



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

Intelligent Backhaul Radio

MODEL NUMBER: IBR-120x-83-NA

FCC ID: 2AAEH-103

REPORT NUMBER: 14U18829-3 Revision A

ISSUE DATE: JANUARY 13, 2015

Prepared for
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SAN JOSE, CA 95131, USA

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NVLAP®

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	1/9/15	Initial Issue	F. De Anda
A	1/13/15	Update to Output power section rule reference	F. De Anda

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CBF NETWORKS, INC., DBA FASTBACK NETWORKS
2460 N. FIRST STREET, SUITE 200
SAN JOSE, CA 95131, USA

EUT DESCRIPTION: Intelligent Backhaul Radio

MODEL: IBR-120x-83-NA

SERIAL NUMBER: 40314120006 (conducted) 40314380089 (radiated)

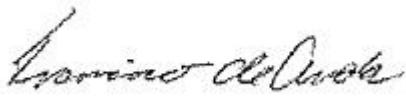
DATE TESTED: October 21, 2014 – December 20, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

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

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

Approved & Released For
UL Verification Services Inc. By:



FRANCISCO DE ANDA
PROJECT LEAD/ PROGRAM MANAGER
UL VERIFICATION SERVICES INC.

Tested By:



CHRIS XIONG
EMC ENGINEER
UL VERIFICATION SERVICES INC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2009.

3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street	
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input checked="" type="checkbox"/> Chamber G
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input checked="" type="checkbox"/> Chamber H
<input type="checkbox"/> Chamber C	<input checked="" type="checkbox"/> Chamber F	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Fixed Point-to-Point radio in 5.8 GHz band with a proprietary communication management interface Intelligent Backhaul Radio.

This device uses 40MHz, 20MHz and 10MHz bandwidths with QAM4, QAM16, QAM64, QAM256 modulation. It transmits dual stream uncorrelated MIMO.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Bandwidth (MHz)	Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz Band, 2Tx				
10	5731-5844	FDD	29.08	809.10
20	5736-5839	FDD	29.02	797.99
40	5746-5829	FDD	28.99	792.50

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Dipole array antenna, with a maximum gain of 10.6 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Build SVN Revision: 5287

The test utility software used during testing was Micro monitor 1.6.0

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.

All radiated testing was performed with the EUT in normal use orientation.

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

10MHz bandwidth QAM 4

20MHz bandwidth QAM 4

40MHz bandwidth QAM 4

Data rate 30 Msamples/s for all bandwidths

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	Think Pad	R9-D497T 11/04	QDS-BRCM 1046
POE	PHIHONG	POE36U-1AT-R	P21601123D1	N/A
AC/DC Adapter	Lenovo	N/A	11S45N0113Z1ZH819P0FN	N/A

I/O CABLES

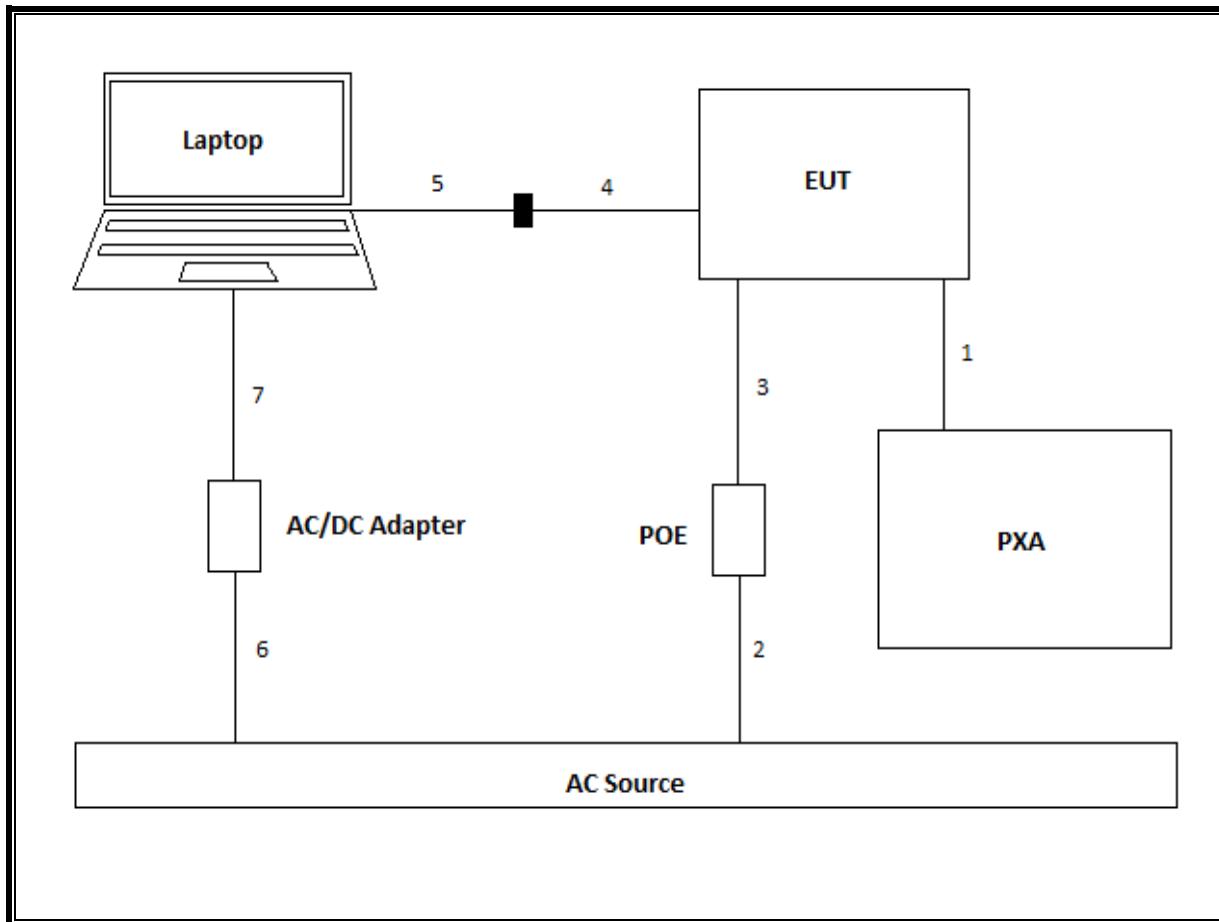
I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	U.FL	Sheilded	0.3	N/A
2	AC	2	3 Prong	Un-Sheilded	1	N/A
3	POE/LAN	1	RJ45	Sheilded	1	N/A
4	USB	1	USB	Sheilded	0.3	N/A
5	Serial	1	9 Pin Sub D	Sheilded	1	N/A
6	AC	2	3 Prong	Un-Sheilded	1	N/A
7	DC	1	Barrel	Un-Sheilded	1	N/A

TEST SETUP

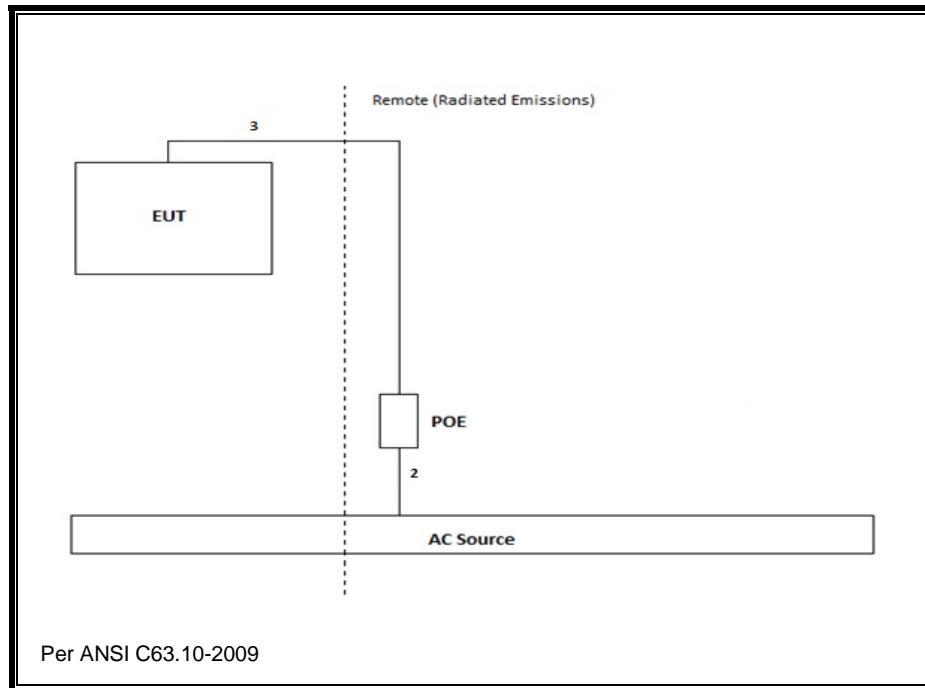
The EUT is a P-P outdoor radio used as a stand-alone device. Test software exercised the radio module

SETUP DIAGRAM FOR TESTS

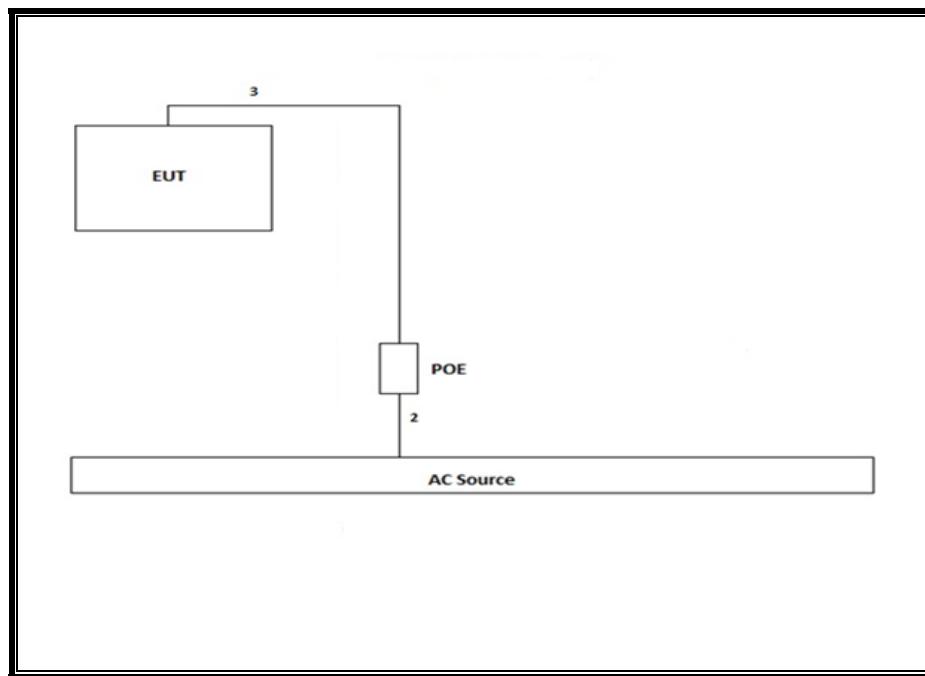
CONDUCTED



RADIATED



AC LINE CONDUCTED



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List						
Description	Manufacturer	Model	T No.	Cal Date	Cal Due	
Chamber F						
Antenna, Horn 18 GHz	ETS Lindgren	3117	120	03/20/14	03/20/15	
Antenna, Biconolog, 30MHz- 1GHz	Sunol Sciences	JB1	122	04/22/14	01/28/15	
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	427	01/20/14	01/20/15	
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	421	01/20/14	01/20/15	
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	425	01/20/14	01/20/15	
RF PreAmplifier, 1- 18GHz	Miteq	AFS42- 00101800-25- S- 42	742	01/20/14	01/20/15	
Preamp, 1000MHz	Sonoma	310N	173	06/07/14	06/07/15	
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	341	02/12/14	02/12/15	
Chamber G						
Antenna, Horn 18 GHz	ETS Lindgren	3117	862	04/14/14	04/14/15	
Antenna, Biconolog, 30MHz- 1GHz	Sunol Sciences	JB3	899	05/14/14	04/27/15	
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	898	05/13/14	05/13/15	
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	892	05/13/14	05/13/15	
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	893	05/14/14	05/13/15	
RF PreAmplifier, 1- 18GHz	Miteq	AFS42- 00101800-25- S- 42	491	05/15/15	06/05/15	
Preamp, 1000MHz	Sonoma	310N	834	05/16/15	06/05/15	
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	905	05/17/15	05/17/15	
Chamber H						
Antenna, Horn 18 GHz	ETS Lindgren	3117	863	04/14/14	04/14/15	
Antenna, Biconolog, 30MHz- 1GHz	Sunol Sciences	JB3	900	05/14/14	04/27/15	
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	897	05/14/14	05/13/15	
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	891	05/13/14	05/13/15	
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	894	05/13/14	05/13/15	
RF PreAmplifier, 1- 18GHz	Miteq	AFS42- 00101800-25- S- 42	495	06/05/14	06/05/15	
Preamp, 1000MHz	Sonoma	310N	835	06/05/14	06/05/15	
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	906	05/07/14	05/07/15	
Conducted						
Spectrum Analyzer	Agilent	E4440A	189	05/09/14	05/09/15	
Power Meter, P- series single channel	Agilent	N1911A	382	04/09/14	04/09/15	
Power Sensor, Peak and average, 50 MHz to 6 GHz, 5 MHz BW	Agilent	E9323A	400	05/02/14	05/02/15	
Power Meter, P- series single channel	Agilent	N1911A	385	04/30/14	04/30/15	
Power Sensor, Peak and average, 50 MHz to 18 GHz, 5 MHz BW	Agilent	E9327A	117	05/15/14	05/15/15	
LISN for Conducted Emissions CISPR- 16	FCC	50/250-25- 2	24	01/17/14	01/17/15	
Rohde & Schwarz	ESCI7	100773	212	08/14/14	08/14/15	

Test Equipment List (cont.)					
Description	Manufacturer	Model	T No.	Cal Date	Cal Due
Above 18GHz					
Antenna, Horn 18 to 26.5GHz	ARA	SWH-28	T125	05/09/14	05/09/15
Amp. 26GHz	Agilent	8449B	T404	03/25/14	03/25/15
Antenna, Horn 26 to 40GHz	ARA	MWh-2640	T90	07/15/14	07/15/15
Amp. 26 to 40GHz	Miteq	NSP4000-SP2	T88	09/03/14	09/03/15
Spectrum Analyzer, 40 GHz	HP	8564E	T106	08/06/14	08/06/15

7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r02, Section 8.1.

Output Power: KDB 558074 D01 v03r02, Section 9.2.2.2.

Power Spectral Density: KDB 558074 D01 v03r02, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r02, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.1.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.2.

KDB 662911 D02 MIMO with Cross-Polarized Antennas v01

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

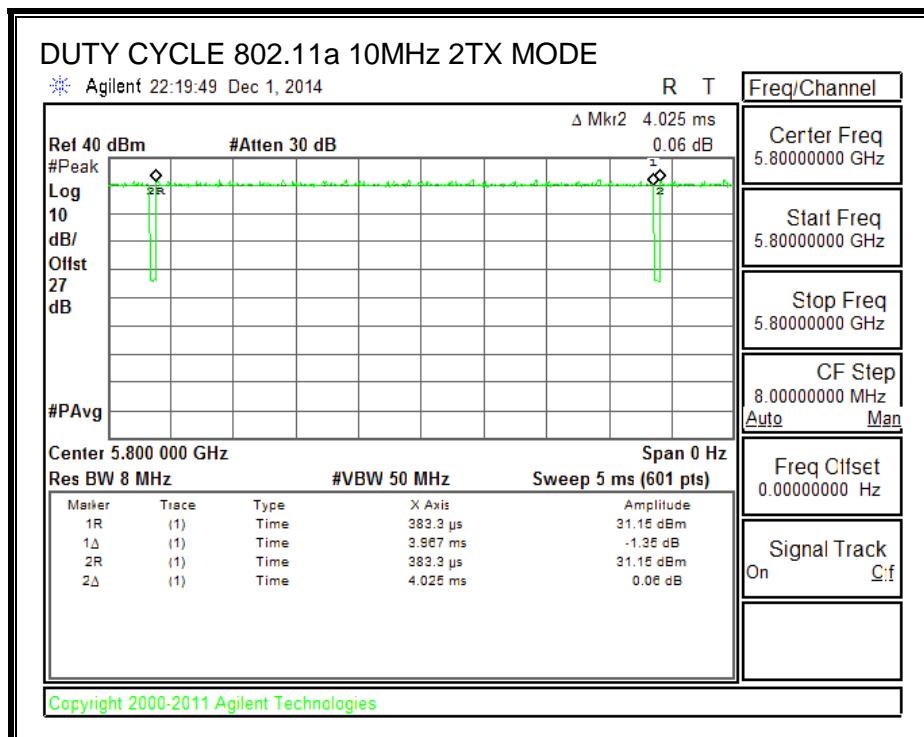
PROCEDURE

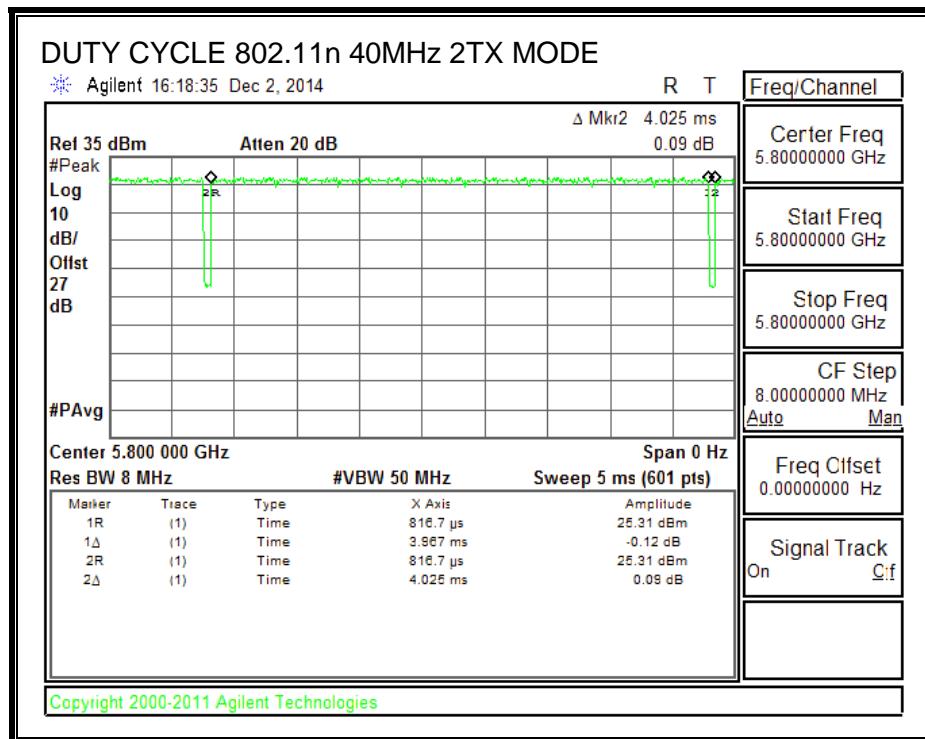
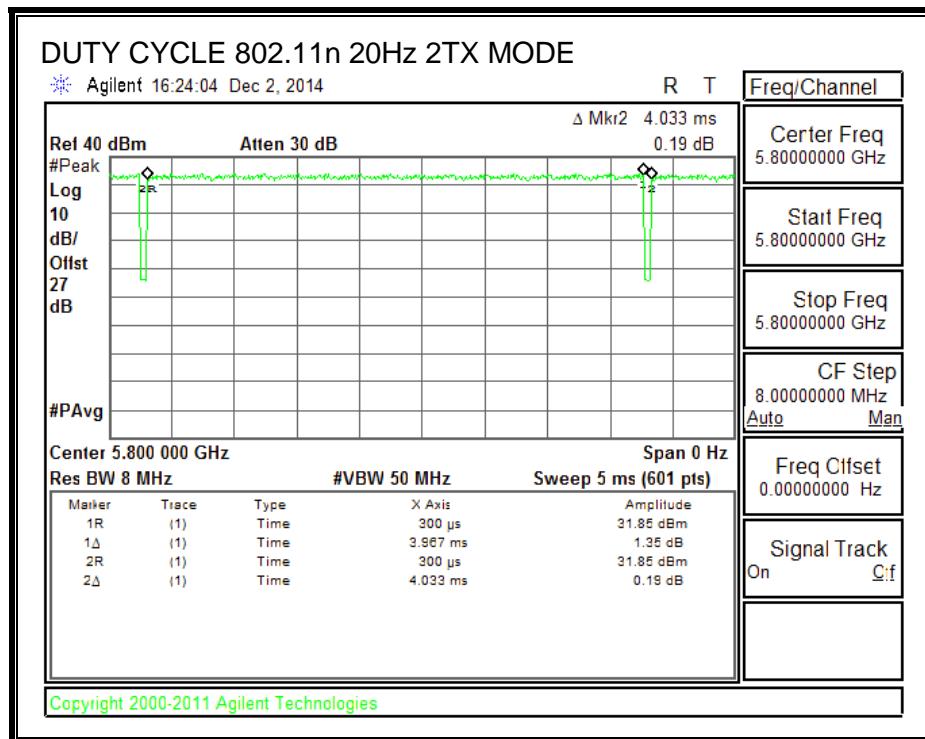
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 10MHz 2TX	3.967	4.025	0.986	98.56%	0.00	0.010
802.11n 20MHz 2TX	3.967	4.033	0.984	98.36%	0.00	0.010
802.11n 40MHz 2TX	3.967	4.025	0.986	98.56%	0.00	0.010

DUTY CYCLE PLOTS





8.2. 10MHz 2Tx MODE IN THE 5.8 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

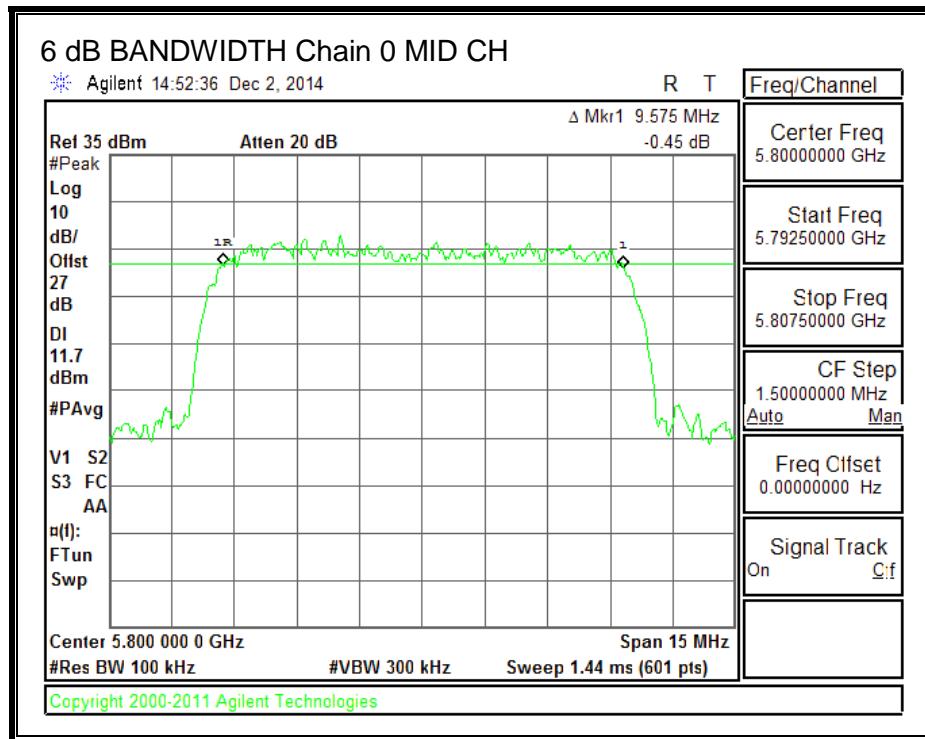
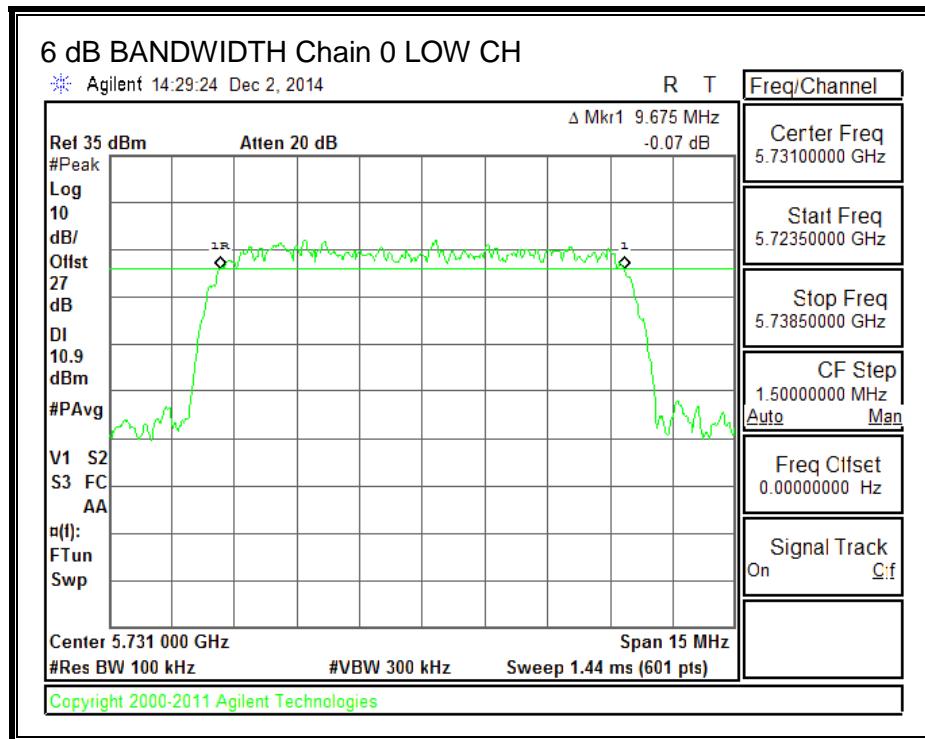
FCC §15.247 (a) (2)

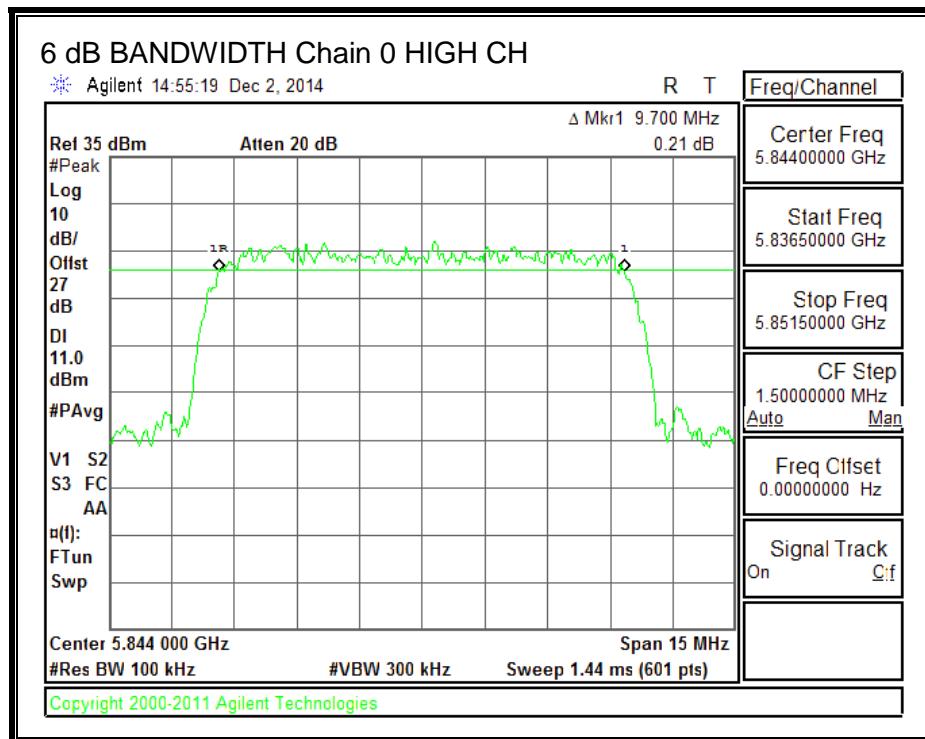
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

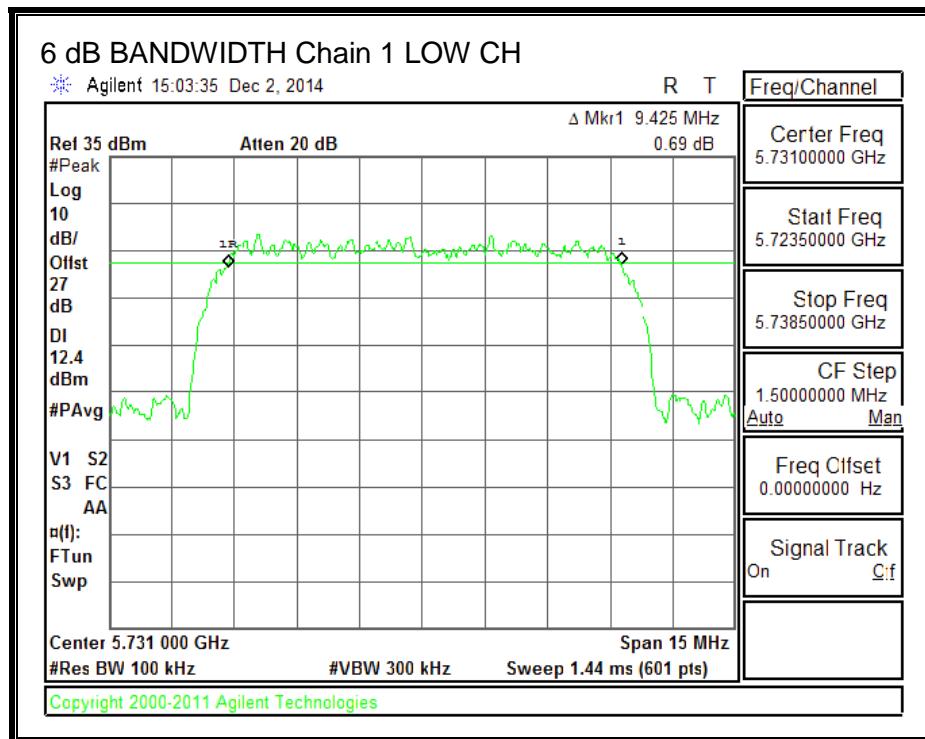
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5731	9.675	9.425	0.5
Mid	5800	9.575	9.425	0.5
High	5844	9.700	9.425	0.5

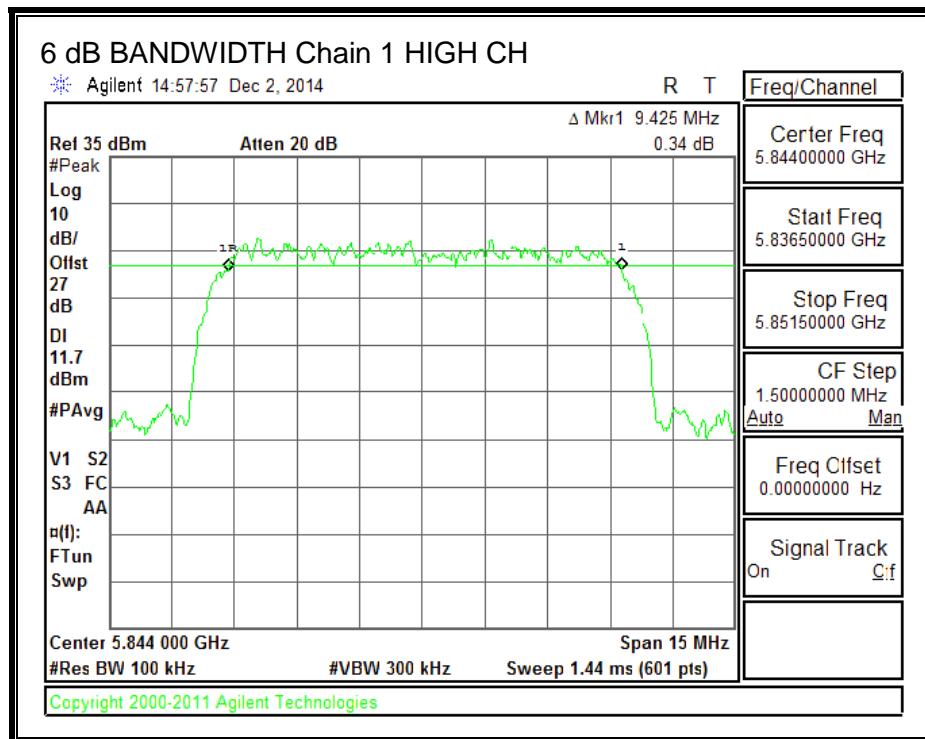
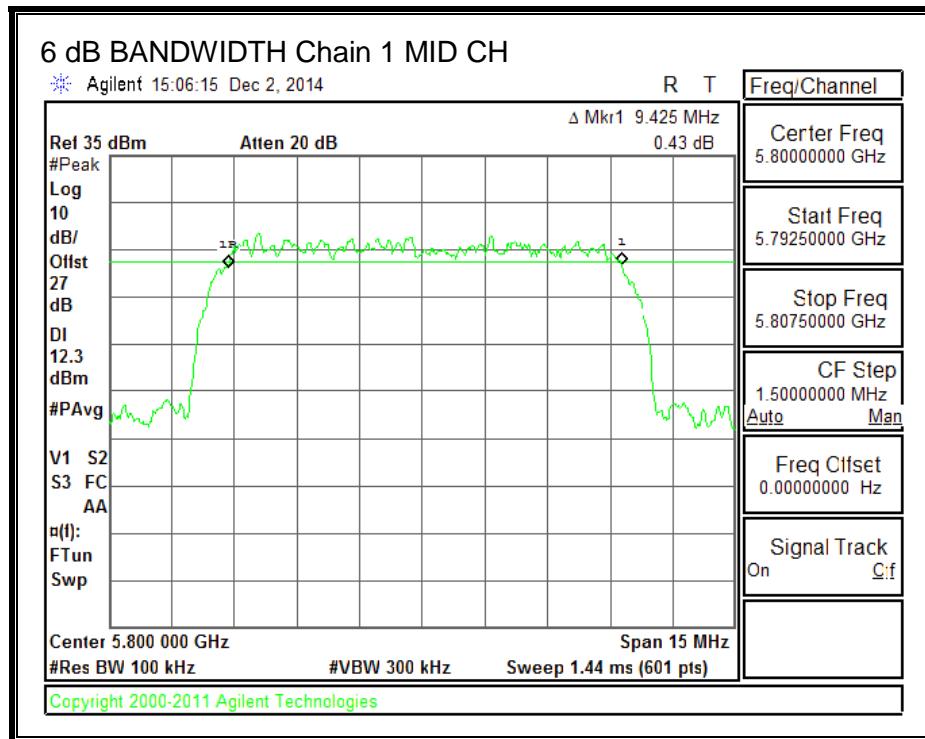
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.2.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3), (c)(1)(ii)

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

DIRECTIONAL ANTENNA GAIN

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

RESULTS

Limits

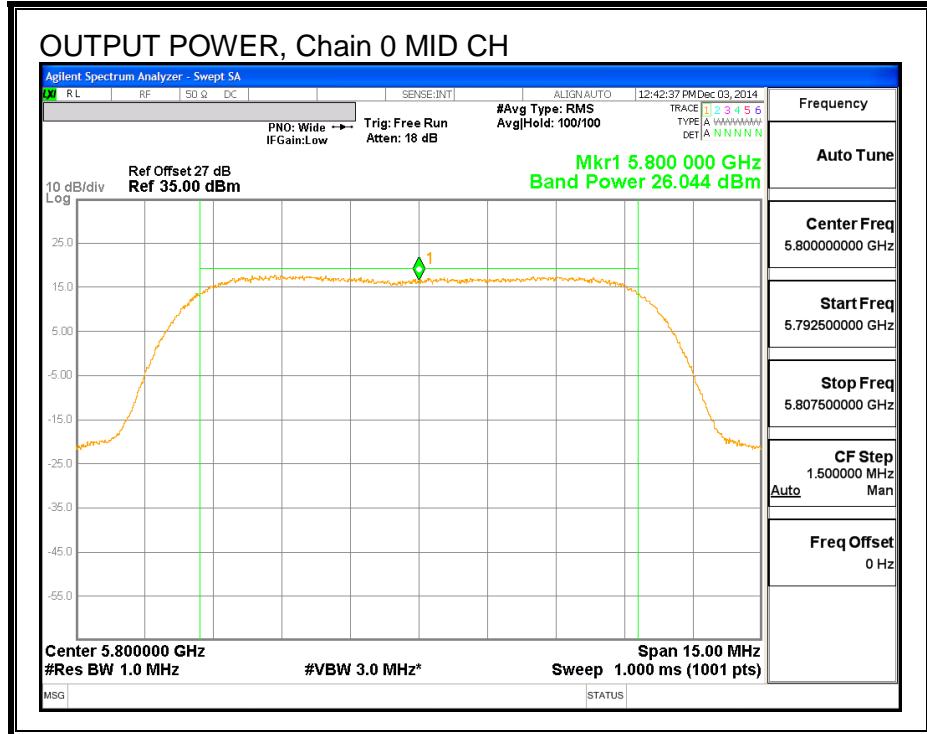
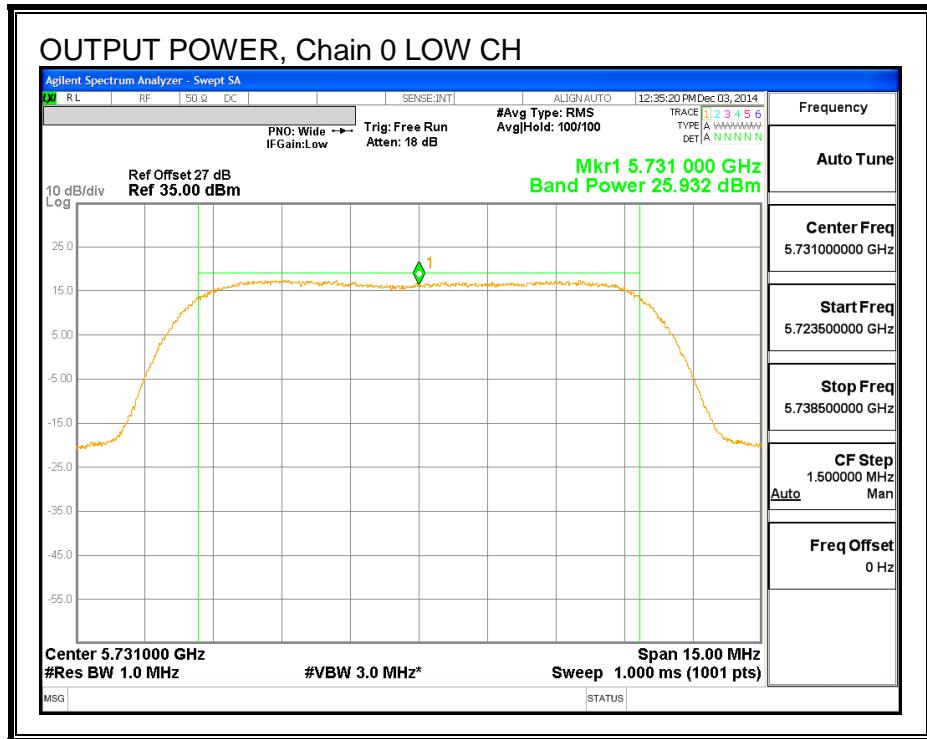
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5731	10.60	30.00	30	36	30.00
Mid	5800	10.60	30.00	30	36	30.00
High	5844	10.60	30.00	30	36	30.00

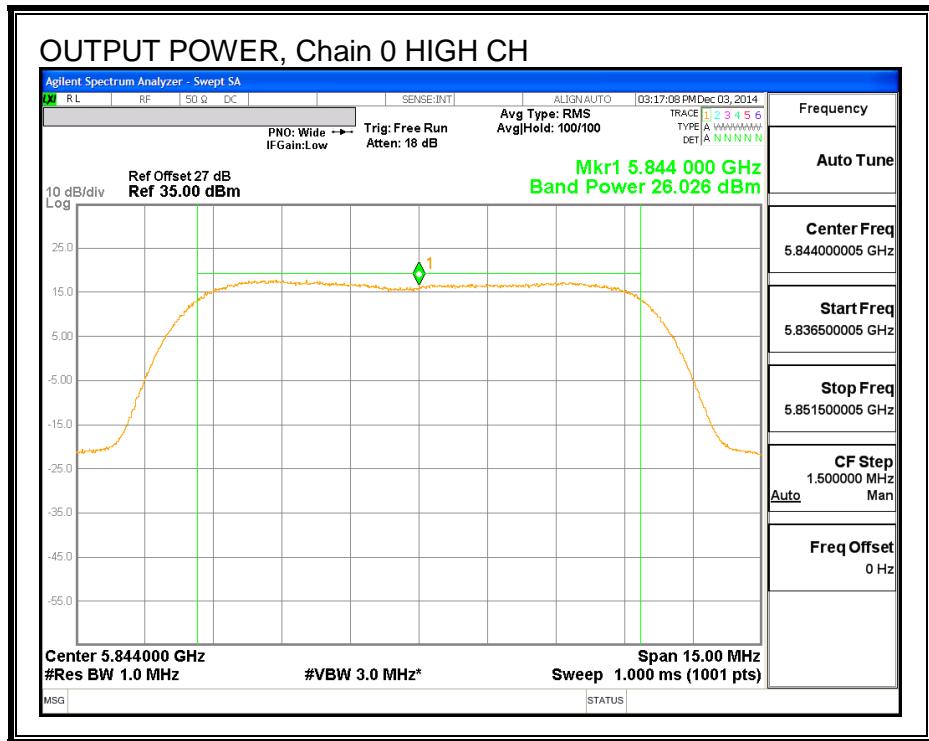
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

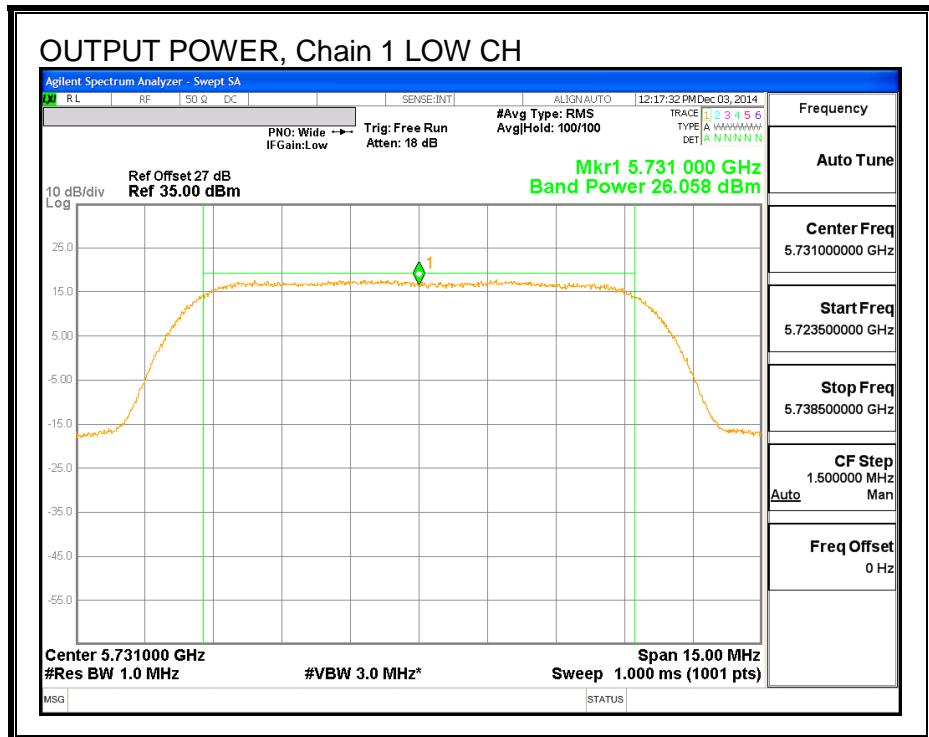
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5731	25.93	26.06	29.01	30.00	-0.99
Mid	5800	26.04	26.08	29.07	30.00	-0.93
High	5844	26.03	26.10	29.08	30.00	-0.92

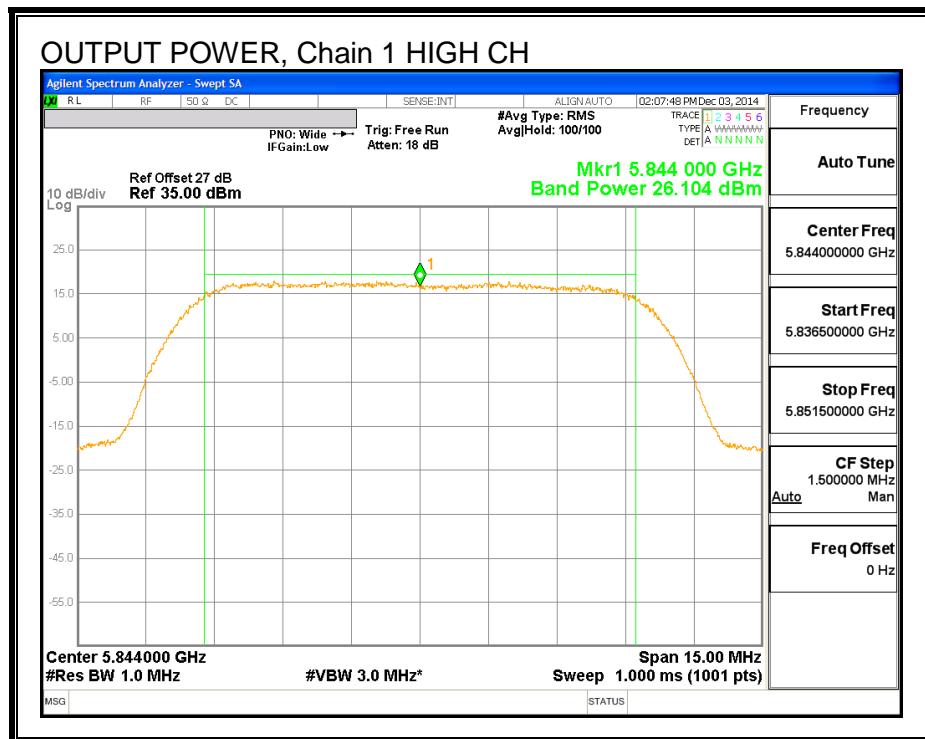
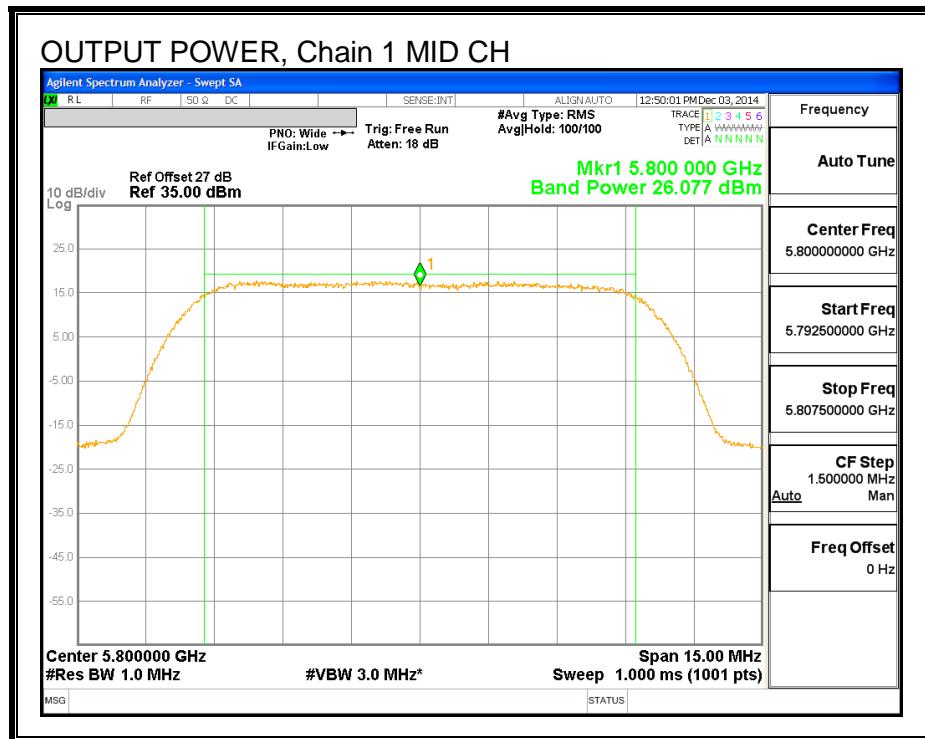
OUTPUT POWER, Chain 0





OUTPUT POWER, Chain 1





8.2.3. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

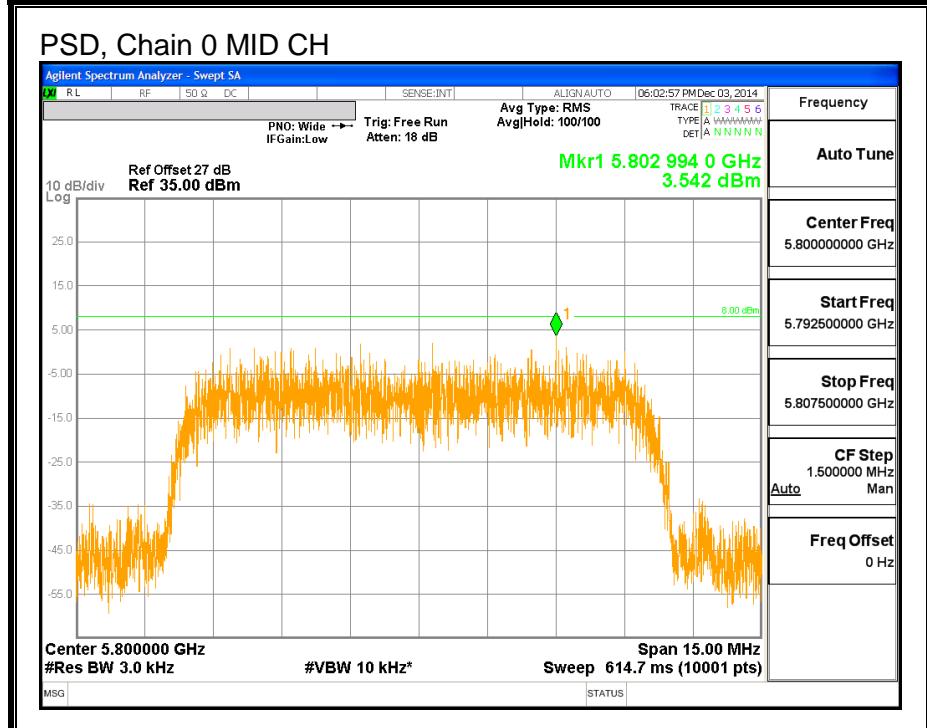
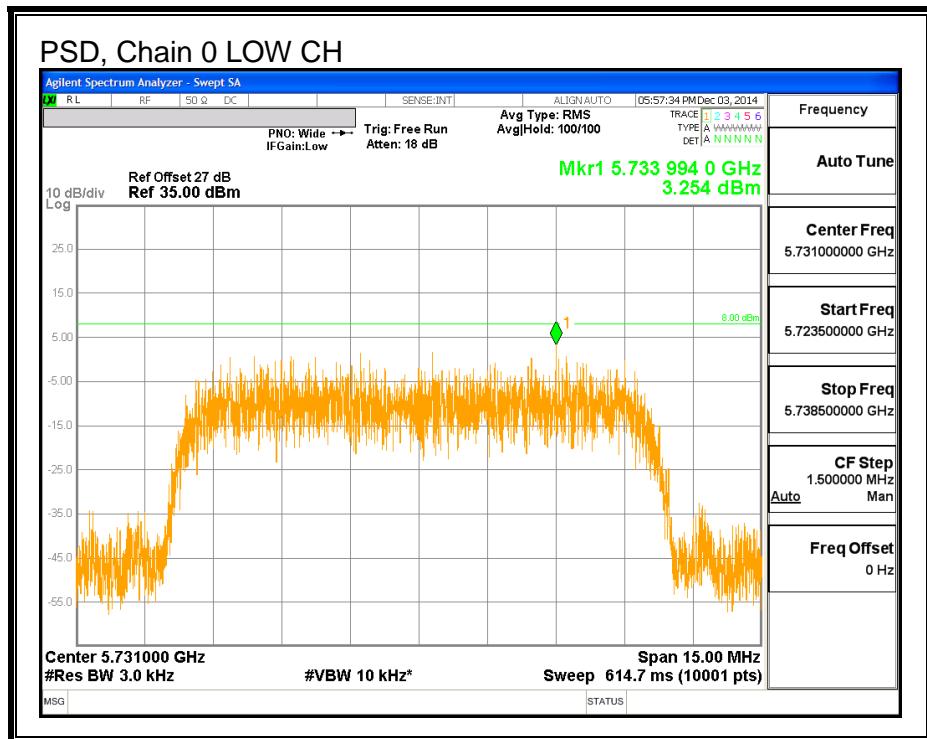
RESULTS

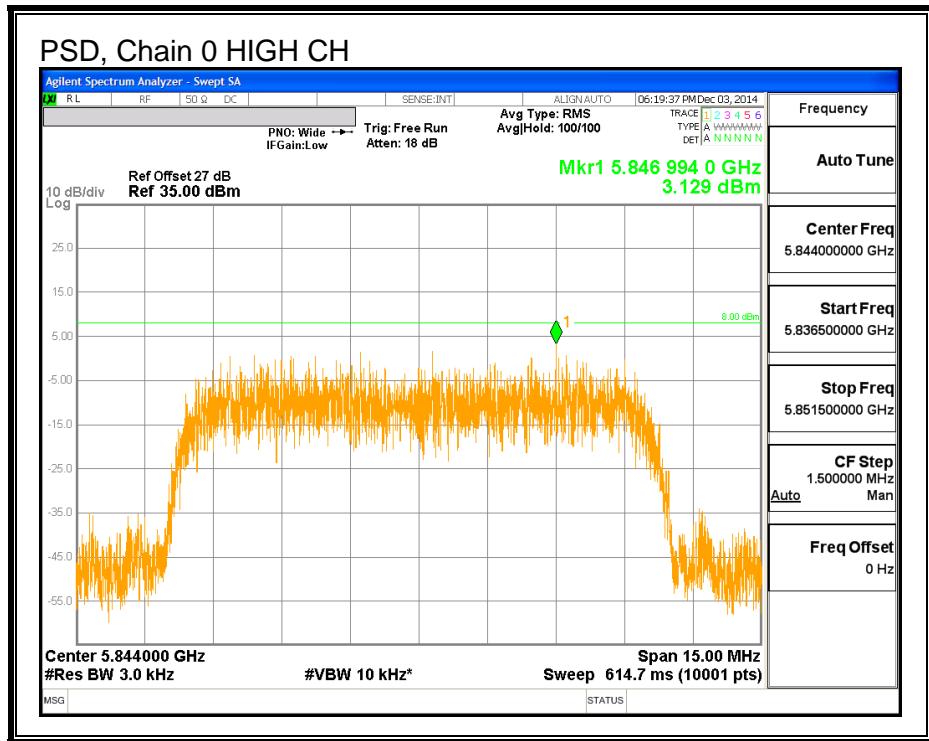
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
--------------------	------	----------------------------------------

PSD Results

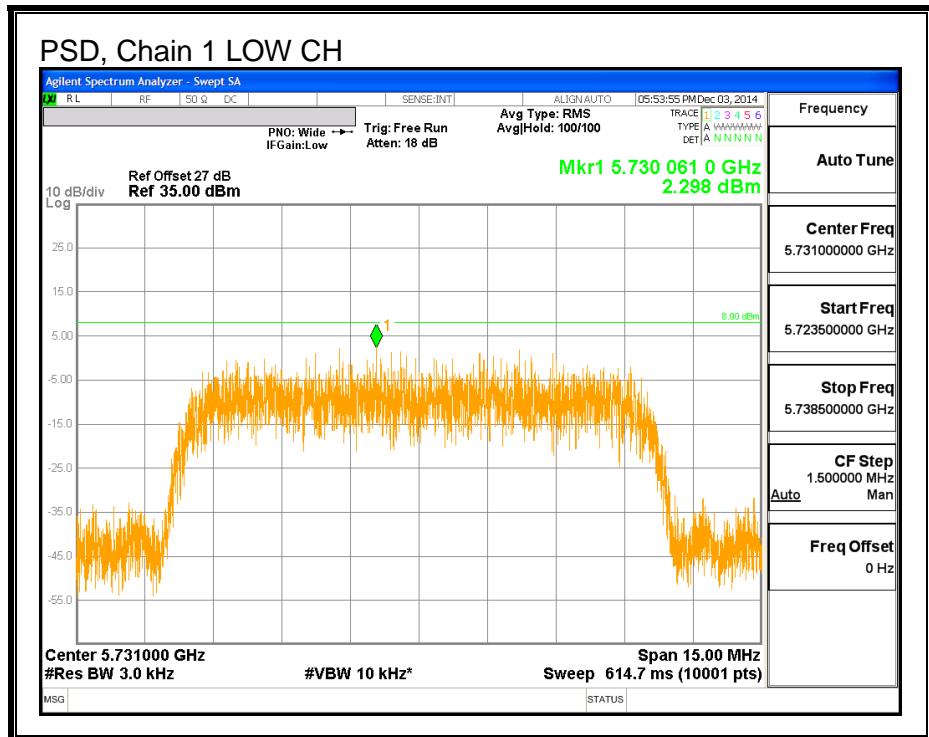
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5731	3.25	2.30	5.81	8.0	-2.2
Mid	5800	3.54	1.87	5.79	8.0	-2.2
High	5844	3.13	1.88	5.56	8.0	-2.4

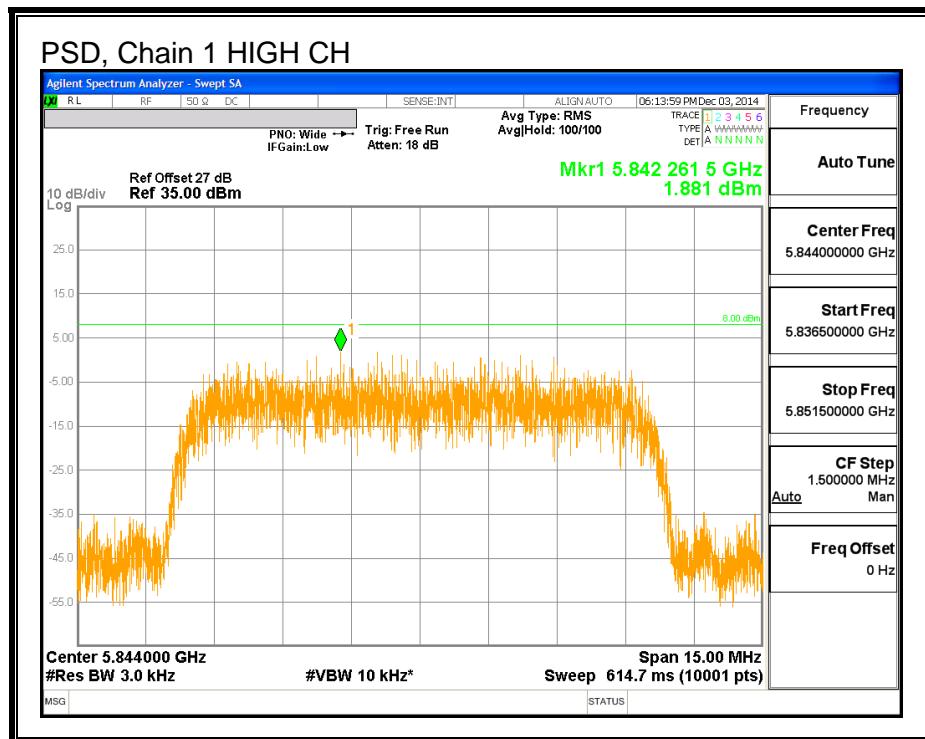
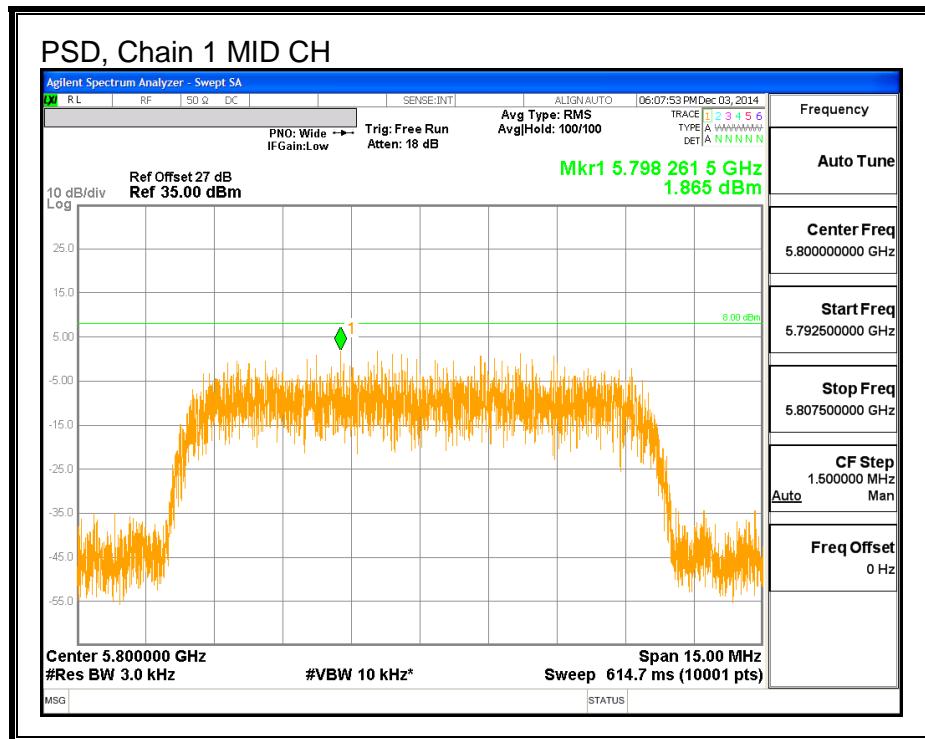
PSD, Chain 0





PSD, Chain 1





8.2.4. OUT-OF-BAND EMISSIONS

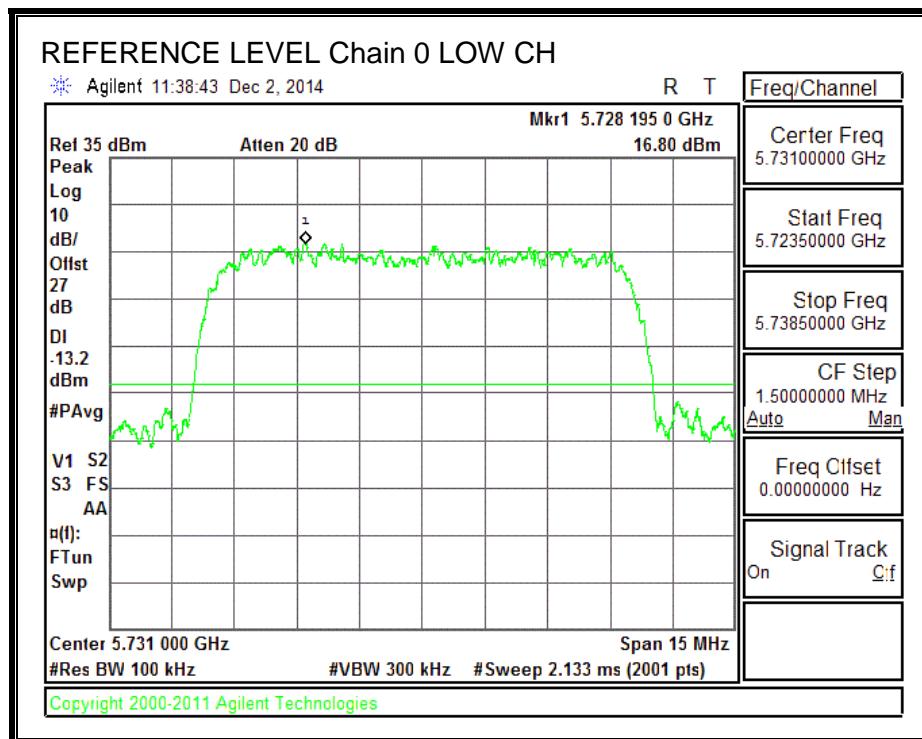
LIMITS

FCC §15.247 (d)

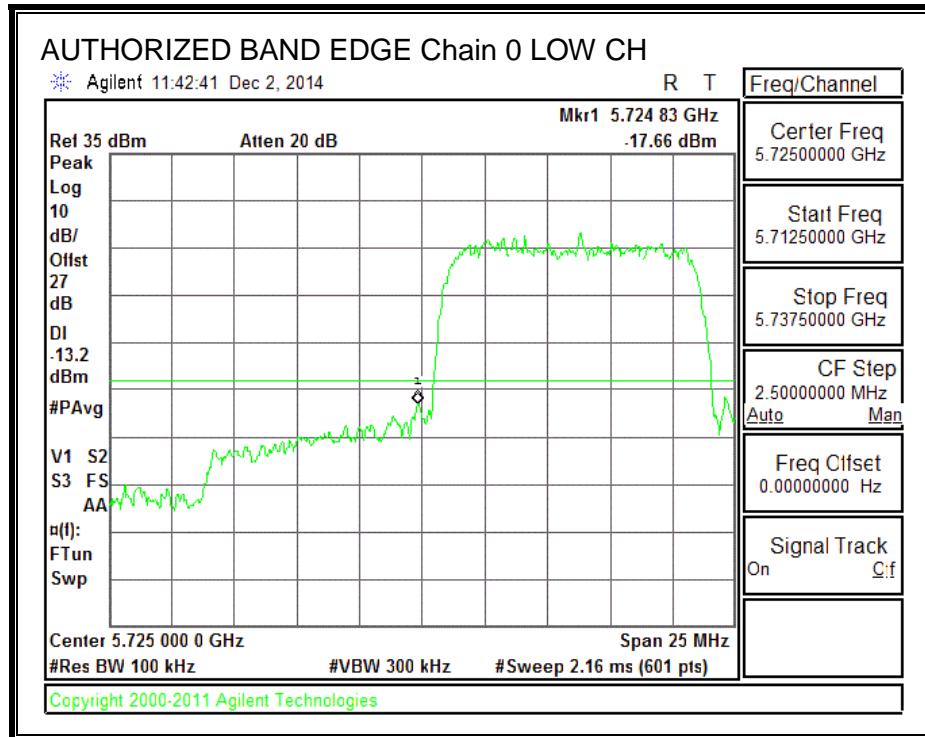
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

RESULTS

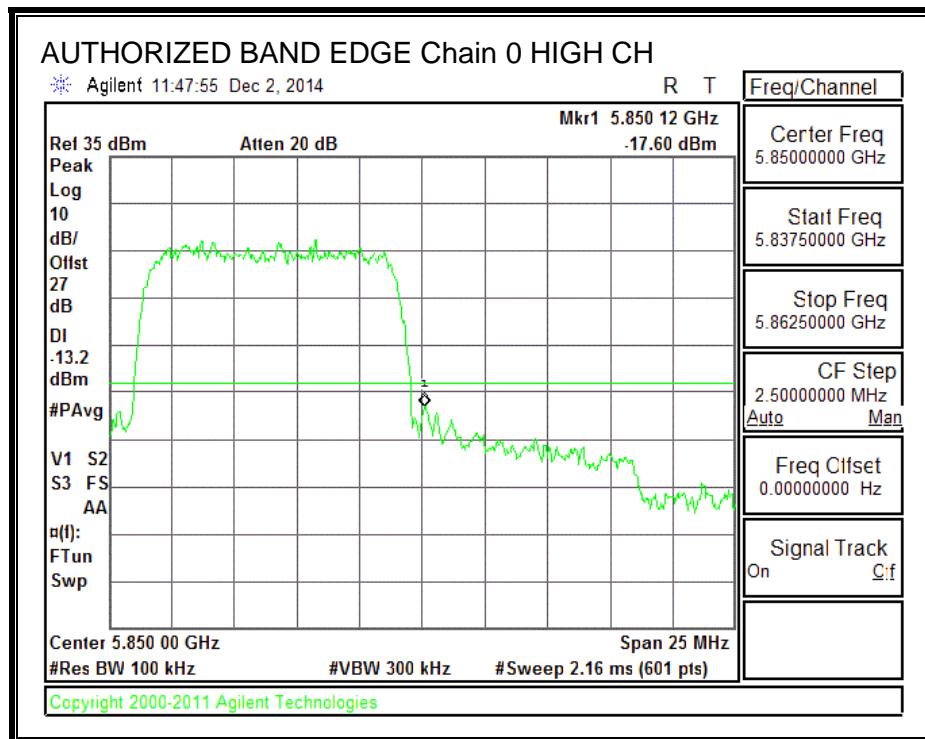
IN-BAND REFERENCE LEVEL, Chain 0



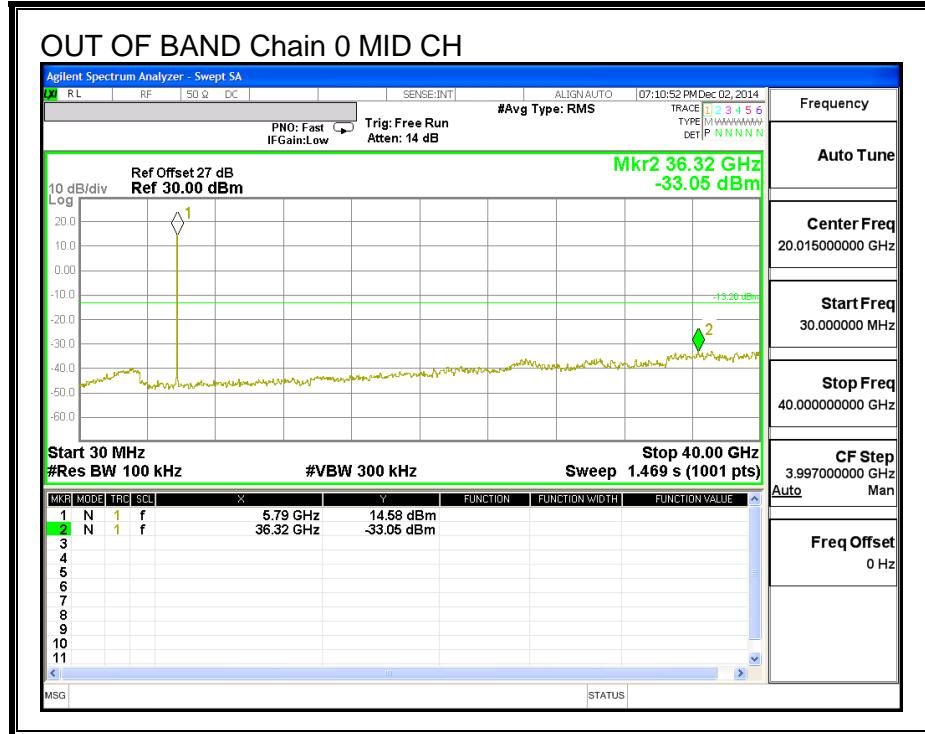
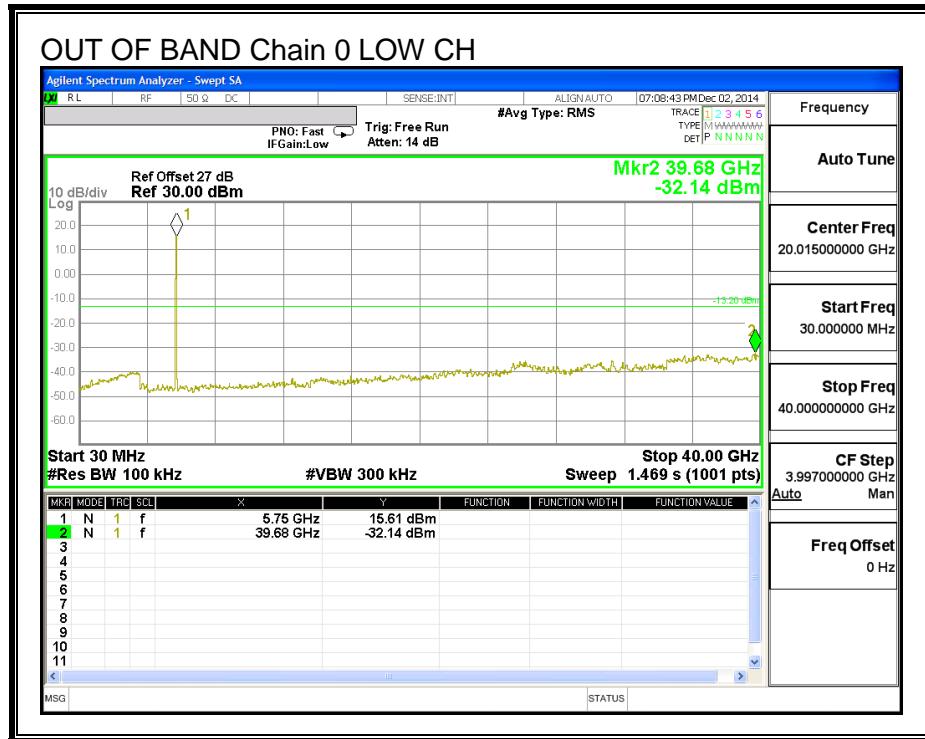
LOW CHANNEL BANDEDGE, Chain 0

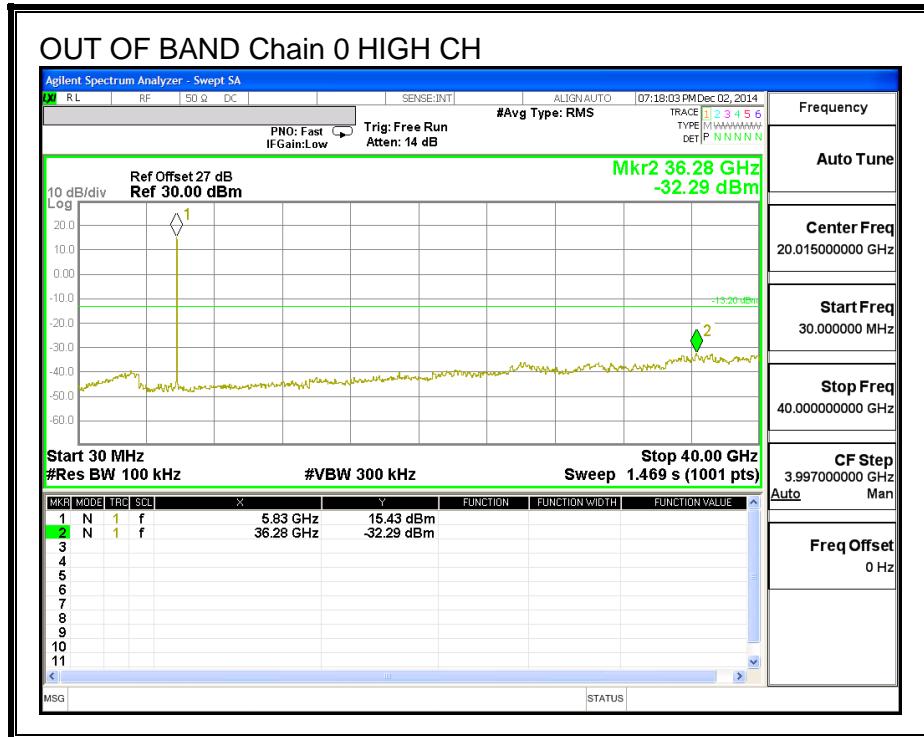


HIGH CHANNEL BANDEDGE, Chain 0

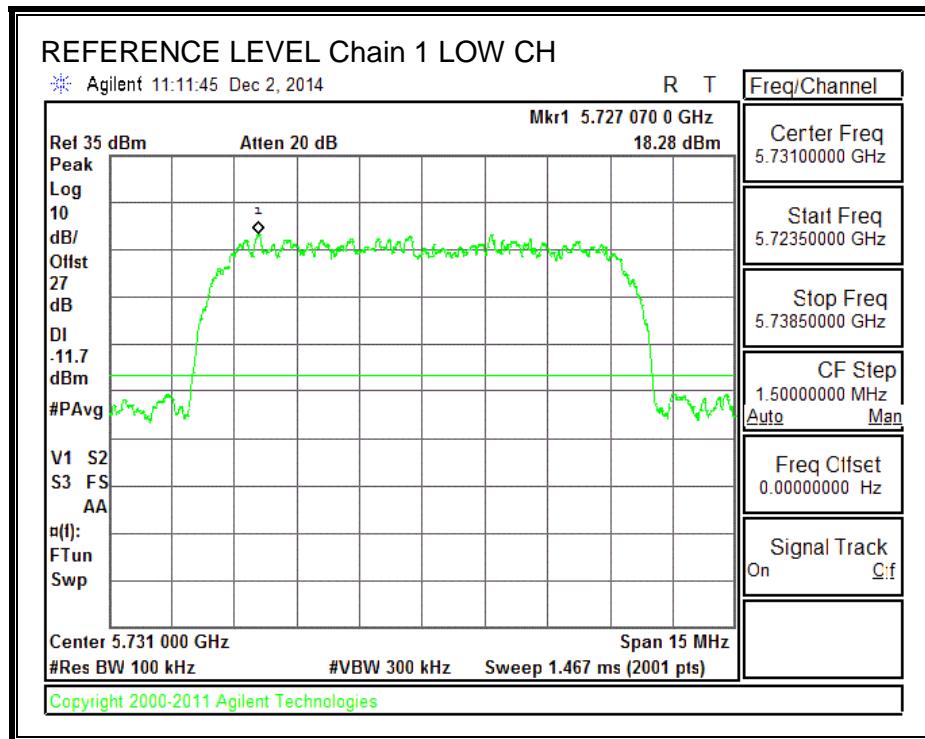


OUT-OF-BAND EMISSIONS, Chain 0

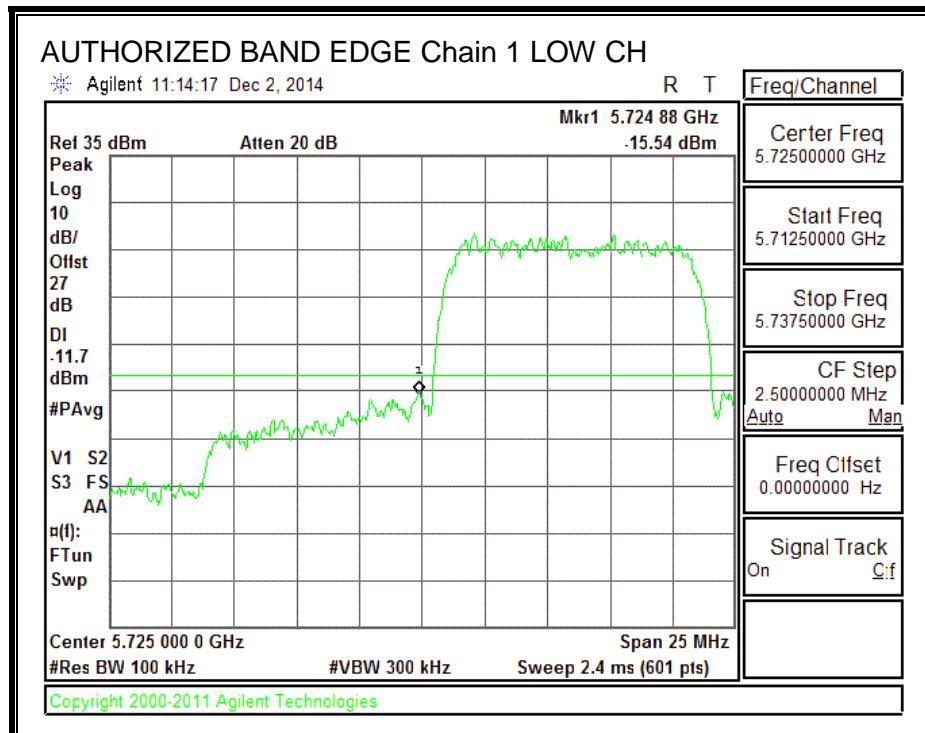




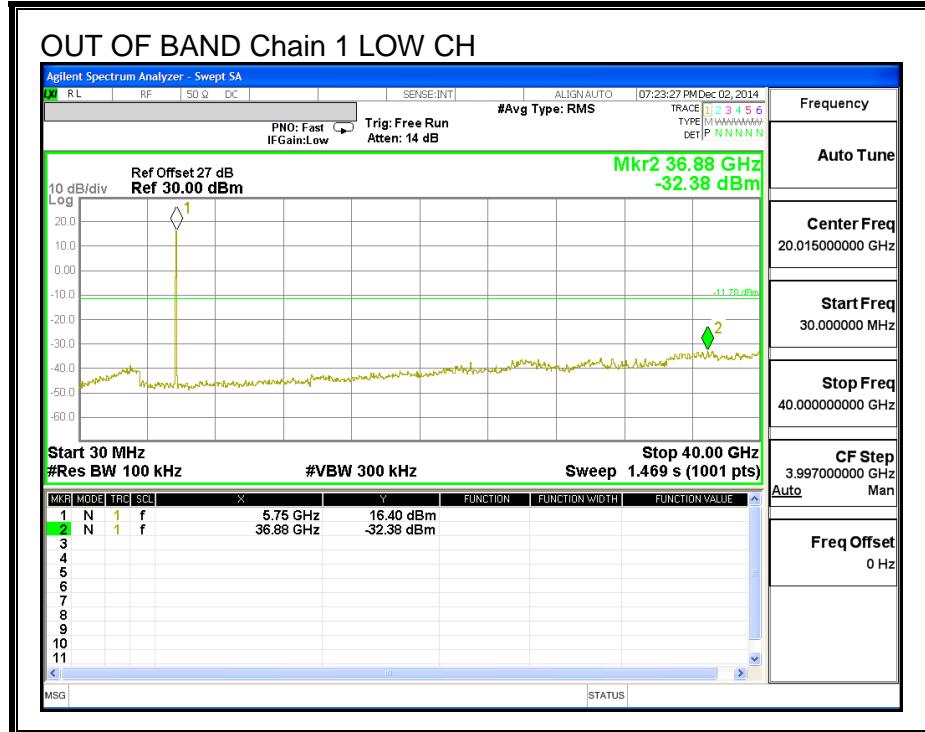
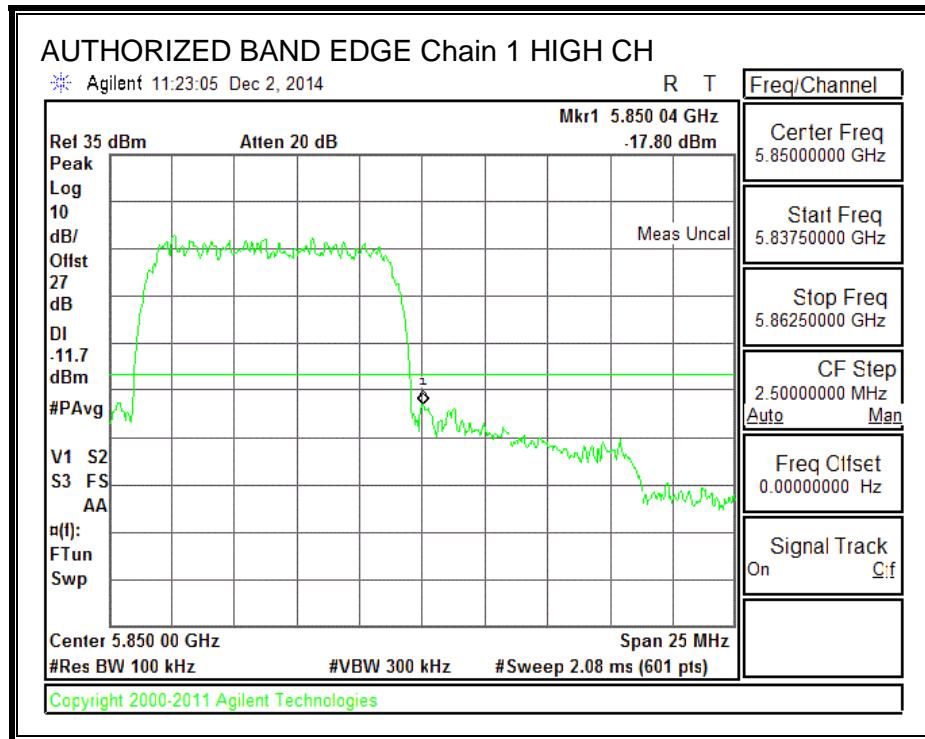
IN-BAND REFERENCE LEVEL, Chain 1

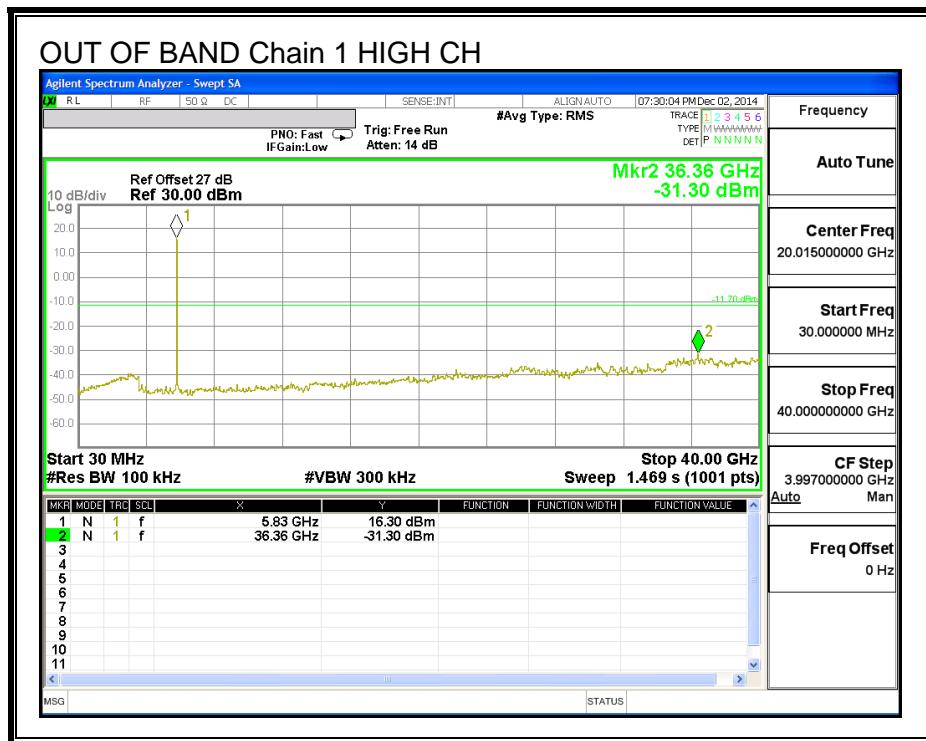
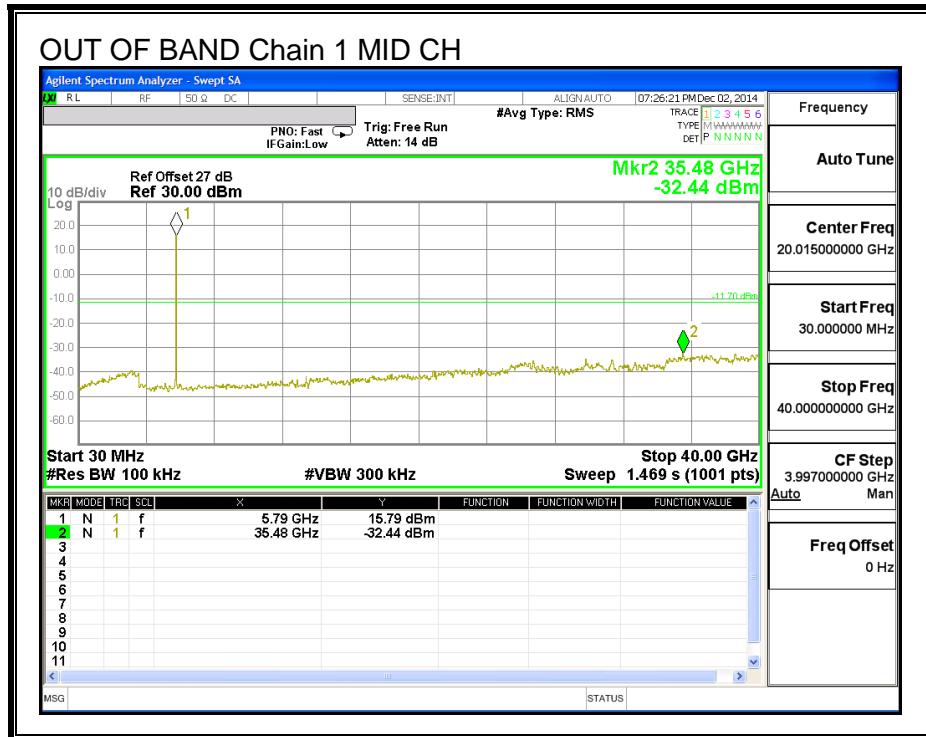


LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1





8.3. 20MHz 2Tx MODE IN THE 5.8 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

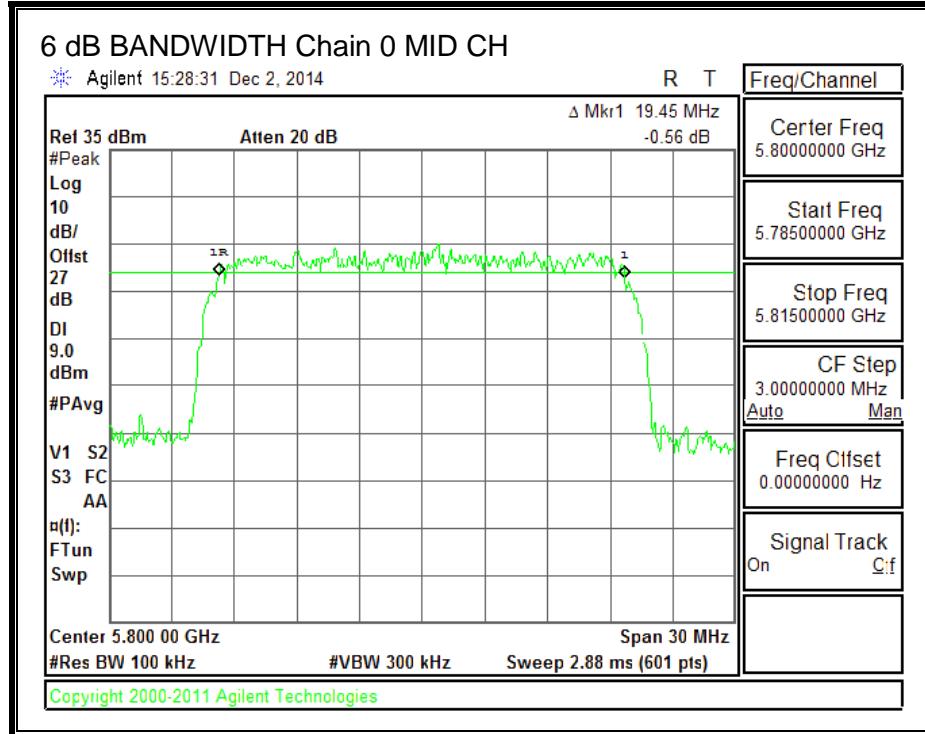
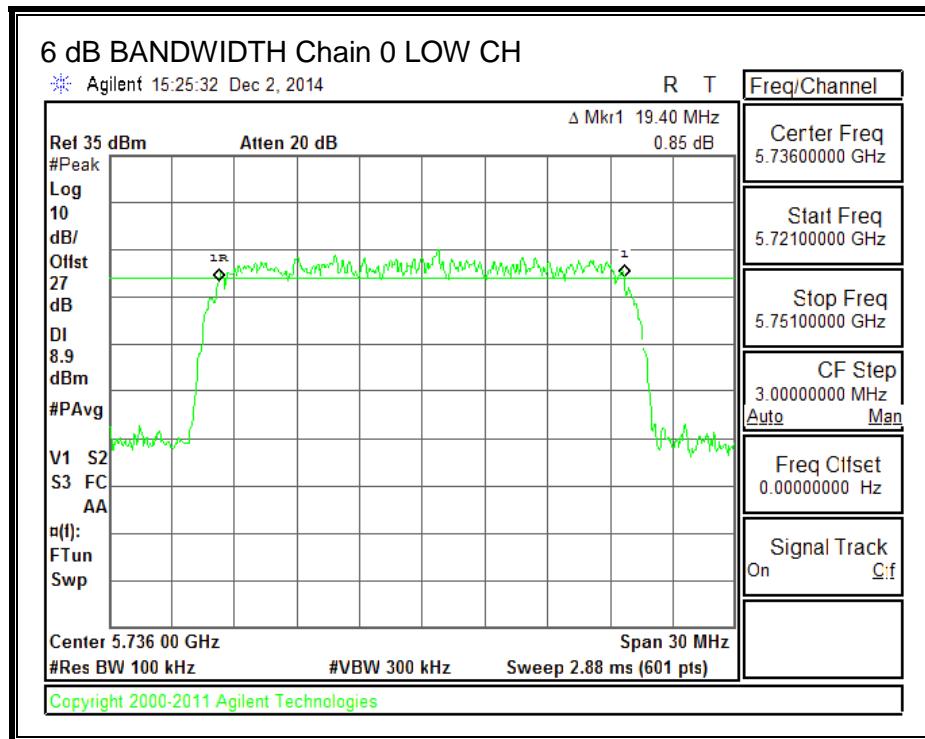
FCC §15.247 (a) (2)

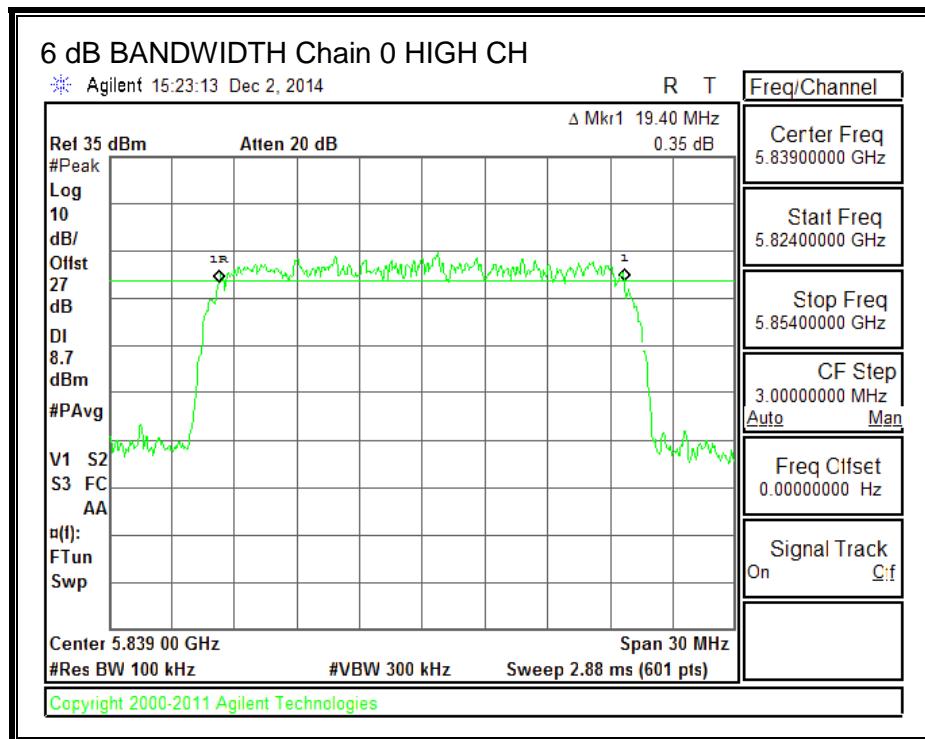
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

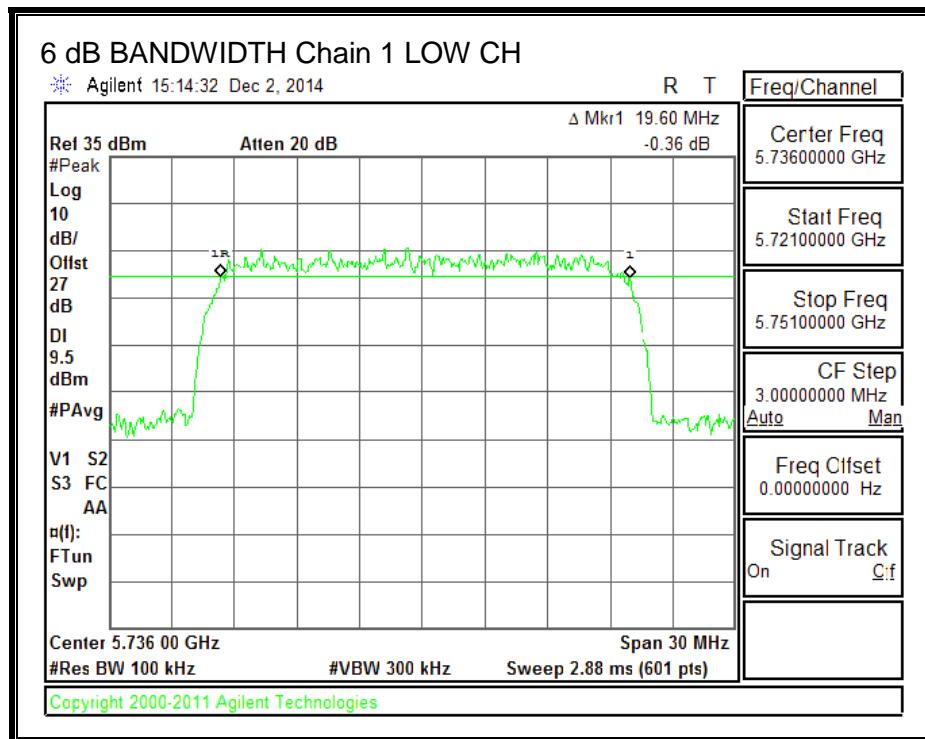
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5736	19.400	19.600	0.5
Mid	5800	19.450	19.600	0.5
High	5839	19.400	19.600	0.5

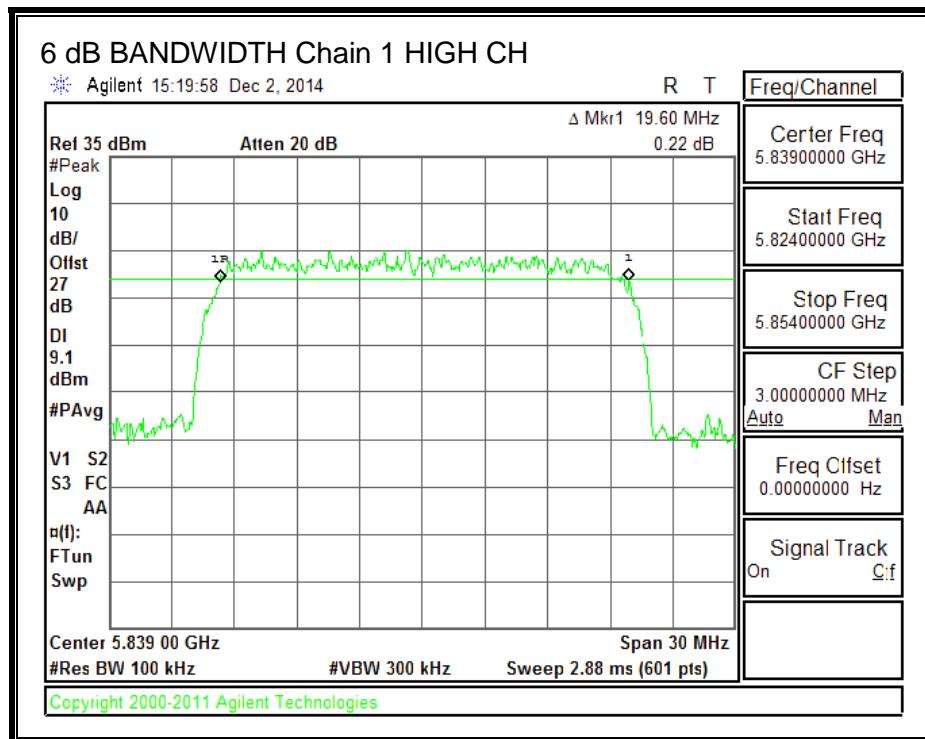
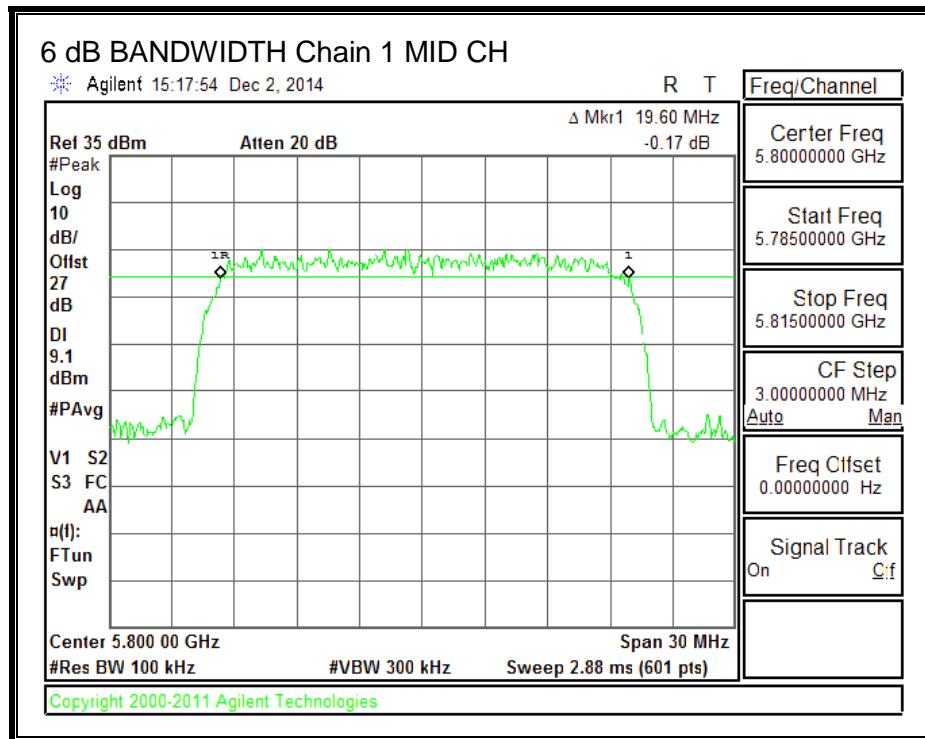
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.3.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3), (c)(1)(ii)

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

DIRECTIONAL ANTENNA GAIN

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

RESULTS

Limits

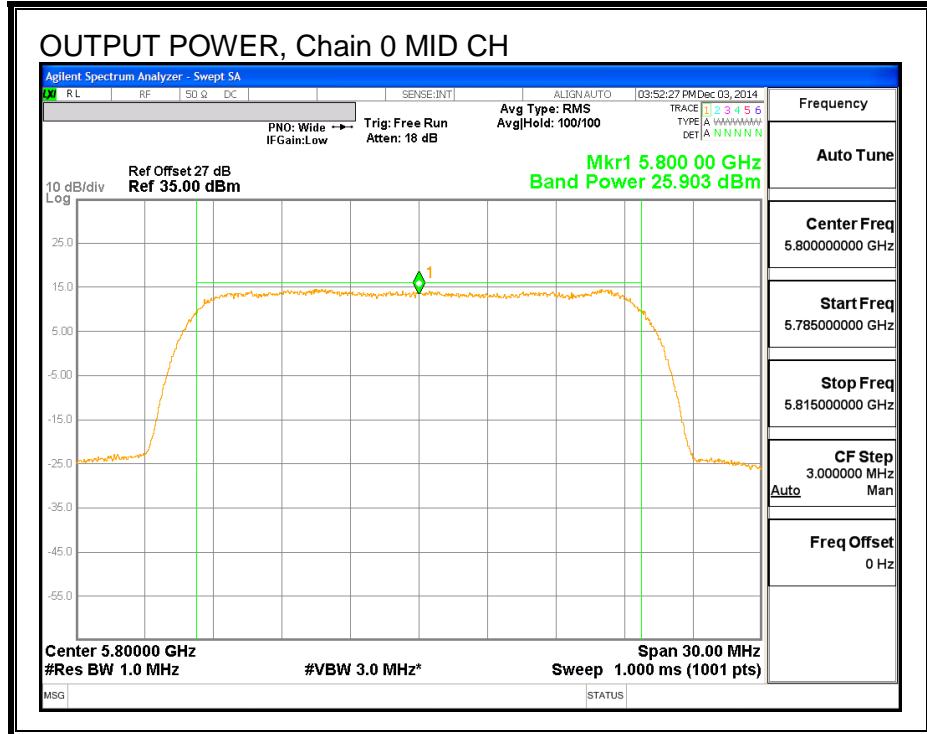
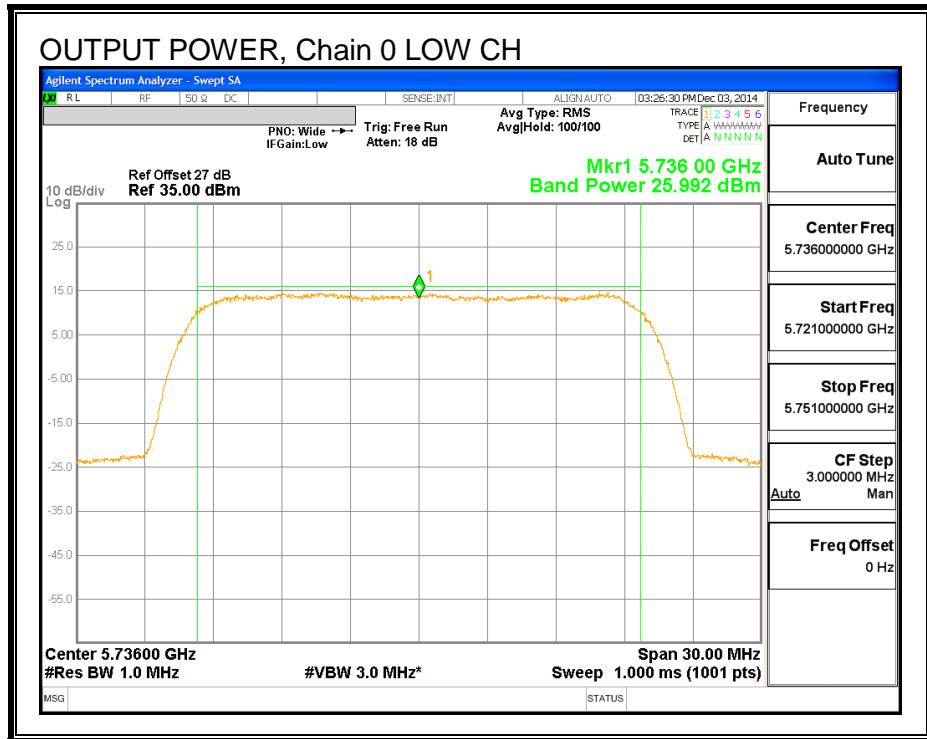
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5736	10.60	30.00	30	36	30.00
Mid	5800	10.60	30.00	30	36	30.00
High	5839	10.60	30.00	30	36	30.00

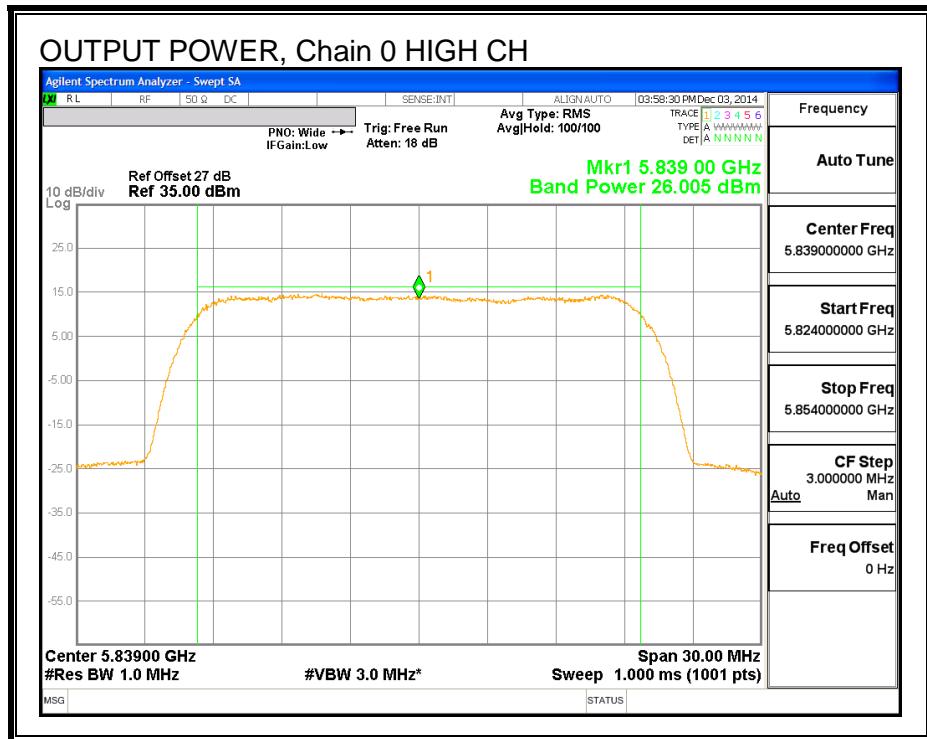
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

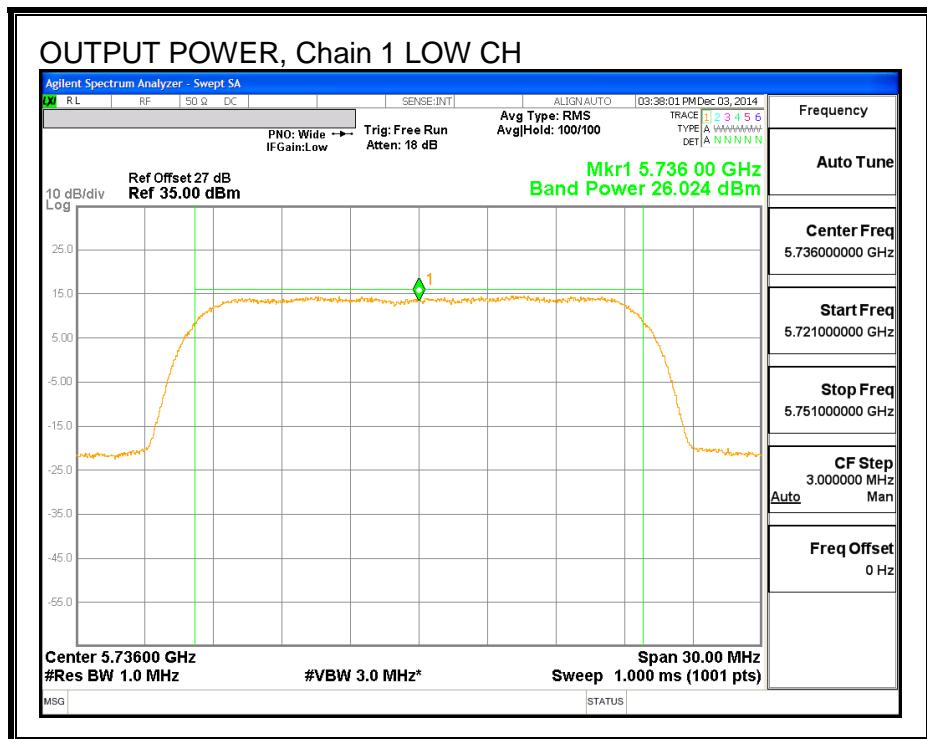
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5736	25.99	26.02	29.02	30.00	-0.98
Mid	5800	25.90	26.02	28.97	30.00	-1.03
High	5839	26.01	25.96	28.99	30.00	-1.01

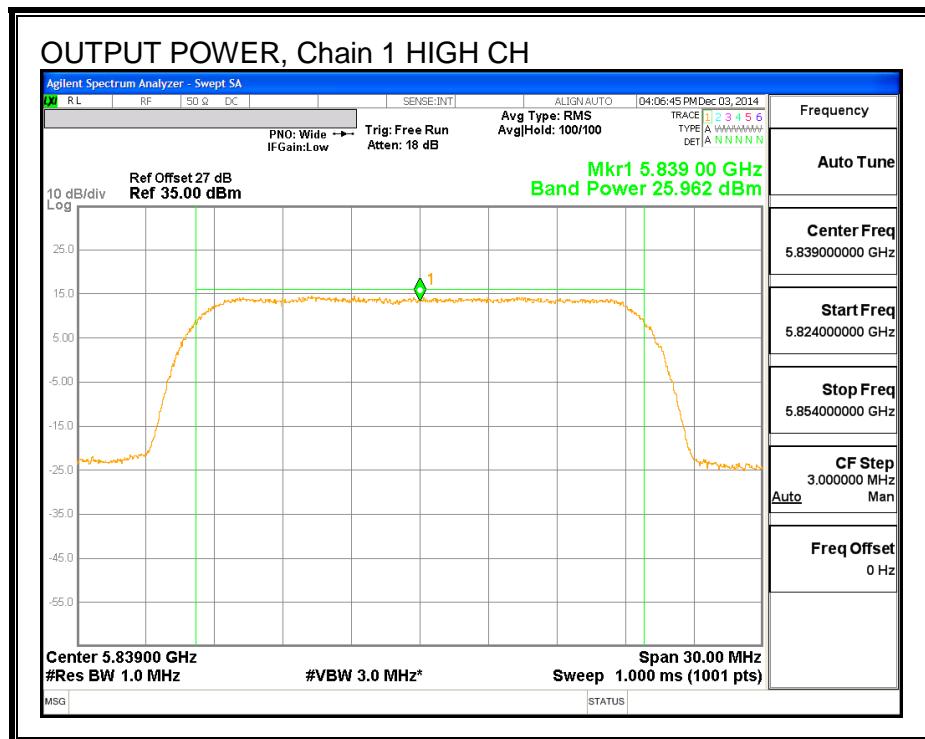
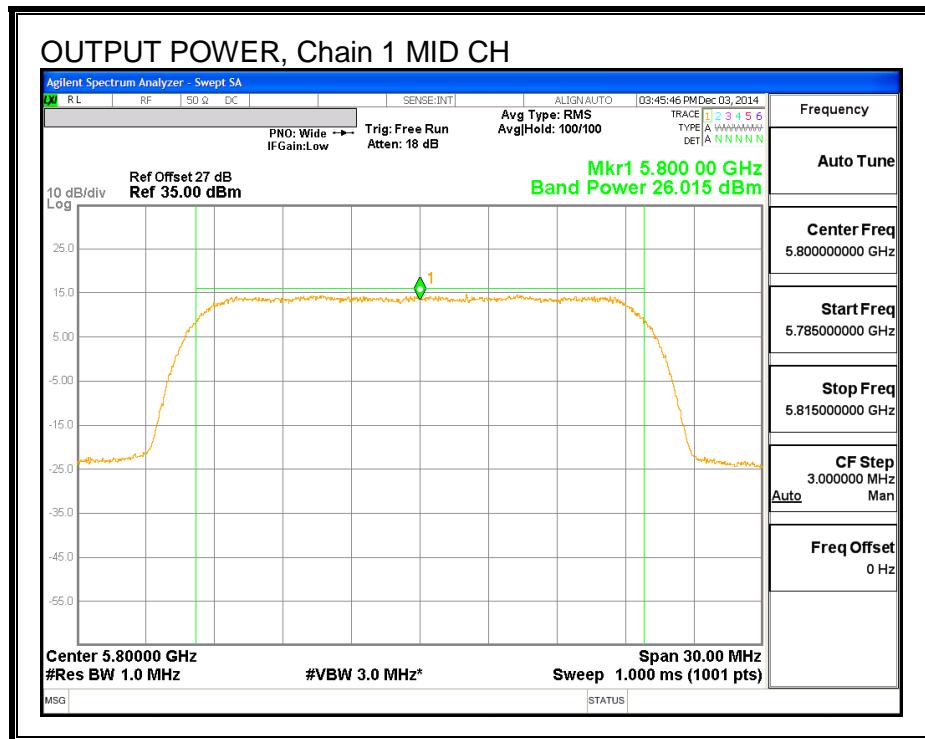
OUTPUT POWER, Chain 0





OUTPUT POWER, Chain 1





8.3.3. POWER SPECTRAL DENSITY

LIMITS

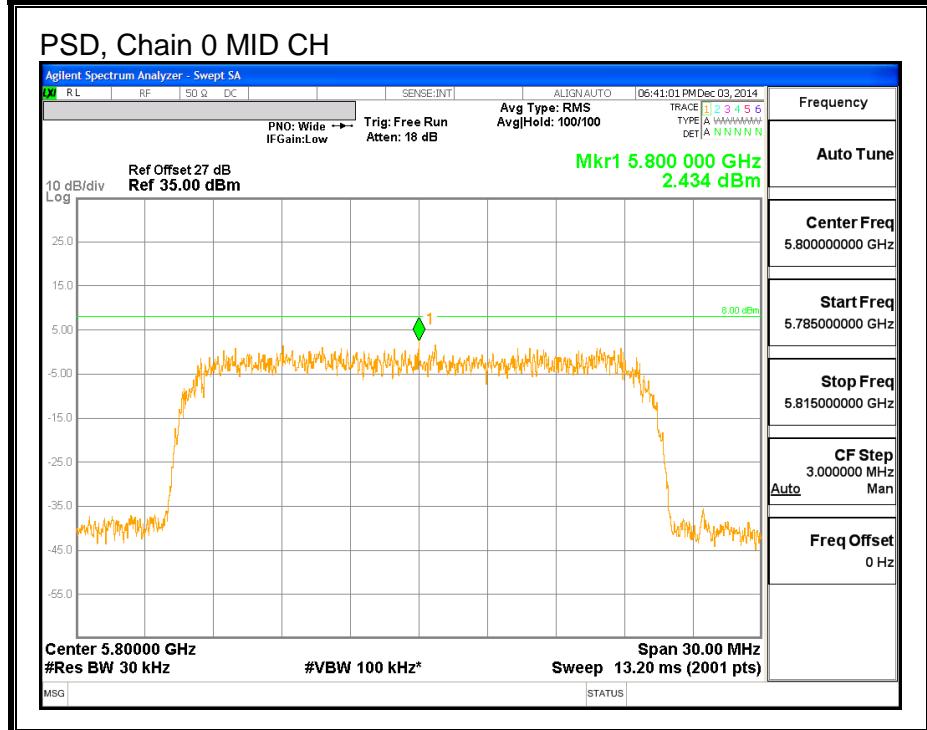
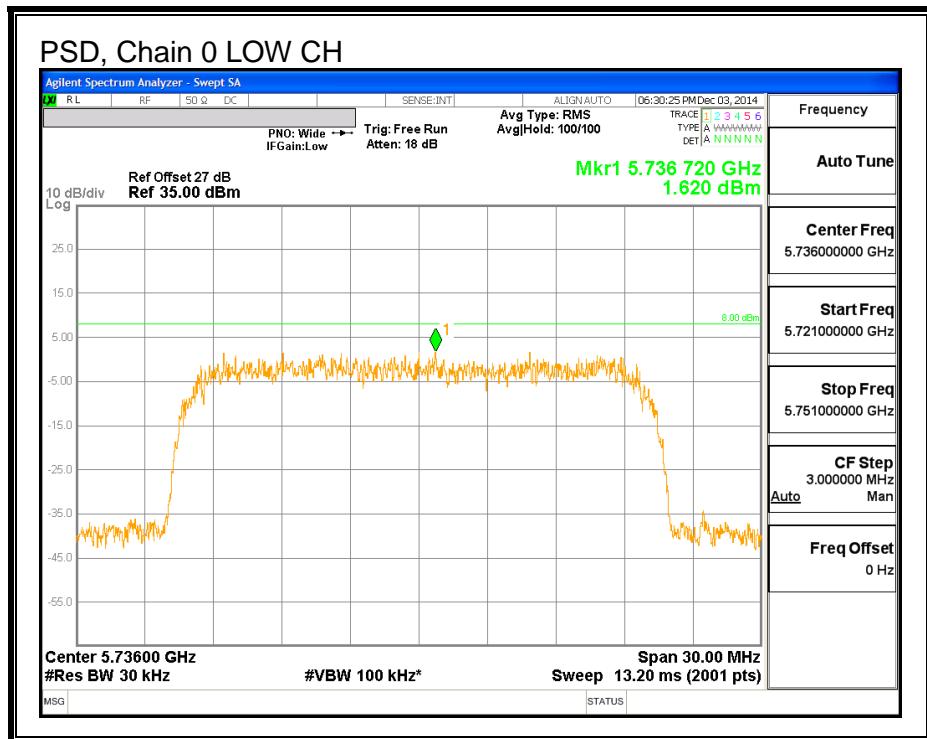
FCC §15.247

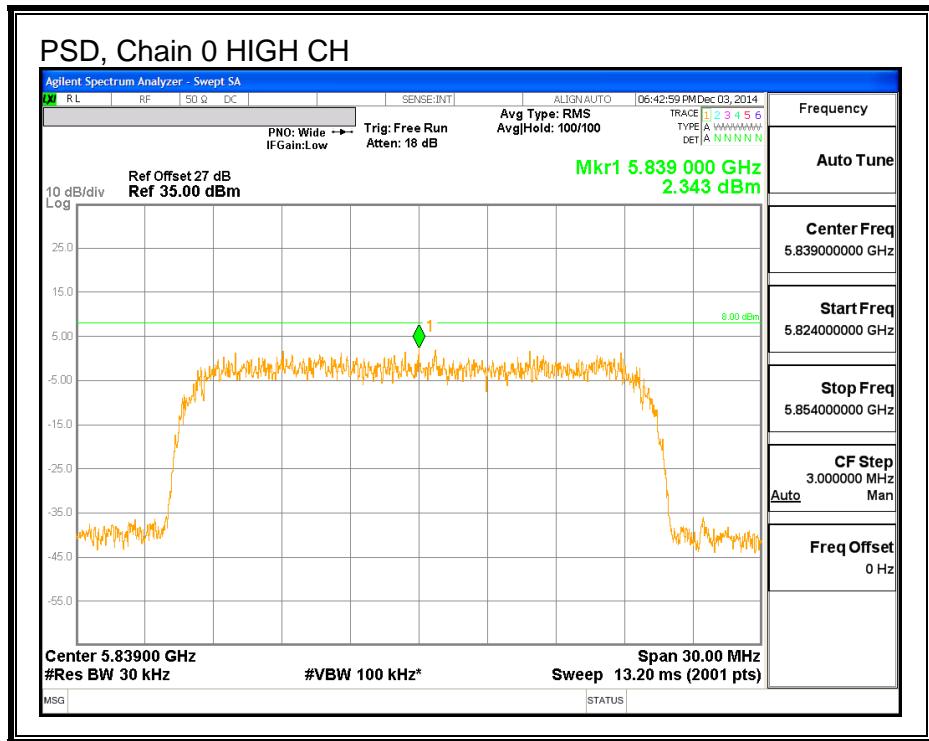
RESULTS

PSD Results

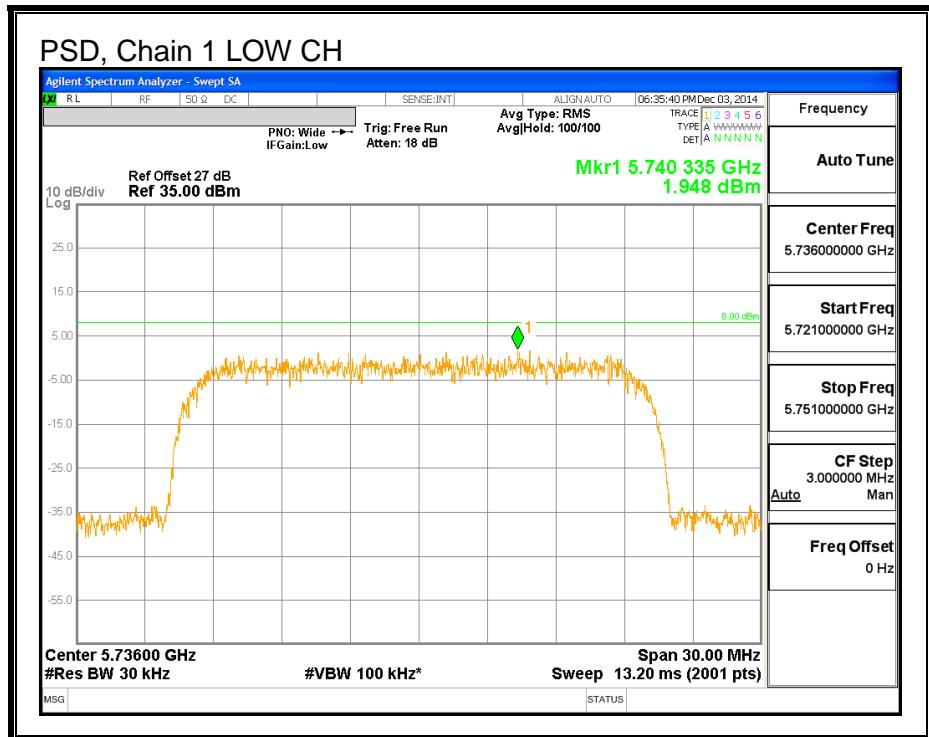
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5736	1.62	1.95	4.80	8.0	-3.2
Mid	5800	2.43	2.55	5.50	8.0	-2.5
High	5839	2.34	1.70	5.05	8.0	-3.0

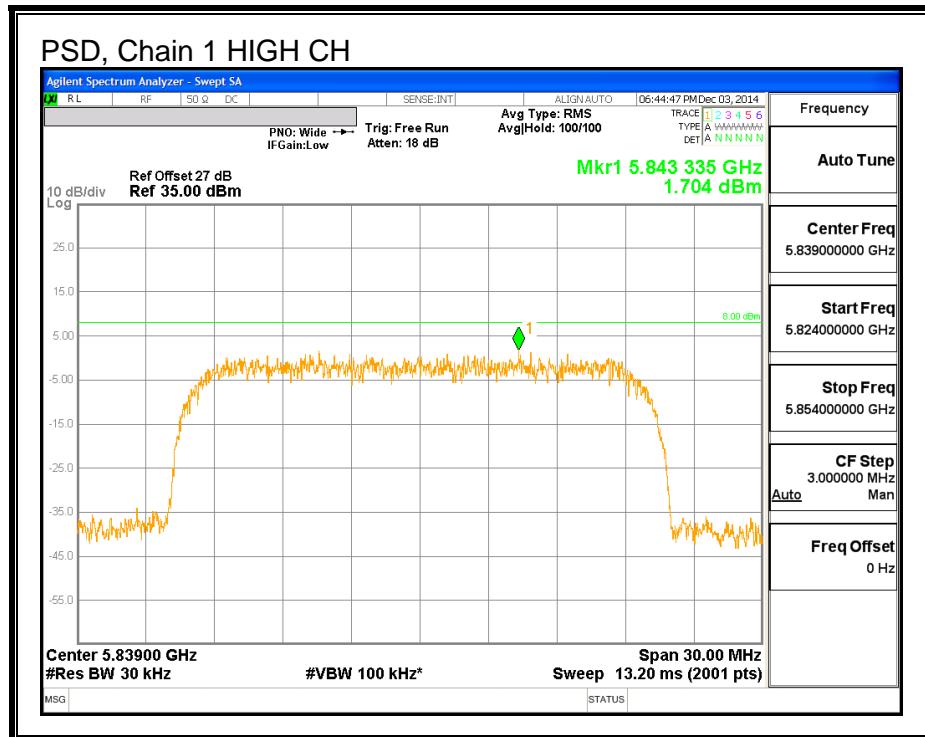
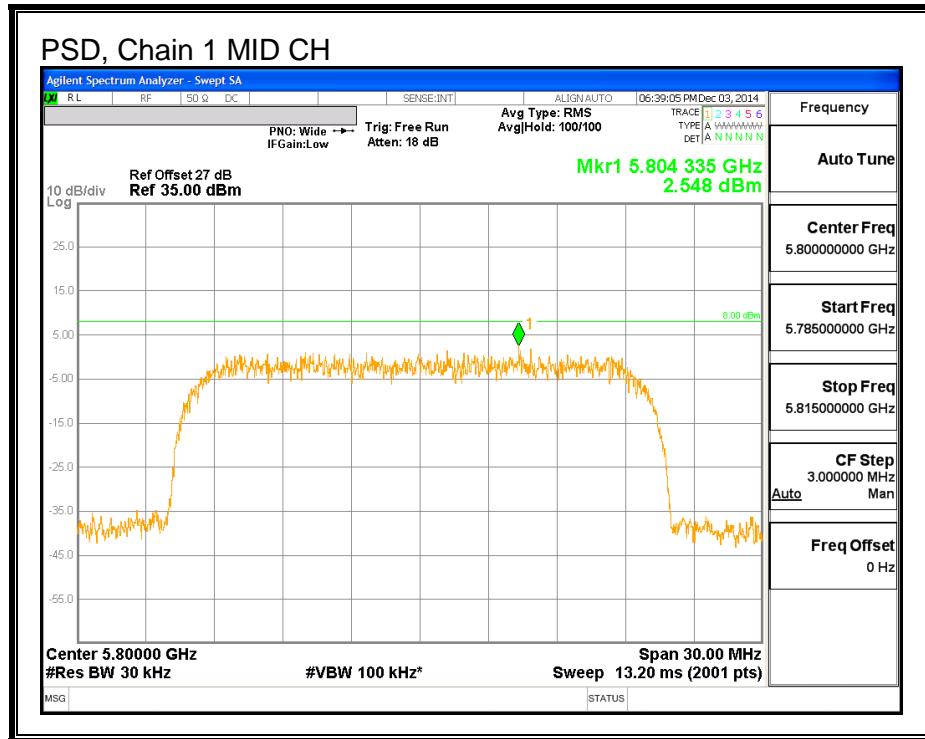
PSD, Chain 0





PSD, Chain 1





8.3.4. OUT-OF-BAND EMISSIONS

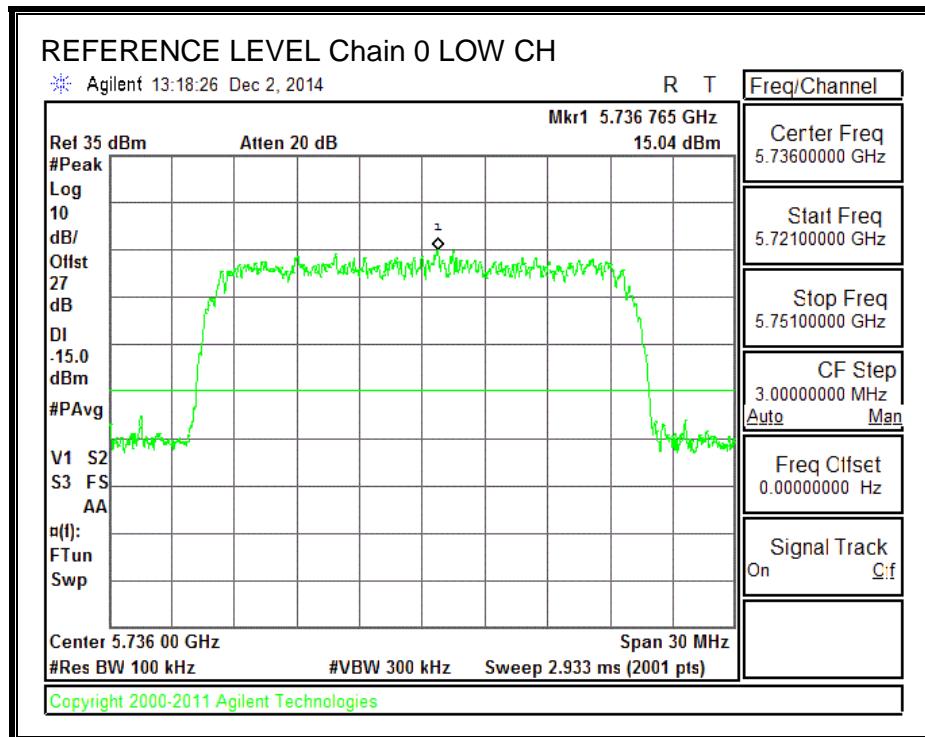
LIMITS

FCC §15.247 (d)

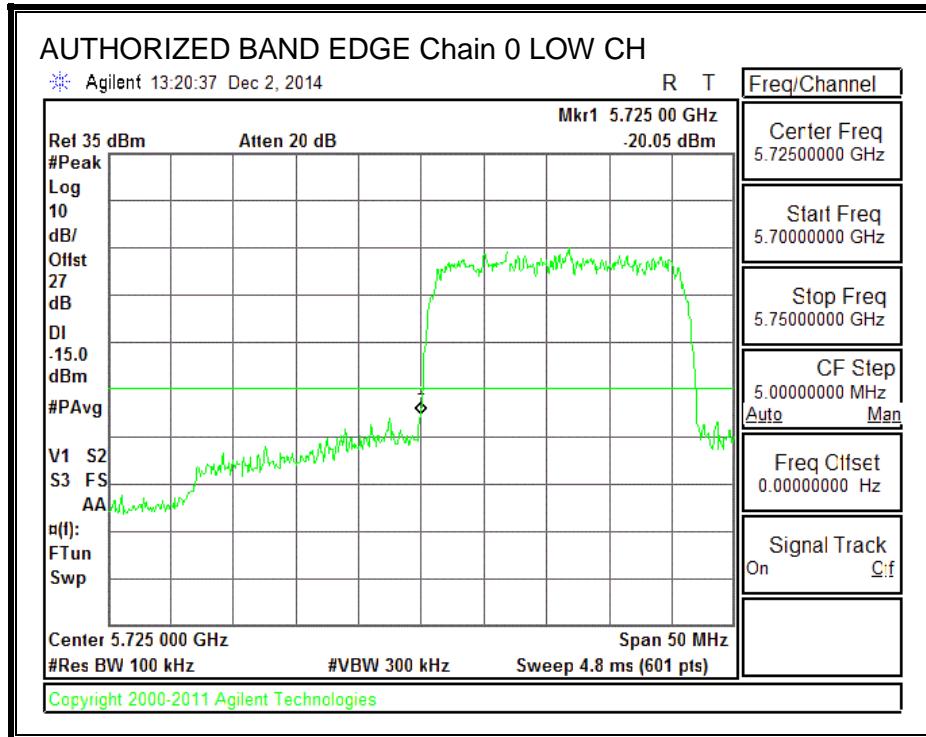
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

RESULTS

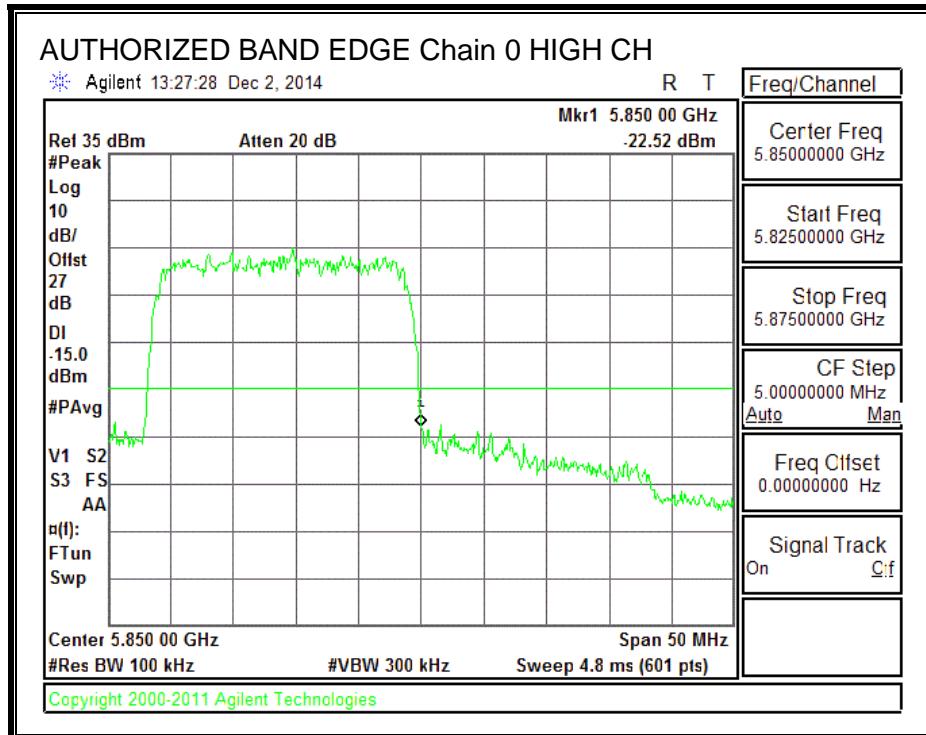
IN-BAND REFERENCE LEVEL, Chain 0



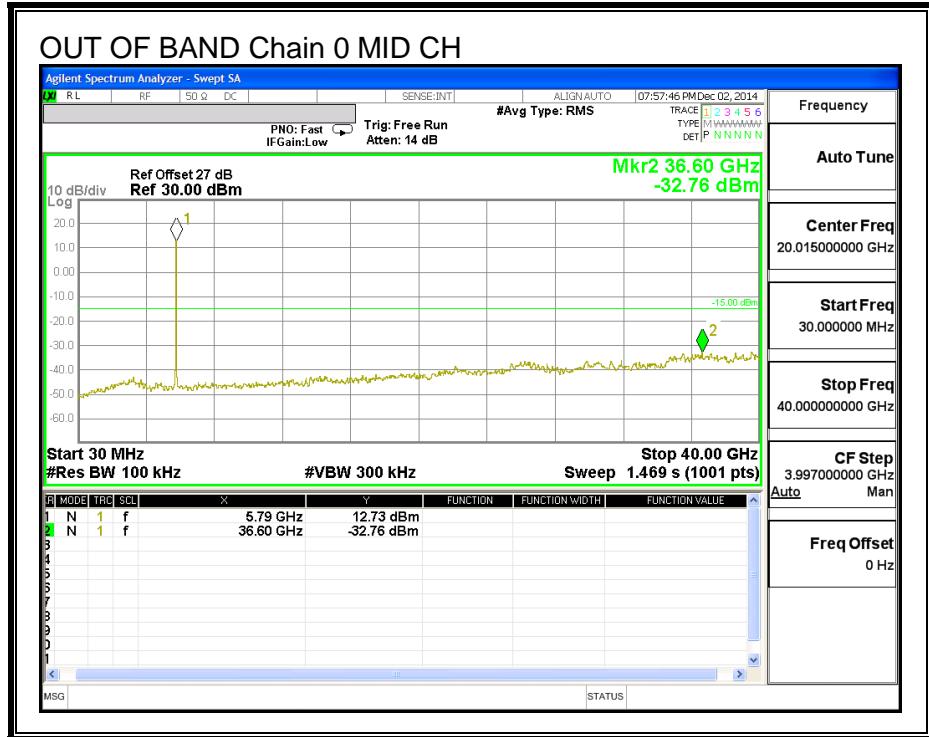
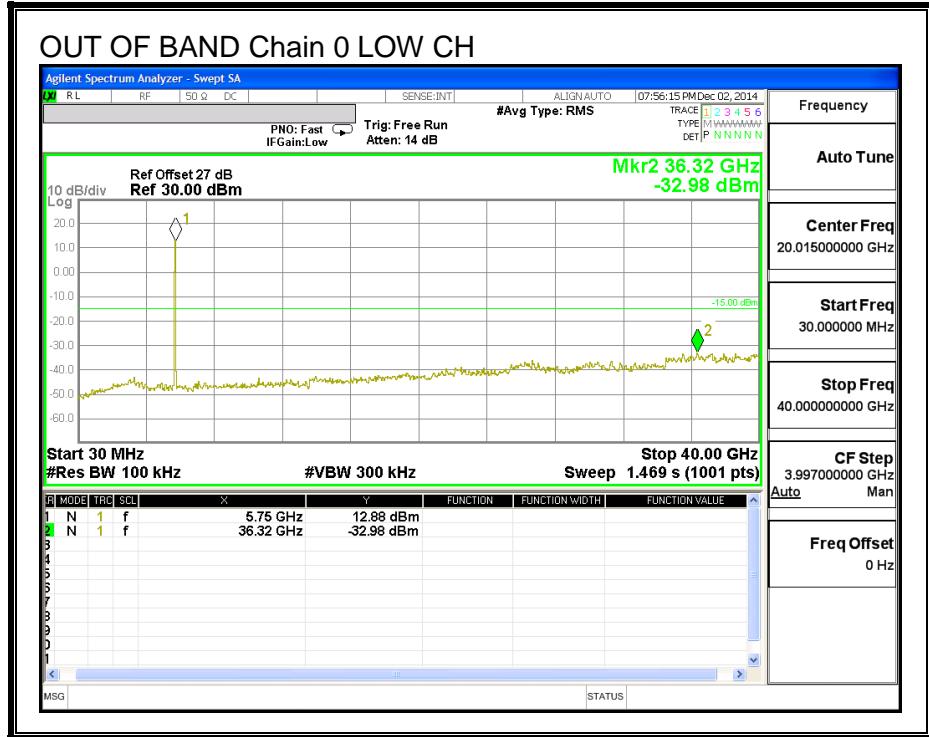
LOW CHANNEL BANDEDGE, Chain 0

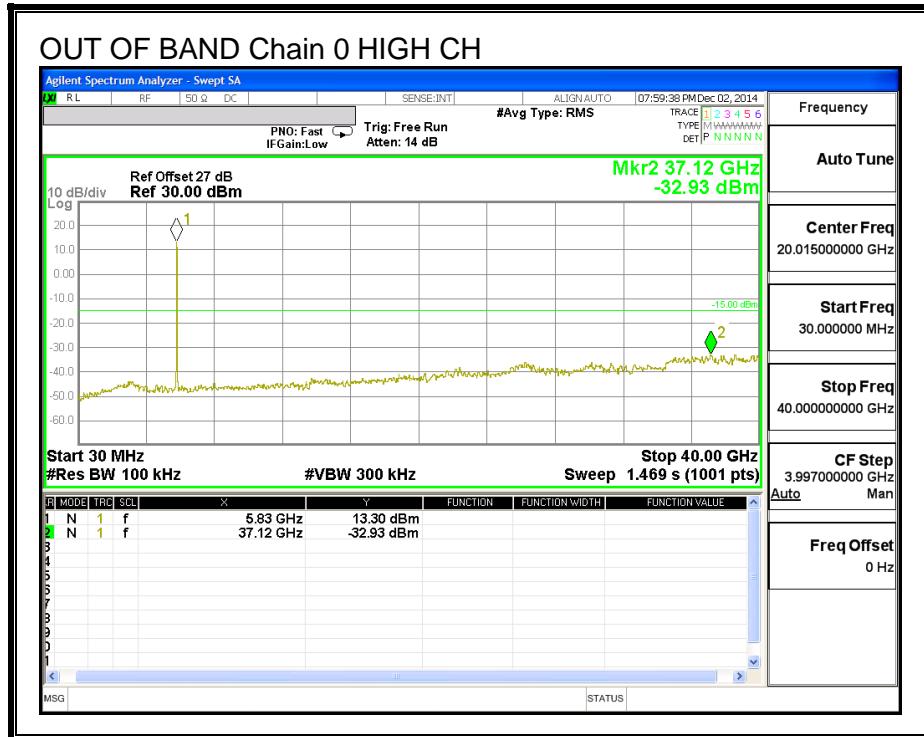


HIGH CHANNEL BANDEDGE, Chain 0

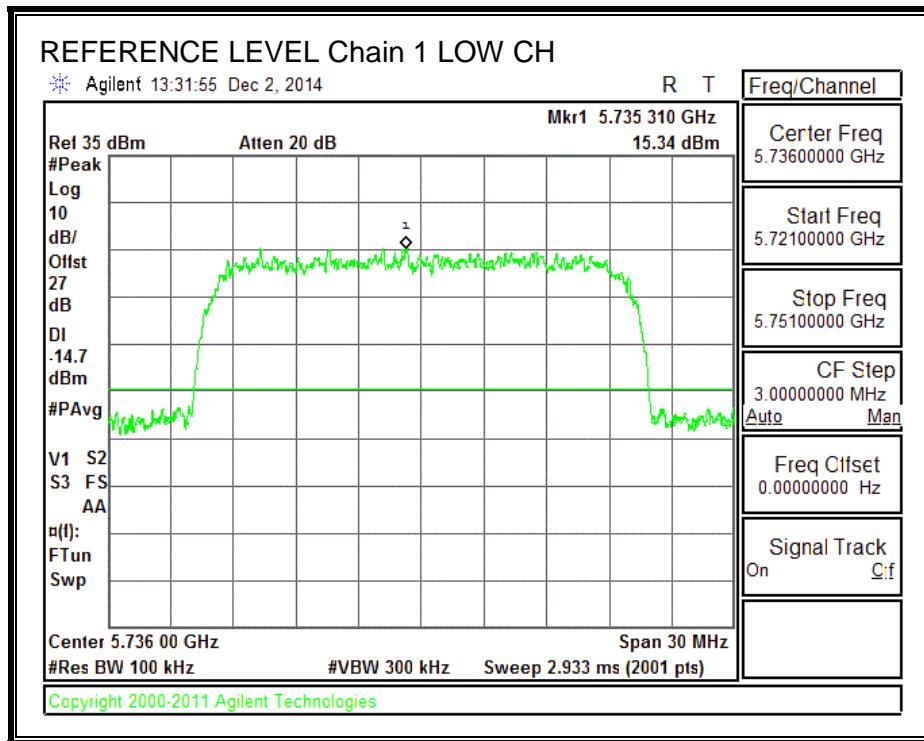


OUT-OF-BAND EMISSIONS, Chain 0

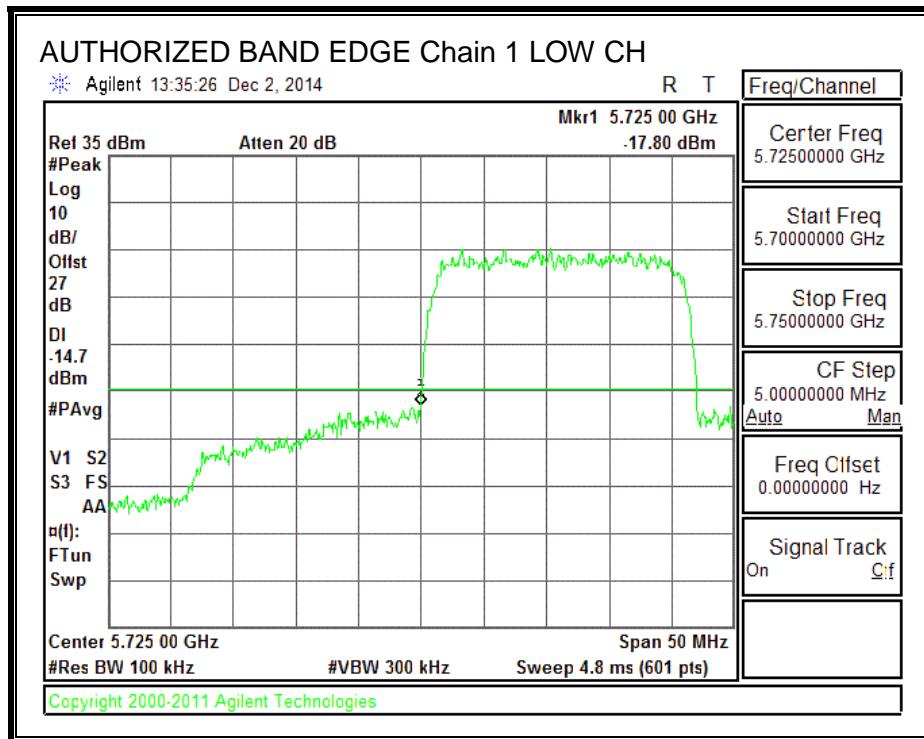




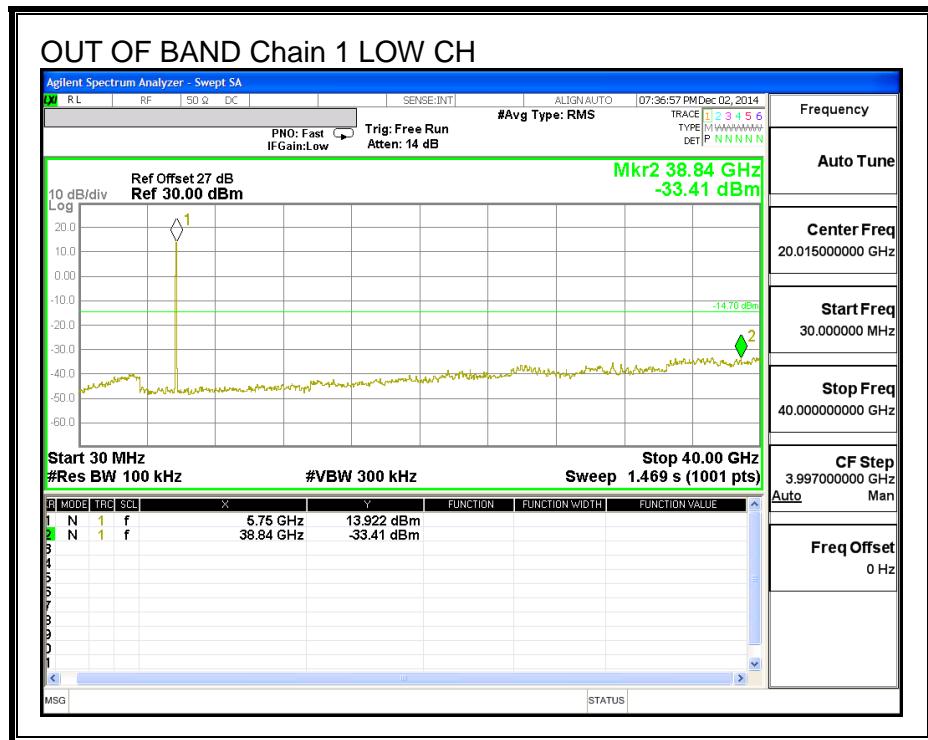
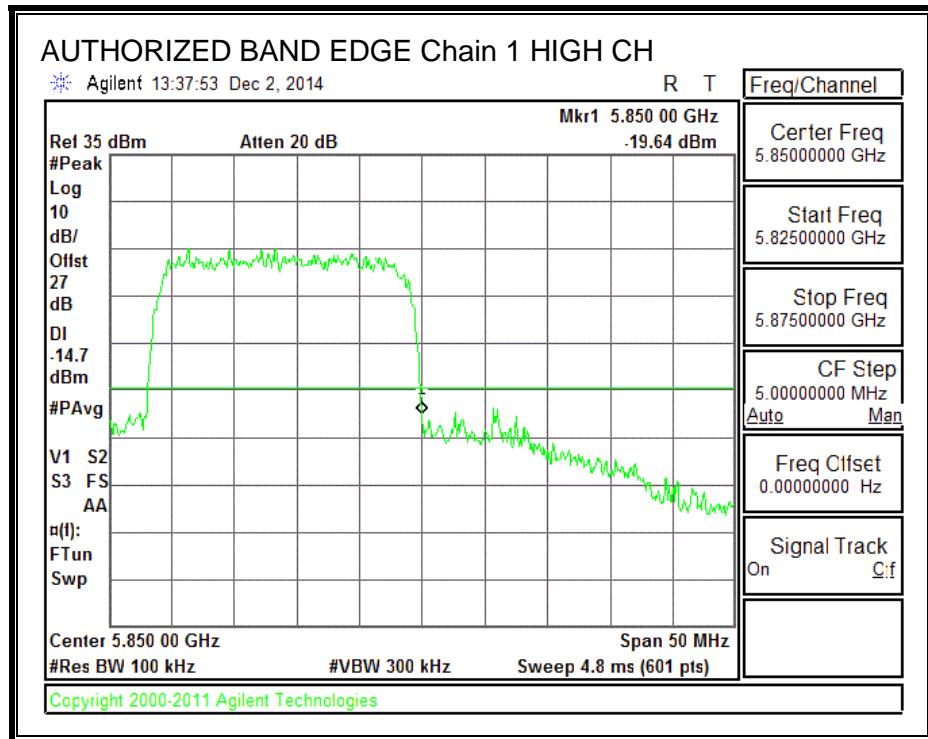
IN-BAND REFERENCE LEVEL, Chain 1

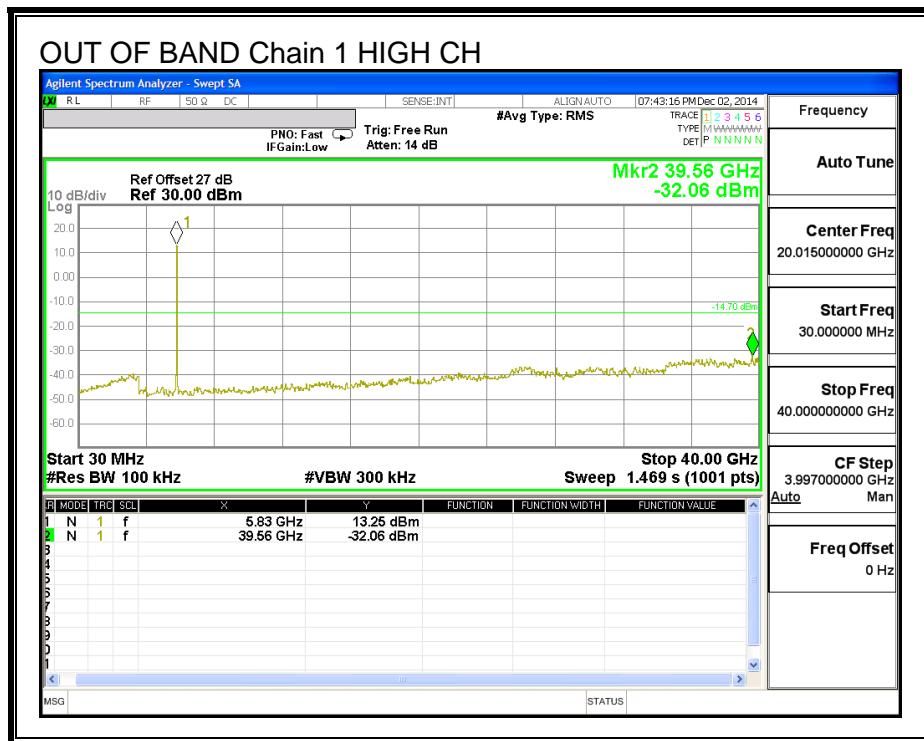
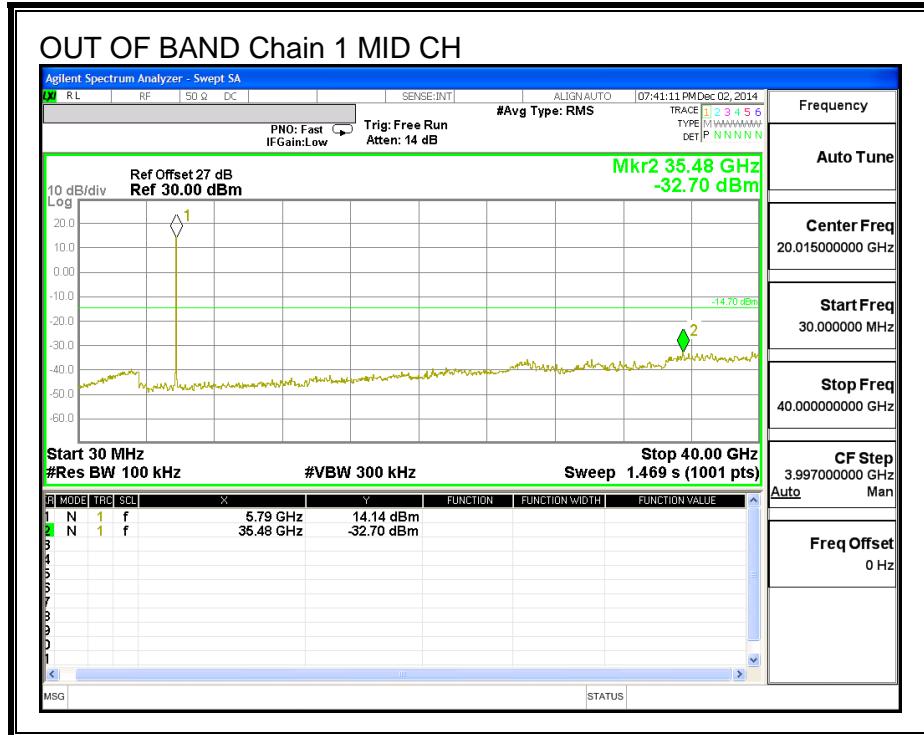


LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1





8.4. 40MHz 2TX MODE IN THE 5.8 GHz BAND

8.4.1. 6 dB BANDWIDTH

LIMITS

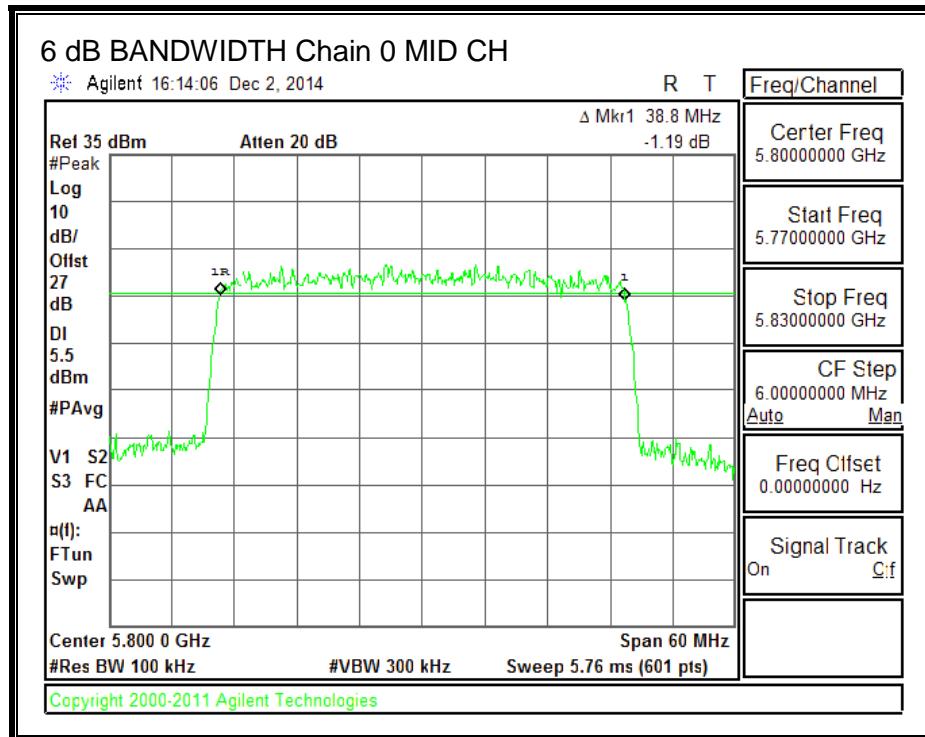
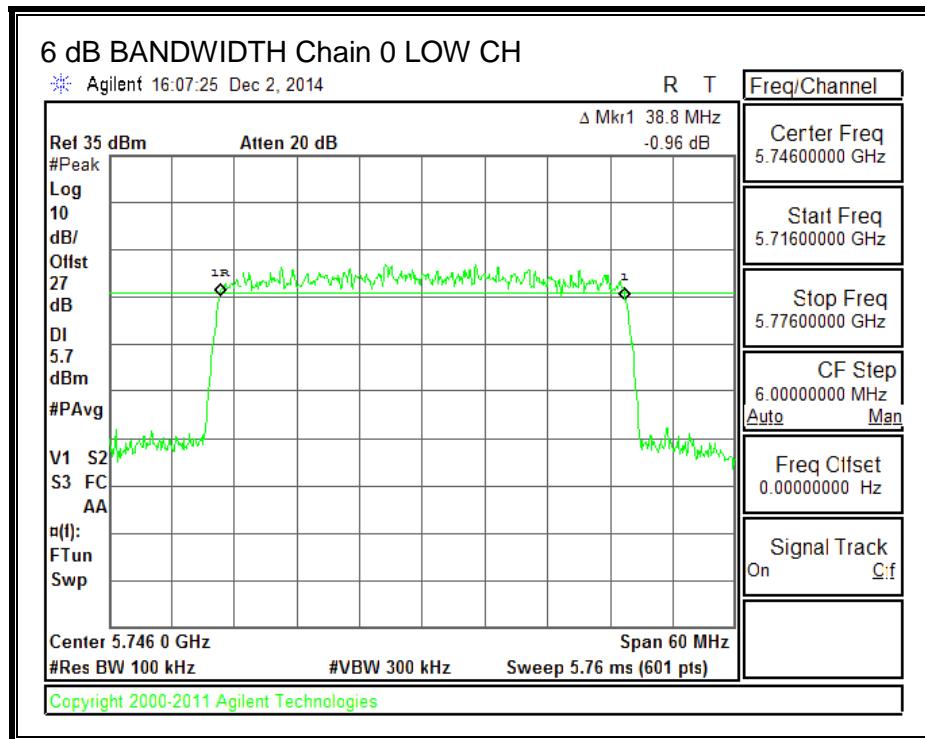
FCC §15.247 (a) (2)

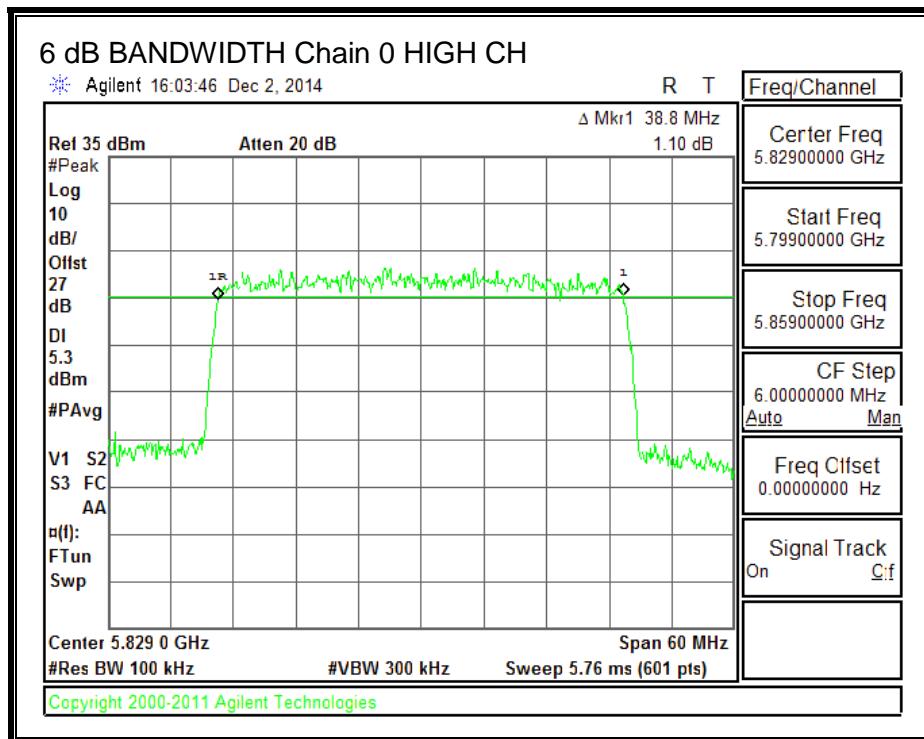
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

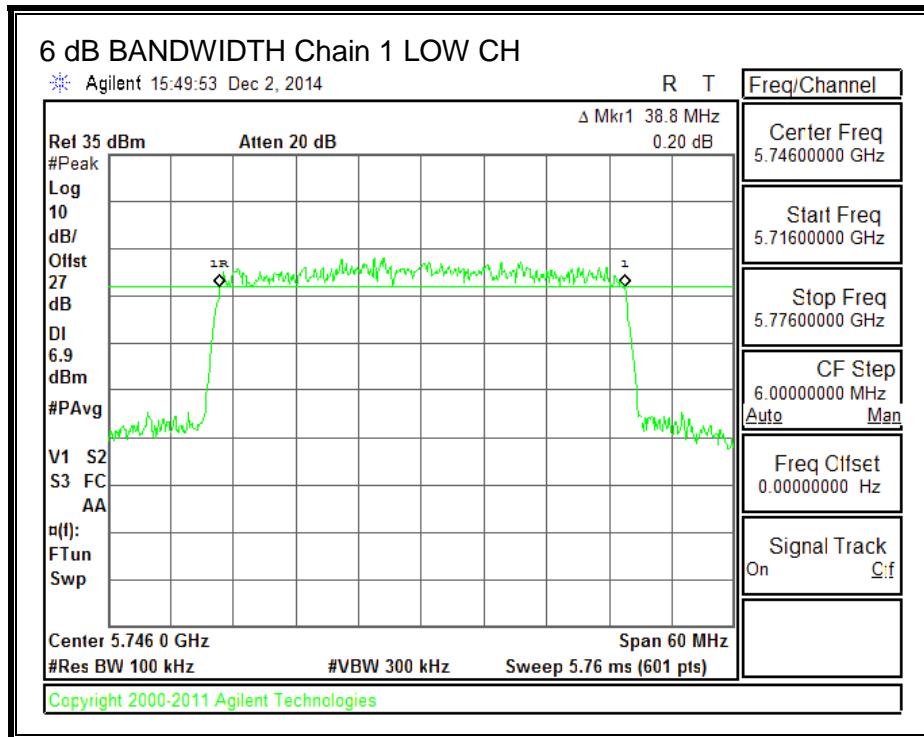
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5746	38.800	38.800	0.5
Mid	5800	38.800	38.600	0.5
High	5829	38.800	38.400	0.5

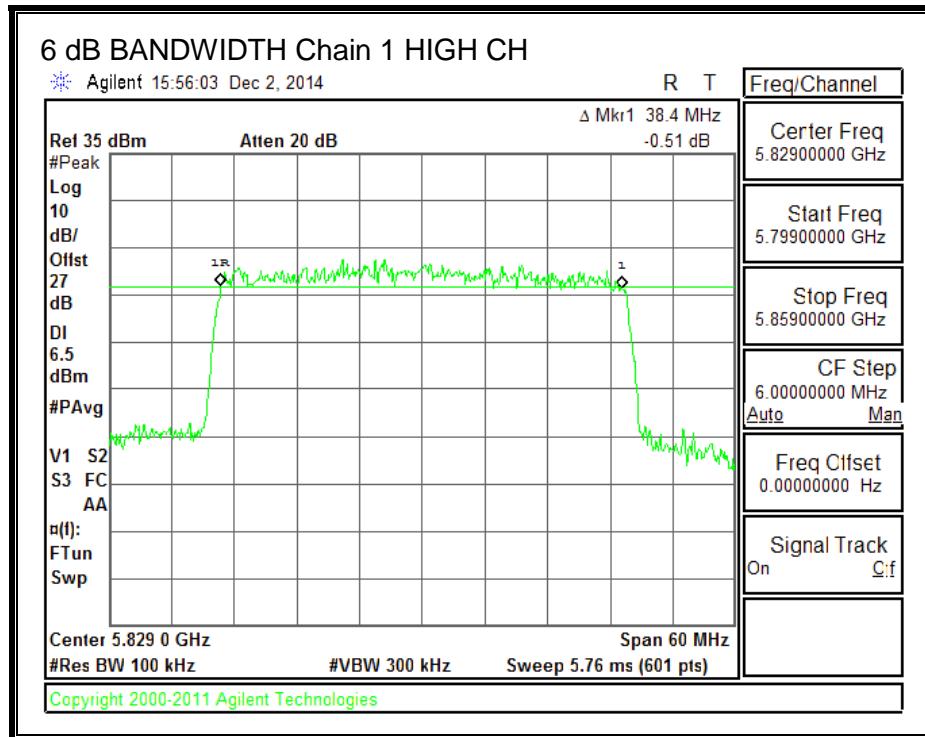
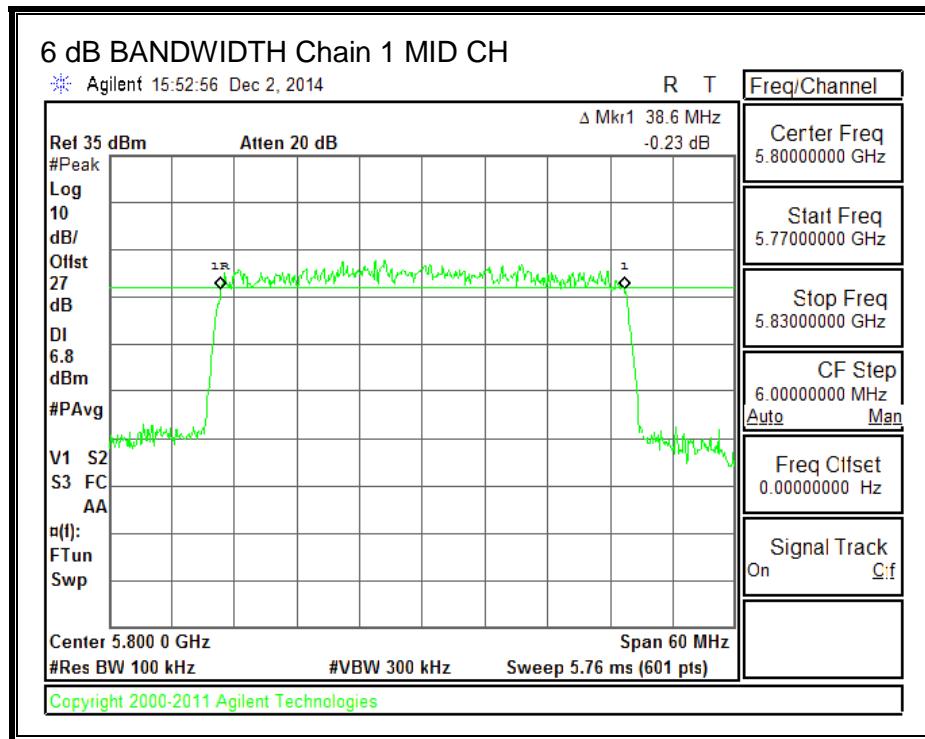
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.4.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3), (c)(1)(ii)

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

DIRECTIONAL ANTENNA GAIN

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

RESULTS

Limits

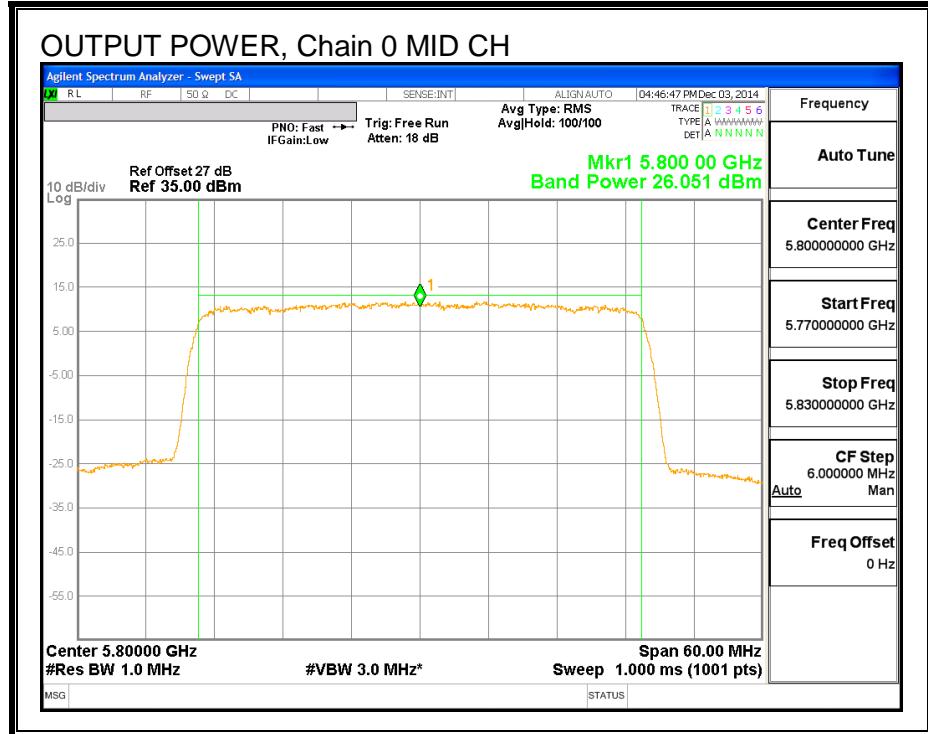
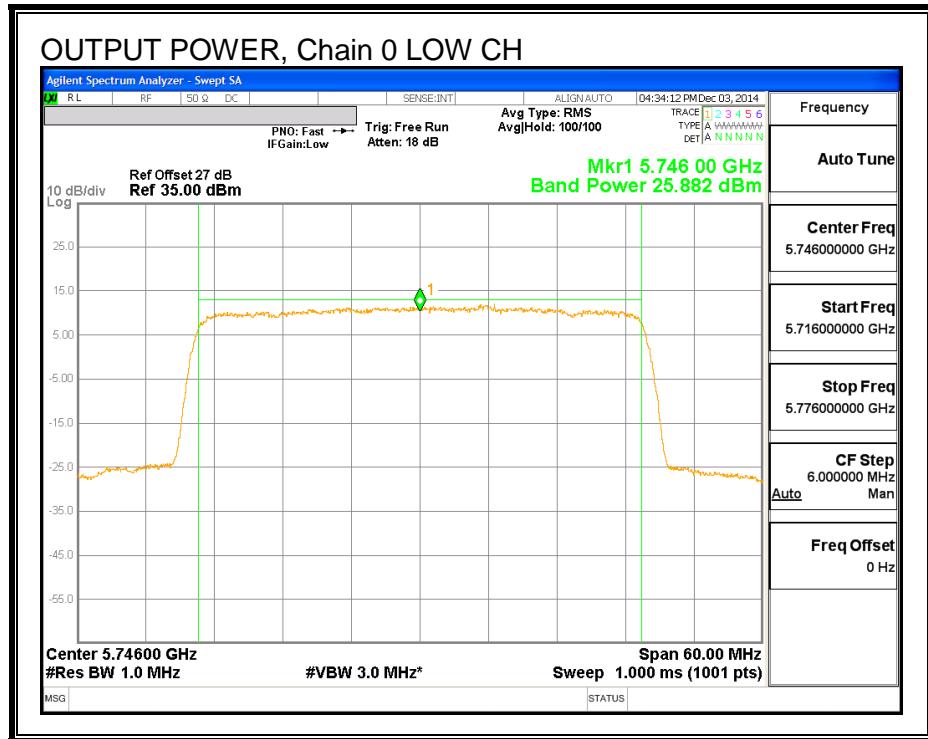
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	5746	10.60	30.00	30	36	30.00
Mid	5800	10.60	30.00	30	36	30.00
High	5829	10.60	30.00	30	36	30.00

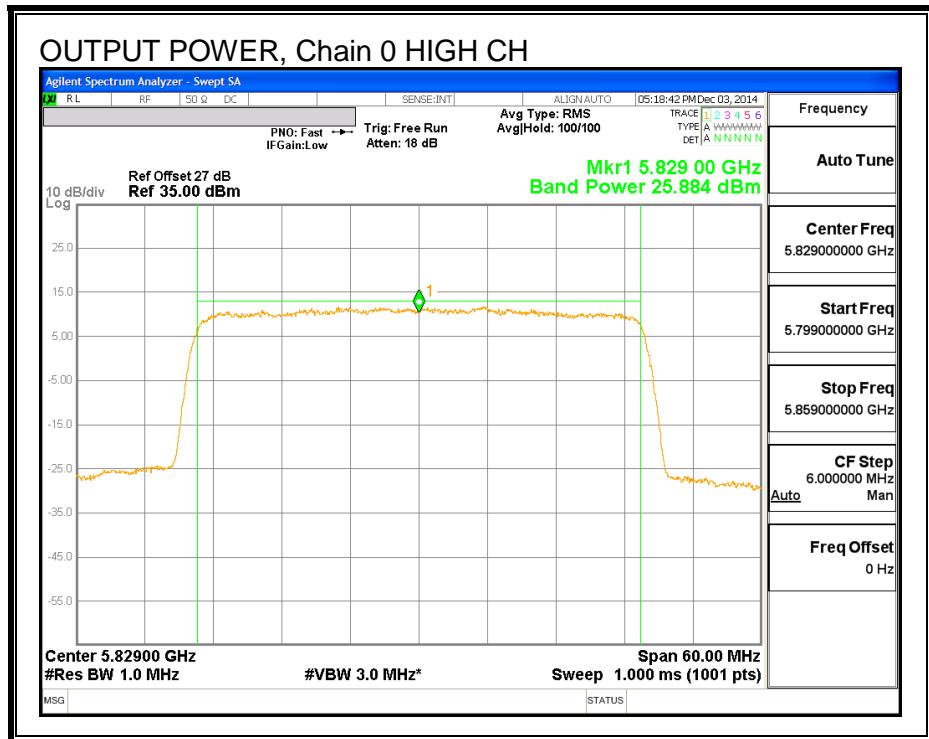
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

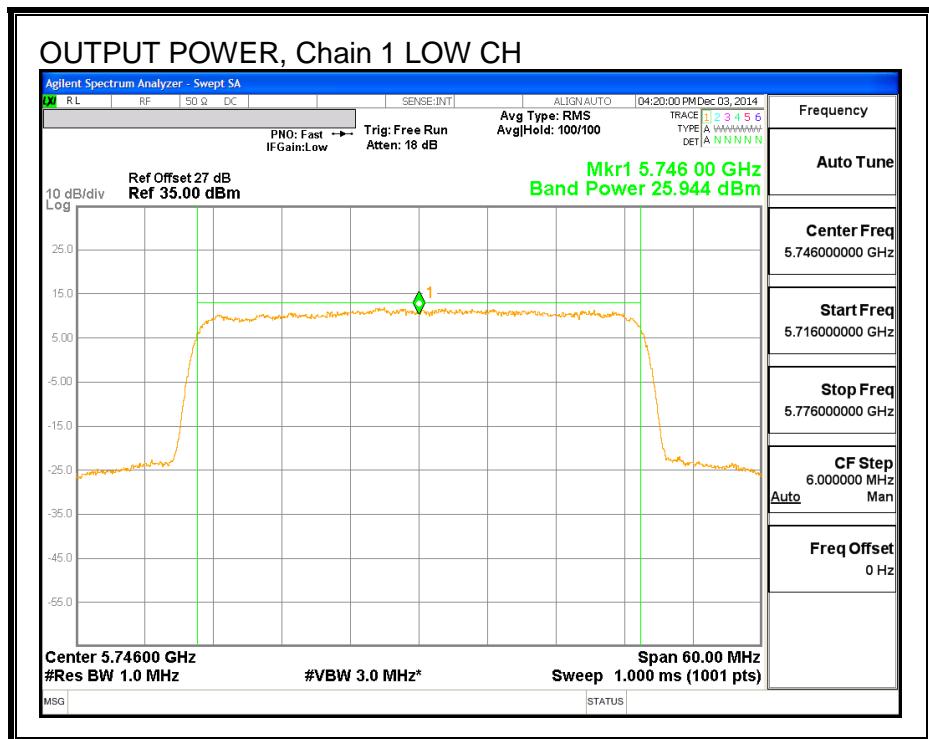
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	5746	25.88	25.94	28.92	30.00	-1.08
Mid	5800	26.05	25.90	28.99	30.00	-1.01
High	5829	25.88	26.06	28.98	30.00	-1.02

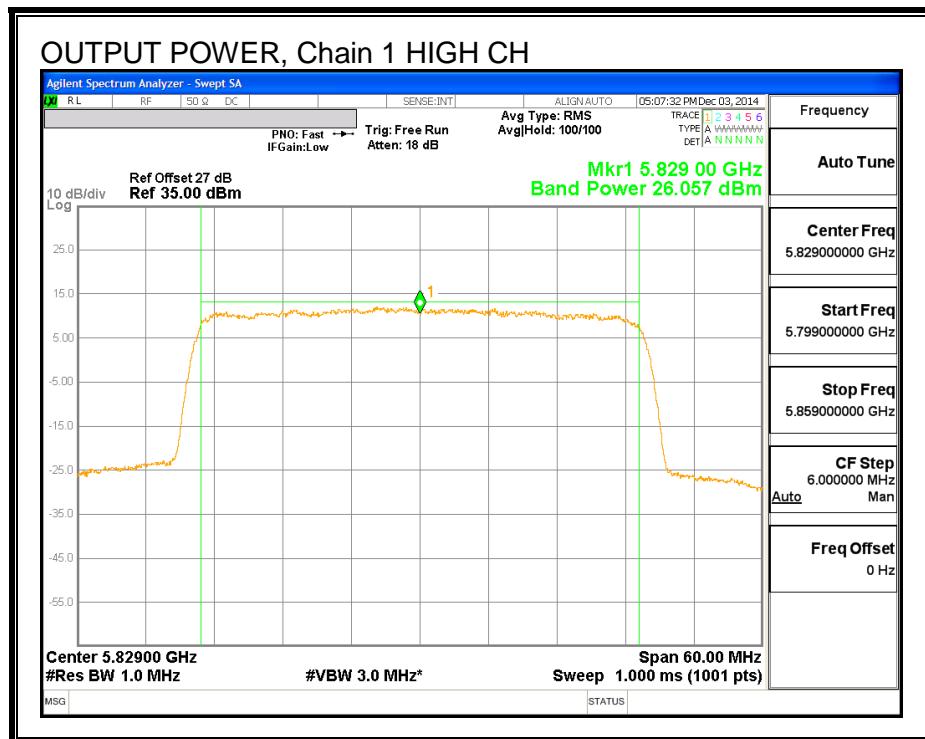
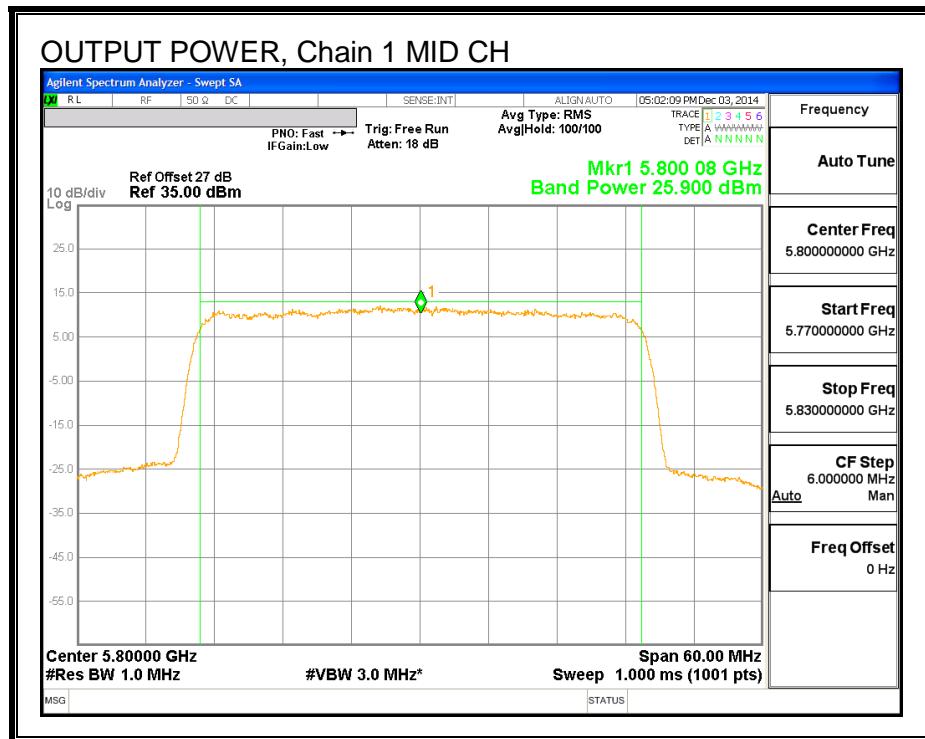
OUTPUT POWER, Chain 0





OUTPUT POWER, Chain 1





8.4.3. POWER SPECTRAL DENSITY

LIMITS

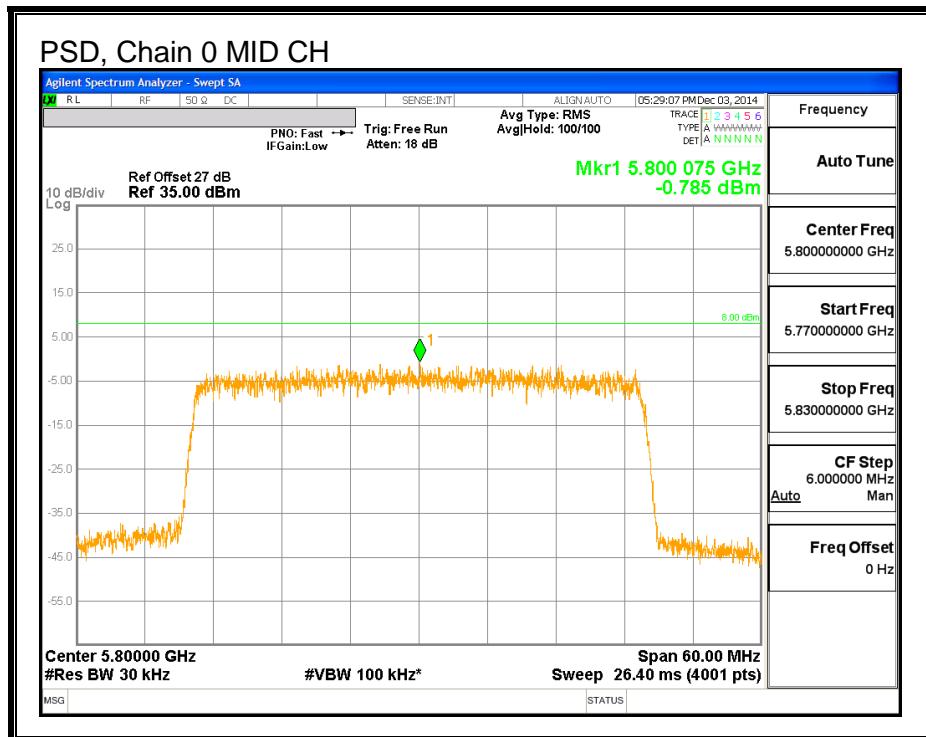
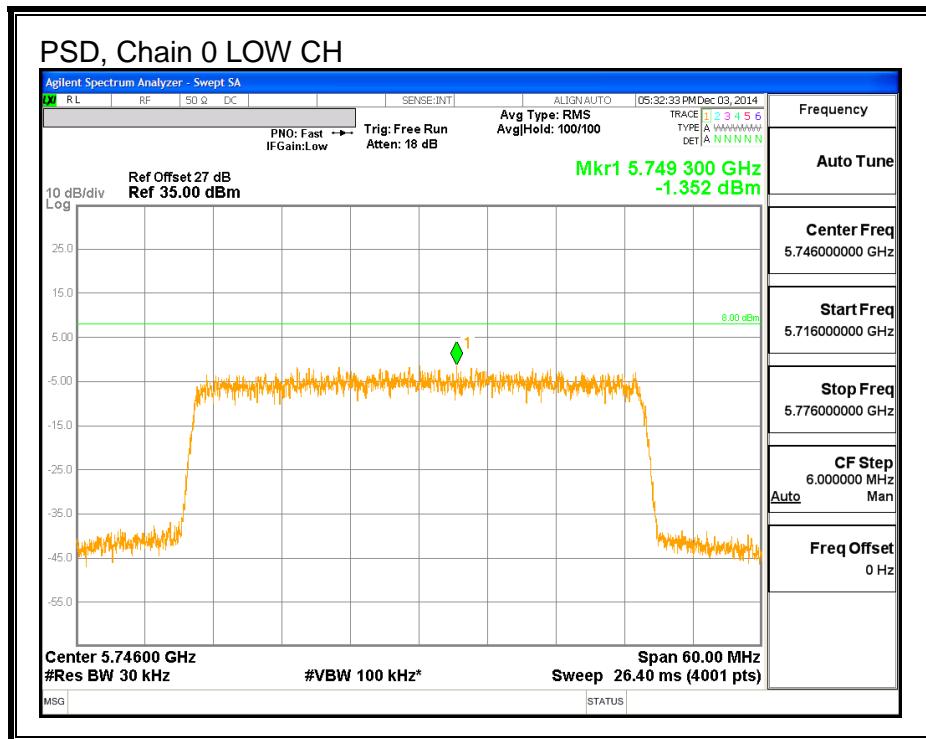
FCC §15.247

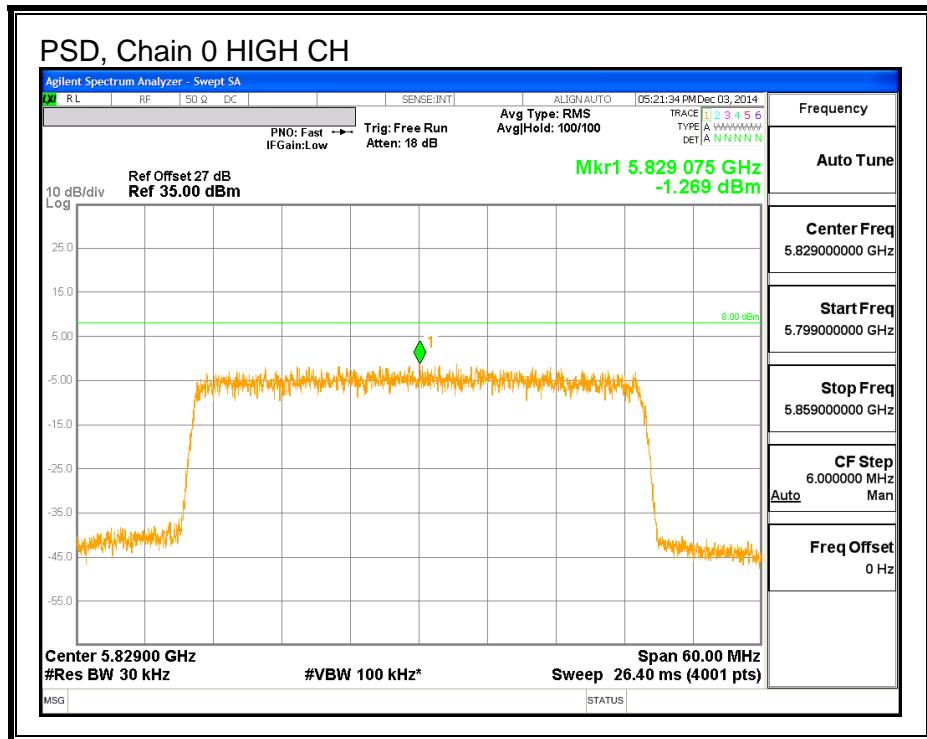
RESULTS

PSD Results

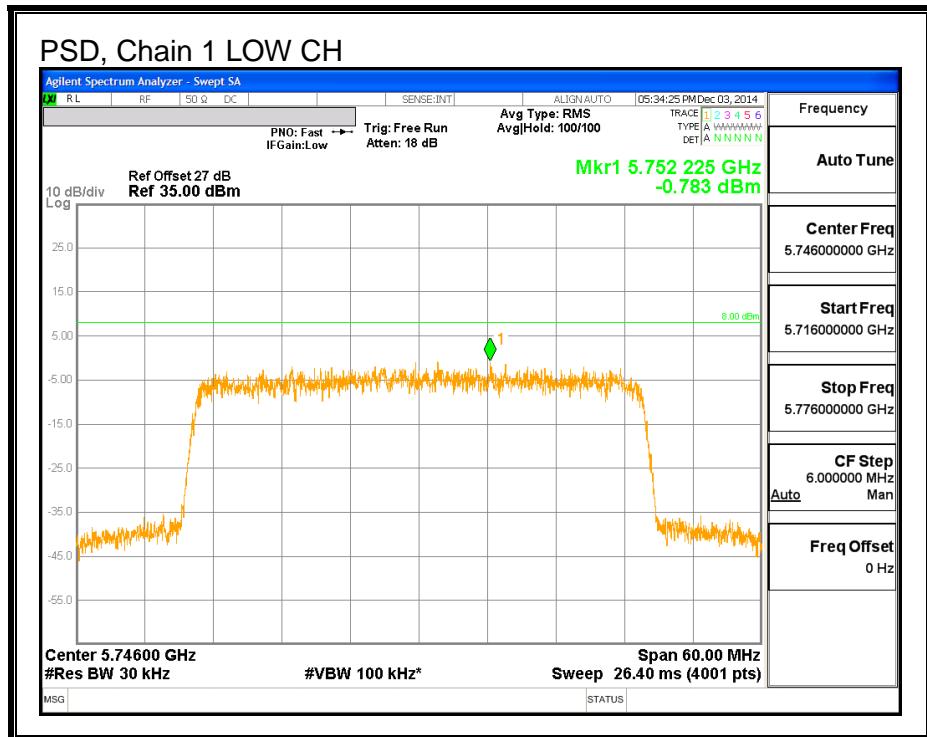
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5746	-1.35	-0.78	1.95	8.0	-6.0
Mid	5800	-0.79	-0.90	2.17	8.0	-5.8
High	5829	-1.27	-0.76	2.00	8.0	-6.0

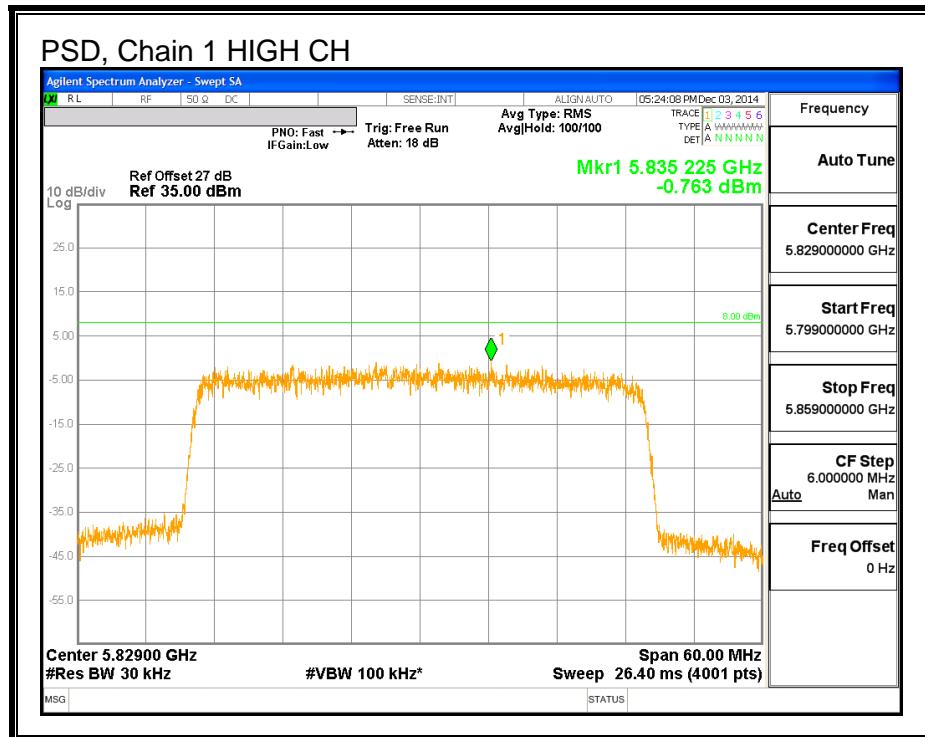
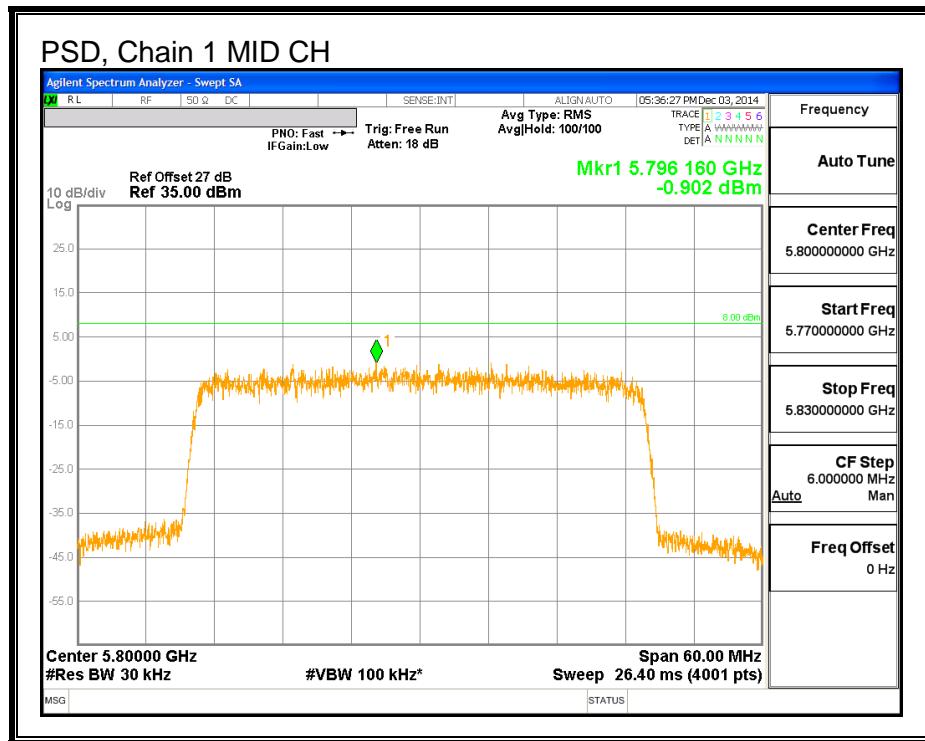
PSD, Chain 0





PSD, Chain 1





8.4.4. OUT-OF-BAND EMISSIONS

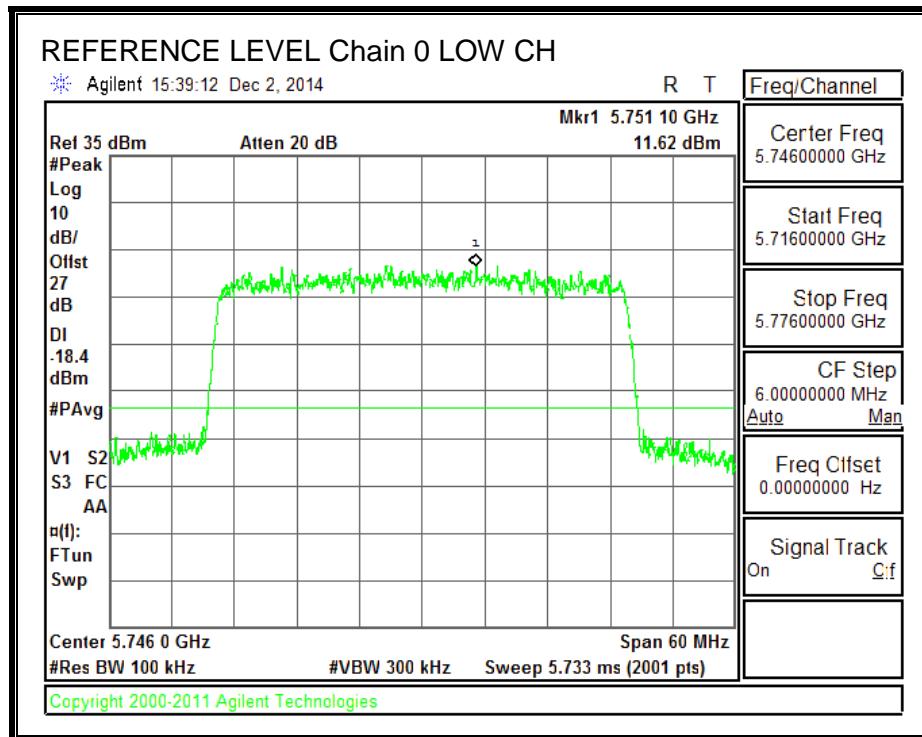
LIMITS

FCC §15.247 (d)

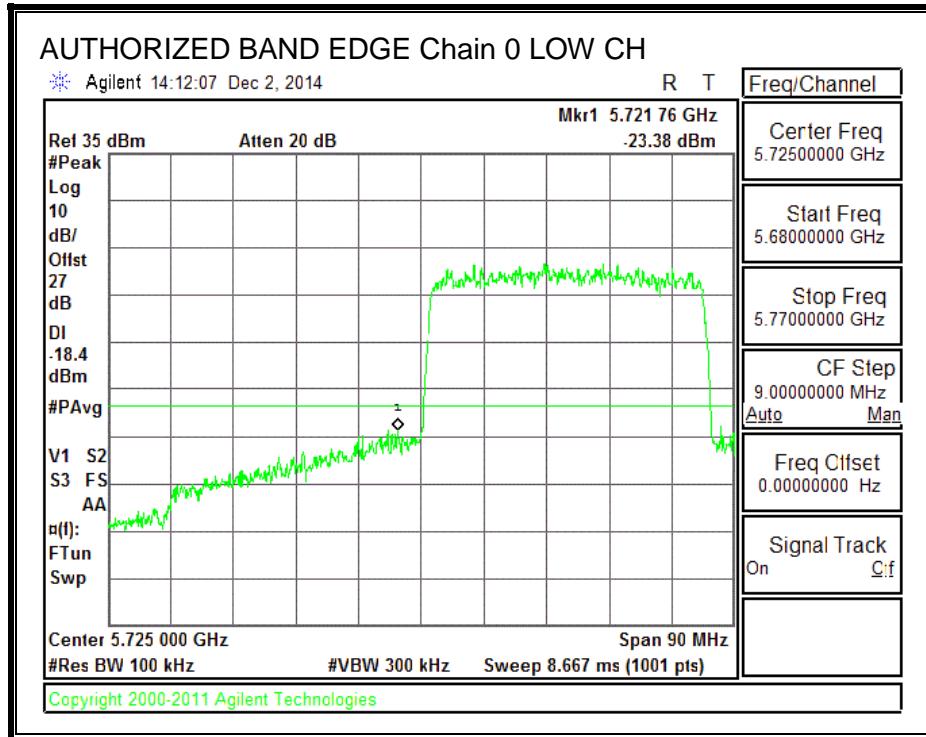
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

RESULTS

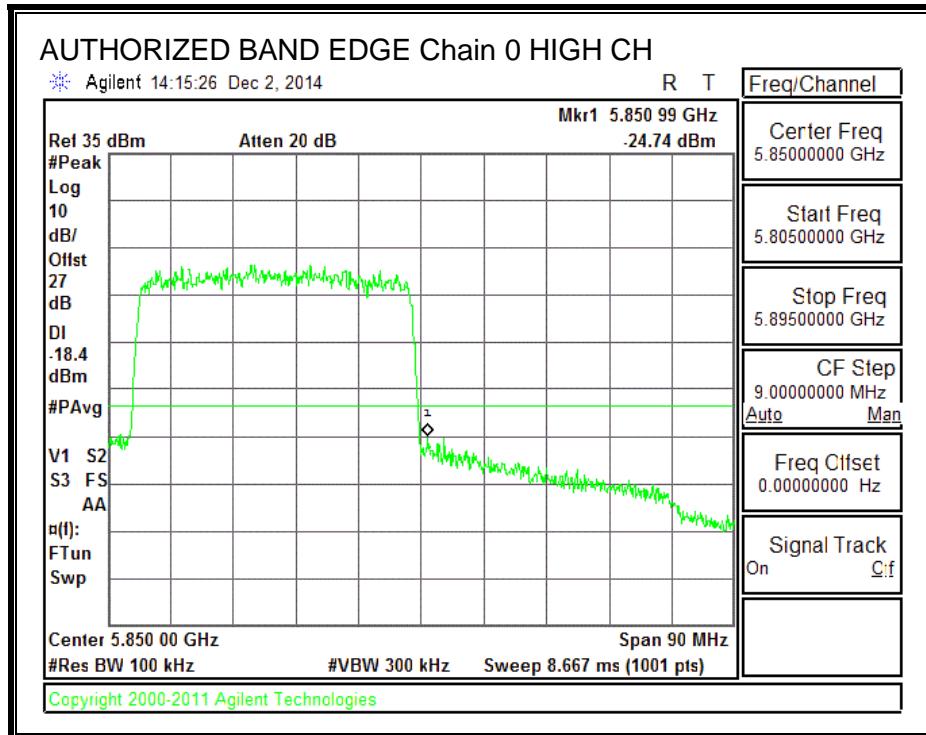
IN-BAND REFERENCE LEVEL, Chain 0



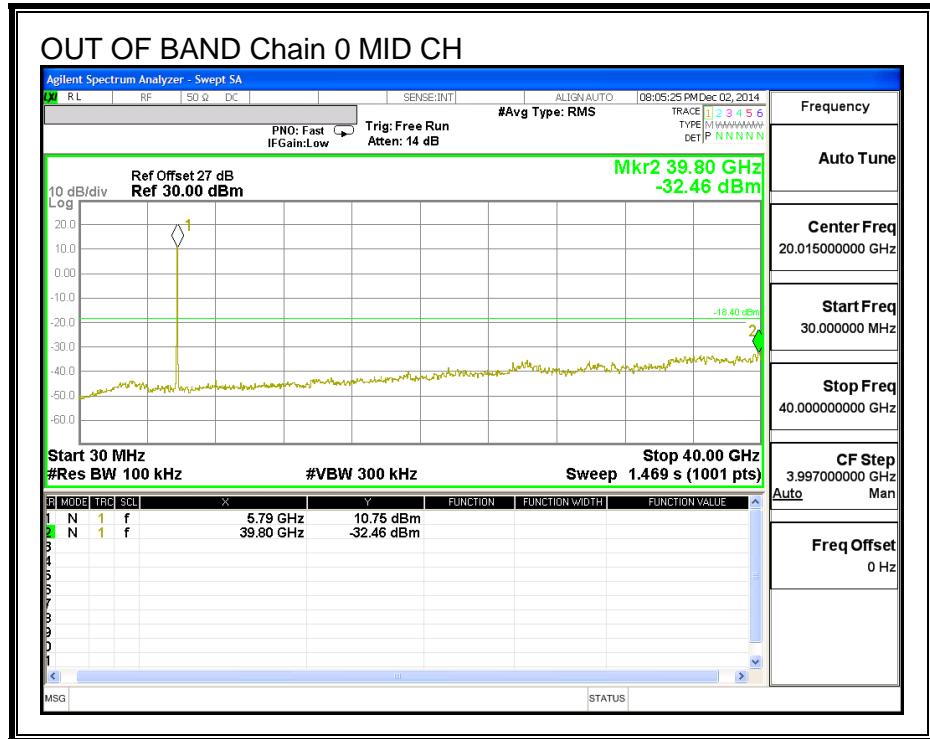
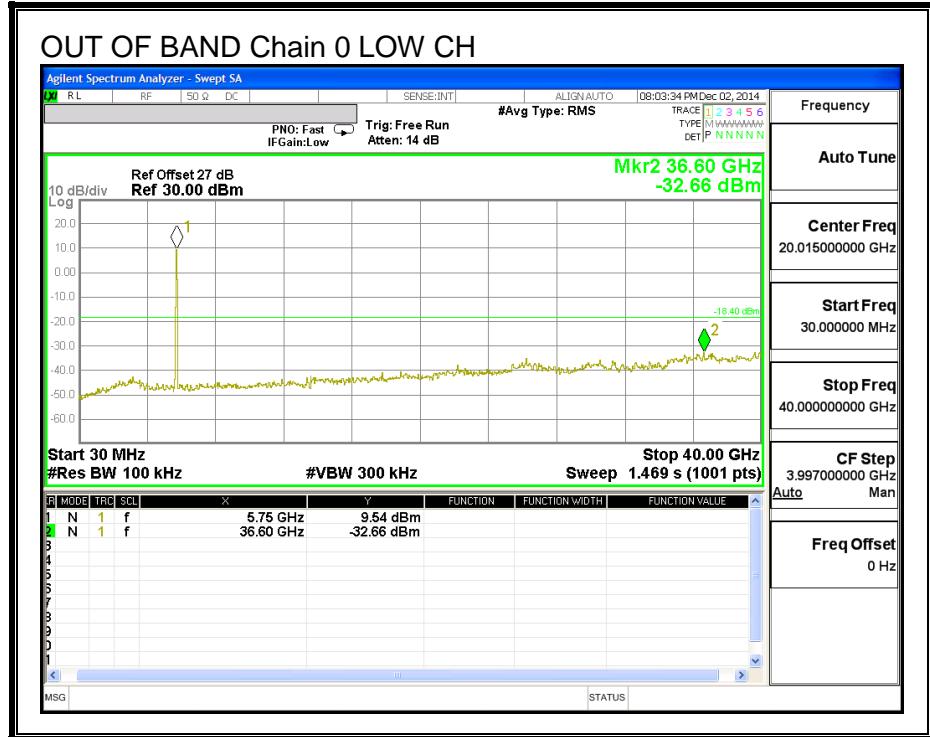
LOW CHANNEL BANDEDGE, Chain 0

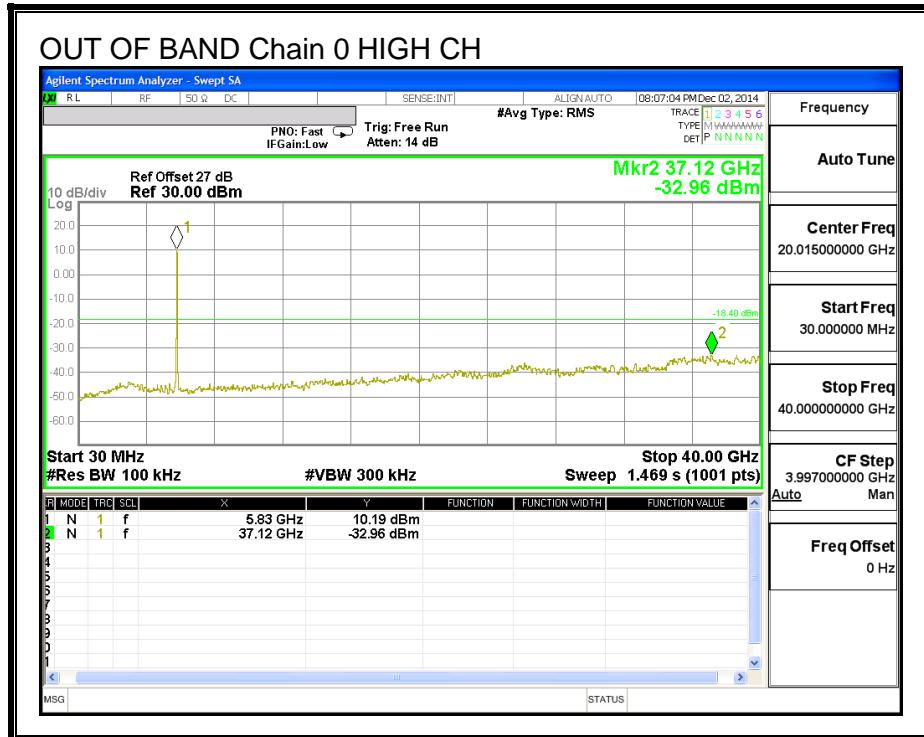


HIGH CHANNEL BANDEDGE, Chain 0

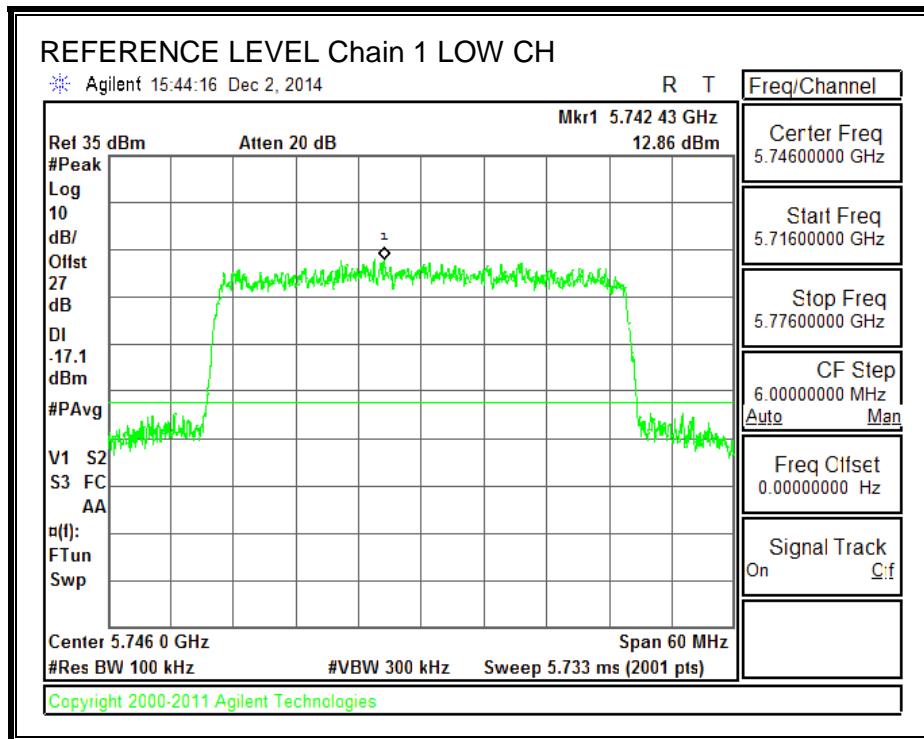


OUT-OF-BAND EMISSIONS, Chain 0

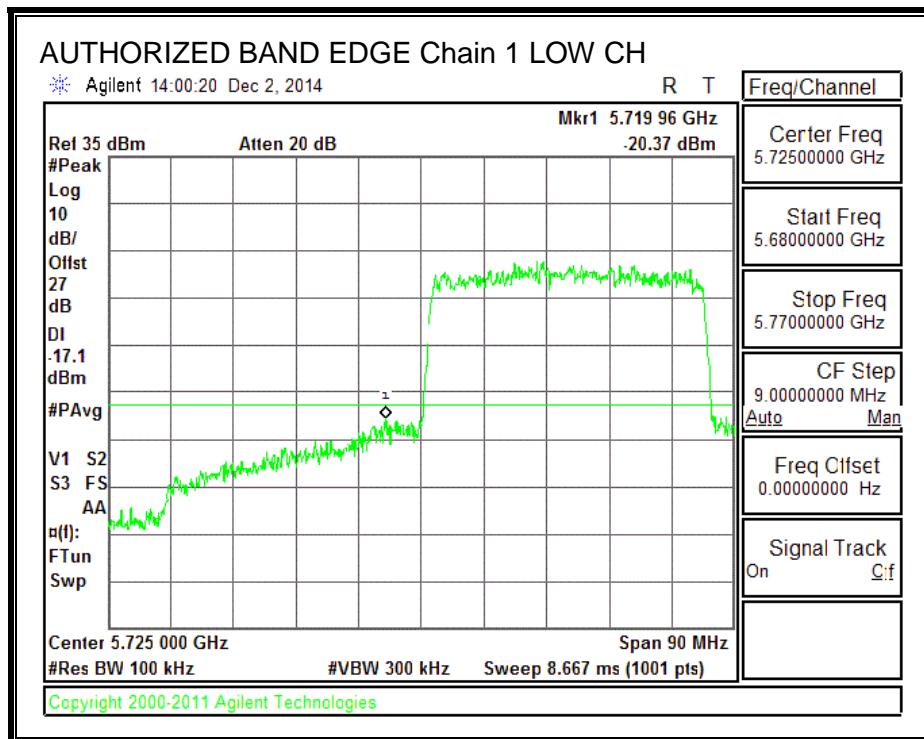




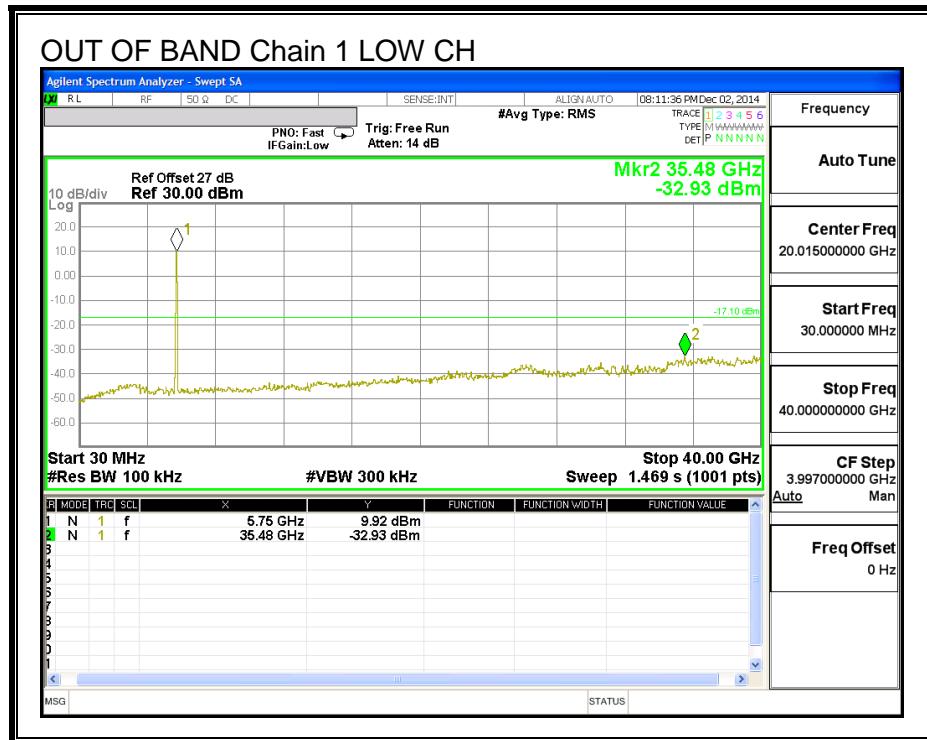
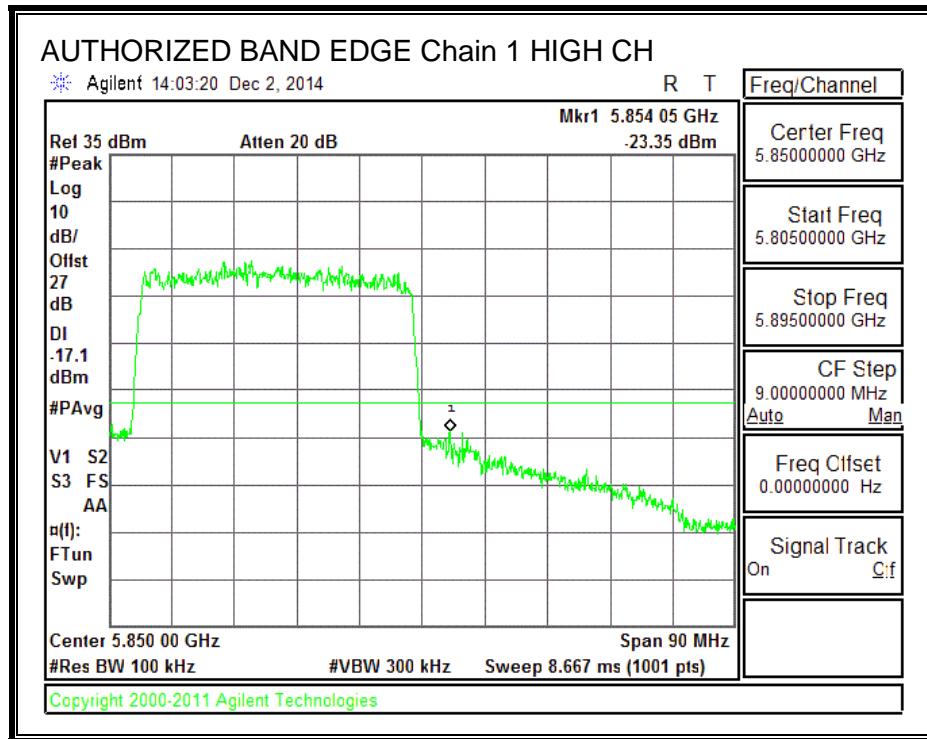
IN-BAND REFERENCE LEVEL, Chain 1

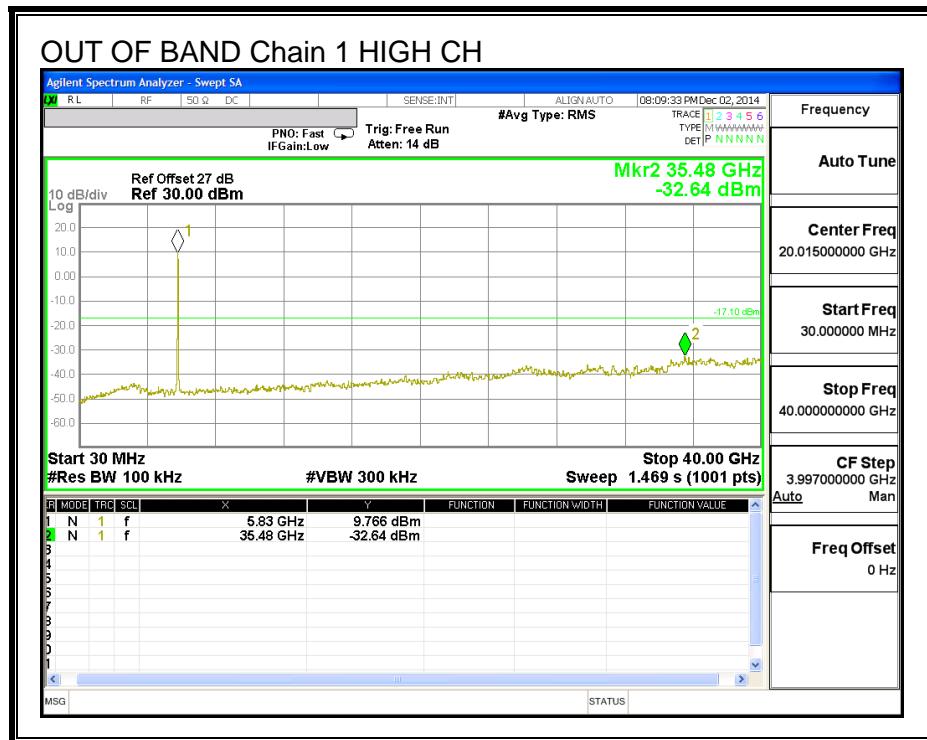
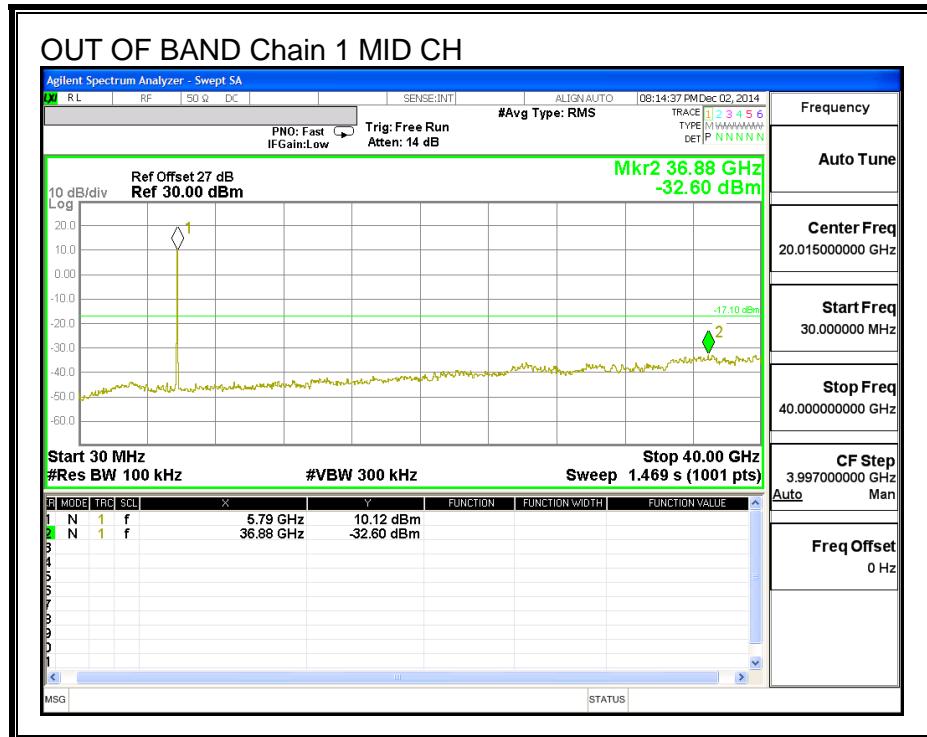


LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

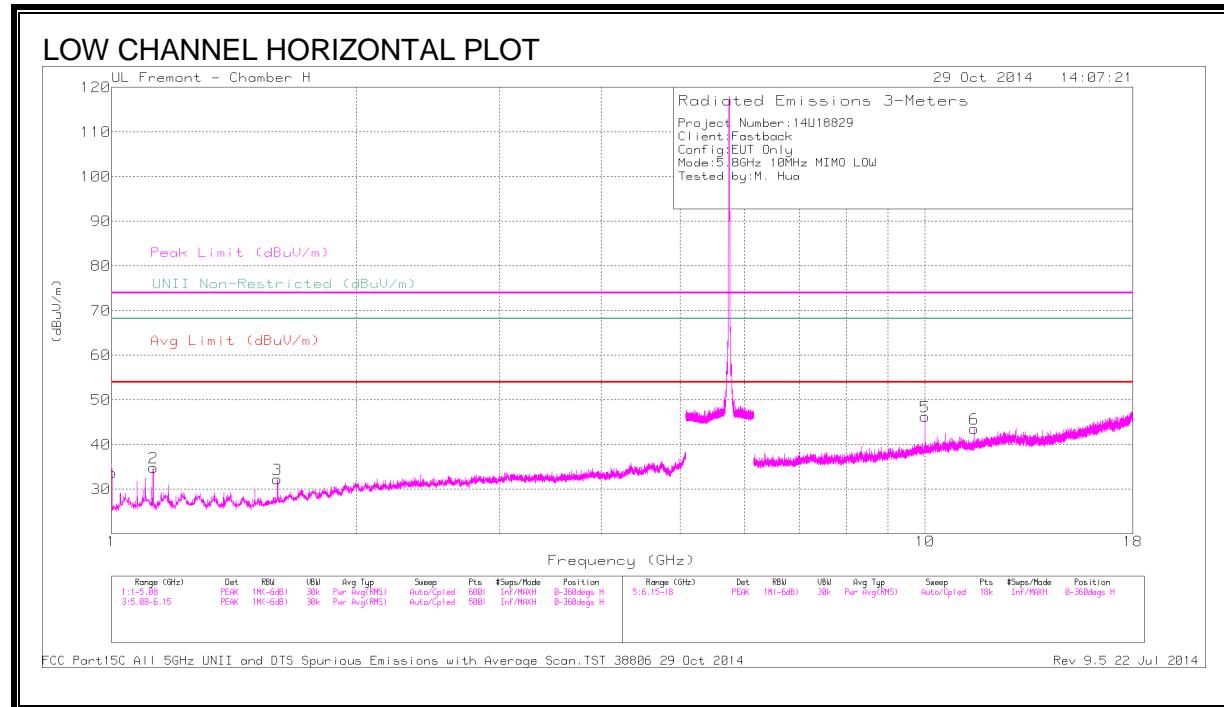
FCC §15.205 and §15.209

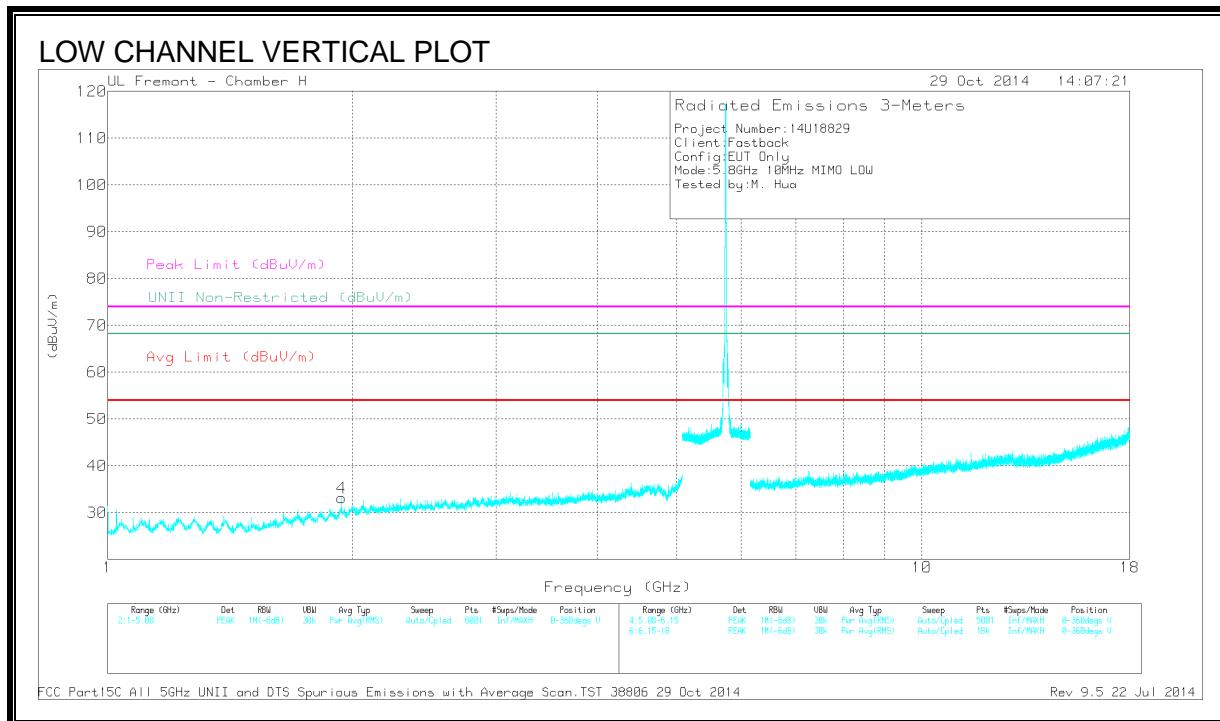
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. TX ABOVE 1 GHz 10MHz 2TX MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS





DATA

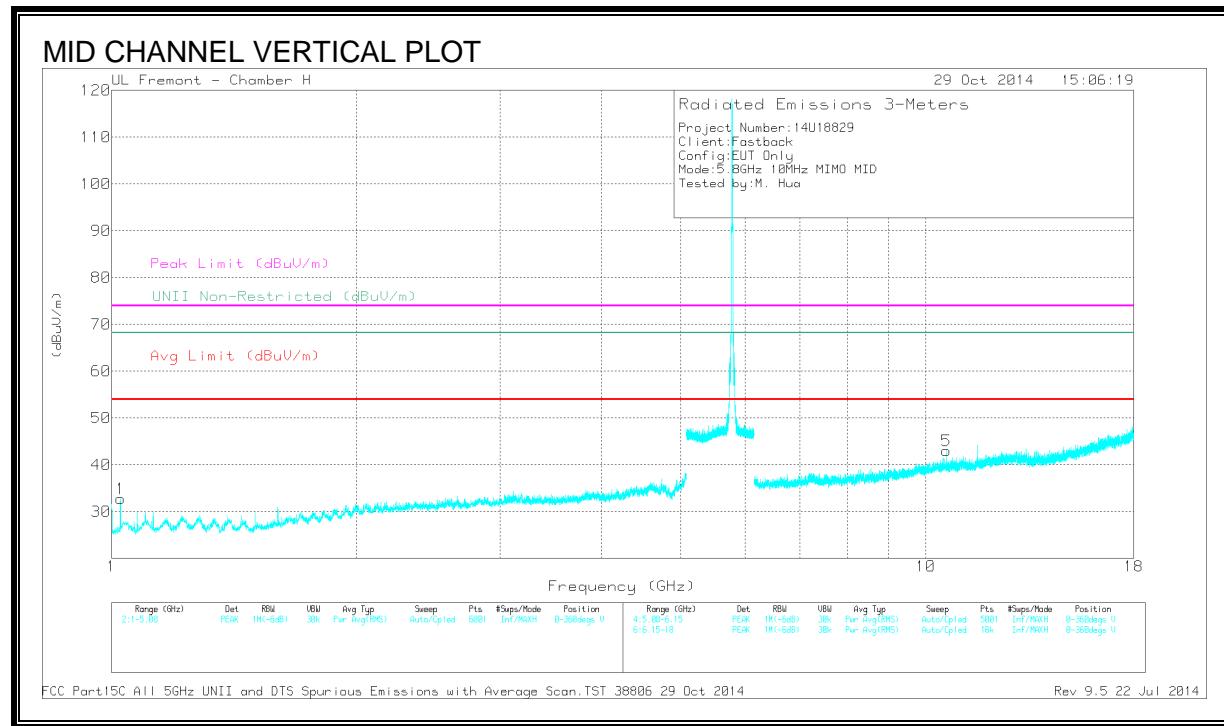
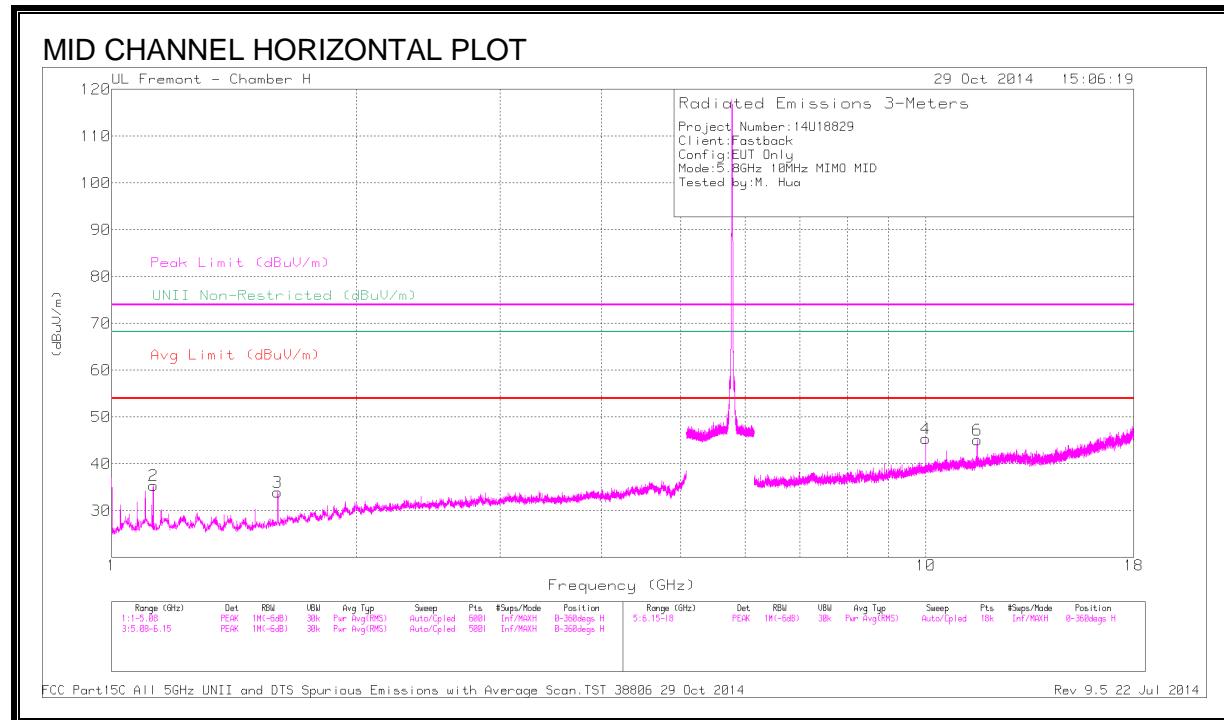
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Ft Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	48.51	PK1	27.7	-35.6	40.61	-	-	74	-33.39	-	-	55	280	H
	* 1	40.19	AD1	27.7	-35.6	32.29	54	-21.71	-	-	-	-	55	280	H
2	* 1.125	47.35	PK1	28.4	-35.6	40.15	-	-	74	-33.85	-	-	343	122	H
	* 1.125	39.94	AD1	28.4	-35.6	32.74	54	-21.26	-	-	-	-	343	122	H
3	* 1.6	45.72	PK1	28.5	-35	39.22	-	-	74	-34.78	-	-	57	146	H
	* 1.6	37.73	AD1	28.5	-35	31.23	54	-22.77	-	-	-	-	57	146	H
6	* 11.486	40.07	PK1	38.1	-25.9	52.27	-	-	74	-21.73	-	-	47	101	H
	* 11.486	28.67	AD1	38.1	-25.9	40.87	54	-13.13	-	-	-	-	47	101	H
4	1.938	43.52	PK1	30.9	-34.6	39.82	-	-	-	-	68.2	-28.38	197	108	V
5	10	40.12	PK1	37.3	-26.3	51.12	-	-	-	-	68.2	-17.08	182	107	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

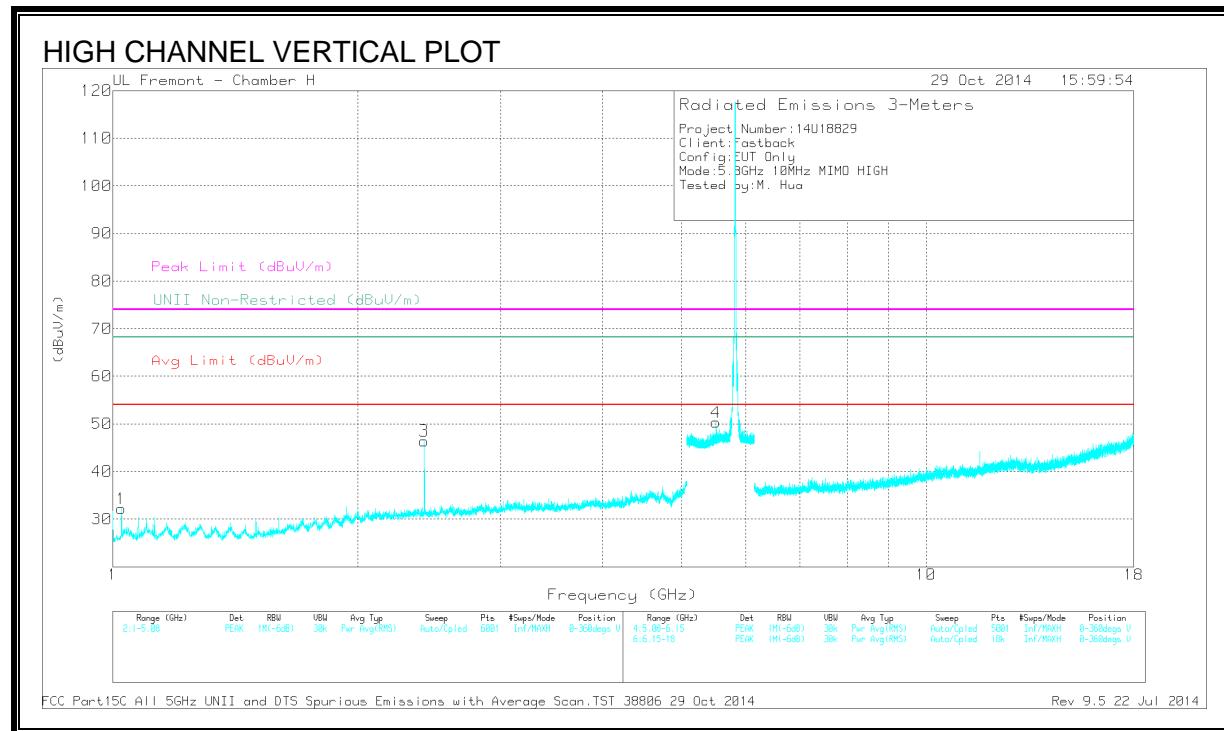
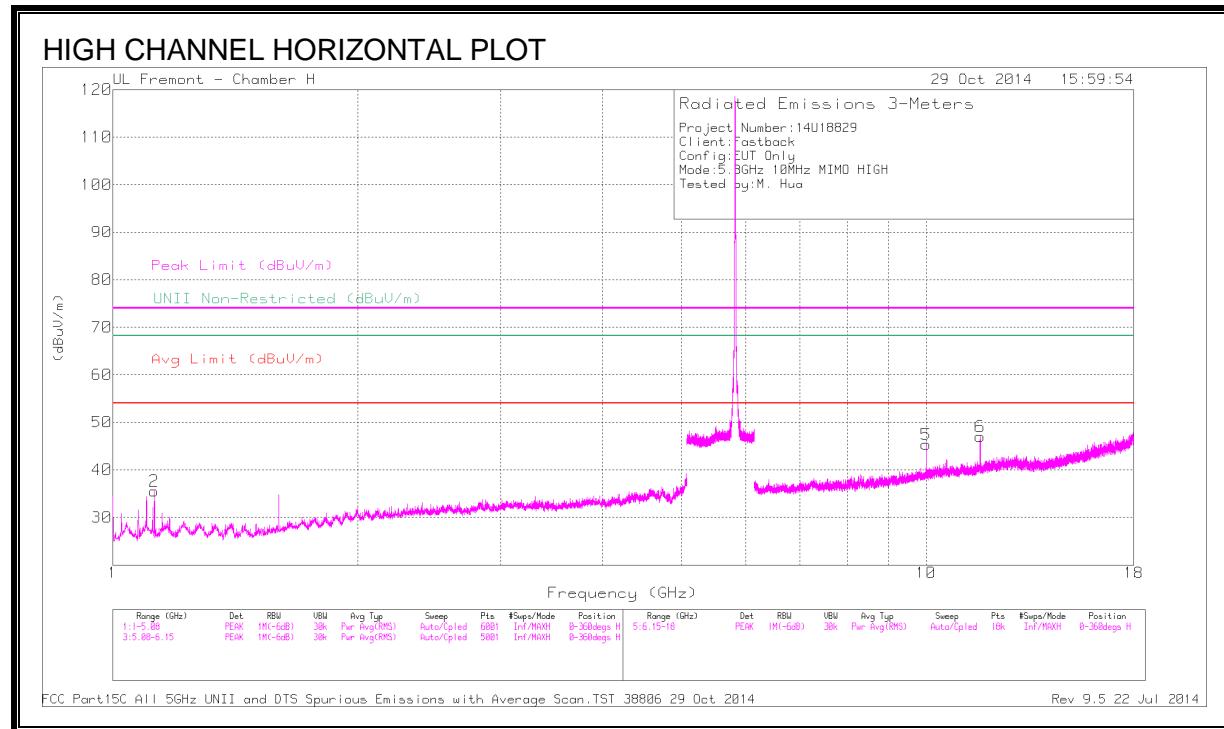
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Ft tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1.125	48.74	PK1	28.3	-35.6	41.44	-	-	74	-32.56	-	-	345	194	H
	* 1.125	40.89	AD1	28.4	-35.6	33.69	54	-20.31	-	-	-	-	345	194	H
3	* 1.6	46.48	PK1	28.5	-35	39.98	-	-	74	-34.02	-	-	48	188	H
	* 1.6	38.95	AD1	28.5	-35	32.45	54	-21.55	-	-	-	-	48	188	H
1	* 1.025	45.93	PK1	27.8	-35.5	38.23	-	-	74	-35.77	-	-	325	199	V
	* 1.025	36.57	AD1	27.8	-35.5	28.87	54	-25.13	-	-	-	-	325	199	V
6	* 11.56	40.29	PK1	38.2	-25.2	53.29	-	-	74	-20.71	-	-	26	137	H
	* 11.56	31.51	AD1	38.2	-25.2	44.51	54	-9.49	-	-	-	-	26	137	H
4	* 10.601	37.14	PK1	37.6	-25.5	49.24	-	-	74	-24.76	-	-	144	294	V
5	10	35.98	PK1	37.3	-26.3	46.98	-	-	-	-	68.2	-21.22	26	137	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filt Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1.125	47.81	PK1	28.4	-35.6	40.61	-	-	74	-33.39	-	-	339	120	H
	* 1.125	40.72	AD1	28.3	-35.6	33.42	54	-20.58	-	-	-	-	339	120	H
1	* 1.025	45.96	PK1	27.8	-35.5	38.26	-	-	74	-35.74	-	-	328	207	V
	* 1.025	36.99	AD1	27.8	-35.5	29.29	54	-24.71	-	-	-	-	328	207	V
6	* 11.653	40.17	PK1	38.3	-25.6	52.87	-	-	74	-21.13	-	-	273	100	H
	* 11.651	30.03	AD1	38.3	-25.6	42.73	54	-11.27	-	-	-	-	273	100	H
3	2.416	42.67	PK1	32	-34.1	40.57	-	-	-	-	68.2	-27.63	4	348	V
4	5.516	45.46	PK1	35.1	-22.4	58.16	-	-	-	-	68.2	-10.04	3	130	V
5	10	40.08	PK1	37.3	-26.3	51.08	-	-	-	-	68.2	-17.12	183	109	H

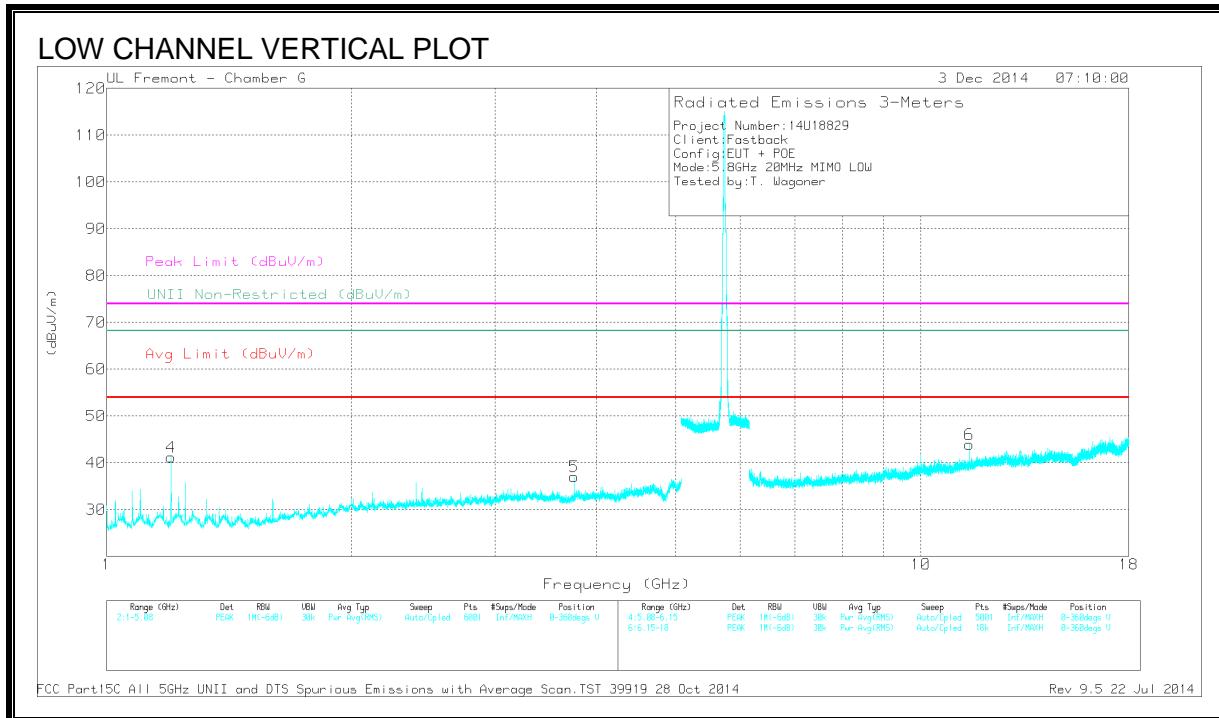
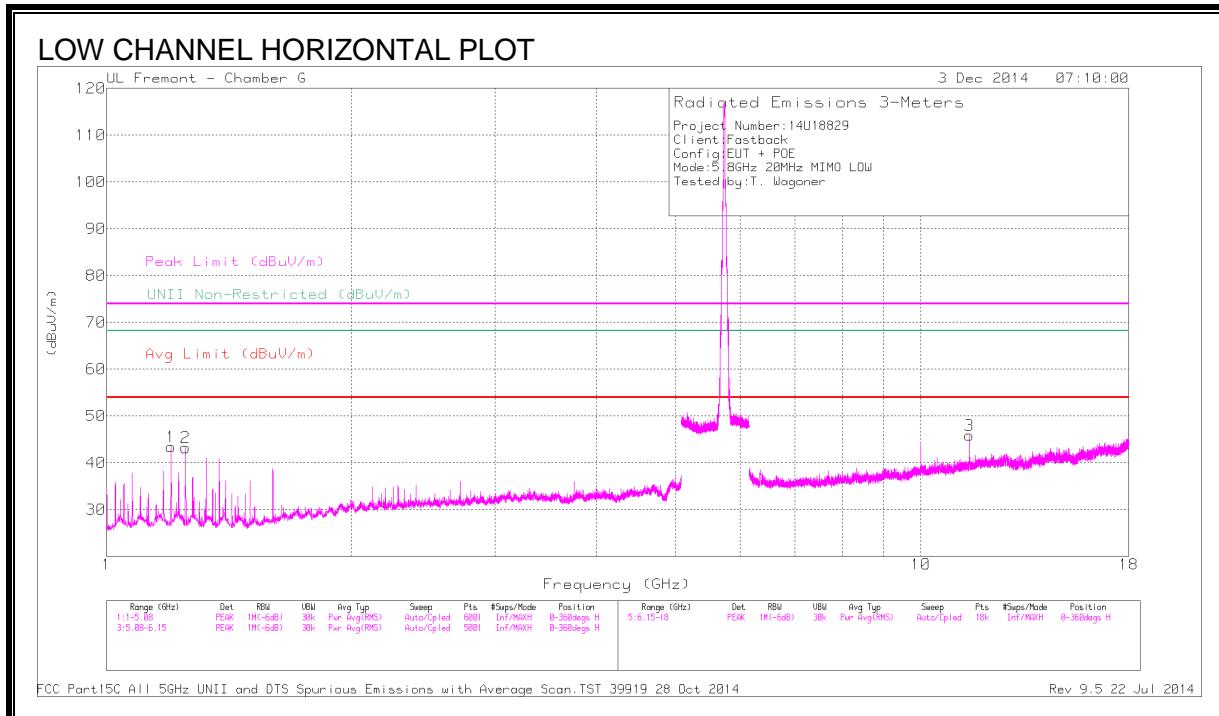
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

9.2.2. TX ABOVE 1 GHz 20MHz 2TX MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS



DATA

Radiated Emissions

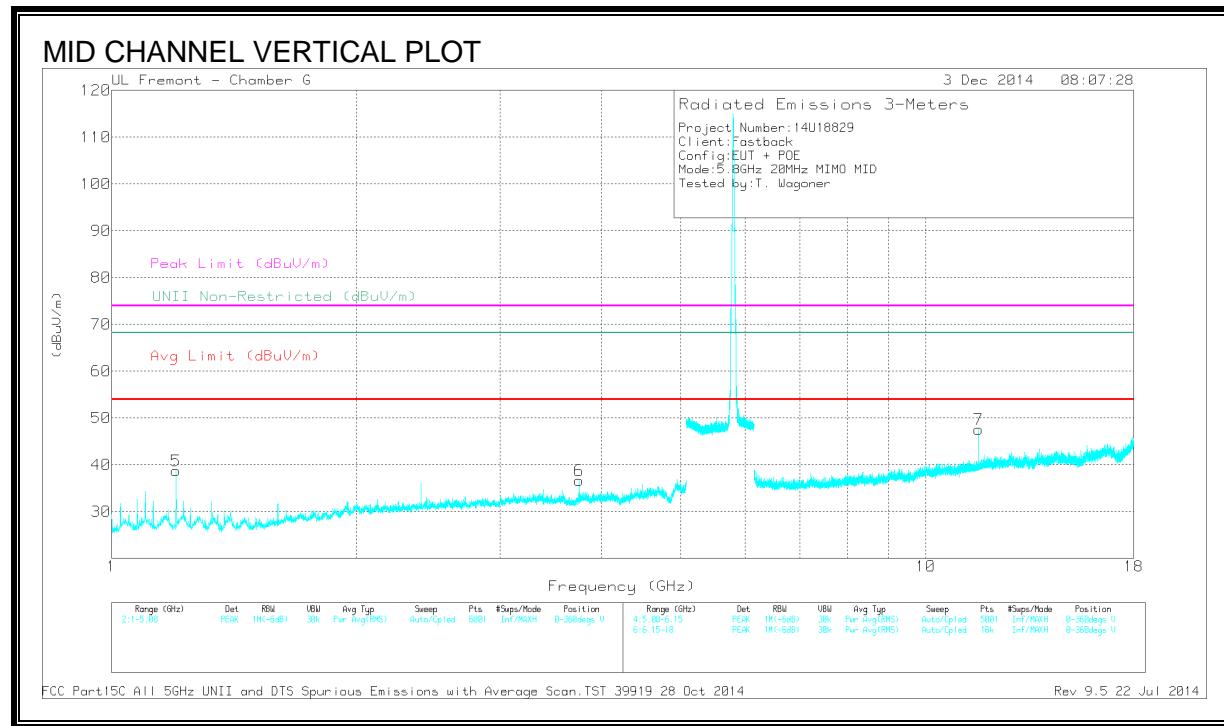
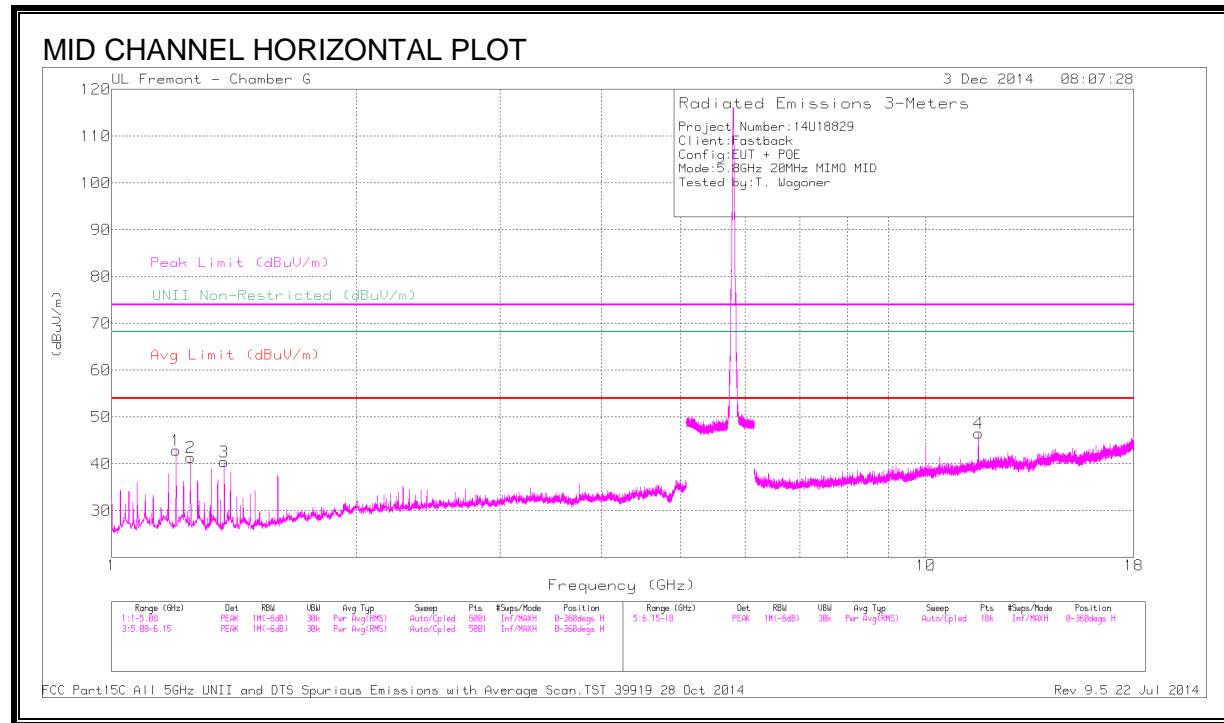
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	51.19	PK1	29	-35.7	44.49	54	-9.51	74	-29.51	-	-	53	103	H
	* 1.2	49.61	AD1	29	-35.7	42.91	54	-11.09	74	-31.09	-	-	53	103	H
2	* 1.25	49.45	PK1	29.2	-35.7	42.95	54	-11.05	74	-31.05	-	-	48	104	H
	* 1.25	47.26	AD1	29.2	-35.7	40.76	54	-13.24	74	-33.24	-	-	48	104	H
4	* 1.2	49.41	Avg	29	-35.7	42.71	54	-11.29	74	-31.29	-	-	39	254	V
5	* 3.75	40.99	PK1	32.9	-33.5	40.39	54	-13.61	74	-33.61	-	-	14	229	V
	* 3.75	36	AD1	32.9	-33.5	35.4	54	-18.6	74	-38.6	-	-	14	229	V
3	* 11.472	36.38	PK1	38.3	-26.9	47.78	54	-6.22	74	-26.22	-	-	22	100	H
	* 11.472	31.35	AD1	38.3	-26.9	42.75	54	-11.25	74	-31.25	-	-	22	100	H
6	* 11.472	37.45	PK1	38.3	-26.9	48.85	54	-5.15	74	-25.15	-	-	54	100	V
	* 11.472	33.08	AD1	38.3	-26.9	44.48	54	-9.52	74	-29.52	-	-	54	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Avg - Video bandwidth < Resolution bandwidth

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

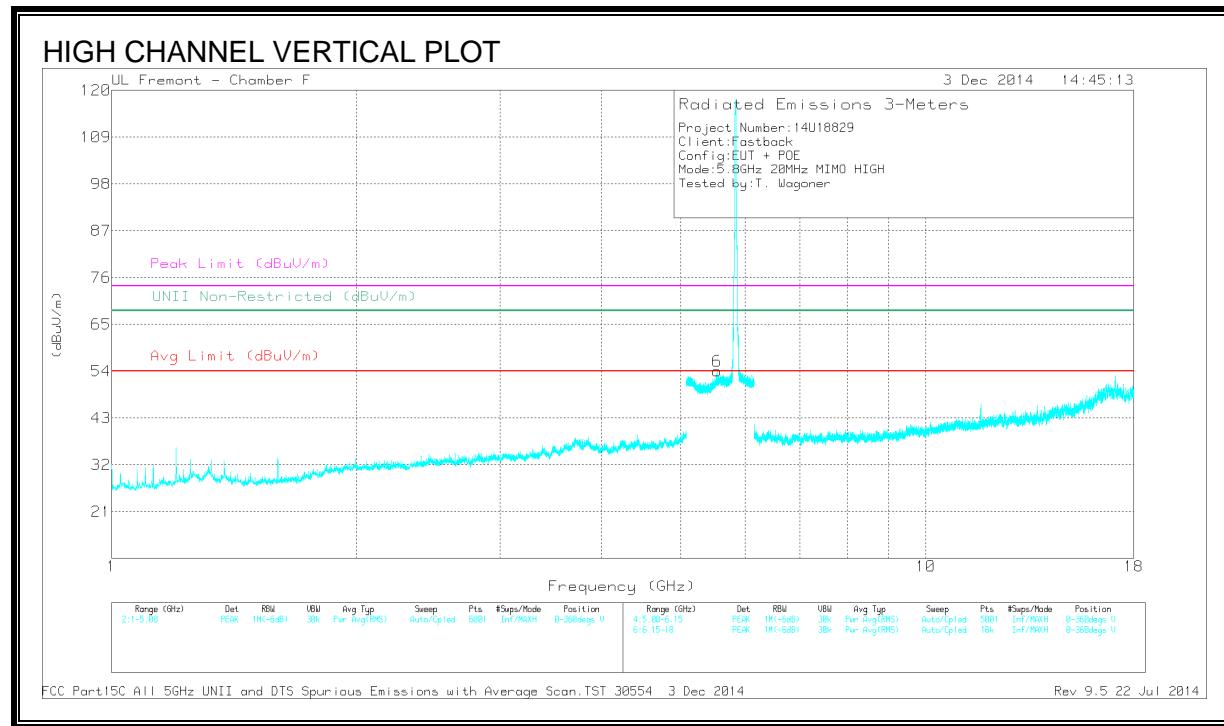
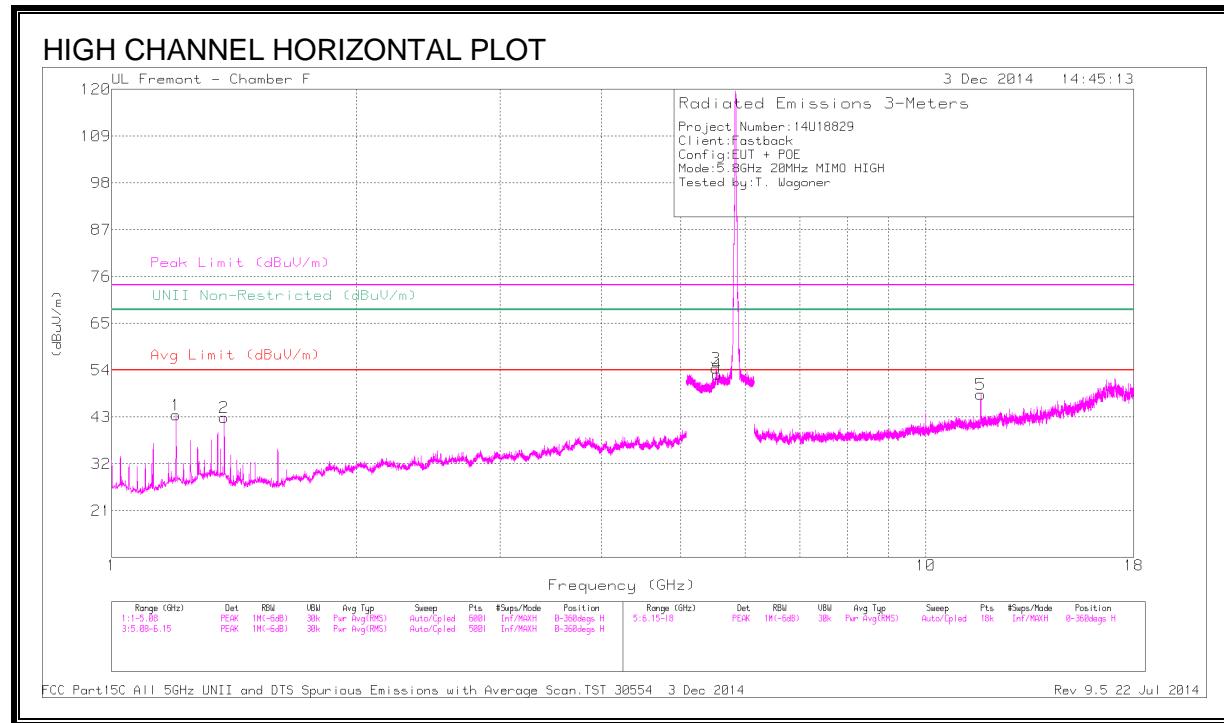
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	50.69	PK1	29	-35.7	43.99	54	-10.01	74	-30.01	-	-	49	102	H
	* 1.2	49.07	AD1	29	-35.7	42.37	54	-11.63	74	-31.63	-	-	49	102	H
2	* 1.25	48.68	PK1	29.2	-35.7	42.18	54	-11.82	74	-31.82	-	-	45	106	H
	* 1.25	46.58	AD1	29.2	-35.7	40.08	54	-13.92	74	-33.92	-	-	45	106	H
3	* 1.375	47.32	PK1	28.6	-35.3	40.62	54	-13.38	74	-33.38	-	-	55	107	H
	* 1.375	44.31	AD1	28.6	-35.3	37.61	54	-16.39	74	-36.39	-	-	55	107	H
5	* 1.2	49.15	PK1	29	-35.7	42.45	54	-11.55	74	-31.55	-	-	35	251	V
	* 1.2	47.24	AD1	29	-35.7	40.54	54	-13.46	74	-33.46	-	-	35	251	V
6	* 3.75	40.99	PK1	32.9	-33.5	40.39	54	-13.61	74	-33.61	-	-	14	229	V
	* 3.75	36	AD1	32.9	-33.5	35.4	54	-18.6	74	-38.6	-	-	14	229	V
4	* 11.6	37.68	PK1	38.5	-27.1	49.08	54	-4.92	74	-24.92	-	-	0	179	H
	* 11.6	33.48	AD1	38.5	-27.1	44.88	54	-9.12	74	-29.12	-	-	0	179	H
7	* 11.6	40.91	PK1	38.5	-27.1	52.31	54	-1.69	74	-21.69	-	-	17	252	V
	* 11.6	38.04	AD1	38.5	-27.1	49.44	54	-4.56	74	-24.56	-	-	17	252	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fit r/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non- Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	47.68	PK1	29	-32.5	44.18	54	-9.82	74	-29.82	-	-	320	107	H
	* 1.2	46.05	AD1	29	-32.5	42.55	54	-11.45	74	-31.45	-	-	320	107	H
2	* 1.375	45.68	PK1	29.4	-31.9	43.18	54	-10.82	74	-30.82	-	-	58	218	H
	* 1.375	42.75	AD1	29.4	-31.9	40.25	54	-13.75	74	-33.75	-	-	58	218	H
5	* 11.678	36.41	PK1	38.6	-22.9	52.11	54	-1.89	74	-21.89	-	-	0	108	H
	* 11.678	30.13	AD1	38.6	-22.9	45.83	54	-8.17	74	-28.17	-	-	0	108	H
3	5.527	42.12	PK1	34.6	-19.4	57.32	-	-	-	-	68.2	-10.88	44	111	H
4	5.537	42.05	PK1	34.6	-19.5	57.15	-	-	-	-	68.2	-11.05	352	120	H
6	5.538	40.54	PK1	34.6	-19.5	55.64	-	-	-	-	68.2	-12.56	352	120	V

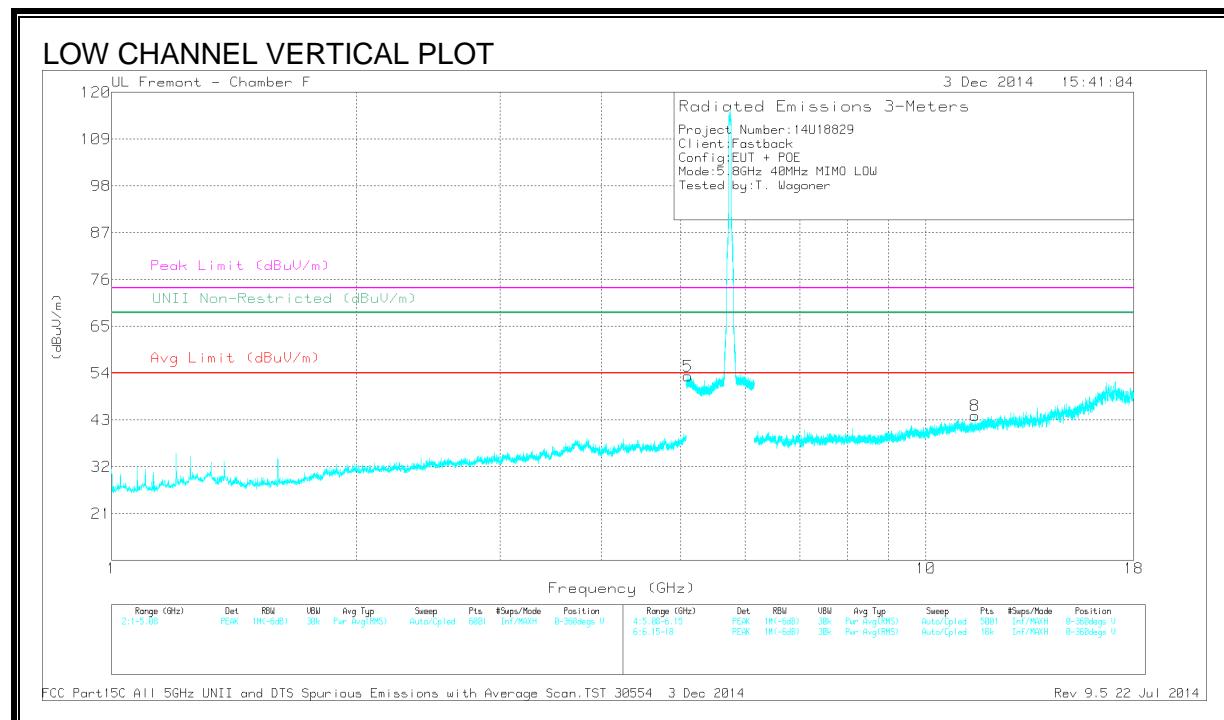
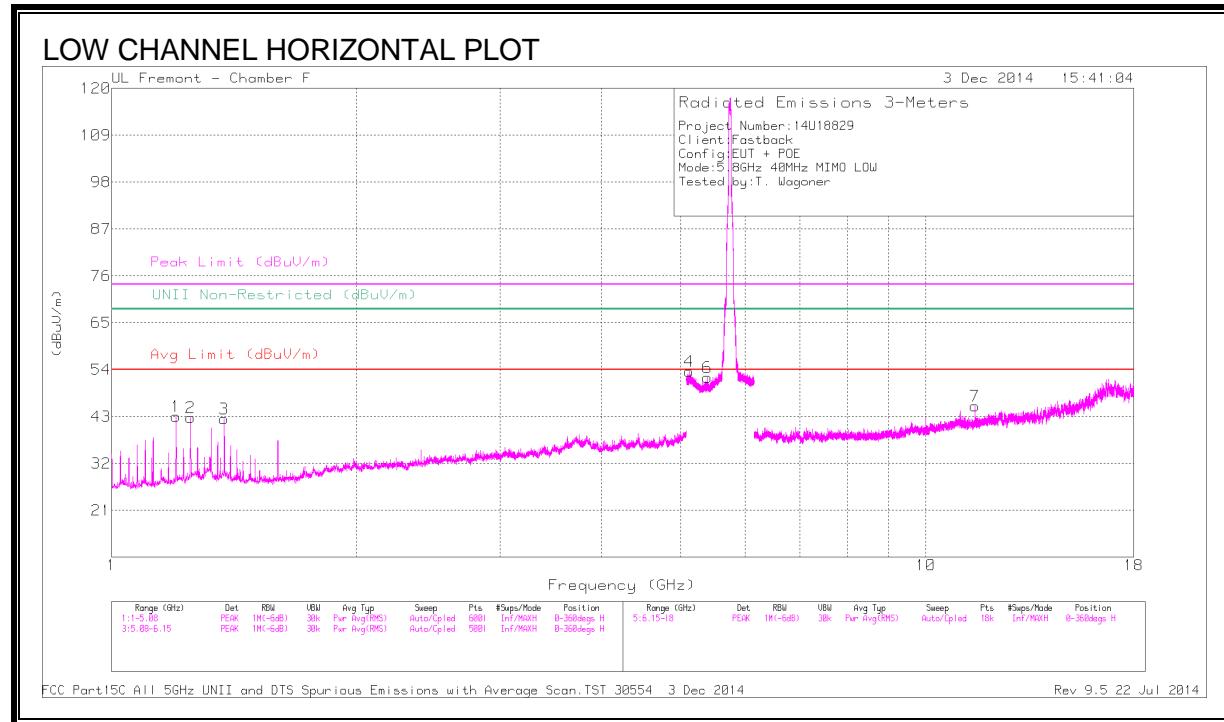
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

9.2.3. TX ABOVE 1 GHz 40MHz 2TX MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS



DATA

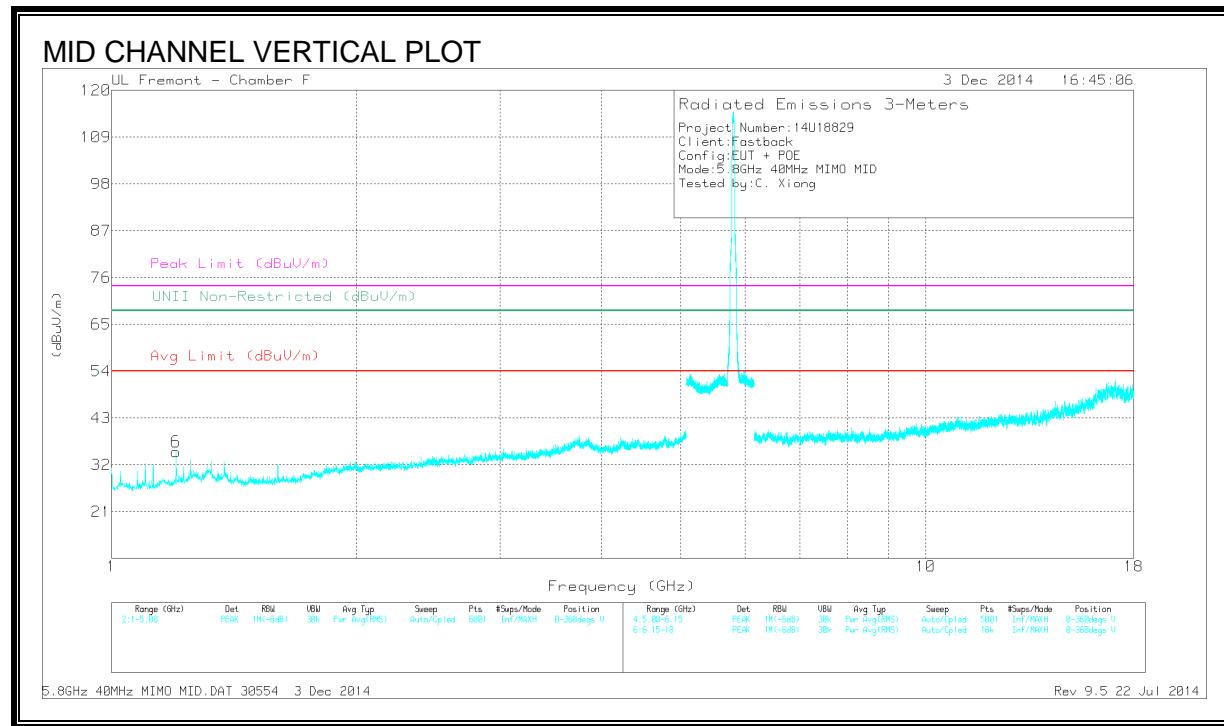
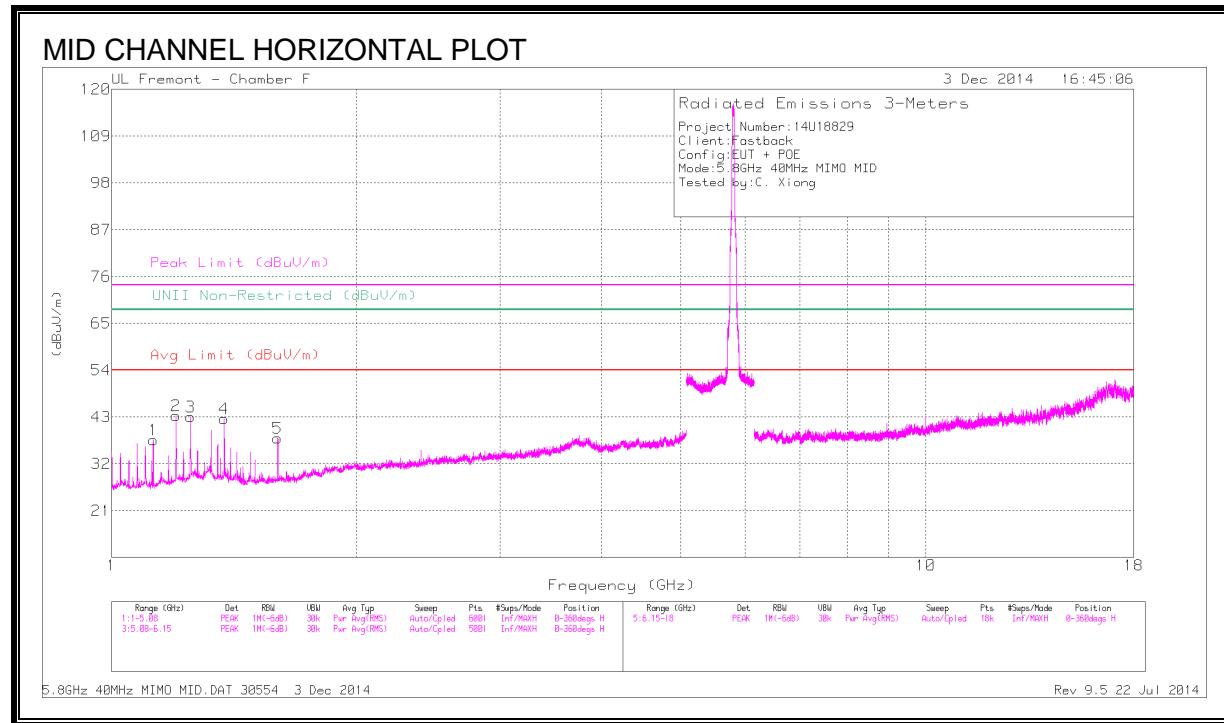
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	47.63	PK1	29	-32.5	44.13			74	-29.87	-	-	333	106	H
	* 1.2	45.81	AD1	29	-32.5	42.31	54	-11.69			-	-	333	106	H
2	* 1.25	46.14	PK1	29.5	-32.2	43.44			74	-30.56	-	-	52	104	H
	* 1.25	43.95	AD1	29.5	-32.2	41.25	54	-12.75			-	-	52	104	H
3	* 1.375	45.74	PK1	29.4	-31.9	43.24			74	-30.76	-	-	53	213	H
	* 1.375	42.55	AD1	29.4	-31.9	40.05	54	-13.95			-	-	53	213	H
4	* 5.117	33.53	PK1	34.4	-19.4	48.53			74	-25.47	-	-	144	334	H
	* 5.117	26.43	AD1	34.3	-19.4	41.33	54	-12.67			-	-	144	334	H
5	* 5.102	40.55	PK1	34.3	-19.7	55.15			74	-18.85	-	-	269	368	V
	* 5.108	33.56	AD1	34.3	-19.7	48.16	54	-5.84			-	-	269	368	V
6	* 5.386	43.51	PK1	34.5	-19.4	58.61	-	-	74	-15.39			158	138	H
	* 5.388	31.99	AD1	34.6	-19.5	47.09	54	-6.91	-	-			158	138	H
7	* 11.492	32.33	PK1	38.4	-22.6	48.13			74	-25.87	-	-	23	103	H
	* 11.492	26.36	AD1	38.4	-22.6	42.16	54	-11.84			-	-	23	103	H
8	* 11.492	32.81	PK1	38.4	-22.5	48.71			74	-25.29	-	-	43	293	V
	* 11.492	27.5	AD1	38.4	-22.6	43.3	54	-10.7			-	-	43	293	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

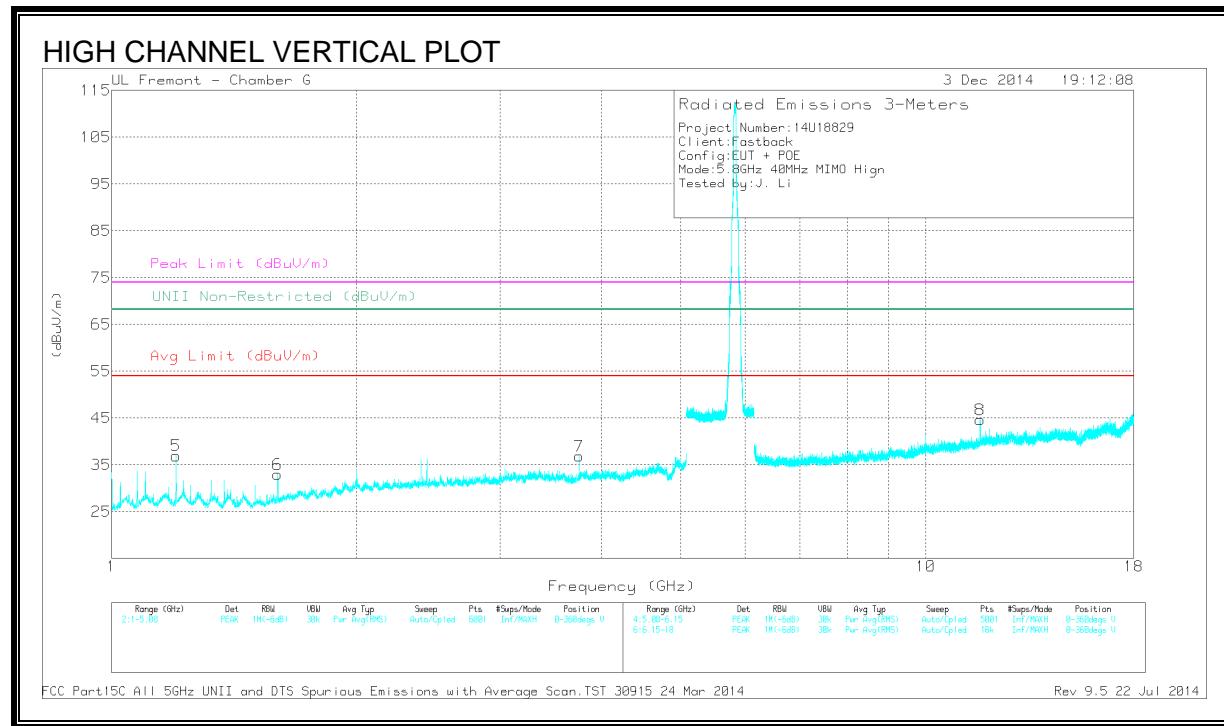
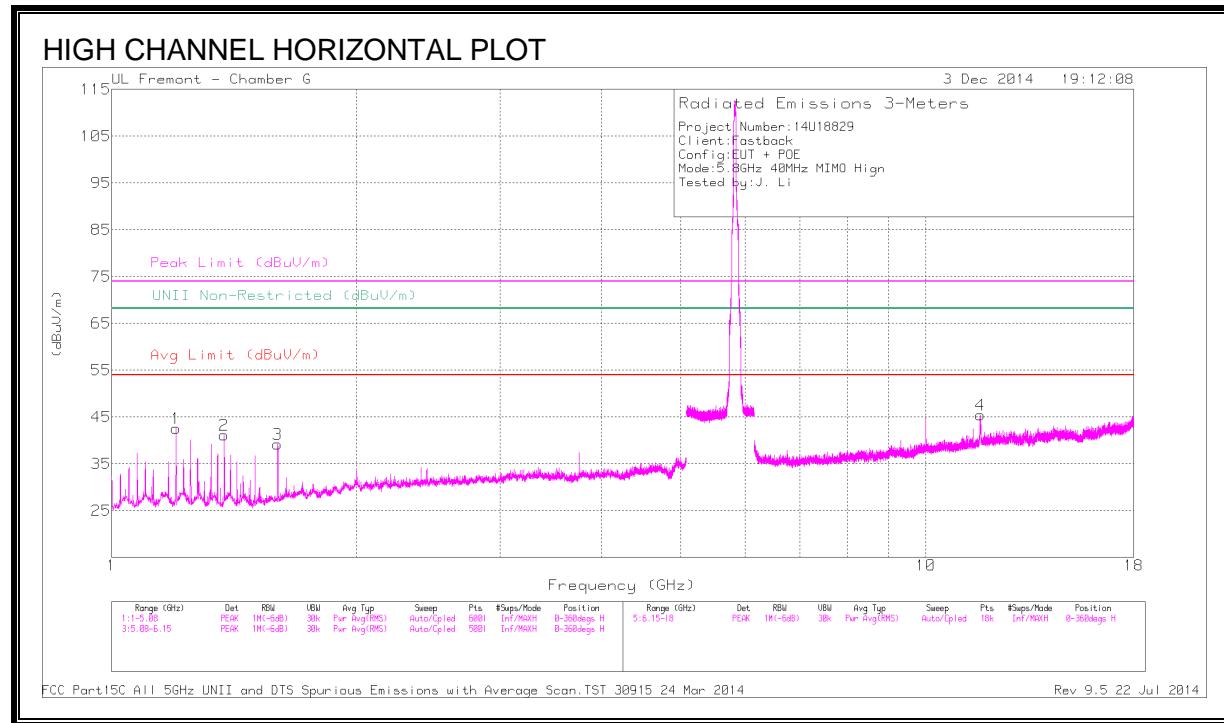
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.125	44.74	PK1	27.9	-32.5	40.14	54	-13.86	74	-33.86	-	-	25	120	H
* 1.125	37.49	AD1	27.9	-32.5	32.89	54	-21.11	74	-41.11	-	-	25	120	H
* 1.2	51.59	PK1	29	-32.5	48.09	54	-5.91	74	-25.91	-	-	59	103	H
* 1.2	48.18	AD1	29	-32.5	44.68	54	-9.32	74	-29.32	-	-	59	103	H
* 1.25	49.09	PK1	29.5	-32.2	46.39	54	-7.61	74	-27.61	-	-	51	102	H
* 1.25	43.56	AD1	29.5	-32.2	40.86	54	-13.14	74	-33.14	-	-	51	102	H
* 1.375	47.75	PK1	29.4	-31.9	45.25	54	-8.75	74	-28.75	-	-	51	226	H
* 1.375	41.42	AD1	29.4	-31.9	38.92	54	-15.08	74	-35.08	-	-	51	226	H
* 1.6	47.6	PK1	28.5	-31.7	44.4	54	-9.6	74	-29.6	-	-	41	161	H
* 1.6	41.27	AD1	28.5	-31.7	38.07	54	-15.93	74	-35.93	-	-	41	161	H
* 1.2	50.53	PK1	29	-32.5	47.03	54	-6.97	74	-26.97	-	-	38	240	V
* 1.2	46.96	AD1	29	-32.5	43.46	54	-10.54	74	-30.54	-	-	38	240	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average



DATA

Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Ft tr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	51.62	PK2	29	-35.7	44.92	-	-	74	-29.08	-	-	227	107	H
	* 1.2	48.49	MAv1	29	-35.7	41.79	54	-12.21	-	-	-	-	227	107	H
2	* 1.375	50.6	PK2	28.6	-35.3	43.9	-	-	74	-30.1	-	-	236	147	H
	* 1.375	45.41	MAv1	28.6	-35.3	38.71	54	-15.29	-	-	-	-	236	147	H
3	* 1.6	50.77	PK2	28.6	-35.3	44.07	-	-	74	-29.93	-	-	225	183	H
	* 1.6	45.68	MAv1	28.6	-35.3	38.98	54	-15.02	-	-	-	-	225	183	H
5	* 1.2	49.21	PK2	29	-35.7	42.51	-	-	74	-31.49	-	-	192	335	V
	* 1.2	45	MAv1	29	-35.7	38.3	54	-15.7	-	-	-	-	192	335	V
6	* 1.6	45.67	PK2	28.6	-35.3	38.97	-	-	74	-35.03	-	-	208	103	V
	* 1.6	37.97	MAv1	28.6	-35.3	31.27	54	-22.73	-	-	-	-	208	103	V
7	* 3.75	44.19	PK2	32.9	-33.5	43.59	-	-	74	-30.41	-	-	193	233	V
	* 3.75	36.4	MAv1	32.9	-33.5	35.8	54	-18.2	-	-	-	-	193	233	V
4	* 11.658	39.45	PK2	38.6	-27	51.05	-	-	74	-22.95	-	-	228	160	H
	* 11.658	32.29	MAv1	38.6	-27	43.89	54	-10.11	-	-	-	-	228	160	H
8	* 11.658	41.45	PK2	38.6	-27	53.05	-	-	74	-20.95	-	-	195	269	V
	* 11.658	35.65	MAv1	38.6	-27	47.25	54	-6.75	-	-	-	-	195	269	V

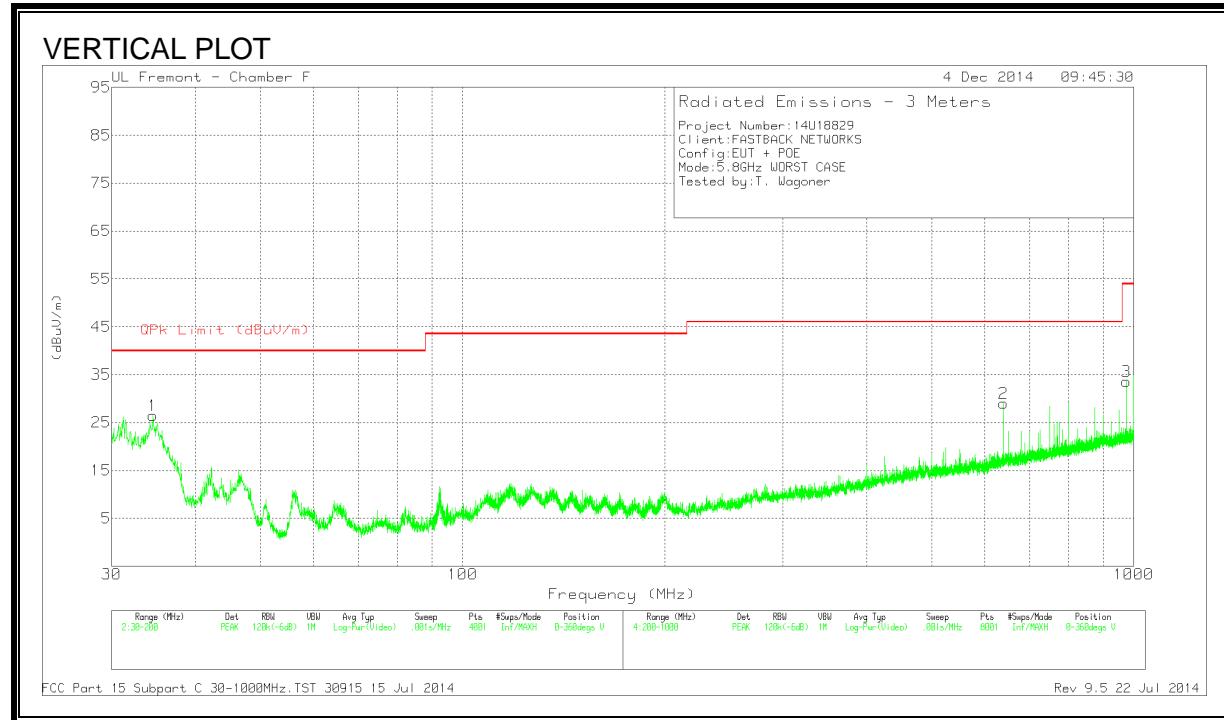
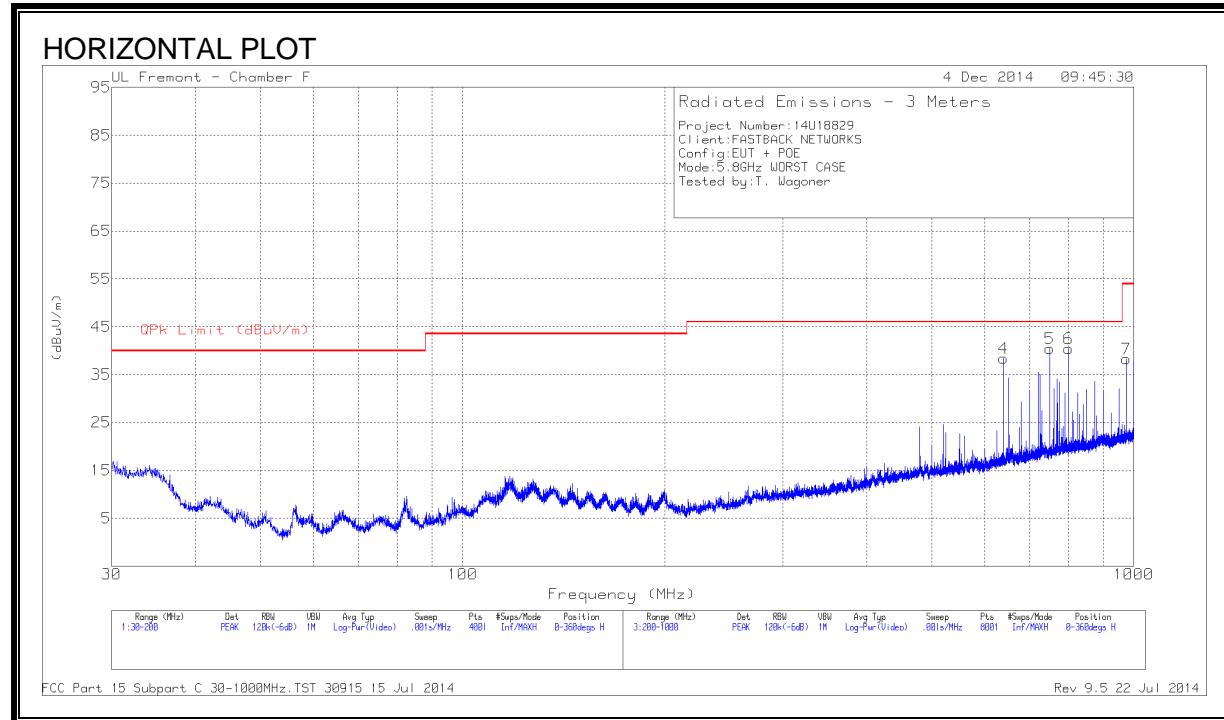
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

9.3. WORST-CASE BELOW 1 GHz

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



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	34.59	40.55	PK	17.9	-32	26.45	40	-13.55	0-360	100	V
4	640	48.37	PK	19.8	-29.8	38.37	46.02	-7.65	0-360	100	H
5	750	49.25	PK	20.8	-29.6	40.45	46.02	-5.57	0-360	100	H
6	800	48.48	PK	21.4	-29.4	40.48	46.02	-5.54	0-360	100	H
7	* 975	42.94	PK	23.1	-27.8	38.24	53.97	-15.73	0-360	201	H
2	640	38.99	PK	19.8	-29.8	28.99	46.02	-17.03	0-360	100	V
3	* 975	38.31	PK	23.1	-27.8	33.61	53.97	-20.36	0-360	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
750.0095	48.92	QP	20.8	-29.6	40.12	46.02	-5.9	259	100	H
800.0076	47.99	QP	21.4	-29.4	39.99	46.02	-6.03	318	101	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

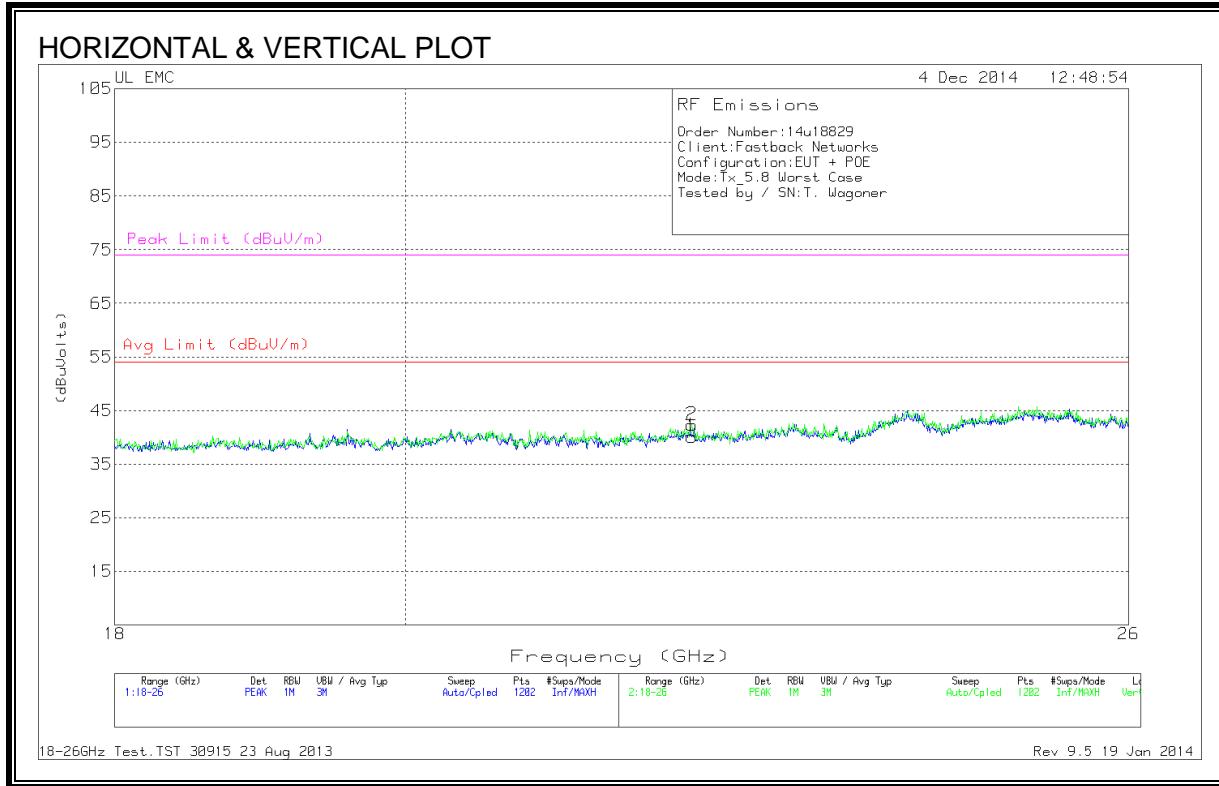
QP - Quasi-Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

Rev 9.5 22 Jul 2014

9.4. WORST-CASE 18 to 26 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



HORIZONTAL & VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AFT125 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	22.19	39.37	PK	33.5	-23.2	-9.5	40.16	54	-13.83	74	-33.83
2	22.19	41.53	PK	33.5	-23.2	-9.5	42.33	54	-11.66	74	-31.66

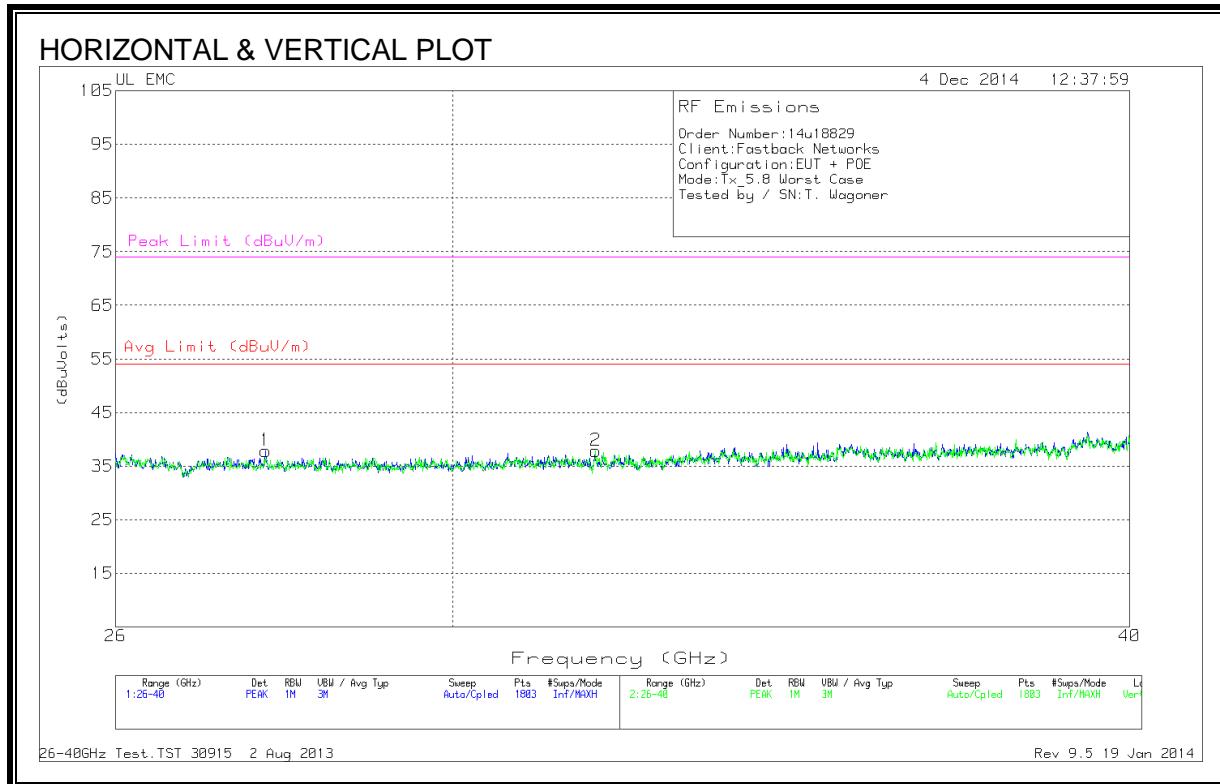
PK - Peak detector

No Emission above the noise floor were detected. Markers in place for reference only.

18-26GHz Test.TST 30915 23 Aug 2013 Rev 9.5 19 Jan 2014

9.5. WORST-CASE 26 to 40 GHz

SPURIOUS EMISSIONS 26 TO 40 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



HORIZONTAL & VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	27.709	46.03	PK	35.8	-34.5	-9.5	37.8333	54	-16.1667	74	-36.1667
2	31.881	47.83	PK	36.3	-36.8	-9.5	37.8333	54	-16.1667	74	-36.1667

PK - Peak detector

No Emission above the noise floor were detected. Markers in place for reference only.

26-40GHz Test.TST 30915 2 Aug 2013 Rev 9.5 19 Jan 2014

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

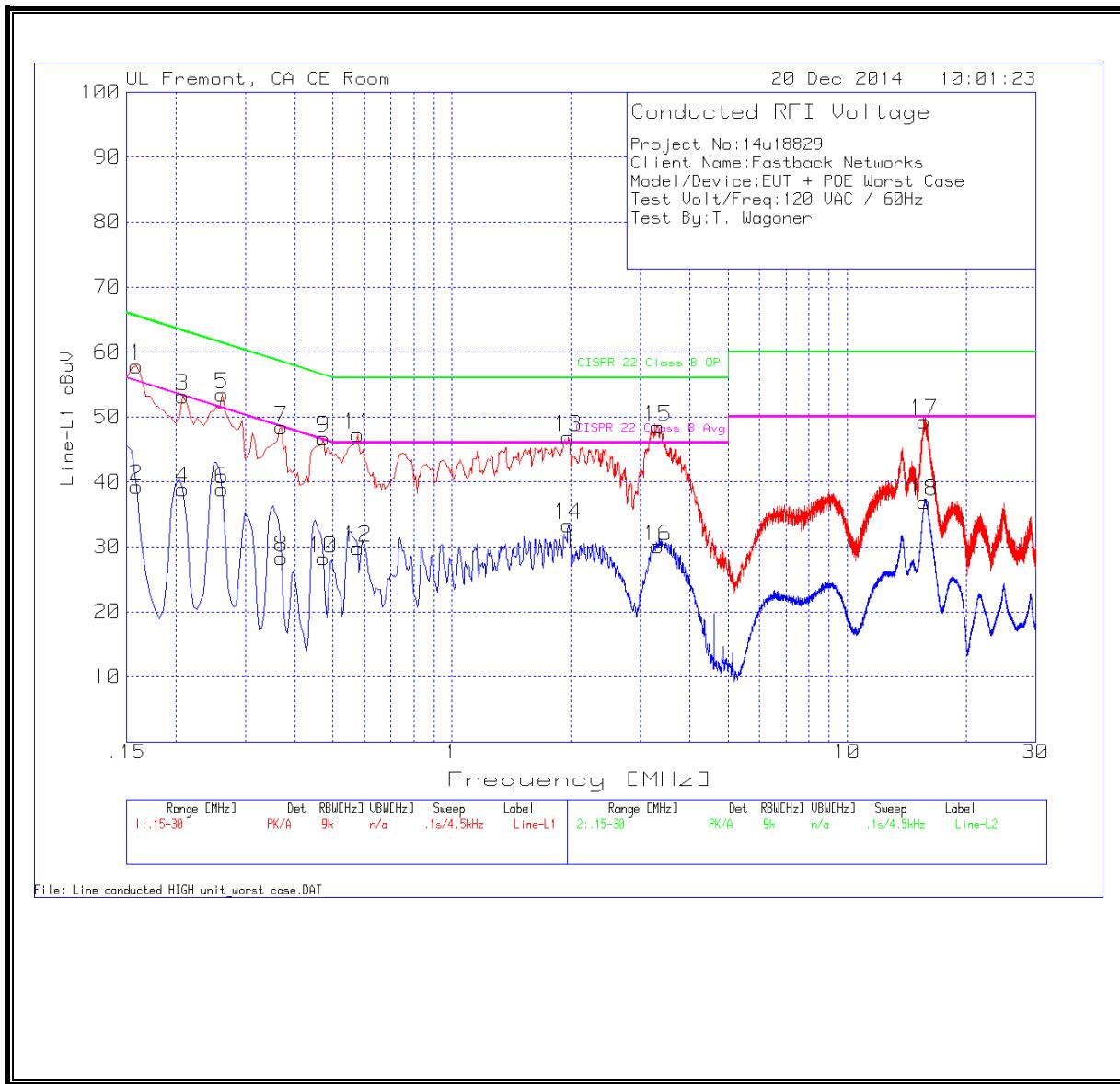
FCC §15.207 (a)

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

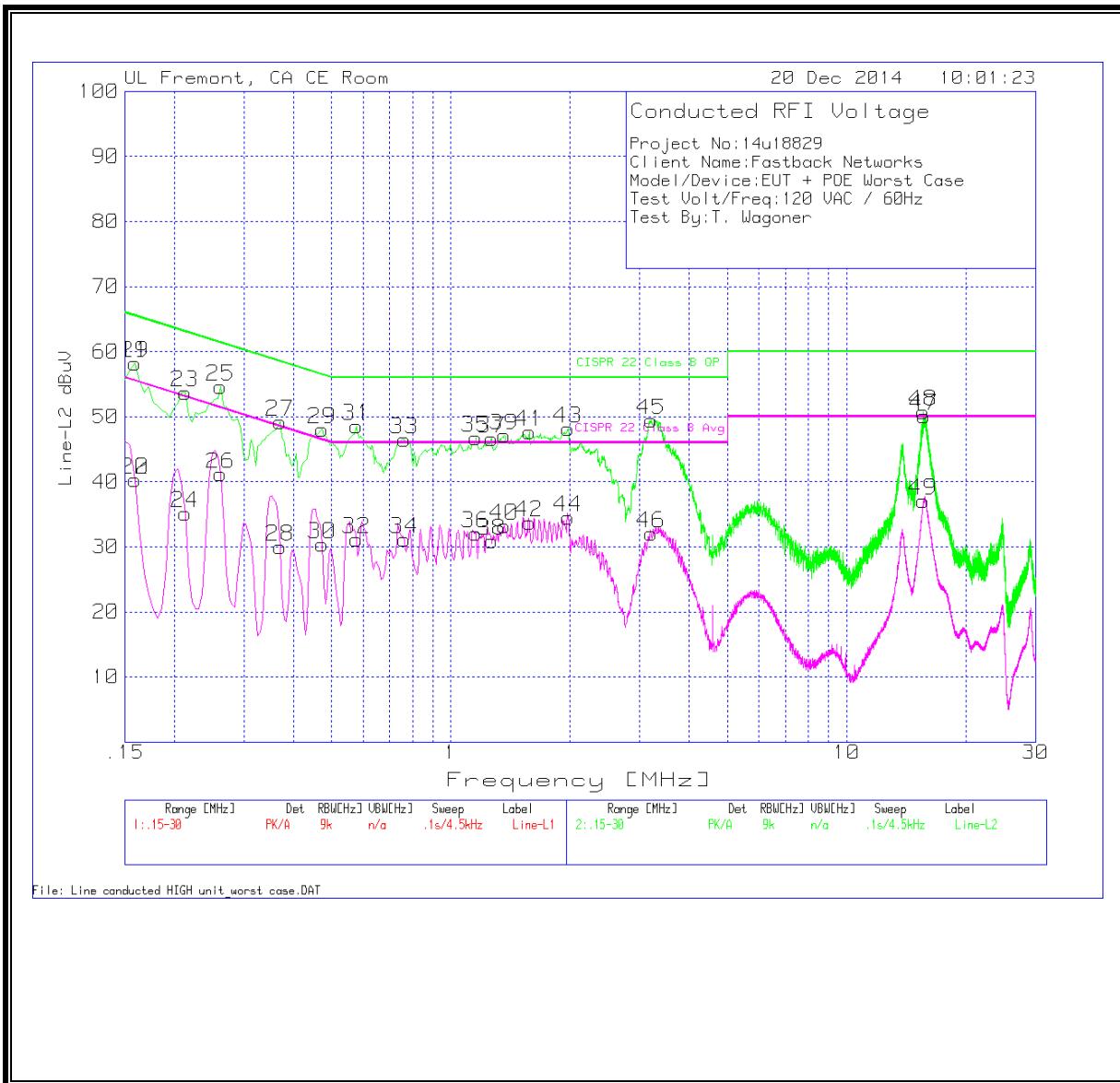
* Decreases with the logarithm of the frequency.

WORST CASE RESULTS

LINE 1 RESULTS



LINE 2 RESULTS



DATA

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.159	56.55	PK	1.3	0	57.85	65.5	-7.65	-	-
2	.159	38.01	Av	1.3	0	39.31	-	-	55.5	-16.19
3	.2085	52.25	PK	.9	0	53.15	63.3	-10.15	-	-
4	.2085	37.98	Av	.9	0	38.88	-	-	53.3	-14.42
5	.2625	52.75	PK	.7	0	53.45	61.4	-7.95	-	-
6	.2625	38.19	Av	.7	0	38.89	-	-	51.4	-12.51
7	.3705	47.97	PK	.4	0	48.37	58.5	-10.13	-	-
8	.3705	27.95	Av	.4	0	28.35	-	-	48.5	-20.15
9	.474	46.33	PK	.4	0	46.73	56.4	-9.67	-	-
10	.474	27.85	Av	.4	0	28.25	-	-	46.4	-18.15
11	.5775	46.92	PK	.3	0	47.22	56	-8.78	-	-
12	.5775	29.54	Av	.3	0	29.84	-	-	46	-16.16
13	1.9725	46.56	PK	.2	.1	46.86	56	-9.14	-	-
14	1.9725	33.09	Av	.2	.1	33.39	-	-	46	-12.61
15	3.3225	48.19	PK	.2	.1	48.49	56	-7.51	-	-
16	3.3225	29.76	Av	.2	.1	30.06	-	-	46	-15.94
17	15.7065	48.87	PK	.3	.2	49.37	60	-10.63	-	-
18	15.7065	36.41	Av	.3	.2	36.91	-	-	50	-13.09

Quasi-Peak Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
.1581	51.19	QP	1.3	0	52.49	65.6	-13.11	-	-
.2094	47.84	QP	.9	0	48.74	63.2	-14.46	-	-
.2634	50.15	QP	.7	0	50.85	61.3	-10.45	-	-
.3696	45.43	QP	.5	0	45.93	58.5	-12.57	-	-
.4731	44.42	QP	.4	0	44.82	56.5	-11.68	-	-
.5793	45.13	QP	.3	0	45.43	56	-10.57	-	-
1.9734	44.63	QP	.2	.1	44.93	56	-11.07	-	-
3.3216	44.26	QP	.2	.1	44.56	56	-11.44	-	-
15.7101	43.76	QP	.3	.2	44.26	60	-15.74	-	-

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
19	.159	56.8	PK	1.4	0	58.2	65.5	-7.3	-	-
20	.159	38.94	Av	1.4	0	40.34	-	-	55.5	-15.16
21	.159	56.8	PK	1.4	0	58.2	65.5	-7.3	-	-
22	.159	38.94	Av	1.4	0	40.34	-	-	55.5	-15.16
23	.213	52.82	PK	.9	0	53.72	63.1	-9.38	-	-
24	.213	34.3	Av	.9	0	35.2	-	-	53.1	-17.9
25	.2625	53.87	PK	.7	0	54.57	61.4	-6.83	-	-
26	.2625	40.45	Av	.7	0	41.15	-	-	51.4	-10.25
27	.3705	48.67	PK	.5	0	49.17	58.5	-9.33	-	-
28	.3705	29.5	Av	.5	0	30	-	-	48.5	-18.5
29	.474	47.67	PK	.4	0	48.07	56.4	-8.33	-	-
30	.474	29.95	Av	.4	0	30.35	-	-	46.4	-16.05
31	.5775	48.27	PK	.3	0	48.57	56	-7.43	-	-
32	.5775	30.88	Av	.3	0	31.18	-	-	46	-14.82
33	.762	46.16	PK	.3	0	46.46	56	-9.54	-	-
34	.762	30.88	Av	.3	0	31.18	-	-	46	-14.82
35	1.158	46.46	PK	.3	0	46.76	56	-9.24	-	-
36	1.158	31.74	Av	.3	0	32.04	-	-	46	-13.96
37	1.266	46.33	PK	.2	.1	46.63	56	-9.37	-	-
38	1.266	30.58	Av	.2	.1	30.88	-	-	46	-15.12
39	1.365	46.78	PK	.2	.1	47.08	56	-8.92	-	-
40	1.365	32.92	Av	.2	.1	33.22	-	-	46	-12.78
41	1.5765	47.3	PK	.2	.1	47.6	56	-8.4	-	-
42	1.5765	33.41	Av	.2	.1	33.71	-	-	46	-12.29
43	1.9815	47.87	PK	.2	.1	48.17	56	-7.83	-	-
44	1.9815	34.23	Av	.2	.1	34.53	-	-	46	-11.47
45	3.201	49.1	PK	.2	.1	49.4	56	-6.6	-	-
46	3.201	31.76	Av	.2	.1	32.06	-	-	46	-13.94
48	15.621	50.2	PK	.3	.2	50.7	60	-9.3	-	-
49	15.621	36.57	Av	.3	.2	37.07	-	-	50	-12.93
47	15.6705	49.57	PK	.3	.2	50.07	60	-9.93	-	-

Quasi-Peak Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
.1554	51.71	QP	1.4	0	53.11	65.7	-12.59	-	-
.2094	48.38	QP	1	0	49.38	63.2	-13.82	-	-
.2652	49.97	QP	.7	0	50.67	61.3	-10.63	-	-
.3687	46.8	QP	.5	0	47.3	58.5	-11.2	-	-
.474	46.16	QP	.4	0	46.56	56.4	-9.84	-	-
.5802	46.36	QP	.3	0	46.66	56	-9.34	-	-
.7602	45.1	QP	.3	.1	45.5	56	-10.5	-	-
1.1589	44.6	QP	.3	0	44.9	56	-11.1	-	-
1.2669	44.54	QP	.2	.1	44.84	56	-11.16	-	-
1.3695	45.24	QP	.2	.1	45.54	56	-10.46	-	-
1.5801	45.12	QP	.2	.1	45.42	56	-10.58	-	-
1.9806	46.13	QP	.2	.1	46.43	56	-9.57	-	-
3.1965	46.24	QP	.2	.1	46.54	56	-9.46	-	-
15.6237	43.76	QP	.3	.2	44.26	60	-15.74	-	-
15.666	43.96	QP	.3	.2	44.46	60	-15.54	-	-

QP - Quasi-Peak detector