Certification Test Report

For a

SmartSponge Plus System – Phase I Cost Reduction

Manufacturer:

Clearcount Medical Solutions, Inc.
101 Bellevue Road, Suite 300
Pittsburgh, Pennsylvania 15229
United States of America

Testing Laboratory:

F-Squared Laboratories
16740 Peters Road
Middlefield, Ohio 44062
United States of America

The **SmartSponge Plus System - Phase I Cost Reduction, model A02,** was tested and was found to comply with the requirements of the Federal Communications Commission outlined in the Federal Register CFR 47, Part 15.225.

The product was received on Dec. 23, 2009 and the testing was completed on Jan. 27, 2010.

Evaluation Conducted By:

Ken Littell
EMC Project Eng.

Russell Beattie
EMC Technical Mgr.

Report Reviewed By:

Wendy Fuster
President

F-Squared Laboratories
16740 Peters Road
Middlefield, Ohio 44062
(440) 632-5541
Fax: (440) 632-5542

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1. ENGINEERING STATEMENT

This report has been prepared on behalf of Clearcount Medical Solutions, Inc. to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.225 of the FCC Rules using ANSI C63.4 2003 standards. The test results found in this test report relate only to the items tested.

1.1. Equipment Under Test:
SmartSponge Plus System
FCC ID: WWQCCMS003

1.2. Trade Name:
Clearcount Medical Solutions, Inc.

1.3. Model:
A02

1.4. Power Supply:
Input: 100-240V~, 50-60 Hz, 1.3A.

1.5. Applicable Rules:
CFR 47, Part 15.225, (a)-(e)

Reference FCC ID PJMLRM2000. Test results for Part 15.225(e) may be found on page 33 of 58 of CETECOM ICT Services GmbH Test Report 2-4112-01-02/05, under separate cover.

1.6. Equipment Category:
Low Power Communication Device Transmitter
Frequency: 13.56 MHz

1.7. Antenna:
Handheld Wand

1.8. Measurement Location:
F-Squared Laboratories in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD**.**

1.9. Measurement Procedure:

All measurements were performed according to the 2003 version of ANSI C63.4 and recommended FCC parts 15.31, 15.33 and 15.35. A list of the measurement equipment can be found in Section 2.

1.10. Uncertainty Budget:

Conducted Emissions – Combined uncertainly ±1.13 dB, expanded ±2.26 dB
Radiated Emissions – Combined Uncertainty ±2.24 dB; Expanded Uncertainty ±4.48 dB

2. LIST OF MEASUREMENT INFORMATION

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shield Room	CL014	Shielding Resources	3 Meter	001	Aug. 14, 2010
Temp/Hum. Recorder	CL118	Extech	RH520	H005870	Dec. 11, 2010
Spectrum Analyzer	0141	Hewlett Packard	8591E	3520A04145	Oct, 8, 2010
Receiver	0145	Rohde & Schwarz	Display, EASI-0-804-8932-52; RF Unit, ESMI-RF 1032-5640-53	84982/015; 849152/005	Apr. 23, 2010
Antenna 1-Chamber	0142	ETS/EMCO	3142B	9811-1330	Aug. 31, 2010
Antenna 2-OATS	0105	Sunol Sciences	JB1	A101101	July 22, 2011
Pre-Amplifier	0197	Hewlett-Packard	8447D	1726A01006	Oct. 20, 2010
OATS	CL017	Compliance Labs	N/A	001	Jan. 13, 2010
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	Dec. 31, 2010
LISN 1	0149	Solar	8028-50-TS-24-BNC	1130	Oct. 20, 2010
LISN 3	0148	Solar	8028-50-TS-24-BNC	1129	Oct. 20, 2010
Active 18” Loop Antenna	CL082	A.H. Systems, Inc.	SAS-562B	241	Sept. 14, 2011

3. EQUIPMENT UNDER TEST (EUT) INFORMATION AND DATA

3.1 Test Item Condition:

The equipment to be tested was received in good condition.

3.2 Testing Algorithm:

The EUT was on and operating, waiting to count out sponges as they were scanned. Three modes were tested: out, in and wand.

3.3 Radiated Emission Testing on Open Area Test Site (OATS):

The SmartSponge Plus System was initially characterized in a semi-anechoic chamber over a frequency range of 0.009 to 1000 MHz. Magnetic field emissions were measured below 30 MHz and electric field emissions were examined above 30 MHz.

The final radiated emissions measurements were performed on an Open Air Test Site (OATS). The SmartSponge Plus System was tested at a tested at a distance of 3.0 meters at frequencies below 30 MHz and 3.0 meters above 30 MHz. At frequencies below 30 MHz, the emissions were maximized by rotating the Transmitter and the loop antenna on their axes. Additionally, the Transmitter was examined in three orthogonal positions to ensure maximization of emissions. At frequencies above 30 MHz, the emissions were maximized by rotating the Transmitter while raising/lowering the bilog antenna mounted on a 4.0 meter mast. Again, three orthogonal Transmitter positions were examined to ensure maximization of the emissions. Both horizontal and vertical field components were measured above 30 MHz. A resolution bandwidth of 200 Hz was used between 0.009 to 0.15 MHz, 9 kHz was used between 0.15 to 30 MHz, and 120 kHz was used between 30 to 1000 MHz. The detector function was set to quasi-peak mode for all measurements. The raw measurements were correlated to allow for antenna factor and cable loss.

3.4 Conducted Emissions Measurements

The equipment was installed on a 0.8-meter high table, as described CISPR 11:2007. Power was provided to the Equipment under Test (EUT) through a Line Impedance Stabilization Network (LISN). An EMI receiver was also connected to the LISN to measure the RF emissions on the power lines of the EUT. The EUT was fully exercised with all cabling attached. The setup conforms to CISPR 11:2007.

During the test, each conductor of the power mains was tested and emissions were measured over the frequency range of 0.15 MHz to 30 MHz. The highest levels were recorded and plots were taken showing the emissions on each conductor. These levels were compared to the Class A limits specified in CISPR 11:2007.

4. EUT CONFIGURATION AND CABLES

4.1. Equipment Under Test (EUT):

Device	Manufacturer	Model Number	Serial Number
SmartSponge	Clearcount Medical Solutions, Inc.	A02	00001060
Wand	Clearcount Medical Solutions, Inc.	None Specified	None Specified

4.2. Accessories (Support Equipment): None

4.3. Cables:

Cable Function	Length	Shielded (Yes/No)
AC Power	N/A	No
Wand	>3 Meters	Yes

5. PRODUCT DESCRPTION

The SmartSponge® System includes surgical sponges, laparatomy pads and surgical towels, each of which contains a unique radio frequency identification (RFID) tag permanently attached to the gauze or fabric. The tags allow the sponges and towels to be individually recognized by an RFID reader.

The SmartBucket is a specially designed cart containing a microcontroller unit with specialized software designed for mobile data collection. Integrated RFID technology allows capture of the information coded on the unique RFID tag on the sponges, pads and towels. The microcontroller unit counts the initial number of sponges introduced into a surgical case, and using the custom software program, reports the total sponges discarded at the end of the procedure, and compares that number to the original. By providing a count of the items entered into surgery, and a count of those discarded and removed permanently from the surgical field, personnel can be alerted to sponges that may still remain in the surgical field prior to closing the patient.

A Detection Wand is an additional antenna that is tethered by a cable to the SmartBucket. It is powered and controlled by the SmartBucket. The antenna functions as an additional RFID antenna to the system, functioning in an identical manner to the internal SmartBucket antennas. By using a keypad the user may select activate the Detection Wand antenna. When in Detection Wand mode, the system uses the Wand antenna to recognize RFID-tagged items that may be inside the surgical site.

6. FCC PART 15.225(a)-(d) – RADIATED EMISSIONS

6.1. Requirements:

The field strength of emissions of the Transmitter operating to FCC Part 15.225 shall not exceed:

(a) In the band 13.553-13.567 MHz, 15848µV/m (84 dBµV/m) at 30m
(b) In the bands 13.410-13.553 and 13.567-13.710 MHz, 334 µV/m (50.5 dBµV/m) at 30m
(c) In the bands 13.110-13.410 MHz and 13.710-14.010 MHz, 106 µV/m (40.5 dBµV/m) at 30m
(d) Any emissions outside the 13.110-14.010 MHz band shall not exceed the FCC 15.209(a) limits.

The radiated emissions measurements, above 30MHz, were initially performed in a semi-anechoic chamber to profile the emissions characteristics of the SmartSponge Plus System. These measurements were performed at a 1.5 meter distance. Radiated emission measurements, below 30MHz, were performed on the OATS at four orthogonal positions to profile the emission characteristic. These measurement were performed at a 3 meter distance. The test setups used in the chamber are shown in Pictorial 1.

The final compliance measurements were performed on the OATs at a 3 meter distance for frequencies below 30 MHz and at 3 meters above 30 MHz. The test setup used on the OATS are showed in Pictorials 2-3.

6.2. Results:

The Spectral Plots of the characterization measurements performed in the semi-anechoic chamber are organized as follows:

Figures 1-10	0.009 MHz to 30MHz	H-Field Loop Antenna, Radiated Emissions, Ambient
Figures 11-18	0.009 MHz to 30MHz	H-Field Radiated Emissions, SmartSponge, Out Mode
Figures 21-28	0.009 MHz to 30MHz	H-Field Radiated Emissions, Smart Sponge, In Mode
Figures 31-38	0.009 MHz to 30MHz	H-Field Radiated Emissions, Wand, Wand Mode
Figures 19-20	13.5 MHz to 13.6 MHz	H-Field Loop Antenna, Band Edge Emissions, Out Mode
Figures 29-30	13.5 MHz to 13.6 MHz	H-Field Loop Antenna, Band Edge Emissions, In Mode
Figures 39-40	13.5 MHz to 13.6 MHz	H-Field Loop Antenna, Band Edge Emissions, Wand
Figures 41-44	30 MHz to 1000 MHz	Bilog Antenna, Characterization Scan, Out Mode

The compliance measurements performed on the OATs are organized as follows, and are found on pages 11-16 of this Test Report:

Table 1	SmartSponge, Out Mode: Emissions below 30 MHz
Table 2	Wand, Wand Mode: Emissions below 30 MHz
Table 3	SmartSponge, Out Mode: Emissions 30 MHz to 1000 MHz
Table 4	SmartSponge, In Mode: Emissions 30 MHz to 1000 MHz
Table 5	Wand, Wand Mode: Emissions 30 MHz to 1000 MHz
Table 6	Band Edge Emissions, SmartSponge, Out Mode Note: In Mode and Wand Mode plots show that peak level was not within 40dB of limit.

The band-edge analysis performed on the OATS (3m distance) used the EUT orthogonal position, turntable and antenna placement that maximizes the field strength of the fundamental (13.56 MHz). With the Transmitter operating the resultant spectrum was recorded over the 13.061-14.061 MHz range.

Table 1

SmartSponge, Out Mode: 9 kHz to 30 MHz

Frequency (MHz)	Antenna Position	Reading @3m (dBµV)	Cable Loss, Antenna Factor & Preamplifer Gain (dB)	Emission @3m (dBµV/m)	Emission @30m (dBµV/m)	Limit @30m (dBµV/m)	Margin (dB)
0.57875	2	59.46	12.8	46.66	6.66	32.360	-25.7
1.43300	2	52.49	6.3	58.79	18.79	24.470	-5.7
13.55700	2	73.81	-23.6	50.20	10.20	83.990	-73.8
13.56500	1	86.11	-23.6	62.46	22.46	83.990	-61.5

Note: SmartSponge, In Mode - All measurements were ambient readings.

Example Emission Calculation

The requirement at 13.565MHz is for 15848 uV/m @ 30m, or equivalently 83.9995 dBuV/m @ 30m. Now, according to 15.31(f)(2), standard falloff can be 40dB/decade or as measured by the equipment. So, 40*LOG(3/30)= 40 since the test distance was reported to be 3 meters and the spec distance is 30m

Adjusting the test result for the spec distance 62.46-40dB = 22.46 dBuV/m@30m therefore the actual margin is -61.5 dB.

Table 2

Wand, Wand Mode: 9 kHz to 30 MHz

Frequency (MHz)	Antenna Position	Reading @ 3m (dBµV)	Cable Loss, Antenna Factor & Preamplifer Gain (dB)	Emission @ 3m (dBµV/m)	Emission @ 30m (dBµV/m)	Limit @ 30m (dBµV/m)	Margin (dB)
0.01041	1	64.53	48.1	112.63	72.63	87.26	-14.6
0.01252	1	62.76	47.0	109.76	69.76	85.65	-15.9
0.01464	1	63.14	46.1	109.24	69.24	84.29	-15.1
0.01746	1	61.77	43.8	105.57	65.57	82.76	-17.2
0.01996	1	60.16	42.2	102.36	62.36	81.60	-19.2
0.0217	1	61.49	41.9	103.39	63.39	80.88	-17.5
0.0270	1	58.77	39.2	97.97	57.97	78.98	-21.0
0.02909	1	57.94	38.4	96.34	56.34	78.33	-22.0
0.033675	1	55.81	37.5	93.26	53.26	77.06	-23.8
0.0372	1	53.79	36.6	90.39	50.39	76.19	-25.8
0.0410775	1	53.94	35.9	89.84	49.84	75.33	-25.5
0.04460	1	51.17	35.1	86.25	46.25	74.62	-28.4
0.05306	1	51.64	33.7	85.34	45.34	73.11	-27.8
0.054825	1	50.49	33.0	83.49	43.49	72.82	-29.3
0.06645	1	49.73	31.9	81.63	41.63	71.15	-29.5
0.492125	1, 2	*Local Ambients*					
0.495625	1, 2	″					
0.51255	1, 2	″					
0.614025	1, 2	″					
0.839525	1, 2	″					
1.110125	1, 2	″					

Example Emission Calculation

The requirement at 0.01041 MHz is for 2400/F(kHZ) uV/m @ 300m, or equivalently 47.26 dBuV/m @ 300m. Now, according to 15.31(f)(2), standard falloff can be 40dB/decade or as measured by the equipment. So, 40*LOG(30/300)= 40 since the test distance was reported to be 3 meters and the spec distance is quoted at 30m. 47.26 + 40 = 87.26 dBuV/m

Adjusting the test result for the spec distance 112.63-40dB = 72.63 dBuV/m@30m therefore the actual margin is -14.6 dB.

Table 3

SmartSponge, Out Mode: 30 MHz to 1000 MHz

Frequency (MHz)	Antenna Polarization	Reading @3m (dBµV)	Cable Loss, Antenna Factor & Preamplifier Gain (dB)	Emission @3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.720000	H	8.9	21.2	30.1	40.0	-9.9
34.060000	V	7.4	18.1	25.5	40.0	-14.5
47.950000	V	18.5	9.3	27.8	40.0	-12.2
49.840000	H	17.0	9.6	26.6	40.0	-13.4
63.990000	H	12.0	9.5	21.5	40.0	-18.5
64.780000	V	11.2	9.2	20.4	40.0	-19.6
83.270000	H	12.2	9.3	21.5	40.0	-18.5
84.480000	V	12.4	9.8	22.2	40.0	-17.8
112.710000	H	24.3	15.3	39.6	43.5	-3.9
113.700000	V	7.3	15.7	23.0	43.5	-20.5
143.230000	H	17.5	15.1	32.6	43.5	-10.9
144.370000	V	19.0	15.2	34.2	43.5	-9.3
165.960000	H	11.9	15.1	27.0	43.5	-16.5
166.620000	V	15.4	15.2	30.6	43.5	-12.9
180.320000	H	22.5	14.3	36.8	43.5	-6.7
180.650000	V	11.4	14.5	25.9	43.5	-17.6

Table 4

SmartSponge, In Mode: 30 MHz to 1000 MHz

Frequency (MHz)	Antenna Polarization	Reading @3m (dBµV)	Cable Loss, Antenna Factor & Preamplifier Gain (dB)	Emission @3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.460000	V	3.3	20.1	23.4	40.0	-16.6
43.170000	V	7.9	11.7	19.6	40.0	-20.4
55.270000	H	7.9	9.1	17.0	40.0	-23.0
55.270000	V	16.3	8.8	25.1	40.0	-14.9
64.000000	H	11.4	9.5	20.9	40.0	-19.1
64.000000	V	11.0	9.1	20.1	40.0	-19.9
75.930000	H	6.1	9.8	15.9	40.0	-24.1
75.930000	V	12.2	9.2	21.4	40.0	-18.6
85.350000	V	13.1	9.9	23.0	40.0	-17.0
85.350000	H	7.5	9.2	16.7	40.0	-23.3
111.420000	H	6.8	15.2	22.0	43.5	-21.5
111.420000	V	8.7	15.4	24.1	43.5	-19.4
125.100000	H	8.2	16.2	24.4	43.5	-19.1
125.100000	V	6.5	16.2	22.7	43.5	-20.8
146.950000	V	15.5	15.1	30.6	43.5	-12.9
146.950000	H	14.5	15.0	29.5	43.5	-14.0
164.970000	V	17.1	15.2	32.3	43.5	-11.2

Table 5

Wand, Wand Mode: 30 MHz to 1000 MHz

Frequency (MHz)	Antenna Polarization	Reading @ 3m (dBµV)	Cable Loss, Antenna Factor & Preamplifier Gain (dB)	Emission @ 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.150000	H	-0.9	21.7	20.8	40.0	-19.2
45.000000	V	12.1	10.6	22.7	40.0	-17.3
45.000000	H	3.8	11.6	15.4	40.0	-24.6
56.000000	V	15.4	8.9	24.3	40.0	-15.7
56.000000	H	7.0	9.2	16.2	40.0	-23.8
69.970000	V	12.4	8.7	21.1	40.0	-18.9
69.970000	H	4.0	9.9	13.9	40.0	-26.1
85.010000	V	14.8	9.9	24.7	40.0	-15.3
85.010000	H	9.4	9.2	18.6	40.0	-21.4
112.000000	V	11.3	15.4	26.7	43.5	-16.8
112.000000	H	5.4	15.2	20.6	43.5	-22.9
124.700000	H	6.9	16.1	23.0	43.5	-20.5
124.700000	V	8.7	16.2	24.9	43.5	-18.6
144.000000	H	8.1	15.1	23.2	43.5	-20.3
144.000000	V	15.8	15.2	31.0	43.5	-12.5

Table 6 – Band Edge Emissions, Out Mode

Frequency (MHz)	Antenna Position	Reading @3m (dBµV)	Cable Loss, Antenna Factor & Preamplifer Gain (dB)	Emission @3m (dBµV/m)	Emission @30m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
13.55700	2	73.81	-23.6	50.20	10.20	83.990	-73.8
13.56500	1	86.11	-23.6	62.46	22.46	83.990	-61.5

Note: In Mode and Wand Mode plots show that peak level was not within 40dB of limit.

Example Emission Calculation

The requirement at 13.565MHz is for 15848 uV/m @ 30m, or equivalently 83.9995 dBuV/m @ 30m. Now, according to 15.31(f)(2), standard falloff can be 40dB/decade or as measured by the equipment. So, 40*LOG(3/30)= 40 since the test distance was reported to be 3 meters and the spec distance is 30m

Adjusting the test result for the spec distance 62.46-40dB = 22.46 dBuV/m@30m therefore the actual margin is -61.5 dB

7. FIGURES – SPECTRAL DATA PLOTS

Figure 1: Radiated Emissions Characterization Ambient
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 1: 9 kHz to 150 kHz, Ambient

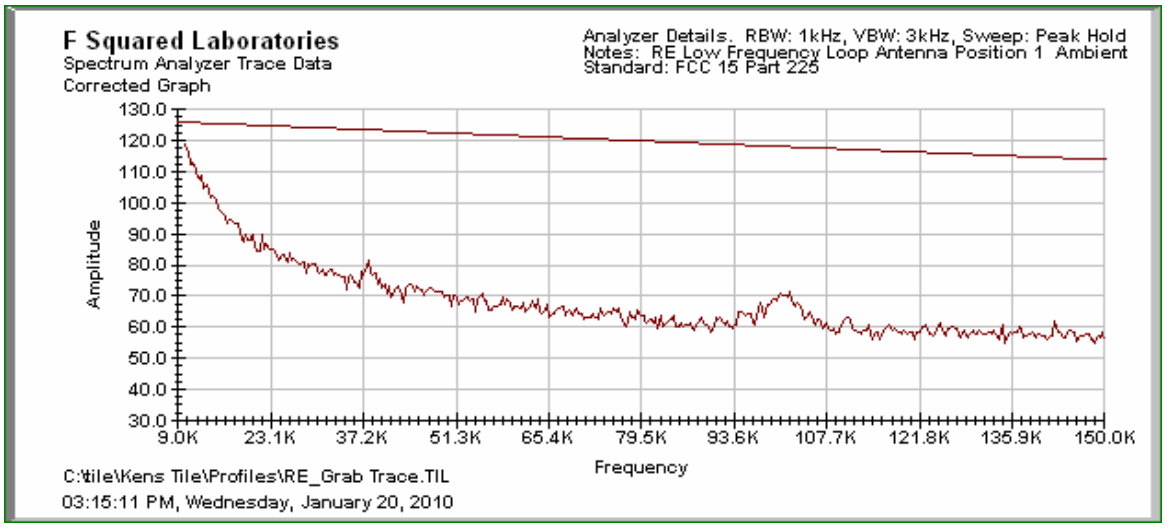


Figure 2: Radiated Emissions Characterization Ambient
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 2: 9 kHz to 150 kHz, Ambient

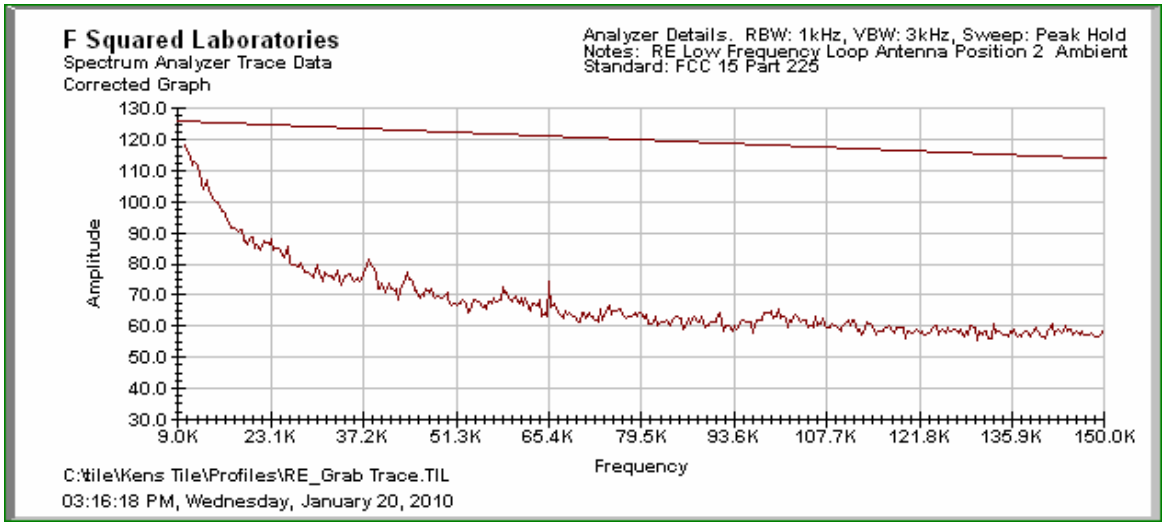


Figure 3: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 2: 150 kHz to 500 kHz, Ambient

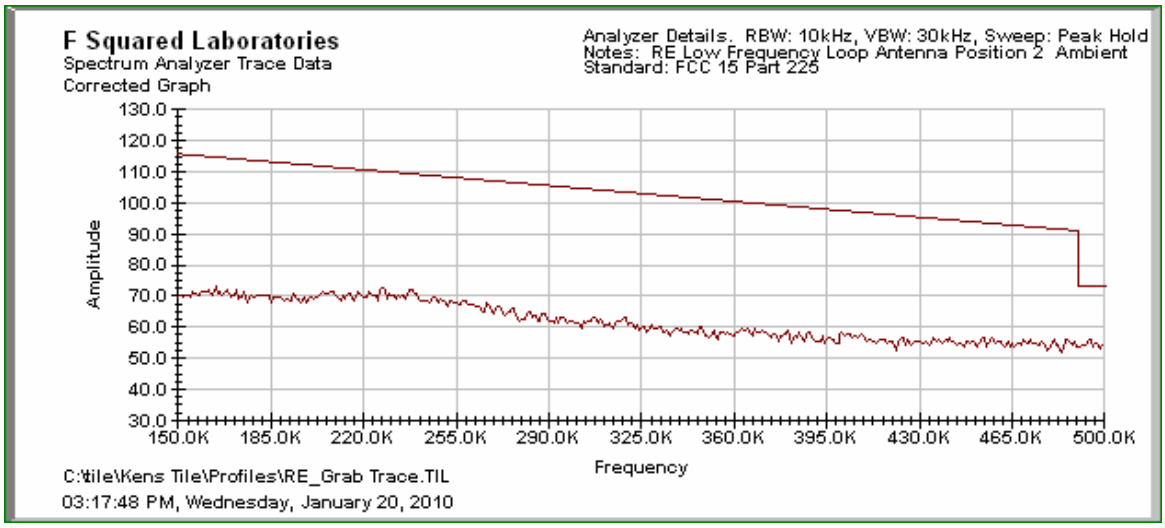


Figure 4: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 1: 150 kHz to 500 kHz, Ambient

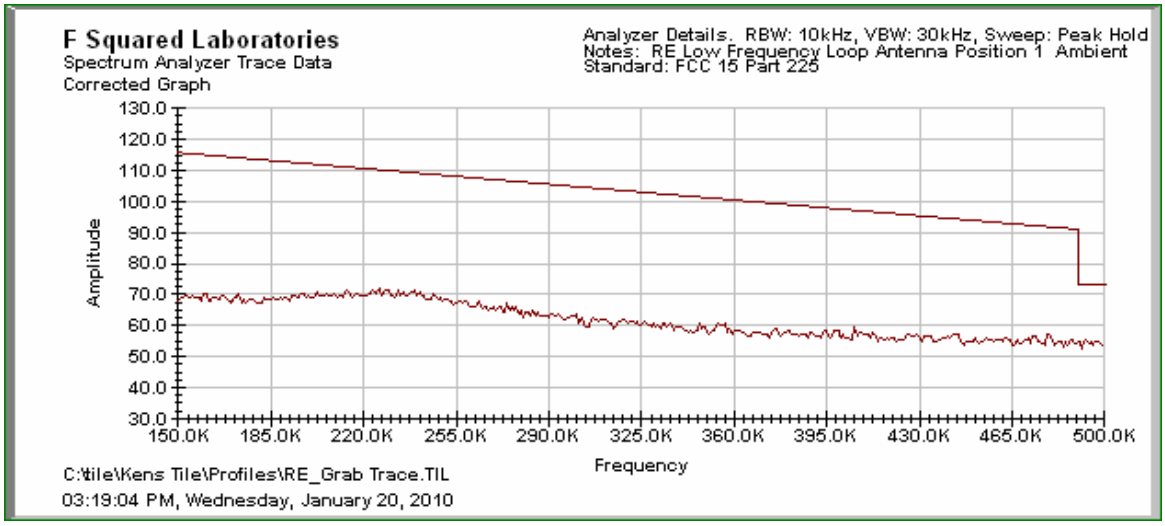


Figure 5: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 1: 500 kHz to 5 MHz, Ambient

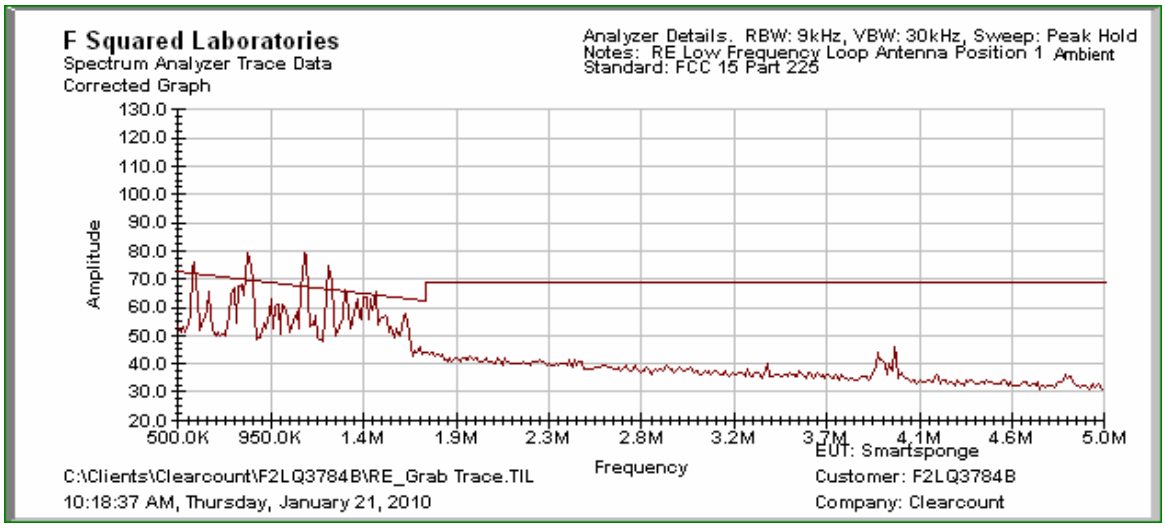


Figure 6: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 2: 500 kHz to 5 MHz, Ambient

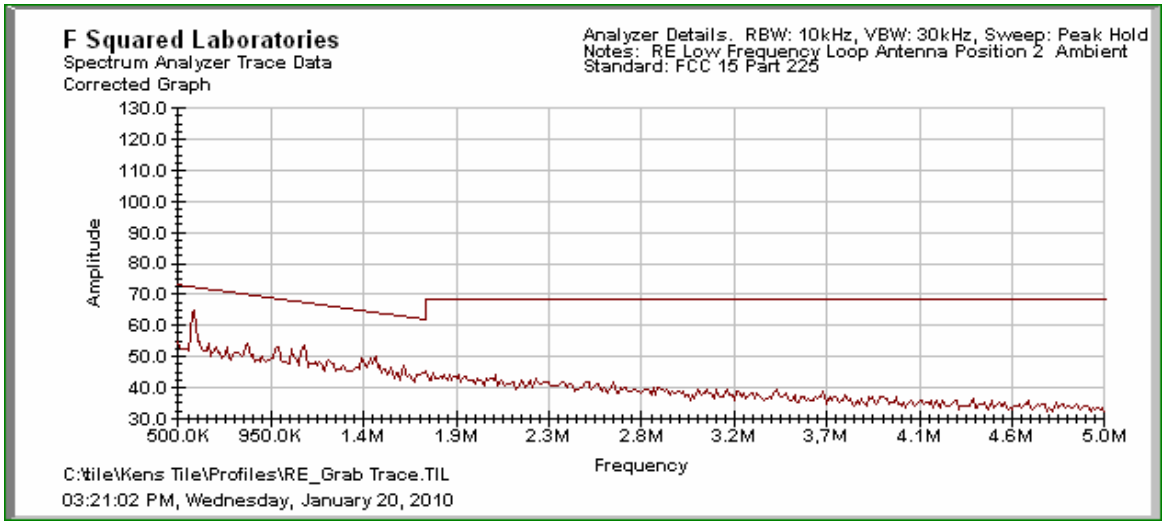


Figure 7: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 2: 5 MHz to 25 MHz, Ambient

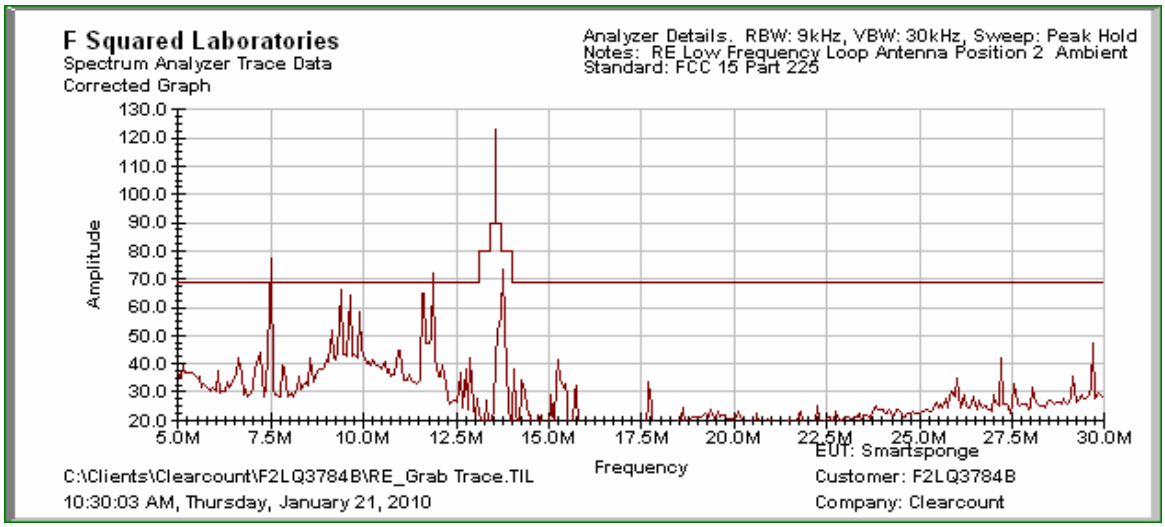


Figure 8: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 1: 5 MHz to 25 MHz, Ambient

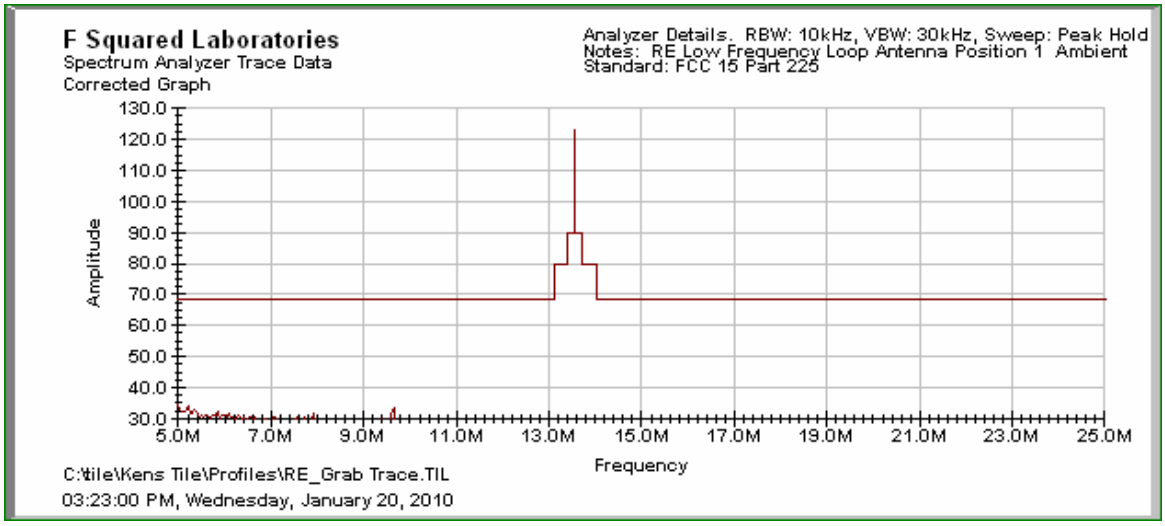


Figure 9: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 1: 25 MHz to 30 MHz, Ambient

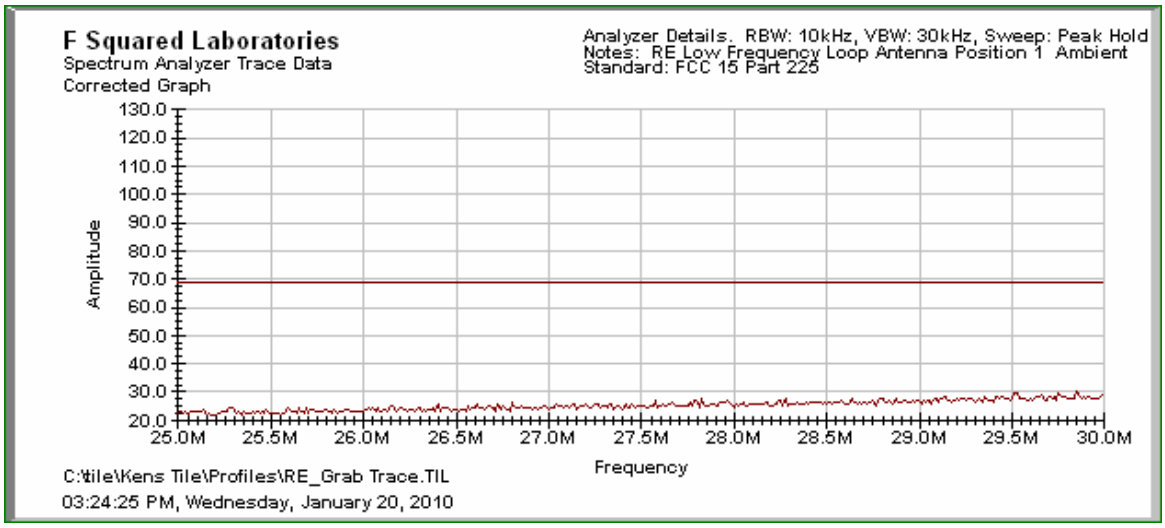


Figure 10: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

Position 2: 25 MHz to 30 MHz, Ambient

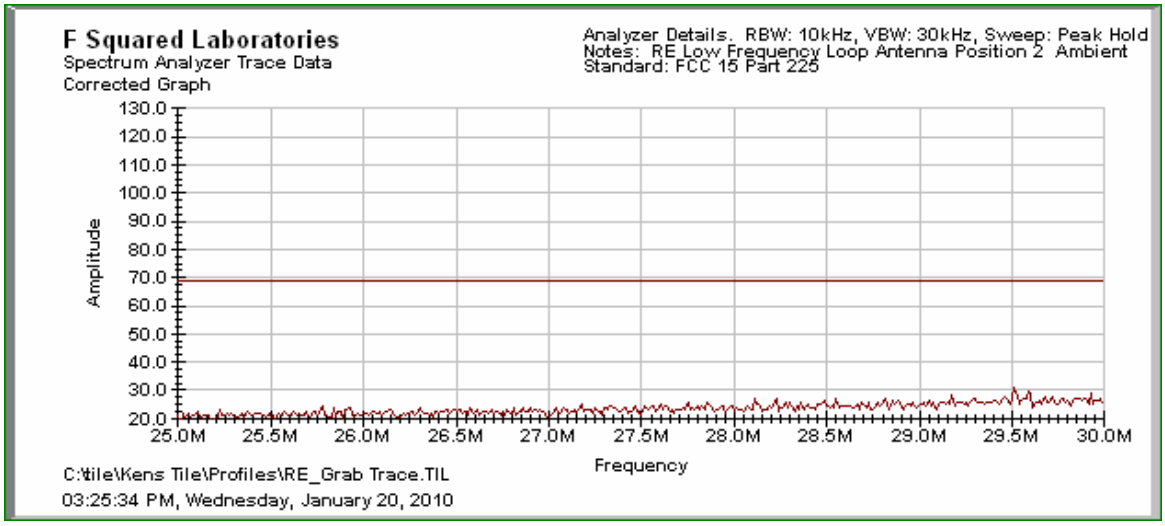


Figure 11: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 2: 5 MHz to 30 MHz

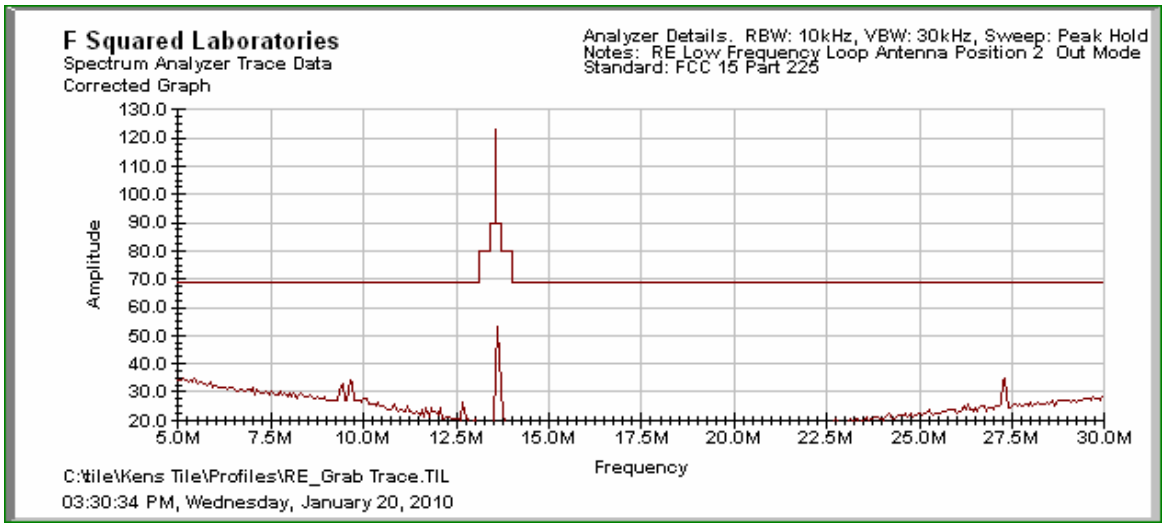


Figure 12: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 1: 5 MHz to 30 MHz

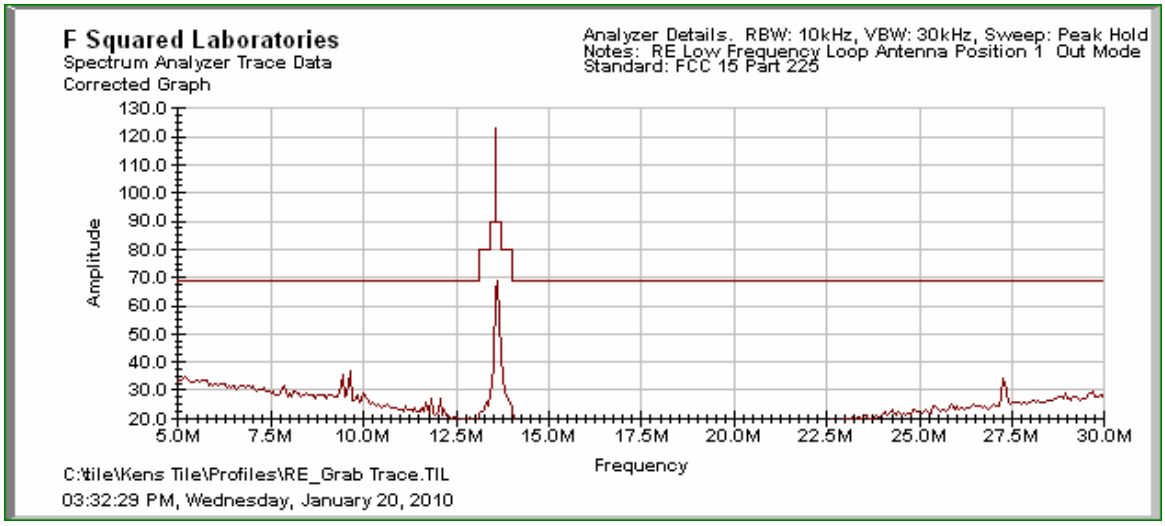


Figure 13: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 1: 500 kHz to 5 MHz

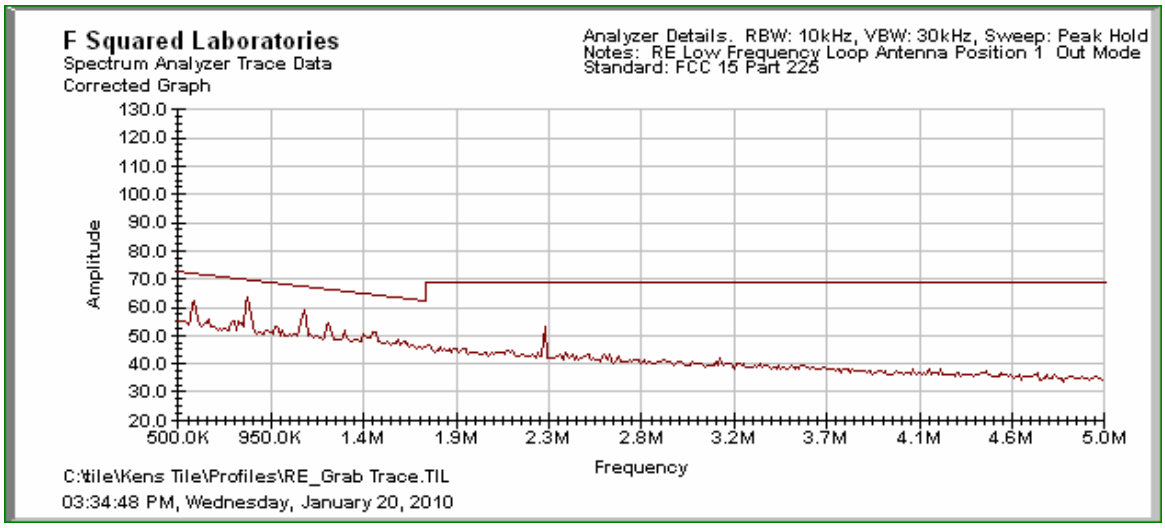


Figure 14: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 2: 500 kHz to 5 MHz

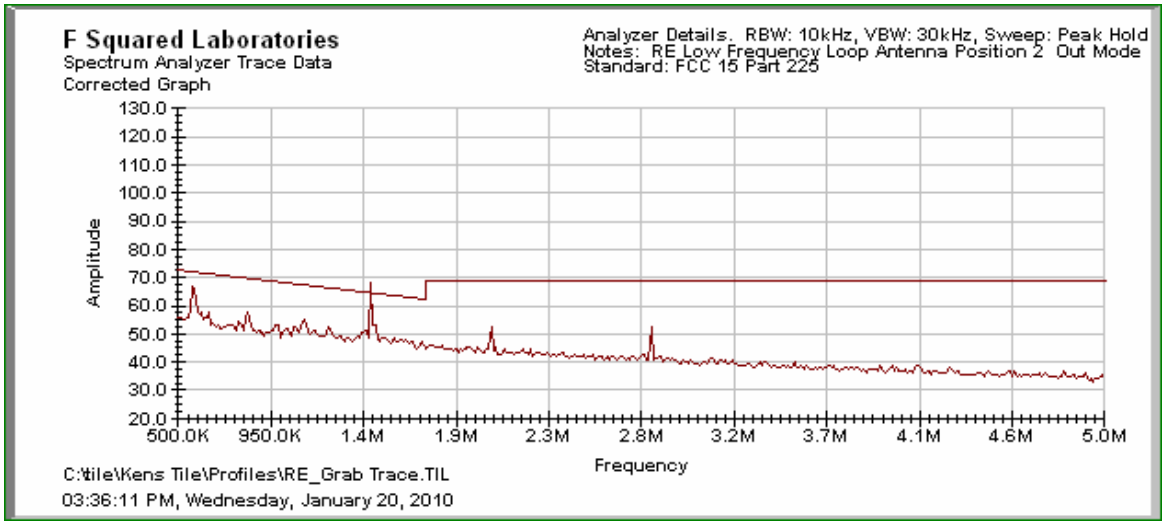


Figure 15: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 2: 150 MHz to 500 kHz

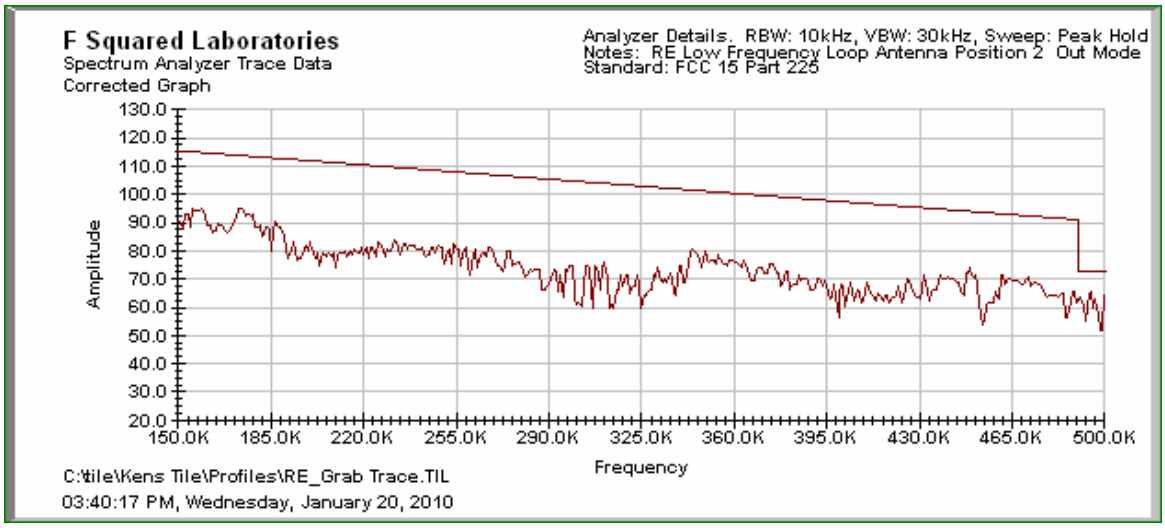


Figure 16: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 1: 150 kHz to 500 kHz

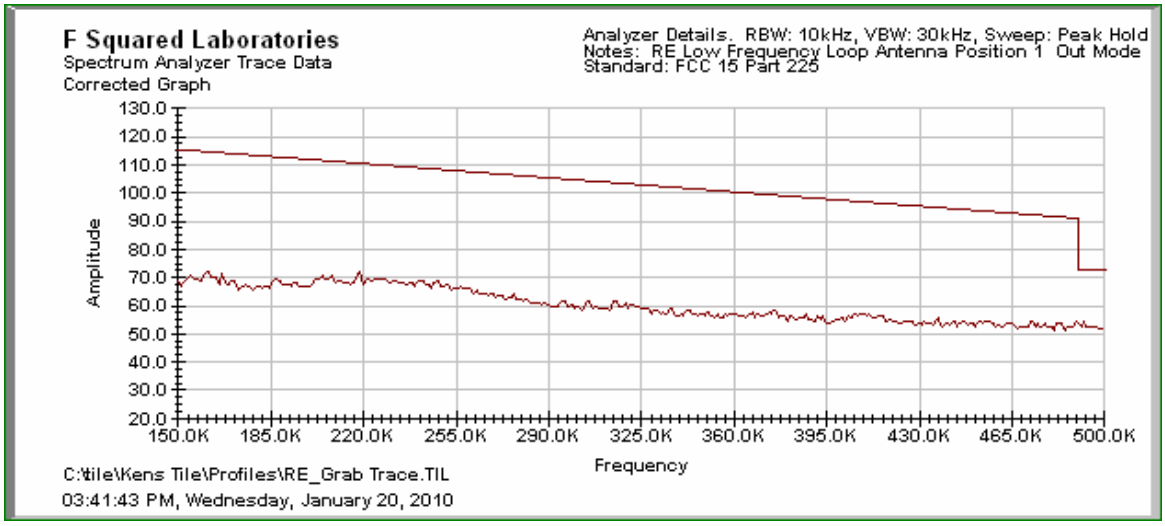


Figure 17: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 1: 9 kHz to 150 kHz

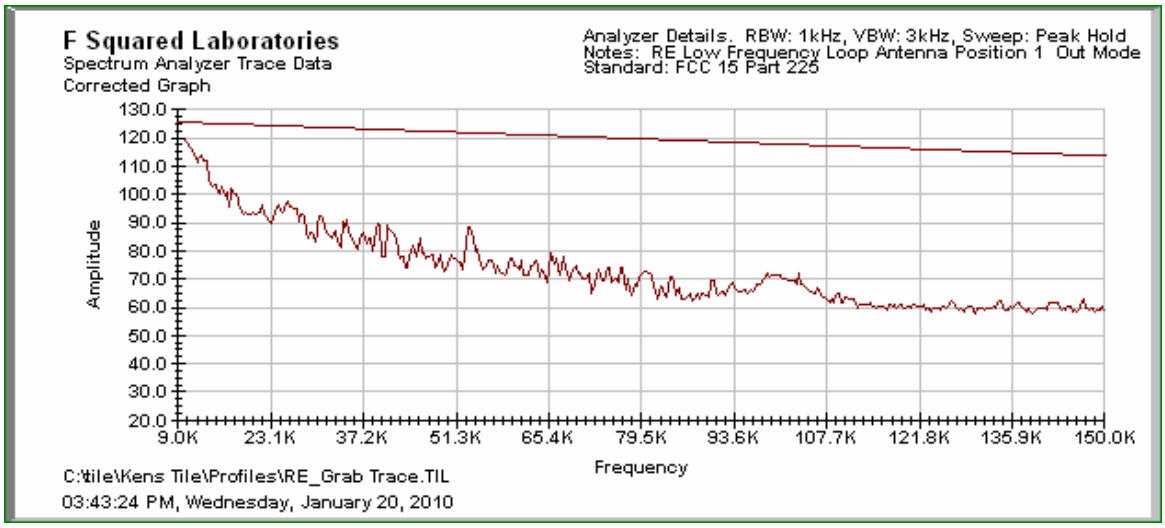


Figure 18: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 2: 9 kHz to 150 kHz

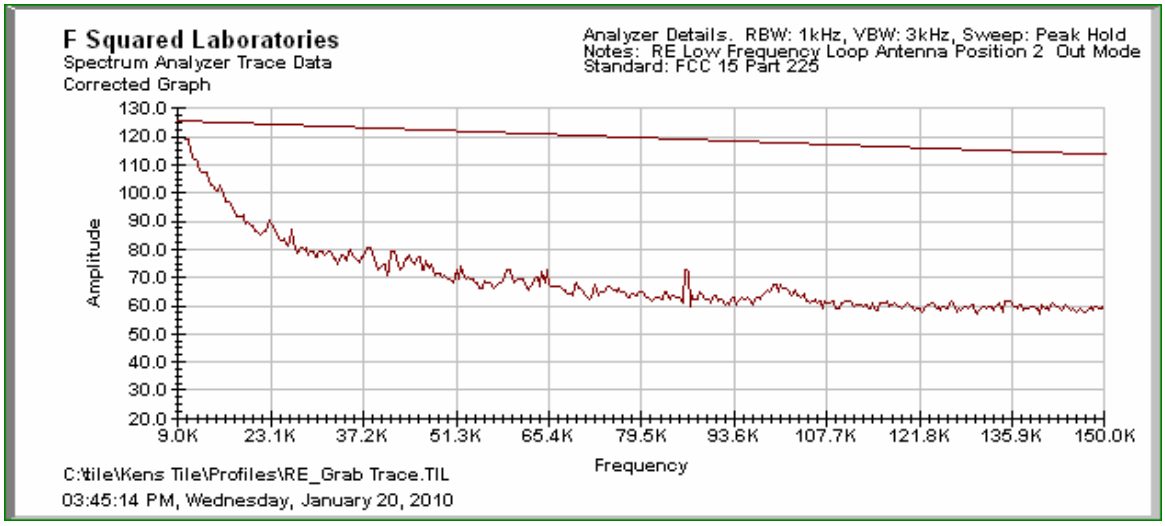


Figure 19: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 2: 13.1 MHz to 14.1 MHz, Operation Within Band

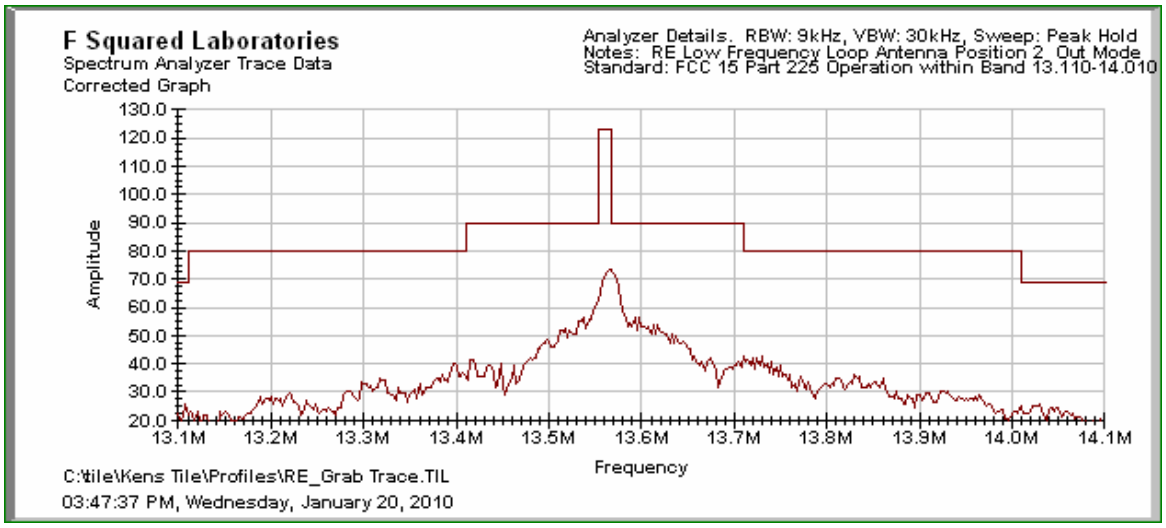


Figure 20: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge Out Mode - Position 1: 13.1 MHz to 14.1 MHz, Operation Within Band

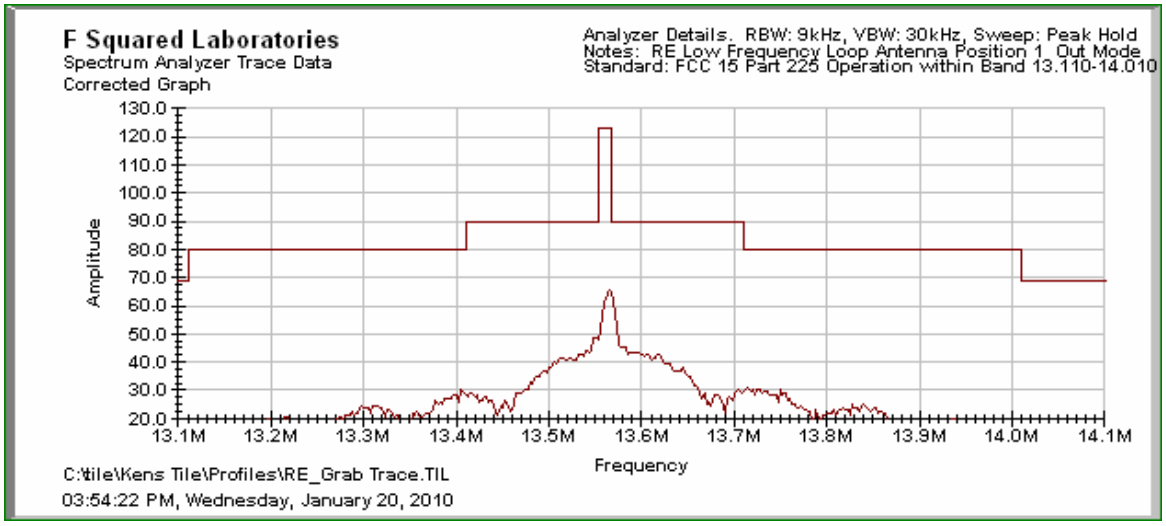


Figure 21: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 1: 9 kHz to 150 kHz

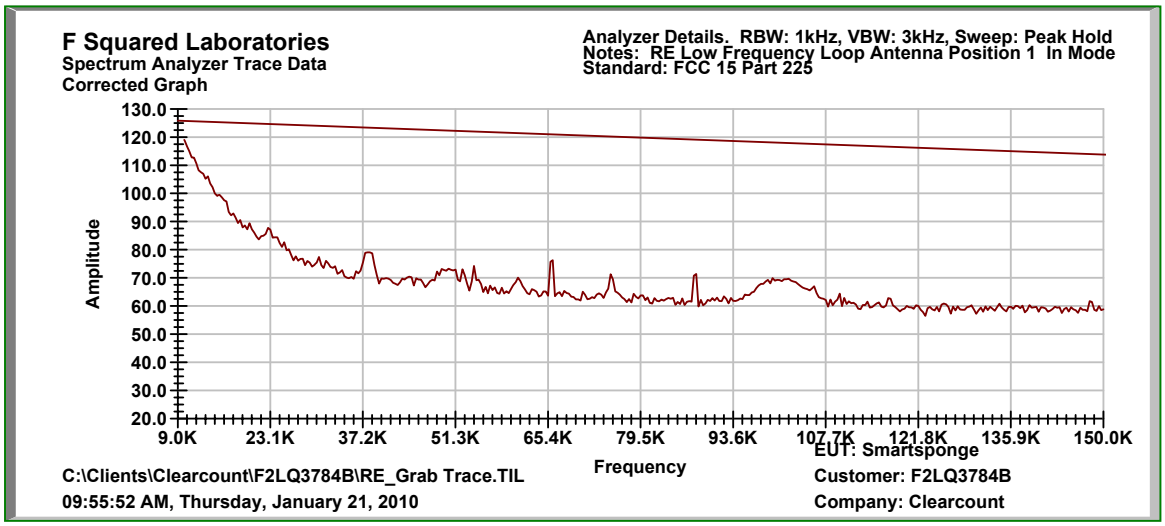


Figure 22: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 2: 9 kHz to 150 kHz

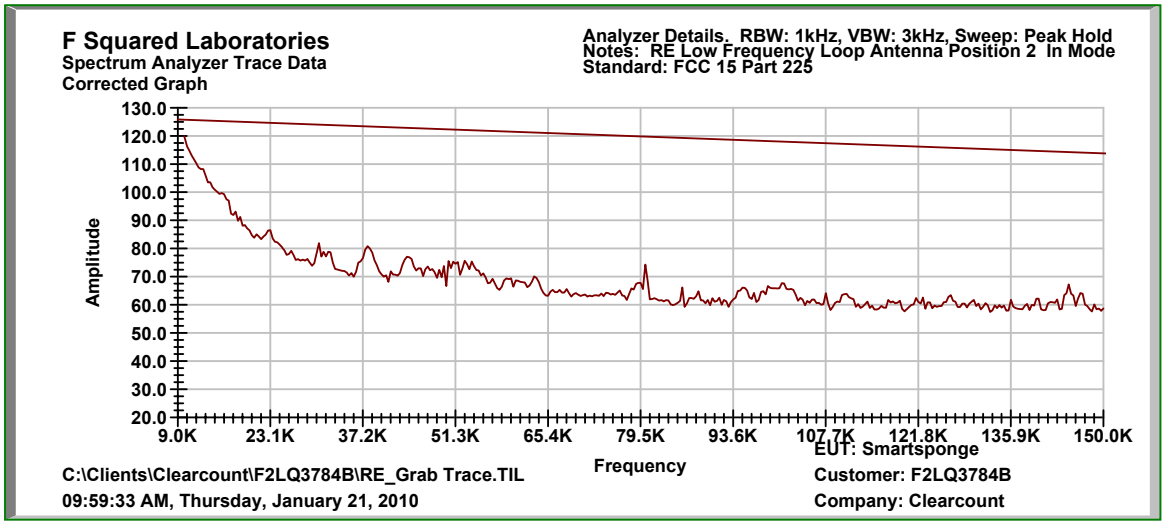


Figure 23: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 2: 150 kHz to 500 kHz

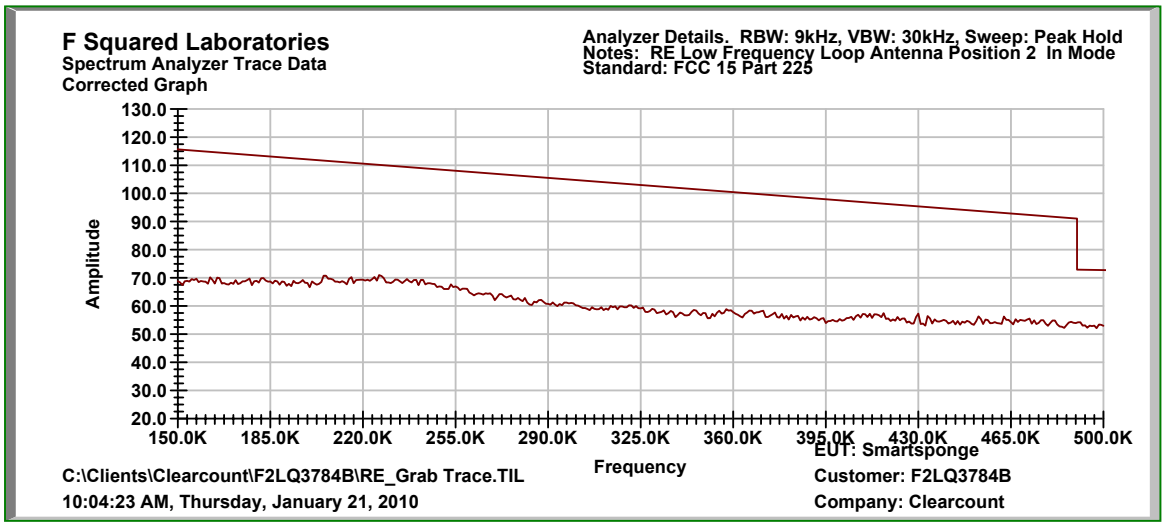


Figure 24: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 1: 150 kHz to 500 kHz

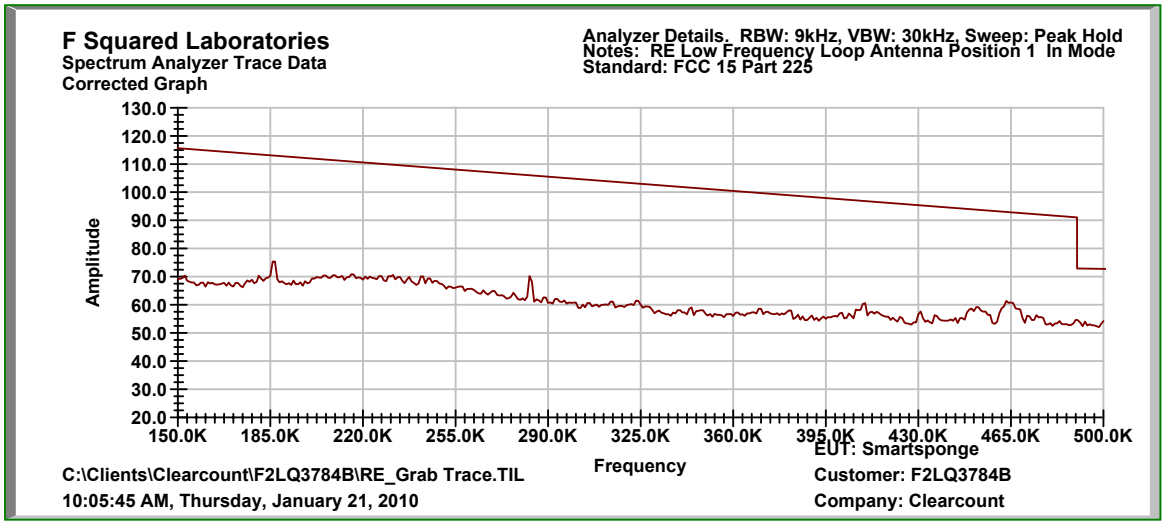


Figure 25: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 1: 500 kHz to 5 MHz

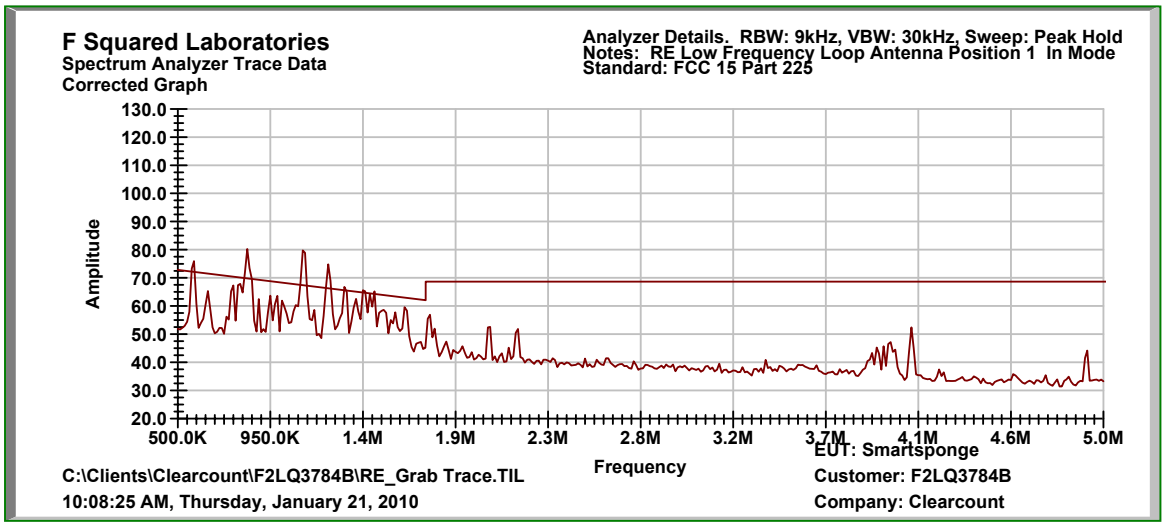


Figure 26: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 2: 500 kHz to 5 MHz

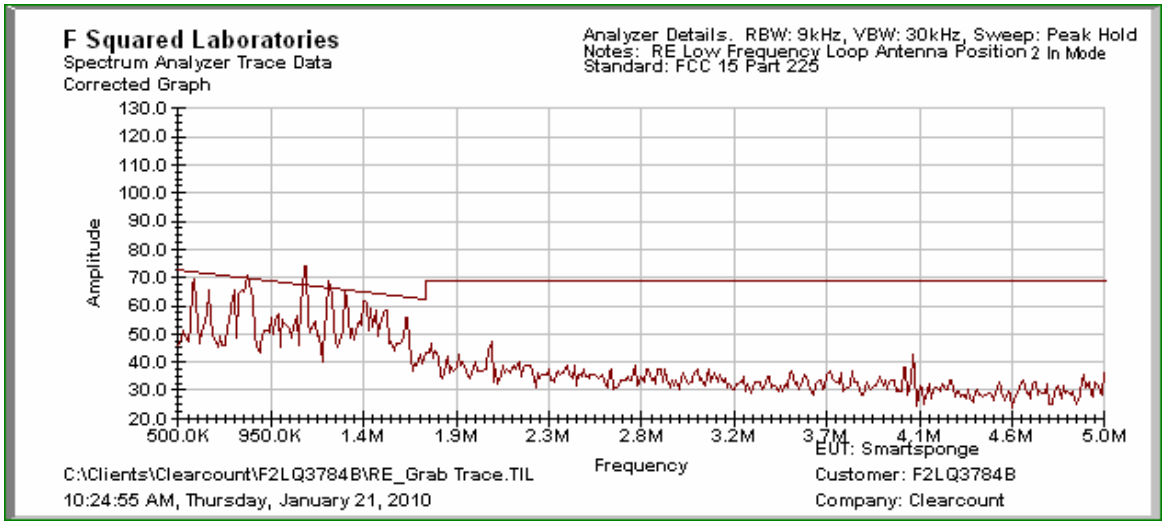


Figure 27: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 2: 5 MHz to 30 MHz

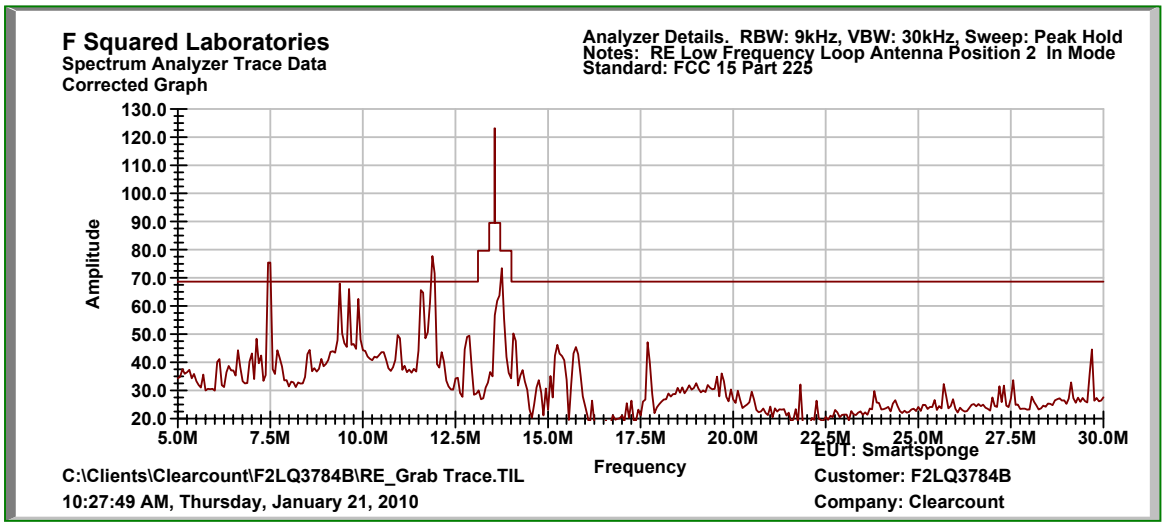


Figure 28: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 1: 5 MHz to 30 MHz

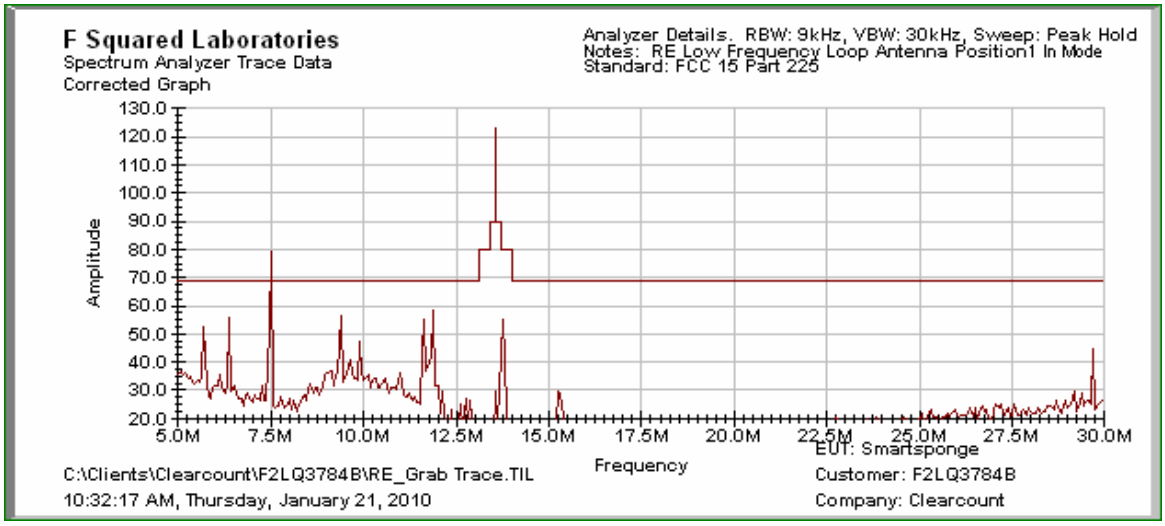


Figure 29: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 1: 13.1 MHz to 14.1 MHz, Operation Within Band

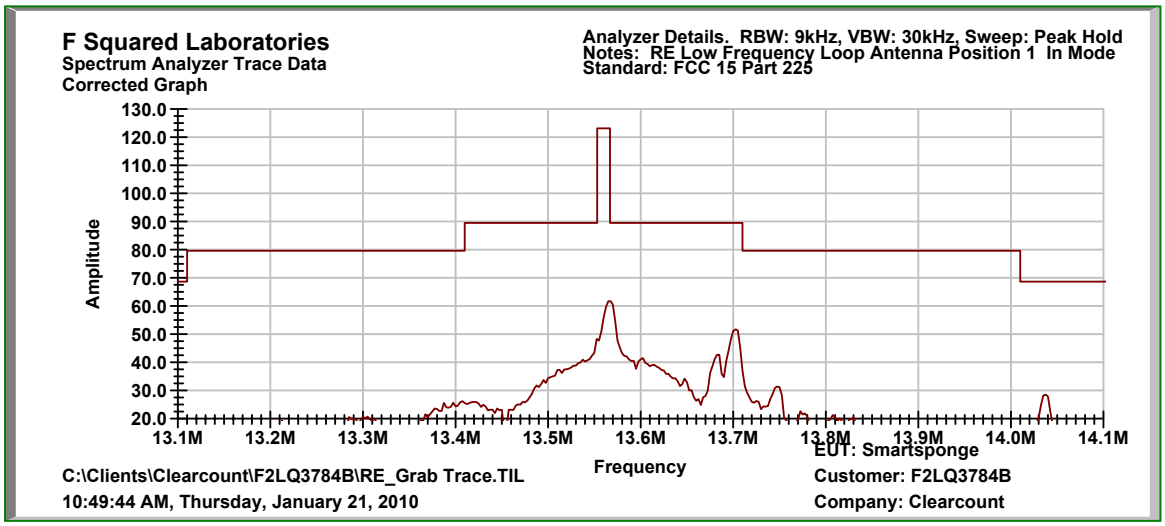


Figure 30: Radiated Emissions Characterization Band Edge Ambient
H-Field Loop Antenna, 3m Distance, Peak Reading

SmartSponge, In Mode - Position 2: 13.1 MHz to 14.1 MHz, Operation Within Band

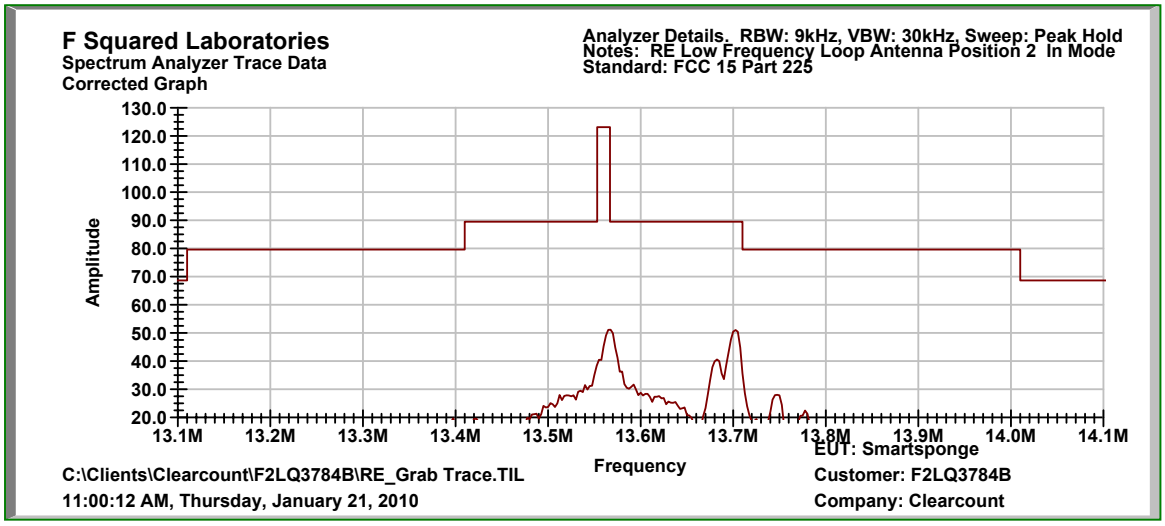


Figure 31: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 1: 9 kHz to 150 kHz

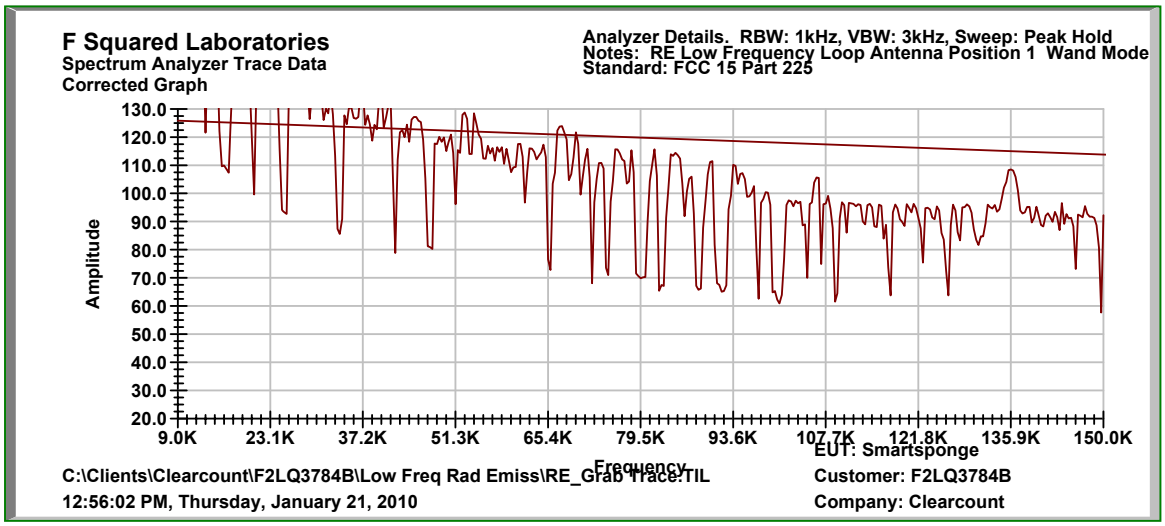


Figure 32: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 2: 9 kHz to 150 kHz

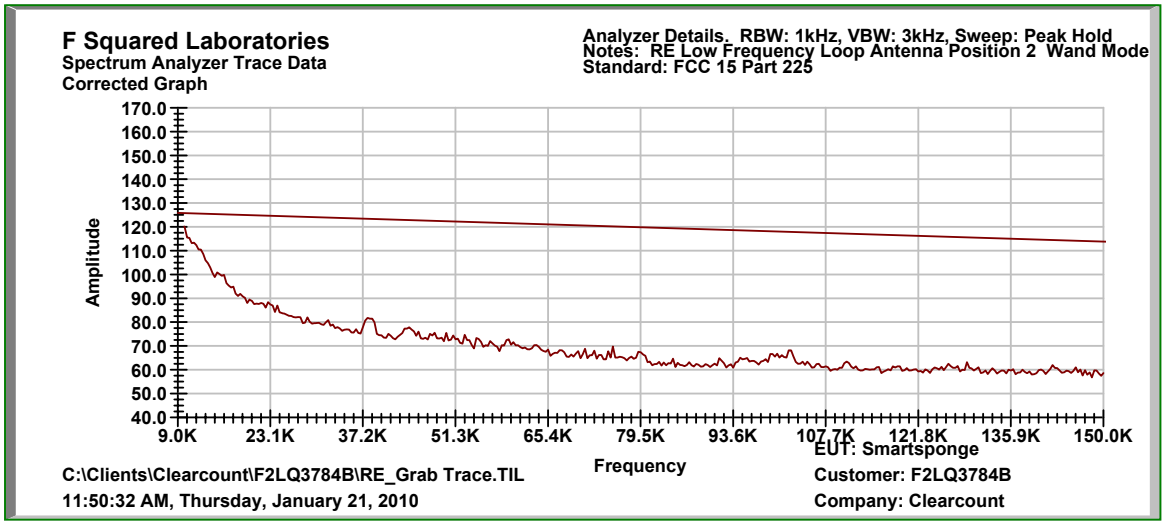


Figure 33: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 2: 150 kHz to 500 kHz

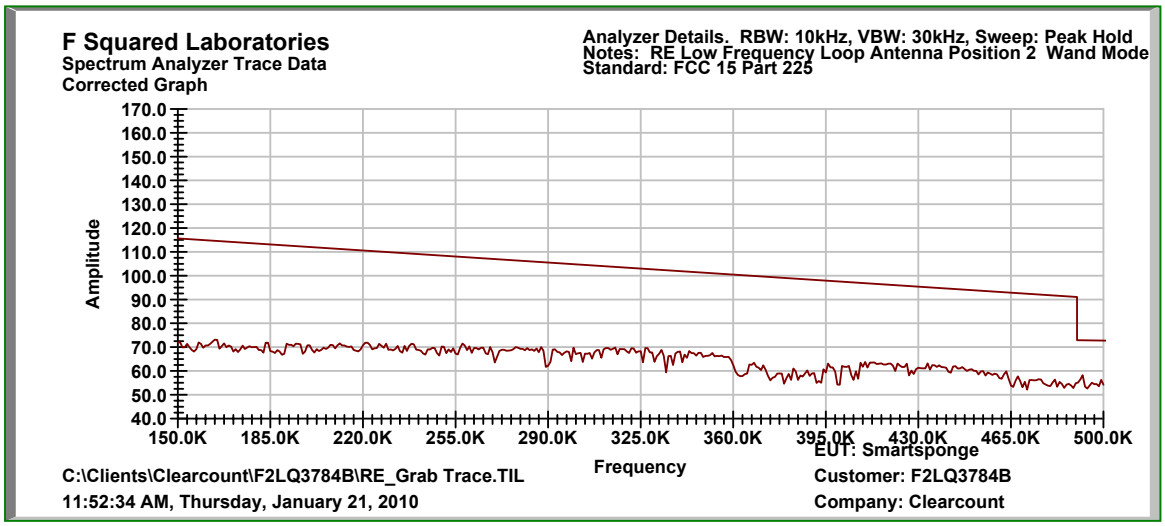


Figure 34: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 1: 150 kHz to 500 kHz

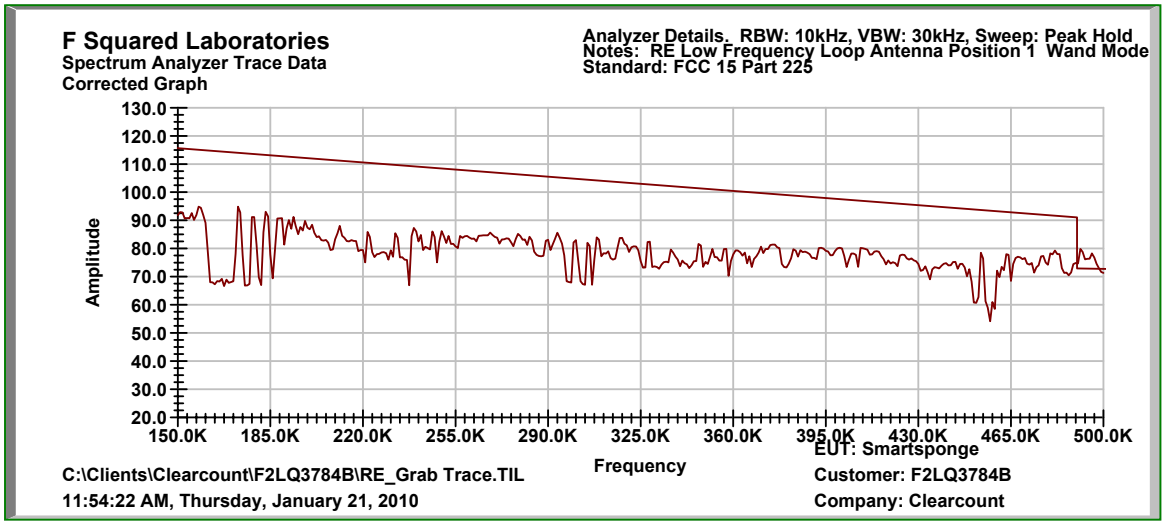


Figure 35: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 1: 500 kHz to 5 MHz

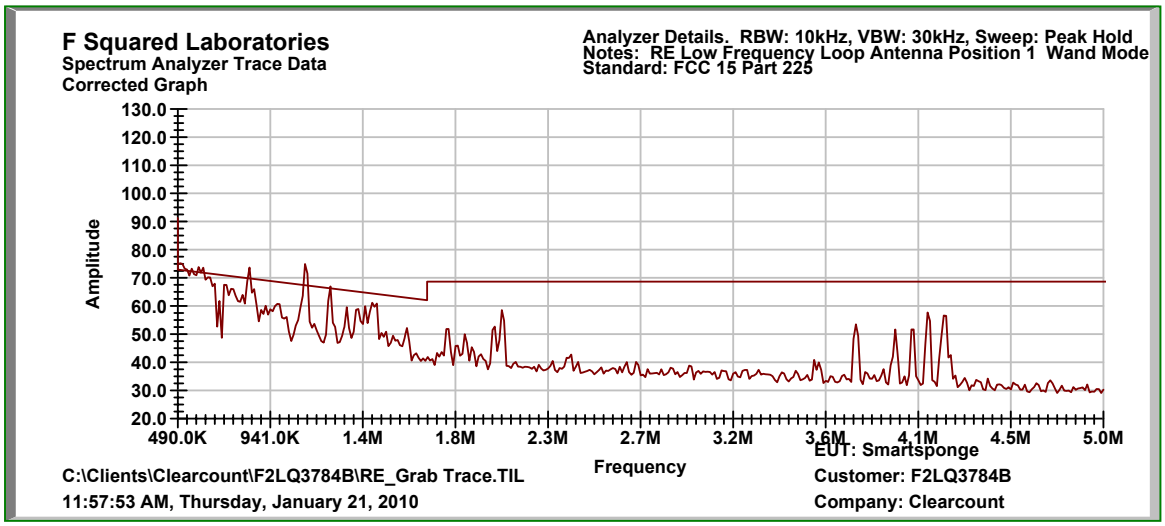


Figure 36: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 2: 500 kHz to 5 MHz

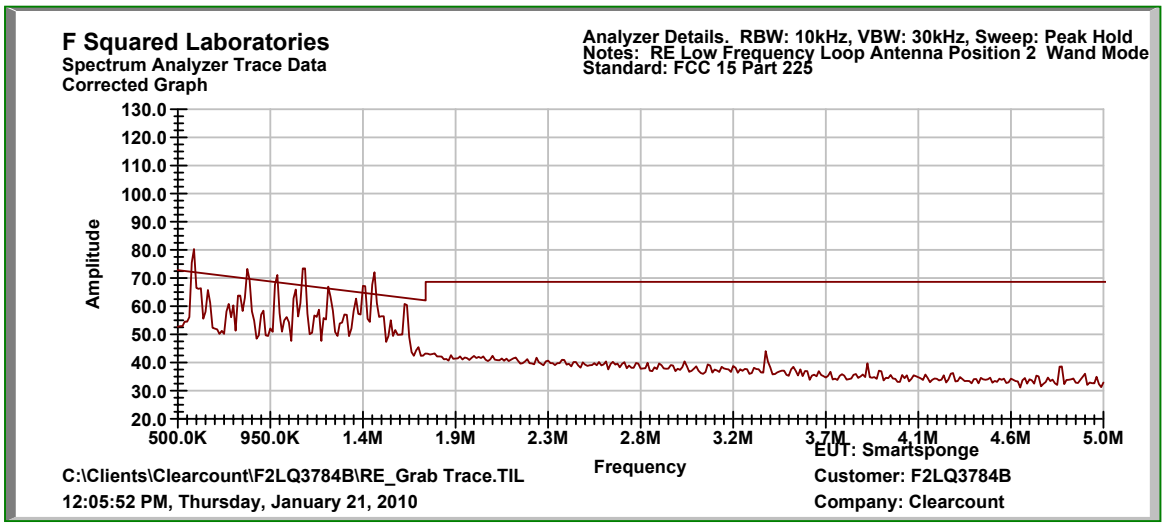


Figure 37: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 2: 5 MHz to 30 MHz

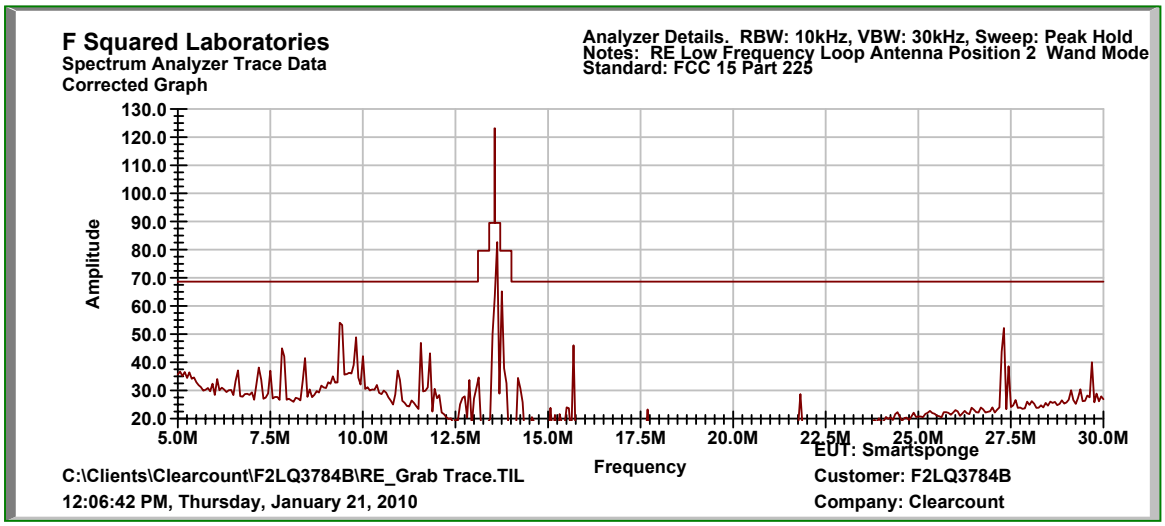


Figure 38: Radiated Emissions Characterization
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 1: 5 MHz to 30 MHz

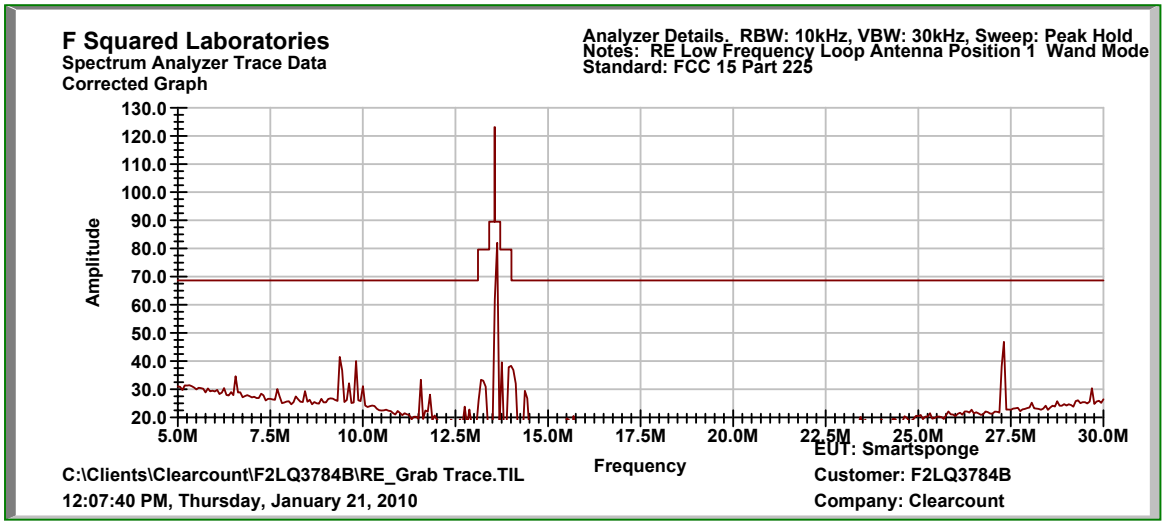


Figure 39: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 1: 13.1 MHz to 14.1 MHz, Operation Within Band

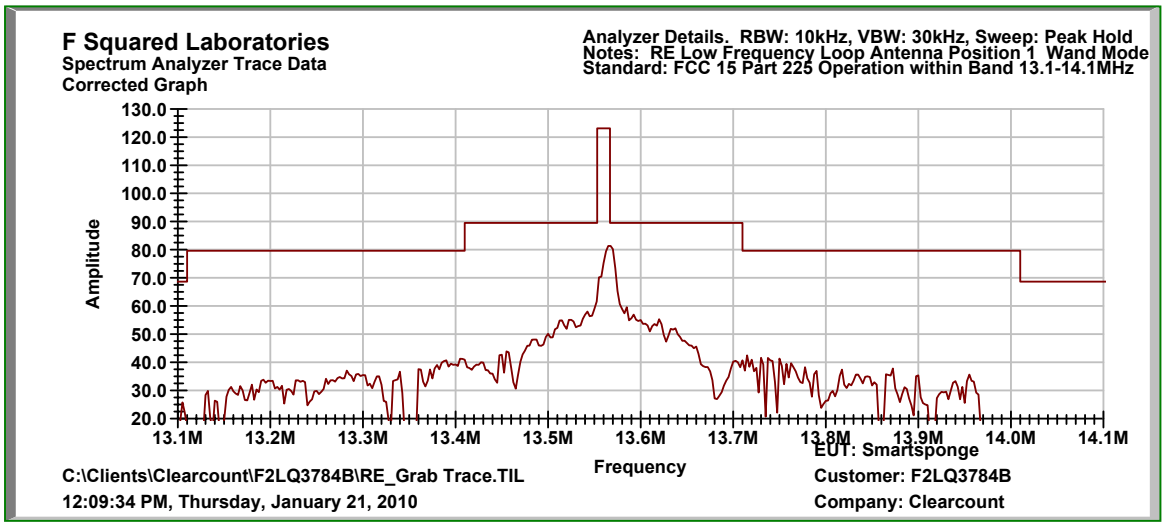


Figure 40: Radiated Emissions Characterization Band Edge
H-Field Loop Antenna, 3m Distance, Peak Reading

Wand, Wand Mode - Position 2: 13.1 MHz to 14.1 MHz, Operation Within Band

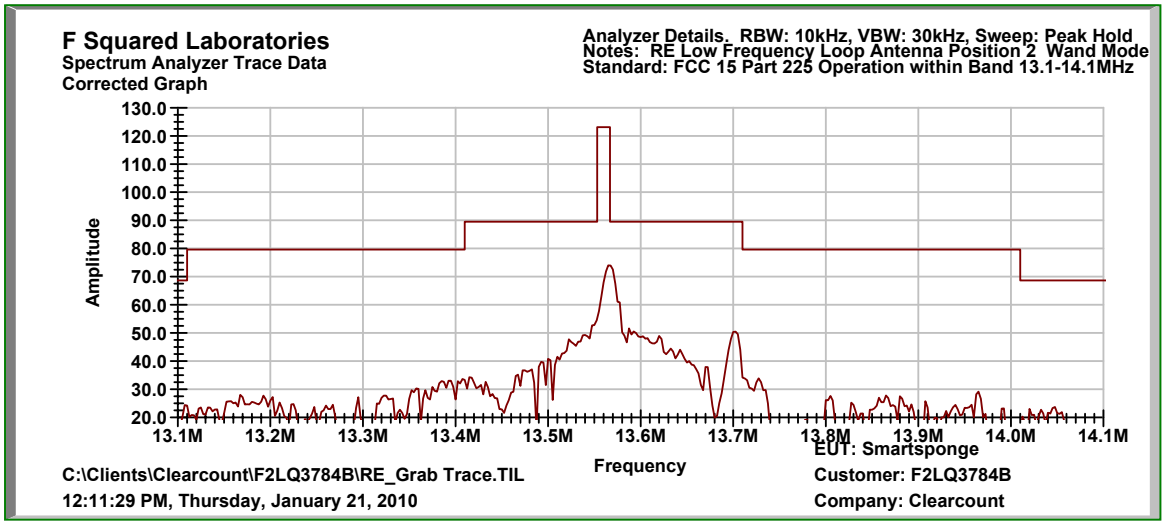


Figure 41: Radiated Emissions Characterization Scan: 30 MHz to 300 MHz, Vertical, Out Mode

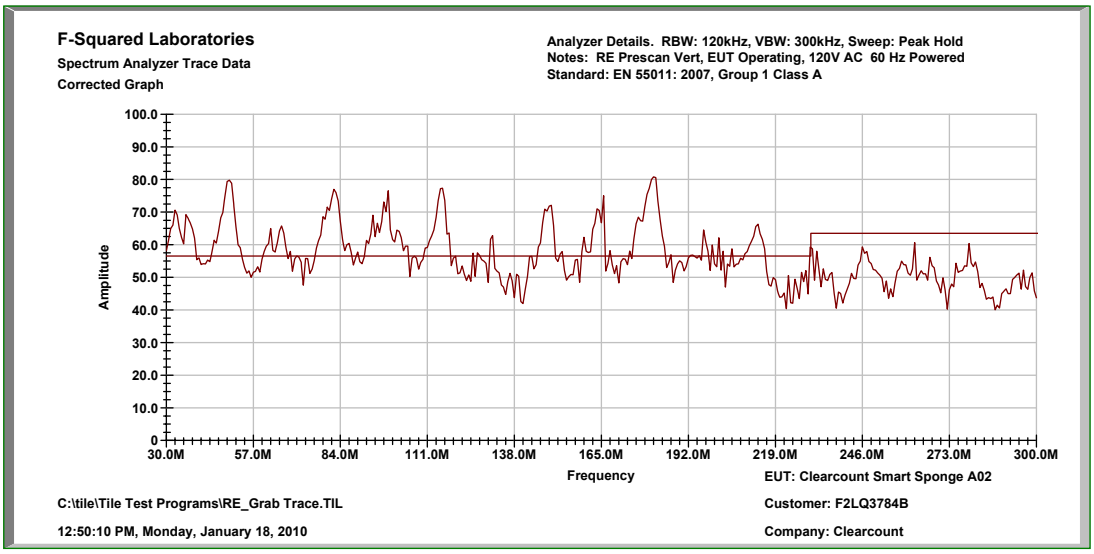


Figure 42: Radiated Emissions Characterization Scan: 300 MHz to 1000 MHz, Vertical, Out Mode

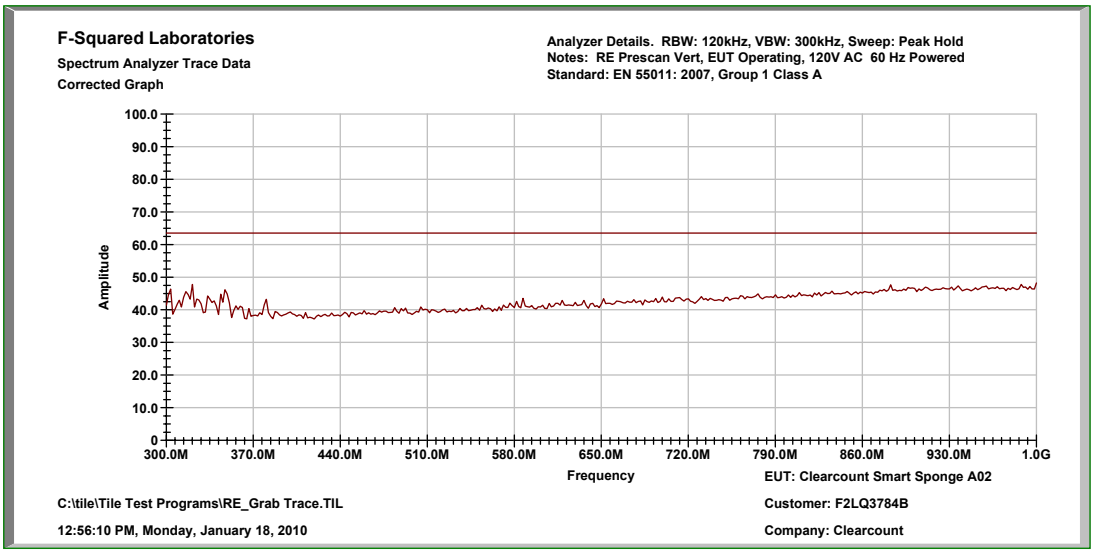


Figure 43: Radiated Emissions Characterization Scan, 30 MHz to 300 MHz, Horizontal, Out Mode

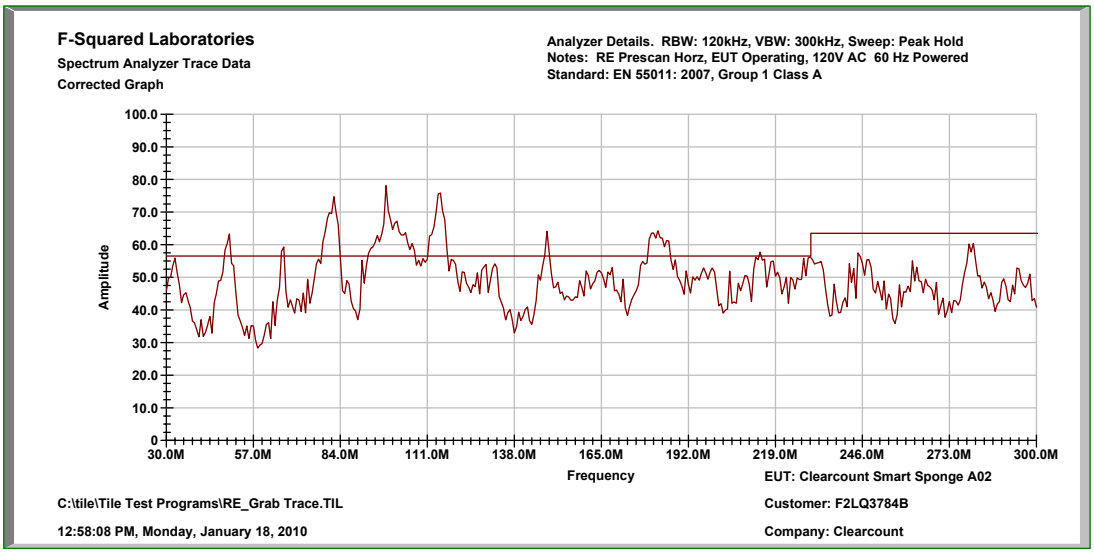


Figure 44: Radiated Emissions Characterization Scan, 300 MHz to 1000 MHz, Horizontal, Out Mode

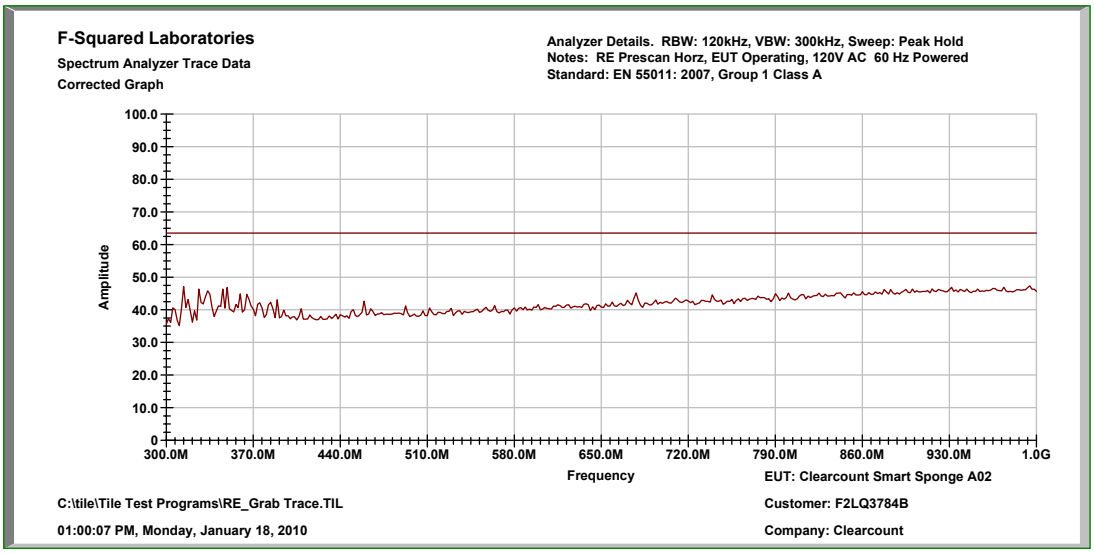


Figure 41: Conducted Test – Line 1: 0.15 MHz to 0.5 MHz, Out Mode

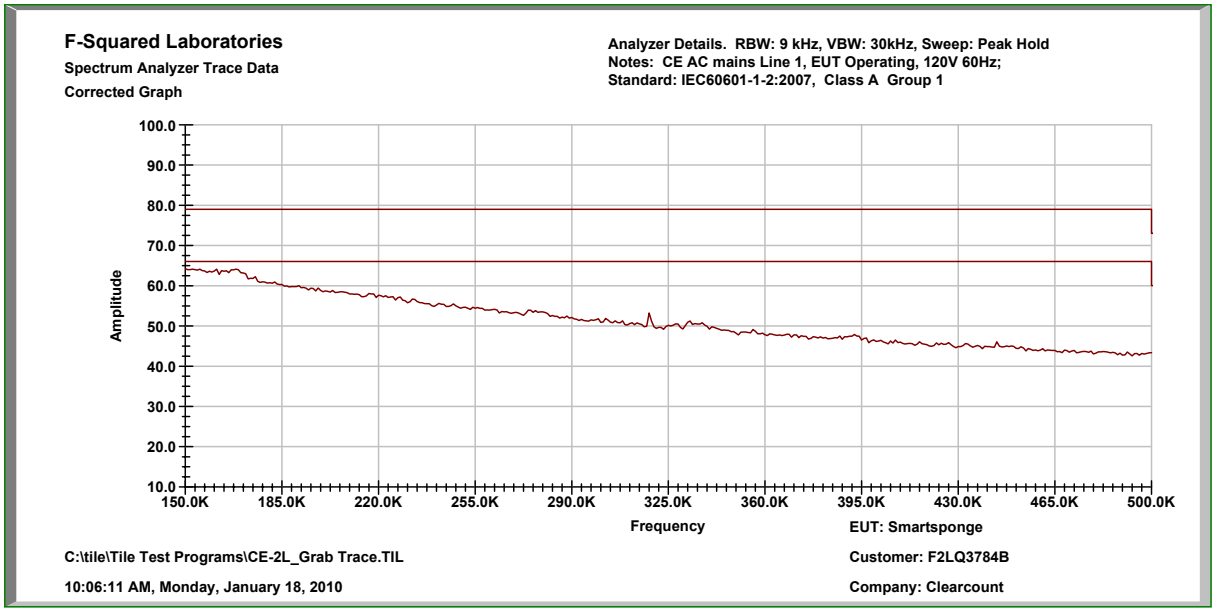


Figure 42: Conducted Test – Line 1: 0.5 MHz to 5.0 MHz, Out Mode

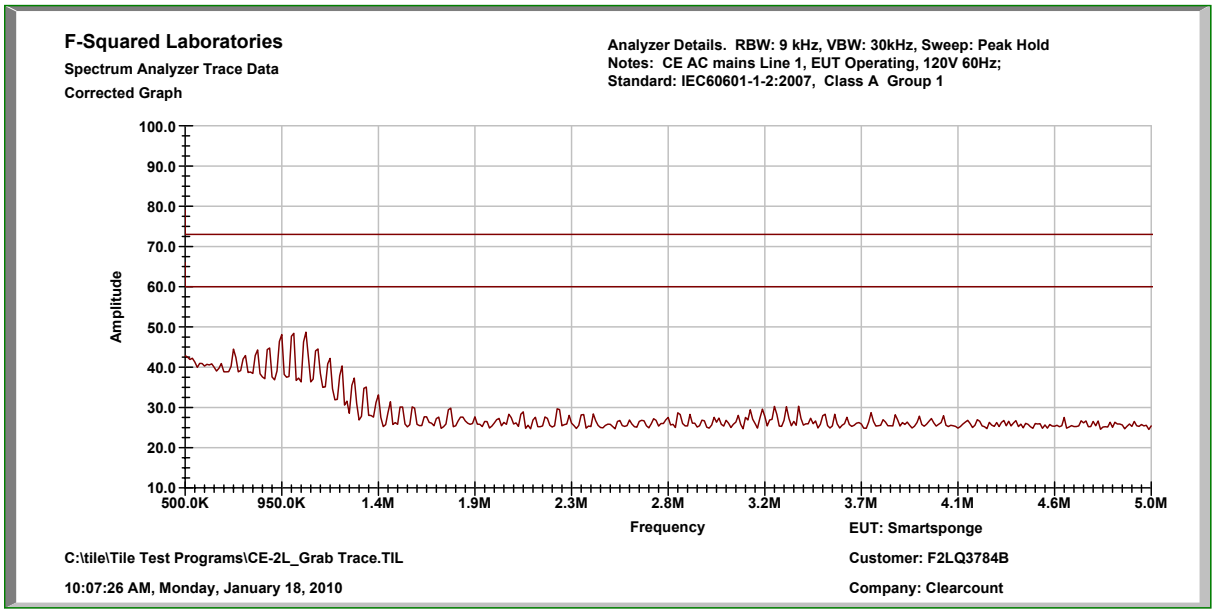


Figure 43: Conducted Test – Line 1: 5.0 MHz to 30.0 MHz, Out Mode

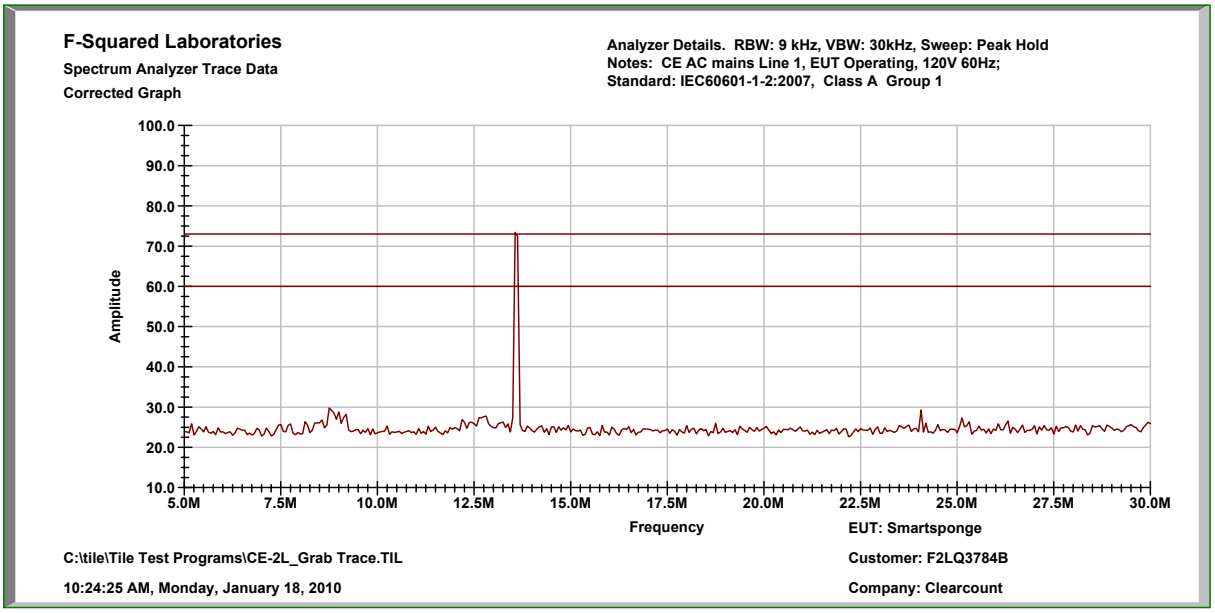


Figure 44: Conducted Test – Line 2: 0.15 MHz to 0.5 MHz, Out Mode

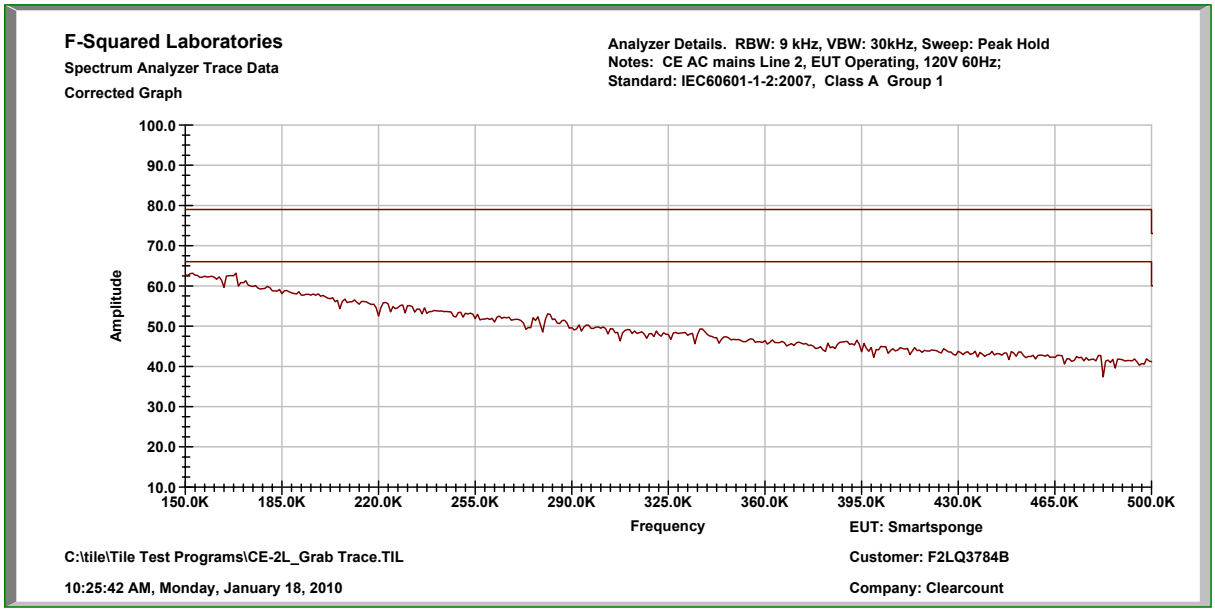


Figure 45: Conducted Test – Line 2: 0.5 MHz to 5.0 MHz, Out Mode

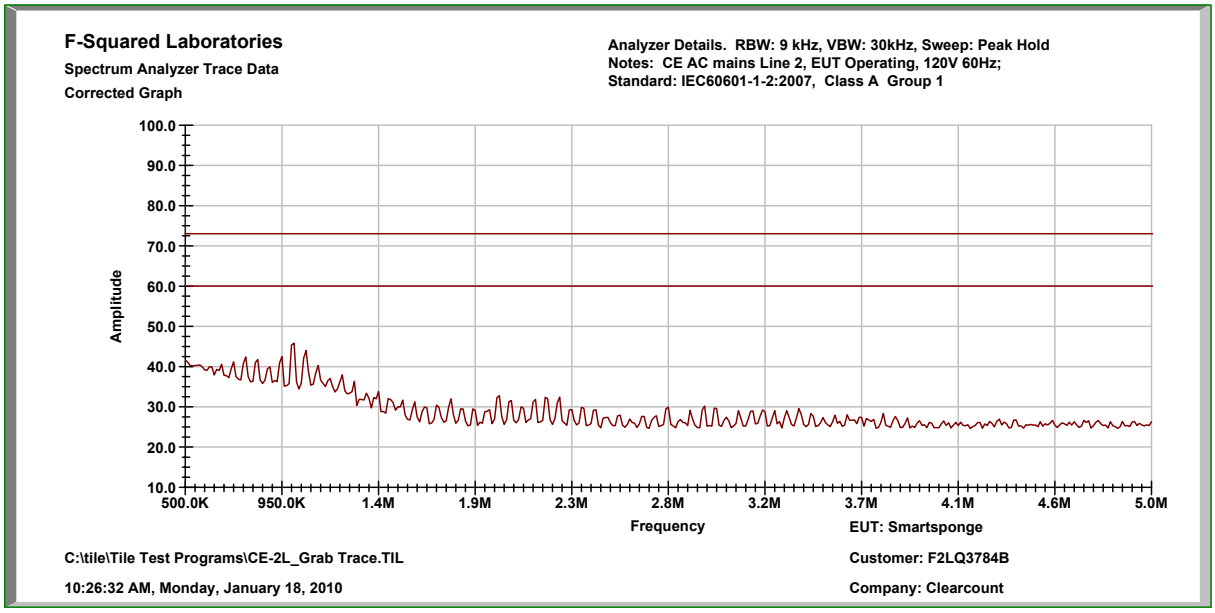


Figure 46: Conducted Test – Line 2: 5.0 MHz to 30.0 MHz, Out Mode

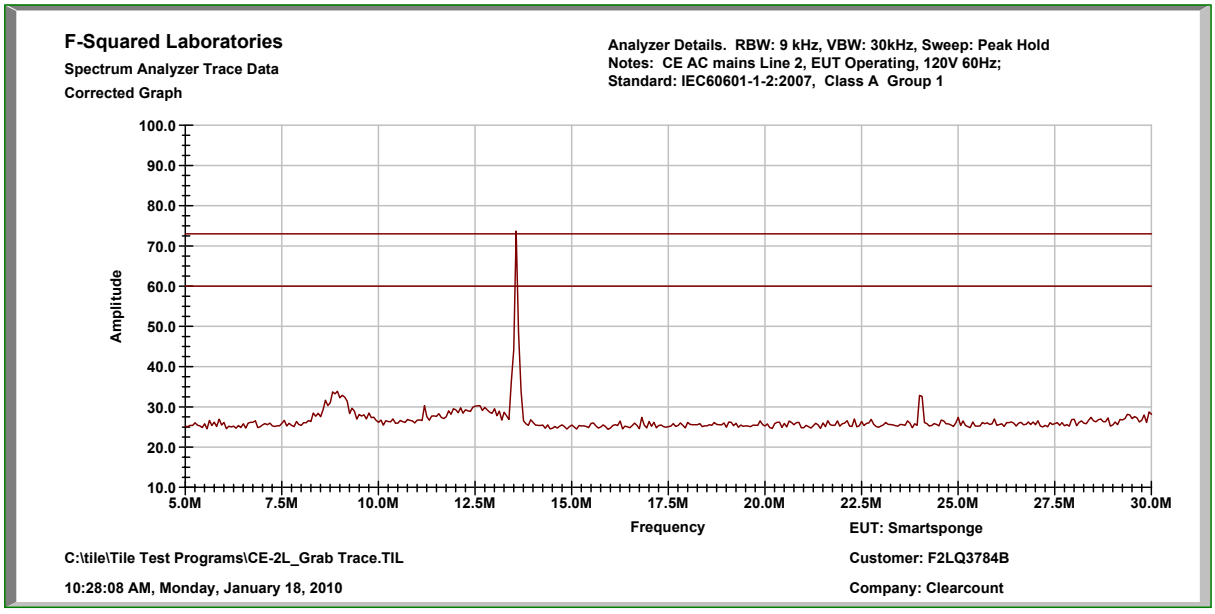


Figure 47: Conducted Test – Line 1: 0.15 MHz to 0.5 MHz, In Mode

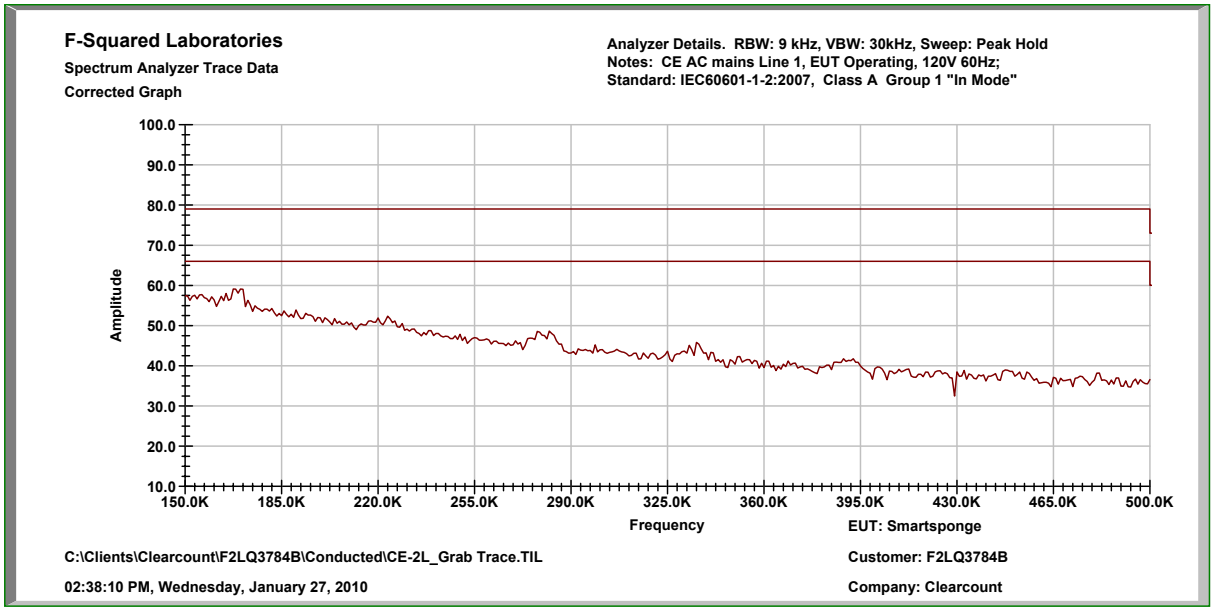


Figure 48: Conducted Test – Line 1: 0.5 MHz to 5.0 MHz, In Mode

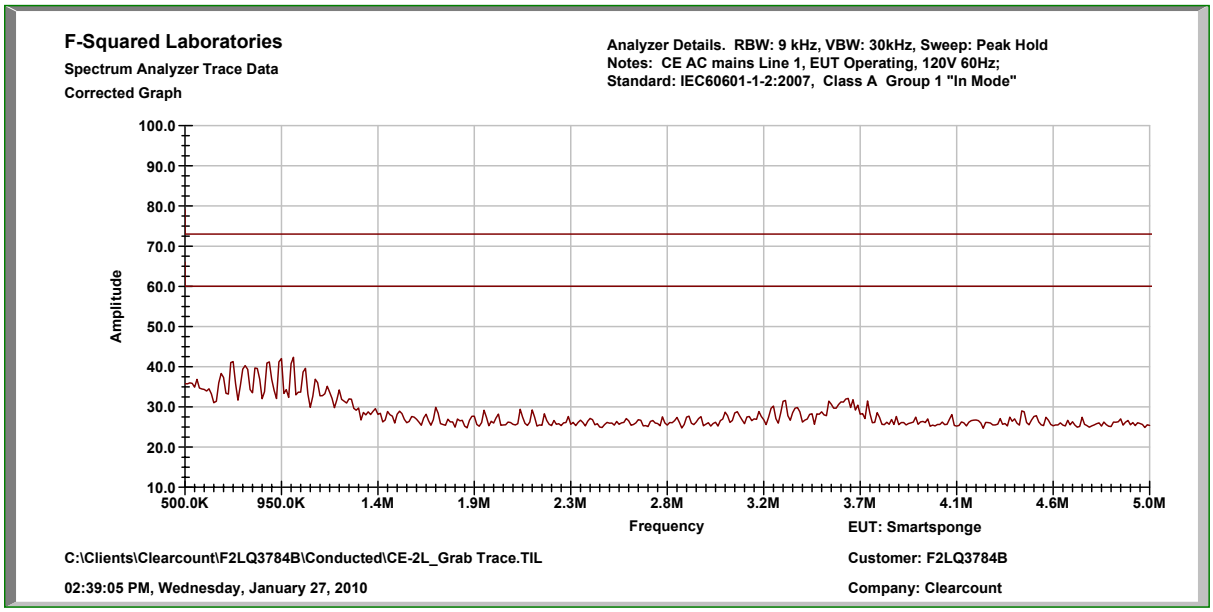


Figure 49: Conducted Test – Line 1: 5.0 MHz to 30.0 MHz, In Mode

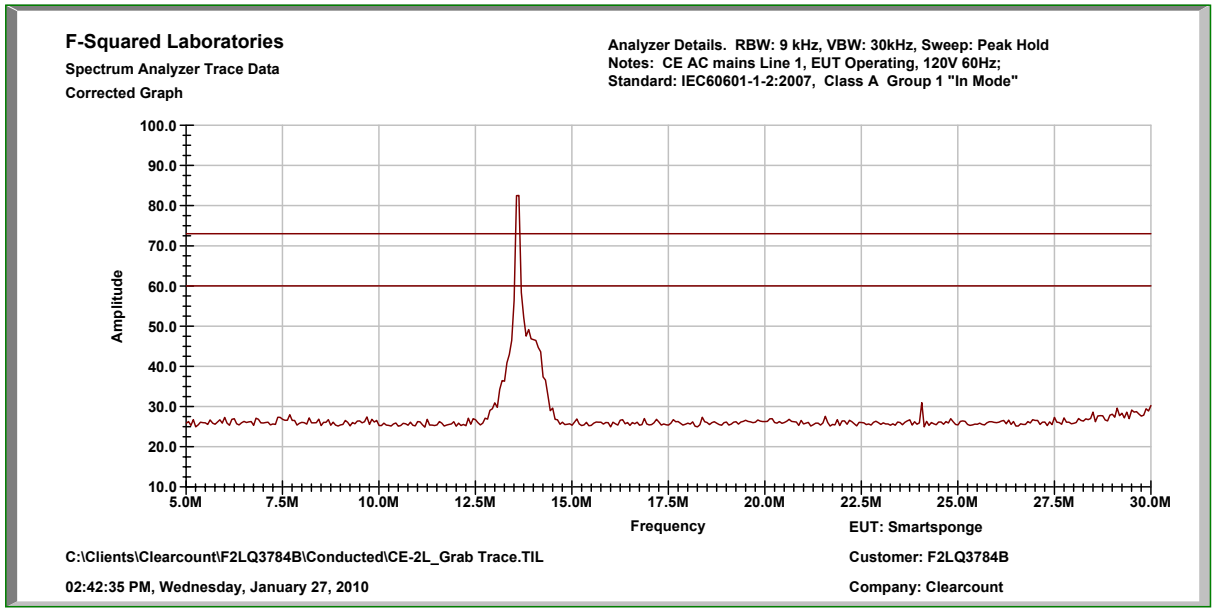


Figure 50: Conducted Test – Line 2: 0.15 MHz to 0.5 MHz, In Mode

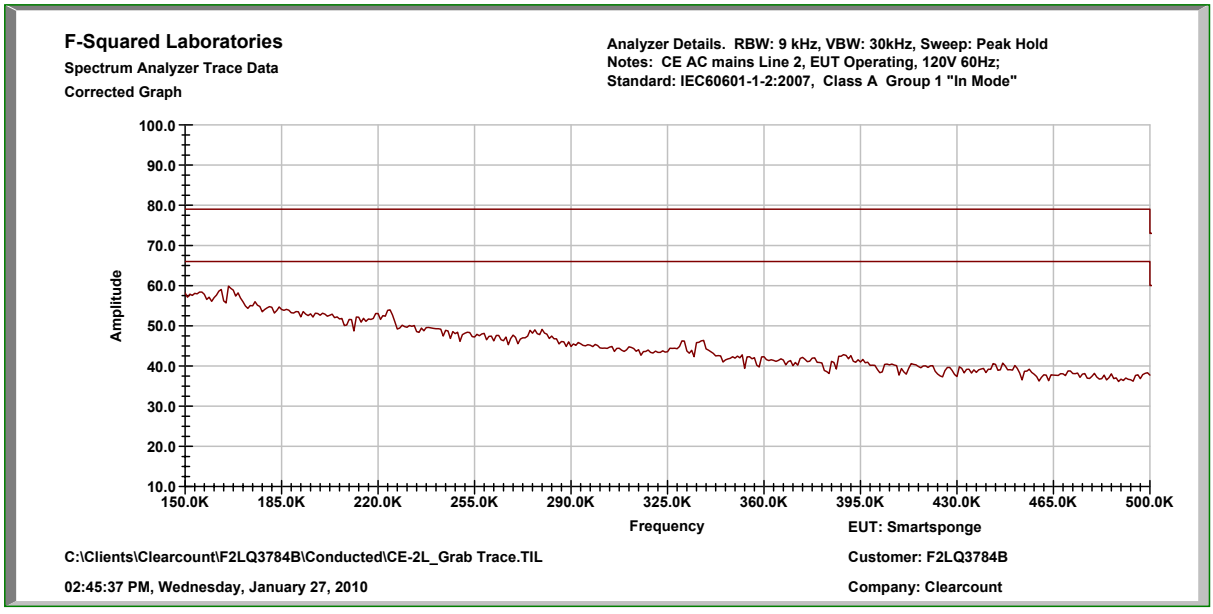


Figure 51: Conducted Test – Line 2: 0.5 MHz to 5.0 MHz, In Mode

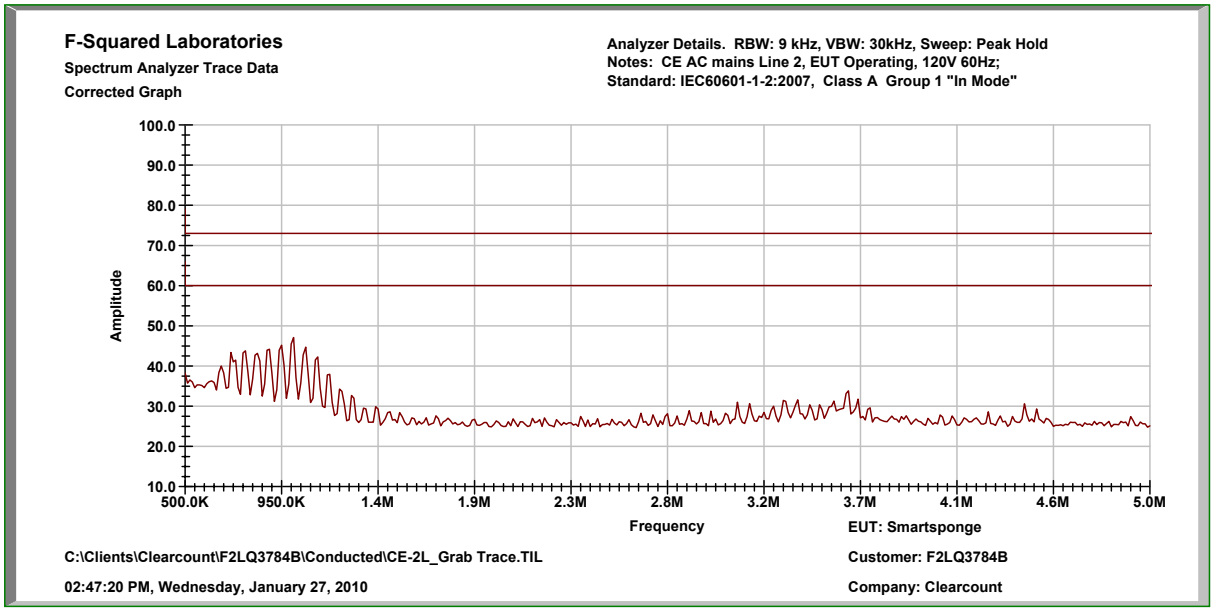


Figure 52: Conducted Test – Line 2: 5.0 MHz to 30.0 MHz, In Mode

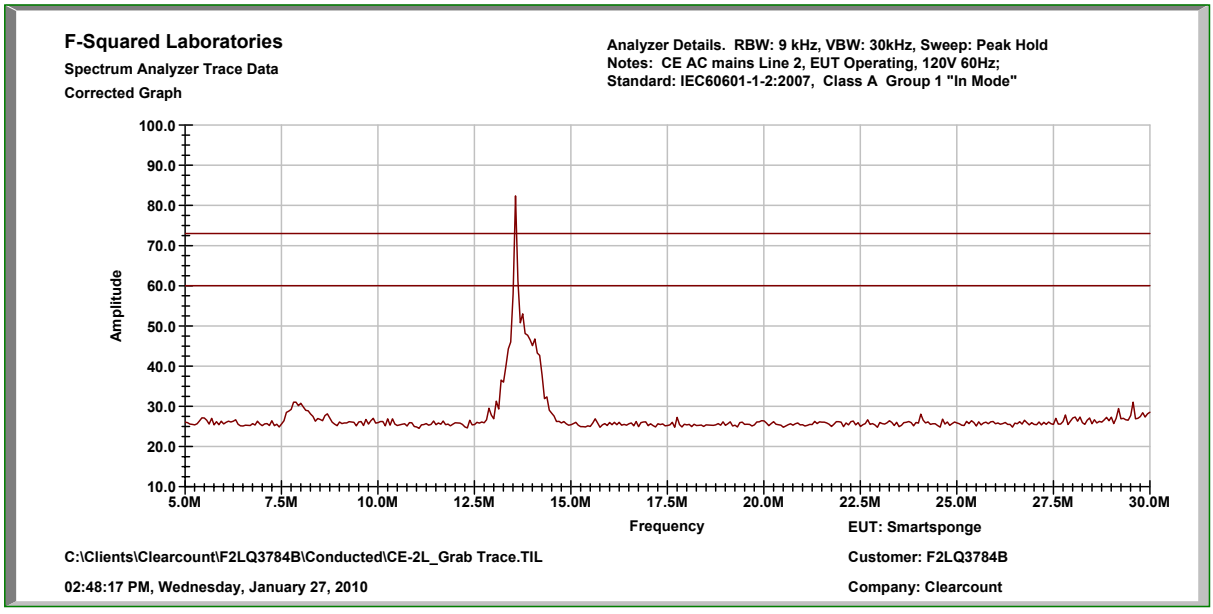


Figure 53: Conducted Test – Line 1: 0.15 MHz to 0.5 MHz, Wand Mode with Dummy Load

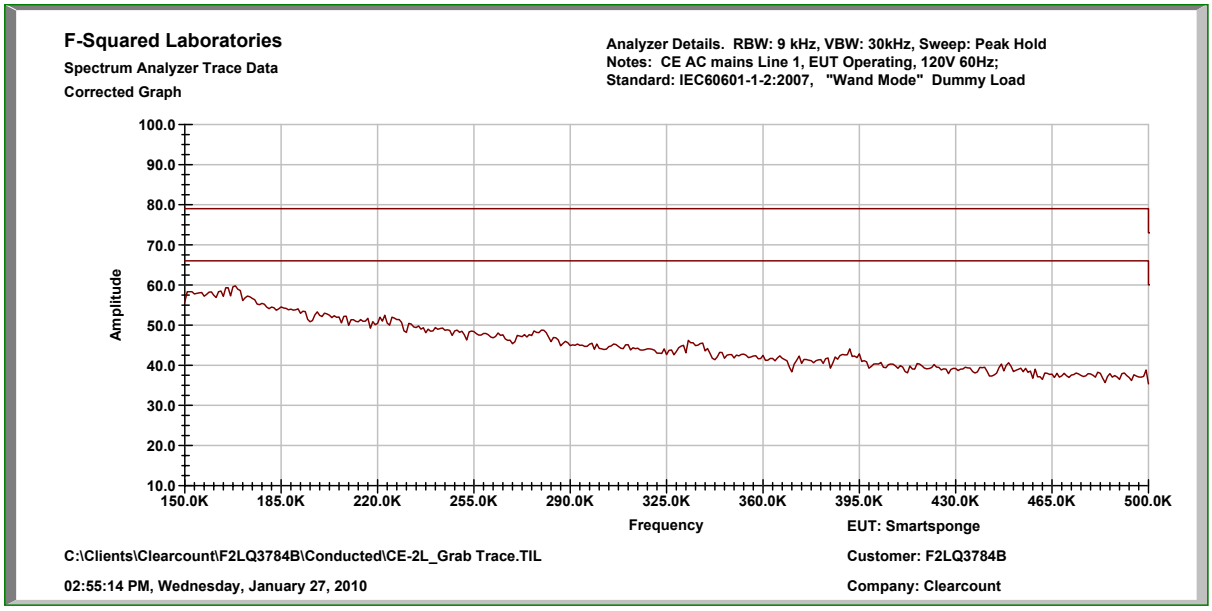


Figure 54: Conducted Test – Line 1: 0.5 MHz to 5.0 MHz, Wand Mode with Dummy Load

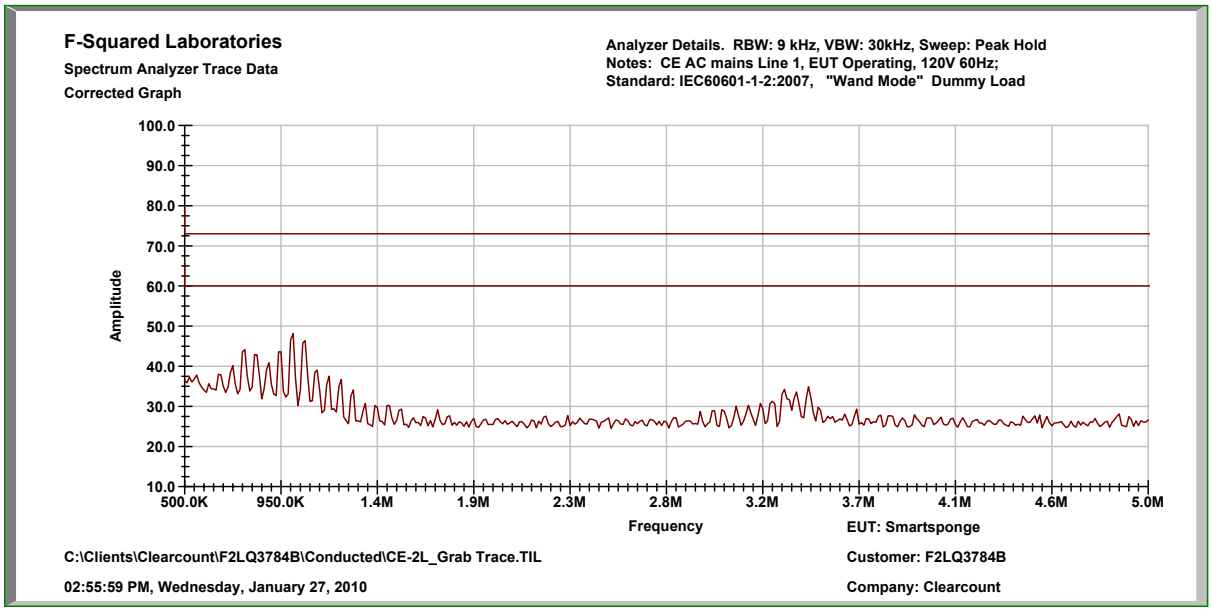


Figure 55: Conducted Test – Line 1: 5.0 MHz to 30.0 MHz, Wand Mode with Dummy Load

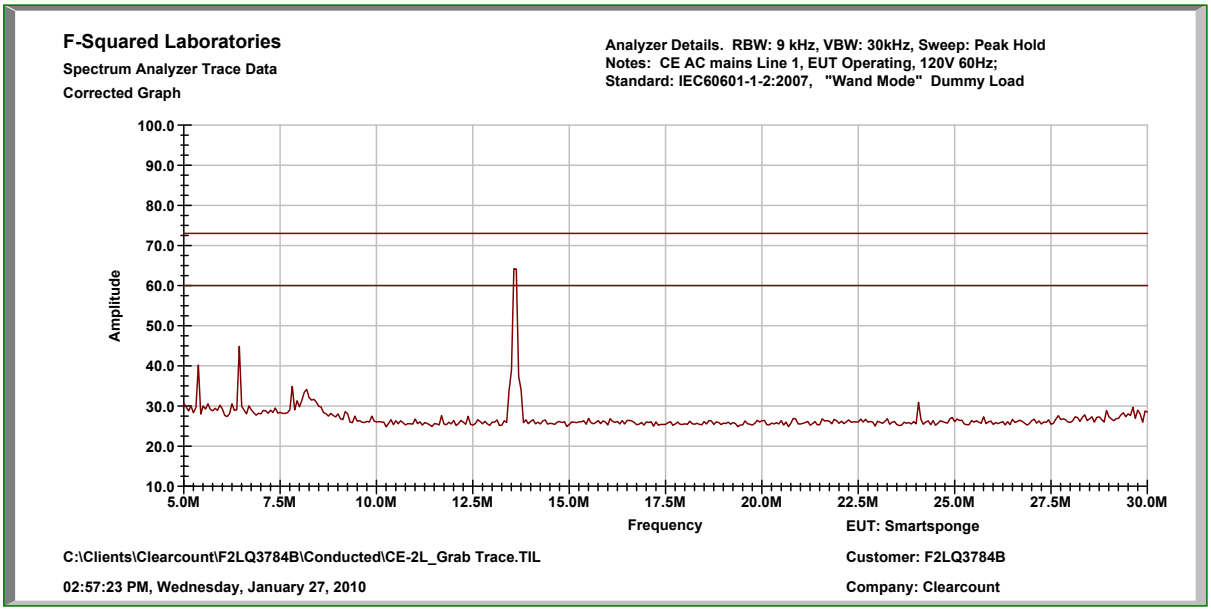


Figure 56: Conducted Test – Line 2: 0.15 MHz to 0.5 MHz, Wand Mode with Dummy Load

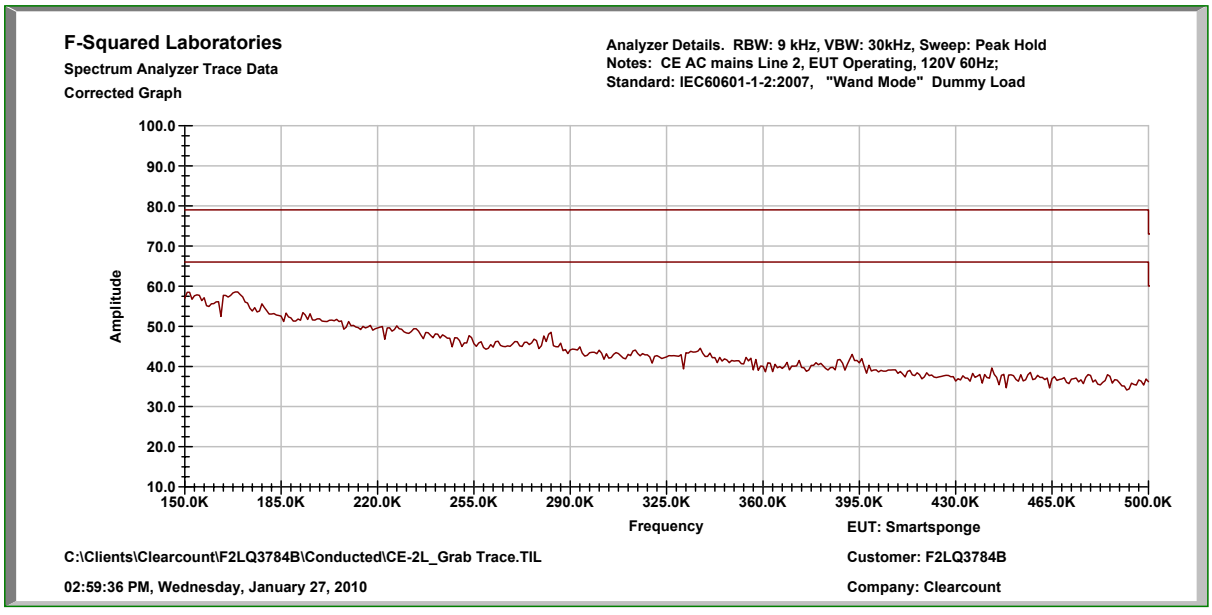


Figure 57: Conducted Test – Line 2: 0.5 MHz to 5.0 MHz, Wand Mode with Dummy Load

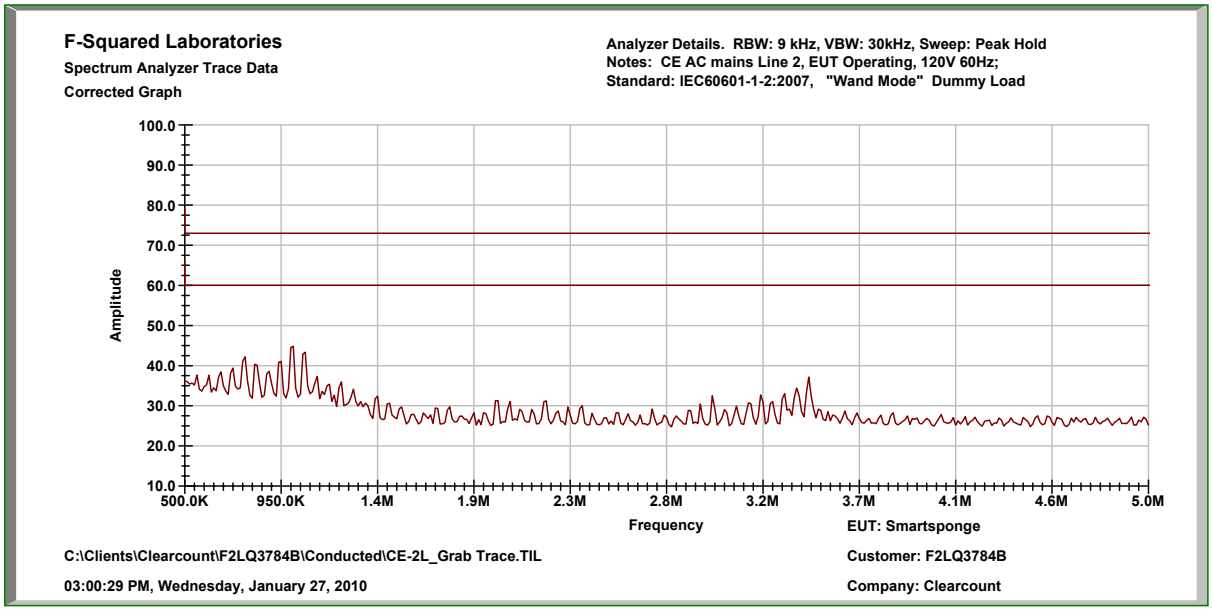
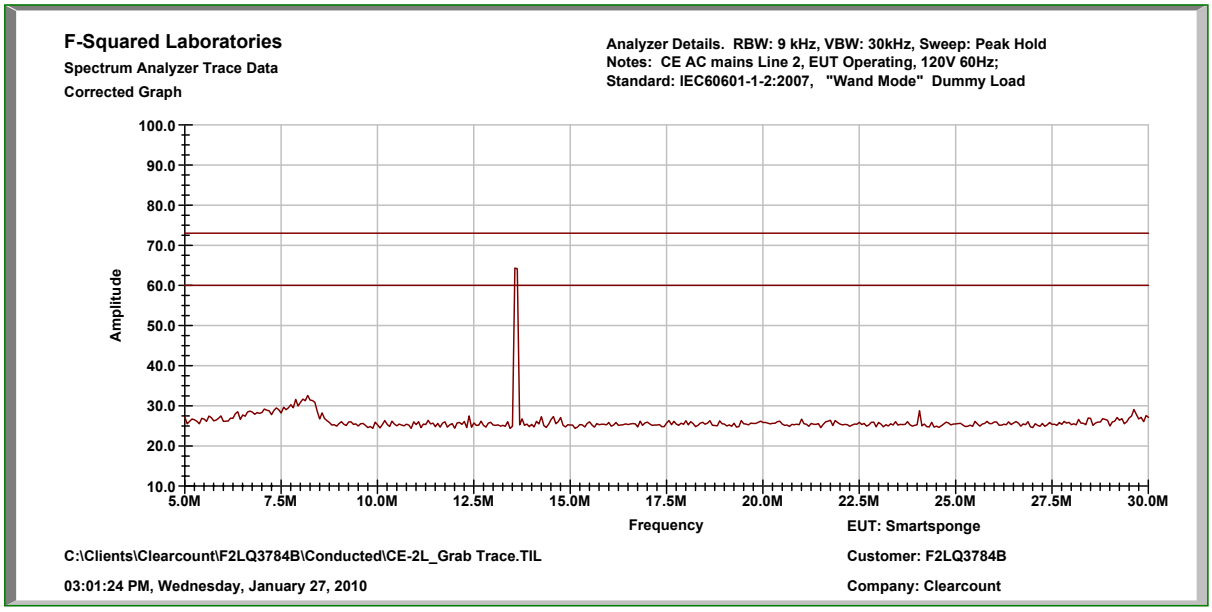


Figure 58: Conducted Test – Line 2: 5.0 MHz to 30.0 MHz, Wand Mode with Dummy Load



8. PICTORIALS – TEST SETUP

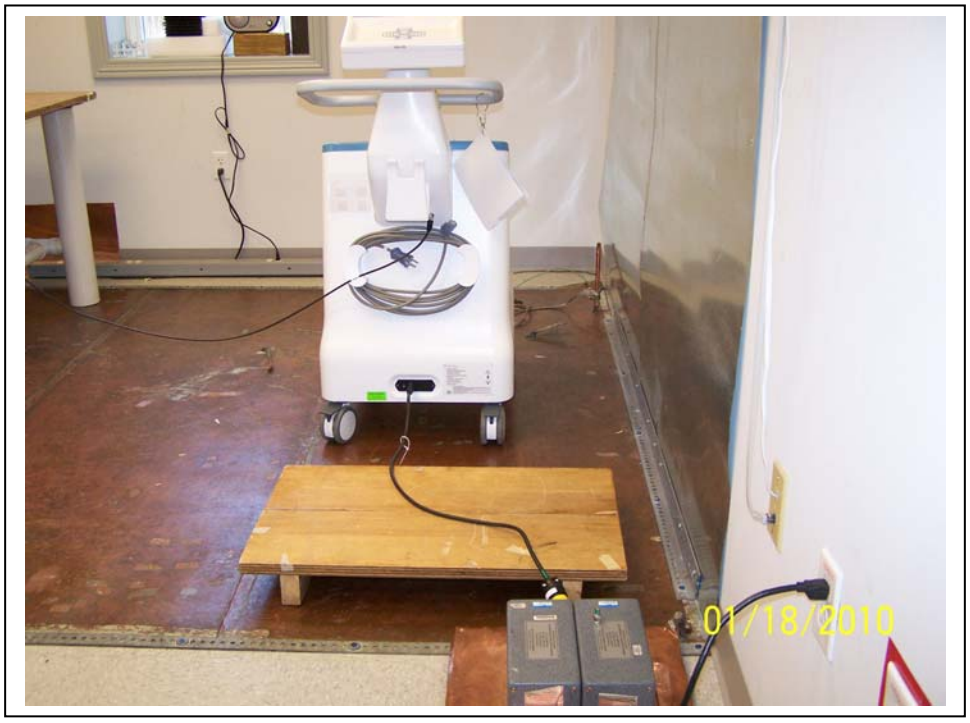
Pictorial 1: RADIATED TEST – *Prescan*

Pictorial 2: RADIATED TEST – *OATS*

Pictorial 3: RADIATED TEST – *Lower Frequency Range, Setup 1*

Pictorial 4: RADIATED TEST – *Lower Frequency Range, Setup 2*

Pictorial 5: Conducted Emissions - Front View, Out & In Modes



Pictorial 6: Conducted Emissions - Front View, Wand Mode

9. PICTORIALS – EUT

SmartBucket Front View

SmartBucket Rear View

SmartBucket Right Side View

SmartBucket Left SideView

SmartBucket with New Wand

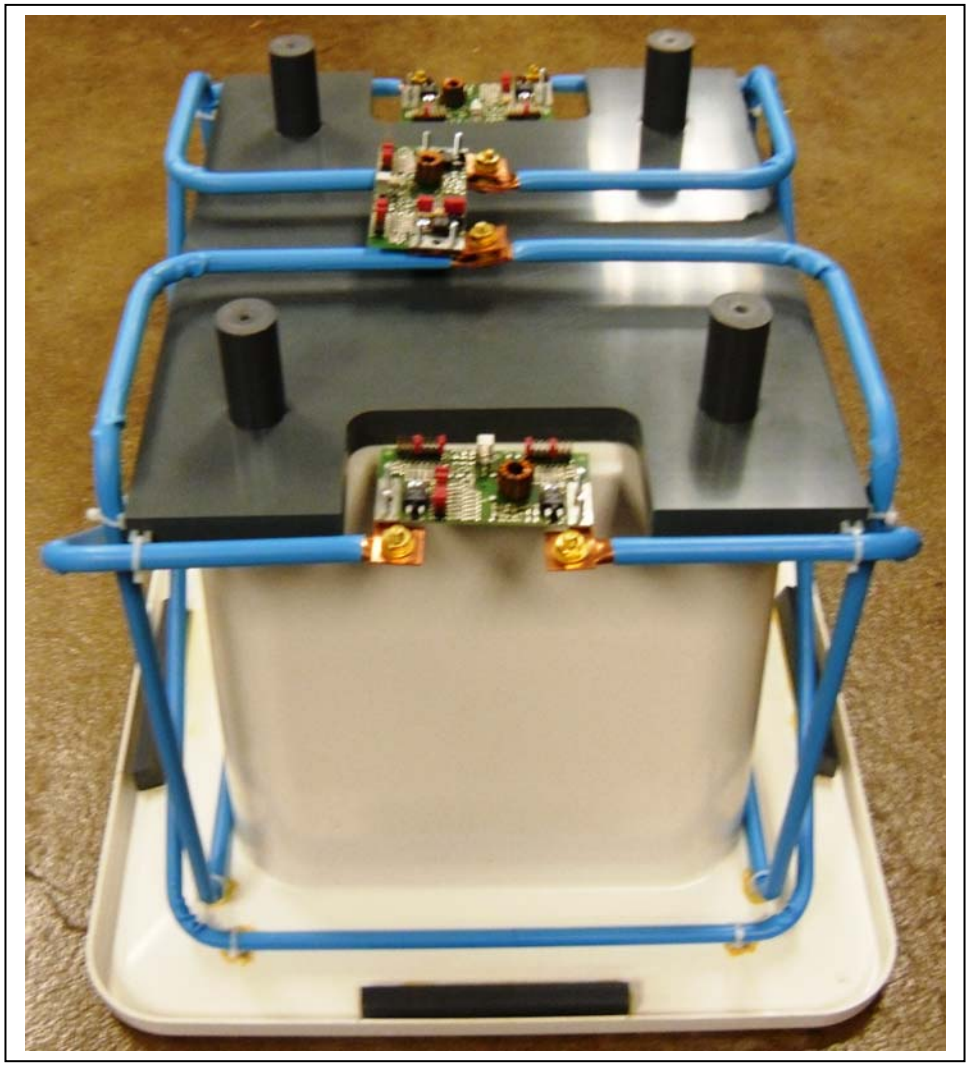
SmartBucket with New Wand 2

Wand Assembly Front View

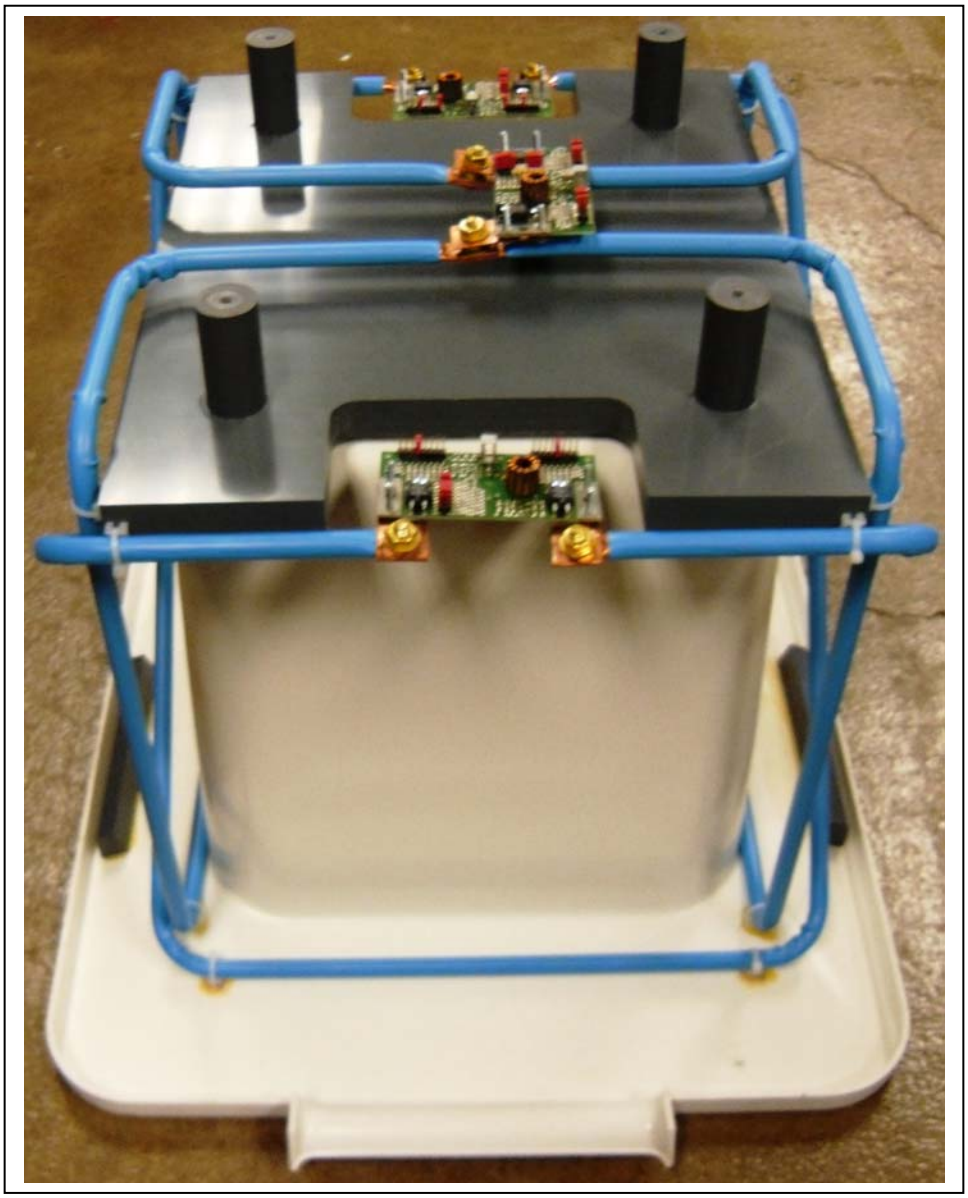
Wand Assembly Side View

Wand Assembly LED Panel

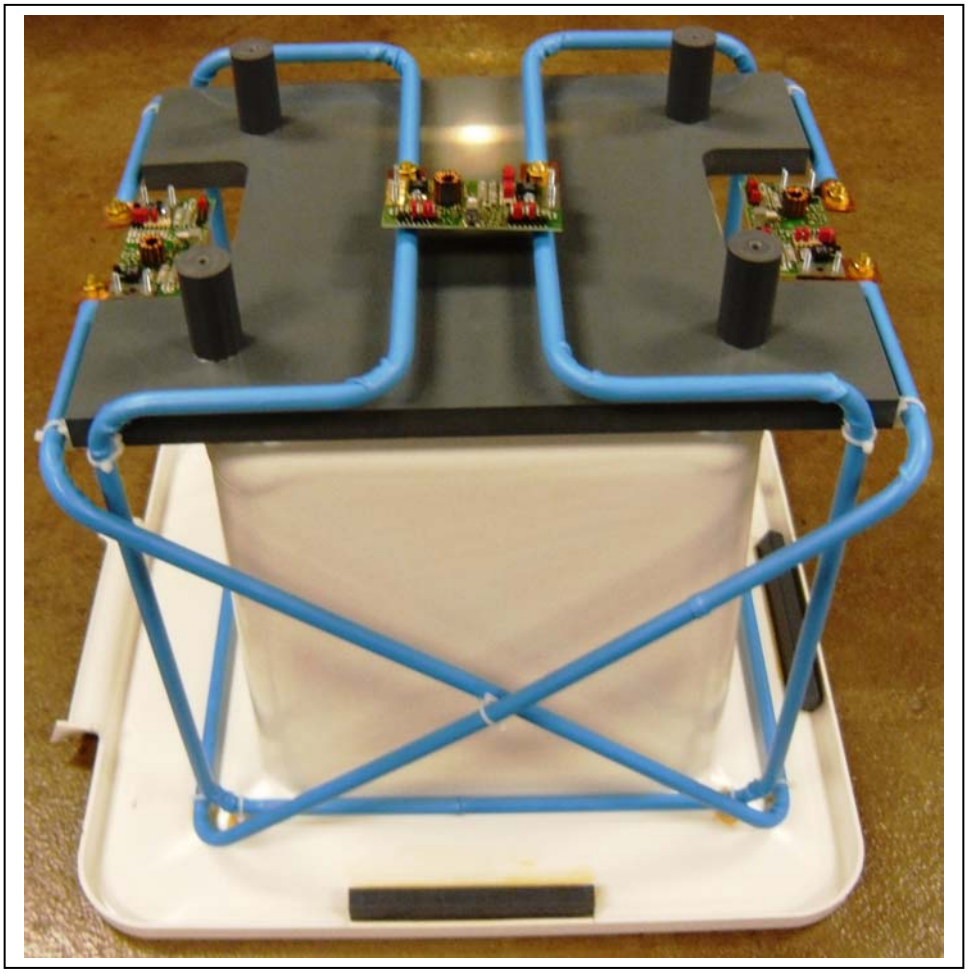
Bucket Antenna Front



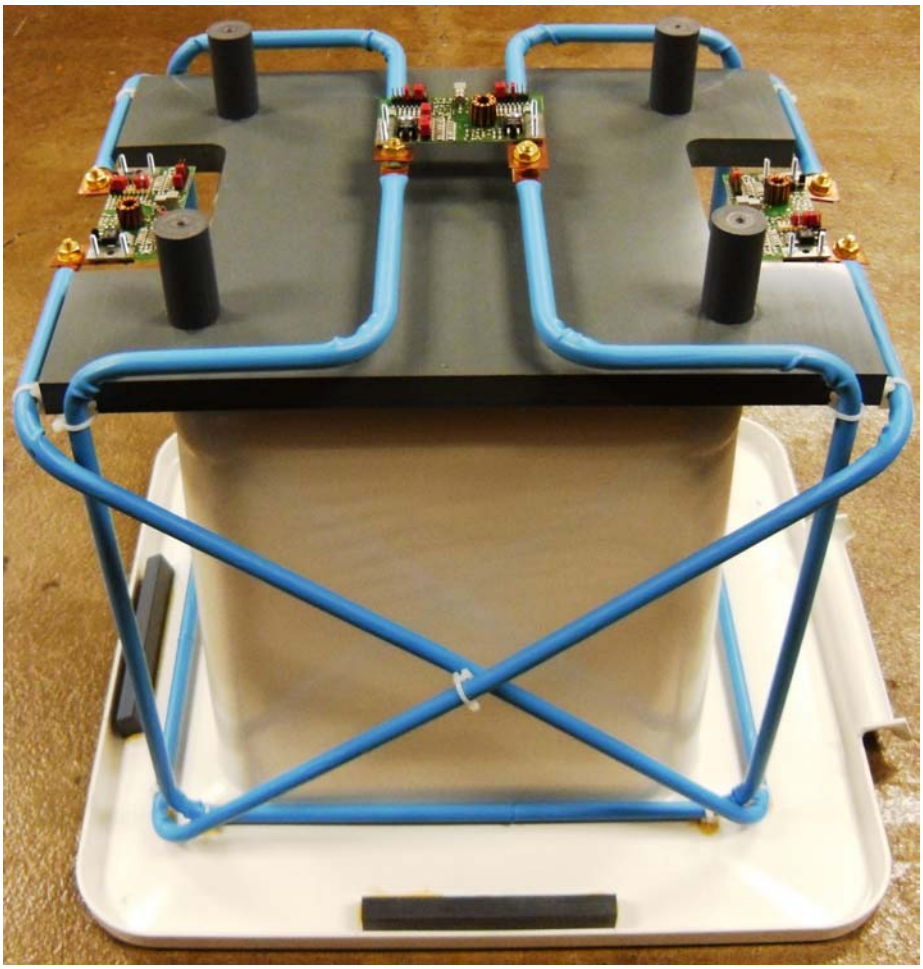
Bucket Antenna Rear



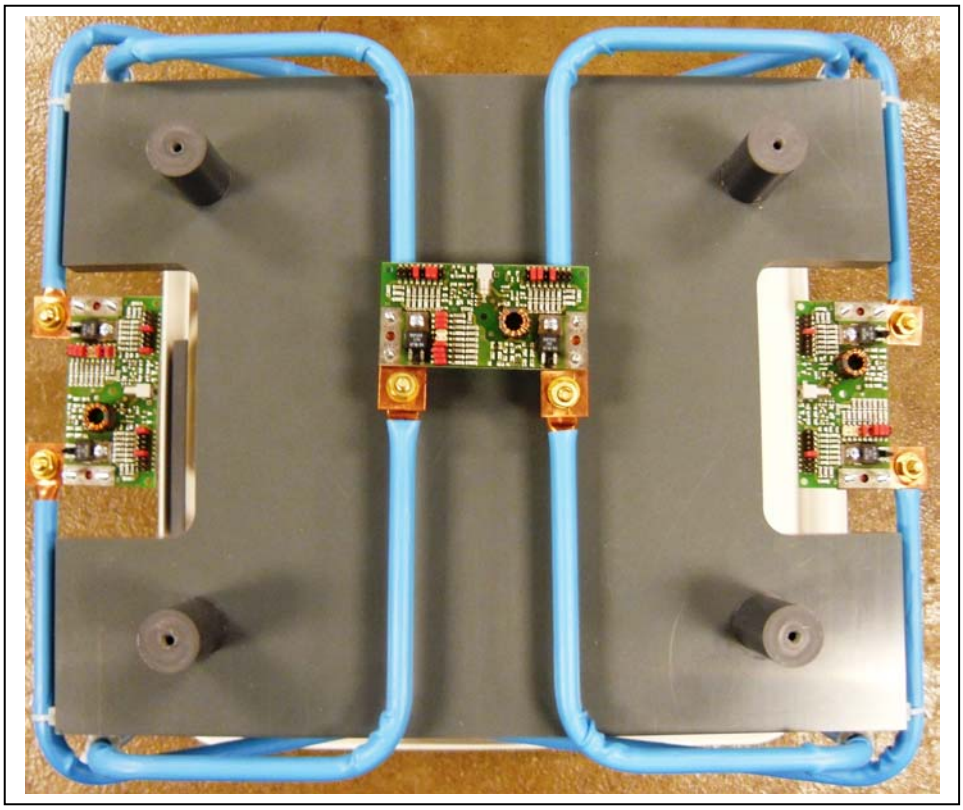
Bucket Antenna Right Side



Bucket Antenna Left Side

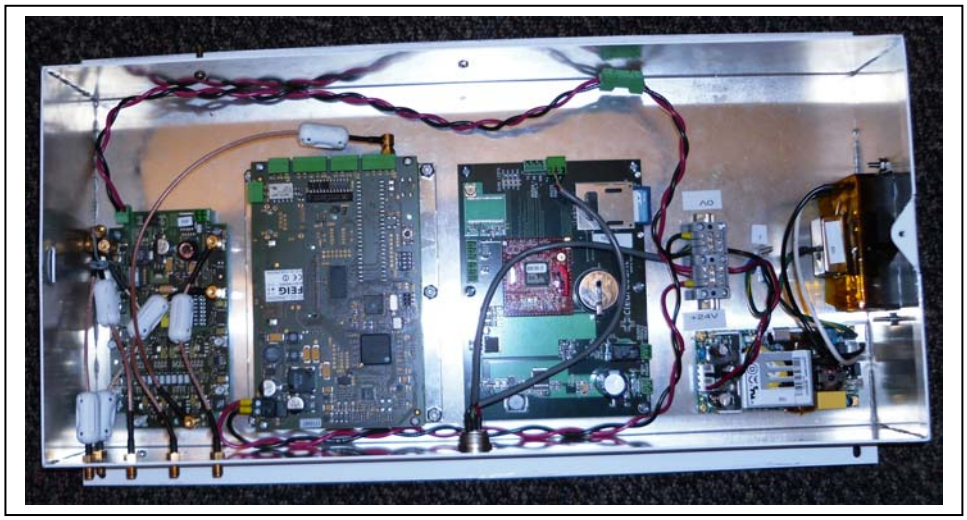


Bucket Antenna Bottom

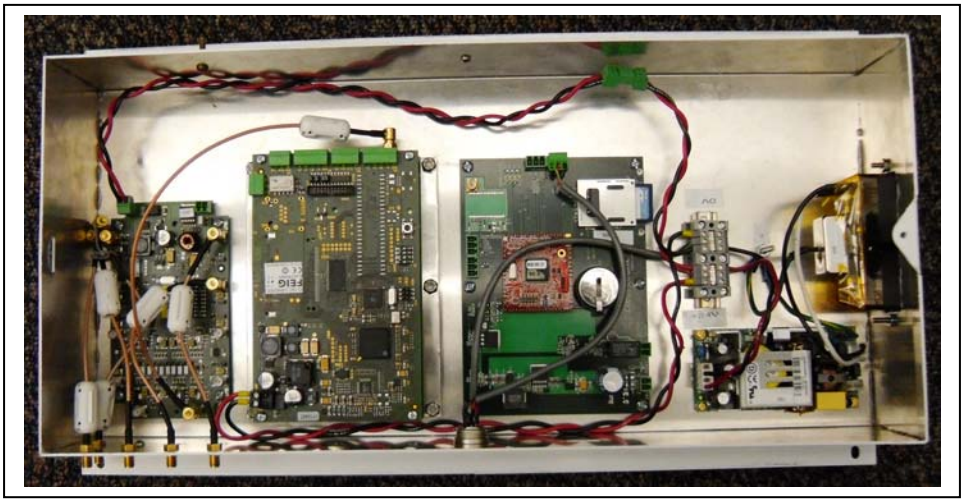


EBox

Inside EBox

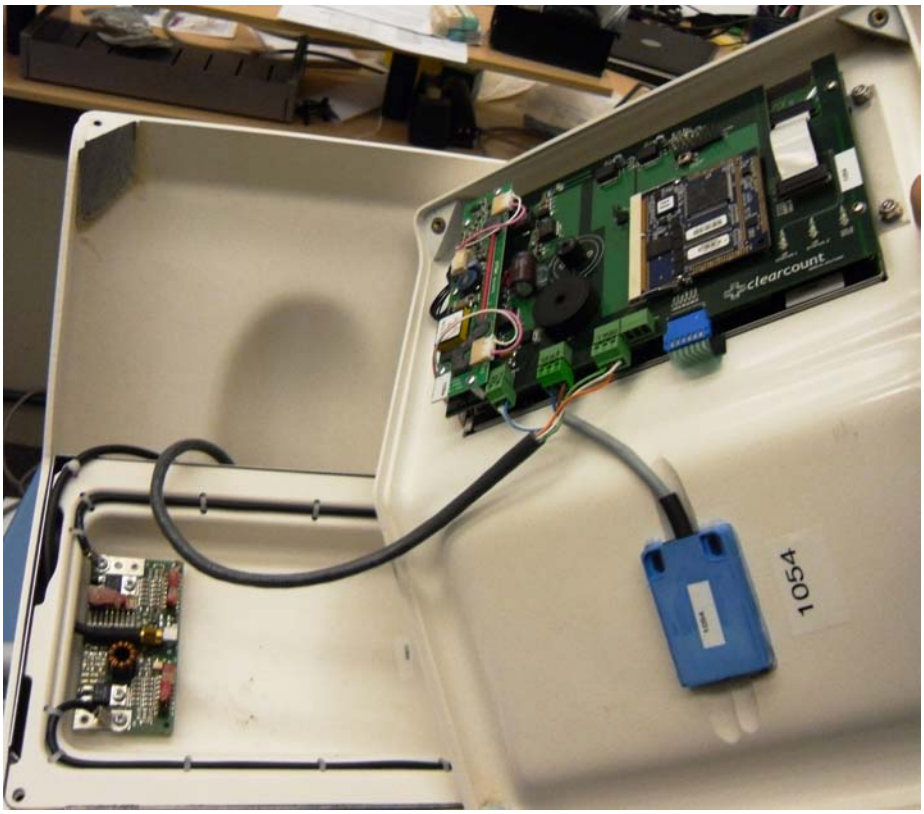


Inside EBox 2

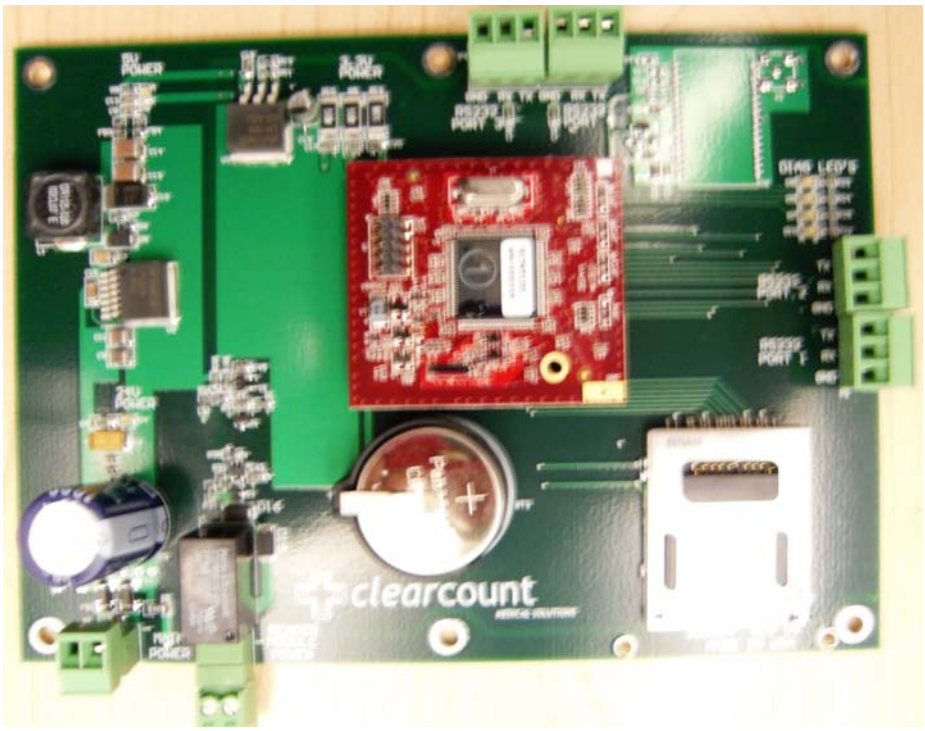


Inside Head Unit

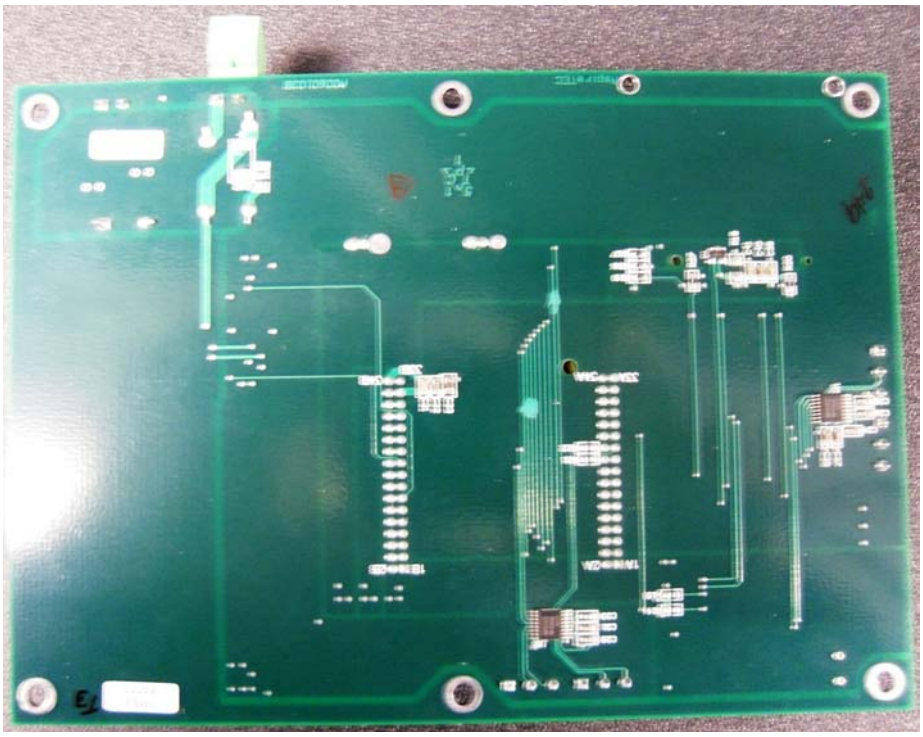
Inside Head Unit 2



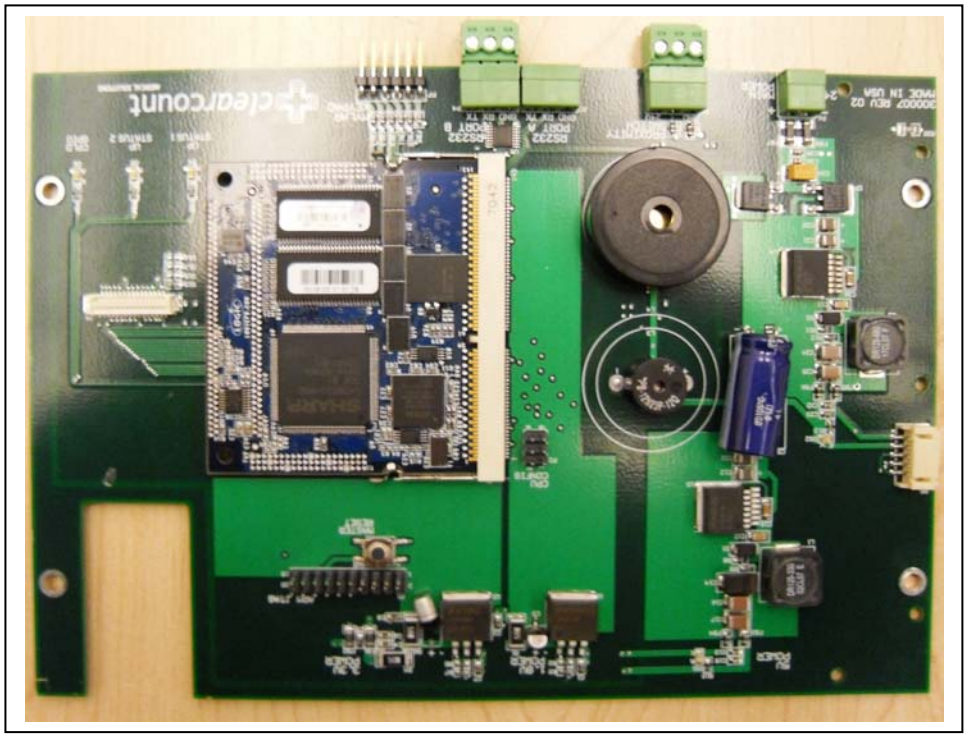
MCU 1



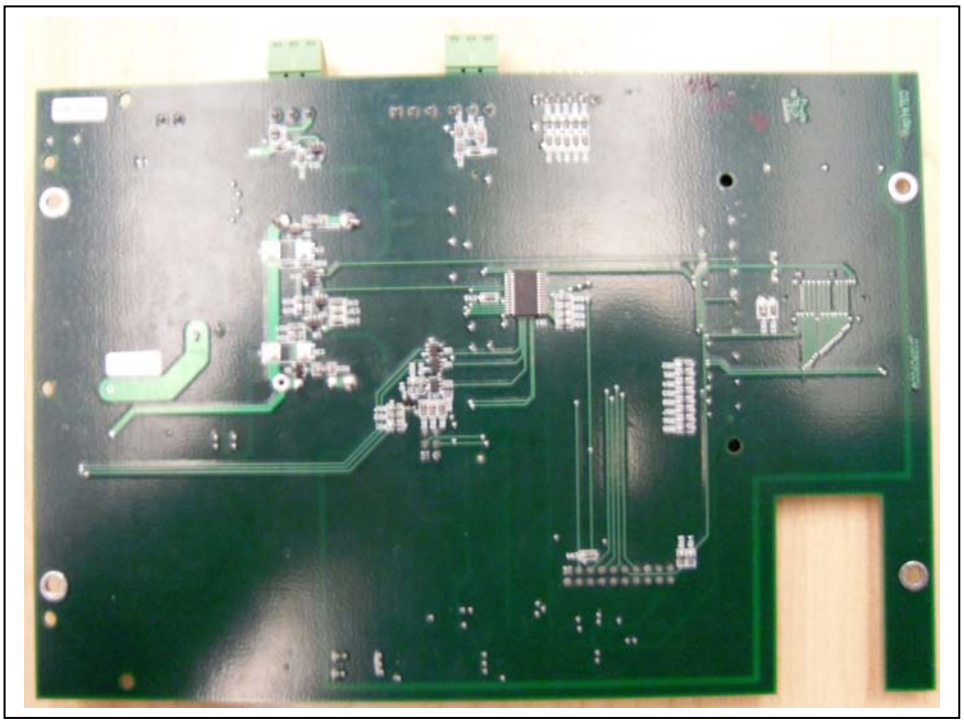
MCU 1 Rear



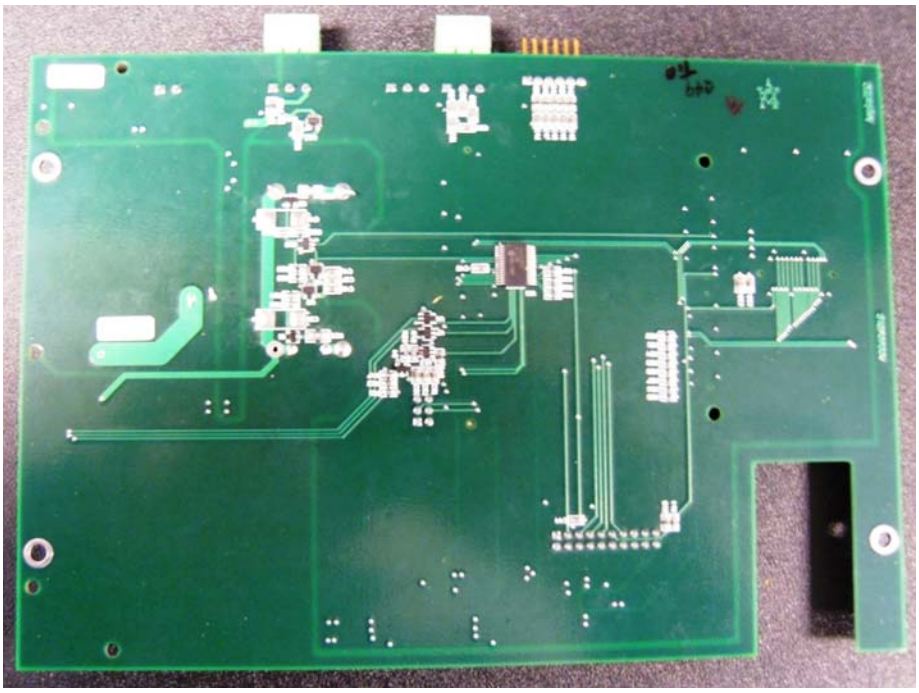
MCU 2



MCU 2 Rear



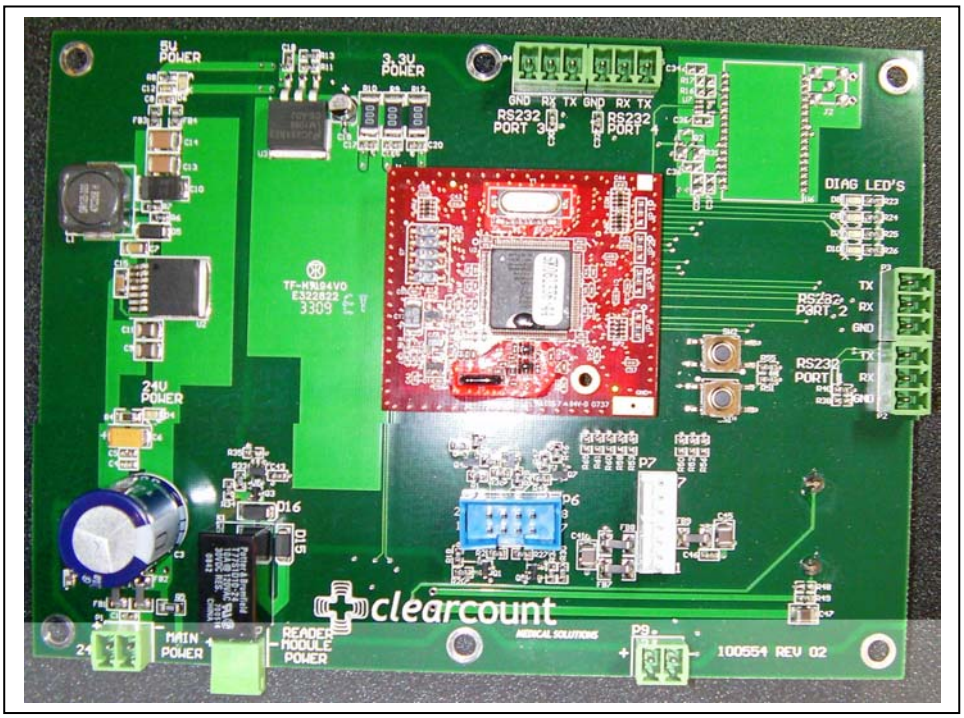
MCU 2-2 Rear



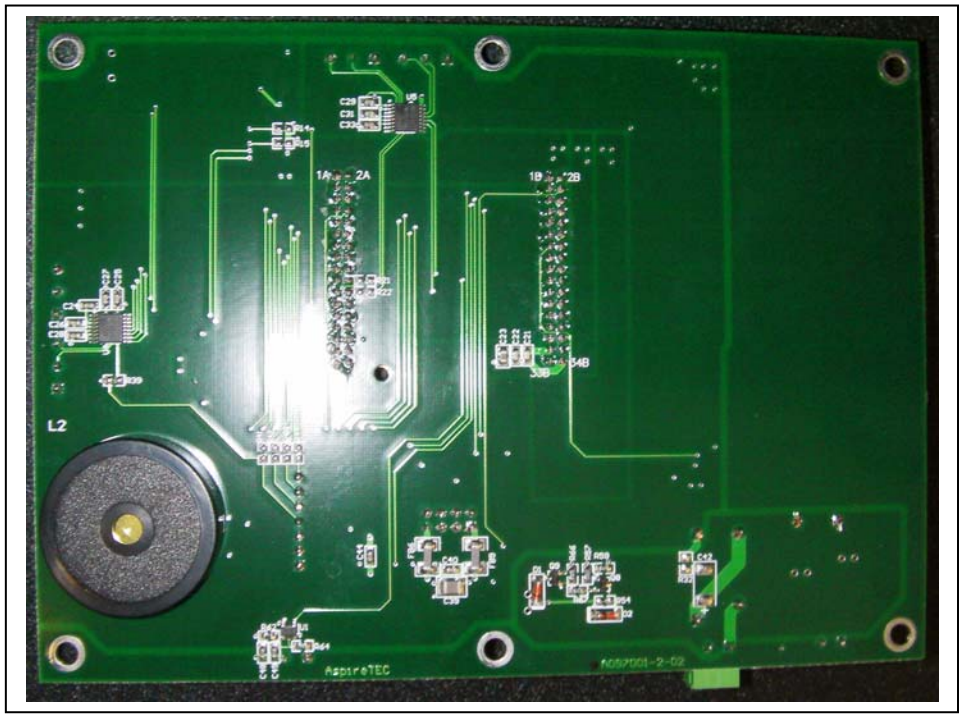
SmartBucket Rear Panel Removed

SmartBucket Rear Panel Removed 2

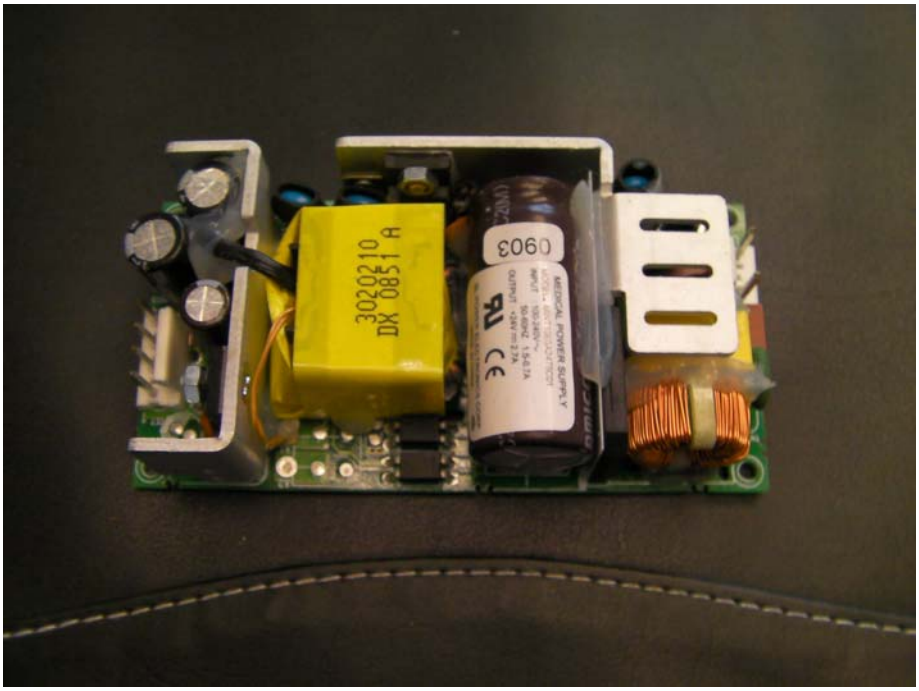
MCU Front



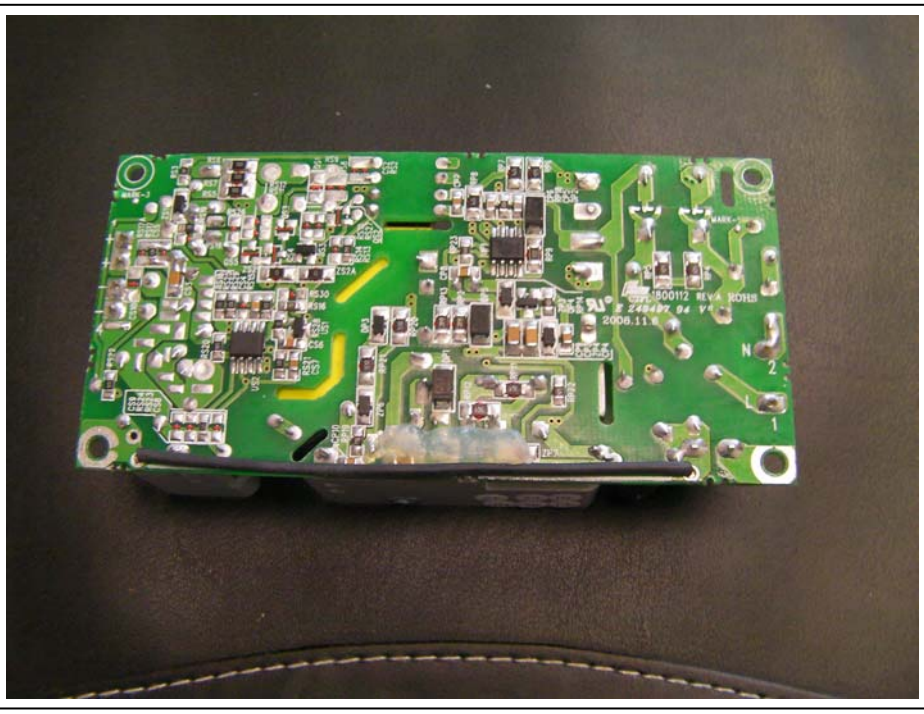
MCU Rear



Power Supply Top



Power Supply Bottom



SmartSponge LCD

Wand LED PCB Back