Medtronic Inc.

MyCareLink™ Patient Monitor

Model 24955

FCC 15.209:2012

Report #: MDTR0183

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

Last Date of Test: September 10, 2012
Medtronic Inc.
MyCareLink™ Patient Monitor
Models 24955

Emissions

Test Description	Specification	Test Method	Pass/Fail
Field Strength of Fundamental	FCC 15.209:2012	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.209:2012	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

NVLAP Lab Code: 200881-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834E-1).

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

Revision Number	Description	Date	Page Number
01	Changed model name to 24955	3/29/13	1, 2, 6

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

NORTHWEST EMC

REV 2012.05.24

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

KCC / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Hong Kong

OFTA – Recognized by OFTA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards.

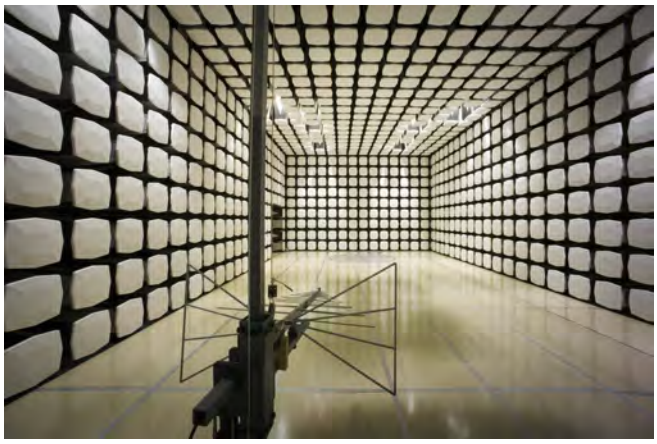
SCOPE

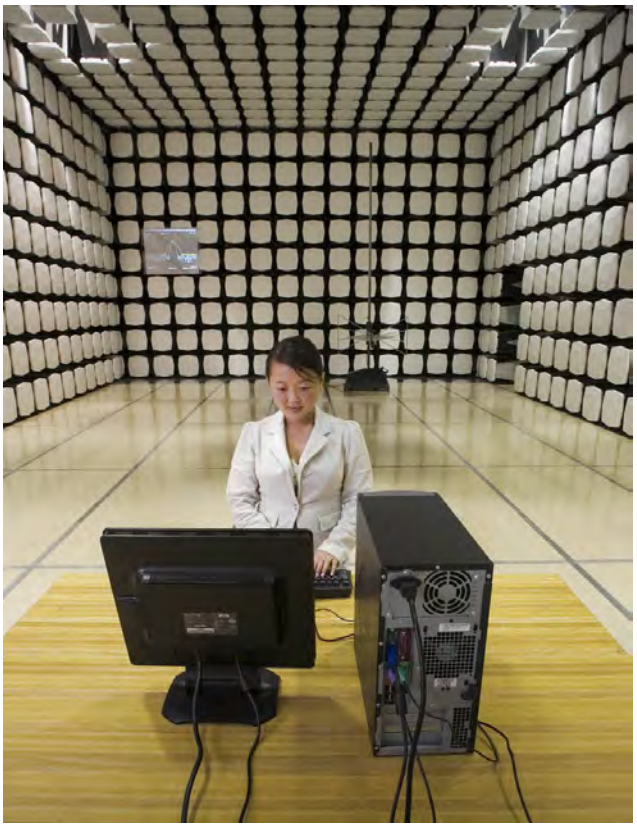
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

LOCATIONS

REV 2012.08.03

Oregon	California	New York	Minnesota	Washington
Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1





PRODUCT DESCRIPTION

WTD 12.5.23

lient and Equipment Under Test (EUT) Information

Company Name:	Medtronic Inc.
Address:	710 Medtronic Parkway, LS250
City, State, Zip:	Fridley, MN 55432
Test Requested By:	Thomas Kelly
Model:	MyCareLink™ Patient Monitor model 24955
First Date of Test:	August 10, 2012
Last Date of Test:	August 10, 2012
Receipt Date of Samples:	July 11, 2012
Equipment Design Stage:	Qualification Build
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

The system consists of a home monitor base station and a handheld reader. The base station includes a MICS transmitter and Bluetooth transmitter. The reader has an inductive transmitter and a pre-certified Bluetooth transmitter.

Testing Objective:

To demonstrate compliance to FCC requirements for the Inductive transmitter.

CONFIGURATIONS

Configuration MDTR0183- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Reader	Medtronic Inc.	24955	RFH000105A

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/10/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	8/10/2012	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Field Strength of Fundamental

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Inductive telemetry

POWER SETTINGS INVESTIGATED

5VDC

CONFIGURATIONS INVESTIGATED

MDTR0183 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	315 kHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4443A	AAS	4/9/2012	12 mo
MN04 Cables	ESM Cable Corp.	MN04 Horn Cables	MNE	4/16/2012	12 mo
Antenna, Loop	EMCO	6502	AZC	8/18/2011	24 mo
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	HGW	11/5/2010	24 mo
Pre-Amplifier	Miteq	AM-1551	AVS	4/16/2012	12 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	1/9/2012	12 mo
MN04 Cables	ESM Cable Corp.	MN04 Bilog Cables	MND	4/16/2012	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal planes, the EUT and/or associated antenna is positioned in 3 orthogonal planes (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

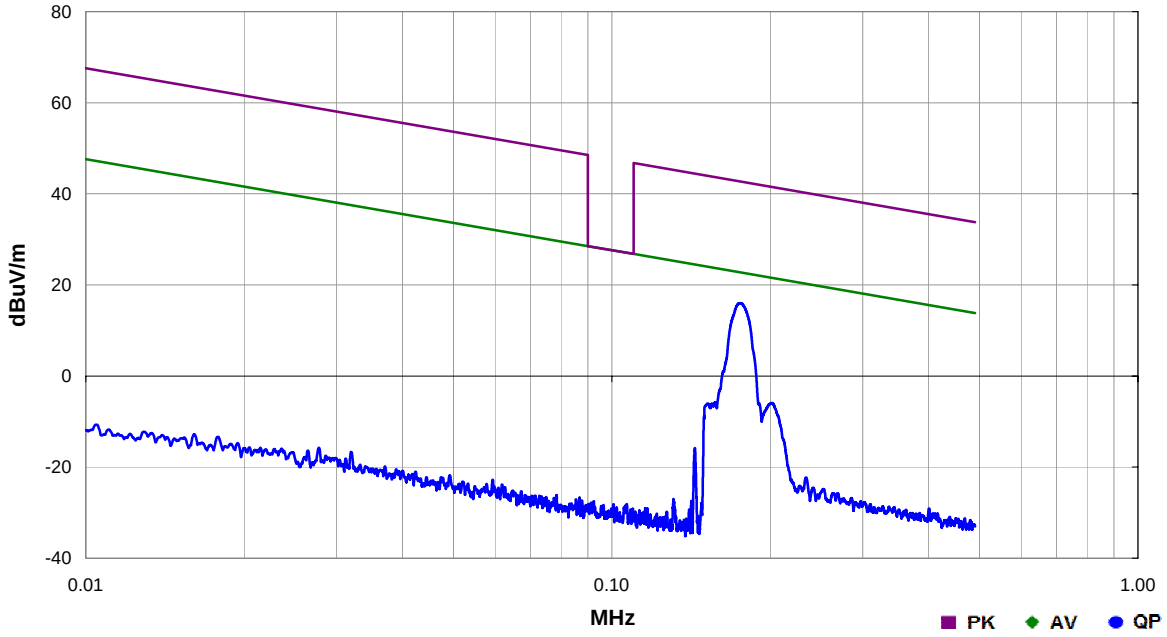
As outlined in 15.209(e), and associated reference to 15.31, measurements may be performed at a distance closer than specified as was the case in this testing. In this case the limit for the defined distance is outlined on the data sheet. For transmitters operating below 10 MHz, the data is adjusted by using the square of the inverse linear distance extrapolation factor of 40dB/decade.

Field Strength of Fundamental

Work Order:	MDTR0183	**Date:**	08/10/12		
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1 (m)	**Results**	Evaluation



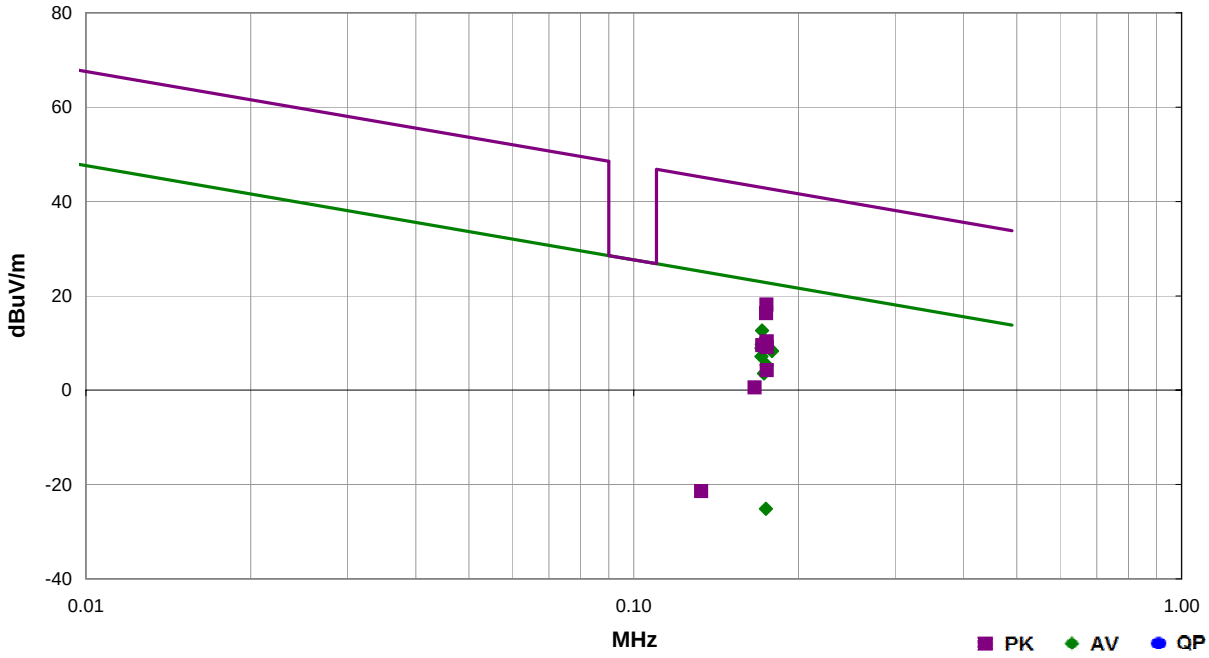
Freq (MHz)	Amplitude (dBuV)	Preamp (dB)	Antenna Height (meters)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments

Field Strength of Fundamental

Work Order:	MDTR0183	**Date:**	08/10/12	Trevor Buls	
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee, Trevor Buls
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.172	81.3	11.3	1.0	37.0	3.0	0.0	Par to EUT	AV	-80.0	12.6	22.9	-10.3	EUT on Side
0.171	78.4	11.3	1.0	249.0	3.0	0.0	Par to EUT	AV	-80.0	9.7	23.0	-13.2	EUT Veritcal
0.177	77.5	11.3	1.0	147.0	3.0	0.0	Par to GND	AV	-80.0	8.8	22.7	-13.8	EUT on Side
0.171	77.6	11.3	1.0	111.0	3.0	0.0	Perp to EUT	AV	-80.0	8.9	23.0	-14.0	EUT on Side
0.179	77.0	11.3	1.0	132.0	3.0	0.0	Par to GND	AV	-80.0	8.3	22.6	-14.2	EUT Horizontal
0.171	75.8	11.3	1.0	33.0	3.0	0.0	Perp to EUT	AV	-80.0	7.1	23.0	-15.8	EUT Veritcal
0.175	74.0	11.3	1.0	339.0	3.0	0.0	Par to GND	AV	-80.0	5.3	22.8	-17.5	EUT Veritcal
0.173	72.2	11.3	1.0	93.0	3.0	0.0	Par to EUT	AV	-80.0	3.5	22.9	-19.3	EUT Horizontal
0.175	86.8	11.3	1.0	37.0	3.0	0.0	Par to EUT	PK	-80.0	18.1	42.8	-24.7	EUT on Side
0.175	85.0	11.3	1.0	111.0	3.0	0.0	Perp to EUT	PK	-80.0	16.3	42.8	-26.5	EUT on Side
0.175	79.0	11.3	1.0	132.0	3.0	0.0	Par to GND	PK	-80.0	10.3	42.8	-32.4	EUT Horizontal
0.175	78.5	11.3	1.0	339.0	3.0	0.0	Par to GND	PK	-80.0	9.8	42.8	-33.0	EUT Veritcal
0.172	78.2	11.3	1.0	249.0	3.0	0.0	Par to EUT	PK	-80.0	9.5	42.9	-33.4	EUT Veritcal
0.175	77.8	11.3	1.0	147.0	3.0	0.0	Par to GND	PK	-80.0	9.1	42.8	-33.6	EUT on Side
0.175	72.9	11.3	1.0	93.0	3.0	0.0	Par to EUT	PK	-80.0	4.2	42.8	-38.5	EUT Horizontal
0.166	69.2	11.3	1.0	33.0	3.0	0.0	Perp to EUT	PK	-80.0	0.5	43.2	-42.7	EUT Veritcal
0.174	43.5	11.3	1.0	81.0	3.0	0.0	Perp to EUT	AV	-80.0	-25.2	22.8	-48.0	EUT Horizontal
0.133	47.2	11.4	1.0	81.0	3.0	0.0	Perp to EUT	PK	-80.0	-21.4	45.2	-66.6	EUT Horizontal

Spurious Radiated Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Inductive telemetry

POWER SETTINGS INVESTIGATED

5VDC

CONFIGURATIONS INVESTIGATED

MDTR0183 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	10 kHz	Stop Frequency	1000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4443A	AAS	4/9/2012	12 mo
MN04 Cables	ESM Cable Corp.	MN04 Horn Cables	MNE	4/16/2012	12 mo
Antenna, Loop	EMCO	6502	AZC	8/18/2011	24 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal planes, the EUT and/or associated antenna is positioned in 3 orthogonal planes (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

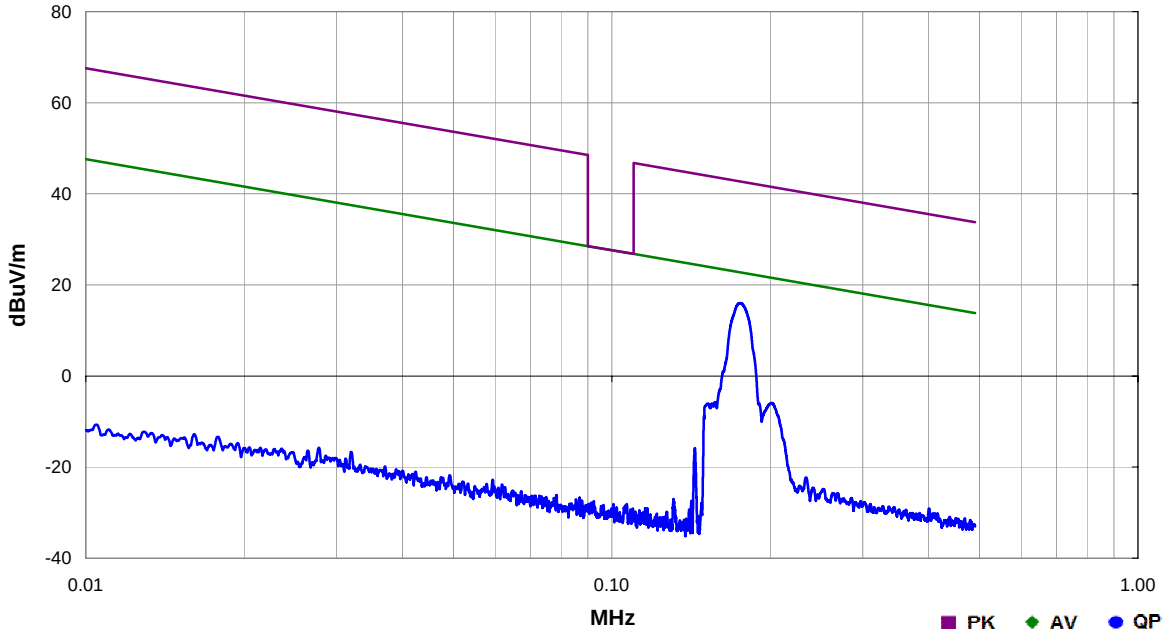
As outlined in 15.209(e), and associated reference to 15.31, measurements may be performed at a distance closer than specified as was the case in this testing. In this case the limit for the defined distance is outlined on the data sheet. For transmitters operating below 10 MHz, the data is adjusted by using the square of the inverse linear distance extrapolation factor of 40dB/decade.

Spurious Radiated Emissions

Work Order:	MDTR0183	**Date:**	08/10/12		
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. EUT on Side. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1 (m)	**Results**	Evaluation



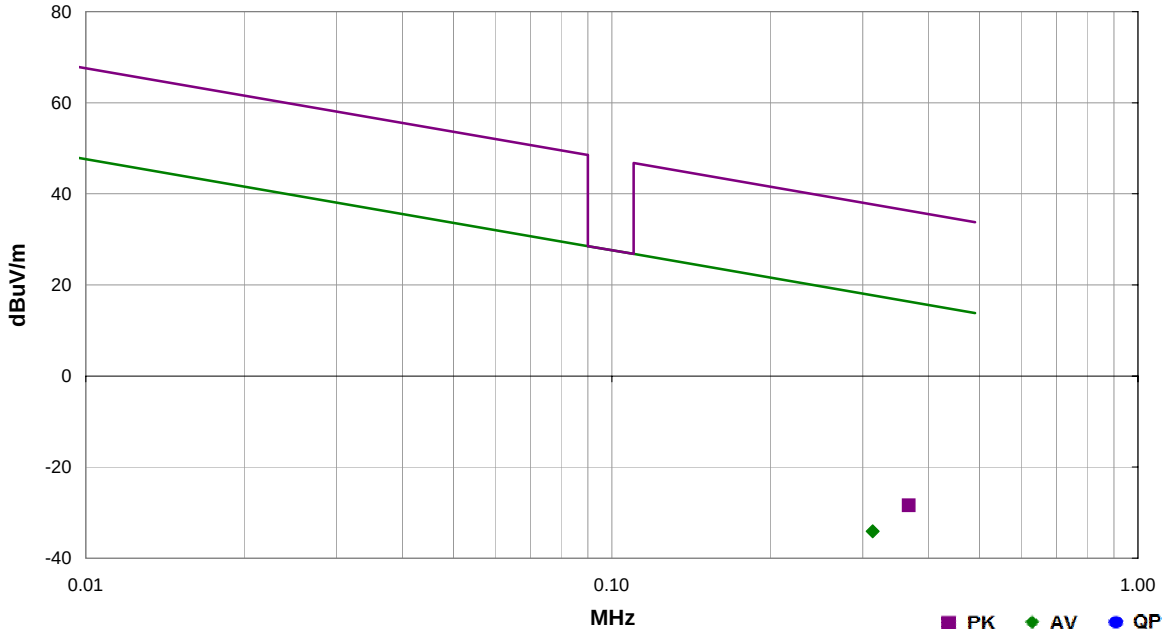
Freq (MHz)	Amplitude (dBuV)	Preamp (dB)	Antenna Height (meters)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments

Spurious Radiated Emissions

Work Order:	MDTR0183	**Date:**	08/10/12		
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee, Trevor Buls
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. EUT on Side. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1m	**Results**	Pass



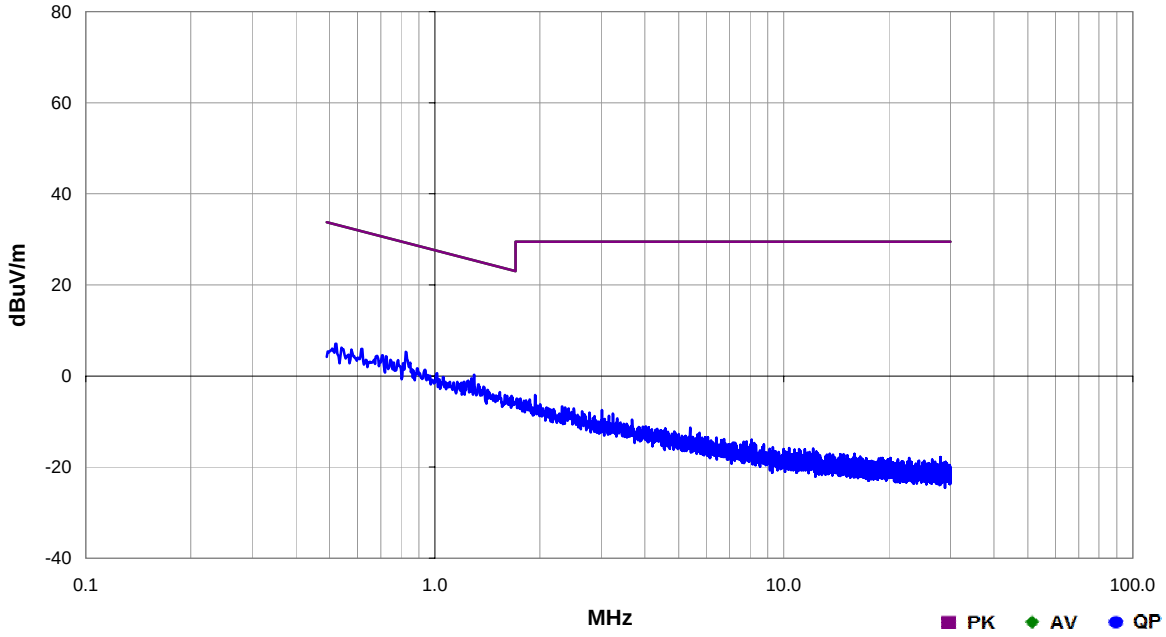
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.313	34.7	11.2	1.0	253.0	3.0	0.0	Par to EUT	AV	-80.0	-34.1	17.7	-51.8	EUT on Side
0.367	40.4	11.2	1.0	253.0	3.0	0.0	Par to EUT	PK	-80.0	-28.4	36.3	-64.7	EUT on Side

Spurious Radiated Emissions

Work Order:	MDTR0183	**Date:**	08/10/12		
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. EUT on Side. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	9	**Test Distance (m)**	3	**Antenna Height(s)**	1 (m)	**Results**	Evaluation



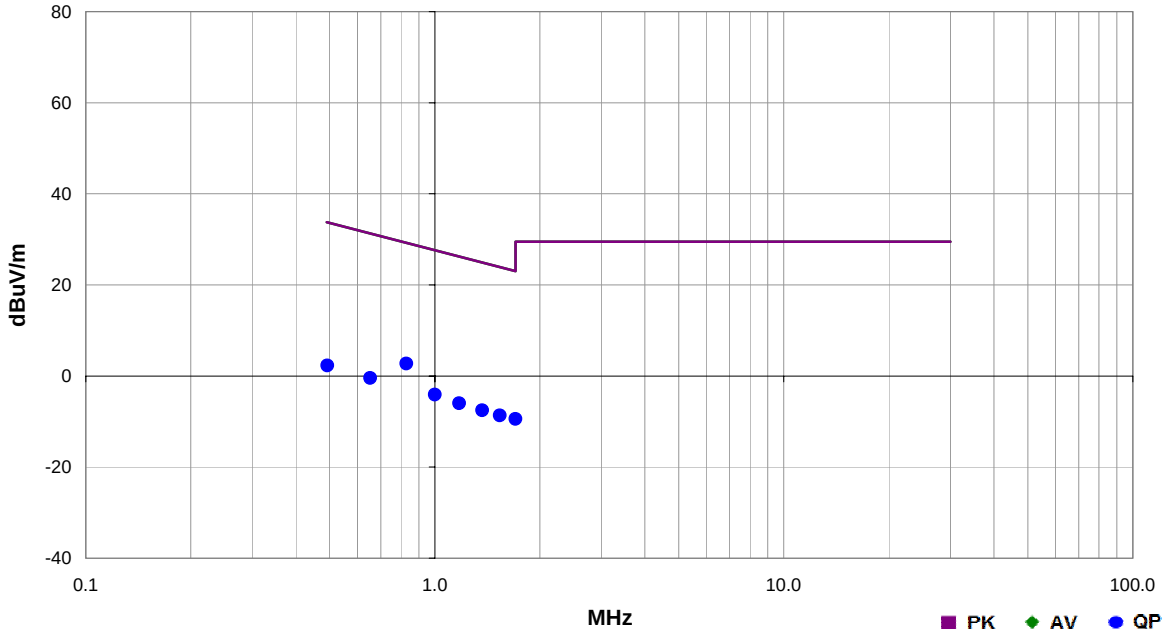
Freq (MHz)	Amplitude (dBuV)	Preamp (dB)	Antenna Height (meters)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments

Spurious Radiated Emissions

Work Order:	MDTR0183	**Date:**	08/10/12		
Project:	None	**Temperature:**	23.32 °C		
Job Site:	MN04	**Humidity:**	51.56% RH		
Serial Number:	YDM000106A	**Barometric Pres.:**	1015.4 mbar	**Tested by:**	Johnathan Lee, Trevor Buls
EUT:	Reader				
Configuration:	3				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	5VDC				
Operating Mode:	Inductive telemetry				
Deviations:	None				
Comments:	Per MDTR0129 test plan configuration: 3. EUT on Side. Both telemetry modes tested simultaneously with the span set wide enough to encompass both modulation types, per customer. Some of the data below shows noise floor measurements for reference only.				

Test Specifications	**Test Method**
FCC 15.209:2012	ANSI C63.10:2009

Run #	9	**Test Distance (m)**	3	**Antenna Height(s)**	1m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.830	31.2	11.5	1.0	313.0	3.0	0.0	Par to EUT	QP	-40.0	2.7	29.2	-26.5	EUT on Side
0.493	30.9	11.4	1.0	285.0	3.0	0.0	Par to EUT	QP	-40.0	2.3	33.8	-31.5	EUT on Side
1.001	24.1	11.8	1.0	330.0	3.0	0.0	Par to EUT	QP	-40.0	-4.1	27.6	-31.7	EUT on Side
0.654	28.1	11.4	1.0	268.0	3.0	0.0	Par to EUT	QP	-40.0	-0.5	31.3	-31.8	EUT on Side
1.175	22.2	11.8	1.0	296.0	3.0	0.0	Par to EUT	QP	-40.0	-6.0	26.2	-32.2	EUT on Side
1.367	20.7	11.8	1.0	114.0	3.0	0.0	Par to EUT	QP	-40.0	-7.5	24.9	-32.4	EUT on Side
1.702	18.8	11.7	1.0	118.0	3.0	0.0	Par to EUT	QP	-40.0	-9.5	23.0	-32.5	EUT on Side
1.537	19.6	11.8	1.0	221.0	3.0	0.0	Par to EUT	QP	-40.0	-8.6	23.9	-32.5	EUT on Side