



# **CERTIFICATION TEST REPORT**

**Report Number. :** 11981280-E25V1

**Applicant :** FITBIT INC.  
199 FREMONT ST, 14TH FLOOR  
SAN FRANCISCO,  
CA 94105, U.S.A

**Model :** FB504

**FCC ID :** XRAFB504

**IC :** 8542A-FB504

**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:**  
February 01, 2018

**Prepared by:**  
UL Verification Services Inc.  
47173 Benicia Street  
Fremont, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888



Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2/1/2018	Initial Review	--

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** FITBIT INC.  
199 FREMONT ST, 14<sup>TH</sup> FLOOR  
SAN FRANCISCO,  
CA 94105, U.S.A

**EUT DESCRIPTION:** SMART WATCH

**MODEL:** FB504

**SERIAL NUMBER:** B2-H3-03 (RADIATED)

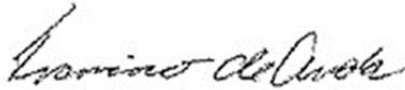
**DATE TESTED:** JANUARY 10, 2018 – JANUARY 26, 2018

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

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  
UL Verification Services Inc. By:



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FRANCISCO DE ANDA  
OPERATIONS LEAD  
UL Verification Services Inc.

Prepared By:



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ERIC YU  
TEST ENGINEER  
UL Verification Services Inc.

Reviewed By:



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TINA CHU  
SENIOR PROJECT ENGINEER  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, 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:22541-1)
<input checked="" type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)
	<input type="checkbox"/> Chamber G (IC:22541-4)
	<input type="checkbox"/> Chamber H (IC:22541-5)

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
Occupied Channel Bandwidth	±0.39 %
Time	±0.02 %

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The equipment under test is a Smart Watch.

### 5.2. MODELS DIFFERENCES DESCRIPTION

FCC ID: XRAFB504 / IC: 8542A-FB504 (model: FB504) has the same board design and mechanical design as FCC ID: XRAFB505 / IC: 8542A-FB505 (model: FB505). The difference is that the Model: FB504 does not have the NFC controller and antenna is depopulated. Conducted tests are leveraged from model FB505. Radiated tests were performed on this model(FB504).

### 5.3. MAXIMUM OUTPUT POWER

Please refer to FCC ID: XRAFB505 / IC: 8542A-FB505 for the maximum output power information.

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Peak Gain (dBi)
2.4	-11.30

### 5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was Tera Term Ver 4.93.  
The firmware installed in the EUT during testing was Version 32.3.125.8.



## **5.6. WORST-CASE CONFIGURATION AND MODE**

EUT has 1 type of plastic wristband and 3 types of metallic bands: Mesh, Link and Tri-Link. The worst-case configuration was investigated with wristbands with and without a charger and it was determined that EUT with plastic wristband and with a charger was the worst-case; therefore, all final radiated testing was performed with this configuration.

Radiated bandedge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed with EUT set to transmit at the Low/Middle/High channels.

Radiated emission below 1GHz, above 18GHz, 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 fundamental of the EUT was investigated in three orthogonal orientations X/Y/Z, it was determined that Z-Portrait orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Z-Portrait orientation.

Worst-case data rates were:

GFSK mode: DH5  
8PSK mode: 3-DH5

DQPSK mode has been verified to have the lowest power.

BT and Wifi bands do not transmit simultaneously.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC Adapter	Homespot	S005AYU0500100	N/A	NA

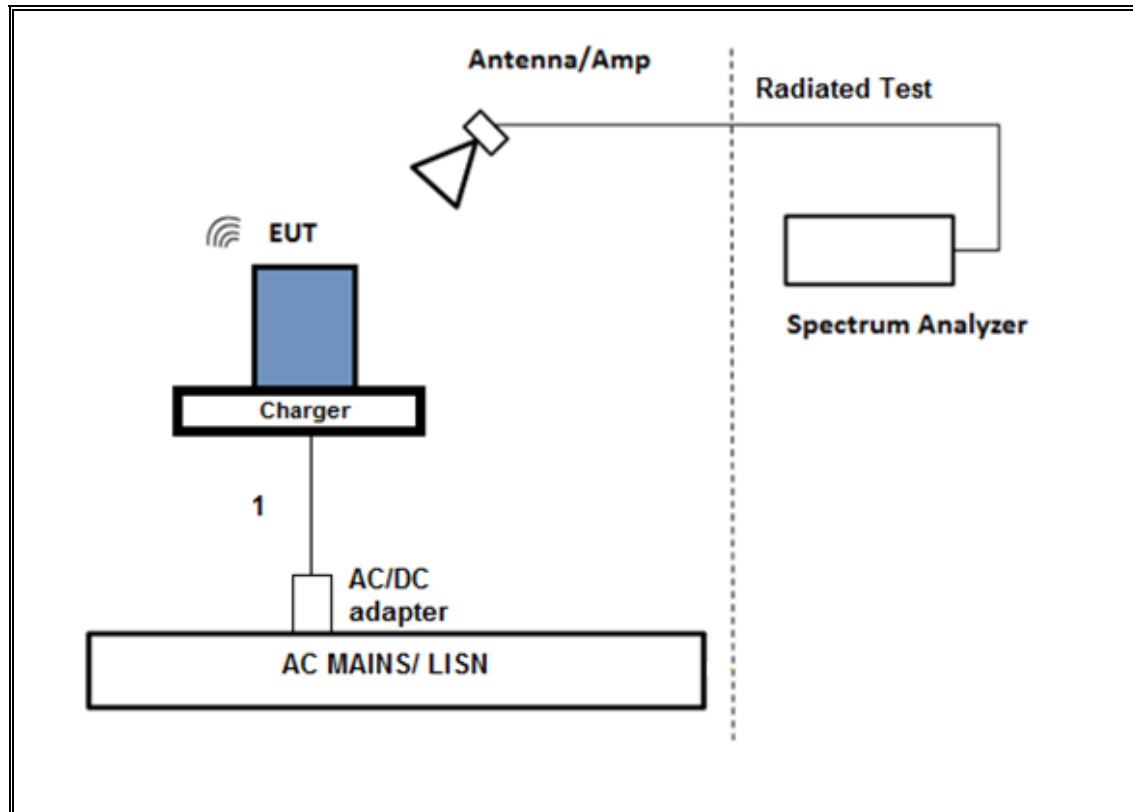
### I/O CABLES (RADIATED TEST)

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

### **TEST SETUP- RADIATED TEST**

The EUT was placed in charger and powered by an AC/DC adapter. Test software exercised the EUT.

### **SETUP DIAGRAM**



## 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, Active Loop 9KHz to 30MHz	EMCO	6502	T35	03/09/2018
Amplifier, 10KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	T300	12/11/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	T130	10/16/2018
Amplifier, 100KHz to 1GHz, 32dB	Keysight	8447D	T15	08/14/2018
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1466	04/11/2018
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T863	06/09//2018
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T493	12/16/2018
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T907	01/23/2018
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T449	06/12/2018
Amplifier, 1 to 26.5GHz 23.5dB gain Minimum	Keysight	8449B	T404	07/23/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A-544	T1113	12/21/2018
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016	

### NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

## 7. MEASUREMENT METHODS

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3 and 6.5

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2013 Section 6.3 and 6.6

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5

## 8. ANTENNA PORT TEST RESULTS

Please refer to FCC ID: XRAFB505 / IC: 8542A-FB505 for the antenna port test results.

## 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 scans above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (10 Hz) video bandwidth with peak detector for average measurements.

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak→ this is a note from Radiated automation software. When the frequency is below 1G, software is using RB=100kHz; when the frequency is above 1G, software is using RB=1MHz.

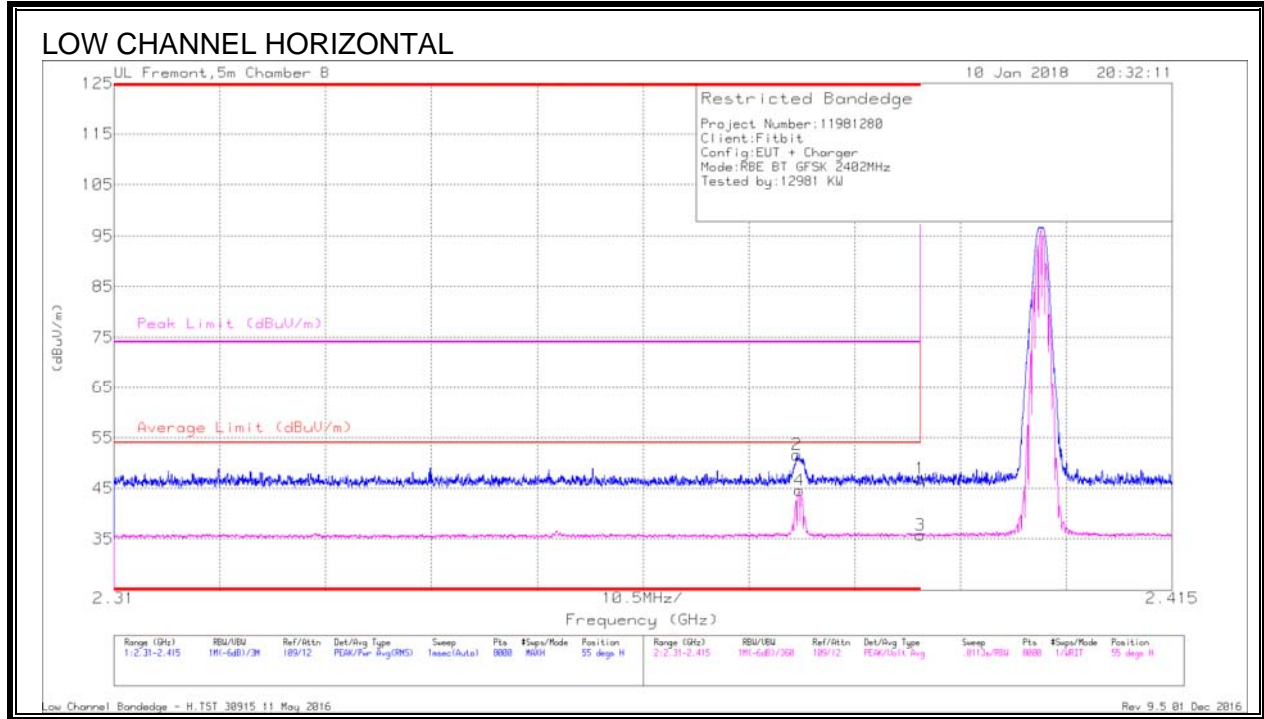
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

#### RESULTS

## 9.2. TRANSMITTER ABOVE 1GHZ

### 9.2.1. BASIC DATA RATE GFSK MODULATION

#### RESTRICTED BANDEDGE (LOW CHANNEL)



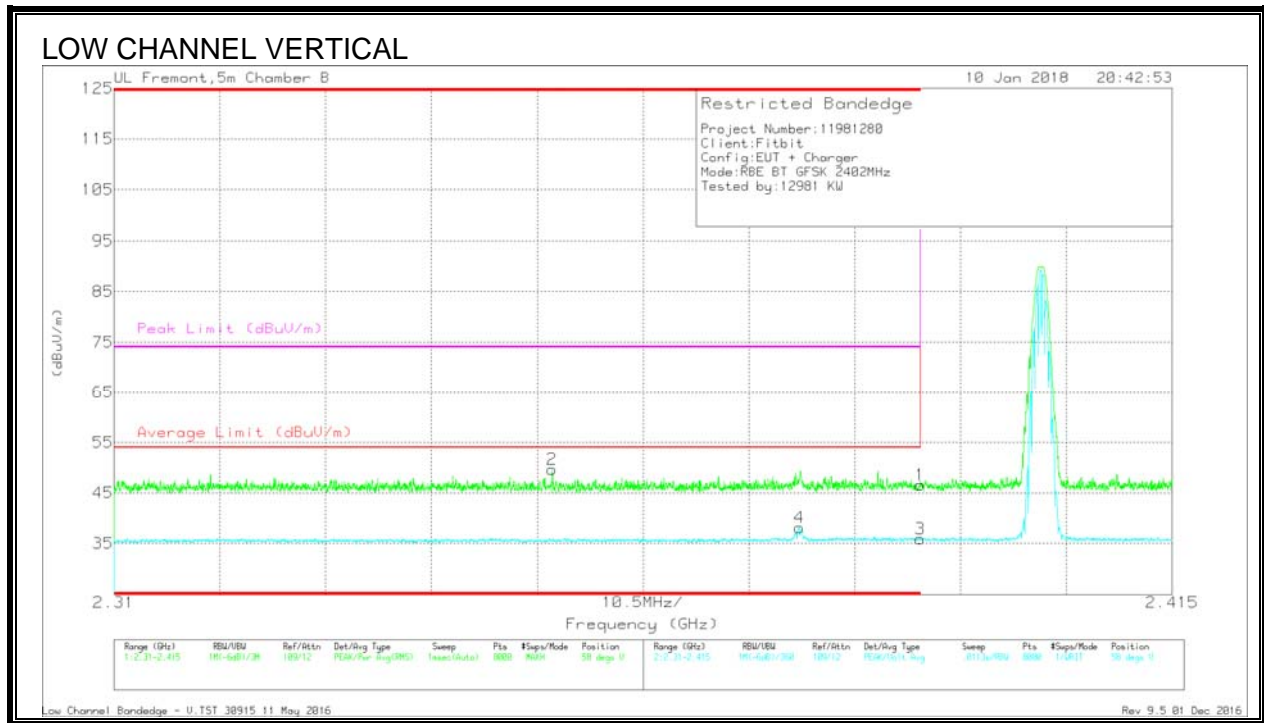
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.378	41	Pk	31.9	-21.3	51.6	-	-	74	-22.4	55	190	H
4	* 2.378	33.97	VA1T	31.9	-21.3	44.57	54	-9.43	-	-	55	190	H
1	* 2.39	36.23	Pk	32	-21.3	46.93	-	-	74	-27.07	55	190	H
3	* 2.39	25.09	VA1T	32	-21.3	35.79	54	-18.21	-	-	55	190	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration





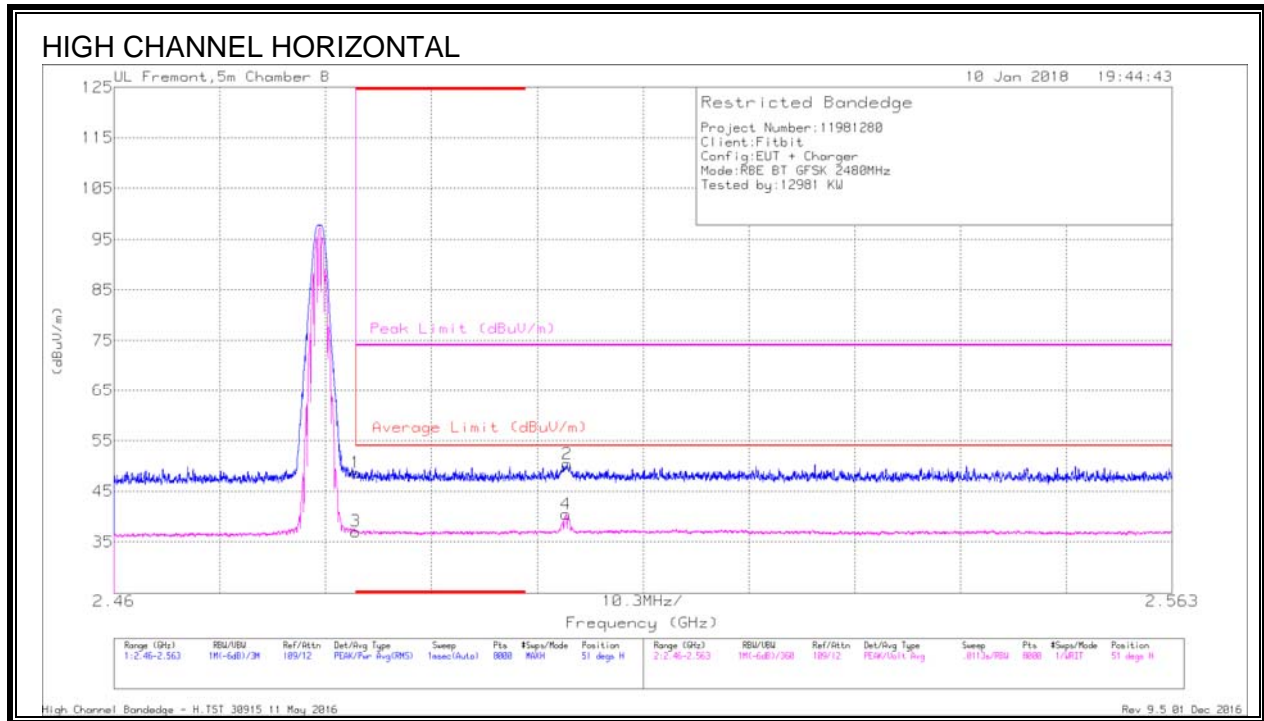
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtz/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.353	39.02	Pk	31.9	-21.3	49.62	-	-	74	-24.38	58	283	V
4	* 2.378	27.49	VA1T	31.9	-21.3	38.09	54	-15.91	-	-	58	283	V
1	* 2.39	35.85	Pk	32	-21.3	46.55	-	-	74	-27.45	58	283	V
3	* 2.39	25.15	VA1T	32	-21.3	35.85	54	-18.15	-	-	58	283	V

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration

**AUTHORIZED BANDEGE (HIGH CHANNEL)**

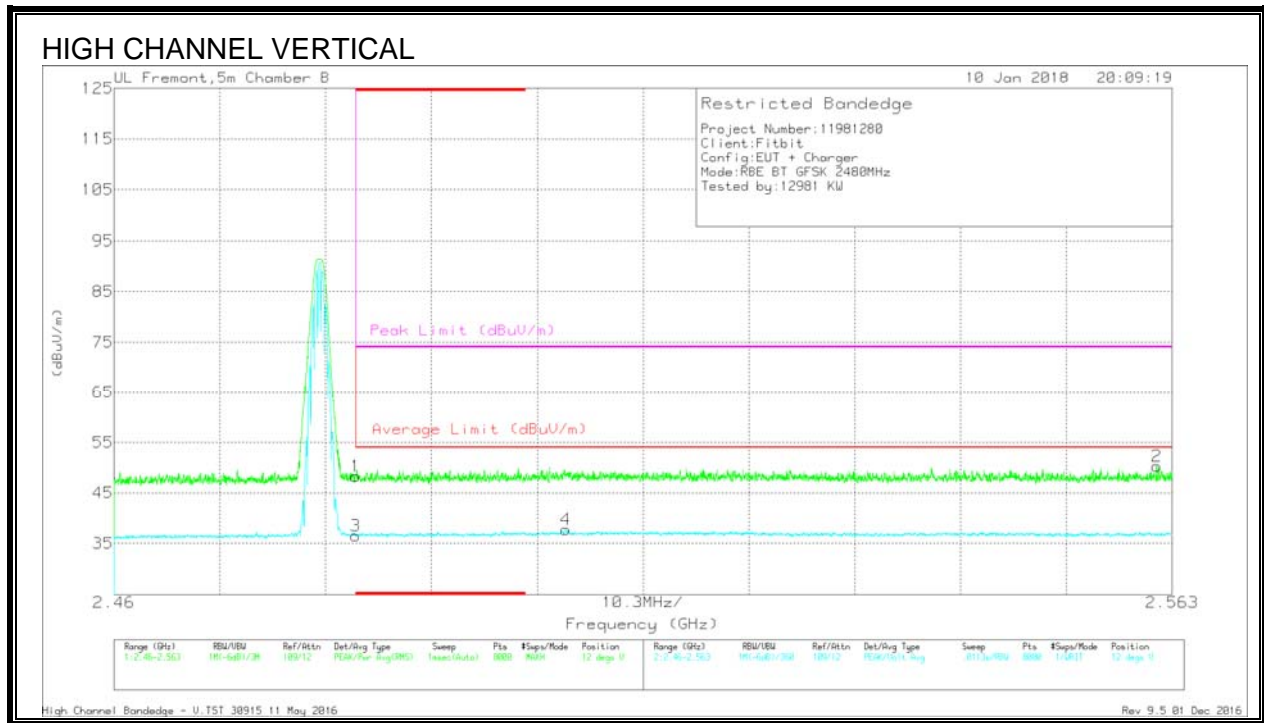


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.44	Pk	32.5	-21.3	48.64	-	-	74	-25.36	51	137	H
3	* 2.484	25.87	VA1T	32.5	-21.3	37.07	54	-16.93	-	-	51	137	H
2	2.504	38.95	Pk	32.6	-21.1	50.45	-	-	74	-23.55	51	137	H
4	2.504	28.95	VA1T	32.6	-21.1	40.45	54	-13.55	-	-	51	137	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration



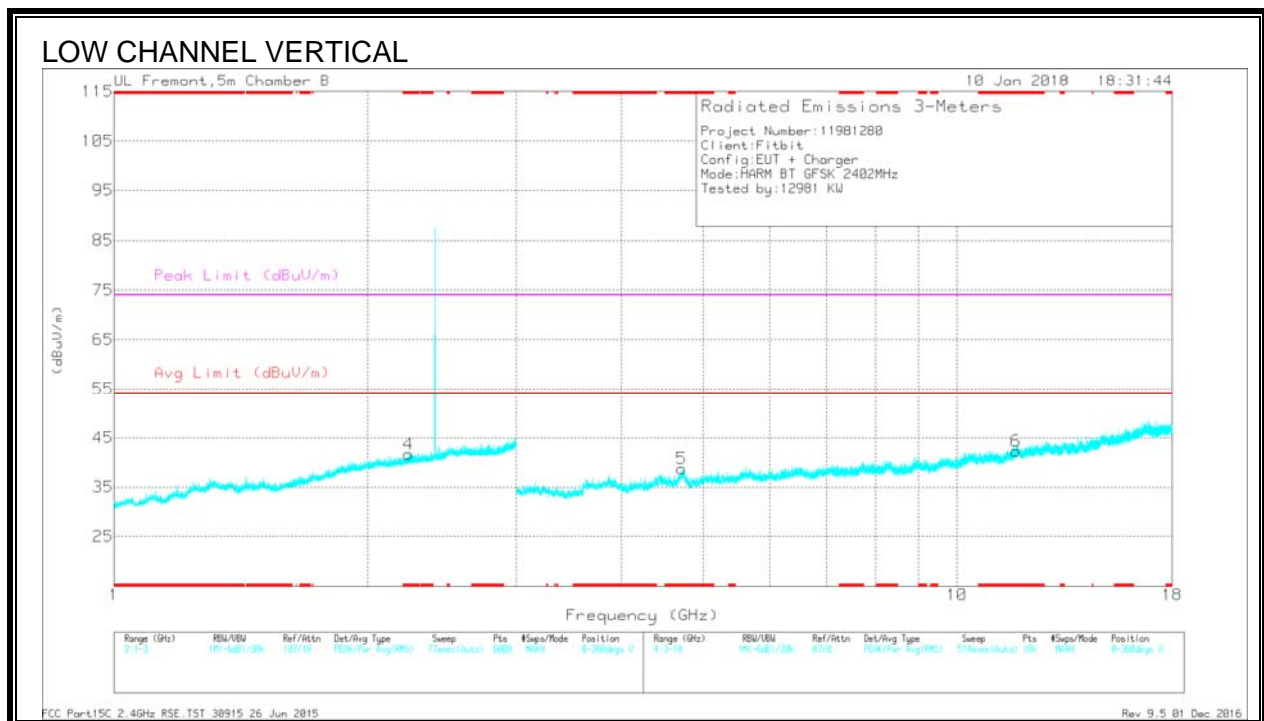
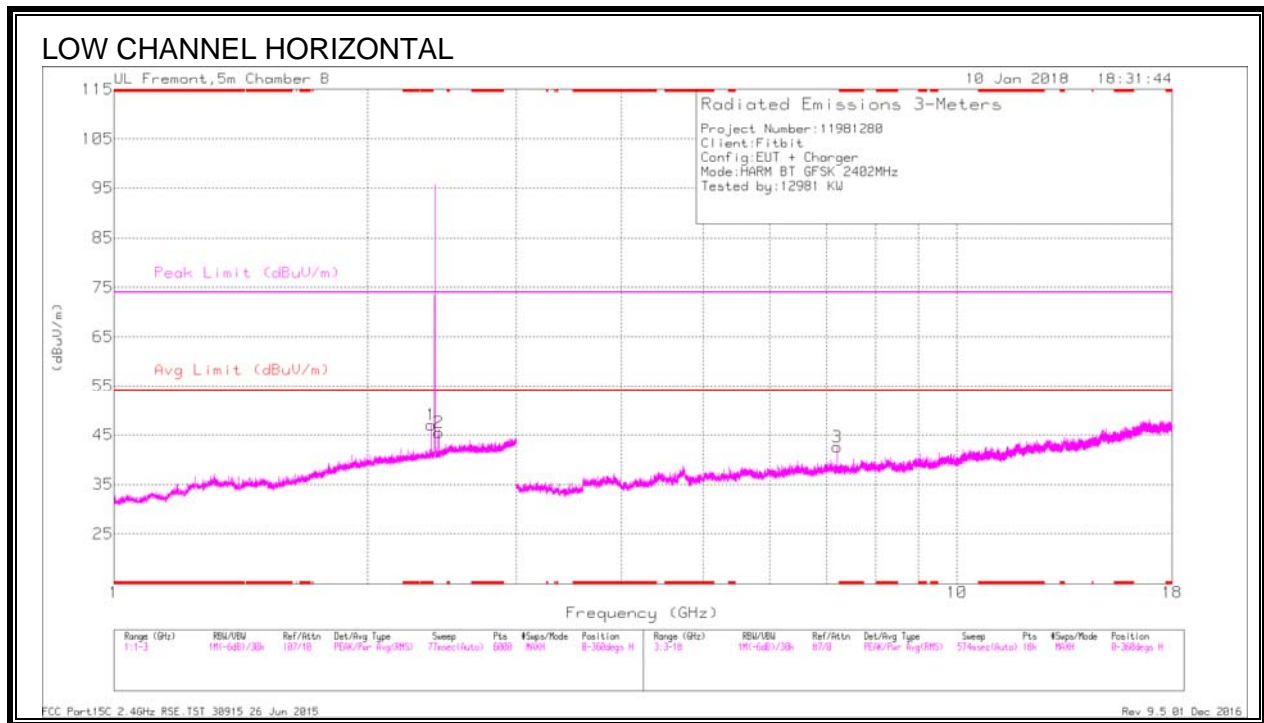
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtz/Pa d (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.08	Pk	32.5	-21.3	48.28	-	-	74	-25.72	12	117	V
3	* 2.484	25.33	VA1T	32.5	-21.3	36.53	54	-17.47	-	-	12	117	V
4	2.504	26.3	VA1T	32.6	-21.1	37.8	54	-16.2	-	-	12	117	V
2	2.561	38.85	Pk	32.5	-21.1	50.25	-	-	74	-23.75	12	117	V

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration

## HARMONICS AND SPURIOUS EMISSIONS



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (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
1	* 2.378	38.43	PKFH	31.9	-21.3	49.03	-	-	74	-24.97	65	167	H
	* 2.378	32.89	VA1T	31.9	-21.3	43.49	54	-10.51	-	-	65	167	H
4	* 2.238	34.17	PKFH	31.9	-21.3	44.77	-	-	74	-29.23	178	158	V
	* 2.236	23.52	VA1T	31.9	-21.3	34.12	54	-19.88	-	-	178	158	V
5	* 4.715	38.26	PKFH	34.2	-30	42.46	-	-	74	-31.54	220	117	V
	* 4.718	27.59	VA1T	34.2	-29.9	31.89	54	-22.11	-	-	220	117	V
6	* 11.748	32.28	PKFH	38.5	-24	46.78	-	-	74	-27.22	131	153	V
	* 11.749	21.98	VA1T	38.5	-24	36.48	54	-17.52	-	-	131	153	V
2	2.426	34.82	Pk	32.2	-21.5	45.52	-	-	-	-	0-360	102	H
3	7.206	35.29	Pk	35.8	-28.5	42.59	-	-	-	-	0-360	102	H

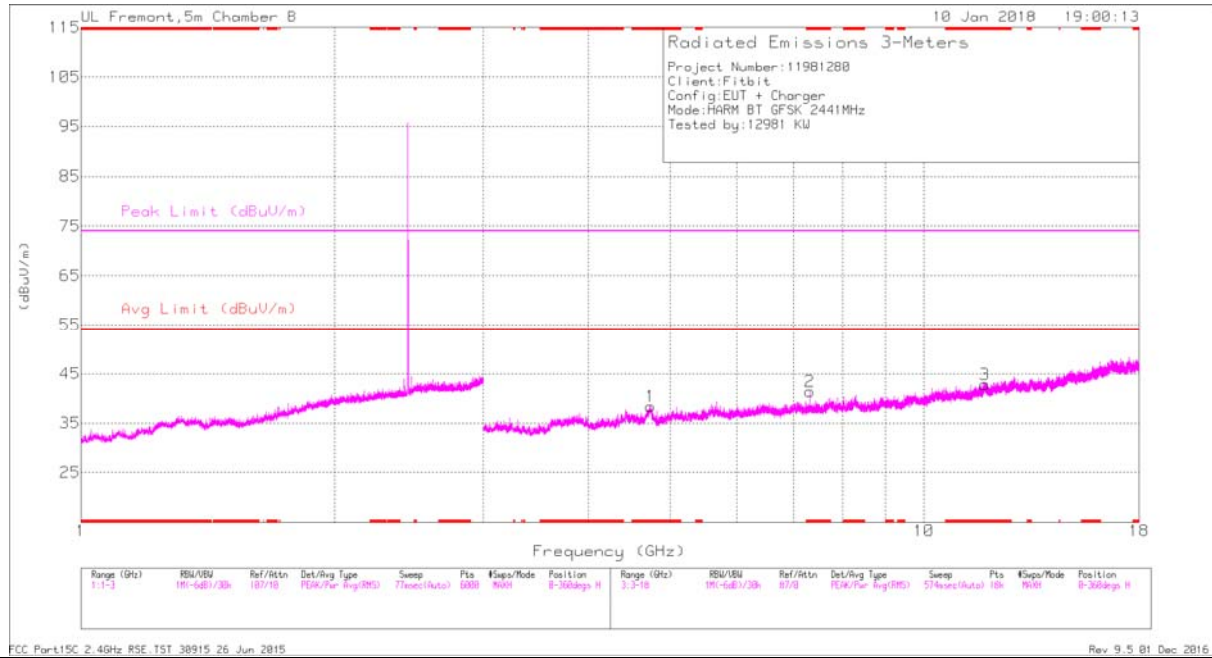
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

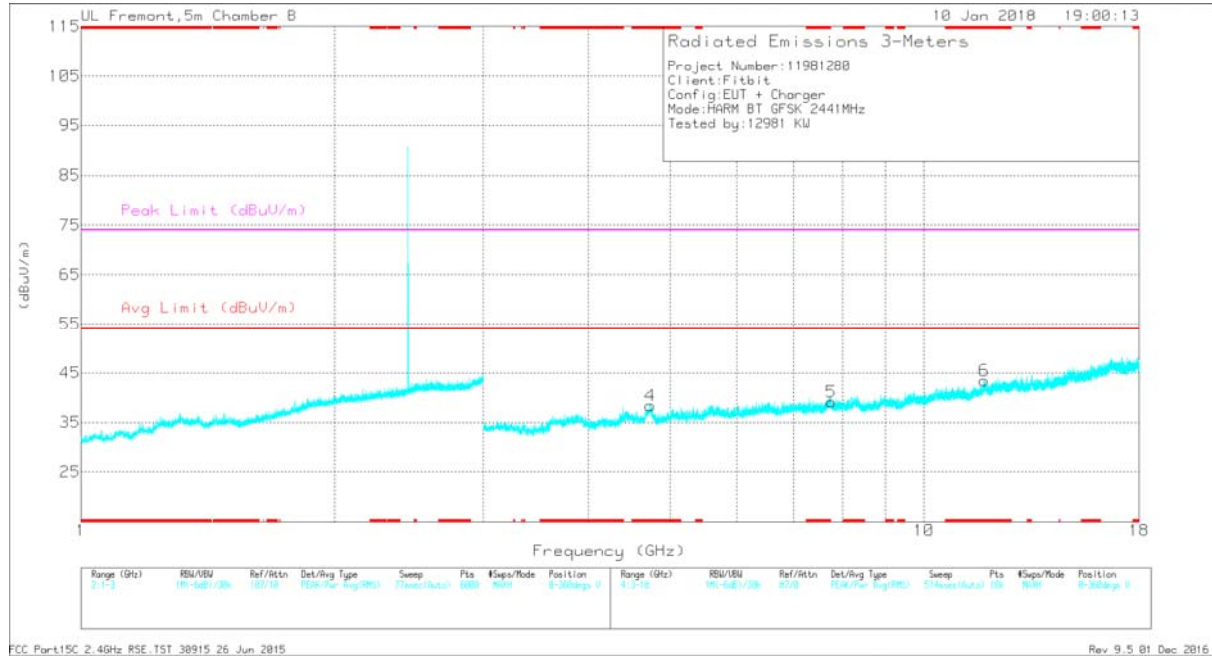
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

### MID CHANNEL HORIZONTAL



### MID CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (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
1	* 4.742	38.1	PKFH	34.2	-29.5	42.8	-	-	74	-31.2	193	182	H
	* 4.743	27.82	VA1T	34.2	-29.4	32.62	54	-21.38	-	-	193	182	H
2	* 7.323	38.58	PKFH	35.9	-28.9	45.58	-	-	74	-28.42	223	191	H
	* 7.323	29.13	VA1T	35.9	-28.9	36.13	54	-17.87	-	-	223	191	H
3	* 11.805	32.57	PKFH	38.6	-23.3	47.87	-	-	74	-26.13	93	205	H
	* 11.805	21.85	VA1T	38.6	-23.3	37.15	54	-16.85	-	-	93	205	H
4	* 4.733	39.14	PKFH	34.2	-29.6	43.74	-	-	74	-30.26	321	179	V
	* 4.737	27.86	VA1T	34.2	-29.5	32.56	54	-21.44	-	-	321	179	V
6	* 11.793	33.82	PKFH	38.6	-23.4	49.02	-	-	74	-24.98	71	192	V
	* 11.794	21.95	VA1T	38.6	-23.3	37.25	54	-16.75	-	-	71	192	V
5	7.763	30.42	Pk	36	-27.3	39.12	-	-	-	-	0-360	200	V

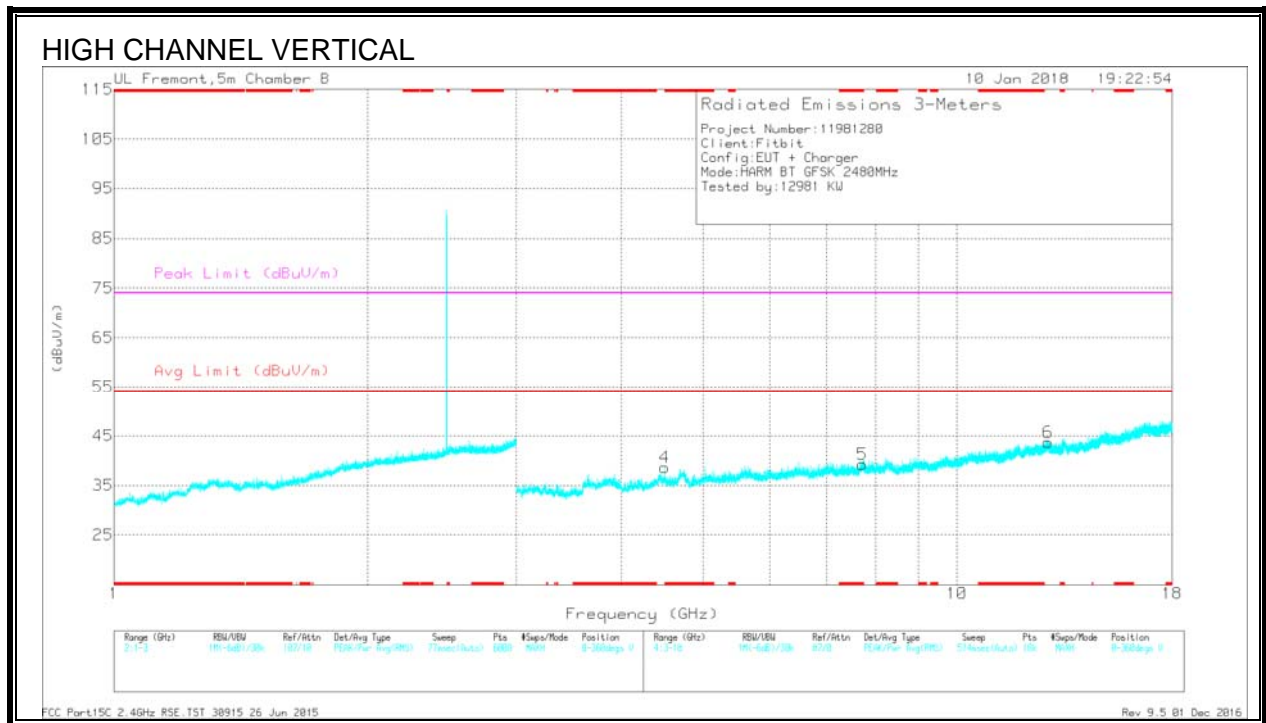
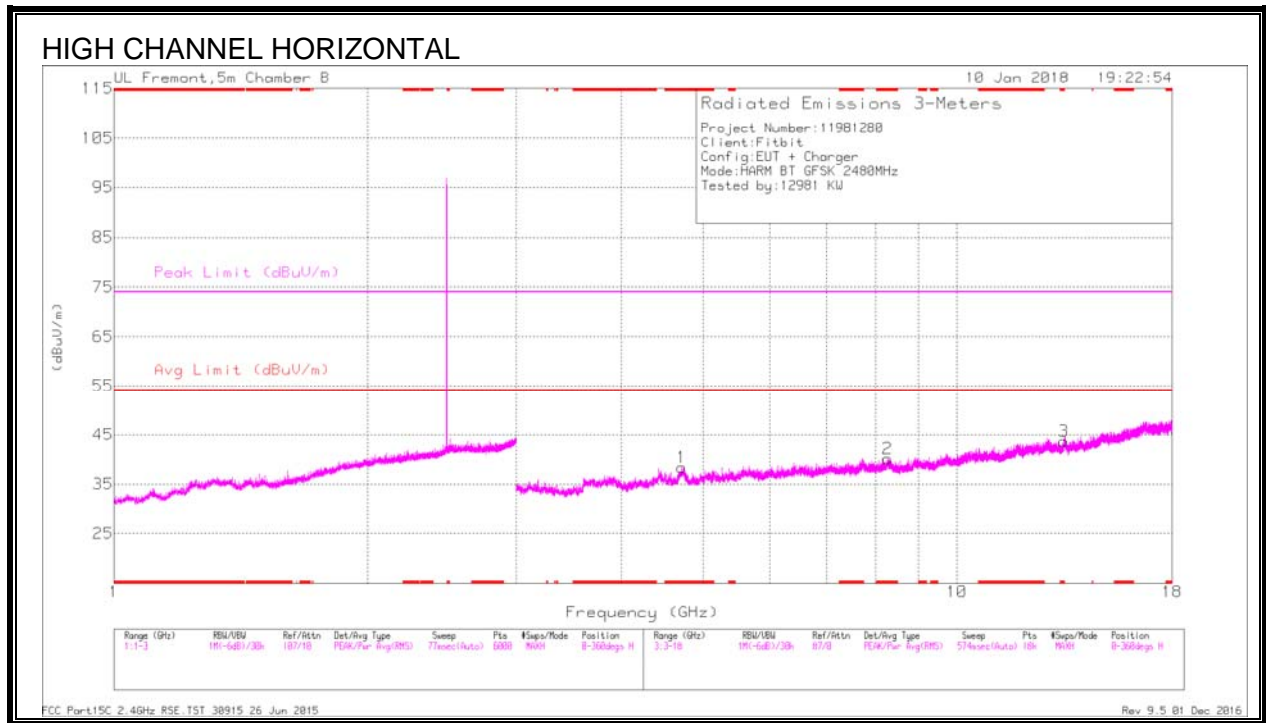
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration







Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (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
1	* 4.714	37.95	PKFH	34.2	-30	42.15	-	-	74	-31.85	257	132	H
	* 4.716	27.71	VA1T	34.2	-29.9	32.01	54	-21.99	-	-	257	132	H
2	* 8.267	35.27	PKFH	36.1	-26.7	44.67	-	-	74	-29.33	127	229	H
	* 8.266	24.77	VA1T	36.1	-26.8	34.07	54	-19.93	-	-	127	229	H
3	* 13.392	34.21	PKFH	39.3	-23.2	50.31	-	-	74	-23.69	211	155	H
	* 13.391	21.76	VA1T	39.3	-23.2	37.86	54	-16.14	-	-	211	155	H
4	* 4.692	39.85	PKFH	34.2	-30.5	43.55	-	-	74	-30.45	133	184	V
	* 4.737	28.04	VA1T	34.2	-29.5	32.74	54	-21.26	-	-	133	184	V
5	* 7.726	35.89	PKFH	36	-27	44.89	-	-	74	-29.11	54	164	V
	* 7.727	24.57	VA1T	36	-27	33.57	54	-20.43	-	-	54	164	V
6	12.827	27.69	Pk	39.4	-23.4	43.69	-	-	-	-	0-360	102	V

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

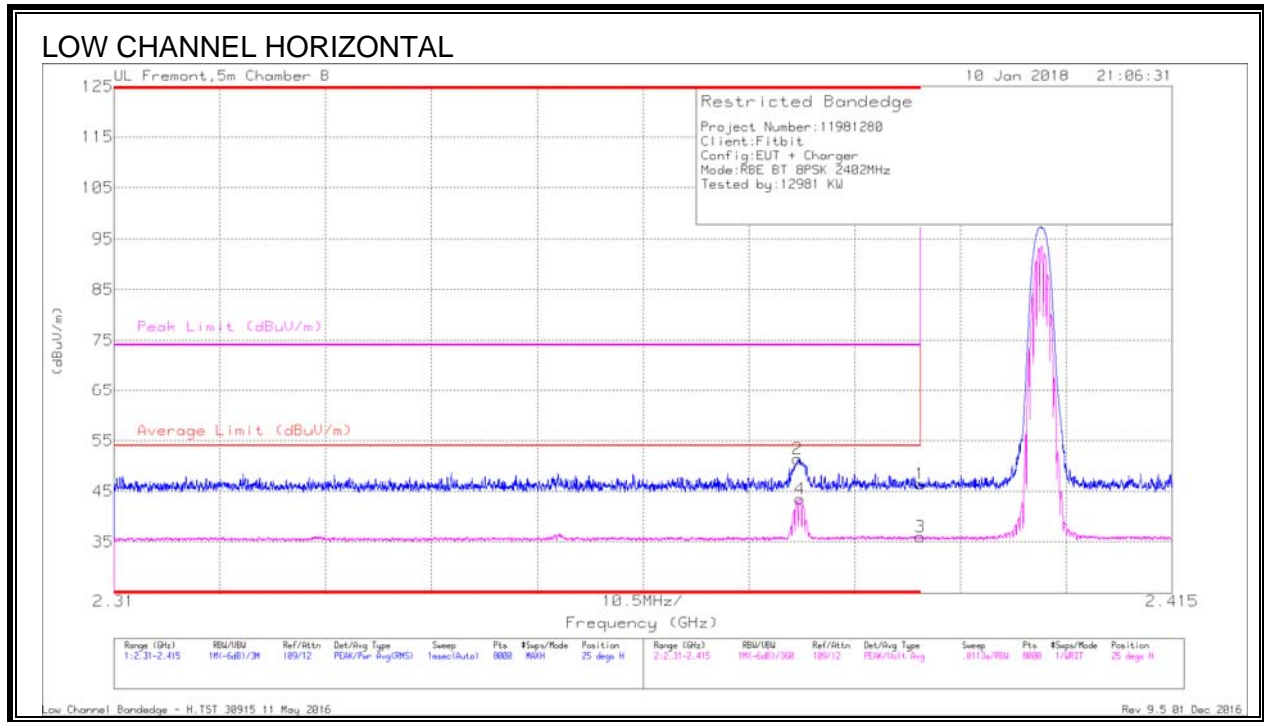
Pk - Peak detector

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

## 9.2.2. ENHANCED DATA RATE 8PSK MODULATION

### RESTRICTED BANDEDGE (LOW CHANNEL)

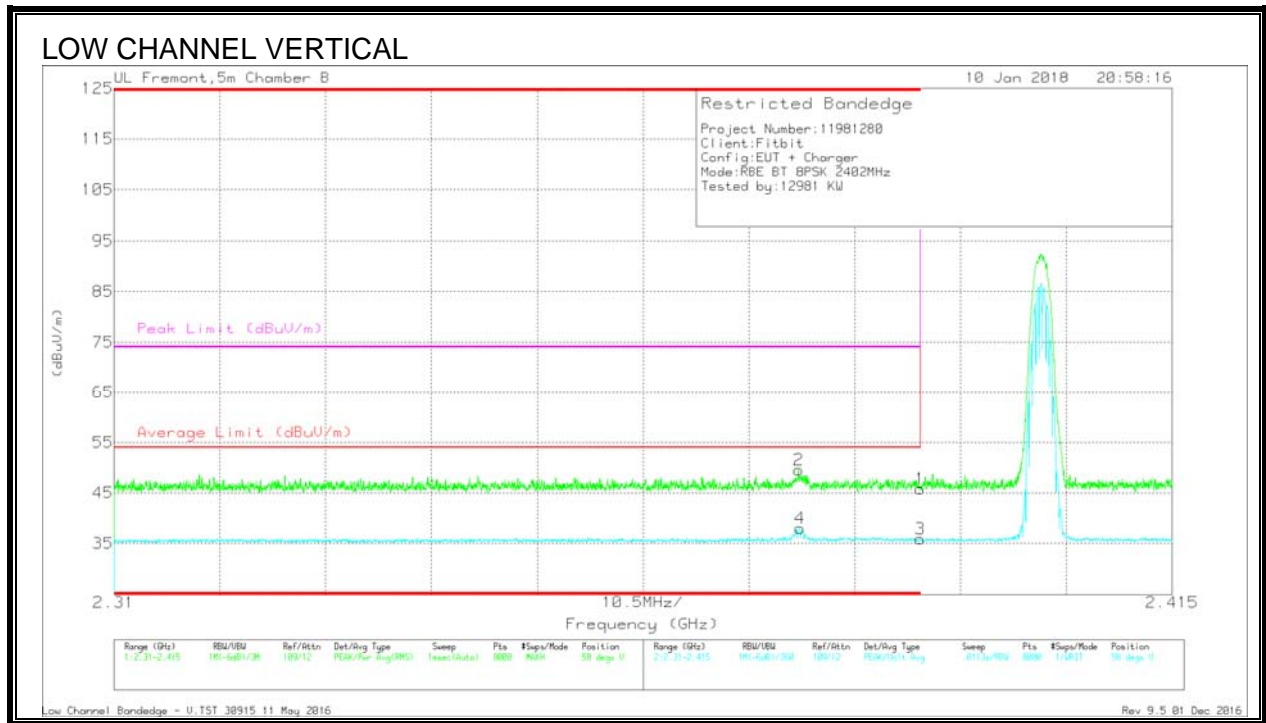


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.378	40.78	Pk	31.9	-21.3	51.38	-	-	74	-22.62	25	191	H
4	* 2.378	32.9	VA1T	31.9	-21.3	43.5	54	-10.5	-	-	25	191	H
1	* 2.39	35.74	Pk	32	-21.3	46.44	-	-	74	-27.56	25	191	H
3	* 2.39	25.36	VA1T	32	-21.3	36.06	54	-17.94	-	-	25	191	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration



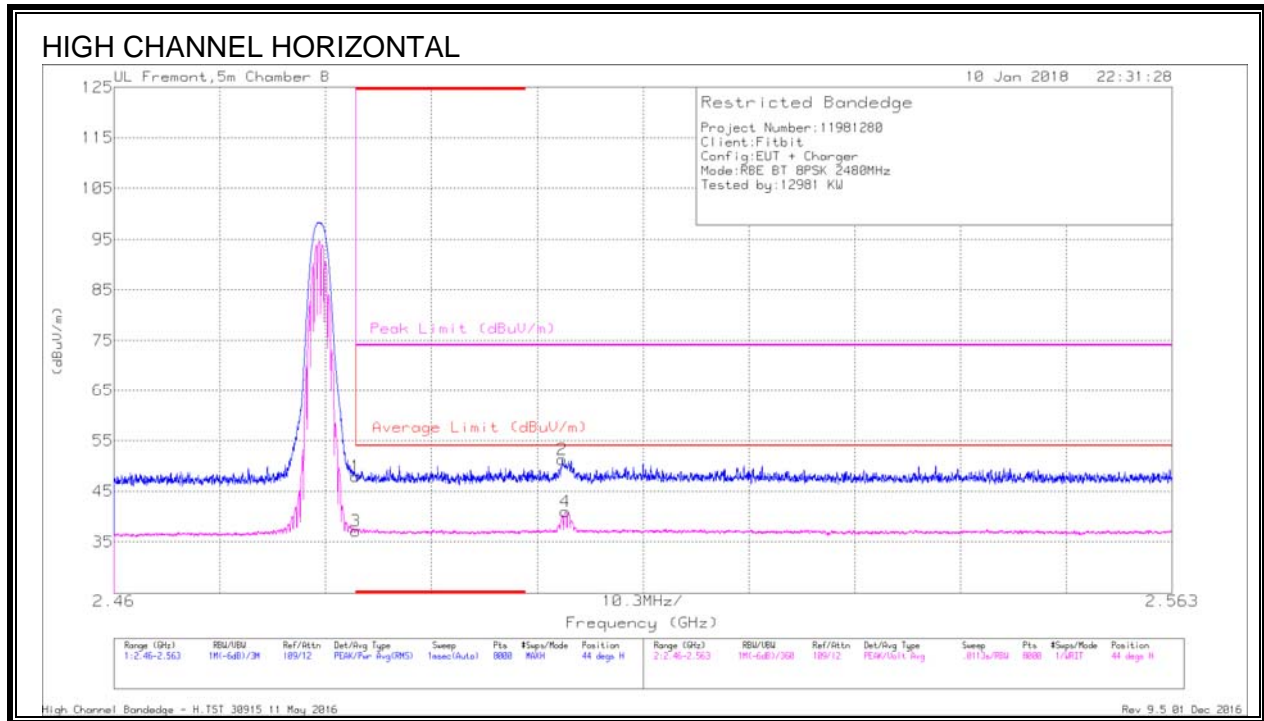
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.378	38.94	Pk	31.9	-21.3	49.54	-	-	74	-24.46	58	283	V
4	* 2.378	27.39	VA1T	31.9	-21.3	37.99	54	-16.01	-	-	58	283	V
1	* 2.39	35.07	Pk	32	-21.3	45.77	-	-	74	-28.23	58	283	V
3	* 2.39	25.23	VA1T	32	-21.3	35.93	54	-18.07	-	-	58	283	V

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration

**AUTHORIZED BANDEGE (HIGH CHANNEL)**

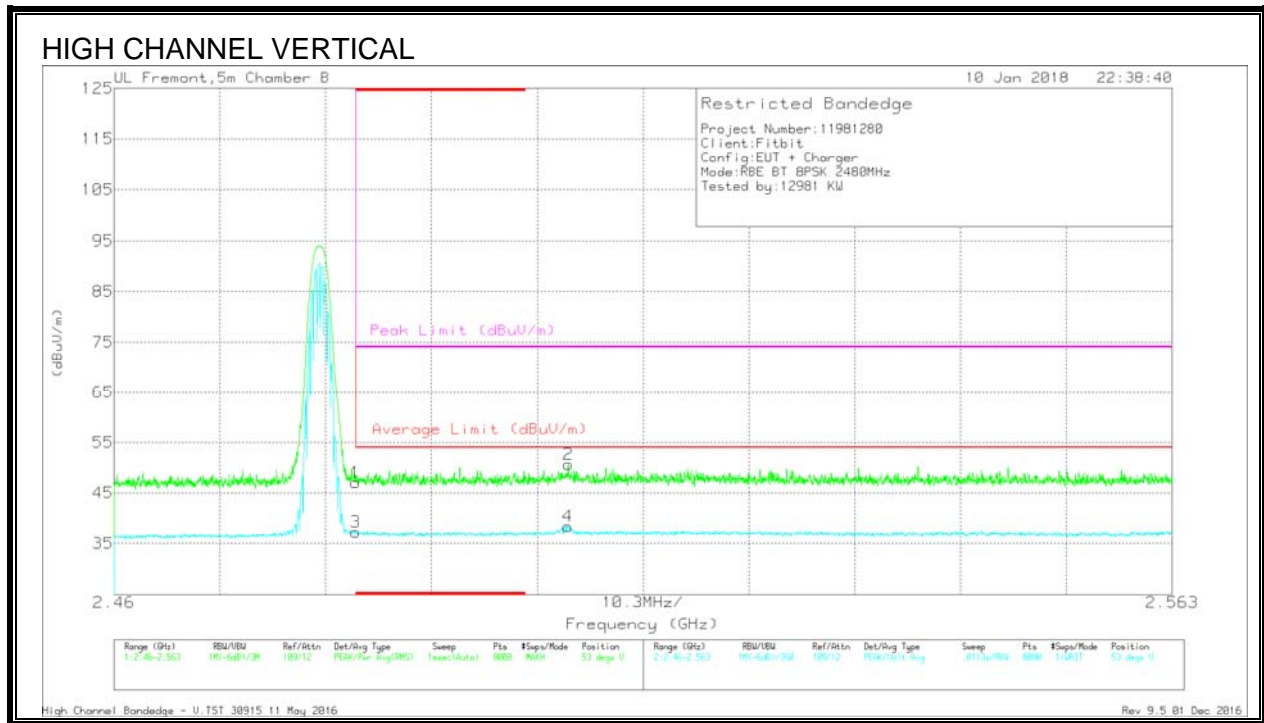


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.7	Pk	32.5	-21.3	47.9	-	-	74	-26.1	44	165	H
3	* 2.484	25.94	VA1T	32.5	-21.3	37.14	54	-16.86	-	-	44	165	H
2	2.504	39.74	Pk	32.6	-21.1	51.24	-	-	74	-22.76	44	165	H
4	2.504	29.48	VA1T	32.6	-21.1	40.98	54	-13.02	-	-	44	165	H

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration



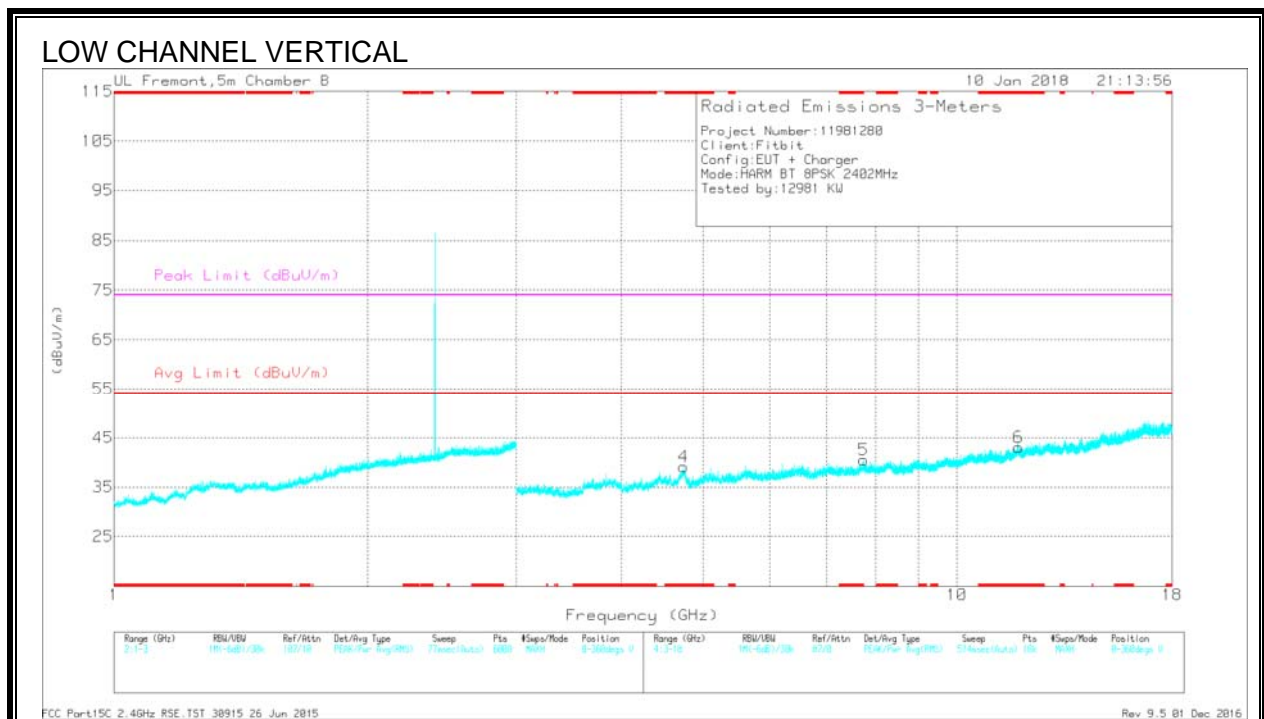
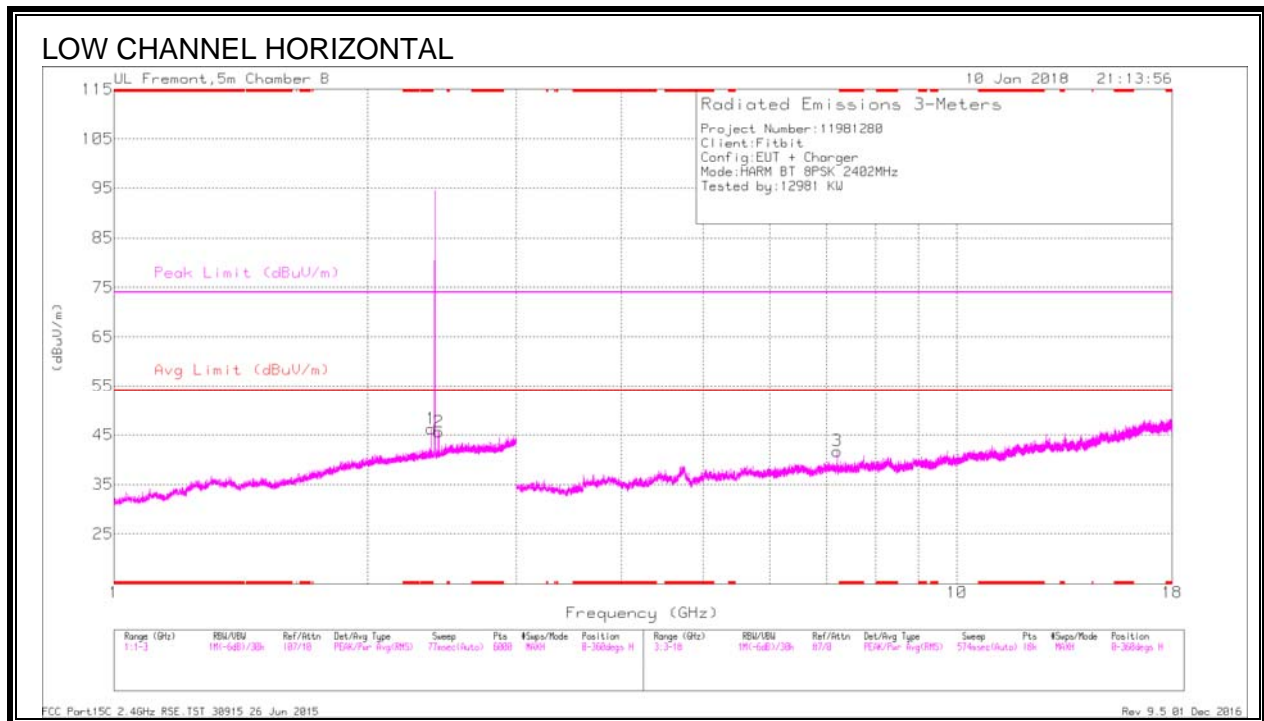
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	35.82	Pk	32.5	-21.3	47.02	-	-	74	-26.98	53	300	V
3	* 2.484	26.1	VA1T	32.5	-21.3	37.3	54	-16.7	-	-	53	300	V
2	2.504	39.18	Pk	32.6	-21.1	50.68	-	-	74	-23.32	53	300	V
4	2.504	26.92	VA1T	32.6	-21.1	38.42	54	-15.58	-	-	53	300	V

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

Pk - Peak detector

VA1T - FHSS: Linear Voltage Average  $V_B = 1/T_{on}$  where:  $T_{on}$  is transmit duration

## HARMONICS AND SPURIOUS EMISSIONS



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (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	* 2.378	38.42	PKFH	31.9	-21.3	49.02	-	-	74	-24.98	76	122	H
	* 2.378	31.75	VA1T	31.9	-21.3	42.35	54	-11.65	-	-	76	122	H
4	* 4.734	39.24	PKFH	34.2	-29.6	43.84	-	-	74	-30.16	115	173	V
	* 4.734	27.8	VA1T	34.2	-29.6	32.4	54	-21.6	-	-	115	173	V
6	* 11.823	32.61	PKFH	38.6	-23	48.21	-	-	74	-25.79	215	211	V
	* 11.823	21.57	VA1T	38.6	-23.1	37.07	54	-16.93	-	-	215	211	V
2	2.426	34.94	Pk	32.2	-21.5	45.64	-	-	-	-	0-360	102	H
3	7.206	34.43	Pk	35.8	-28.5	41.73	-	-	-	-	0-360	102	H
5	7.754	31.73	Pk	36	-27.2	40.53	-	-	-	-	0-360	102	V

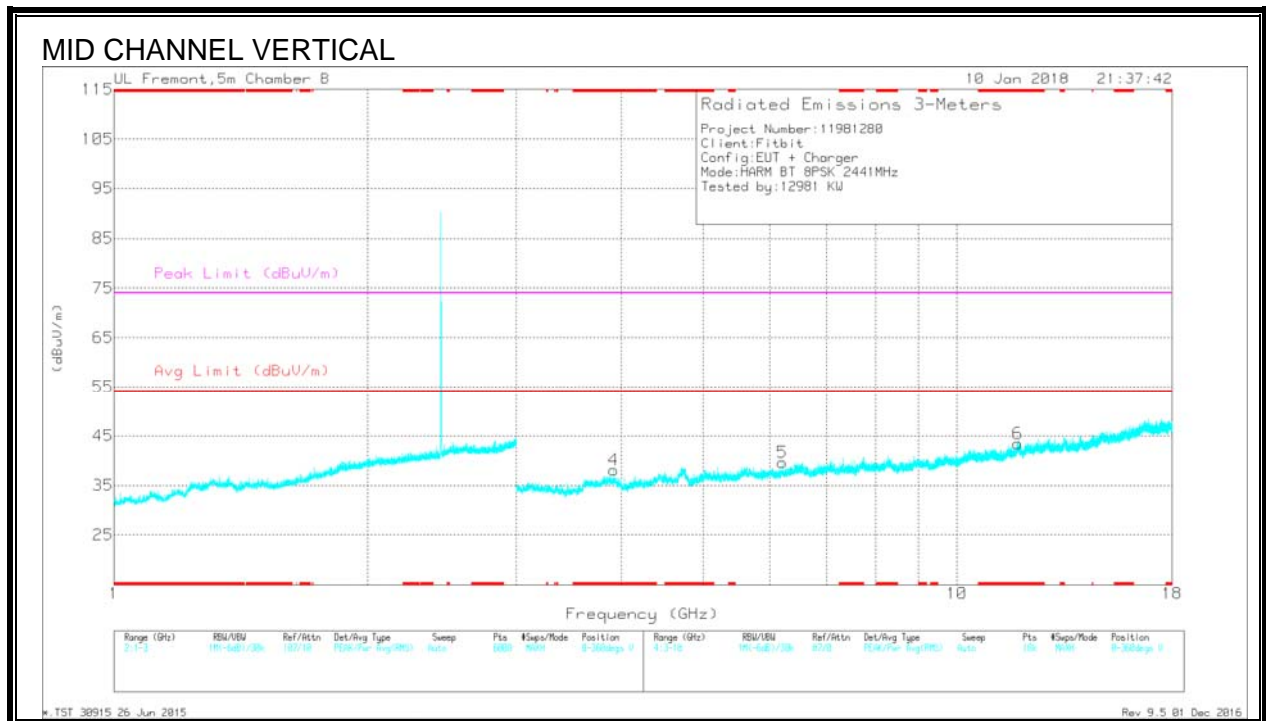
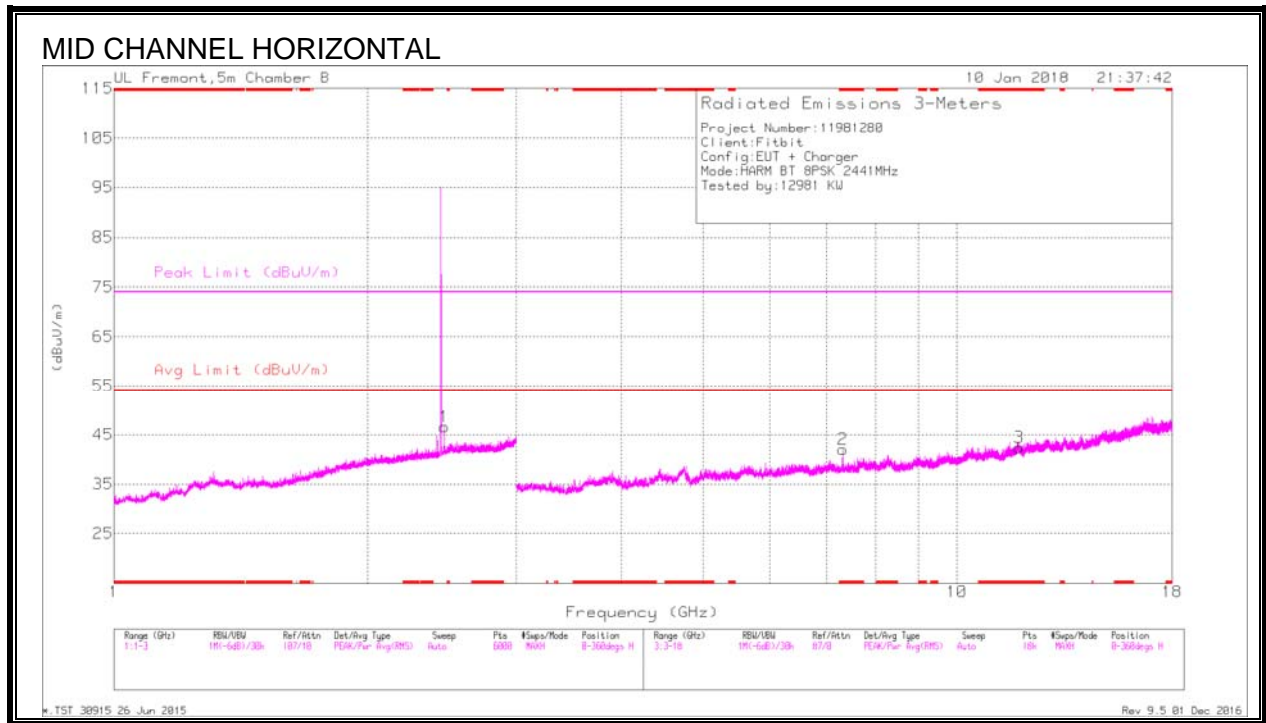
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration







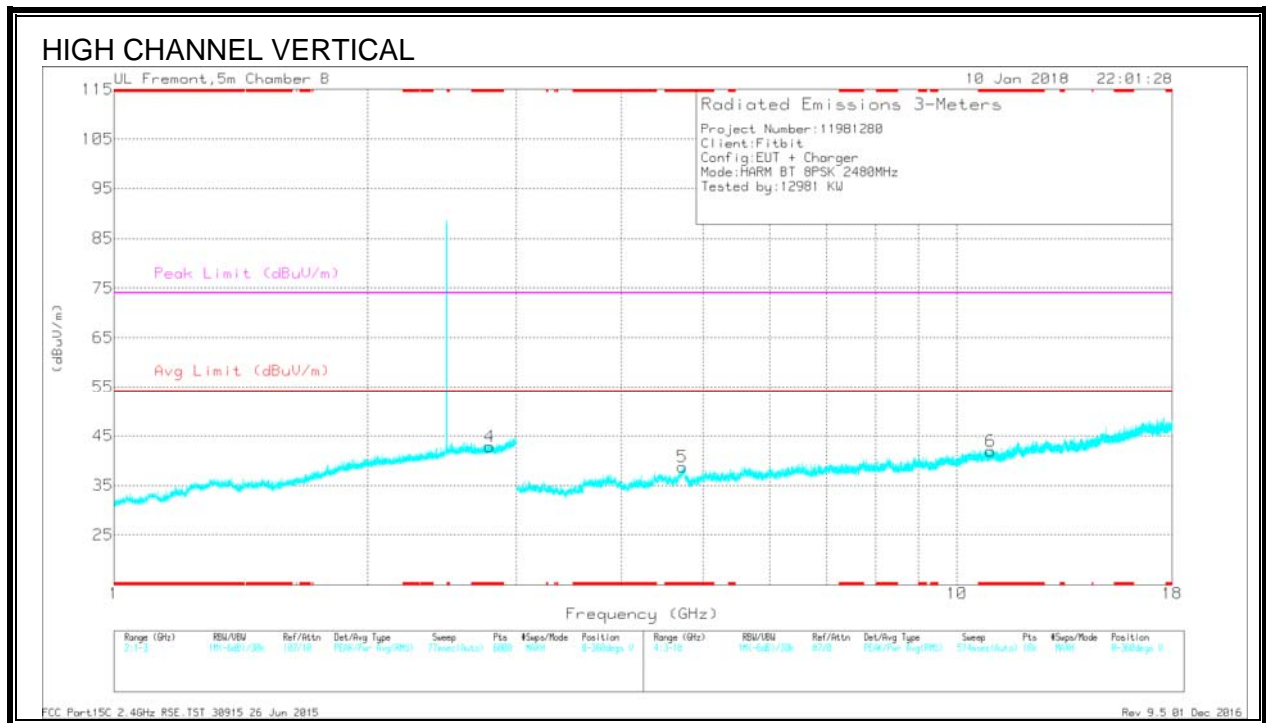
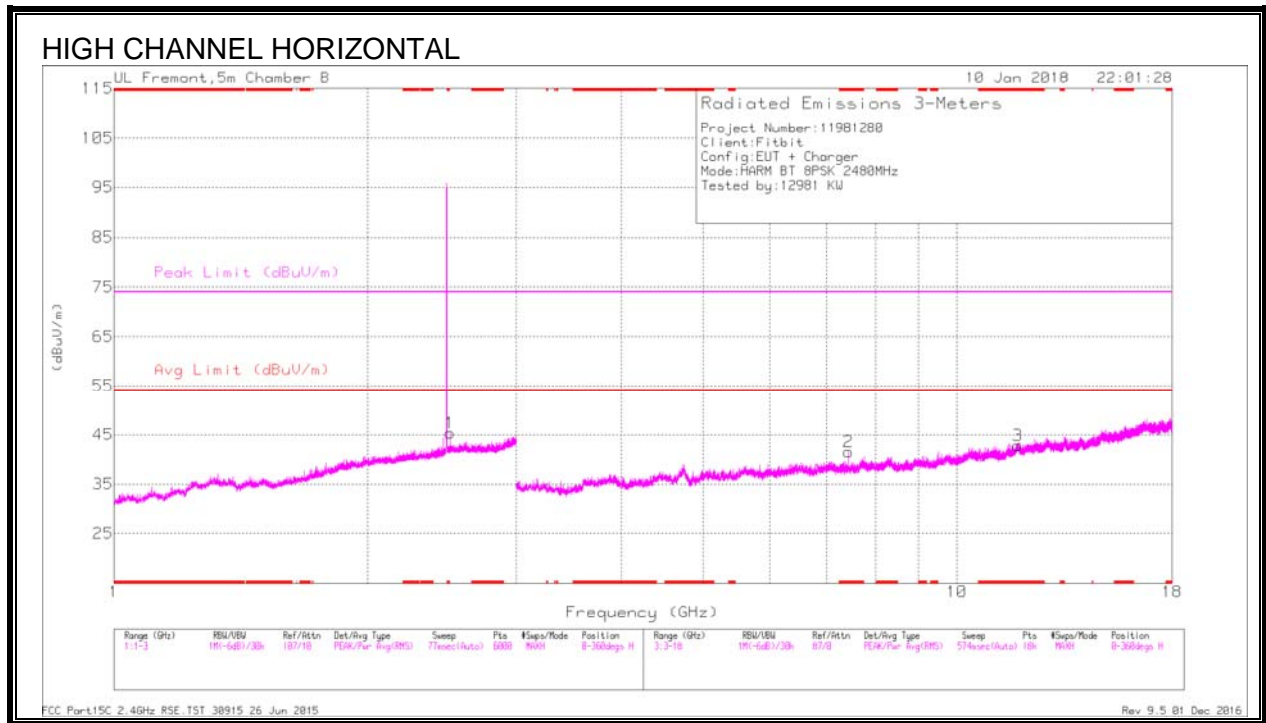
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 7.322	40.15	PKFH	35.9	-28.9	47.15	-	-	74	-26.85	91	172	H
	* 7.323	30	VA1T	35.9	-28.9	37	54	-17	-	-	91	172	H
3	* 11.844	32.49	PKFH	38.6	-23.7	47.39	-	-	74	-26.61	287	118	H
	* 11.846	21.73	VA1T	38.6	-23.7	36.63	54	-17.37	-	-	287	118	H
4	* 3.918	39.51	PKFH	33.5	-30.4	42.61	-	-	74	-31.39	164	169	V
	* 3.919	28	VA1T	33.5	-30.5	31	54	-23	-	-	164	169	V
6	* 11.809	32.72	PKFH	38.6	-23.2	48.12	-	-	74	-25.88	25	145	V
	* 11.81	21.71	VA1T	38.6	-23.1	37.21	54	-16.79	-	-	25	145	V
1	2.465	35.65	Pk	32.4	-21.4	46.65	-	-	-	-	0-360	199	H
5	6.205	33.5	Pk	35.7	-29.6	39.6	-	-	-	-	0-360	102	V

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

Pk - Peak detector

PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (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
4	* 2.789	36.57	PKFH	32.4	-20.6	48.37	-	-	74	-25.63	211	131	V
	* 2.79	23.95	VA1T	32.4	-20.6	35.75	54	-18.25	-	-	211	131	V
2	* 7.441	39.28	PKFH	35.9	-27.9	47.28	-	-	74	-26.72	77	162	H
	* 7.44	28.73	VA1T	35.9	-27.8	36.83	54	-17.17	-	-	77	162	H
3	* 11.807	33.5	PKFH	38.6	-23.2	48.9	-	-	74	-25.1	164	194	H
	* 11.806	21.82	VA1T	38.6	-23.2	37.22	54	-16.78	-	-	164	194	H
5	* 4.725	40.5	PKFH	34.2	-29.7	45	-	-	74	-29	95	223	V
	* 4.725	27.79	VA1T	34.2	-29.7	32.29	54	-21.71	-	-	95	223	V
6	* 10.964	33.11	PKFH	37.7	-24.3	46.51	-	-	74	-27.49	115	184	V
	* 10.965	22.14	VA1T	37.7	-24.3	35.54	54	-18.46	-	-	115	184	V
1	2.504	33.9	Pk	32.6	-21.1	45.4	-	-	-	-	0-360	199	H

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

Pk - Peak detector

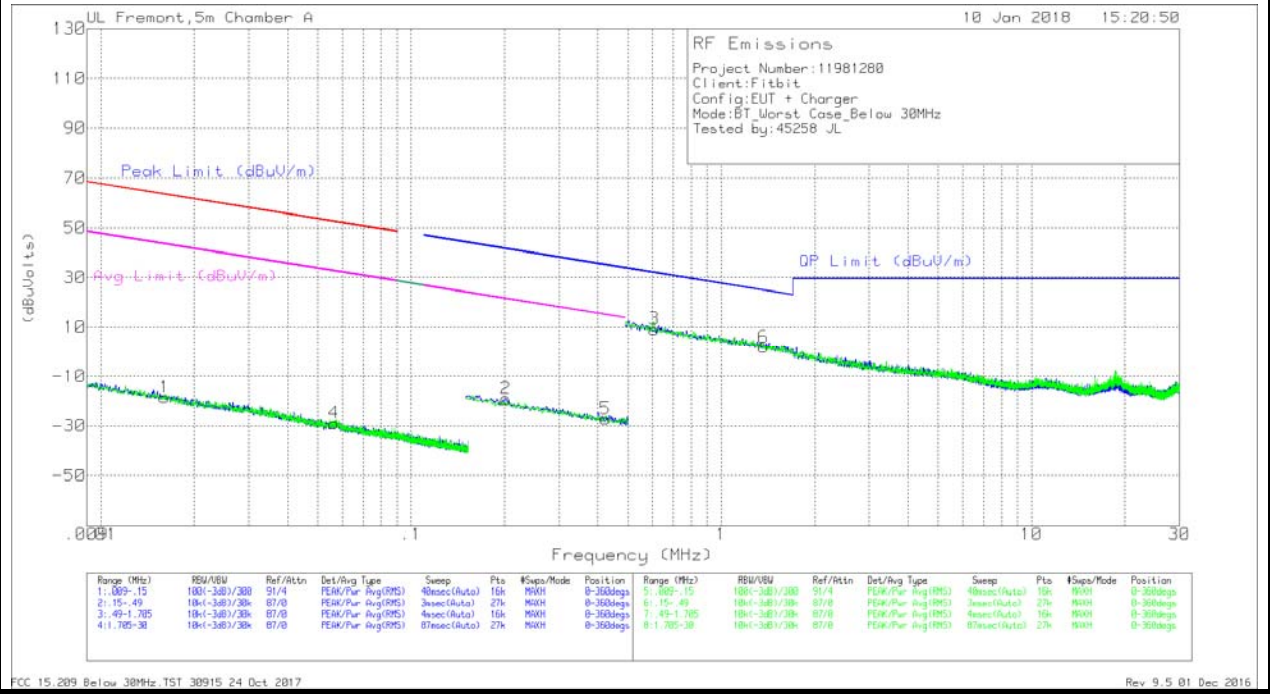
PKFH - FHSS: RB=100k/1MHz VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

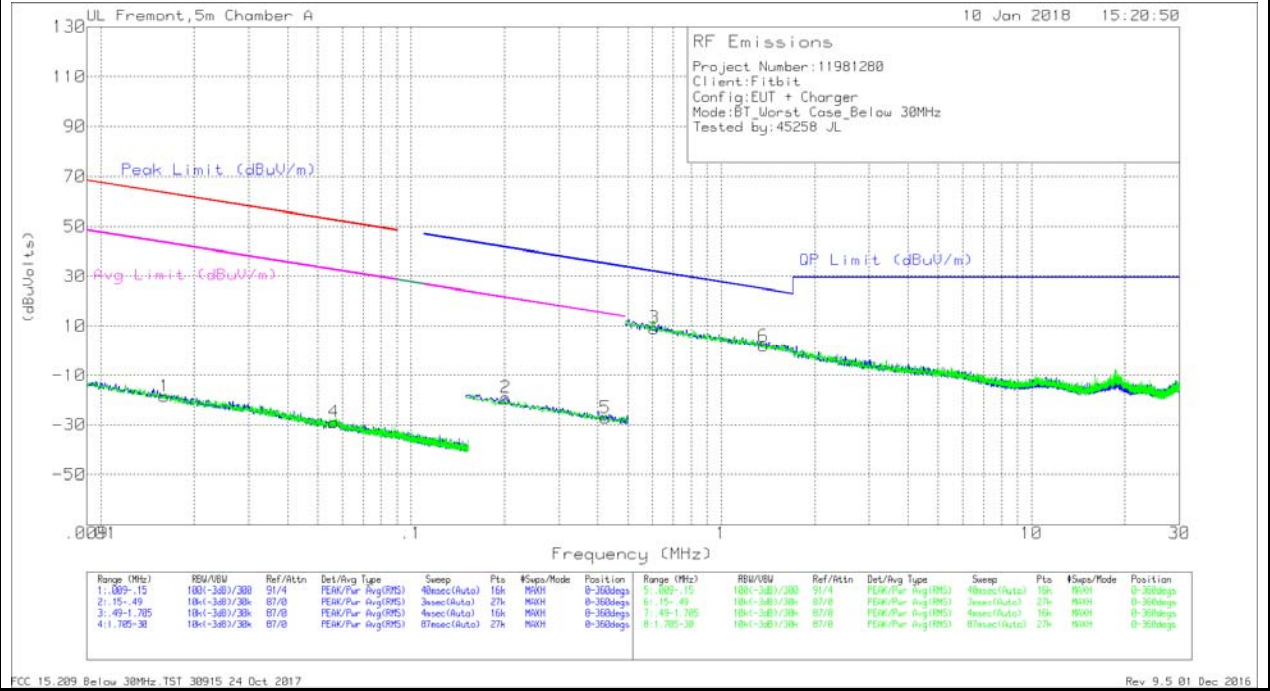
### 9.3. WORST-CASE BELOW 30MHz

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

##### HORIZONTAL PLOT



##### VERTICAL PLOT



## DATA

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)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01605	46.2	Pk	15.1	.1	-80	-18.6	63.48	-82.08	43.48	-62.08	-	-	-	-	0-360
4	.05644	36.59	Pk	14.4	.1	-80	-28.91	52.55	-81.46	32.55	-61.46	-	-	-	-	0-360
2	.20207	46.77	Pk	13.9	.1	-80	-19.23	-	-	-	-	41.51	-60.74	21.51	-40.74	0-360
5	.42314	38.82	Pk	13.8	.1	-80	-27.28	-	-	-	-	35.08	-62.36	15.08	-42.36	0-360

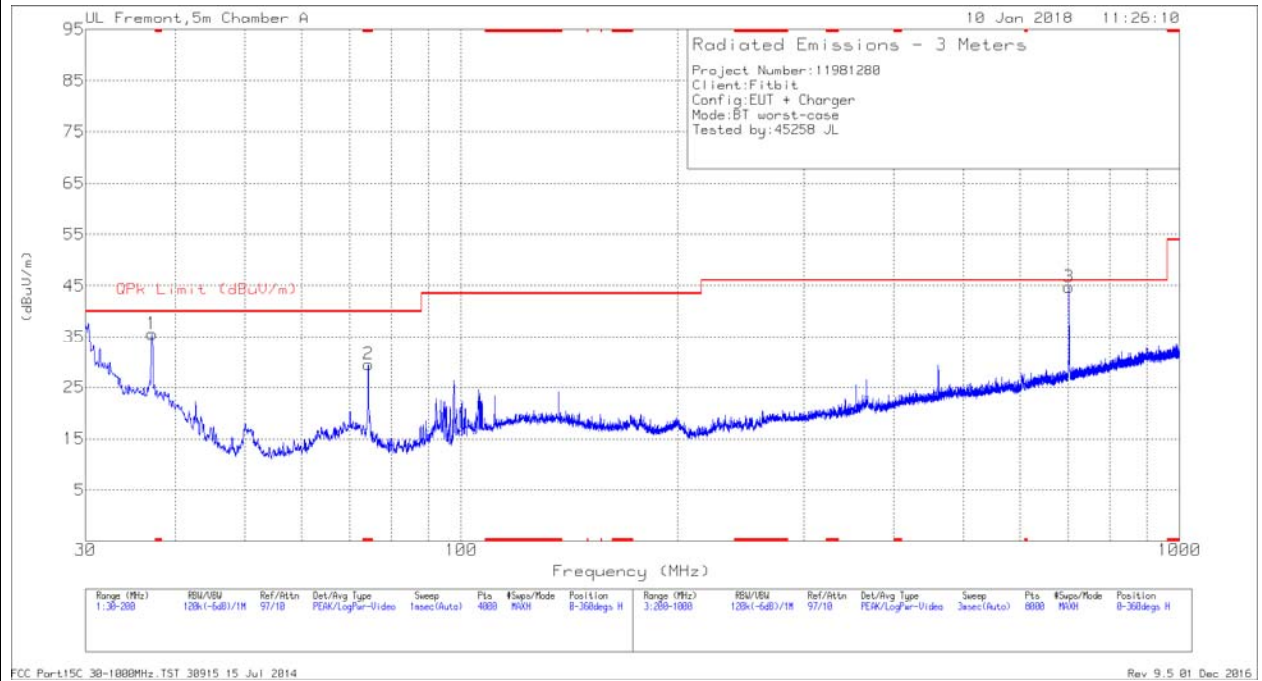
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.60833	35.13	Pk	14	.1	-40	9.23	31.93	-22.7	0-360
6	1.36833	27.36	Pk	14.3	.2	-40	1.86	24.91	-23.05	0-360

Pk - Peak detector

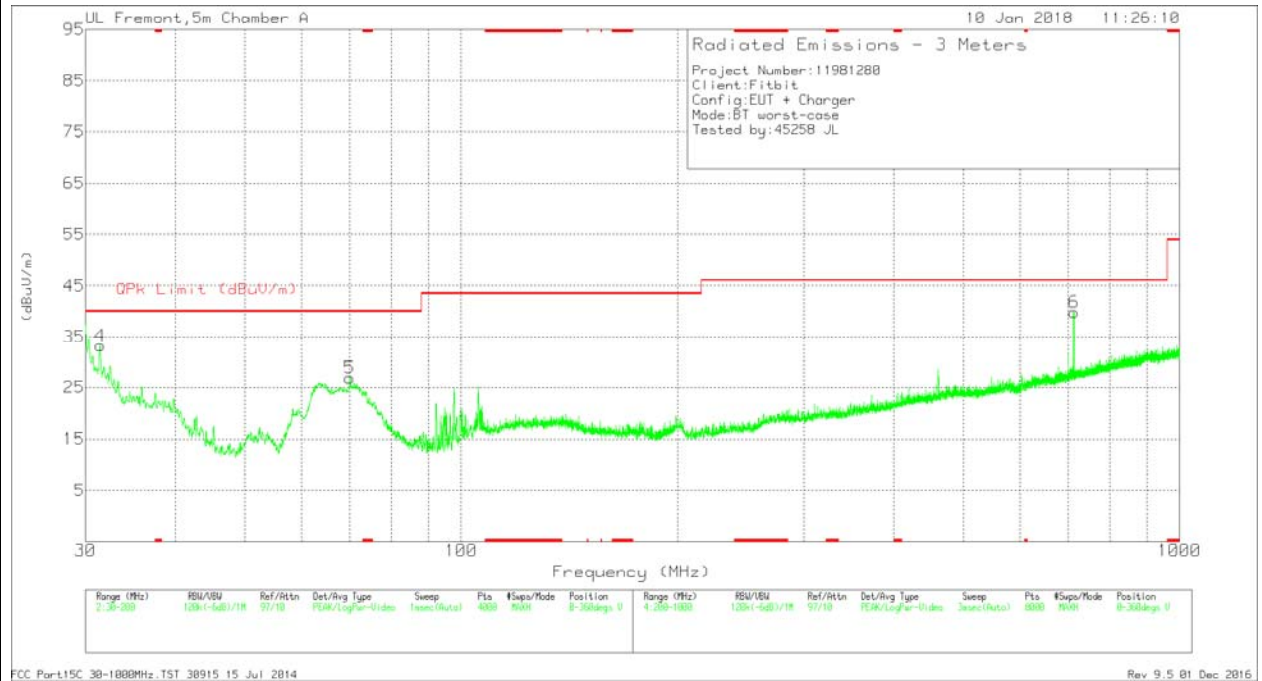
## 9.4. WORST-CASE 30MHz TO 1GHz

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

#### HORIZONTAL PLOT



#### VERTICAL PLOT



## DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 74.254	44.18	Pk	12	-26.7	29.48	40	-10.52	0-360	400	H
4	31.4454	36.39	Pk	24.1	-27.3	33.19	40	-6.81	0-360	100	V
1	37.1418	42.8	Pk	20	-27.2	35.6	40	-4.4	0-360	400	H
	37.1586	23.49	Qp	20	-27.2	16.29	40	-23.71	45	319	H
5	70.0029	41.42	Pk	12.1	-26.7	26.82	40	-13.18	0-360	100	V
3	701.4652	45.03	Pk	24.2	-24.5	44.73	46.02	-1.29	0-360	200	H
	701.2463	22.63	Qp	24.2	-24.5	22.33	46.02	-23.69	114	225	H
6	712.5666	39.8	Pk	24.4	-24.4	39.8	46.02	-6.22	0-360	200	V

NOTE: Marker 3 and 6 are ambient emissions.

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

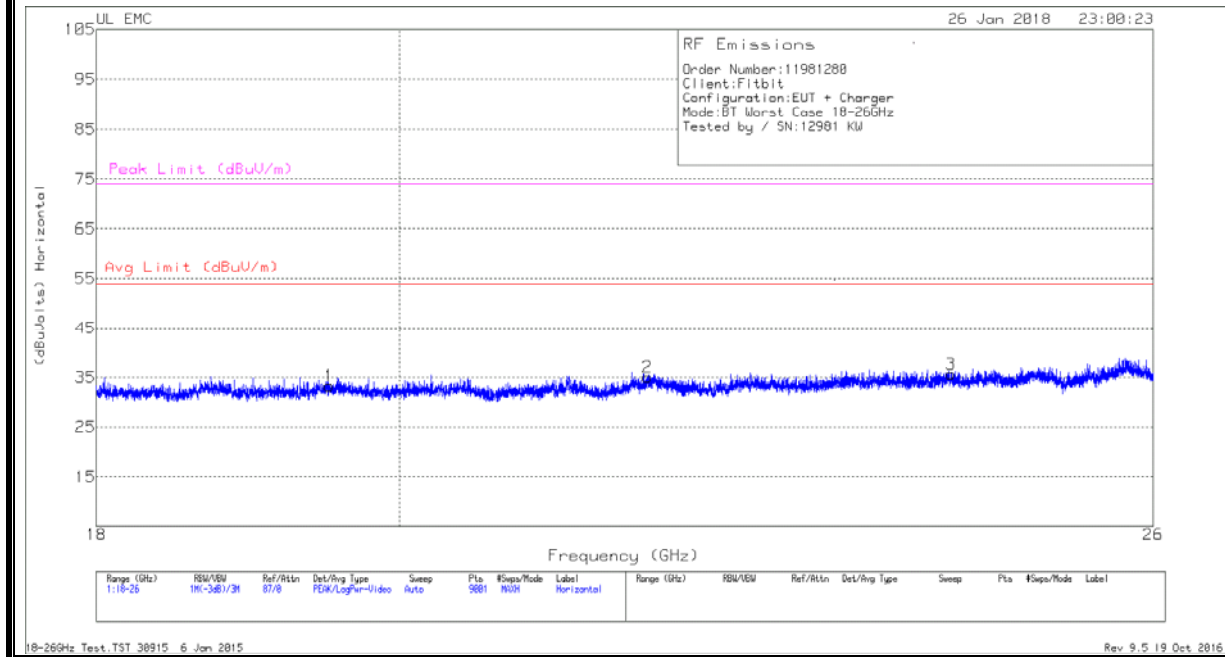
Qp - Quasi-Peak detector

Pk - Peak detector

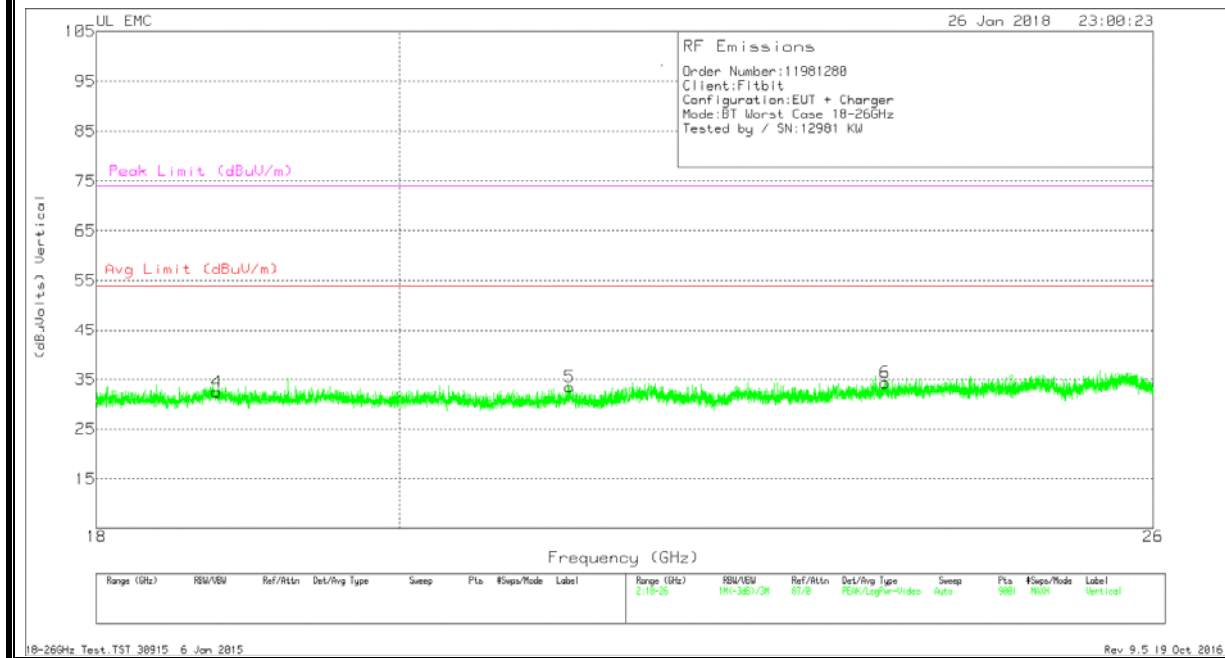
## 9.5. WORST-CASE ABOVE 18GHz

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

#### HORIZONTAL PLOT



#### VERTICAL PLOT





## DATA

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	19.519	35.49	Pk	32.5	-25.2	-9.5	33.29	54	-20.71	74	-40.71
2	21.805	35.65	Pk	33.3	-24.4	-9.5	35.05	54	-18.95	74	-38.95
3	24.233	35.89	Pk	33.5	-24.2	-9.5	35.69	54	-18.31	74	-38.31
4	18.771	34.49	Pk	32.5	-25	-9.5	32.49	54	-21.51	74	-41.51
5	21.221	34.77	Pk	33.1	-24.9	-9.5	33.47	54	-20.53	74	-40.53
6	23.684	34.65	Pk	33.6	-24.4	-9.5	34.35	54	-19.65	74	-39.65

Pk - Peak detector