



**FCC 47 CFR PART 95 SUBPART H  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT**

**FOR**

**Sonicaid Freedom SF1-US**

**MODEL NUMBER: SF1-US**

**FCC ID: 2ABOQ-SF1US  
IC: 11744A-SF1US**

**REPORT NUMBER: 7554936D**

**ISSUE DATE: April 17, 2014**

*Prepared for*  
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**NVLAP LAB CODE 100414-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
--	April 17, 2014	Initial Issue	BM

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Huntleigh Diagnostics  
35 Portmanmoor Road  
Cardiff  
CF24 5HN, United Kingdom

**EUT DESCRIPTION:** Wireless Fetal Monitoring Solution (Ultrasound transducer)

**MODEL:** SF1-US

**SERIAL NUMBER:** Prototype

**DATE TESTED:** October 2013 to February 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 95, Subpart H	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	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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## 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, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/100414.htm>.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 150
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## 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:

#### Measurement Uncertainty

Test	Range	Equipment	Uncertainty k=2
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	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	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Radiated Emissions	26-40GHz	Horn	7.02dB

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

## 5. EQUIPMENT UNDER TEST

## 6. EQUIPMENT UNDER TEST

### 6.1. DESCRIPTION OF EUT

The EUT is an Wireless Fetal Monitoring Solution. It consists of multiple parts of which each is covered by separate test report. This report applies to the US unit 610MHz WMTS band transceiver.

### 6.2. 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)
608.0375	TX	77.89

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal  $\frac{1}{4}$  wave length antenna.

### 6.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was U880-reduced power 10-dock06

Tests use normal operational mode.

### 6.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

## 6.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
EUT - US Transducer	Huntleigh	SF1-US	Prototype

### I/O CABLES

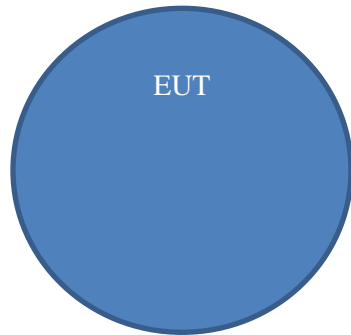
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
0	Enclosure	1	-	-	-	none

### TEST SETUP

The radio is part of the US transducer with see section 6.3 antenna. The US transducer receives the 10kHz Near Field signal from the TOCO.



**SETUP DIAGRAM FOR TESTS**



## 7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:  
Radiated Emissions – 10-Meter Chamber

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20131227	20141231
Bicon Antenna	Chase	VBA6106A	EMC4078	20130213	20140228
Log-P Antenna	Chase	UPA6109	EMC4258	20131015	20141030
Log-P Antenna	Chase	UPA6109	EMC4313	20131003	20141003
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20121226	20131231
Antenna Array	UL	BOMS	EMC4276	20130912	20140930
Spectrum Analyzer	Agilent	N9030A (PXA)	EMC4360	20131221	20141221

## 8. TEST RESULTS

### 8.1.1. 99% & 26dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

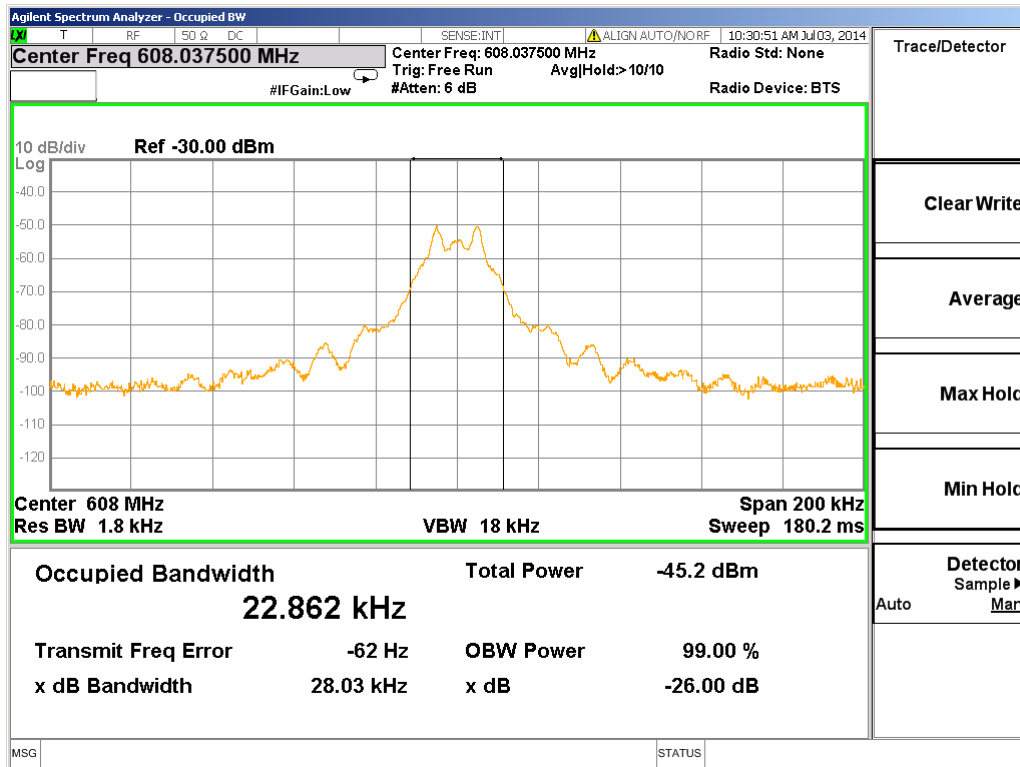
#### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to minimum of 10kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

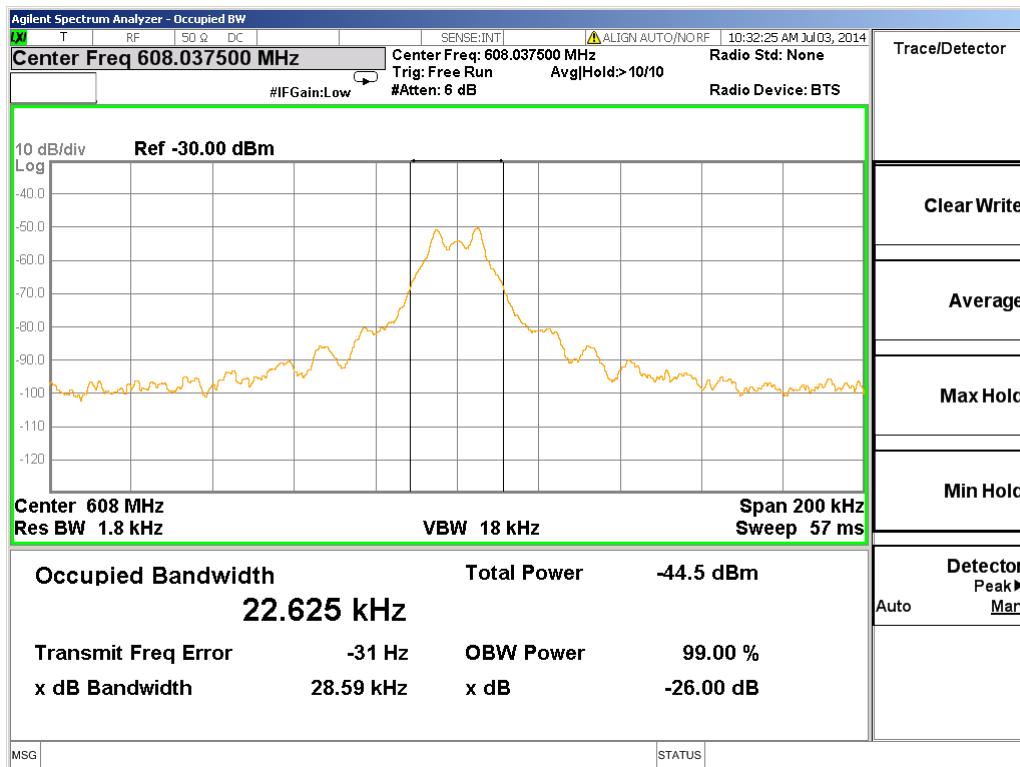
#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth	26dB Bandwidth
		(MHz)	(MHz)
Low	608.012	0.022862	0.02859
Middle	610.54	0.022849	0.02848
High	612.988	0.022847	0.02871

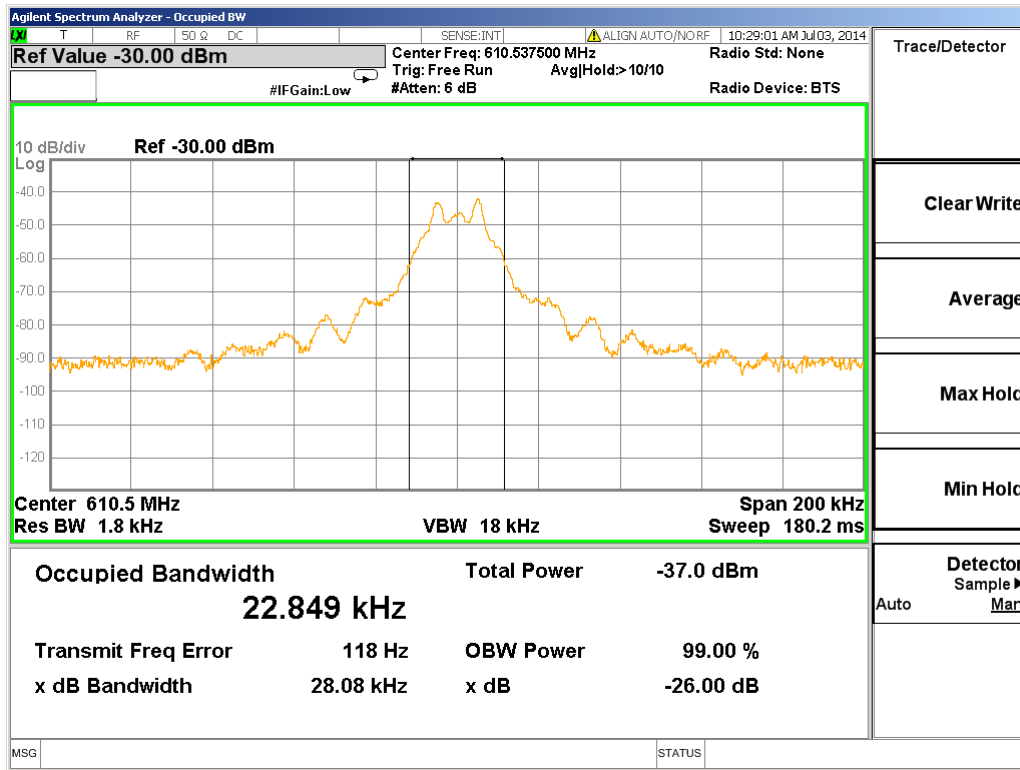
### 99% BANDWIDTH – Low Channel



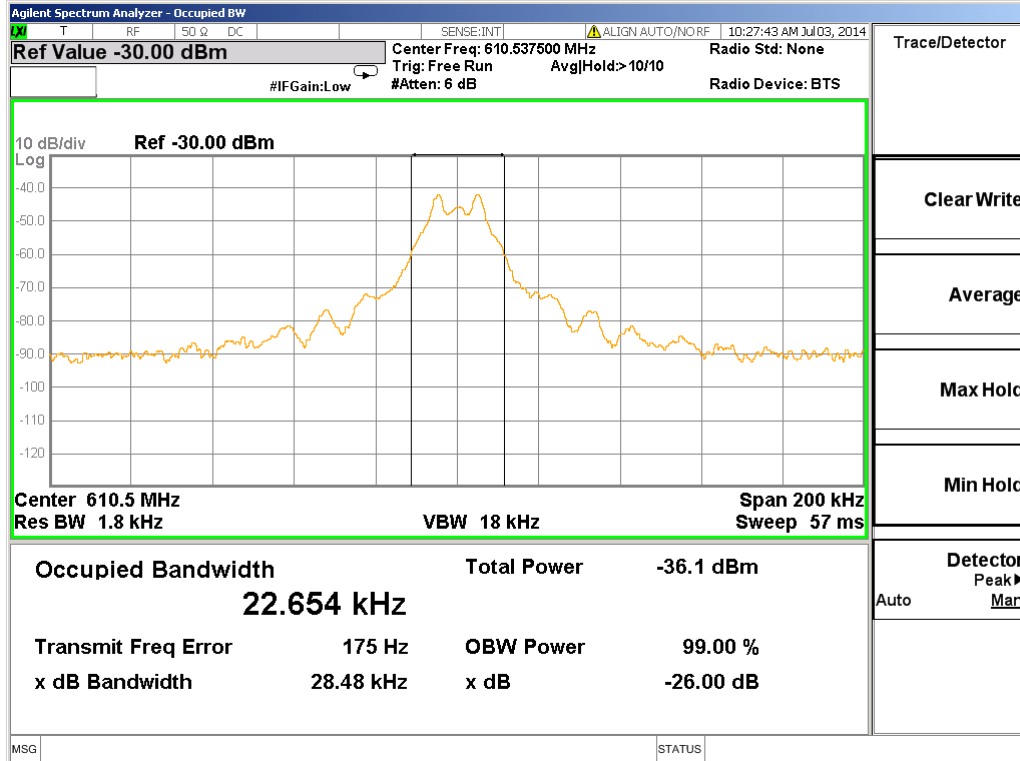
### 26dB BANDWIDTH – Low Channel



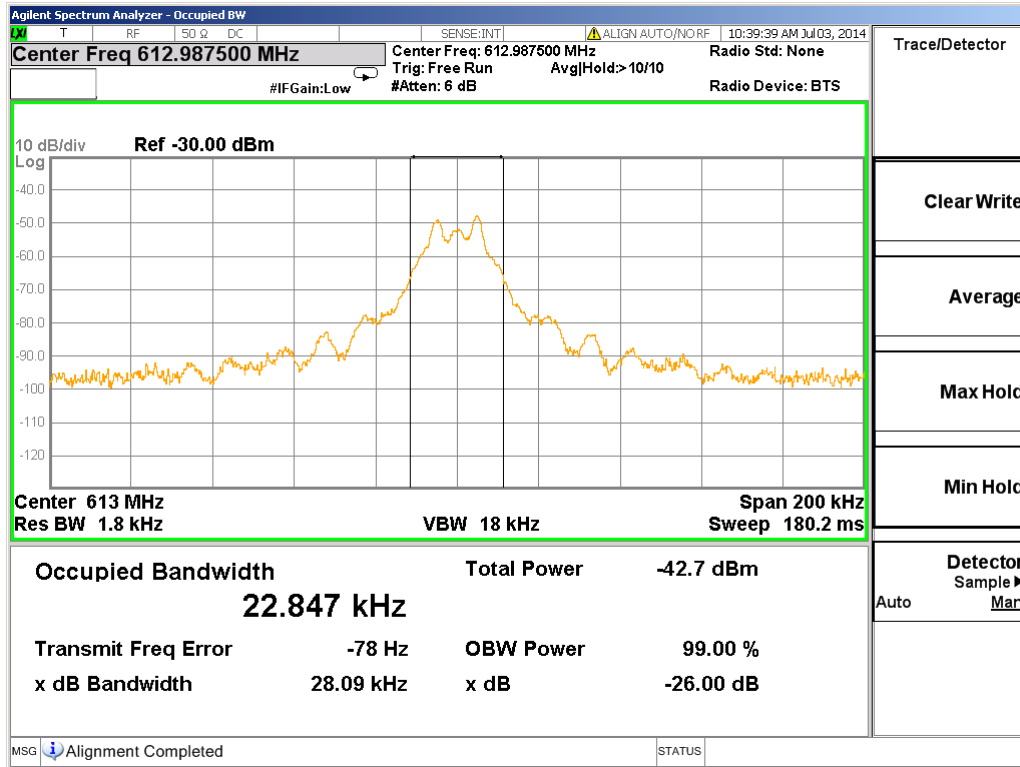
### 99% BANDWIDTH – Middle Channel



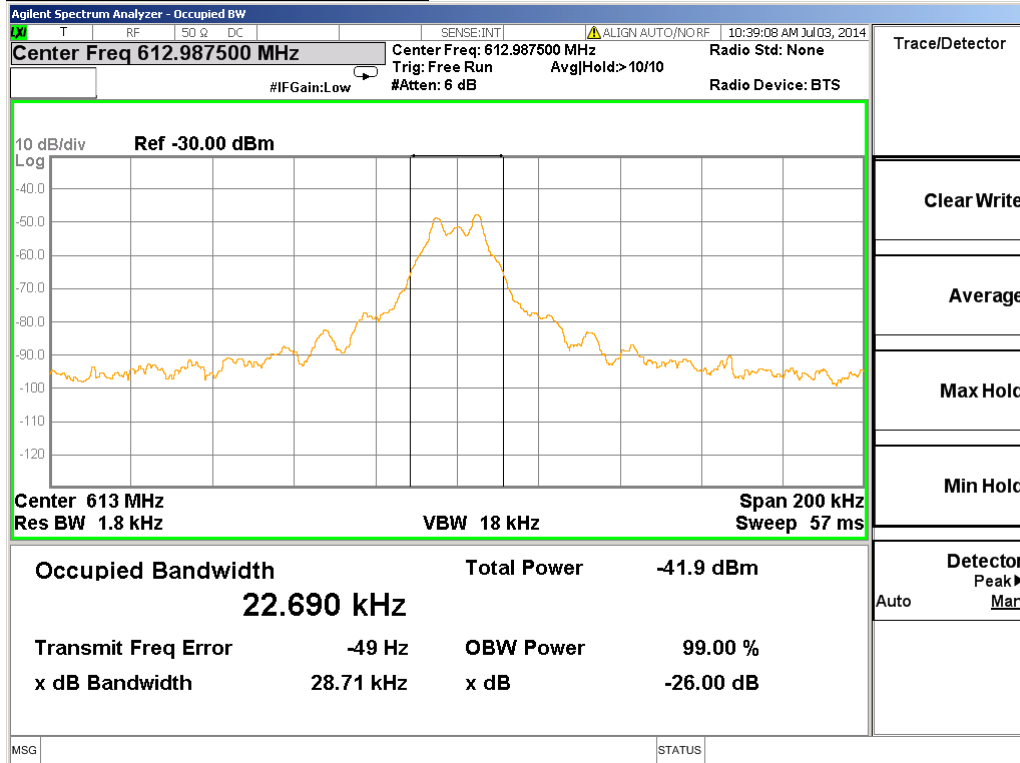
### 26dB BANDWIDTH – Middle Channel



### 99% BANDWIDTH – High Channel



### 26dB BANDWIDTH – High Channel



## 8.2. RADIATED EMISSIONS

### TEST PROCEDURE

ANSI C63.4

### LIMIT

IC RSS-210, A4  
FCC 95.1101, Subpart H

In the 608MHz – 614MHz band, the maximum allowable field strength is 200mV/m, as measured at a distance of 3 meters, using measuring instrumentation with CISPR quasi-peak detector

Undesired emissions

Out of band emissions below 960MHz are limited to 200 microvolts/meter, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector.

Out-of-band emissions above 960MHz are limited to 500 microvolts/meter as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1MHz measurement bandwidth.

## RESULTS

### 8.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

#### Low Channel, X, Y, and Z Axis

Radiated Emission Data												
Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Factor dB	10m to 3m Factor dB	Level dBuV/m	Limit dbuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	Notes
608.037208	71.69	QP	20.1	-24.4	10.5	77.89	106	-28.11	220	150	H	1
608.037208	71.8	PK	20.1	-24.4	10.5	78	106	-28	220	150	H	1
608.037208	59.18	QP	20.1	-24.4	10.5	65.38	106	-40.62	288	400	V	1
608.037208	59.41	PK	20.1	-24.4	10.5	65.61	106	-40.39	288	400	V	1
608.037208	70.36	QP	20.1	-24.4	10.5	76.56	106	-29.44	204	131	H	2
608.037208	70.47	PK	20.1	-24.4	10.5	76.67	106	-29.33	204	131	H	2
608.037208	69.75	QP	20.1	-24.4	10.5	75.95	106	-30.05	102	286	V	2
608.037208	69.86	PK	20.1	-24.4	10.5	76.06	106	-29.94	102	286	V	2
608.037208	63.32	QP	20.1	-24.4	10.5	69.52	106	-36.48	219	389	H	3
608.037208	63.51	PK	20.1	-24.4	10.5	69.71	106	-36.29	219	389	H	3
608.037208	70.43	QP	20.1	-24.4	10.5	76.63	106	-29.37	80	281	V	3
608.037208	70.53	PK	20.1	-24.4	10.5	76.73	106	-29.27	80	281	V	3
Notes: 1 - X-Axis Lo Ch 2 - Y-Axis Lo Ch 3 - Z-Axis Lo Ch PK - Peak detector QP - Quasi-Peak detector												



### Middle Channel, X, Y, and Z Axis

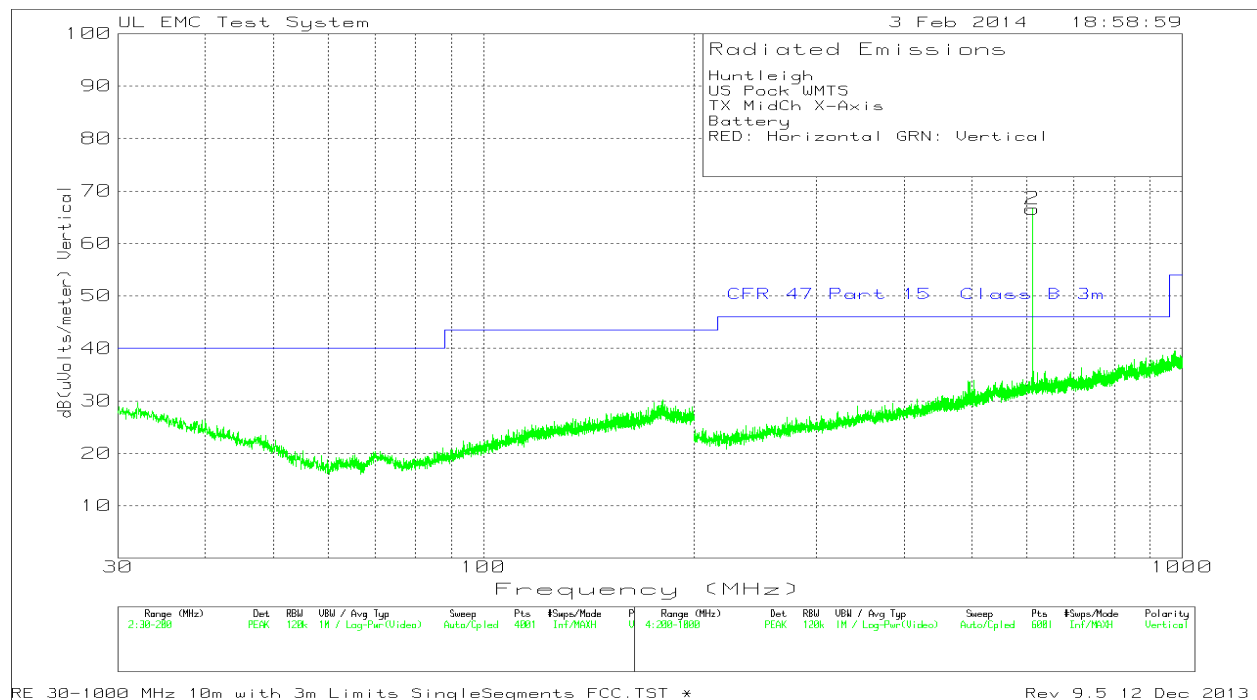
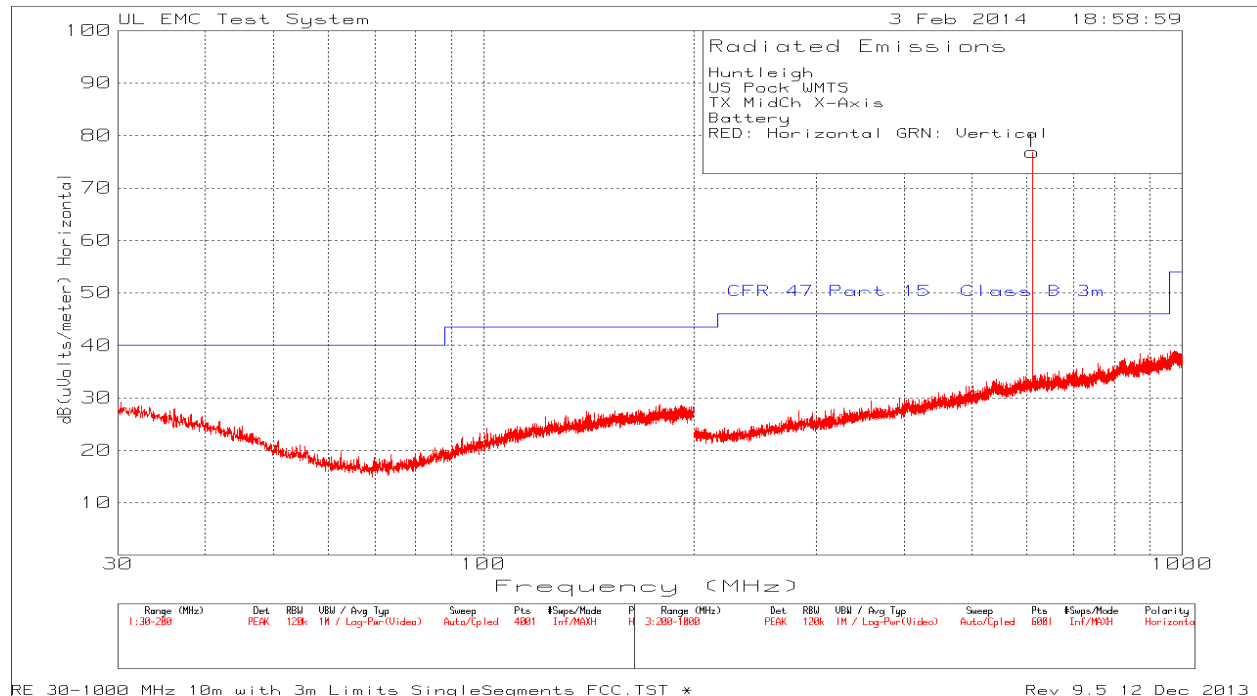
Radiated Emission Data												
Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Factor dB	10m to 3m Factor dB	Level dBuV/m	Limit dbuV/m	Margin (dB)	Azimuth [Degr]	Height [cm]	Polarity	Notes
610.537608	71.68	QP	20.1	-24.5	10.5	77.78	106	-28.22	212	151	H	1
610.537608	71.78	PK	20.1	-24.5	10.5	77.88	106	-28.12	212	151	H	1
610.537608	60.12	QP	20.1	-24.5	10.5	66.22	106	-39.78	312	398	V	1
610.537608	60.35	PK	20.1	-24.5	10.5	66.45	106	-39.55	312	398	V	1
610.536095	70.23	QP	20.1	-24.5	10.5	76.33	106	-29.67	199	129	H	2
610.536095	70.34	PK	20.1	-24.5	10.5	76.44	106	-29.56	199	129	H	2
610.536095	69.72	QP	20.1	-24.5	10.5	75.82	106	-30.18	102	291	V	2
610.536095	69.83	PK	20.1	-24.5	10.5	75.93	106	-30.07	102	291	V	2
610.536095	63.14	QP	20.1	-24.5	10.5	69.24	106	-36.76	213	341	H	3
610.536095	63.31	PK	20.1	-24.5	10.5	69.41	106	-36.59	213	341	H	3
610.536095	70.23	QP	20.1	-24.5	10.5	76.33	106	-29.67	83	281	V	3
610.536095	70.33	PK	20.1	-24.5	10.5	76.43	106	-29.57	83	281	V	3
Notes: 1 - X-Axis Mid Ch 2 - Y-Axis Mid Ch 3 - Z-Axis Mid Ch PK - Peak detector QP - Quasi-Peak detector												

## High Channel, X, Y, and Z Axis

Radiated Emission Data												
Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Factor dB	10m to 3m Factor dB	Level dBuV/m	Limit dbuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	Notes
612.986808	71.33	QP	20.1	-24.5	10.5	77.43	106	-28.57	234	150	H	1
612.986808	71.45	PK	20.1	-24.5	10.5	77.55	106	-28.45	234	150	H	1
612.986808	60.19	QP	20.1	-24.5	10.5	66.29	106	-39.71	314	400	V	1
612.986808	60.43	PK	20.1	-24.5	10.5	66.53	106	-39.47	314	400	V	1
612.986808	69.88	QP	20.1	-24.5	10.5	75.98	106	-30.02	199	128	H	2
612.986808	70	PK	20.1	-24.5	10.5	76.1	106	-29.9	199	128	H	2
612.986808	69.65	QP	20.1	-24.5	10.5	75.75	106	-30.25	107	296	V	2
612.986808	69.77	PK	20.1	-24.5	10.5	75.87	106	-30.13	107	296	V	2
612.986808	63.38	QP	20.1	-24.5	10.5	69.48	106	-36.52	209	343	H	3
612.986808	63.58	PK	20.1	-24.5	10.5	69.68	106	-36.32	209	343	H	3
612.986808	70.42	QP	20.1	-24.5	10.5	76.52	106	-29.48	291	298	V	3
612.986808	70.53	PK	20.1	-24.5	10.5	76.63	106	-29.37	291	298	V	3
Notes: 1 - X-Axis Hi Ch 2 - Y-Axis Hi Ch 3 - Z-Axis Hi Ch PK - Peak detector QP - Quasi-Peak detector												

## 8.2.2. BELOW 1 GHz Emissions

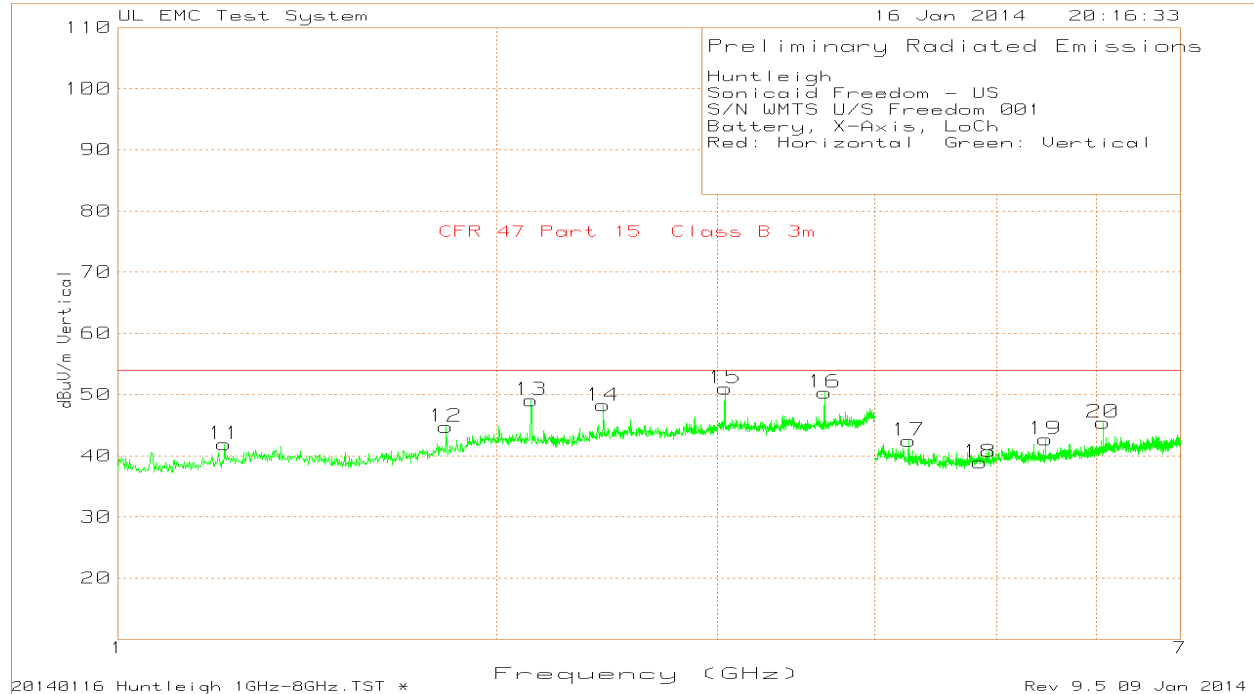
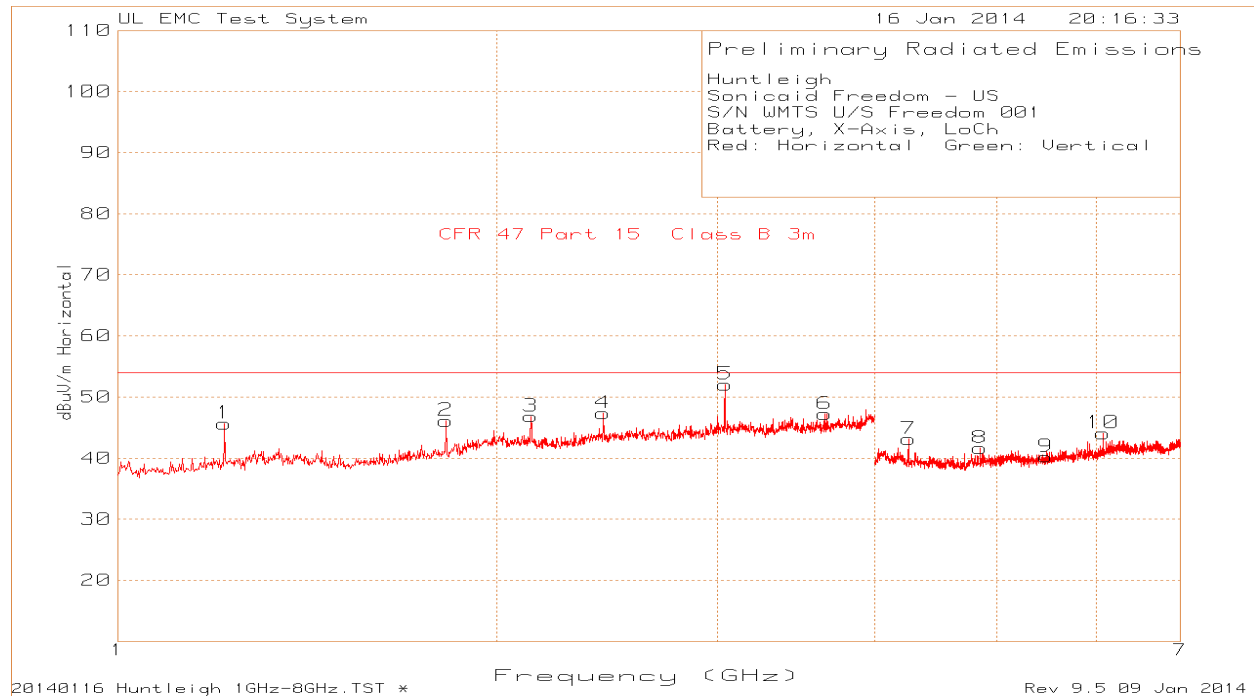
### SPURIOUS EMISSIONS 30 TO 1000 MHz – Middle Channel



\* The actual limit below 960MHz is 46dBuV/m @ 3m and above 960Mhz 54dBuV/m @ 3m. No Emissions recorded within 6dB of the limit. Repeating the scans with other channels active was considered not necessary.

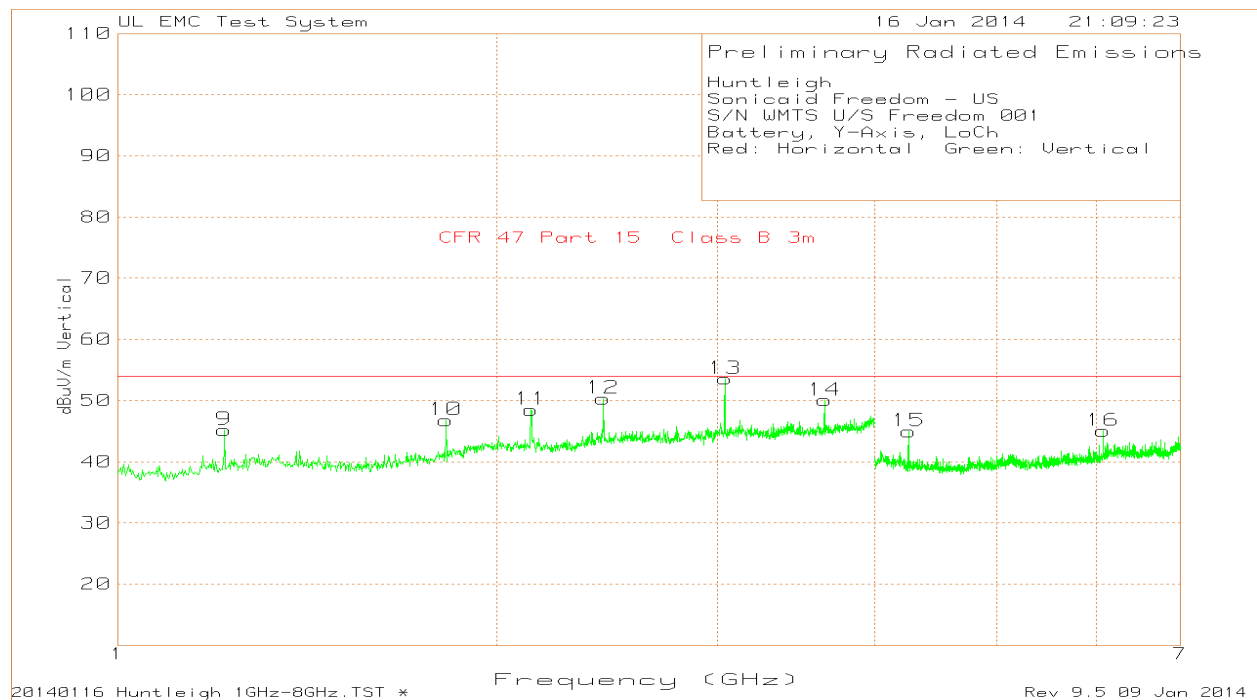
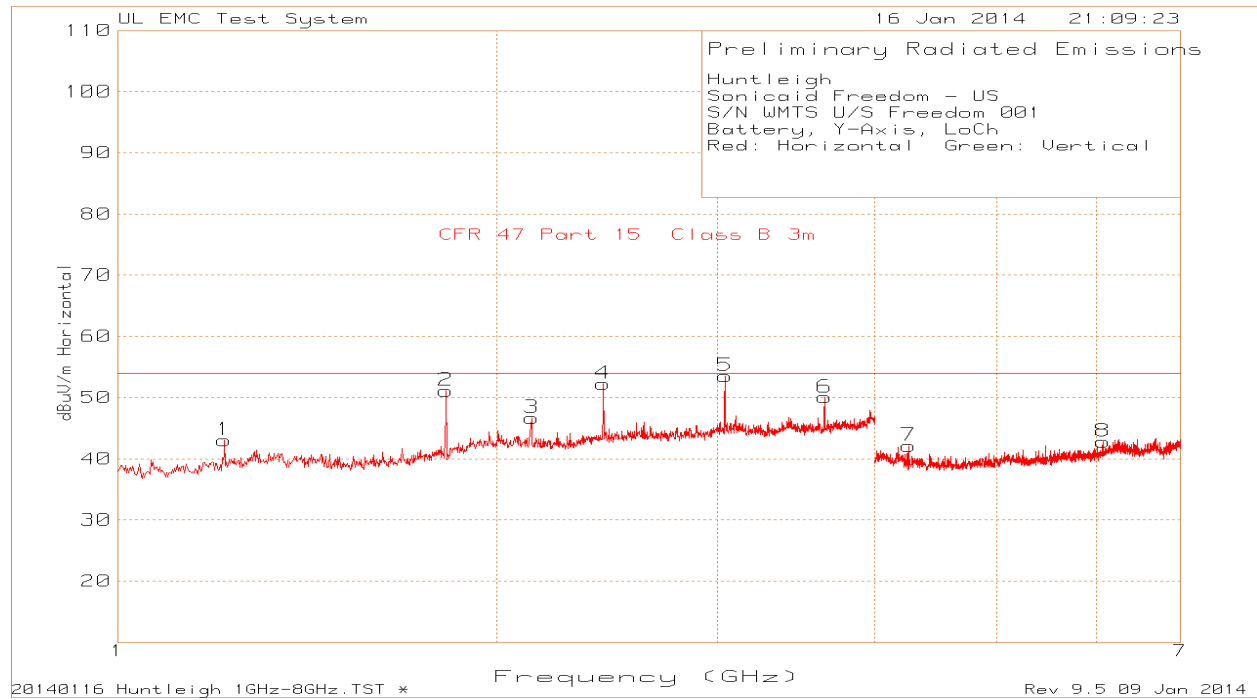
### 8.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

#### X-Axis, Low Channel Data



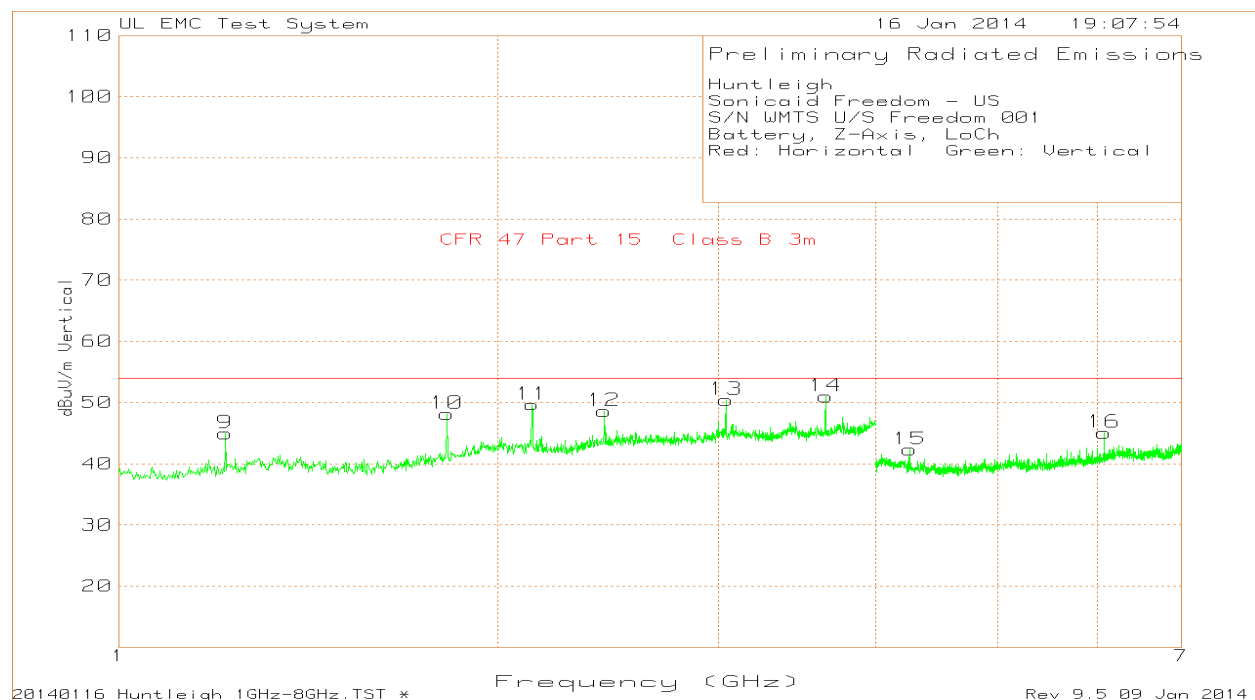
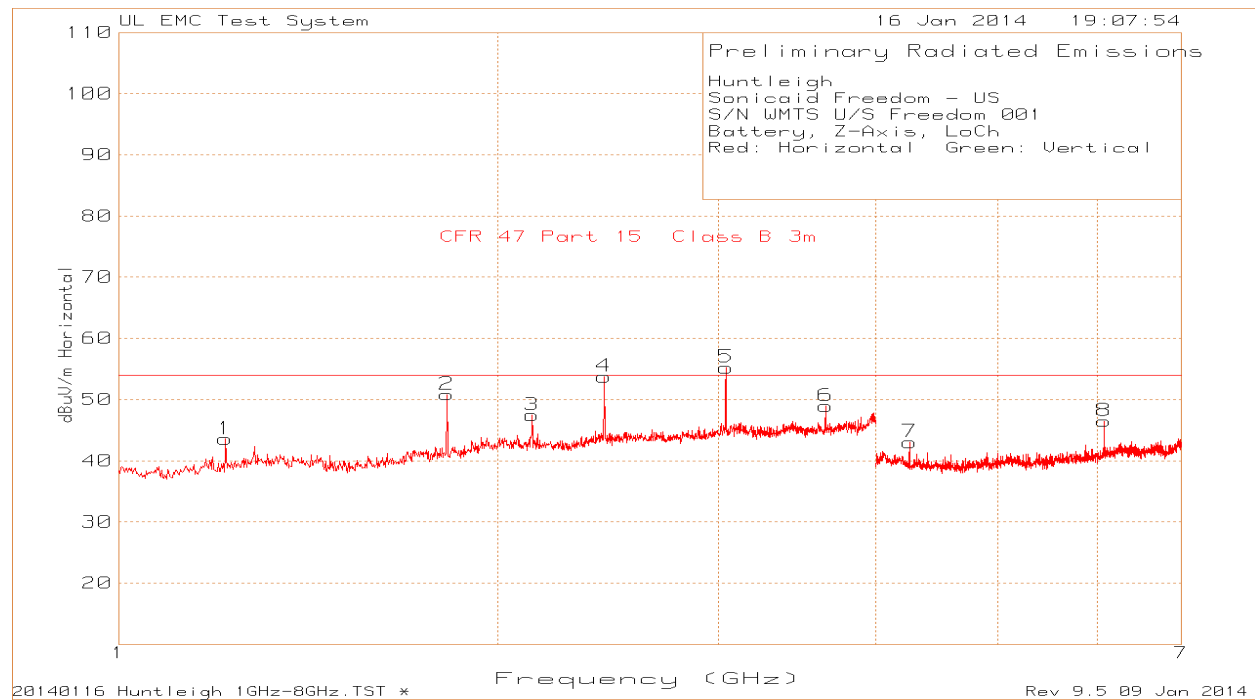
Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, X-Axis, LoCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2161	72.77	PK	28.6	-55.69	45.68	54	-8.32	0-360	100	H
2	1.8246	69.44	PK	30.2	-53.54	46.1	54	-7.9	0-360	100	H
3	2.1308	67.42	PK	31.6	-52.17	46.85	54	-7.15	0-360	149	H
4	2.433	65.95	PK	32.2	-50.82	47.33	54	-6.67	0-360	100	H
5	3.0414	68.79	PK	33.1	-49.8	52.09	54	-1.91	0-360	149	H
6	3.6498	64.02	PK	33.3	-50.11	47.21	54	-6.79	0-360	100	H
7	4.2562	66.65	PK	28.2	-51.75	43.1	54	-10.9	0-360	100	H
8	4.8506	64.1	PK	27.7	-50.18	41.62	54	-12.38	0-360	100	H
9	5.475	61.31	PK	28.1	-49.17	40.24	54	-13.76	0-360	100	H
10	6.0814	63.12	PK	28.9	-47.98	44.04	54	-9.96	0-360	100	H
11	1.2161	69.03	PK	28.6	-55.69	41.94	54	-12.06	0-360	149	V
12	1.8246	68.07	PK	30.2	-53.54	44.73	54	-9.27	0-360	149	V
13	2.1328	69.61	PK	31.6	-52.16	49.05	54	-4.95	0-360	100	V
14	2.433	66.85	PK	32.2	-50.82	48.23	54	-5.77	0-360	100	V
15	3.0414	67.75	PK	33.1	-49.8	51.05	54	-2.95	0-360	100	V
16	3.6498	67.15	PK	33.3	-50.11	50.34	54	-3.66	0-360	149	V
17	4.2562	66.05	PK	28.2	-51.75	42.5	54	-11.5	0-360	100	V
18	4.8526	61.44	PK	27.7	-50.17	38.97	54	-15.03	0-360	149	V
19	5.473	63.79	PK	28.1	-49.17	42.72	54	-11.28	0-360	100	V
20	6.0814	64.54	PK	28.9	-47.98	45.46	54	-8.54	0-360	100	V
Radiated Emission Data											
	3.0402	69.87	PK	33.1	-49.79	53.18	74	-20.82	341	100	H
	3.0403	66.03	LnAv	33.1	-49.79	49.34	54	-4.66	341	100	H
	2.1334	74.32	PK	31.6	-52.16	53.76	74	-20.24	98	100	V
	2.1333	59.5	LnAv	31.6	-52.16	38.94	54	-15.06	98	100	V
	2.4321	68.5	PK	32.2	-50.82	49.88	74	-24.12	11	123	V
	2.4322	62.27	LnAv	32.2	-50.82	43.65	54	-10.35	11	123	V
	3.0401	70.5	PK	33.1	-49.79	53.81	74	-20.19	111	118	V
	3.0403	66.94	LnAv	33.1	-49.79	50.25	54	-3.75	111	118	V
	3.6485	68.31	PK	33.3	-50.12	51.49	74	-22.51	65	113	V
	3.6483	63.16	LnAv	33.3	-50.12	46.34	54	-7.66	65	113	V
PK - Peak detector LnAv - Linear Average detector											

### Y-Axis, Low Channel Data



Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, Y-Axis, LoCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2161	70.15	PK	28.6	-55.69	43.06	54	-10.94	0-360	149	H
2	1.8246	74.51	PK	30.2	-53.54	51.17	54	-2.83	0-360	100	H
3	2.1348	67.27	PK	31.6	-52.15	46.72	54	-7.28	0-360	149	H
4	2.433	70.93	PK	32.2	-50.82	52.31	54	-1.69	0-360	100	H
5	3.0414	70.27	PK	33.1	-49.8	53.57	54	-0.43	0-360	100	H
6	3.6498	66.86	PK	33.3	-50.11	50.05	54	-3.95	0-360	100	H
7	4.2562	65.69	PK	28.2	-51.75	42.14	54	-11.86	0-360	100	H
8	6.0814	61.92	PK	28.9	-47.98	42.84	54	-11.16	0-360	100	H
9	1.2161	72.31	PK	28.6	-55.69	45.22	54	-8.78	0-360	149	V
10	1.8246	70.13	PK	30.2	-53.54	46.79	54	-7.21	0-360	100	V
11	2.1328	69.11	PK	31.6	-52.16	48.55	54	-5.45	0-360	100	V
12	2.433	68.93	PK	32.2	-50.82	50.31	54	-3.69	0-360	149	V
13	3.0414	70.28	PK	33.1	-49.8	53.58	54	-0.42	0-360	149	V
14	3.6498	66.86	PK	33.3	-50.11	50.05	54	-3.95	0-360	100	V
15	4.2562	68.53	PK	28.2	-51.75	44.98	54	-9.02	0-360	100	V
16	6.0814	64.12	PK	28.9	-47.98	45.04	54	-8.96	0-360	100	V
Radiated Emission Data											
	3.0402	72.17	PK	33.1	-49.79	55.48	74	-18.52	46	102	H
	3.0402	69.6	LnAv	33.1	-49.79	52.91	54	-1.09	46	102	H
	1.824	75.26	PK	30.2	-53.54	51.92	74	-22.08	184	100	H
	1.8242	72.73	LnAv	30.2	-53.54	49.39	54	-4.61	184	100	H
	2.4322	71.77	PK	32.2	-50.82	53.15	74	-20.85	200	122	H
	2.4322	68.79	LnAv	32.2	-50.82	50.17	54	-3.83	200	122	H
	3.6482	69.01	PK	33.3	-50.12	52.19	74	-21.81	334	102	H
	3.6483	64.15	LnAv	33.3	-50.12	47.33	54	-6.67	334	102	H
	2.4322	71.36	PK	32.2	-50.82	52.74	74	-21.26	169	113	V
	2.4322	67.88	LnAv	32.2	-50.82	49.26	54	-4.74	169	113	V
	3.0401	72.89	PK	33.1	-49.79	56.2	74	-17.8	199	105	V
	3.0402	70.42	LnAv	33.1	-49.79	53.73	54	-0.27	199	105	V
	3.6482	69.35	PK	33.3	-50.12	52.53	74	-21.47	331	119	V
	3.6483	65.19	LnAv	33.3	-50.12	48.37	54	-5.63	331	119	V
	2.1315	73.87	PK	31.6	-52.16	53.31	74	-20.69	0	123	V
	2.1311	63.25	LnAv	31.6	-52.17	42.68	54	-11.32	0	123	V
PK - Peak detector LnAv - Linear Average detector											

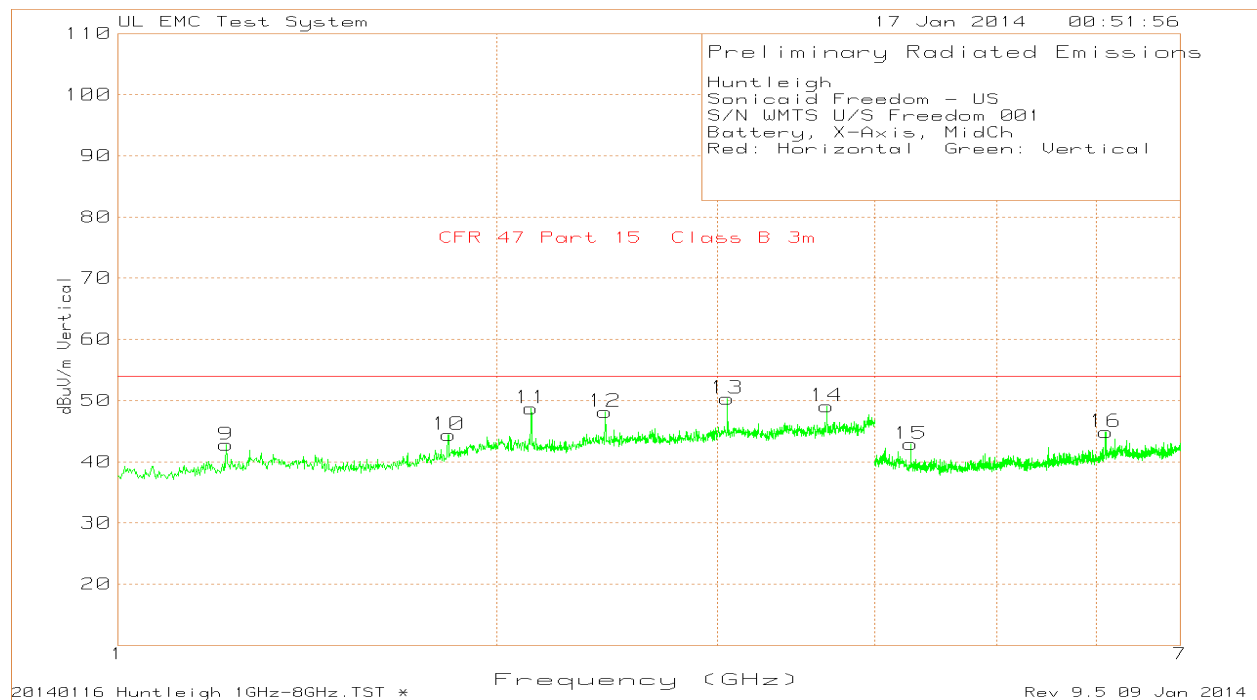
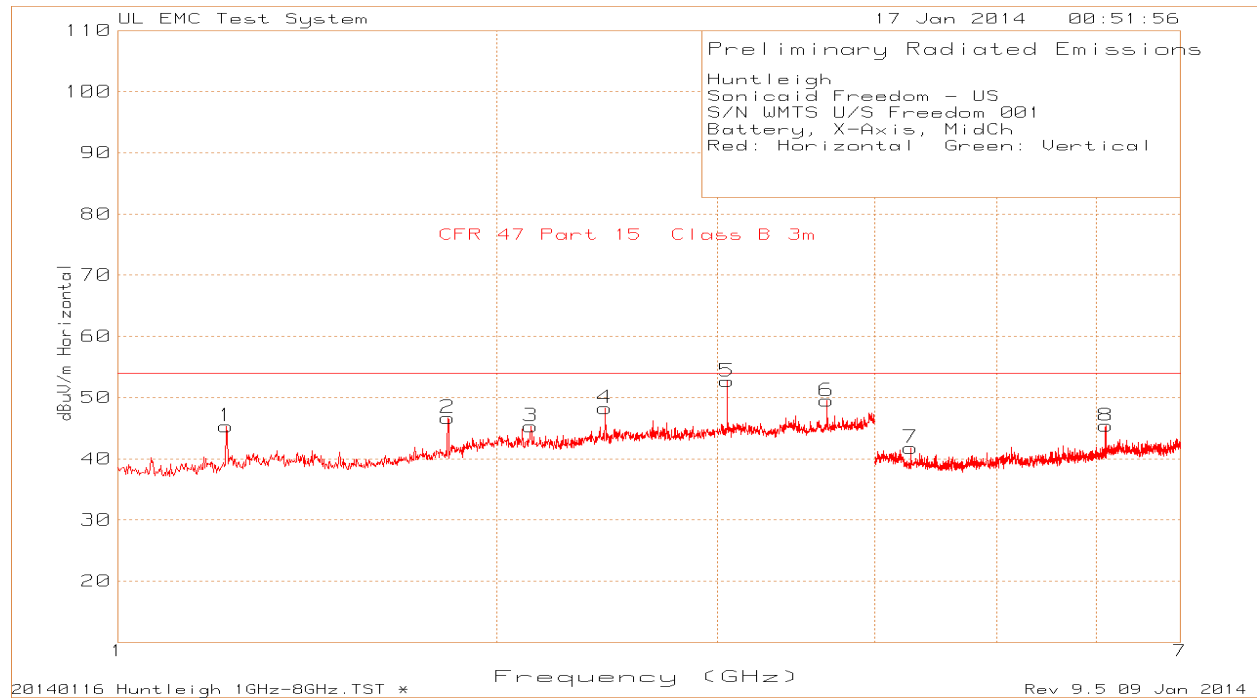
## Z-Axis, Low Channel Data





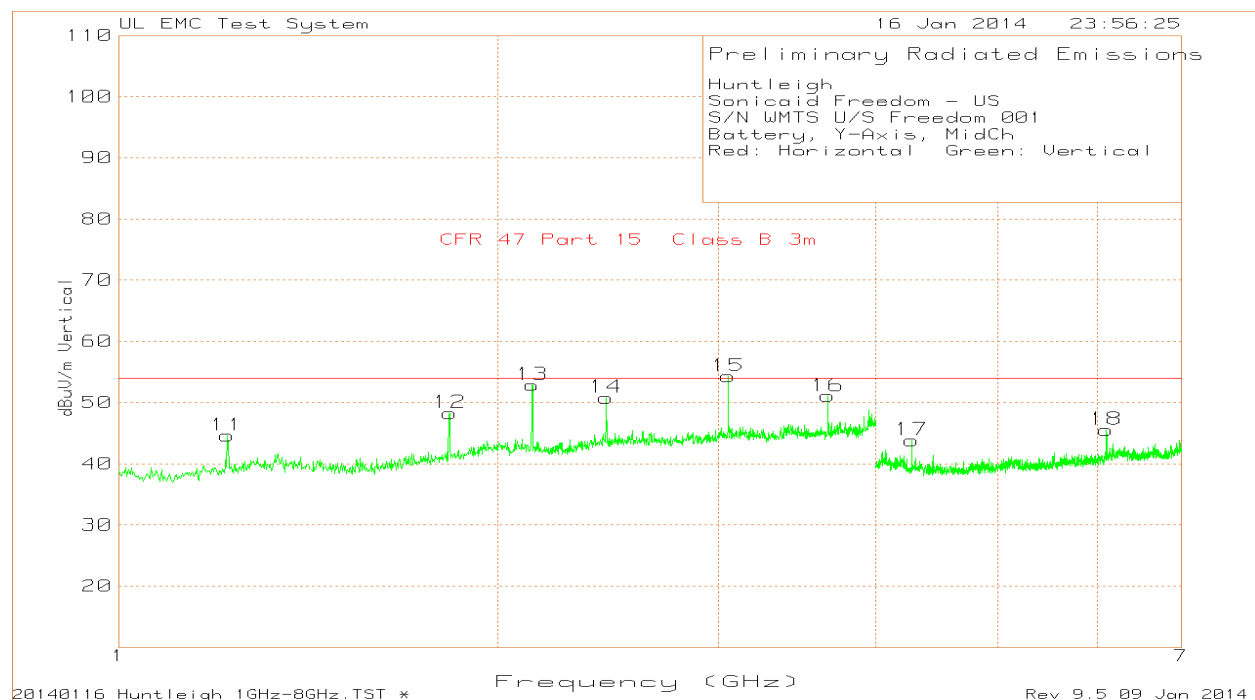
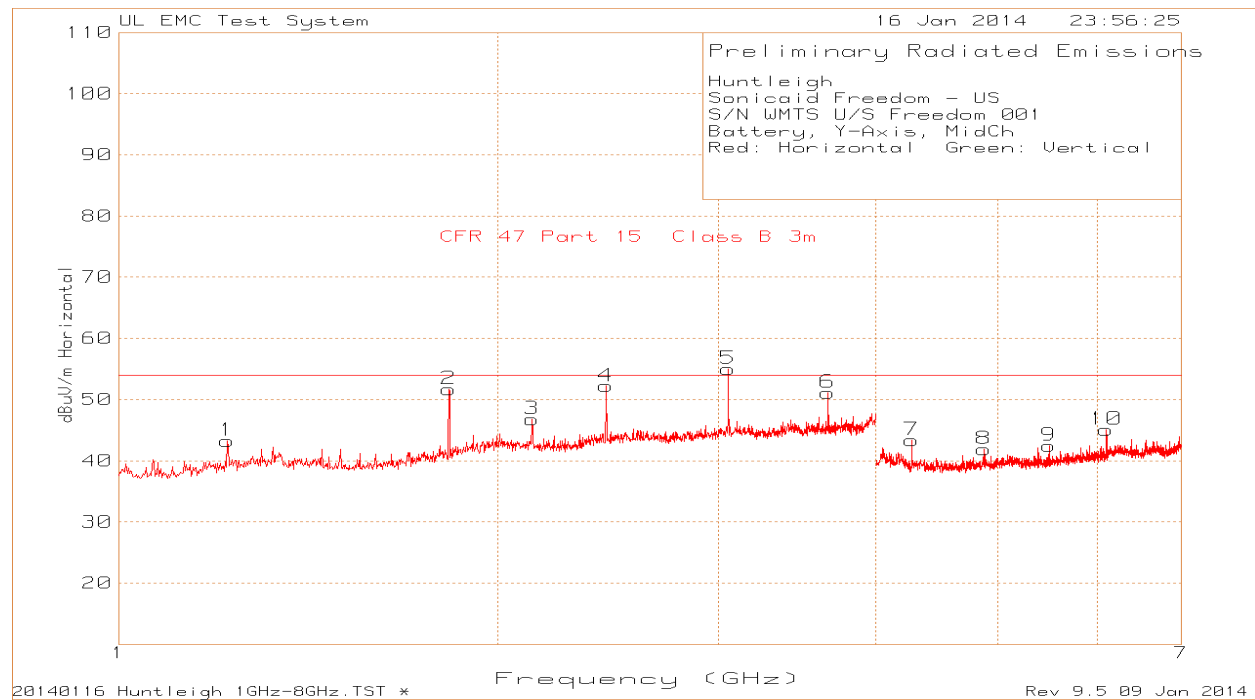
Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, Z-Axis, LoCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2161	70.64	PK	28.6	-55.69	43.55	54	-10.45	0-360	100	H
2	1.8246	74.18	PK	30.2	-53.54	50.84	54	-3.16	0-360	100	H
3	2.1328	68	PK	31.6	-52.16	47.44	54	-6.56	0-360	100	H
4	2.433	72.38	PK	32.2	-50.82	53.76	54	-0.24	0-360	100	H
5	3.0414	71.93	PK	33.1	-49.8	55.23	54	1.23	0-360	100	H
6	3.6498	65.74	PK	33.3	-50.11	48.93	54	-5.07	0-360	100	H
7	4.2562	66.57	PK	28.2	-51.75	43.02	54	-10.98	0-360	100	H
8	6.0814	65.59	PK	28.9	-47.98	46.51	54	-7.49	0-360	100	H
9	1.2161	72.08	PK	28.6	-55.69	44.99	54	-9.01	0-360	149	V
10	1.8246	71.55	PK	30.2	-53.54	48.21	54	-5.79	0-360	100	V
11	2.1328	70.26	PK	31.6	-52.16	49.7	54	-4.3	0-360	100	V
12	2.433	67.28	PK	32.2	-50.82	48.66	54	-5.34	0-360	100	V
13	3.0414	67.14	PK	33.1	-49.8	50.44	54	-3.56	0-360	149	V
14	3.6498	67.84	PK	33.3	-50.11	51.03	54	-2.97	0-360	149	V
15	4.2562	65.86	PK	28.2	-51.75	42.31	54	-11.69	0-360	149	V
16	6.0814	64.15	PK	28.9	-47.98	45.07	54	-8.93	0-360	100	V
Radiated Emission Data											
	3.0402	72.74	PK	33.1	-49.79	56.05	74	-17.95	164	100	H
	3.0403	70.33	LnAv	33.1	-49.79	53.64	54	-0.36	164	100	H
	2.4322	72.93	PK	32.2	-50.82	54.31	74	-19.69	183	100	H
	2.4322	70.25	LnAv	32.2	-50.82	51.63	54	-2.37	183	100	H
	1.8241	75.37	PK	30.2	-53.54	52.03	74	-21.97	185	100	H
	1.8242	72.42	LnAv	30.2	-53.54	49.08	54	-4.92	185	100	H
	2.133	74.4	PK	31.6	-52.16	53.84	74	-20.16	359	100	V
	2.1333	64.06	LnAv	31.6	-52.16	43.5	54	-10.5	359	100	V
	3.0402	67.24	PK	33.1	-49.79	50.55	74	-23.45	157	144	V
	3.0402	62.3	LnAv	33.1	-49.79	45.61	54	-8.39	157	144	V
	3.6483	68.87	PK	33.3	-50.12	52.05	74	-21.95	360	113	V
	3.6483	64.11	LnAv	33.3	-50.12	47.29	54	-6.71	360	113	V
	2.4321	69.65	PK	32.2	-50.82	51.03	74	-22.97	211	117	V
	2.4322	65.27	LnAv	32.2	-50.82	46.65	54	-7.35	211	117	V
PK - Peak detector LnAv - Linear Average detector											

### X-Axis, Middle Channel Data



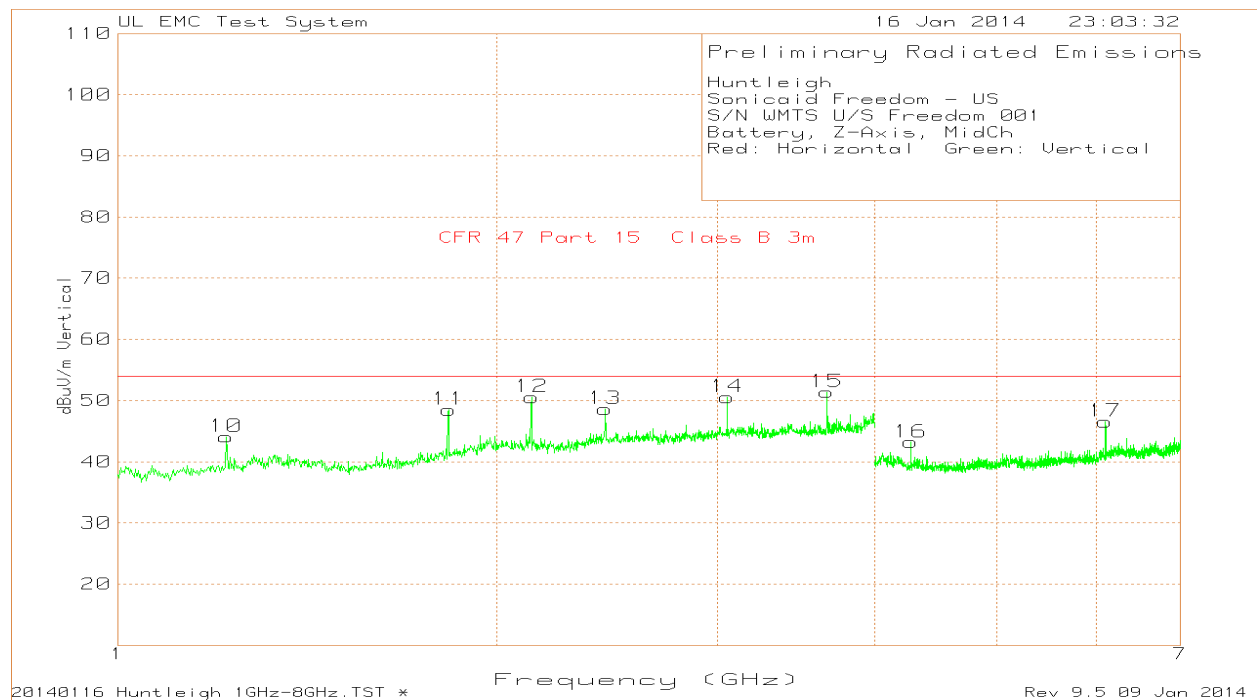
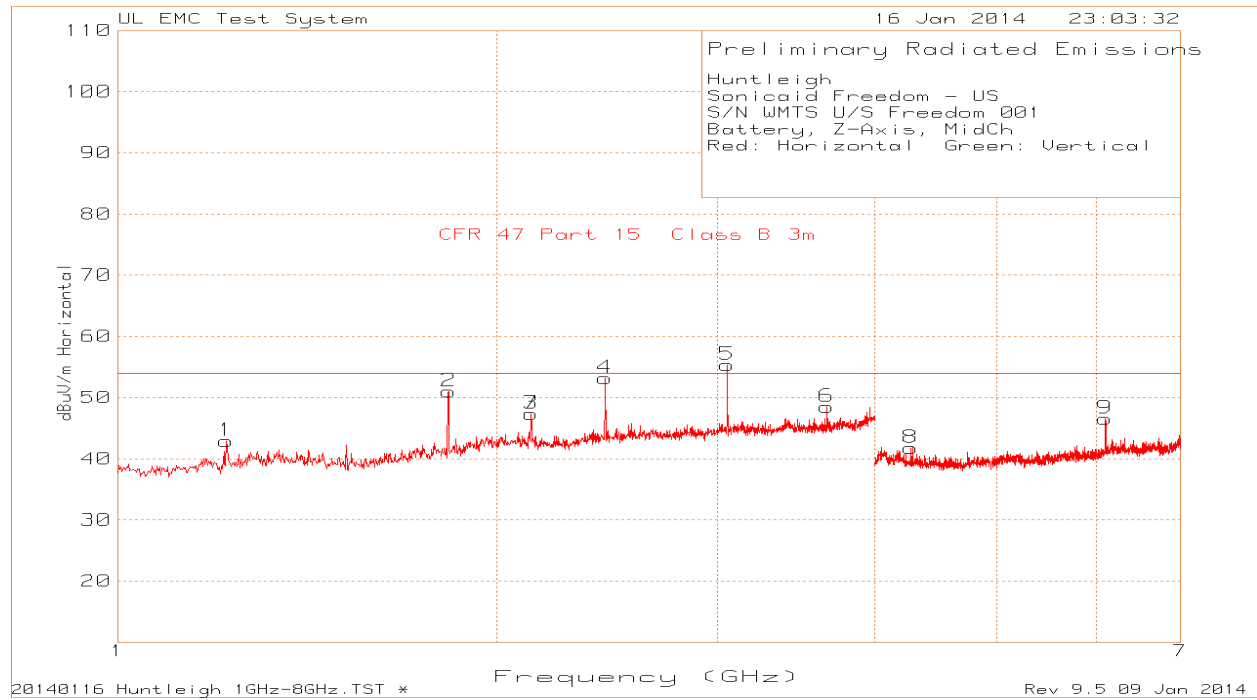
Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, X-Axis, MidCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2201	72.4	PK	28.6	-55.7	45.31	54	-8.69	0-360	149	H
2	1.8306	70.03	PK	30.2	-53.5	46.71	54	-7.29	0-360	100	H
3	2.1308	65.88	PK	31.6	-52.2	45.31	54	-8.69	0-360	149	H
4	2.443	66.88	PK	32.3	-50.9	48.29	54	-5.71	0-360	149	H
5	3.0534	69.39	PK	33.2	-49.9	52.67	54	-1.33	0-360	149	H
6	3.6638	66.27	PK	33.2	-50	49.48	54	-4.52	0-360	100	H
7	4.2742	65.47	PK	28.2	-51.9	41.82	54	-12.18	0-360	100	H
8	6.1074	64.17	PK	29	-47.8	45.38	54	-8.62	0-360	100	H
9	1.2201	69.86	PK	28.6	-55.7	42.77	54	-11.23	0-360	100	V
10	1.8326	67.63	PK	30.3	-53.5	44.41	54	-9.59	0-360	100	V
11	2.1328	69.27	PK	31.6	-52.2	48.71	54	-5.29	0-360	100	V
12	2.443	66.75	PK	32.3	-50.9	48.16	54	-5.84	0-360	149	V
13	3.0534	67.08	PK	33.2	-49.9	50.36	54	-3.64	0-360	149	V
14	3.6638	65.84	PK	33.2	-50	49.05	54	-4.95	0-360	149	V
15	4.2742	66.53	PK	28.2	-51.9	42.88	54	-11.12	0-360	100	V
16	6.1074	63.65	PK	29	-47.8	44.86	54	-9.14	0-360	100	V
Radiated Emission Data											
	3.0527	70.24	PK	33.2	-49.9	53.53	74	-20.47	346	100	H
	3.0527	67.1	LnAv	33.2	-49.9	50.39	54	-3.61	346	100	H
	2.4422	68.34	PK	32.3	-50.9	49.75	74	-24.25	87	100	H
	2.4423	62.04	LnAv	32.3	-50.9	43.45	54	-10.55	87	100	H
	3.6632	68.51	PK	33.2	-50	51.72	74	-22.28	84	103	H
	3.6633	63.43	LnAv	33.2	-50	46.64	54	-7.36	84	103	H
	2.1316	75	PK	31.6	-52.2	54.44	74	-19.56	360	116	V
	2.1319	64.07	LnAv	31.6	-52.2	43.51	54	-10.49	360	116	V
	2.4422	67.46	PK	32.3	-50.9	48.87	74	-25.13	27	151	V
	2.4422	62.02	LnAv	32.3	-50.9	43.43	54	-10.57	27	151	V
	3.0527	70.39	PK	33.2	-49.9	53.68	74	-20.32	108	115	V
	3.0527	66.93	LnAv	33.2	-49.9	50.22	54	-3.78	108	115	V
	3.663	66.77	PK	33.2	-50	49.98	74	-24.02	252	114	V
	3.6633	60.39	LnAv	33.2	-50	43.6	54	-10.4	252	114	V
PK - Peak detector LnAv - Linear Average detector											

## Y-Axis, Middle Channel Data



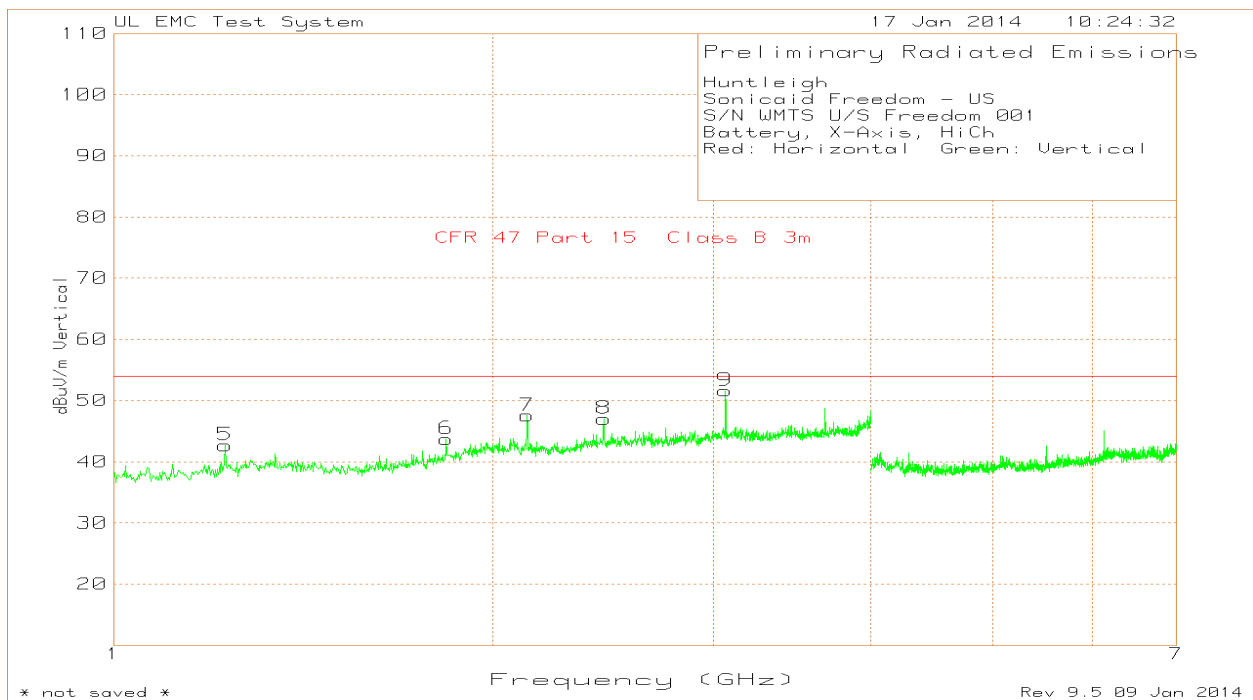
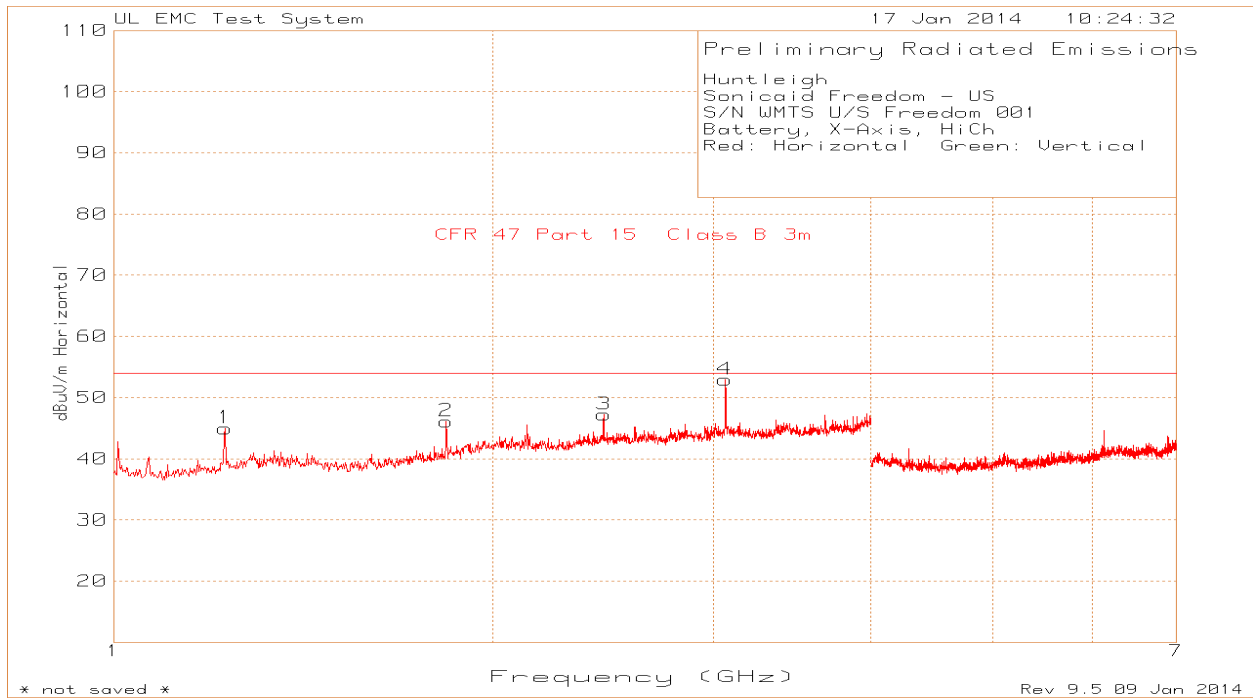
Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, Y-Axis, MidCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2201	70.34	PK	28.6	-55.69	43.25	54	-10.75	0-360	100	H
2	1.8306	75.03	PK	30.2	-53.52	51.71	54	-2.29	0-360	100	H
3	2.1328	67.35	PK	31.6	-52.16	46.79	54	-7.21	0-360	100	H
4	2.443	70.81	PK	32.3	-50.89	52.22	54	-1.78	0-360	100	H
5	3.0534	71.76	PK	33.2	-49.92	55.04	54	1.04	0-360	100	H
6	3.6638	67.9	PK	33.2	-49.99	51.11	54	-2.89	0-360	100	H
7	4.2742	67.06	PK	28.2	-51.85	43.41	54	-10.59	0-360	100	H
8	4.8746	64.31	PK	27.7	-50.11	41.9	54	-12.1	0-360	149	H
9	5.495	63.74	PK	28.1	-49.34	42.5	54	-11.5	0-360	100	H
10	6.1054	63.88	PK	29	-47.8	45.08	54	-8.92	0-360	100	H
11	1.2201	71.68	PK	28.6	-55.69	44.59	54	-9.41	0-360	100	V
12	1.8326	71.49	PK	30.3	-53.52	48.27	54	-5.73	0-360	100	V
13	2.1328	73.45	PK	31.6	-52.16	52.89	54	-1.11	0-360	100	V
14	2.443	69.36	PK	32.3	-50.89	50.77	54	-3.23	0-360	149	V
15	3.0534	71	PK	33.2	-49.92	54.28	54	0.28	0-360	149	V
16	3.6638	67.87	PK	33.2	-49.99	51.08	54	-2.92	0-360	100	V
17	4.2742	67.52	PK	28.2	-51.85	43.87	54	-10.13	0-360	100	V
18	6.1054	64.32	PK	29	-47.8	45.52	54	-8.48	0-360	100	V
Radiated Emission Data											
	3.0527	72.93	PK	33.2	-49.91	56.22	74	-17.78	62	100	H
	3.0527	70.39	LnAv	33.2	-49.91	53.68	54	-0.32	62	100	H
	1.8316	75.7	PK	30.3	-53.52	52.48	74	-21.52	190	100	H
	1.8317	73.14	LnAv	30.3	-53.52	49.92	54	-4.08	190	100	H
	2.4421	72.03	PK	32.3	-50.89	53.44	74	-20.56	189	122	H
	2.4422	69.07	LnAv	32.3	-50.89	50.48	54	-3.52	189	122	H
	3.6632	69.68	PK	33.2	-49.99	52.89	74	-21.11	345	100	H
	3.6633	65.16	LnAv	33.2	-49.99	48.37	54	-5.63	345	100	H
	3.0527	73.07	PK	33.2	-49.91	56.36	74	-17.64	198	107	V
	3.0527	70.49	LnAv	33.2	-49.91	53.78	54	-0.22	198	107	V
	2.442	70.83	PK	32.3	-50.89	52.24	74	-21.76	180	115	V
	2.4422	66.93	LnAv	32.3	-50.89	48.34	54	-5.66	180	115	V
	3.6632	69.34	PK	33.2	-49.99	52.55	74	-21.45	337	119	V
	3.6633	65.01	LnAv	33.2	-49.99	48.22	54	-5.78	337	119	V
	2.1341	78.08	PK	31.6	-52.16	57.52	74	-16.48	0	100	V
	2.1332	66.56	LnAv	31.6	-52.16	46	54	-8	0	100	V
PK - Peak detector LnAv - Linear Average detector											

### Z-Axis, Middle Channel Data



Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, Z-Axis, MidCh Red: Horizontal Green: Vertical											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2201	70.04	PK	28.6	-55.69	42.95	54	-11.05	0-360	100	H
2	1.8326	74.24	PK	30.3	-53.52	51.02	54	-2.98	0-360	100	H
4	2.443	71.77	PK	32.3	-50.89	53.18	54	-0.82	0-360	100	H
5	3.0534	72.05	PK	33.2	-49.92	55.33	54	1.33	0-360	100	H
6	3.6638	65.29	PK	33.2	-49.99	48.5	54	-5.5	0-360	100	H
7	2.1328	67.94	PK	31.6	-52.16	47.38	54	-6.62	0-360	100	H
8	4.2742	65.43	PK	28.2	-51.85	41.78	54	-12.22	0-360	100	H
9	6.1054	65.38	PK	29	-47.8	46.58	54	-7.42	0-360	100	H
10	1.2201	71.2	PK	28.6	-55.69	44.11	54	-9.89	0-360	100	V
11	1.8326	71.71	PK	30.3	-53.52	48.49	54	-5.51	0-360	100	V
13	2.443	67.21	PK	32.3	-50.89	48.62	54	-5.38	0-360	149	V
14	3.0534	67.3	PK	33.2	-49.92	50.58	54	-3.42	0-360	149	V
15	3.6638	68.2	PK	33.2	-49.99	51.41	54	-2.59	0-360	149	V
16	4.2742	66.86	PK	28.2	-51.85	43.21	54	-10.79	0-360	100	V
17	6.1054	65.36	PK	29	-47.8	46.56	54	-7.44	0-360	100	V
Radiated Emission Data											
	3.0527	73.02	PK	33.2	-49.91	56.31	74	-17.69	181	100	H
	3.0527	70.53	LnAv	33.2	-49.91	53.82	54	-0.18	181	100	H
	2.4422	72.88	PK	32.3	-50.89	54.29	74	-19.71	169	100	H
	2.4422	70.05	LnAv	32.3	-50.89	51.46	54	-2.54	169	100	H
	3.6633	67.24	PK	33.2	-49.99	50.45	74	-23.55	360	104	H
	3.6633	61.66	LnAv	33.2	-49.99	44.87	54	-9.13	360	104	H
	1.8318	75.09	PK	30.3	-53.52	51.87	74	-22.13	184	100	H
	1.8317	72.4	LnAv	30.3	-53.52	49.18	54	-4.82	184	100	H
	3.0525	67.9	PK	33.2	-49.9	51.2	74	-22.8	354	170	V
	3.0528	63.11	LnAv	33.2	-49.91	46.4	54	-7.6	354	170	V
	3.6632	67.78	PK	33.2	-49.99	50.99	74	-23.01	233	105	V
	3.6633	61.34	LnAv	33.2	-49.99	44.55	54	-9.45	233	105	V
PK - Peak detector LnAv - Linear Average detector											

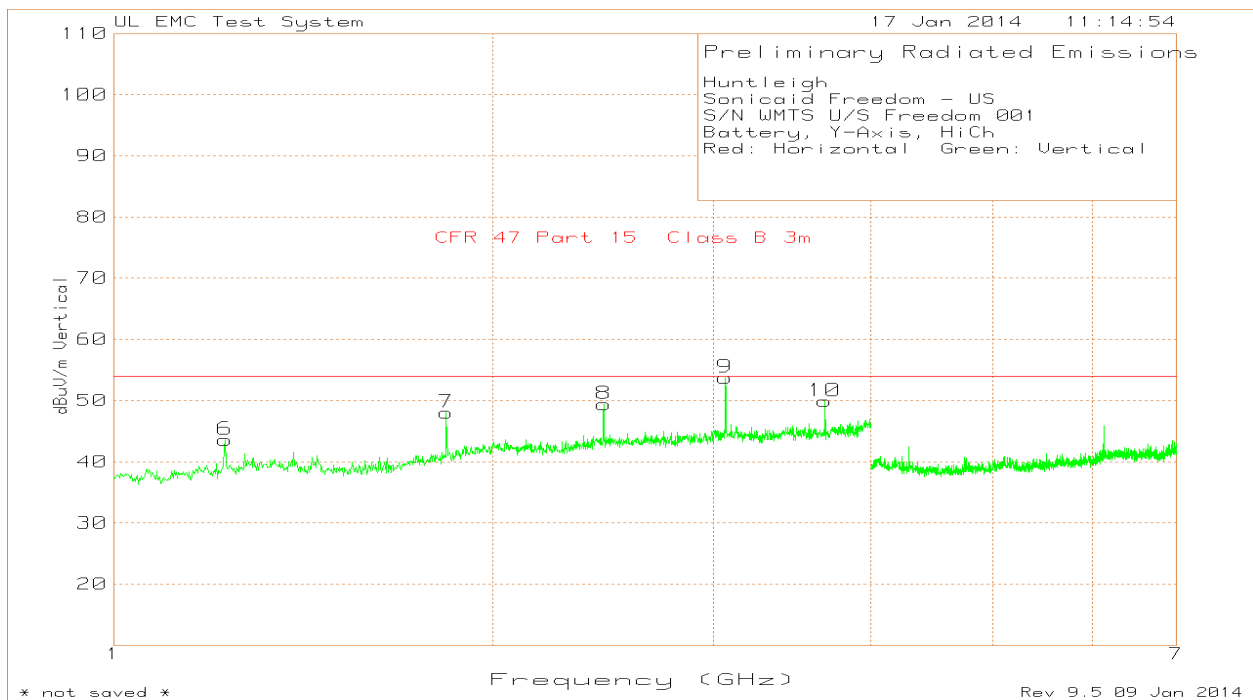
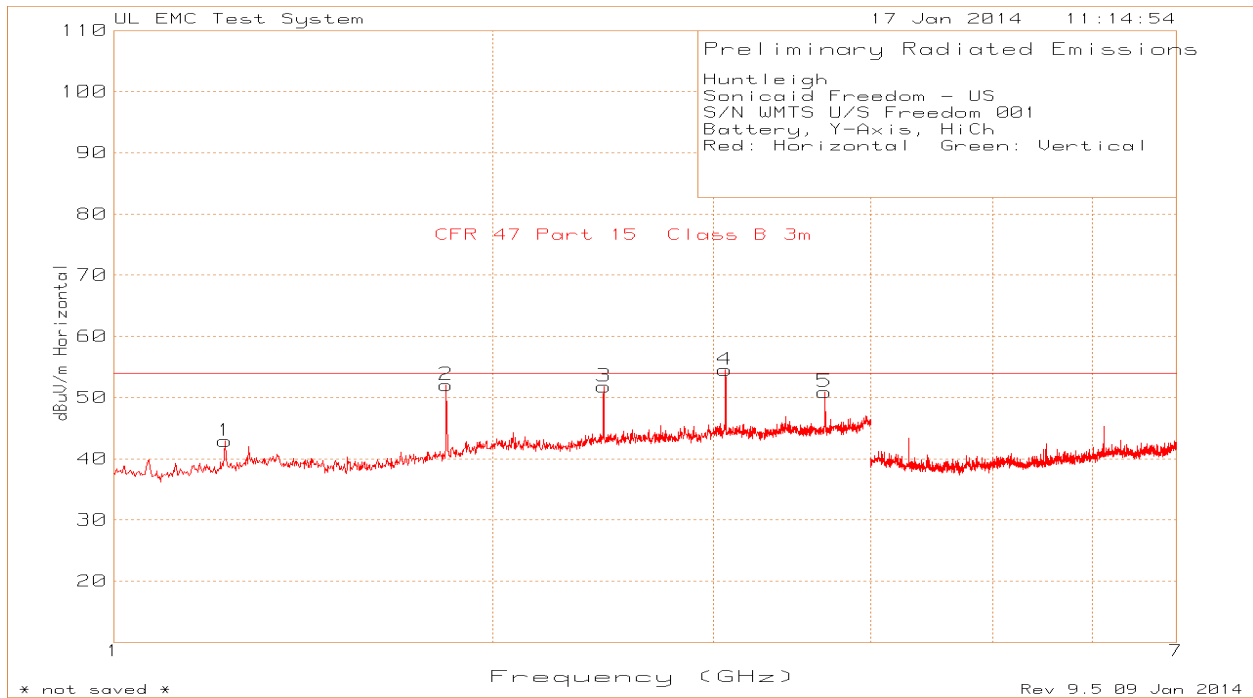
### X-Axis, High Channel Data





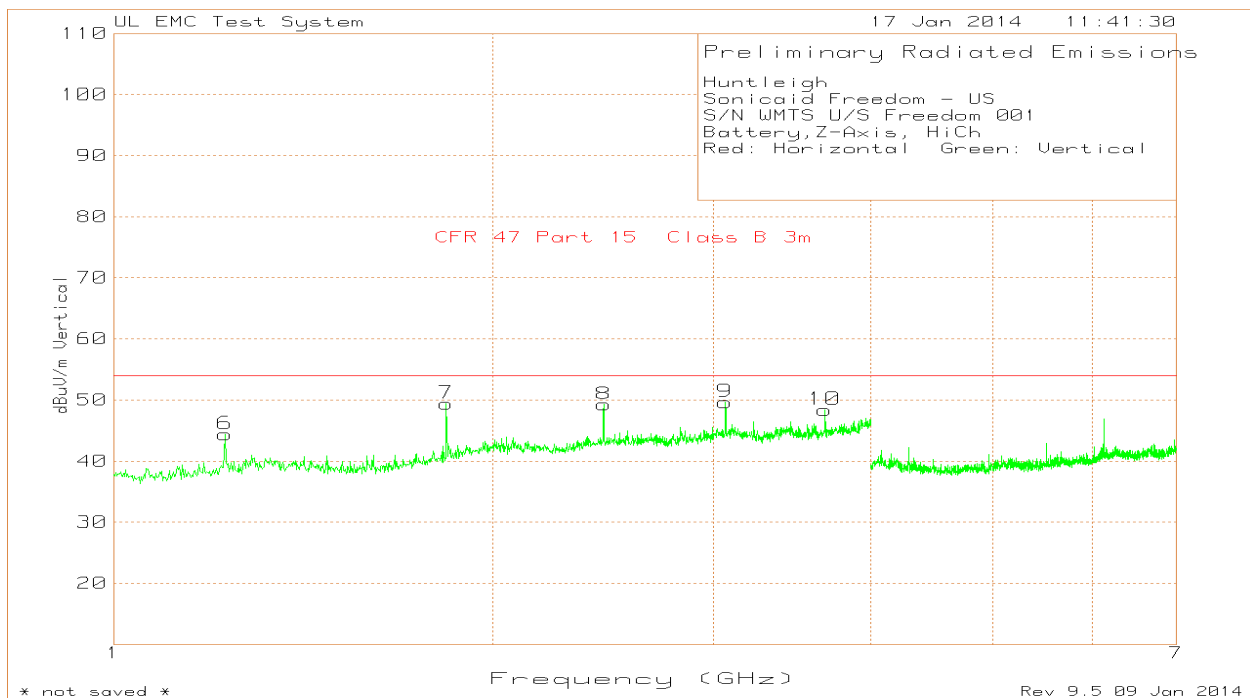
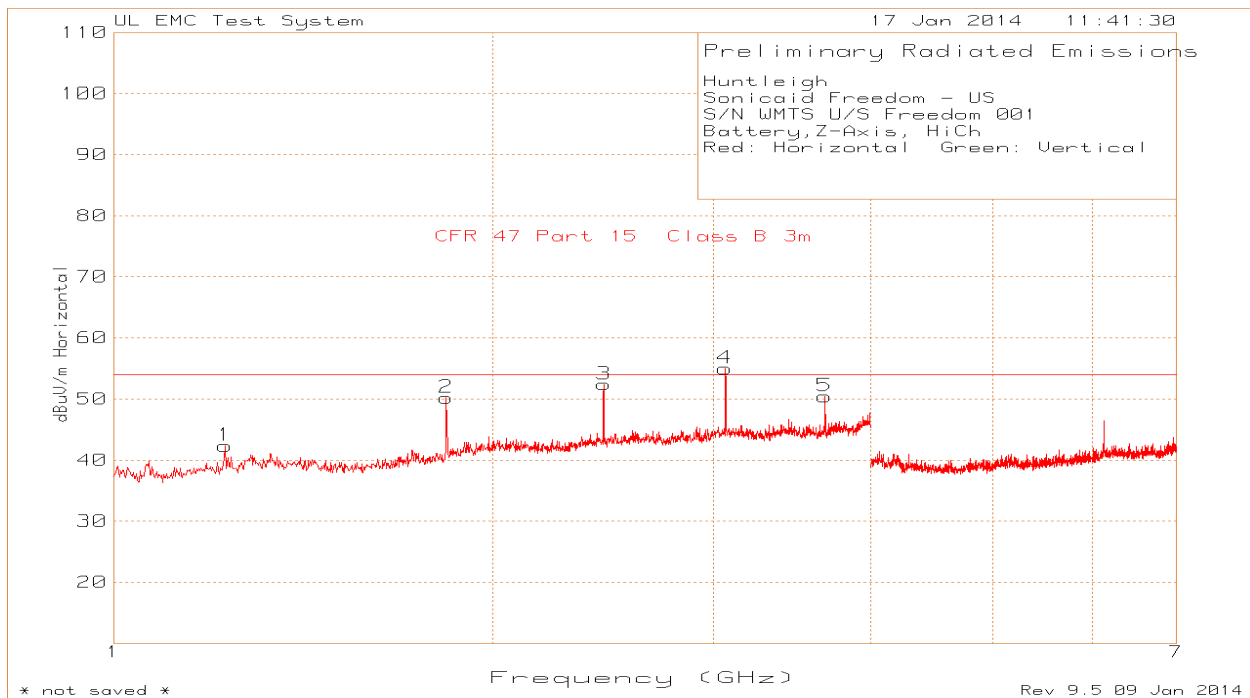
Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, X-Axis, HiCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2262	72.01	PK	28.7	-55.69	45.02	54	-8.98	0-360	100	H
2	1.8386	69.37	PK	30.3	-53.51	46.16	54	-7.84	0-360	100	H
3	2.453	65.81	PK	32.3	-50.9	47.21	54	-6.79	0-360	100	H
4	3.0654	69.67	PK	33.3	-50.05	52.92	54	-1.08	0-360	149	H
5	1.2262	69.71	PK	28.7	-55.69	42.72	54	-11.28	0-360	149	V
6	1.8386	66.92	PK	30.3	-53.51	43.71	54	-10.29	0-360	100	V
7	2.1328	68.1	PK	31.6	-52.16	47.54	54	-6.46	0-360	149	V
8	2.453	65.66	PK	32.3	-50.9	47.06	54	-6.94	0-360	149	V
9	3.0654	68.39	PK	33.3	-50.05	51.64	54	-2.36	0-360	149	V
Radiated Emission Data											
	3.0649	70.71	PK	33.3	-50.05	53.96	74	-20.04	50	100	H
	3.065	67.48	LnAv	33.3	-50.05	50.73	54	-3.27	50	100	H
PK - Peak detector LnAv - Linear Average detector											

### Y-Axis, High Channel Data



Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery, Y-Axis, HiCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.2262	69.87	PK	28.7	-55.69	42.88	54	-11.12	0-360	149	H
2	1.8386	75.28	PK	30.3	-53.51	52.07	54	-1.93	0-360	100	H
3	2.453	70.41	PK	32.3	-50.9	51.81	54	-2.19	0-360	149	H
4	3.0654	71.26	PK	33.3	-50.05	54.51	54	0.51	0-360	100	H
5	3.6798	67.55	PK	33.2	-49.82	50.93	54	-3.07	0-360	100	H
6	1.2262	70.61	PK	28.7	-55.69	43.62	54	-10.38	0-360	100	V
7	1.8386	71.28	PK	30.3	-53.51	48.07	54	-5.93	0-360	100	V
8	2.453	68.05	PK	32.3	-50.9	49.45	54	-4.55	0-360	149	V
9	3.0654	70.54	PK	33.3	-50.05	53.79	54	-0.21	0-360	149	V
10	3.6798	66.55	PK	33.2	-49.82	49.93	54	-4.07	0-360	149	V
Radiated Emission Data											
	3.0651	72.69	PK	33.3	-50.05	55.94	74	-18.06	57	100	H
	3.065	70.15	LnAv	33.3	-50.05	53.4	54	-0.6	57	100	H
	3.6778	69.44	PK	33.2	-49.82	52.82	74	-21.18	349	100	H
	3.678	65.21	LnAv	33.2	-49.82	48.59	54	-5.41	349	100	H
	3.065	69.86	PK	33.3	-50.05	53.11	74	-20.89	329	103	V
	3.065	66.7	LnAv	33.3	-50.05	49.95	54	-4.05	329	103	V
PK - Peak detector LnAv - Linear Average detector											

## Z-Axis, High Channel Data



Huntleigh Sonicaid Freedom - US S/N WMTS U/S Freedom 001 Battery,Z-Axis, HiCh Red: Horizontal Green: Vertical Trace Markers											
Marker No.	Test Frequency GHz	Meter Reading dBuV	Detector	Antenna Factor dB/m	Path Factor dB	Level dbuV/m	CFR 47 Part 15 Class B 3m Limit dBuV/m	Margin (dB)	Azimuth [Degr]	Height [cm]	Polarity
1	1.2262	69.34	PK	28.7	-55.69	42.35	54	-11.65	0-360	149	H
2	1.8386	73.45	PK	30.3	-53.51	50.24	54	-3.76	0-360	102	H
3	2.453	71.04	PK	32.3	-50.9	52.44	54	-1.56	0-360	102	H
4	3.0654	71.74	PK	33.3	-50.05	54.99	54	0.99	0-360	102	H
5	3.6798	67.04	PK	33.2	-49.82	50.42	54	-3.58	0-360	102	H
6	1.2262	71.41	PK	28.7	-55.69	44.42	54	-9.58	0-360	100	V
7	1.8386	72.65	PK	30.3	-53.51	49.44	54	-4.56	0-360	100	V
8	2.453	67.86	PK	32.3	-50.9	49.26	54	-4.74	0-360	149	V
9	3.0654	66.41	PK	33.3	-50.05	49.66	54	-4.34	0-360	100	V
10	3.6798	65	PK	33.2	-49.82	48.38	54	-5.62	0-360	149	V
Radiated Emission Data											
	3.065	73.17	PK	33.3	-50.05	56.42	74	-17.58	182	102	H
	3.065	70.69	LnAv	33.3	-50.05	53.94	54	-0.06	184	103	H
	2.4519	72.7	PK	32.3	-50.9	54.1	74	-19.9	168	151	H
	2.452	69.39	LnAv	32.3	-50.9	50.79	54	-3.21	168	151	H
PK - Peak detector LnAv - Linear Average detector											

## **8.2.4. FREQUENCY STABILITY**

### **LIMIT**

§2.1055 & 95.1115 (e) Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all of the manufacturer's specific conditions.

### **TEST PROCEDURE**

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.3.1 and 2.3.2

### **RESULTS**

No non-compliance noted.

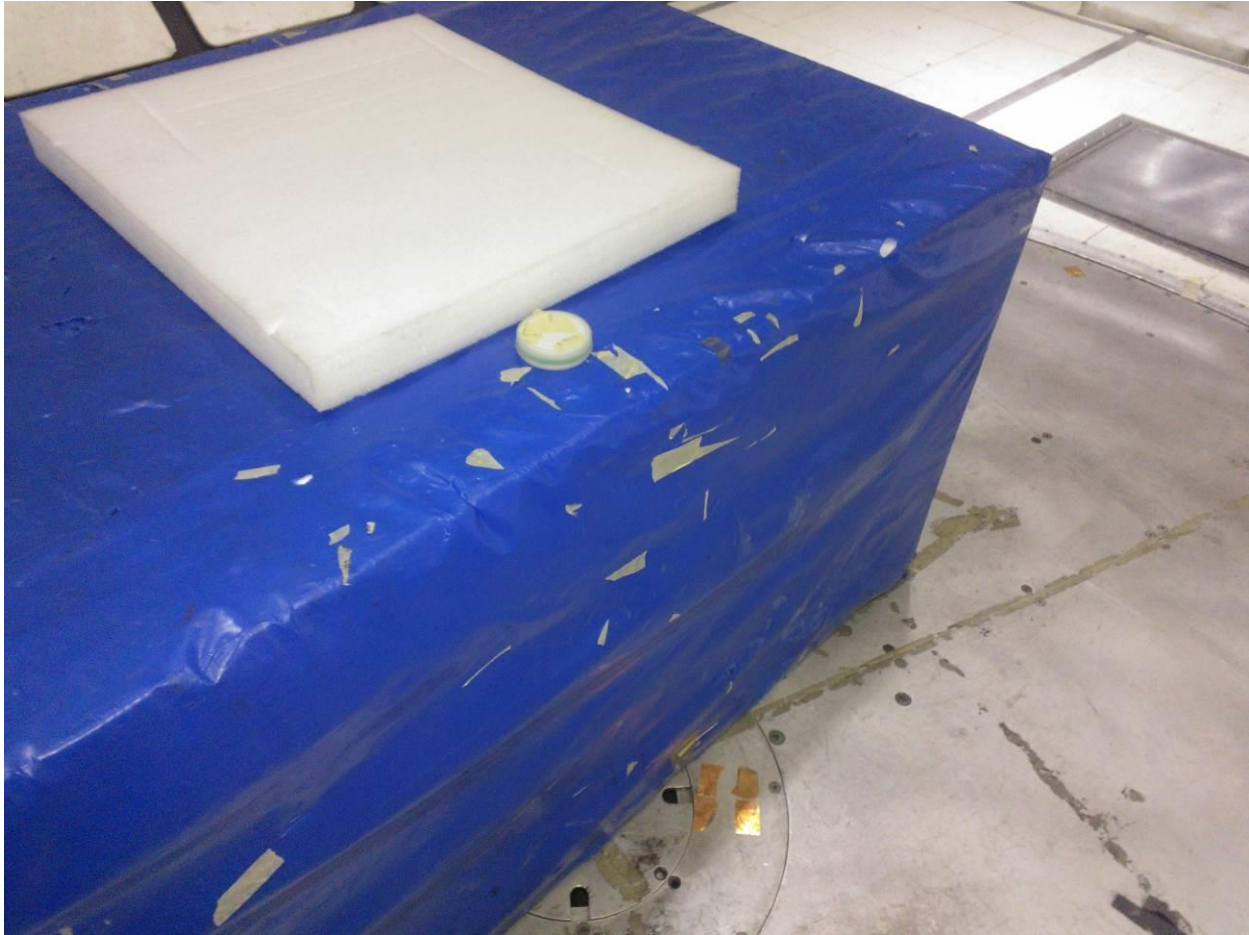
**Middle Channel Frequency Stability**

	Temperature deg C	Center Frequency MHz	Frequency Error MHz from 610.5375 MHz	Frequency Error PPM from 610.5375 MHz	Low Channel Error - Edge Frequency MHz	High Channel Error - Edge Frequency MHz
Temperature Variation	-30	EUT did not operate at this temperature				
	-20	EUT did not operate at this temperature				
	-10	610.5375000	0.0000000	0	<b>608.0232050</b>	<b>612.9731450</b>
	0	610.5376125	0.0001125	0.184263866	<b>608.0233175</b>	<b>612.9732575</b>
	10	610.5377250	0.0002250	0.368527732	<b>608.0234300</b>	<b>612.9733700</b>
	20	610.5377250	0.0002250	0.368527732	<b>608.0234300</b>	<b>612.9733700</b>
	25	610.5375125	0.0000125	0.020473763	<b>608.0232175</b>	<b>612.9731575</b>
	30	610.5376125	0.0001125	0.184263866	<b>608.0233175</b>	<b>612.9732575</b>
	40	610.5374625	-0.0000375	-0.061421289	<b>608.0231675</b>	<b>612.9731075</b>
	50	610.5372125	-0.0002875	-0.470896546	<b>608.0229175</b>	<b>612.9728575</b>
Voltage Variation	Batt Full	610.5376500	0.0001500	0.245685154	<b>608.0233550</b>	<b>612.9732950</b>
	Batt zero bars	610.5376250	0.0001250	0.204737629	<b>608.0233300</b>	<b>612.9732700</b>
					<b>Low Channel Frequency MHz</b>	<b>High Channel Frequency MHz</b>
					<b>608.0375</b>	<b>612.9875</b>
					<b>Low Channel 26dB BW MHz</b>	<b>High Channel 26dB BW MHz</b>
					<b>0.02859</b>	<b>0.02871</b>
					<b>Low Channel Lower Edge MHz</b>	<b>High Channel Upper Edge MHz</b>
					<b>608.023205</b>	<b>612.973145</b>

## 9. SETUP PHOTOS

### ANTENNA PORT MEASUREMENT SETUP

Radiated Emissions X-Axis





Radiated Emissions –Y-Axis



Radiated Emissions – Z-Axis



**END OF REPORT**