Medtronic Inc.

CTM2
Model 8880T2

EMC Test Report

Report No. MDTR0042.5

Report Prepared By

NORTHWEST EMC

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

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: December 20, 2012

Medtronic Inc.

Model: 8880T2

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Emissions Mask	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Emissions Mask	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Field Strength of Fundamental	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Field Strength of Fundamental	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Occupied Bandwidth	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Occupied Bandwidth	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Output Power	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Output Power	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Spurious Conducted Emissions	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Spurious Conducted Emissions	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Frequency Stability	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Frequency Stability	RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009	**Pass**
Receiver Spurious Emissions	FCC 15.109:2011 Class B	ANSI C63.10:2009	**Pass**
Receiver Spurious Emissions	RSS-243:2010	RSS-Gen:2010	**Pass**
Spurious Radiated Emissions	FCC 95I:2011	ANSI/TIA/EIA-603-C-2004	**Pass**
Spurious Radiated Emissions	RSS-243:2010	RSS-Gen:2010	**Pass**

Modifications made to the product
See the Modifications section of this report

Test Facility

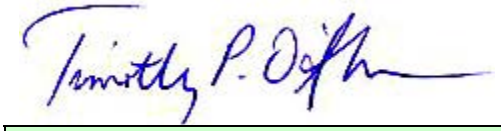
The measurement facility used to collect the data is located at:

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

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

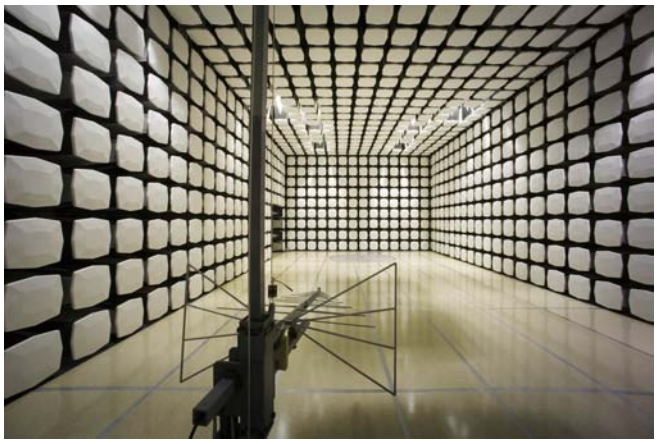
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

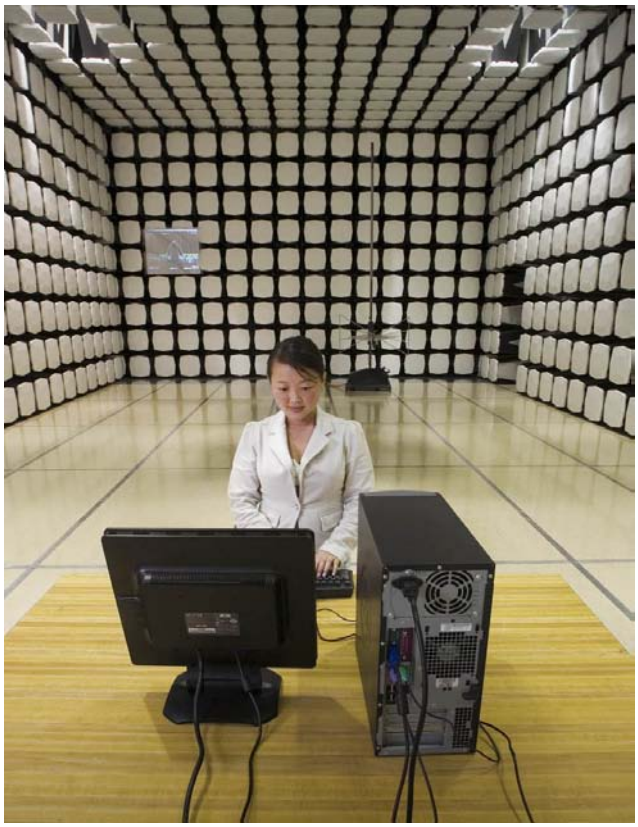
California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

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 14, 2011
Last Date of Test:	December 20, 2011
Receipt Date of Samples:	December 12, 2011
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 MICS transmitter.

CONFIGURATION 2 MDTR0042

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

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB System Cable, M943457A002 Rev. D	Yes	1.8m	Yes	CTM2	NGCP
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 4 MDTR0042

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CTM2	Medtronic Inc.	8880T2	NKW001457N

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude D610	12068016661
Power Brick (Laptop)	Dell	LA90PS0-00	CN-0DF266-71615-7BE-1D3E

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.8m	No	AC Mains	Power Brick (Laptop)
DC Power	No	1.8m	Yes	Power Brick (Laptop)	Laptop
XTM FTDI Cable, M947422A002 Rev. A	Yes	2.3m	No	Laptop	CTM2
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	12/14/2011	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	12/15/2011	Receiver 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	12/15/2011	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.
4	12/19/2011	Emission Mask	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.
5	12/19/2011	Occupied Bandwidth	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.
6	12/19/2011	Output Power	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.
7	12/19/2011	Spurious Conducted 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.
8	12/20/2011	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Emissions Mask

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
Multimeter	Fluke	114	MMU	7/8/2011	24
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	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) (Amplitude Accuracy +/-0.49) 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

Per 47 CFR 95.635(d)(4-5) the emission mask was measured. Emissions more than 150 kHz away from the center frequency must be attenuated below the transmitter output power by at least 20 dB. This was evaluated by the Occupied Bandwidth measurement according to 47 CFR 95.633(e)(1). In addition, emissions 250 kHz or less above and below the MICS band (402-405 MHz) must be attenuated below the maximum permitted output power by at least 20 dB.

A spectrum analyzer was used to measure the emission mask. A spectrum analyzer using a peak detector with no video filtering was used with a resolution bandwidth equal to approximately 1.0 percent of the emission bandwidth of the EUT. However, various plots were made using different frequency spans and resolution bandwidths in an attempt to not only satisfy the measurement criteria, but to also show that all emissions outside of the occupied band are greatly attenuated.

NORTHWEST EMC

Emissions Mask

XMit 2011.10.26
PsaTx 2011.12.16

EUT:	CTM2			Work Order:	MDTR0042
Serial Number:	NKW001457N			Date:	12/19/11
Customer:	Medtronic Inc.			Temperature:	25.23C°C
Attendees:	None			Humidity:	20%
Project:	None			Barometric Pres.:	1017.8
Tested by:	Bryan Weller	Power:	2.75VDC	Job Site:	MN08

TEST SPECIFICATIONS	Test Method
FCC 95I:2011	ANSI/TIA/EIA-603-C-2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

COMMENTS

MDTR0012 Test Plan Configuration 6

DEVIATIONS FROM TEST STANDARD

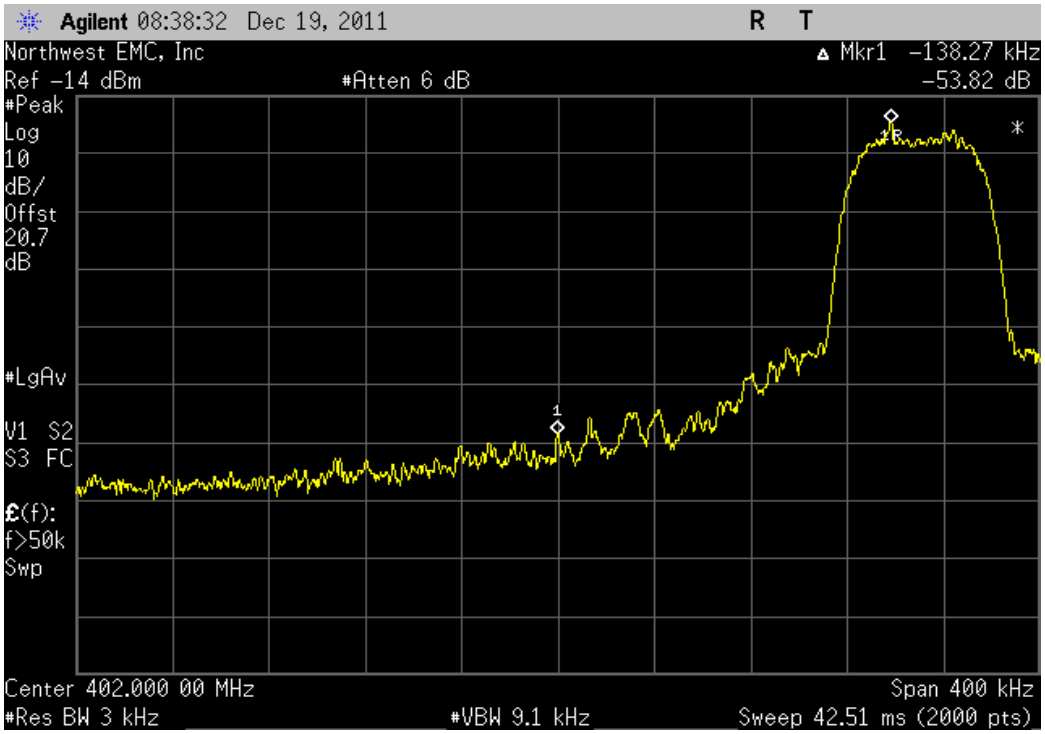
None

Configuration #	4	Signature	Trevor Bills

		Value	Limit	Result
Antenna Coil				
	Low Channel, 402.15 MHz	-53.82 dBc	≤ -20 dBc	Pass
	High Channel, 404.85 MHz	-55.19 dBc	≤ -20 dBc	Pass
Antenna PCB				
	Low Channel, 402.15 MHz	-56.51 dBc	≤ -20 dBc	Pass
	High Channel, 404.85 MHz	-54.33 dBc	≤ -20 dBc	Pass

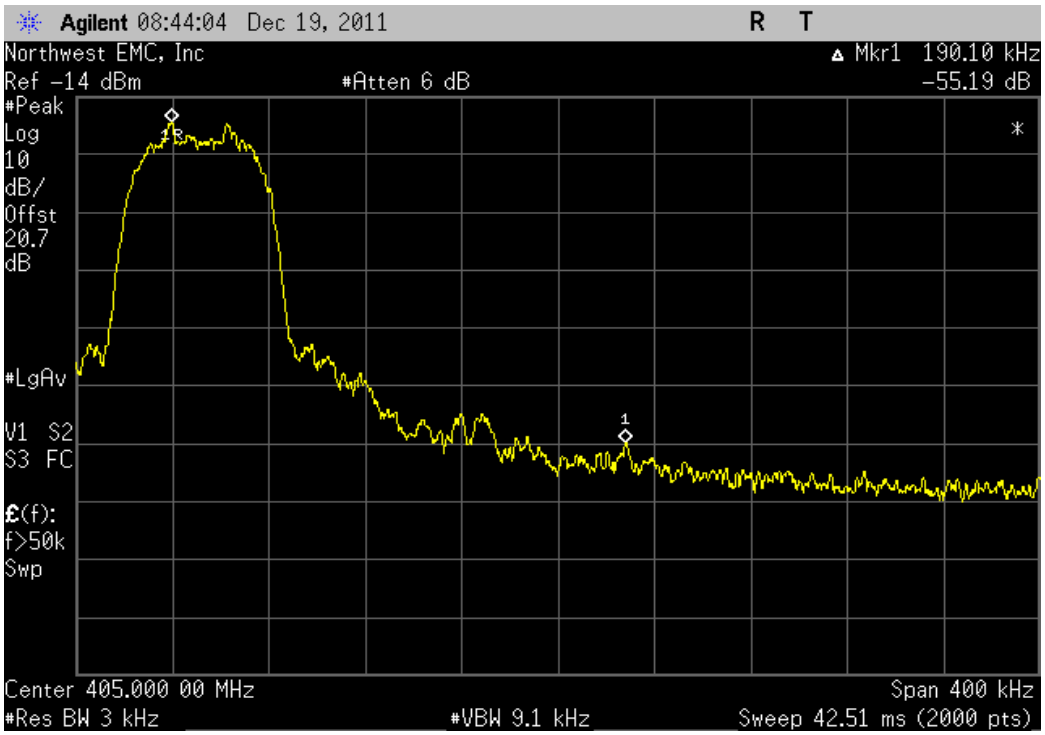
Antenna Coil, Low Channel, 402.15 MHz

				Value	Limit	Result
				-53.82 dBc	≤ -20 dBc	Pass



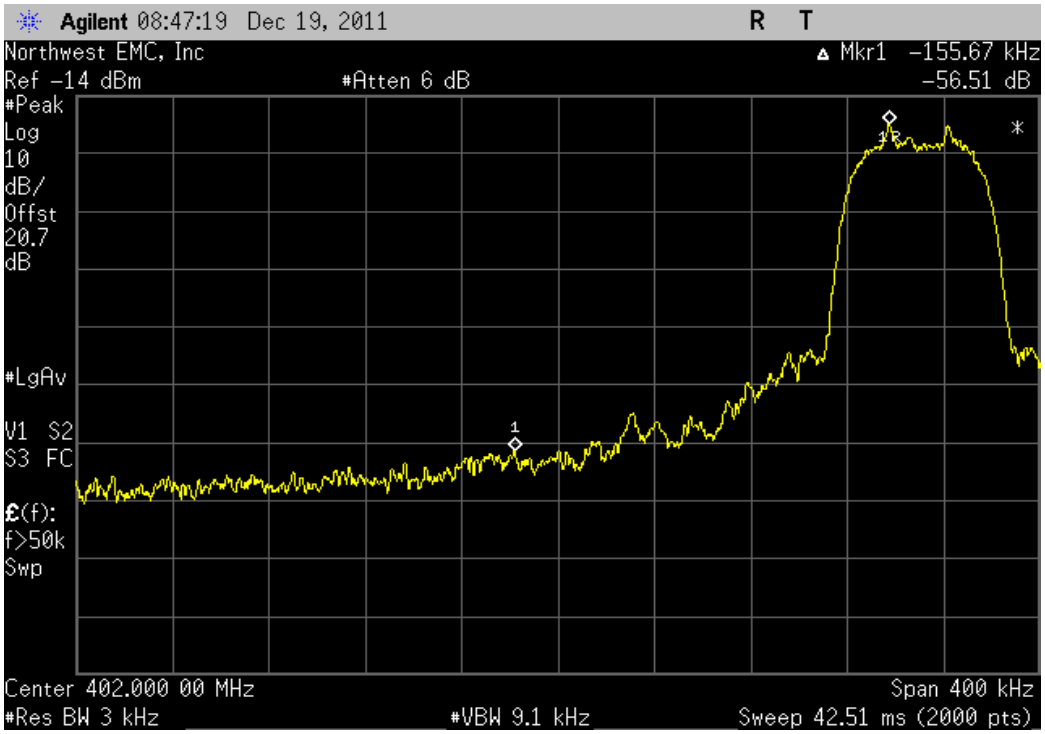
Antenna Coil, High Channel, 404.85 MHz

				Value	Limit	Result
				-55.19 dBc	≤ -20 dBc	Pass



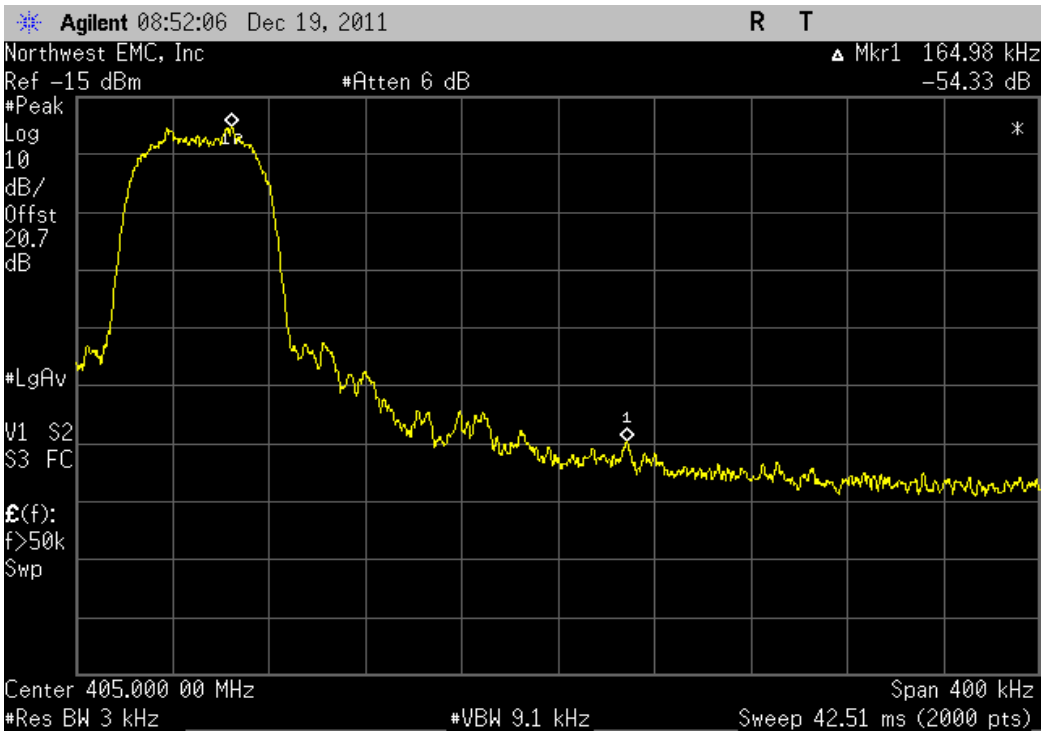
Antenna PCB, Low Channel, 402.15 MHz

				Value	Limit	Result
				-56.51 dBc	≤ -20 dBc	Pass



Antenna PCB, High Channel, 404.85 MHz

				Value	Limit	Result
				-54.33 dBc	≤ -20 dBc	Pass



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 MICS CW, Ch 1: 402.15 MHz, Ch 5: 403.35 MHz, Ch 10: 404.85 MHz, PCB, Coil Antenna (See comments)

POWER SETTINGS INVESTIGATED
Battery

CONFIGURATIONS INVESTIGATED
MDTR0042: CTM2 - 2

FREQUENCY RANGE INVESTIGATED			
Start Frequency	402 MHz	Stop Frequency	405 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
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	2/2/2011	12 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

Per 95.628(g)(3), the maximum EIRP for a MICS transmitter is 25uW. This is equivalent to a radiated field strength 85.2 dBuV/m at 3 meters when measured over a reference ground plane.

The Field Strength of the Fundamental was measured in the far-field at an FCC Listed Semi-anechoic Chamber. Spectrum analyzer and linearly polarized antennas were used to measure the effective radiated power (EIRP) of the fundamental.

The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The turntable azimuth was varied to maximize the level of radiated emissions. The height of the measurement antenna was also varied from 1 to 4 meters. The amplitude and frequency of the emissions were noted.

The height of the transmitter was 1.5-meter above the reference ground plane.

NORTHWEST
EMC

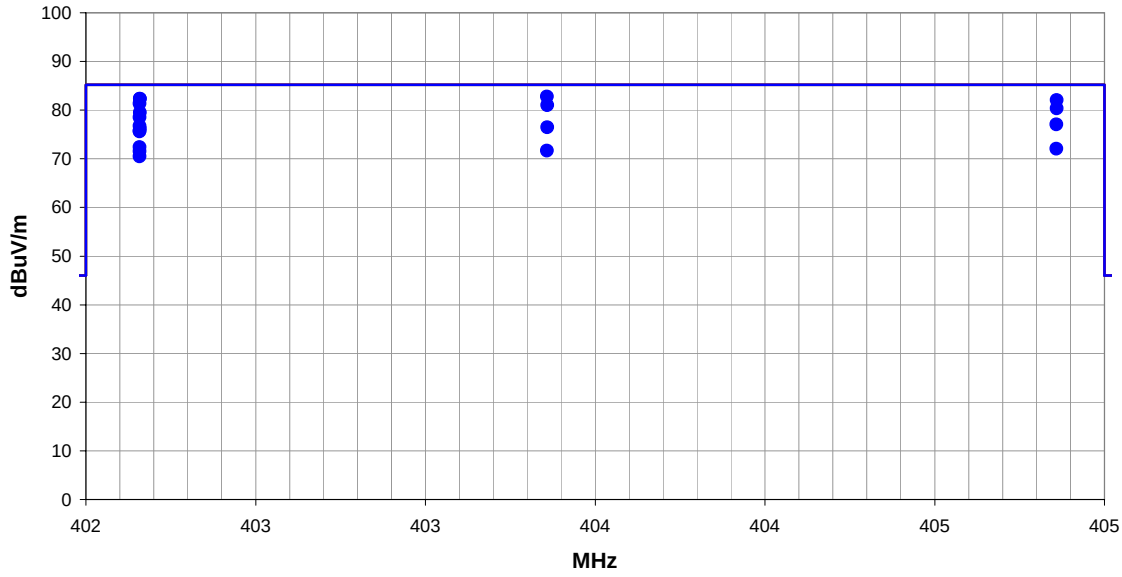
Field Strength of Fundamental

PSA-ESCI 2011.07.26
PSA-ESCI Version 2011.06.23

Work Order:	MDTR0042	**Date:**	12/14/11	Trevor Buls	
Project:	None	**Temperature:**	24.28 °C		
Job Site:	MN05	**Humidity:**	23.23% RH		
Serial Number:	NKW001518N	**Barometric Pres.:**	1011.6 mbar	**Tested by:**	Trevor Buls
EUT:	CTM2				
Configuration:	2				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting MICS CW, Ch 1: 402.15 MHz, Ch 5: 403.35 MHz, Ch 10: 404.85 MHz, PCB, Coil Antenna (See comments)				
Deviations:	None				
Comments:	MDTR0012 Test Plan Configuration 6				

Test Specifications	**Test Method**
FCC 95I:2011	ANSI/TIA/EIA-603-C:2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

Run #	35	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
403.359	61.0	21.8	1.2	47.0	3.0	0.0	Horz	QP	0.0	82.8	85.2	-2.4	Ch 5, Coil, EUT Horizontal
402.159	60.6	21.7	1.3	257.0	3.0	0.0	Horz	QP	0.0	82.3	85.2	-2.9	Ch 1, PCB, EUT on Side
402.159	60.6	21.7	1.2	51.0	3.0	0.0	Horz	QP	0.0	82.3	85.2	-2.9	Ch 1, Coil, EUT Horizontal
404.860	60.2	21.8	1.3	55.0	3.0	0.0	Horz	QP	0.0	82.0	85.2	-3.2	Ch 10, Coil, EUT Horizontal
402.159	59.6	21.7	1.2	59.0	3.0	0.0	Horz	QP	0.0	81.3	85.2	-3.9	Ch 1, Coil, EUT on Side
403.359	59.2	21.8	1.2	226.0	3.0	0.0	Horz	QP	0.0	81.0	85.2	-4.2	Ch 5, PCB, EUT on Side
404.860	58.5	21.8	1.2	236.0	3.0	0.0	Horz	QP	0.0	80.3	85.2	-4.9	Ch 10, PCB, EUT on Side
402.159	57.8	21.7	1.3	61.0	3.0	0.0	Horz	QP	0.0	79.5	85.2	-5.7	Ch 1, PCB, EUT Horizontal
402.159	56.8	21.7	1.8	274.0	3.0	0.0	Vert	QP	0.0	78.5	85.2	-6.7	Ch 1, PCB, EUT Vertical
404.859	55.2	21.8	1.0	304.0	3.0	0.0	Vert	QP	0.0	77.0	85.2	-8.2	Ch 10, PCB, EUT on Side
402.158	55.0	21.7	1.2	57.0	3.0	0.0	Horz	QP	0.0	76.7	85.2	-8.5	Ch 1, PCB, EUT Vertical
403.359	54.7	21.8	1.0	305.0	3.0	0.0	Vert	QP	0.0	76.5	85.2	-8.7	Ch 5, PCB, EUT on Side
402.159	54.5	21.7	1.0	184.0	3.0	0.0	Vert	QP	0.0	76.2	85.2	-9.0	Ch 1, PCB, EUT on Side
402.159	54.0	21.7	1.2	13.0	3.0	0.0	Horz	QP	0.0	75.7	85.2	-9.5	Ch 1, Coil, EUT Vertical
402.158	53.9	21.7	1.0	158.0	3.0	0.0	Vert	QP	0.0	75.6	85.2	-9.6	Ch 1, Coil, EUT Vertical
402.159	50.7	21.7	1.0	123.0	3.0	0.0	Vert	QP	0.0	72.4	85.2	-12.8	Ch 1, Coil, EUT on Side
404.859	50.2	21.8	2.4	103.0	3.0	0.0	Vert	QP	0.0	72.0	85.2	-13.2	Ch 10, Coil, EUT Horizontal
403.359	49.9	21.8	1.0	94.0	3.0	0.0	Vert	QP	0.0	71.7	85.2	-13.5	Ch 5, Coil, EUT Horizontal
402.158	49.8	21.7	1.0	95.0	3.0	0.0	Vert	QP	0.0	71.5	85.2	-13.7	Ch 1, Coil, EUT Horizontal
402.158	48.8	21.7	2.4	142.0	3.0	0.0	Vert	QP	0.0	70.5	85.2	-14.7	Ch 1, PCB, EUT Horizontal

Occupied Bandwidth

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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Multimeter	Fluke	114	MMU	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	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. 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 sample detector was used

NORTHWEST EMC

Occupied Bandwidth

XMit 2011.10.26
PsaTx 2011.12.16

EUT:	CTM2			**Work Order:**	MDTR0042
Serial Number:	NKW001457N			**Date:**	12/19/11
Customer:	Medtronic Inc.			**Temperature:**	24.40C°C
Attendees:	None			**Humidity:**	20%
Project:	None			**Barometric Pres.:**	1017.8
Tested by:	Bryan Weller	**Power:**	2.75VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 95I:2011	ANSI/TIA/EIA-603-C-2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

COMMENTS

MDTR0012 Test Plan Configuration 6

DEVIATIONS FROM TEST STANDARD

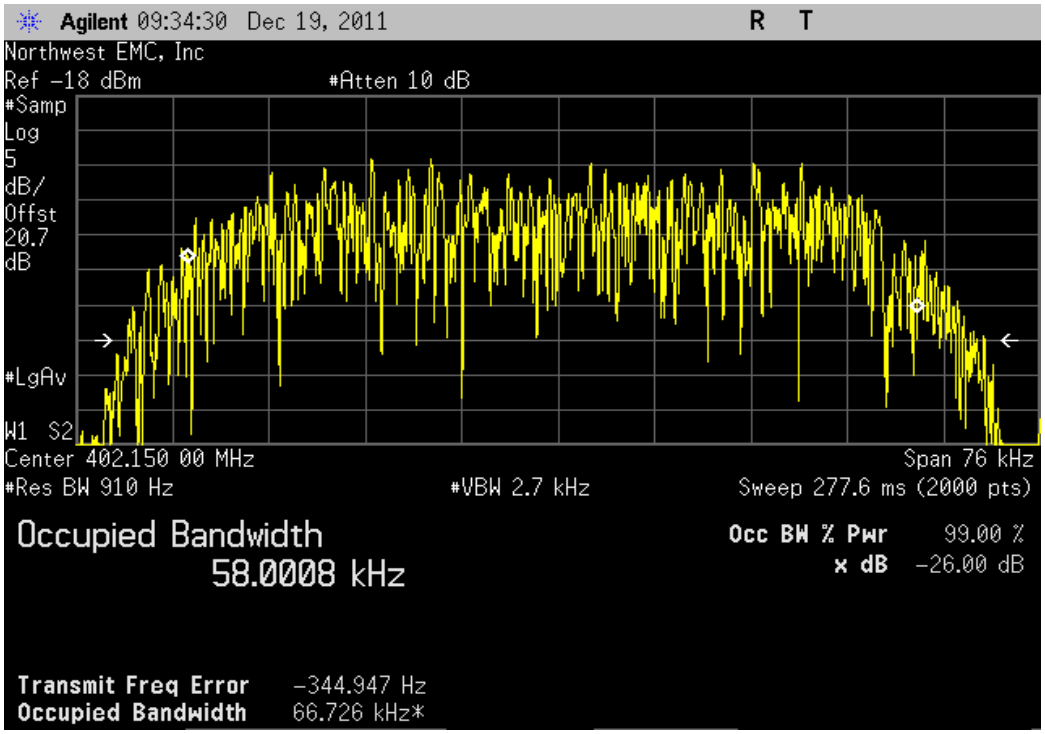
None

Configuration #	4	Signature	Trevor Bills

		Value	Limit	Result
Antenna Coil				
	Low Channel, 402.15 MHz	58.001 kHz	≤ 300 kHz	Pass
	Mid Channel, 403.35 MHz	58.044 kHz	≤ 300 kHz	Pass
	High Channel, 404.85 MHz	58.053 kHz	≤ 300 kHz	Pass
Antenna PCB				
	Low Channel, 402.15 MHz	57.973 kHz	≤ 300 kHz	Pass
	Mid Channel, 403.35 MHz	58.33 kHz	≤ 300 kHz	Pass
	High Channel, 404.85 MHz	58.277 kHz	≤ 300 kHz	Pass

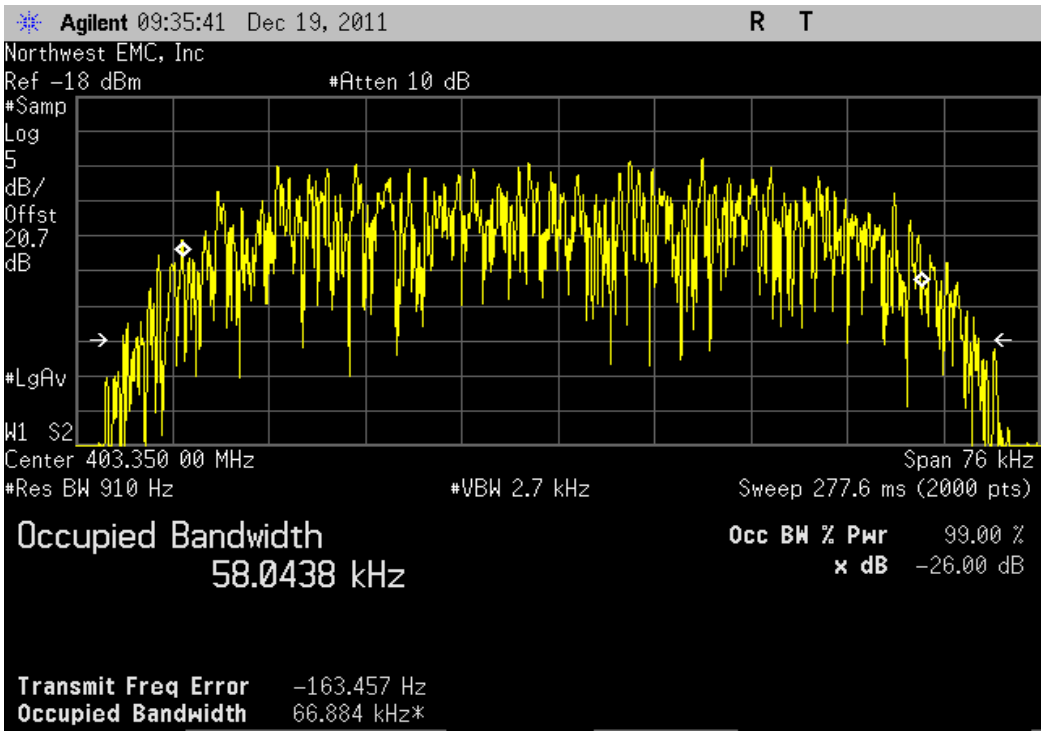
Antenna Coil, Low Channel, 402.15 MHz

				Value	Limit	Result
				58.001 kHz	≤ 300 kHz	Pass



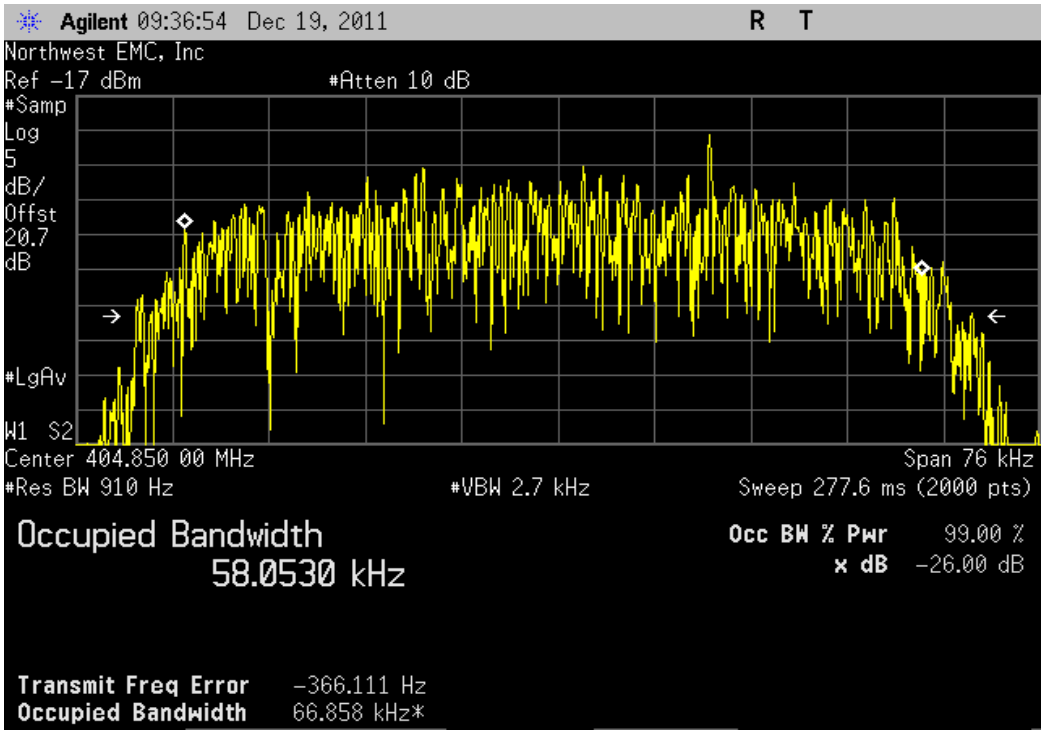
Antenna Coil, Mid Channel, 403.35 MHz

				Value	Limit	Result
				58.044 kHz	≤ 300 kHz	Pass



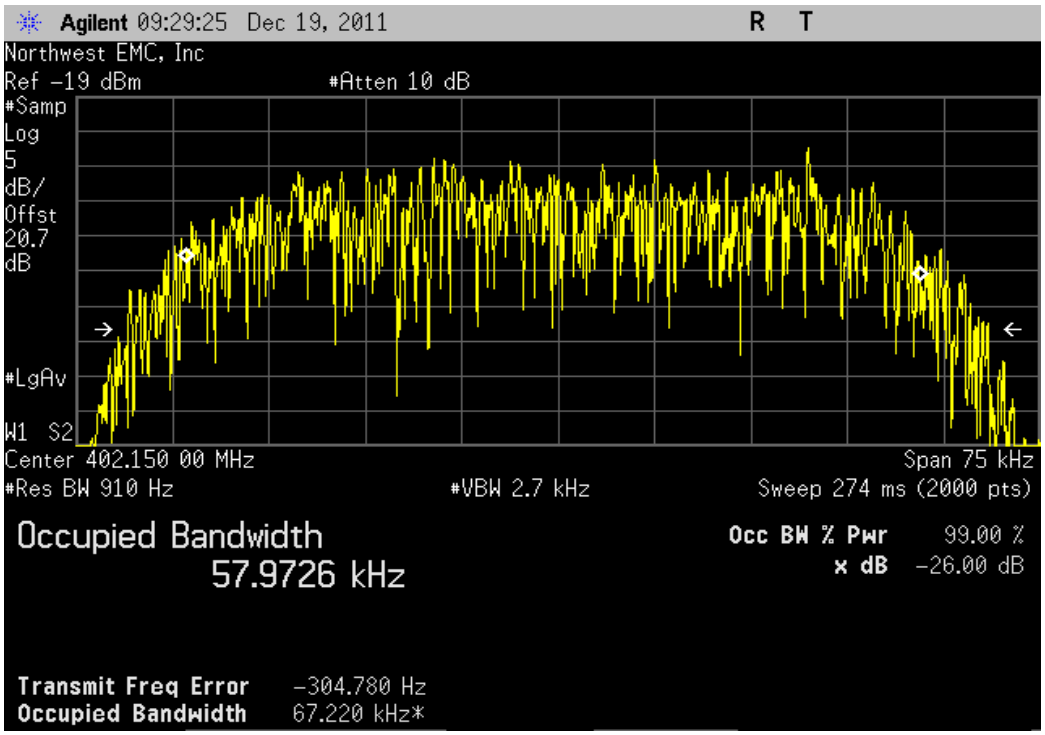
Antenna Coil, High Channel, 404.85 MHz

				Value	Limit	Result
				58.053 kHz	≤ 300 kHz	Pass



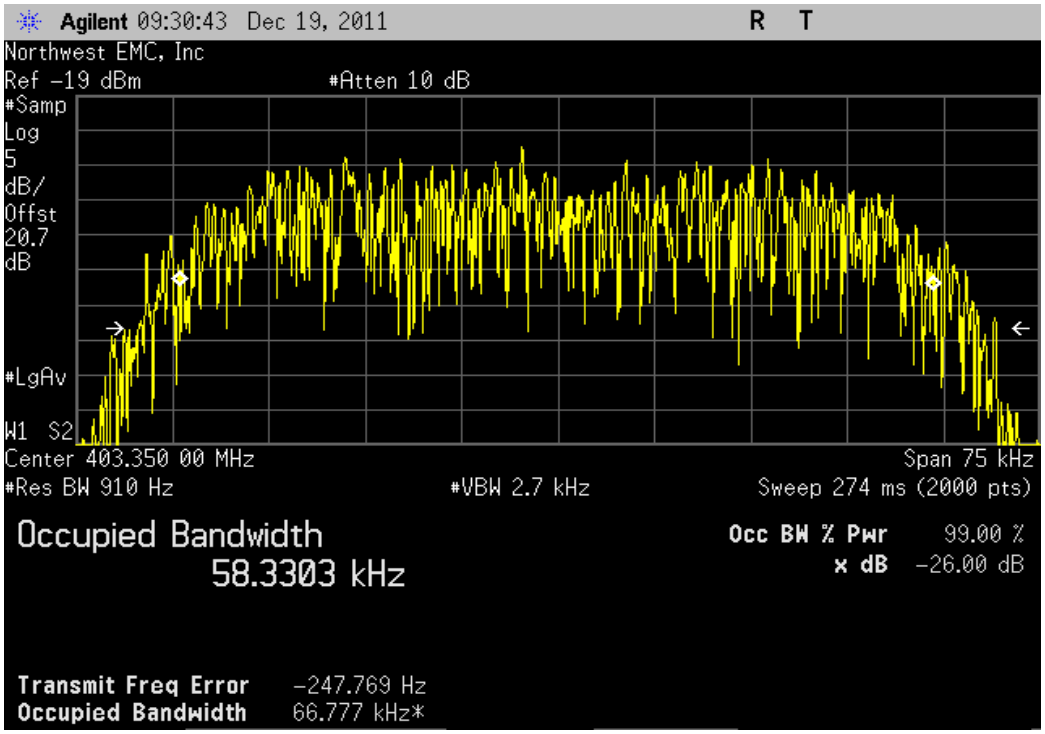
Antenna PCB, Low Channel, 402.15 MHz

				Value	Limit	Result
				57.973 kHz	≤ 300 kHz	Pass



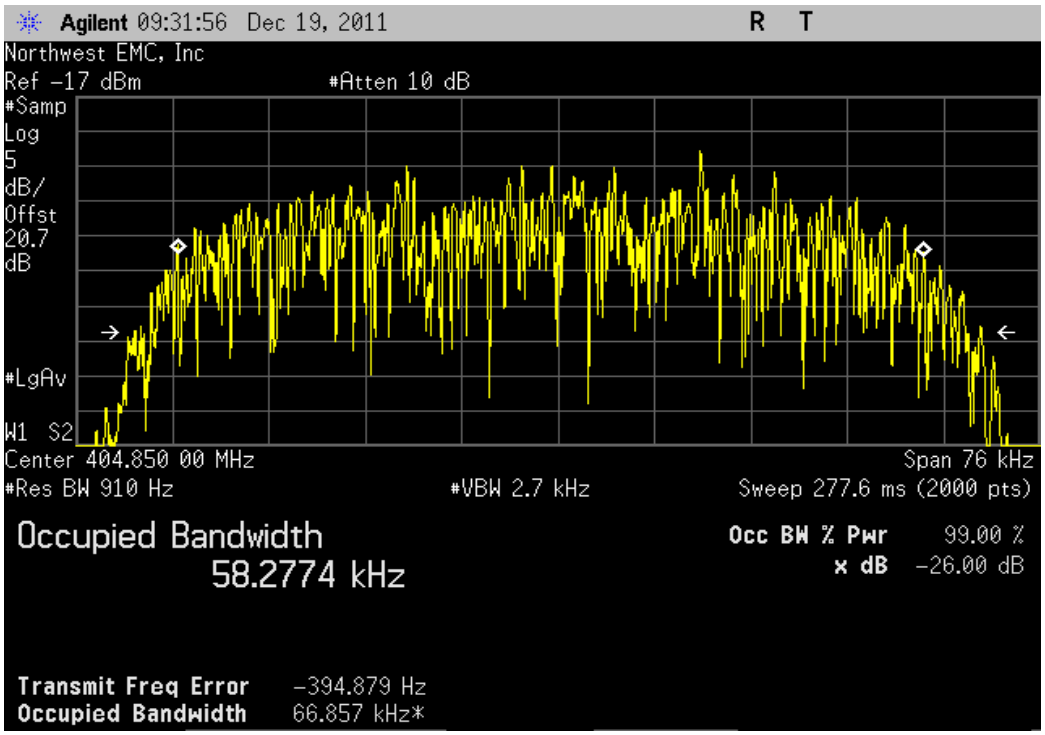
Antenna PCB, Mid Channel, 403.35 MHz

				Value	Limit	Result
				58.33 kHz	≤ 300 kHz	Pass



Antenna PCB, High Channel, 404.85 MHz

				Value	Limit	Result
				58.277 kHz	≤ 300 kHz	Pass



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
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Multimeter	Fluke	114	MMU	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	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) (Conducted Power: +/- 0.41) 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 peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at it's maximum data rate.

NORTHWEST EMC

Output Power

XMit 2011.10.26
PsaTx 2011.12.16

EUT:	CTM2			**Work Order:**	MDTR0042
Serial Number:	NKW001457N			**Date:**	12/19/11
Customer:	Medtronic Inc.			**Temperature:**	24.40C°C
Attendees:	None			**Humidity:**	20%
Project:	None			**Barometric Pres.:**	1017.8
Tested by:	Bryan Weller	**Power:**	2.75VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 95I:2011	ANSI/TIA/EIA-603-C-2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

COMMENTS

MDTR0012 Test Plan Configuration 6

DEVIATIONS FROM TEST STANDARD

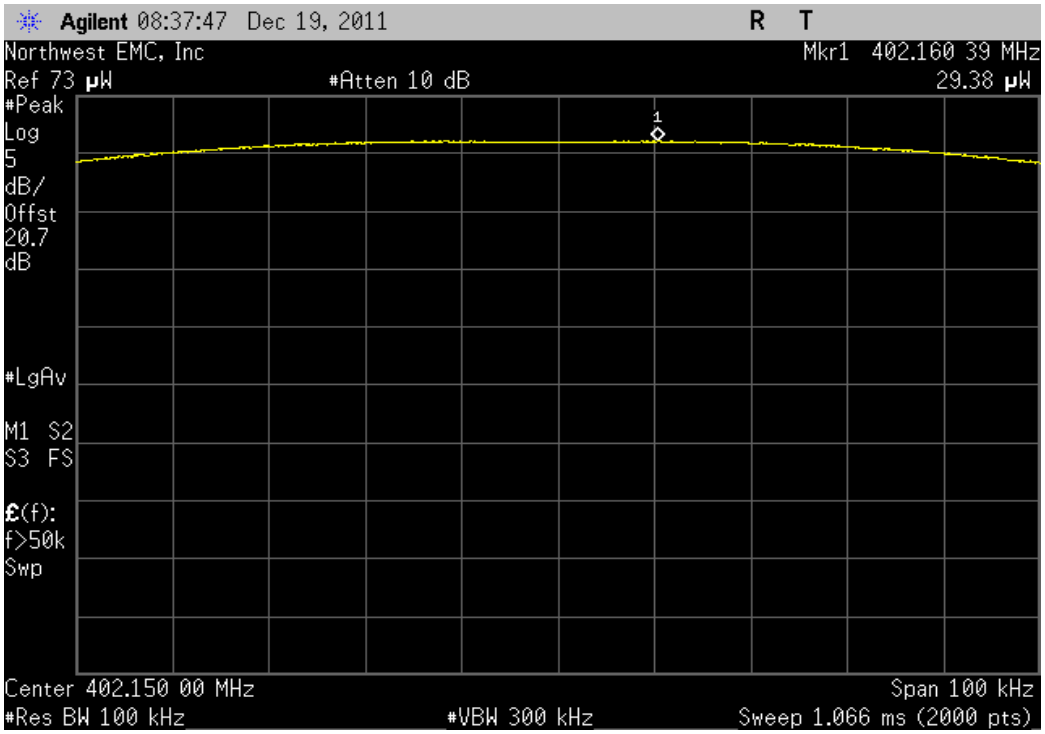
None

Configuration #	4	Signature	Trevor Bills

		Value	Limit	Result
Antenna Coil				
	Low Channel, 402.15 MHz	29.383 uW	N/A	N/A
	Mid Channel, 403.35 MHz	30.818 uW	N/A	N/A
	High Channel, 404.85 MHz	29.336 uW	N/A	N/A
Antenna PCB				
	Low Channel, 402.15 MHz	25.48 uW	N/A	N/A
	Mid Channel, 403.35 MHz	26.412 uW	N/A	N/A
	High Channel, 404.85 MHz	26.002 uW	N/A	N/A

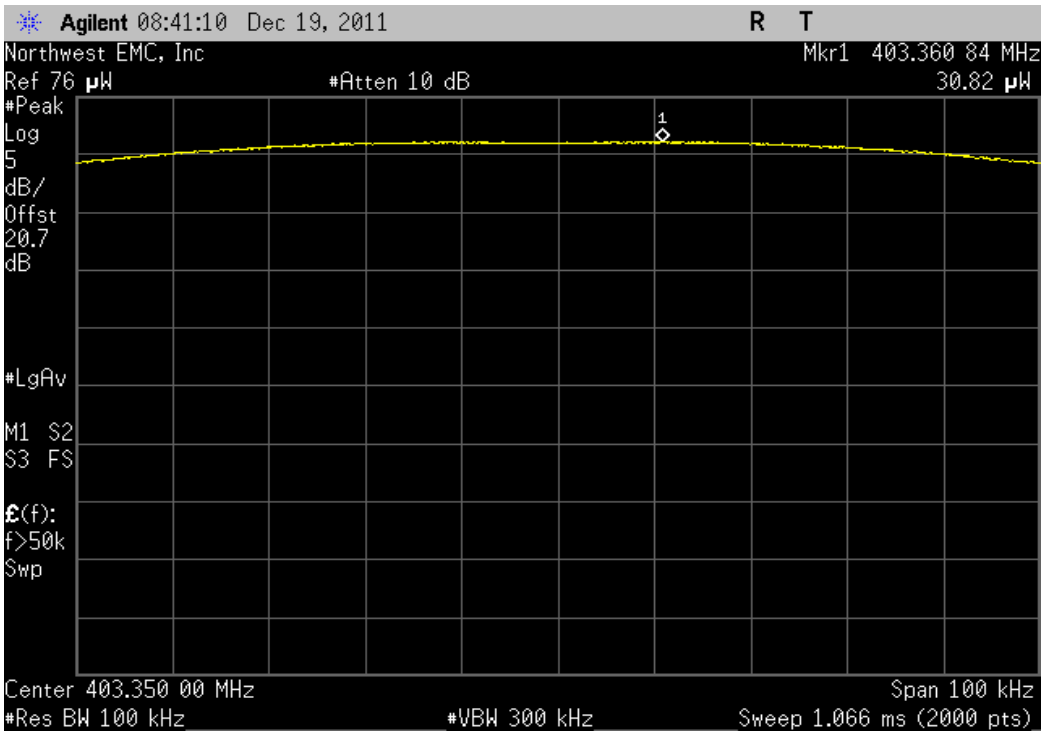
Antenna Coil, Low Channel, 402.15 MHz

				Value	Limit	Result
				29.383 uW	N/A	N/A



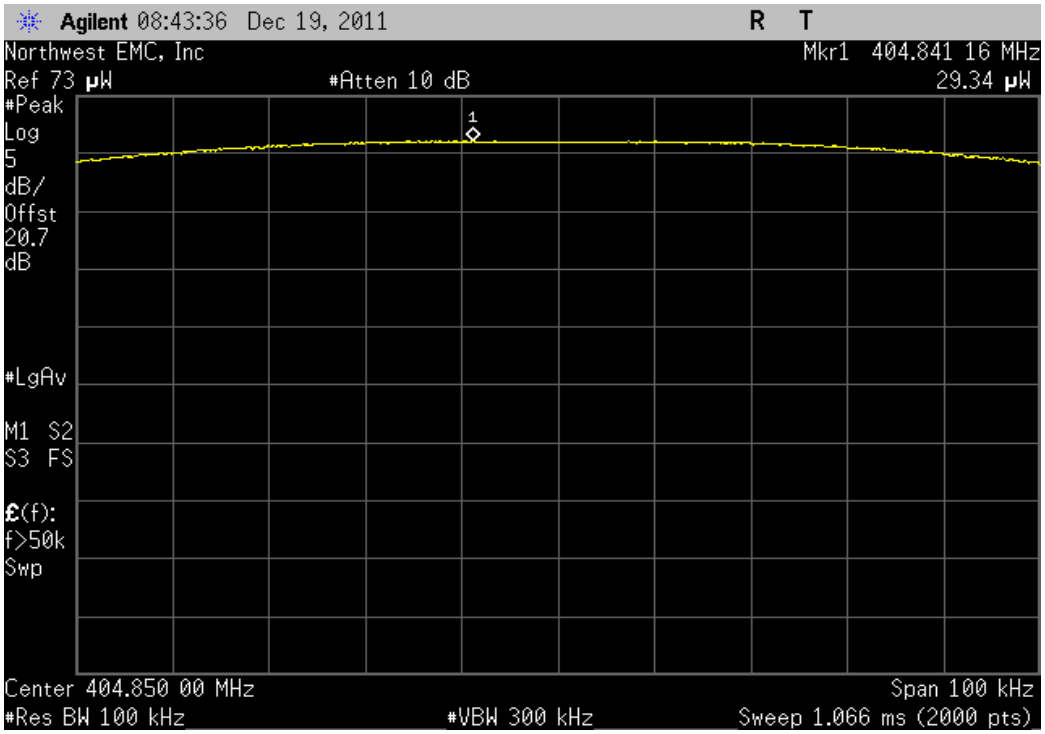
Antenna Coil, Mid Channel, 403.35 MHz

				Value	Limit	Result
				30.818 uW	N/A	N/A



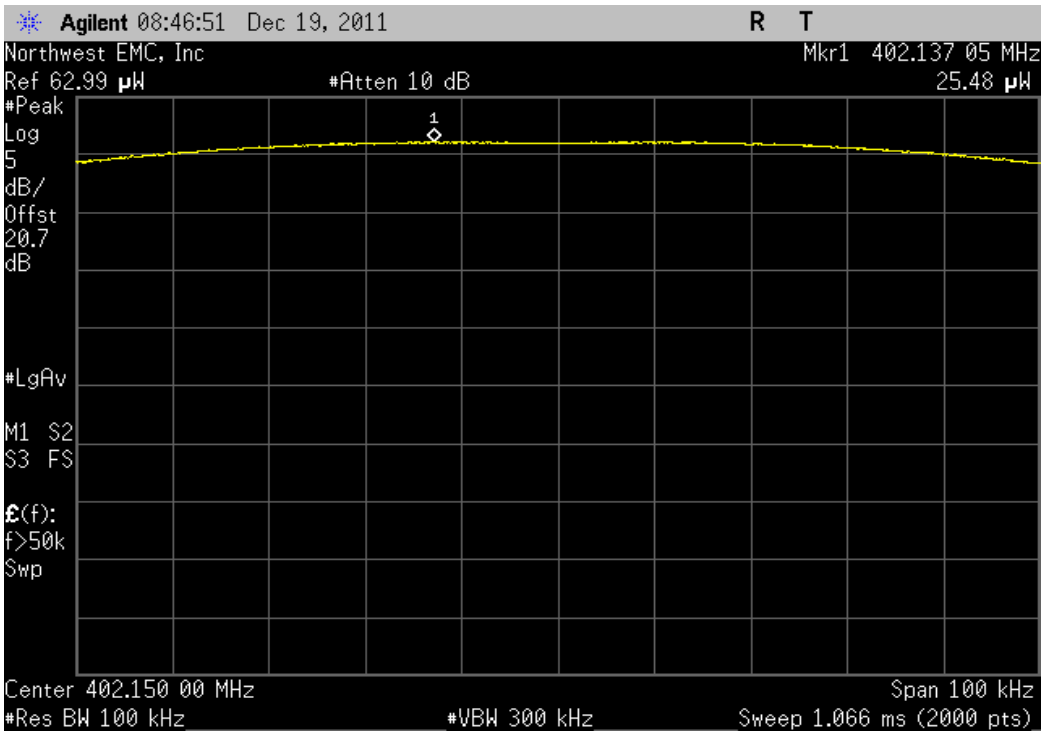
Antenna Coil, High Channel, 404.85 MHz

				Value	Limit	Result
				29.336 uW	N/A	N/A



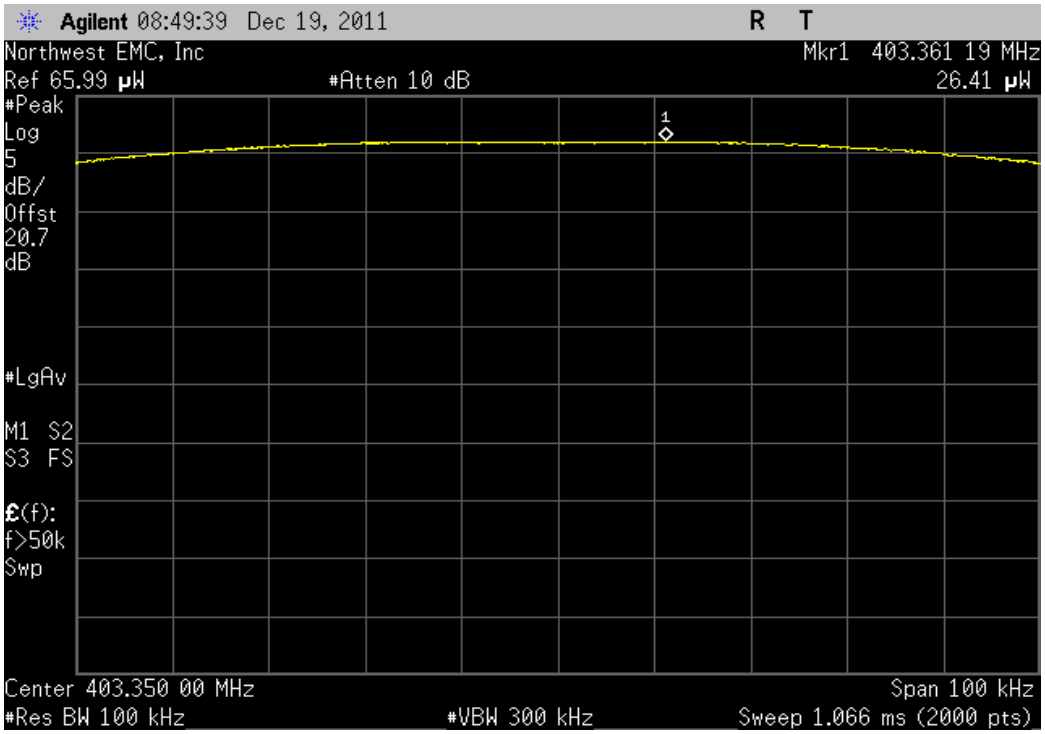
Antenna PCB, Low Channel, 402.15 MHz

				Value	Limit	Result
				25.48 uW	N/A	N/A



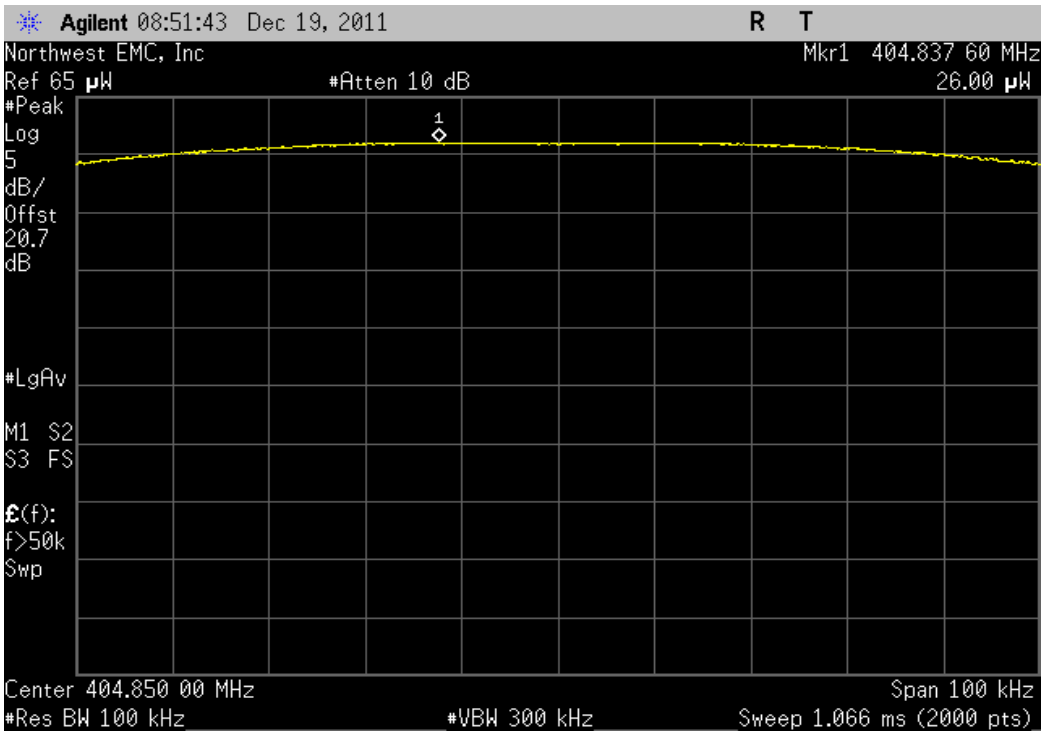
Antenna PCB, Mid Channel, 403.35 MHz

				Value	Limit	Result
				26.412 uW	N/A	N/A



Antenna PCB, High Channel, 404.85 MHz

				Value	Limit	Result
				26.002 uW	N/A	N/A



Spurious Conducted 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12
Multimeter	Fluke	114	MMU	7/8/2011	24

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) (Amplitude Accuracy +/-0.49) 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 spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

NORTHWEST EMC

Spurious Conducted Emissions

XMit 2011.10.26
PsaTx 2011.12.16

EUT:	CTM2			**Work Order:**	MDTR0042
Serial Number:	NKW001457N			**Date:**	12/19/11
Customer:	Medtronic Inc.			**Temperature:**	24.40C°C
Attendees:	None			**Humidity:**	20%
Project:	None			**Barometric Pres.:**	1017.8
Tested by:	Bryan Weller	**Power:**	2.75VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2011	ANSI C63.10:2009
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

COMMENTS

MDTR0012 Test Plan Configuration 6

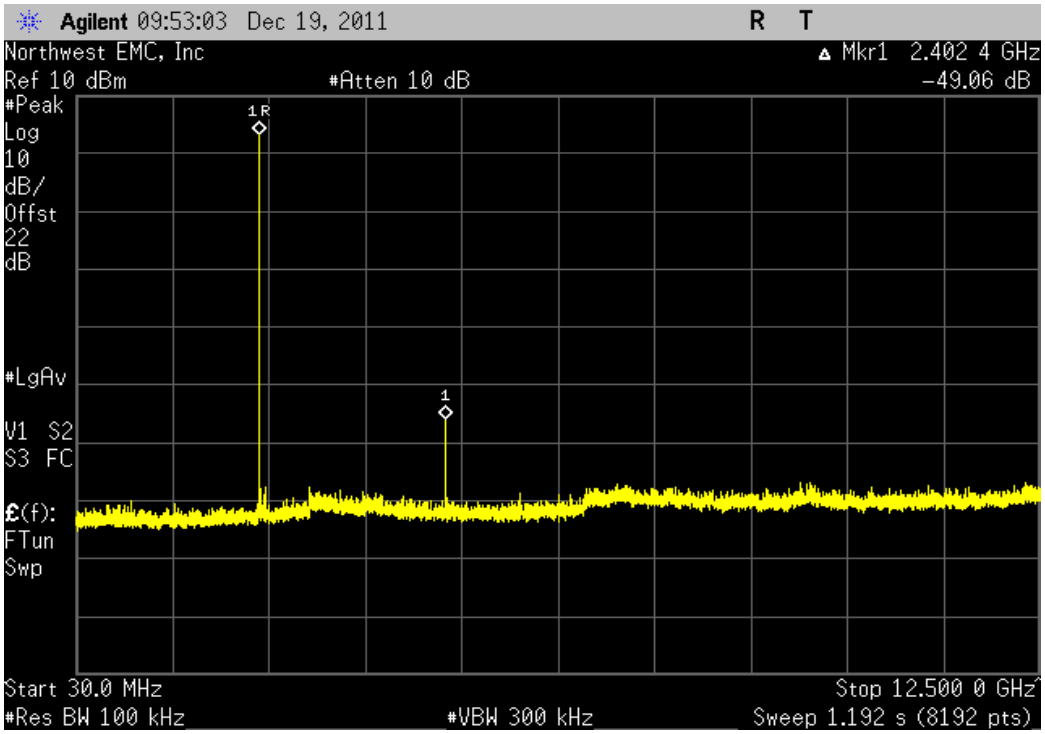
DEVIATIONS FROM TEST STANDARD

None

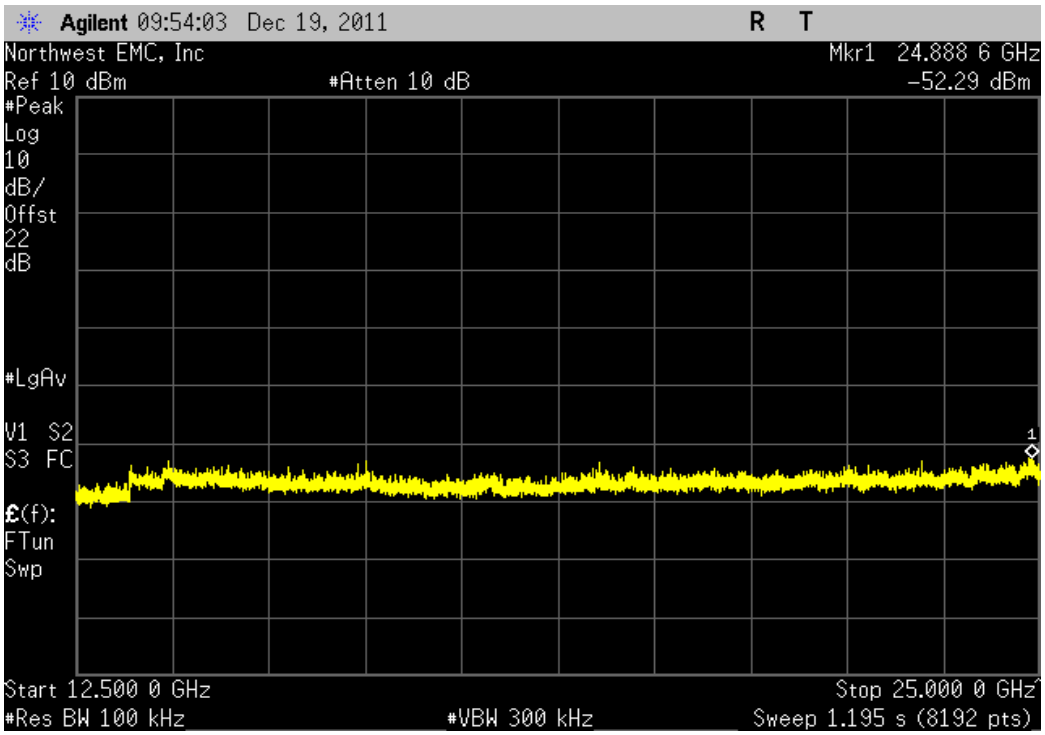
Configuration #	4	*Signature* Trevor Buls

		Frequency Range	Value	Limit	Result
DH5, GFSK					
	Low Channel	30 MHz - 12.5 GHz	-49.06 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-55.4 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-46.92 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-55.03 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-46.43 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-55.43 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK					
	Low Channel	30 MHz - 12.5 GHz	-47.27 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-50.65 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-49.62 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-52.52 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-56.58 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-52.58 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK					
	Low Channel	30 MHz - 12.5 GHz	-42.33 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-46.05 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-50.7 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-52.21 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-51.35 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-51.9 dBc	≤ -20 dBc	Pass

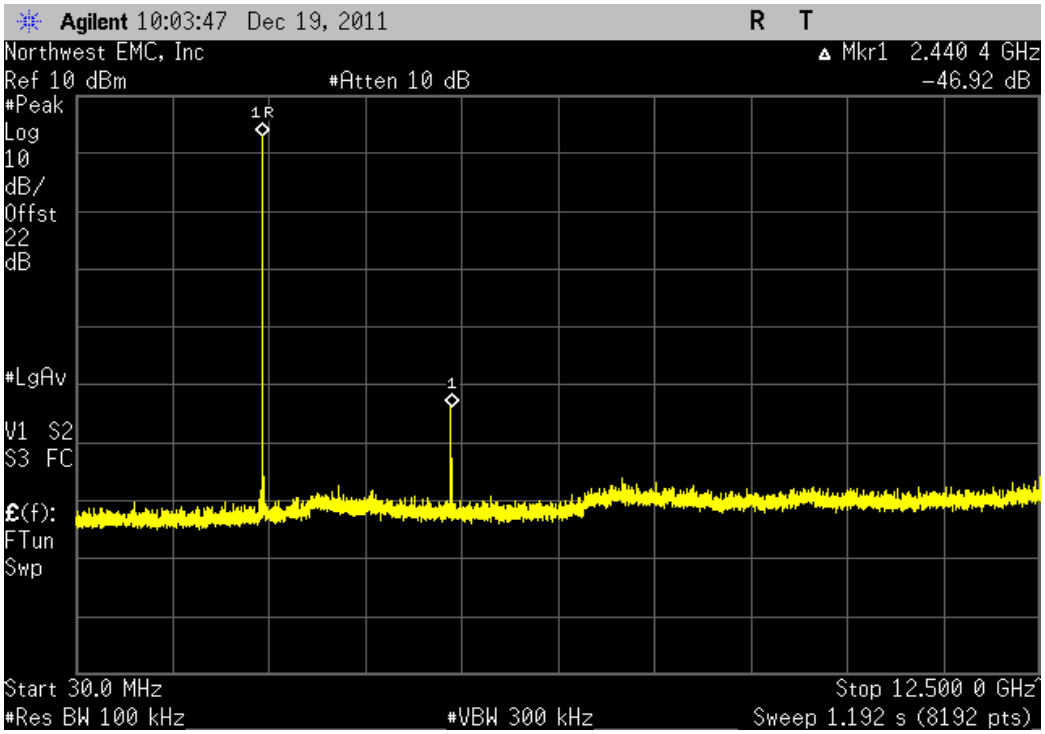
DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.06 dBc	≤ -20 dBc	Pass



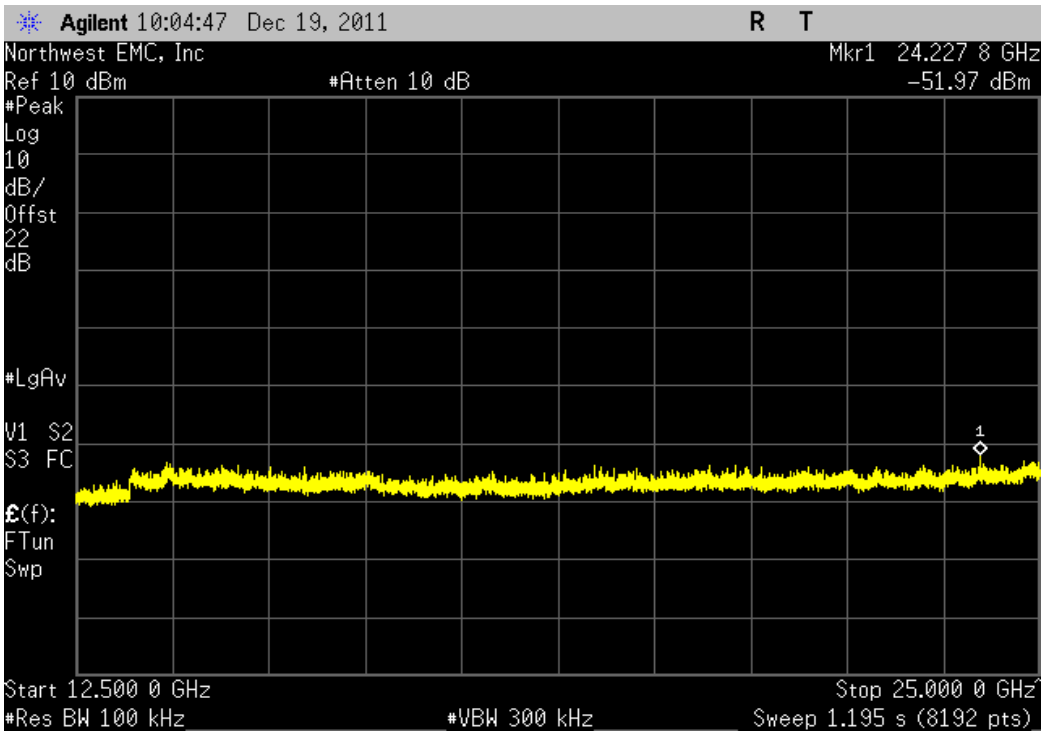
DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.4 dBc	≤ -20 dBc	Pass



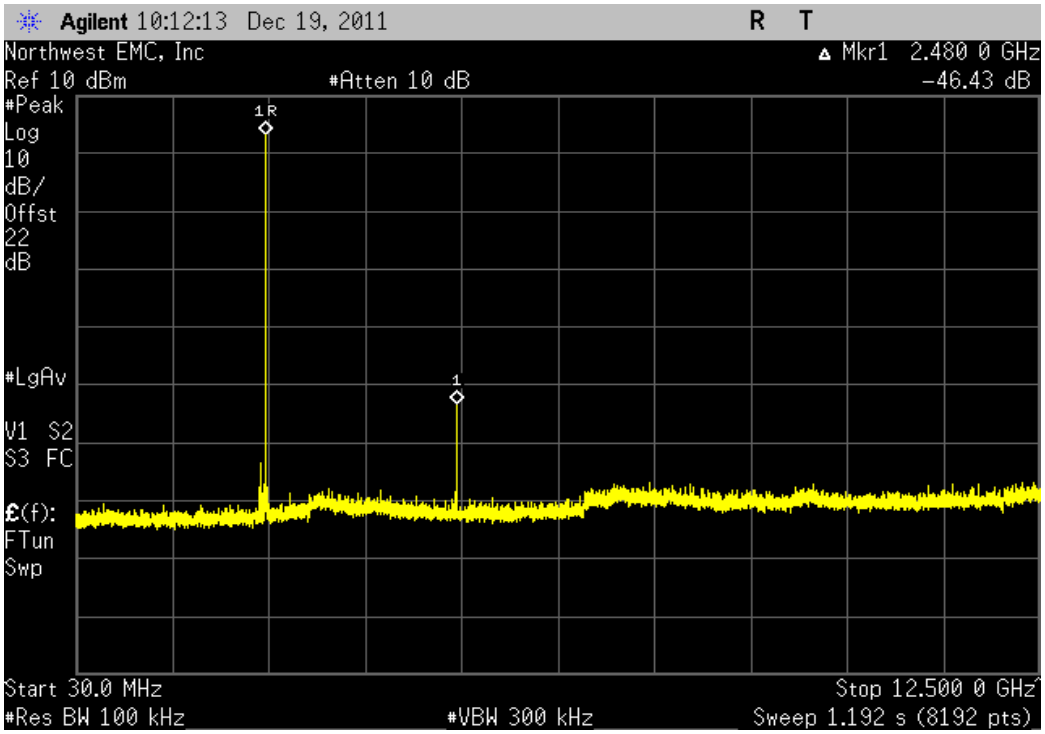
DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.92 dBc	≤ -20 dBc	Pass



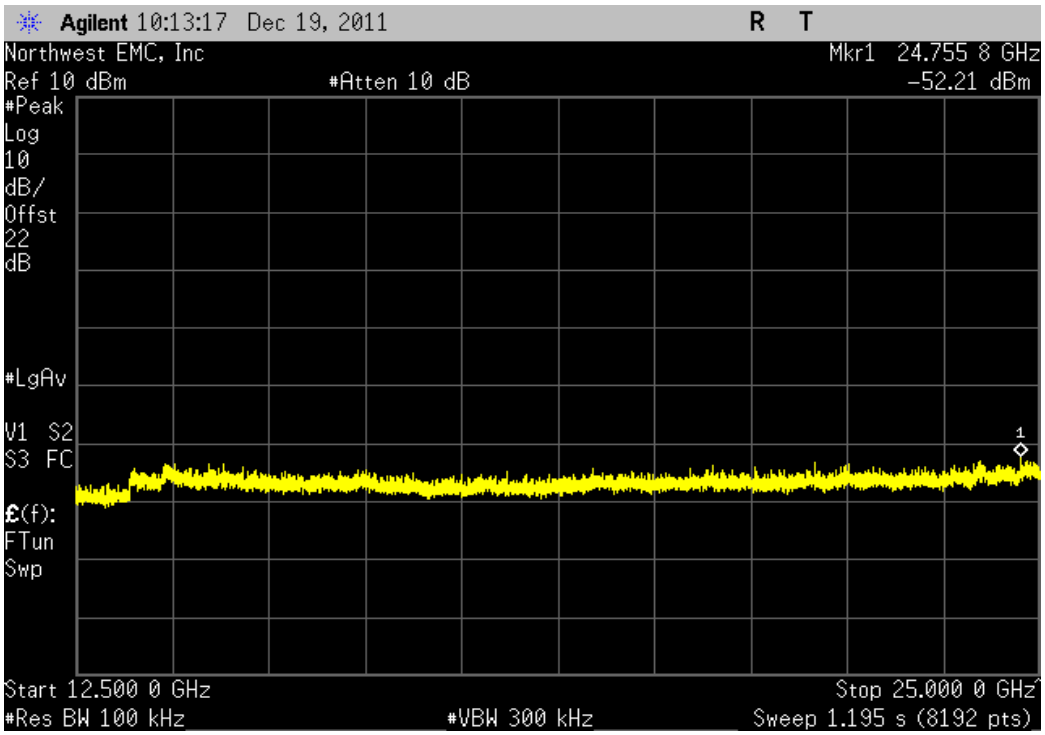
DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.03 dBc	≤ -20 dBc	Pass



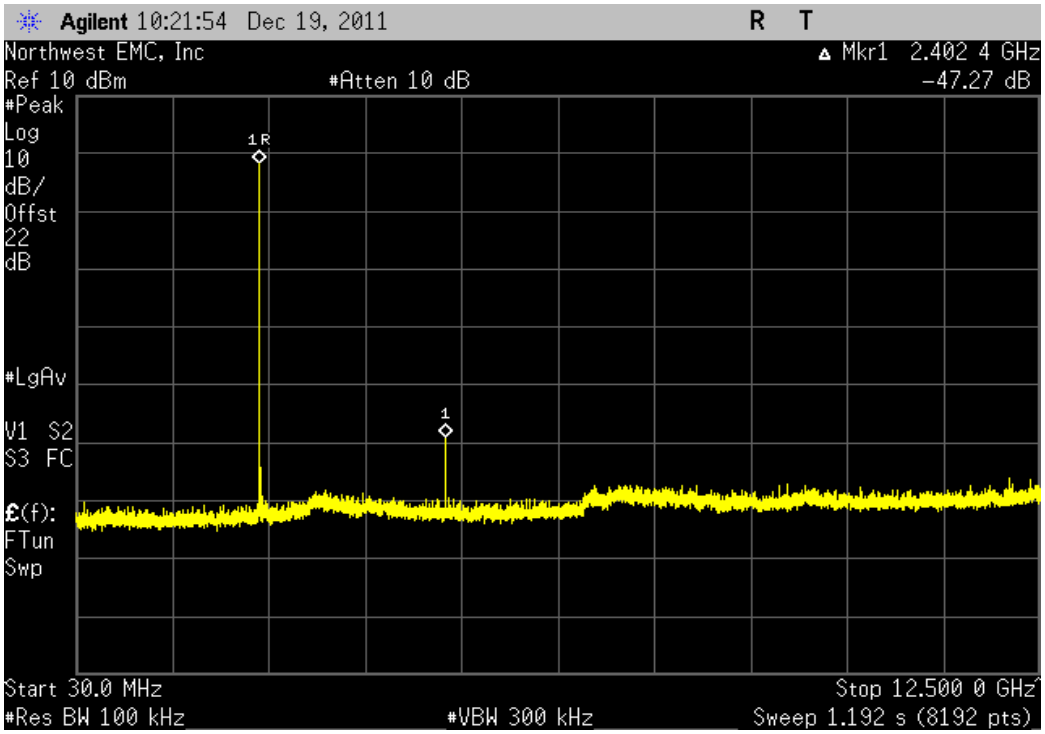
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.43 dBc	≤ -20 dBc	Pass



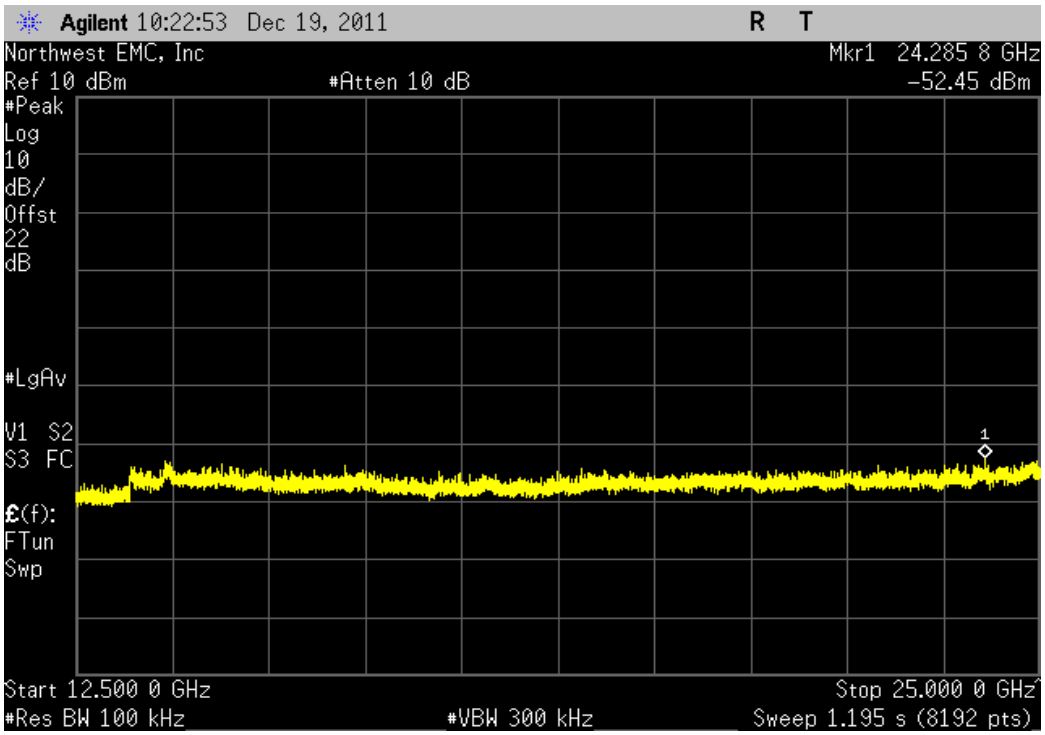
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.43 dBc	≤ -20 dBc	Pass



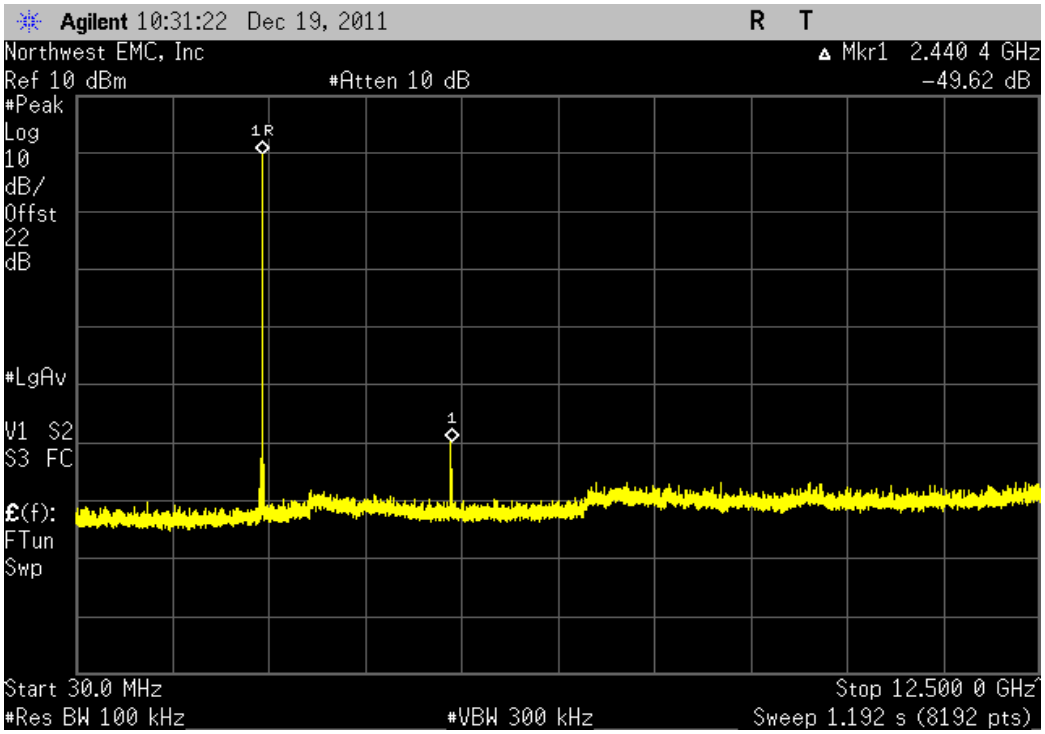
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.27 dBc	≤ -20 dBc	Pass



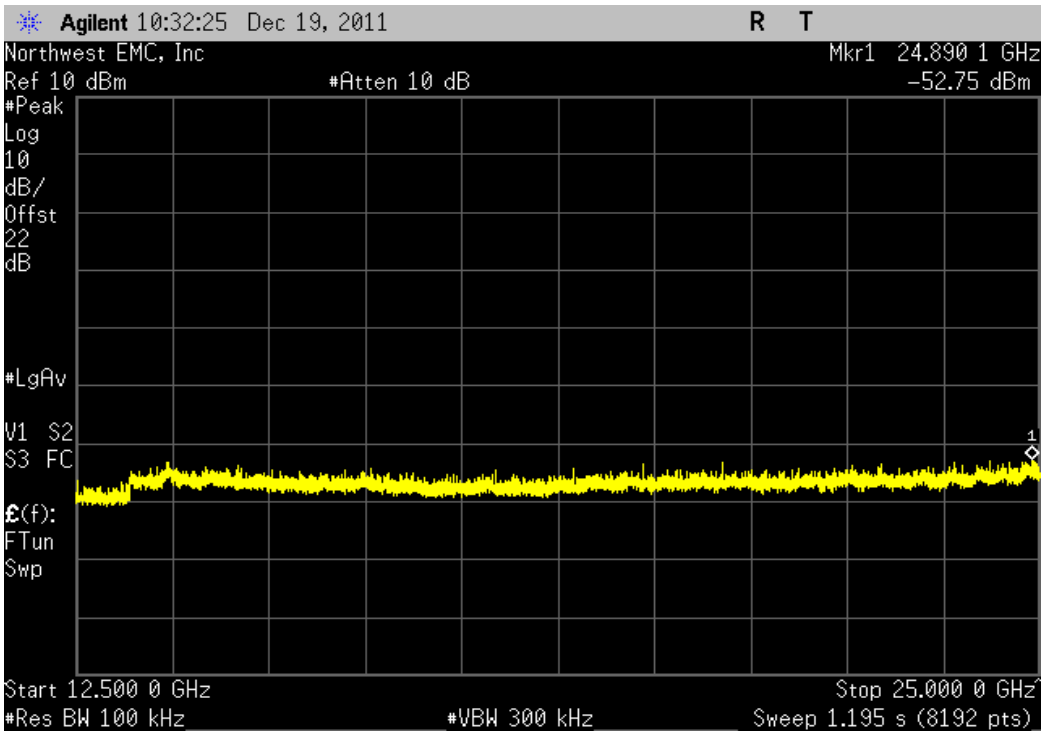
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-50.65 dBc	≤ -20 dBc	Pass



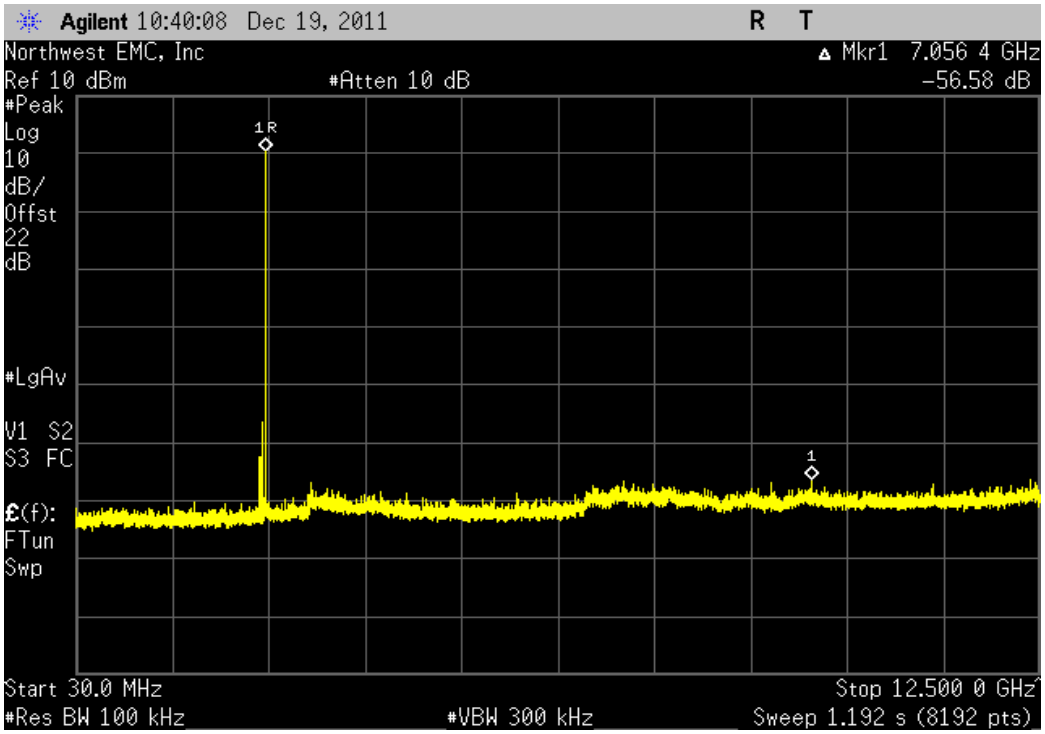
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.62 dBc	≤ -20 dBc	Pass



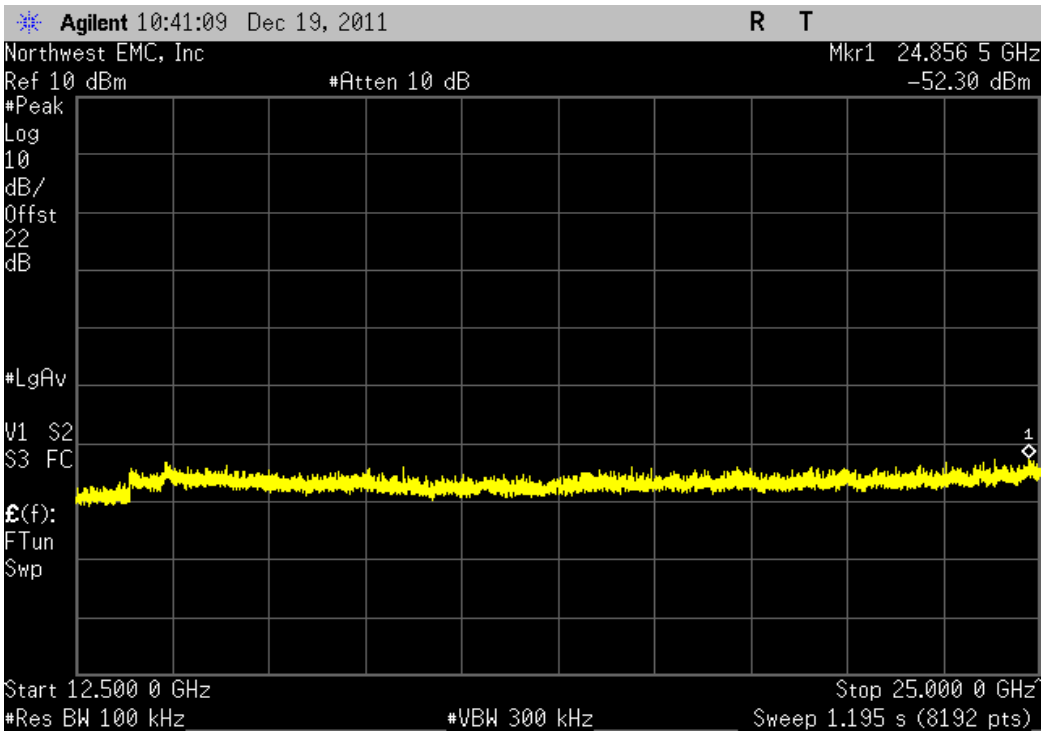
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-52.52 dBc	≤ -20 dBc	Pass



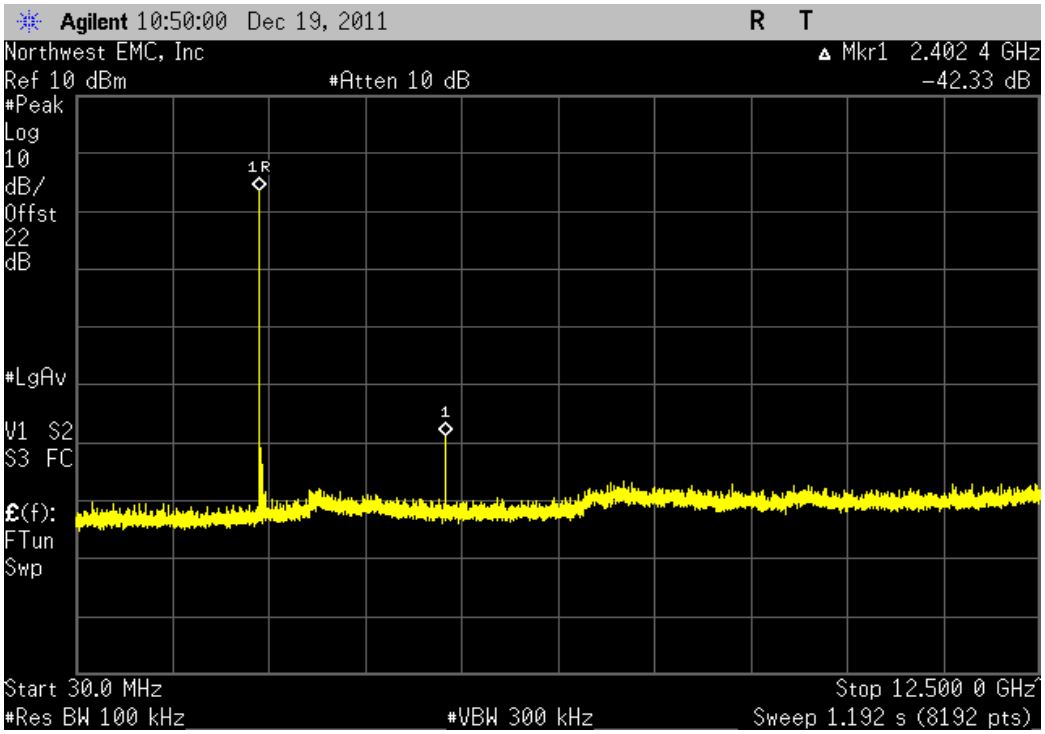
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-56.58 dBc	≤ -20 dBc	Pass



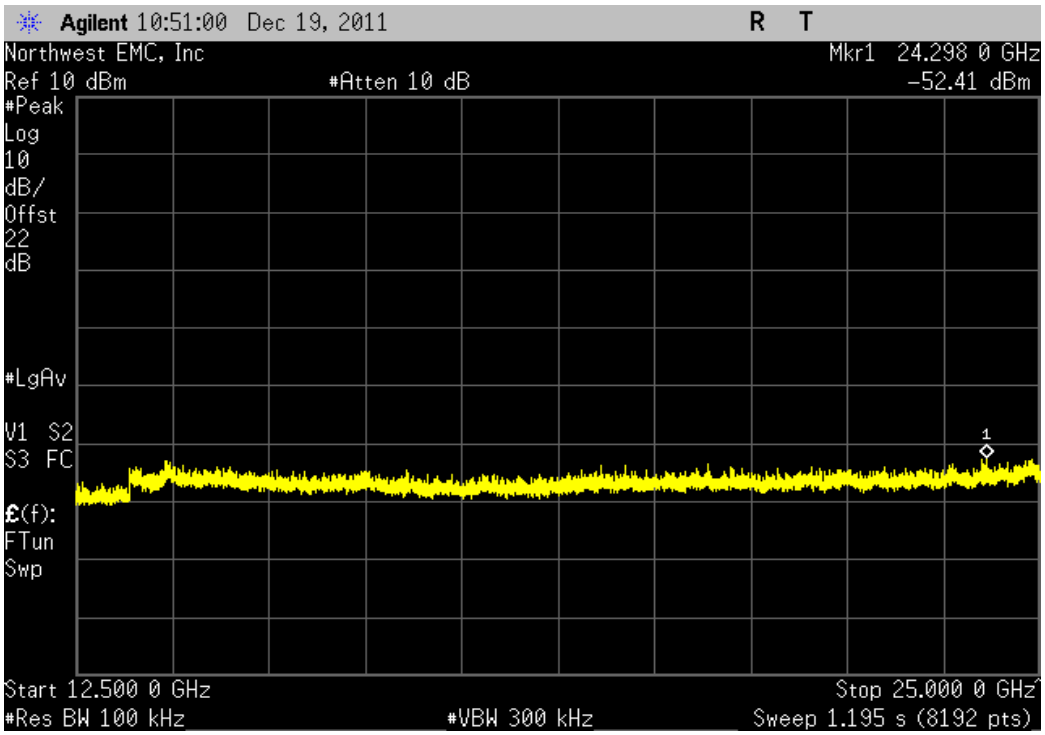
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-52.58 dBc	≤ -20 dBc	Pass



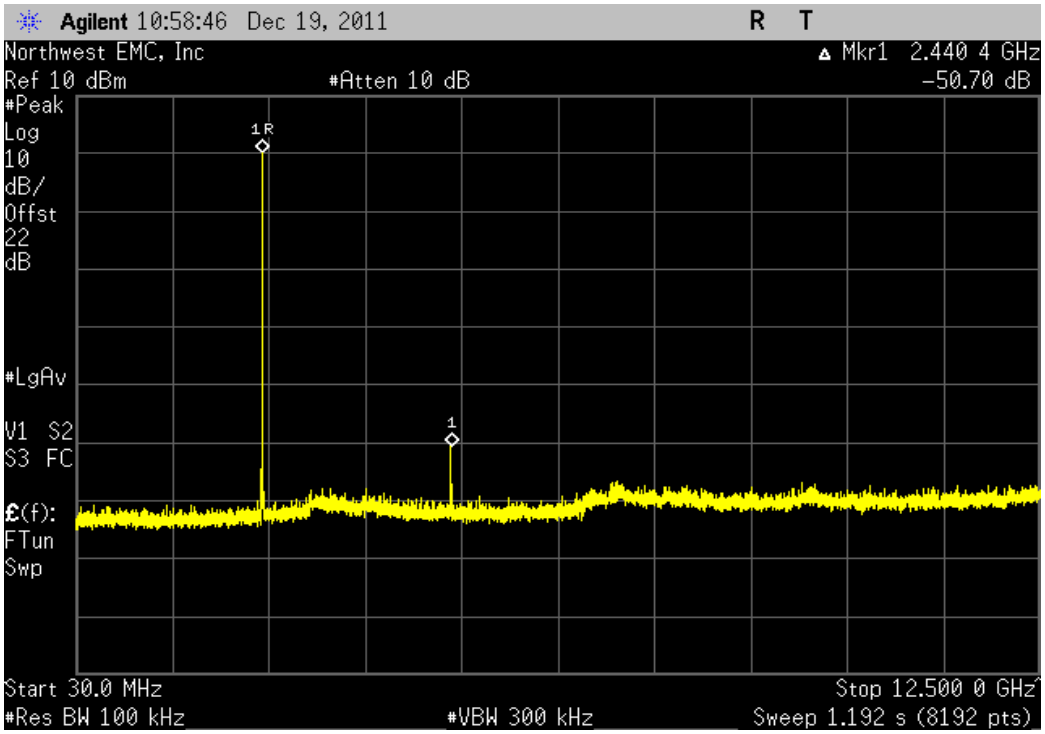
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-42.33 dBc	≤ -20 dBc	Pass



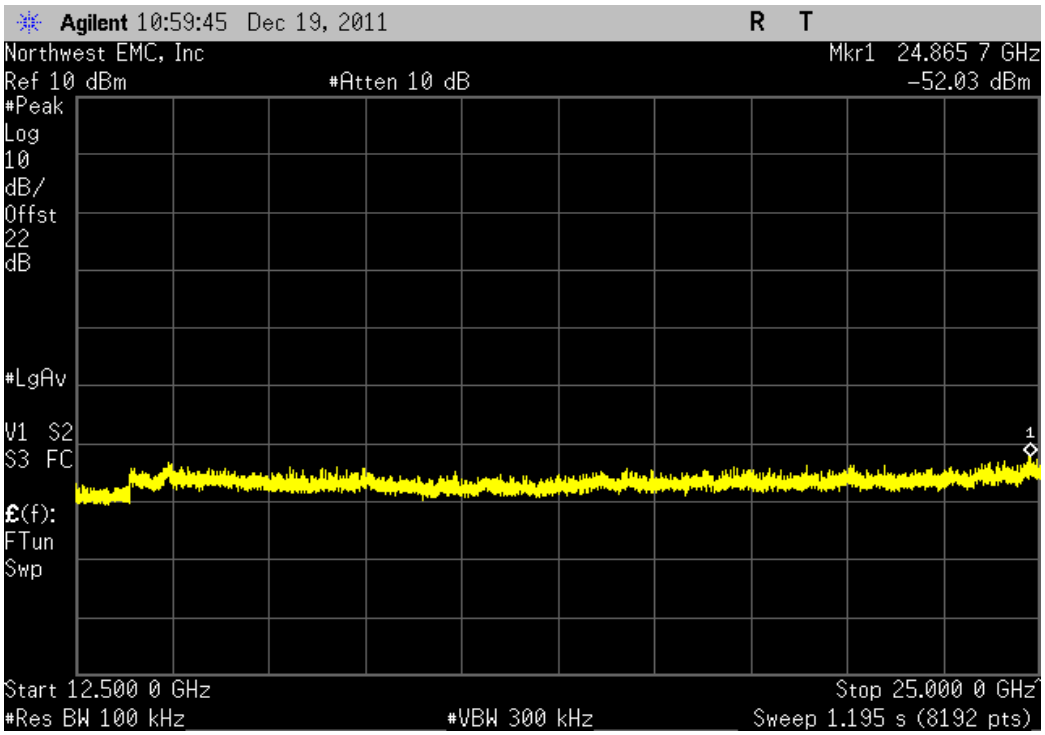
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-46.05 dBc	≤ -20 dBc	Pass



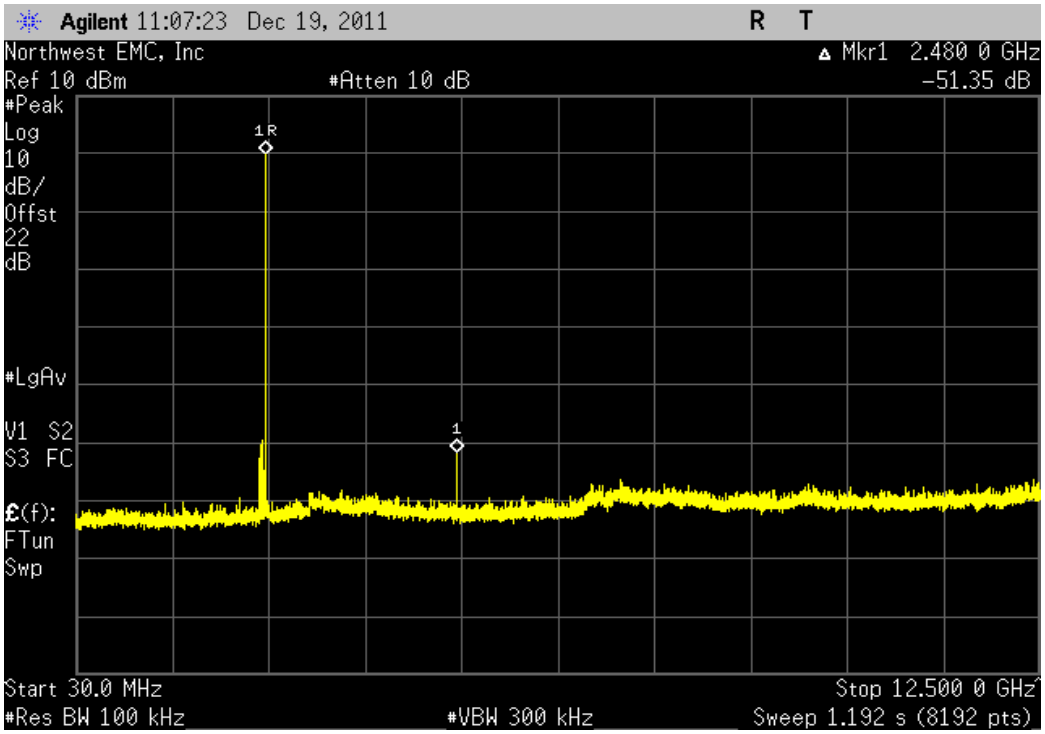
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-50.7 dBc	≤ -20 dBc	Pass



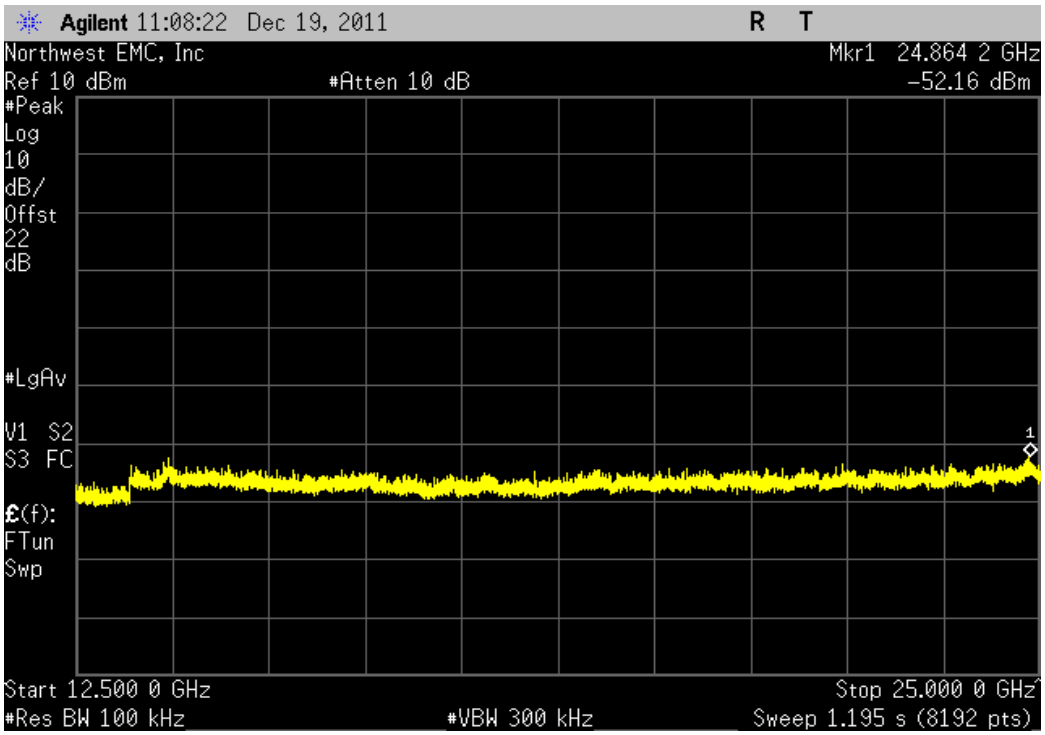
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-52.21 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-51.35 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-51.9 dBc	≤ -20 dBc	Pass



Frequency Stability

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
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZPH-32-3.5-SCT/AC	TBF	NCR	0
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Multimeter	Fluke	114	MMU	7/8/2011	24
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	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

Variation of Supply Voltage

The primary supply voltage was varied over the range specified by the client.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range as declared by the manufacturer (+10°, +22°C and +40° C).

The Frequency Stability was measured using a spectrum analyzer. The spectrum analyzer is configured with a precision frequency reference that exceeds the stability requirement of the transmitter. The EUT was placed inside a temperature / humidity chamber. A low-loss coaxial cable connected the EUT to the spectrum analyzer outside of the chamber.

NORTHWEST EMC

Frequency Stability

XMit 2011.10.26
PsaTx 2011.12.16

EUT:	CTM2			**Work Order:**	MDTR0042
Serial Number:	NKW001457N			**Date:**	12/20/11
Customer:	Medtronic Inc.			**Temperature:**	24.09°C
Attendees:	None			**Humidity:**	17%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Trevor Buls	**Power:**	2.75VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 95I:2011	ANSI/TIA/EIA-603-C-2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

COMMENTS

MDTR0012 Test Plan Configuration 6

DEVIATIONS FROM TEST STANDARD

None

Configuration #	4	Signature	Trevor Buls

	Measured (MHz)	Assigned (MHz)	Error (ppm)	Limit (ppm)	Result
Normal Temperature					
Normal Voltage +2.75 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149617	N/A	N/A	N/A	N/A
Mid Channel, 403.35 MHz	403.349702	N/A	N/A	N/A	N/A
High Channel, 404.85 MHz	404.849669	N/A	N/A	N/A	N/A
Antenna PCB					
Low Channel, 402.15 MHz	402.149617	N/A	N/A	N/A	N/A
Mid Channel, 403.35 MHz	403.349685	N/A	N/A	N/A	N/A
High Channel, 404.85 MHz	404.849669	N/A	N/A	N/A	N/A
Extreme Voltage +3.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149617	402.149617	0.0	100	Pass
Mid Channel, 403.35 MHz	403.349702	403.349702	0.0	100	Pass
High Channel, 404.85 MHz	404.849669	404.849669	0.0	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149601	402.149617	0.0	100	Pass
Mid Channel, 403.35 MHz	403.349701	403.349685	0.0	100	Pass
High Channel, 404.85 MHz	404.849669	404.849669	0.0	100	Pass
Extreme Voltage +2.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149618	402.149617	0.0	100	Pass
Mid Channel, 403.35 MHz	403.349702	403.349702	0.0	100	Pass
High Channel, 404.85 MHz	404.849669	404.849669	0.0	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149601	402.149617	0.0	100	Pass
Mid Channel, 403.35 MHz	403.349685	403.349685	0.0	100	Pass
High Channel, 404.85 MHz	404.849668	404.849669	0.0	100	Pass
Extreme Temperature +40°C					
Normal Voltage +2.75 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149584	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349702	0.1	100	Pass
High Channel, 404.85 MHz	404.849636	404.849669	0.1	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149567	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349685	0.0	100	Pass
High Channel, 404.85 MHz	404.849636	404.849669	0.1	100	Pass
Extreme Voltage +3.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149584	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349702	0.1	100	Pass
High Channel, 404.85 MHz	404.849636	404.849669	0.1	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149585	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349685	0.0	100	Pass
High Channel, 404.85 MHz	404.849637	404.849669	0.1	100	Pass
Extreme Voltage +2.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149585	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349702	0.1	100	Pass
High Channel, 404.85 MHz	404.849636	404.849669	0.1	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149584	402.149617	0.1	100	Pass
Mid Channel, 403.35 MHz	403.349668	403.349685	0.0	100	Pass
High Channel, 404.85 MHz	404.849636	404.849669	0.1	100	Pass
Extreme Temperature +10°C					
Normal Voltage +2.75 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149401	402.149617	0.5	100	Pass
Mid Channel, 403.35 MHz	403.349469	403.349702	0.6	100	Pass
High Channel, 404.85 MHz	404.849452	404.849669	0.5	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149385	402.149617	0.6	100	Pass
Mid Channel, 403.35 MHz	403.349469	403.349685	0.5	100	Pass
High Channel, 404.85 MHz	404.849436	404.849669	0.6	100	Pass
Extreme Voltage +3.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149401	402.149617	0.5	100	Pass
Mid Channel, 403.35 MHz	403.349486	403.349702	0.5	100	Pass
High Channel, 404.85 MHz	404.849452	404.849669	0.5	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149401	402.149617	0.5	100	Pass
Mid Channel, 403.35 MHz	403.349486	403.349685	0.5	100	Pass
High Channel, 404.85 MHz	404.849452	404.849669	0.5	100	Pass
Extreme Voltage +2.2 V					
Antenna Coil					
Low Channel, 402.15 MHz	402.149401	402.149617	0.5	100	Pass
Mid Channel, 403.35 MHz	403.349486	403.349702	0.5	100	Pass
High Channel, 404.85 MHz	404.849452	404.849669	0.5	100	Pass
Antenna PCB					
Low Channel, 402.15 MHz	402.149385	402.149617	0.6	100	Pass
Mid Channel, 403.35 MHz	403.349469	403.349685	0.5	100	Pass
High Channel, 404.85 MHz	404.849451	404.849669	0.5	100	Pass

Receiver Spurious 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

Receiving MICS, mode 1, Ch 1, 5, 10: 402.15 MHz, 403.35 MHz, 404.85 MHz with PCB/Coil Antenna (See Comments)

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0042 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	5 GHz

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	AMF-3D-00100800-32-13P	AVX	7/1/2011	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	10/18/2011	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/29/2011	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	2/2/2011	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2011	12 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	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) (Radiated Power via Substitution: +0.69, -0.68) 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 highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band receive frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp was used for this test in order to provide sufficient measurement

NORTHWEST
EMC

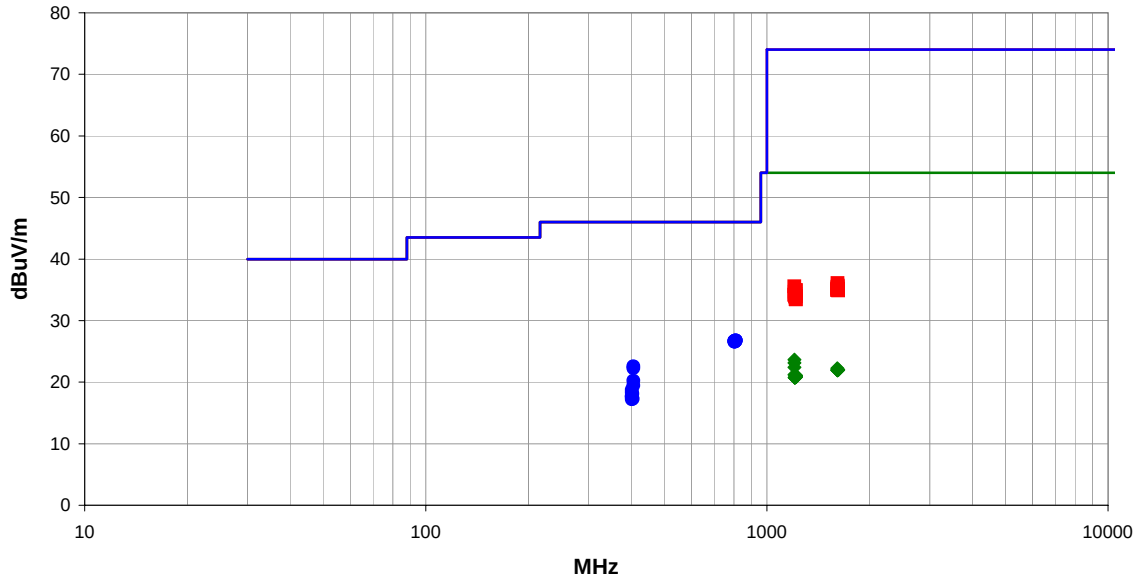
Receiver Spurious Emissions

PSA-ESCI 2011.07.26
PSA-ESCI Version 2011.06.23

Work Order:	MDTR0042	**Date:**	12/15/11		
Project:	None	**Temperature:**	24.39 °C		
Job Site:	MN05	**Humidity:**	20.96% RH		
Serial Number:	NKW001518N	**Barometric Pres.:**	1011.4 mbar	**Tested by:**	Trevor Buls
EUT:	CTM2				
Configuration:	2				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Receiving MICS, mode 1, Ch 1, 5, 10: 402.15 MHz, 403.35 MHz, 404.85 MHz with PCB/Coil Antenna (See Comments)				
Deviations:	None				
Comments:	MDTR0012 Test Plan Configuration 6				

Test Specifications	**Class B**	**Test Method**
FCC 15.109:2011		ANSI C63.4:2003
RSS-243:2010		RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

Run #	54	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
810.953	17.0	9.8	2.2	243.0	3.0	0.0	Horz	QP	0.0	26.8	40.4	-13.6	Ch 10, Coil, EUT Vertical
810.760	17.0	9.8	1.0	169.0	3.0	0.0	Horz	QP	0.0	26.8	40.4	-13.6	Ch 10, PCB, EUT Vertical
808.798	17.0	9.7	1.0	178.0	3.0	0.0	Vert	QP	0.0	26.7	40.4	-13.7	Ch 10, Coil, EUT Vertical
805.034	17.0	9.7	2.4	231.0	3.0	0.0	Vert	QP	0.0	26.7	40.4	-13.7	Ch 5, PCB, EUT Vertical
803.817	17.0	9.7	1.0	128.0	3.0	0.0	Vert	QP	0.0	26.7	40.4	-13.7	Ch 1, PCB, EUT Vertical
810.614	16.9	9.7	1.0	173.0	3.0	0.0	Vert	QP	0.0	26.6	40.4	-13.8	Ch 10, PCB, EUT Vertical
802.593	17.0	9.6	1.9	121.0	3.0	0.0	Horz	QP	0.0	26.6	40.4	-13.8	Ch 1, PCB, EUT Vertical
806.910	16.9	9.7	1.0	321.0	3.0	0.0	Vert	QP	0.0	26.6	40.4	-13.8	Ch 5, Coil, EUT Vertical
806.628	16.9	9.7	1.0	72.0	3.0	0.0	Horz	QP	0.0	26.6	40.4	-13.8	Ch 5, Coil, EUT Vertical
806.501	16.9	9.7	1.0	268.0	3.0	0.0	Horz	QP	0.0	26.6	40.4	-13.8	Ch 5, PCB, EUT Vertical
805.834	16.9	9.7	1.0	164.0	3.0	0.0	Vert	QP	0.0	26.6	40.4	-13.8	Ch 1, Coil, EUT Vertical
803.522	16.9	9.6	3.9	55.0	3.0	0.0	Horz	QP	0.0	26.5	40.4	-13.9	Ch 1, Coil, EUT Vertical
406.007	22.3	0.2	1.8	179.0	3.0	0.0	Vert	QP	0.0	22.5	40.4	-17.9	Ch 10, Coil, EUT Vertical
406.004	22.0	0.2	1.0	112.0	3.0	0.0	Vert	QP	0.0	22.2	40.4	-18.2	Ch 10, PCB, EUT Vertical
406.003	20.0	0.2	1.0	84.0	3.0	0.0	Horz	QP	0.0	20.2	40.4	-20.2	Ch 10, PCB, EUT Vertical
406.002	19.2	0.2	1.0	46.0	3.0	0.0	Horz	QP	0.0	19.4	40.4	-21.0	Ch 10, Coil, EUT Vertical
401.638	18.7	0.0	1.6	291.0	3.0	0.0	Vert	QP	0.0	18.7	40.4	-21.7	Ch 1, PCB, EUT Vertical
401.666	18.3	0.0	1.0	220.0	3.0	0.0	Vert	QP	0.0	18.3	40.4	-22.1	Ch 1, Coil, EUT Vertical
403.560	18.0	0.1	1.0	334.0	3.0	0.0	Vert	QP	0.0	18.1	40.4	-22.3	Ch 5, Coil, EUT Vertical
401.876	17.7	0.0	1.0	119.0	3.0	0.0	Horz	QP	0.0	17.7	40.4	-22.7	Ch 5, PCB, EUT Vertical
401.633	17.7	0.0	3.0	59.0	3.0	0.0	Vert	QP	0.0	17.7	40.4	-22.7	Ch 5, PCB, EUT Vertical
401.896	17.5	0.0	1.3	343.0	3.0	0.0	Horz	QP	0.0	17.5	40.4	-22.9	Ch 1, PCB, EUT Vertical

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
404.723	17.1	0.2	1.0	230.0	3.0	0.0	Horz	QP	0.0	17.3	40.4	-23.1	Ch 5, Coil, EUT Vertical
402.300	17.2	0.0	1.0	321.0	3.0	0.0	Horz	QP	0.0	17.2	40.4	-23.2	Ch 1, Coil, EUT Vertical
1204.000	30.9	-7.3	1.0	61.0	3.0	0.0	Vert	AV	0.0	23.6	54.0	-30.4	Ch 1, Coil, EUT Vertical
1204.000	30.4	-7.3	1.0	204.0	3.0	0.0	Vert	AV	0.0	23.1	54.0	-30.9	Ch 1, PCB, EUT Vertical
1204.000	29.7	-7.3	1.0	192.0	3.0	0.0	Horz	AV	0.0	22.4	54.0	-31.6	Ch 1, PCB, EUT Vertical
1609.992	28.0	-5.7	1.0	190.0	3.0	0.0	Vert	AV	0.0	22.3	54.0	-31.7	Ch 1, Coil, EUT Vertical
1613.225	27.8	-5.7	1.0	150.0	3.0	0.0	Vert	AV	0.0	22.1	54.0	-31.9	Ch 5, PCB, EUT Vertical
1617.175	27.7	-5.7	3.5	217.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 10, PCB, EUT Vertical
1617.050	27.7	-5.7	1.0	280.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 10, PCB, EUT Vertical
1613.575	27.7	-5.7	1.0	284.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 5, Coil, EUT Vertical
1613.350	27.7	-5.7	1.0	105.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 5, Coil, EUT Vertical
1610.967	27.7	-5.7	1.0	360.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 5, PCB, EUT Vertical
1610.317	27.7	-5.7	1.0	326.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 1, PCB, EUT Vertical
1610.217	27.7	-5.7	1.0	106.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 1, Coil, EUT Vertical
1610.017	27.7	-5.7	1.0	197.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 1, PCB, EUT Vertical
1204.000	28.5	-7.3	1.0	72.0	3.0	0.0	Horz	AV	0.0	21.2	54.0	-32.8	Ch 1, Coil, EUT Vertical
1217.100	28.2	-7.2	1.0	166.0	3.0	0.0	Vert	AV	0.0	21.0	54.0	-33.0	Ch 10, Coil, EUT Vertical
1217.100	28.2	-7.2	1.0	252.0	3.0	0.0	Vert	AV	0.0	21.0	54.0	-33.0	Ch 10, Coil, EUT Vertical
1217.092	28.1	-7.2	1.0	176.0	3.0	0.0	Vert	AV	0.0	20.9	54.0	-33.1	Ch 10, PCB, EUT Vertical
1217.100	28.1	-7.2	1.0	15.0	3.0	0.0	Horz	AV	0.0	20.9	54.0	-33.1	Ch 10, Coil, EUT Vertical
1217.100	28.0	-7.2	1.0	233.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 10, PCB, EUT Vertical
1216.417	28.0	-7.2	3.2	314.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 10, Coil, EUT Vertical
1208.092	28.0	-7.2	1.2	110.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 5, PCB, EUT Vertical
1207.892	28.0	-7.2	1.8	15.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 5, PCB, EUT Vertical
1207.650	28.0	-7.2	2.8	326.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 5, Coil, EUT Vertical
1207.650	28.0	-7.2	1.0	225.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 5, Coil, EUT Vertical
1611.050	41.8	-5.7	1.0	360.0	3.0	0.0	Horz	PK	0.0	36.1	74.0	-37.9	Ch 5, PCB, EUT Vertical
1613.733	41.4	-5.7	1.0	150.0	3.0	0.0	Vert	PK	0.0	35.7	74.0	-38.3	Ch 5, PCB, EUT Vertical
1204.133	42.8	-7.3	1.0	61.0	3.0	0.0	Vert	PK	0.0	35.5	74.0	-38.5	Ch 1, Coil, EUT Vertical
1613.250	41.2	-5.7	1.0	284.0	3.0	0.0	Vert	PK	0.0	35.5	74.0	-38.5	Ch 5, Coil, EUT Vertical
1610.300	41.1	-5.7	1.0	190.0	3.0	0.0	Vert	PK	0.0	35.4	74.0	-38.6	Ch 1, Coil, EUT Vertical
1609.867	40.9	-5.7	1.0	197.0	3.0	0.0	Horz	PK	0.0	35.2	74.0	-38.8	Ch 1, PCB, EUT Vertical
1617.158	40.8	-5.7	3.5	217.0	3.0	0.0	Horz	PK	0.0	35.1	74.0	-38.9	Ch 10, PCB, EUT Vertical
1614.100	40.8	-5.7	1.0	105.0	3.0	0.0	Horz	PK	0.0	35.1	74.0	-38.9	Ch 5, Coil, EUT Vertical
1611.008	40.7	-5.7	1.0	106.0	3.0	0.0	Horz	PK	0.0	35.0	74.0	-39.0	Ch 1, Coil, EUT Vertical
1608.808	40.7	-5.7	1.0	326.0	3.0	0.0	Vert	PK	0.0	35.0	74.0	-39.0	Ch 1, PCB, EUT Vertical
1216.825	42.1	-7.2	1.0	233.0	3.0	0.0	Horz	PK	0.0	34.9	74.0	-39.1	Ch 10, PCB, EUT Vertical
1215.600	42.1	-7.2	1.0	252.0	3.0	0.0	Vert	PK	0.0	34.9	74.0	-39.1	Ch 10, Coil, EUT Vertical
1618.567	40.6	-5.7	1.0	280.0	3.0	0.0	Vert	PK	0.0	34.9	74.0	-39.1	Ch 10, PCB, EUT Vertical
1206.158	41.9	-7.3	1.0	204.0	3.0	0.0	Vert	PK	0.0	34.6	74.0	-39.4	Ch 1, PCB, EUT Vertical
1213.483	41.5	-7.2	3.2	314.0	3.0	0.0	Horz	PK	0.0	34.3	74.0	-39.7	Ch 10, Coil, EUT Vertical
1207.342	41.5	-7.2	1.0	192.0	3.0	0.0	Horz	PK	0.0	34.3	74.0	-39.7	Ch 1, PCB, EUT Vertical
1209.500	41.4	-7.2	1.0	225.0	3.0	0.0	Horz	PK	0.0	34.2	74.0	-39.8	Ch 5, Coil, EUT Vertical
1204.533	41.4	-7.3	1.0	72.0	3.0	0.0	Horz	PK	0.0	34.1	74.0	-39.9	Ch 1, Coil, EUT Vertical
1208.175	41.3	-7.2	1.8	15.0	3.0	0.0	Vert	PK	0.0	34.1	74.0	-39.9	Ch 5, PCB, EUT Vertical
1215.925	41.1	-7.2	1.0	166.0	3.0	0.0	Vert	PK	0.0	33.9	74.0	-40.1	Ch 10, Coil, EUT Vertical
1212.250	41.1	-7.2	1.2	110.0	3.0	0.0	Horz	PK	0.0	33.9	74.0	-40.1	Ch 5, PCB, EUT Vertical
1211.392	41.1	-7.2	2.8	326.0	3.0	0.0	Vert	PK	0.0	33.9	74.0	-40.1	Ch 5, Coil, EUT Vertical
1213.342	40.7	-7.2	1.0	15.0	3.0	0.0	Horz	PK	0.0	33.5	74.0	-40.5	Ch 10, Coil, EUT Vertical
1216.192	40.6	-7.2	1.0	176.0	3.0	0.0	Vert	PK	0.0	33.4	74.0	-40.6	Ch 10, PCB, EUT Vertical

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 MICS Mode 1, Ch 1, 5, 10: 402.15 MHz, 403.35 MHz, 404.85 MHz, PCB/Coil Antenna (See Comments)

POWER SETTINGS INVESTIGATED
Battery

CONFIGURATIONS INVESTIGATED
MDTR0042: CTM2 - 2

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	5 GHz

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.	Double Ridge Guide Horn Cables	MNI	10/18/2011	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2011	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/29/2011	24 mo
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
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) (Radiated Power via Substitution: +0.69, -0.68) 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 highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes. A preamp was used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST
EMC

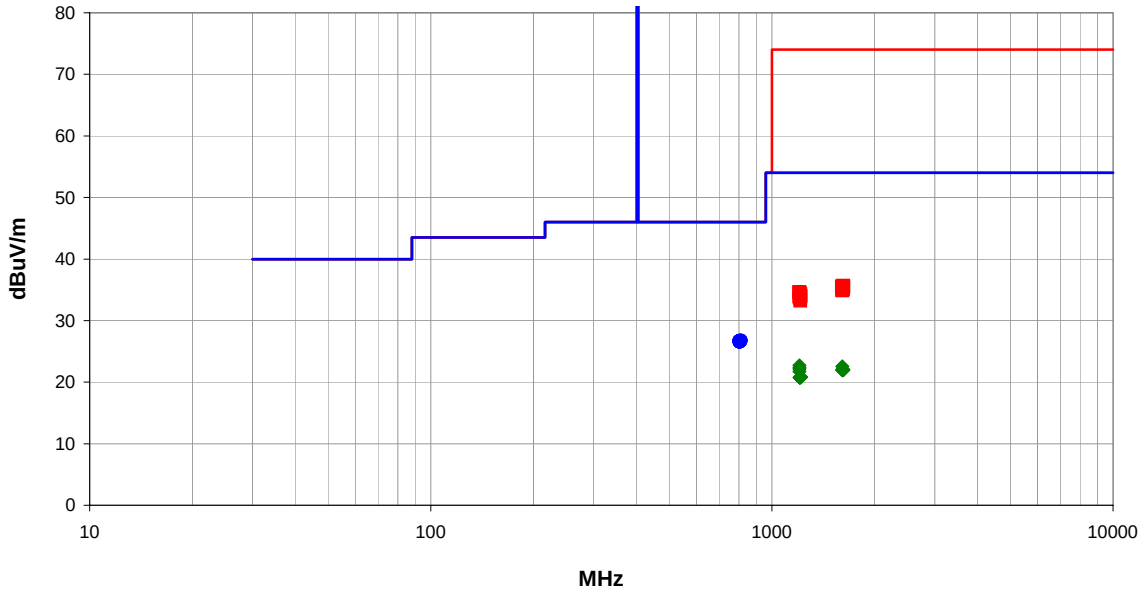
Spurious Radiated Emissions

PSA-ESCI 2011.07.26
PSA-ESCI Version 2011.06.23

Work Order:	MDTR0042	**Date:**	12/15/11		
Project:	None	**Temperature:**	24.39 °C		
Job Site:	MN05	**Humidity:**	20.96% RH		
Serial Number:	NKW001518N	**Barometric Pres.:**	1011.4 mbar	**Tested by:**	Trevor Buls
EUT:	CTM2				
Configuration:	2				
Customer:	Medtronic Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting MICS Mode 1, Ch 1, 5, 10: 402.15 MHz, 403.35 MHz, 404.85 MHz, PCB/Coil Antenna (See Comments)				
Deviations:	None				
Comments:	MDTR0012 Test Plan Configuration 6				

Test Specifications	**Test Method**
FCC 95I:2011	ANSI/TIA/EIA-603-C:2004
RSS-243:2010	RSS-Gen Issue 3:2010 EN 301 839-1 V1.3.1:2009

Run #	39	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
811.064	17.0	9.8	1.0	135.0	3.0	0.0	Horz	QP	0.0	26.8	46.0	-19.2	Ch 10, PCB, EUT Vertical
810.194	17.0	9.7	1.0	103.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 10, PCB, EUT Vertical
809.554	17.0	9.7	1.0	61.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 10, Coil, EUT Vertical
809.507	17.0	9.7	1.0	241.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 10, Coil, EUT Vertical
804.742	17.0	9.7	1.0	269.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT on Side
804.732	17.0	9.7	2.5	42.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT Horizontal
804.528	17.0	9.7	3.4	344.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 1, Coil, EUT Horizontal
804.471	17.0	9.7	1.0	95.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT Vertical
804.471	17.0	9.7	1.0	10.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 5, PCB, EUT Vertical
804.256	17.0	9.7	1.0	293.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT Horizontal
804.117	17.0	9.7	1.0	31.0	3.0	0.0	Horz	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT Vertical
803.994	17.0	9.7	1.0	95.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 1, Coil, EUT on Side
803.962	17.0	9.7	1.0	296.0	3.0	0.0	Vert	QP	0.0	26.7	46.0	-19.3	Ch 1, PCB, EUT on Side
808.501	16.9	9.7	1.0	194.0	3.0	0.0	Vert	QP	0.0	26.6	46.0	-19.4	Ch 5, PCB, EUT Vertical
806.272	16.9	9.7	3.4	184.0	3.0	0.0	Vert	QP	0.0	26.6	46.0	-19.4	Ch 5, Coil, EUT Vertical
806.195	16.9	9.7	1.0	82.0	3.0	0.0	Horz	QP	0.0	26.6	46.0	-19.4	Ch 5, Coil, EUT Vertical
804.216	16.9	9.7	1.0	129.0	3.0	0.0	Horz	QP	0.0	26.6	46.0	-19.4	Ch 1, Coil, EUT Vertical
804.100	16.9	9.7	1.0	254.0	3.0	0.0	Vert	QP	0.0	26.6	46.0	-19.4	Ch 1, Coil, EUT Vertical
804.070	16.9	9.7	1.0	90.0	3.0	0.0	Vert	QP	0.0	26.6	46.0	-19.4	Ch 1, Coil, EUT Horizontal
803.813	16.9	9.7	1.0	198.0	3.0	0.0	Horz	QP	0.0	26.6	46.0	-19.4	Ch 1, Coil, EUT on Side
1204.000	30.0	-7.3	1.0	147.0	3.0	0.0	Vert	AV	0.0	22.7	54.0	-31.3	Ch 1, PCB, EUT Vertical
1610.000	28.3	-5.7	1.0	107.0	3.0	0.0	Vert	AV	0.0	22.6	54.0	-31.4	Ch 1, Coil, EUT Vertical

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
1204.008	29.6	-7.3	1.0	345.0	3.0	0.0	Vert	AV	0.0	22.3	54.0	-31.7	Ch 1, Coil, EUT Vertical
1204.000	29.4	-7.3	1.0	21.0	3.0	0.0	Horz	AV	0.0	22.1	54.0	-31.9	Ch 1, Coil, EUT Vertical
1613.525	27.8	-5.7	4.0	350.0	3.0	0.0	Vert	AV	0.0	22.1	54.0	-31.9	Ch 5, PCB, EUT Vertical
1610.058	27.8	-5.7	1.0	292.0	3.0	0.0	Vert	AV	0.0	22.1	54.0	-31.9	Ch 1, PCB, EUT Vertical
1619.125	27.7	-5.7	2.8	92.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 10, PCB, EUT Vertical
1617.317	27.7	-5.7	1.0	210.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 10, Coil, EUT Vertical
1617.217	27.7	-5.7	1.0	99.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 10, Coil, EUT Vertical
1616.908	27.7	-5.7	1.0	349.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 10, PCB, EUT Vertical
1615.117	27.7	-5.7	3.7	277.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 5, PCB, EUT Vertical
1613.783	27.7	-5.7	3.6	305.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 5, Coil, EUT Vertical
1613.333	27.7	-5.7	1.0	15.0	3.0	0.0	Vert	AV	0.0	22.0	54.0	-32.0	Ch 5, Coil, EUT Vertical
1610.317	27.7	-5.7	2.5	188.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 1, Coil, EUT Vertical
1609.800	27.7	-5.7	3.5	211.0	3.0	0.0	Horz	AV	0.0	22.0	54.0	-32.0	Ch 1, PCB, EUT Vertical
1204.000	29.0	-7.3	1.9	22.0	3.0	0.0	Horz	AV	0.0	21.7	54.0	-32.3	Ch 1, PCB, EUT Vertical
1216.200	28.0	-7.2	2.9	183.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 10, PCB, EUT Vertical
1215.558	28.0	-7.2	1.0	105.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 10, Coil, EUT Vertical
1215.533	28.0	-7.2	1.0	230.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 10, PCB, EUT Vertical
1213.883	28.0	-7.2	2.2	346.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 10, Coil, EUT Vertical
1207.967	28.0	-7.2	1.0	251.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 5, PCB, EUT Vertical
1207.967	28.0	-7.2	1.0	263.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 5, Coil, EUT Vertical
1207.942	28.0	-7.2	1.4	88.0	3.0	0.0	Vert	AV	0.0	20.8	54.0	-33.2	Ch 5, PCB, EUT Vertical
1207.800	28.0	-7.2	1.0	137.0	3.0	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 5, Coil, EUT Vertical
1618.200	41.4	-5.7	1.0	99.0	3.0	0.0	Vert	PK	0.0	35.7	74.0	-38.3	Ch 10, Coil, EUT Vertical
1621.017	41.3	-5.7	1.0	349.0	3.0	0.0	Horz	PK	0.0	35.6	74.0	-38.4	Ch 10, PCB, EUT Vertical
1615.783	41.3	-5.7	1.0	15.0	3.0	0.0	Vert	PK	0.0	35.6	74.0	-38.4	Ch 5, Coil, EUT Vertical
1609.000	41.3	-5.7	3.5	211.0	3.0	0.0	Horz	PK	0.0	35.6	74.0	-38.4	Ch 1, PCB, EUT Vertical
1613.242	41.2	-5.7	3.7	277.0	3.0	0.0	Horz	PK	0.0	35.5	74.0	-38.5	Ch 5, PCB, EUT Vertical
1606.558	41.2	-5.7	1.0	107.0	3.0	0.0	Vert	PK	0.0	35.5	74.0	-38.5	Ch 1, Coil, EUT Vertical
1618.067	41.1	-5.7	2.8	92.0	3.0	0.0	Vert	PK	0.0	35.4	74.0	-38.6	Ch 10, PCB, EUT Vertical
1617.683	40.9	-5.7	1.0	210.0	3.0	0.0	Horz	PK	0.0	35.2	74.0	-38.8	Ch 10, Coil, EUT Vertical
1610.492	40.9	-5.7	2.5	188.0	3.0	0.0	Horz	PK	0.0	35.2	74.0	-38.8	Ch 1, Coil, EUT Vertical
1613.658	40.8	-5.7	3.9	350.0	3.0	0.0	Vert	PK	0.0	35.1	74.0	-38.9	Ch 5, PCB, EUT Vertical
1606.842	40.7	-5.7	1.0	292.0	3.0	0.0	Vert	PK	0.0	35.0	74.0	-39.0	Ch 1, PCB, EUT Vertical
1612.492	40.6	-5.7	3.6	305.0	3.0	0.0	Horz	PK	0.0	34.9	74.0	-39.1	Ch 5, Coil, EUT Vertical
1204.342	41.9	-7.3	1.0	345.0	3.0	0.0	Vert	PK	0.0	34.6	74.0	-39.4	Ch 1, Coil, EUT Vertical
1204.017	41.9	-7.3	1.9	22.0	3.0	0.0	Horz	PK	0.0	34.6	74.0	-39.4	Ch 1, PCB, EUT Vertical
1207.742	41.7	-7.2	1.0	21.0	3.0	0.0	Horz	PK	0.0	34.5	74.0	-39.5	Ch 1, Coil, EUT Vertical
1212.317	41.5	-7.2	2.2	346.0	3.0	0.0	Vert	PK	0.0	34.3	74.0	-39.7	Ch 10, Coil, EUT Vertical
1210.900	41.3	-7.2	1.4	88.0	3.0	0.0	Vert	PK	0.0	34.1	74.0	-39.9	Ch 5, PCB, EUT Vertical
1208.842	41.3	-7.2	1.0	137.0	3.0	0.0	Horz	PK	0.0	34.1	74.0	-39.9	Ch 5, Coil, EUT Vertical
1215.517	41.2	-7.2	1.0	230.0	3.0	0.0	Horz	PK	0.0	34.0	74.0	-40.0	Ch 10, PCB, EUT Vertical
1209.142	41.2	-7.2	1.0	251.0	3.0	0.0	Horz	PK	0.0	34.0	74.0	-40.0	Ch 5, PCB, EUT Vertical
1204.400	41.2	-7.3	1.0	147.0	3.0	0.0	Vert	PK	0.0	33.9	74.0	-40.1	Ch 1, PCB, EUT Vertical
1207.992	41.0	-7.2	1.0	263.0	3.0	0.0	Vert	PK	0.0	33.8	74.0	-40.2	Ch 5, Coil, EUT Vertical
1212.592	40.9	-7.2	2.9	183.0	3.0	0.0	Vert	PK	0.0	33.7	74.0	-40.3	Ch 10, PCB, EUT Vertical
1212.792	40.4	-7.2	1.0	105.0	3.0	0.0	Horz	PK	0.0	33.2	74.0	-40.8	Ch 10, Coil, EUT Vertical