



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 1**

CERTIFICATION TEST REPORT

FOR

WI-FI COMMUNICATIONS MODULE

MODEL NUMBER: COM1

**FCC ID: 2AHES-COMGEN1
IC: 21152-COMGEN1**

REPORT NUMBER: R11093405-E1

ISSUE DATE: 2016-04-05

Prepared for
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NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2016-03-17	Initial Issue	Ron Reichard
2	2016-03-25	Added below 30 MHz data.	Ron Reichard
3	2016-03-30	Revised company address, IC ID revised in header, revised Chain designations in Radiated Emissions sections, added duty cycle correction for 802.11 g/n modes, revised 18-26 GHz tabular data, revised ANSI document reference on page 219.	Ron Reichard
4	2016-04-05	Revised company name.	Ron Reichard

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: BSH HOME APPLIANCES CORP
1901 MAIN STREET, SUITE 600
IRVINE, CA 92614 USA

EUT DESCRIPTION: WI-FI COMMUNICATIONS MODULE

MODEL: COM1

SERIAL NUMBER: Non-serialized

DATE TESTED: 2016-01-27 to 2016-03-25

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
INDUSTRY CANADA RSS-247 Issue 1	PASS
INDUSTRY CANADA RSS-GEN Issue 4	PASS

UL LLC 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 LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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 LLC By:



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UL – Consumer Technology Division

Prepared By:



Ron Reichard
EMC Engineer
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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 C63.10-2013, RSS-GEN Issue 4, RSS-247 Issue 1.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

12 Laboratory Dr., RTP, NC 27709	
<input type="checkbox"/>	Chamber A
<input checked="" type="checkbox"/>	Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560	
<input checked="" type="checkbox"/>	Chamber NORTH
<input checked="" type="checkbox"/>	Chamber SOUTH

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>

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
Total RF power, conducted	+/- 0.45
RF power density, conducted	+/- 1.50
Spurious emissions, conducted	+/- 2.94
All emissions, radiated up to 18 GHz	+/- 5.36
Temperature	+/- 0.07
Humidity	+/- 2.26
DC and low frequency voltages	+/- 1.27

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g/n transceiver module. It is a SISO module that contains two antenna ports for diversity. Additionally, there is an option to install an external antenna on Antenna Port 0 for improved performance. The external antenna is not intended to be installed on Chain 1.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	15.98	39.63
2412 - 2462	802.11g	12.88	19.41
2412 - 2462	802.11n HT20	12.80	19.05

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two internal Inverted F antennas, Chain 0 has a maximum gain of +0.7 dBi, and Chain 1 has a maximum gain of +0.5 dBi.

The radio also utilizes an external PCB slot antenna, with a maximum gain of -1.7 dBi. This external antenna is only intended to be installed on Chain 0.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was COM Application CPU (STM) version SW 1.3.23 and WiFi SiP version 5.90.230.12.

The EUT driver software installed during testing was written by Prolific, version 3.6.78.350

The test utility software used during testing was WiFi SiP, version 5.90.230.12, FWID 01-169cf8b2.

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, unless otherwise documented.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z for the two internal antennas, chains 0 and 1. It was determined that the X orientation for both internal antennas were the worst-case orientations, therefore, all final radiated testing was performed in the X orientation using the internal antennas.

Additionally, the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, for the external antenna. It was determined that the Y orientation with the external antenna was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the Y orientation using the external antenna.

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

802.11b mode: 5.5 Mbps
802.11g mode: 12 Mbps
802.11n HT20mode: MCS5

Note Regarding desired powered for each mode:

- 802.11b – This mode was set so that all channels are set for the same power.
- 802.11g – This mode was set so the channels had a stair-step power setting: Channels 1-3 were stepped up in power, with 3 reaching the same maximum power setting as the middle channel. Channels 9-11 were stepped down in power, where 9 was the same maximum power setting as the middle channel, and then 10 and 11 were stepped down in power.
- 802.11n – This mode was set so the channels had a stair-step power setting: Channels 1-3 were stepped up in power, with 3 reaching the same maximum power setting as the middle channel. Channels 9-11 were stepped down in power, where 9 was the same maximum power setting as the middle channel, and then 10 and 11 were stepped down in power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Supporting Laptop	Compaq	Presario CQ56-115DX	CNF1134NRP	PPD-AR5B95-H
Laptop Power Supply	Not Available			
USB-Serial Port Adapter				

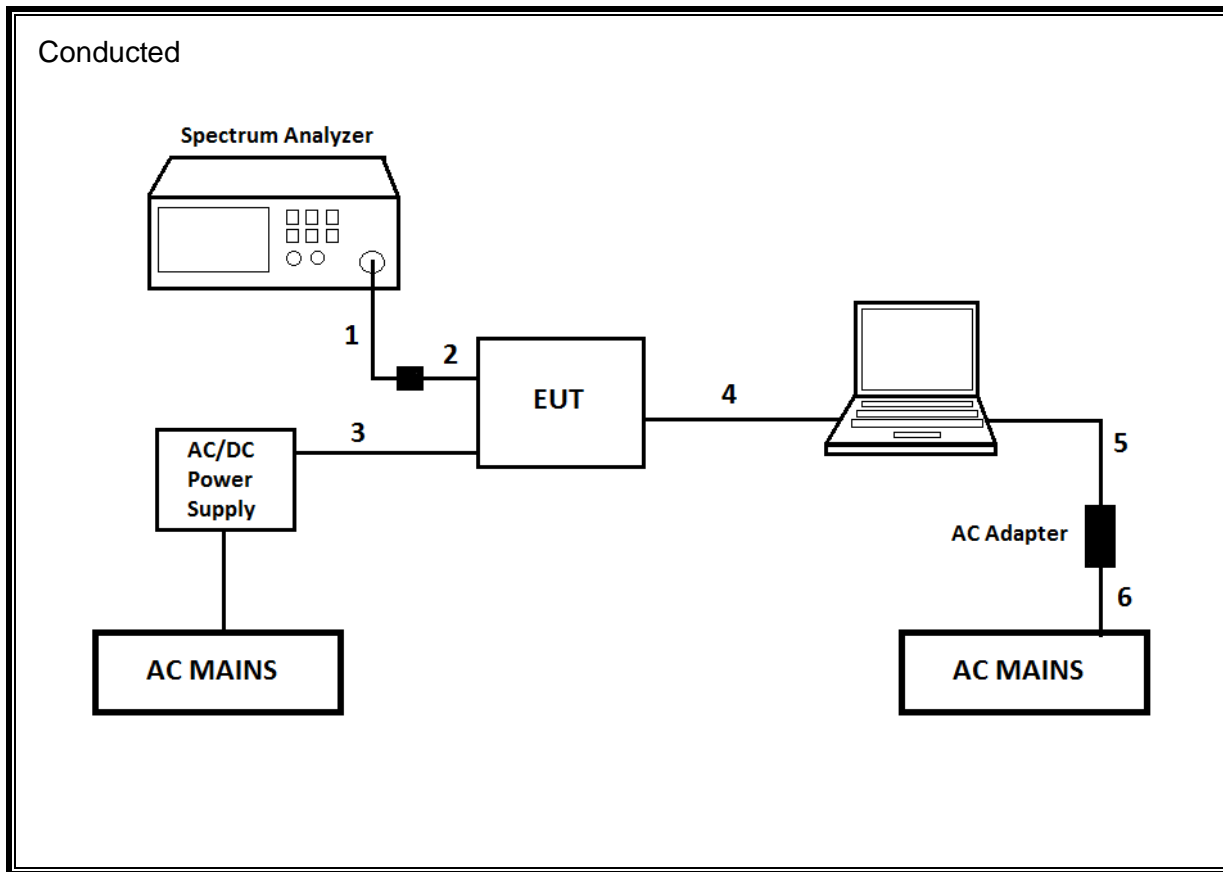
I/O CABLES

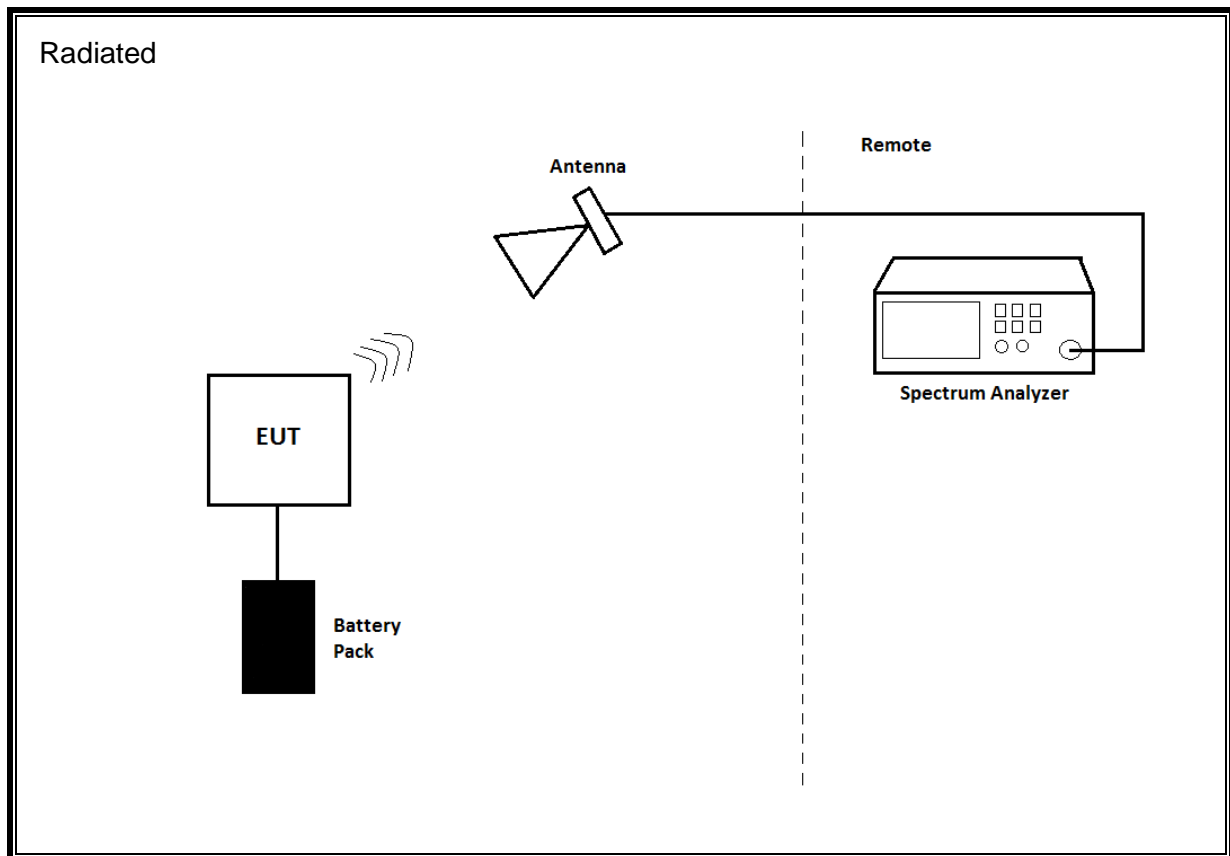
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.5	To U.FL Adapter cable
2	Antenna	1	SMA to U.FL	Un-Shielded	0.1	To Spectrum Analyzer
3	DC Supply	1		Un-Shielded	0.5	DC Supply to EUT
4	Control Port	1		Un-Shielded	0.5	4 Wire Cable
5	DC	1	DC	Un-Shielded	0.8	N/A
6	AC	1	2 Prong	Un-Shielded	1.5	N/A

TEST SETUP

The EUT is a wireless communications module. Test software exercised the radio card. Two configurations were used during the testing. One configuration utilized the two internal trace antenna chains in a SISO mode for diversity. The second configuration utilized an external antenna on chain 0 only for improved performance, while antenna chain 1 remained an internal trace antenna. Therefore, antenna 1 was only tested once.

SETUP DIAGRAM FOR TESTS





6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0073	Hybrid Broadband Antenna, 30-1000MHz	Sunol Sciences Corp.	JB3	2015-06-10	2016-06-30
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2015-02-17	2016-02-29
N-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2015-06-04	2016-06-30
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2015-09-29	2016-09-30
SA0026	Spectrum Analyzer	Agilent	N9030A	2015-03-27	2016-03-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
HI0079	Temp/Humid/Pressure Meter	Springfield Precision	PreciseTemp	2015-07-01	2016-07-31

Note – All testing in this chamber was performed prior to 2016-02-29

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2015-12-08	2016-12-31
AT0074	Hybrid Broadband Antenna, 30-1000MHz	Sunol Sciences Corp.	JB3	2015-06-10	2016-06-30
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2015-02-17	2016-02-29
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2015-10-07	2016-10-31
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2015-06-09	2016-06-30
S-SAC03	Gain-loss string: 1-18 GHz	Various	Various	2015-08-22	2016-08-31
SA0018	Spectrum Analyzer	Agilent	N9030A	2015-11-07	2016-11-30
SA0025	Spectrum Analyzer	Agilent	N9030A	2016-03-17	2017-03-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
HI0050	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2015-07-01	2016-07-31

Note – All testing in this chamber was performed prior to 2016-02-29, except 9kHz-30 MHz testing performed on 2016-03-25.

Test Equipment Used - Radiated Disturbance Emissions (E-field) – Chamber C

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2015-08-27	2016-08-31
C-SAC03	Gain-loss string: 18-40GHz	Various	Various	2015-09-27	2016-09-30
SA0016	Spectrum Analyzer	Agilent	N9030A	2015-08-26	2016-08-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
HI0034	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2015-03-23	2016-03-31

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL077	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2015-10-29	2016-10-31
HI0079	Temp/Humid/Pressure Meter	Springfield Precision	PreciseTemp	2015-07-01	2016-07-31
LISN002	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2015-08-24	2016-08-31
MM0167	Multi-meter	Agilent	U1232A	2015-08-17	2016-08-31
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2015-08-26	2016-08-31
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2015-05-22	2016-05-31
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	NA	NA

Test Equipment Used - Wireless Conducted Measurement Equipment(Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
SA0019	Spectrum Analyzer	Agilent Technologies	E4446A	2015-09-02	2016-09-30
PWM004	RF Power Meter	Keysight Technologies	N1911A	2015-06-08	2017-06-08
PWS004	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05	2016-06-05
HI0079	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
MM0167	True RMS Multimeter	Agilent	U1232A	2015-08-17	2016-08-31
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	NA	NA

7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r04, Section 8.1.

Output Power: KDB 558074 D01 v03r04, Section 9.2.3.1

Power Spectral Density: KDB 558074 D01 v03r04, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r04, Section 12.0.

Band-edge: KDB 558074 D01 v03r04, Section 13.3

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

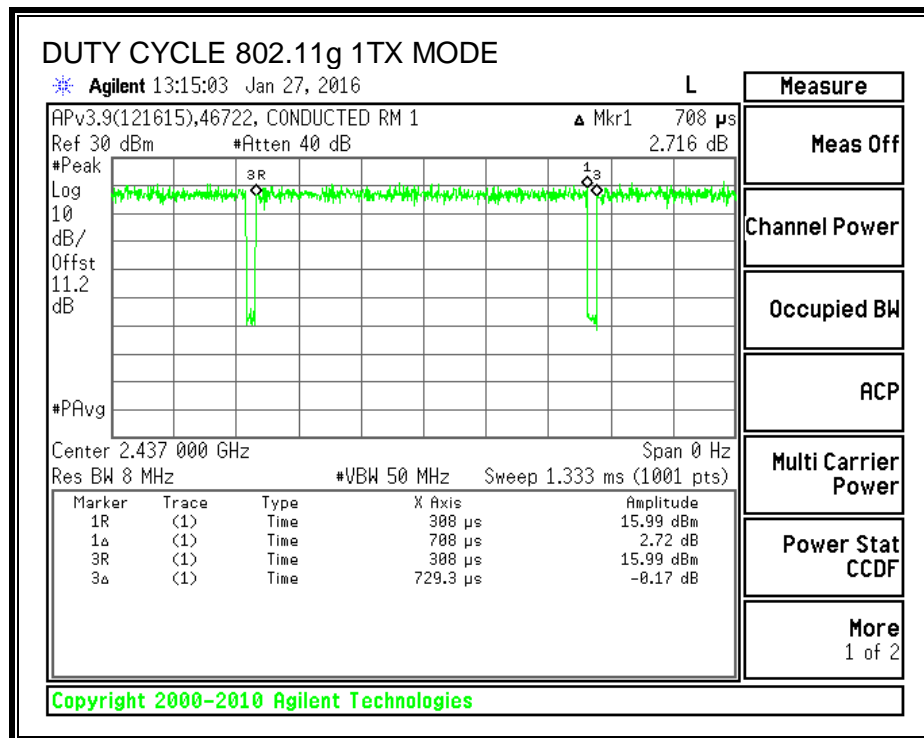
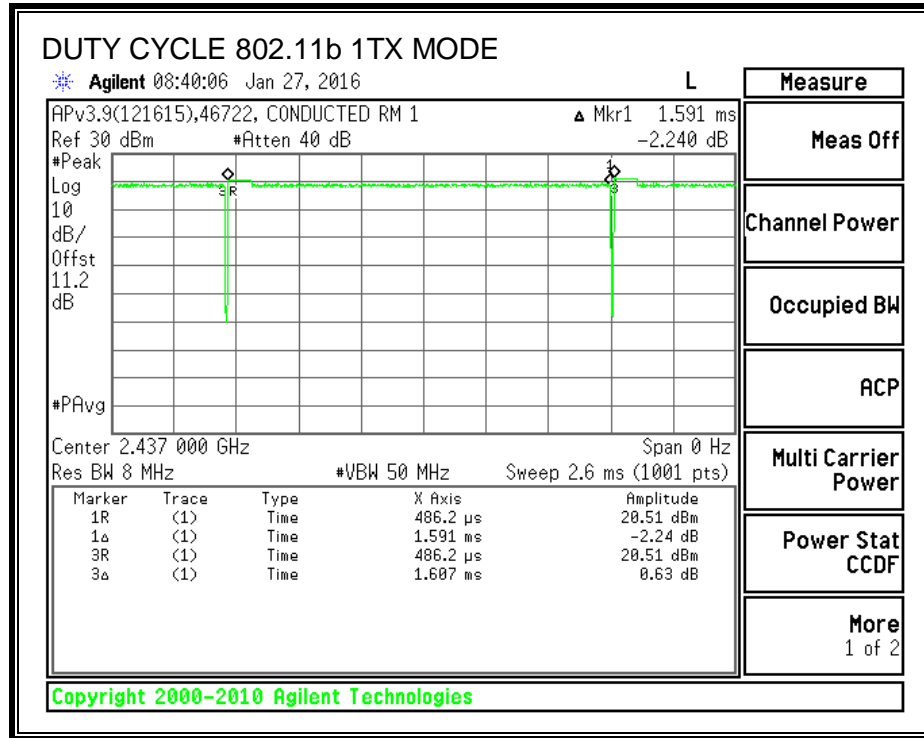
KDB 558074 Zero-Span Spectrum Analyzer Method.

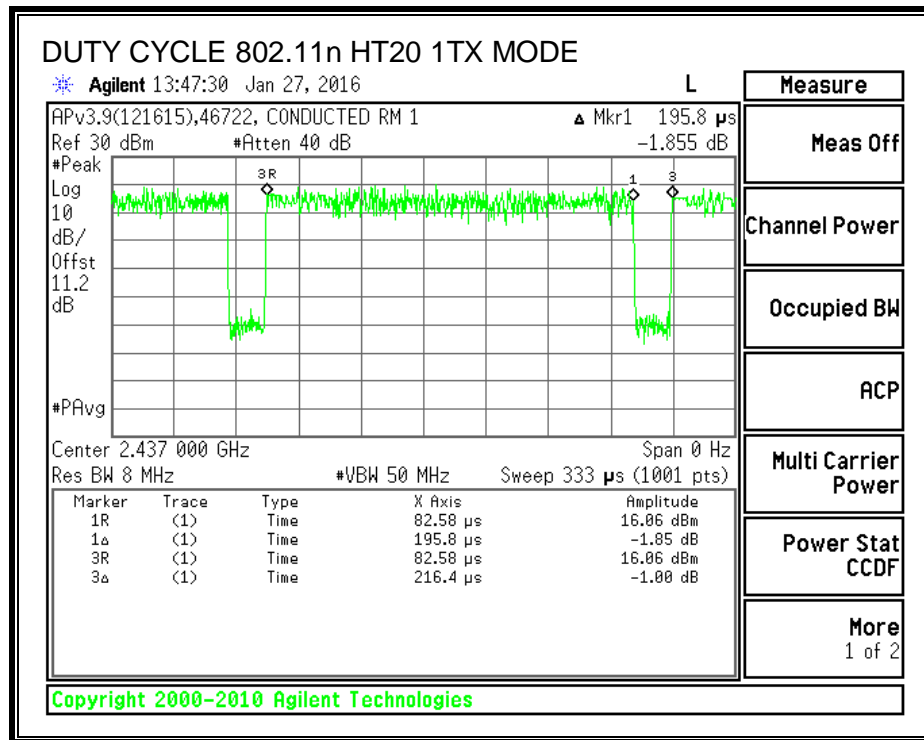
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	1.591	1.607	0.990	99.00%	0.00	0.010
802.11g 1TX	0.708	0.729	0.971	97.08%	0.13	1.412
802.11n HT20 1TX	0.196	0.216	0.905	90.48%	0.43	5.107

DUTY CYCLE PLOTS

2.4 GHz BAND





8.2. 802.11b MODE IN THE 2.4 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

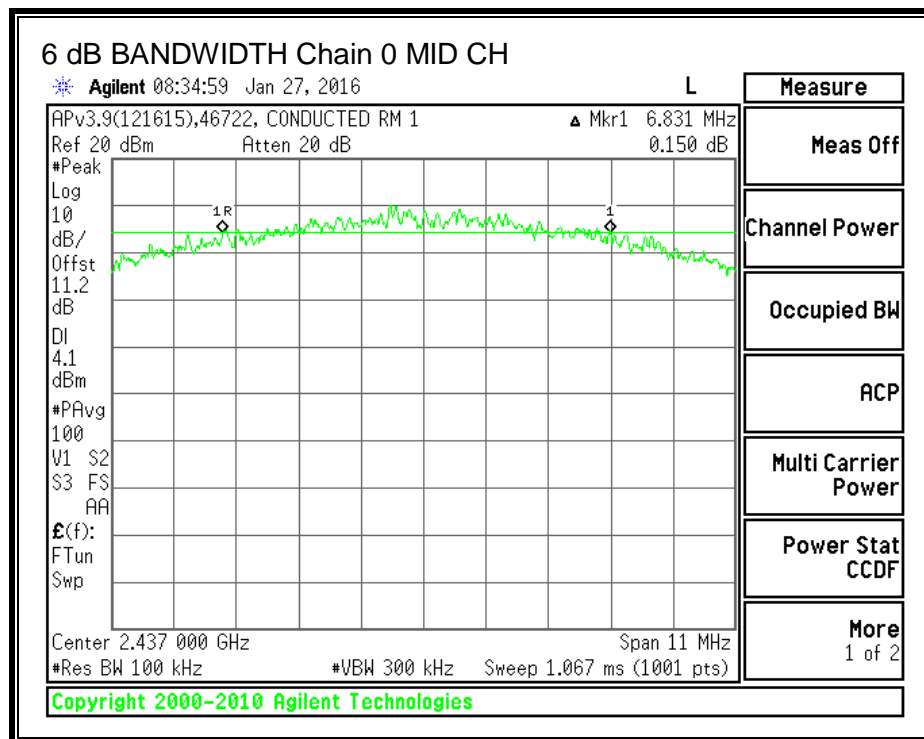
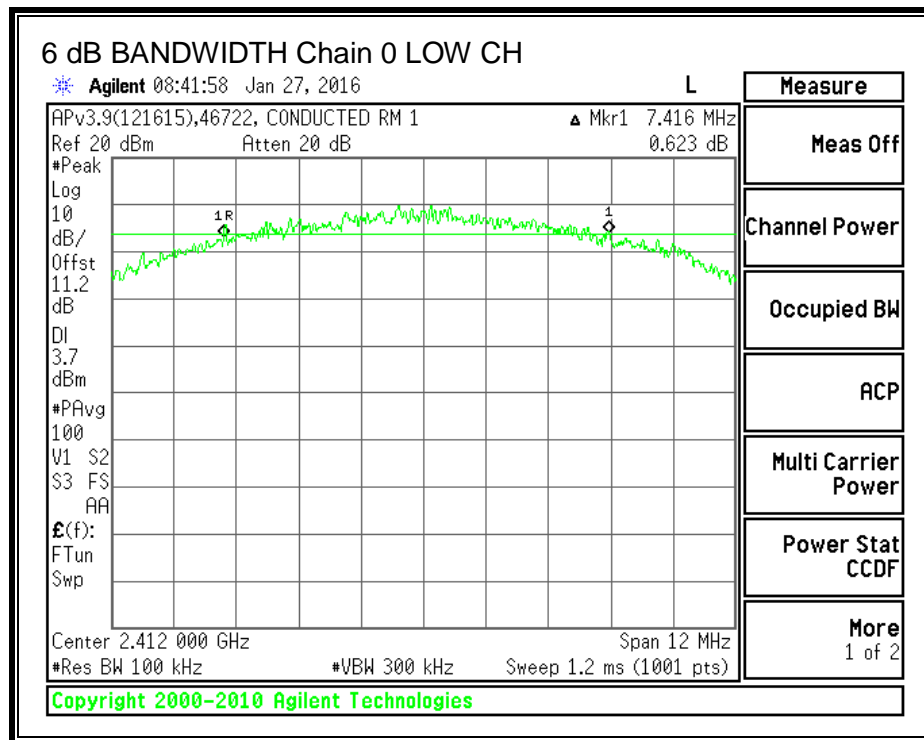
IC RSS-247 5.2 (1)

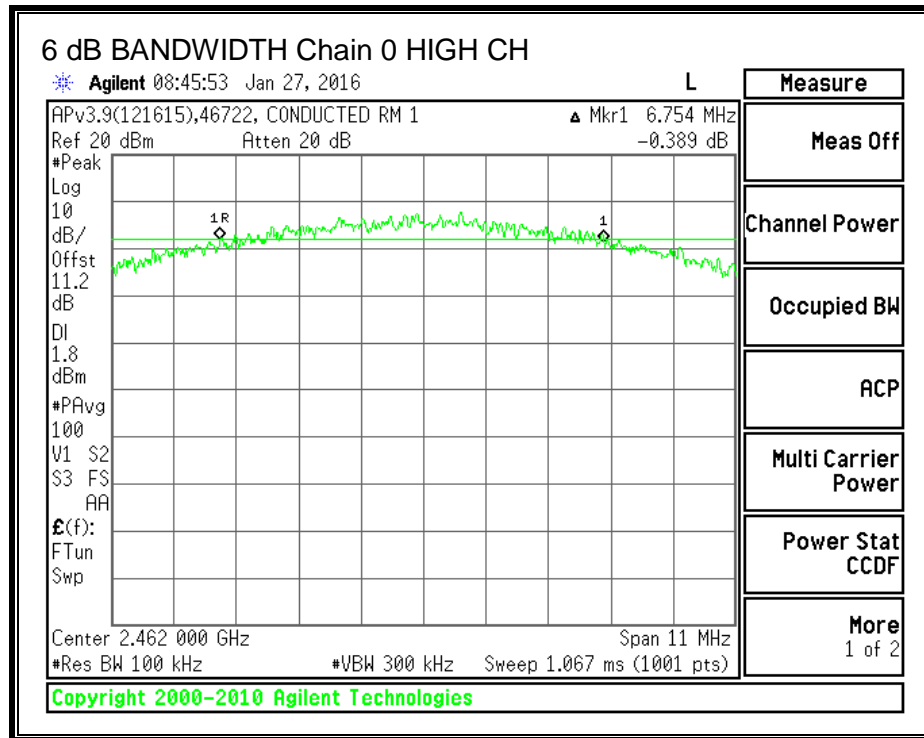
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

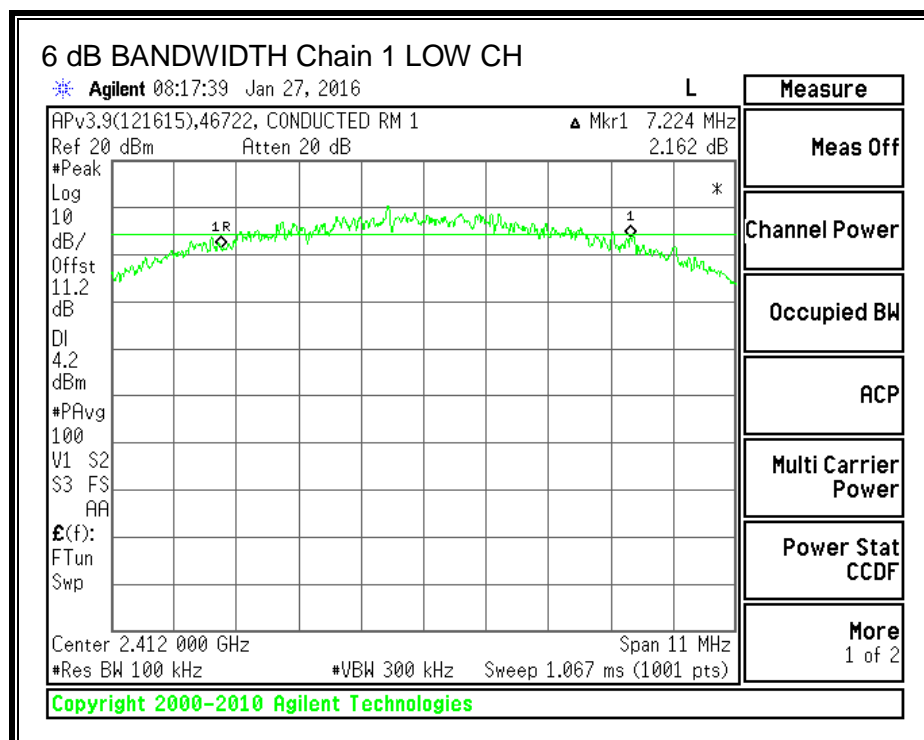
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	7.416	7.224	0.5
Mid	2437	6.831	7.326	0.5
High	2462	6.754	7.956	0.5

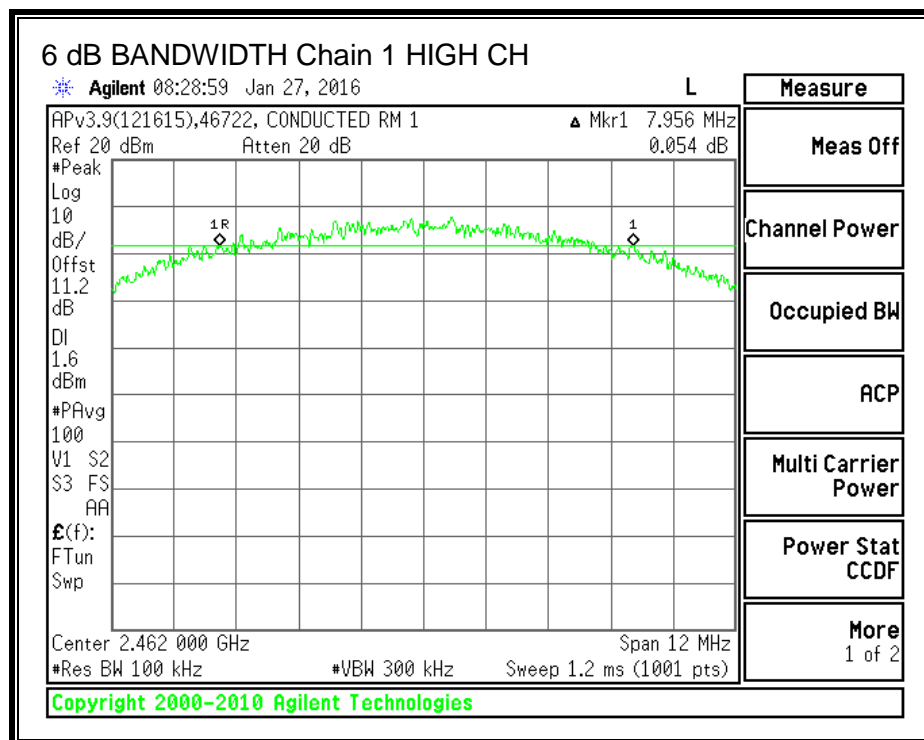
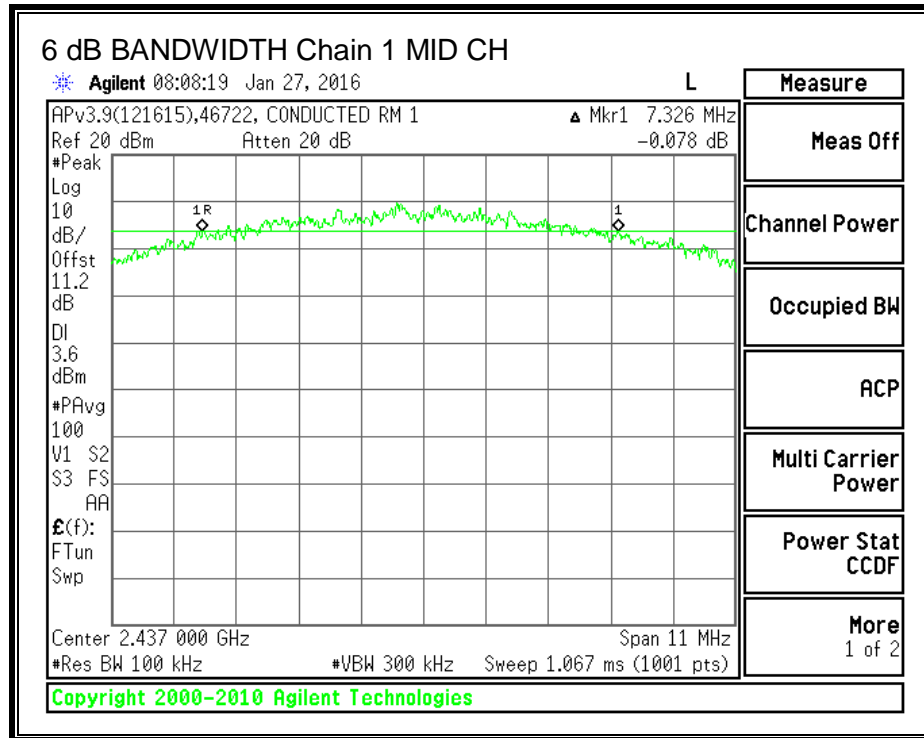
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.2.2. 99% BANDWIDTH

LIMITS

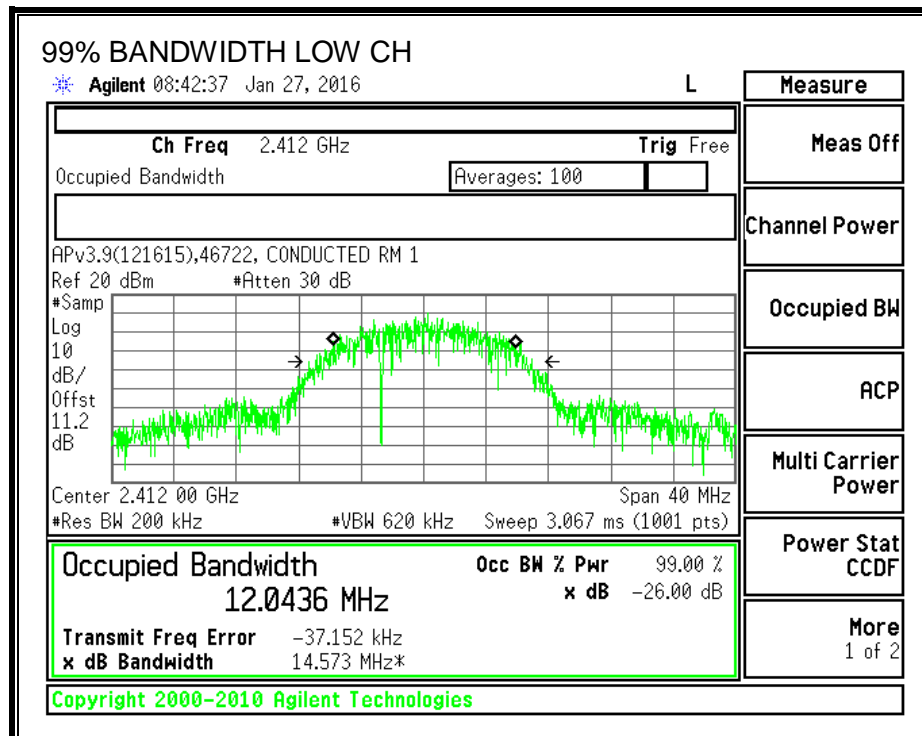
None; for reporting purposes only.

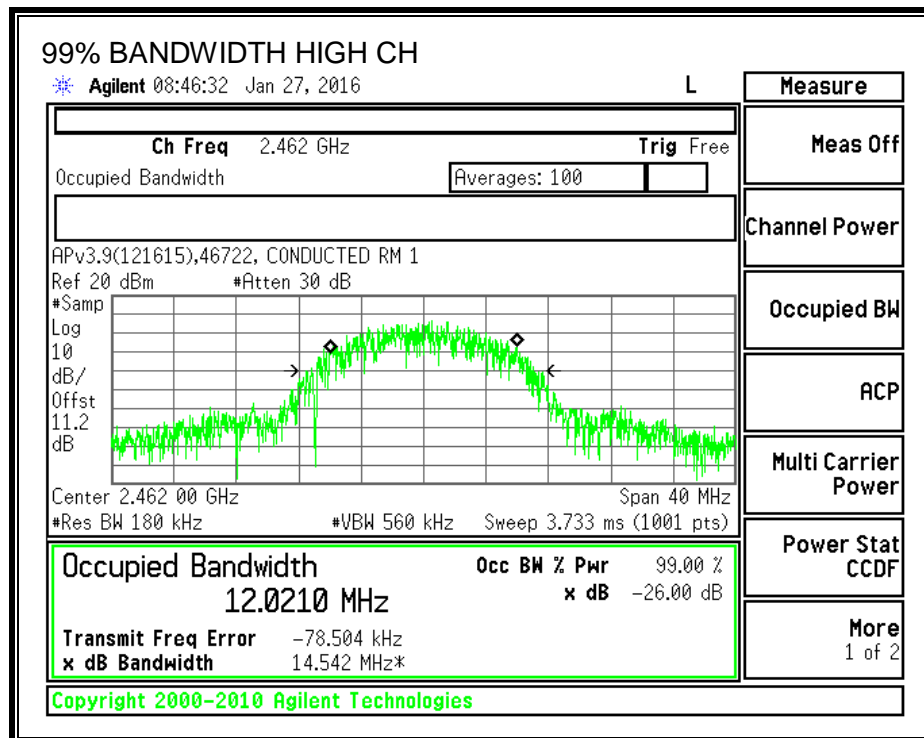
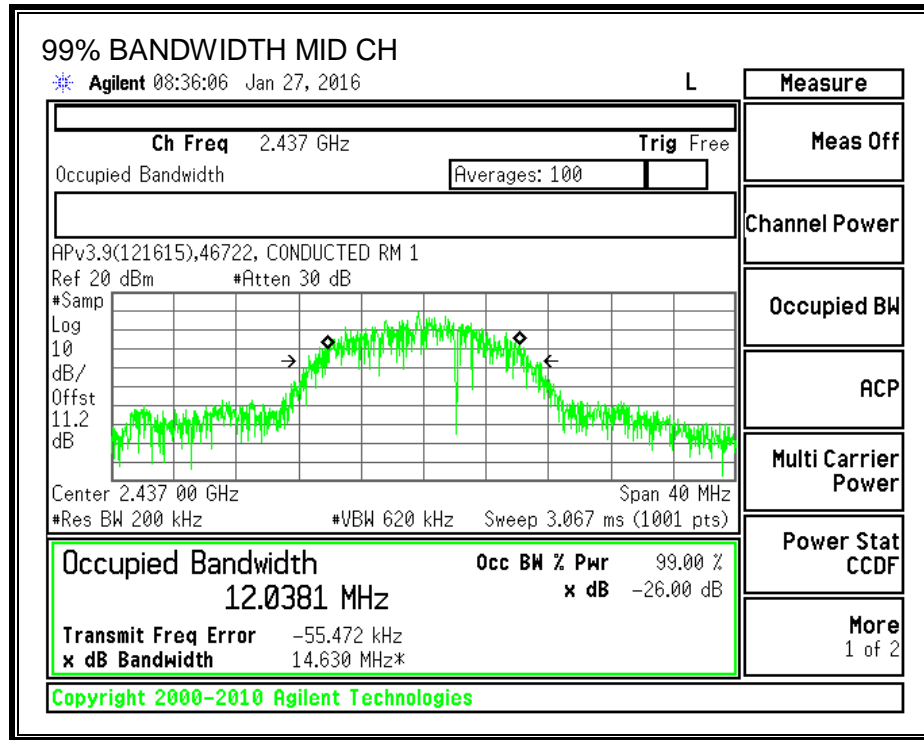
RESULTS

Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.0436
Mid	2437	12.0381
High	2462	12.0210

99% BANDWIDTH

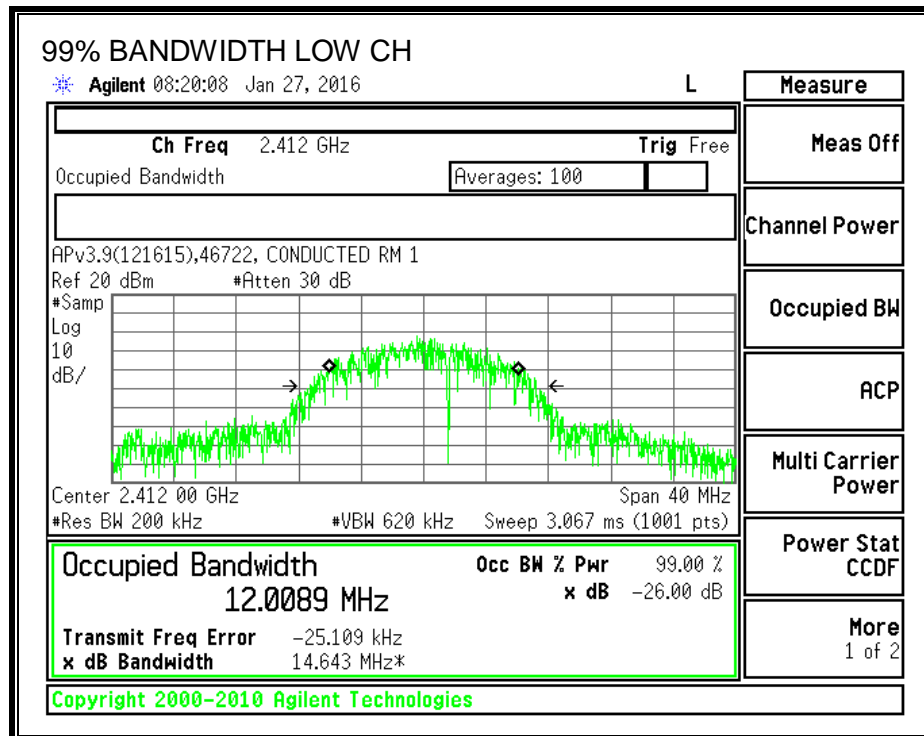


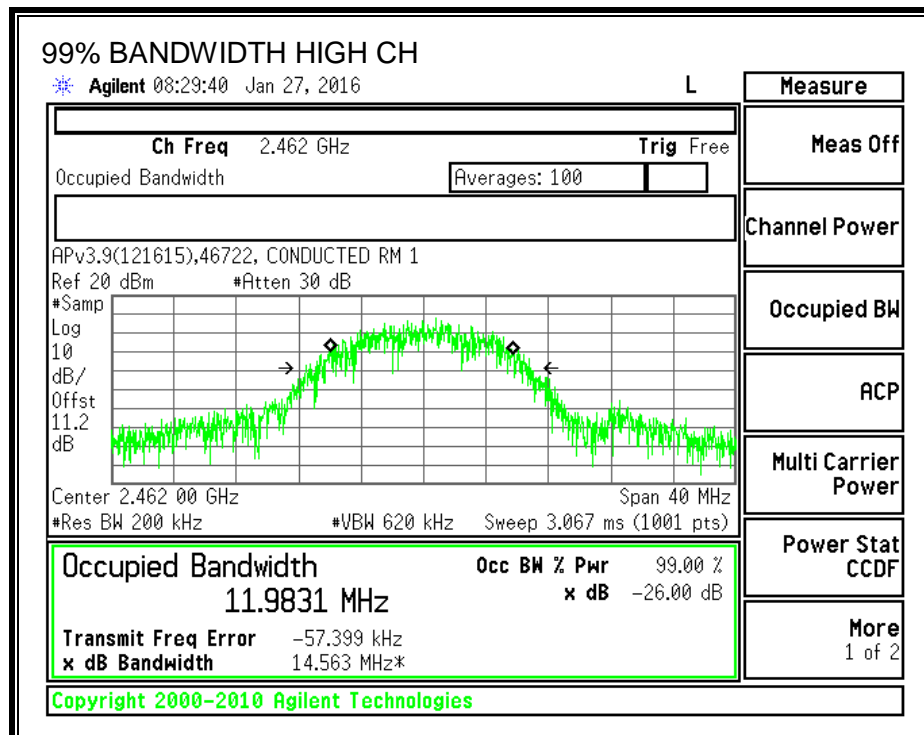
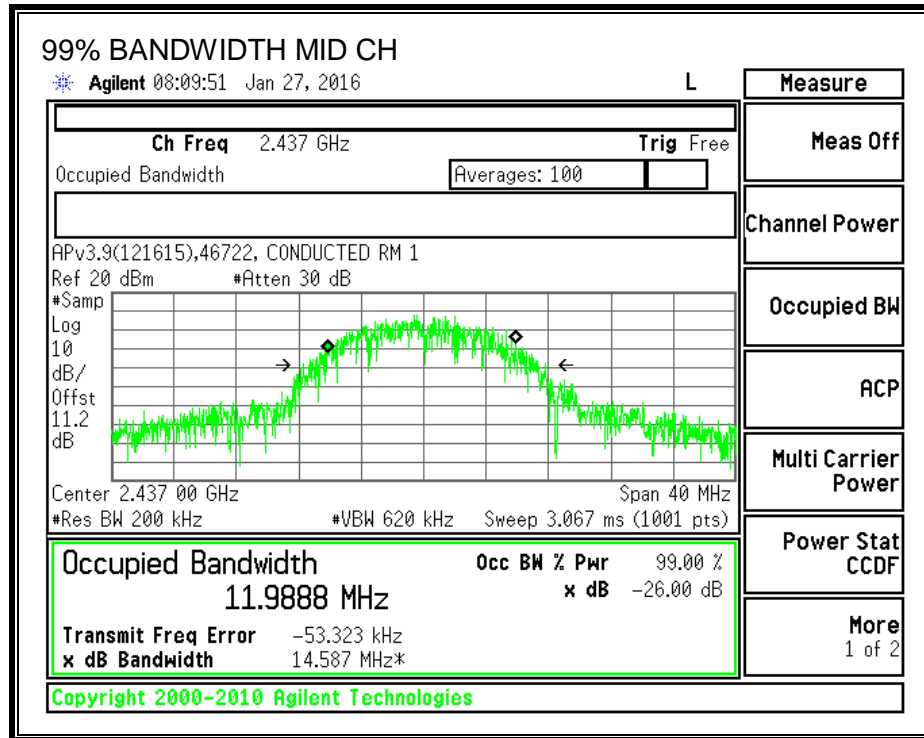


Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.0089
Mid	2437	11.9888
High	2462	11.9831

99% BANDWIDTH





8.2.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

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

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

RESULTS

Chain 0 – Average Power

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.70	30.00	30	36	30.00
Mid	2437	0.70	30.00	30	36	30.00
High	2462	0.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	15.60	15.60	30.00	-14.40
Mid	2437	15.72	15.72	30.00	-14.28
High	2462	15.98	15.98	30.00	-14.02

Chain 1 – Average Power

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.50	30.00	30	36	30.00
Mid	2437	0.50	30.00	30	36	30.00
High	2462	0.50	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	15.75	15.75	30.00	-14.25
Mid	2437	15.76	15.76	30.00	-14.24
High	2462	15.89	15.89	30.00	-14.11

Chain 0 – Average Power (External Antenna)

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.70	30.00	30	36	30.00
Mid	2437	-1.70	30.00	30	36	30.00
High	2462	-1.70	30.00	30	36	30.00

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

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	15.60	15.60	30.00	-14.40
Mid	2437	15.72	15.72	30.00	-14.28
High	2462	15.98	15.98	30.00	-14.02

8.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Chain 0

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

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.20	-6.20	8.0	-14.2
Mid	2437	-4.74	-4.74	8.0	-12.7
High	2462	-8.29	-8.29	8.0	-16.3

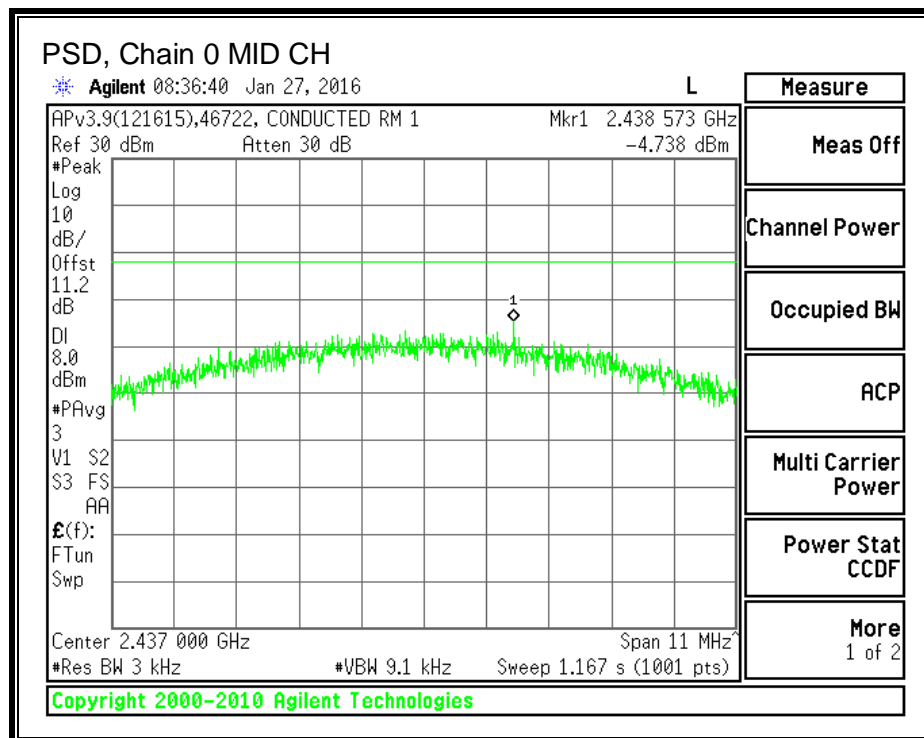
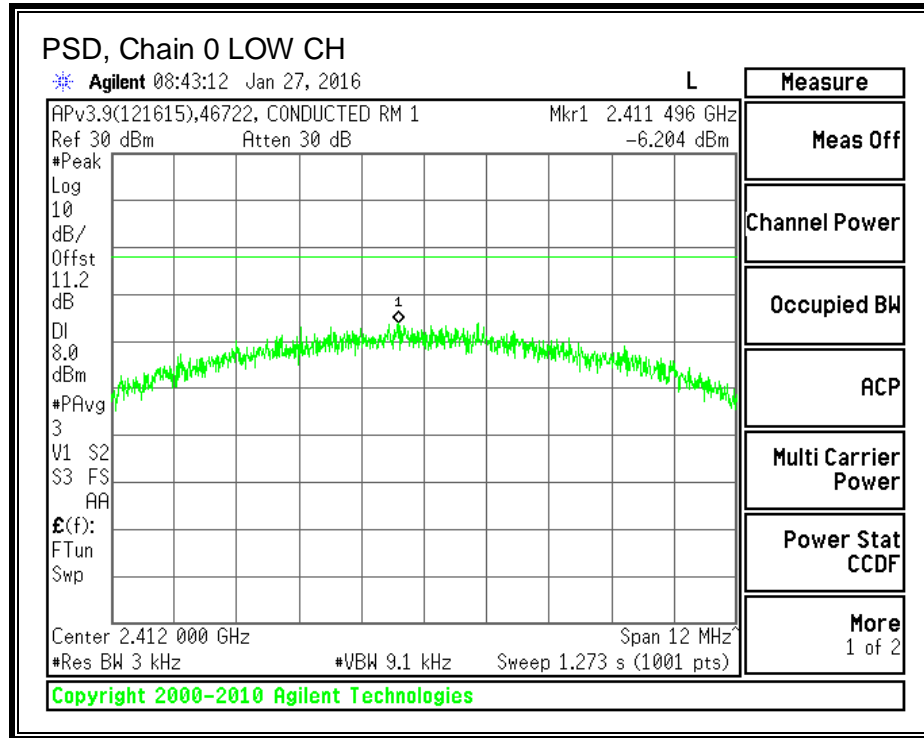
Chain 1

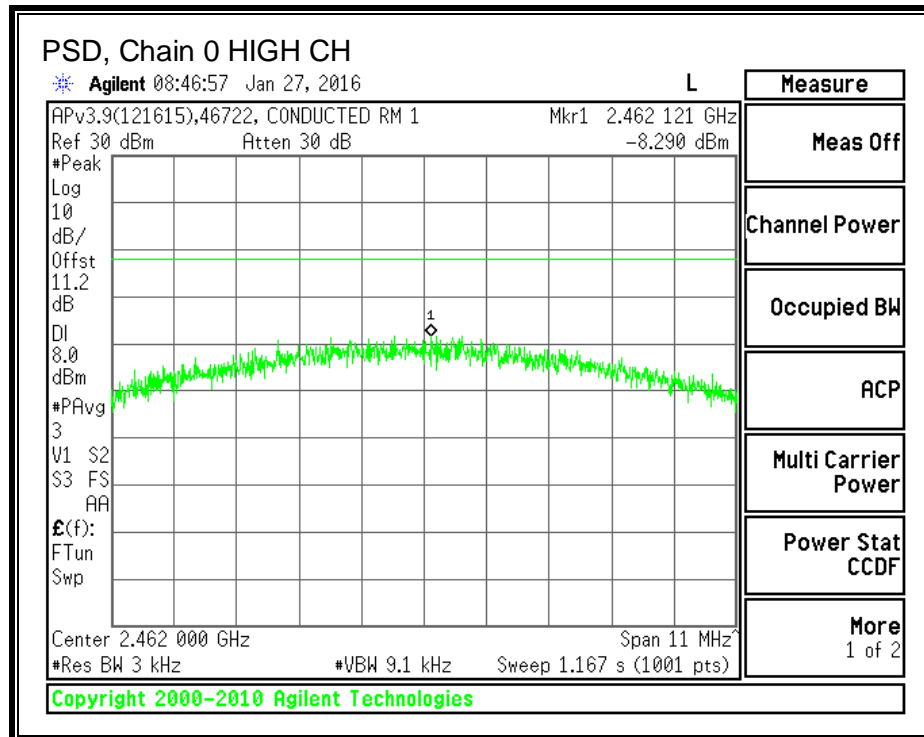
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

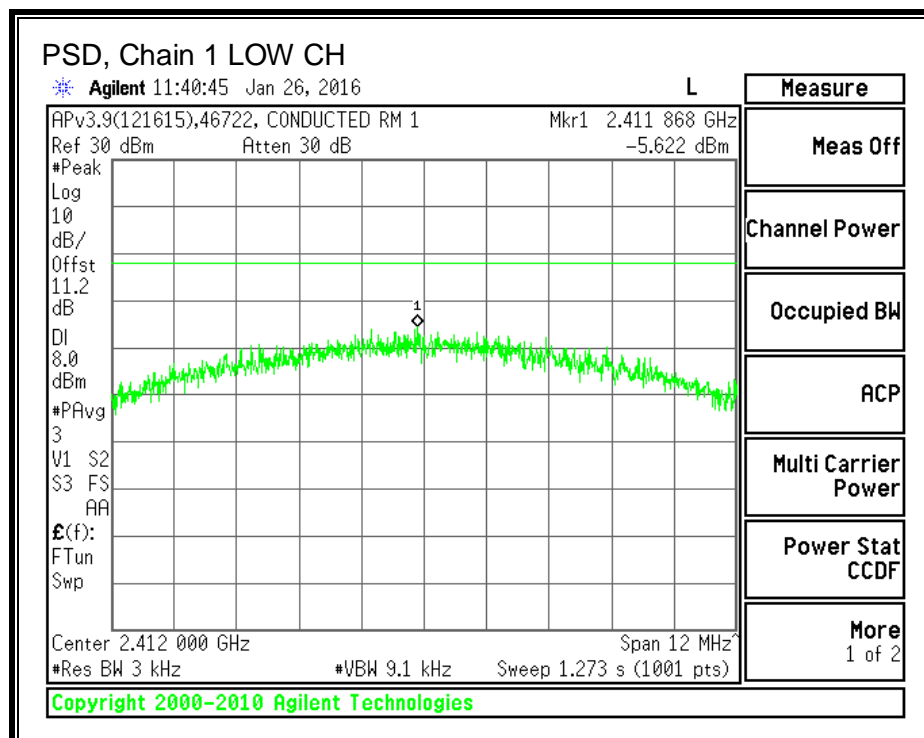
Channel	Frequency (MHz)	Chain 1 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.62	-5.62	8.0	-13.6
Mid	2437	-6.34	-6.34	8.0	-14.3
High	2462	-6.58	-6.58	8.0	-14.6

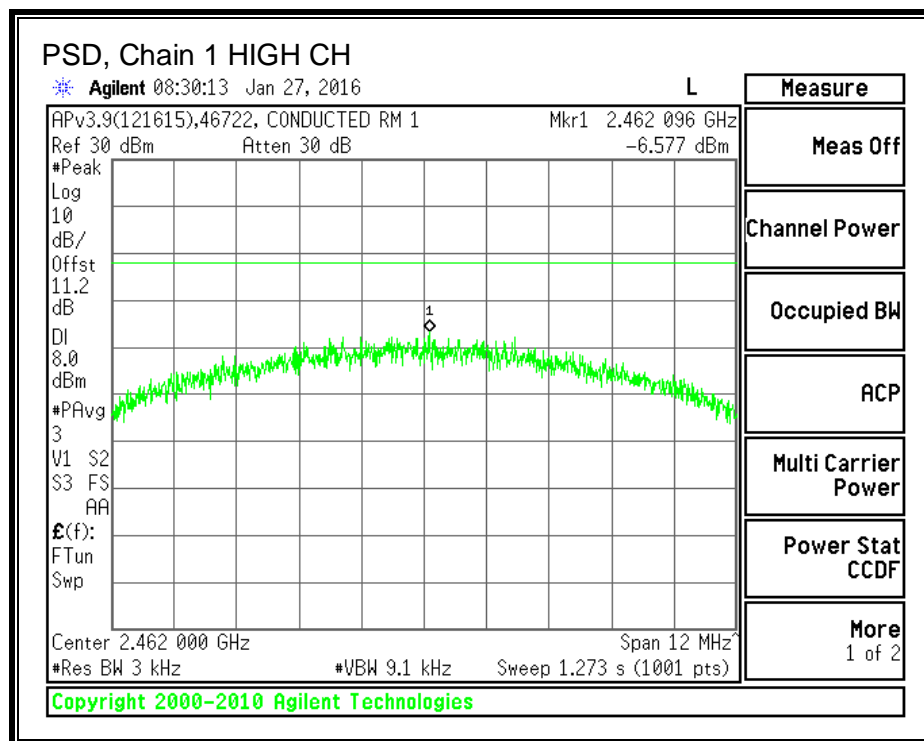
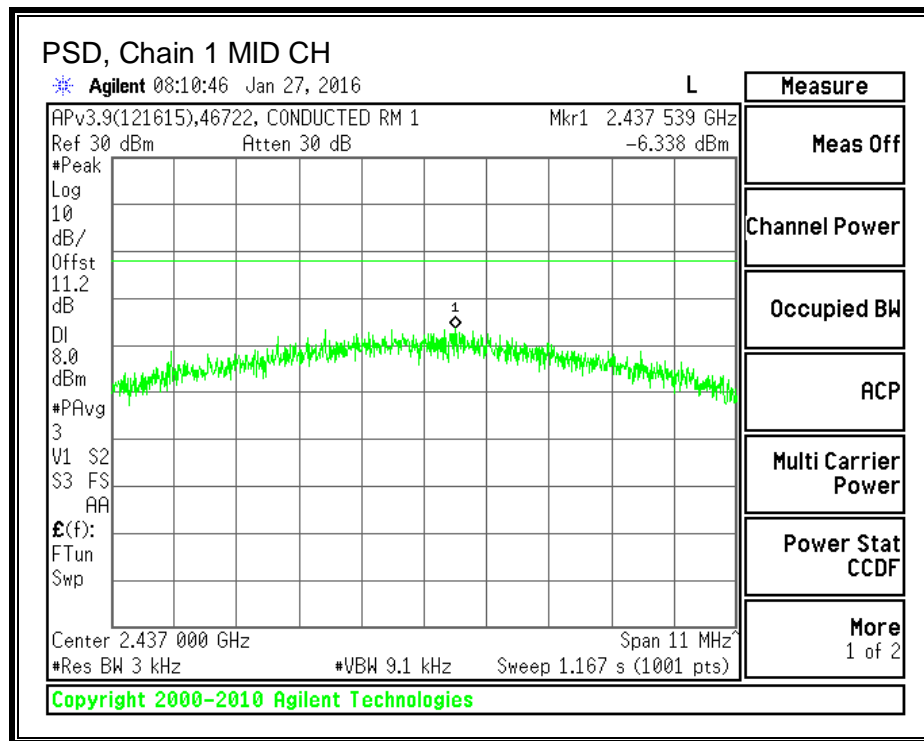
PSD, Chain 0





PSD, Chain 1





8.2.5. OUT-OF-BAND EMISSIONS

LIMITS

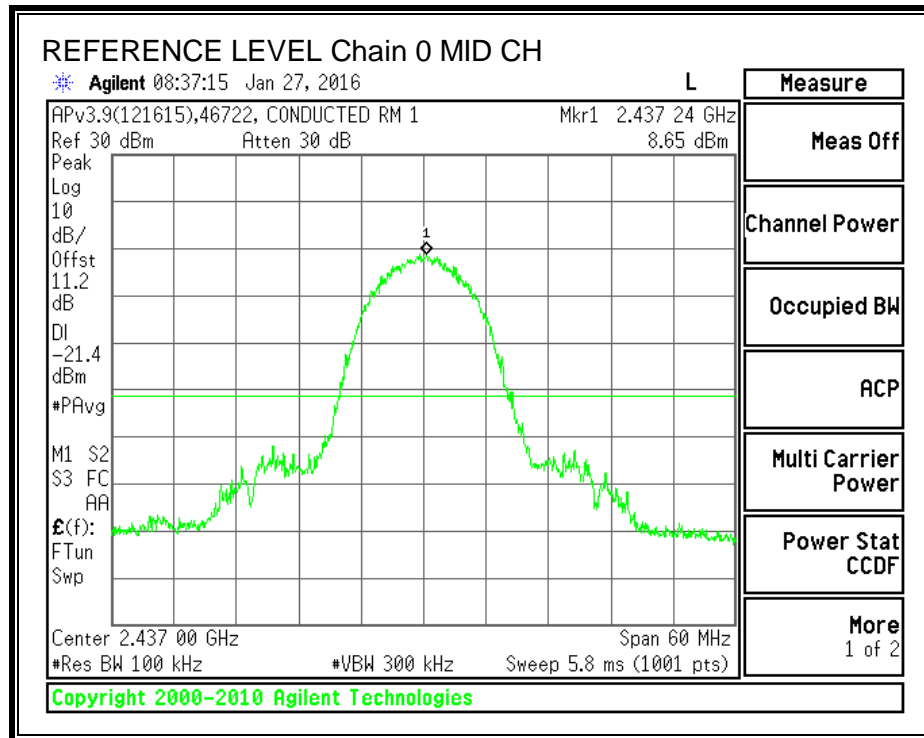
FCC §15.247 (d)

IC RSS-247 5.5

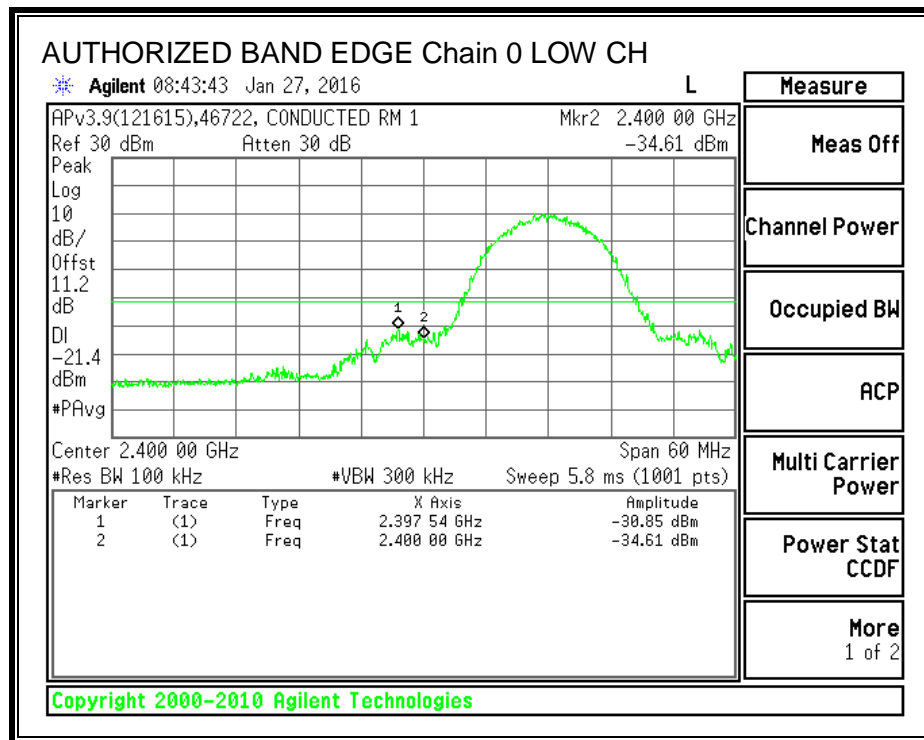
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

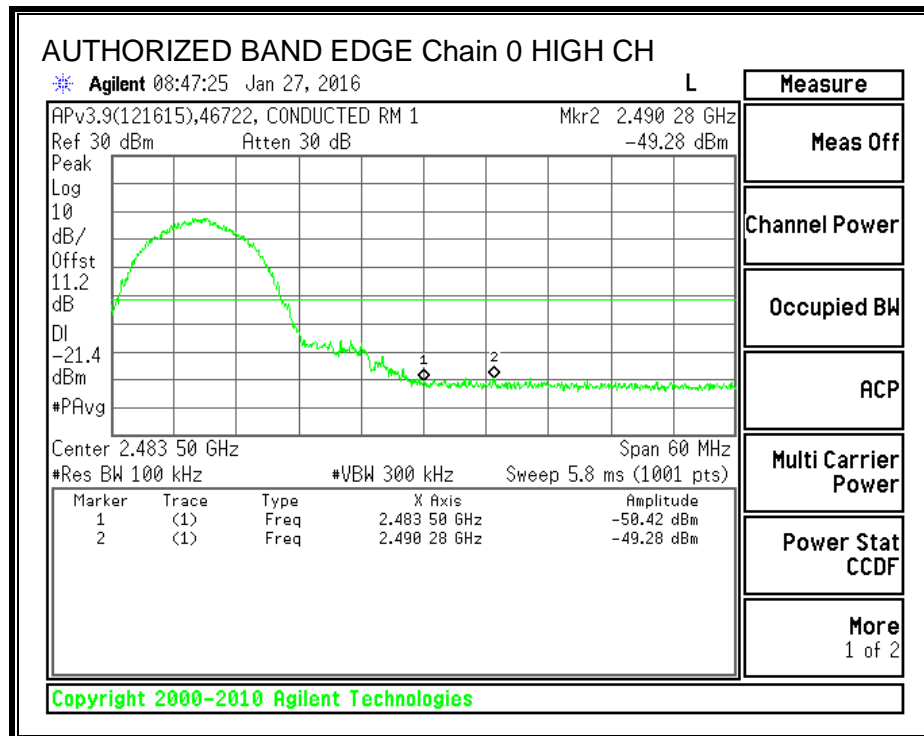
IN-BAND REFERENCE LEVEL, Chain 0



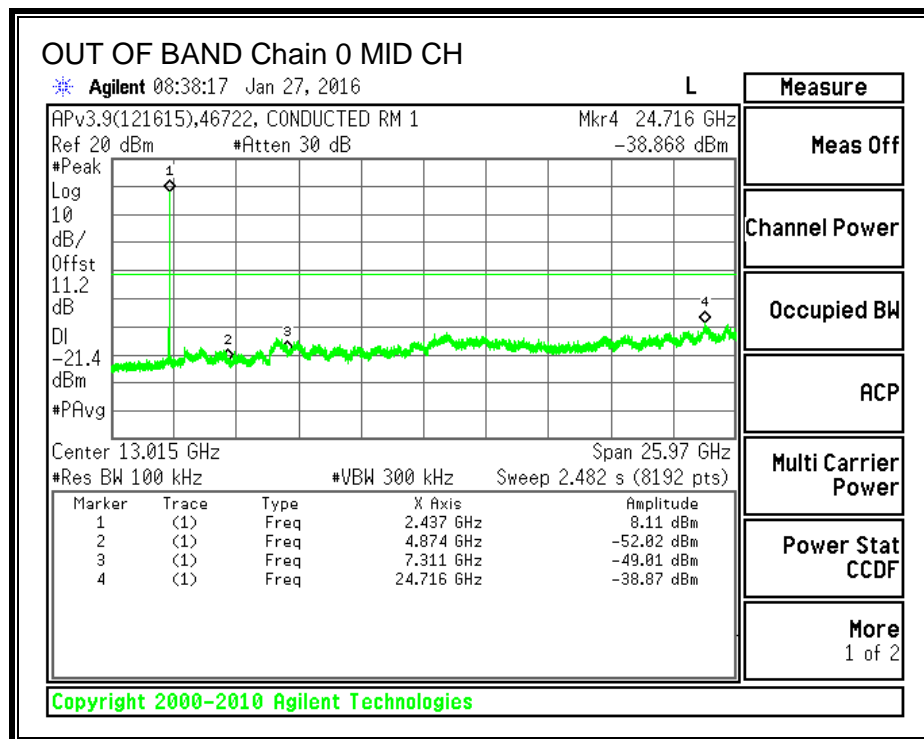
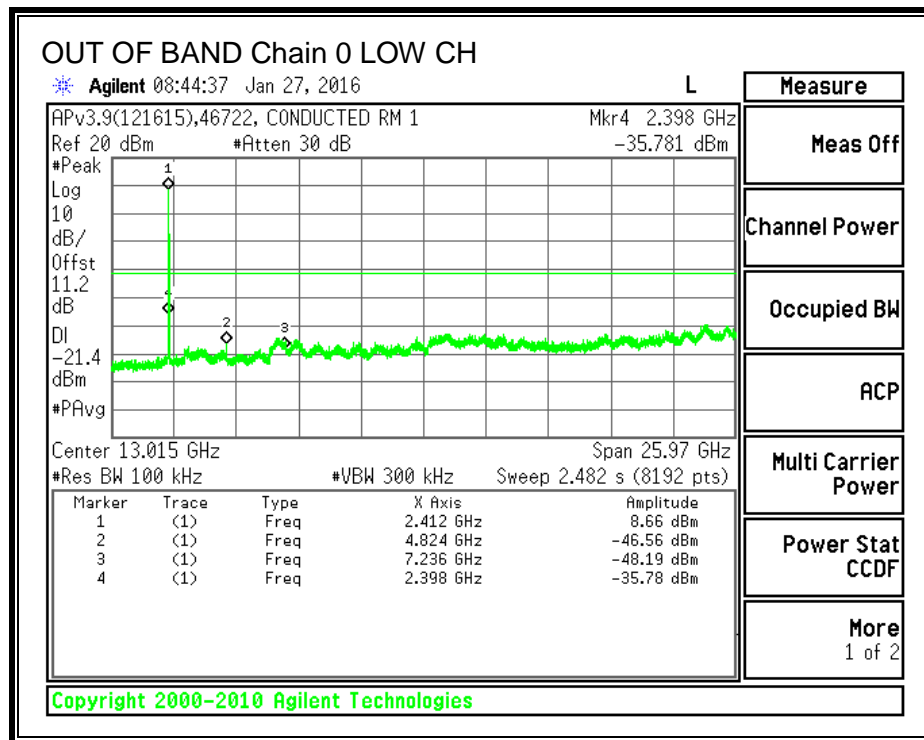
LOW CHANNEL BANDEDGE, Chain 0

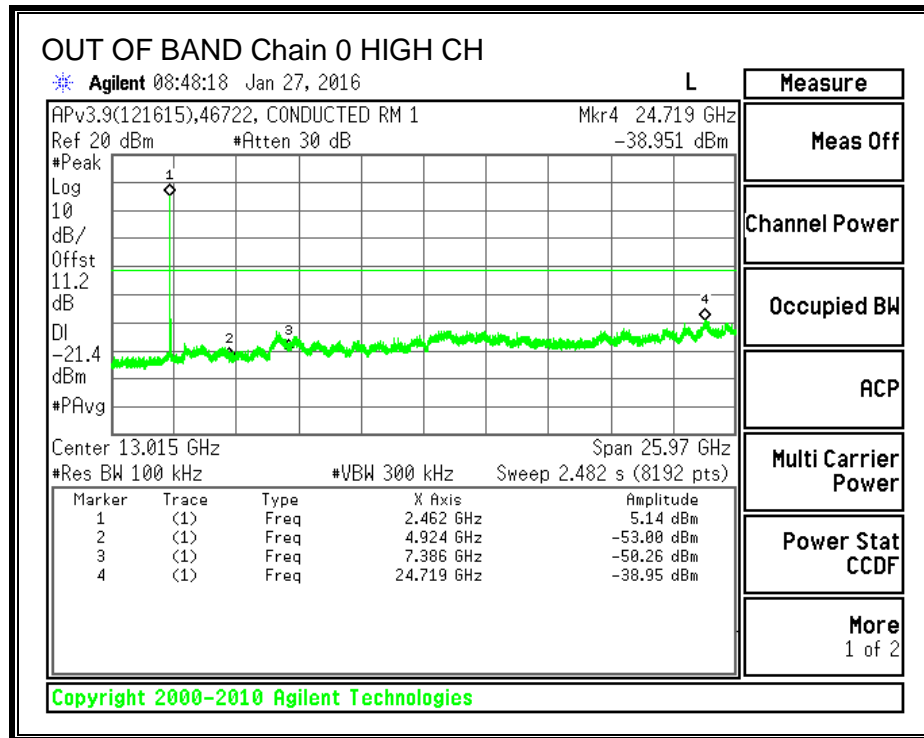


HIGH CHANNEL BANDEDGE, Chain 0

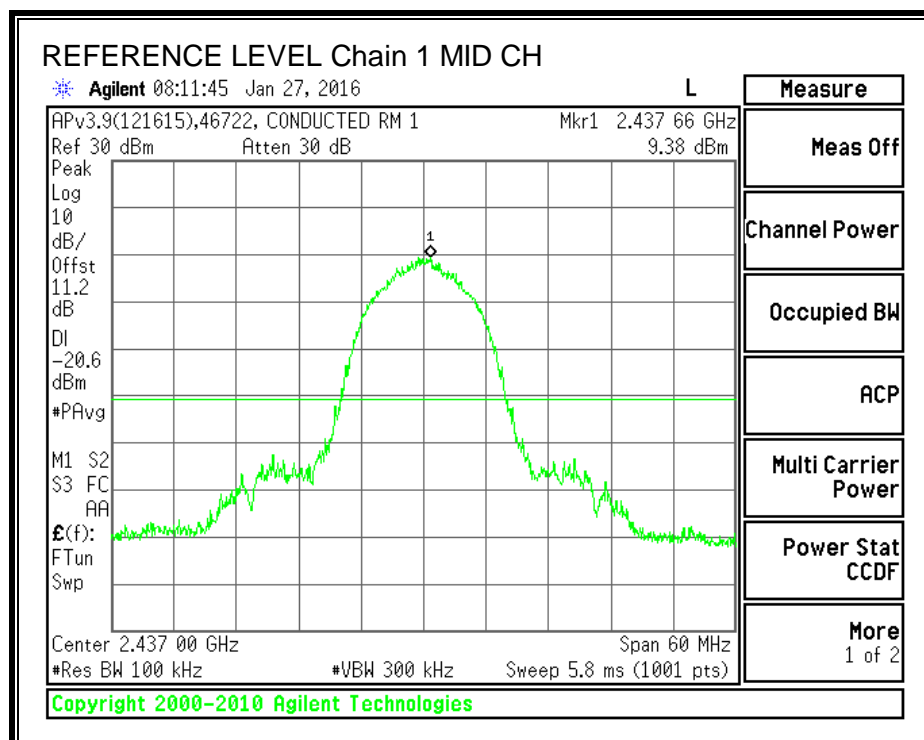


OUT-OF-BAND EMISSIONS, Chain 0

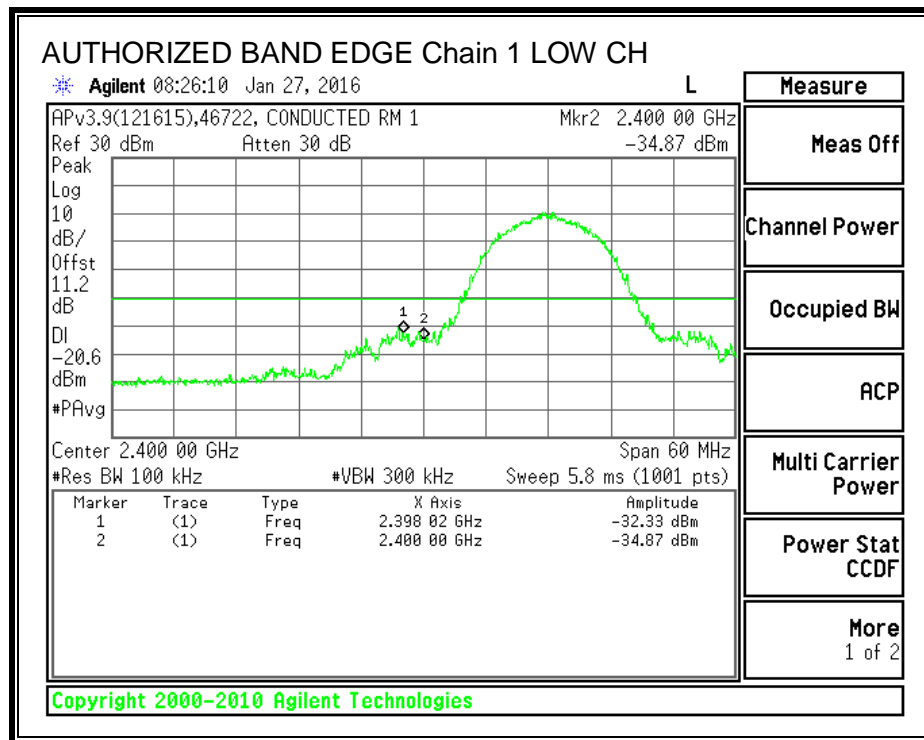




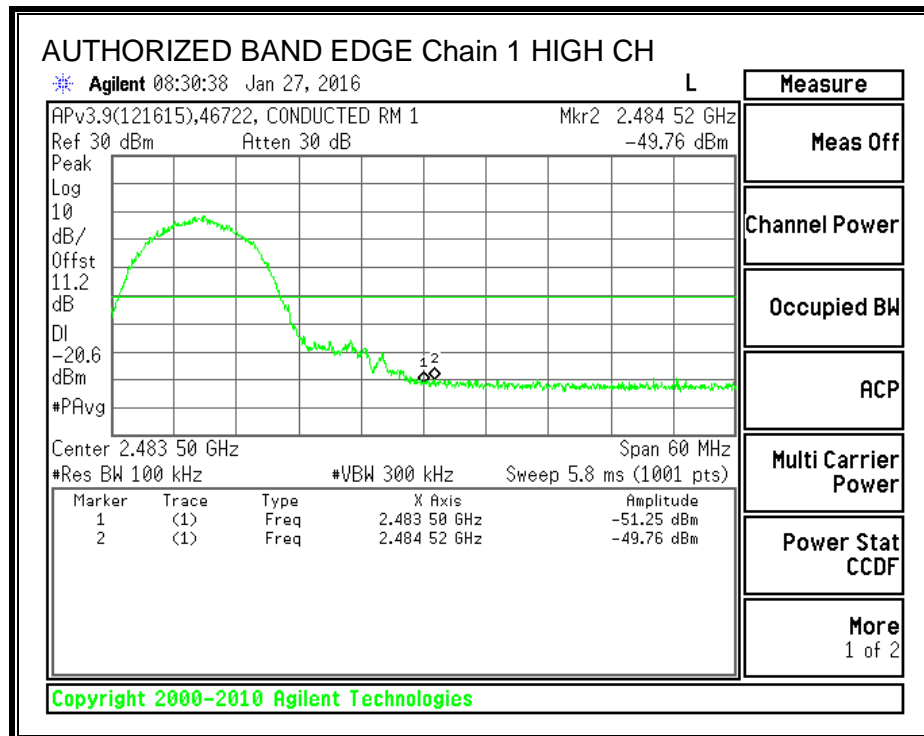
IN-BAND REFERENCE LEVEL, Chain 1

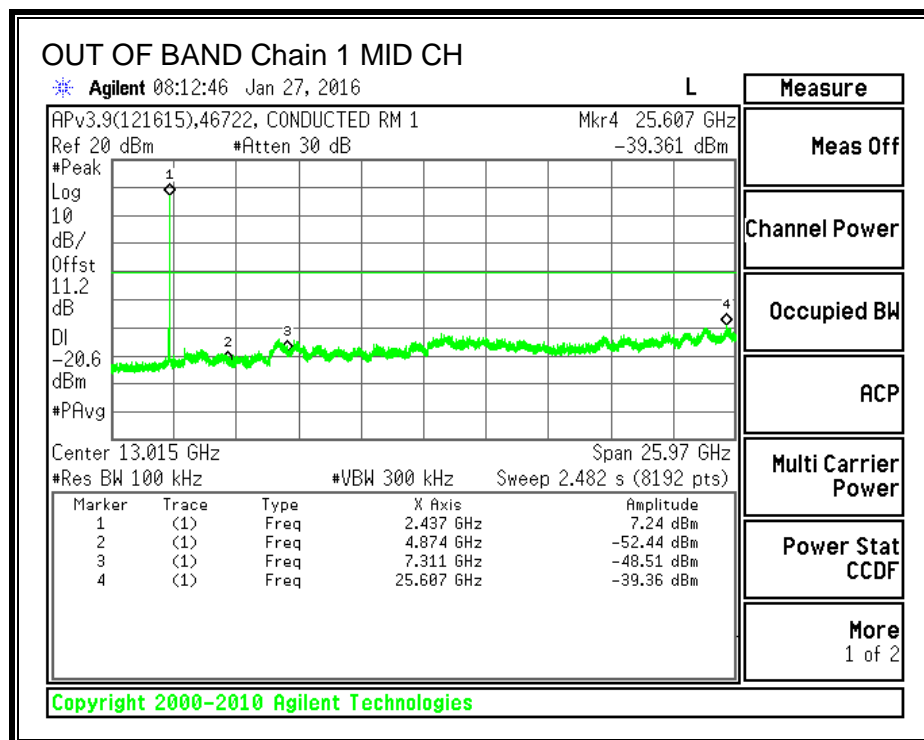
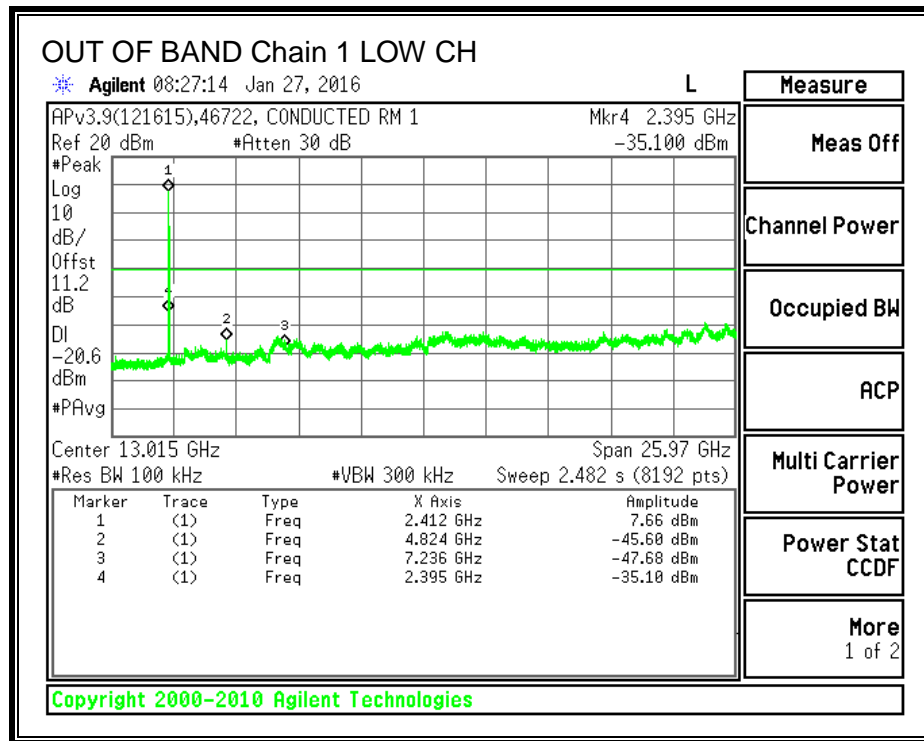


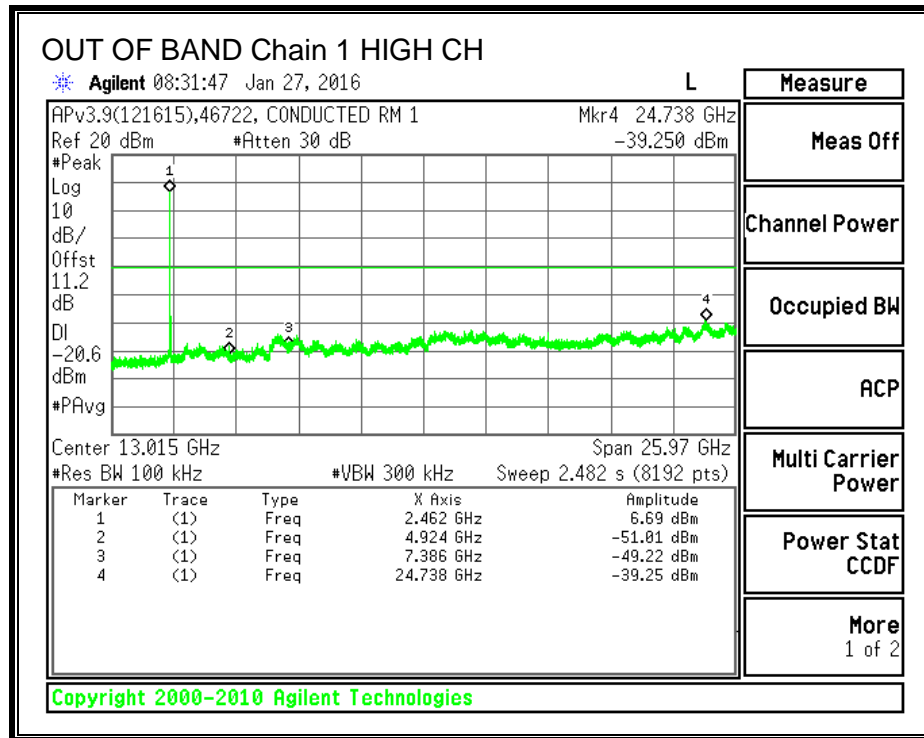
LOW CHANNEL BANDEDGE, Chain 1



HIGH CHANNEL BANDEDGE, Chain 1







8.3. 802.11g MODE IN THE 2.4 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2 (1)

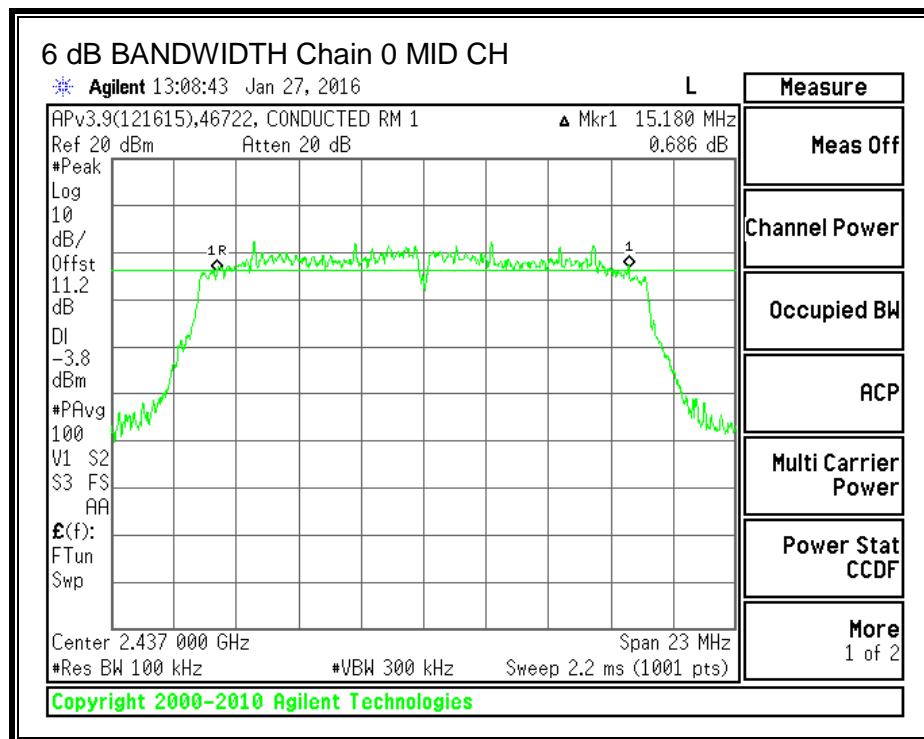
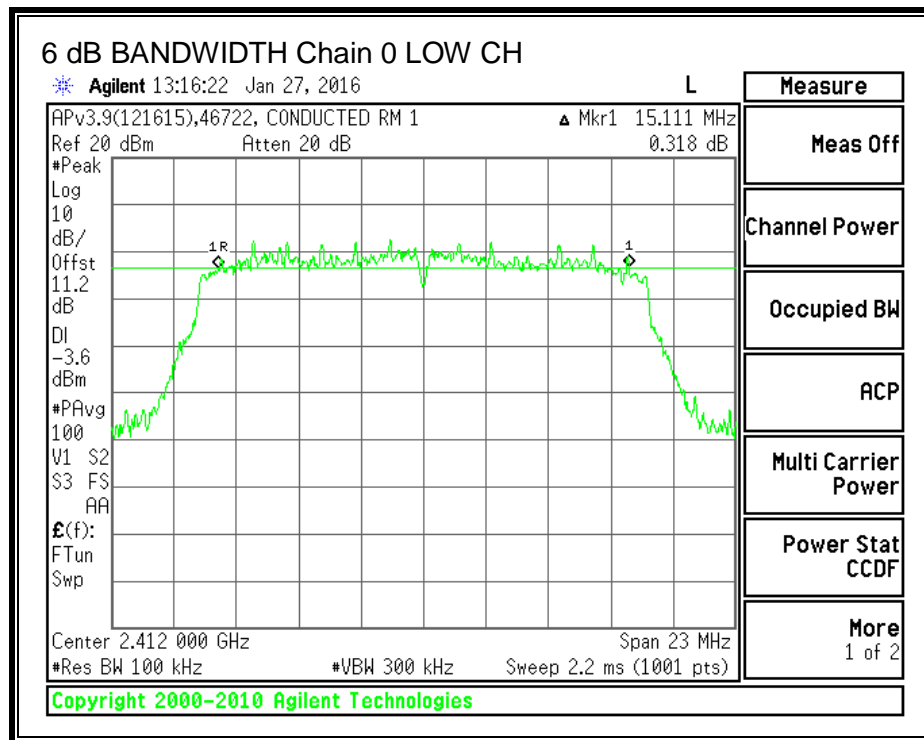
The minimum 6 dB bandwidth shall be at least 500 kHz.

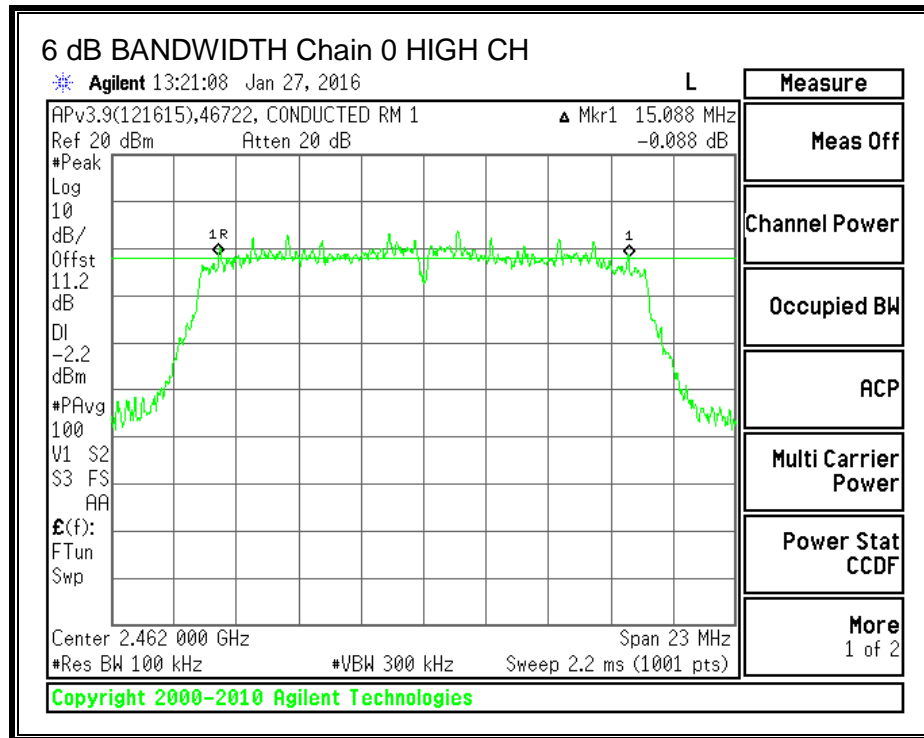
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	15.111	15.111	0.5
Mid	2437	15.180	15.088	0.5
High	2462	15.088	15.111	0.5

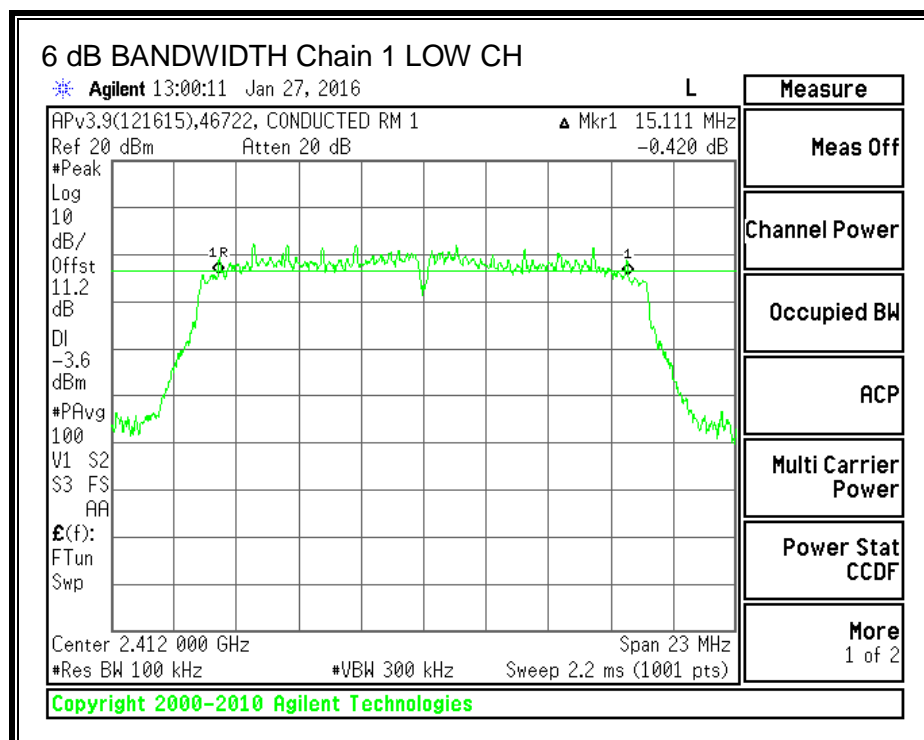
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

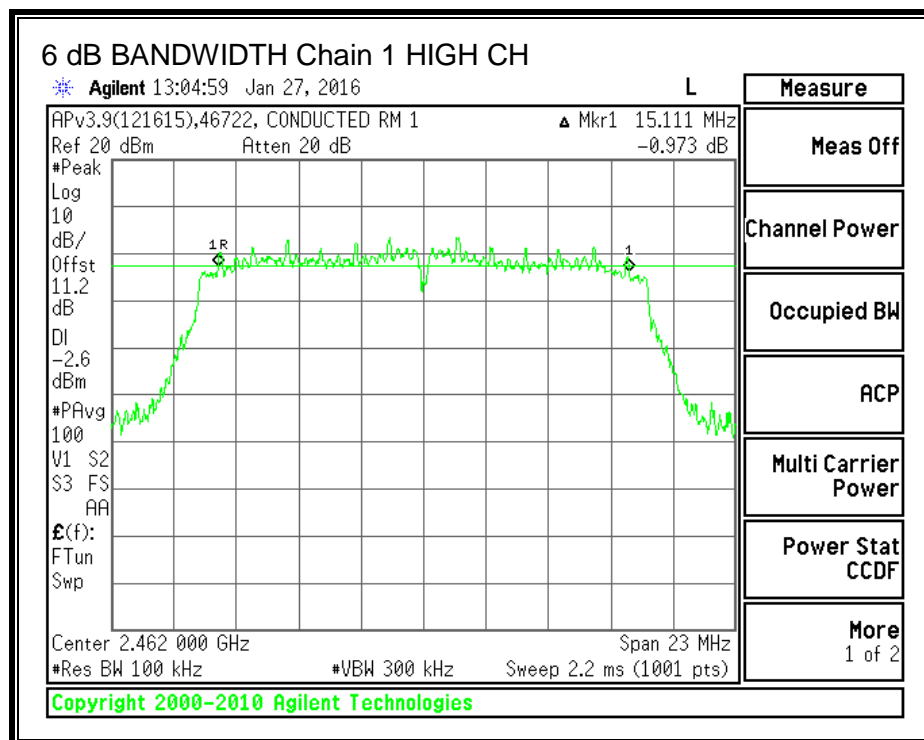
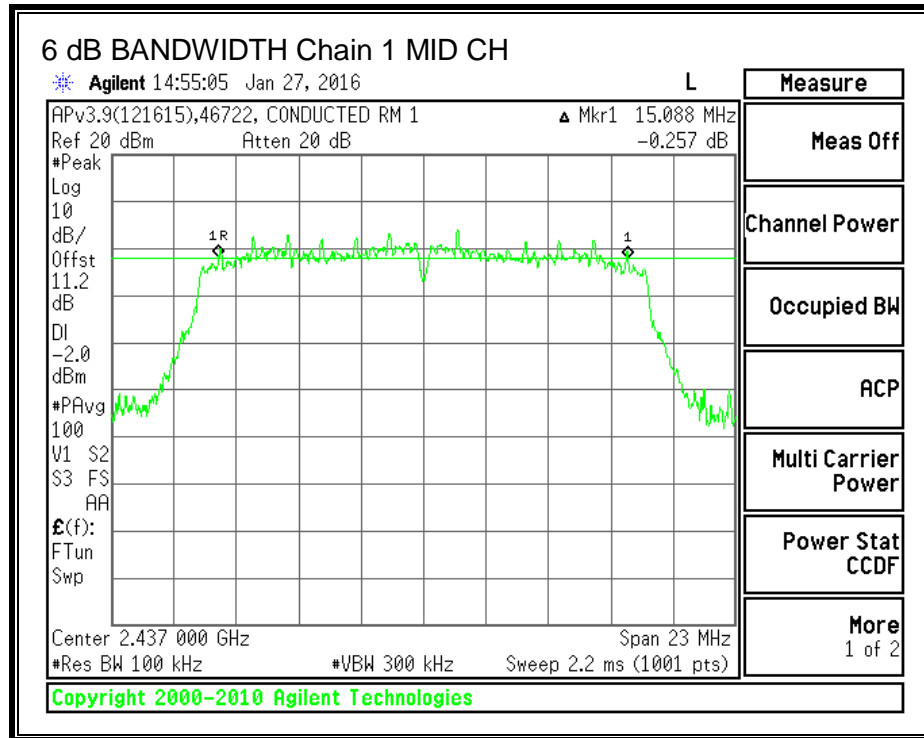
6 dB BANDWIDTH, Chain 0

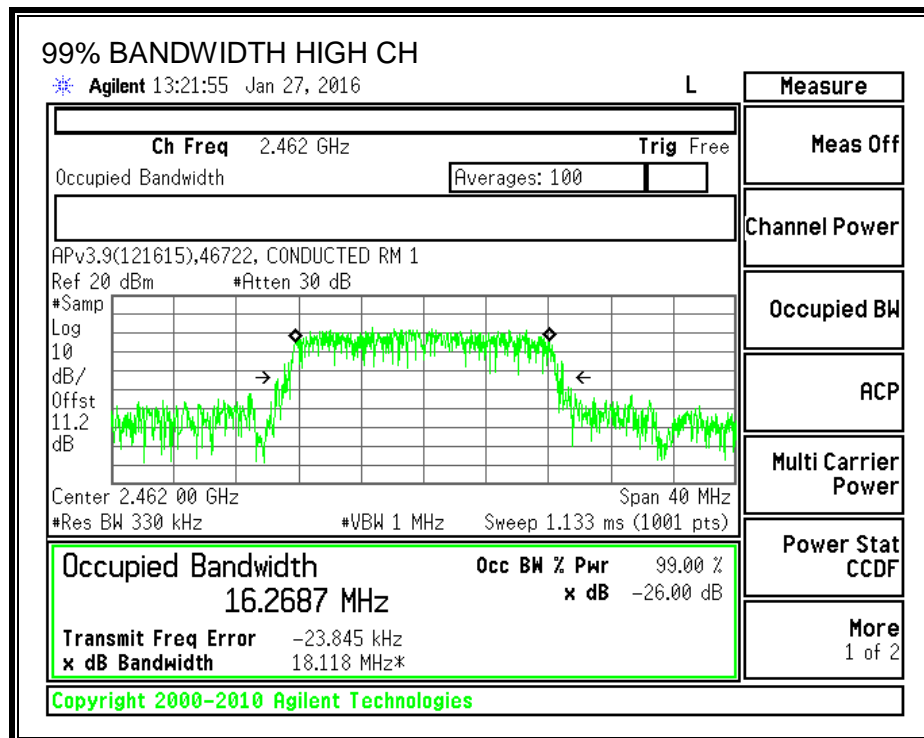
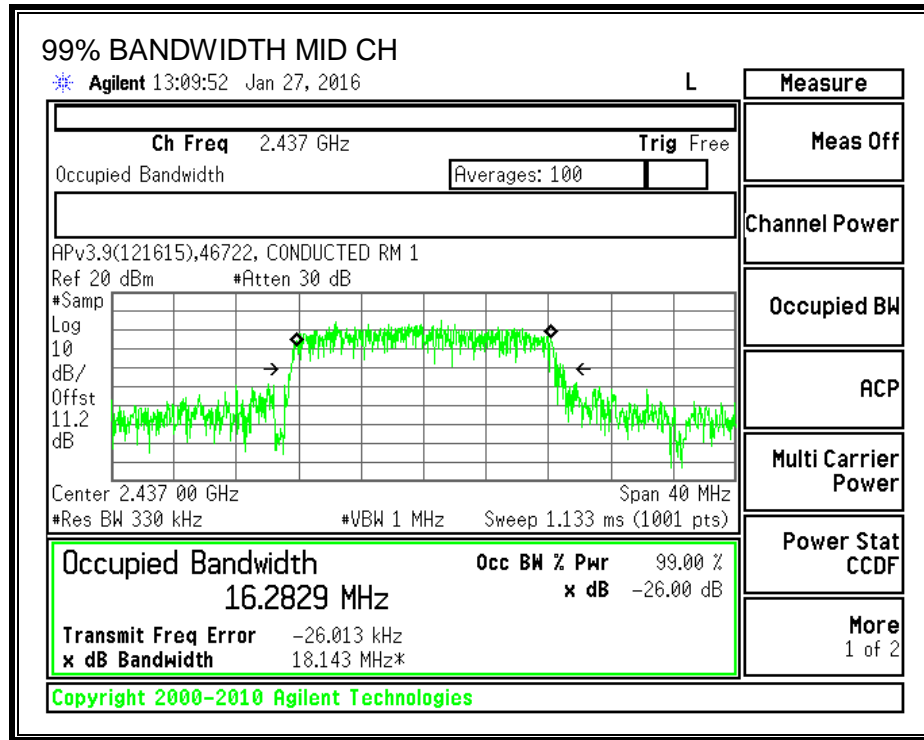




6 dB BANDWIDTH, Chain 1



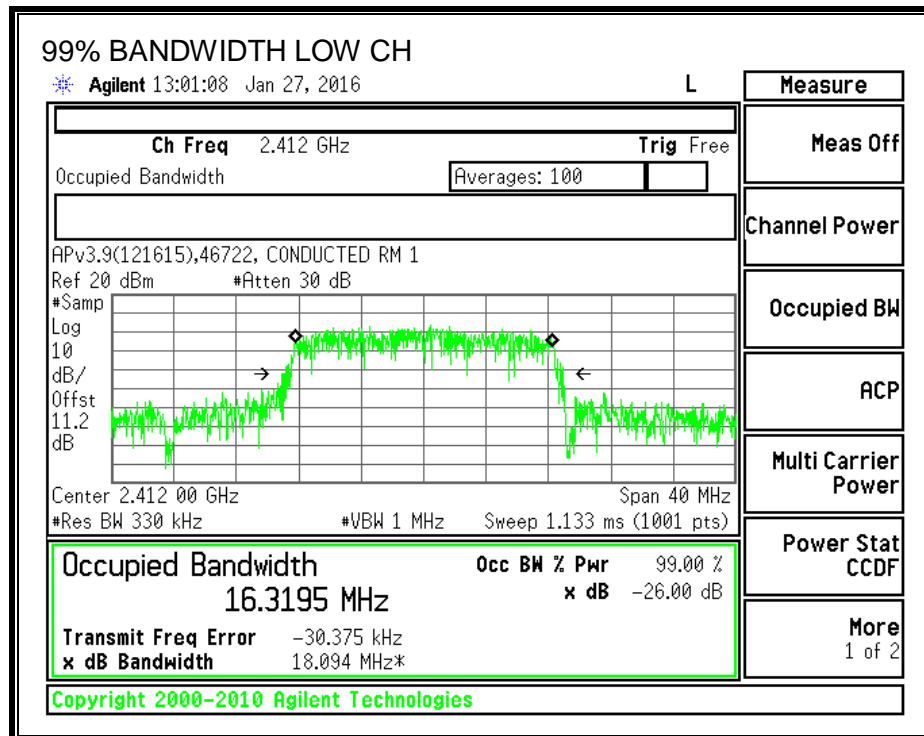


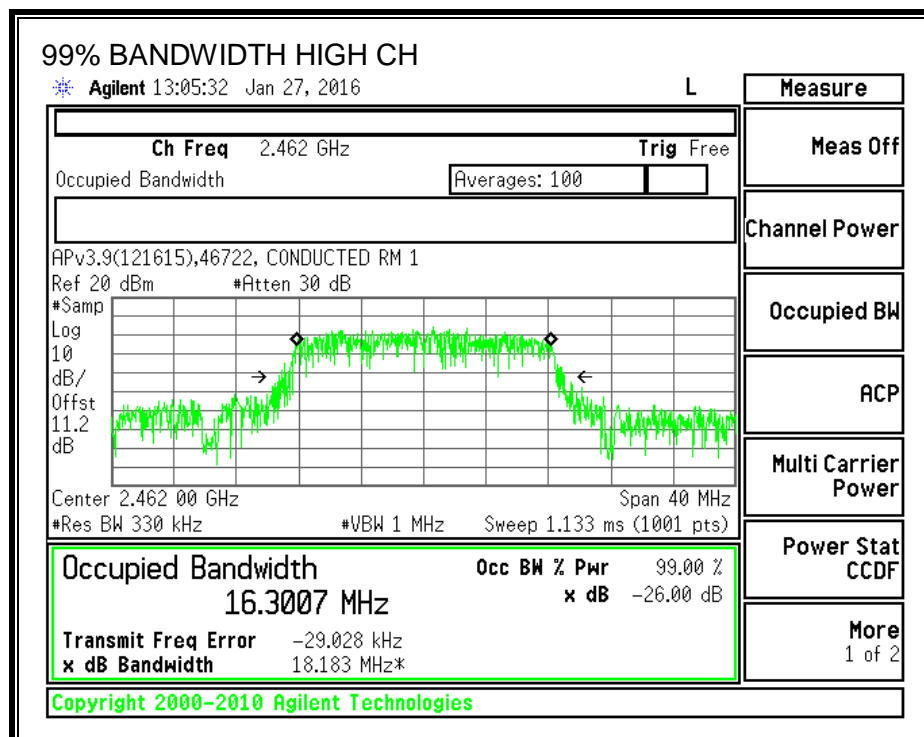
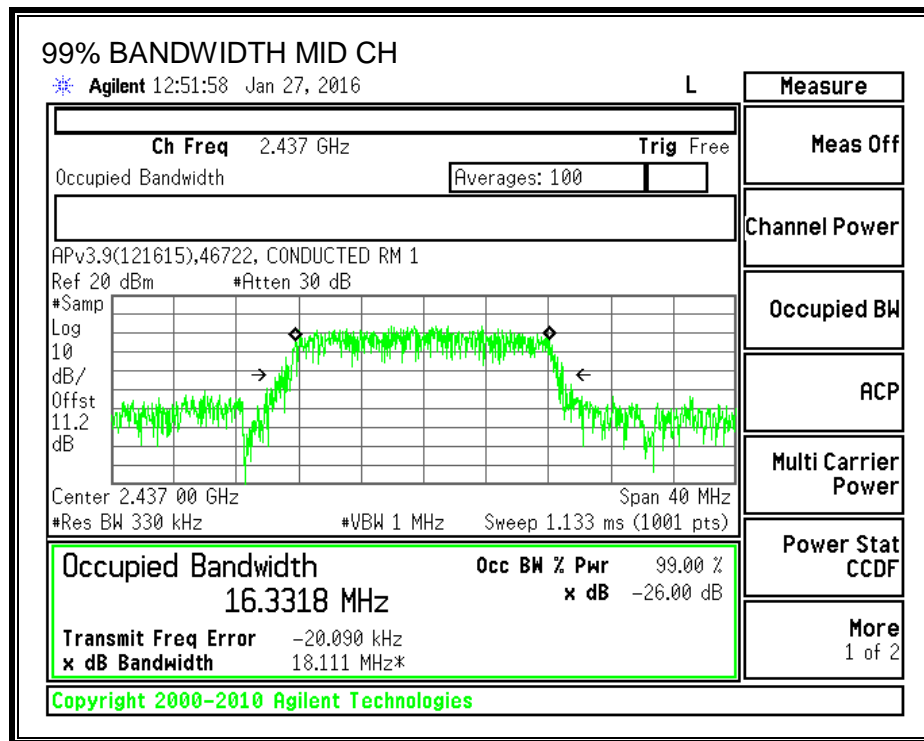


Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3195
Mid	2437	16.3318
High	2462	16.3007

99% BANDWIDTH





8.3.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

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

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

RESULTS

Chain 0

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.70	30.00	30	36	30.00
Ch. 2	2417	0.70	30.00	30	36	30.00
Ch. 3	2422	0.70	30.00	30	36	30.00
Mid	2437	0.70	30.00	30	36	30.00
Ch. 9	2452	0.70	30.00	30	36	30.00
Ch. 10	2457	0.70	30.00	30	36	30.00
High	2462	0.70	30.00	30	36	30.00

Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.32	10.45	30.00	-19.55
Ch. 2	2417	11.41	11.54	30.00	-18.46
Ch. 3	2422	12.50	12.63	30.00	-17.37
Mid	2437	12.65	12.78	30.00	-17.22
Ch. 9	2452	12.63	12.76	30.00	-17.24
Ch. 10	2457	11.78	11.91	30.00	-18.09
High	2462	10.69	10.82	30.00	-19.18

Chain 1

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.50	30.00	30	36	30.00
2	2417	0.50	30.00	30	36	30.00
3	2422	0.50	30.00	30	36	30.00
Mid	2437	0.50	30.00	30	36	30.00
9	2452	0.50	30.00	30	36	30.00
10	2457	0.50	30.00	30	36	30.00
High	2462	0.50	30.00	30	36	30.00

Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.34	10.47	30.00	-19.53
2	2417	11.40	11.53	30.00	-18.47
3	2422	12.54	12.67	30.00	-17.33
Mid	2437	12.65	12.78	30.00	-17.22
9	2452	12.75	12.88	30.00	-17.12
10	2457	11.83	11.96	30.00	-18.04
High	2462	10.63	10.76	30.00	-19.24

Chain 0 (External Antenna)

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.70	30.00	30	36	30.00
2	2417	-1.70	30.00	30	36	30.00
3	2422	-1.70	30.00	30	36	30.00
Mid	2437	-1.70	30.00	30	36	30.00
9	2452	-1.70	30.00	30	36	30.00
10	2457	-1.70	30.00	30	36	30.00
High	2462	-1.70	30.00	30	36	30.00

Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.32	10.45	30.00	-19.55
2	2417	11.41	11.54	30.00	-18.46
3	2422	12.50	12.63	30.00	-17.37
Mid	2437	12.65	12.78	30.00	-17.22
9	2452	12.63	12.76	30.00	-17.24
10	2457	11.78	11.91	30.00	-18.09
High	2462	10.69	10.82	30.00	-19.18

8.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

Chain 0

Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.04	-8.91	8.0	-16.9
Mid	2437	-10.11	-9.98	8.0	-18.0
High	2462	-10.18	-10.05	8.0	-18.1

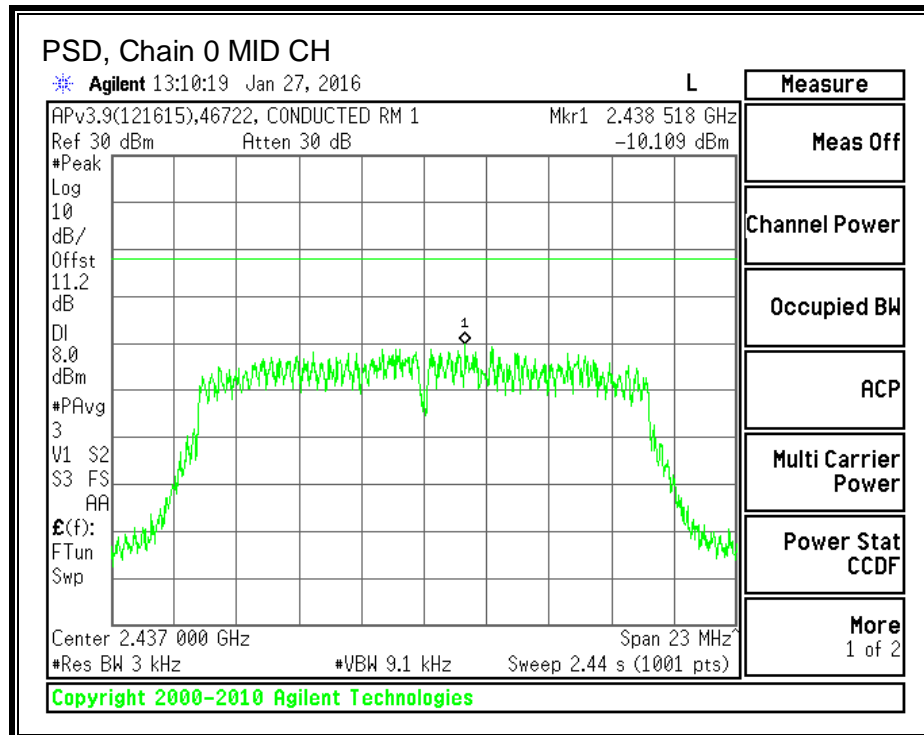
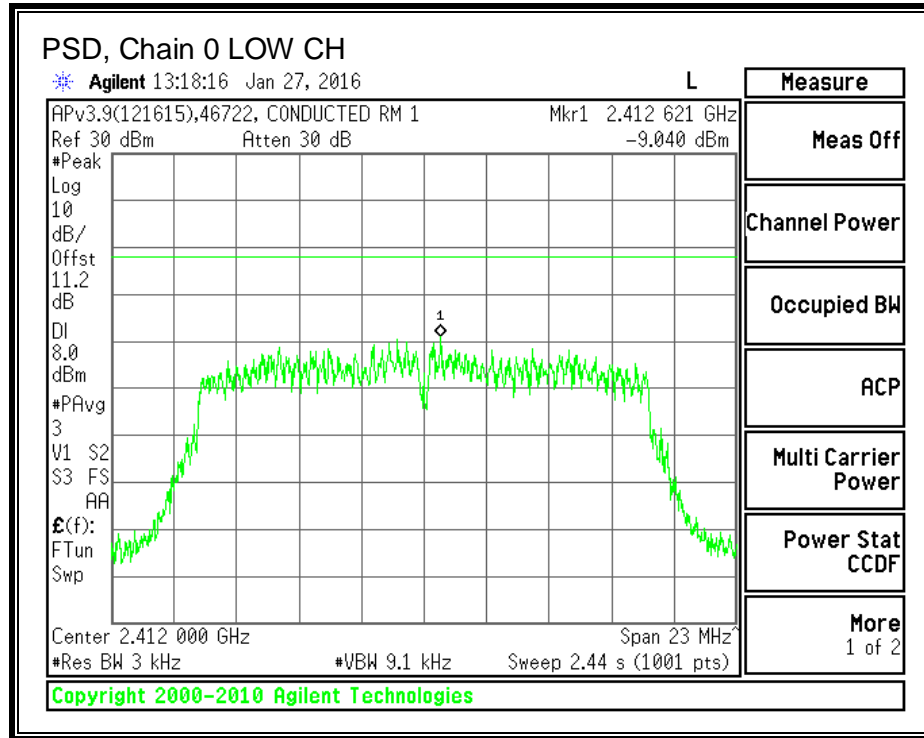
Chain 1

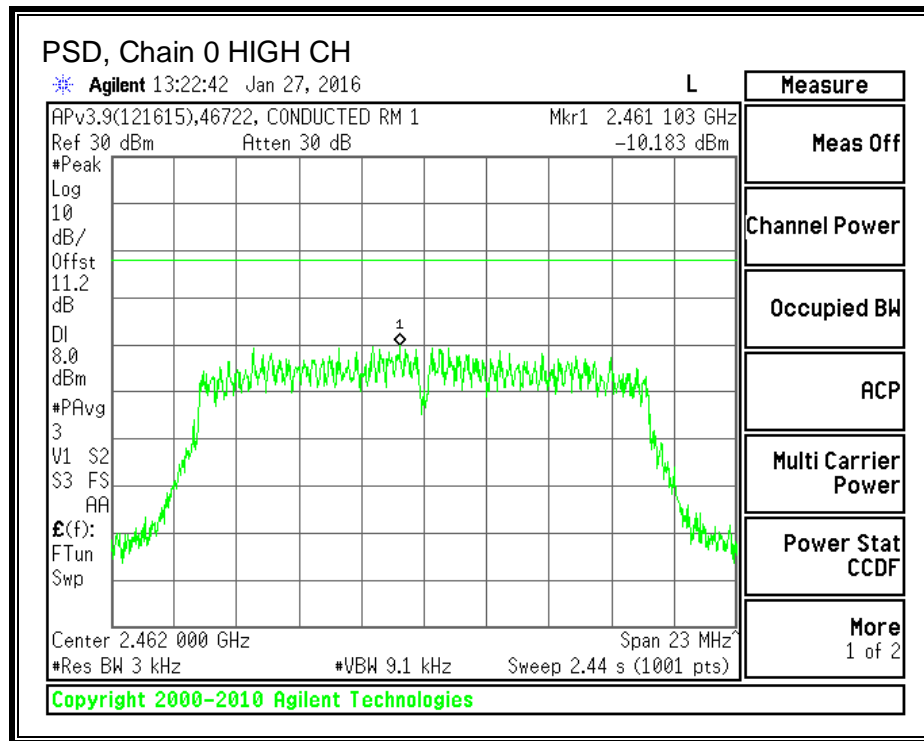
Duty Cycle CF (dB)	0.13	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

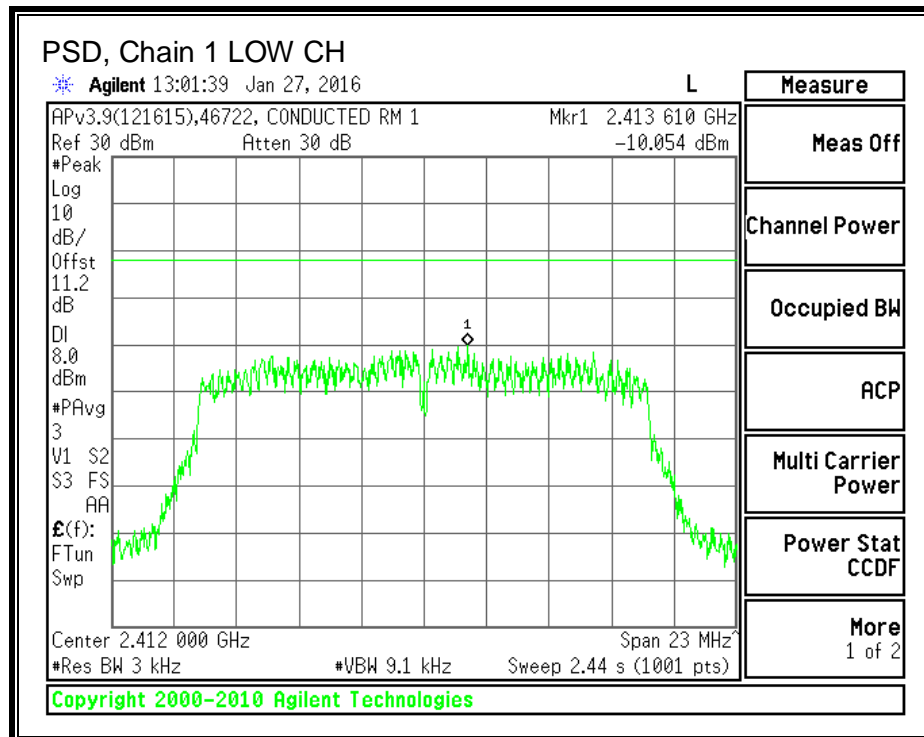
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.05	-9.92	8.0	-17.9
Mid	2437	-9.50	-9.37	8.0	-17.4
High	2462	-8.72	-8.59	8.0	-16.6

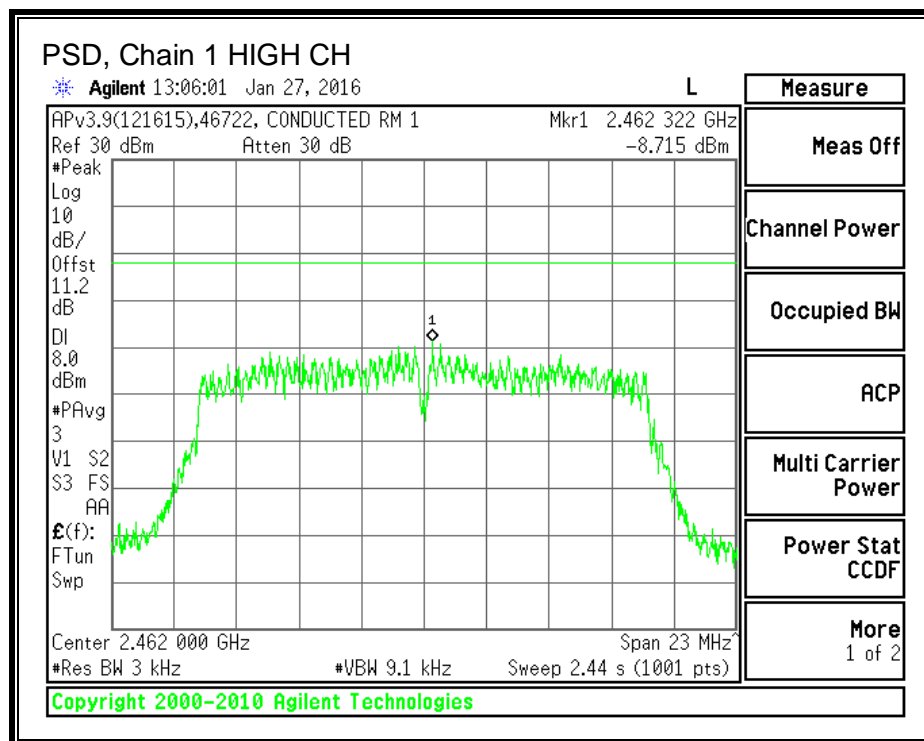
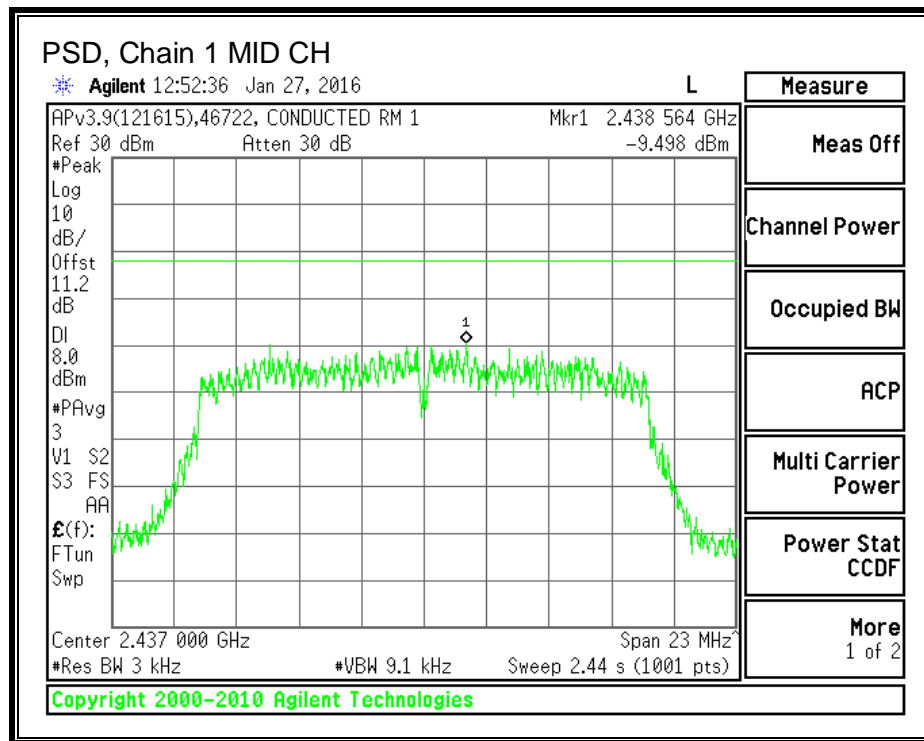
PSD, Chain 0





PSD, Chain 1





8.3.5. OUT-OF-BAND EMISSIONS

LIMITS

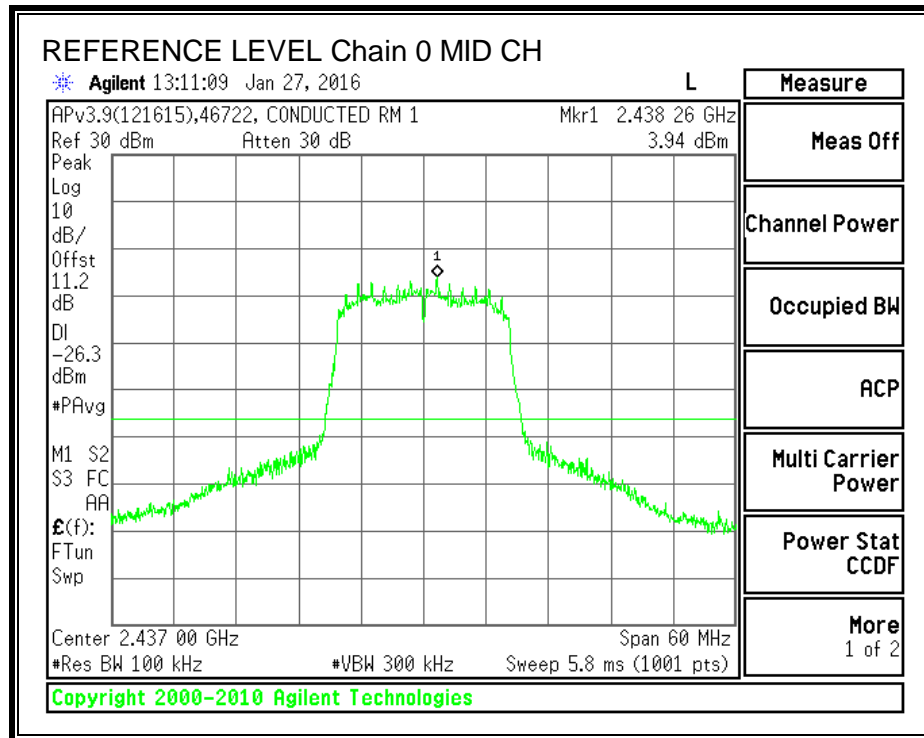
FCC §15.247 (d)

IC RSS-247 5.5

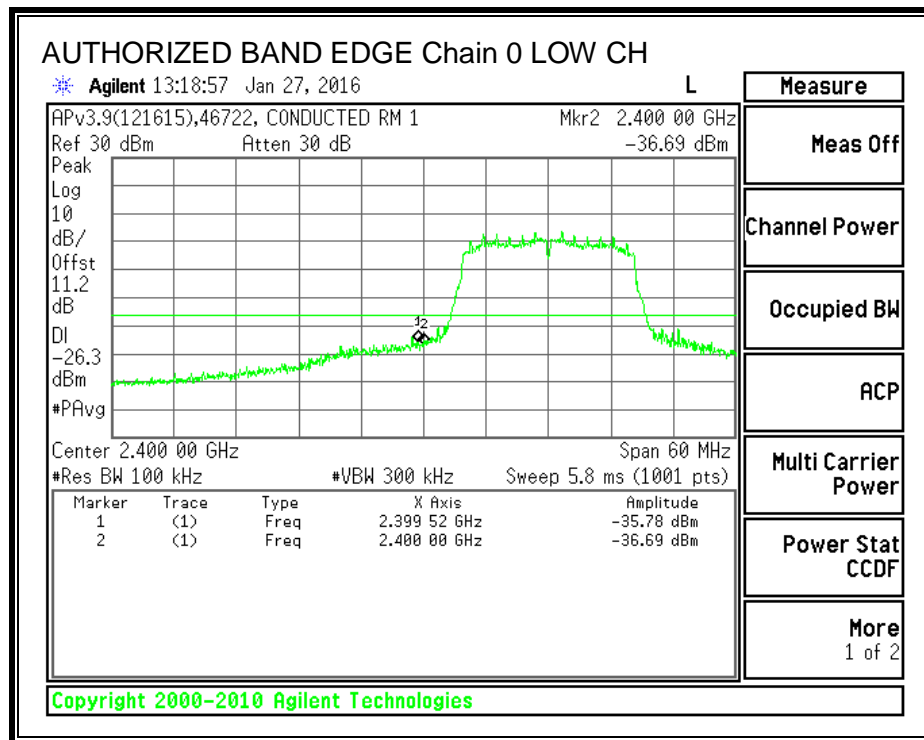
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

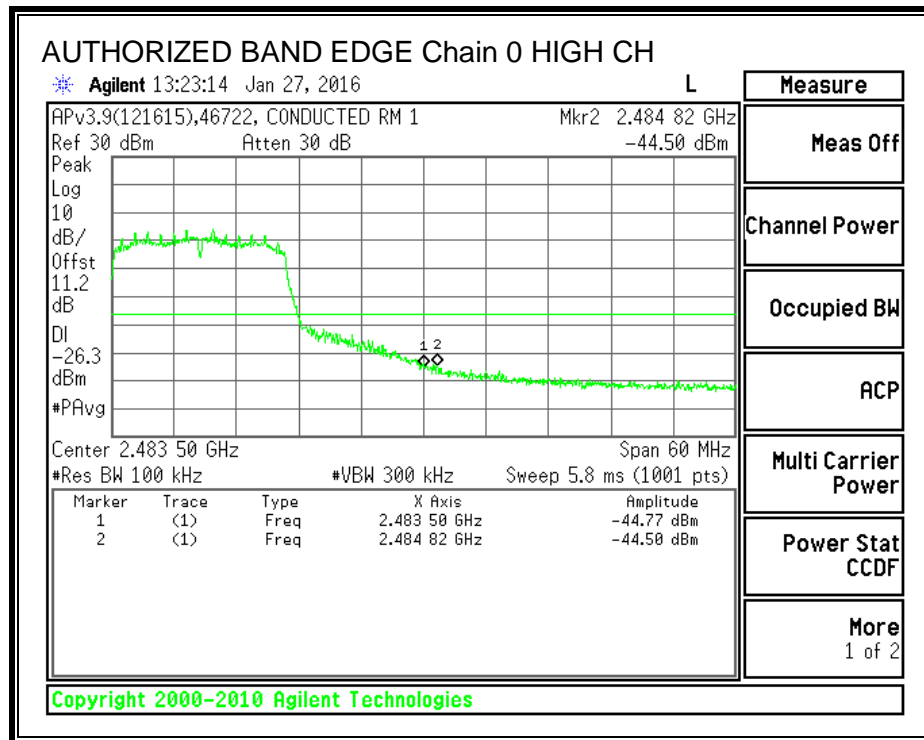


LOW CHANNEL BANDEDGE, Chain 0



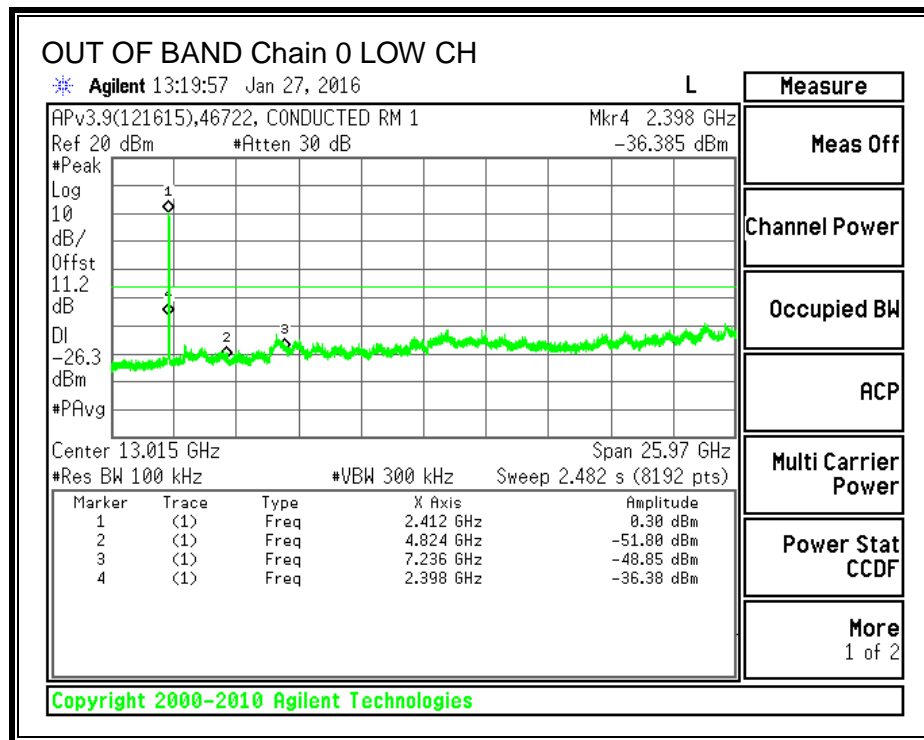
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

HIGH CHANNEL BANDEDGE, Chain 0

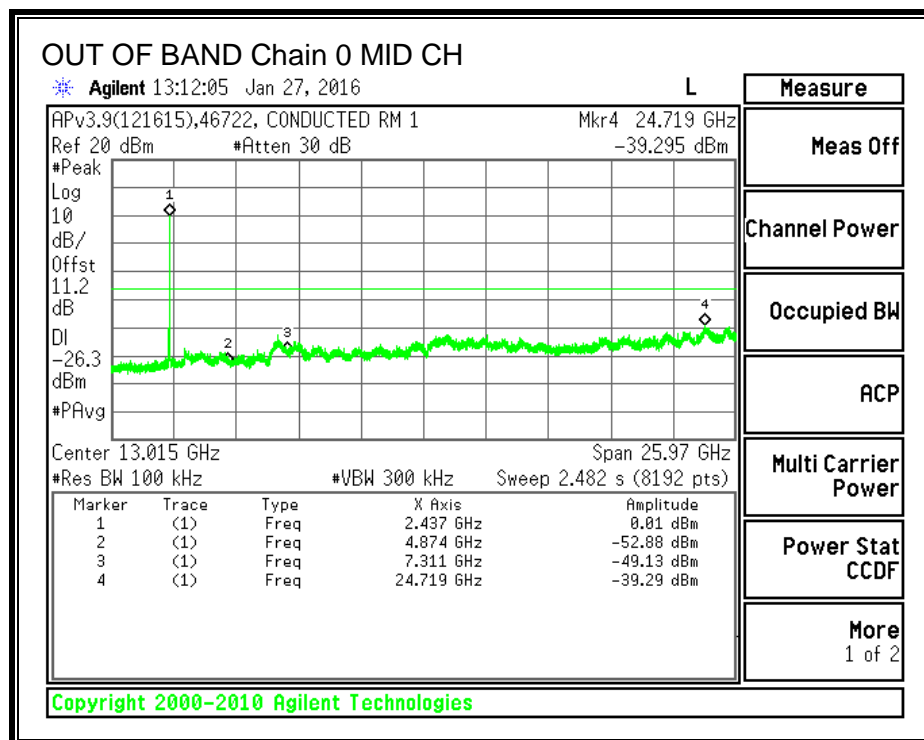


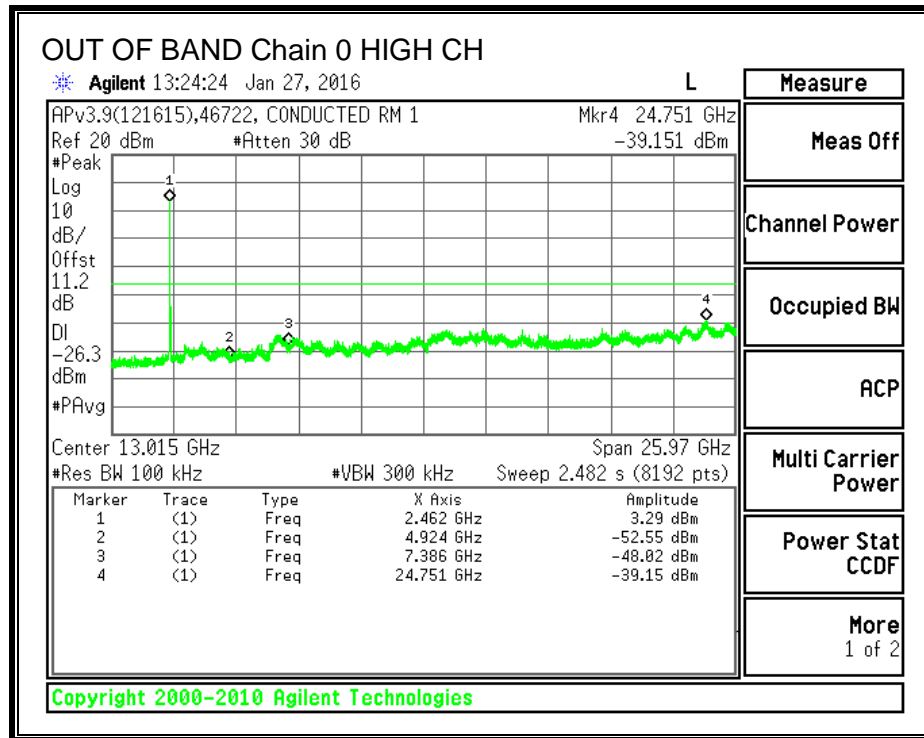
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

OUT-OF-BAND EMISSIONS, Chain 0



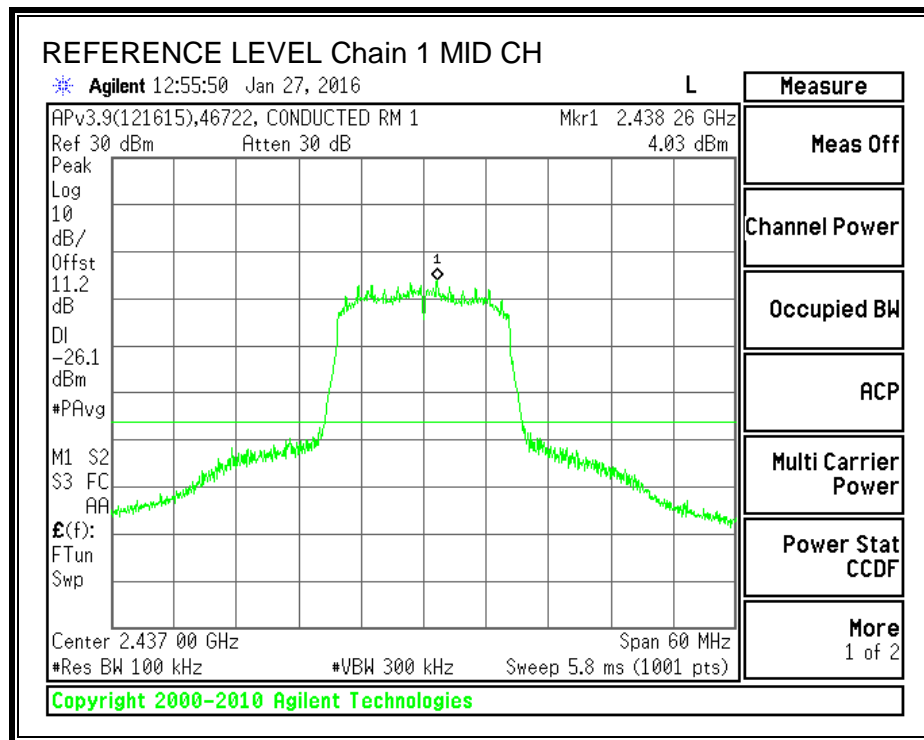
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



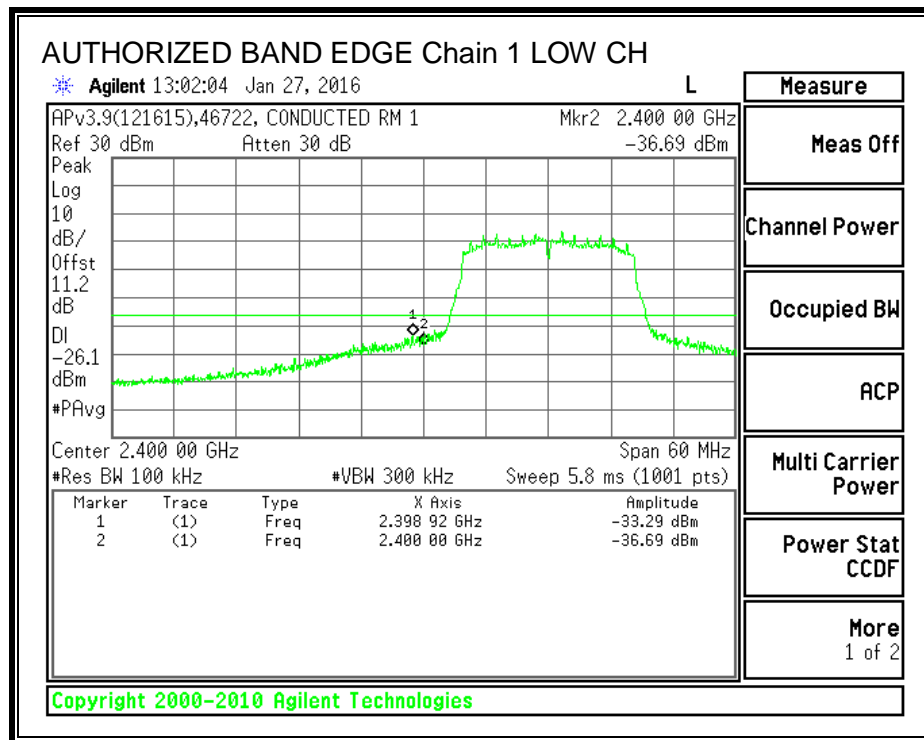


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

IN-BAND REFERENCE LEVEL, Chain 1

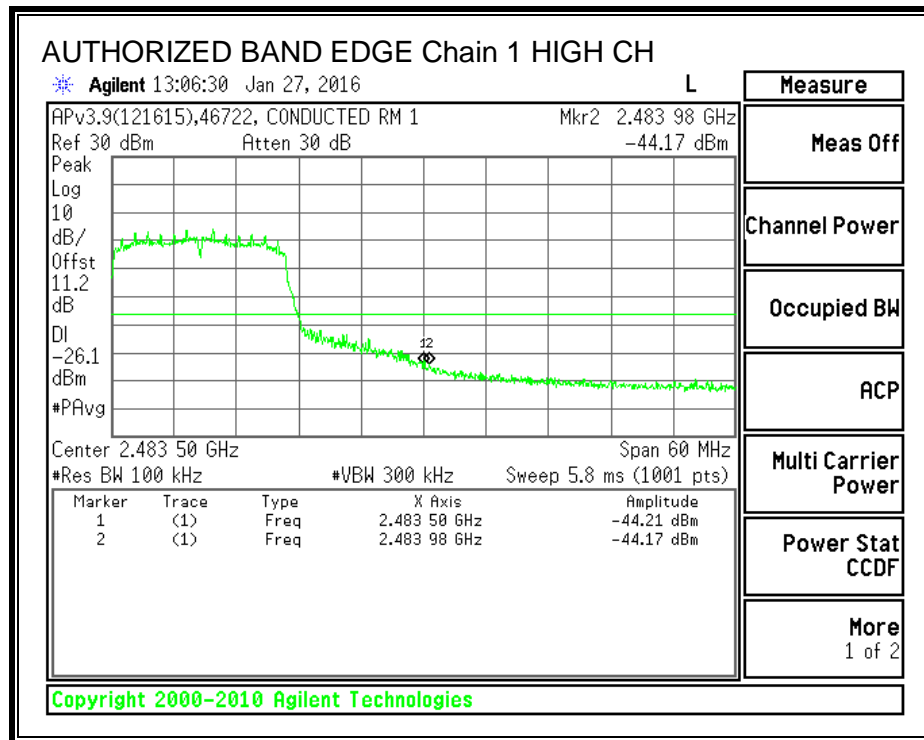


LOW CHANNEL BANDEDGE, Chain 1

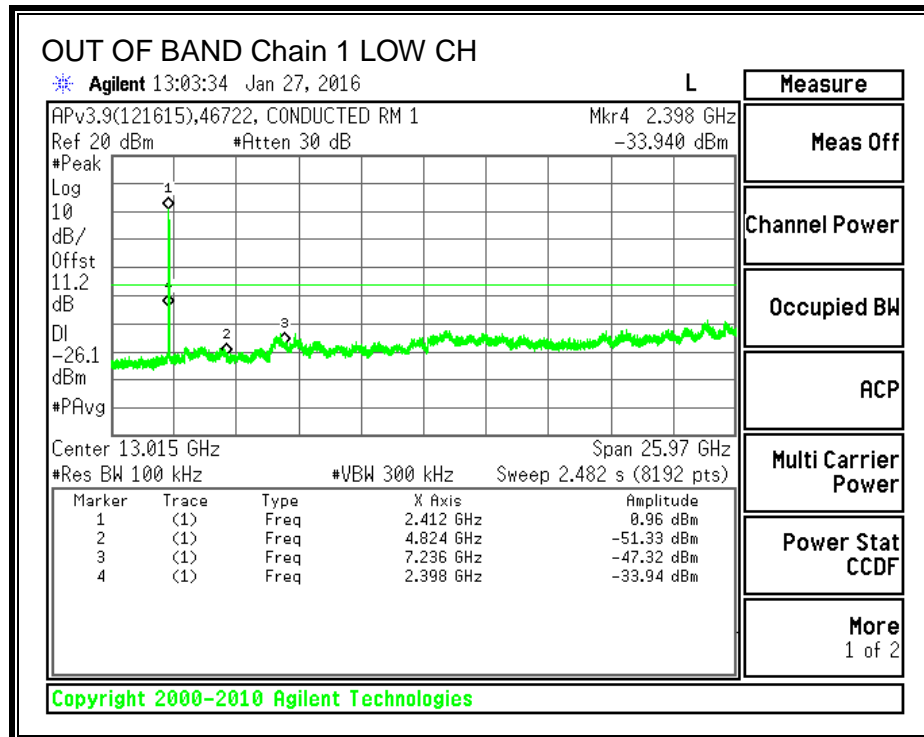


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

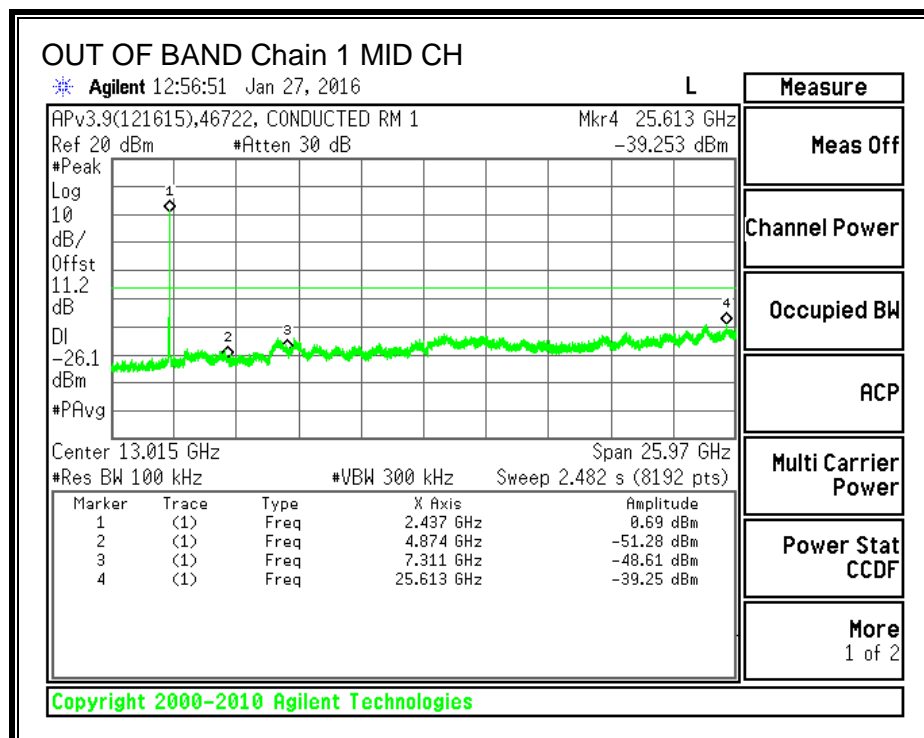
HIGH CHANNEL BANDEDGE, Chain 1

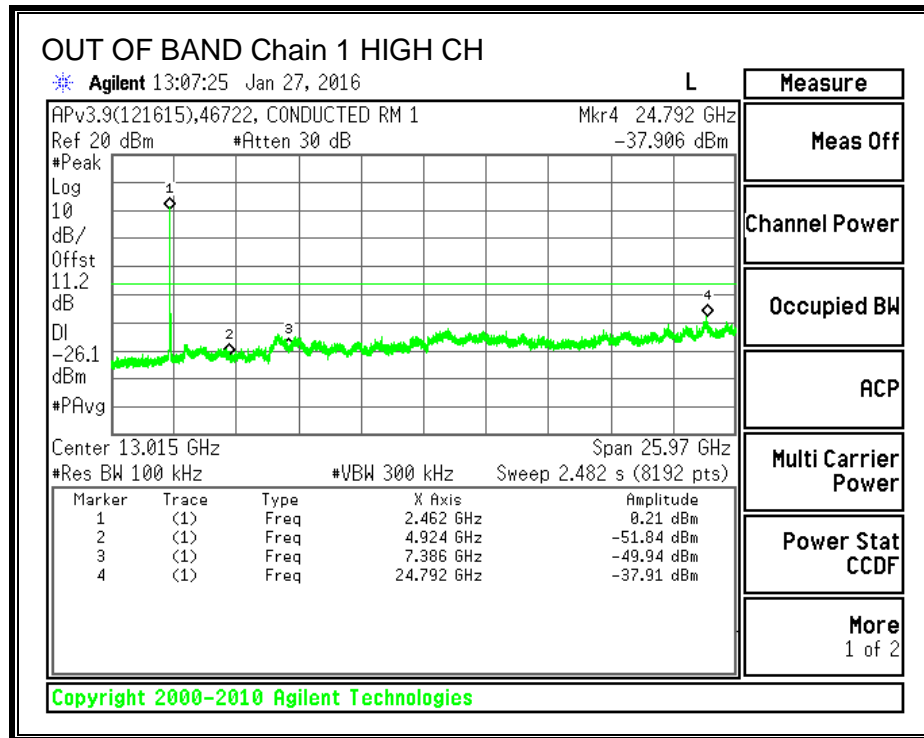


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

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-247 5.2 (1)

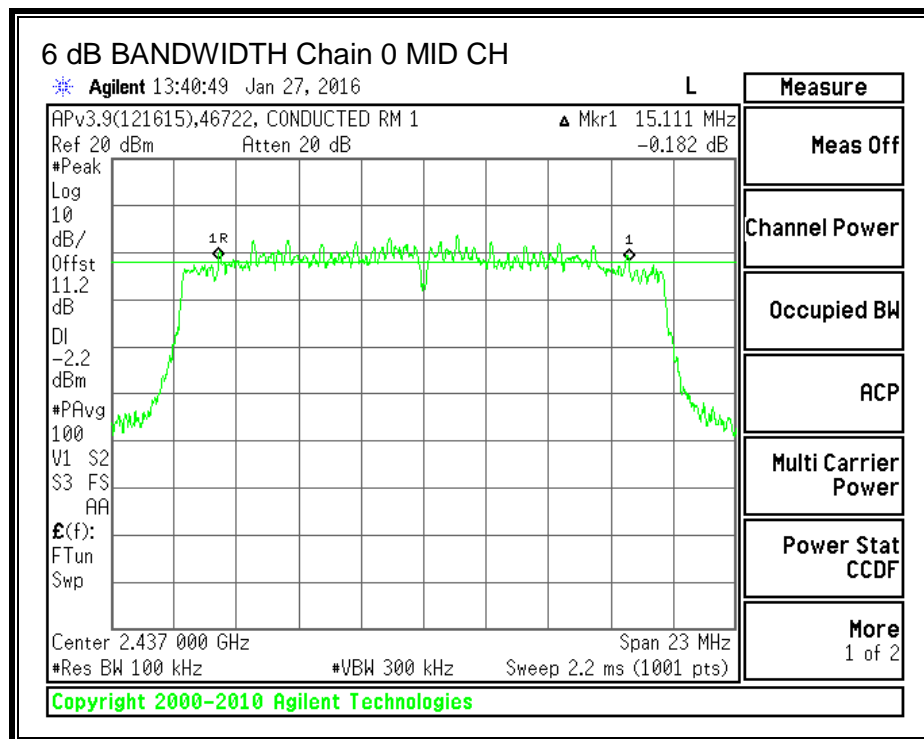
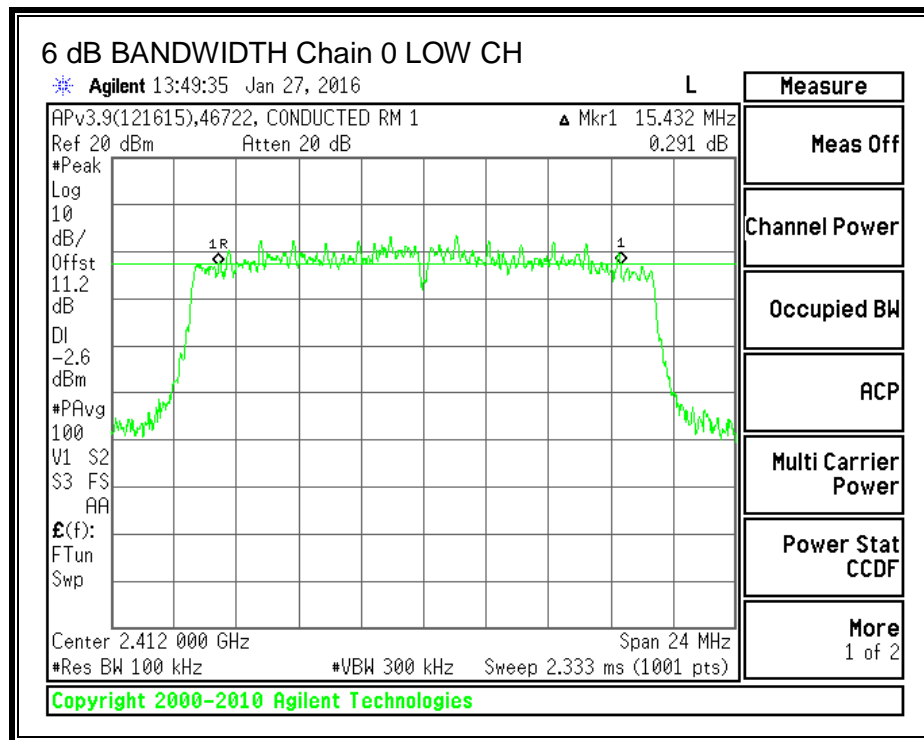
The minimum 6 dB bandwidth shall be at least 500 kHz.

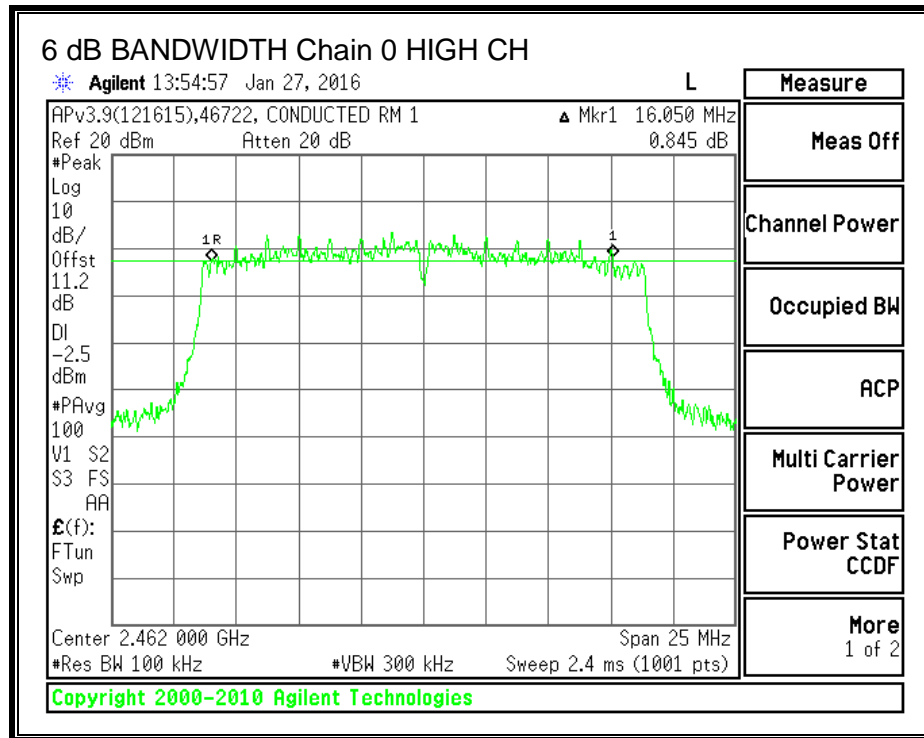
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	2412	15.432	15.720	0.5
Mid	2437	15.111	15.134	0.5
High	2462	16.050	16.100	0.5

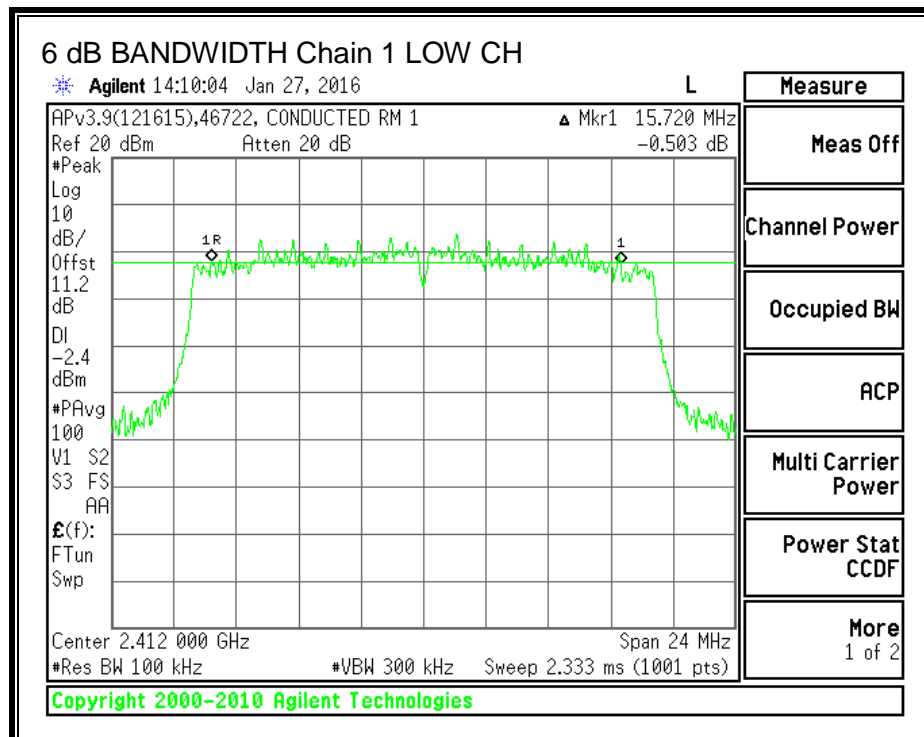
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

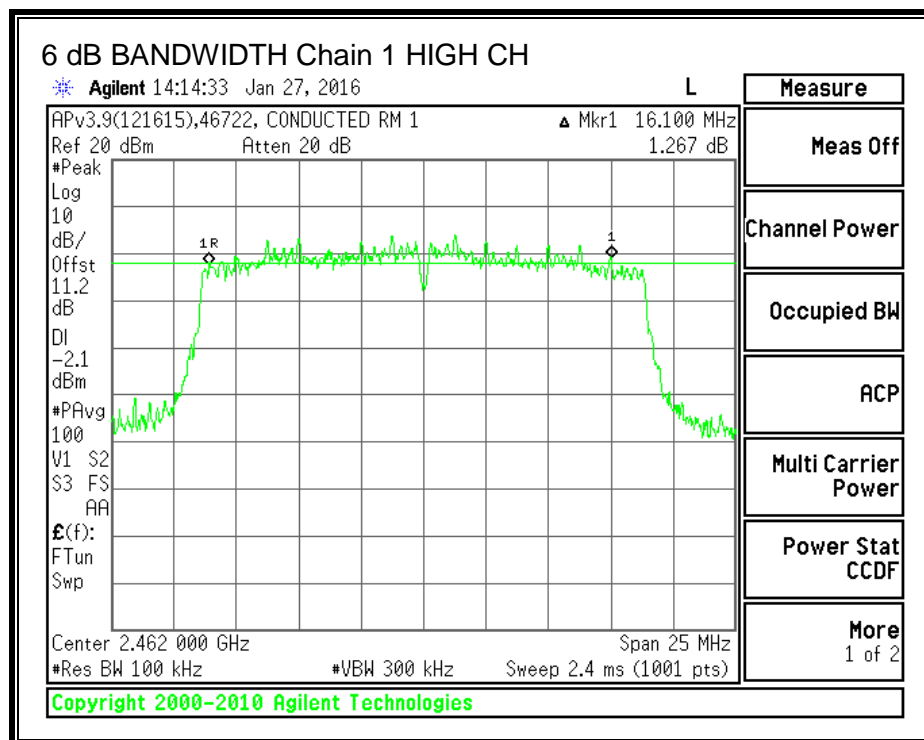
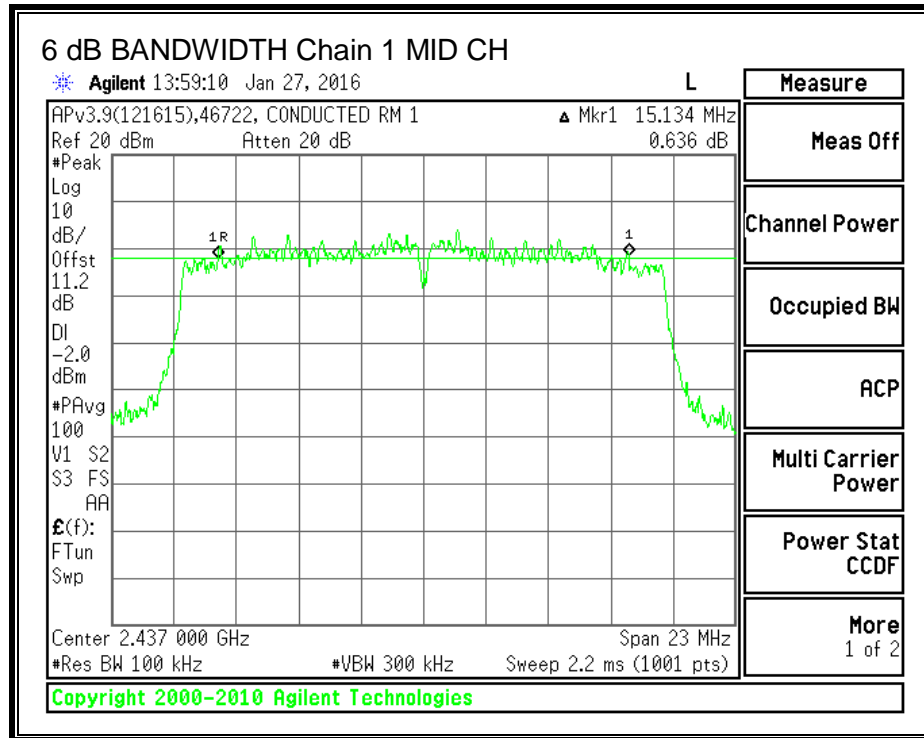
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

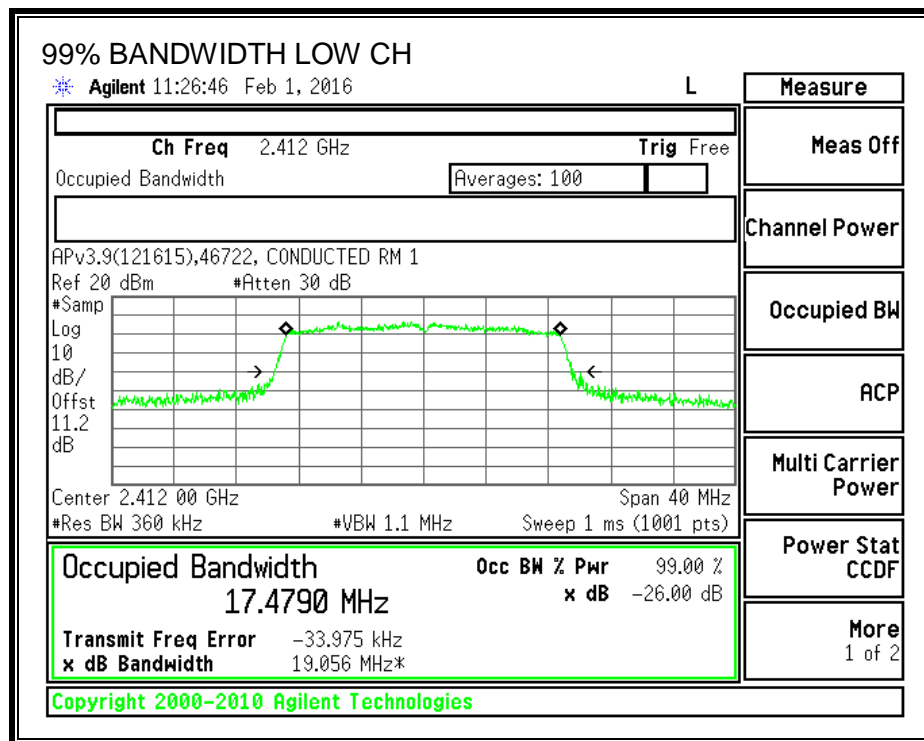
RESULTS

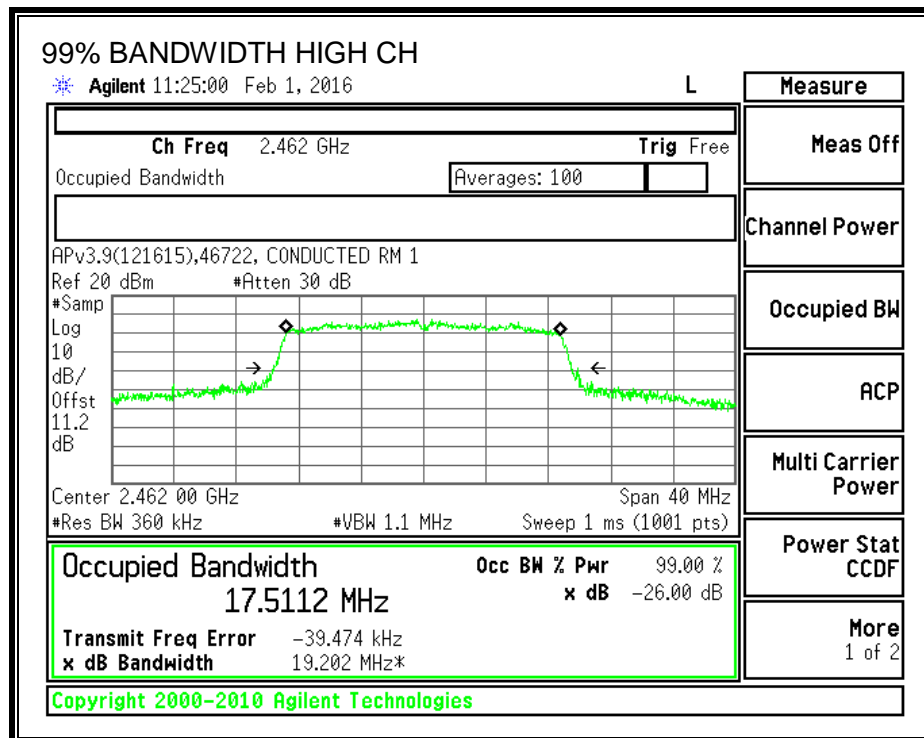
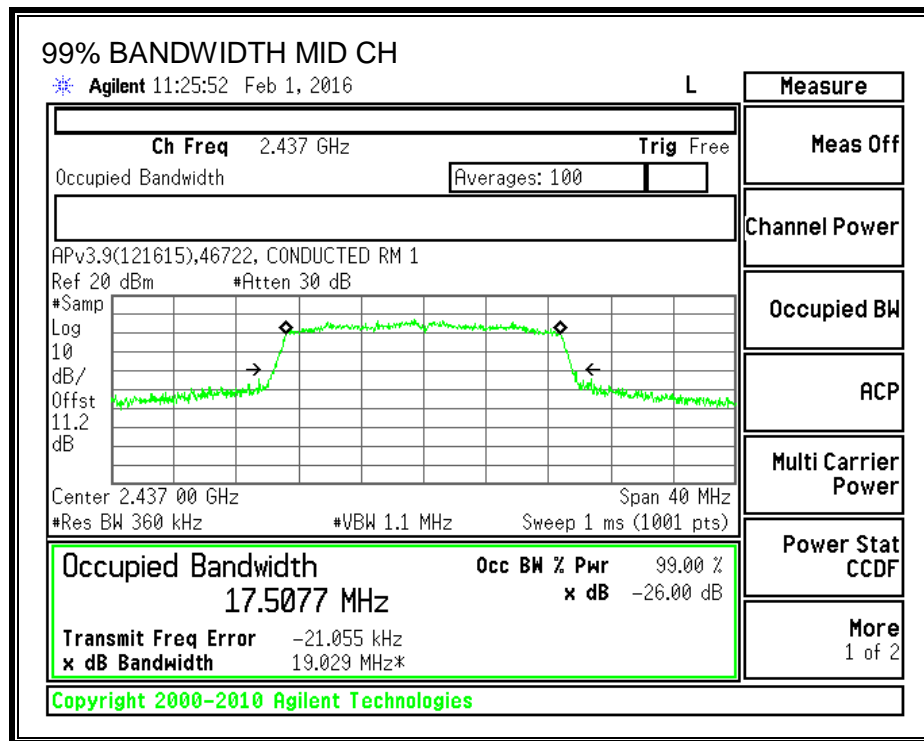
Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.4790
Mid	2437	17.5077
High	2462	17.5112

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

99% BANDWIDTH

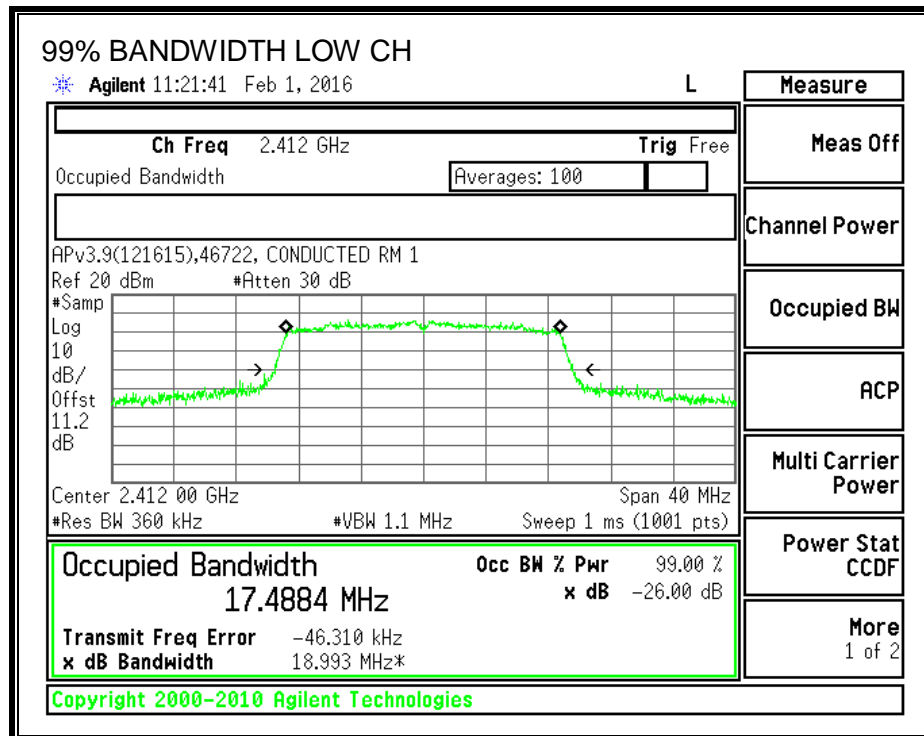


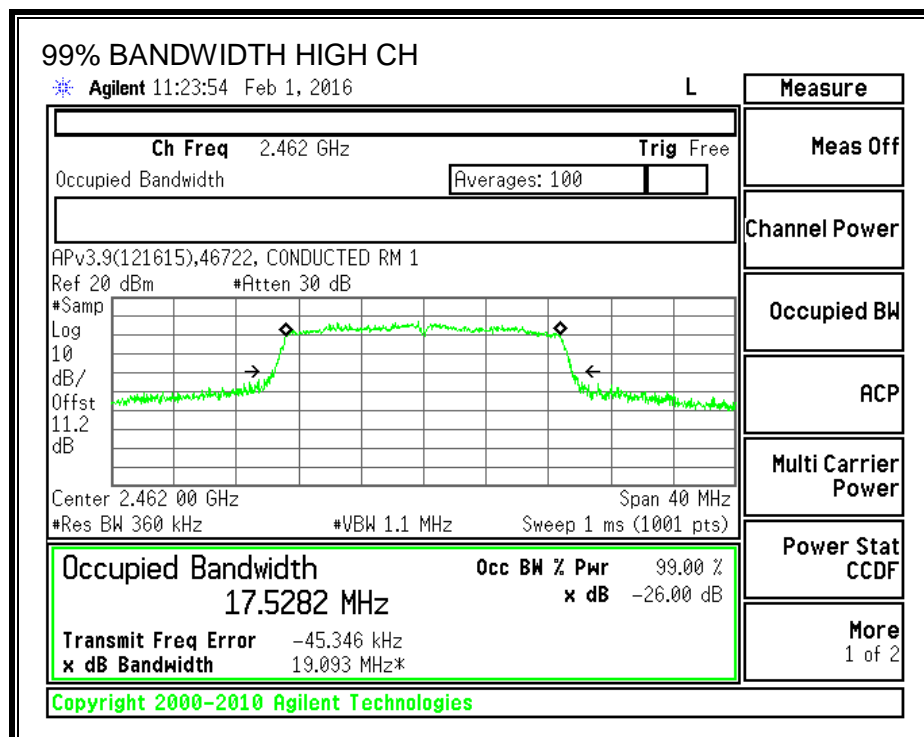
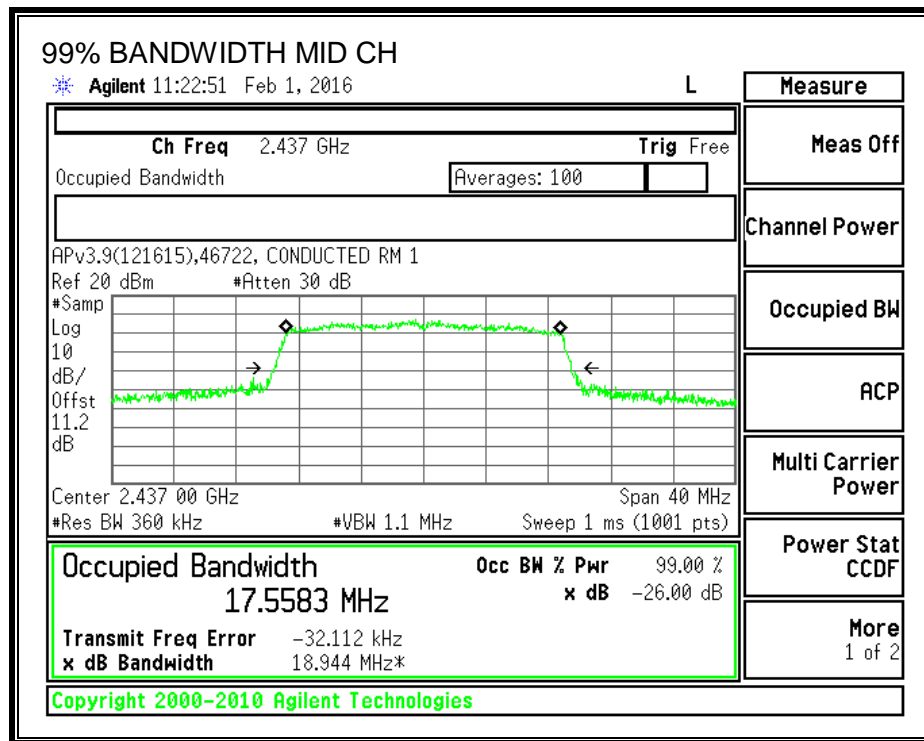


Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.4884
Mid	2437	17.5583
High	2462	17.5282

99% BANDWIDTH





8.4.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 5.4

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

DIRECTIONAL ANTENNA GAIN

There is only one transmitter chain operating at one time, therefore the directional gain is equal to the antenna gain of that chain.

RESULTS

Chain 0

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.70	30.00	30	36	30.00
2	2417	0.70	30.00	30	36	30.00
3	2422	0.70	30.00	30	36	30.00
Mid	2437	0.70	30.00	30	36	30.00
9	2452	0.70	30.00	30	36	30.00
10	2457	0.70	30.00	30	36	30.00
High	2462	0.70	30.00	30	36	30.00

Duty Cycle CF (dB)	0.43	Included in Calculations of Corr'd Power
--------------------	------	--

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.11	10.54	30.00	-19.46
2	2417	11.22	11.65	30.00	-18.35
3	2422	12.10	12.53	30.00	-17.47
Mid	2437	12.17	12.60	30.00	-17.40
9	2452	12.27	12.70	30.00	-17.30
10	2457	11.43	11.86	30.00	-18.14
High	2462	10.12	10.55	30.00	-19.45

Chain 1

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.50	30.00	30	36	30.00
2	2417	0.50	30.00	30	36	30.00
3	2422	0.50	30.00	30	36	30.00
Mid	2437	0.50	30.00	30	36	30.00
9	2452	0.50	30.00	30	36	30.00
10	2457	0.50	30.00	30	36	30.00
High	2462	0.50	30.00	30	36	30.00

Duty Cycle CF (dB)	0.43	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.10	10.53	30.00	-19.47
2	2417	11.09	11.52	30.00	-18.48
3	2422	12.10	12.53	30.00	-17.47
Mid	2437	12.37	12.80	30.00	-17.20
9	2452	12.33	12.76	30.00	-17.24
10	2457	11.45	11.88	30.00	-18.12
High	2462	10.32	10.75	30.00	-19.25

Chain 0 (External Antenna)

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.70	30.00	30	36	30.00
2	2417	-1.70	30.00	30	36	30.00
3	2422	-1.70	30.00	30	36	30.00
Mid	2437	-1.70	30.00	30	36	30.00
9	2452	-1.70	30.00	30	36	30.00
10	2457	-1.70	30.00	30	36	30.00
High	2462	-1.70	30.00	30	36	30.00

Duty Cycle CF (dB)	0.43	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	10.11	10.54	30.00	-19.46
2	2417	11.22	11.65	30.00	-18.35
3	2422	12.10	12.53	30.00	-17.47
Mid	2437	12.17	12.60	30.00	-17.40
9	2452	12.27	12.70	30.00	-17.30
10	2457	11.43	11.86	30.00	-18.14
High	2462	10.12	10.55	30.00	-19.45

8.4.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 5.2 (2)

RESULTS

Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

Chain 0

Duty Cycle CF (dB)	0.43	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.88	-10.45	8.0	-18.5
Mid	2437	-9.96	-9.53	8.0	-17.5
High	2462	-11.44	-11.01	8.0	-19.0

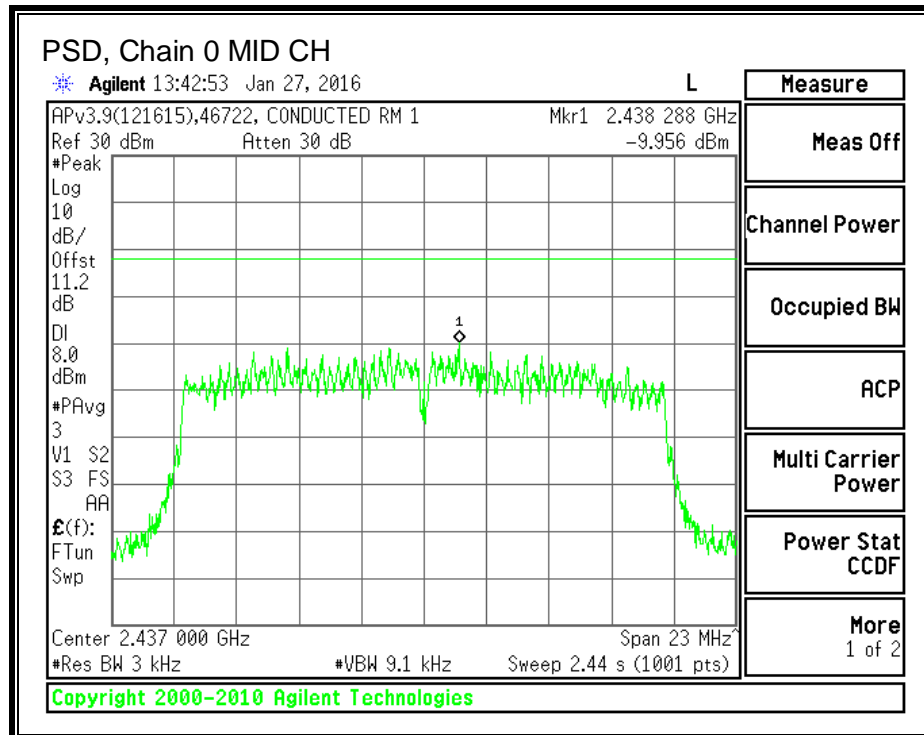
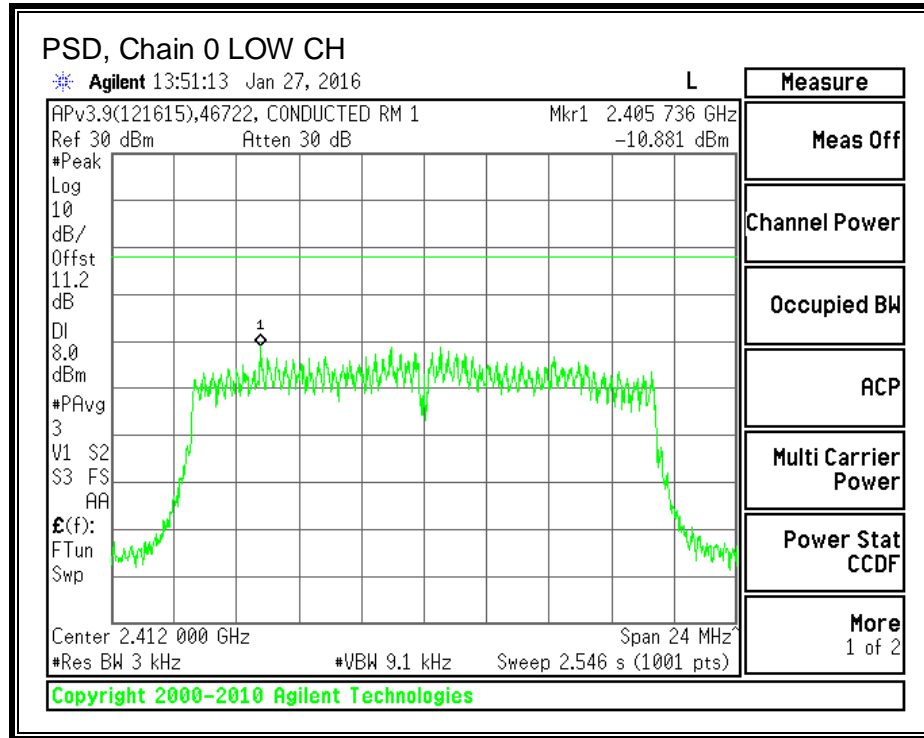
Chain 1

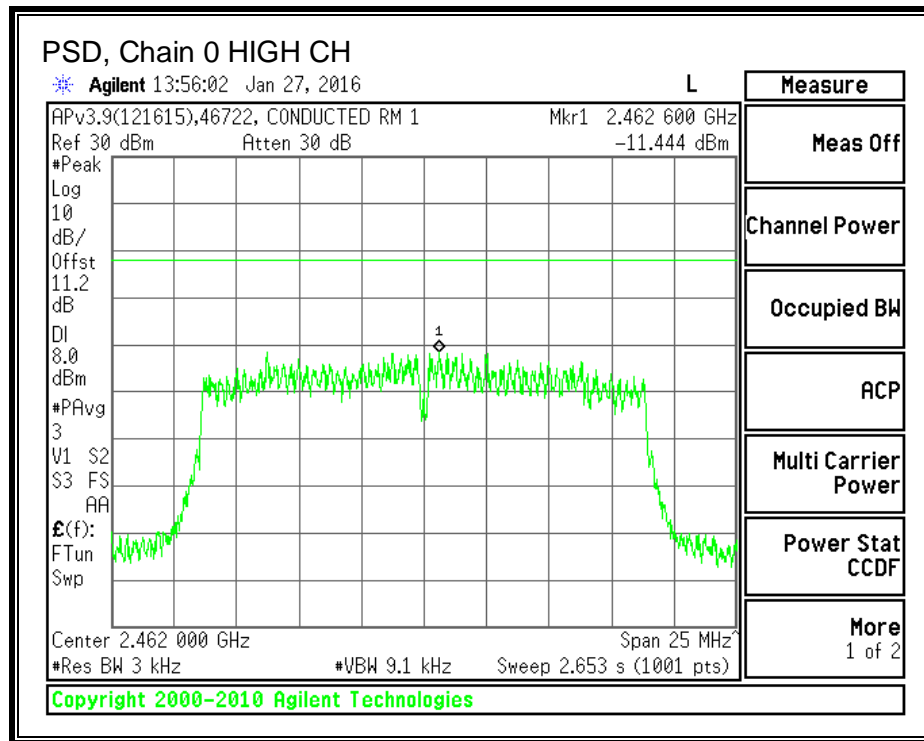
Duty Cycle CF (dB)	0.43	Included in Calculations of Corr'd PSD
--------------------	------	--

PSD Results

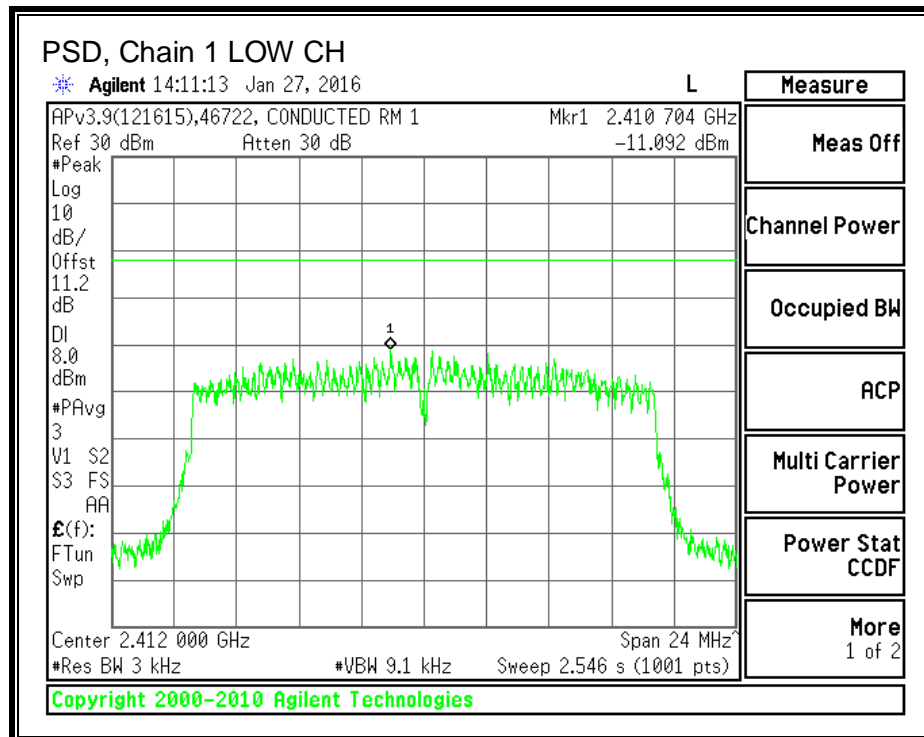
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.09	-10.66	8.0	-18.7
Mid	2437	-11.64	-11.21	8.0	-19.2
High	2462	-10.80	-10.37	8.0	-18.4

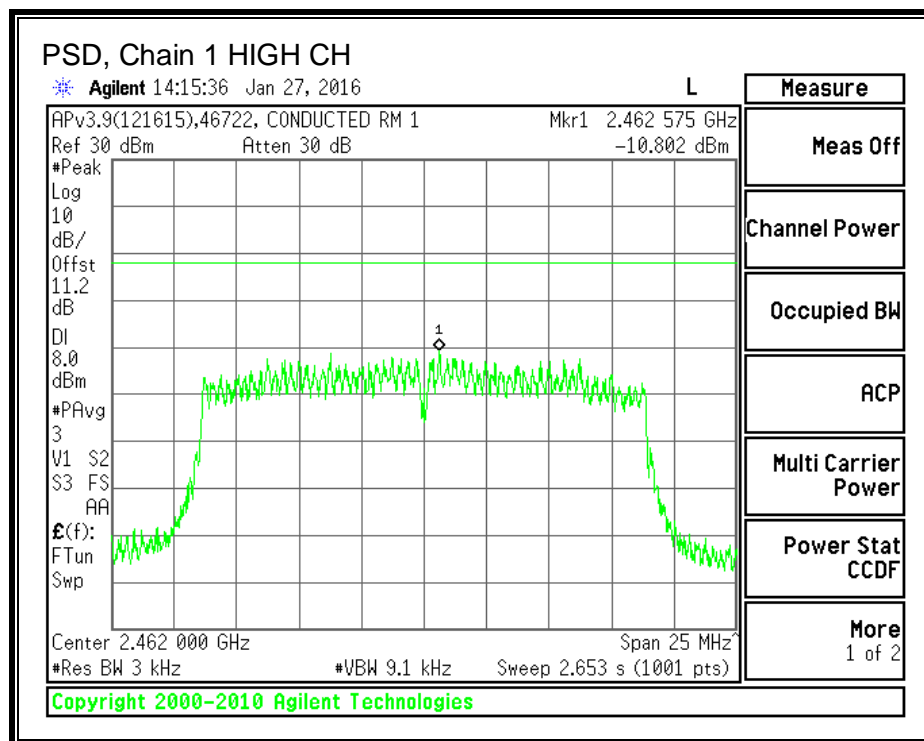
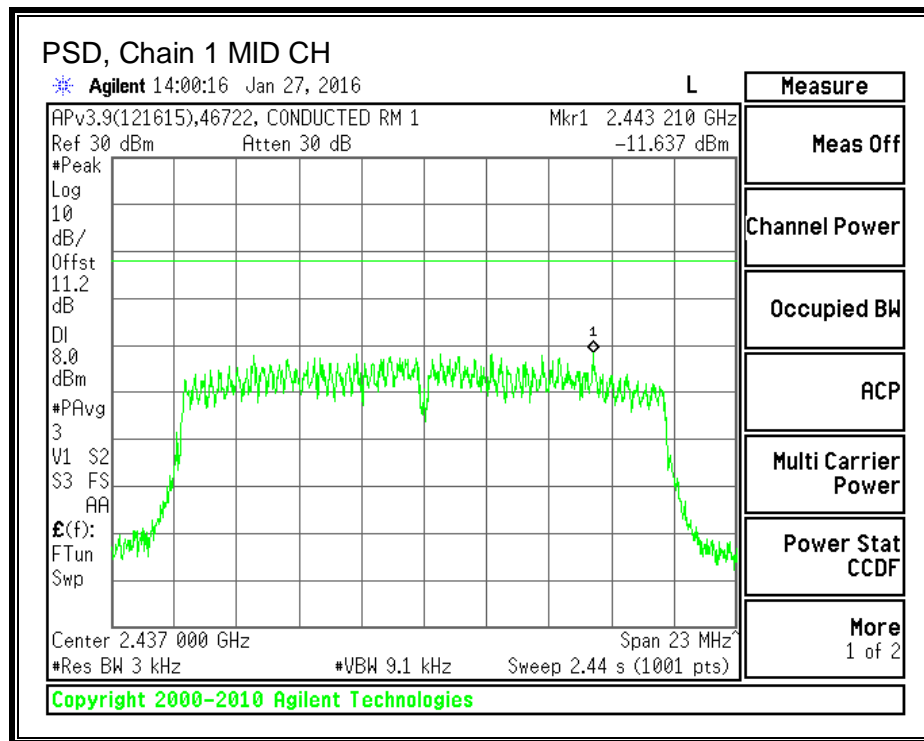
PSD, Chain 0





PSD, Chain 1





8.4.5. OUT-OF-BAND EMISSIONS

LIMITS

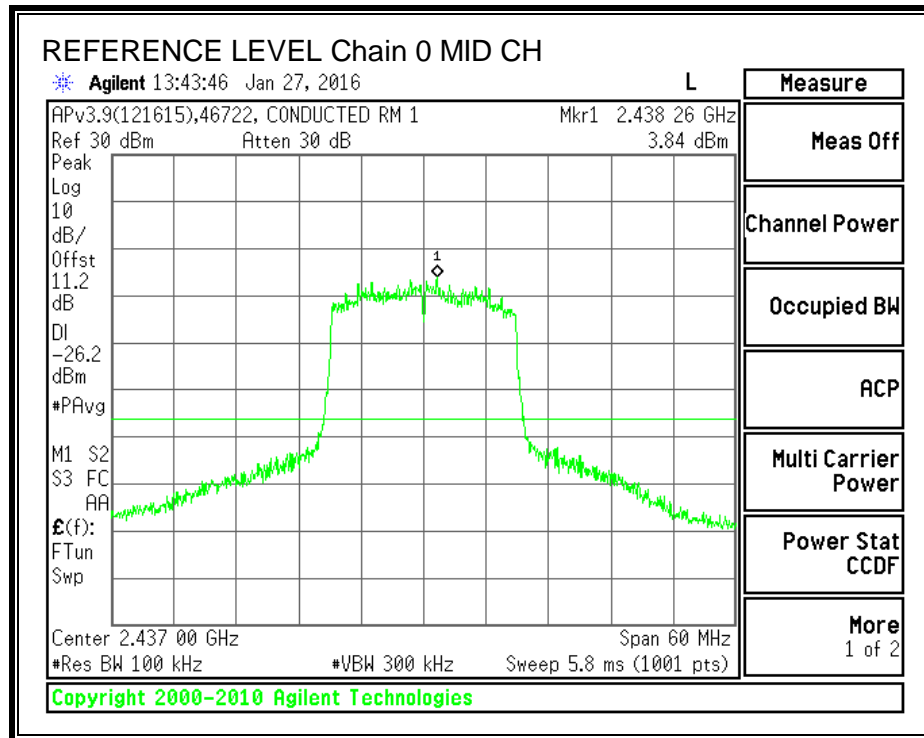
FCC §15.247 (d)

IC RSS-247 5.5

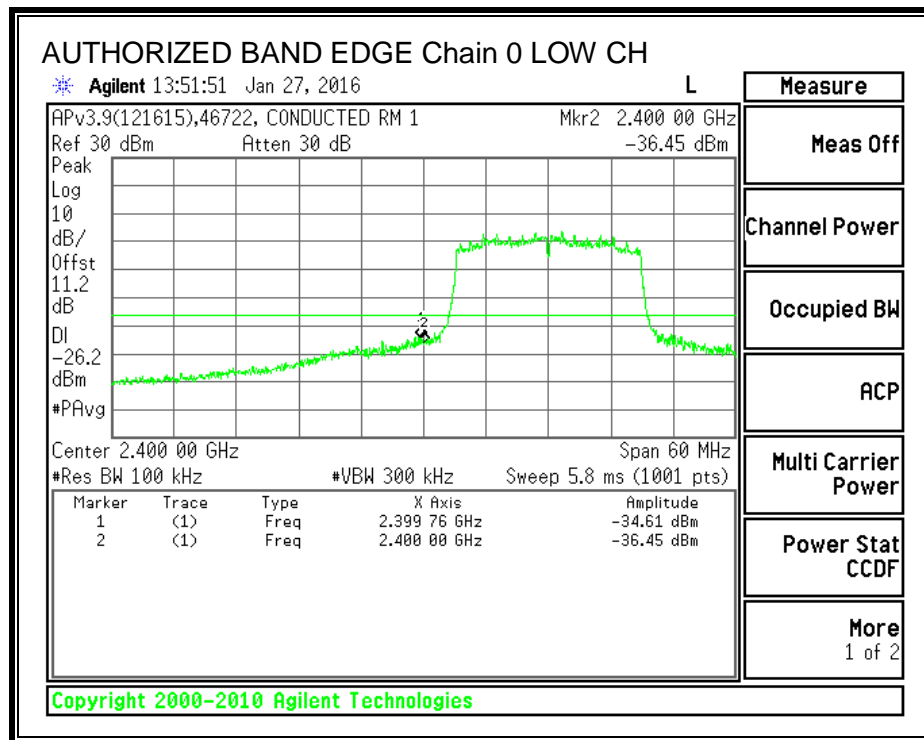
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

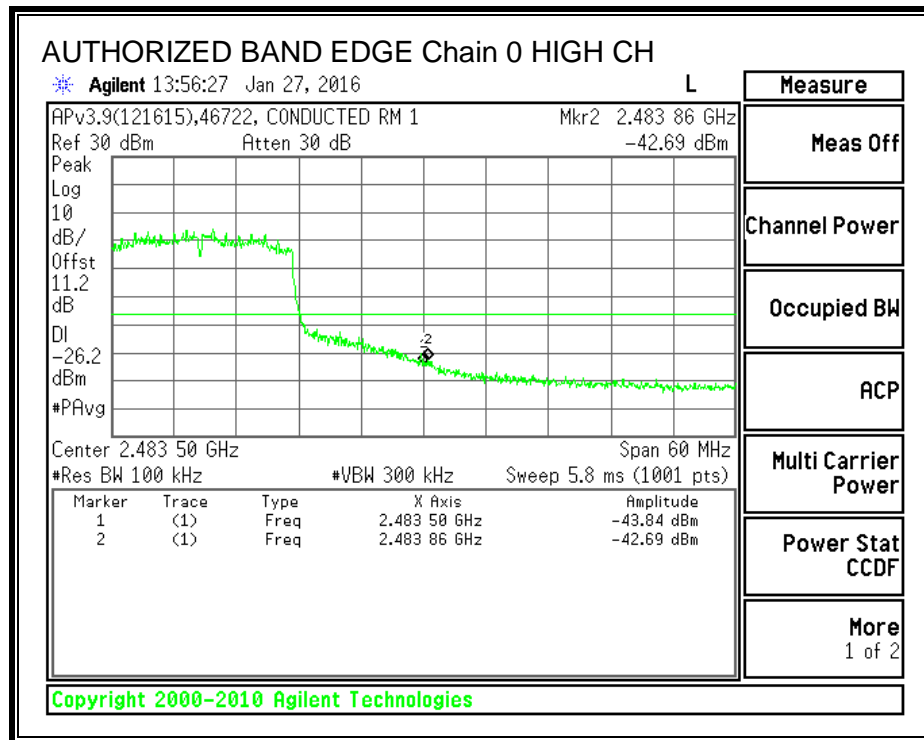


LOW CHANNEL BANDEDGE, Chain 0



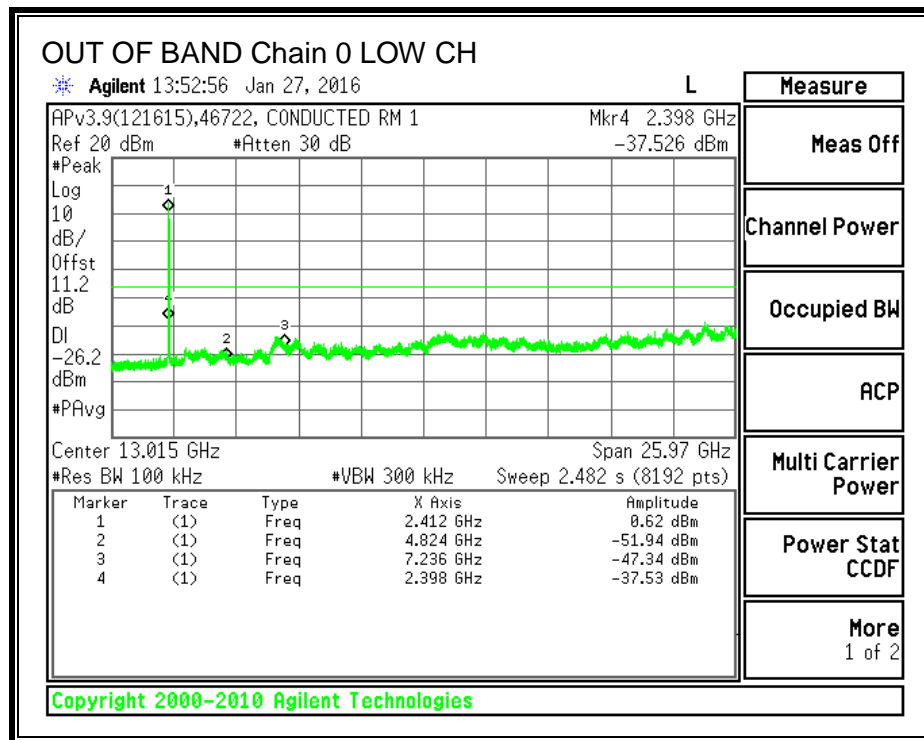
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

HIGH CHANNEL BANDEDGE, Chain 0

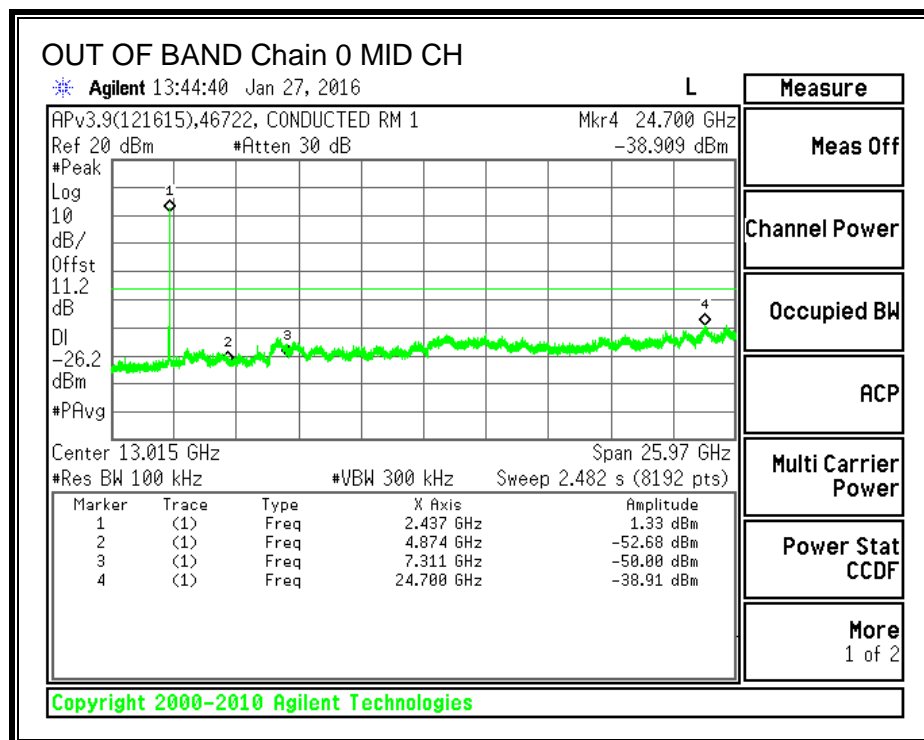


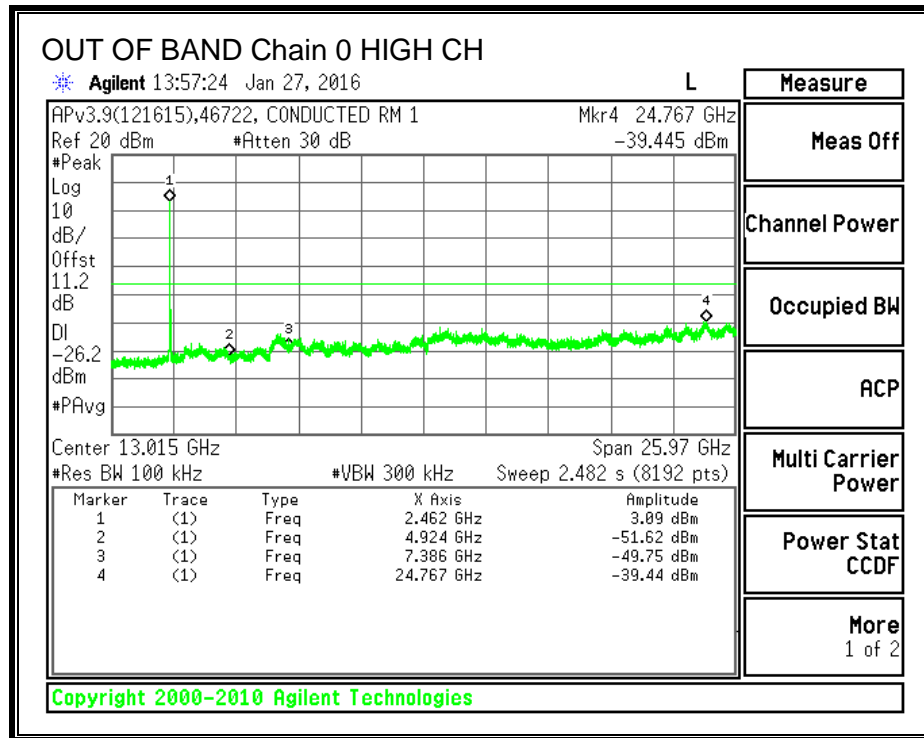
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

OUT-OF-BAND EMISSIONS, Chain 0



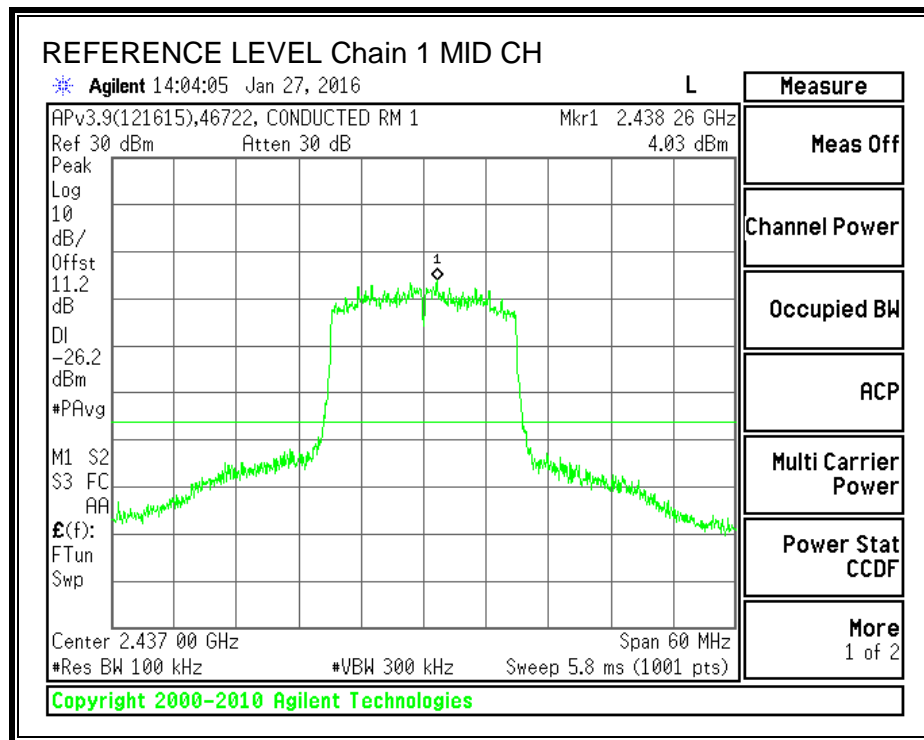
Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



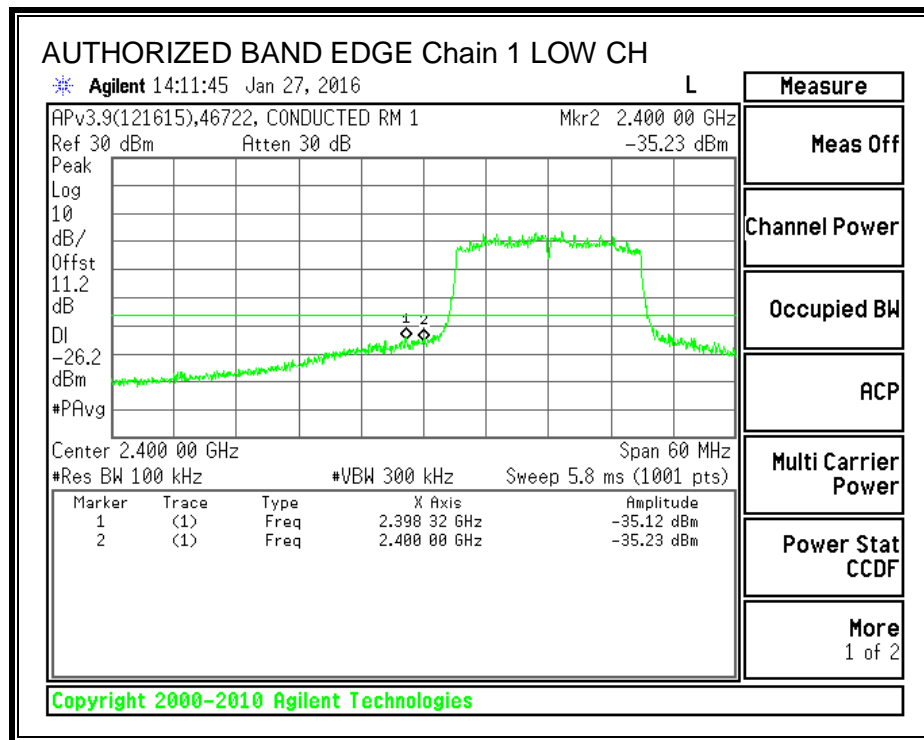


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

IN-BAND REFERENCE LEVEL, Chain 1

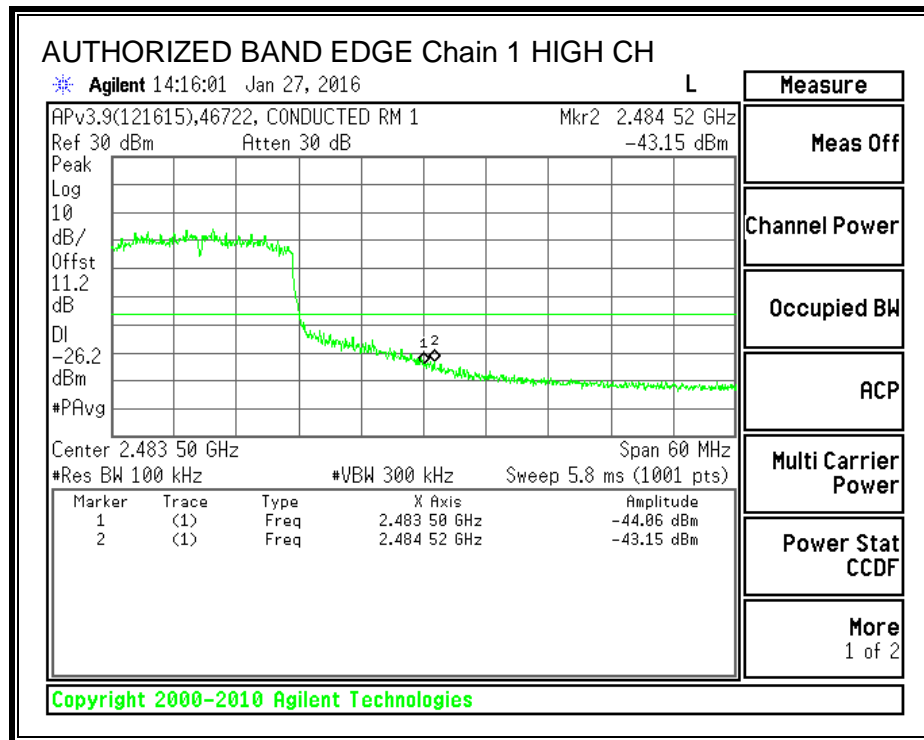


LOW CHANNEL BANDEDGE, Chain 1

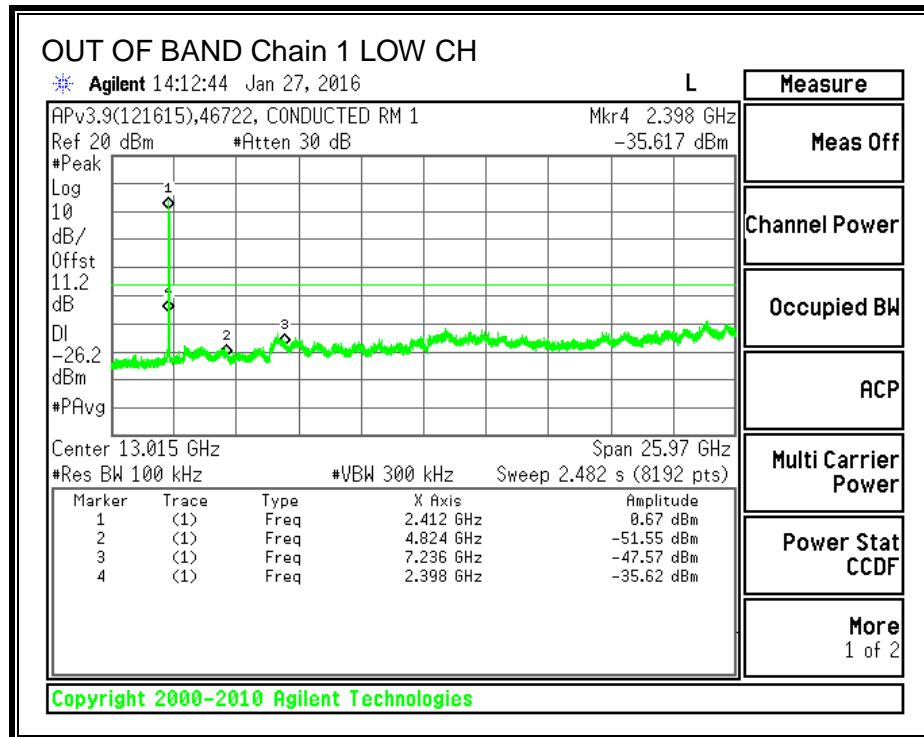


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

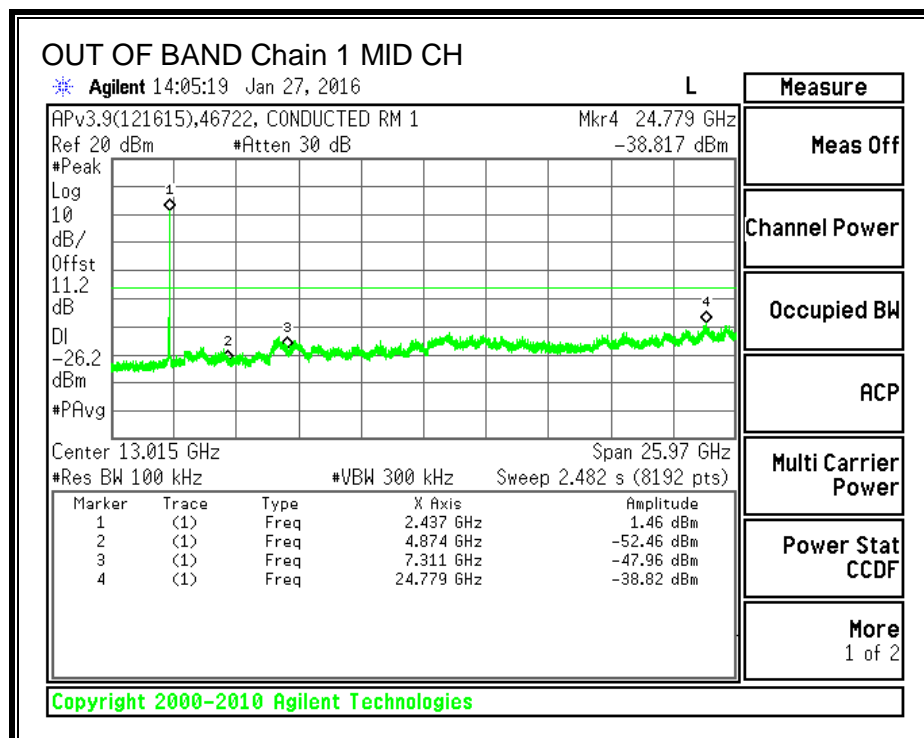
HIGH CHANNEL BANDEDGE, Chain 1

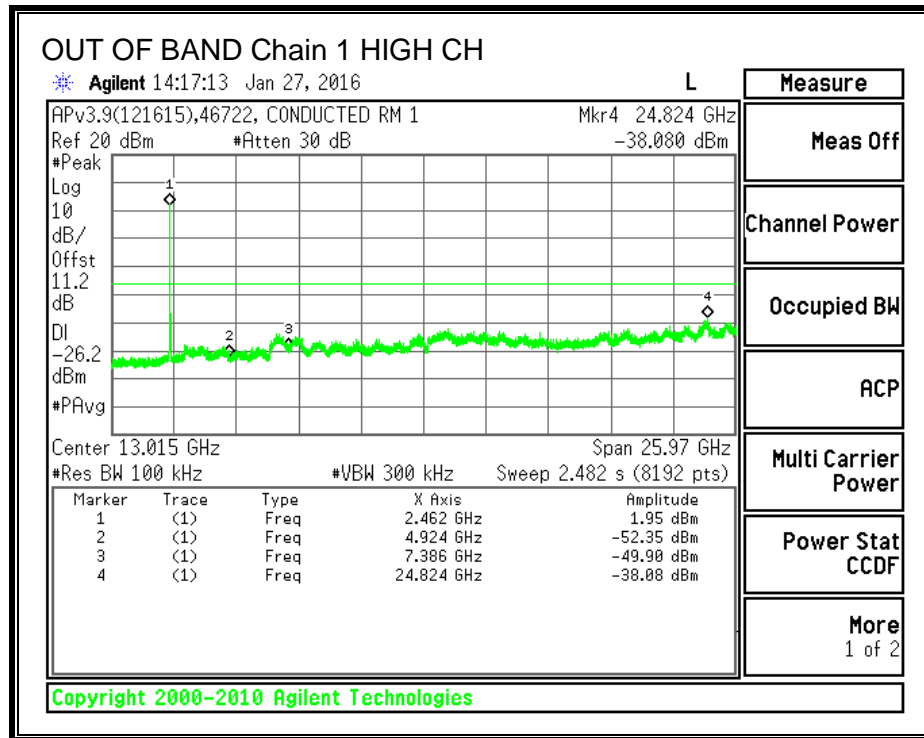


Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.



Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.





Note – This test was performed with the low and high channels at mid-channel levels to achieve a worst-case maximum power.

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

IC RSS-GEN Clause 7.1.2 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 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 for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The averaging method used for this test program was Power Averaging (RMS).

The spectrum from 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band, except where noted.

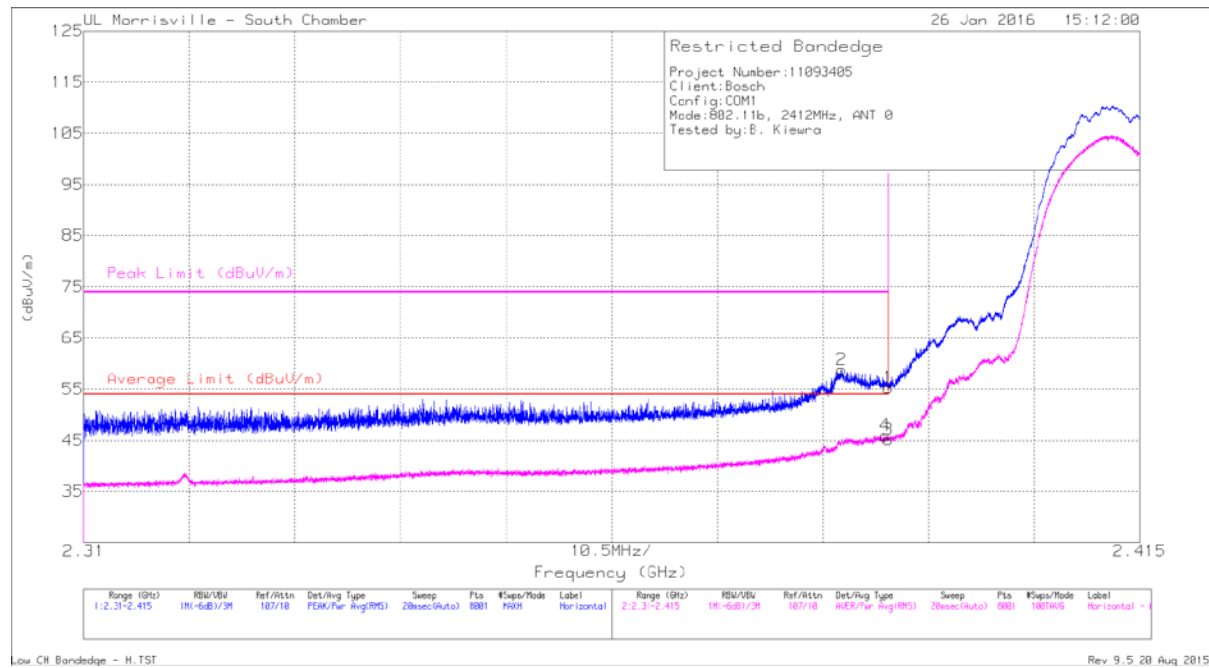
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

9.2. TRANSMITTER 1-18 GHz

9.2.1. TX 1-18 GHz 802.11b MODE IN THE 2.4 GHz BAND

Chain 0 (Internal Antenna)

RESTRICTED BANDEDGE (LOW CHANNEL)



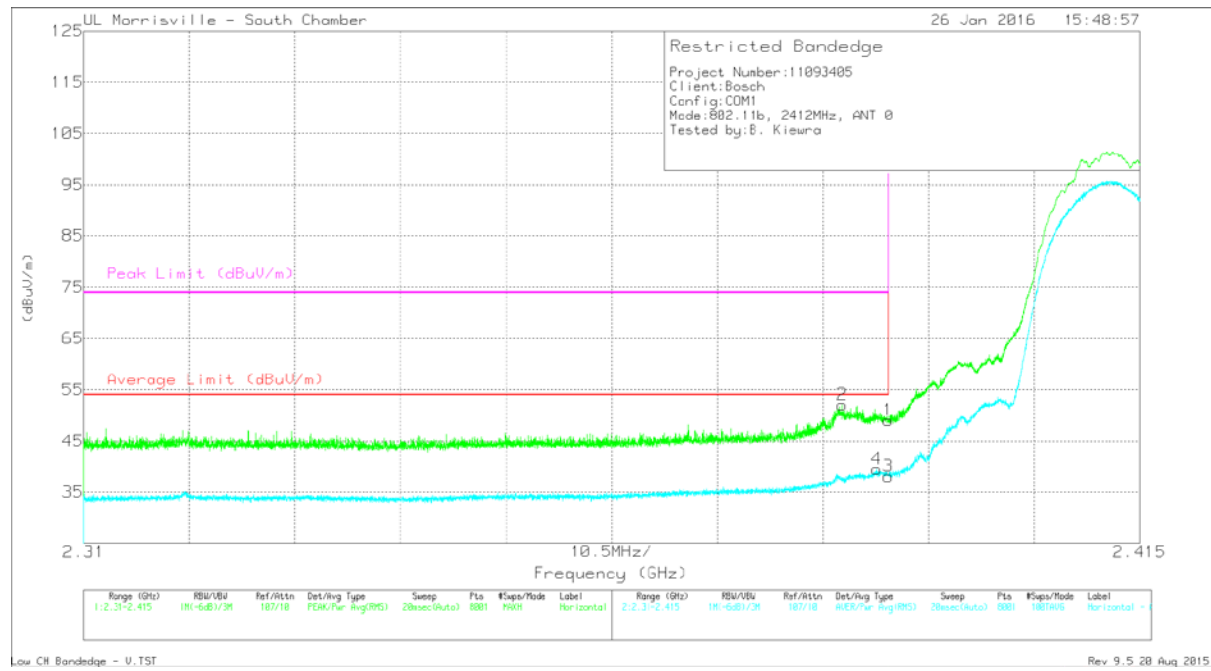
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	47.52	Pk	32	-24.2	0	55.32	-	-	74	-18.68	28	140	H
2	* 2.385	50.9	Pk	32	-24.1	0	58.8	-	-	74	-15.2	28	140	H
3	* 2.39	37.4	RMS	32	-24.2	0	45.2	54	-8.8	-	-	28	140	H
4	* 2.39	38.05	RMS	32	-24.1	0	45.95	54	-8.05	-	-	28	140	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

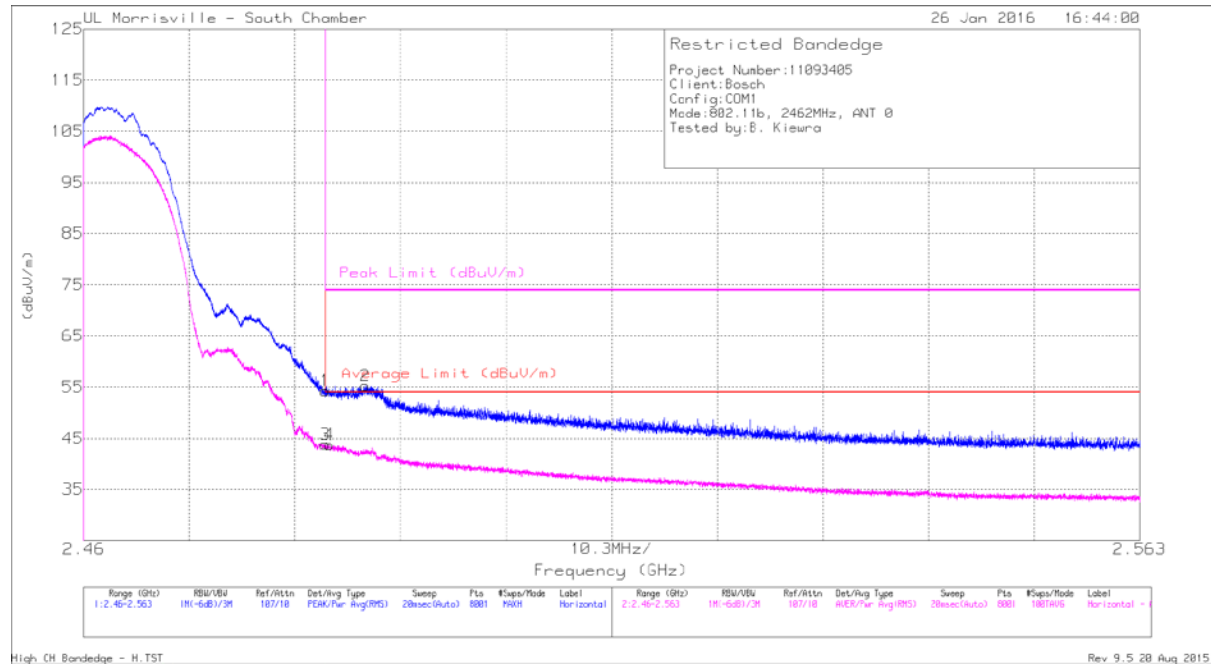
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.25	Pk	32	-24.2	0	49.05	-	-	74	-24.95	81	384	V
2	* 2.385	44.2	Pk	32	-24.1	0	52.1	-	-	74	-21.9	81	384	V
3	* 2.39	30.33	RMS	32	-24.2	0	38.13	54	-15.87	-	-	81	384	V
4	* 2.389	31.6	RMS	32	-24.1	0	39.5	54	-14.5	-	-	81	384	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



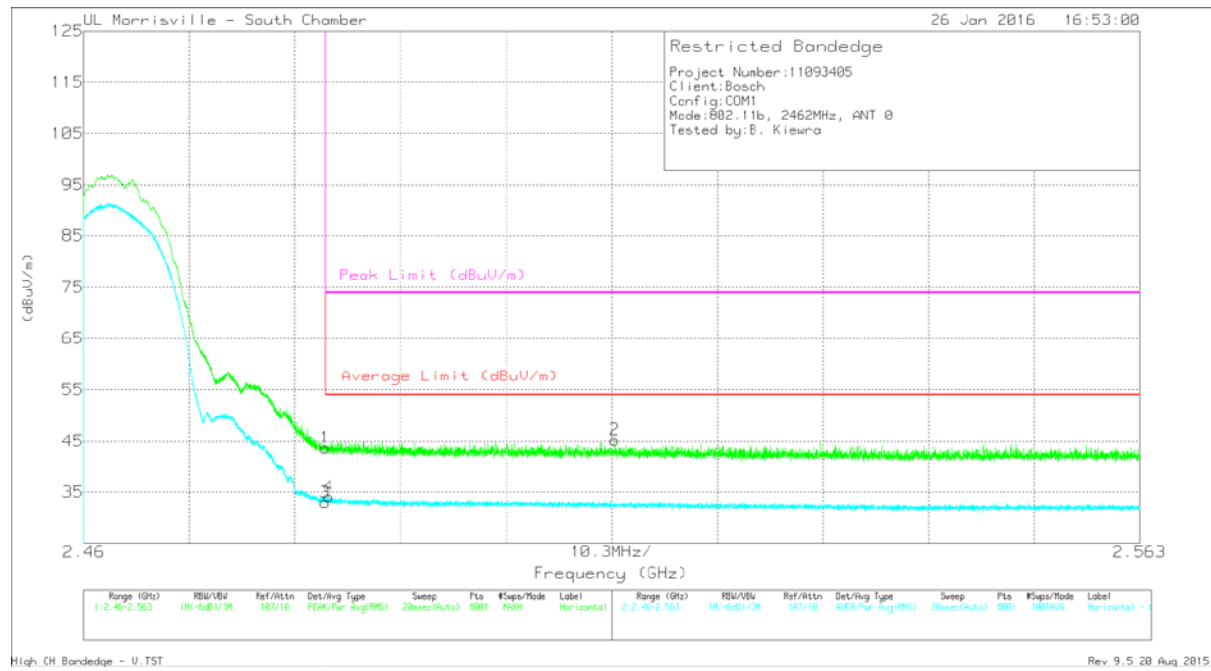
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46.86	Pk	32.1	-24.7	0	54.26	-	-	74	-19.74	13	178	H
2	* 2.487	47.88	Pk	32.1	-24.7	0	55.28	-	-	74	-18.72	13	178	H
3	* 2.484	36.44	RMS	32.1	-24.7	0	43.84	54	-10.16	-	-	13	178	H
4	* 2.484	36.34	RMS	32.1	-24.7	0	43.74	54	-10.26	-	-	13	178	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.25	Pk	32.1	-24.7	0	43.65	-	-	74	-30.35	137	317	V
3	* 2.484	25.62	RMS	32.1	-24.7	0	33.02	54	-20.98	-	-	137	317	V
4	* 2.484	26.68	RMS	32.1	-24.7	0	34.08	54	-19.92	-	-	137	317	V
2	2.512	38.02	Pk	32.1	-24.9	0	45.22	-	-	74	-28.78	137	317	V

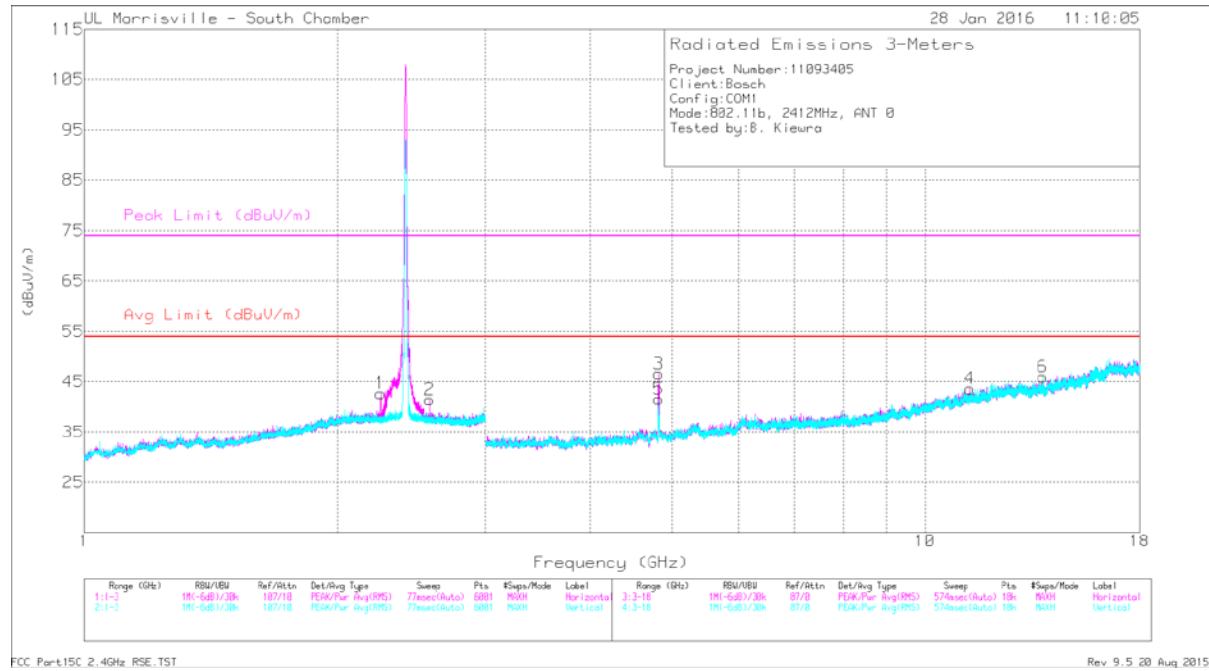
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Fitr/Pa d (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.251	39.37	PK2	31.8	-23.6	0	47.57	-	-	74	-26.43	15	133	H
	* 2.252	26.51	MAv1	31.8	-23.6	0	34.71	54	-19.29	-	-	15	133	H
3	* 4.824	49.03	PK2	34	-31.7	0	51.33	-	-	74	-22.67	196	159	H
	* 4.824	36.29	MAv1	34	-31.7	0	38.59	54	-15.41	-	-	196	159	H
4	* 11.316	34.95	PK2	38.2	-24.3	0	48.85	-	-	74	-25.15	167	266	H
	* 11.315	23.36	MAv1	38.2	-24.3	0	37.26	54	-16.74	-	-	167	266	H
5	* 4.824	44.7	PK2	34	-31.7	0	47	-	-	74	-27	48	320	V
	* 4.824	32.25	MAv1	34	-31.7	0	34.55	54	-19.45	-	-	48	320	V
2	2.572	34.44	Pk	32.2	-25.2	0	41.44	-	-	-	-	0-360	102	H
6	13.81	32.24	Pk	39	-25.3	0	45.94	-	-	-	-	0-360	102	V

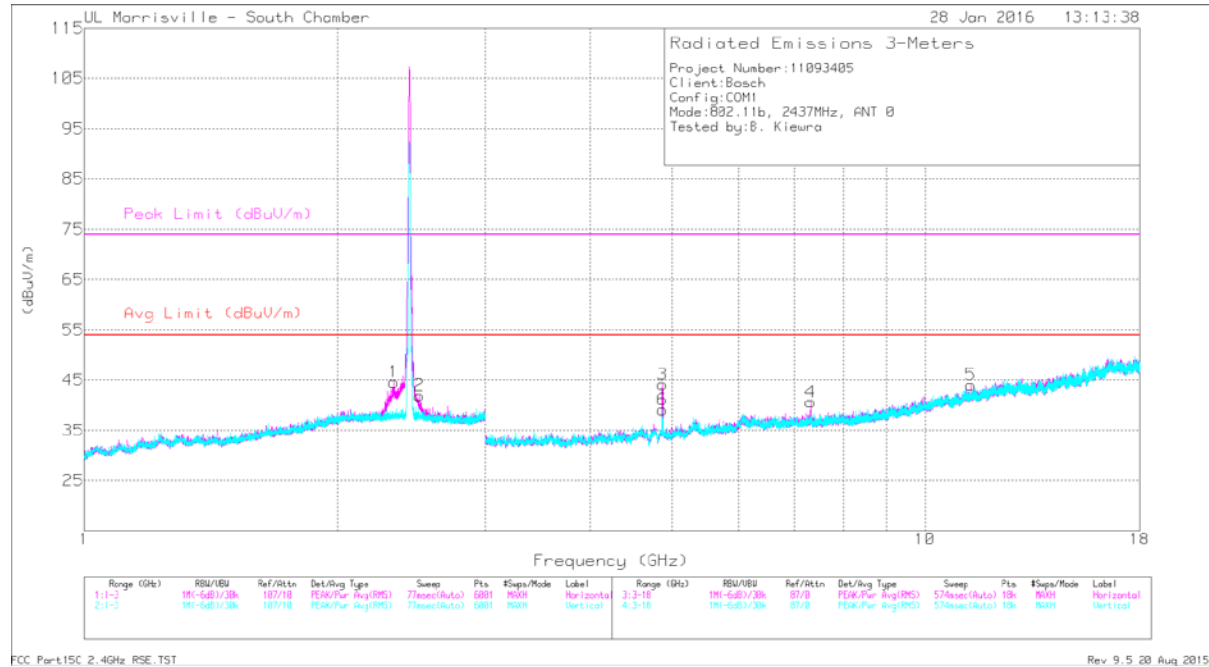
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.332	45.98	PK2	31.9	-23.9	0	53.98	-	-	74	-20.02	13	107	H
	* 2.333	31.66	MAV1	31.9	-23.9	0	39.66	54	-14.34	-	-	13	107	H
3	* 4.874	47.61	PK2	34	-31.6	0	50.01	-	-	74	-23.99	321	132	H
	* 4.874	36.52	MAV1	34	-31.6	0	38.92	54	-15.08	-	-	321	132	H
4	* 7.311	39.57	PK2	35.5	-28.3	0	46.77	-	-	74	-27.23	170	102	H
	* 7.31	26.87	MAV1	35.5	-28.3	0	34.07	54	-19.93	-	-	170	102	H
5	* 11.339	34.64	PK2	38.2	-24.1	0	48.74	-	-	74	-25.26	195	185	H
	* 11.338	23.55	MAV1	38.2	-24.1	0	37.65	54	-16.35	-	-	195	185	H
6	* 4.874	44.47	PK2	34	-31.6	0	46.87	-	-	74	-27.13	358	377	V
	* 4.874	32.89	MAV1	34	-31.6	0	35.29	54	-18.71	-	-	358	377	V
2	2.503	34.65	Pk	32.1	-24.8	0	41.95	-	-	-	-	0-360	199	H

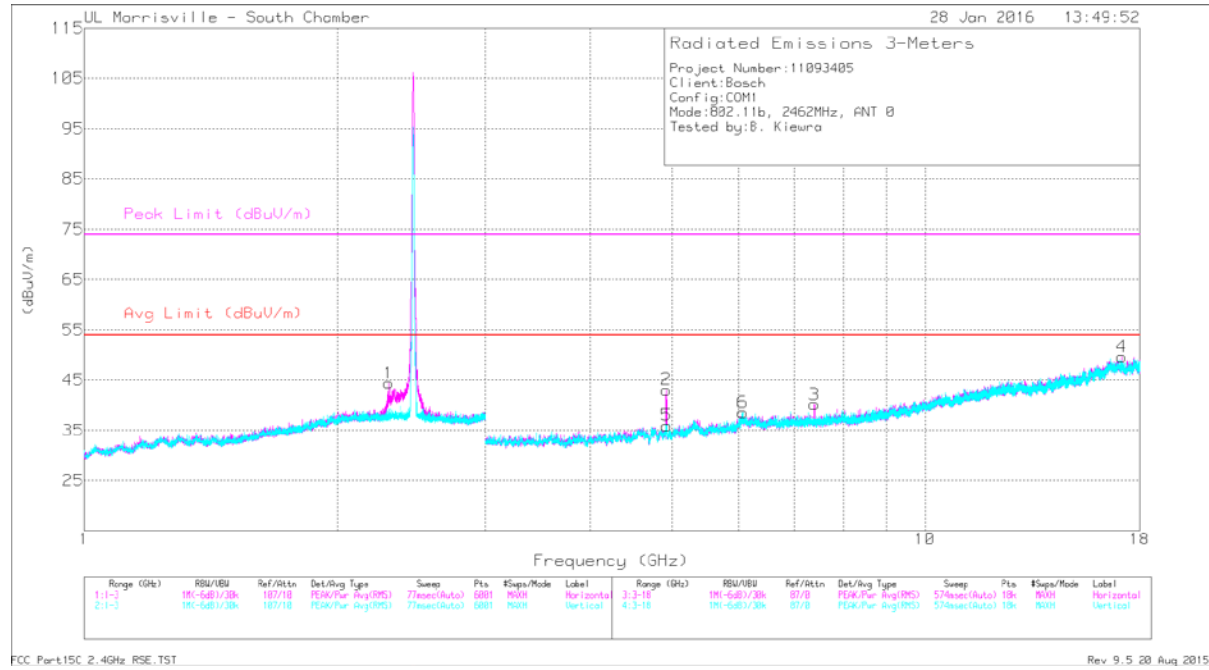
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

High Channel



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.924	46.71	PK2	33.9	-31.5	0	49.11	-	-	74	-24.89	100	108	H
	* 4.924	34.53	MAV1	33.9	-31.6	0	36.83	54	-17.17	-	-	100	108	H
3	* 7.385	38.49	PK2	35.6	-28.3	0	45.79	-	-	74	-28.21	166	103	H
	* 7.385	26.36	MAV1	35.6	-28.3	0	33.66	54	-20.34	-	-	166	103	H
5	* 4.929	41.45	PK2	33.9	-31.4	0	43.95	-	-	74	-30.05	351	307	V
	* 4.929	32.29	MAV1	33.9	-31.4	0	34.79	54	-19.21	-	-	351	307	V
1	2.302	36.3	Pk	31.9	-23.8	0	44.4	-	-	-	-	0-360	199	H
6	6.069	32.27	Pk	35.1	-28.8	0	38.57	-	-	-	-	0-360	101	V
4	17.148	31.44	Pk	41.8	-23.6	0	49.64	-	-	-	-	0-360	102	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

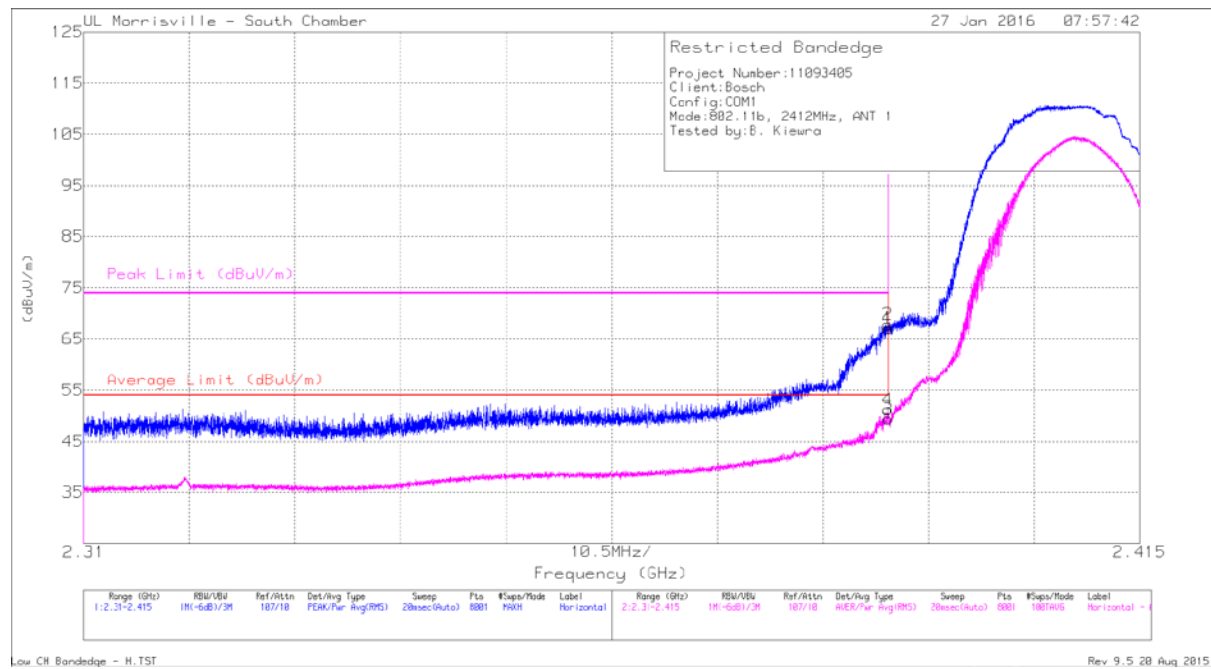
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

Chain 1

RESTRICTED BANDEDGE (LOW CHANNEL)



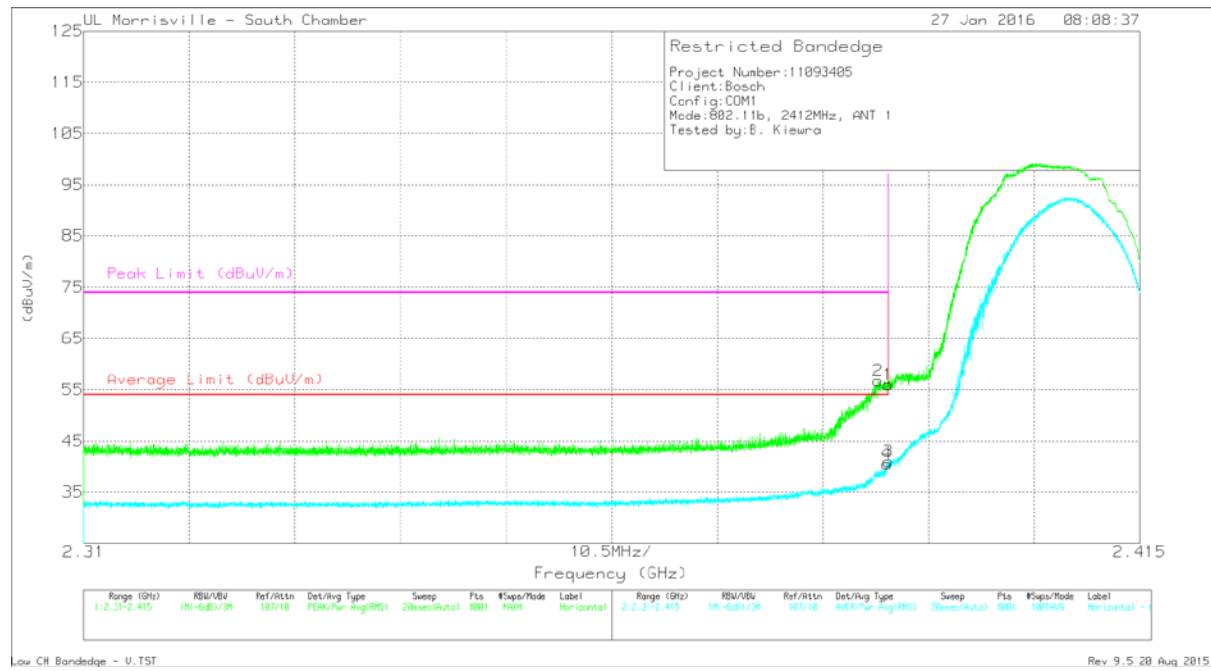
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	59.31	Pk	32	-24.2	0	67.11	-	-	74	-6.89	173	115	H
2	* 2.39	60.03	Pk	32	-24.2	0	67.83	-	-	74	-6.17	173	115	H
3	* 2.39	41.58	RMS	32	-24.2	0	49.38	54	-4.62	-	-	173	115	H
4	* 2.39	43.39	RMS	32	-24.2	0	51.19	54	-2.81	-	-	173	115	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

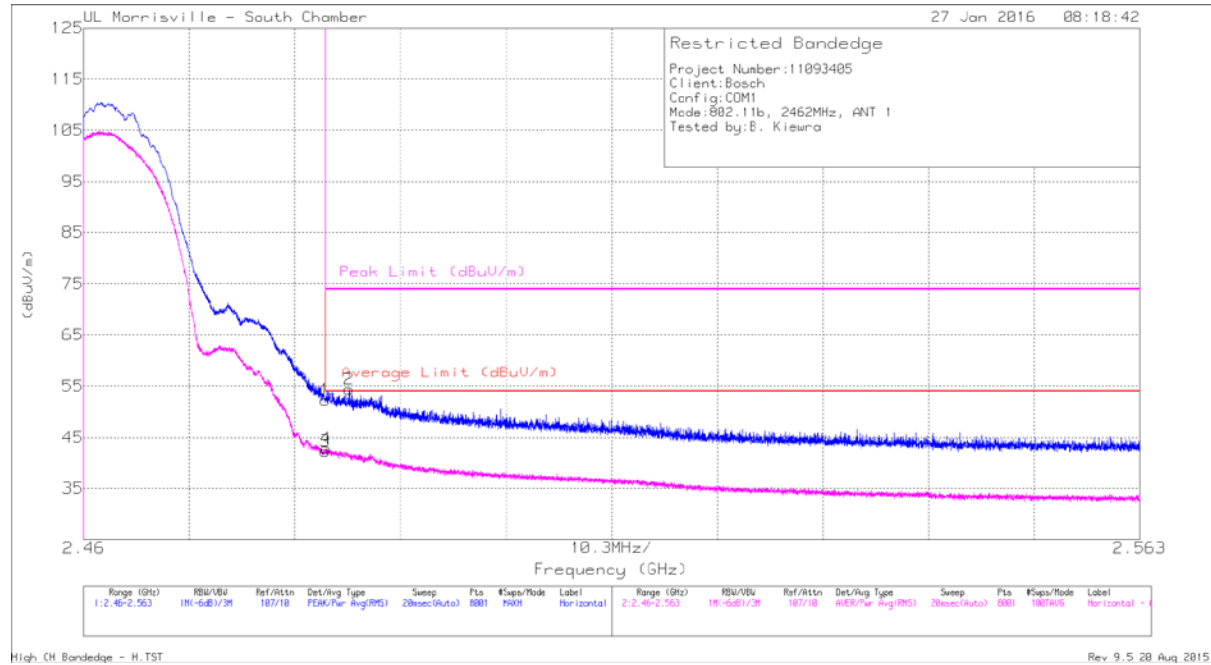
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	48.19	Pk	32	-24.2	0	55.99	-	-	74	-18.01	330	401	V
2	* 2.389	48.8	Pk	32	-24.1	0	56.7	-	-	74	-17.3	330	401	V
3	* 2.39	33.16	RMS	32	-24.2	0	40.96	54	-13.04	-	-	330	401	V
4	* 2.39	32.76	RMS	32	-24.2	0	40.56	54	-13.44	-	-	330	401	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



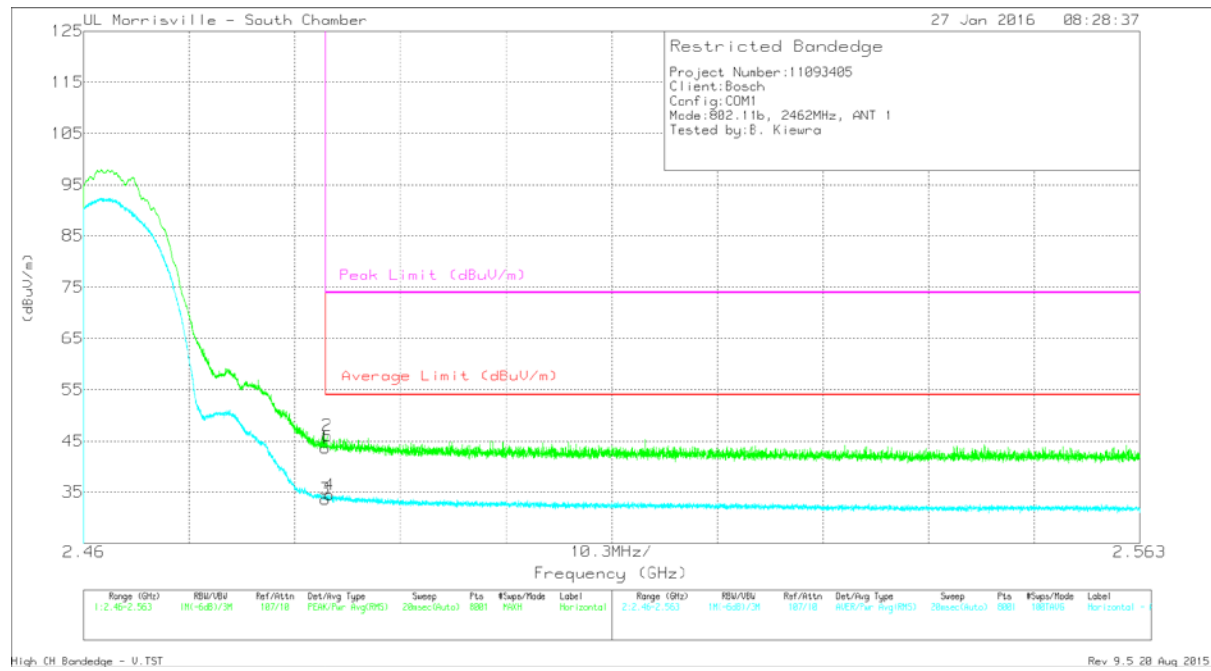
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.88	Pk	32.1	-24.7	0	52.28	-	-	74	-21.72	176	131	H
2	* 2.486	46.96	Pk	32.1	-24.7	0	54.36	-	-	74	-19.64	176	131	H
3	* 2.484	34.87	RMS	32.1	-24.7	0	42.27	54	-11.73	-	-	176	131	H
4	* 2.484	35.46	RMS	32.1	-24.7	0	42.86	54	-11.14	-	-	176	131	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.22	Pk	32.1	-24.7	0	43.62	-	-	74	-30.38	322	291	V
2	* 2.484	38.61	Pk	32.1	-24.7	0	46.01	-	-	74	-27.99	322	291	V
3	* 2.484	26.26	RMS	32.1	-24.7	0	33.66	54	-20.34	-	-	322	291	V
4	* 2.484	27.1	RMS	32.1	-24.7	0	34.5	54	-19.5	-	-	322	291	V

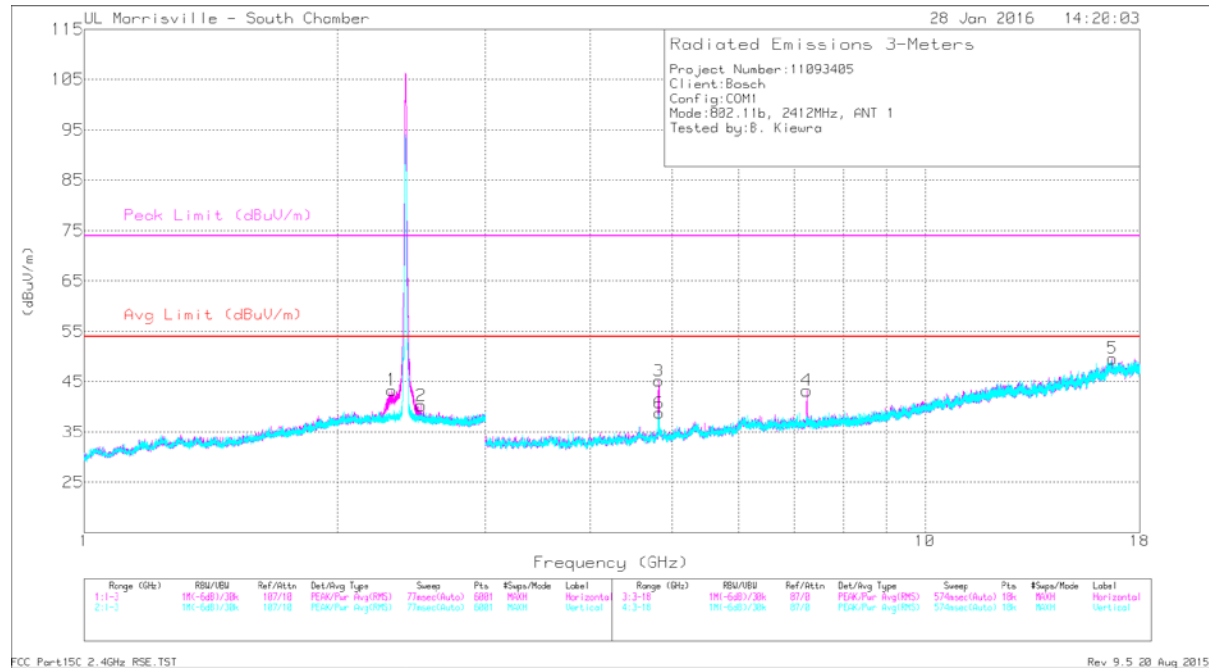
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.32	44.41	PK2	31.9	-23.9	0	52.41	-	-	74	-21.59	204	170	H
	* 2.32	31.24	MAV1	31.9	-23.9	0	39.24	54	-14.76	-	-	204	170	H
3	* 4.824	48.25	PK2	34	-31.7	0	50.55	-	-	74	-23.45	357	252	H
	* 4.824	36.22	MAV1	34	-31.7	0	38.52	54	-15.48	-	-	357	252	H
6	* 4.829	44.07	PK2	34	-31.6	0	46.47	-	-	74	-27.53	12	366	V
	* 4.829	35.05	MAV1	34	-31.6	0	37.45	54	-16.55	-	-	12	366	V
2	2.516	33.04	Pk	32.1	-24.9	0	40.24	-	-	-	-	0-360	199	H
4	7.235	36.34	Pk	35.5	-28.6	0	43.24	-	-	-	-	0-360	102	H
5	16.718	32.91	Pk	42	-25.3	0	49.61	-	-	-	-	0-360	199	H

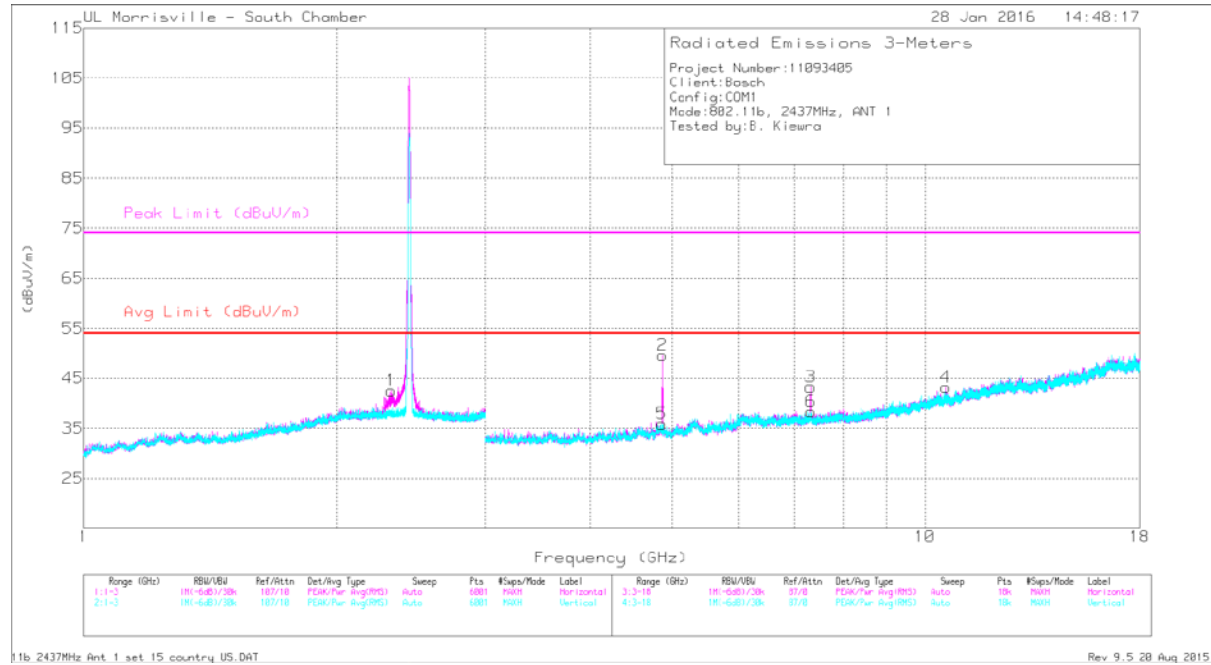
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.32	44.4	PK2	31.9	-23.9	0	52.4	-	-	74	-21.6	208	148	H
	* 2.32	30.21	MAV1	31.9	-23.9	0	38.21	54	-15.79	-	-	208	148	H
2	* 4.874	48.09	PK2	34	-31.6	0	50.49	-	-	74	-23.51	305	120	H
	* 4.874	37.6	MAV1	34	-31.6	0	40	54	-14	-	-	305	120	H
3	* 7.31	42.63	PK2	35.5	-28.3	0	49.83	-	-	74	-24.17	300	107	H
	* 7.31	28.54	MAV1	35.5	-28.3	0	35.74	54	-18.26	-	-	300	107	H
5	* 4.868	42.23	PK2	34	-31.5	0	44.73	-	-	74	-29.27	351	350	V
	* 4.869	33.36	MAV1	34	-31.5	0	35.86	54	-18.14	-	-	351	350	V
6	* 7.315	37.61	PK2	35.5	-28.4	0	44.71	-	-	74	-29.29	248	390	V
	* 7.316	26.08	MAV1	35.5	-28.4	0	33.18	54	-20.82	-	-	248	390	V
4	10.586	30.91	Pk	37.6	-25.3	0	43.21	-	-	-	-	0-360	102	H

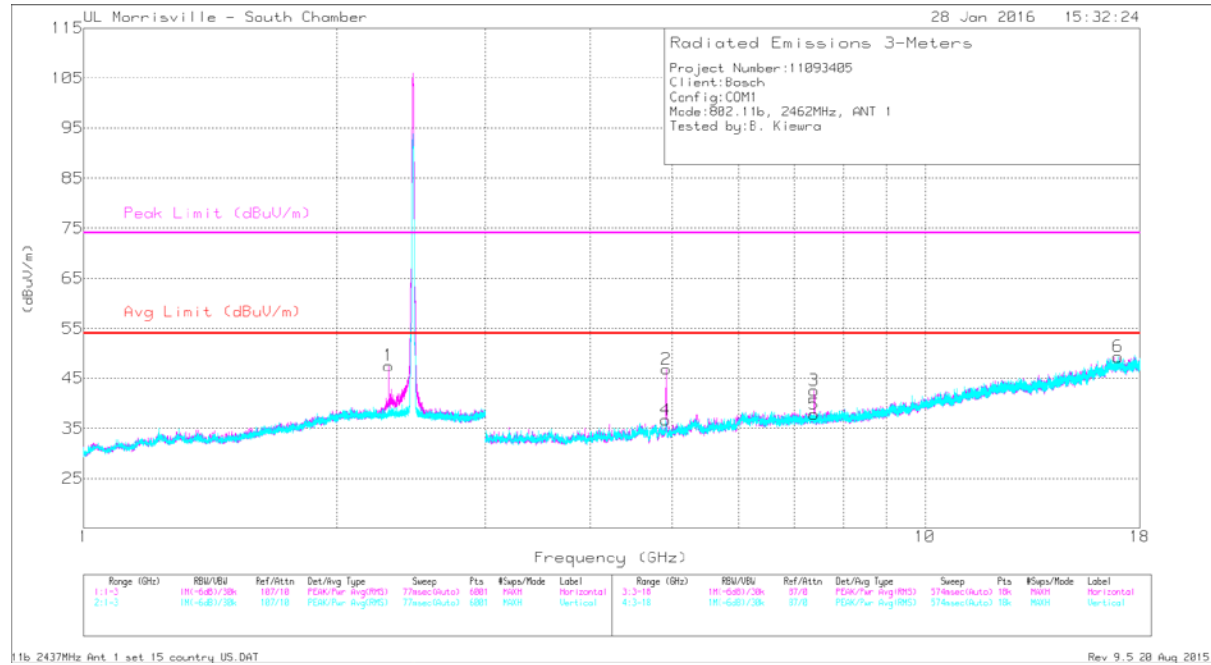
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

High Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.924	47.81	PK2	33.9	-31.5	0	50.21	-	-	74	-23.79	298	137	H
	* 4.924	35.75	MAv1	33.9	-31.5	0	38.15	54	-15.85	-	-	298	137	H
3	* 7.385	39.68	PK2	35.6	-28.3	0	46.98	-	-	74	-27.02	354	129	H
	* 7.382	27.34	MAv1	35.6	-28.3	0	34.64	54	-19.36	-	-	354	129	H
4	* 4.919	42.5	PK2	33.9	-31.6	0	44.8	-	-	74	-29.2	204	389	V
	* 4.919	33.59	MAv1	33.9	-31.6	0	35.89	54	-18.11	-	-	204	389	V
5	* 7.385	37.64	PK2	35.6	-28.3	0	44.94	-	-	74	-29.06	333	348	V
	* 7.387	25.61	MAv1	35.6	-28.4	0	32.81	54	-21.19	-	-	333	348	V
1	2.302	39.43	Pk	31.9	-23.8	0	47.53	-	-	-	-	0-360	199	H
6	16.97	31.91	Pk	42	-24.6	0	49.31	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

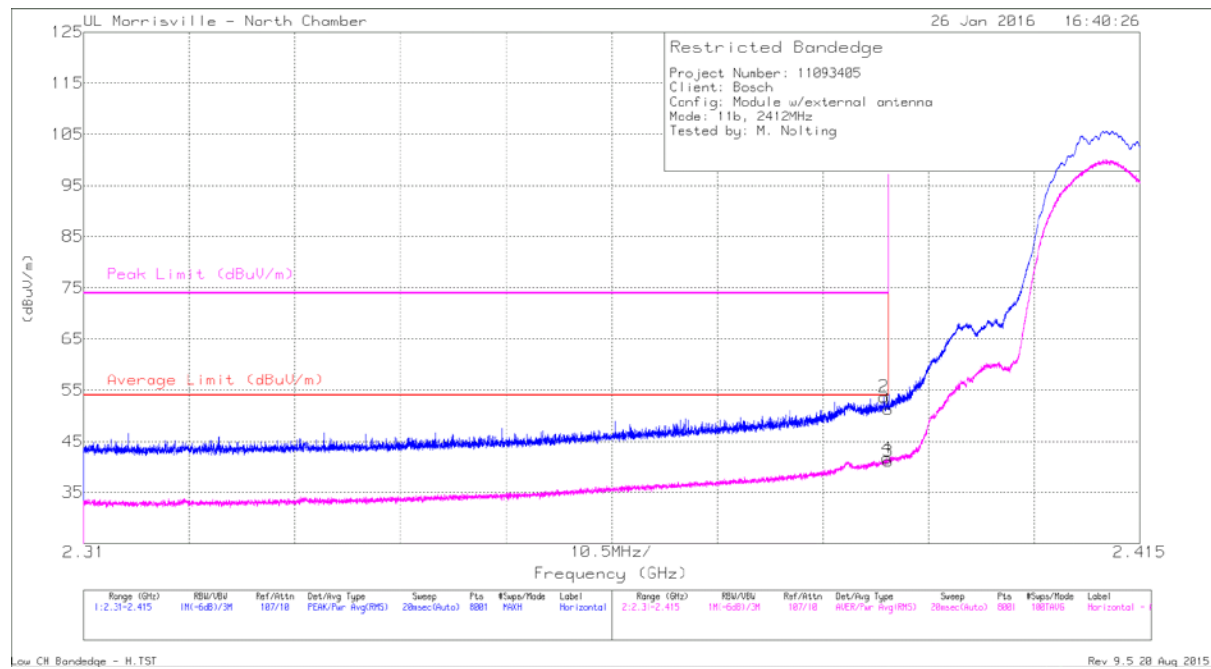
Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

External Antenna

RESTRICTED BANDEDGE (LOW CHANNEL)



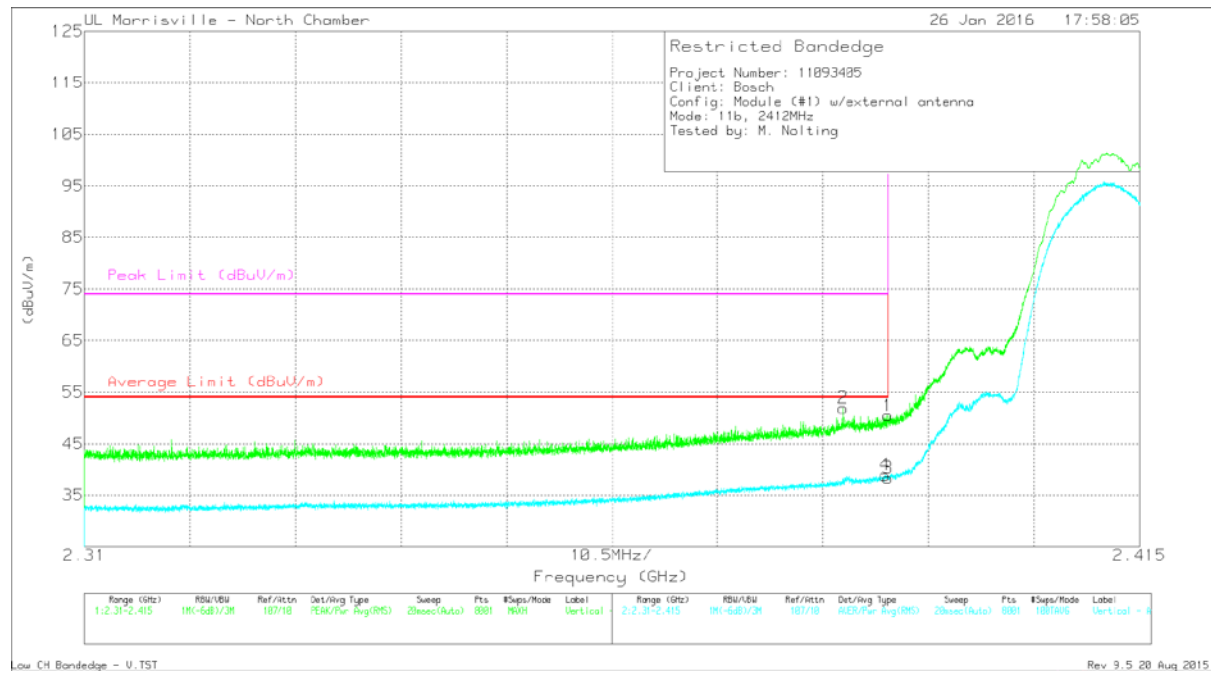
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.09	Pk	31.9	-24.8	51.19	-	-	74	-22.81	298	165	H
2	* 2.39	46.6	Pk	31.9	-24.8	53.7	-	-	74	-20.3	298	165	H
3	* 2.39	34.01	RMS	31.9	-24.8	41.11	54	-12.89	-	-	298	165	H
4	* 2.39	34.59	RMS	31.9	-24.8	41.69	54	-12.31	-	-	298	165	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

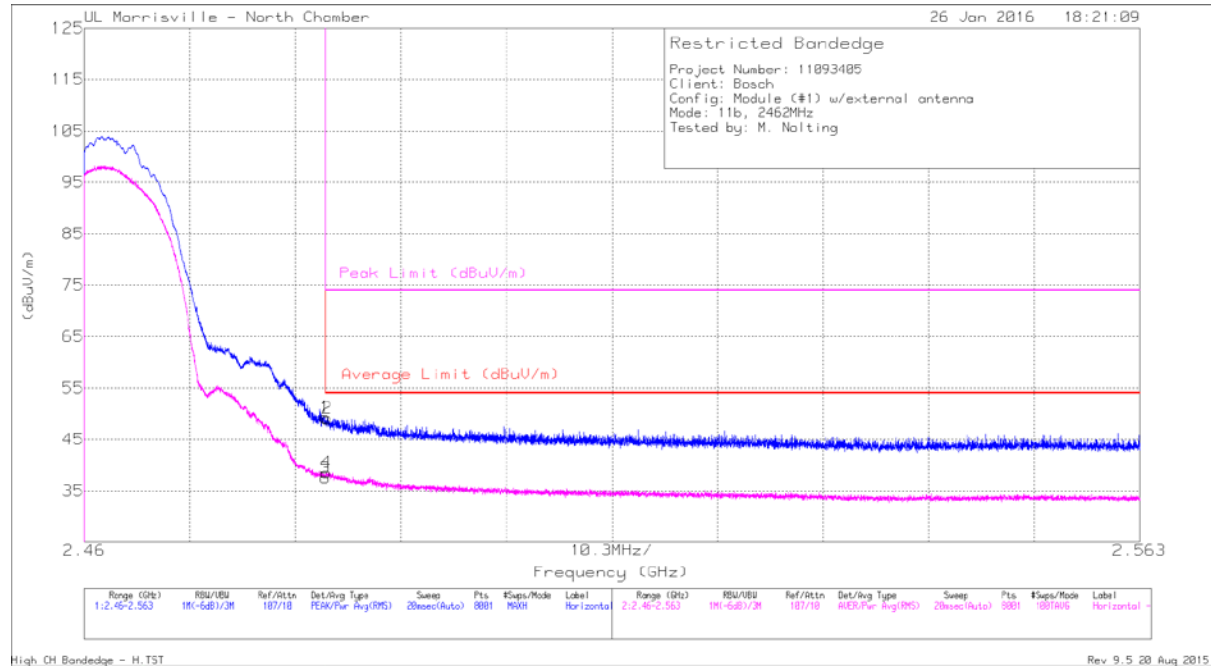
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.385	44.85	Pk	31.9	-24.8	51.95	-	-	74	-22.05	22	101	V
1	* 2.39	43.37	Pk	31.9	-24.8	50.47	-	-	74	-23.53	22	101	V
3	* 2.39	31.27	RMS	31.9	-24.8	38.37	54	-15.63	-	-	22	101	V
4	* 2.39	31.81	RMS	31.9	-24.8	38.91	54	-15.09	-	-	22	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



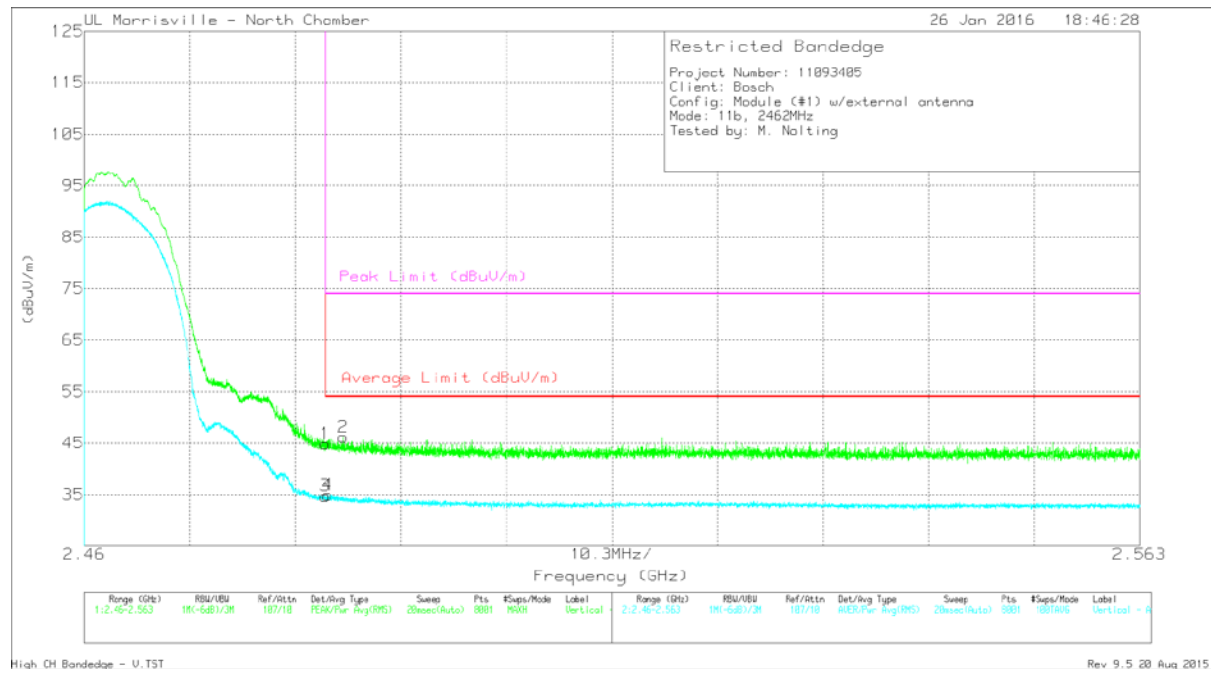
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42	Pk	32.1	-24.8	49.3	-	-	74	-24.7	299	204	H
2	* 2.484	41.77	Pk	32.1	-24.8	49.07	-	-	74	-24.93	299	204	H
3	* 2.484	30.19	RMS	32.1	-24.8	37.49	54	-16.51	-	-	299	204	H
4	* 2.484	31.2	RMS	32.1	-24.8	38.5	54	-15.5	-	-	299	204	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.58	Pk	32.1	-24.8	44.88	-	-	74	-29.12	22	117	V
3	* 2.484	27.45	RMS	32.1	-24.8	34.75	54	-19.25	-	-	22	117	V
4	* 2.484	27.64	RMS	32.1	-24.8	34.94	54	-19.06	-	-	22	117	V
2	* 2.485	38.85	Pk	32.1	-24.8	46.15	-	-	74	-27.85	22	117	V

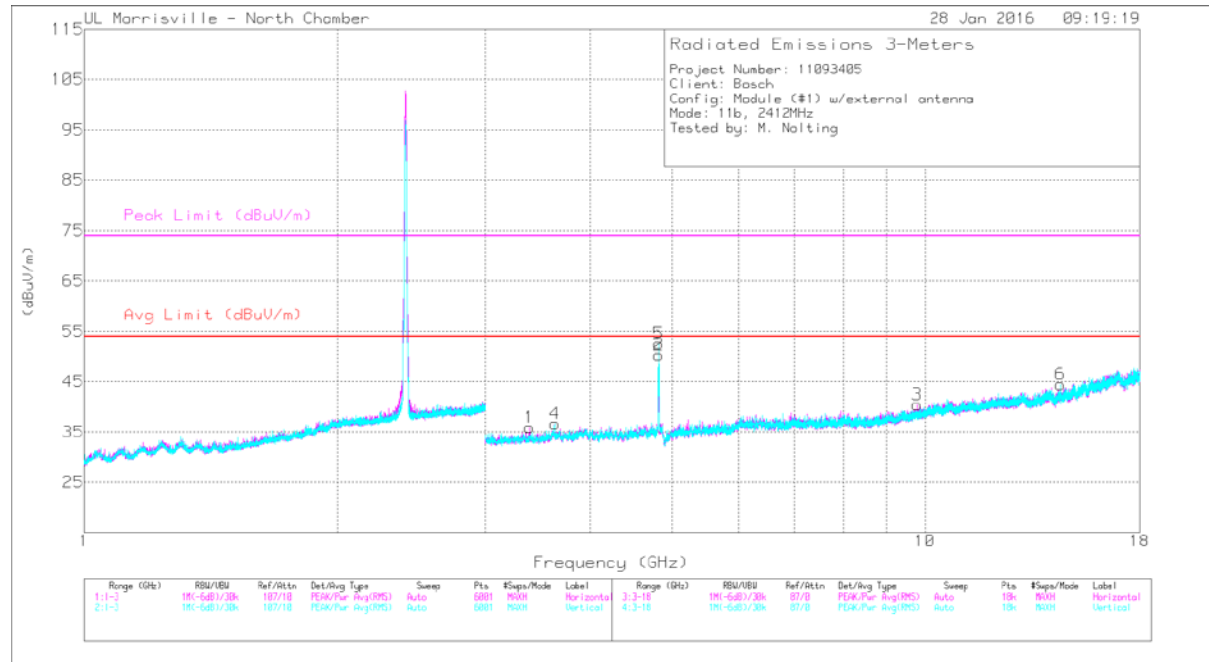
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.824	49.93	PK2	34.1	-32.2	51.83	-	-	74	-22.17	21	107	H
	* 4.819	39.37	MAv1	34.1	-32.2	41.27	54	-12.73	-	-	21	107	H
4	* 3.631	39.59	PK2	33.3	-32.2	40.69	-	-	74	-33.31	110	101	V
	* 3.632	28.37	MAv1	33.3	-32.2	29.47	54	-24.53	-	-	110	101	V
5	* 4.824	53.69	PK2	34.1	-32.2	55.59	-	-	74	-18.41	122	103	V
	* 4.819	44.08	MAv1	34.1	-32.2	45.98	54	-8.02	-	-	122	103	V
6	* 14.494	37.62	PK2	39.6	-28.1	49.12	-	-	74	-24.88	250	101	V
	* 14.491	26.17	MAv1	39.6	-28.1	37.67	54	-16.33	-	-	250	101	V
1	3.382	36.02	PK	33	-33.1	35.92	-	-	-	-	0-360	199	H
3	9.784	31.84	PK	37	-28.4	40.44	-	-	-	-	0-360	199	H

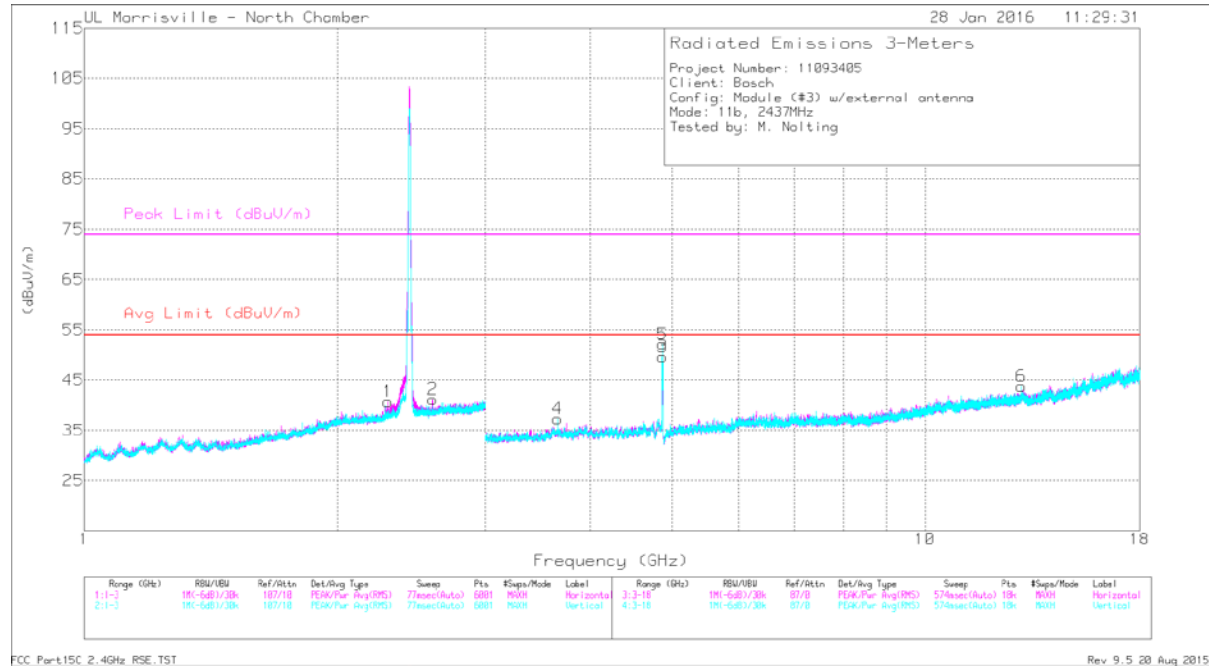
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.293	39.05	PK2	31.7	-24.8	45.95	-	-	74	-28.05	300	153	H
	* 2.293	27.34	MAv1	31.7	-24.8	34.24	54	-19.76	-	-	300	153	H
3	* 4.874	53.29	PK2	34.1	-32.2	55.19	-	-	74	-18.81	320	101	H
	* 4.868	44.09	MAv1	34.1	-32	46.19	54	-7.81	-	-	320	101	H
4	* 3.655	42.37	PK2	33.3	-32.3	43.37	-	-	74	-30.63	130	200	V
	* 3.656	33.32	MAv1	33.3	-32.3	34.32	54	-19.68	-	-	130	200	V
5	* 4.874	56.07	PK2	34.1	-32.2	57.97	-	-	74	-16.03	122	103	V
	* 4.869	46.8	MAv1	34.1	-32	48.9	54	-5.1	-	-	122	103	V
2	2.597	33.58	Pk	32.2	-24.6	41.18	-	-	-	-	0-360	199	H
6	13.026	31.08	Pk	39.3	-26.6	43.78	-	-	-	-	0-360	101	V

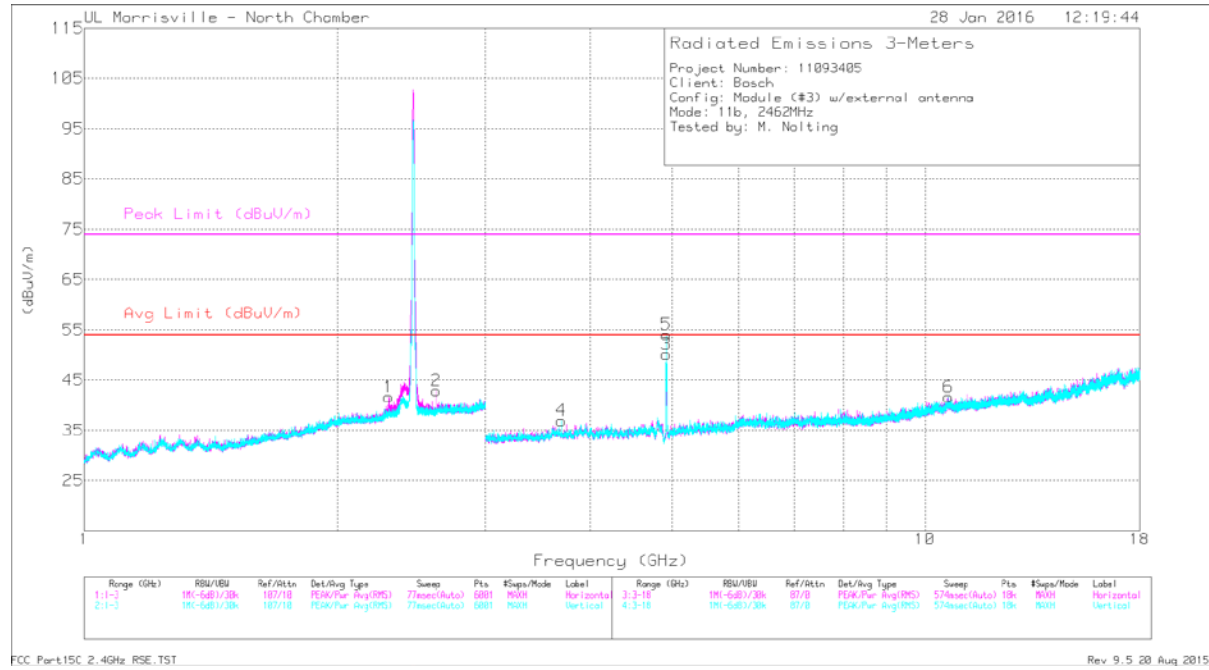
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

High Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0072 (dB/m)	Amp/Cbl /Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.924	51.61	PK2	34.1	-32.5	53.21	-	-	74	-20.79	323	118	H
	* 4.919	41.37	MAv1	34.1	-32.4	43.07	54	-10.93	-	-	323	118	H
4	* 3.693	43.37	PK2	33.3	-32.6	44.07	-	-	74	-29.93	129	185	V
	* 3.693	35.25	MAv1	33.3	-32.6	35.95	54	-18.05	-	-	129	185	V
5	* 4.924	53.77	PK2	34.1	-32.5	55.37	-	-	74	-18.63	121	111	V
	* 4.919	43.92	MAv1	34.1	-32.4	45.62	54	-8.38	-	-	121	111	V
6	* 10.67	34.99	PK2	37.8	-26	46.79	-	-	74	-27.21	17	102	V
	* 10.669	23.54	MAv1	37.8	-26	35.34	54	-18.66	-	-	17	102	V
1	2.302	34.62	Pk	31.7	-24.7	41.62	-	-	-	-	0-360	101	H
2	2.622	35.18	Pk	32.2	-24.5	42.88	-	-	-	-	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average