

## **EMISSIONS TEST REPORT**

**Report Number: 3114493BOX-004**  
**Project Number: 3114493**

**Testing performed on the**

**Merlin Antenna**

**Model: 3638**

**To**

**FCC Part 15 Subpart C 15.249**  
**IC RSS-210 Issue 6 September 2005**

**For**

**St. Jude Medical AB**

Test Performed by:  
Intertek – ETL SEMKO  
70 Codman Hill Road  
Boxborough, MA 01719

Test Authorized by:  
St. Jude Medical AB  
175 84 Järfälla  
Stockholm, Sweden

Prepared by:   
Nicholas Abbondante

Date: 2/16/07

Reviewed by:   
Jeff Goulet

Date: 2/19/07

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## 1.0 Job Description

### 1.1 Client Information

This EUT has been tested at the request of:

**Company:** St. Jude Medical AB  
SE-175 84  
Järfälla, Sweden

**Contact:** Hans Andersen

**Telephone:** +46 8 474 4567

**Fax:** +46 8 761 2905

**Email:** [handersen@sjm.com](mailto:handersen@sjm.com)

### 1.2 Equipment Under Test

**Equipment Type:** Merlin Antenna

**Intended FCC ID:** RIASJMRFANT

**Model Number(s):** 3638

**Serial number(s):** 85200001, 85200093, 900061

**Manufacturer:** St. Jude Medical

**EUT receive date:** 01/15/2007

**EUT received condition:** Prototype in Good Condition

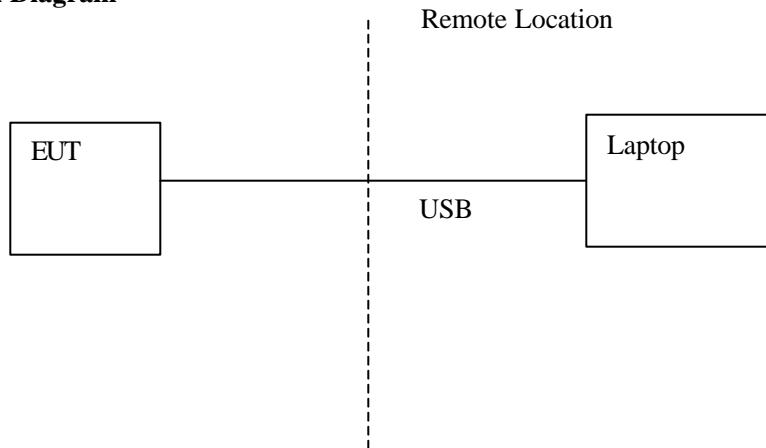
**Test start date:** 01/18/2007

**Test end date:** 02/09/2007

**1.3 Test Plan Reference:** Tested according to the standards listed.

### 1.4 Test Configuration

#### 1.4.1 Block Diagram



**1.4.2. Cables:**

Cable	Shielding	Connector	Length (m)	Qty.
USB	Braid	Metal/USB	2	1
USB	Braid	Metal/USB	2.9	1

**1.4.3. Support Equipment:**

Name: Laptop Computer  
Model No.: Dell Latitude  
Serial No.: WS2330

Name: LG Electronics Inc. Laptop  
Model No.: LGM6  
Serial No.: N/L

Name: LG Electronics Inc. AC Adapter  
Model No.: PA-1900-08  
Serial No.: N/L

**1.5 Mode(s) of Operation:**

The EUT was activated from a fresh battery and was transmitting a modulated carrier during testing. Channels 6, 13, and 20 were utilized for testing unless otherwise indicated.

Ch6 2406.00 MHz  
Ch13 2413.00 MHz  
Ch20 2420.00 MHz

## 2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart C 15.249 IC RSS-210 Issue 6 September 2005		
SUB-TEST	TEST PARAMETER	COMMENT
RF Output Power FCC §15.249, RSS-210 Section A2.9	The fundamental field strength must not exceed 50 mV/meter at 3m test distance (94 dB $\mu$ V/m at 3m).	Pass
Emission Bandwidth FCC §15.215, RSS-Gen Section 4.4	The fundamental frequency must stay within the assigned band.	Pass
Radiated Spurious Emissions FCC §15.205, 15.209, 15.249, RSS-210 Sections 2.7, A2.9	Harmonic emissions must not exceed 500uV/m (54 dB $\mu$ V/m). Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation. Field strength limits are specified at a distance of 3 meters. Emissions falling into the restricted bands of 15.205 must meet the general limits of 15.209.	Pass
AC Line-Conducted Emissions FCC §15.207, RSS-Gen Section 7.2.2	The AC line-conducted emissions must not exceed the FCC 15.207 and RSS-Gen Section 7.2.2 Table 2 limits.	Pass

REVISION SUMMARY – The following changes have been made to this Report:

<u>Date</u>	<u>Project</u>	<u>Project</u>	<u>Page(s)</u>	<u>Item</u>	<u>Description of Change</u>
	<u>No.</u>		<u>Handler</u>		

### 3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

FS = Field Strength in dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB $\mu$ V

RF = Reading from receiver in dB $\mu$ V

LF = LISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF/20)} \text{ where UF = Net Reading in } \mu\text{V}$$

#### Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V}/20)} = 254 \mu\text{V/m}$$

### **3.1 Measurement Uncertainty**

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ( $k = 2$ ) for radiated emissions from 30 to 1000 MHz has been determined to be:

$\pm 3.5$  dB at 10m,  $\pm 3.8$  dB at 3m

The expanded uncertainty ( $k = 2$ ) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 2.6$  dB

The expanded uncertainty ( $k = 2$ ) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

$\pm 3.2$  for ISN and voltage probe measurements

$\pm 3.1$  for current probe measurements

### **3.2 Site Description**

#### **Test Site(s): 2**

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.247, IC RSS-210 Issue 6 September 2005

**Test:** RF Output Power, FCC §15.249, RSS-210 Section A2.9

**Performance Criterion:** The fundamental field strength must not exceed 50 mV/meter at 3m test distance (94 dB $\mu$ V/m at 3m).

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	See Table	Pressure (hPa):	See Table	Ambient (°C):	See Table
Pretest Verification Performed	Yes		Equipment under Test:	3638		

**Test Equipment Used:**

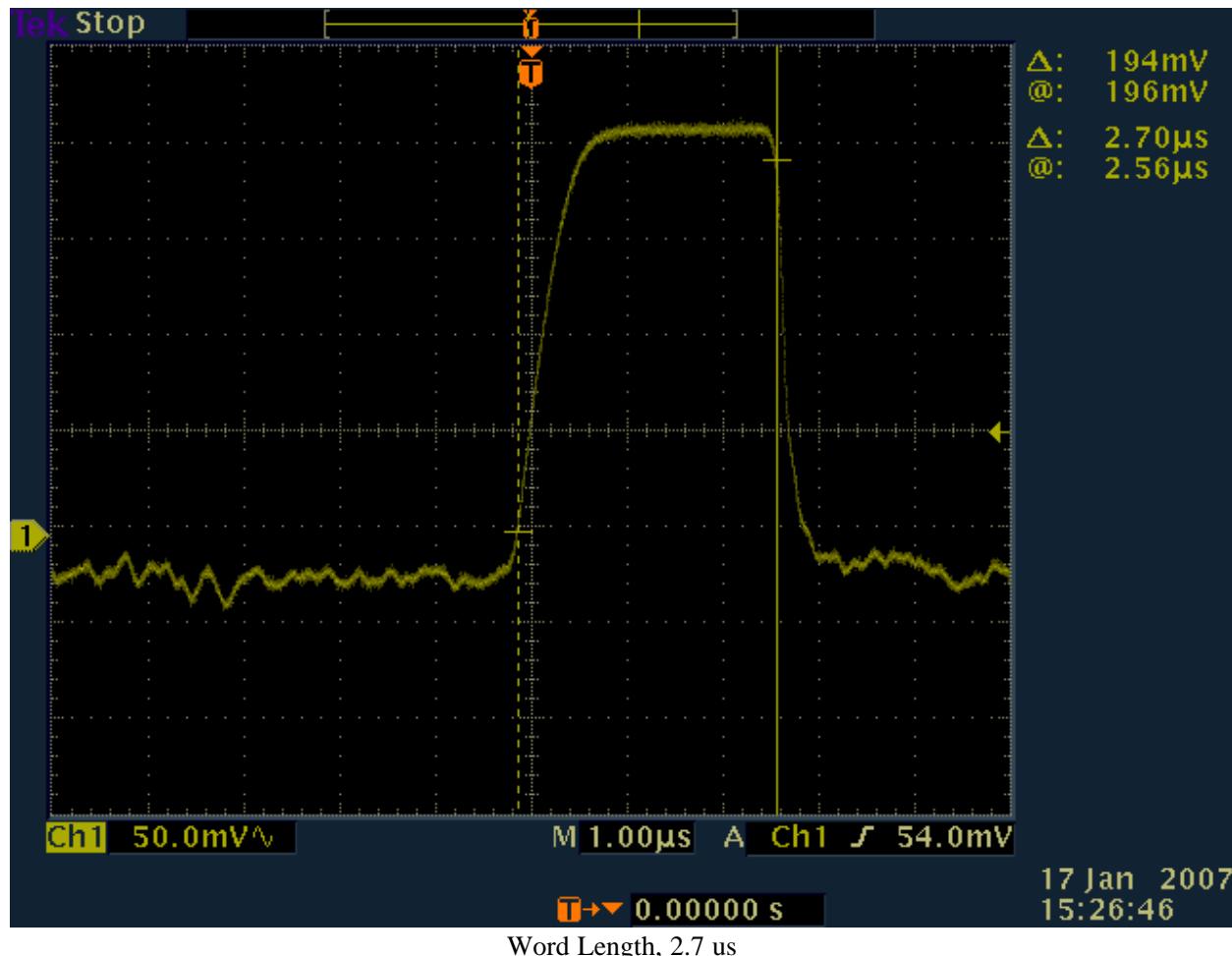
TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
2	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
3	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
4	Oscilloscope, Digital Storage	Tektronix	TDS3052	B014809	03/03/2007
5	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007

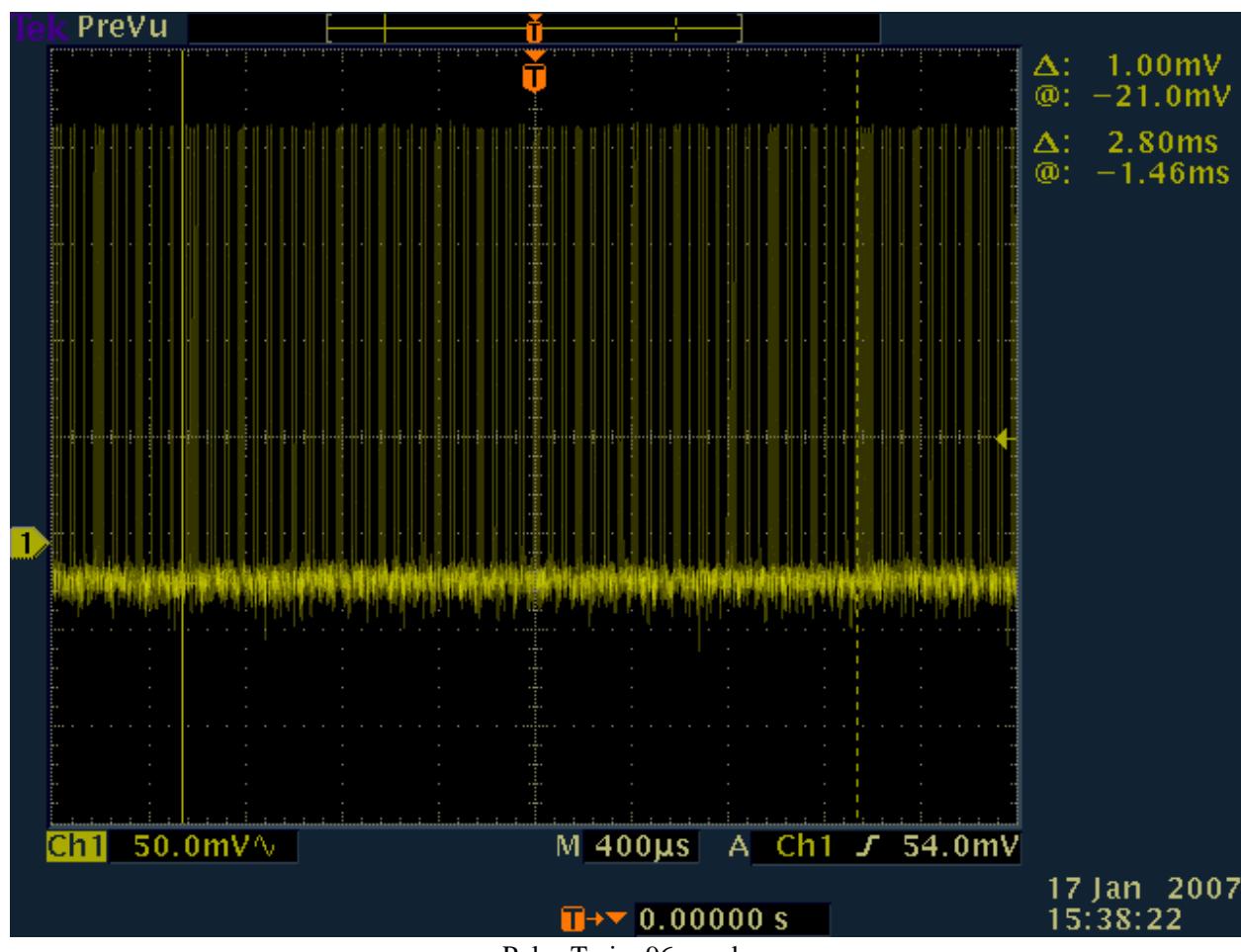
**Software Utilized:**

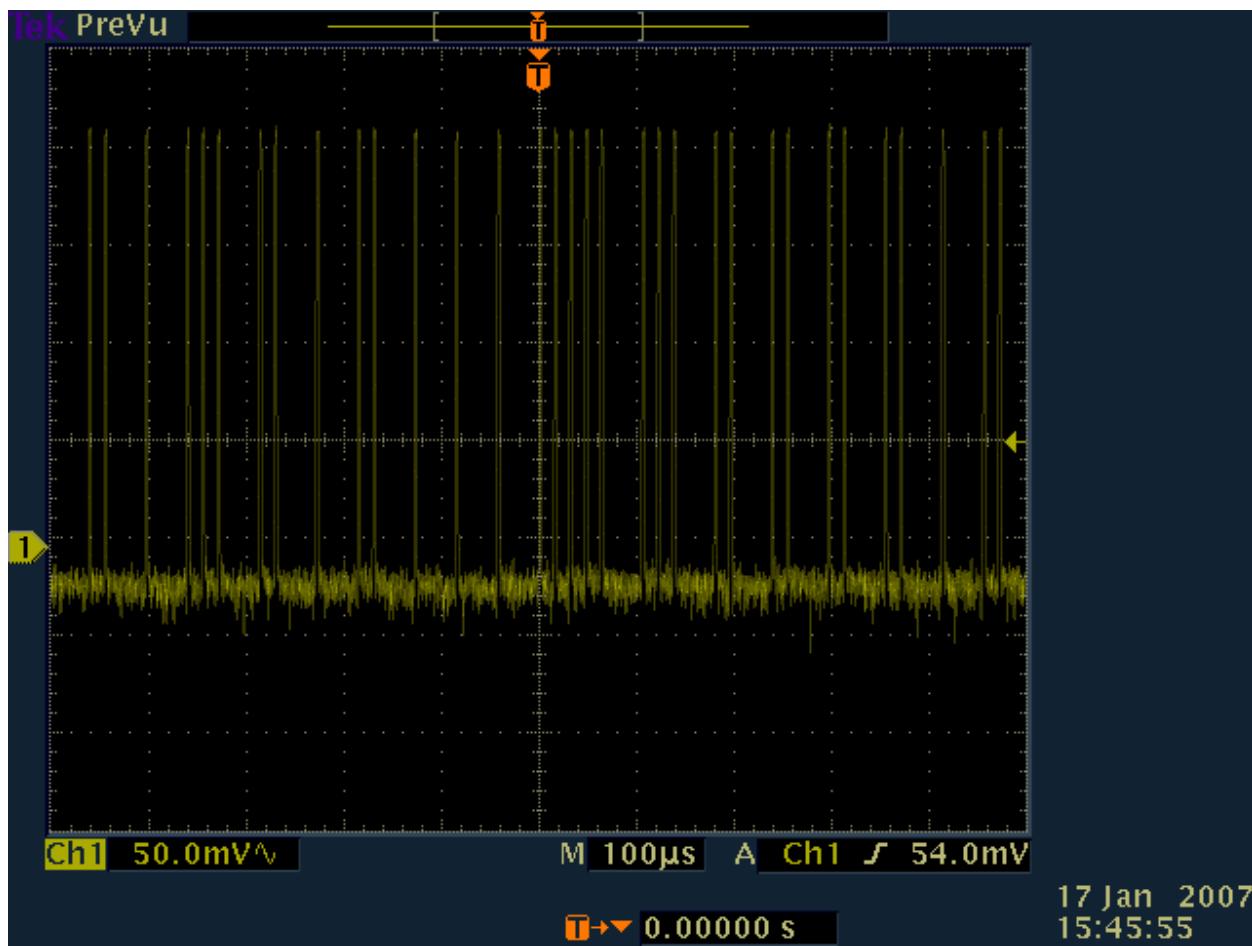
Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

**Test Details:**

Special Radiated Emissions											
Company:	St. Jude Medical			Antenna & Cables:			HF			Bands: N, LF, HF, SHF	
Model #:	3638			LF Antenna:			HORN3 V3m 6-12-07.txt			HORN3 H3m 6-12-07.txt	
Serial #:	85200001			N Antenna:			LOG2 1-25-07 V3.txt			LOG2 1-25-07 H3.txt	
Engineers:	Nicholas Abbondante			Location:			Site 2			HF Antenna:	
Project #:	3114493			Date(s):			01/15/07	01/16/07	01/17/07	EMC04 V 1m 12-13-2007.txt	
Standard:	FCC Part 15 Subpart C 15.249/IC RSS-210 A2.9			LF Cable(s):			CBL029 12-04-2007.txt			CBL030 12-04-2007.txt	
Receiver:	R&S FSEK-30 (ROS001)			Limit Distance (m):			3			N Cable(s): S3 3M FLR 9-26-07.txt	
PreAmp:	PRE8 11-14-07.txt			Test Distance (m):			3			HF Cable(s): CBL030 12-04-2007.txt	
Barometer:	BAR2			Temp/Humidity/Pressure:			20c	35%	1007mB	SHF Cable(s): CBL029 12-04-2007.txt	
PreAmp Used? (Y or N):	N			Voltage/Frequency:			120V/60Hz			Frequency Range:	
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW											
Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
PK	H	2406.000	82.1	30.0	1.5	0.0	0.0	113.5	114.0	-0.5	1/10MHz
AVG	H	2406.000	62.1	30.0	1.5	0.0	0.0	93.6	94.0	-0.4	1/10MHz
PK	H	2413.000	81.5	30.0	1.5	0.0	0.0	112.9	114.0	-1.1	1/10MHz
AVG	H	2413.000	61.5	30.0	1.5	0.0	0.0	93.0	94.0	-1.0	1/10MHz
PK	H	2420.000	81.3	30.0	1.5	0.0	0.0	112.8	114.0	-1.2	1/10MHz
AVG	H	2420.000	61.3	30.0	1.5	0.0	0.0	92.8	94.0	-1.2	1/10MHz







Notes: Pulse trains from the EUT consist of 96 words in a 2.8 ms burst. Each word is 2.7 us long. This yields a duty cycle of 9.26%, and a duty cycle correction factor of -20.67 dB.

**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.249, IC RSS-210 Issue 6 September 2005

**Test:** Emission Bandwidth, FCC §15.215, RSS-Gen Section 4.4

**Performance Criterion:** The fundamental frequency must stay within the assigned band.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	N/A	Pressure (hPa):	N/A	Ambient (°C):	N/A
Pretest Verification Performed	Yes	Equipment under Test:			3638	

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007

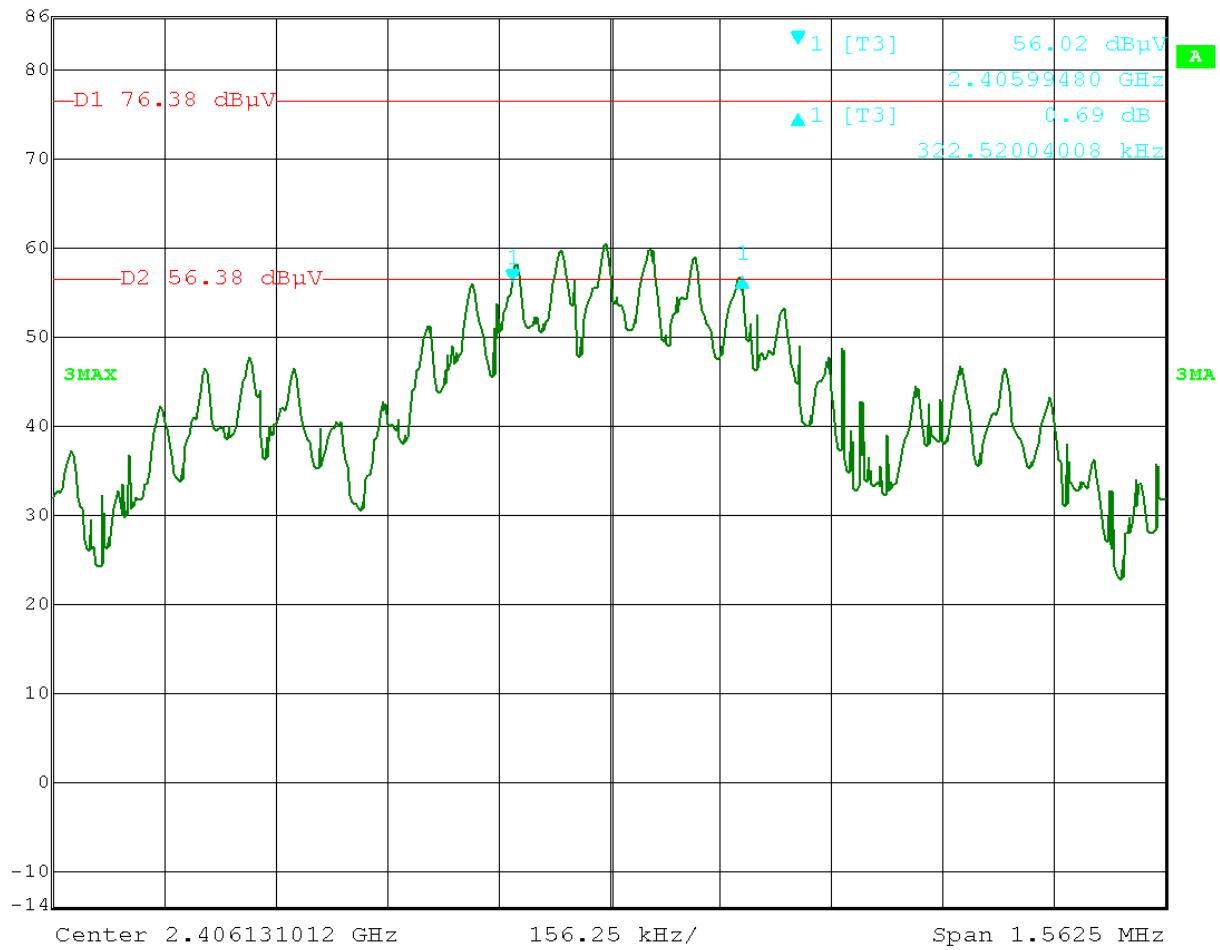
**Test Details:**



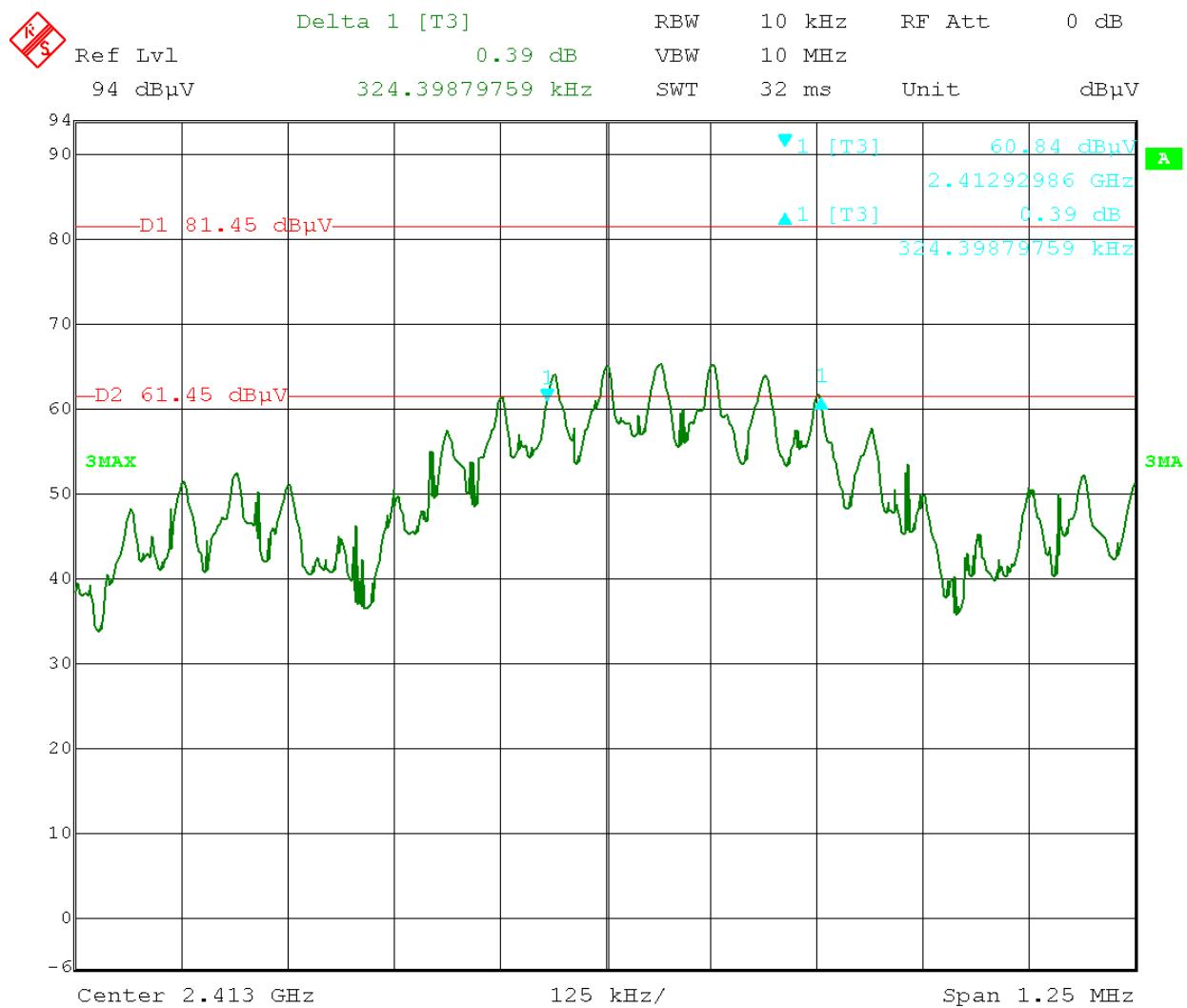
Ref Lvl  
86 dB $\mu$ V

Delta 1 [T3]  
0.69 dB  
322.52004008 kHz

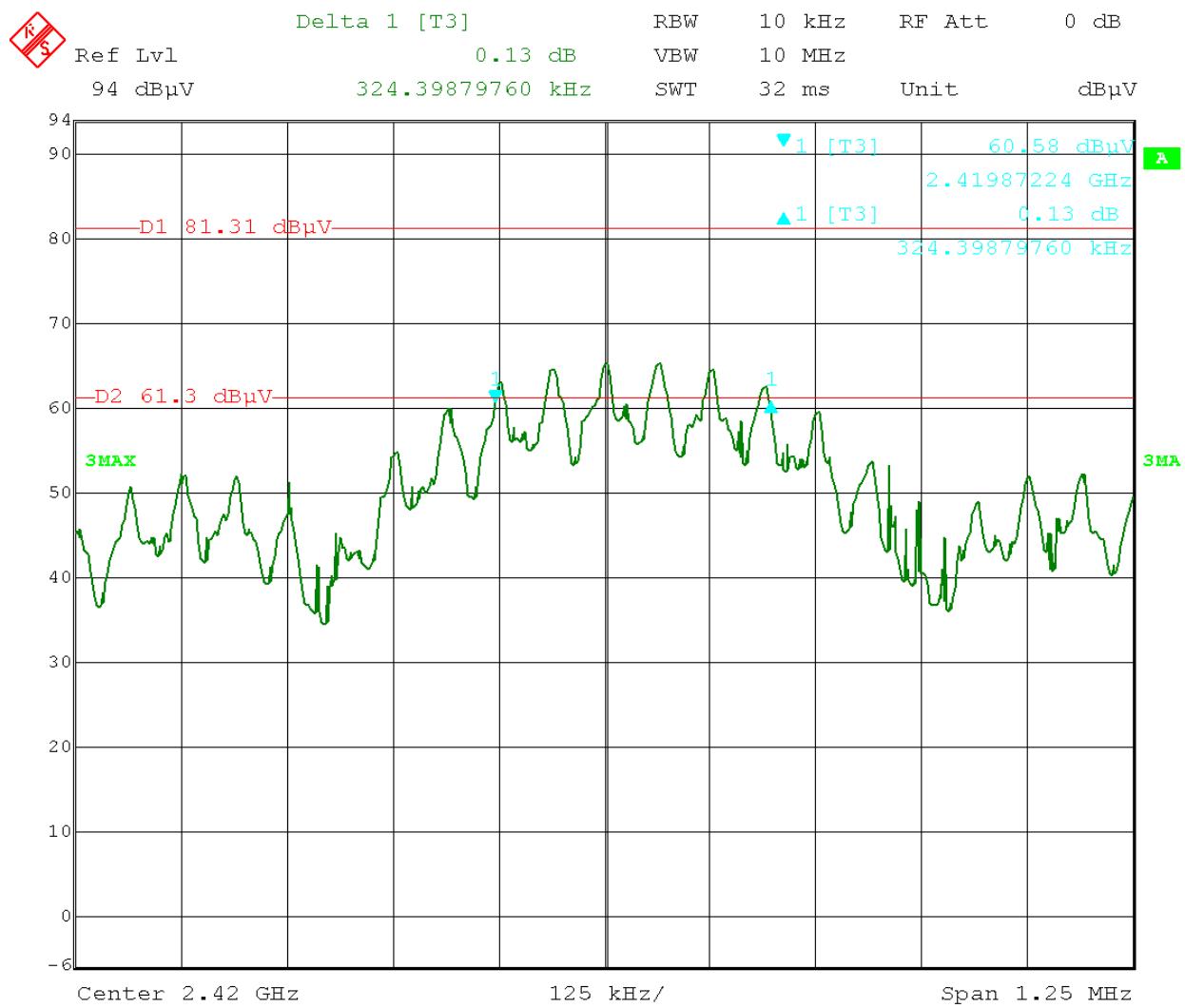
RBW 10 kHz  
VBW 10 MHz  
SWT 40 ms  
Unit dB $\mu$ V



Date: 15.JAN.2007 12:37:55  
Channel 6 20 dB Bandwidth, 322.5 kHz



Date: 15.JAN.2007 13:33:39  
Channel 13 20 dB Bandwidth, 324.4 kHz



Date: 15.JAN.2007 13:40:33  
Channel 20 20 dB Bandwidth, 324.4 kHz

**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.249, IC RSS-210 Issue 6 September 2005

**Test:** Radiated Spurious Emissions, FCC §15.205, 15.209, 15.249, RSS-210 Sections 2.7, A2.9

**Performance Criterion:** Harmonic emissions must not exceed 500uV/m (54 dBuV/m). Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation. Field strength limits are specified at a distance of 3 meters. Emissions falling into the restricted bands of 15.205 must meet the general limits of 15.209.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	See Tables	Pressure (hPa):	See Tables	Ambient (°C):	See Tables
Pretest Verification Performed	Yes		Equipment under Test:	3638		

**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
2	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
3	PREAMPLIFIER 1-40 GHz	MITEQ	NSP4000-NF	507145	11/14/2007
4	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007
5	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
6	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
7	ANTENNA	EMCO	3142	9711-1223	02/06/2008
8	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
9	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	12/13/2007

**Software Utilized:**

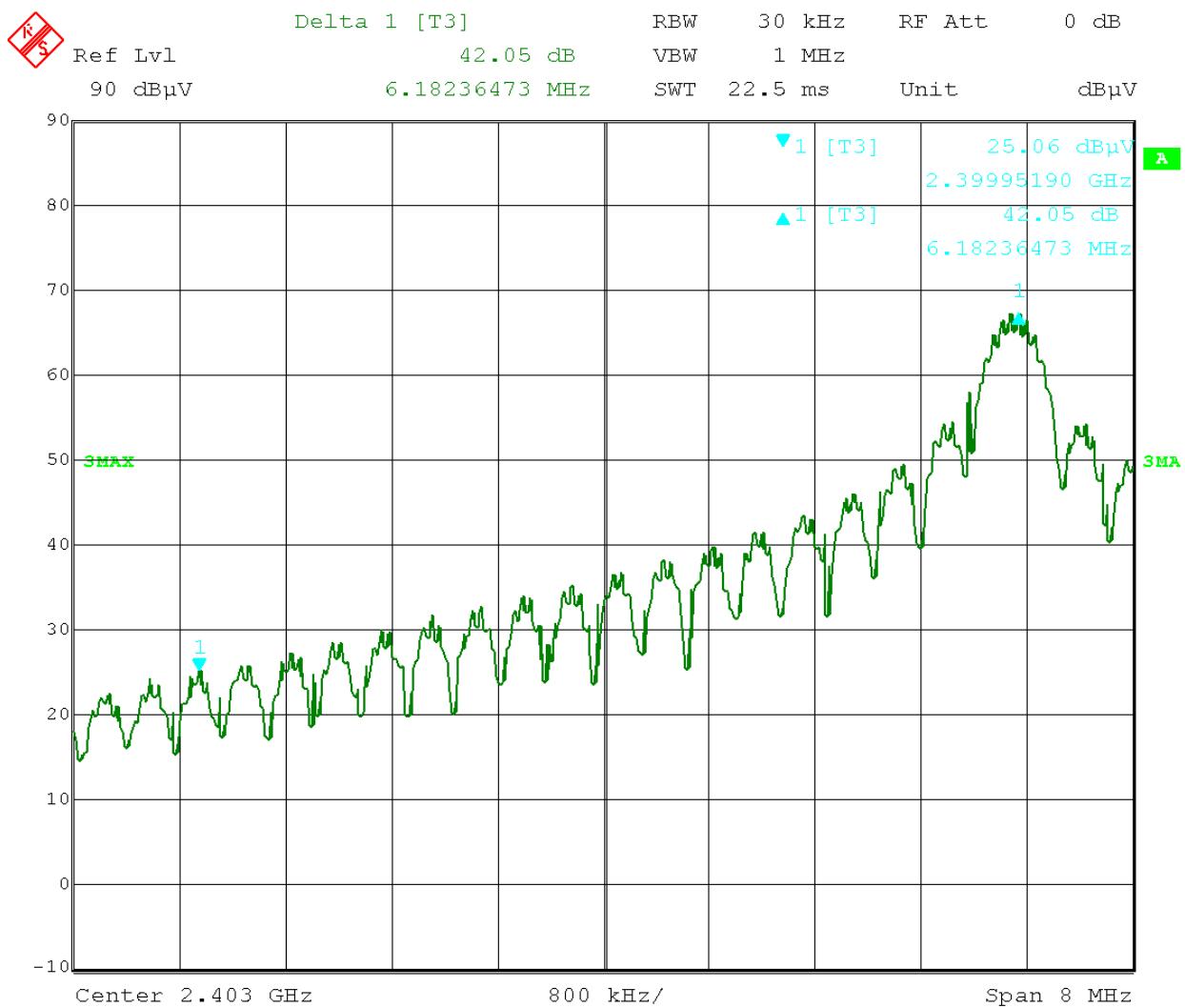
Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

**Test Details:**

Notes: See RF Output Power for duty cycle calculations.

Radiated Emissions											
						Antenna & Cables:		Bands: N, LF, HF, SHF			
Company:	St. Jude Medical					Antenna:	N				
Model #:	3638					LF Antenna:	HORN3 V3m 6-12-07.txt		HORN3 H3m 6-12-07.txt		
Serial #:	85200001					N Antenna:	LOG2 2-06-08 V3.txt		LOG2 2-06-08 H3.txt		
Engineers:	Nicholas Abbondante					HF Antenna:	HORN3 V3m 6-12-07.txt		HORN3 H3m 6-12-07.txt		
Project #:	3114493		Date(s):	01/18/07		SHF Antenna:	EMC04 V 1m 12-13-2007.txt		EMC04 H 1m 12-13-2007.txt		
Standard:	FCC Part 15 Subpart C 15.249/IC RSS-210 A2.9					LF Cable(s):	CBL029 12-04-2007.txt		CBL030 12-04-2007.txt		
Receiver:	R&S FSEK-30 (ROS001)		Limit Distance (m):	3		N Cable(s):	S2 3M FLR 9-26-07.txt		NONE.		
PreAmp:	PRE8 11-14-07.txt		Test Distance (m):	3		HF Cable(s):	CBL030 12-04-2007.txt		NONE.		
Barometer:	BAR2	Temp/Humidity/Pressure:	19c	24%	1026mB	SHF Cable(s):	CBL029 12-04-2007.txt		CBL030 12-04-2007.txt		
PreAmp Used? (Y or N):	N	Voltage/Frequency:	120V/60Hz			Frequency Range:	30-1000 MHz				
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW											
Detector Type	Ant. Pol.	Antenna Frequency (MHz)	Reading dB(uV)	Cable Factor dB(1m)	Pre-amp Loss dB	Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC IC
QP	V	37.570	10.5	12.6	0.9	0.0	24.0	40.0	-16.0	120/300 kHz	RB RB
QP	V	49.570	11.3	8.5	1.0	0.0	20.8	42.8	-22.0	120/300 kHz	
QP	V	62.820	5.9	8.4	1.1	0.0	0.0	15.4	42.8	-27.4	120/300 kHz
QP	V	74.680	14.5	7.5	1.2	0.0	0.0	23.2	42.8	-19.6	120/300 kHz
QP	V	84.000	25.9	7.7	1.2	0.0	0.0	34.8	42.8	-8.0	120/300 kHz
QP	V	108.800	10.7	7.9	1.4	0.0	0.0	20.0	43.5	-23.5	120/300 kHz
QP	V	114.500	17.3	7.5	1.5	0.0	0.0	26.3	43.5	-17.2	120/300 kHz
QP	V	120.000	28.7	7.0	1.4	0.0	0.0	37.1	43.5	-6.4	120/300 kHz
QP	V	122.800	17.5	6.9	1.5	0.0	0.0	25.9	43.5	-17.6	120/300 kHz
QP	V	132.100	26.1	6.7	1.6	0.0	0.0	34.4	43.5	-9.1	120/300 kHz
QP	V	137.900	20.8	7.1	1.5	0.0	0.0	29.3	43.5	-14.2	120/300 kHz
QP	V	144.000	27.5	7.6	1.5	0.0	0.0	36.6	43.5	-6.9	120/300 kHz
QP	V	168.000	15.9	8.7	1.8	0.0	0.0	26.3	43.5	-17.2	120/300 kHz
QP	V	173.500	10.2	8.8	1.8	0.0	0.0	20.8	43.5	-22.7	120/300 kHz
QP	V	182.500	13.2	9.2	1.9	0.0	0.0	24.3	43.5	-19.2	120/300 kHz
QP	V	204.000	13.2	10.7	2.0	0.0	0.0	25.9	43.5	-17.6	120/300 kHz
QP	V	216.000	17.3	11.5	2.0	0.0	0.0	30.8	43.5	-12.7	120/300 kHz
QP	V	228.000	13.1	12.1	2.2	0.0	0.0	27.4	46.0	-18.6	120/300 kHz
QP	V	240.000	10.7	12.4	2.2	0.0	0.0	25.3	46.0	-20.7	120/300 kHz
QP	V	252.000	6.6	12.7	2.4	0.0	0.0	21.6	46.0	-24.4	120/300 kHz
QP	V	258.000	1.2	12.8	2.2	0.0	0.0	16.2	46.0	-29.8	120/300 kHz
QP	V	264.000	4.7	13.0	2.4	0.0	0.0	20.1	46.0	-25.9	120/300 kHz
QP	V	276.000	0.1	13.4	2.3	0.0	0.0	15.8	46.0	-30.2	120/300 kHz
QP	V	288.000	4.9	13.9	2.4	0.0	0.0	21.2	46.0	-24.8	120/300 kHz
QP	V	300.000	3.2	14.4	2.4	0.0	0.0	20.0	46.0	-26.0	120/300 kHz
QP	V	312.000	4.8	14.4	2.4	0.0	0.0	21.6	46.0	-24.4	120/300 kHz
QP	V	324.000	2.2	14.4	2.5	0.0	0.0	19.1	46.0	-26.9	120/300 kHz
QP	V	336.000	6.7	14.7	2.6	0.0	0.0	24.0	46.0	-22.0	120/300 kHz
QP	V	348.000	1.4	15.1	2.5	0.0	0.0	19.0	46.0	-27.0	120/300 kHz
QP	V	360.000	2.5	15.2	2.7	0.0	0.0	20.4	46.0	-25.6	120/300 kHz
QP	V	372.000	2.5	15.2	3.1	0.0	0.0	20.8	46.0	-25.2	120/300 kHz
QP	V	384.000	6.6	15.4	2.8	0.0	0.0	24.8	46.0	-21.2	120/300 kHz
QP	V	396.000	4.9	15.6	2.7	0.0	0.0	23.2	46.0	-22.8	120/300 kHz
QP	V	408.000	1.6	15.9	2.8	0.0	0.0	20.3	46.0	-25.7	120/300 kHz
QP	V	420.000	0.7	16.2	2.9	0.0	0.0	19.8	46.0	-26.2	120/300 kHz
QP	V	432.000	7.2	16.5	3.0	0.0	0.0	26.6	46.0	-19.4	120/300 kHz
QP	V	444.000	0.3	16.7	2.9	0.0	0.0	19.9	46.0	-26.1	120/300 kHz
QP	V	456.000	-1.1	17.2	3.2	0.0	0.0	19.3	46.0	-26.7	120/300 kHz

Special Radiated Emissions														
Company: St. Jude Medical							Antenna & Cables: HF	Bands: N, LF, HF, SHF						
Model #: 3638							LF Antenna: HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt						
Serial #: 85200001							N Antenna: LOG2 2-06-08 V3.txt	LOG2 2-06-08 H3.txt						
Engineers: Nicholas Abbondante				Location: Site 2				HF Antenna: HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt					
Project #: 3114493	Date(s): 01/15/07 01/16/07 01/17/07			SHF Antenna: EMC04 V 1m 12-13-2007.txt	EMC04 H 1m 12-13-2007.txt									
Standard: FCC Part 15 Subpart C 15.249/IC RSS-210 A2.9							LF Cable(s): CBL029 12-04-2007.txt	CBL030 12-04-2007.txt						
Receiver: R&S FSEK-30 (ROS001)				Limit Distance (m): 3				N Cable(s): S3 3M FLR 9-26-07.txt	NONE.					
PreAmp: PRE8 11-14-07.txt				Test Distance (m): 3				HF Cable(s): CBL030 12-04-2007.txt	NONE.					
Barometer: BAR2	Temp/Humidity/Pressure: 20c 35%			1007mB				SHF Cable(s): CBL029 12-04-2007.txt	CBL030 12-04-2007.txt					
PreAmp Used? (Y or N): N				Voltage/Frequency: 120V/60Hz				Frequency Range: 1-4 GHz						
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW														
Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1m)	Cable Loss dB	Pre-amp Factor dB	Distance dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth			
FCC IC														
Note: Ch6 values adjusted -42.05 dB using marker-delta method														
PK	H	2399.990	39.6	30.0	1.5	0.0	0.0	71.0	74.0	-3.0	100kHz/1MHz			
AVGsweep	H	2399.990	17.2	30.0	1.5	0.0	0.0	48.7	54.0	-5.3	100kHz/1MHz			
AVG10kHz	H	2399.990	5.1	30.0	1.5	0.0	0.0	36.5	54.0	-17.5	100kHz/1MHz			
Note: Ch20 Band Edge Compliance 1 MHz RBW														
PK	H	2483.510	25.6	30.2	1.5	0.0	0.0	57.3	74.0	-16.7	1/10 MHz			
AVGsweep	H	2483.510	21.6	30.2	1.5	0.0	0.0	53.3	54.0	-0.7	1/10 MHz			
AVG10kHz	H	2483.510	15.6	30.2	1.5	0.0	0.0	47.3	54.0	-6.7	1MHz/10kHz			
Note: Spurious Emissions 1-4 GHz														
PK	V	3693.000	28.0	32.7	1.6	0.0	0.0	62.3	74.0	-11.7	1/10MHz			
VGdetector	V	3693.000	16.7	32.7	1.6	0.0	0.0	51.0	54.0	-3.0	1/10MHz			
AVG10kHz	V	3693.000	15.5	32.7	1.6	0.0	0.0	49.8	54.0	-4.2	1MHz/10kHz			
RB RB RB RB RB RB														



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Channel 6 Band Edge Compliance, Marker Delta Measurement

Special Radiated Emissions														
							Antenna & Cables:	LF	Bands: N, LF, HF, SHF					
Company: St. Jude Medical							LF Antenna:	HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt					
Model #: 3638							N Antenna:	LOG2 2-06-08 V3.txt	LOG2 2-06-08 H3.txt					
Serial #: 85200001							HF Antenna:	HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt					
Engineers: Nicholas Abbondante							SHF Antenna:	EMC04 V 1m 12-13-2007.txt	EMC04 H 1m 12-13-2007.txt					
Project #: 3114493							LF Cable(s):	CBL029 12-04-2007.txt	CBL030 12-04-2007.txt					
Standard: FCC Part 15 Subpart C 15.249/IC RSS-210 A2.9							N Cable(s):	S3 3M FLR 9-26-07.txt	NONE.					
Receiver: R&S FSEK-30 (ROS001)							HF Cable(s):	CBL030 12-04-2007.txt	NONE.					
PreAmp: PRE8 11-14-07.txt							SHF Cable(s):	CBL029 12-04-2007.txt	CBL030 12-04-2007.txt					
Barometer: BAR2							Temp/Humidity/Pressure:	19c	31%	1001mB				
PreAmp Used? (Y or N): Y							Voltage/Frequency:	120V60Hz	Frequency Range: 4-18 GHz					
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW														
Detector	Ant.	Pol.	Frequency	Reading	Antenna	Cable	Pre-amp	Distance	Net	Limit	Margin	Bandwidth	FCC	IC
Type	(V/H)		MHz	dB(uV)	Factor	Loss	Factor	Factor	dB(uV/m)	dB(uV/m)	dB			
Note: Noise Floor														
PK	V	8292.580	32.3	38.1	5.3	19.6	0.0	56.1	74.0	-17.9	1/10MHz	RB	RB	
AVGdetect	V	8292.580	21.0	38.1	5.3	19.6	0.0	44.8	54.0	-9.2	1/10MHz	RB	RB	
AVG10kHz	V	8292.580	22.7	38.1	5.3	19.6	0.0	46.5	54.0	-7.5	1/10MHz	RB	RB	
PK	V	15980.000	34.2	40.7	8.5	22.3	0.0	61.0	74.0	-13.0	1/10MHz	RB	RB	
AVGdetect	V	15980.000	22.9	40.7	8.5	22.3	0.0	49.8	54.0	-4.2	1/10MHz	RB	RB	
AVG10kHz	V	15980.000	24.2	40.7	8.5	22.3	0.0	51.1	54.0	-2.9	1/10MHz	RB	RB	
Note: Duty Cycle Adjusted Average Values (-19.97 dB)														
PK	H	4812.000	39.2	35.7	3.8	21.5	0.0	57.2	74.0	-16.8	1/10MHz	RB	RB	
AVG	H	4812.000	19.3	35.7	3.8	21.5	0.0	37.2	54.0	-16.8	1/10MHz	RB	RB	
PK	H	7218.000	34.8	38.4	4.8	20.4	0.0	57.7	74.0	-16.3	1/10MHz	RB	RB	
AVG	H	7218.000	14.9	38.4	4.8	20.4	0.0	37.7	54.0	-16.3	1/10MHz	RB	RB	
PK	H	9624.000	34.8	41.6	5.6	18.6	0.0	63.5	74.0	-10.5	1/10MHz	RB	RB	
AVG	H	9624.000	14.9	41.6	5.6	18.6	0.0	43.5	54.0	-10.5	1/10MHz	RB	RB	
PK	V	12028.000	28.0	40.7	6.6	18.2	0.0	57.1	74.0	-16.9	1/10MHz	RB	RB	
AVG	V	12028.000	8.1	40.7	6.6	18.2	0.0	37.2	54.0	-16.8	1/10MHz	RB	RB	
PK	H	4826.000	36.4	35.8	3.8	21.6	0.0	54.4	74.0	-19.6	1/10MHz	RB	RB	
AVG	H	4826.000	16.5	35.8	3.8	21.6	0.0	34.5	54.0	-19.5	1/10MHz	RB	RB	
PK	H	7239.000	34.8	38.4	4.8	20.3	0.0	57.7	74.0	-16.3	1/10MHz	RB	RB	
AVG	H	7239.000	14.9	38.4	4.8	20.3	0.0	37.8	54.0	-16.2	1/10MHz	RB	RB	
PK	H	9652.000	34.6	41.6	5.6	18.5	0.0	63.3	74.0	-10.7	1/10MHz	RB	RB	
AVG	H	9652.000	14.6	41.6	5.6	18.5	0.0	43.4	54.0	-10.6	1/10MHz	RB	RB	
PK	H	12065.000	33.5	40.8	6.6	18.2	0.0	62.7	74.0	-11.3	1/10MHz	RB	RB	
AVG	H	12065.000	13.5	40.8	6.6	18.2	0.0	42.7	54.0	-11.3	1/10MHz	RB	RB	
PK	H	4840.000	35.9	35.8	3.8	21.6	0.0	53.9	74.0	-20.1	1/10MHz	RB	RB	
AVG	H	4840.000	15.9	35.8	3.8	21.6	0.0	34.0	54.0	-20.0	1/10MHz	RB	RB	
PK	H	7260.000	33.7	38.5	4.8	20.3	0.0	56.7	74.0	-17.3	1/10MHz	RB	RB	
AVG	H	7260.000	13.7	38.5	4.8	20.3	0.0	36.7	54.0	-17.3	1/10MHz	RB	RB	
PK	H	9680.000	34.3	41.7	5.7	18.5	0.0	63.1	74.0	-10.9	1/10MHz	RB	RB	
AVG	H	9680.000	14.3	41.7	5.7	18.5	0.0	43.1	54.0	-10.9	1/10MHz	RB	RB	
PK	H	12100.000	33.5	40.9	6.7	18.2	0.0	62.8	74.0	-11.2	1/10MHz	RB	RB	
AVG	H	12100.000	13.5	40.9	6.7	18.2	0.0	42.8	54.0	-11.2	1/10MHz	RB	RB	
PK	H	14520.000	29.7	43.4	7.6	20.0	0.0	60.7	74.0	-13.3	1/10MHz	RB	RB	
AVG	H	14520.000	9.7	43.4	7.6	20.0	0.0	40.7	54.0	-13.3	1/10MHz	RB	RB	

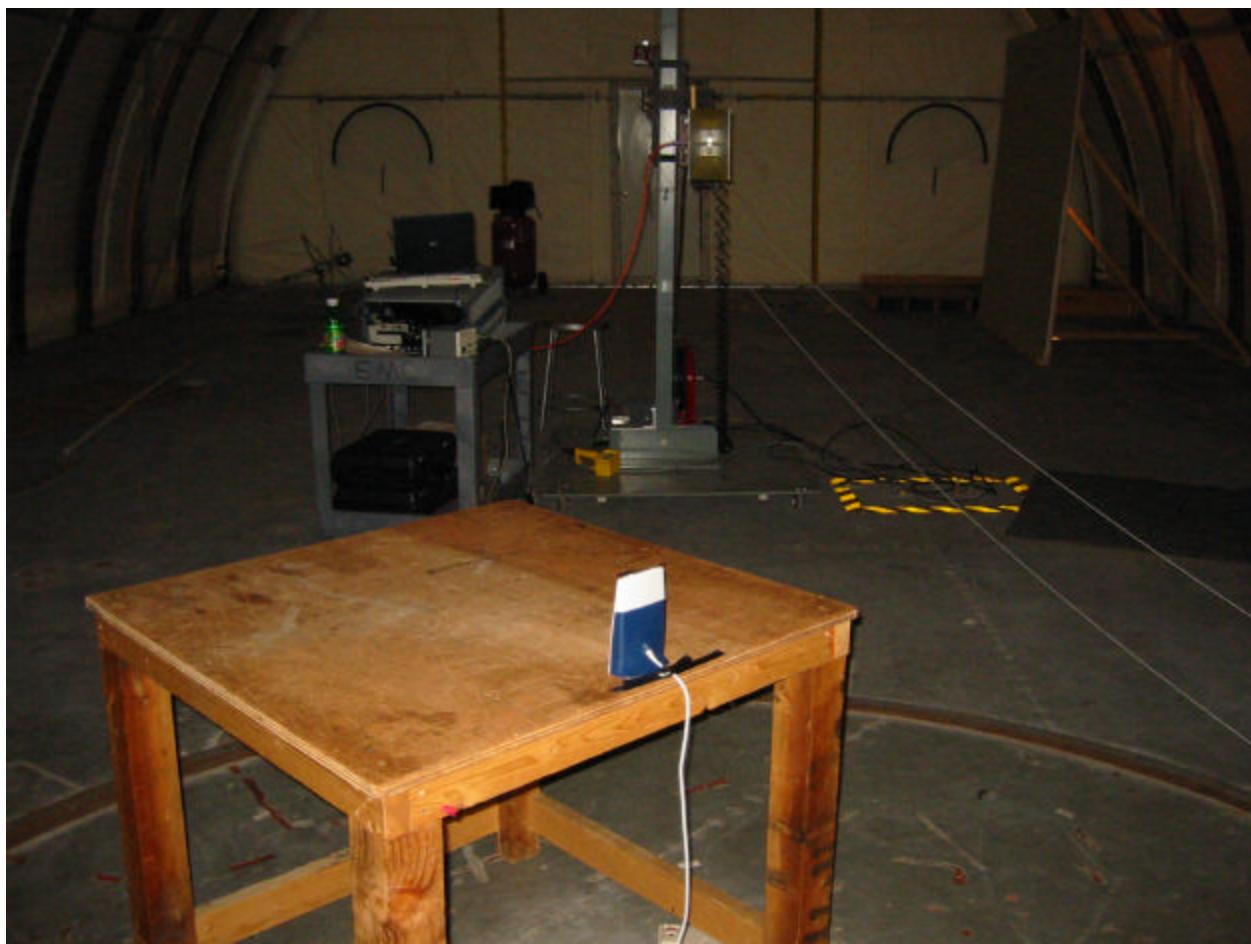
**Special Radiated Emissions**

Company: St. Jude Medical	Antenna & Cables: SHF	Bands: N, LF, HF, SHF												
Model #: 3638	LF Antenna: HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt												
Serial #: 85200001	N Antenna: LOG2 2-06-08 V3.txt	LOG2 2-06-08 H3.txt												
Engineers: Nicholas Abbondante	HF Antenna: HORN3 V3m 6-12-07.txt	HORN3 H3m 6-12-07.txt												
Project #: 3114493	SHF Antenna: EMC04 V 1m 12-13-2007.txt	EMC04 H 1m 12-13-2007.txt												
Standard: FCC Part 15 Subpart C 15.249/IC RSS-210 A2.9	LF Cable(s): CBL029 12-04-2007.txt	CBL030 12-04-2007.txt												
Receiver: R&S FSEK-30 (ROS001)	N Cable(s): S2 3M FLR 9-26-07.txt	NONE.												
PreAmp: PRE8 11-14-07.txt	HF Cable(s): CBL030 12-04-2007.txt	NONE.												
Barometer: BAR2	SHF Cable(s): CBL029 12-04-2007.txt	CBL030 12-04-2007.txt												
PreAmp Used? (Y or N): Y	Voltage/Frequency: 120V/60Hz	Frequency Range: 18-25 GHz												
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS: NF = Noise Floor, RB = Restricted Band, Bandwidth denoted as RBW/VBW														
Detector Type	Ant.	Pol.	Frequency MHz	Reading dB(uV)	Antenna	Cable	Pre-amp	Distance	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
PK	V	19248.000	33.7	45.0	10.4	24.0	9.5	55.6	74.0	-18.4	1/10 MHz	RB	RB	
AVG	V	19248.000	22.0	45.0	10.4	24.0	9.5	43.9	54.0	-10.1	1/10 MHz	RB	RB	
PK	V	21654.000	35.2	45.3	9.9	21.4	9.5	59.4	74.0	-14.6	1/10 MHz			
AVG	V	21654.000	22.9	45.3	9.9	21.4	9.5	47.1	54.0	-6.9	1/10 MHz			
PK	V	24060.000	33.3	45.5	10.4	19.4	9.5	60.3	74.0	-13.7	1/10 MHz			
AVG	V	24060.000	21.5	45.5	10.4	19.4	9.5	48.5	54.0	-5.5	1/10 MHz			
PK	V	19304.000	33.2	45.1	10.3	23.9	9.5	55.1	74.0	-18.9	1/10 MHz	RB	RB	
AVG	V	19304.000	21.5	45.1	10.3	23.9	9.5	43.4	54.0	-10.6	1/10 MHz	RB	RB	
PK	V	21717.000	35.2	45.3	9.9	21.5	9.5	59.4	74.0	-14.6	1/10 MHz			
AVG	V	21717.000	23.3	45.3	9.9	21.5	9.5	47.5	54.0	-6.5	1/10 MHz			
PK	V	24130.000	33.3	45.6	10.4	19.6	9.5	60.2	74.0	-13.8	1/10 MHz			
AVG	V	24130.000	21.5	45.6	10.4	19.6	9.5	48.4	54.0	-5.6	1/10 MHz			
PK	V	19360.000	33.3	45.1	10.3	23.9	9.5	55.3	74.0	-18.7	1/10 MHz	RB	RB	
AVG	V	19360.000	21.5	45.1	10.3	23.9	9.5	43.5	54.0	-10.5	1/10 MHz	RB	RB	
PK	V	21780.000	35.8	45.2	9.9	21.5	9.5	59.9	74.0	-14.1	1/10 MHz			
AVG	V	21780.000	23.7	45.2	9.9	21.5	9.5	47.8	54.0	-6.2	1/10 MHz			
PK	V	24200.000	33.6	45.6	10.4	19.7	9.5	60.3	74.0	-13.7	1/10 MHz			
AVG	V	24200.000	22.0	45.6	10.4	19.7	9.5	48.8	54.0	-5.2	1/10 MHz			

**Setup Photos**







**Test Results:** Pass

**Test Standard:** FCC Part 15 Subpart C 15.249, IC RSS-210 Issue 6 September 2005

**Test:** AC Line-Conducted Emissions, FCC §15.207, RSS-Gen Section 7.2.2

**Performance Criterion:** The AC line-conducted emissions must not exceed the FCC 15.207 and RSS-Gen Section 7.2.2 Table 2 limits.

**Test Environment:**

Environmental Conditions During Testing:	Humidity (%):	24-30	Pressure (hPa):	N/A	Ambient (°C):	23-24
Pretest Verification Performed	Yes	Equipment under Test:			3638	

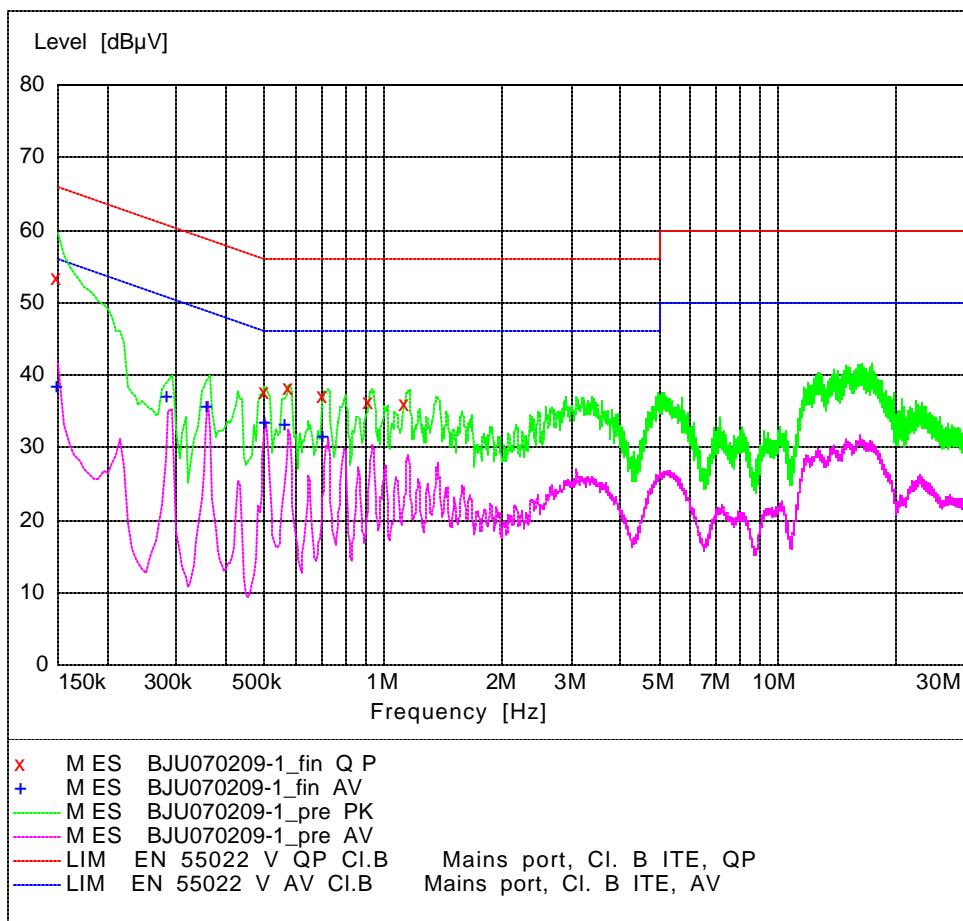
**Test Equipment Used:**

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	ID No.	Next Cal. Due
1	FCC Test Site	N/L	N/L	5164	N/A
2	Measurement Receiver	Rohde & Schwarz	ESHS30	4946	06/15/207
3	LISN	Rohde & Schwarz	ESH3-Z5	2727	07/07/2008
4	Transformer	Tufvassons	AFM-1500	30317	Verified
5	Cable, LISN- Measurement Receiver	N/L	N/L	8911	10/26/2007

**Software Utilized:**

Name	Manufacturer	Version
ES-K1	Rohde & Schwarz	V1.70

**Test Details:**



Overview sweeps performed with peak and average detectors

Data summary

<b>Quasi-Peak</b>		
Frequency /MHz	Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,150	53,2	66
0,503	37,6	56
0,578	38,1	56
0,713	37,1	56
0,923	36,2	56
1,140	36,0	56

<b>Average</b>		
Frequency /MHz	Disturbance Level /dB(µV)	Permitted limit /dB(µV)
0,150	38,2	56
0,285	37,1	51
0,360	35,6	49
0,503	33,4	46
0,570	33,0	46
0,713	31,4	46

### Setup Photos



