Medtronic MiniMed

ADDENDUM TO TEST REPORT 95094-9A

Carelink USB 2.4
Model: MMT-7306CL

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207 and 15.247

Report No.: 95094-9B

Date of issue: February 10, 2015

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Medtronic MiniMed
18000 Devonshire Street
Northridge, CA 91325-1219

Representative: Bob Vitti
Customer Reference Number: 4500091834

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 95094

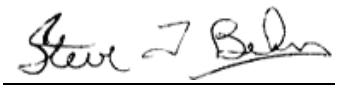
DATE OF EQUIPMENT RECEIPT: November 4, 2013
DATE(S) OF TESTING: November 4-6, 2013

Revision History

Original: Testing of Carelink USB 2.4, Model: MMT-7306CL to FCC Part 15 Subpart C Sections 15.207 and 15.247.
Addendum A: To correct the labels in the Power Output 15.247(b)(3) table by removing the word "bandwidth" in the "Corrections due to bandwidth, cables, amplifiers & antennas (dB)" header and correcting the last column header from "ERP Watts" to "Conducted Power (Watts)".
Addendum B: To correct an error in the value description of LISN, Asset # 01311. The value listed was 5uH and it should have been 50uH.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea A	US0060	SL2-IN-E-1146R	3082D-1	90473	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4	Pass
6dB Occupied Bandwidth	FCC Part 15 Subpart C Section 15.247(a)(2) / FHSS – DA00-705 / DTS – KDB 558074/ ANSI C63.4	Pass
Maximum Output Power	FCC Part 15 Subpart C Section 15.247(b)(3) / FHSS – DA00-705 / DTS – KDB 558074 / ANSI C63.4	Pass
Radiated Spurious Emissions / Bandedge	FCC Part 15 Subpart C Section 15.247(d) / FHSS – DA00-705 / DTS – KDB 558074 / ANSI C63.4	Pass
Power Spectral Density	FCC Part 15 Subpart C 15.247(e) / FHSS – DA00-705 / DTS – KDB 558074 / ANSI C63.4	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Carelink USB 2.4
Manuf: Medtronic MiniMed
Model: MMT-7306CL
Serial: PC0002898F

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Mouse
Manuf: Microsoft
Model: X800898
Serial: NA

Laptop
Manuf: Dell
Model: Latitude E6320
Serial:

Headphones
Manuf: Monster
Model: DNA
Serial: 5W64574YRF

AC/DC Adaptor
Manuf: Dell
Model: DA90PE3-00
Serial: NA

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer:	**Medtronic MiniMed**		
Specification:	**15.207 AC Mains - Quasi-peak**		
Work Order #:	**95094**	Date:	11/4/2013
Test Type:	**Conducted Emissions**	Time:	12:08:08
Equipment:	**Carelink USB 2.4**	Sequence#:	10
Manufacturer:	Medtronic MiniMed	Tested By:	Steven Pittsford
Model:	MMT-7306CL		120V 60Hz
S/N:	PC0002898F		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05435	Attenuator	PE7015-10	10/5/2012	10/5/2014
T2	ANP05546	Cable	Heliax	3/27/2013	3/27/2015
T3	ANP05547	Cable	Heliax	9/7/2012	9/7/2014
T4	AN01311	50uH LISN-Line	3816/2	12/9/2011	12/9/2013
	AN01311	50uH LISN-Neutral	3816/2	12/9/2011	12/9/2013
T5	AN02871	Spectrum Analyzer	E4440A	4/11/2013	4/11/2015
T6	AN02611	High Pass Filter	HE9615-150K-50-720B	4/18/2012	4/18/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Carelink USB 2.4*	Medtronic MiniMed	MMT-7306CL	PC0002898F

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Microsoft	X800898	NA
Headphones	Monster	DNA	5W64574YRF
Laptop	Dell	Latitude E6320	NA
AC/DC Adaptor	Dell	DA90PE3-00	NA

Test Conditions / Notes:

Temperature: 21°C
Pressure: 102.7kPa
Humidity: 32%
Frequency: 150k-30MHz

EUT is located on the top of the test table 80cm over the ground plane.
EUT is connected to support laptop via a 6 foot long USB extender.
Ports are filled on the support laptop.
EUT is in Transmitting.

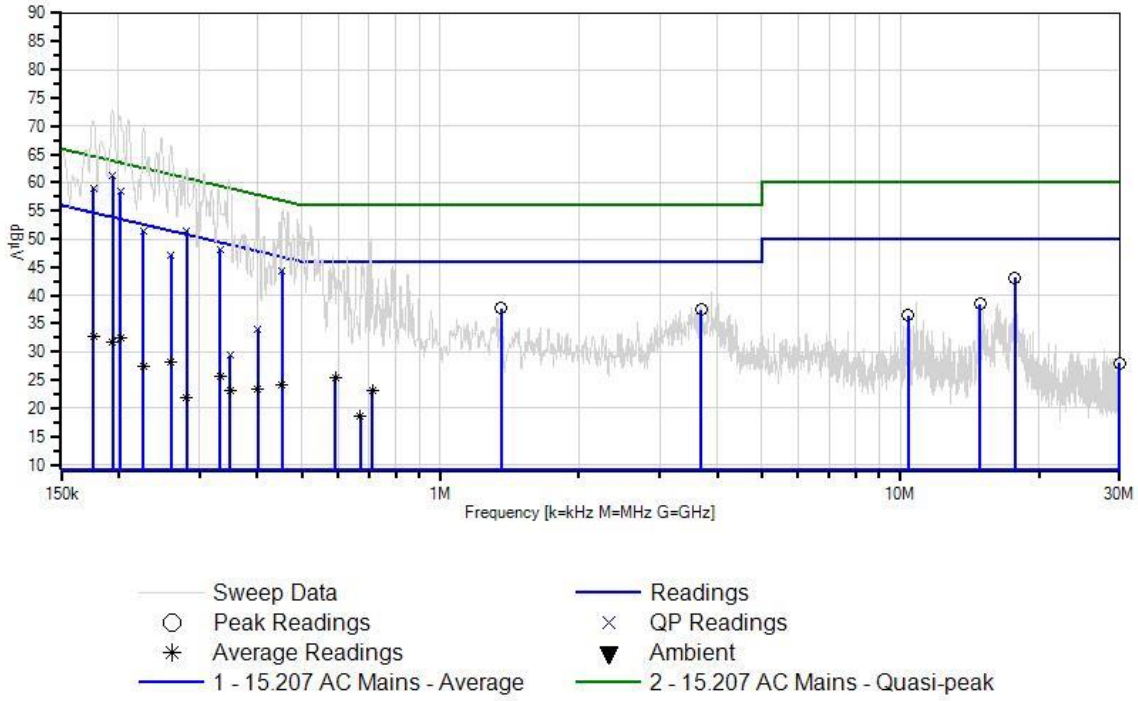
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Line

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	194.359k	51.7	+9.0	+0.0	+0.0	+0.1	+0.0	61.1	63.8	-2.7	Line
	QP		+0.0	+0.3							
2	201.631k	49.1	+9.0	+0.0	+0.0	+0.1	+0.0	58.4	63.5	-5.1	Line
	QP		+0.0	+0.2							
3	176.178k	49.5	+9.0	+0.0	+0.0	+0.1	+0.0	59.0	64.7	-5.7	Line
	QP		+0.0	+0.4							
4	17.765M	33.3	+9.0	+0.0	+0.1	+0.6	+0.0	43.1	50.0	-6.9	Line
			+0.0	+0.1							
5	1.355M	28.3	+9.0	+0.0	+0.1	+0.1	+0.0	37.7	46.0	-8.3	Line
			+0.0	+0.2							
6	3.691M	28.1	+9.0	+0.0	+0.1	+0.1	+0.0	37.5	46.0	-8.5	Line
			+0.0	+0.2							
7	280.896k	42.3	+9.0	+0.0	+0.0	+0.1	+0.0	51.5	60.8	-9.3	Line
	QP		+0.0	+0.1							
8	332.530k	39.0	+9.0	+0.0	+0.0	+0.1	+0.0	48.2	59.4	-11.2	Line
	QP		+0.0	+0.1							
9	226.356k	42.0	+9.0	+0.0	+0.0	+0.1	+0.0	51.4	62.6	-11.2	Line
	QP		+0.0	+0.3							
10	14.904M	28.6	+9.0	+0.0	+0.1	+0.7	+0.0	38.4	50.0	-11.6	Line
			+0.0	+0.0							
11	453.500k	35.1	+9.0	+0.0	+0.0	+0.1	+0.0	44.4	56.8	-12.4	Line
	QP		+0.0	+0.2							
12	10.407M	27.0	+9.0	+0.1	+0.1	+0.3	+0.0	36.5	50.0	-13.5	Line
			+0.0	+0.0							
13	259.807k	37.9	+9.0	+0.0	+0.0	+0.1	+0.0	47.2	61.4	-14.2	Line
	QP		+0.0	+0.2							
14	591.200k	16.0	+9.0	+0.0	+0.0	+0.1	+0.0	25.3	46.0	-20.7	Line
	Ave		+0.0	+0.2							
^	591.200k	41.4	+9.0	+0.0	+0.0	+0.1	+0.0	50.7	46.0	+4.7	Line
			+0.0	+0.2							
16	201.631k	23.1	+9.0	+0.0	+0.0	+0.1	+0.0	32.4	53.5	-21.1	Line
	Ave		+0.0	+0.2							
^	201.631k	62.5	+9.0	+0.0	+0.0	+0.1	+0.0	71.8	53.5	+18.3	Line
			+0.0	+0.2							

18	176.178k	23.3	+9.0	+0.0	+0.0	+0.1	+0.0	32.8	54.7	-21.9	Line
	Ave		+0.0	+0.4							
^	176.178k	61.4	+9.0	+0.0	+0.0	+0.1	+0.0	70.9	54.7	+16.2	Line
			+0.0	+0.4							
20	30.000M	17.7	+9.1	+0.1	+0.1	+0.8	+0.0	28.0	50.0	-22.0	Line
			+0.0	+0.2							
21	194.359k	22.4	+9.0	+0.0	+0.0	+0.1	+0.0	31.8	53.8	-22.0	Line
	Ave		+0.0	+0.3							
^	194.359k	63.4	+9.0	+0.0	+0.0	+0.1	+0.0	72.8	53.8	+19.0	Line
			+0.0	+0.3							
23	453.500k	14.8	+9.0	+0.0	+0.0	+0.1	+0.0	24.1	46.8	-22.7	Line
	Ave		+0.0	+0.2							
^	453.500k	47.7	+9.0	+0.0	+0.0	+0.1	+0.0	57.0	46.8	+10.2	Line
			+0.0	+0.2							
25	711.900k	13.8	+9.0	+0.0	+0.0	+0.1	+0.0	23.1	46.0	-22.9	Line
	Ave		+0.0	+0.2							
^	711.900k	35.8	+9.0	+0.0	+0.0	+0.1	+0.0	45.1	46.0	-0.9	Line
			+0.0	+0.2							
27	259.807k	18.9	+9.0	+0.0	+0.0	+0.1	+0.0	28.2	51.4	-23.2	Line
	Ave		+0.0	+0.2							
^	259.807k	57.2	+9.0	+0.0	+0.0	+0.1	+0.0	66.5	51.4	+15.1	Line
			+0.0	+0.2							
29	400.885k	24.8	+9.0	+0.0	+0.0	+0.1	+0.0	34.1	57.8	-23.7	Line
	QP		+0.0	+0.2							
30	332.530k	16.4	+9.0	+0.0	+0.0	+0.1	+0.0	25.6	49.4	-23.8	Line
	Ave		+0.0	+0.1							
^	332.530k	49.4	+9.0	+0.0	+0.0	+0.1	+0.0	58.6	49.4	+9.2	Line
			+0.0	+0.1							
32	400.885k	14.1	+9.0	+0.0	+0.0	+0.1	+0.0	23.4	47.8	-24.4	Line
	Ave		+0.0	+0.2							
^	400.885k	48.2	+9.0	+0.0	+0.0	+0.1	+0.0	57.5	47.8	+9.7	Line
			+0.0	+0.2							
34	226.356k	17.9	+9.0	+0.0	+0.0	+0.1	+0.0	27.3	52.6	-25.3	Line
	Ave		+0.0	+0.3							
^	226.356k	60.2	+9.0	+0.0	+0.0	+0.1	+0.0	69.6	52.6	+17.0	Line
			+0.0	+0.3							
36	350.000k	14.0	+9.0	+0.0	+0.0	+0.1	+0.0	23.2	49.0	-25.8	Line
	Ave		+0.0	+0.1							
37	671.400k	9.3	+9.0	+0.0	+0.0	+0.1	+0.0	18.6	46.0	-27.4	Line
	Ave		+0.0	+0.2							
^	671.400k	35.9	+9.0	+0.0	+0.0	+0.1	+0.0	45.2	46.0	-0.8	Line
			+0.0	+0.2							
39	280.896k	12.6	+9.0	+0.0	+0.0	+0.1	+0.0	21.8	50.8	-29.0	Line
	Ave		+0.0	+0.1							
^	280.896k	53.3	+9.0	+0.0	+0.0	+0.1	+0.0	62.5	50.8	+11.7	Line
			+0.0	+0.1							
41	350.000k	20.2	+9.0	+0.0	+0.0	+0.1	+0.0	29.4	59.0	-29.6	Line
	QP		+0.0	+0.1							

CKC Laboratories, Inc. Date: 11/4/2013 Time: 12:08:08 Medtronic MiniMed WO#: 95094
Test Lead: Line 120V 60Hz Sequence#: 10 Line
Medtronic MiniMed Carelink USB 2.4 P/N: MMT-7306CL



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Medtronic MiniMed**
Specification: **15.207 AC Mains - Average**
Work Order #: **95094** Date: 11/4/2013
Test Type: **Conducted Emissions** Time: 12:20:52
Equipment: **Carelink USB 2.4** Sequence#: 11
Manufacturer: Medtronic MiniMed Tested By: Steven Pittsford
Model: MMT-7306CL 120V 60Hz
S/N: PC0002898F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05435	Attenuator	PE7015-10	10/5/2012	10/5/2014
T2	ANP05546	Cable	Heliax	3/27/2013	3/27/2015
T3	ANP05547	Cable	Heliax	9/7/2012	9/7/2014
	AN01311	50uH LISN-Line	3816/2	12/9/2011	12/9/2013
T4	AN01311	50uH LISN-Neutral	3816/2	12/9/2011	12/9/2013
	AN02871	Spectrum Analyzer	E4440A	4/11/2013	4/11/2015
T5	AN02611	High Pass Filter	HE9615-150K-50-720B	4/18/2012	4/18/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Carelink USB 2.4*	Medtronic MiniMed	MMT-7306CL	PC0002898F

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Microsoft	X800898	NA
Headphones	Monster	DNA	5W64574YRF
Laptop	Dell	Latitude E6320	NA
AC/DC Adaptor	Dell	DA90PE3-00	NA

Test Conditions / Notes:

Temperature: 21°C
Pressure: 102.7kPa
Humidity: 32%
Frequency: 150k-30MHz

EUT is located on the top of the test table 80cm over the ground plane.
EUT is connected to support laptop via a 6 foot long USB extender.
Ports are filled on the support laptop.
EUT is in Transmitting.

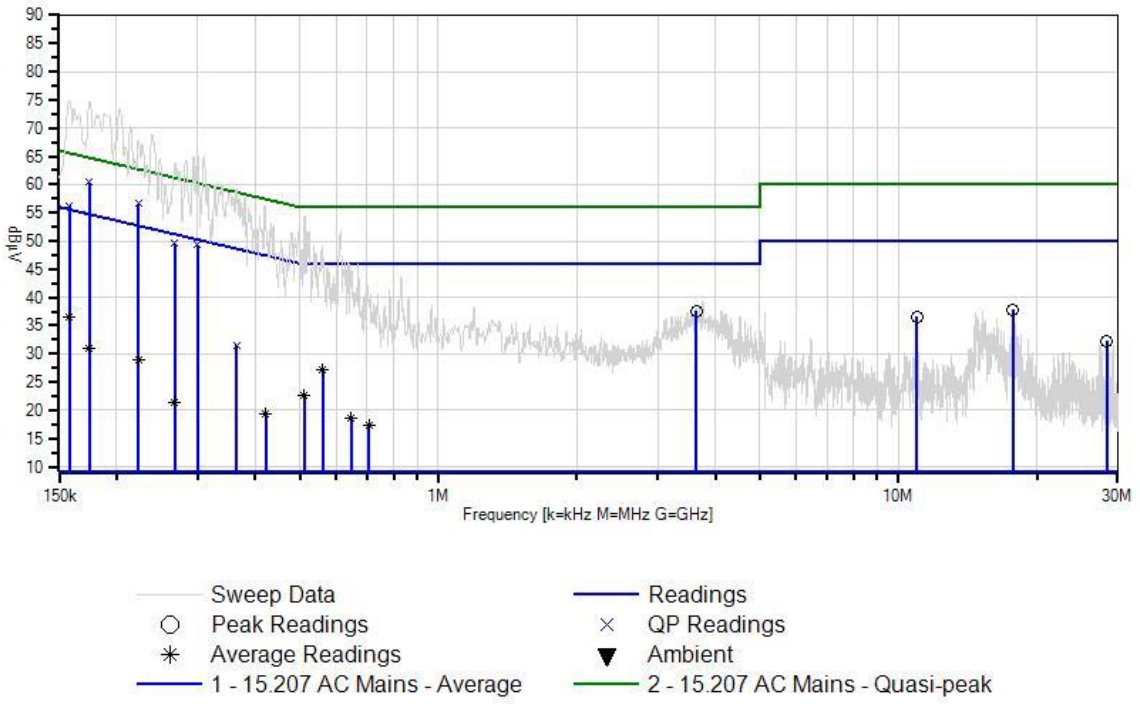
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: Neutral

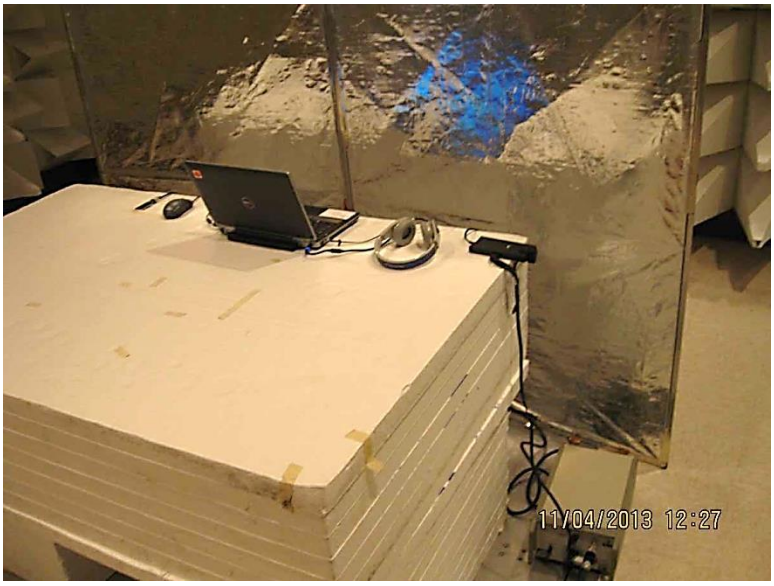
#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	174.725k	50.9	+9.0	+0.0	+0.0	+0.1	+0.0	60.4	64.7	-4.3	Neutr
	QP		+0.4								
2	223.448k	47.2	+9.0	+0.0	+0.0	+0.1	+0.0	56.6	62.7	-6.1	Neutr
	QP		+0.3								
3	3.639M	28.0	+9.0	+0.0	+0.1	+0.2	+0.0	37.5	46.0	-8.5	Neutr
			+0.2								
4	157.999k	46.5	+9.0	+0.0	+0.0	+0.1	+0.0	56.3	65.6	-9.3	Neutr
	QP		+0.7								
5	299.804k	40.1	+9.0	+0.0	+0.0	+0.1	+0.0	49.3	60.2	-10.9	Neutr
	QP		+0.1								
^	299.804k	56.0	+9.0	+0.0	+0.0	+0.1	+0.0	65.2	50.2	+15.0	Neutr
			+0.1								
7	267.807k	40.3	+9.0	+0.0	+0.0	+0.1	+0.0	49.6	61.2	-11.6	Neutr
	QP		+0.2								
8	17.762M	28.0	+9.0	+0.0	+0.1	+0.6	+0.0	37.8	50.0	-12.2	Neutr
			+0.1								
9	10.976M	27.1	+9.0	+0.1	+0.1	+0.3	+0.0	36.6	50.0	-13.4	Neutr
			+0.0								
10	28.376M	21.9	+9.1	+0.1	+0.1	+0.8	+0.0	32.2	50.0	-17.8	Neutr
			+0.2								
11	560.200k	17.8	+9.0	+0.0	+0.0	+0.1	+0.0	27.1	46.0	-18.9	Neutr
	Ave		+0.2								
^	560.200k	42.8	+9.0	+0.0	+0.0	+0.1	+0.0	52.1	46.0	+6.1	Neutr
			+0.2								
13	157.999k	26.7	+9.0	+0.0	+0.0	+0.1	+0.0	36.5	55.6	-19.1	Neutr
	Ave		+0.7								
^	157.999k	65.1	+9.0	+0.0	+0.0	+0.1	+0.0	74.9	55.6	+19.3	Neutr
			+0.7								
15	511.300k	13.4	+9.0	+0.0	+0.0	+0.1	+0.0	22.7	46.0	-23.3	Neutr
	Ave		+0.2								
^	511.300k	40.9	+9.0	+0.0	+0.0	+0.1	+0.0	50.2	46.0	+4.2	Neutr
			+0.2								
17	223.448k	19.6	+9.0	+0.0	+0.0	+0.1	+0.0	29.0	52.7	-23.7	Neutr
	Ave		+0.3								
^	223.448k	58.3	+9.0	+0.0	+0.0	+0.1	+0.0	67.7	52.7	+15.0	Neutr
			+0.3								
19	174.725k	21.4	+9.0	+0.0	+0.0	+0.1	+0.0	30.9	54.7	-23.8	Neutr
	Ave		+0.4								
^	174.725k	65.3	+9.0	+0.0	+0.0	+0.1	+0.0	74.8	54.7	+20.1	Neutr
			+0.4								
21	364.526k	22.3	+9.0	+0.0	+0.0	+0.1	+0.0	31.5	58.6	-27.1	Neutr
	QP		+0.1								
^	364.526k	50.1	+9.0	+0.0	+0.0	+0.1	+0.0	59.3	48.6	+10.7	Neutr
			+0.1								
23	646.200k	9.3	+9.0	+0.0	+0.0	+0.1	+0.0	18.6	46.0	-27.4	Neutr
	Ave		+0.2								

^	646.200k	40.6	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	49.9	46.0	+3.9	Neutr
25	422.700k Ave	10.0	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	19.3	47.4	-28.1	Neutr
^	422.700k	44.7	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	54.0	47.4	+6.6	Neutr
27	707.500k Ave	8.1	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	17.4	46.0	-28.6	Neutr
^	707.500k	37.3	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	46.6	46.0	+0.6	Neutr
29	267.807k Ave	12.0	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	21.3	51.2	-29.9	Neutr
^	267.807k	54.7	+9.0 +0.2	+0.0	+0.0	+0.1	+0.0	64.0	51.2	+12.8	Neutr

CKC Laboratories, Inc. Date: 11/4/2013 Time: 12:20:52 Medtronic MiniMed WO#: 95094
Test Lead: Neutral 120V 60Hz Sequence#: 11 Neutral
Medtronic MiniMed Carelink USB 2.4 P/N: MMT-7306CL



Test Setup Photos



15.247(a)(2) 6dB Occupied Bandwidth

Test Conditions / Setup

The EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. The EUT is located on top of a Styrofoam table, 80cm over the ground plane. The EUT is connected to support laptop via a 6 foot long USB extender. Ports are filled on the support laptop.

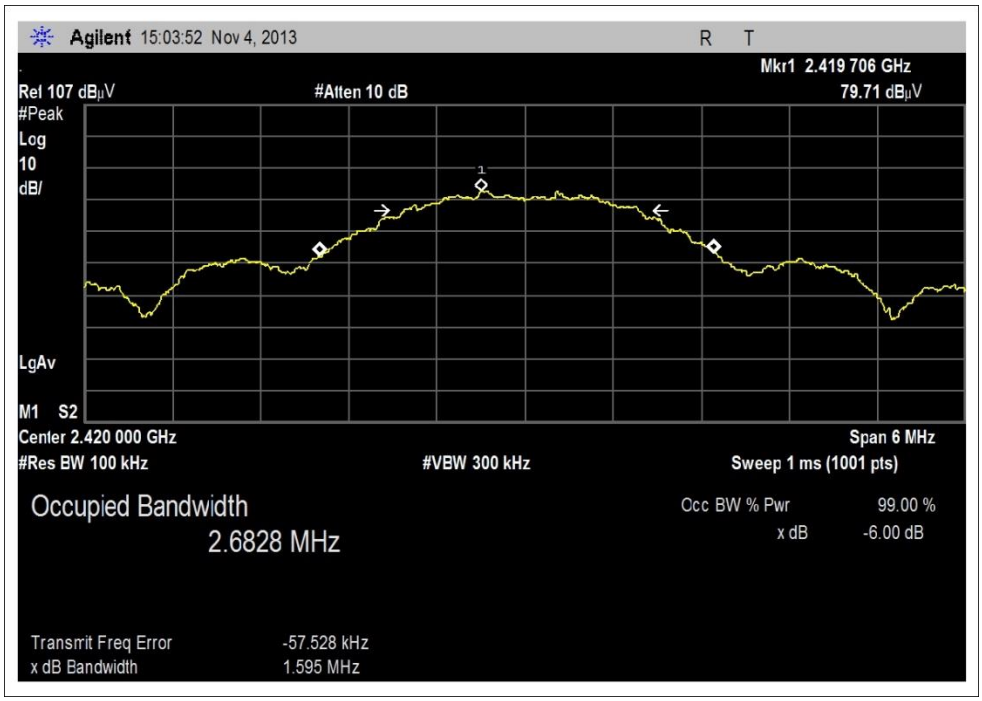
Test Conditions:
Temp: 23°C
Humidity: 31%
Pressure: 102.5kPa
Freq: 2400-2483.5MHz

Engineer Name: Steven Pittsford

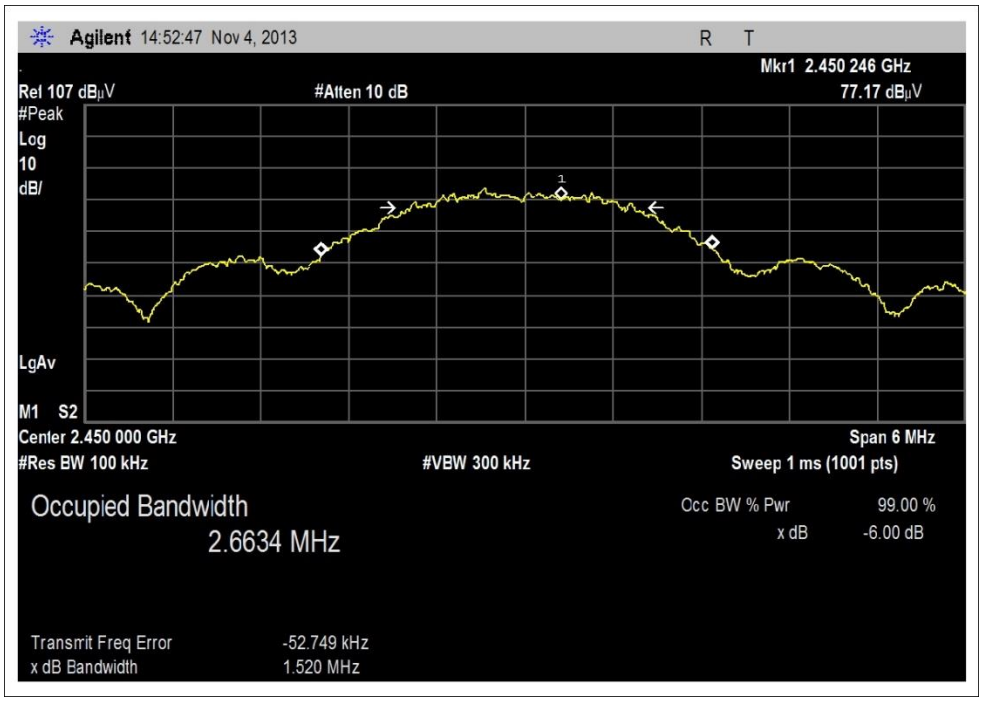
Test Equipment					
Asset #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	EMCO	9/16/2013	9/16/2015
AN03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
ANP05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
ANP05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
AN02871	Spectrum Analyzer	E4440A	Agilent	4/11/2013	4/11/2015

Test Data

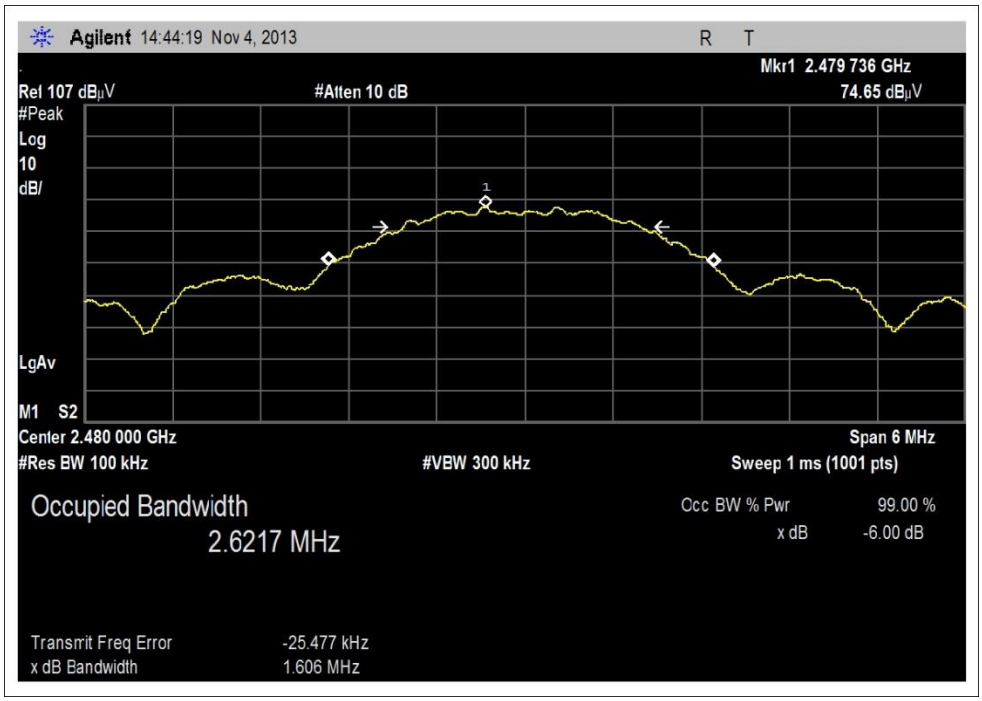
Frequency (MHz)	6dB Bandwidth
2420	1.595MHz
2450	1.520MHz
2480	1.606MHz


Agilent 15:03:52 Nov 4, 2013
R T
Mkr1 2.419 706 GHz
Rel 107 dBµV
#Atten 10 dB
79.71 dBµV
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.420 000 GHz
Span 6 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (1001 pts)
Occupied Bandwidth
2.6828 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -57.528 kHz
x dB Bandwidth 1.595 MHz

Low

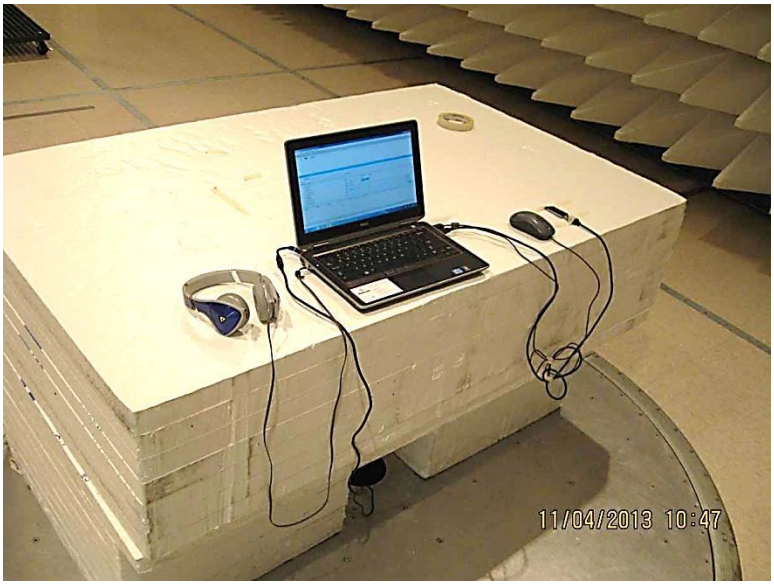

Agilent 14:52:47 Nov 4, 2013
R T
Mkr1 2.450 246 GHz
Rel 107 dBµV
#Atten 10 dB
77.17 dBµV
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.450 000 GHz
Span 6 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (1001 pts)
Occupied Bandwidth
2.6634 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -52.749 kHz
x dB Bandwidth 1.520 MHz

Middle


Agilent 14:44:19 Nov 4, 2013
R T
Mkr1 2.479 736 GHz
Ref 107 dBµV
#Atten 10 dB
74.65 dBµV
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.480 000 GHz
Span 6 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (1001 pts)
Occupied Bandwidth
2.6217 MHz
Ccc BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -25.477 kHz
x dB Bandwidth 1.606 MHz

High

Test Setup Photos



15.247(b)(3) Maximum Output Power

Test Conditions / Setup

The EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. The formula shown below will be used to calculate the ERP. The EUT is located on top of a Styrofoam table, 80cm over the ground plane. Voltage on the laptop will be varied per FCC 15.31(e). The EUT is connected to support laptop via a 6 foot long USB extender. Ports are filled on the support laptop.

Test Conditions:
Temp: 21°C
Humidity: 32%
Pressure: 102.6kPa
Freq: 2400-2483.5MHz

P = (Ed)^2 / (30 * G)

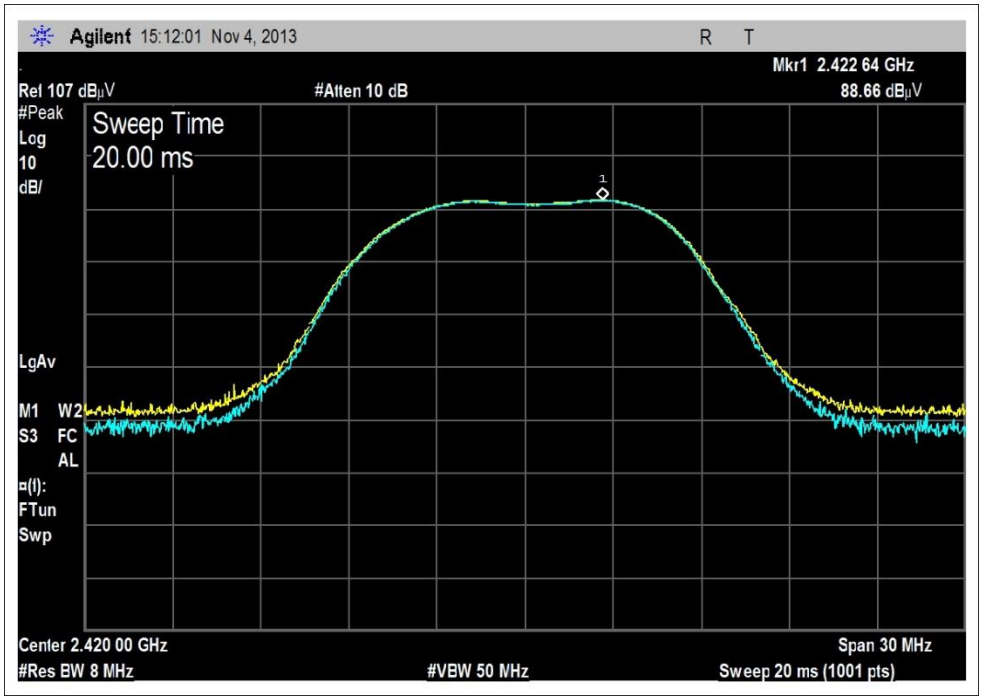
E = Field strength of the measurement converted to V/M
d = Measurement distance in meters
G = Numerical gain of the EUT's antenna relative to an isotropic radiator.
P = The power in watts for which we are solving

Engineer Name: Steven Pittsford

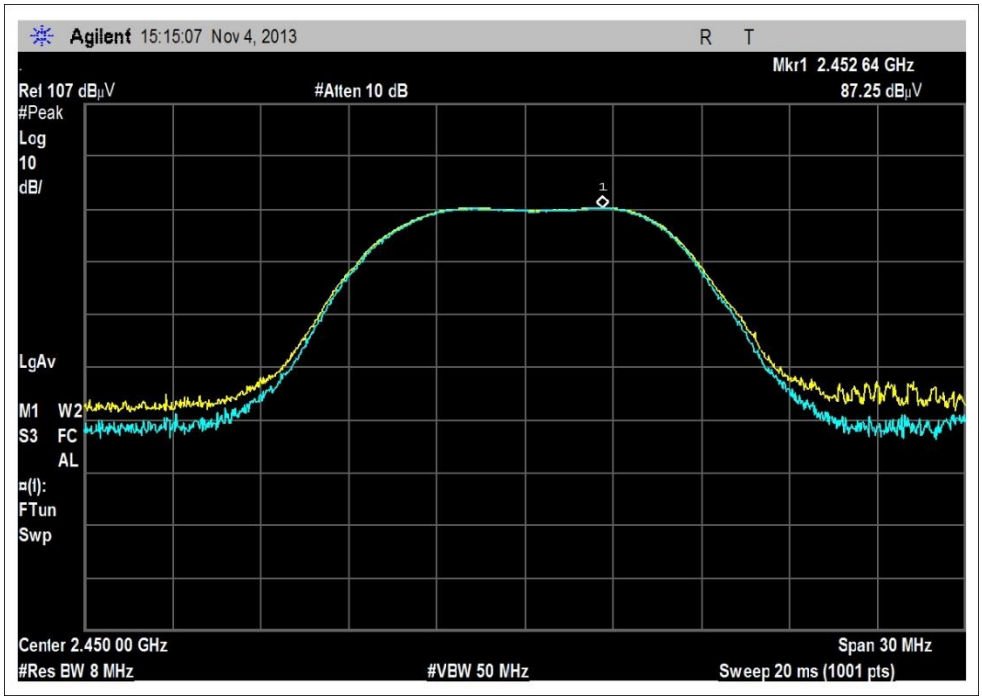
Test Equipment					
Asset #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	EMCO	9/16/2013	9/16/2015
AN03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
ANP05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
ANP05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
AN02871	Spectrum Analyzer	E4440A	Agilent	4/11/2013	4/11/2015

Test Data

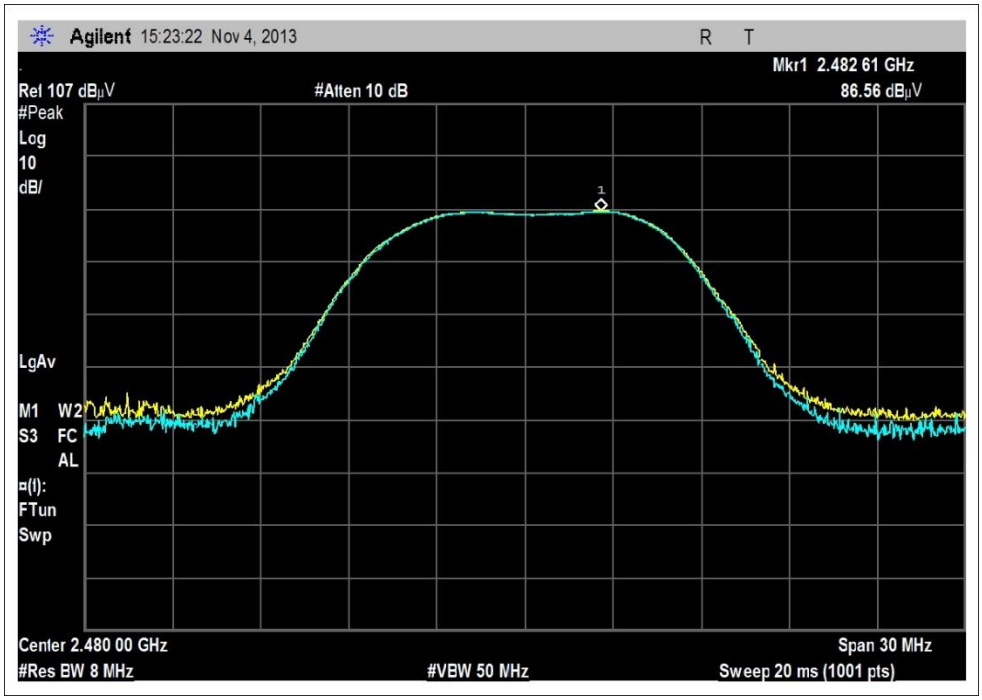
Frequency (MHz)	Input Voltage	Spectrum Analyzer Measurement (dBuV)	Corrections due to cables, amplifiers, antennas and (dB)	Corrected Reading (dBuV)	Antenna Gain (dBi)	Conducted Power (Watts)
2420	102VAC	88.7	1.5	90.2	0	$3.141*10^{-4}$
	120VAC	88.7	1.5	90.2	0	$3.141*10^{-4}$
	138VAC	88.7	1.5	90.2	0	$3.141*10^{-4}$
2450	102VAC	87.2	1.6	88.8	0	$2.276*10^{-4}$
	120VAC	87.2	1.6	88.8	0	$2.276*10^{-4}$
	138VAC	87.2	1.6	88.8	0	$2.276*10^{-4}$
2480	102VAC	86.6	1.6	88.2	0	$1.982*10^{-4}$
	120VAC	86.6	1.6	88.2	0	$1.982*10^{-4}$
	138VAC	86.6	1.6	88.2	0	$1.982*10^{-4}$



Low

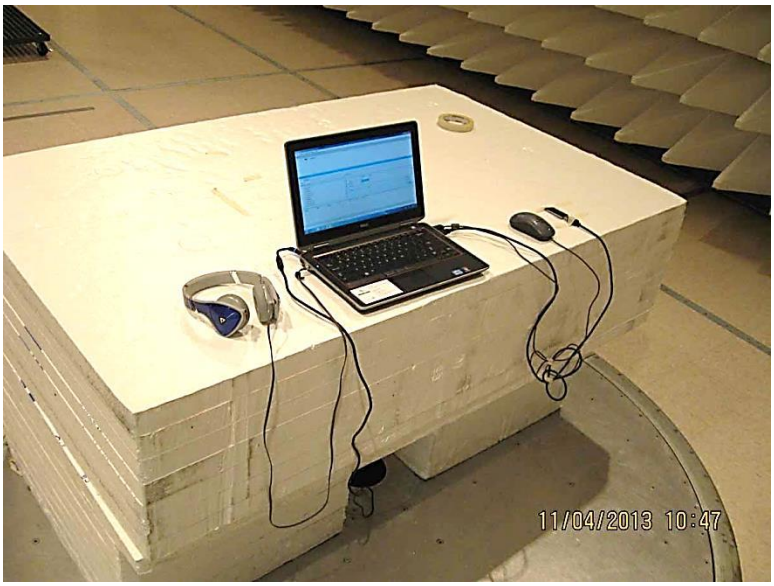

Agilent 15:15:07 Nov 4, 2013
R T
Mkr1 2.452 64 GHz
Rel 107 dBµV
#Atten 10 dB
87.25 dBµV
#Peak
Log
10
dB/
LgAv
M1 W2
S3 FC
AL
¤(l):
FTun
Swp
Center 2.450 00 GHz
Span 30 MHz
#Res BW 8 MHz
#VBW 50 MHz
Sweep 20 ms (1001 pts)

Middle


Agilent 15:23:22 Nov 4, 2013
R T
Mkr1 2.482 61 GHz
Rel 107 dBµV
#Atten 10 dB
86.56 dBµV
#Peak
Log
10
dB/
LgAv
M1 W2
S3 FC
AL
¤(l):
FTun
Swp
Center 2.480 00 GHz
Span 30 MHz
#Res BW 8 MHz
#VBW 50 MHz
Sweep 20 ms (1001 pts)

High

Test Setup Photos



15.247(d) Radiated Spurious Emissions

Test Data Sheet

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Medtronic MiniMed**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **95094** Date: 11/5/2013
Test Type: **Maximized Emissions** Time: 18:16:37
Equipment: **Carelink USB 2.4** Sequence#: 10
Manufacturer: Medtronic MiniMed Tested By: Steven Pittsford
Model: MMT-7306CL
S/N: PC0002898F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	9/16/2013	9/16/2015
T2	AN03209	Preamp	83051A	3/5/2013	3/5/2015
T3	ANP05546	Cable	Heliax	3/27/2013	3/27/2015
T4	ANP05547	Cable	Heliax	9/7/2012	9/7/2014
T5	AN02871	Spectrum Analyzer	E4440A	4/11/2013	4/11/2015
T6	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	12/18/2012	12/18/2014
T7	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	12/17/2012	12/17/2014
T8	AN02763-69	Waveguide	Multiple	6/7/2012	6/7/2014
T9	ANP05428	Cable	PE35591-60	6/8/2012	6/8/2014
T10	AN02308	Preamp	8447D	4/3/2012	4/3/2014
T11	AN01996	Biconilog Antenna	CBL6111C	3/2/2012	3/2/2014
T12	ANP05360	Cable	RG214	12/3/2012	12/3/2014
T13	ANP05541	Cable	Heliax	4/11/2012	4/11/2014
T14	AN00052	Loop Antenna	6502	5/16/2012	5/16/2014
T15	ANP05422	Cable	PE35591-72	6/8/2012	6/8/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Carelink USB 2.4*	Medtronic MiniMed	MMT-7306CL	PC0002898F

Support Devices:

Function	Manufacturer	Model #	S/N
AC/DC Adaptor	Dell	DA90PE3-00	NA
Laptop	Dell	Latitude E6320	NA
Headphones	Monster	DNA	5W64574YRF
Mouse	Microsoft	X800898	NA

Test Conditions / Notes:

Temperature: 23°C
Pressure: 102.5kPa
Humidity: 31%
Frequency: 9k-26GHz

Vertical and Horizontal Polarizations investigated
CISPR Bandwidths Used.
EUT is located on the top of the test table 80cm over the ground plane.
EUT is connected to support laptop via a 6 foot long USB extender. Ports are filled on the support laptop.
EUT is transmitting at Low, Mid and High Channels.

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10 T14	T3 T7 T11 T15	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	4959.658M	41.4	+32.5 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+2.3 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0	+0.0 -16	49.0	54.0	-5.0	Vert 100
2	144.500M	53.3	+0.0 +0.0 +0.0 +0.4	+0.0 +0.0 -27.6 +0.0	+0.3 +0.0 +11.3 +0.0	+0.0 +0.0 +0.7	+0.0 351	38.4	43.5	-5.1	Horiz 131
3	4960.692M	41.3	+32.5 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+2.3 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0	+0.0	48.9	54.0	-5.1	Horiz
4	4899.905M	41.5	+32.3 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+2.2 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0	+0.0 360	48.8	54.0	-5.2	Horiz 116
5	24800.345 M	44.9	+0.0 +0.0 +6.3 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 -12.4 +0.0 +8.6	+0.0 +0.2 +0.0	+0.0 304	47.6	54.0	-6.4	Vert 106
6	4840.915M	40.5	+32.2 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+2.2 +0.0 +0.0 +0.0	+3.5 +0.0 +0.0	+0.0 348	47.5	54.0	-6.5	Horiz 112
7	4899.235M	39.7	+32.3 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+2.2 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0	+0.0	47.0	54.0	-7.0	Vert 123
8	4840.000M	39.2	+32.2 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+2.2 +0.0 +0.0 +0.0	+3.5 +0.0 +0.0	+0.0 203	46.2	54.0	-7.8	Vert 101

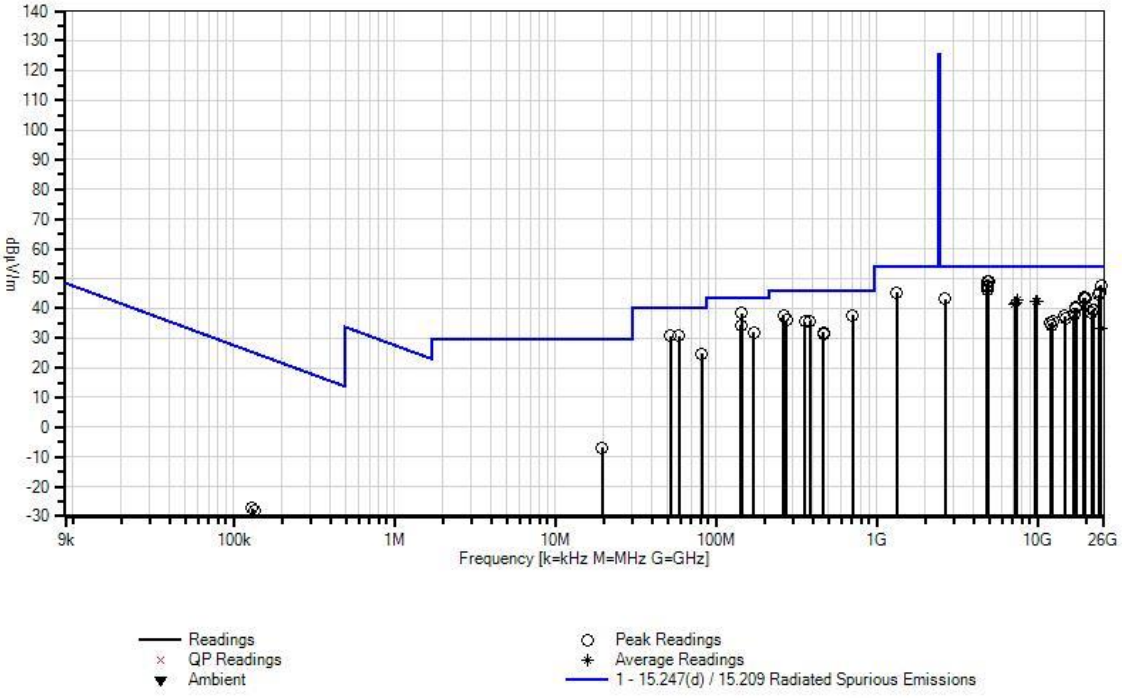
9	711.900M	41.5	+0.0	+0.0	+0.7	+0.0	+0.0	37.7	46.0	-8.3	Horiz
			+0.0	+0.0	+0.0	+0.0	360				131
			+0.0	-28.2	+20.9	+1.8					
			+1.0	+0.0	+0.0						
10	263.800M	49.9	+0.0	+0.0	+0.4	+0.0	+0.0	37.5	46.0	-8.5	Horiz
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	-27.1	+12.7	+1.0					
			+0.6	+0.0	+0.0						
11	1330.000M	48.4	+24.5	-30.7	+1.3	+1.8	+0.0	45.3	54.0	-8.7	Horiz
			+0.0	+0.0	+0.0	+0.0	102				99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
12	24500.050 M	42.8	+0.0	+0.0	+0.0	+0.0	+0.0	45.1	54.0	-8.9	Vert
			+0.0	+0.0	-12.9	+0.1					
			+6.4	+0.0	+0.0	+0.0	360				109
			+0.0	+0.0	+8.7						
13	143.500M	49.3	+0.0	+0.0	+0.3	+0.0	+0.0	34.4	43.5	-9.1	Horiz
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	-27.6	+11.3	+0.7					
			+0.4	+0.0	+0.0						
14	59.100M	52.4	+0.0	+0.0	+0.1	+0.0	+0.0	30.8	40.0	-9.2	Horiz
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	-28.0	+5.5	+0.5					
			+0.3	+0.0	+0.0						
15	52.300M	50.6	+0.0	+0.0	+0.1	+0.0	+0.0	30.7	40.0	-9.3	Horiz
			+0.0	+0.0	+0.0	+0.0	360				131
			+0.0	-28.0	+7.4	+0.4					
			+0.2	+0.0	+0.0						
16	24200.000 M	42.9	+0.0	+0.0	+0.0	+0.0	+0.0	44.5	54.0	-9.5	Vert
			+0.0	+0.0	-13.5	+0.1					
			+6.4	+0.0	+0.0	+0.0					109
			+0.0	+0.0	+8.6						
17	273.500M	48.1	+0.0	+0.0	+0.4	+0.0	+0.0	35.9	46.0	-10.1	Horiz
			+0.0	+0.0	+0.0	+0.0	360				131
			+0.0	-27.1	+12.8	+1.1					
			+0.6	+0.0	+0.0						
18	384.000M	45.4	+0.0	+0.0	+0.4	+0.0	+0.0	35.8	46.0	-10.2	Horiz
			+0.0	+0.0	+0.0	+0.0	360				131
			+0.0	-27.7	+15.8	+1.2					
			+0.7	+0.0	+0.0						
19	19360.000 M	42.2	+0.0	+0.0	+0.0	+0.0	+0.0	43.6	54.0	-10.4	Vert
			+0.0	+0.0	-13.3	+1.5					
			+5.5	+0.0	+0.0	+0.0	360				106
			+0.0	+0.0	+7.7						
20	359.800M	45.7	+0.0	+0.0	+0.4	+0.0	+0.0	35.6	46.0	-10.4	Horiz
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	-27.5	+15.1	+1.2					
			+0.7	+0.0	+0.0						
21	19838.245 M	42.4	+0.0	+0.0	+0.0	+0.0	+0.0	43.5	54.0	-10.5	Vert
			+0.0	+0.0	-13.4	+0.9					
			+5.7	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+7.9						

22	19600.050 M	41.8	+0.0 +0.0 +5.6 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 -13.3 +0.0 +7.8	+0.0 +1.3 +0.0	+0.0 360	43.2	54.0	-10.8	Vert 109
23	2666.000M	40.8	+28.5 +0.0 +0.0 +0.0	-30.2 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+2.7 +0.0 +0.0	+0.0	43.2	54.0	-10.8	Vert 99
24	7440.110M Ave	25.7	+37.5 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.2 +0.0 +0.0 +0.0	+4.4 +0.0 +0.0	+0.0 360	42.6	54.0	-11.4	Vert 105
^	7440.110M	39.2	+37.5 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.2 +0.0 +0.0 +0.0	+4.4 +0.0 +0.0	+0.0 220	56.1	54.0	+2.1	Vert 100
26	9681.275M Ave	24.6	+37.5 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+3.4 +0.0 +0.0 +0.0	+4.8 +0.0 +0.0	+0.0 360	42.5	54.0	-11.5	Vert 105
^	9681.275M	39.5	+37.5 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+3.4 +0.0 +0.0 +0.0	+4.8 +0.0 +0.0	+0.0 360	57.4	54.0	+3.4	Vert 100
28	9920.000M Ave	25.1	+37.3 +0.0 +0.0 +0.0	-27.9 +0.0 +0.0 +0.0	+3.1 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 360	42.5	54.0	-11.5	Horiz 105
^	9920.000M	40.5	+37.3 +0.0 +0.0 +0.0	-27.9 +0.0 +0.0 +0.0	+3.1 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 360	57.9	54.0	+3.9	Horiz 99
30	9800.642M Ave	24.8	+37.4 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+3.2 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 360	42.5	54.0	-11.5	Vert 105
^	9800.642M	39.9	+37.4 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+3.2 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 275	57.6	54.0	+3.6	Vert 105
32	171.600M	48.3	+0.0 +0.0 +0.0 +0.5	+0.0 +0.0 -27.4 +0.0	+0.3 +0.0 +9.5 +0.0	+0.0 +0.0 +0.8	+0.0 360	32.0	43.5	-11.5	Horiz 131
33	7349.230M Ave	25.5	+37.1 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.1 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0 +0.0	+0.0 360	41.8	54.0	-12.2	Horiz 105
^	7349.230M	40.8	+37.1 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.1 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0 +0.0	+0.0	57.1	54.0	+3.1	Horiz 120

35	7262.230M Ave	25.5	+36.8 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.0 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0	+0.0 360	41.4	54.0	-12.6	Vert 105
36	7262.230M Ave	25.5	+36.8 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.0 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0	+0.0 360	41.4	54.0	-12.6	Horiz 105
^	7262.230M	40.8	+36.8 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+3.0 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0	+0.0	56.7	54.0	+2.7	Horiz 124
38	17359.925 M	41.2	+0.0 +0.0 +0.0 +0.0	+0.0 -12.3 +0.0 +0.0	+4.5 +0.0 +0.0 +0.0	+6.9 +0.0 +0.0	+0.0	40.3	54.0	-13.7	Vert 99
39	467.500M	40.0	+0.0 +0.0 +0.0 +0.8	+0.0 +0.0 -28.2 +0.0	+0.5 +0.0 +17.5 +0.0	+0.0 +0.0 +1.4	+0.0 360	32.0	46.0	-14.0	Horiz 131
40	17150.630 M	41.5	+0.0 +0.0 +0.0 +0.0	+0.0 -12.7 +0.0 +0.0	+4.4 +0.0 +0.0 +0.0	+6.7 +0.0 +0.0	+0.0	39.9	54.0	-14.1	Horiz 99
41	22318.860 M	41.9	+0.0 +0.0 +6.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 -16.8 +0.0 +8.3	+0.0 +0.1 +0.0	+0.0 181	39.5	54.0	-14.5	Vert 106
42	22050.050 M	41.3	+0.0 +0.0 +6.1 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 -16.5 +0.0 +8.3	+0.0 +0.2 +0.0	+0.0 360	39.4	54.0	-14.6	Vert 109
43	468.400M	39.1	+0.0 +0.0 +0.0 +0.8	+0.0 +0.0 -28.2 +0.0	+0.5 +0.0 +17.5 +0.0	+0.0 +0.0 +1.4	+0.0	31.1	46.0	-14.9	Horiz 99
44	81.400M	44.2	+0.0 +0.0 +0.0 +0.3	+0.0 +0.0 -28.0 +0.0	+0.2 +0.0 +7.4 +0.0	+0.0 +0.0 +0.6	+0.0 360	24.7	40.0	-15.3	Horiz 131
45	21780.000 M	40.2	+0.0 +0.0 +6.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 -16.1 +0.0 +8.3	+0.0 +0.2 +0.0	+0.0	38.6	54.0	-15.4	Vert 109
46	16942.270 M	39.9	+0.0 +0.0 +0.0 +0.0	+0.0 -12.9 +0.0 +0.0	+4.4 +0.0 +0.0 +0.0	+6.5 +0.0 +0.0	+0.0	37.9	54.0	-16.1	Vert 99
47	14699.250 M	41.8	+0.0 +0.0 +0.0 +0.0	+0.0 -14.9 +0.0 +0.0	+4.2 +0.0 +0.0 +0.0	+6.3 +0.0 +0.0	+0.0 354	37.4	54.0	-16.6	Horiz 99

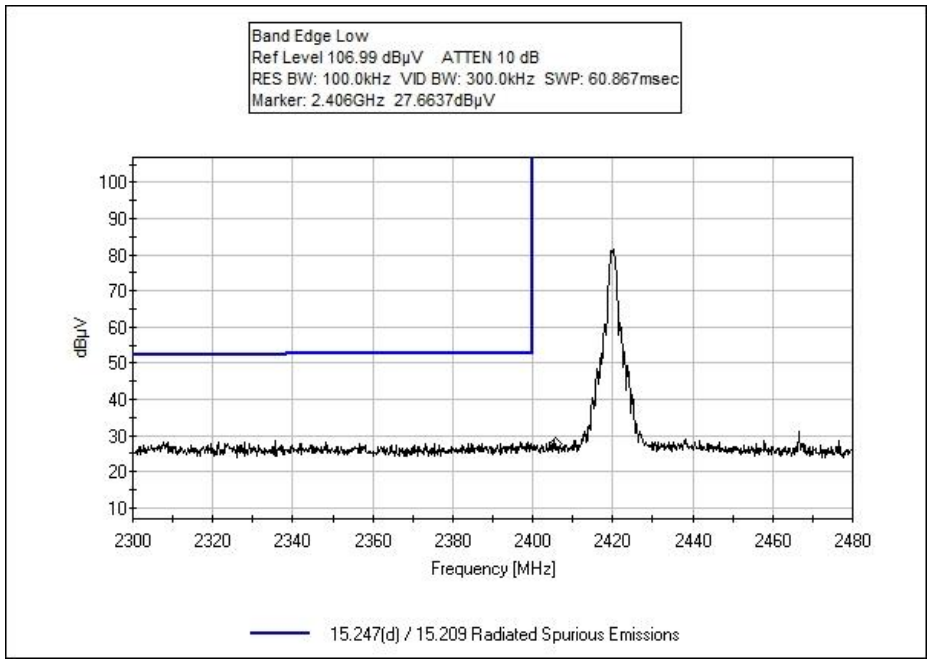
48	14879.360	40.9	+0.0	+0.0	+4.0	+6.3	+0.0	36.4	54.0	-17.6	Vert
	M		+0.0	-14.8	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0						
49	12398.105	40.0	+0.0	+0.0	+3.8	+5.7	+0.0	35.4	54.0	-18.6	Vert
	M		+0.0	-14.1	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0						
50	12100.865	39.4	+0.0	+0.0	+3.8	+5.6	+0.0	34.9	54.0	-19.1	Vert
	M		+0.0	-13.9	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0						
51	12250.480	38.6	+0.0	+0.0	+3.8	+5.7	+0.0	34.2	54.0	-19.8	Horiz
	M		+0.0	-13.9	+0.0	+0.0					
			+0.0	+0.0	+0.0	+0.0					105
			+0.0	+0.0	+0.0						
52	24800.000	30.7	+0.0	+0.0	+0.0	+0.0	+0.0	33.4	54.0	-20.6	Vert
	M		+0.0	+0.0	-12.4	+0.2					
	Ave		+6.3	+0.0	+0.0	+0.0	298				106
			+0.0	+0.0	+8.6						
53	19.582M	25.3	+0.0	+0.0	+0.0	+0.0	-40.0	-6.8	29.5	-36.3	Paral
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+7.9	+0.0						
54	130.500k	43.2	+0.0	+0.0	+0.0	+0.0	-80.0	-27.3	25.3	-52.6	Paral
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.5	+0.0						
55	135.140k	42.6	+0.0	+0.0	+0.0	+0.0	-80.0	-27.9	25.0	-52.9	Paral
			+0.0	+0.0	+0.0	+0.0					99
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.5	+0.0						

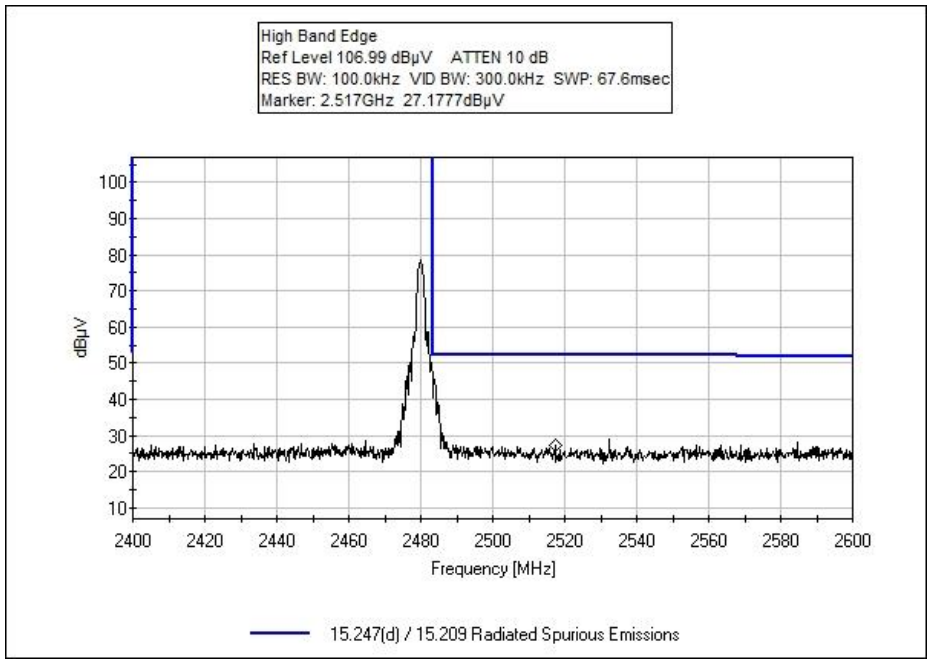
CKC Laboratories, Inc. Date: 11/5/2013 Time: 18:16:37 Medtronic MiniMed WO#: 95094
Test Distance: 3 Meters Sequence#: 10 Horiz
Medtronic MiniMed Carelink USB 2.4 P/N: MMT-7306CL



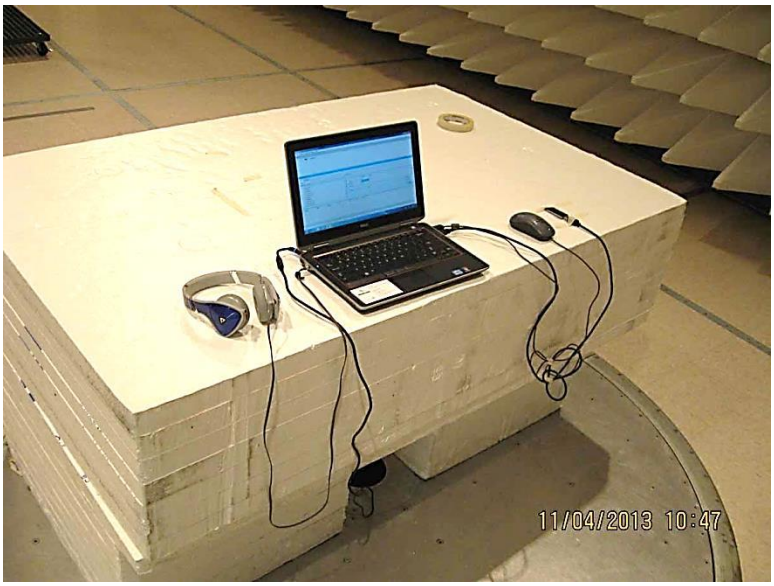
Bandedge

Test Plots





Test Setup Photos



15.247(e) Power Spectral Density

Test Conditions / Setup

The EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. The formula shown below will be used to calculate the Power Spectral Density. The EUT is located on top of a Styrofoam table, 80cm over the ground plane. The EUT is connected to support laptop via a 6 foot long USB extender. Ports are filled on the support laptop.

Test Conditions:
Temp: 21°C
Humidity: 38%
Pressure: 103.1kPa
Freq: 2400-2483.5MHz

P = (Ed)^2 / (30 * G)

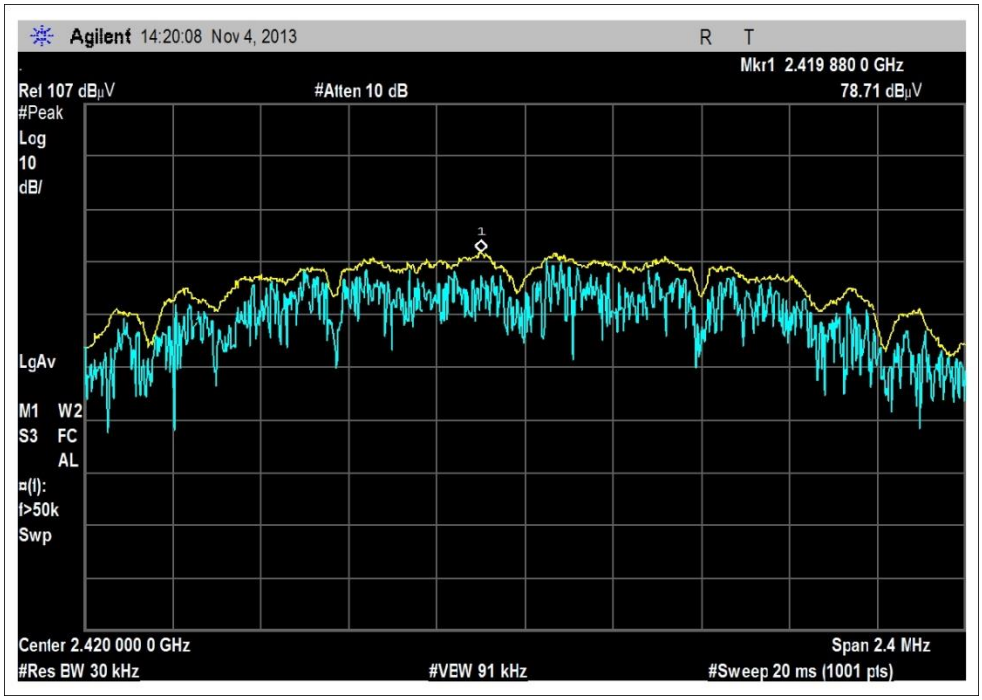
E = Field strength of the measurement converted to V/M.
d = Measurement distance in meters.
G = Numerical gain of the EUT's antenna relative to an isotropic radiator.
P = The power in watts for which we are solving.

Engineer Name: Steven Pittsford

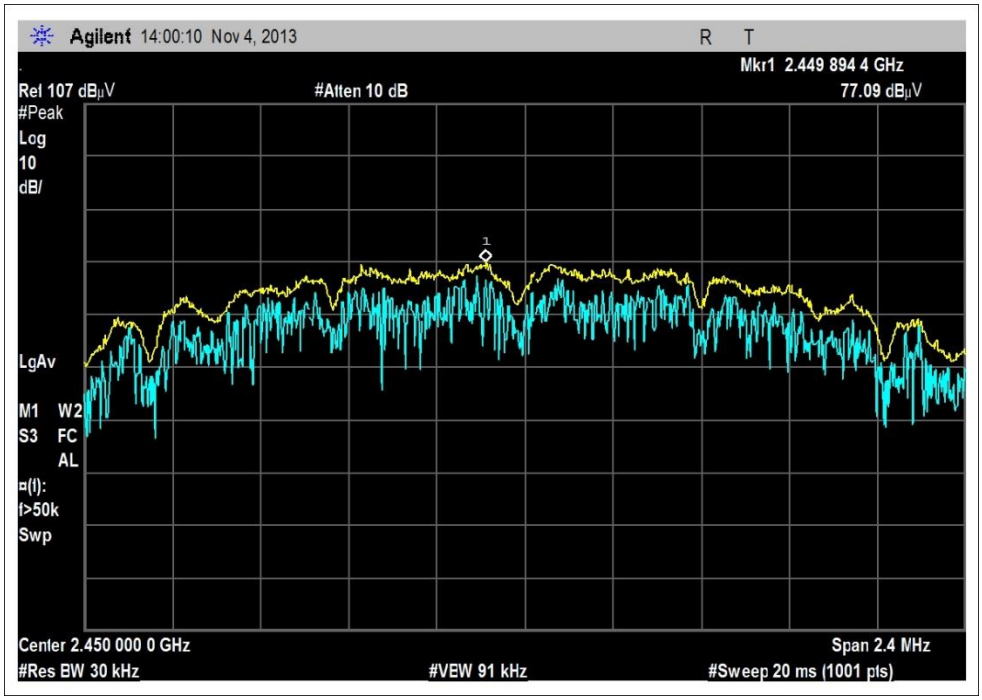
Test Equipment					
Asset #	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	EMCO	9/16/2013	9/16/2015
AN03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
ANP05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
ANP05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
AN02871	Spectrum Analyzer	E4440A	Agilent	4/11/2013	4/11/2015

Test Data

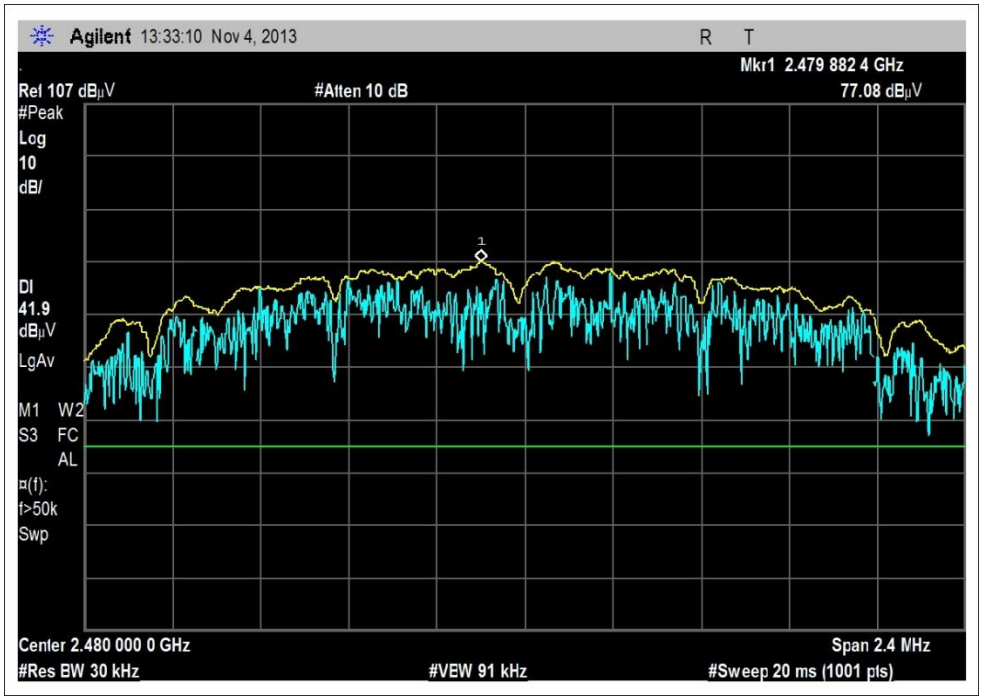
Frequency (MHz)	Spectrum Analyzer Measurement (dBuV)	Corrections due to cables, amplifiers, antennas and Bandwidth (dB)	Corrected Reading (dBuV)	Antenna Gain (dBi)	Spectral Density (Watts)	Spectral Density (dBm)
2420	78.6	1.5	80.1	0.0	$3.070*10^{-5}$	-15.129
2450	77.1	1.6	78.7	0.0	$2.224*10^{-5}$	-16.529
2480	77.1	1.6	78.7	0.0	$2.224*10^{-5}$	-16.529



Low

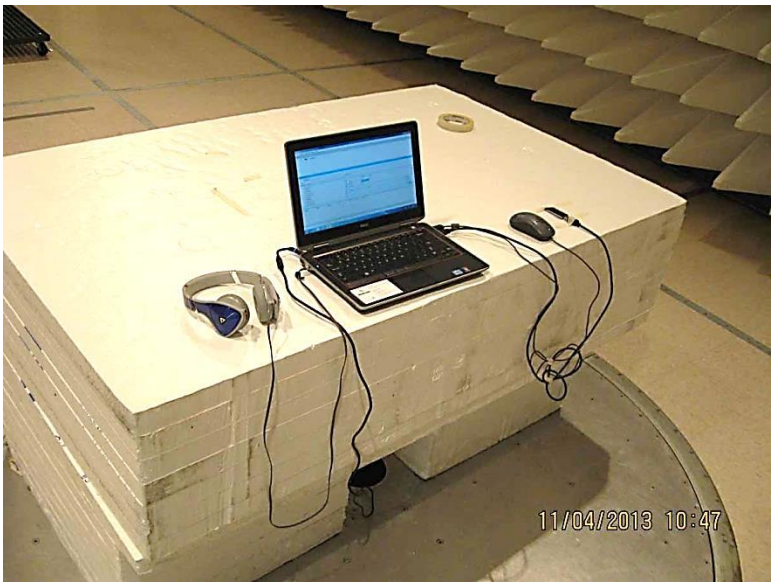

Agilent 14:00:10 Nov 4, 2013
R T
Mkr1 2.449 894 4 GHz
Rel 107 dBµV
#Atten 10 dB
77.09 dBµV
#Peak
Log
10
dB/
LgAv
M1 W2
S3 FC
AL
¤(f):
f>50k
Swp
Center 2.450 000 0 GHz
Span 2.4 MHz
#Res BW 30 kHz
#VEW 91 kHz
#Sweep 20 ms (1001 pts)

Middle


Agilent 13:33:10 Nov 4, 2013
R T
Mkr1 2.479 882 4 GHz
Rel 107 dBµV
#Atten 10 dB
77.08 dBµV
#Peak
Log
10
dB/
Dl
41.9
dBµV
LgAv
M1 W2
S3 FC
AL
¤(f):
f>50k
Swp
Center 2.480 000 0 GHz
Span 2.4 MHz
#Res BW 30 kHz
#VEW 91 kHz
#Sweep 20 ms (1001 pts)

High

Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.