FCC CFR47 PART 15 SUBPART C
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: 12U14476-1, Rev B

ISSUE DATE: AUGUST 29, 2012

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

Prepared by
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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	08/03/2012	Added antenna description and actual antenna used Added 40GHz Horn antenna in equipment list Added MPE	T. LEE
B	08/29/12	Revised antenna effective gain from uncorrelated to correlated for 11n HT20 and 11n HT40 modes	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 20, 2012 TO JULY 18, 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

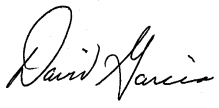
UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and 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
STAFF ENGINEER
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 C63.10-2009, 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 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 peak conducted output power as follows:

2400- 2483.5 MHz Authorized Frequency Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	16.00	39.83
2412 - 2462	802.11g	14.11	25.76
2413 - 2462	802.11g Beam Forming	16.99	50.00
2412 - 2462	802.11n HT20	15.50	35.48
2422 - 2452	802.11n HT40	23.34	215.77

5725- 5850 Authorized Frequency Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745-5825	802.11a	15.82	38.19
5745-5825	802.11a Beam Forming	18.79	75.68
5745-5825	802.11n HT20	17.06	50.82
5745-5825	802.11n HT40	25.16	328.10

5.3. 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, manufactured by Laird, Part # MAF95295 was used for testing.

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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)

5.4. SOFTWARE AND FIRMWARE

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

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

802.11b mode: 11 Mbps
802.11g mode: 6 Mbps
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

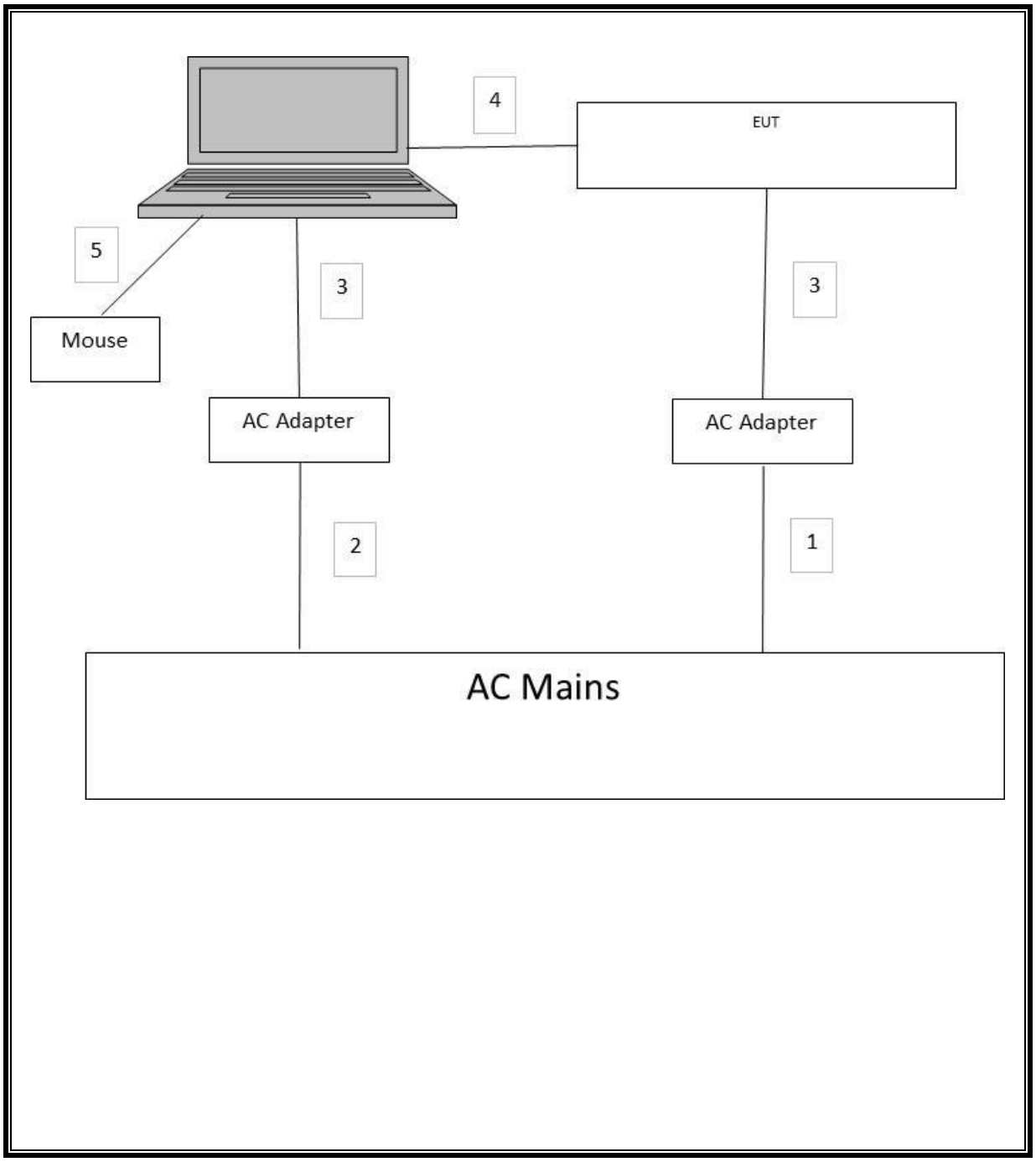
I/O CABLES

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. ANTENNA PORT TEST RESULTS

8.1. 802.11b MODE IN THE 2.4 GHz BAND

8.1.1. 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.

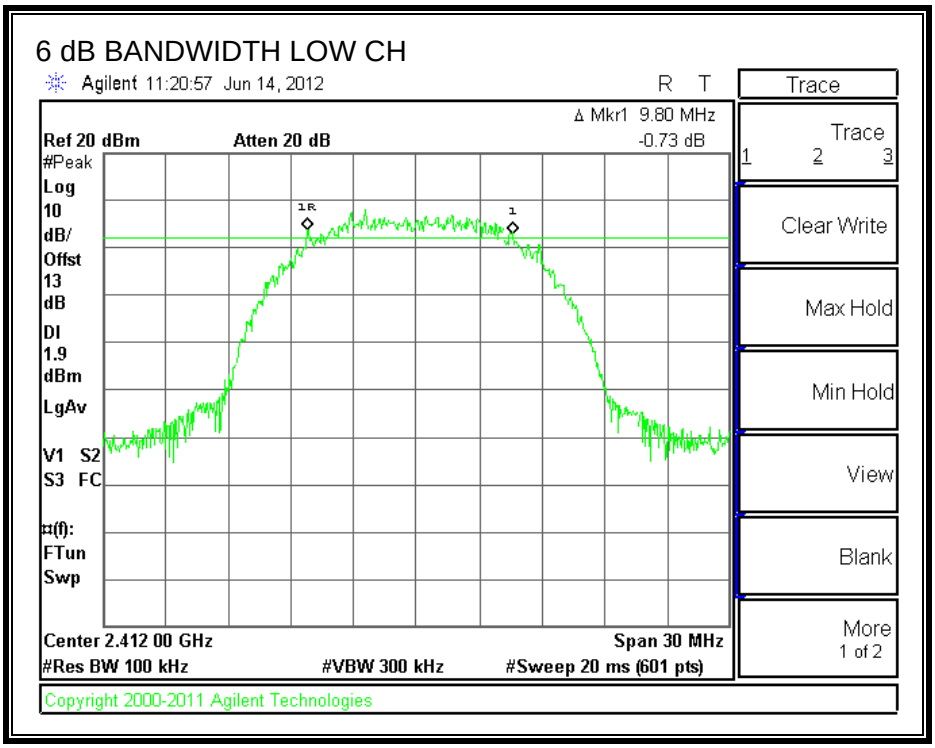
TEST PROCEDURE

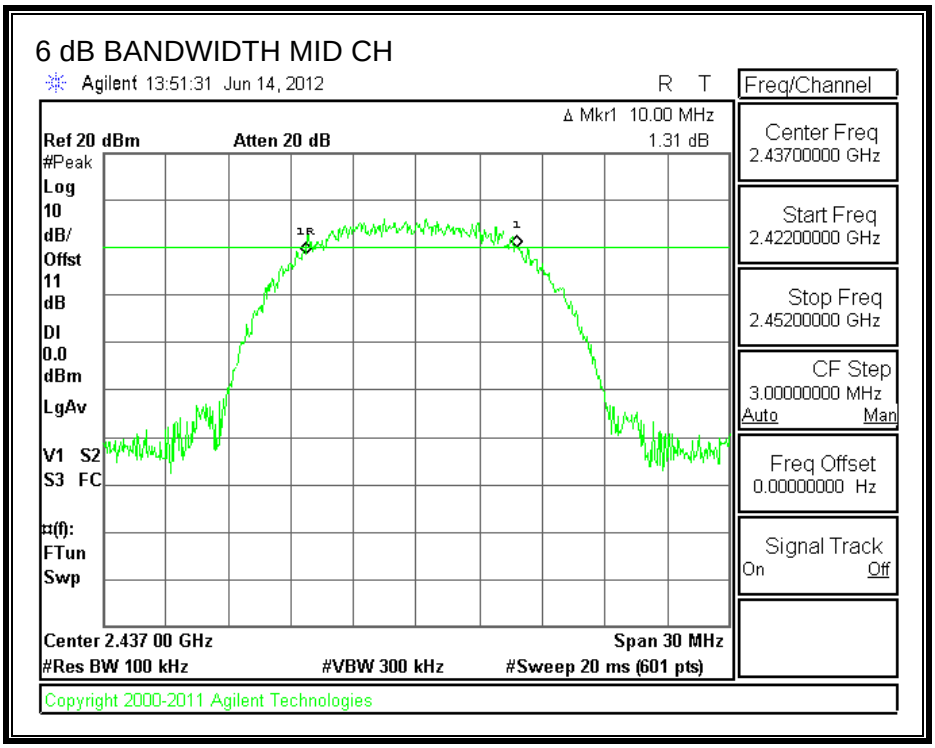
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

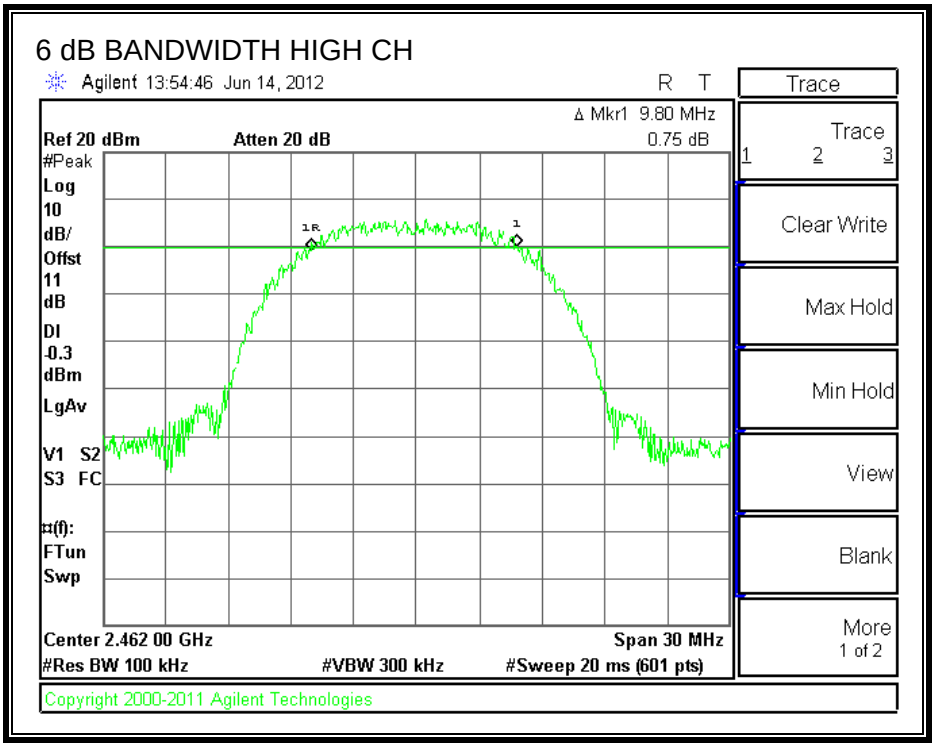
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.8000	0.5
Middle	2437	10.0000	0.5
High	2462	9.8000	0.5

6 dB BANDWIDTH







8.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

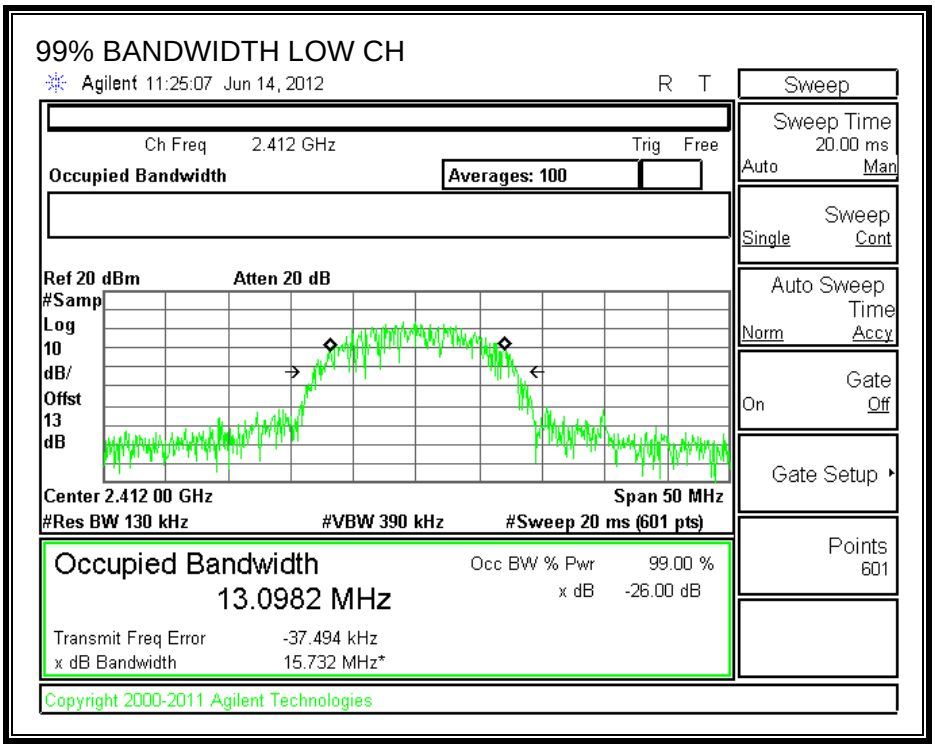
TEST PROCEDURE

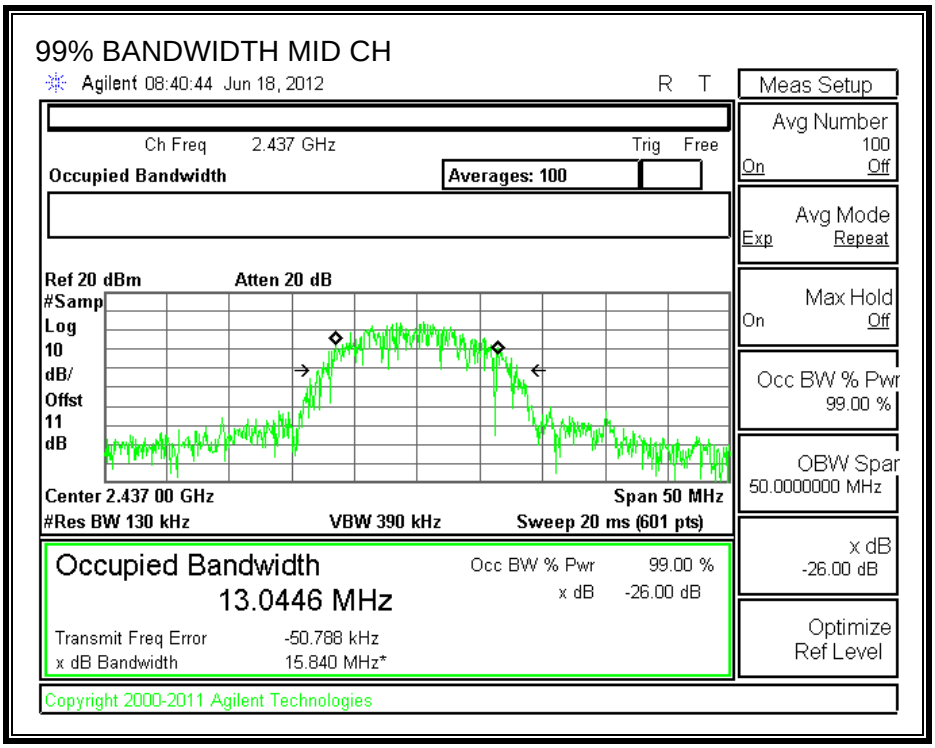
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

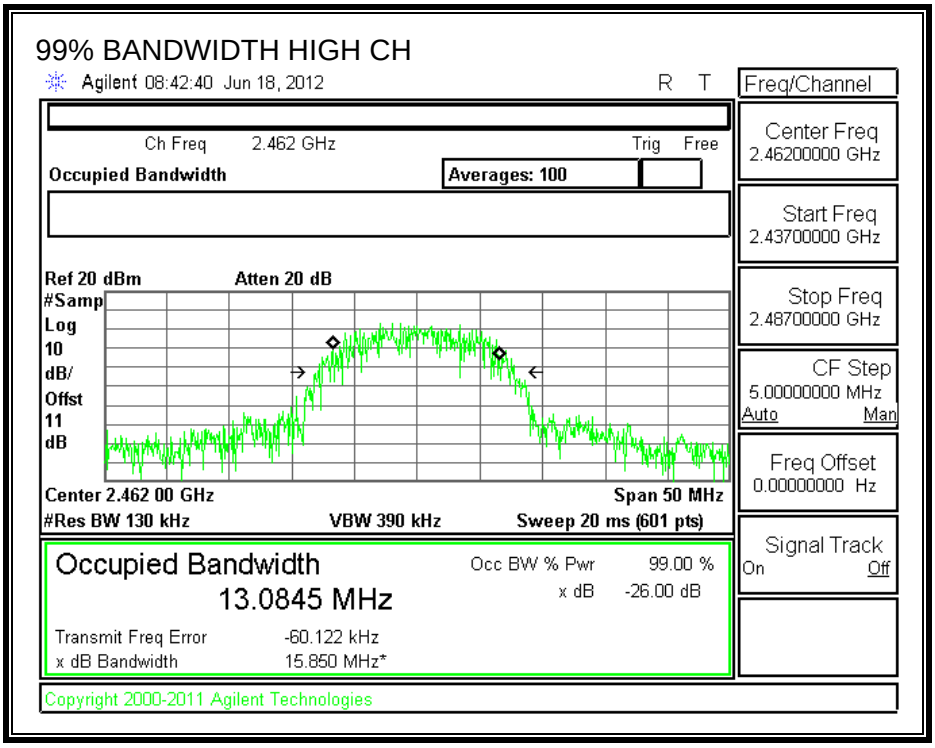
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.0982
Middle	2437	13.0446
High	2462	13.0845

99% BANDWIDTH







8.1.3. 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.

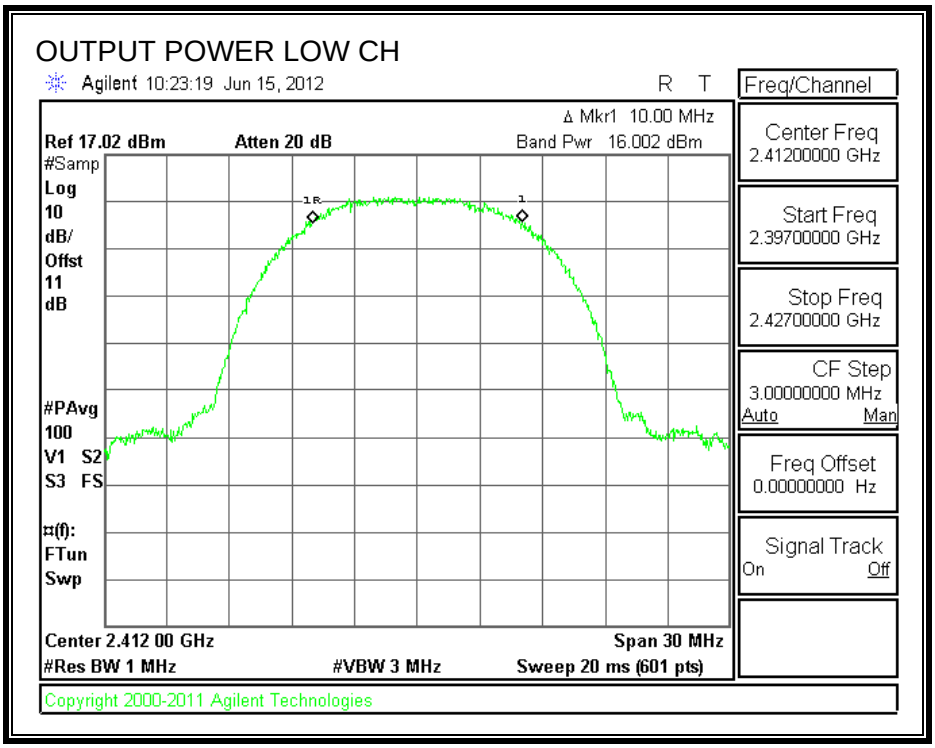
TEST PROCEDURE

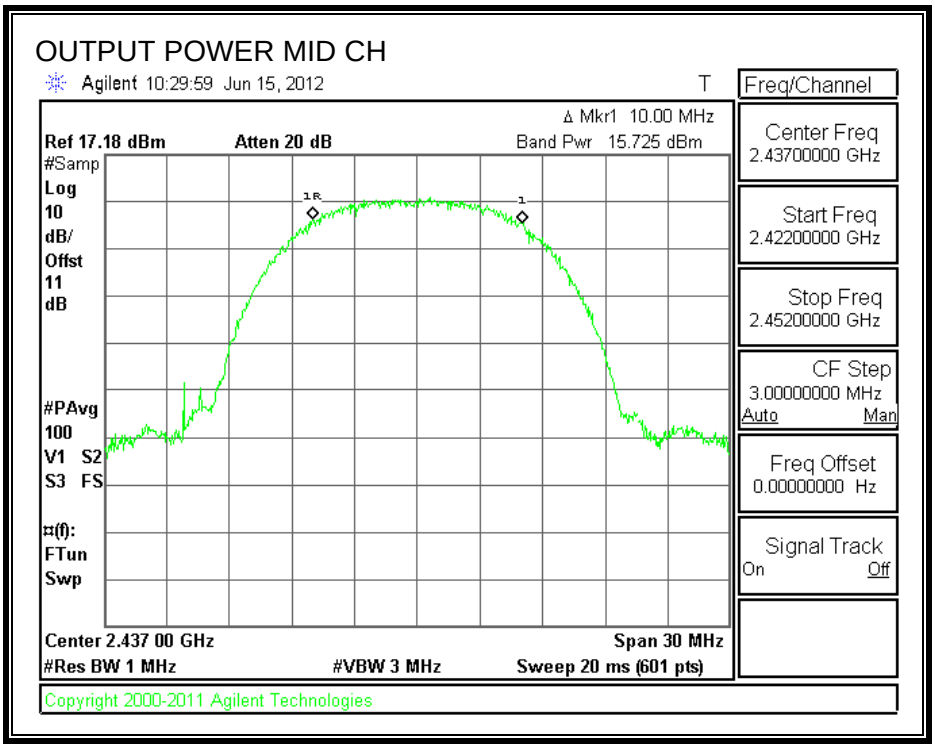
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

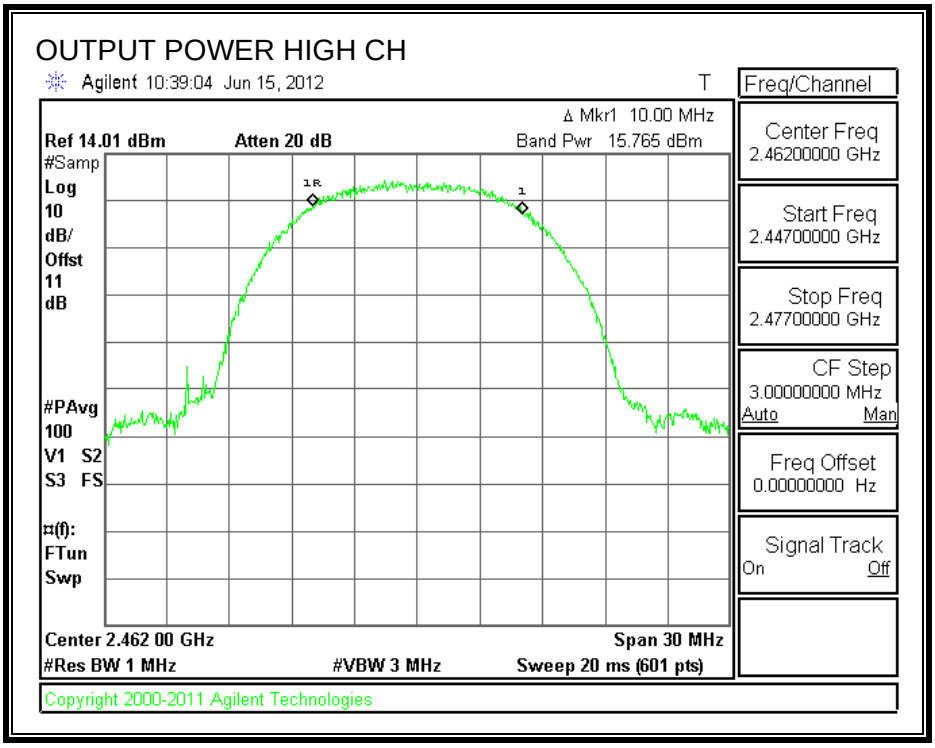
RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2412	16.002	30	-13.998
Middle	2437	15.725	30	-14.275
High	2462	15.765	30	-14.235

OUTPUT POWER







8.1.4. 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 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2412	16.19
Middle	2437	15.96
High	2462	16.02

8.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

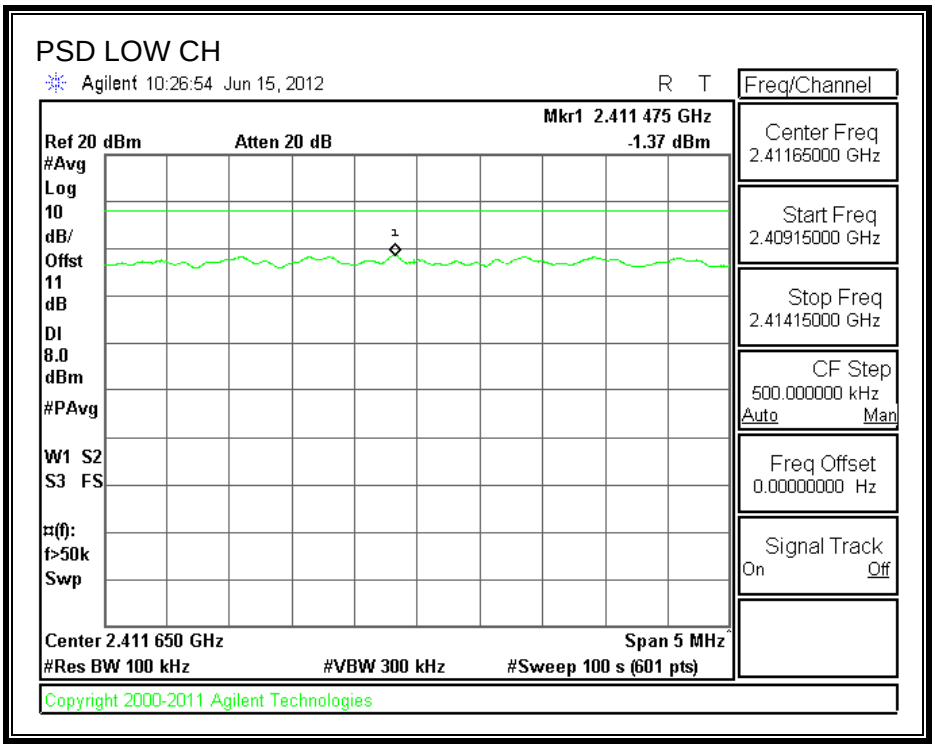
TEST PROCEDURE

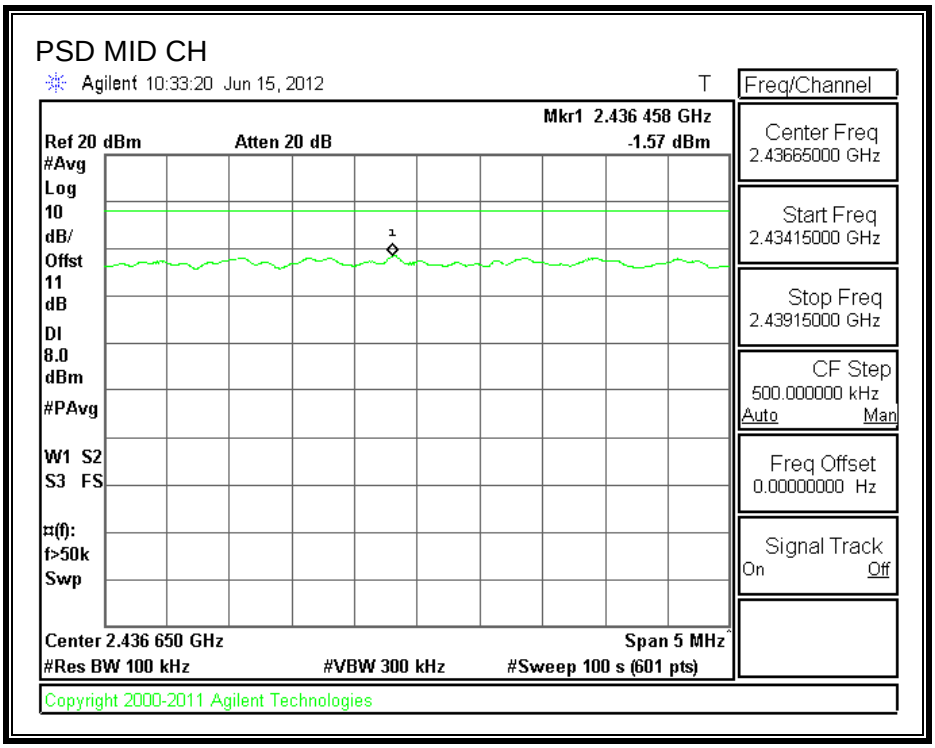
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

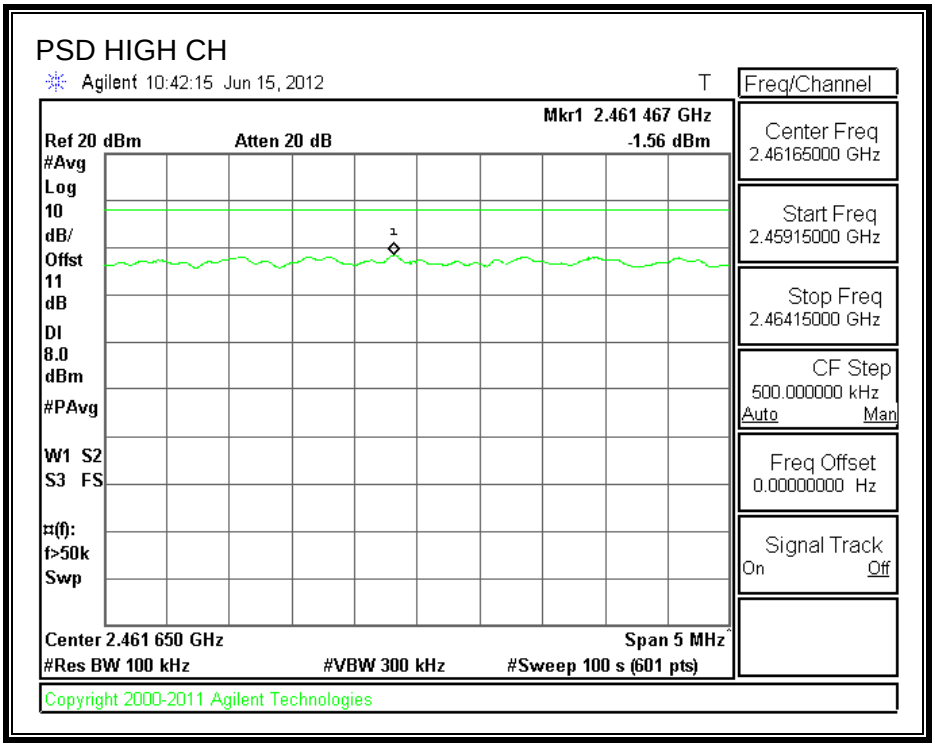
RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-1.37	8	-9.37
Middle	2437	-1.57	8	-9.57
High	2462	-1.56	8	-9.56

POWER SPECTRAL DENSITY







8.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

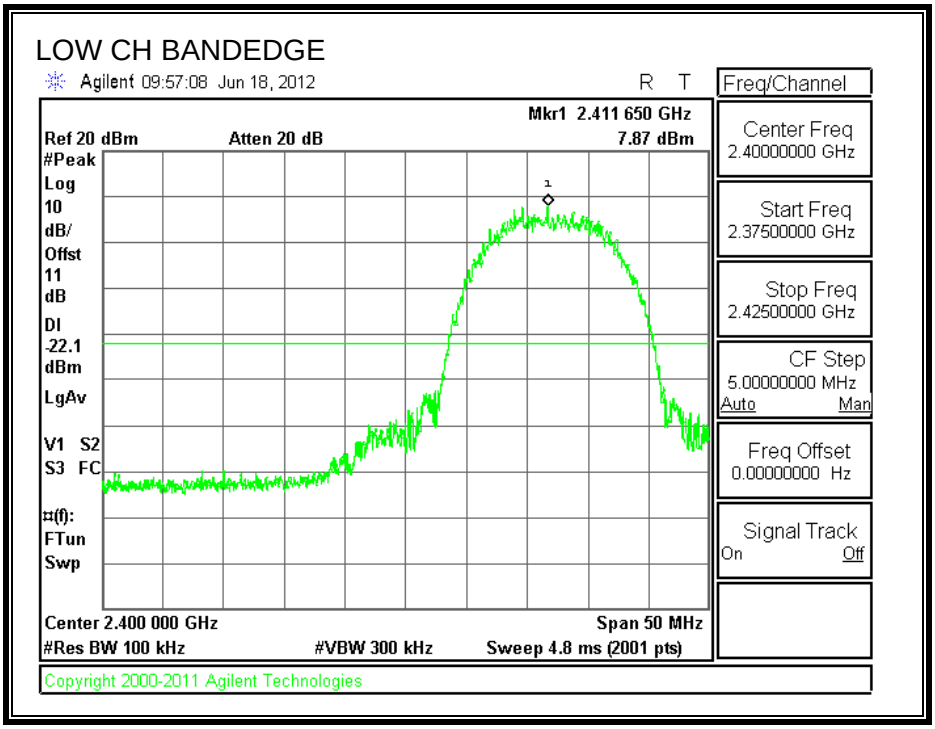
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

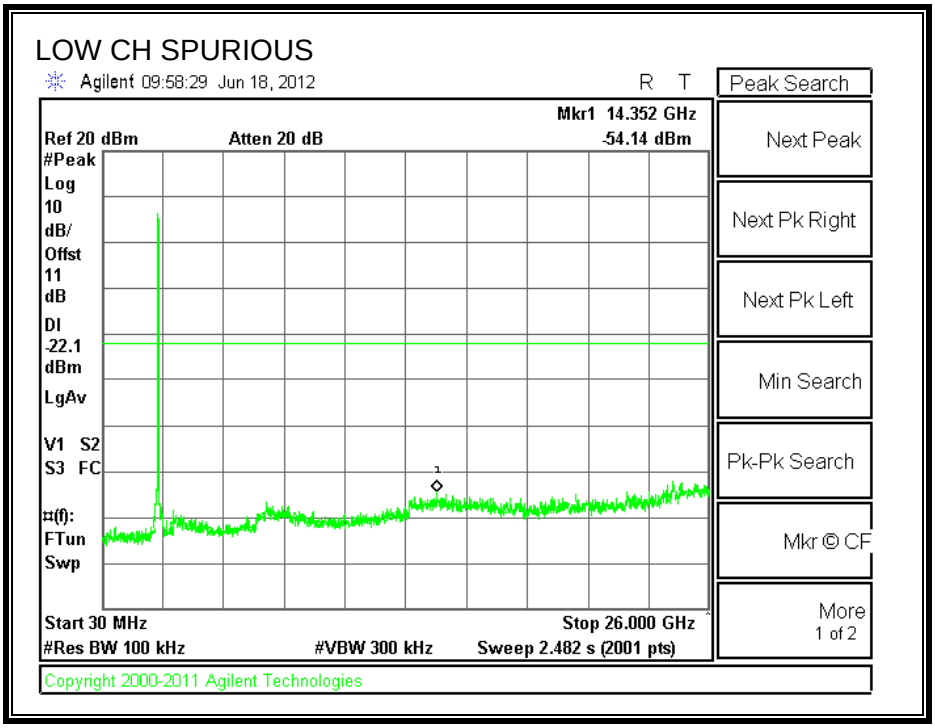
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

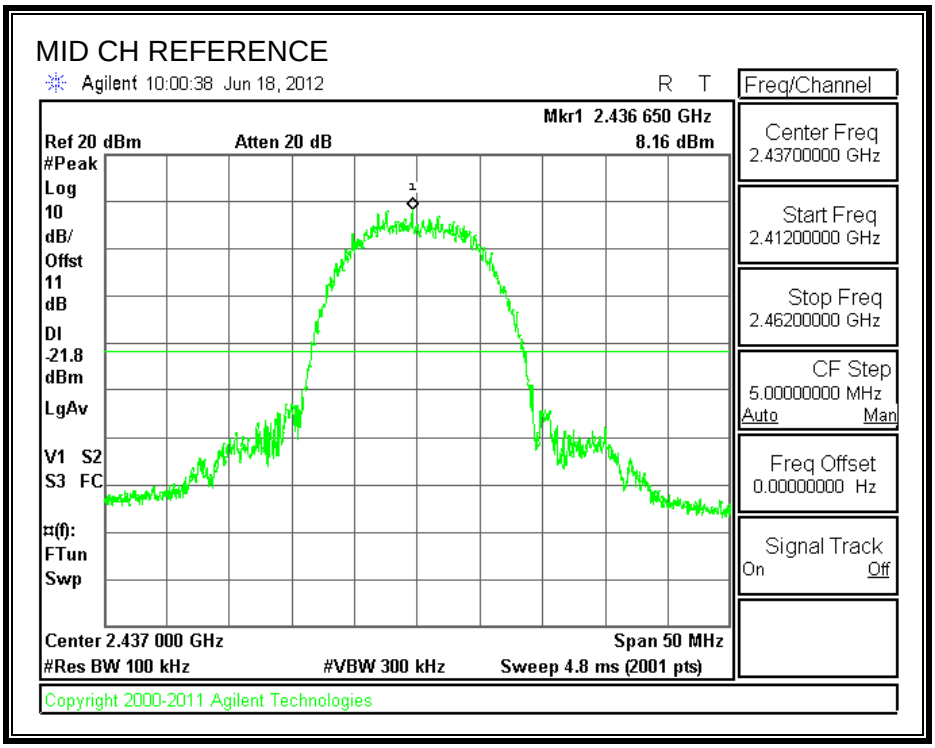
RESULTS

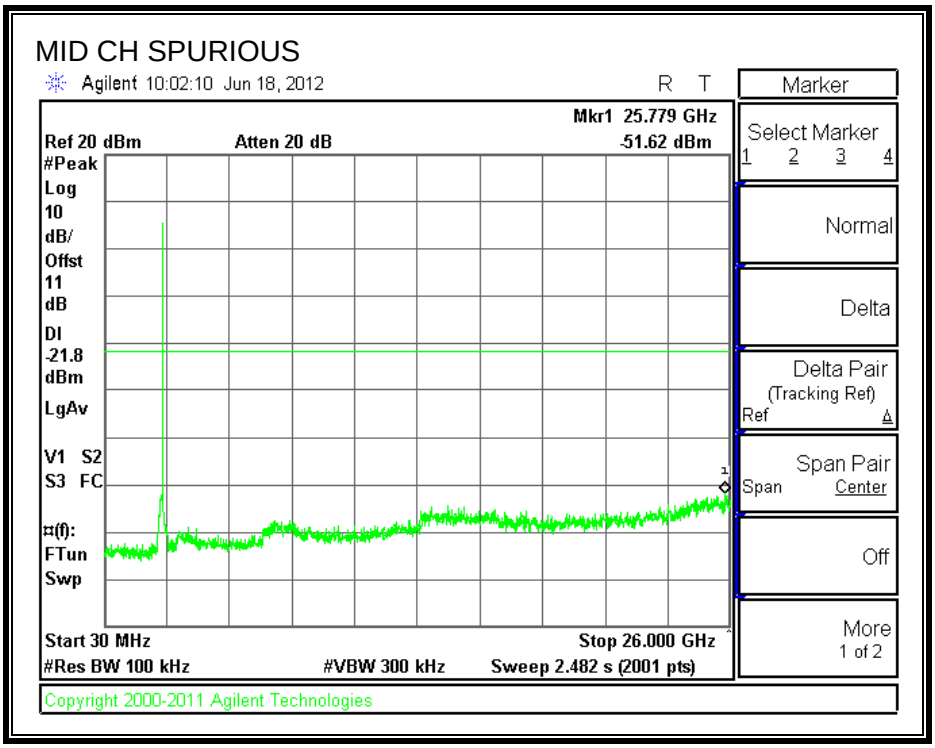
SPURIOUS EMISSIONS, LOW CHANNEL



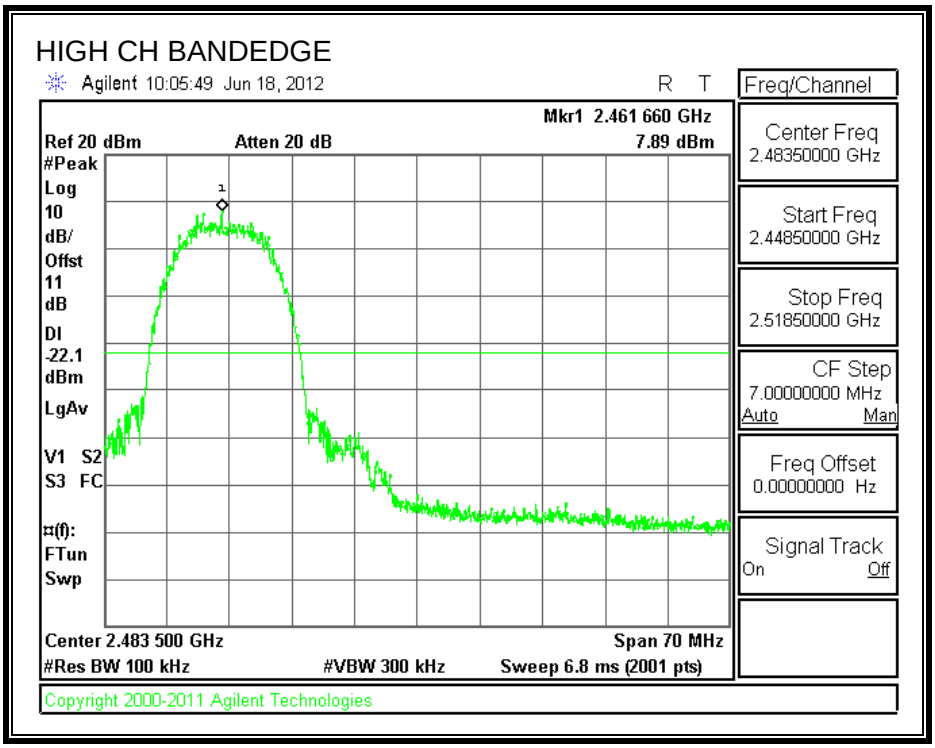


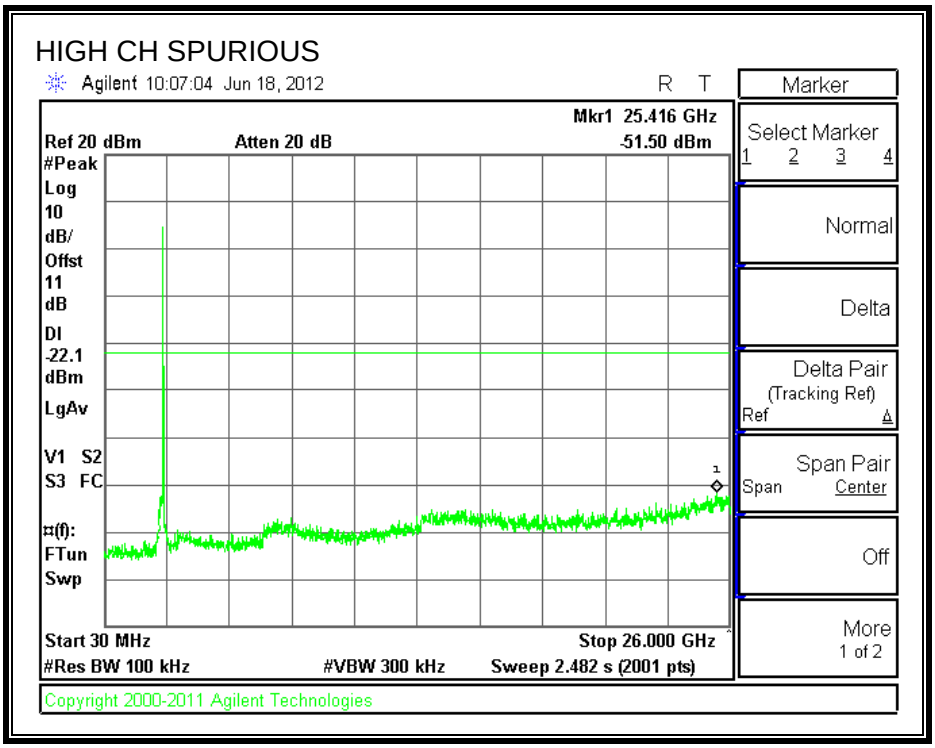
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





8.2. 802.11g MODE IN THE 2.4 GHz BAND

8.2.1. 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.

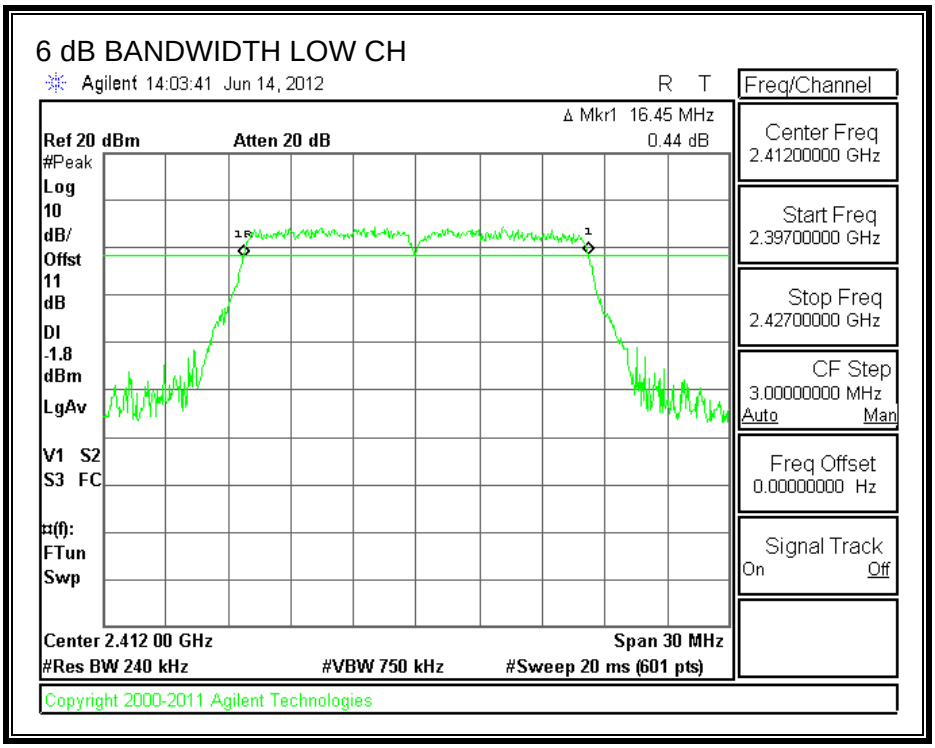
TEST PROCEDURE

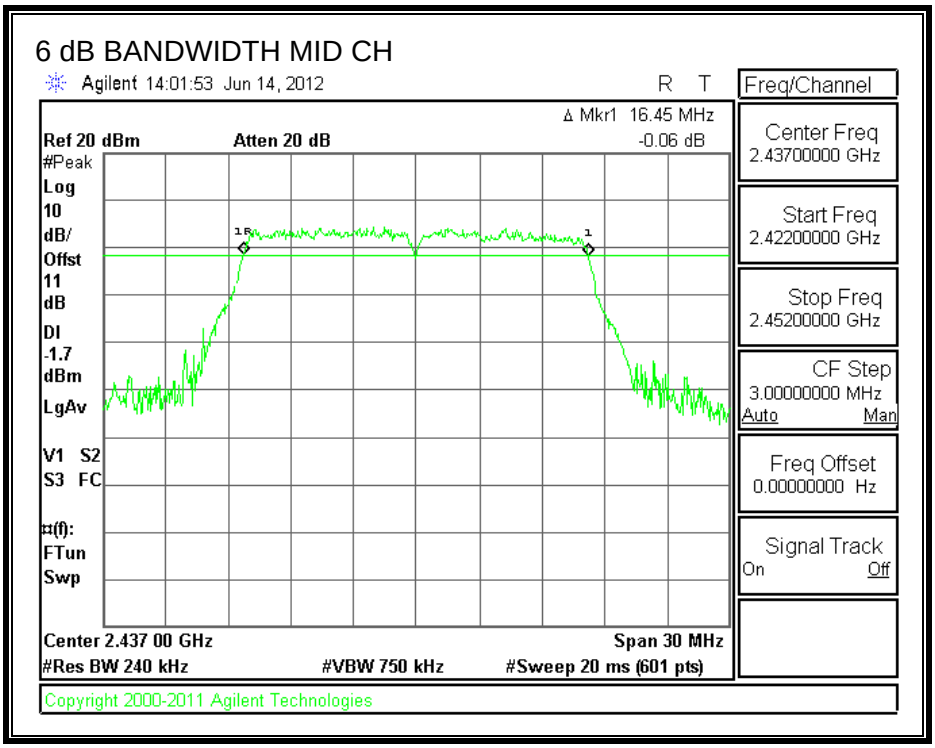
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

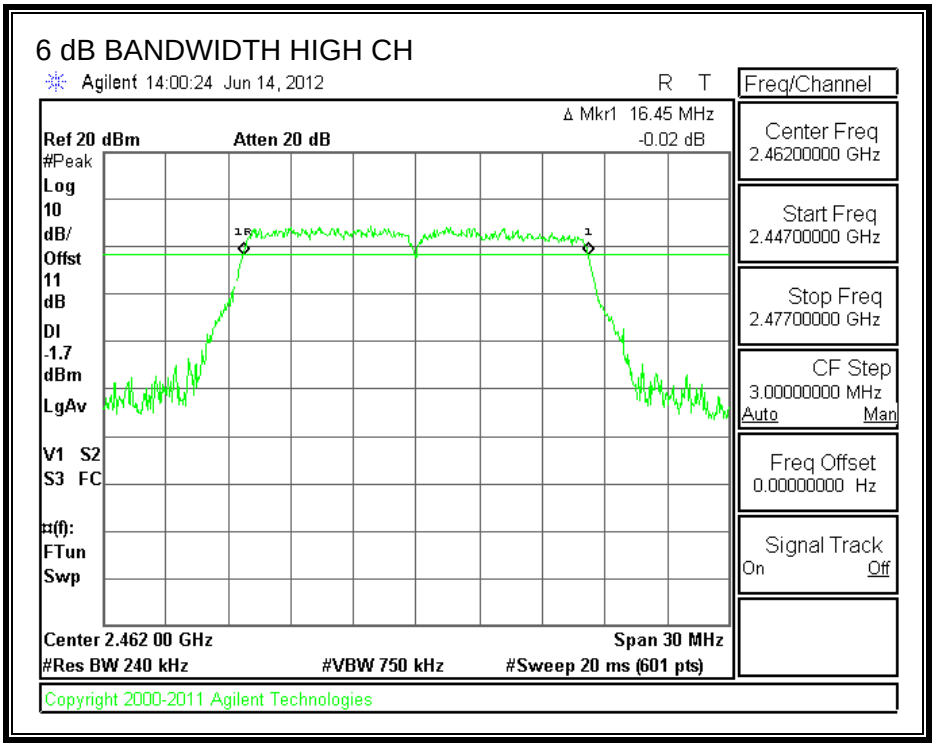
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.4500	0.5
Middle	2437	16.4500	0.5
High	2462	16.4500	0.5

6 dB BANDWIDTH







8.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

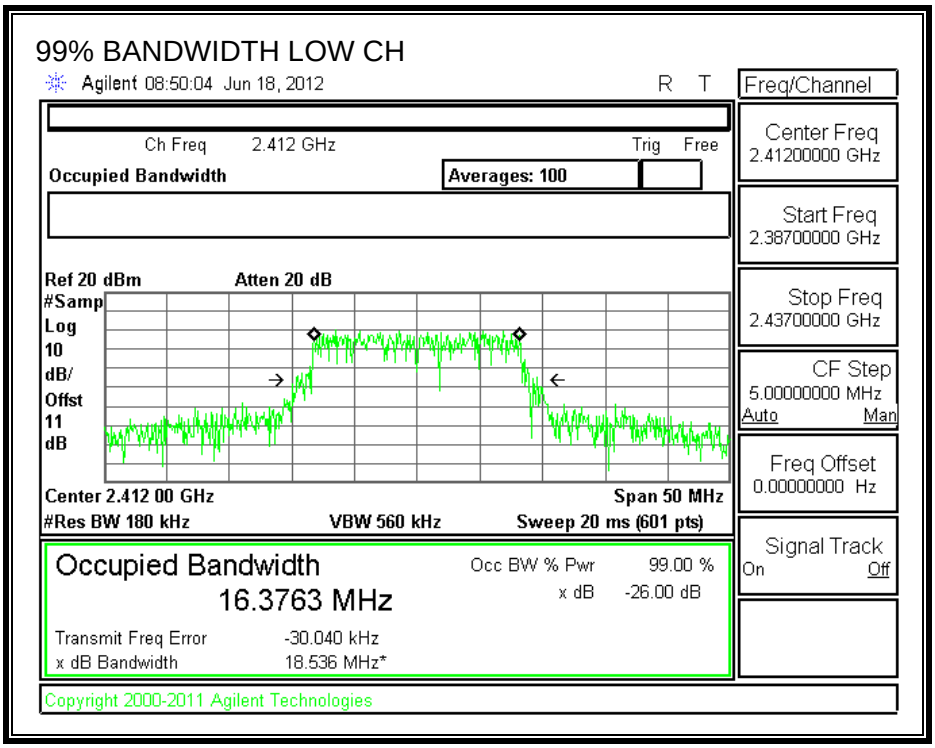
TEST PROCEDURE

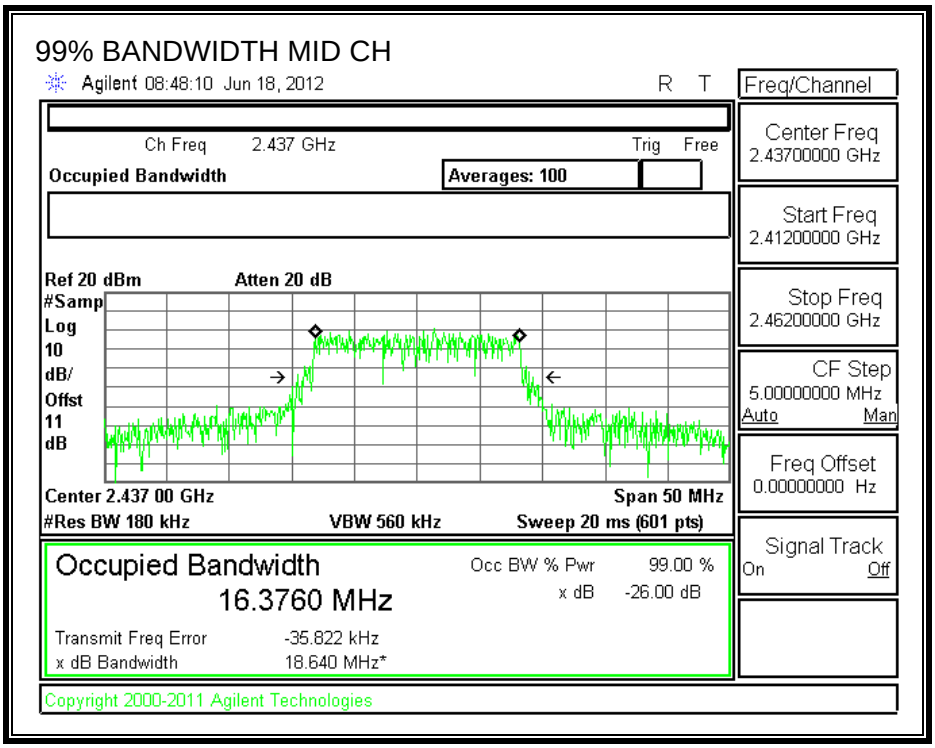
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

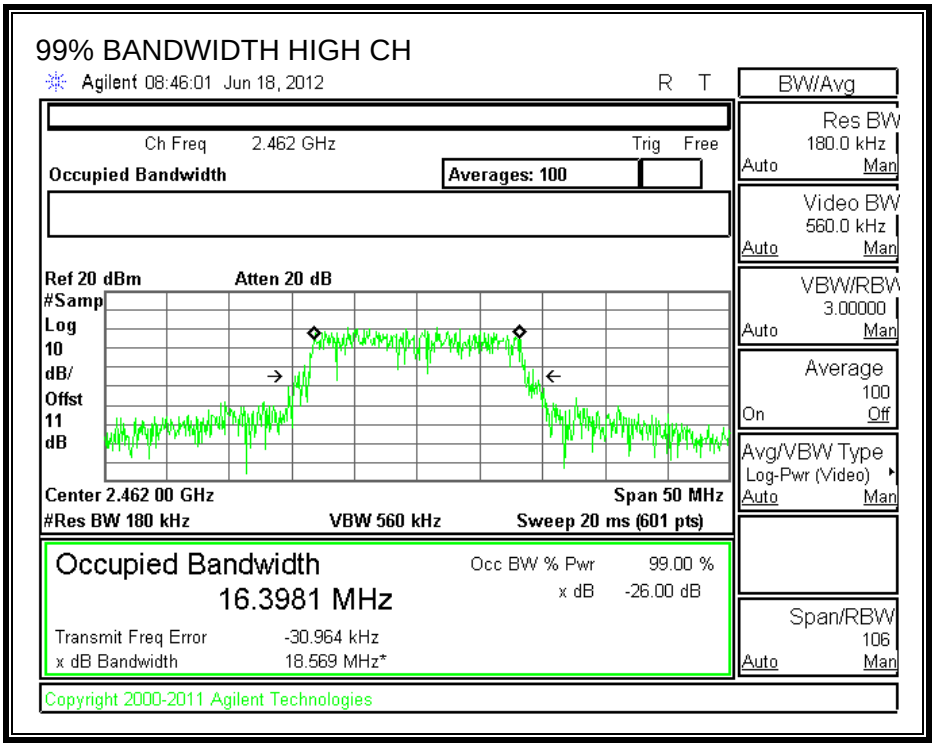
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3763
Middle	2437	16.376
High	2462	16.3981

99% BANDWIDTH







8.2.3. 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.

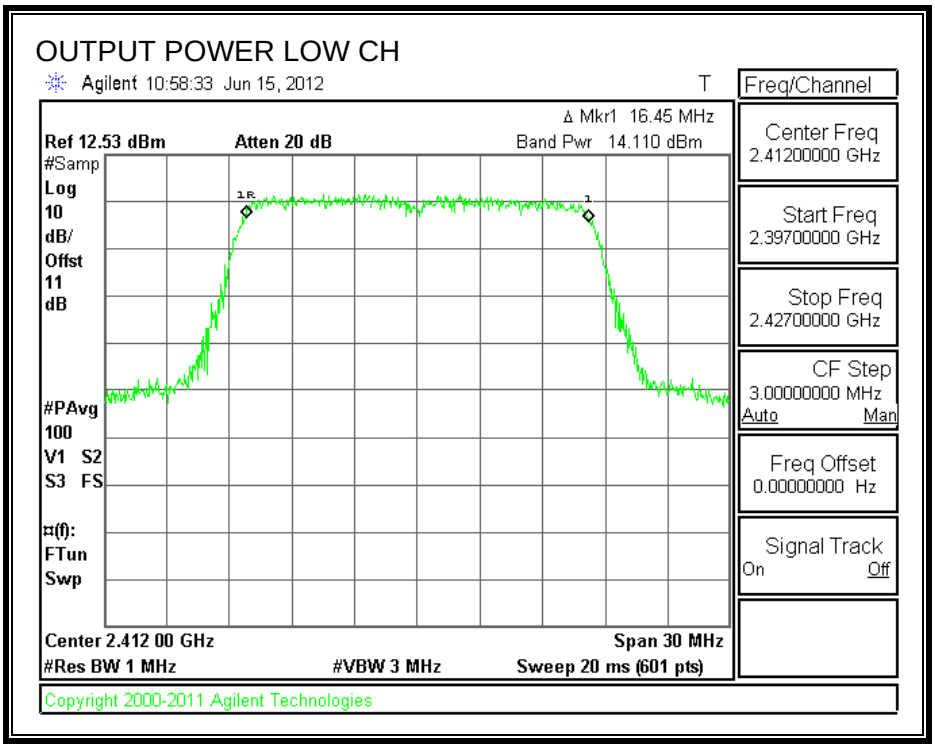
TEST PROCEDURE

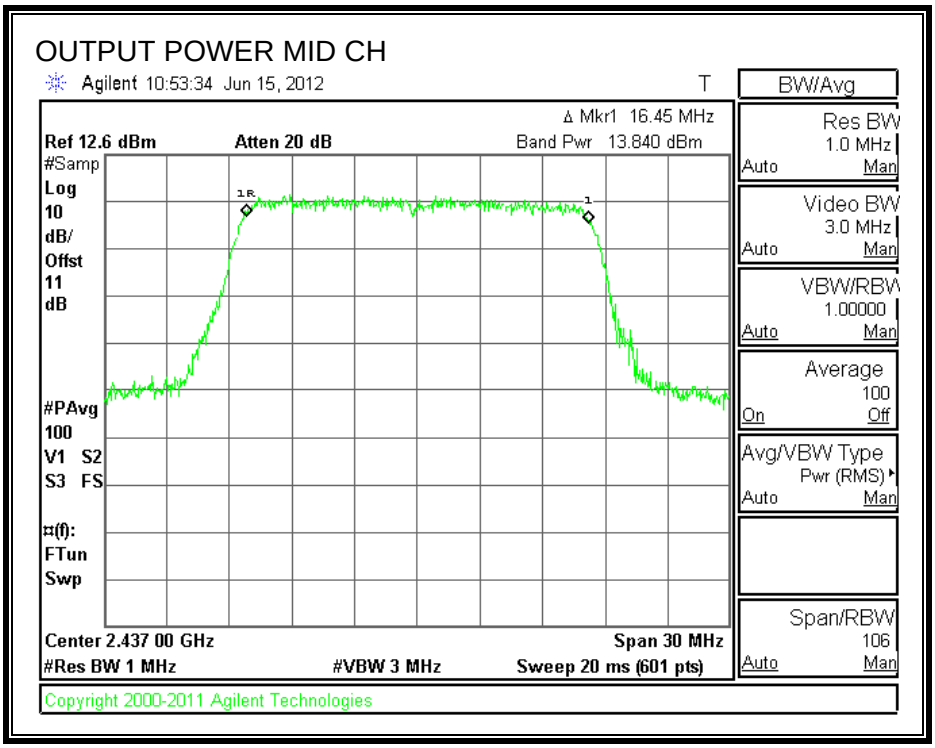
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

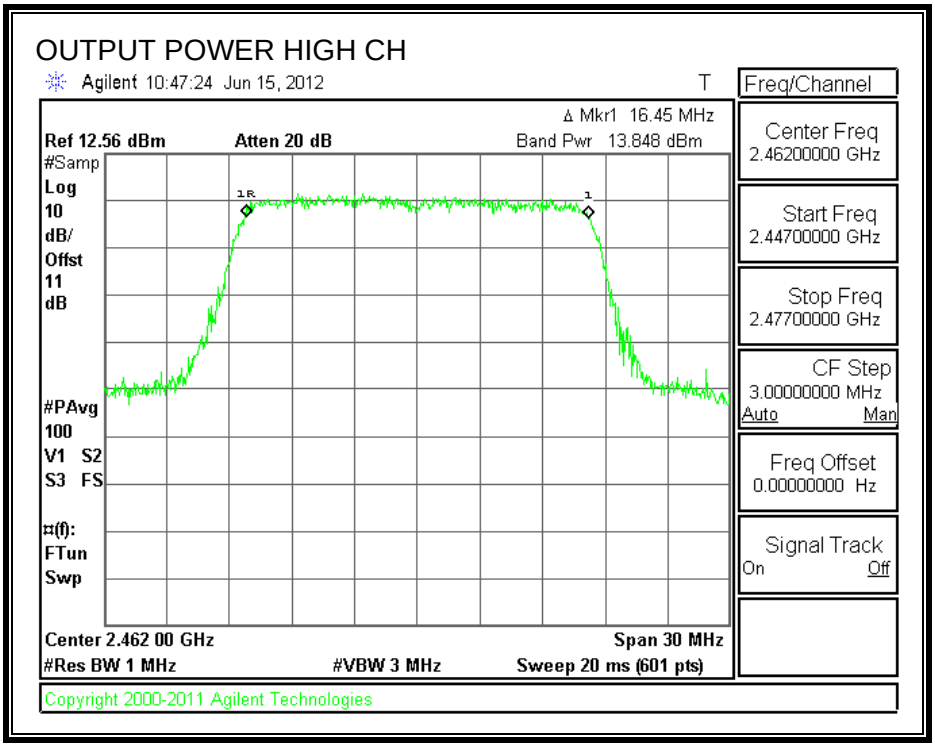
RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	14.11	0	14.11	30	-15.89
Middle	2437	13.84	0	13.84	30	-16.16
High	2462	13.848	0	13.85	30	-16.15

OUTPUT POWER







8.2.4. 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 11 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	13.98
Middle	2437	13.95
High	2462	13.84

8.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

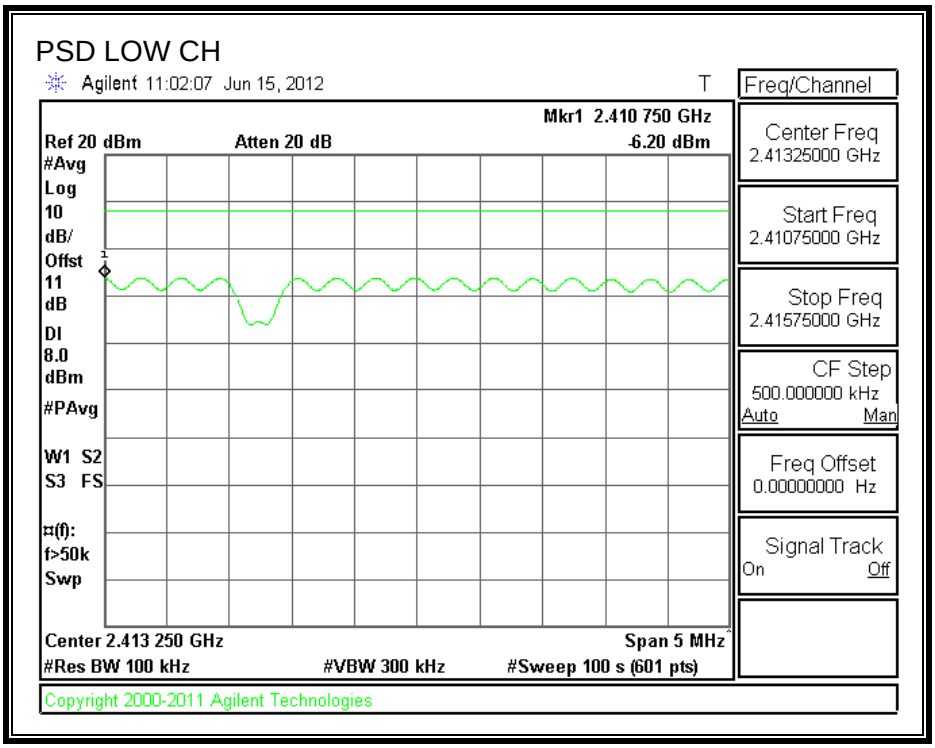
TEST PROCEDURE

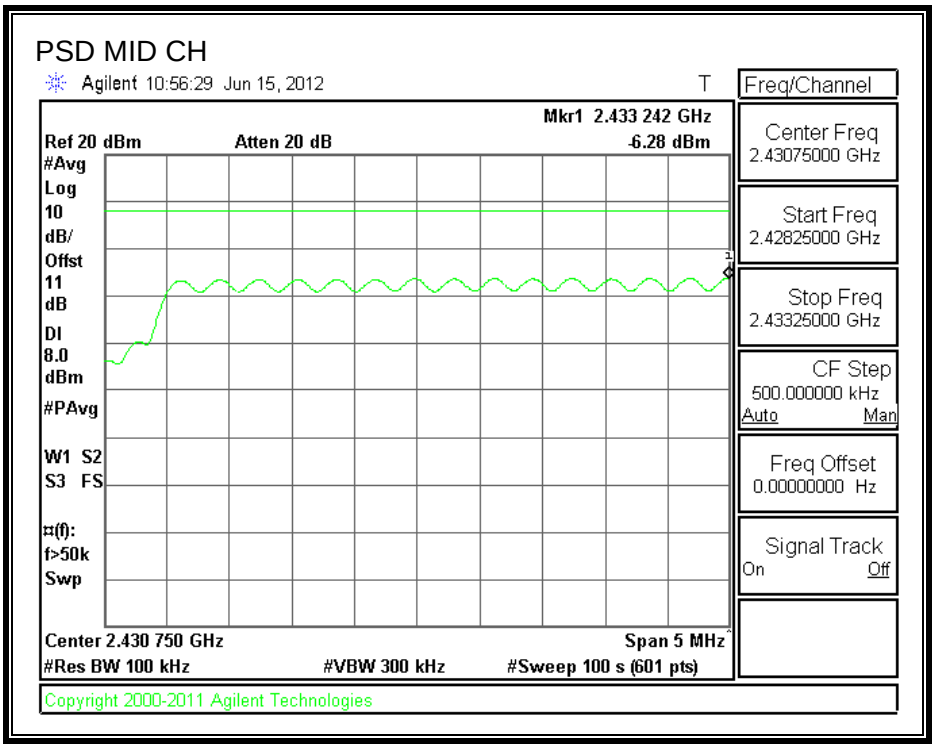
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

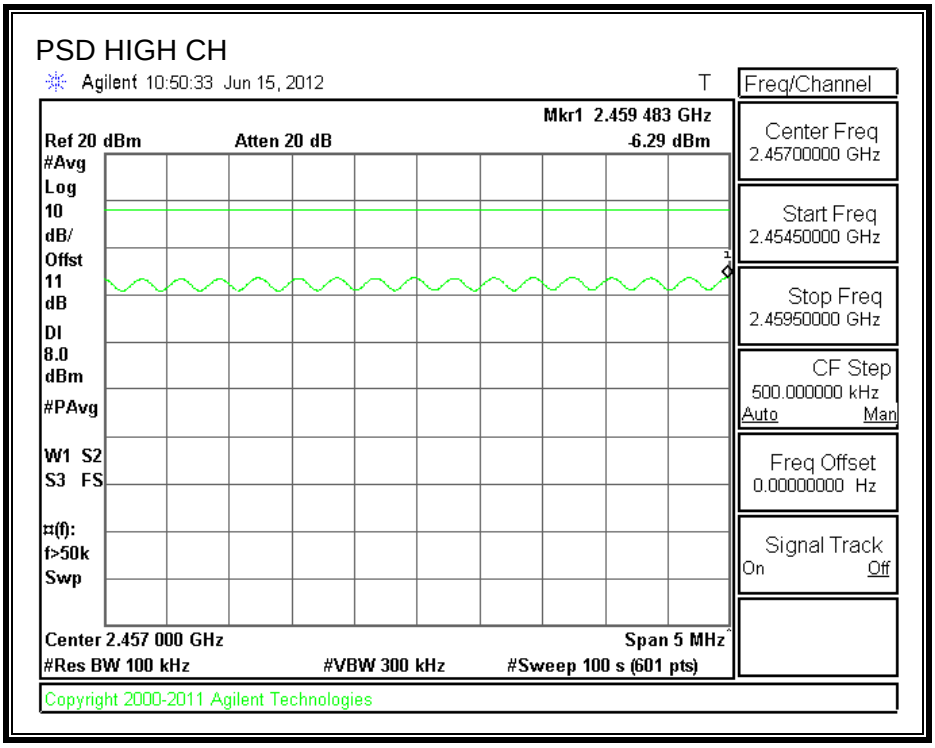
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.20	8	-14.20
Middle	2437	-6.28	8	-14.28
High	2462	-6.29	8	-14.29

POWER SPECTRAL DENSITY







8.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

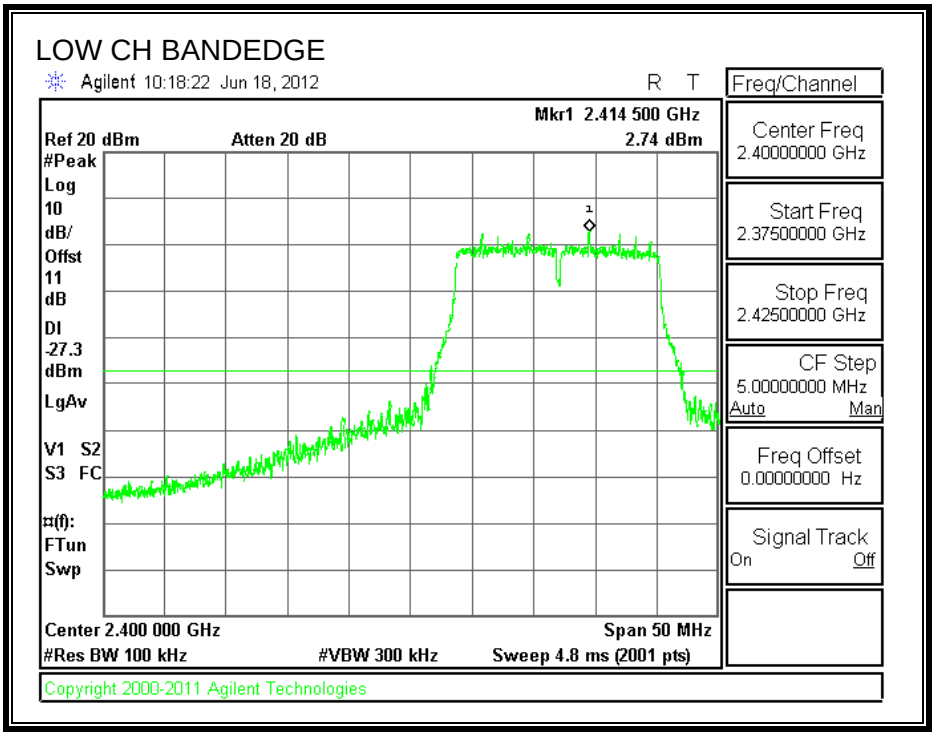
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

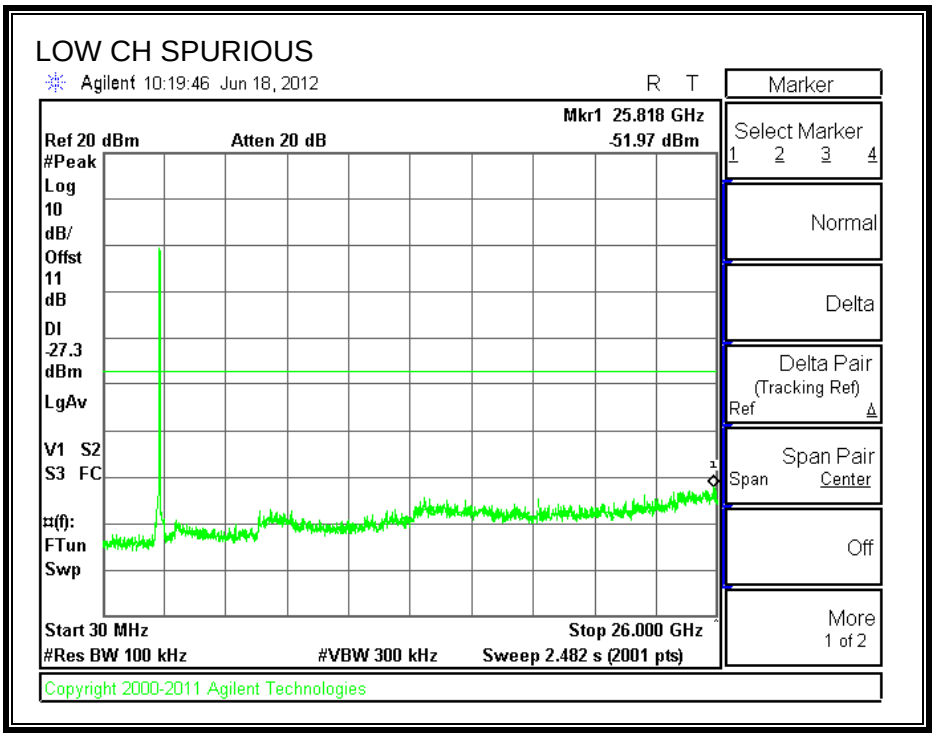
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

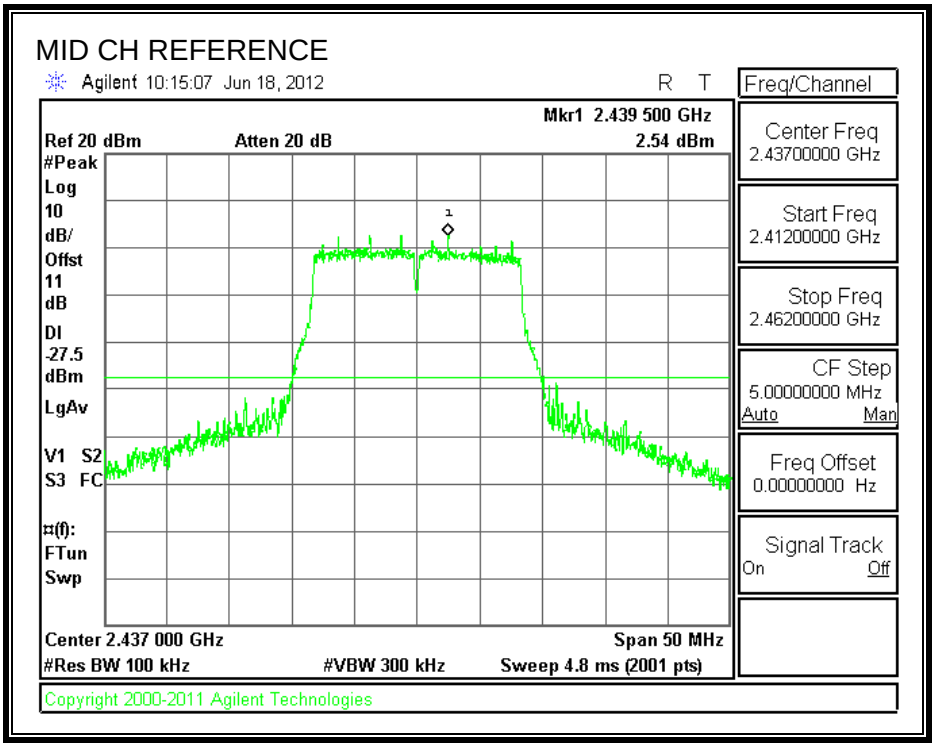
RESULTS

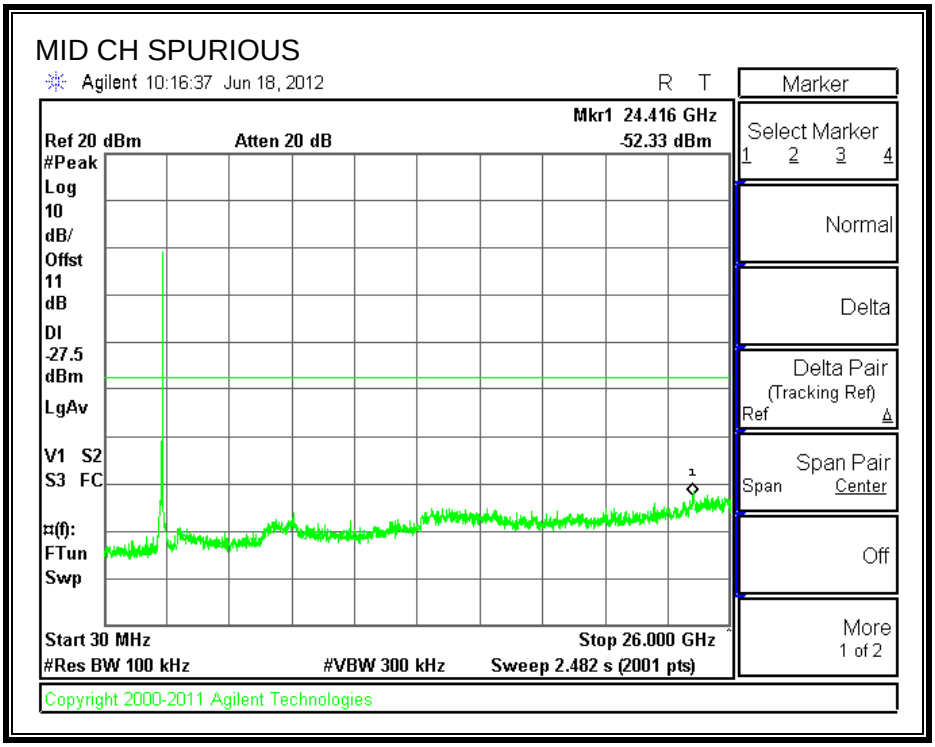
SPURIOUS EMISSIONS, LOW CHANNEL



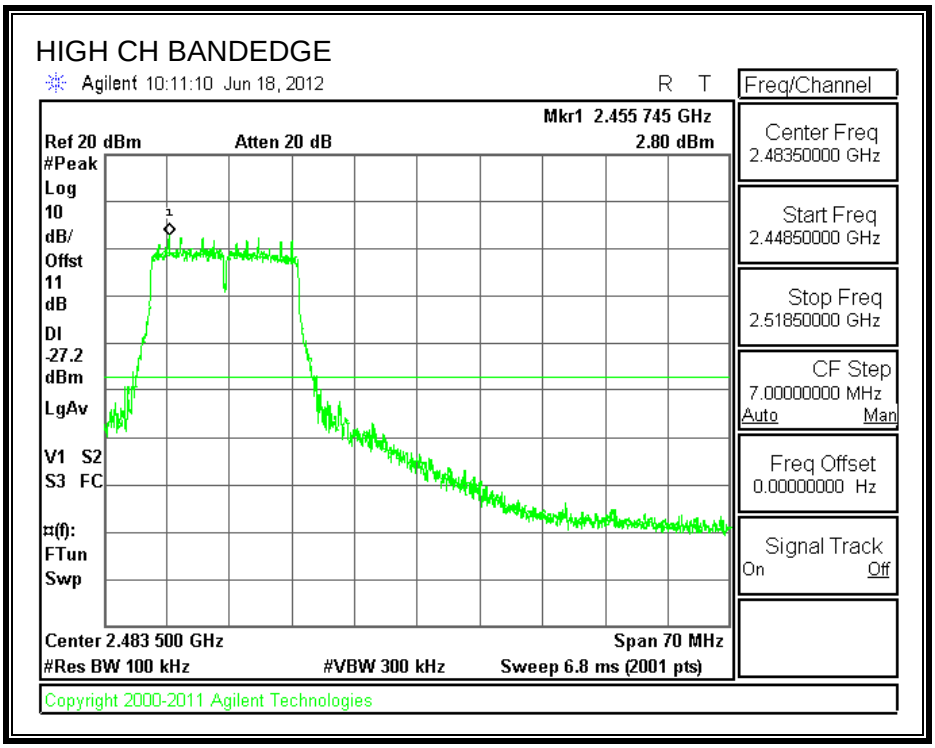


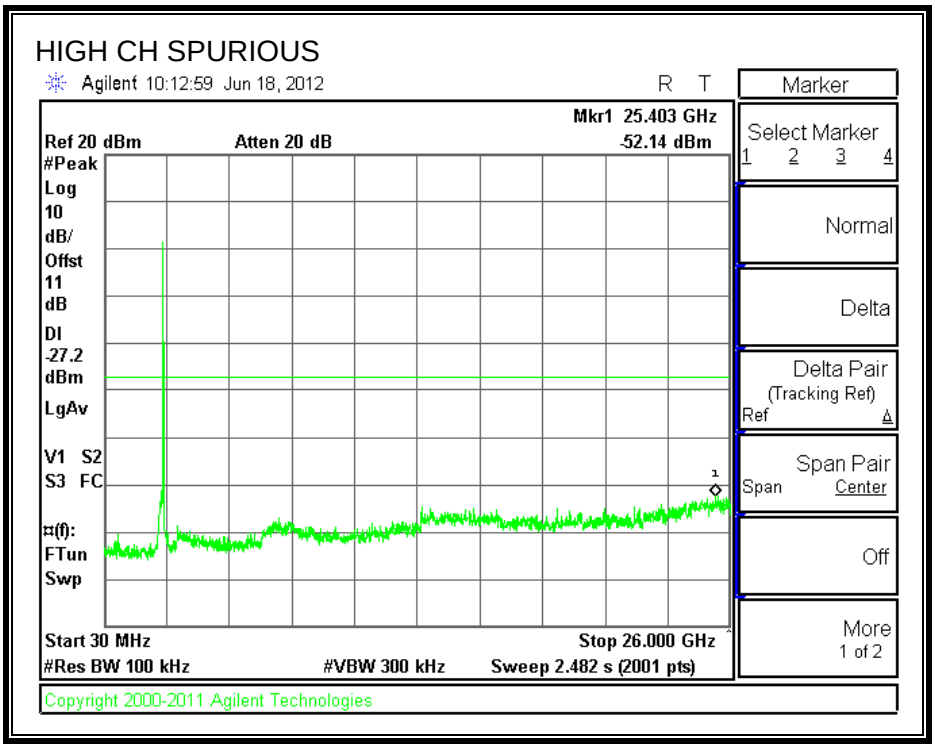
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





8.3. 802.11g DUAL CHAIN BEAM FORMING MODE IN THE 2.4 GHz BAND

8.3.1. 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.

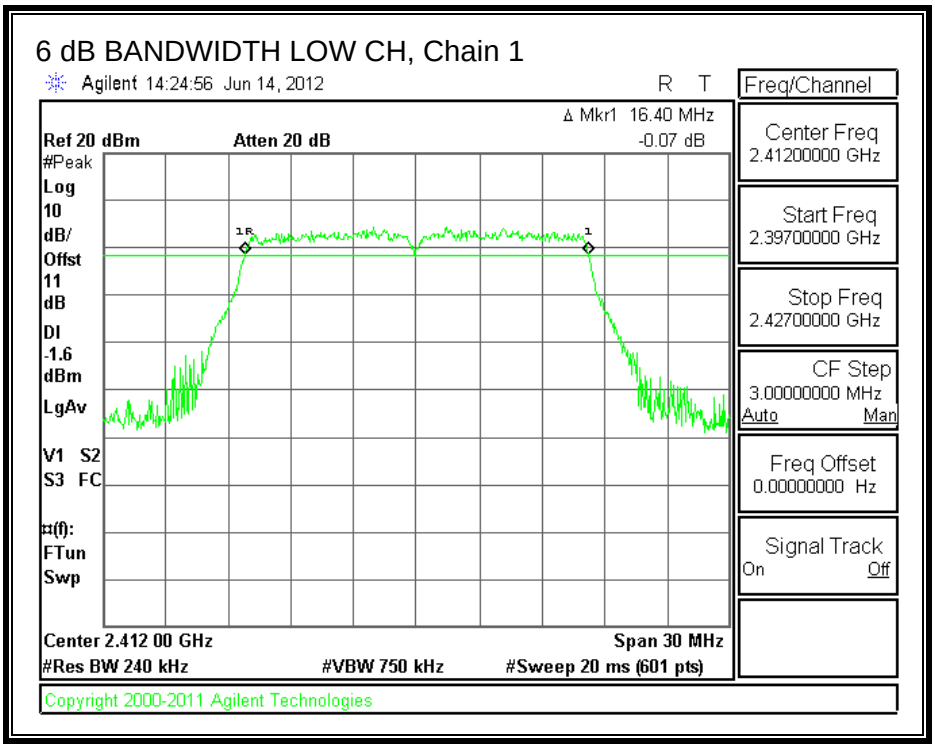
TEST PROCEDURE

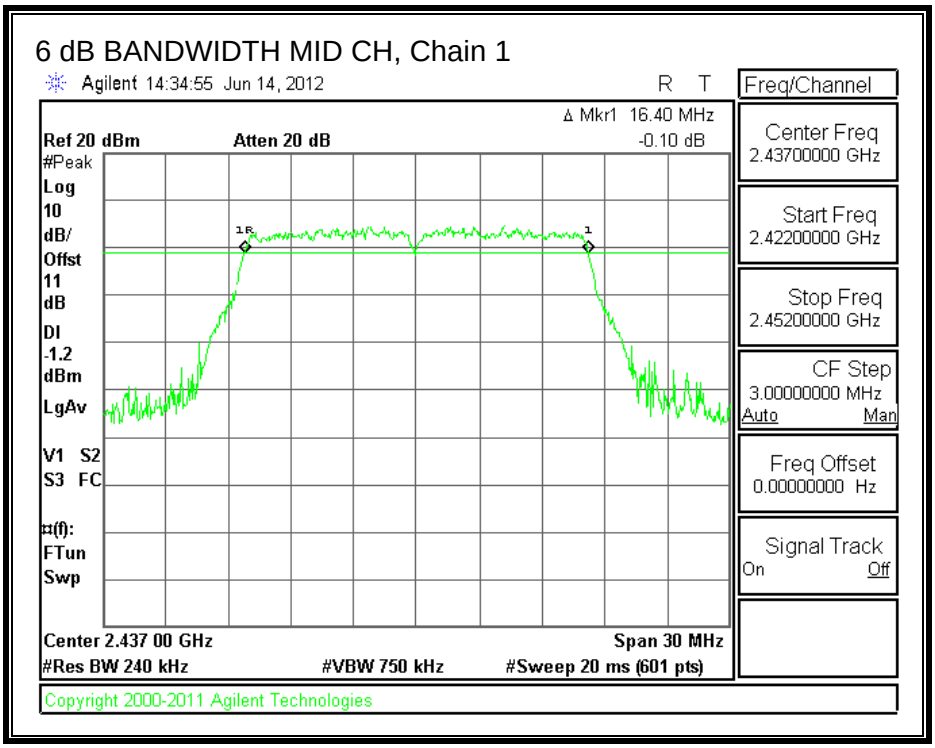
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

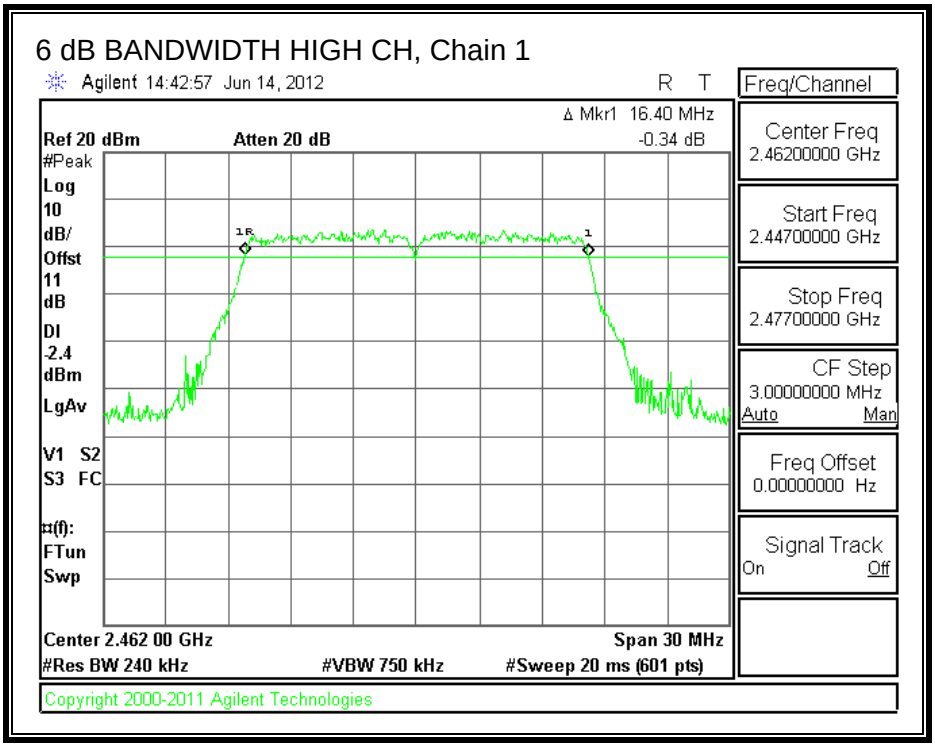
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB Bandwidth (MHz)	Chain 2 6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.4000	16.4500	0.5
Middle	2437	16.4000	16.4500	0.5
High	2462	16.4000	16.4000	0.5

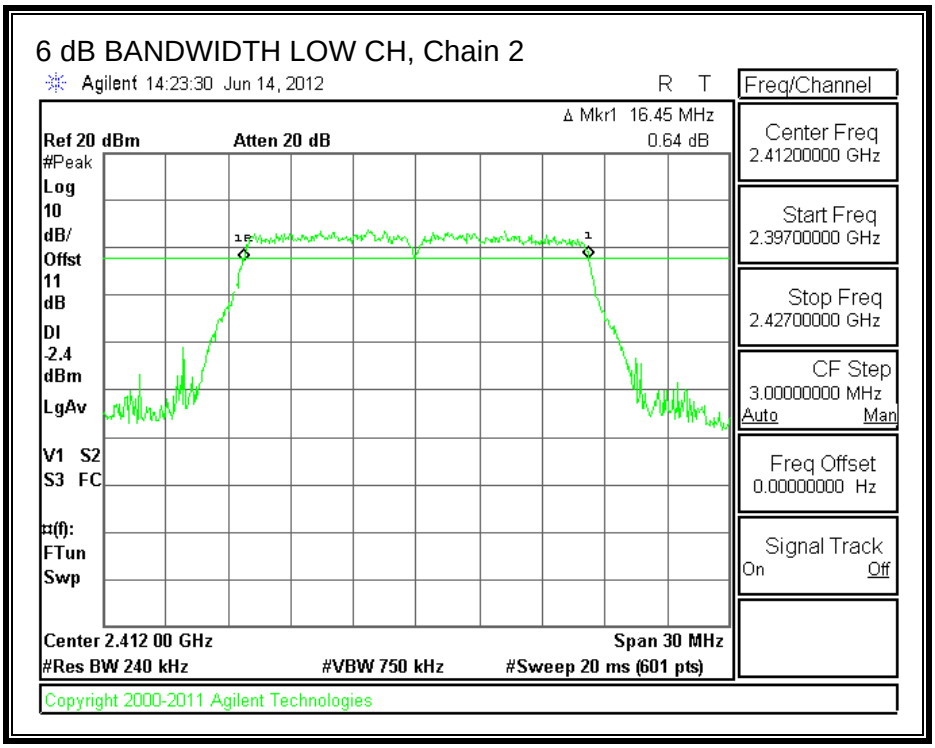
6 dB BANDWIDTH, Chain 1

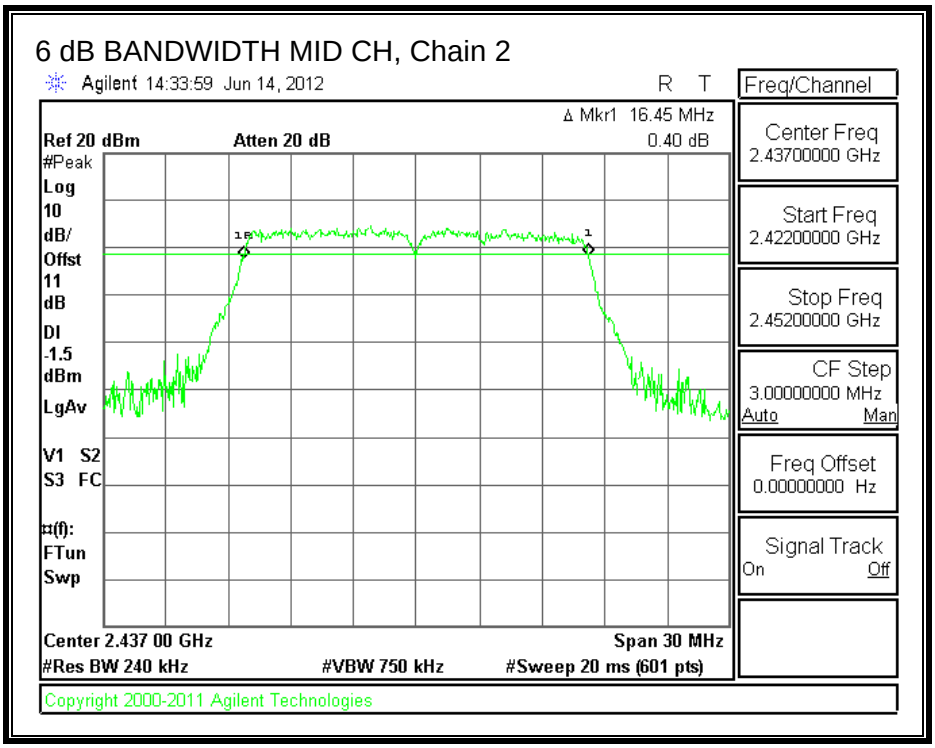


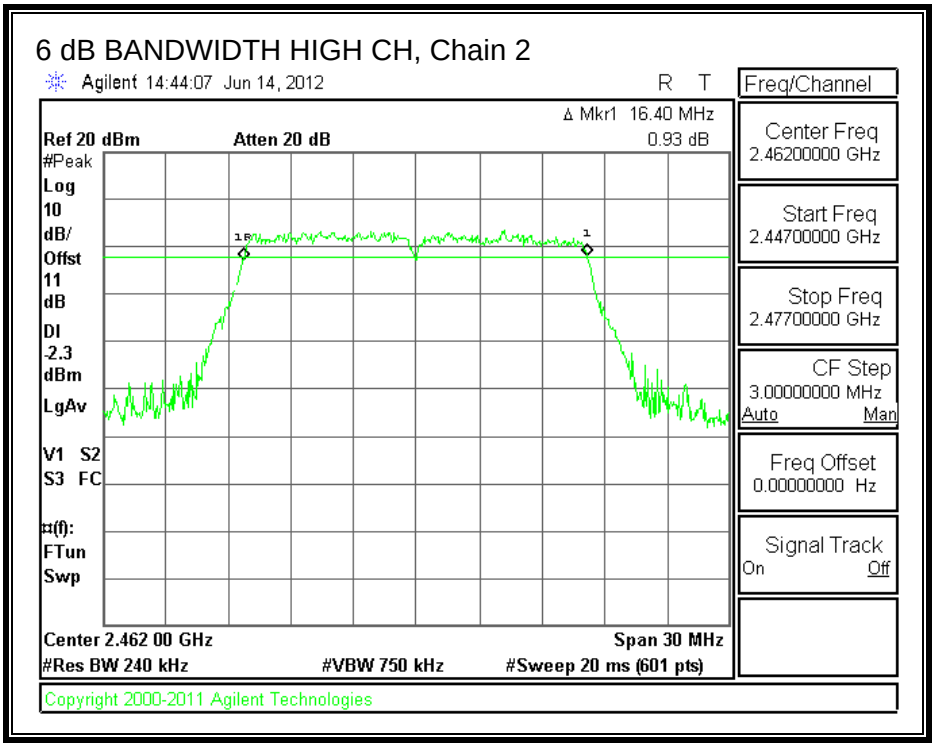




6 dB BANDWIDTH, Chain 2







8.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

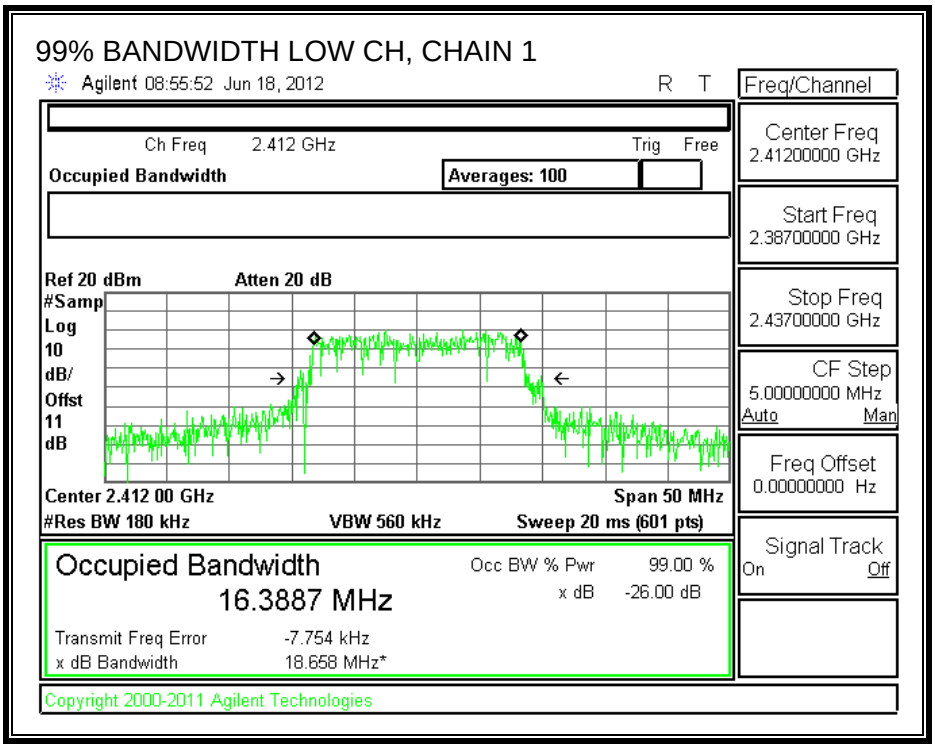
TEST PROCEDURE

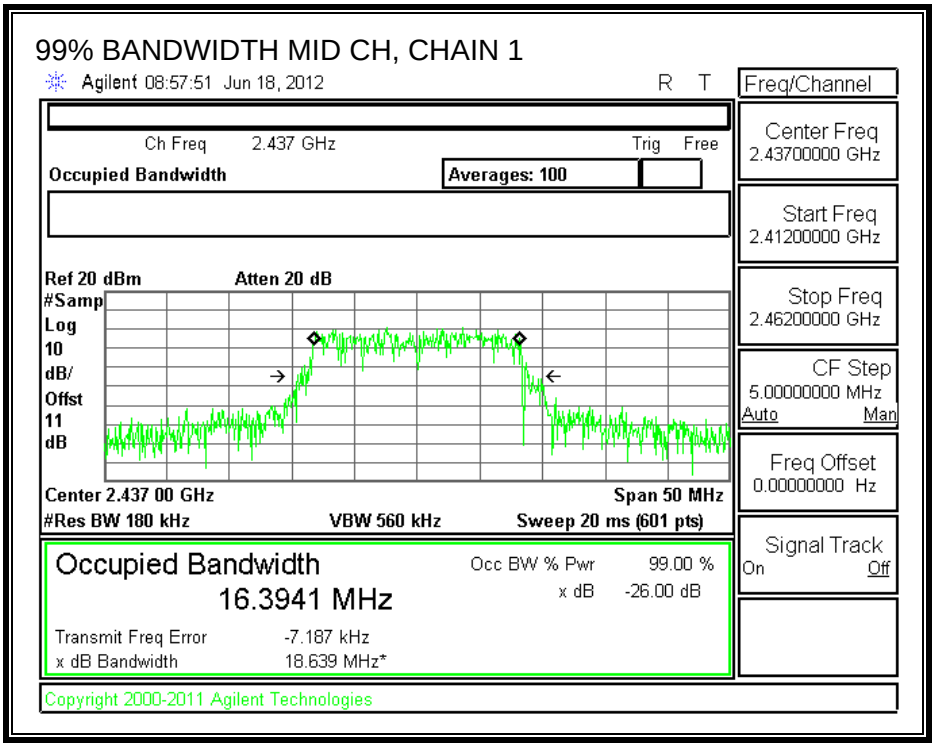
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

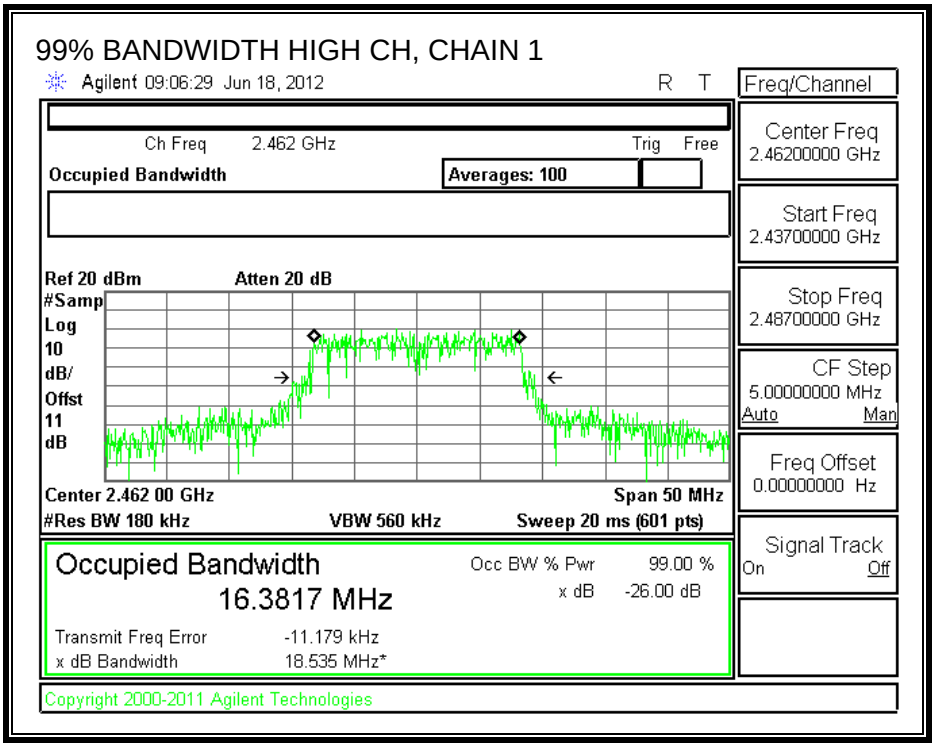
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	2412	16.3887	16.391
Middle	2437	16.3941	16.395
High	2462	16.3817	16.3927

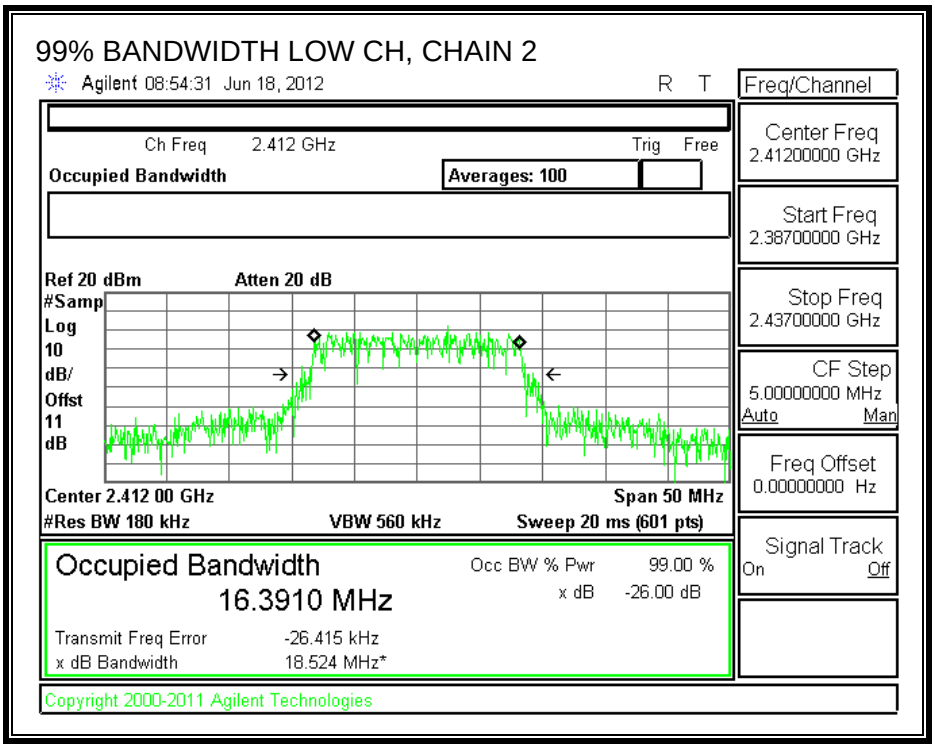
99% BANDWIDTH, CHAIN 1

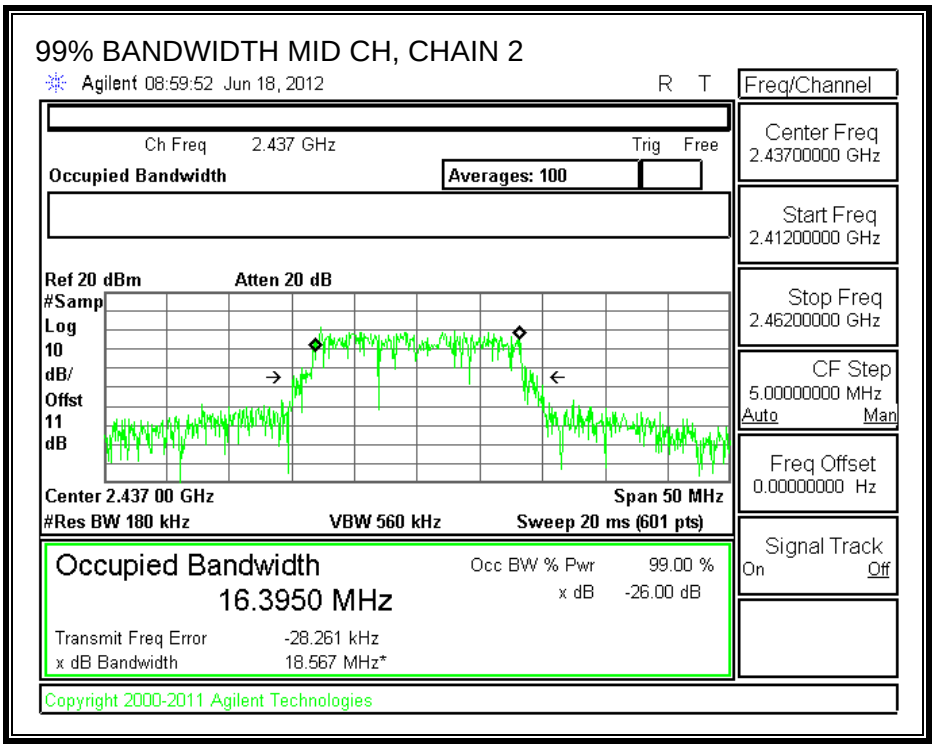


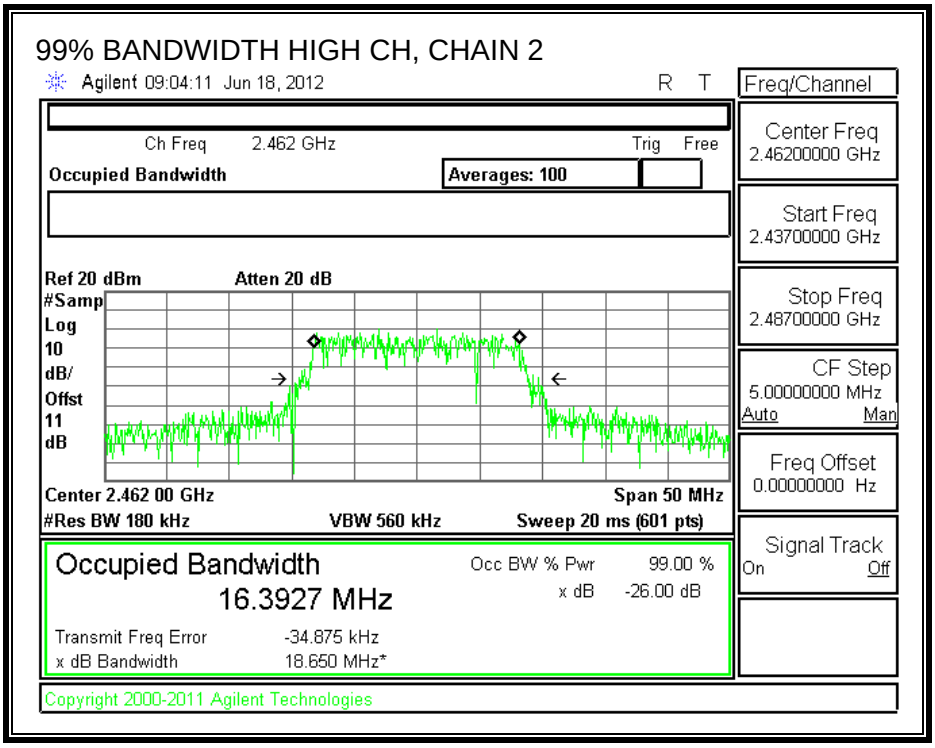




99% BANDWIDTH, CHAIN 2







8.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	13.75	13.23	0.00	16.51	30.00	-13.49
Mid	2437	14.01	13.96	0.00	16.99	30.00	-13.01
High	2462	13.12	13.03	0.00	16.08	30.00	-13.92

The maximum effective legacy gain is greater than or equal to 6 dBi, therefore the limit is 28.99 dBm.

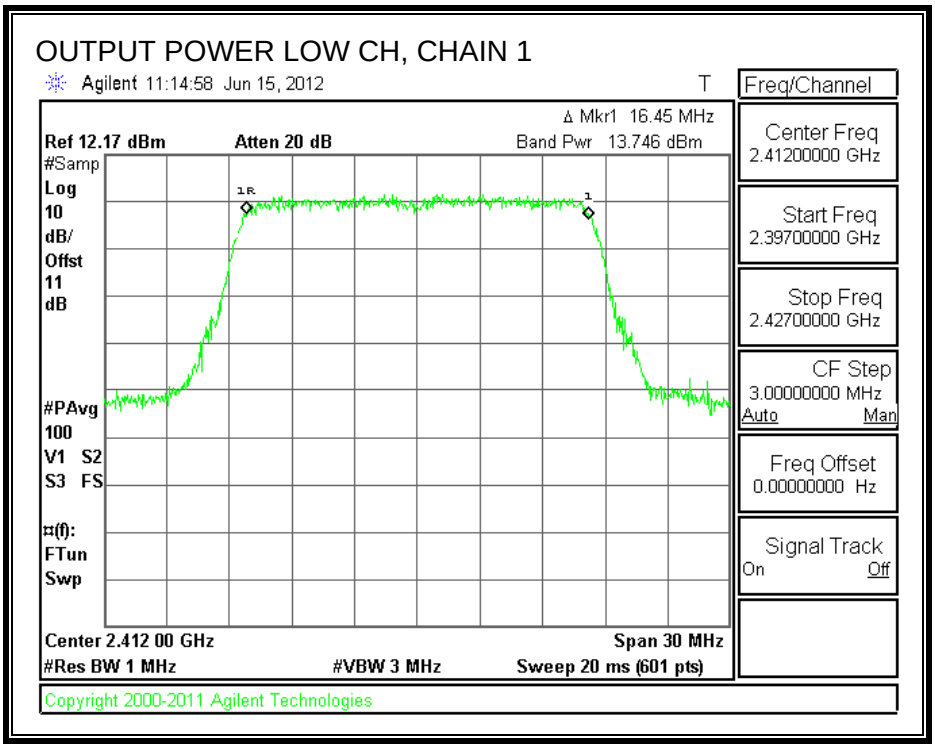
TEST PROCEDURE

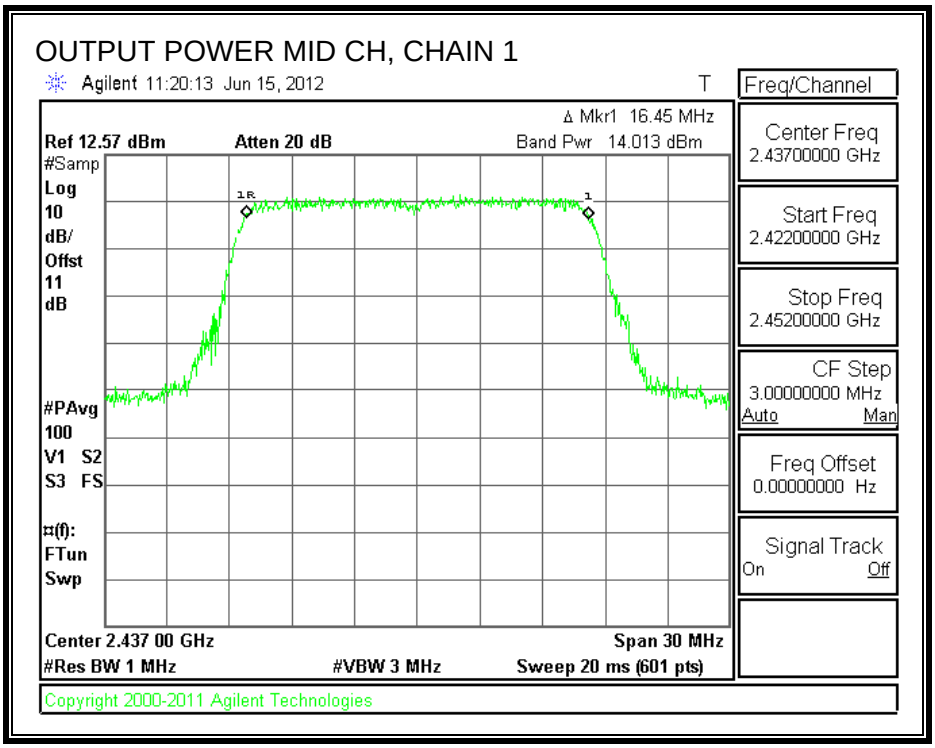
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

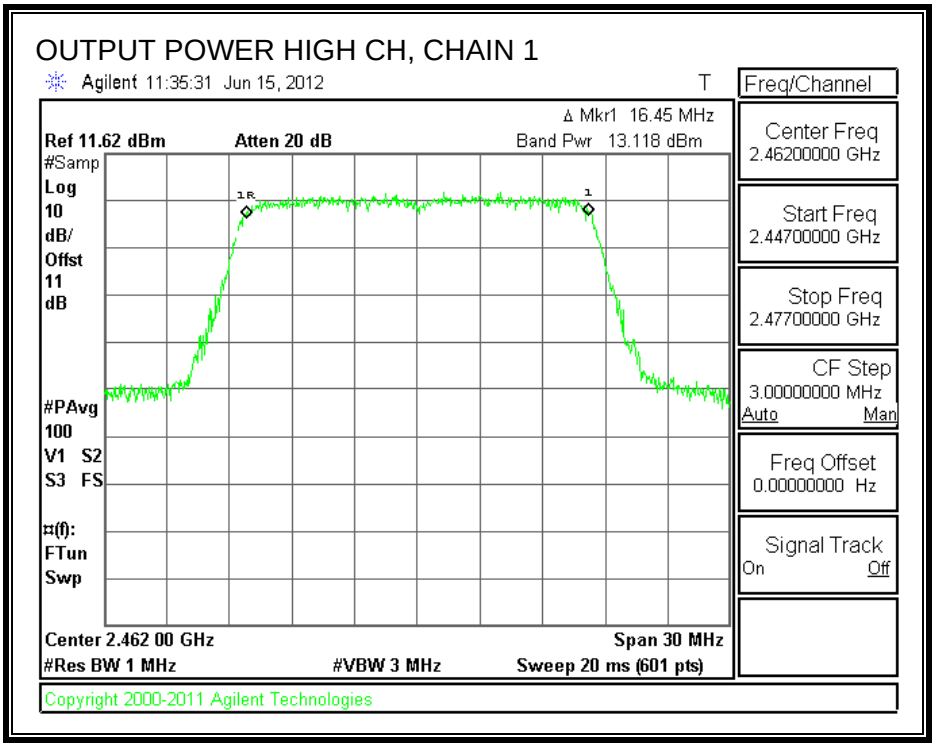
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	13.75	13.23	0.00	16.51	28.99	-12.48
Mid	2437	14.01	13.96	0.00	16.99	28.99	-12.00
High	2462	13.12	13.03	0.00	16.08	28.99	-12.91

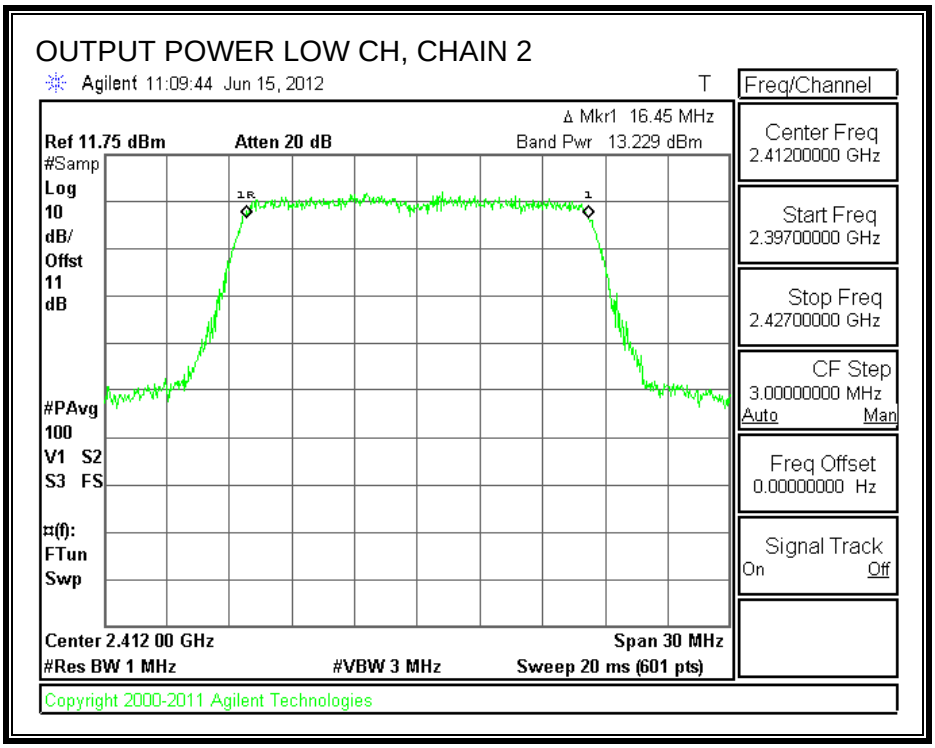
CHAIN 1 OUTPUT POWER

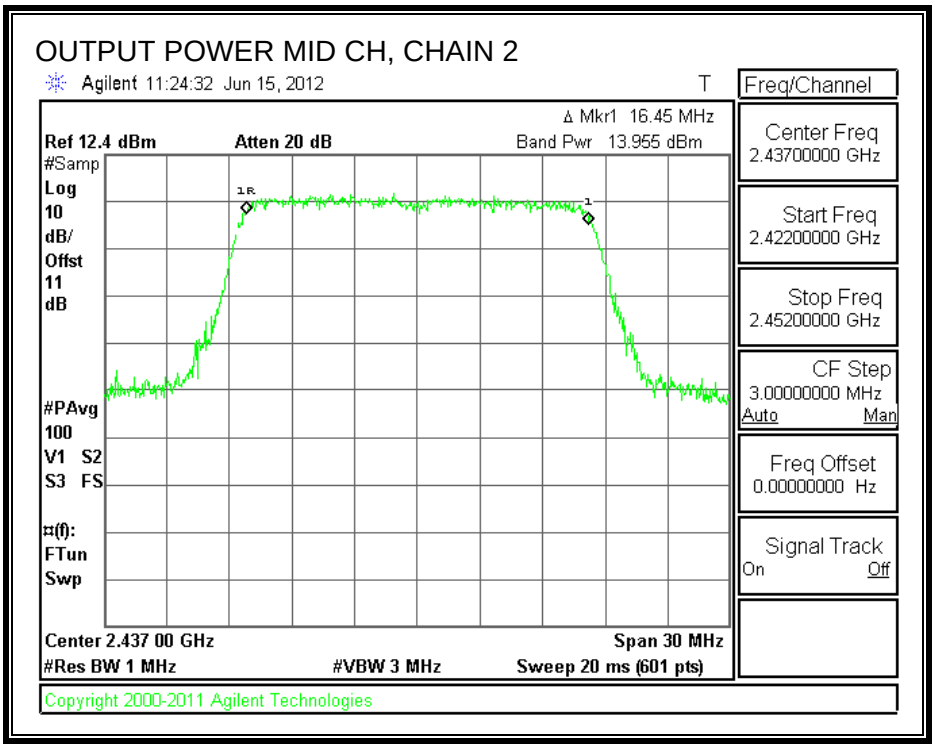


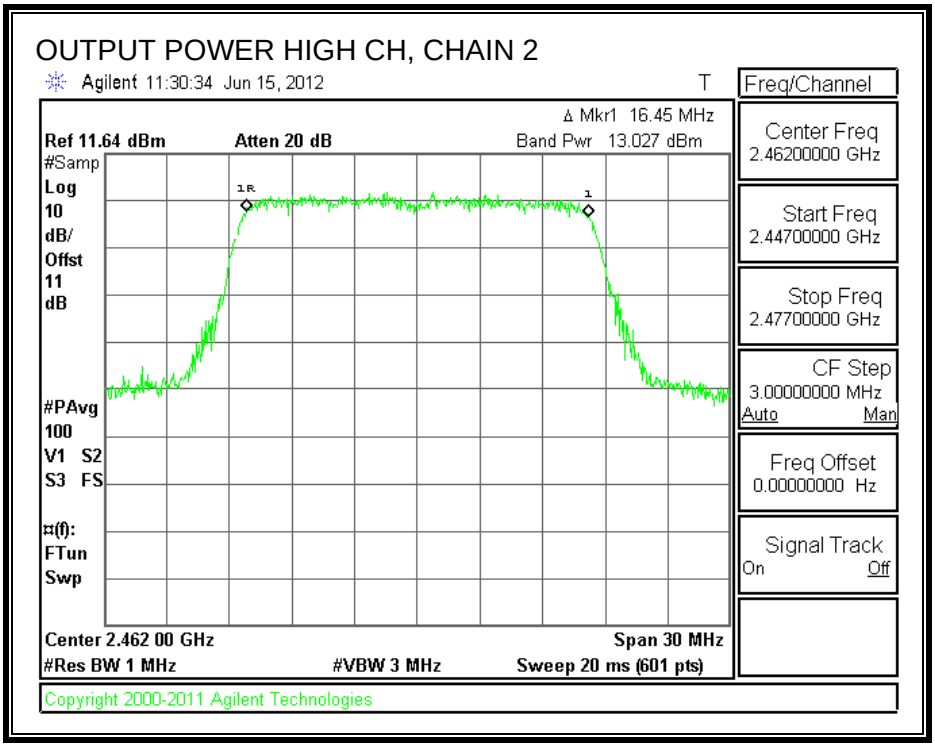




CHAIN 2 OUTPUT POWER







8.3.4. 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 dB (including 10 dB pad and 1.0 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	2412	13.74	13.25	16.51
Middle	2437	14.27	13.92	17.11
High	2462	13.21	12.98	16.11

8.3.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

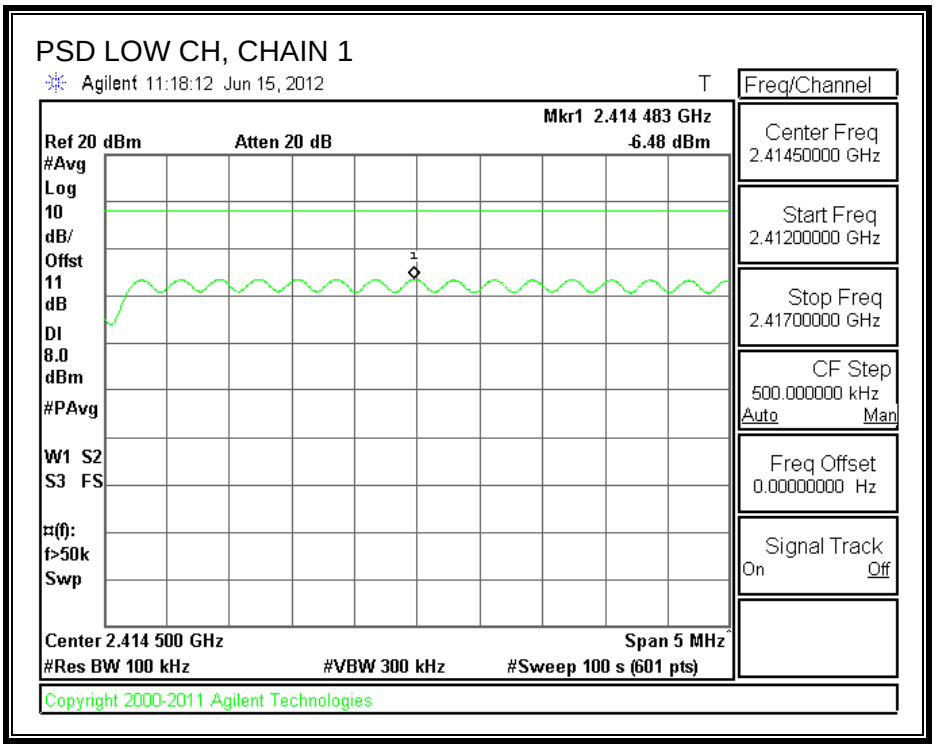
TEST PROCEDURE

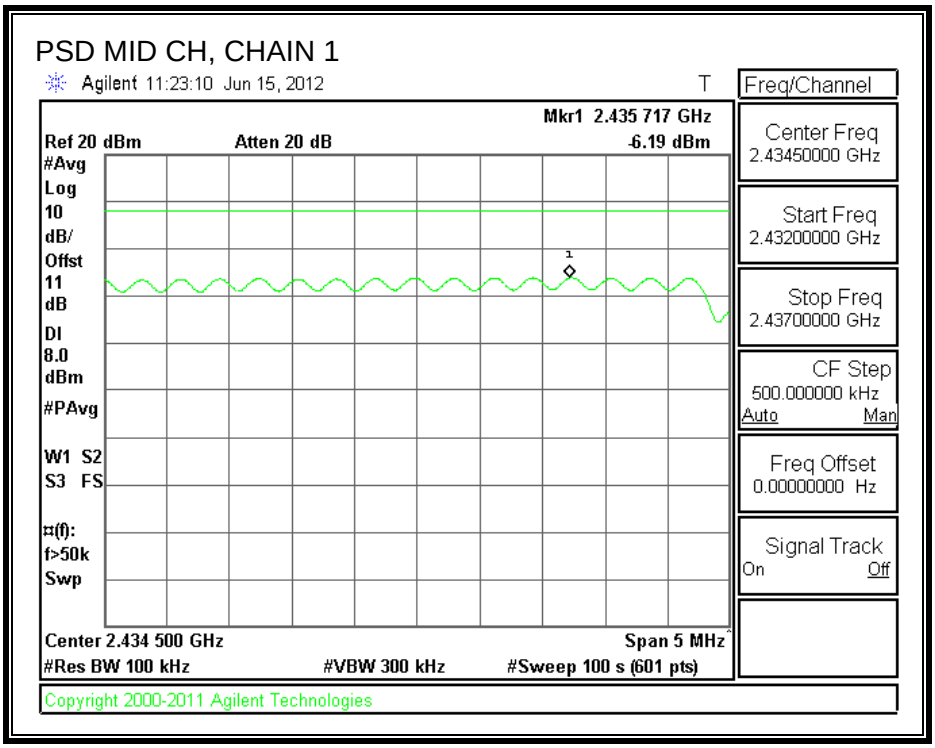
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

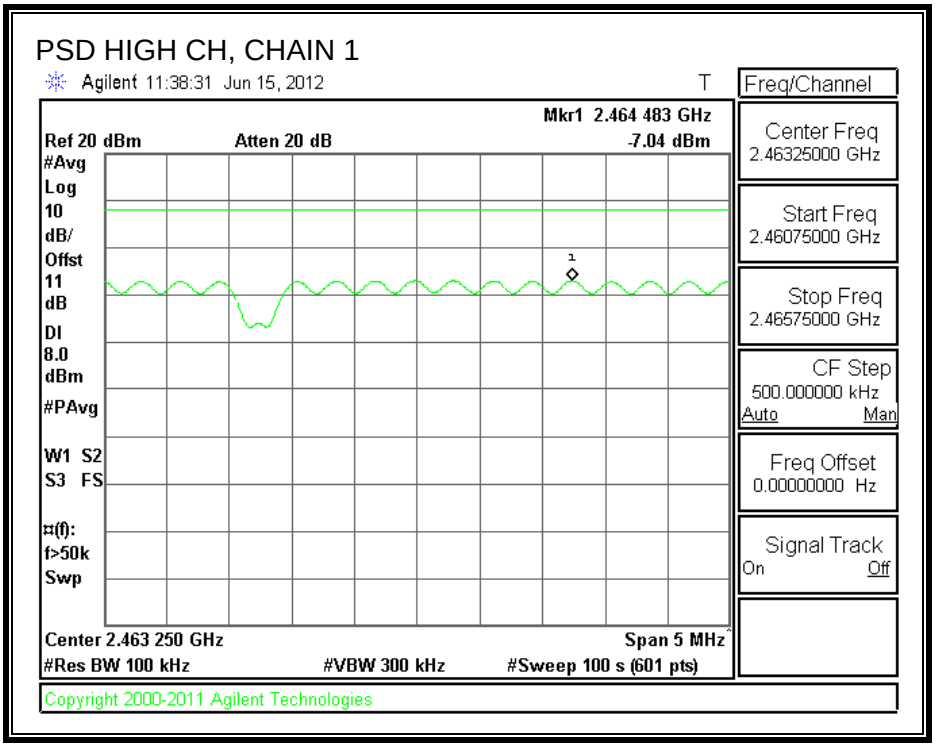
RESULTS

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.48	-7.09	-3.76	8	-11.76
Middle	2437	-6.19	-6.16	-3.16	8	-11.16
High	2462	-7.04	-7.28	-4.15	8	-12.15

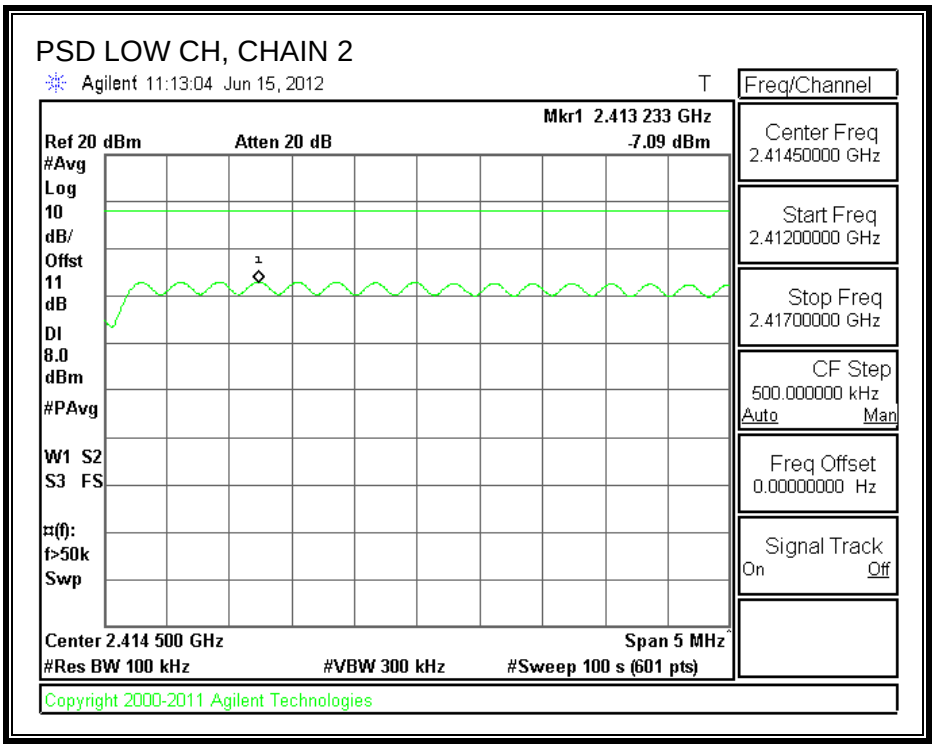
POWER SPECTRAL DENSITY, CHAIN 1

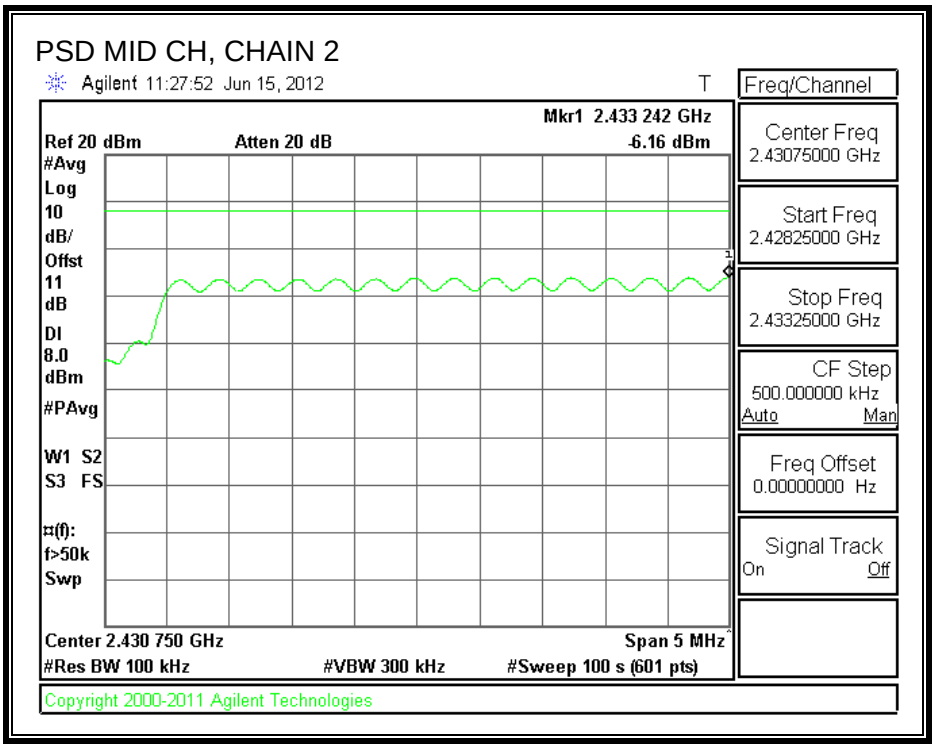


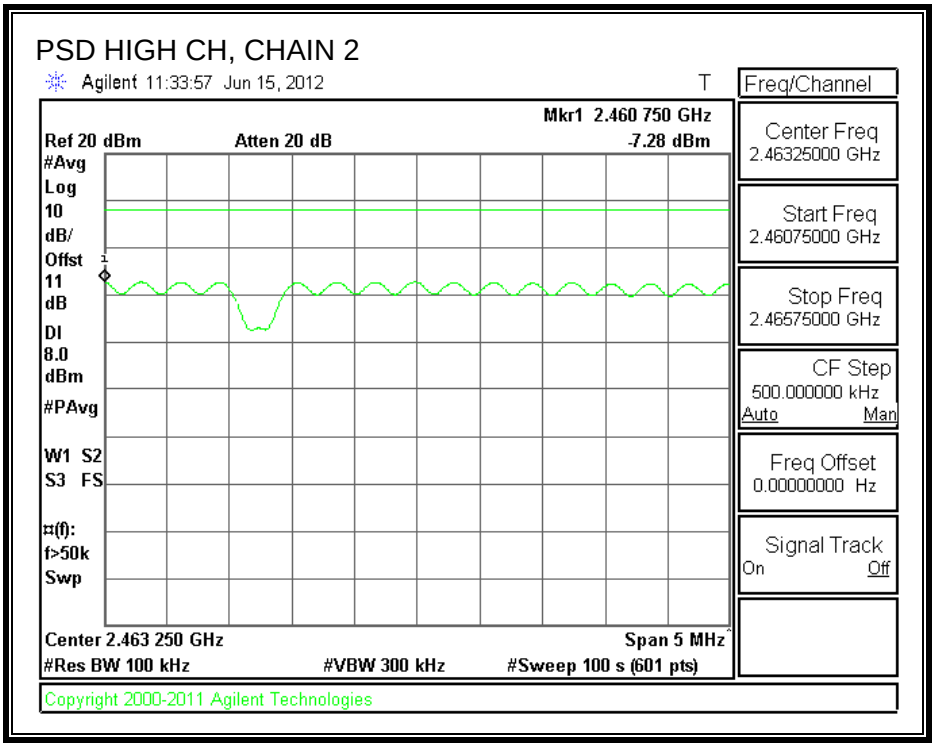




POWER SPECTRAL DENSITY, CHAIN 2







8.3.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

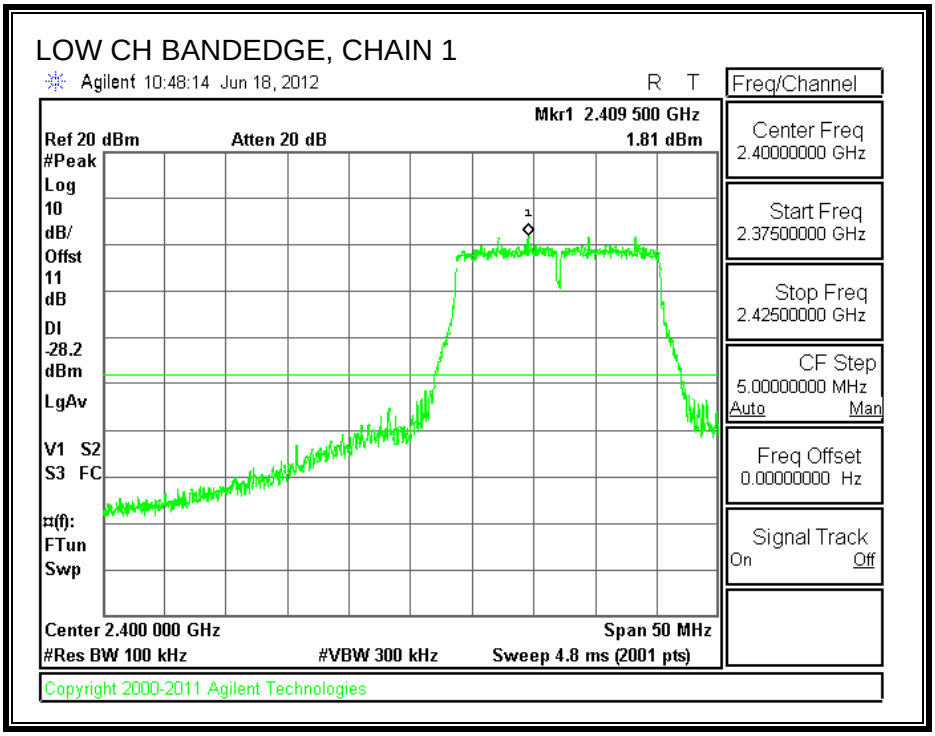
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

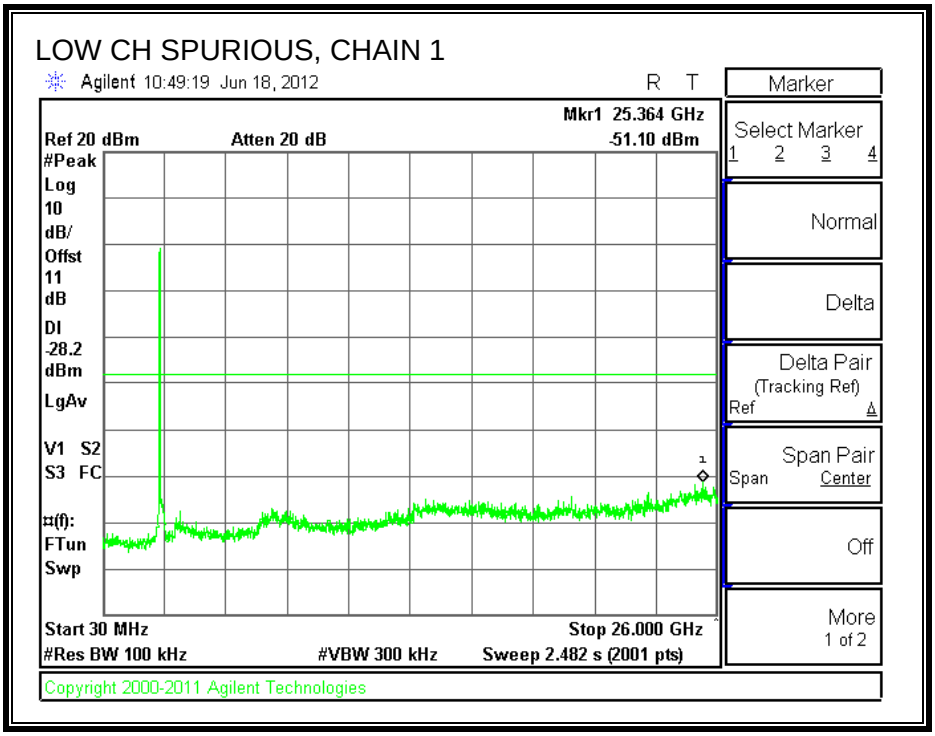
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

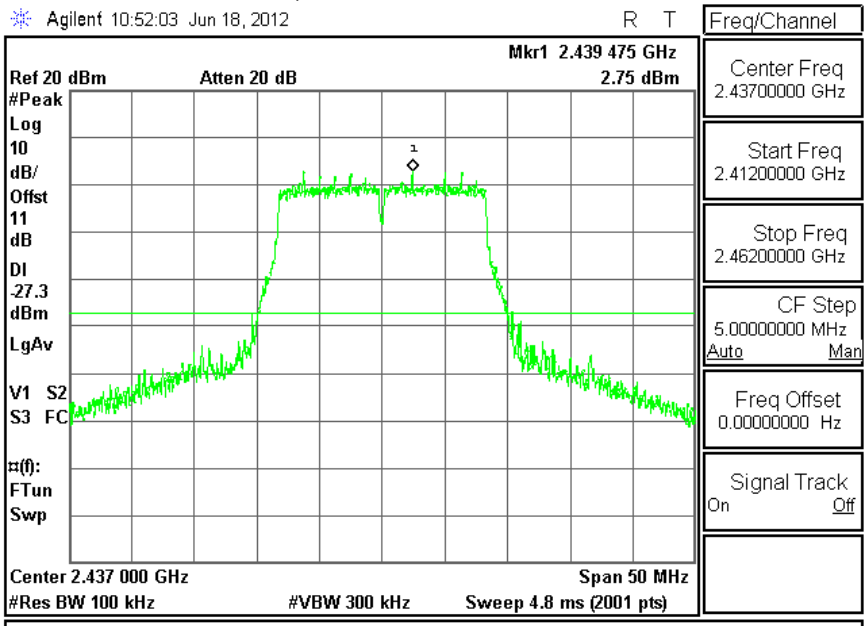
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

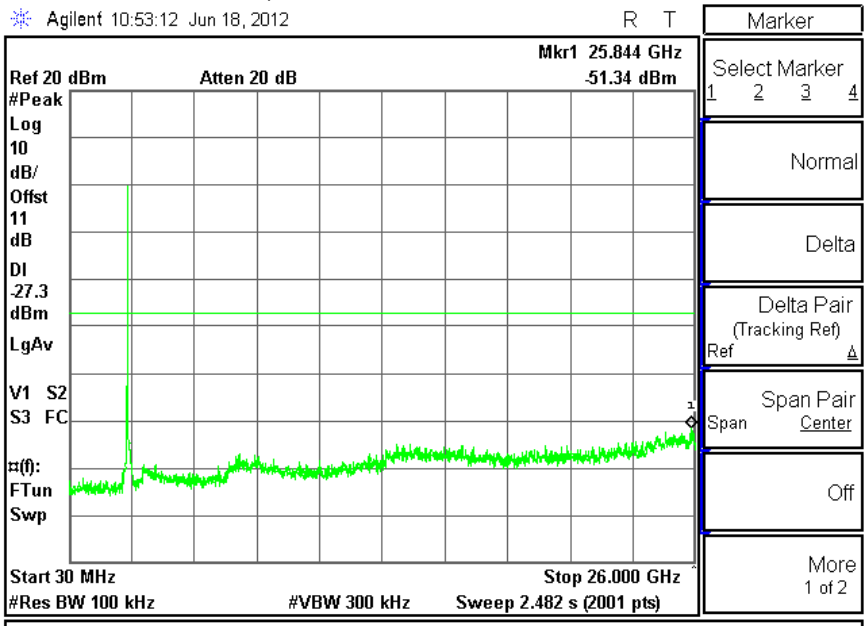




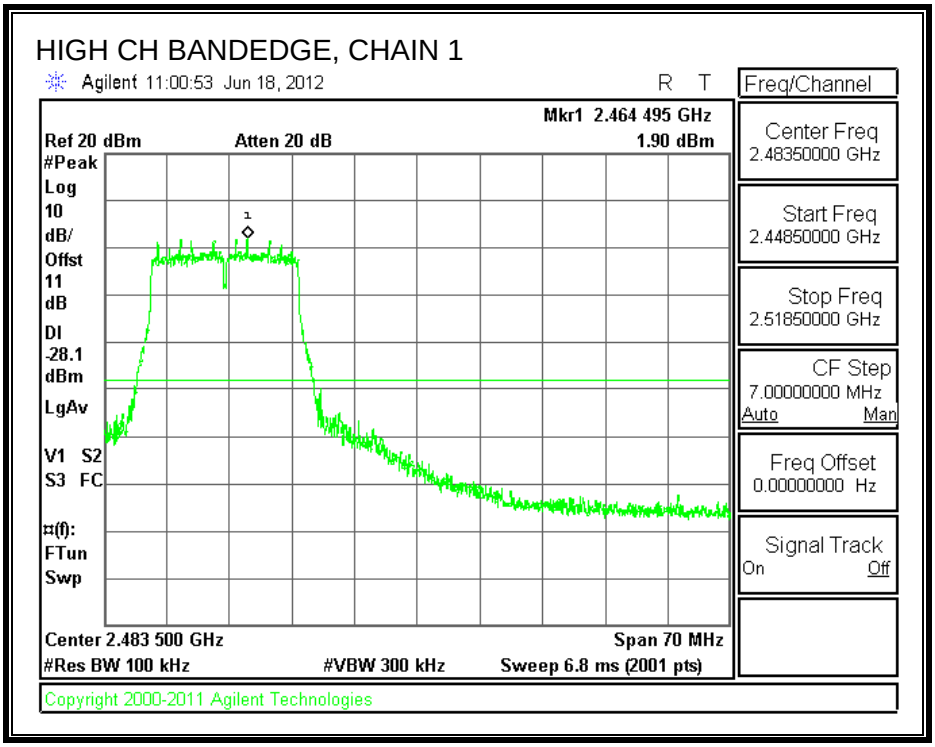
MID CH REFERENCE, CHAIN 1



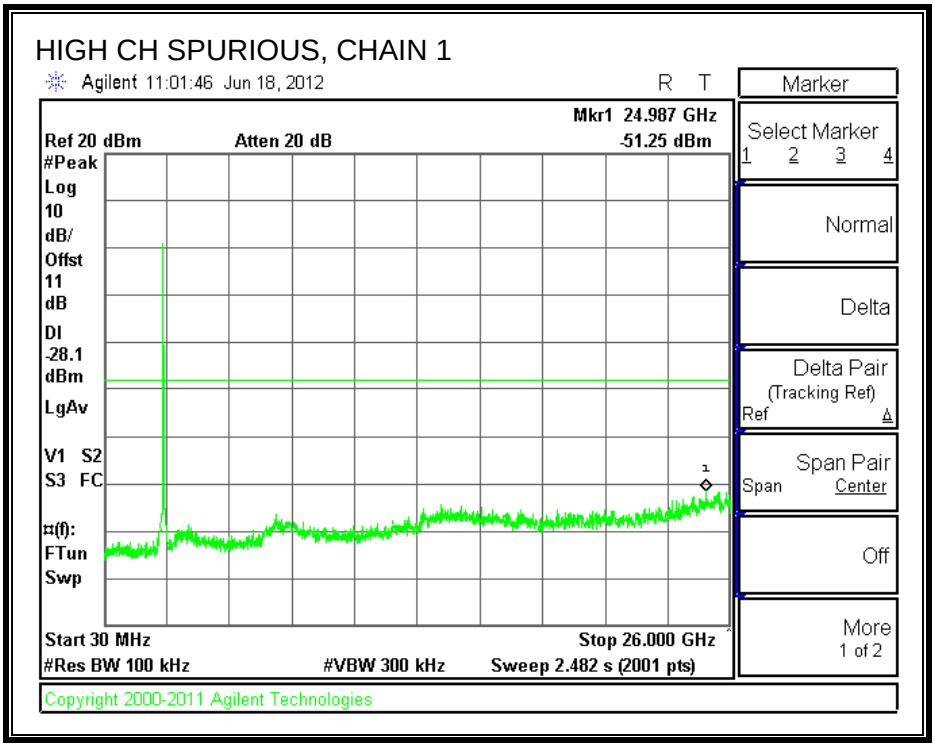
MID CH SPURIOUS, CHAIN 1



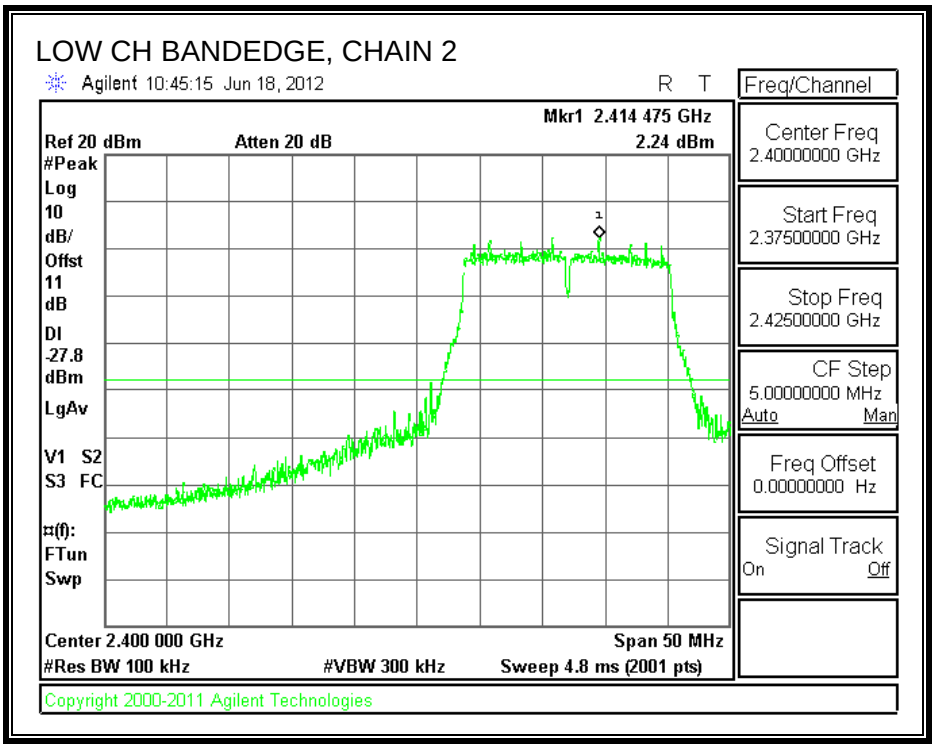
HIGH CH BANDEDGE, CHAIN 1

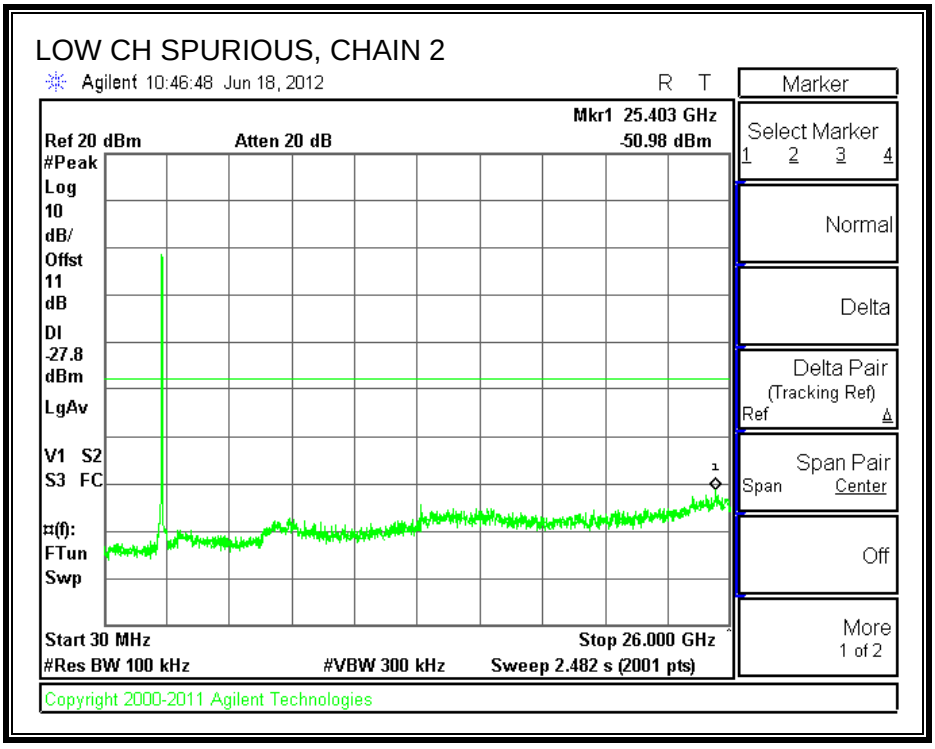


HIGH CH SPURIOUS, CHAIN 1

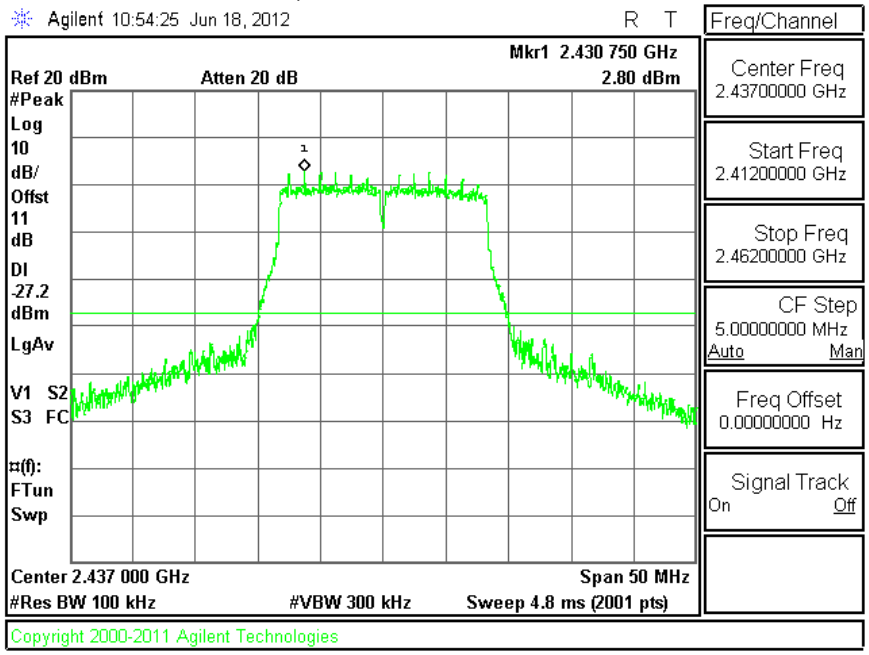


CHAIN 2 SPURIOUS EMISSIONS

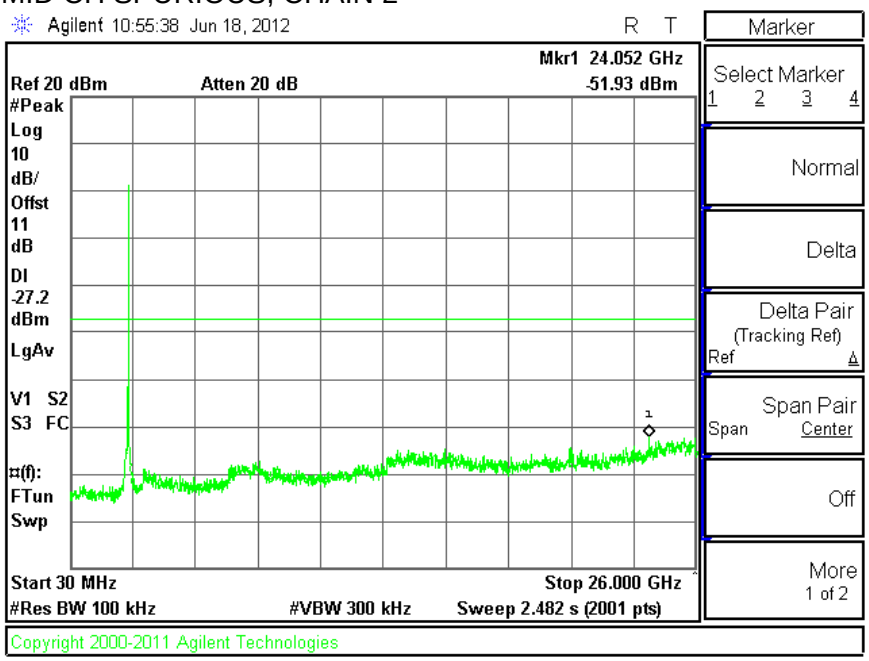


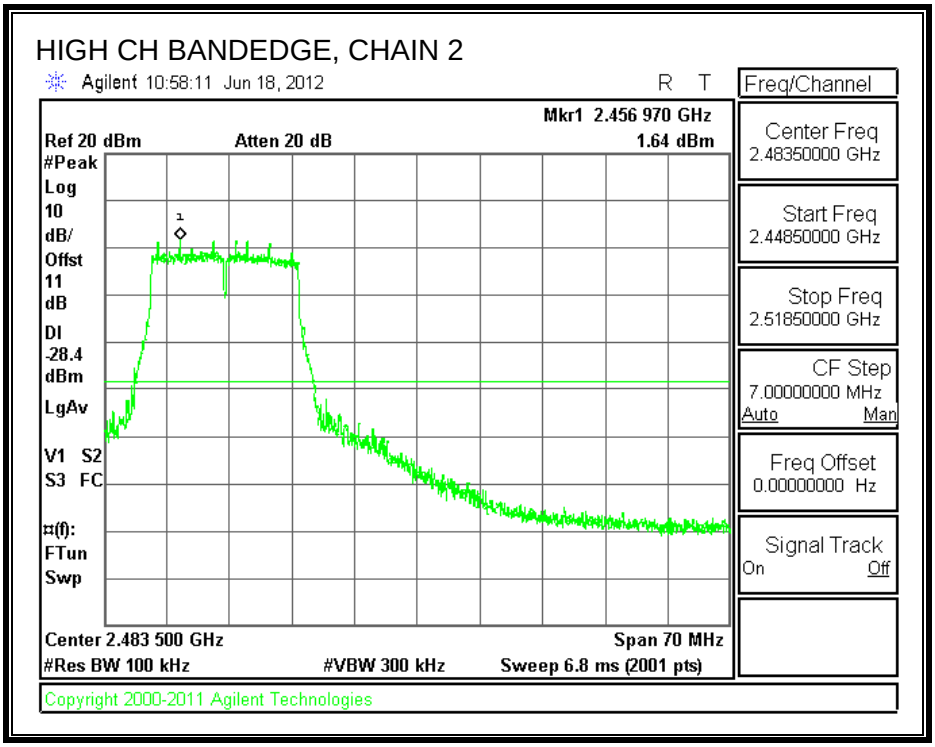


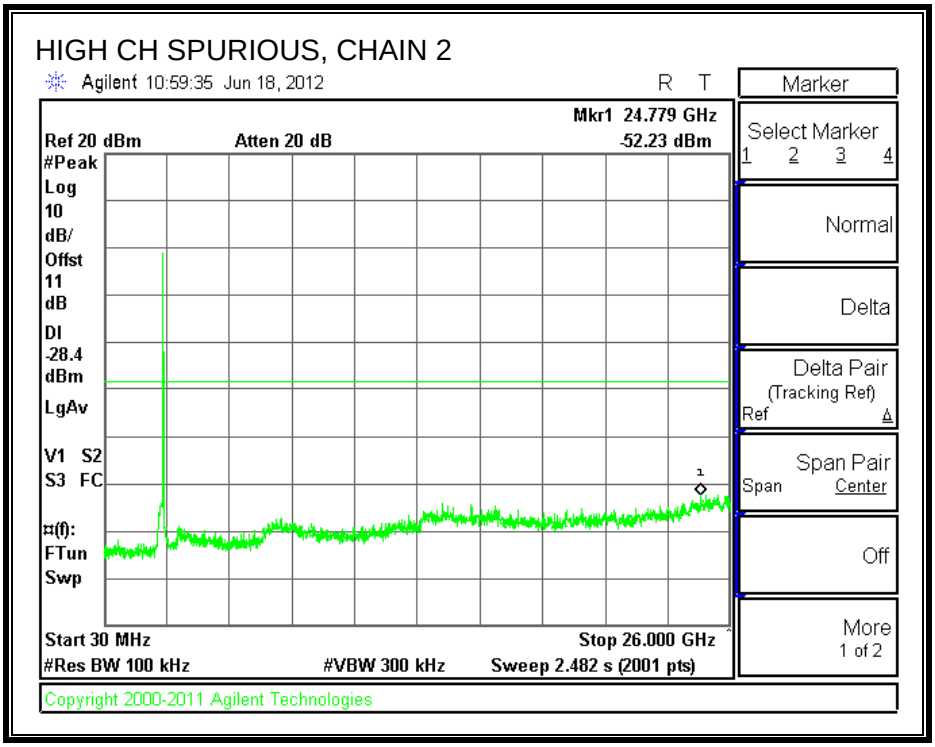
MID CH REFERENCE, CHAIN 2



MID CH SPURIOUS, CHAIN 2







8.4. 802.11n HT20 MODE IN THE 2.4 GHz BAND

8.4.1. 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.

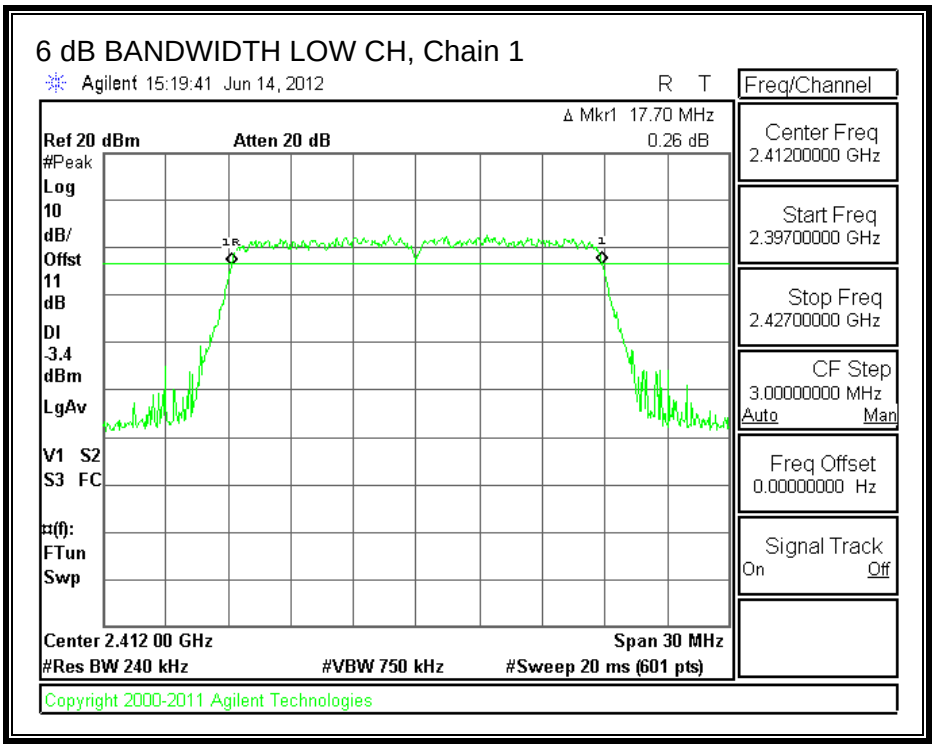
TEST PROCEDURE

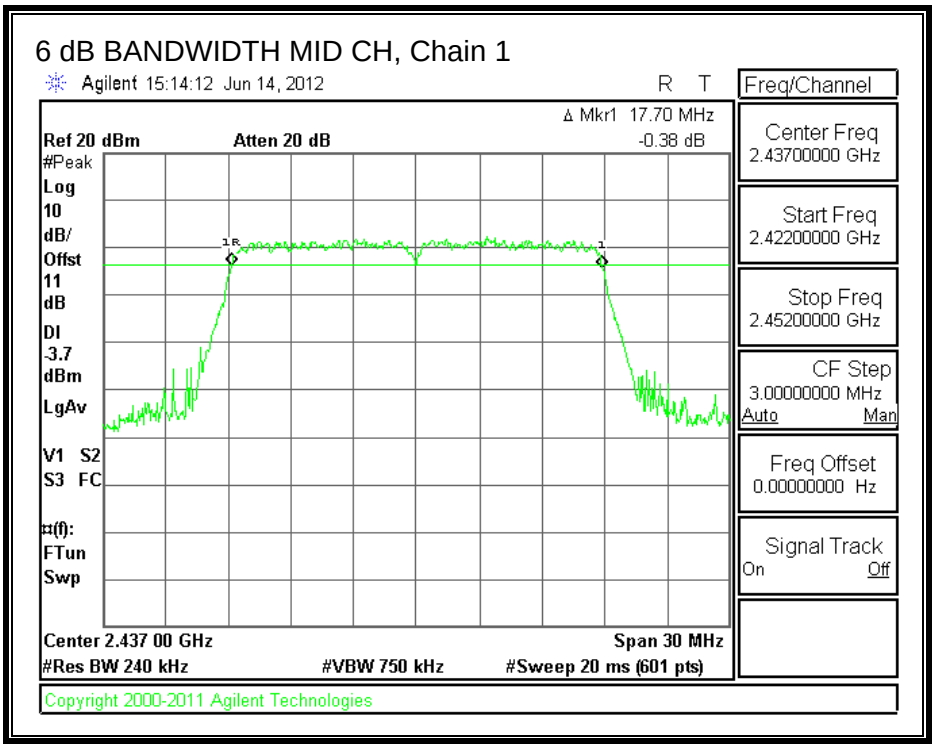
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

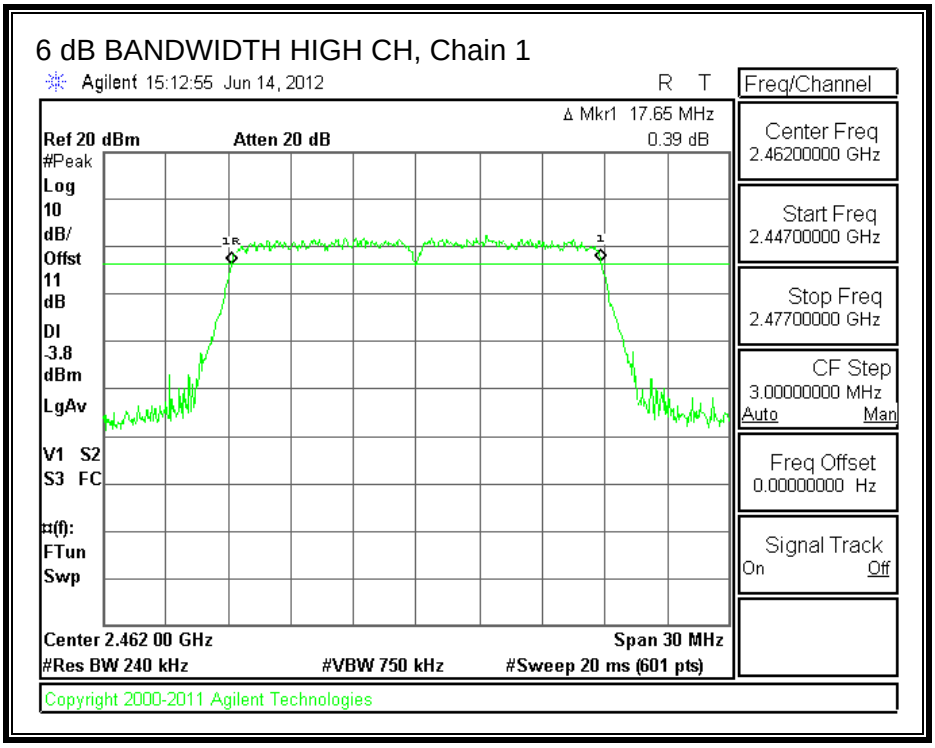
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB Bandwidth (MHz)	Chain 2 6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.7000	17.7000	0.5
Middle	2437	17.7000	17.6500	0.5
High	2462	17.6500	17.6500	0.5

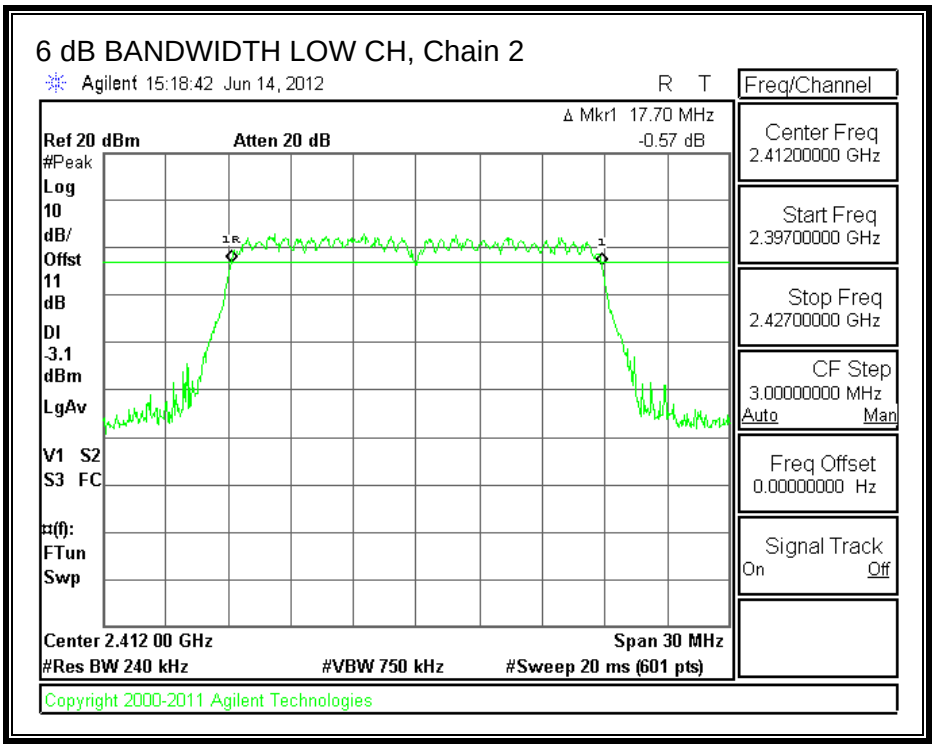
6 dB BANDWIDTH, Chain 1

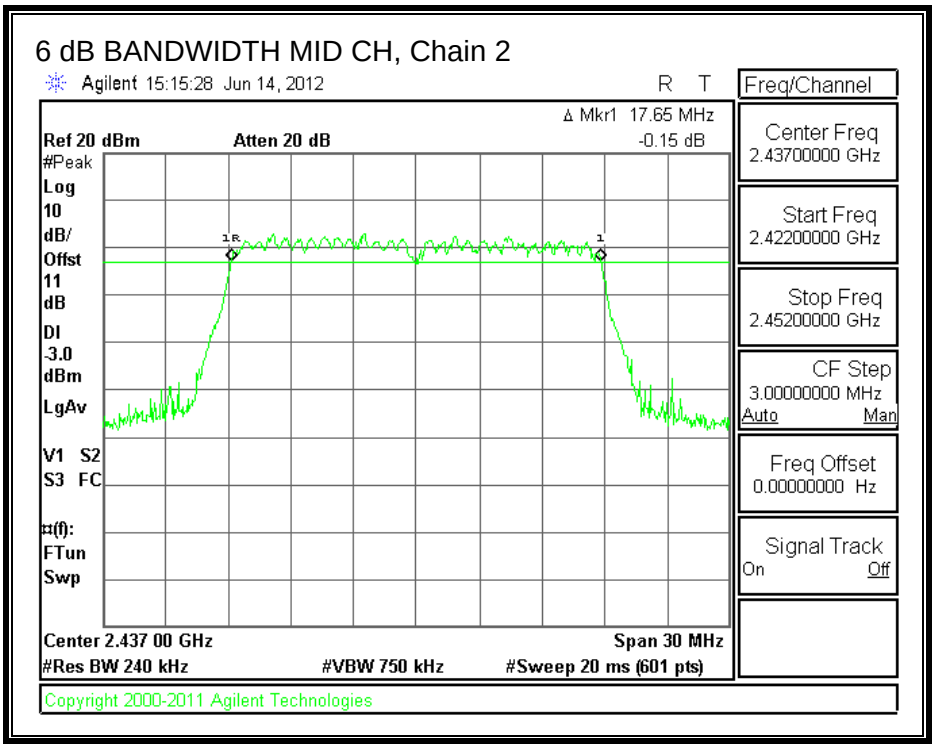


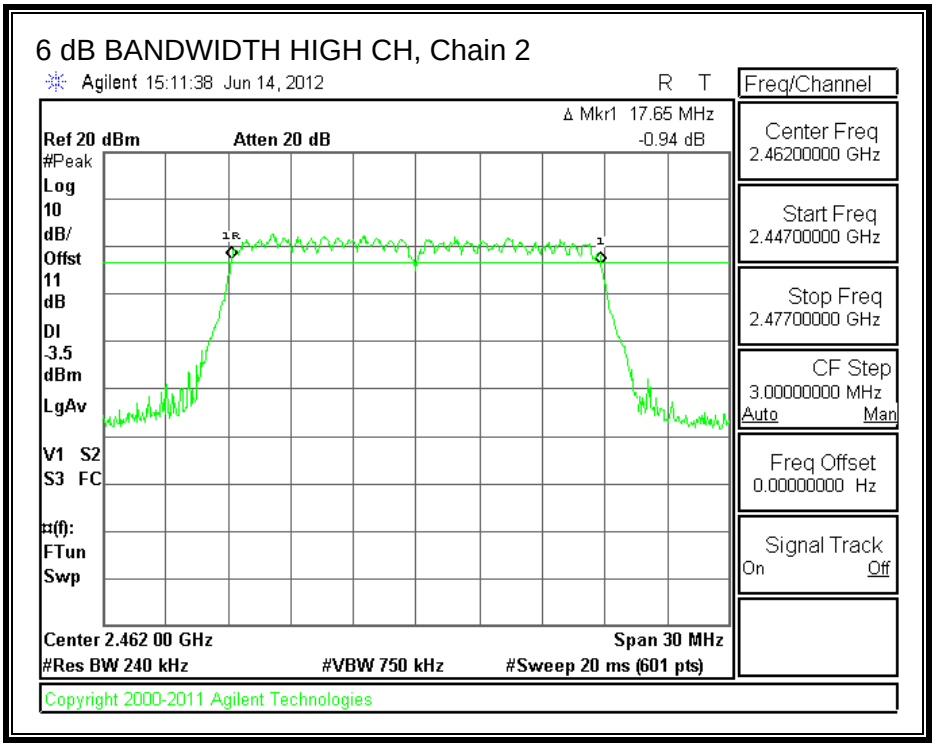




6 dB BANDWIDTH, Chain 2







8.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

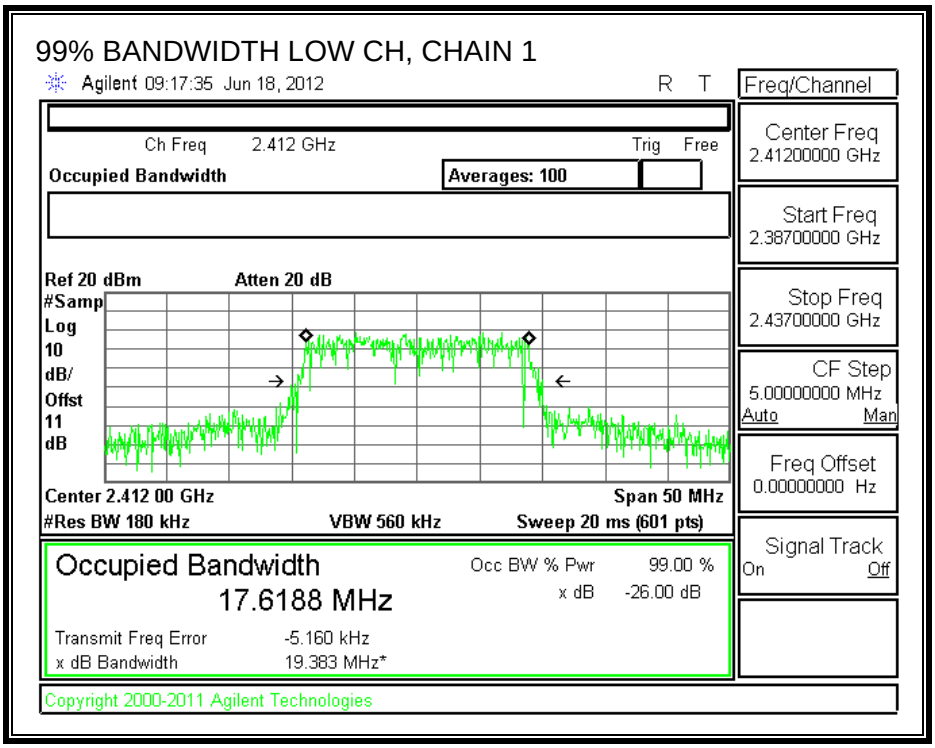
TEST PROCEDURE

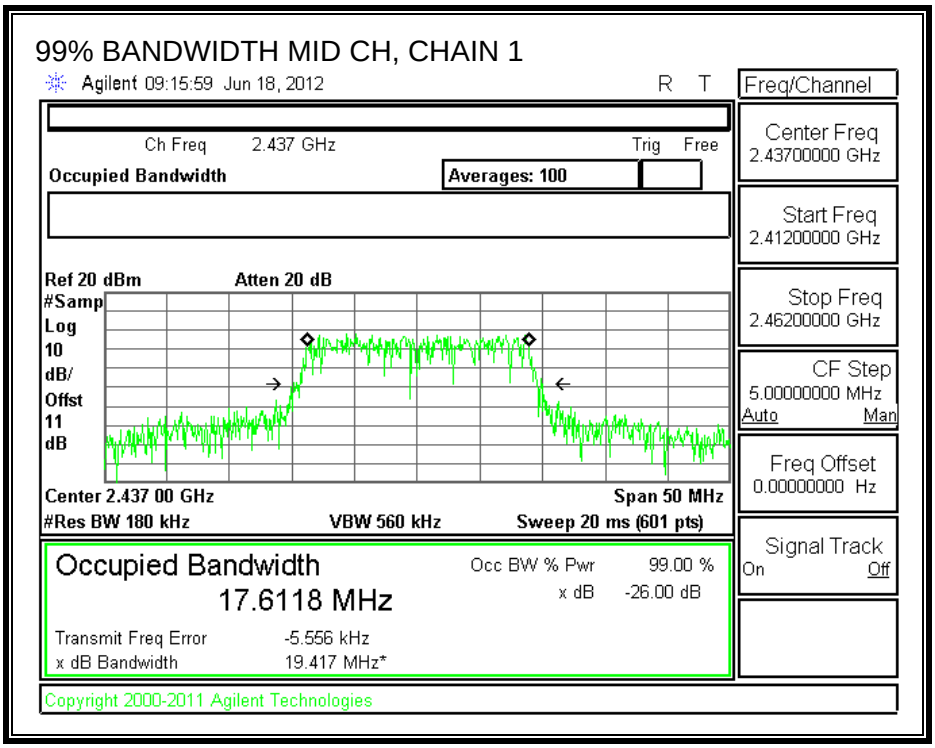
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

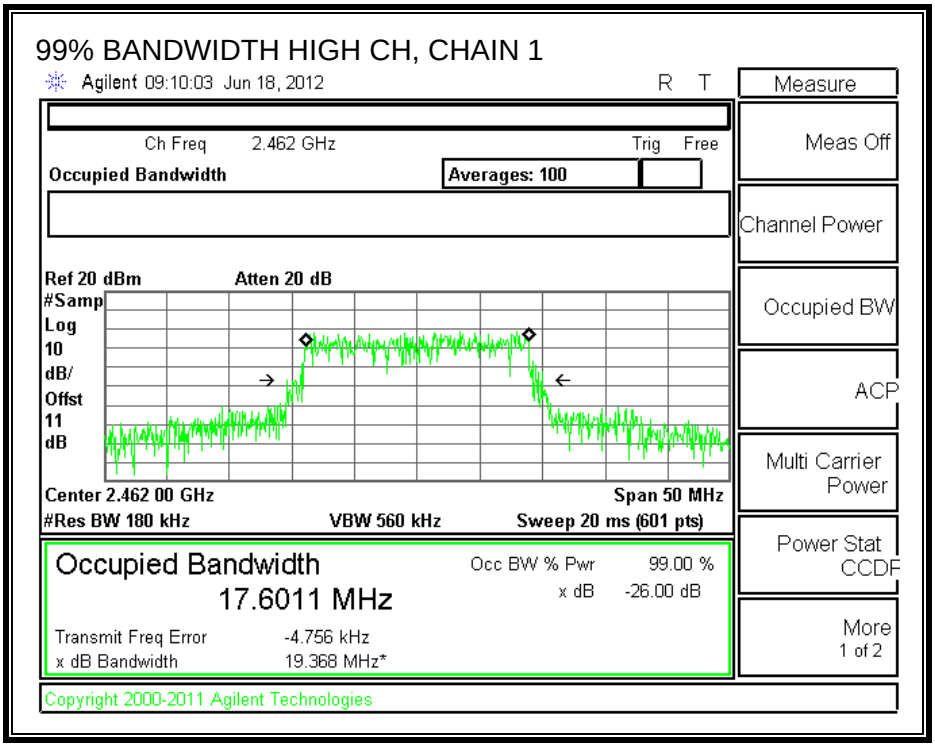
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	2412	17.6188	17.5832
Middle	2437	17.6118	17.5909
High	2462	17.6011	17.5787

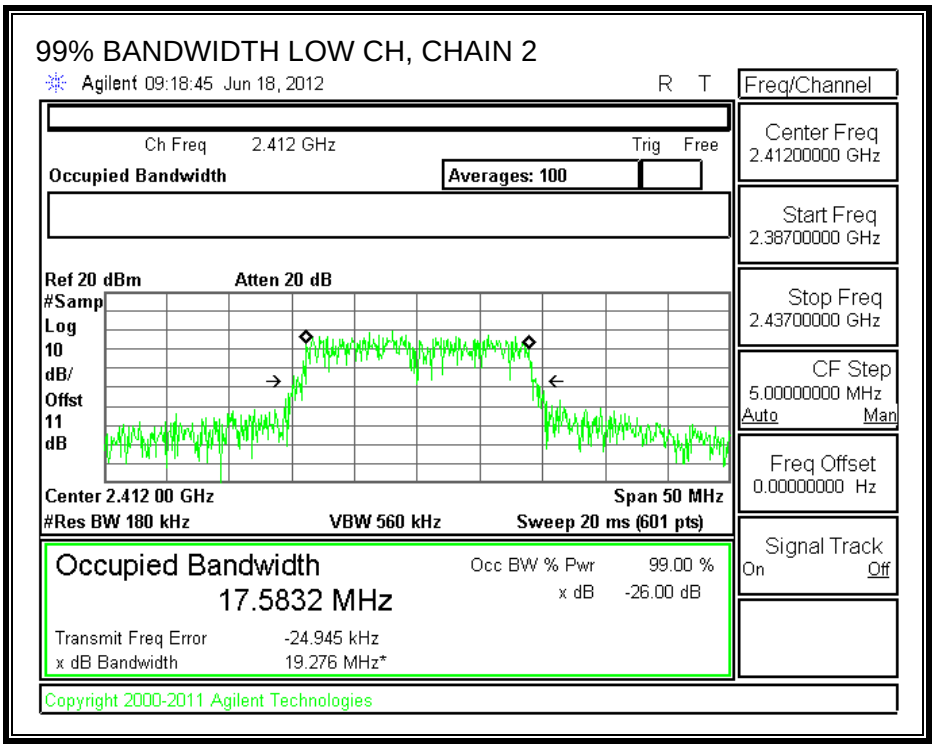
99% BANDWIDTH, CHAIN 1

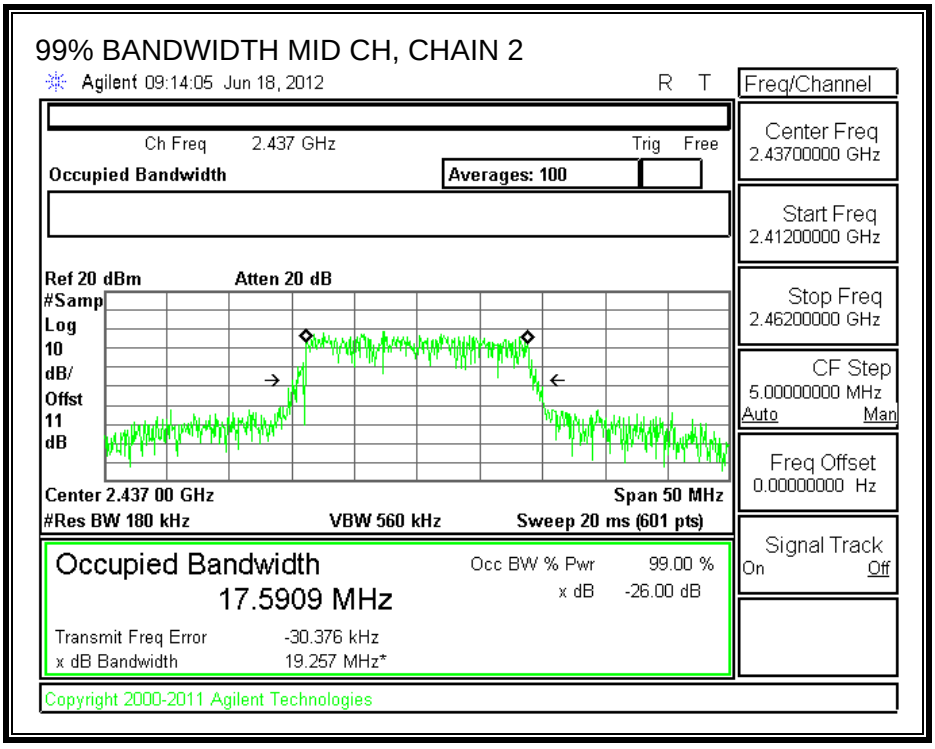


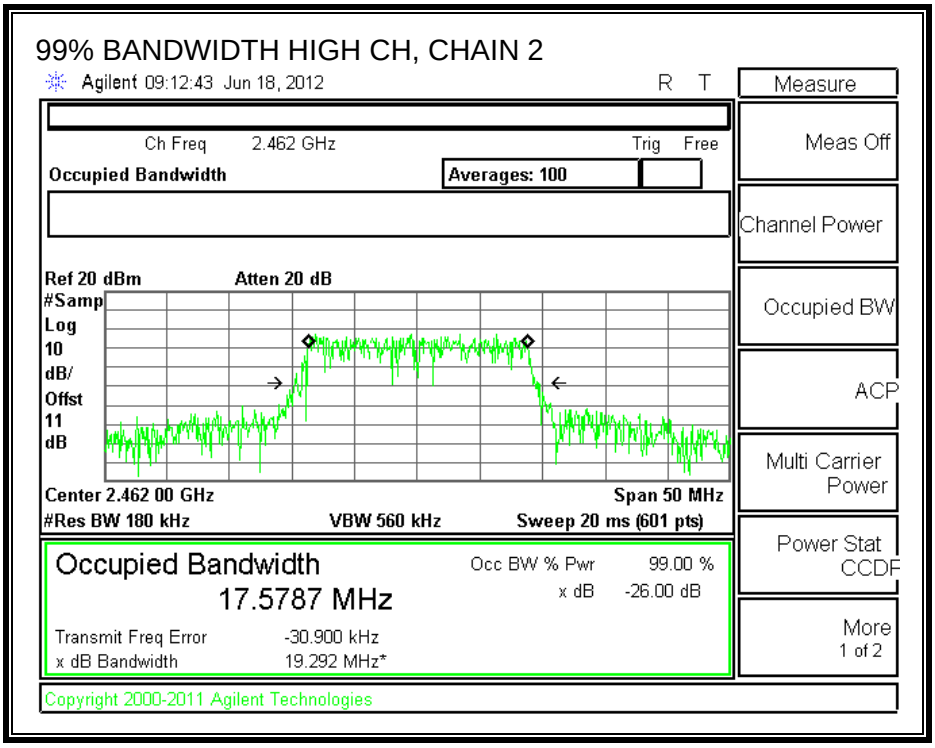




99% BANDWIDTH, CHAIN 2







8.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.00	3.01	7.01

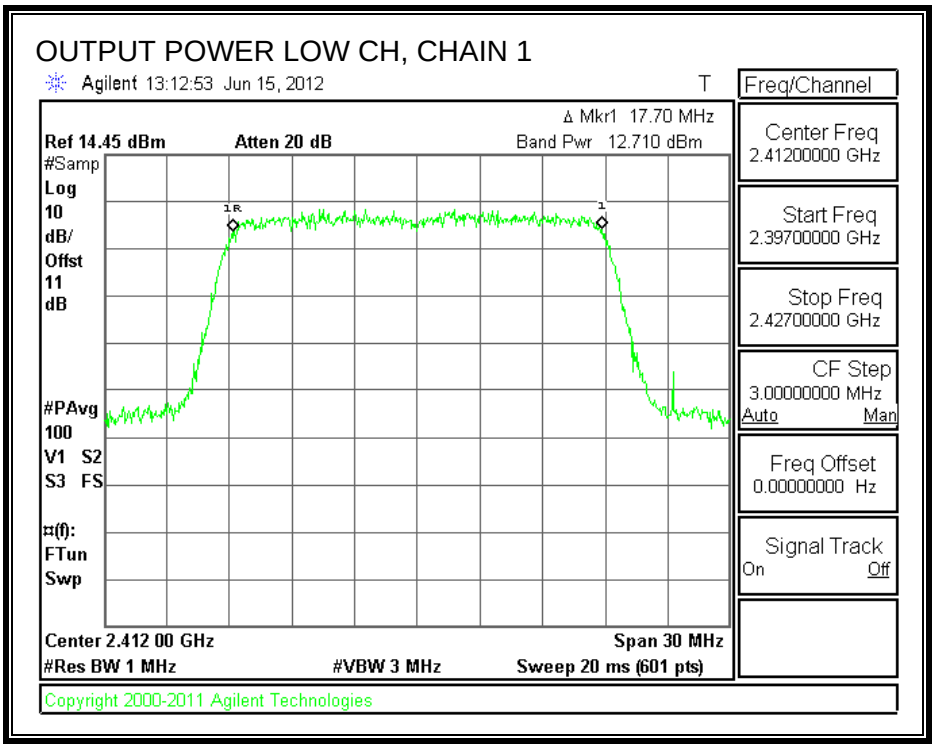
TEST PROCEDURE

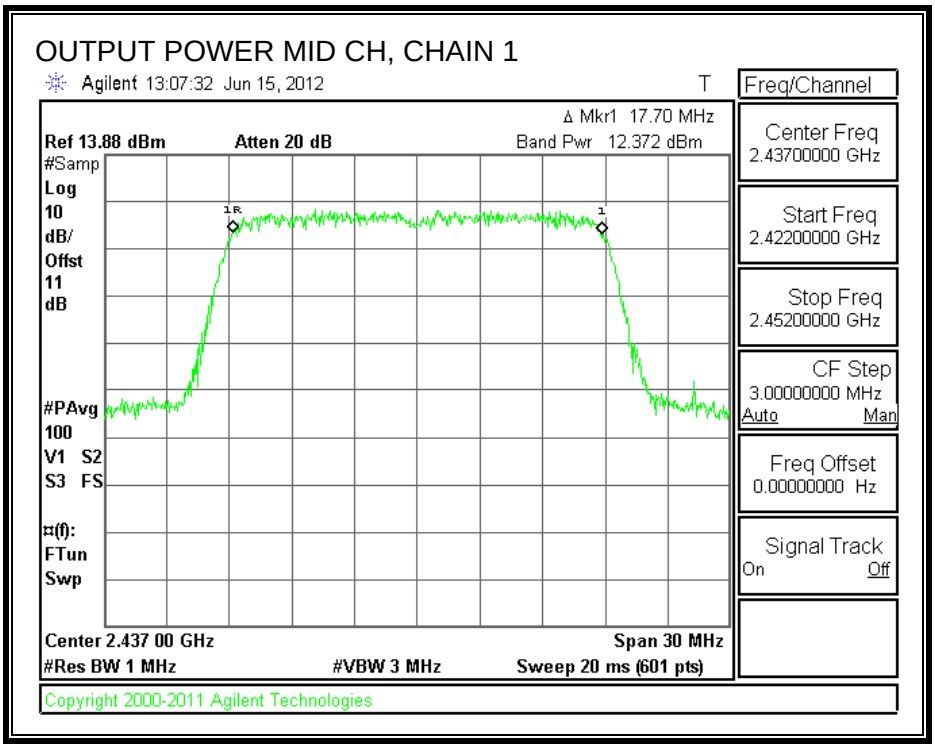
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

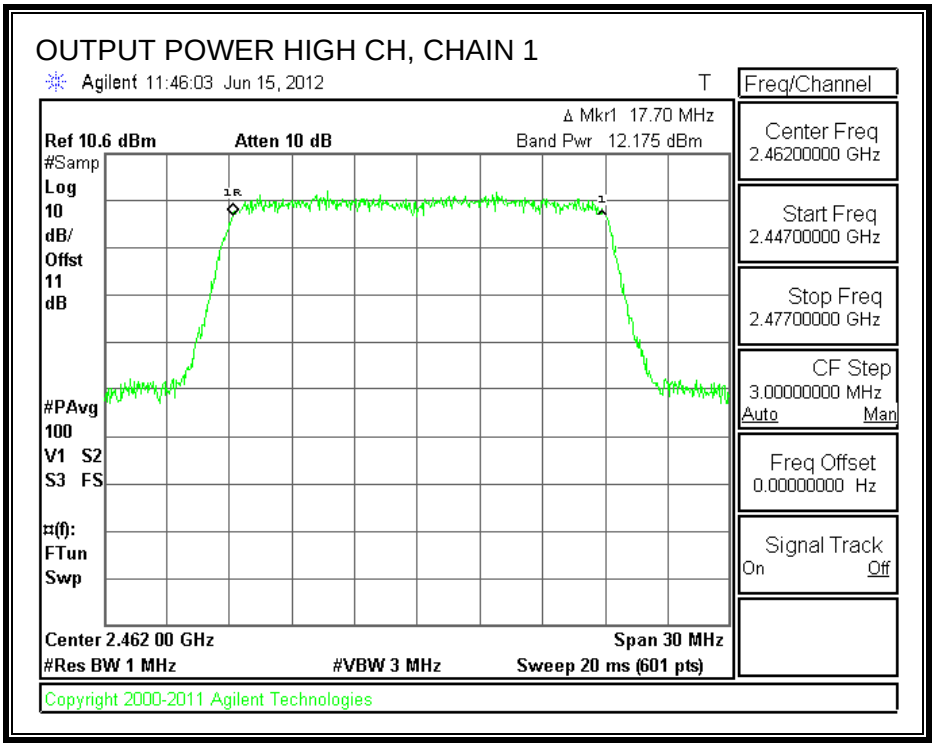
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	12.71	12.26	0.00	15.50	28.99	-13.49
Mid	2437	12.37	11.91	0.00	15.16	28.99	-13.83
High	2462	12.18	11.96	0.00	15.08	28.99	-13.91

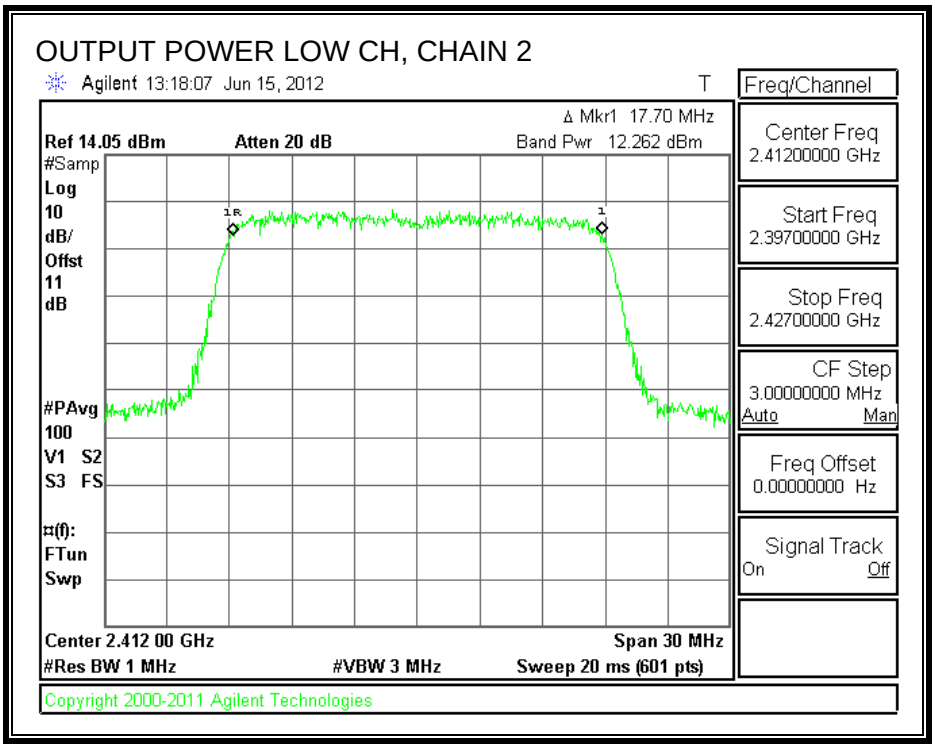
CHAIN 1 OUTPUT POWER

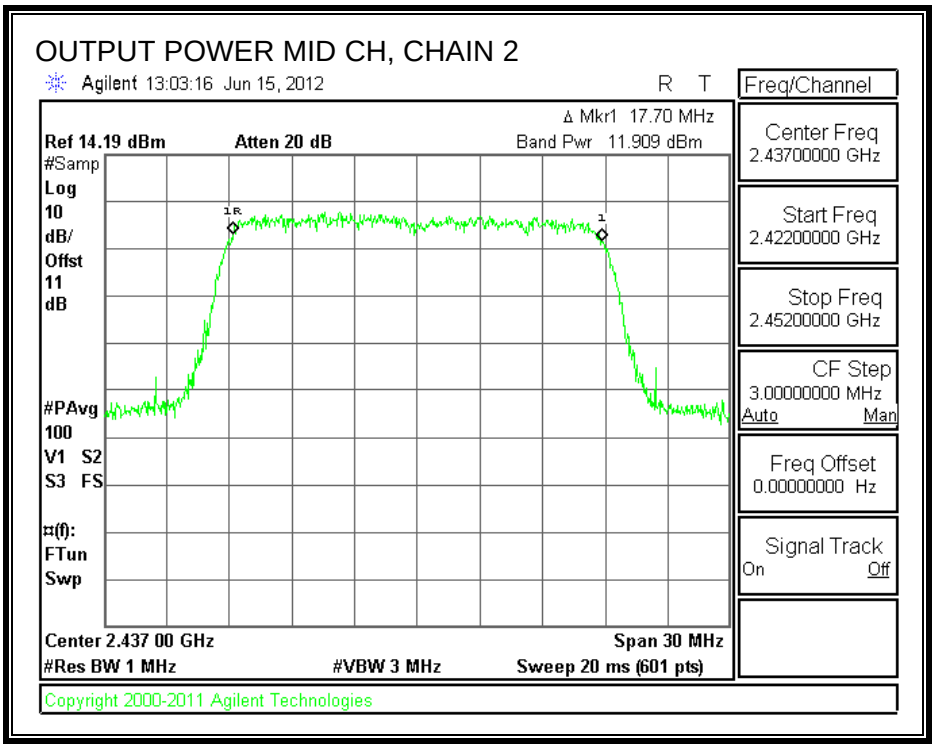


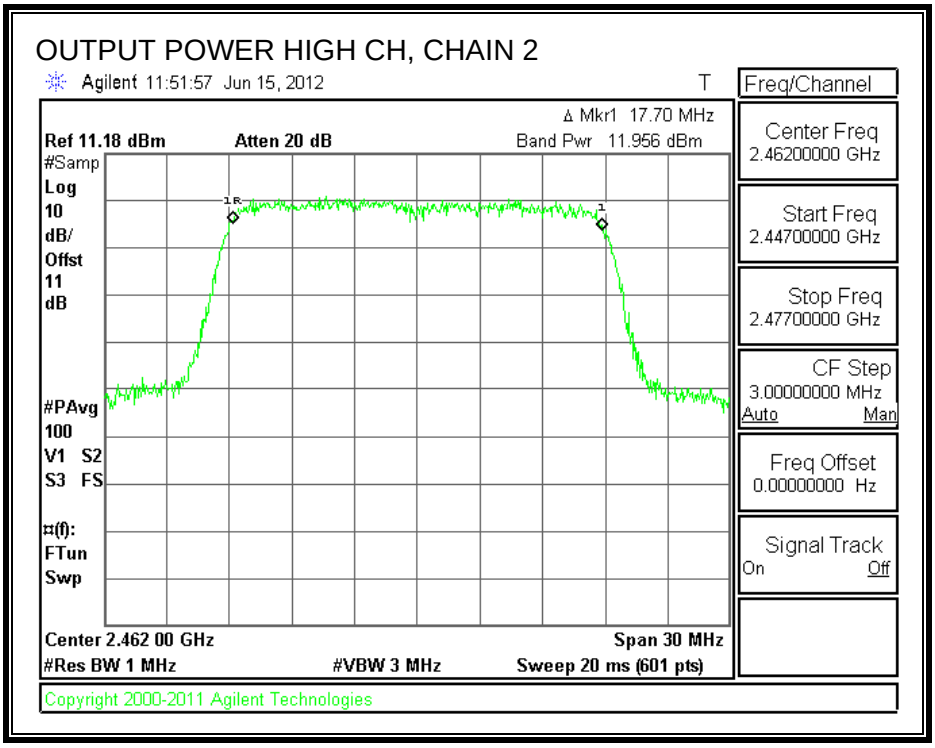




CHAIN 2 OUTPUT POWER







8.4.4. 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 dB (including 10 dB pad and 1.0 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	2412	12.71	12.03	15.39
Middle	2437	12.32	11.92	15.13
High	2462	12.12	11.87	15.01

8.4.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

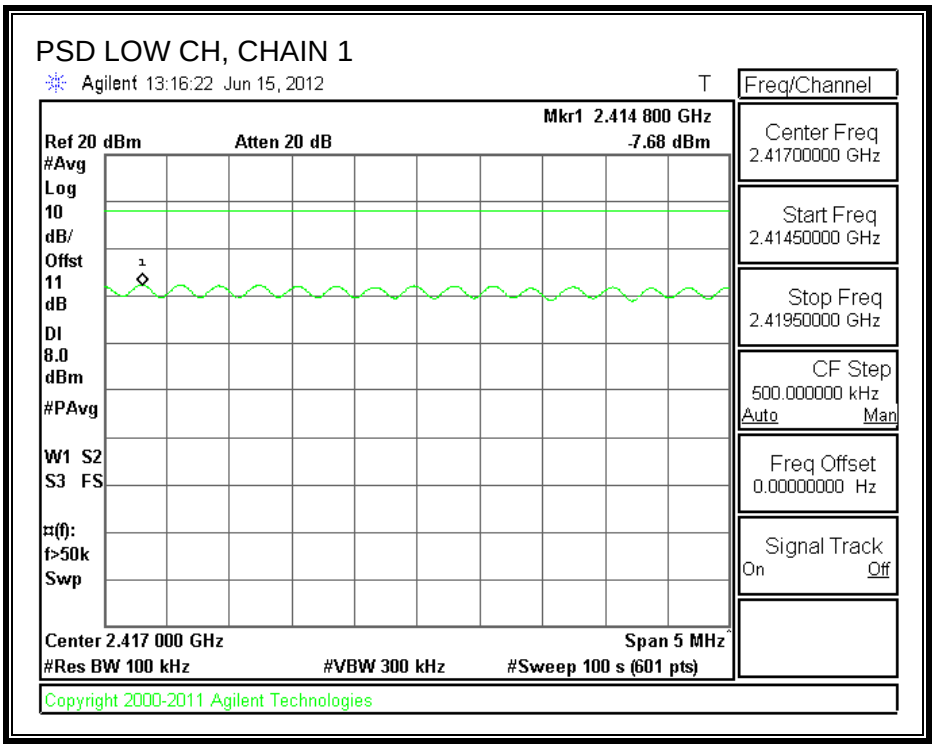
TEST PROCEDURE

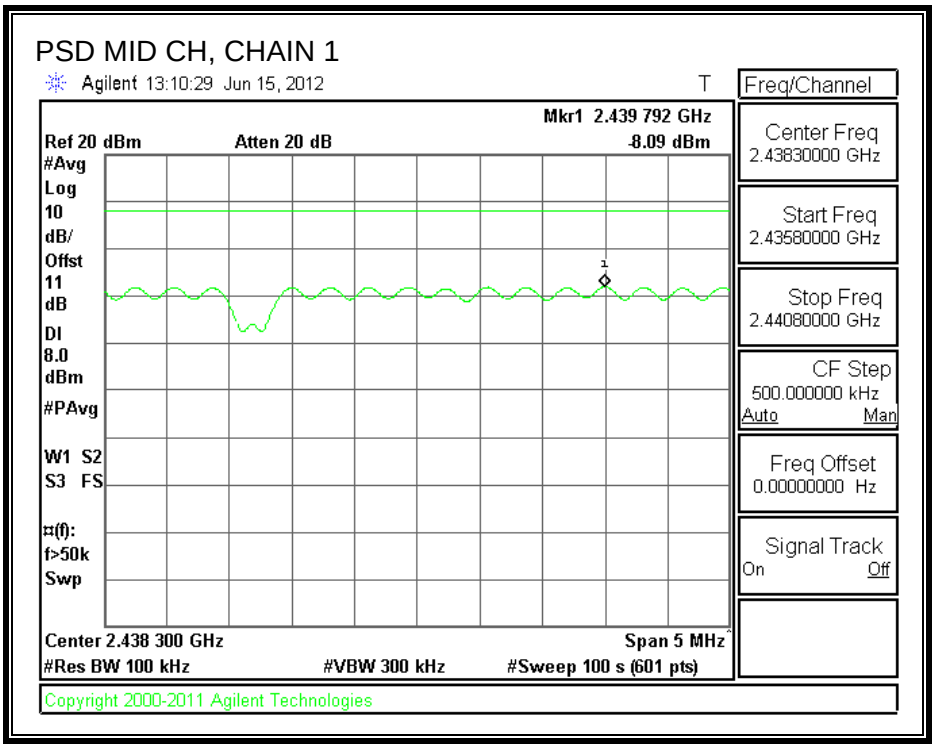
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

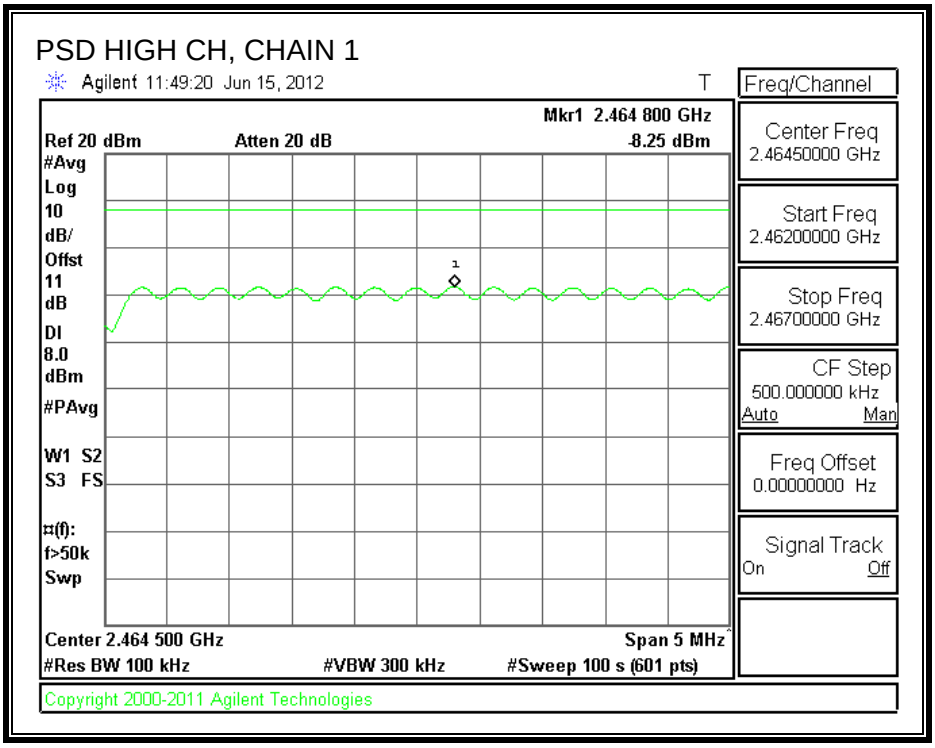
RESULTS

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-7.68	-7.82	-4.74	8	-12.74
Middle	2437	-8.09	-7.86	-4.96	8	-12.96
High	2462	-8.25	-8.01	-5.12	8	-13.12

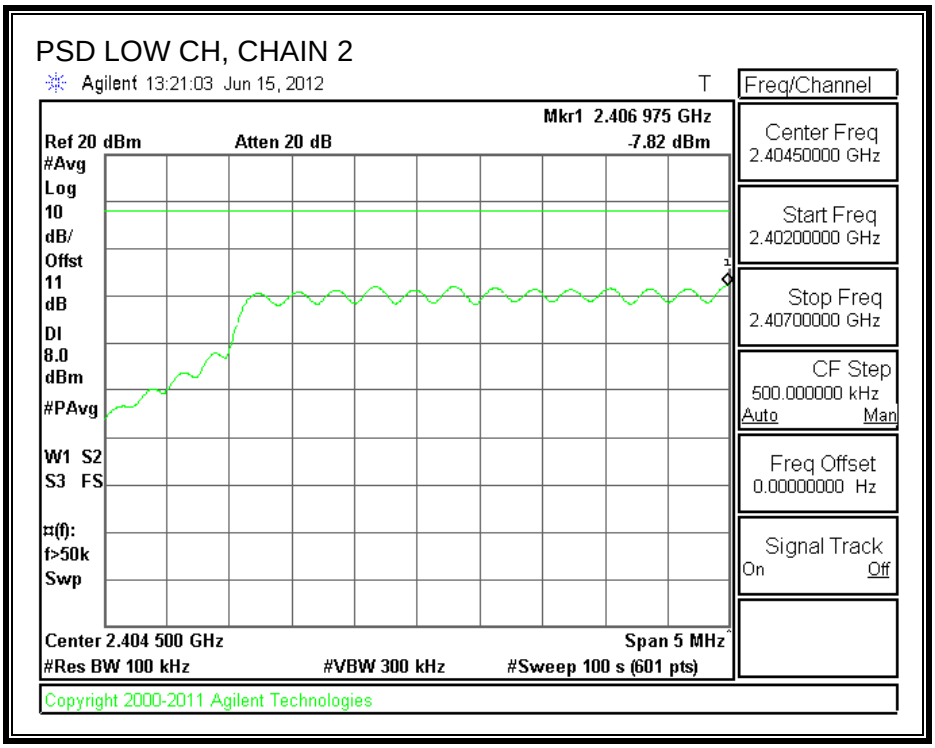
POWER SPECTRAL DENSITY, CHAIN 1

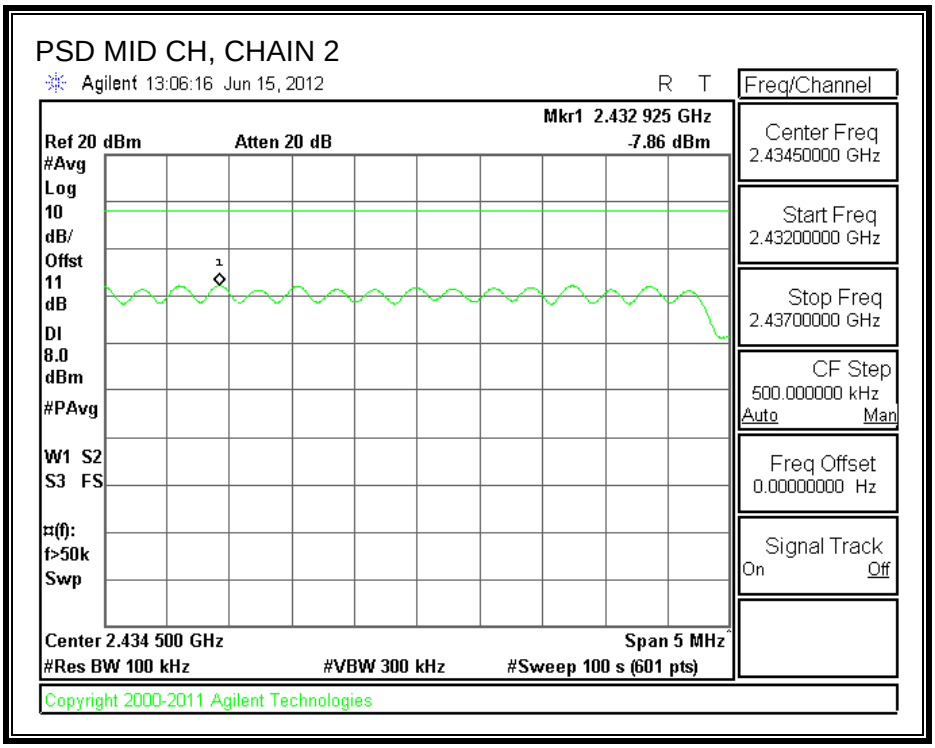


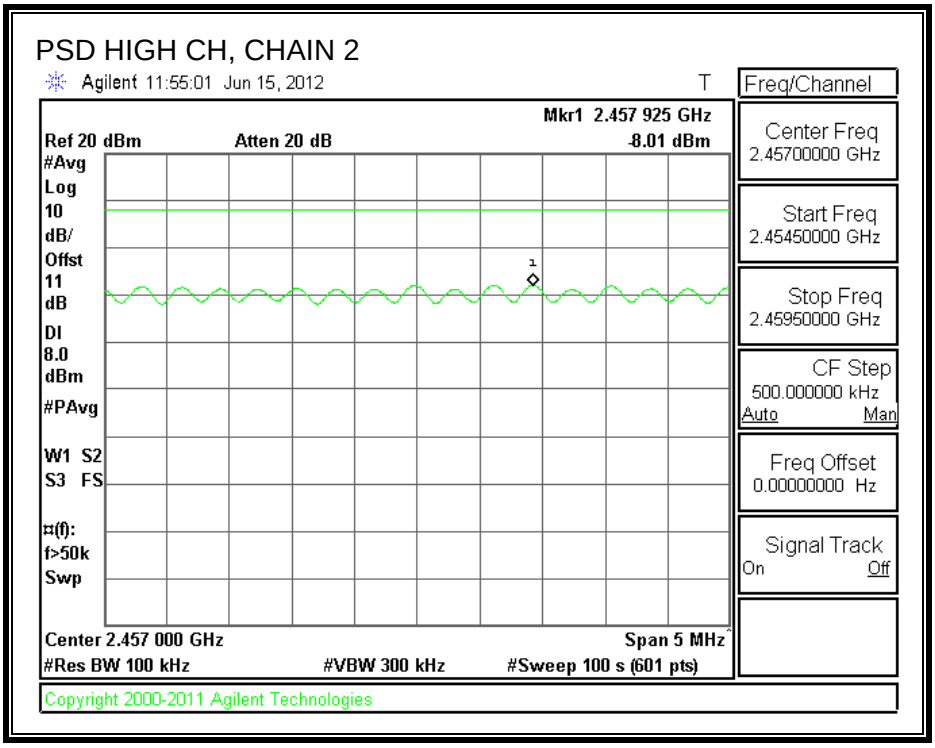




POWER SPECTRAL DENSITY, CHAIN 2







8.4.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

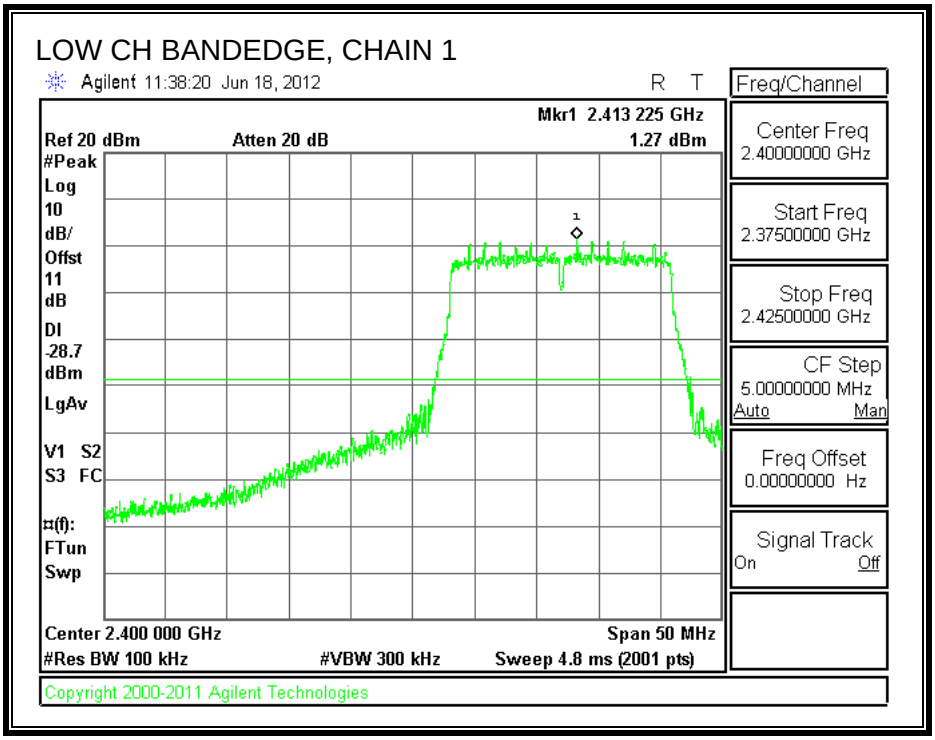
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

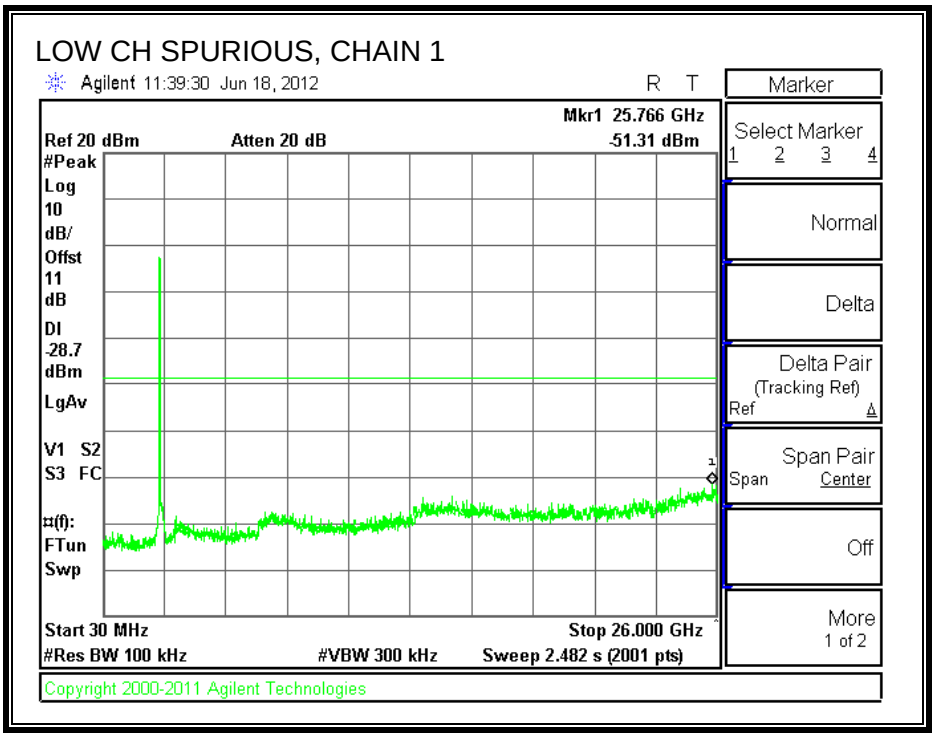
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

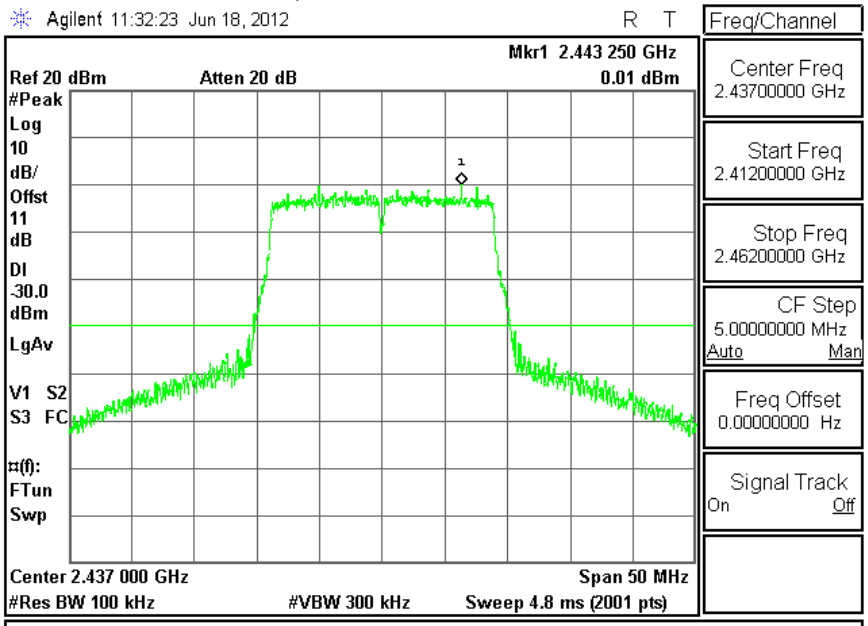
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

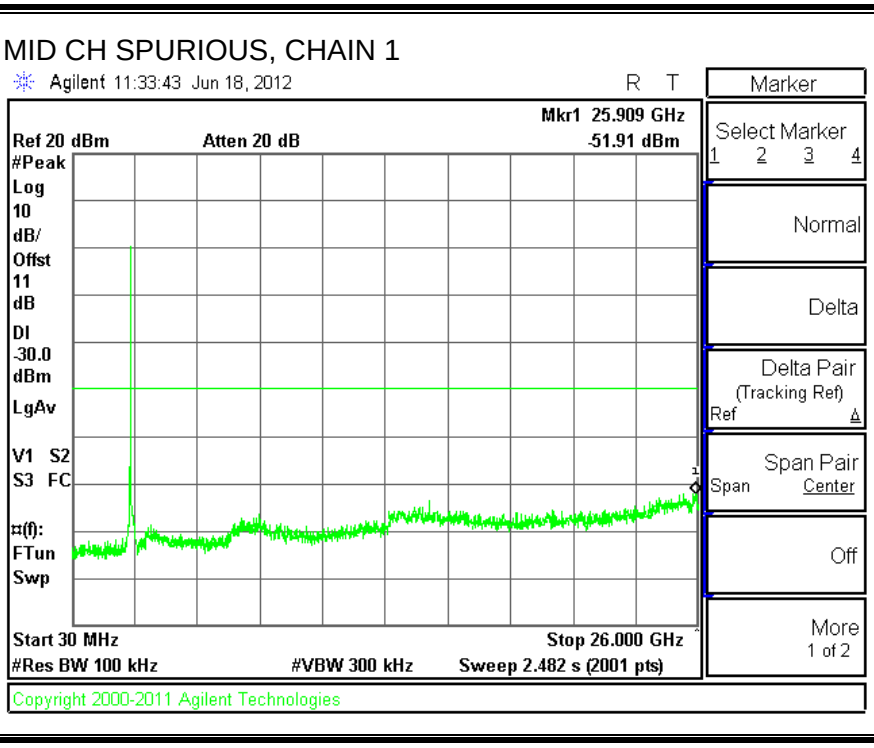




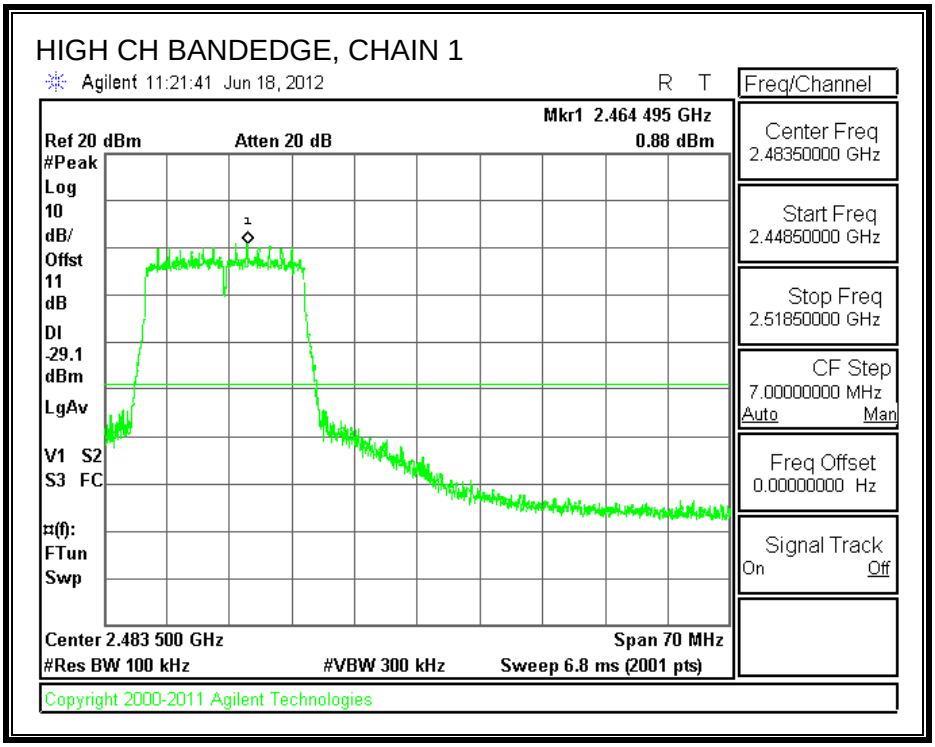
MID CH REFERENCE, CHAIN 1



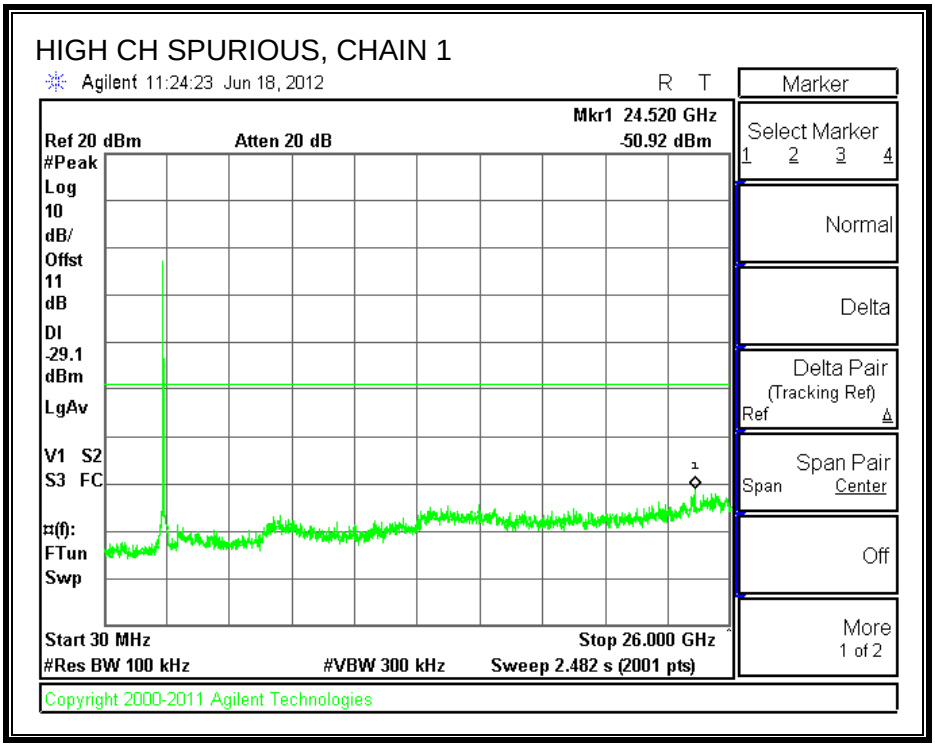
MID CH SPURIOUS, CHAIN 1



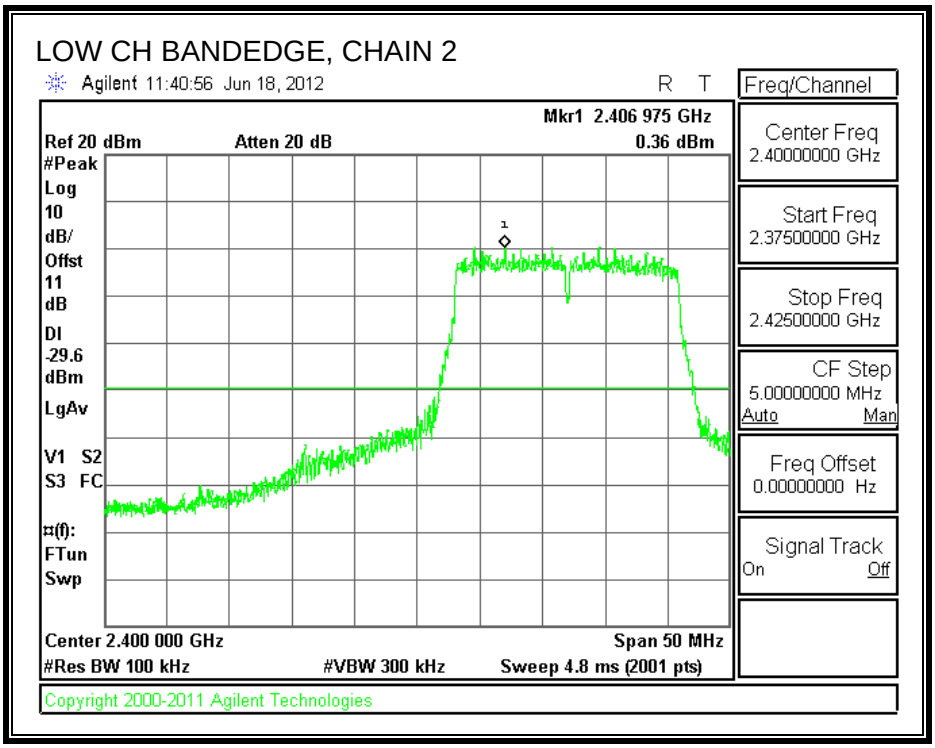
HIGH CH BANDEDGE, CHAIN 1

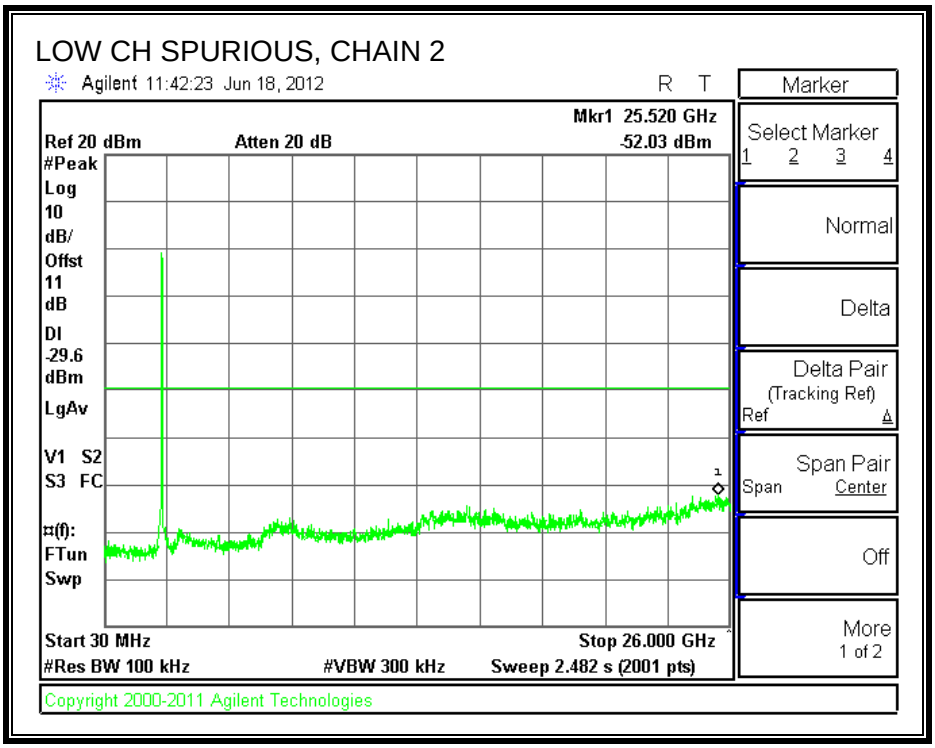


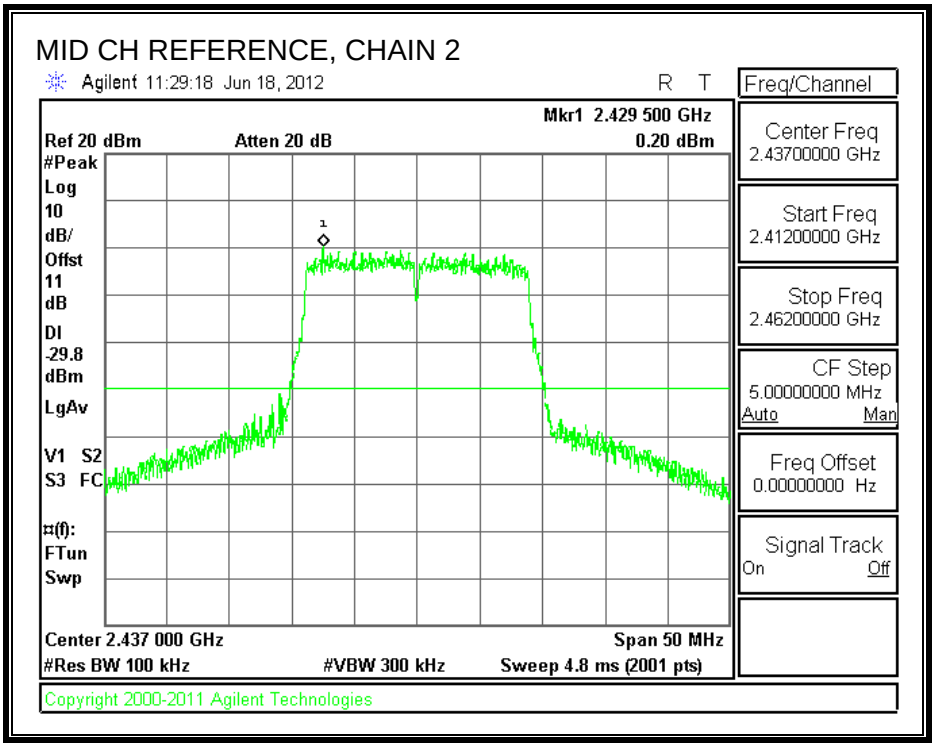
HIGH CH SPURIOUS, CHAIN 1

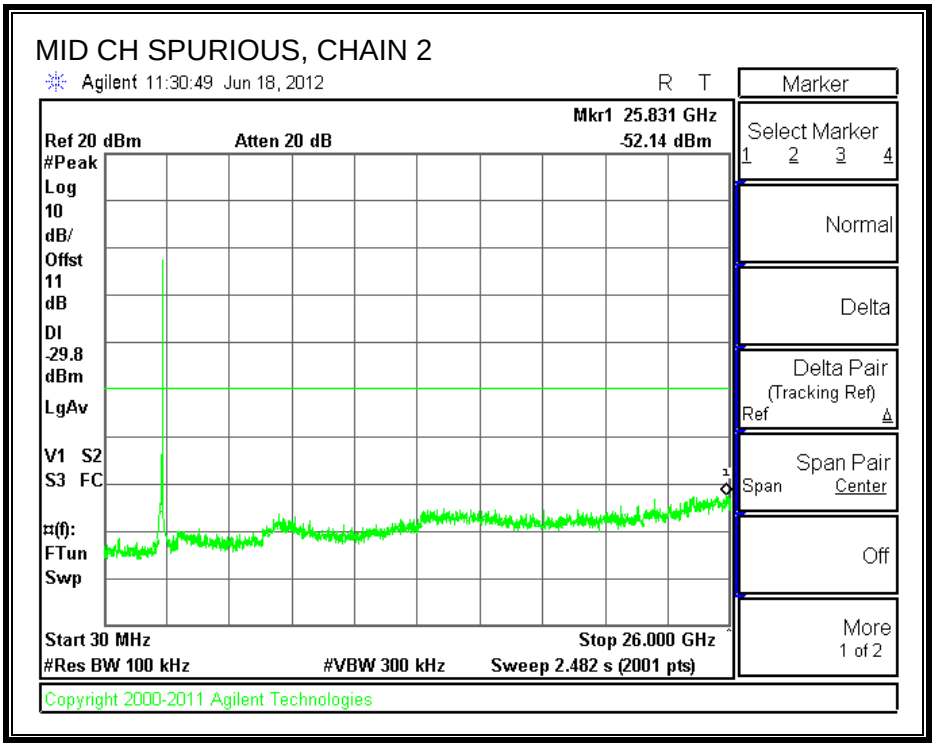


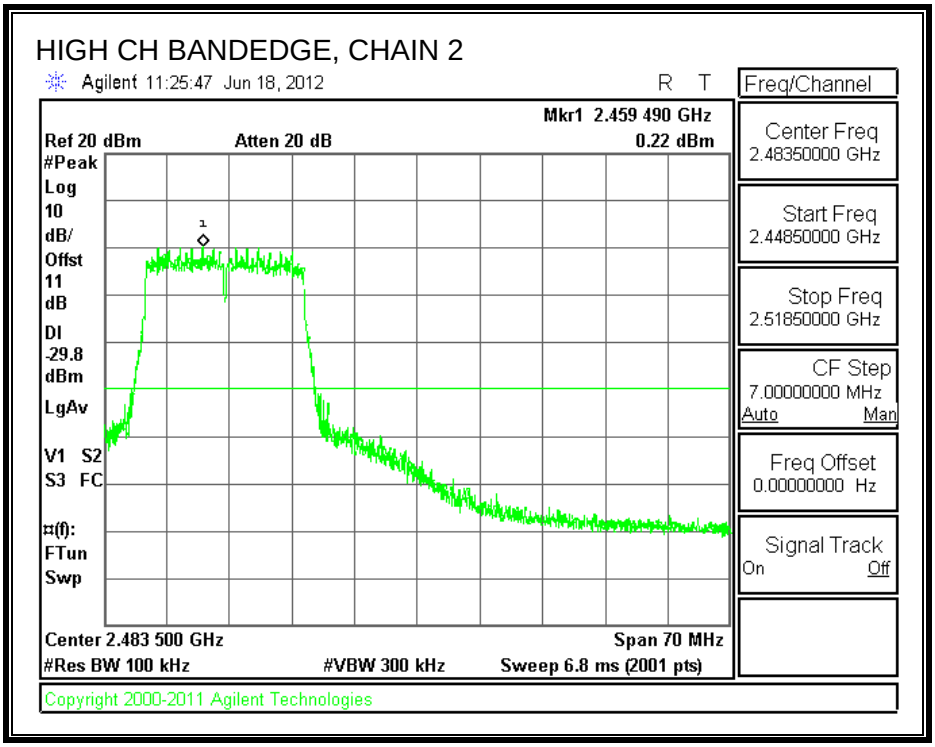
CHAIN 2 SPURIOUS EMISSIONS

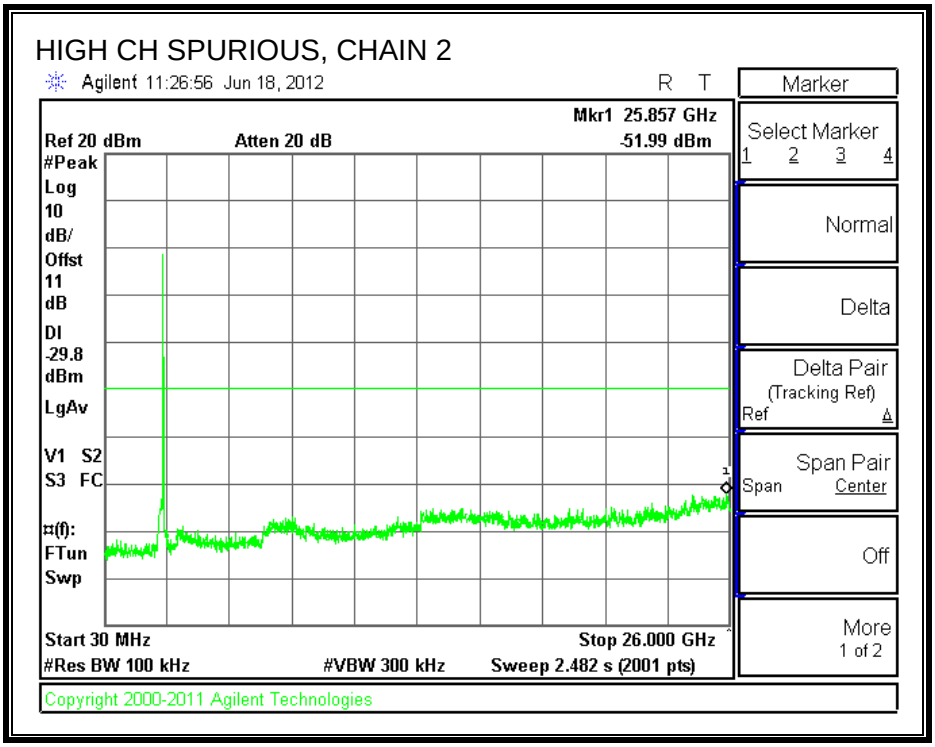












8.5. 802.11n HT40 MODE IN THE 2.4 GHz BAND

8.5.1. 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.

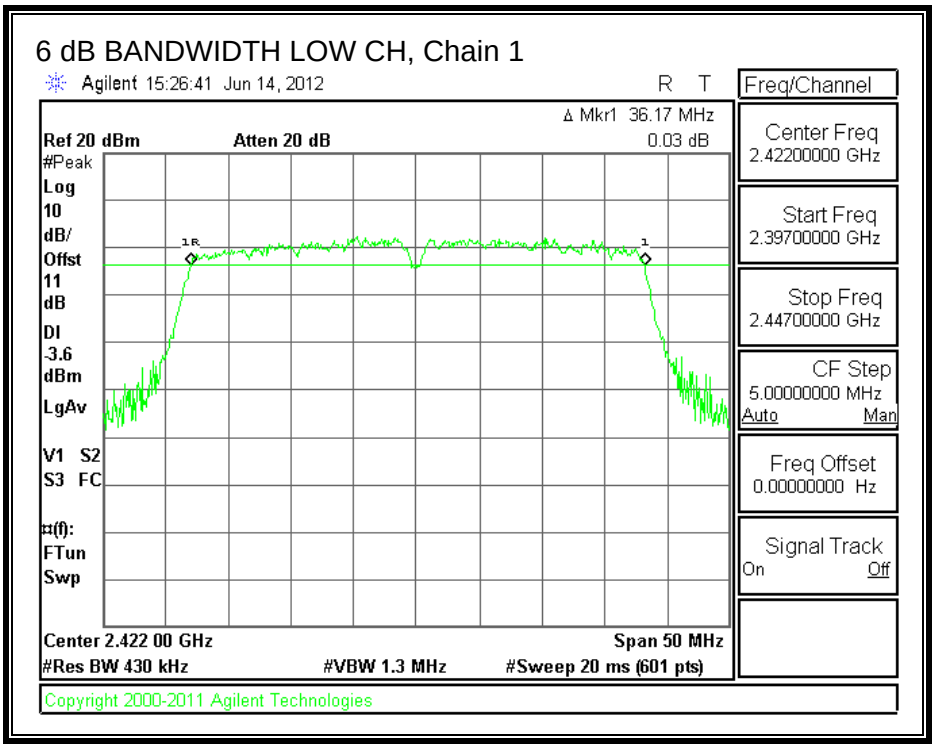
TEST PROCEDURE

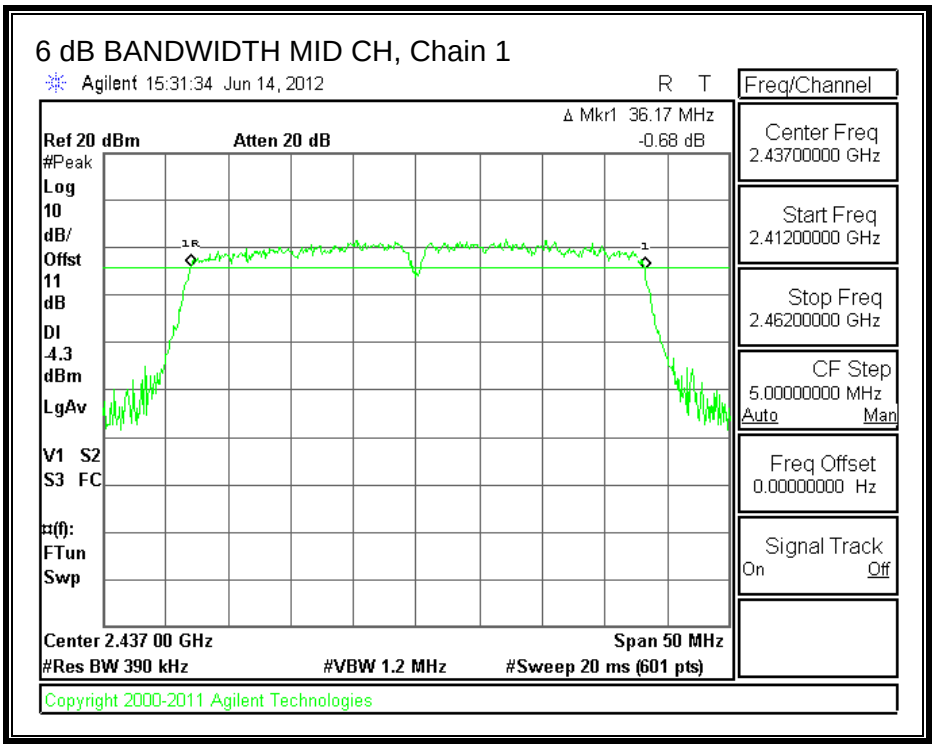
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

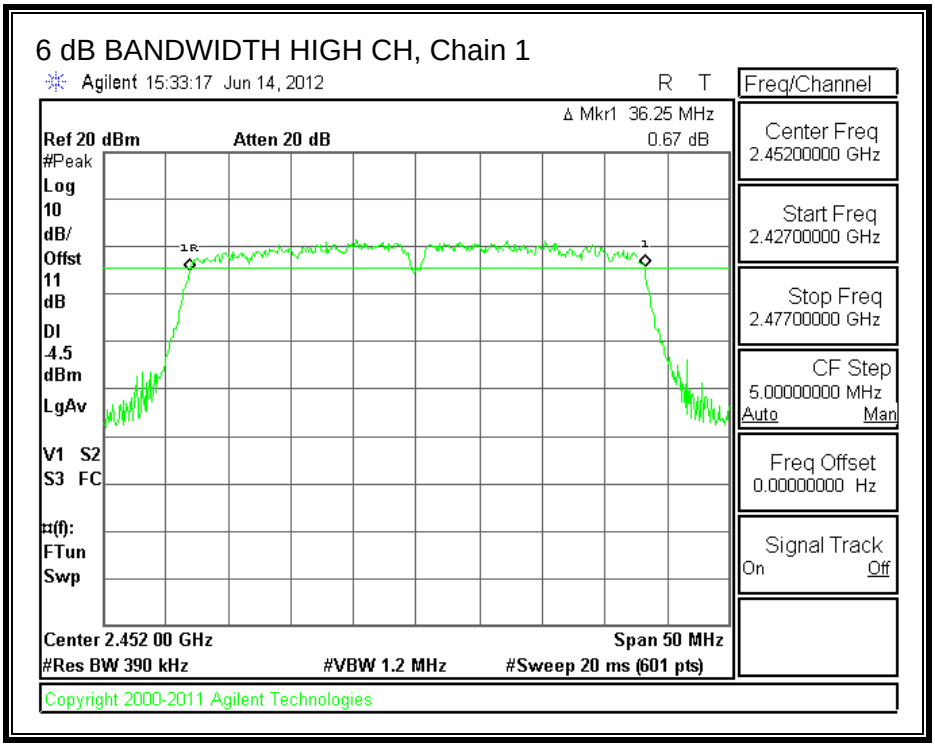
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB Bandwidth (MHz)	Chain 2 6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2422	36.1700	35.8300	0.5
Middle	2437	36.1700	36.1700	0.5
High	2452	36.2500	36.0000	0.5

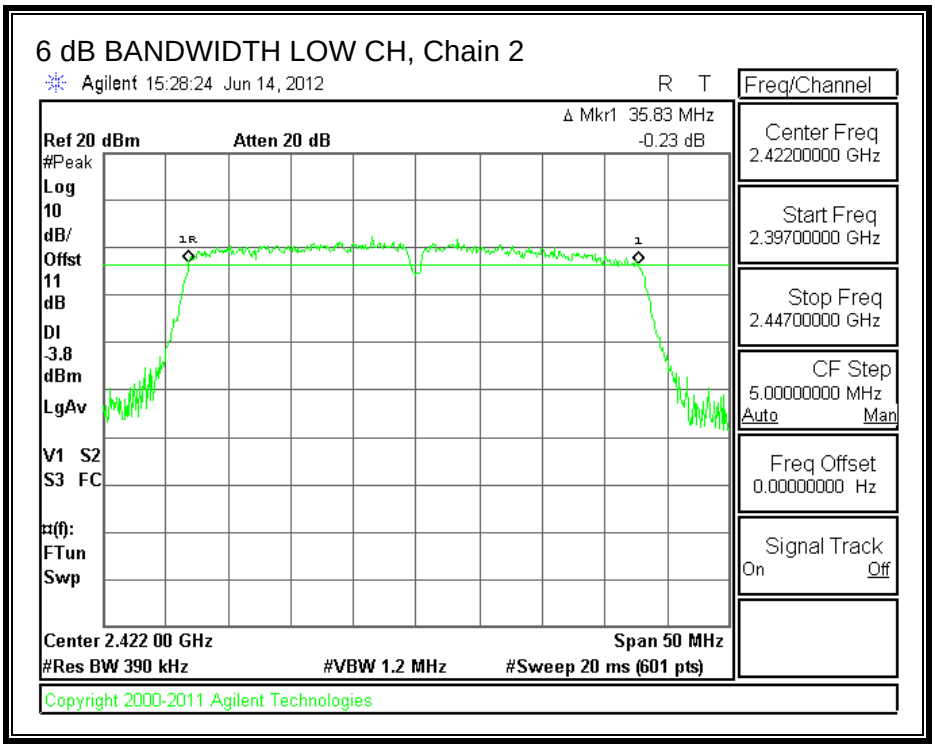
6 dB BANDWIDTH, Chain 1

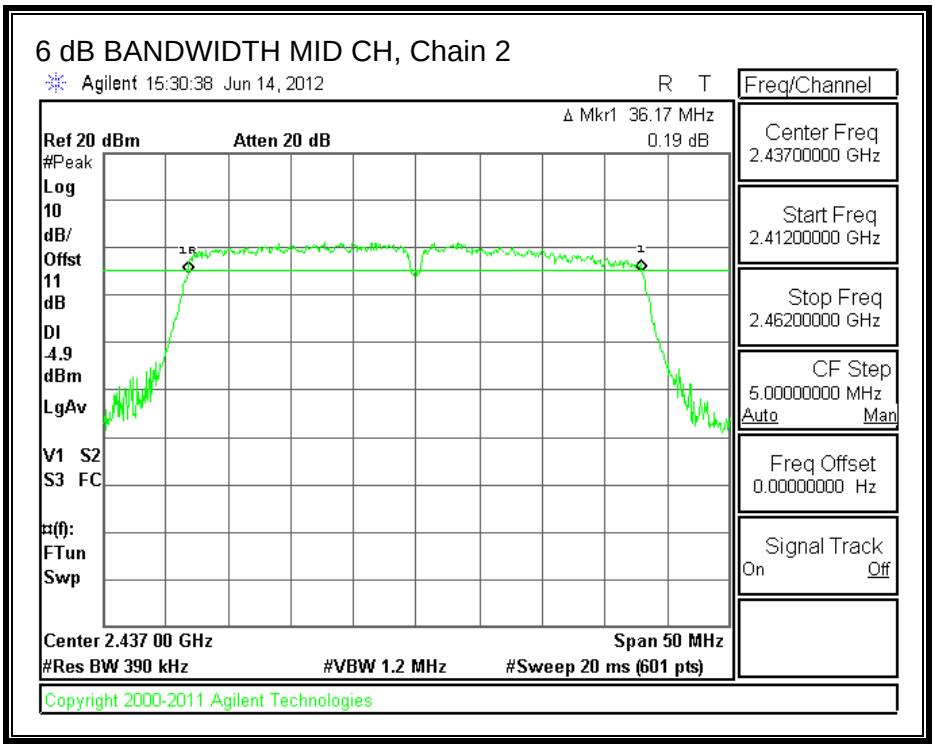


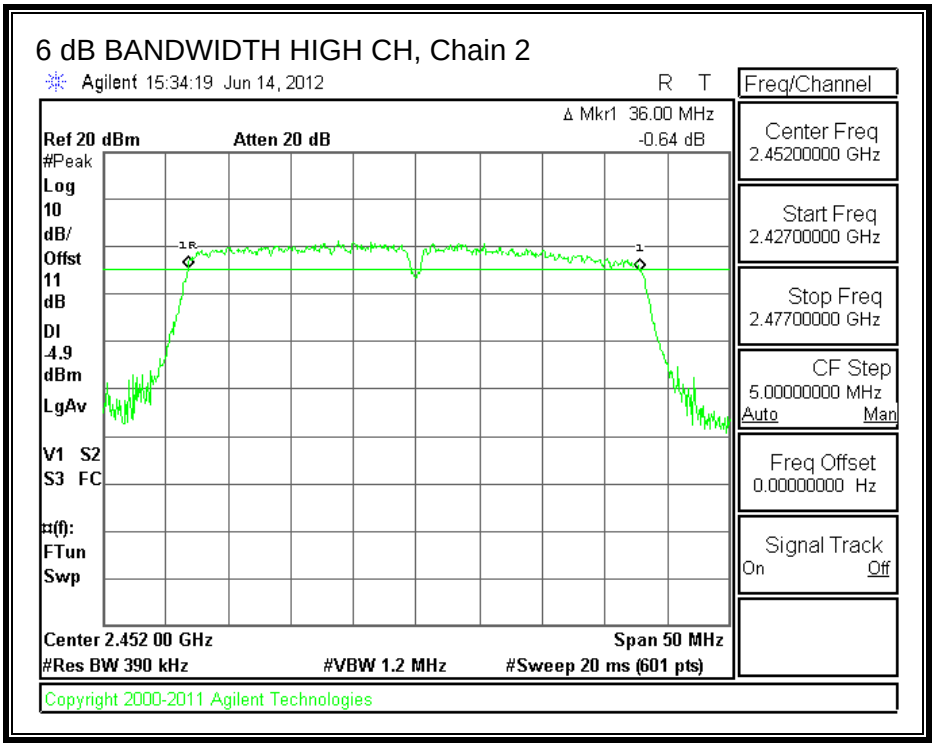




6 dB BANDWIDTH, Chain 2







8.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

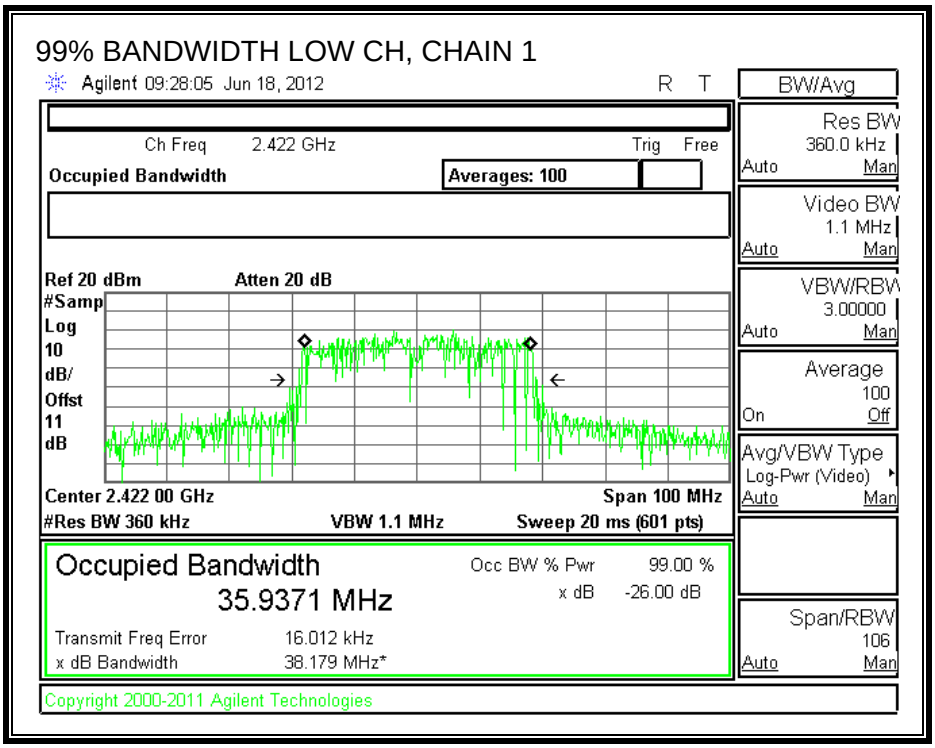
TEST PROCEDURE

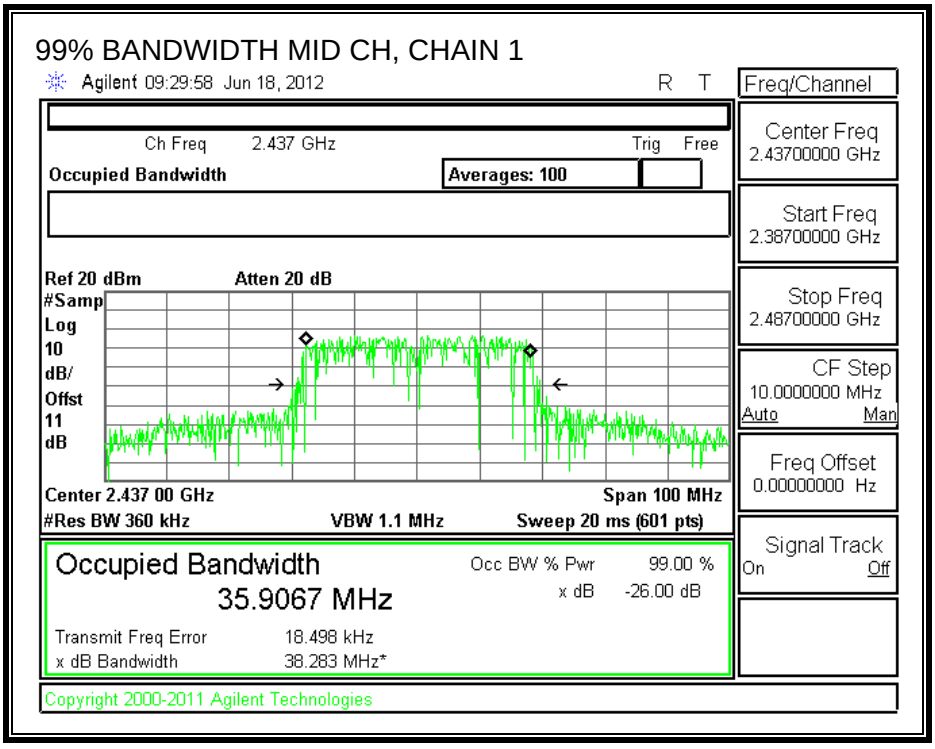
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

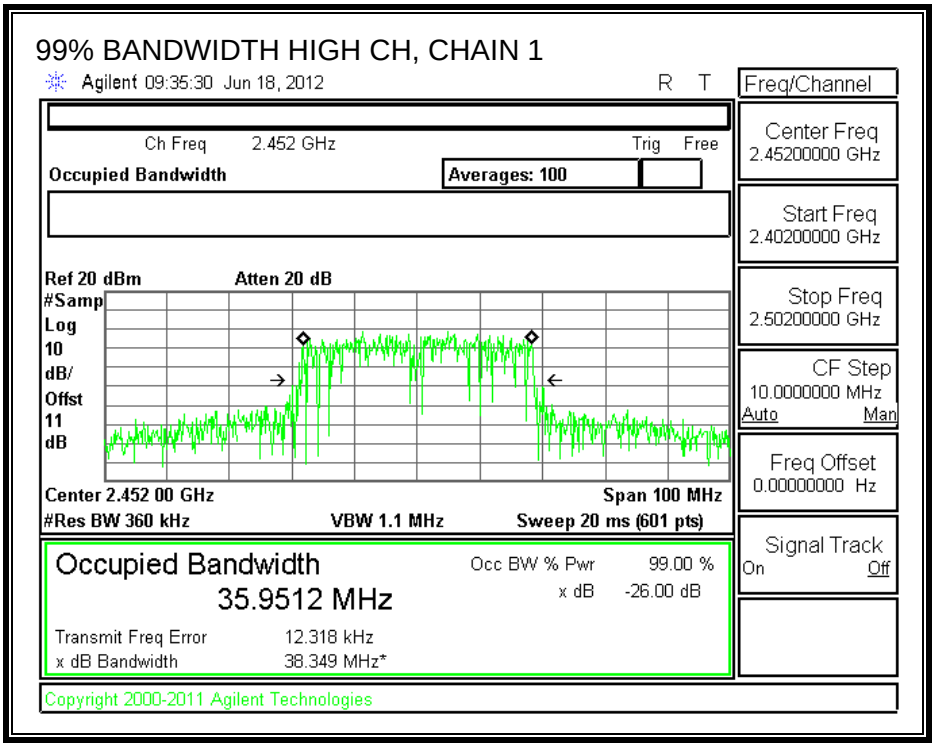
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	2422	35.9371	35.9005
Middle	2437	35.9067	35.9086
High	2452	35.9512	35.8908

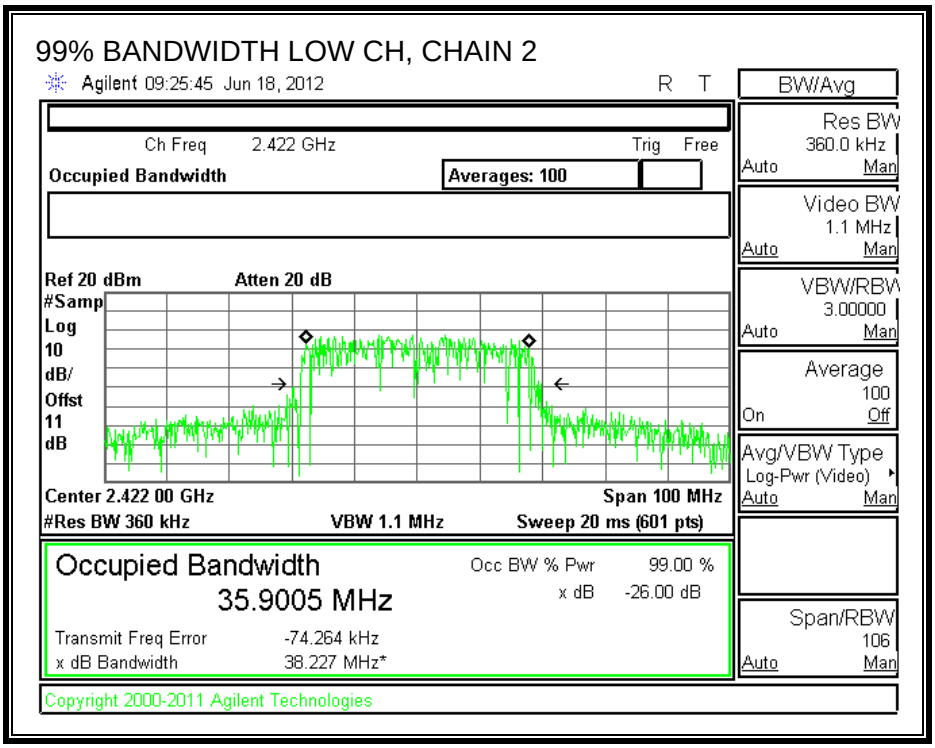
99% BANDWIDTH, CHAIN 1

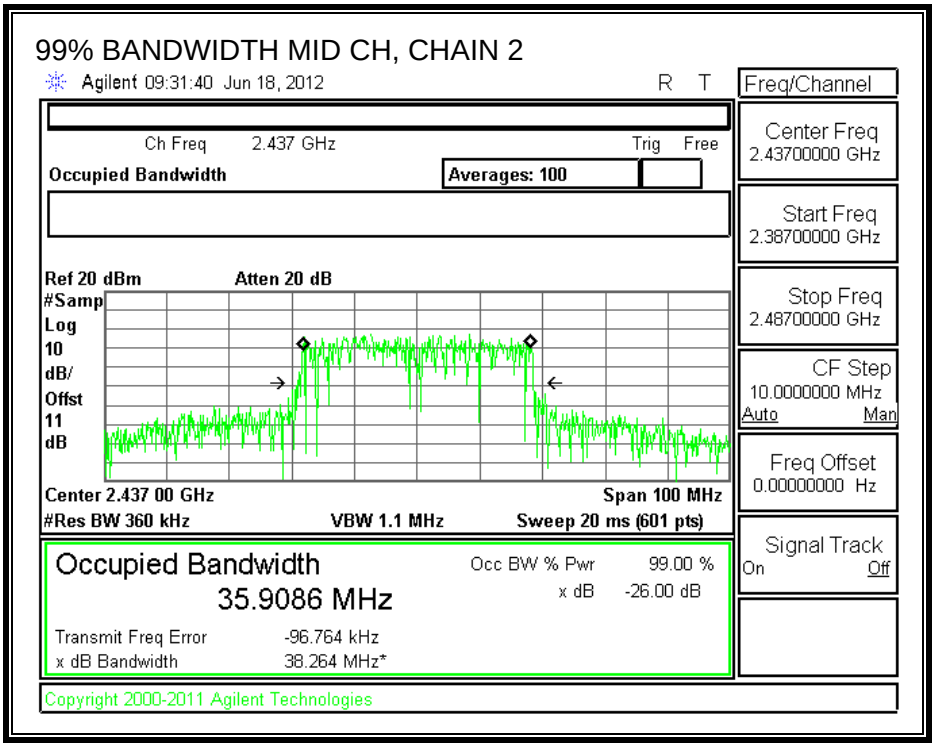


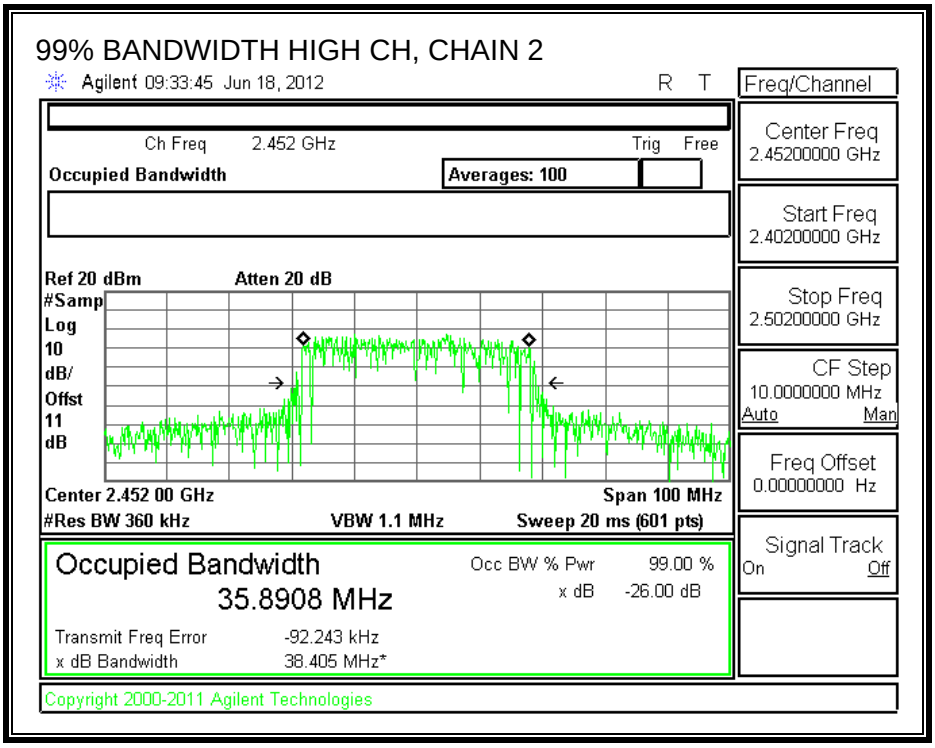




99% BANDWIDTH, CHAIN 2







8.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.00	3.01	7.01

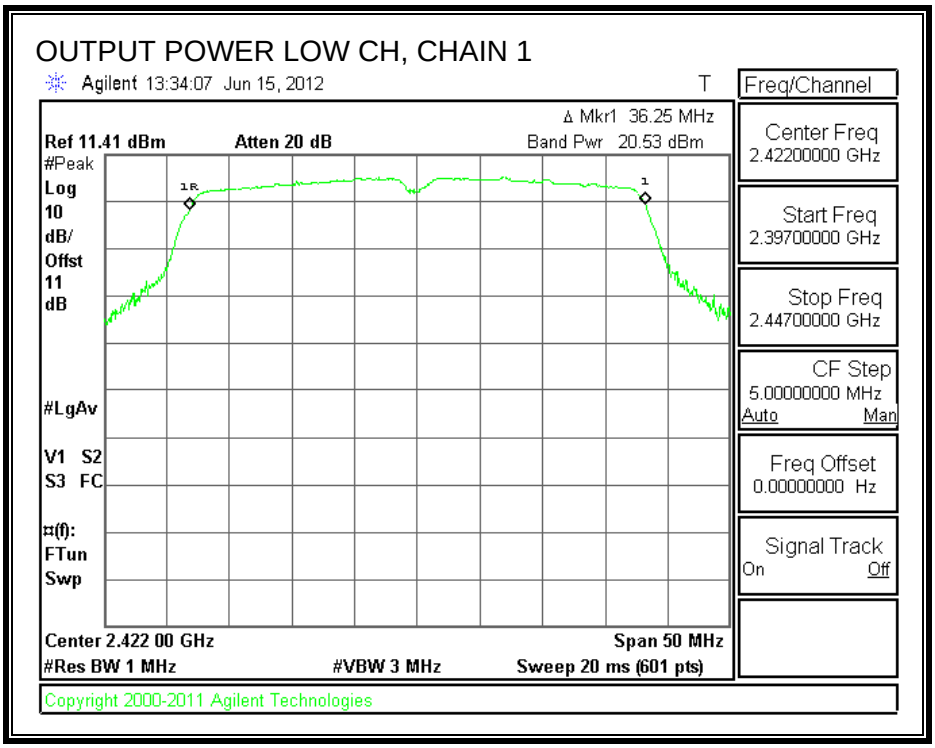
TEST PROCEDURE

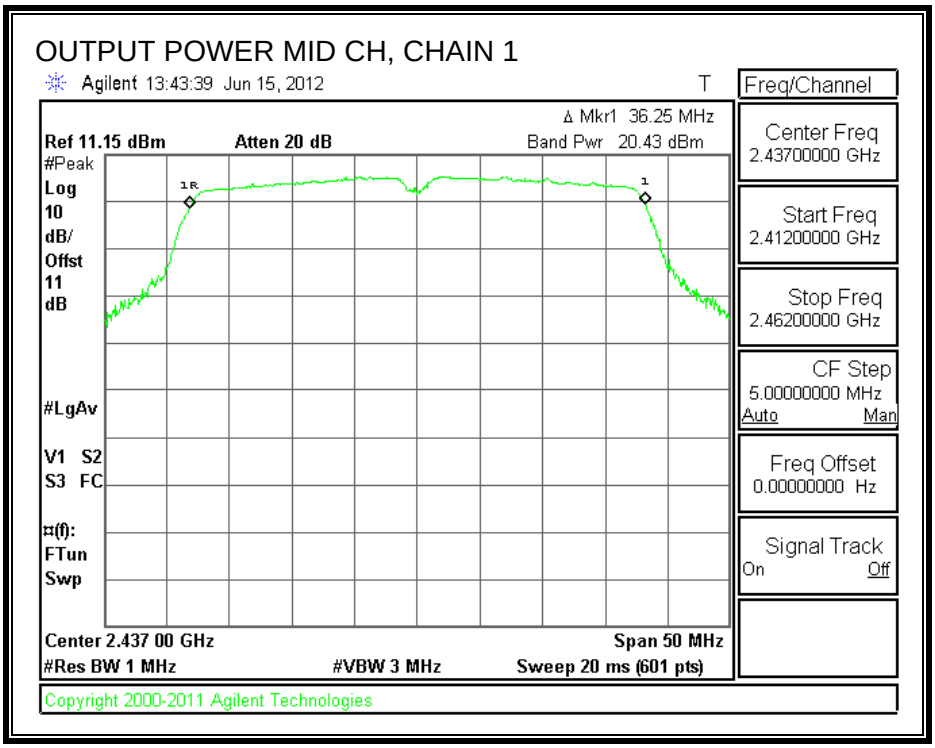
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

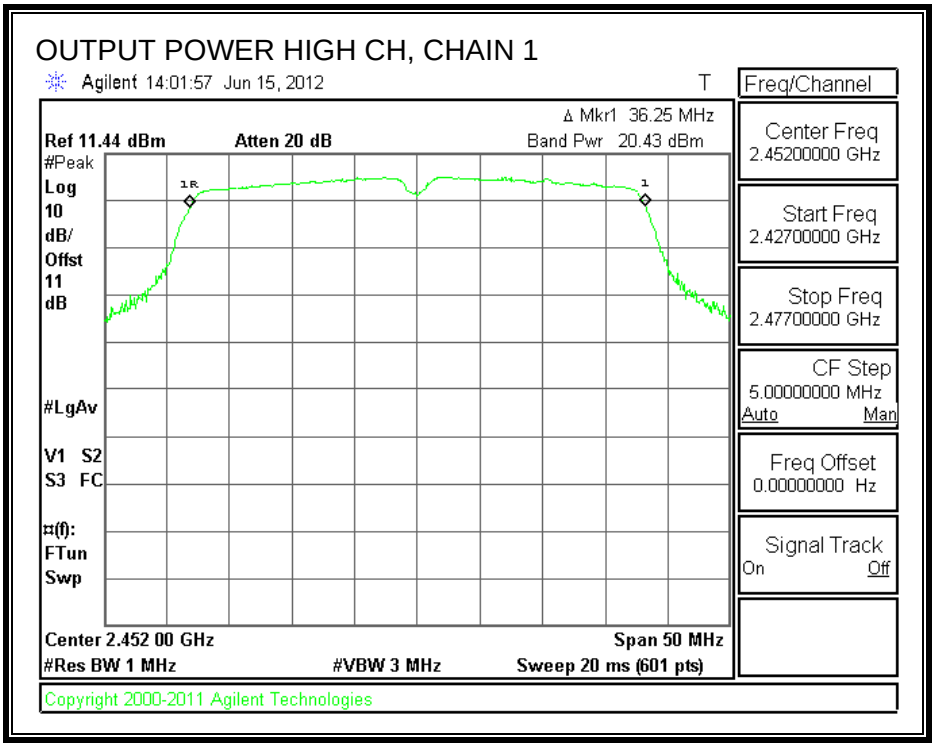
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2422	20.53	19.92	0.00	23.25	28.99	-5.74
Mid	2437	20.43	20.22	0.00	23.34	28.99	-5.65
High	2452	20.43	19.89	0.00	23.18	28.99	-5.81

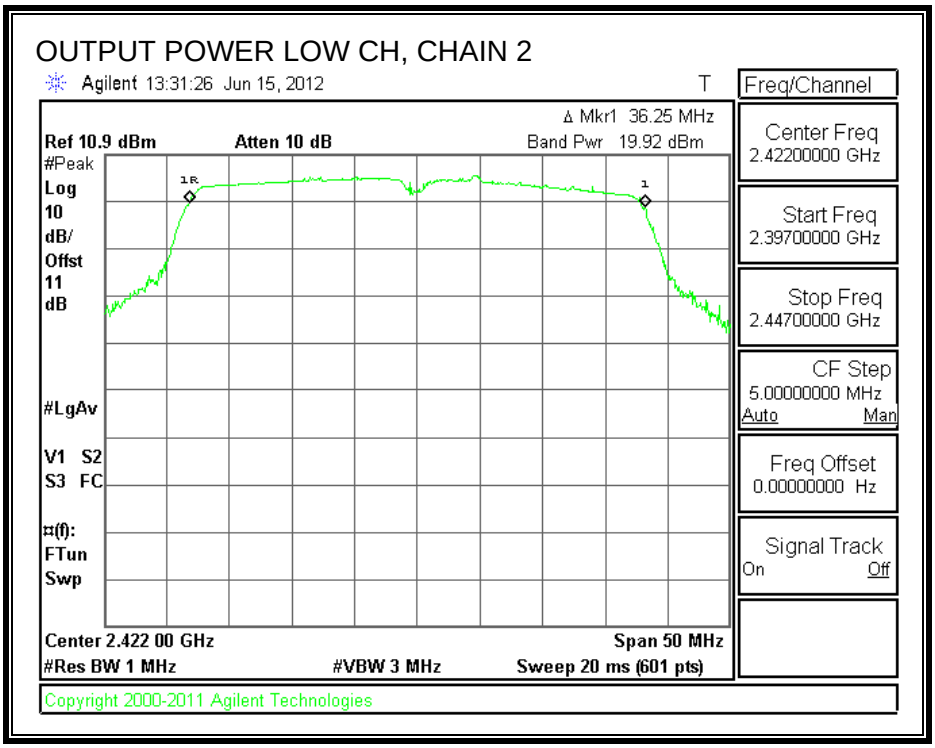
CHAIN 1 OUTPUT POWER

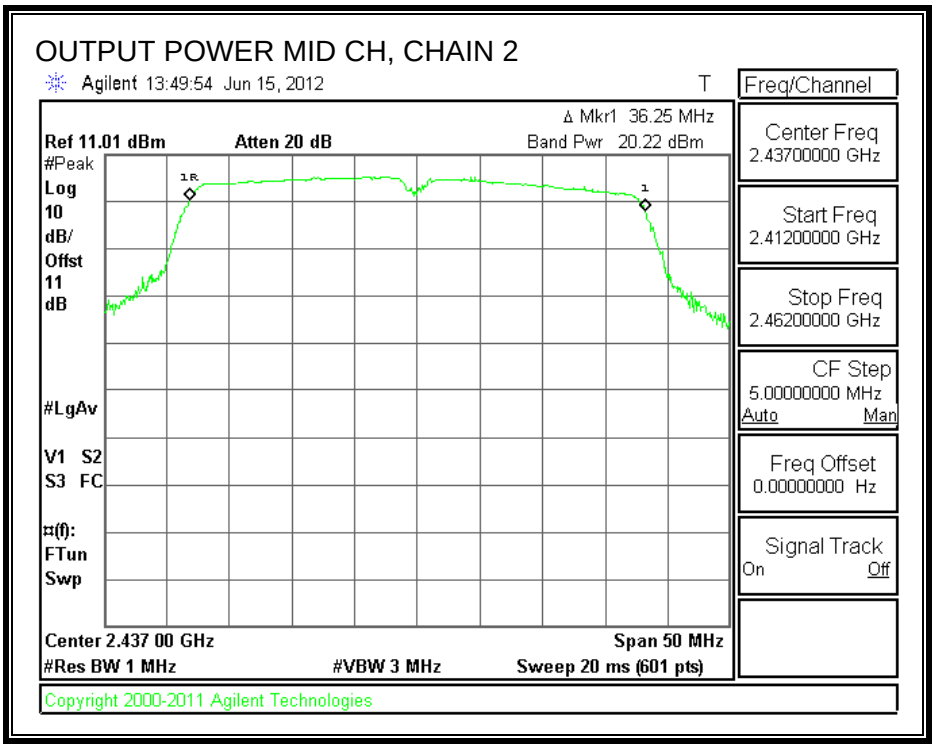


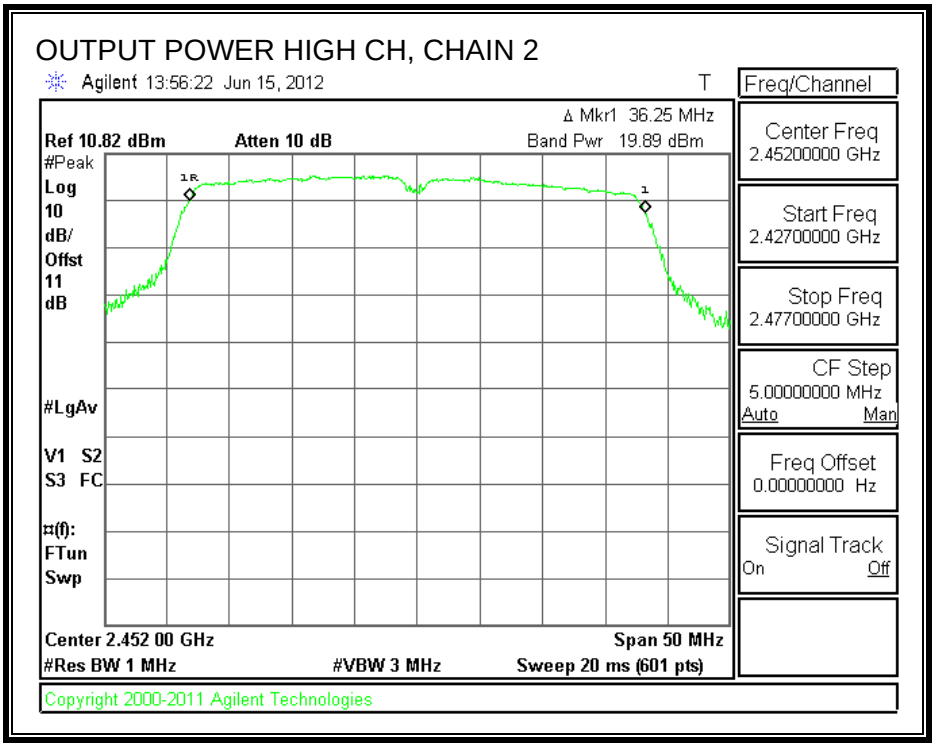




CHAIN 2 OUTPUT POWER







8.5.4. 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 dB (including 10 dB pad and 1.0 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	2422	11.94	11.34	14.66
Middle	2437	11.74	11.24	14.51
High	2452	11.52	11.12	14.33

8.5.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

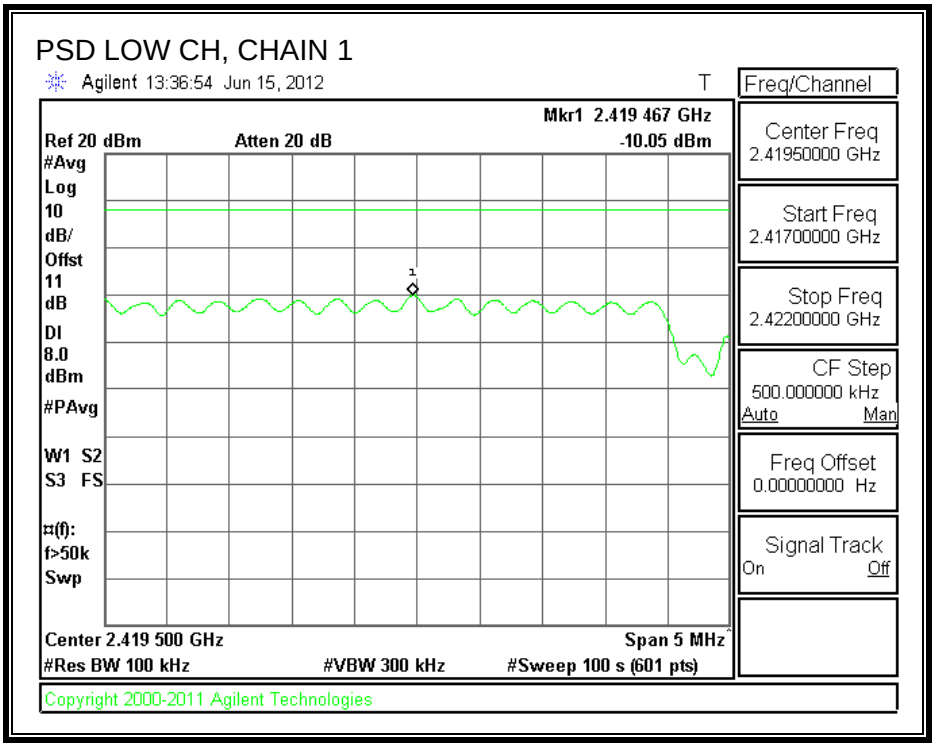
TEST PROCEDURE

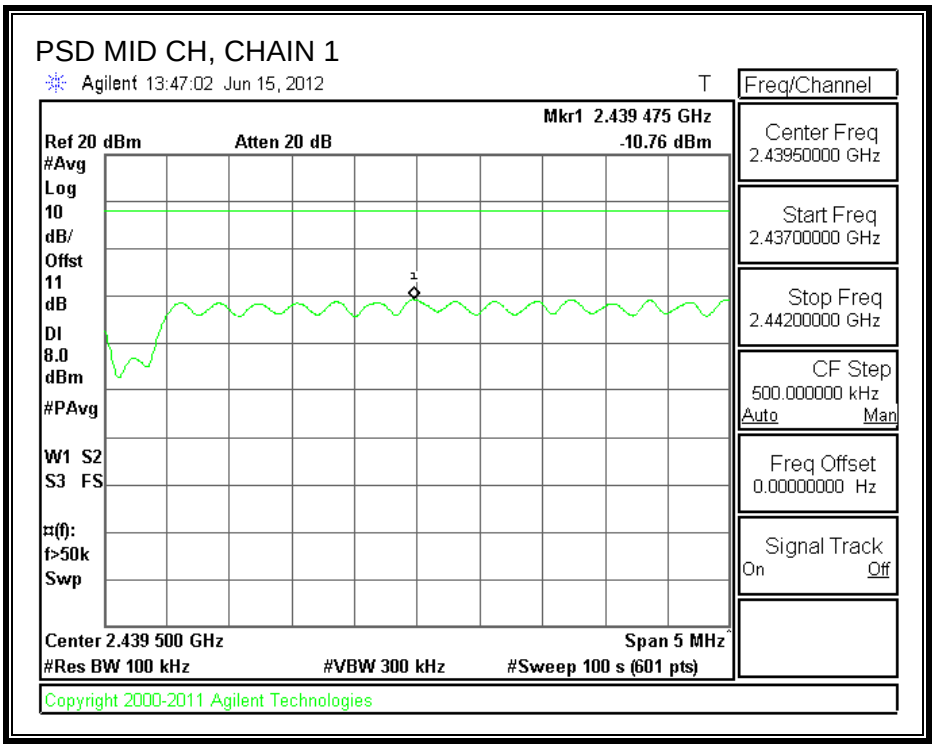
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

RESULTS

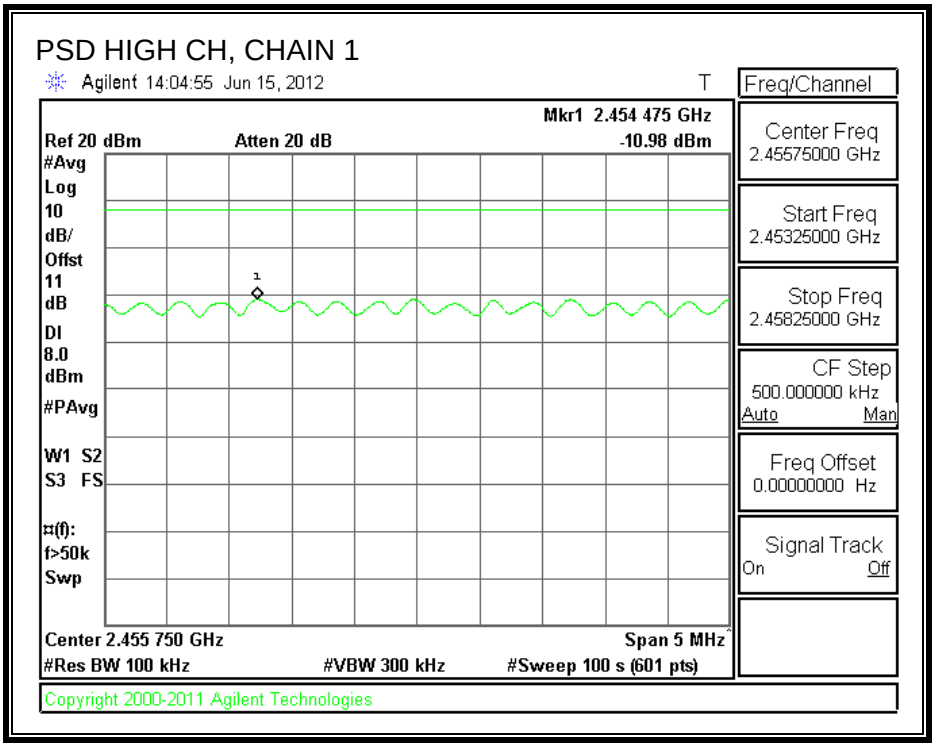
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2422	-10.05	-10.76	-7.38	8	-15.38
Middle	2437	-10.76	-10.84	-7.79	8	-15.79
High	2452	-10.98	-11.06	-8.01	8	-16.01

POWER SPECTRAL DENSITY, CHAIN 1

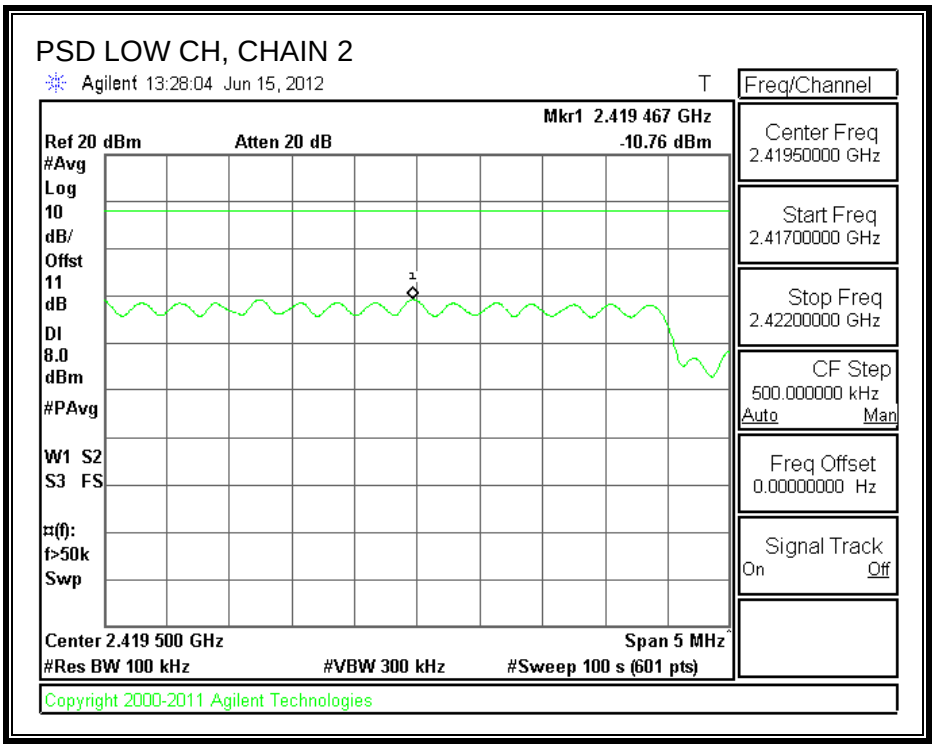


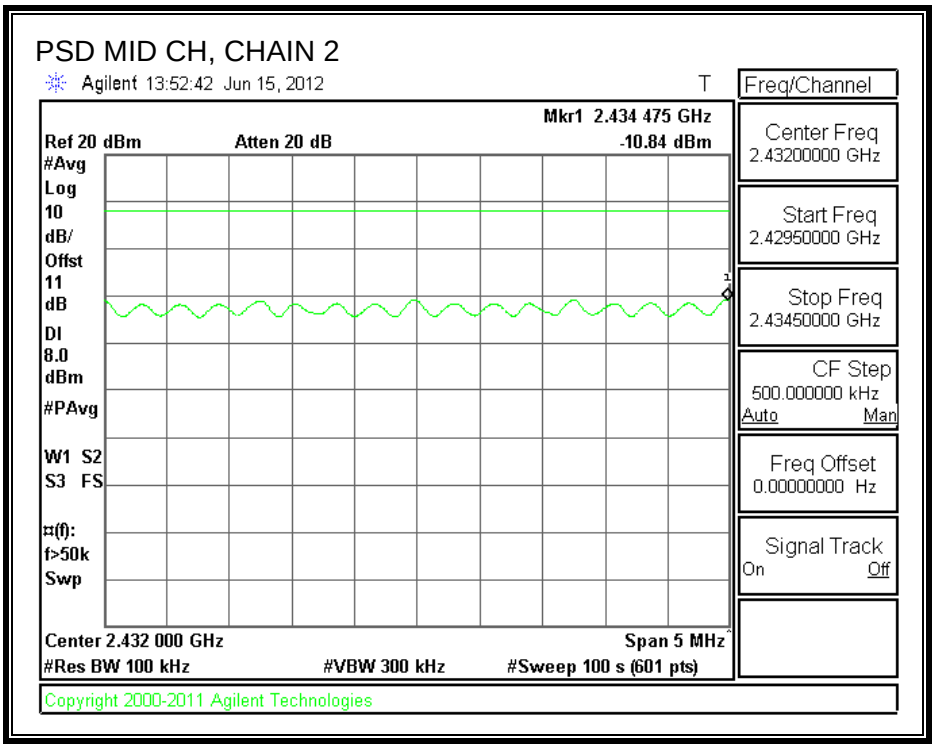


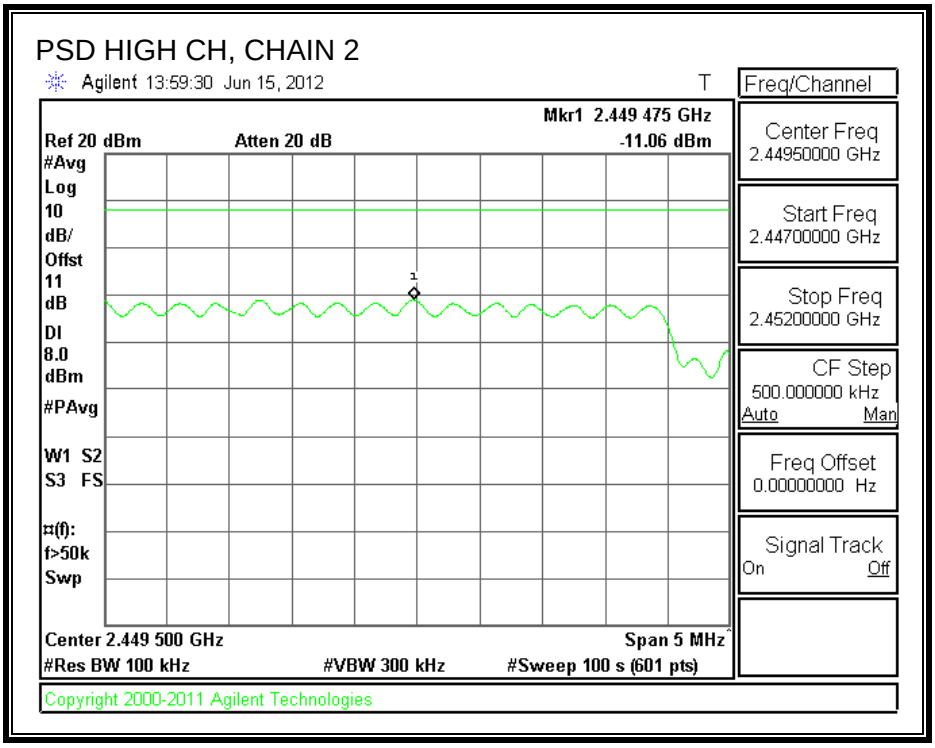
PSD HIGH CH, CHAIN 1



POWER SPECTRAL DENSITY, CHAIN 2







8.5.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

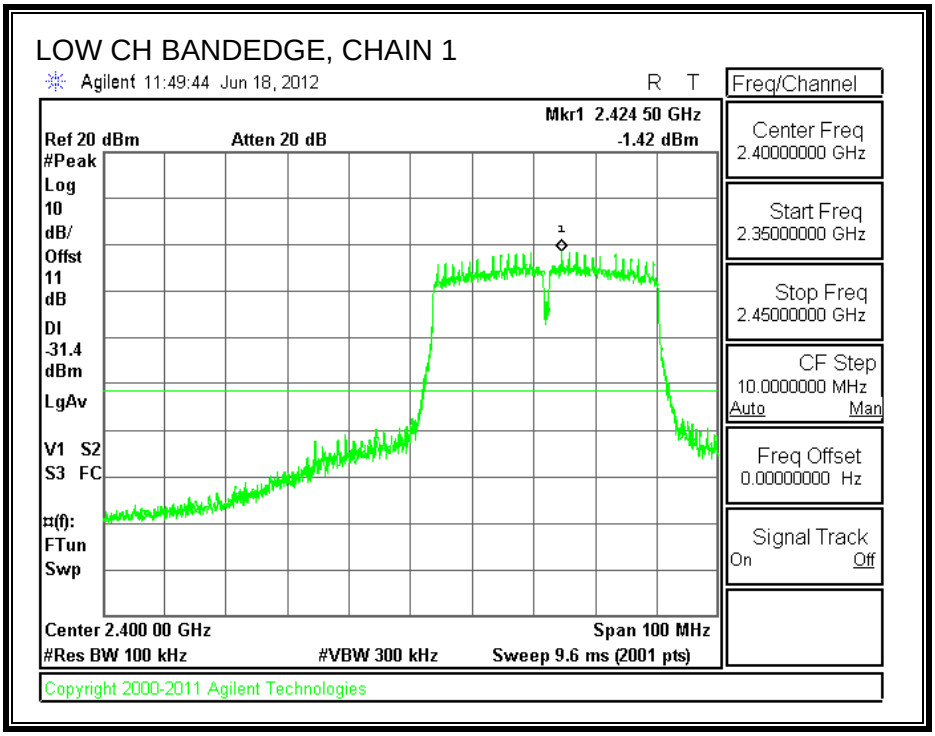
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

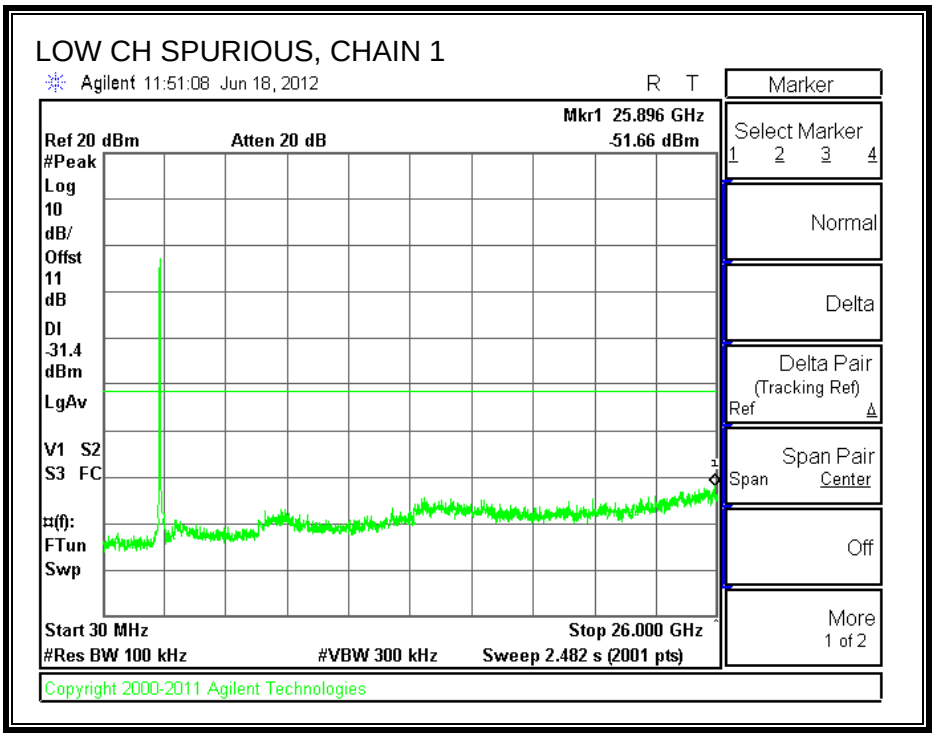
TEST PROCEDURE

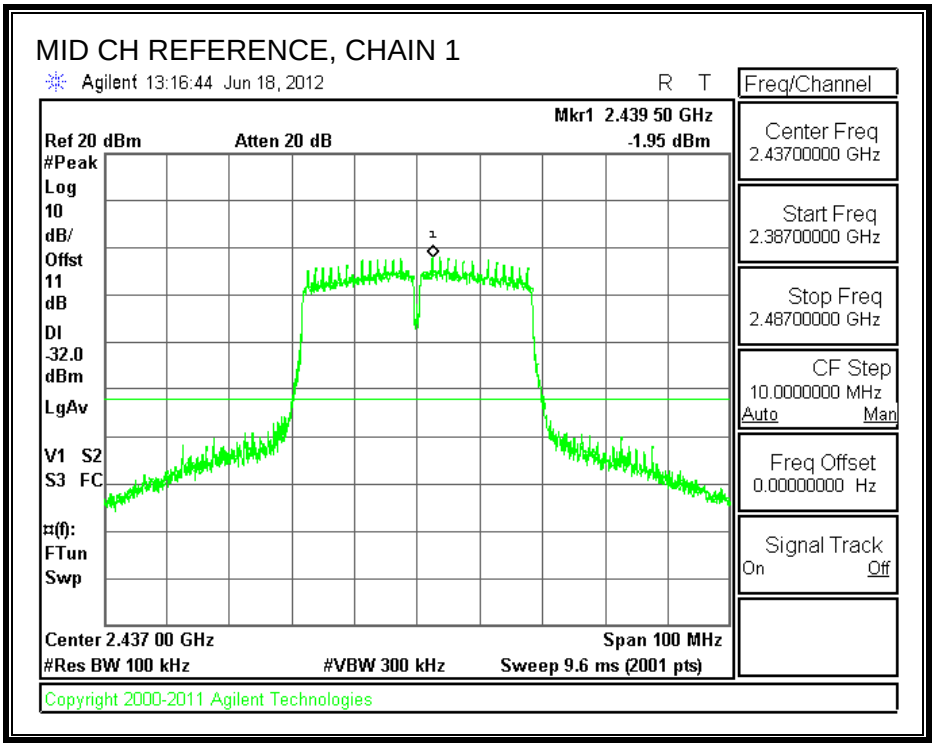
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

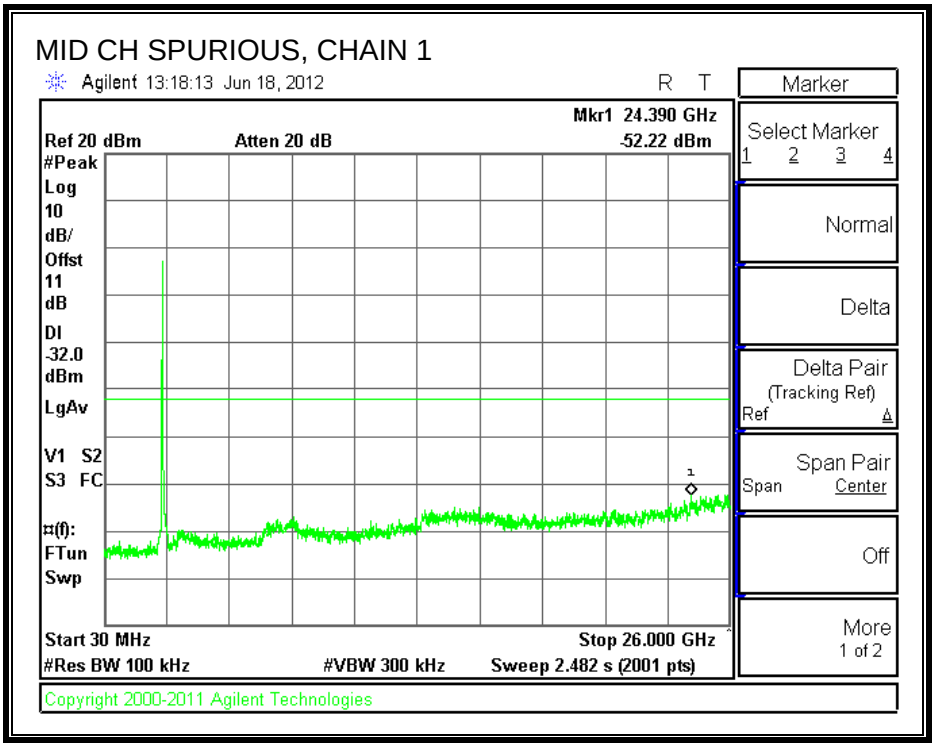
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

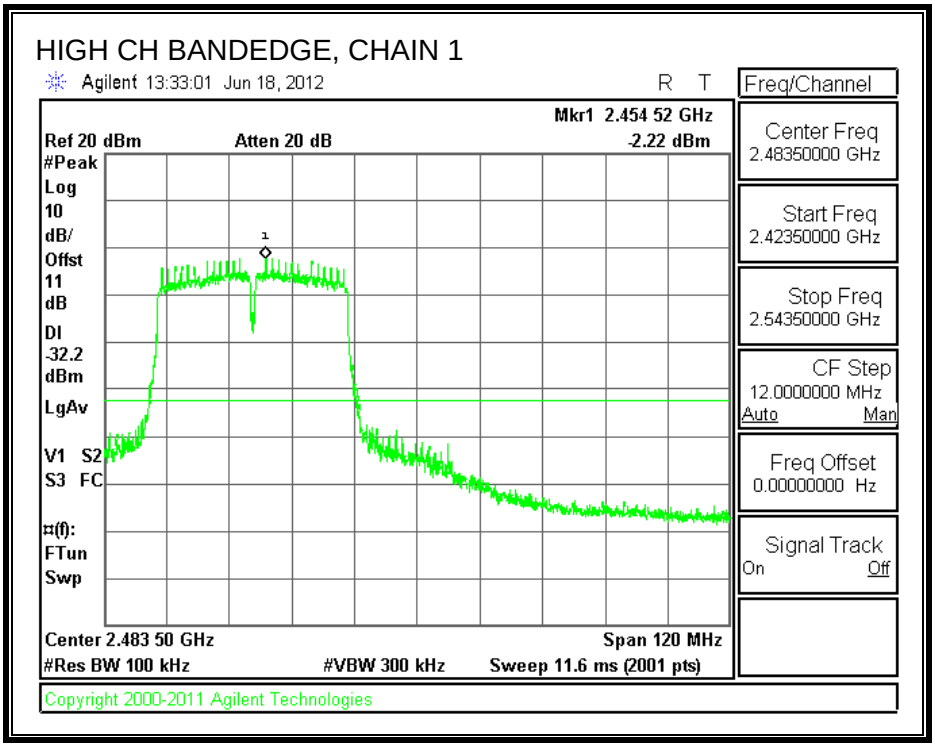




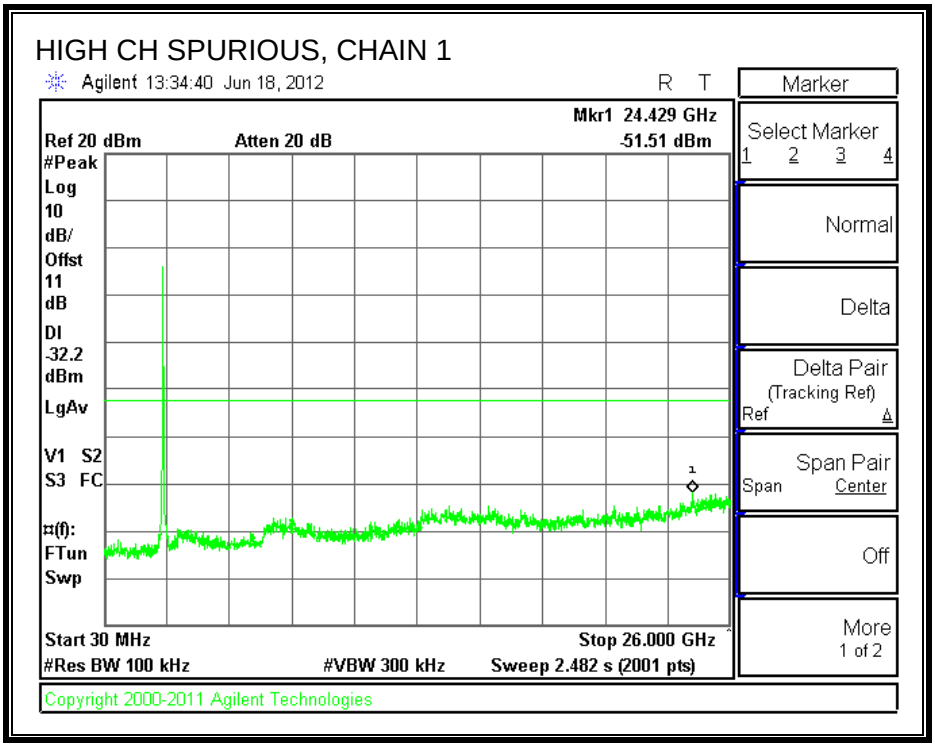




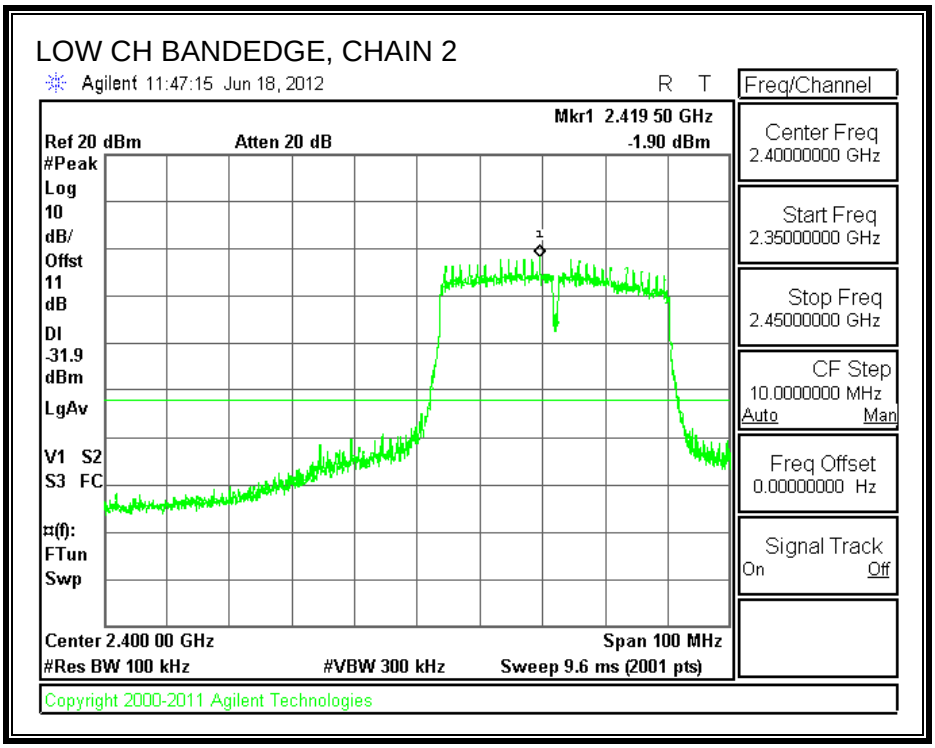
HIGH CH BANDEDGE, CHAIN 1

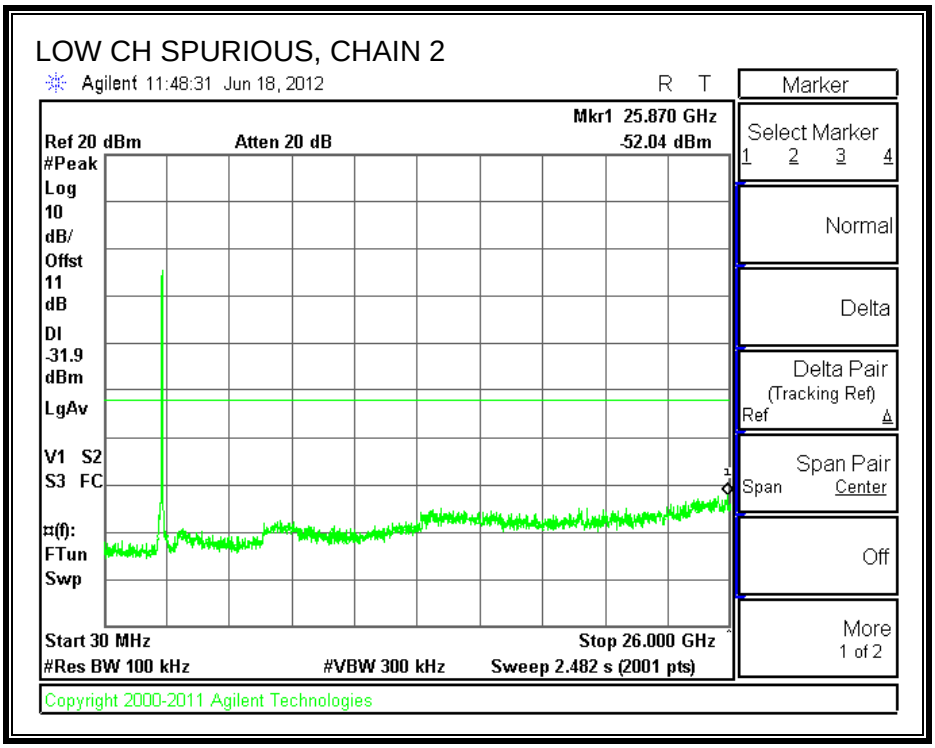


HIGH CH SPURIOUS, CHAIN 1

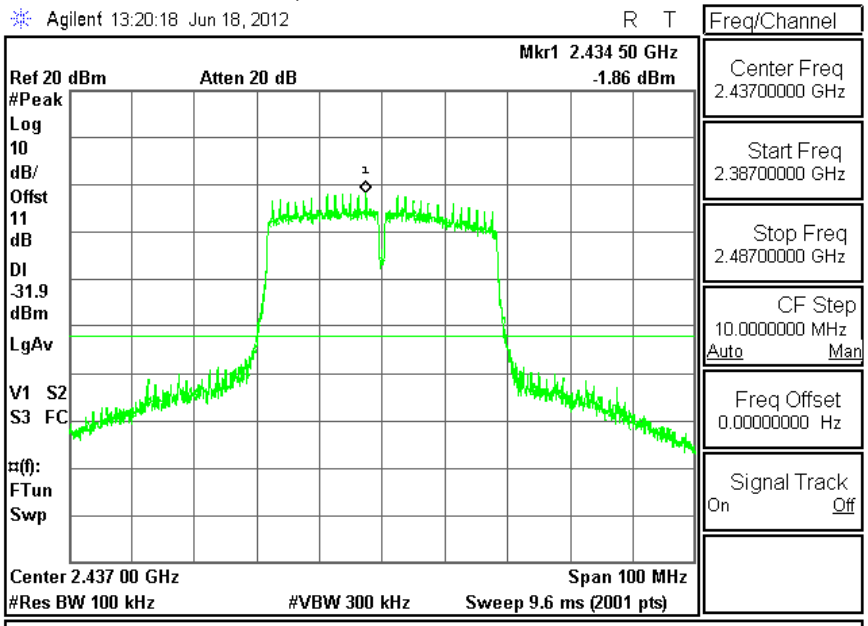


CHAIN 2 SPURIOUS EMISSIONS

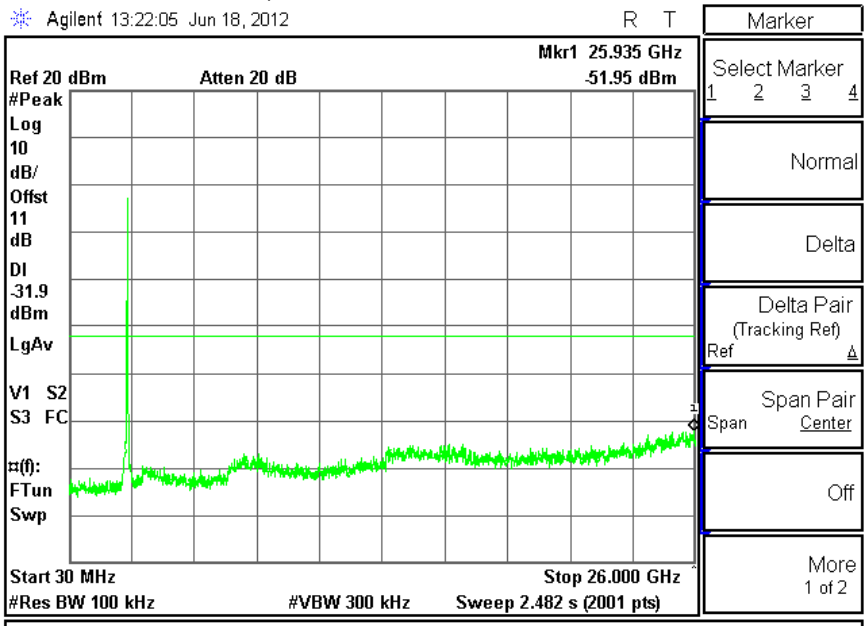




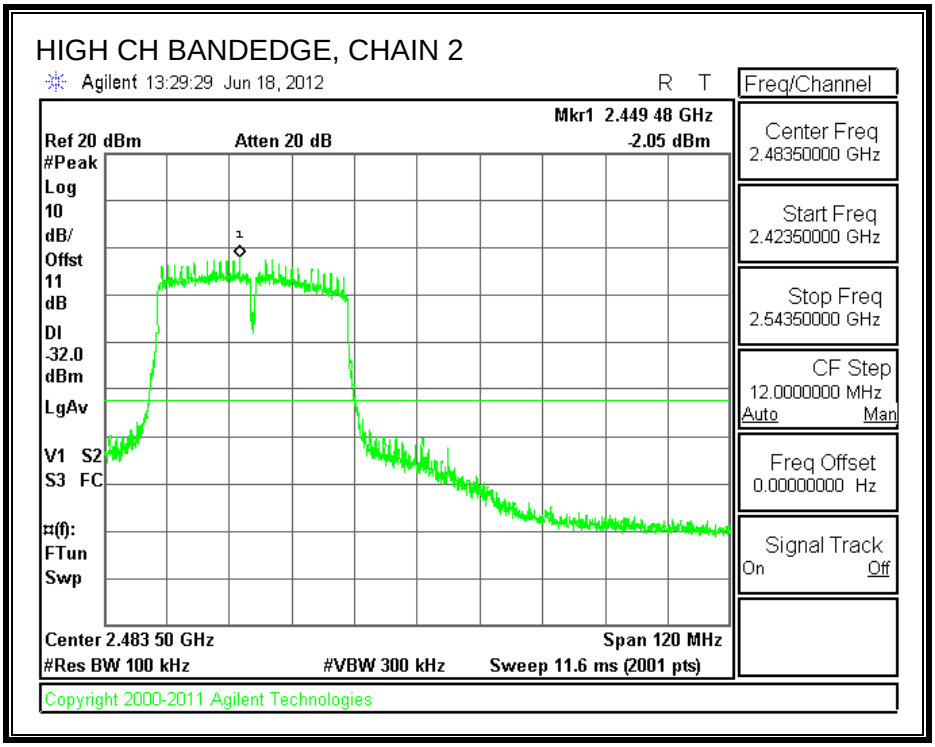
MID CH REFERENCE, CHAIN 2



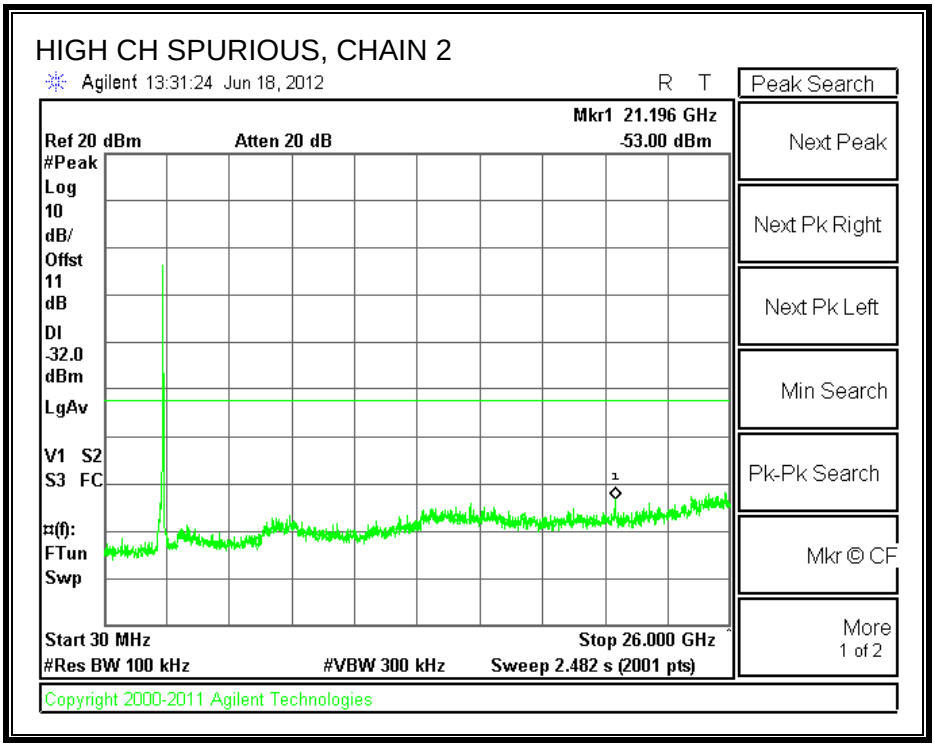
MID CH SPURIOUS, CHAIN 2



HIGH CH BANDEDGE, CHAIN 2



HIGH CH SPURIOUS, CHAIN 2



8.6. 802.11a MODE IN THE 5.8 GHz BAND

8.6.1. 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.

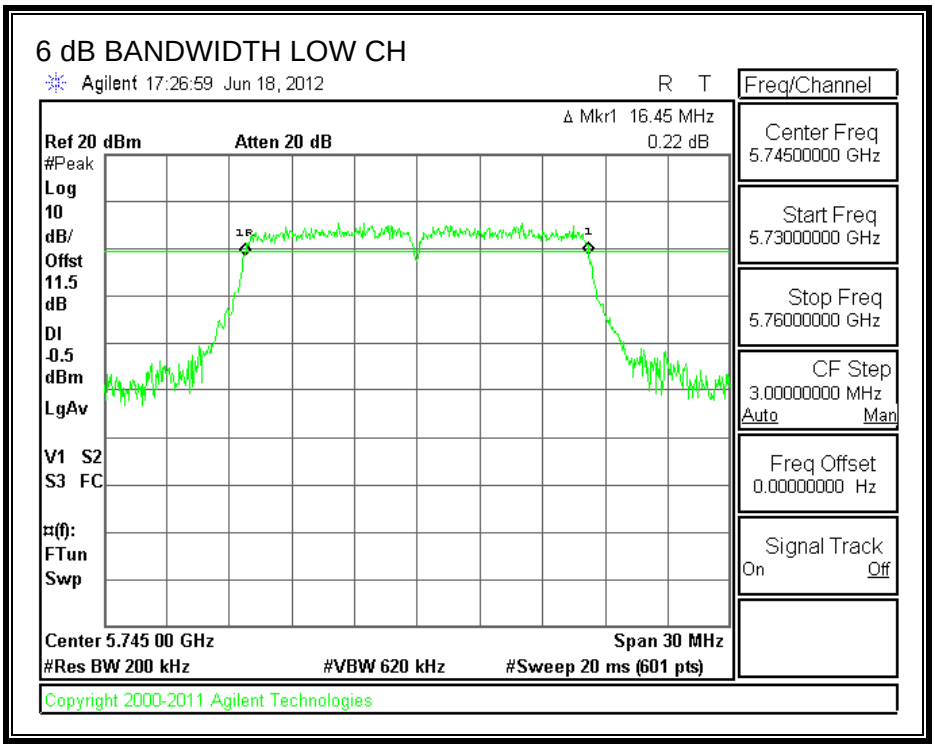
TEST PROCEDURE

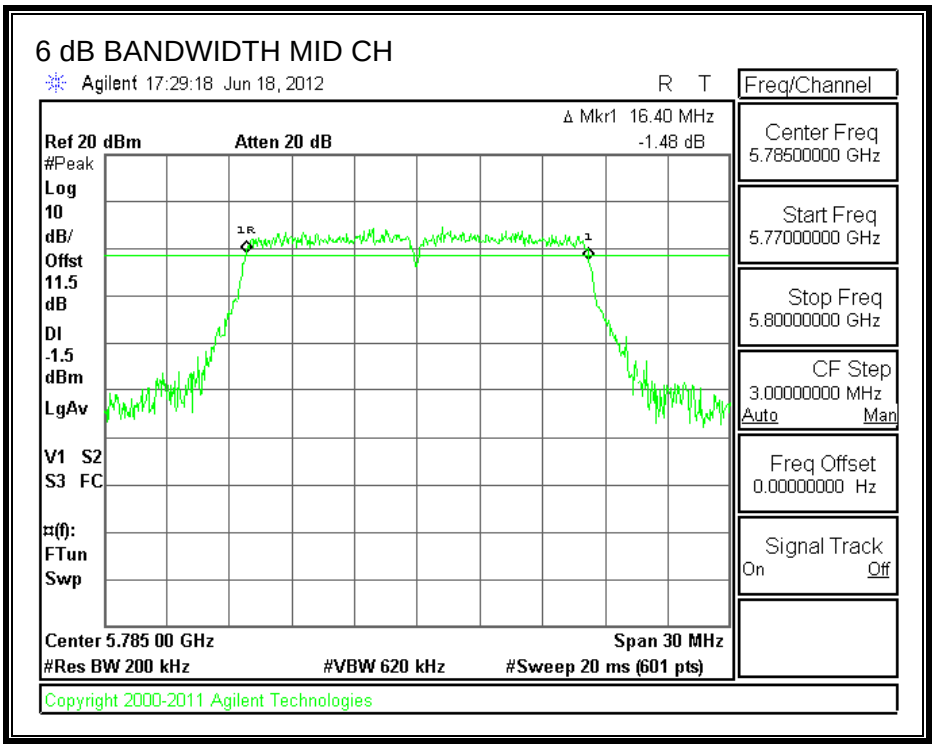
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

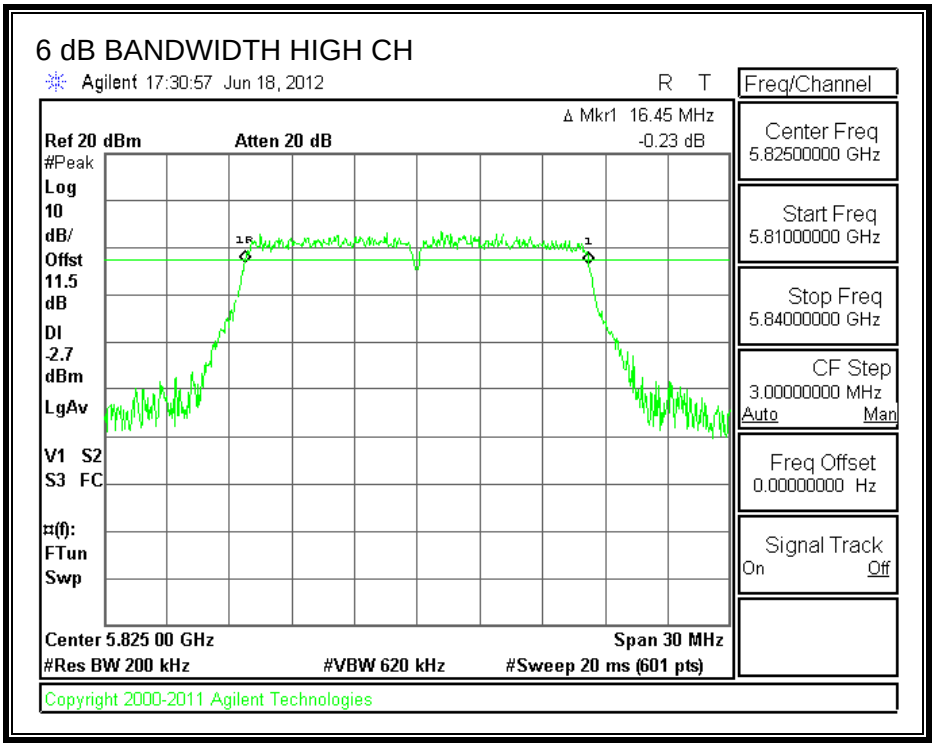
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.45	0.5
Middle	5785	16.4	0.5
High	5825	16.45	0.5

6 dB BANDWIDTH







8.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

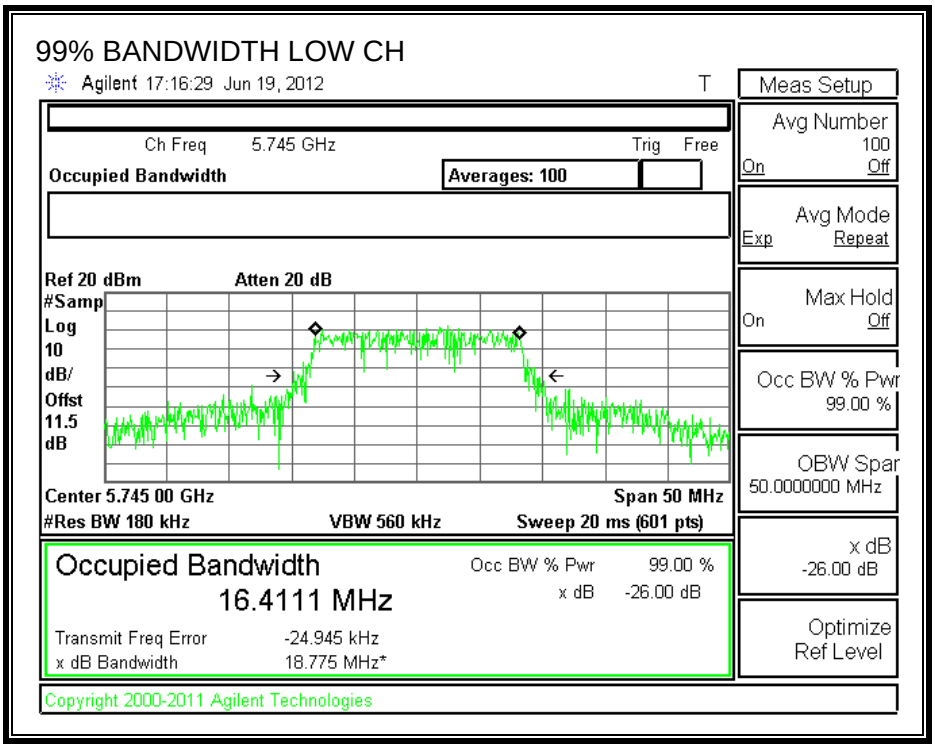
TEST PROCEDURE

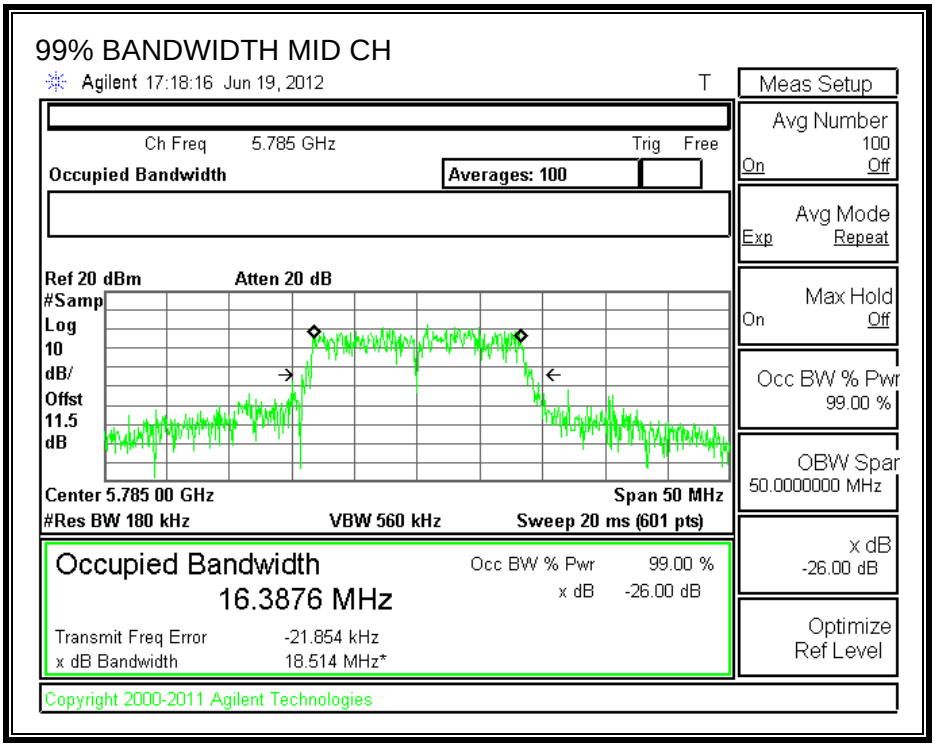
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

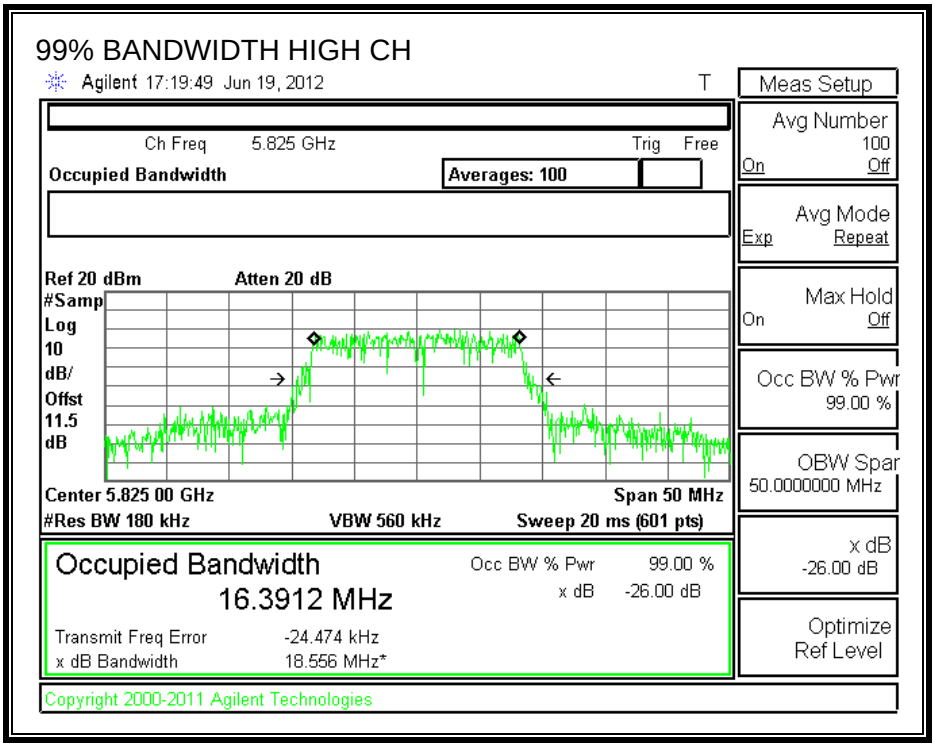
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.4111
Middle	5785	16.3876
High	5825	16.3912

99% BANDWIDTH







8.6.3. 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.

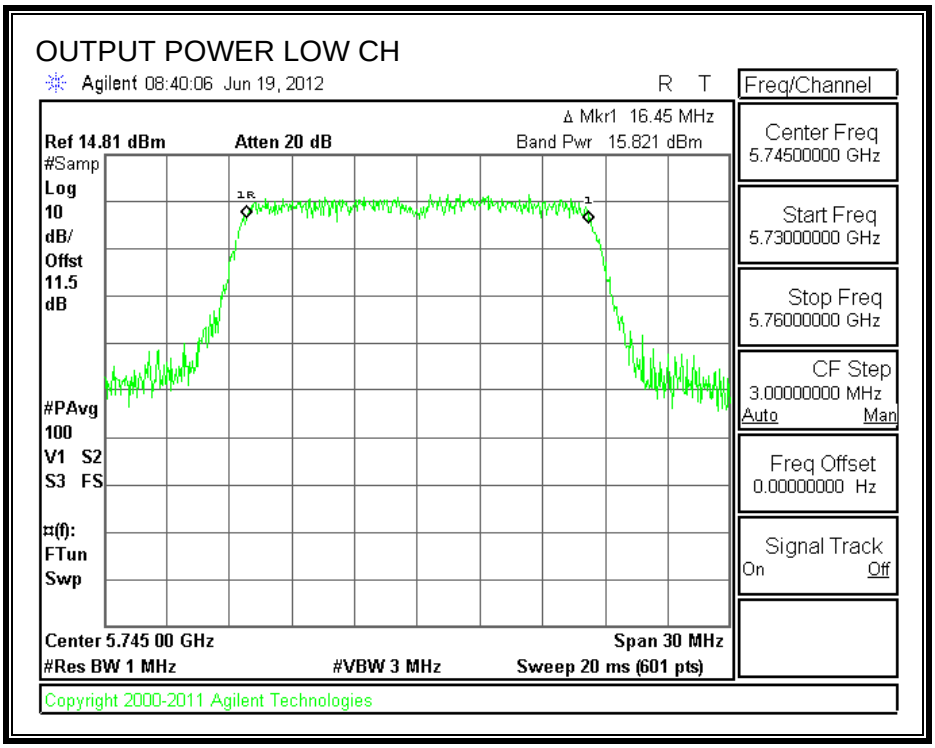
TEST PROCEDURE

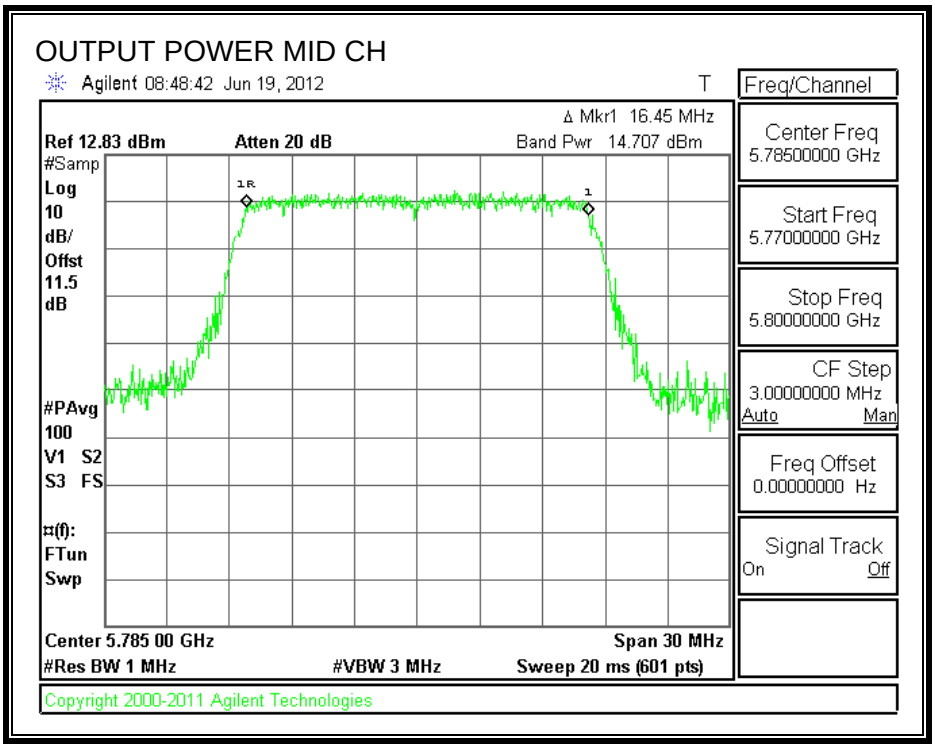
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

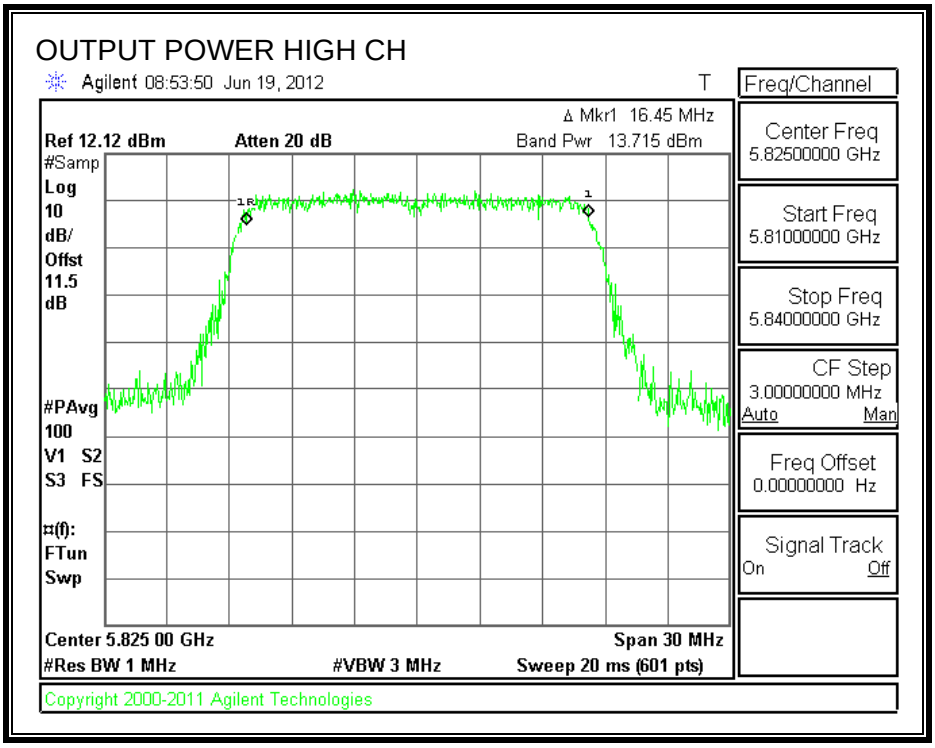
RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	15.821	0	15.82	30	-14.18
Middle	5785	14.707	0	14.71	30	-15.29
High	5825	13.715	0	13.72	30	-16.29

OUTPUT POWER







8.6.4. 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 11.5 dB (including 10 dB pad and1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.30
Middle	5785	14.20
High	5825	13.30

8.6.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

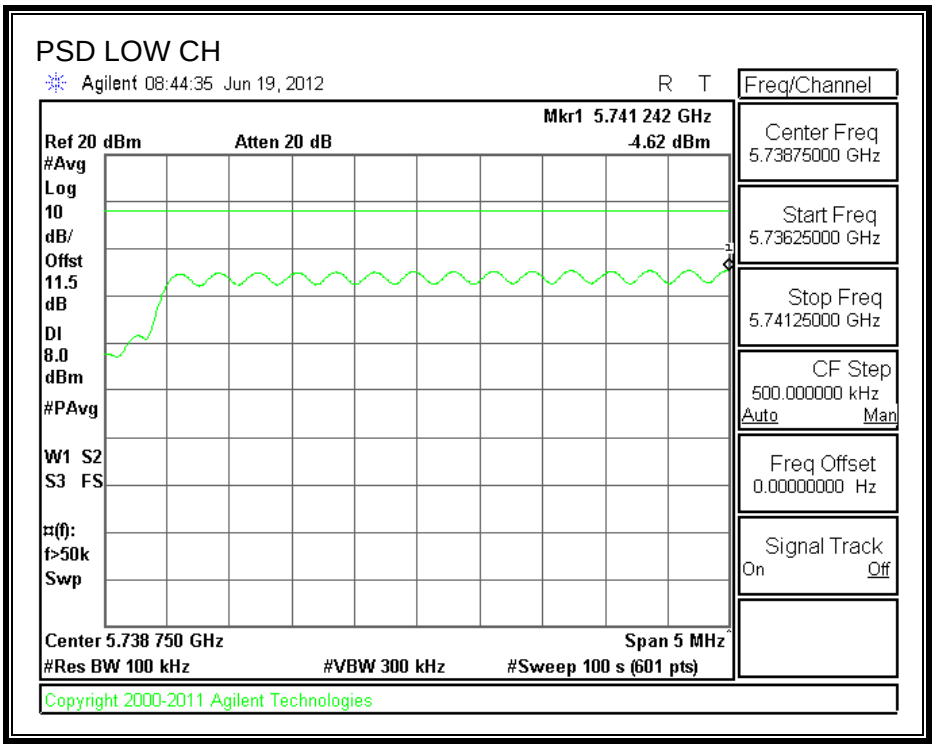
TEST PROCEDURE

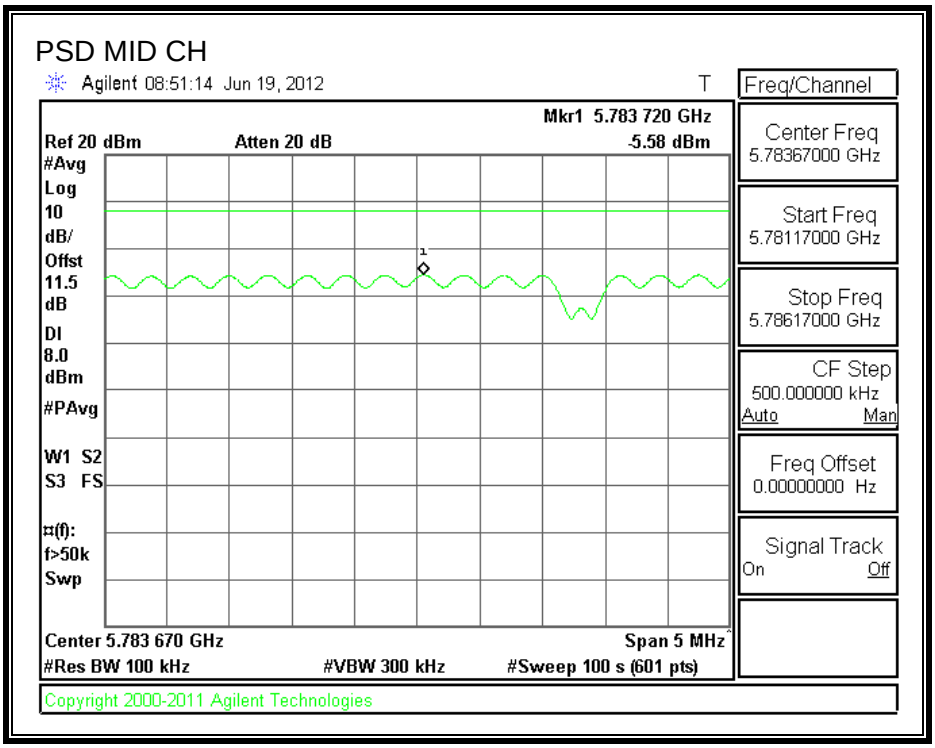
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

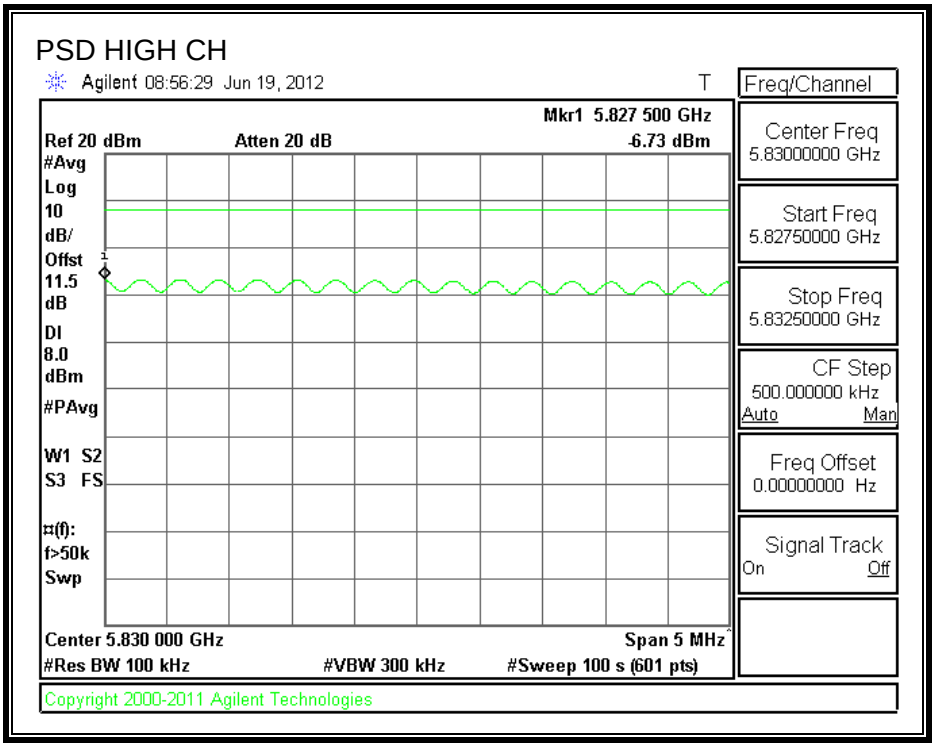
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-4.62	8	-12.62
Middle	5785	-5.58	8	-13.58
High	5825	-6.73	8	-14.73

POWER SPECTRAL DENSITY







8.6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

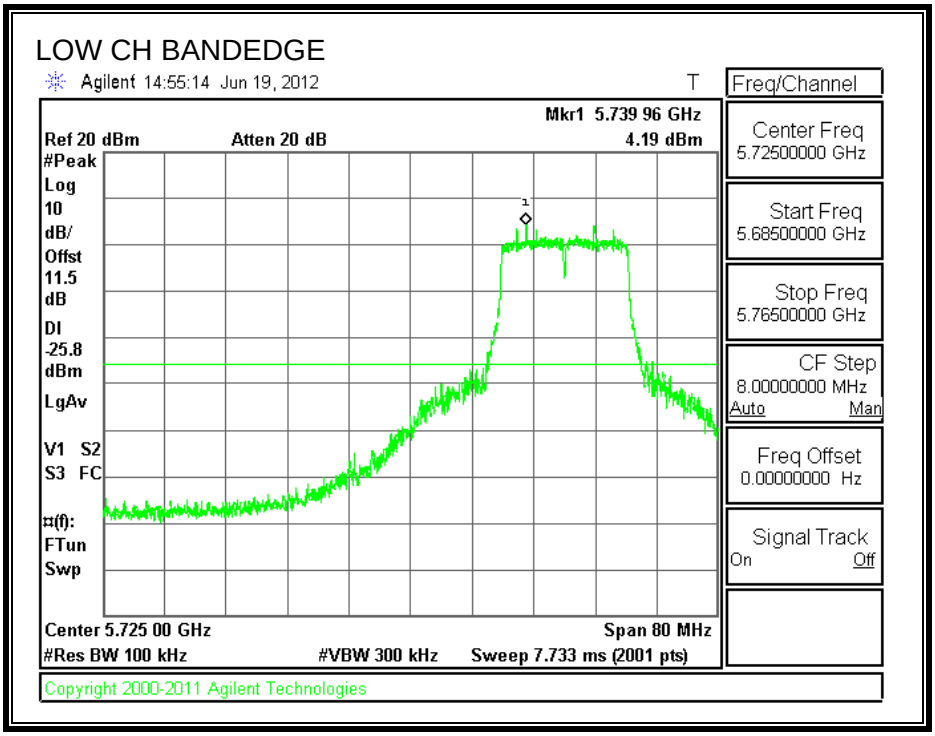
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

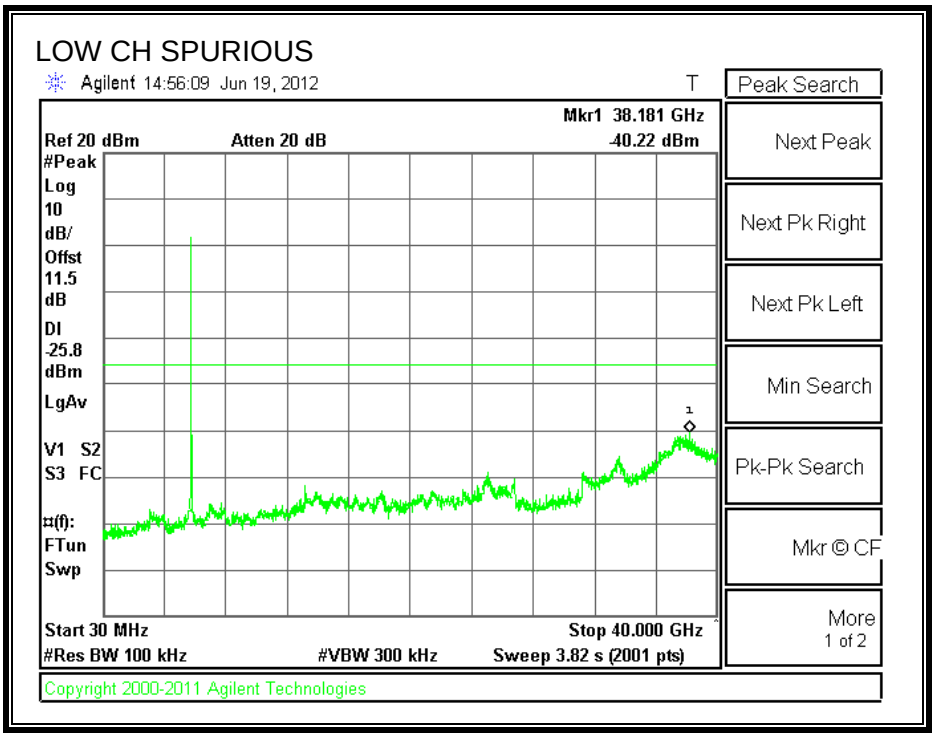
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

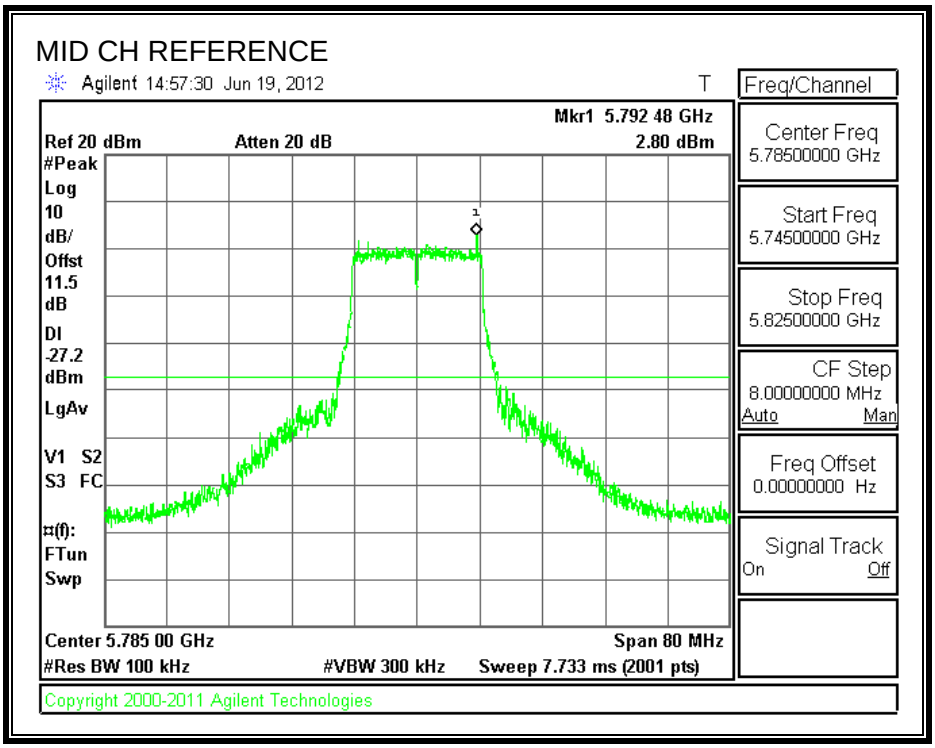
RESULTS

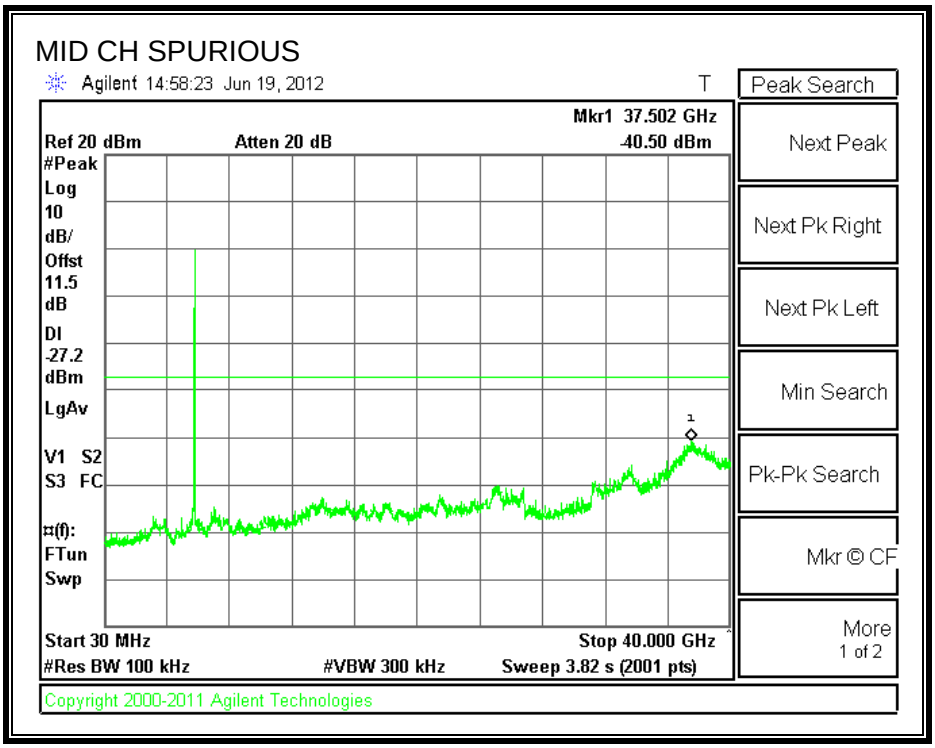
SPURIOUS EMISSIONS, LOW CHANNEL



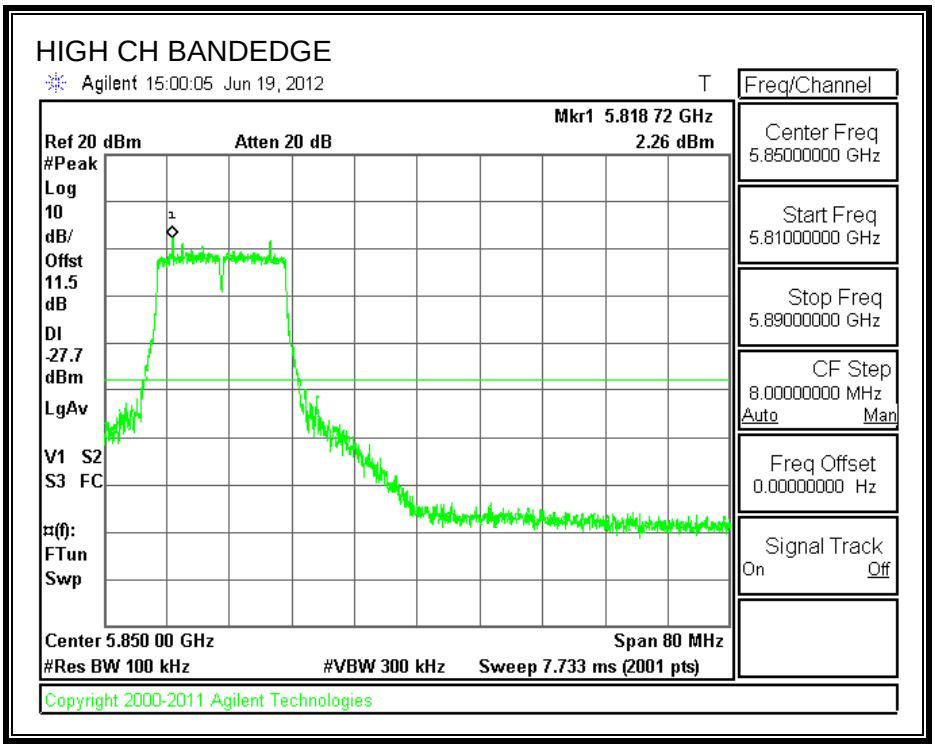


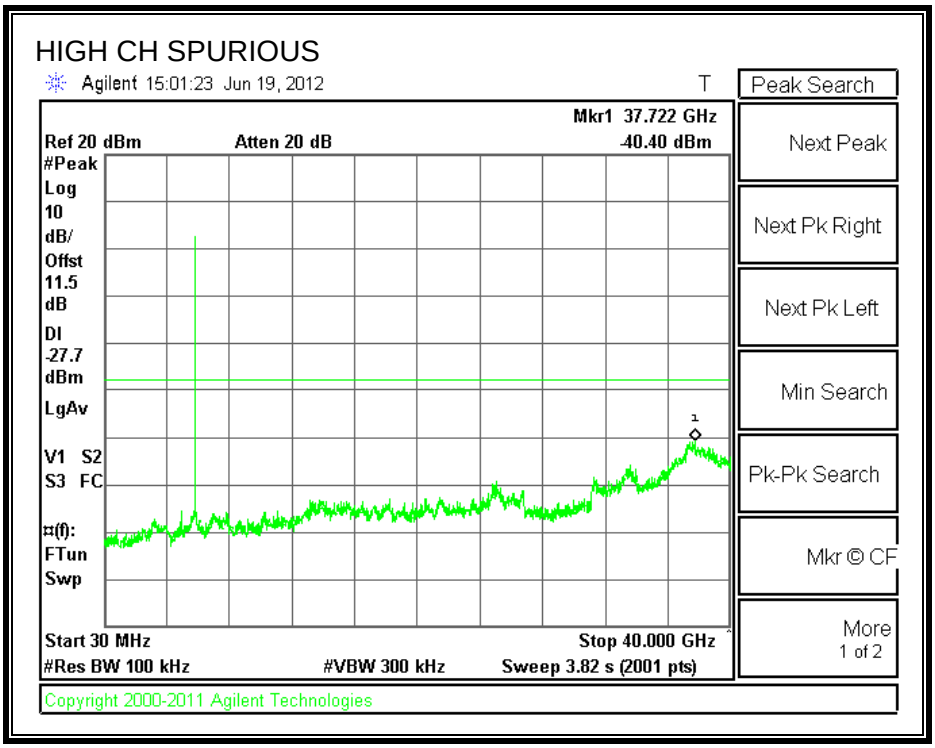
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





8.7. 802.11a DUAL CHAIN BEAM FORMING MODE IN THE 5.8 GHz BAND

8.7.1. 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.

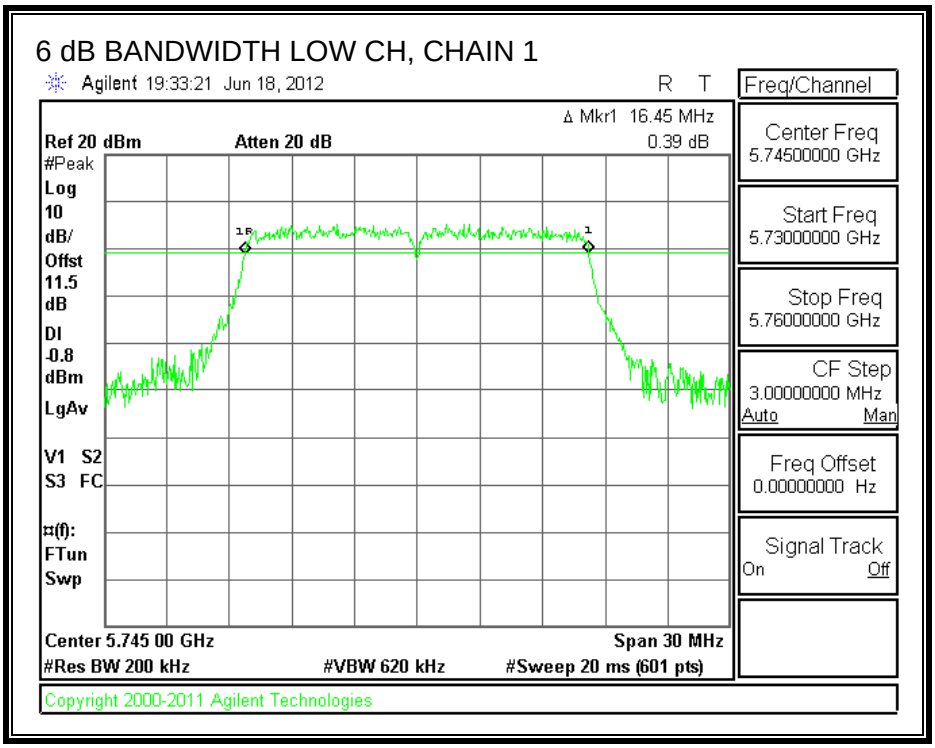
TEST PROCEDURE

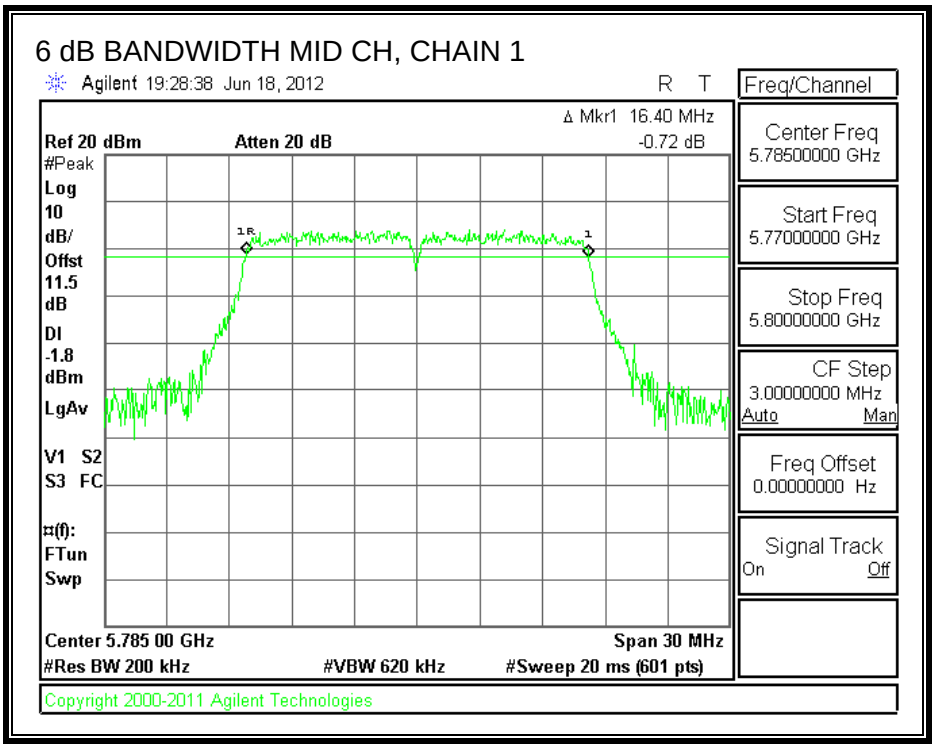
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

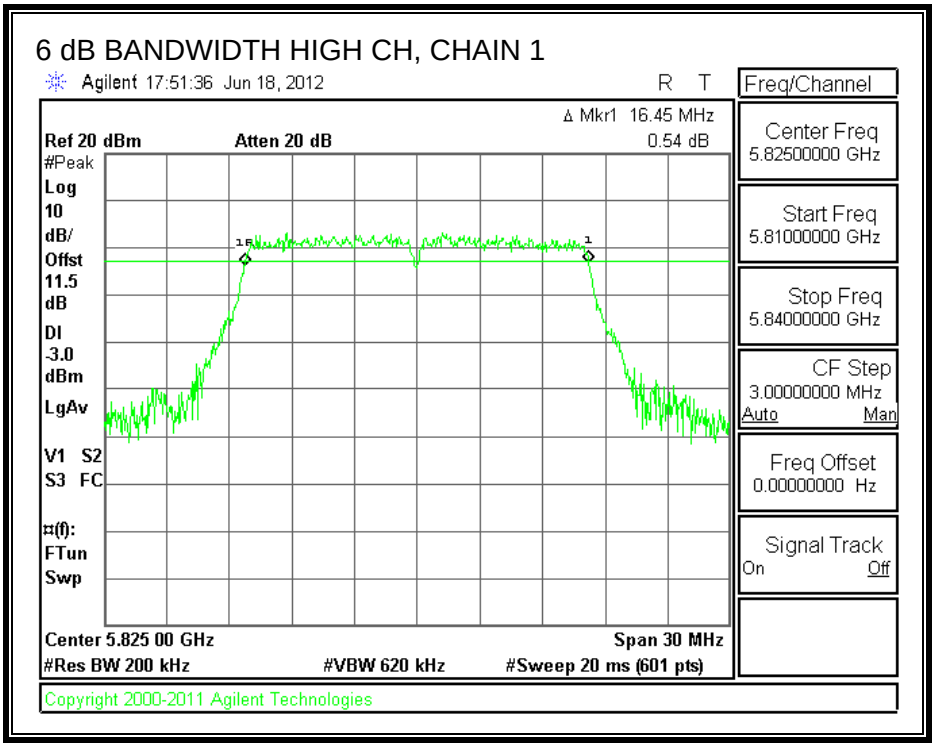
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	16.45	16.4	0.5
Middle	5785	16.4	16.4	0.5
High	5825	16.45	16.45	0.5

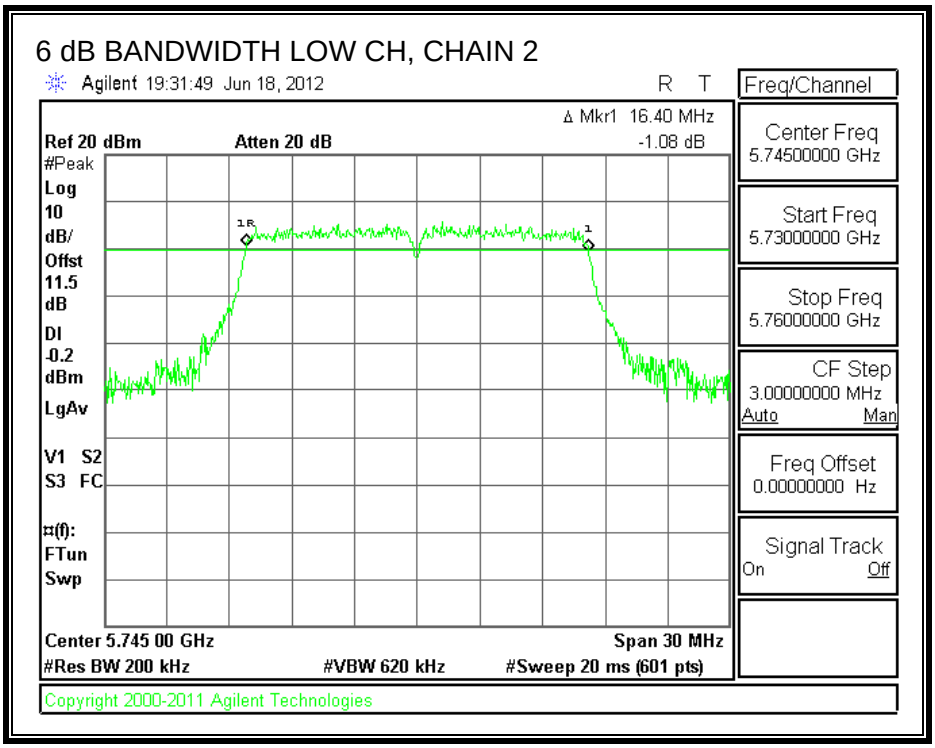
6 dB BANDWIDTH, CHAIN 1

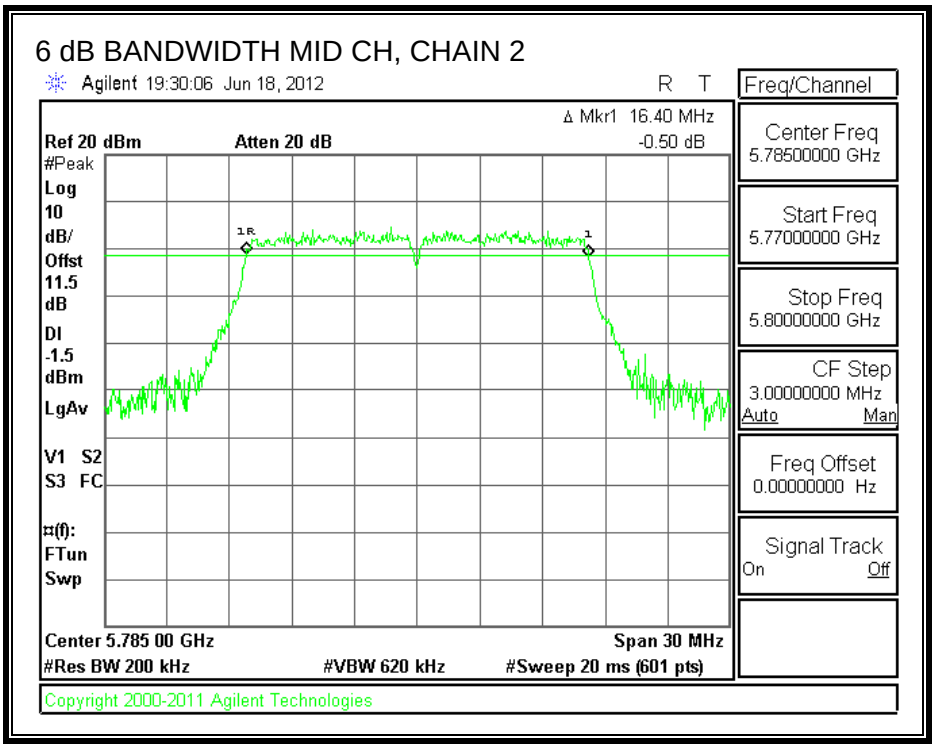


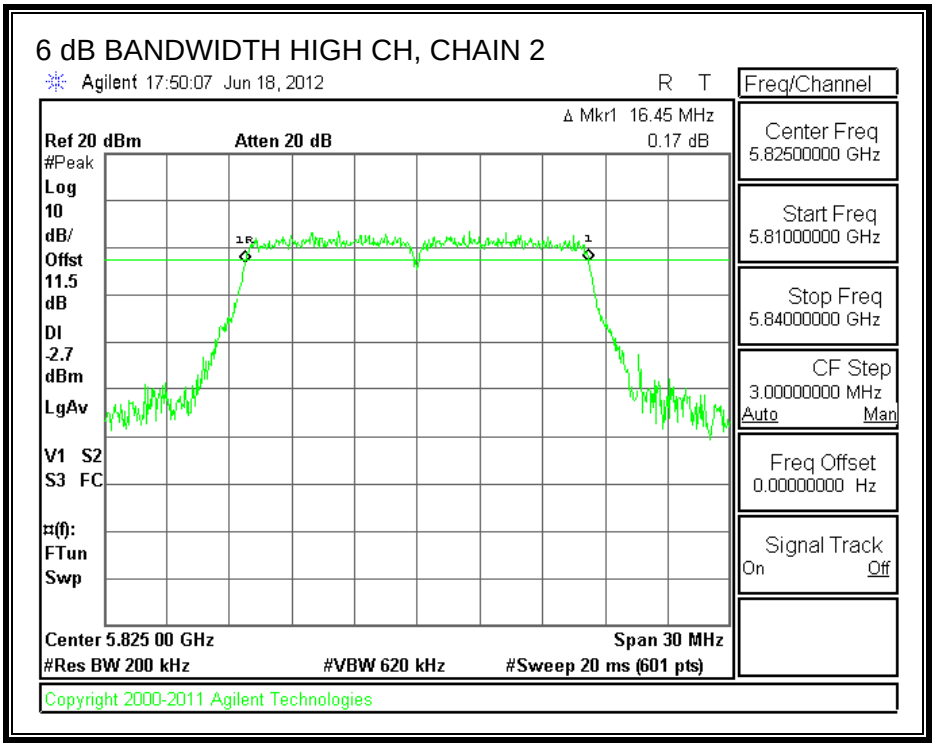




6 dB BANDWIDTH, CHAIN 2







8.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

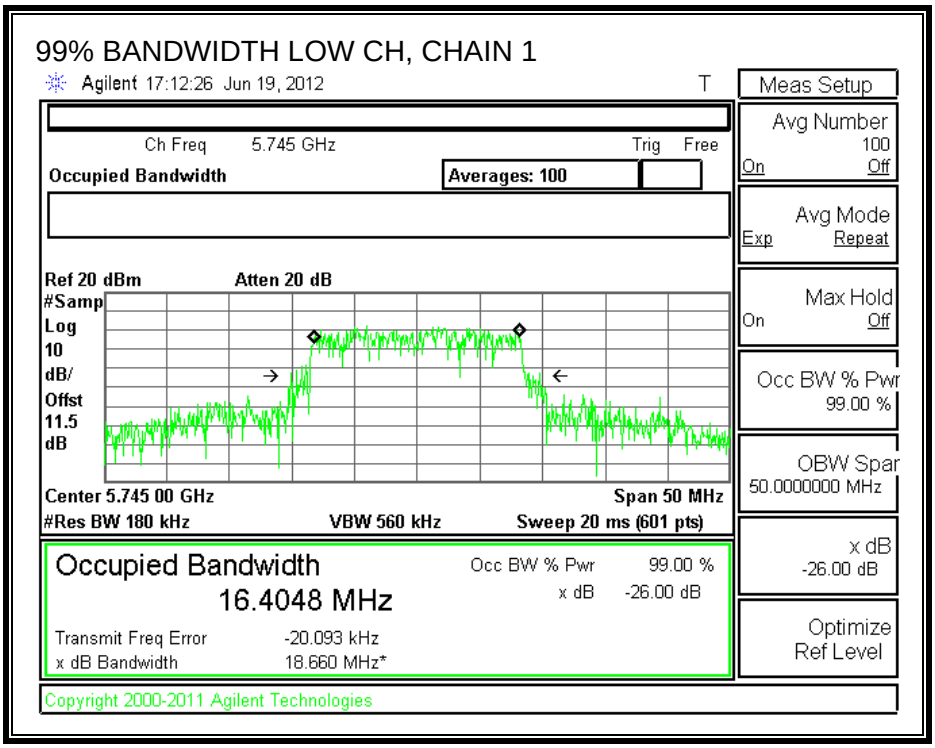
TEST PROCEDURE

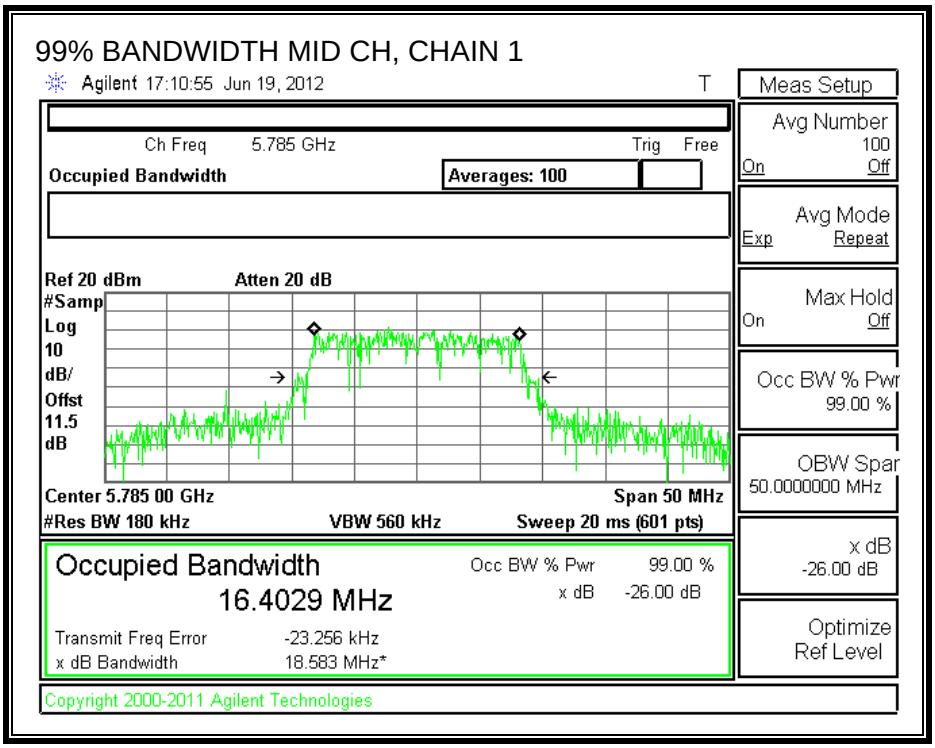
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

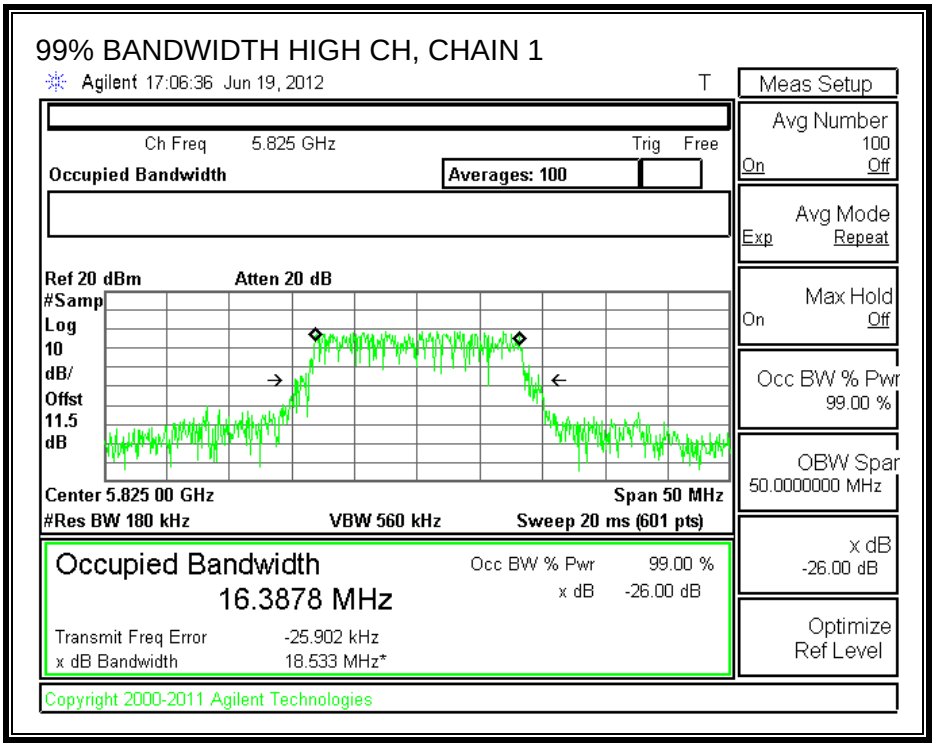
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5745	16.4048	16.386
Middle	5785	16.4029	16.3897
High	5825	16.3878	16.3909

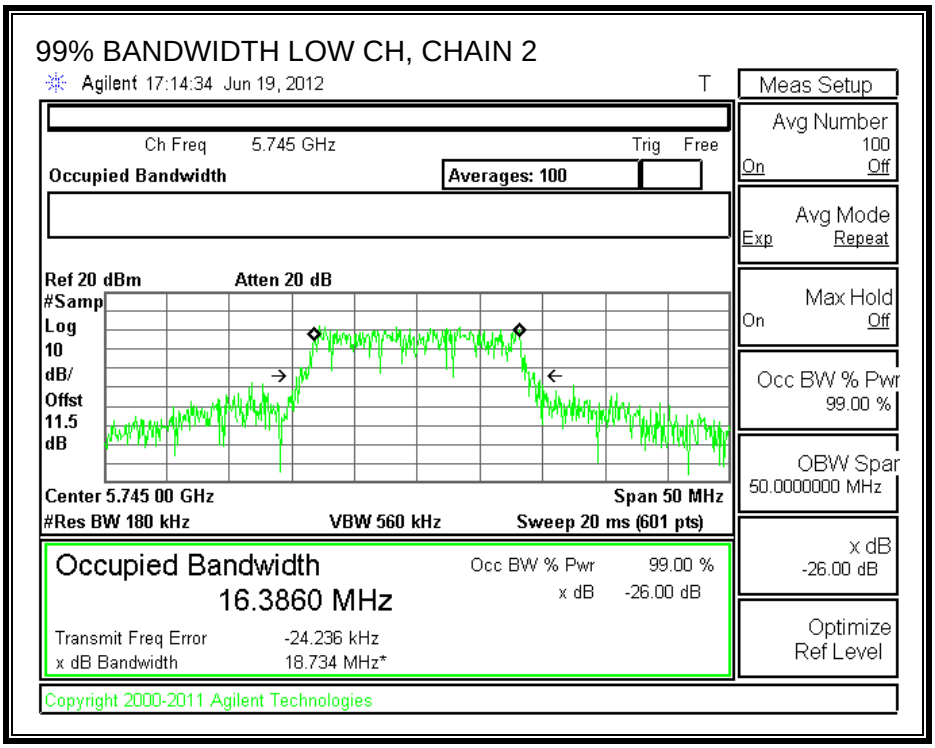
99% BANDWIDTH, CHAIN 1

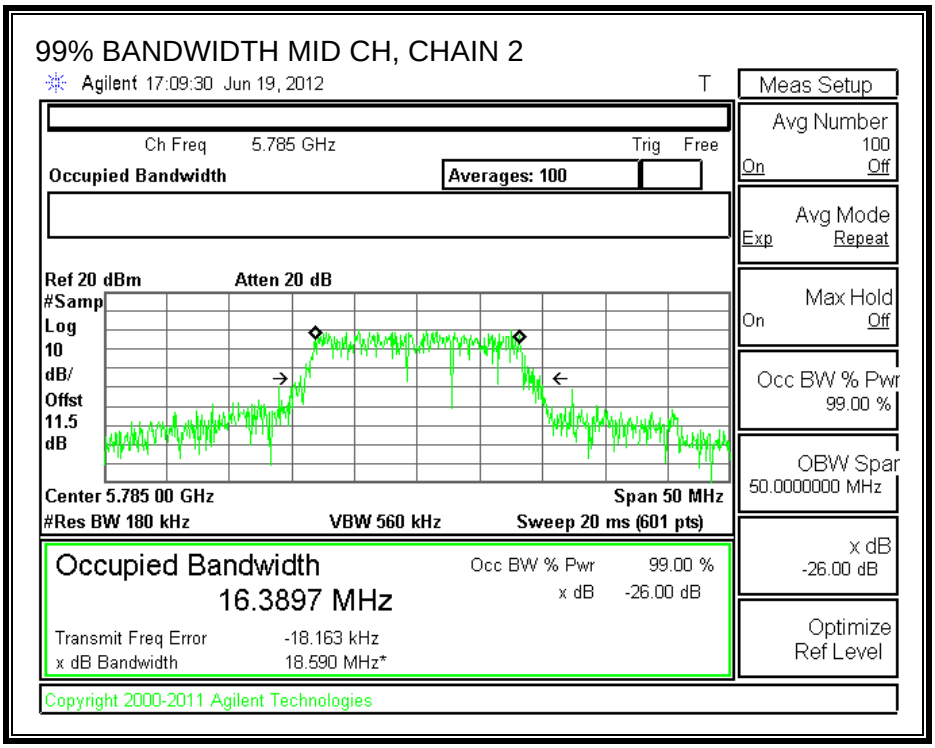


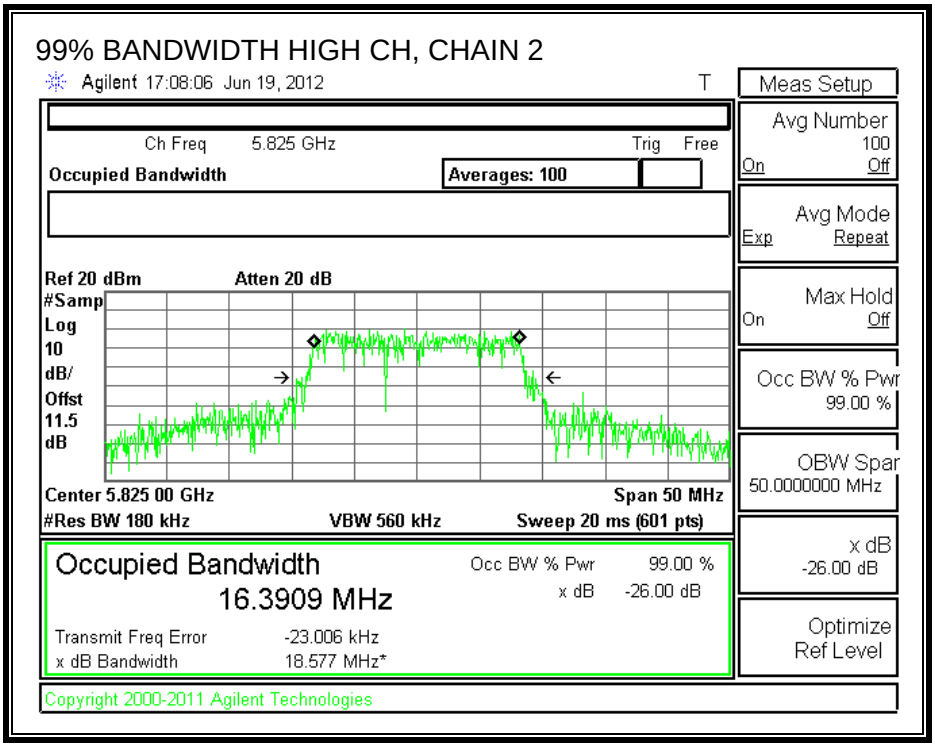




99% BANDWIDTH, CHAIN 2







8.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	15.82	15.74	0.00	18.79	30.00	-11.21
Mid	5785	14.78	14.72	0.00	17.76	30.00	-12.24
High	5825	13.61	13.67	0.00	16.65	30.00	-13.35

The maximum effective legacy gain is 9.01 dBi for other than fixed, point-to-point operations, therefore the limit is 26.99 dBm.

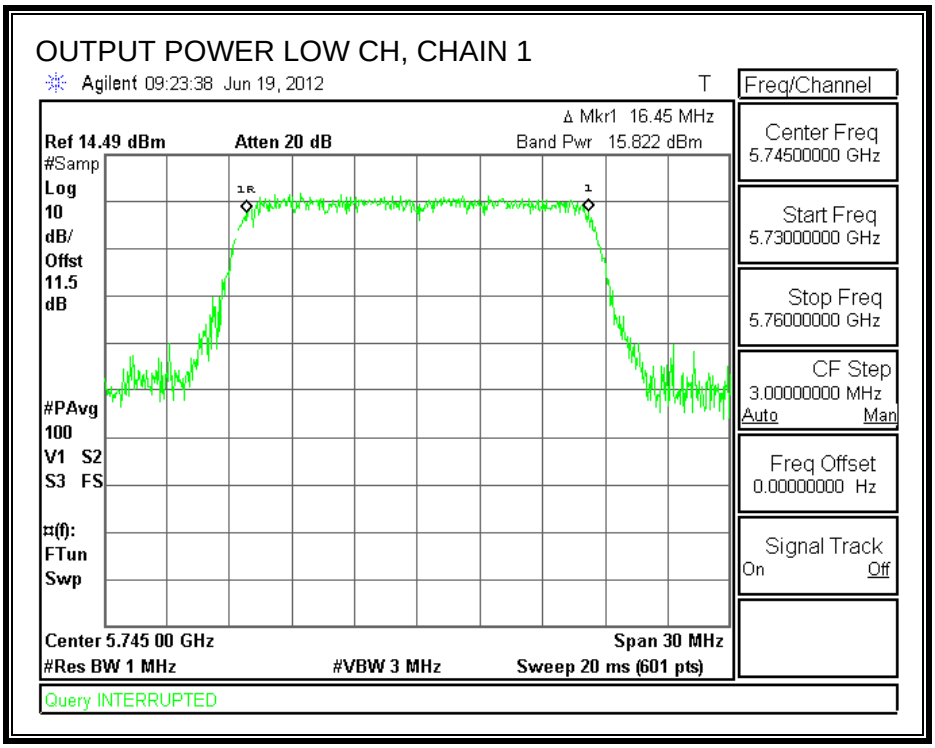
TEST PROCEDURE

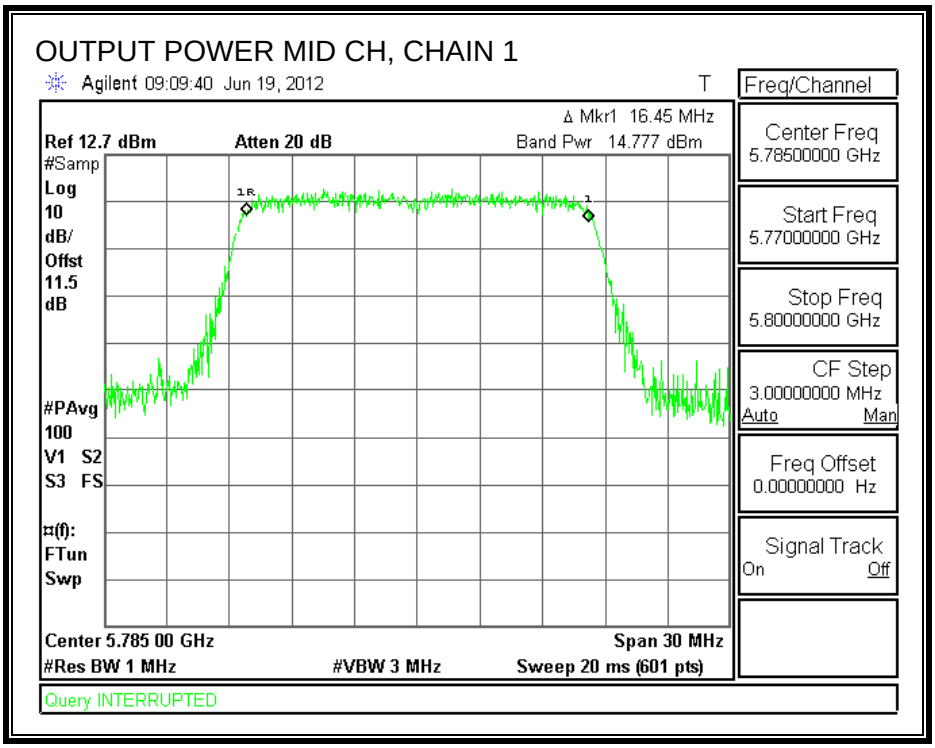
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

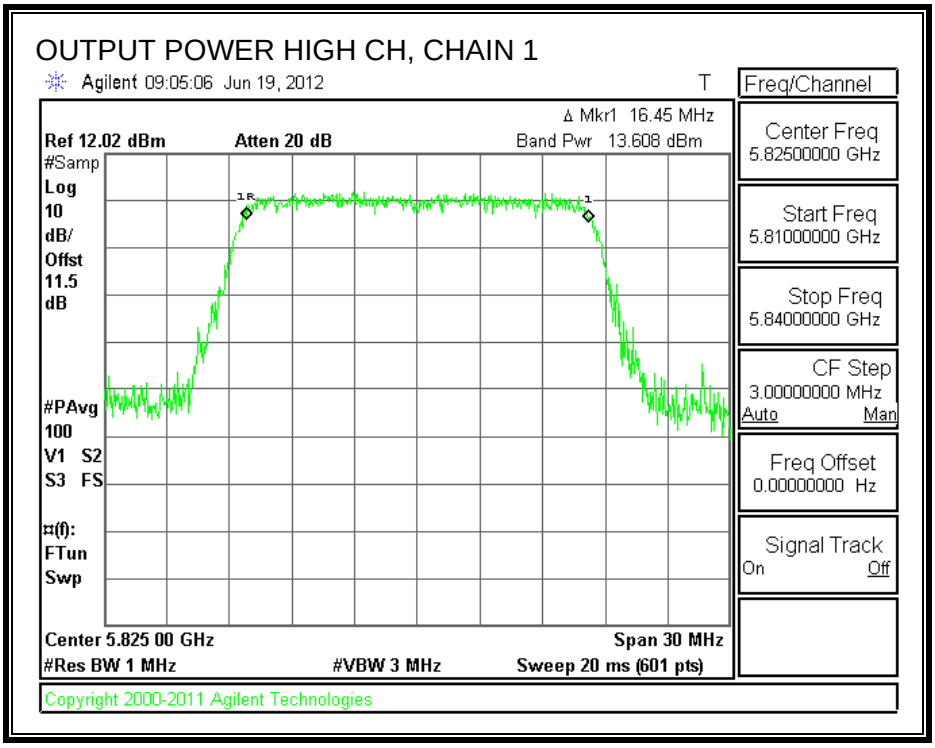
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	15.82	15.74	0.00	18.79	26.99	-8.20
Mid	5785	14.78	14.72	0.00	17.76	26.99	-9.23
High	5825	13.61	13.67	0.00	16.65	26.99	-10.34

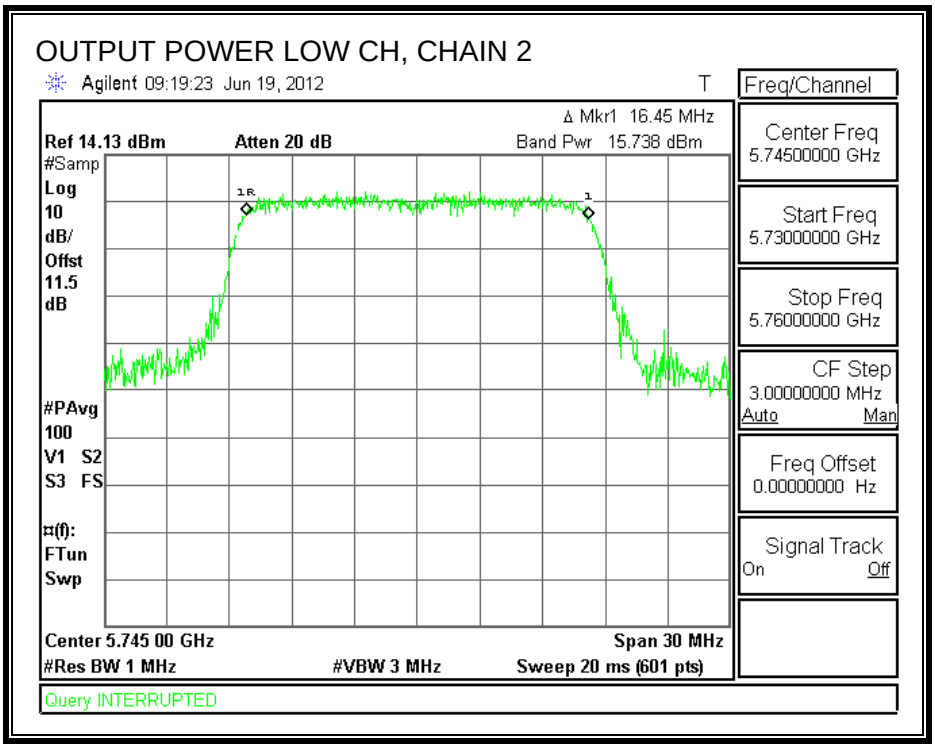
CHAIN 1 OUTPUT POWER

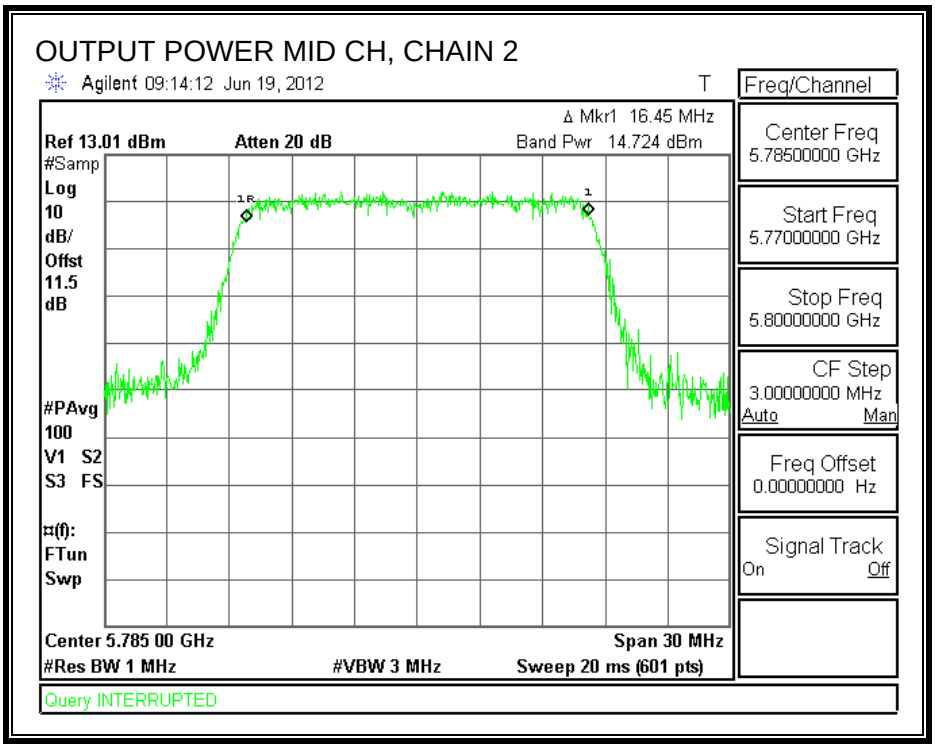


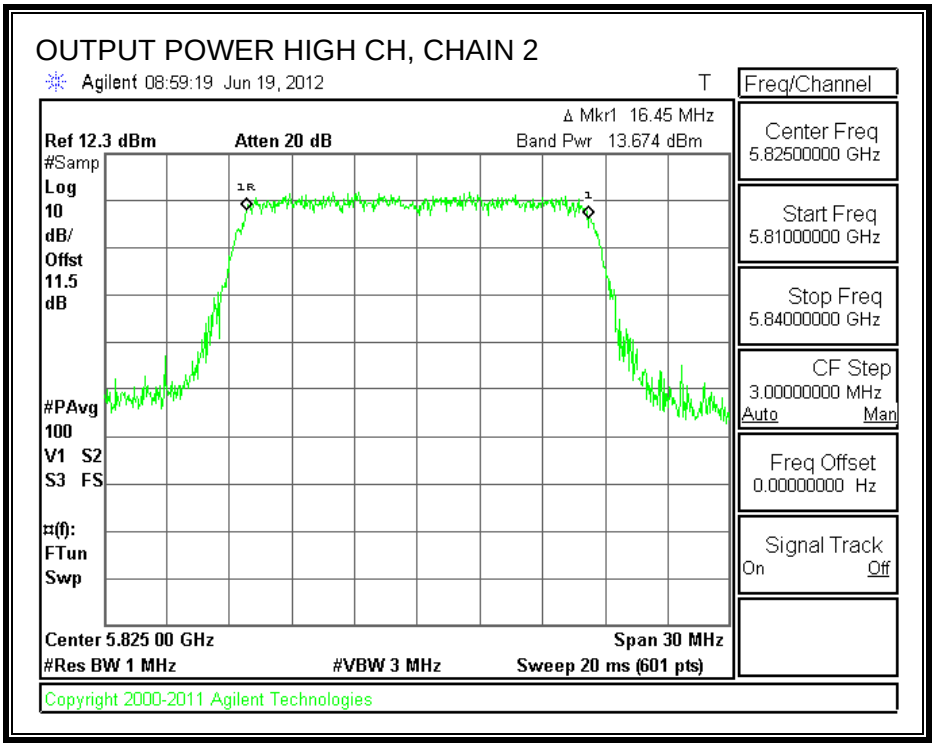




CHAIN 2 OUTPUT POWER







8.7.4. 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 11.5 dB (including 10 dB pad and 1.5 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	15.40	15.30	18.36
Middle	5785	14.30	14.20	17.26
High	5825	13.30	13.30	16.31

8.7.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

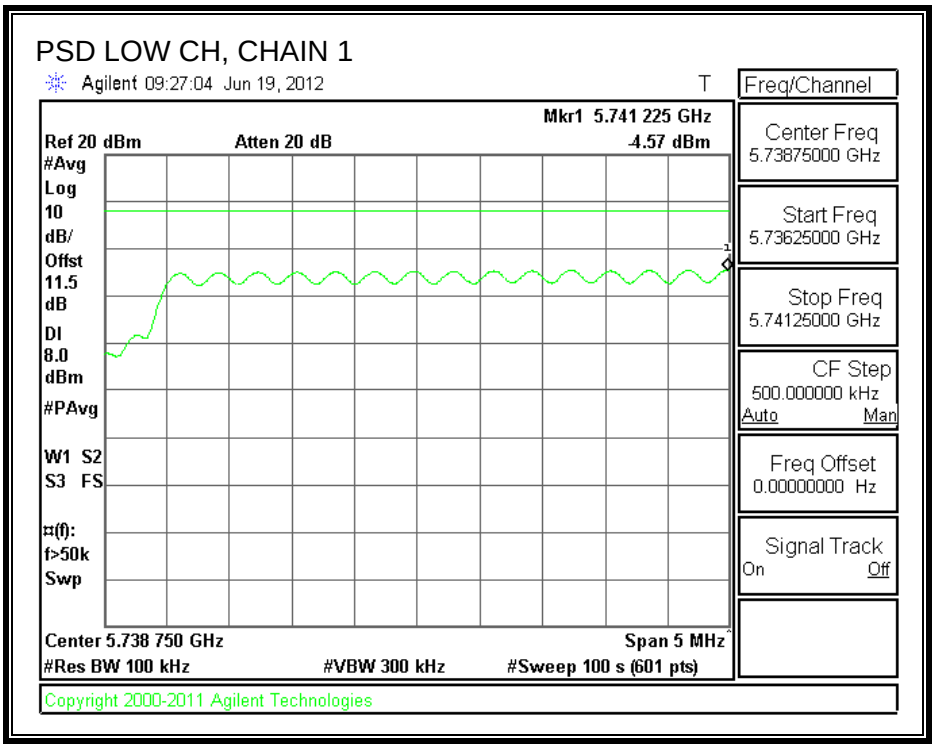
TEST PROCEDURE

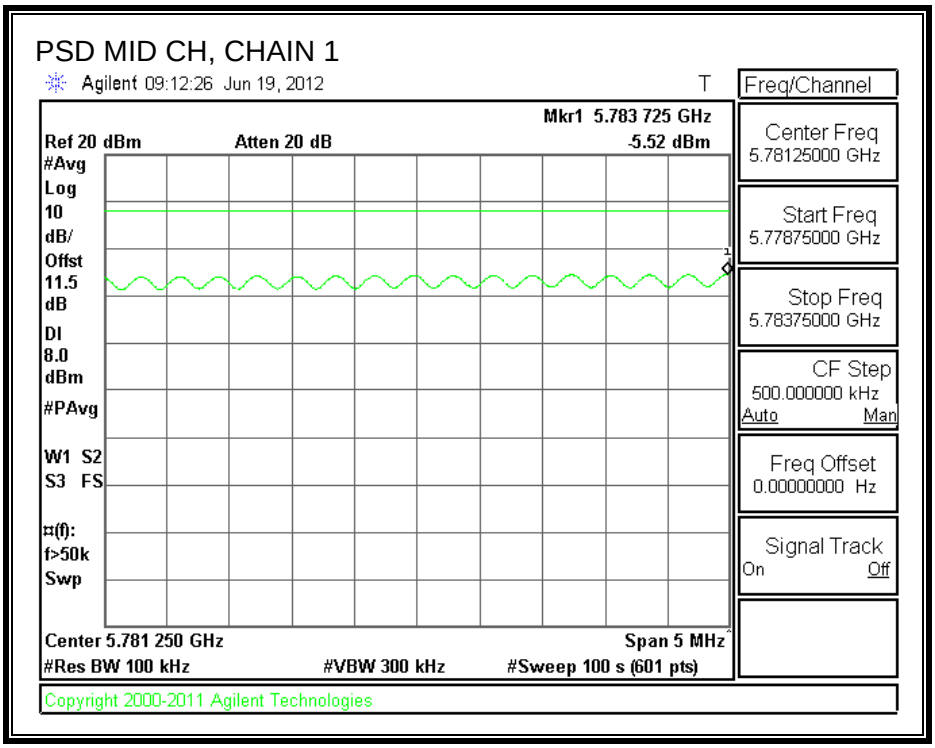
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

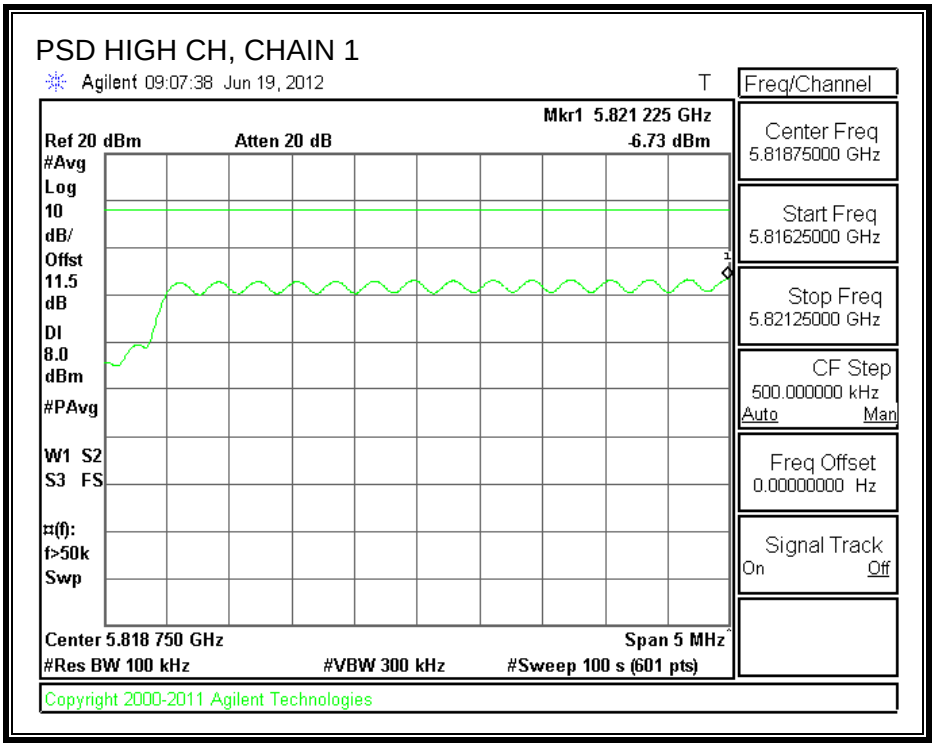
RESULTS:

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-4.57	-4.52	-1.53	8	-9.53
Middle	5785	-5.52	-5.51	-2.50	8	-10.50
High	5825	-6.73	-6.63	-3.67	8	-11.67

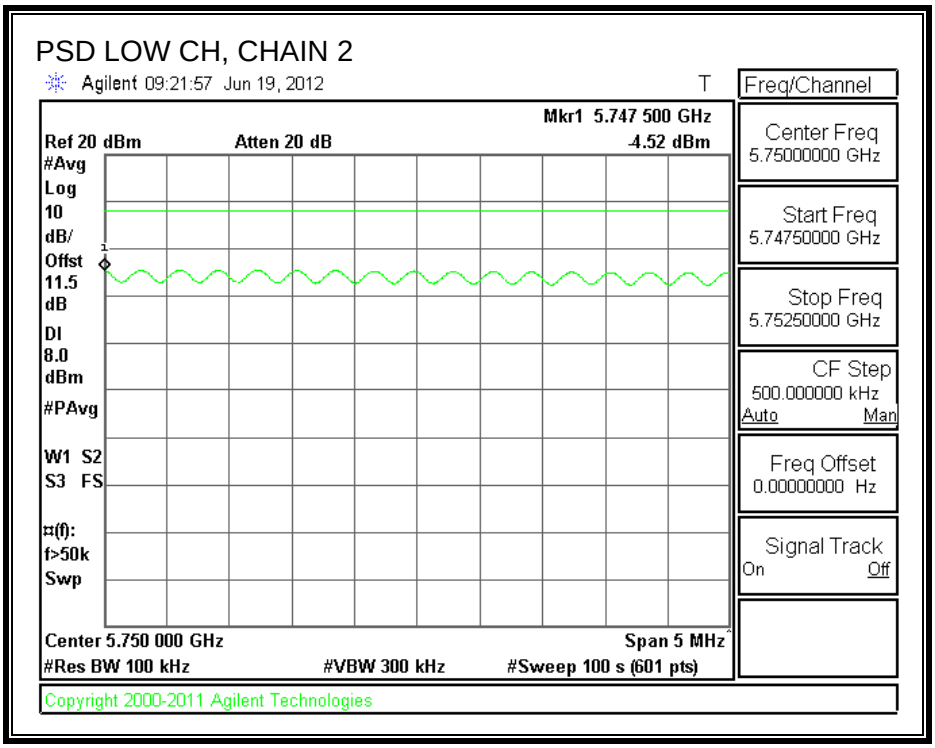
POWER SPECTRAL DENSITY, CHAIN 1

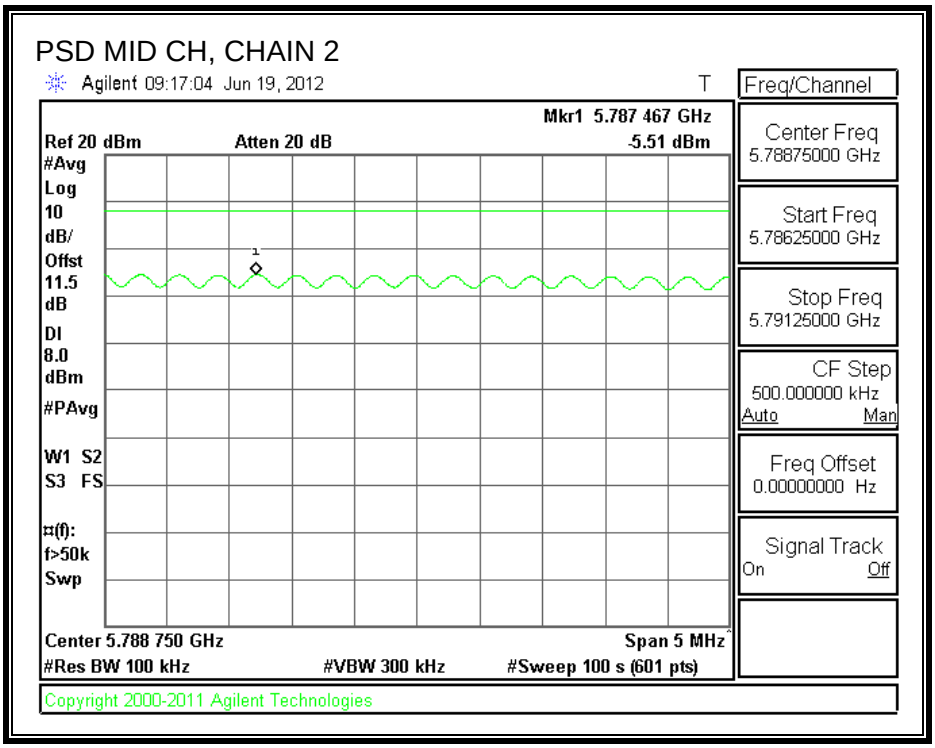


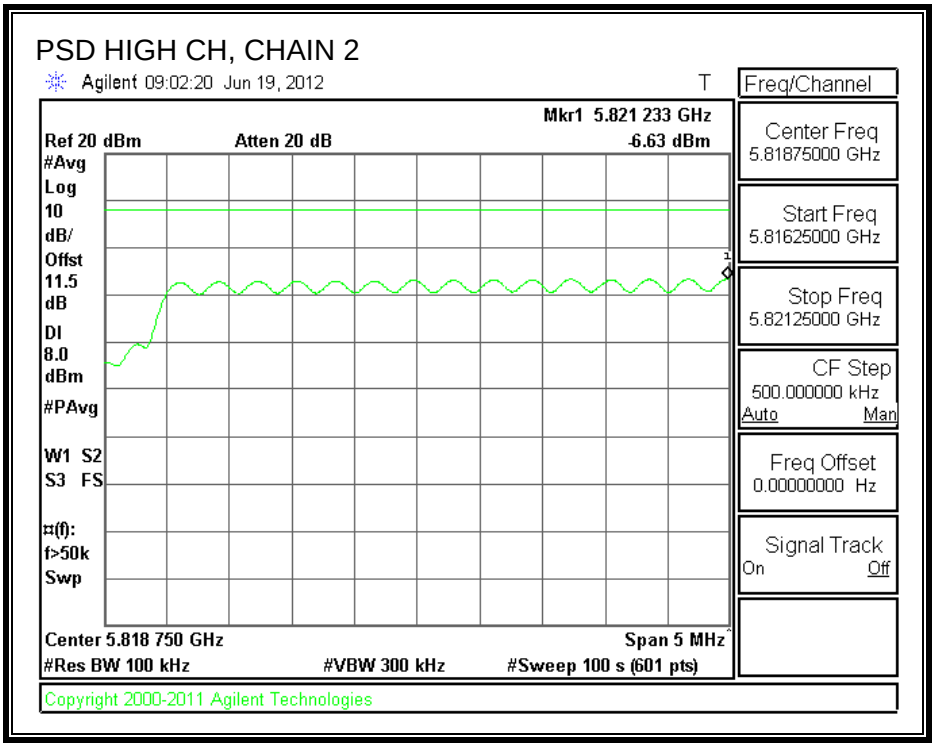




POWER SPECTRAL DENSITY, CHAIN 2







8.7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

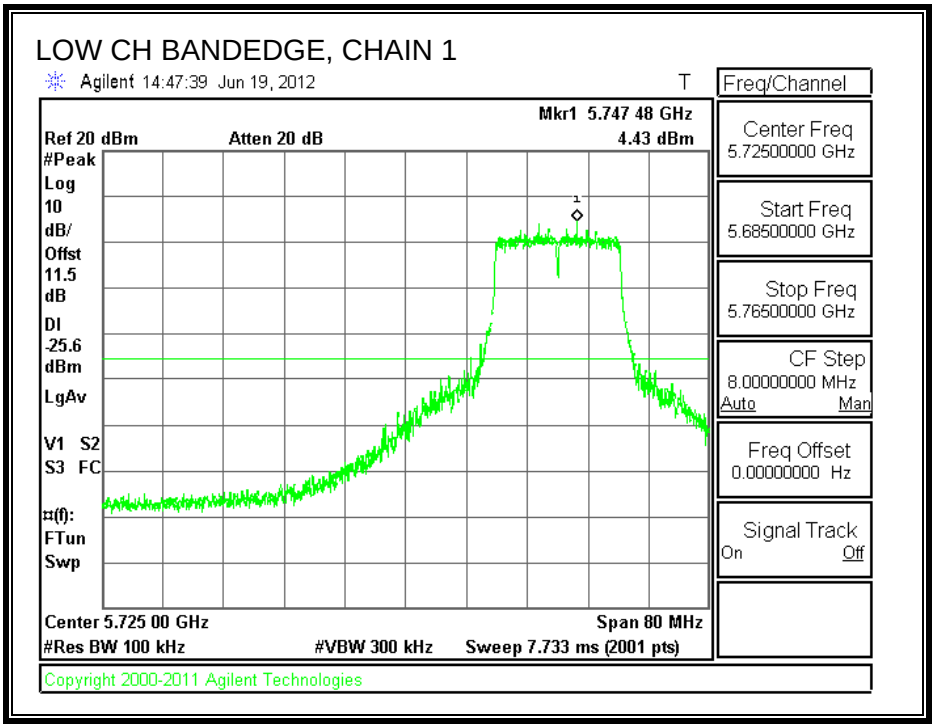
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

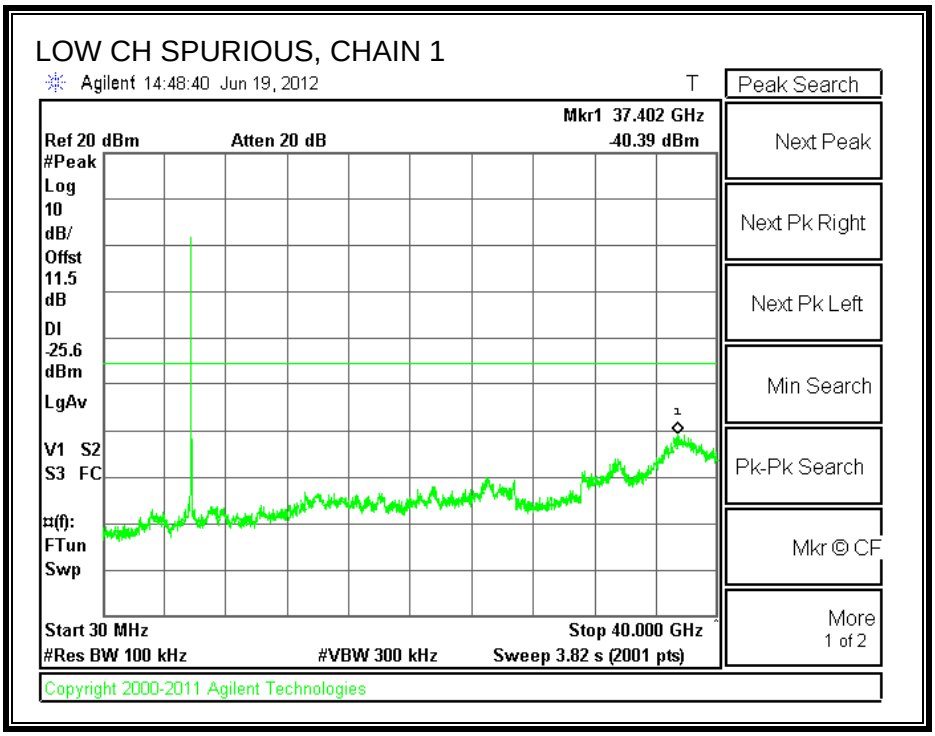
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

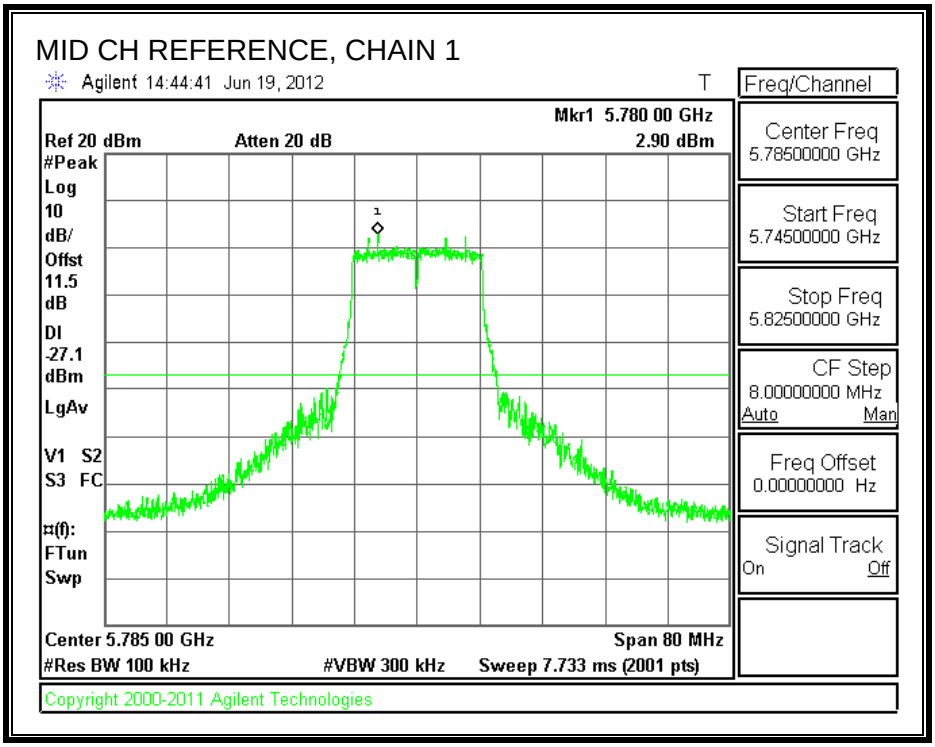
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

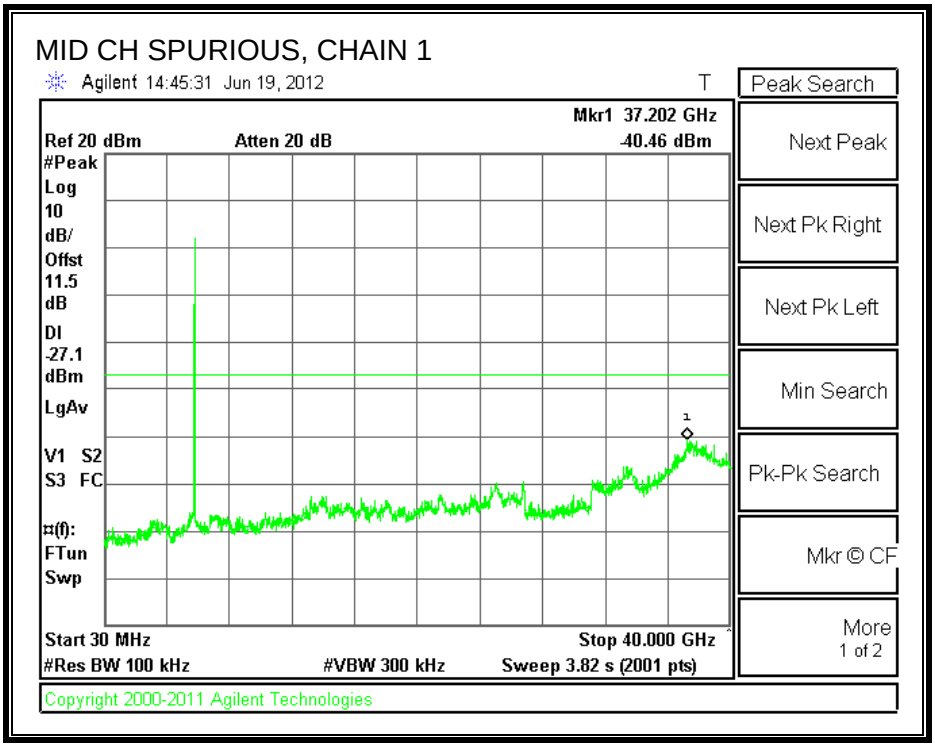




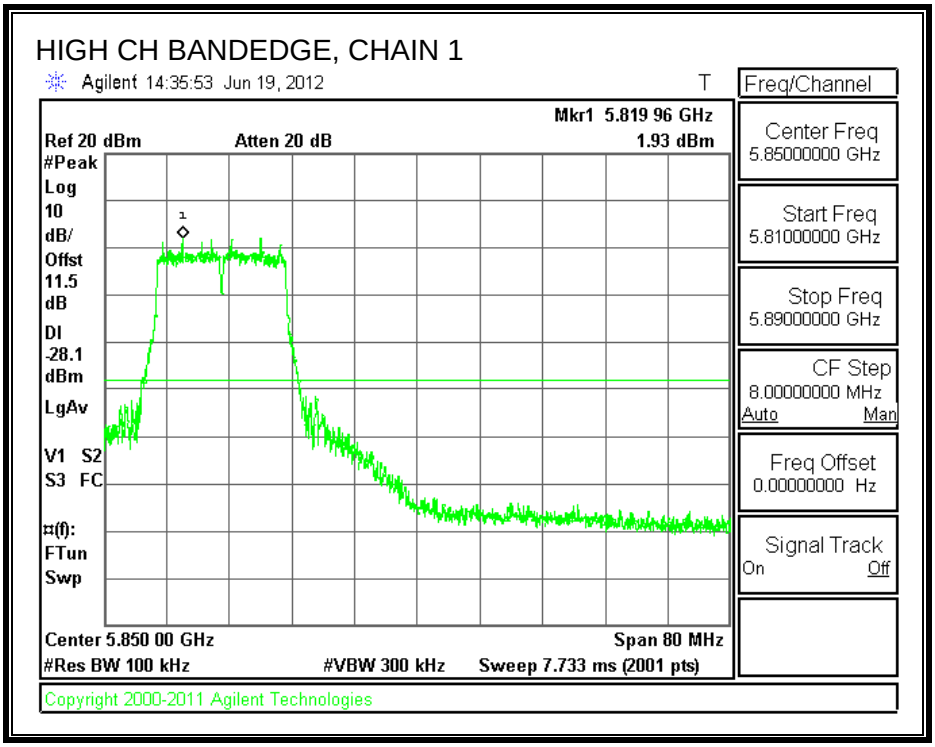
MID CH REFERENCE, CHAIN 1



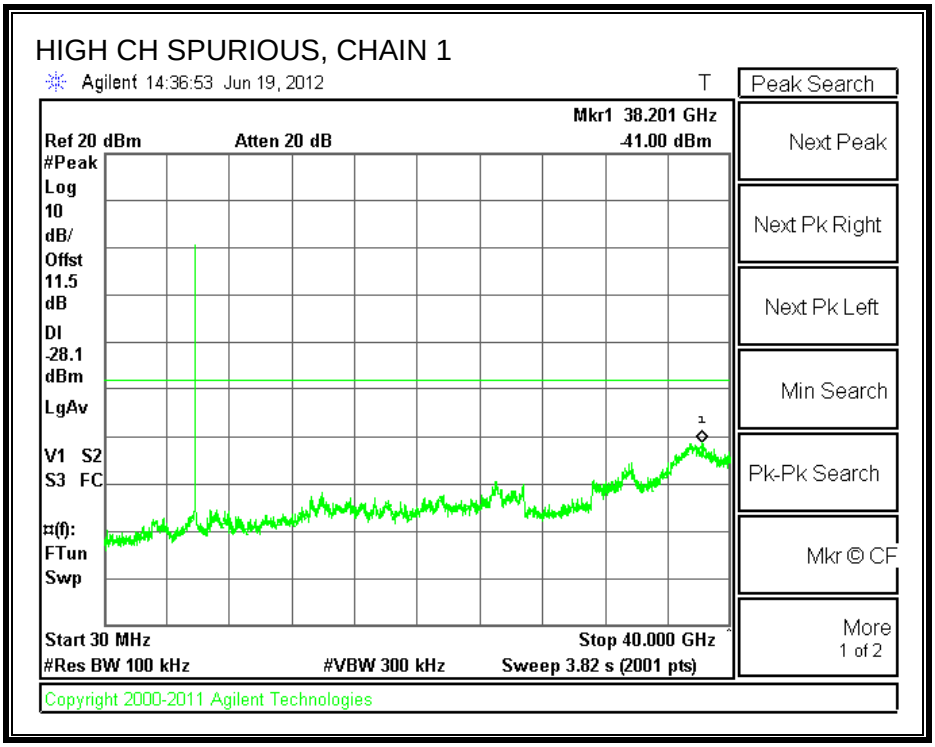
MID CH SPURIOUS, CHAIN 1



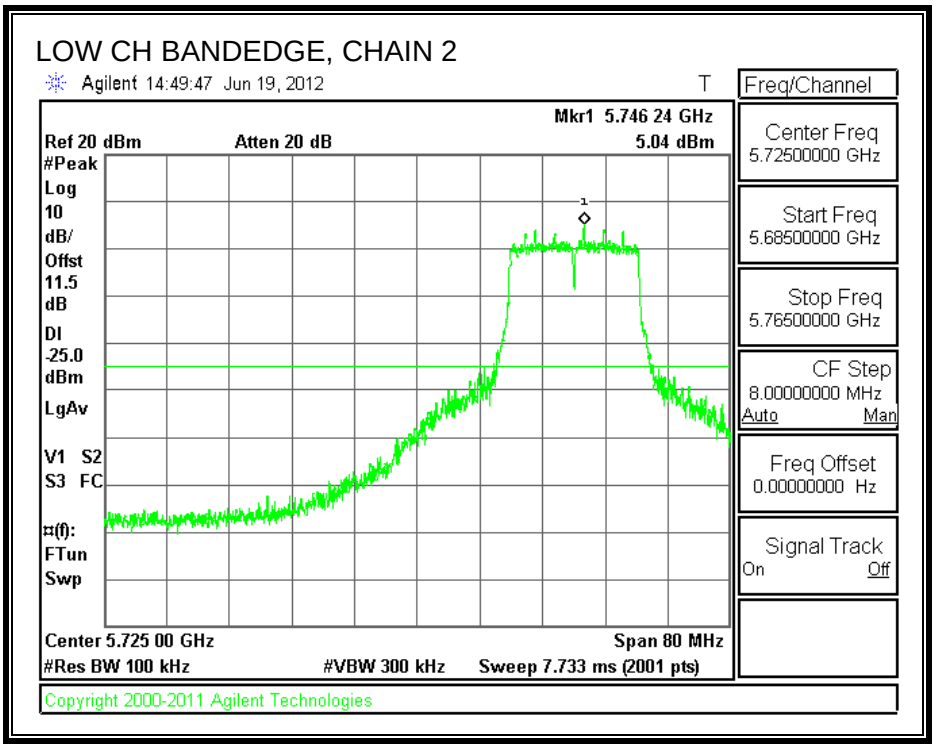
HIGH CH BANDEDGE, CHAIN 1

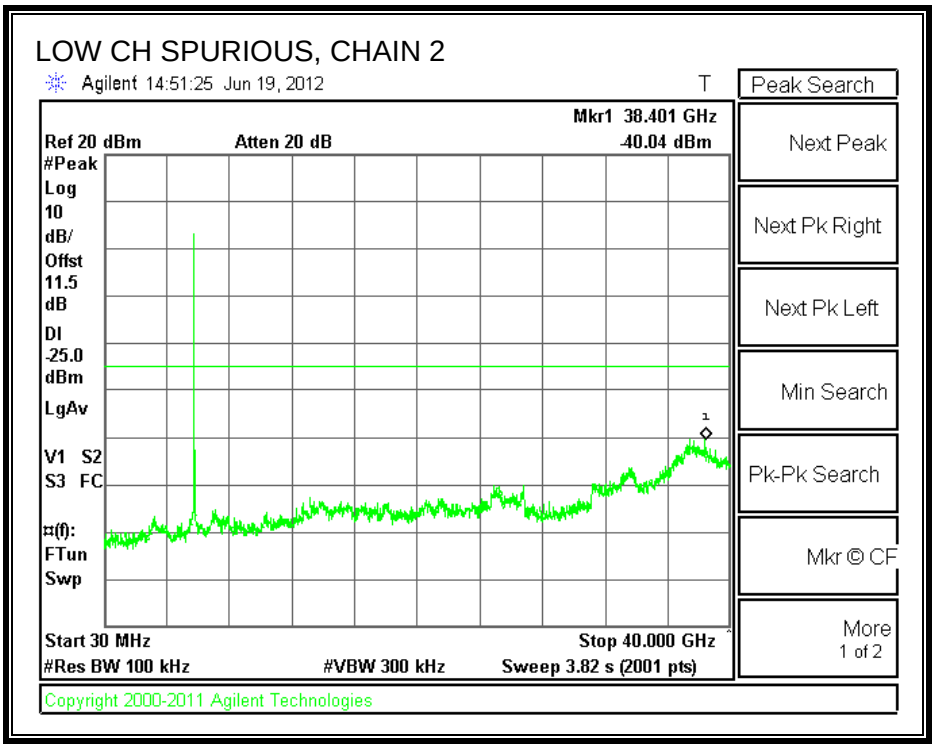


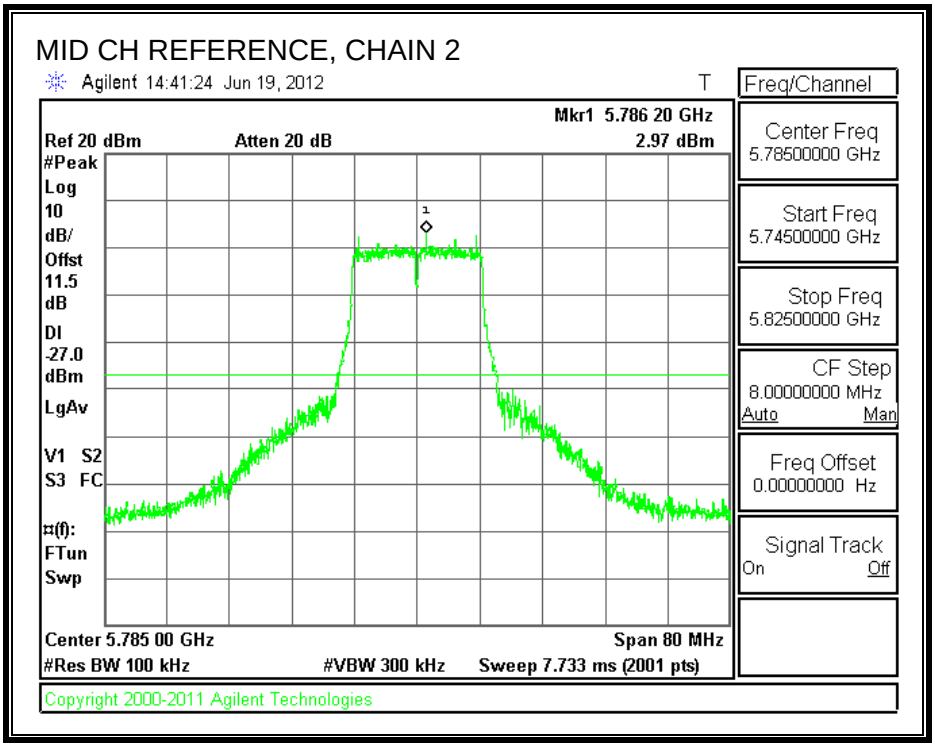
HIGH CH SPURIOUS, CHAIN 1

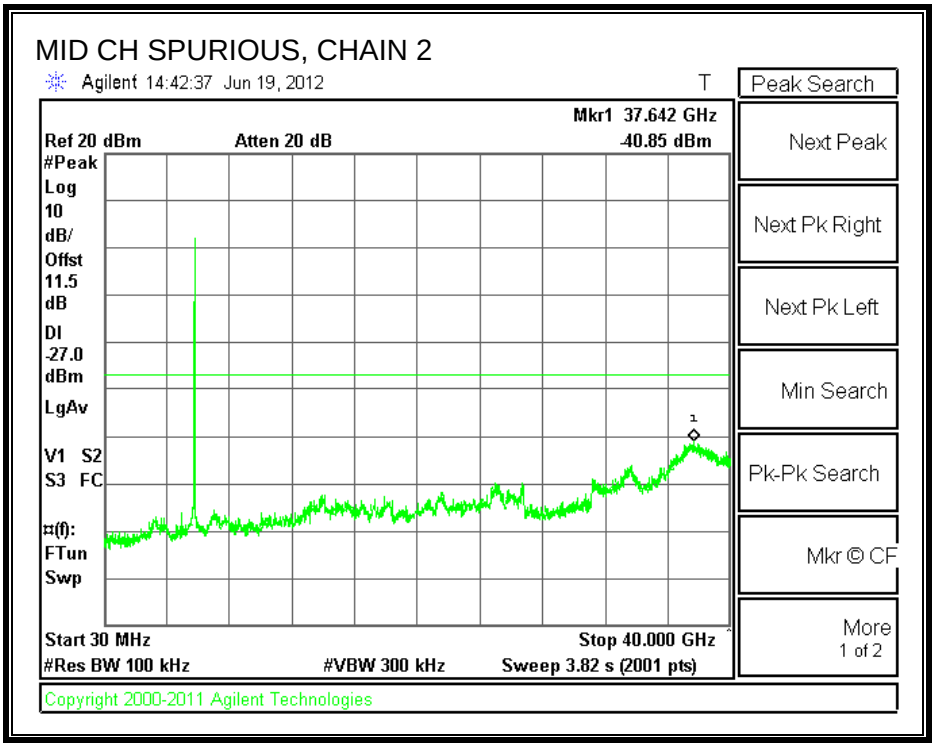


CHAIN 2 SPURIOUS EMISSIONS

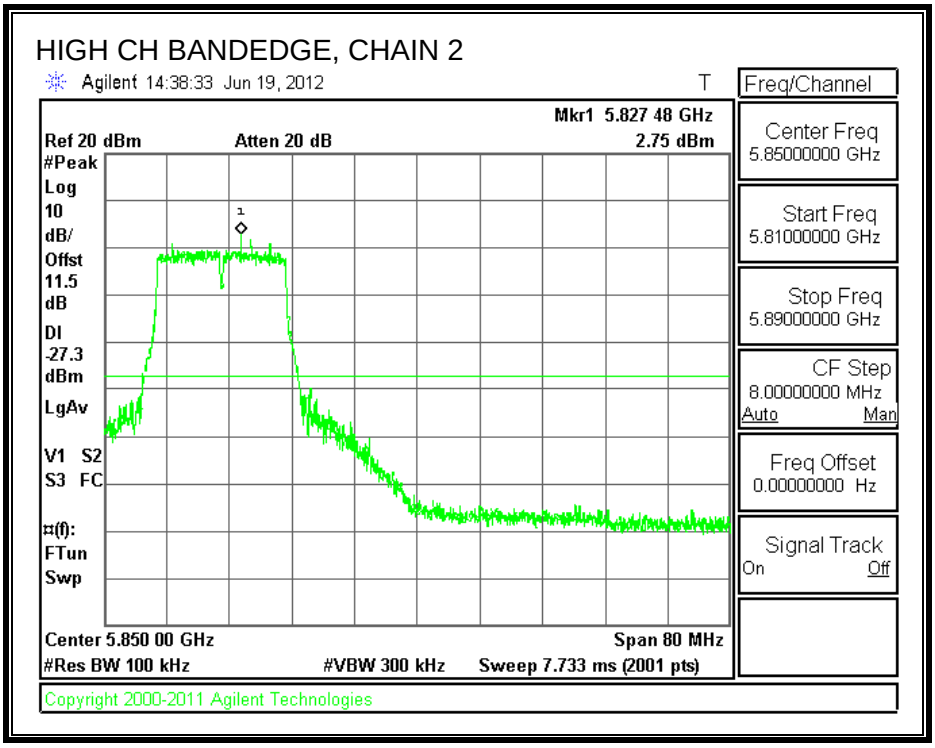




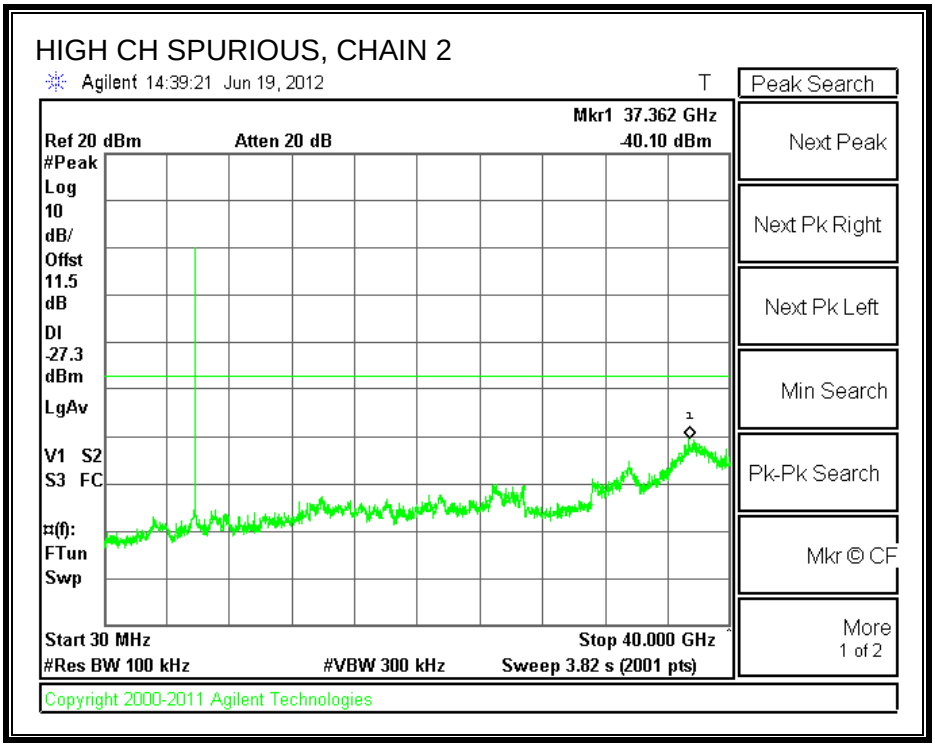




HIGH CH BANDEDGE, CHAIN 2



HIGH CH SPURIOUS, CHAIN 2



8.8. 802.11n HT20 MODE IN THE 5.8 GHz BAND

8.8.1. 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.

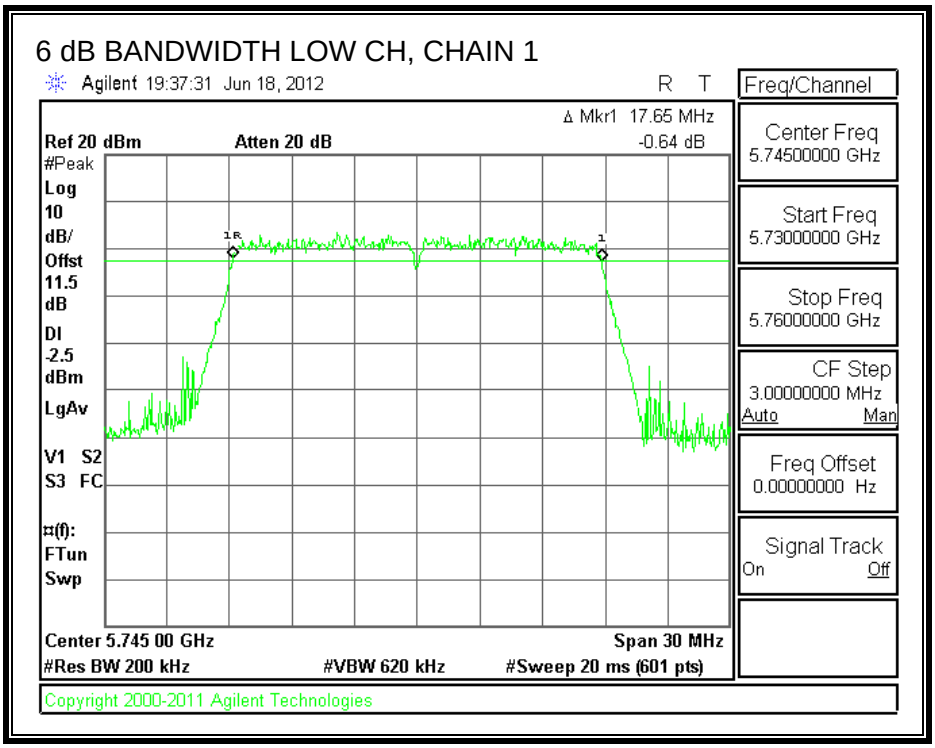
TEST PROCEDURE

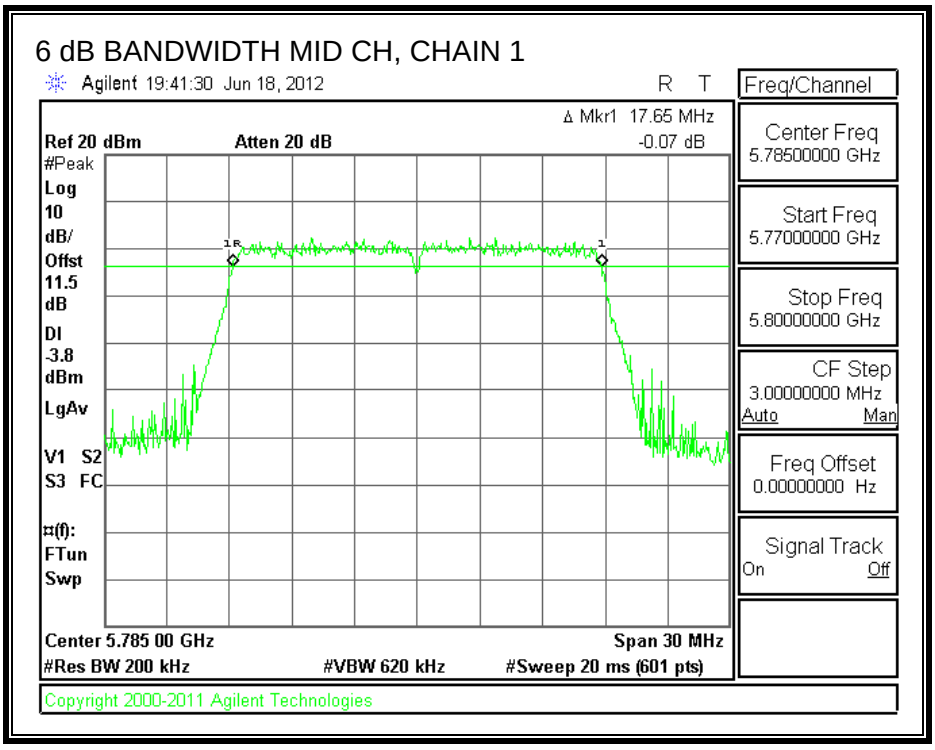
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

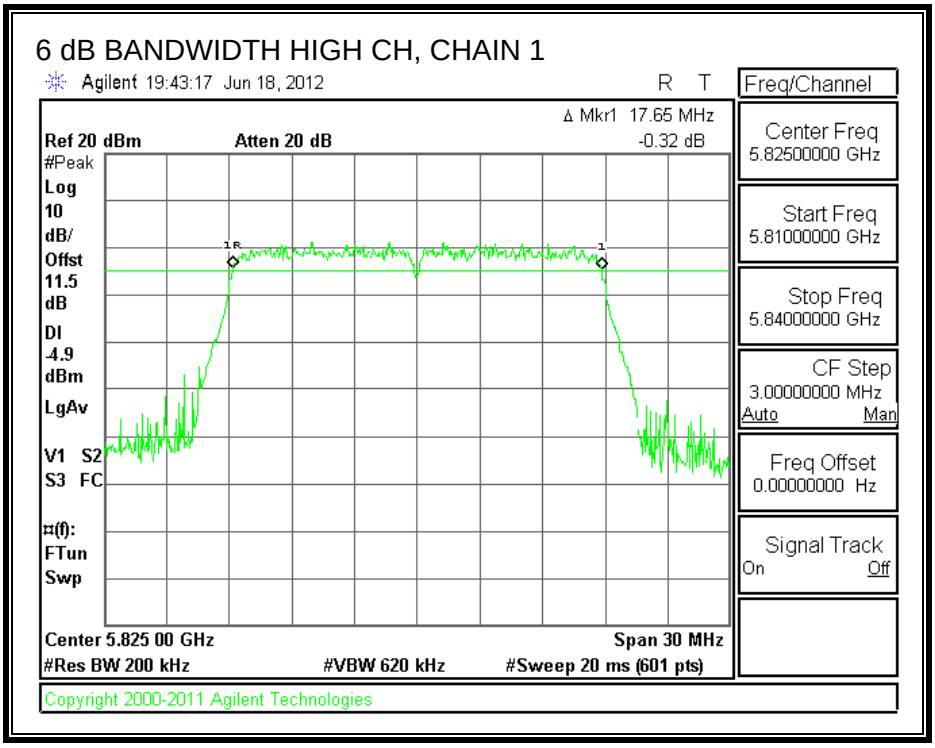
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	17.65	17.65	0.5
Middle	5785	17.65	17.65	0.5
High	5825	17.65	17.7	0.5

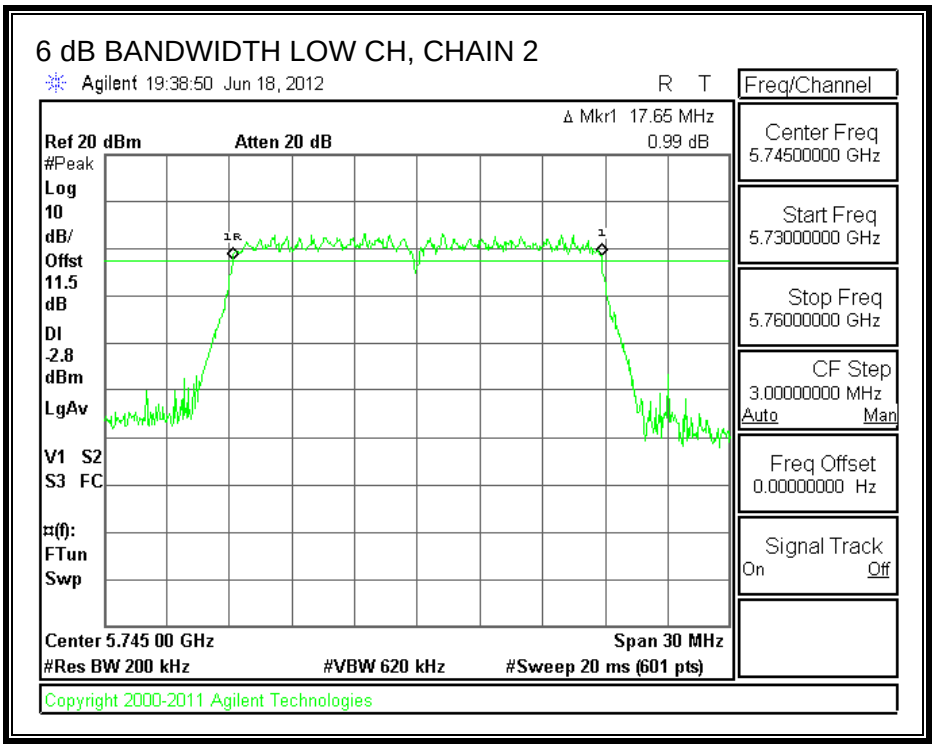
6 dB BANDWIDTH, CHAIN 1

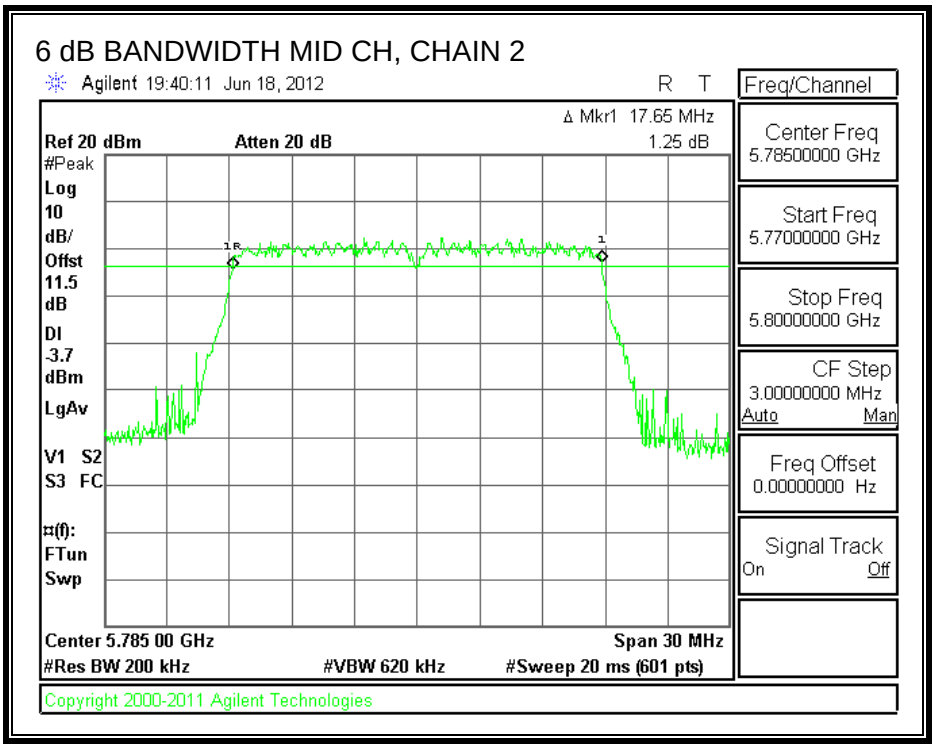


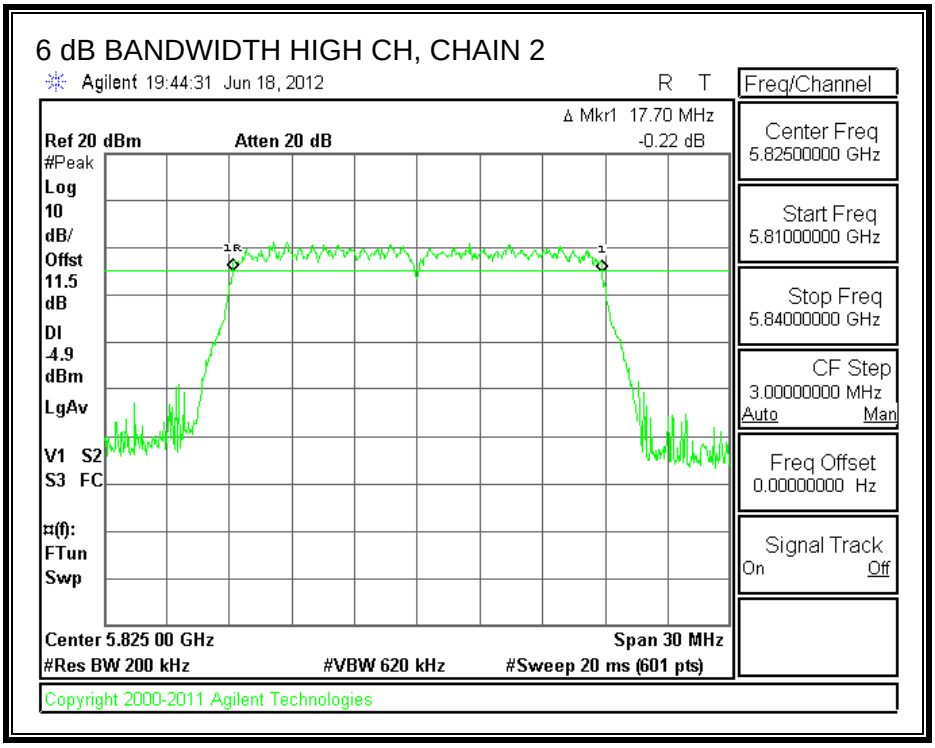




6 dB BANDWIDTH, CHAIN 2







8.8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

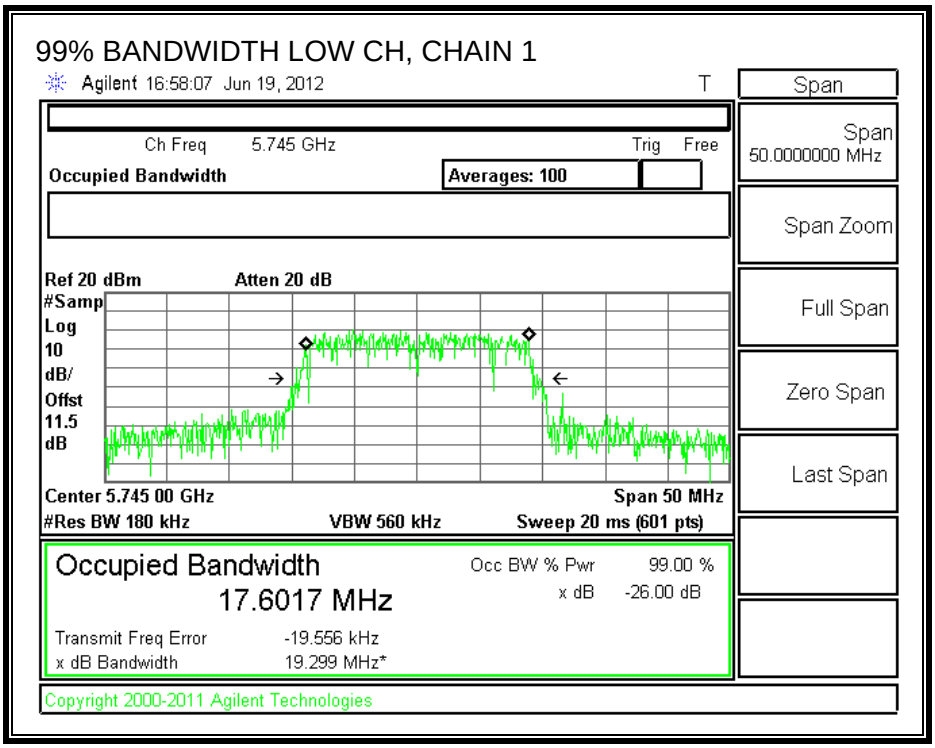
TEST PROCEDURE

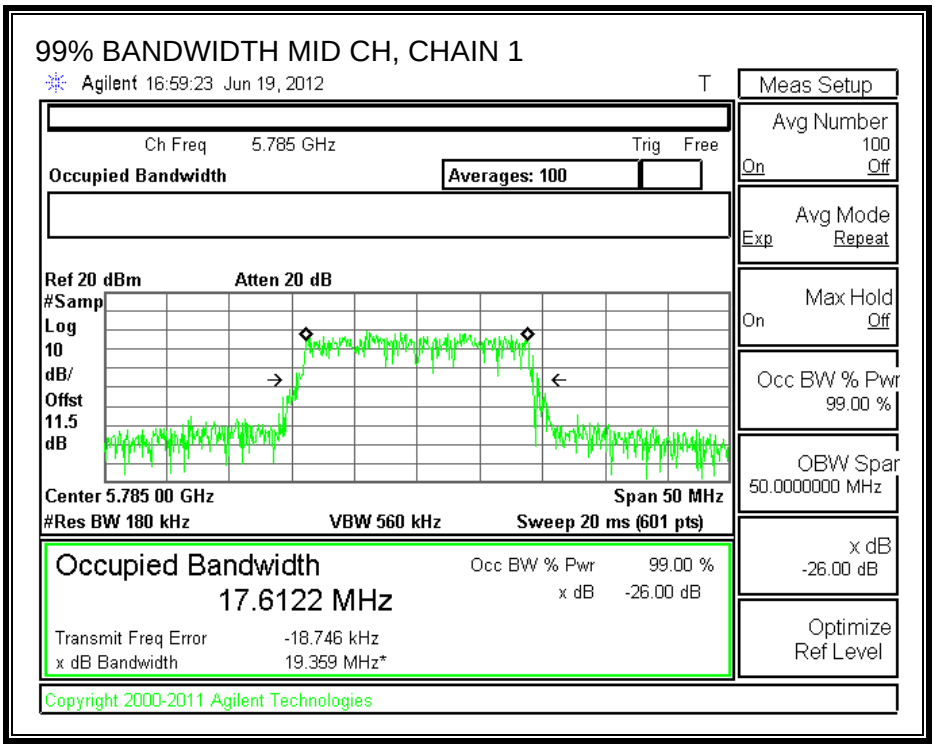
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

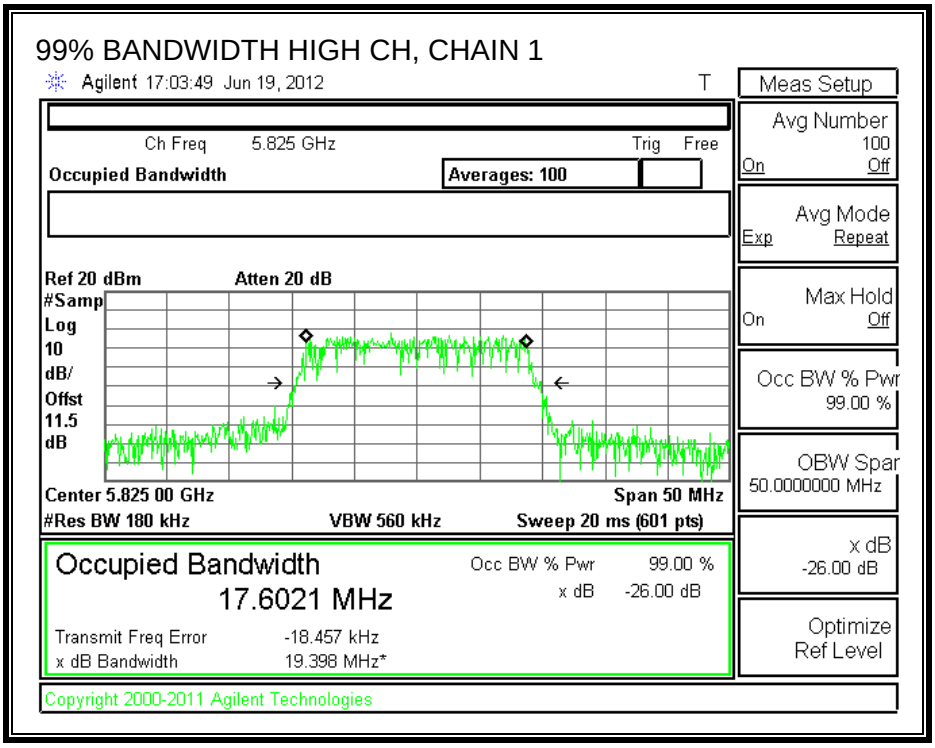
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5745	17.6017	17.5875
Middle	5785	17.6122	17.5759
High	5825	17.6021	17.5917

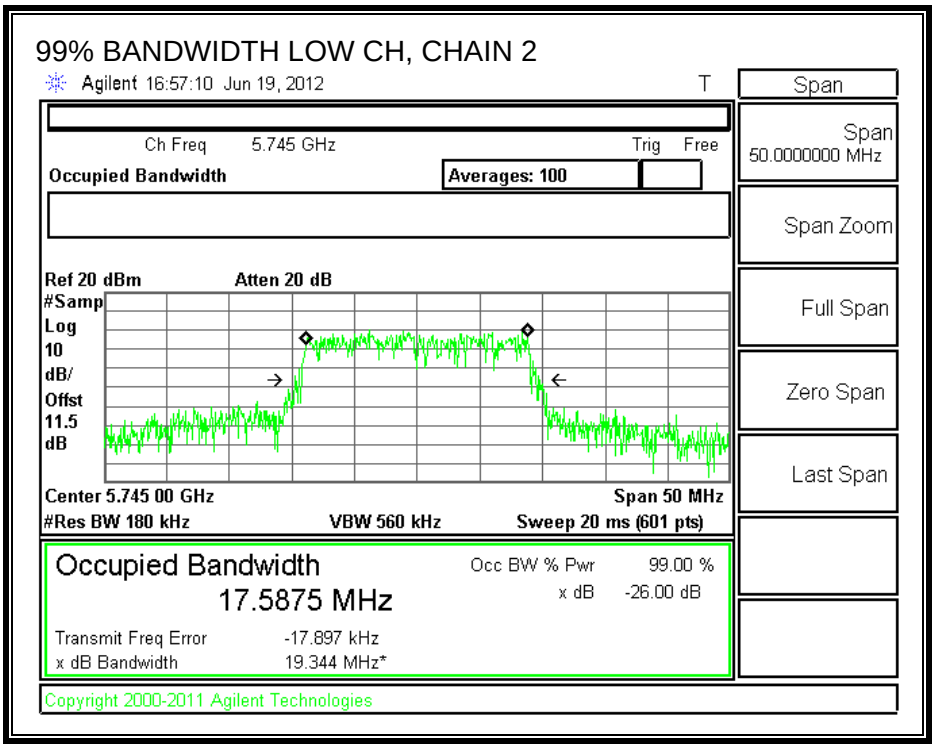
99% BANDWIDTH, CHAIN 1

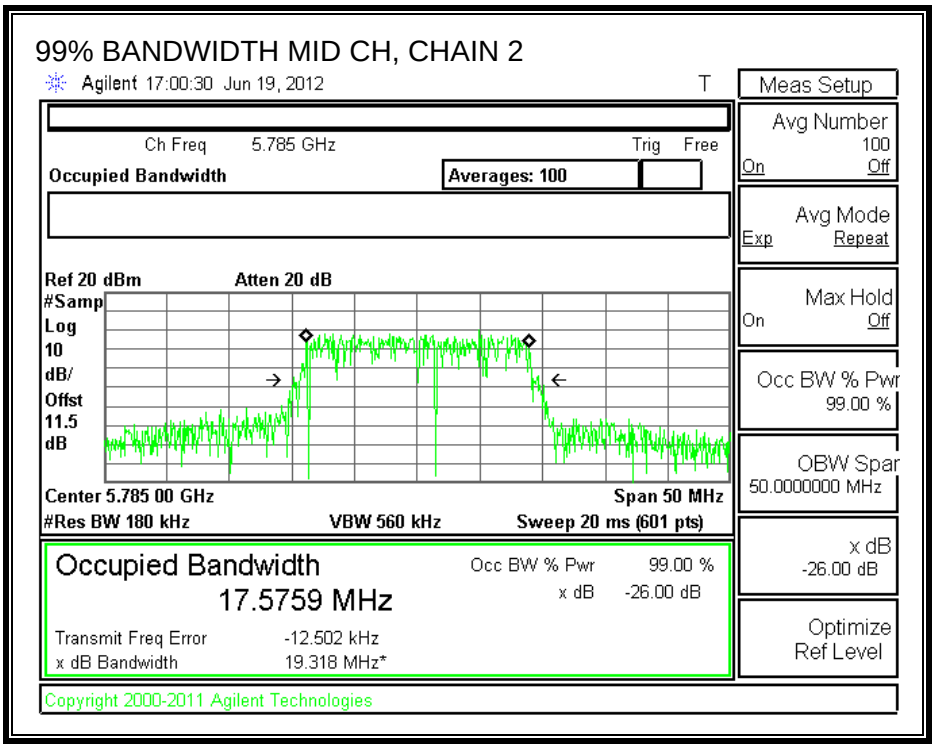


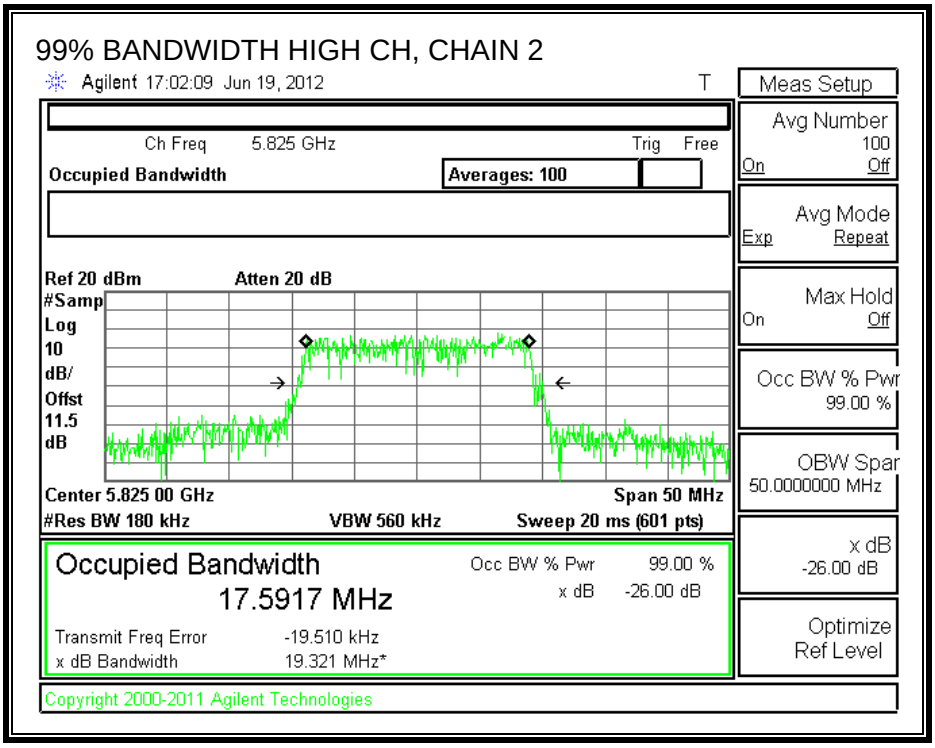




99% BANDWIDTH, CHAIN 2







8.8.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.00	3.01	7.01

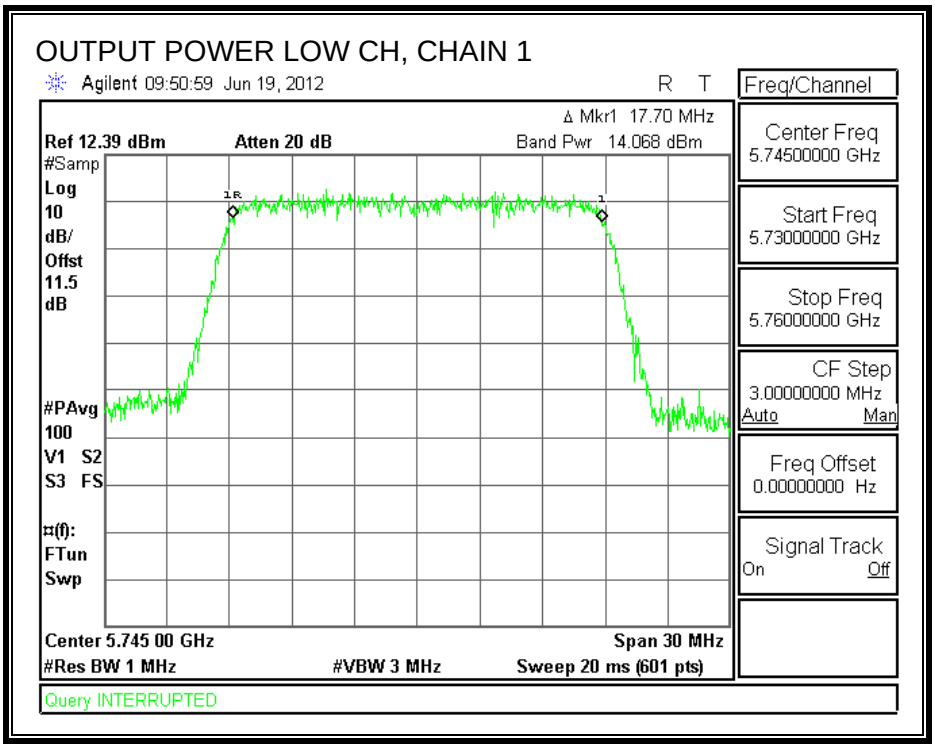
TEST PROCEDURE

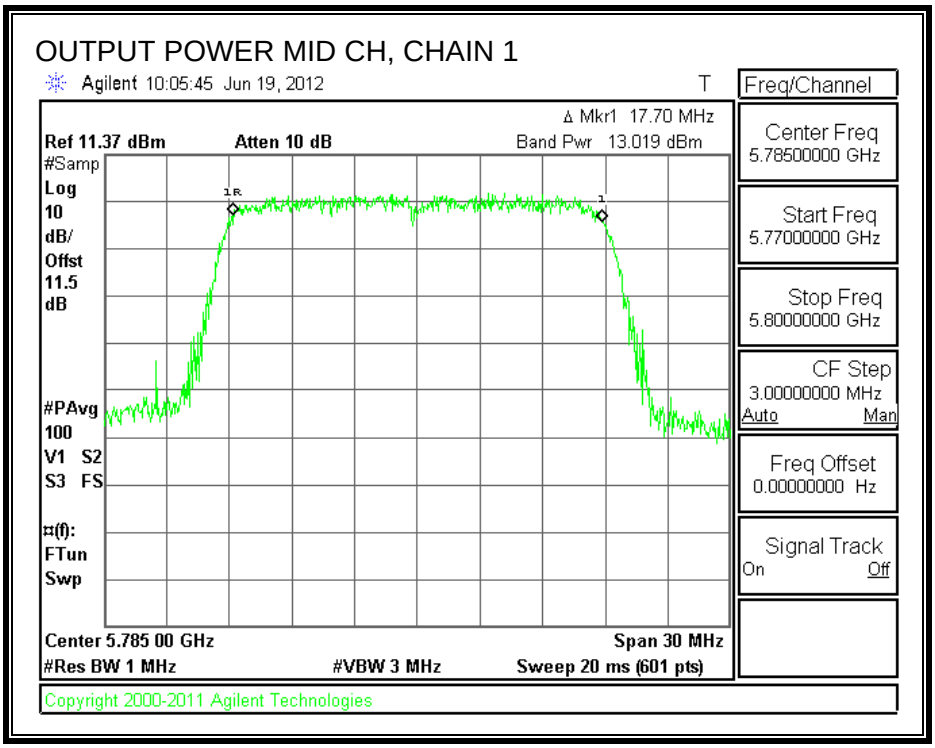
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

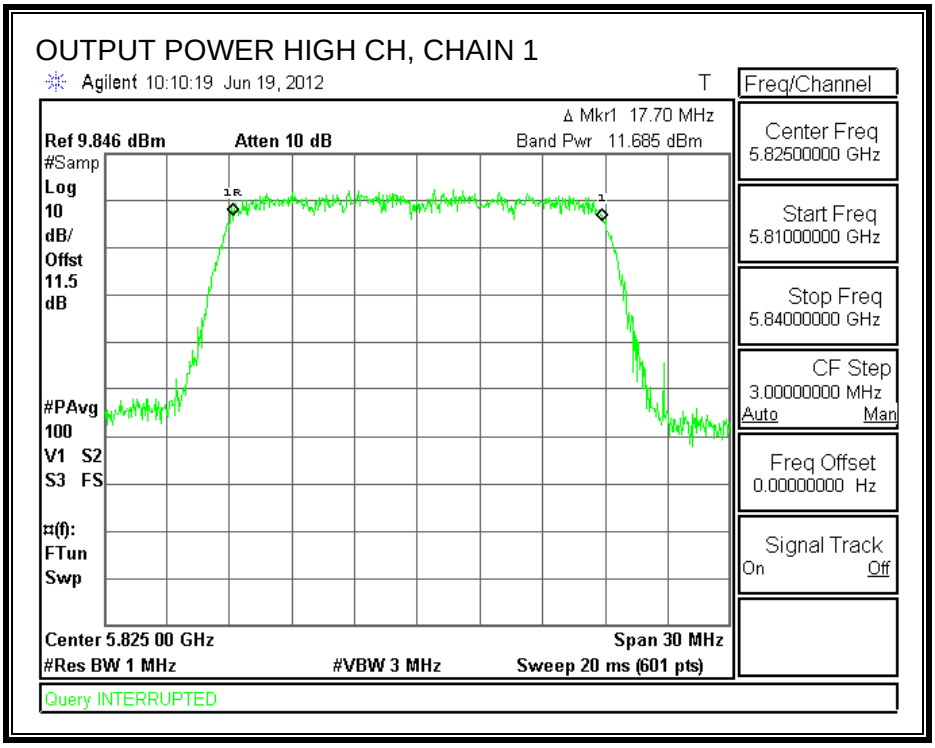
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	14.07	14.02	0.00	17.06	28.99	-11.93
Mid	5785	13.02	13.04	0.00	16.04	28.99	-12.95
High	5825	11.69	11.90	0.00	14.80	28.99	-14.19

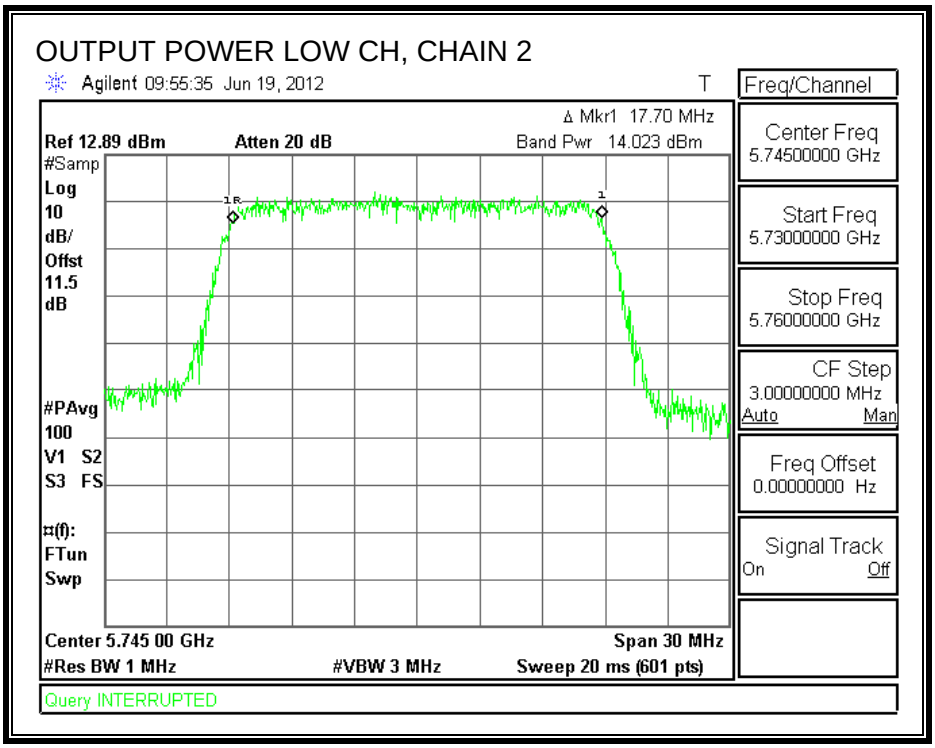
CHAIN 1 OUTPUT POWER

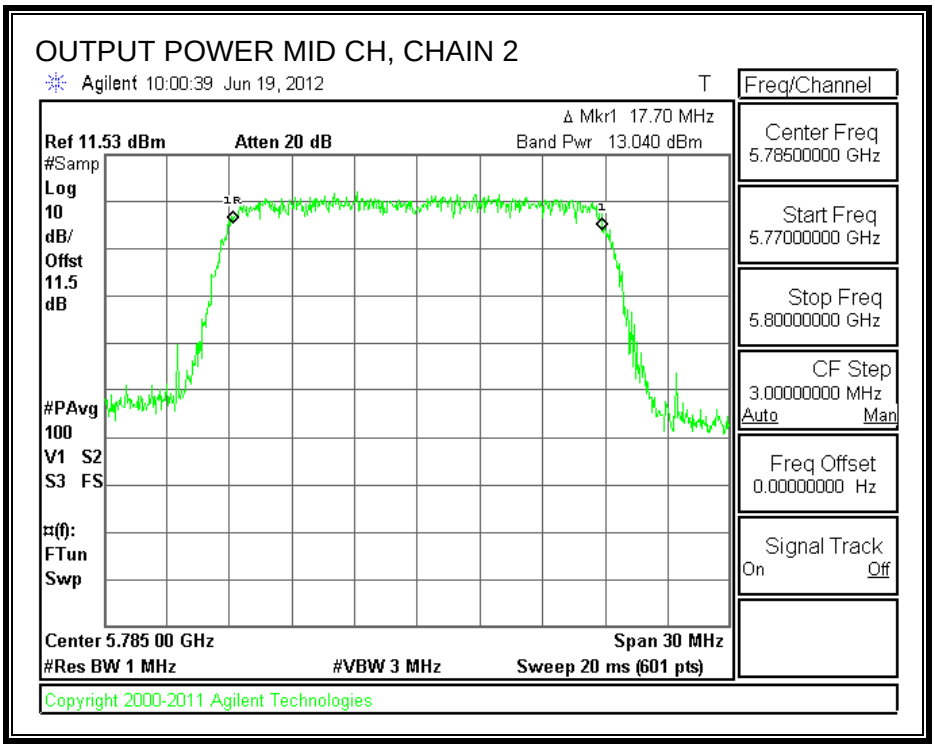


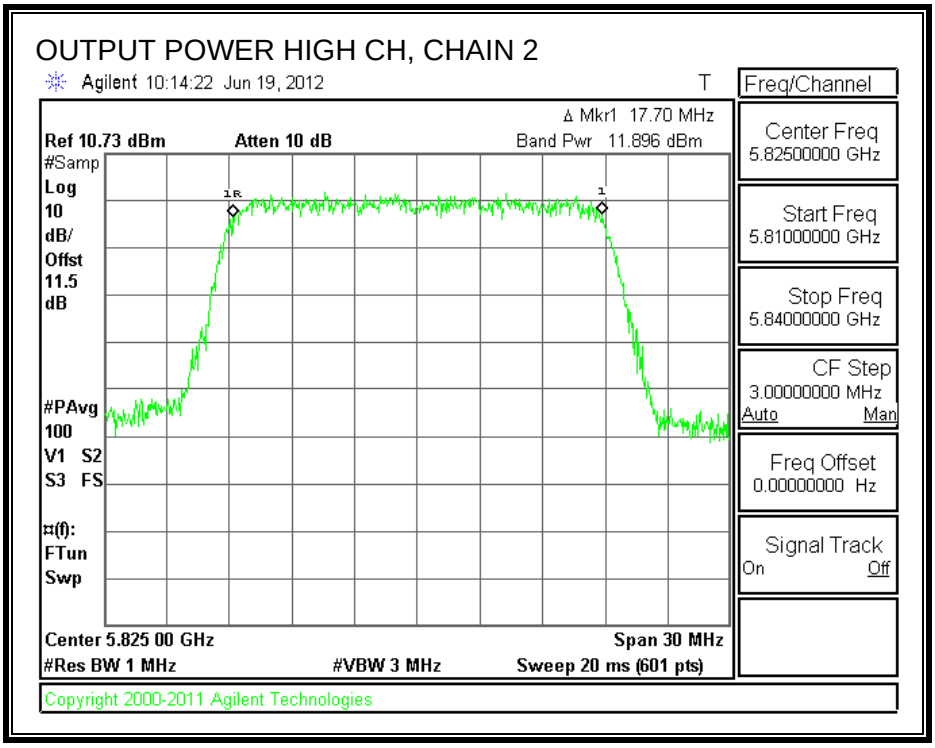




CHAIN 2 OUTPUT POWER







8.8.4. 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 11.5 dB (including 10 dB pad and 1.5 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	13.50	13.40	16.46
Middle	5785	12.50	12.40	15.46
High	5825	11.40	11.40	14.41

8.8.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

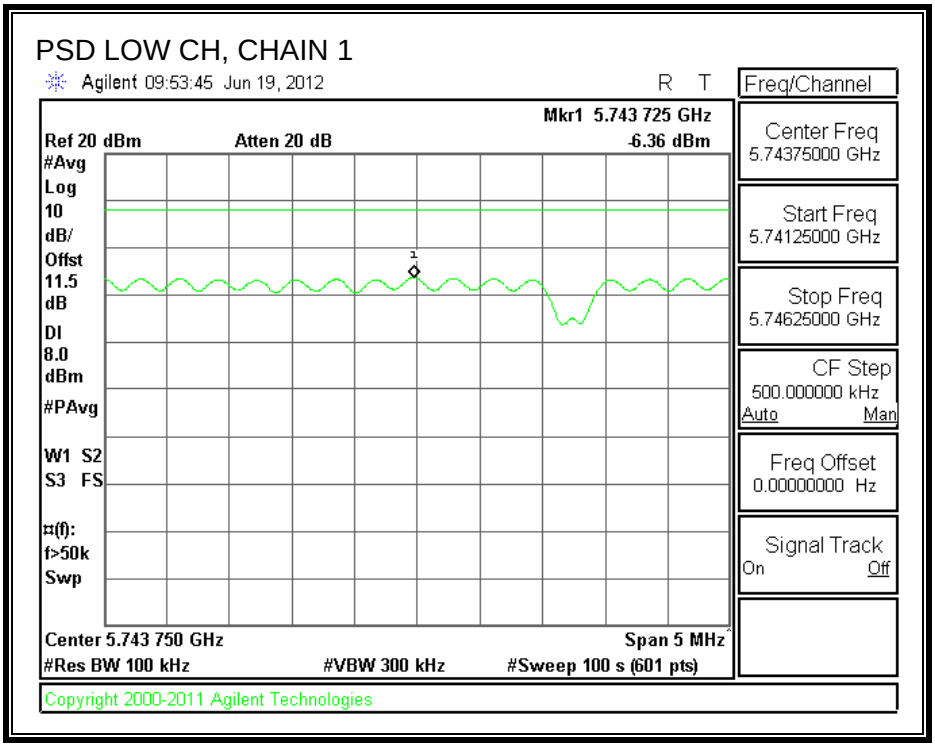
TEST PROCEDURE

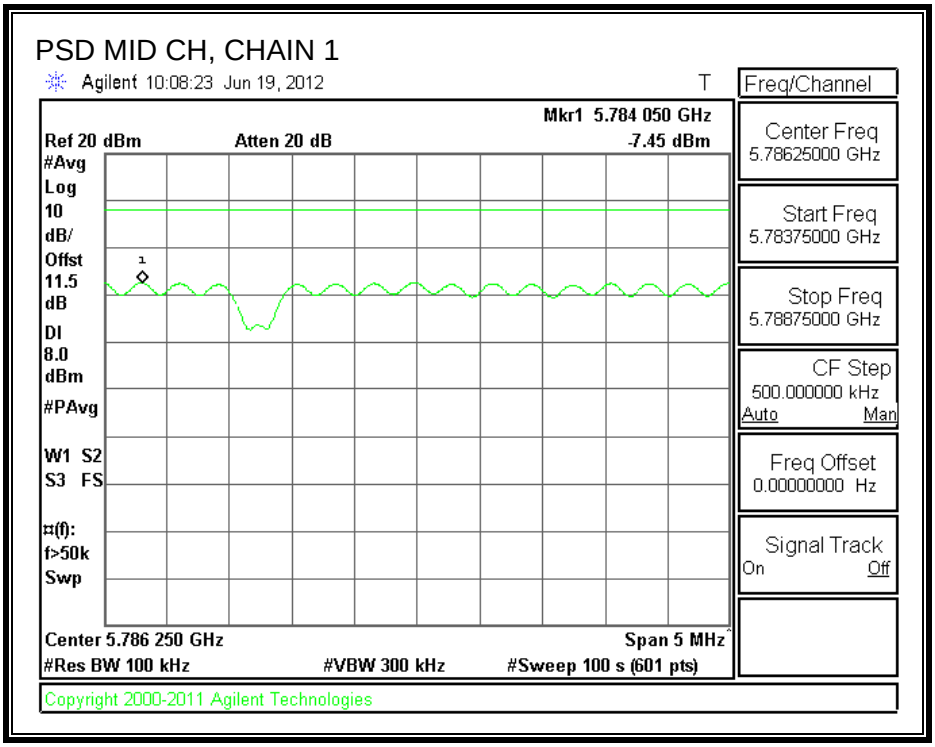
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

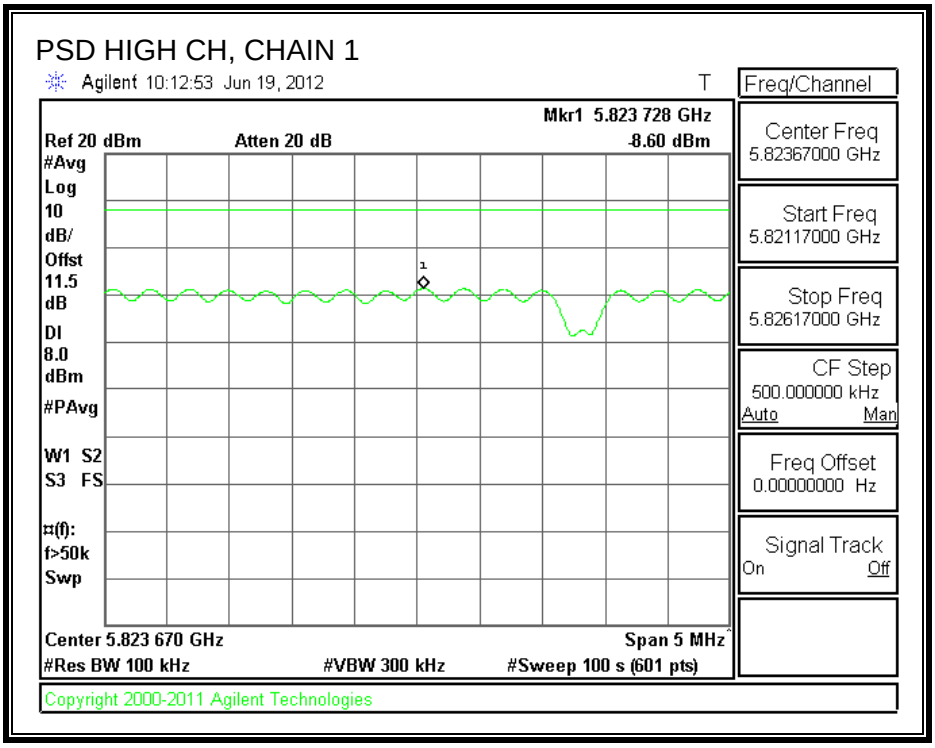
RESULTS:

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-6.36	-6.01	-3.17	8	-11.17
Middle	5785	-7.45	-6.98	-4.20	8	-12.20
High	5825	-8.6	-8.15	-5.36	8	-13.36

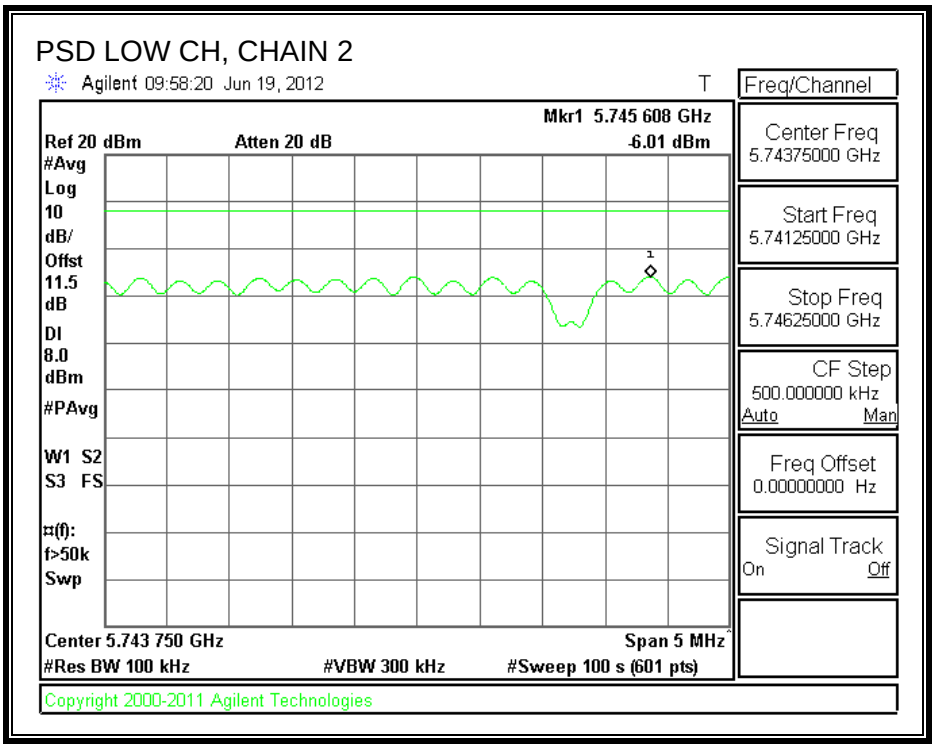
POWER SPECTRAL DENSITY, CHAIN 1

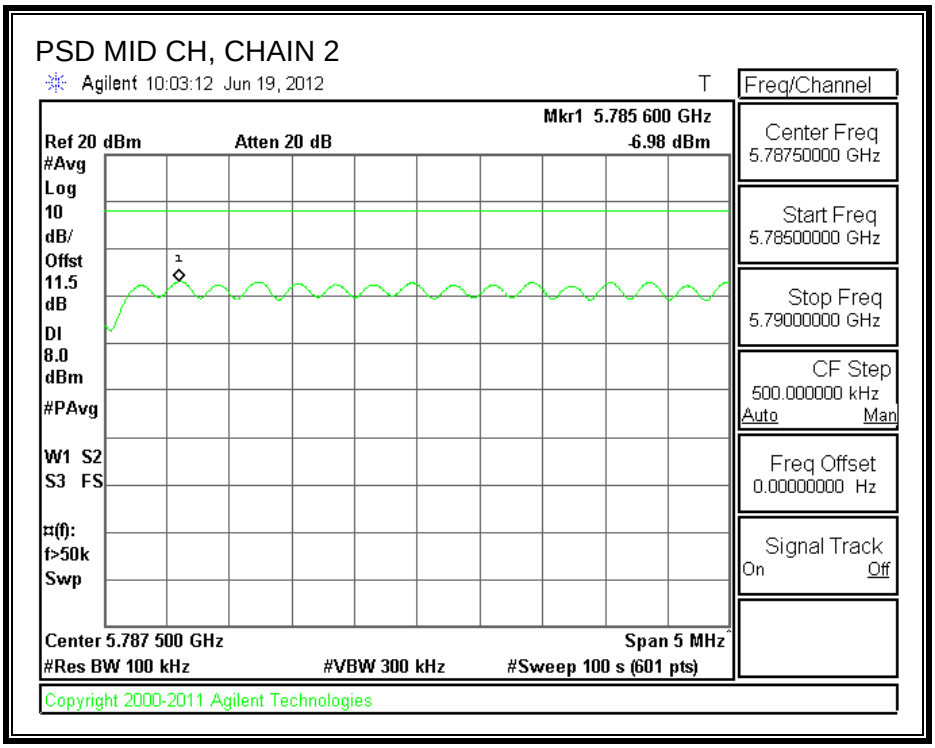




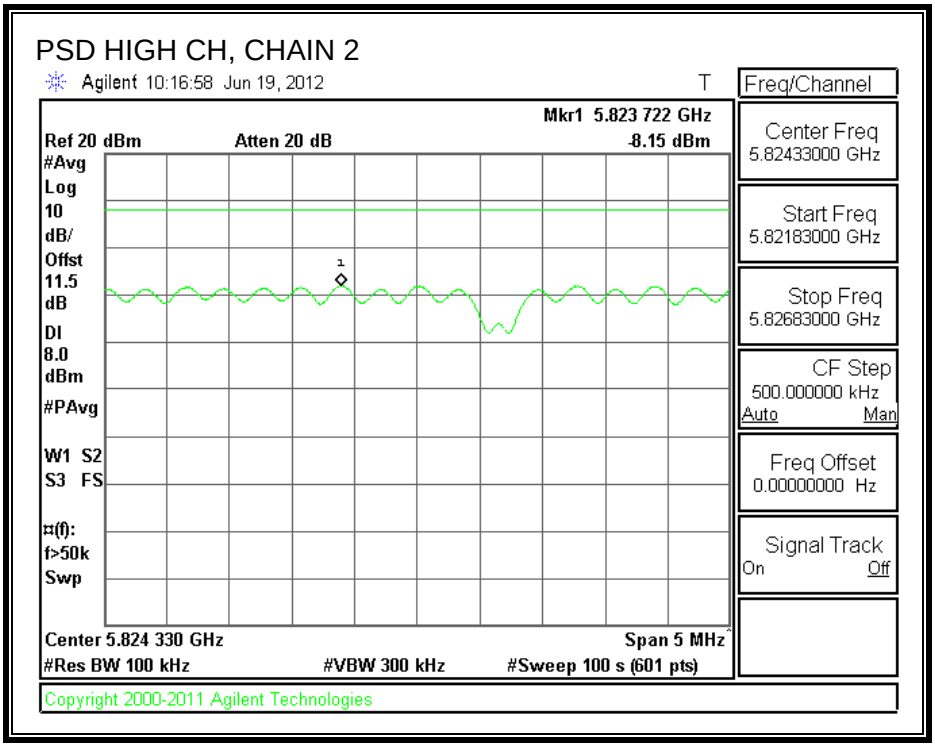


POWER SPECTRAL DENSITY, CHAIN 2





PSD HIGH CH, CHAIN 2



8.8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

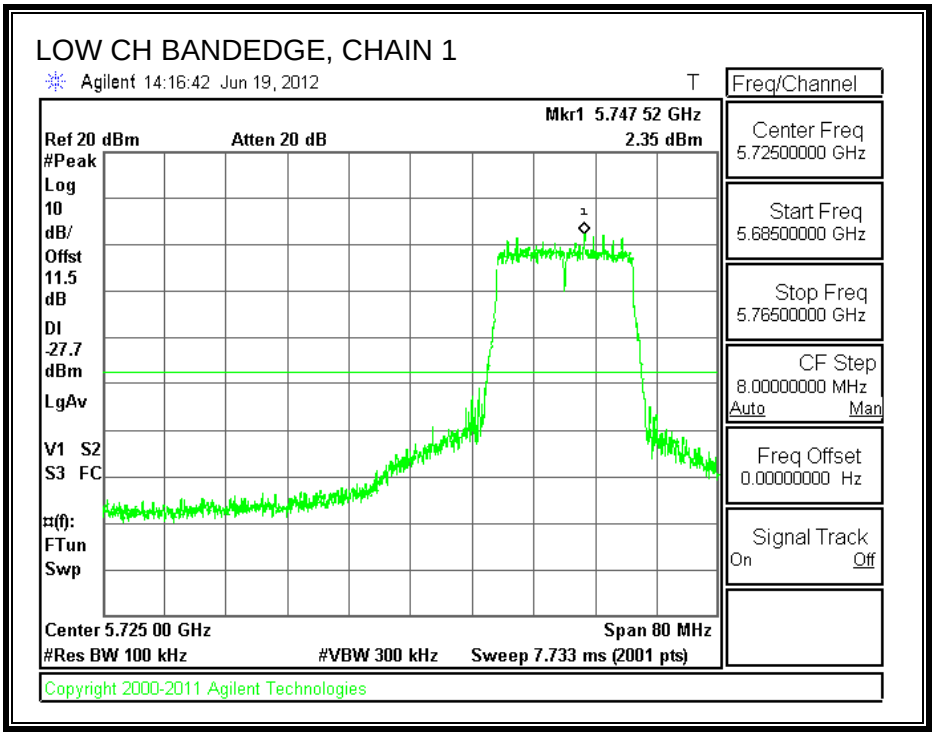
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

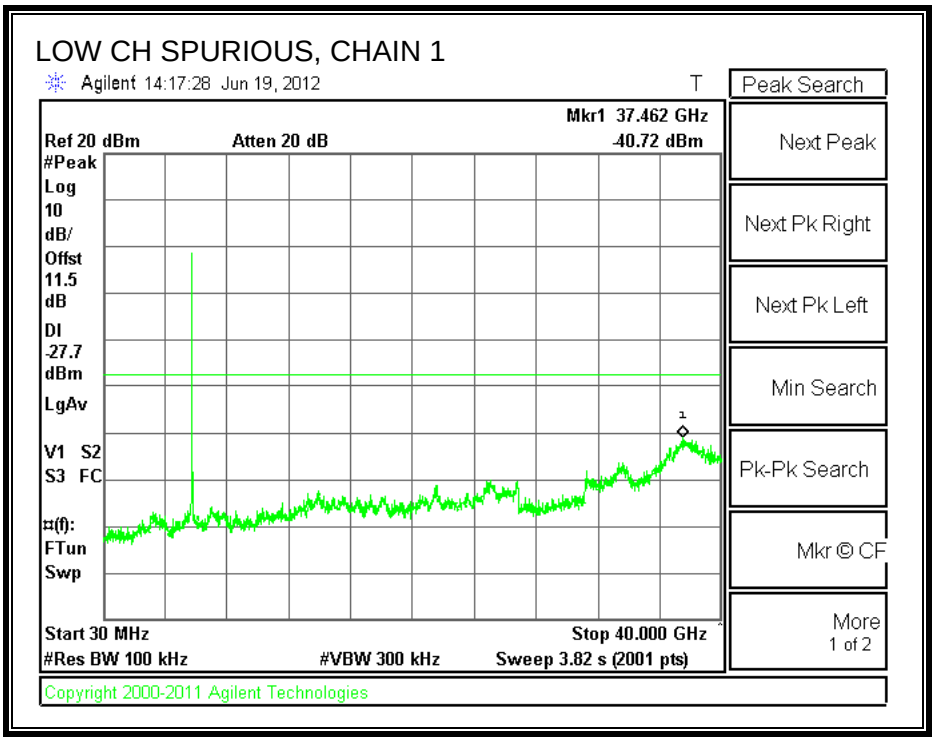
TEST PROCEDURE

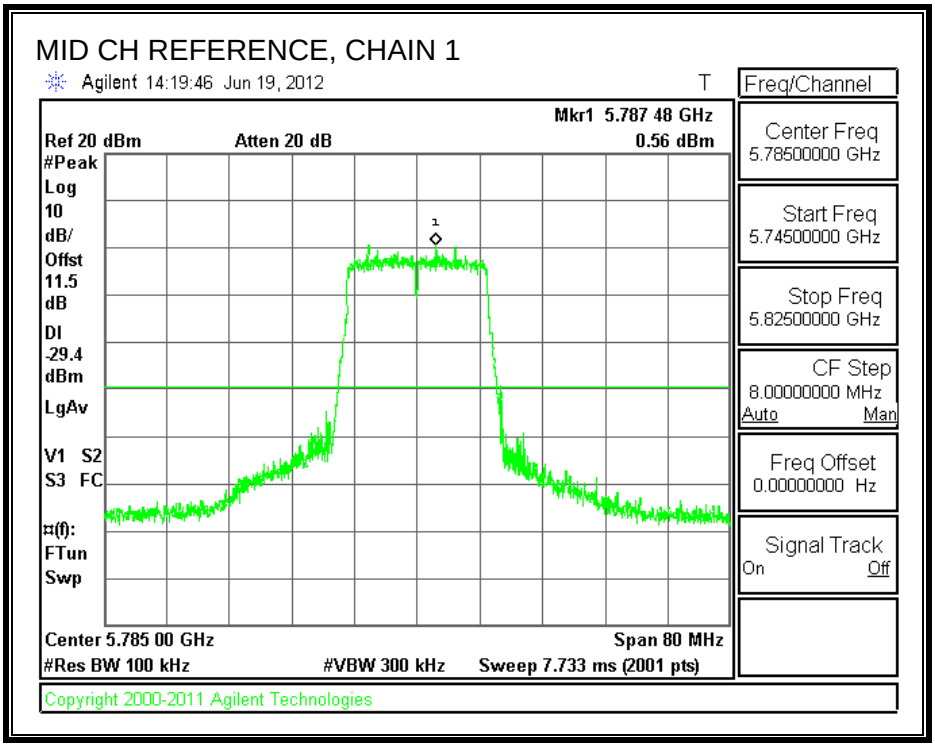
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

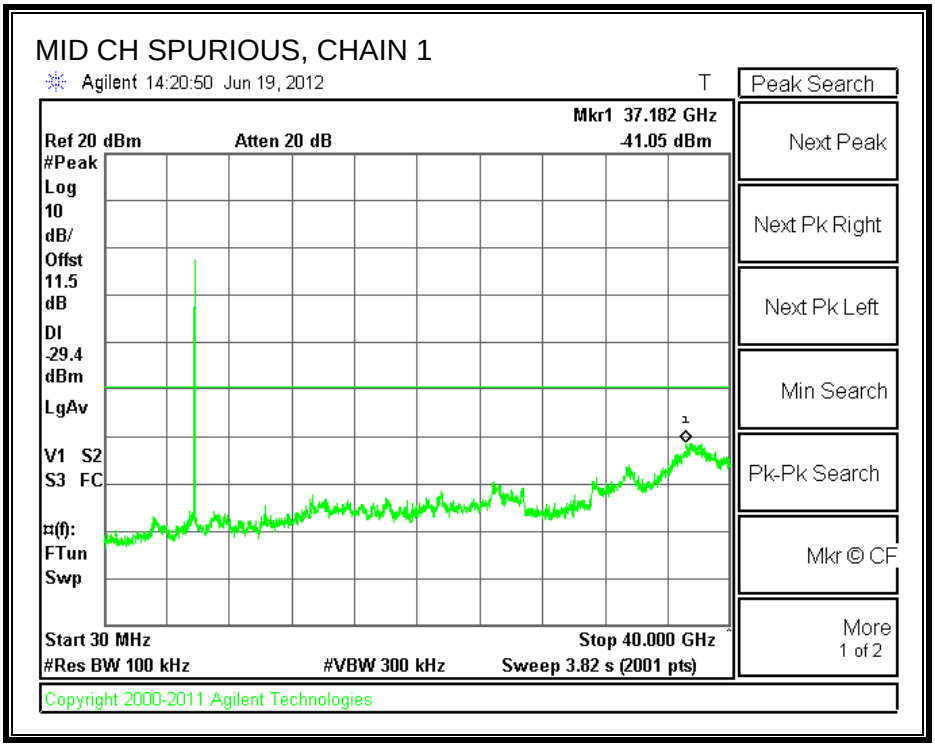
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

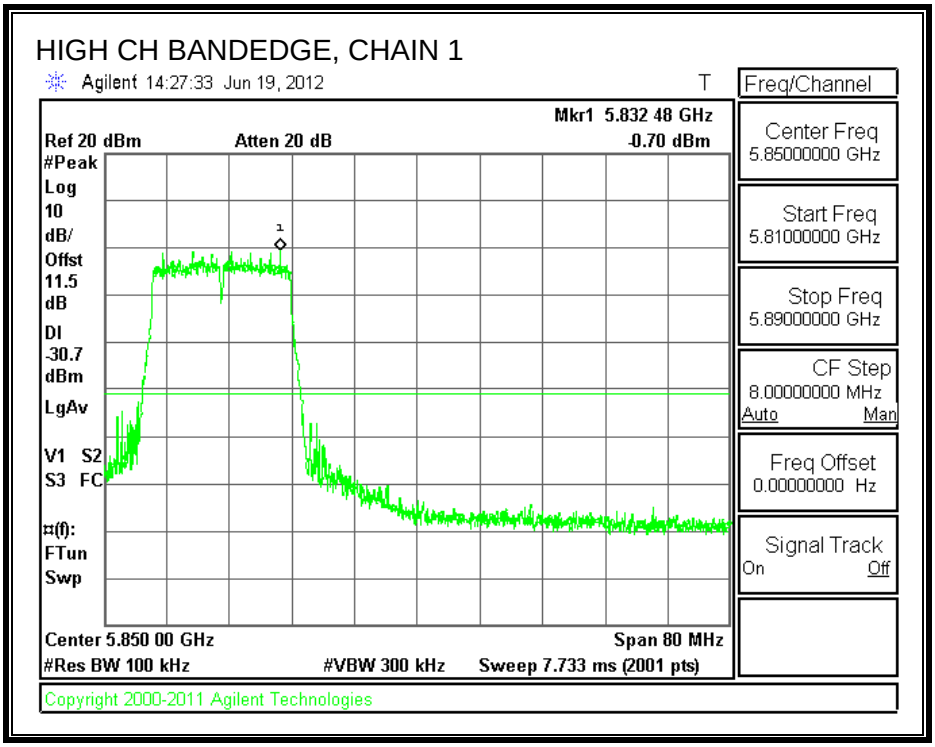




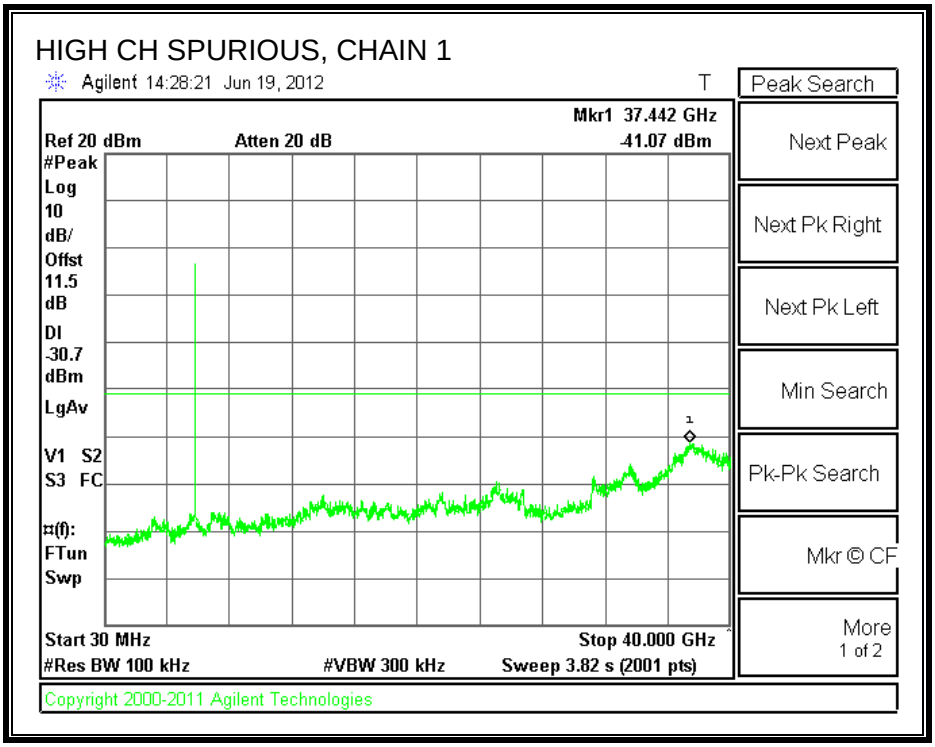




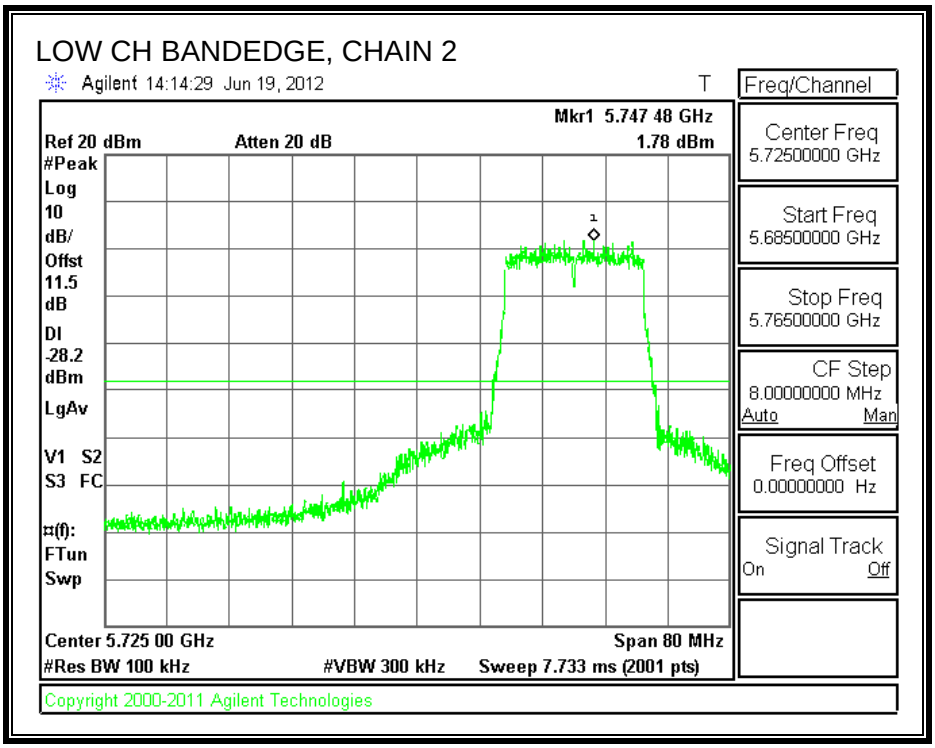
HIGH CH BANDEDGE, CHAIN 1

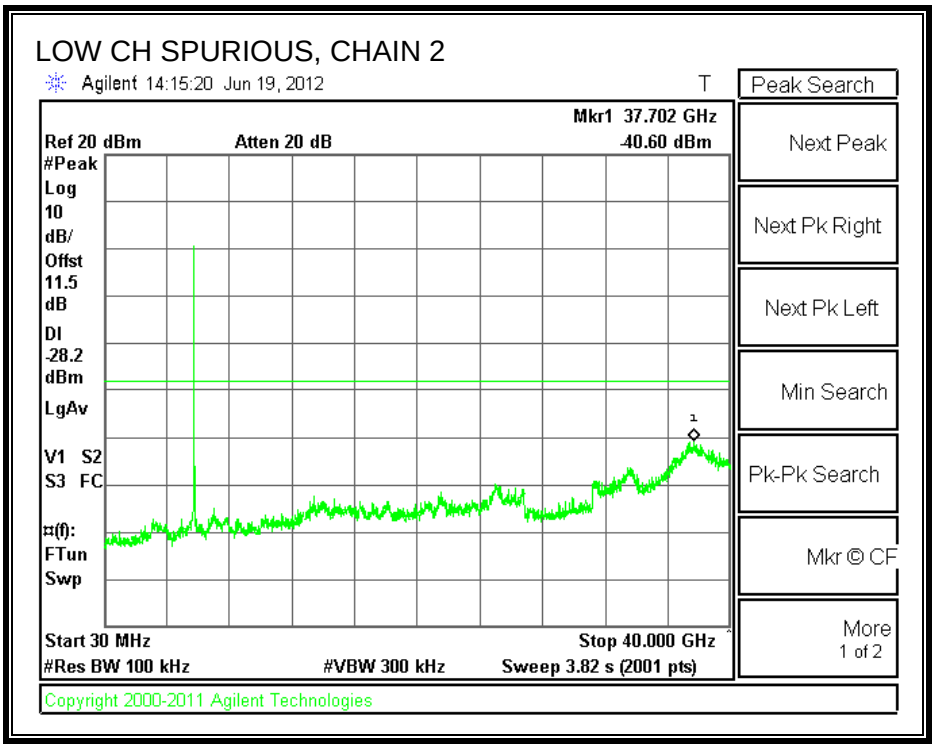


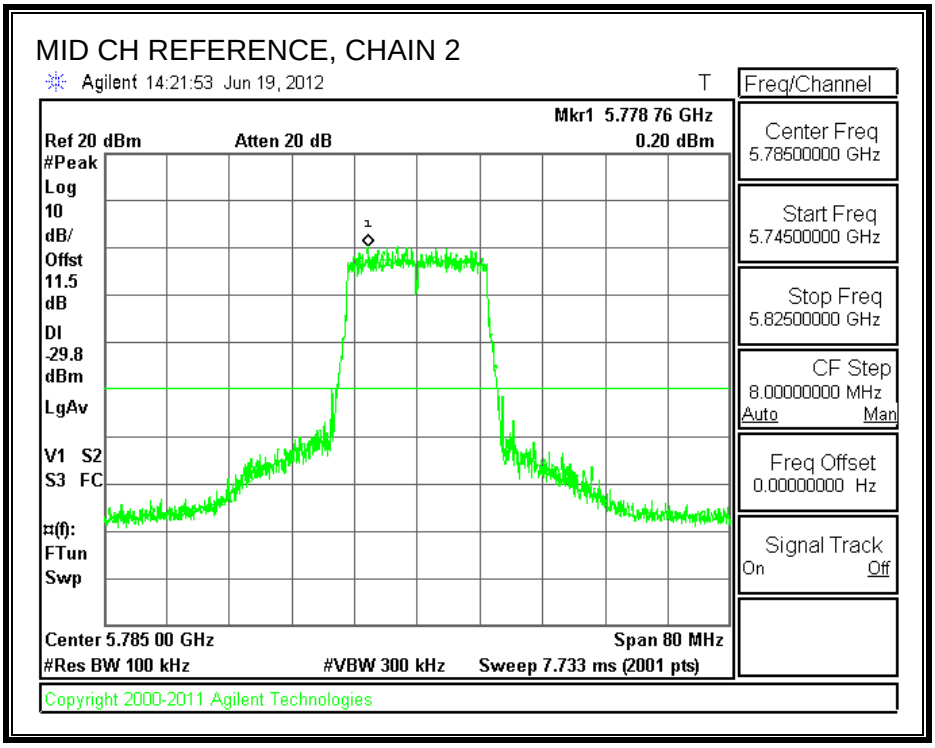
HIGH CH SPURIOUS, CHAIN 1

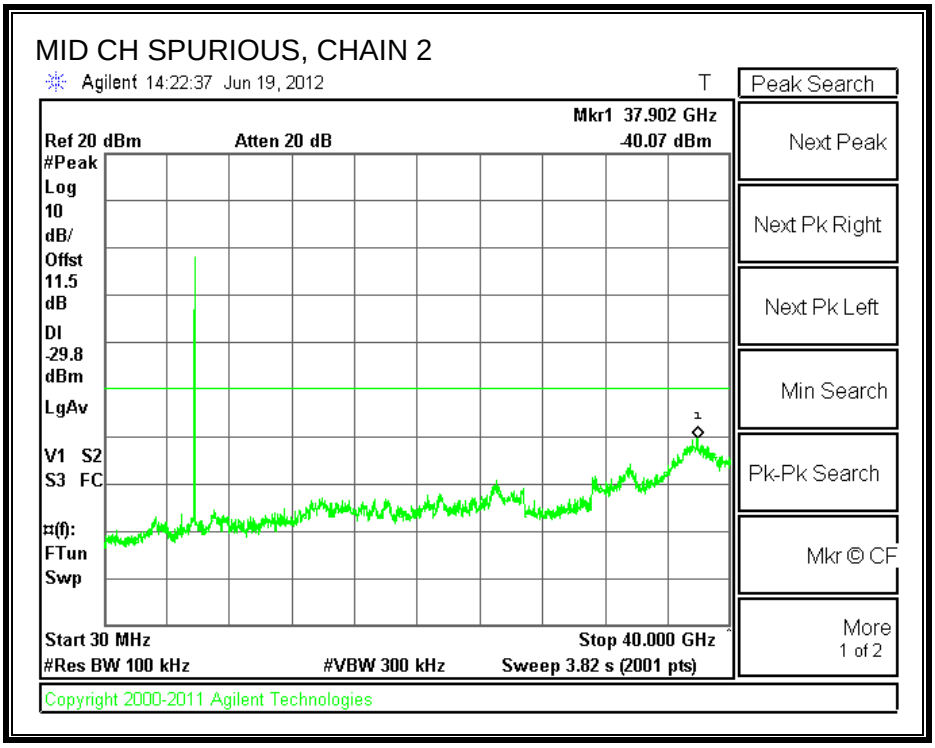


CHAIN 2 SPURIOUS EMISSIONS

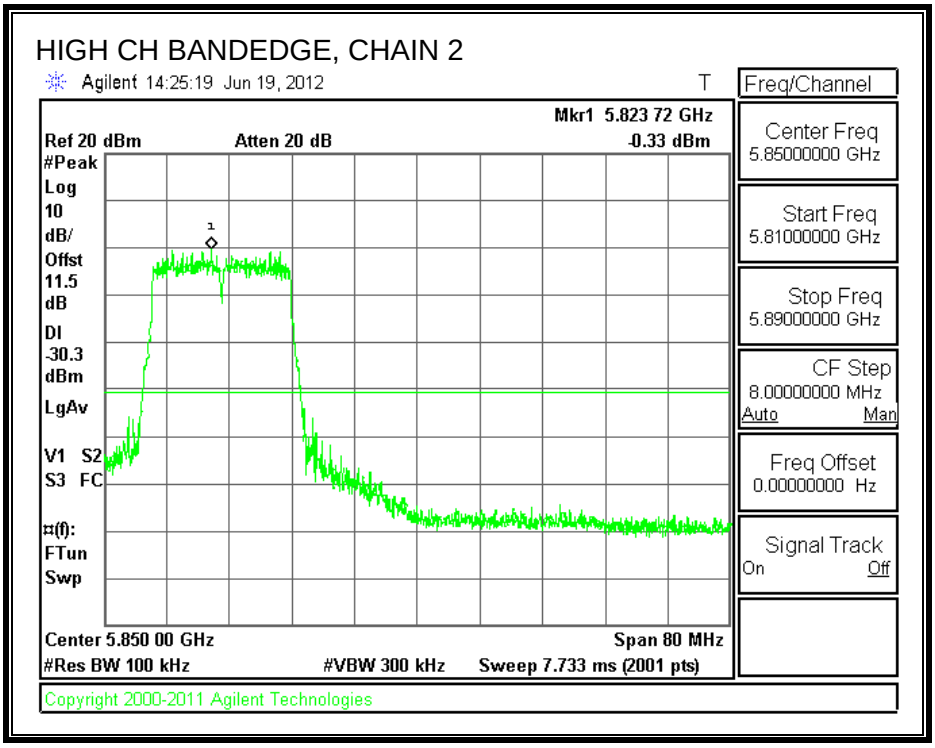




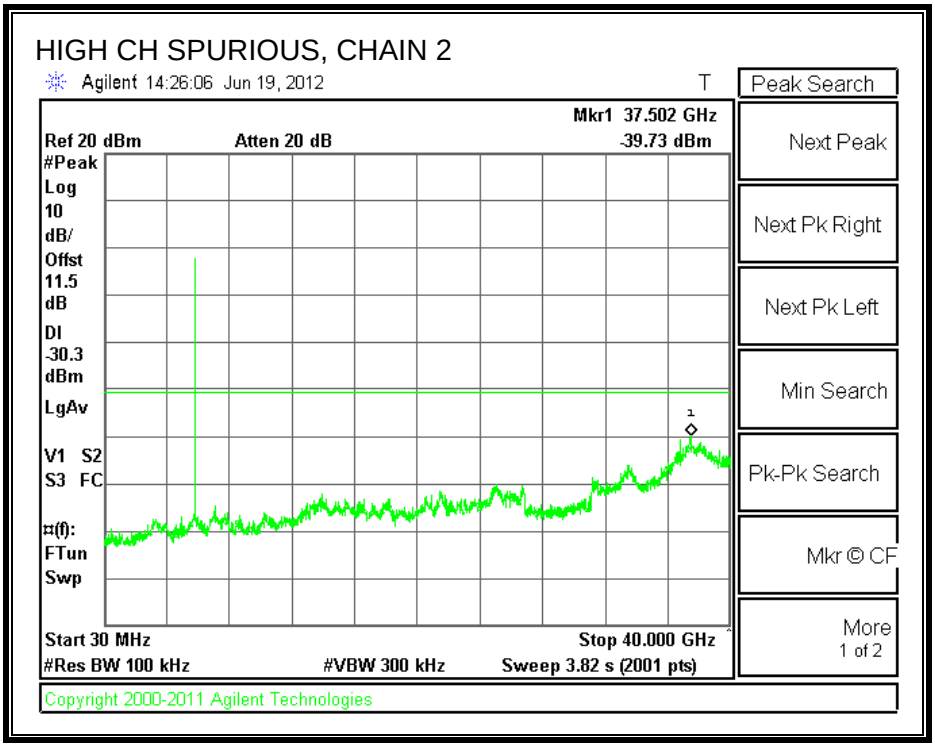




HIGH CH BANDEDGE, CHAIN 2



HIGH CH SPURIOUS, CHAIN 2



8.9. 802.11n HT40 MODE IN THE 5.8 GHz BAND

8.9.1. 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.

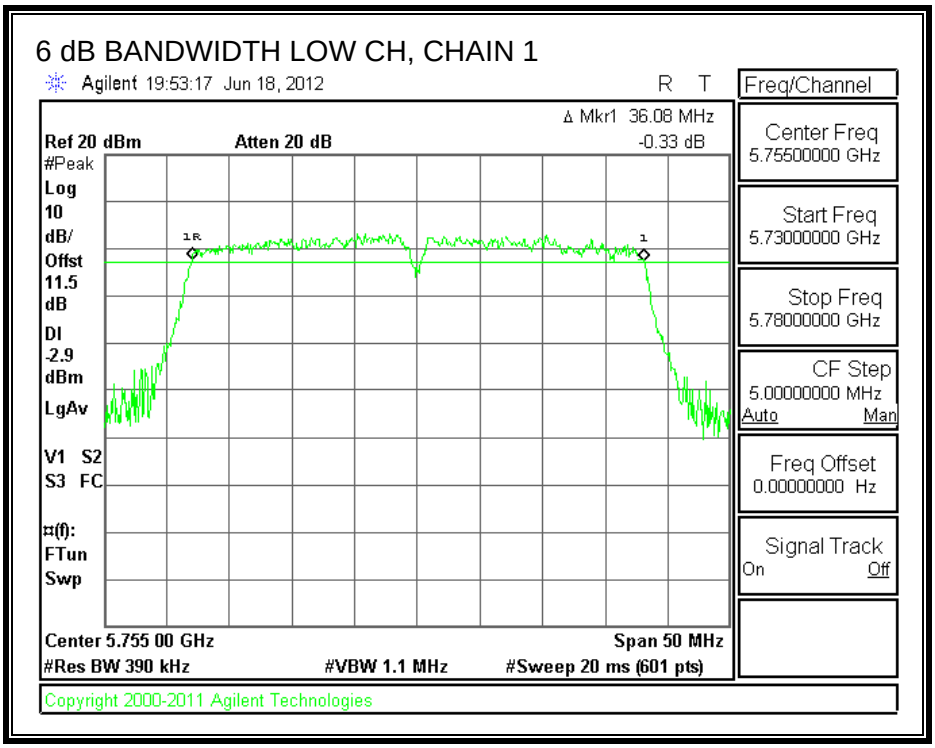
TEST PROCEDURE

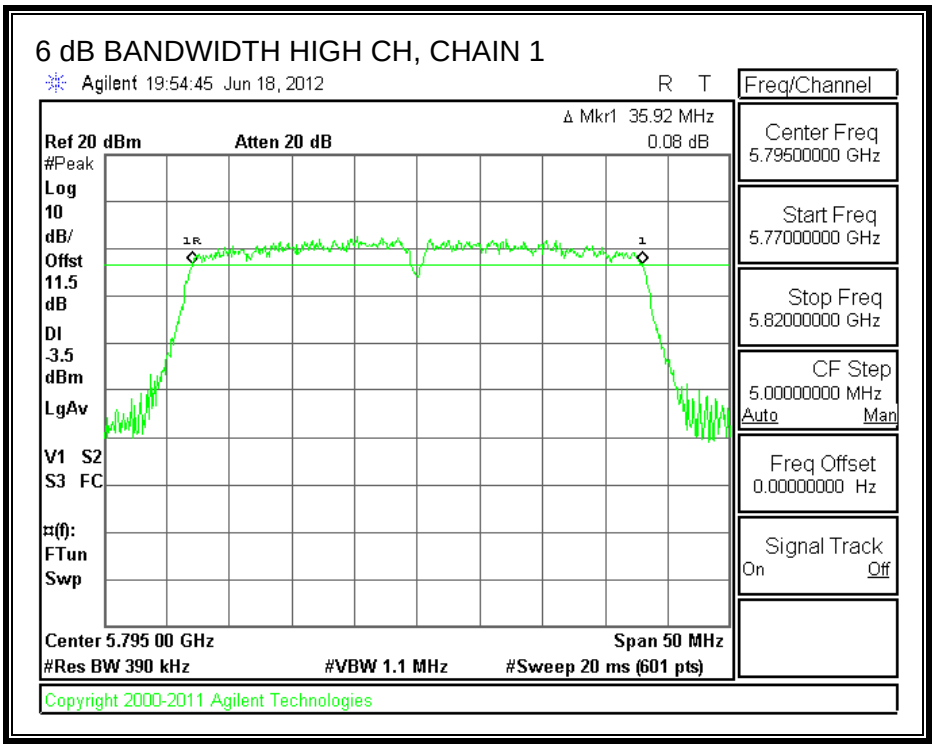
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

RESULTS

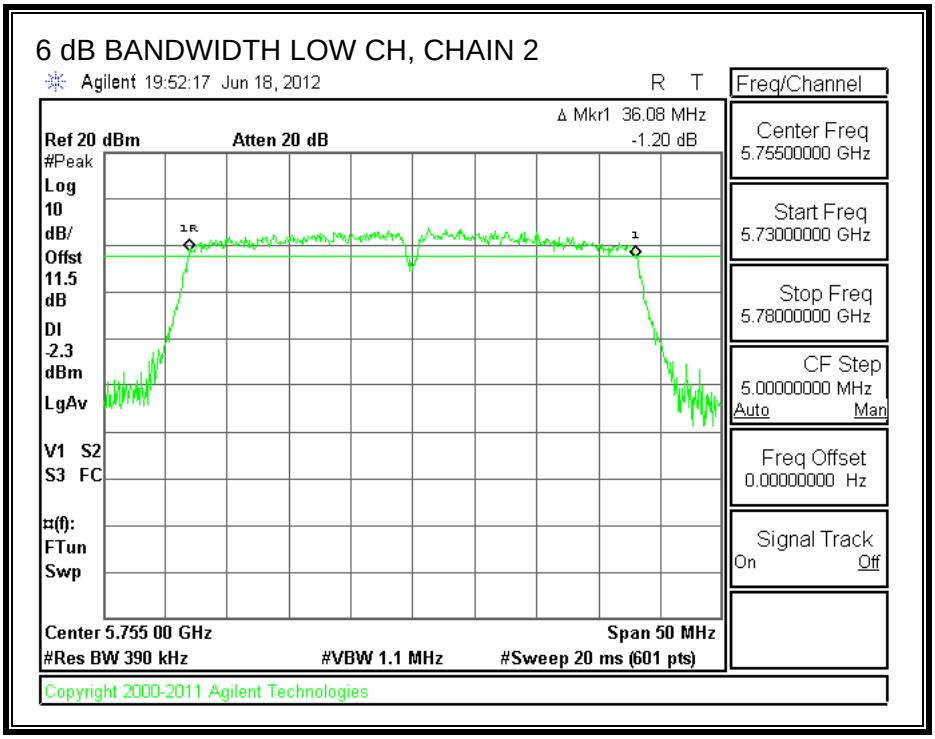
Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5755	36.08	36.08	0.5
High	5795	35.92	36.25	0.5

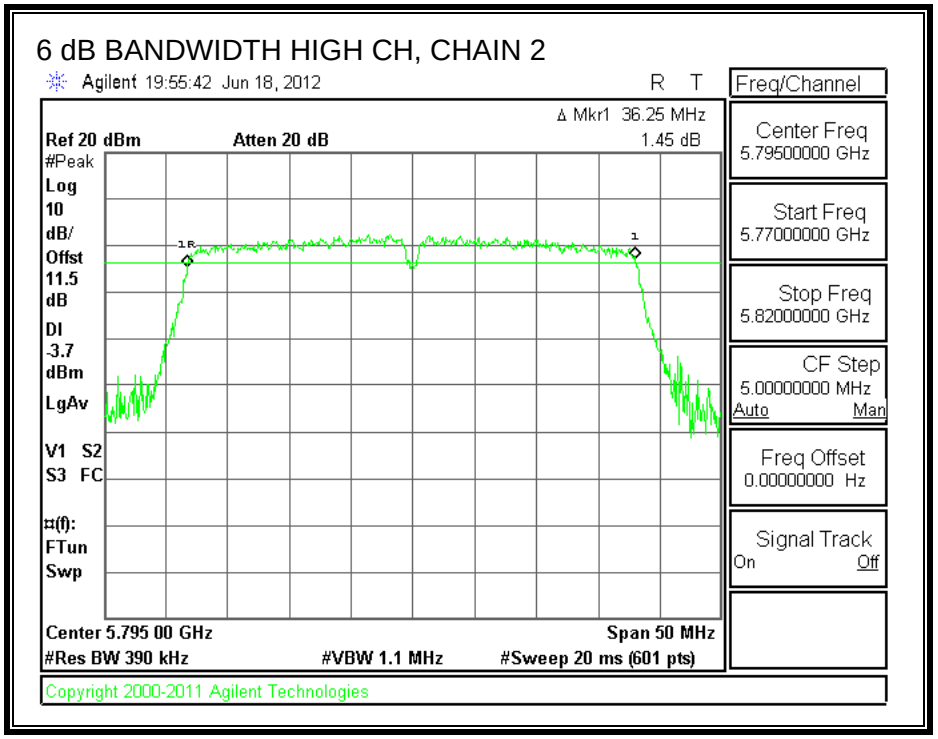
6 dB BANDWIDTH, CHAIN 1





6 dB BANDWIDTH, CHAIN 2





8.9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

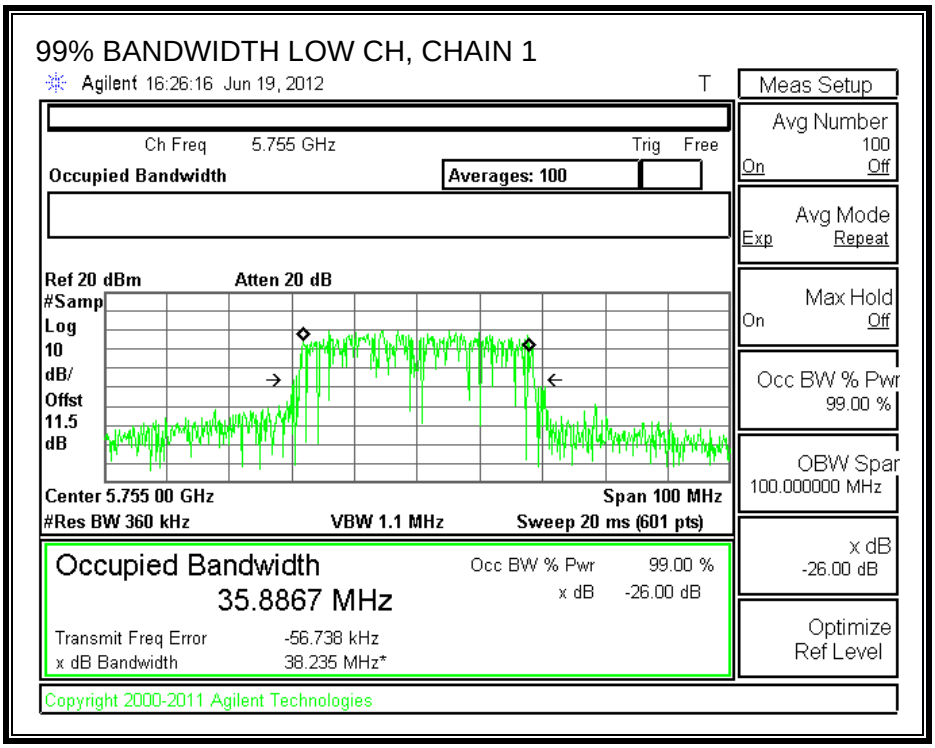
TEST PROCEDURE

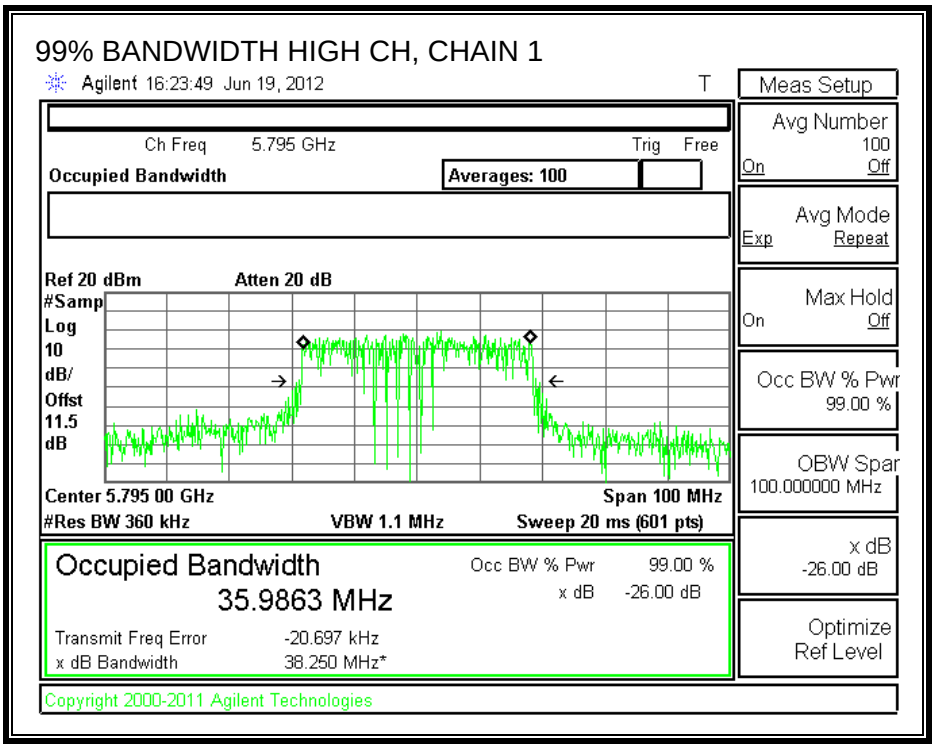
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

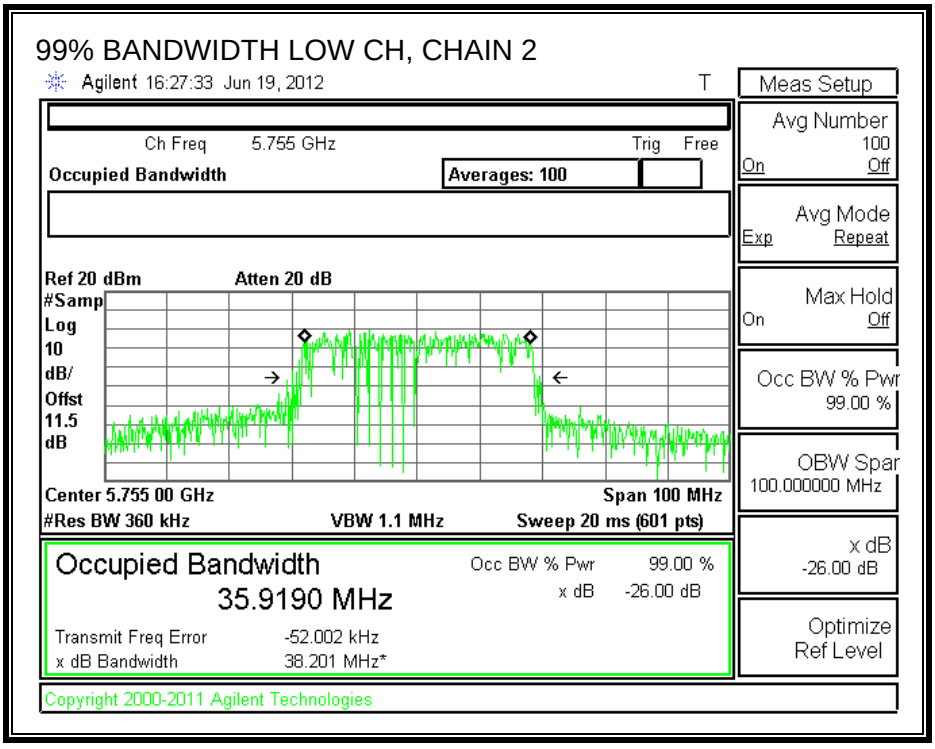
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5755	35.8867	35.919
High	5795	35.9863	35.9116

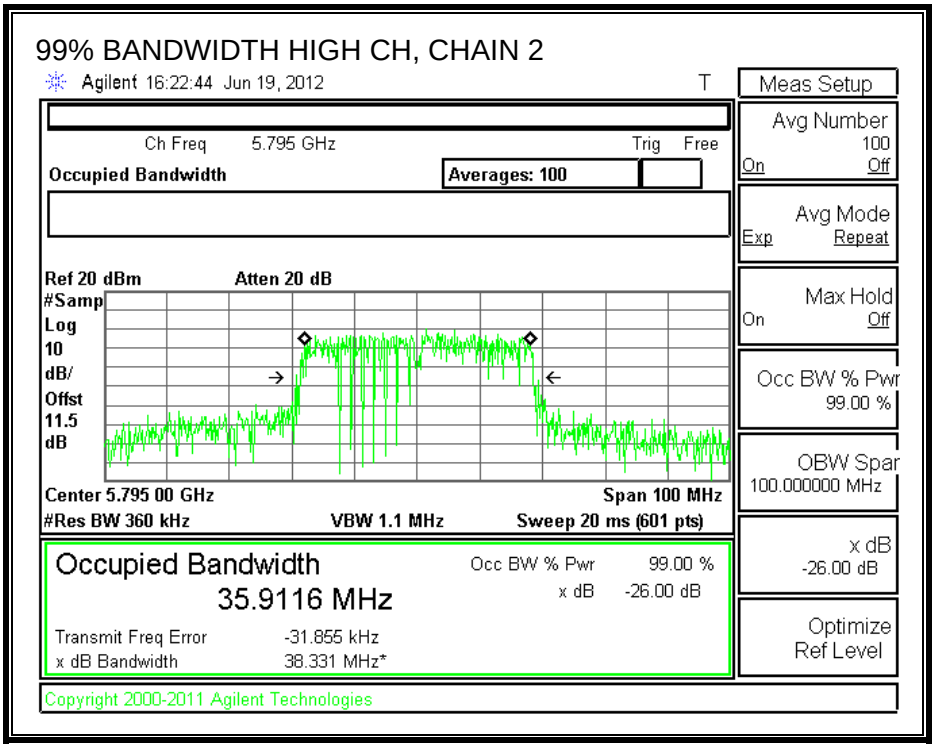
99% BANDWIDTH, CHAIN 1





99% BANDWIDTH, CHAIN 2





8.9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.00	3.01	7.01

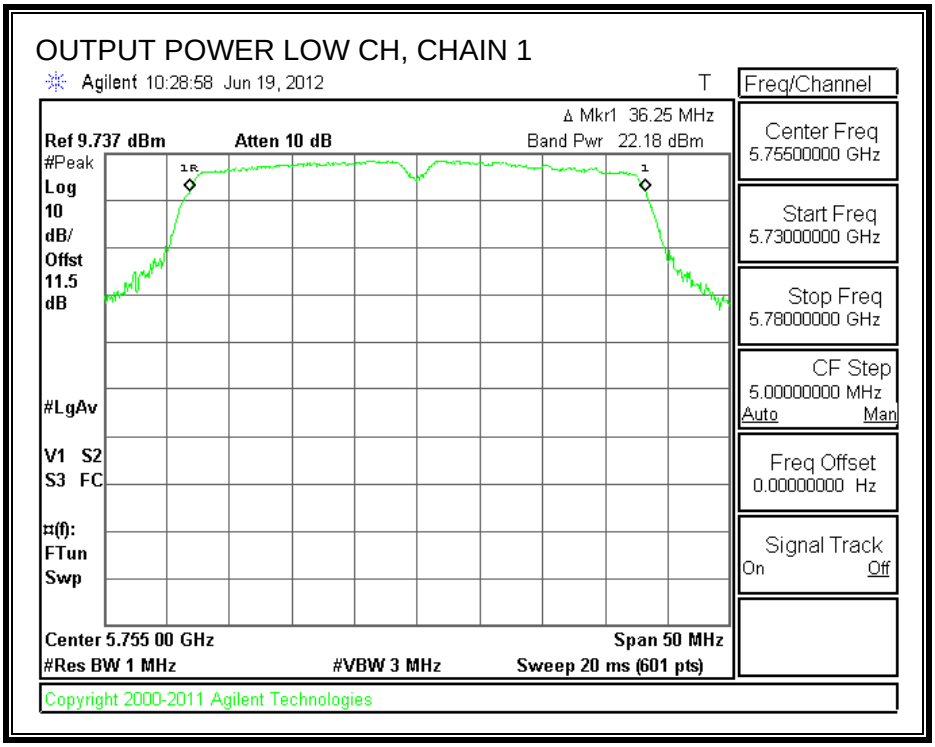
TEST PROCEDURE

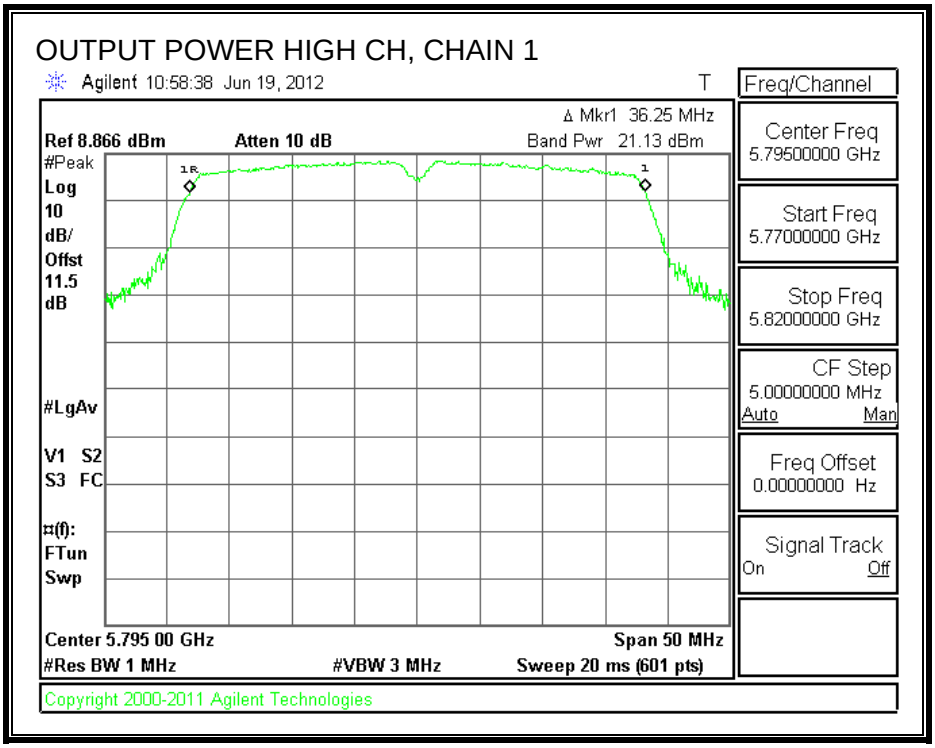
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

RESULTS

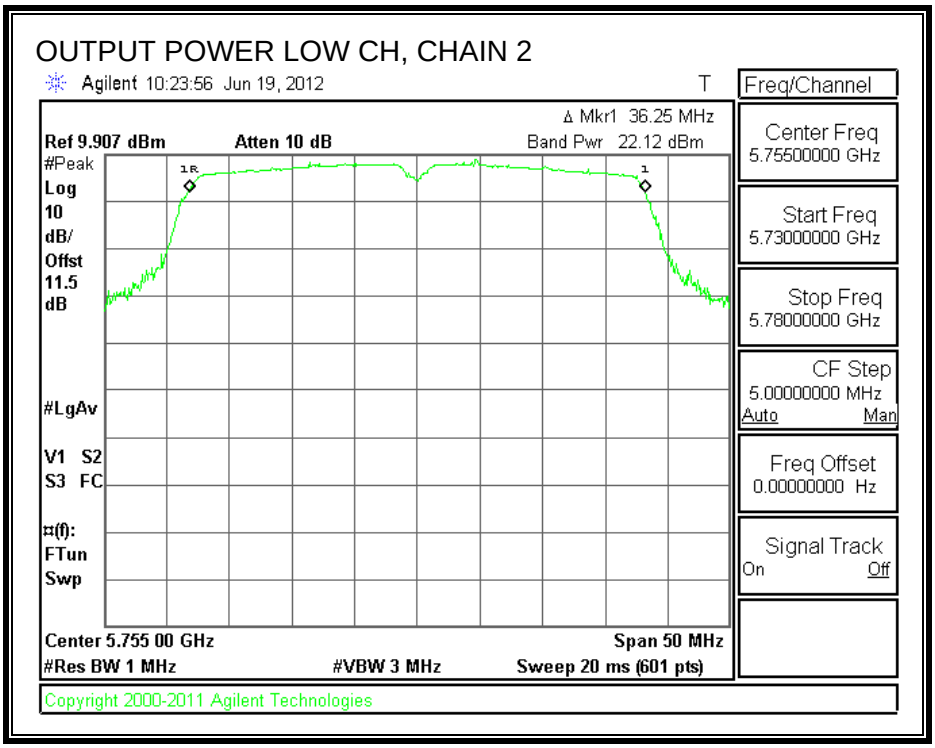
Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Attenuator + Cable Offset (dB)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5755	22.18	22.12	0.00	25.16	28.99	-3.83
High	5795	21.13	21.22	0.00	24.19	28.99	-4.80

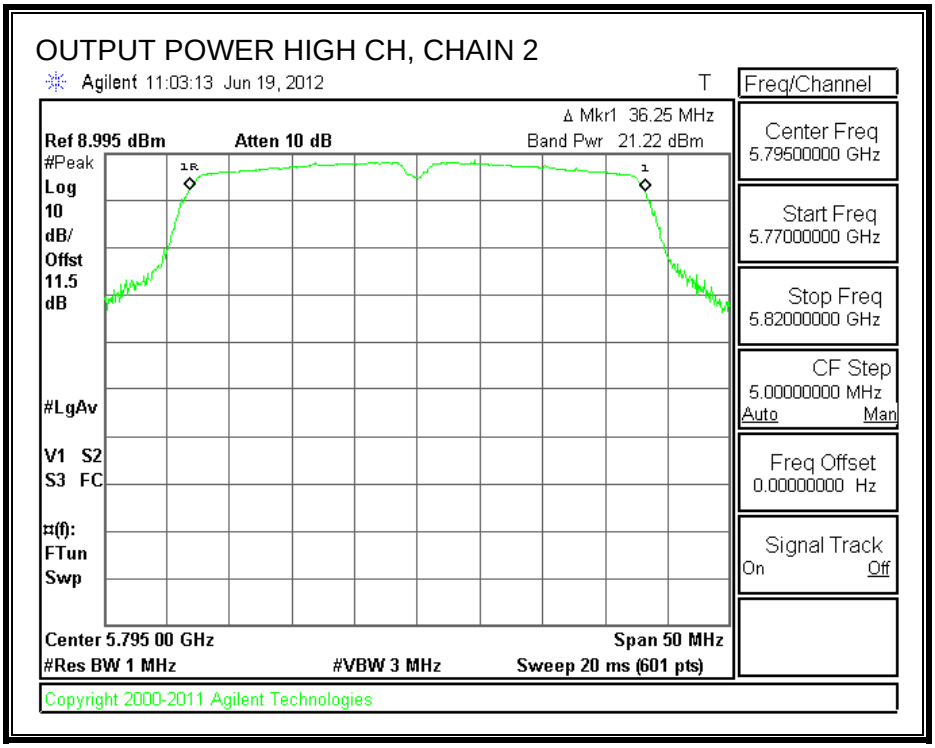
CHAIN 1 OUTPUT POWER





CHAIN 2 OUTPUT POWER





8.9.4. 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 11.5 dB (including 10 dB pad and 1.5 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	5755	13.20	13.20	16.21
High	5795	12.10	12.10	15.11

8.9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

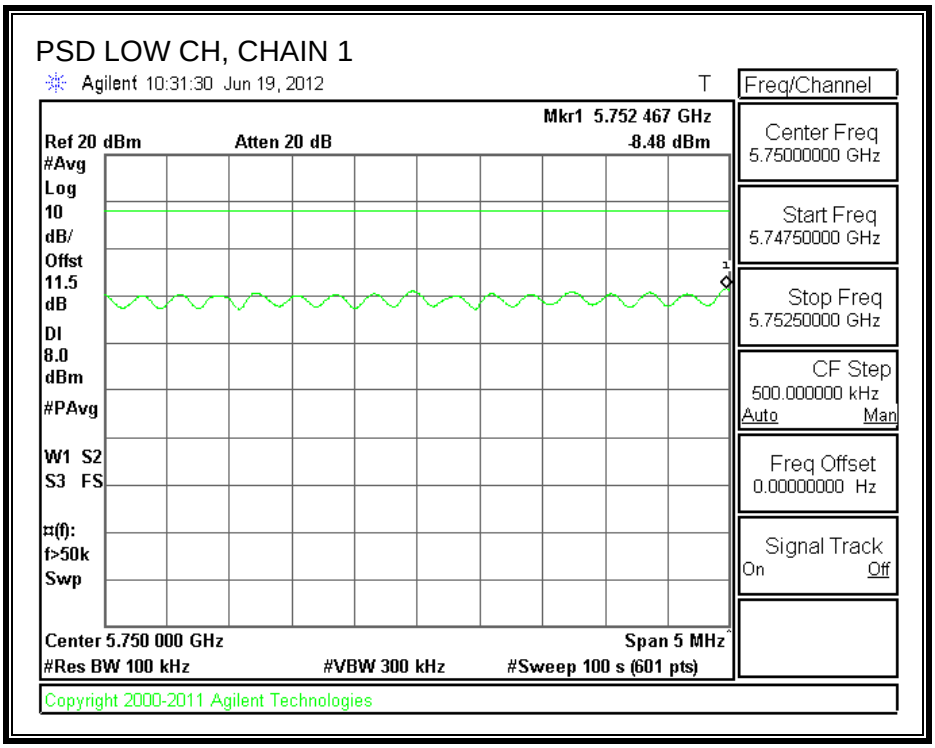
TEST PROCEDURE

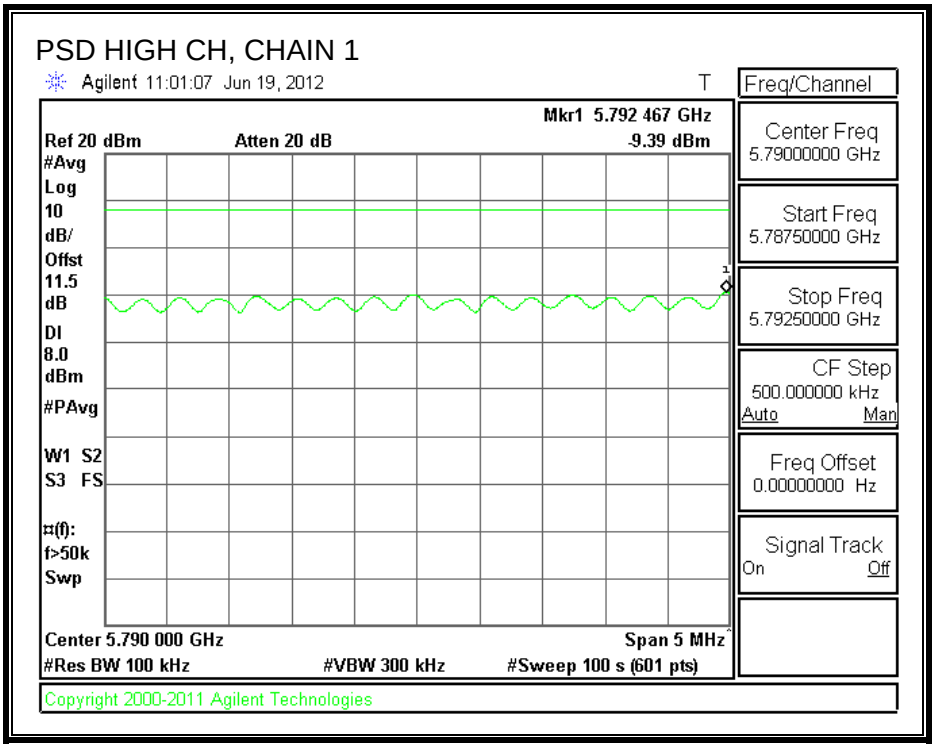
KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

RESULTS:

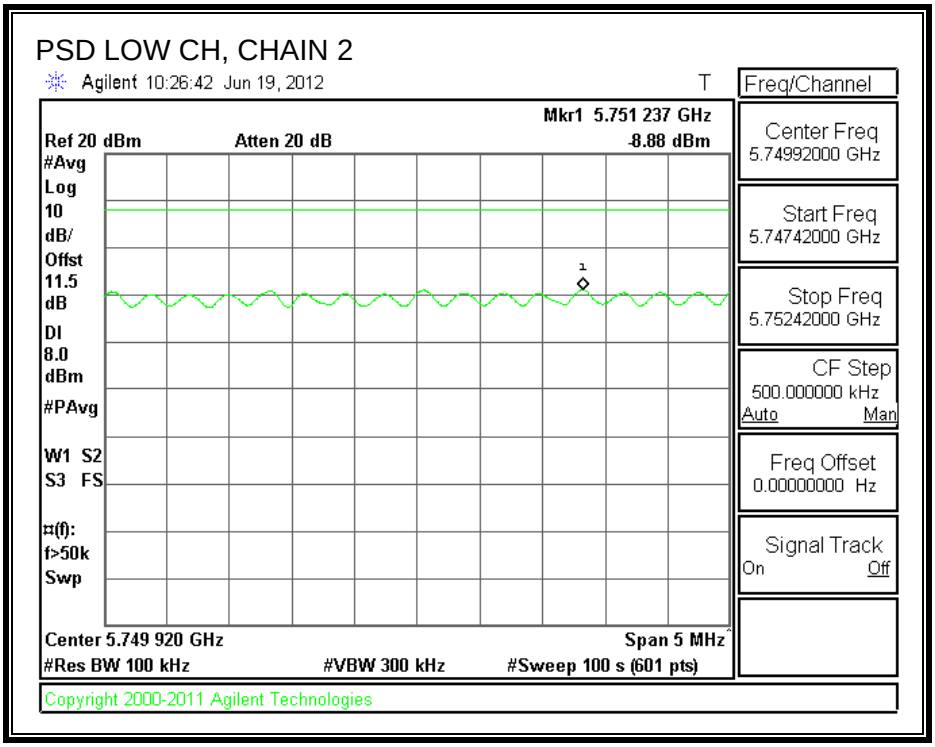
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-8.48	-8.88	-5.67	8	-13.67
High	5795	-9.39	-9.94	-6.65	8	-14.65

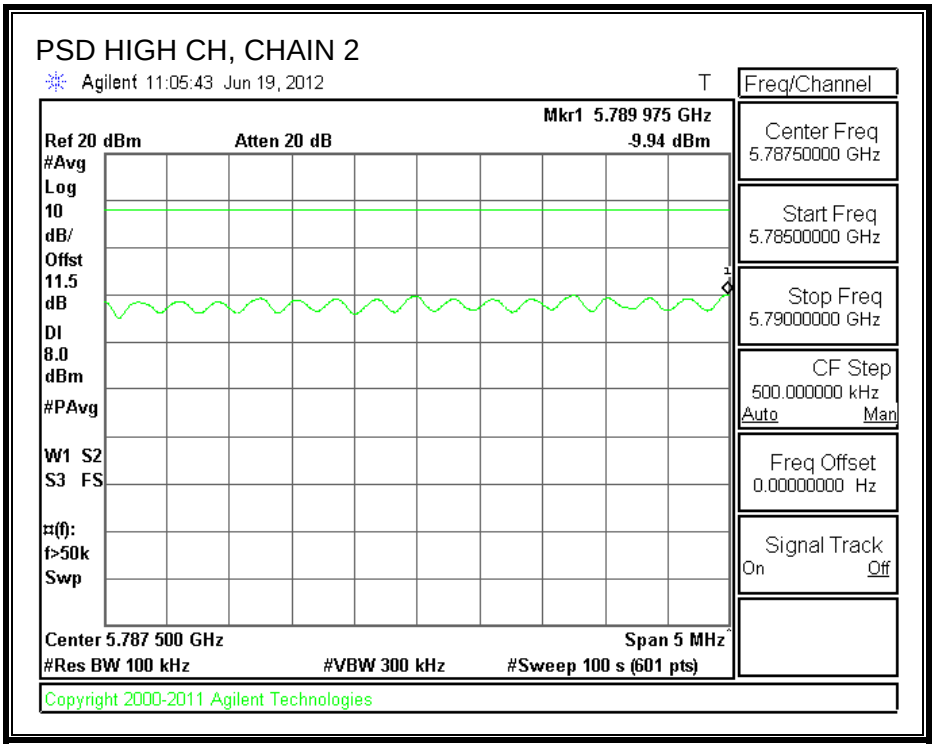
POWER SPECTRAL DENSITY, CHAIN 1





POWER SPECTRAL DENSITY, CHAIN 2





8.9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

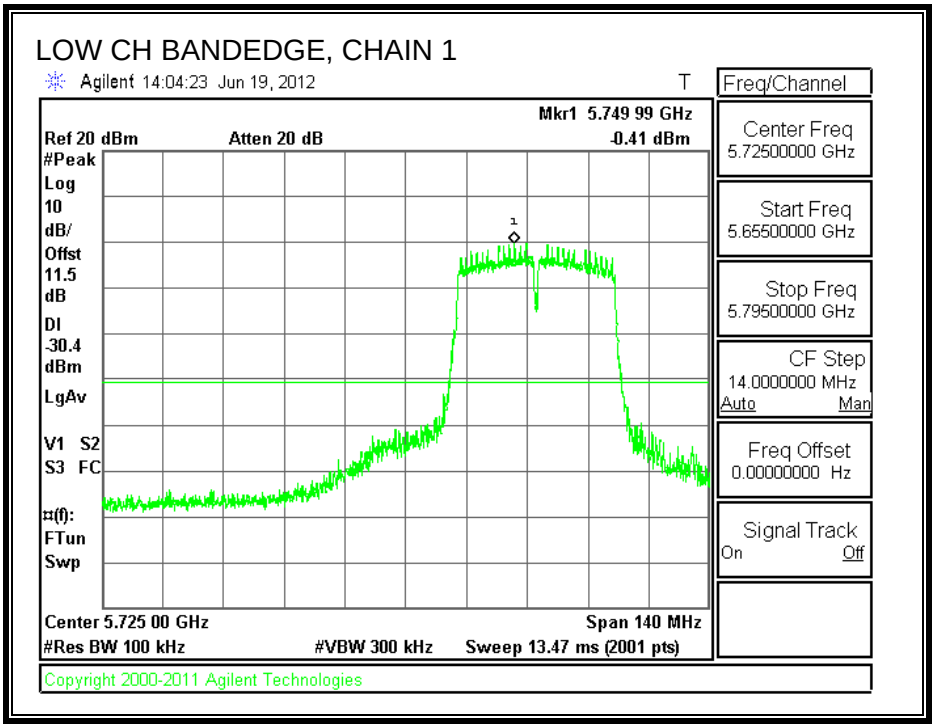
Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

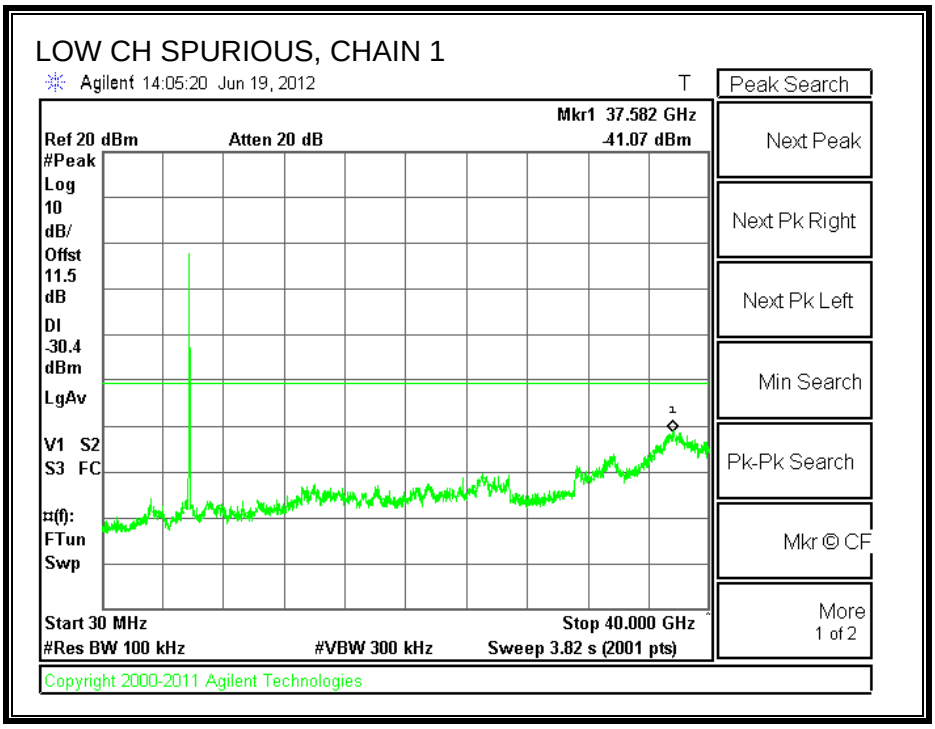
TEST PROCEDURE

KDB 558074 D01 v01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”.

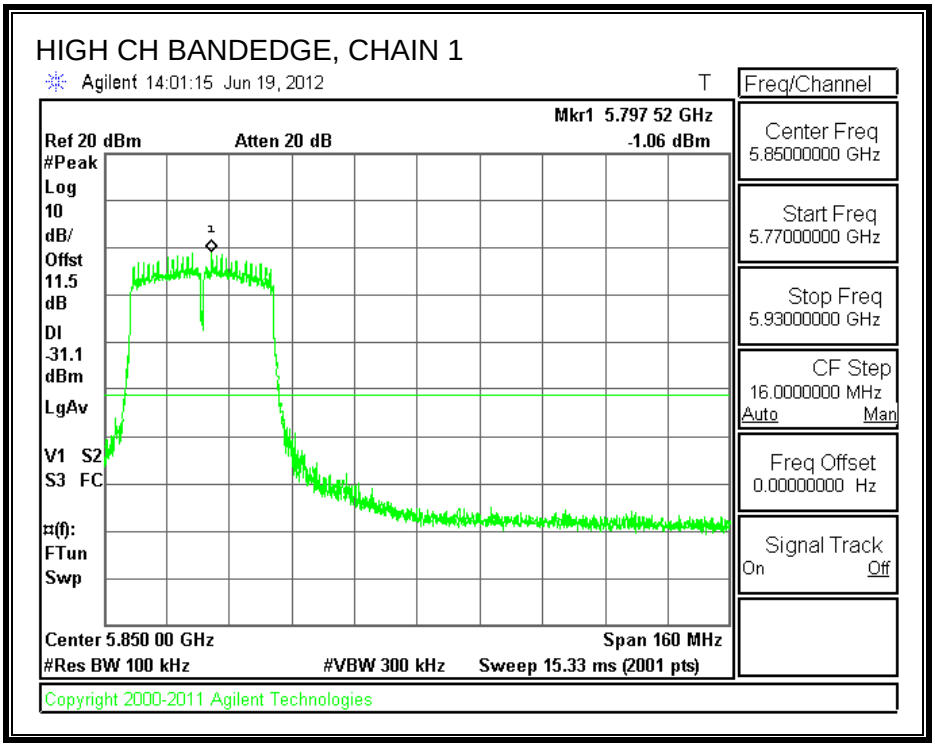
RESULTS

CHAIN 1 SPURIOUS EMISSIONS

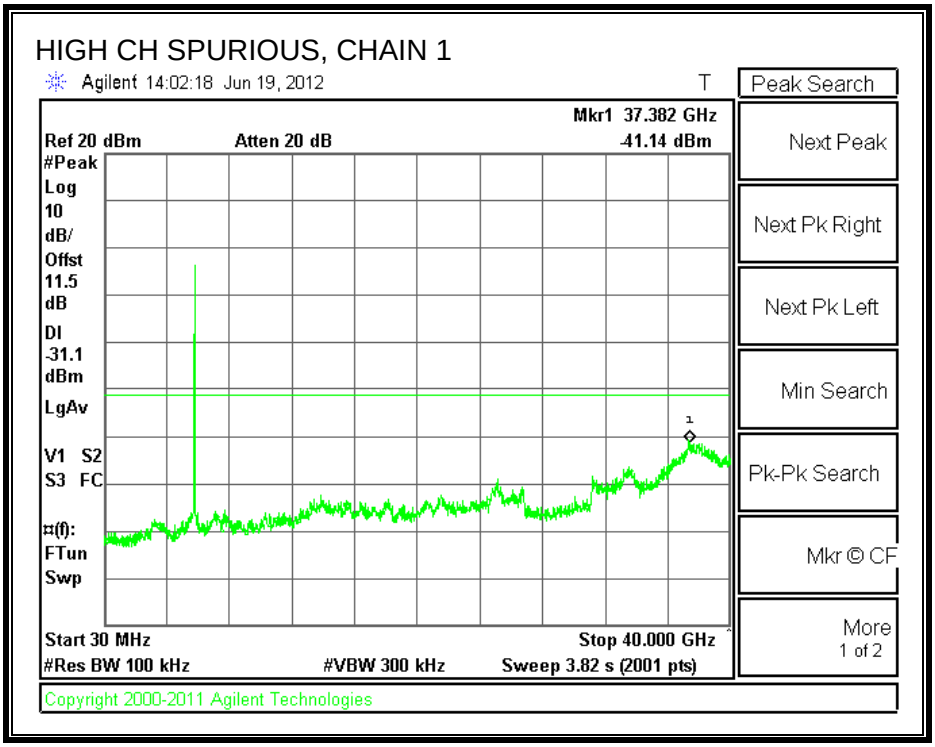




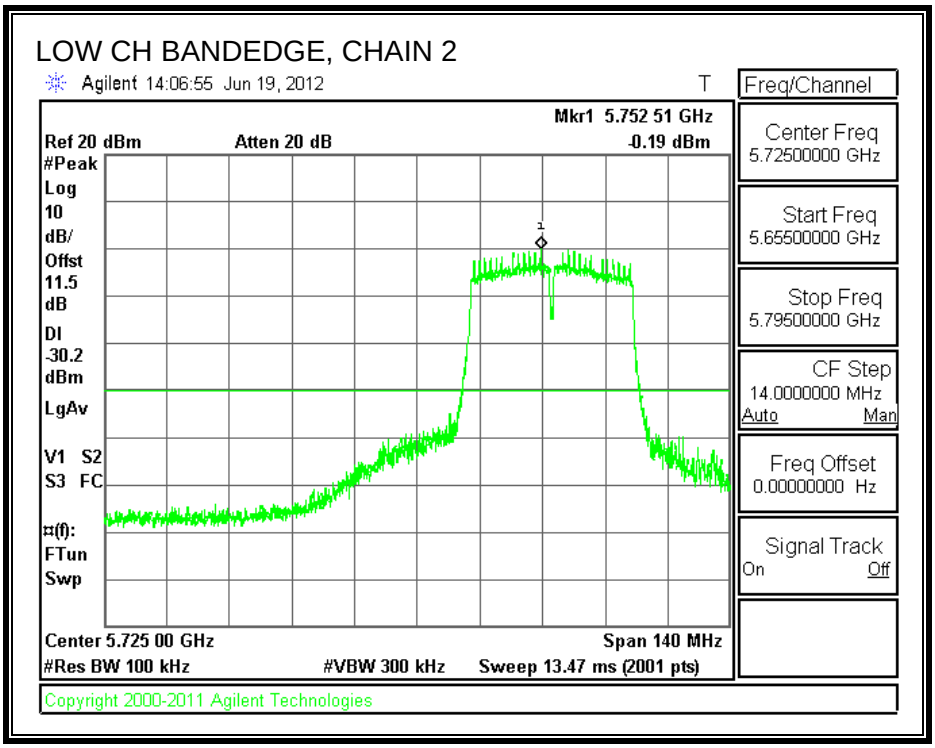
HIGH CH BANDEDGE, CHAIN 1

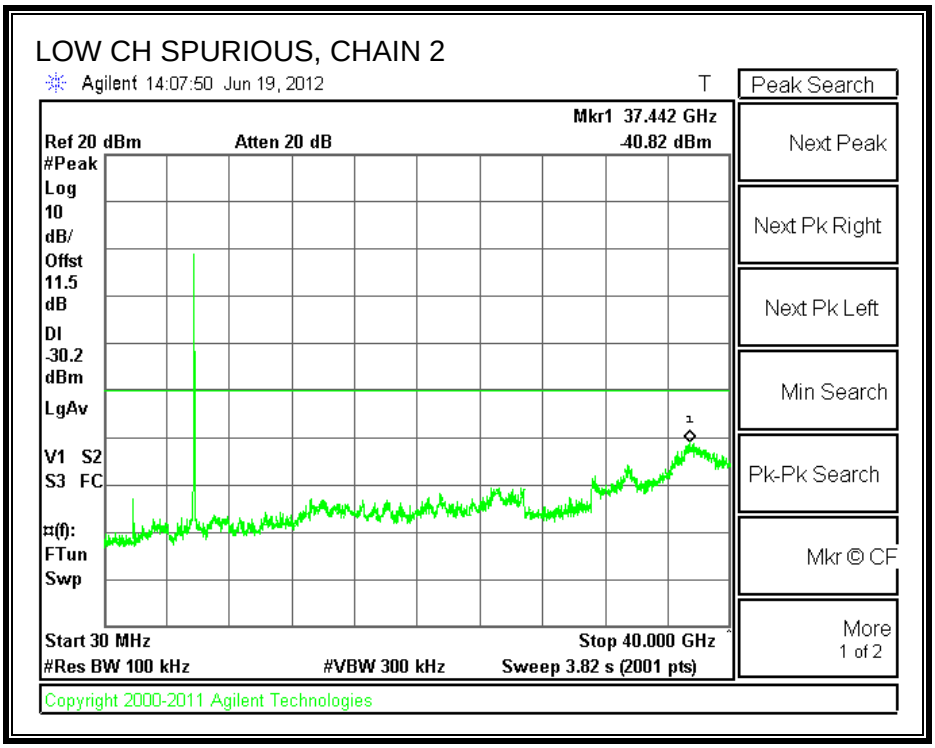


HIGH CH SPURIOUS, CHAIN 1

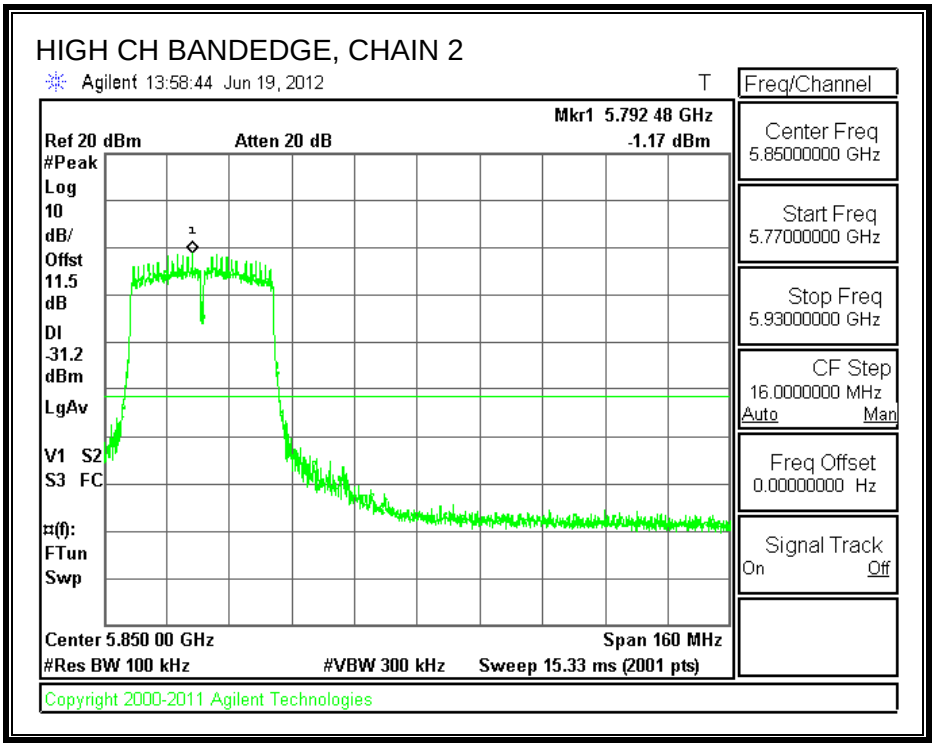


CHAIN 2 SPURIOUS EMISSIONS

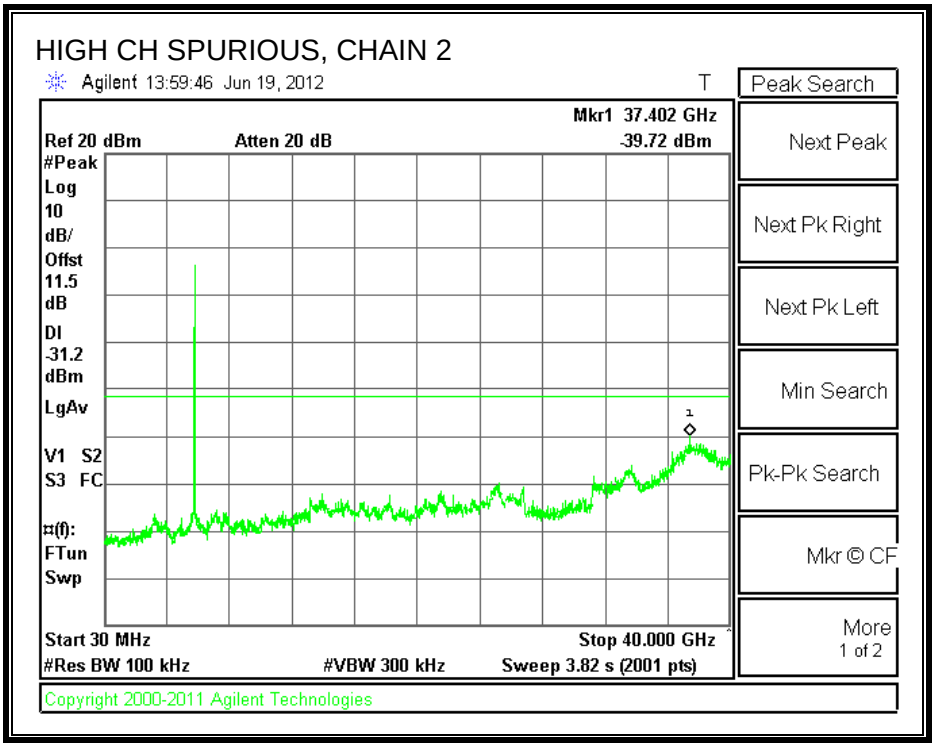




HIGH CH BANDEDGE, CHAIN 2



HIGH CH SPURIOUS, CHAIN 2



9. RADIATED TEST RESULTS

9.1. 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.

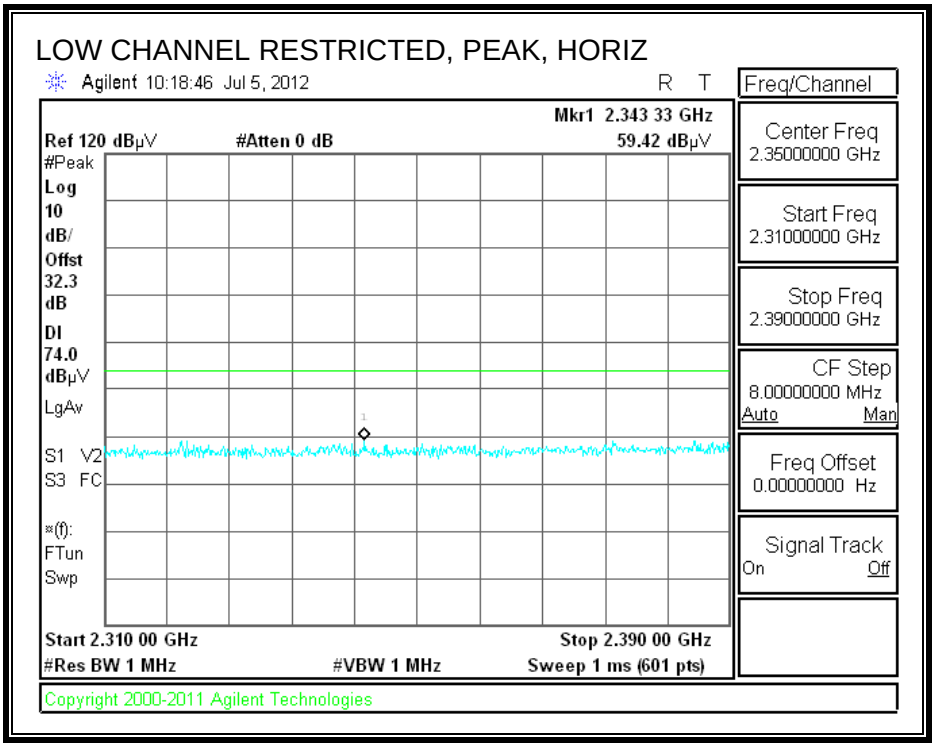
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

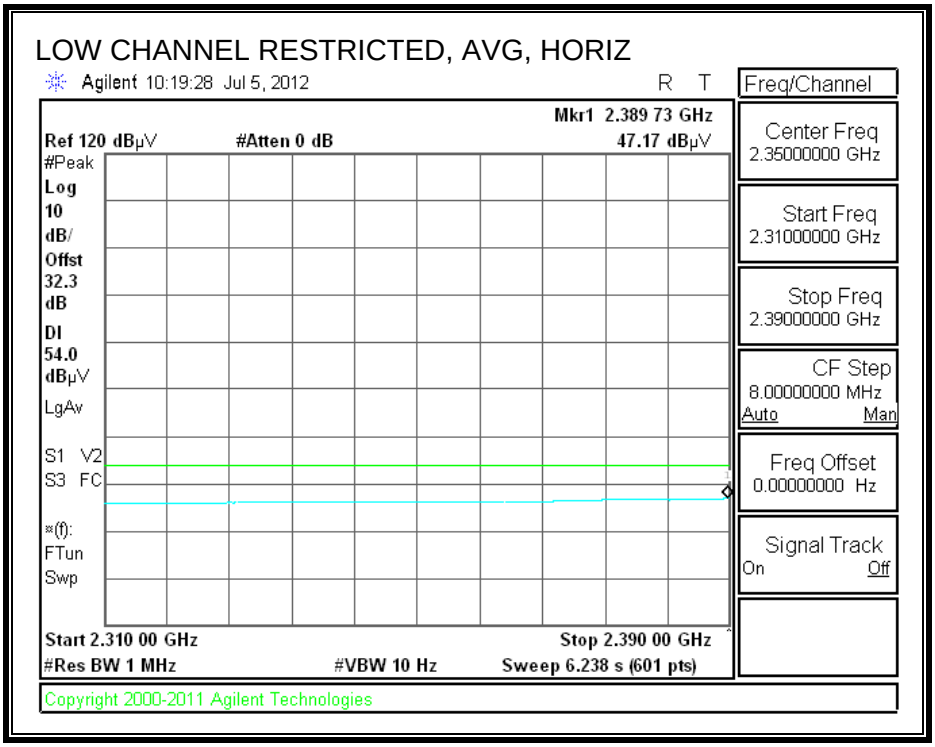
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.2. TRANSMITTER ABOVE 1 GHz

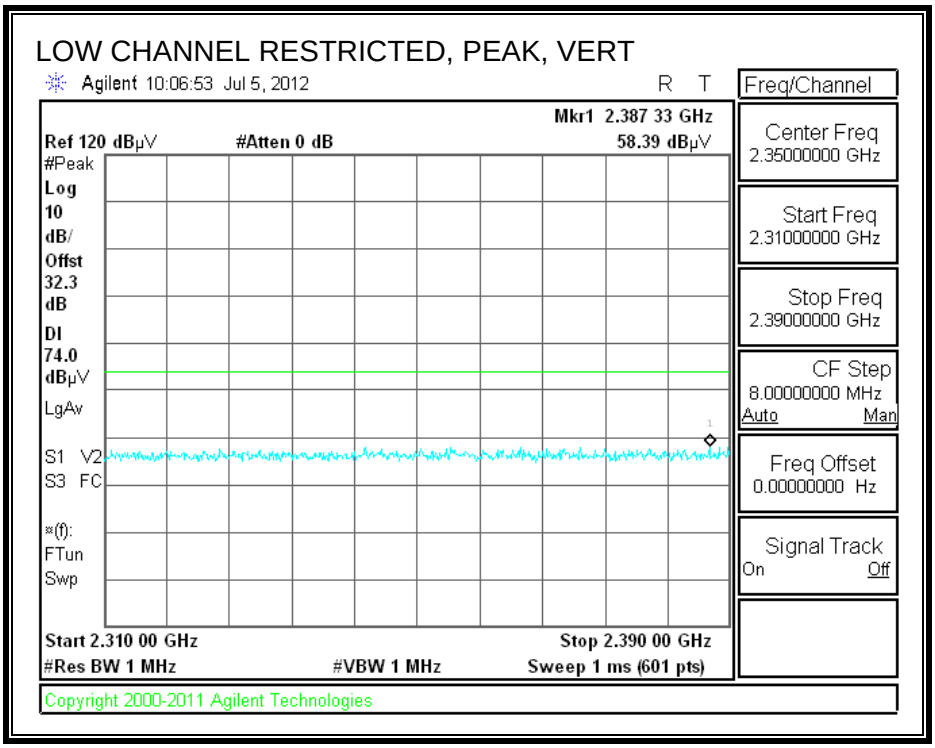
9.2.1. TX ABOVE 1 GHz FOR 802.11b 1TX MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

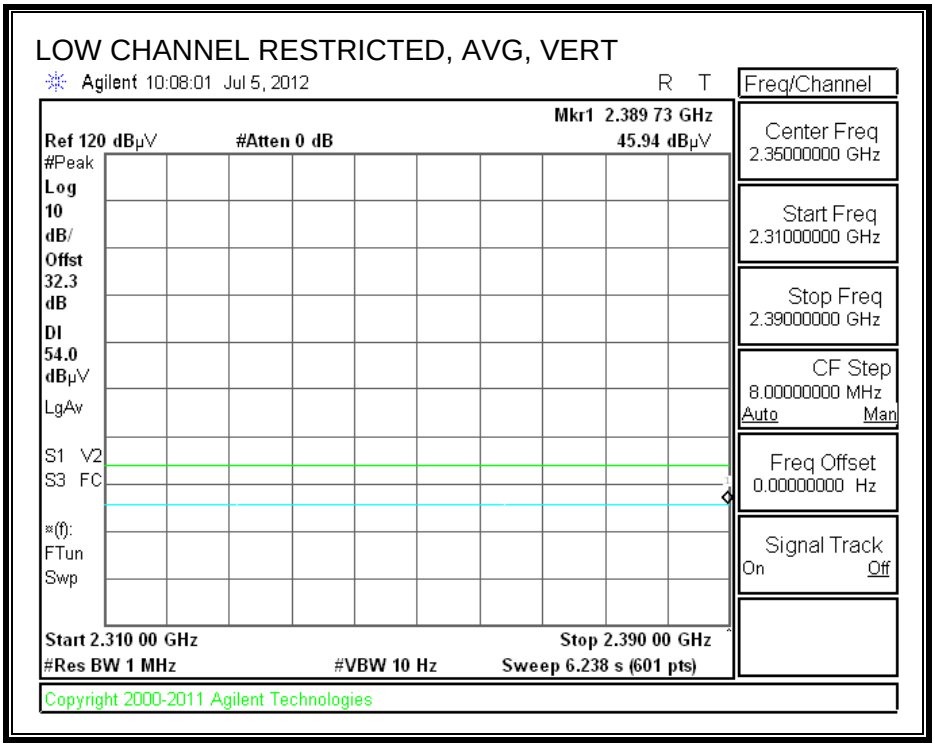




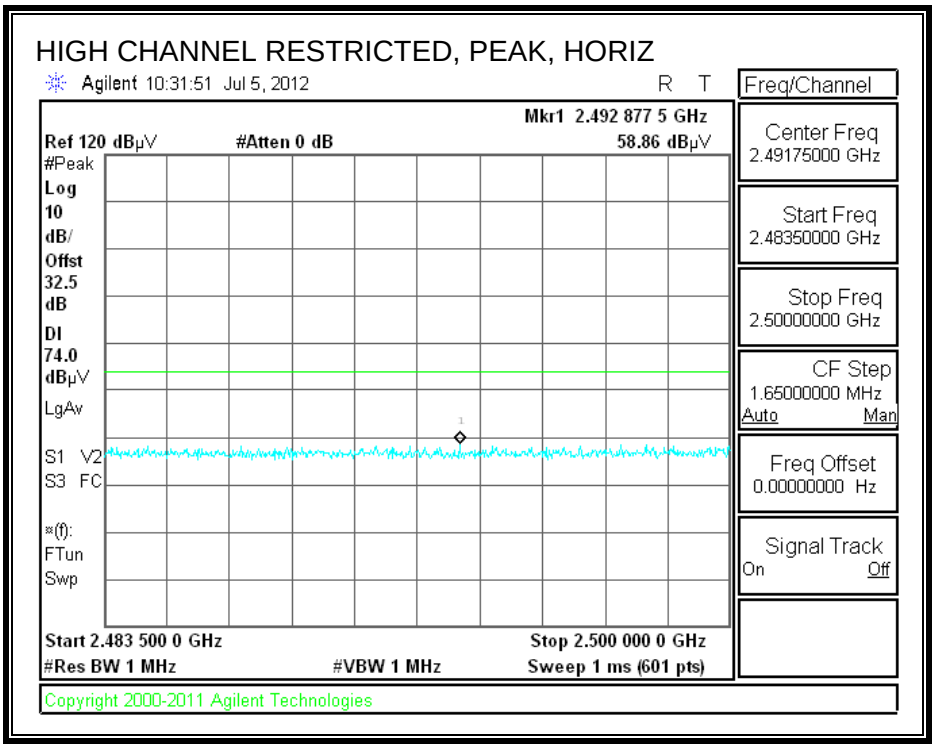
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

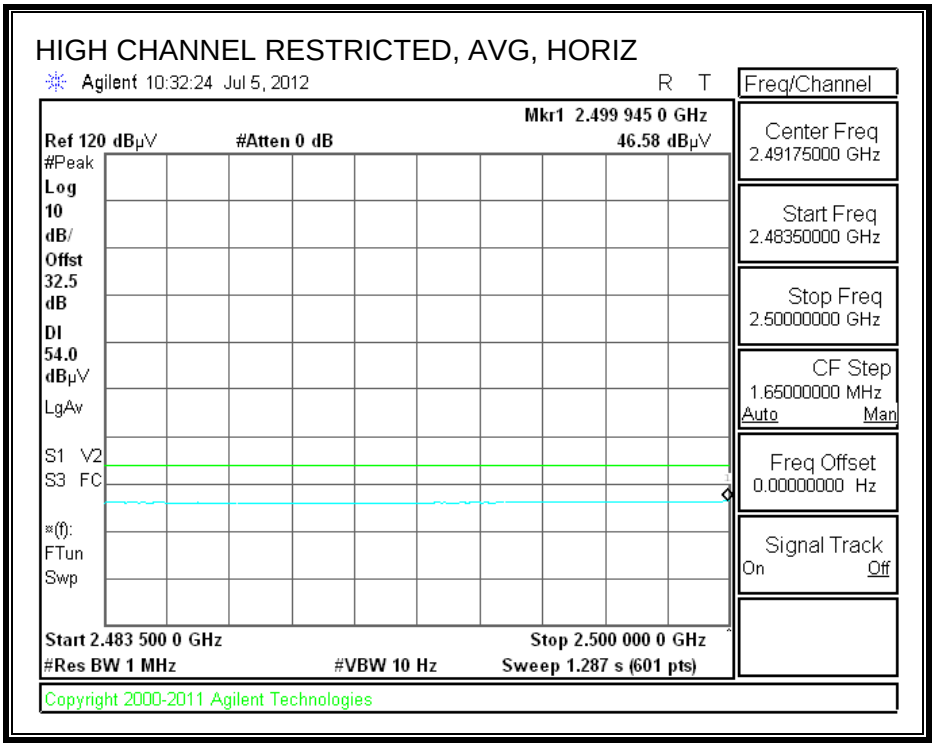


LOW CHANNEL RESTRICTED, AVG, VERT

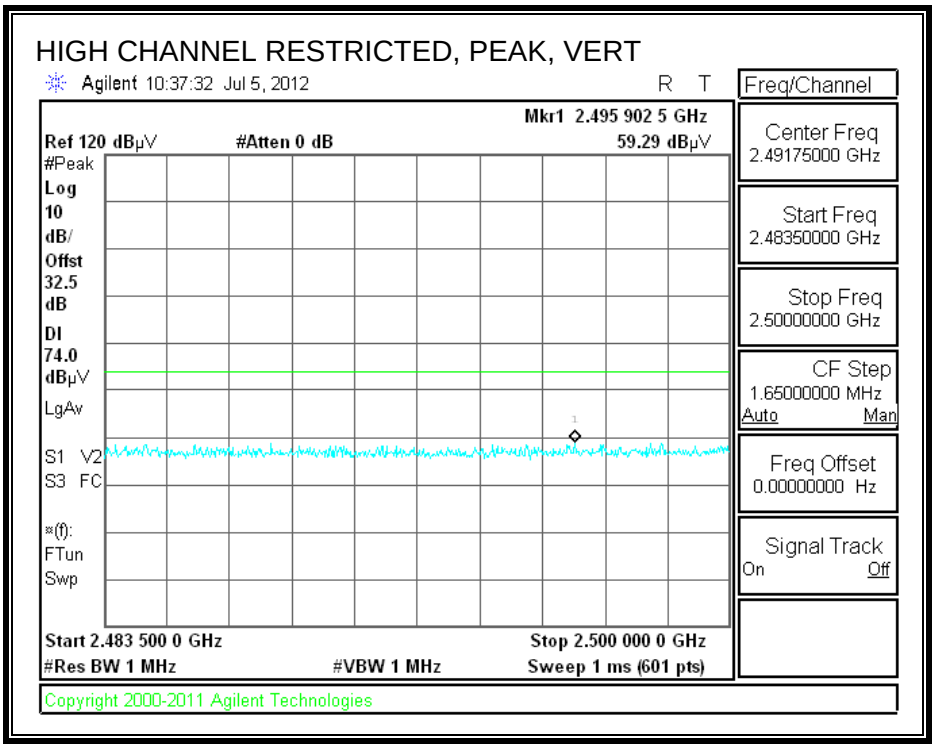


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

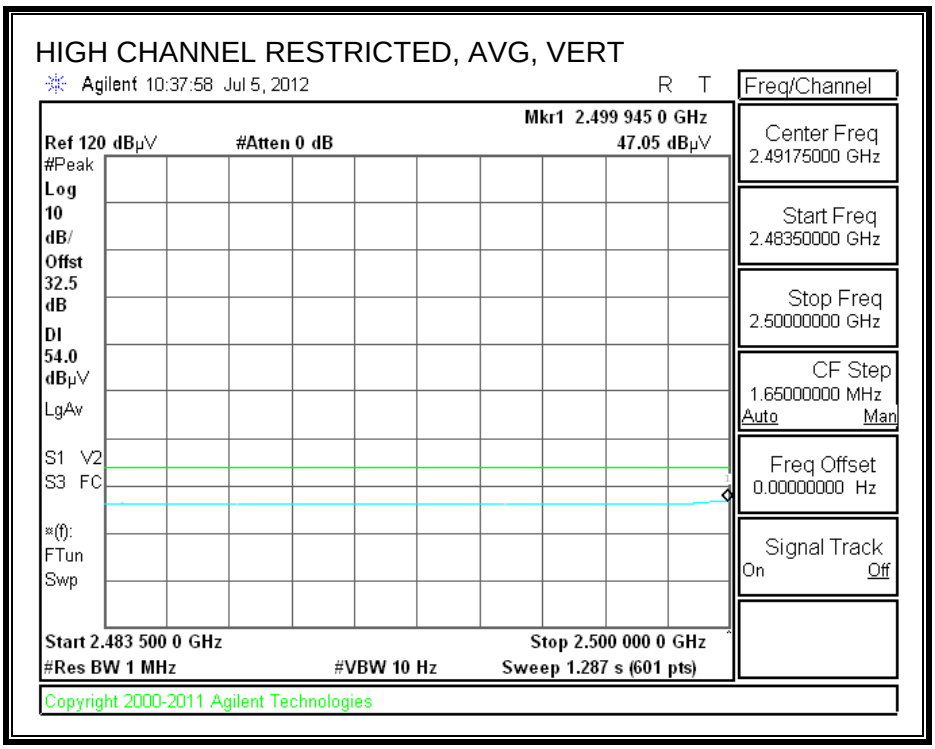




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 07/12/12
Project #: 12U14473
Company: Cisco
Test Target: 15.205
Mode Oper: 11b, 11mb/s data rate, Tx

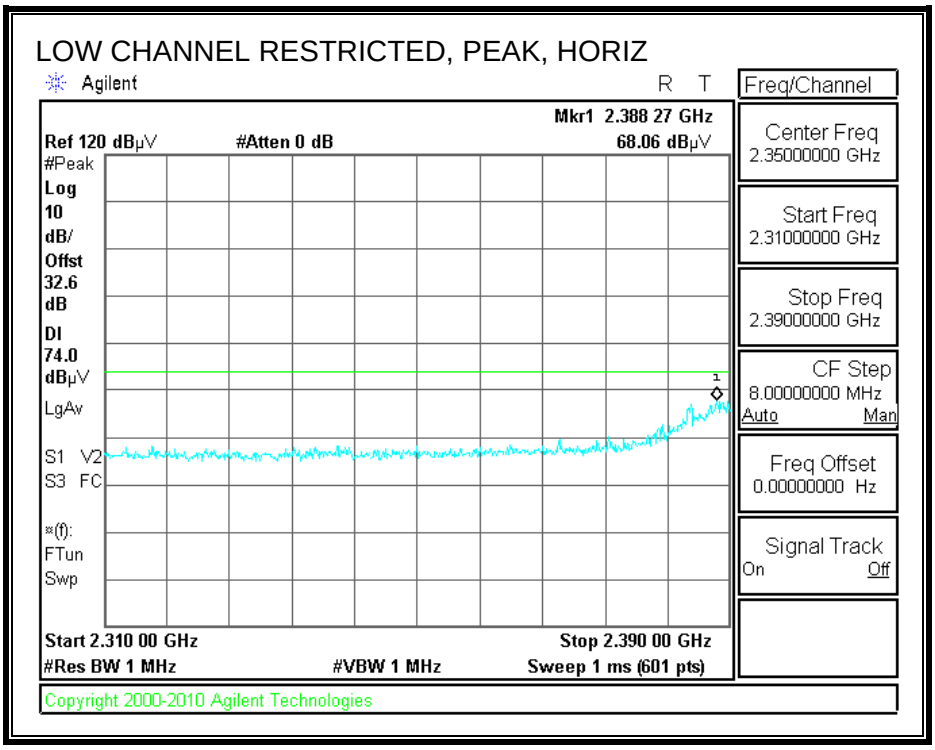
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin 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	Notes
Low Channel: 2412 MHz													
4.824	3.0	37.0	33.1	6.8	-34.1	0.0	0.0	42.8	74.0	-31.2	H	P	
4.824	3.0	24.4	33.1	6.8	-34.1	0.0	0.0	30.3	54.0	-23.7	H	A	
12.060	3.0	34.3	39.4	11.9	-32.5	0.0	0.0	53.1	74.0	-20.9	H	P	
12.060	3.0	21.5	39.4	11.9	-32.5	0.0	0.0	40.4	54.0	-13.6	H	A	
4.824	3.0	36.7	33.1	6.8	-34.1	0.0	0.0	42.6	74.0	-31.4	V	P	
4.824	3.0	24.6	33.1	6.8	-34.1	0.0	0.0	30.4	54.0	-23.6	V	A	
12.060	3.0	34.0	39.4	11.9	-32.5	0.0	0.0	52.9	74.0	-21.1	V	P	
12.060	3.0	21.5	39.4	11.9	-32.5	0.0	0.0	40.3	54.0	-13.7	V	A	
Middle Channel: 2437 MHz													
4.874	3.0	36.1	33.2	6.8	-34.0	0.0	0.0	42.0	74.0	-32.0	H	P	
4.874	3.0	24.0	33.2	6.8	-34.0	0.0	0.0	29.9	54.0	-24.1	H	A	
7.311	3.0	35.8	36.3	9.1	-33.1	0.0	0.0	48.0	74.0	-26.0	H	P	
7.311	3.0	23.1	36.3	9.1	-33.1	0.0	0.0	35.3	54.0	-18.7	H	A	
12.185	3.0	33.4	39.4	12.0	-32.5	0.0	0.0	52.3	74.0	-21.7	H	P	
12.185	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	H	A	
4.874	3.0	36.6	33.2	6.8	-34.0	0.0	0.0	42.5	74.0	-31.5	V	P	
4.874	3.0	25.1	33.2	6.8	-34.0	0.0	0.0	31.0	54.0	-23.0	V	A	
7.311	3.0	35.8	36.3	9.1	-33.1	0.0	0.0	48.0	74.0	-26.0	V	P	
7.311	3.0	23.1	36.3	9.1	-33.1	0.0	0.0	35.4	54.0	-18.6	V	A	
12.185	3.0	34.0	39.4	12.0	-32.5	0.0	0.0	52.8	74.0	-21.2	V	P	
12.185	3.0	21.2	39.4	12.0	-32.5	0.0	0.0	40.1	54.0	-13.9	V	A	
High Channel: 2462 MHz													
4.924	3.0	36.2	33.2	6.8	-34.0	0.0	0.0	42.2	74.0	-31.8	H	P	
4.924	3.0	23.7	33.2	6.8	-34.0	0.0	0.0	29.7	54.0	-24.3	H	A	
7.386	3.0	34.6	36.4	9.1	-33.1	0.0	0.0	47.1	74.0	-26.9	H	P	
7.386	3.0	22.5	36.4	9.1	-33.1	0.0	0.0	34.9	54.0	-19.1	H	A	
12.310	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.1	74.0	-21.9	H	P	
12.310	3.0	20.8	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	H	A	
4.924	3.0	36.5	33.2	6.8	-34.0	0.0	0.0	42.5	74.0	-31.5	V	P	
4.924	3.0	23.9	33.2	6.8	-34.0	0.0	0.0	30.0	54.0	-24.0	V	A	
7.386	3.0	34.5	36.4	9.1	-33.1	0.0	0.0	46.9	74.0	-27.1	V	P	
7.386	3.0	22.6	36.4	9.1	-33.1	0.0	0.0	35.0	54.0	-19.0	V	A	
12.310	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.2	74.0	-21.8	V	P	
12.310	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	V	A	

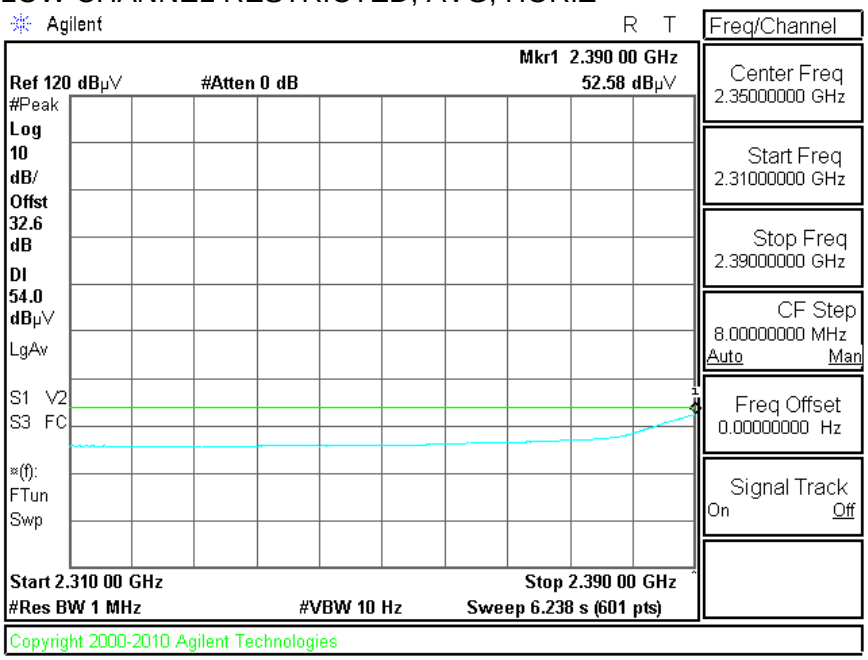
Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

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

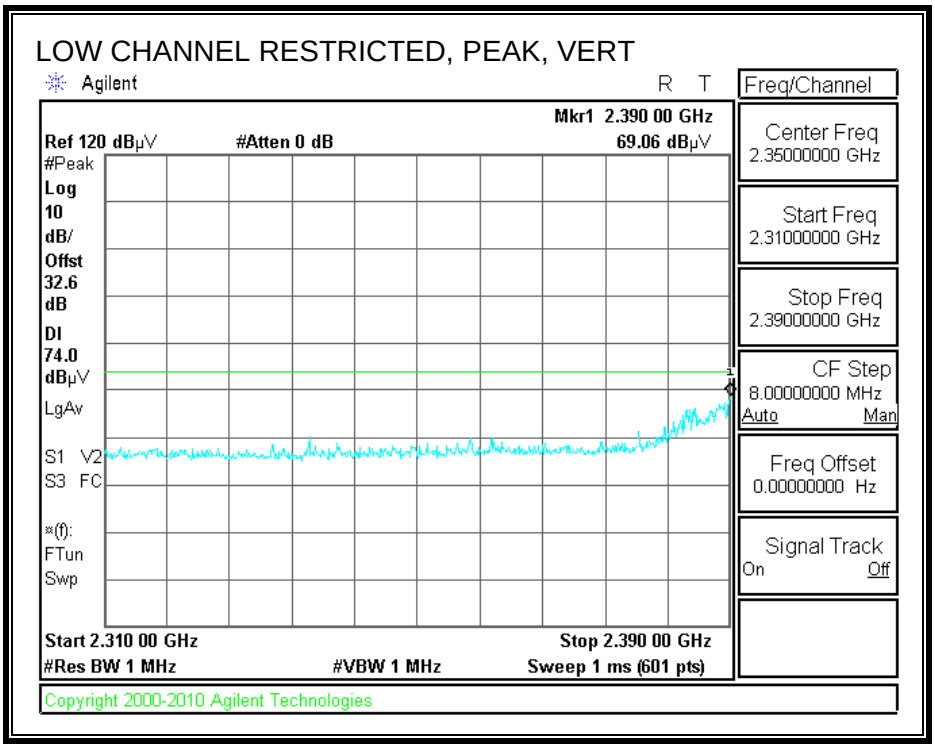
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



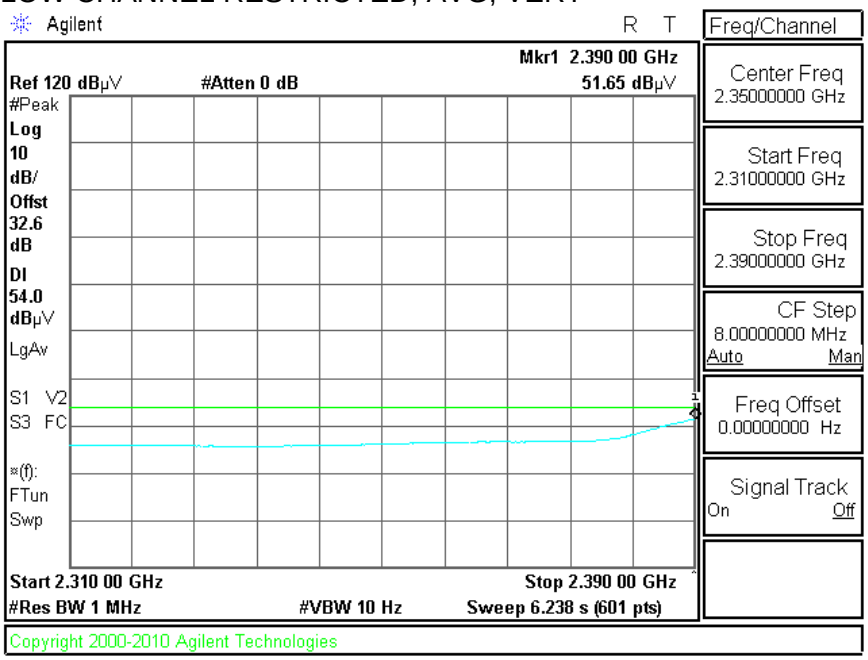
LOW CHANNEL RESTRICTED, AVG, HORIZ



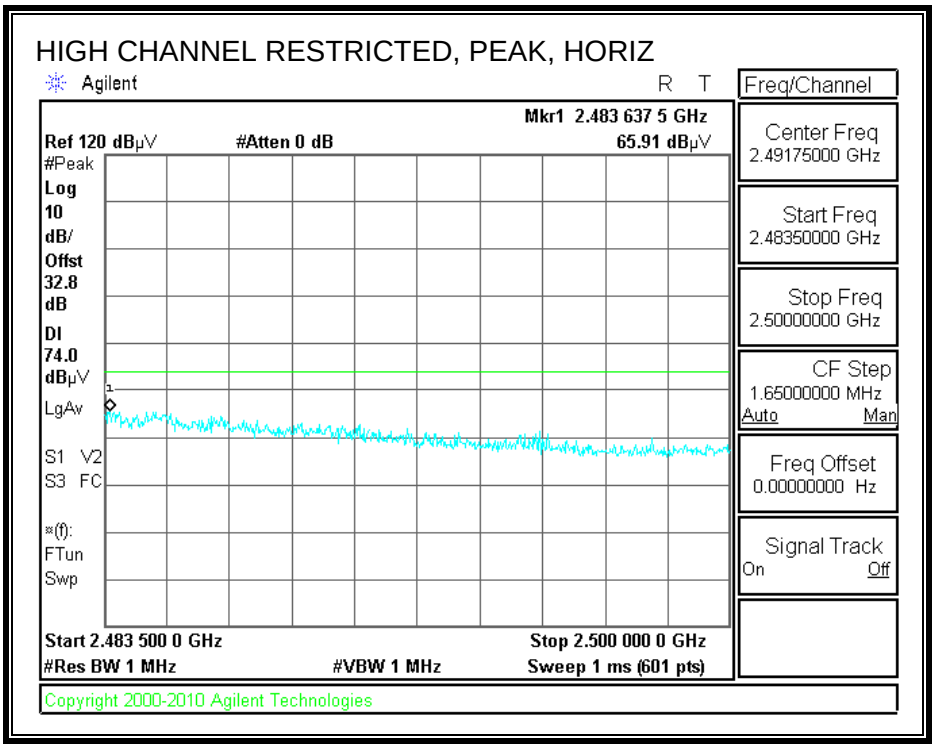
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



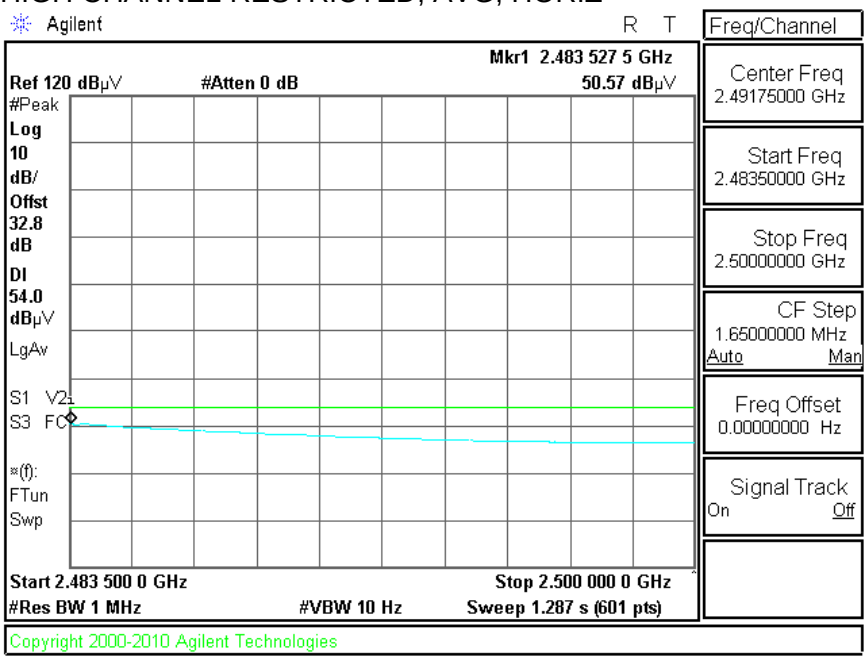
LOW CHANNEL RESTRICTED, AVG, VERT



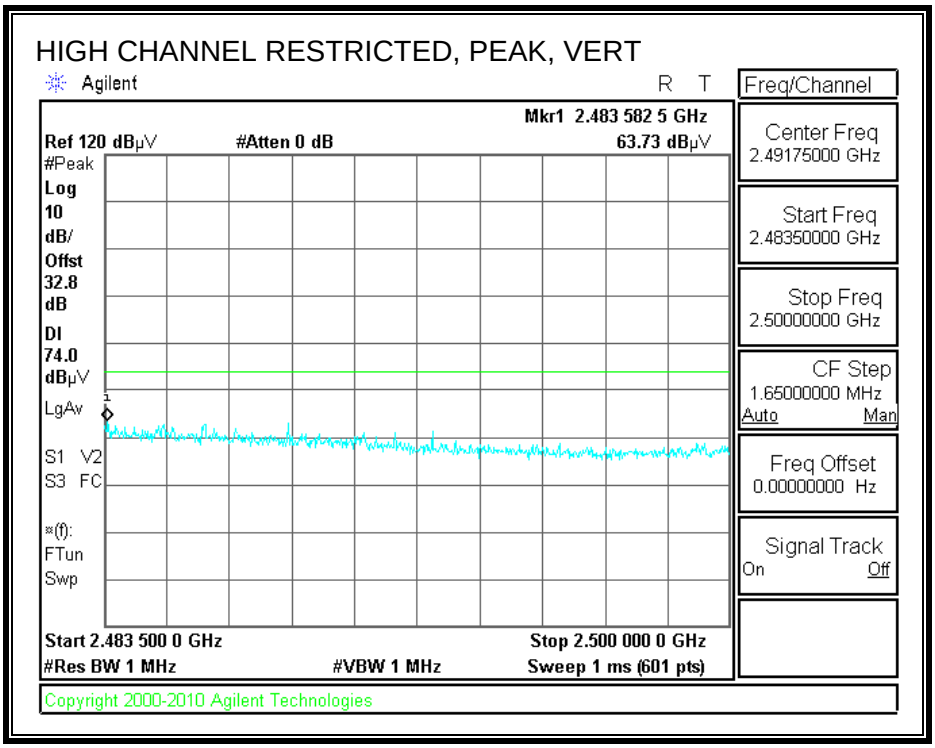
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



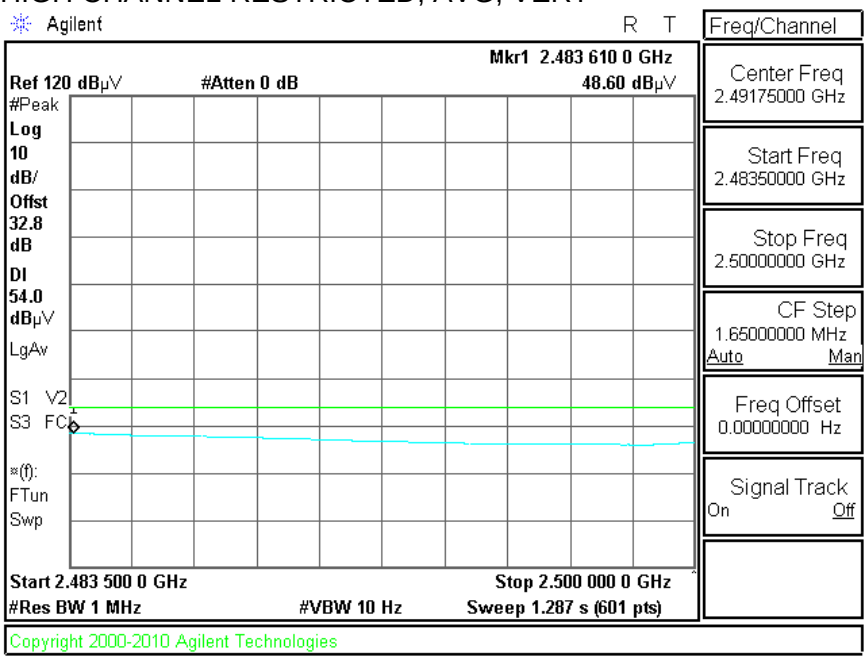
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 07/12/12
Project #: 12U14473
Company: Cisco
Test Target: 15.205
Mode Oper: 11g, 6mb/s data rate, Tx

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

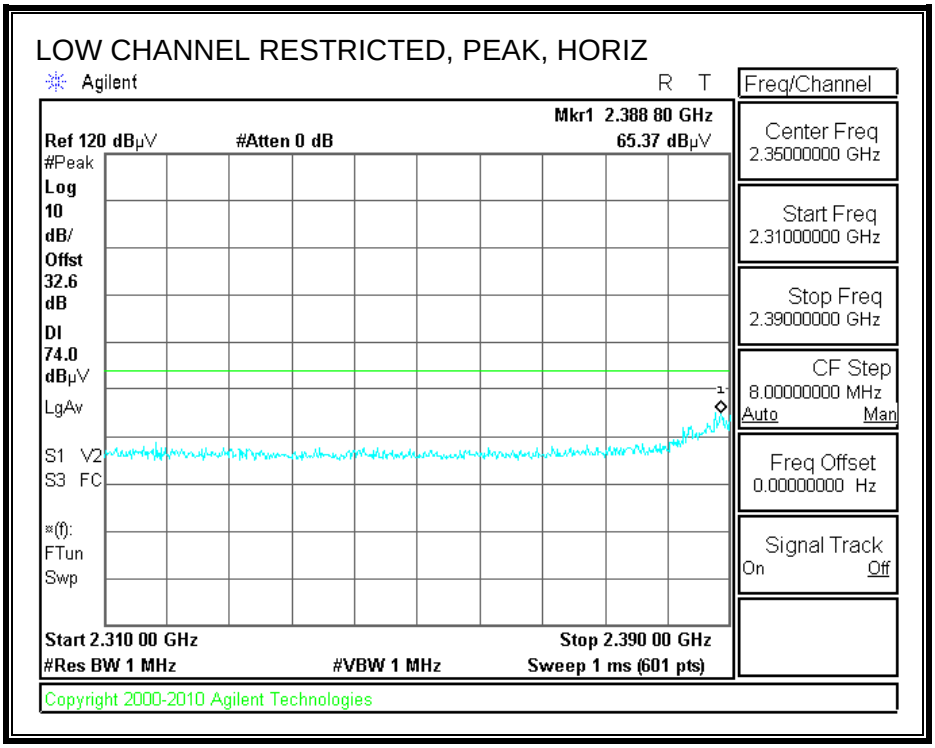
Average Field Strength Limit
Peak Field Strength Limit
Margin vs. Average Limit
Margin vs. Peak Limit

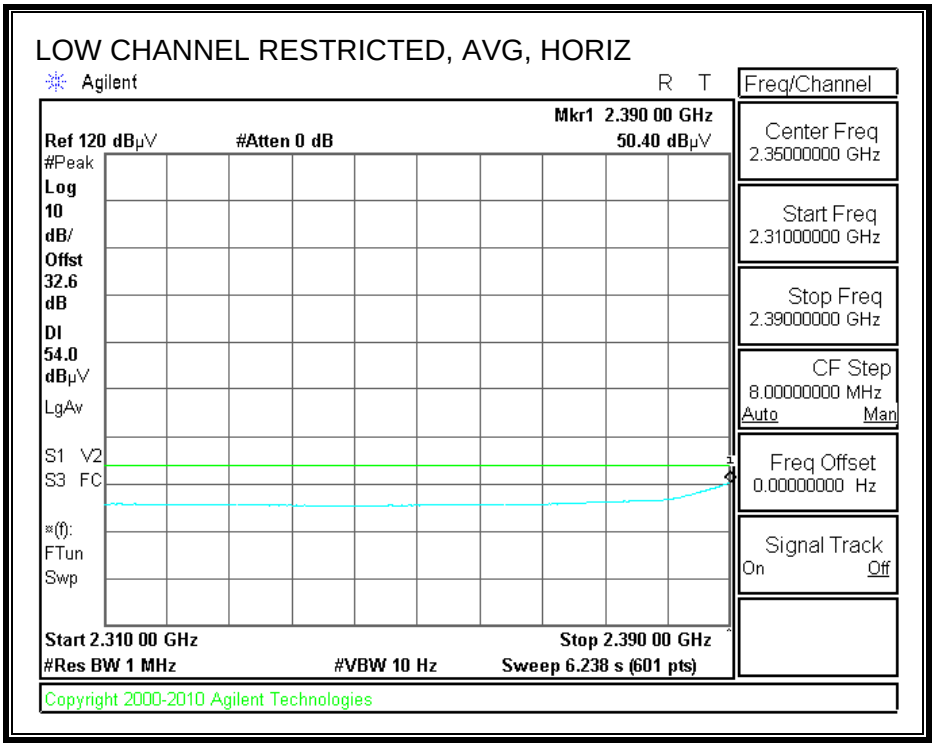
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Channel: 2412 MHz													
4.824	3.0	37.1	33.1	6.8	-34.1	0.0	0.0	42.9	74.0	-31.1	H	P	
4.824	3.0	24.3	33.1	6.8	-34.1	0.0	0.0	30.1	54.0	-23.9	H	A	
12.060	3.0	34.4	39.4	11.9	-32.5	0.0	0.0	53.2	74.0	-20.8	H	P	
12.060	3.0	21.2	39.4	11.9	-32.5	0.0	0.0	40.0	54.0	-14.0	H	A	
4.824	3.0	36.2	33.1	6.8	-34.1	0.0	0.0	42.0	74.0	-32.0	V	P	
4.824	3.0	23.8	33.1	6.8	-34.1	0.0	0.0	29.6	54.0	-24.4	V	A	
12.060	3.0	33.6	39.4	11.9	-32.5	0.0	0.0	52.4	74.0	-21.6	V	P	
12.060	3.0	21.3	39.4	11.9	-32.5	0.0	0.0	40.2	54.0	-13.8	V	A	
Middle Channel: 2437 MHz													
4.874	3.0	36.4	33.2	6.8	-34.0	0.0	0.0	42.3	74.0	-31.7	H	P	
4.874	3.0	23.9	33.2	6.8	-34.0	0.0	0.0	29.8	54.0	-24.2	H	A	
7.311	3.0	35.0	36.3	9.1	-33.1	0.0	0.0	47.3	74.0	-26.7	H	P	
7.311	3.0	23.0	36.3	9.1	-33.1	0.0	0.0	35.2	54.0	-18.8	H	A	
12.185	3.0	33.5	39.4	12.0	-32.5	0.0	0.0	52.4	74.0	-21.6	H	P	
12.185	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	H	A	
4.874	3.0	36.5	33.2	6.8	-34.0	0.0	0.0	42.5	74.0	-31.5	V	P	
4.874	3.0	23.8	33.2	6.8	-34.0	0.0	0.0	29.8	54.0	-24.2	V	A	
7.311	3.0	35.6	36.3	9.1	-33.1	0.0	0.0	47.9	74.0	-26.1	V	P	
7.311	3.0	23.0	36.3	9.1	-33.1	0.0	0.0	35.3	54.0	-18.7	V	A	
12.185	3.0	34.2	39.4	12.0	-32.5	0.0	0.0	53.1	74.0	-20.9	V	P	
12.185	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	V	A	
High Channel: 2462 MHz													
4.924	3.0	35.7	33.2	6.8	-34.0	0.0	0.0	41.7	74.0	-32.3	H	P	
4.924	3.0	23.7	33.2	6.8	-34.0	0.0	0.0	29.7	54.0	-24.3	H	A	
7.386	3.0	35.7	36.4	9.1	-33.1	0.0	0.0	48.1	74.0	-25.9	H	P	
7.386	3.0	22.6	36.4	9.1	-33.1	0.0	0.0	35.0	54.0	-19.0	H	A	
12.310	3.0	33.0	39.4	12.0	-32.5	0.0	0.0	51.9	74.0	-22.1	H	P	
12.310	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	H	A	
4.924	3.0	36.5	33.2	6.8	-34.0	0.0	0.0	42.5	74.0	-31.5	V	P	
4.924	3.0	23.9	33.2	6.8	-34.0	0.0	0.0	29.9	54.0	-24.1	V	A	
7.386	3.0	34.6	36.4	9.1	-33.1	0.0	0.0	47.1	74.0	-26.9	V	P	
7.386	3.0	22.6	36.4	9.1	-33.1	0.0	0.0	35.1	54.0	-18.9	V	A	
12.310	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.1	74.0	-21.9	V	P	
12.310	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	V	A	

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

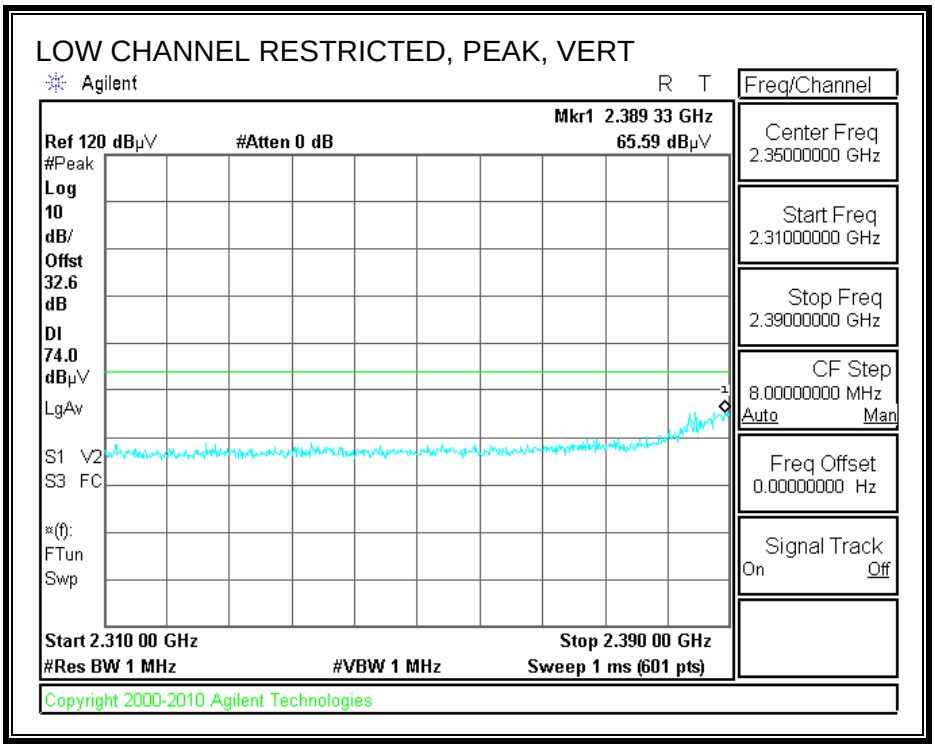
9.2.3. TX ABOVE 1 GHz, 802.11g 2TX BEAM FORMING MODE, 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

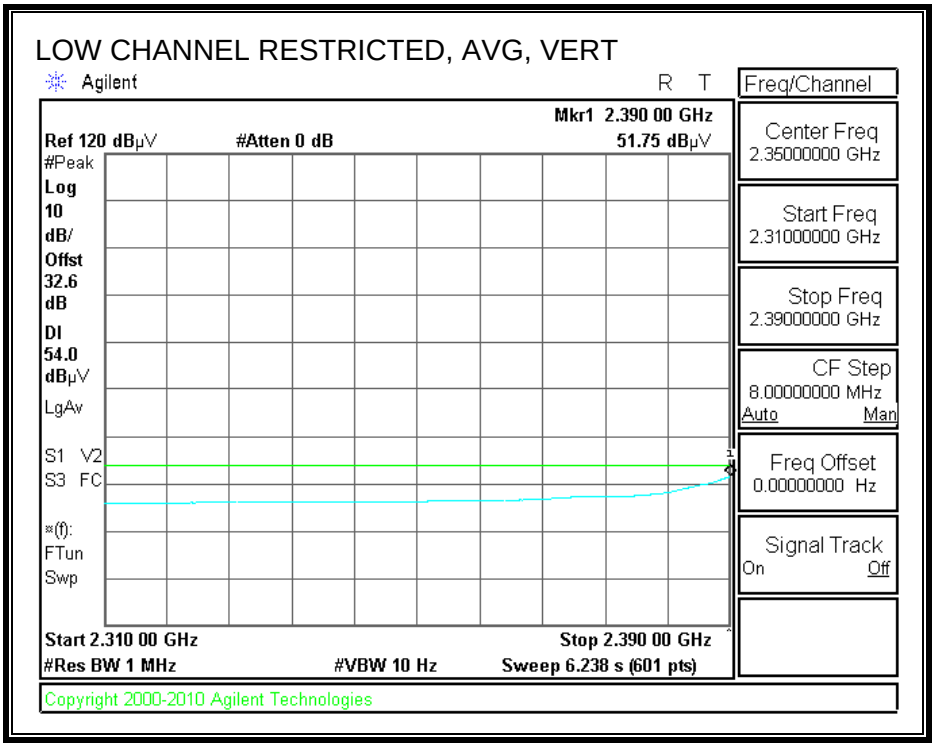




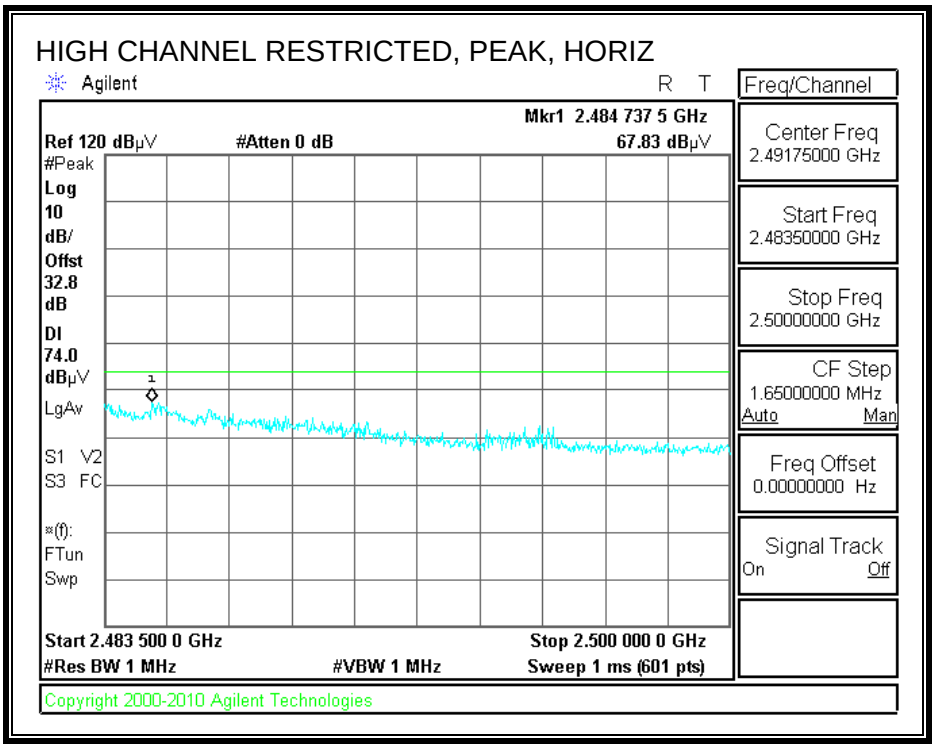
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

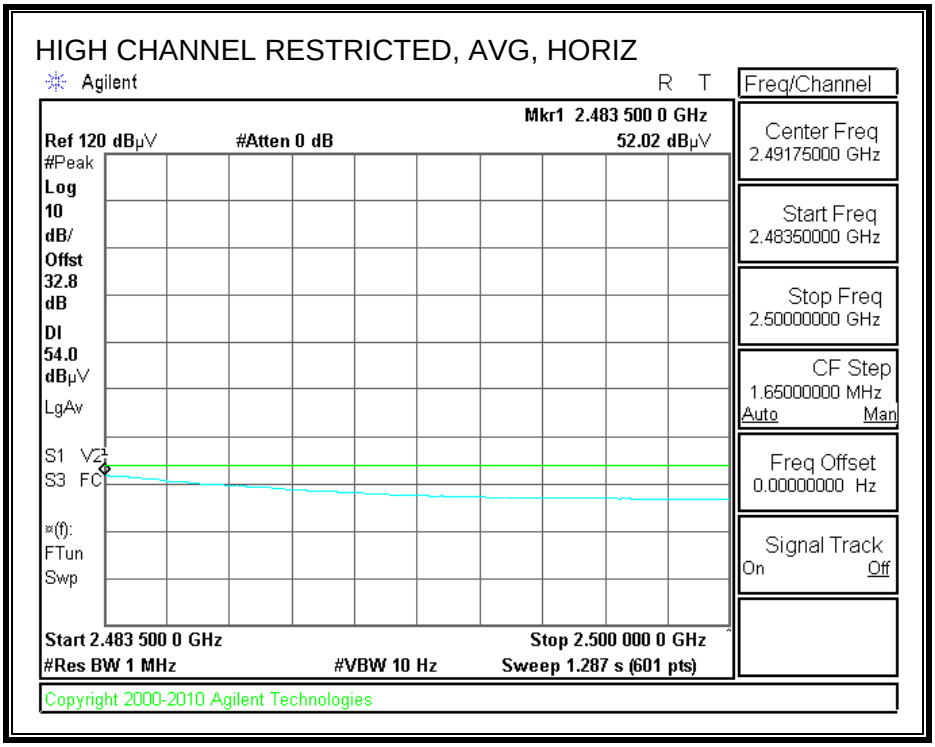


LOW CHANNEL RESTRICTED, AVG, VERT

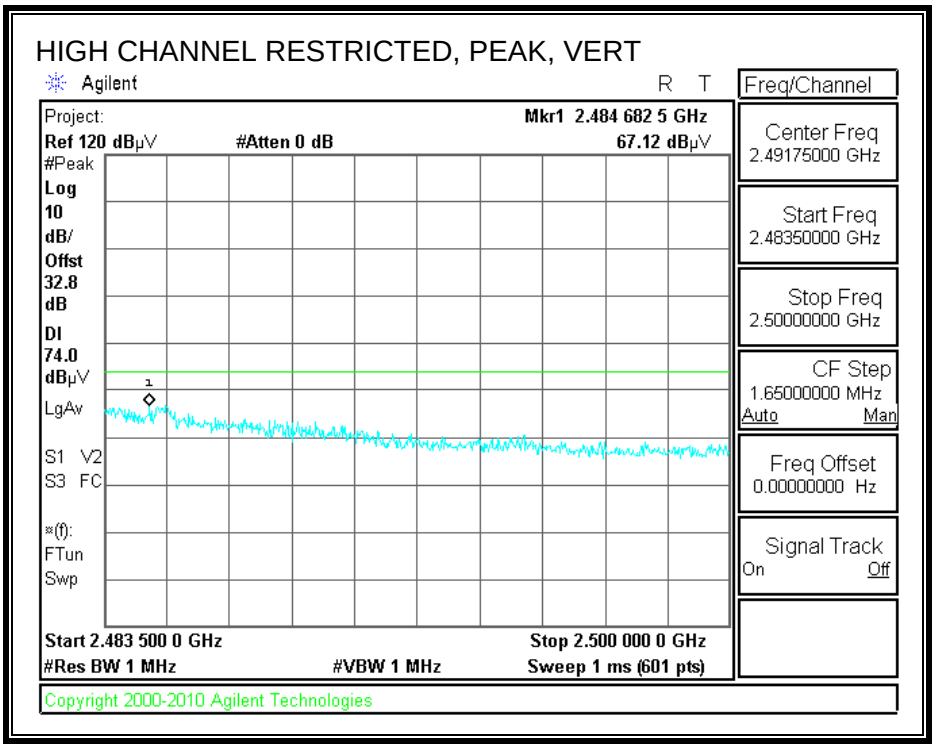


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

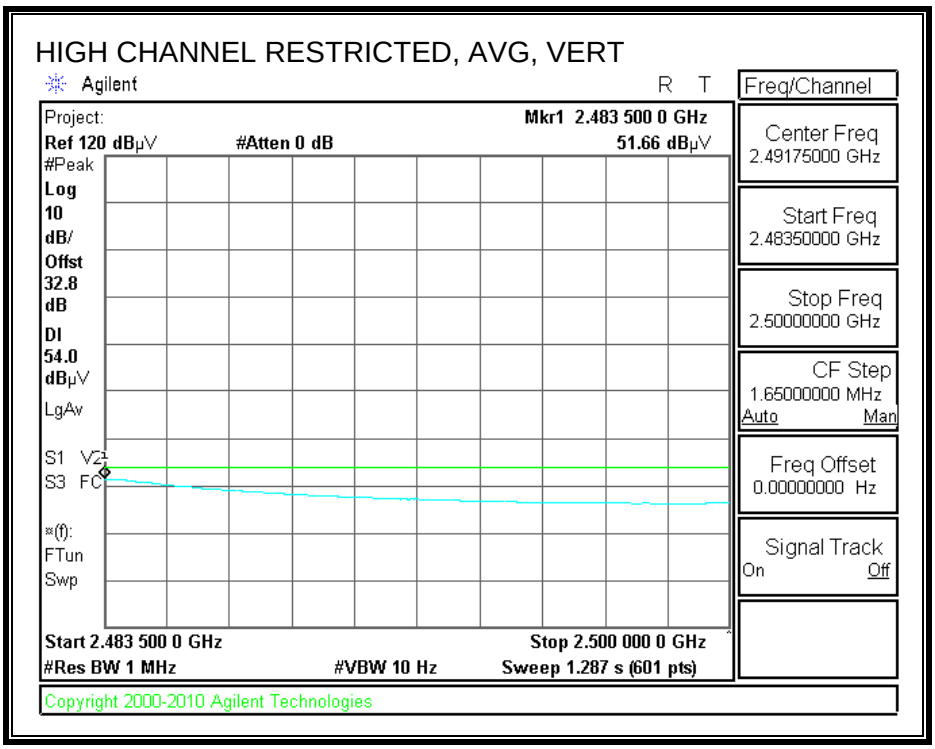




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 07/12/12
Project #: 12U14473
Company: Cisco
Test Target: 15.205
Mode Oper: 11g Beam Form, 6mb/s data rate, Tx

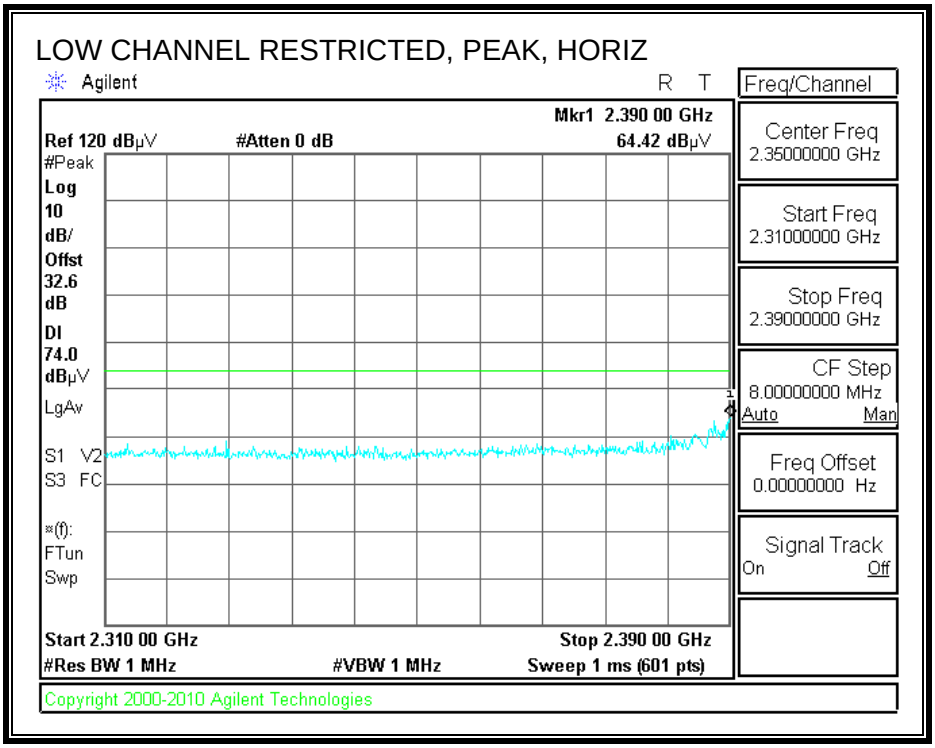
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

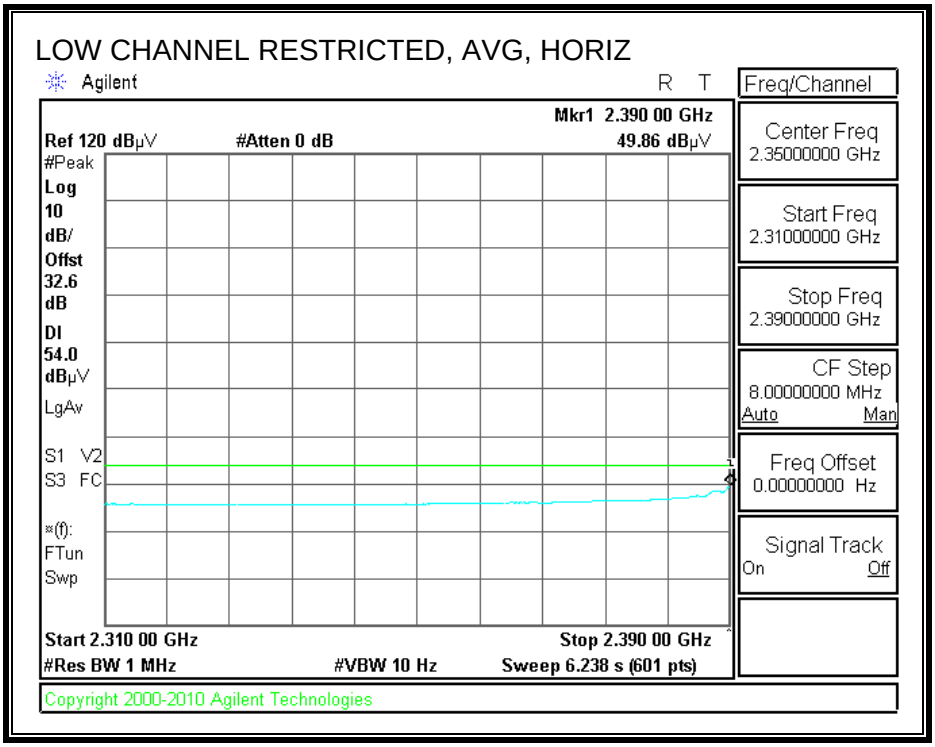
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Channel: 2412 MHz													
4.824	3.0	36.0	33.1	6.8	-34.1	0.0	0.0	41.9	74.0	-32.1	H	P	
4.824	3.0	23.9	33.1	6.8	-34.1	0.0	0.0	29.8	54.0	-24.2	H	A	
12.060	3.0	33.3	39.4	11.9	-32.5	0.0	0.0	52.2	74.0	-21.8	H	P	
12.060	3.0	21.2	39.4	11.9	-32.5	0.0	0.0	40.0	54.0	-14.0	H	A	
4.824	3.0	37.4	33.1	6.8	-34.1	0.0	0.0	43.3	74.0	-30.7	V	P	
4.824	3.0	24.4	33.1	6.8	-34.1	0.0	0.0	30.2	54.0	-23.8	V	A	
12.060	3.0	33.7	39.4	11.9	-32.5	0.0	0.0	52.5	74.0	-21.5	V	P	
12.060	3.0	21.2	39.4	11.9	-32.5	0.0	0.0	40.0	54.0	-14.0	V	A	
Middle Channel: 2437 MHz													
4.874	3.0	36.3	33.2	6.8	-34.0	0.0	0.0	42.2	74.0	-31.8	H	P	
4.874	3.0	23.7	33.2	6.8	-34.0	0.0	0.0	29.6	54.0	-24.4	H	A	
7.311	3.0	35.6	36.3	9.1	-33.1	0.0	0.0	47.8	74.0	-26.2	H	P	
7.311	3.0	22.8	36.3	9.1	-33.1	0.0	0.0	35.1	54.0	-18.9	H	A	
12.185	3.0	32.9	39.4	12.0	-32.5	0.0	0.0	51.8	74.0	-22.2	H	P	
12.185	3.0	20.8	39.4	12.0	-32.5	0.0	0.0	39.7	54.0	-14.3	H	A	
4.874	3.0	36.1	33.2	6.8	-34.0	0.0	0.0	42.0	74.0	-32.0	V	P	
4.874	3.0	23.7	33.2	6.8	-34.0	0.0	0.0	29.6	54.0	-24.4	V	A	
7.311	3.0	35.6	36.3	9.1	-33.1	0.0	0.0	47.8	74.0	-26.2	V	P	
7.311	3.0	22.7	36.3	9.1	-33.1	0.0	0.0	35.0	54.0	-19.0	V	A	
12.185	3.0	33.6	39.4	12.0	-32.5	0.0	0.0	52.4	74.0	-21.6	V	P	
12.185	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	V	A	
High Channel: 2462 MHz													
4.924	3.0	36.1	33.2	6.8	-34.0	0.0	0.0	42.2	74.0	-31.8	H	P	
4.924	3.0	23.4	33.2	6.8	-34.0	0.0	0.0	29.4	54.0	-24.6	H	A	
7.386	3.0	35.4	36.4	9.1	-33.1	0.0	0.0	47.8	74.0	-26.2	H	P	
7.386	3.0	22.5	36.4	9.1	-33.1	0.0	0.0	34.9	54.0	-19.1	H	A	
12.310	3.0	33.0	39.4	12.0	-32.5	0.0	0.0	52.0	74.0	-22.0	H	P	
12.310	3.0	21.2	39.4	12.0	-32.5	0.0	0.0	40.1	54.0	-13.9	H	A	
4.924	3.0	35.9	33.2	6.8	-34.0	0.0	0.0	41.9	74.0	-32.1	V	P	
4.924	3.0	24.1	33.2	6.8	-34.0	0.0	0.0	30.1	54.0	-23.9	V	A	
7.386	3.0	35.2	36.4	9.1	-33.1	0.0	0.0	47.6	74.0	-26.4	V	P	
7.386	3.0	22.9	36.4	9.1	-33.1	0.0	0.0	35.3	54.0	-18.7	V	A	
12.310	3.0	34.3	39.4	12.0	-32.5	0.0	0.0	53.3	74.0	-20.7	V	P	
12.310	3.0	21.1	39.4	12.0	-32.5	0.0	0.0	40.1	54.0	-13.9	V	A	

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

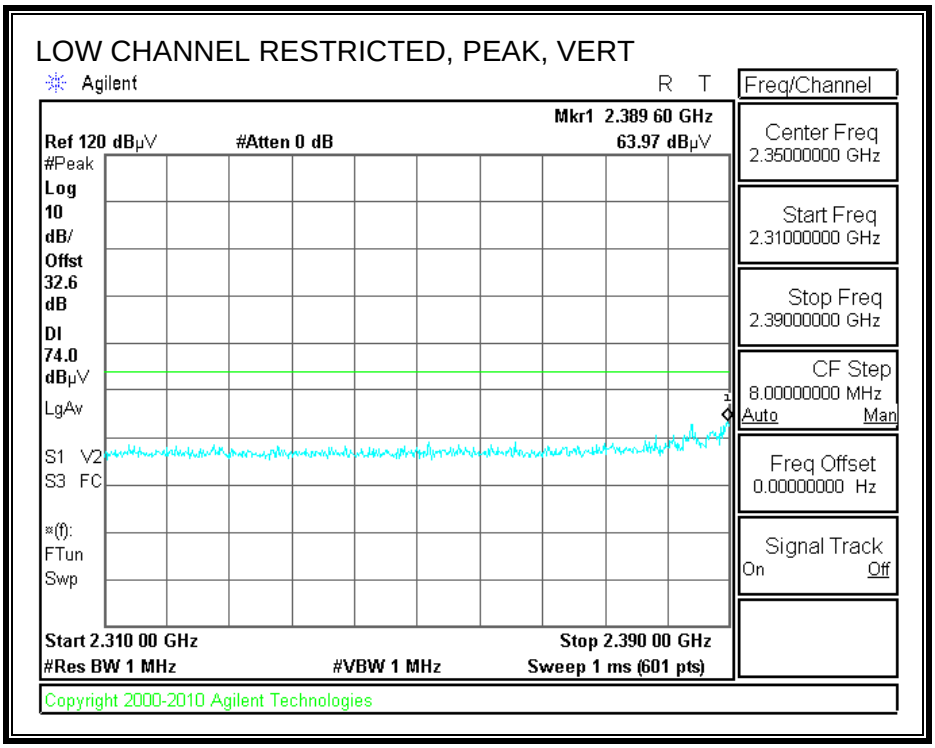
9.2.4. TX ABOVE 1 GHz FOR 802.11n HT20 2TX MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

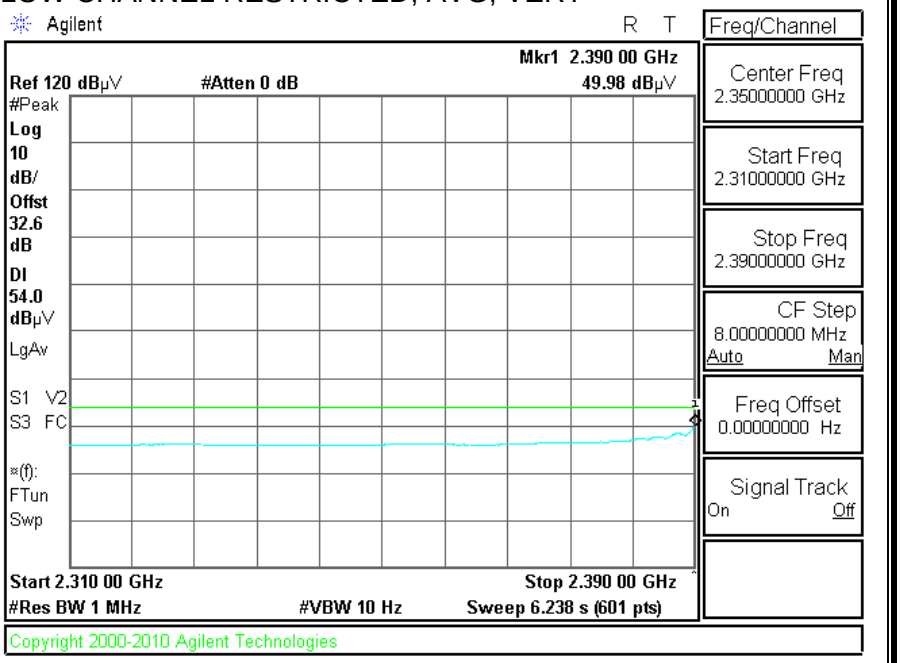




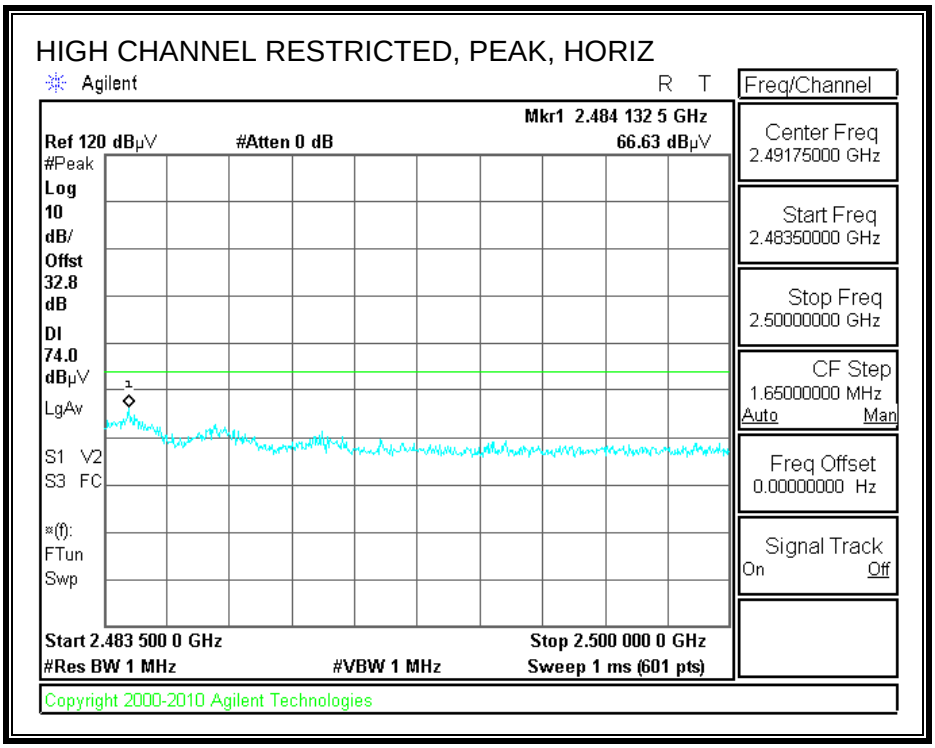
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



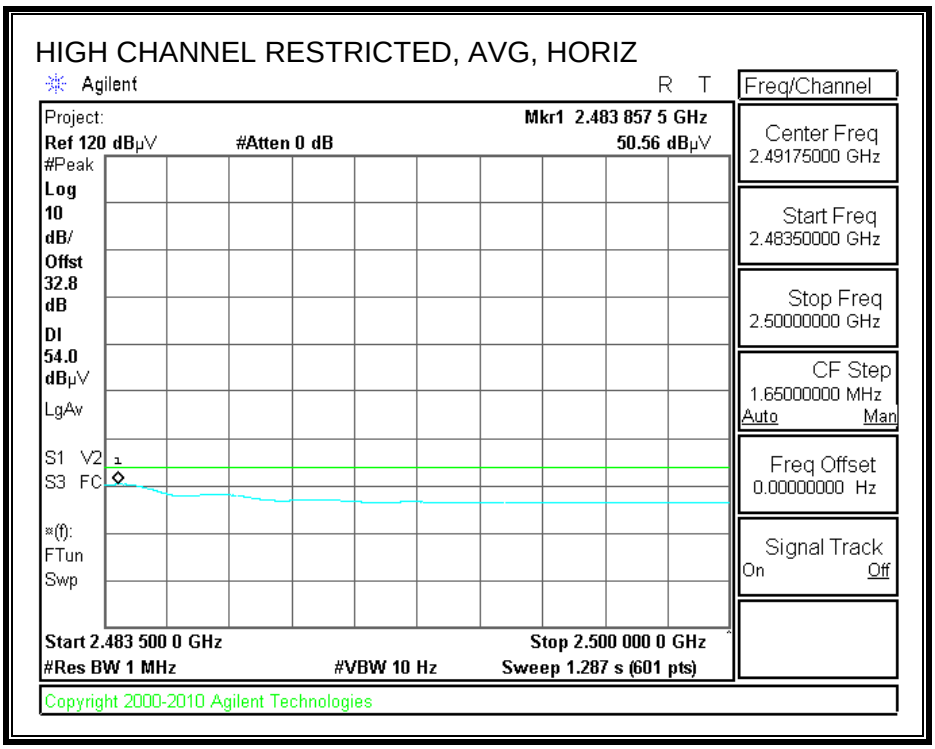
LOW CHANNEL RESTRICTED, AVG, VERT



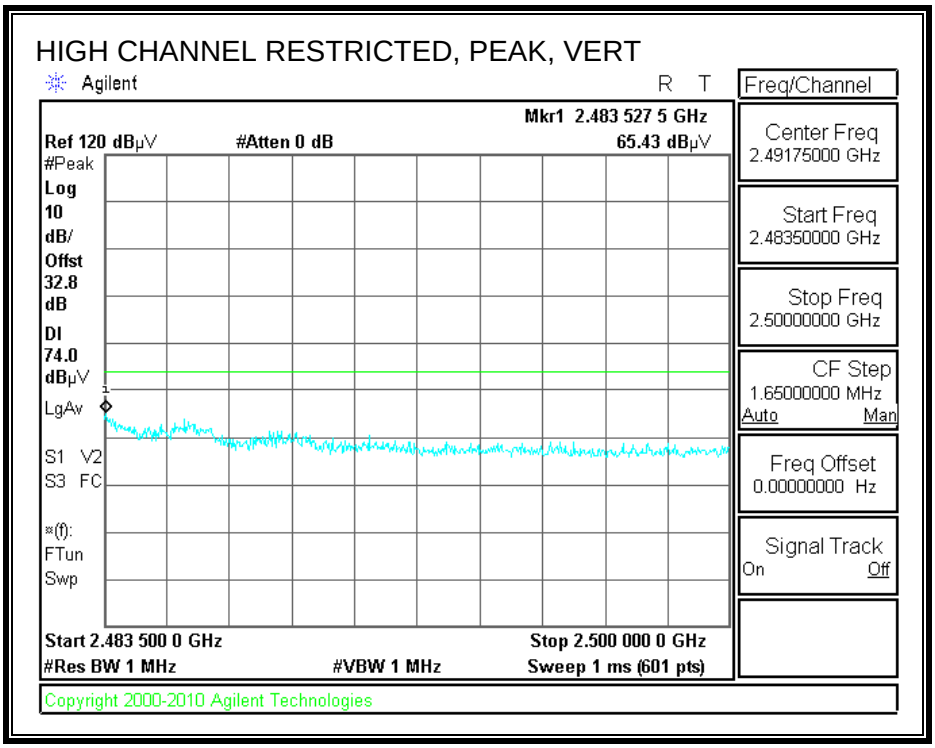
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



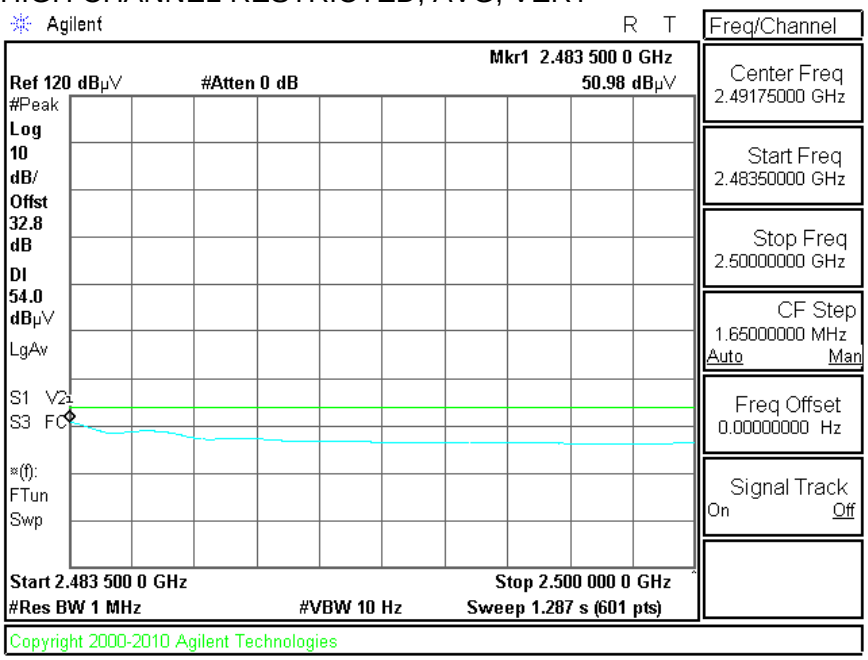
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 07/12/12
Project #: 12U14473
Company: Cisco
Test Target: 15.205
Mode Oper: HT20, MCS0 data rate, Tx

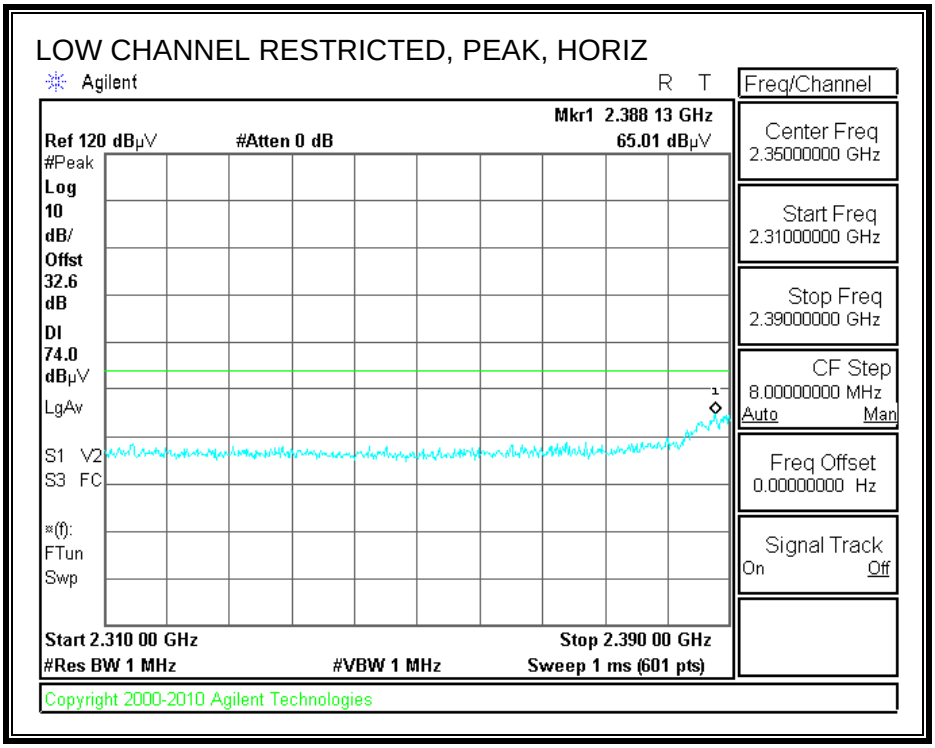
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

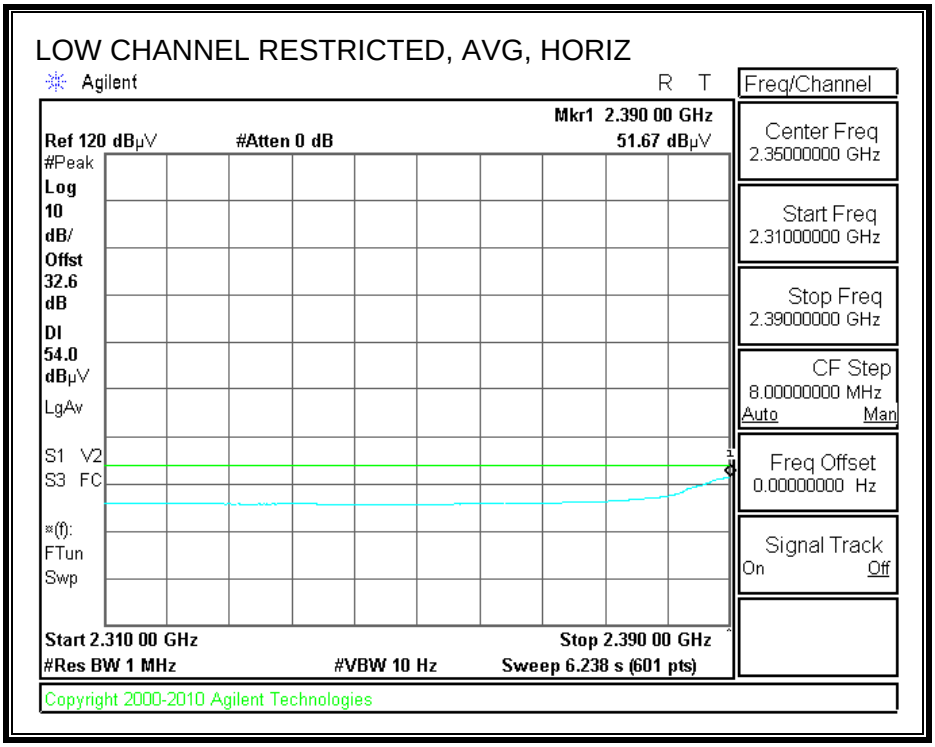
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Channel 2412 MHZ													
4.824	3.0	36.4	33.1	6.8	-34.1	0.0	0.0	42.3	74.0	-31.7	H	P	
4.824	3.0	24.1	33.1	6.8	-34.1	0.0	0.0	30.0	54.0	-24.0	H	A	
12.060	3.0	33.7	39.4	11.9	-32.5	0.0	0.0	52.5	74.0	-21.5	H	P	
12.060	3.0	21.2	39.4	11.9	-32.5	0.0	0.0	40.0	54.0	-14.0	H	A	
4.824	3.0	36.9	33.1	6.8	-34.1	0.0	0.0	42.8	74.0	-31.2	V	P	
4.824	3.0	24.1	33.1	6.8	-34.1	0.0	0.0	30.0	54.0	-24.0	V	A	
12.060	3.0	33.1	39.4	11.9	-32.5	0.0	0.0	52.0	74.0	-22.0	V	P	
12.060	3.0	21.2	39.4	11.9	-32.5	0.0	0.0	40.0	54.0	-14.0	V	A	
Middle Channel 2437 MHZ													
4.874	3.0	36.1	33.2	6.8	-34.0	0.0	0.0	42.1	74.0	-31.9	H	P	
4.874	3.0	24.0	33.2	6.8	-34.0	0.0	0.0	29.9	54.0	-24.1	H	A	
7.311	3.0	35.6	36.3	9.1	-33.1	0.0	0.0	47.9	74.0	-26.1	H	P	
7.311	3.0	23.0	36.3	9.1	-33.1	0.0	0.0	35.3	54.0	-18.7	H	A	
12.185	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.0	74.0	-22.0	H	P	
12.185	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	H	A	
4.874	3.0	36.1	33.2	6.8	-34.0	0.0	0.0	42.0	74.0	-32.0	V	P	
4.874	3.0	23.8	33.2	6.8	-34.0	0.0	0.0	29.7	54.0	-24.3	V	A	
7.311	3.0	35.5	36.3	9.1	-33.1	0.0	0.0	47.8	74.0	-26.2	V	P	
7.311	3.0	22.8	36.3	9.1	-33.1	0.0	0.0	35.1	54.0	-18.9	V	A	
12.185	3.0	33.4	39.4	12.0	-32.5	0.0	0.0	52.3	74.0	-21.7	V	P	
12.185	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	V	A	
High Channel 2462 MHZ													
4.924	3.0	35.6	33.2	6.8	-34.0	0.0	0.0	41.6	74.0	-32.4	H	P	
4.924	3.0	23.8	33.2	6.8	-34.0	0.0	0.0	29.8	54.0	-24.2	H	A	
7.386	3.0	34.8	36.4	9.1	-33.1	0.0	0.0	47.2	74.0	-26.8	H	P	
7.386	3.0	22.4	36.4	9.1	-33.1	0.0	0.0	34.8	54.0	-19.2	H	A	
12.310	3.0	33.3	39.4	12.0	-32.5	0.0	0.0	52.2	74.0	-21.8	H	P	
12.310	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	H	A	
4.924	3.0	36.4	33.2	6.8	-34.0	0.0	0.0	42.4	74.0	-31.6	V	P	
4.924	3.0	24.0	33.2	6.8	-34.0	0.0	0.0	30.0	54.0	-24.0	V	A	
7.386	3.0	35.5	36.4	9.1	-33.1	0.0	0.0	47.9	74.0	-26.1	V	P	
7.386	3.0	22.8	36.4	9.1	-33.1	0.0	0.0	35.2	54.0	-18.8	V	A	
12.310	3.0	33.6	39.4	12.0	-32.5	0.0	0.0	52.5	74.0	-21.5	V	P	
12.310	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	40.0	54.0	-14.0	V	A	

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

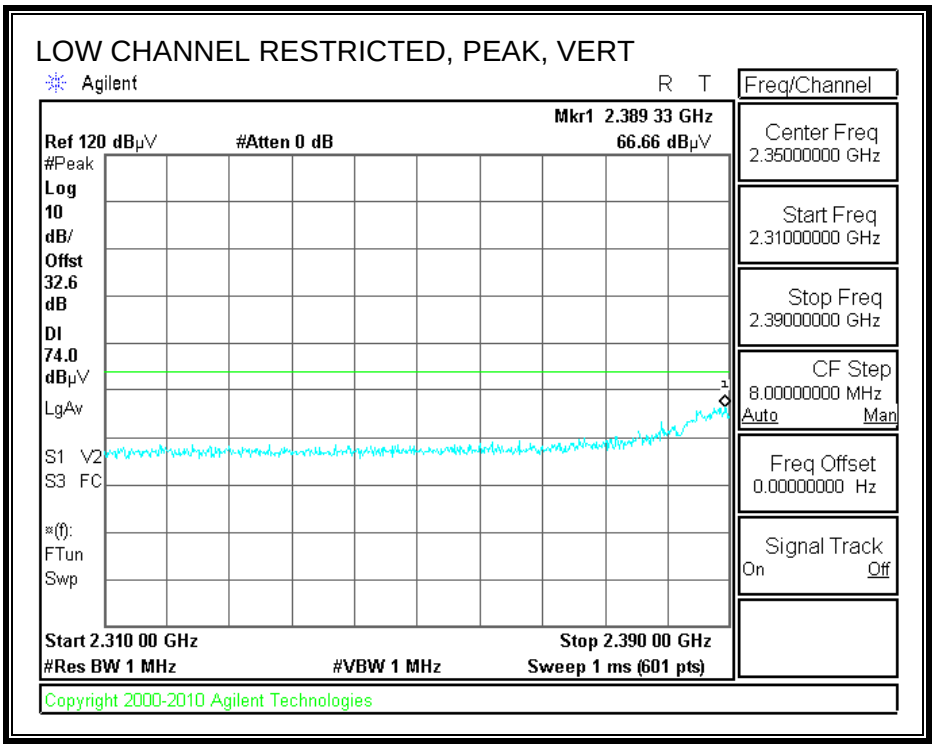
9.2.5. TX ABOVE 1 GHz FOR 802.11n HT40 2TX MODE IN THE 2.4 GHz BAND

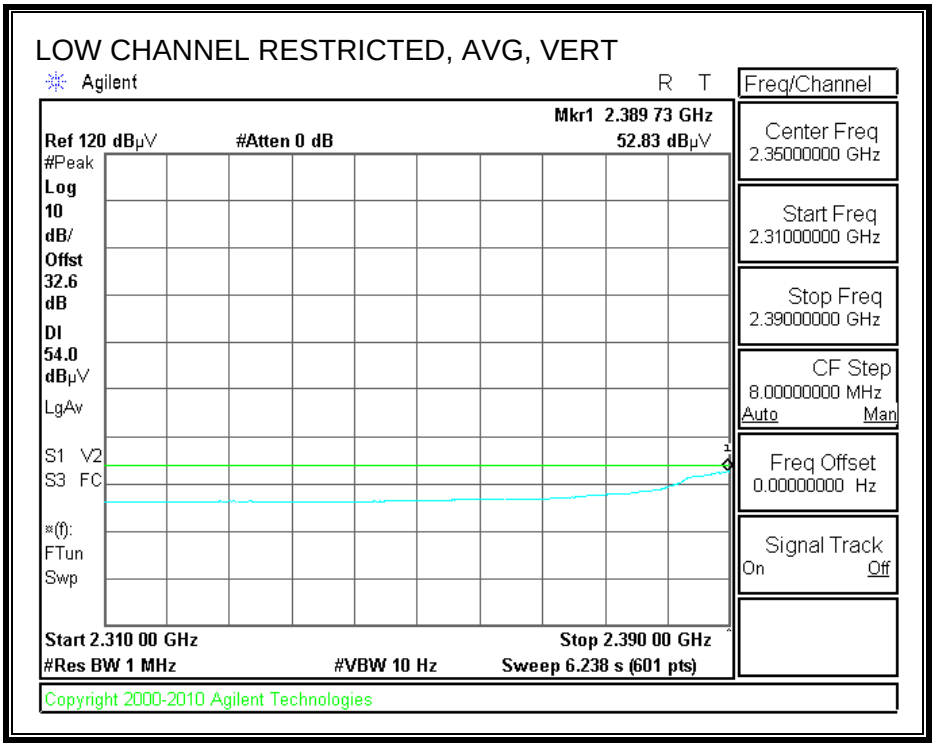
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



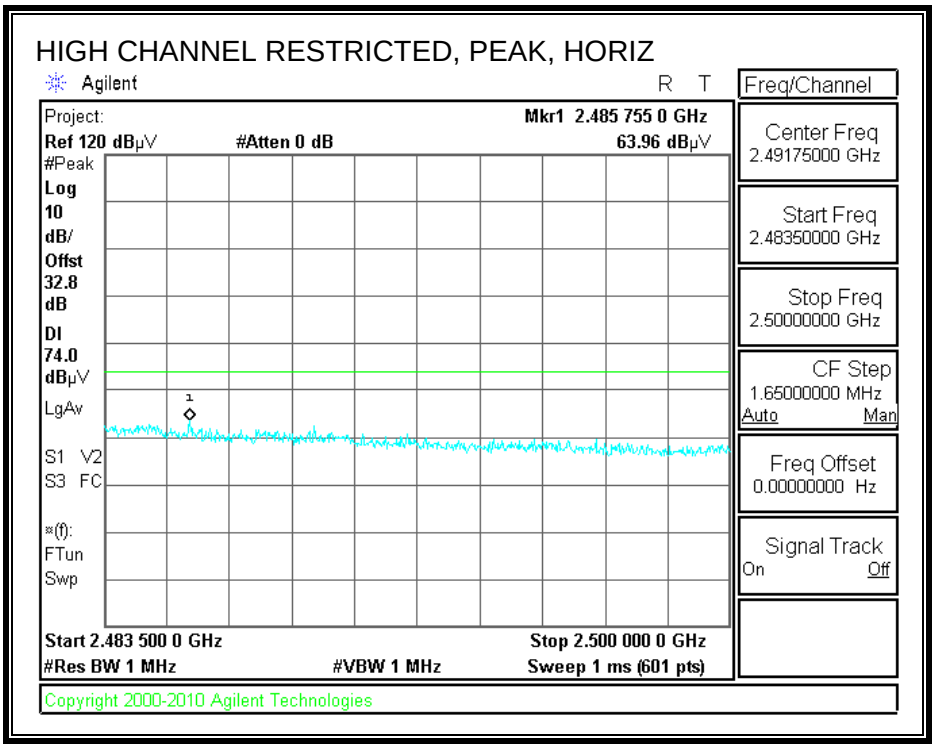


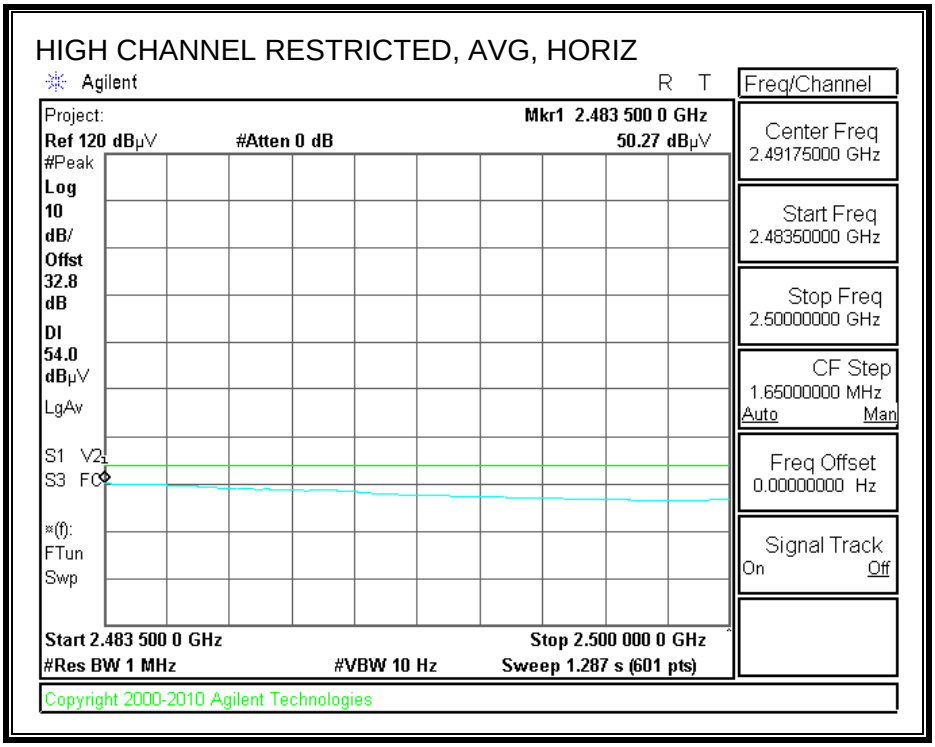
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



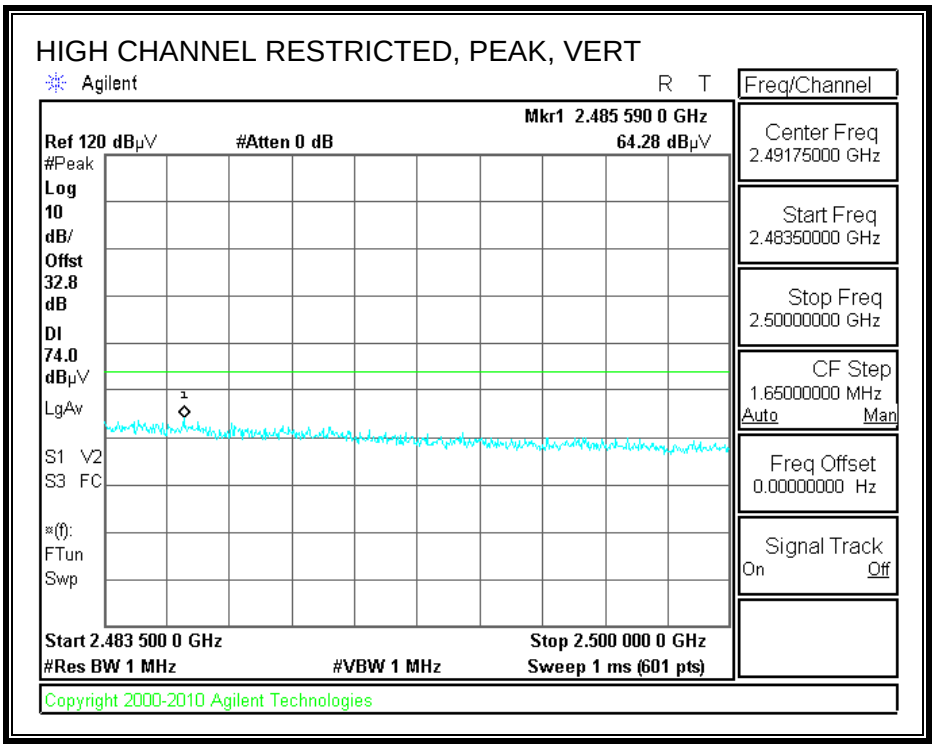


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

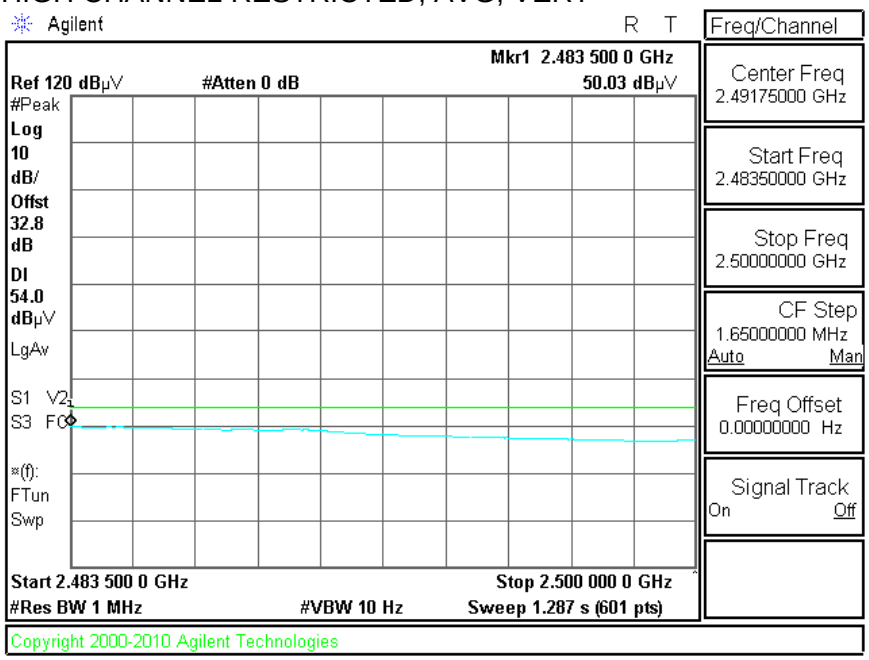




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 07/12/12
Project #: 12U14476
Company: Cisco
Test Target: 15.205
Mode Oper: HT40, MCS8 data rate, Tx

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	Notes
Low Channel 2422 MHZ													
4.844	3.0	35.7	33.1	6.8	-34.0	0.0	0.0	41.6	74.0	-32.4	H	P	
4.844	3.0	23.6	33.1	6.8	-34.0	0.0	0.0	29.5	54.0	-24.5	H	A	
7.266	3.0	34.9	36.2	9.1	-33.2	0.0	0.0	47.1	74.0	-26.9	H	P	
7.266	3.0	22.8	36.2	9.1	-33.2	0.0	0.0	34.9	54.0	-19.1	H	A	
12.110	3.0	33.8	39.4	12.0	-32.5	0.0	0.0	52.7	74.0	-21.3	H	P	
12.110	3.0	21.4	39.4	12.0	-32.5	0.0	0.0	40.3	54.0	-13.7	H	A	
4.844	3.0	35.9	33.1	6.8	-34.0	0.0	0.0	41.7	74.0	-32.3	V	P	
4.844	3.0	23.8	33.1	6.8	-34.0	0.0	0.0	29.6	54.0	-24.4	V	A	
7.266	3.0	35.8	36.2	9.1	-33.2	0.0	0.0	48.0	74.0	-26.0	V	P	
7.266	3.0	22.9	36.2	9.1	-33.2	0.0	0.0	35.1	54.0	-18.9	V	A	
12.110	3.0	33.6	39.4	12.0	-32.5	0.0	0.0	52.5	74.0	-21.5	V	P	
12.110	3.0	21.4	39.4	12.0	-32.5	0.0	0.0	40.2	54.0	-13.8	V	A	
Middle Channel 2437 MHZ													
4.874	3.0	36.5	33.2	6.8	-34.0	0.0	0.0	42.4	74.0	-31.6	H	P	
4.874	3.0	23.4	33.2	6.8	-34.0	0.0	0.0	29.3	54.0	-24.7	H	A	
7.311	3.0	35.0	36.3	9.1	-33.1	0.0	0.0	47.3	74.0	-26.7	H	P	
7.311	3.0	22.6	36.3	9.1	-33.1	0.0	0.0	34.9	54.0	-19.1	H	A	
12.185	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.1	74.0	-21.9	H	P	
12.185	3.0	20.9	39.4	12.0	-32.5	0.0	0.0	39.8	54.0	-14.2	H	A	
4.874	3.0	36.2	33.2	6.8	-34.0	0.0	0.0	42.1	74.0	-31.9	V	P	
4.874	3.0	23.8	33.2	6.8	-34.0	0.0	0.0	29.7	54.0	-24.3	V	A	
7.311	3.0	35.0	36.3	9.1	-33.1	0.0	0.0	47.3	74.0	-26.7	V	P	
7.311	3.0	22.9	36.3	9.1	-33.1	0.0	0.0	35.2	54.0	-18.8	V	A	
12.185	3.0	33.2	39.4	12.0	-32.5	0.0	0.0	52.0	74.0	-22.0	V	P	
12.185	3.0	21.1	39.4	12.0	-32.5	0.0	0.0	40.0	54.0	-14.0	V	A	
High Channel 2452 MHZ													
4.904	3.0	35.7	33.2	6.8	-34.0	0.0	0.0	41.6	74.0	-32.4	H	P	
4.904	3.0	23.6	33.2	6.8	-34.0	0.0	0.0	29.6	54.0	-24.4	H	A	
7.356	3.0	34.8	36.4	9.1	-33.1	0.0	0.0	47.1	74.0	-26.9	H	P	
7.356	3.0	22.5	36.4	9.1	-33.1	0.0	0.0	34.8	54.0	-19.2	H	A	
12.260	3.0	34.4	39.4	12.0	-32.5	0.0	0.0	53.3	74.0	-20.7	H	P	
12.260	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	H	A	
4.904	3.0	35.7	33.2	6.8	-34.0	0.0	0.0	41.7	74.0	-32.3	V	P	
4.904	3.0	23.5	33.2	6.8	-34.0	0.0	0.0	29.5	54.0	-24.5	V	A	
7.356	3.0	35.3	36.4	9.1	-33.1	0.0	0.0	47.7	74.0	-26.3	V	P	
7.356	3.0	22.6	36.4	9.1	-33.1	0.0	0.0	34.9	54.0	-19.1	V	A	
12.260	3.0	34.0	39.4	12.0	-32.5	0.0	0.0	52.9	74.0	-21.1	V	P	
12.260	3.0	21.0	39.4	12.0	-32.5	0.0	0.0	39.9	54.0	-14.1	V	A	

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

9.2.6. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/18/2012
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: 5745 MHz															
11.490	3.0	36.8	27.2	38.8	10.7	-35.5	0.0	0.0	50.8	41.2	74	54	-23.2	-12.8	V
11.490	3.0	35.5	25.6	38.8	10.7	-35.5	0.0	0.0	49.5	39.6	74	54	-24.5	-14.4	H
Middle Channel: 5785 MHz															
11.570	3.0	35.8	25.3	25.1	10.8	-35.5	0.0	0.0	36.1	25.7	74	54	-37.9	-28.3	V
11.570	3.0	34.7	24.9	38.9	10.8	-35.5	0.0	0.0	48.9	39.1	74	54	-25.1	-14.9	H
High Channel: 5825 MHz															
11.650	3.0	35.7	25.1	39.0	10.9	-35.5	0.0	0.0	50.0	39.5	74	54	-24.0	-14.5	V
11.650	3.0	34.5	24.8	39.0	10.9	-35.5	0.0	0.0	48.9	39.1	74	54	-25.1	-14.9	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		

9.2.7. TX ABOVE 1 GHz, 802.11a 2TX BEAM FORMING MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/18/2012
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: 5745 MHz															
11.490	3.0	43.8	33.3	38.8	10.7	-35.5	0.0	0.0	57.8	47.3	74	54	-16.2	-6.7	V
11.490	3.0	42.8	32.4	38.8	10.7	-35.5	0.0	0.0	56.8	46.4	74	54	-17.2	-7.6	H
Middle Channel: 5785 MHz															
11.570	3.0	43.6	33.6	25.1	10.8	-35.5	0.0	0.0	43.9	34.0	74	54	-30.1	-20.0	V
11.570	3.0	40.2	29.9	38.9	10.8	-35.5	0.0	0.0	54.4	44.0	74	54	-19.6	-10.0	H
High Channel: 5825 MHz															
11.650	3.0	43.7	33.5	39.0	10.9	-35.5	0.0	0.0	58.1	47.9	74	54	-15.9	-6.1	V
11.650	3.0	42.5	31.4	39.0	10.9	-35.5	0.0	0.0	56.9	45.7	74	54	-17.1	-8.3	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		

9.2.8. TX ABOVE 1 GHz, 802.11n HT20 MODE, 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/18/2012
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: 5745 MHz															
11.490	3.0	42.8	31.3	38.8	10.7	-35.5	0.0	0.0	56.8	45.3	74	54	-17.2	-8.7	V
11.490	3.0	41.7	30.1	38.8	10.7	-35.5	0.0	0.0	55.7	44.1	74	54	-18.3	-9.9	H
Middle Channel: 5785 MHz															
11.570	3.0	42.2	31.7	25.1	10.8	-35.5	0.0	0.0	42.6	32.0	74	54	-31.4	-22.0	V
11.570	3.0	39.2	28.3	38.9	10.8	-35.5	0.0	0.0	53.3	42.5	74	54	-20.7	-11.5	H
High Channel: 5825 MHz															
11.650	3.0	42.4	31.0	39.0	10.9	-35.5	0.0	0.0	56.7	45.4	74	54	-17.3	-8.6	V
11.650	3.0	39.2	28.7	39.0	10.9	-35.5	0.0	0.0	53.5	43.1	74	54	-20.5	-10.9	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		

9.2.9. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/18/2012
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: 5755 MHz															
11.510	3.0	40.3	28.8	38.8	10.7	-35.5	0.0	0.0	54.3	42.8	74	54	-19.7	-11.2	V
11.510	3.0	36.8	24.7	38.8	10.7	-35.5	0.0	0.0	50.8	38.7	74	54	-23.2	-15.3	H
High Channel: 5795 MHz															
11.590	3.0	38.2	28.6	25.1	10.8	-35.5	0.0	0.0	38.5	28.9	74	54	-35.5	-25.1	V
11.590	3.0	35.3	25.2	38.9	10.8	-35.5	0.0	0.0	49.5	39.5	74	54	-24.5	-14.5	H

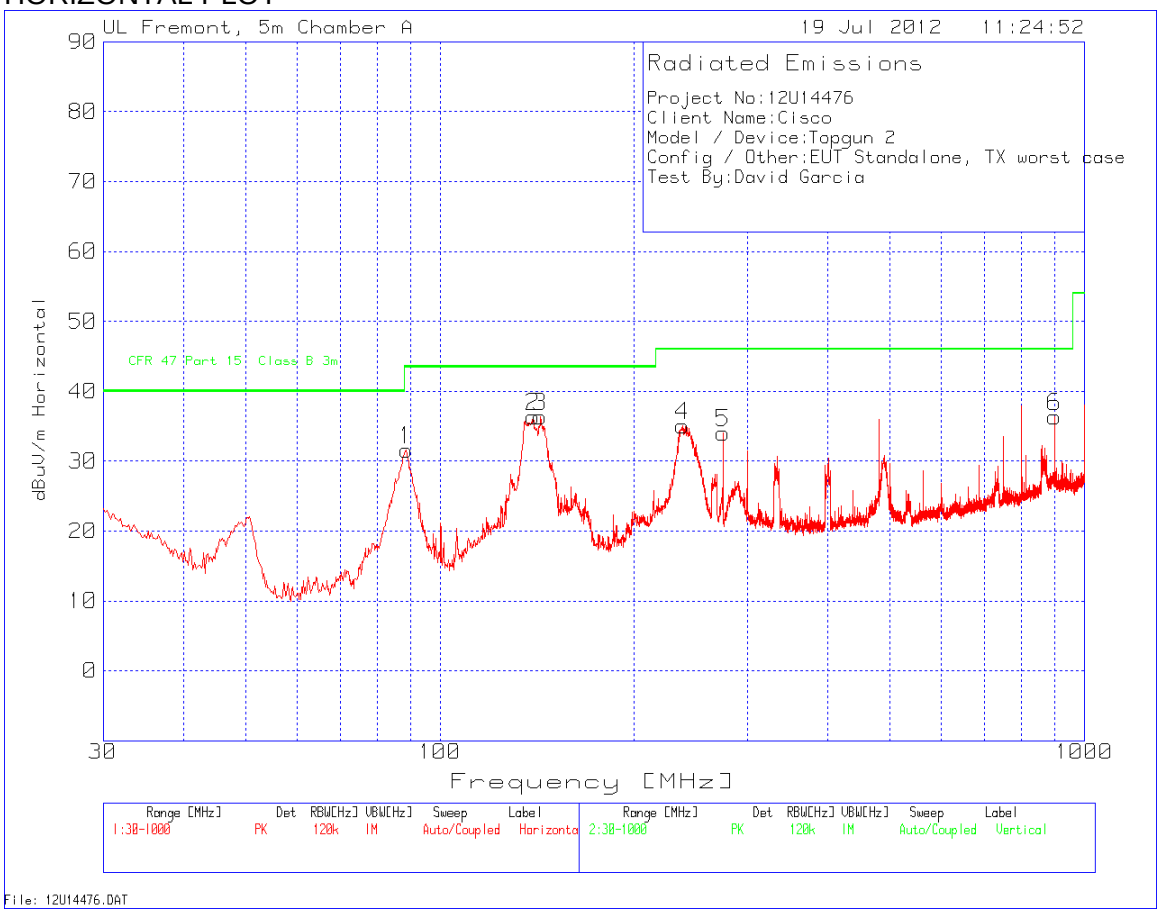
Rev. 11.10.11

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		

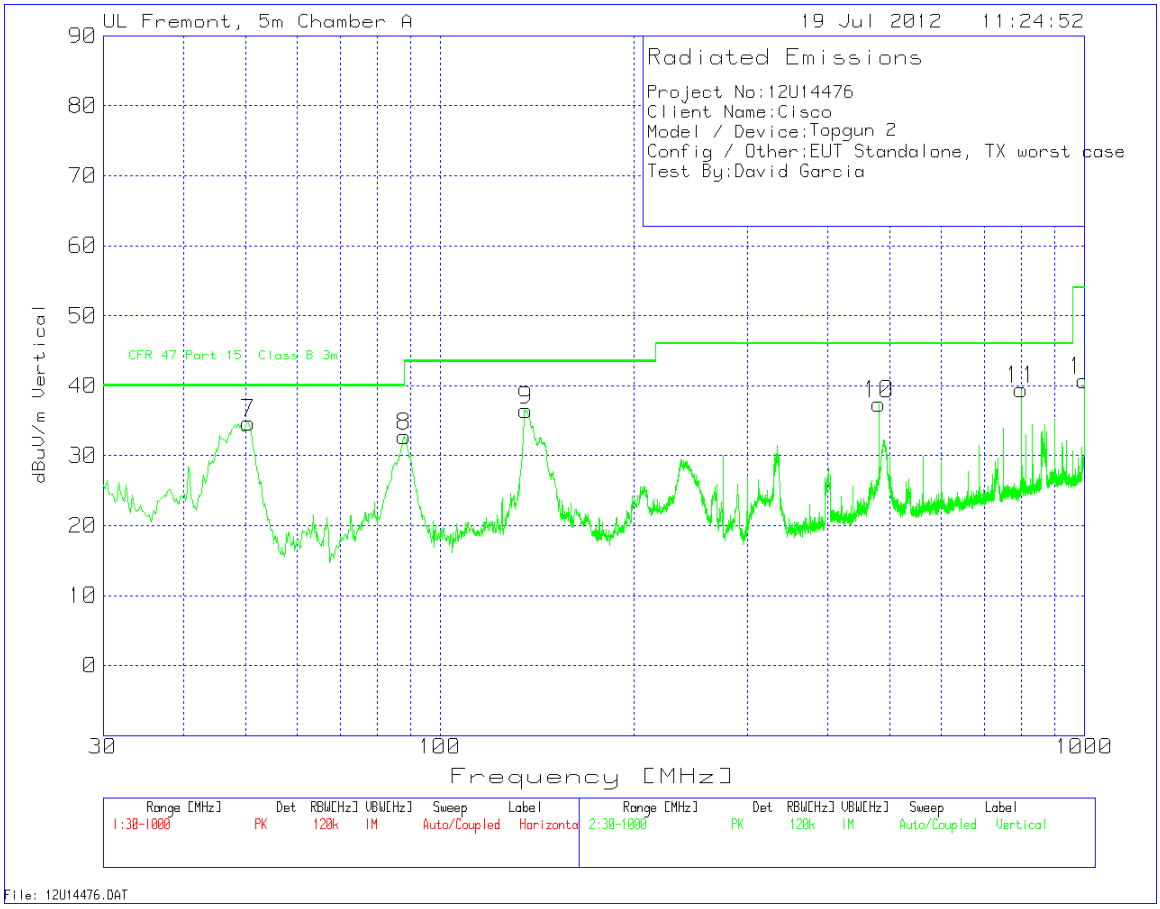
9.3. WORST-CASE BELOW 1 GHz

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

10. 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

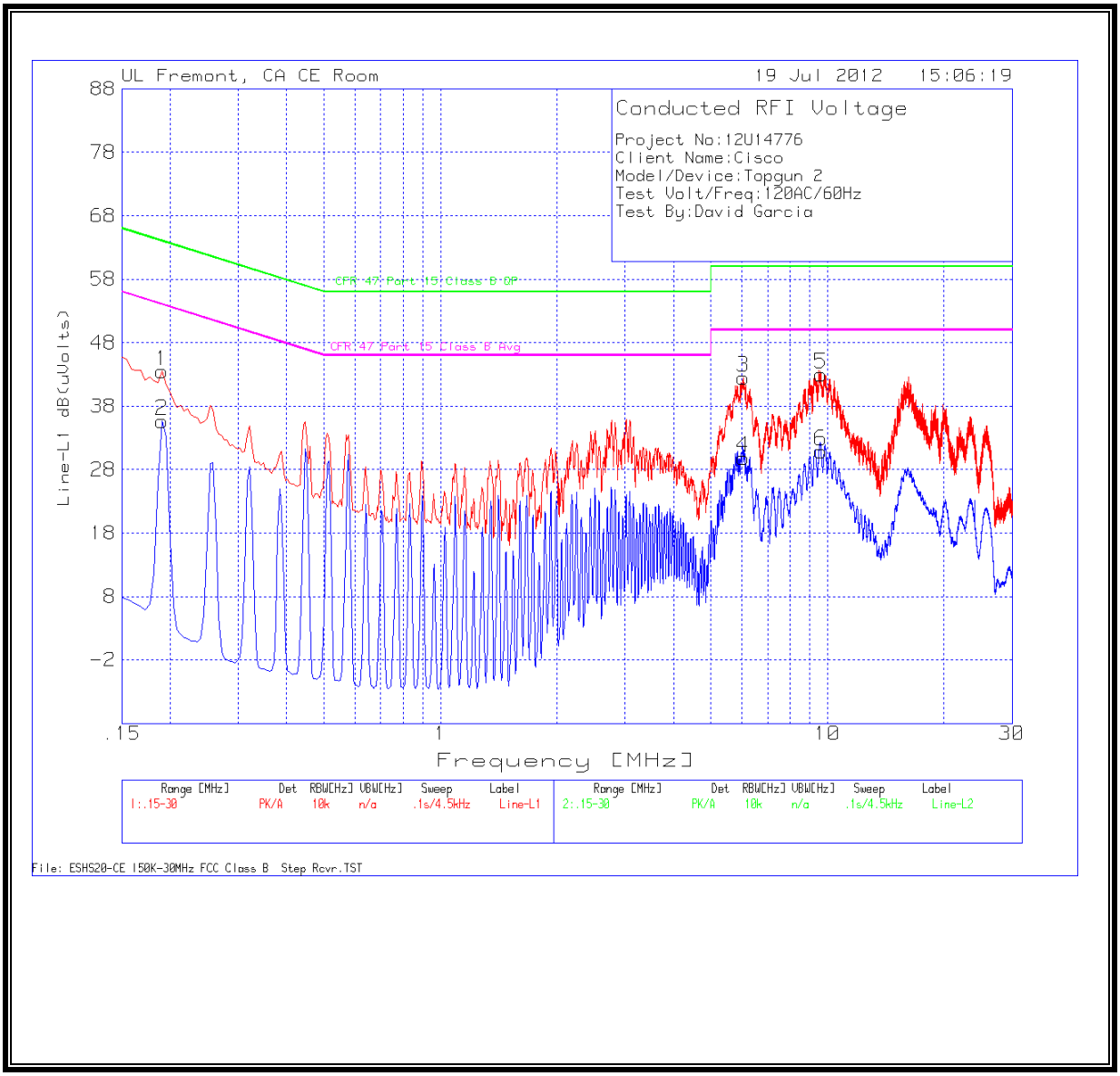
Line-L1 .15 - 30MHz

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

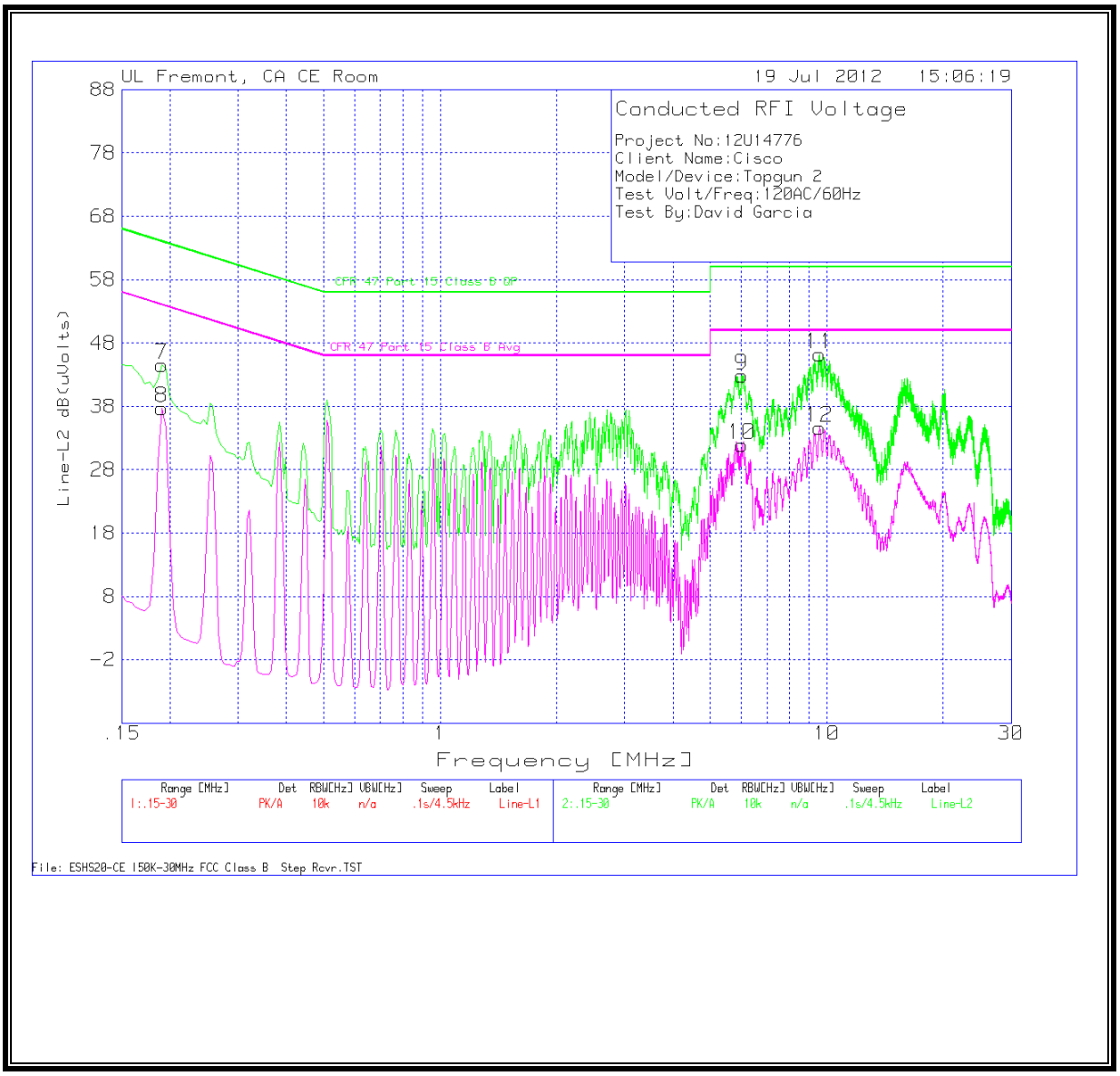
Line-L2 .15 - 30MHz

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



11. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequenoe of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)
where
S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mW/cm^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))
where
D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

RSS-102 Clause 2.5.2 RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 2.5 W;
- at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

RESULTS

Band	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Source Based EIRP (mW)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
2.4 GHz	WLAN	20	17.1	4.0	100	129.1	0.03	0.257
5 GHz	WLAN	20	18.4	6.0	100	272.9	0.05	0.543

The device operates above 1.5 GHz with a maximum EIRP less than or equal to 5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation under RSS-102.