



# element

**BIOTRONIK, Inc.**

**Neuro SCS IPG**

**FCC 15.247:2021**

**Bluetooth Low Energy**

**Report: BIOT0080 Rev. 1, Issue Date: November 3, 2021**



NVLAP LAB CODE: 200630-0



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# CERTIFICATE OF TEST

**Last Date of Test: January 26, 2021**  
**BIOTRONIK, Inc.**  
**EUT: Neuro SCS IPG**

## Radio Equipment Testing

### Standards

Specification	Method
FCC 15.247:2021	ANSI C63.10:2013, KDB 558074

### Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated 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:



Kyle Holgate, 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



<b>Revision Number</b>	<b>Description</b>	<b>Date</b> (yyyy-mm-dd)	<b>Page Number</b>
01	Updated radio name to Bluetooth Low Energy	2021-10-19	1
	Updated Test Description	2021-10-19	23

# ACCREDITATIONS AND AUTHORIZATIONS



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## 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

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## Canada

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

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## European Union

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

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## 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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

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

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# FACILITIES



<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>Oregon</b> Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>NVLAP</b>				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
<b>Innovation, Science and Economic Development Canada</b>				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
<b>BSMI</b>				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>				
A-0029	A-0109	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA</b>				
US0158	US0175	US0017	US0191	US0157



# MEASUREMENT UNCERTAINTY



## 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.

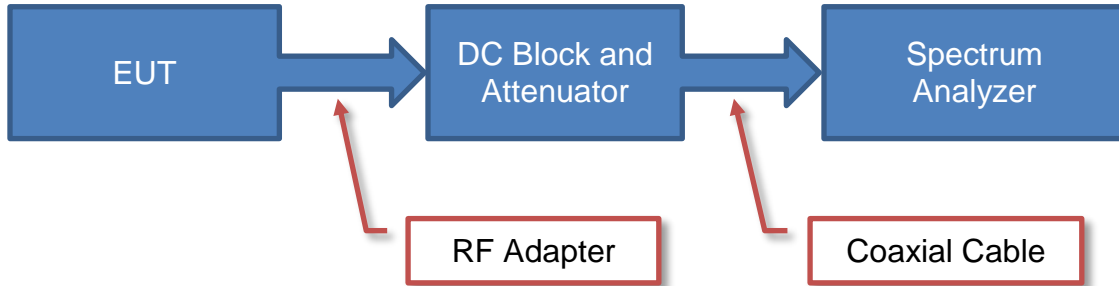
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable 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.

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

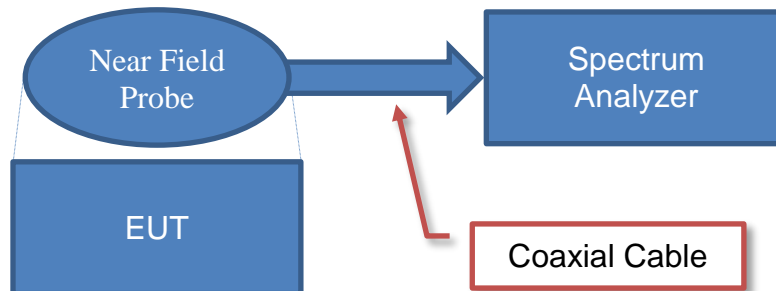
<b>Test</b>	<b>+ MU</b>	<b>- MU</b>
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

# 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

<b>Company Name:</b>	BIOTRONIK, Inc.
<b>Address:</b>	6024 Jean Road, BLDG B
<b>City, State, Zip:</b>	Lake Oswego, OR 97035
<b>Test Requested By:</b>	Roy Wang
<b>EUT:</b>	Neuro SCS IPG
<b>First Date of Test:</b>	January 18, 2021
<b>Last Date of Test:</b>	January 26, 2021
<b>Receipt Date of Samples:</b>	January 18, 2021
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage
<b>Purchase Authorization:</b>	Verified

## Information Provided by the Party Requesting the Test

<b>Functional Description of the EUT:</b>
Implantable Neurostimulator
<b>Testing Objective:</b>
To demonstrate compliance of the Bluetooth Low Energy radio to FCC 15.247 requirements.



# POWER SETTINGS AND ANTENNAS



The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

## ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Monopole	Manufacturer	2400 - 2500	1.4

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

## SETTINGS FOR ALL TESTS IN THIS REPORT

	Implantable Neurostimulator	Power Setting
BLE	Low Channel – 2402 MHz	Max Power - 0x08
	Mid Channel – 2440 MHz	Max Power - 0x08
	High Channel – 2480 MHz	Max Power - 0x08

# CONFIGURATIONS



## Configuration BIOT0080- 1

Software/Firmware Running during test	
Description	Version
BLE RF test app	Rev3.0
SCS ROM	2.1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Implantable Neurostimulator	BIOTRONIK, Inc.	Prospera	88200467

## Configuration BIOT0080- 3

Software/Firmware Running during test	
Description	Version
BLE RF test app	Rev3.0
SCS ROM	2.1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Implantable Neurostimulator	BIOTRONIK, Inc.	Prospera	88200591

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Inductive Programmer	BIOTRONIK, Inc.	PGH Head	78241720

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	Latitude Ultrabook	C1NMGH2
Interface Box	BIOTRONIK, Inc.	USB Tel Box	405
AC Adapter (Laptop)	Dell	FA90PM130	None
Switching Power Supply	Voltcraft	UPA 12000	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Cable	No	2.0 m	No	Interface Box	Switching Power Supply
AC Cable	No	0.9 m	No	AC Mains	AC Adapter
AC Cable	No	0.9 m	No	AC Mains	AC Adapter
DC Cable	No	2.0 m	No	AC Adapter (Tablet)	Tablet
PGH Head Cable	Yes	3.0 m	Yes	Inductive Programmer	Interface Box
USB Cable	No	2.0 m	No	Laptop	Interface Box

# MODIFICATIONS



## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-01-18	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	2021-01-19	Equivalent Isotropic Radiated 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.
3	2021-01-26	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	2021-01-26	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	2021-01-26	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	2021-01-26	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.
7	2021-01-26	Spurious Conducted 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

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

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time. The EUT operates at 100% Duty Cycle.



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# OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2020-03-13	2021-03-13
Attenuator	S.M. Electronics	SA26B-20	AUY	2020-03-13	2021-03-13
Block - DC	Fairview Microwave	SD3379	AMW	2020-03-13	2021-03-13
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08

## TEST DESCRIPTION

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



TelTx 2019.08.30.0 XMI 2020.12.30.0

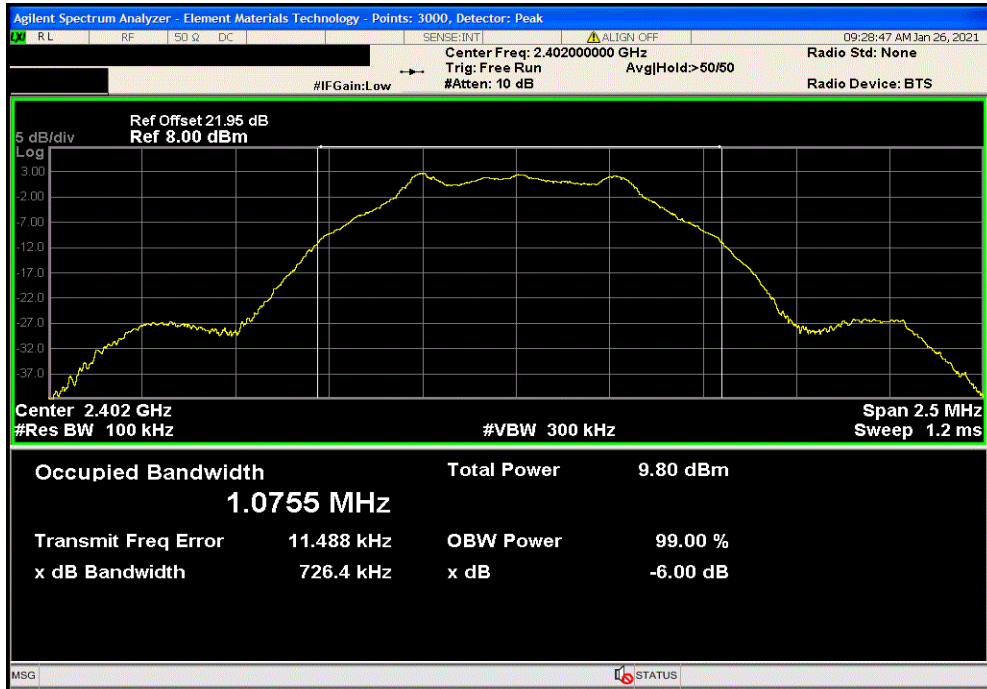
EUT: Neuro SCS IPG		Work Order: BIOT0080	
Serial Number: 88200591		Date: 26-Jan-21	
Customer: BIOTRONIK, Inc.		Temperature: 22.6 °C	
Attendees: Roy Wang		Humidity: 29.8% RH	
Project: None		Barometric Pres.: 1004 mbar	
Tested by: Kam Robertson & Jeff Alcoke		Power: Battery	
Job Site: EV06		Test Method	
TEST SPECIFICATIONS		ANSI C63.10:2013	
FCC 15.247:2021			
COMMENTS			
The reference level offset includes: dc block, 20dB attenuator, measurement cable, and the manufacturers patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature	
		Value	Limit (±) Result
		BLE/GFSK 1 Mbps Low Channel, 2402 MHz	726.389 kHz 500 kHz Pass
		BLE/GFSK 1 Mbps Mid Channel, 2440 MHz	704.931 kHz 500 kHz Pass
		BLE/GFSK 1 Mbps High Channel, 2480 MHz	711.031 kHz 500 kHz Pass

# OCCUPIED BANDWIDTH

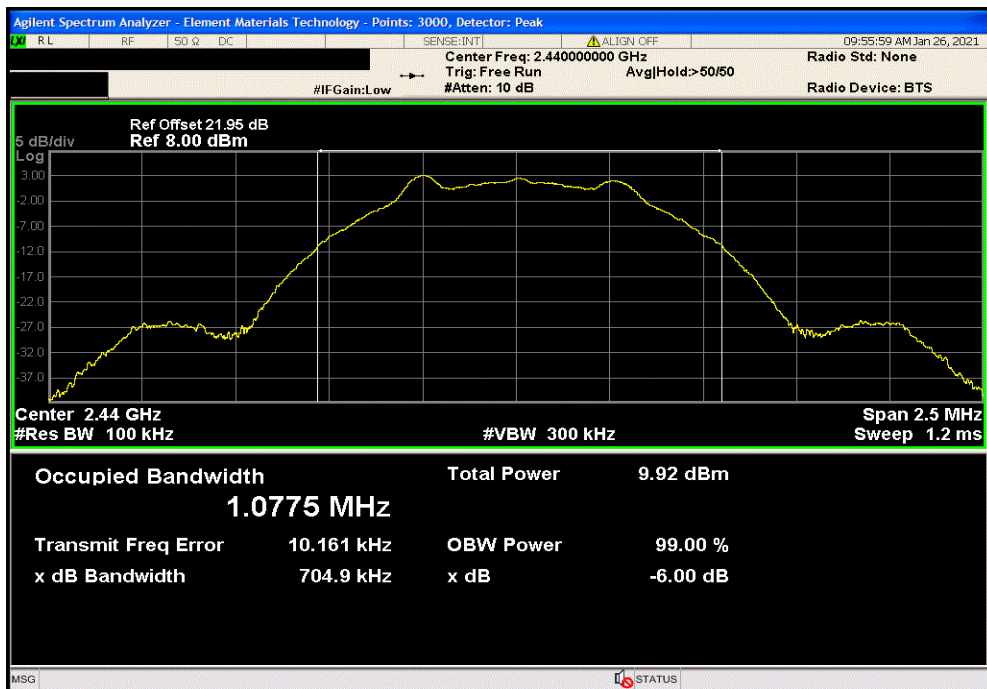


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz				Value	Limit	Result
					(≥)	
				726.389 kHz	500 kHz	Pass



BLE/GFSK 1 Mbps Mid Channel, 2440 MHz				Value	Limit	Result
					(≥)	
				704.931 kHz	500 kHz	Pass

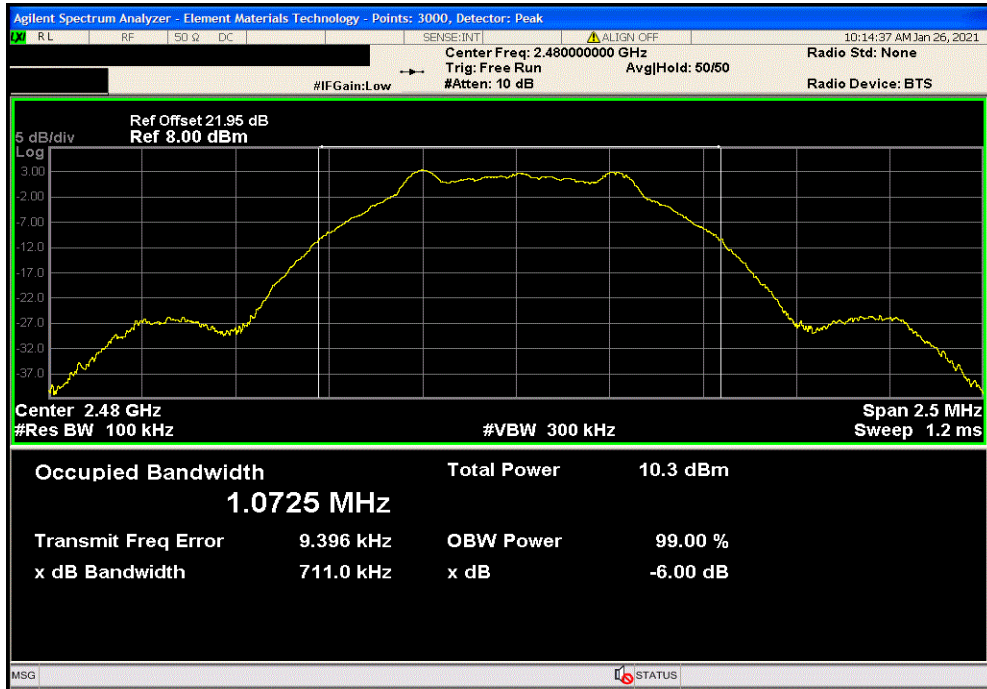


# OCCUPIED BANDWIDTH



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz		
Value	Limit	Result
711.031 kHz	500 kHz	Pass





# OUTPUT POWER



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Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2020-03-13	2021-03-13
Attenuator	S.M. Electronics	SA26B-20	AUY	2020-03-13	2021-03-13
Block - DC	Fairview Microwave	SD3379	AMW	2020-03-13	2021-03-13
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08

## TEST DESCRIPTION

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



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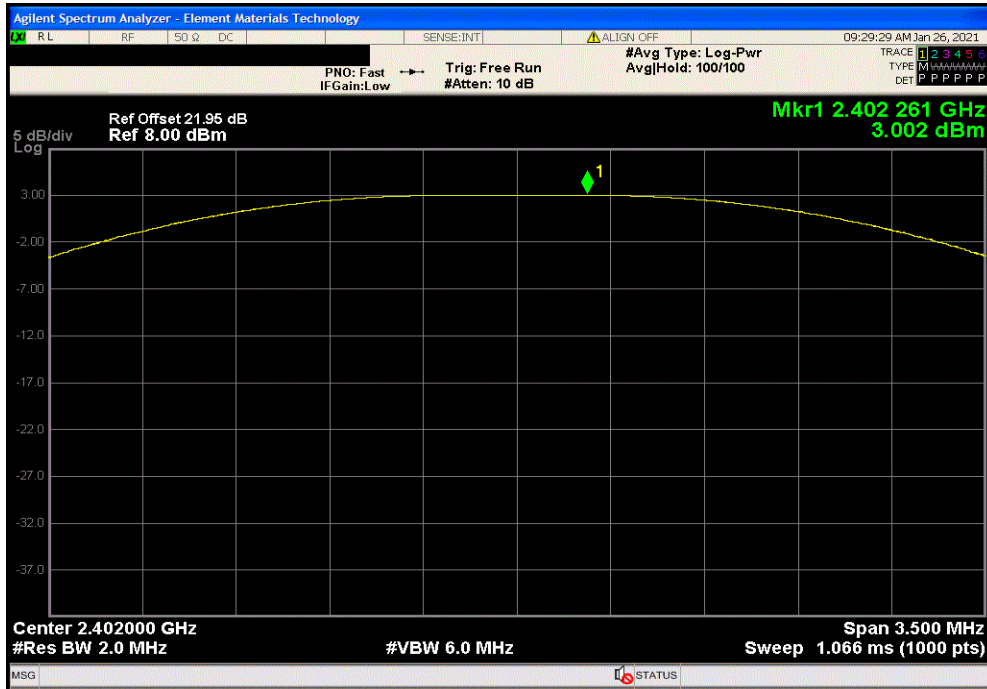
EUT: Neuro SCS IPG		Work Order: BIOT0080	
Serial Number: 88200591		Date: 26-Jan-21	
Customer: BIOTRONIK, Inc.		Temperature: 22.6 °C	
Attendees: Roy Wang		Humidity: 29.8% RH	
Project: None		Barometric Pres.: 1004 mbar	
Tested by: Kam Robertson & Jeff Alcoke		Power: Battery	
Job Site: EV06		Test Method	
TEST SPECIFICATIONS		ANSI C63.10:2013	
FCC 15.247:2021			
COMMENTS			
The reference level offset includes: dc block, 20dB attenuator, measurement cable, and the manufacturers patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature	
		Out Pwr (dBm)	Limit (dBm) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		3.002	30 Pass
BLE/GFSK 1 Mbps Mid Channel, 2440 MHz		3.066	30 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		3.435	30 Pass

# OUTPUT POWER

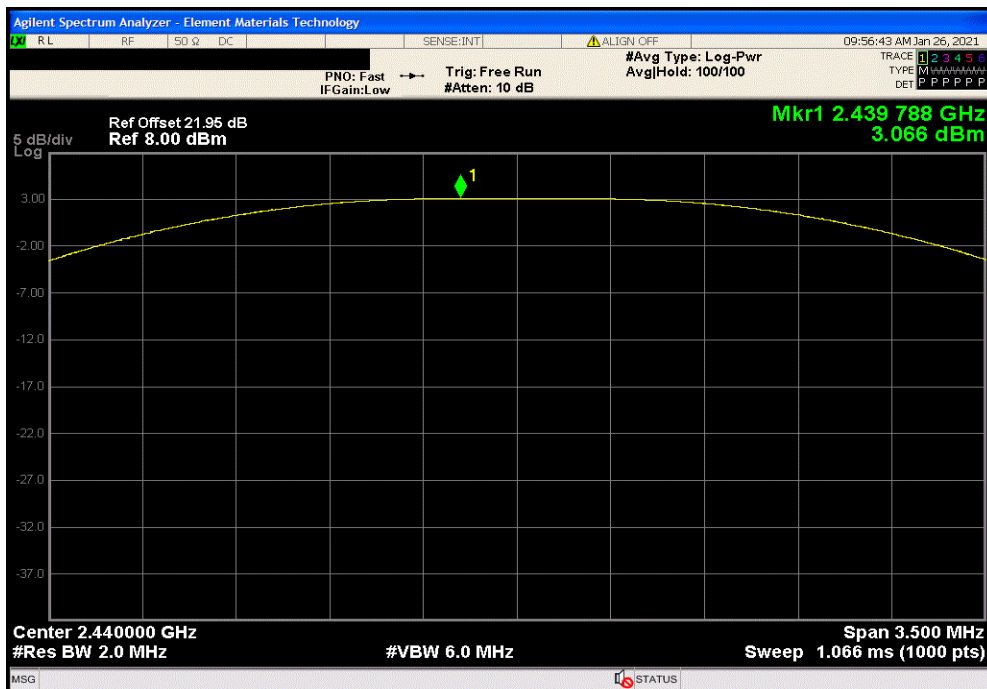


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.002	30	Pass



BLE/GFSK 1 Mbps Mid Channel, 2440 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.066	30	Pass

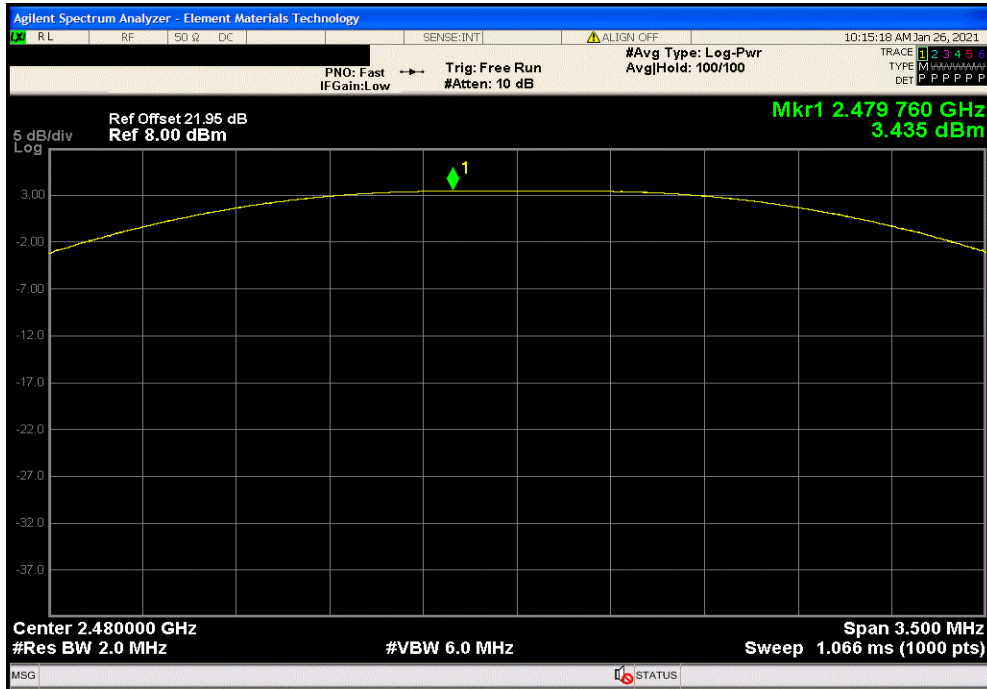


# OUTPUT POWER



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				3.435	30	Pass



# EQUIVALENT ISOTROPIC RADIATED POWER



PSA-ESCI 2020.12.30.0

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

BLE Continuous Tx, Low Channel = 2402 MHz, Mid Channel = 2440 MHz, High Channel = 2402 MHz

## POWER SETTINGS INVESTIGATED

Battery

## CONFIGURATIONS INVESTIGATED

BIOT0080 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency | 2402 MHz | Stop Frequency | 2480 MHz

## SAMPLE CALCULATIONS

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

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	N/A	Double Ridge Horn Cables	EVB	2020-11-17	11/17/2021
Antenna - Double Ridge	EMCO	3115	AHC	2020-07-01	7/1/2022
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2020-12-16	12/16/2021

## TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. A field strength measurement of the fundamental was made with the carrier fully maximized for its highest radiated power.

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

The fundamental emission was then measured as per ANSIC63.10:2013, section 11.9.1.1


The final data was converted from field strength to a radiated power value using the equations found in ANSI C63.10:2013, Annex G.2

# EQUIVALENT ISOTROPIC RADIATED POWER



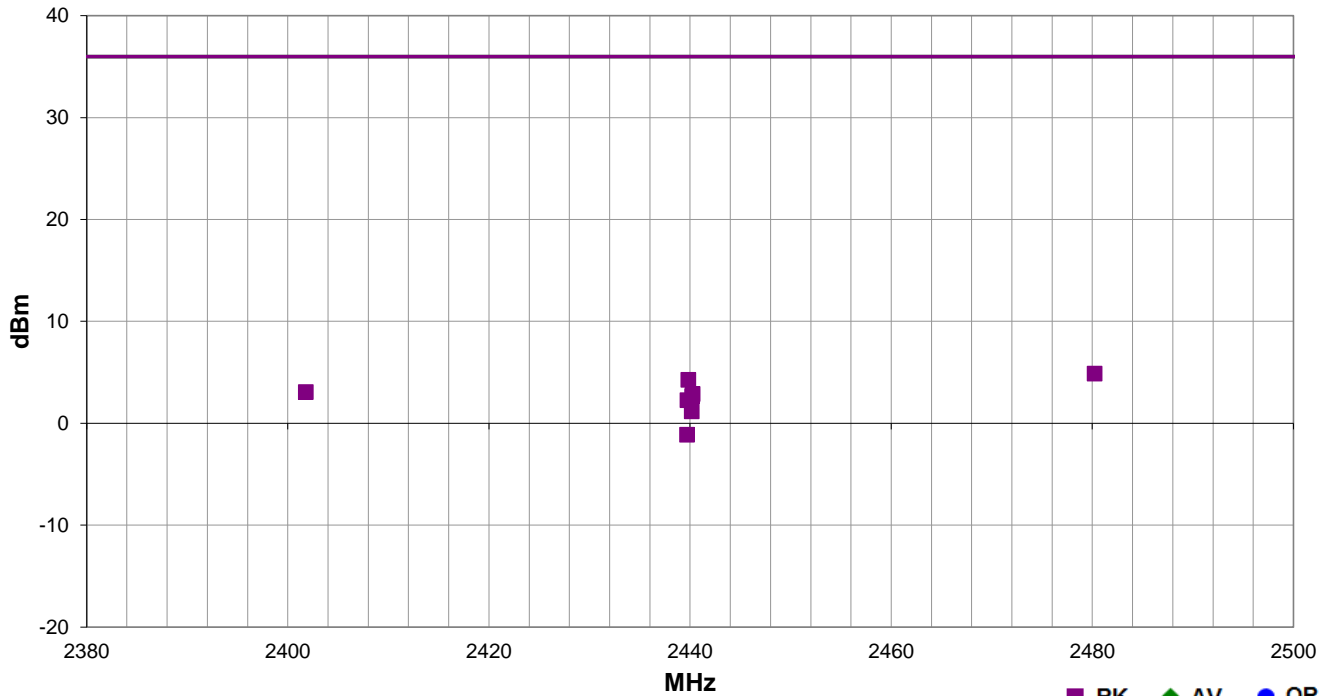
EmiR5 2020.12.09.0

PSA-ESCI 2020.12.30.0

<b>Work Order:</b>	BIOT0080	<b>Date:</b>	2021-01-19	
<b>Project:</b>	None	<b>Temperature:</b>	23.4 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	30.5% RH	
<b>Serial Number:</b>	88200467	<b>Barometric Pres.:</b>	1032 mbar	<b>Tested by:</b> Cole Ghizzone
<b>EUT:</b>	Neuro SCS IPG			
<b>Configuration:</b>	1			
<b>Customer:</b>	BIOTRONIK, Inc.			
<b>Attendees:</b>	Roy Wang			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	BLE Continuous Tx, Low Channel = 2402 MHz, Mid Channel = 2440 MHz, High Channel = 2402 MHz			
<b>Deviations:</b>	None			
<b>Comments:</b>	See comments below for Channel and EUT orientation.			

<b>Test Specifications</b>	FCC 15.247:2021	<b>Test Method</b>	ANSI C63.10:2013
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<b>Run #</b>	46	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1 to 4(m)	<b>Results</b>	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2480.225	1.74	100.0	Vert	PK	3.1E-3	4.9	36.0	-31.1	High Channel, EUT On Side
2439.817	1.0	95.0	Vert	PK	2.7E-3	4.3	36.0	-31.7	Mid Channel, EUT On Side
2401.800	1.0	95.0	Vert	PK	2.0E-3	3.1	36.0	-32.9	Low Channel, EUT On Side
2440.258	1.54	25.0	Horz	PK	1.9E-3	2.9	36.0	-33.1	Mid Channel EUT Horizontal
2440.208	3.59	210.0	Horz	PK	1.8E-3	2.7	36.0	-33.3	Mid Channel EUT Vertical
2439.742	2.09	236.0	Vert	PK	1.7E-3	2.3	36.0	-33.7	Mid Channel EUT Vertical
2440.175	1.81	218.0	Horz	PK	1.3E-3	1.2	36.0	-34.8	Mid Channel, EUT On Side
2439.692	1.45	227.0	Vert	PK	771.1E-6	-1.1	36.0	-37.1	Mid Channel EUT Horizontal



XMIT 2020.12.30.0

# POWER SPECTRAL DENSITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2020-03-13	2021-03-13
Attenuator	S.M. Electronics	SA26B-20	AUY	2020-03-13	2021-03-13
Block - DC	Fairview Microwave	SD3379	AMW	2020-03-13	2021-03-13
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08

## TEST DESCRIPTION

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



TelTx 2019.08.30.0 XMI 2020.12.30.0

EUT: Neuro SCS IPG		Work Order: BIOT0080		
Serial Number: 88200591		Date: 26-Jan-21		
Customer: BIOTRONIK, Inc.		Temperature: 22.6 °C		
Attendees: Roy Wang		Humidity: 29.5% RH		
Project: None		Barometric Pres.: 1004 mbar		
Tested by: Kam Robertson & Jeff Alcoke		Power: Battery		
Job Site: EV06				
TEST SPECIFICATIONS		Test Method		
FCC 15.247:2021		ANSI C63.10:2013		
COMMENTS				
The reference level offset includes: dc block, 20dB attenuator, measurement cable, and the manufacturers patch cable.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	3	Signature		
		Value dBm/3kHz	Limit < dBm/3kHz	
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-10.357	8	Pass
BLE/GFSK 1 Mbps Mid Channel, 2440 MHz		-9.829	8	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-9.456	8	Pass

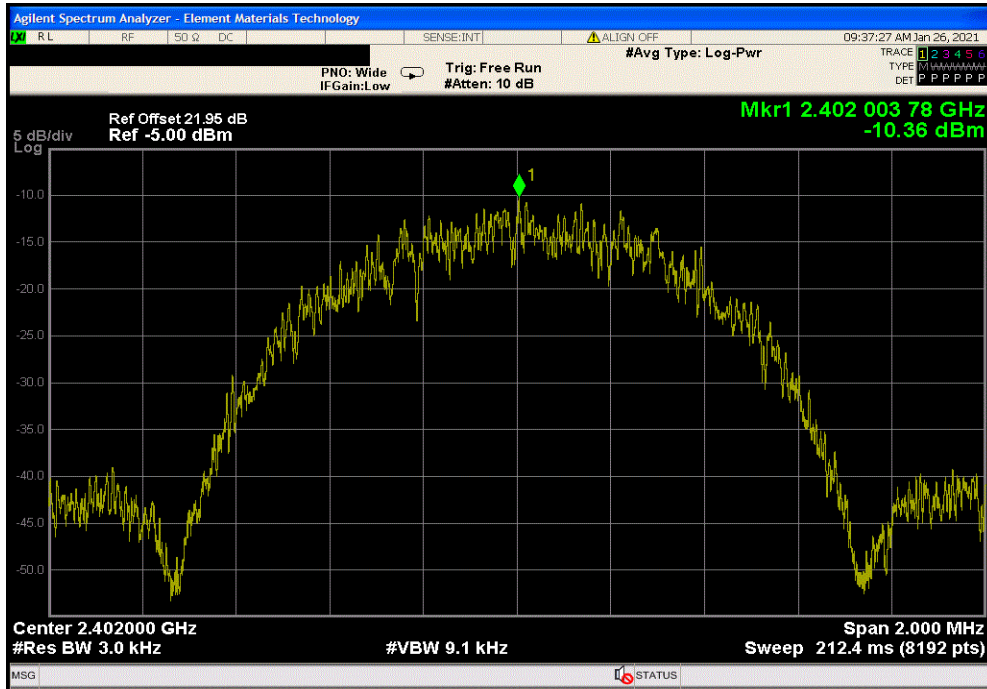


# POWER SPECTRAL DENSITY

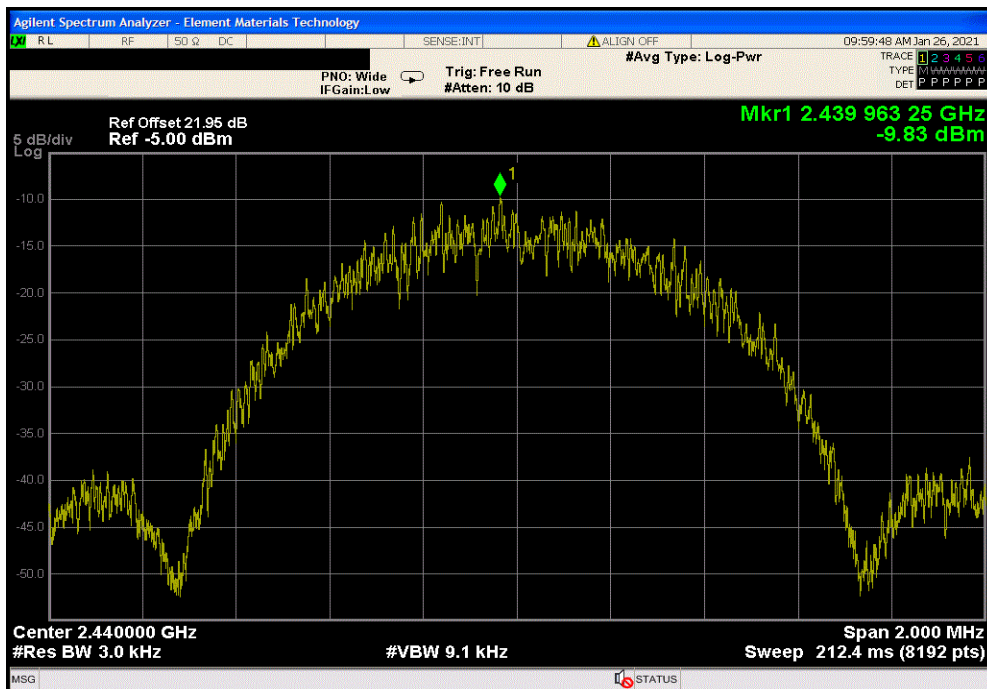


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-10.357	8	Pass			



BLE/GFSK 1 Mbps Mid Channel, 2440 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-9.829	8	Pass			

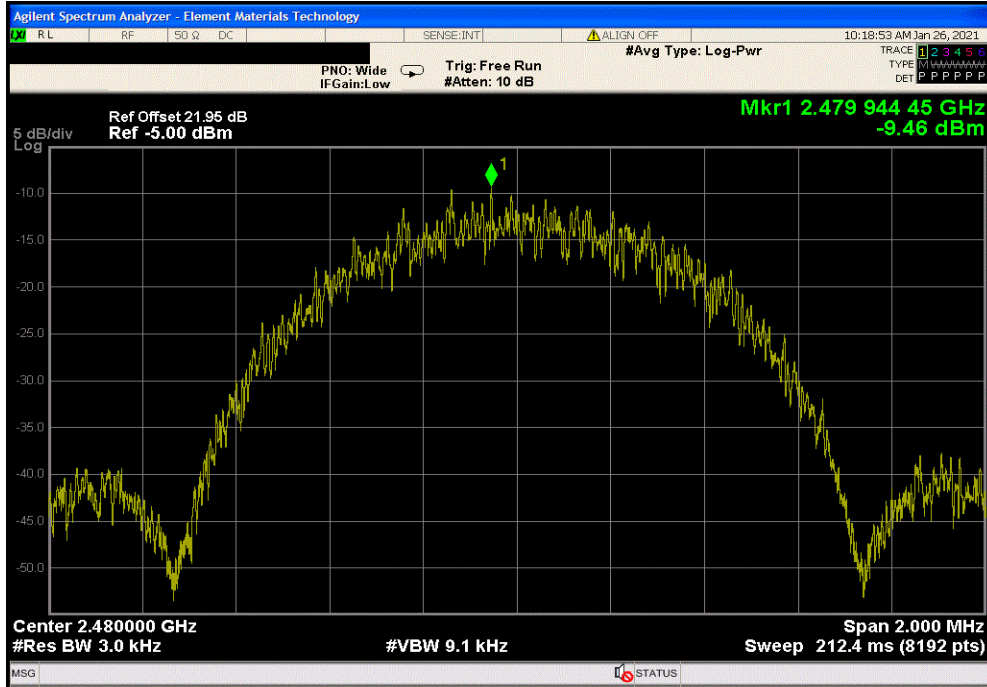


# POWER SPECTRAL DENSITY



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
		Value	Limit	Results		
		dBm/3kHz	< dBm/3kHz			
		-9.456	8	Pass		



# BAND EDGE COMPLIANCE



XMI 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2020-03-13	2021-03-13
Attenuator	S.M. Electronics	SA26B-20	AUY	2020-03-13	2021-03-13
Block - DC	Fairview Microwave	SD3379	AMW	2020-03-13	2021-03-13
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08

## TEST DESCRIPTION


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



TelTx 2019.08.30.0 XMI 2020.12.30.0

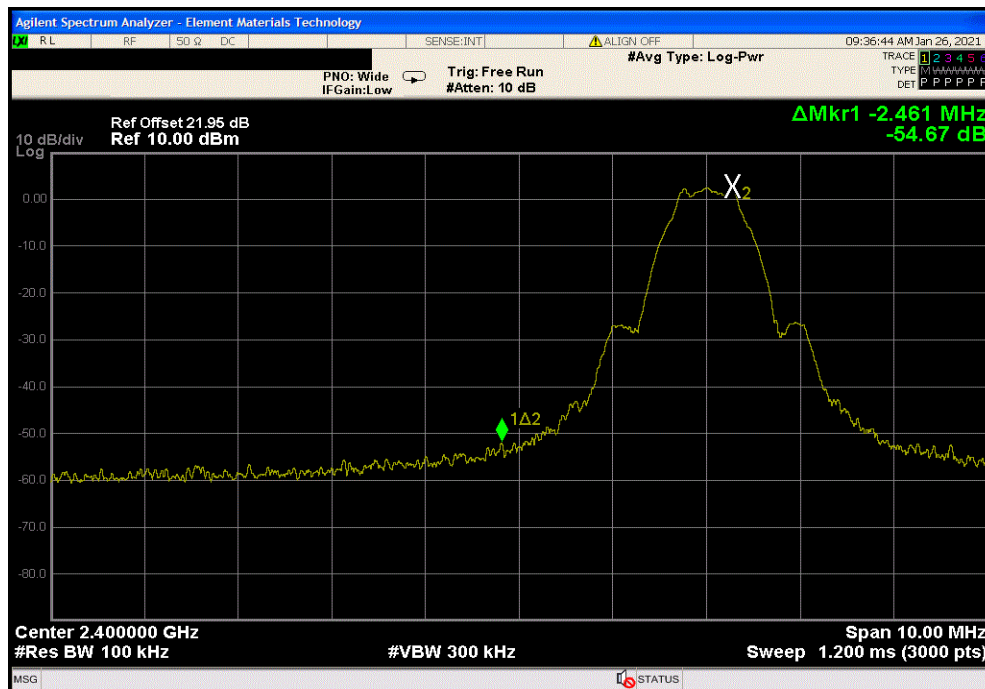
EUT: Neuro SCS IPG		Work Order: BIOT0080	
Serial Number: 88200591		Date: 26-Jan-21	
Customer: BIOTRONIK, Inc.		Temperature: 22.5 °C	
Attendees: Roy Wang		Humidity: 29.7% RH	
Project: None		Barometric Pres.: 1004 mbar	
Tested by: Kam Robertson & Jeff Alcock		Power: Battery	
		Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
The reference level offset includes: dc block, 20dB attenuator, measurement cable, and the manufacturers patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-54.68	-20 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-58.27	-20 Pass

# BAND EDGE COMPLIANCE

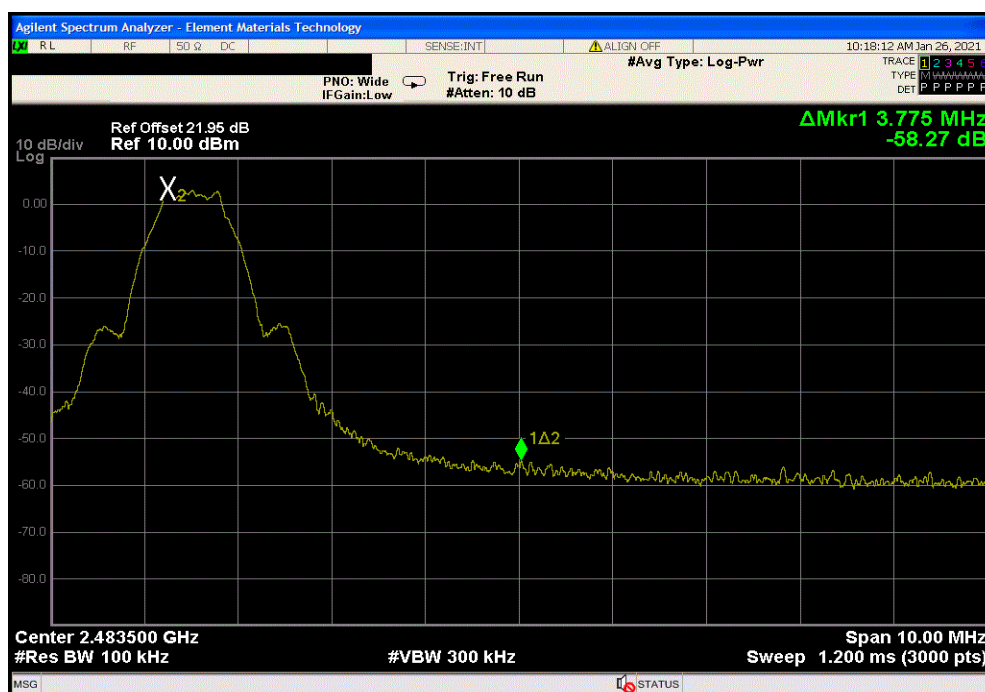


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz				Value	Limit	Result
				(dBc)	≤ (dBc)	
				-54.68	-20	Pass



BLE/GFSK 1 Mbps High Channel, 2480 MHz				Value	Limit	Result
				(dBc)	≤ (dBc)	
				-58.27	-20	Pass



# SPURIOUS CONDUCTED EMISSIONS



XMit 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	2020-03-13	2021-03-13
Attenuator	S.M. Electronics	SA26B-20	AUY	2020-03-13	2021-03-13
Block - DC	Fairview Microwave	SD3379	AMW	2020-03-13	2021-03-13
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08

## TEST DESCRIPTION

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



TelTx 2019.08.30.0 XMI 2020.12.30.0

EUT: <b>Neuro SCS IPG</b>		Work Order: <b>BIOT0080</b>	
Serial Number: <b>88200591</b>		Date: <b>26-Jan-21</b>	
Customer: <b>BIOTRONIK, Inc.</b>		Temperature: <b>22.6 °C</b>	
Attendees: <b>Roy Wang</b>		Humidity: <b>29.5% RH</b>	
Project: <b>None</b>		Barometric Pres.: <b>1004 mbar</b>	
Tested by: <b>Kam Robertson &amp; Jeff Alcoke</b>		Power: <b>Battery</b>	
Job Site: <b>EV06</b>			
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
The reference level offset includes: dc block, 20dB attenuator, measurement cable, and the manufacturers patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature	

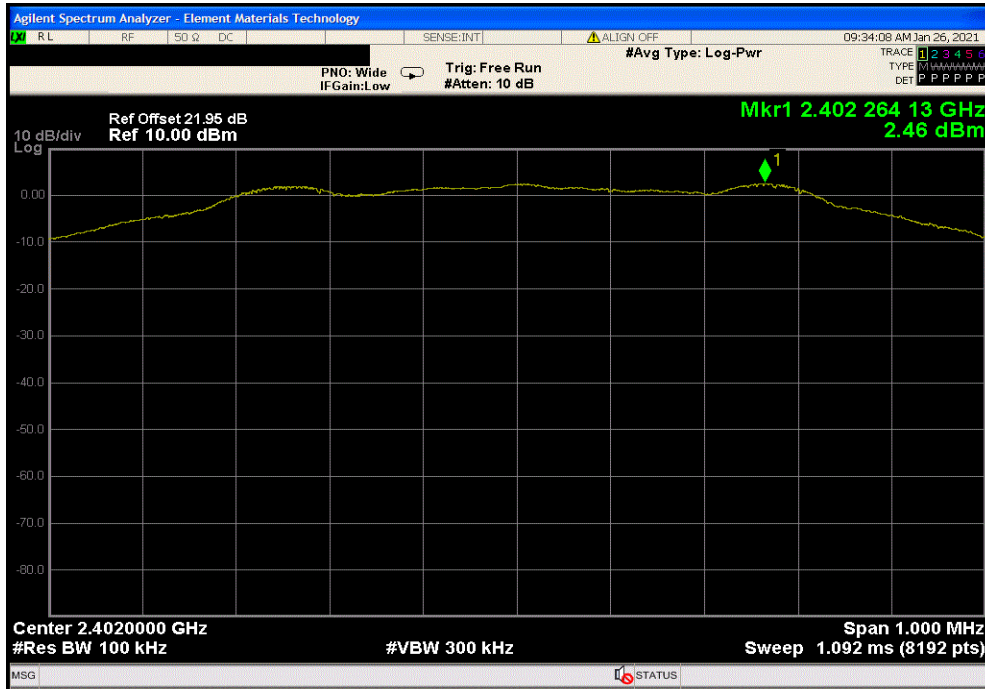
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	Fundamental	2402.26	N/A	N/A	N/A
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	3773.59	-55.11	-20	Pass
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24091.99	-53.3	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2440 MHz	Fundamental	2439.75	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2440 MHz	30 MHz - 12.5 GHz	3778.16	-55.04	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2440 MHz	12.5 GHz - 25 GHz	24050.79	-54.68	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	Fundamental	2479.75	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	3746.18	-55.71	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	24882.49	-54.27	-20	Pass

# SPURIOUS CONDUCTED EMISSIONS

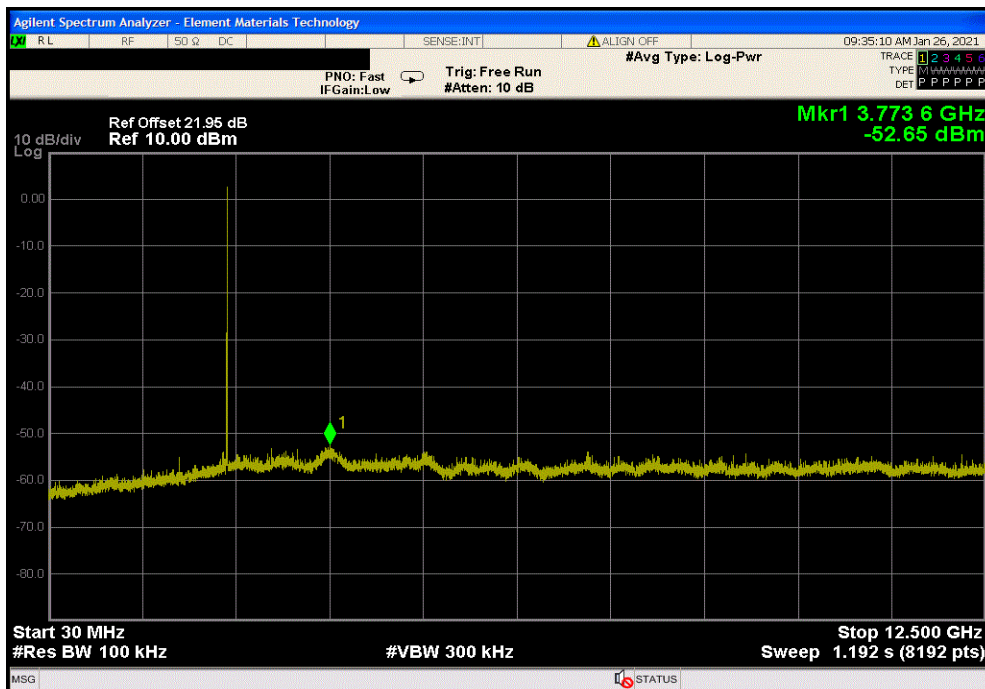


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2402.26	N/A	N/A	N/A	



BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	3773.59	-55.11	-20	Pass	



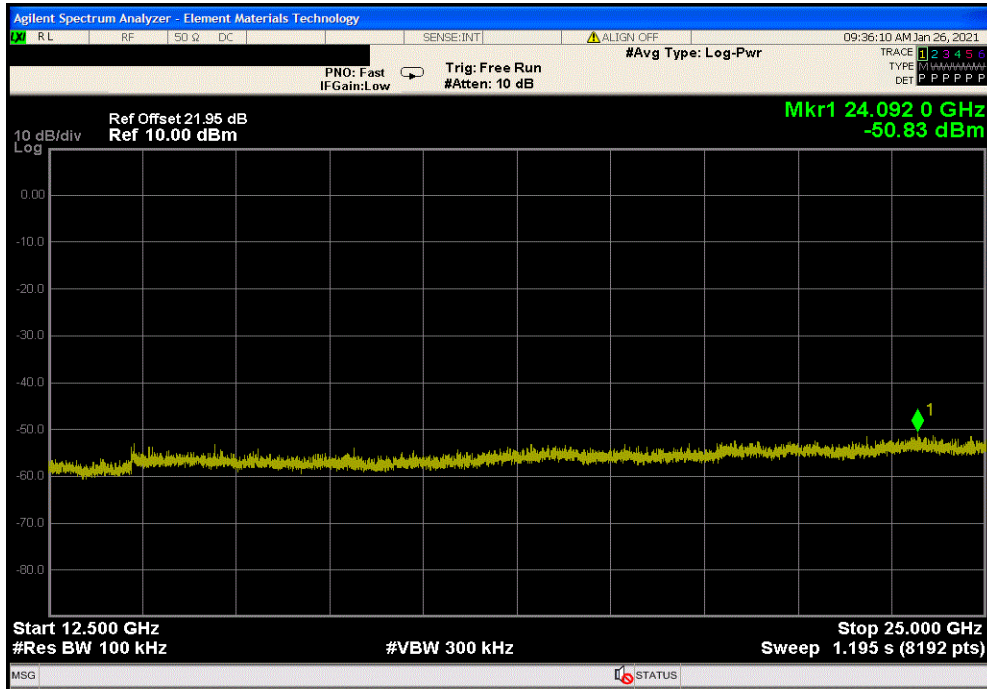


# SPURIOUS CONDUCTED EMISSIONS

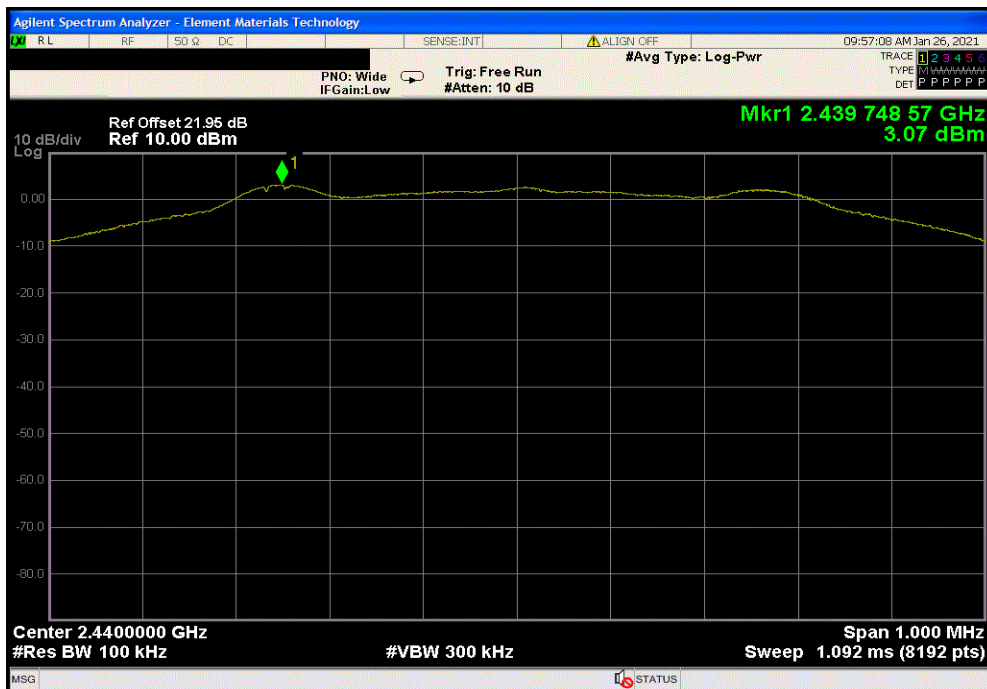


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24091.99	-53.3	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2439.75	N/A	N/A	N/A	

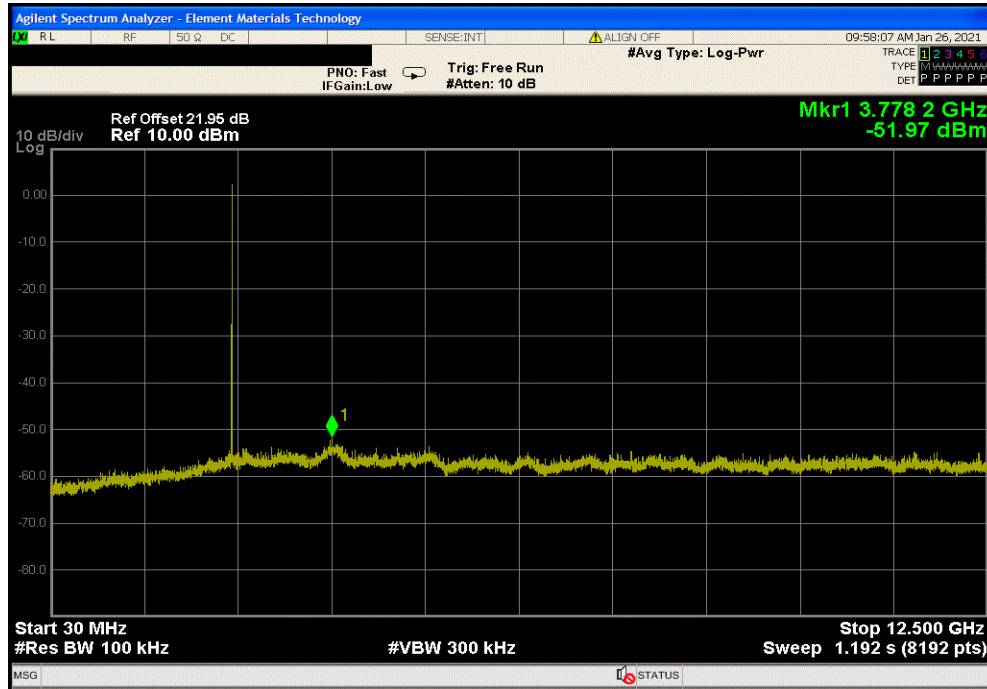


# SPURIOUS CONDUCTED EMISSIONS

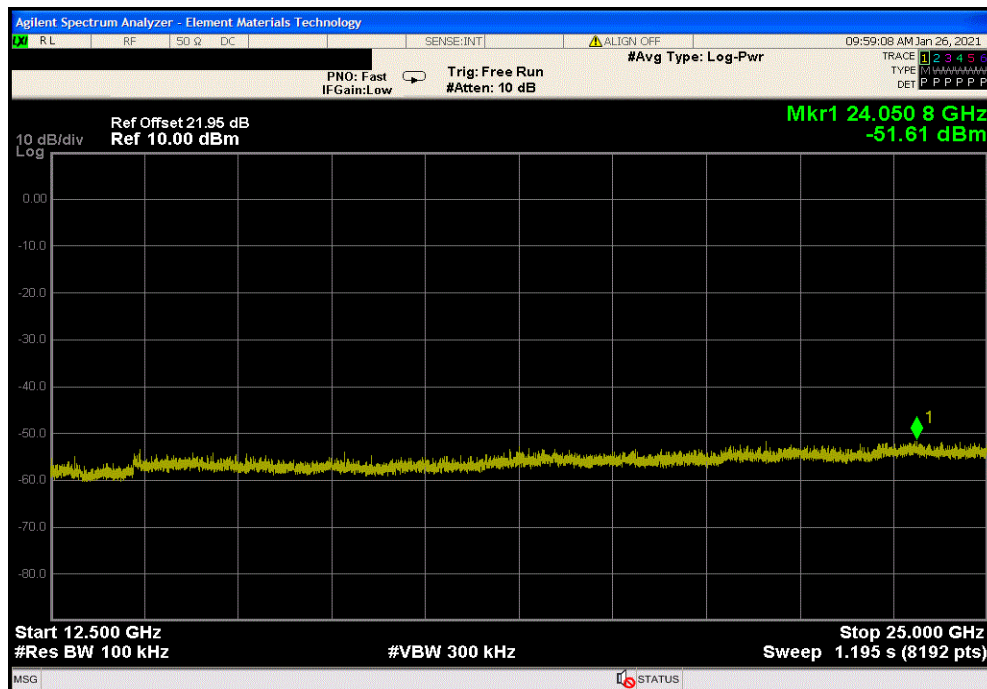


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	3778.16	-55.04	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24050.79	-54.68	-20	Pass	

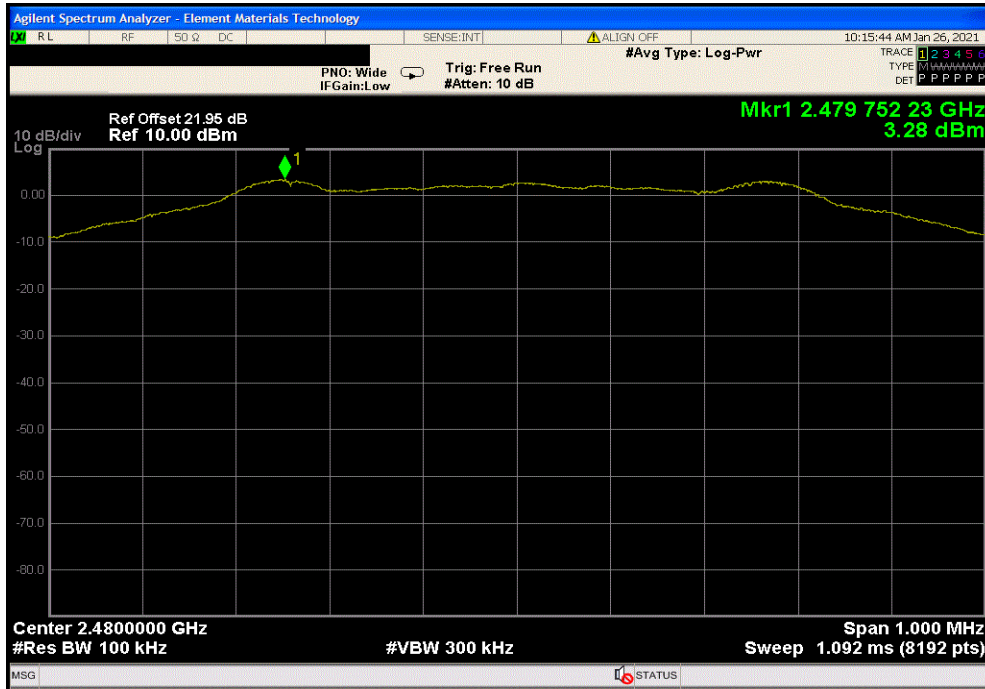


# SPURIOUS CONDUCTED EMISSIONS

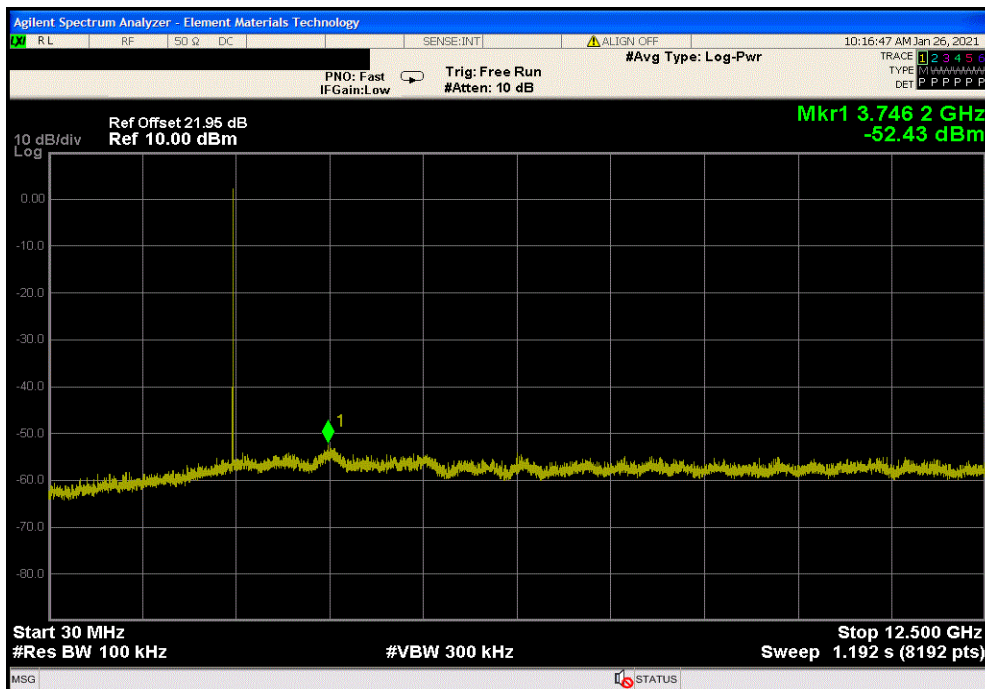


TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2479.75	N/A	N/A	N/A		



BLE/GFSK 1 Mbps High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	3746.18	-55.71	-20	Pass		

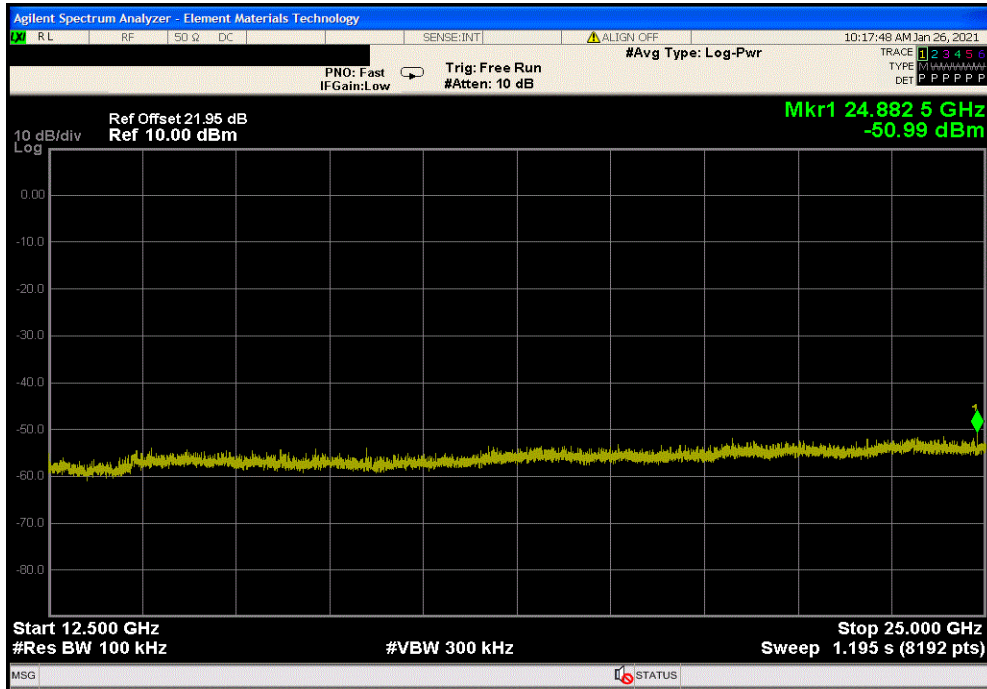


# SPURIOUS CONDUCTED EMISSIONS



TbTx 2019.08.30.0 XMI 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24882.49	-54.27	-20	Pass



# SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2020.12.30.0

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

Continuous transmit, BLE, low channel 2402MHz, mid channel 2440MHz & high channel 2480MHz

## POWER SETTINGS INVESTIGATED

Battery

## CONFIGURATIONS INVESTIGATED

BIOT0080 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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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.	Cal. Due
Filter - High Pass	Micro-Tronics	HPM50111	HFO	2020-11-17	11/17/2021
Attenuator	Coaxicom	3910-20	AXZ	2020-02-15	2/15/2021
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2020-07-25	7/25/2021
Cable	None	Standard Gain Horns Cable	EVF	2020-11-18	11/18/2021
Cable	N/A	Double Ridge Horn Cables	EVB	2020-11-17	11/17/2021
Cable	N/A	Bilog Cables	EVA	2020-11-17	11/17/2021
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2020-07-25	7/25/2021
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2020-11-18	11/18/2021
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2020-11-18	11/18/2021
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2020-11-17	11/17/2021
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2020-11-17	11/17/2021
Antenna - Double Ridge	EMCO	3115	AHC	2020-07-01	7/1/2022
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Antenna - Biconilog	EMCO	3141	AXG	2019-07-23	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2020-12-16	12/16/2021

## 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 2020.12.30.0

## 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 within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the CISPR average(voltage 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  $20 \cdot \log(1/dc)$ .

# SPURIOUS RADIATED EMISSIONS

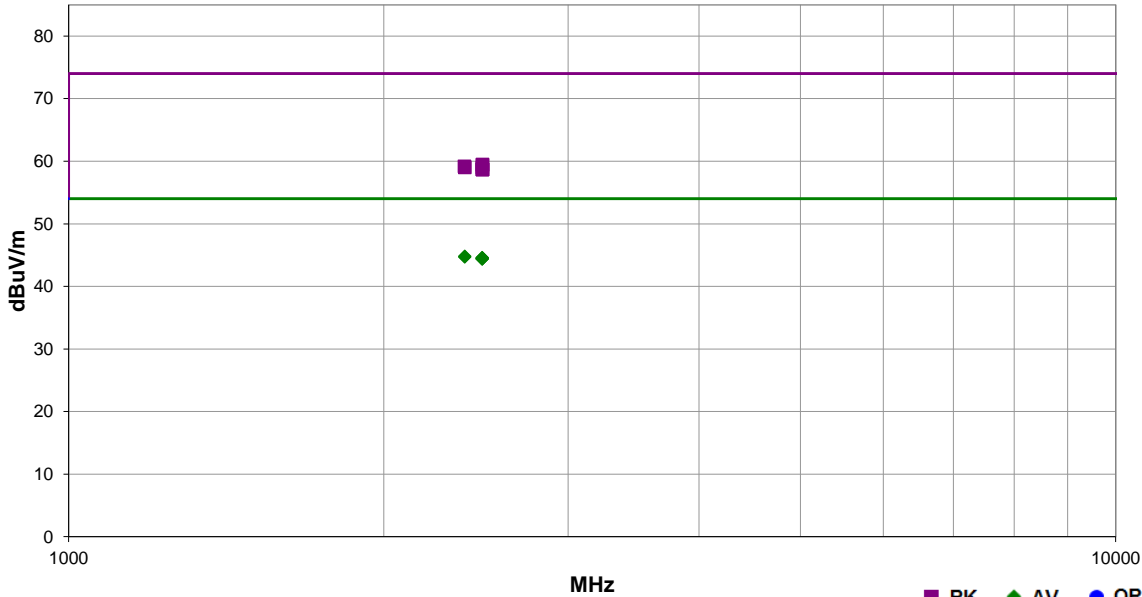


EmiR5 2020.12.09.0 PSA-ESCI 2020.12.30.0

<b>Work Order:</b>	BIOT0080	<b>Date:</b>	2021-01-18	
<b>Project:</b>	None	<b>Temperature:</b>	22.5 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	34.7% RH	
<b>Serial Number:</b>	88200467	<b>Barometric Pres.:</b>	1036 mbar	
<b>EUT:</b>	Neuro SCS IPG			
<b>Configuration:</b>	1			
<b>Customer:</b>	BIOTRONIK, Inc.			
<b>Attendees:</b>	Roy Wang			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous transmit, BLE, low channel 2402MHz, mid channel 2440MHz & high channel 2480MHz			
<b>Deviations:</b>	None			
<b>Comments:</b>	EUT leads terminated in distilled water			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.247:2021	ANSI C63.10:2013

<b>Run #</b>	18	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1 to 4(m)	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.957	28.3	-3.5	1.5	47.0	3.0	20.0	Horz	AV	0.0	44.8	54.0	-9.2	Low Channel, EUT Vertical
2389.913	28.2	-3.5	1.62	302.0	3.0	20.0	Vert	AV	0.0	44.7	54.0	-9.3	Low Channel, EUT Vertical
2483.507	28.2	-3.6	3.92	109.0	3.0	20.0	Horz	AV	0.0	44.6	54.0	-9.4	High Channel, EUT Horizontal
2483.567	28.1	-3.6	1.52	341.0	3.0	20.0	Horz	AV	0.0	44.5	54.0	-9.5	High Channel, EUT On Side
2483.503	28.1	-3.6	1.5	311.0	3.0	20.0	Vert	AV	0.0	44.5	54.0	-9.5	High Channel, EUT Vertical
2483.577	28.0	-3.6	2.79	75.0	3.0	20.0	Vert	AV	0.0	44.4	54.0	-9.6	High Channel, EUT On Side
2483.530	28.0	-3.6	1.5	132.0	3.0	20.0	Horz	AV	0.0	44.4	54.0	-9.6	High Channel, EUT Vertical
2483.503	28.0	-3.6	1.5	267.0	3.0	20.0	Vert	AV	0.0	44.4	54.0	-9.6	High Channel, EUT Horizontal
2484.457	43.1	-3.6	1.5	267.0	3.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	High Channel, EUT Horizontal
2484.283	43.0	-3.6	2.79	75.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	High Channel, EUT On Side
2388.143	42.7	-3.5	1.5	47.0	3.0	20.0	Horz	PK	0.0	59.2	74.0	-14.8	Low Channel, EUT Vertical
2483.560	42.6	-3.6	1.5	311.0	3.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	High Channel, EUT Vertical
2389.297	42.5	-3.5	1.62	302.0	3.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	Low Channel, EUT Vertical
2484.213	42.3	-3.6	1.52	341.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Channel, EUT On Side
2483.680	42.3	-3.6	1.5	132.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Channel, EUT Vertical
2484.223	42.3	-3.6	3.92	109.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	High Channel, EUT Horizontal

# SPURIOUS RADIATED EMISSIONS

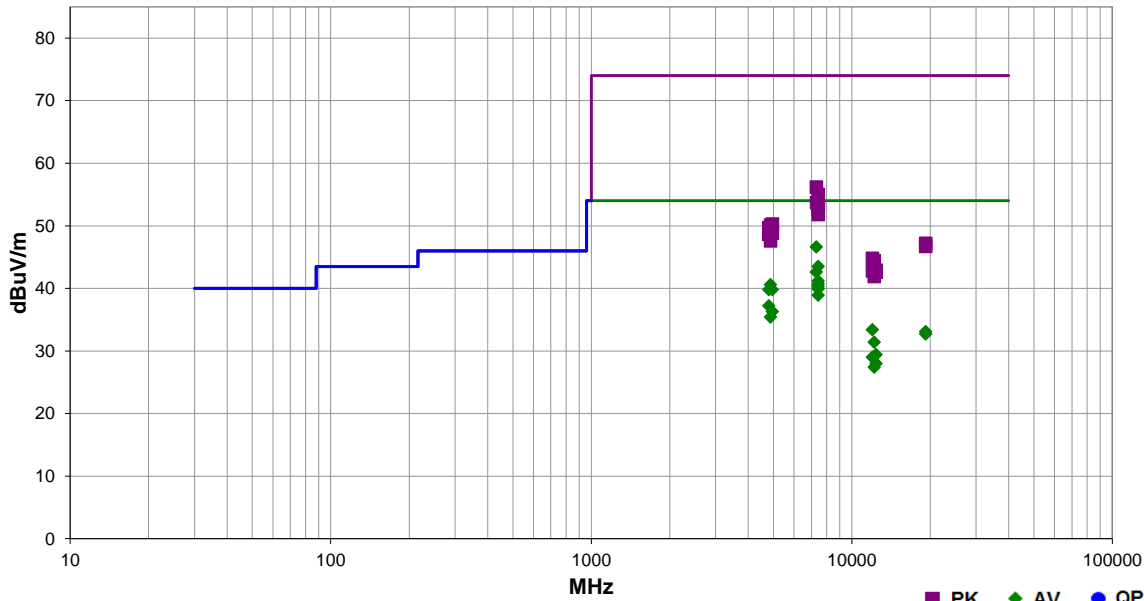


EmiR5 2020.12.09.0 PSA-ESCI 2020.12.30.0

<b>Work Order:</b>	BIOT0080	<b>Date:</b>	2021-01-18	
<b>Project:</b>	None	<b>Temperature:</b>	22.5 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	34.7% RH	
<b>Serial Number:</b>	88200467	<b>Barometric Pres.:</b>	1036 mbar	
<b>EUT:</b>	Neuro SCS IPG			
<b>Configuration:</b>	1			
<b>Customer:</b>	BIOTRONIK, Inc.			
<b>Attendees:</b>	Roy Wang			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous transmit, BLE, low channel 2402MHz, mid channel 2440MHz & high channel 2480MHz			
<b>Deviations:</b>	None			
<b>Comments:</b>	EUT leads terminated in distilled water			

Test Specifications	Test Method
FCC 15.247:2021	ANSI C63.10:2013

Run #	21	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)	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
7319.375	34.9	11.7	1.99	148.0	3.0	0.0	Vert	AV	0.0	46.6	54.0	-7.4	Mid Channel, EUT On side
7439.375	31.3	12.2	2.55	73.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	High Channel, EUT On Side
7319.375	30.9	11.7	1.83	143.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	Mid Channel, EUT On side
7439.350	29.0	12.2	2.18	327.0	3.0	0.0	Horz	AV	0.0	41.2	54.0	-12.8	High Channel, EUT On Side
7439.367	28.5	12.2	1.5	53.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	High Channel, EUT Horizontal
4879.842	34.6	6.0	2.16	163.0	3.0	0.0	Horz	AV	0.0	40.6	54.0	-13.4	Mid Channel, EUT On side
7439.383	28.1	12.2	1.5	227.0	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	High Channel, EUT Vertical
7439.367	27.7	12.2	1.54	228.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	High Channel, EUT Vertical
4959.983	33.9	5.9	2.12	163.0	3.0	0.0	Horz	AV	0.0	39.8	54.0	-14.2	High Channel, EUT On Side
4803.792	34.7	5.1	2.34	240.0	3.0	0.0	Horz	AV	0.0	39.8	54.0	-14.2	Low Channel, EUT On side
7439.358	26.7	12.2	2.8	98.0	3.0	0.0	Vert	AV	0.0	38.9	54.0	-15.1	High Channel, EUT Horizontal
4803.792	32.1	5.1	2.3	258.0	3.0	0.0	Vert	AV	0.0	37.2	54.0	-16.8	Low Channel, EUT On Side
4960.058	30.4	5.9	1.5	248.0	3.0	0.0	Vert	AV	0.0	36.3	54.0	-17.7	High Channel, EUT On Side
7319.375	44.5	11.7	1.99	148.0	3.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	Mid Channel, EUT On side
4879.600	29.4	6.0	1.5	119.0	3.0	0.0	Vert	AV	0.0	35.4	54.0	-18.6	Mid Channel, EUT On side
7441.000	42.8	12.2	2.55	73.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	High Channel, EUT On Side
7320.983	42.0	11.7	1.83	143.0	3.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	Mid Channel, EUT On Side
7439.567	41.4	12.2	1.5	227.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	High Channel, EUT Vertical
12008.880	32.3	1.1	2.56	61.0	3.0	0.0	Horz	AV	0.0	33.4	54.0	-20.6	Low Channel, EUT On Side
7440.400	41.2	12.2	1.5	53.0	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	High Channel, EUT Horizontal
19215.010	29.7	3.4	1.5	220.0	3.0	0.0	Vert	AV	0.0	33.1	54.0	-20.9	Low Channel, EUT On Side
7439.258	40.9	12.2	2.18	327.0	3.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	High Channel, EUT On Side



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
19214.150	29.3	3.4	1.5	135.0	3.0	0.0	Horz	AV	0.0	32.7	54.0	-21.3	Low Channel, EUT On Side
7440.700	40.4	12.2	1.54	228.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	High Channel, EUT Vertical
7440.875	39.6	12.2	2.8	98.0	3.0	0.0	Vert	PK	0.0	51.8	74.0	-22.2	High Channel, EUT Horizontal
12198.840	30.5	0.9	2.45	54.0	3.0	0.0	Horz	AV	0.0	31.4	54.0	-22.6	Mid Channel, EUT On Side
4960.158	44.4	5.9	2.12	163.0	3.0	0.0	Horz	PK	0.0	50.3	74.0	-23.7	High Channel, EUT On Side
4880.592	44.1	6.0	2.16	163.0	3.0	0.0	Horz	PK	0.0	50.1	74.0	-23.9	Mid Channel, EUT On side
4804.317	44.5	5.2	2.34	240.0	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	Low Channel, EUT On Side
12398.850	27.9	1.5	1.5	28.0	3.0	0.0	Horz	AV	0.0	29.4	54.0	-24.6	High Channel, EUT On Side
12008.860	27.9	1.1	3.74	296.0	3.0	0.0	Vert	AV	0.0	29.0	54.0	-25.0	Low Channel, EUT On Side
4959.408	42.9	5.9	1.5	248.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	High Channel, EUT On Side
4804.750	43.5	5.2	2.3	258.0	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	Low Channel, EUT On Side
12398.870	26.5	1.5	1.5	180.0	3.0	0.0	Vert	AV	0.0	28.0	54.0	-26.0	High Channel, EUT On Side
4880.900	41.6	6.0	1.5	119.0	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Mid Channel, EUT On side
12201.300	26.5	0.9	1.56	151.0	3.0	0.0	Vert	AV	0.0	27.4	54.0	-26.6	Mid Channel, EUT On Side
19215.680	43.8	3.4	1.5	220.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Low Channel, EUT On Side
19217.380	43.3	3.4	1.5	135.0	3.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	Low Channel, EUT On Side
12008.800	43.7	1.1	2.56	61.0	3.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	Low Channel, EUT On Side
12201.180	43.5	0.9	2.45	54.0	3.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6	Mid Channel, EUT On Side
12398.630	41.4	1.5	1.5	28.0	3.0	0.0	Horz	PK	0.0	42.9	74.0	-31.1	High Channel, EUT On Side
12009.680	41.7	1.1	3.74	296.0	3.0	0.0	Vert	PK	0.0	42.8	74.0	-31.2	Low Channel, EUT On Side
12399.040	41.1	1.5	1.5	180.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	High Channel, EUT On Side
12198.090	41.0	0.9	1.56	151.0	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	Mid Channel, EUT On Side