



Medtronic Inc.
MyCareLink Patient Monitor Model 24955
FCC 15:209:2012

Report #: MDTR0293.1



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: October 14, 2013
Medtronic Inc.
Model: MyCareLink Patient Monitor

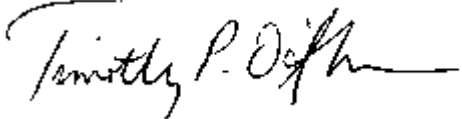
Emissions

Test Description	Specification	Test Method	Pass/Fail
Field Strength of Fundamental	FCC 15.209:2013	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.209:2013	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:



Tim O'Shea, Operations Manager



NVLAP Lab Code: 200881-0

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.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

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/>

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

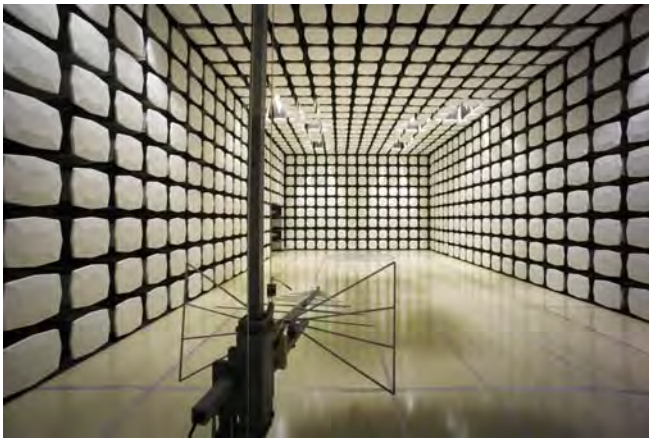
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is listed below. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-1 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	3.80	-3.80
AC Powerline Conducted Emissions (dB)	2.94	-2.94



Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Minnesota Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Washington Labs NC01-05, SU02, SU07 19201 120 th Ave. NE Bothell, WA 98011 (425) 984-6600
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
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0



Client and Equipment Under Test (EUT) Information

Company Name:	Medtronic Inc.
Address:	8200 Coral Sea Street NE
City, State, Zip:	Mounds View, MN 55112
Test Requested By:	Thomas Kelly
Model:	MyCareLink Patient Monitor Model 24955
First Date of Test:	October 14, 2013
Last Date of Test:	October 14, 2013
Receipt Date of Samples:	October 12, 2013
Equipment Design Stage:	Production
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. The Reader for these tests is the Single Board Configuration.

Client Provided Information

The purpose of the MyCareLink Reader single board change is to reduce the component count of the original design while maintaining all of the performance and function of the original two board design. This component reduction is achieved by removing components and instead, incorporating those components into a single Application Specific Integrated Circuit (ASIC).

This change does not impact the transmit amplifier circuitry, antenna, enclosure, or the ability to transmit or receive data using Telemetry Inductive. All performance specifications remain unchanged. The Bluetooth radio for this product is unchanged and remains a pre-certified module. Either design may be used with the MyCareLink Patient Monitor Model 24950 interchangeably.

This Single Board Version Reader was tested against, and passed, all functional performance requirements of the original Starlight Vega (two-board) Reader

Testing Objective:

To demonstrate compliance to the inductive portion of the device to FCC Part 15.209 specifications. This testing is to confirm that changes made to the head/reader are still in compliance with these requirements.



WTD 12.5.23

CONFIGURATIONS

Configuration MDTR0293- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Reader	Medtronic Inc.	24955	RFH000642A

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/14/2013	Field Strength of Fundamental	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	10/14/2013	Spurious Radiated Emissions	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

Transmitting Inductive, OOK and FSK centered at 175 kHz.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0293 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	490 kHz
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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
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	5/20/2013	12 mo
Antenna, Loop	ETS Lindgren	6502	AOB	2/20/2013	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	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

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 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

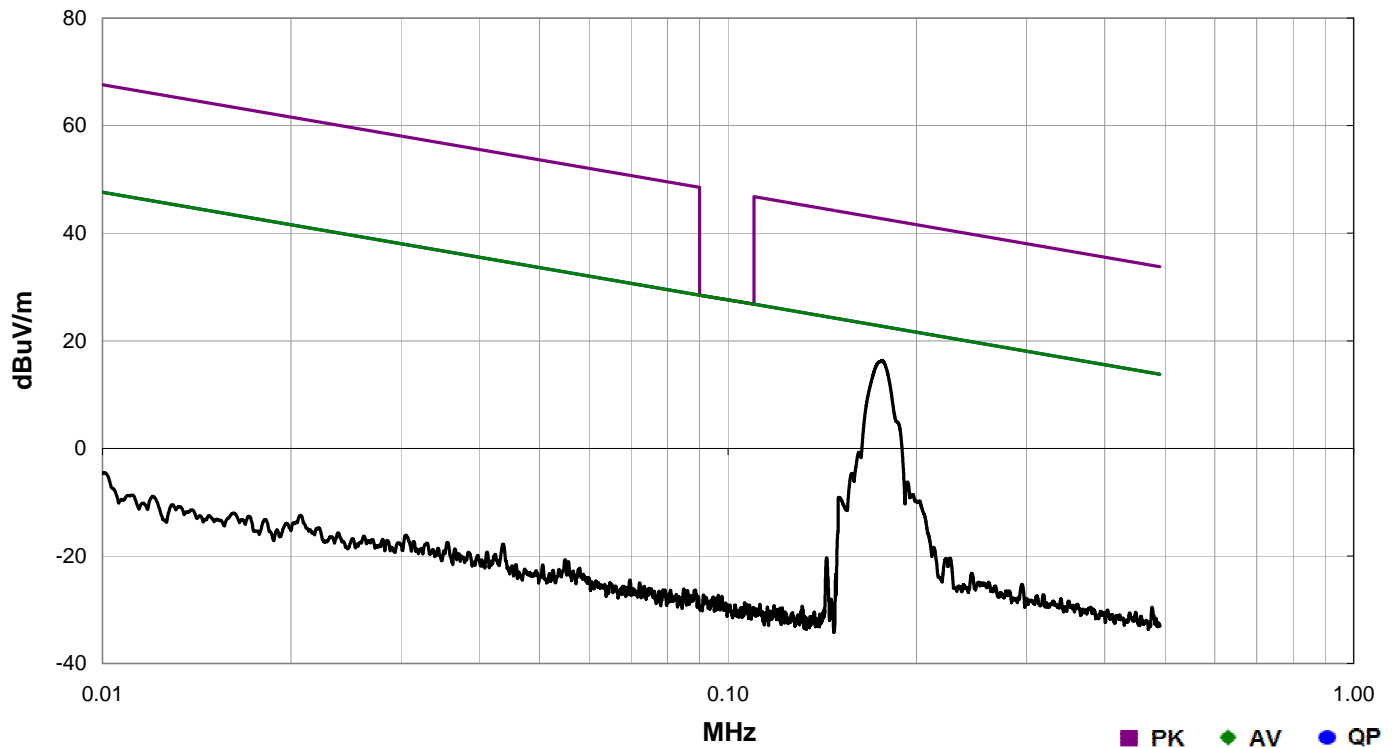
If there are no detectable emissions above the noise floor, the data included will show noise floor measurements for reference only.

Field Strength of Fundamental

Work Order:	MDTR0293	Date:	10/14/13	
Project:	None	Temperature:	22 °C	
Job Site:	MN05	Humidity:	35.9% RH	
Serial Number:	RFH000642A	Barometric Pres.:	1027.8 mbar	Tested by: Trevor Buls
EUT:	MyCareLink Patient Monitor, Model 24955			
Configuration:	2			
Customer:	Medtronic Inc.			
Attendees:	Thomas Kelly			
EUT Power:	Battery			
Operating Mode:	Transmitting Inductive, OOK and FSK centered at 175 kHz.			
Deviations:	None			
Comments:	None			

Test Specifications		Test Method	
FCC 15.209:2013		ANSI C63.10:2009	

Run #	12	Test Distance (m)	3	Antenna Height(s)	1 (m)	Results	Evaluation
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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)
0.175	15		3							15	PK	

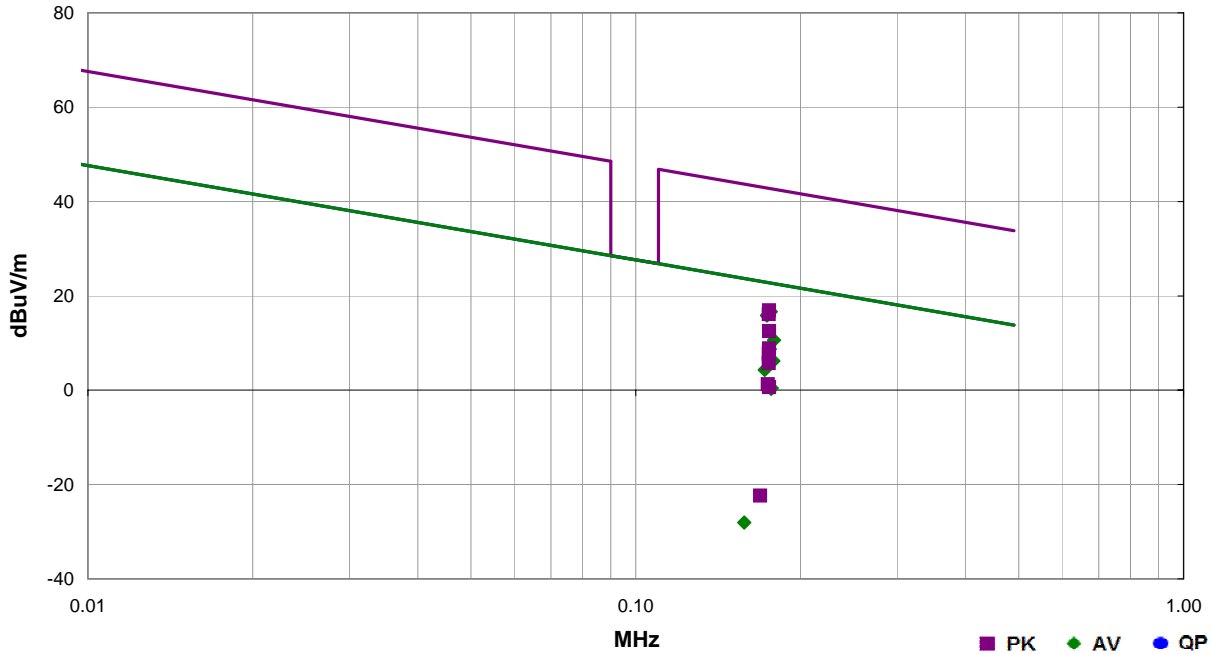


Field Strength of Fundamental

Work Order:	MDTR0293	Date:	10/14/13	<i>Trevor Buls</i>	
Project:	None	Temperature:	22 °C		
Job Site:	MN05	Humidity:	35.9% RH		
Serial Number:	RFH000642A	Barometric Pres.:	1027.8 mbar		Tested by: Trevor Buls
EUT:	MyCareLink Patient Monitor, Model 24955				
Configuration:	2				
Customer:	Medtronic Inc.				
Attendees:	Thomas Kelly				
EUT Power:	Battery				
Operating Mode:	Transmitting Inductive, OOK and FSK centered at 175 kHz.				
Deviations:	None				
Comments:	None				

Test Specifications	Test Method
FCC 15.209:2013	ANSI C63.10:2009

Run #	12	Test Distance (m)	3	Antenna Height(s)	1m	Results	Pass
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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
0.177	85.2	11.4	1.0	158.0	3.0	0.0	Par to EUT	AV	-80.0	16.6	22.7	-6.1	EUT on Side
0.174	84.4	11.4	1.0	125.0	3.0	0.0	Par to EUT	AV	-80.0	15.8	22.8	-7.0	EUT Vertical
0.179	79.2	11.4	1.0	36.0	3.0	0.0	Perp to GND	AV	-80.0	10.6	22.6	-12.0	EUT Vertical
0.176	77.3	11.4	1.0	158.0	3.0	0.0	Par to GND	AV	-80.0	8.7	22.7	-14.0	EUT Vertical
0.178	74.8	11.4	1.0	236.0	3.0	0.0	Par to GND	AV	-80.0	6.2	22.6	-16.4	EUT Horizontal
0.172	72.9	11.4	1.0	306.0	3.0	0.0	Perp to GND	AV	-80.0	4.3	22.9	-18.6	EUT on Side
0.177	69.0	11.4	1.0	273.0	3.0	0.0	Par to GND	AV	-80.0	0.4	22.7	-22.2	EUT on Side
0.177	68.9	11.4	1.0	272.0	3.0	0.0	Par to EUT	AV	-80.0	0.3	22.7	-22.4	EUT Horizontal
0.175	85.5	11.4	1.0	158.0	3.0	0.0	Par to EUT	PK	-80.0	16.9	42.8	-25.8	EUT on Side
0.175	84.7	11.4	1.0	125.0	3.0	0.0	Par to EUT	PK	-80.0	16.1	42.8	-26.6	EUT Vertical
0.175	81.1	11.4	1.0	36.0	3.0	0.0	Perp to GND	PK	-80.0	12.5	42.7	-30.2	EUT Vertical
0.175	77.4	11.4	1.0	158.0	3.0	0.0	Par to GND	PK	-80.0	8.8	42.8	-33.9	EUT Vertical
0.175	76.3	11.4	1.0	236.0	3.0	0.0	Par to GND	PK	-80.0	7.7	42.8	-35.0	EUT Horizontal
0.175	74.3	11.4	1.0	306.0	3.0	0.0	Perp to GND	PK	-80.0	5.7	42.8	-37.0	EUT on Side
0.174	69.8	11.4	1.0	273.0	3.0	0.0	Par to GND	PK	-80.0	1.2	42.8	-41.6	EUT on Side
0.175	69.2	11.4	1.0	272.0	3.0	0.0	Par to EUT	PK	-80.0	0.6	42.8	-42.1	EUT Horizontal
0.158	40.5	11.4	1.0	157.0	3.0	0.0	Perp to GND	AV	-80.0	-28.1	23.7	-51.7	EUT Horizontal
0.169	46.2	11.4	1.0	157.0	3.0	0.0	Perp to GND	PK	-80.0	-22.4	43.1	-65.4	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

Transmitting Inductive, OOK and FSK centered at 175 kHz.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0293 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	1000 MHz
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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
Pre-Amplifier	Miteq	AM-1616-1000	PAD	5/20/2013	12 mo
Antenna, Bilog	Teseq	CBL 6141B	AYD	12/17/2012	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	5/20/2013	12 mo
Antenna, Loop	ETS Lindgren	6502	AOB	2/20/2013	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	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

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.

For measurements below 30 MHz, as outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

If there are no detectable emissions above the noise floor, the data included will show noise floor measurements for reference only.



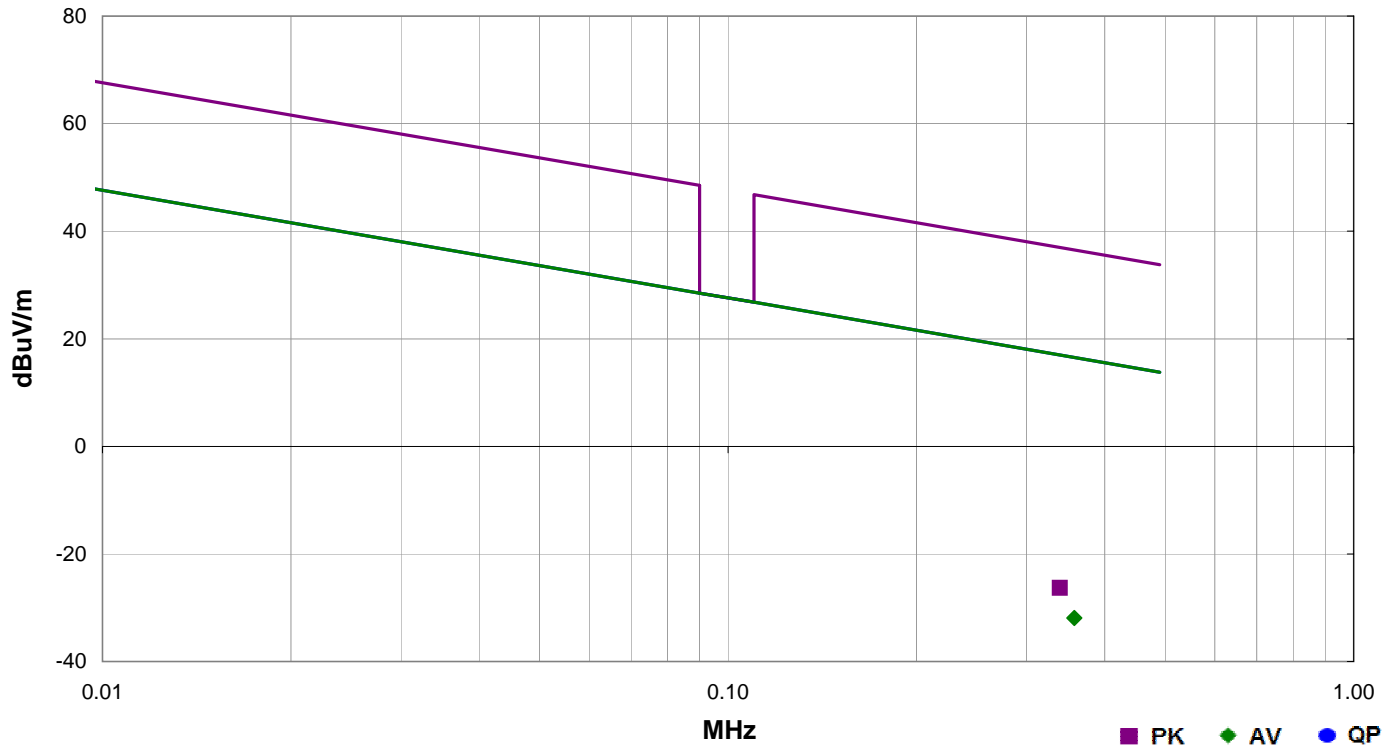
Spurious Radiated Emissions

Trevor Buls

Work Order:	MDTR0293	Date:	10/14/13
Project:	None	Temperature:	22 °C
Job Site:	MN05	Humidity:	35.9% RH
Serial Number:	RFH000642A	Barometric Pres.:	1027.8 mbar
EUT: MyCareLink Patient Monitor, Model 24955			Tested by: Trevor Buls
Configuration:	2		
Customer:	Medtronic Inc.		
Attendees:	Thomas Kelly		
EUT Power:	Battery		
Operating Mode:	Transmitting Inductive, OOK and FSK centered at 175 kHz.		
Deviations:	None		
Comments:	EUT on Side.		

Test Specifications	Test Method
FCC 15.209:2013	ANSI C63.10:2009

Run #	13	Test Distance (m)	3	Antenna Height(s)	1m	Results	Pass
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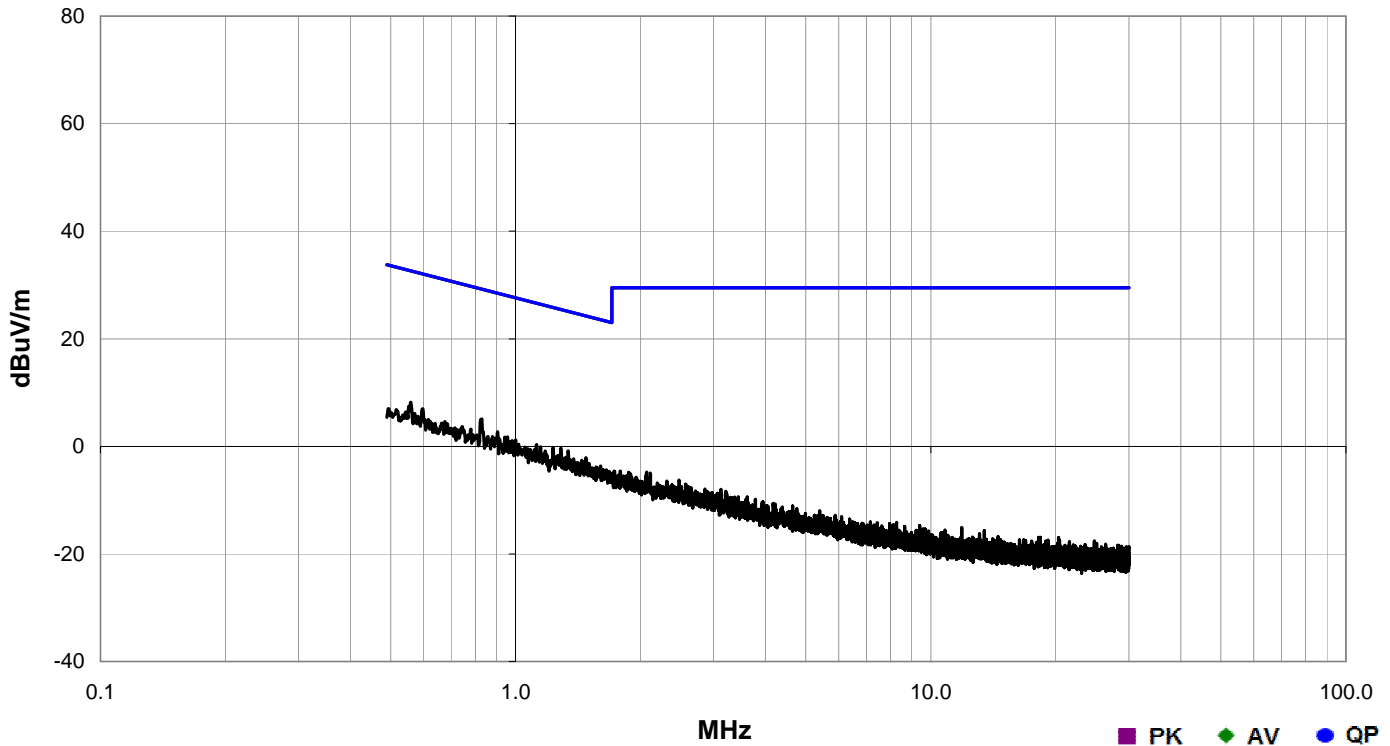
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
0.358	36.7	11.4	1.0	241.0	3.0	0.0	Par to EUT	AV	-80.0	-31.9	16.5	-48.4
0.339	42.3	11.4	1.0	241.0	3.0	0.0	Par to EUT	PK	-80.0	-26.3	37.0	-63.3

Spurious Radiated Emissions

Work Order:	MDTR0293	Date:	10/14/13	
Project:	None	Temperature:	22 °C	
Job Site:	MN05	Humidity:	35.9% RH	
Serial Number:	RFH000642A	Barometric Pres.:	1027.8 mbar	
EUT:	MyCareLink Patient Monitor, Model 24955			
Configuration:	2			
Customer:	Medtronic Inc.			
Attendees:	Thomas Kelly			
EUT Power:	Battery			
Operating Mode:	Transmitting Inductive, OOK and FSK centered at 175 kHz.			
Deviations:	None			
Comments:	EUT on Side.			

Test Specifications		Test Method	
FCC 15.209:2013		ANSI C63.10:2009	

Run #	14	Test Distance (m)	3	Antenna Height(s)	1 (m)	Results	Evaluation
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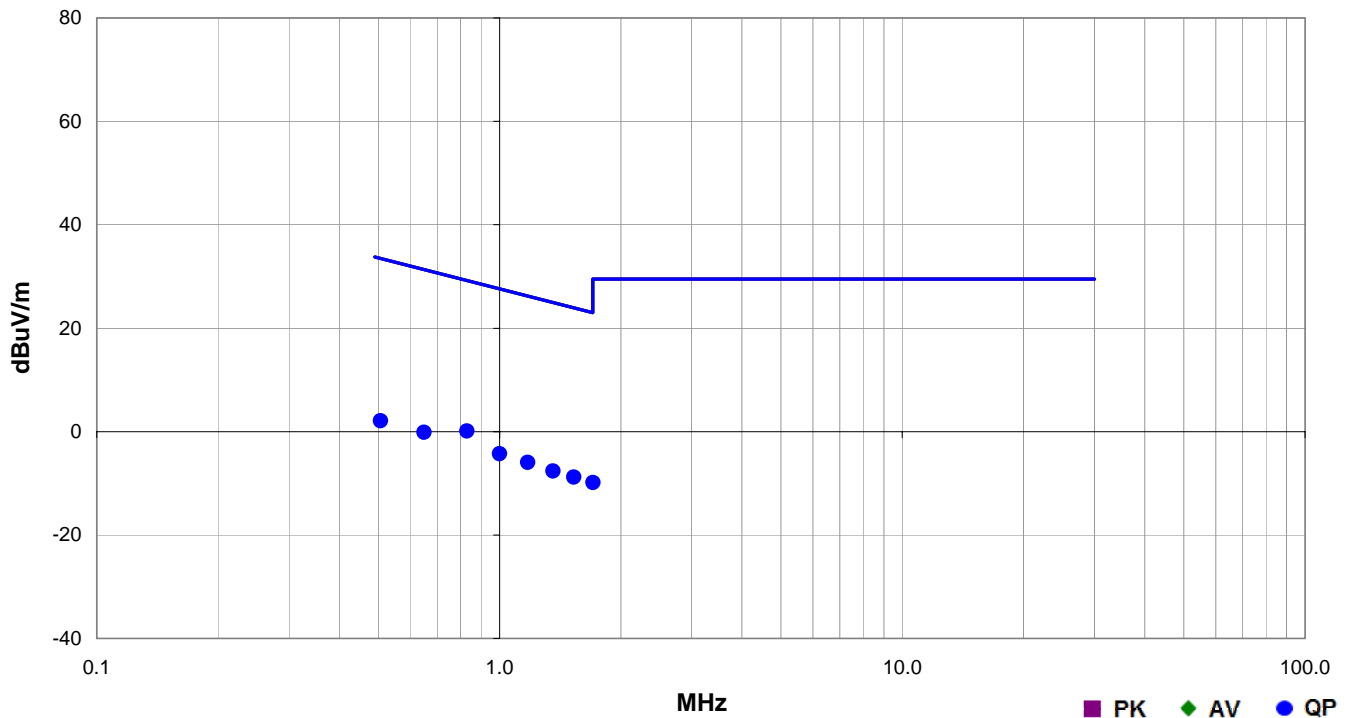
Freq (MHz)	Amplitude (dBuV)	Preamp (dB)	Antenna Height (meters)	Transducer (dB)	Cable (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
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Spurious Radiated Emissions

Work Order:	MDR0293	Date:	10/14/13	<i>Trevor Buls</i>
Project:	None	Temperature:	22 °C	
Job Site:	MN05	Humidity:	35.9% RH	
Serial Number:	RFH000642A	Barometric Pres.:	1027.8 mbar	
EUT:	MyCareLink Patient Monitor, Model 24955			
Configuration:	2			
Customer:	Medtronic Inc.			
Attendees:	Thomas Kelly			
EUT Power:	Battery			
Operating Mode:	Transmitting Inductive, OOK and FSK centered at 175 kHz.			
Deviations:	None			
Comments:	EUT on Side.			

Test Specifications	Test Method
FCC 15.209:2013	ANSI C63.10:2009

Run #	14	Test Distance (m)	3	Antenna Height(s)	1m	Results	Pass
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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)
0.830	28.5	11.6	1.0	137.0	3.0	0.0	Par to EUT	QP	-40.0	0.1	29.2	-29.1
0.507	30.5	11.6	1.0	148.0	3.0	0.0	Par to EUT	QP	-40.0	2.1	33.5	-31.4
0.650	28.3	11.6	1.0	64.0	3.0	0.0	Par to EUT	QP	-40.0	-0.1	31.4	-31.5
1.001	23.8	11.9	1.0	232.0	3.0	0.0	Par to EUT	QP	-40.0	-4.3	27.6	-31.9
1.175	22.2	11.8	1.0	0.0	3.0	0.0	Par to EUT	QP	-40.0	-6.0	26.2	-32.2
1.357	20.6	11.8	1.0	128.0	3.0	0.0	Par to EUT	QP	-40.0	-7.6	25.0	-32.6
1.528	19.5	11.7	1.0	56.0	3.0	0.0	Par to EUT	QP	-40.0	-8.8	23.9	-32.7
1.707	18.5	11.6	1.0	36.0	3.0	0.0	Par to EUT	QP	-40.0	-9.9	29.5	-39.4