



**FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT**

**FOR**

**Flash**

**MODEL NUMBER: F0**

**FCC ID: PT3-F0  
IC: 10638A-F0**

**REPORT NUMBER: 14U18370-1**

**ISSUE DATE: August 6, 2014**

*Prepared for*  
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NVLAP Lab code: 100414-0

Revision History

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Rev.	Date	Issue Revisions	Revised By
--	08/06/14	Initial Issue	M.Ferrer

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** MISFIT WEARABLES CORPORATION  
5 Brookdale Rd., Salem,  
New Hampshire 03079

**EUT DESCRIPTION:** Flash

**MODEL:** F0

**DATE TESTED:** July 31, 2014 – August 6, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

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

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

Approved & Released For  
UL LLC By:



Tested By:



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UL LLC

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/Standards/scopes/1004140.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

#### Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)

Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)

Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

### 4.3. MEASUREMENT UNCERTAINTY

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

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.30dB
Radiated Emissions	30-130MHz	Bicon 3m Vert	4.84dB
Radiated Emissions	130-200MHz	Bicon 3m Vert	4.94dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	3.46dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	4.98dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a quarter sized pedometer that links to a cellular device to send real-time data. The EUT is a Bluetooth Low Energy 4.1 transceiver.

The radio module is manufactured by Misfit Wearables.

### 5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)
2402-2480	BTLE	93.22

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a trace antenna, with a maximum gain of 0dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Flash, rev. FL2.0.6r.prod.

### 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
EUT	Misfit Wearables Co	F0	-	PT3-F0

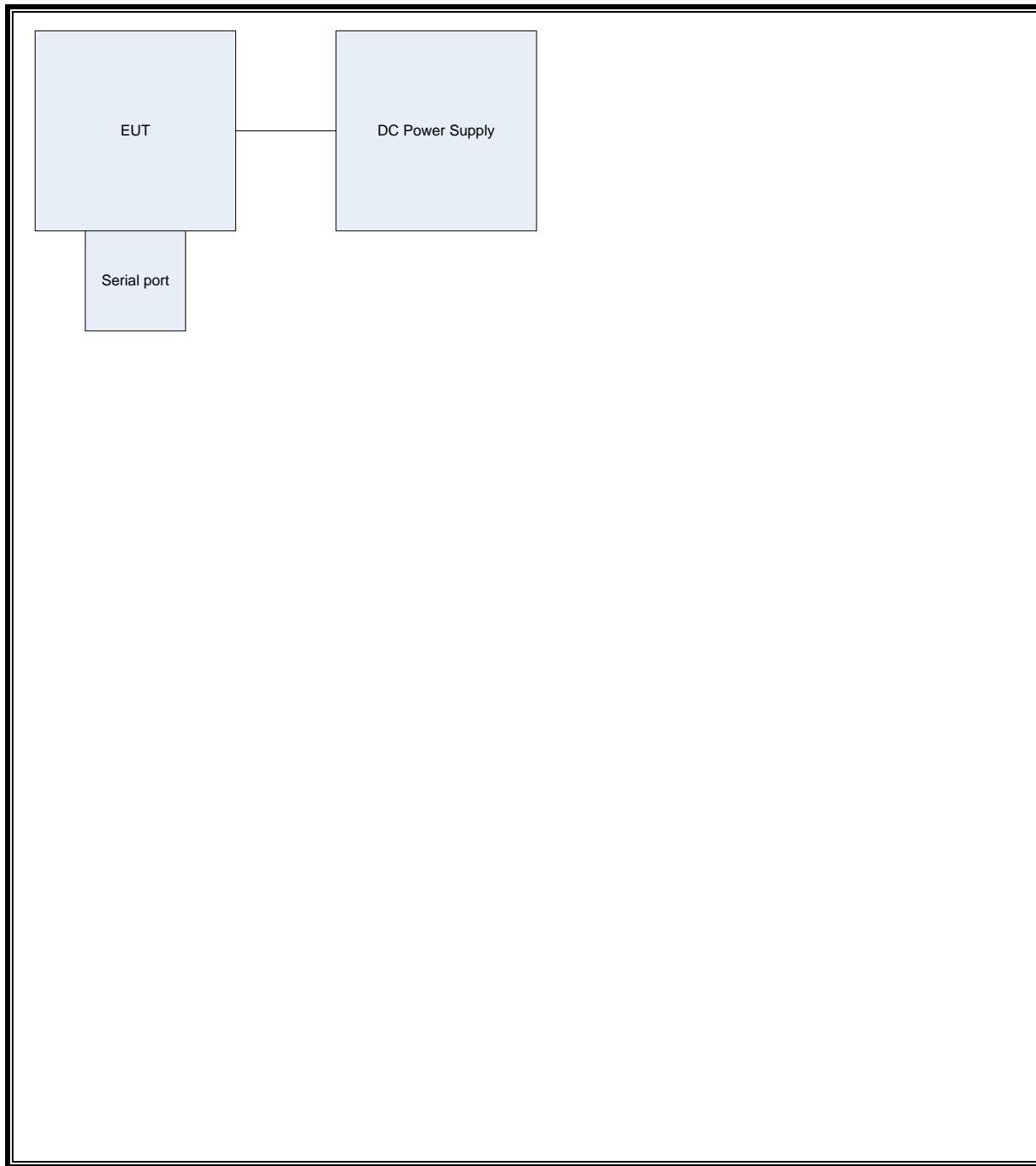
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Wire	0.1	Only for testing purposes
2	Serial	1	IO	Wire	0.1	Only for testing purposes

### TEST SETUP

The EUT was programmed using a PC connected via serial port. The was powered via DC power supply to maintain constant 3VDC. Normally EUT is battery powered internally and no external connection accessible.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

Description	Manufacturer	Model	Asset	Cal Date	Cal Due
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20131220	20141231
Bicon Antenna	Chase	VBA6106A	EMC4078	20140401	20150401
Log-P Antenna	Schaffner	UPA6109	EMC4313	20131003	20141003
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20131217	20141231
Antenna Array	UL	BOMS	EMC4276	20121227	20141231
EMI Test Receiver	Agilent	N9030A	EMC4360	20131221	20141221
Antenna	ETS	1003	N/A	N/A	N/A

## 7. TEST RESULTS

### 7.1.1. 99% and 20dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

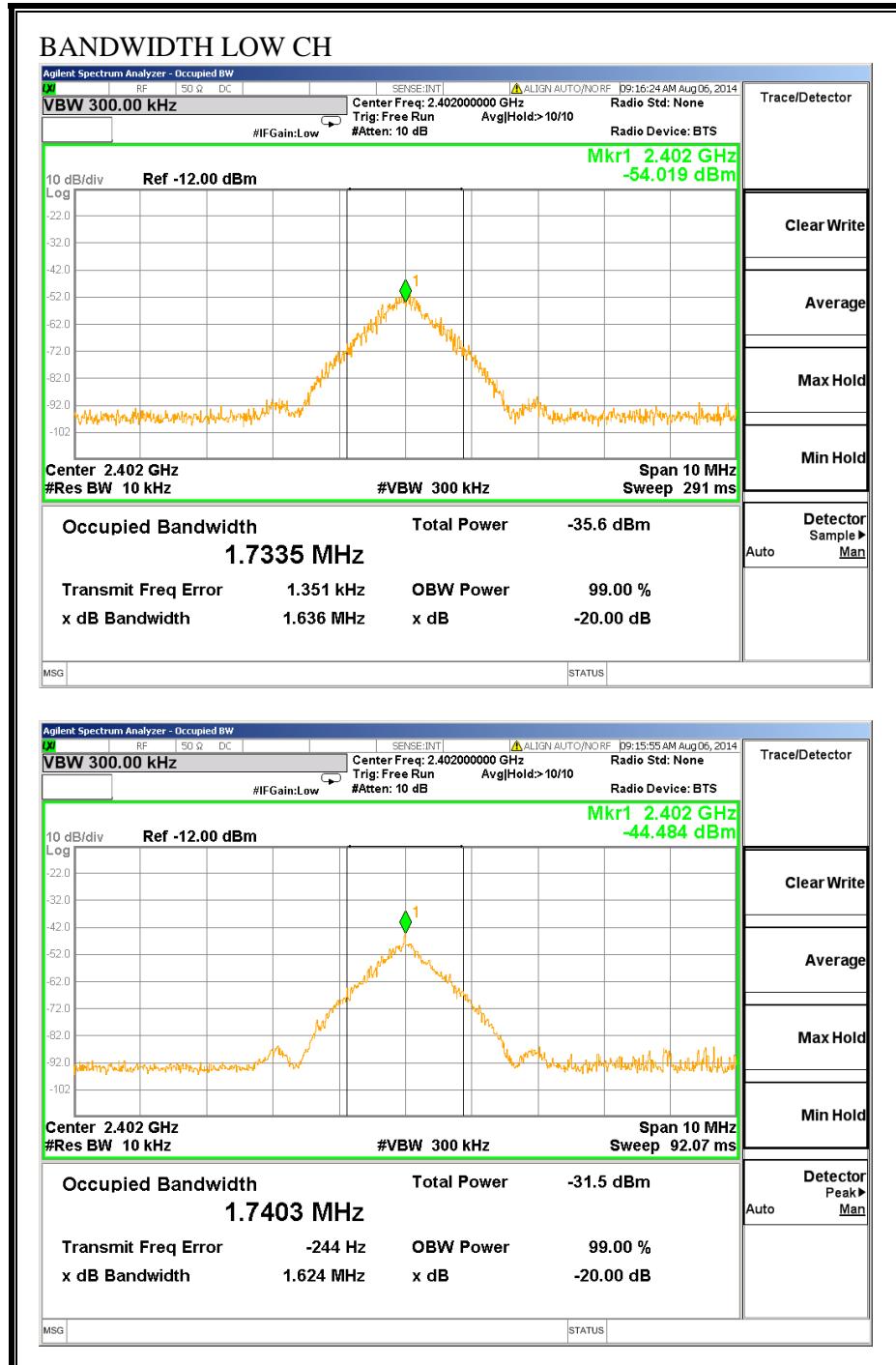
#### TEST PROCEDURE

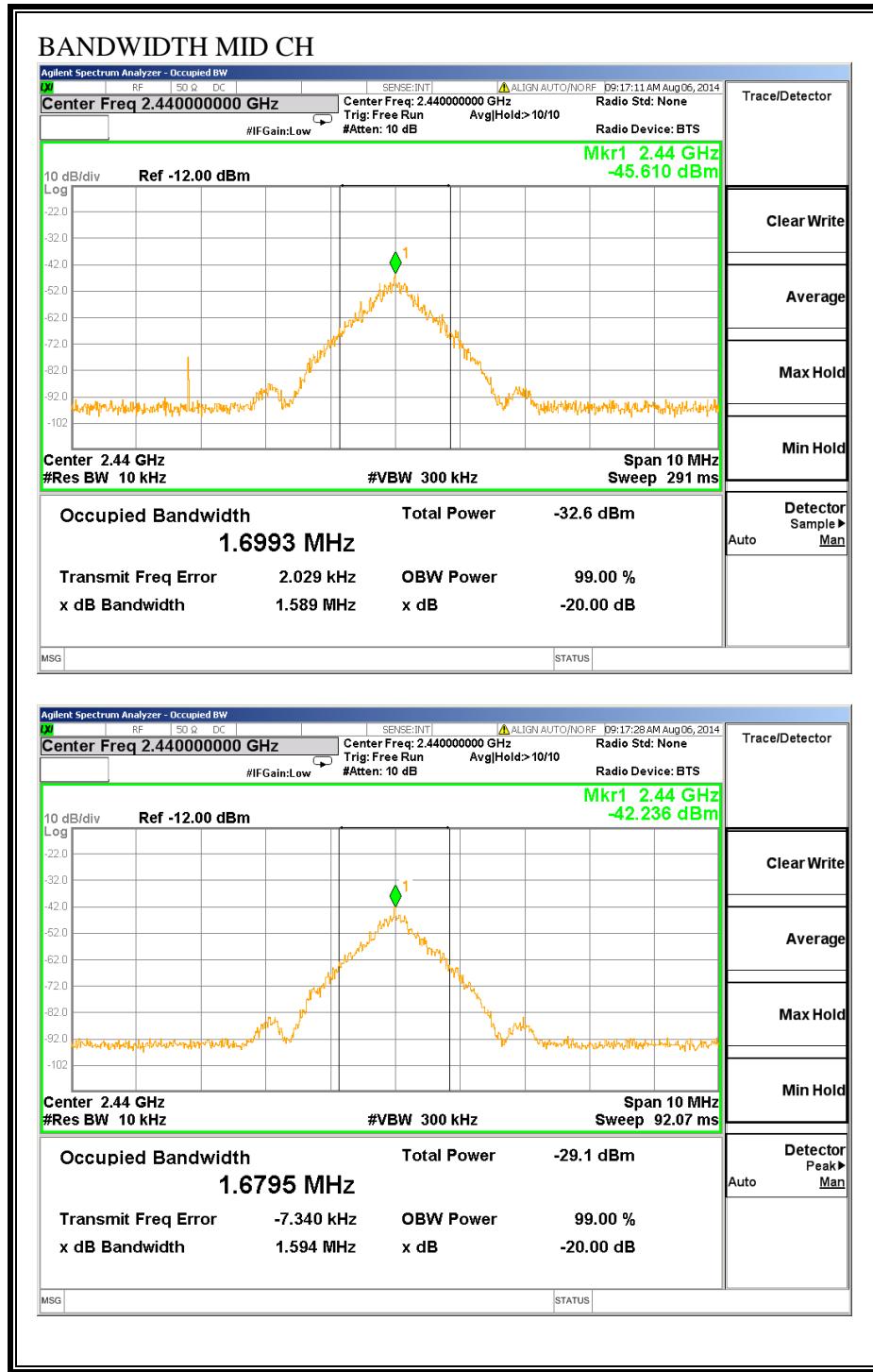
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% and 20dB bandwidth function is utilized.

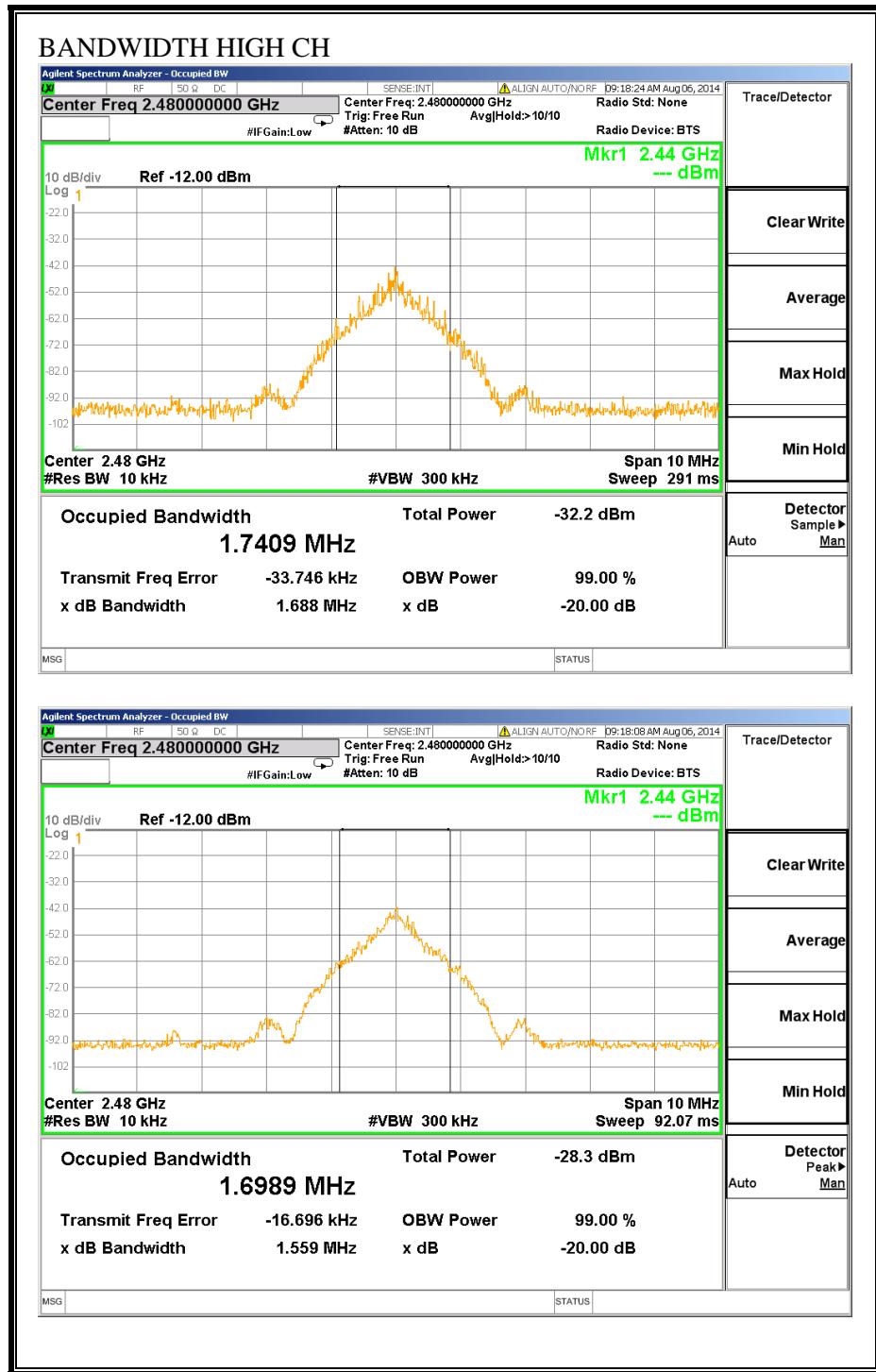
#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	1.7335	1.624
Middle	2440	1.699	1.594
High	2480	1.741	1.559

## **99% and 20dB BANDWIDTH**







## 7.2. RADIATED EMISSIONS

### LIMIT

IC RSS-210, A2.9  
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz .....	50	500
2400–2483.5 MHz .....	50	500
5725–5875 MHz .....	50	500
24.0–24.25 GHz .....	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490 .....	2400/F(kHz)	300
0.490–1.705 .....	24000/F(kHz)	30
1.705–30.0 .....	30	30
30–88 .....	100 **	3
88–216 .....	150 **	3
216–960 .....	200 **	3
Above 960 .....	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Peak scan: 1MHz RBW, 1MHz VBW

AV scan: 1MHz RBW, 10Hz VBW

## **RESULTS**

### **7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION**

Test Frequency (GHz)	Meter		Antenna Gain dB/m		Cable Factor dB	Corrected Reading dBuV/m	CFR 47		Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
	Reading (dBuV)	Detector	Part 15 Limit	Margin (dB)								
2.4017	56.11	PK	21.8	4.54	82.45	114	-31.55	159	101	H		
2.402	54.7	LnAv	21.8	4.54	81.04	94	-12.96	159	101	H		
2.4017	65.04	PK	21.8	4.54	91.38	114	-22.62	171	120	V		
2.402	63.64	LnAv	21.8	4.54	89.98	94	-4.02	171	120	V		
2.4403	66.82	PK	21.9	4.5	93.22	114	-20.78	163	120	V		
2.44	65.4	LnAv	21.9	4.49	91.79	94	-2.21	163	120	V		
2.4397	56.47	PK	21.9	4.49	82.86	114	-31.14	161	100	H		
2.44	54.99	LnAv	21.9	4.49	81.38	94	-12.62	161	100	H		
2.4802	54.81	PK	22	4.34	81.15	114	-32.85	142	113	H		
2.48	53.28	LnAv	22	4.34	79.62	94	-14.38	142	113	H		
2.4797	65.19	PK	22	4.34	91.53	114	-22.47	148	118	V		
2.48	63.84	LnAv	22	4.34	90.18	94	-3.82	148	118	V		

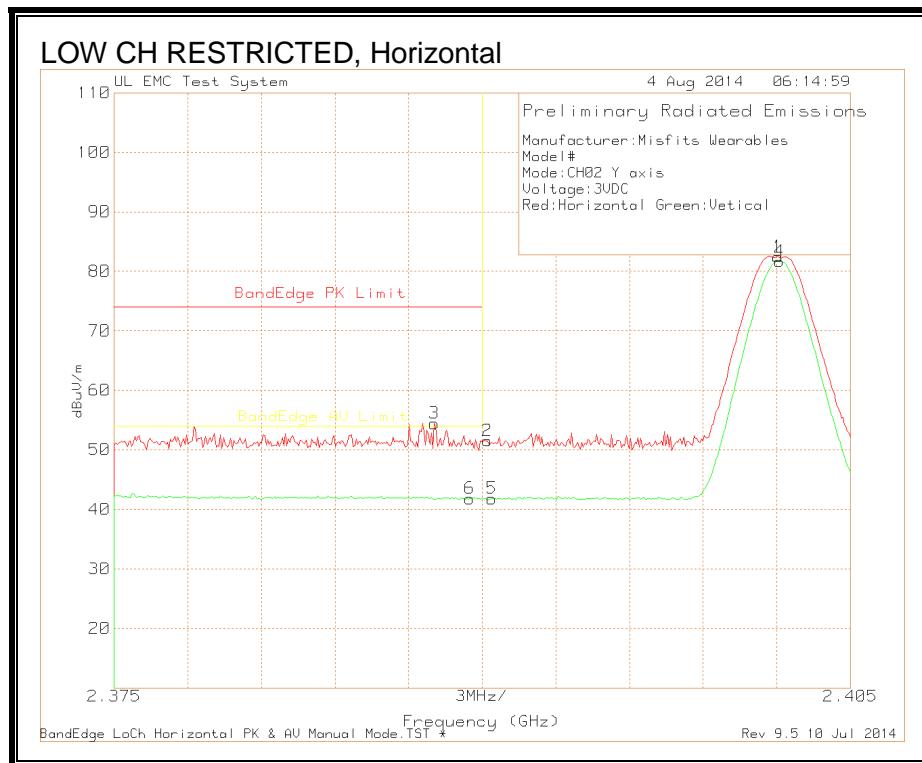
PK - Peak detector

LnAv - Linear (voltage) average detector

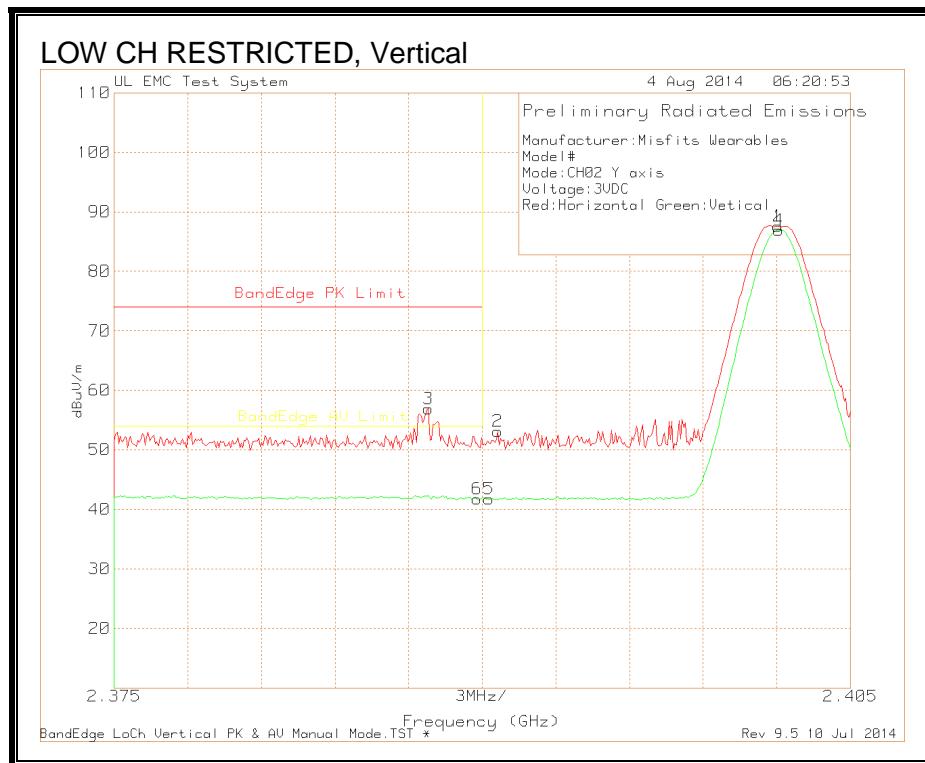
Measurements performed at 3m

## 7.2.2. TRANSMITTER RESTRICTED BAND EDGES

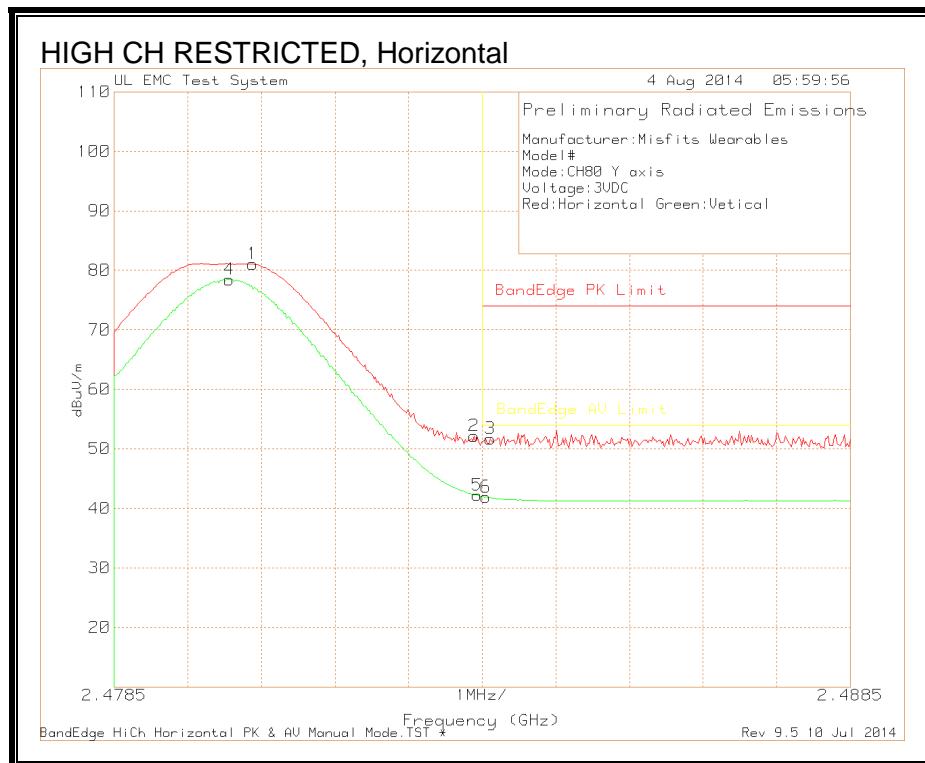
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



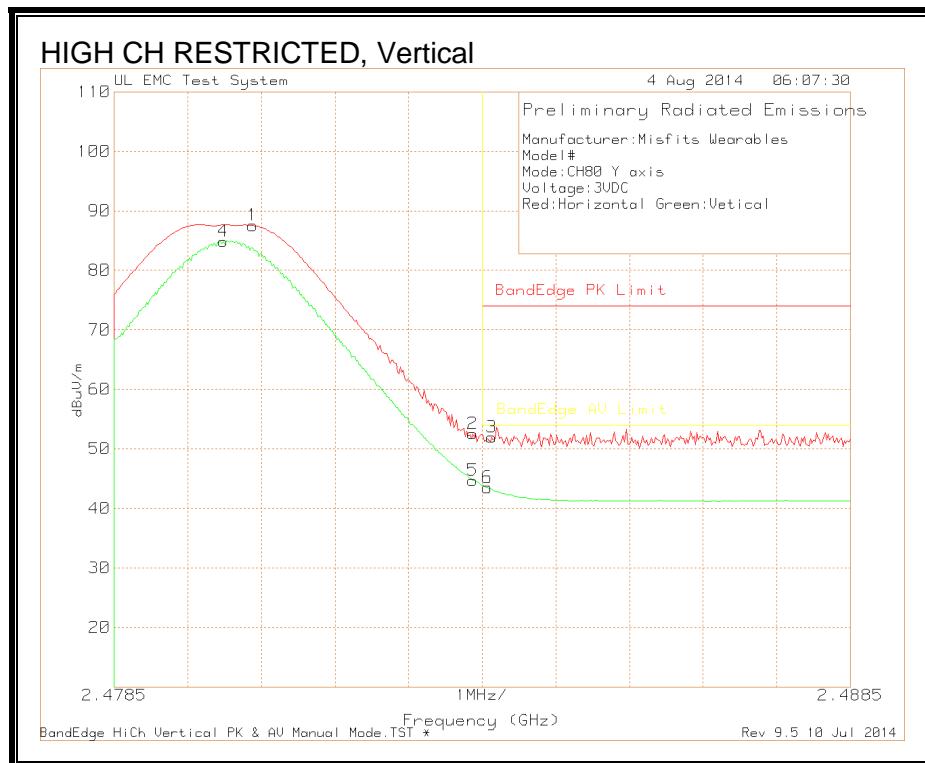
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

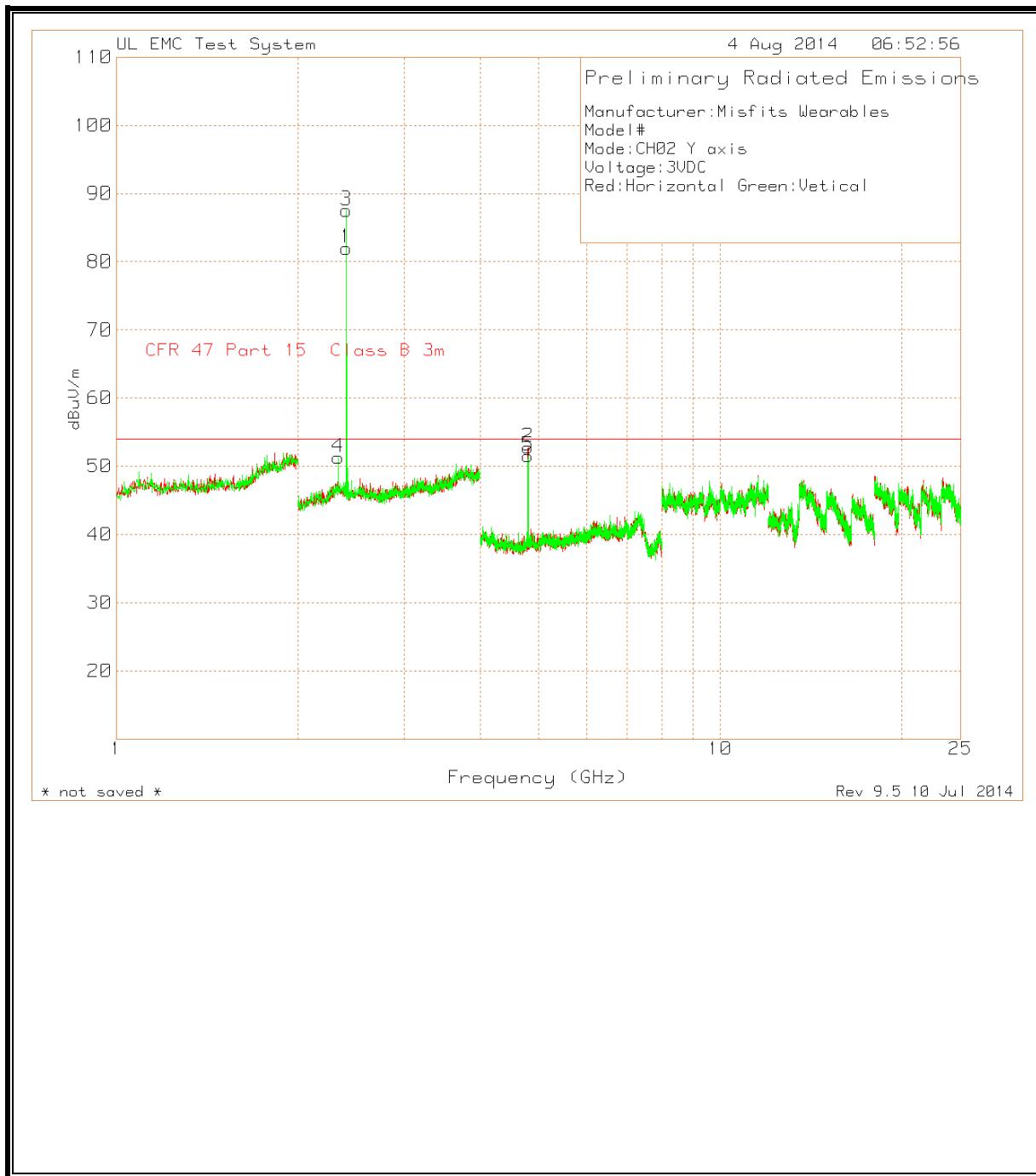


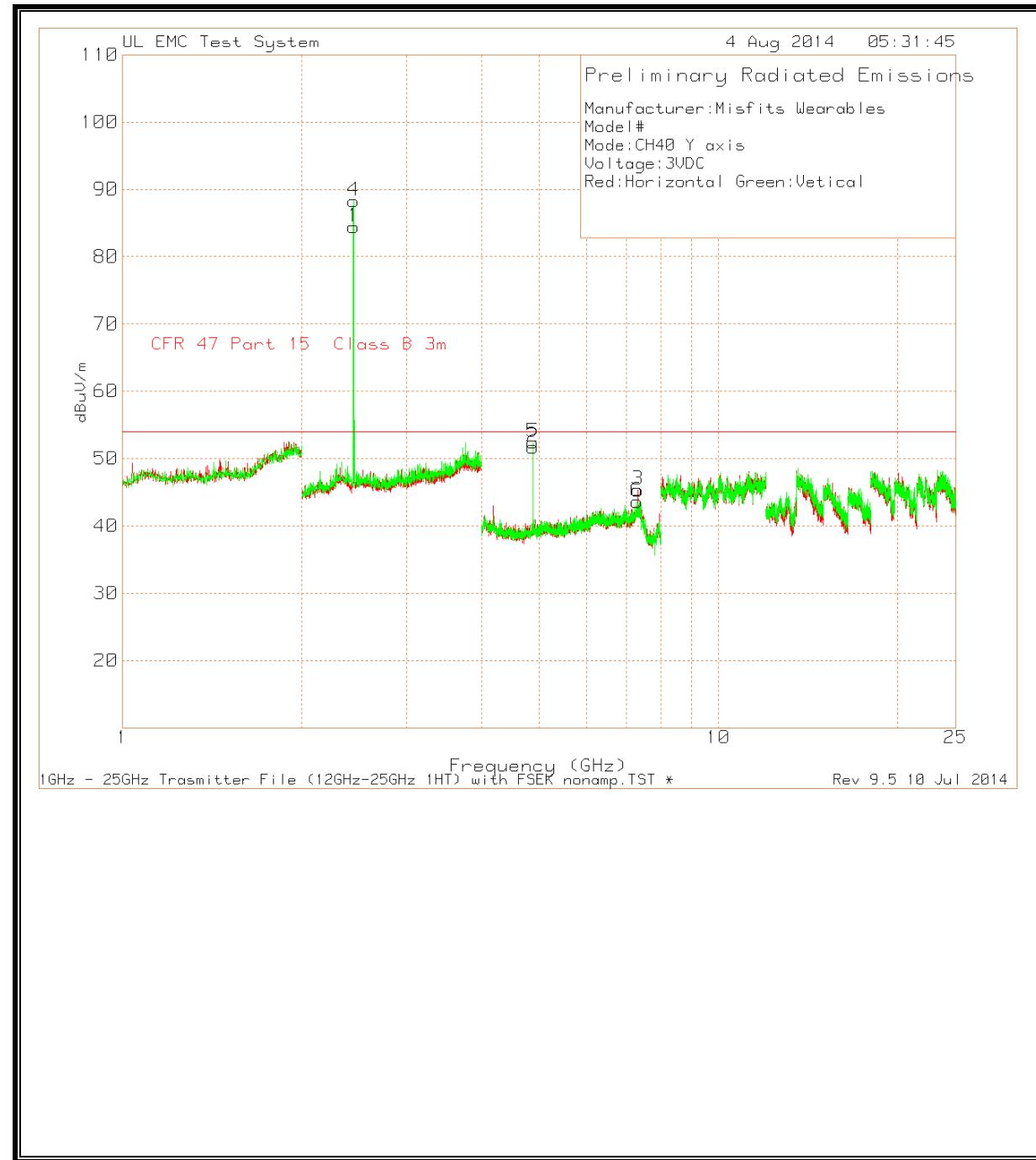
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

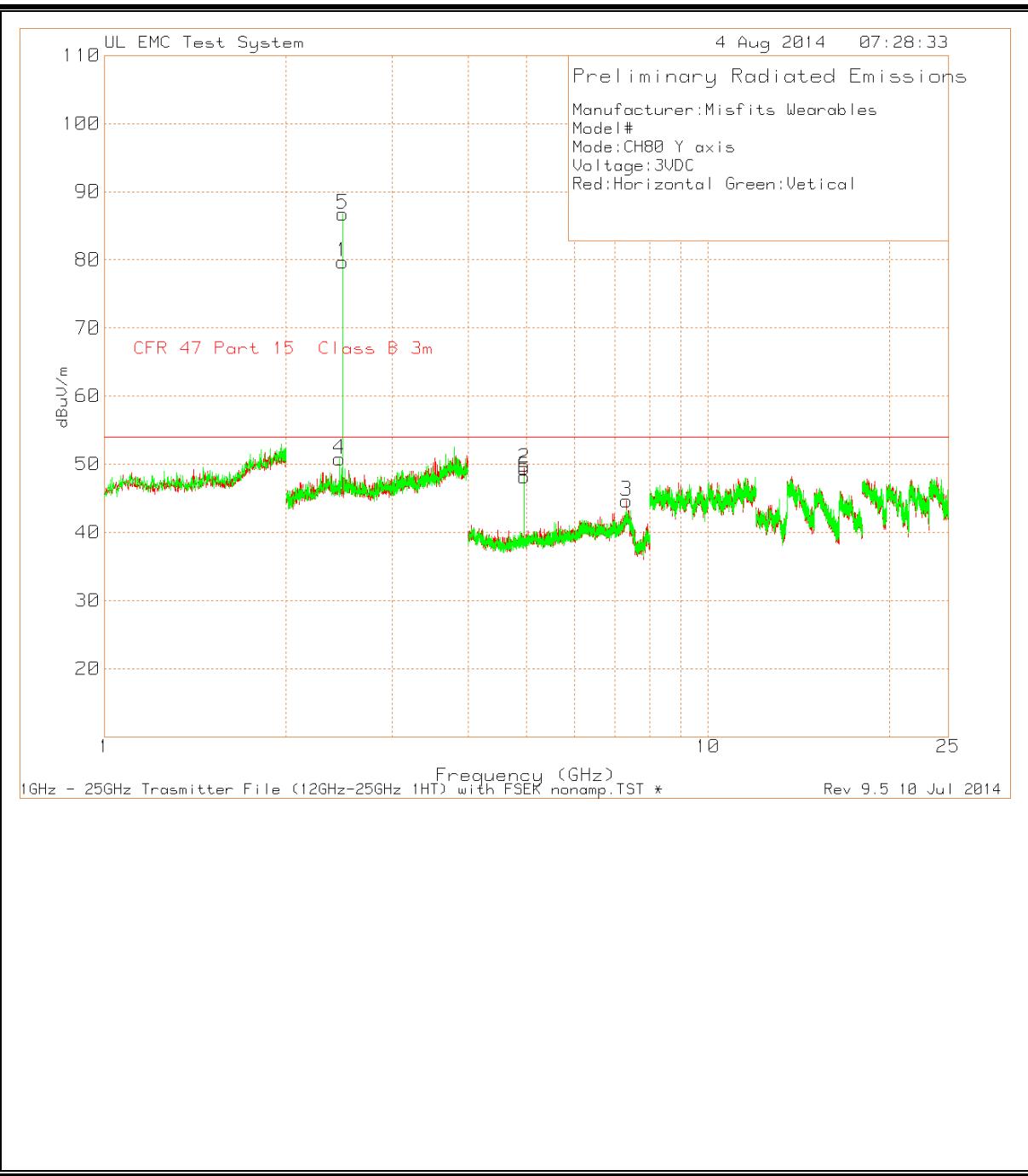


### 7.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

#### SPURIOUS EMISSIONS 1 TO 25 GHz (TX mode)





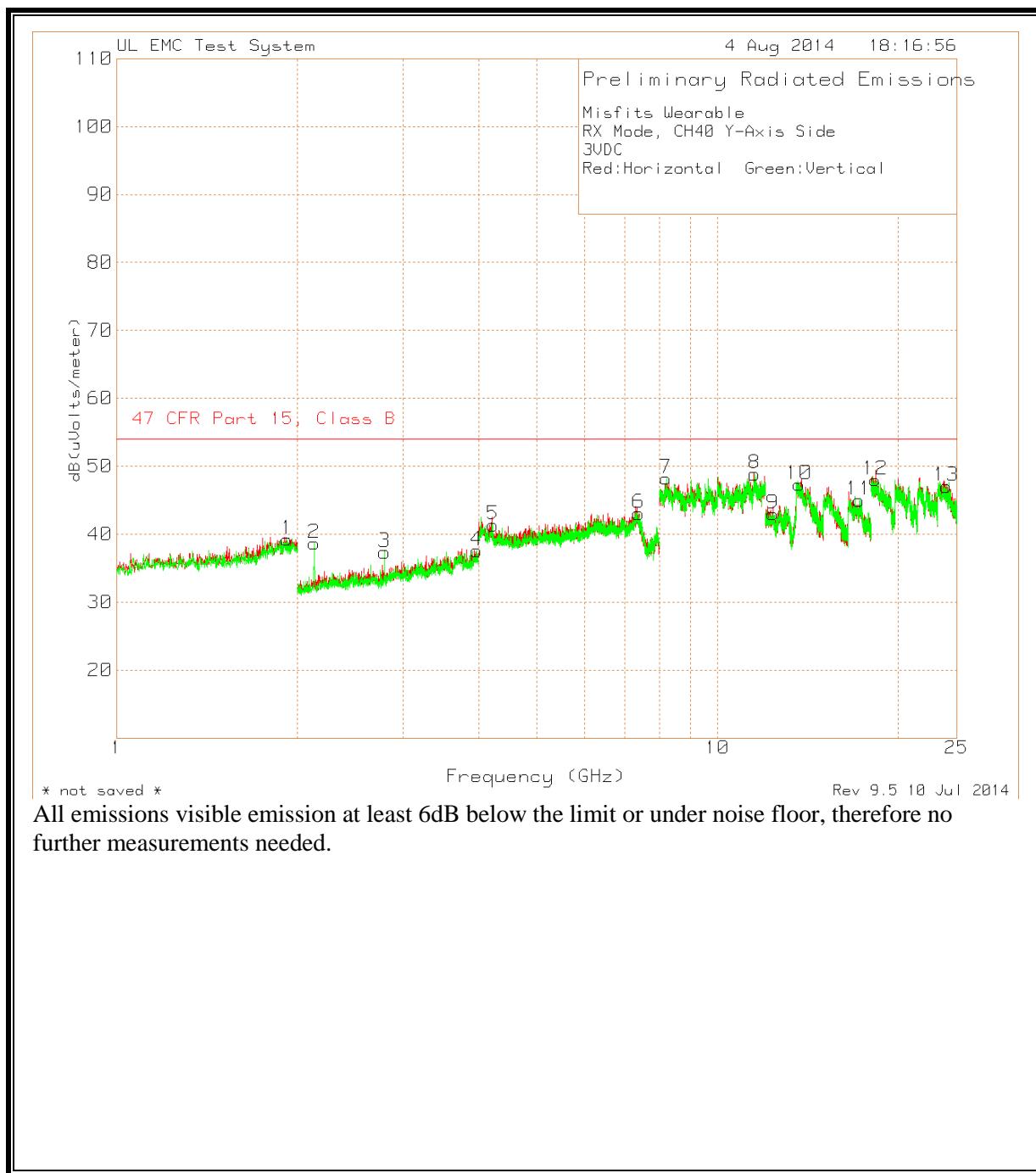


Test Frequency (GHz)	Meter		Corrected		CFR 47					
	Reading (dBuV)	Detector	Antenna Gain dB/m	Cable Factor dB	Reading dBuV/m	Part 15 Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4.8807	74.14	PK	27.7	-50.11	51.73	74	-22.27	134	101	V
4.88	69.46	LnAv	27.7	-50.11	47.05	54	-6.95	134	101	V
4.8793	74.54	PK	27.7	-50.11	52.13	74	-21.87	192	101	H
4.88	70.08	LnAv	27.7	-50.11	47.67	54	-6.33	192	101	H
4.8047	76.57	PK	27.7	-50.45	53.82	74	-20.18	218	100	H
4.8041	72.2	LnAv	27.7	-50.46	49.44	54	-4.56	218	100	H
4.8034	75.39	PK	27.7	-50.46	52.63	74	-21.37	146	101	V
4.8041	71.02	LnAv	27.7	-50.46	48.26	54	-5.74	146	101	V
4.9606	72.64	PK	27.8	-50.5	49.94	74	-24.06	192	100	V
4.96	67.68	LnAv	27.8	-50.5	44.98	54	-9.02	192	100	V
4.9608	72.77	PK	27.8	-50.5	50.07	74	-23.93	232	100	H
4.96	68.21	LnAv	27.8	-50.5	45.51	54	-8.49	232	100	H

PK - Peak detector

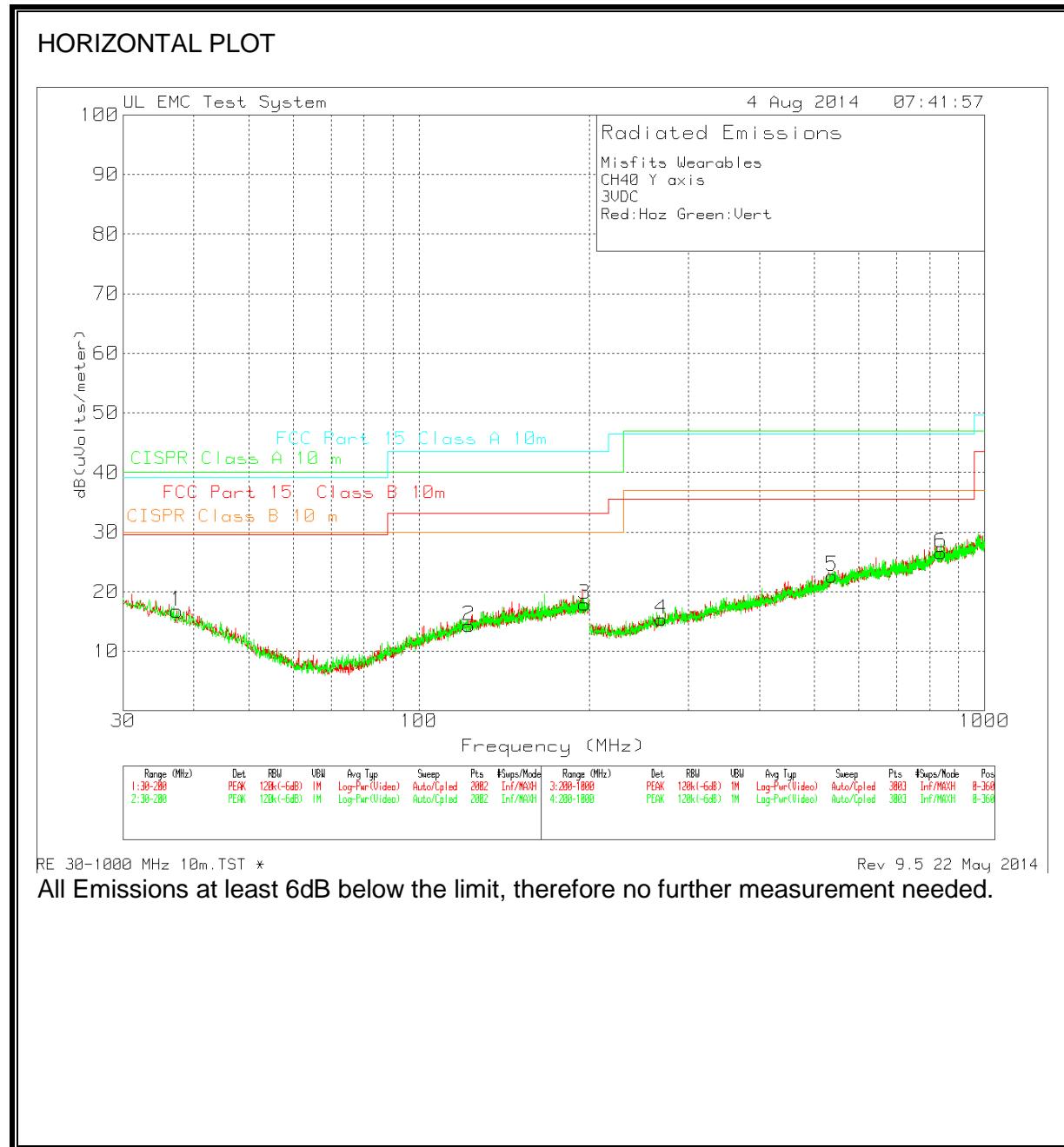
LnAv - Linear (voltage) average detector

**SPURIOUS EMISSIONS 1 TO 25 GHz (RX mode)**



## 7.2.4. WORST-CASE BELOW 1 GHz

### SPURIOUS EMISSIONS 30 TO 1000 MHz (TX mode)



**SPURIOUS EMISSIONS 30 TO 1000 MHz (RX mode)**

