MEDTRONIC MINIMED INC. TEST REPORT

FOR THE

IMPLANTABLE INSULIN PUMP, MMT-2007C

FCC PART 15 SUBPART C SECTION 15.209

COMPLIANCE

DATE OF ISSUE: JANUARY 31, 2002

PREPARED FOR:

Medtronic MiniMed Inc.
18000 Devonshire Street
Northridge, Ca 91325

P.O. No.: 43994
W.O. No.: 78257

PREPARED BY:

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

Date of test: January 21-29, 2002

Report No.: FC02-013

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ADMINISTRATIVE INFORMATION

DATE OF TEST:	January 21-29, 2002
DATE OF RECEIPT:	January 21, 2002
PURPOSE OF TEST:	To demonstrate the compliance of the Implantable Insulin Pump, MMT-2007C with the requirements for FCC Part 15 Subpart C Section 15.209 devices.
TEST METHOD:	ANSI C63.4 (1992)
MANUFACTURER:	Medtronic MiniMed Inc. 18000 Devonshire Street Northridge, Ca 91325
REPRESENTATIVE:	Varaz Shahmirian
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the Medtronic MiniMed Inc. Implantable Insulin Pump, MMT-2007C 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

Canada
RSS-210 using:
- FCC Part 15 Subpart C Section 15.209

Industry of Canada File No. IC 3082-D

CONDITIONS FOR COMPLIANCE
No modifications or special conditions were applicable.

APPROVALS

QUALITY ASSURANCE:

Dennis Ward, Quality Manager

Chuck Kendall, EMC/Lab Manager

TEST PERSONNEL:

Randy Clark, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit.

Pump
EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003.

PPC
EUT is a personal communicator (PPC) with an insulin pump. The PPC is controlled by a laptop computer using a fiber optic connection. All devices are battery operated. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. The pump/PPC product line was tested simultaneously during emissions testing only.

15.203 Antenna Requirements
The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

15.205 Restricted Bands
The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

15.31(e) Voltage Variations
Not applicable to this device because it is battery powered.

15.31(m) Number Of Channels
This device operates on a single channel.

15.33(a) Frequency Ranges Tested
15.209 Radiated Emissions: 9 kHz – 1000 MHz

EUT Operating Frequency
The EUT was operating at 131 kHz. The actual readings taken show this to be higher due to the modulation scheme and the particular data stream, but they are all within the limit and the specified bandwidth.

Temperature And Humidity During Testing
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST

Implantable Insulin Pump

Manuf:	Medtronic MiniMed Inc.
Model:	MMT-2007C
Serial:	20101, 20103 & 20104
FCC ID:	Pending

PPC for MMT-2007C

Manuf:	Medtronic MiniMed Inc.
Model:	MMT-3150
Serial:	200005, 200007 & 200011
FCC ID:	Pending

PERIPHERAL DEVICES

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

Laptop Computer

Manuf:	Micron
Model:	NBK001371-00
Serial:	1459617-0030
FCC ID:	GBQM700PC

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the Implantable Insulin Pump, MMT-2007C. 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: Fundamental Emission Levels

FREQUENCY Hz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	15.31 dB	dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
0.133	67.2	10.1	-25.5	-80.0		-28.2	25.1	-53.3	V-1
0.133	66.4	10.1	-25.5	-80.0		-29.0	25.1	-54.1	V-2
0.133	66.2	10.1	-25.5	-80.0		-29.2	25.1	-54.3	V-1
0.133	66.1	10.1	-25.5	-80.0		-29.3	25.1	-54.4	V-2
0.133	64.9	10.1	-25.5	-80.0		-30.5	25.1	-55.6	V-1
0.133	64.8	10.1	-25.5	-80.0		-30.6	25.1	-55.7	V-3

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

NOTES: H = Horizontal Polarization
V = Vertical Polarization
1 = Set 1
2 = Set 2
3 = Set 3

COMMENTS: EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: Fundamental. Test Distance used is 3 meters. Test distance correction factor 40dB/decade used in accordance with 15.31. Testing was performed on three identical sets.

EUT setup consists of an insulin pump and PPC. The PPC is controlled by a laptop computer using a fiber optic connection. All devices are battery operated.

Insulin Pump set: The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003.

Table 2: Six Highest Radiated Emission Levels: 9 kHz - 30 MHz									
FREQUENCY Hz	METER READING dBµV	CORRECTION FACTORS Ant dB	15.31 dB	Cable dB	dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
0.657	16.9	10.2	-20.0	0.1		7.2	31.2	-24.0	V-2
0.917	14.5	10.1	-20.0	0.2		4.8	28.3	-23.5	V-2
0.921	14.1	10.1	-20.0	0.2		4.4	28.3	-23.9	V-1
0.924	15.0	10.1	-20.0	0.2		5.3	28.3	-23.0	V-3
1.179	10.1	10.2	-20.0	0.2		0.5	26.1	-25.6	V-2
1.185	11.8	10.2	-20.0	0.2		2.2	26.1	-23.9	V-1

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

NOTES: V = Vertical Polarization
1 = Set 1
2 = Set 2
3 = Set 3

COMMENTS: EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 9kHz - 30MHz. Test Distance correction factor 40dB/decade used in accordance with 15.31. Testing was performed on three identical sets.

EUT setup consists of an insulin pump and PPC. The PPC is controlled by a laptop computer using a fiber optic connection. All devices are battery operated.

Insulin Pump set: The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003.

Table 3: Six Highest Radiated Emission Levels: 30-1000 MHz

FREQUENCY Hz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
108.808	50.0	13.3	-27.1	2.1		38.3	43.5	-5.2	V-2
110.590	48.4	13.4	-27.1	2.1		36.8	43.5	-6.7	V-1
111.118	51.6	13.5	-27.1	2.1		40.1	43.5	-3.4	V-2
114.670	48.5	13.8	-27.0	2.1		37.4	43.5	-6.1	V-3
115.720	49.4	13.9	-27.0	2.1		38.4	43.5	-5.1	V-3
194.550	42.2	17.6	-26.7	2.8		35.9	43.5	-7.6	H-1

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

NOTES: H = Horizontal Polarization
V = Vertical Polarization
1 = Set 1
2 = Set 2
3 = Set 3

COMMENTS: EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 30-1000 MHz. Testing was performed on three identical sets.

EUT setup consists of an insulin pump and PPC. The PPC is controlled by a laptop computer using a fiber optic connection. All devices are battery operated.

Insulin Pump set: The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 2.94dB measurement uncertainty.

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 interval between different pieces of equipment was approximately 10 centimeters. All excessive interconnecting cable was bundled.

The radiated emissions data of the Implantable Insulin Pump, MMT-2007C, 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. All EUTs were tested in three orthogonal orientations.

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 in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: 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 in Appendix B were used to collect both the radiated emissions data for the Implantable Insulin Pump, MMT-2007C. 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.

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 dBµV, and a vertical scale of 10 dB per division.

FCC SECTION 15.35:
TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

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 for the Implantable Insulin Pump, MMT-2007C.

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 host PC 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 88 MHz was scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. The frequency range of 100 to 300 MHz was then scanned in the same manner using the biconical antenna and the peaks recorded. Lastly, a scan of the FM band from 88 to 110 MHz was made, using a reduced resolution bandwidth and frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 to 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 to 1000 MHz was again scanned. 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 PHOTOGRAPHS

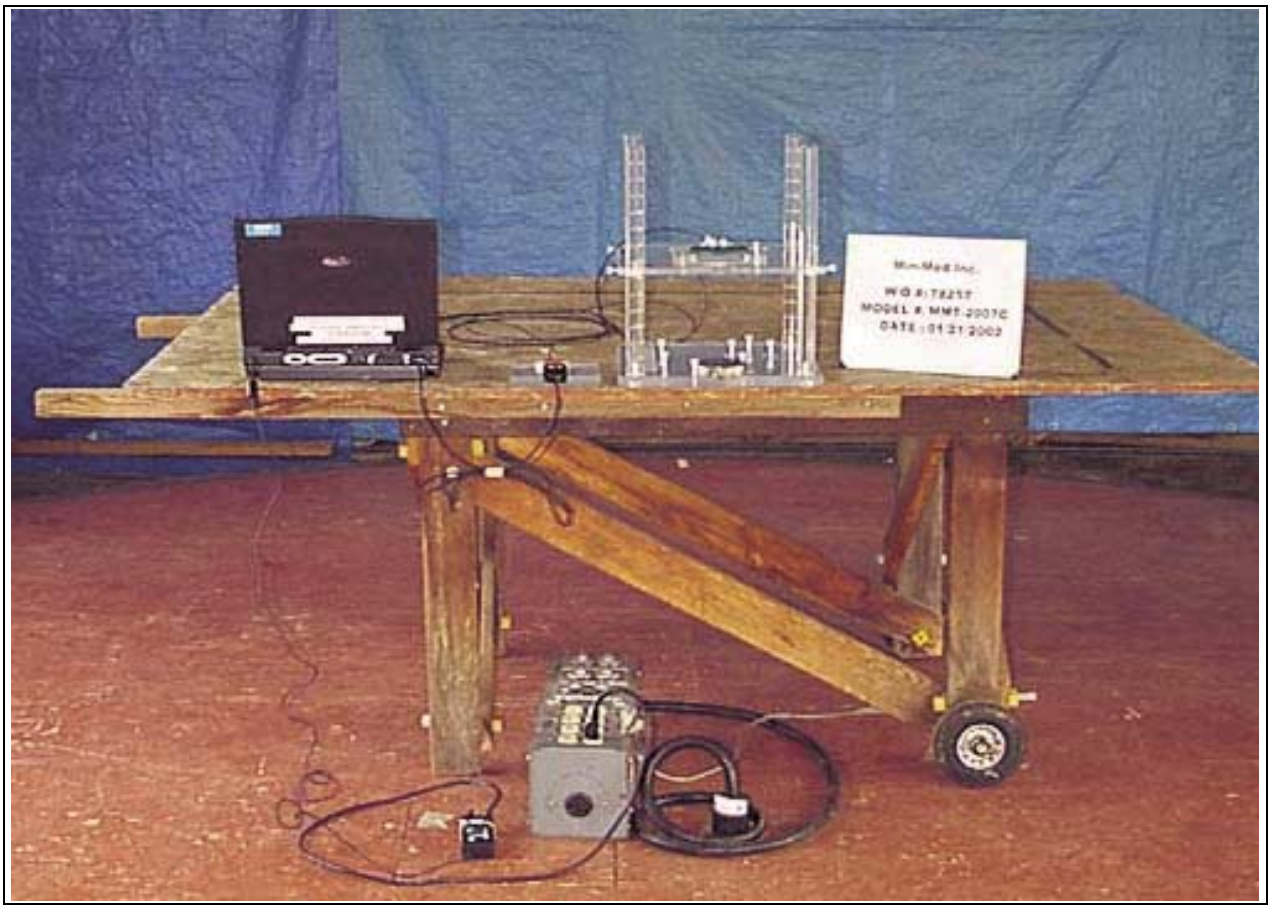
PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Closeup

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

APPENDIX B

TEST EQUIPMENT LIST

Test equipment used for radiated emissions 9kHz – 30Mhz

Equipment	*Mfg.*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
3/10m & LISN Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/02
Antenna, Loop	EMCO	6502	1074	00226	5/31/2001	5/31/02
Power Supply, DC	HP	6205C	2228A01775	00762	5/31/2001	5/31/02
Preamp	HP	8447D	1937A02604	00099	03/29/01	3/29/02
Spectrum Analyzer	HP	8564E	3623A00539	01406	12/12/01	12/12/02
QPA	HP	85650A	2043A00202	02430	11/21/01	11/21/02
S/A Display	HP	85662A	2816A15964	P00708	11/21/01	11/21/02
S/A RF Section	HP	8567A	2727A00473	P00709	11/21/01	11/21/02

Test equipment used for radiated emissions testing 30-1000 MHz

Equipment	*Mfg.*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
3/10m & LISN Cable	Andrews	Hardline	N/A	N/A	11/19/01	11/19/02
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/06/01	12/6/02
Antenna, Log	A&H	SAS-200/510	154	01330	05/07/01	5/7/02
Power Supply, DC	HP	6205C	2228A01775	00762	5/31/2001	5/31/02
Preamp	HP	8447D	1937A02604	00099	03/29/01	3/29/02
QPA	HP	85650A	2043A00202	02430	11/21/01	11/21/02
S/A Display	HP	85662A	2816A15964	P00708	11/21/01	11/21/02
S/A RF Section	HP	8567A	2727A00473	P00709	11/21/01	11/21/02

APPENDIX C

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Radiated Scan** Time: 15:58:57
Equipment: **Insulin Pump** Sequence#: 2
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-2007C
S/N: 20103

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

Function	Manufacturer	Model #	S/N
Insulin Pump*	MiniMed	MMT-2007C	20103
PPC for 2007C	MiniMed	MMT-3150	200011

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: Fundamental. Test Distance used is 3 meters. Test distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq Hz	Rdng dBµV	Loop dB	Cable 15.31 dB	Amp dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	133.290k	67.2	+10.1	+0.0 -80.0	-25.5		+0.0	-28.2	25.1	-53.3	Vert
2	133.290k	66.2	+10.1	+0.0 -80.0	-25.5		+0.0	-29.2	25.1	-54.3	Vert
3	133.300k	64.9	+10.1	+0.0 -80.0	-25.5		+0.0	-30.5	25.1	-55.6	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Radiated Scan** Time: 14:54:55
Equipment: Insulin Pump Sequence#: 27
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-3150
S/N: 200007

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

Function	Manufacturer	Model #	S/N
PPC for 2007C*	MiniMed	MMT-3150	200007
Insulin Pump	MiniMed	MMT-2007C	20101

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: Fundamental. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq Hz	Rdng dBµV	Amp dB	Loop dB	Cable dB	15.31 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	133.240k	66.4	-25.5	+10.1	+0.0	-80.0	+0.0	-29.0	25.1	-54.1	Vert
2	133.260k	66.1	-25.5	+10.1	+0.0	-80.0	+0.0	-29.3	25.1	-54.4	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Radiated Scan** Time: 14:21:06
Equipment: Insulin Pump Sequence#: 46
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-3150
S/N: 200010

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

Function	Manufacturer	Model #	S/N
Insulin Pump	MiniMed	MMT-2007C	20104
PPC for 2007C	MiniMed	MMT-3150	200005

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: Fundamental. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq	Rdng	Loop	Cable Amp		15.31	Dist	Corr	Spec	Margin	Polar
	Hz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	133.290k	64.8	+10.1	+0.0 -25.5		-80.0	+0.0	-30.6	25.1	-55.7	Vert
2	133.280k	64.1	+10.1	+0.0 -25.5		-80.0	+0.0	-31.3	25.1	-56.4	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/22/2002
Test Type: **Radiated Scan** Time: 14:33:57
Equipment: **Insulin Pump** Sequence#: 69
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-2007C
S/N: 20103

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

Function	Manufacturer	Model #	S/N
Insulin Pump*	MiniMed	MMT-2007C	20103
PPC for 2007C	MiniMed	MMT-3150	200011

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 9kHz - 30MHz. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq	Rdng	Loop	Cable	15.31		Dist	Corr	Spec	Margin	Polar
	Hz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	1.185M	11.8	+10.2	+0.2	-20.0		+0.0	2.2	26.1	-23.9	Vert
2	921.320k	14.1	+10.1	+0.2	-20.0		+0.0	4.4	28.3	-23.9	Vert
3	1.185M	9.2	+10.2	+0.2	-20.0		+0.0	-0.4	26.1	-26.5	Horiz
4	1.448M	7.2	+10.2	+0.2	-20.0		+0.0	-2.4	24.3	-26.7	Horiz
5	921.342k	10.7	+10.1	+0.2	-20.0		+0.0	1.0	28.3	-27.3	Horiz
6	526.490k	15.0	+10.1	+0.1	-20.0		+0.0	5.2	33.2	-28.0	Vert
7	658.135k	12.3	+10.2	+0.1	-20.0		+0.0	2.6	31.2	-28.6	Vert
8	394.905k	17.7	+10.1	+0.1	-60.0		+0.0	-32.1	15.7	-47.8	Vert
9	394.854k	15.5	+10.1	+0.1	-60.0		+0.0	-34.3	15.7	-50.0	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Radiated Scan** Time: 09:43:44
Equipment: Insulin Pump Sequence#: 74
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-3150
S/N: 200007

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

Function	Manufacturer	Model #	S/N
PPC for 2007C*	MiniMed	MMT-3150	200007
Insulin Pump	MiniMed	MMT-2007C	20101

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 9kHz - 30MHz. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq Hz	Rdng dBµV	Loop dB	Cable dB	15.31 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	916.850k	14.5	+10.1	+0.2	-20.0		+0.0	4.8	28.3	-23.5	Vert
2	656.500k	16.9	+10.2	+0.1	-20.0		+0.0	7.2	31.2	-24.0	Vert
3	1.179M	10.1	+10.2	+0.2	-20.0		+0.0	0.5	26.1	-25.6	Vert
4	1.443M	8.2	+10.2	+0.2	-20.0		+0.0	-1.4	24.4	-25.8	Horiz
5	1.442M	7.8	+10.2	+0.2	-20.0		+0.0	-1.8	24.4	-26.2	Vert
6	655.300k	14.1	+10.2	+0.1	-20.0		+0.0	4.4	31.3	-26.9	Horiz
7	918.950k	9.5	+10.1	+0.2	-20.0		+0.0	-0.2	28.3	-28.5	Horiz
8	392.780k	19.3	+10.1	+0.1	-60.0		+0.0	-30.5	15.7	-46.2	Horiz
9	392.850k	18.5	+10.1	+0.1	-60.0		+0.0	-31.3	15.7	-47.0	Vert
10	393.450k	16.9	+10.1	+0.1	-60.0		+0.0	-32.9	15.7	-48.6	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Radiated Scan** Time: 17:44:25
Equipment: Insulin Pump Sequence#: 78
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-7710
S/N: 007

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

Function	Manufacturer	Model #	S/N
Insulin Pump	MiniMed	MMT-2007C	20104
PPC for 2007C	MiniMed	MMT-3150	200005

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 9kHz - 30MHz. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq Hz	Rdng dBµV	Loop dB	Cable dB	15.31 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	923.880k	15.0	+10.1	+0.2	-20.0		+0.0	5.3	28.3	-23.0	Vert
2	1.188M	8.9	+10.2	+0.2	-20.0		+0.0	-0.7	26.1	-26.8	Vert
3	1.452M	7.0	+10.2	+0.2	-20.0		+0.0	-2.6	24.3	-26.9	Vert
4	1.188M	8.2	+10.2	+0.2	-20.0		+0.0	-1.4	26.1	-27.5	Vert
5	657.780k	13.2	+10.2	+0.1	-20.0		+0.0	3.5	31.2	-27.7	Horiz
6	1.184M	7.7	+10.2	+0.2	-20.0		+0.0	-1.9	26.1	-28.0	Horiz
7	660.980k	12.8	+10.2	+0.1	-20.0		+0.0	3.1	31.2	-28.1	Vert
8	921.640k	9.8	+10.1	+0.2	-20.0		+0.0	0.1	28.3	-28.2	Horiz
9	1.447M	3.4	+10.2	+0.2	-20.0		+0.0	-6.2	24.3	-30.5	Horiz

10	395.100k	17.2	+10.1	+0.1	-60.0	+0.0	-32.6	15.7	-48.3	Vert
11	394.940k	15.7	+10.1	+0.1	-60.0	+0.0	-34.1	15.7	-49.8	Horiz
12	263.200k	18.7	+10.0	+0.1	-60.0	+0.0	-31.2	19.2	-50.4	Horiz
13	135.983k	8.2	+10.0	+0.0	-60.0	+0.0	-41.8	24.9	-66.7	Vert
14	137.400k	7.0	+10.0	+0.0	-60.0	+0.0	-43.0	24.8	-67.8	Vert

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/23/2002
Test Type: **Radiated Scan** Time: 10:49:40
Equipment: **Insulin Pump** Sequence#: 71
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-2007C
S/N: 20103

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

Function	Manufacturer	Model #	S/N
Insulin Pump*	MiniMed	MMT-2007C	20103
PPC for 2007C	MiniMed	MMT-3150	200011

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 30-1000MHz. Test Distance correction factor 40dB/decade used in accordance with 15.31.

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

#	Freq Hz	Rdng dBµV	Amp dB	Bicon dB	Log 1 dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	110.590M	48.4	-27.1	+13.4	+0.0	+2.1	+0.0	36.8	43.5	-6.7	Vert
2	194.550M	42.2	-26.7	+17.6	+0.0	+2.8	+0.0	35.9	43.5	-7.6	Horiz
3	184.390M	42.5	-26.8	+16.8	+0.0	+2.7	+0.0	35.2	43.5	-8.3	Horiz
4	180.570M	41.4	-26.8	+16.4	+0.0	+2.7	+0.0	33.7	43.5	-9.8	Horiz
5	109.430M	45.2	-27.1	+13.3	+0.0	+2.1	+0.0	33.5	43.5	-10.0	Horiz
6	180.440M	40.8	-26.8	+16.4	+0.0	+2.7	+0.0	33.1	43.5	-10.4	Horiz
7	166.230M	42.6	-26.8	+14.4	+0.0	+2.5	+0.0	32.7	43.5	-10.8	Horiz
8	173.140M	39.2	-26.8	+15.8	+0.0	+2.6	+0.0	30.8	43.5	-12.7	Horiz
9	201.990M	33.5	-26.7	+17.9	+0.0	+2.9	+0.0	27.6	43.5	-15.9	Horiz
10	179.640M	34.8	-26.8	+16.4	+0.0	+2.7	+0.0	27.1	43.5	-16.4	Horiz

11	130.413M	37.3	-27.0	+14.0	+0.0	+2.2	+0.0	26.5	43.5	-17.0	Horiz
12	126.858M	36.8	-27.0	+14.2	+0.0	+2.2	+0.0	26.2	43.5	-17.3	Horiz
13	123.518M	36.5	-27.0	+14.3	+0.0	+2.2	+0.0	26.0	43.5	-17.5	Horiz
14	129.243M	36.8	-27.0	+14.0	+0.0	+2.2	+0.0	26.0	43.5	-17.5	Horiz
15	127.998M	36.6	-27.0	+14.1	+0.0	+2.2	+0.0	25.9	43.5	-17.6	Horiz
16	131.608M	36.5	-26.9	+13.9	+0.0	+2.3	+0.0	25.8	43.5	-17.7	Horiz
17	124.413M	35.8	-27.0	+14.4	+0.0	+2.2	+0.0	25.4	43.5	-18.1	Horiz
18	121.438M	35.1	-27.0	+14.3	+0.0	+2.2	+0.0	24.6	43.5	-18.9	Horiz
19	121.618M	34.3	-27.0	+14.3	+0.0	+2.2	+0.0	23.8	43.5	-19.7	Horiz
20	86.628M	35.7	-27.1	+8.5	+0.0	+1.8	+0.0	18.9	40.0	-21.1	Horiz

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/23/2002
Test Type: **Radiated Scan** Time: 16:56:15
Equipment: Insulin Pump Sequence#: 75
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-3150
S/N: 200007

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

Function	Manufacturer	Model #	S/N
PPC for 2007C*	MiniMed	MMT-3150	200007
Insulin Pump	MiniMed	MMT-2007C	20101

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 30-1000MHz.

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

#	Freq	Rdng	Amp	Bicon	Log 1	Cable	Dist	Corr	Spec	Margin	Polar
	Hz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	111.118M	51.6	-27.1	+13.5	+0.0	+2.1	+0.0	40.1	43.5	-3.4	Vert
2	108.808M	50.0	-27.1	+13.3	+0.0	+2.1	+0.0	38.3	43.5	-5.2	Vert
3	110.112M	45.3	-27.1	+13.4	+0.0	+2.1	+0.0	33.7	43.5	-9.8	Horiz
4	109.158M QP	44.9	-27.1	+13.3	+0.0	+2.1	+0.0	33.2	43.5	-10.3	Vert
5	202.089M	38.8	-26.7	+17.9	+0.0	+2.9	+0.0	32.9	43.5	-10.6	Horiz
6	194.550M	38.8	-26.7	+17.6	+0.0	+2.8	+0.0	32.5	43.5	-11.0	Horiz
7	155.022M	40.9	-26.8	+13.1	+0.0	+2.4	+0.0	29.6	43.5	-13.9	Horiz
8	111.013M QP	40.9	-27.1	+13.5	+0.0	+2.1	+0.0	29.4	43.5	-14.1	Vert
9	173.266M	36.8	-26.8	+15.8	+0.0	+2.6	+0.0	28.4	43.5	-15.1	Horiz

10	110.441M QP	39.5	-27.1	+13.4	+0.0	+2.1	+0.0	27.9	43.5	-15.6	Horiz
^	110.393M	44.6	-27.1	+13.4	+0.0	+2.1	+0.0	33.0	43.5	-10.5	Horiz
^	110.411M	44.6	-27.1	+13.4	+0.0	+2.1	+0.0	33.0	43.5	-10.5	Horiz
13	110.362M QP	38.8	-27.1	+13.4	+0.0	+2.1	+0.0	27.2	43.5	-16.3	Horiz
14	137.943M	38.0	-26.9	+13.4	+0.0	+2.3	+0.0	26.8	43.5	-16.7	Horiz
15	138.010M	38.0	-26.9	+13.4	+0.0	+2.3	+0.0	26.8	43.5	-16.7	Horiz
16	109.270M QP	38.3	-27.1	+13.3	+0.0	+2.1	+0.0	26.6	43.5	-16.9	Horiz
^	109.270M	43.7	-27.1	+13.3	+0.0	+2.1	+0.0	32.0	43.5	-11.5	Horiz
18	111.135M QP	37.7	-27.0	+13.6	+0.0	+2.1	+0.0	26.4	43.5	-17.1	Horiz
^	111.135M	43.7	-27.1	+13.5	+0.0	+2.1	+0.0	32.2	43.5	-11.3	Horiz
20	123.520M QP	36.4	-27.0	+14.3	+0.0	+2.2	+0.0	25.9	43.5	-17.6	Horiz
^	123.498M	40.1	-27.0	+14.3	+0.0	+2.2	+0.0	29.6	43.5	-13.9	Horiz
22	131.456M	36.3	-26.9	+13.9	+0.0	+2.3	+0.0	25.6	43.5	-17.9	Horiz
23	86.244M	39.0	-27.1	+8.4	+0.0	+1.8	+0.0	22.1	40.0	-17.9	Horiz
24	155.216M QP	35.7	-26.8	+13.1	+0.0	+2.4	+0.0	24.4	43.5	-19.1	Horiz
25	180.441M QP	31.9	-26.8	+16.4	+0.0	+2.7	+0.0	24.2	43.5	-19.3	Horiz
^	180.440M	33.9	-26.8	+16.4	+0.0	+2.7	+0.0	26.2	43.5	-17.3	Horiz
27	131.679M QP	34.8	-26.9	+13.8	+0.0	+2.3	+0.0	24.0	43.5	-19.5	Horiz
28	174.400M	31.8	-26.8	+16.0	+0.0	+2.6	+0.0	23.6	43.5	-19.9	Horiz
29	121.654M	33.9	-27.0	+14.3	+0.0	+2.2	+0.0	23.4	43.5	-20.1	Horiz
30	121.592M	33.9	-27.0	+14.3	+0.0	+2.2	+0.0	23.4	43.5 Without transmitters on.	-20.1	Horiz
31	134.452M QP	34.2	-26.9	+13.6	+0.0	+2.3	+0.0	23.2	43.5	-20.3	Horiz
^	134.510M	40.1	-26.9	+13.6	+0.0	+2.3	+0.0	29.1	43.5	-14.4	Horiz

33	173.145M QP	31.0	-26.8	+15.8	+0.0	+2.6	+0.0	22.6	43.5	-20.9	Horiz
34	126.827M QP	32.6	-27.0	+14.2	+0.0	+2.2	+0.0	22.0	43.5	-21.5	Horiz
^	126.884M	39.4	-27.0	+14.2	+0.0	+2.2	+0.0	28.8	43.5	-14.7	Horiz
36	178.389M QP	29.5	-26.8	+16.3	+0.0	+2.6	+0.0	21.6	43.5	-21.9	Horiz
^	178.390M	32.9	-26.8	+16.3	+0.0	+2.6	+0.0	25.0	43.5	-18.5	Horiz
38	121.414M QP	28.3	-27.0	+14.3	+0.0	+2.2	+0.0	17.8	43.5	-25.7	Horiz
^	121.494M	41.8	-27.0	+14.3	+0.0	+2.2	+0.0	31.3	43.5	-12.2	Horiz

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Customer: **MiniMed Inc.**
Specification: **FCC 15.209**
Work Order #: **78257** Date: 01/24/2002
Test Type: **Maximized Emissions** Time: 17:29:10
Equipment: Insulin Pump Sequence#: 79
Manufacturer: MiniMed Tested By: Randal Clark
Model: MMT-3150
S/N: 200010

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

Function	Manufacturer	Model #	S/N
Insulin Pump	MiniMed	MMT-2007C	20104
PPC for 2007C	MiniMed	MMT-3150	200005

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Micron	NBK001371-00	1459617-0030

Test Conditions / Notes:

EUT is an insulin pump which is in communication with the Personal Communicator (PPC). Both devices are battery operated. The laptop is controlling RF section of the pump through the PPC. The PPC and pump are located six inches apart and are mounted in a test jig simulating normal usage. The test software running on the laptop is entitled 131kHz EMI/EMC Diagnostic Test Software version 9021084-001. The PPC is running software version 9021083-001. The insulin pump is running software version 9021055-003. Frequency Range Tested: 30-1000 MHz.

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

#	Freq Hz	Rdng dBµV	Amp dB	Bicon dB	Log 1 dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	115.720M	49.4	-27.0	+13.9	+0.0	+2.1	+0.0	38.4	43.5	-5.1	Vert
2	114.670M	48.5	-27.0	+13.8	+0.0	+2.1	+0.0	37.4	43.5	-6.1	Vert
3	117.620M	46.4	-27.0	+14.0	+0.0	+2.1	+0.0	35.5	43.5	-8.0	Vert
4	110.426M	43.5	-27.1	+13.4	+0.0	+2.1	+0.0	31.9	43.5	-11.6	Horiz
5	109.418M	42.1	-27.1	+13.3	+0.0	+2.1	+0.0	30.4	43.5	-13.1	Horiz
6	185.394M	36.0	-26.8	+16.8	+0.0	+2.7	+0.0	28.7	43.5	-14.8	Horiz
7	185.990M	34.2	-26.8	+16.9	+0.0	+2.7	+0.0	27.0	43.5	-16.5	Horiz
8	177.970M	32.1	-26.8	+16.3	+0.0	+2.6	+0.0	24.2	43.5	-19.3	Horiz
9	178.580M	30.9	-26.8	+16.3	+0.0	+2.6	+0.0	23.0	43.5	-20.5	Horiz
10	181.695M	30.5	-26.8	+16.5	+0.0	+2.7	+0.0	22.9	43.5	-20.6	Horiz