F2 Labs
16740 Peters Road
Middlefield, Ohio 44062
United States of America
www.f2labs.com

CERTIFICATION TEST REPORT

Manufacturer:	**Steris Corporation** **5960 Heisley Road** **Mentor, Ohio 44060** **United States of America**
Applicant:	**Same As Above**
Product:	**Biodecontamination System**
Model:	**VHP X10**
FCC ID:	**2ABQIVHPX10**
Testing Commenced:	**Nov. 7, 2013**
Testing Ended:	**Nov. 15, 2013**
Summary of Test Results:	**Page 4**

Standards:

- **FCC Part 15 Subpart C, Section 15.225, 15.207, 15.209**

Evaluation Conducted by: Ken Littell, EMC Tech. Mgr.

Report Reviewed by: Wendy Fuster, President

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs 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**.**

1.2 Measurement Procedure:

All measurements were performed according to the 2003 version of ANSI C63.4 and recommended FCC procedure of measurement of DTS operating under Section 15.225. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

Radiated Emissions

- Combined Uncertainty (+ or -) 2.67 dB
- Expanded Uncertainty (+ or -) 5.35 dB

Conducted Emissions

- Combined Uncertainty (+ or -) 1.88 dB
- Expanded Uncertainty (+ or -) 3.75 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2LQ5823-02E	First Issue	Nov. 22, 2013	W. Fuster
F2LQ5823-02E Rev. 1	Revision of FCC ID	Jan. 21, 2014	W. Fuster
F2LQ5823-02E Rev. 2	Update of section 1.3; addition of findings in section 8.1; replacement of frequency stability plots in section 8.2; addition of occupied bandwidth data and additional radiated spurs data.	Feb. 12, 2014	W. Fuster

2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
Operation Within the Band 13.110-14.010 MHz	FCC Part 15 Subpart C 15.225(a)(b)(c)(d)	Complies
AC Mains Conducted Emissions	FCC Part 15 Subpart C 15.207	Complies
Radiated Emissions	FCC Part 15 Subpart C 15.209	Complies
Frequency Stability	FCC Part 15 Subpart C 15.225(e)	Complies
Occupied Bandwidth	FCC Part 15 Subpart C 15.215(c)	Complies

Modifications Made to the Equipment
None

3 ENGINEERING STATEMENT

This report has been prepared on behalf of Steris Corporation 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 and Part 15 standards. The test results found in this test report relate only to the items tested.

4 EUT INFORMATION AND DATA

4.1 Equipment Under Test:

Product: Biodecontamination System
Model: VHP X10
Serial No.: None Specified
FCC ID: 2ABQIVHPX10

4.2 Trade Name:

Steris Corporation

4.3 Power Supply:

230VAC, 60Hz

4.4 Applicable Rules:

CFR 47, Part 15.225, subpart C

4.5 Equipment Category:

RFID

4.6 Antenna:

Internal Chip antenna

4.7 Accessories:

N/A

4.8 Test Item Condition:

The equipment to be tested was received in good condition.

4.9 Testing Algorithm:

The EUT was configured to constantly scan a passive tag internal to the EUT. For radiated emissions tests, a semi-anechoic chamber and an OATS were used. For the conducted emissions test on the AC Mains power cord, a CISPR 16 approved LISN set was used. The highest emissions were recorded in the data tables.

5 LIST OF MEASUREMENT INSTRUMENTATION

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shield Room	0175	Ray Proof	N/A	11645	Oct. 28, 2014
Temp/Hum. Recorder	CL137	Extech	RH520	CH16992	Apr. 17, 2014
OATS-3m	CL017	Compliance Labs	N/A	001	Dec. 13, 2014
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	Oct. 24, 2014
Spectrum Analyzer	CL138	Agilent Technologies	E4407B	US41192779	Oct. 29, 2014
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Oct. 30, 2014
Antenna 1-Chamber	0142	ETS/EMCO	3142B	9811-1330	Verified
Antenna 2-OATS	0105	Sunol Sciences	JB1	A101101	May 7, 2015
Pre-Amplifier	0139	Hewlett Packard	83006A	3104A00500	Feb. 20, 2014
Active 18” Loop Antenna	CL082	A.H. Systems, Inc.	SAS-562B	241	Sept. 6, 2014
LISN 1	0149	Solar	8028-50-TS-24-BNC	1130	Oct. 18, 2016
LISN 2	0147	Solar	8028-50-TS-24-BNC	1128	Oct. 28, 2016

6 FCC PART 15.225(a)(b)(c)(d) – Operation Within the band 13.110-14.010 MHz

6.1 Requirements

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters. (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

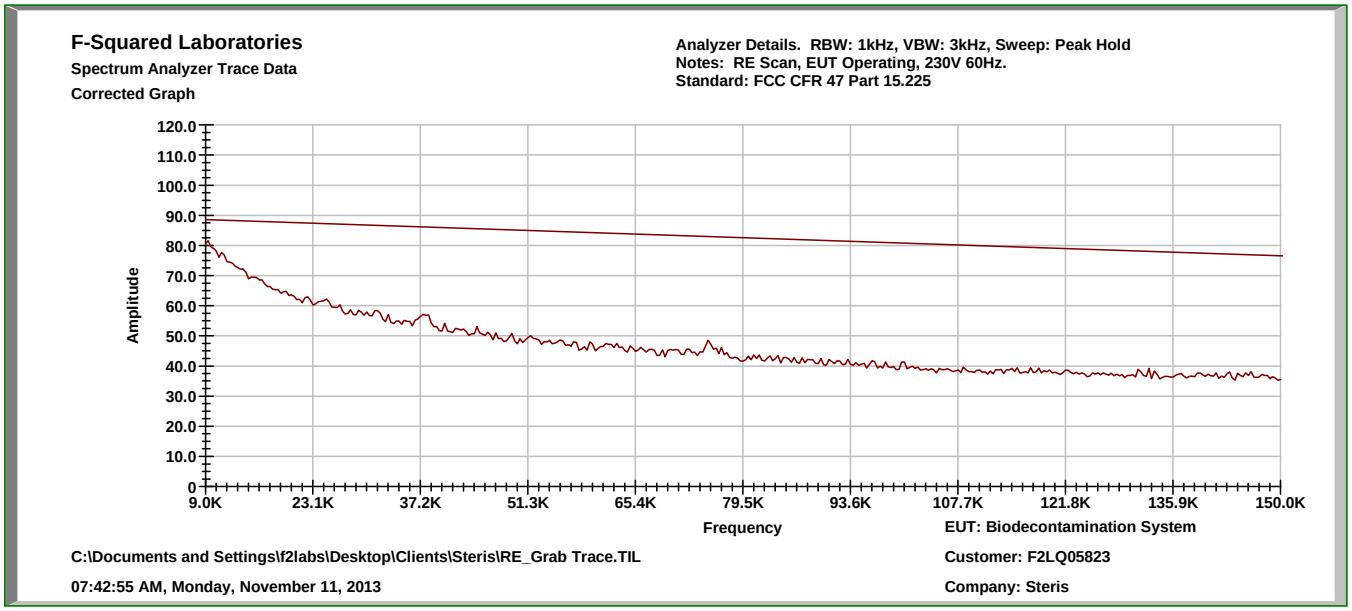
6.2 Test Procedure

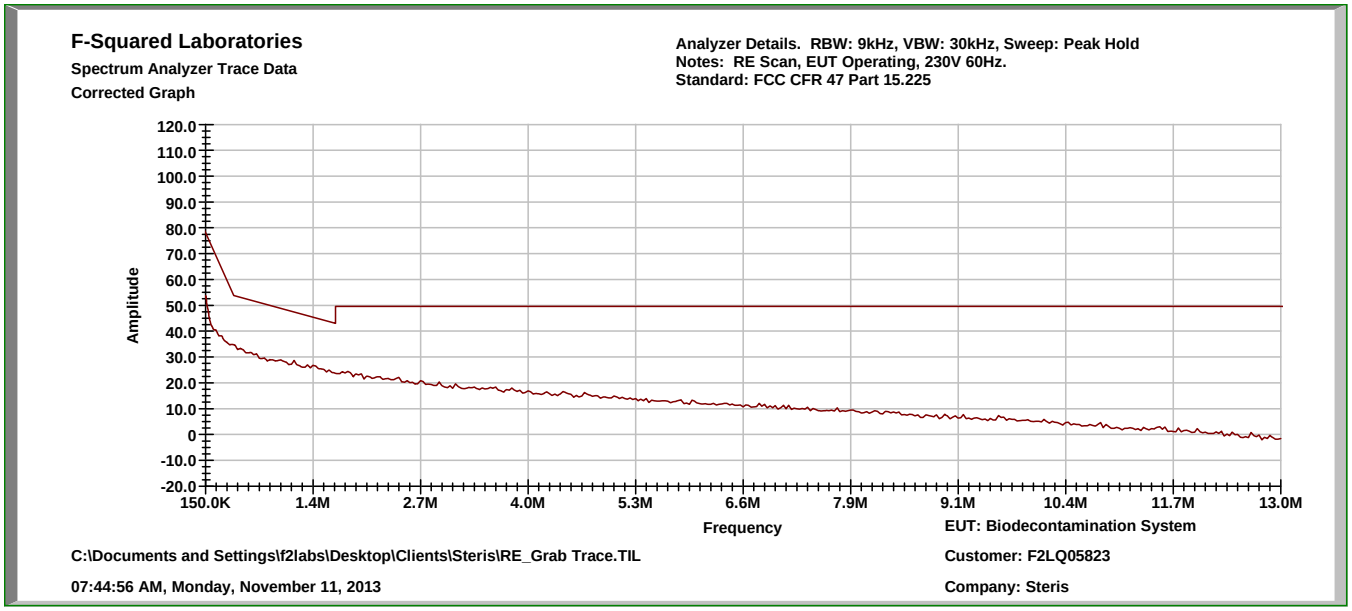
The EUT was tested at a distance of 1 meter. The emissions were maximized by rotating the table and raising/lowering the antenna mounted on a 4 meter mast. Cable and peripheral positions were also varied to produce maximum emissions. Both horizontal and vertical polarities were measured. The output of the antenna was connected to the input of the receiver and emissions were measured in the range 9 kHz to 1 GHz. The values up to 1 GHz with a resolution bandwidth of 1, 9, and 120 kHz are quasi-peak readings made at 1 meter. The raw measurements were corrected to allow for antenna factor and cable loss.

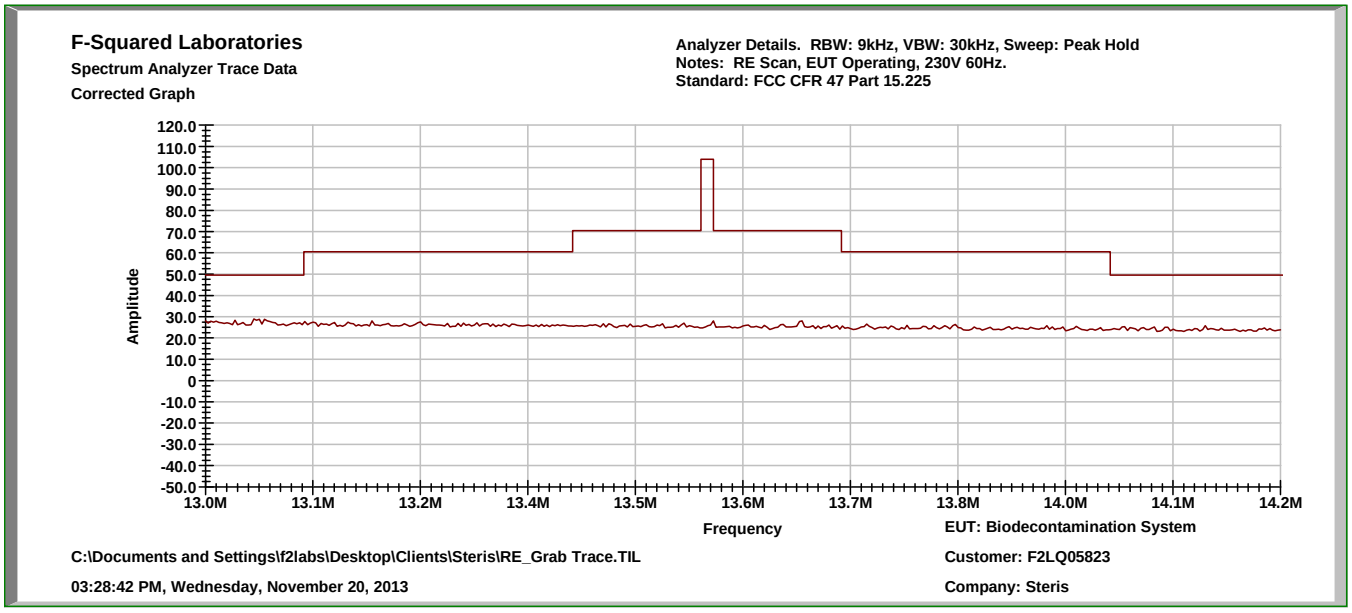
6.3 Test Data

Test Date:	Nov. 7-11, 2013	**Test Engineer:**	K. Littell
Standards:	CFR 47 Part 15.225 & 15.209	**Air Temperature:**	20.4ºC
		Relative Humidity:	47%

Results: No emissions were measurable over the ambient at 3m on a calibrated OATS and no emissions were measurable over the noise floor at 1m in a shielded chamber.






F-Squared Laboratories
Spectrum Analyzer Trace Data
Corrected Graph
Analyzer Details. RBW: 9kHz, VBW: 30kHz, Sweep: Peak Hold
Notes: RE Scan, EUT Operating, 230V 60Hz.
Standard: FCC CFR 47 Part 15.225
Amplitude
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
13.0M
13.1M
13.2M
13.4M
13.5M
13.6M
13.7M
13.8M
14.0M
14.1M
14.2M
Frequency
EUT: Biodecontamination System
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Customer: F2LQ05823
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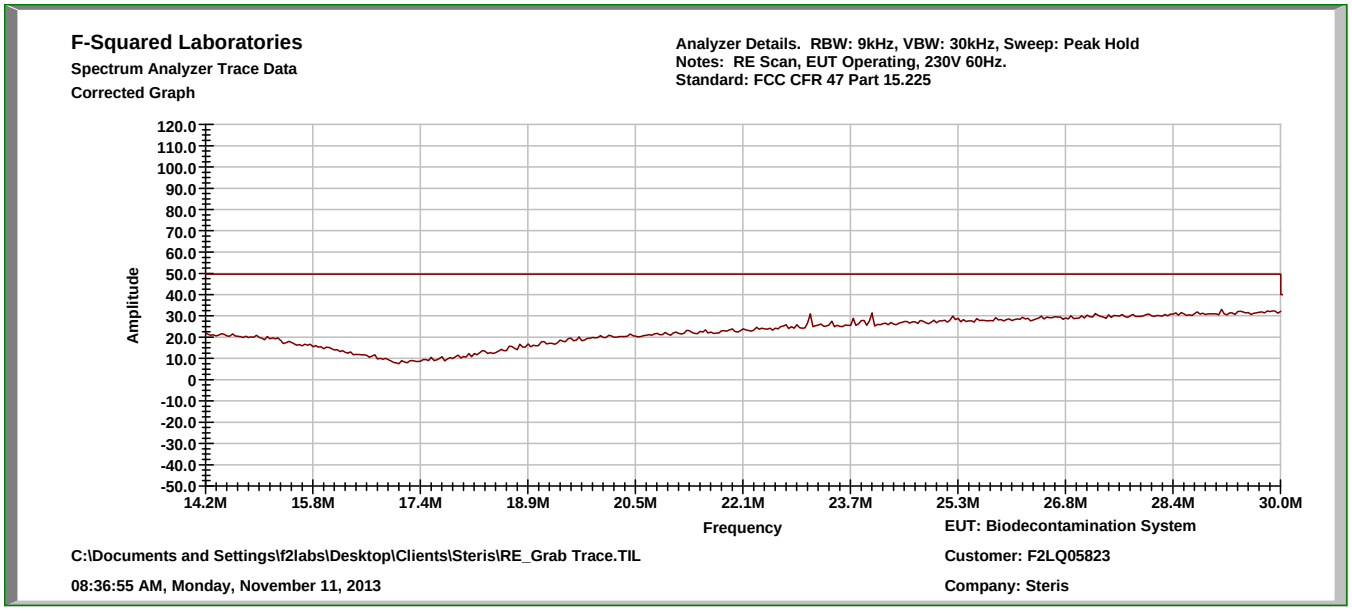
Company: Steris


F-Squared Laboratories
Spectrum Analyzer Trace Data
Corrected Graph
Analyzer Details. RBW: 9kHz, VBW: 30kHz, Sweep: Peak Hold
Notes: RE Scan, EUT Operating, 230V 60Hz.
Standard: FCC CFR 47 Part 15.225
Amplitude
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
-30.0
-40.0
-50.0
14.2M
15.8M
17.4M
18.9M
20.5M
22.1M
23.7M
25.3M
26.8M
28.4M
30.0M
Frequency
EUT: Biodecontamination System
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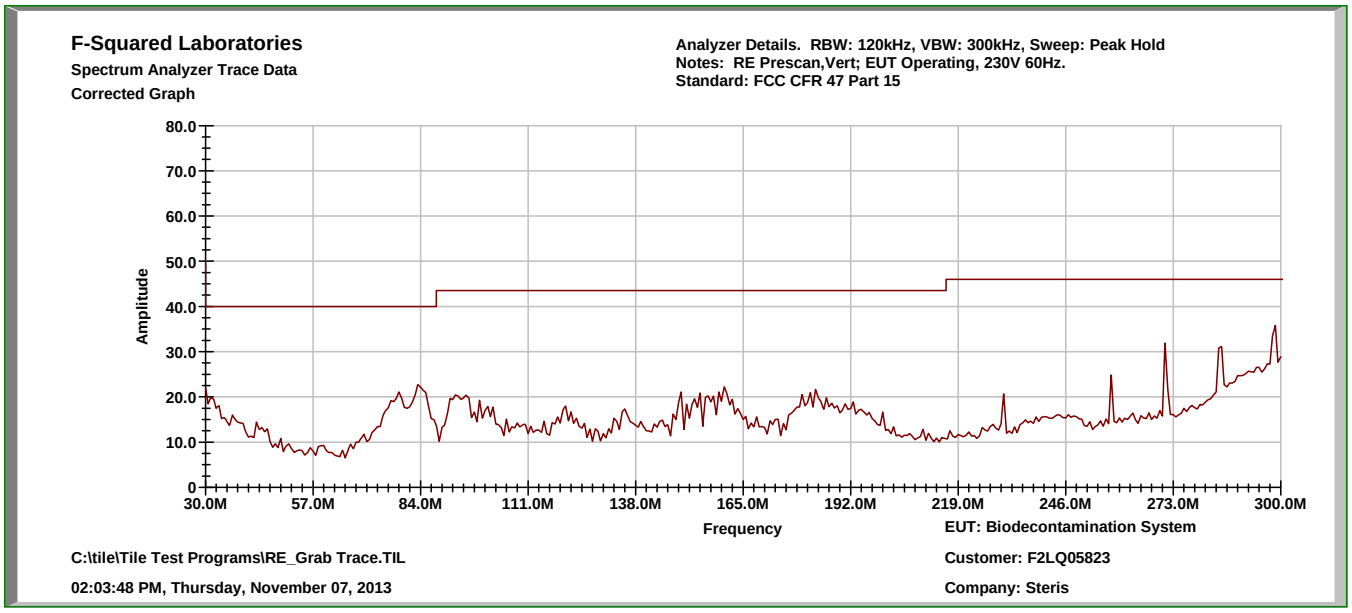
Company: Steris


F-Squared Laboratories
Spectrum Analyzer Trace Data
Corrected Graph
Analyzer Details. RBW: 120kHz, VBW: 300kHz, Sweep: Peak Hold
Notes: RE Prescan,Vert; EUT Operating, 230V 60Hz.
Standard: FCC CFR 47 Part 15
Amplitude
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
30.0M
57.0M
84.0M
111.0M
138.0M
165.0M
192.0M
219.0M
246.0M
273.0M
300.0M
Frequency
EUT: Biodecontamination System
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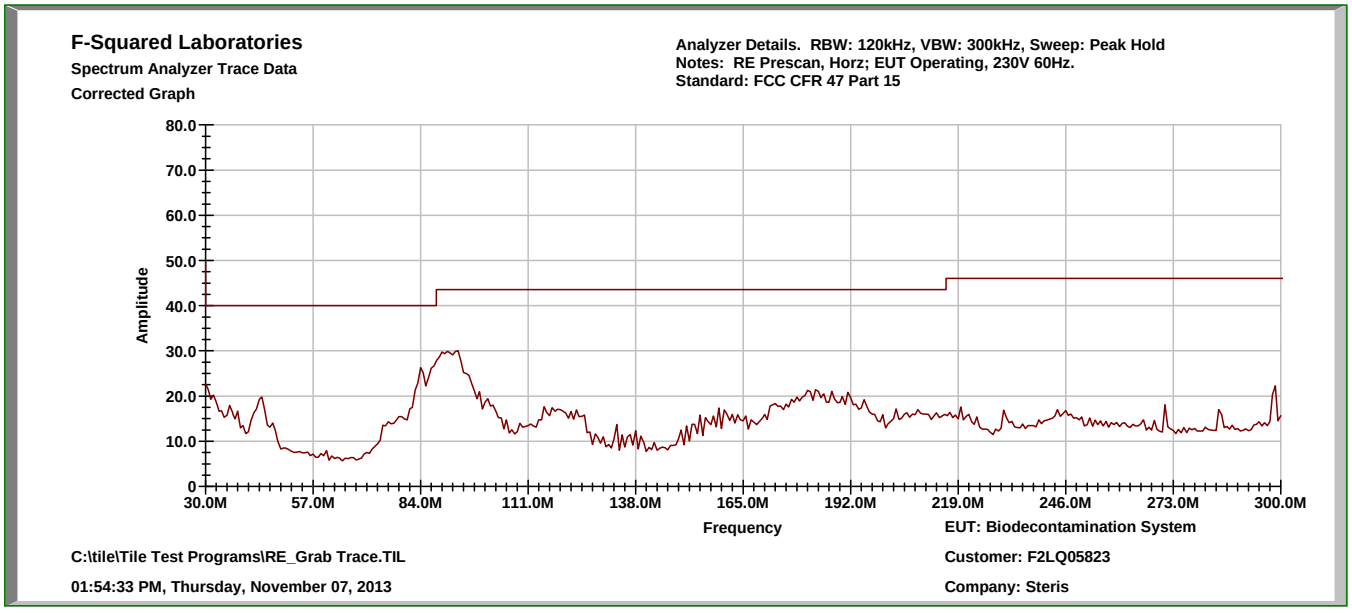
02:03:48 PM, Thursday, November 07, 2013
Company: Steris


F-Squared Laboratories
Spectrum Analyzer Trace Data
Corrected Graph
Analyzer Details. RBW: 120kHz, VBW: 300kHz, Sweep: Peak Hold
Notes: RE Prescan, Horz; EUT Operating, 230V 60Hz.
Standard: FCC CFR 47 Part 15
Amplitude
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
30.0M
57.0M
84.0M
111.0M
138.0M
165.0M
192.0M
219.0M
246.0M
273.0M
300.0M
Frequency
EUT: Biodecontamination System
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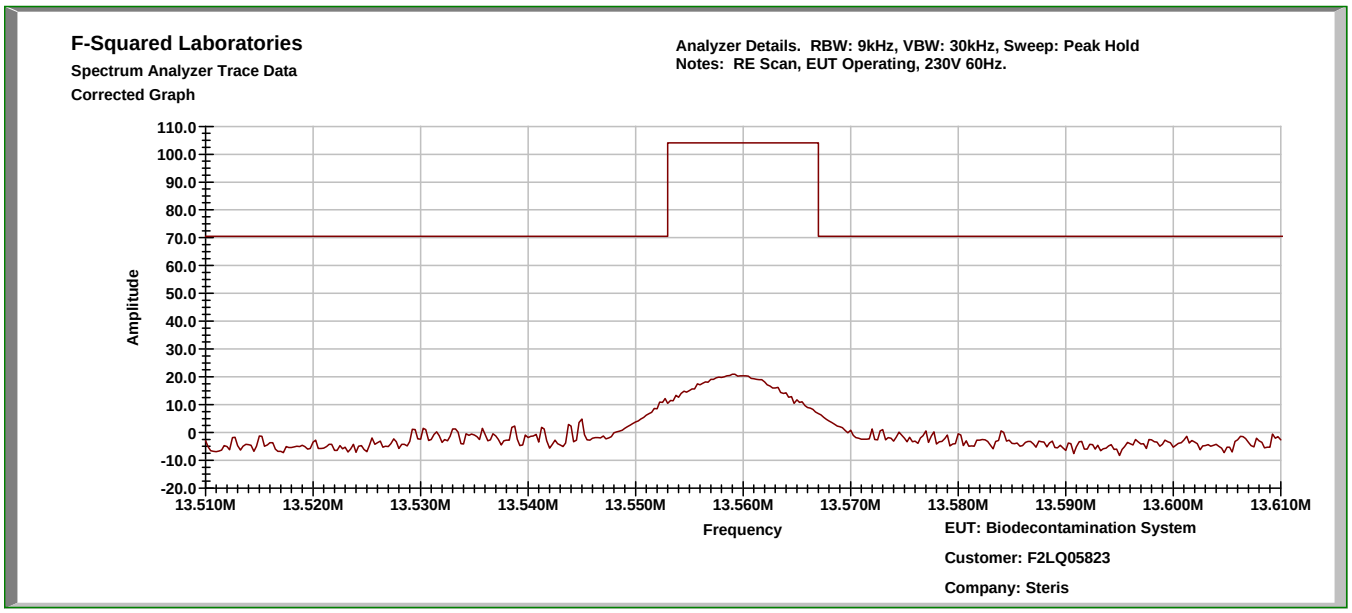
Company: Steris



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Bandwidth (kHz)	Polarity	Corr. (dB)	Margin
13.550000	18.2	104.0	9.000	-	3.1	-85.8
13.560000	20.3	104.0	9.000	-	3.1	-83.7
13.565000	19.4	104.0	9.000	-	3.1	-84.6
32.520000	33.1	40.0	120.000	V	20.0	-6.9
44.100000	26.5	40.0	120.000	H	11.3	-13.5
79.620000	33.7	40.0	120.000	V	9.3	-6.3
83.820000	29.5	40.0	120.000	V	8.9	-10.5
84.010000	21.8	40.0	120.000	H	8.9	-18.2
92.830000	26.0	43.5	120.000	H	9.9	-17.5
230.260000	18.9	46.5	120.000	V	11.8	-27.6
257.170000	20.3	46.5	120.000	V	12.9	-26.2
271.150000	28.2	46.5	120.000	V	14.6	-18.3
284.710000	25.3	46.5	120.000	V	14.8	-21.2
298.310000	22.8	46.5	120.000	V	14.6	-23.7
298.750000	23.5	46.5	120.000	H	14.5	-23.0

7 FCC PART 15.207 – AC MAINS CONDUCTED EMISSIONS

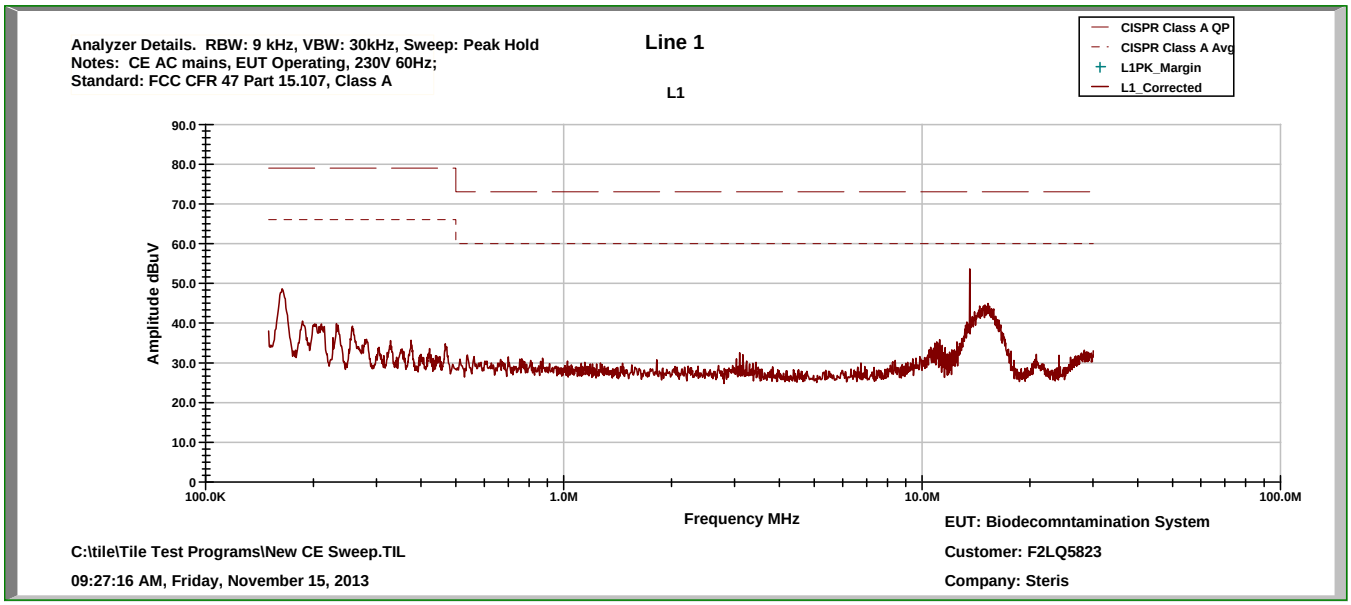
7.1 Test Procedure

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.

7.2 Test Data

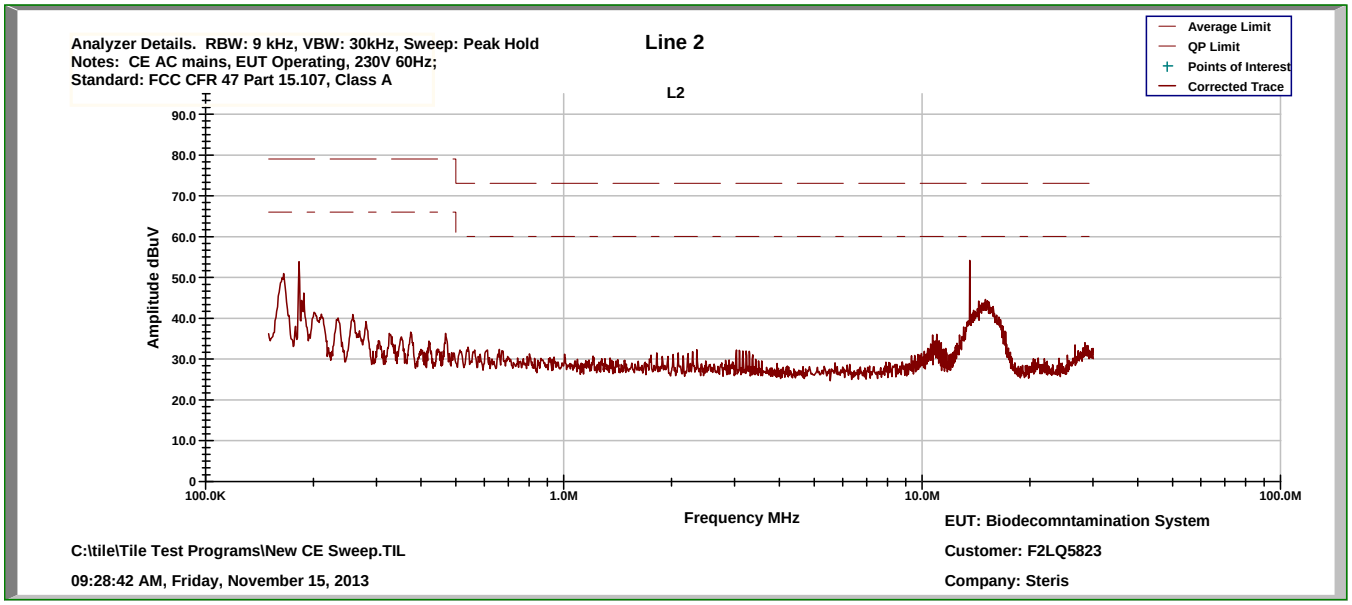
Test Date:	Nov. 15, 2013	**Test Engineer:**	K. Littell
Standards:	CFR 47 Part 15.207	**Air Temperature:**	21.2ºC
		Relative Humidity:	47%

Line 1



Top Discrete Measurements								
No.	**Conductor**	**Frequency (MHz)**	**Detector**	**Level (dBµV)**	**Adjustment (dB)**	**Results (dBµV)**	**Limit (dBµV)**	**Margin (dB)**
1	Line 1	0.160375	Quasi-Peak	35.48	11.0	46.48	79.00	-32.5
			Average	19.14	11.0	30.14	66.00	-35.9
2	Line 1	0.186	Quasi-Peak	34.62	11.0	45.62	79.00	-33.4
			Average	18.91	11.0	29.91	66.00	-36.1
3	Line 1	0.202994	Quasi-Peak	32.77	11.0	43.77	79.00	-35.2
			Average	16.12	11.0	27.12	66.00	-38.9
4	Line 1	0.245869	Quasi-Peak	30.49	11.0	41.49	79.00	-37.5
			Average	14.66	11.0	25.66	66.00	-40.3
5	Line 1	0.284369	Quasi-Peak	28.31	11.0	39.31	79.0	-39.7
			Average	12.79	11.0	23.79	66.0	-42.2
6	Line 1	0.347	Quasi-Peak	25.11	11.0	36.11	79.0	-42.9
			Average	10.46	11.0	21.46	66.0	-44.5
7	Line 1	5.6875	Quasi-Peak	27.06	11.0	38.06	73.0	-34.9
			Average	18.94	11.0	29.94	60.0	-30.1
8	Line 1	13.56	Quasi-Peak	28.81	11.0	39.81	73.0	-33.2
			Average	22.73	11.0	33.73	60.0	-26.3

Line 2



Top Discrete Measurements								
No.	**Conductor**	**Frequency (MHz)**	**Detector**	**Level (dBµV)**	**Adjustment (dB)**	**Results (dBµV)**	**Limit (dBµV)**	**Margin (dB)**
1	Line 2	0.160375	Quasi-Peak	37.14	11.0	48.14	79.00	-30.9
			Average	21.9	11.0	32.90	66.00	-33.1
2	Line 2	0.186	Quasi-Peak	35.98	11.0	46.98	79.00	-32.0
			Average	19.16	11.0	30.16	66.00	-35.8
3	Line 2	0.202994	Quasi-Peak	35.1	11.0	46.10	79.00	-32.9
			Average	18.46	11.0	29.46	66.00	-36.5
4	Line 2	0.247125	Quasi-Peak	32.77	11.0	43.77	79.00	-35.2
			Average	18.31	11.0	29.31	66.00	-36.7
5	Line 2	0.29325	Quasi-Peak	30.45	11.0	41.45	79.0	-37.6
			Average	17.58	11.0	28.58	66.0	-37.4
6	Line 2	0.330	Quasi-Peak	27.11	11.0	38.11	79.0	-40.9
			Average	14.79	11.0	25.79	66.0	-40.2
7	Line 2	6.175	Quasi-Peak	25.31	11.0	36.31	73.0	-36.7
			Average	20.76	11.0	31.76	60.0	-28.2
8	Line 2	13.56	Quasi-Peak	29.14	11.0	40.14	73.0	-32.9
			Average	23.66	11.0	34.66	60.0	-25.3

8 FCC PART 15.225(e) – Frequency Stability

8.1 Requirements

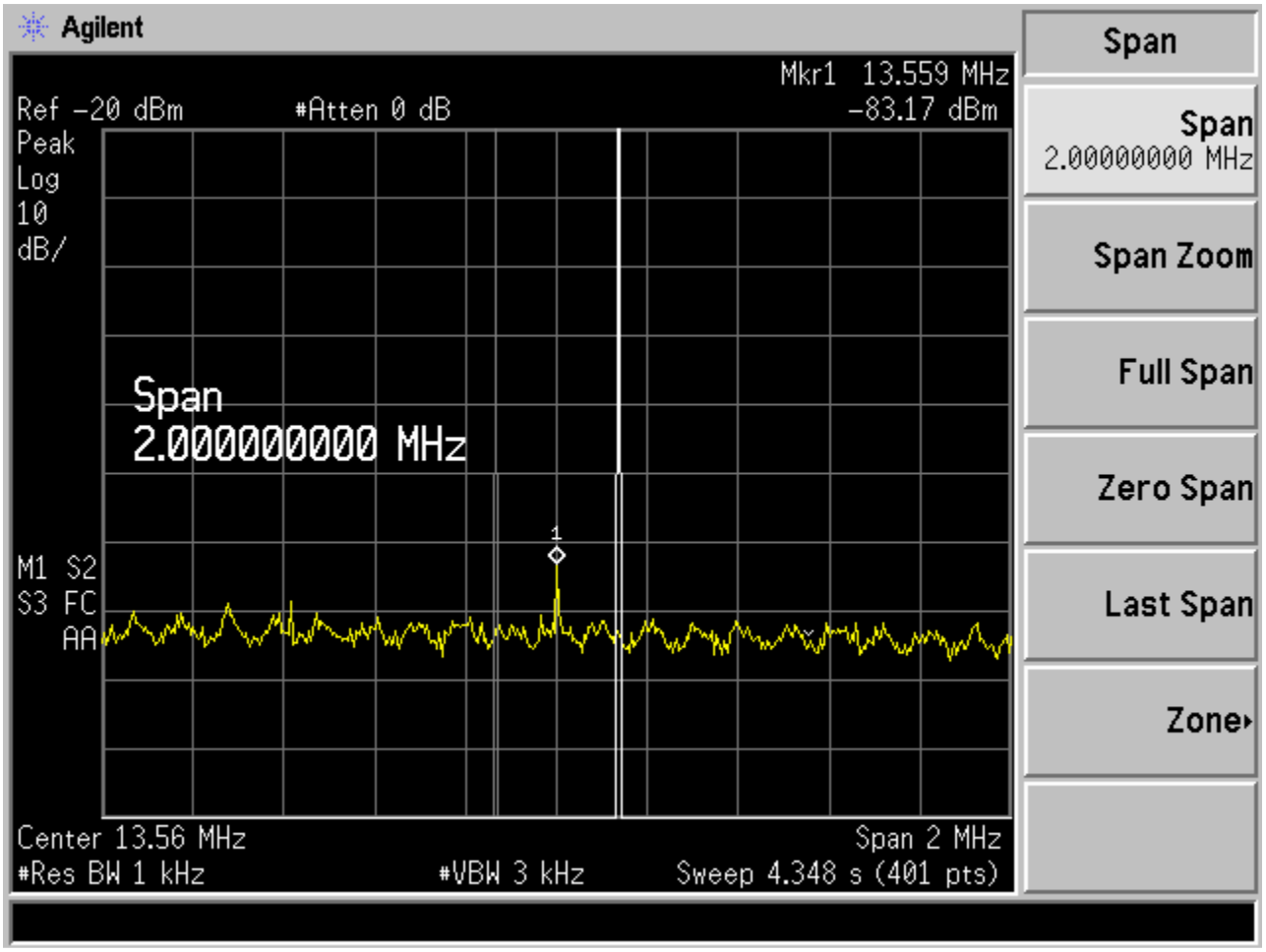
The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20ºC to +50 ºC at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20ºC. For battery-operated equipment, the equipment tests shall be performed using a new battery.

Findings:

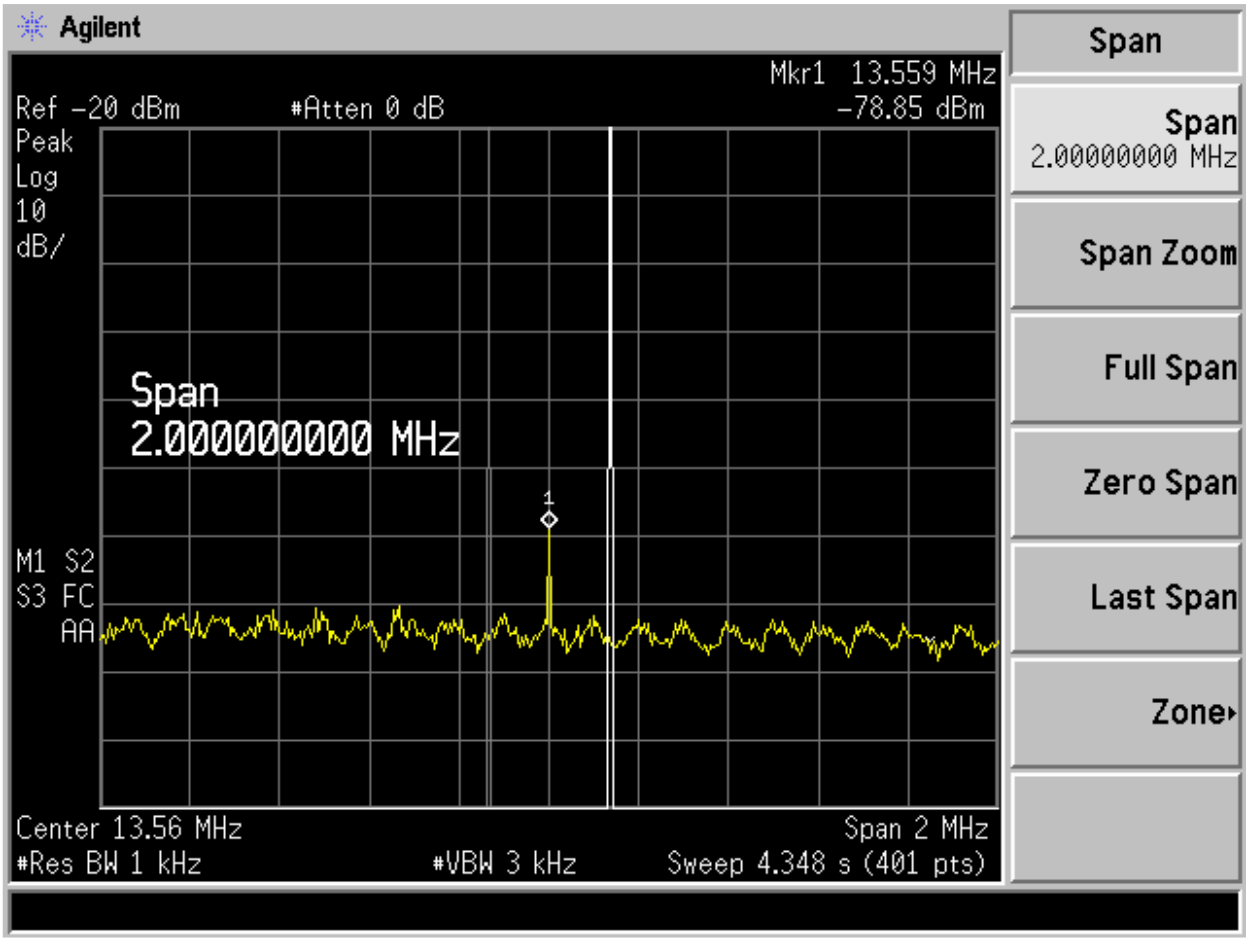
There was no signal present at 3 meters, so the antenna was moved in to 1 meter and still no signal was present. A near field probe was used and placed inside the EUT in order to get a signal to perform this test.

8.2 Test Data

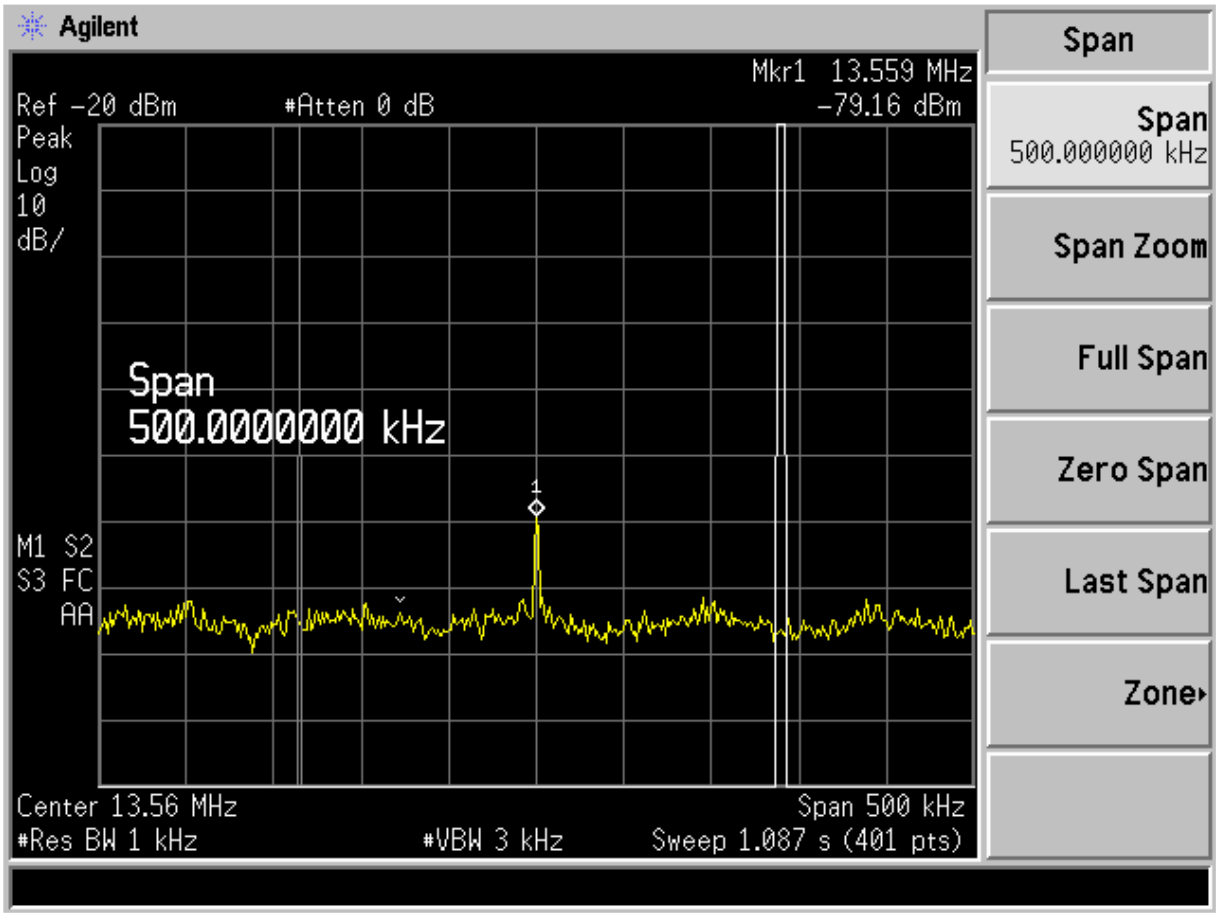
-20°C



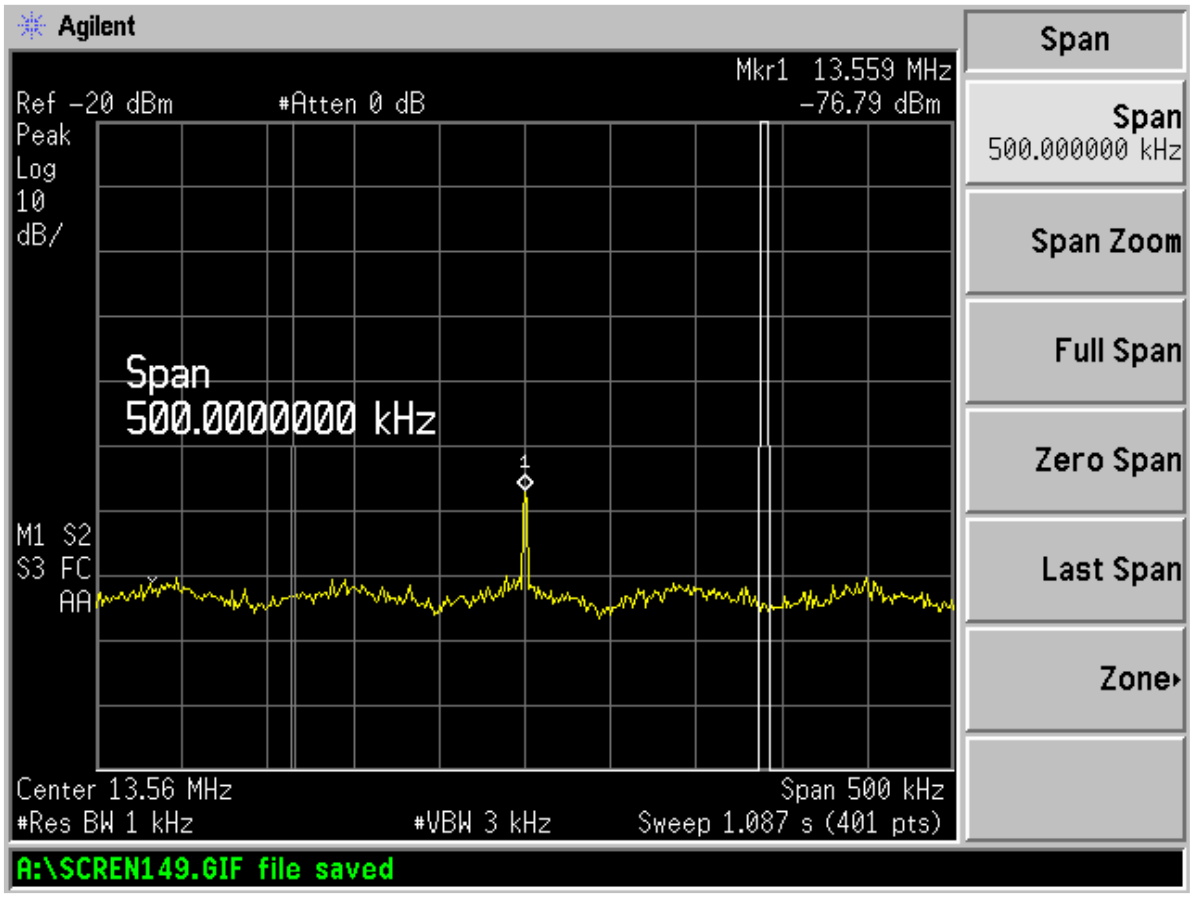
+50ºC


Agilent
Mkr1 13.559 MHz
Ref -20 dBm
#Atten 0 dB
-78.85 dBm
Peak
Log
10
dB/
Span
2.000000000 MHz
M1 S2
S3 FC
AA
Center 13.56 MHz
Span 2 MHz
#Res BW 1 kHz
#VBW 3 kHz
Sweep 4.348 s (401 pts)
Span
Span
2.00000000 MHz
Span Zoom
Full Span
Zero Span
Last Span
Zone

85% Supply Voltage at +20°C



115% Supply Voltage at +20ºC



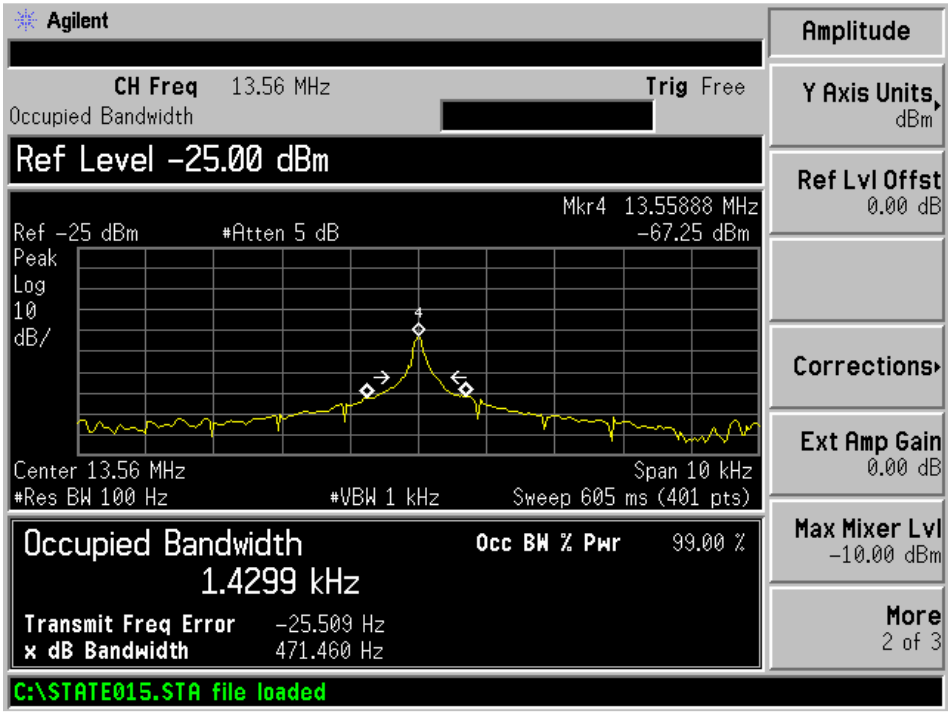
9 FCC PART 15.215(C) OCCUPIED BANDWIDTH

9.1 Requirements:

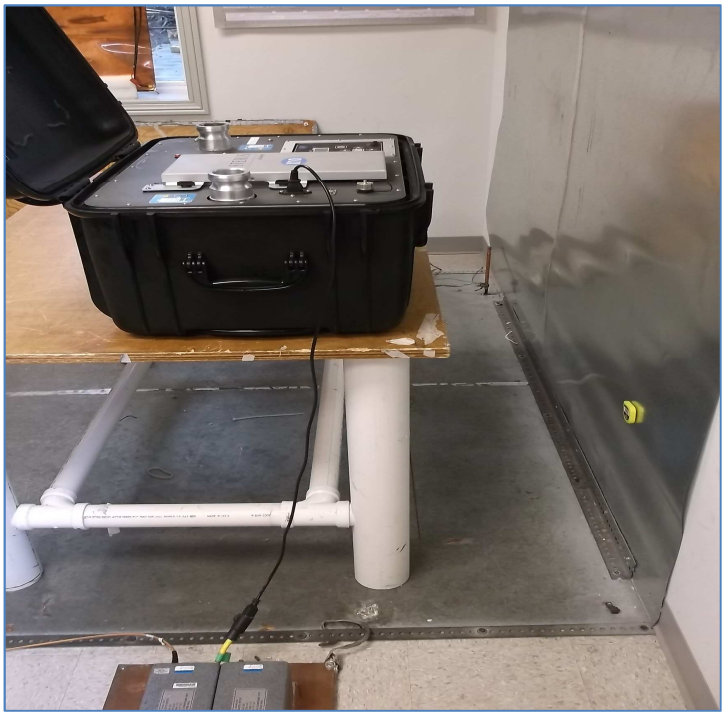
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in Subpart E of this part, must be designed to ensure that the 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Method:

Due to the extremely low field strength, the noise floor was higher than the emission from the EUT at all measurement distances including 1 meter and closer; therefore, a near field probe was used to increase the signal above the noise floor to be able to record the measurement. It was also necessary to reduce the RBW and Span in order to properly capture the signal.



10 PHOTOGRAPHS/EXHIBITS – PRODUCT PHOTOS, TEST SETUPS




Versa
50.0
SYSTEM
MODE
ENTER
RUN HOLD
Tenney


Versa Vent III
°C
°F
19.8
PROGRAM RUN
PROGRAM HOLD
PROGRAM SET
SP1 20.0
MODE
ENTER
RUN HOLD
SYSTEM
ON
OFF
CALIBRATED
Tenney
ENVIRONMENTAL
WILLIAMSPORT, PA


Versa Vent III
°C
°F
-20.2
PROGRAM RUN
PROGRAM HOLD
PROGRAM SET
SP1-20.0
MODE
ENTER
RUN HOLD
SYSTEM
ON
OFF
Tenney
ENVIRONMENTAL
WILLIAMSPORT, PA