

# Electromagnetic Compatibility Test Report

*Prepared in accordance with*

**Product Standard:**

**FCC Part 15**

on

**Footswitch**

**RF Medical Switch**

Prepared for:

**Linemaster Switch**

**29 Plaine Hill Road**

**Woodstock, CT 06281**

Prepared by:



**TUV Rheinland of North America, Inc.**

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Report No.:

30762628.005

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<b>Auftraggeber:</b> <i>Client:</i>		<b>Linemaster Switch</b> <b>29 Plaine Hill Road</b> <b>Woodstock, CT 06281</b>													
<b>Bezeichnung:</b> <i>Identification:</i>	<b>Footswitch</b>	<b>Serien-Nr.:</b> <i>Serial No.</i>	PT1003T, P1004T, P1005T												
<b>Gegenstand der Prüfung:</b> <i>Test item:</i>	<b>RF Medical Switch</b>	<b>Prüfdatum:</b> <i>Date tested:</i>	November 11th-16th, 2007												
<b>Prüfort:</b> <i>Testing location:</i>	TUV Rheinland of North America 12 Commerce Road Newtown, CT 06470-1607 NVLAP # 200111-0														
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC Part 15: FCC Part 15C Section 15.247 FCC Part 15.247 (a)(2), FCC Par 15.247 (b)(3), FCC Part 15.247 (b)(5) and 1.1310, FCC Part 15.247 (c), 15.205, 15.209, FCC Part 15, FCC Part 15.247 (e), FCC Part 15.215 (c)														
<b>Prüfergebnis:</b> <i>Test Result</i>	<b>Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The above product was found to be Compliant to the above test standard(s)</b>														
<b>geprüft / tested by: Dieter Baldamus</b>		<b>kontrolliert / reviewed by: Randall Masline</b>													
<u>22 October 2008</u> <table border="0"> <tr> <td><b>Datum</b></td> <td><b>Name</b></td> <td><b>Unterschrift</b></td> </tr> <tr> <td><i>Date</i></td> <td><i>Name</i></td> <td><i>Signature</i></td> </tr> </table>		<b>Datum</b>	<b>Name</b>	<b>Unterschrift</b>	<i>Date</i>	<i>Name</i>	<i>Signature</i>	<u>22 October 2008</u> <table border="0"> <tr> <td><b>Datum</b></td> <td><b>Name</b></td> <td><b>Unterschrift</b></td> </tr> <tr> <td><i>Date</i></td> <td><i>Name</i></td> <td><i>Signature</i></td> </tr> </table>		<b>Datum</b>	<b>Name</b>	<b>Unterschrift</b>	<i>Date</i>	<i>Name</i>	<i>Signature</i>
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<i>Date</i>	<i>Name</i>	<i>Signature</i>													
<b>Sonstiges :</b> <i>Other Aspects:</i>	<b>None</b>														
Abkürzungen: OK, Pass, Compliant, Complies = entspricht Prüfgrundlage Fail, Not Compliant, Does not Comply = entspricht nicht Prüfgrundlage N/A = nicht anwendbar		Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable													
															
<b>889954</b>		<b>200111-0</b>													
		<b>Industry Canada</b>													
		<b>3466D-1</b>													

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## 1 General Information

### 1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15C, based on the results of testing performed on the Footswitch, Model No. RF Medical Switch, manufactured by Linemaster Switch. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

### 1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

**1.3 Summary of Test Results**

Applicant	Linemaster Switch 29 Plaine Hill Road Woodstock, CT 06281		Tel	(860) 974-1000	Contact	Mark Grochowski	
			Fax	(860) 974-0502	email	MGrochowski@linemaster.com	
Type of Equipment		Footswitch	Model Number		RF Medical Switch		
Standards		Description	Severity Level or Limit			Criteria	Test Result
FCC Part 15		Radio Frequency Devices -Part C	See called out basic standards below			See Below	Complies
FCC Part 15.247 (b) (3)		Spectrum Bandwith of a Direct Sequence Spread Spectrum System	500kHz on a 6dB Bandwith, 2.405 GHz - 2.480 GHz			Limit	Complies
FCC Part 15.247 (b) (3)		Maximum Output Power	1 Watt (30dBm)			Limit	Complies
FCC Part 15.247 (b)(5) and 1.1310		RF Human Exposure Limit	1.0 (mW/cm2)			Limit	Complies
FCC Part 15.247 (c), 15.205, 15.209		Radiated Spurious Emissions	-20dBc, 15.205 (a), 15.209 (a)			Limit	Complies
FCC Part 15.247 (e)		Transmitter Power Density	8 dBm/3kHz			Limit	Complies
FCC Part 15.207		Conducted Emissions	15.207 (a)			Limit	Complies
FCC Part 15.215 (c)		Frequency Stability	Containment of 20dB,			Limit	Complies

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## 2 Laboratory Information

### 2.1 Accreditations & Endorsements

#### 2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 12 Commerce Road, Newtown CT is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 889954). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

#### 2.1.2 NIST / NVLAP

Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code: 200111-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

#### 2.1.3 Industry Canada

Registration No.: 3466D-1. The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2003.

### 2.2 Measurement Uncertainty

#### General

The estimated combined standard uncertainty for conducted immunity measurements is $\pm 1.4\text{dB}$ .
The estimated combined standard uncertainty for radiated emissions measurements is $\pm 1.6\text{ dB}$ .
The estimated combined standard uncertainty for conducted emissions measurements is $\pm 1.2\text{dB}$ .

### 2.3 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

## 2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Power Supply	California Instruments	5001iX	HK53766	08/04/07	08/04/08	All
Antenna Horn	Emco	3115	9402-4227	03/17/08	03/17/10	RE, RI
Antenna, Log. Periodic	Emco	3146	9309-3691	06/26/06	06/26/08	RE, RI
Antenna, Bicon	Emco	3108	2234	06/26/06	06/26/08	RE, RI
Receiver	Hewlett Packard	HP 8546A, 85460A	3330A00125, 3325A00134	03/14/08	03/14/09	CE, DP, CE
Spectrum Analyzer	Hewlett Packard	HP 8593E	3410A01090	06/26/08	06/26/09	CE, DP, CE
Antenna	Sunol Sciences	JB3	A022707	03/08/07	03/08/09	RE, RI

Note: CE = Conducted Emissions, CI= Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD = Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions



### 3 Product Information

#### 3.1 Product Description

The EUT is a wireless foot pedal used for various applications in the industrial environment. The wireless system eliminates the nuisance of wires under foot while invisible waves fill a room with 360° of signal. The EUT consist of a wireless foot pedal transmitter and a receiver; one (the transmitter) used with batteries and one (the receiver) used with an AC/DC adapter. The receiver also sends a signal every second to control de antenna output power of the transmitter

#### 3.2 Equipment Modifications

No modifications were needed to bring product into compliance.

#### 3.3 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report



Figure 1 – Photo of EUT (Transmitter)

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## 4 Emissions

### 4.1 Spectrum Bandwidth

This test measures the spectrum bandwidth of the intentional radiator signal generated by the EUT.

#### 4.1.1 Over View of Test

Results	Complies (as tested per this report)					Date	11/11/2007	
Standard	FCC Part 15.247 (b) (3)							
Product Model	RF Medical Switch				Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details							
Test Set-up	Tested @ 3m on O.A.T.S. placed on turn-table, see test plans for details							
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar	
Frequency Range	2.405 GHz - 2.480 GHz @ 3m							
Perf. Criteria	500kHz. (Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Dieter Baldamus		

#### 4.1.2 Test Procedure

Radiated and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 2.405-2.480 GHz was investigated for radiated emissions, testing the lowest middle and highest channels.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 3m OATS.

#### 4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan.

#### 4.1.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

Report No.:

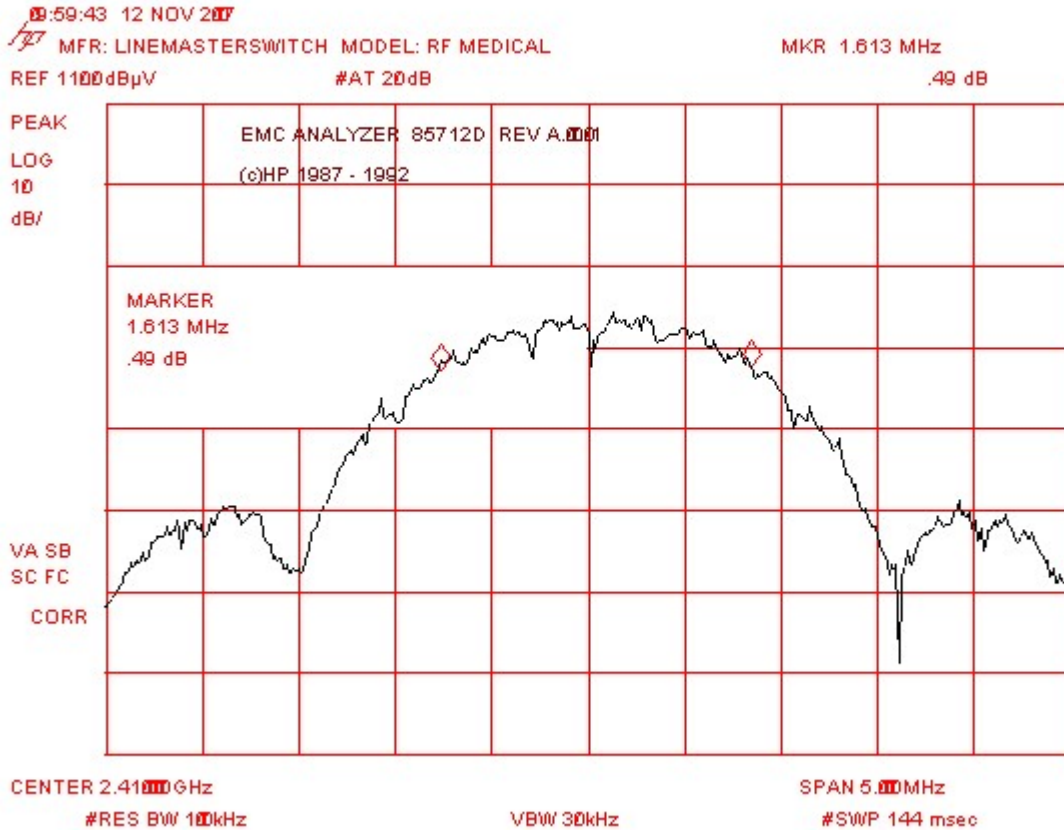
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#### 4.1.5 Summary of Final Data

NOTES:

#### Spectrum Bandwidth Low Frequency



#### ANTENNA/COUPLER:

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

#### MEAS TYPE:

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

#### POLARIZATION:

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

#### DISTANCE:

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

#### LOCATION:

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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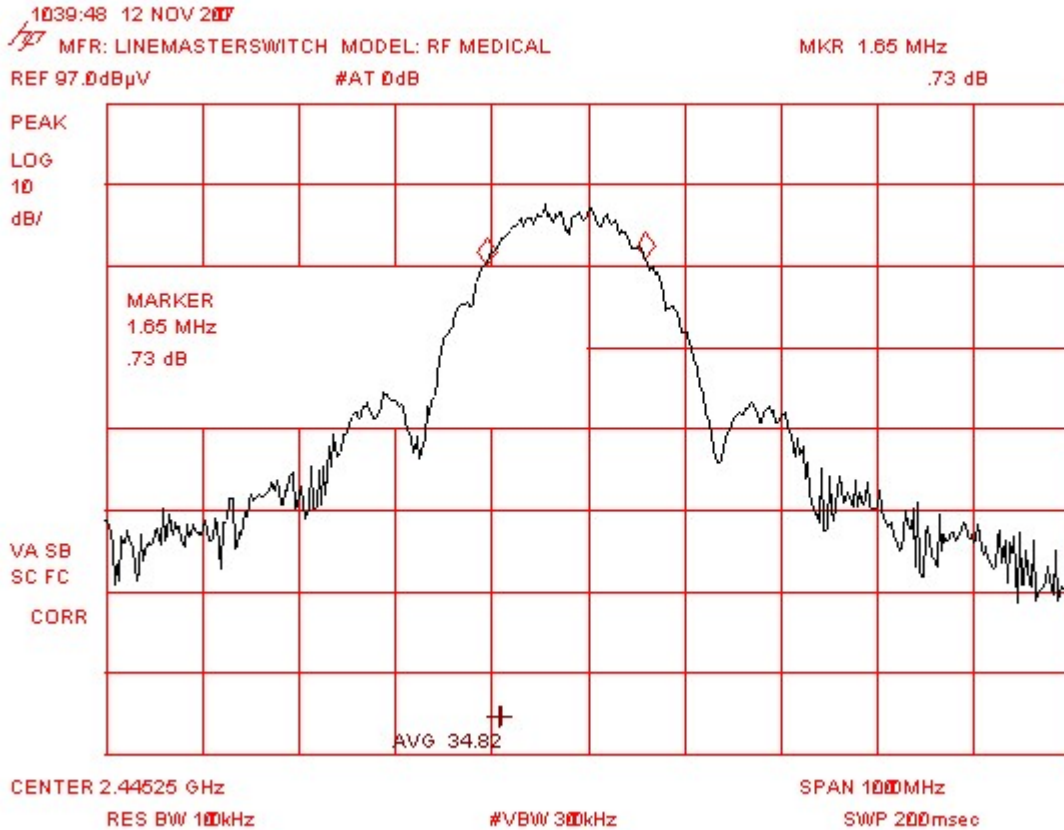
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NOTES:

**Spectrum Bandwidth  
Middle Frequency**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other

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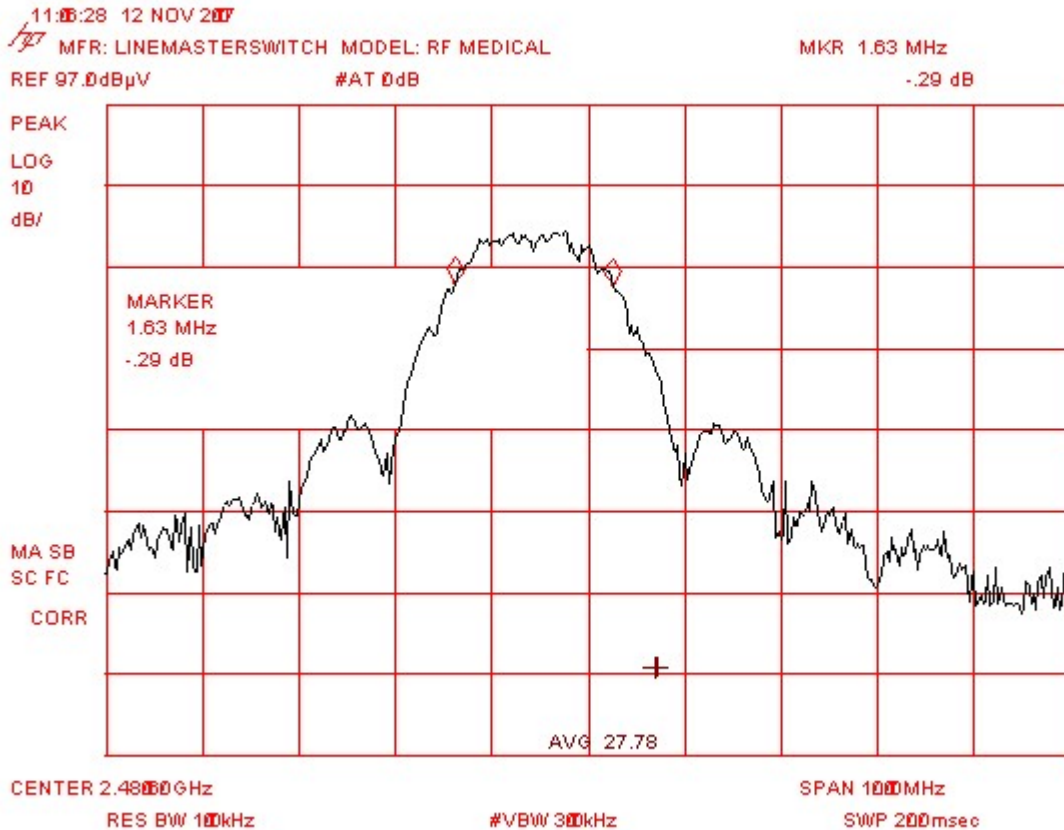
Report No.:

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NOTES:

**Spectrum Bandwidth  
High Frequency**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other

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#### 4.1.6 Tabulated Test Data

Radiated Emissions Measurements						
Standard:	47 CFR 15.247 (a) (2)				Date:	11/12/2007
Device Tested:	Linemaster Switch - Industrial Switch				File:	0711110 6dB Bandwith.xls
					</	

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#### 4.1.7 Photos

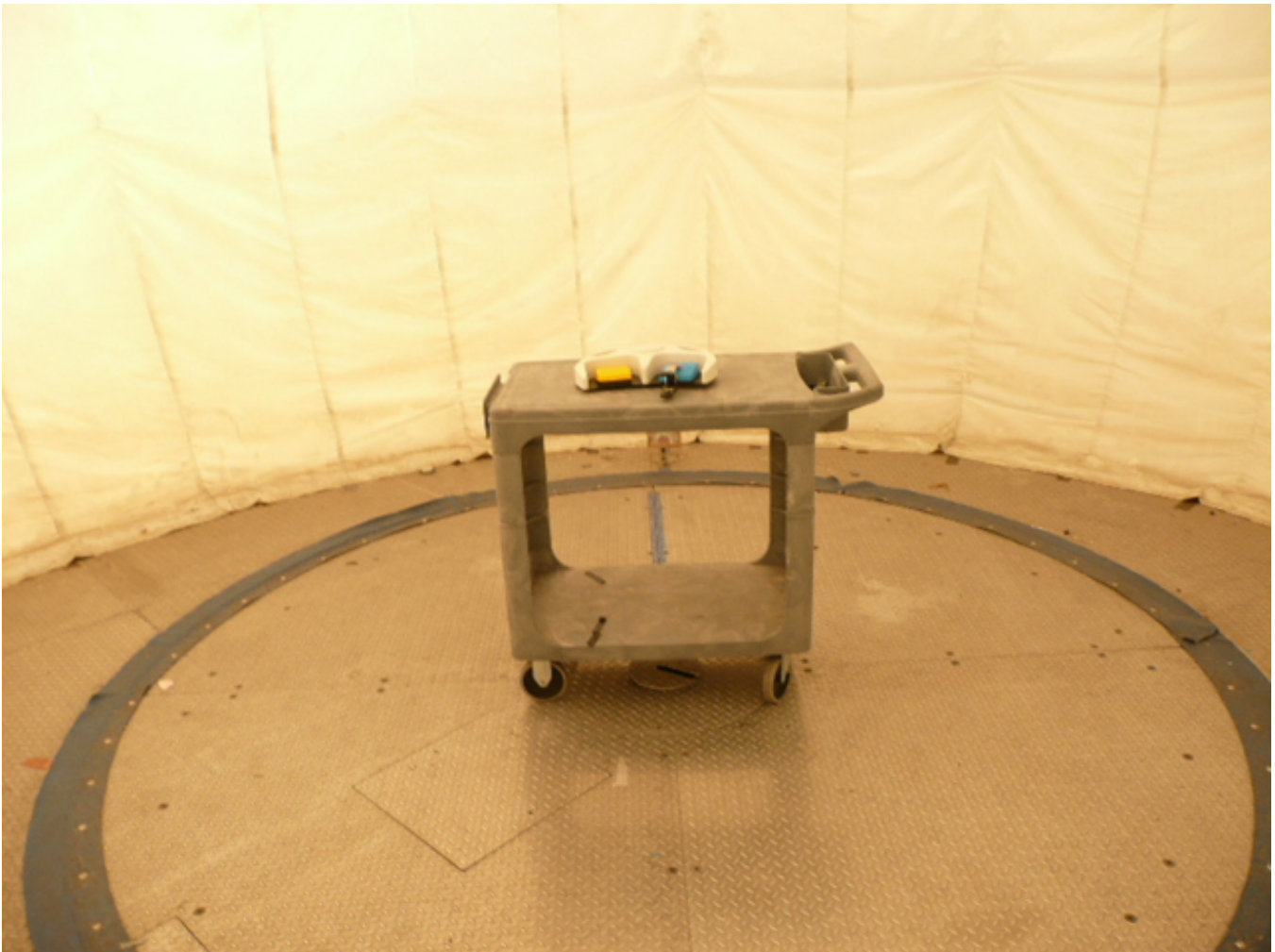


Figure 2 - Radiated Emissions Test Setup (O.A.T.S.)

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## 4.2 Maximum Output Power

This test measures the radiated electromagnetic levels of the intentional radiator generated by the EUT through the antenna port.

### 4.2.1 Over View of Test

Results	Complies (as tested per this report)				Date	11/12/2007	
Standard	FCC Part 15.247 (b) (3)						
Product Model	RF Medical Switch			Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details						
Test Set-up	Tested @ 3m on O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar
Frequency Range	2.405GHz - 2.480GHz @ 3m						
Perf. Criteria	1 Watt (30dBm) (Bellow Limit )	Perf. Verification		Readings Under Limit for L1 and L2			
Mod. to EUT	None	Test Performed By		Dieter Baldamus			

### 4.2.2 Test Procedure

Radiated emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. In addition the alternative test procedure, described in the "Measurement of Digital Transmission Systems", from March 23, 2005, was followed.

The photos included with the report show the EUT in its maximized configuration.

The frequency range from 2.405-2.480 GHz was investigated for radiated emissions, testing the lowest middle and highest channels.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 3m OATS.

### 4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan.

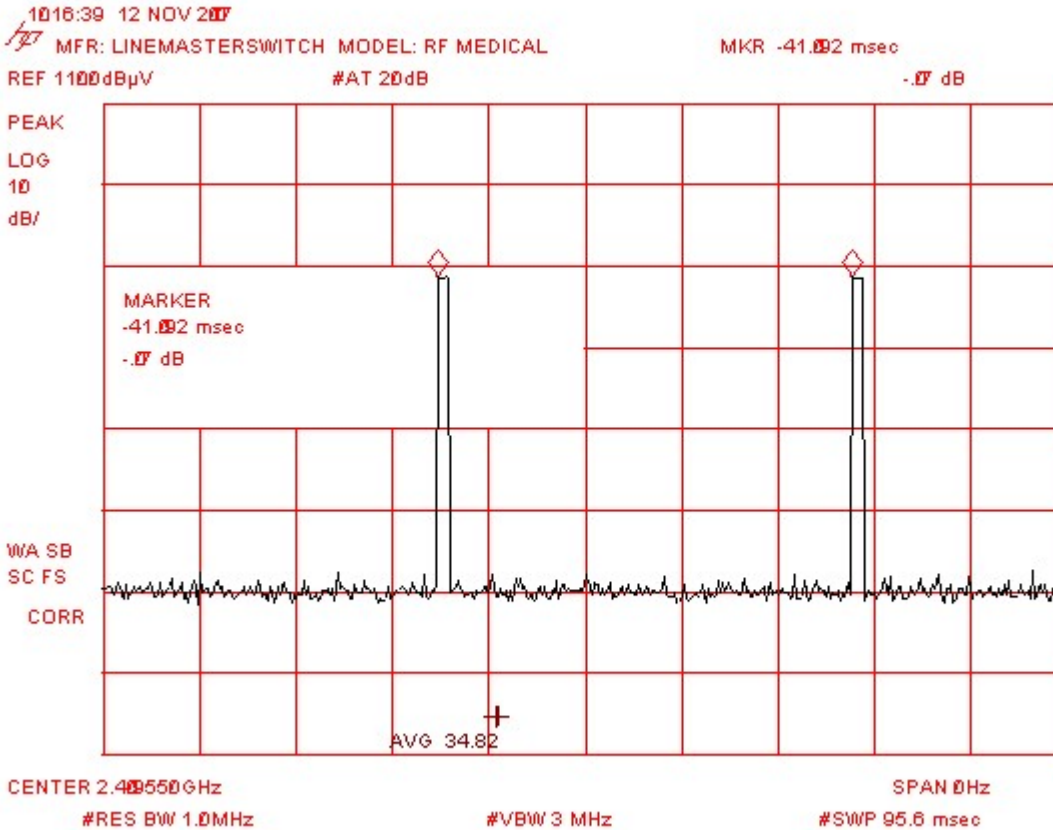
### 4.2.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

#### 4.2.5 Summary of Final Data

NOTES:

#### Duty Cycle Measurement



#### ANTENNA/COUPLER:

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

#### MEAS TYPE:

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance  
Power  
☐  
Other \_\_\_\_\_

#### POLARIZATION:

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

#### DISTANCE:

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

#### LOCATION:

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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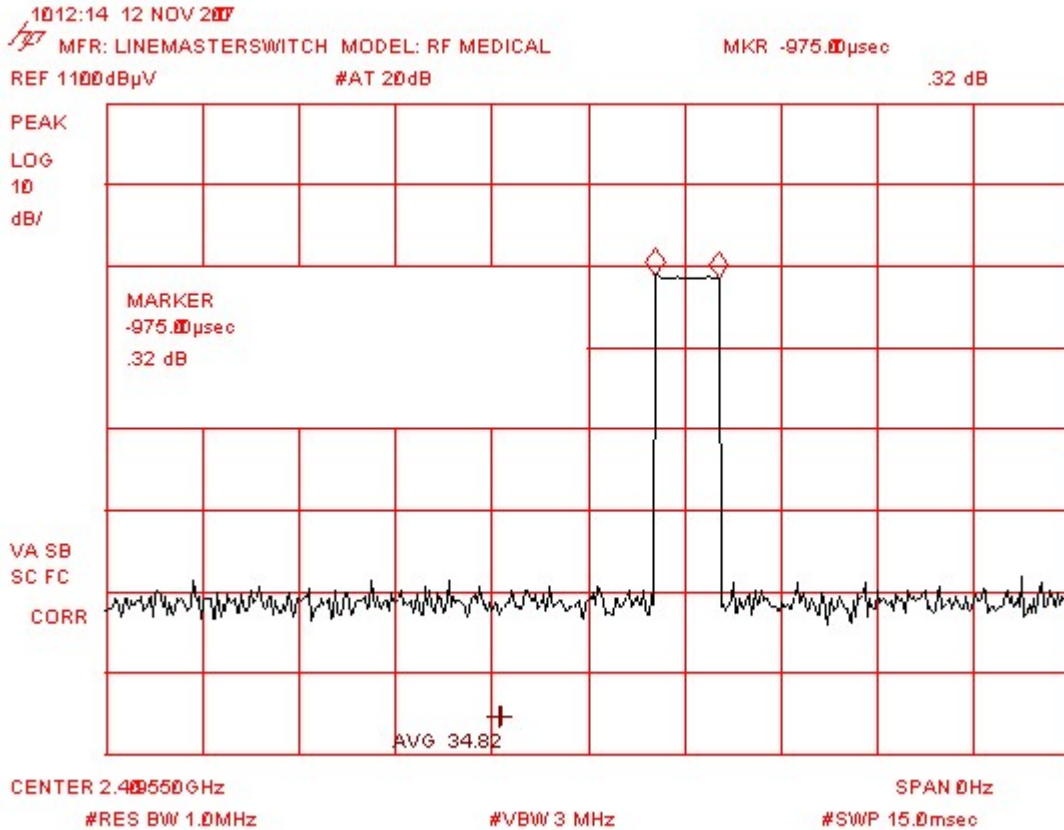
Report No.:

30762628.005

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NOTES:

**Duty Cycle Measurement**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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## 4.2.6 Tabulated Test Data

Radiated Emissions Measurements													
Standard:		47 CFR 15.247(b)(3)											
Device Tested:		Unimaster switch - Industrial Switch											
		Pre scan/Final: Final											
		Distance: 3.0m											

Average Values were calculated based on the duty cycle of the transmission frequency

Measured Pulse is 0.895µSec, and there are 1.6 packages in 100ms

$$\text{Duty Cycle} = 0.895 \times 1.6 / 100 = 0.01432$$

$$\text{Duty Cycle} = 20 \log (0.01432) = -36.8811$$

Average Value = Peak Value (in dBµV) – Duty Cycle

Corrected Measurement Peak (dBµV/m) = Measured Peak + Antenna Correction Factor – Cable & Amplifier correction factor

According to Alternative test Procedure of DTS from March 23, 2005

Total EIRP = (E\*d) squared/(30\*G)

e.g. for 2.40935 GHz

$$= (0.0704 \times 3)^2 / (30 \times 2) = 0.0007413 \text{ watts}$$

$$= -1.299981 \text{ dBm}$$

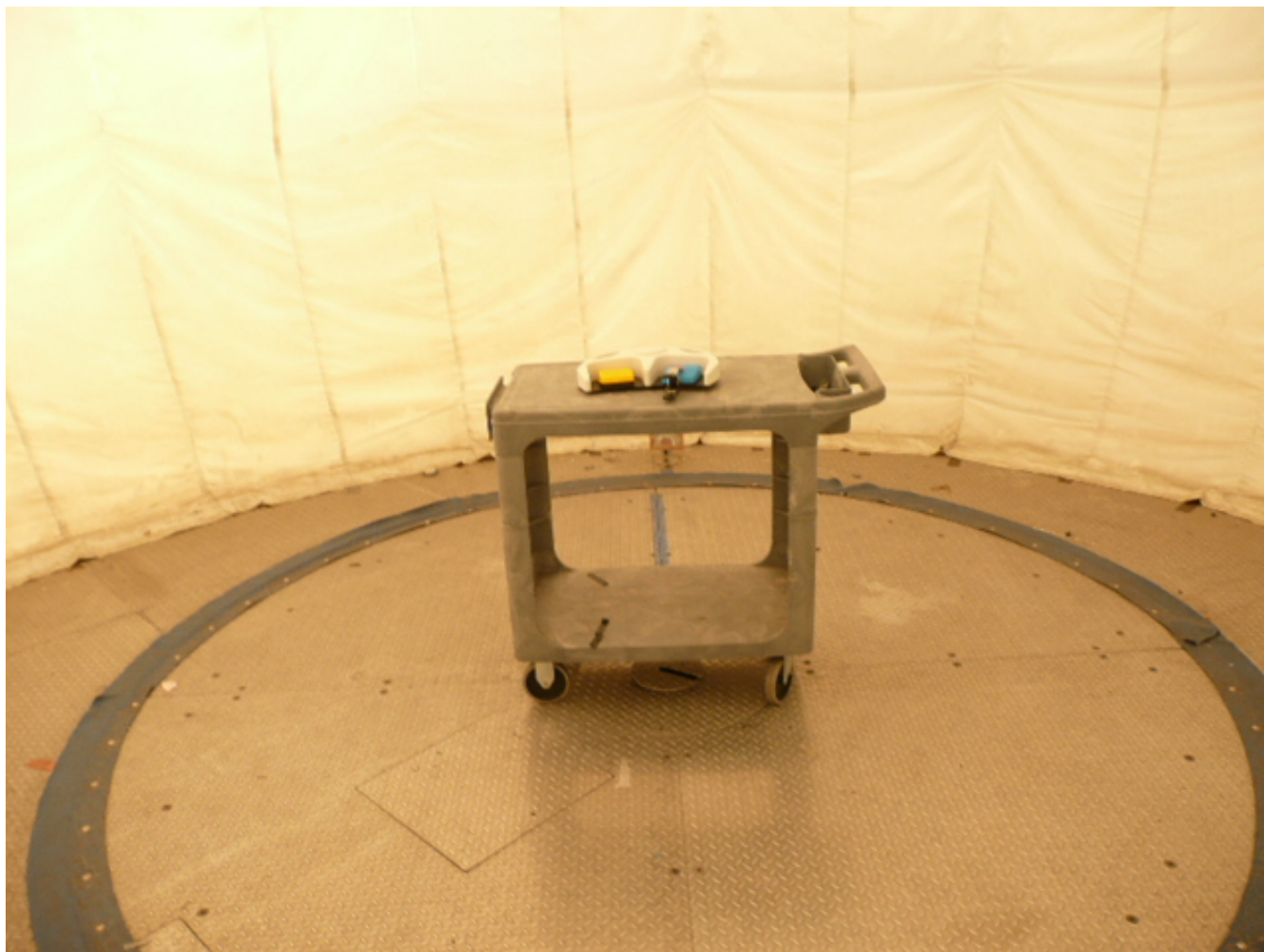


Figure 3 – Maximum Output Power (O.A.T.S)

### 4.3 RF Human Exposure Limits

This test evaluates the RF Human Exposure to prove the safety of radiation harmfulness to human body.

#### 4.3.1 Test Over View

Results	Complies (as tested per this report)					Date	11/11/2007	
Standard	FCC Part 15.247 (b)(5) and 1.1310							
Product Model	RF Medical Switch				Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details							
Test Set-up	NA							
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar	
Frequency Range	2.405GHz - 2.480GHz @ 3m							
Perf. Criteria	1.0 (mW/cm2) (Bellow Limit)			Perf. Verification		Readings under Limit		
Mod to EUT	None			Test Performed By		Dieter Baldamus		

#### 4.3.2 Test Procedure

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Semi-Anechoic Chamber, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula (see section 4.9.6) and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

#### 4.3.3 RF Exposure Limit

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)



**LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
300-1500	...	...	F/1500	6
1500-100,000	...	...	1.0	30

F = Frequency in MHz

#### 4.3.4 Deviations

There were no deviations from the test methodology listed in the test plan

#### 4.3.5 Antenna Gain

The maximum Gain measured in the OATS is 3.24 dBi or 2.109 (numeric).

#### 4.3.6 Test Results

##### ***Output Power into Antenna & RF Exposure value at distance 20cm:***

Calculations for this report are based on highest power measurement and the highest gain of the antenna. Limit for MPE (from FCC part 1.1310 table 1) is 1.0 mW/cm<sup>2</sup> for 2.4-2.483.5 GHz.

Highest Pout is 0.74 mW (-1.29dBm), (Including antenna gain) and R is 20cm.

$P_d = (0.74) / (4 * \pi * 20^2) = 0.0001472 \text{ mW/cm}^2$ , which is 0.9985 mW/cm<sup>2</sup> below to the limit.

#### Sample Calculation

The Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where;

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi \approx 3.1416$

R = distance between observation point and center of the radiator in cm

Ref.: David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

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## 4.4 Radiated Spurious Emissions

This test measures the radiated electromagnetic levels of the intentional and unintentional radiator generated by the EUT.

### 4.4.1 Test Over View

Results	Complies (as tested per this report)				Date	11/ 11 <sup>th</sup> – 12 <sup>th</sup> /2007	
Standard	FCC Part 15.247 (c), 15.205, 15.209						
Product Model	RF Medical Switch			Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details						
Test Set-up	Tested @ 3m on O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar
Frequency Range	2.405GHz - 2.480GHz @ 3m						
Perf. Criteria	-20dBc, 15.205 (a), 15.209 (a)			Perf. Verification	Readings under Limit		
Mod to EUT	None			Test Performed By	Dieter Baldamus		

### 4.4.2 Test Procedure

Radiated and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 2.405-2.480 GHz was investigated for radiated emissions, testing the lowest middle and highest channels.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 3m OATS.

### 4.4.3 Deviations

There were no deviations from the test methodology listed in the test plan.

### 4.4.4 Final Test

The Radiated Spurious Emissions of the EUT were below the limits specified in the standard.

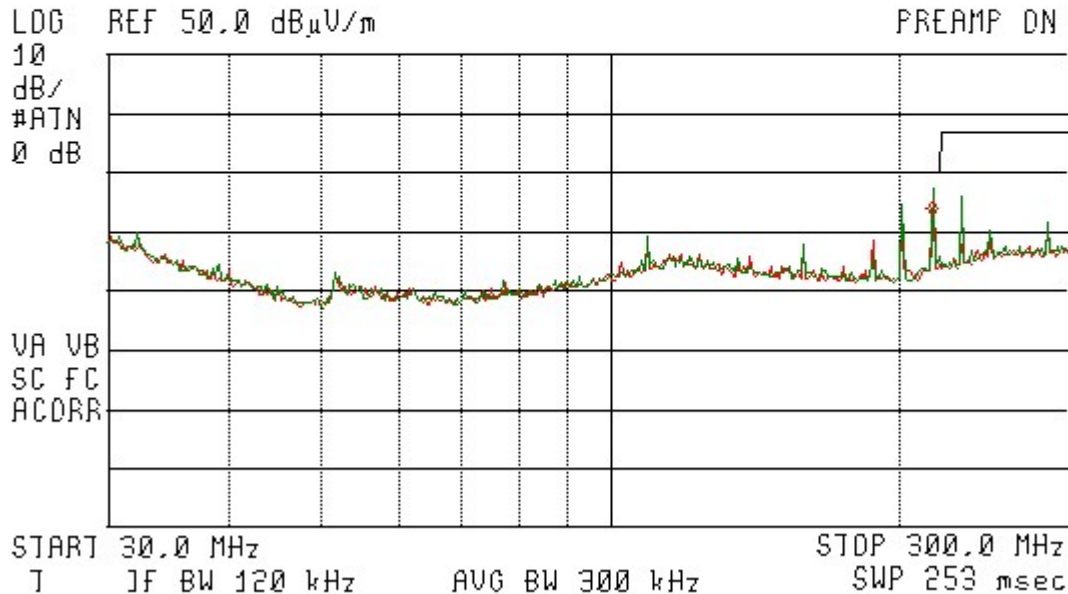


#### 4.4.5 Summary of Final Data

##### NOTES:

##### Radiated Emissions Prescan

09:59:18 NOV 12, 2007  
MFR: LINEMASTERSWITCH MODEL: RF MEDICAL SWITCH PRESC  
MARKER  
224.4 MHz  
22.59 dB $\mu$ V/m  
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 224.4 MHz  
22.59 dB $\mu$ V/m



##### ANTENNA/COUPLER:

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

##### MEAS TYPE:

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

##### POLARIZATION:

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

##### DISTANCE:

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

##### LOCATION:

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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Report No.:

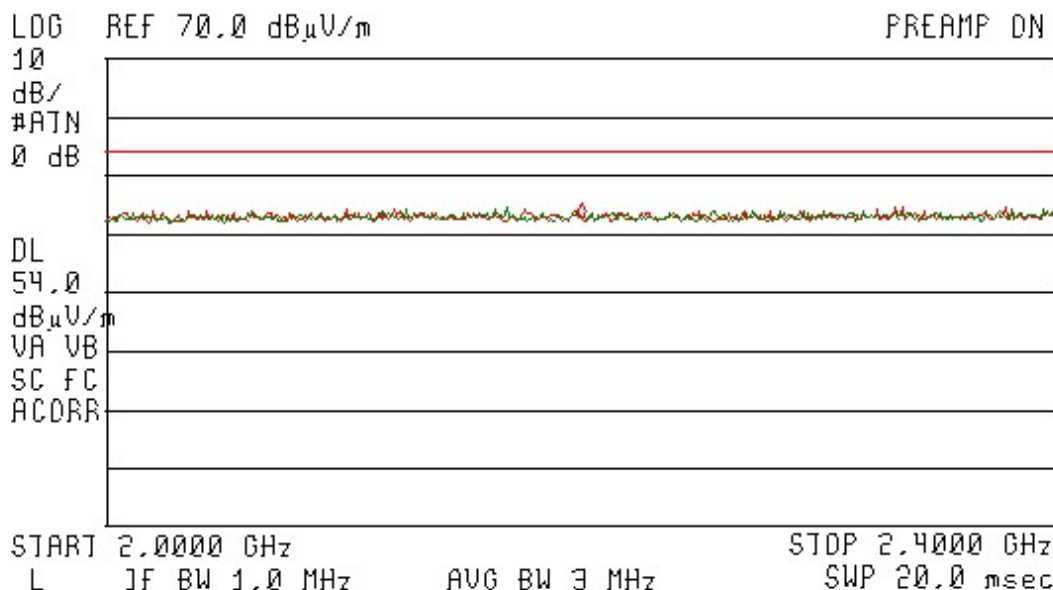
30762628.005

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NOTES:

**Radiated Spurious Emissions Prescan**

10:18:17 NOV 12, 2007  
MFR: LINEMASTERSWITCH MODEL: RF MEDICAL SWITCH PRESC  
MARKER 2.2000 GHz  
42.42 dB $\mu$ V/m  
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.2000 GHz  
42.42 dB $\mu$ V/m



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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Report No.:

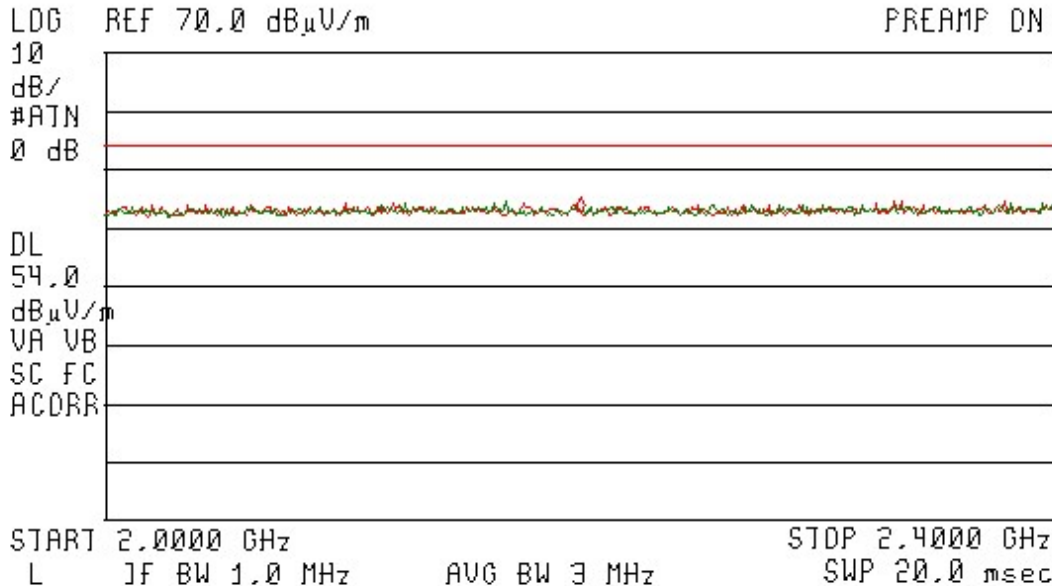
30762628.005

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NOTES:

**Radiated Spurious Emissions Prescan**

10:18:17 NOV 12, 2007  
MFR: LINEMASTERSWITCH MODEL: RF MEDICAL SWITCH PRESC  
MARKER 2.2000 GHz  
42.42 dB $\mu$ V/m  
ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.2000 GHz  
42.42 dB $\mu$ V/m



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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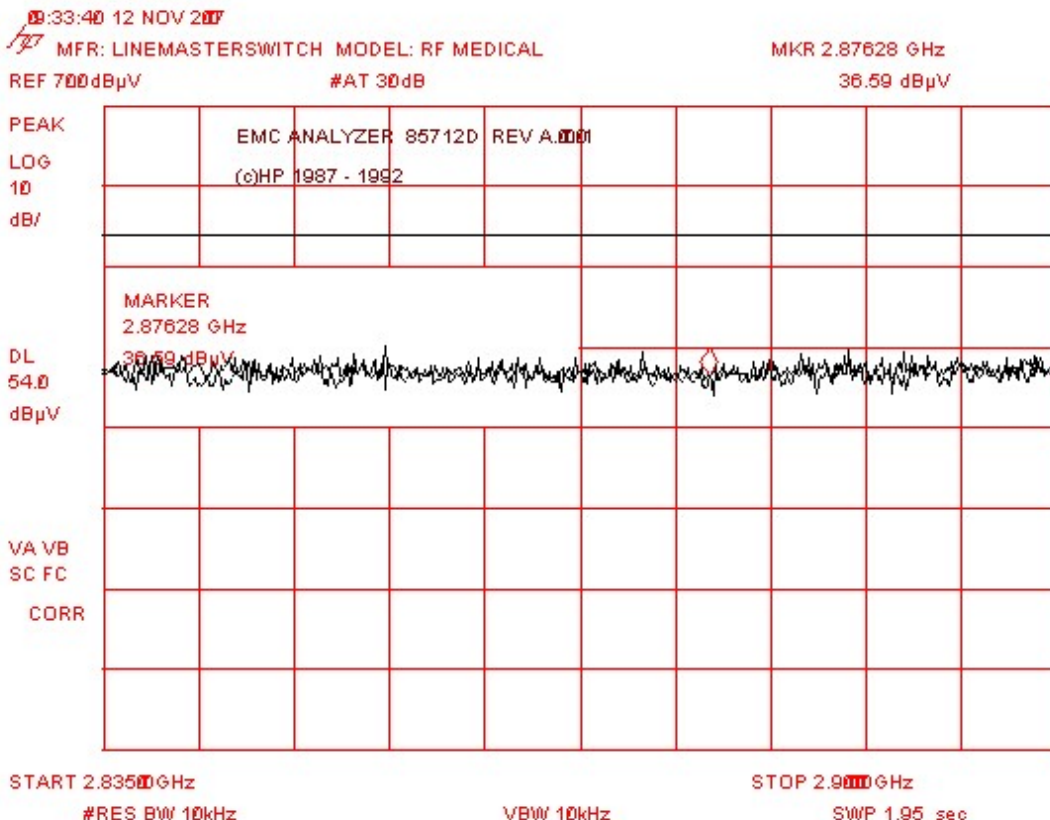
Report No.:

30762628.005

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NOTES:

**Radiated Spurious Emissions Prescan**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon     | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input type="checkbox"/> 3115 Horn      | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan
- ☐ Radiated Final
- ☐ Conducted
- ☐ Disturbance Power
- ☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical
- ☒ Horizontal
- ☐ Line
- ☐ Neutral
- ☐ NA

**DISTANCE:**

- ☒ 3 Meter
- ☐ 10 Meter
- ☐ \_\_\_\_\_ Meter
- ☐ NA

**LOCATION:**

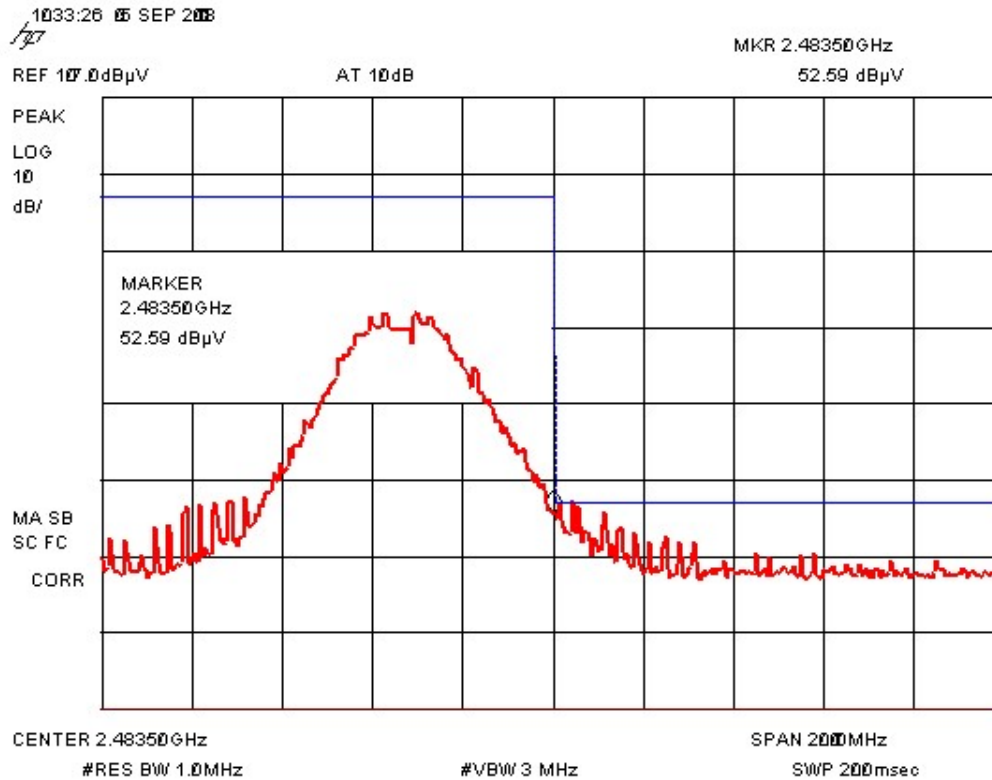
- ☐ OATS
- ☐ Semi-Anechoic
- ☒ Shielded Room
- ☐ Factory Floor
- ☐ Other \_\_\_\_\_

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#### 4.4.6 Band Edge Graphs

##### NOTES:

##### Band Edge Measurement (Radiated)



##### ANTENNA/COUPLER:

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

##### MEAS TYPE:

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

##### POLARIZATION:

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

##### DISTANCE:

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

##### LOCATION:

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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#### 4.4.7 Tabulated Test Data

Radiated Emissions Measurements												Date: 11/11/2007				
Standard: 47 CFR 15.247 (G) 15.209 and 15.205												File: 07111105 RE Spurious Emissions.xls				
Device Tested: Linemaster Switch-Medical Switch																
										Prescan/Final						
										Distance: 3.0m						
Meas #	Freq (MHz)	Measured Peak (dBµV/m)	Antenna Correction Factor (dB)	Cable & Amplifier Correction Factor (dB)	Corrected Measured Peak (dBµV/m)	Duty Cycle (dBµV)	Corrected Average Value (dBµV/m)	15.209 Limit (dBµV/m)	15.209 Limit Δ (dBµV/m)	15.247 Average Limit (-20dBc) (dBµV/m)	15.247 Average Limit Δ (dBµV/m)	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
Lower Channel																
1	2410.65	89.45	31.20	16.20	104.45								Horizontal	187	2.66	
2	2407.75	89.45	31.10	16.20	84.35								Horizontal	187	2.66	-20dBc
3	2400.00	52.59	31.30	16.20	67.69	-36.06	29.63	53.98	-24.35	84.45	-54.82	Complied	Horizontal	187	2.66	at bandedge
4	4620.14	43.73	31.10	16.40	59.43	-36.06	20.37	53.98	-33.61	84.45	-64.08	Complied	Horizontal	6	1.00	2nd Harmonic
Middle Channel																
5	2445.75	87.79	31.20	16.30	102.69								Horizontal	180	2.29	
6	4689.00	42.18	31.10	16.40	56.88	-36.06	18.82	53.98	-35.16	82.69	-63.87	Complied	Horizontal	356	1.00	2nd Harmonic
High Channel																
7	2479.65	85.19	31.10	16.40	99.89								Horizontal	183	2.45	
8	2462.85	85.19	31.10	16.30	79.99								Horizontal	183	2.45	-20dBc
9	2463.50	58.23	31.10	16.30	73.03	-36.06	34.97	53.98	-19.01	79.89	-44.92	Complied	Horizontal	183	2.45	at bandedge
10	4959.10	40.70	31.10	16.40	55.40	-36.06	17.34	53.98	-36.64	79.89	-62.55	Complied	Horizontal	3	1.00	2nd Harmonic
Tested by: Dieter Baldamus																
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel (203) 426-0888 Fax: (203) 426-4009																
Average Values were calculated based on the duty cycle of the transmission frequency																
Measured Duty Cycle is a 0.975msec package in 78ms																
Duty Cycle = 0.975ms/78ms = 1.25%																
Duty Cycle = 20log (0.0125) = -38.0618																
Average Value = Peak Value (in dBµV/m) - Duty Cycle																
Corrected Measured Peak (dBµV/m) = Measured Peak + Antenna Correction Factor - Cable & Amplifier Correction Factor																
Corrected Average = Corrected Measured Peak + Duty Cycle																
All Emissions are within the restricted band specified at FCC part 15.205 (a)																

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#### 4.4.8 Photos



Figure 4 - Radiated Spurious Emissions Test Setup (Semi-Anechoic Chamber 2)

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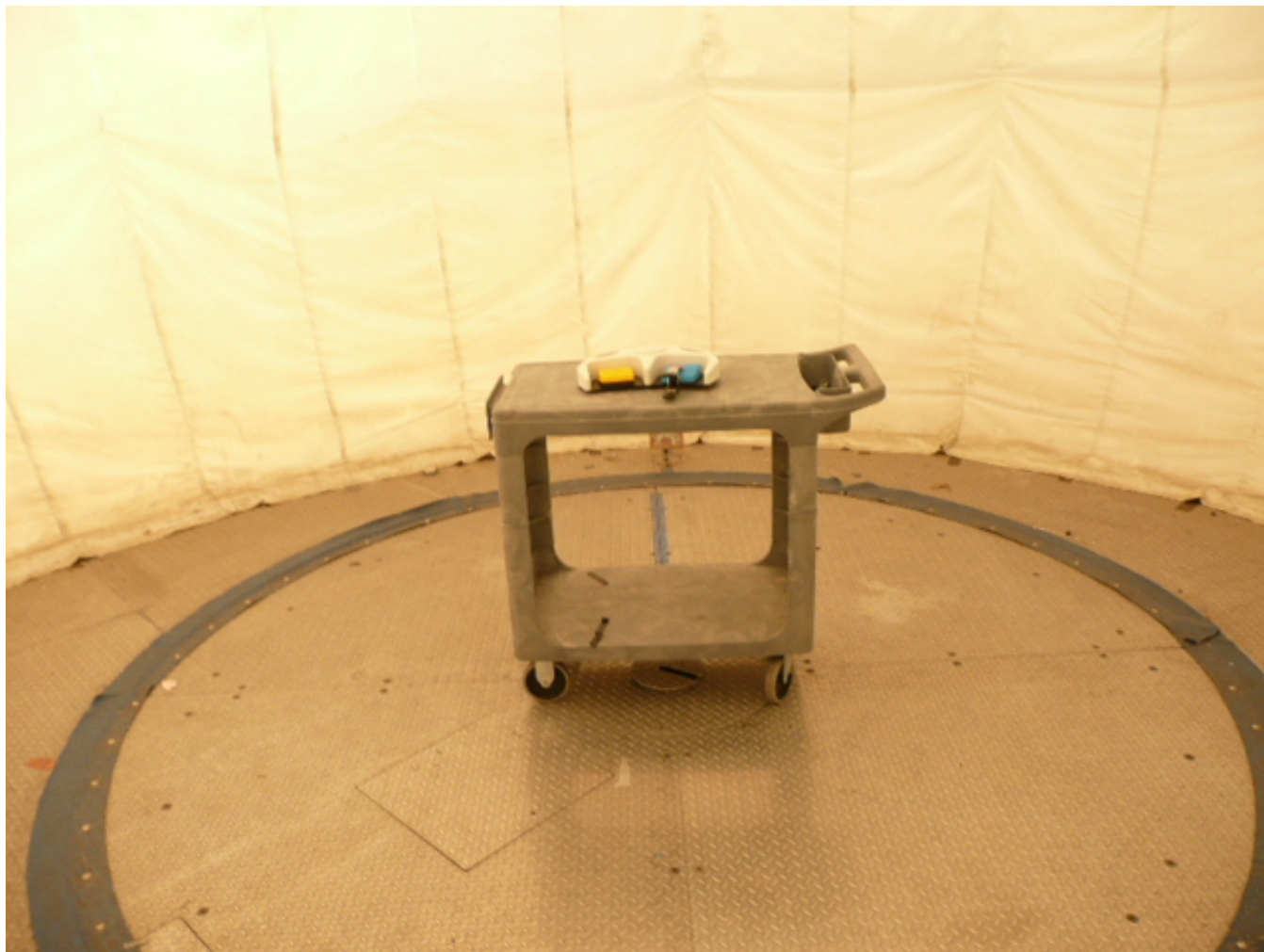


Figure 5 - Radiated Spurious Emissions Test Setup (O.A.T.S.)



## 4.5 Transmitter Power Density Spectrum

This test is to evaluate

### 4.5.1 Test Over View

Results	Complies (as tested per this report)					Date	11/12/2007	
Standard	FCC Part 15.215 (c)							
Product Model	RF Medical Switch				Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details							
Test Set-up	Tested @ 3m on O.A.T.S. placed on turn-table, see test plans for details							
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar	
Frequency Range	2.405GHz - 2.480GHz @ 3m							
Perf. Criteria	8dBm in a 3kHz BW			Perf. Verification	Readings under Limit			
Mod to EUT	None			Test Performed By	Dieter Baldamus			

### 4.5.2 Test Procedure

The PSD Option 2 test procedure, described in the "Measurement of Digital Transmission Systems", from March 23, 2005, was followed.

The Radiated Power Density was performed using a 100 sweeps over a 3kHz Resolution bandwidth and a 10 kHz Video bandwidth using a Peak detector.

The frequency range from 2.405-2.480 GHz was investigated for radiated emissions, testing the lowest middle and highest channels

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 3m OATS

### 4.5.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Transmitter Power Density Immunity test.

### 4.5.4 Final Test

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.

#### 4.5.5 Test Results

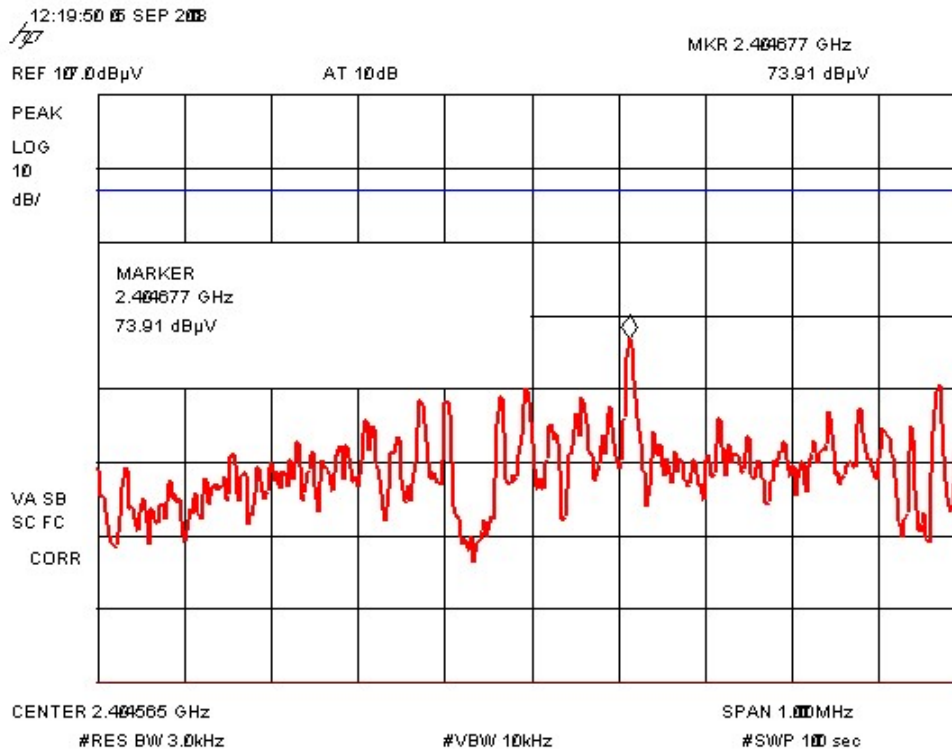
Radiated Emissions Measurements - Power Spectral Density										
Standard:		47 CFR 15.247 (d)						Date:	11/12/2007	
Device Tested:		Linemaster Switch - Industrial Switch						File:	07111104 P.S.D.xls	
Meas #	Freq (MHz)	Measured Peak (dBμV/m)	Antenna Correction Factor (dB)	Cable & Amplifier Correction Factor (dB)	Corrected Measured Peak (dBμV/m)	Measured Power Spectral Density (dBm)	Minimum Limit (MHz)	Minimum Limit Δ (Measured PSD - Limit)	Result	Comment
Channel 1 (2410GHz)	2410.09	76.42	31.10	23.60	83.92	-23.07	8.0000	-31.07	Complied	
Channel 8 (2450GHz)	2445.16	73.93	31.20	23.70	81.43	-25.56	8.0000	-33.56	Complied	
Channel 15 (2480GHz)	2480.07	72.23	31.10	23.09	80.24	-26.75	8.0000	-34.75	Complied	
Tested by:		Dieter Baldamus								
TUV Rheinland of North America, Inc.				12 Commerce Road		Newtown, CT 06470	Tel:(203) 426-0888 Fax: (203) 426-4009			
Corrected Measured Peak = Measured Peak + Antenna Factor - Cable & Amplifier Correction Factor										

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#### 4.5.6 Summary of Final Data

##### NOTES:

##### Transmitter Power Density Measurement Low Channel



##### ANTENNA/COUPLER:

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

##### MEAS TYPE:

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

##### POLARIZATION:

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

##### DISTANCE:

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

##### LOCATION:

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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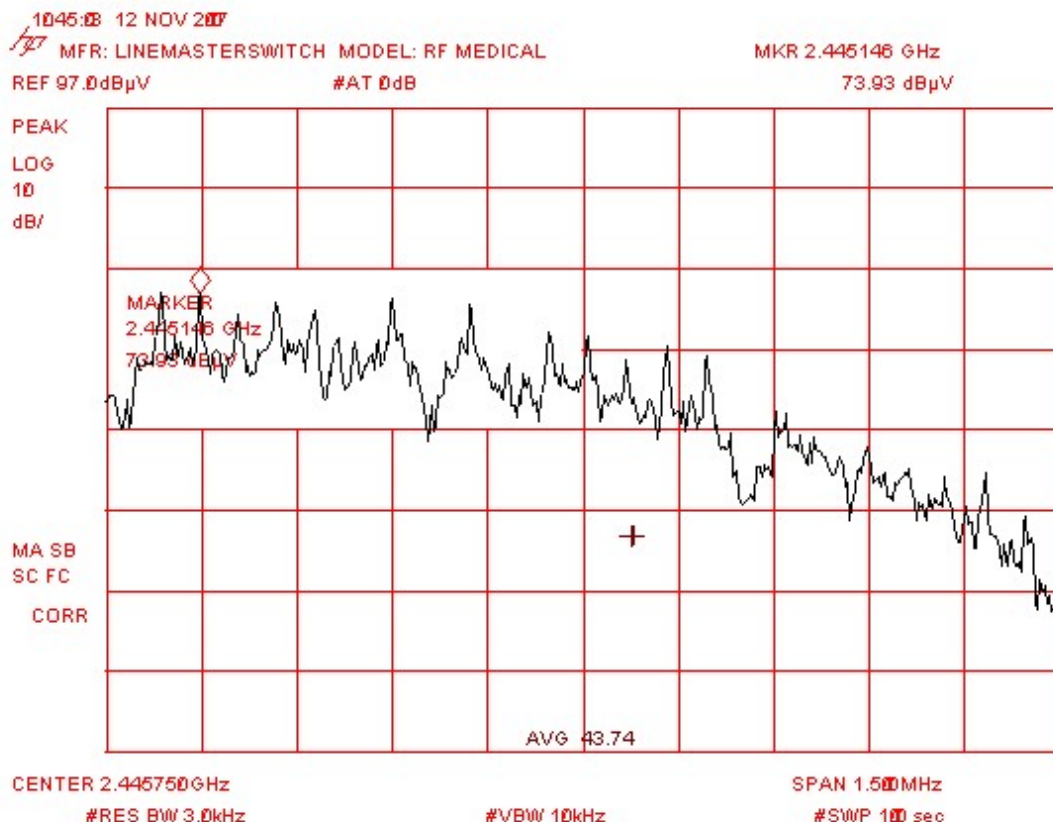
Report No.:

30762628.005

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NOTES:

**Transmitter Power Density Measurement  
Middle Channel**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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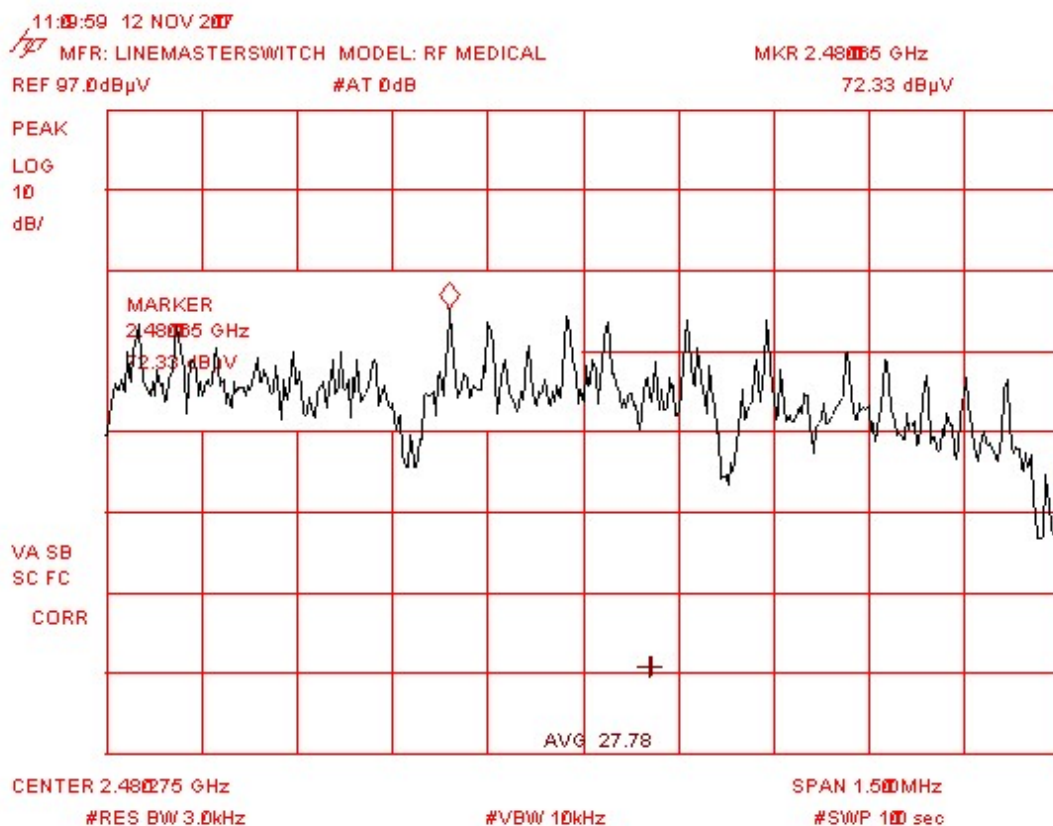
Report No.:

30762628.005

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NOTES:

**Transmitter Power Density Measurement  
High Channel**



**ANTENNA/COUPLER:**

- |                                       |   |   |  |
|---------------------------------------|---|---|--|
| <input type="checkbox"/> 9124 Bicon   | <input type="checkbox"/> 3109 Bicon           | <input type="checkbox"/> CBL6140 X-Wing | <input type="checkbox"/> NNB-4/63TL LISN |
| <input type="checkbox"/> 3146 Log Per | <input checked="" type="checkbox"/> 3115 Horn | <input type="checkbox"/> JB3 Bilog      | <input type="checkbox"/> NNB-4/200X LISN |
| <input type="checkbox"/> 3106 Horn    | <input type="checkbox"/> CBL6112B Bilog       | <input type="checkbox"/> NSLK 8126 LISN | <input type="checkbox"/> MDS-21 Clamp    |

**MEAS TYPE:**

- ☒ Radiated Prescan  
☐ Radiated Final  
☐ Conducted  
☐ Disturbance Power  
☐ Other \_\_\_\_\_

**POLARIZATION:**

- ☒ Vertical  
☒ Horizontal  
☐ Line  
☐ Neutral  
☐ NA

**DISTANCE:**

- ☒ 3 Meter  
☐ 10 Meter  
☐ \_\_\_\_\_ Meter  
☐ NA

**LOCATION:**

- ☐ OATS  
☐ Semi-Anechoic  
☒ Shielded Room  
☐ Factory Floor  
☐ Other \_\_\_\_\_

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#### 4.5.7 Photos



Figure 6 – Transmitter Power Density Spectrum (Semi-Anechoic Chamber 2)

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## 4.6 Frequency Stability

This test is to evaluate the performance of the EUT when subjected to high-energy disturbances on the power and interconnecting lines.

### 4.6.1 Test Over View

Results	Complies (as tested per this report)				Date	10/09/2007	
Standard	FCC Part 15.215						
Product Model	RF Medical Switch			Serial#	Pt1003t, P1004t, P1005t		
Configuration	See test plan for details						
Test Set-up	Tested @ 3m on O.A.T.S. placed on turn-table, see test plans for details						
EUT Powered By	AC/DC Adapter & Batteries	Temp	22°C	Humidity	45%	Pressure	998mbar
Frequency Range	2.405 GHZ – 2.480GHz		Temperature Range		0°C – 70°C		
Perf. Criteria	Containment of 20dB of frequency range		Perf. Verification		Readings under Limit		
Mod to EUT	None		Test Performed By		Dieter Baldamus		

### 4.6.2 Test Procedure

EUT was place in a temperature chamber. Frequency and output power level were measured at room temperature. Temperature in the chamber was increased to 70°C and maintained till the EUT reached that temperature. Frequency and level was measured again. EUT was placed into a humidity chamber and temperature was set to 0 °C. Temperature was maintained till the EUT reached that temperature. Frequency and level were measured again.

### 4.6.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Surge Immunity test.

### 4.6.4 Final Test

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.



#### 4.6.5 Summary of Final Test Results

Radiated Emissions Measurements - Frequency Stability Test					
Standard:	47 CFR 15.247 (d)		Date:	10/8/2007	
Device Tested:	Linemasterswitch - Industrial Switch		File:	071008711 Freq Stability	
Test Variation:	Temperature Variation				
Meas #	- 20dB Freq (MHz)	Limit Freq (MHz)	Frequency ✓ (MHz)	Result	Comment
Low Bandedge					
22°	2403.24	2400.00	3.24	Complied	
0 °	2401.50	2400.00	1.50	Complied	
70°	2401.20	2400.00	1.20	Complied	
High Bandedge					
22°	2481.45	2483.50	-2.05	Complied	
0 °	2482.50	2483.50	-1.00	Complied	
70°	2482.70	2483.50	-0.80	Complied	
Tested by:	Dieter Baldamus				
TUV Rheinland of North America, Inc. 12 Commerce Road Newtown, CT 06470 Tel:(203) 426-0888 Fax: (203) 426-4009					

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#### 4.6.6 Photos



Figure 7 –Frequency Stability Test Setup – Temperature Chamber at +70°C

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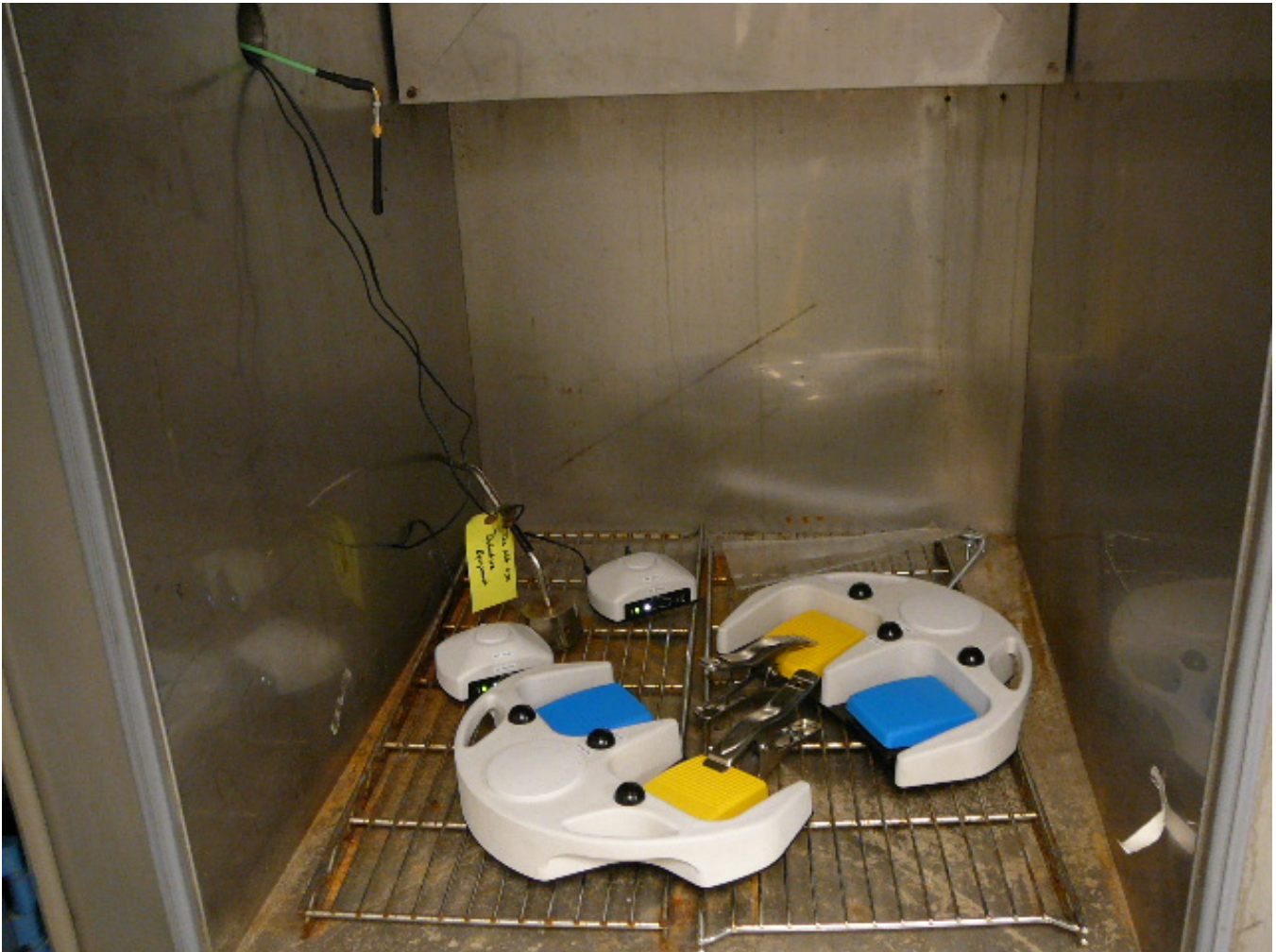


Figure 8 –Frequency Stability Test Setup – Humidity Chamber at 0°C

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## Appendix A

### 5 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

#### 5.1 General Information

<b>Client</b>	Linemaster Switch
<b>Address</b>	29 Plaine Hill Road
<b>Address</b>	Woodstock, CT 06281
<b>Contact Person</b>	Mark Grochowski
<b>Telephone</b>	(860) 974-1000
<b>Fax</b>	(860) 974-0502
<b>email</b>	MGrochowski@linemaster.com

#### 5.2 Model(s) Name

RF Medical Switch

#### 5.3 Type of Product

Footswitch
------------

## 5.4 Equipment Under Test (EUT) Description

The EUT is a wireless foot pedal used for various applications in the industrial environment. The wireless system eliminates the nuisance of wires under foot while invisible waves fill a room with 360° of signal. The EUT consist of a wireless foot pedal transmitter and a receiver; one (the transmitter) used with batteries and one (the receiver) used with an AC/DC adapter. The receiver also sends a signal every second to control de antenna output power of the transmitter.

## 5.5 Product Environment

<input type="checkbox"/>	<b>Residential</b>	<input checked="" type="checkbox"/>	<b>Hospital</b>
<input type="checkbox"/>	<b>Light Industrial</b>	<input checked="" type="checkbox"/>	<b>Small Clinic</b>
<input type="checkbox"/>	<b>Industrial</b>	<input checked="" type="checkbox"/>	<b>Doctor's office</b>
<input type="checkbox"/>	<b>Other</b>		

\*Check all that apply

## 5.6 Countries

<input checked="" type="checkbox"/>	<b>USA</b>
<input type="checkbox"/>	<b>Taiwan</b>
<input type="checkbox"/>	<b>Japan</b>
<input type="checkbox"/>	<b>Europe</b>

\*Check all that apply

## 5.7 Applicable Documents

Standard	Description
FCC Part 15	Rado Frquency Devices -Part C
FCC Part 15.247 (a) (2)	Spectrum Bandwith of a Direct Sequence Spread Spectrum System
FCC Part 15.247 (b)	Maximum Output Power
FCC Part 1.1310	RF Human Exposure Limit
FCC Part 15.247 (c), 15.205, 15.209	Radiated Spurious Emissions
FCC Part 15.247 (d)	Transmitter Power Density of a Direct Sequence Spread Spectrum System
FCC Part 15.207	Conducted Emissions
FCC Part 15.215 (b)	Frequency Stability

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## 5.8 General Product Information

EUT(1)		Transmitter								
Size		H	7.5cm		W	22cm		L	15cm	
Weight		2.5kg			Fork-Lift Needed			No		
EUT(1)		Receiver								
Size		H	8cm		W	12cm		L	8cm	
Weight		2.0kg			Fork-Lift Needed			No		
Notes										

## 5.9 EUT Powered Information

### 5.9.1 Power Type

<input checked="" type="checkbox"/>	<b>AC</b>	<input type="checkbox"/>	<b>DC</b>	<input checked="" type="checkbox"/>	<b>Batteries</b>	<input type="checkbox"/>	<b>Host -</b>
	<b>(Receiver)</b>				<b>(Transmitter)</b>		

### 5.9.2 Power Information

Name	Type	Voltage		Frequency	Current	Notes
		min	max			
6VDC USA AC/DC Adapter	Class 1	120VAC	120VAC	60Hz	500mA	
<b>Notes</b>	AC/DC Adapter Models: GTM341-6-500					

## 5.10 EUT Modes Of operation

The EUT footswitch transmitter has 2 modes of operation. Switch ON or Switch OFF. Both modes were in operation during the test. The receiver was constantly on receiving signals from the footswitch transmitter.

### 5.11 EUT Configurations

Configuration	Description
Configuration 1	Switch ON, Switch OFF
<b>Note:</b> all configurations are the same except as noted above	

### 5.12 EUT Clock/Oscillator Frequencies

<input type="checkbox"/>	Less than 108MHz	FCC – scan up to 1GHz
<input type="checkbox"/>	Less than 500MHz	FCC – scan up to 2GHz
<input type="checkbox"/>	Less than 1000MHz	FCC – scan up to 5GHz
<input checked="" type="checkbox"/>	Greater than 1000MHz	FCC – scan up to 5 <sup>th</sup> Harmonic or 40GHz (2.4GHz)

### 5.13 Electrical Support Equipment

Type	Manufacture	Model	Connected To
NA	NA	NA	NA



#### 5.14 Non - Electrical Support Equipment

Item	Notes
NA	NA

#### 5.15 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Cable Type		
			Length	Shielded	Bead
DC Input	AC/DC Adapter	Receiver	1.5m	No	No

#### 5.16 EUT Doors

<input checked="" type="checkbox"/>	None
<input type="checkbox"/>	For service personnel only
<input type="checkbox"/>	Operator will wear ESD strap
<input type="checkbox"/>	Other

#### 5.17 EUT Grounding

<input type="checkbox"/>	None
<input checked="" type="checkbox"/>	AC line cord – third wire
<input type="checkbox"/>	Via host I/O cable
<input type="checkbox"/>	Other

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## 5.18 EUT Test Program

None

## 5.19 Monitoring of EUT during Testing

During the test a LED in the receiver indicates that the switch of the transmitter is ON. If the LED is off the foot switch is OFF as well.

## 5.20 EUT Configuration Block Diagram

