



MEDTRONIC MINIMED TEST REPORT

FOR THE

PERSONAL PUMP COMMUNICATOR, MMT-3160

FCC PART 15 SUBPART C SECTION 15.209

COMPLIANCE

DATE OF ISSUE: APRIL 1, 2004

PREPARED FOR:

Medtronic MiniMed
18000 Devonshire Street
Northridge, CA 91325-1219

P.O. No.: 4700000378
W.O. No.: 81943

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: March 22-25, 2004

Report No.: FC04-027

This report contains a total of 30 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc. The results in this report apply only to the items tested, as identified herein.

TABLE OF CONTENTS

Administrative Information	3
Summary of Results	4
Conditions for Compliance	4
Approvals	4
FCC 15.31(e) Voltage Variation	5
FCC 15.33(a) Frequency Ranges Tested	5
Eut Operating Frequency	5
Equipment Under Test (EUT) Description	5
Equipment Under Test	5
Peripheral Devices	5
Report of Measurements	6
Table 1: FCC 15.209 Fundamental	6
Table 2: FCC 15.209 Six Highest Radiated Emission Levels: 9kHz - 30MHz	7
Table 3: FCC 15.209 Six Highest Radiated Emission Levels: >1 GHz	8
Measurement Uncertainty	9
EUT Setup	9
Correction Factors	9
Table A: Sample Calculations	9
Test Instrumentation and Analyzer Settings	10
Spectrum Analyzer Detector Functions	10
Peak	10
Quasi-Peak	10
Average	10
EUT Testing	11
Radiated Emissions	11
Appendix A: Test Setup Photograph	12
Photograph Showing Radiated Emissions	13
Appendix B: Test Equipment List	14
Appendix C: Measurement Data Sheets	15

ADMINISTRATIVE INFORMATION

DATE OF TEST: March 22-25, 2004

DATE OF RECEIPT: March 22, 2004

PURPOSE OF TEST: To demonstrate the compliance of the Personal Pump Communicator, MMT-3160 with the requirements for FCC Part 15 Subpart C Section 15.209 devices.

TEST METHOD: ANSI C63.4 (1992)

MANUFACTURER: Medtronic MiniMed
18000 Devonshire Street
Northridge, CA 91325-1219

REPRESENTATIVE: Varaz Shahmirian

TEST LOCATION: CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the Medtronic MiniMed Personal Pump Communicator, MMT-3160 was found to be fully compliant with the following standards and specifications:

United States

➤ FCC Part 15 Subpart C Section 15.209

➤ ANSI C63.4 (1992) method

FCC Site No. 90477

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

A handwritten signature in black ink, appearing to read "Joyce Walker".

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

A handwritten signature in black ink, appearing to read "Mike Wilkinson".

Mike Wilkinson, Lab Manager

A handwritten signature in black ink, appearing to read "Randy Clark".

Randy Clark, EMC Engineer

FCC 15.31(e) Voltage Variations

Not applicable to this device because it is battery powered.

FCC 15.33(a) Frequency Ranges Tested

15.209 Radiated: 9 kHz – 1000 MHz

Eut Operating Frequency

The EUT was operating at 133 kHz.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit. The EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery.

EQUIPMENT UNDER TEST**Implantable Insulin Pump**

Manuf: Medtronic MiniMed
Model: MMT-2007D
Serial: 300067
FCC ID: OH22007C

Personal Pump Communicator (3 each)

Manuf: Medtronic MiniMed
Model: MMT-3160
Serial: 300032, 300030 & 300004
FCC ID: pending

PERIPHERAL DEVICES

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

IR Dongle

Manuf: Actisys
Model: ACT-IR220LN115
Serial: LN000087
FCC ID: DoC

Support PC

Manuf: Toshiba
Model: PS160U-18886
Serial: 1030263CU
FCC ID: DoC

Support Power Supply

Manuf: Toshiba
Model: API-7595
Serial: 002044
FCC ID: NA

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: FCC 15.209 Fundamental									
FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS				CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES
		Ant dB		Corr dB					
0.133	59.5	9.6		-80.0		-10.9	25.1	-36.0	V

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization

COMMENTS: EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Table 2: FCC 15.209 Six Highest Radiated Emission Levels: 9kHz - 30MHz

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS				CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES
		Ant dB		Cable dB	Corr dB				
0.132	58.9	9.6		0.0	-80.0	-11.5	25.2	-36.7	V
0.530	28.6	9.6		0.1	-40.0	-1.7	33.1	-34.8	V
0.662	36.7	9.6		0.1	-40.0	6.4	31.2	-24.8	V
1.049	30.6	9.8		0.2	-40.0	0.6	27.1	-26.5	V
1.049	30.4	9.8		0.2	-40.0	0.4	27.1	-26.7	H
1.049	21.7	9.8		0.2	-40.0	-8.3	27.1	-35.4	H

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization

COMMENTS: See individual data sheets for test conditions.

Table 3: FCC 15.209 Six Highest Radiated Emission Levels: >1 GHz

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
70.659	41.3	5.8	-27.2	1.3	10.0	31.2	40.0	-8.8	V
166.019	39.7	9.4	-26.9	2.1	10.0	34.3	43.5	-9.2	V
179.480	43.5	8.2	-26.8	2.2	10.0	37.1	43.5	-6.4	V
701.680	29.4	20.3	-27.8	5.3	10.0	37.2	46.0	-8.8	V
757.800	31.2	21.0	-27.7	5.4	10.0	39.9	46.0	-6.1	V
952.166	26.0	23.5	-27.2	6.1	10.0	38.4	46.0	-7.6	VQ

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Section 15.209
Test Distance: 10 Meters

NOTES: Q = Quasi Peak Reading
V = Vertical Polarization

COMMENTS: See individual data sheets for test conditions.

MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Statements of compliance are based on the nominal values only.

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

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 dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. For frequencies from 30 to 1000 MHz, the biconilog antenna was used.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. 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 test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

EUT TESTING

Radiated Emissions

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

APPENDIX A

TEST SETUP PHOTOGRAPH

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions

APPENDIX B

TEST EQUIPMENT LIST

<30 MHz

<i>Description</i>	<i>Asset #</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Antenna, Loop	00226	EMCO	6502	1074	5/21/03	5/20/2005
Spectrum Analyzer 100Hz - 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/25/2005
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/03	2/25/2005
Spectrum Analyzer QP Adapter	00478	HP	85650A	2811A01267	2/26/03	2/25/2005

>30 Mhz

<i>Description</i>	<i>Asset #</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Antenna, Biconilog	01991	Chase	CBL6111C	2456	12/13/02	12/12/2004
Preamplifier	00099	HP	8447D	1937A02604	3/7/03	3/6/2005
Spectrum Analyzer 100Hz - 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/25/2005
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/03	2/25/2005
Spectrum Analyzer QP Adapter	00478	HP	85650A	2811A01267	2/26/03	2/25/2005

APPENDIX C:
MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300004

Date: 03/22/2004
 Time: 13:54:03
 Sequence#: 4
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator	Medtronic MiniMed	MMT-3160	300030

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=15.31 3m 40dB/Dec Correction
--	---------------------------------

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	133.140k	59.5	+9.6	-80.0			+0.0	-10.9	25.1	-36.0	Vert
									Face Up		
2	133.180k	58.1	+9.6	-80.0			+0.0	-12.3	25.1	-37.4	Vert
									Top Side Up		
3	133.200k	54.0	+9.6	-80.0			+0.0	-16.4	25.1	-41.5	Horiz
									Right Side Up		
4	133.260k	51.1	+9.6	-80.0			+0.0	-19.3	25.1	-44.4	Vert
									Face Up		

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943** Date: 03/22/2004
 Test Type: **Maximized Emissions** Time: 11:49:09
 Equipment: **Personal Pump Communicator** Sequence#: 2
 Manufacturer: Medtronic MiniMed Tested By: Randal Clark
 Model: MMT-3160
 S/N: 300004

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300004

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=15.31 3m 40dB/Dec Correction
--	---------------------------------

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	131.790k	58.9	+9.6	-80.0			+0.0	-11.5	25.2	-36.7	Vert
2	131.810k	57.7	+9.6	-80.0			+0.0	-12.7	25.2	-37.9	Vert
3	131.830k	51.7	+9.6	-80.0			+0.0	-18.7	25.2	-43.9	Horiz

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300032

Date: 03/22/2004
 Time: 15:54:54
 Sequence#: 8
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300032

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz Temperature: 21°C Humidity: 50% Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=15.31 3m 40dB/Dec Correction
--	---------------------------------

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	133.170k	59.5	+9.6	-80.0			+0.0	-10.9	25.1	-36.0	Vert
									Top Side Up		
2	131.814k	58.8	+9.6	-80.0			+0.0	-11.6	25.2	-36.8	Vert
									Face Up		
3	133.290k	53.0	+9.6	-80.0			+0.0	-17.4	25.1	-42.5	Horiz
									Top Side Up		
4	133.170k	47.3	+9.6	-80.0			+0.0	-23.1	25.1	-48.2	Vert
									Right Side Up		

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300004

Date: 03/22/2004
 Time: 11:52:13
 Sequence#: 3
 Tested By: Randal Clark

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300004

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=Cable - 10 Meter
T3=15.31 3m 40dB/Dec Correction	

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

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	662.091k	36.7	+9.6	+0.1	-40.0		+0.0	6.4	31.2	-24.8	Vert
2	1.049M	30.6	+9.8	+0.2	-40.0		+0.0	0.6	27.1	-26.5	Vert
3	1.049M	30.4	+9.8	+0.2	-40.0		+0.0	0.4	27.1	-26.7	Horiz
4	530.000k	28.6	+9.6	+0.1	-40.0		+0.0	-1.7	33.1	-34.8	Vert
5	2.759M	16.0	+9.5	+0.2	-40.0		+0.0	-14.3	29.5	-43.8	Vert
6	1.710M	13.9	+9.7	+0.2	-40.0		+0.0	-16.2	29.5	-45.7	Vert
7	2.098M	5.5	+9.6	+0.2	-40.0		+0.0	-24.7	29.5	-54.2	Vert

8	6.294M	3.3	+9.2	+0.3	-40.0	+0.0	-27.2	29.5	-56.7	Vert
9	396.720k	28.2	+9.6	+0.1	-80.0	+0.0	-42.1	15.6	-57.7	Vert
10	6.294M	0.4	+9.2	+0.3	-40.0	+0.0	-30.1	29.5	-59.6	Horiz
11	261.650k	29.6	+9.6	+0.1	-80.0	+0.0	-40.7	19.2	-59.9	Vert
12	392.950k	24.6	+9.6	+0.1	-80.0	+0.0	-45.7	15.7	-61.4	Vert

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300004

Date: 03/22/2004
 Time: 14:08:38
 Sequence#: 6
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator	Medtronic MiniMed	MMT-3160	300030

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=Cable - 10 Meter
T3=15.31 3m 40dB/Dec Correction	

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

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1.049M	17.1	+9.8	+0.2	-40.0		+0.0	-12.9	27.1	-40.0	Horiz
2	785.920k	18.7	+9.7	+0.1	-40.0		+0.0	-11.5	29.7	-41.2	Horiz
3	654.920k	20.4	+9.6	+0.1	-40.0		+0.0	-9.9	31.3	-41.2	Horiz
4	523.880k	22.2	+9.6	+0.1	-40.0		+0.0	-8.1	33.2	-41.3	Horiz
5	5.245M	9.4	+9.3	+0.2	-40.0		+0.0	-21.1	29.5	-50.6	Horiz
6	2.098M	8.9	+9.6	+0.2	-40.0		+0.0	-21.3	29.5	-50.8	Horiz

7	4.196M	5.6	+9.4	+0.2	-40.0	+0.0	-24.8	29.5	-54.3	Horiz
8	393.540k	25.3	+9.6	+0.1	-80.0	+0.0	-45.0	15.7	-60.7	Horiz
9	262.380k	28.5	+9.6	+0.1	-80.0	+0.0	-41.8	19.2	-61.0	Horiz

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300032

Date: 03/22/2004
 Time: 16:08:55
 Sequence#: 9
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300032

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Toshiba	PS160U-18886	1030263CU

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 9kHz - 30MHz. Temperature: 21°C, Humidity: 50%. Data corrected for test distance using standard theoretical falloff of 40dB/decade.

Transducer Legend:

T1=Mag Loop - Site B - AN 00226 - 9kHz-30M	T2=Cable - 10 Meter
T3=15.31 3m 40dB/Dec Correction	

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

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1.049M	21.7	+9.8	+0.2	-40.0		+0.0	-8.3	27.1	-35.4	Horiz
2	1.049M	16.1	+9.8	+0.2	-40.0		+0.0	-13.9	27.1	-41.0	Vert
3	785.970k	18.4	+9.7	+0.1	-40.0		+0.0	-11.8	29.7	-41.5	Vert
4	655.030k	17.7	+9.6	+0.1	-40.0		+0.0	-12.6	31.3	-43.9	Vert
5	785.970k	14.1	+9.7	+0.1	-40.0		+0.0	-16.1	29.7	-45.8	Vert
6	2.102M	11.0	+9.6	+0.2	-40.0		+0.0	-19.2	29.5	-48.7	Vert
7	2.098M	9.7	+9.6	+0.2	-40.0		+0.0	-20.5	29.5	-50.0	Horiz

8	4.196M	8.5	+9.4	+0.2	-40.0	+0.0	-21.9	29.5	-51.4	Vert
9	6.295M	5.2	+9.2	+0.3	-40.0	+0.0	-25.3	29.5	-54.8	Vert
10	2.098M	4.4	+9.6	+0.2	-40.0	+0.0	-25.8	29.5	-55.3	Horiz
11	393.240k	28.4	+9.6	+0.1	-80.0	+0.0	-41.9	15.7	-57.6	Vert
12	266.640k	28.6	+9.6	+0.1	-80.0	+0.0	-41.7	19.1	-60.8	Vert

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300030

Date: 03/23/2004
 Time: 10:24:32
 Sequence#: 13
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300030

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Dell	PP01L-DELL	29300023

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 30 - 1000 MHz. Temperature: 21°C, Humidity: 50%.

Transducer Legend:

T1=Cable - 10 Meter	T2=Amp - S/N 604
T3=Bilog Site B	

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	701.680M	29.4	+5.3	-27.8	+20.3		+10.0	37.2	46.0	-8.8	Vert
2	62.480M	40.7	+1.3	-27.2	+5.8		+10.0	30.6	40.0	-9.4	Vert
3	71.241M	40.0	+1.3	-27.2	+5.8		+10.0	29.9	40.0	-10.1	Vert
4	205.321M	38.9	+2.4	-26.7	+8.7		+10.0	33.3	43.5	-10.2	Vert
5	165.998M	38.5	+2.1	-26.9	+9.4		+10.0	33.1	43.5	-10.4	Vert
6	165.997M	36.6	+2.1	-26.9	+9.4		+10.0	31.2	43.5	-12.3	Horiz

7	438.740M	29.6	+3.9	-27.4	+16.2	+10.0	32.3	46.0	-13.7	Vert
8	189.270M	33.7	+2.3	-26.7	+8.2	+10.0	27.5	43.5	-16.0	Vert
9	169.010M	31.5	+2.1	-26.8	+9.1	+10.0	25.9	43.5	-17.6	Vert
10	170.997M	30.7	+2.2	-26.8	+8.9	+10.0	25.0	43.5	-18.5	Horiz

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**

Specification: **FCC 15.209**

Work Order #: **81943**

Date: 03/23/2004

Test Type: **Maximized Emissions**

Time: 09:37:53

Equipment: **Personal Pump Communicator**

Sequence#: 10

Manufacturer: Medtronic MiniMed

Tested By: Mike Wilkinson

Model: MMT-3160

S/N: 300032

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300032

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Dell	PP01L-DELL	29300023

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 30 - 1000 MHz. Temperature: 21°C, Humidity: 50%.

Transducer Legend:

T1=Cable - 10 Meter	T2=Amp - S/N 604
T3=Bilog Site B	

Measurement Data:

Reading listed by margin.

Test Distance: 10 Meters

#	Freq Hz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	757.800M	31.2	+5.4	-27.7	+21.0		+10.0	39.9	46.0	-6.1	Vert
2	179.480M	43.5	+2.2	-26.8	+8.2		+10.0	37.1	43.5	-6.4	Vert
3	952.166M	26.0	+6.1	-27.2	+23.5		+10.0	38.4	46.0	-7.6	Vert
4	70.659M	41.3	+1.3	-27.2	+5.8		+10.0	31.2	40.0	-8.8	Vert
5	166.019M	39.7	+2.1	-26.9	+9.4		+10.0	34.3	43.5	-9.2	Vert
6	188.658M	40.2	+2.3	-26.7	+8.2		+10.0	34.0	43.5	-9.5	Vert
7	437.832M	32.9	+3.9	-27.4	+16.2		+10.0	35.6	46.0	-10.4	Vert

8	62.830M	38.8	+1.2	-27.3	+6.0	+10.0	28.7	40.0	-11.3	Vert
9	168.884M QP	35.8	+2.1	-26.8	+9.1	+10.0	30.2	43.5	-13.3	Vert
10	281.500M	30.9	+2.9	-26.5	+12.5	+10.0	29.8	46.0	-16.2	Vert
11	171.513M	27.7	+2.2	-26.8	+8.9	+10.0	22.0	43.5	-21.5	Vert

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Medtronic MiniMed**
 Specification: **FCC 15.209**
 Work Order #: **81943**
 Test Type: **Maximized Emissions**
 Equipment: **Personal Pump Communicator**
 Manufacturer: Medtronic MiniMed
 Model: MMT-3160
 S/N: 300004

Date: 03/23/2004
 Time: 10:48:48
 Sequence#: 14
 Tested By: Mike Wilkinson

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Implantable Insulin Pump	Medtronic MiniMed	MMT-2007D	300067
Personal Pump Communicator*	Medtronic MiniMed	MMT-3160	300004

Support Devices:

Function	Manufacturer	Model #	S/N
Support Power Supply	Toshiba	API-7595	002044
IR Dongle	Actisys	ACT-IR220LN115	LN000087
Support PC	Dell	PP01L-DELL	29300023

Test Conditions / Notes:

EUT is a Personal Pump Communicator which operates in conjunction with an implantable insulin pump. EUT is battery operated - tests performed with a fresh battery. EUT is tested in three orthogonal orientations - test data represents worst case of all orientations. Support computer is connected to the PPC via an infrared link over a fiber optic connection. EUT is running application software version 9027807. Insulin pump is running application software version 9021055 (applicable to MMT-2007C and MMT-2007D). Support computer is running EMI/EMC test software version 9029323. Frequency Range Investigated: 30 - 1000 MHz. Temperature: 21°C, Humidity: 50%.

Transducer Legend:

T1=Cable - 10 Meter	T2=Amp - S/N 604
T3=Bilog Site B	

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq Hz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	166.000M	38.8	+2.1	-26.9	+9.4		+10.0	33.4	43.5	-10.1	Horiz
2	61.842M	39.8	+1.1	-27.3	+6.0		+10.0	29.6	40.0	-10.4	Vert
3	166.042M	38.3	+2.1	-26.9	+9.4		+10.0	32.9	43.5	-10.6	Vert
4	179.772M	38.3	+2.2	-26.8	+8.2		+10.0	31.9	43.5	-11.6	Vert
5	70.003M	37.3	+1.3	-27.2	+5.7		+10.0	27.1	40.0	-12.9	Vert
6	331.940M	31.6	+3.3	-26.7	+13.7		+10.0	31.9	46.0	-14.1	Vert

7	138.284M	33.4	+1.8	-27.1	+10.9	+10.0	29.0	43.5	-14.5	Horiz
8	170.000M	33.0	+2.1	-26.8	+9.0	+10.0	27.3	43.5	-16.2	Vert
9	170.000M	29.6	+2.1	-26.8	+9.0	+10.0	23.9	43.5	-19.6	Horiz