



Medtronic, Inc.

MyCareLink Relay Home Communicator 24960

**FCC 15. 247:2018
Bluetooth Low Energy**

Report # MDTR0649.9



NVLAP LAB CODE: 200881-0



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CERTIFICATE OF TEST

Last Date of Test: September 4, 2018
Medtronic, Inc.
Model: MyCareLink Relay Home Communicator 24960

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2018	ANSI C63.10:2013, KDB 558074
FCC 15.247:2018	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	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:



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.

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

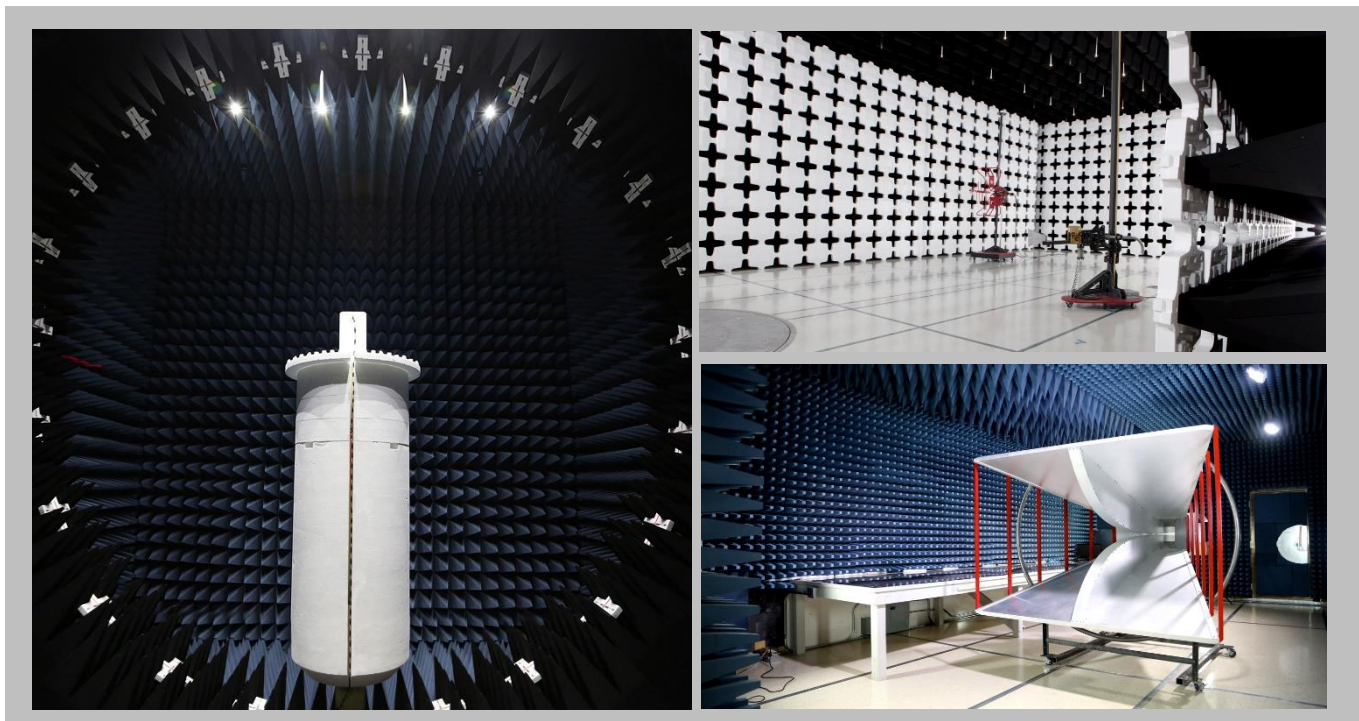
For details on the Scopes of our Accreditations, please visit:

<https://www.nwemc.com/emc-testing-accreditations>

FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th 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/RRR, 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:

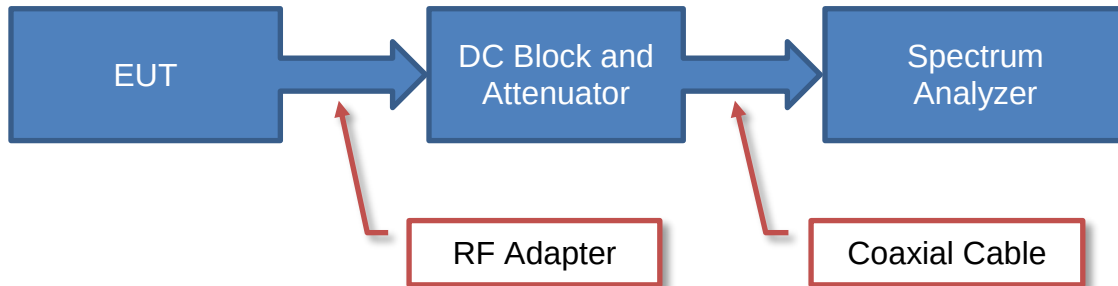
Field Strength	Measured Level	Antenna Factor	Cable Factor	Amplifier Gain	Distance Adjustment Factor	External Attenuation
33.5	42.6	28.6	3.1	40.8	0.0	0.0

Conducted Emissions:

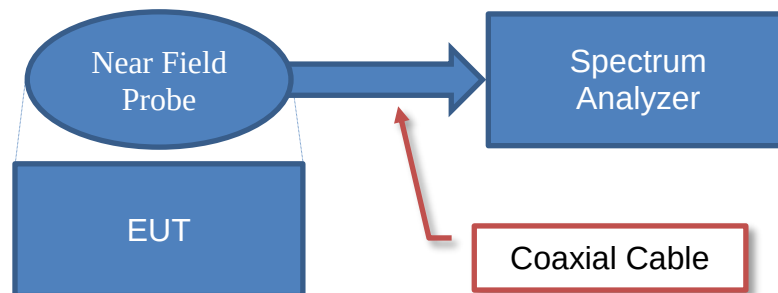
Adjusted Level	Measured Level	Transducer Factor	Cable Factor	External Attenuation
47.1	26.7	0.3	0.1	20.0

Test Setup Block Diagrams

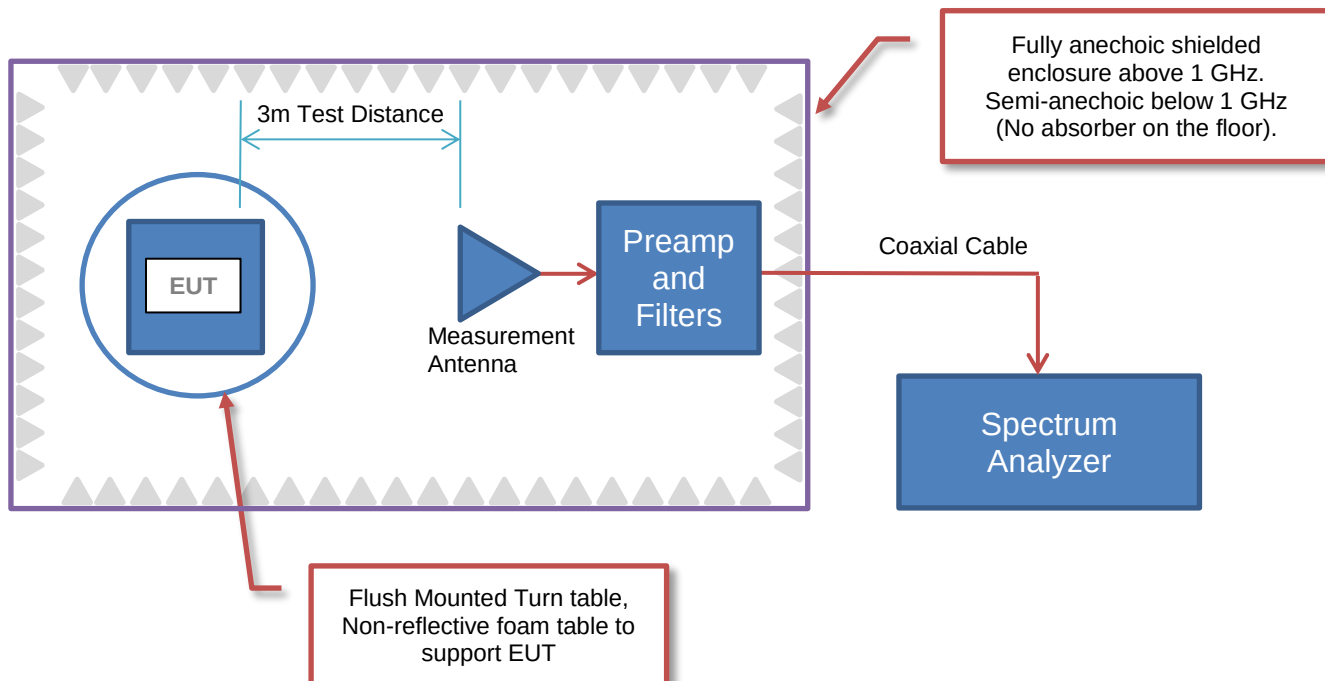
Antenna Port Conducted Measurements



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:	Taylor Dowden
Model:	MyCareLink Relay Home Communicator 24960
First Date of Test:	June 25, 2018
Last Date of Test:	September 4, 2018
Receipt Date of Samples:	June 25, 2018
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 MyCareLink Relay home communicator wirelessly transfers information between an implanted medical device and the Medtronic CareLink network. The wireless communication between the MyCareLink Relay and an implanted medical device is accomplished by means of a Bluetooth low energy (BLE) radio.

Testing Objective:

To demonstrate compliance of the Bluetooth Low Energy radio to FCC 15. 247 requirements.

CONFIGURATIONS



Configuration MDTR0649- 2

Software/Firmware Running during test	
Description	Version
connectivity_test_genfsk	N/A

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
MyCareLink Relay Home Communicator 24960	Medtronic, Inc.	24960	MEA9963DEM
Atech OEM Power Supply	Atech OEM	ADS012T-W050200	S1811003694

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Atech OEM Power Supply Cable	No	1.9 m	Yes	MyCareLink Relay Home Communicator 24960	Atech OEM Power Supply

Configuration MDTR0649- 48

Software/Firmware Running during test	
Description	Version
connectivity_test_genfsk	N/A

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
MyCareLink Relay Home Communicator 24960	Medtronic, Inc.	24960	MEA9963DEM
Atech OEM Power Supply	Atech OEM	ADS012T-W050200	S1811003696

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Atech OEM Power Supply Cable	No	1.9 m	Yes	MyCareLink Relay Home Communicator 24960	Atech OEM Power Supply

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	6/25/2018	Spurious Radiated 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.
2	7/12/2018	Powerline 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.
3	9/4/2018	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	9/4/2018	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.
5	9/4/2018	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.
6	9/4/2018	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.
7	9/4/2018	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.
8	9/4/2018	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS



TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/15/2018	3/15/2019
Cable - Conducted Cable Assembly	Northwest EMC	MNC	MNCC	1/24/2018	1/24/2019
Receiver	Rohde & Schwarz	ESR7	ARI	6/26/2018	6/26/2019
Filter - High Pass	TTE	H97-100K-50-720B	HGN	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

MDTR0649-2

MODES INVESTIGATED

Tx Mid Ch. 2440 MHz

POWERLINE CONDUCTED EMISSIONS



EUT:	MyCareLink Relay Home Communicator 24960	Work Order:	MDTR0649
Serial Number:	MEA9963DEM	Date:	07/12/2018
Customer:	Medtronic, Inc.	Temperature:	22.9°C
Attendees:	Taylor Dowden	Relative Humidity:	63.4%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Kyle McMullan, Chris Patterson	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MDTR0649-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

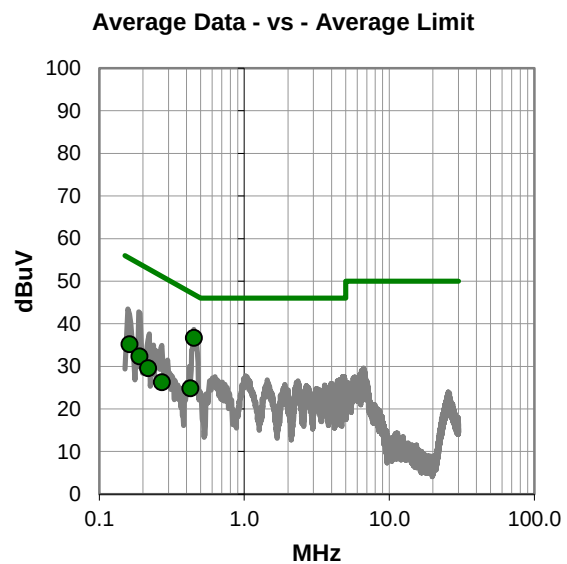
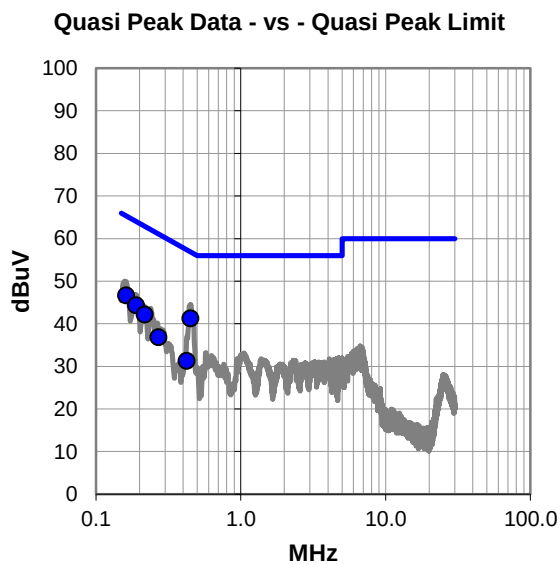
BLE

EUT OPERATING MODES

Tx Mid Ch. 2440 MHz

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.450	41.1	0.2	41.3	56.9	-15.6
0.161	46.4	0.3	46.7	65.4	-18.7
0.189	44.1	0.3	44.4	64.1	-19.7
0.217	41.9	0.3	42.2	62.9	-20.7
0.270	36.7	0.2	36.9	61.1	-24.2
0.423	31.1	0.2	31.3	57.4	-26.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.450	36.5	0.2	36.7	46.9	-10.2
0.161	34.9	0.3	35.2	55.4	-20.2
0.189	32.1	0.3	32.4	54.1	-21.7
0.423	24.7	0.2	24.9	47.4	-22.5
0.217	29.3	0.3	29.6	52.9	-23.3
0.270	26.1	0.2	26.3	51.1	-24.8

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	MyCareLink Relay Home Communicator 24960	Work Order:	MDTR0649
Serial Number:	MEA9963DEM	Date:	07/12/2018
Customer:	Medtronic, Inc.	Temperature:	22.9°C
Attendees:	Taylor Dowden	Relative Humidity:	63.4%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Kyle McMullan, Chris Patterson	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MDTR0649-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2018	ANSI C63.10:2013

TEST PARAMETERS

Run #:	8	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

BLE

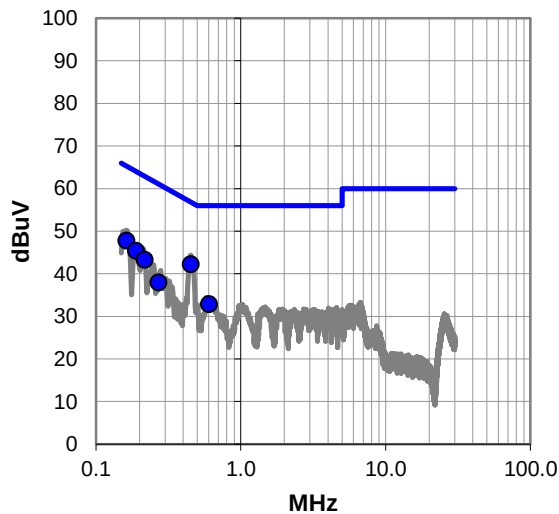
EUT OPERATING MODES

Tx Mid Ch. 2440 MHz

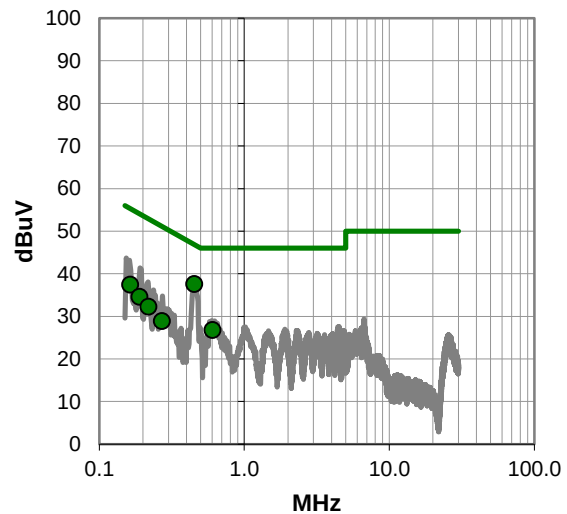
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.451	42.1	0.2	42.3	56.9	-14.6
0.163	47.5	0.3	47.8	65.3	-17.5
0.189	45.1	0.3	45.4	64.1	-18.7
0.217	43.0	0.3	43.3	62.9	-19.6
0.603	32.7	0.2	32.9	56.0	-23.1
0.270	37.8	0.2	38.0	61.1	-23.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.451	37.4	0.2	37.6	46.9	-9.3
0.163	37.2	0.3	37.5	55.3	-17.8
0.603	26.6	0.2	26.8	46.0	-19.2
0.189	34.3	0.3	34.6	54.1	-19.5
0.217	32.0	0.3	32.3	52.9	-20.6
0.270	28.7	0.2	28.9	51.1	-22.2

CONCLUSION

Pass



Tested By

DUTY CYCLE



XMR 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

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.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

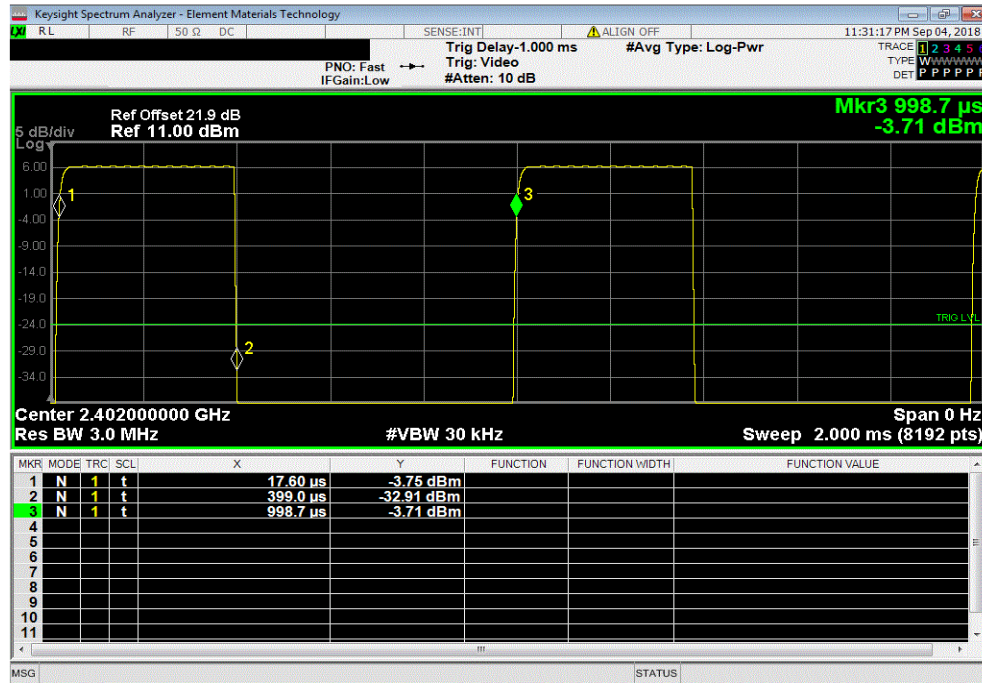
ThiTx 2017.12.14 XMIT 2017.12.13

DUTY CYCLE

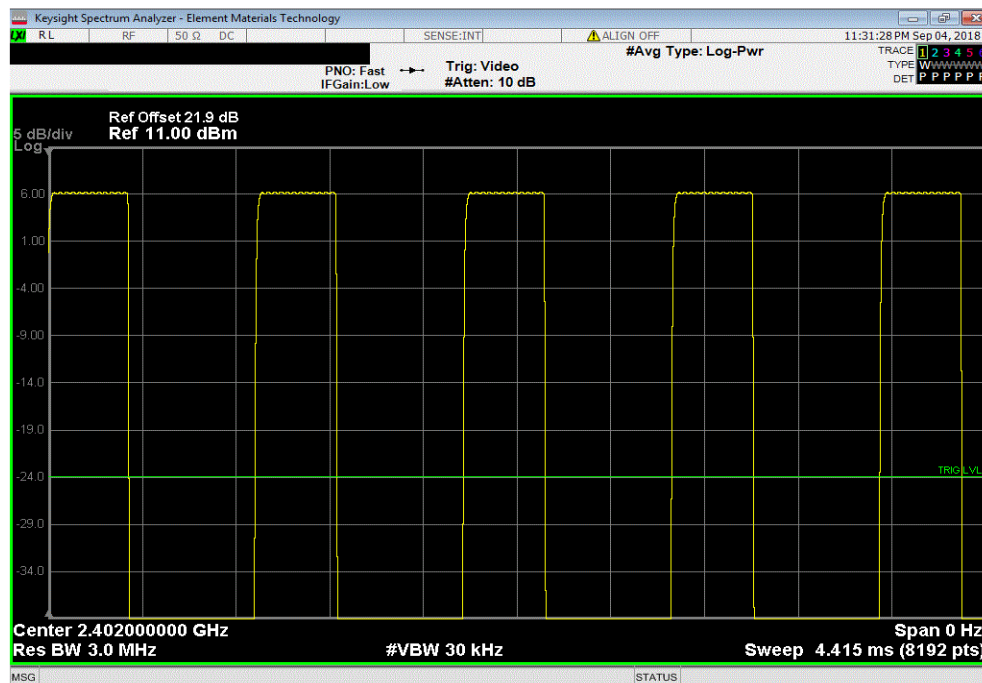


TMTx 2017.12.14 XMI 2017.12.13

BLE/GFSK Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
381.4 μ s	981.1 μ s	1	38.9	N/A	N/A	



BLE/GFSK Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

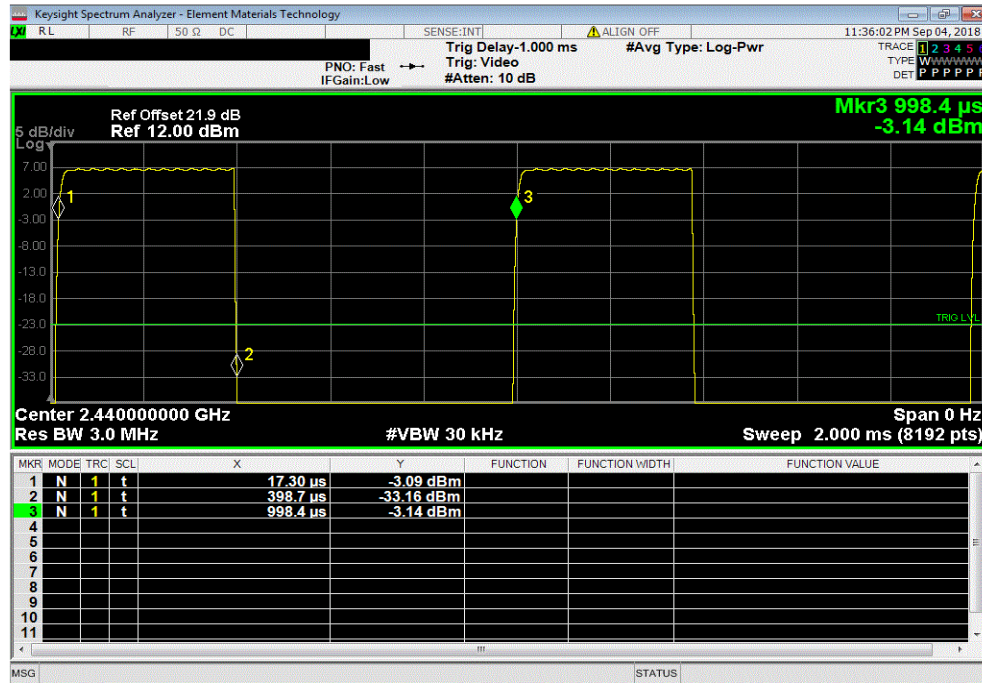


DUTY CYCLE

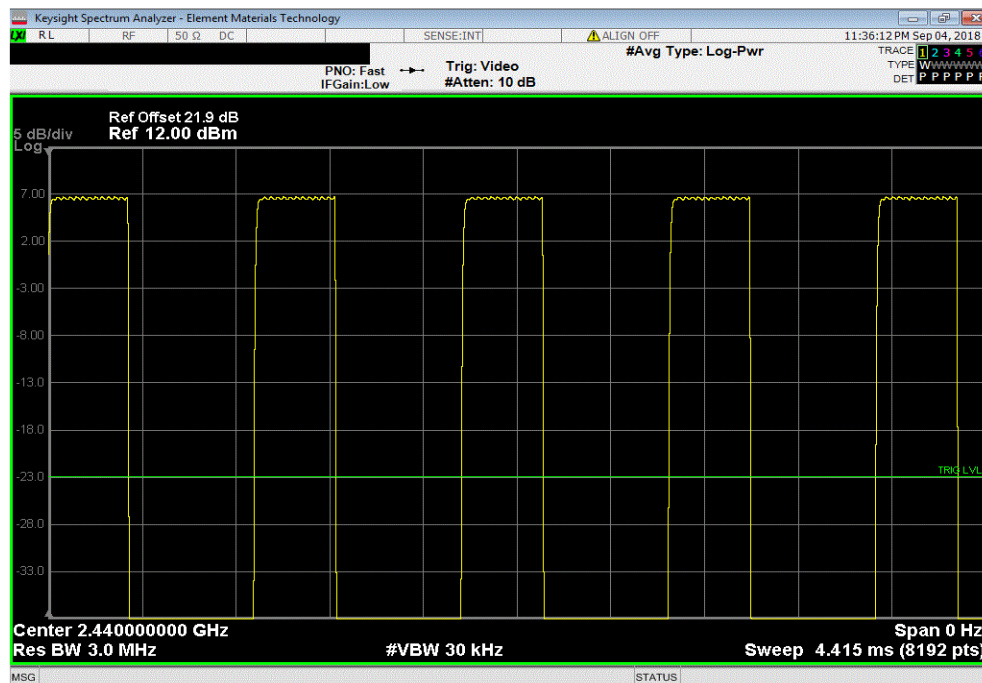


TMTx 2017.12.14 XMI 2017.12.13

BLE/GFSK Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
381.4 μ s	981.1 μ s	1	38.9	N/A	N/A	



BLE/GFSK Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

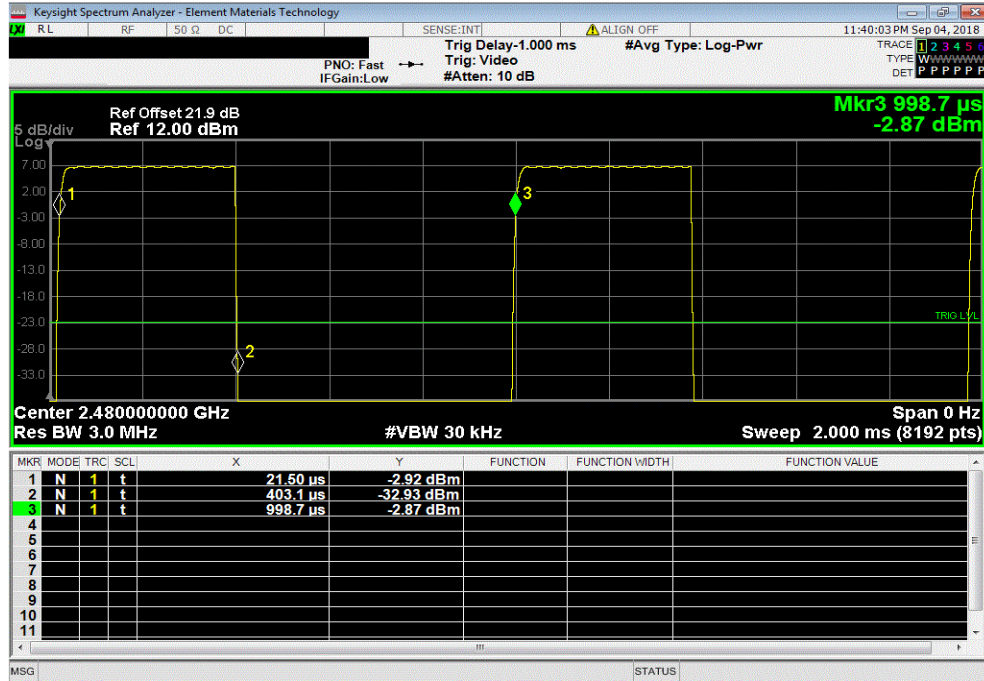


DUTY CYCLE

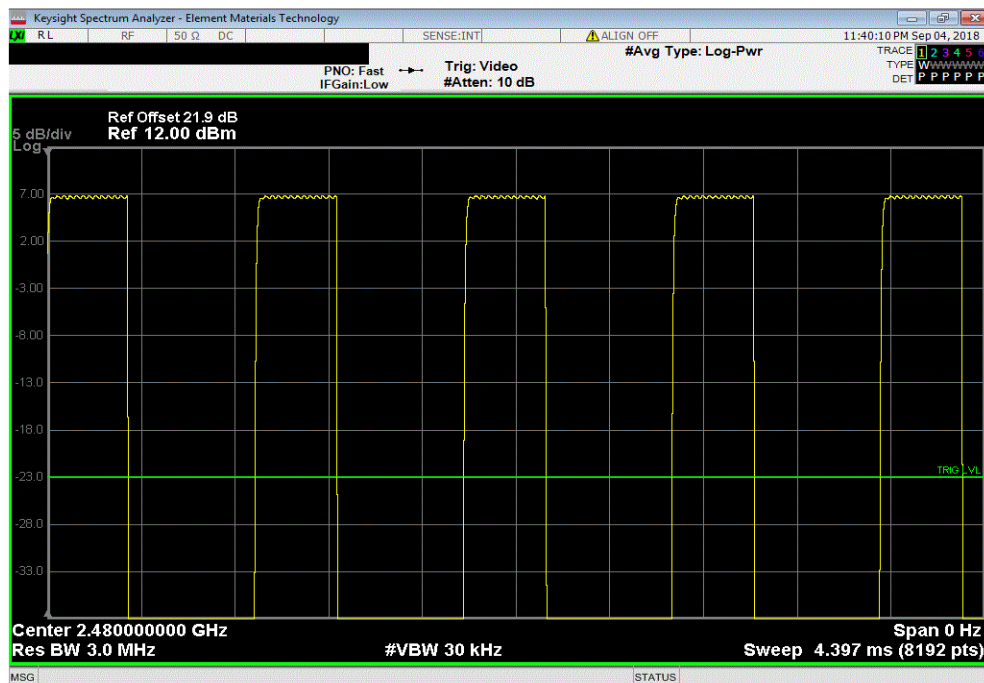


TMTx 2017.12.14 XMI 2017.12.13

BLE/GFSK High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
381.6 μ s	977.2 μ s	1	39.1	N/A	N/A	



BLE/GFSK High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



OCCUPIED BANDWIDTH



XMI 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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



TM17x 2017.12.14 XM16 2017.12.13

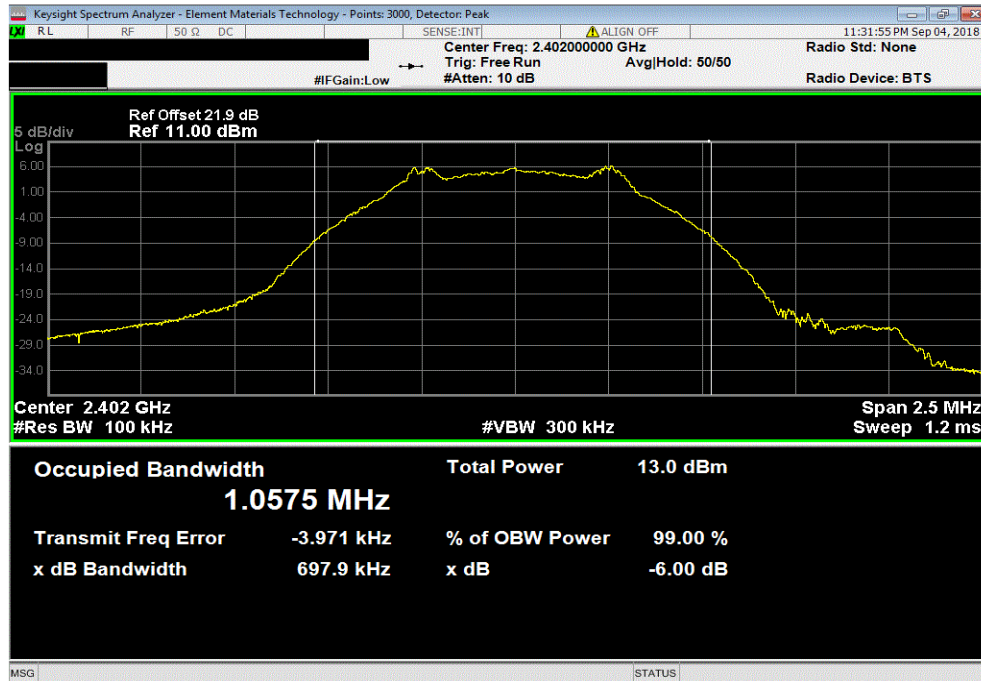
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649	
Serial Number: MEA9963DEM		Date: 4-Sep-18	
Customer: Medtronic, Inc.		Temperature: 23.3 °C	
Attendees: Taylor Dowden		Humidity: 56.4% RH	
Project: None		Barometric Pres.: 1020 mbar	
Tested by: Kyle McMullan		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2018		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	48	Signature <i>Kyle McMullan</i>	
		Value	Limit (±) Result
BLE/GFSK Low Channel, 2402 MHz		697.923 kHz	500 kHz Pass
BLE/GFSK Mid Channel, 2440 MHz		704.478 kHz	500 kHz Pass
BLE/GFSK High Channel, 2480 MHz		706.154 kHz	500 kHz Pass

OCCUPIED BANDWIDTH

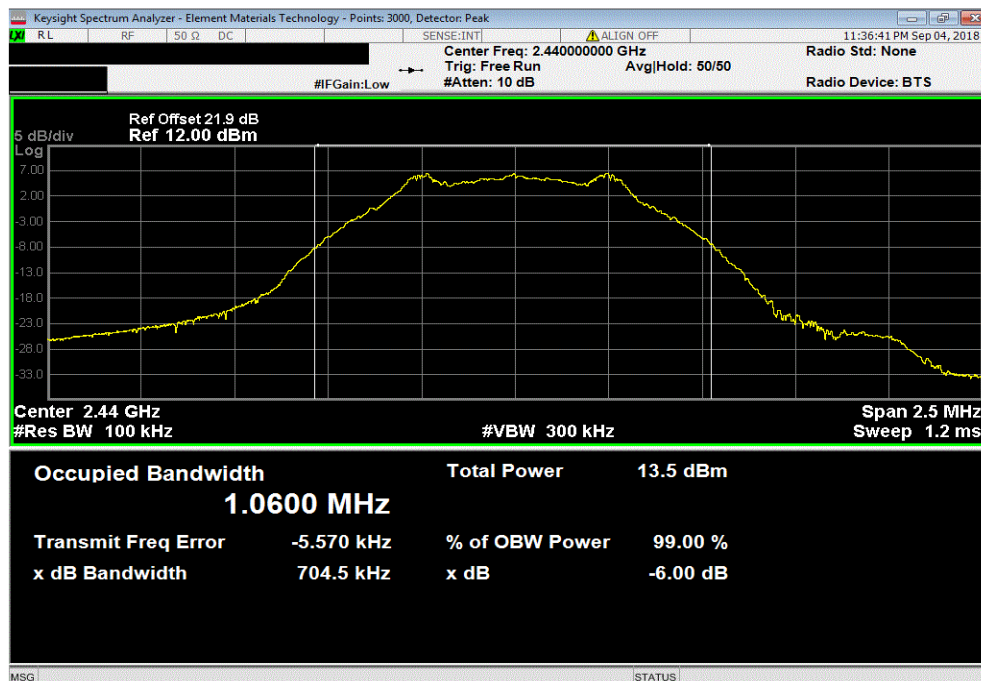


TMTx 2017.12.14 XMt 2017.12.13

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



BLE/GFSK Mid Channel, 2440 MHz						
				Value	Limit (≥)	Result
				704.478 kHz	500 kHz	Pass

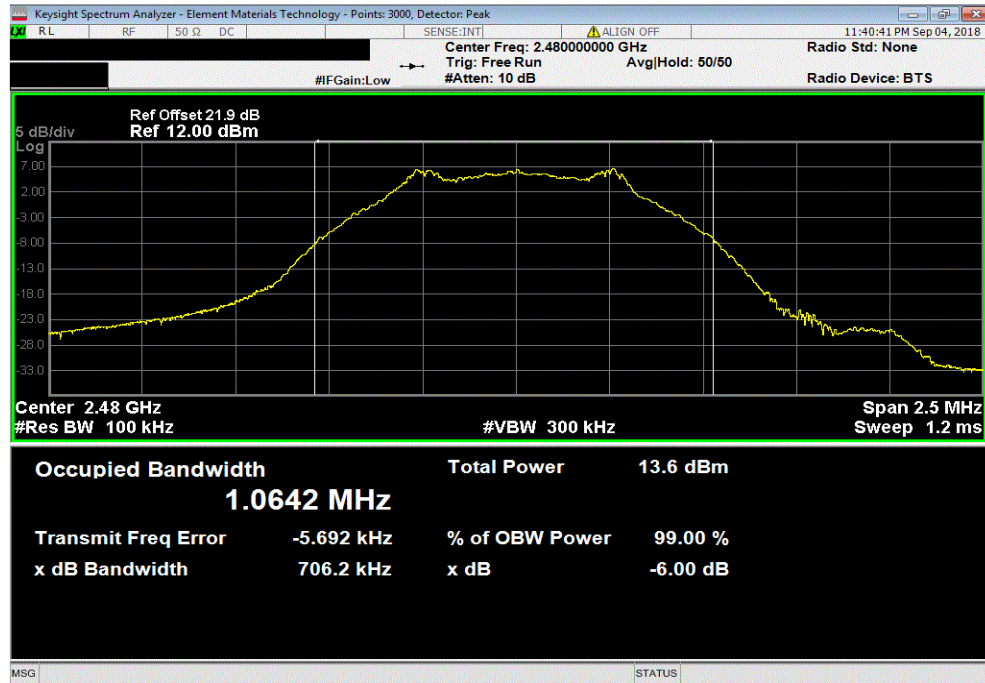


OCCUPIED BANDWIDTH



TMTx 2017.12.14 XMI 2017.12.13

BLE/GFSK High Channel, 2480 MHz						
Value				Limit	Result	
706.154 kHz				500 kHz	Pass	



OUTPUT POWER



XMI 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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



THxTx 2017.12.14 XMt 2017.12.13

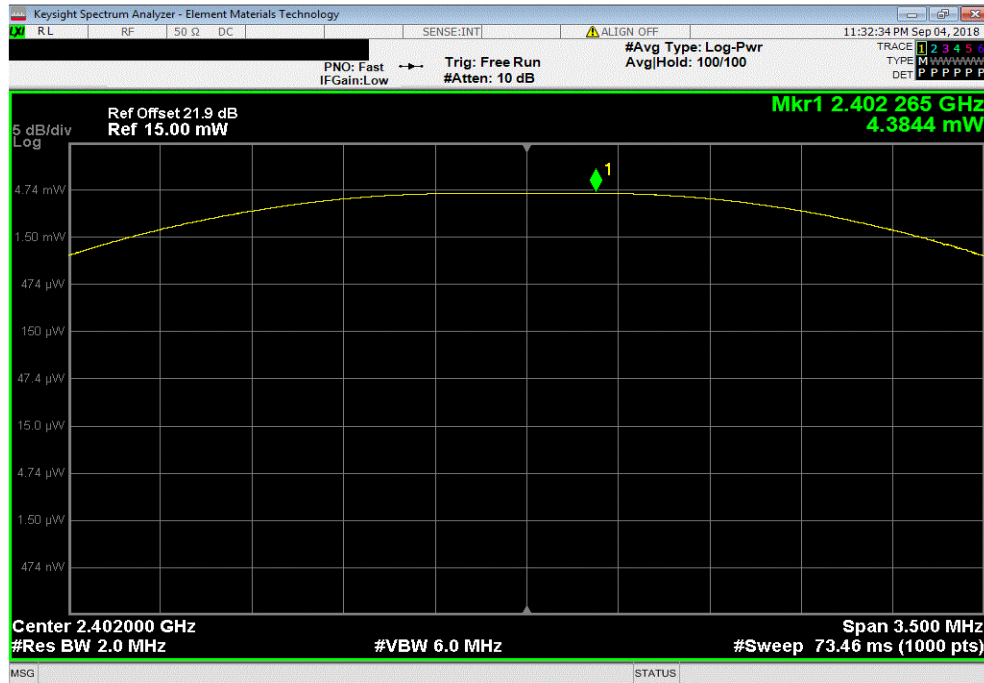
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649	
Serial Number: MEA9963DEM		Date: 4-Sep-18	
Customer: Medtronic, Inc.		Temperature: 23.3 °C	
Attendees: Taylor Dowden		Humidity: 55.7% RH	
Project: None		Barometric Pres.: 1020 mbar	
Tested by: Kyle McMullan		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2018		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	48	Signature <i>Kyle McMullan</i>	
		Value	Limit (<)
BLE/GFSK Low Channel, 2402 MHz		4.384 mW	1 W
BLE/GFSK Mid Channel, 2440 MHz		4.947 mW	1 W
BLE/GFSK High Channel, 2480 MHz		5.11 mW	1 W
			Result
			Pass
			Pass
			Pass

OUTPUT POWER

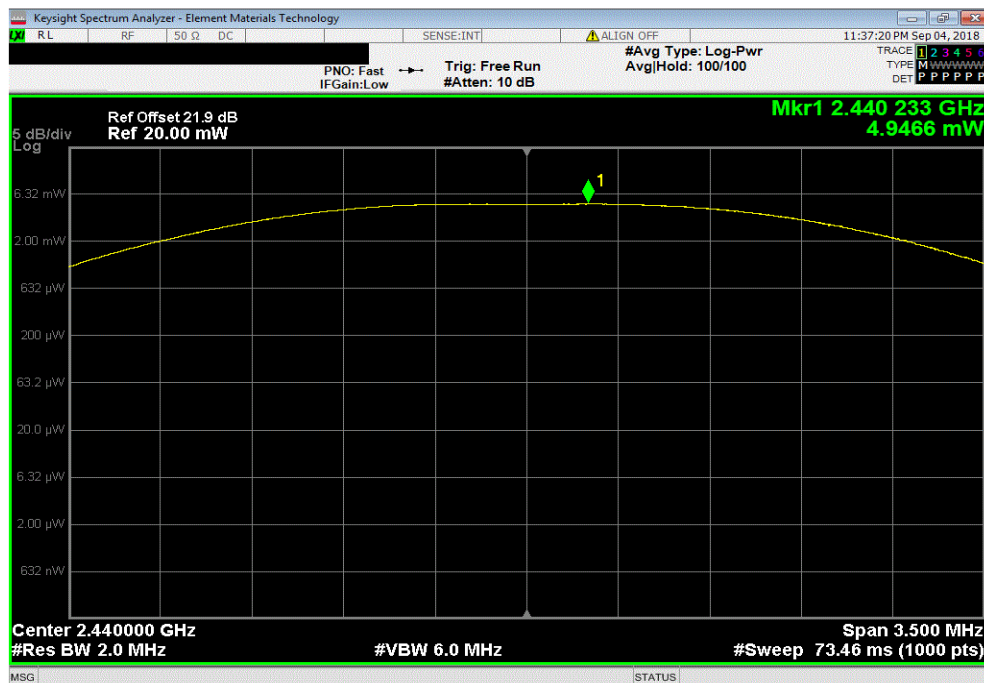


TMTx 2017.12.14 XMI 2017.12.13

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



BLE/GFSK Mid Channel, 2440 MHz						
				Value	Limit (<)	Result
				4.947 mW	1 W	Pass

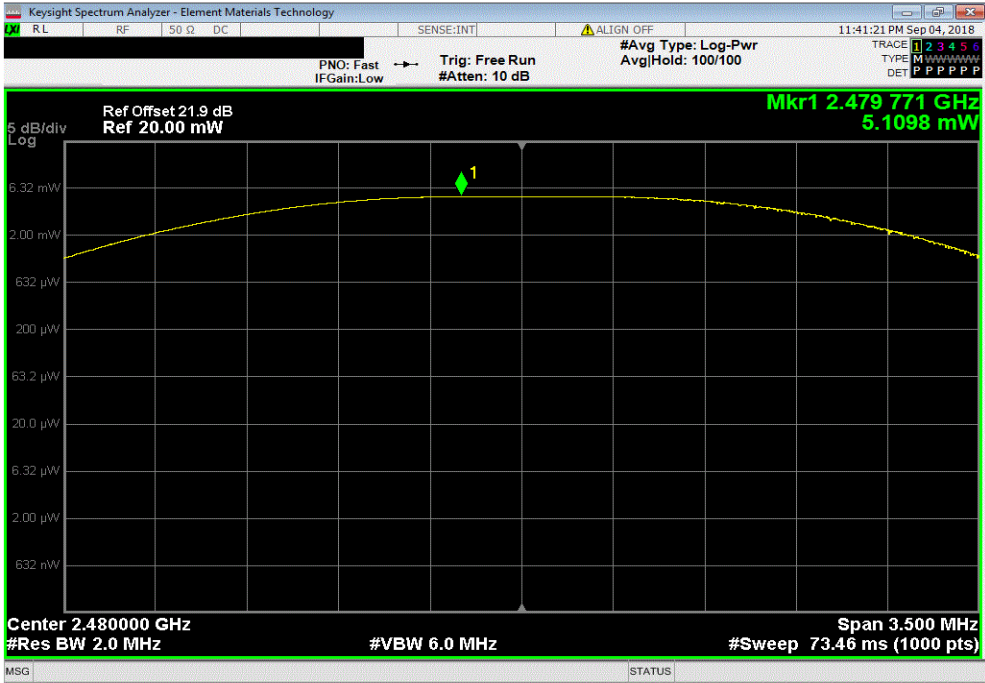


OUTPUT POWER



TMTx 2017.12.14 XMt 2017.12.13

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



POWER SPECTRAL DENSITY



XMR 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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



TMTx 2017.12.14 XMt 2017.12.13

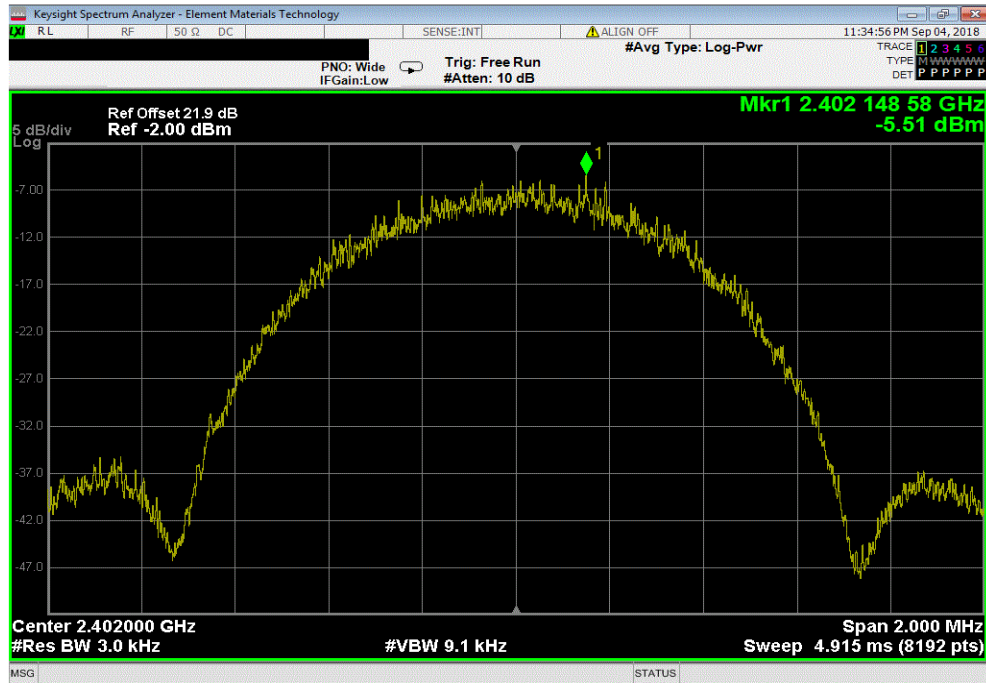
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649	
Serial Number: MEA9963DEM		Date: 4-Sep-18	
Customer: Medtronic, Inc.		Temperature: 23.3 °C	
Attendees: Taylor Dowden		Humidity: 55.2% RH	
Project: None		Barometric Pres.: 1020 mbar	
Tested by: Kyle McMullan		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2018		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	48	Signature <i>Kyle McMullan</i>	
		Value dBm/3kHz	Limit < dBm/3kHz
BLE/GFSK Low Channel, 2402 MHz		-5.508	8
BLE/GFSK Mid Channel, 2440 MHz		-3.754	8
BLE/GFSK High Channel, 2480 MHz		-4.129	8
			Results
			Pass
			Pass
			Pass

POWER SPECTRAL DENSITY

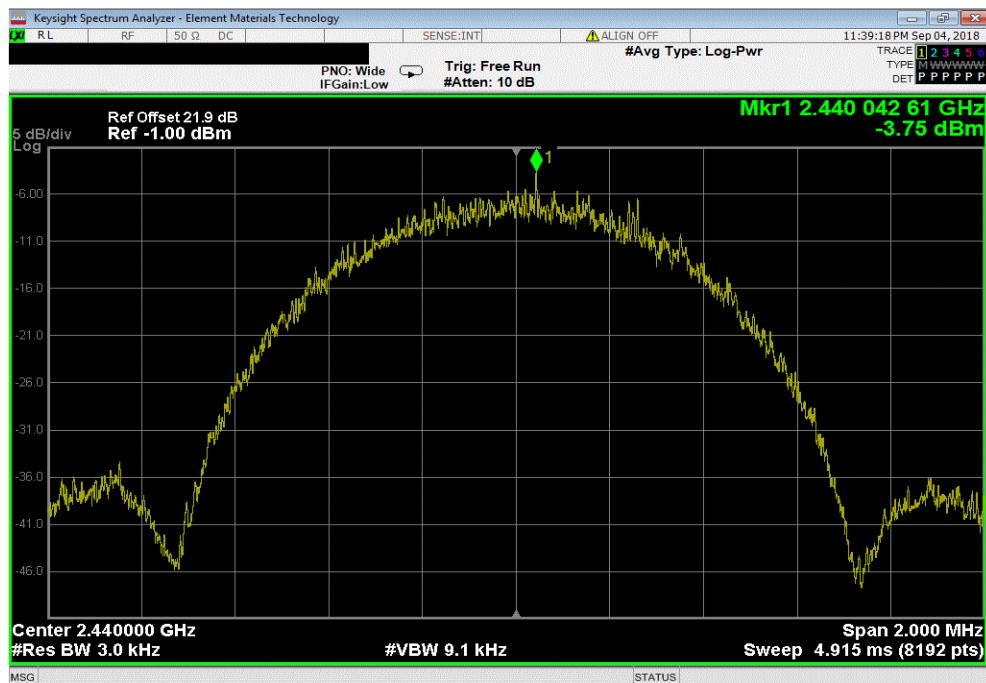


TMTx 2017.12.14 XMt 2017.12.13

BLE/GFSK Low Channel, 2402 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-5.508	8	Pass



BLE/GFSK Mid Channel, 2440 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-3.754	8	Pass

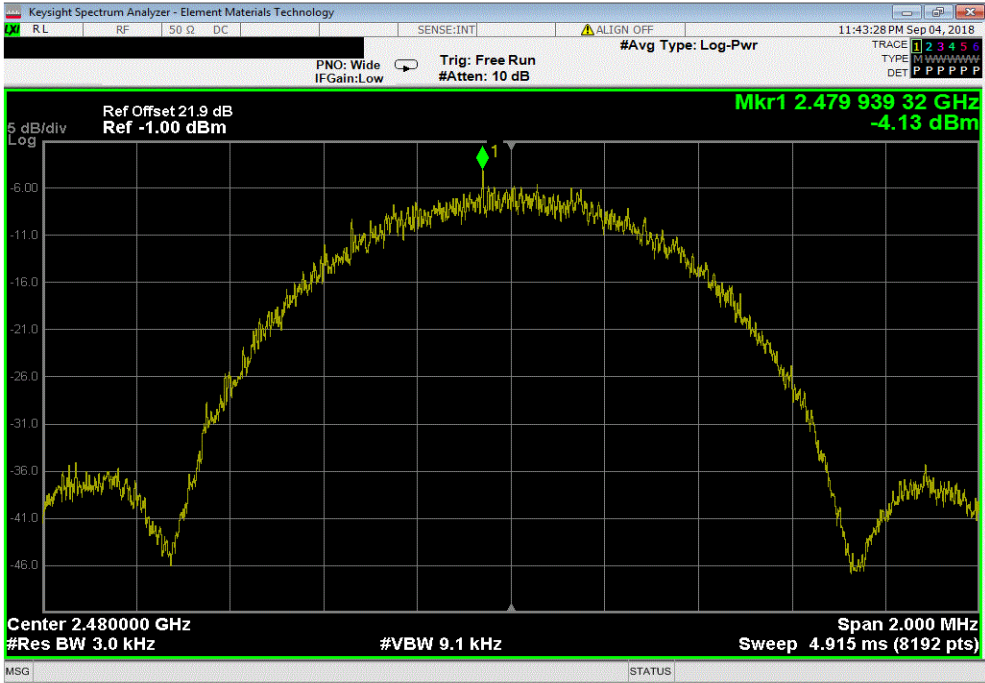


POWER SPECTRAL DENSITY



TMTx 2017.12.14 XMM 2017.12.13

BLE/GFSK High Channel, 2480 MHz						
				Value	Limit	Results
				dBm/3kHz	< dBm/3kHz	
				-4.129	8	Pass



BAND EDGE COMPLIANCE



XMI 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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



TMTx 2017.12.14 XMM 2017.12.13

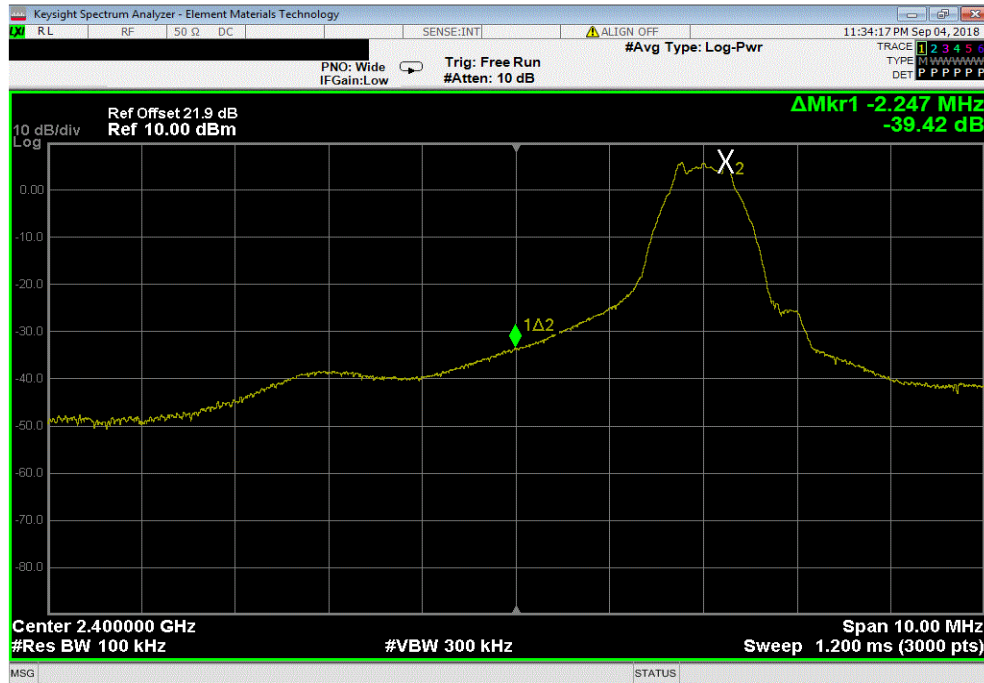
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649	
Serial Number: MEA9963DEM		Date: 4-Sep-18	
Customer: Medtronic, Inc.		Temperature: 23.2 °C	
Attendees: Taylor Dowden		Humidity: 56.6% RH	
Project: None		Barometric Pres.: 1020 mbar	
Tested by: Kyle McMullan		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2018		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	48	Signature <i>Kyle McMullan</i>	
		Value (dBc)	Limit ≤ (dBc) Result
BLE/GFSK Low Channel, 2402 MHz		-39.42	-20 Pass
BLE/GFSK High Channel, 2480 MHz		-44.18	-20 Pass

BAND EDGE COMPLIANCE

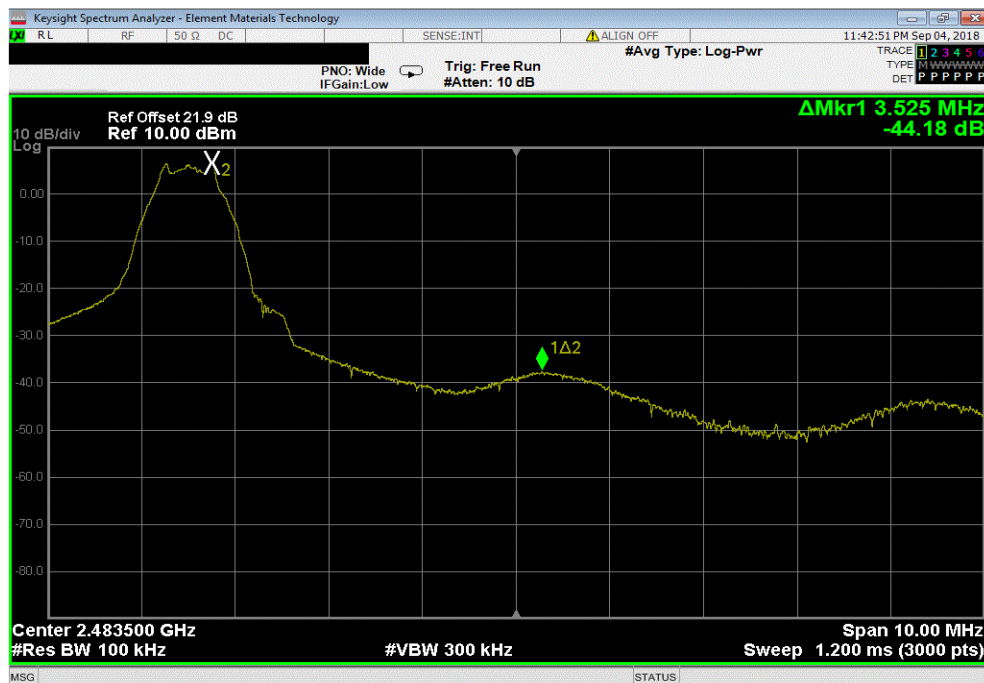


TMTx 2017.12.14 XMt 2017.12.13

BLE/GFSK Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-39.42	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-44.18	-20	Pass



SPURIOUS CONDUCTED EMISSIONS



XMI 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
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Attenuator	S.M. Electronics	SA26B-20	RFW	13-Feb-18	13-Feb-19
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	15-Mar-18	15-Mar-19
Generator - Signal	Agilent	N5173B	TIW	5-Jul-17	5-Jul-20
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	19-Dec-17	19-Dec-18

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



THxTx 2017.12.14 XMtM 2017.12.13

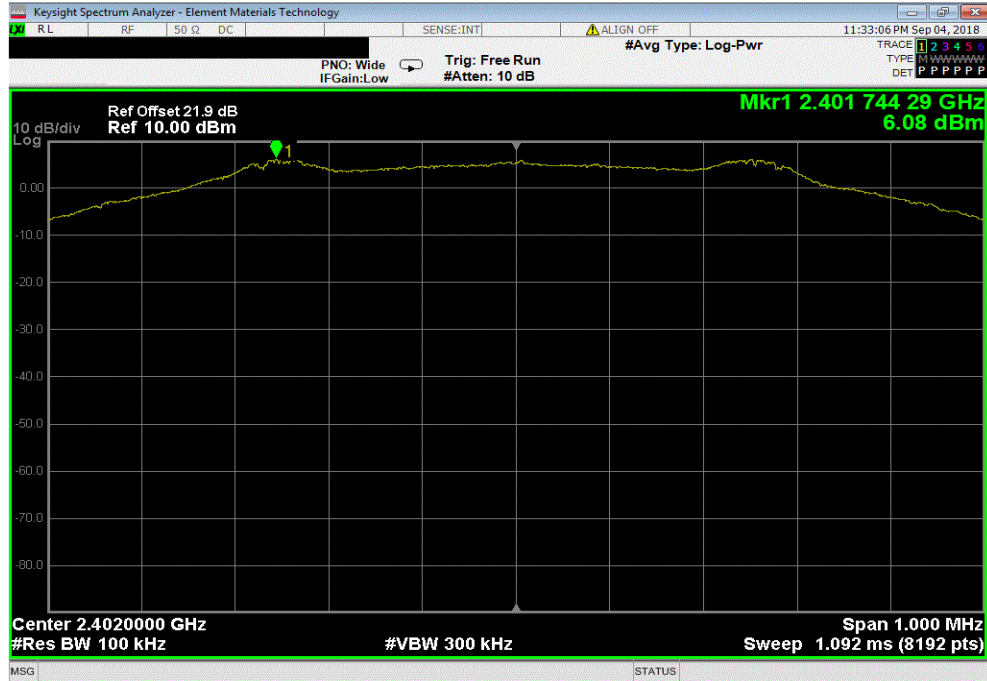
EUT: MyCareLink Relay Home Communicator 24960		Work Order: MDTR0649	
Serial Number: MEA9963DEM		Date: 4-Sep-18	
Customer: Medtronic, Inc.		Temperature: 23.3 °C	
Attendees: Taylor Dowden		Humidity: 54.7% RH	
Project: None		Barometric Pres.: 1020 mbar	
Tested by: Kyle McMullan		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2018		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	48	Signature <i>Kyle McMullan</i>	
		Frequency Range	Max Value (dBc)
			Limit ≤ (dBc)
			Result
BLE/GFSK Low Channel, 2402 MHz		Fundamental	N/A
BLE/GFSK Low Channel, 2402 MHz		30 MHz - 12.5 GHz	-44.12
BLE/GFSK Low Channel, 2402 MHz		12.5 GHz - 25 GHz	-56.53
BLE/GFSK Mid Channel, 2440 MHz		Fundamental	N/A
BLE/GFSK Mid Channel, 2440 MHz		30 MHz - 12.5 GHz	-59.23
BLE/GFSK Mid Channel, 2440 MHz		12.5 GHz - 25 GHz	-56.75
BLE/GFSK High Channel, 2480 MHz		Fundamental	N/A
BLE/GFSK High Channel, 2480 MHz		30 MHz - 12.5 GHz	-58.56
BLE/GFSK High Channel, 2480 MHz		12.5 GHz - 25 GHz	-56.73
			-20
			Pass

SPURIOUS CONDUCTED EMISSIONS

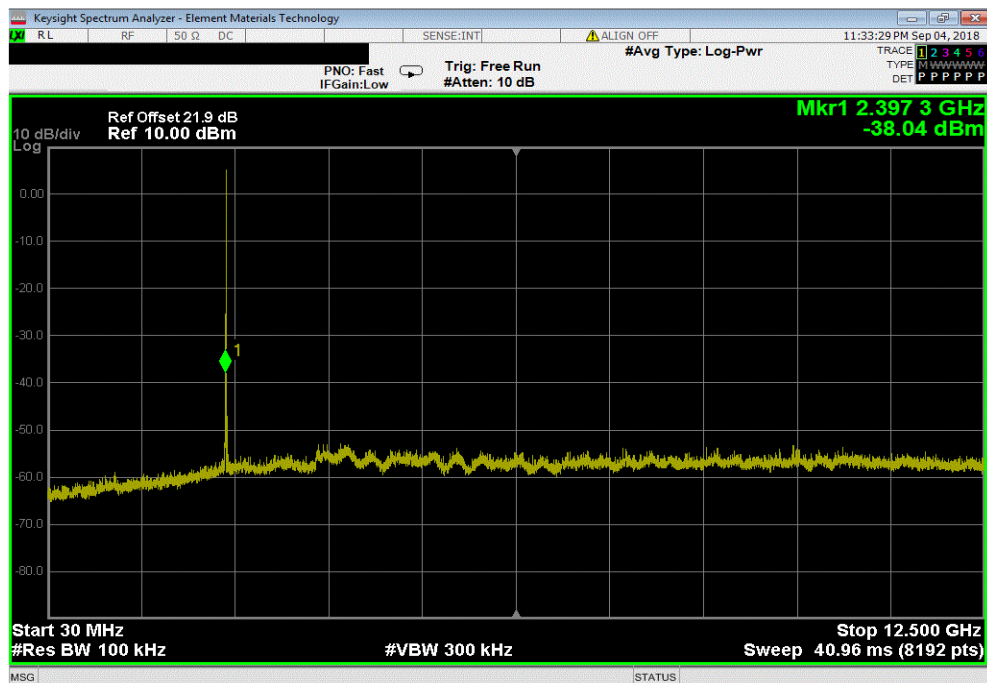


TMTx 2017.12.14 XMI 2017.12.13

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	-44.12	-20	Pass			

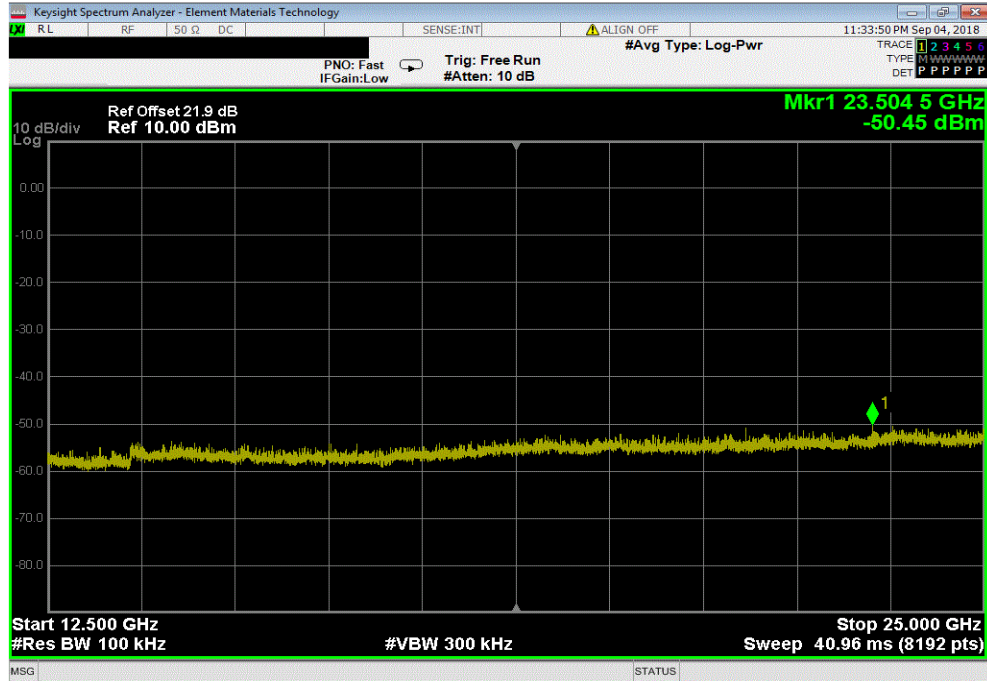


SPURIOUS CONDUCTED EMISSIONS

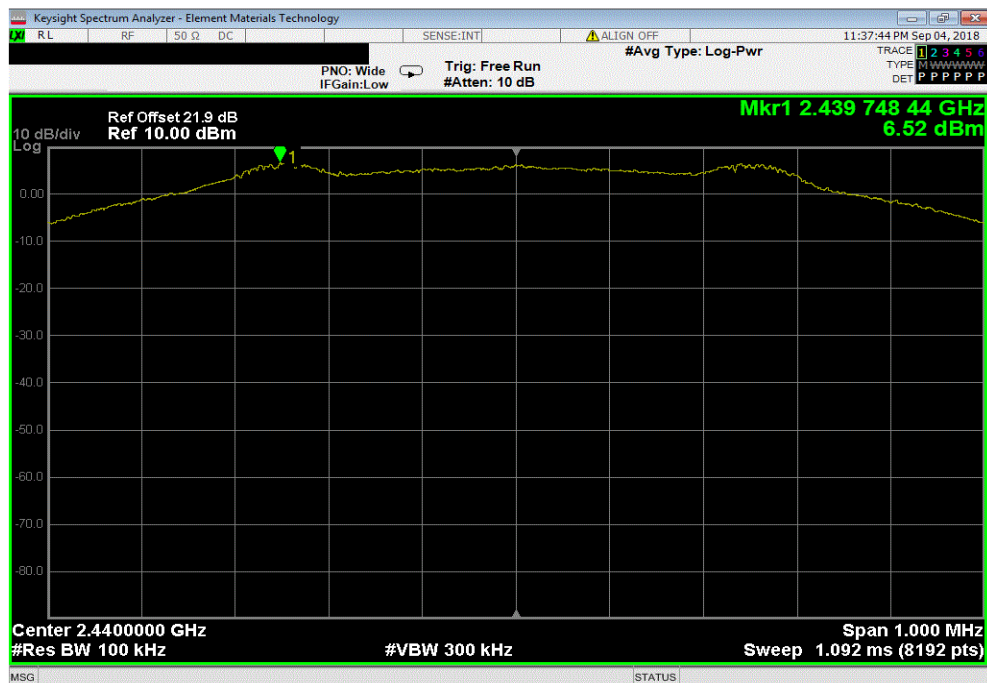


TMTx 2017.12.14 XMt 2017.12.13

BLE/GFSK Low Channel, 2402 MHz				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.53	-20	Pass	



BLE/GFSK Mid Channel, 2440 MHz				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	N/A	N/A	N/A	

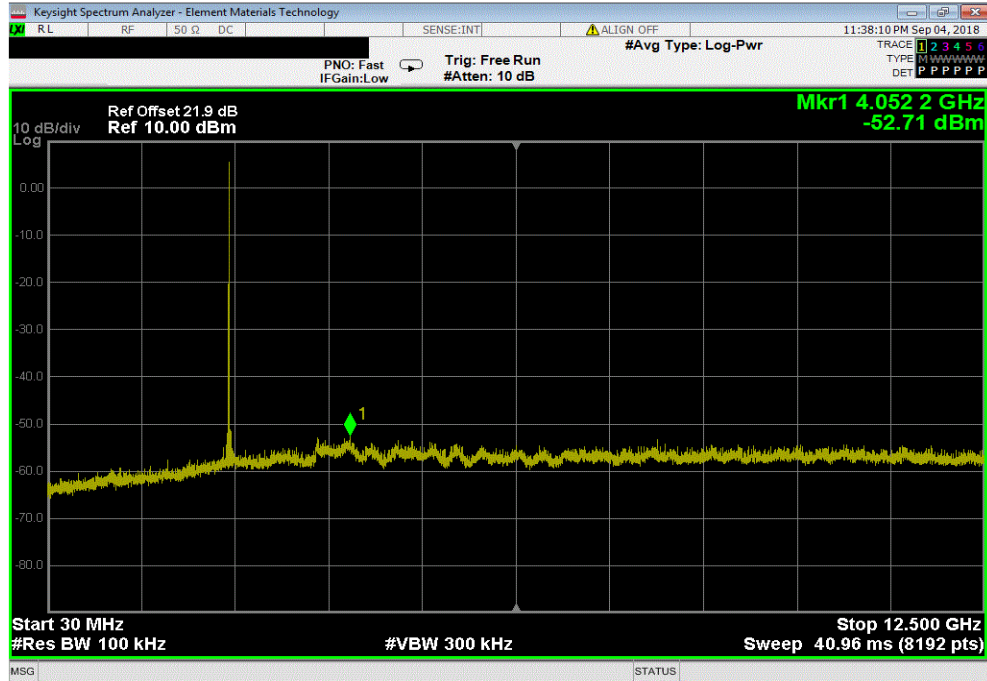


SPURIOUS CONDUCTED EMISSIONS

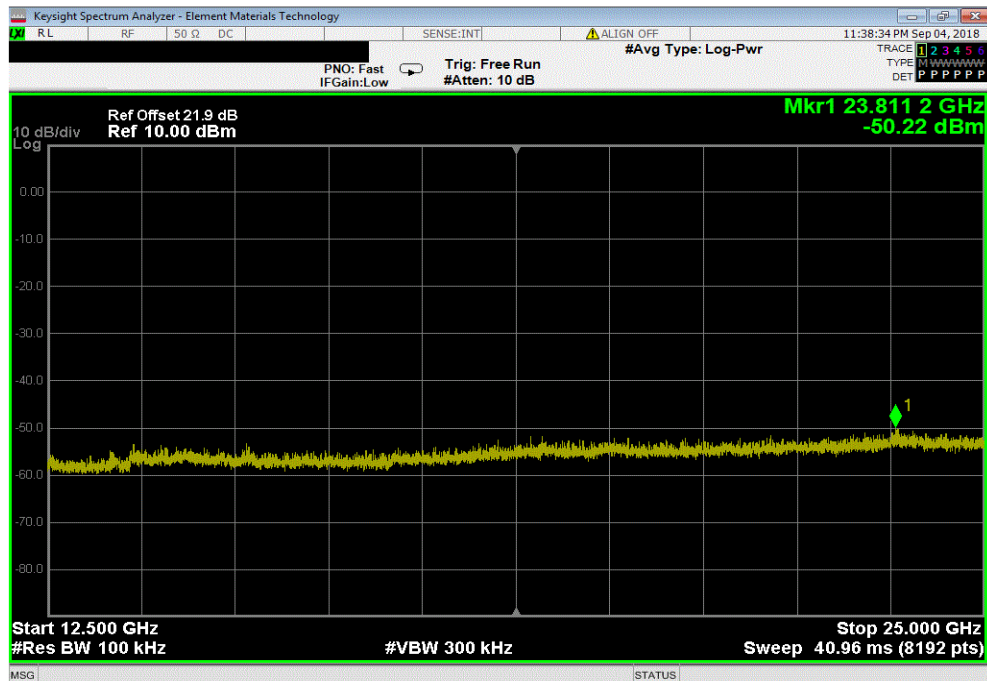


TMTx 2017.12.14 XMtX 2017.12.13

BLE/GFSK Mid Channel, 2440 MHz				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-59.23	-20	Pass	



BLE/GFSK Mid Channel, 2440 MHz				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.75	-20	Pass	

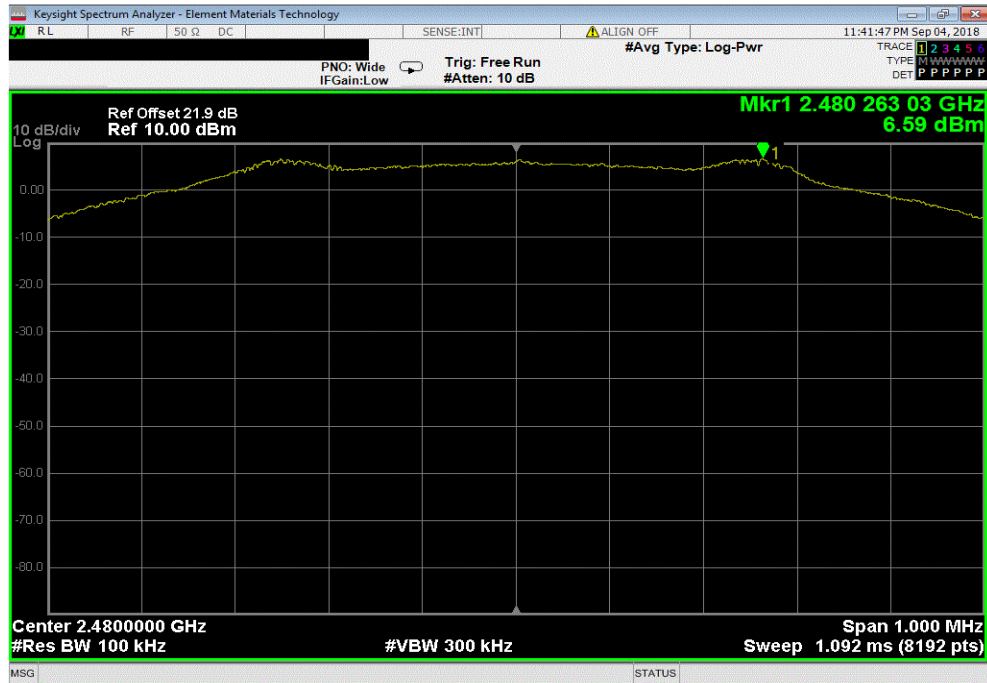


SPURIOUS CONDUCTED EMISSIONS

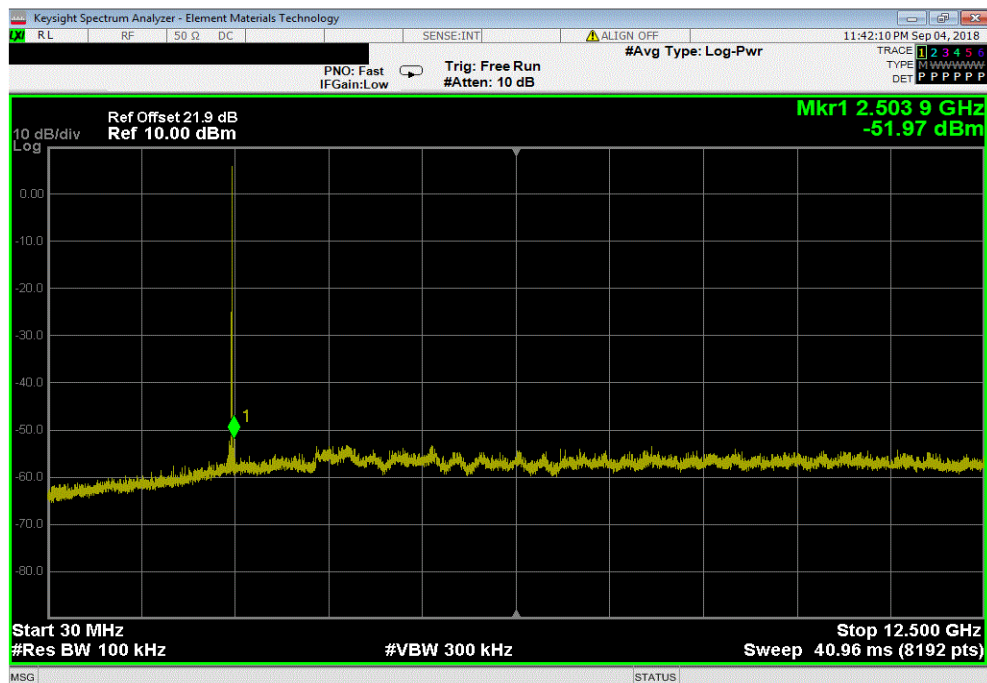


TMTx 2017.12.14 XMt 2017.12.13

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		-58.56		-20	Pass	

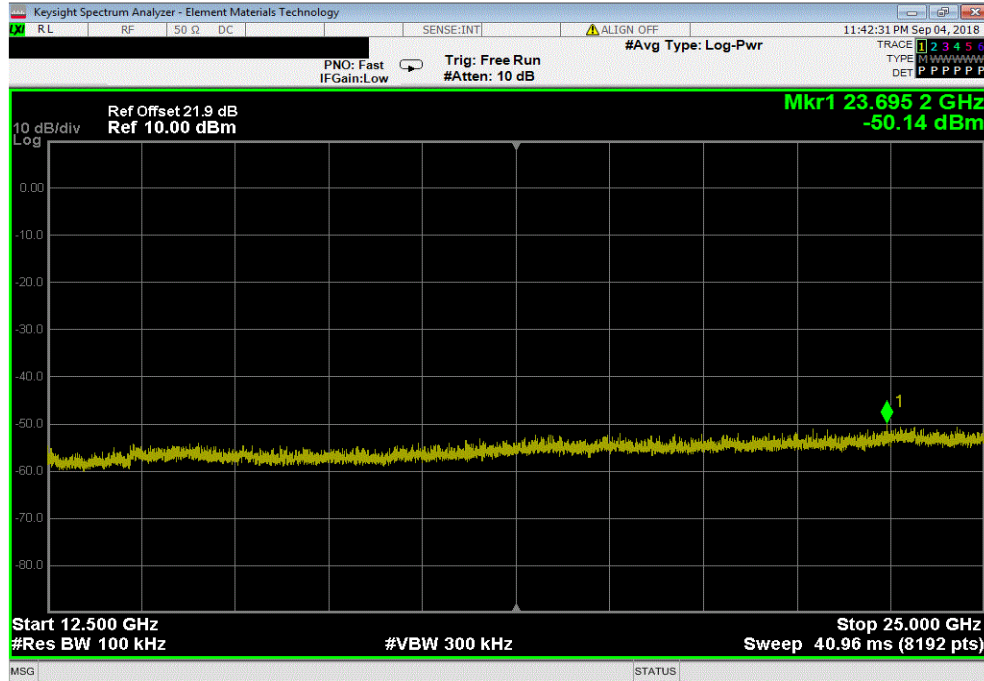


SPURIOUS CONDUCTED EMISSIONS



TMTx 2017.12.14 XMt 2017.12.13

BLE/GFSK High Channel, 2480 MHz				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.73	-20	Pass	



SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.05.04

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

Tx BLE on Low, Mid, or High channel at 2402, 2440, or 2480 MHz.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

MDTR0649 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	25 GHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Filter - Low Pass	Micro-Tronics	LPM50004	HGG	21-Sep-2017	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFM	24-Feb-2018	12 mo
Attenuator	Coaxicom	3910-20	AXY	24-Feb-2018	12 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-12001800-30-10P	PAP	24-Feb-2018	12 mo
Antenna	ETS-Lindgren	3160-08	AJP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	24-Feb-2018	12 mo
Cable	Element	Standard Gain Cable	MNW	24-Feb-2018	12 mo
Antenna	ETS-Lindgren	3160-07	AJJ	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	24-Feb-2018	12 mo
Cable	Element	Double Ridge Guide Horn Cables	MNV	24-Feb-2018	12 mo
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	14-Nov-2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	24-Feb-2018	12 mo
Cable	Element	Biconilog Cable	MNX	24-Feb-2018	12 mo
Antenna - Biconilog	ETS Lindgren	3142D	AXO	15-Dec-2017	24 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	12-Sep-2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	12-Sep-2017	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	26-Mar-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 2018.05.04

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 $10 \cdot \text{LOG}(\text{dc})$.

SPURIOUS RADIATED EMISSIONS



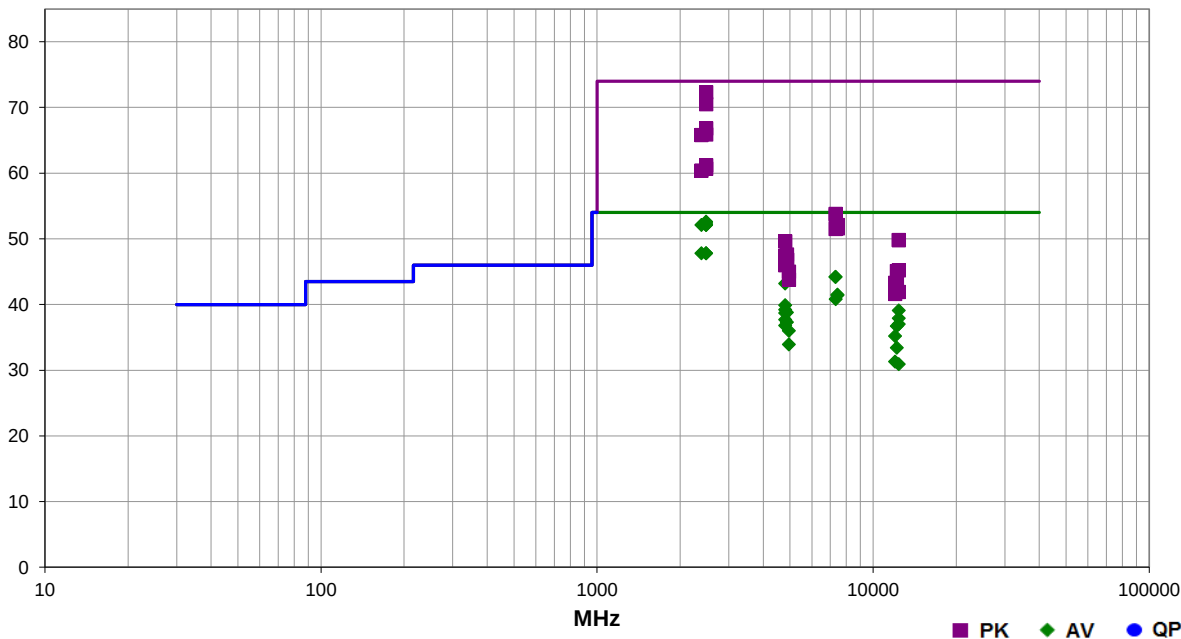
EmiRS 2018.05.07

PSA-ESCI 2018.05.04

Work Order:	MDTR0649	Date:	25-Jun-2018	<i>Kyle McMullan</i>
Project:	None	Temperature:	21.7 °C	
Job Site:	MN09	Humidity:	56.4% RH	
Serial Number:	MEA9963DEM	Barometric Pres.:	1022 mbar	
EUT: MyCareLink Relay Home Communicator 24960				Tested by: Kyle McMullan
Configuration:	2			
Customer:	Medtronic, Inc.			
Attendees:	Taylor Dowden			
EUT Power:	110VAC/60Hz			
Operating Mode:	Tx BLE on Low, Mid, or High channel at 2402, 2440, or 2480 MHz.			
Deviations:	None			
Comments:	None			

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

Run #	15	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.613	32.7	-4.2	1.0	93.0	4.1	20.0	Vert	AV	0.0	52.6	54.0	-1.4	EUT Horz, High Ch
2483.810	32.5	-4.2	1.3	68.0	4.1	20.0	Horz	AV	0.0	52.4	54.0	-1.6	EUT On Side, High Ch
2483.617	56.5	-4.2	1.0	93.0	20.0	20.0	Vert	PK	0.0	72.3	74.0	-1.7	EUT Horz, High Ch
2483.840	32.2	-4.2	1.0	102.1	4.1	20.0	Horz	AV	0.0	52.1	54.0	-1.9	EUT Vert, High Ch
2483.997	32.2	-4.2	3.4	204.0	4.1	20.0	Vert	AV	0.0	52.1	54.0	-1.9	EUT Vert, High Ch
2389.833	32.1	-4.1	1.0	236.9	4.1	20.0	Vert	AV	0.0	52.1	54.0	-1.9	EUT Horz, Low Ch
2483.677	54.7	-4.2	1.3	68.0	20.0	20.0	Horz	PK	0.0	70.5	74.0	-3.5	EUT On Side, High Ch
2485.480	32.0	-4.2	1.0	131.9	0.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT Horz, High Ch
2484.430	32.0	-4.2	1.0	85.0	0.0	20.0	Vert	AV	0.0	47.8	54.0	-6.2	EUT On Side, High Ch
2389.577	31.9	-4.1	1.7	18.0	0.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch
2483.777	51.0	-4.2	1.0	102.1	20.0	20.0	Horz	PK	0.0	66.8	74.0	-7.2	EUT Vert, High Ch
2483.547	50.1	-4.2	3.4	204.0	20.0	20.0	Vert	PK	0.0	65.9	74.0	-8.1	EUT Vert, High Ch
2389.967	49.9	-4.1	1.0	236.9	20.0	20.0	Vert	PK	0.0	65.8	74.0	-8.2	EUT Horz, Low Ch
7319.300	32.1	12.1	1.1	124.0	0.0	0.0	Horz	AV	0.0	44.2	54.0	-9.8	EUT Vert, Mid Ch
7319.317	29.5	10.6	1.0	192.1	4.1	0.0	Horz	AV	0.0	44.2	54.0	-9.8	EUT Vert, Mid Ch
4803.475	38.9	4.3	1.9	12.0	0.0	0.0	Horz	AV	0.0	43.2	54.0	-10.8	EUT Vert, Low Ch
7439.400	29.0	12.5	2.3	217.0	0.0	0.0	Vert	AV	0.0	41.5	54.0	-12.5	EUT Horz, High Ch

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7439.392	28.9	12.5	1.0	127.0	0.0	0.0	Horz	AV	0.0	41.4	54.0	-12.6	EUT Vert, High Ch
2483.883	45.4	-4.2	1.0	132.0		20.0	Horz	PK	0.0	61.2	74.0	-12.8	EUT Horz, High Ch
7320.792	28.7	12.1	1.0	357.0	0.0	0.0	Vert	AV	0.0	40.8	54.0	-13.2	EUT Horz, Mid Ch
2484.023	44.9	-4.2	1.0	85.0		20.0	Vert	PK	0.0	60.7	74.0	-13.3	EUT On Side, High Ch
2389.777	44.5	-4.1	1.7	18.0		20.0	Horz	PK	0.0	60.4	74.0	-13.6	EUT On Side, Low Ch
4803.542	35.6	4.3	1.0	181.0	0.0	0.0	Vert	AV	0.0	39.9	54.0	-14.1	EUT Horz, Low Ch
4803.600	34.9	4.3	1.9	350.0	0.0	0.0	Horz	AV	0.0	39.2	54.0	-14.8	EUT Horz, Low Ch
12401.350	26.7	12.4	2.8	118.0	0.0	0.0	Horz	AV	0.0	39.1	54.0	-14.9	EUT Vert, High Ch
4879.492	34.8	4.0	1.0	337.0	0.0	0.0	Horz	AV	0.0	38.8	54.0	-15.2	EUT Vert, Mid Ch
4803.567	34.4	4.3	2.0	19.0	0.0	0.0	Horz	AV	0.0	38.7	54.0	-15.3	EUT On Side, Low Ch
12401.400	25.5	12.4	1.0	112.0	0.0	0.0	Vert	AV	0.0	37.9	54.0	-16.1	EUT Horz, High Ch
4803.492	33.4	4.3	2.8	73.0	0.0	0.0	Vert	AV	0.0	37.7	54.0	-16.3	EUT On Side, Low Ch
4879.467	33.3	4.0	1.7	272.0	0.0	0.0	Vert	AV	0.0	37.3	54.0	-16.7	EUT Horz, Mid Ch
12398.770	37.5	-0.5	2.4	97.0	0.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	EUT Vert, High Ch
4803.500	32.5	4.3	3.7	297.0	0.0	0.0	Vert	AV	0.0	36.8	54.0	-17.2	EUT Vert, Low Ch
12198.810	36.9	-0.2	1.6	119.0	0.0	0.0	Horz	AV	0.0	36.7	54.0	-17.3	EUT Vert, Mid Ch
4959.600	32.0	4.0	2.2	351.0	0.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	EUT Vert, High Ch
12008.740	37.0	-1.8	3.0	106.0	0.0	0.0	Horz	AV	0.0	35.2	54.0	-18.8	EUT Vert, Low Ch
4959.317	29.9	4.0	1.0	158.0	0.0	0.0	Vert	AV	0.0	33.9	54.0	-20.1	EUT Horz, High Ch
7319.558	43.2	10.6	1.0	192.1		0.0	Horz	PK	0.0	53.8	74.0	-20.2	EUT Vert, Mid Ch
7320.542	41.5	12.1	1.1	124.0		0.0	Horz	PK	0.0	53.6	74.0	-20.4	EUT Vert, Mid Ch
12201.280	33.6	-0.2	3.5	63.0	0.0	0.0	Vert	AV	0.0	33.4	54.0	-20.6	EUT Horz, Mid Ch
7438.783	39.6	12.5	1.0	127.0		0.0	Horz	PK	0.0	52.1	74.0	-21.9	EUT Vert, High Ch
7441.433	39.1	12.5	2.3	217.0		0.0	Vert	PK	0.0	51.6	74.0	-22.4	EUT Horz, High Ch
7318.708	39.4	12.1	1.0	357.0		0.0	Vert	PK	0.0	51.5	74.0	-22.5	EUT Horz, Mid Ch
12011.290	33.0	-1.7	1.0	80.0	0.0	0.0	Vert	AV	0.0	31.3	54.0	-22.7	EUT Horz, Low Ch
12398.680	31.4	-0.5	1.0	94.0	0.0	0.0	Vert	AV	0.0	30.9	54.0	-23.1	EUT Horz, High Ch
12401.720	37.4	12.4	1.0	112.0		0.0	Vert	PK	0.0	49.8	74.0	-24.2	EUT Horz, High Ch
12401.280	37.4	12.4	2.8	118.0		0.0	Horz	PK	0.0	49.8	74.0	-24.2	EUT Vert, High Ch
4803.383	45.3	4.3	1.9	12.0		0.0	Horz	PK	0.0	49.6	74.0	-24.4	EUT Vert, Low Ch
4879.492	43.6	4.0	1.0	337.0		0.0	Horz	PK	0.0	47.6	74.0	-26.4	EUT Vert, Mid Ch
4803.567	43.1	4.3	1.0	181.0		0.0	Vert	PK	0.0	47.4	74.0	-26.6	EUT Horz, Low Ch
4803.275	42.6	4.3	1.9	350.0		0.0	Horz	PK	0.0	46.9	74.0	-27.1	EUT Horz, Low Ch
4803.542	42.6	4.3	2.0	19.0		0.0	Horz	PK	0.0	46.9	74.0	-27.1	EUT On Side, Low Ch
4880.650	42.9	3.9	1.7	272.0		0.0	Vert	PK	0.0	46.8	74.0	-27.2	EUT Horz, Mid Ch
4804.083	41.7	4.3	2.8	73.0		0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT On Side, Low Ch
4803.292	41.7	4.3	3.7	297.0		0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Vert, Low Ch
12398.830	45.7	-0.5	2.4	97.0		0.0	Horz	PK	0.0	45.2	74.0	-28.8	EUT Vert, High Ch
12198.820	45.3	-0.2	1.6	119.0		0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT Vert, Mid Ch
4959.675	41.0	4.0	2.2	351.0		0.0	Horz	PK	0.0	45.0	74.0	-29.0	EUT Vert, High Ch
4957.650	39.8	4.0	1.0	158.0		0.0	Vert	PK	0.0	43.8	74.0	-30.2	EUT Horz, High Ch
12011.230	45.0	-1.7	3.0	106.0		0.0	Horz	PK	0.0	43.3	74.0	-30.7	EUT Vert, Low Ch
12201.680	43.2	-0.2	3.5	63.0		0.0	Vert	PK	0.0	43.0	74.0	-31.0	EUT Horz, Mid Ch
12399.180	42.4	-0.5	1.0	94.0		0.0	Vert	PK	0.0	41.9	74.0	-32.1	EUT Horz, High Ch
12008.690	43.4	-1.8	1.0	80.0		0.0	Vert	PK	0.0	41.6	74.0	-32.4	EUT Horz, Low Ch