

Medtronic Inc.

CTM2 Model 8880T2

Report No. MDTR0042.4

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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EMC Test Report

Certificate of Test

Last Date of Test: December 16, 2011

Medtronic Inc.

Model: 8880T2

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Field Strength of Fundamental	FCC 15.209:2011	ANSI C63.10:2009	Pass
Field Strength of Fundamental	RSS-210:2010	RSS-Gen:2010	Pass
Spurious Emissions	FCC 15.209:2011	ANSI C63.10:2009	Pass
Spurious Emissions	RSS-210:2010	RSS-Gen:2010	Pass
Occupied Bandwidth	RSS-210:2010	RSS-Gen:2010	Pass

Modifications made to the product

See the Modifications section of this report

Test Facility

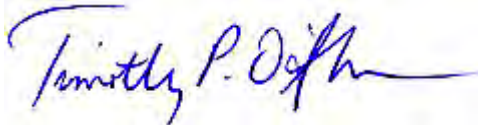
The measurement facility used to collect the data is located at:

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 (Site filing #2834E-1). filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada

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 Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, 2834B-3, Brooklyn Park: 2834E-1*)

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



Accreditations and Authorizations

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, T-1659, and G-548, Sultan: R-871, G-83, C-3265, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634.*)

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175*)

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



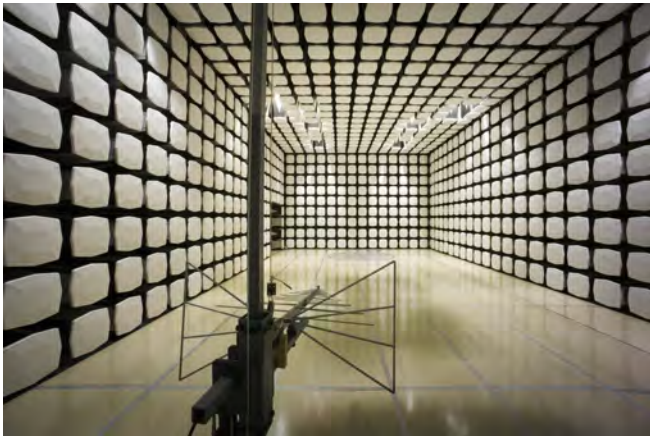
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Medtronic Inc.
Address:	7000 Central Avenue NE
City, State, Zip:	Minneapolis, MN 55432
Test Requested By:	Paul Wood
Model:	8880T2
First Date of Test:	December 12, 2012
Last Date of Test:	December 16, 2012
Receipt Date of Samples:	December 12, 2012
Equipment Design Stage:	Production equivalent
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

The Clinician Telemetry Module (CTM2) provides a communication link from the Clinician Programmer (CP) to an Implanted Medical Device (IMD). The CTM2 provides a single telemetry module solution for use with the following telemetry types: TEL-M (Medical Implant Communications Service MICS Telemetry) connection to the Intellis IMD, TEL A/N (Proximal wakeup) connection to Intellis IMD and communication with the SM3 pump, Bluetooth connection to CP, and/or USB connection to CP. The CTM2 is a Battery operated device that will be used in a hospital environment by medical professionals.

Testing Objective:

To demonstrate compliance to FCC and IC requirements for the Inductive transmitter.

CONFIGURATION 1 MDTR0042

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
CTM2	Medtronic Inc.	8880T2	NKW001518N

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
NGCP	Medtronic Inc.	MICA-101	NKR001179N
Power Brick	SINPRO	MPU64-106	S0138633

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Pump	Medtronic Inc.	Synchromed III	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Programmer	Yes	1.8m	Yes	CTM2	NGCP
AC Power	No	1.8m	No	Power Brick	AC Mains
DC Power	No	1.3m	Yes	NGCP	Power Brick
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 3 MDTR0042

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
CTM2	Medtronic Inc.	8880T2	NKW001419N

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
NGCP	Medtronic Inc.	MICA-101	NKR001179N
Power Brick	SINPRO	MPU64-106	S0138633

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Pump	Medtronic Inc.	Synchromed III	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Programmer	Yes	1.8m	Yes	CTM2	NGCP
AC Power	No	1.8m	No	Power Brick	AC Mains
DC Power	No	1.3m	Yes	NGCP	Power Brick
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/12/2011	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	12/12/2011	Spurious 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.
3	12/16/2011	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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 Tel A 175 kHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0042 - 1

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	AVY	7/1/2011	12 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	2/2/2011	12 mo
Antenna, Loop	ETS Lindgren	6502	AOB	2/9/2011	24 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/15/2011	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

Measurements were made using the IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

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) (Frequency Strength: +/- 4.00) for each test is on each data sheet. 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.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal plane, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

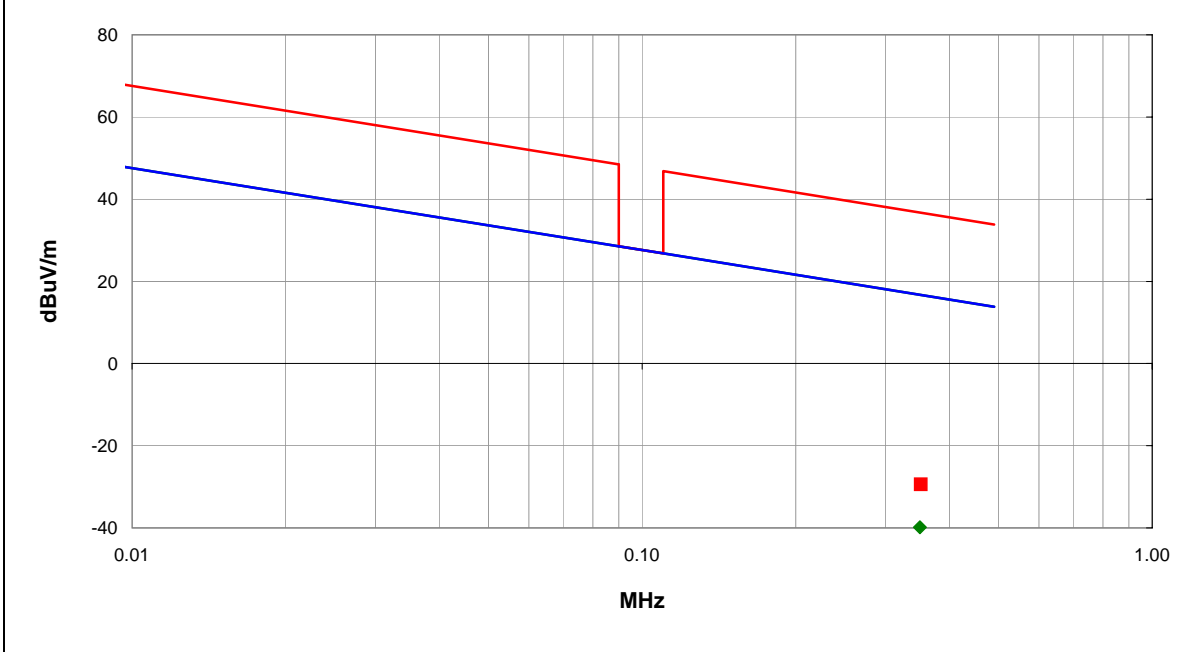
EMC

Spurious Emissions

Work Order:	MDTR0042	Date:	12/12/11	<i>Trevor Buls</i> Tested by: Trevor Buls
Project:	None	Temperature:	24.55 °C	
Job Site:	MN05	Humidity:	20.38% RH	
Serial Number:	NKW001518N	Barometric Pres.:	1021.7 mbar	
EUT:	CTM2			
Configuration:	1			
Customer:	Medtronic Inc.			
Attendees:	Michael Olsen			
EUT Power:	Battery			
Operating Mode:	Transmitting Tel A 175 kHz			
Deviations:	None			
Comments:	MDTR0012 Test Plan Configuration 12. EUT Vertical			

Test Specifications	Test Method
FCC 15.209:2011	ANSI C63.10:2009
RSS-210:2010	RSS-Gen:2010

Run #	2	Test Distance (m)	3	Antenna Height(s)	1-2.5m	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)
0.350	28.7	11.5	1.3	95.0	3.0	0.0	Par to EUT	AV	-80.0	-39.8	16.7	-56.6
0.352	39.1	11.5	1.3	95.0	3.0	0.0	Par to EUT	PK	-80.0	-29.4	36.7	-66.1

EMC

Spurious Emissions

Work Order:	MDTR0042	Date:	12/12/11	<i>Trevor Buls</i> Tested by: Trevor Buls
Project:	None	Temperature:	24.55 °C	
Job Site:	MN05	Humidity:	20.38% RH	
Serial Number:	NKW001518N	Barometric Pres.:	1021.7 mbar	
EUT:	CTM2			
Configuration:	1			
Customer:	Medtronic Inc.			
Attendees:	Michael Olsen			
EUT Power:	Battery			
Operating Mode:	Transmitting Tel A 175 kHz			
Deviations:	None			
Comments:	MDTR0012 Test Plan Configuration 12. EUT Vertical			

Test Specifications	Test Method		
FCC 15.209:2011	ANSI C63.10:2009		
RSS-210:2010	RSS-Gen:2010		
Run #	Test Distance (m)	Antenna Height(s)	Results
3	3	1-2.5m	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)
0.874	29.4	12.0	1.0	360.0	3.0	0.0	Par to EUT	QP	-40.0	1.4	28.8	-27.4
1.225	24.8	12.1	1.0	194.0	3.0	0.0	Par to EUT	QP	-40.0	-3.1	25.9	-28.9
0.525	30.6	11.6	1.0	188.0	3.0	0.0	Par to EUT	QP	-40.0	2.2	33.2	-31.0
1.053	23.6	12.2	1.0	289.0	3.0	0.0	Par to EUT	QP	-40.0	-4.2	27.2	-31.4
0.700	27.5	11.8	1.5	151.0	3.0	0.0	Par to EUT	QP	-40.0	-0.7	30.7	-31.4
1.574	19.6	12.0	1.0	231.0	3.0	0.0	Par to EUT	QP	-40.0	-8.4	23.7	-32.1
1.401	20.5	12.1	1.0	162.0	3.0	0.0	Par to EUT	QP	-40.0	-7.4	24.7	-32.1
1.746	18.5	12.0	1.0	162.0	3.0	0.0	Par to EUT	QP	-40.0	-9.5	29.5	-39.0

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 Tel A 175 kHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0042 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	315 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	2/2/2011	12 mo
Antenna, Loop	ETS Lindgren	6502	AOB	2/9/2011	24 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/15/2011	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

Measurements were made using the IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

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) (Frequency Strength: +/- 4.00) for each test is on each data sheet. 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.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal plane, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2009). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

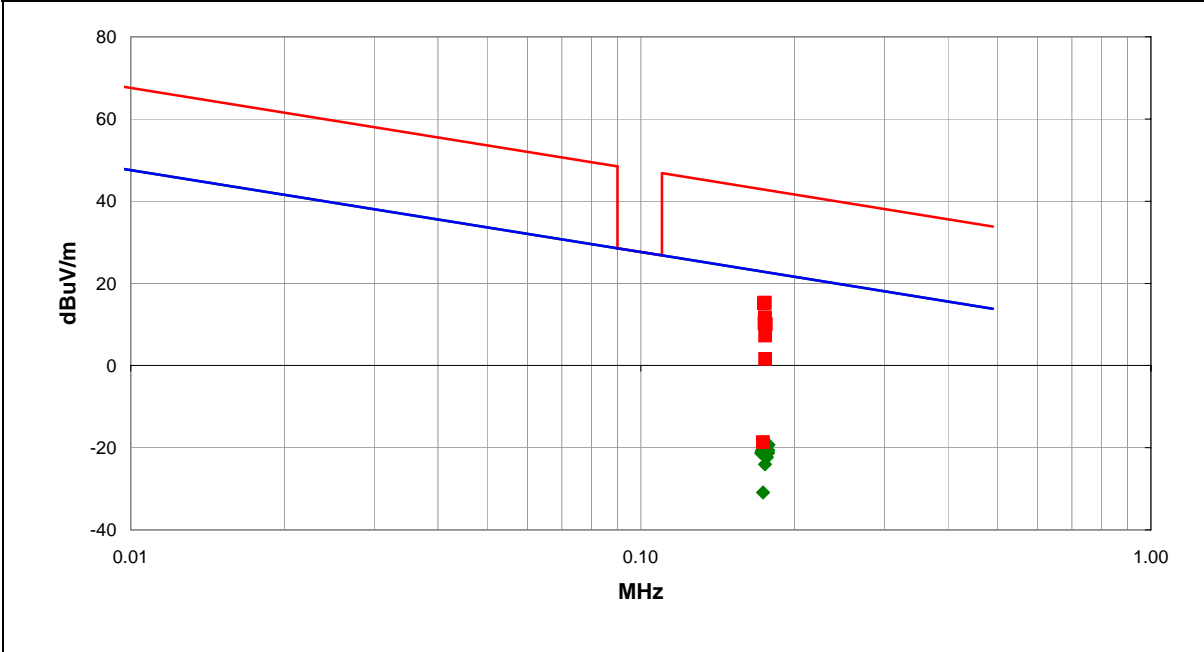
EMC

Field Strength of Fundamental

Work Order:	MDTR0042	Date:	12/12/11	<i>Trevor Buls</i> Tested by: Trevor Buls
Project:	None	Temperature:	24.55 °C	
Job Site:	MN05	Humidity:	20.38% RH	
Serial Number:	NKW001518N	Barometric Pres.:	1021.7 mbar	
EUT:	CTM2			
Configuration:	1			
Customer:	Medtronic Inc.			
Attendees:	Michael Olsen			
EUT Power:	Battery			
Operating Mode:	Transmitting Tel A 175 kHz			
Deviations:	None			
Comments:	MDTR0012 Test Plan Configuration 12			

Test Specifications	Test Method
FCC 15.209:2011	ANSI C63.10:2009
RSS-210:2010	RSS-Gen:2010

Run #	1	Test Distance (m)	3	Antenna Height(s)	1-2.5m	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
0.175	83.9	11.4	1.0	356.0	3.0	0.0	Par to EUT	PK	-80.0	15.3	42.8	-27.5	EUT Vertical
0.174	83.7	11.4	1.0	267.0	3.0	0.0	Par to EUT	PK	-80.0	15.1	42.8	-27.7	EUT on Side
0.175	80.3	11.4	1.0	265.0	3.0	0.0	Perp to GND	PK	-80.0	11.7	42.7	-31.1	EUT Vertical
0.175	80.1	11.4	1.0	164.0	3.0	0.0	Perp to GND	PK	-80.0	11.5	42.8	-31.3	EUT on Side
0.175	78.8	11.4	2.0	75.0	3.0	0.0	Par to GND	PK	-80.0	10.2	42.8	-32.6	EUT on Side
0.176	78.7	11.4	2.2	164.0	3.0	0.0	Par to GND	PK	-80.0	10.1	42.7	-32.6	EUT Vertical
0.175	75.9	11.4	1.0	331.0	3.0	0.0	Par to GND	PK	-80.0	7.3	42.7	-35.4	EUT Horizontal
0.175	70.2	11.4	1.0	0.0	3.0	0.0	Par to EUT	PK	-80.0	1.6	42.7	-41.1	EUT Horizontal
0.178	49.3	11.4	1.0	356.0	3.0	0.0	Par to EUT	AV	-80.0	-19.3	22.6	-41.9	EUT Vertical
0.177	49.3	11.4	1.0	267.0	3.0	0.0	Par to EUT	AV	-80.0	-19.3	22.7	-42.0	EUT on Side
0.178	48.0	11.4	1.0	265.0	3.0	0.0	Perp to GND	AV	-80.0	-20.6	22.6	-43.2	EUT Vertical
0.173	47.8	11.4	1.0	164.0	3.0	0.0	Perp to GND	AV	-80.0	-20.8	22.9	-43.7	EUT on Side
0.178	47.4	11.4	2.0	75.0	3.0	0.0	Par to GND	AV	-80.0	-21.2	22.6	-43.8	EUT on Side
0.172	47.3	11.4	2.2	164.0	3.0	0.0	Par to GND	AV	-80.0	-21.3	22.9	-44.2	EUT Vertical
0.177	46.3	11.4	1.0	331.0	3.0	0.0	Par to GND	AV	-80.0	-22.3	22.7	-45.0	EUT Horizontal
0.175	44.6	11.4	1.0	0.0	3.0	0.0	Par to EUT	AV	-80.0	-24.0	22.8	-46.8	EUT Horizontal
0.174	37.7	11.4	1.0	65.0	3.0	0.0	Perp to GND	AV	-80.0	-30.9	22.8	-53.7	EUT Horizontal
0.174	49.9	11.4	1.0	65.0	3.0	0.0	Perp to GND	PK	-80.0	-18.7	42.8	-61.5	EUT Horizontal

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
MN04 Cables	ESM Cable Corp.	MN04 Horn Cables	MNE	5/18/2011	12
Antenna, Loop	ETS Lindgren	6502	AOB	2/9/2011	24
Spectrum Analyzer	Agilent	E4443A	AAS	3/17/2011	12

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) (Frequency Accuracy: +0.12/-0.01) for each test is on each data sheet. 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.

TEST DESCRIPTION

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation at its lowest, middle, and highest transmit frequency in a no-hop mode. The spectrum analyzer's resolution bandwidth was set to between 1% and 3% of the 20dB bandwidth and the video bandwidth was at least 3 times the resolution bandwidth. A peak detector was used to more accurately measure the emissions envelope.

EMC

Occupied Bandwidth

EUT: CTM2	Work Order: MDTR0042
Serial Number: NKW001419N	Date: 12/16/11
Customer: Medtronic Inc.	Temperature: 24.72°C
Attendees: None	Humidity: 14%
Project: None	Barometric Pres.: 1029.8
Tested by: Trevor Buls	Power: Battery
	Job Site: MN04

TEST SPECIFICATIONS		Test Method
RSS-210:2010		RSS-Gen :2010

COMMENTS
MDTR0012 Test Plan Configuration 12. Transmitting Tel A at 175 kHz

DEVIATIONS FROM TEST STANDARD
None

Configuration #	3	Signature	<i>Trevor Buls</i>
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Channel	Value	Limit	Result
Mid	16.3089 kHz	N/A	N/A

Mid

Value	Limit	Result
16.3089 kHz	N/A	N/A

