Medtronic MiniMed

ADDENDUM TO TEST REPORT 94428-15

Insulin Pump
Model: MiniMed 640G

Tested To The Following Standards:

FCC Part 15 Subpart C Section 15.247
and
RSS-210 Issue 8

Report No.: 94428-15A

Date of issue: December 4, 2013

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

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.

Testing the Future
CKC LABORATORIES, INC.

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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: 4500087631

REPORT PREPARED BY:

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 94428

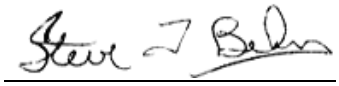
DATE OF EQUIPMENT RECEIPT: Septmenber 16, 2013
DATE(S) OF TESTING: Septmenber 16 - 17, 2013

Revision History

Original: Testing of the Insulin Pump, MiniMed 640G to FCC Part 15 Subpart C Section 15.247 and RSS-210 Issue 8.
Addendum A: In the following sections, maximum output power and spectral density, a change in the calculations was implemented. No new testing was performed.

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
Bothell	US0081	SL2-IN-E-1145R	3082C-1	318736	A-0148

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C / RSS-210 Issue 8

Description	Test Procedure/Method	Results
-6dBc Occupied Bandwidth	FCC Part 15 Subpart C Section 15.247(a)(2) / FHSS – DA00-705, DTS – KDB558074, ANSI C63.4	Pass
99% Bandwidth	RSS-210 Section A8.2(a)	Pass
TX Spurious Emissions	RSS – 210 Section A8.5	Pass
Maximum Power Output	FCC Part 15 Subpart C Section 15.247(b)(3) / FHSS – DA00-705, DTS – KDB558074, ANSI C63.4	Pass
TX Spurious Emissions	FCC Part 15 Subpart C Section 15.247(d)/ FHSS – DA00-705, DTS – KDB558074, ANSI C63.4	Pass
Power Spectral Density	FCC Part 15 Subpart C 15.247(e)/ FHSS – DA00-705, DTS – KDB558074, 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

Insulin Pump
Manuf: Medtronic MiniMed
Model: MiniMed 640G
Serial: NG1007075U

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

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.

-6dBc Occupied Bandwidth

Test Conditions / Setup

Engineer Name: Rodney MacInnes

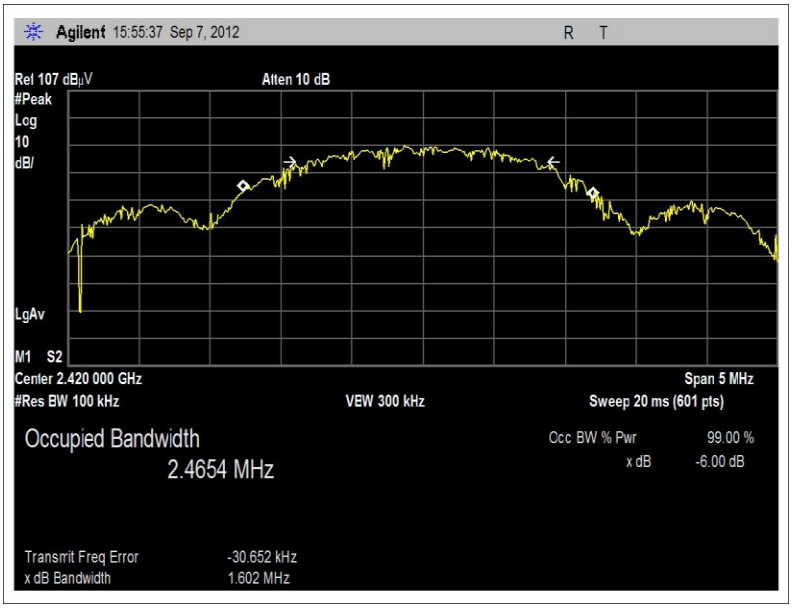
Test Conditions:
Temp: 22°C
Humidity: 51%
Pressure: 101.6kPa
Freq: 2420-2480MHz

EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. EUT is on top of a Styrofoam table, 80cm over the ground plane and whose ports are populated. New battery per FCC 15.31(e).

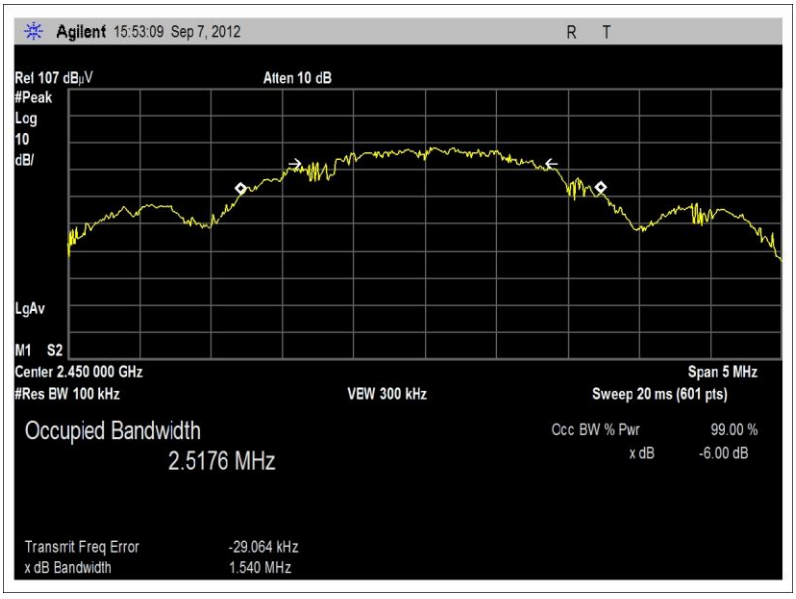
Frequency (MHz)	6dB Bandwidth
2420	1.64MHz
2450	1.54MHz
2480	1.60MHz

Test Equipment					
Asset#	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
01467	Horn Antenna	3115	EMCO	10/19/2011	10/19/2013
P05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
P05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
02871	Spectrum Analyzer	E4440A	Agilent	7/19/2013	7/19/2015

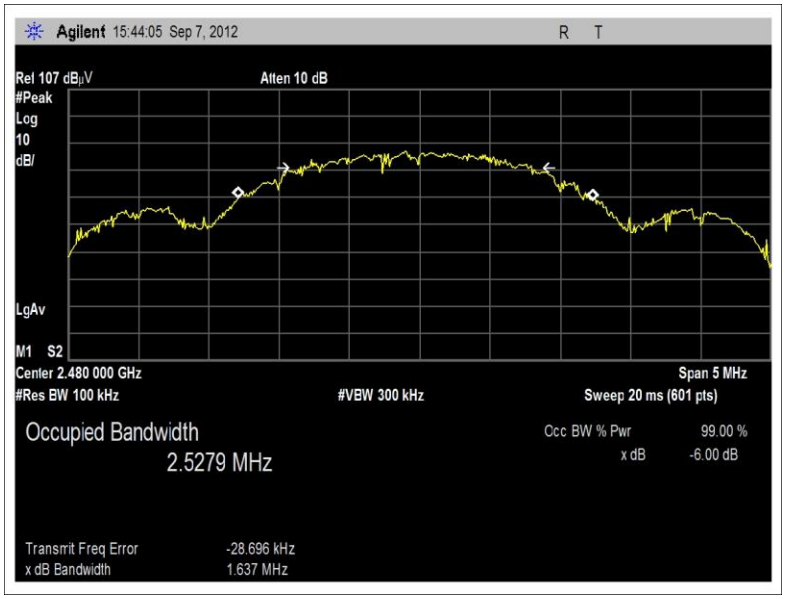
Test Plots



Low



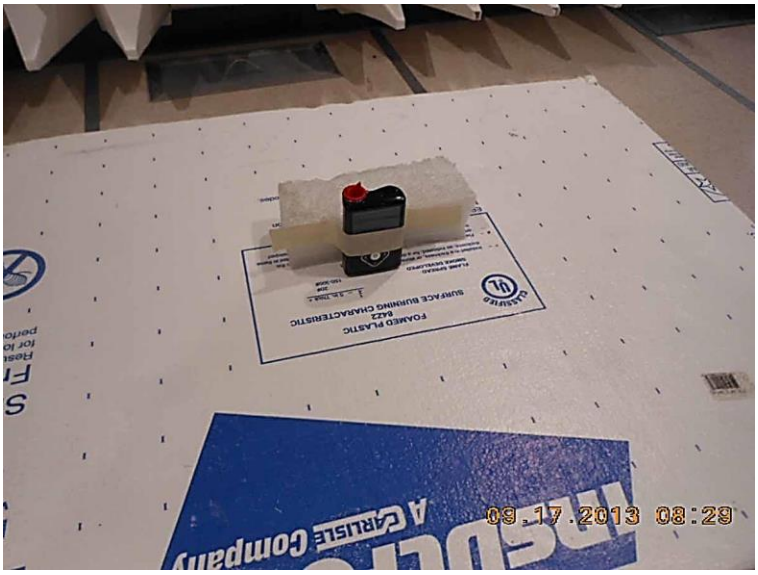
Middle


Agilent 15:44:05 Sep 7, 2012
R T
Rel 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.480 000 GHz
Span 5 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 20 ms (601 pts)
Occupied Bandwidth
2.5279 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -28.696 kHz
x dB Bandwidth 1.637 MHz

High

Test Setup Photos

X - Axis



Y - Axis

Z - Axis

15.247(b)(3) Maximum Power Output

Test Conditions / Setup

Engineer Name: Rodney MacInnes

Test Conditions:
Temp: 22°C
Humidity: 52%
Pressure: 101.6kPa
Freq: 2420-2480MHz

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 EIRP. EUT is connected to a laptop which is located on top of a Styrofoam table, 80cm over the ground plane.
New battery per FCC 15.31(e).

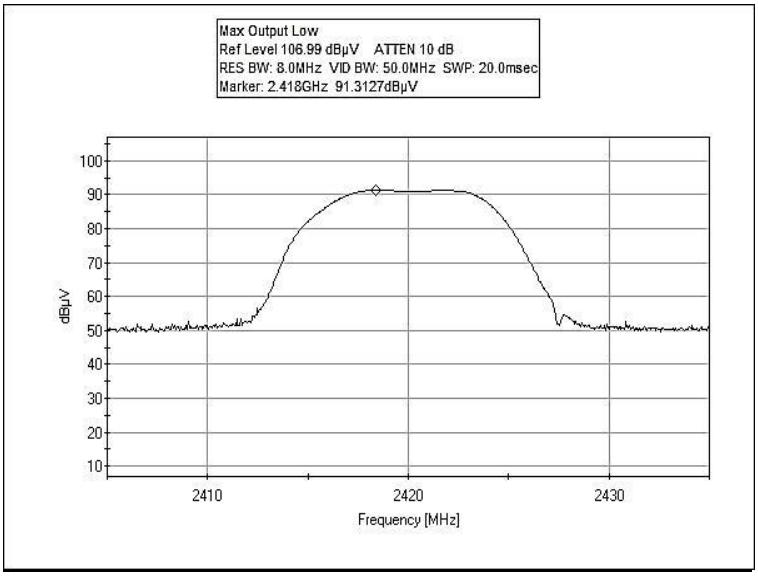
Plots do not have corrections applied to them see correction factors in table below.

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.

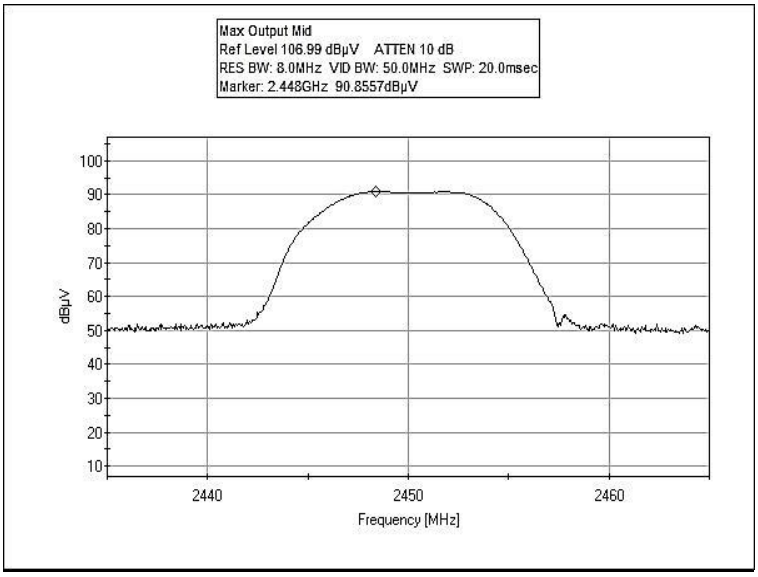
EUT Serial Number	Frequency (MHz)	Spectrum Analyzer Measurement (dBuV)	Corrections due to cables, Amplifiers and antennas (dB)	Corrected Reading (dBuV)	Antenna Gain (dBi)	Conducted Power (mW)
0927F	**2420**	91.3	-0.1	91.2	0.5	0.35
0927F	**2450**	90.9	0.0	90.9	0.5	0.33
0927F	**2480**	89.3	+0.1	89.4	0.5	0.23

Test Equipment					
Asset#	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
01467	Horn Antenna	3115	EMCO	10/19/2011	10/19/2013
P05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
P05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
02871	Spectrum Analyzer	E4440A	Agilent	7/19/2013	7/19/2015

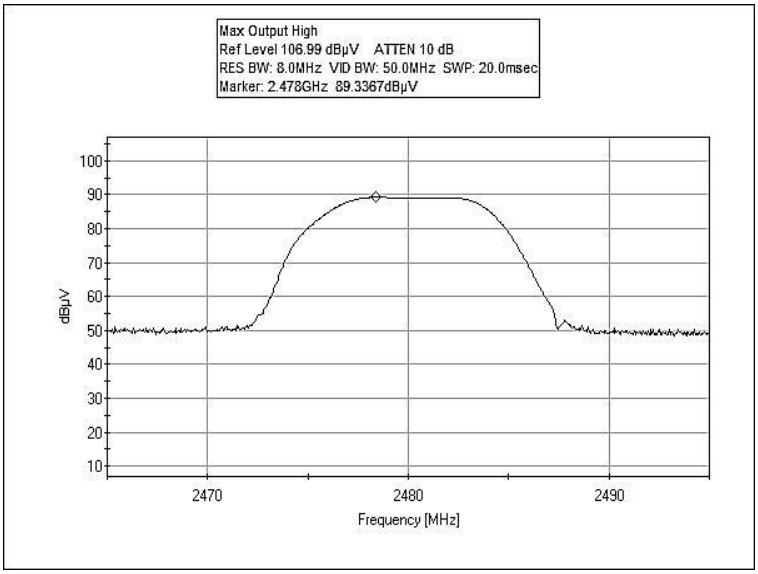
Test Plots



Low



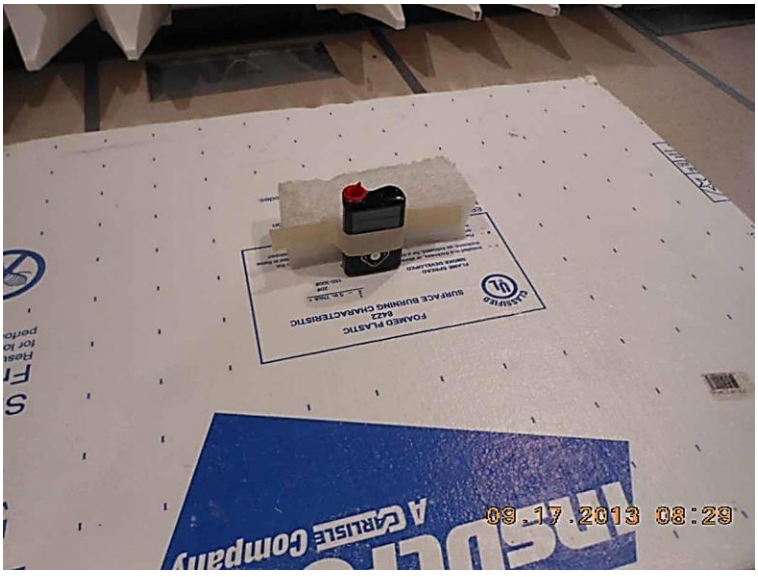
Middle


Max Output High
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 8.0MHz VID BW: 50.0MHz SWP: 20.0msec
Marker: 2.478GHz 89.3367dBµV
100
90
80
70
60
50
40
30
20
10
dBµV
2470
2480
2490
Frequency [MHz]

High

Test Setup Photos

X - Axis



Y - Axis

Z - Axis

15.247(d) TX Spurious Emissions

Test Data

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 #: **94428** Date: 9/16/2013
Test Type: **Maximized Emissions** Time: 16:12:02
Equipment: **Insulin Pump** Sequence#: 1
Manufacturer: Medtronic MiniMed Tested By: Rodney MacInnes
Model: MiniMed 640G
S/N: NG1007075U

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02308	Preamp	8447D	4/3/2012	4/3/2014
T2	AN01996	Biconilog Antenna	CBL6111C	3/2/2012	3/2/2014
T3	ANP05360	Cable	RG214	12/3/2012	12/3/2014
T4	ANP05366	Cable	RG-214	10/14/2011	10/14/2013
T5	ANP05546	Cable	Heliax	3/27/2013	3/27/2015
T6	AN02673	Spectrum Analyzer	E4446A	5/11/2012	5/11/2014
T7	AN00052	Loop Antenna	6502	5/16/2012	5/16/2014
T8	ANP05547	Cable	Heliax	9/7/2012	9/7/2014
T9	AN03209	Preamp	83051A	3/5/2013	3/5/2015
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	10/19/2011	10/19/2013
T11	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	12/18/2012	12/18/2014
T12	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	12/17/2012	12/17/2014
T13	AN02763-69	Waveguide	Multiple	6/7/2012	6/7/2014
T14	ANP05422	Cable	PE35591-72	6/8/2012	6/8/2014
T15	ANP05428	Cable	PE35591-60	6/8/2012	6/8/2014

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

Function	Manufacturer	Model #	S/N
Insulin Pump*	Medtronic MiniMed	MiniMed 640G	NG1007075U

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Temp: 23°C
Humidity: 52%
Pressure: 101.7kPa

Freq: 9kHz-24.8GHz

EUT's antenna is non-removable, thus the data will be gathered through radiated measurements.
EUT is located on top of a Styrofoam table, 80cm over the ground plane.
CISPR BW used.
Emissions investigated from three orthogonal axis and 3 channels (low, mid, high) of the equipment.

Low = 2.42GHz
Mid = 2.45GHz
High = 2.48GHz

FCC 15.31(e) Freshly charged battery is installed

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	7349.940M	28.6	+0.0 +3.1 -28.2 +0.0	+0.0 +0.0 +35.9 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.3 +0.0	+0.0 360	43.7	54.0 Mid, 3rd harmonic	-10.3	Horiz 119
2	4839.970M	36.7	+0.0 +2.2 -30.9 +0.0	+0.0 +0.0 +32.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +3.5 +0.0	+0.0	43.5	54.0 Low, 2nd harmonic	-10.5	Horiz 119
3	24800.000 M	40.2	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +6.3	+0.0 +0.0 -12.4	+0.0 223	42.9	54.0 High, 10th Harmonic	-11.1	Horiz 119
4	7259.955M	27.8	+0.0 +3.0 -28.2 +0.0	+0.0 +0.0 +35.7 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.3 +0.0	+0.0 360	42.6	54.0 Low, 3rd Harmonic	-11.4	Horiz 119
5	9680.000M	34.2	+0.0 +3.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.8 +0.0	+0.0 360	42.4	54.0 Low, 4th Harmonic	-11.6	Horiz 119
6	24200.000 M	40.6	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +6.4	+0.0 +0.0 -13.5	+0.0 355	42.2	54.0 Low, 10th Harmonic	-11.8	Horiz 119
7	4899.970M	34.8	+0.0 +2.2 -30.8 +0.0	+0.0 +0.0 +32.2 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +3.6 +0.0	+0.0	42.0	54.0 Mid, 2nd harmonic	-12.0	Horiz 119

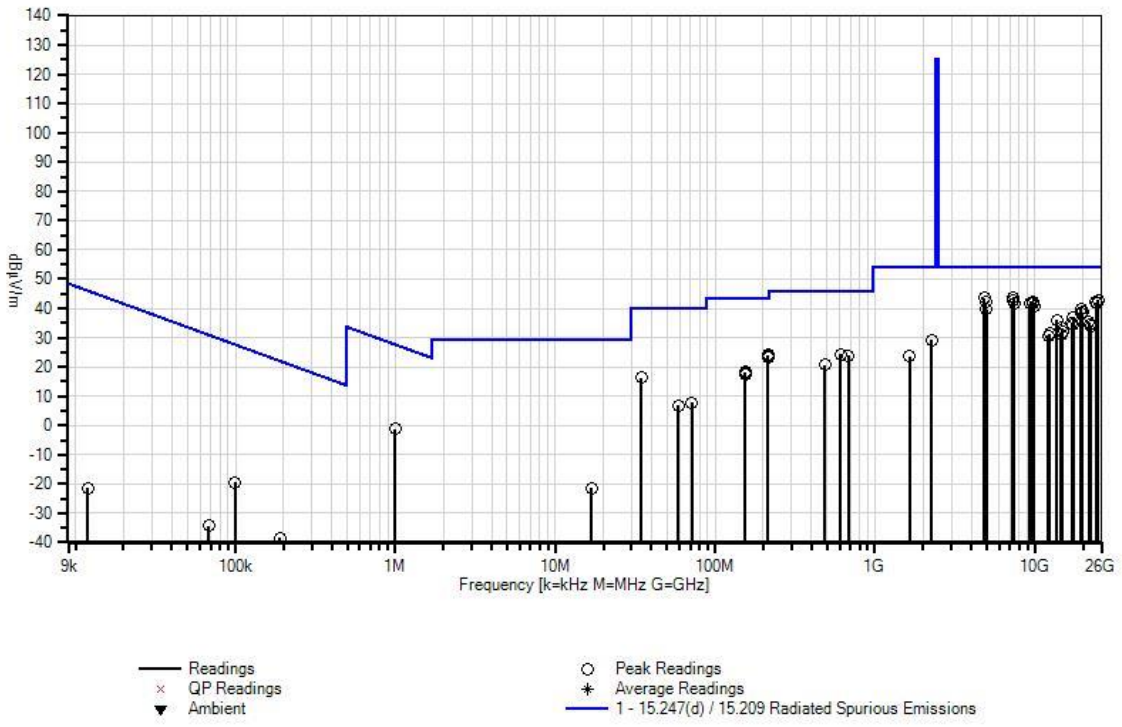
8	9800.000M	33.7	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+3.2	+0.0	+0.0	+4.9	360		Mid, 4th Harmonic		119	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
9	7439.942M	26.3	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+3.2	+0.0	+0.0	+4.4	360		High, 3rd Harmonic		119	
			-28.2	+36.1	+0.0	+0.0						
			+0.0	+0.0	+0.0							
10	24500.000 M	39.5	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-12.9	70		Mid, 10th		119	
			+0.1	+8.7	+6.4				Harmonic			
11	9262.000M	25.5	+0.0	+0.0	+0.0	+0.0	+0.0	41.6	54.0	-12.4	Horiz	
			+3.3	+0.0	+0.0	+4.7	360		High, Y-axis		119	
			-27.7	+35.8	+0.0	+0.0						
			+0.0	+0.0	+0.0							
12	9920.000M	33.0	+0.0	+0.0	+0.0	+0.0	+0.0	41.0	54.0	-13.0	Horiz	
			+3.1	+0.0	+0.0	+4.9	193		High, 4th Harmonic		119	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
13	19360.000 M	38.4	+0.0	+0.0	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.3			Low, 8th Harmonic		119	
			+1.5	+7.7	+5.5							
14	4959.961M	32.3	+0.0	+0.0	+0.0	+0.0	+0.0	39.7	54.0	-14.3	Horiz	
			+2.3	+0.0	+0.0	+3.6			High, 2nd		119	
			-30.8	+32.3	+0.0	+0.0			Harmonic			
			+0.0	+0.0	+0.0							
15	19840.000 M	37.5	+0.0	+0.0	+0.0	+0.0	+0.0	38.6	54.0	-15.4	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.4	285		High, 8th Harmonic		119	
			+0.9	+7.9	+5.7							
16	19600.000 M	37.0	+0.0	+0.0	+0.0	+0.0	+0.0	38.4	54.0	-15.6	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.3	88		Mid, 8th Harmonic		119	
			+1.3	+7.8	+5.6							
17	17360.000 M	38.0	+0.0	+0.0	+0.0	+0.0	+0.0	37.1	54.0	-16.9	Horiz	
			+4.5	+0.0	+0.0	+6.9						
			+0.0	+0.0	-12.3	+0.0	322		High, 7th Harmonic		119	
			+0.0	+0.0	+0.0							
18	13672.000 M	41.3	+0.0	+0.0	+0.0	+0.0	+0.0	36.1	54.0	-17.9	Horiz	
			+3.8	+0.0	+0.0	+6.0						
			+0.0	+0.0	-15.0	+0.0			Low, Z-axis		119	
			+0.0	+0.0	+0.0							
19	13663.500 M	40.9	+0.0	+0.0	+0.0	+0.0	+0.0	35.7	54.0	-18.3	Horiz	
			+3.8	+0.0	+0.0	+6.0						
			+0.0	+0.0	-15.0	+0.0	249		High, Y-axis		119	
			+0.0	+0.0	+0.0							
20	21780.000 M	37.0	+0.0	+0.0	+0.0	+0.0	+0.0	35.4	54.0	-18.6	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-16.1	358		Low, 9th Harmonic		119	
			+0.2	+8.3	+6.0							

21	16940.000 M	36.9	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.9 +0.0	+0.0 +0.0 +6.5 +0.0	+0.0	34.9	54.0 Low, 7th Harmonic	-19.1	Horiz 119
22	215.040M	39.0	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.0 334	24.0	43.5 High, Z-axis	-19.5	Horiz 150
23	17150.000 M	35.9	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.7 +0.0	+0.0 +0.0 +6.7 +0.0	+0.0 81	34.3	54.0 Mid, 7th Harmonic	-19.7	Horiz 119
24	22050.000 M	36.1	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +6.1	+0.0 +0.0 -16.5	+0.0 357	34.2	54.0 Mid, 9th Harmonic	-19.8	Horiz 119
25	215.040M	38.6	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.0 26	23.6	43.5 Mid, Z-axis	-19.9	Horiz 150
26	22320.000 M	36.3	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +6.0	+0.0 +0.0 -16.8	+0.0 102	33.9	54.0 High, 9th Harmonic	-20.1	Horiz 119
27	215.040M	38.0	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.0 290	23.0	43.5 Low, Z-axis	-20.5	Horiz 150
28	14700.000 M	37.8	+0.0 +4.2 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.9 +0.0	+0.0 +0.0 +6.3 +0.0	+0.0 360	33.4	54.0 Mid, 6th Harmonic	-20.6	Horiz 119
29	610.472M	28.5	-28.3 +0.6 +0.0 +0.0	+20.1 +0.0 +0.0 +0.0	+1.6 +0.0 +0.0 +0.0	+1.8 +0.0 +0.0 +0.0	+0.0	24.3	46.0 High, X-axis	-21.7	Vert 150
30	14880.000 M	36.6	+0.0 +4.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.8 +0.0	+0.0 +0.0 +6.3 +0.0	+0.0 225	32.1	54.0 High, 6th Harmonic	-21.9	Horiz 119
31	681.720M	27.3	-28.2 +0.6 +0.0 +0.0	+20.6 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0 +0.0	+1.9 +0.0 +0.0 +0.0	+0.0 272	23.9	46.0 Low, Z-axis	-22.1	Vert 150
32	12400.000 M	36.1	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.1 +0.0	+0.0 +0.0 +5.7 +0.0	+0.0 187	31.5	54.0 High, 5th Harmonic	-22.5	Horiz 119
33	14520.000 M	35.5	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -15.1 +0.0	+0.0 +0.0 +6.3 +0.0	+0.0	31.1	54.0 Low, 6th Harmonic	-22.9	Horiz 119

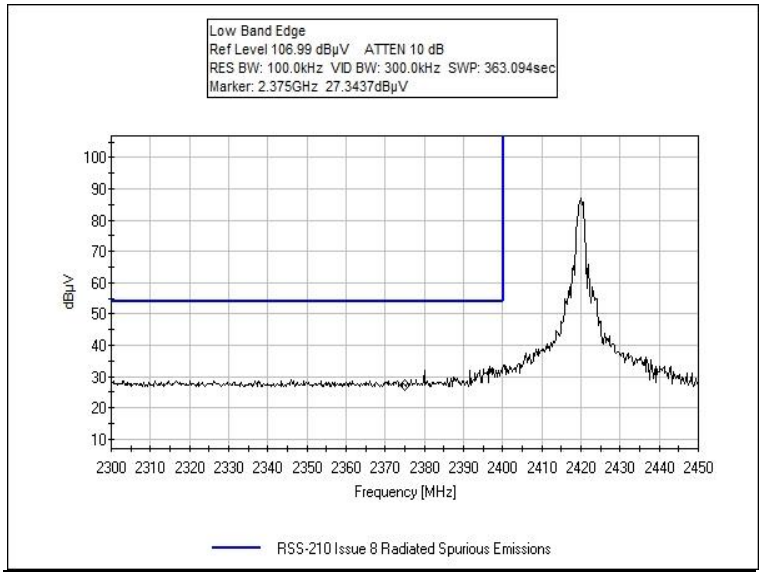
34	12100.000 M	35.2	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+0.0 +5.6 +0.0	+0.0	30.7	54.0 Low, 5th Harmonic	-23.3	Horiz 119
35	12250.000 M	34.8	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+0.0 +5.7 +0.0	+0.0	30.4	54.0 Mid, 5th Harmonic	-23.6	Horiz 119
36	34.368M	27.5	-28.0 +0.1 +0.0 +0.0	+16.1 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0 +0.0	+0.2 +0.0 +0.0	+0.0	16.2	40.0 High, Y-axis	-23.8	Vert 150
37	2269.000M	29.5	+0.0 +1.3 -30.4 +0.0	+0.0 +0.0 +26.4 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +2.5 +0.0	+0.0 360	29.3	54.0 Low, X-axis	-24.7	Horiz 119
38	153.550M	33.2	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 99	18.3	43.5 Mid, Z-axis	-25.2	Horiz 150
39	486.664M	27.7	-28.2 +0.5 +0.0 +0.0	+17.8 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+1.6 +0.0 +0.0	+0.0 5	20.8	46.0 Mid, Z-axis	-25.2	Horiz 150
40	153.550M	33.0	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 342	18.1	43.5 Low, Z-axis	-25.4	Horiz 150
41	153.550M	32.3	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 353	17.4	43.5 High, Z-axis	-26.1	Vert 150
42	1.000M	28.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.8 +0.0 +0.0	+0.0 +0.1 +0.0	-40.0 202	-1.2	27.6 Low, Y-axis	-28.8	Horiz 150
43	1639.000M	27.8	+0.0 +1.4 -30.7 +0.0	+0.0 +0.0 +23.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +2.1 +0.0	+0.0 360	23.6	54.0 Mid, X-axis	-30.4	Horiz 119
44	71.706M	28.7	-28.0 +0.2 +0.0 +0.0	+6.1 +0.0 +0.0 +0.0	+0.5 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+0.0 360	7.9	40.0 Low, X-axis	-32.1	Vert 150
45	58.560M	28.2	-28.0 +0.1 +0.0 +0.0	+5.7 +0.0 +0.0 +0.0	+0.5 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+0.0 360	6.9	40.0 Mid, Y-axis	-33.1	Horiz 150
46	99.600k	51.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.6 +0.0 +0.0	+0.0 +0.0 +0.0	-80.0 24	-19.4	27.6 High, Z-axis	-47.0	Horiz 150

47	16.946M	9.8	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +8.7 +0.0	+0.0 +0.1 +0.0	-40.0 216	-21.4	29.5	-50.9	Horiz 150
48	189.900k	32.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.5 +0.0	+0.0 +0.0 +0.0	-80.0 235	-38.5	22.0 mid, Y-axis	-60.5	Horiz 150
49	67.940k	36.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.6 +0.0	+0.0 +0.0 +0.0	-80.0 358	-34.2	31.0 Mid, X-axis	-65.2	Horiz 150
50	11.930k	43.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +15.5 +0.0	+0.0 +0.0 +0.0	-80.0 358	-21.3	46.1 Mid, Y-axis	-67.4	Horiz 150

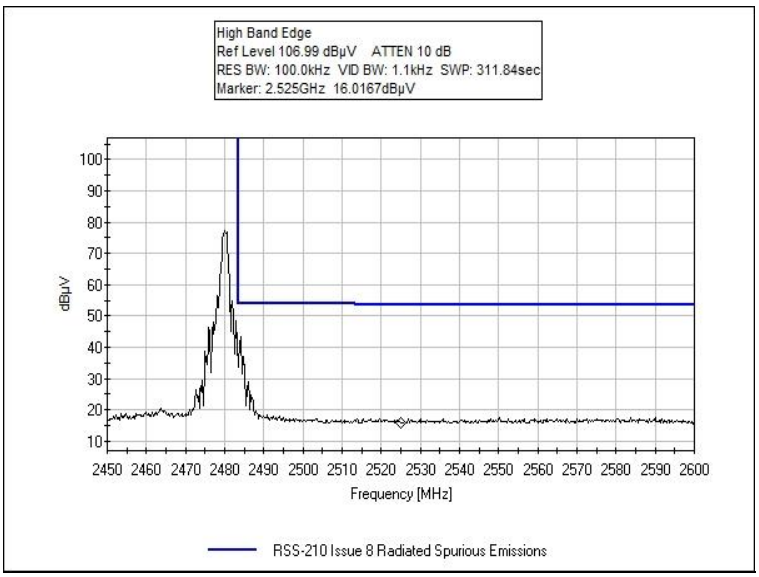
CKC Laboratories, Inc. Date: 9/16/2013 Time: 16:12:02 Medtronic MiniMed WO#: 94428
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz Sequence#: 1 Ext ATTN: 0 dB



Test Plots



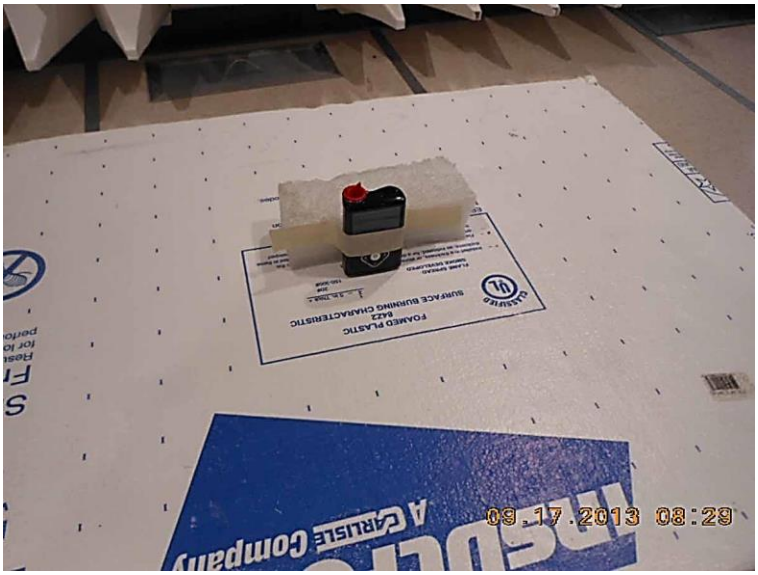
Low Band Edge



High Band Edge

Test Setup Photos

X - Axis



Y - Axis

Z - Axis

15.247(e) Power Spectral Density

Test Conditions / Setup

Engineer Name: Rodney MacInnes

Test Conditions:
Temp: 22°C
Humidity: 50%
Pressure: 101.6Pa
Freq: 2420-2480MHz

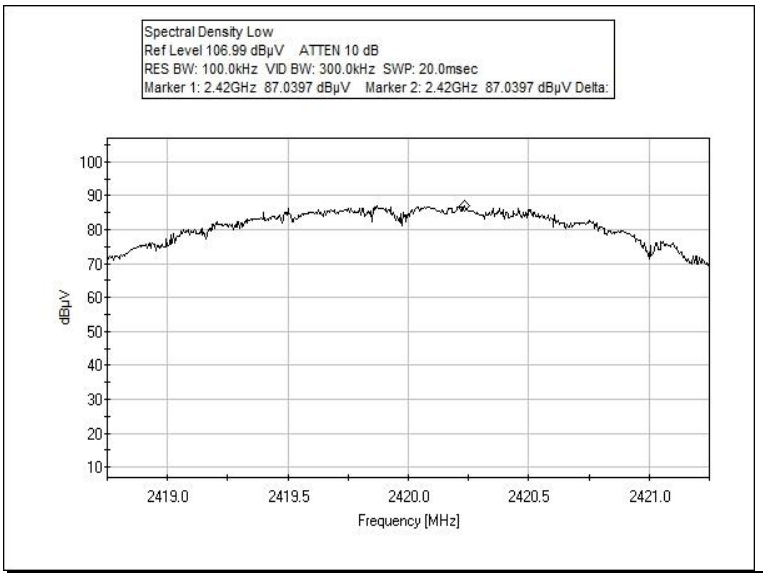
EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. The formula shown below will be used to calculate the Power Spectral Density. EUT is located on top of a Styrofoam table, 80cm over the ground plane and whose ports are populated. New battery per FCC 15.31(e).

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

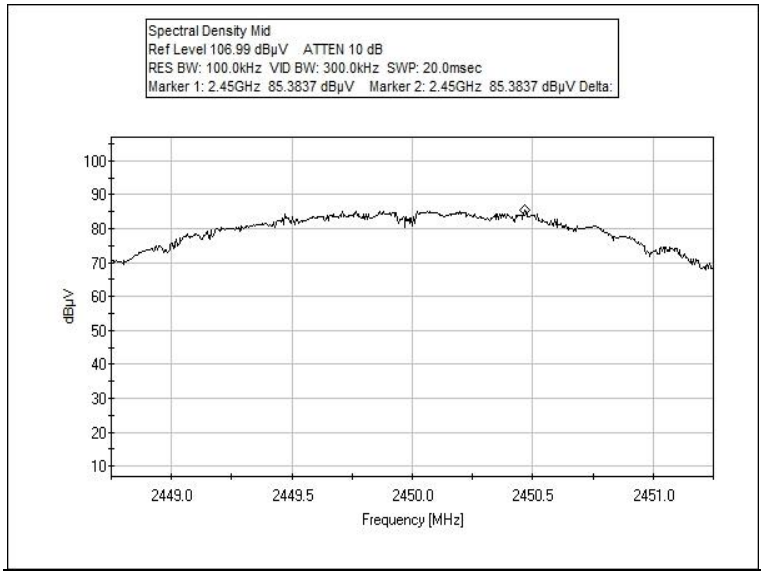
Frequency (MHz)	Spectrum Analyzer Measurement (dBuV)	Corrections due to cables, amplifiers, antennas and Bandwidth (dB)	Corrected Reading (dBuV)	Antenna Gain (dBi)	Spectral Density (dBm)
2420	87.0	-0.1	86.9	0.5	-8.8
2450	85.4	0.0	85.4	0.5	-10.3
2480	84.8	+0.1	84.9	0.5	-10.9

Test Equipment					
Asset#	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
01467	Horn Antenna	3115	EMCO	10/19/2011	10/19/2013
P05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
P05965	Cable	Heliax	Andrew	8/26/2011	8/26/2013
02871	Spectrum Analyzer	E4440A	Agilent	7/19/2013	7/19/2015

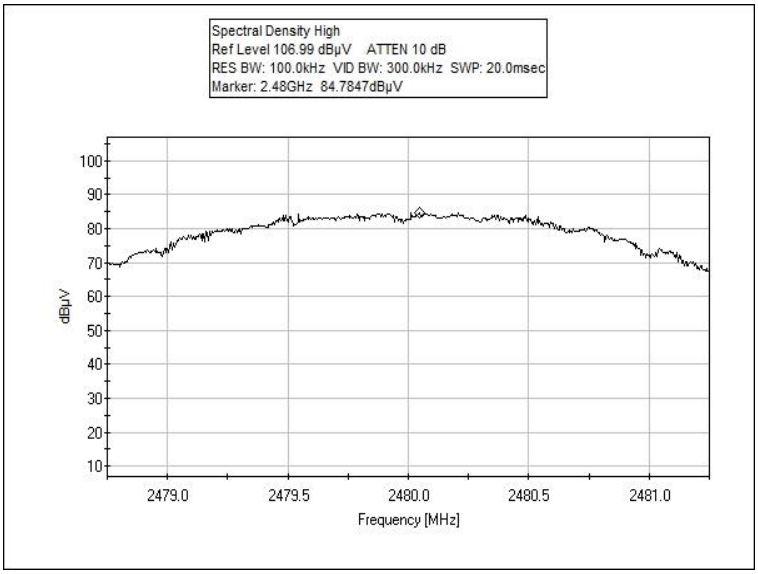
Test Plots


Spectral Density Low
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 2.42GHz 87.0397 dBµV Marker 2: 2.42GHz 87.0397 dBµV Delta:
dBµV
100
90
80
70
60
50
40
30
20
10
2419.0
2419.5
2420.0
2420.5
2421.0
Frequency [MHz]

Low


Spectral Density Mid
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker 1: 2.45GHz 85.3837 dBµV Marker 2: 2.45GHz 85.3837 dBµV Delta:
dBµV
100
90
80
70
60
50
40
30
20
10
2449.0
2449.5
2450.0
2450.5
2451.0
Frequency [MHz]

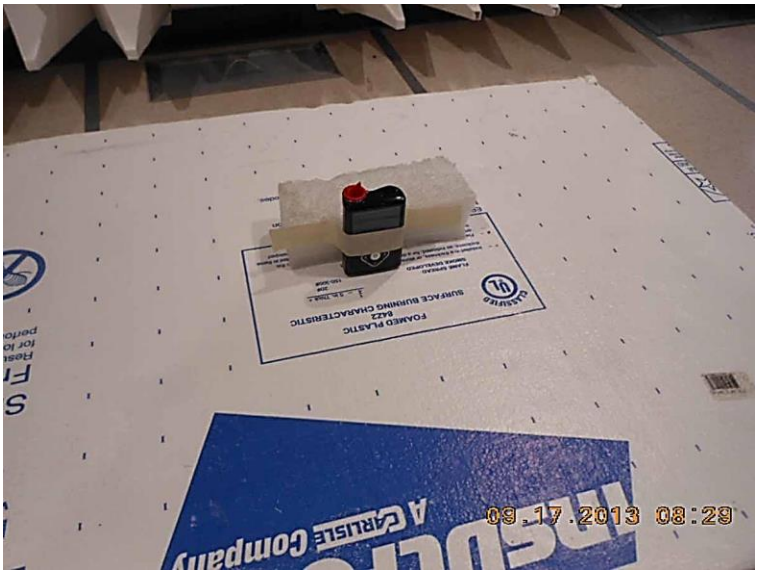
Middle


Spectral Density High
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 20.0msec
Marker: 2.48GHz 84.7847dBµV
100
90
80
70
60
50
40
30
20
10
dBµV
2479.0
2479.5
2480.0
2480.5
2481.0
Frequency [MHz]

High

Test Setup Photos

X - Axis



Y - Axis

Z - Axis

RSS - 210

Test Conditions / Setup

99% Bandwidth

Engineer Name: Rodney MacInnes

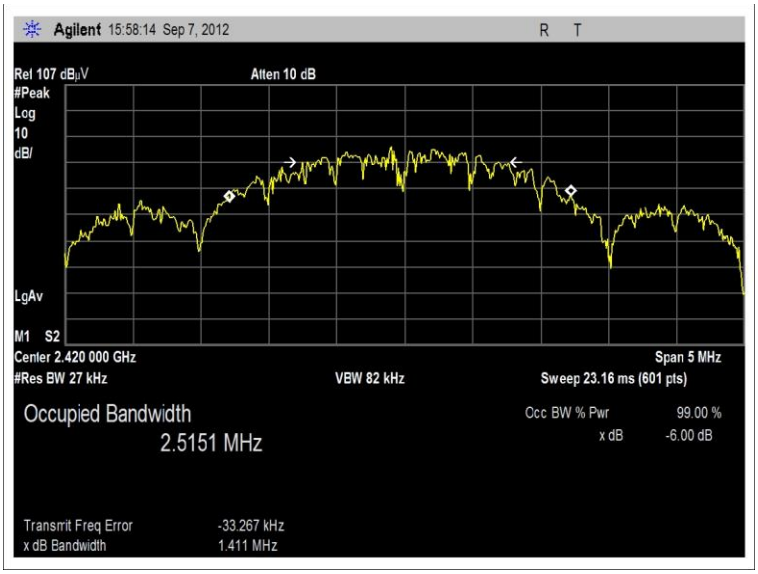
Test Conditions:
Temp: 22°C
Humidity: 51%
Pressure: 101.6kPa
Freq: 2420-2480MHz

EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. EUT is on top of a Styrofoam table, 80cm over the ground plane and whose ports are populated. New battery per FCC 15.31(e).

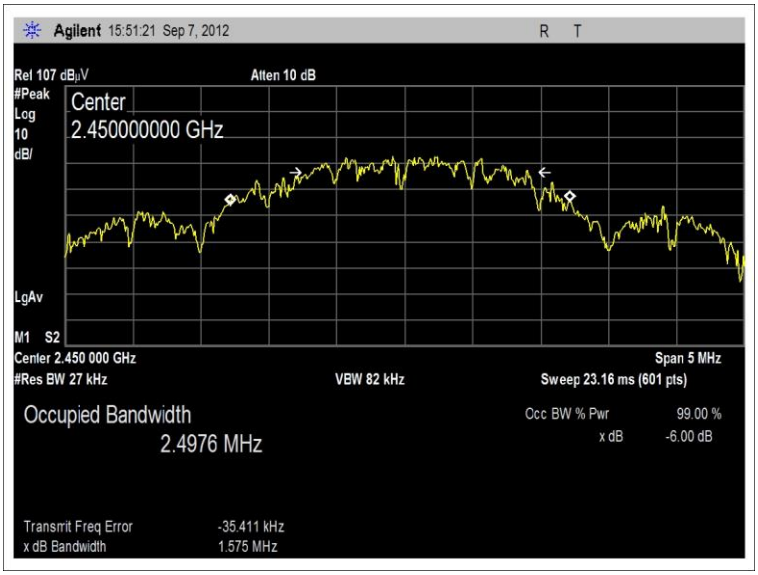
Frequency (MHz)	99% Bandwidth
2420	2.51MHz
2450	2.50MHz
2480	2.52MHz

Test Equipment					
Asset#	**Description**	**Model**	**Manufacturer**	**Cal Date**	**Cal Due**
03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
01467	Horn Antenna	3115	EMCO	10/19/2011	10/19/2013
P05546	Cable	Heliax	Andrews	3/27/2013	3/27/2015
P05547	Cable	Heliax	Andrews	9/7/2012	9/7/2014
02871	Spectrum Analyzer	E4440A	Agilent	7/19/2013	7/19/2015

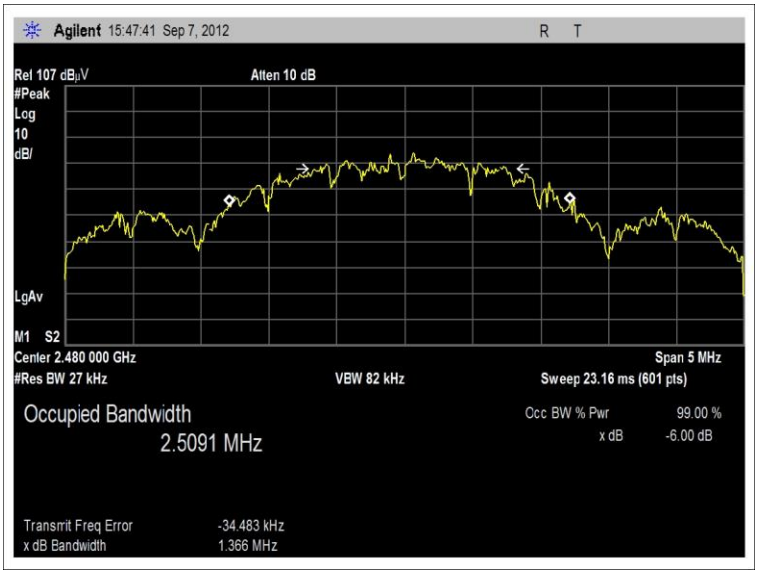
Test Plots



Low



Middle


Agilent 15:47:41 Sep 7, 2012
R T
Rel 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.480 000 GHz
Span 5 MHz
#Res BW 27 kHz
VBW 82 kHz
Sweep 23.16 ms (601 pts)
Occupied Bandwidth
2.5091 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -34.483 kHz
x dB Bandwidth 1.366 MHz

High

TX Spurious Emissions

Test Data

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

Customer: **Medtronic MiniMed**
Specification: **RSS-210 Issue 8 Radiated Spurious Emissions**
Work Order #: **94428** Date: 9/16/2013
Test Type: **Maximized Emissions** Time: 16:12:02
Equipment: **Insulin Pump** Sequence#: 1
Manufacturer: Medtronic MiniMed Tested By: Rodney MacInnes
Model: MiniMed 640G
S/N: NG1007075U

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02308	Preamp	8447D	4/3/2012	4/3/2014
T2	AN01996	Biconilog Antenna	CBL6111C	3/2/2012	3/2/2014
T3	ANP05360	Cable	RG214	12/3/2012	12/3/2014
T4	ANP05366	Cable	RG-214	10/14/2011	10/14/2013
T5	ANP05546	Cable	Heliax	3/27/2013	3/27/2015
T6	AN02673	Spectrum Analyzer	E4446A	5/11/2012	5/11/2014
T7	AN00052	Loop Antenna	6502	5/16/2012	5/16/2014
T8	ANP05547	Cable	Heliax	9/7/2012	9/7/2014
T9	AN03209	Preamp	83051A	3/5/2013	3/5/2015
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	10/19/2011	10/19/2013
T11	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	12/18/2012	12/18/2014
T12	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	12/17/2012	12/17/2014
T13	AN02763-69	Waveguide	Multiple	6/7/2012	6/7/2014
T14	ANP05422	Cable	PE35591-72	6/8/2012	6/8/2014
T15	ANP05428	Cable	PE35591-60	6/8/2012	6/8/2014

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

Function	Manufacturer	Model #	S/N
Insulin Pump*	Medtronic MiniMed	MiniMed 640G	NG1007075U

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

Temp: 23°C
Humidity: 52%
Pressure: 101.7kPa

Freq: 9kHz-24.8GHz

EUT's antenna is non-removable, thus the data will be gathered through radiated measurements.
EUT is located on top of a Styrofoam table, 80cm over the ground plane.
CISPR BW used.
Emissions investigated from three orthogonal axis and 3 channels (low, mid, high) of the equipment.

Low = 2.42GHz
Mid = 2.45GHz
High = 2.48GHz

FCC 15.31(e) Freshly charged battery is installed

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	7349.940M	28.6	+0.0 +3.1 -28.2 +0.0	+0.0 +0.0 +35.9 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.3 +0.0	+0.0 360	43.7	54.0 Mid, 3rd harmonic	-10.3	Horiz 119
2	4839.970M	36.7	+0.0 +2.2 -30.9 +0.0	+0.0 +0.0 +32.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +3.5 +0.0	+0.0	43.5	54.0 Low, 2nd harmonic	-10.5	Horiz 119
3	24800.000 M	40.2	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +6.3	+0.0 +0.0 -12.4	+0.0 223	42.9	54.0 High, 10th Harmonic	-11.1	Horiz 119
4	7259.955M	27.8	+0.0 +3.0 -28.2 +0.0	+0.0 +0.0 +35.7 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.3 +0.0	+0.0 360	42.6	54.0 Low, 3rd Harmonic	-11.4	Horiz 119
5	9680.000M	34.2	+0.0 +3.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +4.8 +0.0	+0.0 360	42.4	54.0 Low, 4th Harmonic	-11.6	Horiz 119
6	24200.000 M	40.6	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +6.4	+0.0 +0.0 -13.5	+0.0 355	42.2	54.0 Low, 10th Harmonic	-11.8	Horiz 119
7	4899.970M	34.8	+0.0 +2.2 -30.8 +0.0	+0.0 +0.0 +32.2 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +3.6 +0.0	+0.0	42.0	54.0 Mid, 2nd harmonic	-12.0	Horiz 119

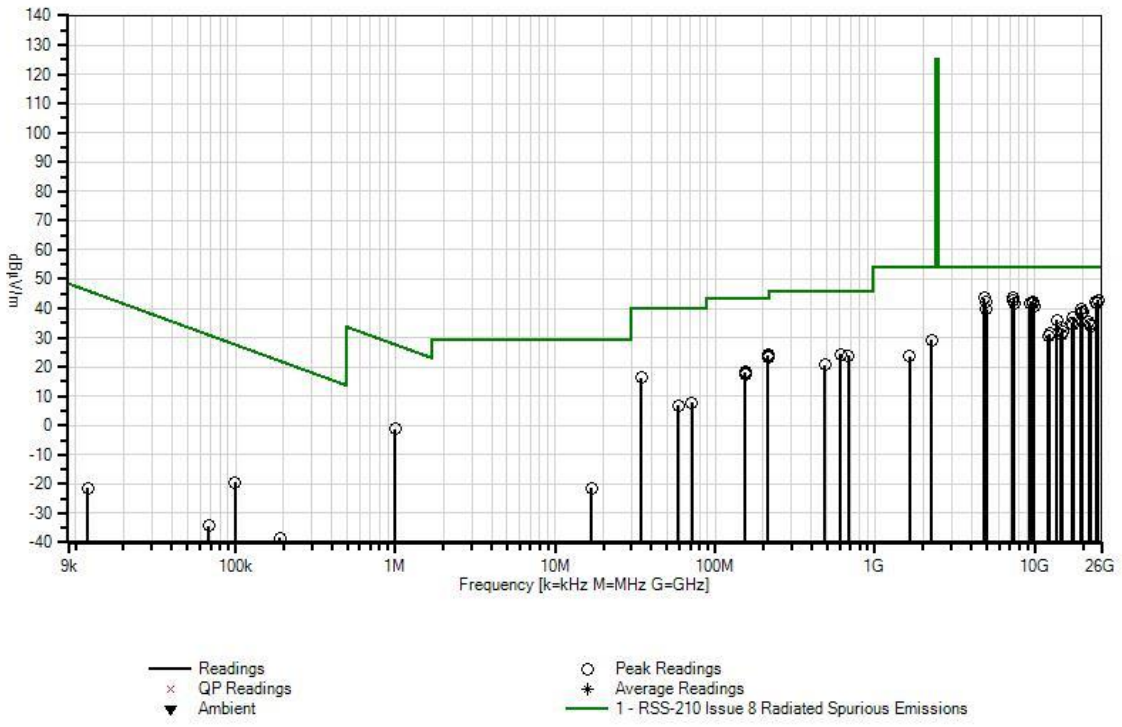
8	9800.000M	33.7	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+3.2	+0.0	+0.0	+4.9	360		Mid, 4th Harmonic		119	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
9	7439.942M	26.3	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+3.2	+0.0	+0.0	+4.4	360		High, 3rd Harmonic		119	
			-28.2	+36.1	+0.0	+0.0						
			+0.0	+0.0	+0.0							
10	24500.000 M	39.5	+0.0	+0.0	+0.0	+0.0	+0.0	41.8	54.0	-12.2	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-12.9	70		Mid, 10th		119	
			+0.1	+8.7	+6.4				Harmonic			
11	9262.000M	25.5	+0.0	+0.0	+0.0	+0.0	+0.0	41.6	54.0	-12.4	Horiz	
			+3.3	+0.0	+0.0	+4.7	360		High, Y-axis		119	
			-27.7	+35.8	+0.0	+0.0						
			+0.0	+0.0	+0.0							
12	9920.000M	33.0	+0.0	+0.0	+0.0	+0.0	+0.0	41.0	54.0	-13.0	Horiz	
			+3.1	+0.0	+0.0	+4.9	193		High, 4th Harmonic		119	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
13	19360.000 M	38.4	+0.0	+0.0	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.3			Low, 8th Harmonic		119	
			+1.5	+7.7	+5.5							
14	4959.961M	32.3	+0.0	+0.0	+0.0	+0.0	+0.0	39.7	54.0	-14.3	Horiz	
			+2.3	+0.0	+0.0	+3.6			High, 2nd		119	
			-30.8	+32.3	+0.0	+0.0			Harmonic			
			+0.0	+0.0	+0.0							
15	19840.000 M	37.5	+0.0	+0.0	+0.0	+0.0	+0.0	38.6	54.0	-15.4	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.4	285		High, 8th Harmonic		119	
			+0.9	+7.9	+5.7							
16	19600.000 M	37.0	+0.0	+0.0	+0.0	+0.0	+0.0	38.4	54.0	-15.6	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-13.3	88		Mid, 8th Harmonic		119	
			+1.3	+7.8	+5.6							
17	17360.000 M	38.0	+0.0	+0.0	+0.0	+0.0	+0.0	37.1	54.0	-16.9	Horiz	
			+4.5	+0.0	+0.0	+6.9						
			+0.0	+0.0	-12.3	+0.0	322		High, 7th Harmonic		119	
			+0.0	+0.0	+0.0							
18	13672.000 M	41.3	+0.0	+0.0	+0.0	+0.0	+0.0	36.1	54.0	-17.9	Horiz	
			+3.8	+0.0	+0.0	+6.0						
			+0.0	+0.0	-15.0	+0.0			Low, Z-axis		119	
			+0.0	+0.0	+0.0							
19	13663.500 M	40.9	+0.0	+0.0	+0.0	+0.0	+0.0	35.7	54.0	-18.3	Horiz	
			+3.8	+0.0	+0.0	+6.0						
			+0.0	+0.0	-15.0	+0.0	249		High, Y-axis		119	
			+0.0	+0.0	+0.0							
20	21780.000 M	37.0	+0.0	+0.0	+0.0	+0.0	+0.0	35.4	54.0	-18.6	Horiz	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0	-16.1	358		Low, 9th Harmonic		119	
			+0.2	+8.3	+6.0							

21	16940.000 M	36.9	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.9 +0.0	+0.0 +6.5 +0.0	+0.0	34.9	54.0 Low, 7th Harmonic	-19.1	Horiz 119
22	215.040M	39.0	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0 334	24.0	43.5 High, Z-axis	-19.5	Horiz 150
23	17150.000 M	35.9	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.7 +0.0	+0.0 +6.7 +0.0	+0.0 81	34.3	54.0 Mid, 7th Harmonic	-19.7	Horiz 119
24	22050.000 M	36.1	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +6.1	+0.0 +0.0 -16.5	+0.0 357	34.2	54.0 Mid, 9th Harmonic	-19.8	Horiz 119
25	215.040M	38.6	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0 26	23.6	43.5 Mid, Z-axis	-19.9	Horiz 150
26	22320.000 M	36.3	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +6.0	+0.0 +0.0 -16.8	+0.0 102	33.9	54.0 High, 9th Harmonic	-20.1	Horiz 119
27	215.040M	38.0	-27.2 +0.3 +0.0 +0.0	+10.1 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0 290	23.0	43.5 Low, Z-axis	-20.5	Horiz 150
28	14700.000 M	37.8	+0.0 +4.2 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.9 +0.0	+0.0 +6.3 +0.0	+0.0 360	33.4	54.0 Mid, 6th Harmonic	-20.6	Horiz 119
29	610.472M	28.5	-28.3 +0.6 +0.0 +0.0	+20.1 +0.0 +0.0 +0.0	+1.6 +0.0 +0.0 +0.0	+1.8 +0.0 +0.0	+0.0	24.3	46.0 High, X-axis	-21.7	Vert 150
30	14880.000 M	36.6	+0.0 +4.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.8 +0.0	+0.0 +6.3 +0.0	+0.0 225	32.1	54.0 High, 6th Harmonic	-21.9	Horiz 119
31	681.720M	27.3	-28.2 +0.6 +0.0 +0.0	+20.6 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0 +0.0	+1.9 +0.0 +0.0	+0.0 272	23.9	46.0 Low, Z-axis	-22.1	Vert 150
32	12400.000 M	36.1	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.1 +0.0	+0.0 +5.7 +0.0	+0.0 187	31.5	54.0 High, 5th Harmonic	-22.5	Horiz 119
33	14520.000 M	35.5	+0.0 +4.4 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -15.1 +0.0	+0.0 +6.3 +0.0	+0.0	31.1	54.0 Low, 6th Harmonic	-22.9	Horiz 119

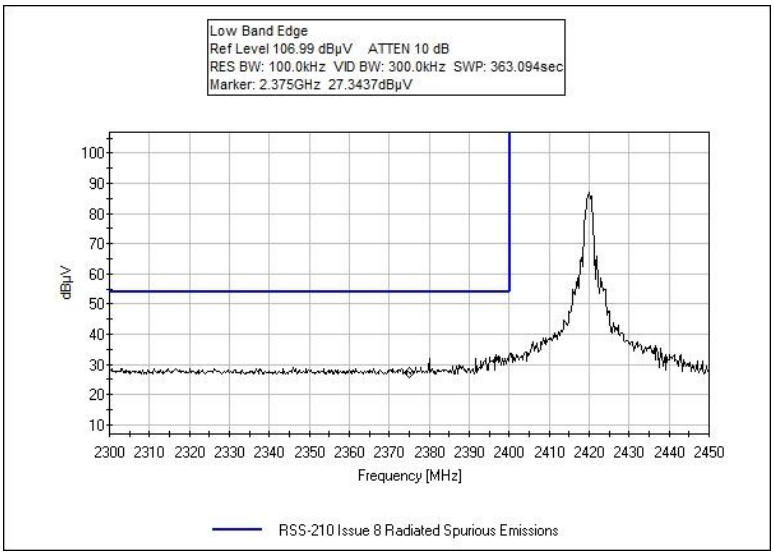
34	12100.000 M	35.2	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+0.0 +5.6 +0.0	+0.0	30.7	54.0 Low, 5th Harmonic	-23.3	Horiz 119
35	12250.000 M	34.8	+0.0 +3.8 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+0.0 +5.7 +0.0	+0.0	30.4	54.0 Mid, 5th Harmonic	-23.6	Horiz 119
36	34.368M	27.5	-28.0 +0.1 +0.0 +0.0	+16.1 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0 +0.0	+0.2 +0.0 +0.0	+0.0	16.2	40.0 High, Y-axis	-23.8	Vert 150
37	2269.000M	29.5	+0.0 +1.3 -30.4 +0.0	+0.0 +0.0 +26.4 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +2.5 +0.0	+0.0 360	29.3	54.0 Low, X-axis	-24.7	Horiz 119
38	153.550M	33.2	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 99	18.3	43.5 Mid, Z-axis	-25.2	Horiz 150
39	486.664M	27.7	-28.2 +0.5 +0.0 +0.0	+17.8 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+1.6 +0.0 +0.0	+0.0 5	20.8	46.0 Mid, Z-axis	-25.2	Horiz 150
40	153.550M	33.0	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 342	18.1	43.5 Low, Z-axis	-25.4	Horiz 150
41	153.550M	32.3	-27.6 +0.3 +0.0 +0.0	+10.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0	+0.0 353	17.4	43.5 High, Z-axis	-26.1	Vert 150
42	1.000M	28.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.8 +0.0 +0.0	+0.0 +0.1 +0.0	-40.0 202	-1.2	27.6 Low, Y-axis	-28.8	Horiz 150
43	1639.000M	27.8	+0.0 +1.4 -30.7 +0.0	+0.0 +0.0 +23.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +2.1 +0.0	+0.0 360	23.6	54.0 Mid, X-axis	-30.4	Horiz 119
44	71.706M	28.7	-28.0 +0.2 +0.0 +0.0	+6.1 +0.0 +0.0 +0.0	+0.5 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+0.0 360	7.9	40.0 Low, X-axis	-32.1	Vert 150
45	58.560M	28.2	-28.0 +0.1 +0.0 +0.0	+5.7 +0.0 +0.0 +0.0	+0.5 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+0.0 360	6.9	40.0 Mid, Y-axis	-33.1	Horiz 150
46	99.600k	51.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.6 +0.0 +0.0	+0.0 +0.0 +0.0	-80.0 24	-19.4	27.6 High, Z-axis	-47.0	Horiz 150

47	16.946M	9.8	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +8.7 +0.0	+0.0 +0.1 +0.0	-40.0 216	-21.4	29.5	-50.9	Horiz 150
48	189.900k	32.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.5 +0.0	+0.0 +0.0 +0.0	-80.0 235	-38.5	22.0 mid, Y-axis	-60.5	Horiz 150
49	67.940k	36.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +9.6 +0.0	+0.0 +0.0 +0.0	-80.0 358	-34.2	31.0 Mid, X-axis	-65.2	Horiz 150
50	11.930k	43.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +15.5 +0.0	+0.0 +0.0 +0.0	-80.0 358	-21.3	46.1 Mid, Y-axis	-67.4	Horiz 150

CKC Laboratories, Inc. Date: 9/16/2013 Time: 16:12:02 Medtronic MiniMed WO#: 94428
RSS-210 Issue 8 Radiated Spurious Emissions Test Distance: 3 Meters Horiz Sequence#: 1 Ext ATTN: 0 dB



Test Plots



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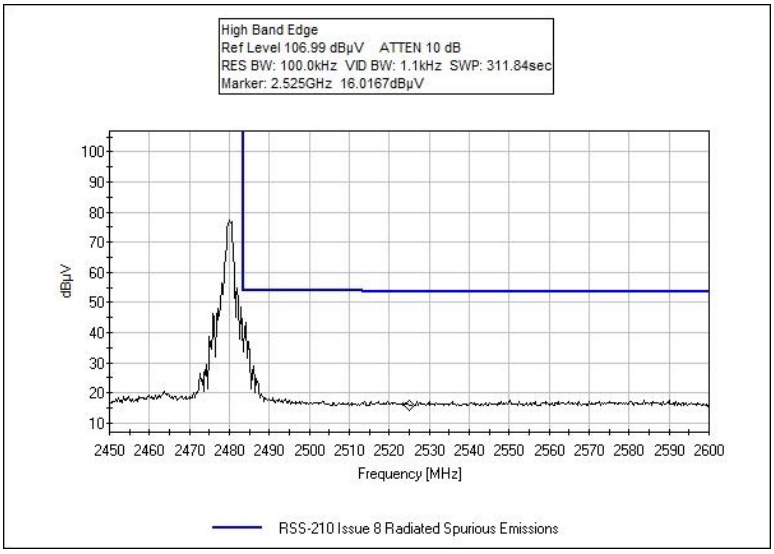
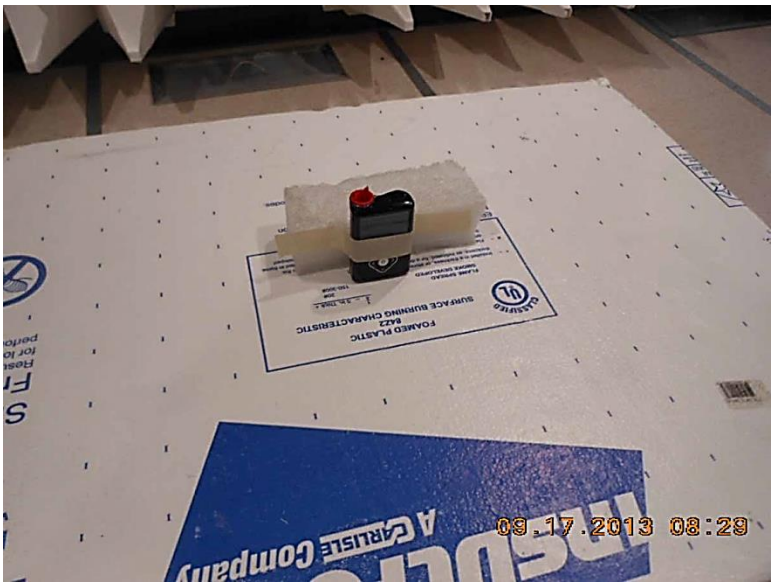


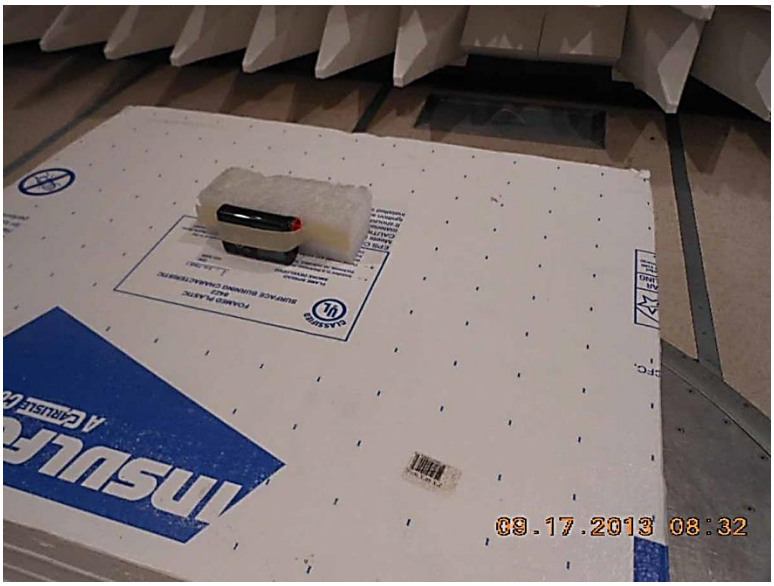
High

Test Setup Photos

X – Axis



Y - Axis



Z - Axis

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.