



# **CERTIFICATION TEST REPORT**

**Report Number. :** 11633253-E2V2

**Applicant :** FITBIT INC.  
405 HOWARD STREET, SUITE 550  
SAN FRANCISCO,  
CA 94105, U.S.A

**Model :** FB503

**FCC ID :** XRAFB503

**IC :** 8542A-FB503

**EUT Description :** Smart Watch

**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:**  
May 16, 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	03/27/17	Initial Issue	C. Vergonio
V2	05/16/17	Updated Limit table in Section 11.1.	C. Vergonio

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** FITBIT INC.  
405 HOWARD STREET, SUITE 550  
SAN FRANCISCO, CA 94105, U.S.A

**EUT DESCRIPTION:** Smart Watch

**MODEL:** FB503

**SERIAL NUMBER:** 0x00001BA532AE3029 (Radiated Sample)  
0x00001B8B472E4029 (Conducted Sample)

**DATE TESTED:** February 10 to 24, 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 any government.

Approved & Released For  
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UL VERIFICATION SERVICES INC.

Prepared By:



Jason Qian  
WiSE LAB 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 v03r05, 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 (IC:2324B-1)	<input type="checkbox"/>	Chamber D (IC:2324B-4)
<input checked="" type="checkbox"/>	Chamber B (IC:2324B-2)	<input type="checkbox"/>	Chamber E (IC:2324B-5)
<input type="checkbox"/>	Chamber C (IC:2324B-3)	<input type="checkbox"/>	Chamber F (IC:2324B-6)
		<input type="checkbox"/>	Chamber G (IC:2324B-7)
		<input type="checkbox"/>	Chamber H (IC:2324B-8)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

Parameter	Uncertainty
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 Smart Watch.

### 5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	7.21	5.26

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT utilizes a monopole antenna with maximum gain of -3.01dBi across operation frequency 2.4GHz band.

### 5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Tera Term Ver 4.79.  
The firmware installed in the EUT during testing was Version 27.20.11.4.

### 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated bandedge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed. The EUT was set to transmit at the Low/Middle/High channels with designed (target) output powers.

Radiated emission below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT was set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X/Y/Z, it was determined that X orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in X orientation.

Worst-case data rate as provided by the client was: 1Mbps.



## 6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC Adapter	Lenovo	ADLX65NLC2A	11S36200283ZZ10051KU2U	NA
Laptop	Lenovo	T460	PC0C3DUA	NA
AC Adapter	ANKER	A2141	FY6422FF	NA
Test Fixture	Fitbit	Compton 4	N/A	DOC

### I/O CABLES (CONDUCTED TEST)

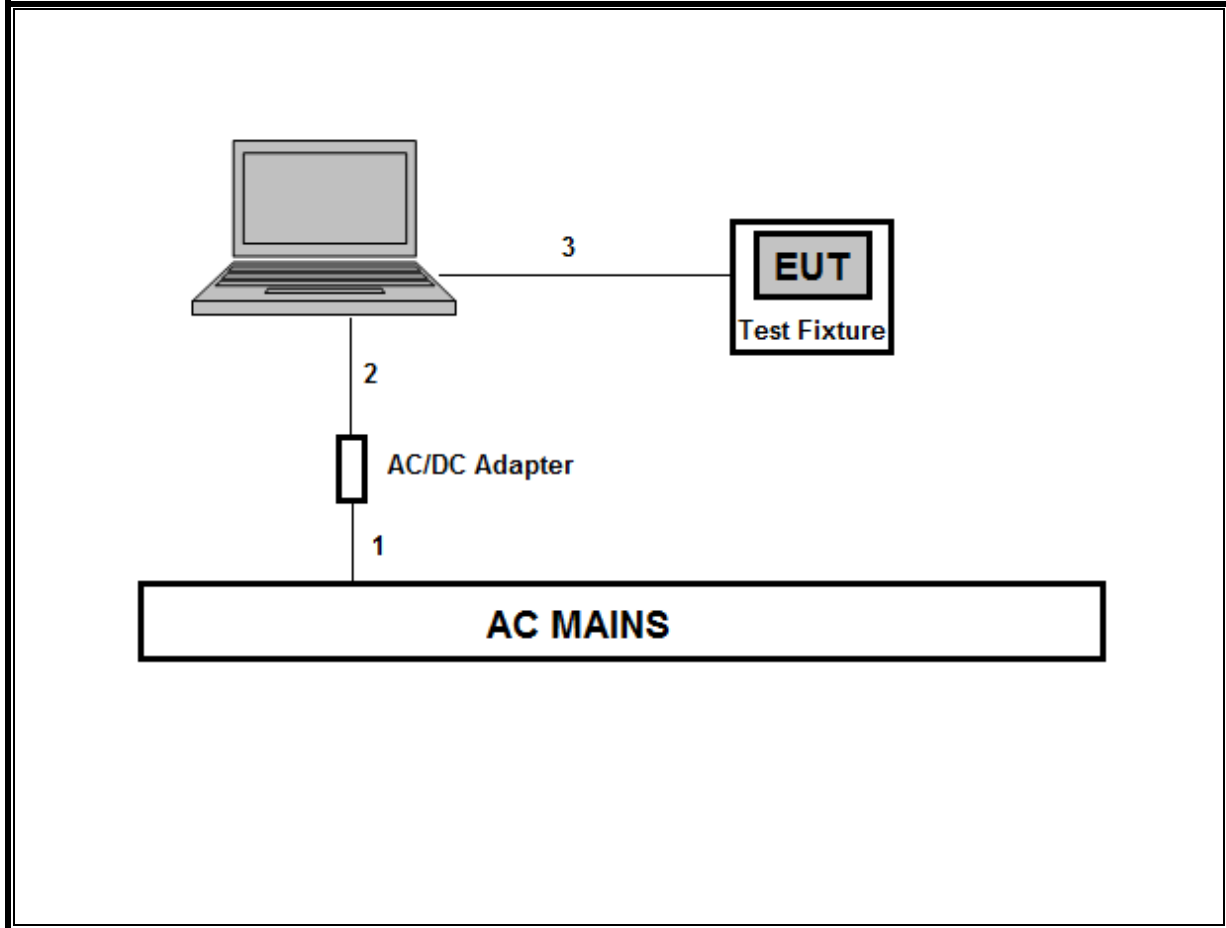
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	1	AC Mains to AC/DC Adapter
2	DC	1	DC	Unshielded	1.5	AC/DC Adapter to Laptop
3	USB	1	USB	Shielded	1	Laptop to EUT

### I/O CABLES (RADIATED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	Unshielded	1	EUT to AC Adapter

**SETUP DIAGRAM**

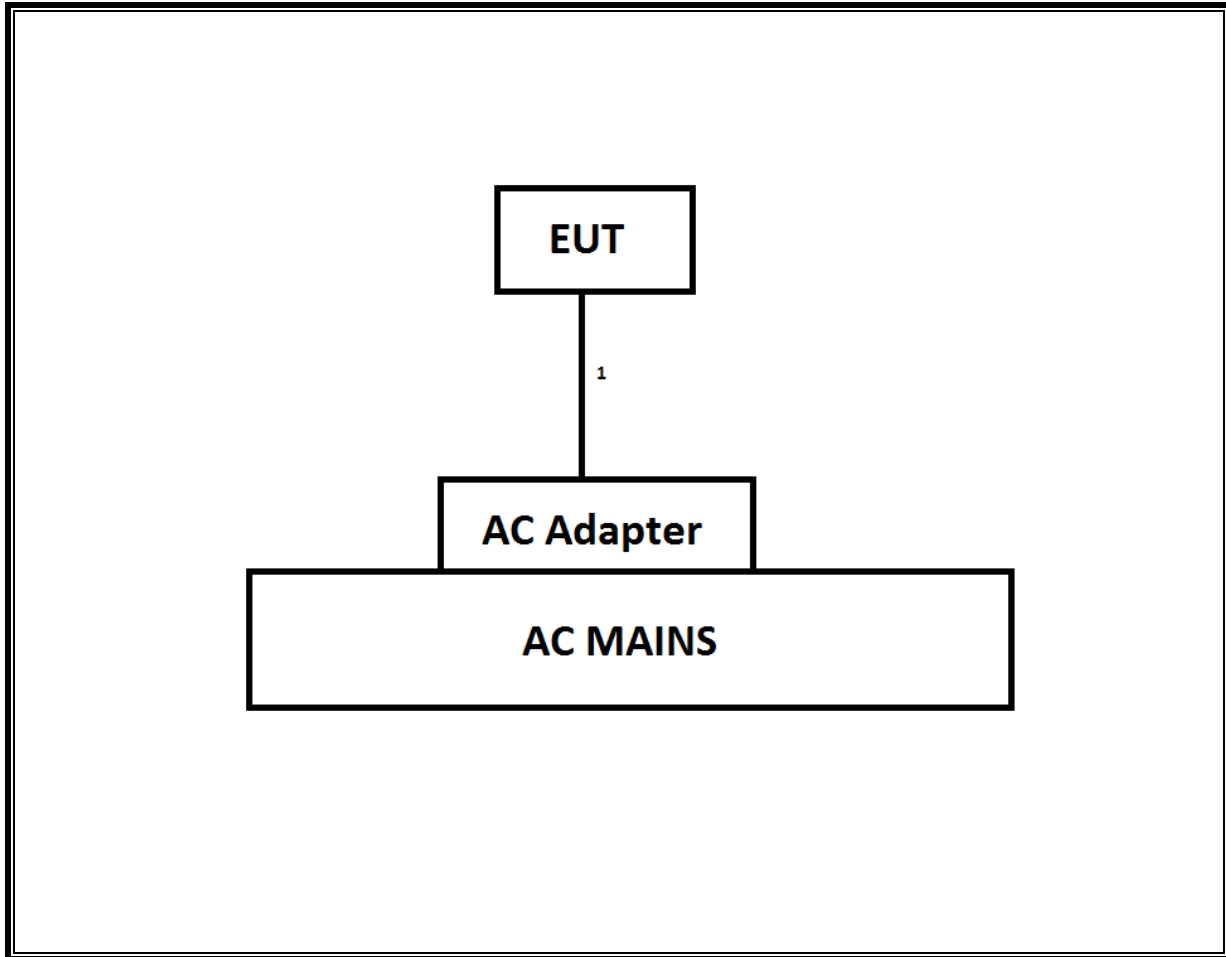
**CONDUCTED**



**TEST SETUP**

The EUT was connected to a test fixture which connected to a laptop via USB cable. Test software exercised the EUT.

**RADIATED**



**TEST SETUP**

The EUT was installed on a test fixture which connected to a laptop via USB cable to program the parameters such as modes, channels, output powers, & data rates.

After programed, the EUT was connected to an AC/DC adapter and tested without the test fixture and the laptop.

## 7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	Manufacturer	Model	T Number	Cal Date	Cal Due
PSA Series Spectrum Analyzer, 3Hz - 26.5GHz	Agilent	E4440A	199	07/22/16	07/22/17
PXA Spectrum Analyzer, 3Hz to 44GHz	Agilent	N9030A	908	04/13/16	04/13/17
Horn Antenna, 18 - 26.5 GHz	Seavey Division	MWH-1826/B	449	05/26/16	05/26/17
Horn Antenna, 1-18GHz	ETS Lindgren	3117	711	01/30/17	01/30/18
Antenna, Broadband Hybrid 30MHz to 2000MHz	Sunol Sciences	JB1	130	09/23/16	09/23/17
Loop Antenna	EMCO	6502	1616	12/12/16	12/12/17
Amplifier, 1-26.5GHz	Miteq	AFS42-00101800-25-S-42	1165	08/01/16	08/01/17
Amplifier, 1 to 8GHz	Miteq	AMF-4D-01000800-30-29P	1170	04/28/16	04/28/17
Amplifier, 10KHz to 1GHz, 32dB	Keysight	8447D	300	11/10/16	11/10/17
P-Series Power Meter	Keysight	N1911A	1264	07/08/16	07/08/17
Wideband Power Sensor 50MHz - 18GHz	Agilent	N1921A	1224	03/22/16	03/22/17
EMI Receiver	Rohde & Schwarz	ESR-EMI	1436	12/19/16	12/19/17
LISN	FISCHER	FCC-LISN-50/250-25-2-01	1310	06/08/16	06/08/17

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

NOTE: \*testing is completed before equipment calibration expiration date.

## 8. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r05, Section 8.1.

Output Power: KDB 558074 D01 v03r05, Section 9.1.1.

Power Spectral Density: KDB 558074 D01 v03r05, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r05, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r05, Section 12.1.

Band-edge: KDB 558074 D01 v03r05, Section 12.1.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

## 9. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass
15.205, 15.209, 15.247(d)	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass

## 10. ANTENNA PORT TEST RESULTS

### 10.1. ON TIME, DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

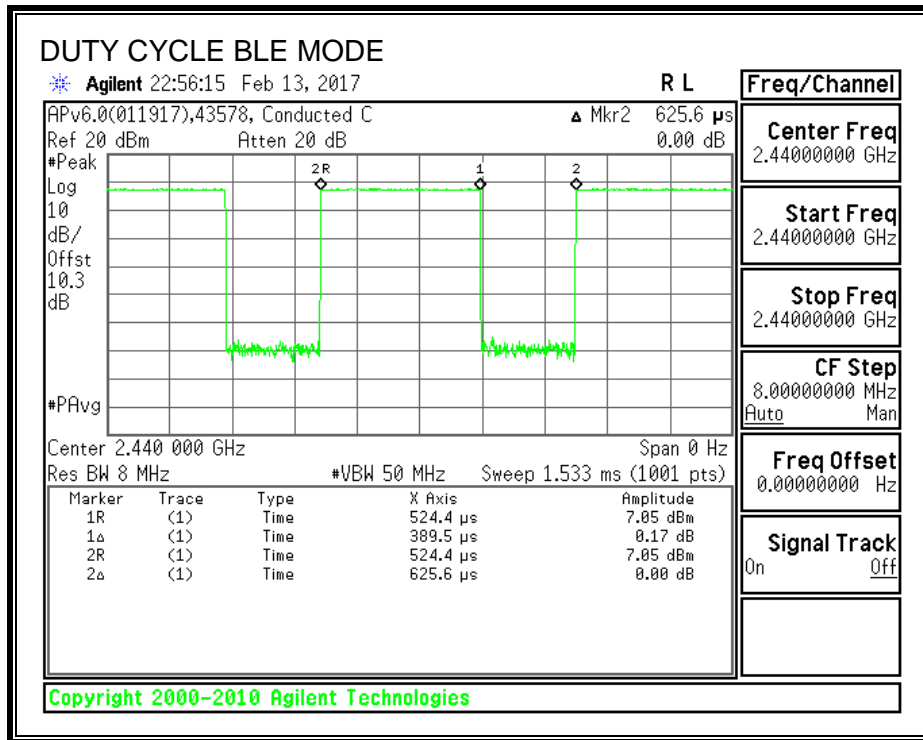
#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
0.390	0.626	0.623	62.26%	2.06	2.567

**DUTY CYCLE PLOTS**





## 10.2. 6 dB BANDWIDTH

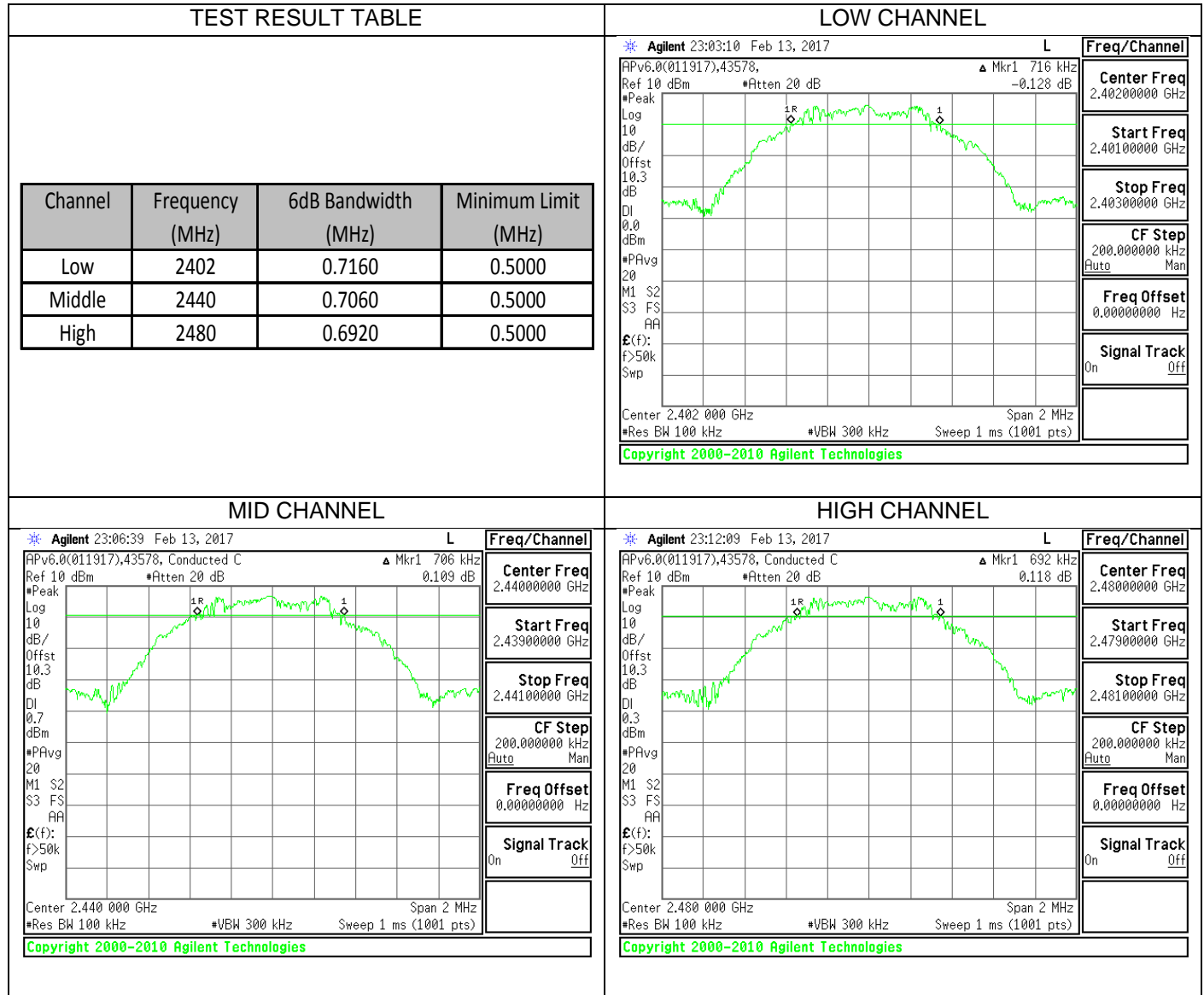
### 10.2.1. LIMITS

FCC §15.247 (a) (2)

IC RSS-247 (5.2) (a)

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

### 10.2.2. RESULTS



## 10.3. 99% BANDWIDTH

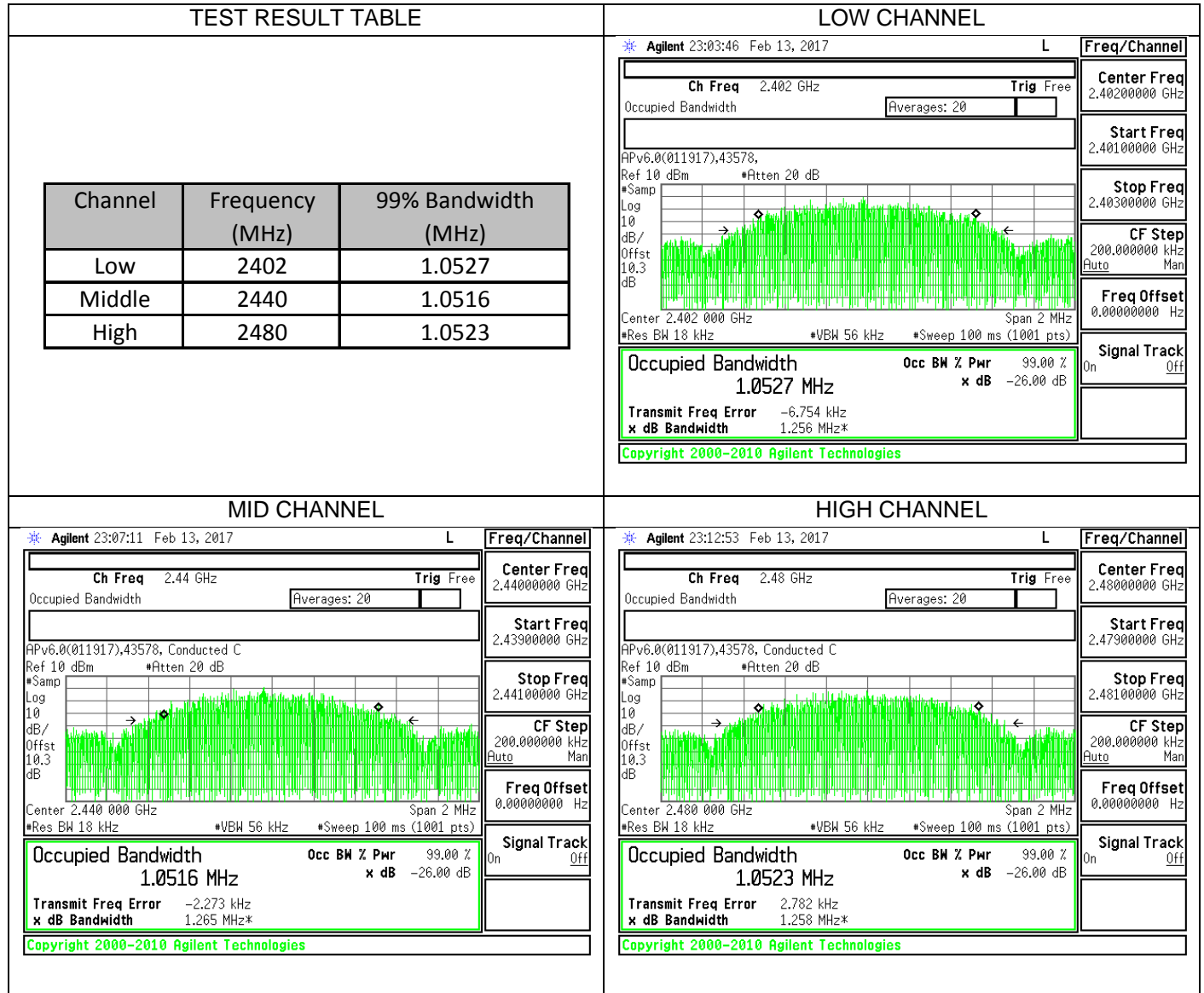
### 10.3.1. LIMITS

None; for reporting purposes only.

#### **Test Procedure**

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

### 10.3.2. RESULTS



## 10.4. AVERAGE POWER

### 10.4.1. LIMITS

None; for reporting purposes only.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### 10.4.2. RESULTS

<b>Test Engineer ID:</b>	50818	<b>Date:</b>	02/14/17
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Channel	Frequency (MHz)	AV Power (MHz)
Low	2402	6.31
Middle	2440	6.93
High	2480	6.63

## 10.5. OUTPUT POWER

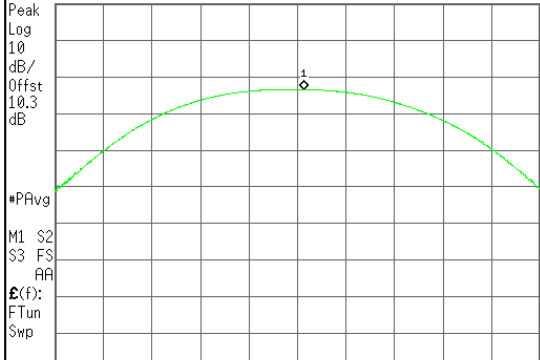
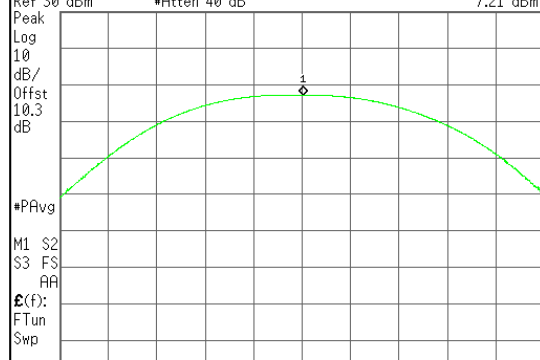
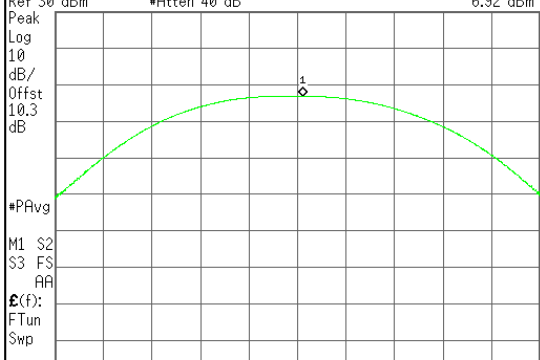
### 10.5.1. LIMITS

FCC §15.247 (b)

IC RSS-247 (5.4) (d)

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

### 10.5.2. RESULTS

TEST RESULT TABLE					LOW CHANNEL																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Channel</th> <th>Frequency (MHz)</th> <th>Output Power (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>2402</td> <td>6.57</td> <td>30.0</td> <td>-23.43</td> </tr> <tr> <td>Middle</td> <td>2440</td> <td>7.21</td> <td>30.0</td> <td>-22.79</td> </tr> <tr> <td>High</td> <td>2480</td> <td>6.92</td> <td>30.0</td> <td>-23.08</td> </tr> </tbody> </table>					Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)	Low	2402	6.57	30.0	-23.43	Middle	2440	7.21	30.0	-22.79	High	2480	6.92	30.0	-23.08	* Agilent 15:23:59 Feb 13, 2017 <span style="float: right;">L</span>		Measure Meas Off
					Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)																		
					Low	2402	6.57	30.0	-23.43																		
					Middle	2440	7.21	30.0	-22.79																		
					High	2480	6.92	30.0	-23.08																		
APV6.0(011917),50818, Conducted C <span style="float: right;">Mkr1 2.402 108 GHz</span> Ref 30 dBm *Atten 40 dB <span style="float: right;">6.57 dBm</span>		Channel Power																									
		Occupied BW ACP Multi Carrier Power Power Stat CCDF More 1 of 2																									
Center 2.402 000 GHz <span style="float: right;">Span 9 MHz</span> *Res BW 3 MHz *VBW 8 MHz Sweep 1 ms (1001 pts)		Copyright 2000-2010 Agilent Technologies																									
MID CHANNEL					HIGH CHANNEL																						
* Agilent 15:18:27 Feb 13, 2017 <span style="float: right;">L</span>					* Agilent 15:25:06 Feb 13, 2017 <span style="float: right;">L</span>																						
APV6.0(011917),50818, <span style="float: right;">Mkr1 2.440 027 GHz</span> Ref 30 dBm *Atten 40 dB <span style="float: right;">7.21 dBm</span>					APV6.0(011917),50818, Conducted C <span style="float: right;">Mkr1 2.480 090 GHz</span> Ref 30 dBm *Atten 40 dB <span style="float: right;">6.92 dBm</span>																						
																											
Center 2.440 000 GHz <span style="float: right;">Span 9 MHz</span> *Res BW 3 MHz *VBW 8 MHz Sweep 1 ms (1001 pts)					Center 2.480 000 GHz <span style="float: right;">Span 9 MHz</span> *Res BW 3 MHz *VBW 8 MHz Sweep 1 ms (1001 pts)																						
Copyright 2000-2010 Agilent Technologies					Copyright 2000-2010 Agilent Technologies																						

## 10.6. POWER SPECTRAL DENSITY

### 10.6.1. LIMITS

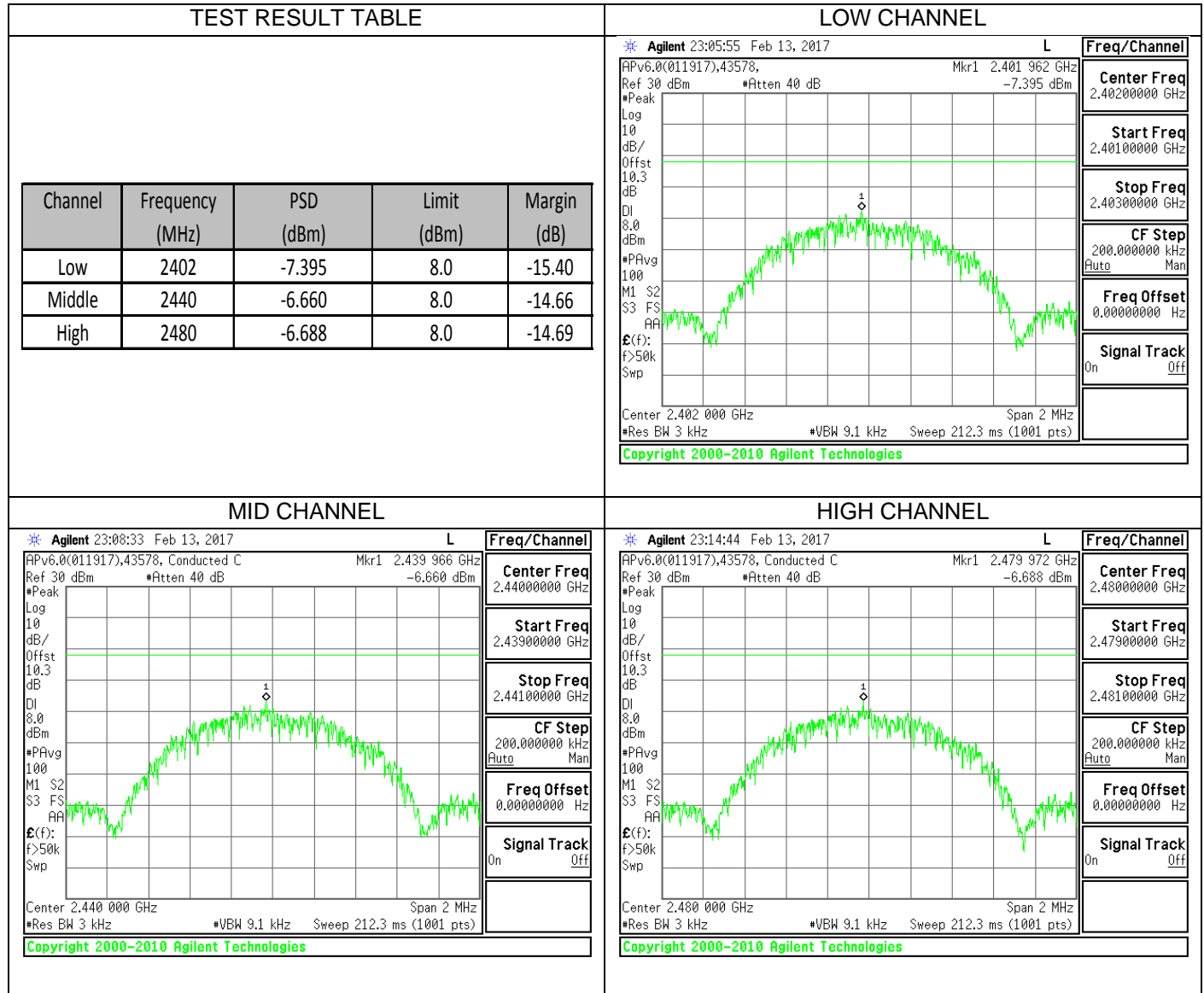
FCC §15.247 (e)

IC RSS-247 (5.2) (b)

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



### 10.6.2. RESULTS



## 10.7. CONDUCTED BANDEGE AND SPURIOUS EMISSIONS

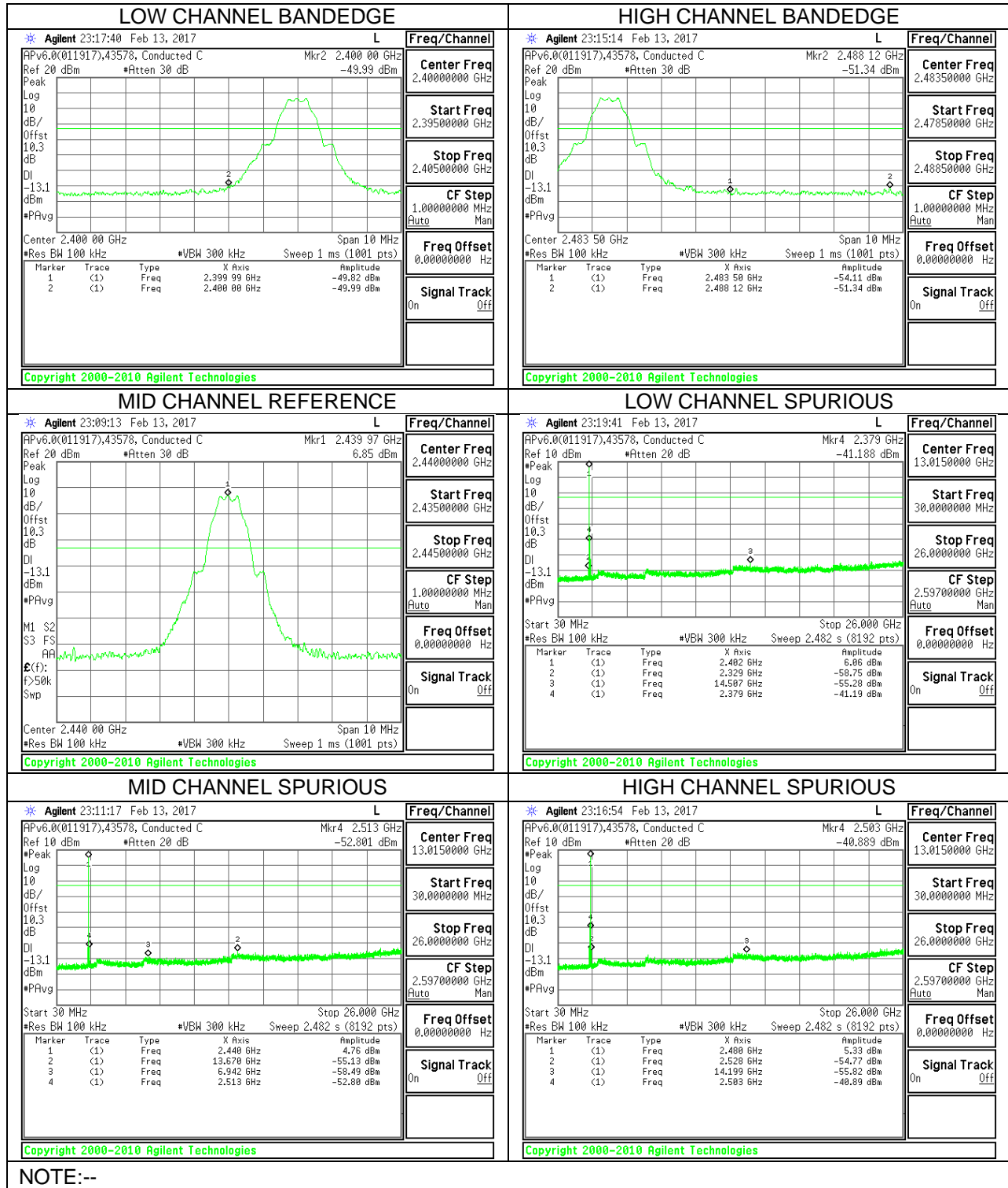
### 10.7.1. LIMITS

FCC §15.247 (d)

IC RSS-247 (5.5)

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

## 10.7.2. RESULTS



NOTE:--

## 11. RADIATED TEST RESULTS

### 11.1. 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
0.009 – 0.490	2400/F (kHz)	2400/F (kHz)
0.490 – 1.705	24000/F (kHz)	24000/F (kHz)
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.

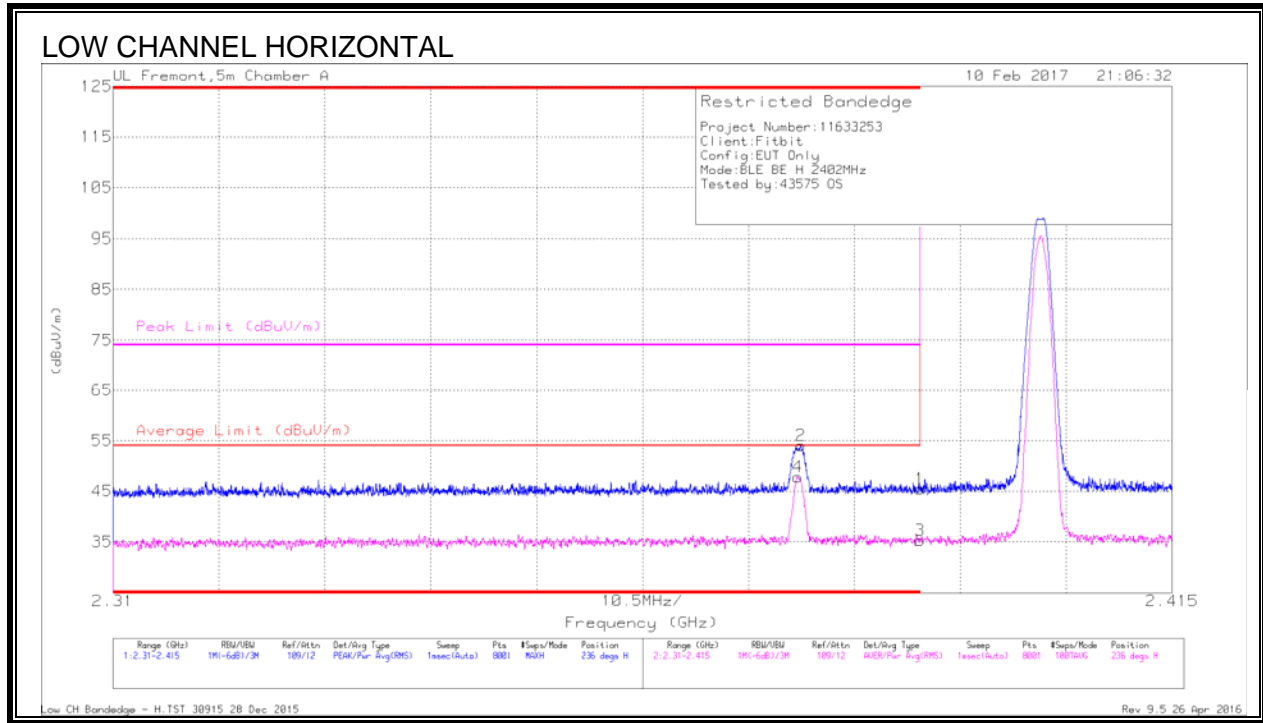
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For 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. Note: The pre-scan measurements above 1GHz the VBW is set to 30 kHz

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz 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.

### 11.2. RESTRICTED BANDEGE (LOW CHANNEL)



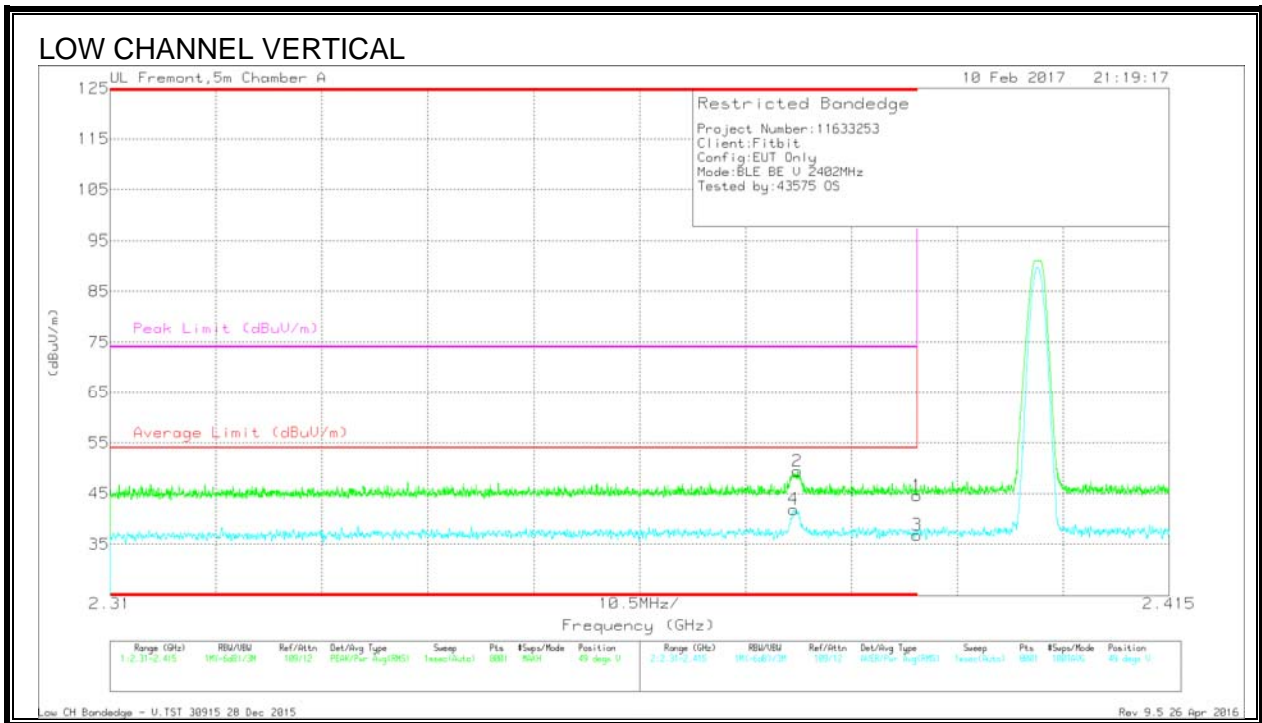
#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (db/m)	Amp/Col/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	36.83	Pk	32.3	-23.7	0	45.43	-	-	74	-28.57	236	219	H
2	* 2.378	45.56	Pk	32.2	-23.7	0	54.06	-	-	74	-19.94	236	219	H
3	* 2.39	26.69	RMS	32.3	-23.7	2.06	37.35	54	-16.65	-	-	236	219	H
4	* 2.378	39.32	RMS	32.2	-23.7	2.06	49.88	54	-4.12	-	-	236	219	H

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

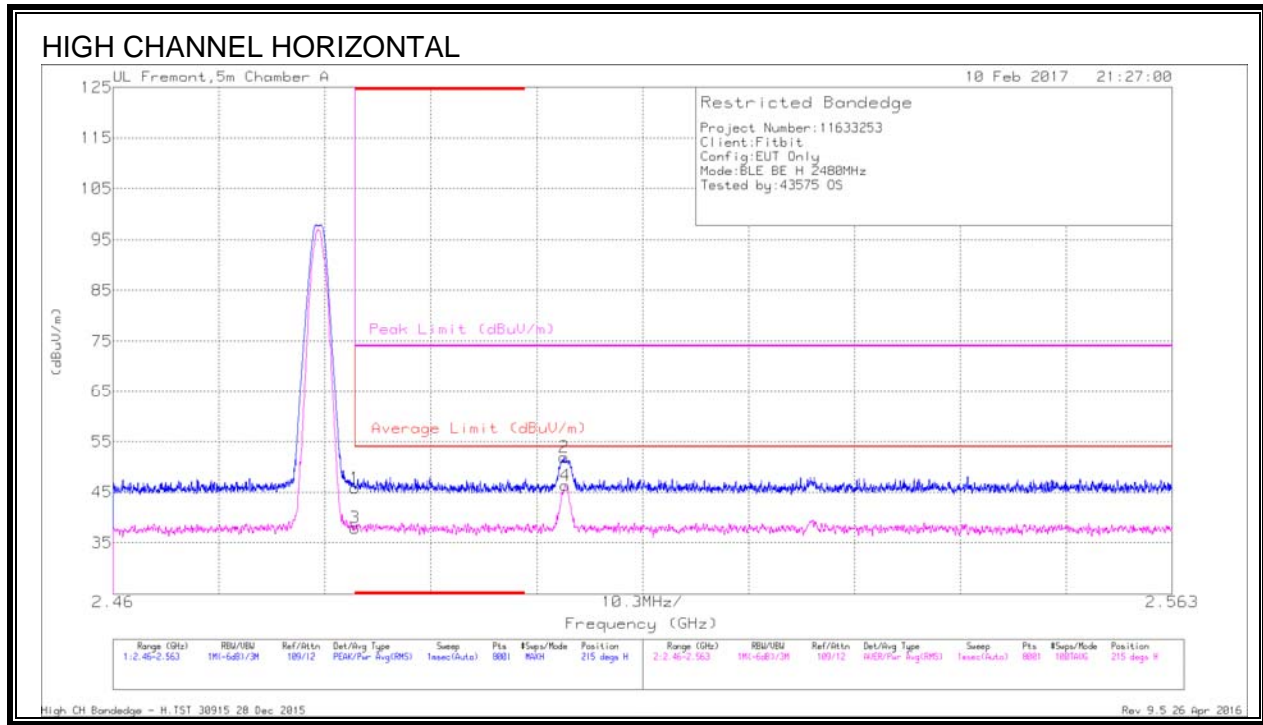
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T346 (db/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.378	40.9	Pk	32.2	-23.7	0	49.4	-	-	74	-24.6	49	285	V
4	* 2.378	31.36	RMS	32.2	-23.7	2.06	41.92	54	-12.08	-	-	49	285	V
1	* 2.39	36.02	Pk	32.3	-23.7	0	44.62	-	-	74	-29.38	49	285	V
3	* 2.39	26.17	RMS	32.3	-23.7	2.06	36.82	54	-17.18	-	-	49	285	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

RMS - RMS detection

### 8.1.1 AUTHORIZED BANDEGE (HIGH CHANNEL)



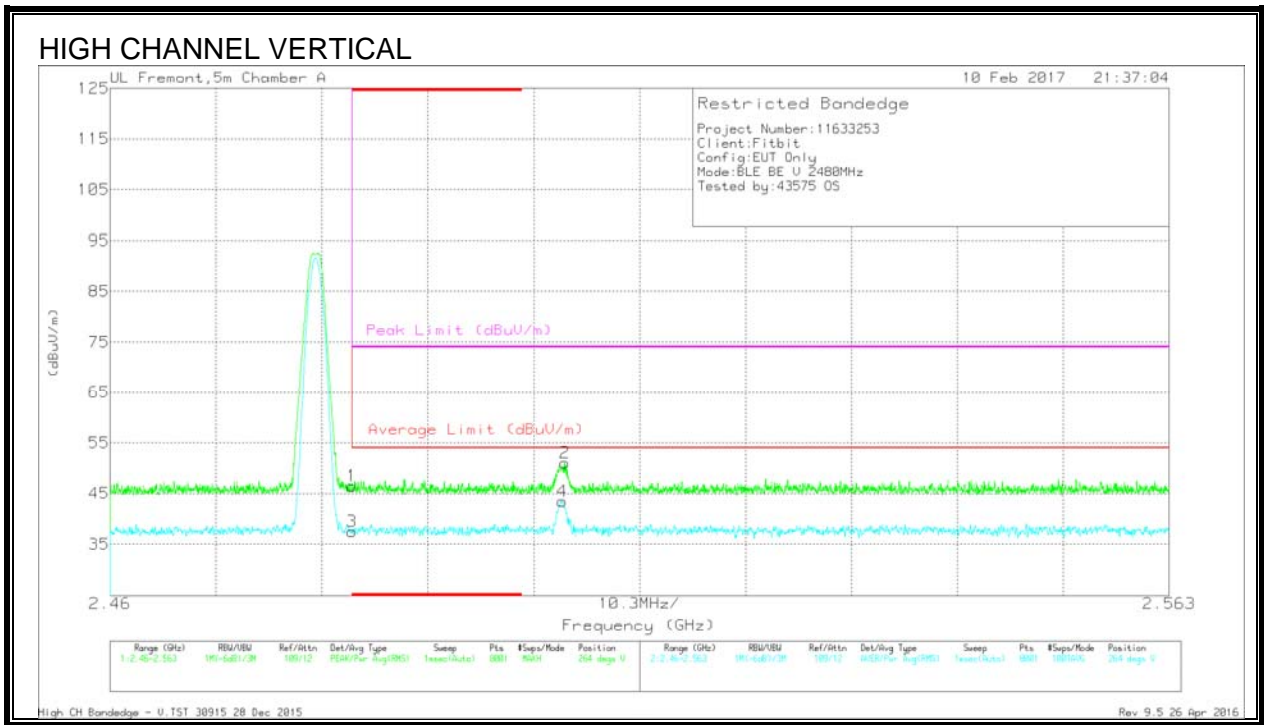
#### Trace Markers

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T346 (dblm)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.05	Pk	32.4	-23.6	0	45.85	-	-	74	-28.15	215	144	H
3	* 2.484	27.09	RMS	32.4	-23.6	2.06	37.95	54	-16.05	-	-	215	144	H
2	2.504	43	Pk	32.5	-23.6	0	51.9	-	-	74	-22.1	215	144	H

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

RMS - RMS detection



Trace Markers

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T346 (dbim)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.7	Pk	32.4	-23.6	0	46.5	-	-	74	-27.5	264	376	V
3	* 2.484	26.65	RMS	32.4	-23.6	2.06	37.51	54	-16.49	-	-	264	376	V
2	2.504	42.08	Pk	32.5	-23.6	0	50.98	-	-	74	-23.02	264	376	V

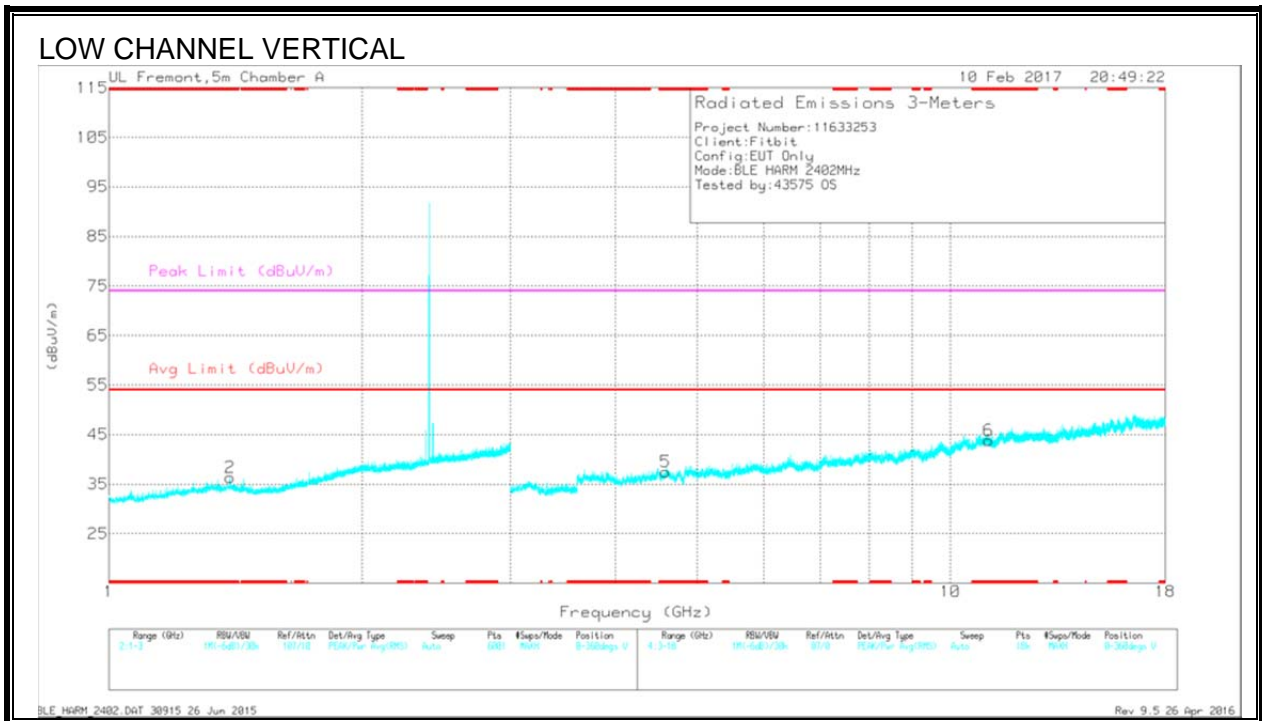
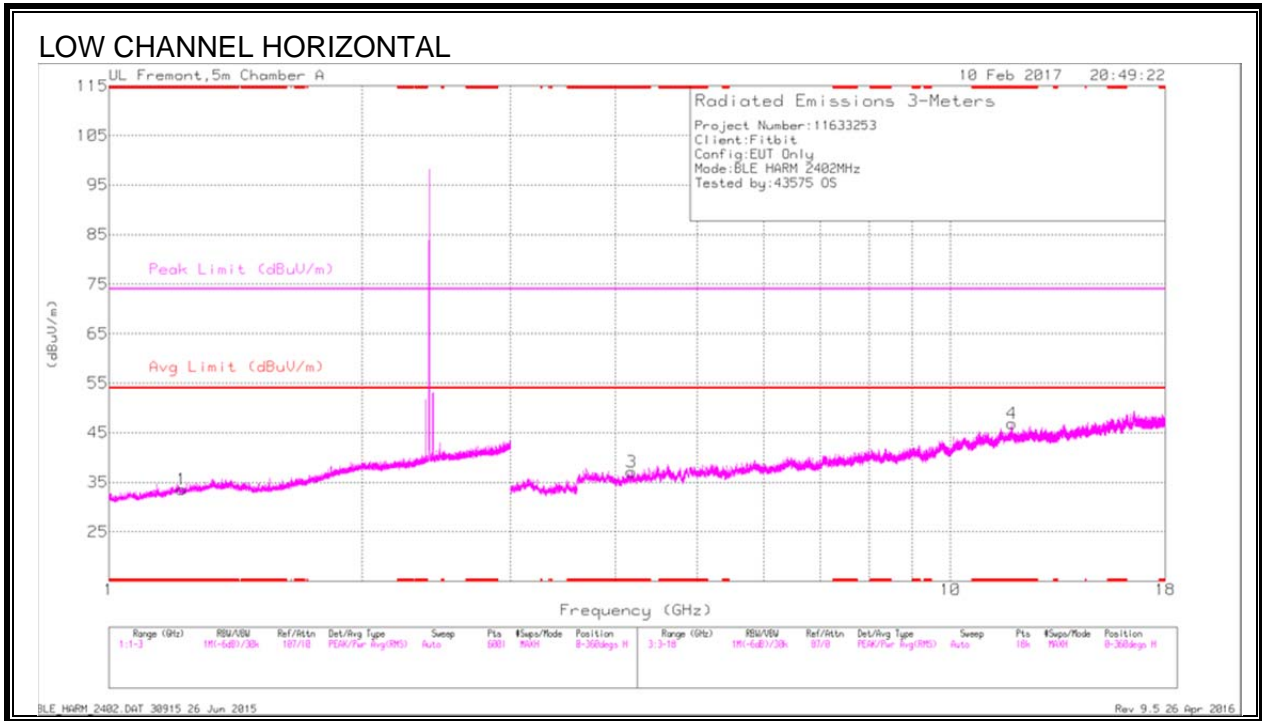
\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

RMS - RMS detection



### 8.1.2 HARMONICS AND SPURIOUS EMISSIONS



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 1.22	29.17	Pk	28.5	-24.1	0	33.57	-	-	74	-40.43	0-360	199	H
2	* 1.393	31.01	Pk	29	-23.7	0	36.31	-	-	74	-37.69	0-360	101	V
3	* 4.177	33	Pk	33.6	-29.5	0	37.1	-	-	74	-36.9	0-360	199	H
4	* 11.837	27.62	Pk	38.6	-19.4	0	46.82	-	-	74	-27.18	0-360	199	H
5	* 4.585	31.83	Pk	34.4	-28.8	0	37.43	-	-	74	-36.57	0-360	101	V
6	* 11.105	26.19	Pk	37.9	-20.3	0	43.79	-	-	74	-30.21	0-360	199	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

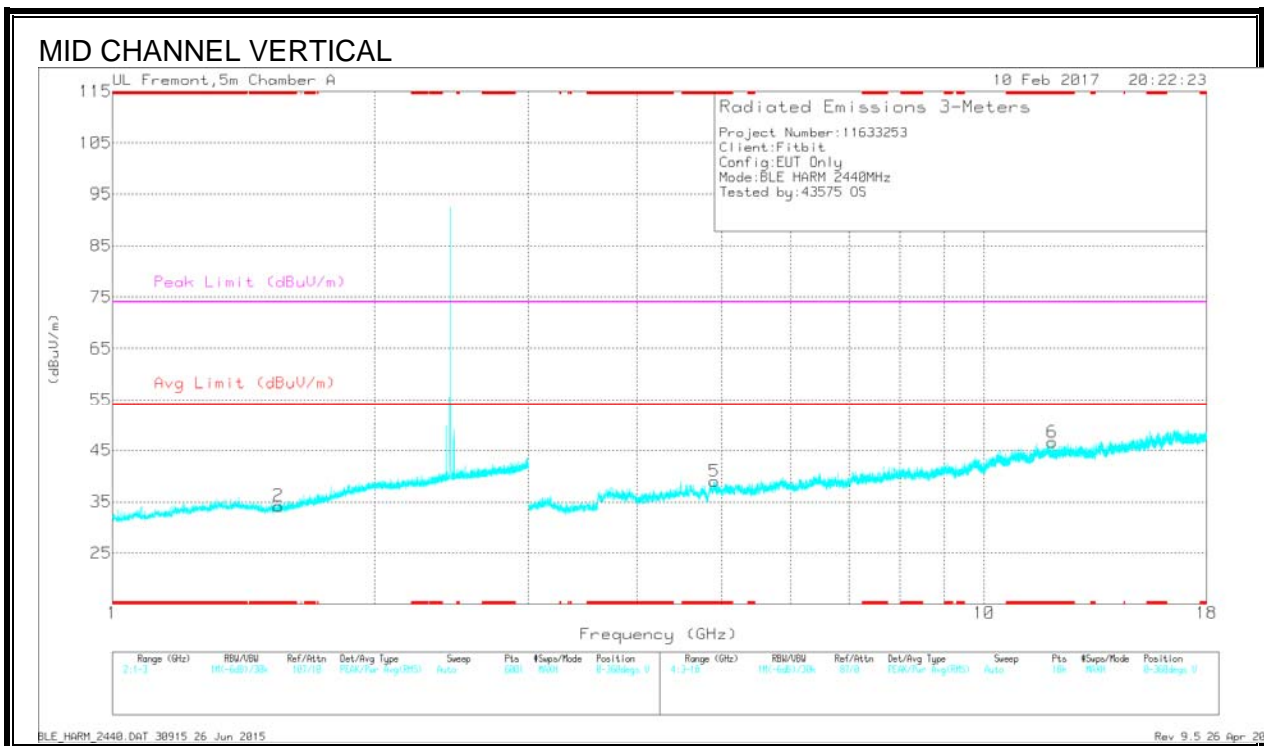
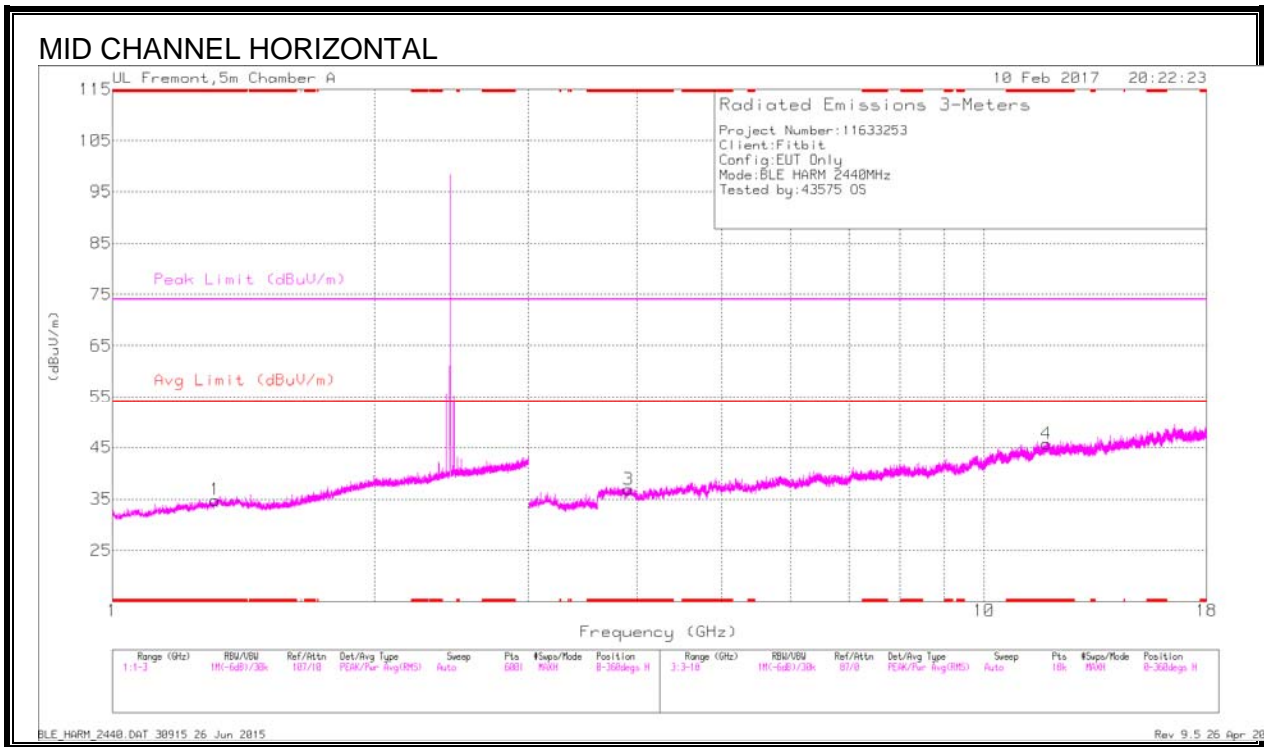
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.218	35.83	PK2	28.4	-24.1	0	40.13	-	-	74	-33.87	265	273	H
* 1.221	20.92	MAv1	28.5	-24.1	2.06	27.38	54	-26.62	-	-	265	273	H
* 1.392	35.81	PK2	29	-23.7	0	41.11	-	-	74	-32.89	56	134	V
* 1.394	21.26	MAv1	29	-23.7	2.06	28.62	54	-25.38	-	-	56	134	V
* 11.837	32.46	PK2	38.6	-19.4	0	51.66	-	-	74	-22.34	162	211	H
* 11.838	21.75	MAv1	38.6	-19.4	2.06	43.01	54	-10.99	-	-	162	211	H
* 4.179	38.77	PK2	33.6	-29.4	0	42.97	-	-	74	-31.03	50	164	H
* 4.176	27.09	MAv1	33.6	-29.5	2.06	33.25	54	-20.75	-	-	50	164	H
* 4.584	39.19	PK2	34.4	-28.8	0	44.79	-	-	74	-29.21	170	240	V
* 4.586	26.58	MAv1	34.4	-28.8	2.06	34.24	54	-19.76	-	-	170	240	V
* 11.104	32.88	PK2	37.9	-20.3	0	50.48	-	-	74	-23.52	183	318	V
* 11.105	20.38	MAv1	37.9	-20.3	2.06	40.04	54	-13.96	-	-	183	318	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 1.311	29.78	Pk	28.9	-23.9	0	34.78	-	-	74	-39.22	0-360	99	H
2	* 1.549	29.88	Pk	28	-23.7	0	34.18	-	-	74	-39.82	0-360	101	V
3	* 3.912	33.35	Pk	33.6	-30.1	0	36.85	-	-	74	-37.15	0-360	100	H
4	* 11.787	26.6	Pk	38.6	-19.5	0	45.7	-	-	74	-28.3	0-360	100	H
5	* 4.903	32.07	Pk	34.3	-27.4	0	38.97	-	-	74	-35.03	0-360	101	V
6	* 11.974	27.67	Pk	38.8	-19.9	0	46.57	-	-	74	-27.43	0-360	101	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

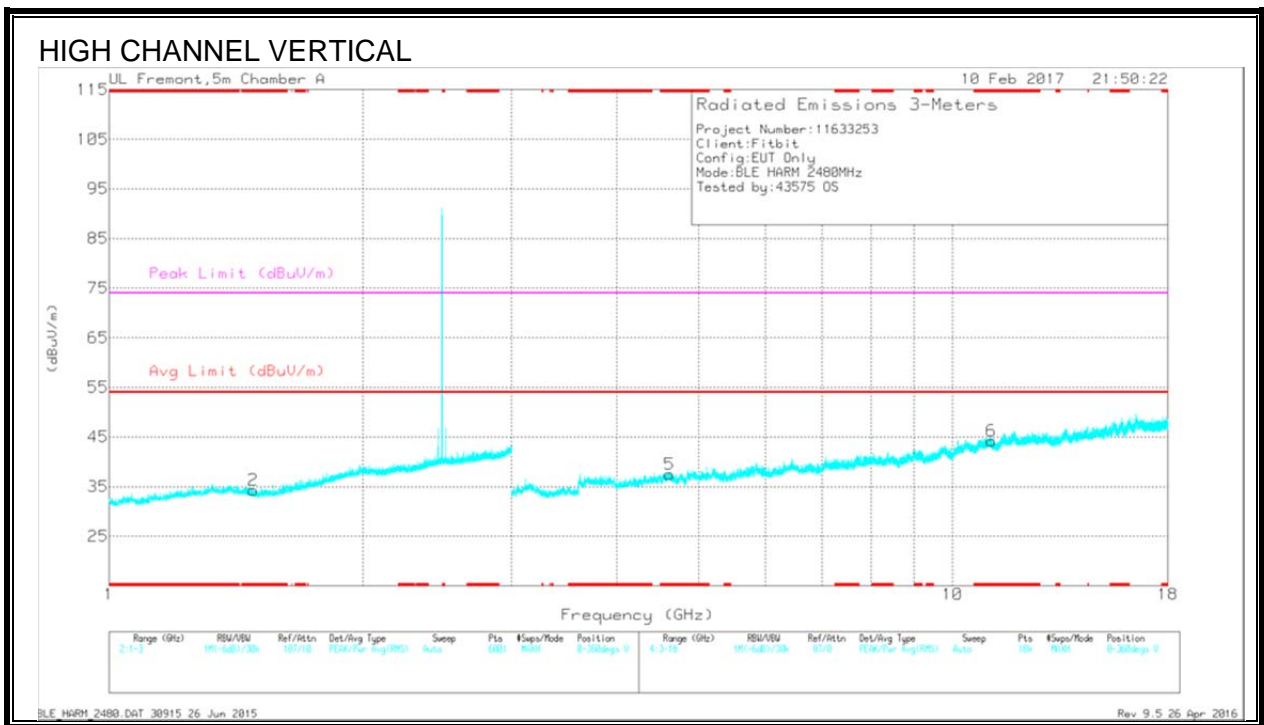
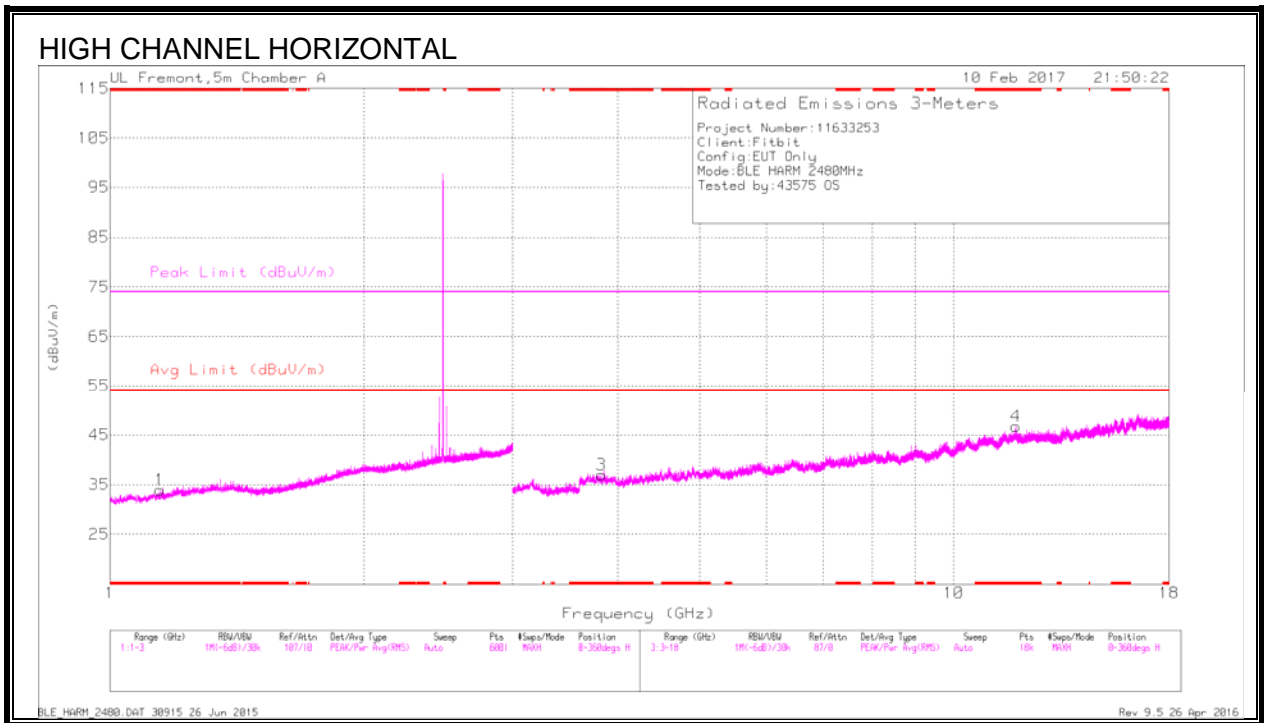
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.313	34.63	PK2	28.9	-23.9	0	39.63	-	-	74	-34.37	343	246	H
* 1.309	21.15	MAv1	28.9	-24	2.06	28.11	54	-25.89	-	-	343	246	H
* 1.55	35.42	PK2	28	-23.7	0	39.72	-	-	74	-34.28	261	327	V
* 1.55	20.48	MAv1	28	-23.7	2.06	26.84	54	-27.16	-	-	261	327	V
* 3.914	39.05	PK2	33.6	-30.1	0	42.55	-	-	74	-31.45	169	166	H
* 3.913	28.22	MAv1	33.6	-30.1	2.06	33.78	54	-20.22	-	-	169	166	H
* 11.785	31.68	PK2	38.6	-19.6	0	50.68	-	-	74	-23.32	65	354	H
* 11.785	19.85	MAv1	38.6	-19.5	2.06	41.01	54	-12.99	-	-	65	354	H
* 4.902	36.95	PK2	34.3	-27.4	0	43.85	-	-	74	-30.15	287	181	V
* 4.903	25.97	MAv1	34.3	-27.4	2.06	34.93	54	-19.07	-	-	287	181	V
* 11.974	31.92	PK2	38.8	-19.9	0	50.82	-	-	74	-23.18	272	337	V
* 11.974	19.75	MAv1	38.8	-19.9	2.06	40.71	54	-13.29	-	-	272	337	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 1.145	30.07	Pk	28	-24.2	0	33.87	-	-	74	-40.13	0-360	101	H
2	* 1.482	29.91	Pk	28.1	-23.7	0	34.31	-	-	74	-39.69	0-360	201	V
3	* 3.822	33.61	Pk	33.6	-30.2	0	37.01	-	-	74	-36.99	0-360	199	H
4	* 11.84	27.5	Pk	33.6	-19.3	0	46.8	-	-	74	-27.2	0-360	199	H
5	* 4.622	32.13	Pk	34.4	-29	0	37.53	-	-	74	-36.47	0-360	101	V
6	* 11.122	26.42	Pk	37.9	-20.1	0	44.22	-	-	74	-29.78	0-360	101	V

\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.146	34.8	PK2	28	-24.2	0	38.6	-	-	74	-35.4	213	249	H
* 1.144	21.08	MAv1	28	-24.1	2.06	27.04	54	-26.96	-	-	213	249	H
* 1.481	35.92	PK2	28.1	-23.7	0	40.32	-	-	74	-33.68	27	343	V
* 1.481	20.54	MAv1	28.1	-23.7	2.06	27	54	-27.02	-	-	27	343	V
* 11.84	32.5	PK2	38.6	-19.3	0	51.8	-	-	74	-22.2	204	312	H
* 11.839	21.65	MAv1	38.6	-19.3	2.06	43.01	54	-10.99	-	-	204	312	H
* 3.822	39.3	PK2	33.6	-30.1	0	42.8	-	-	74	-31.2	327	331	H
* 3.822	28	MAv1	33.6	-30.2	2.06	33.46	54	-20.54	-	-	327	331	H
* 4.621	37.62	PK2	34.4	-29	0	43.02	-	-	74	-30.98	86	363	V
* 4.623	26.71	MAv1	34.4	-29	2.06	34.17	54	-19.83	-	-	86	363	V
* 11.122	31.92	PK2	37.9	-20.2	0	49.62	-	-	74	-24.38	223	232	V
* 11.121	20.24	MAv1	37.9	-20.2	2.06	40	54	-14.02	-	-	223	232	V

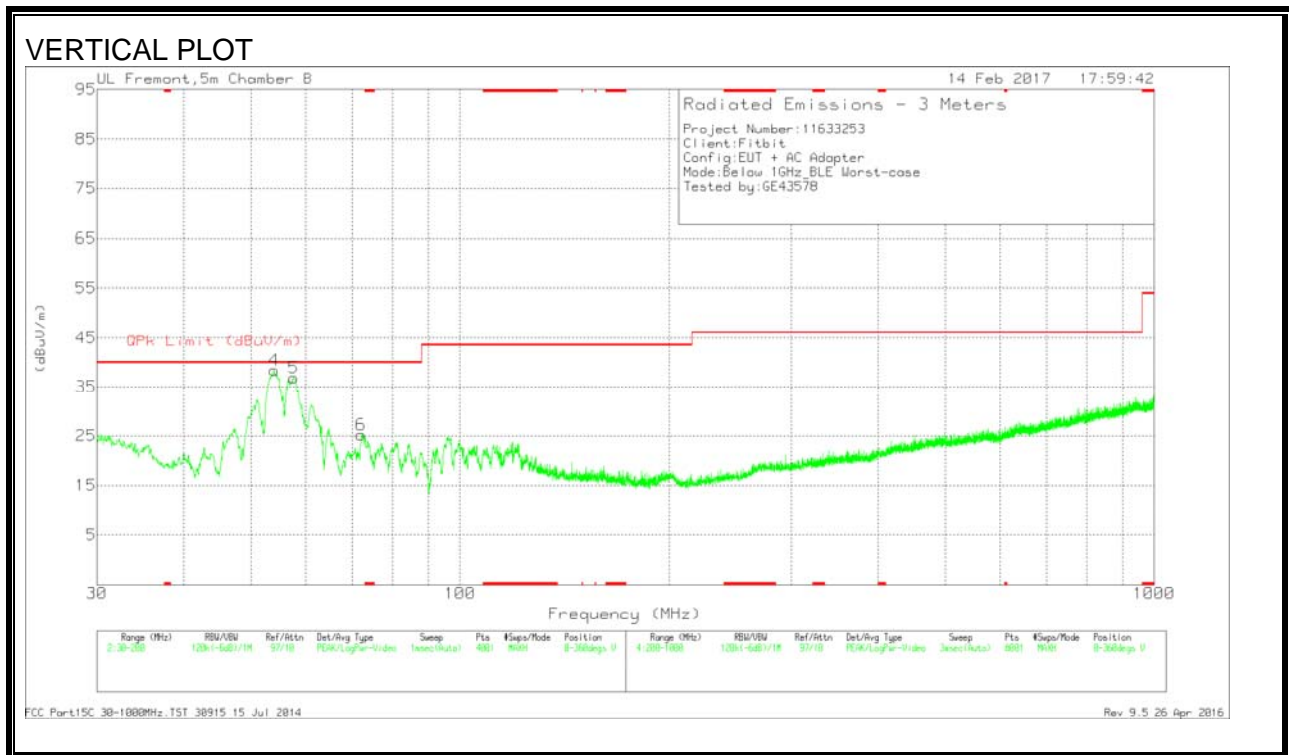
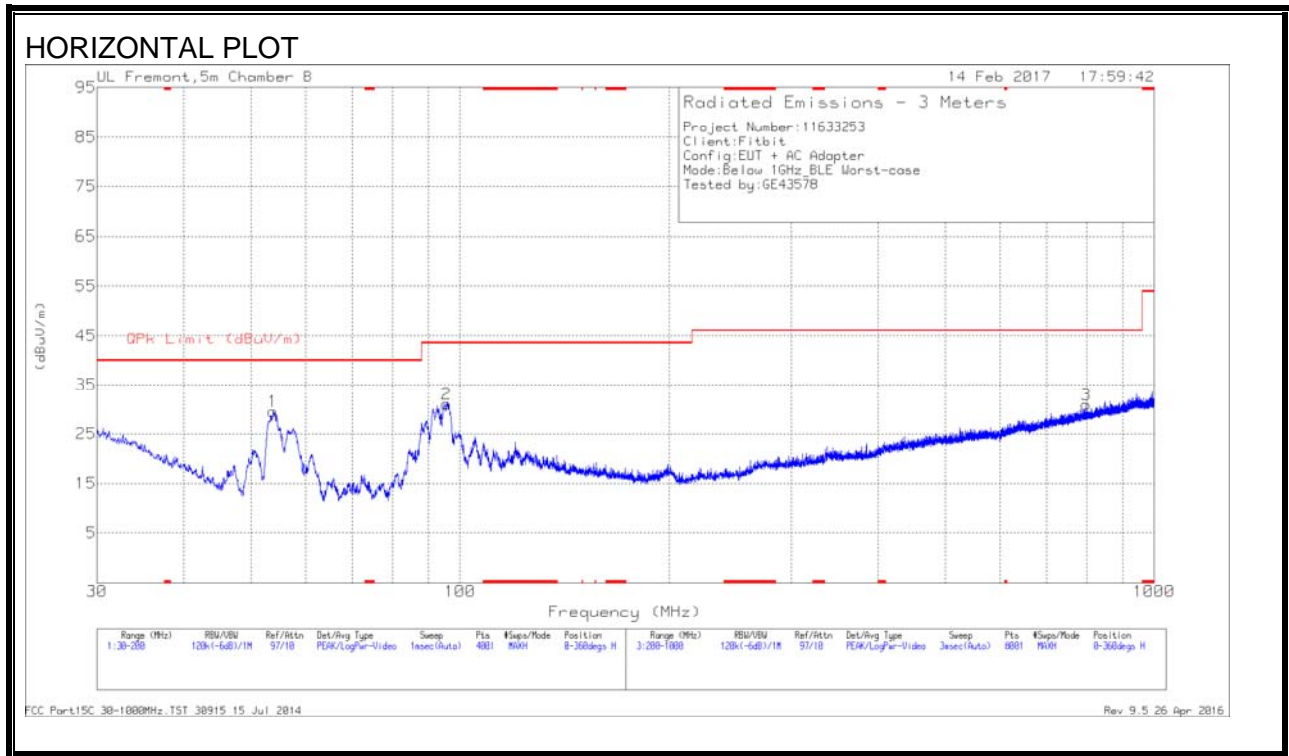
\* - indicates frequency in CFR15.205/RSS-GEN 8.10 -Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 11.3 WORST-CASE BELOW 1 GHz

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



**DATA**

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	53.8213	46.91	Pk	11.2	-28.6	29.51	40	-10.49	0-360	400	H
4	53.97	55.68	Pk	11.2	-28.5	38.38	40	-1.62	0-360	100	V
5	57.625	54.25	Pk	11.3	-28.7	36.85	40	-3.15	0-360	100	V
6	72.075	41.63	Pk	12	-28.4	25.23	40	-14.77	0-360	100	V
2	95.62	46.25	Pk	13	-28.2	31.05	43.52	-12.47	0-360	300	H
3	798.1	30.41	Pk	25.2	-24.7	30.91	46.02	-15.11	0-360	100	H

Pk - Peak detector

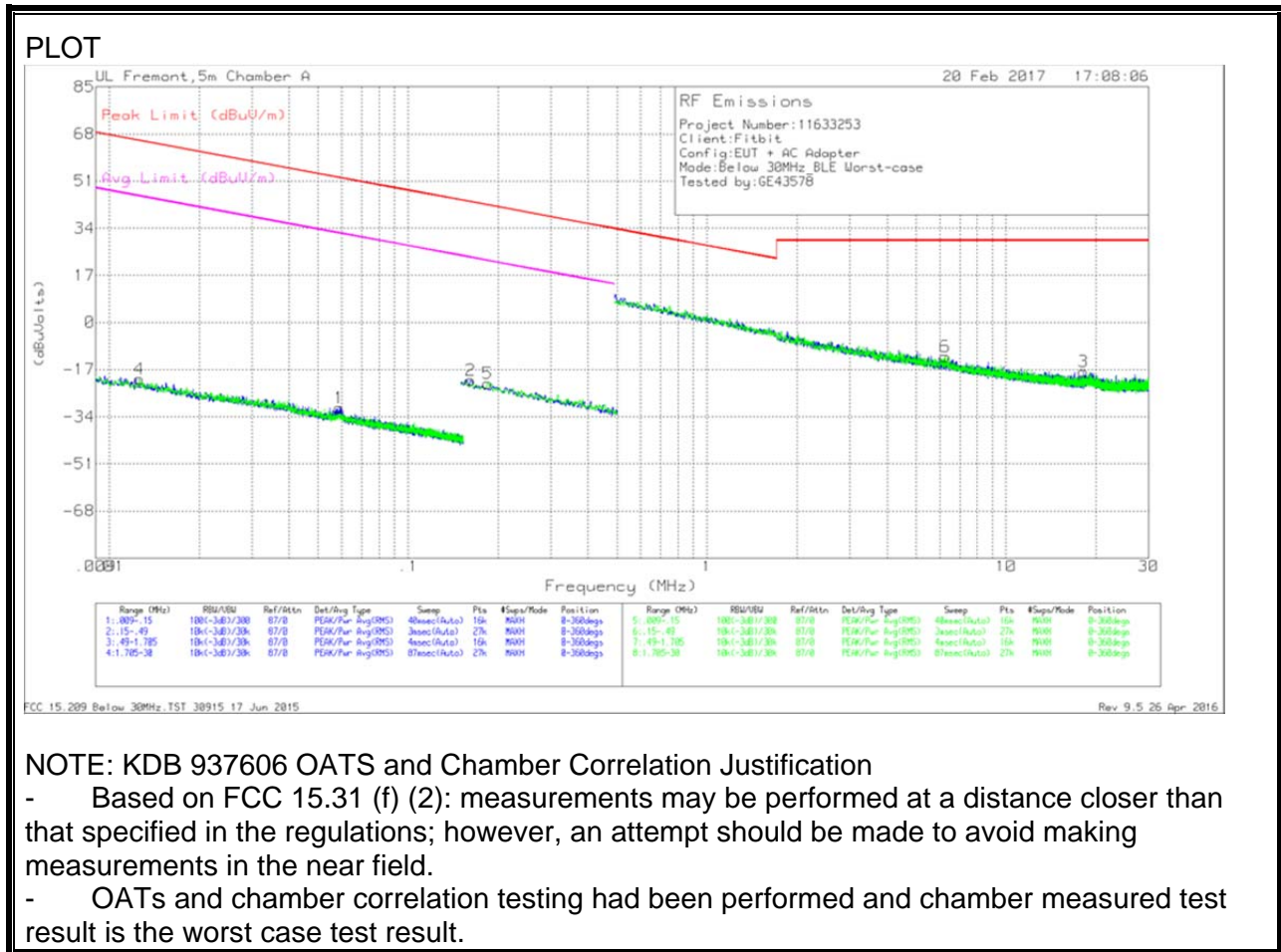
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	53.97	50.98	Qp	11.2	-28.5	33.68	40	-6.32	75	102	V
5	57.625	50.36	Qp	11.3	-28.7	32.96	40	-7.04	63	113	V

Qp - Quasi-Peak detector



## 11.4 WORST-CASE BELOW 30 MHz

### SPURIOUS EMISSIONS BELOW 30MHz (WORST-CASE CONFIGURATION)



#### Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.01263	42.53	Pk	16.9	.1	-80	-20.47	65.58	-86.05	45.58	-66.05	0-360
1	.05877	37.85	Pk	11.2	.1	-80	-30.85	52.22	-83.07	32.22	-63.07	0-360
2	.16199	48.25	Pk	10.8	.1	-80	-20.85	43.41	-64.26	23.41	-44.26	0-360
5	.18453	47.08	Pk	10.8	.1	-80	-22.02	42.28	-64.3	22.28	-44.3	0-360

#### Pk - Peak detector

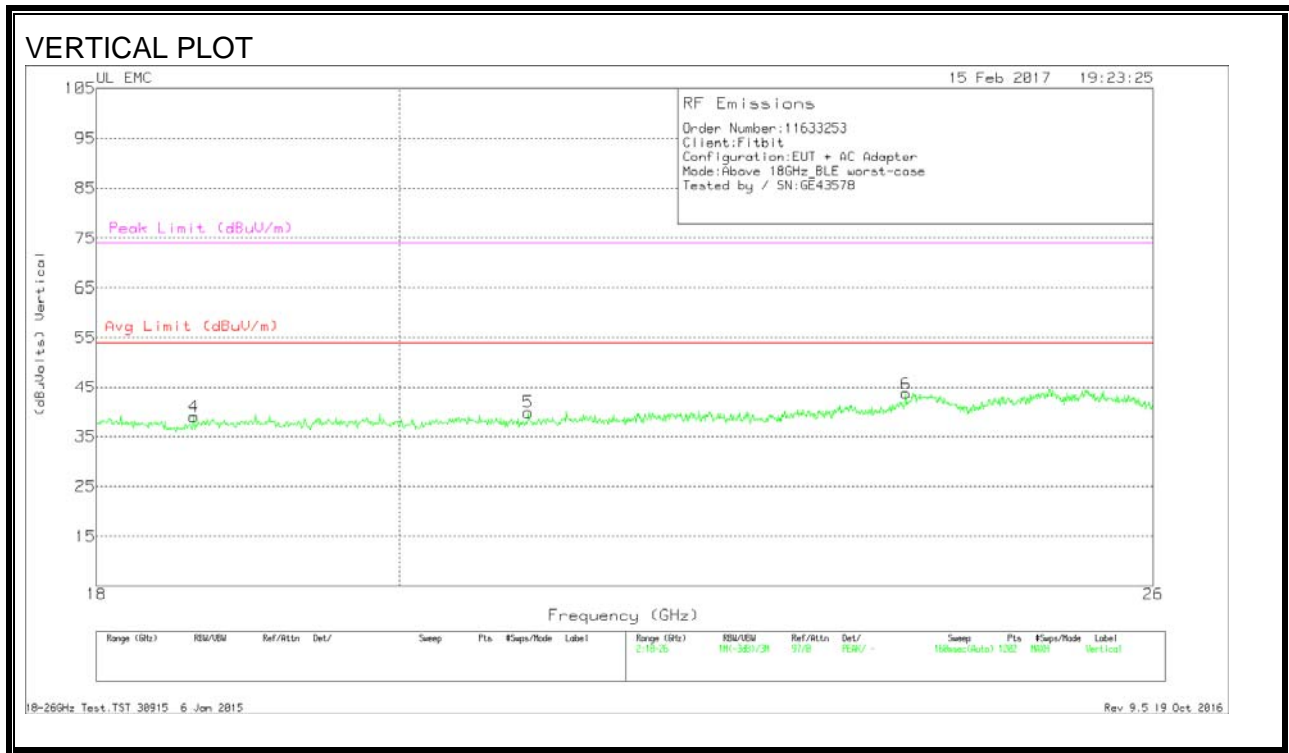
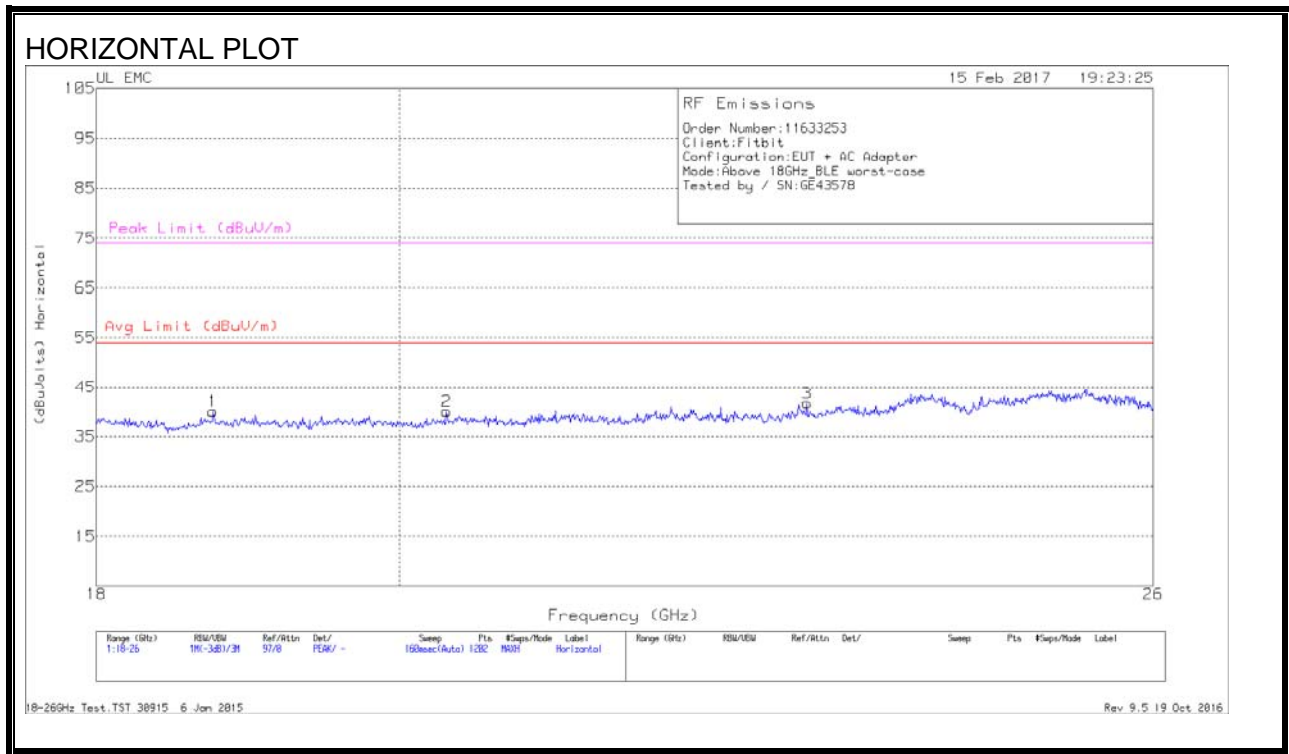
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
6	6.26223	16.45	Pk	10.9	.4	-40	-12.25	29.54	-41.79	-	-	0-360
3	18.11092	11.32	Pk	10.3	.6	-40	-17.78	29.54	-47.32	-	-	0-360

#### Pk - Peak detector

Note: No emissions were detected above the noise floor.

## 11.5 WORST-CASE ABOVE 18 GHz

### SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION)



**Data**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (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	18.746	41.7	Pk	32.4	-24.6	-9.5	40	54	-14	74	-34
2	20.331	42.1	Pk	32.9	-25.5	-9.5	40	54	-14	74	-34
3	23.049	42.87	Pk	33.5	-25.2	-9.5	41.67	54	-12.33	74	-32.33
4	18.619	40.8	Pk	32.5	-24.8	-9.5	39	54	-15	74	-35
5	20.918	41.43	Pk	33.1	-25.2	-9.5	39.83	54	-14.17	74	-34.17
6	23.855	43.37	Pk	33.9	-24.1	-9.5	43.67	54	-10.33	74	-30.33

Pk - Peak detector

Note: No emissions were detected above the noise floor.

## 12. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

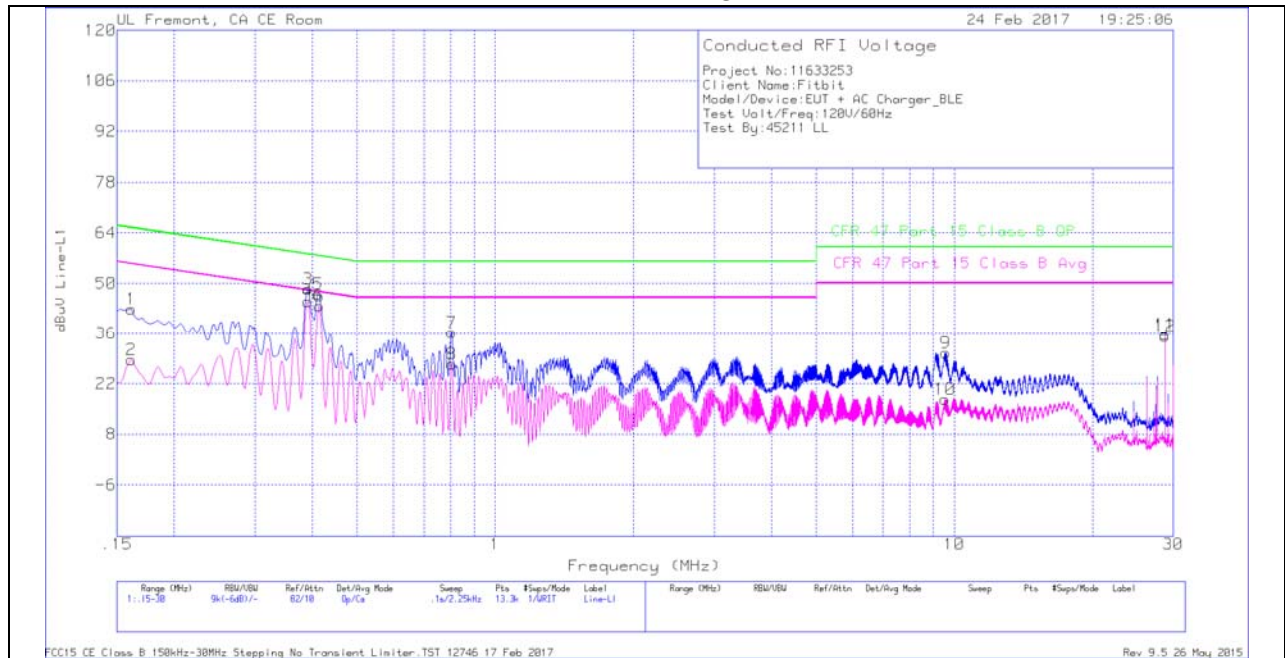
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both Line 1 (HOT) and Line 2 (NEUTRAL).

### RESULTS

**WORST EMISSIONS**

**LINE 1 PLOT**



**LINE 1 RESULT**

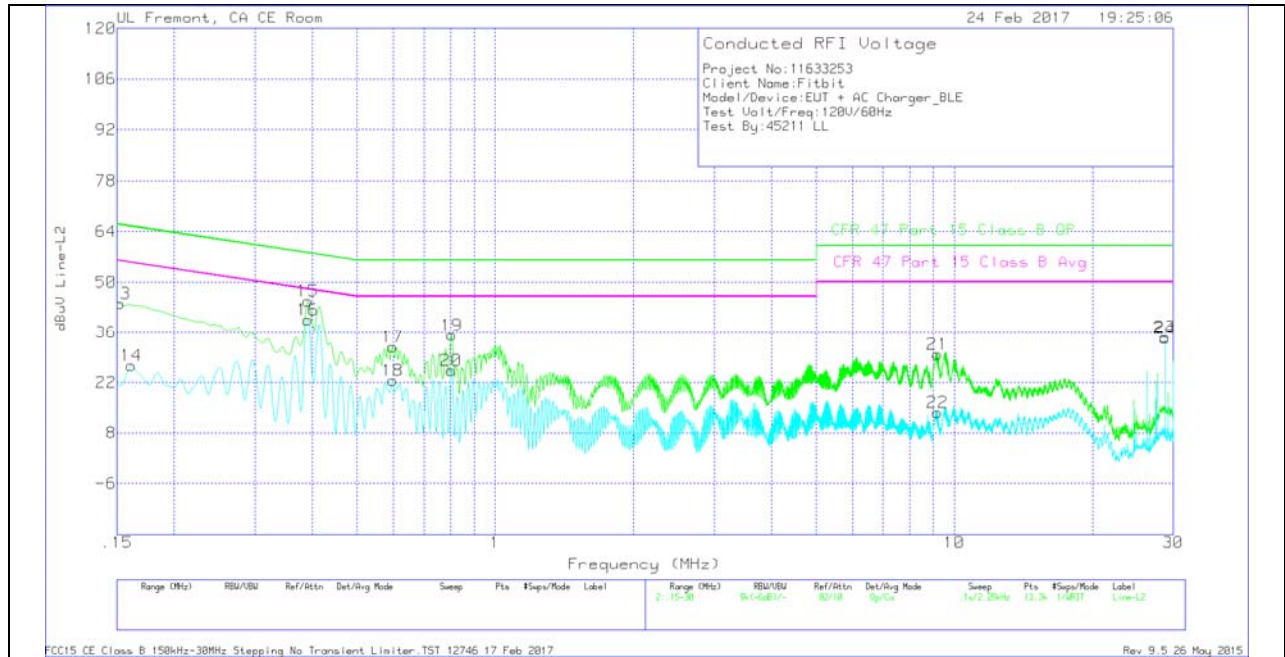
Trace Markers

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
1	.16125	42.75	Qp	0	.1	42.85	65.4	-22.55	-	-
2	.16125	28.52	Ca	0	.1	28.62	-	-	55.4	-26.78
3	.39075	48.27	Qp	0	.1	48.37	58.05	-9.68	-	-
4	.39075	44.9	Ca	0	.1	45	-	-	48.05	-3.05
5	.411	46.96	Qp	0	.1	47.06	57.63	-10.57	-	-
6	.41325	43.69	Ca	0	.1	43.79	-	-	47.58	-3.79
7	.80475	36.23	Qp	0	.1	36.33	56	-19.67	-	-
8	.80475	27.27	Ca	0	.1	27.37	-	-	46	-18.63
9	9.57975	30.33	Qp	0	.2	30.53	60	-29.47	-	-
10	9.555	17.43	Ca	0	.2	17.63	-	-	50	-32.37
11	28.74975	35.28	Qp	.1	.3	35.68	60	-24.32	-	-
12	28.74975	34.76	Ca	.1	.3	35.16	-	-	50	-14.84

Qp - Quasi-Peak detector

Ca - CISPR average detection

**LINE 2 PLOT**



**LINE 2 RESULT**

Trace Markers

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR) Margin (dB)
13	.15225	44.05	Qp	0	0	44.05	65.88	-21.83	-	-
14	.16125	26.68	Ca	0	.1	26.78	-	-	55.4	-28.62
15	.39075	44.68	Qp	0	.1	44.78	58.05	-13.27	-	-
16	.39075	39.51	Ca	0	.1	39.61	-	-	48.05	-8.44
17	.59775	31.87	Qp	0	.1	31.97	56	-24.03	-	-
18	.59775	22.46	Ca	0	.1	22.56	-	-	46	-23.44
19	.80475	35.12	Qp	0	.1	35.22	56	-20.78	-	-
20	.8025	25.27	Ca	0	.1	25.37	-	-	46	-20.63
21	9.18825	29.62	Qp	0	.2	29.82	60	-30.18	-	-
22	9.186	13.48	Ca	0	.2	13.68	-	-	50	-36.32
23	28.74975	34.37	Qp	.1	.3	34.77	60	-25.23	-	-
24	28.74975	33.96	Ca	.1	.3	34.36	-	-	50	-15.64

Qp - Quasi-Peak detector

Ca - CISPR average detection