



**Medtronic Inc.
Reveal LINQ™
FCC 95I:2013**

Report #: MDTR0228.1



Report Prepared By Northwest EMC Inc.

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

California – Minnesota – Oregon – New York – Washington

Last Date of Test: June 11, 2013
Medtronic Inc.
Model: Reveal LINQ

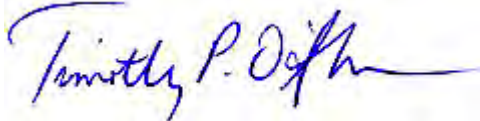
Emissions

Test Description	Specification	Test Method	Pass/Fail
Radiated Power (EIRP)	FCC 95I:2013, FCC 2.1046:2013	ANSI/TIA/EIA-603-C:2004	Pass
Spurious Radiated Emissions	FCC 95I:2013, FCC 2.1053:2013	ANSI/TIA/EIA-603-C:2004	Pass
Emission Bandwidth	FCC 95I:2013, FCC 2.1049:2013	ANSI/TIA/EIA-603-C:2004	Pass
Emission Mask	FCC 95I:2013, FCC 2.1049:2013	ANSI/TIA/EIA-603-C:2004	Pass
Frequency Stability	FCC 95I:2013, FCC 2.1055:2013	ANSI/TIA/EIA-603-C:2004	Pass

Deviations From Test Standards

None

Approved By:



Tim O'Shea, Operations Manager



NVLAP Lab Code: 200881-0

Test Facility

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

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

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

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

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

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

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Hong Kong

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

Vietnam

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

Russia

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

SCOPE

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

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

Measurement Uncertainty

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

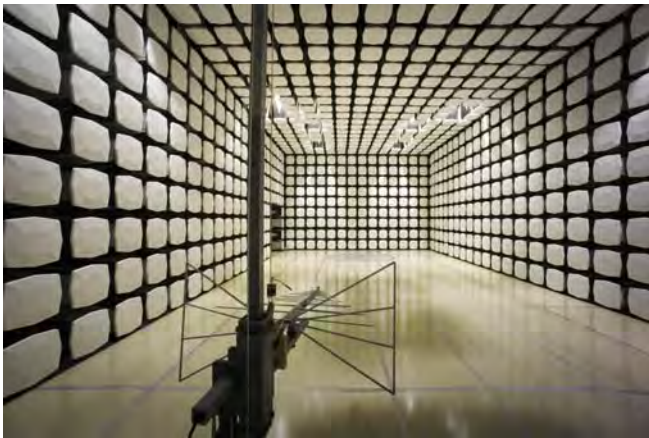
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is listed below. Our measurement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

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

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



Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Minnesota Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Washington Labs NC01-05, SU02, SU07 19201 120 th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-2	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0



Client and Equipment Under Test (EUT) Information

Company Name:	Medtronic Inc.
Address:	8200 Coral Sea St NE
City, State, Zip:	Mounds View, MN 55112
Test Requested By:	Yogi Shah
Model:	Reveal LINQ
First Date of Test:	June 6, 2013
Last Date of Test:	June 11, 2013
Receipt Date of Samples:	June 11, 2013
Equipment Design Stage:	Production
Equipment Condition:	New

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

The Medtronic Reveal LINQ Insertable Cardiac Monitor is a programmable device which continuously monitors a patient's ECG and other physiological parameters. The Reveal LINQ records cardiac information in response to automatically detected arrhythmias and patient activation. The device communicates via an inductive transceiver and a MEDS band transmitter operating in the lower MEDS wing band of 401-402 MHz

Testing Objective:

To demonstrate compliance with the MEDS lower wing band frequency of operation at 401.5 MHz \pm 0.14 MHz for FCC Part 95. The conducted output power and conducted spurious emissions required by 2.1046 and 2.1051 cannot be run on the device because the device is a small sealed system with no direct connect possibility. Instead, radiated power and radiated spurious emissions were performed to demonstrate compliance. The EUT will shut down RF transmission before a low voltage condition is reached, therefore no voltage conditions were tested in frequency stability because the RF transmission would cease.

Customer Provided Information:

Simulated Biological Solution Measurements			
Material/Liquid Type	Date Measured	Permittivity e' @ 403.5 MHz	Sigma - σ (Calculated Conductivity)
Simulated Biological Solution	11-Jul-2013	57.98	0.88



CONFIGURATIONS

Configuration MDTR0228- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
ICM	Medtronic Inc	LNQ11	RLA600209S

Configuration MDTR0228- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
ICM	Medtronic Inc	LNQ11	RLA600212S

Configuration MDTR0228- 3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
ICM	Medtronic Inc	LNQ11	RLA600216S

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	6/6/2013	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	6/6/2013	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.
3	6/11/2013	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.
4	6/11/2013	Emission 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.
5	6/11/2013	Frequency Stability	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	6/11/2013	Emissions Mask	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Radiated Power (EIRP)

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, 401.5 MHz \pm 0.14 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0228 - 1

MDTR0228 - 2

MDTR0228 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency | 401 MHz

Stop Frequency | 406 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
Pre-Amplifier	Miteq	AM-1616-1000	PAD	5/20/2013	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	5/20/2013	12 mo
Antenna, Bilog	Teseq	CBL 6141B	AYD	12/17/2012	12 mo
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

Per 95.627(g)(3), the maximum EIRP for a MEDS transmitter is 250nW. The Field Strength of the Fundamental data was converted to EIRP with the formula based upon the Friis transmission equation modified with 6 dB removed due to reflections from the ground plane: $EIRP = ((E/2) \cdot d)^2 / 30$ where E is V/m and d = distance = 3m, and $EIRP = W$.


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 radiated field strength 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 EUT was configured to transmit in a fixture that simulates the human torso. The dimensions of the test fixture and the characteristics of the tissue substitute material met the requirements 95.627(i) and FCC KDB 617965. The height of the transmitter was 1.5-meter above the reference ground plane.

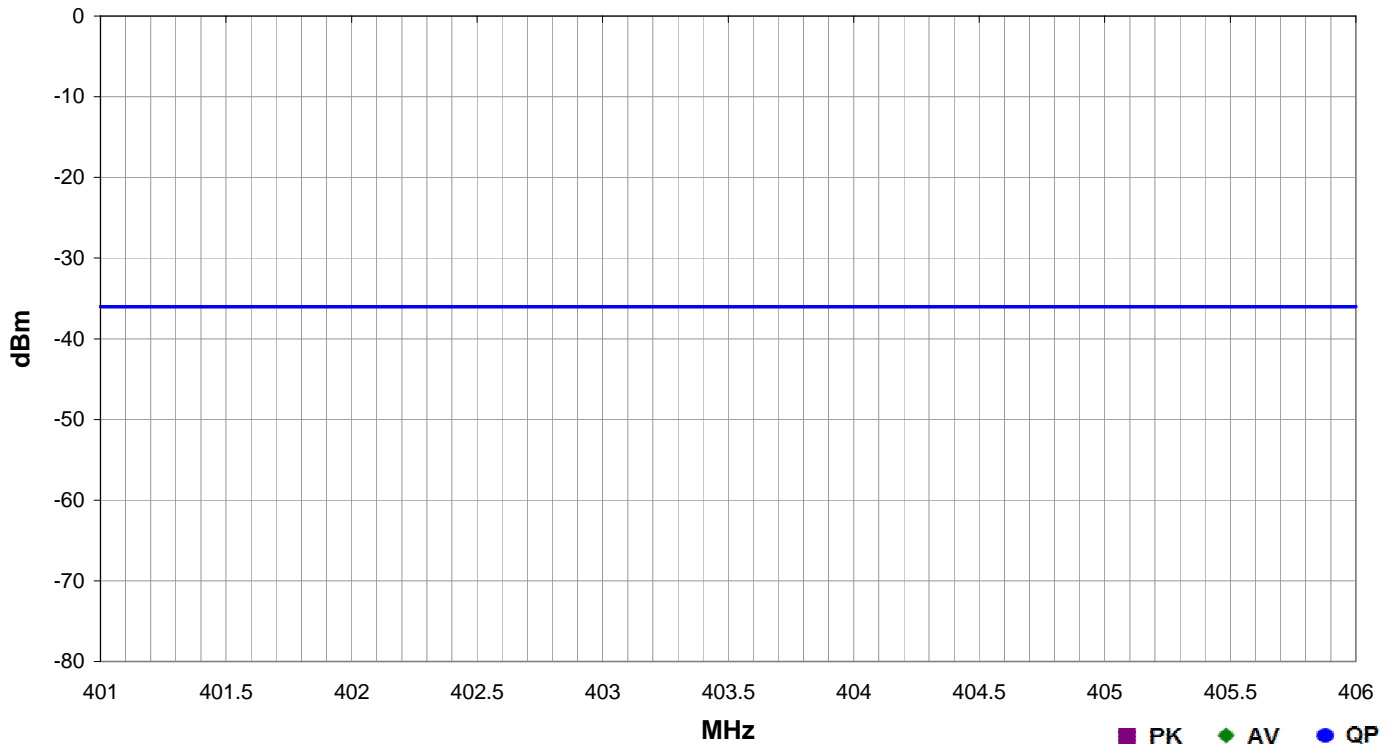


Radiated Power (EIRP)

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	21.7 °C	
Job Site:	MN05	Humidity:	43.9% RH	
Serial Number:	RLA600209S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	1			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 951:2013	ANSI/TIA/EIA-603-C:2004


Run #	1	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
401.519	1.7	0.0	Vert	6.26E-09	-52.0	-36.0	-16.0	EUT Vertical
401.527	1.9	220.0	Horz	1.40E-09	-58.5	-36.0	-22.5	EUT Vertical
401.512	1.2	55.0	Horz	2.07E-10	-66.8	-36.0	-30.8	EUT on Side
401.522	1.1	255.0	Horz	9.26E-11	-70.3	-36.0	-34.3	EUT Horizontal
401.530	1.0	351.0	Vert	9.05E-11	-70.4	-36.0	-34.4	EUT Horizontal
401.538	1.0	344.0	Vert	5.46E-11	-72.6	-36.0	-36.6	EUT on Side

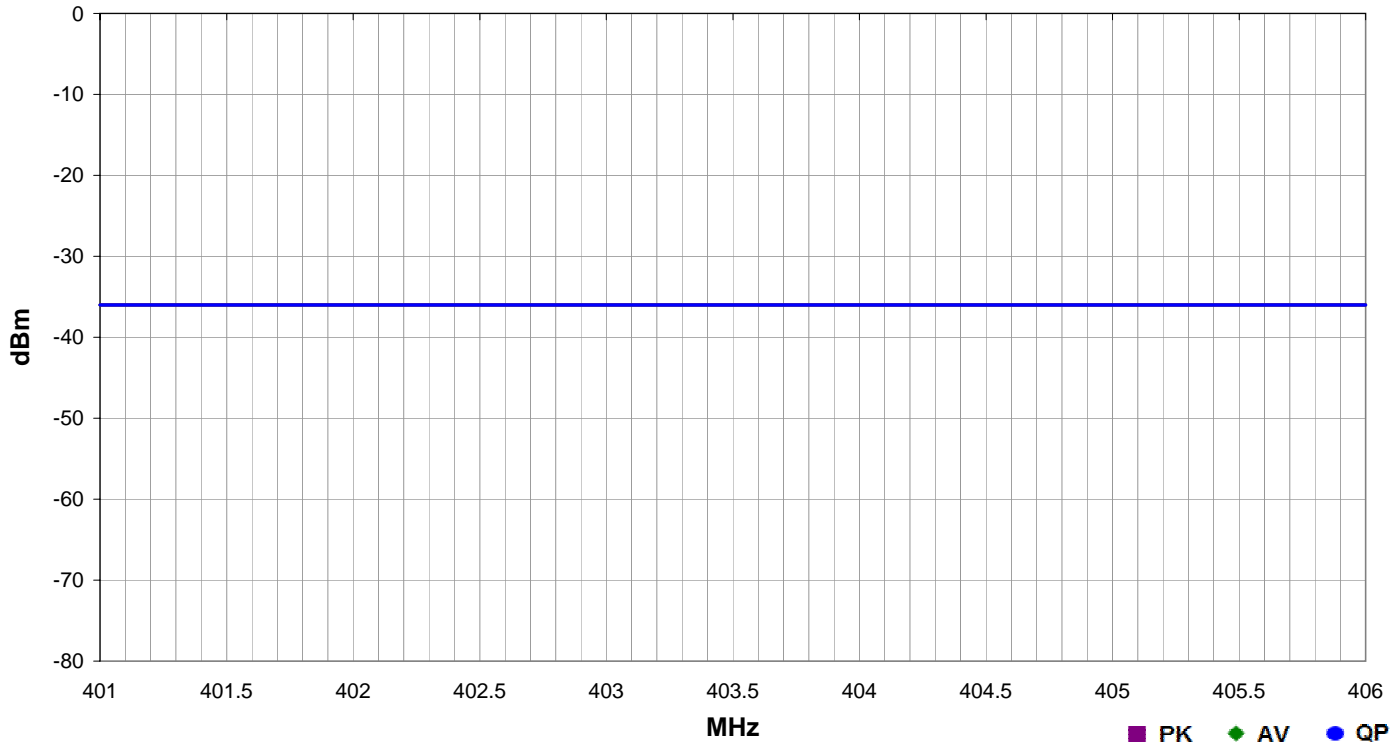


Radiated Power (EIRP)

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	21.7 °C	
Job Site:	MN05	Humidity:	43.9% RH	
Serial Number:	RLA600212S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	2			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 95I:2013	ANSI/TIA/EIA-603-C:2004

Run #	2	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
401.516	1.6	359.0	Vert	7.19E-09	-51.4	-36.0	-15.4	EUT Vertical
401.530	1.9	233.0	Horz	1.65E-09	-57.8	-36.0	-21.8	EUT Vertical
401.524	1.2	42.0	Horz	3.69E-10	-64.3	-36.0	-28.3	EUT on Side
401.514	1.2	39.0	Horz	2.80E-10	-65.5	-36.0	-29.5	EUT Horizontal
401.543	1.0	339.0	Vert	9.93E-11	-70.0	-36.0	-34.0	EUT Horizontal
401.529	1.0	336.0	Vert	6.26E-11	-72.0	-36.0	-36.0	EUT on Side

■ PK ◆ AV ● QP

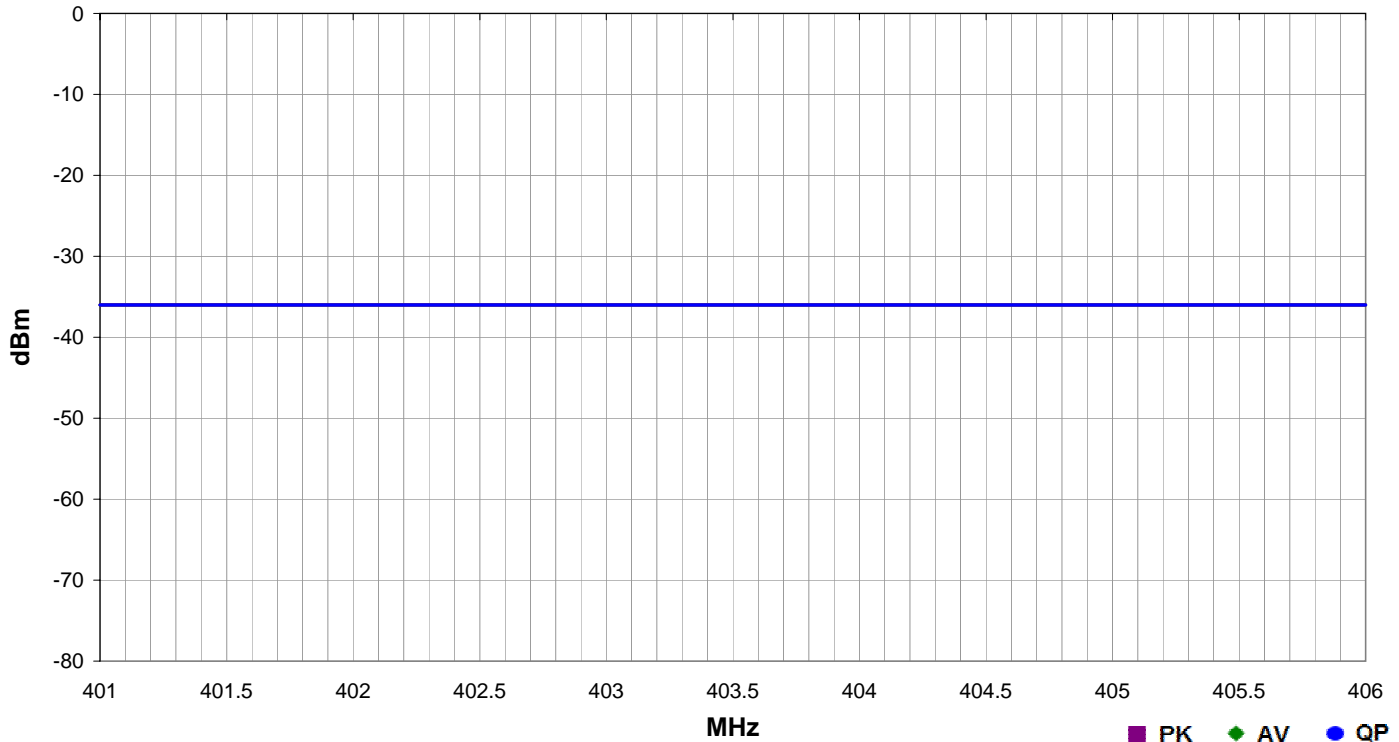


Radiated Power (EIRP)

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	21.7 °C	
Job Site:	MN05	Humidity:	43.9% RH	
Serial Number:	RLA600216S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	3			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 95I:2013	ANSI/TIA/EIA-603-C:2004

Run #	3	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
401.468	1.6	356.0	Vert	7.52E-09	-51.2	-36.0	-15.2	EUT Vertical
401.464	1.9	228.0	Horz	1.61E-09	-57.9	-36.0	-21.9	EUT Vertical
401.463	1.2	69.0	Horz	3.28E-10	-64.8	-36.0	-28.8	EUT on Side
401.453	2.1	91.0	Horz	1.16E-10	-69.3	-36.0	-33.3	EUT Horizontal
401.467	1.0	0.0	Vert	1.01E-10	-69.9	-36.0	-33.9	EUT Horizontal
401.472	1.7	5.0	Vert	8.84E-11	-70.5	-36.0	-34.5	EUT on Side

■ PK ◆ AV ● QP

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, 401.5 MHz \pm 0.14 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0228 - 1

MDTR0228 - 2

MDTR0228 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	5 GHz
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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	AMF-3D-00100800-32-13P	AVX	5/20/2013	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	5/20/2013	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/29/2011	36 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAD	5/20/2013	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	5/20/2013	12 mo
Antenna, Bilog	Teseq	CBL 6141B	AYD	12/17/2012	12 mo
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

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 (per ANSI C63.10:2009). A preamp was used for this test in order to provide sufficient measurement sensitivity.

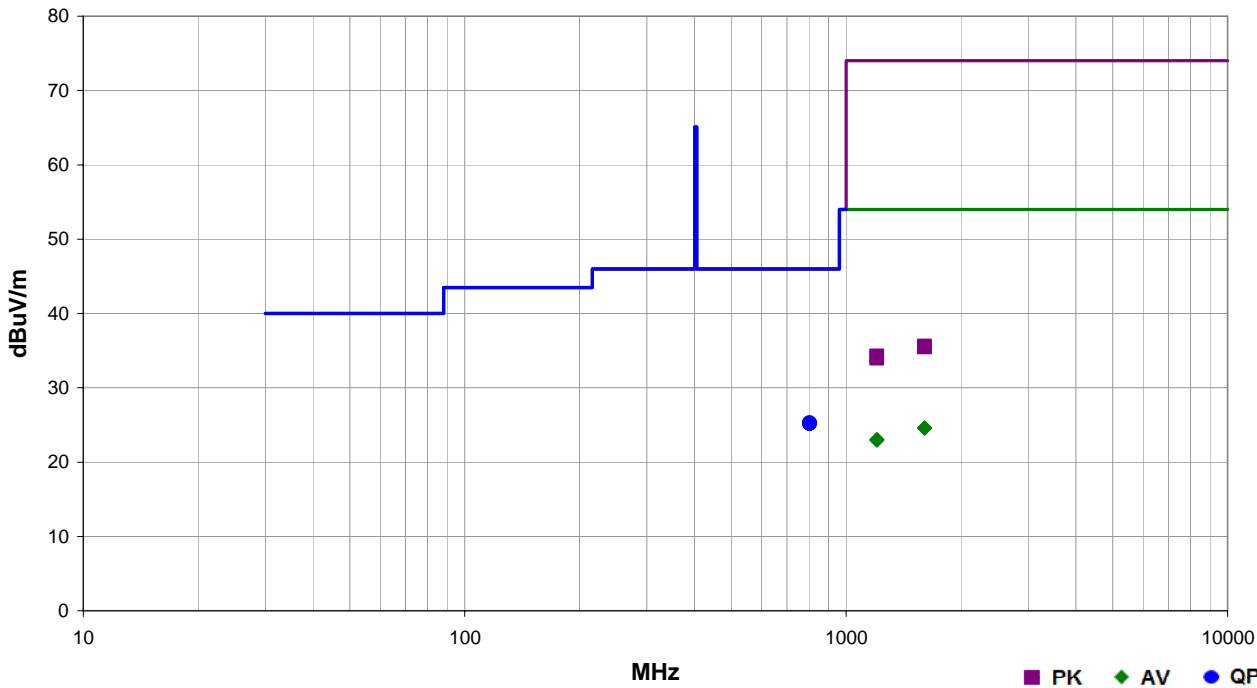


Spurious Radiated Emissions

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	22.5 °C	
Job Site:	MN05	Humidity:	47% RH	
Serial Number:	RLA600216S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	3			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			


Test Specifications	Test Method
FCC 951:2013	ANSI/TIA/EIA-603-C:2004

Run #	4	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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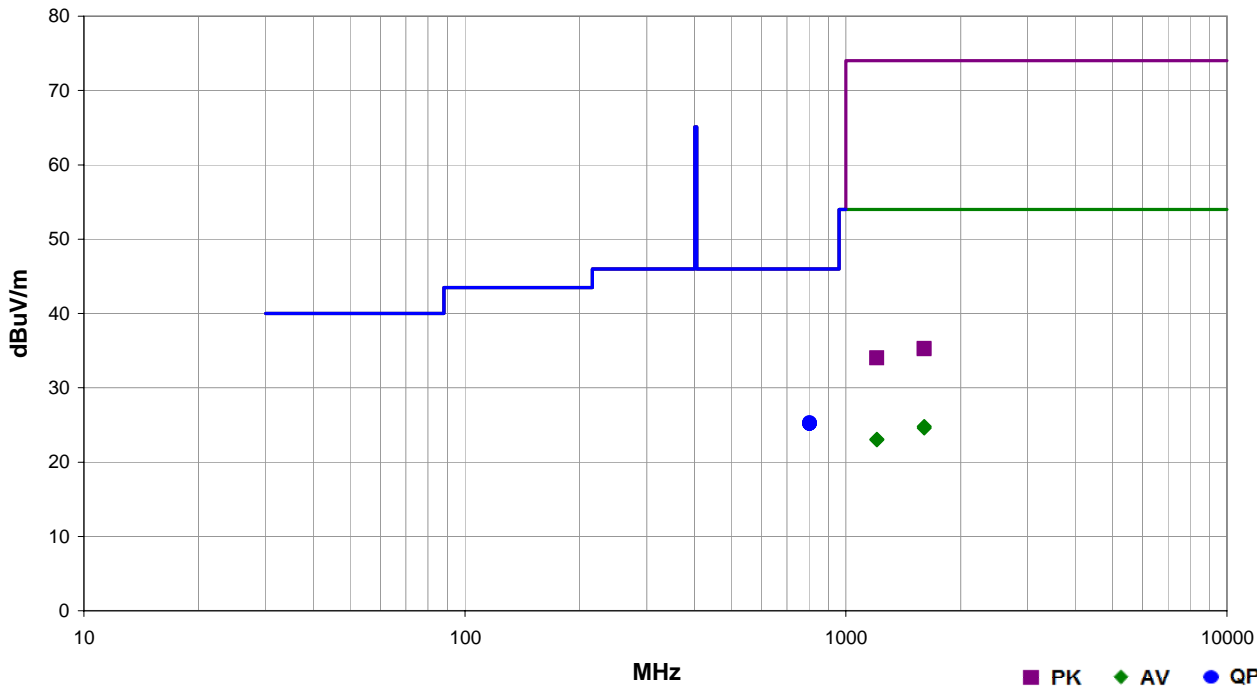
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
803.086	17.1	8.2	1.0	262.0	3.0	0.0	Horz	QP	0.0	25.3	46.0	-20.7	EUT Vertical
803.109	17.0	8.2	4.0	250.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
803.002	17.0	8.2	1.2	106.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
802.848	17.0	8.2	2.0	353.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT on Side
802.828	17.0	8.2	1.0	117.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT Vertical
802.817	17.0	8.2	2.9	255.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT on Side
1606.032	30.2	-5.6	3.7	153.0	3.0	0.0	Vert	AV	0.0	24.6	54.0	-29.4	EUT Vertical
1605.995	30.2	-5.6	1.7	34.0	3.0	0.0	Horz	AV	0.0	24.6	54.0	-29.4	EUT Vertical
1204.540	30.3	-7.2	1.2	239.0	3.0	0.0	Horz	AV	0.0	23.1	54.0	-30.9	EUT Vertical
1204.500	30.2	-7.2	1.2	194.0	3.0	0.0	Vert	AV	0.0	23.0	54.0	-31.0	EUT Vertical
1605.952	41.2	-5.6	1.7	34.0	3.0	0.0	Horz	PK	0.0	35.6	74.0	-38.4	EUT Vertical
1606.000	41.1	-5.6	3.7	153.0	3.0	0.0	Vert	PK	0.0	35.5	74.0	-38.5	EUT Vertical
1204.496	41.5	-7.2	1.2	194.0	3.0	0.0	Vert	PK	0.0	34.3	74.0	-39.7	EUT Vertical
1204.501	41.2	-7.2	1.2	239.0	3.0	0.0	Horz	PK	0.0	34.0	74.0	-40.0	EUT Vertical

Spurious Radiated Emissions

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	22.5 °C	
Job Site:	MN05	Humidity:	47% RH	
Serial Number:	RLA600212S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	2			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 951:2013	ANSI/TIA/EIA-603-C:2004

Run #	5	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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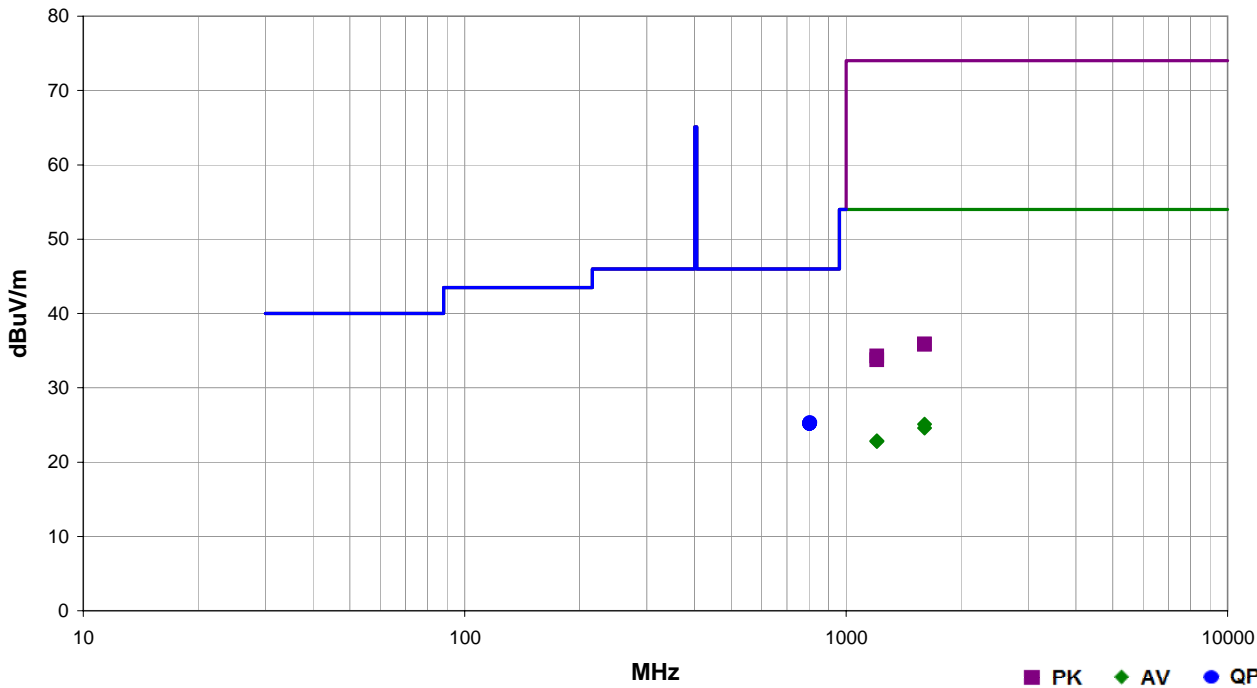
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
802.860	17.1	8.2	3.7	197.0	3.0	0.0	Vert	QP	0.0	25.3	46.0	-20.7	EUT Vertical
803.210	17.0	8.2	1.0	316.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
803.168	17.0	8.2	1.6	190.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT Vertical
803.092	17.0	8.2	1.0	250.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT on Side
802.875	17.0	8.2	1.8	117.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT on Side
802.753	17.0	8.2	1.0	240.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
1606.027	30.4	-5.6	1.2	360.0	3.0	0.0	Vert	AV	0.0	24.8	54.0	-29.2	EUT Vertical
1606.023	30.2	-5.6	1.2	21.0	3.0	0.0	Horz	AV	0.0	24.6	54.0	-29.4	EUT Vertical
1204.460	30.3	-7.2	1.2	88.0	3.0	0.0	Vert	AV	0.0	23.1	54.0	-30.9	EUT Vertical
1204.503	30.2	-7.2	1.2	213.0	3.0	0.0	Horz	AV	0.0	23.0	54.0	-31.0	EUT Vertical
1605.991	40.9	-5.6	1.2	360.0	3.0	0.0	Vert	PK	0.0	35.3	74.0	-38.7	EUT Vertical
1606.036	40.8	-5.6	1.2	21.0	3.0	0.0	Horz	PK	0.0	35.2	74.0	-38.8	EUT Vertical
1204.463	41.2	-7.2	1.2	88.0	3.0	0.0	Vert	PK	0.0	34.0	74.0	-40.0	EUT Vertical
1204.550	41.2	-7.2	1.2	213.0	3.0	0.0	Horz	PK	0.0	34.0	74.0	-40.0	EUT Vertical

Spurious Radiated Emissions

Work Order:	MDTR0228	Date:	06/06/13	
Project:	None	Temperature:	22.5 °C	
Job Site:	MN05	Humidity:	47% RH	
Serial Number:	RLA600209S	Barometric Pres.:	1015.3 mbar	
EUT:	Reveal LINQ			
Configuration:	1			
Customer:	Medtronic Inc.			
Attendees:	Nick Blake			
EUT Power:	Battery			
Operating Mode:	Transmitting, 401.5 MHz ± 0.14 MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 951:2013	ANSI/TIA/EIA-603-C:2004

Run #	6	Test Distance (m)	3	Antenna Height(s)	1-4m	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
803.147	17.1	8.2	3.3	187.0	3.0	0.0	Vert	QP	0.0	25.3	46.0	-20.7	EUT on Side
802.988	17.0	8.2	2.5	180.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT Vertical
802.840	17.0	8.2	1.0	18.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
802.863	17.0	8.2	1.0	164.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	EUT Horizontal
802.748	17.0	8.2	2.5	246.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT on Side
802.756	17.0	8.2	1.0	295.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	EUT Vertical
1605.950	30.7	-5.6	1.2	13.0	3.0	0.0	Horz	AV	0.0	25.1	54.0	-28.9	EUT Vertical
1605.999	30.2	-5.6	1.2	144.0	3.0	0.0	Vert	AV	0.0	24.6	54.0	-29.4	EUT Vertical
1204.502	30.1	-7.2	1.2	188.0	3.0	0.0	Horz	AV	0.0	22.9	54.0	-31.1	EUT Vertical
1204.543	30.0	-7.2	1.2	87.0	3.0	0.0	Vert	AV	0.0	22.8	54.0	-31.2	EUT Vertical
1606.040	41.5	-5.6	1.2	144.0	3.0	0.0	Vert	PK	0.0	35.9	74.0	-38.1	EUT Vertical
1606.033	41.5	-5.6	1.2	13.0	3.0	0.0	Horz	PK	0.0	35.9	74.0	-38.1	EUT Vertical
1204.451	41.5	-7.2	1.2	188.0	3.0	0.0	Horz	PK	0.0	34.3	74.0	-39.7	EUT Vertical
1204.518	41.0	-7.2	1.2	87.0	3.0	0.0	Vert	PK	0.0	33.8	74.0	-40.2	EUT Vertical

Emission 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
Near Field Probe Set	ETS	7405	IPO	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/15/2012	24

TEST DESCRIPTION

Per 47 CFR 95.633(e)(3), the emission bandwidth was determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 20 dB down relative to the maximum level of the modulated carrier. 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.



Emission Bandwidth

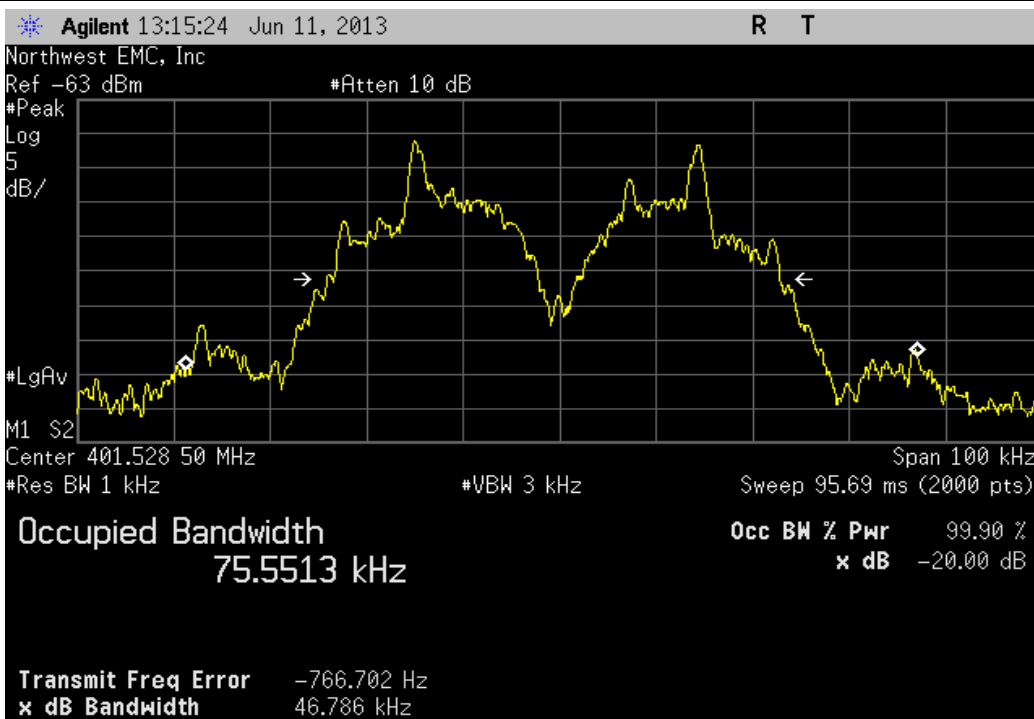
XMit 2013.02.28
PsaTx 2013.06.07

EUT: Reveal LINQ		Work Order: MDTR0228	
Serial Number: RLA600209S, RLA600212S, RLA600216S		Date: 06/11/13	
Customer: Medtronic Inc.		Temperature: 23.2°C	
Attendees: Nick Blake		Humidity: 56%	
Project: None		Barometric Pres.: 1010.8	
Tested by: Trevor Buls		Power: Battery	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 95I:2013		ANSI/TIA/EIA-603-C-2004	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1,2,3	Signature	<i>Trevor Buls</i>
SN: RLA600209S	401.5 MHz	Value	Limit
		46.914 kHz	≤ 100 kHz
SN: RLA600212S	401.5 MHz	46.786 kHz	≤ 100 kHz
SN: RLA600216S	401.5 MHz	46.663 kHz	≤ 100 kHz
			Pass
			Pass
			Pass

SN: RLA600209S, 401.5 MHz			
	Value	Limit	Result
	46.914 kHz	≤ 100 kHz	Pass

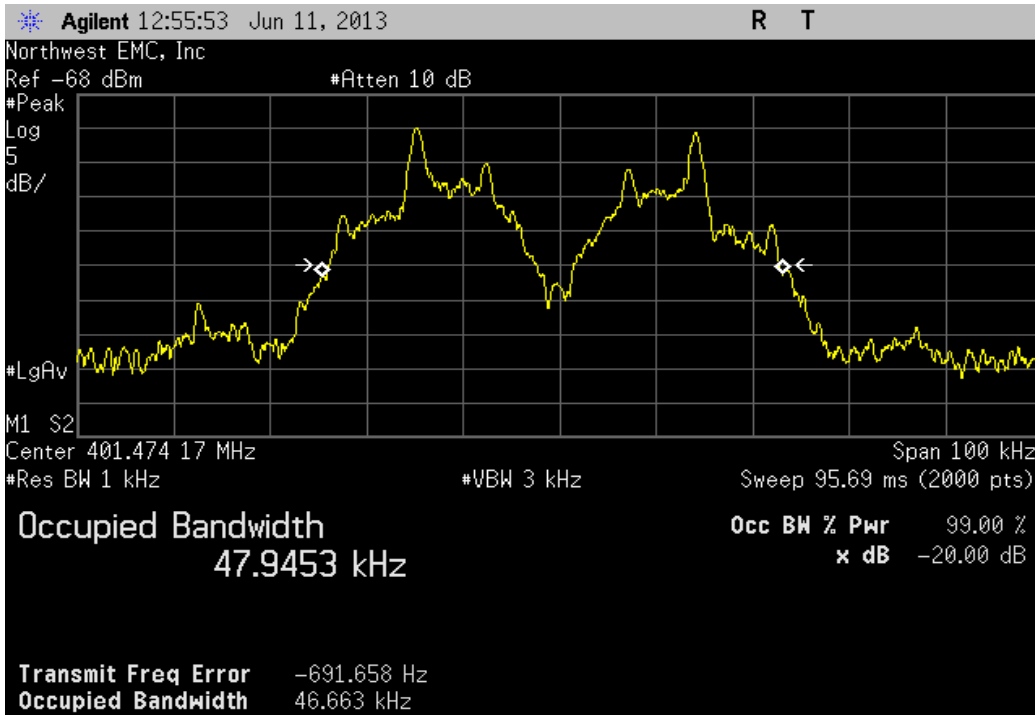


SN: RLA600212S, 401.5 MHz			
	Value	Limit	Result
	46.786 kHz	≤ 100 kHz	Pass



SN: RLA600216S, 401.5 MHz

Value	Limit	Result
46.663 kHz	≤ 100 kHz	Pass



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
Near Field Probe Set	ETS	7405	IPO	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/15/2012	24

TEST DESCRIPTION

Per 47 CFR 95.635(d)(4) the emission mask was measured. Emissions more than 50 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 100 kHz or less above and below the MEDS band (401-402 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.



Emissions Mask

XMit 2013.02.28
PsaTx 2013.06.07

EUT: Reveal LINQ	Work Order: MDTR0228
Serial Number: RLA600209S, RLA600212S, RLA600216S	Date: 06/11/13
Customer: Medtronic Inc.	Temperature: 23.2°C
Attendees: Nick Blake	Humidity: 56%
Project: None	Barometric Pres.: 1010.8
Tested by: Trevor Buls	Power: Battery
	Job Site: MN08

TEST SPECIFICATIONS	
FCC 95:2013	ANSI/TIA/EIA-603-C-2004
TEST METHOD	

COMMENTS

None

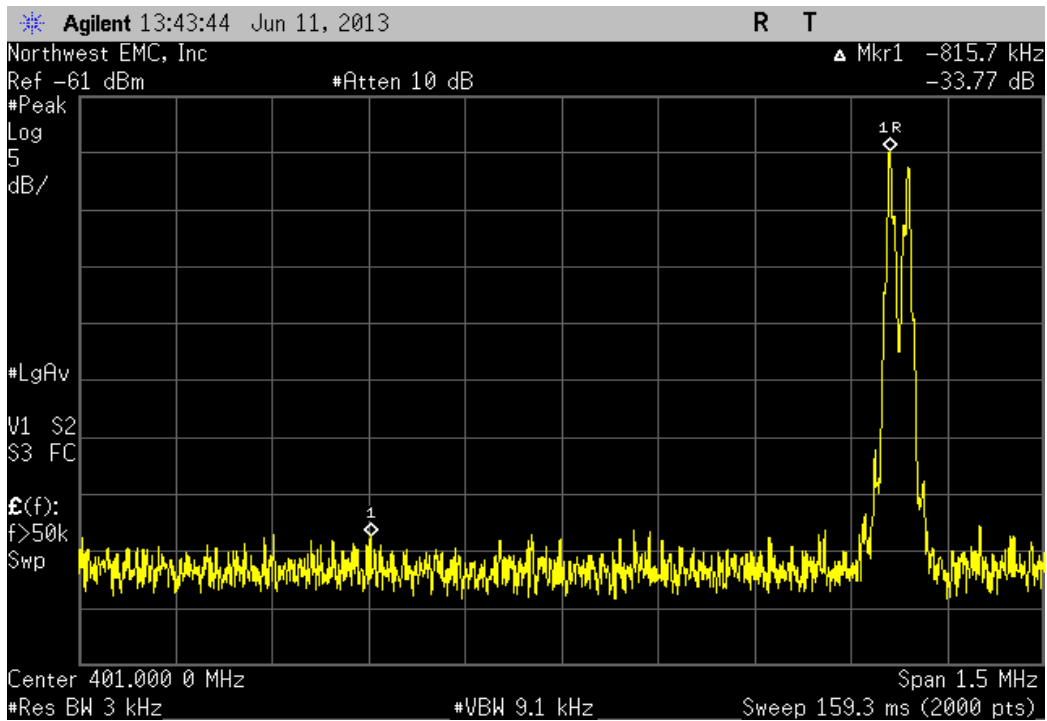
DEVIATIONS FROM TEST STANDARD

None

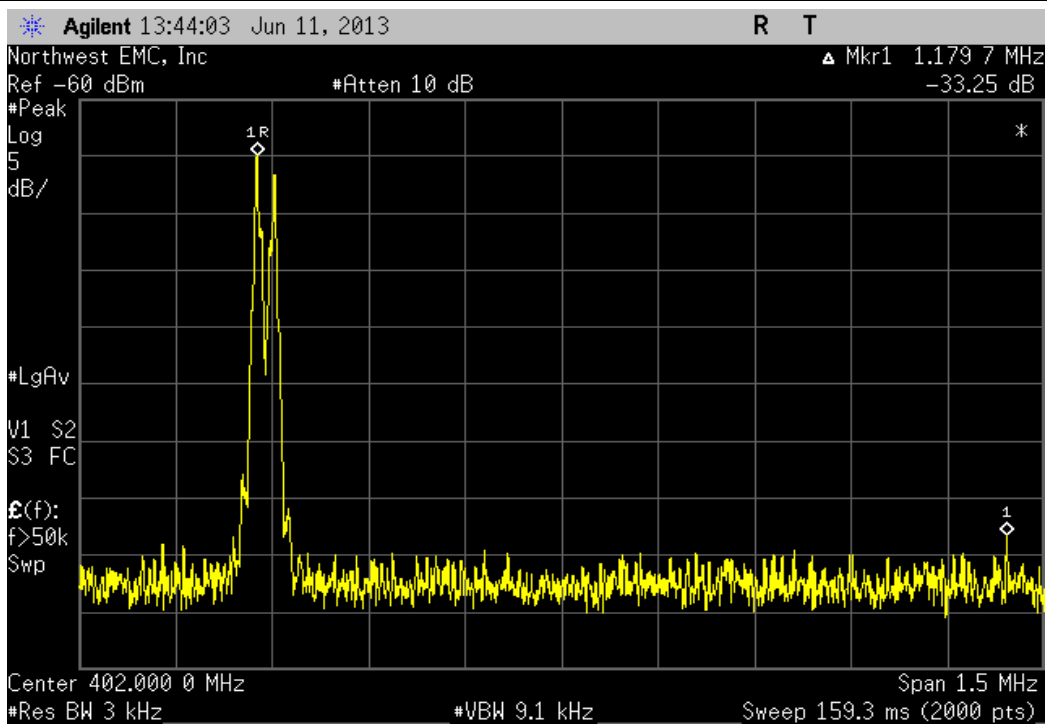
Configuration #	1,2,3	Signature	<i>Trevor Buls</i>
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		Value	Limit	Result
SN: RLA600209S	401.5 MHz			
	Low Band Edge	-33.78 dBc	≤ -20 dBc	Pass
	High Band Edge	-33.25 dBc	≤ -20 dBc	Pass
SN: RLA600212S	401.5 MHz			
	Low Band Edge	-31.72 dBc	≤ -20 dBc	Pass
	High Band Edge	-31.12 dBc	≤ -20 dBc	Pass
SN: RLA600216S	401.5 MHz			
	Low Band Edge	-27.34 dBc	≤ -20 dBc	Pass
	High Band Edge	-27.54 dBc	≤ -20 dBc	Pass

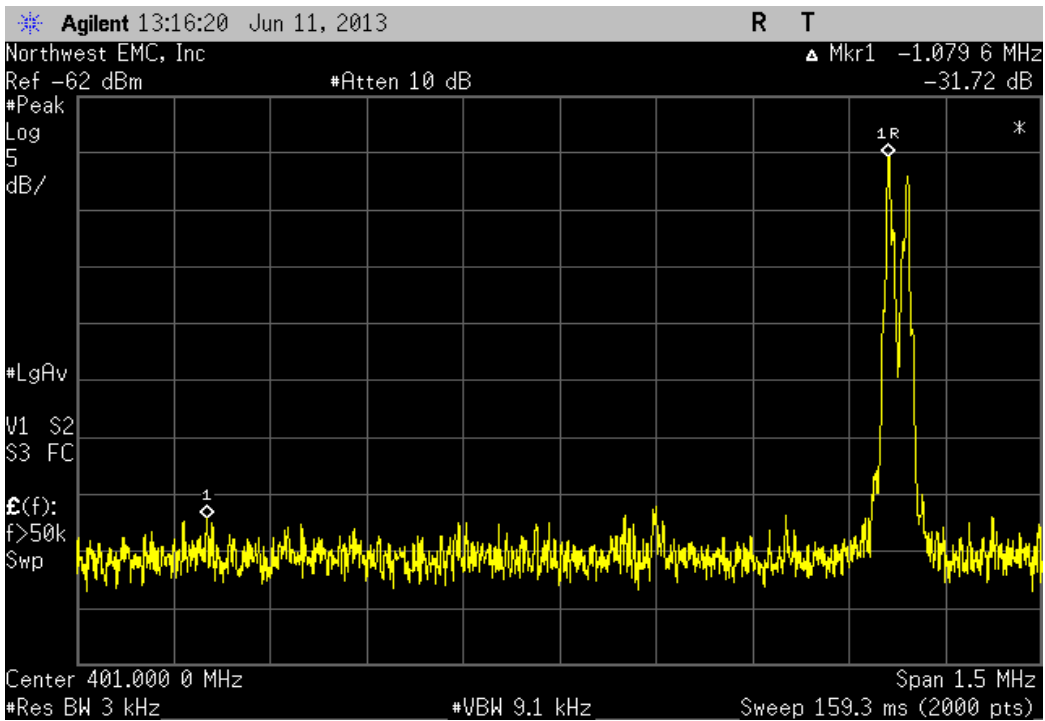
SN: RLA600209S, 401.5 MHz, Low Band Edge			
	Value	Limit	Result
	-33.78 dBc	≤ -20 dBc	Pass



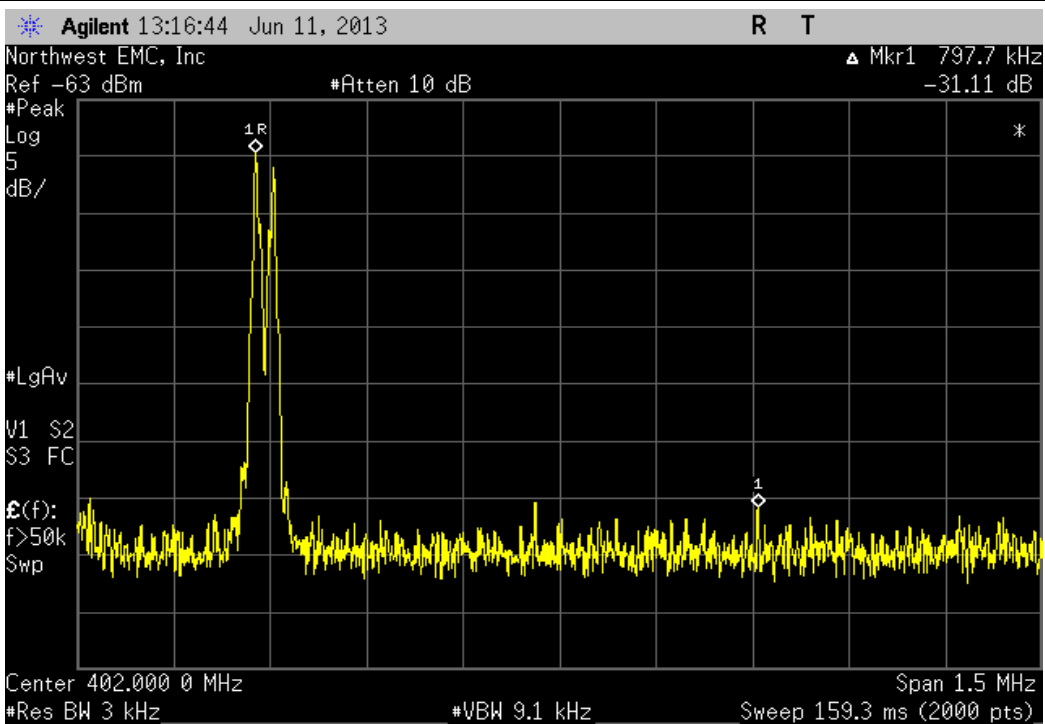
SN: RLA600209S, 401.5 MHz, High Band Edge			
	Value	Limit	Result
	-33.25 dBc	≤ -20 dBc	Pass



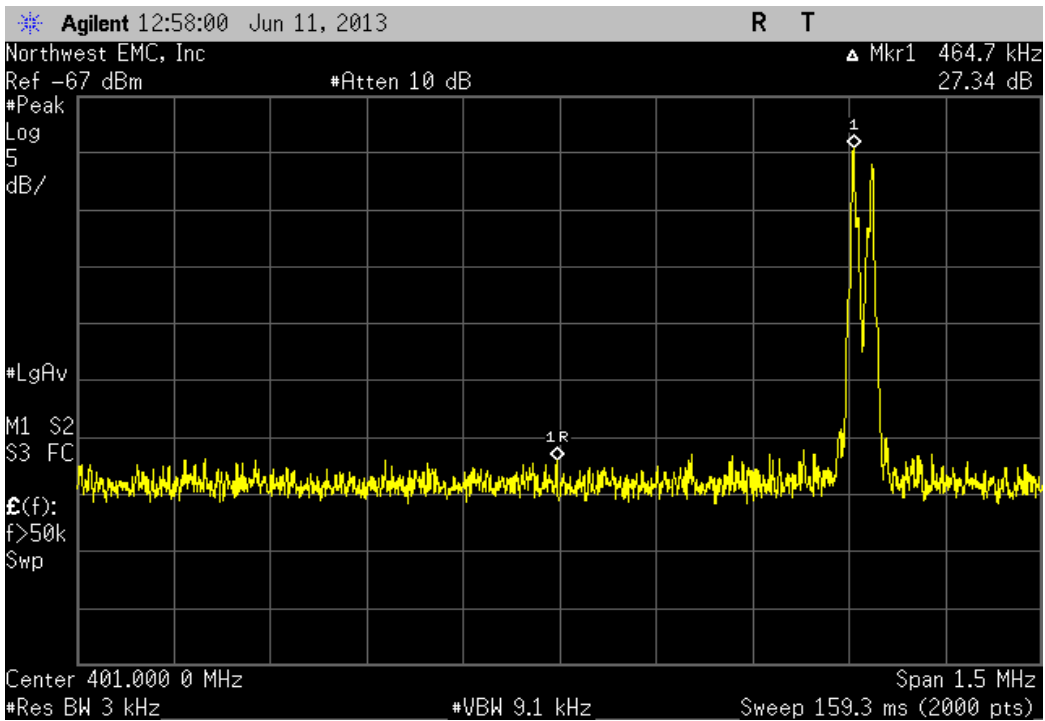
SN: RLA600212S, 401.5 MHz, Low Band Edge			
	Value	Limit	Result
	-31.72 dBc	≤ -20 dBc	Pass



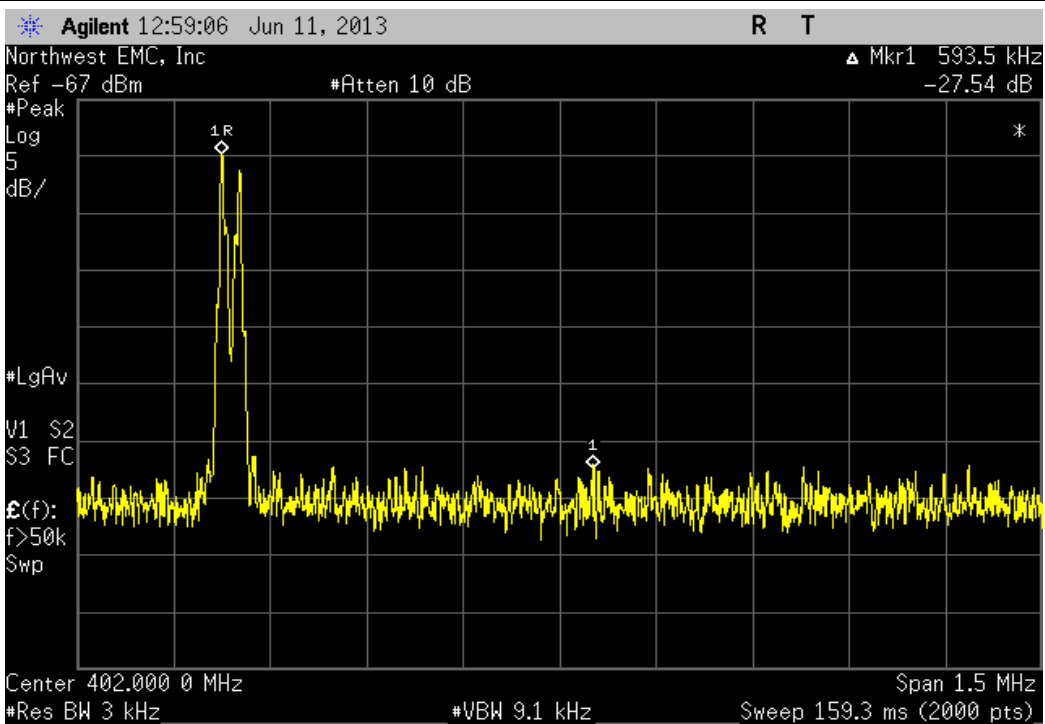
SN: RLA600212S, 401.5 MHz, High Band Edge			
	Value	Limit	Result
	-31.12 dBc	≤ -20 dBc	Pass



SN: RLA600216S, 401.5 MHz, Low Band Edge			
	Value	Limit	Result
	-27.34 dBc	≤ -20 dBc	Pass



SN: RLA600216S, 401.5 MHz, High Band Edge			
	Value	Limit	Result
	-27.54 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
Near Field Probe Set	ETS	7405	IPO	NCR	0
Humidity Temperature Meter	Omega Engineering, Inc.	HH31	DUB	10/25/2011	36
Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZPH-32-3.5-SCT/AC	TBF	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/15/2012	24

TEST DESCRIPTION

Variation of Supply Voltage

The primary supply voltage was varied over the range specified by the client. Per the client, the device only works over this voltage range; it will shut off if the voltage is outside the specified range.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (+25°, +35°C and +45° C).

The Frequency Stability was measured using a near-field probe and 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. The near-field probe was placed near the transmitter. A low-loss coaxial cable connected the near-field probe to the spectrum analyzer outside of the chamber.



Frequency Stability

XMit 2013.02.28
PsaTx 2013.06.07

EUT: Reveal LINQ	Work Order: MDTR0228
Serial Number: RLA600209S, RLA600212S, RLA600216S	Date: 06/11/13
Customer: Medtronic Inc.	Temperature: 23.2°C
Attendees: Nick Blake	Humidity: 56%
Project: None	Barometric Pres.: 1010.8
Tested by: Trevor Buls	Power: Battery
	Job Site: MN08

TEST SPECIFICATIONS	Test Method
FCC 95:2013	ANSI/TIA/EIA-603-C-2004

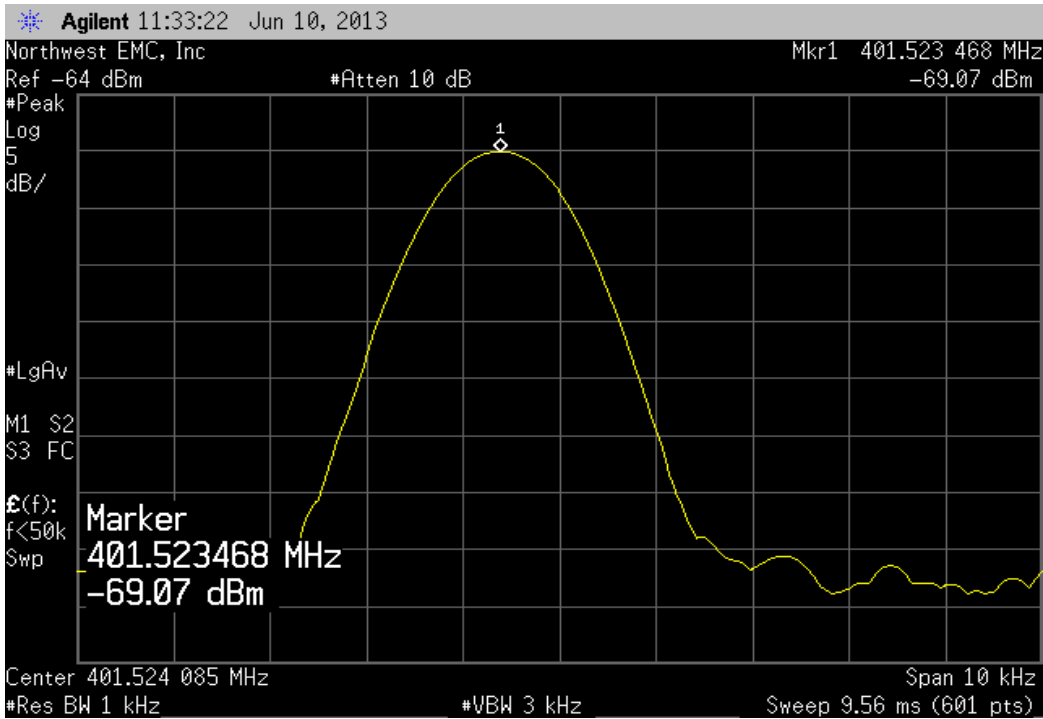
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
None

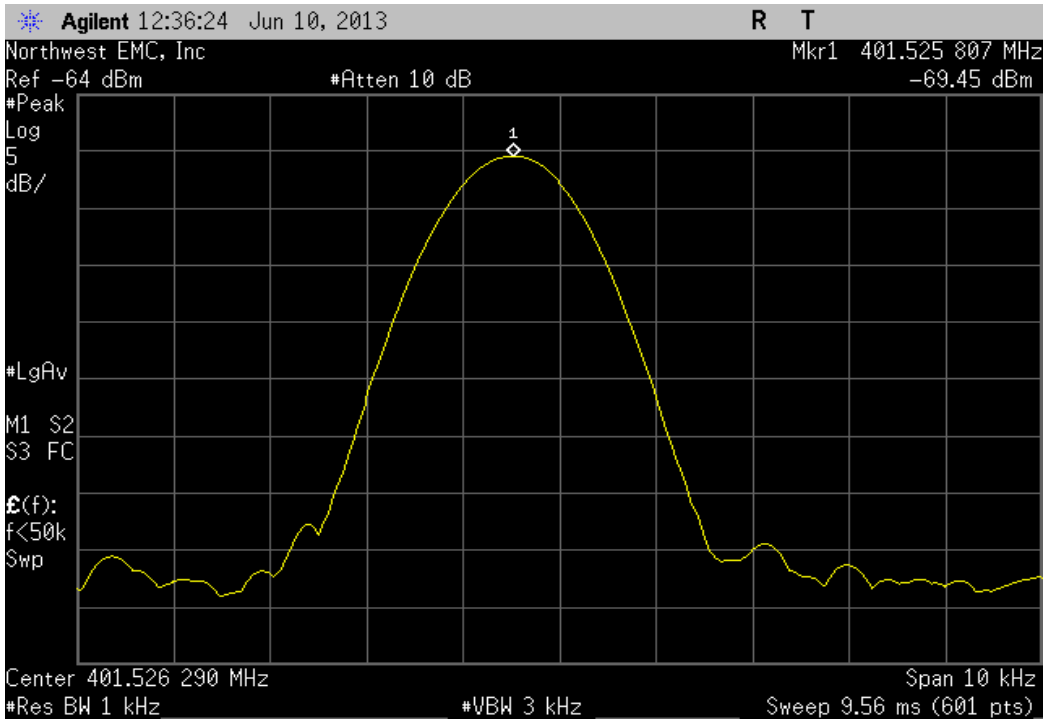
Configuration #	1,2,3	Signature	<i>Trevor Buls</i>
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		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
SN: RLA600209S	Extreme Temperature +45C					
	401.5 MHz	401.523468	401.5	58.4	100	Pass
	Extreme Temperature +35C					
	401.5 MHz	401.525807	401.5	64.3	100	Pass
	Extreme Temperature +25C					
	401.5 MHz	401.524987	401.5	62.2	100	Pass
SN: RLA600212S	Extreme Temperature +45C					
	401.5 MHz	401.523561	401.5	58.7	100	Pass
	Extreme Temperature +35C					
	401.5 MHz	401.526208	401.5	65.3	100	Pass
	Extreme Temperature +25C					
	401.5 MHz	401.526441	401.5	65.9	100	Pass
SN: RLA600216S	Extreme Temperature +45C					
	401.5 MHz	401.469223	401.5	76.7	100	Pass
	Extreme Temperature +35C					
	401.5 MHz	401.471825	401.5	70.2	100	Pass
	Extreme Temperature +25C					
	401.5 MHz	401.471307	401.5	71.5	100	Pass

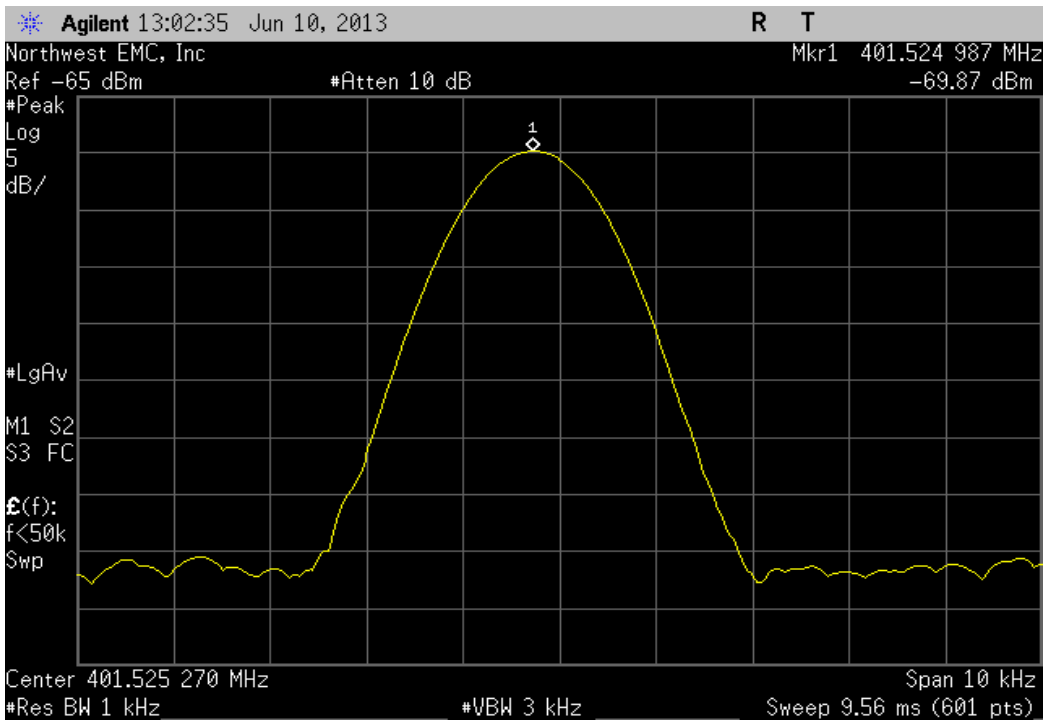
SN: RLA600209S, Extreme Temperature +45C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.523468	401.5	58.4	100	Pass	



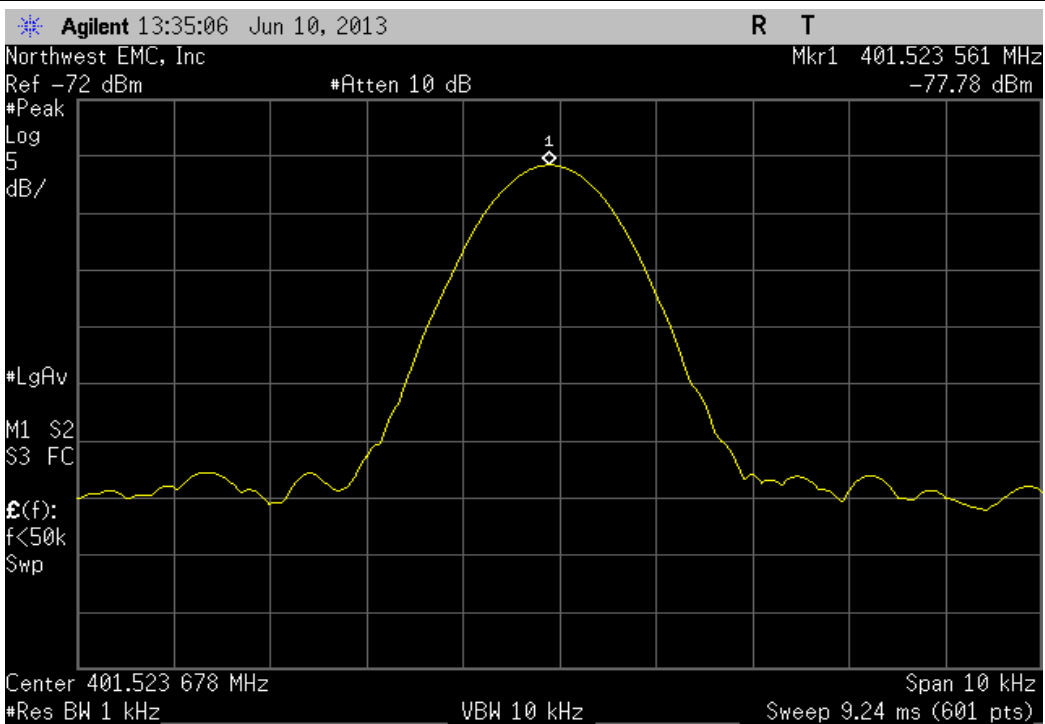
SN: RLA600209S, Extreme Temperature +35C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.525807	401.5	64.3	100	Pass	



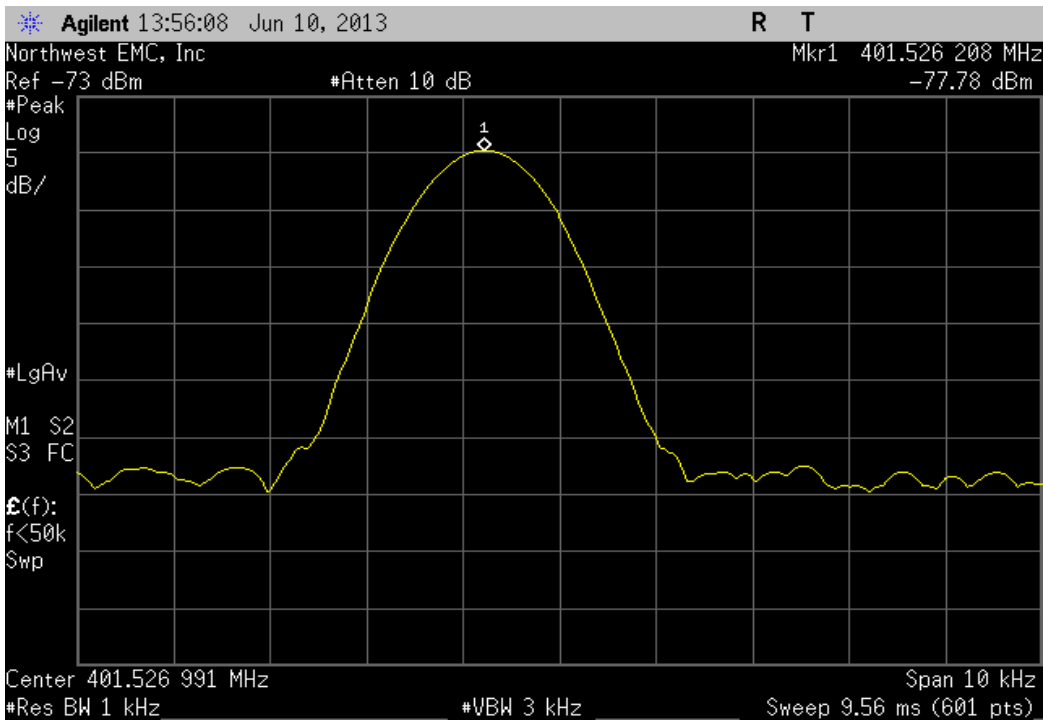
SN: RLA600209S, Extreme Temperature +25C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.524987	401.5	62.2	100	Pass	



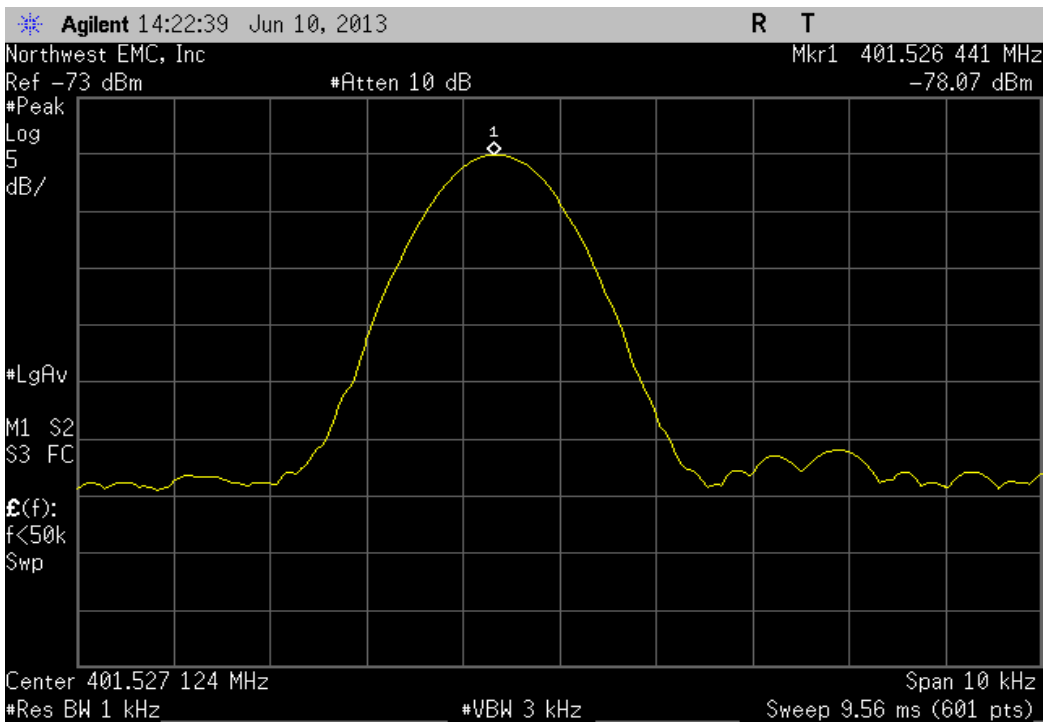
SN: RLA600212S, Extreme Temperature +45C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.523561	401.5	58.7	100	Pass	



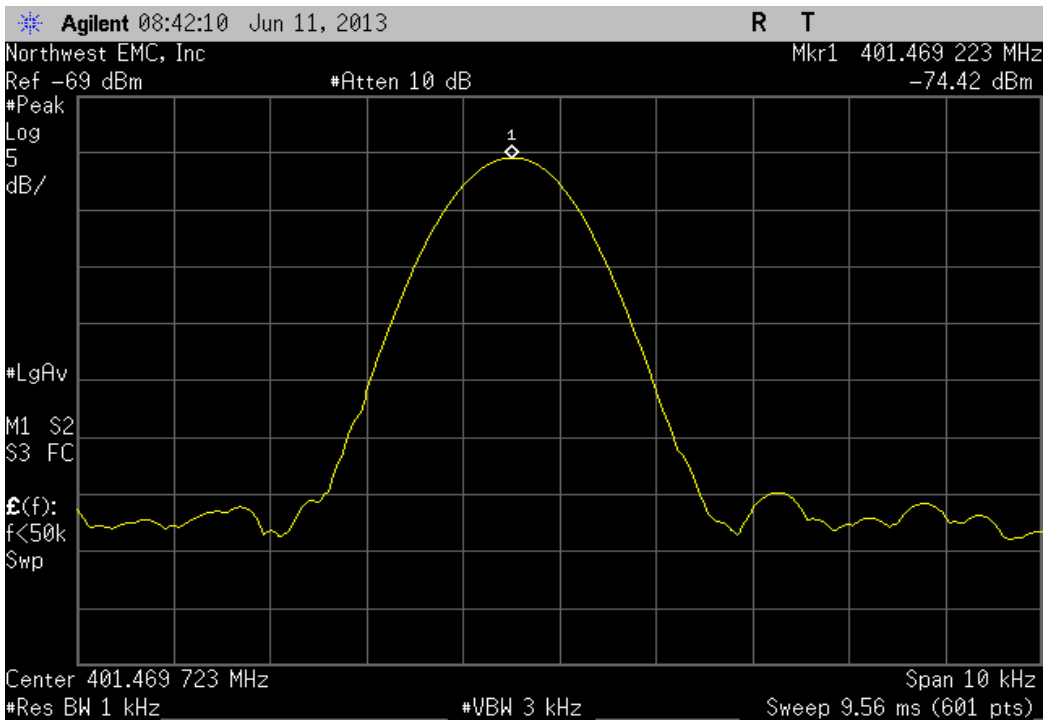
SN: RLA600212S, Extreme Temperature +35C, 401.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
	401.526208	401.5	65.3	100	Pass	



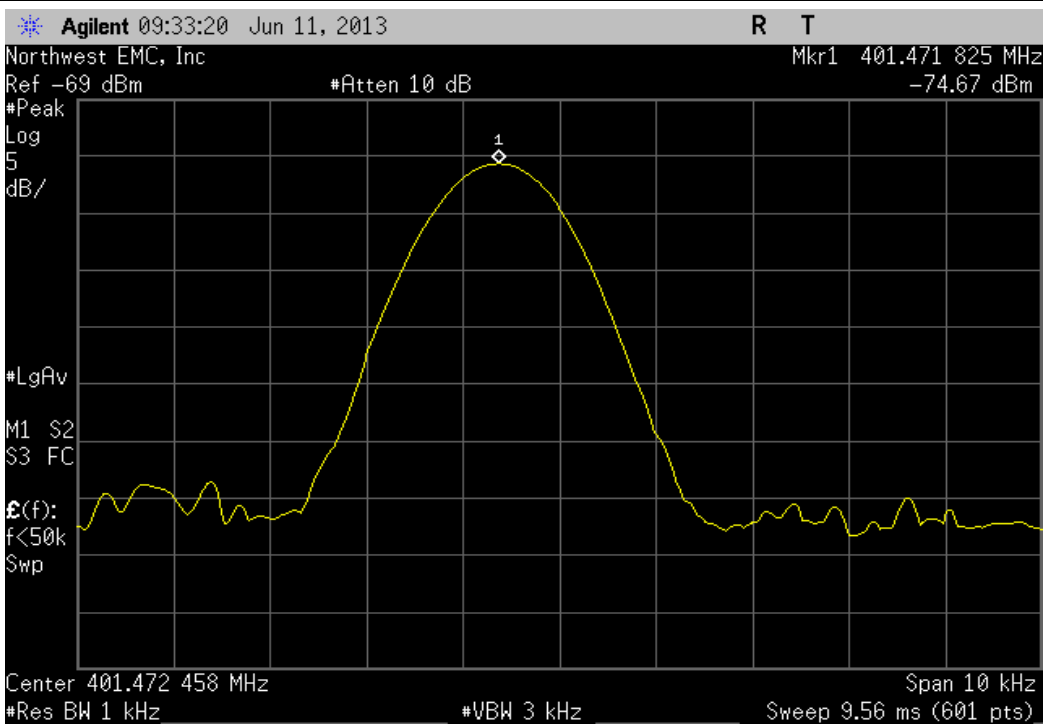
SN: RLA600212S, Extreme Temperature +25C, 401.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
	401.526441	401.5	65.9	100	Pass	



SN: RLA600216S, Extreme Temperature +45C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.469223	401.5	76.7	100	Pass	



SN: RLA600216S, Extreme Temperature +35C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.471825	401.5	70.2	100	Pass	



SN: RLA600216S, Extreme Temperature +25C, 401.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result	
401.471307	401.5	71.5	100	Pass	

