

Certification Test Report

For a
CryMed Cryoablator Console

Manufacturer:

BIOMEC, Inc.
1771 East 30th Street
Cleveland, Ohio 44114
United States of America

Testing Laboratory:

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

The Console, model CTI-G2-50L, for the BIOMEC/Crymed Cryoablator, was tested and was found to comply with the requirements of the Federal Communications Commission outlined in the Federal Register CFR 47, Part 15.247.

The product was received on Nov. 21, 2005 and the testing was completed on Dec. 8, 2005.

Evaluation Conducted By:

Kenneth P. Klann
EMC Engineer

Report Reviewed By:

John Harrington
EMC Technical Manager



F-Squared Laboratories
14333 Kinsman Road
Burton, OH 44021
(440) 834-8926
Fax: (440) 834-8914

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1. ENGINEERING STATEMENT

This report has been prepared on behalf of BIOMECH, Inc. to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 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:

BIOMECH/Crymed Cryoablator Console
FCC ID: TUYCTIG250LC

1.2. Trade Name:

BIOMECH

1.3. Model:

BIOMECH/Crymed Cryoablator CTI-G2-50L Console

1.4. Power Supply:

AC 120V, 60 Hz

1.5. Applicable Rules:

CFR 47, Part 15.247, subpart C

1.6. Equipment Category:

Radio Transmitter-DTS

1.7. Antenna:

½ Wave Coaxial Dipole (external)
Centurion Model: NCR2400-SMA
Gain: 2.0 dBi

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 procedure of measurement of DTS operating under Section 15.247 dated March 2005. A list of the measurement equipment can be found in Section 2.

1.10. Uncertainty Budget:

Radiated Emission - Combined Uncertainty (+ or -) 2.24 dB; Expanded Uncertainty (+ or -) 4.48 dB

1.11. Engineering Certification:

The undersigned of this report hereby state that the measurements shown in this application were made in accordance with the procedures indicated, and that the energy emitted by this equipment was found to be within the limits. The undersigned assume full responsibility for the accuracy and completeness of these measurements and further state that, on the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15.247 of the FCC Rules under normal use and maintenance.

2. LIST OF MEASUREMENT INFORMATION

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due Date
Thermohygrometer	Oakton	32230-80	001	June 7, 2006
OATS	Compliance Labs	N/A	001	Aug. 24, 2006
Receiver	Rohde & Schwarz	Display, EASI-0-804-8932-52; RF Unit, ESMI-RF 1032-5640-53	84982/015; 849152/005	Mar. 31, 2006
Horn Antenna	Emco	3115	9809-5580	Apr. 6, 2006
Pre-Amplifier	Hewlett Packard	83006A	310A00500	Oct. 20, 2006
Transient Limiter	Hewlett Packard	11947A	3107A03325	Oct. 6, 2006
LISN 2	Solar	8028-50-TS-24-BNC	1128	Oct. 5, 2006
LISN 3	Solar	8028-50-TS-24-BNC	1129	Oct. 5, 2006
Active Loop Antenna	AH Systems Inc	SAS-562B	238	Jul 11, 2006
Antenna 2-OATS	Sunol Sciences	JB1	A101101	Apr. 15, 2006

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 Console Electronics Package was configured with Radio Test Firmware to permit frequency changes from low-mid-upper transmission channel using digital modulation (required for digital transmission systems) or unmodulated carrier. For RF antenna conducted tests, the Console Electronics Package antenna port was connected directly to the measurement equipment. For the conducted and radiated emissions tests, the electronics package was installed in the Console and fitted with the Centurion WCR2400-SMA antenna. All measurements were performed with the output power set to Level 7 (set in firmware). The highest emissions were recorded in the data tables.

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

The EUT was tested at a distance of 3.0 meters and 1.0 meter. The emissions were maximized by rotating the table and raising/lowering the antenna mounted on a 4.0 meter mast.* Both horizontal and vertical field components 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 25 GHz. The values up to 1GHz are quasi-peak readings made at 3.0 meters with a resolution bandwidth of 200 Hz from 9 kHz to 150 kHz, 9 kHz from 150 kHz to 30 MHz and 120 kHz from 30 MHz to 1 GHz. The measurements above 1GHz with a resolution bandwidth of 1 MHz are average readings at a distance of 1.0 meter. The raw measurements were corrected to allow for antenna factor, cable loss and preamplifier gain. All data for radiated emissions can be found in Section 11.2.

4. EUT CONFIGURATION AND CABLES

4.1. Equipment Under Test (EUT):

Device	Manufacturer	Model Number	Serial Number
Console	BIOMECH/CryMed	CTI-G2-50L	Sample 00003

4.2. Accessories (Support Equipment):

Device	Manufacturer	Model Number	Serial Number
Footswitch	Aquiline	9745	Not Specified

4.3. Cables:

Device	Length	Shielded
AC Mains	3.0 meters	No
Footswitch	3.6 meters	Yes

All cables were connected during spurious emissions testing.

Test Date:	Dec. 8, 2005	Test Engineer:	K. Klann
Standard:	FCC 47 CFR 15.247	Air Temperature:	17°-22° C
		Relative Humidity:	20%-35%

5. FCC PART 15.403(f) – DIGITAL MODULATION

Product Description:

The Transmitter in the Console Electronics Package is a digital transmission system (DTS) based on the Cypress CYWUSB6934. Digital modulation (GFSK) was applied in single frequency mode for all tests except the FCC Part 15.247(c) Radiated Emissions Test for Harmonics/Spurs performed on the Open Area Test Site (OATS). FCC Part 15.247(c) measurements on the OATS utilized continuous wave (CW) operation.

6. FCC PART 15.31(m) – OPERATING FREQUENCIES

Number of Operating Frequencies:

The Console Transmitter normally operates on frequencies selected between Channels 10-70 (60 channels total),* extending from 2.410-2.470 GHz in the 2.400-2.4835 GHz band.

*As defined by firmware for the Cypress CYWUSB6934 Chip Set.

7. FCC PART 15.207(a) – POWER LINE CONDUCTED EMISSIONS

7.1. Requirements:

The Console power supply operating the incorporated DTS Transmitter shall not exceed the limits below when measured using procedures of ANSI C63.4.

Frequency of Emission (MHz)	Conducted Emissions Limit (db μ V)	
	Quasi-Peak	Average
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5.0	56	48
5.0 – 30.0	60	50

*Decreasing with the logarithm of frequency.

7.2. Results:

The measured power line conducted emissions are shown in Figures 1 and 2. These measurements are peak readings. Quasi-peak and average measurements of the highest emissions are presented in the tables that follow.

Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dB μ V)	Adjustment (dB)	Results (dB μ V)	Limit (dB μ V)	Margin (dB)
1	Line 1	0.150	Quasi-Peak	39.4	11.0	50.4	66.0	-15.6
			Average	33.3	11.0	44.3	56.0	-11.7
2	Line 1	0.197	Quasi-Peak	29.5	11.0	40.5	63.7	-23.2
			Average	25.6	11.0	36.6	53.7	-17.1
3	Line 1	0.246	Quasi-Peak	25.2	11.0	36.2	61.9	-25.7
			Average	22.8	11.0	33.8	51.9	-18.1
4	Line 1	6.443	Quasi-Peak	23.0	11.0	34.0	60.0	-26.0
			Average	22.4	11.0	33.4	50.0	-16.6
5	Line 1	9.098	Quasi-Peak	14.9	11.0	25.9	60.0	-34.1
			Average	7.8	11.0	18.8	50.0	-31.2
6	Line 1	11.264	Quasi-Peak	21.5	11.0	32.5	60.0	-27.5
			Average	18.4	11.0	29.4	50.0	-20.6

No.	Conductor	Frequency (MHz)	Detector	Level (dB μ V)	Adjustment (dB)	Results (dB μ V)	Limit (dB μ V)	Margin (dB)
1	Line 2 (N)	0.150	Quasi-Peak	38.3	11.0	49.3	66.0	-16.7
			Average	31.5	11.0	42.5	56.0	-13.5
2	Line 2 (N)	0.197	Quasi-Peak	30.2	11.0	41.2	63.7	-22.5
			Average	25.4	11.0	36.4	53.7	-17.3
3	Line 2 (N)	0.246	Quasi-Peak	24.0	11.0	35.0	61.9	-26.9
			Average	21.7	11.0	32.7	51.9	-19.2
4	Line 2 (N)	6.443	Quasi-Peak	27.6	11.0	38.6	60.0	-21.4
			Average	24.7	11.0	35.7	50.0	-14.3
5	Line 2 (N)	11.654	Quasi-Peak	21.0	11.0	32.0	60.0	-28.0
			Average	10.8	11.0	21.8	50.0	-28.2
6	Line 2 (N)	14.999	Quasi-Peak	17.6	11.0	28.6	60.0	-31.4
			Average	11.3	11.0	22.3	50.0	-27.7

Based on these measurements, the Console incorporating the DTS Transmitter meets FCC Part 15.207(a) requirements for suppression of conducted emissions.

8. FCC PART 15.247(a)(2) – BANDWIDTH

8.1. Requirements:

The 6dB bandwidth shall be greater than 500 kHz.

Bandwidth measurements were made at the low (channel 10-2.410 GHz), mid (channel 40-2.440 GHz) and upper (channel 70-2.470 GHz) frequencies with the spectrum analyzer impulse bandwidth set at 120 kHz (video bandwidth set at 300 kHz). The bandwidth was measured using the analyzer's marker function.

8.2. Results:

The measured 6dB bandwidth with the Console DTS Transmitter operating on the low channel (2.410 GHz) is 833 kHz (see spectral plot in Figure 3).

The 6dB bandwidth at the mid channel (2.440 GHz) is 839 kHz (see spectral plot in Figure 4).

Finally, the 6dB bandwidth at the upper channel (2.470 GHz) is 828 kHz (see spectral plot in Figure 5).

The measured 6dB bandwidths meet the FCC 500 kHz requirements. The Console DTS Transmitter meets the FCC Part 15.247(a)(2) bandwidth requirements.

9. FCC PART 15.247(b)(3) – POWER OUTPUT

The Console electronics package containing the DTS Transmitter was connected directly to the spectrum analyzer. The peak power output was measured.

9.1. Requirements:

The peak power output shall be 1 watt (30 dBm) or less.

Power output measurements were made at the low (channel 10-2.410 GHz), mid (channel 40-2.440 GHz) and upper (Channel 70-2.470 GHz) frequencies, with the spectrum analyzer impulse bandwidth set at 1 MHz (video bandwidth set at 3 MHz). The peak output level was measured using the spectrum analyzer's marker function.

9.2. Results:

The measured peak power output found with the Console DTS Transmitter operating on the low channel (2.410 GHz) is $105.23 \text{ dB}\mu\text{V} = -1.77 \text{ dBm} = 0.665 \text{ mW}$ (see plot in Figure 6).

The peak power output at the mid channel (2.440 GHz) is $104.80 \text{ dB}\mu\text{V} = -2.20 \text{ dBm} = 0.603 \text{ mW}$ (see plot in Figure 7).

Finally, the power output at the upper channel (2.470 GHz) is $104.24 \text{ dB}\mu\text{V} = -2.76 \text{ dBm} = 0.530 \text{ mW}$ (see plot in Figure 8).

The measured peak power output is less than the 1 watt limit. The Console DTS Transmitter meets FCC Part 15.247(b)(3) power requirements.

Varying the supply voltage between 85% and 115% of the nominal rated supply did not affect the peak power output.

10. FCC PART 15.247(b)(5) – RF SAFETY

The output power level (<1.0 mW) on the Console Transmitter coupled with the low gain antenna (2.0 dBi) ensures that the user and/or general public will not be exposed to radio frequency energy levels in excess of FCC guidelines, per OET Bulletin 65 Supplement C Edition 01-01 June 2001.

11. FCC Part 15.247(d) – SPURIOUS EMISSIONS, 9 kHz to 25 GHz

The following tests were performed to demonstrate compliance.

11.1. RF Antenna Conducted Test

The Console DTS Transmittal Antenna Port was directly connected to the spectrum analyzer.

11.1.1. Requirements:

All harmonics and spurs must be at least 20dB down from the highest emission level measured within the authorized band up through the tenth harmonic.

Spurious emissions measurements were made at the low (channel 10-2.410 GHz), mid (channel 40-2.440 GHz), and upper (channel 70-2.470 GHz) frequencies with the appropriate spectrum analyzer impulse bandwidth. Additionally, 20 dB down points were measured for the low and high channels to verify band edge compliance.

11.1.2. Results:

Low (channel 10-2.410 GHz) frequency spectral data plots are shown in figures 9-21. The data is summarized in the table below.

Console DTS Transmitter
Harmonics & Spurious Emissions: Low Frequency, Channel 10-2.410 GHz

Frequency (GHz)	Level (dBμV)	Harmonic Order	dB down from f_0
2.4100	103.86	f_0	-
4.8200	59.17	f_2	-44.69
7.2300	48.76	f_3	-55.10
9.6400	39.13	f_4	-64.73

Mid (channel 40-2.440 GHz) frequency spectral data plots are shown in figures 22-34. The data is summarized in the table below.

Console DTS Transmitter
Harmonics & Spurious Emissions: Mid Frequency, Channel 40-2.440 GHz

Frequency (GHz)	Level (dBμV)	Harmonic Order	dB down from f_0
2.440	103.07	f_0	-
4.880	59.09	f_2	-43.98
7.320	47.51	f_3	-55.56
9.760	39.25	f_4	-63.82

Upper (channel 70-2.470 GHz) frequency spectral data plots are shown in Figures 37-47. The data is summarized in the table below.

Console DTS Transmitter
Harmonics & Spurious Emissions: Upper Frequency, Channel 70-2.470 GHz

Frequency (GHz)	Level (dBμV)	Harmonic Order	dB down from f_0
2.470	102.49	f_0	-
4.940	55.61	f_2	-46.88
7.410	47.03	f_3	-55.46
9.880	40.45	f_4	-62.04

Lower band edge compliance measurement with the DTS Transmitter operating on the low frequency (channel 10, 2.410 GHz) yields a 20 dB down point of 2.408527 GHz. This is within the 2.4000-2.4835 GHz authorized band.

Upper band edge compliance measurement with the Console DTS Transmitter operating on the upper frequency (channel 70, 2.470 GHz) yields a 20 dB down point of 2.471427 GHz. This is within the 2.4000-2.4835 GHz authorized band.

The harmonics/spurs and band edge measurements demonstrate that all emissions outside the authorized band are suppressed by at least 20 dB. The Console DTS Transmitter meets FCC Part 15.247(c) requirements for conducted spurious emissions.

11.2. RADIATED EMISSIONS (Restricted Bands)

The Console DTS Transmitter was fitted with its Centurion WCR2400-SMA antenna and installed in the Console System cabinet/enclosure. Radiated emissions were measured on the Open Area Test Site (OATS). All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

11.2.1. Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).

11.2.2. Results:

The measurement results are contained in the tables on the following pages. Measurements were performed on the low, middle and upper frequencies with the transmitter unmodulated.

The Console with the DTS Transmitter meets FCC Part 15.209 restrictions on field intensity in the restricted bands. Hence, the Console DTS Transmitter satisfies FCC Part 15.247(c) regarding emissions in the restricted bands.

Console DTS Transmitter
Spurious Emissions (Restricted Bands): Low Frequency, Channel 10-2.410 GHz
Unmodulated Carrier, Power Output Setting = Level 7

Frequency (GHz)	Antenna Polarization	Reading @ 1m (dBμV)	Antenna Factor (dB)	Coax Factor (dB)	Preamp Gain (dB)	Emission @ 1m (dBμV/m)	Emission Extrapolated to 3m (dBμV/m) - (9.54dB)	Limit (dBμV/m)	Margin (dB)
4.820	H	33.4	32.8	7.6	28.0	45.8	36.3	54.0	-17.7
4.820	V	28.2	32.8	7.6	28.0	40.6	31.1	54.0	-22.9

All measurements were performed at 1 MHz impulse resolution bandwidth using linear average detector.

Console DTS Transmitter
Spurious Emissions (Restricted Bands): Mid Frequency, Channel 40-2.440 GHz
Unmodulated Carrier, Power Output Setting = Level 7

Frequency (GHz)	Antenna Polarization	Reading @ 1m (dBμV)	Antenna Factor (dB)	Coax Factor (dB)	Preamp Gain (dB)	Emission @ 1m (dBμV/m)	Emission Extrapolated to 3m (dBμV/m) - (9.54dB)	Limit (dBμV/m)	Margin (dB)
4.880	H	33.5	32.9	7.6	28.0	46.0	36.5	54.0	-17.5
4.880	V	29.2	32.9	7.6	28.0	41.7	32.2	54.0	-21.8
7.320	H	23.2*	35.6	10.5	28.0	41.3	31.8	54.0	-22.2
7.320	V	23.2*	35.6	10.5	28.0	41.3	31.8	54.0	-22.2

**Noise floor of measurement system.*

All measurements were performed at 1 MHz impulse resolution bandwidth using linear average detector.

Console DTS Transmitter

Spurious Emissions (Restricted Bands): Upper Frequency, Channel 70-2.470 GHz
Unmodulated Carrier, Power Output Setting = Level 7

Frequency (GHz)	Antenna Polarization	Reading 1m (dBμV)	Antenna Factor (dB)	Coax Factor (dB)	Preamp Gain (dB)	Emission @ 1m (dBμV/m)	Emission Extrapolated to 3m (dBμV/m) - (9.54dB)	Limit (dBμV/m)	Margin (dB)
4.940	H	33.0	33.1	7.6	28.0	45.7	36.2	54.0	-17.8
4.940	V	28.0	33.1	7.6	28.0	40.7	31.2	54.0	-22.8
7.410	H	23.4*	35.8	10.5	28.0	41.7	32.2	54.0	-21.8
7.410	V	23.4*	35.8	10.5	28.0	41.7	32.2	54.0	-21.8

**Noise floor of measurement system.*

All measurements were performed at 1 MHz impulse resolution bandwidth using linear average detector.

12. FCC PART 15.247(d) – PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

12.1. Requirements:

The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

Power spectral density measurements were performed at a resolution bandwidth of 3 kHz (video bandwidth set at 3 MHz). The peak spectral densities were measured at the low (channel 10-2.410 GHz), mid (channel 40-2.440 GHz) and upper (channel 70-2.470 GHz) frequencies.

12.2. Results:

The spectral plots of the PSD at the low channel are shown in figures 48 and 49. The peak spectral densities were found at:

Frequency (GHz)	Peak PSD (dBμV)	Peak PSD (dBm)
2.44096	93.25	-13.75
2.41005	103.61	-3.39
2.41055	93.30	-13.70

The spectral plots of the PSD at the mid channel are shown in figures 50 and 51. The peak spectral densities were found at:

Frequency (GHz)	Peak PSD (dBμV)	Peak PSD (dBm)
2.43955	92.84	-14.16
2.44004	103.28	-3.72
2.44055	92.24	-14.76

The plots of the PSD for the upper channel are shown in figures 52 and 53. The peak spectral densities were found at:

Frequency (GHz)	Peak PSD (dBμV)	Peak PSD (dBm)
2.46956	92.23	-14.77
2.47005	102.79	-4.21
2.47056	92.48	-14.52

The peak power spectral densities measured from the Console DTS Transmitter are less than the 8 dBm limit per FCC Part 15.247(d). The Console DTS Transmitter meets the requirements of FCC Part 15.247(d).

13. FIGURES – SPECTRAL DATA PLOTS

Figure 1: CryMed Console Power Line Conducted Emissions – Line 1

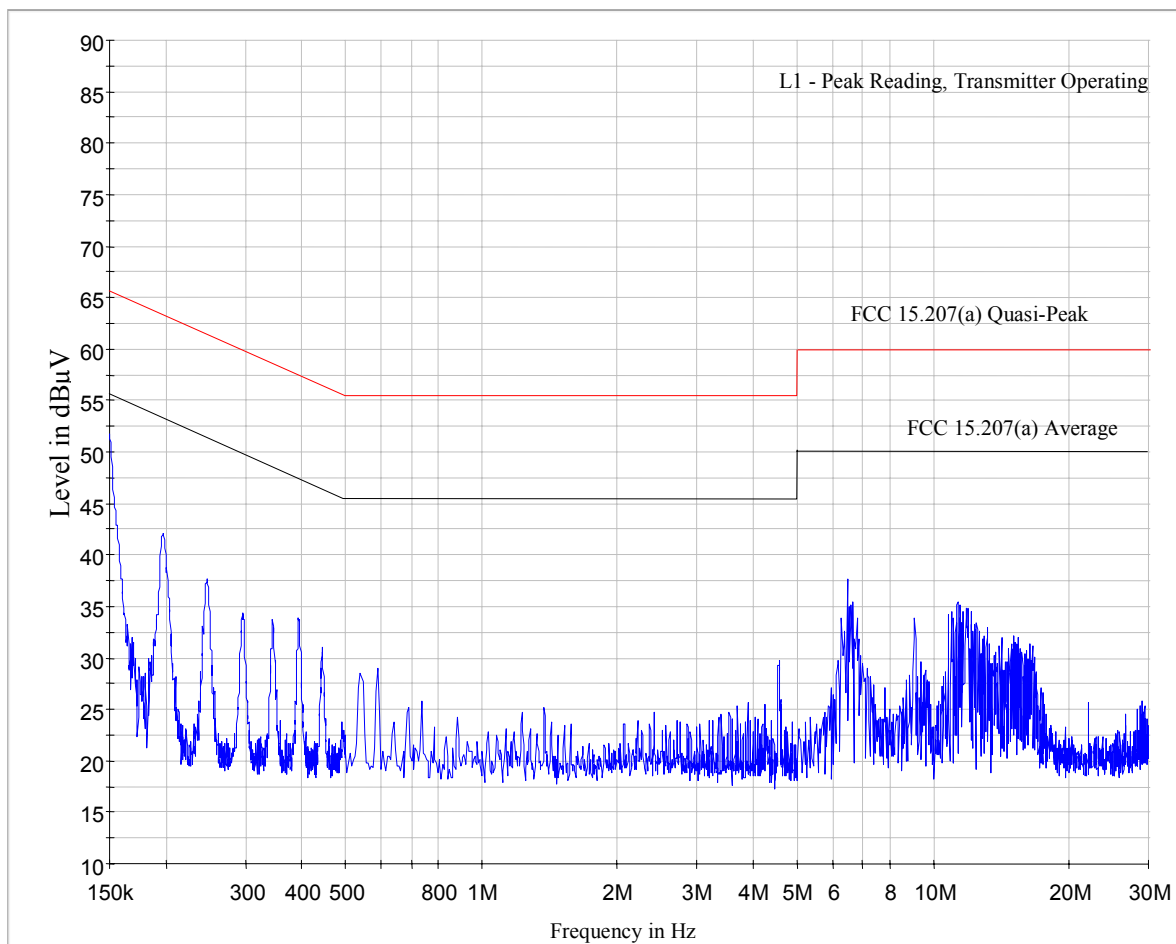


Figure 2: CryMed Console Power Line Conducted Emissions – Line 2 (N)

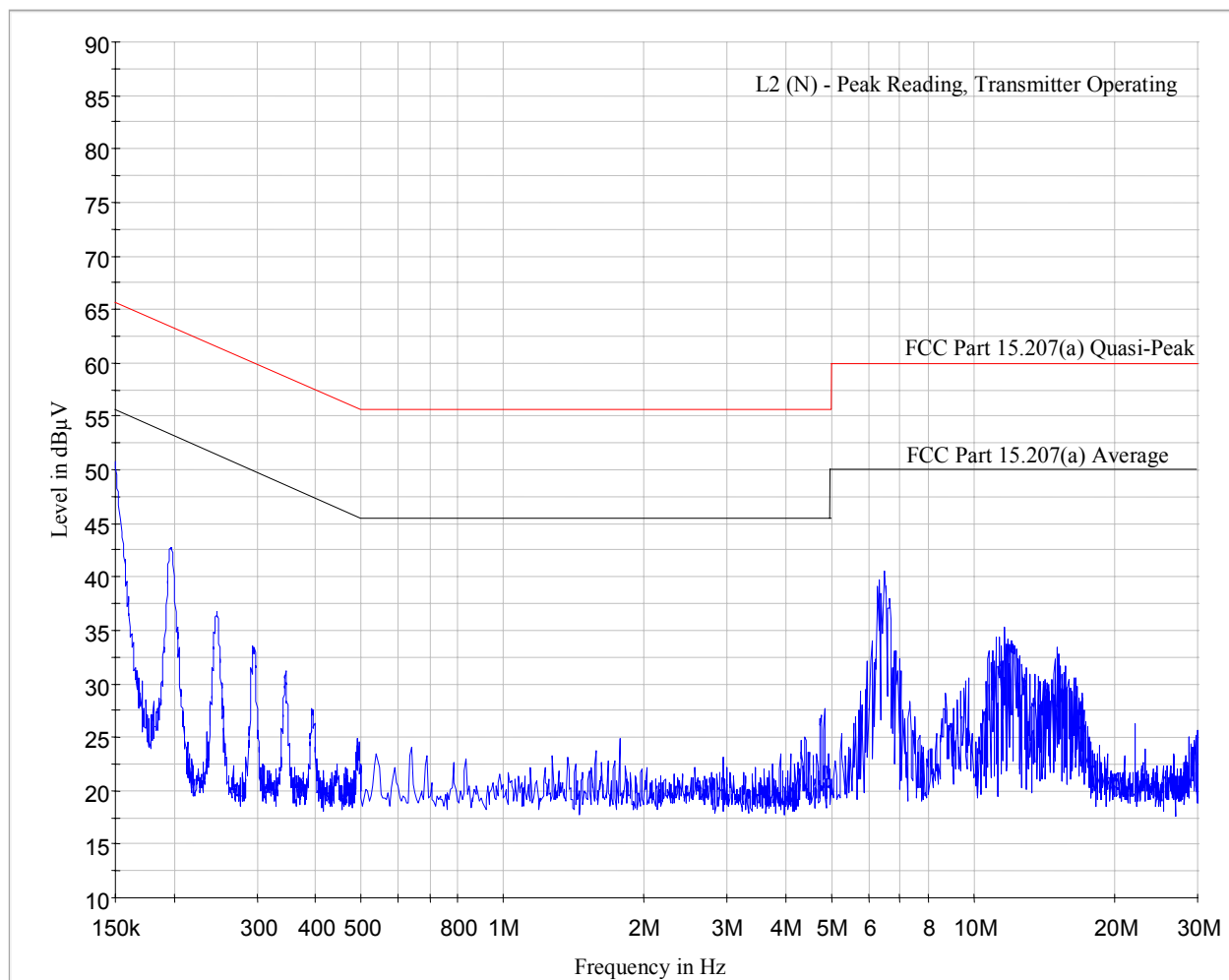


Figure 3: Occupied Bandwidth, Low Channel

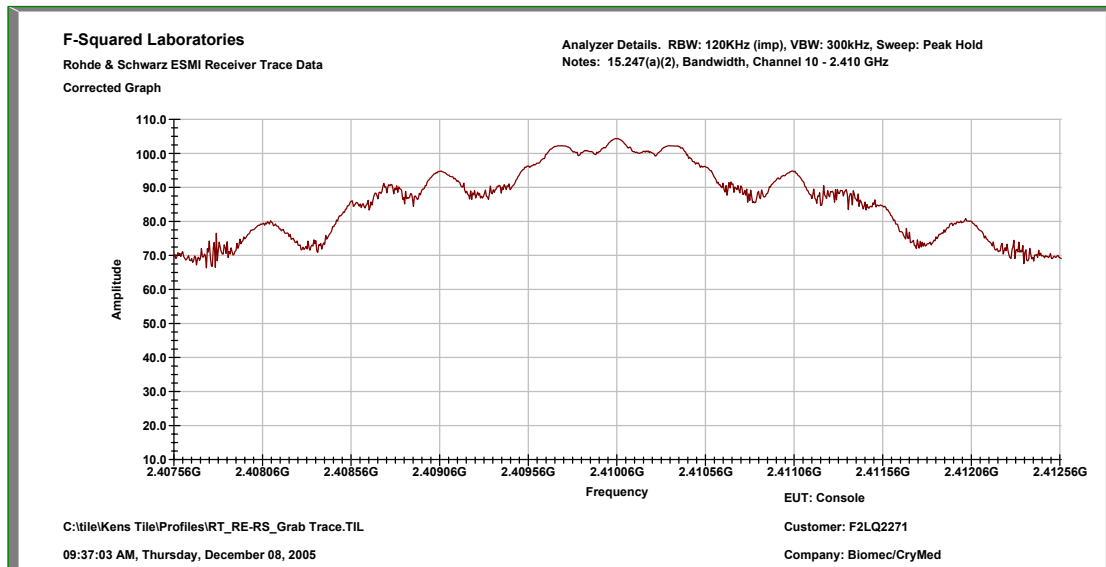


Figure 4: Occupied Bandwidth, Mid Channel

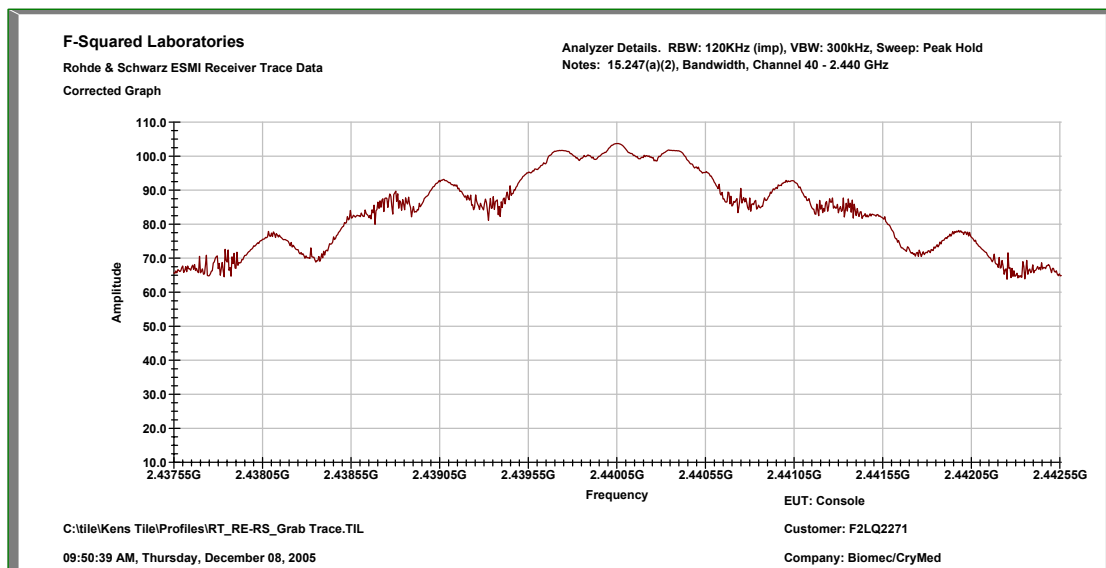


Figure 5: Occupied Bandwidth, Upper Channel

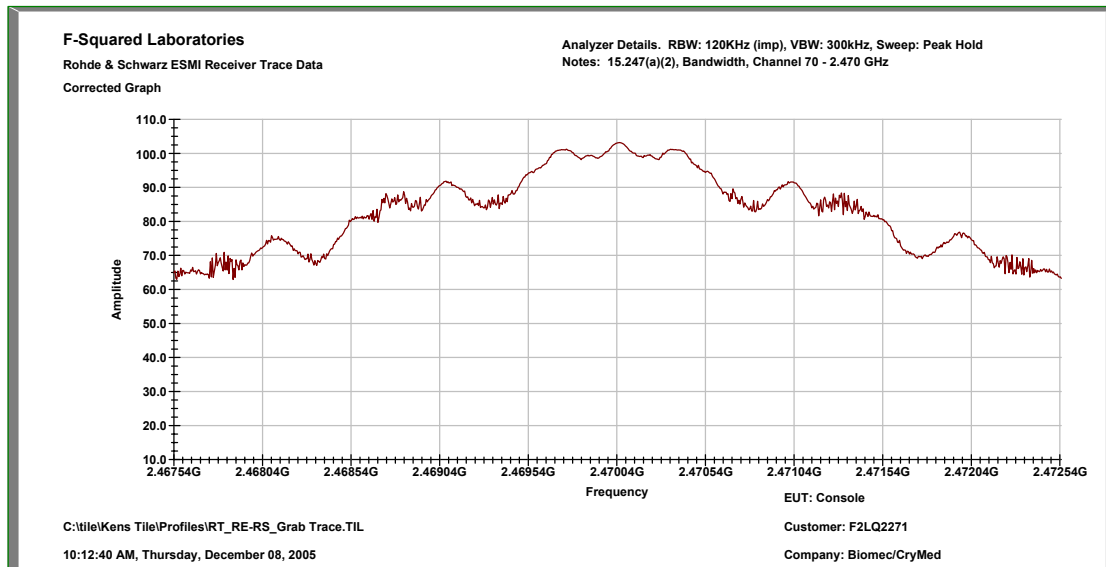


Figure 6: Peak Power Output, Low Channel

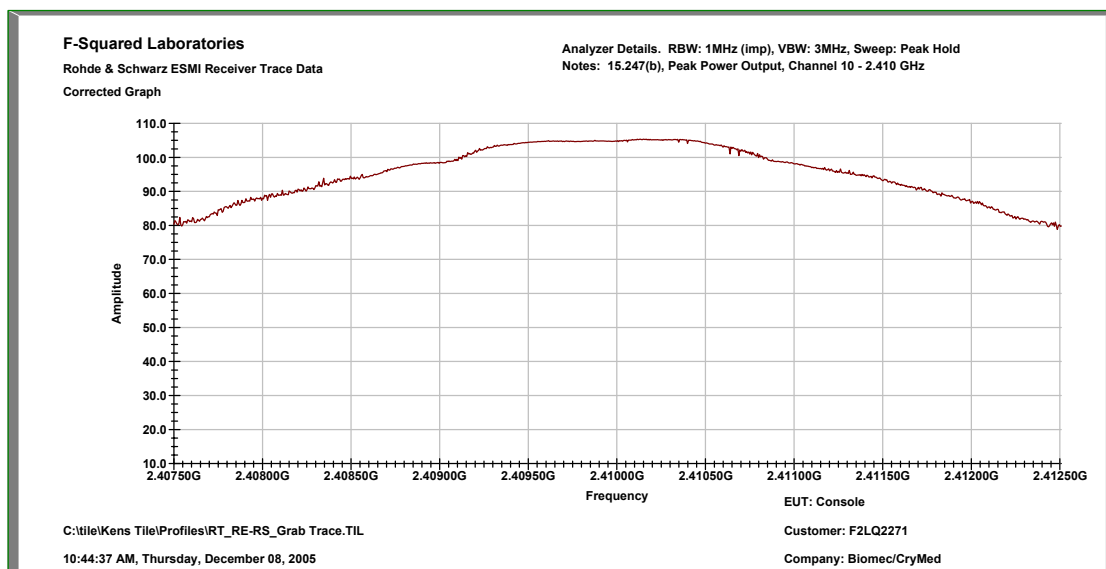


Figure 7: Peak Power Output, Mid Channel

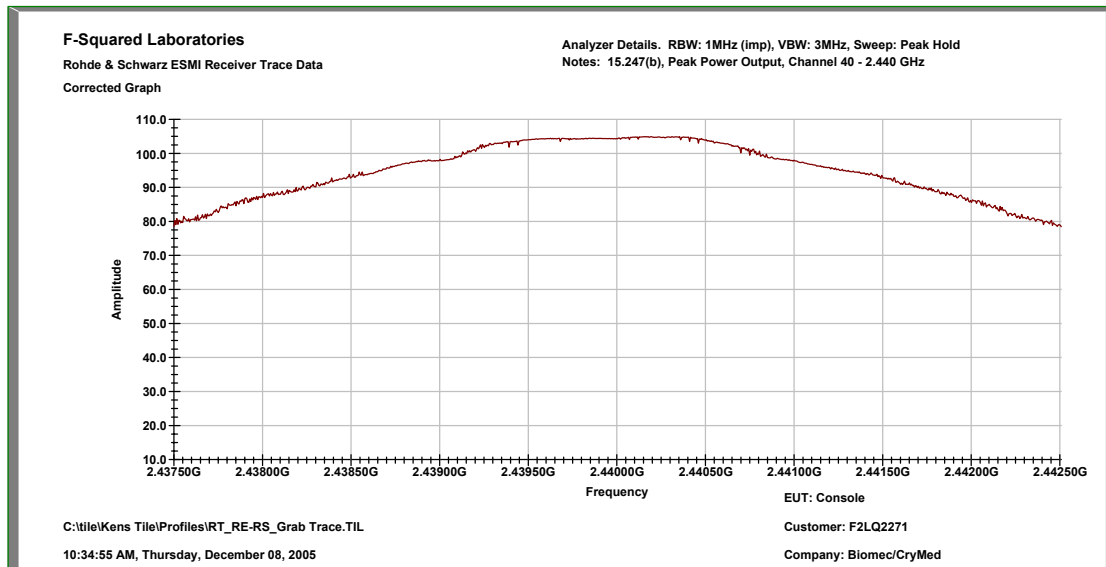


Figure 8: Peak Power Output, Upper Channel

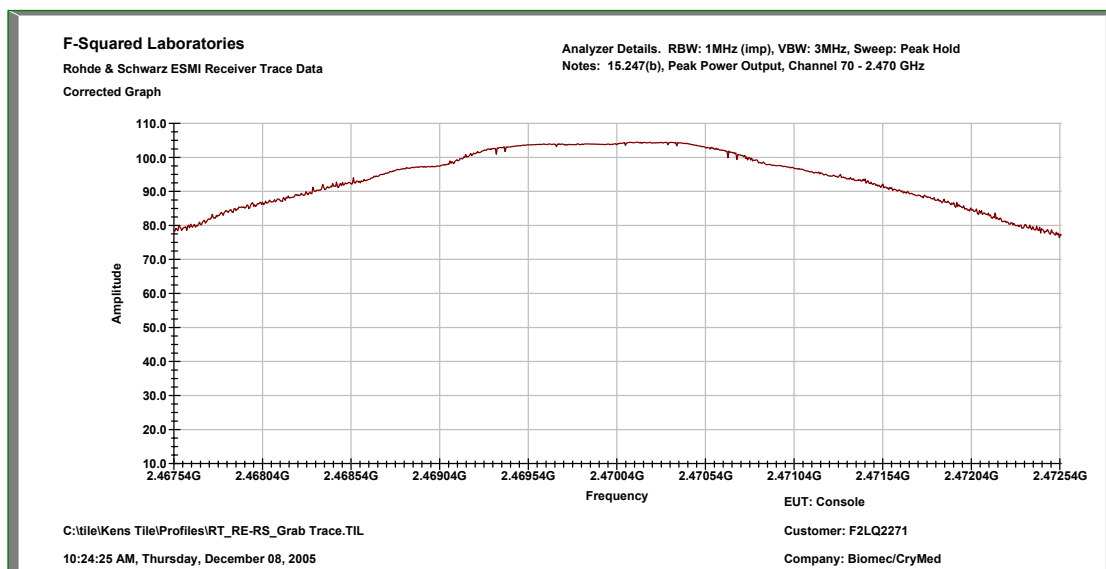


Figure 9: Harmonics & Spurious Emissions, Low Channel, 0-1 GHz

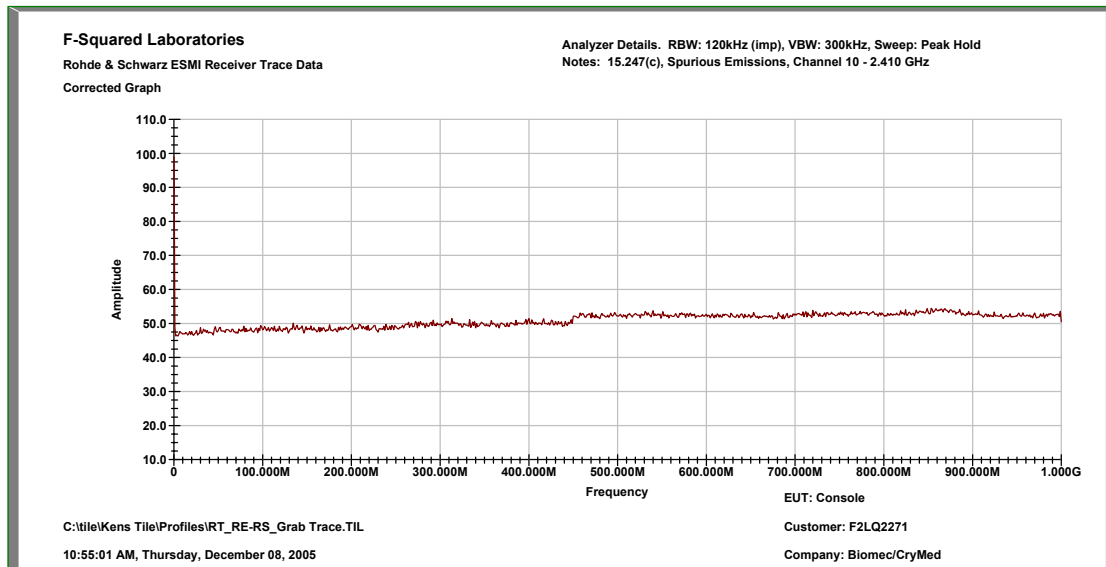


Figure 10: Harmonics & Spurious Emissions, Low Channel, 1-2 GHz

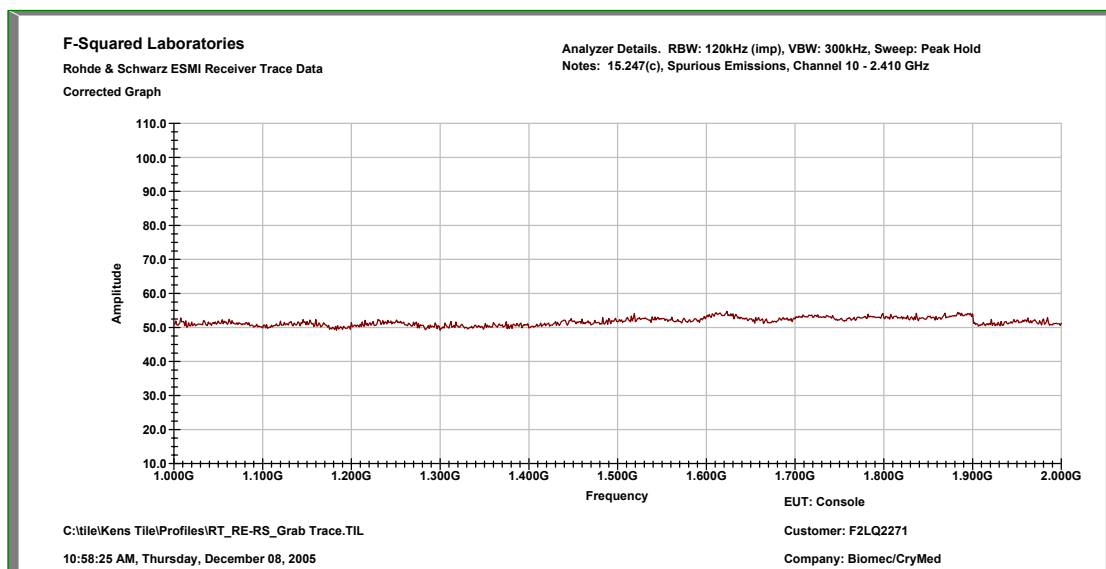


Figure 11: Harmonics & Spurious Emissions, Low Channel, 2-3 GHz

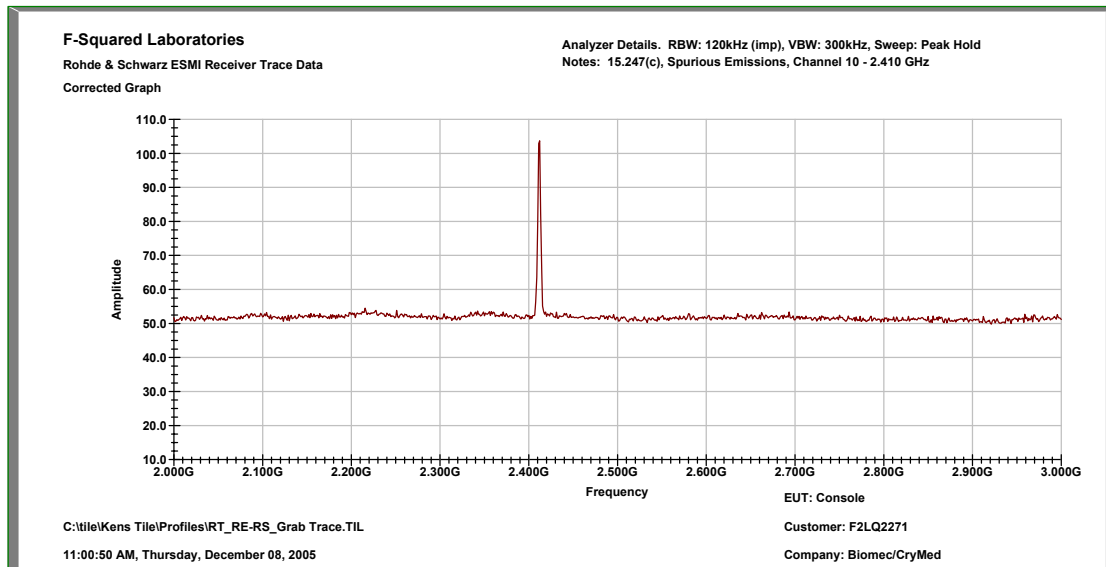


Figure 12: Harmonics & Spurious Emissions, Low Channel, 3-4 GHz

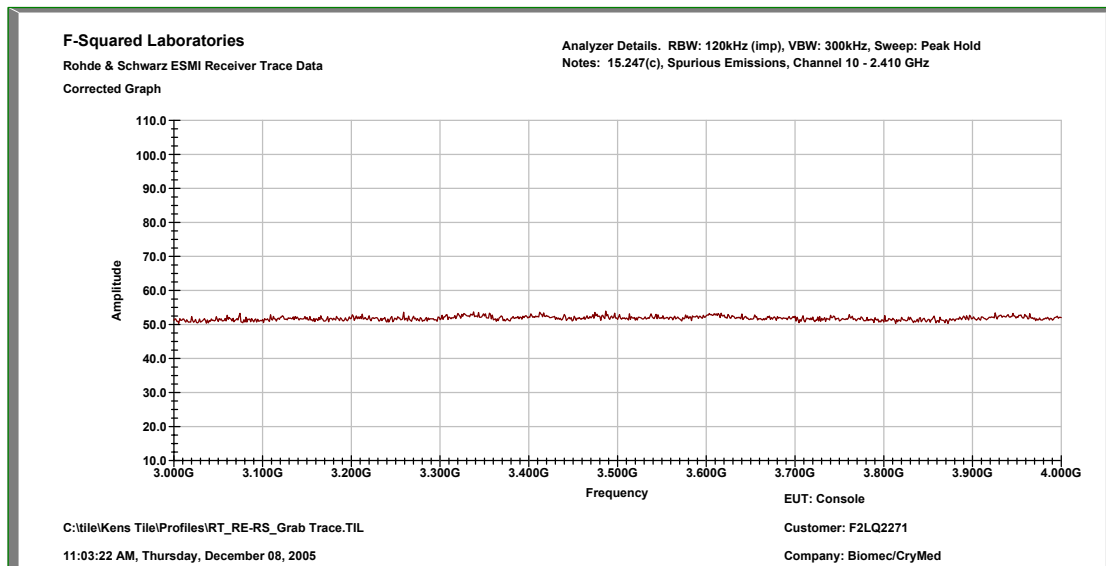


Figure 13: Harmonics & Spurious Emissions, Low Channel, 4-5 GHz

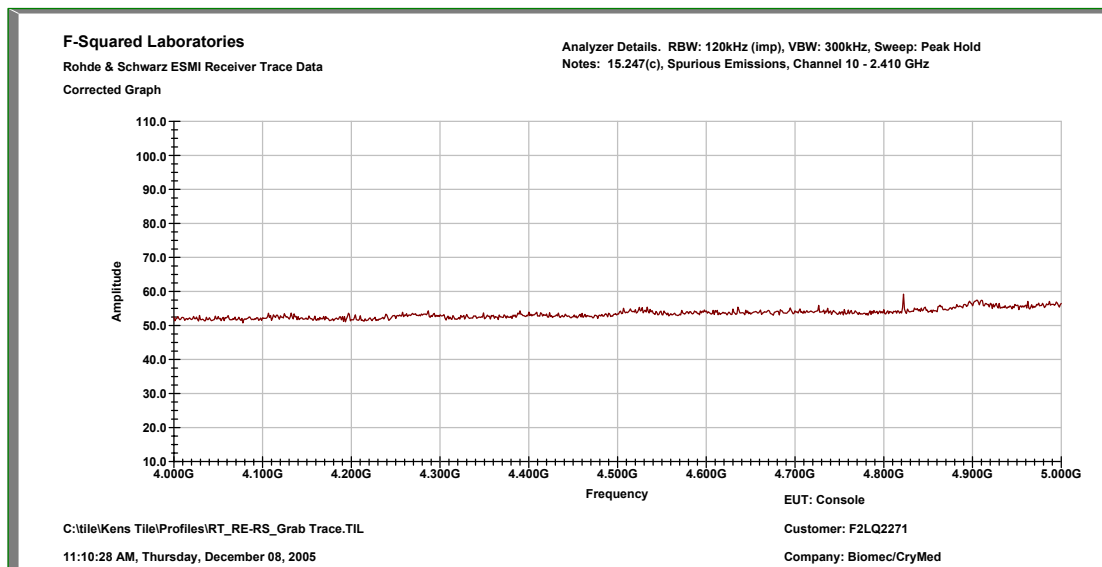


Figure 14: Harmonics & Spurious Emissions, Low Channel, 5-6 GHz

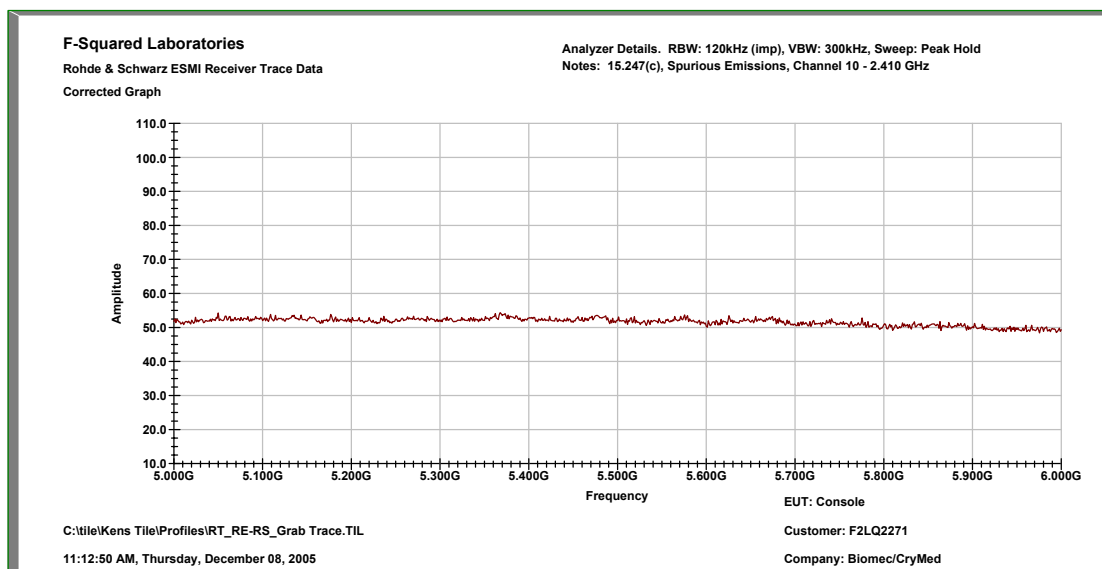


Figure 15: Harmonics & Spurious Emissions, Low Channel, 6-7 GHz

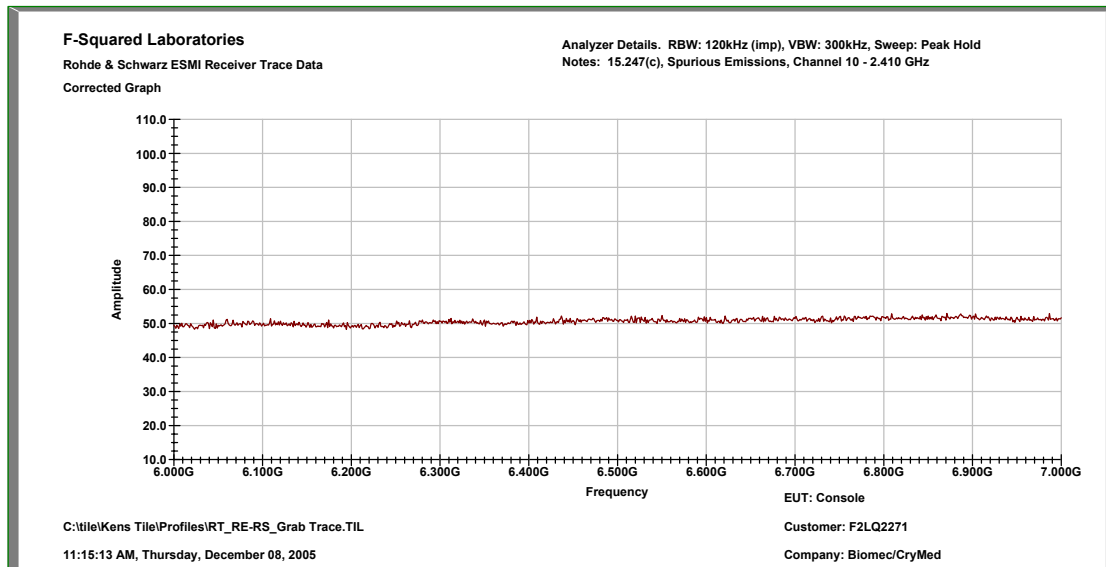


Figure 16: Harmonics & Spurious Emissions, Low Channel, 7-8 GHz

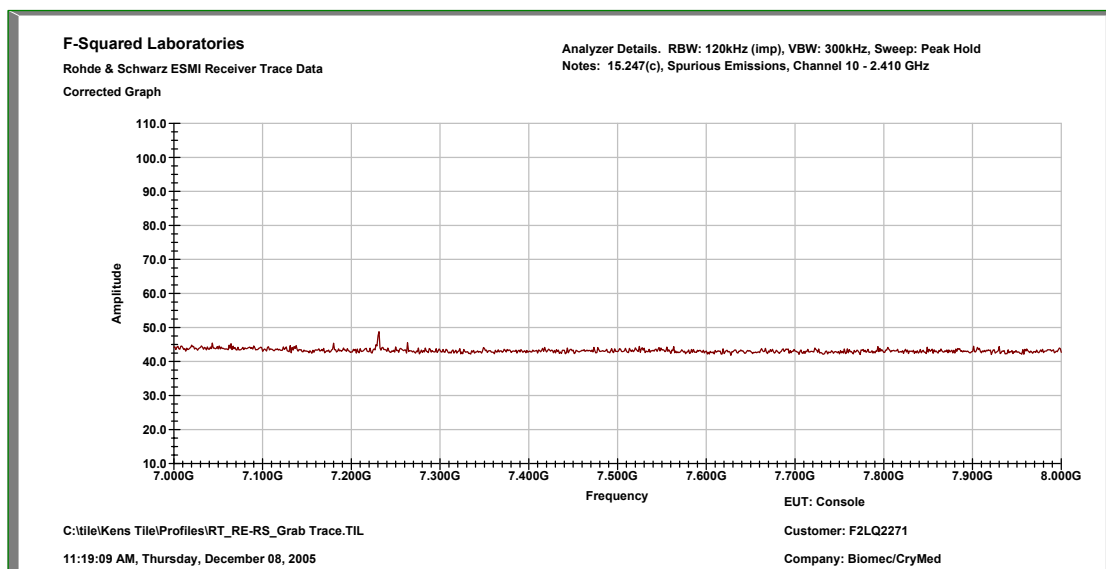


Figure 17: Harmonics & Spurious Emissions, Low Channel, 8-9 GHz

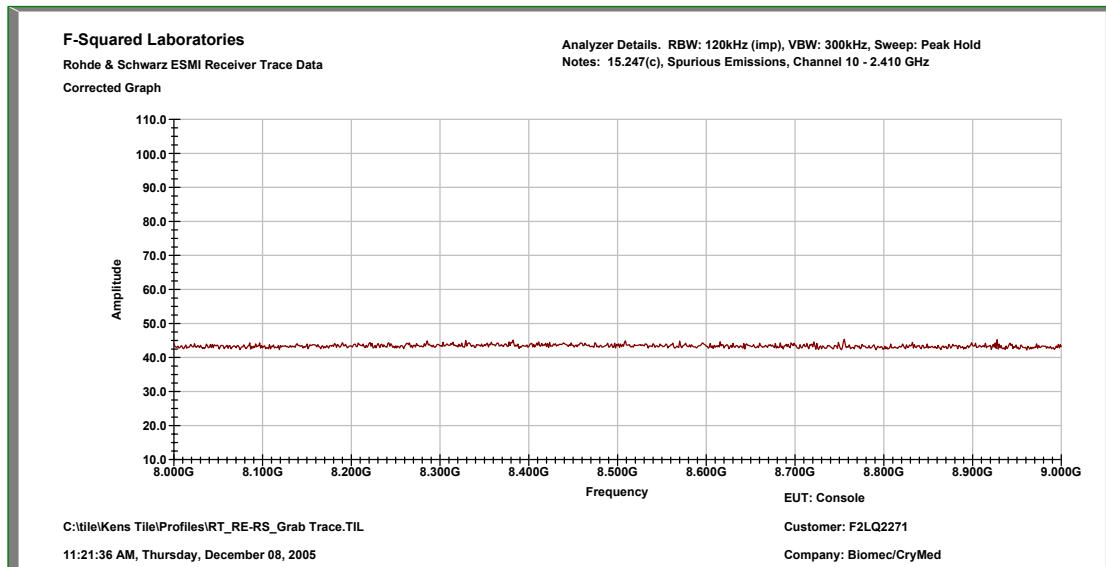


Figure 18: Harmonics & Spurious Emissions, Low Channel, 9-10 GHz

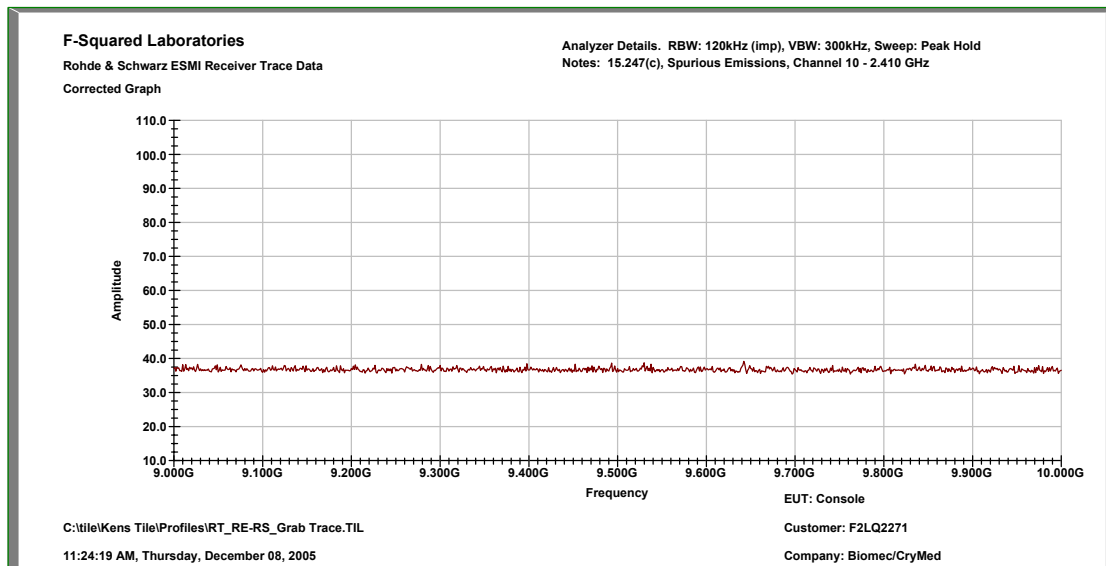


Figure 19: Harmonics & Spurious Emissions, Low Channel, 10-15 GHz

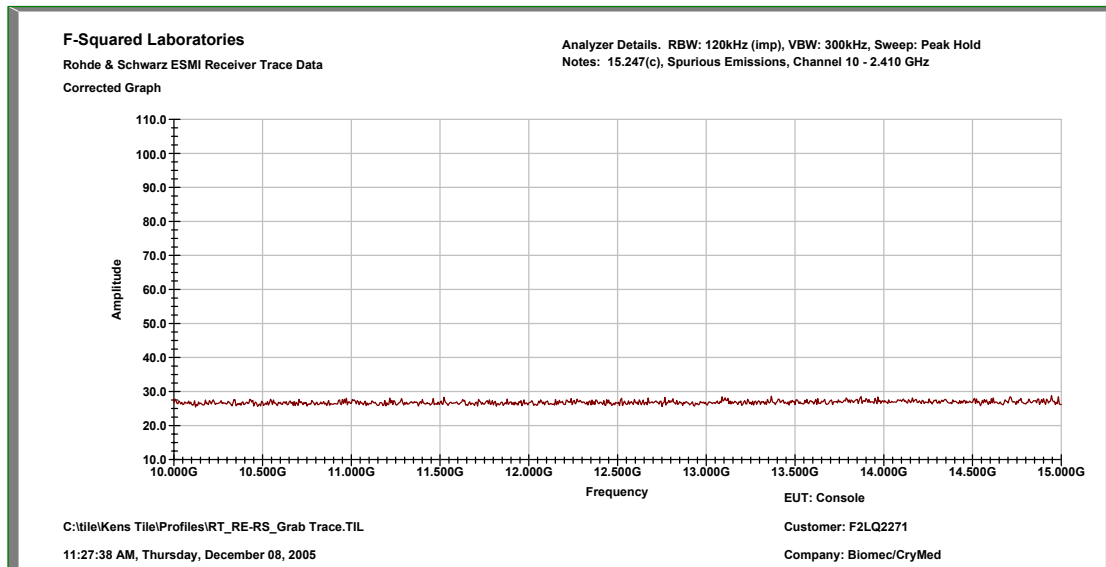


Figure 20: Harmonics & Spurious Emissions, Low Channel, 15-20 GHz

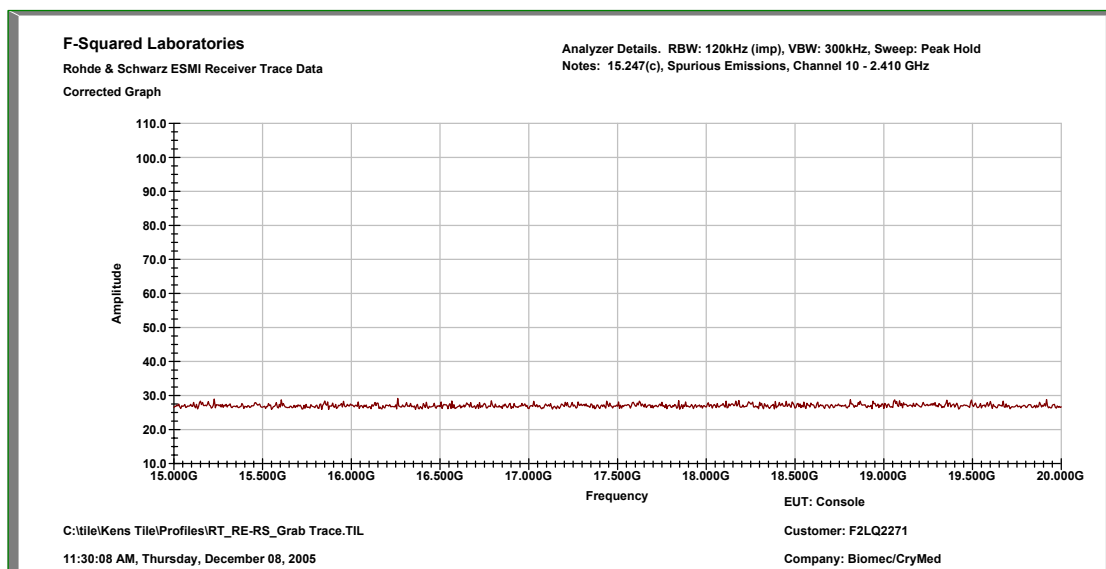


Figure 21: Harmonics & Spurious Emissions, Low Channel, 20-25 GHz

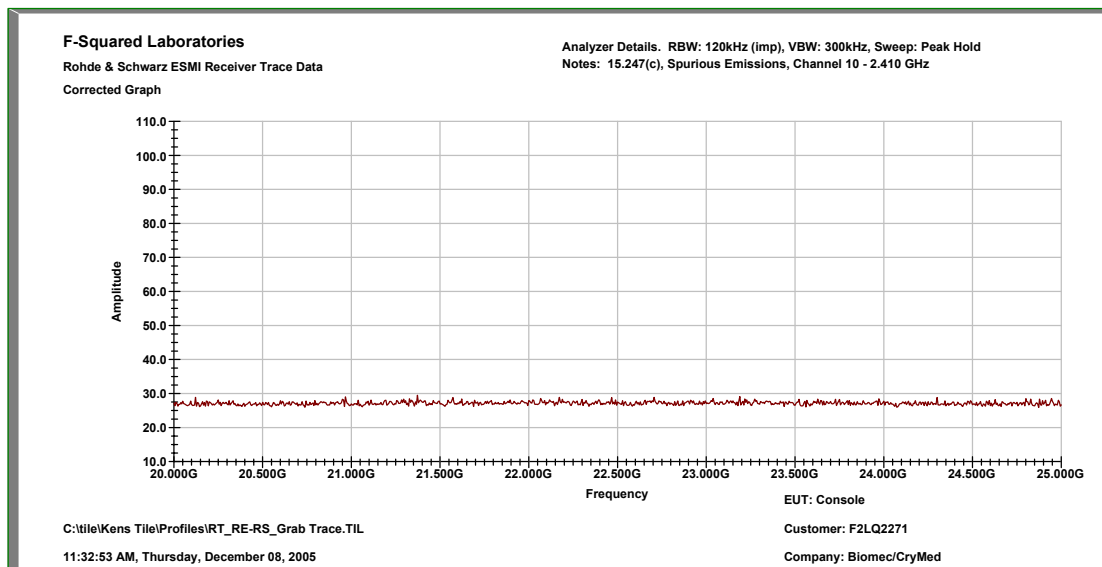


Figure 22: Harmonics & Spurious Emissions, Mid Channel, 0-1 GHz

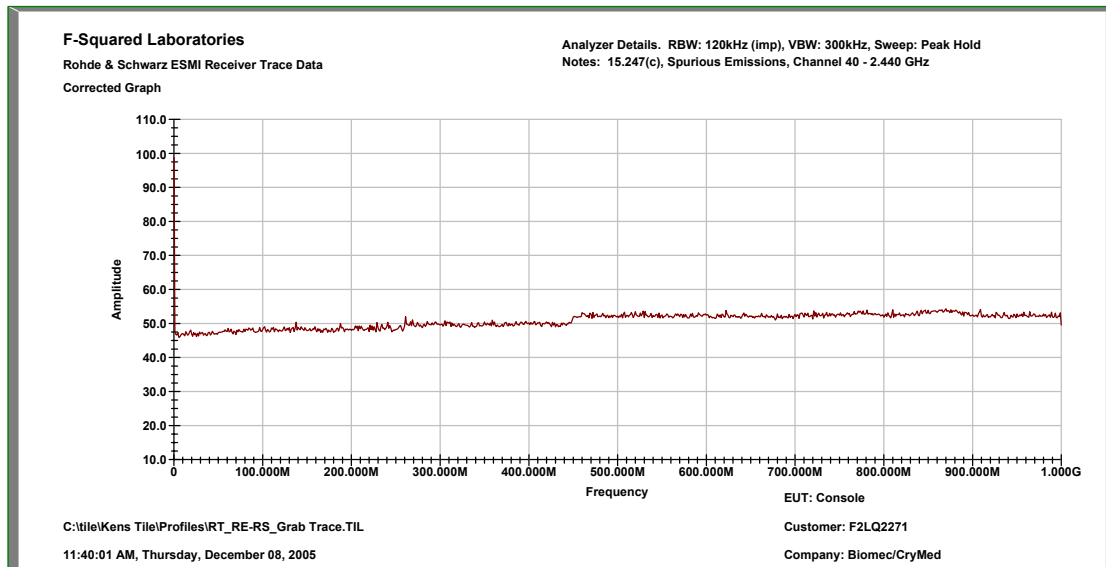


Figure 23: Harmonics & Spurious Emissions, Mid Channel, 1-2 GHz

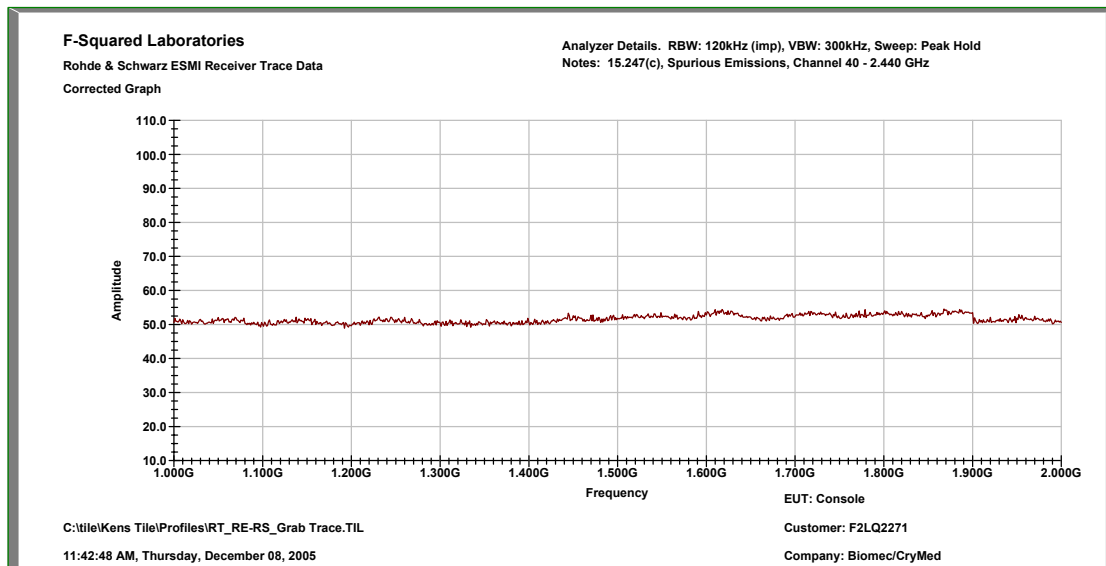


Figure 24: Harmonics & Spurious Emissions, Mid Channel, 2-3 GHz

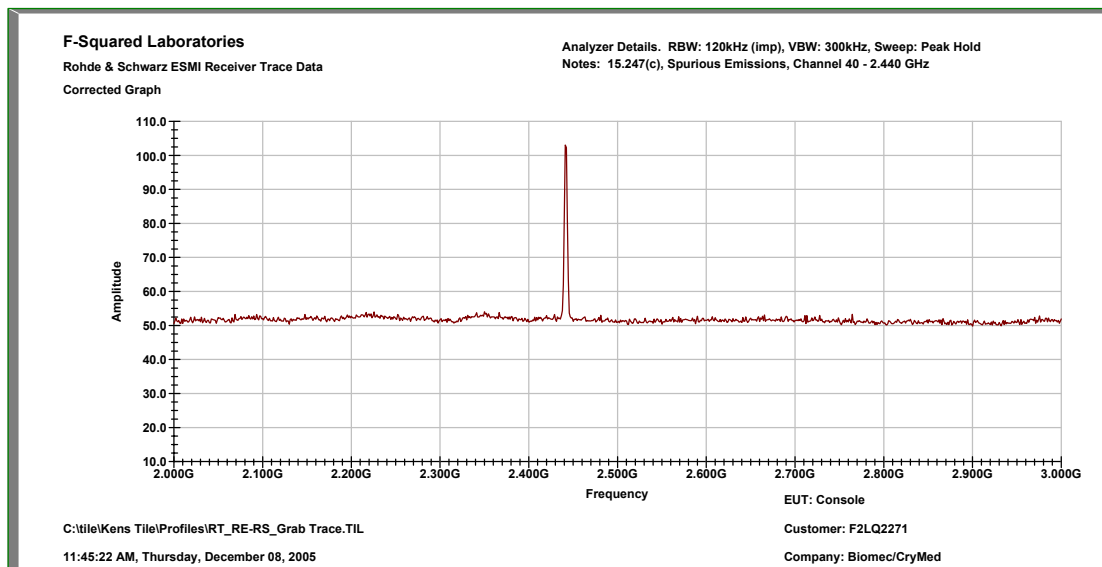


Figure 25: Harmonics & Spurious Emissions, Mid Channel, 3-4 GHz

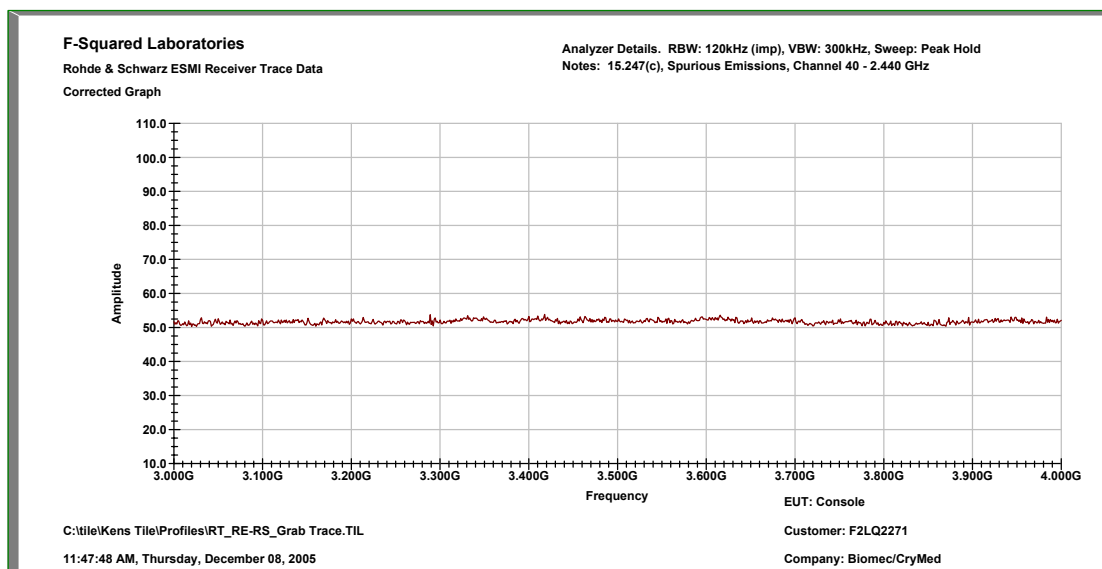


Figure 26: Harmonics & Spurious Emissions, Mid Channel, 4-5 GHz

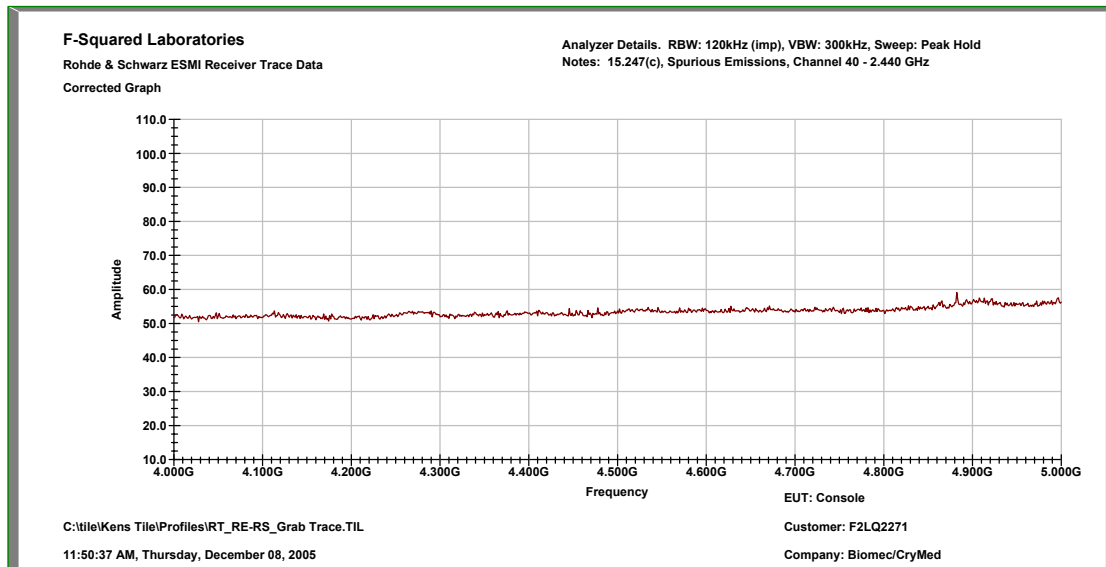


Figure 27: Harmonics & Spurious Emissions, Mid Channel, 5-6 GHz

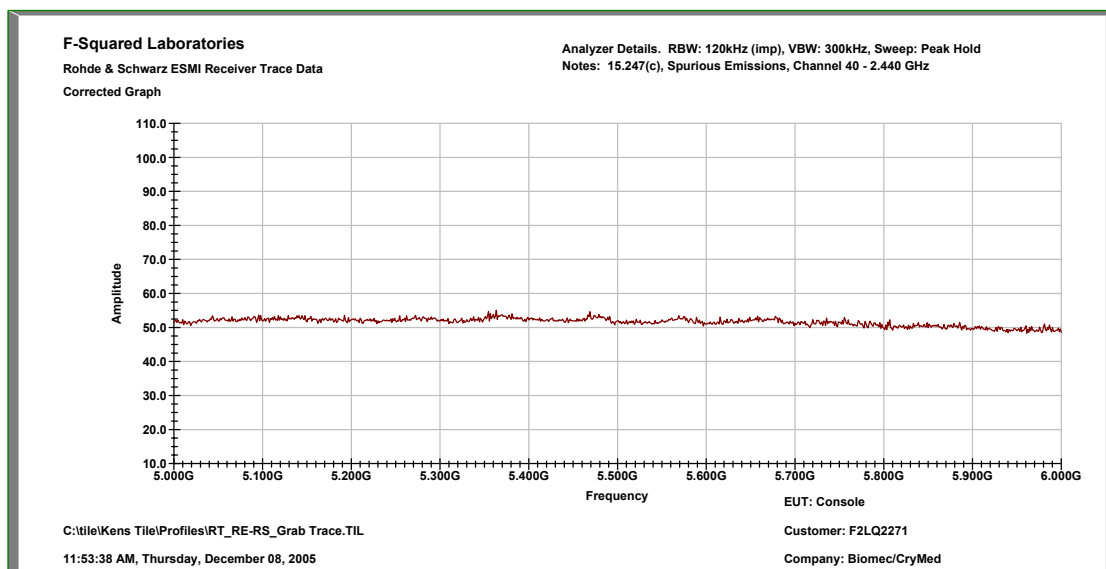


Figure 28: Harmonics & Spurious Emissions, Mid Channel, 6-7 GHz

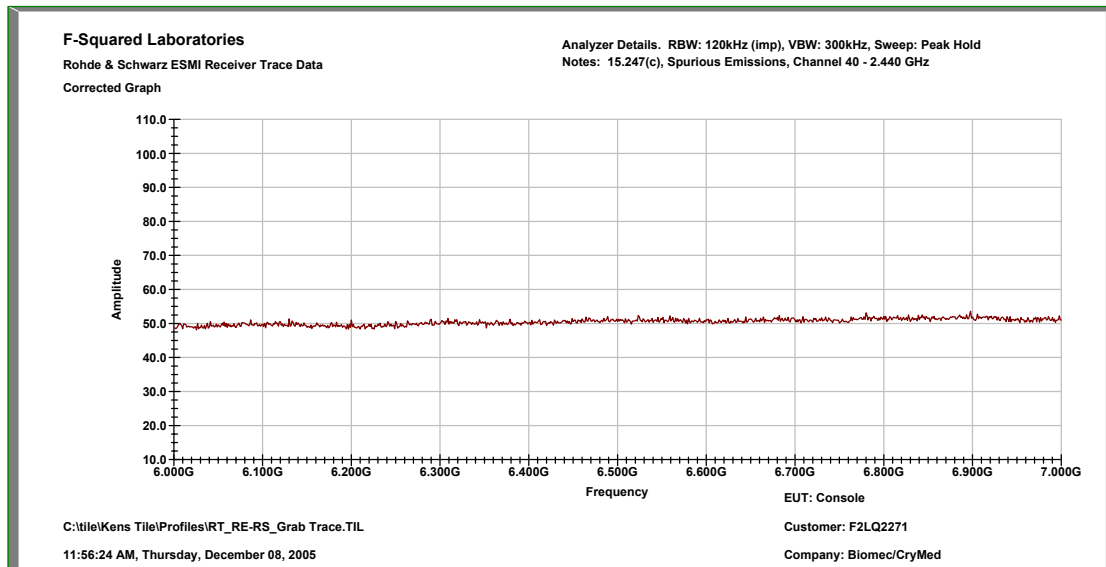


Figure 29: Harmonics & Spurious Emissions, Mid Channel, 7-8 GHz

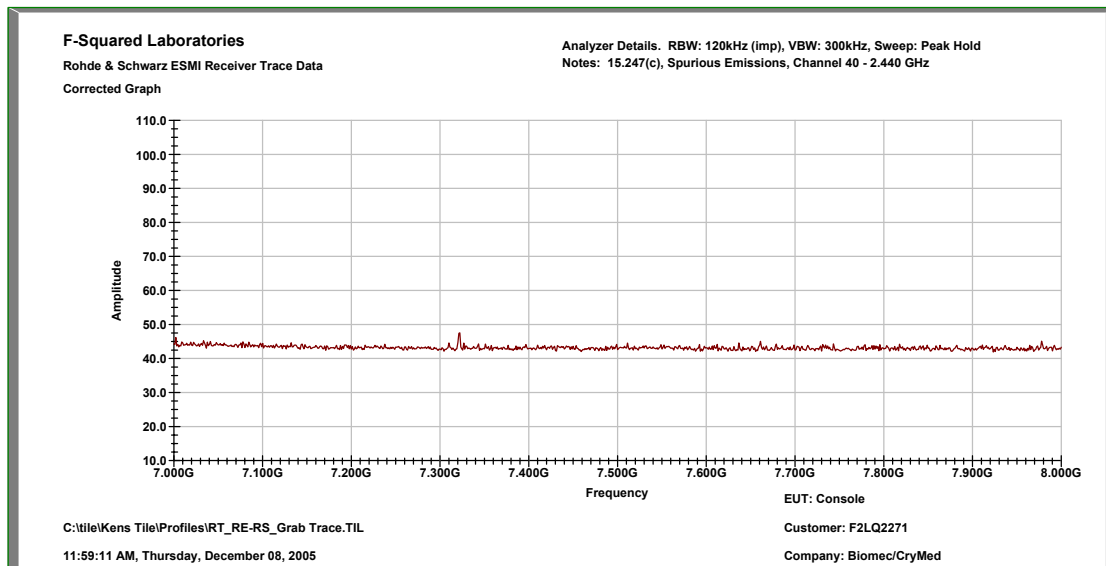


Figure 30: Harmonics & Spurious Emissions, Mid Channel, 8-9 GHz

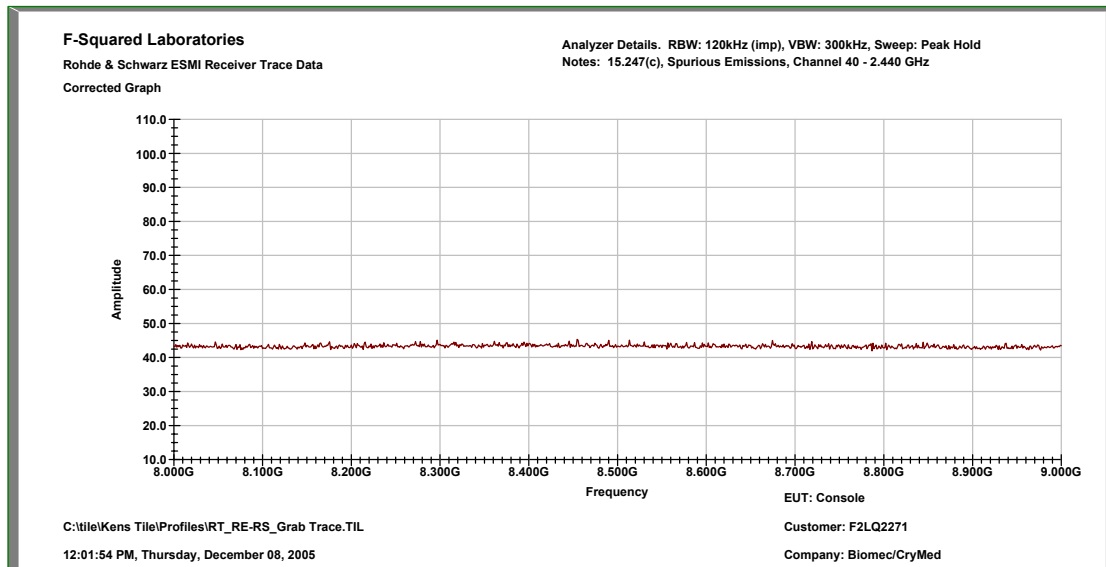


Figure 31: Harmonics & Spurious Emissions, Mid Channel, 9-10 GHz

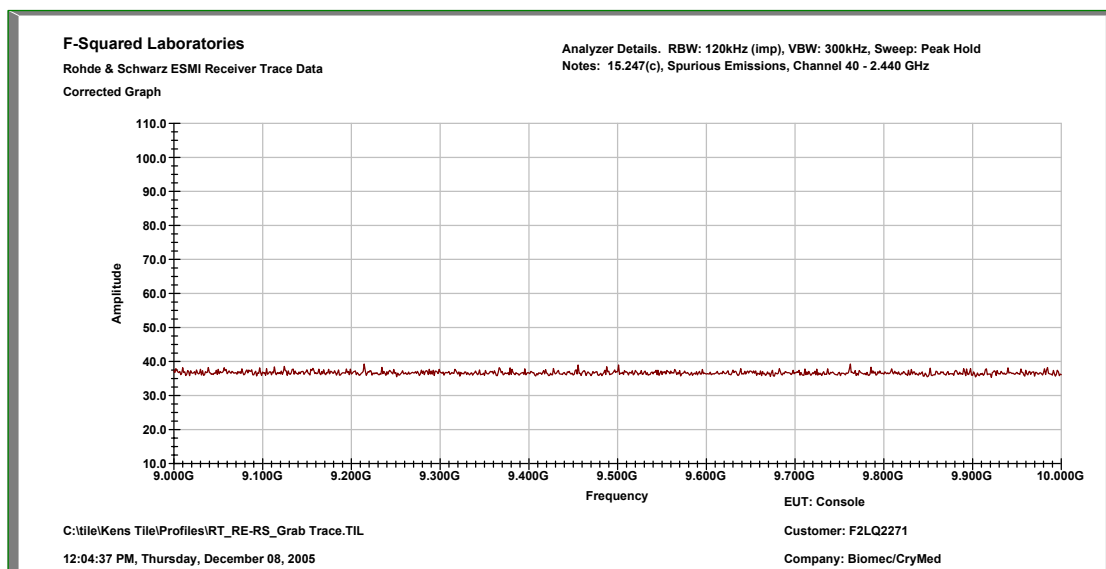


Figure 32: Harmonics & Spurious Emissions, Mid Channel, 10-15 GHz

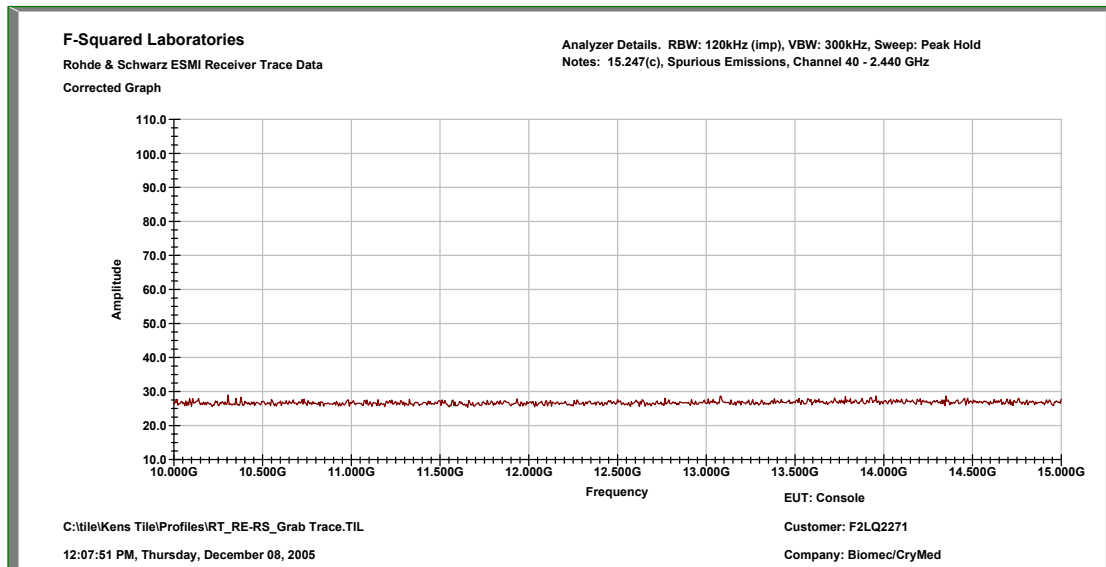


Figure 33: Harmonics & Spurious Emissions, Mid Channel, 15-20 GHz

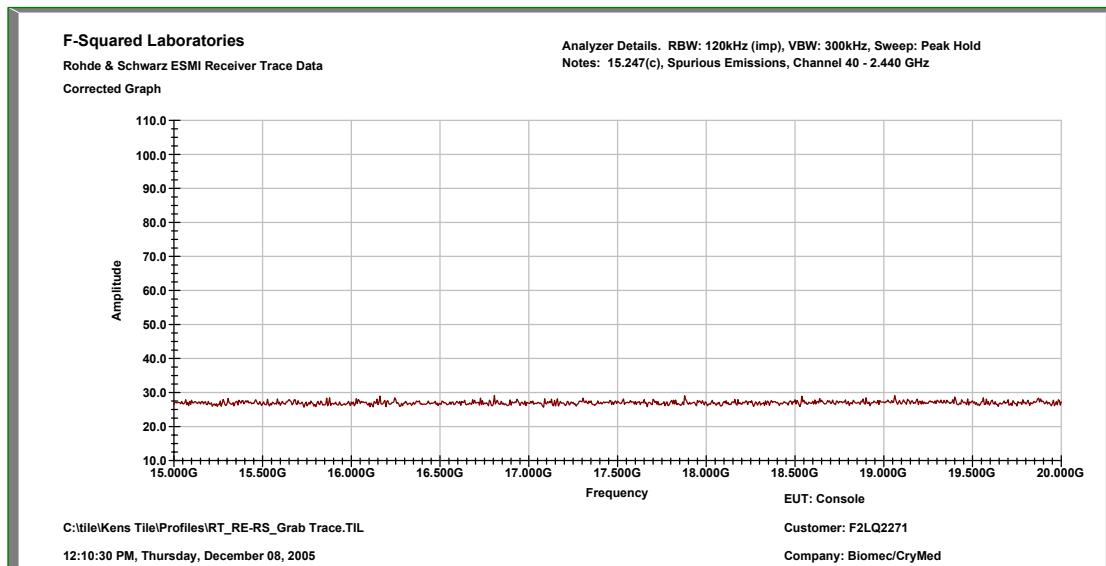


Figure 34: Harmonics & Spurious Emissions, Mid Channel, 20-25 GHz

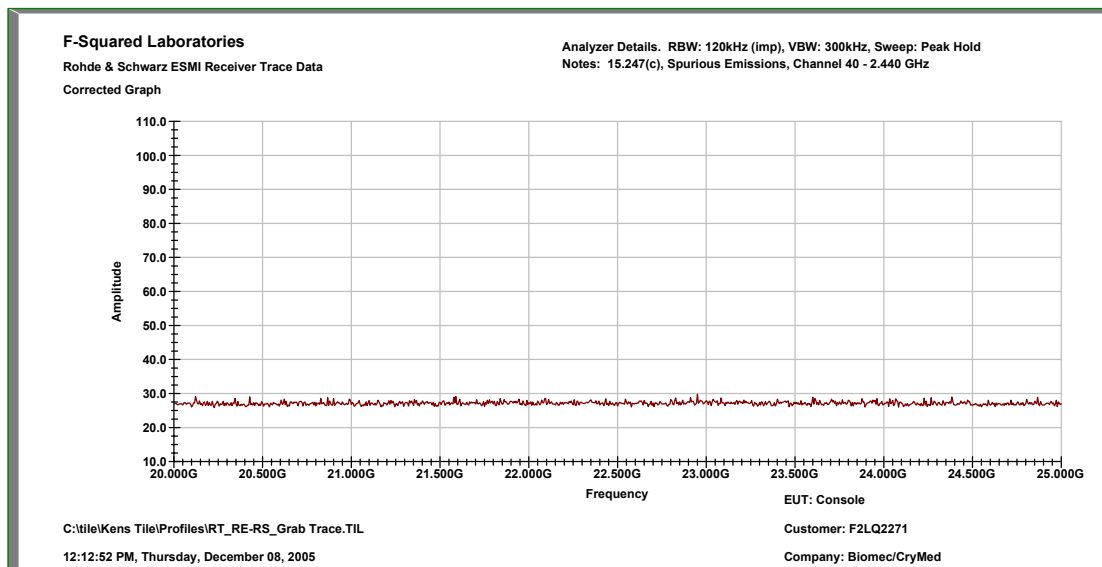


Figure 35: Harmonics & Spurious Emissions, Upper Channel, 0-1 GHz

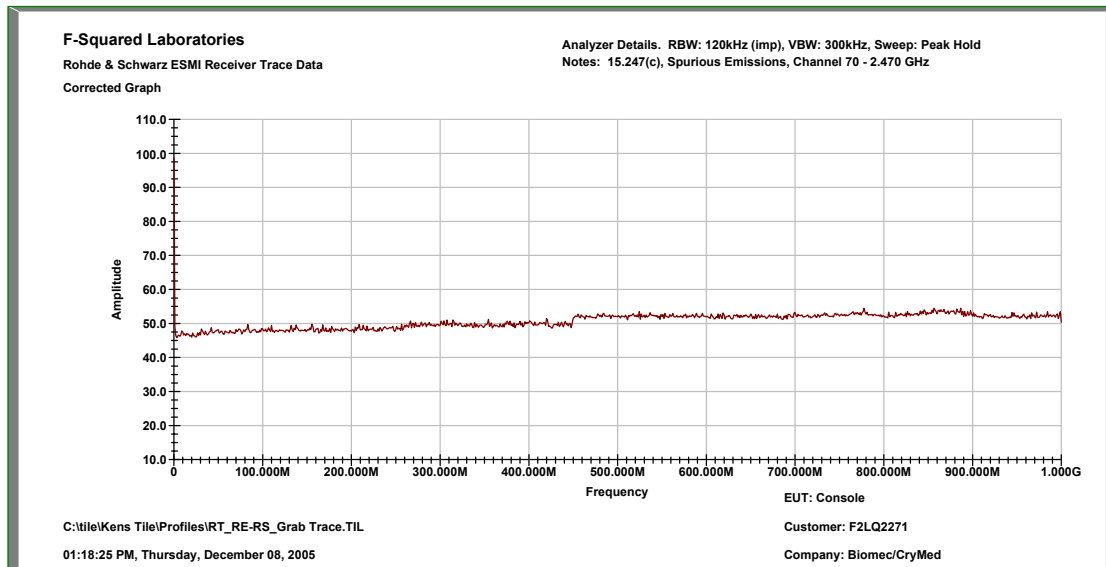


Figure 36: Harmonics & Spurious Emissions, Upper Channel, 1-2 GHz

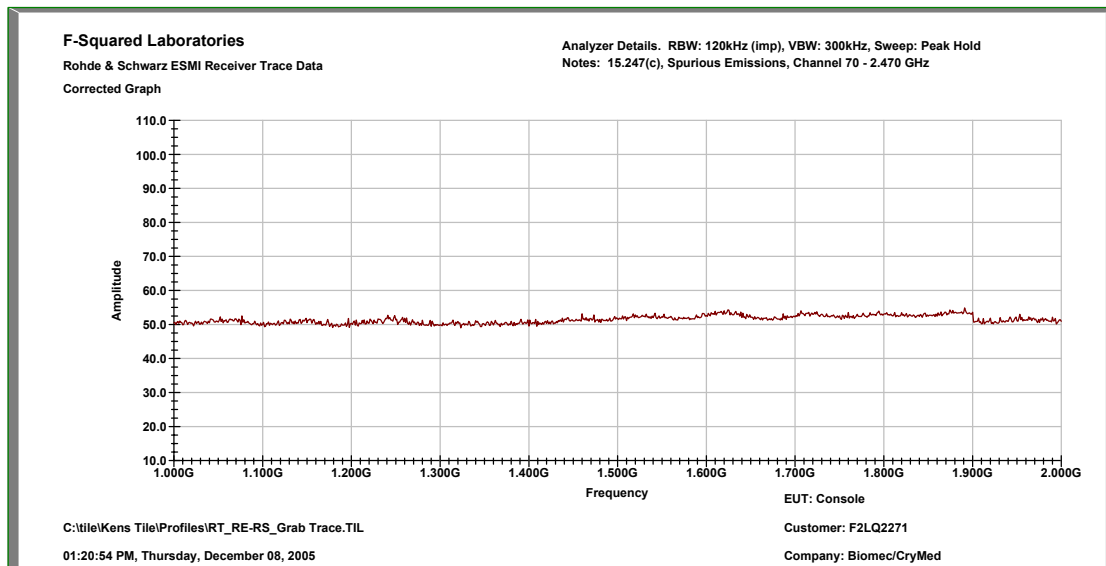


Figure 37: Harmonics & Spurious Emissions, Upper Channel, 2-3 GHz

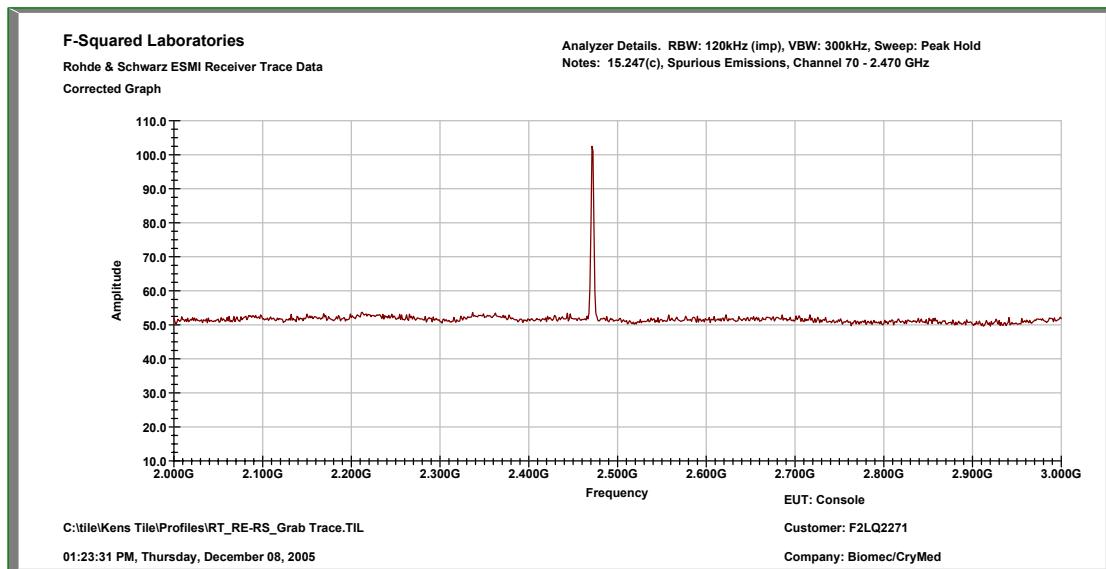


Figure 38: Harmonics & Spurious Emissions, Upper Channel, 3-4 GHz

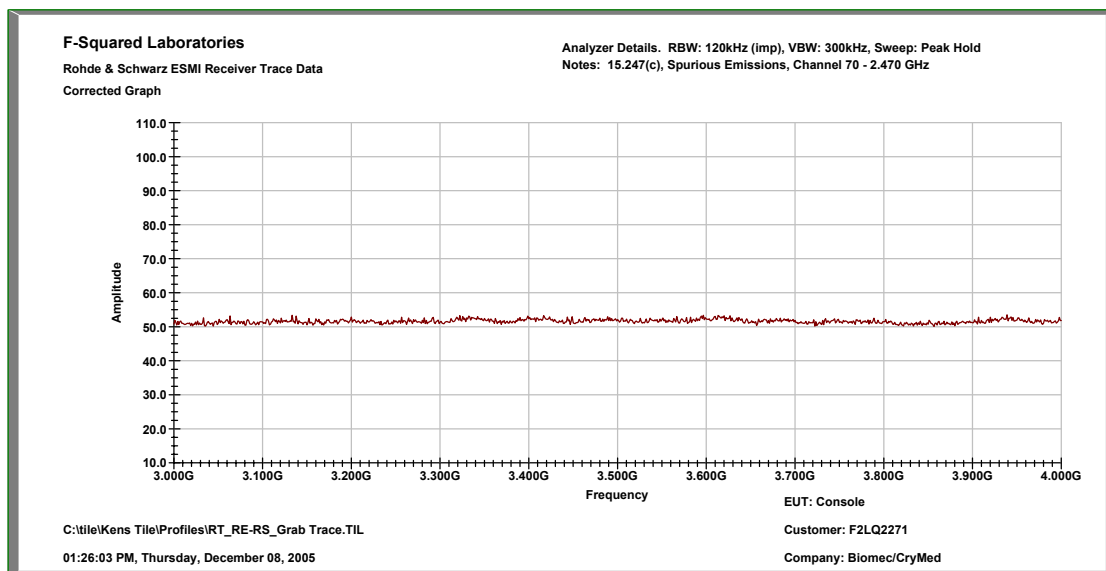


Figure 39: Harmonics & Spurious Emissions, Upper Channel, 4-5 GHz

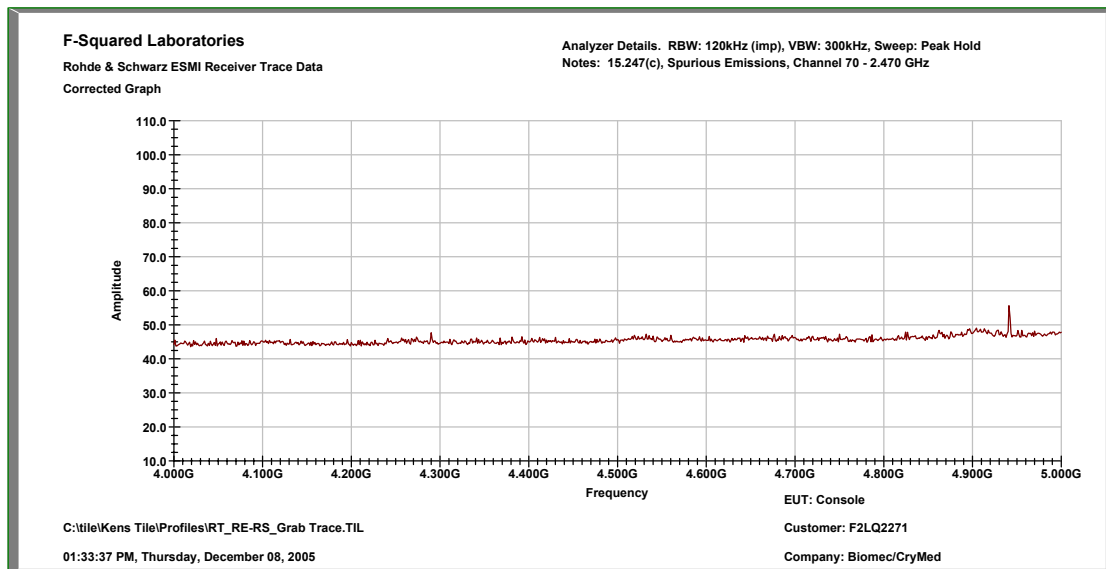


Figure 40: Harmonics & Spurious Emissions, Upper Channel, 5-6 GHz

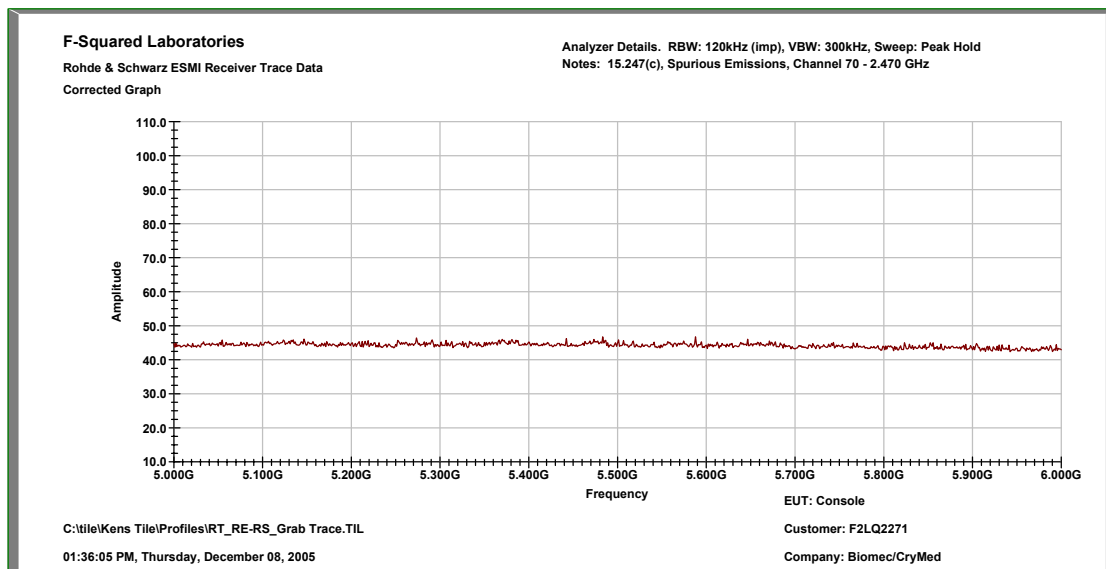


Figure 41: Harmonics & Spurious Emissions, Upper Channel, 6-7 GHz

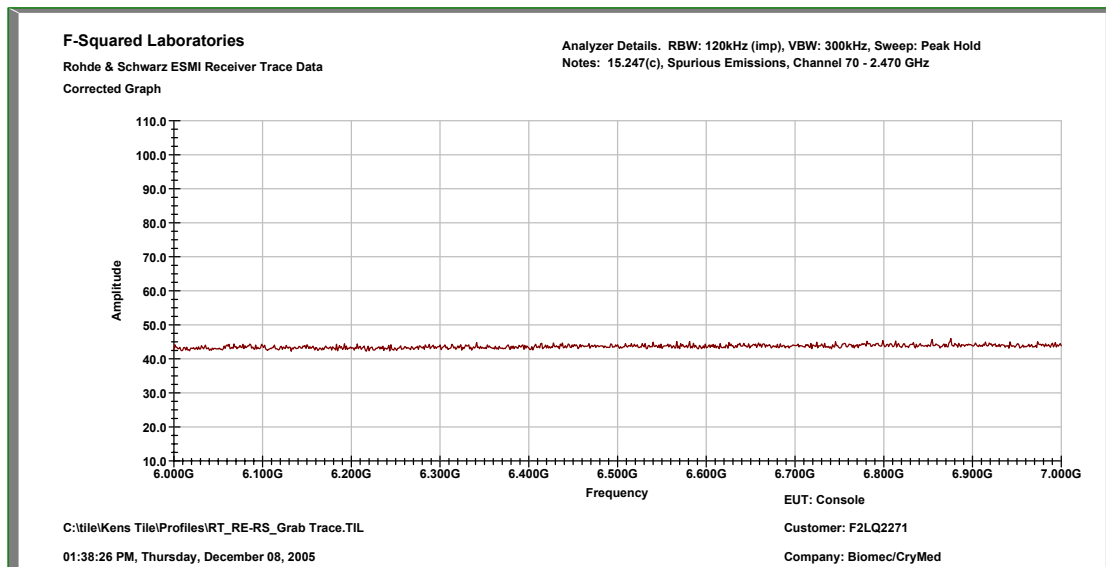


Figure 42: Harmonics & Spurious Emissions, Upper Channel, 7-8 GHz

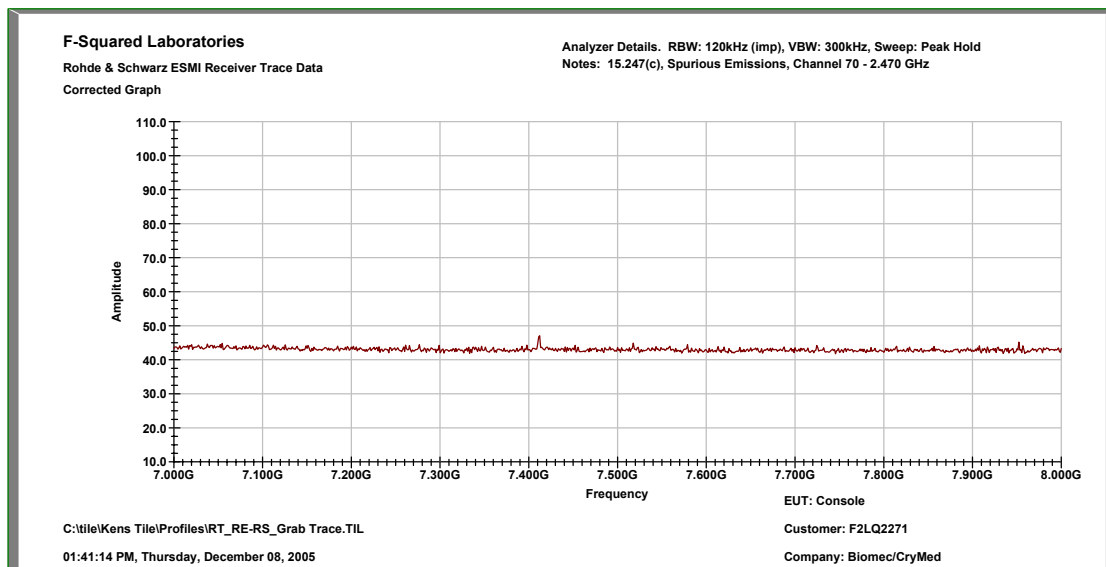


Figure 43: Harmonics & Spurious Emissions, Upper Channel, 7-8 GHz

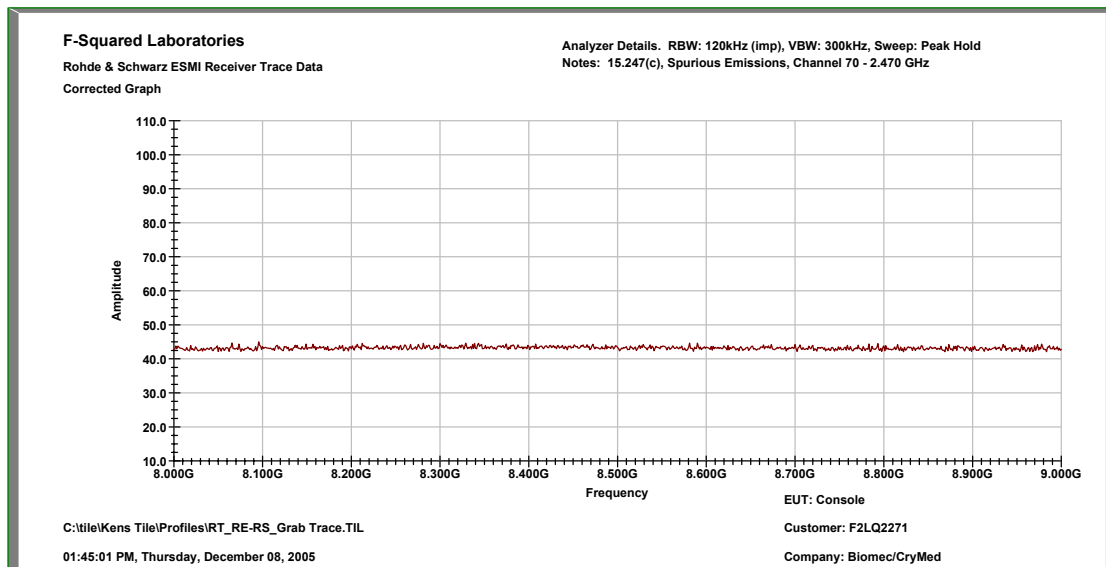


Figure 44: Harmonics & Spurious Emissions, Upper Channel, 7-8 GHz

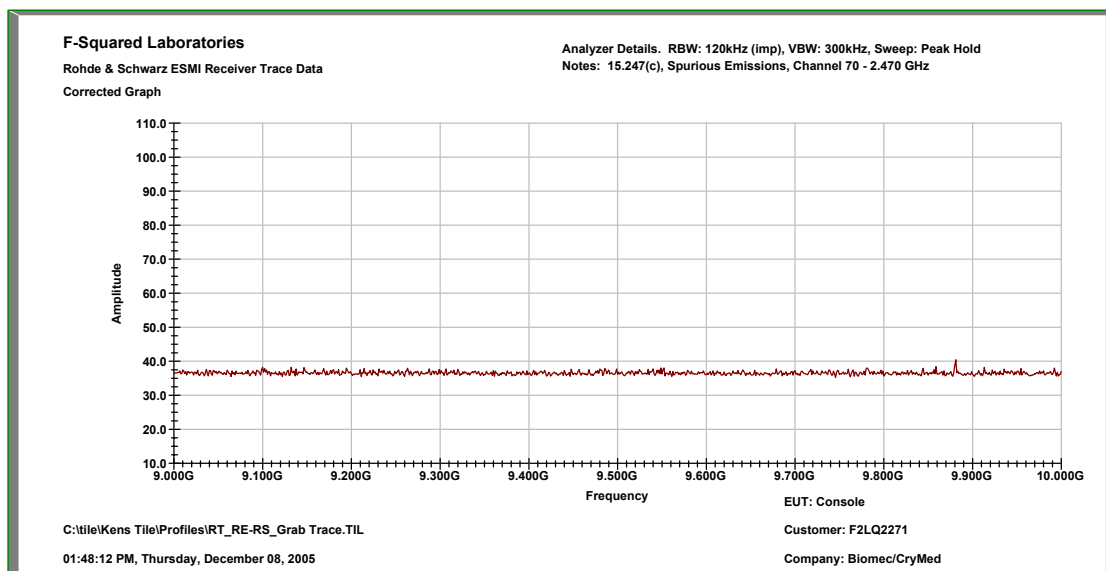


Figure 45: Harmonics & Spurious Emissions, Upper Channel, 10-15 GHz

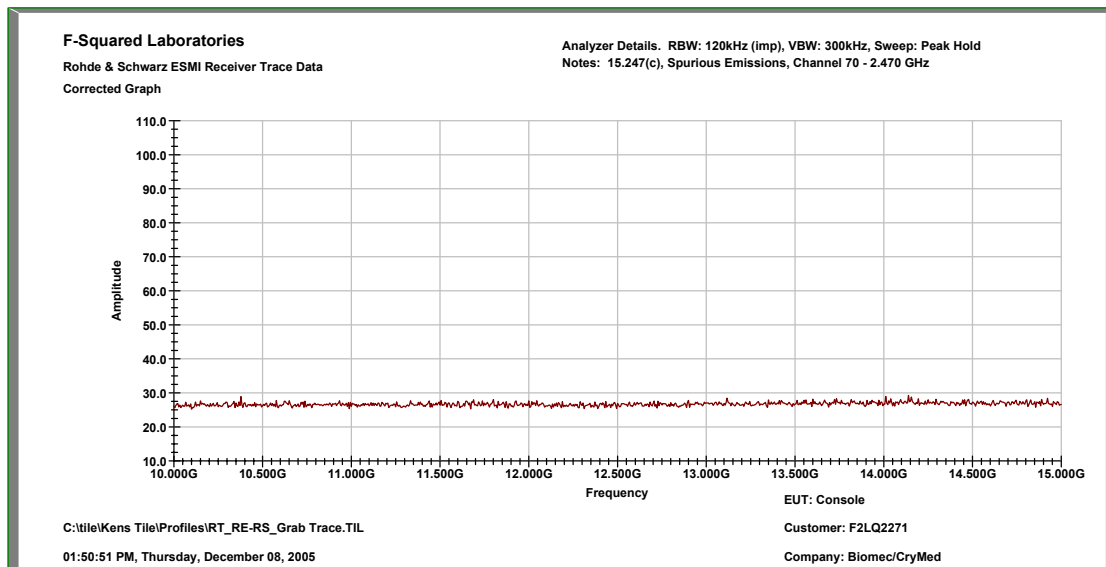


Figure 46: Harmonics & Spurious Emissions, Upper Channel, 15-20 GHz

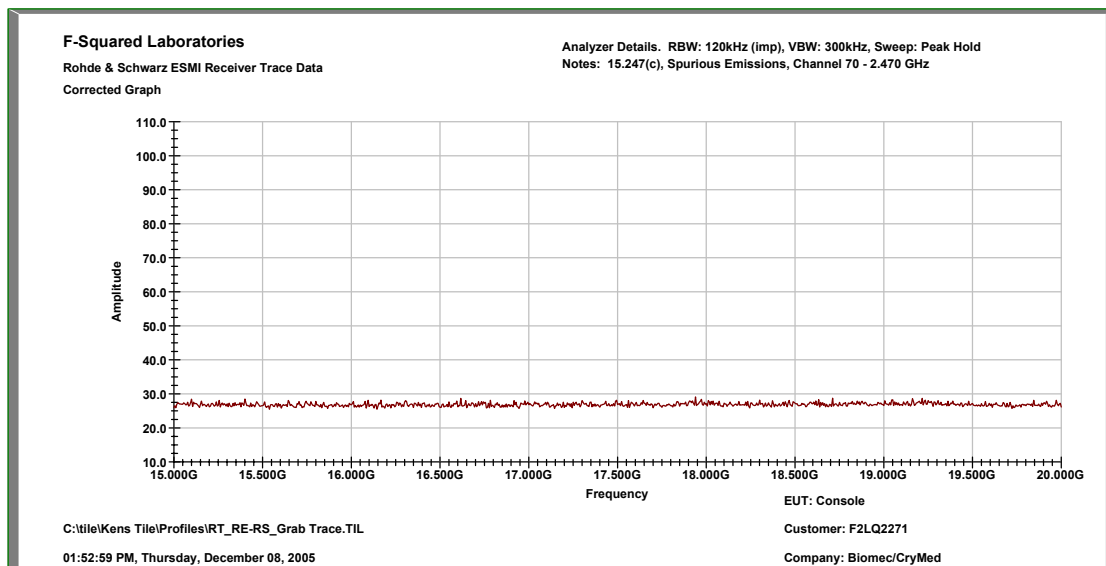


Figure 47: Harmonics & Spurious Emissions, Upper Channel, 20-25 GHz

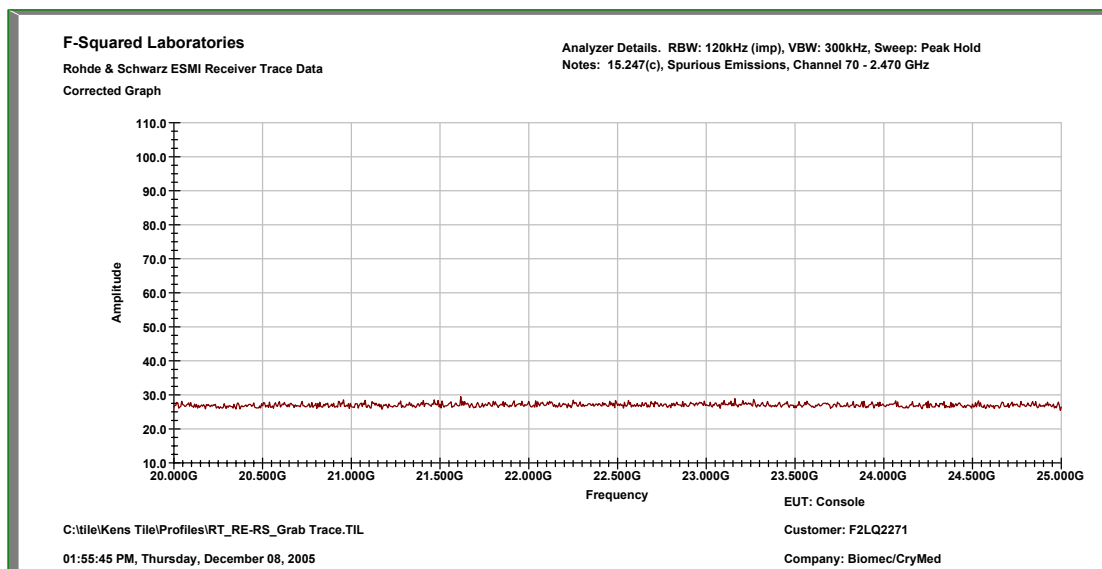


Figure 48: Peak Power Spectral Density, Low Channel, 200 kHz Span

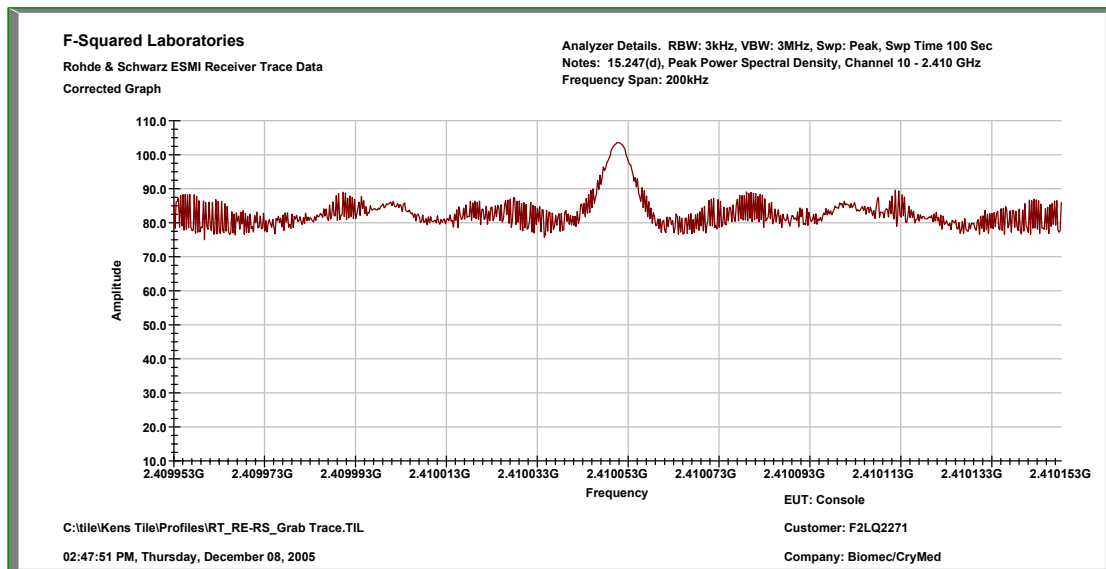


Figure 49: Peak Power Spectral Density, Low Channel, 1.5 MHz Span

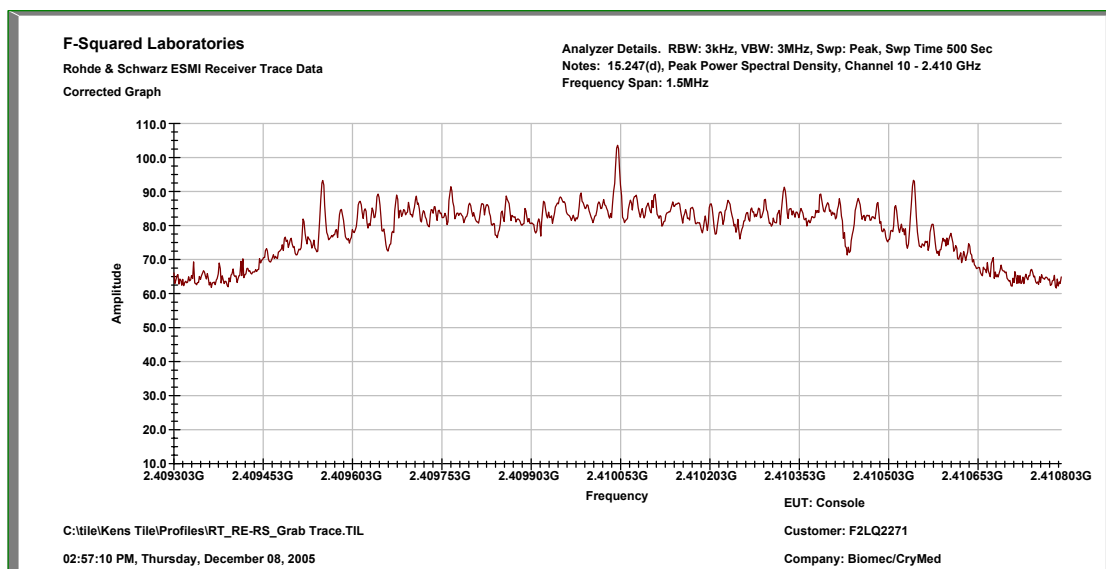


Figure 50: Peak Power Spectral Density, Mid Channel, 200 kHz Span

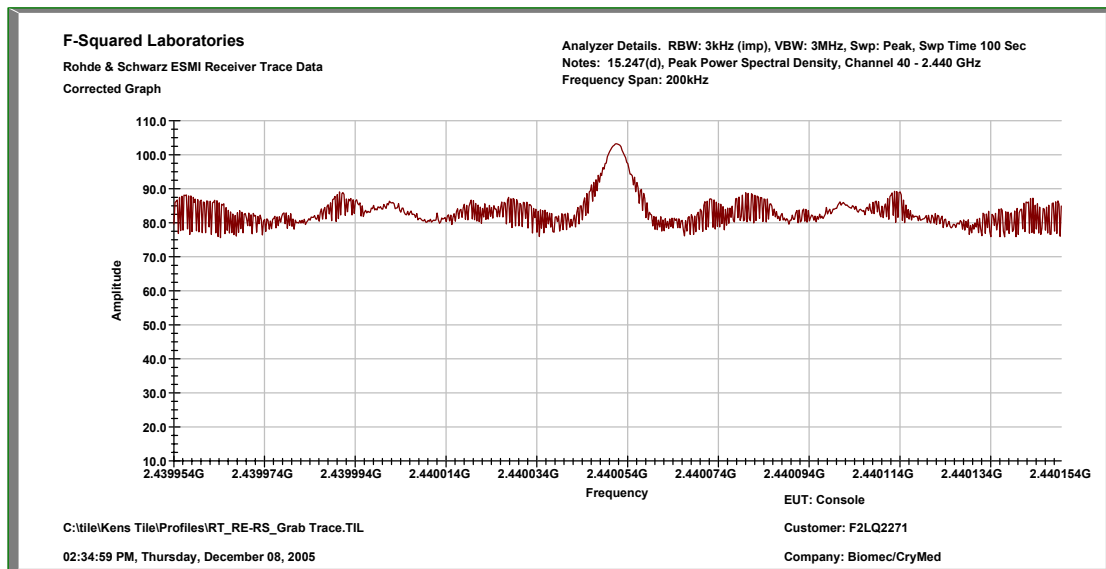


Figure 51: Peak Power Spectral Density, Mid Channel, 1.5 MHz Span

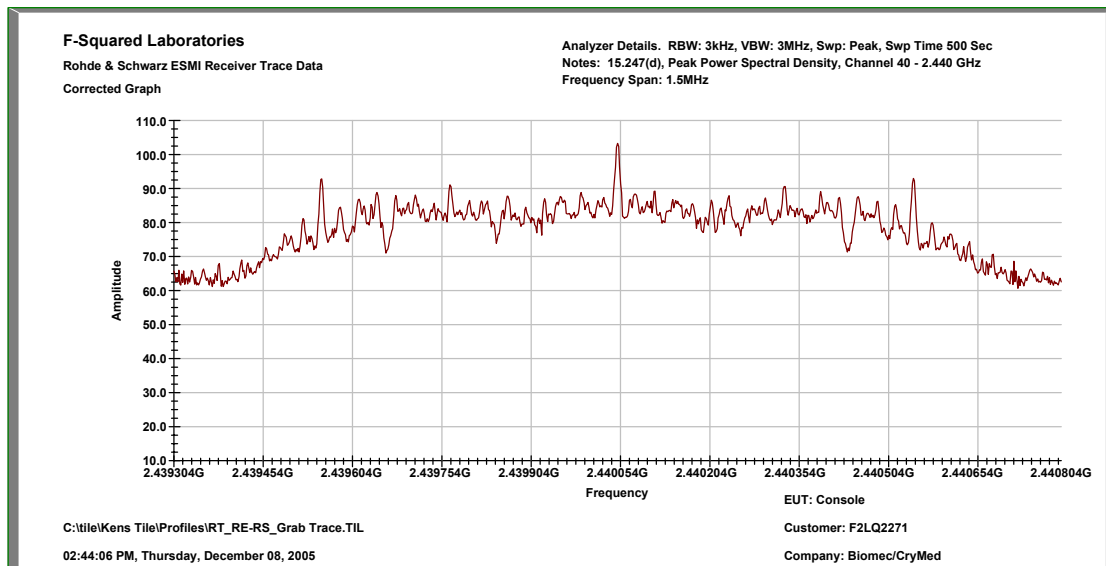


Figure 52: Peak Power Spectral Density, Upper Channel, 200 kHz Span

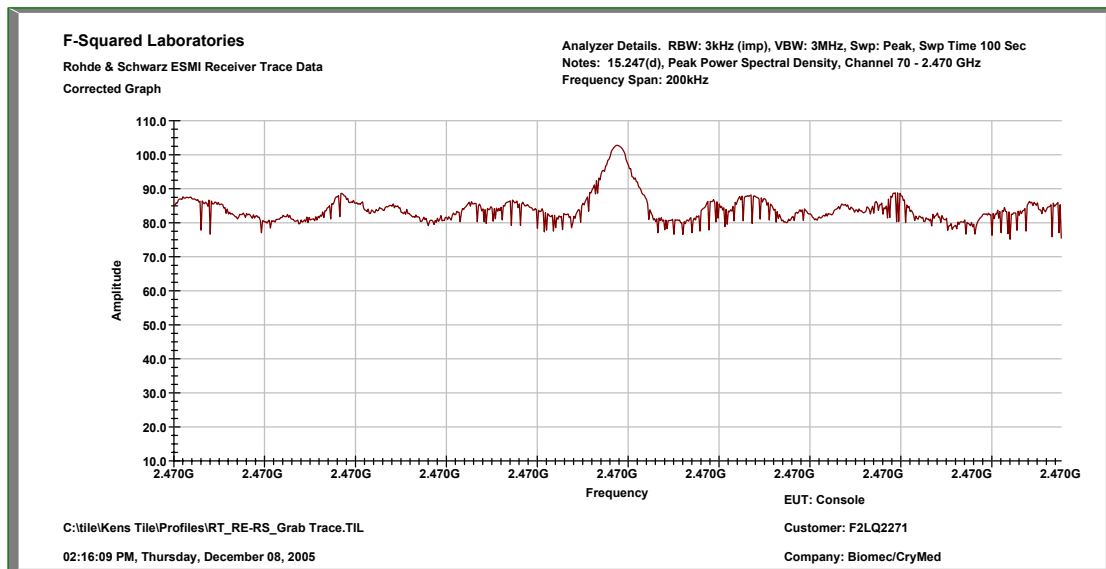
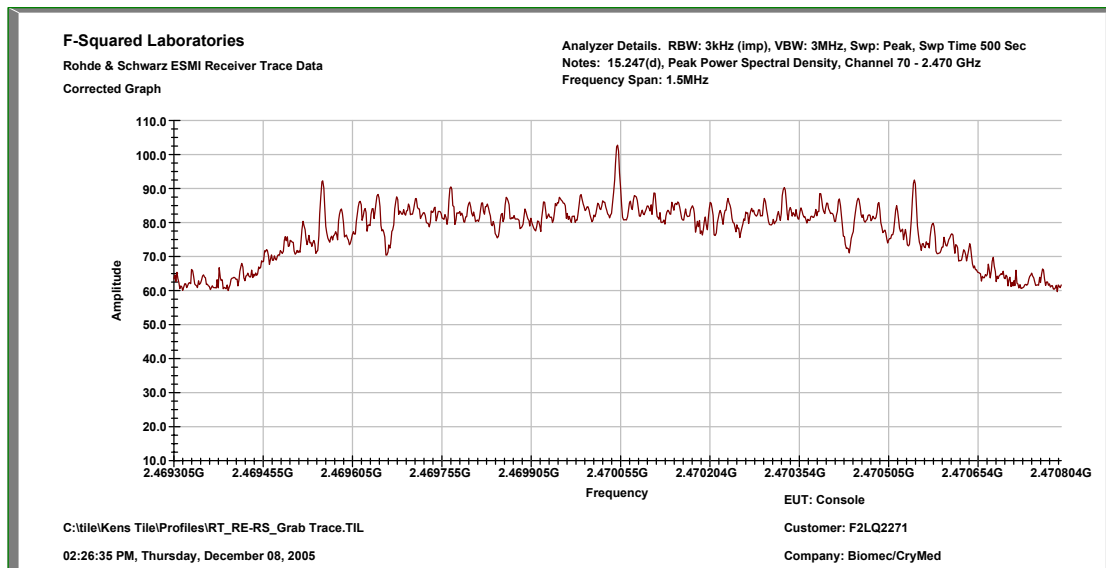
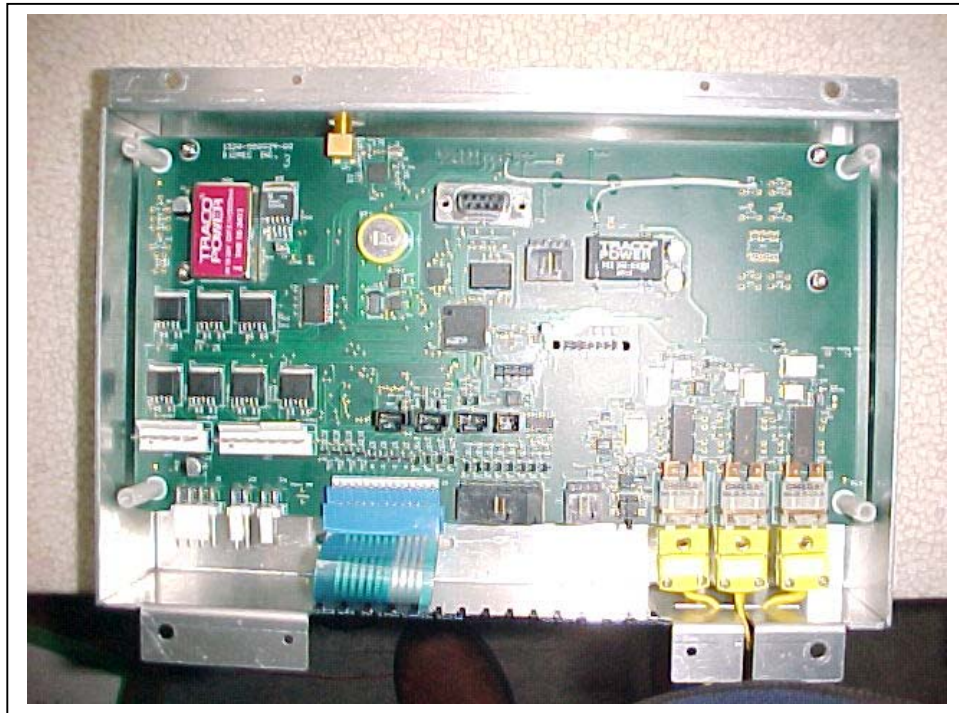


Figure 53: Peak Power Spectral Density, Upper Channel, 1.5 MHz Span

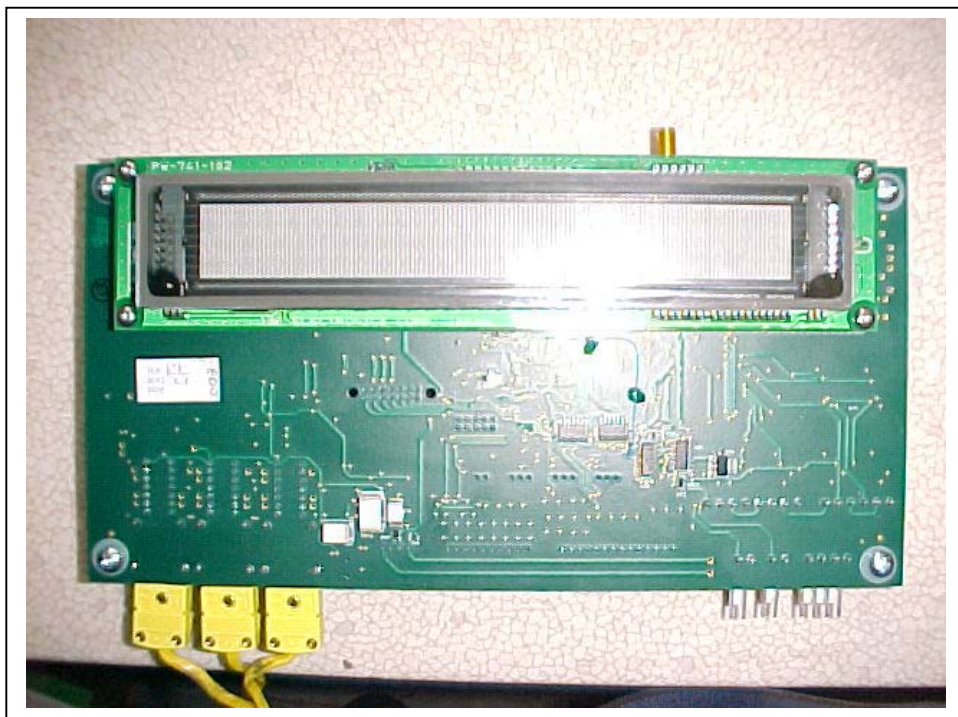


14. PHOTOGRAPHS/EXHIBITS – PRODUCT PHOTOS, TEST SETUPS

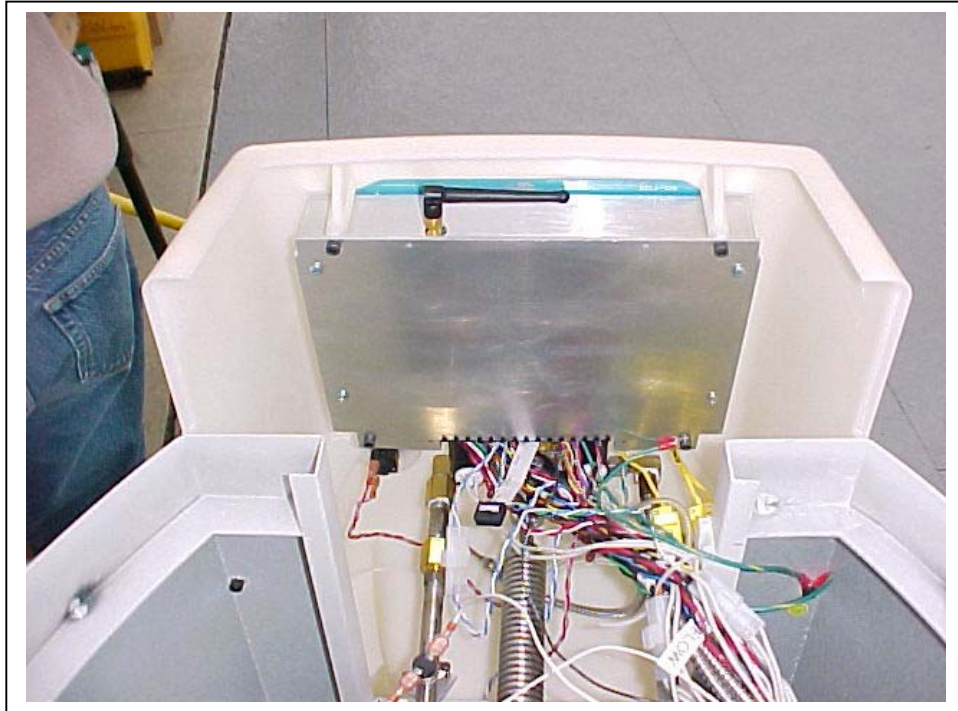
Console Electronics Package:
Shield Cover Removed Exposing Component Side of Printed Circuit Board



**Console Electronics Package:
Removed from Shield Case - Solder Side of Printed Circuit Board**



Console Electronics Package:
Installed in Console Unit with Centurion Antenna Connected
(plastic top cover removed from console unit to expose electronics package)



**Console Electronics Package:
Installed in Console Unit – Front View of Console**



**Conducted Emissions Test Setup:
Console Unit with DTS Transmitter – Overall Test Arrangement**



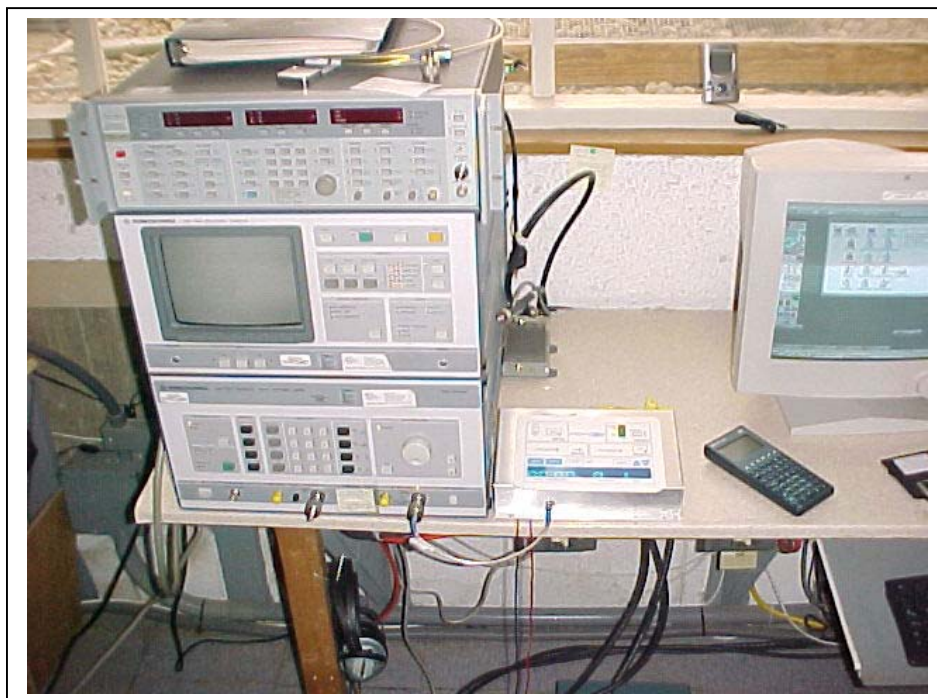
Conducted Emissions Test Setup:
Console Unit with DTS Transmitter – LISN Connection to Console



**Conducted Emissions Test Setup:
Console Electronics Package Direct Connection to Spectrum Analyzer**



Antenna Conducted Test Setup:
Console Electronics Package Direct Connection to Spectrum Analyzer – Overall Test Arrangement



**Radiated Emissions Test on OATS:
Console Unit with DTS Transmitter – Plastic Top Cover Installed**



(Radiated Emissions Test on OATS:
Console Unit with DTS Transmitter – Plastic Top Cover Installed, cont'd)

