



# **CERTIFICATION TEST REPORT**

**Report Number. : 11854771-E1V2**

**Applicant :** GATE LABS, INC.  
379 CLEMENTINA ST, SUITE A  
SAN FRANCISCO, CA, 94103 USA

**Model :** BLB0

**FCC ID :** 2AMVI-G1

**IC :** 22940-G1

**EUT Description :** Smart Lock

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS - 247 ISSUE 2  
INDUSTRY CANADA RSS-GEN ISSUE 4

**Date Of Issue:**  
August 10, 2017

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	07/27/2017	Initial Issue	---
V2	08/10/2017	Updated section 9.1	F. de Anda

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** GATE LABS, INC.  
379 CLEMENTINA ST, SUITE A  
SAN FRANCISCO, CA, 94103 USA

**EUT DESCRIPTION:** SMART LOCK

**MODEL:** BLB0

**SERIAL NUMBER:** PVTGK164 -Radiated, PVTGK010 -Conducted

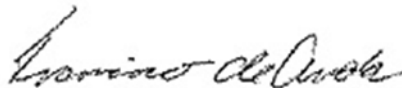
**DATE TESTED:** July 12<sup>th</sup>, 2017 – July 24<sup>th</sup>, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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.

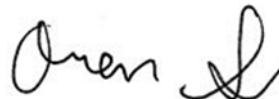
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. 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 the U.S. government.

Approved & Released For  
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CONSUMER TECHNOLOGY DIVISION  
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Prepared By:



OREN STOELTING  
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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, KDB 558074 D01 v04, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

## 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 checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input checked="" type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input type="checkbox"/> Chamber G
	<input type="checkbox"/> Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a wireless Smart Lock.

### 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	14.01	25.18
2412 - 2462	802.11g	12.85	19.28

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an antenna, with a maximum gain of 3.2 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 1.1.0.0.

### 5.5. WORST-CASE CONFIGURATION AND MODE

For below 1GHz radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The orientation of the EUT was set in its designated fixed position for standard operation.

Worst-case data rates as provided by the client were:

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

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps



## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Acer	Aspire E5-575	NXGE6AA0196470A5A57600	PPD-QCNFA435
Interface Board	Gate Labs	634815170015	N/A	N/A

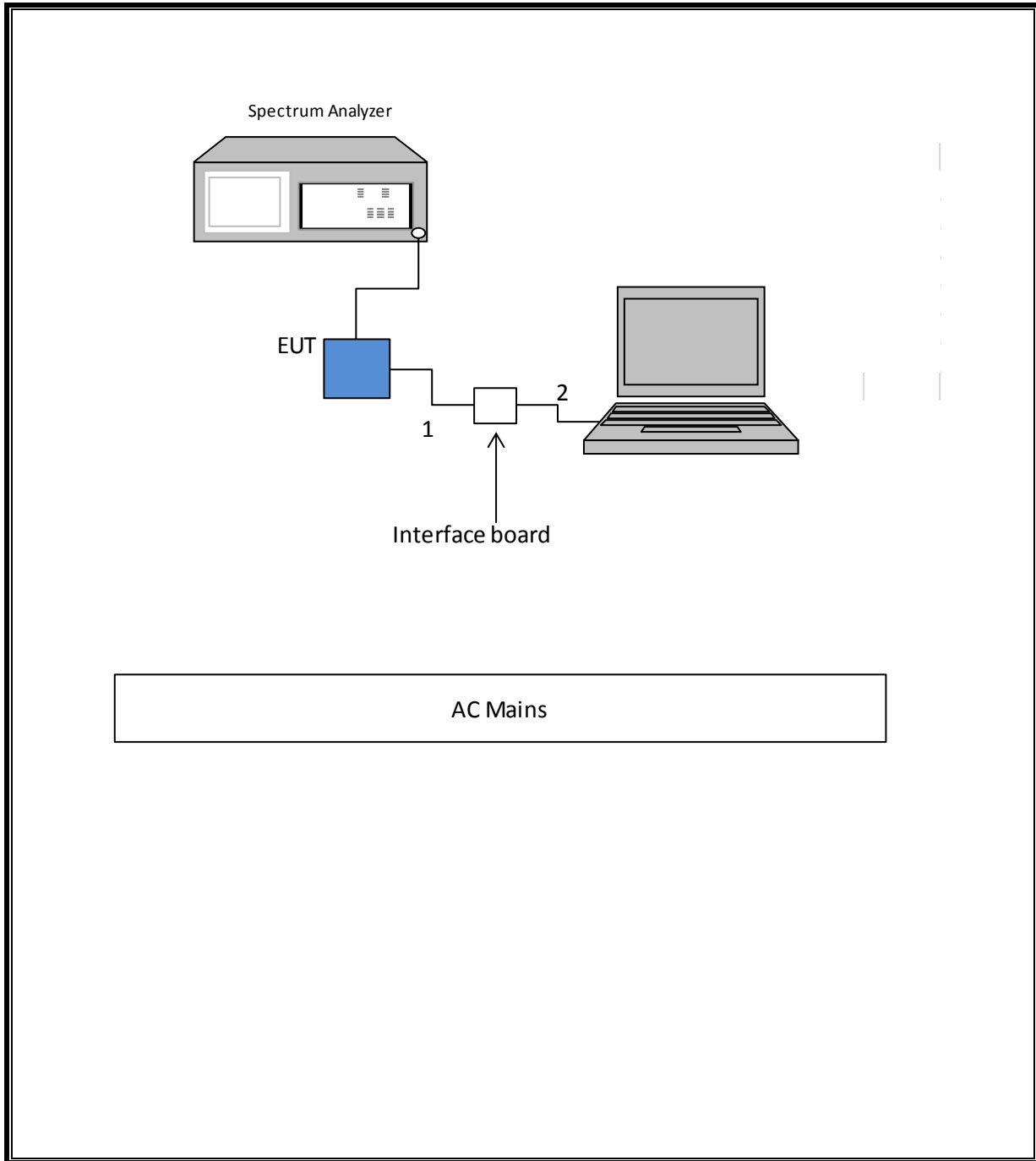
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Data	1	header	Un-shielded	0.15	
2	USB	1	USB	Shielded	1	

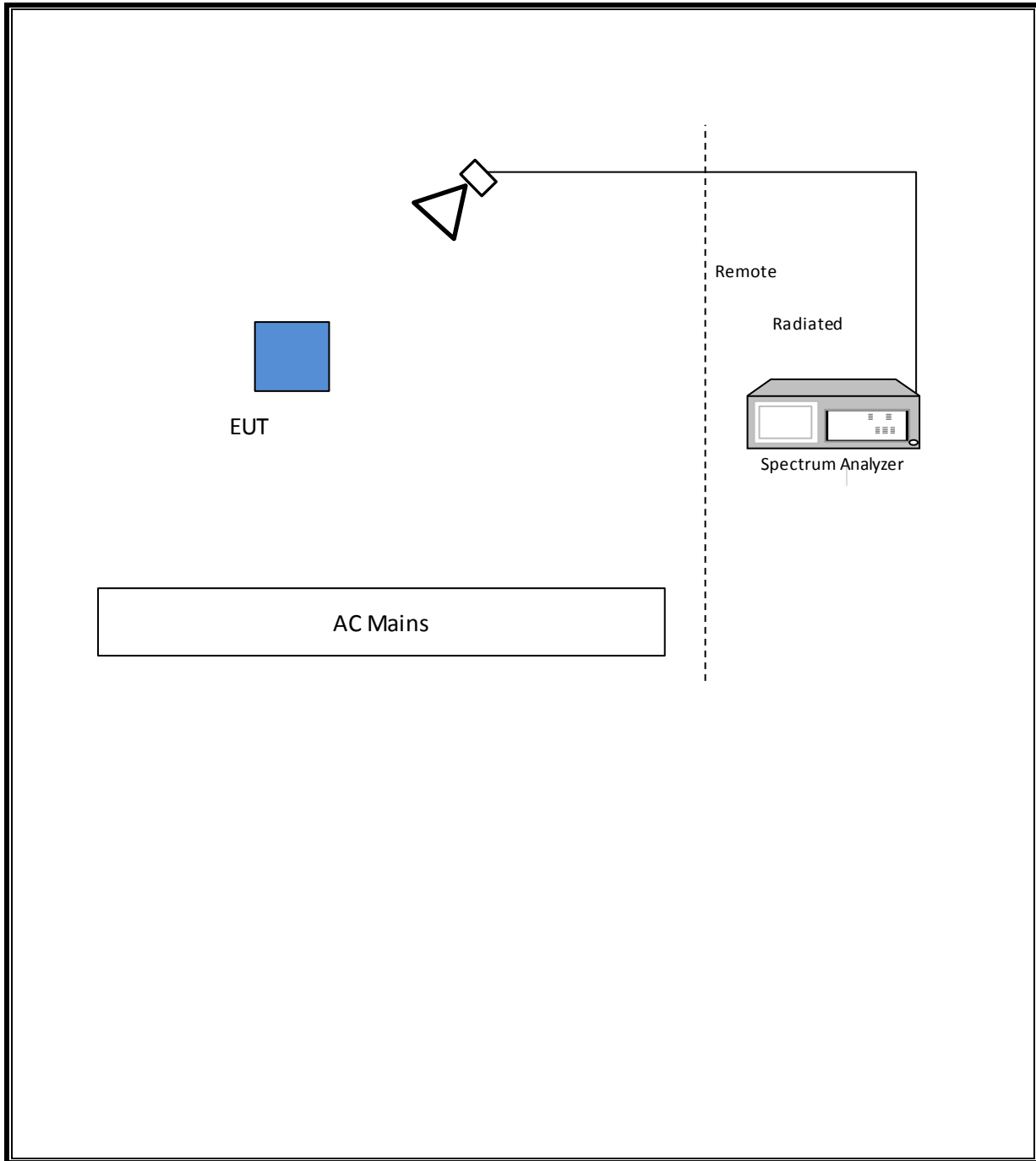
### TEST SETUP

The EUT was connected to a support laptop to set test modes via an interface board. Radiated testing was performed with EUT in standalone mode, battery powered. Test software exercised the radio card.

**SETUP DIAGRAM FOR ANTENNA PORT CONDUCTED TESTS**



**SETUP DIAGRAM FOR RADIATED TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB Pad	Sunol Sciences Corp.	JB3	T477	06/22/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T712	01/30/2018
Antenna, Horn 18-26.5GHz	ARA	MWH-1826/B	T449	06/12/2018
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1264	07/08/2018
Power Sensor, P – series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T413	06/20/2018
Amplifier, 1-26.5GHz	MITEQ	AFS42-00101800-25-S-42	T1165	08/01/2017
Amplifier, 1-26.5GHz	Agilent (Keysight) Technologies	8449B	T404	07/05/2018
Amplifier, 10kHz-1GHz	Agilent (Keysight) Technologies	8447D	T15	08/26/2017
Amplifier, 1-8 GHz	MITEQ	AMF-4D-01000800-30-29P	T1170	04/28/2018
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T908	04/13/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T907	01/23/2018
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E9030A	T905	01/11/2018
LISN	FISCHER	FCC-LISN-50/250-25-2-01	T1310	06/08/2018

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

## 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v04, Section 6.

6 dB BW: KDB 558074 D01 v04, Section 8.1.

99% BW: ANSI C63.10-2013, Section 6.9.3.

Output Power: KDB 558074 D01 v04, Section 9.2.3.2.

Power Spectral Density: KDB 558074 D01 v04, Section 10.3.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04, Section 11.1 (b).

Out-of-band emissions in restricted bands: KDB 558074 D01 v04, Section 12.1.

Band-edge: KDB 558074 D01 v04, Section 12.1.

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

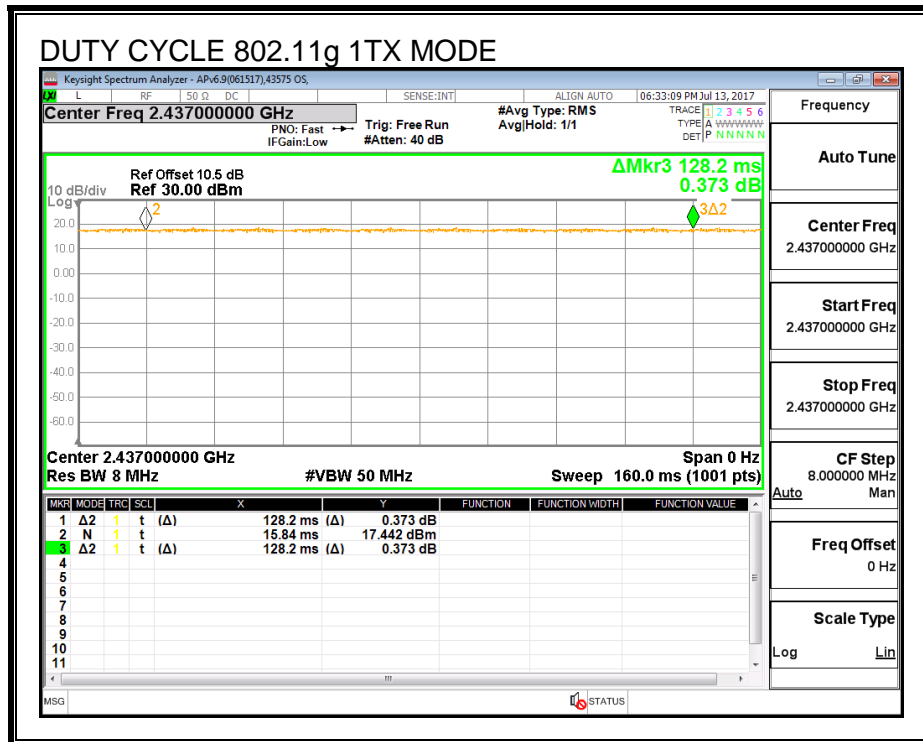
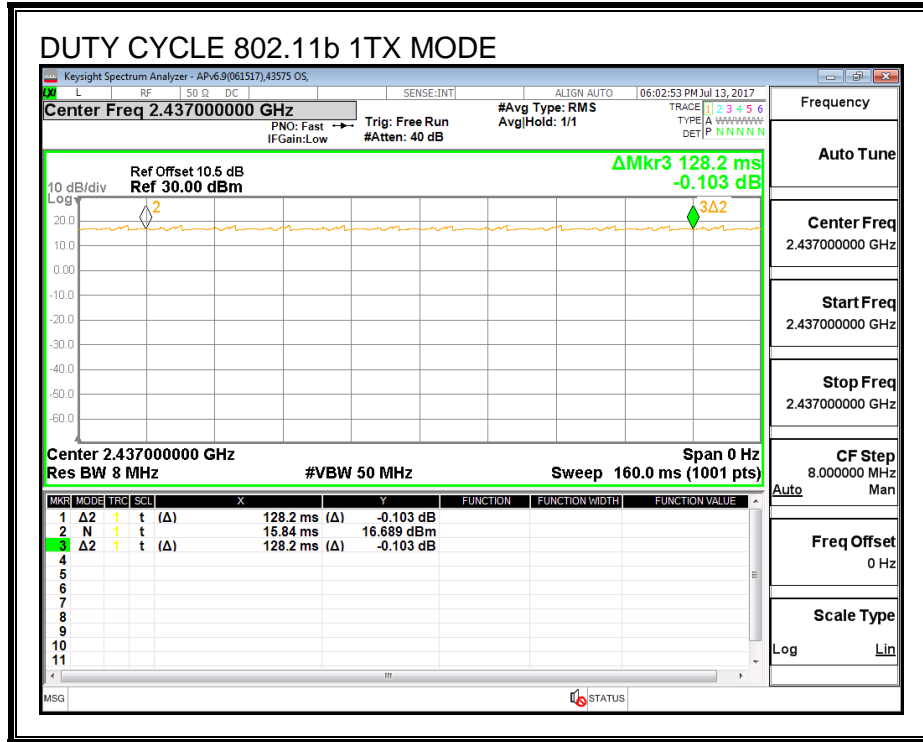
KDB 558074 Zero-Span Spectrum Analyzer Method.

#### 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)
802.11b	128.200	128.200	1.000	100.00%	0.00	0.010
802.11g	128.200	128.200	1.000	100.00%	0.00	0.010

**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)

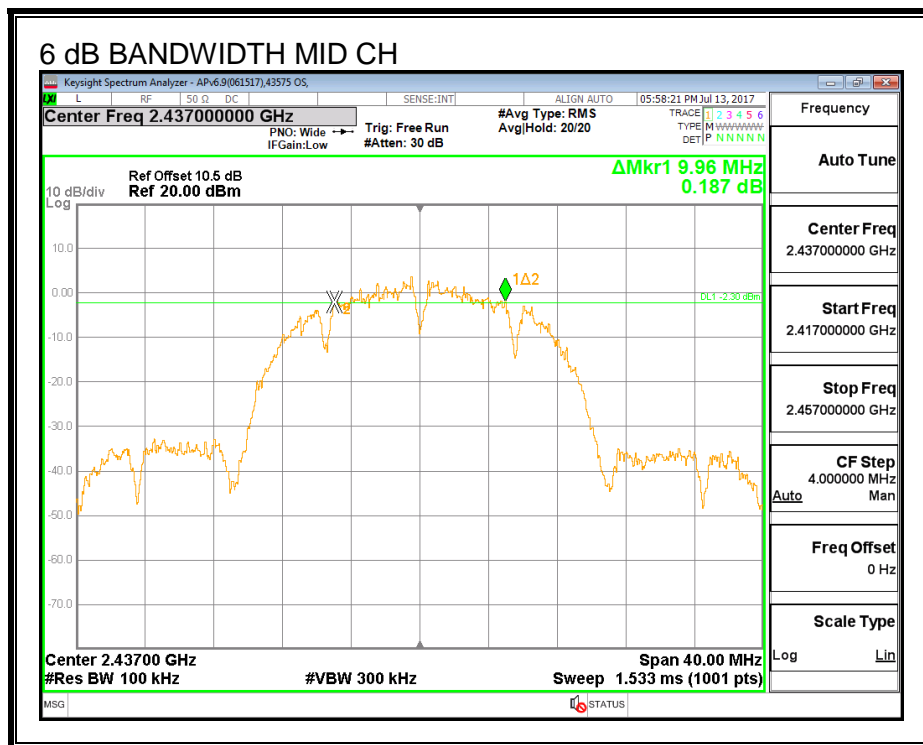
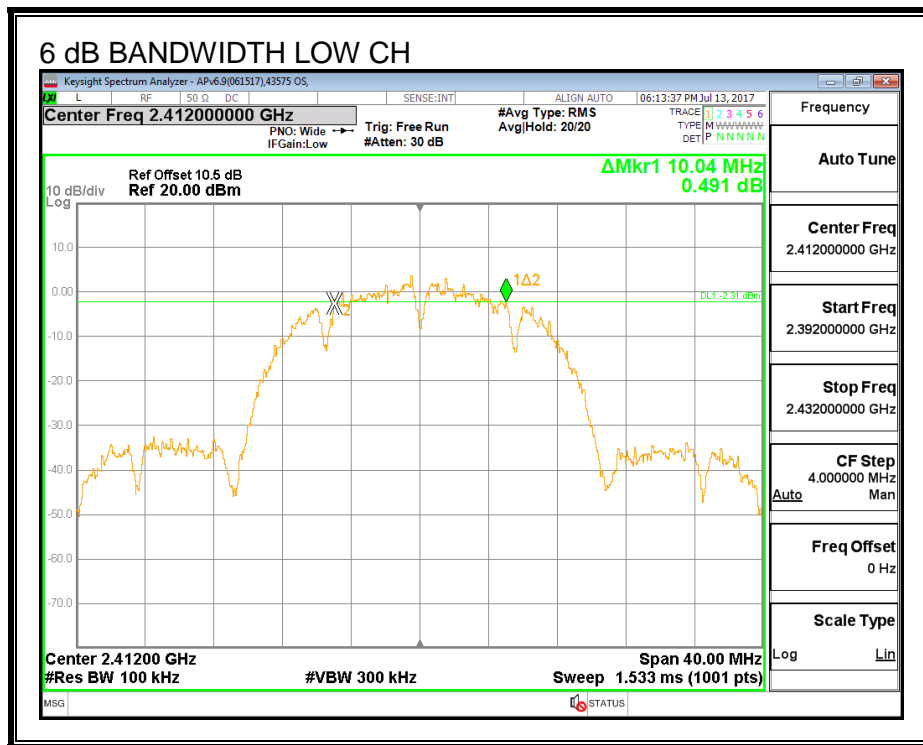
The minimum 6 dB bandwidth shall be at least 500 kHz.

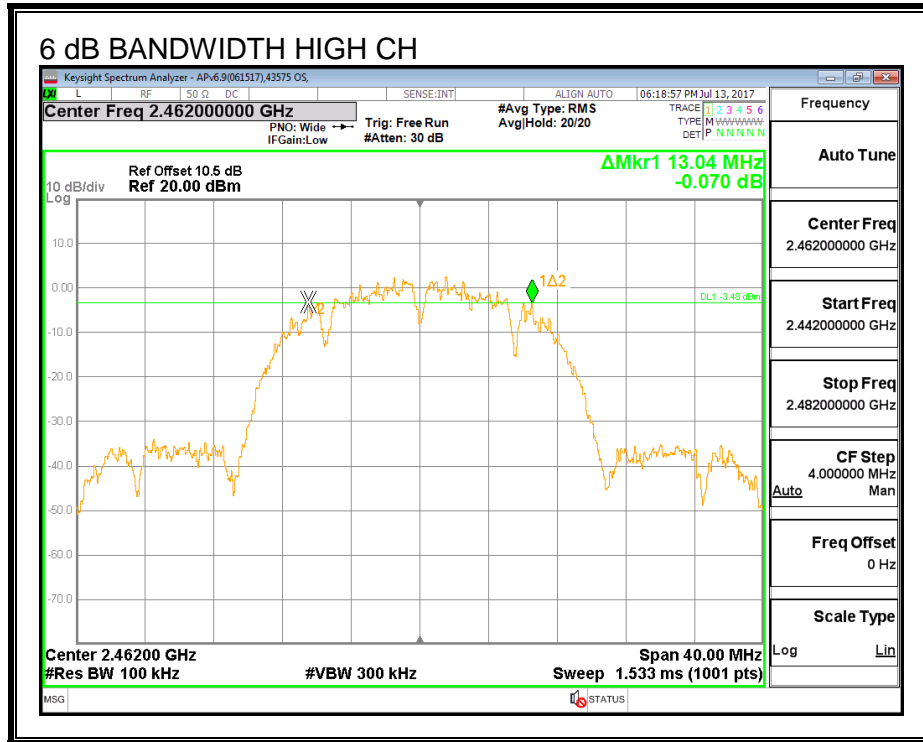
#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.040	0.5
Mid	2437	9.960	0.5
High	2462	13.040	0.5



**6 dB BANDWIDTH**





## 8.2.2. 99% BANDWIDTH

### LIMITS

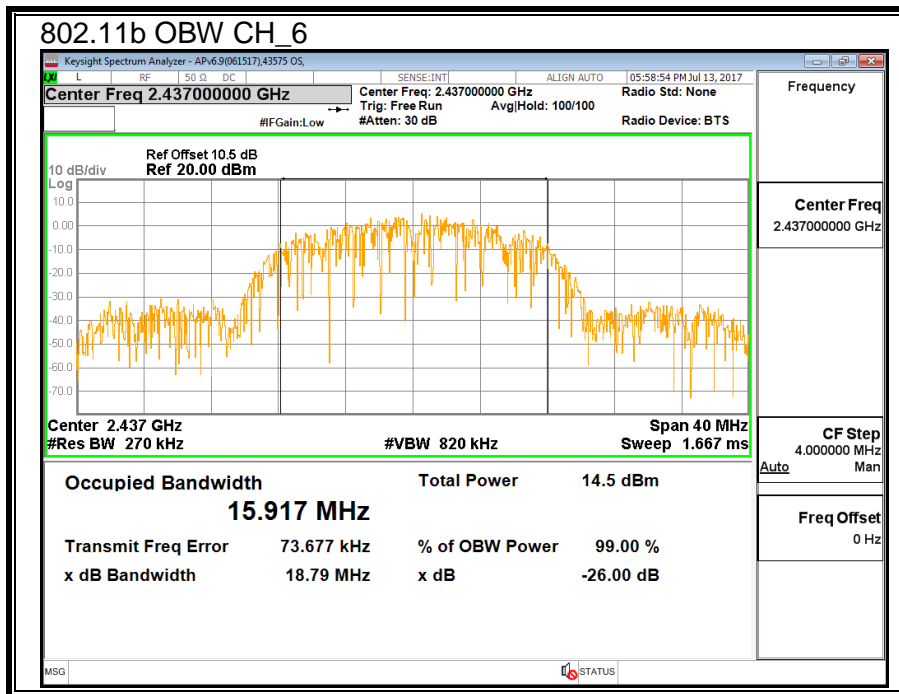
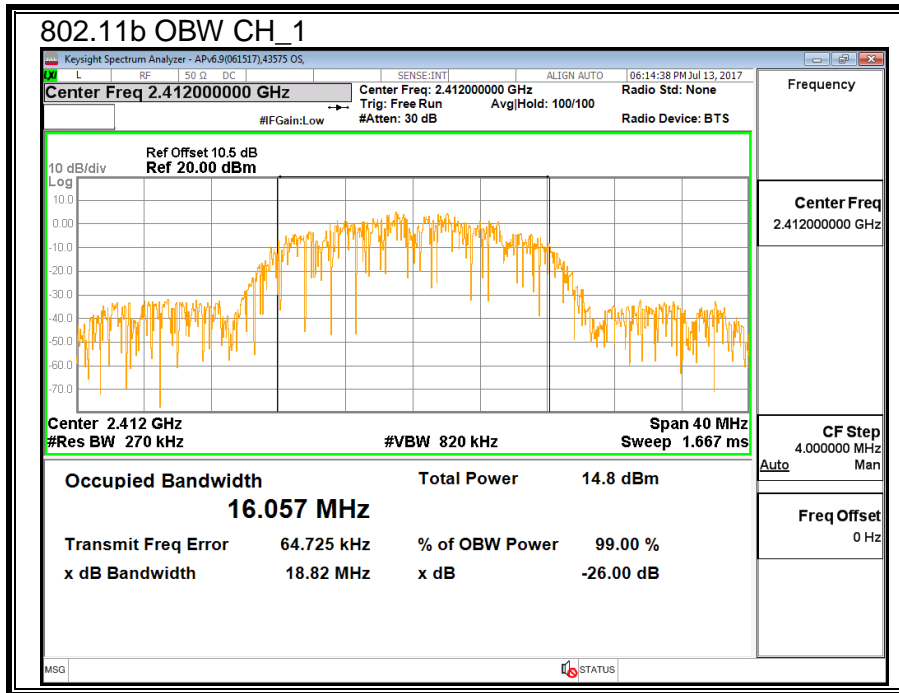
None; for reporting purposes only.

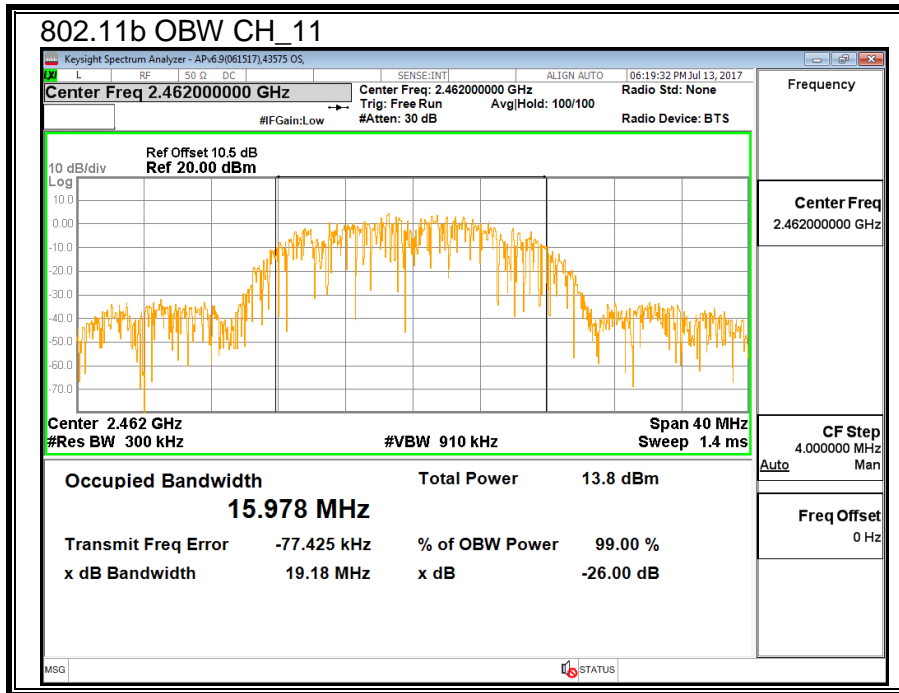
### TEST PROCEDURE

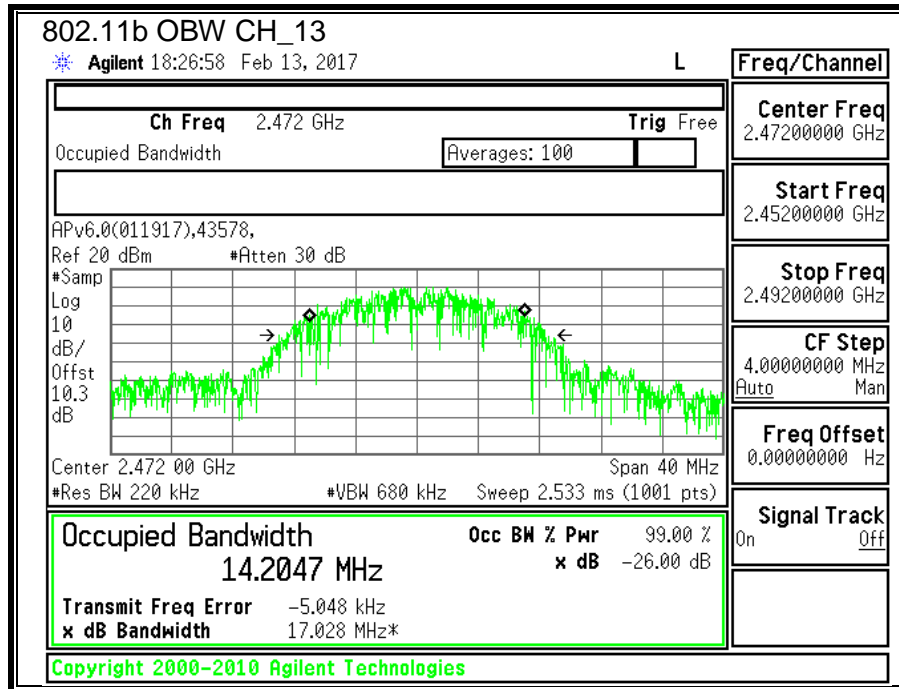
ANSI C63.10: 2013 Section 6.9.3

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)
Low	2412	16.057
Mid	2437	15.917
High	2462	15.978







### 8.2.3. OUTPUT POWER

#### LIMITS

FCC §15.247

IC RSS-247 (5.4) (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 output therefore 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	2412	3.20	30.00	30	36	30.00
Mid	2437	3.20	30.00	30	36	30.00
High	2462	3.20	30.00	30	36	30.00

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power</b>
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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	14.01	14.01	30.00	-15.99
Mid	2437	13.73	13.73	30.00	-16.27
High	2462	13.59	13.59	30.00	-16.41

**TEST INFORMATION**

**Date:** 7/13/17  
**Tester:** 43575 OS

### 8.2.4. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

#### RESULTS

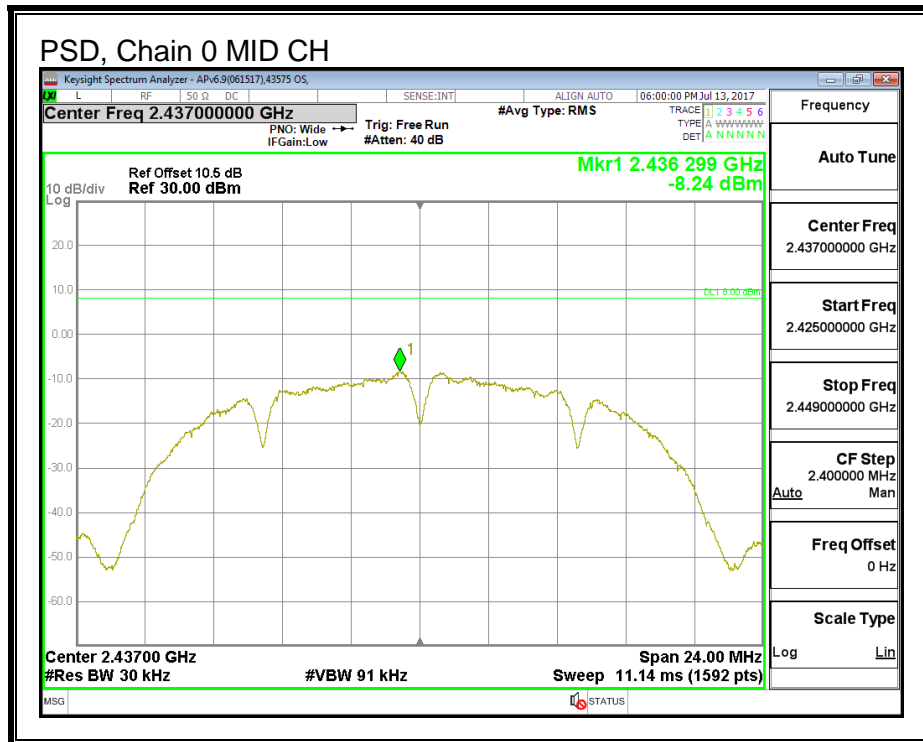
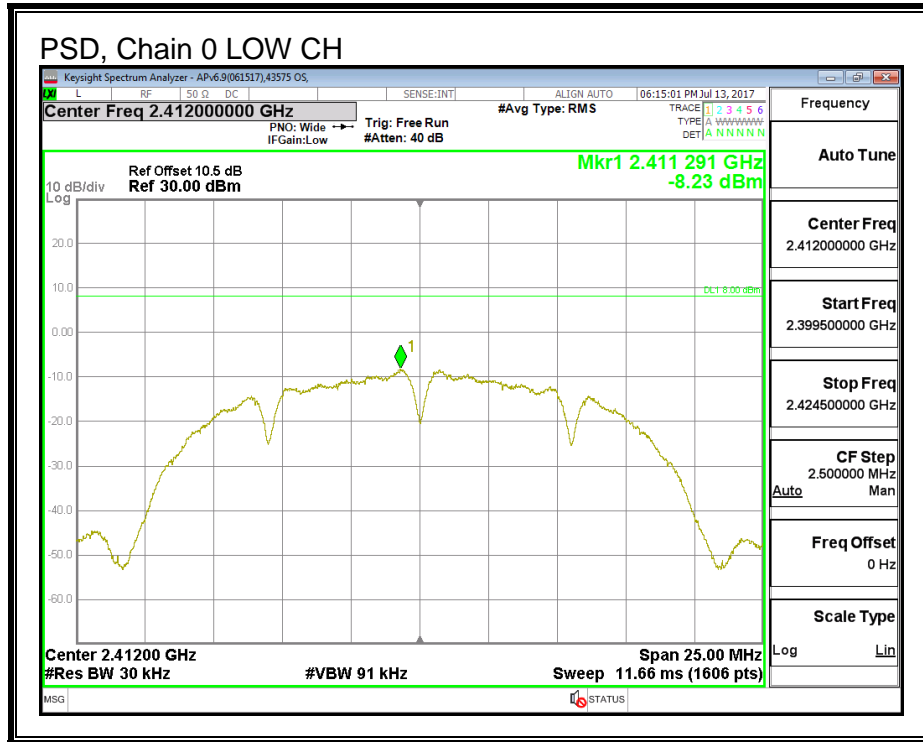
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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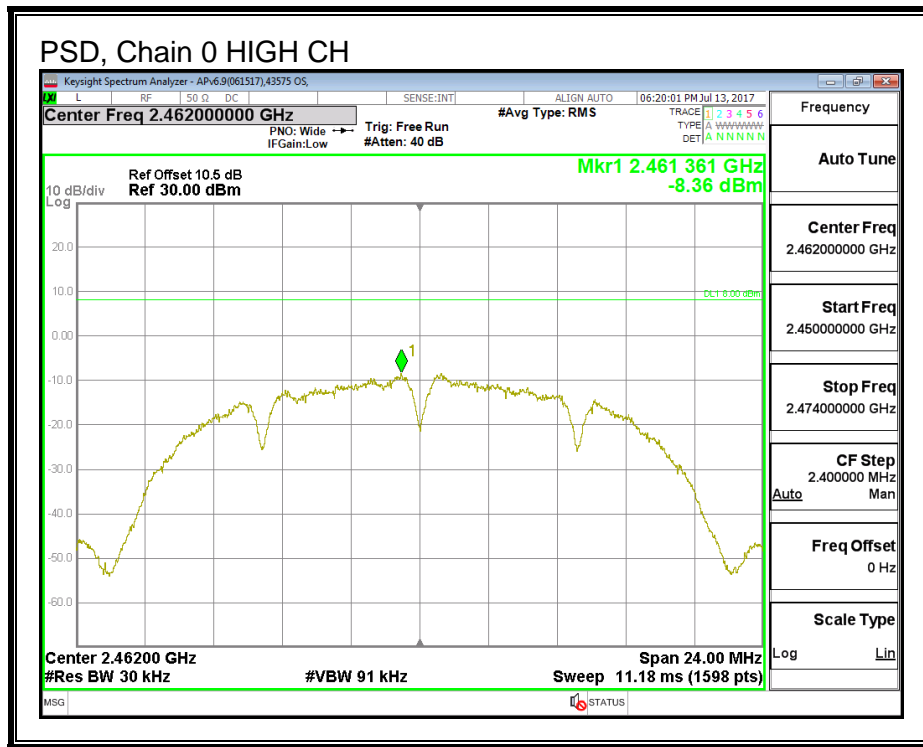
#### **PSD Results**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 Meas (dBm)</b>	<b>Total Corr'd PSD (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
Low	2412	-8.23	-8.23	8.0	-16.2
Mid	2437	-8.24	-8.24	8.0	-16.2
High	2462	-8.36	-8.36	8.0	-16.4



**PSD, Chain 0**





## 8.2.5. OUT-OF-BAND EMISSIONS

### LIMITS

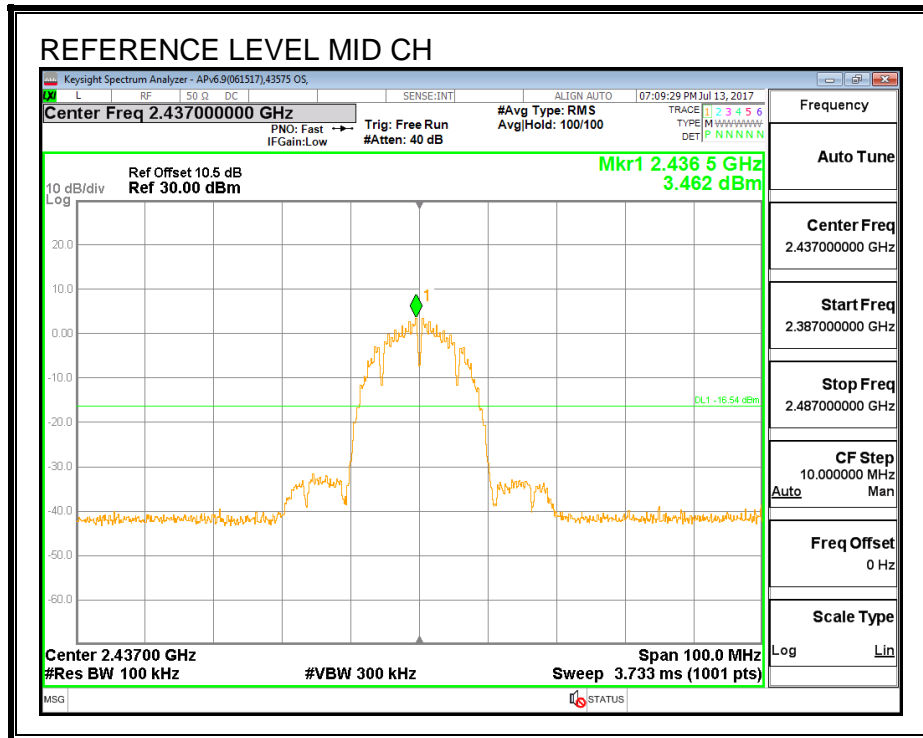
FCC §15.247 (d)

IC RSS-247 (5.5)

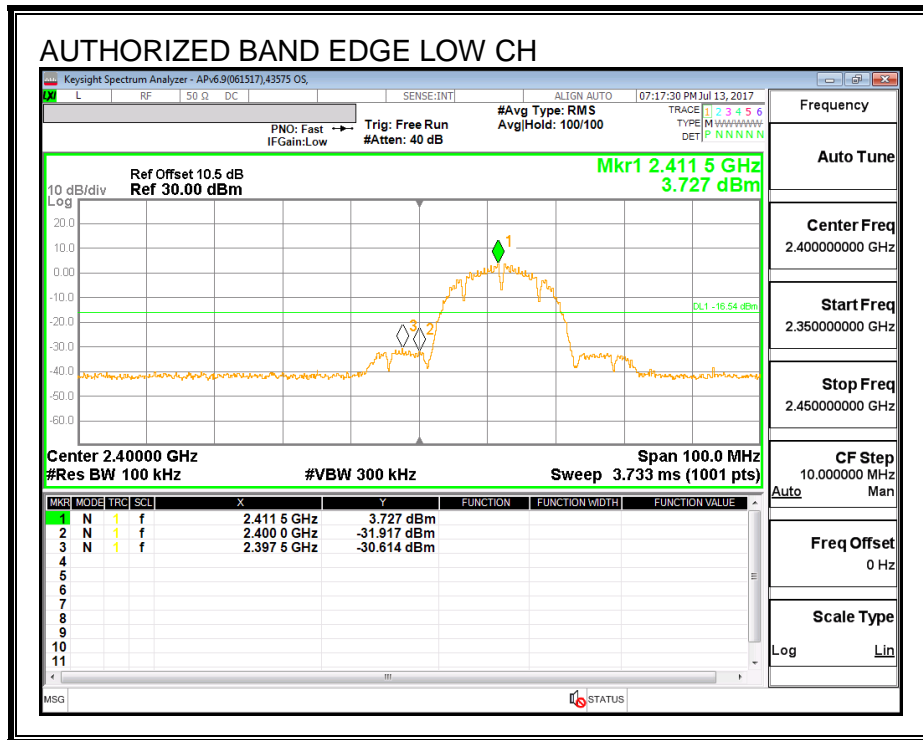
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

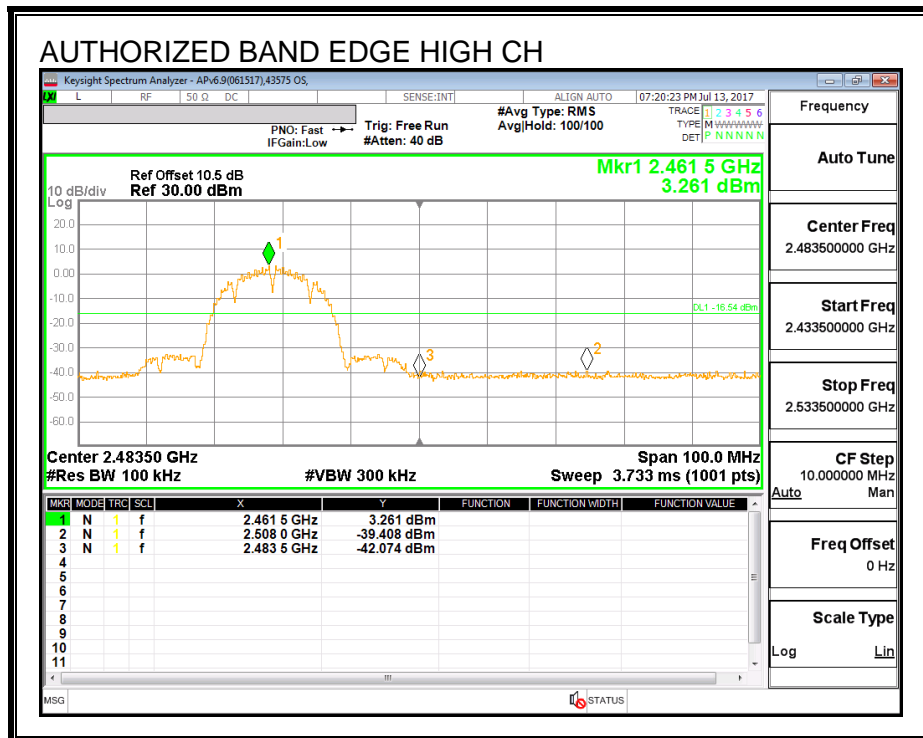
**IN-BAND REFERENCE LEVEL**



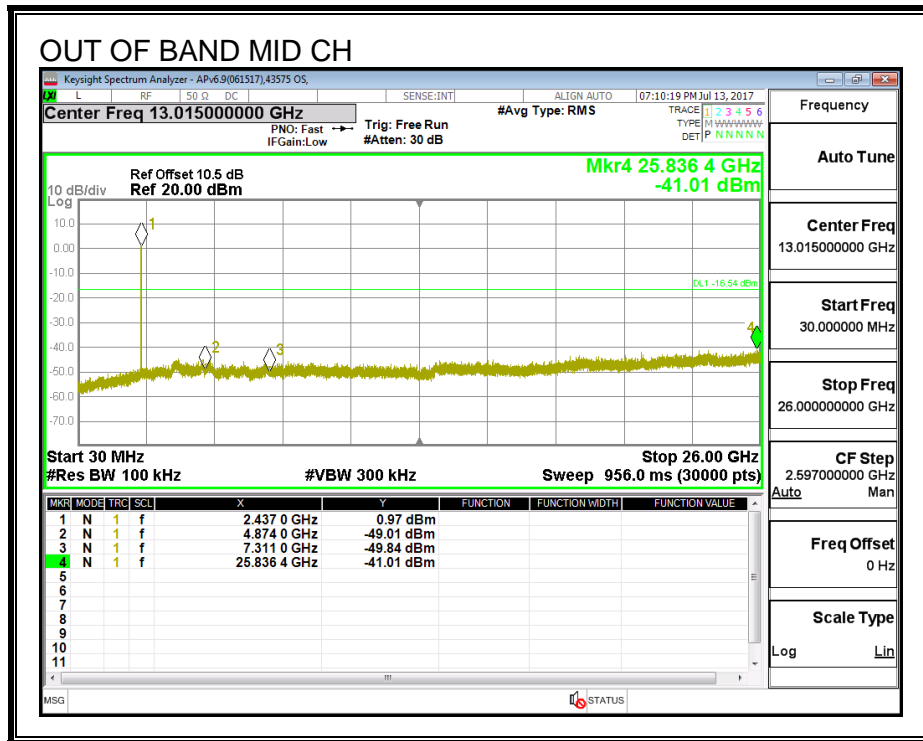
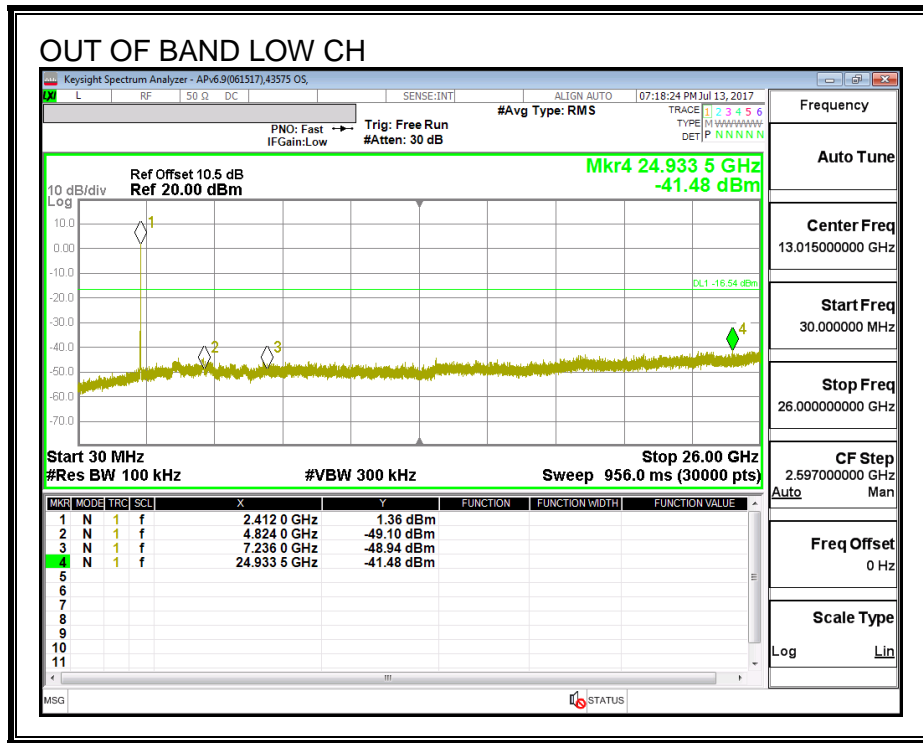
**LOW CHANNEL BANDEGE**

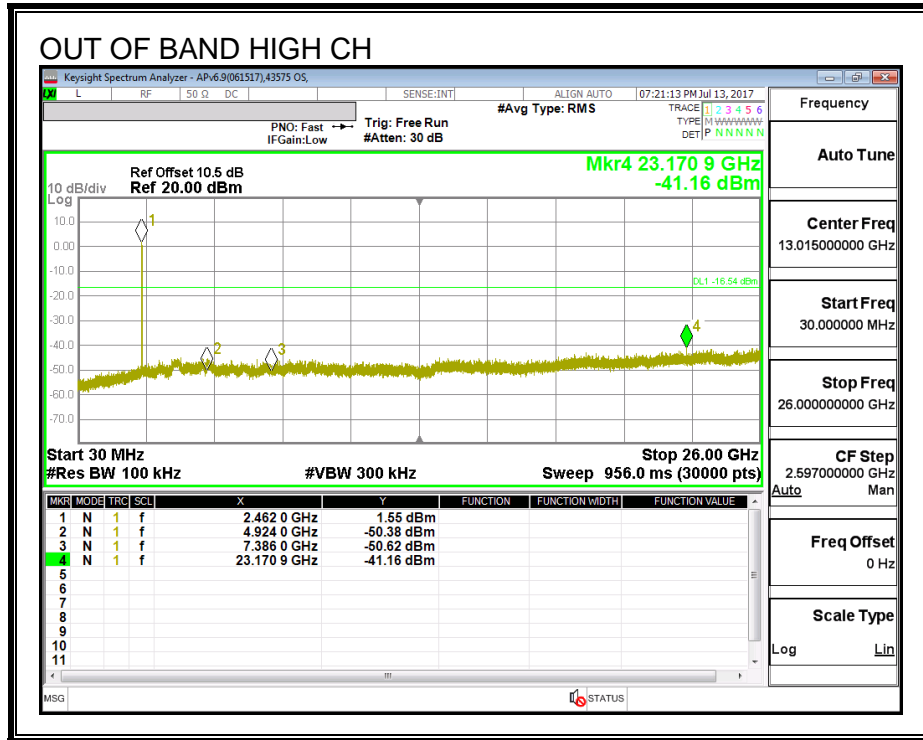


**HIGH CHANNEL BANDEGE**



**OUT-OF-BAND EMISSIONS**





### 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)

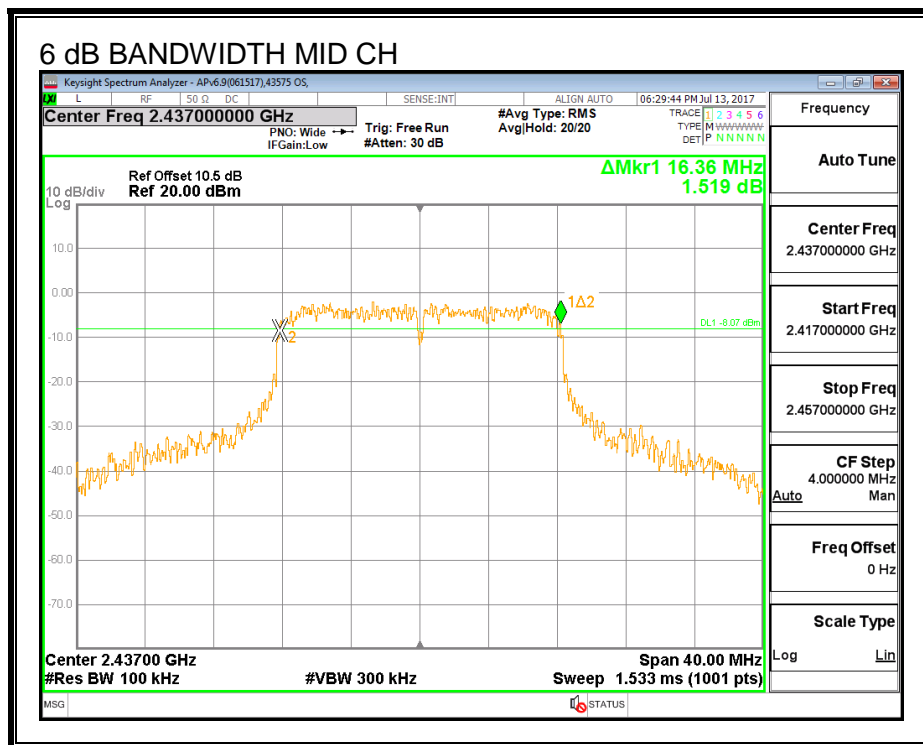
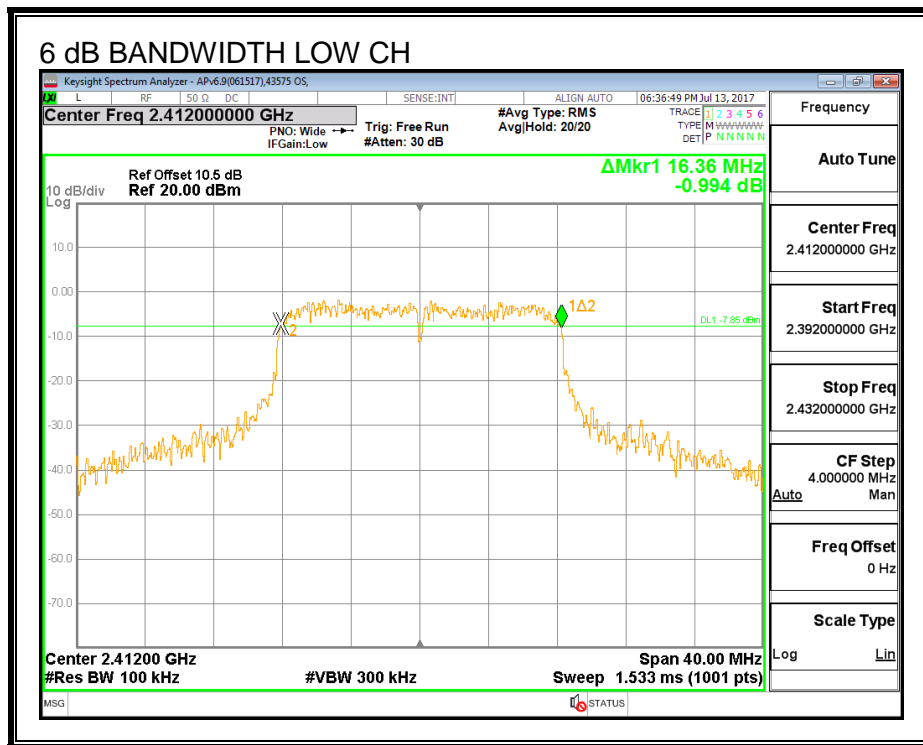
The minimum 6 dB bandwidth shall be at least 500 kHz.

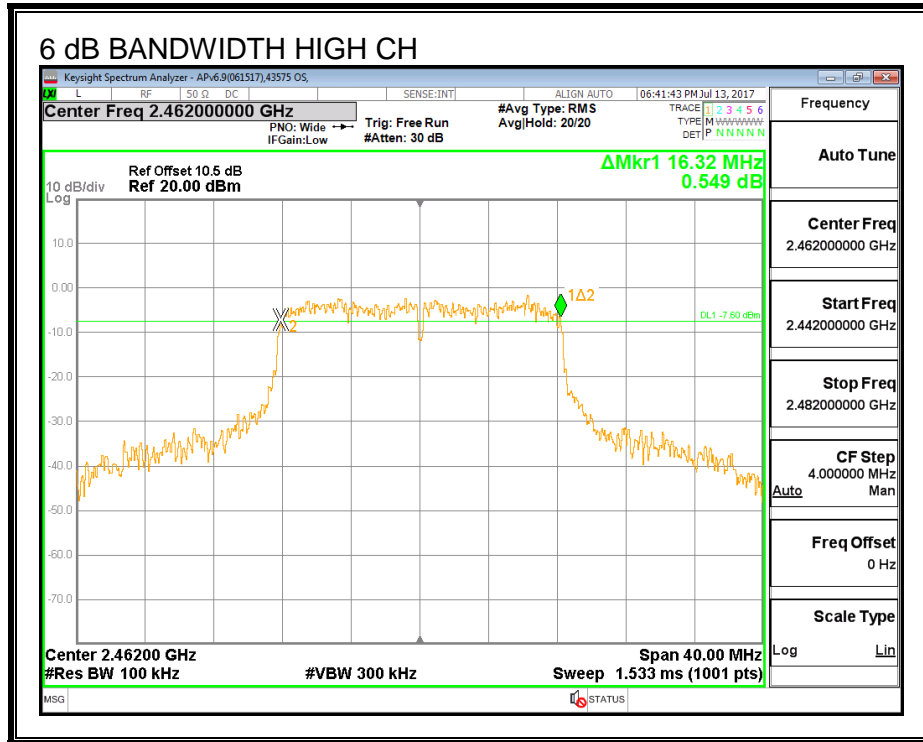
##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.360	0.5
Mid	2437	16.360	0.5
High	2462	16.320	0.5



**6 dB BANDWIDTH**





### 8.3.2. 99% BANDWIDTH

#### LIMITS

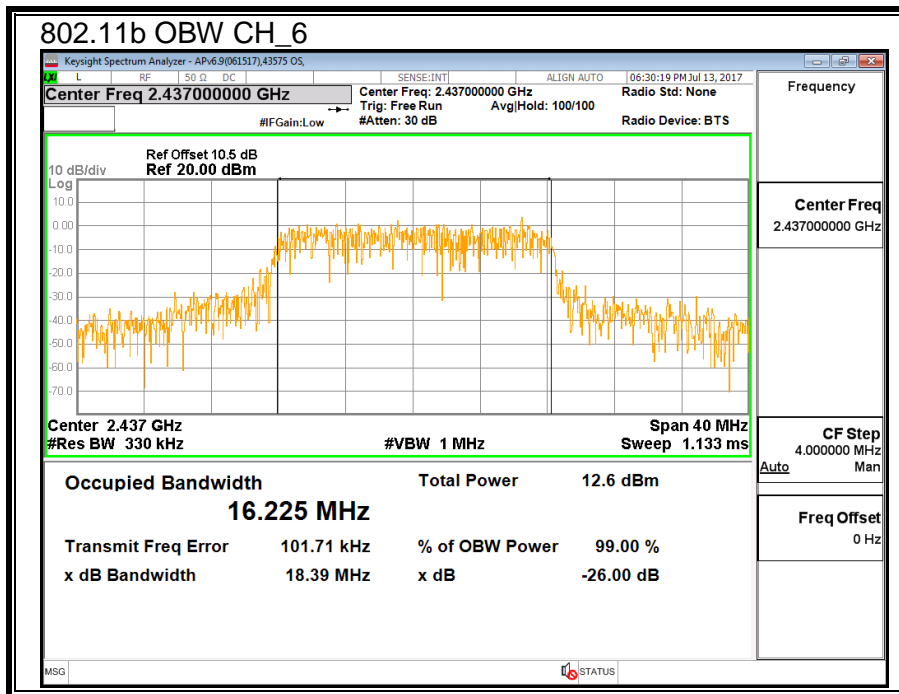
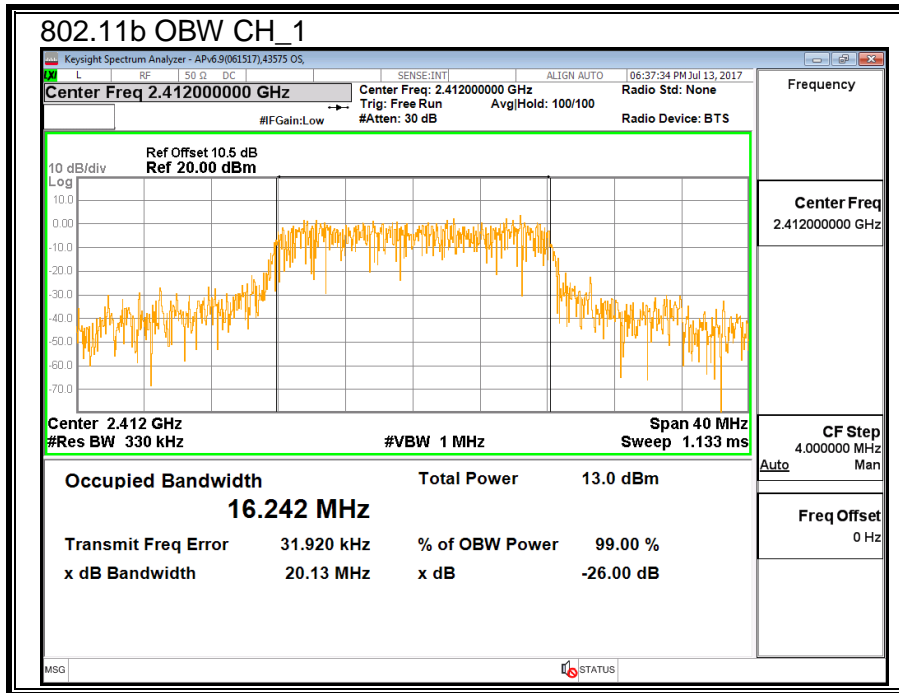
None; for reporting purposes only.

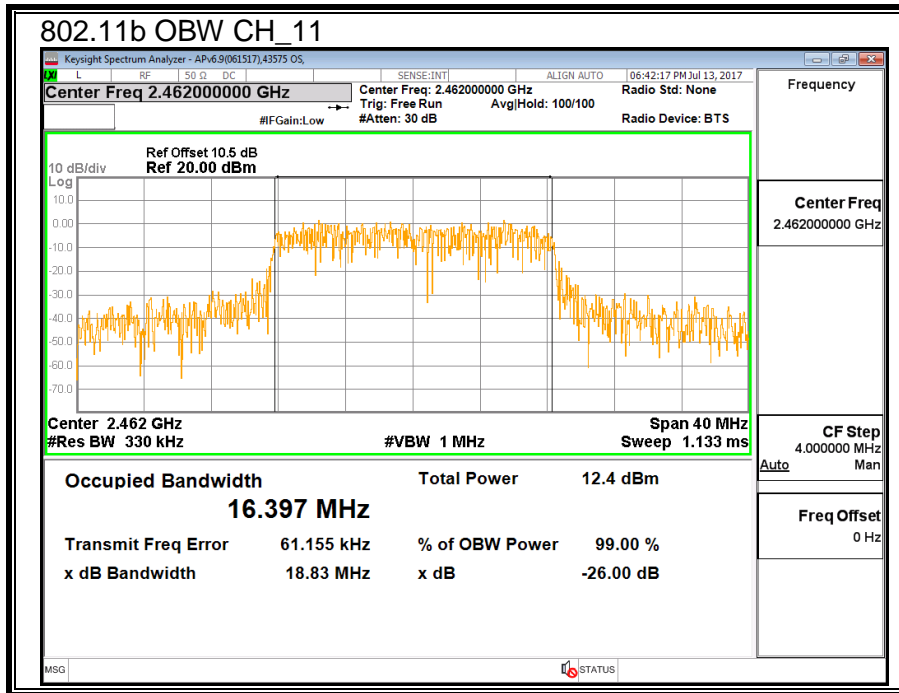
#### TEST PROCEDURE

ANSI C63.10: 2013 Section 6.9.3

#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)
Low	2412	16.424
Mid	2437	16.225
High	2462	16.397





### **8.3.3. OUTPUT POWER**

#### **LIMITS**

FCC §15.247

IC RSS-247 (5.4) (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 output therefore 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	2412	3.20	30.00	30	36	30.00
Mid	2437	3.20	30.00	30	36	30.00
High	2462	3.20	30.00	30	36	30.00

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

**Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	12.52	12.52	30.00	-17.48
Mid	2437	12.25	12.25	30.00	-17.75
High	2462	12.85	12.85	30.00	-17.15

**TEST INFORMATION**

**Date:** 7/13/17  
**Tester:** 43575 OS

### 8.3.4. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

#### RESULTS

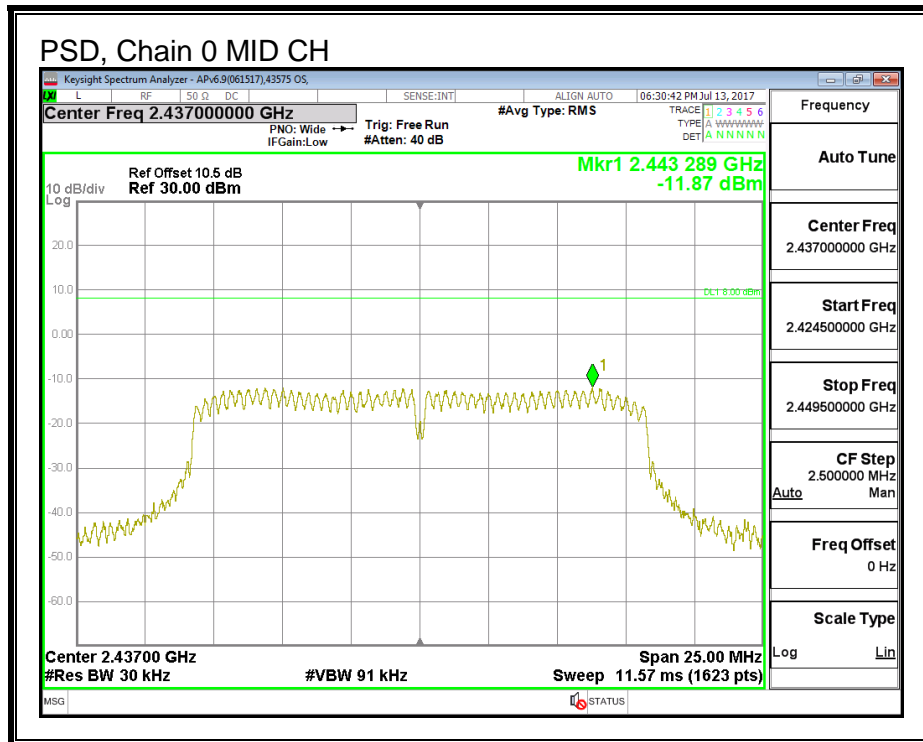
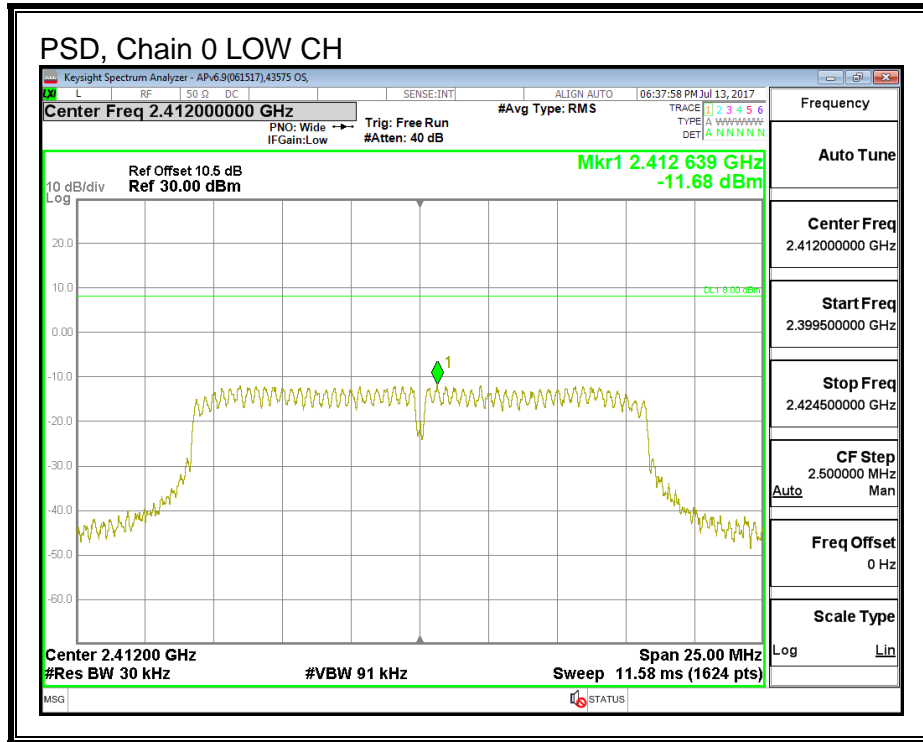
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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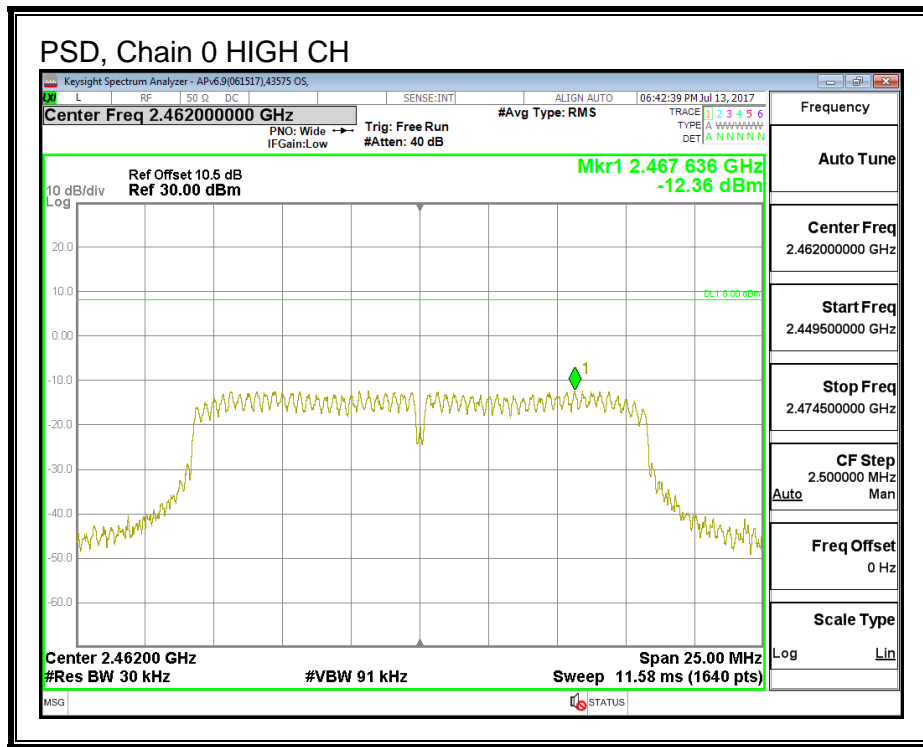
#### **PSD Results**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 Meas (dBm)</b>	<b>Total Corr'd PSD (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
Low	2412	-11.68	-11.68	8.0	-19.7
Mid	2437	-11.87	-11.87	8.0	-19.9
High	2462	-12.36	-12.36	8.0	-20.4



**PSD, Chain 0**





### 8.3.5. OUT-OF-BAND EMISSIONS

#### LIMITS

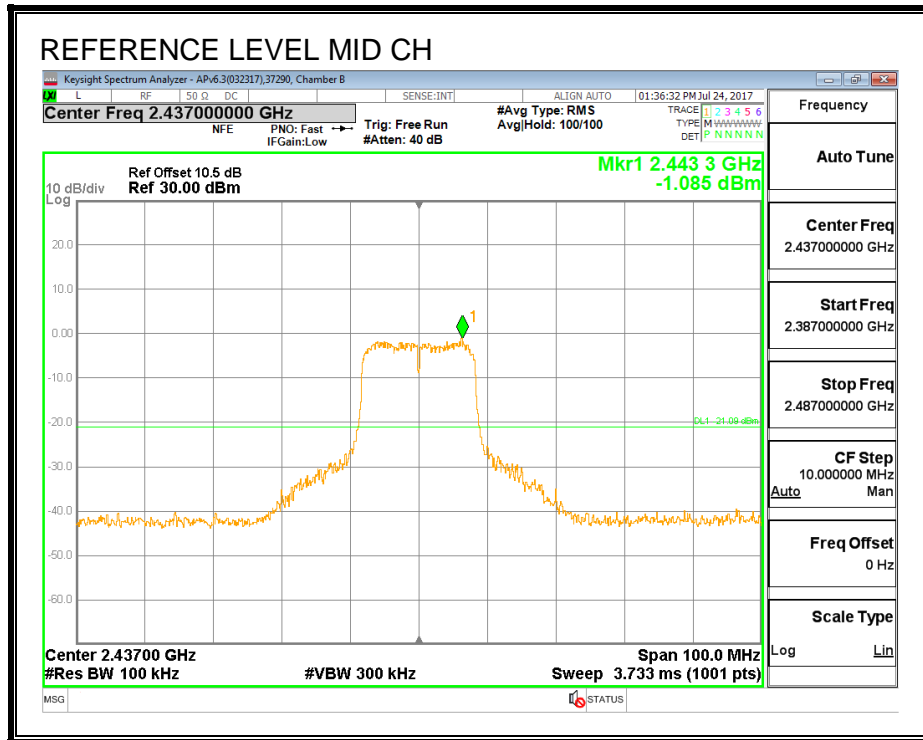
FCC §15.247 (d)

IC RSS-247 (5.5)

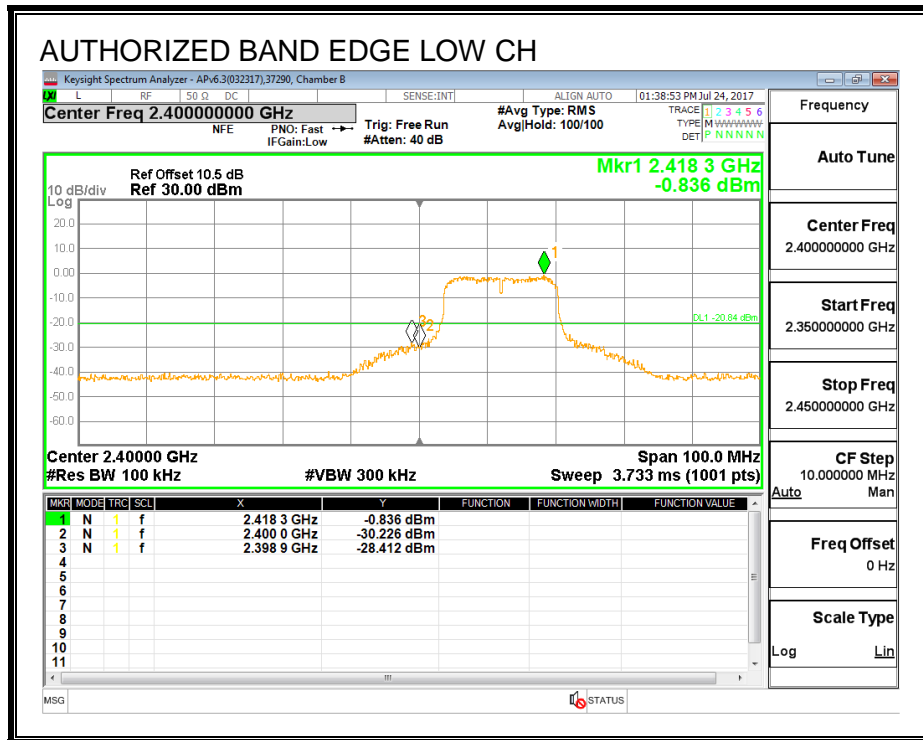
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

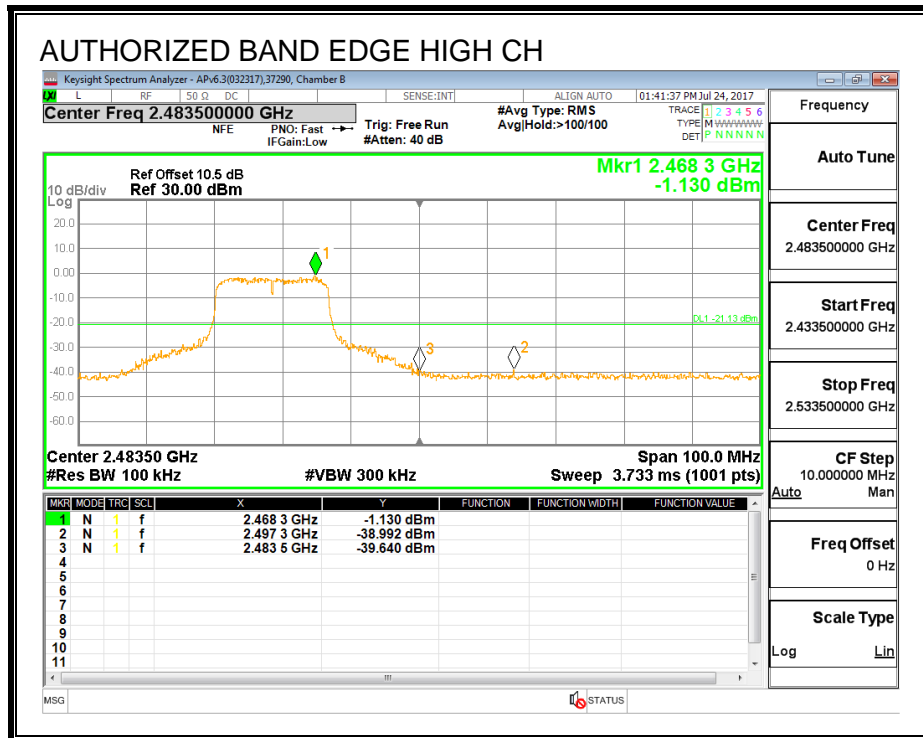
**IN-BAND REFERENCE LEVEL**



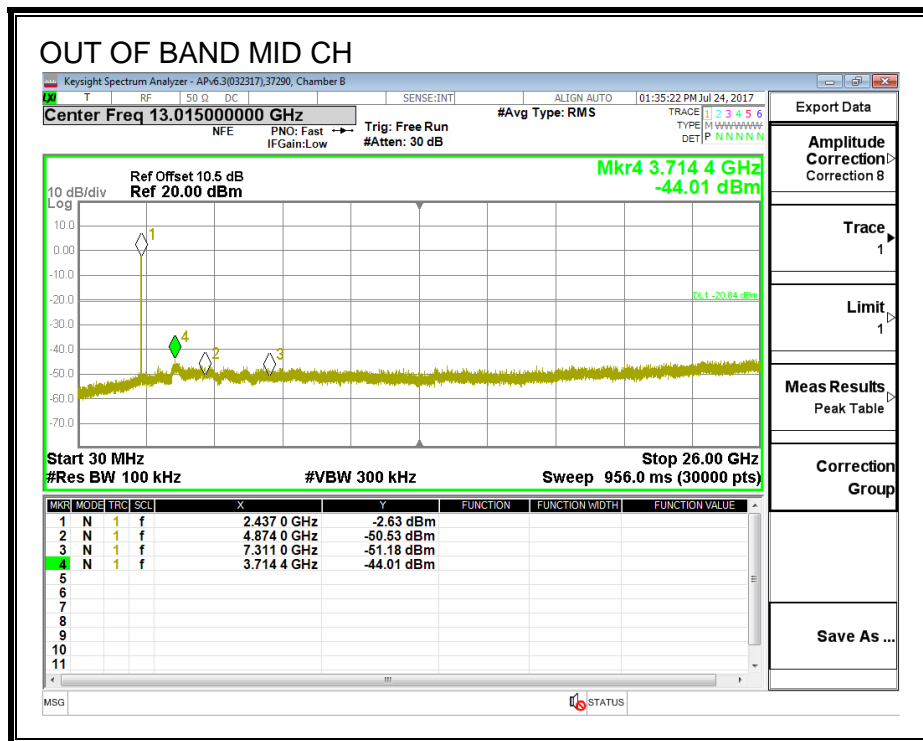
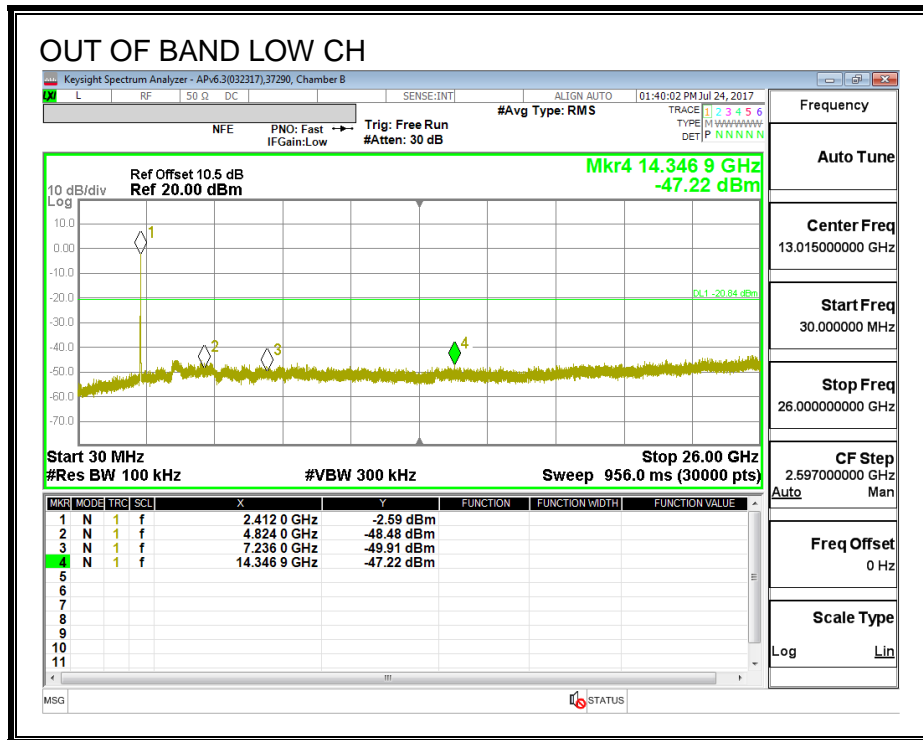
**LOW CHANNEL BANDEDGE**

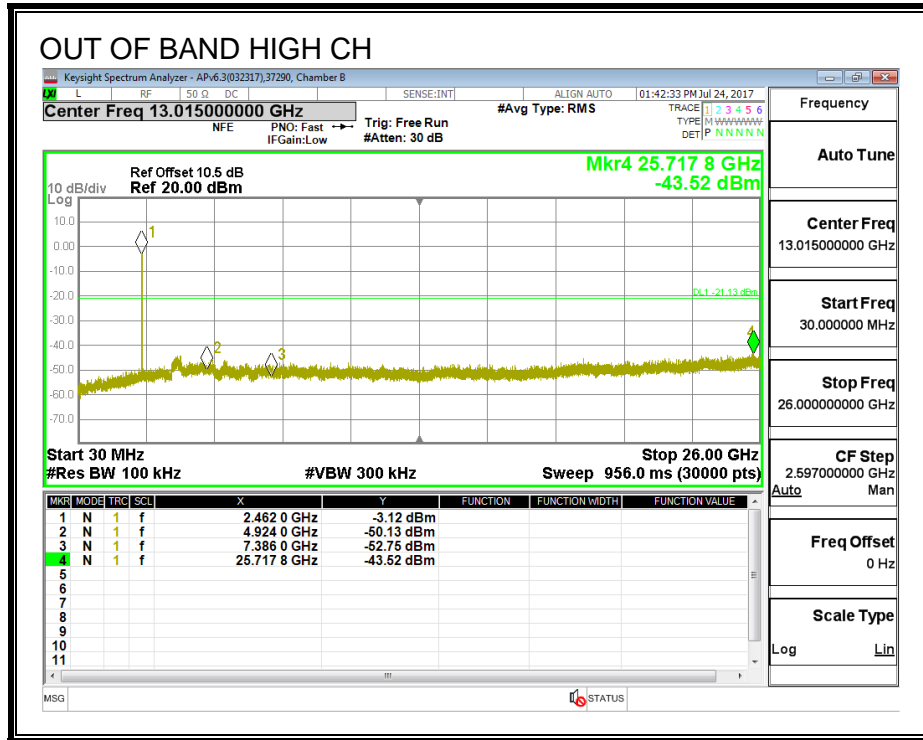


**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**





## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

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

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

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

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

For 2.4 GHz band, the spectrum from 30 MHz to 1 GHz and from 18 GHz to 26 GHz is investigated with the transmitter set to the channel with the highest output power as worst case in each applicable band. The spectrum from 1 GHz to 18GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

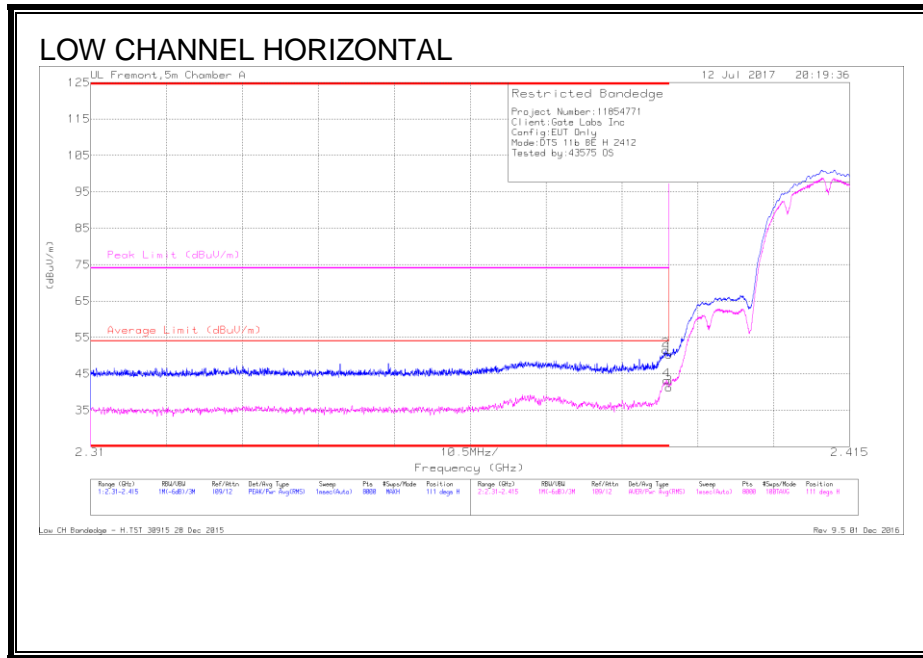
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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



## 9.2. TRANSMITTER ABOVE 1 GHz

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

#### RESTRICTED BANDEDGE (LOW CHANNEL)



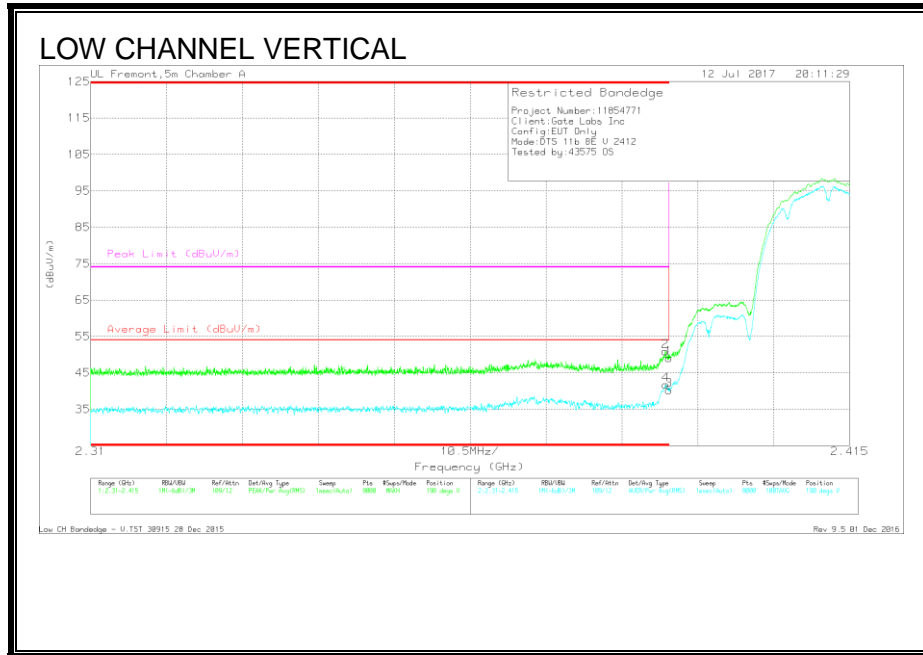
#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filt/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	41.75	Pk	31.8	-23.2	0	50.35	-	-	74	-23.65	111	331	H
2	* 2.39	42.88	Pk	31.8	-23.2	0	51.48	-	-	74	-22.52	111	331	H
3	* 2.39	32.67	RMS	31.8	-23.2	0	41.27	54	-12.73	-	-	111	331	H
4	* 2.39	34.6	RMS	31.8	-23.2	0	43.2	54	-10.8	-	-	111	331	H

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

Pk - Peak detector

RMS - RMS detection

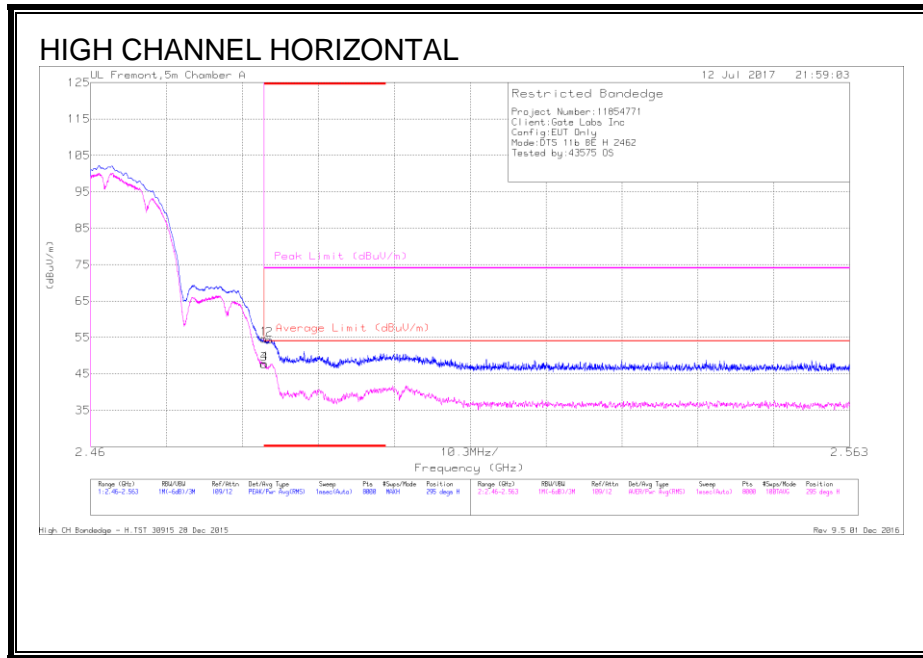


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dBm)	Amp/Cb/Filt/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	40.42	Pk	31.8	-23.2	0	49.02	-	-	74	-24.98	190	373	V
2	* 2.389	42.26	Pk	31.8	-23.2	0	50.86	-	-	74	-23.14	190	373	V
3	* 2.39	31.62	RMS	31.8	-23.2	0	40.22	54	-13.78	-	-	190	373	V
4	* 2.39	33.12	RMS	31.8	-23.2	0	41.72	54	-12.28	-	-	190	373	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 T862 (dBm)	Amp/Cb/Filt/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	45.46	Pk	32.3	-23.1	0	54.66	-	-	74	-19.34	295	189	H
2	* 2.484	45.25	Pk	32.3	-23.1	0	54.45	-	-	74	-19.55	295	189	H
3	* 2.484	38.43	RMS	32.3	-23.1	0	47.63	54	-6.37	-	-	295	189	H
4	* 2.484	38.55	RMS	32.3	-23.1	0	47.75	54	-6.25	-	-	295	189	H

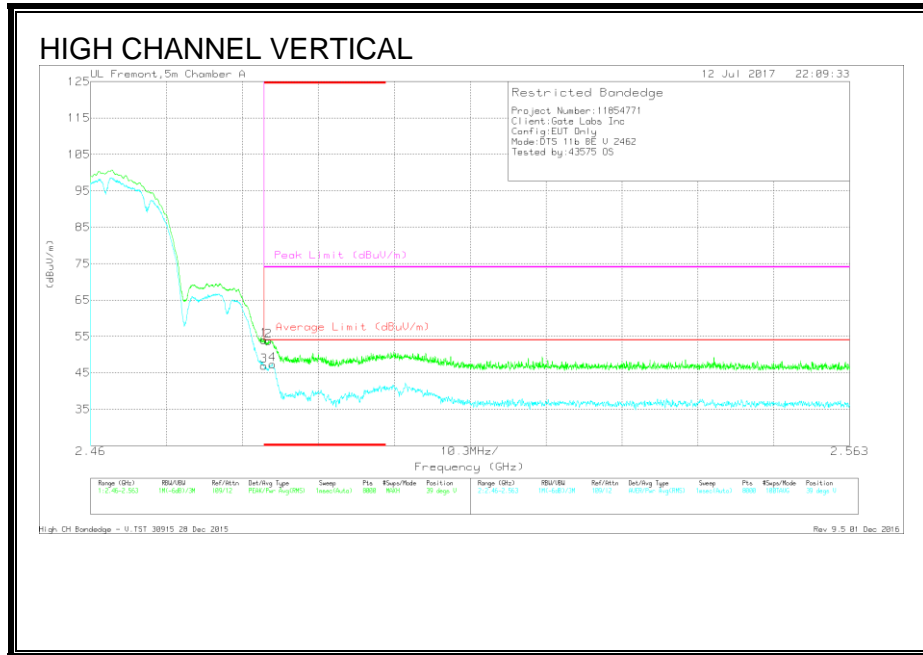
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

High CH Bandedge - H.TST 30915 28 Dec 2015

Rev 9.5 01 Dec 2016



Trace Markers

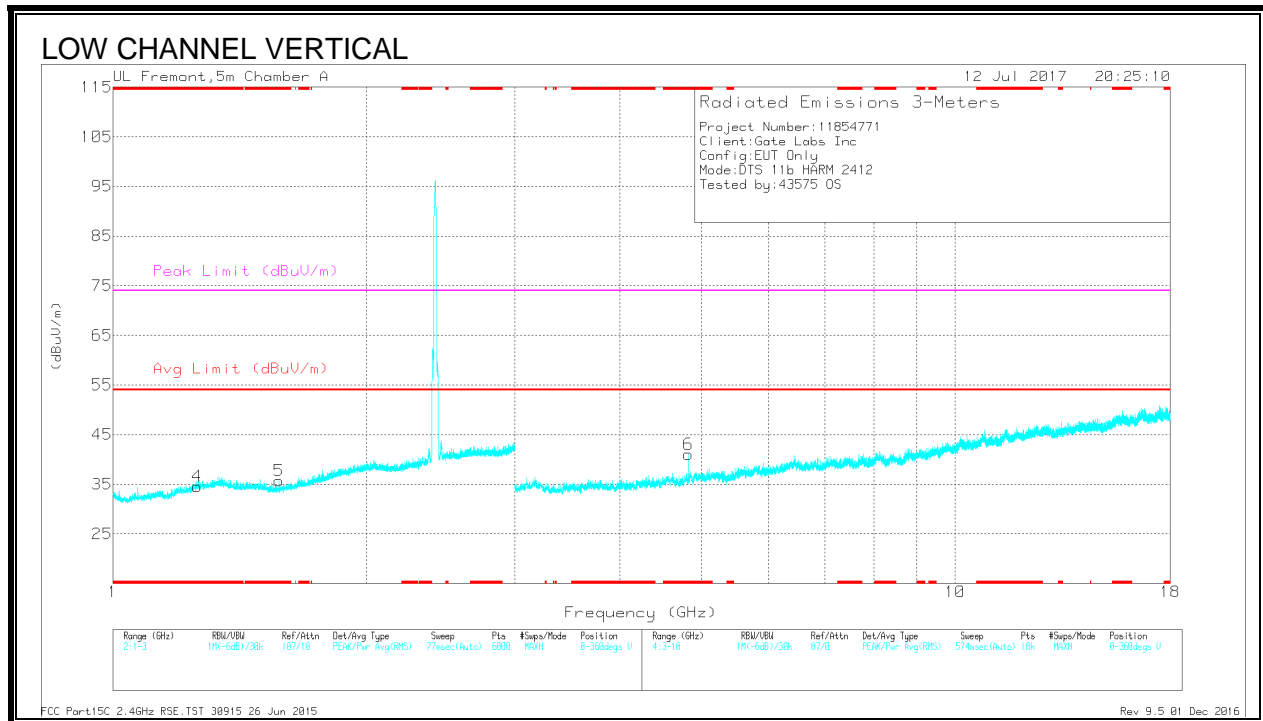
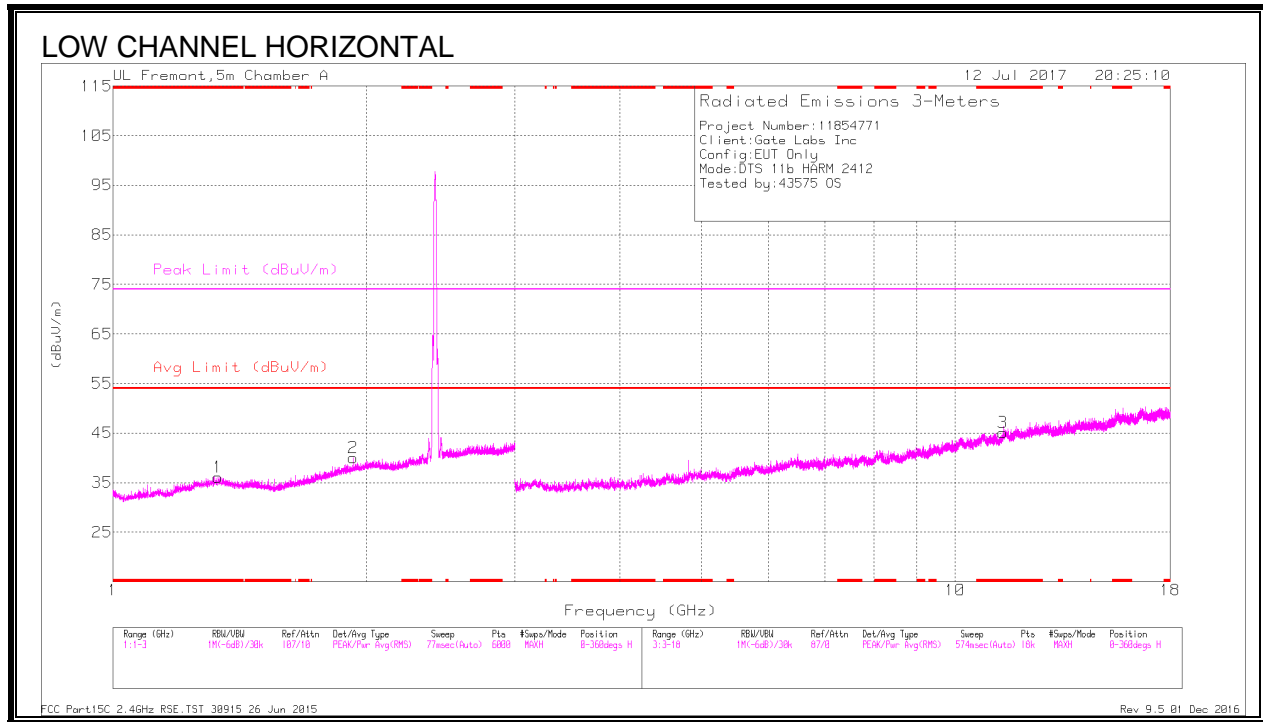
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.83	Pk	32.3	-23.1	0	54.03	-	-	74	-19.97	39	122	V
2	* 2.484	44.58	Pk	32.3	-23.1	0	53.78	-	-	74	-20.22	39	122	V
3	* 2.484	37.73	RMS	32.3	-23.1	0	46.93	54	-7.07	-	-	39	122	V
4	* 2.485	38.13	RMS	32.3	-23.1	0	47.33	54	-6.67	-	-	39	122	V

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

Pk - Peak detector

RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, CH 1)**



Radiated Emissions

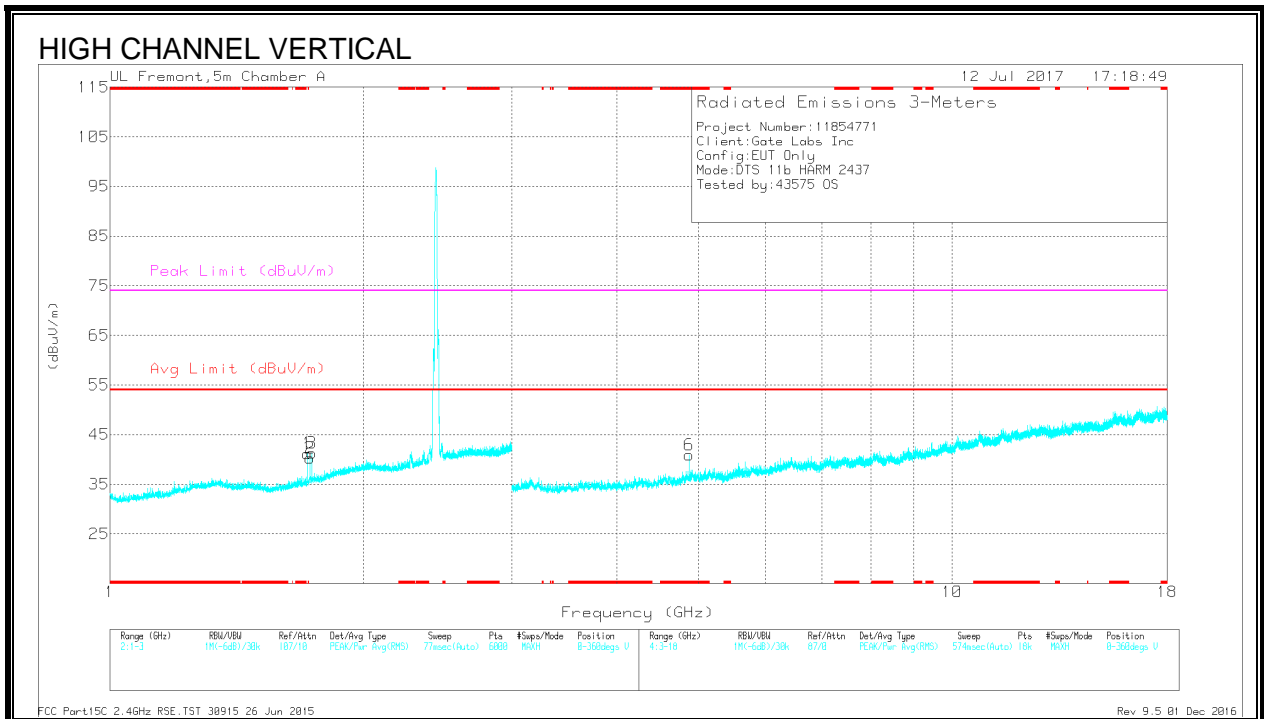
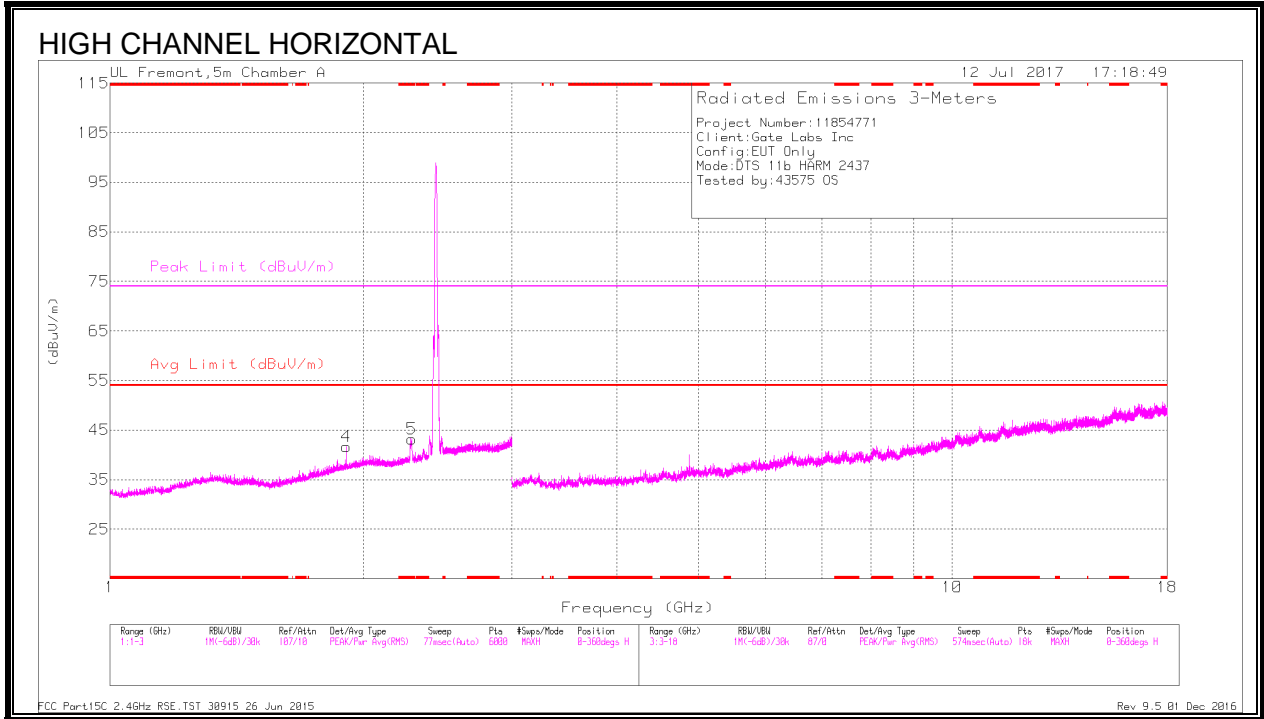
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.331	36.4	PK2	29.5	-23.5	0	42.4	-	-	74	-31.6	244	288	H
* 1.331	24.17	MAV1	29.5	-23.5	0	30.17	54	-23.83	-	-	244	288	H
* 1.261	35.81	PK2	29.2	-23.6	0	41.41	-	-	74	-32.59	235	283	V
* 1.259	23.94	MAV1	29.2	-23.6	0	29.54	54	-24.46	-	-	235	283	V
* 1.577	36.72	PK2	28	-23.2	0	41.52	-	-	74	-32.48	6	202	V
* 1.576	24.24	MAV1	28	-23.2	0	29.04	54	-24.96	-	-	6	202	V
* 11.391	33.11	PK2	38.2	-19.2	0	52.11	-	-	74	-21.89	282	241	H
* 11.389	20.46	MAV1	38.2	-19.2	0	39.46	54	-14.54	-	-	282	241	H
* 4.824	38.96	PK2	34.2	-27.3	0	45.86	-	-	74	-28.14	49	101	V
* 4.824	32.4	MAV1	34.2	-27.3	0	39.3	54	-14.7	-	-	49	101	V
1.928	24.38	MAV1	31.2	-23.1	0	32.48	-	-	-	-	9	278	H
1.93	36.43	PK2	31.2	-23.1	0	44.53	-	-	-	-	9	278	H

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

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, CH 6)**



Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (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
* 2.28	40.82	PK2	31.5	-23.3	0	49.02	-	-	74	-24.98	114	190	H
* 2.279	31.79	MAv1	31.5	-23.3	0	39.99	54	-14.01	-	-	114	190	H
* 4.874	38.84	PK2	34.1	-27.2	0	45.74	-	-	74	-28.26	58	109	V
* 4.874	32.25	MAv1	34.1	-27.2	0	39.15	54	-14.85	-	-	58	109	V
1.716	37.06	PK2	29.2	-23.3	0	42.96	-	-	-	-	1	153	V
1.717	24.42	MAv1	29.2	-23.3	0	30.32	-	-	-	-	1	153	V
1.728	24.42	MAv1	29.4	-23.3	0	30.52	-	-	-	-	254	241	V
1.729	36.16	PK2	29.4	-23.3	0	42.26	-	-	-	-	254	241	V
1.736	36.5	PK2	29.5	-23.3	0	42.7	-	-	-	-	6	377	V
1.736	24.46	MAv1	29.5	-23.3	0	30.66	-	-	-	-	6	377	V
1.911	36.36	PK2	31.1	-23.2	0	44.26	-	-	-	-	226	375	H
1.912	24.35	MAv1	31.1	-23.2	0	32.25	-	-	-	-	226	375	H

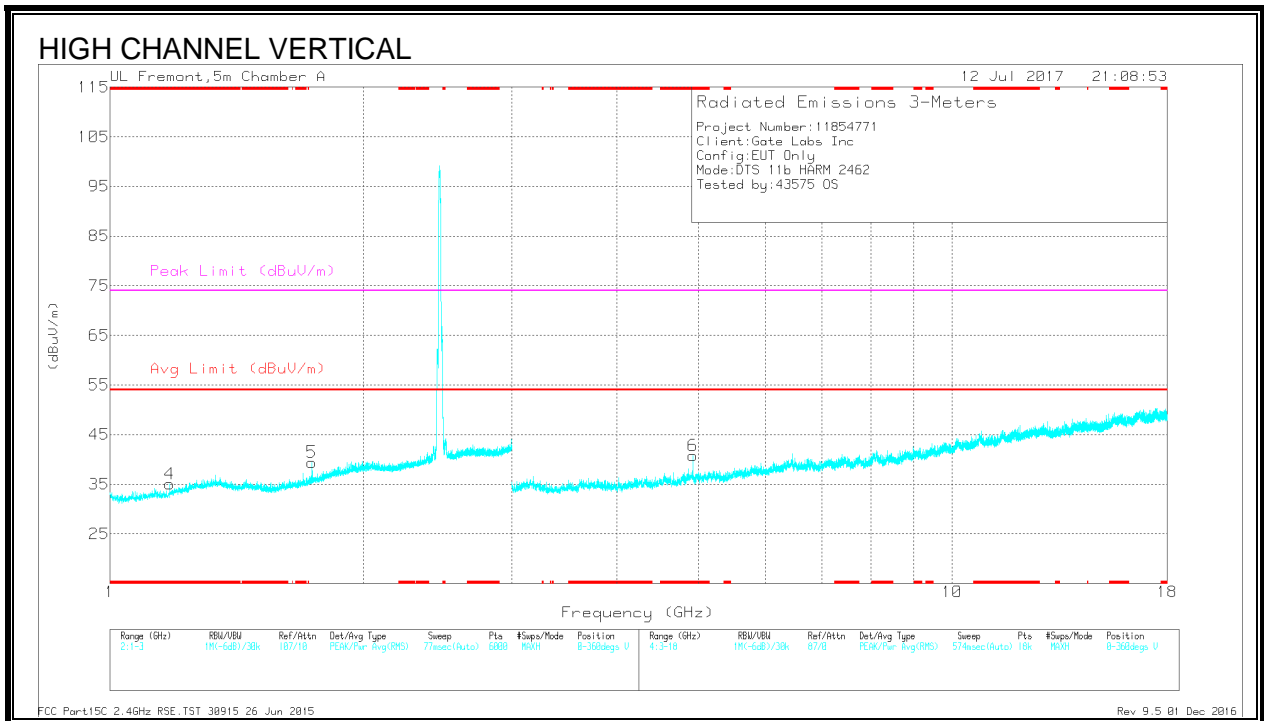
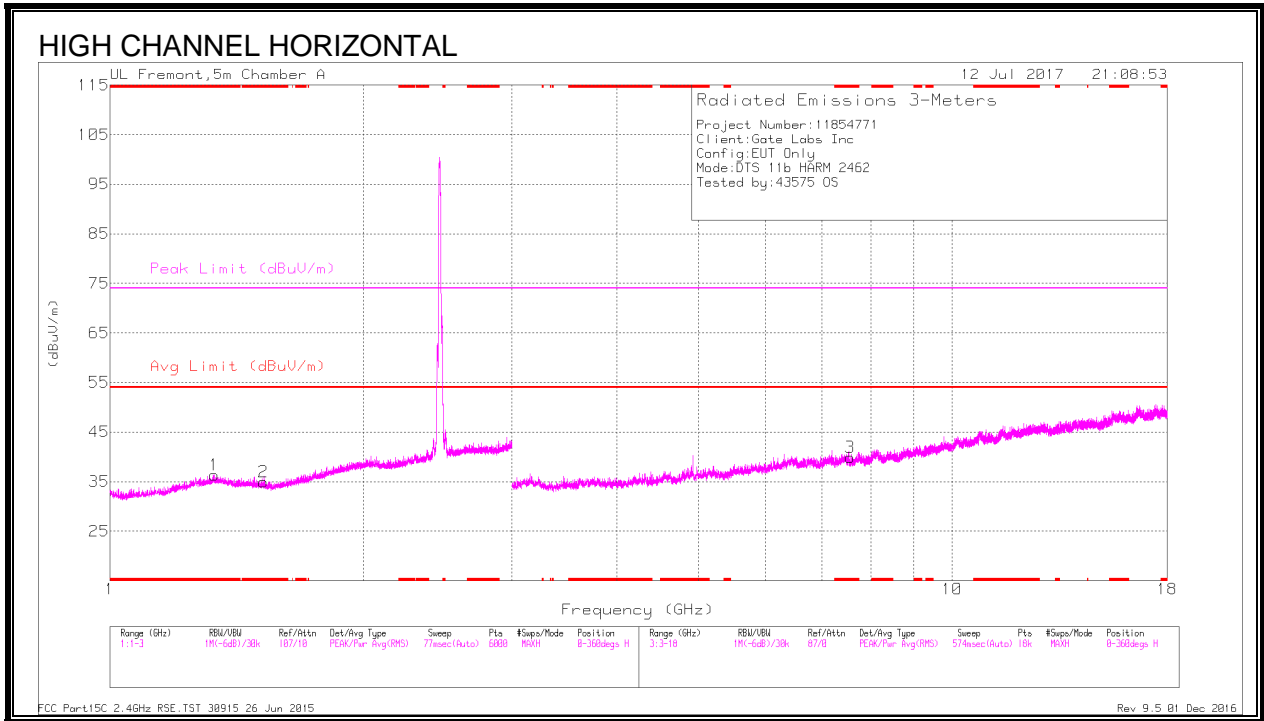
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, CH 11)**



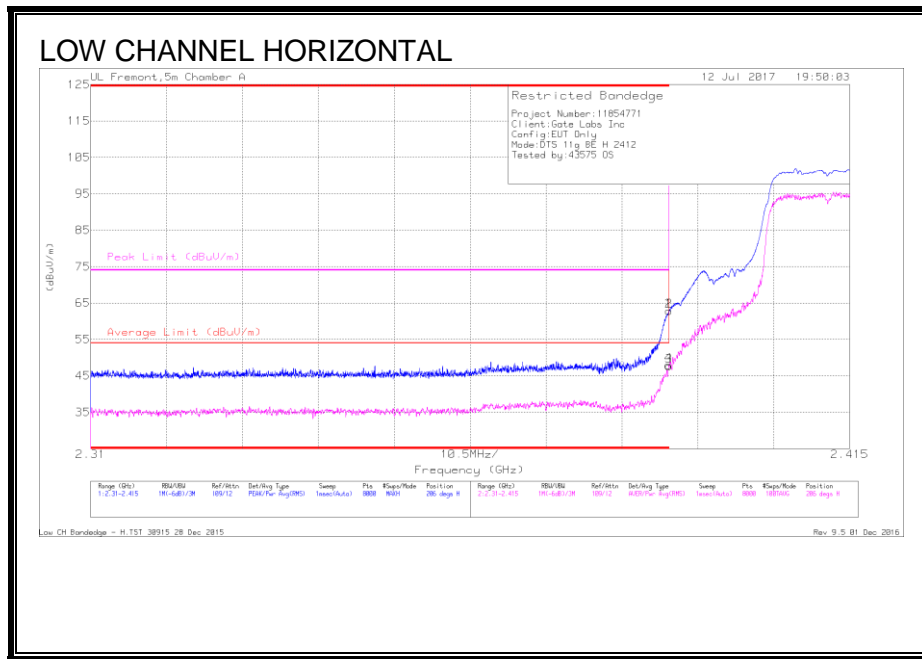
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cb/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
* 1.331	36.25	PK2	29.5	-23.5	0	42.25	-	-	74	-31.75	256	174	H
* 1.327	24.26	MAv1	29.5	-23.5	0	30.26	54	-23.74	-	-	256	174	H
* 1.521	35.88	PK2	28.1	-23.2	0	40.78	-	-	74	-33.22	313	249	H
* 1.52	24.28	MAv1	28.1	-23.3	0	29.08	54	-24.92	-	-	313	249	H
* 1.176	35.87	PK2	27.9	-23.7	0	40.07	-	-	74	-33.93	110	212	V
* 1.178	23.95	MAv1	27.9	-23.7	0	28.15	54	-25.85	-	-	110	212	V
* 7.564	33.5	PK2	35.7	-23.5	0	45.7	-	-	74	-28.3	277	400	H
* 7.566	21.87	MAv1	35.7	-23.4	0	34.17	54	-19.83	-	-	277	400	H
* 4.924	38.51	PK2	34.1	-27.1	0	45.51	-	-	74	-28.49	222	110	V
* 4.924	30.11	MAv1	34.1	-27.1	0	37.11	54	-16.89	-	-	222	110	V
1.737	24.57	MAv1	29.6	-23.3	0	30.87	-	-	-	-	46	252	V
1.738	36.49	PK2	29.6	-23.3	0	42.79	-	-	-	-	46	252	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak  
 MAv1 - KDB558074 Option 1 Maximum RMS Average

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

#### RESTRICTED BANDEDGE (LOW CHANNEL)



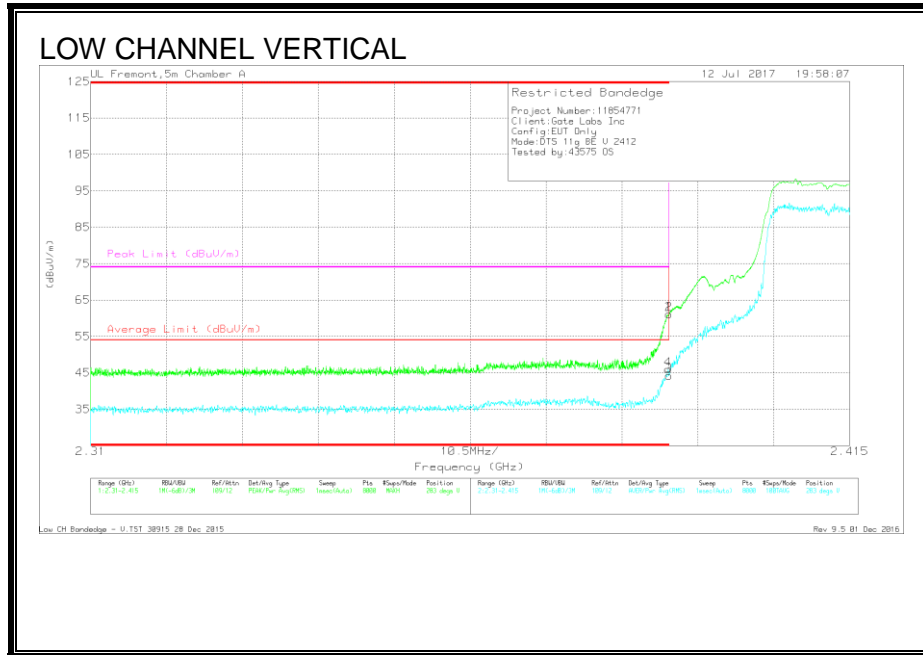
#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cof/Filtz/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuW/m)	Average Limit (dBuW/m)	Margin (dB)	Peak Limit (dBuW/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.19	Pk	31.8	-23.2	0	62.79	-	-	74	-11.21	206	286	H
2	* 2.39	54.28	Pk	31.8	-23.2	0	62.88	-	-	74	-11.12	206	286	H
3	* 2.39	39.11	RMS	31.8	-23.2	0	47.71	54	-6.29	-	-	206	286	H
4	* 2.39	39.3	RMS	31.8	-23.2	0	47.9	54	-6.1	-	-	206	286	H

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

Pk - Peak detector

RMS - RMS detection

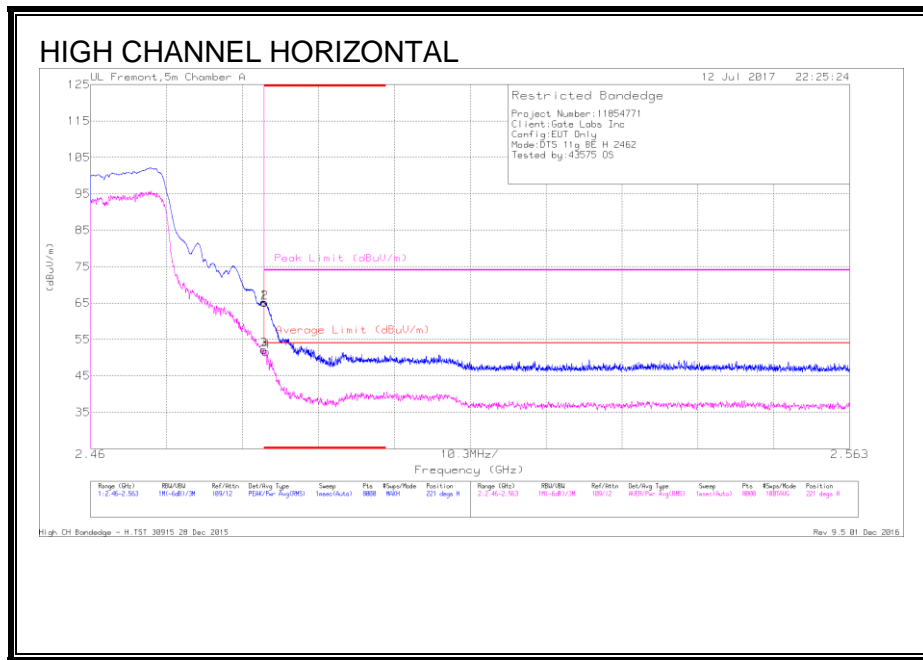


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dBm)	Amp/Cb/Filtz/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	52.45	Pk	31.8	-23.2	0	61.05	-	-	74	-12.95	283	374	V
2	* 2.39	52.5	PK	31.8	-23.2	0	61.1	-	-	74	-12.9	283	374	V
3	* 2.39	35.65	RMS	31.8	-23.2	0	44.25	54	-9.75	-	-	283	374	V
4	* 2.39	37.4	RMS	31.8	-23.2	0	46	54	-8	-	-	283	374	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 T652 (dBm)	Amp/Cb/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	56.03	Pk	-32.3	-23.1	0	65.23	-	-	74	-8.77	221	129	H
2	* 2.484	55.92	Pk	-32.3	-23.1	0	65.12	-	-	74	-8.88	221	129	H
3	* 2.484	42.9	RMS	-32.3	-23.1	0	52.1	54	-1.9	-	-	221	129	H
4	* 2.484	42.5	RMS	-32.3	-23.1	0	51.7	54	-2.3	-	-	221	129	H

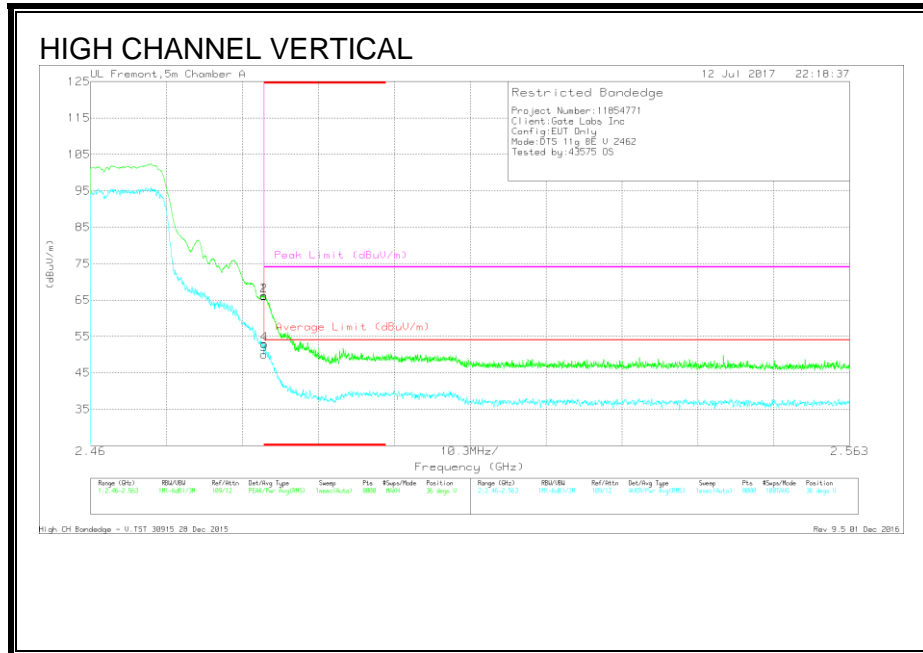
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

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Trace Markers

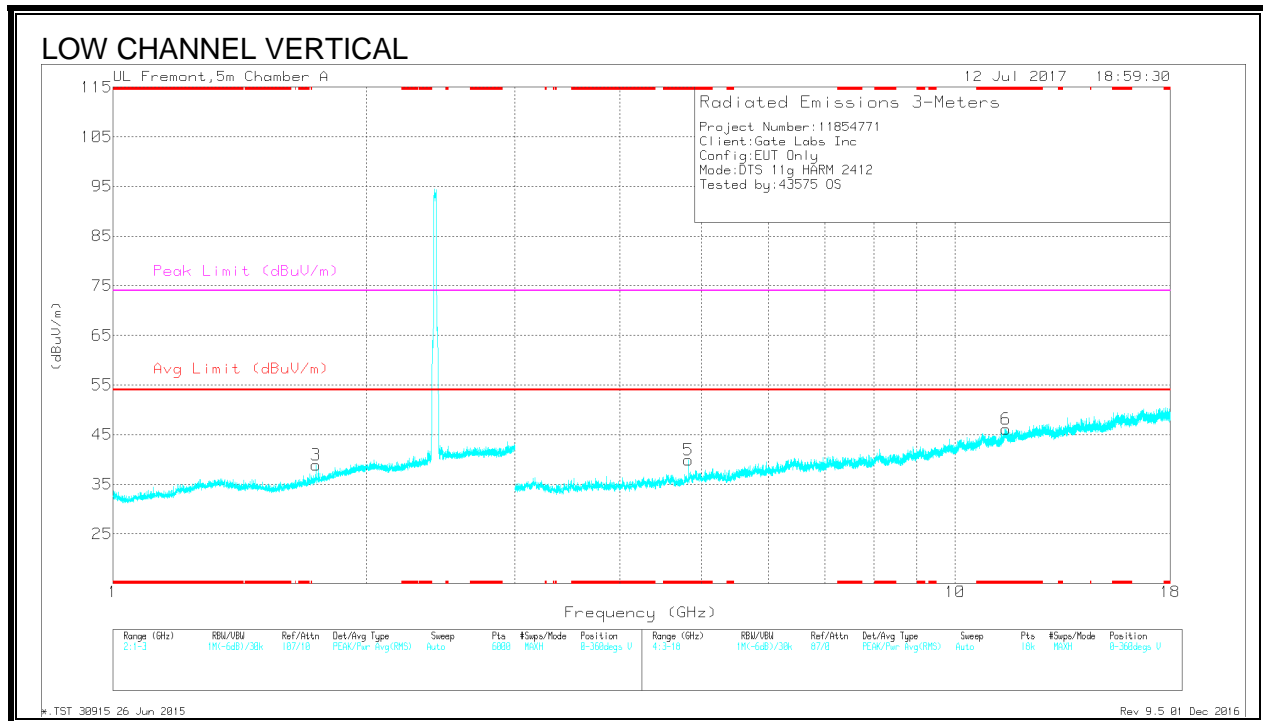
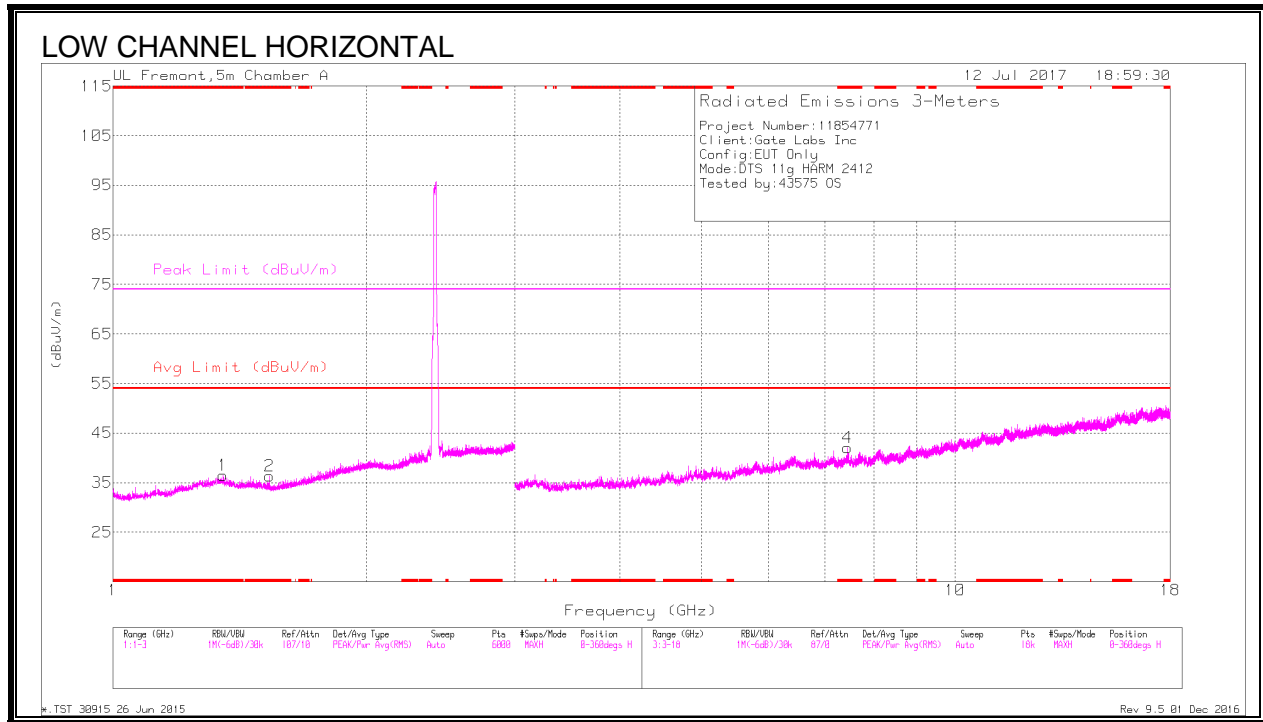
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.86	Pk	32.3	-23.1	0	66.06	-	-	74	-7.94	36	121	V
2	* 2.484	56.96	Pk	32.3	-23.1	0	66.16	-	-	74	-7.84	36	121	V
3	* 2.484	40.88	RMS	32.3	-23.1	0	50.08	54	-3.92	-	-	36	121	V
4	* 2.484	43.65	RMS	32.3	-23.1	0	52.85	54	-1.15	-	-	36	121	V

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

Pk - Peak detector

RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, CH 1)**



Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (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
* 1.352	35.75	PK2	29.5	-23.3	0	41.95	-	-	74	-32.05	132	347	H
* 1.353	23.92	MAv1	29.4	-23.4	0	29.92	54	-24.08	-	-	132	347	H
* 1.533	36.89	PK2	28	-23.2	0	41.69	-	-	74	-32.31	122	219	H
* 1.536	24.27	MAv1	28	-23.2	0	29.07	54	-24.93	-	-	122	219	H
* 7.449	33.08	PK2	35.6	-22.1	0	46.58	-	-	74	-27.42	242	218	H
* 7.448	21.43	MAv1	35.6	-22.1	0	34.93	54	-19.07	-	-	242	218	H
* 4.824	38.96	PK2	34.2	-27.3	0	45.86	-	-	74	-28.14	140	109	V
* 4.824	31.29	MAv1	34.2	-27.3	0	38.19	54	-15.81	-	-	140	109	V
* 11.484	32.15	PK2	38.3	-18.4	0	52.05	-	-	74	-21.95	30	338	V
* 11.483	20.44	MAv1	38.3	-18.3	0	40.44	54	-13.56	-	-	30	338	V
1.741	36.59	PK2	29.6	-23.3	0	42.89	-	-	-	-	264	190	V
1.743	24.43	MAv1	29.7	-23.3	0	30.83	-	-	-	-	264	190	V

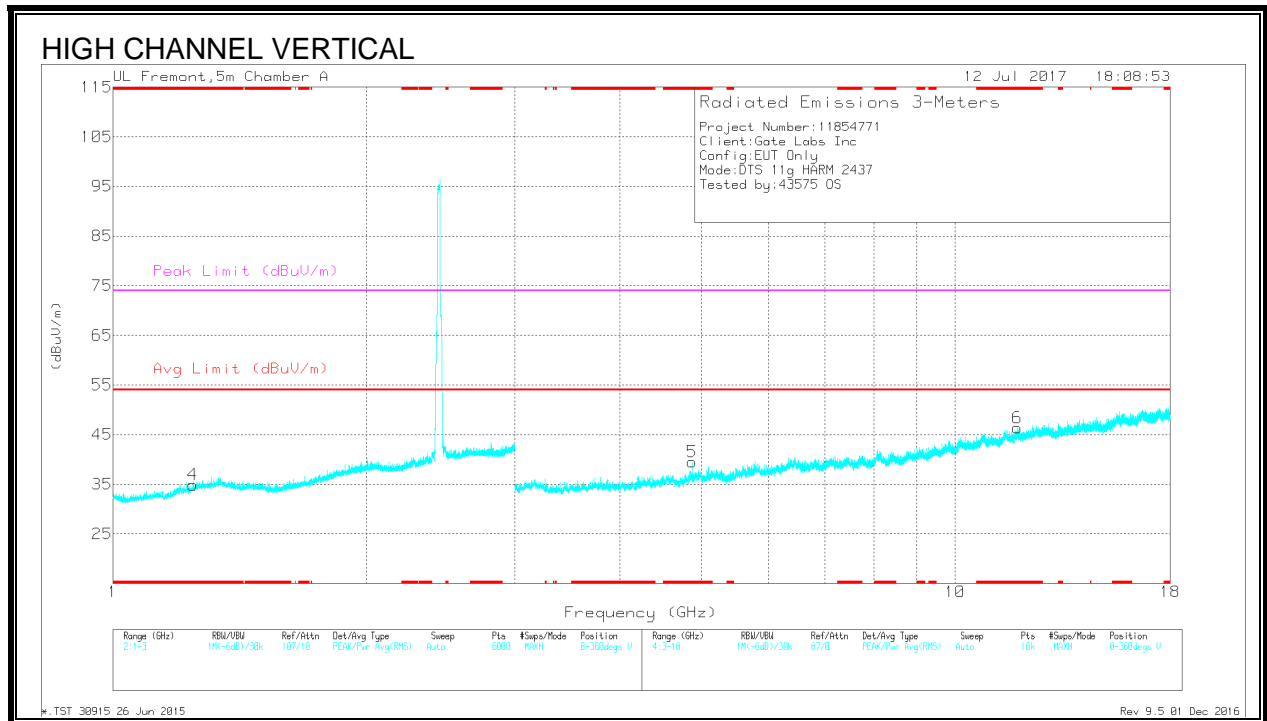
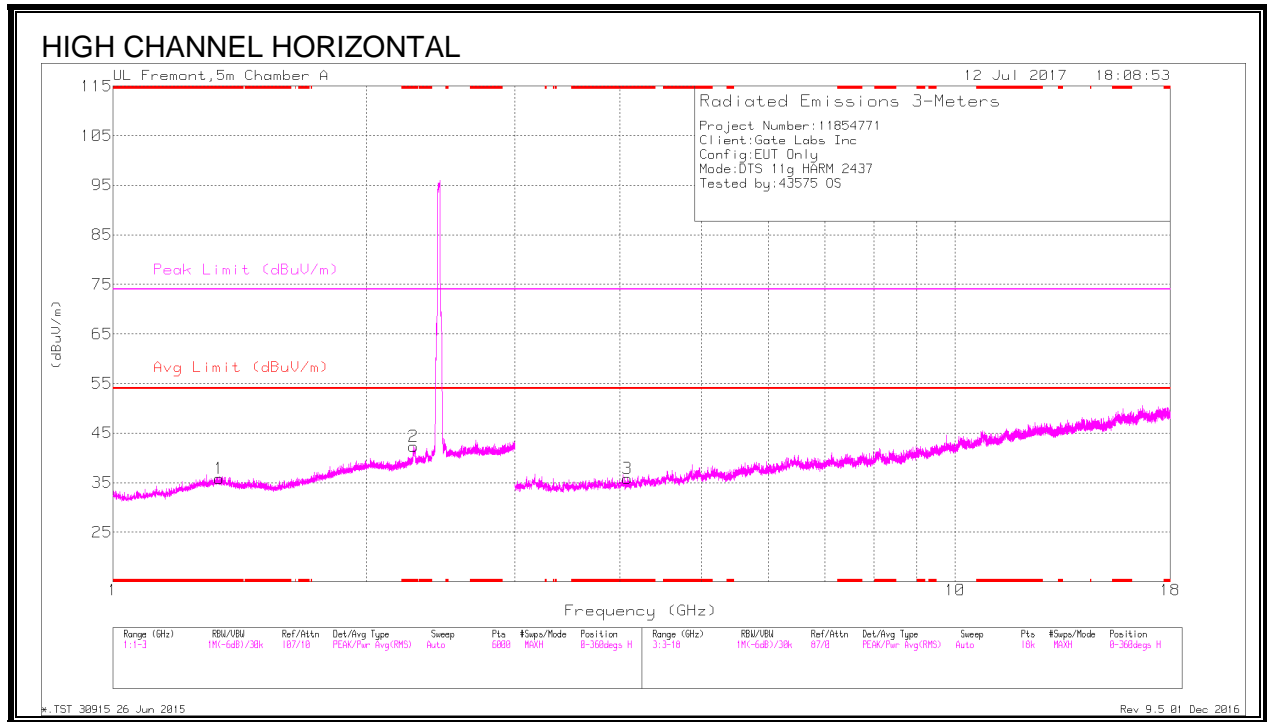
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, CH 6)**



Radiated Emissions

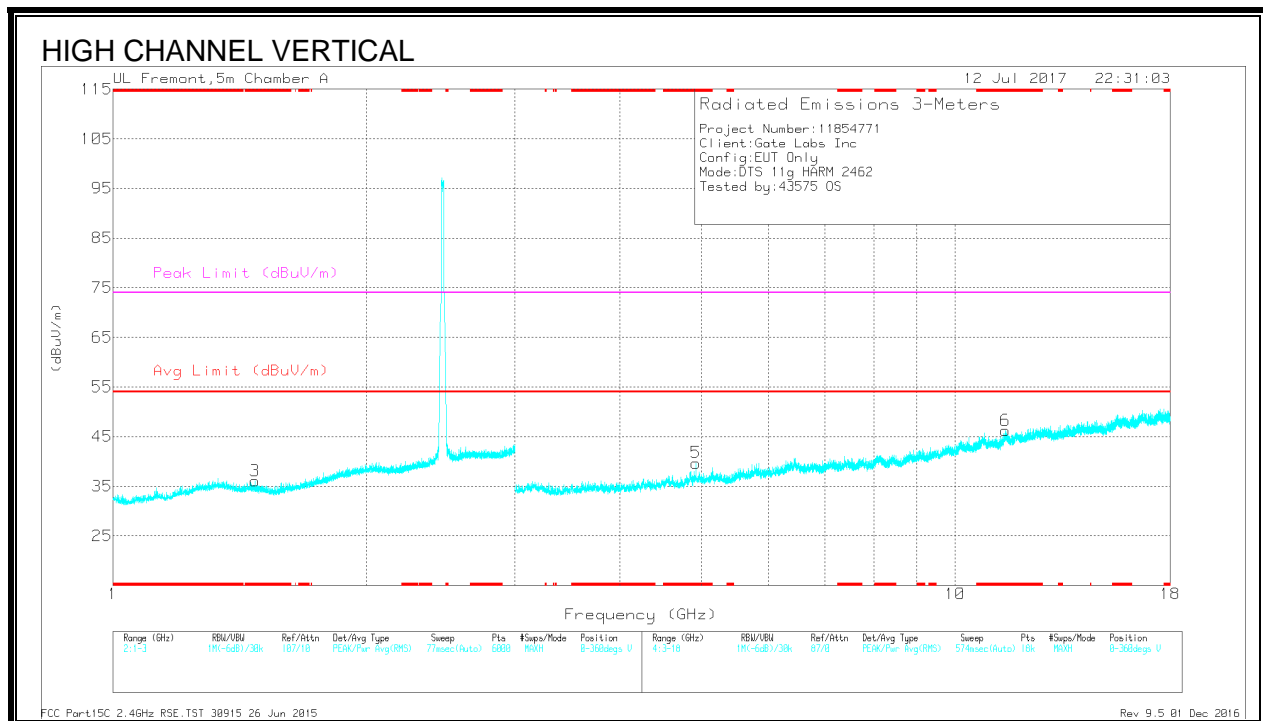
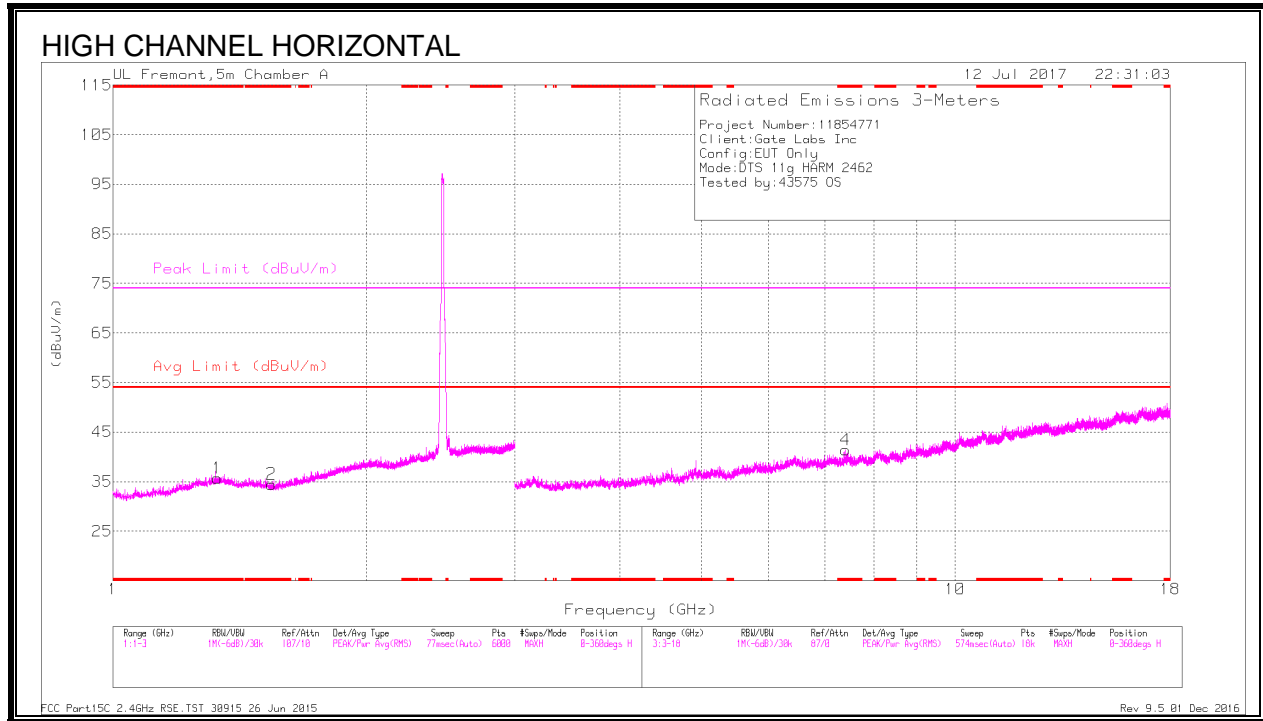
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.335	36.21	PK2	29.5	-23.5	0	42.21	-	-	74	-31.79	340	168	H
* 1.336	24.15	MAv1	29.5	-23.5	0	30.15	54	-23.85	-	-	340	168	H
* 2.277	41.86	PK2	31.5	-23.3	0	50.06	-	-	74	-23.94	293	213	H
* 2.276	29.66	MAv1	31.5	-23.3	0	37.86	54	-16.14	-	-	293	213	H
* 1.243	35.82	PK2	29	-23.7	0	41.12	-	-	74	-32.88	111	344	V
* 1.243	24.03	MAv1	29	-23.7	0	29.33	54	-24.67	-	-	111	344	V
* 4.076	37.9	PK2	33.4	-29.3	0	42	-	-	74	-32	4	353	H
* 4.079	25.95	MAv1	33.4	-29.2	0	30.15	54	-23.85	-	-	4	353	H
* 4.874	38.57	PK2	34.1	-27.2	0	45.47	-	-	74	-28.53	224	105	V
* 4.874	31.16	MAv1	34.1	-27.2	0	38.06	54	-15.94	-	-	224	105	V
* 11.848	31.85	PK2	38.8	-18.8	0	51.85	-	-	74	-22.15	0	342	V
* 11.846	20.29	MAv1	38.8	-18.7	0	40.39	54	-13.61	-	-	0	342	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, CH 11)**



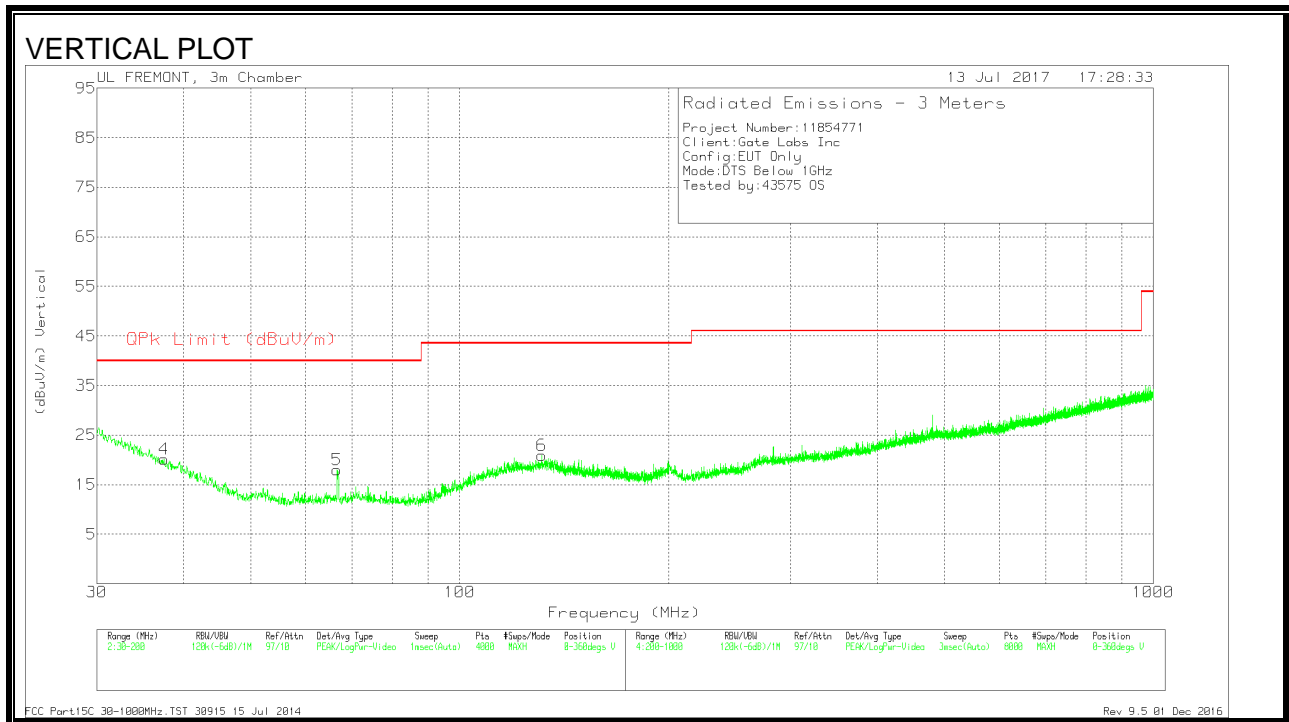
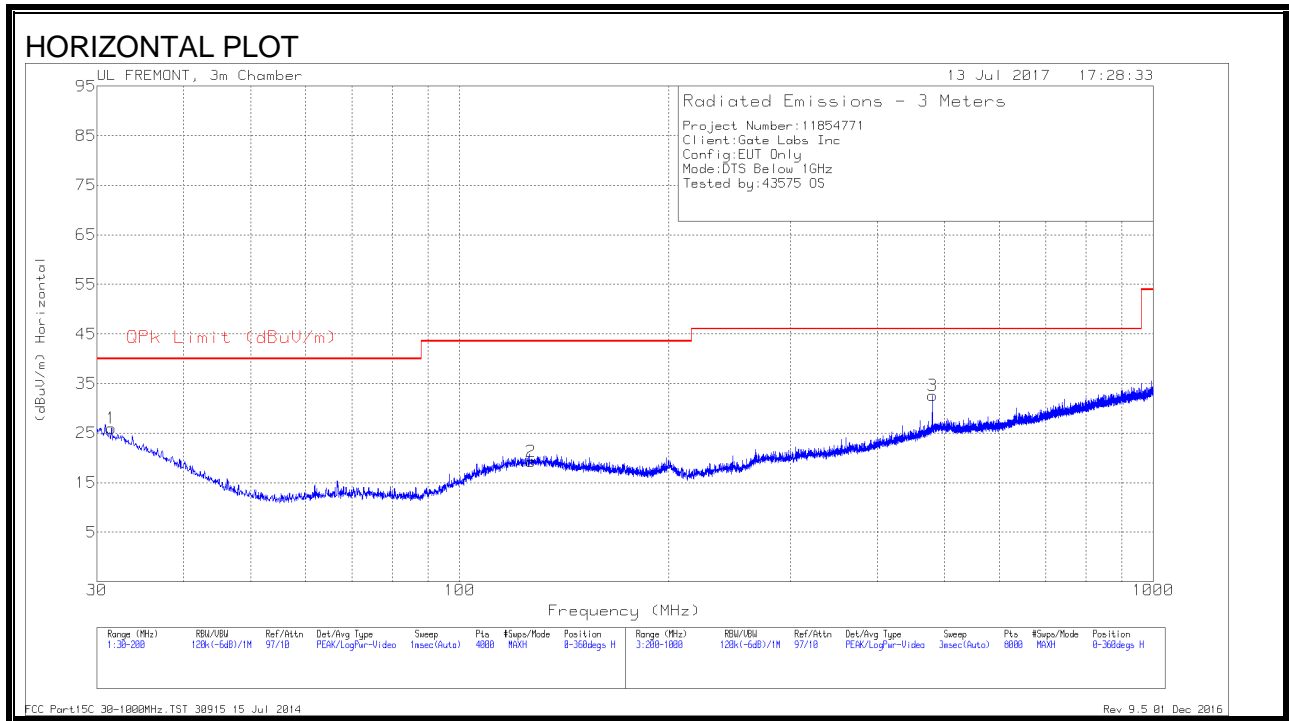
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (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
* 1.328	35.8	PK2	29.5	-23.5	0	41.8	-	-	74	-32.2	83	192	H
* 1.327	24.18	MAv1	29.5	-23.5	0	30.18	54	-23.82	-	-	83	192	H
* 1.543	36.41	PK2	27.9	-23.2	0	41.11	-	-	74	-32.89	354	350	H
* 1.545	24.16	MAv1	27.8	-23.2	0	28.76	54	-25.24	-	-	354	350	H
* 1.472	36.11	PK2	28.6	-23.2	0	41.51	-	-	74	-32.49	327	220	V
* 1.474	24.16	MAv1	28.6	-23.2	0	29.56	54	-24.44	-	-	327	220	V
* 7.408	33.35	PK2	35.6	-22.6	0	46.35	-	-	74	-27.65	184	125	H
* 7.408	21.73	MAv1	35.6	-22.6	0	34.73	54	-19.27	-	-	184	125	H
* 4.924	39.03	PK2	34.1	-27.1	0	46.03	-	-	74	-27.97	229	111	V
* 4.924	30.74	MAv1	34.1	-27.1	0	37.74	54	-16.26	-	-	229	111	V
* 11.475	32.31	PK2	38.3	-18.4	0	52.21	-	-	74	-21.79	357	380	V
* 11.474	20.57	MAv1	38.3	-18.4	0	40.47	54	-13.53	-	-	357	380	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-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)



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.4879	28.98	Pk	24.2	-27.2	25.98	40	-14.02	0-360	300	H
4	37.4819	27.54	Pk	19.8	-27.2	20.14	40	-19.86	0-360	100	V
5	66.602	32.7	Pk	12	-26.7	18	40	-22	0-360	100	V
2	126.7125	27.4	Pk	17.8	-25.9	19.3	43.52	-24.22	0-360	100	H
6	131.2612	29.09	Pk	17.7	-25.9	20.89	43.52	-22.63	0-360	100	V
3	480.3364	35.65	Pk	21.6	-24.7	32.55	46.02	-13.47	0-360	200	H

Pk - Peak detector

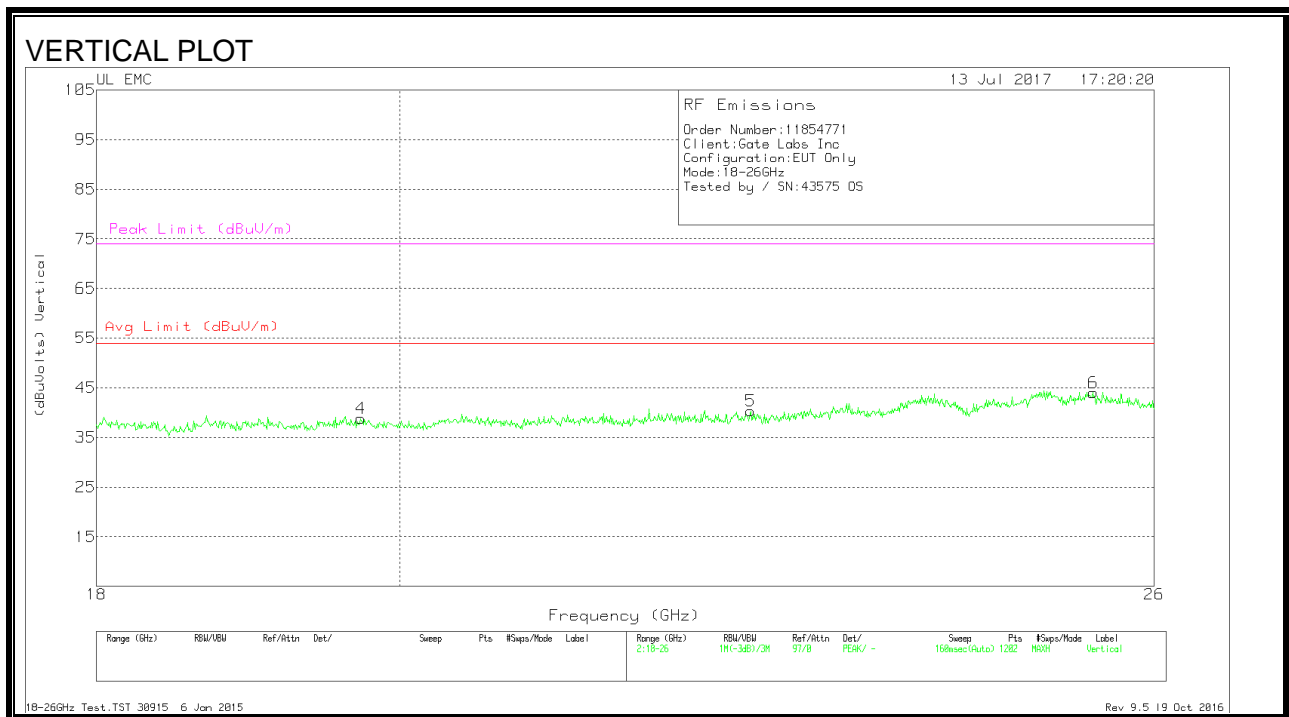
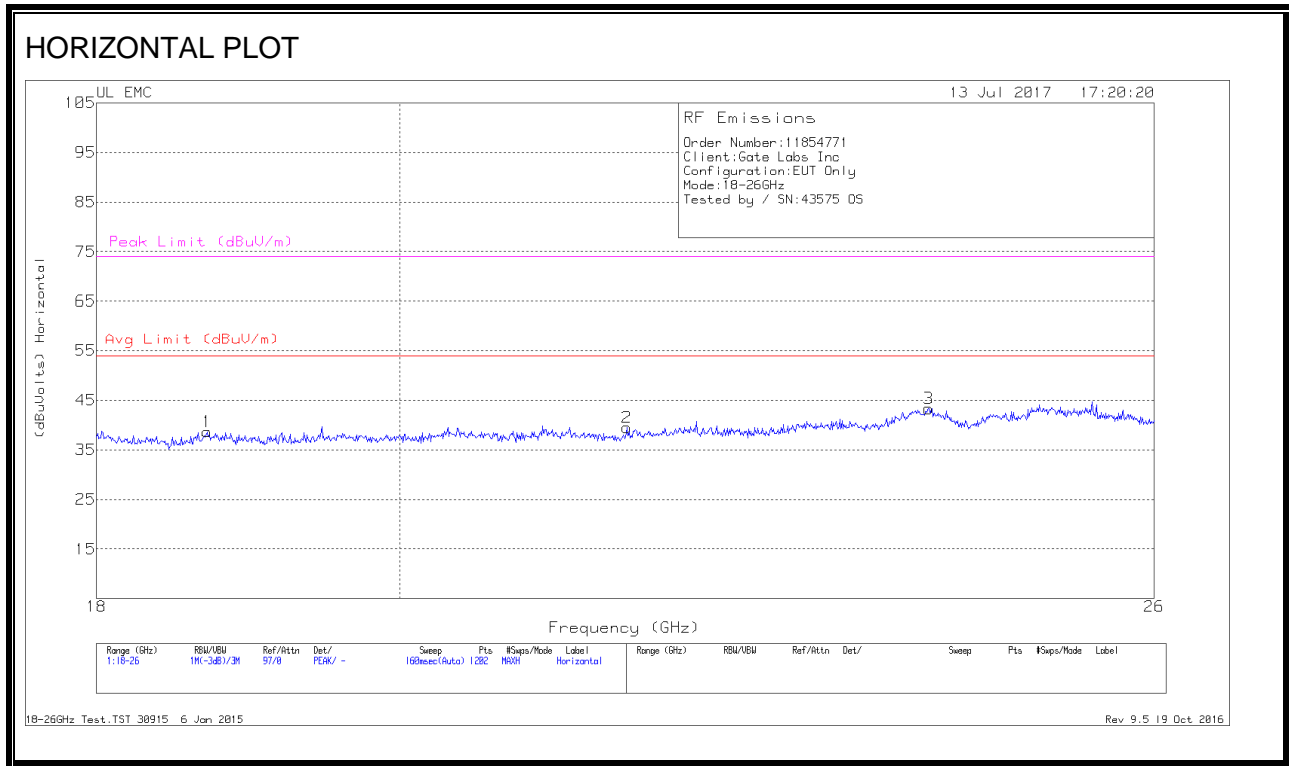
Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
480.4535	25.93	Qp	21.6	-24.7	22.83	46.02	-23.19	17	192	H

Qp - Quasi-Peak detector

### 9.4. WORST-CASE 18 to 26 GHz

#### SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T449 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	18.706	40.27	Pk	32.3	-24.4	-9.5	38.67	54	-15.33	74	-35.33
2	21.644	41	Pk	33.2	-25.2	-9.5	39.5	54	-14.5	74	-34.5
3	24.038	43.33	Pk	33.9	-24.4	-9.5	43.33	54	-10.67	74	-30.67
4	19.732	40.53	Pk	32.7	-24.9	-9.5	38.83	54	-15.17	74	-35.17
5	22.596	41.93	Pk	33.4	-25.5	-9.5	40.33	54	-13.67	74	-33.67
6	25.454	43.6	Pk	34.4	-24.5	-9.5	44	54	-10	74	-30

Pk - Peak detector