NORTHWEST EMC

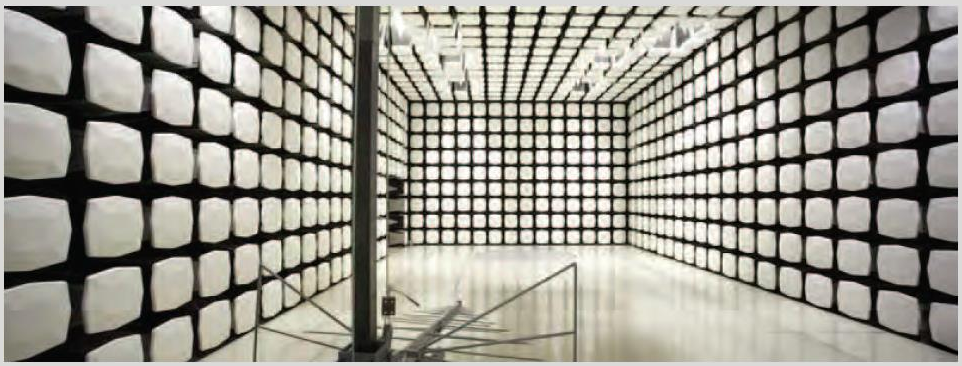
Medtronic, Inc.

Percepta, Serena, Solara

FCC 15.247:2016

Bluetooth Low Energy Radio

Report # MDTR0535



NVLAP TESTING

NVLAP Lab Code: 200881-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: December 12, 2016
Medtronic, Inc.
Model: Percepta, Serena, Solara

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2016	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	

Deviations from Test Standards

None

Approved By:

Dean Ghizzone, General Manager

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. 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. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2016.7.25

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 17065 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

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Validated by the European Commission 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

MSIP / 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.

Israel

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

Hong Kong

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

Vietnam

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

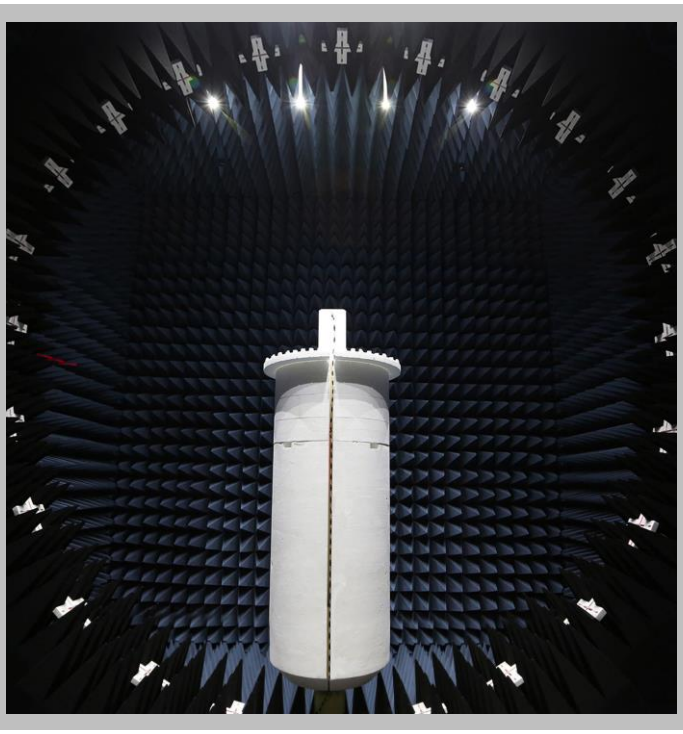
SCOPE

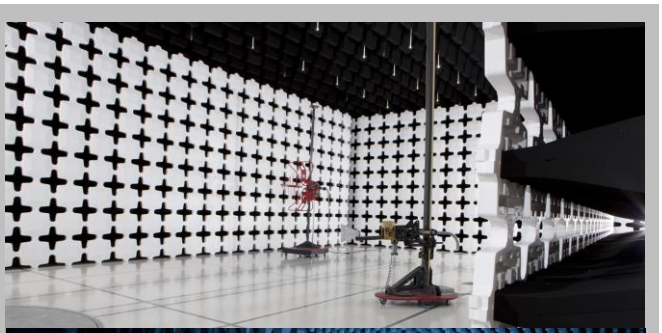
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

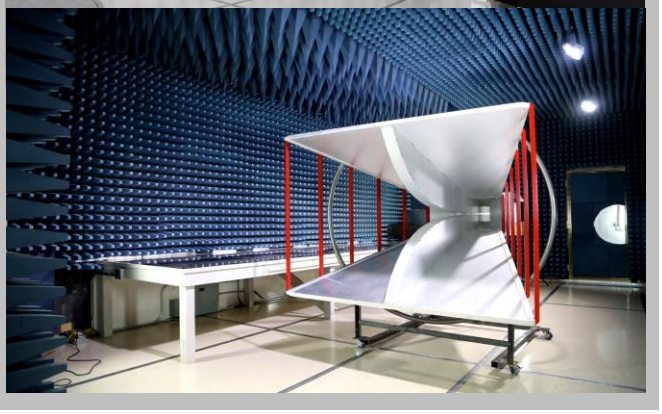
FACILITIES

NORTHWEST EMC
REV 2016.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

TMU.2015.07.10

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 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 16-4-2 as applicable), and are available upon request.

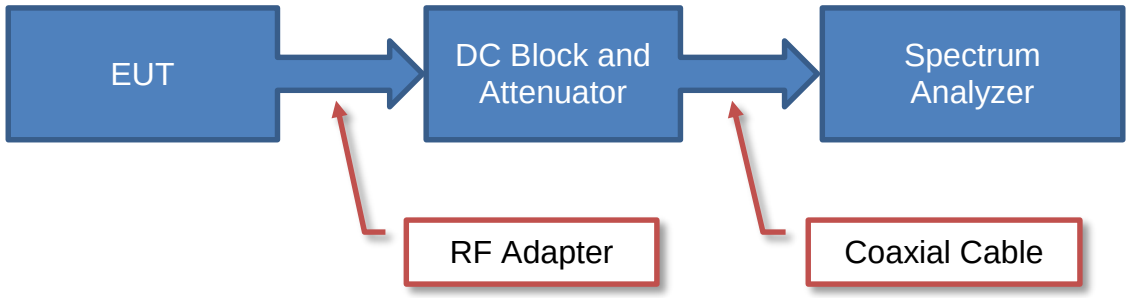
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

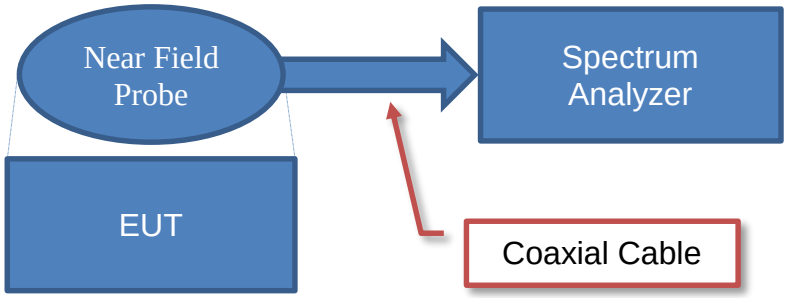
Test Setup Block Diagrams

NORTHWEST EMC
REV 2016.10.04

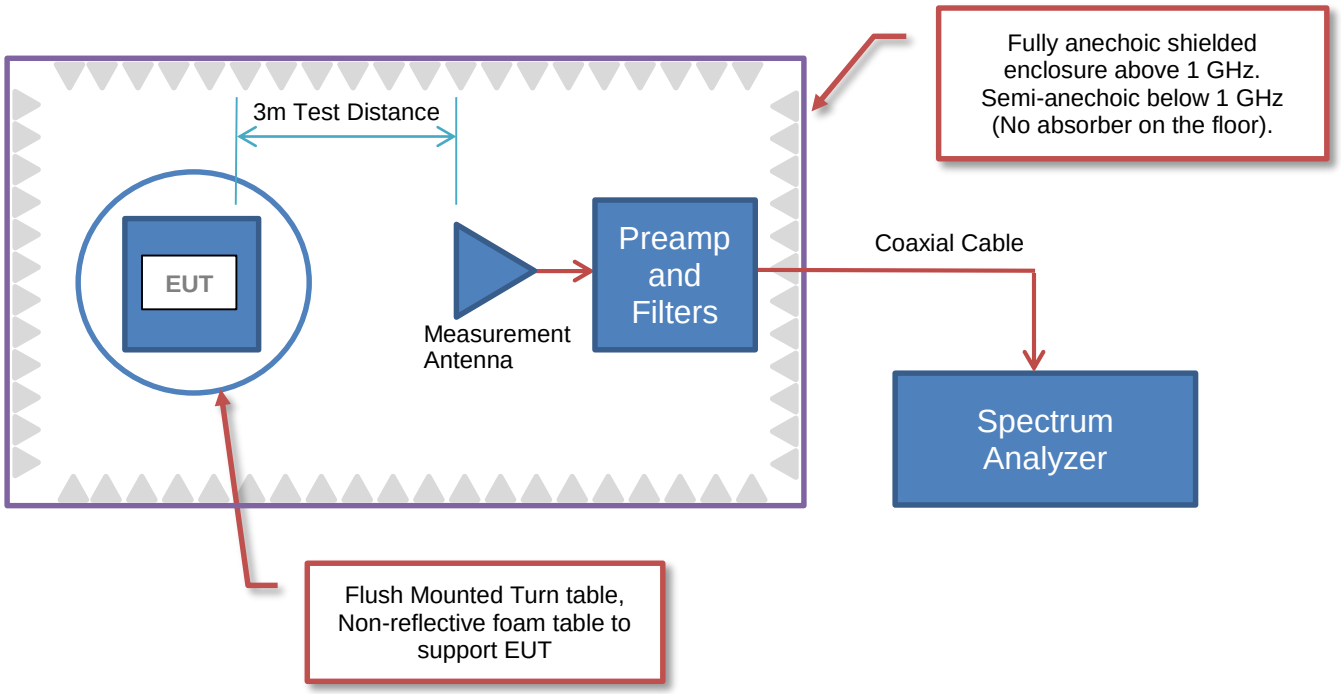
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

NORTHWEST EMC 2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Medtronic, Inc.
Address:	710 Medtronic Parkway
City, State, Zip:	Minneapolis, MN 55432
Test Requested By:	Jay Axmann
Model:	Percepta Quad CRT-P MRI SureScan
First Date of Test:	December 2, 2016
Last Date of Test:	December 12, 2016
Receipt Date of Samples:	December 2, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The CRT-P-Quad implant family will be marketed under 6 different models, as listed below. They all will include the same Bluetooth Low Energy (BLE) radio and antenna. All therapy differences will be activated via FW. The only physical difference will be with the external header. There will be two types - one for the Quad models and one for the standard (Bipolar configuration) models. Both will accommodate 3 connectors, but one connection for the Quad devices will be for a 4-pin connector. Even with these two different connectors, the BLE antenna will be the same.

Testing was performed on two representative Percepta samples, but the results represent the performance of the complete product family. The following list of models are represented by these test results:

Percepta CRT-P-MRI Surescan
Percepta Quad CRT-P-MRI Surescan
Serena CRT-P-MRI Surescan
Serena Quad CRT-P-MRI Surescan
Solara CRT-P-MRI Surescan
Solara Quad CRT-P-MRI Surescan

Transmitter Output Power and Spurious measurements were performed by two methods-

1. Conducted measurements taken at the antenna port performed per ANSI C63.10.
2. Radiated measurements using a human torso simulator and simulation tissue liquid solution with the electrical properties of muscle tissue at 2.44GHz. Tests performed per the radiated methods of ANSI C63.10 for a radio operating in the 2.4GHz - 2.5GHz range. A muscle tissue solution defined in OET Bulletin 65 Supplement C at an implant depth of 2cm to reflect the radiated field from a human torso.

Measured simulated muscle tissue properties at 2.44GHz:
Permittivity = 51.26
Conductivity = 2.08

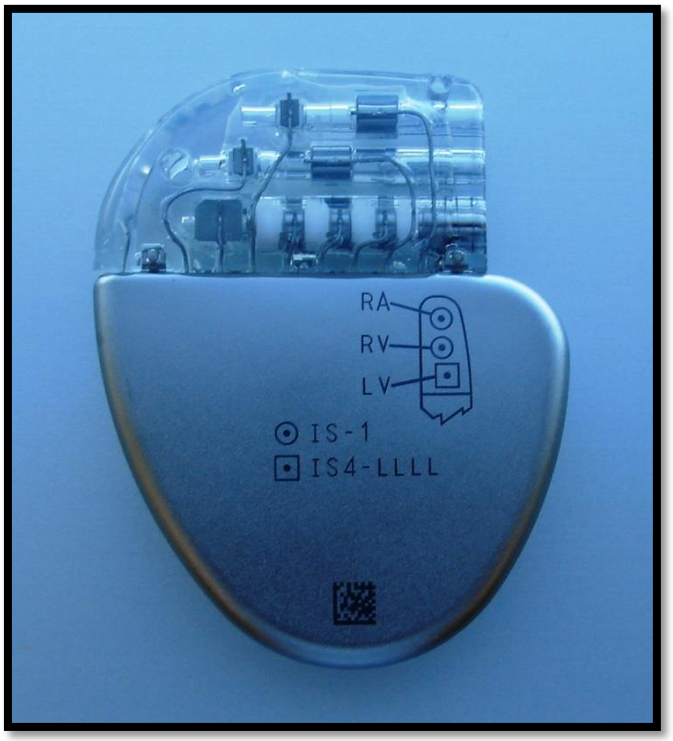
Testing Objective:

To demonstrate compliance of the Bluetooth Low Energy radio to FCC 15.247 requirements.

PRODUCT DESCRIPTION

NORTHWEST EMC
2014-12-10

EUT Photo:



CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MDTR0535- 1

Software/Firmware Running during test	
Description	**Version**
CRT-P Quad Firmware (EMA Board)	5.01

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Implant (EMA Board)	Medtronic, Inc.	Percepta Quad CRT-P MRI SureScan	RNV160015S

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude E6410	7KGKYN1
AC Adapter (Laptop)	Dell	LA90PM111	CN-0Y4M8K-72438-38R-C8D9-A01
Bluetooth Test Instrument	Medtronic, Inc.	M960127B001	15B0055
DC Power Supply	Lambda Electronics Corp.	LL-902-OV	D13861
Shielded Test Enclosure	Ramsey Electronics, LLC	STE3800	1168

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop
AC Cable (Laptop)	No	1.8m	No	AC Adapter (Laptop)	AC Mains
USB Cable	Yes	2.0m	No	Laptop	Bluetooth Test Instrument
SMA Cable 2	Yes	0.4m	No	Implant (EMA Board)	Shielded Test Enclosure
SMA Cable 1 (Shielded Test Enclosure)	Yes	0.6m	No	Shielded Test Enclosure	Bluetooth Test Instrument
Banana Cables 2 (x2)	No	0.1m	No	Implant (EMA Board)	Shielded Test Enclosure
Banana Cables 1 (x2, Shielded Test Enclosure)	No	0.9m	No	Shielded Test Enclosure	DC Power Supply

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MDTR0535- 3

Software/Firmware Running during test	
Description	**Version**
CRT-P Quad Firmware	1.23

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Implant	Medtronic, Inc.	Percepta Quad CRT-P MRI SureScan	RNP601017S

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Atrial Lead	Medtronic, Inc.	5076-65CM	PJN3391150
Right Ventricular Lead	Medtronic, Inc.	5076-65CM	PJN3624359
Left Ventricular Lead	Medtronic, Inc.	4298-88CM	QUA015221V

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/2/2016	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.
2	12/2/2016	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.
3	12/2/2016	Power Spectral Density	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	12/2/2016	Band Edge Compliance	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	12/2/2016	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.
6	12/12/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

The EUT operates at 100% Duty Cycle.

OCCUPIED BANDWIDTH

XMit 2016.09.29

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.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

EUT:	Percepta Quad CRT-P MRI SureScan			**Work Order:**	MDTR0535
Serial Number:	RNV160015S			**Date:**	12/02/16
Customer:	Medtronic, Inc.			**Temperature:**	21.4 °C
Attendees:	Nick Blake			**Humidity:**	28.9% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Dustin Sparks	**Power:**	2.9VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

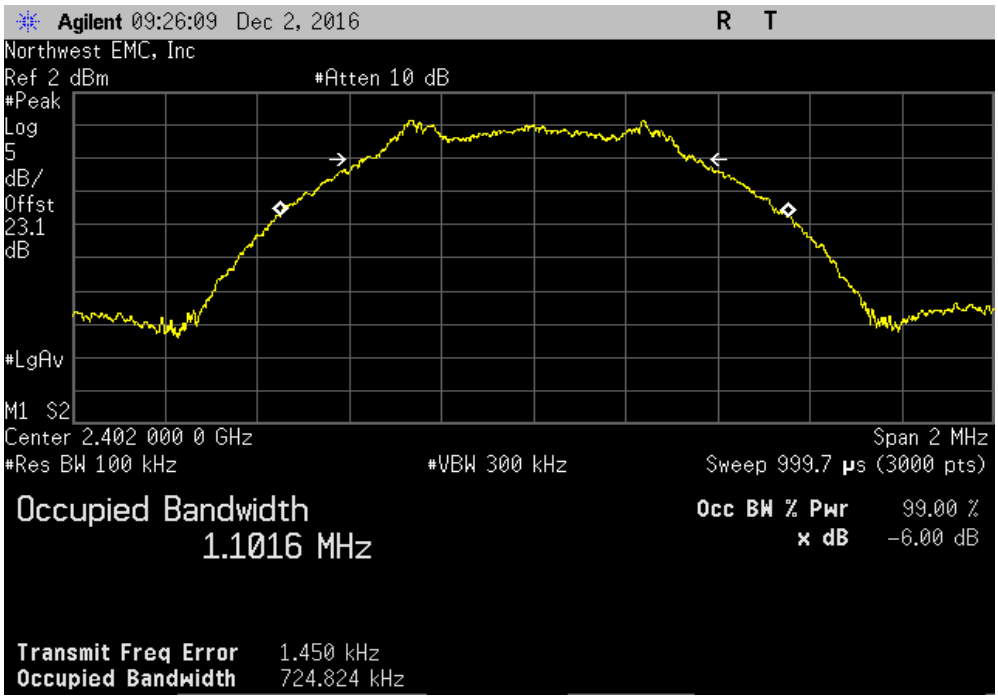
Configuration #	1	Signature

	Value	Limit (≥)	Result
BLE/GFSK Low Channel, 2402 MHz	724.824 kHz	500 kHz	Pass
BLE/GFSK Mid Channel, 2442 MHz	715.559 kHz	500 kHz	Pass
BLE/GFSK High Channel, 2480 MHz	720.7 kHz	500 kHz	Pass

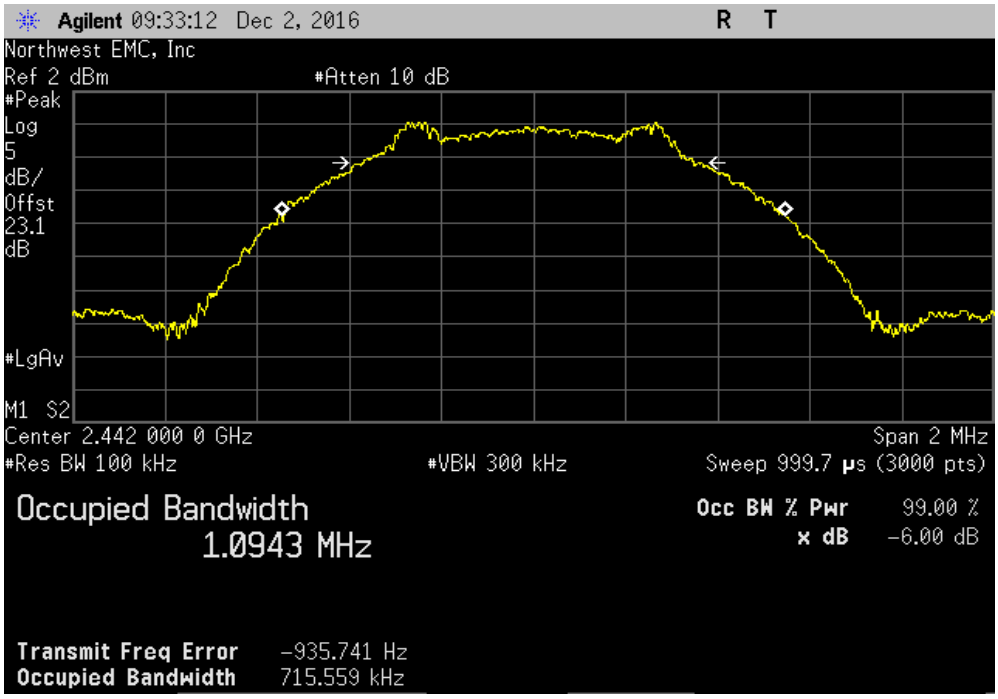
OCCUPIED BANDWIDTH

XMit 2016.09.29
NweTx 2016.09.14.2

BLE/GFSK Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				724.824 kHz	500 kHz	Pass



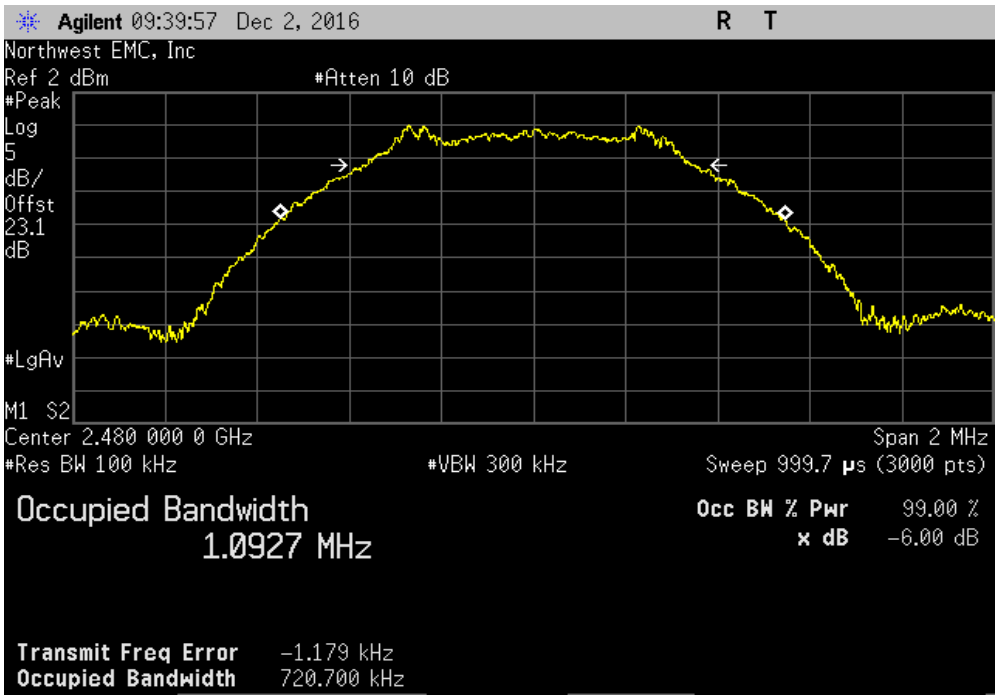
BLE/GFSK Mid Channel, 2442 MHz						
				Value	Limit (≥)	Result
				715.559 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

XMit 2016.09.29
NweTx 2016.09.14.2

BLE/GFSK High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				720.7 kHz	500 kHz	Pass



OUTPUT POWER

XMit 2016.09.29

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.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

EUT:	Percepta Quad CRT-P MRI SureScan			**Work Order:**	MDTR0535
Serial Number:	RNV160015S			**Date:**	12/02/16
Customer:	Medtronic, Inc.			**Temperature:**	21.5 °C
Attendees:	Nick Blake			**Humidity:**	28.6% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Dustin Sparks	**Power:**	2.9VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

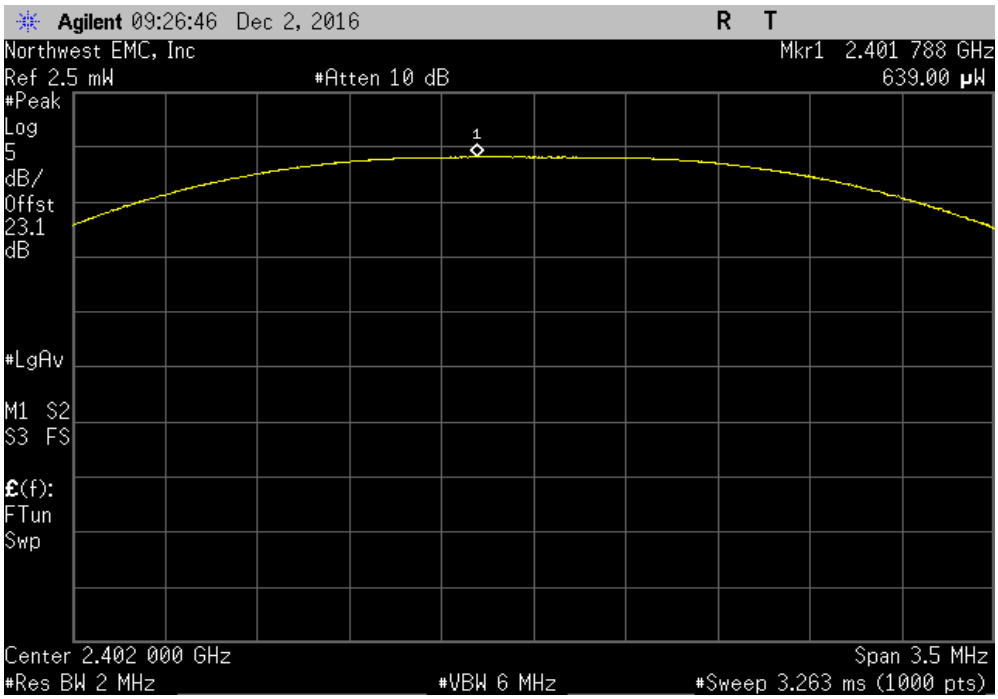
DEVIATIONS FROM TEST STANDARD

None

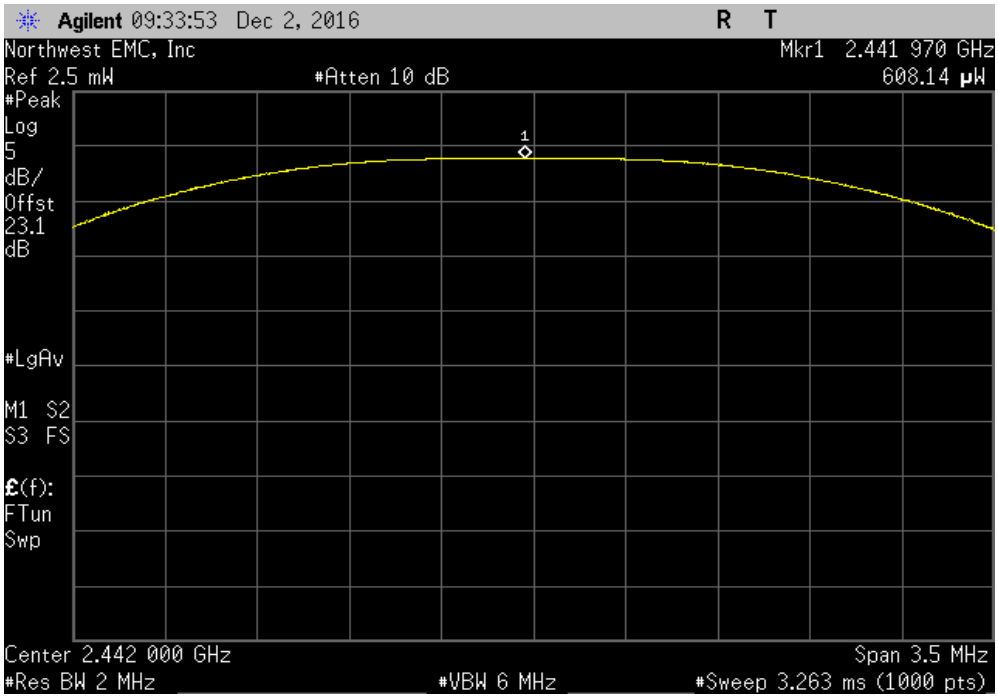
Configuration #	1	Signature

	Value	Limit (<)	Result
BLE/GFSK Low Channel, 2402 MHz	638.999 uW	1 W	Pass
BLE/GFSK Mid Channel, 2442 MHz	608.135 uW	1 W	Pass
BLE/GFSK High Channel, 2480 MHz	550.047 uW	1 W	Pass

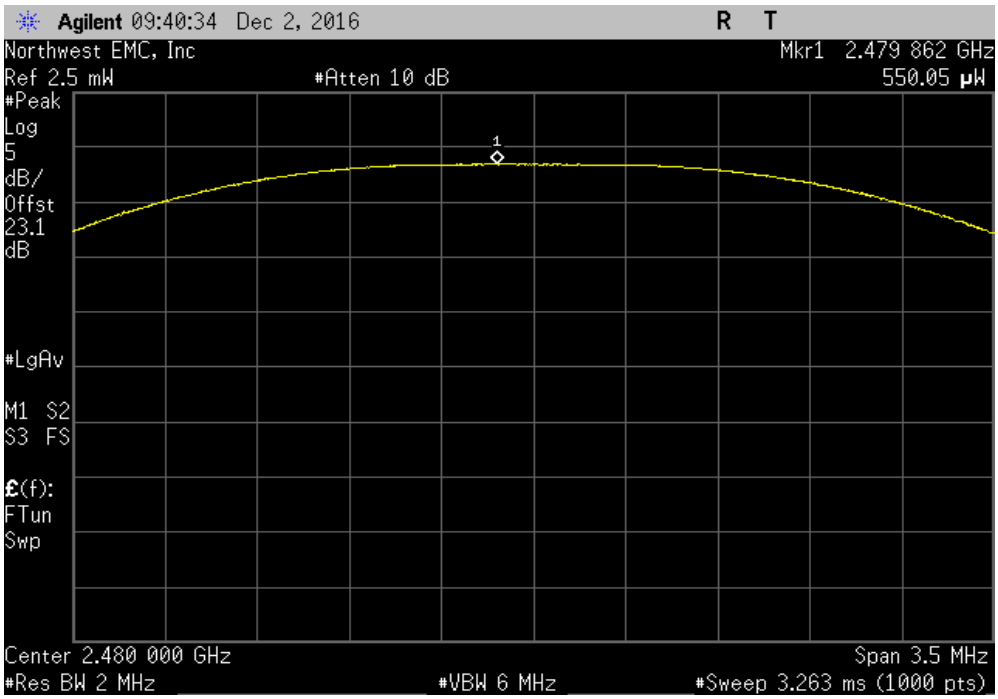
BLE/GFSK Low Channel, 2402 MHz						
				Value	Limit (<)	Result
				638.999 uW	1 W	Pass



BLE/GFSK Mid Channel, 2442 MHz						
				Value	Limit (<)	Result
				608.135 uW	1 W	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value	Limit (<)	Result
				550.047 uW	1 W	Pass



POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2016.09.29

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.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

EUT:	Percepta Quad CRT-P MRI SureScan			**Work Order:**	MDTR0535
Serial Number:	RNV160015S			**Date:**	12/02/16
Customer:	Medtronic, Inc.			**Temperature:**	21.6 °C
Attendees:	Nick Blake			**Humidity:**	28.6% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Dustin Sparks	**Power:**	2.9VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

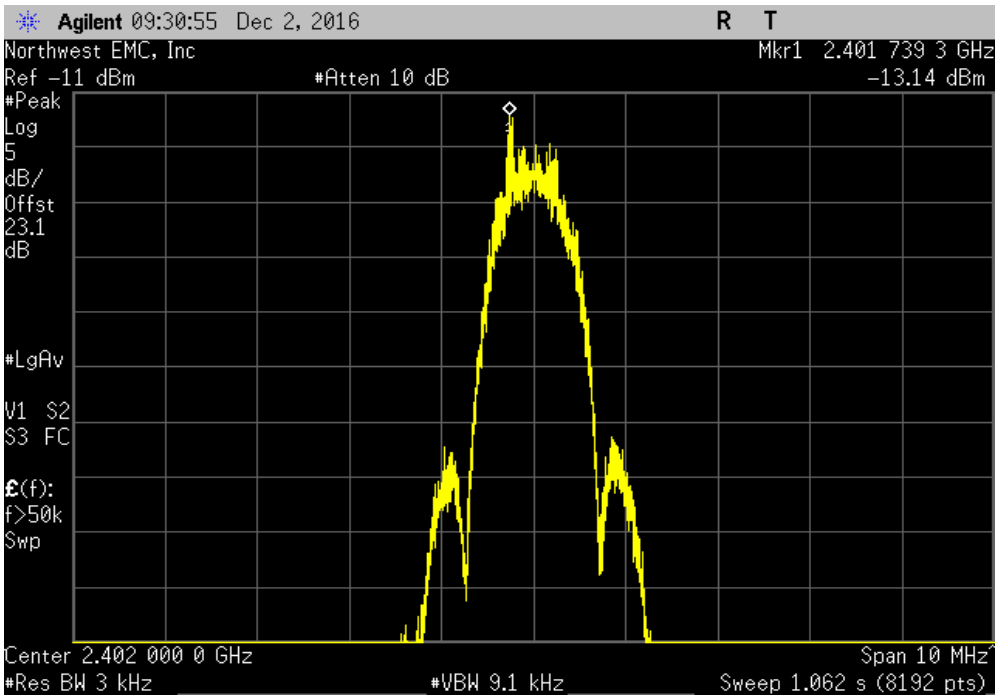
DEVIATIONS FROM TEST STANDARD

None

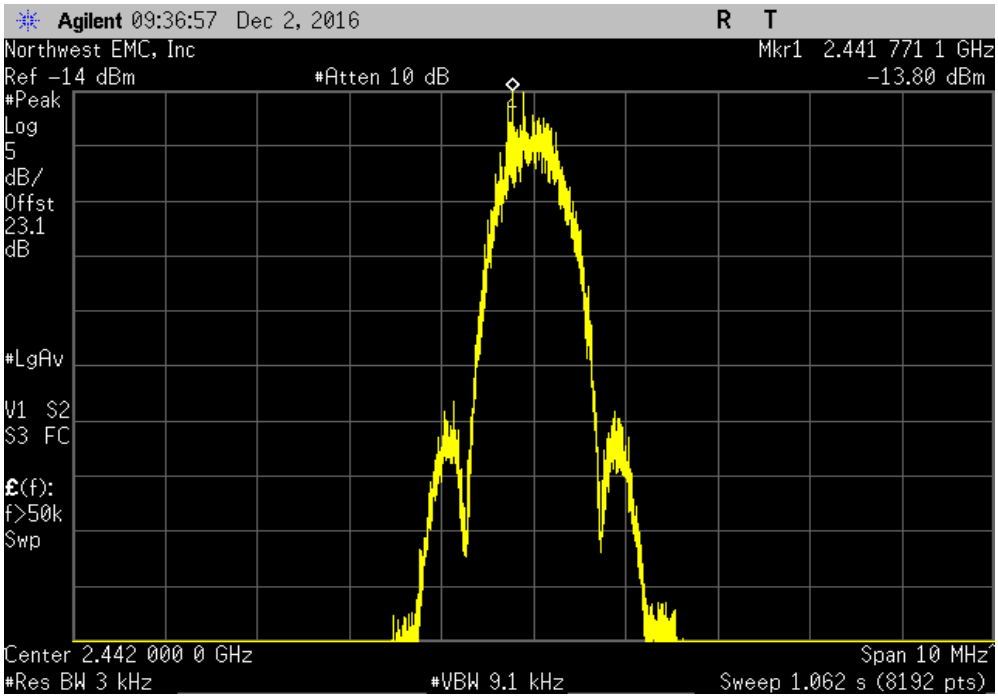
Configuration #	1	Signature

	Value dBm/3kHz	Limit < dBm/3kHz	Results
BLE/GFSK Low Channel, 2402 MHz	-13.142	8	Pass
BLE/GFSK Mid Channel, 2442 MHz	-13.799	8	Pass
BLE/GFSK High Channel, 2480 MHz	-14.254	8	Pass

BLE/GFSK Low Channel, 2402 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-13.142	8	Pass



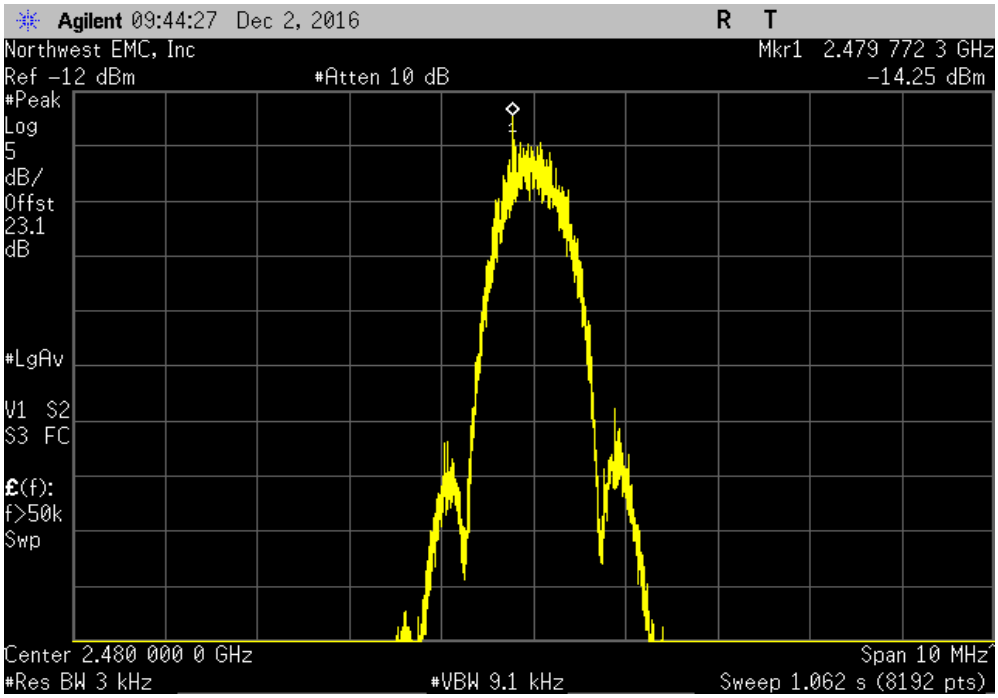
BLE/GFSK Mid Channel, 2442 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-13.799	8	Pass



POWER SPECTRAL DENSITY

XMit 2016.09.29
NweTx 2016.09.14.2

BLE/GFSK High Channel, 2480 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-14.254	8	Pass



BAND EDGE COMPLIANCE

XMit 2016.09.29

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.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

EUT:	Percepta Quad CRT-P MRI SureScan			**Work Order:**	MDTR0535
Serial Number:	RNV160015S			**Date:**	12/02/16
Customer:	Medtronic, Inc.			**Temperature:**	21.3 °C
Attendees:	Nick Blake			**Humidity:**	28.6% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Dustin Sparks	**Power:**	2.9VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

Configuration #	1	Signature

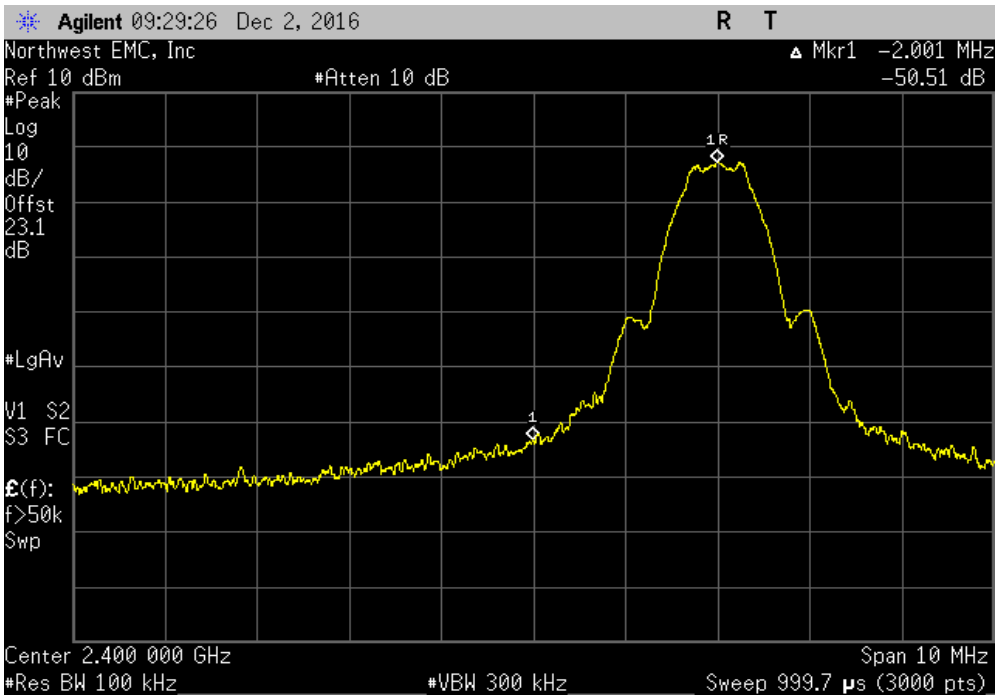
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	-50.51	-20	Pass
BLE/GFSK High Channel, 2480 MHz	-54.24	-20	Pass

BAND EDGE COMPLIANCE

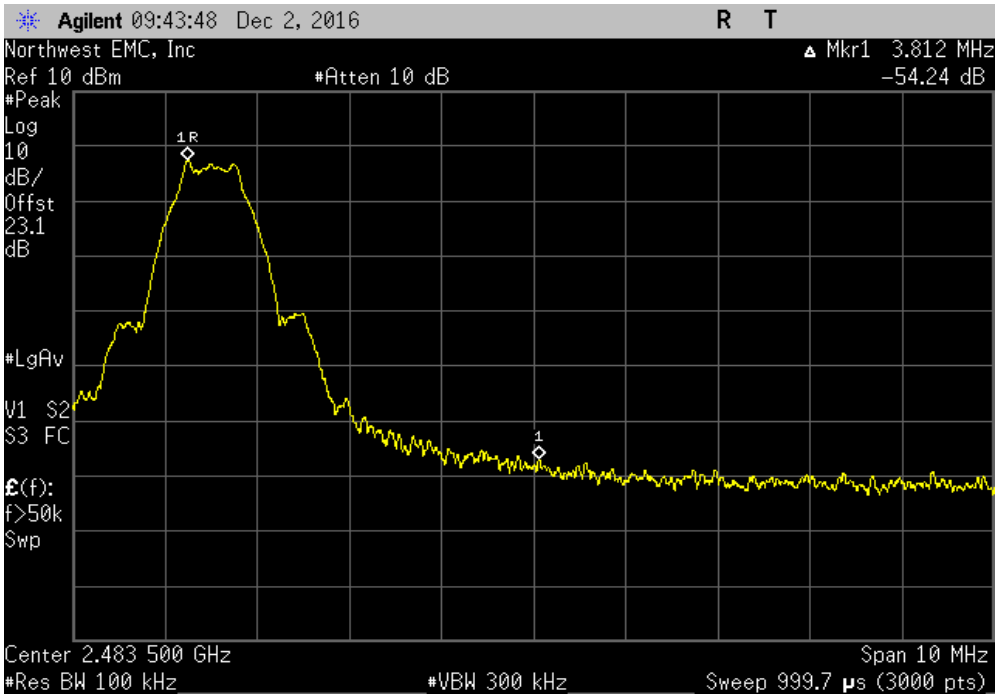
NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

BLE/GFSK Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.51	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-54.24	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2016.09.29

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.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

NORTHWEST EMC

XMit 2016.09.29
NweTx 2016.09.14.2

EUT:	Percepta Quad CRT-P MRI SureScan			**Work Order:**	MDTR0535
Serial Number:	RNV160015S			**Date:**	12/02/16
Customer:	Medtronic, Inc.			**Temperature:**	21.5 °C
Attendees:	Nick Blake			**Humidity:**	28.5% RH
Project:	None			**Barometric Pres.:**	1026 mbar
Tested by:	Dustin Sparks	**Power:**	2.9VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

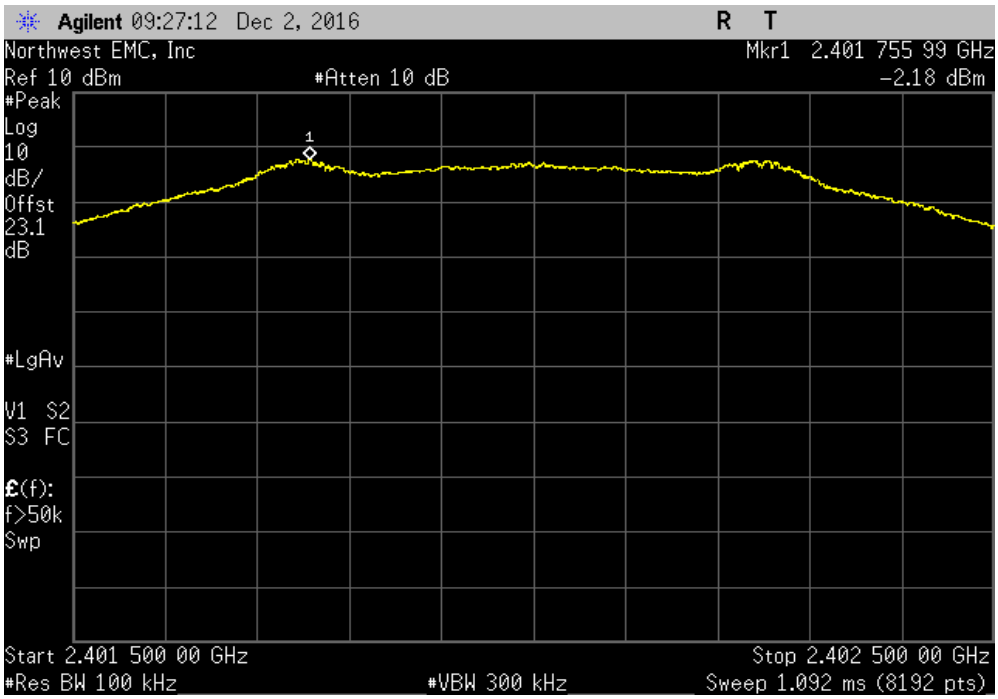
DEVIATIONS FROM TEST STANDARD

None

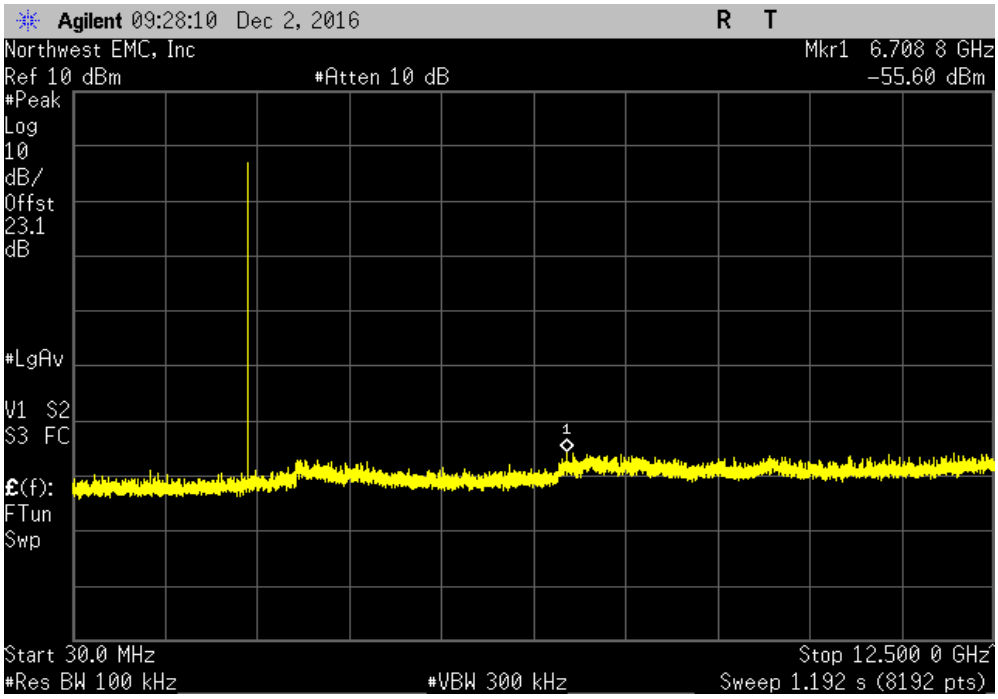
Configuration #	1	Signature

	Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-53.42	-20	Pass
BLE/GFSK Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-49.12	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	-52.73	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	-48.53	-20	Pass
BLE/GFSK High Channel, 2480 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	30 MHz - 12.5 GHz	-52.17	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	-48.87	-20	Pass

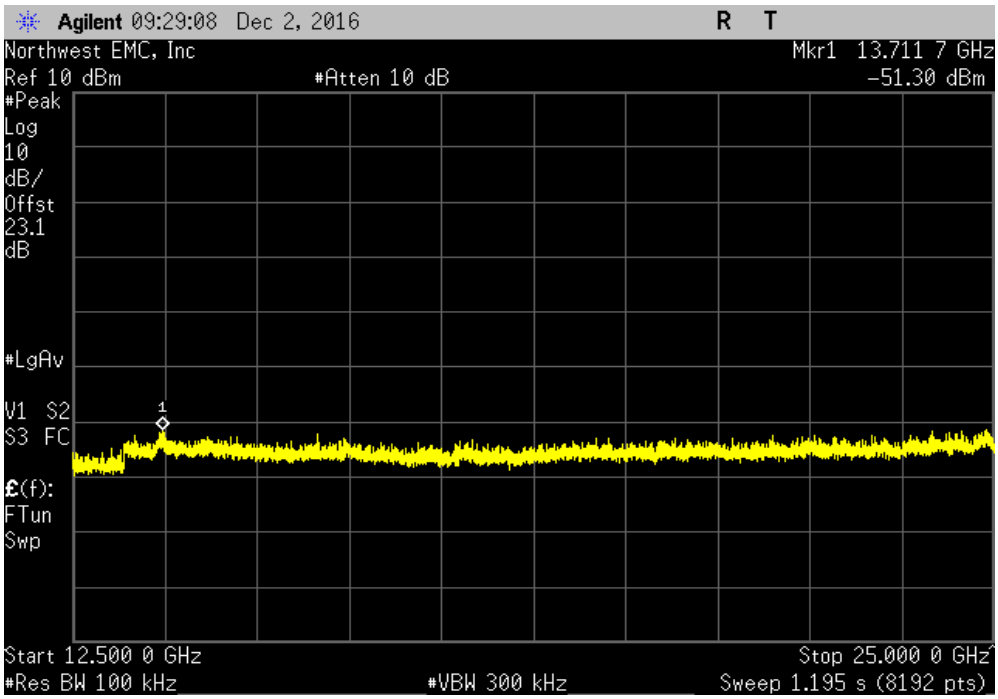
BLE/GFSK Low Channel, 2402 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



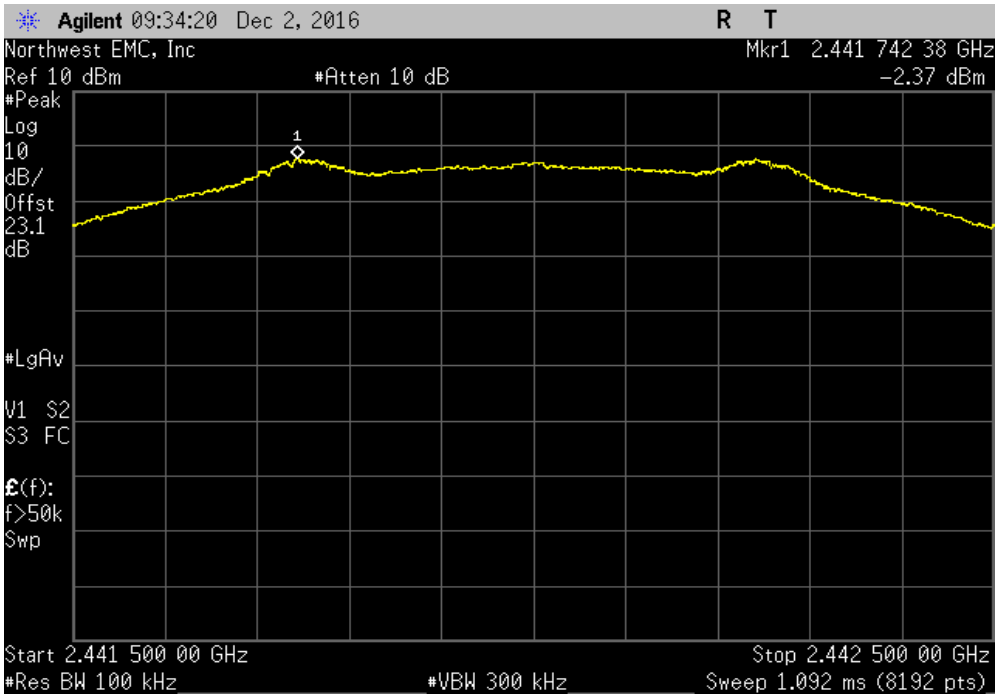
BLE/GFSK Low Channel, 2402 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-53.42	-20	Pass



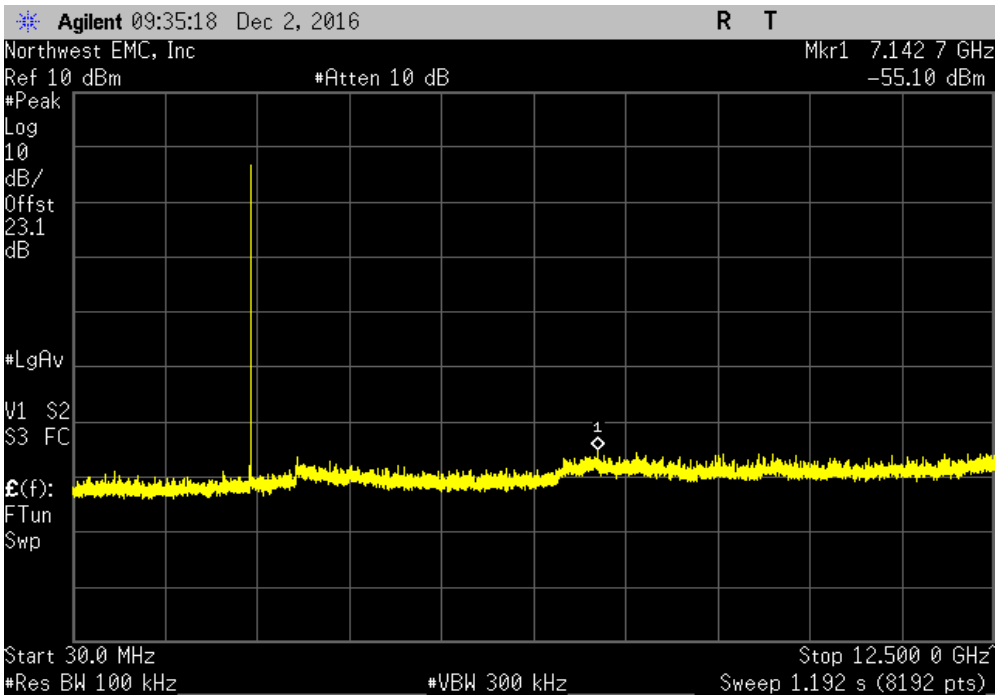
BLE/GFSK Low Channel, 2402 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-49.12	-20	Pass



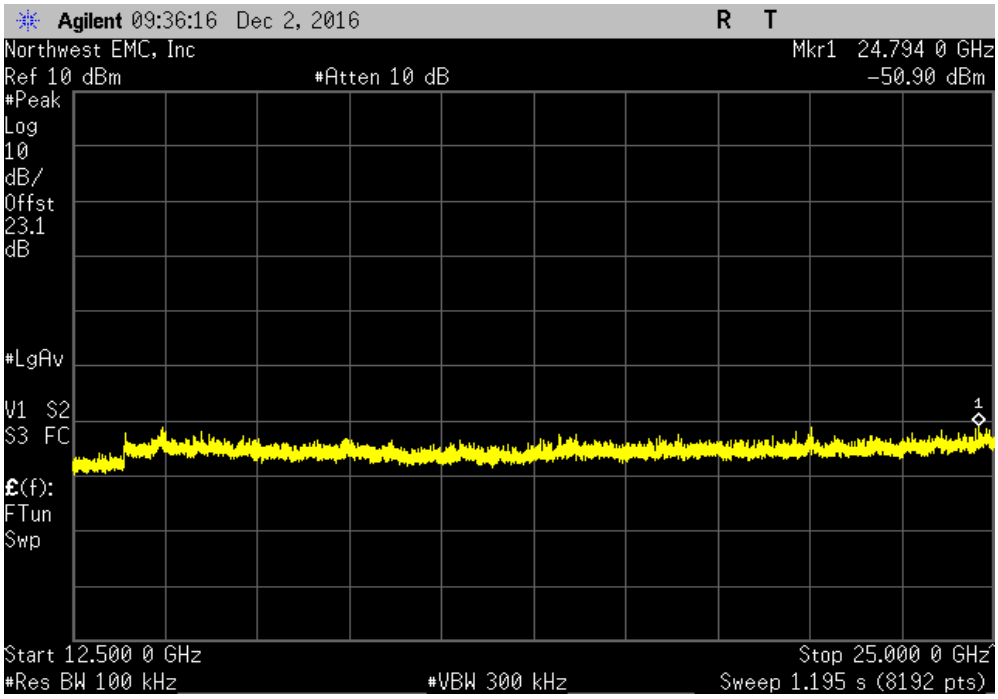
BLE/GFSK Mid Channel, 2442 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



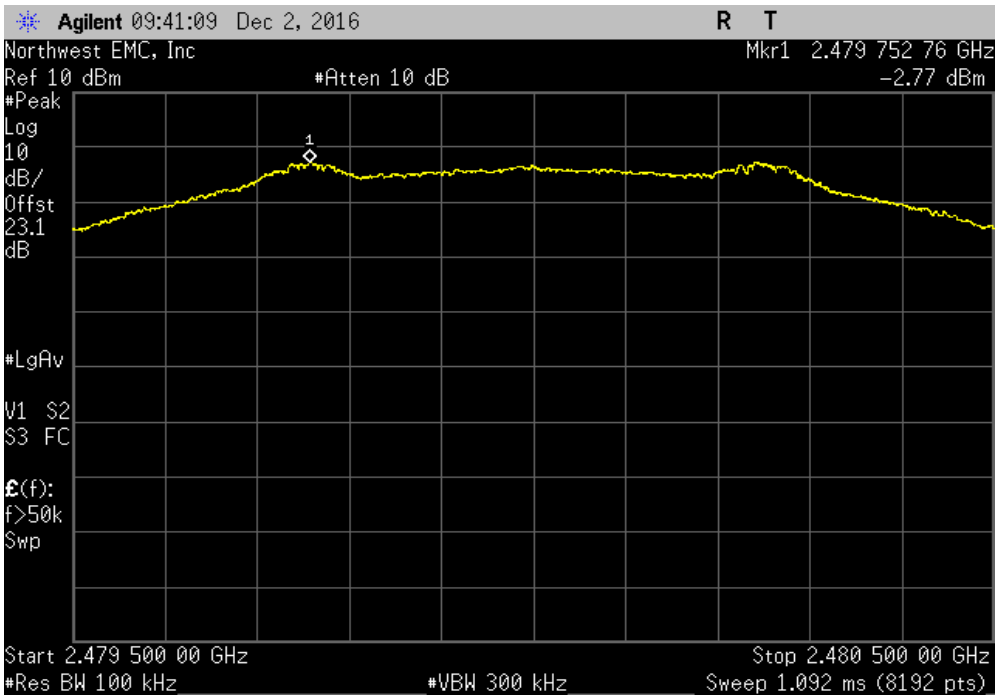
BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-52.73	-20	Pass



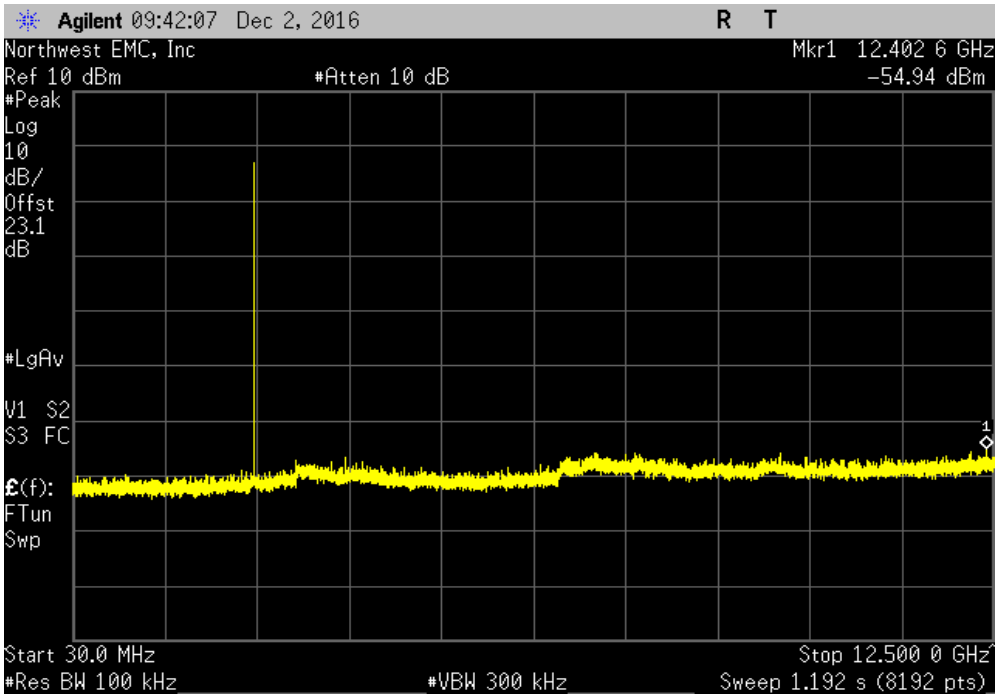
BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-48.53	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



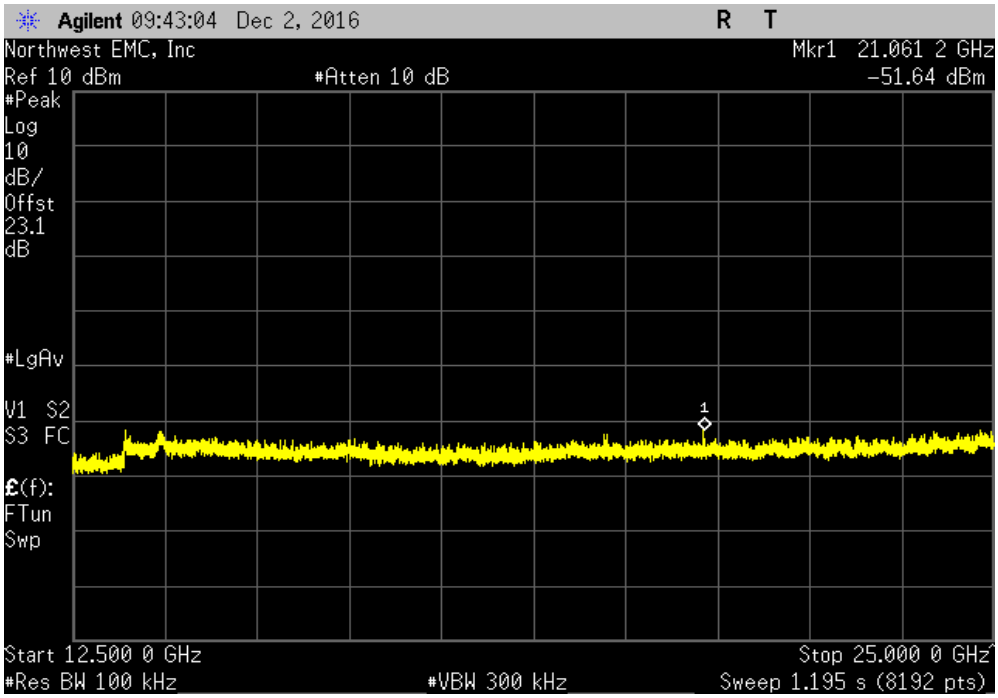
BLE/GFSK High Channel, 2480 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-52.17	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2016.09.29
NweTx 2016.09.14.2

BLE/GFSK High Channel, 2480 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-48.87	-20	Pass



SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.09.30

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 BLE, PN15, see data comments for channel and frequency.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0535 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 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
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/15/2016	12 mo
Cable	Northwest EMC	18-26GHz Standard Gain Horn Cable	MNP	9/15/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Attenuator	Fairview Microwave	SA18E-10	TYA	9/23/2016	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	9/23/2016	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/29/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	9/23/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	3/1/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/1/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/1/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	3/1/2016	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/1/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2016	12 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

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

SPURIOUS RADIATED EMISSIONS

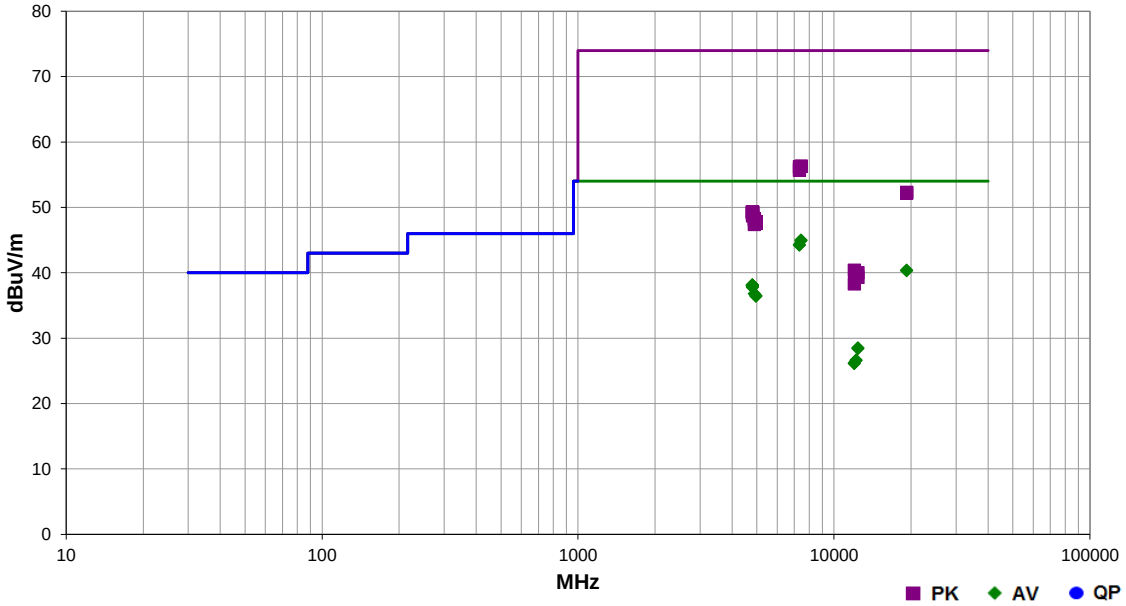
NORTHWEST EMC

PSA-ESCI 2016.09.30
EmiR5 2016.08.26

Work Order:	MDTR0535	**Date:**	12/12/16		
Project:	None	**Temperature:**	23 °C		
Job Site:	MN05	**Humidity:**	17.8% RH		
Serial Number:	RNP601017S	**Barometric Pres.:**	1020 mbar	**Tested by:**	Cole Ghizzone, Kyle Mcmullen
EUT:	Percepta Quad CRT-P MRI SureScan				
Configuration:	3				
Customer:	Medtronic, Inc.				
Attendees:	Nick Blake				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE, PN15, see data comments for channel and frequency.				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	45	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**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
7440.067	29.7	15.3	1.0	154.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	High Ch. 2480 MHz, EUT vert.
7438.492	29.6	15.3	1.0	271.0	3.0	0.0	Horz	AV	0.0	44.9	54.0	-9.1	High Ch. 2480 MHz, EUT vert.
7323.783	29.1	15.2	2.2	146.0	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	Mid Ch. 2442 MHz, EUT vert
7324.642	29.0	15.2	3.7	84.1	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	Mid Ch. 2442 MHz, EUT vert
19215.900	27.8	12.6	1.0	336.9	3.0	0.0	Horz	AV	0.0	40.4	54.0	-13.6	Low Ch. 2402 MHz, EUT vert
19215.920	27.7	12.6	1.0	286.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	Low Ch. 2402 MHz, EUT vert
4801.517	31.4	6.7	1.0	151.0	3.0	0.0	Vert	AV	0.0	38.1	54.0	-15.9	Low Ch. 2402 MHz, EUT horz.
4801.533	31.4	6.7	3.6	137.1	3.0	0.0	Horz	AV	0.0	38.1	54.0	-15.9	Low Ch. 2402 MHz, EUT horz.
4801.517	31.4	6.7	1.0	151.0	3.0	0.0	Vert	AV	0.0	38.1	54.0	-15.9	Low Ch. 2402 MHz, EUT horz.
4801.533	31.4	6.7	3.6	137.1	3.0	0.0	Horz	AV	0.0	38.1	54.0	-15.9	Low Ch. 2402 MHz, EUT horz.
4802.705	31.4	6.7	1.0	196.1	3.0	0.0	Horz	AV	0.0	38.1	54.0	-15.9	Low Ch. 2402 MHz, EUT vert
4802.550	31.2	6.7	1.0	34.1	3.0	0.0	Vert	AV	0.0	37.9	54.0	-16.1	Low Ch. 2402 MHz, EUT on side
4802.745	31.1	6.7	1.0	99.0	3.0	0.0	Horz	AV	0.0	37.8	54.0	-16.2	Low Ch. 2402 MHz, EUT on side
4802.555	31.1	6.7	2.9	293.9	3.0	0.0	Vert	AV	0.0	37.8	54.0	-16.2	Low Ch. 2402 MHz, EUT vert
4886.208	30.2	6.6	1.0	250.0	3.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	Mid Ch. 2442 MHz, EUT vert
4962.133	29.8	6.7	1.0	46.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	High Ch. 2480 MHz, EUT vert.
4962.092	29.7	6.7	1.0	343.9	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	High Ch. 2480 MHz, EUT vert.
7442.433	41.0	15.3	1.0	271.0	3.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	High Ch. 2480 MHz, EUT vert.
7441.758	41.0	15.3	1.0	154.0	3.0	0.0	Vert	PK	0.0	56.3	74.0	-17.7	High Ch. 2480 MHz, EUT vert.
7325.442	41.1	15.1	2.2	146.0	3.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	Mid Ch. 2442 MHz, EUT vert
7323.575	40.5	15.2	3.7	84.1	3.0	0.0	Vert	PK	0.0	55.7	74.0	-18.3	Mid Ch. 2442 MHz, EUT vert
19215.170	39.7	12.6	1.0	336.9	3.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	Low Ch. 2402 MHz, EUT vert
19214.150	39.6	12.6	1.0	286.0	3.0	0.0	Vert	PK	0.0	52.2	74.0	-21.8	Low Ch. 2402 MHz, EUT vert

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
4801.675	42.6	6.7	1.0	151.0	3.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7	Low Ch. 2402 MHz, EUT horz.
4801.675	42.6	6.7	1.0	151.0	3.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7	Low Ch. 2402 MHz, EUT horz.
4803.075	42.6	6.7	1.0	99.0	3.0	0.0	Horz	PK	0.0	49.3	74.0	-24.7	Low Ch. 2402 MHz, EUT on side
4802.458	42.5	6.7	3.6	137.1	3.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	Low Ch. 2402 MHz, EUT horz.
4802.458	42.5	6.7	3.6	137.1	3.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	Low Ch. 2402 MHz, EUT horz.
4803.205	42.5	6.7	1.0	34.1	3.0	0.0	Vert	PK	0.0	49.2	74.0	-24.8	Low Ch. 2402 MHz, EUT on side
4805.250	42.2	6.7	1.0	196.1	3.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	Low Ch. 2402 MHz, EUT vert
4802.610	42.0	6.7	2.9	293.9	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	Low Ch. 2402 MHz, EUT vert
12399.290	27.8	0.7	1.0	275.1	3.0	0.0	Horz	AV	0.0	28.5	54.0	-25.5	High Ch. 2480 MHz, EUT vert.
12399.490	27.7	0.7	1.0	189.0	3.0	0.0	Vert	AV	0.0	28.4	54.0	-25.6	High Ch. 2480 MHz, EUT vert.
4883.717	41.7	6.6	1.0	250.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	Mid Ch. 2442 MHz, EUT vert
4884.083	41.5	6.6	1.0	306.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Mid Ch. 2442 MHz, EUT vert
4962.317	41.1	6.7	1.0	46.0	3.0	0.0	Vert	PK	0.0	47.8	74.0	-26.2	High Ch. 2480 MHz, EUT vert.
4959.325	40.9	6.7	1.0	343.9	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	High Ch. 2480 MHz, EUT vert.
4883.925	40.8	6.6	1.0	250.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	Mid Ch. 2442 MHz, EUT vert
12208.660	27.1	-0.5	1.0	48.1	3.0	0.0	Horz	AV	0.0	26.6	54.0	-27.4	Mid Ch. 2442 MHz, EUT vert
12208.860	27.1	-0.5	1.0	282.9	3.0	0.0	Vert	AV	0.0	26.6	54.0	-27.4	Mid Ch. 2442 MHz, EUT vert
12008.540	27.3	-1.1	3.8	51.2	3.0	0.0	Horz	AV	0.0	26.2	54.0	-27.8	Low Ch. 2402 MHz, EUT vert
12008.960	27.2	-1.1	1.0	227.1	3.0	0.0	Vert	AV	0.0	26.1	54.0	-27.9	Low Ch. 2402 MHz, EUT vert
12008.750	41.5	-1.1	3.8	51.2	3.0	0.0	Horz	PK	0.0	40.4	74.0	-33.6	Low Ch. 2402 MHz, EUT vert
12399.640	39.3	0.7	1.0	275.1	3.0	0.0	Horz	PK	0.0	40.0	74.0	-34.0	High Ch. 2480 MHz, EUT vert.
12211.310	40.0	-0.5	1.0	282.9	3.0	0.0	Vert	PK	0.0	39.5	74.0	-34.5	Mid Ch. 2442 MHz, EUT vert
12399.480	38.6	0.7	1.0	189.0	3.0	0.0	Vert	PK	0.0	39.3	74.0	-34.7	High Ch. 2480 MHz, EUT vert.
12211.080	39.8	-0.5	1.0	48.1	3.0	0.0	Horz	PK	0.0	39.3	74.0	-34.7	Mid Ch. 2442 MHz, EUT vert
12009.190	39.4	-1.1	1.0	227.1	3.0	0.0	Vert	PK	0.0	38.3	74.0	-35.7	Low Ch. 2402 MHz, EUT vert

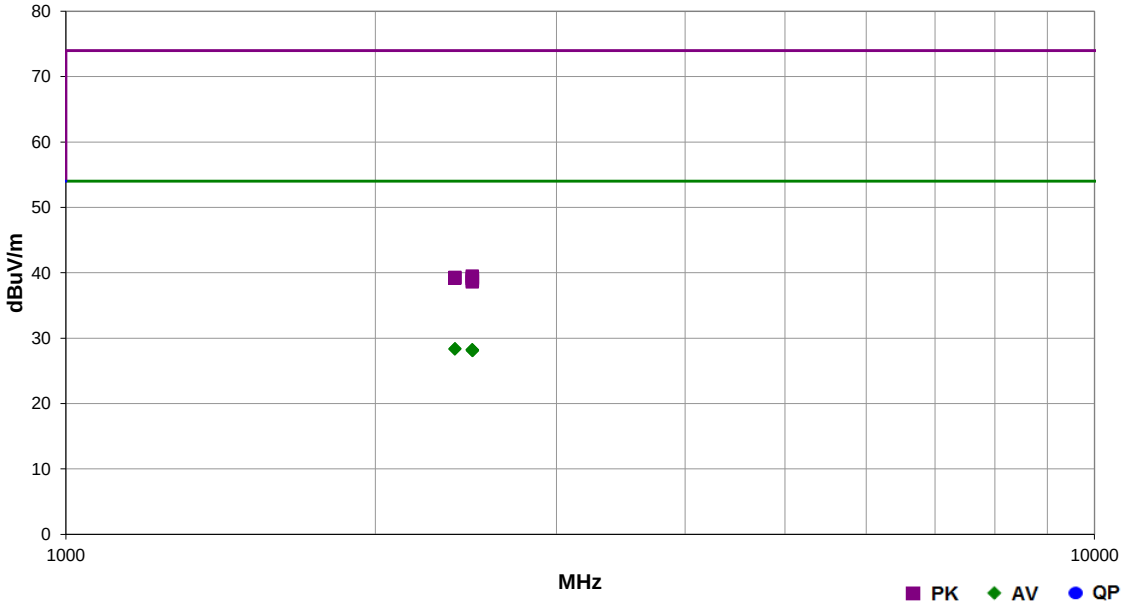
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.09.30
EmiR5 2016.08.26

Work Order:	MDTR0535	**Date:**	12/12/16		
Project:	None	**Temperature:**	23 °C		
Job Site:	MN05	**Humidity:**	17.8% RH		
Serial Number:	RNP601017S	**Barometric Pres.:**	1020 mbar	**Tested by:**	Cole Ghizzone
EUT:	Percepta Quad CRT-P MRI SureScan				
Configuration:	3				
Customer:	Medtronic, Inc.				
Attendees:	Nick Blake				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE, PN15, see data comments for channel and frequency.				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	46	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**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
2389.813	30.8	-2.4	1.0	137.1	3.0	0.0	Vert	AV	0.0	28.4	54.0	-25.6	Low Ch. 2402 MHz, EUT vert
2389.360	30.7	-2.4	1.5	107.0	3.0	0.0	Horz	AV	0.0	28.3	54.0	-25.7	Low Ch. 2402 MHz, EUT vert
2485.203	30.8	-2.6	1.0	347.0	3.0	0.0	Horz	AV	0.0	28.2	54.0	-25.8	High Ch. 2480 MHz, EUT vert.
2484.253	30.8	-2.6	1.0	245.0	3.0	0.0	Vert	AV	0.0	28.2	54.0	-25.8	High Ch. 2480 MHz, EUT vert.
2483.877	30.8	-2.6	1.0	239.0	3.0	0.0	Horz	AV	0.0	28.2	54.0	-25.8	High Ch. 2480 MHz, EUT on side
2483.567	30.8	-2.6	1.4	307.0	3.0	0.0	Vert	AV	0.0	28.2	54.0	-25.8	High Ch. 2480 MHz, EUT on side
2485.357	30.7	-2.6	1.7	4.1	3.0	0.0	Horz	AV	0.0	28.1	54.0	-25.9	High Ch. 2480 MHz, EUT horz.
2485.303	30.7	-2.6	2.0	177.1	3.0	0.0	Vert	AV	0.0	28.1	54.0	-25.9	High Ch. 2480 MHz, EUT horz.
2484.120	42.1	-2.6	1.0	245.0	3.0	0.0	Vert	PK	0.0	39.5	74.0	-34.5	High Ch. 2480 MHz, EUT vert.
2484.740	41.9	-2.6	1.7	4.1	3.0	0.0	Horz	PK	0.0	39.3	74.0	-34.7	High Ch. 2480 MHz, EUT horz.
2389.663	41.7	-2.4	1.0	137.1	3.0	0.0	Vert	PK	0.0	39.3	74.0	-34.7	Low Ch. 2402 MHz, EUT vert
2389.010	41.6	-2.4	1.5	107.0	3.0	0.0	Horz	PK	0.0	39.2	74.0	-34.8	Low Ch. 2402 MHz, EUT vert
2483.717	41.7	-2.6	1.0	347.0	3.0	0.0	Horz	PK	0.0	39.1	74.0	-34.9	High Ch. 2480 MHz, EUT vert.
2485.070	41.7	-2.6	1.0	239.0	3.0	0.0	Horz	PK	0.0	39.1	74.0	-34.9	High Ch. 2480 MHz, EUT on side
2484.607	41.4	-2.6	1.4	307.0	3.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2	High Ch. 2480 MHz, EUT on side
2483.977	41.2	-2.6	2.0	177.1	3.0	0.0	Vert	PK	0.0	38.6	74.0	-35.4	High Ch. 2480 MHz, EUT horz.