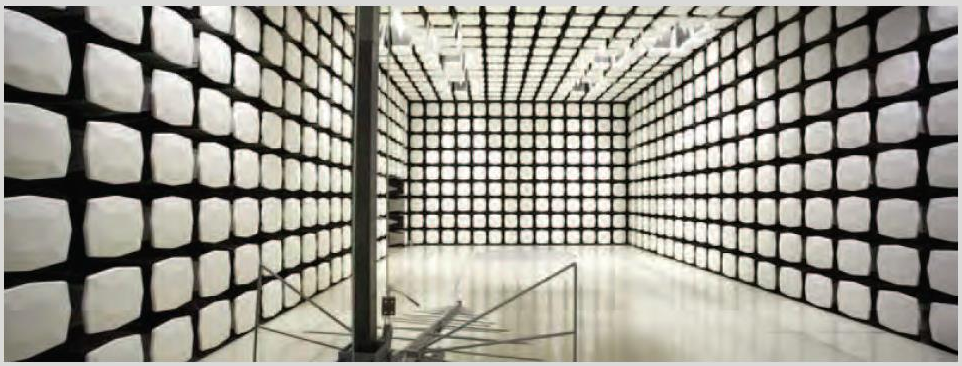
Medtronic, Inc.

LINQ II

FCC 15.247:2018

Report # MDTR0718



NVLAP LAB CODE: 200881-0

CERTIFICATE OF TEST

Last Date of Test: October 11, 2018
Medtronic, Inc.
Model: LINQ II

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2018	ANSI C63.10:2013

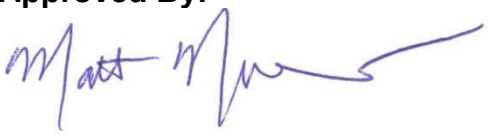
Results

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	
11.9.1.1	Equivalent Isotropic Radiated Power (EIRP)	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:



Matt Nuernberg, Operations 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. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

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 Element 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 – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

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

Korea

MSIT / 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

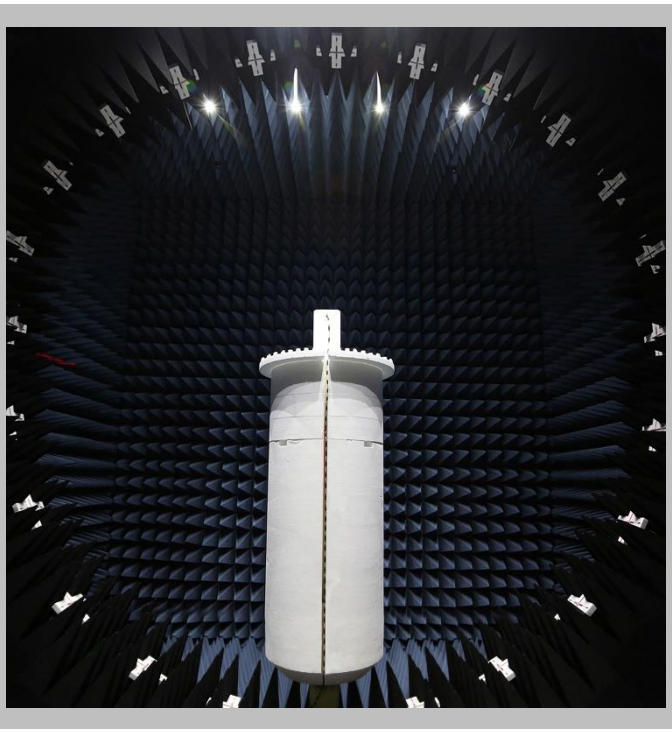
MIC – Recognized by MIC as a CAB for the acceptance of test data.

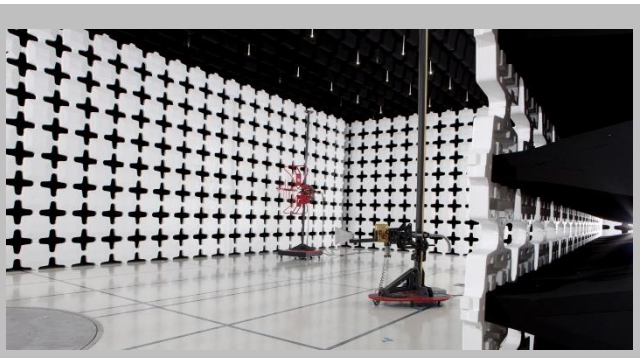
SCOPE

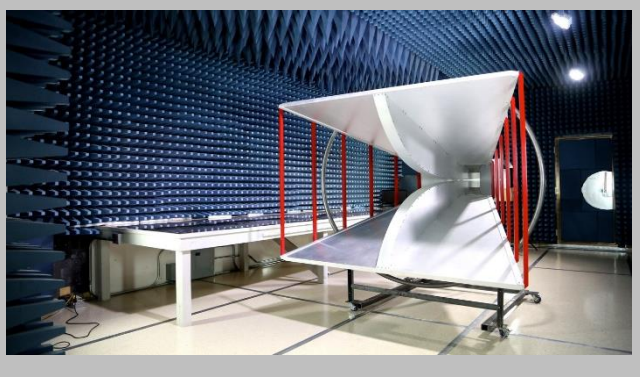
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 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 6775 NE Evergreen Pkwy #400 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, 2834E-3	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







EMISSIONS MEASUREMENTS

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 QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. 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.

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 bandwidths and detectors specified. No video filter was used.

Sample Calculations

Radiated Emissions:

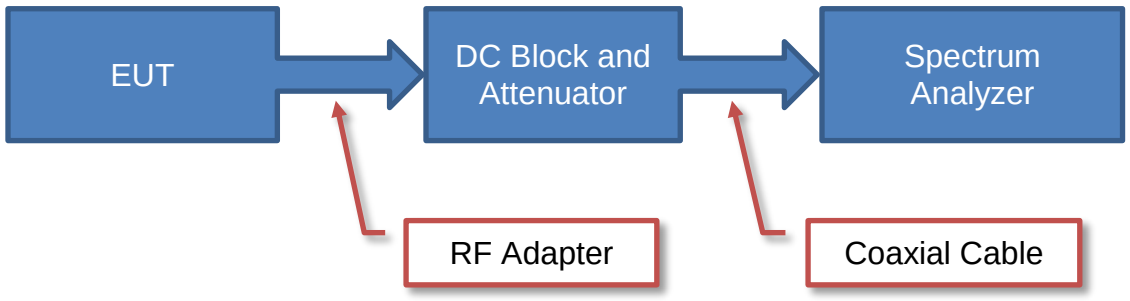
Field Strength		Measured Level		Antenna Factor		Cable Factor		Amplifier Gain		Distance Adjustment Factor		External Attenuation
33.5	=	42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0

Conducted Emissions:

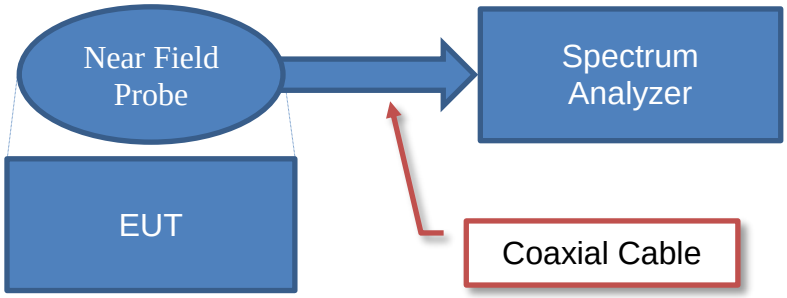
Adjusted Level		Measured Level		Transducer Factor		Cable Factor		External Attenuation
47.1	=	26.7	+	0.3	+	0.1	+	20.0

Test Setup Block Diagrams

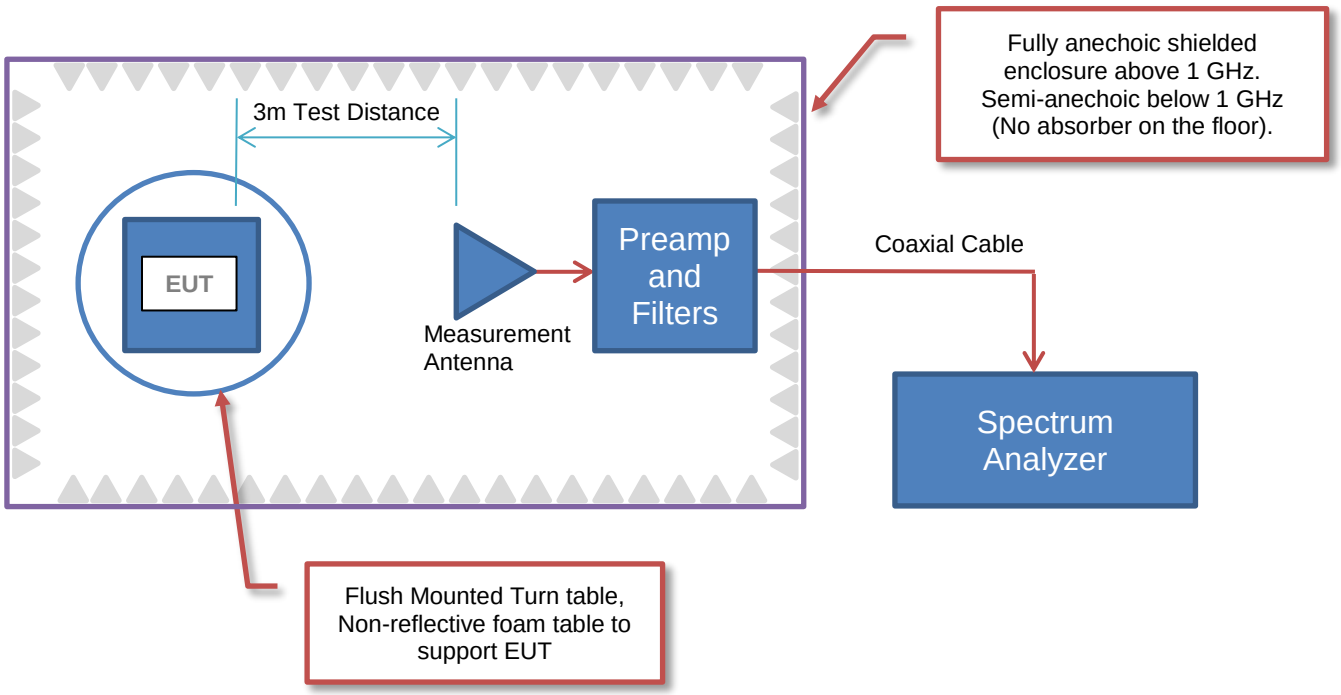
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

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:	LINQ II
First Date of Test:	October 8, 2018
Last Date of Test:	October 11, 2018
Receipt Date of Samples:	October 8, 2018
Equipment Design Stage:	Production equivalent
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The LINQ II Model LNQ22 Insertable Cardiac Monitor (ICM) is the next generation of Medtronic diagnostic implant devices designed to simplify the user experience from earlier diagnostic implant devices. The LINQ II ICM includes a 2.4 GHz ISM band Bluetooth Low Energy (BLE) radio telemetry module.

Testing Objective:

To demonstrate compliance of the Bluetooth Low Energy (BLE) radio to FCC 15.247 requirements. LINQ II EUT tested per Medtronic Test Plan MDT30138837.

Client Provided Information:

At the time of radio compliance testing, the LINQ II test samples were configured with version 5.1 firmware. Testing unrelated to radio compliance resulted in firmware updates to resolve several anomalies associated with LINQ II's medical functionality. These firmware updates do not affect performance or functionality of the BLE radio, and therefore the results herein remain valid. Details of these firmware updates are documented in Medtronic document MDT30149419.

The LINQ II Insertable Cardiac Monitor (ICM) has been setup in a test fixture for direct connect radio transmitter measurements. The test fixture includes an antenna impedance matching circuit that introduces a fixed 2.36 dB loss to the RF signal. To ensure that measured values are accurate with the actual transmitter output levels, a 2.36 dB correction factor is added to the following measurements:

- Output Power
- Equivalent Isotropic Radiated Power (EIRP)
- Power Spectral Density

This correction factor is included in the data sheets.

POWER SETTINGS

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
BLE	DTS	0	2402	High Power*
		20	2442	High Power*
		39	2480	High Power*

*High Power is the only power setting available. See configuration for software version.

CONFIGURATIONS

Configuration MDTR0718- 1

Software/Firmare Running during Test	
Decription	**Version**
ULP	8.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
LINQ II	Medtronic, Inc.	LNQ22	RLB001885G

Configuration MDTR0718- 2

Software/Firmare Running during Test	
Decription	**Version**
ULP	8.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
LINQ II (Baseline)	Medtronic, Inc.	LNQ22 Hybrid	12345670307

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Banana Cables (x2)	No	1.7 m	No	LINQ II (Baseline)	DC Power Supply

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-10-09	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2018-10-09	Equivalent Isotropic Radiated Power (EIRP)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2018-10-09	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2018-10-09	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2018-10-09	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2018-10-09	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2018-10-11	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. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

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 during test to facilitate radio measurements.

During actual radio operation, the radio worst case Duty Cycle is approximately 44% based on the Bluetooth Low Energy protocol specified in version 4.1 of the BT SIG standard.

OCCUPIED BANDWIDTH

XMit 2017.12.13

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	Keysight	N5182B-506	TEU	23-Apr-18	23-Apr-21
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**LINQ II**			**Work Order:**	**MDTR0718**
Serial Number:	**12345670307**			**Date:**	**9-Oct-18**
Customer:	**Medtronic, Inc.**			**Temperature:**	**22 °C**
Attendees:	**Nick Blake**			**Humidity:**	**45.7% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Kyle McMullan**	**Power:**	**2.9VDC**	**Job Site:**	**MN05**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2018	**ANSI C63.10:2013**

COMMENTS

None

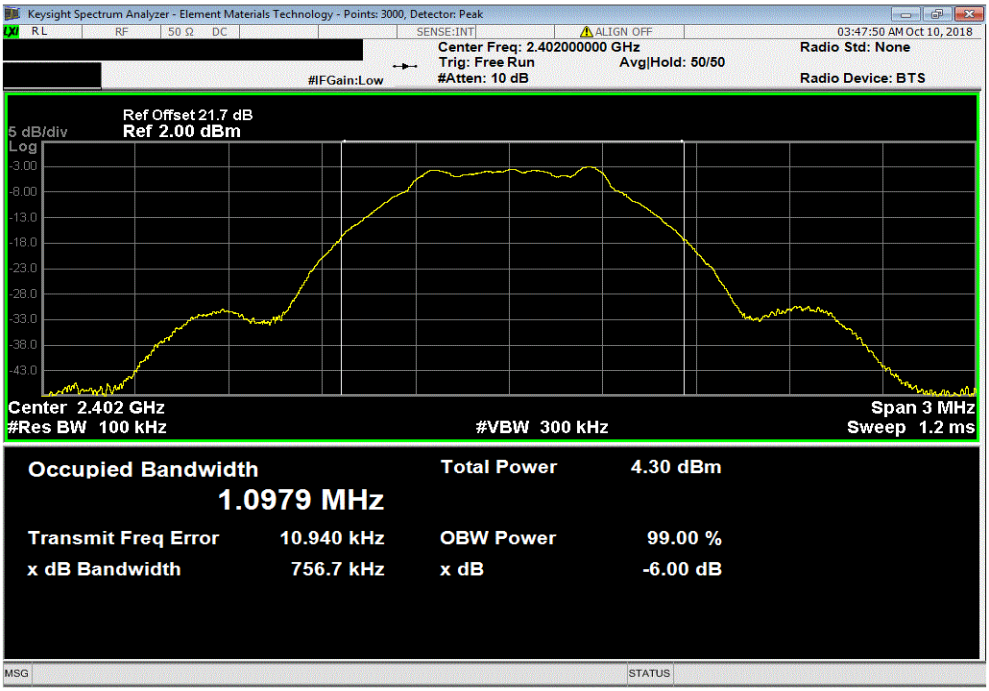
DEVIATIONS FROM TEST STANDARD

None

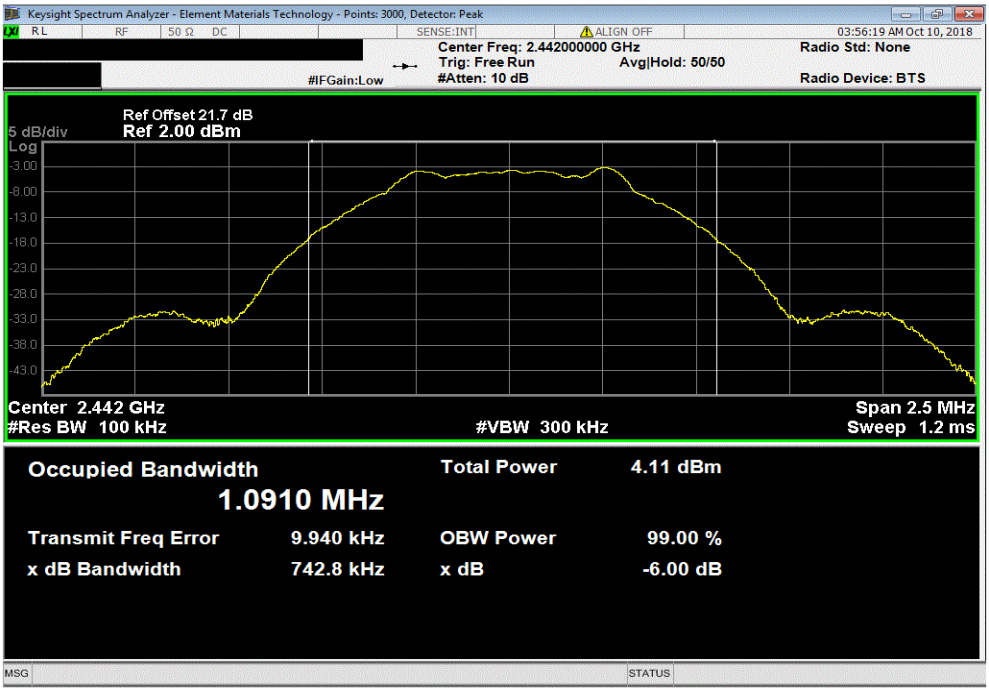
Configuration #	**2**	*Signature*

	Value	**Limit (≥)**	**Result**
BLE/GFSK Low Channel, 2402 MHz	756.665 kHz	500 kHz	Pass
BLE/GFSK Mid Channel, 2442 MHz	742.794 kHz	500 kHz	Pass
BLE/GFSK High Channel, 2480 MHz	751.014 kHz	500 kHz	Pass

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

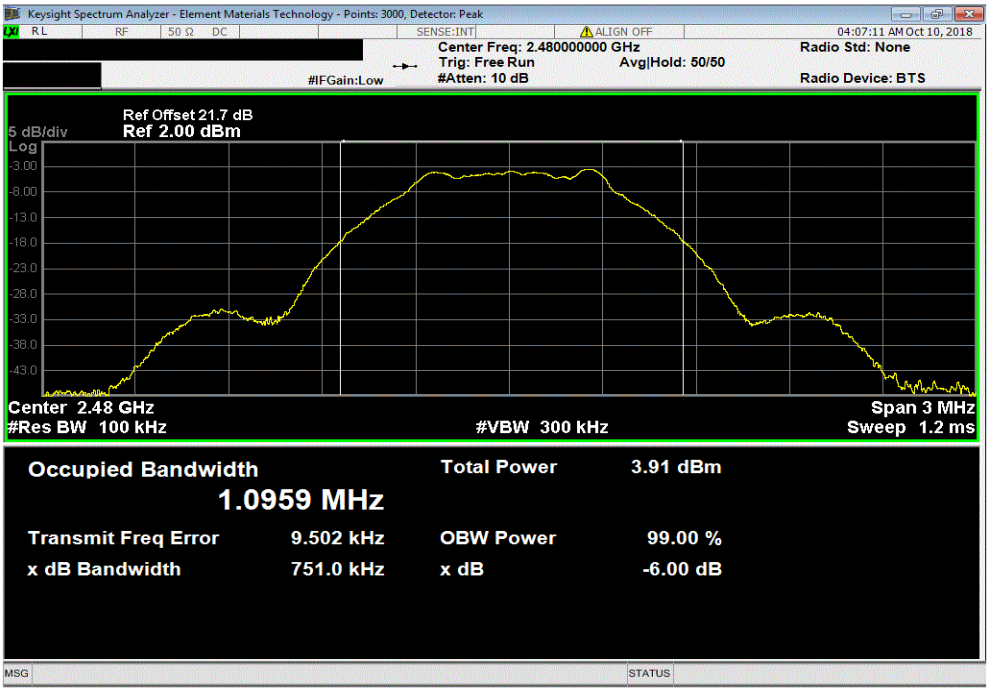


BLE/GFSK Mid Channel, 2442 MHz						
				Value	Limit (≥)	Result
				742.794 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

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



OUTPUT POWER

XMit 2017.12.13

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	Keysight	N5182B-506	TEU	23-Apr-18	23-Apr-21
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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.

OUTPUT POWER

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	LINQ II			Work Order:	MDTR0718
Serial Number:	12345670307			Date:	9-Oct-18
Customer:	Medtronic, Inc.			Temperature:	22.1 °C
Attendees:	Nick Blake			Humidity:	45.7% RH
Project:	None			Barometric Pres.:	1019 mbar
Tested by:	Kyle McMullan	Power:	2.9VDC	Job Site:	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2018	ANSI C63.10:2013

COMMENTS

See customer provided information for details on correction factor

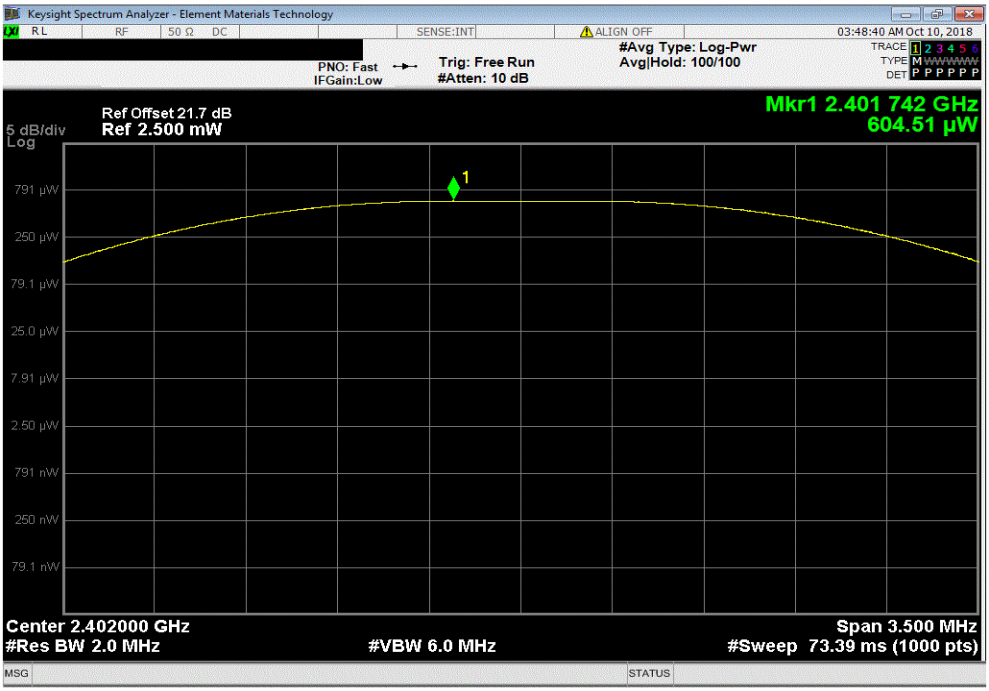
DEVIATIONS FROM TEST STANDARD

None

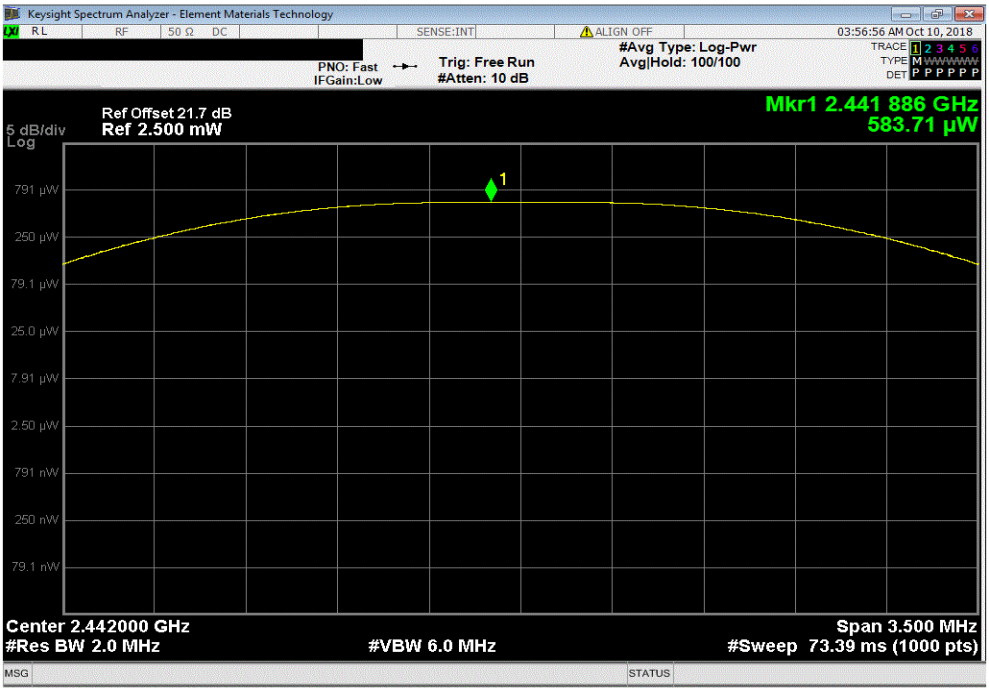
Configuration #	2	Signature

	Measured Value (uW)	Correction Factor (dB)	Corrected Value (dBm)	Corrected Value (mW)	Limit (< W)	Result
BLE/GFSK Low Channel, 2402 MHz	604.51	2.36	0.17	1.04	1	Pass
BLE/GFSK Mid Channel, 2442 MHz	583.71	2.36	0.02	1.01	1	Pass
BLE/GFSK High Channel, 2480 MHz	553.19	2.36	-0.21	0.95	1	Pass

BLE/GFSK Low Channel, 2402 MHz						
	Measured Value (uW)	Correction Factor (dB)	Corrected Value (dBm)	Corrected Value (mW)	Limit (< W)	Result
	604.51	2.36	0.17	1.04	1	Pass

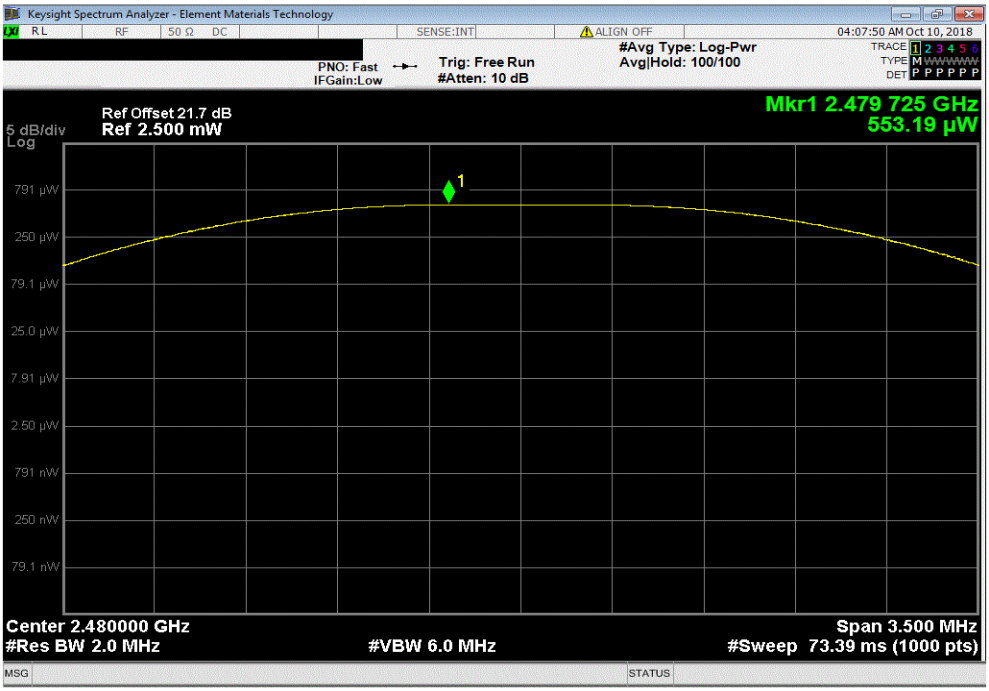


BLE/GFSK Mid Channel, 2442 MHz						
	Measured Value (uW)	Correction Factor (dB)	Corrected Value (dBm)	Corrected Value (mW)	Limit (< W)	Result
	583.71	2.36	0.02	1.01	1	Pass



OUTPUT POWER

BLE/GFSK High Channel, 2480 MHz						
	Measured Value (uW)	Correction Factor (dB)	Corrected Value (dBm)	Corrected Value (mW)	Limit (< W)	Result
	553.19	2.36	-0.21	0.95	1	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

XMit 2017.12.13

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.

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Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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.

The gain of the antenna was added to the conducted output power. This value must not exceed 4 Watts, which is the same as 36 dBm.

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	LINQ II			**Work Order:**	MDTR0718
Serial Number:	12345670307			**Date:**	9-Oct-18
Customer:	Medtronic, Inc.			**Temperature:**	22.1 °C
Attendees:	Nick Blake			**Humidity:**	45.7% RH
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Kyle McMullan	**Power:**	2.9VDC	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2018	ANSI C63.10:2013

COMMENTS

See customer provided information for details on correction factor

DEVIATIONS FROM TEST STANDARD

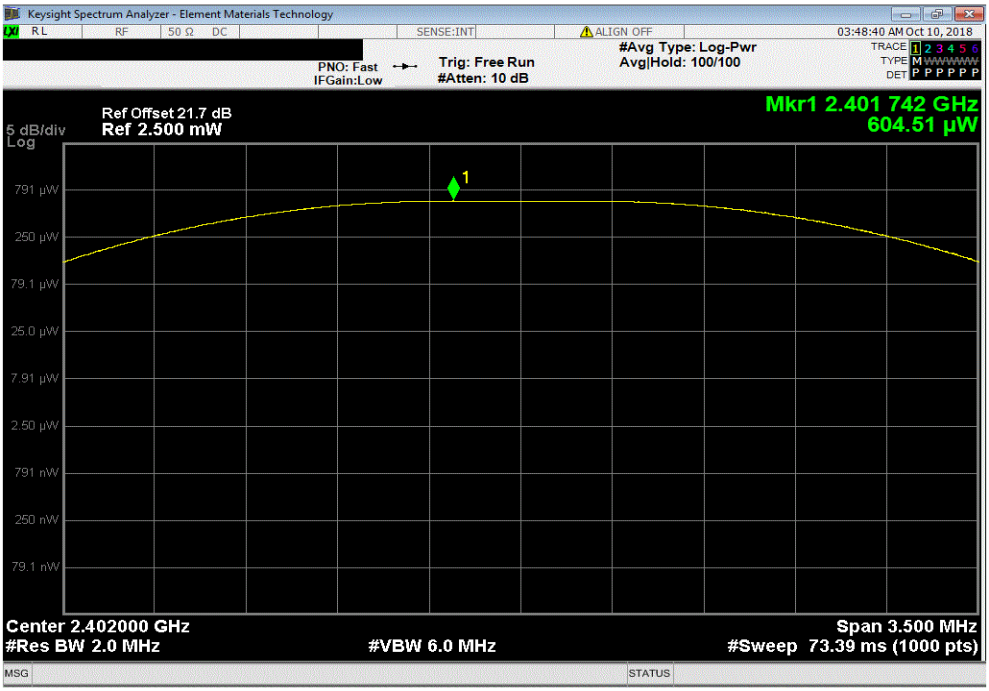
None

Configuration #	2	Signature

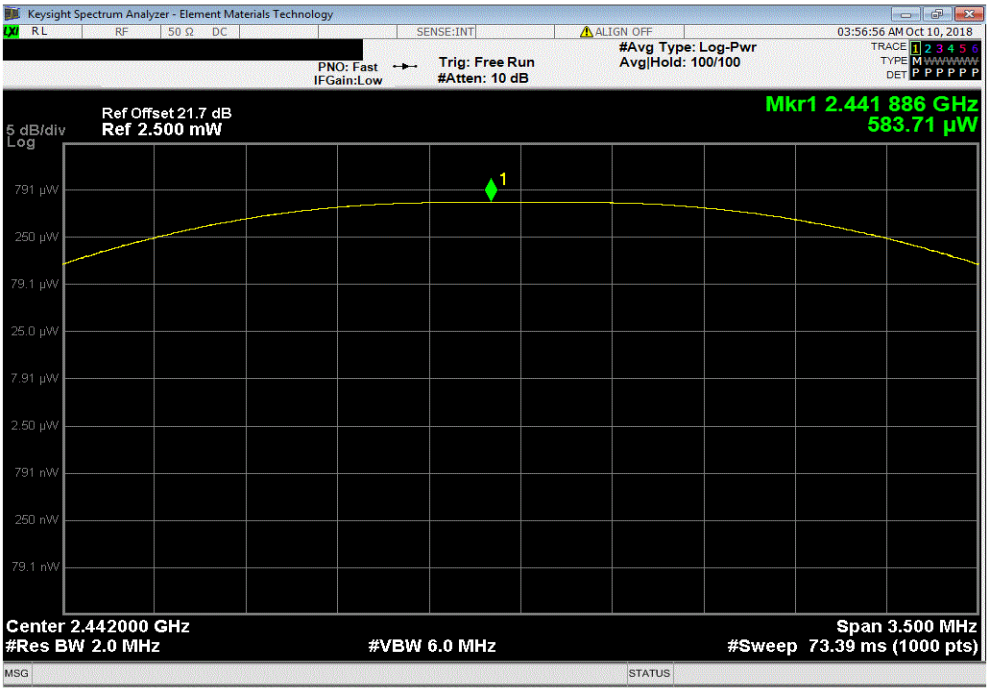
	Measured Value (uW)	Correction Factor (dB)	Gain (dBi)	EIRP (dBm)	Limit (< dBm)	Result
BLE/GFSK Low Channel, 2402 MHz	601.51	2.36	-22	-21.8	36	Pass
BLE/GFSK Mid Channel, 2442 MHz	583.71	2.36	-22	-22.0	36	Pass
BLE/GFSK High Channel, 2480 MHz	553.19	2.36	-22	-22.2	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

BLE/GFSK Low Channel, 2402 MHz						
	Measured Value (uW)	Correction Factor (dB)	Gain (dBi)	EIRP (dBm)	Limit (< dBm)	Result
	601.51	2.36	-22	-21.8	36	Pass



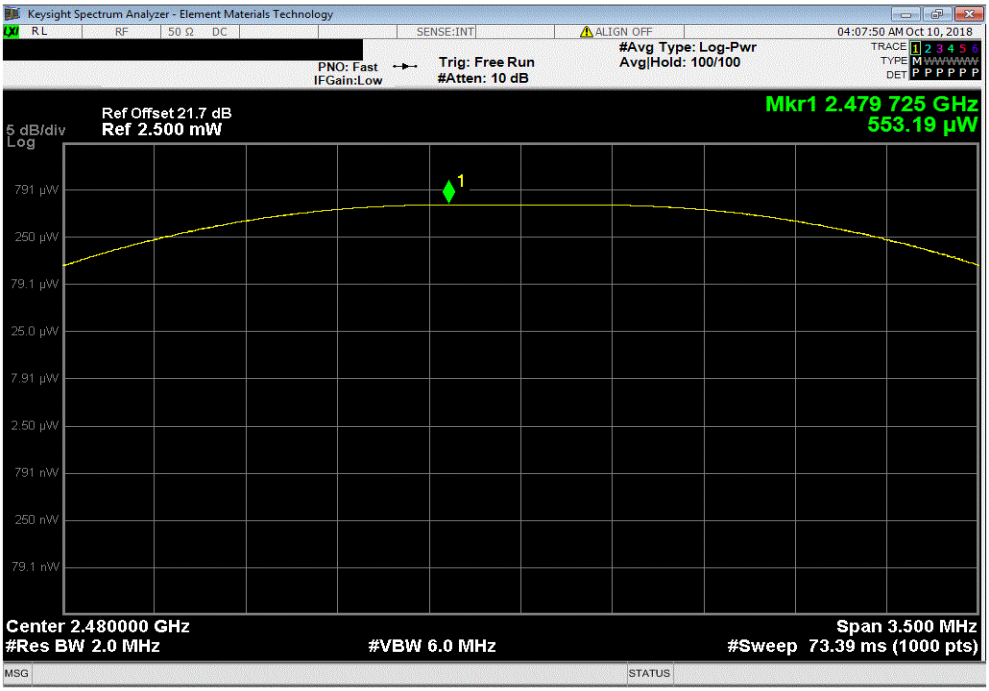
BLE/GFSK Mid Channel, 2442 MHz						
	Measured Value (uW)	Correction Factor (dB)	Gain (dBi)	EIRP (dBm)	Limit (< dBm)	Result
	583.71	2.36	-22	-22.0	36	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

TbtTx 2018.09.13 XMit 2017.12.13

BLE/GFSK High Channel, 2480 MHz						
	Measured Value (uW)	Correction Factor (dB)	Gain (dBi)	EIRP (dBm)	Limit (< dBm)	Result
	553.19	2.36	-22	-22.2	36	Pass



POWER SPECTRAL DENSITY

XMit 2017.12.13

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	Keysight	N5182B-506	TEU	23-Apr-18	23-Apr-21
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	LINQ II			**Work Order:**	MDTR0718
Serial Number:	12345670307			**Date:**	9-Oct-18
Customer:	Medtronic, Inc.			**Temperature:**	22.2 °C
Attendees:	Nick Blake			**Humidity:**	45.5% RH
Project:	None			**Barometric Pres.:**	1019 mbar
Tested by:	Kyle McMullan	**Power:**	2.9VDC	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2018	ANSI C63.10:2013

COMMENTS

See customer provided information for details on correction factor

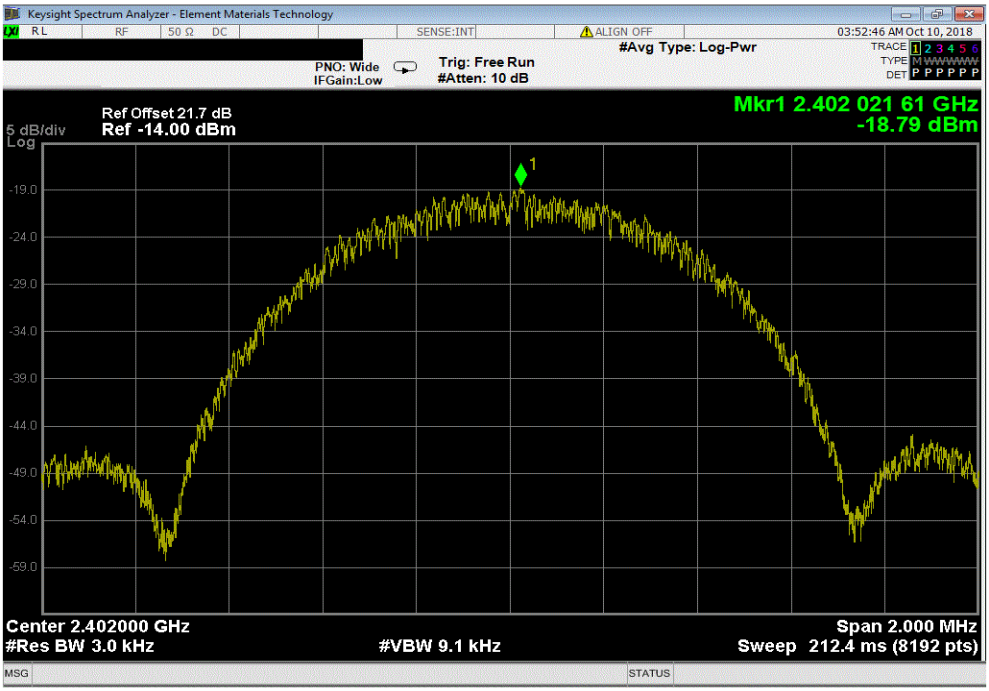
DEVIATIONS FROM TEST STANDARD

None

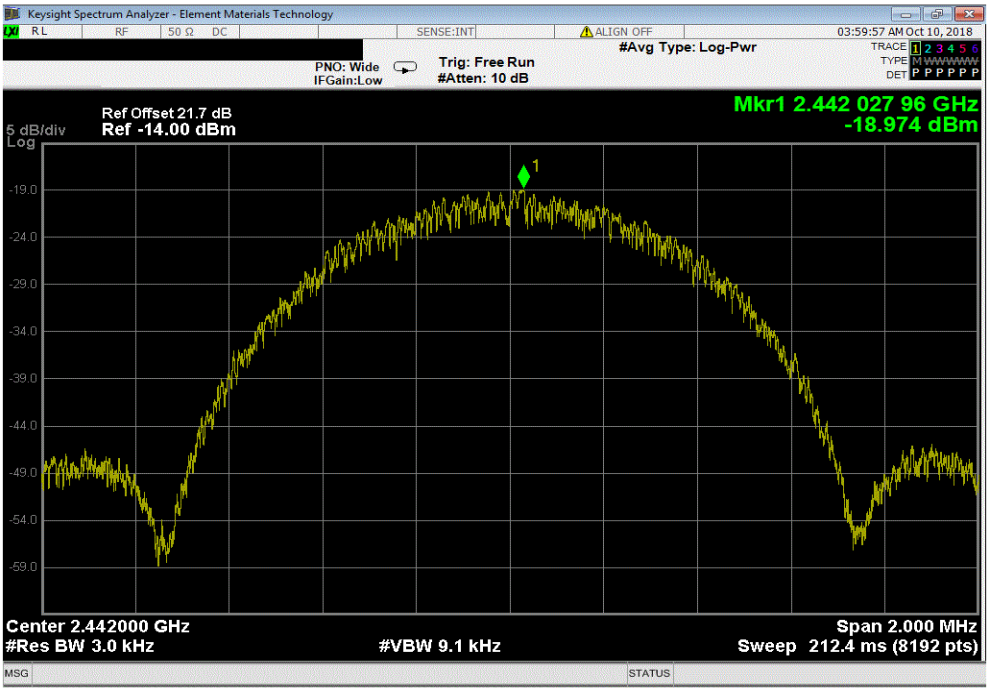
Configuration #	2	Signature

	Measured Val (dBm/3kHz)	Correction Factor (dB)	Corrected Val dBm/3kHz	Limit < dBm/3kHz	Results
BLE/GFSK Low Channel, 2402 MHz	-18.793	2.36	-16.43	8	Pass
BLE/GFSK Mid Channel, 2442 MHz	-18.974	2.36	-16.61	8	Pass
BLE/GFSK High Channel, 2480 MHz	-19.084	2.36	-16.72	8	Pass

BLE/GFSK Low Channel, 2402 MHz						
		Measured Val (dBm/3kHz)	Correction Factor (dB)	Corrected Val dBm/3kHz	Limit < dBm/3kHz	Results
		-18.793	2.36	-16.43	8	Pass



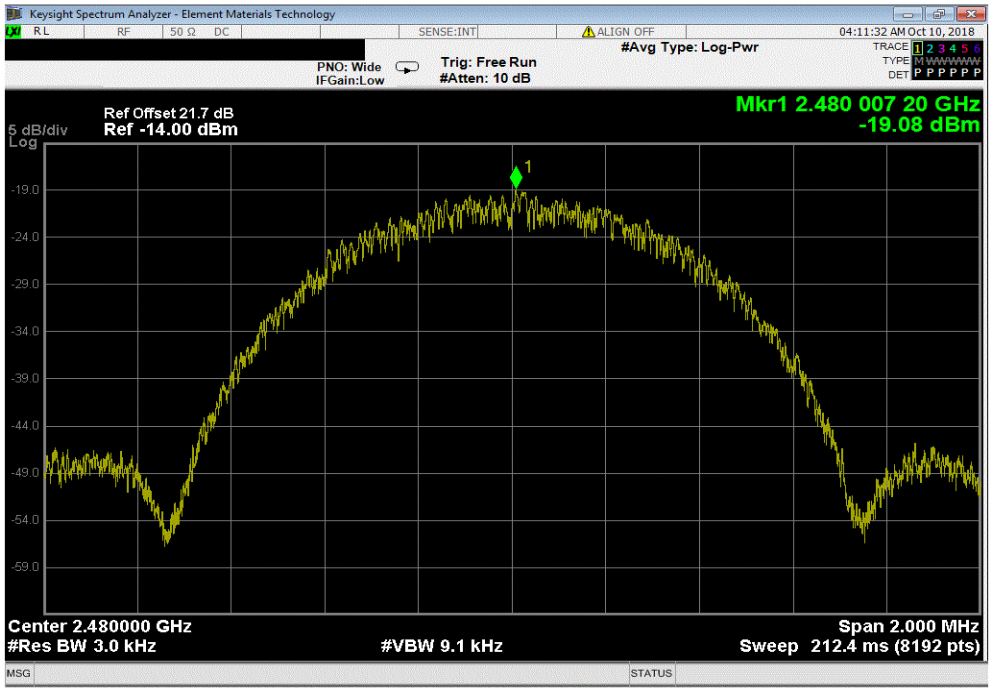
BLE/GFSK Mid Channel, 2442 MHz						
		Measured Val (dBm/3kHz)	Correction Factor (dB)	Corrected Val dBm/3kHz	Limit < dBm/3kHz	Results
		-18.974	2.36	-16.61	8	Pass



POWER SPECTRAL DENSITY

TbtTx 2018.09.13 XMit 2017.12.13

BLE/GFSK High Channel, 2480 MHz						
		Measured Val (dBm/3kHz)	Correction Factor (dB)	Corrected Val dBm/3kHz	Limit < dBm/3kHz	Results
		-19.084	2.36	-16.72	8	Pass



BAND EDGE COMPLIANCE

XMit 2017.12.13

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	Keysight	N5182B-506	TEU	23-Apr-18	23-Apr-21
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	LINQ II			Work Order:	MDTR0718
Serial Number:	12345670307			Date:	9-Oct-18
Customer:	Medtronic, Inc.			Temperature:	22 °C
Attendees:	Nick Blake			Humidity:	44.9% RH
Project:	None			Barometric Pres.:	1019 mbar
Tested by:	Kyle McMullan	Power:	2.9VDC	Job Site:	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2018	ANSI C63.10:2013

COMMENTS

None

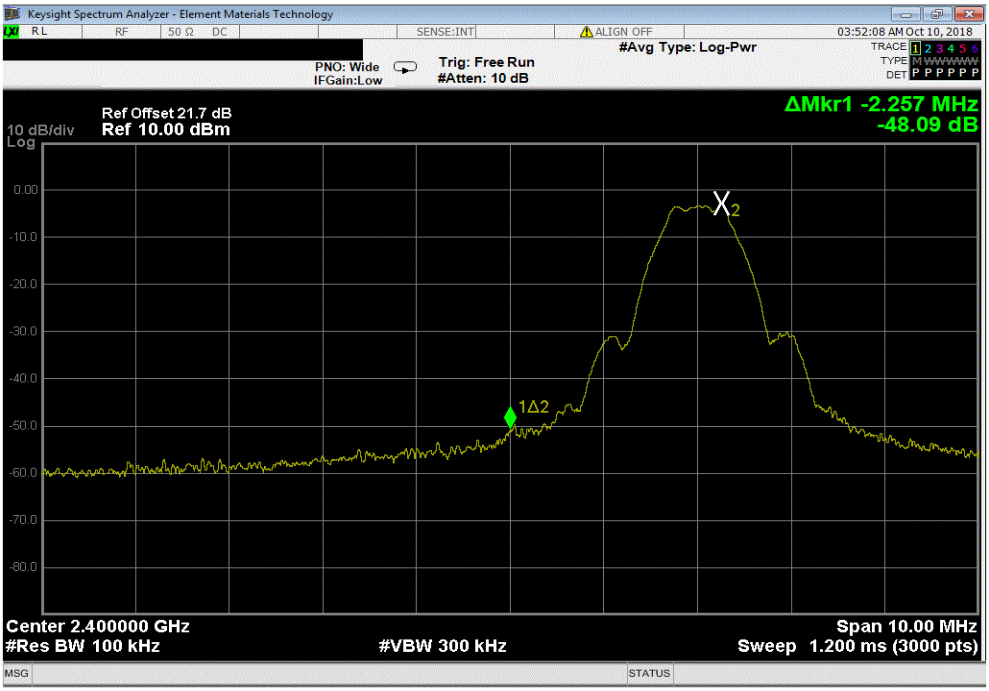
DEVIATIONS FROM TEST STANDARD

None

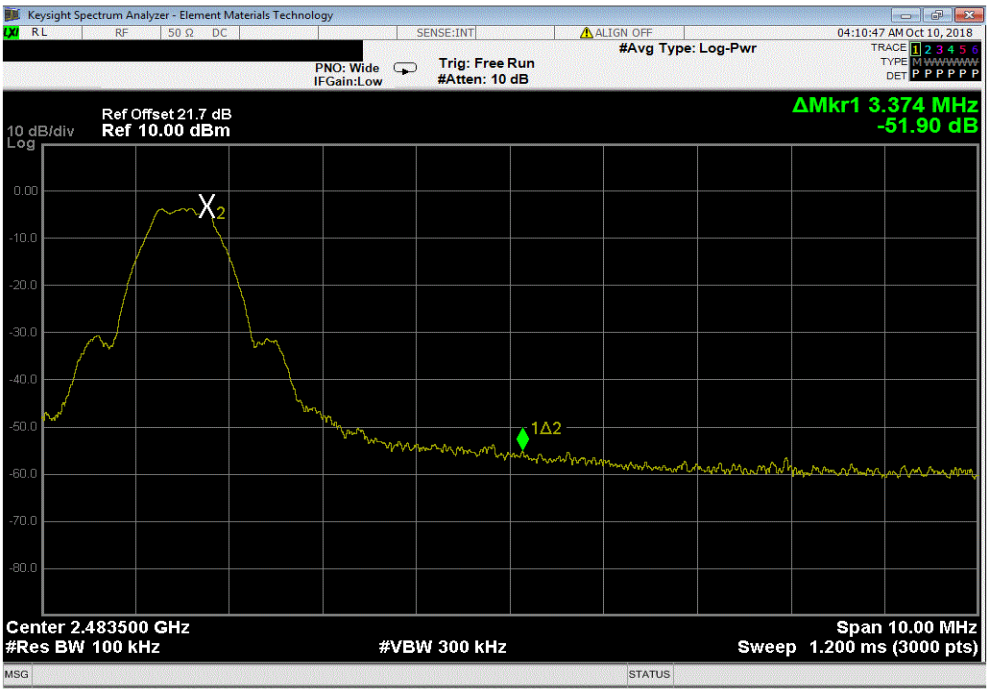
Configuration #	2	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	-48.1	-20	Pass
BLE/GFSK High Channel, 2480 MHz	-51.9	-20	Pass

BLE/GFSK Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.1	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.9	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2017.12.13

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	Keysight	N5182B-506	TEU	23-Apr-18	23-Apr-21
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Power Supply - DC	Agilent	U8002A	TPZ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	12-Jun-18	12-Jun-19
Block - DC	Fairview Microwave	SD3379	AMI	7-Sep-18	7-Sep-19
Attenuator	Fairview Microwave	SA4014-20	AQI	7-Sep-18	7-Sep-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-18	27-Apr-19

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

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**LINQ II**			**Work Order:**	**MDTR0718**
Serial Number:	**12345670307**			**Date:**	**9-Oct-18**
Customer:	**Medtronic, Inc.**			**Temperature:**	**22.3 °C**
Attendees:	**Nick Blake**			**Humidity:**	**45.5% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Kyle McMullan**	**Power:**	**2.9VDC**	**Job Site:**	**MN05**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2018	**ANSI C63.10:2013**

COMMENTS

None

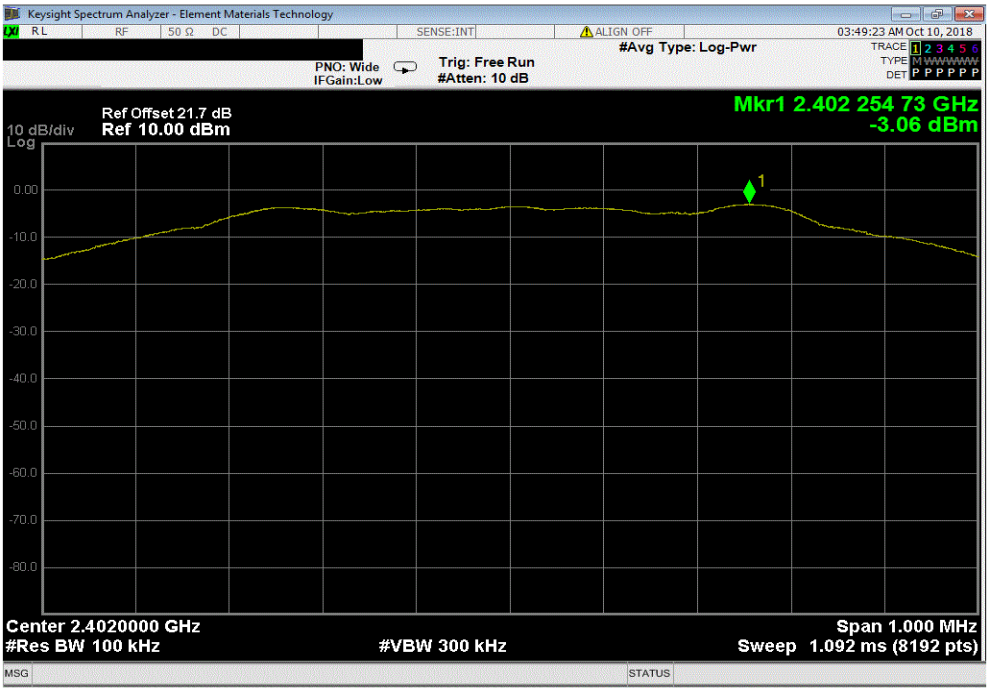
DEVIATIONS FROM TEST STANDARD

None

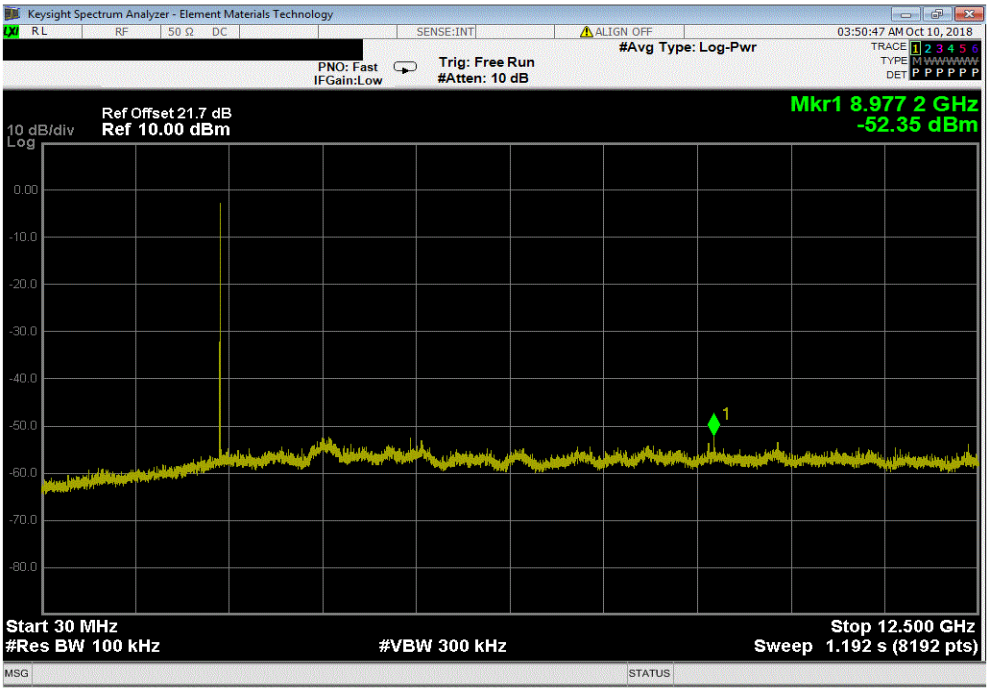
Configuration #	**2**	*Signature*

	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	Fundamental	2402.25	N/A	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	30 MHz - 12.5 GHz	8977.16	-49.29	-20	Pass
BLE/GFSK Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24307.17	-47.95	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	Fundamental	2442.25	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	3834.48	-49.27	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24516.24	-48.03	-20	Pass
BLE/GFSK High Channel, 2480 MHz	Fundamental	2480.25	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	30 MHz - 12.5 GHz	3864.93	-48.31	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	24105.73	-47.48	-20	Pass

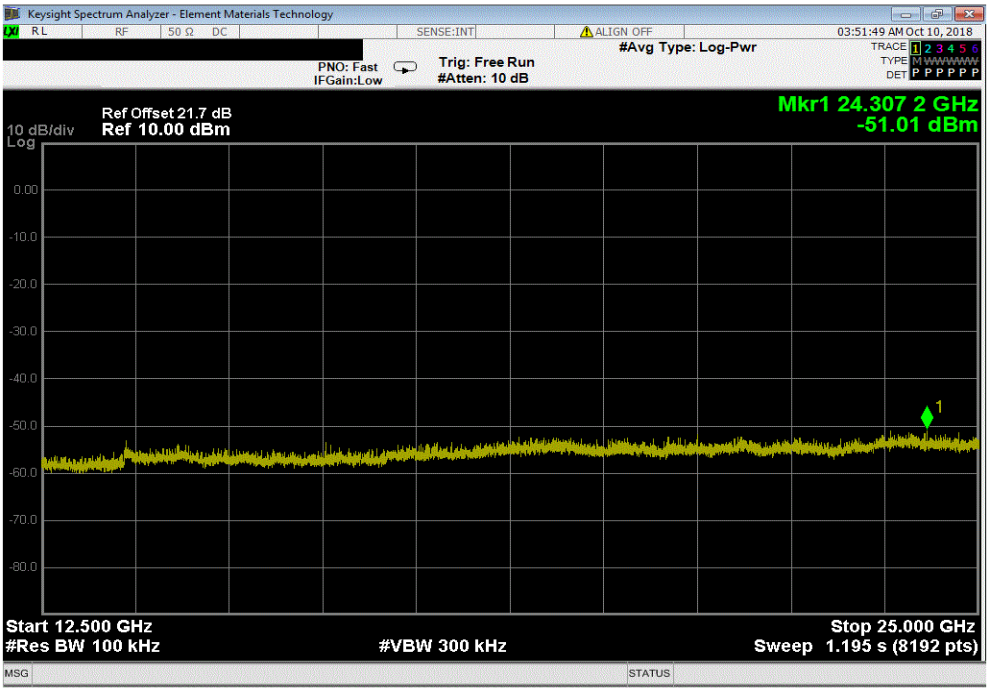
BLE/GFSK Low Channel, 2402 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2402.25	N/A	N/A	N/A



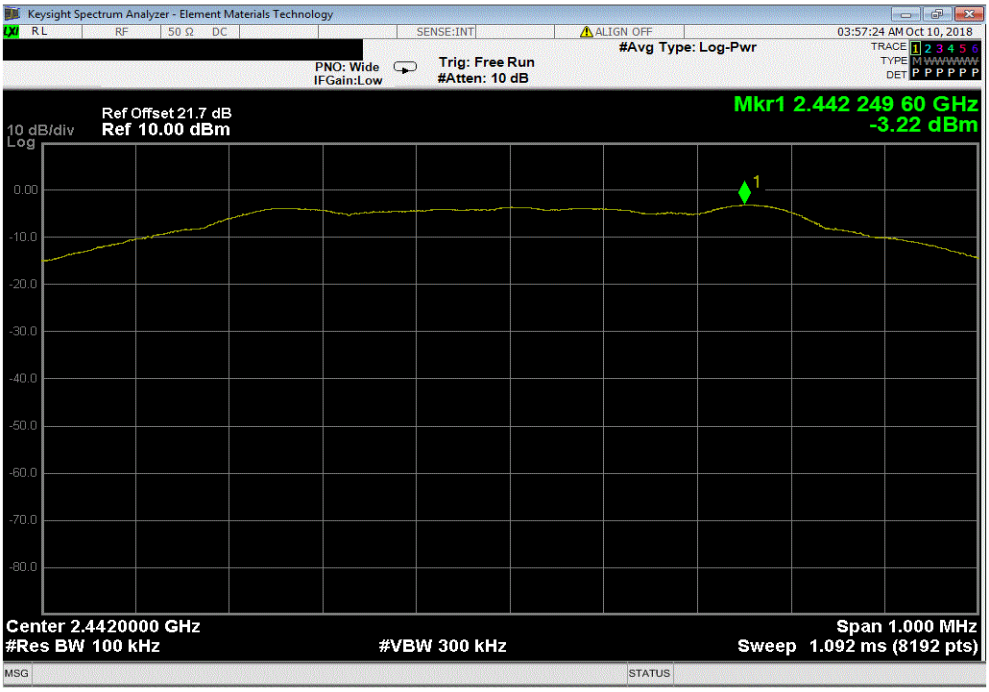
BLE/GFSK Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	8977.16	-49.29	-20	Pass



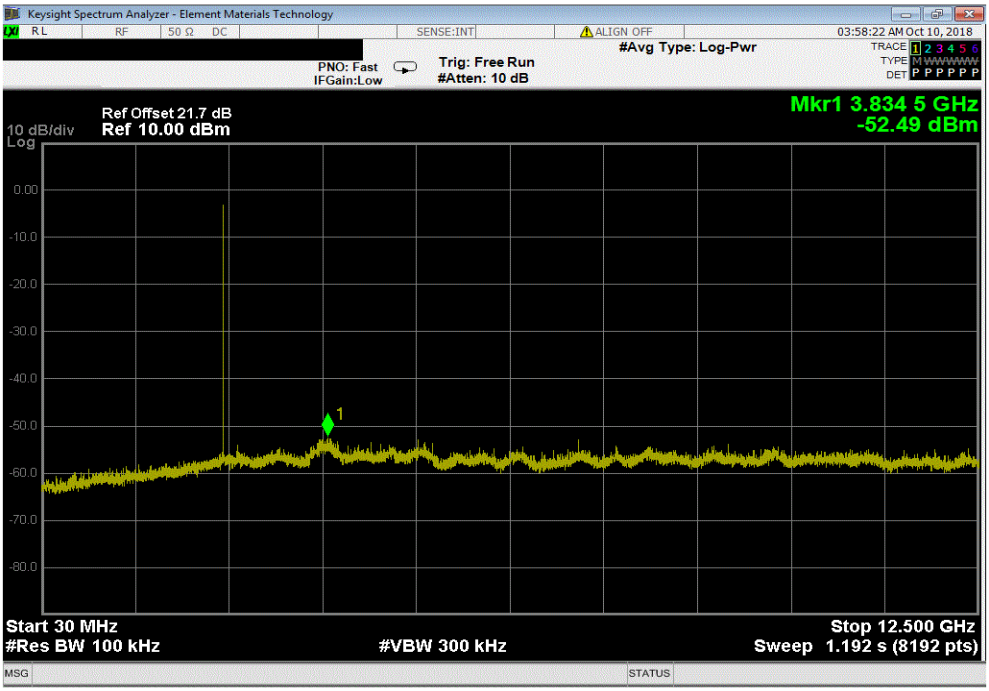
BLE/GFSK Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24307.17	-47.95	-20	Pass



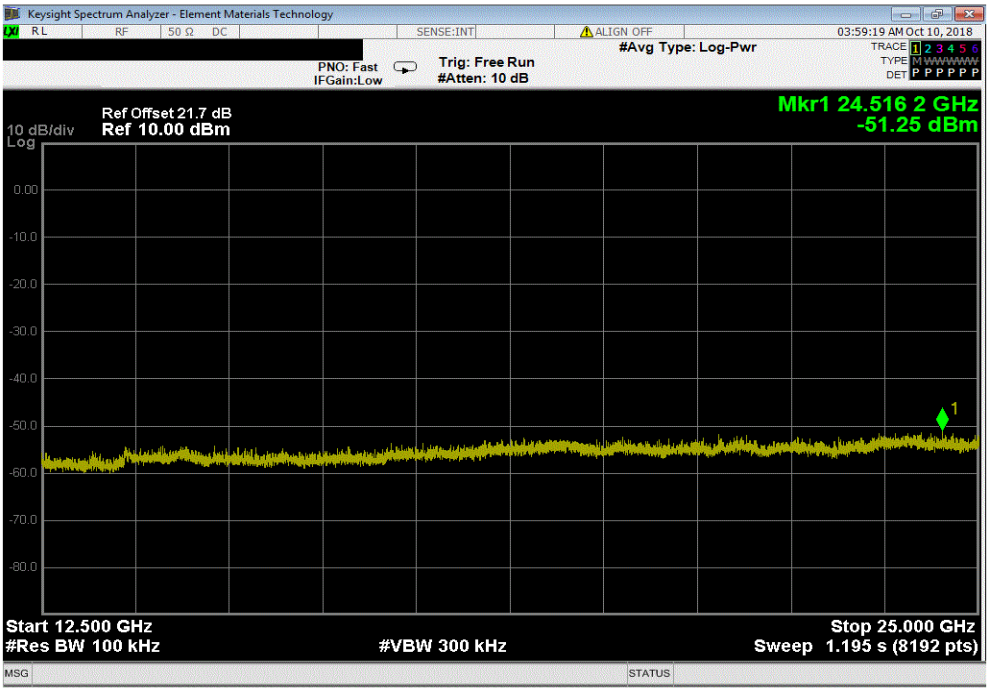
BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2442.25	N/A	N/A	N/A



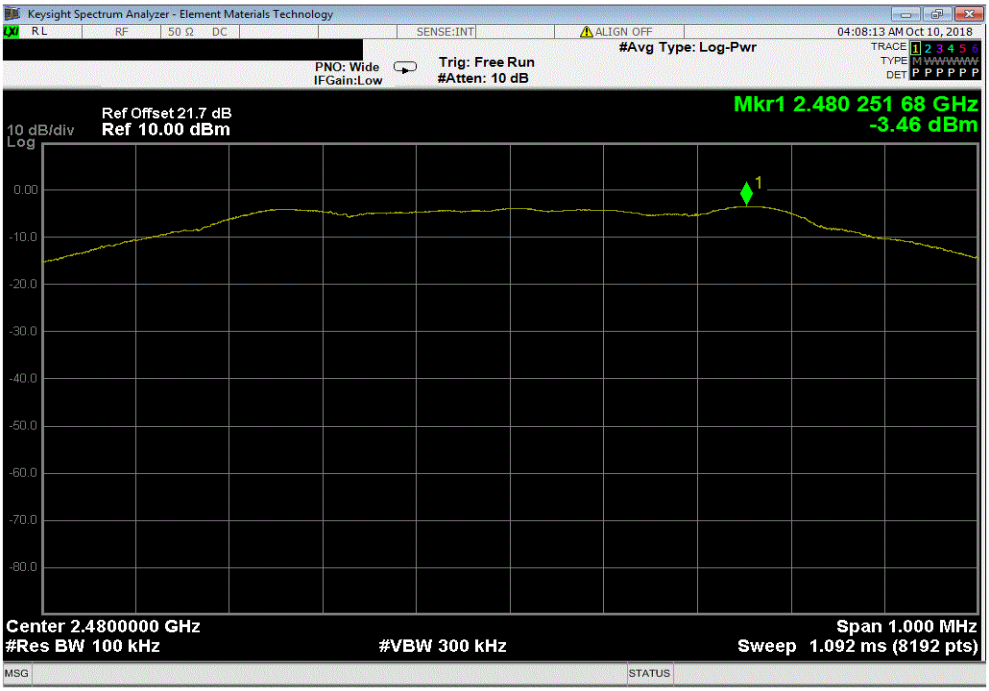
BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	3834.48	-49.27	-20	Pass



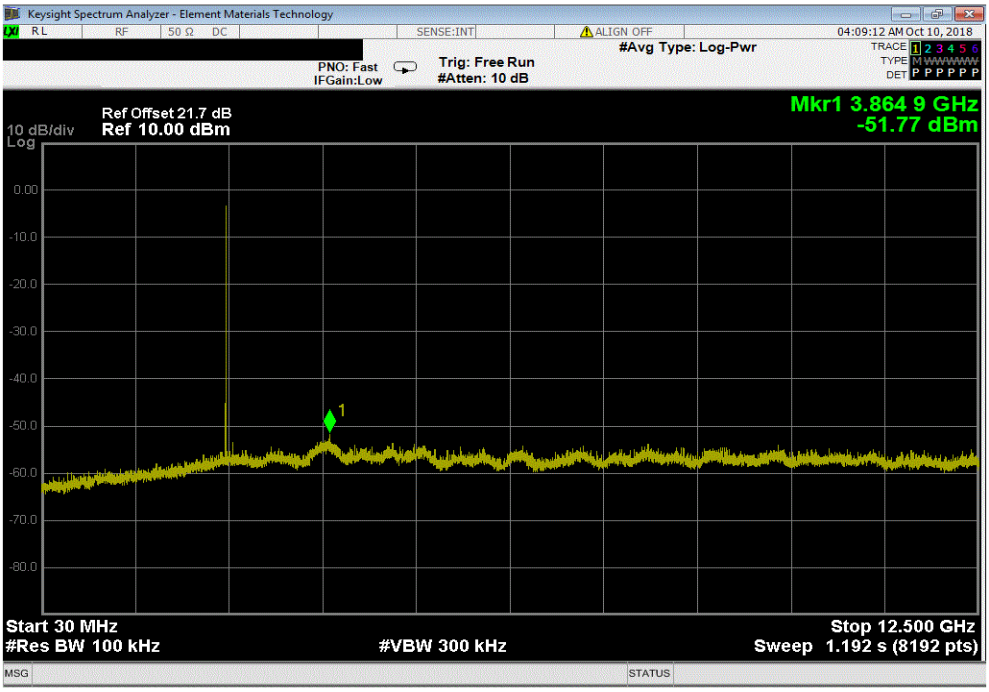
BLE/GFSK Mid Channel, 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24516.24	-48.03	-20	Pass



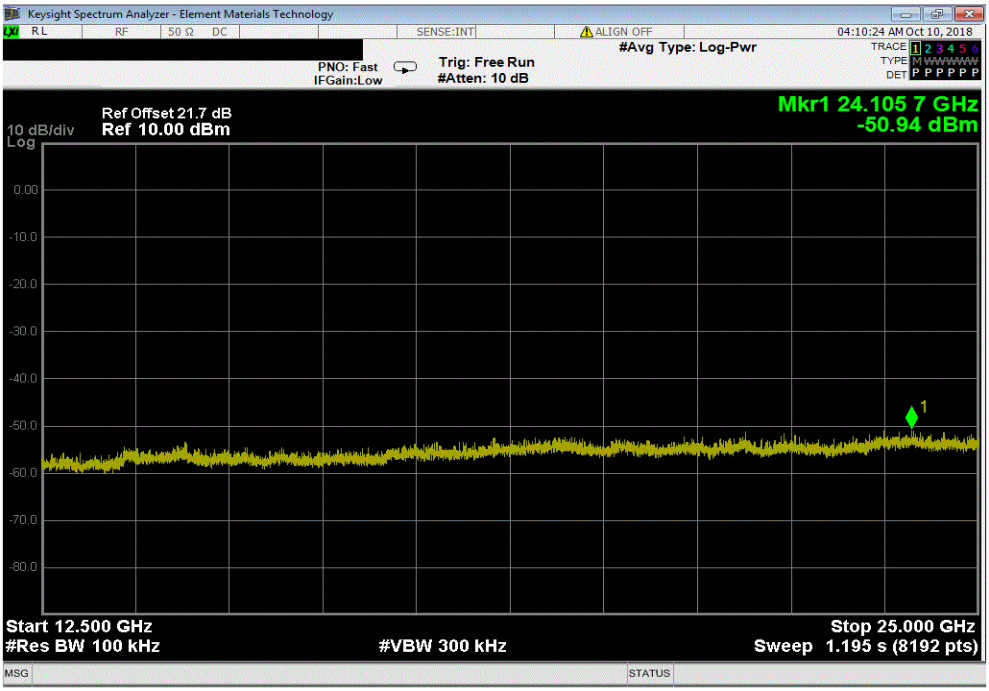
BLE/GFSK High Channel, 2480 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2480.25	N/A	N/A	N/A



BLE/GFSK High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	3864.93	-48.31	-20	Pass



BLE/GFSK High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24105.73	-47.48	-20	Pass



SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2018.07.27

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 low (2402 MHz), mid (2442 MHz), or high channel (2480 MHz)

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0718 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	25 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
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	13-Sep-2018	12 mo
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	12-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	13-Feb-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	13-Feb-2018	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	12-Jul-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	13-Feb-2018	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	24-Sep-2018	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	27-Jun-2018	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	9-Nov-2017	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	9-Nov-2017	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	25-Jan-2018	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	27-Apr-2018	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

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2018.07.27

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.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*LOG(dc).

To mimic the patient use condition, the EUT was tested in tissue substitute solution of 3g/L saline concentration which is representative of the subcutaneous tissue surrounding the implanted device. This provides a representative impedance match for the device’s integral antenna compare with antenna-to-air measurements and allows the results to be consistent with implantable devices using MedRadio which are tested in tissue simulant per 95.2569 (c). A KDB inquiry was sent to the FCC and they approved the alternative test configuration. A copy of the inquiry will be submitted with the application as a confidential document.

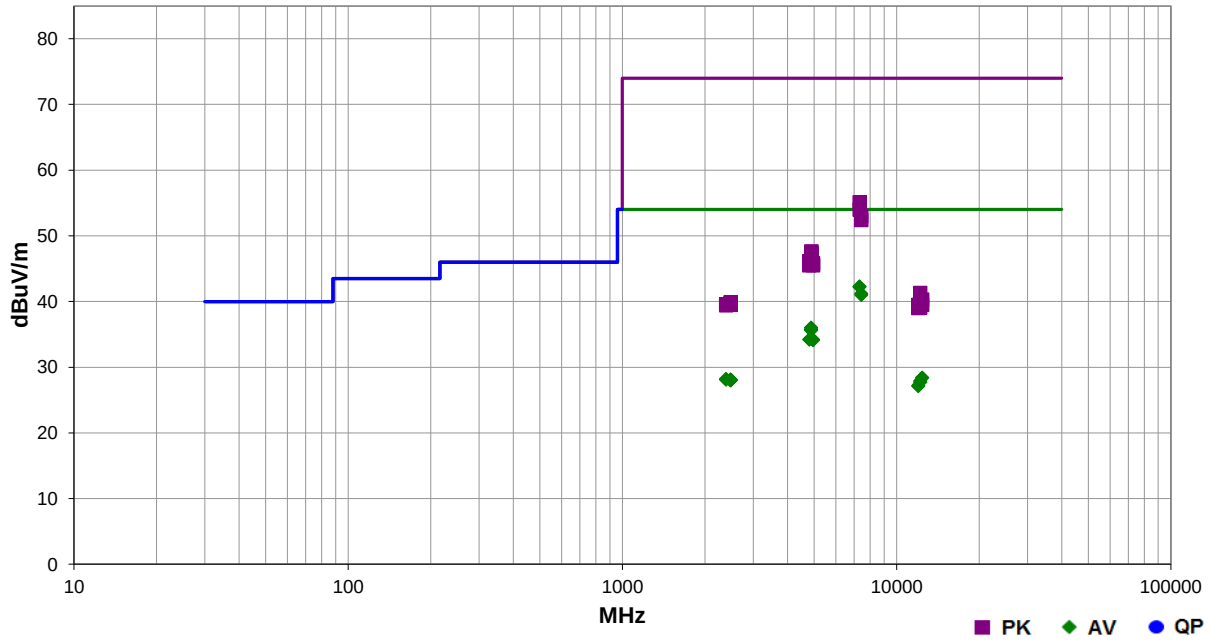
SPURIOUS RADIATED EMISSIONS

EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	MDTR0718	**Date:**	11-Oct-2018		
Project:	None	**Temperature:**	22 °C		
Job Site:	MN05	**Humidity:**	29.2% RH		
Serial Number:	RLB001885G	**Barometric Pres.:**	1032 mbar	**Tested by:**	Kyle McMullan
EUT:	LINQ II				
Configuration:	1				
Customer:	Medtronic, Inc.				
Attendees:	Nick Blake				
EUT Power:	Battery				
Operating Mode:	Transmitting BLE low (2402 MHz), mid (2442 MHz), or high channel (2480 MHz)				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2018	ANSI C63.10:2013

Run #	49	**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
7324.867	30.9	11.4	2.5	65.1	3.0	0.0	Horz	AV	0.0	42.3	54.0	-11.7	Mid Ch, EUT Vert
7323.833	30.8	11.4	3.9	279.0	3.0	0.0	Vert	AV	0.0	42.2	54.0	-11.8	Mid Ch, EUT Vert
7439.358	29.5	11.7	1.3	253.9	3.0	0.0	Horz	AV	0.0	41.2	54.0	-12.8	High Ch, EUT Vert
7438.400	29.3	11.7	1.0	156.1	3.0	0.0	Vert	AV	0.0	41.0	54.0	-13.0	High Ch, EUT Vert
4881.525	31.9	4.1	3.5	282.9	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Mid Ch, EUT Vert
4881.642	31.9	4.1	3.6	202.1	3.0	0.0	Vert	AV	0.0	36.0	54.0	-18.0	Mid Ch, EUT Vert
4881.608	31.6	4.1	1.1	351.0	3.0	0.0	Horz	AV	0.0	35.7	54.0	-18.3	Mid Ch, EUT On Side
4881.833	31.6	4.1	2.0	224.1	3.0	0.0	Vert	AV	0.0	35.7	54.0	-18.3	Mid Ch, EUT On Side
4882.233	31.6	4.1	1.0	325.0	3.0	0.0	Horz	AV	0.0	35.7	54.0	-18.3	Mid Ch, EUT Horz
4882.158	31.5	4.1	1.7	322.9	3.0	0.0	Vert	AV	0.0	35.6	54.0	-18.4	Mid Ch, EUT Horz
7327.142	43.7	11.4	3.9	279.0	3.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	Mid Ch, EUT Vert
4957.508	29.9	4.3	1.0	223.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	High Ch, EUT Vert
4804.442	30.3	3.9	1.0	66.1	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Low Ch, EUT Vert
4804.550	30.3	3.9	1.0	343.0	3.0	0.0	Vert	AV	0.0	34.2	54.0	-19.8	Low Ch, EUT Vert
4957.942	29.8	4.3	1.7	81.0	3.0	0.0	Vert	AV	0.0	34.1	54.0	-19.9	High Ch, EUT Vert
7326.533	42.6	11.4	2.5	65.1	3.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	Mid Ch, EUT Vert
7440.183	41.3	11.7	1.0	156.1	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	High Ch, 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
7438.250	40.7	11.7	1.3	253.9	3.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	High Ch, EUT Vert
12399.000	27.5	0.9	1.0	268.9	3.0	0.0	Horz	AV	0.0	28.4	54.0	-25.6	High Ch, EUT Vert
12399.980	27.5	0.9	1.0	83.1	3.0	0.0	Vert	AV	0.0	28.4	54.0	-25.6	High Ch, EUT Vert
2388.977	32.1	-3.9	1.8	257.9	3.0	0.0	Horz	AV	0.0	28.2	54.0	-25.8	Low Ch, EUT Horz
2483.867	32.2	-4.1	1.0	95.1	3.0	0.0	Horz	AV	0.0	28.1	54.0	-25.9	High Ch, EUT Vert
2483.917	32.2	-4.1	1.1	358.0	3.0	0.0	Horz	AV	0.0	28.1	54.0	-25.9	High Ch, EUT Horz
2484.810	32.2	-4.1	1.0	195.1	3.0	0.0	Vert	AV	0.0	28.1	54.0	-25.9	High Ch, EUT Horz
2389.293	32.0	-3.9	2.9	344.9	3.0	0.0	Vert	AV	0.0	28.1	54.0	-25.9	Low Ch, EUT Horz
2484.827	32.1	-4.1	1.0	50.0	3.0	0.0	Vert	AV	0.0	28.0	54.0	-26.0	High Ch, EUT Vert
2484.823	32.1	-4.1	2.4	340.0	3.0	0.0	Horz	AV	0.0	28.0	54.0	-26.0	High Ch, EUT On Side
2483.553	32.1	-4.1	3.5	72.0	3.0	0.0	Vert	AV	0.0	28.0	54.0	-26.0	High Ch, EUT On Side
12207.880	28.2	-0.3	1.0	219.0	3.0	0.0	Vert	AV	0.0	27.9	54.0	-26.1	Mid Ch, EUT Vert
12207.790	28.0	-0.3	1.1	199.1	3.0	0.0	Horz	AV	0.0	27.7	54.0	-26.3	Mid Ch, EUT Vert
4884.700	43.5	4.1	3.6	202.1	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Mid Ch, EUT Vert
4885.925	43.5	4.1	2.0	224.1	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Mid Ch, EUT On Side
4883.842	43.3	4.1	3.5	282.9	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	Mid Ch, EUT Vert
4883.042	43.2	4.1	1.0	325.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Mid Ch, EUT Horz
4883.333	43.1	4.1	1.1	351.0	3.0	0.0	Horz	PK	0.0	47.2	74.0	-26.8	Mid Ch, EUT On Side
4884.500	43.1	4.1	1.7	322.9	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Mid Ch, EUT Horz
12008.160	28.1	-0.9	1.0	59.1	3.0	0.0	Horz	AV	0.0	27.2	54.0	-26.8	Low Ch, EUT Vert
12008.220	28.0	-0.9	1.0	274.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9	Low Ch, EUT Vert
4804.817	42.2	3.9	1.0	66.1	3.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	Low Ch, EUT Vert
4957.650	41.5	4.3	1.0	223.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	High Ch, EUT Vert
4960.633	41.2	4.3	1.7	81.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	High Ch, EUT Vert
4804.283	41.6	3.9	1.0	343.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	Low Ch, EUT Vert
12210.070	41.5	-0.2	1.1	199.1	3.0	0.0	Horz	PK	0.0	41.3	74.0	-32.7	Mid Ch, EUT Vert
12399.350	39.4	0.9	1.0	268.9	3.0	0.0	Horz	PK	0.0	40.3	74.0	-33.7	High Ch, EUT Vert
2485.483	44.0	-4.1	2.4	340.0	3.0	0.0	Horz	PK	0.0	39.9	74.0	-34.1	High Ch, EUT On Side
2483.923	44.0	-4.1	1.0	195.1	3.0	0.0	Vert	PK	0.0	39.9	74.0	-34.1	High Ch, EUT Horz
2483.593	43.9	-4.1	1.0	95.1	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	High Ch, EUT Vert
2485.487	43.7	-4.1	1.0	50.0	3.0	0.0	Vert	PK	0.0	39.6	74.0	-34.4	High Ch, EUT Vert
2484.747	43.7	-4.1	3.5	72.0	3.0	0.0	Vert	PK	0.0	39.6	74.0	-34.4	High Ch, EUT On Side
2389.667	43.5	-3.9	1.8	257.9	3.0	0.0	Horz	PK	0.0	39.6	74.0	-34.4	Low Ch, EUT Horz
12398.360	38.6	0.9	1.0	83.1	3.0	0.0	Vert	PK	0.0	39.5	74.0	-34.5	High Ch, EUT Vert
12007.620	40.4	-0.9	1.0	59.1	3.0	0.0	Horz	PK	0.0	39.5	74.0	-34.5	Low Ch, EUT Vert
2483.837	43.6	-4.1	1.1	358.0	3.0	0.0	Horz	PK	0.0	39.5	74.0	-34.5	High Ch, EUT Horz
2389.950	43.3	-3.9	2.9	344.9	3.0	0.0	Vert	PK	0.0	39.4	74.0	-34.6	Low Ch, EUT Horz
12208.870	39.3	-0.2	1.0	219.0	3.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9	Mid Ch, EUT Vert
12011.040	39.9	-0.9	1.0	274.0	3.0	0.0	Vert	PK	0.0	39.0	74.0	-35.0	Low Ch, EUT Vert