Electromagnetic Compatibility Test Report

Tests Performed on a Delsys, Inc.

Wireless EMG Hip Module, Model DS-T02

Radiometrics Document RP-6978

ACCREDITED
TESTING CERT #1495.01

Product Detail: FCC ID: W4P-SP-W03 IC: 8138A-DST02 Equipment type: 2.4 GHz Transmitter
Test Standards: US CFR Title 47, Chapter I, FCC Part 15 Subpart C FCC Part 15 CFR Title 47: 2009 Industry Canada RSS-210, Issue 8: 2010 as required for Category I Equipment This report concerns: Original Grant for Certification FCC Part 15.249

Tests Performed For:	*Test Facility:*
Delsys, Inc. 650 Beacon St., Floor 6 Boston, MA 02215	**Radiometrics Midwest Corporation** 12 East Devonwood Romeoville, IL 60446

Test Date(s): (Month-Day-Year)
February 18 thru March 9, 2011

Document RP-6978 Revisions:

Rev.	Issue Date	Affected Pages	Revised By
0	June 15, 2011		
1	June 29, 2011	22	Joseph Strzelecki
2	December 6, 2011	All	Joseph Strzelecki
3	December 8, 2011	All	Joseph Strzelecki

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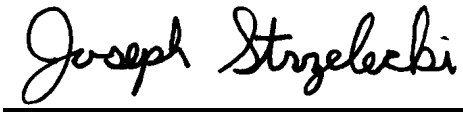
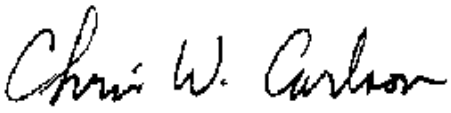
1 ADMINISTRATIVE DATA

Equipment Under Test: A Delsys, Inc., Wireless EMG Sensor System Model: DS-T02, Serial Number: none This will be referred to as the EUT in this Report	
Date EUT Received at Radiometrics: (Month-Day-Year) February 18, 2011	*Test Date(s): (Month-Day-Year)* February 18 thru March 9, 2011
Test Report Written By: Joseph Strzelecki Senior EMC Engineer	*The Test Witnessed by:* The Test was not Witnessed by Personnel from Delsys, Inc.
Radiometrics' Personnel Responsible for Test:  Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE	*Test Report Approved By*  Chris W. Carlson Director of Engineering NARTE EMC-000921-NE

2 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a Wireless EMG Sensor Hip Modeule, Model DS-T02, manufactured by Delsys, Inc. The EUT consists of a Base and Sensor. The detailed test results are presented in a separate section. The following is a summary of the test results.

Emissions Tests Results

Environmental Phenomena	Frequency Range	FCC Section	RSS-210 Section	Test Result
20 dB Bandwidth Test	2400 to 2483 MHz	15.249	A2.9	Pass
Radiated Emissions	30 MHz to 25 GHz	15.249	A2.9	Pass
AC Conducted Emissions Test	0.15-30 MHz	15.207	RSS-Gen-e 7.2.2	Pass

2.1 RF Exposure Compliance Requirements

Because the power output is 9 mW, The EUT meets 15.203 of the FCC requirement for RF exposure. Since the EUT is less than 200 mW, it is exempt from RSS-102. There are no power level adjustments and the antenna is permanently attached. The detailed calculations for RF Exposure are presented in a separate document.

3 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is a module for the Trigno Wireless EMG Sensor System, Model DS-T02, manufactured by Delsys, Inc. The EUT was in good working condition during the tests, with no known defects.

3.1.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The antenna is permanently attached to the PCB via a trace on the circuit board. The antenna is internal to the EUT and it is not readily available to be modified by the end user. Therefore it meets the 15.203 Requirements.

3.2 Related Submittals

The Sensor is operated under 15.249. It is subject to the FCC requirements pursuant to the certification equipment authorization under Part 15 Subpart C, and is being submitted as FCC ID: W4P-SP-W01.

4 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations. Power was supplied to the EUT at 115 VAC, 60 Hz single-phase to its external power supply.

The identification for all equipment, plus descriptions of all cables used in the tested system, are:

Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	Wireless EMG Sensor Hip Module	E	Delsys, Inc.	DS-T02	Proto 1
2	Power Adaptor	E	Jerome Industries	WSA450M	Sample 1
3	Notebook PC	P	Dell	PP01L	TW04E641-12800-1A9-5632 (NB1)
4	Dell Power Supply	P	Dell	ADP-70EB	TH-09364U-17971-287-I5SK
5	Mouse	P	Dell	M071KC	514086791
6	Modem	P	US Robotics	0701	22SBBAC9FPMN

* Type: E = EUT, P = Peripheral,

List of System Cables

QTY	Length (m)	Cable Description	Shielded?
1	1.8	AC cable to Power Supply adaptor	No
1	1.7	DC cable from EUT to Power Supply adaptor	No
1	1.7	USB Cable from Mouse to EUT	Yes
1	1.8	USB Cable from PC to EUT	Yes
1	1.0	Terminated Audio Cable connected to EUT	No
3	1.0	Terminated Input cables connected to EUT	Yes
1	1.8	Serial cable from Modem to laptop PC	Yes

4.2 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.3 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5 TEST SPECIFICATIONS AND RELATED DOCUMENTS

Document	Date	Title
FCC CFR Title 47	2009	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices
ANSI C63.4-2003	2003	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
IC RSS-210 Issue 8	2010	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment
IC RSS-Gen Issue 3	2010	General Requirements and Information for the Certification of Radiocommunication Equipment (RSS-Gen)
FCC DA 00-705	2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
FCC 558074	2005	Measurement of Digital Transmission Systems Operating under Section 15.247

The test procedures used are in accordance with the FCC DA 00-705, or FCC 558074, Industry Canada RSS-212 and ANSI document C63.4-2003, "Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The specific procedures are described herein. Radiated testing was performed at an antenna to EUT distance of 3 meters. The antenna was raised and lowered from 1 to 4 meters.

6 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 2005 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during the tests:

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

Test Station F: Is an area that measures 10' D X 12' W X 10' H. The floor and back wall are metal shielded. This area is used for conducted emissions measurements.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as file number IC3124A-1.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

9 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12GHz	12 Mo.	01/19/11
AMP-20	Avantek	Pre-amplifier	SF8-0652	15221	8-18GHz	12 Mo	01/18/11
AMP-22	Anritsu	Pre-amplifier	MH648A	M23969	0.1-1200MHz	12 Mo.	01/18/11
AMP-29	HP / Agilent	Amplifier	11975A	2304A00158	2-8 GHz	12 Mo.	04/05/10
ANT-13	EMCO	Horn Antenna	3115	2502	1.0-18GHz	24 Mo.	11/18/10
ANT-44	Impossible Machine	Super Log Antenna	SL-20M2G	1002	20-2000MHz	24 Mo.	11/25/09
ANT-48	RMC	Std Gain Horn	HW2020	1001	18-26 GHz	12 Mo.	04/05/10
HPF-01	Solar	High Pass Filter	7930-100	HPF-1	0.15-30MHz	24 Mo.	10/27/09
HPF-03	Mini-Circuits	High Pass Filter	VHP-39	HPF-03	3-10 GHz	24 Mo.	10/27/09
LSN-01	Electrometrics	50 uH LISN	FCC/VDE 50/2	1001	0.01-30MHz	24 Mo.	06/01/09
LSN-03	Farnell	50 uH LISN	1EXLSN30B	000314	0.01-30MHz	24 Mo.	06/01/09
PRE-01	Hewlett Packard	Preselector	85685A	2510A00143	20 Hz-2GHz	24 Mo.	01/11/10
REC-03	Anritsu	Spectrum Analyzer	MS2601B	MT94589	0.01-2200MHz	12 Mo.	03/15/10
REC-07	Anritsu	Spectrum Analyzer	MS2601A	MT53067	0.01-2200MHz	12 Mo.	04/06/10
REC-08	Hewlett Packard	Spectrum Analyzer	8566B	2648A13481 2209A01436	30Hz-22GHz	24 Mo.	08/21/09
THM-02	Fluke	Temp/Humid Meter	971	93490471	N/A	24 Mo.	04/01/10

Note: All calibrated equipment is subject to periodic checks.

10 TEST SECTIONS

10.1 AC Conducted Emissions

The tests and limits are in accordance with FCC section 15.207 and RSS Gen section 7.2.2.

A computer-controlled analyzer was used to perform the conducted emissions measurements. The frequency range was divided into 500 subranges equally spaced on a logarithmic scale. The computer recorded the peak of each subrange. This data was then plotted on semi-log graph paper generated by the computer and plotter. Adjusting the positions of the cables and orientation of the test system then maximizes the highest emissions.

Mains Conducted emission measurements were performed using a 50 Ohm/50 uH Line Impedance Stabilization Network (LISN) as the pick-up device. Measurements were repeated on both leads within the power cord. If the EUT power cord exceeded 80 cm in length, the excess length of the power cord was made into a 30 to 40 cm bundle near the center of the cord. The LISN was placed on the floor at the base of the test platform and electrically bonded to the ground plane.

Broadband conducted emissions may exceed the following limits by no more than 13 dB. An emission is defined as broadband if the average detector amplitude is 6 dB or more under the quasi-peak detector amplitude.

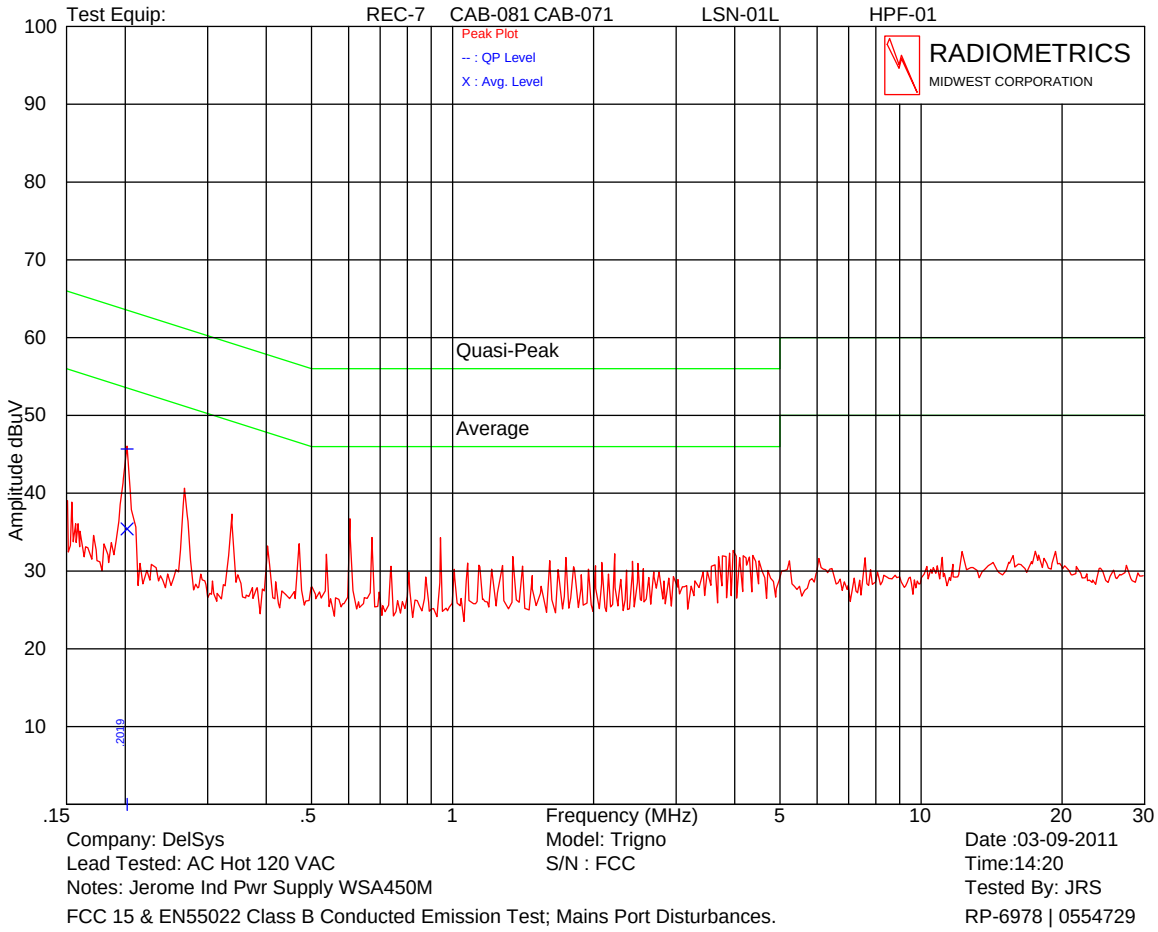
FCC Limits of Conducted Emissions at the AC Mains Ports

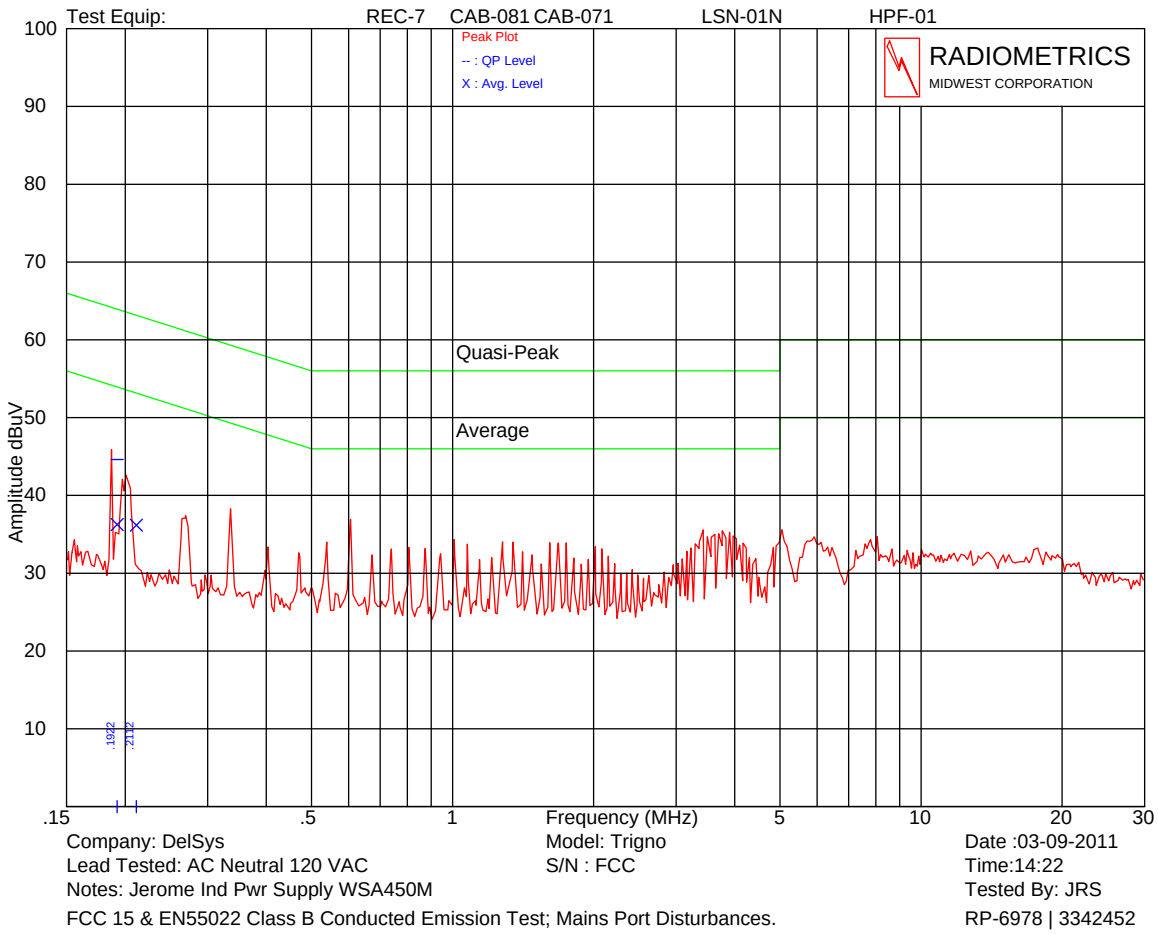
Frequency Range (MHz)	Class B Limits (dBuV)	
	Quasi-Peak	Average
0.150 - 0.50*	66 - 56	56 - 46
0.5 – 5.0	56	46
5.0 - 30	60	50
* The limit decreases linearly with the logarithm of the frequency in this range.		

The initial step in collecting conducted data is a peak detector scan and the plotting of the measurement range. Significant peaks are then marked as shown on the following table, and these signals are then measured with the quasi-peak detector. The following represents the worst case emissions from the EUT power cord, after testing all modes of operation.

10.1.1 AC Conducted Emissions Test Results

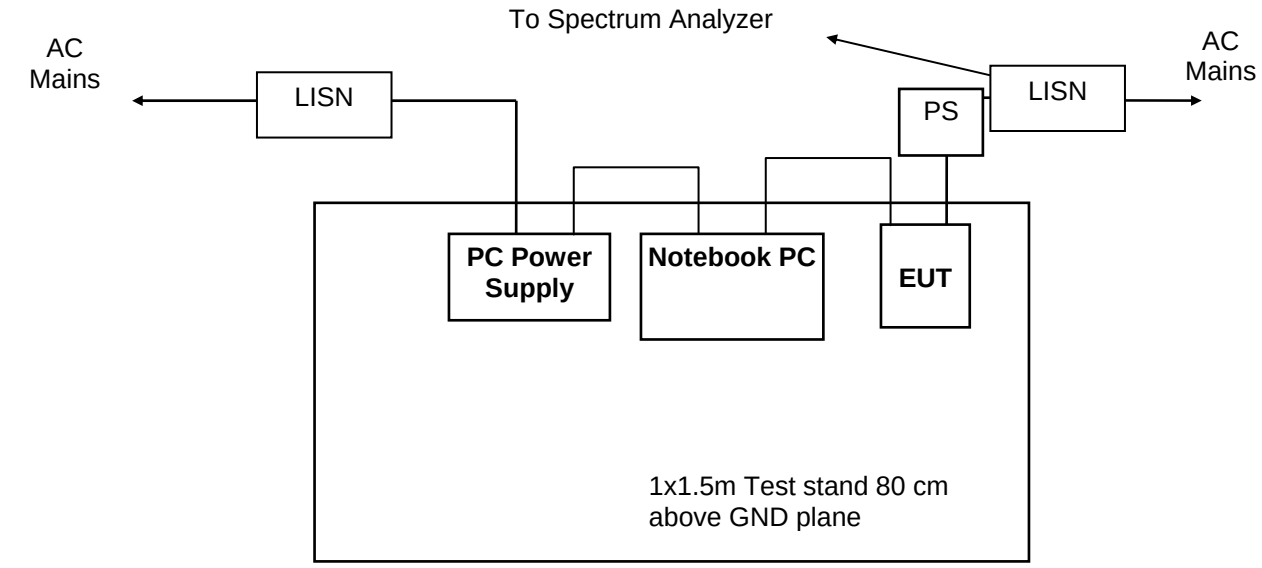
Test Date : 2/22/2011
The Amplitude is the final corrected value with cable and LISN Loss.





Judgment: Passed by at least 8 dB

Figure 1. Conducted Emissions Test Setup



Notes:
- LISN's at least 80 cm from EUT chassis
- Vertical conductive plane 40 cm from rear of table top
- EUT power cord bundled

10.2 Time of Occupancy (Dwell Time)

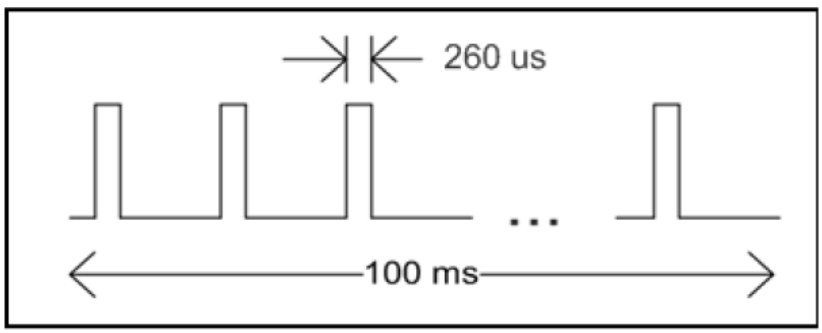
The Peak to Average factor is calculated by the highest duty cycle in percent over any 100mS transmission. The factor in dB is 20 * Log(Duty cycle/100).

As required by FCC section 15.35 and RSS-210 section 6.5, the Peak to Average correction factor was calculated.

The transmitter sends the beacon in a 260 us burst once every 13 ms as shown below. In any interval, there will be, at most, 8 bursts, for a maximum transmitter duty cycle of 2.1%.

8 *260 us/100 ms = 2.1%

Figure 2. Duty Cycle Plot



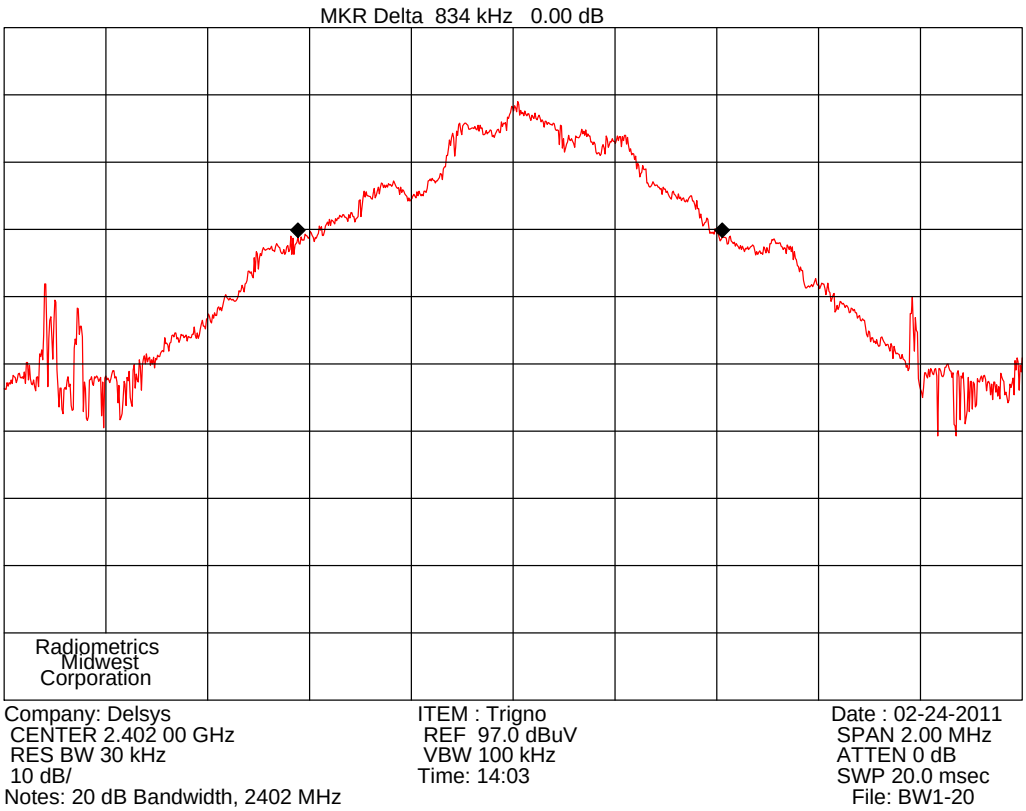
10.3 Occupied Bandwidth

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The EUT was transmitting at its maximum data rate. The trace was allowed to stabilize.

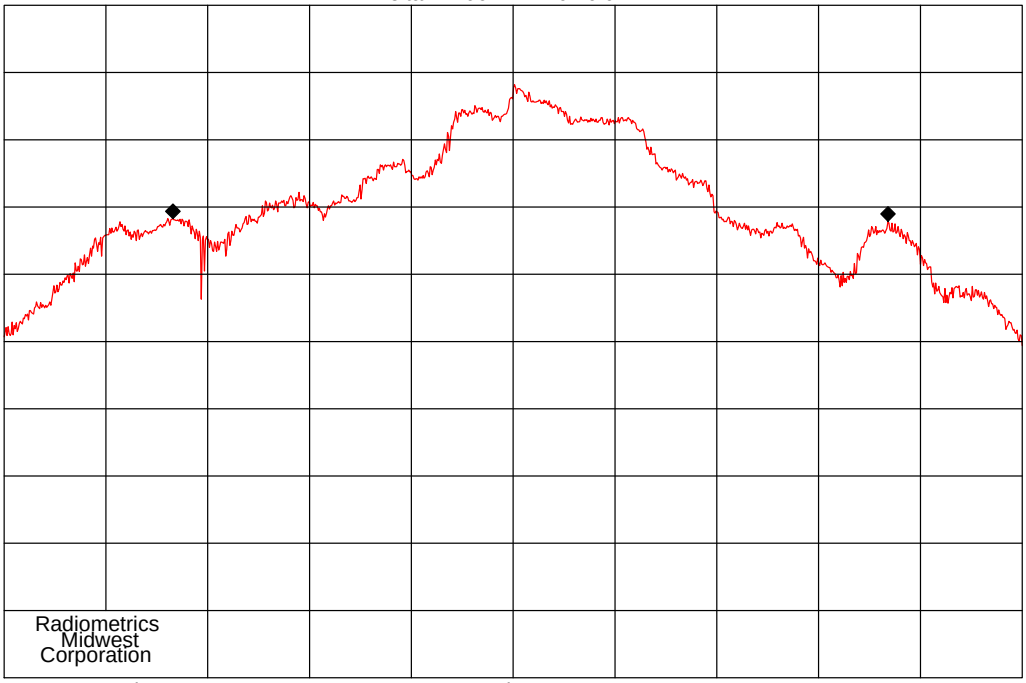
The marker-to-peak function was set to the peak of the emission. Then the marker-delta function was used to measure 20 dB down one side of the emission. The marker-delta function was reset and then moved to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

Channel	20 dB EBW kHz
2402	834
2440	1406
2474	1430

10.3.1 Bandwidth Plots



MKR Delta 1.406 MHz -0.40 dB

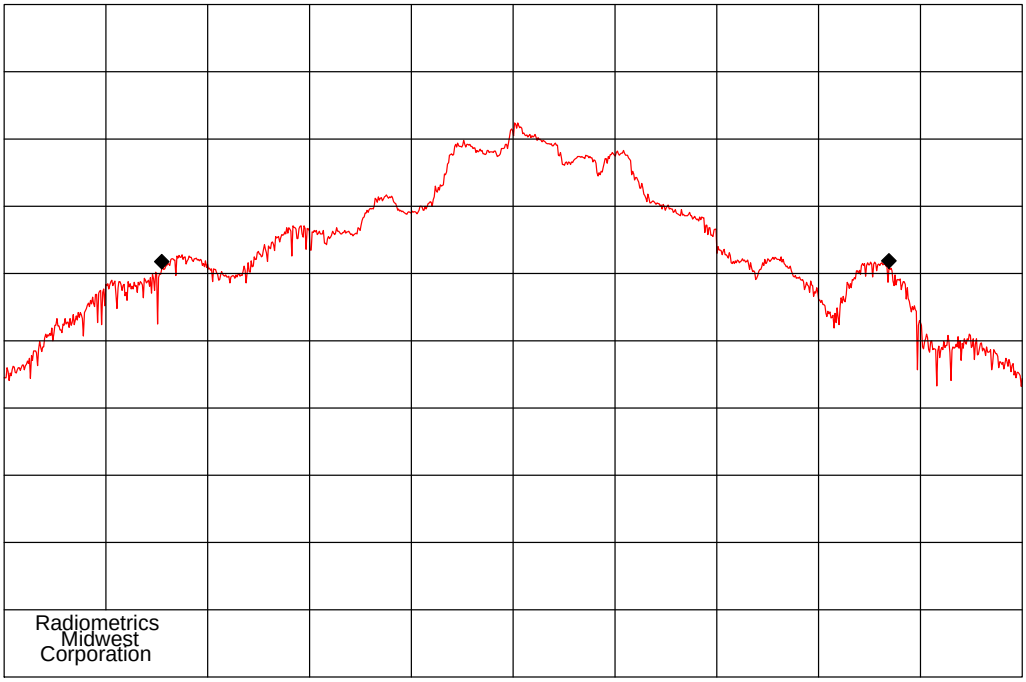


Company: Delsys
CENTER 2.440 00 GHz
RES BW 30 kHz
10 dB/
Notes: 20 dB Bandwidth, 2440 MHz

ITEM : Trigno
REF 97.0 dBuV
VBW 100 kHz
Time: 13:52

Date : 02-24-2011
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec
File: BW2-20

MKR Delta 1.430 MHz 0.10 dB



Company: Delsys
CENTER 2.474 00 GHz
RES BW 30 kHz
10 dB/
Notes: 20 dB Bandwidth, 2474 MHz

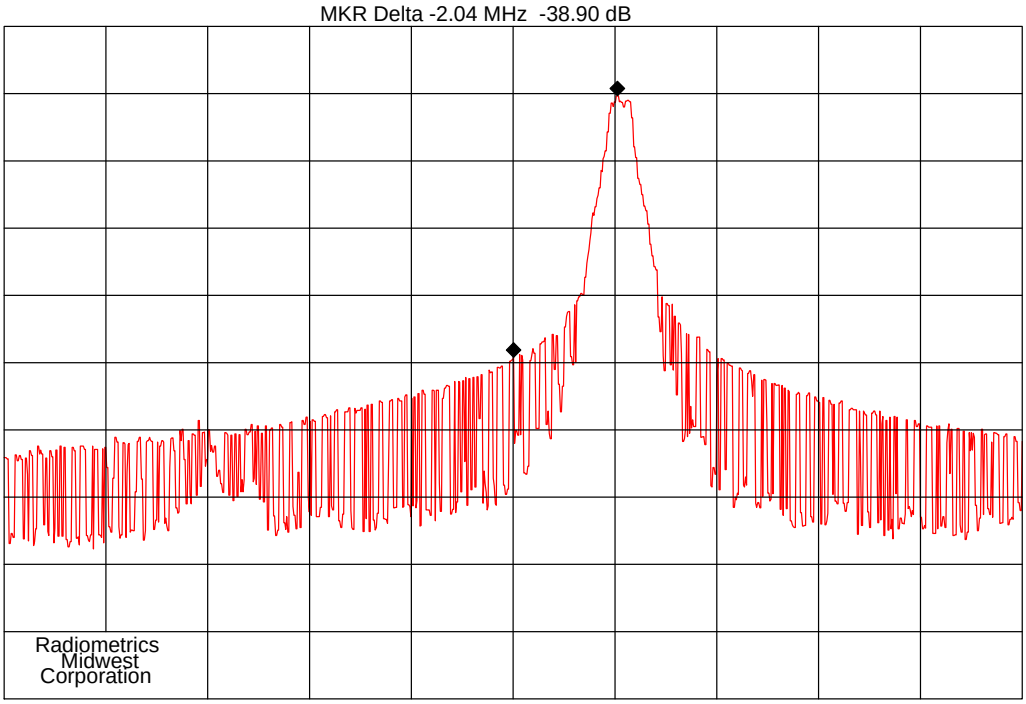
ITEM : Trigno
REF 97.0 dBuV
VBW 100 kHz
Time: 13:50

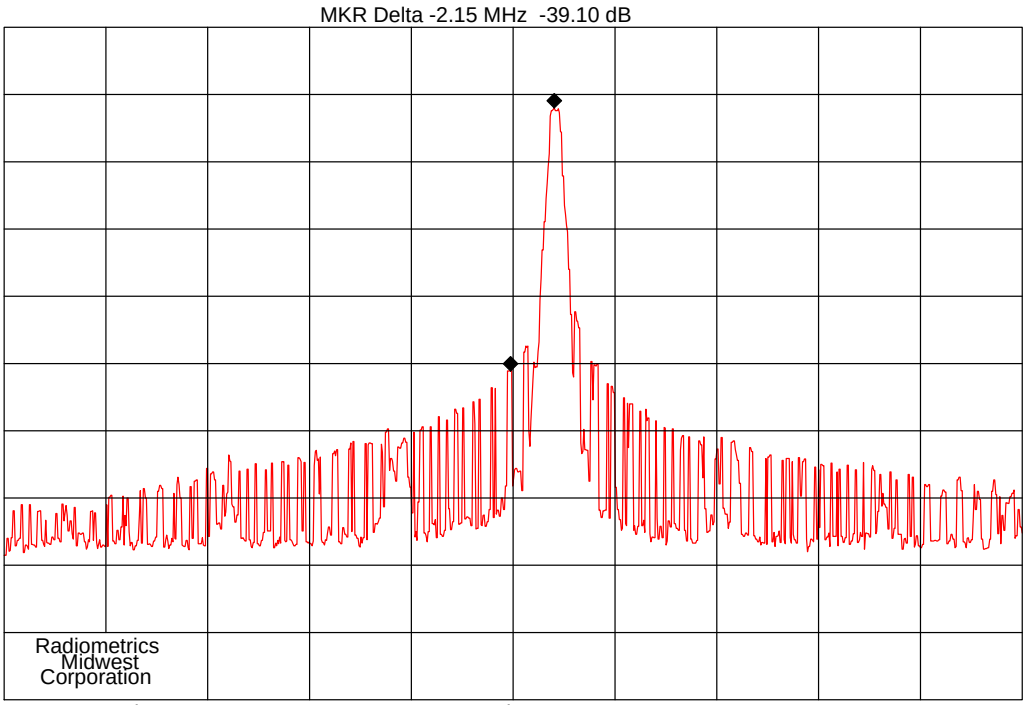
Date : 02-24-2011
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec
File: BW3-20

10.4 Band-edge Compliance of RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation at the band-edge, with the EUT set to the lowest frequency. The trace was allowed to stabilize. A Delta Marker was used to measure the Difference between the peak of the inband signal and level at the band edges (2400 and 2483.5 MHz).

Channel	Band Edge Delta Readings	Minimum Allowed
	dB	dB
2402 Lower Band edge	38.9	20
2474 Upper Band edge	44.2	20

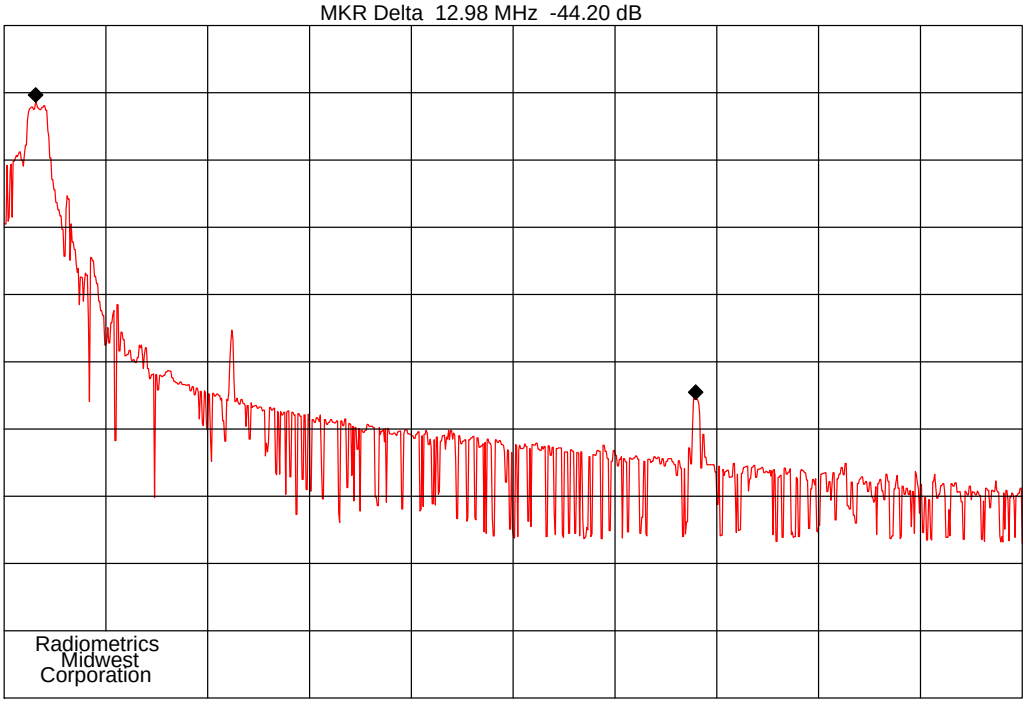




Company: Delsys
CENTER 2.400 0 GHz
RES BW 100 kHz
10 dB/
Notes: Band Edge Test, 2402 MHz

ITEM : Trigno
REF 97.0 dBuV
VBW 300 kHz
Time: 14:20

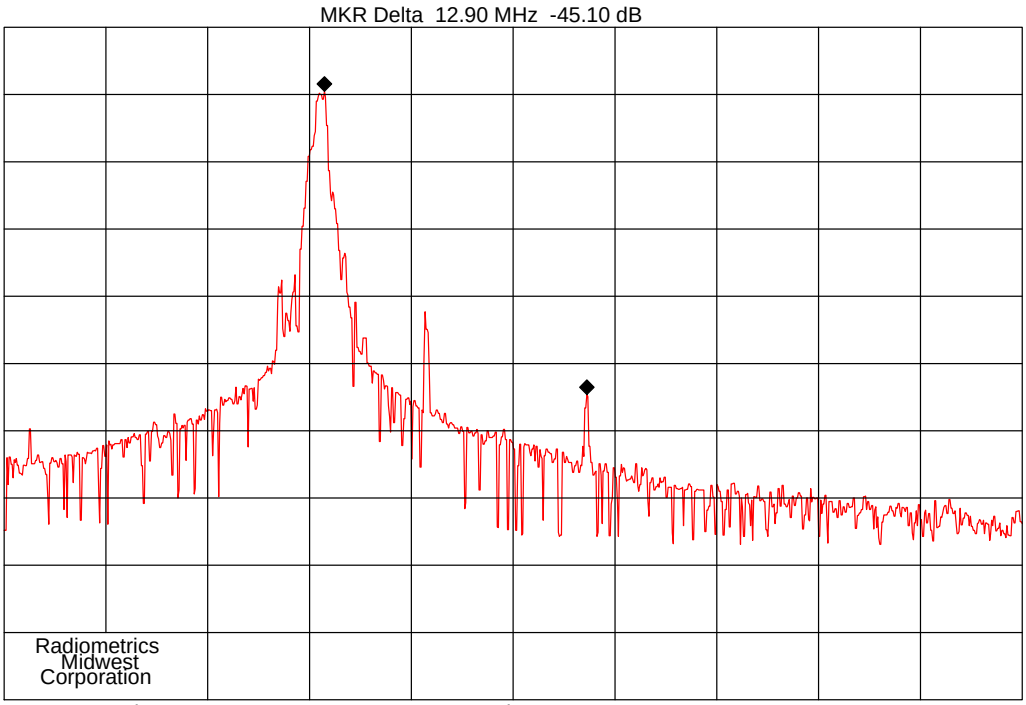
Date : 02-24-2011
SPAN 50.0 MHz
ATTEN 0 dB
SWP 20.0 msec
File: BE-L2



Company: Delsys
CENTER 2.483 5 GHz
RES BW 100 kHz
10 dB/
Notes: Band Edge Test, 2474 MHz

ITEM : Trigno
REF 97.0 dBuV
VBW 300 kHz
Time: 14:16

Date : 02-24-2011
SPAN 20.0 MHz
ATTEN 0 dB
SWP 20.0 msec
File: BE-U1



10.5 RF Radiated Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 150 kHz to 30 MHz is 9 or 10 kHz and the bandwidth from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists.

From 30 to 1000 MHz, an Anritsu spectrum analyzer was used. For tests from 1 to 25 GHz, an HP 8566 spectrum analyzer was used. For tests from 1 to 10 GHz, a high pass filter was used to reduce the fundamental emission. A harmonic mixer was used from 18 to 25 GHz. Figure 4 herein lists the details of the test equipment used during radiated emissions tests.

The Sensor was rotated through three orthogonal axis as per 13.1.4.1 of ANSI C63.4 during the prescans and during final radiated tests.

Final radiated emissions measurements were performed inside of an anechoic chamber at a test distance of 3 meters. The anechoic chamber is designated as Chamber E. This Chamber meets the Site Attenuation requirements of ANSI C63.4 and CISPR 16-1. Chamber E is located at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 MHz to 25 GHz was slowly scanned with particular attention paid to those frequency ranges which appeared high. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded. All measurements may be performed using either the peak, average or quasi-peak detector functions. If the peak detector data exceeds or is marginally close to the limits, the measurements are repeated using a quasi-peak detector or average function as required by the specification for final determination of compliance.

The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground.

10.5.1 Radiated Emissions Field Strength Sample Calculation

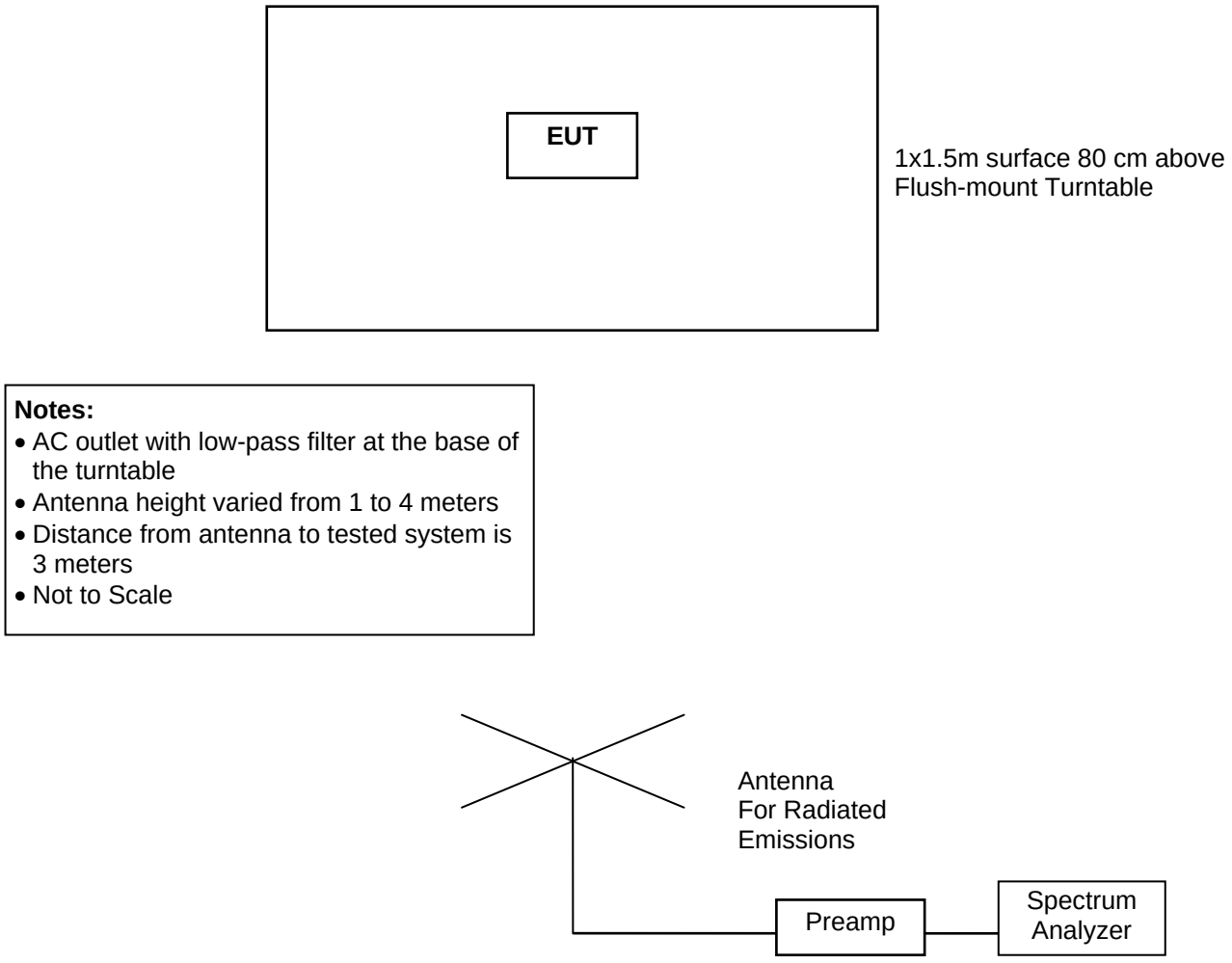
The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

FS = RA + AF + CF - AG

Where: FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain
PKA = Peak to Average Factor (This is zero for non-average measurements)

The Peak to average factor is used when average measurements are required. It is calculated by the highest duty cycle in percent over any 100mS transmission. The factor in dB is 20 * Log(Duty cycle/100).

Figure 3. Drawing of Radiated Emissions Setup



10.5.2 Spurious Radiated Emissions Test Results

The following spectrum analyzer settings were used.

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

A Video Bandwidth of 10 Hz was used for Average measurements above 1 GHz.

Manufacturer	Delsys, Inc.	Specification	FCC Part 15 Subpart C & RSS-210
Model	SP-W03	Test Date	02-18-2011
Serial Number	none	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Corr. Factors = Cable Loss – Preamp Gain		
Configuration	Full system with Computer Transmitting and recieving		

Spurious Emissions from 30 to 1000 MHz

Freq. MHz	Meter Reading dBuV	Dect Type	Antenna Factor dB	Antenna Pol/ ID#	Corr. Factors dB	Field Strength dBuV/m EUT	Field Strength dBuV/m Limit	Margin Under Limit dB
61.2	39.8	P	10.2	H/44	-27.6	22.4	40.0	17.6
72.0	39.8	P	7.2	H/44	-27.4	19.6	40.0	20.4
107.2	54.4	P	12.1	H/44	-27.0	39.5	43.5	4.0
107.6	52.0	Q	12.0	H/44	-27.0	37.0	43.5	6.5
133.2	46.3	P	12.8	H/44	-26.8	32.3	43.5	11.2
143.6	46.4	P	10.5	H/44	-26.7	30.2	43.5	13.3
149.6	49.8	P	10.0	H/44	-26.6	33.2	43.5	10.3
170.8	48.5	P	9.5	H/44	-26.5	31.5	43.5	12.0
194.4	52.5	P	9.7	H/44	-26.2	36.0	43.5	7.5
198.9	43.0	Q	9.6	H/44	-26.1	26.5	43.5	17.0
209.3	43.4	Q	10.4	H/44	-26.1	27.7	43.5	15.8
221.2	51.6	P	11.5	H/44	-26.1	37.0	46.0	9.0
221.5	51.0	Q	11.5	H/44	-26.1	36.4	46.0	9.6
250.8	51.0	P	12.7	H/44	-25.9	37.8	46.0	8.2
266.4	44.8	P	12.8	H/44	-25.8	31.8	46.0	14.2
276.5	48.7	P	13.1	H/44	-25.7	36.1	46.0	9.9
323.0	49.6	P	13.5	H/44	-25.5	37.6	46.0	8.4
368.4	47.9	P	15.0	H/44	-25.4	37.5	46.0	8.5
399.2	48.3	P	15.7	H/44	-25.3	38.7	46.0	7.3
459.6	47.2	P	16.8	H/44	-24.7	39.3	46.0	6.7
553.0	39.2	P	18.0	H/44	-24.1	33.1	46.0	12.9
600.0	40.3	P	18.8	H/44	-23.6	35.5	46.0	10.5
645.0	42.0	P	18.8	H/44	-23.3	37.5	46.0	8.5
666.0	43.0	P	19.9	H/44	-23.3	39.6	46.0	6.4
691.8	45.1	Q	19.8	H/44	-23.4	41.5	46.0	4.5
712.0	39.8	P	19.5	H/44	-23.3	36.0	46.0	10.0
788.0	40.7	P	20.3	H/44	-22.5	38.5	46.0	7.5
875.0	37.4	P	21.3	H/44	-21.4	37.3	46.0	8.7
967.0	34.2	P	22.1	H/44	-20.6	35.7	54.0	18.3
43.6	48.0	P	15.0	V/44	-27.8	35.2	40.0	4.8
59.2	48.0	Q	11.0	V/44	-27.6	31.4	40.0	8.6
60.4	49.6	P	10.5	V/44	-27.6	32.5	40.0	7.5
81.6	50.9	P	7.0	V/44	-27.3	30.6	40.0	9.4
99.5	54.3	Q	9.4	V/44	-27.1	36.6	43.5	6.9
100.4	52.8	P	9.7	V/44	-27.0	35.5	43.5	8.0
101.3	58.2	Q	10.2	V/44	-27.0	41.4	43.5	2.1
108.0	52.2	P	12.0	V/44	-27.0	37.2	43.5	6.3
143.9	53.5	Q	10.4	V/44	-26.7	37.2	43.5	6.3
165.2	48.5	P	9.9	V/44	-26.5	31.9	43.5	11.6

Freq. MHz	Meter Reading dBuV	Dect Type	Antenna Factor dB	Antenna Pol/ ID#	Corr. Factors dB	Field Strength dBuV/m EUT	Field Strength dBuV/m Limit	Margin Under Limit dB
166.6	54.5	Q	9.8	V/44	-26.5	37.8	43.5	5.7
168.0	52.8	P	9.7	V/44	-26.5	36.0	43.5	7.5
183.6	51.2	P	9.3	V/44	-26.3	34.2	43.5	9.3
209.3	43.9	Q	10.4	V/44	-26.1	28.2	43.5	15.3
219.9	40.6	Q	11.5	V/44	-26.1	26.0	46.0	20.0
220.8	53.5	P	11.5	V/44	-26.1	38.9	46.0	7.1
221.1	40.8	Q	11.5	V/44	-26.1	26.2	46.0	19.8
238.4	45.6	P	12.1	V/44	-25.9	31.8	46.0	14.2
250.2	44.6	P	12.6	V/44	-25.9	31.3	46.0	14.7
263.6	42.9	P	12.8	V/44	-25.8	29.9	46.0	16.1
281.6	44.0	P	13.0	V/44	-25.7	31.3	46.0	14.7
292.8	44.5	P	12.7	V/44	-25.6	31.6	46.0	14.4
323.6	42.1	P	13.5	V/44	-25.5	30.1	46.0	15.9
368.4	43.4	P	15.0	V/44	-25.4	33.0	46.0	13.0
400.3	40.6	P	15.7	V/44	-25.2	31.1	46.0	14.9
433.3	41.1	P	16.7	V/44	-25.1	32.7	46.0	13.3
459.6	47.4	P	16.8	V/44	-24.7	39.5	46.0	6.5
471.4	40.6	P	17.3	V/44	-24.7	33.2	46.0	12.8
507.0	39.7	P	17.2	V/44	-24.6	32.3	46.0	13.7
599.0	42.2	P	18.8	V/44	-23.6	37.4	46.0	8.6
645.0	40.4	P	18.8	V/44	-23.3	35.9	46.0	10.1
691.0	40.7	P	19.8	V/44	-23.4	37.1	46.0	8.9
800.0	43.4	P	20.3	V/44	-22.3	41.4	46.0	4.6
814.0	40.0	P	21.2	V/44	-22.1	39.1	46.0	6.9
844.0	37.2	P	21.8	V/44	-21.8	37.2	46.0	8.8
875.0	36.5	P	21.3	V/44	-21.4	36.4	46.0	9.6

The emissions in Red are from host Computer. There may be other emissions listed from the host computer, but since the margin is greater than 4 dB, the source was not determined

Judgment: Passed by 2.1 dB

Spurious Emissions Above 1 GHz

Test Date	02/22/2011
Configuration	Full system with Computer Transmitting and recieving

Freq. MHz	Reading dBuV	Detector Function	Polarity	Factor dB	Field Strength EUT	Field Strength Limit	Margin Under Limit dB
1058.5	50.0	P	H	-1.9	48.1	74.0	25.9
1060.0	46.6	P	H	-1.9	44.7	74.0	29.3
1151.9	52.7	P	H	-0.8	51.9	74.0	22.1
1151.9	41.7	A	H	-0.8	40.9	54.0	13.1
1236.5	51.0	P	H	-0.8	50.2	74.0	23.8
1237.0	45.3	A	H	-0.8	44.5	54.0	9.5
1242.9	39.3	A	H	-0.7	38.6	54.0	15.4
1245.5	50.4	P	H	-0.7	49.7	74.0	24.3
1294.6	51.9	P	H	-0.5	51.4	74.0	22.6

Freq. MHz	Reading dBuV	Detector Function	Polarity	Factor dB	Field Strength		Margin Under Limit dB
					EUT	Limit	
1295.6	34.1	A	H	-0.5	33.6	54.0	20.4
1429.0	46.6	P	H	-0.7	45.9	74.0	28.1
1520.0	45.5	P	H	-0.3	45.2	74.0	28.8
1613.3	39.5	A	H	0.1	39.6	54.0	14.4
1613.5	48.8	P	H	0.1	48.9	74.0	25.1
1710.5	44.8	P	H	0.6	45.4	74.0	28.6
1803.5	42.3	P	H	1.5	43.8	74.0	30.2
1922.0	42.7	P	H	2.1	44.8	74.0	29.2
2087.0	40.8	P	H	2.4	43.2	74.0	30.8
2521.7	63.7	P	H	4.1	67.8	74.0	6.2
2521.7	26.6	A	H	4.1	30.7	54.0	23.3
2588.8	22.0	A	H	4.5	26.5	54.0	27.5
2589.0	61.2	P	H	4.5	65.7	74.0	8.3
1032.5	45.7	P	V	-2.1	43.6	74.0	30.4
1055.0	50.3	P	V	-1.9	48.4	74.0	25.6
1059.4	43.5	P	V	-1.9	41.6	74.0	32.4
1059.5	38.7	A	V	-1.9	36.8	54.0	17.2
1146.5	47.0	P	V	-0.9	46.1	74.0	27.9
1243.1	40.8	A	V	-0.7	40.1	54.0	13.9
1243.5	51.4	P	V	-0.7	50.7	74.0	23.3
1245.0	52.5	P	V	-0.7	51.8	74.0	22.2
1404.5	44.7	P	V	-0.8	43.9	74.0	30.1
1519.1	36.1	A	V	-0.3	35.8	54.0	18.2
1519.7	44.4	P	V	-0.3	44.1	74.0	29.9
1521.5	50.2	P	V	-0.3	49.9	74.0	24.1
1614.5	50.2	P	V	0.1	50.3	74.0	23.7
1792.4	51.1	P	V	1.5	52.6	74.0	21.4
1792.4	47.5	A	V	1.5	49.0	54.0	5.0
2079.0	39.7	P	V	2.4	42.1	74.0	31.9
2390.0	60.5	P	V	3.6	64.1	74.0	9.9
2589.1	55.6	P	V	4.5	60.1	74.0	13.9
2589.2	24.2	A	V	4.5	28.7	54.0	25.3
3175.0	34.8	P	V	6.8	41.6	74.0	32.4

Except for harmonics shown below, No other spurious emissions were detected from 1 to 12.5 GHz.

Judgment: Passed by 5.0 dB

Emissions above 2 GHz while Transmitting

		Spectrum Analyzer Readings									EUT	Peak	Ave	Peak	Ave	Margin
hrm	Tx	Peak			Ave	Peak			Ave	Corr.	Emission	Tot. FS		Limit		Under
		Vertical Polarization				Horizontal Polarization					Freq					
#	Freq	X	Y	Z	Max	X	Y	Z	Max	Fact.	MHz	dBuV/m		dBuV/m		Limit
1	2402	104.5	100.1	103.3	70.9	100.0	106.4	98.9	72.8	3.7	2402	110.1	76.5	114	94	3.9
be	2402	60.3	55.9	59.1	26.7	55.8	62.2	54.7	28.6	3.7	2390	65.9	32.3	74	54	8.1
2	2402	43.4	44.1	46.0	12.4	49.4	47.5	46.9	15.8	11.8	4804	61.2	27.6	74	54	12.8
3	2402	44.0	42.7	44.1	10.5	42.5	45.8	41.7	12.2	19.9	7206	65.7	32.1	74	54	8.3
4	2402	43.1	44.0	43.5	10.4	44.6	43.8	42.8	11.0	16	9608	60.6	27.0	74	54	13.4
5	2402	38.8	41.9	41.6	8.3	38.9	40.6	39.1	7.0	17	12010	58.9	25.3	74	54	15.1
6	2402	40.9	41.2	40.1	7.6	39.4	40.6	39.8	7.0	21.8	14412	63.0	29.4	74	54	11.0
1	2440	99.8	98.8	103.2	69.6	103.5	100.6	99.7	69.9	3.9	2440	107.4	73.8	114	94	6.6
2	2440	44.3	42.5	44.2	10.7	45.8	45.1	44.2	12.2	11.6	4880	57.4	23.8	74	54	16.6
3	2440	41.9	41.4	44.4	10.8	42.3	41.5	40.4	8.7	20.4	7320	64.8	31.2	74	54	9.2
4	2440	41.8	42.8	40.5	9.2	42.5	42.8	41.5	9.2	16.1	9760	58.9	25.3	74	54	15.1
5	2440	40.9	39.8	38.9	7.3	38.6	41.6	38.5	8.0	16.7	12200	58.3	24.7	74	54	15.7
6	2440	40.4	41.0	40.0	7.4	41.2	41.3	39.2	7.7	21.7	14640	63.0	29.4	74	54	11.0
1	2474	100.0	97.9	102.2	68.6	98.8	98.6	100.2	66.6	4	2474	106.2	72.6	114	94	7.8
BE	2474	61.0	58.9	63.2	29.6	59.8	59.6	61.2	27.6	4	2483.5	67.2	33.6	74	54	6.8
2	2474	41.3	43.6	41.5	10.0	43.3	43.3	40.5	9.7	11.9	4948	55.5	21.9	74	54	18.5
3	2474	39.7	40.5	41.3	7.7	39.5	40.4	38.2	6.8	21.1	7422	62.4	28.8	74	54	11.6
4	2474	41.6	42.2	42.6	9.0	41.5	42.9	45.1	11.5	16.3	9896	61.4	27.8	74	54	12.6
5	2474	38.9	37.9	38.0	5.3	40.3	38.1	41.6	8.0	16.4	12370	58.0	24.4	74	54	16.0
6	2474	40.3	40.7	40.1	7.1	40.2	39.5	39.7	6.6	21.3	14844	62.0	28.4	74	54	12.0
Column numbers (see below for explanations)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Judgment: Passed by 3.9 dB
No other emissions were detected from 15 to 25 GHz.

Column #1. hrm = Harmonic; BE = Band Edge emissions
Column #2. Frequency of Transmitter.
Column #3. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #4. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #5. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #6. Average Reading based on peak reading reduced by the Duty cylce correction
Column #7. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #8. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #9. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #10. Average Reading based on peak reading reduced by the Duty cylce correction
Column #11. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor
Column #12. Frequency of Tested Emission
Column #13. Highest peak field strength at listed frequency.
Column #14. Highest Average field strength at listed frequency.
Column #15. Peak Limit.
Column #16. Average Limit.
Column #17. The margin (last column) is the worst case margin under the peak or average limits for that row.