eurofins | Product Service

RADIO REPORT

FCC 47 CFR Part 15E

Unlicensed National Information Infrastructure Devices in the 5 GHz Bands

Report Reference No	G0M-2206-1512-TFC407WF-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS - Registration number : D-PL-12092-01-04 FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	BIOTRONIK SE & Co. KG
Address	Woermannkehre 1 12359 Berlin GERMANY
Test Specification	47 CFR Part 15E
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Data Gateway for Electrophysiology Lab
Model(s)	Qubic Connect
Additional Model(s)	None
Brand Name(s)	BIOTRONIK
Hardware Version(s)	A.A
Software Version(s)	Wi-Fi Driver Version: 22.70.0.6
FCC ID	QRI-QCONNECT
Test Result	**PASSED**

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2022-06-15	
Report:		
Compiled by	Burkhard Pudell	
Tested by (+ signature) (Responsible for Test)	Burkhard Pudell	B. Pudell
Approved by (+ signature) (Test Lab Engineer)	Radwan Jaafar	R Jaafar
Date of Issue	2022-12-01	
Total number of pages	52	
General Remarks:		
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2022-12-01	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BPSK	Binary Phase Shift Keying
EIRP	Equivalent Isotropic Radiated Power
EUT	Equipment Under Test
FCC	Federal Communications Commission
HT	High Throughput
IEEE 802.11	MAC and PHY Layer for WiFi
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
TPC	Transmit Power Control
VBW	Video bandwidth
VHT	Very High Throughput

REPORT INDEX

1 Equipment (Test Item) Under Test

Description	Data Gateway for Electrophysiology Lab	
Model	Qubic Connect	
Additional Model(s)	None	
Brand Name(s)	BIOTRONIK	
Serial Number(s)	(44) 00298859 (SID: 40181)	
Hardware Version(s)	A.A	
Software Version(s)	Wi-Fi Driver Version: 22.70.0.6	
FCC-ID	QRI-QCONNECT	
Equipment type	End Product	
Device type	Client	
Radio type	Transceiver	
Assigned frequency bands	5150 - 5250 MHz (U-NII-1) 5250 - 5350 MHz (U-NII-2A) 5470 - 5725 MHz (U-NII-2C) 5725 - 5850 MHz (U-NII-3)	
Radio technology	IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11n (HT40) IEEE 802.11ac (VHT20) IEEE 802.11ac (VHT40) IEEE 802.11ac (VHT80) IEEE 802.11ac (VHT160)	
Modulation	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM	
Number of antenna ports	2	
Transmit power control	Yes	
Radio Module	Type	WiFi 6E module
	Model	AX210NGW
	Manufacturer	Intel
	Software version	Driver 22.70.0.6
	Hardware version	None
	FCC-ID	PD9AX210NG
Antenna 1	Type	Integrated
	Model	001-0021
	Manufacturer	Laird
	Gain	3.0 dBi (manufacturer declaration)
Antenna 2	Type	Integrated
	Model	FXP830.24.0100B
	Manufacturer	Taoglas
	Gain	4.6 dBi (manufacturer declaration)
Supply Voltage	V_{NOM}	12.0 V DC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	AKM65US12
	Vendor	XP Power
	Input	100 V AC – 240 V AC / 50/60 Hz
	Output	12.0 V DC
Manufacturer	BIOTRONIK SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Laptop	Dell	none	To enable test modes
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test mode duty cycle evaluation

1.5.1 Information

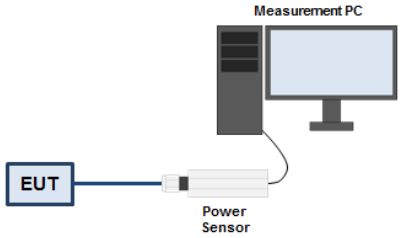
Test Information	
Measurement Method	ANSI C63.10 12.2

1.5.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required (10 x Log_{10}(1/DC)

1.5.3 Setup

Test Setup



1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Power Sensor	ETS-Lindgren	7002-006	EF00934	2022-07	2023-07

1.5.5 Procedure

Test Procedure

1. EUT set to test mode
2. Sweep time is set long enough to capture at least 5 bursts
3. The maximum burst duration TON is measured
4. The minimum idle duration TOFF is measured
5. The duty cycle is calculated by DC = T_{ON} / (T_{ON} + T_{OFF})
6. The duty cycle correction is calculated by CF = 10 x Log_{10}(1 / DC)

1.5.6 Results

Duty Cycle Results				
Mode	Channel [MHz]	Data rate	Duty Cycle	Correction Factor [dB]
OFDM	5280	6 Mbps	0.97	0.13
OFDM	5200	6 Mbps	0.97	0.13
OFDM	5785	6 Mbps	0.97	0.13

1.6 Test Modes

Mode	Description
OFDM (IEEE 802.11a)	Mode = Transmit Bandwidth = 20 MHz Duty cycle = 97% Power setting = 16 Data rate = 6 Mbps
Comment: Test mode and frequency selection is based on modular approval measurements of output power of all operational modes and channels. The operational modes with the highest output power were selected for compliance tests. Above worst case scenarios were found in module test report: **200611-03.TR01** Rev.01, **2020.10.14** & **200611-03.TR02** Rev.03, **2020.10.26** & **200611-03.TR03** Rev.01, **2020.10.14** issued by **Intel Corporation S.A.S - WRF Lab**.	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	56	5280
F2	Tx / Rx	120	5600
F3	Tx / Rx	157	5785

1.8 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB/m) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBµV + 26 dB/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

1.9 Normative References

References	
Designator	Reference
KDB 789033	KDB 789033 D02 v02r01
ANSI C63.10	ANSI C63.10:2013

2 Result Summary

FCC 47 CFR Part 15E				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
FCC 15.407(e)	6 dB bandwidth	KDB 789033 C.2	N/R	Only required in 5725-5850 MHz band.
FCC 15.407(a)(2),(a)(5),(h)(2)	26 dB bandwidth	KDB 789033 C.1	N/R	No limit. Basis for other measurements.
FCC 15.407(a)	Maximum output power	KDB 789033 E	N/R	
FCC 15.407(a)	Transmit power control	KDB 789033 E	N/R	Required in 5250-5350 and 5470-5725 MHz bands. Not required for EIRP < 500 mW.
FCC 15.407(a)	Power spectral density	KDB 789033 F	N/R	
FCC 15.407(g)	Frequency stability	ANSI C63.10 6.8	N/R	
FCC 15.207	AC power line conducted emissions	ANSI C63.10 6.2	PASS	
FCC 15.407(b)	Transmitter radiated emissions	KDB 789033 G	PASS	
FCC 15.407(a)	Radiation pattern	KDB 789033 H	N/R	Required for outdoor access points
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - AC power line conducted emissions

3.1.1 Information

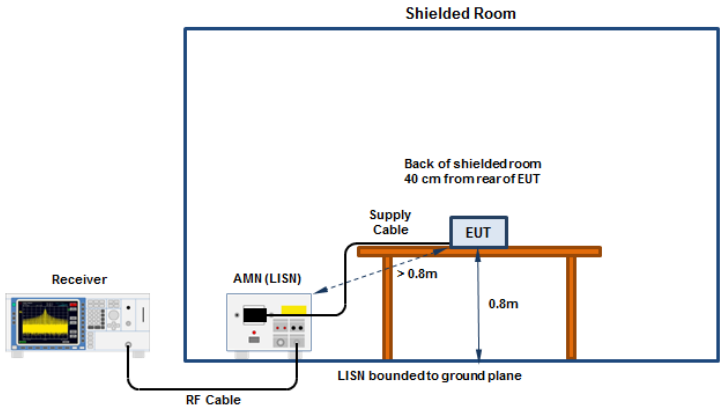
Test Information	
Reference	FCC 15.207
Measurement Method	ANSI C63.10 6.2
Operator	Mr. Qawasmeh
Date	2021-09-16
Measurement uncertainty	±3.82 %

3.1.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBµV]	Average [dBµV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50
* Limit decreases linearly with the logarithm of the frequency		

3.1.3 Setup

Test Setup



3.1.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

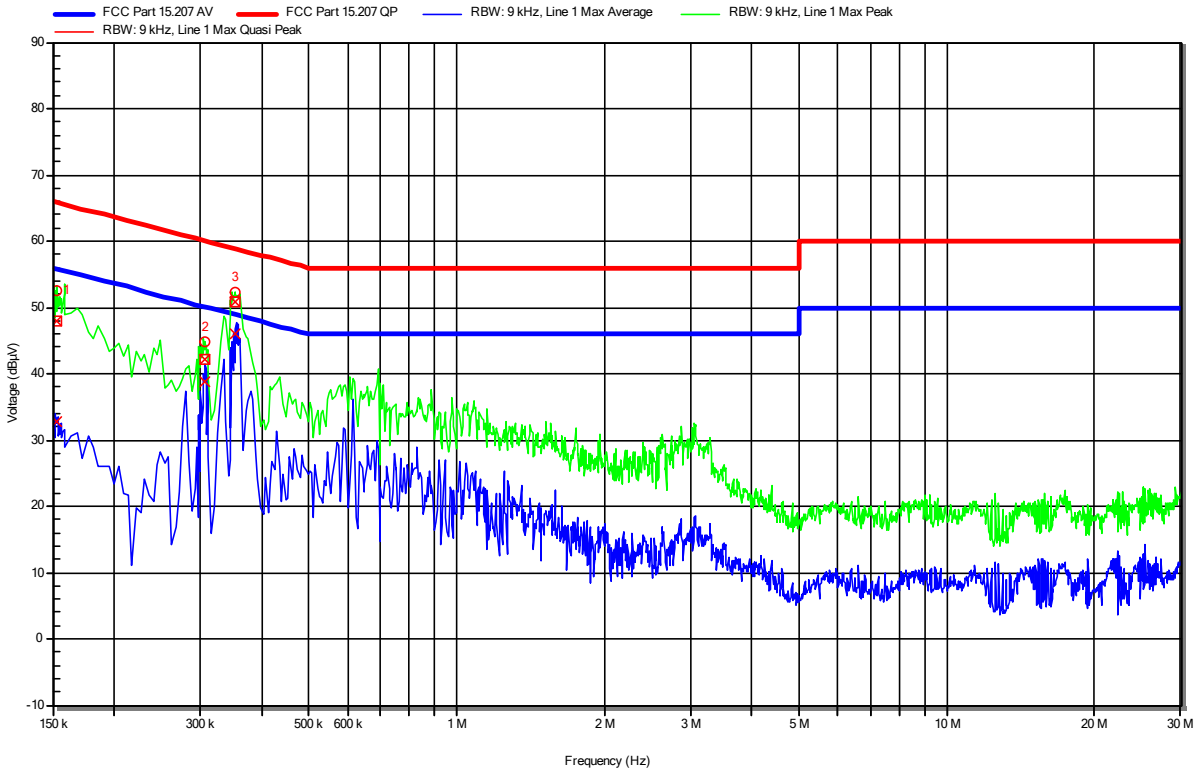
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2022-07	2023-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2023-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2021-07	2023-07

Conducted emissions at the mains power port according to FCC Part 15.207

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40191
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Qawasmeh
Test Date:	2022-09-16
Operating Conditions:	ambient temperature: 22 °Celsius power input: 120VAC/60Hz
LISN:	Schwarzbeck NSLK 8127 RC L1
Operational Mode:	IEEE 802.11a Tx (channel 120 - 5600 MHz)
EUT Configuration:	OFDM_BW20_6Mbps_ANT 1
Applied to Port:	L1
Note 1:	

Index 112

RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	153.15 kHz	47.94 dBµV	65.83 dBµV	-17.89 dB	Pass	Line 1
2	306.15 kHz	42.13 dBµV	60.07 dBµV	-17.94 dB	Pass	Line 1
3	352.95 kHz	50.79 dBµV	58.89 dBµV	-8.1 dB	Pass	Line 1

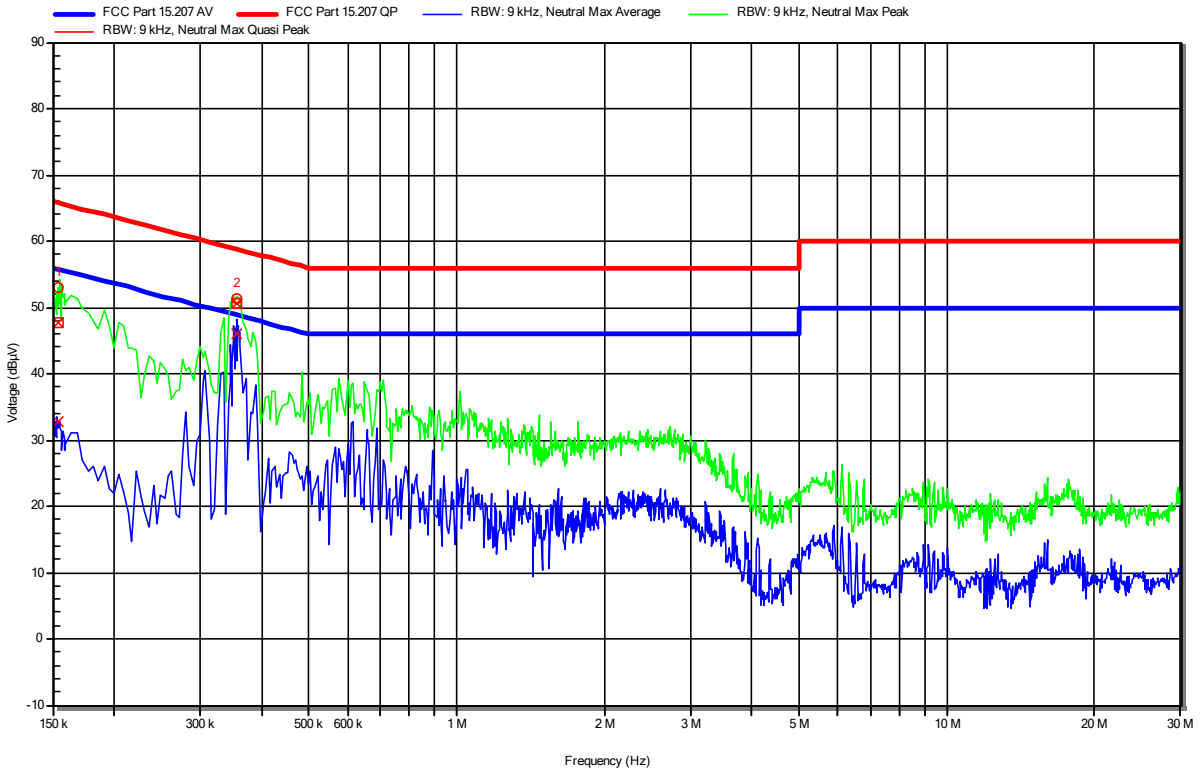
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	153.15 kHz	32.73 dBµV	55.83 dBµV	-23.09 dB	Pass	Line 1
2	306.15 kHz	38.85 dBµV	50.07 dBµV	-11.23 dB	Pass	Line 1
3	352.95 kHz	46.09 dBµV	48.89 dBµV	-2.8 dB	Pass	Line 1

Conducted emissions at the mains power port according to FCC Part 15.207

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40191
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Qawasmeh
Test Date:	2022-09-16
Operating Conditions:	ambient temperature: 22 °Celsius power input: 120VAC/60Hz
LISN:	Schwarzbeck NSLK 8127 RC L1
Operational Mode:	IEEE 802.11a Tx (channel 120 - 5600 MHz)
EUT Configuration:	OFDM_BW20_6Mbps_ANT 1
Applied to Port:	N
Note 1:	

Index 113

RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	154.05 kHz	47.71 dBµV	65.78 dBµV	-18.07 dB	Pass	Neutral
2	355.65 kHz	50.48 dBµV	58.83 dBµV	-8.35 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	154.05 kHz	32.81 dBµV	55.78 dBµV	-22.97 dB	Pass	Neutral
2	355.65 kHz	46.03 dBµV	48.83 dBµV	-2.8 dB	Pass	Neutral

3.2 Test Conditions and Results - Transmitter radiated emissions

3.2.1 Information

Test Information	
Reference	FCC 15.407(b)
Measurement Method	KDB 789033 G
Operator	B. Pudell
Date	2022-07-23
Measurement uncertainty	±5.1 %

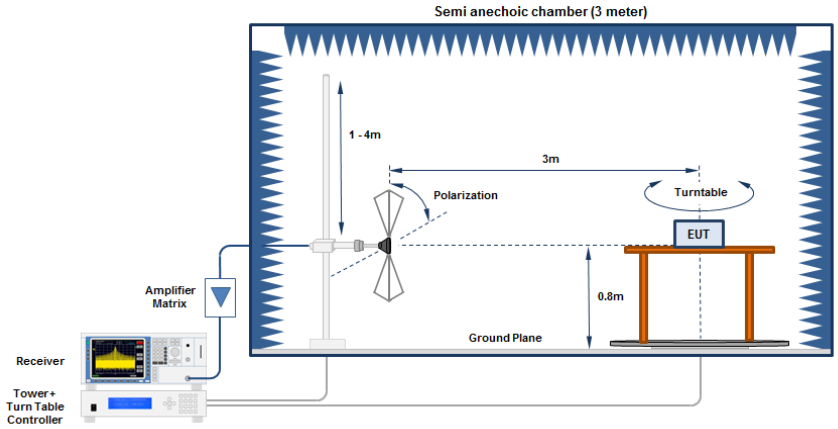
3.2.2 Limits

Limits - Restricted frequency bands and below 1 GHz			
Frequency [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

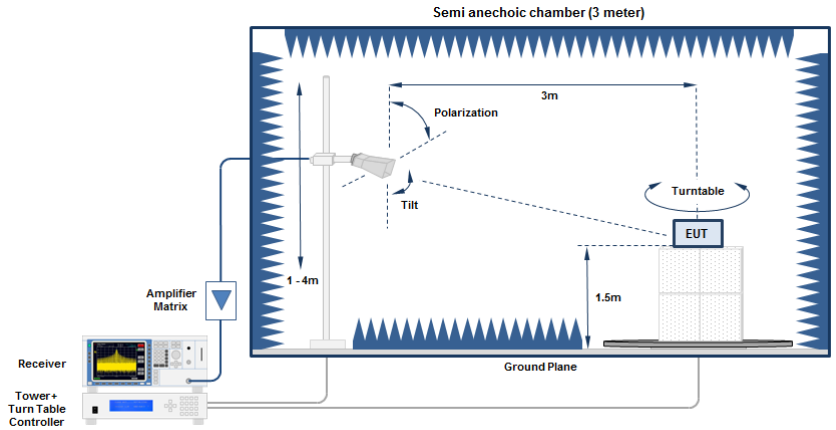
Limits - Outside restricted frequency bands above 1 GHz			
Frequency band [MHz]	Power limit [dBm EIRP]	Field strength limit [dBµV/m]	Measurement distance [m]
5150 - 5250	-27 dBm/MHz	68.2	3
5250 - 5350	-27 dBm/MHz	68.2	3
5470 - 5725	-27 dBm/MHz	68.2	3
5725 - 5850	-27 dBm/MHz @ ±75 MHz from band edge	68.2	3
5725 - 5850	10 to -27 dBm/MHz @ ±25 to ±75 MHz from band edge	105.2 to 68.2	3
5725 - 5850	15.6 to 10 dBm/MHz @ ±5 to ±25 MHz from band edge	110.8 to 105.2	3
5725 - 5850	27 to 15.6 dBm/MHz @ ±0 to ±5 MHz from band edge	122.2 to 110.8	3

3.2.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz



3.2.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF01011	functional test	functional test
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2023-01
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00212	2022-08	2025-08

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 2	EF01616	functional test	functional test
Spectrum analyzer	R&S	FSU43	EF01631	2022-08	2023-08
Horn antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Horn Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03
Horn Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-06
Horn Antenna	Flann Microwave Ltd	22240-25	EF00301	2019-12	2022-12

3.2.5 Procedure

Test Procedure 30 - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground
2. EUT set to test mode
3. The receiver is set to peak detection with max hold
4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground
2. EUT set to test mode
3. The receiver is set to peak detection with max hold
4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5. All significant emissions are measured again using the corresponding final detector

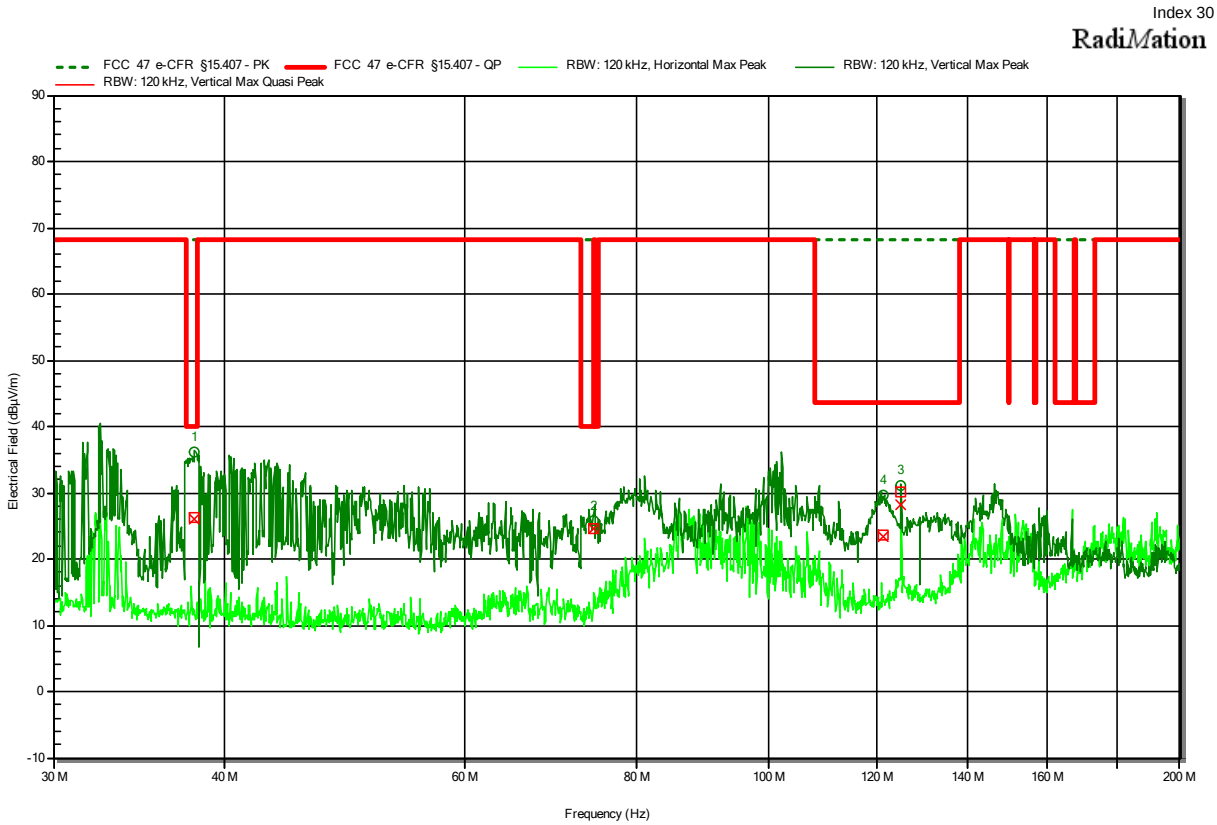
3.2.6 Results

Test Results – OFDM						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
56 [5280]	38.0705	26.20	qpk	ver	40.00	-13.85
56 [5280]	74.5527	24.60	qpk	ver	40.00	-15.42
56 [5280]	125.0087	30.10	qpk	ver	43.50	-13.44
56 [5280]	249.9994	31.20	qpk	ver	46.00	-14.84
56 [5280]	31775	46.75	pk	ver	54.00	-07.25
56 [5280]	31775	36.74	RMS	ver	54.00	-17.26
56 [5280]	36464	49.35	pk	ver	54.00	-04.65
56 [5280]	36464	39.25	RMS	ver	54.00	-14.75
56 [5280]	39890	51.42	pk	ver	54.00	-02.58
56 [5280]	39890	43.46	RMS	ver	54.00	-10.54
120 [5600]	37.7948	26.40	qpk	ver	40.00	-13.55
120 [5600]	250.02	31.90	qpk	ver	46.00	-14.09
120 [5600]	5445	47.38	RMS	ver	54.00	-06.62
120 [5600]	31797	46.87	pk	ver	54.00	-07.13
120 [5600]	31797	37.43	RMS	ver	54.00	-16.57
120 [5600]	36499	48.67	pk	ver	54.00	-05.33
120 [5600]	36499	39.12	RMS	ver	54.00	-14.88
120 [5600]	39888	53.06	pk	ver	54.00	-00.94
120 [5600]	39888	42.89	RMS	ver	54.00	-11.11
157 [5785]	37.7945	24.60	qpk	ver	40.00	-15.42
157 [5785]	250	32.40	qpk	hor	46.00	-13.65
157 [5785]	330.78	29.80	pk	hor	46.00	-16.18
157 [5785]	31632	39.78	RMS	ver	54.00	-14.22
157 [5785]	36486	43.85	RMS	ver	54.00	-10.15
157 [5785]	39885	56.37	pk	ver	74.00	-17.63
157 [5785]	39885	46.80	RMS	ver	54.00	-07.20

ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

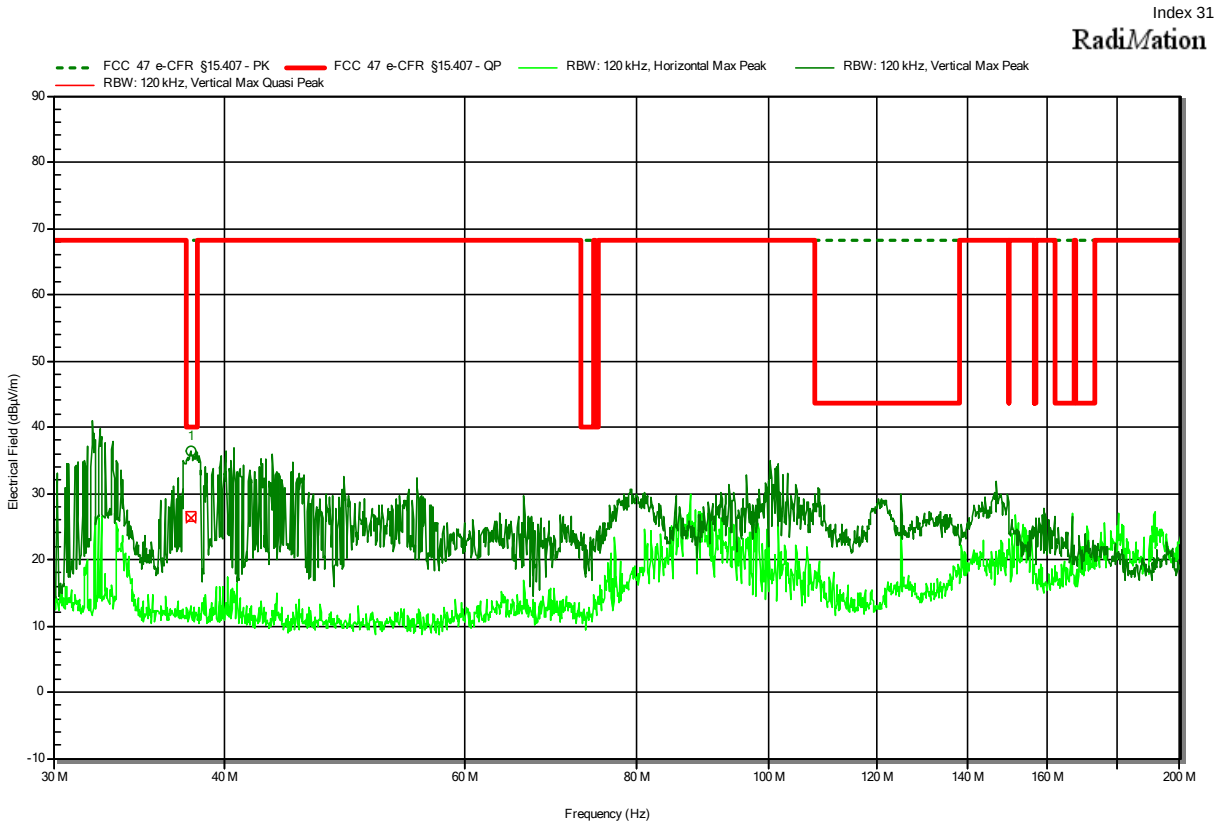
Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HK 116
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
38.0705 MHz	26.2 dBµV/m	40 dBµV/m	-13.85 dB	Pass	Vertical
74.5527 MHz	24.6 dBµV/m	40 dBµV/m	-15.42 dB	Pass	Vertical
121.4727 MHz	23.5 dBµV/m	43.5 dBµV/m	-20.01 dB	Pass	Vertical
125.0087 MHz	30.1 dBµV/m	43.5 dBµV/m	-13.44 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

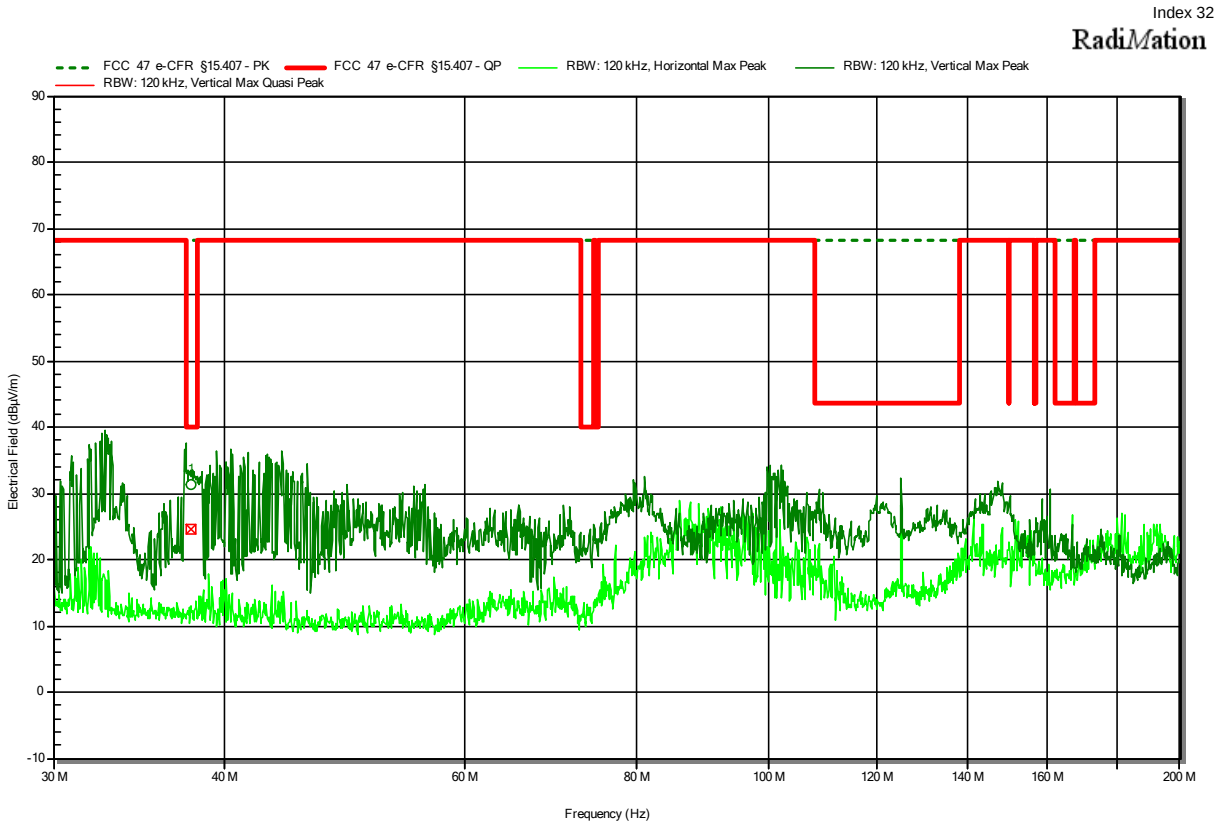
Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HK 116
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
37.7948 MHz	26.4 dBµV/m	40 dBµV/m	-13.55 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

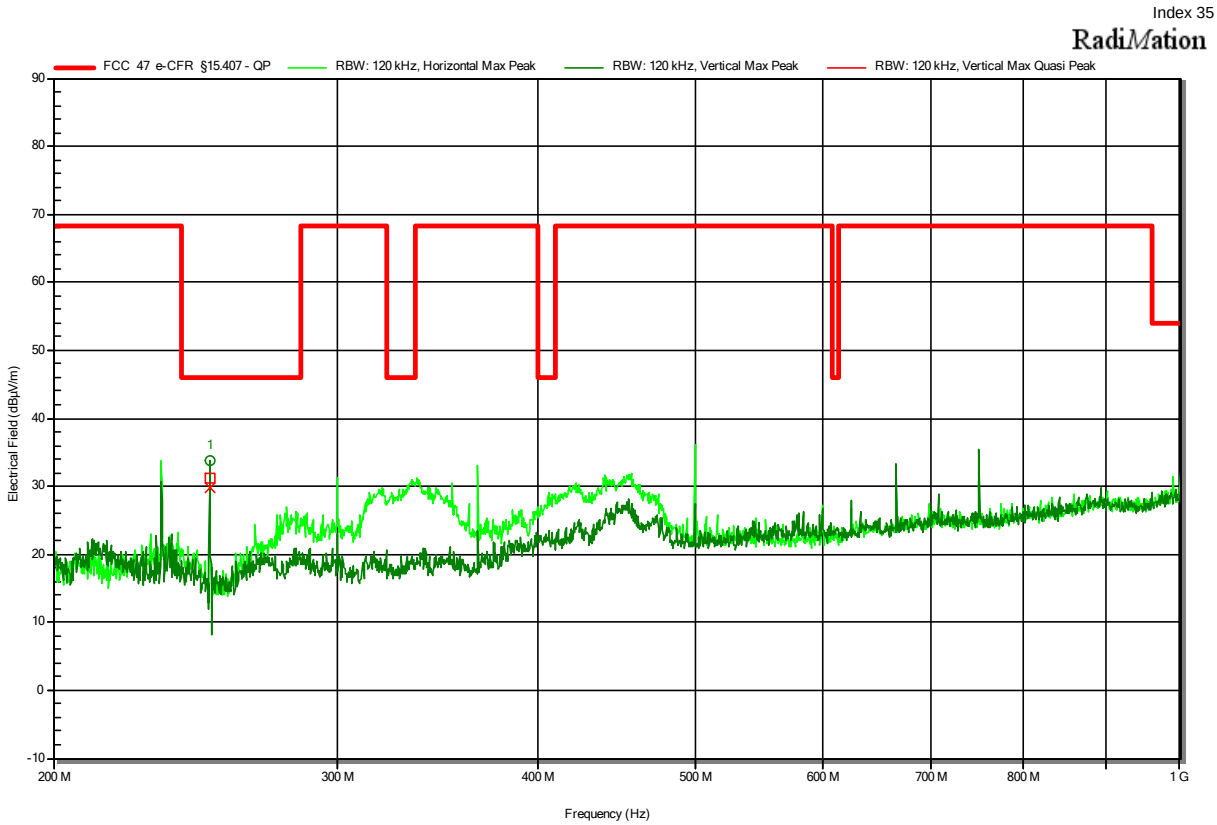
Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HK 116
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
37.7945 MHz	24.6 dBµV/m	40 dBµV/m	-15.42 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

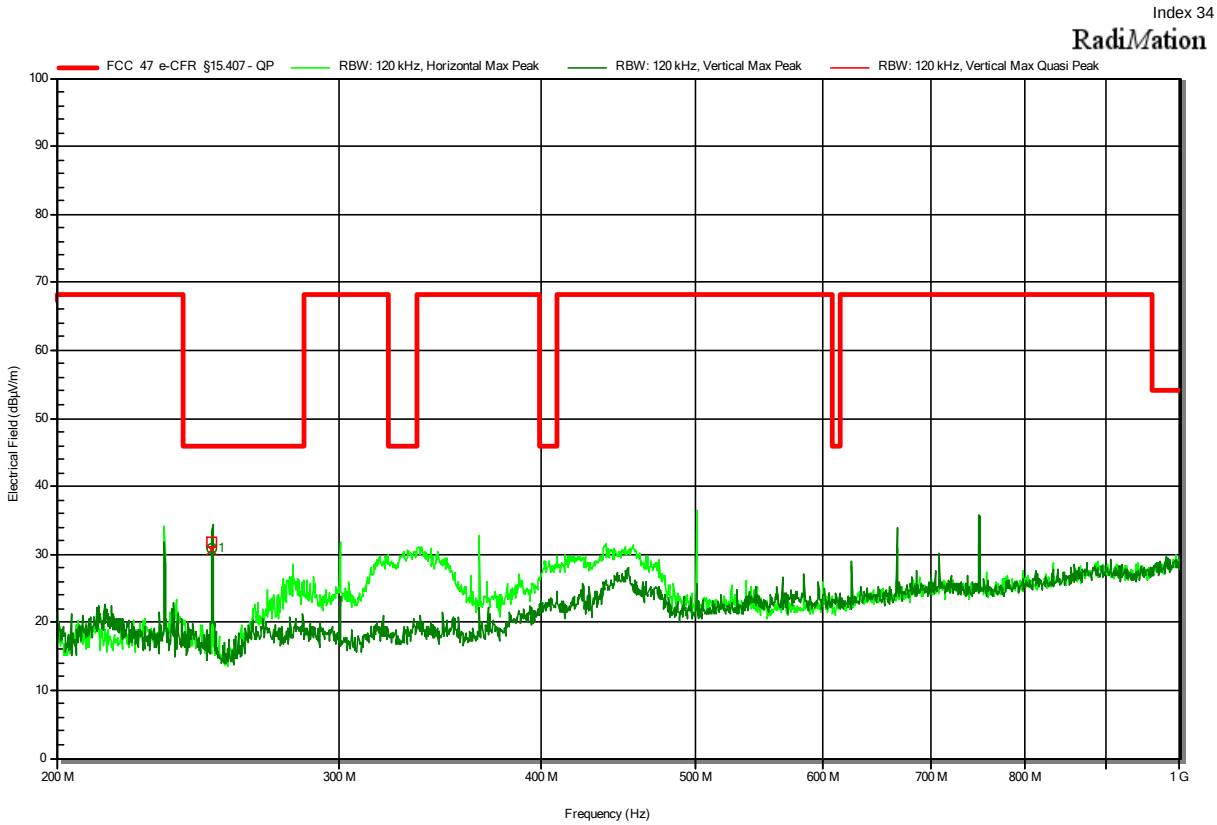
Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HL 223
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
249.9994 MHz	31.2 dBµV/m	46 dBµV/m	-14.84 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

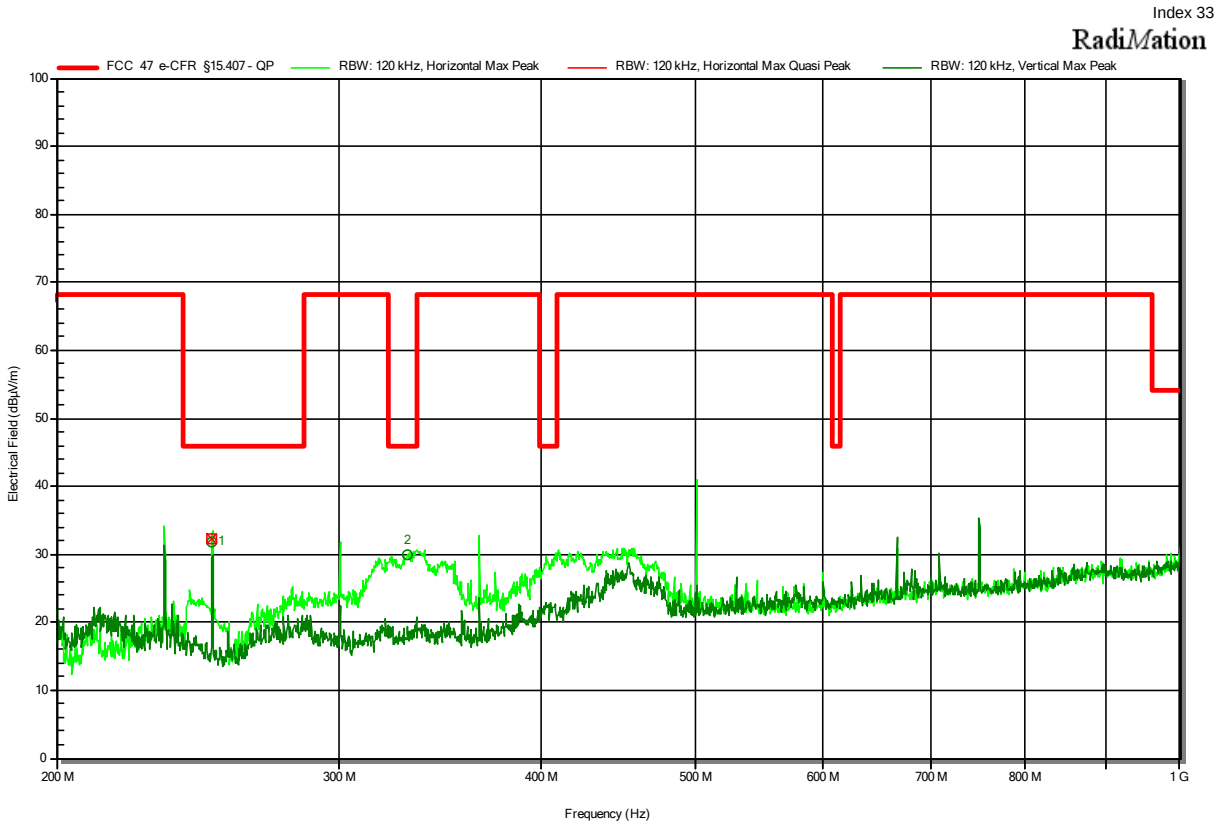
Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HL 223
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
250.02 MHz	31.9 dBµV/m	46 dBµV/m	-14.09 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Voigt
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Rohde & Schwarz HL 223
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal

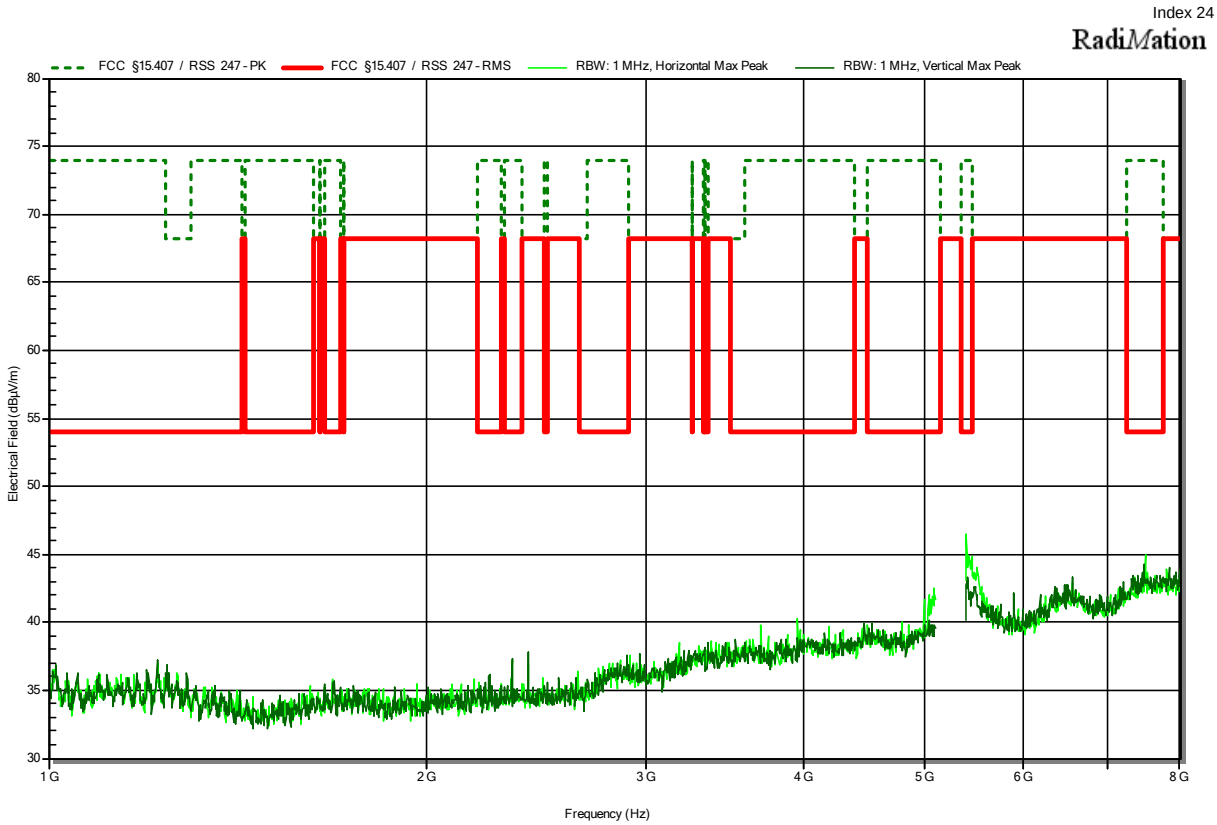


Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
330.78 MHz	29.8 dBµV/m	46 dBµV/m	-16.18 dB	Pass	Horizontal

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Polarization
250 MHz	32.4 dBµV/m	46 dBµV/m	-13.65 dB	Pass	Horizontal

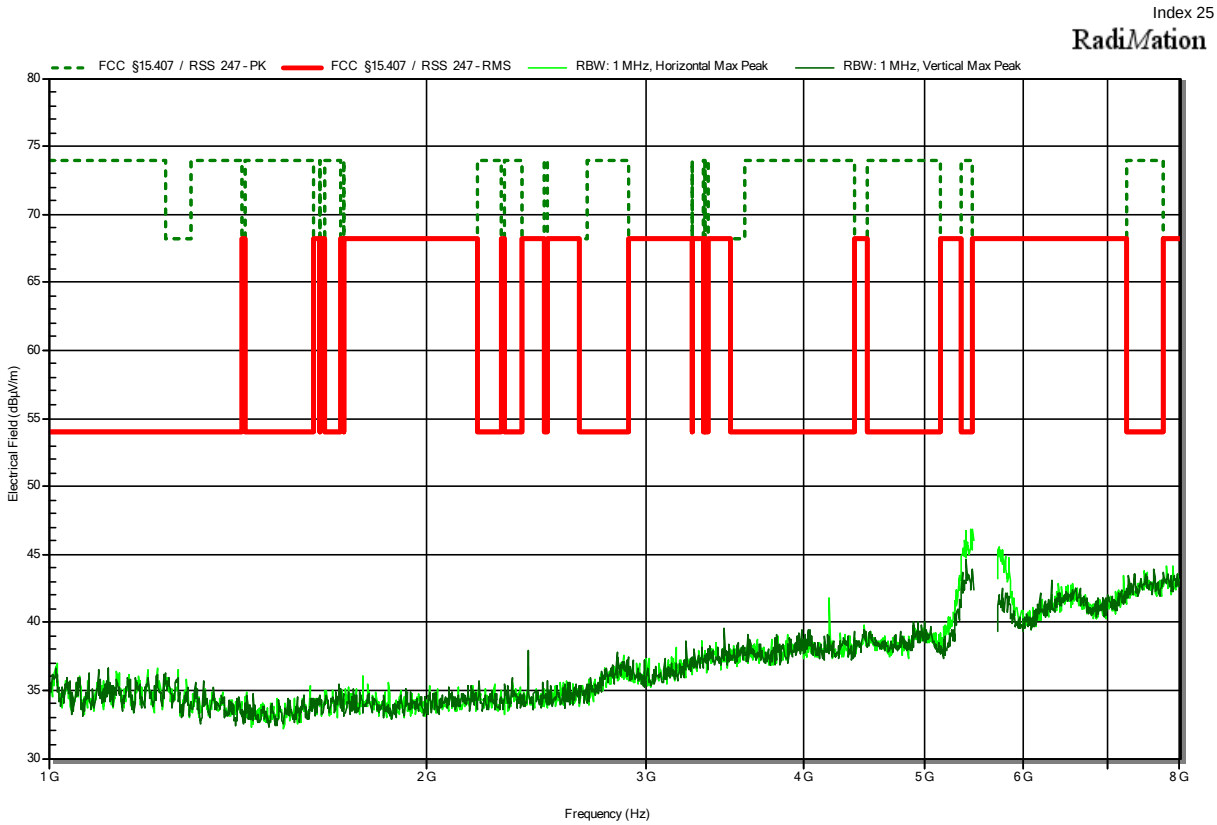
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



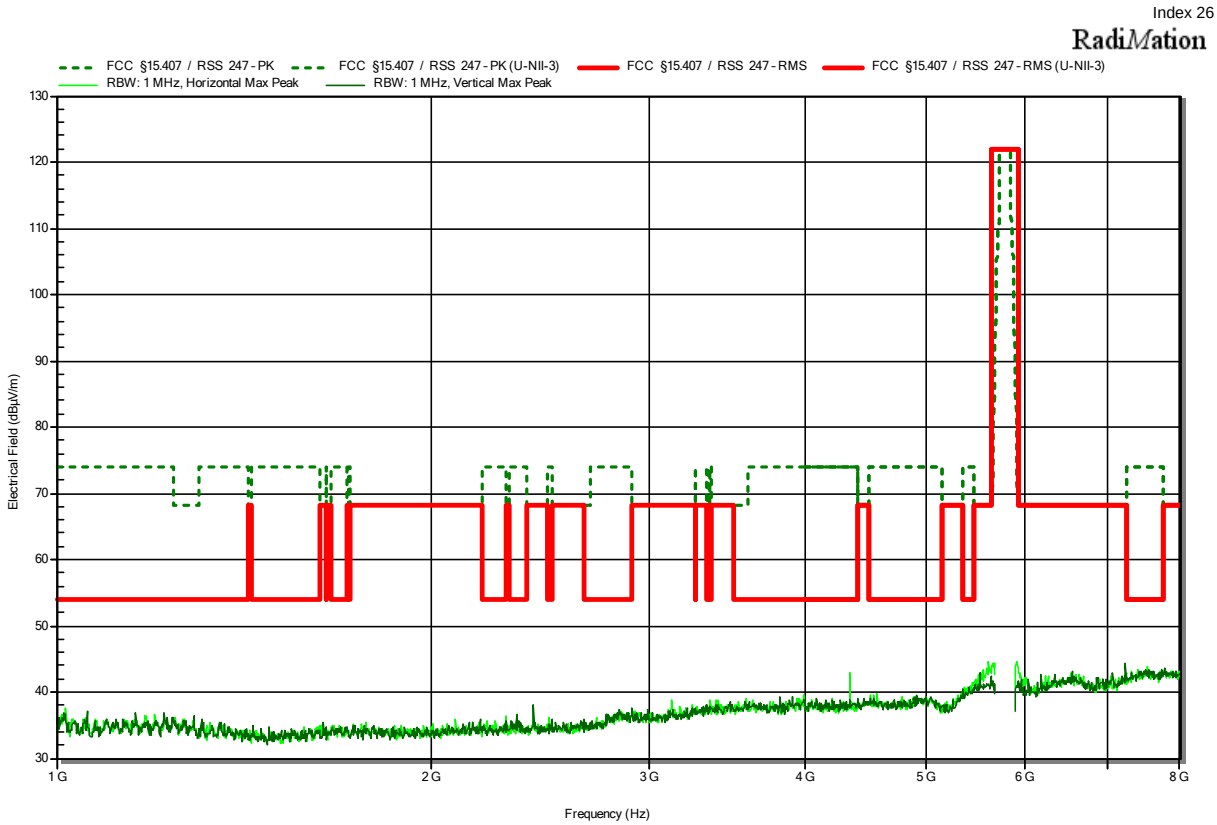
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



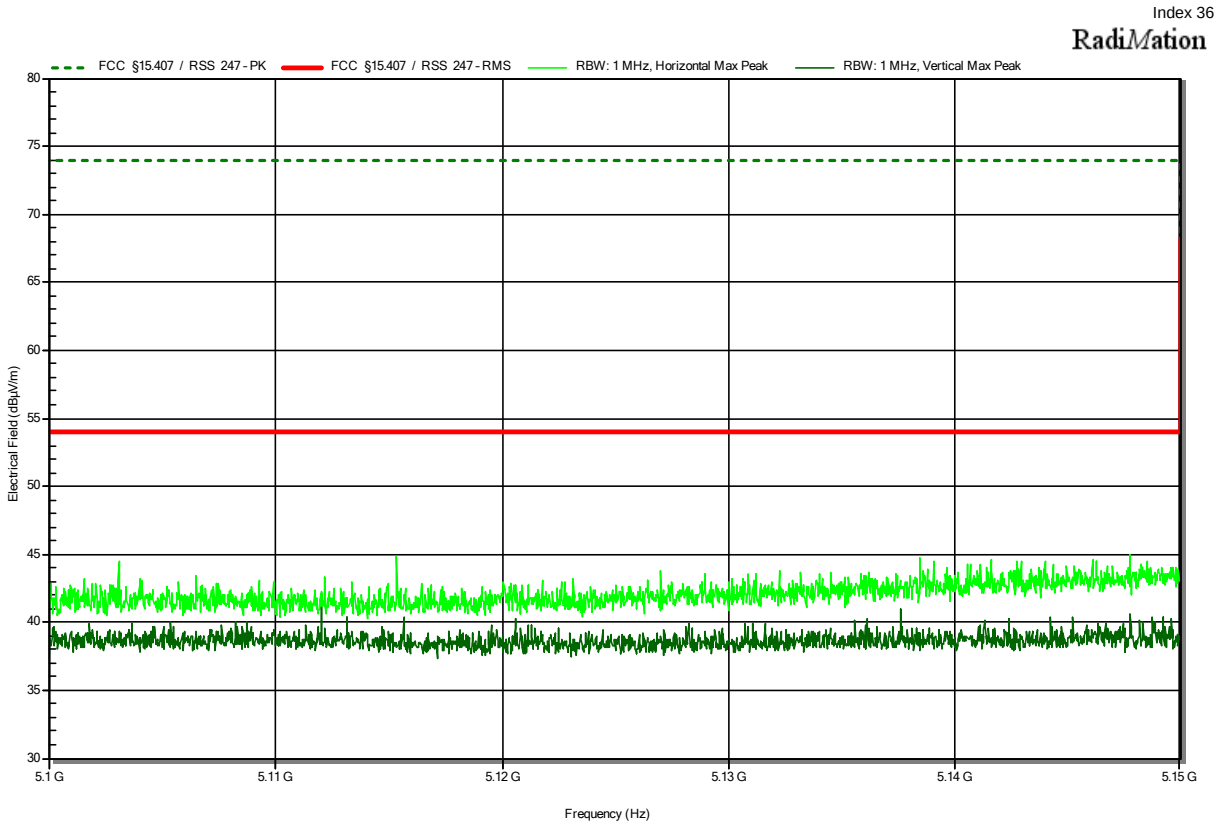
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-23
Note:	EUT horizontal



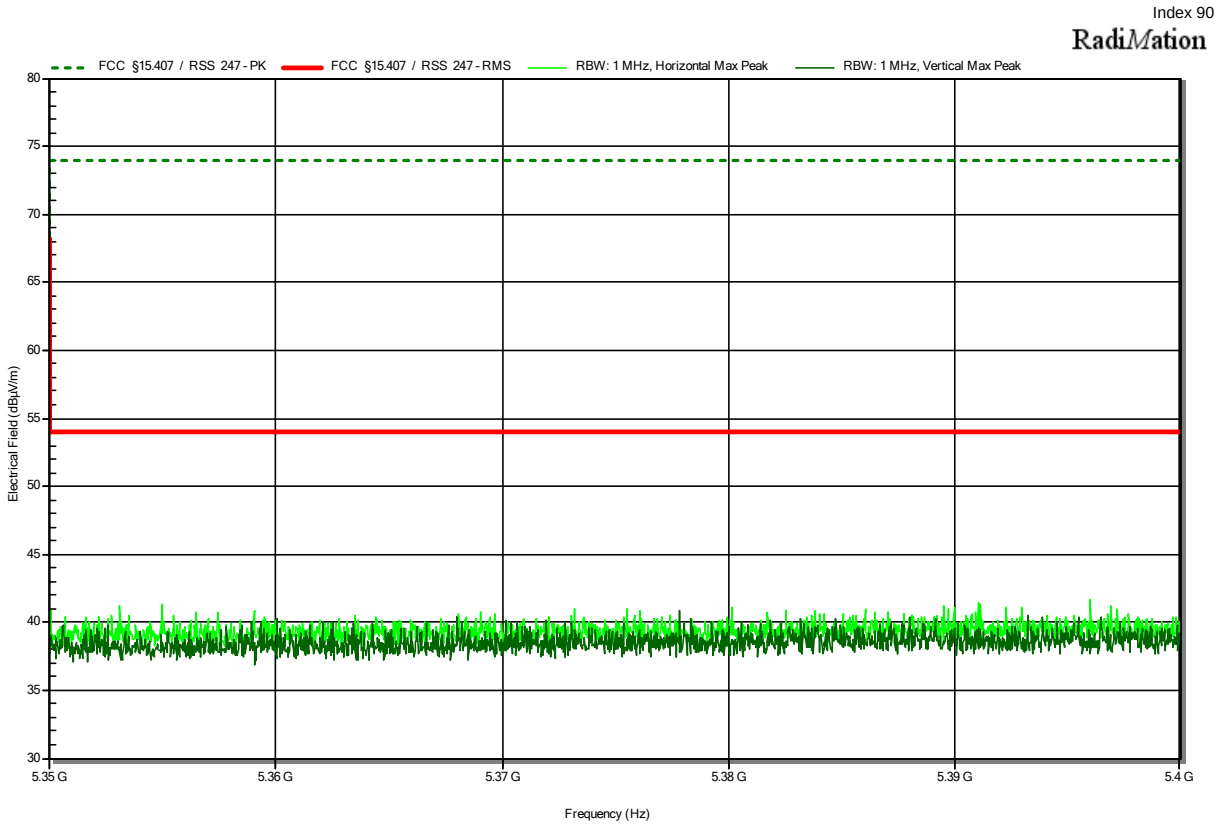
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-24
Note:	lower band area; EUT horizontal



Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-28
Note:	upper bandedge; EUT horizontal

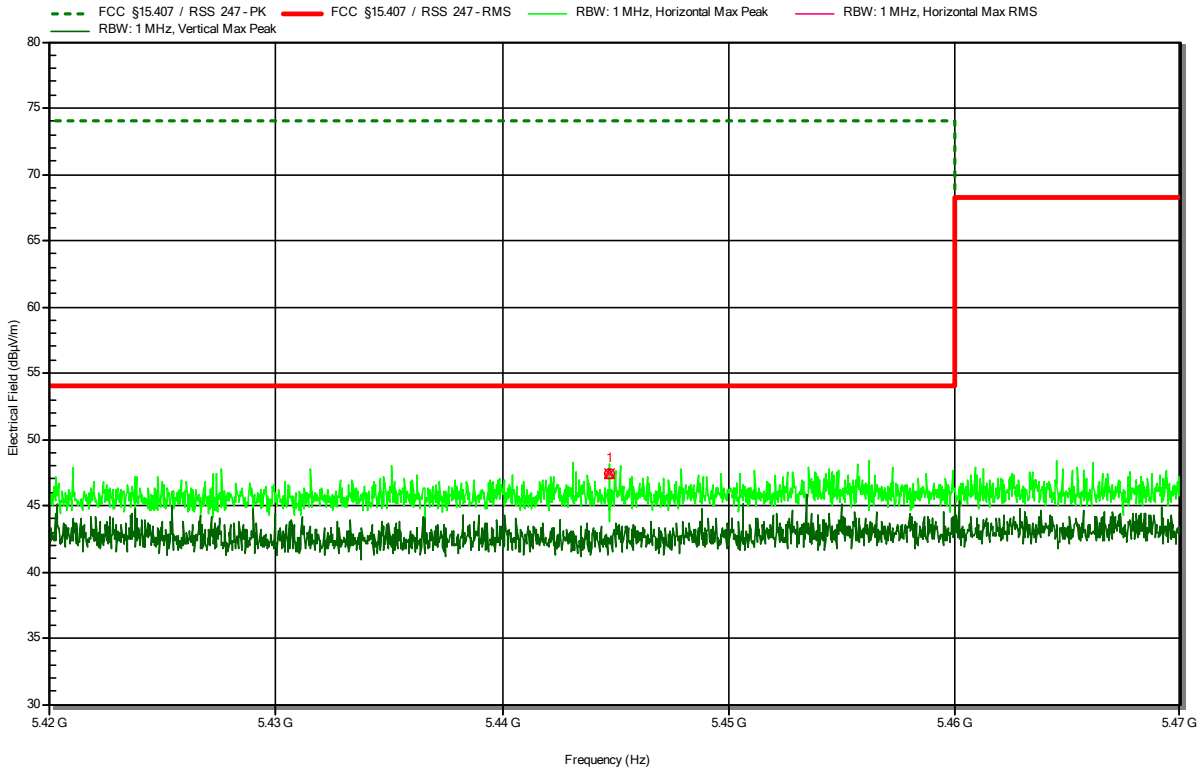


Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-24
Note:	lower band area; EUT horizontal

Index 39

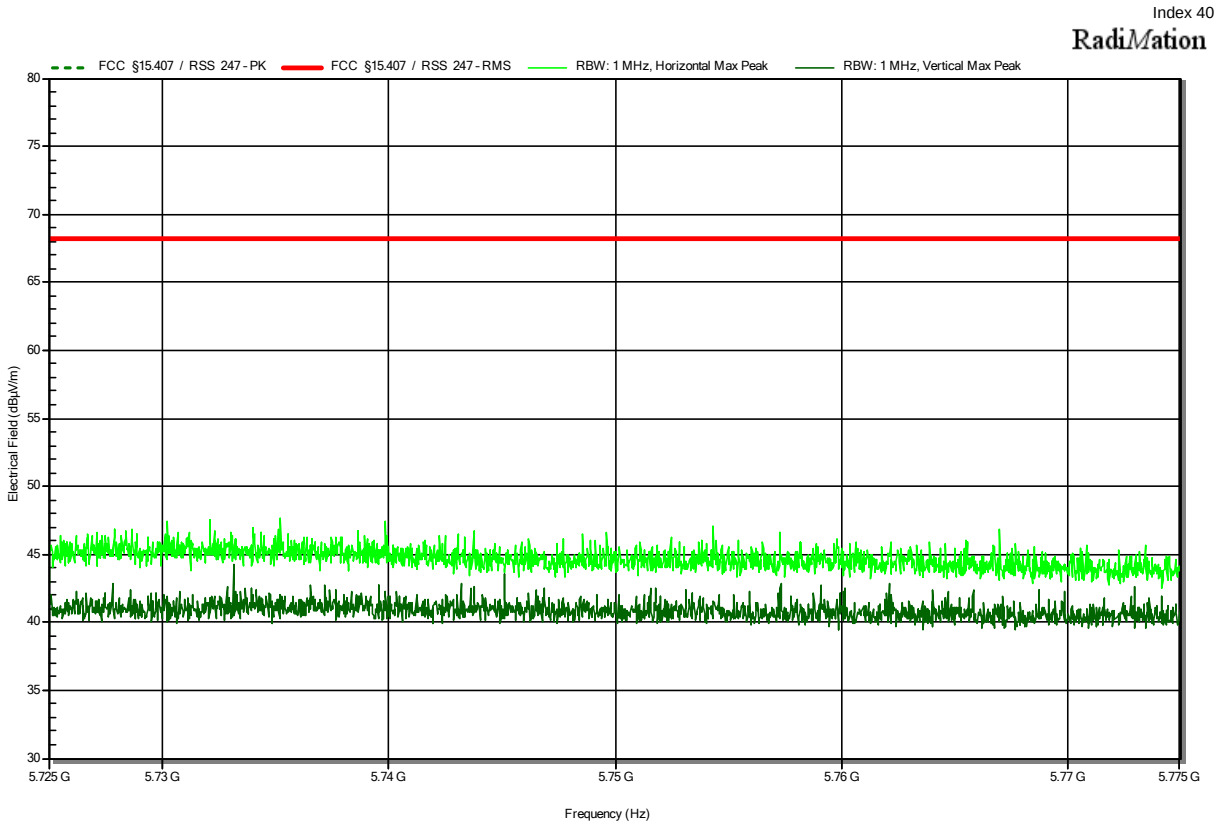
RadiMation



Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Polarization
5.445 GHz	47.38 dBµV/m	54 dBµV/m	-6.62 dB	Pass	Horizontal

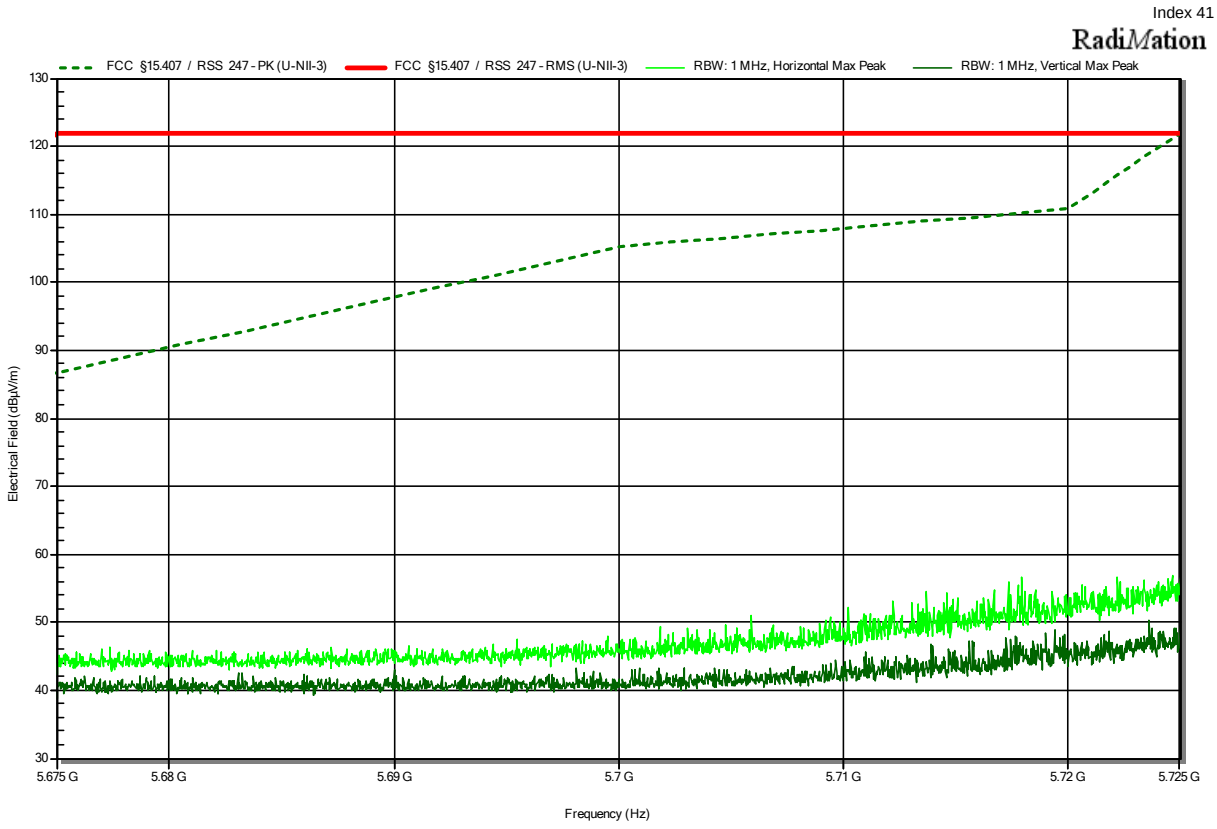
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-24
Note:	upper band area; EUT horizontal



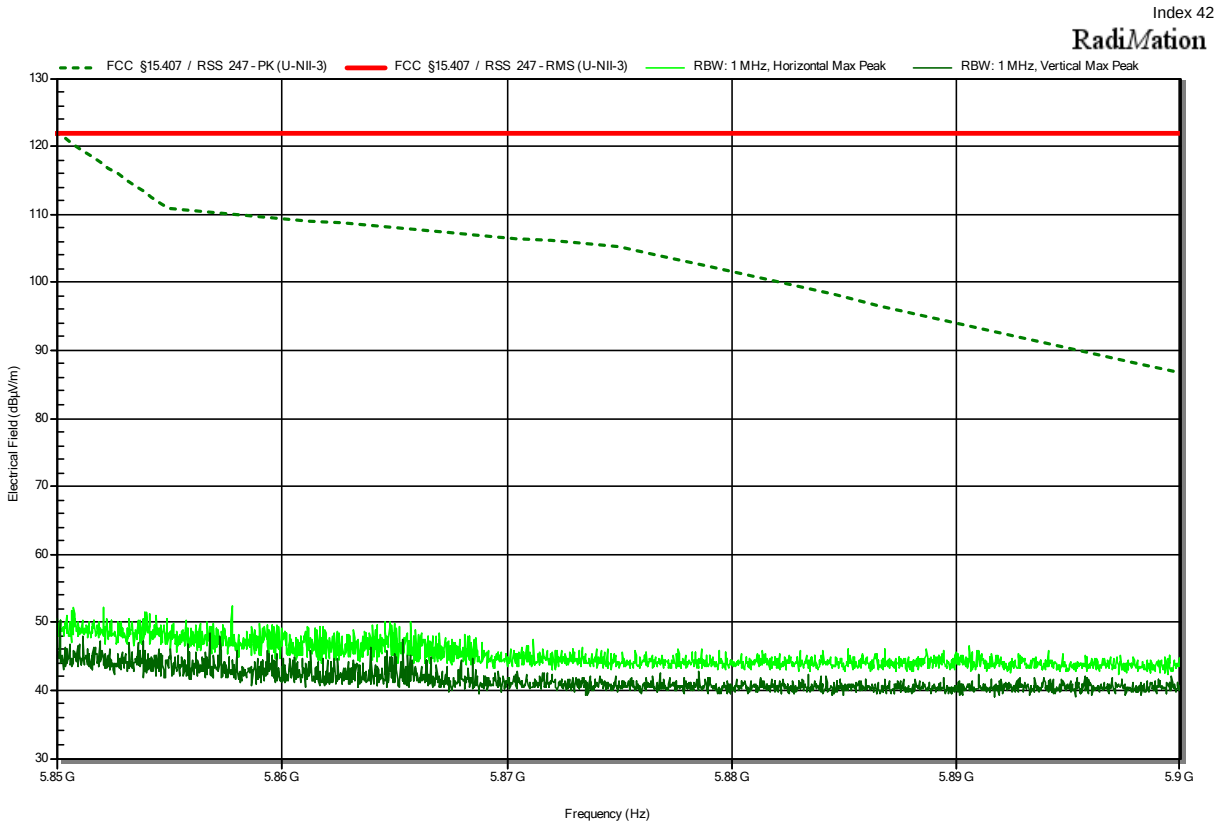
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-24
Note:	lower band area; EUT horizontal



Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck BBHA 9120B
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-24
Note:	upper band area; EUT horizontal

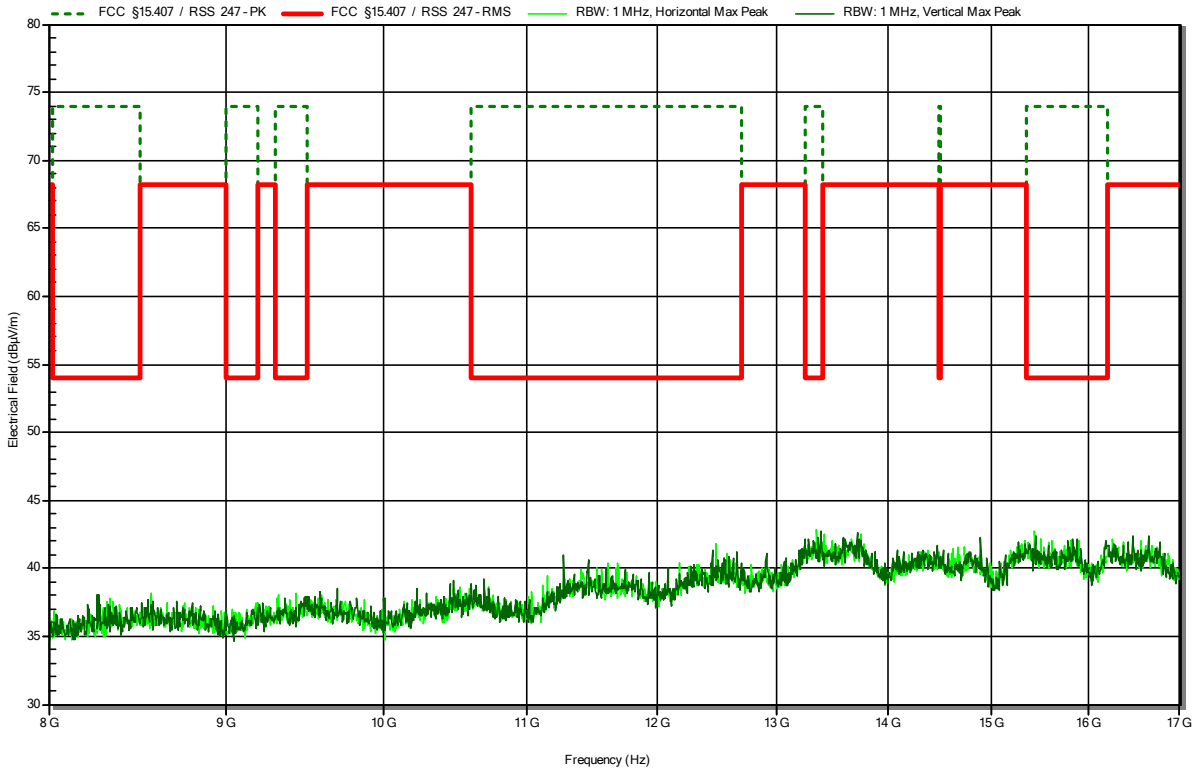


Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck HWRD 650
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-22
Note:	EUT horizontal

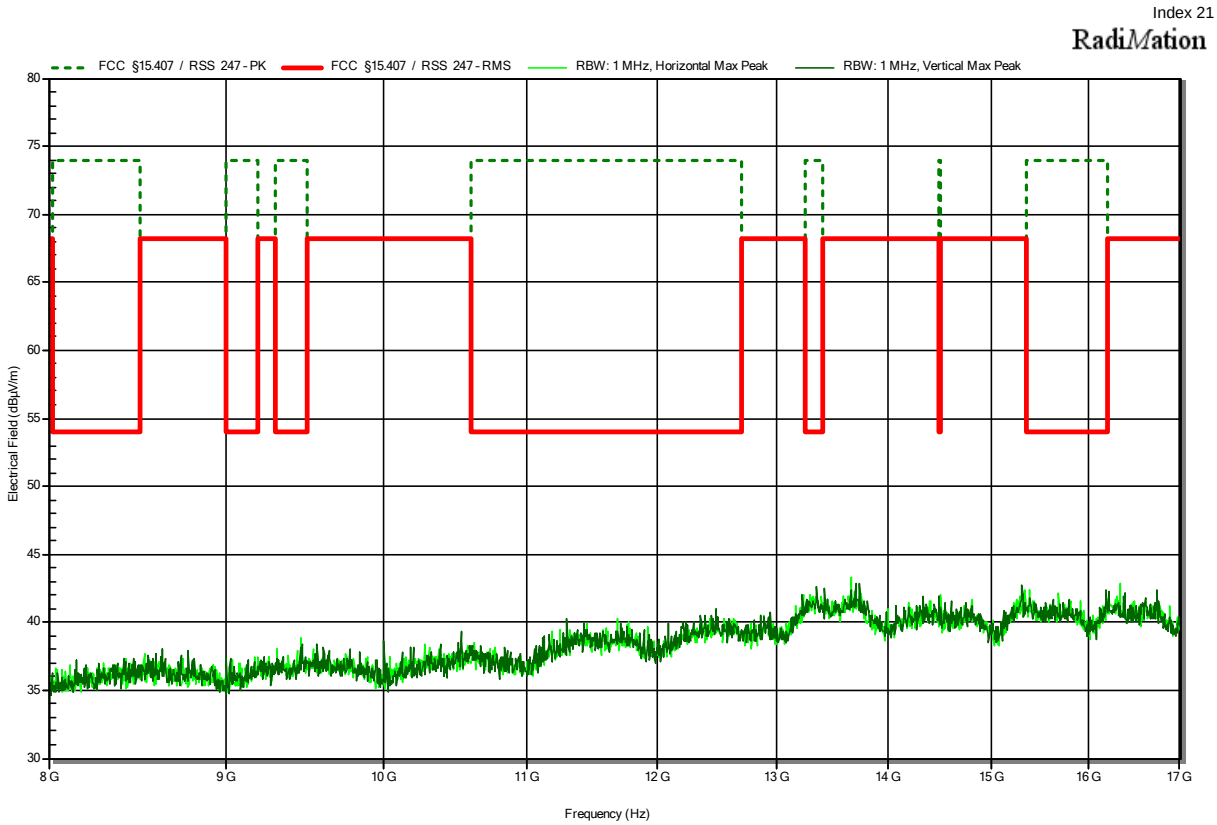
Index 20

RadiMation



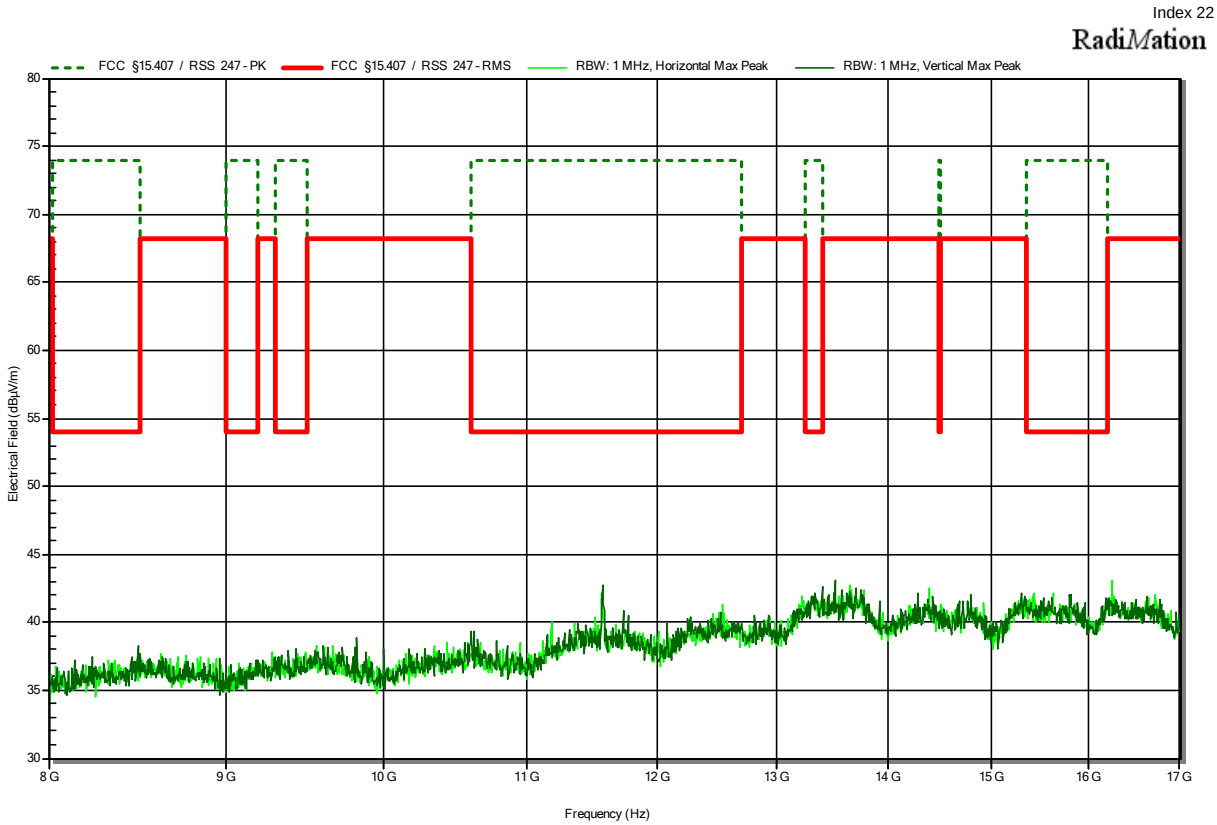
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck HWRD 650
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-22
Note:	EUT horizontal



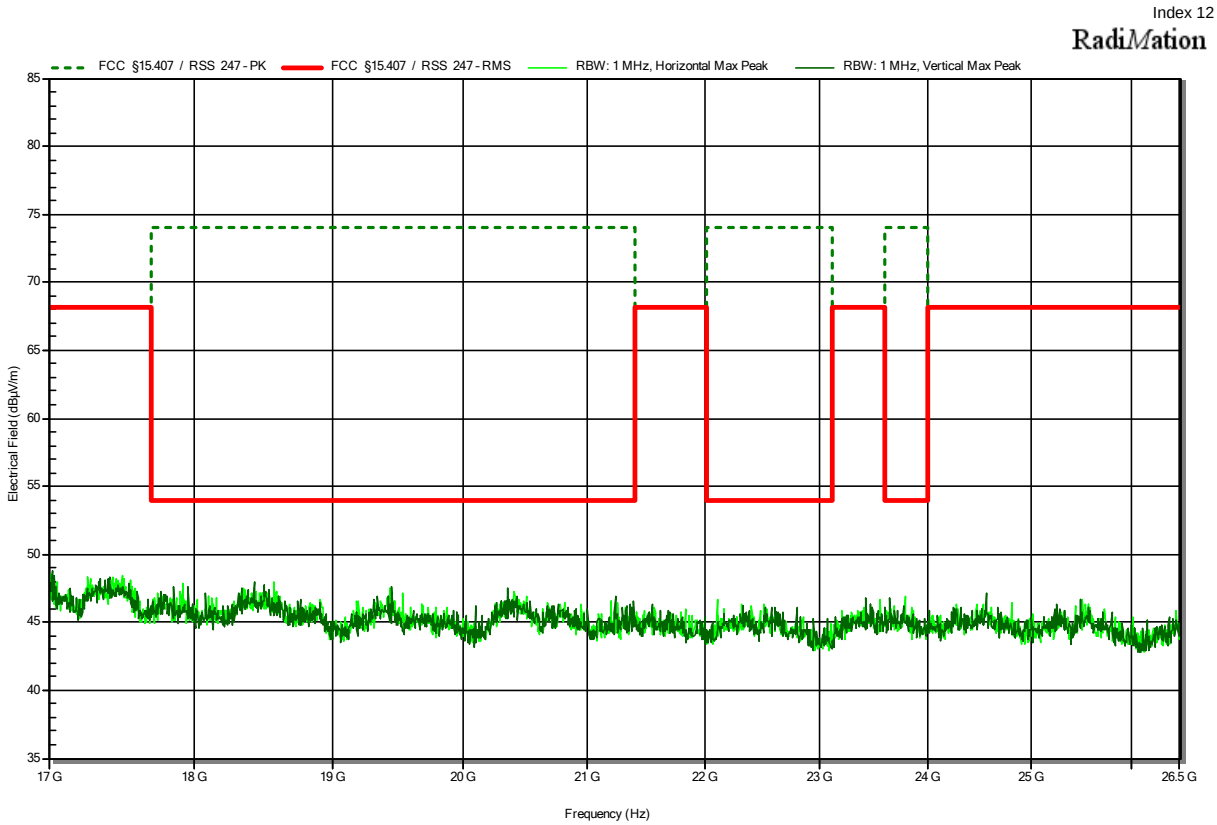
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Schwarzbeck HWRD 650
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-22
Note:	EUT horizontal



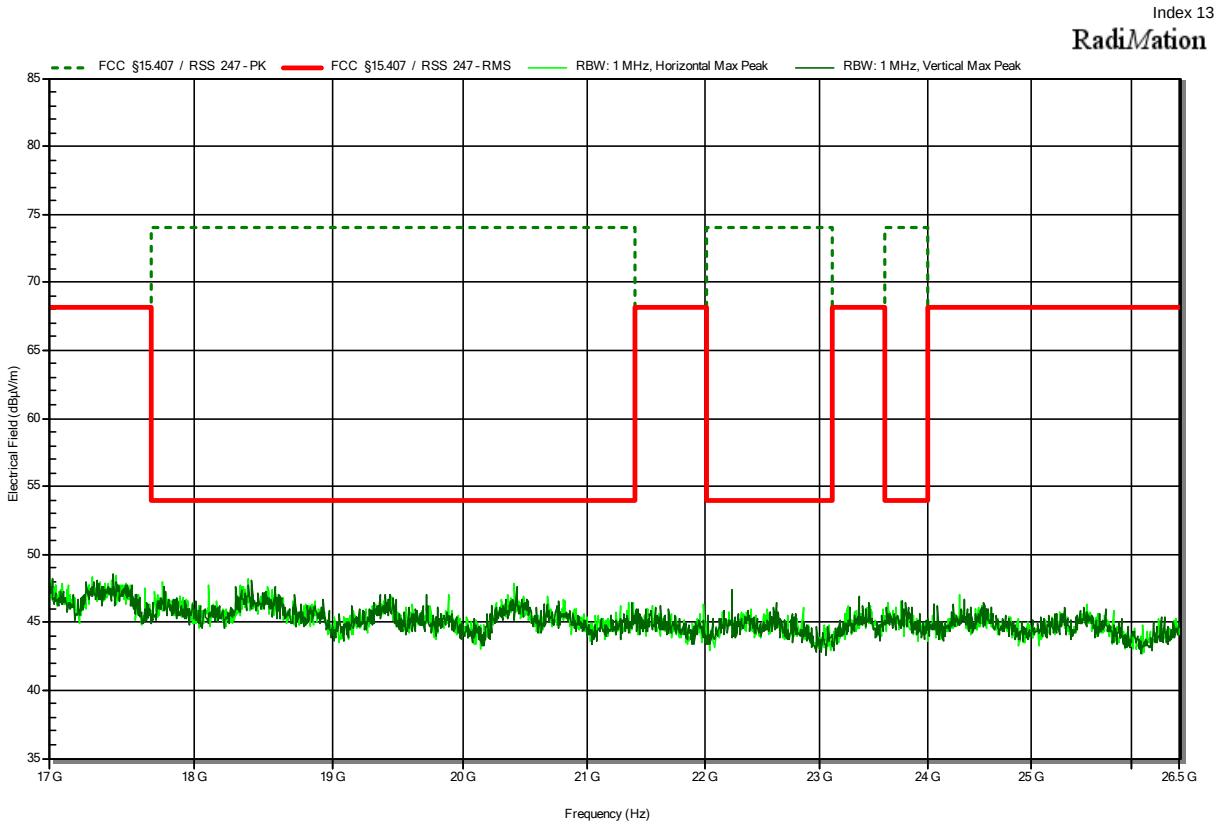
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Amplifier Research AT4560
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-20
Note:	EUT vertical



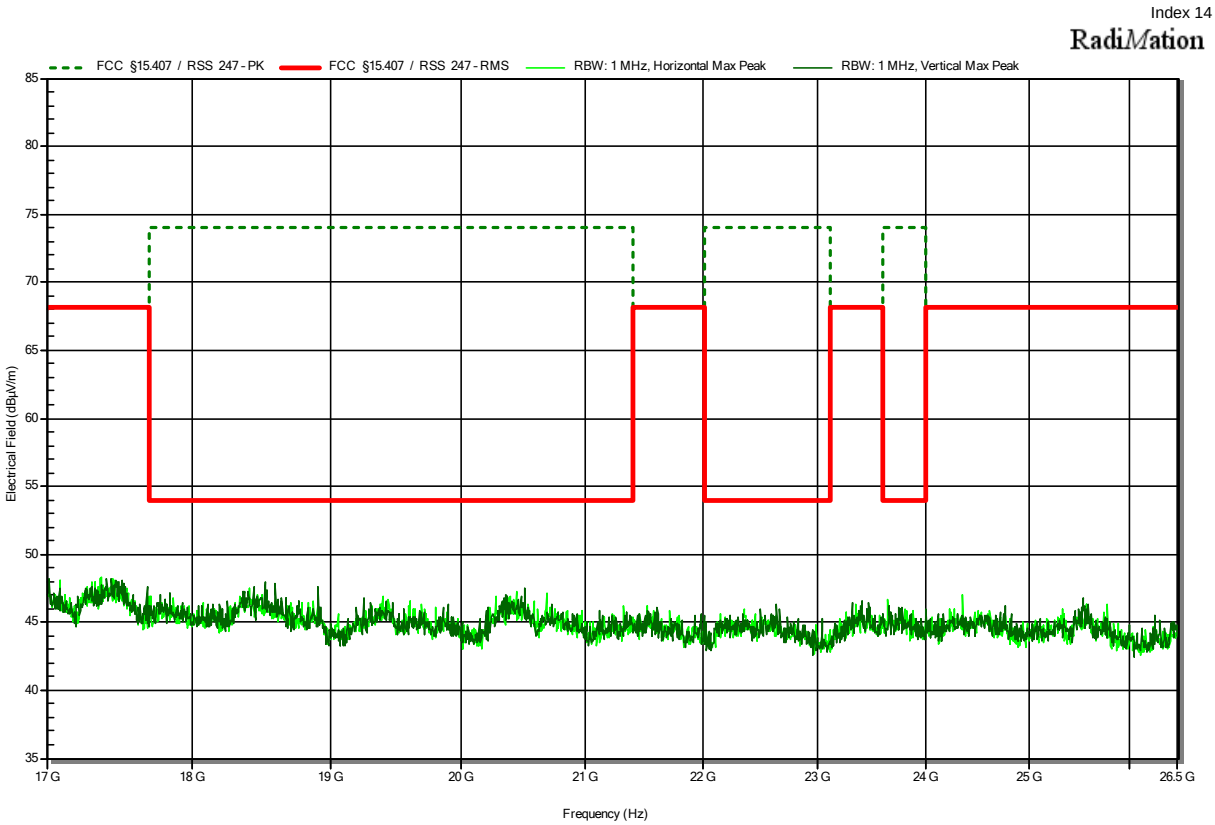
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Amplifier Research AT4560
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-20
Note:	EUT vertical



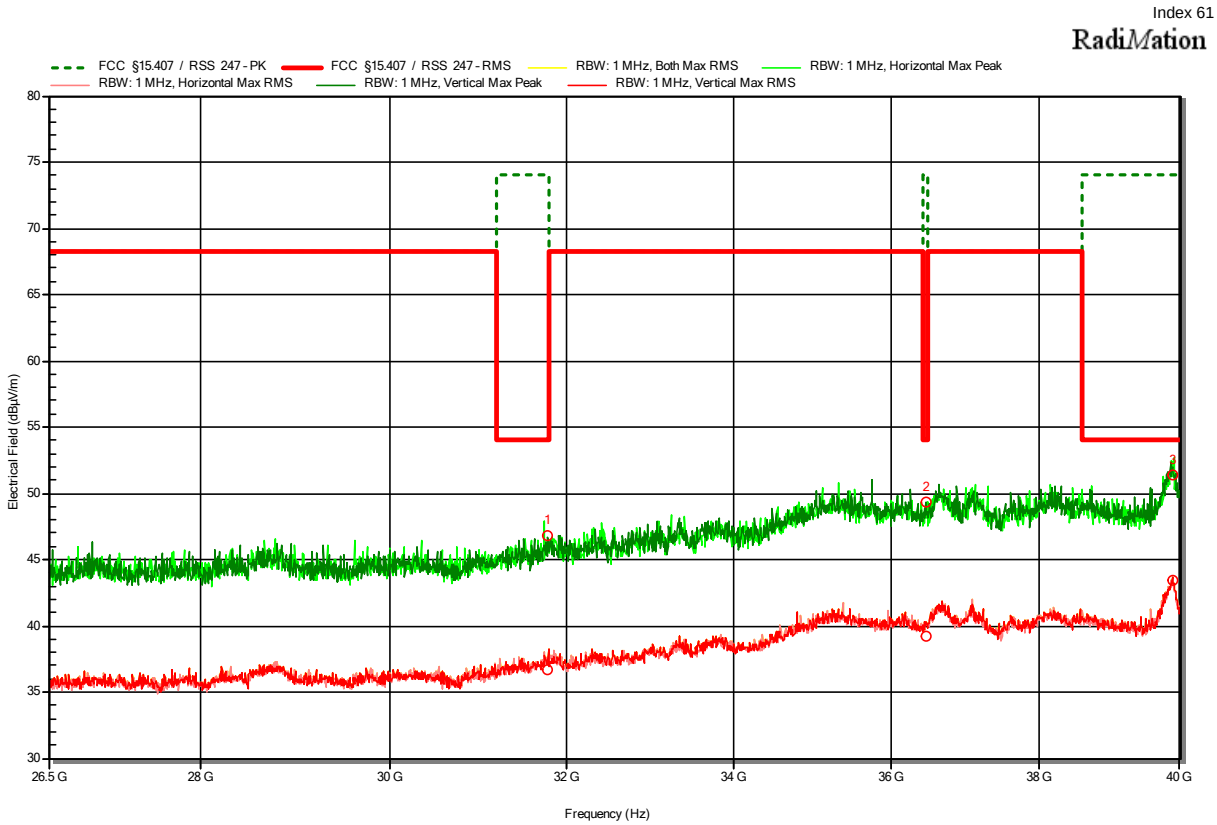
Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Godson Offorji
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Amplifier Research AT4560
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-22
Note:	EUT horizontal



Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Qawasmeh
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 23 °Celsius, Vnom: 12.0 V DC
Antenna:	Configurable Antenna
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 56 (5280 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-05-27
Note:	EUT horizontal

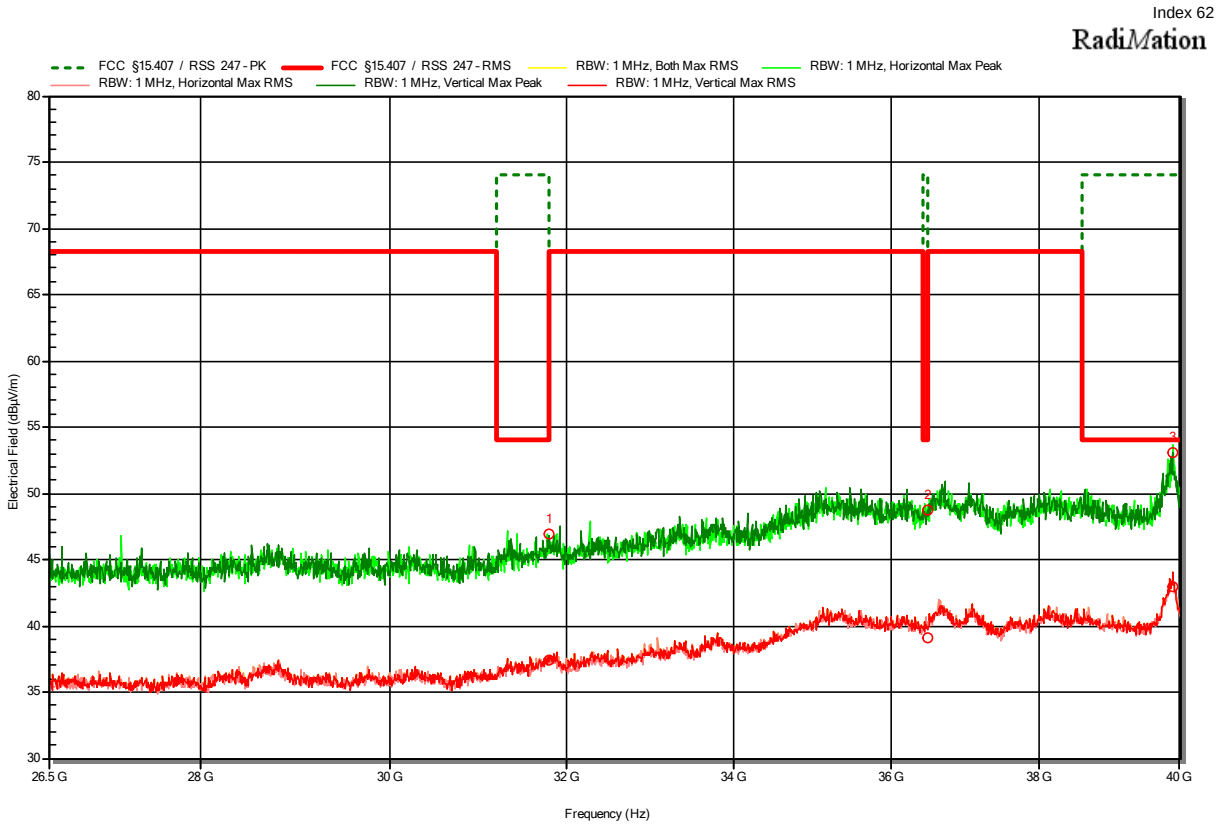


Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
31.775 GHz	46.75 dBµV/m	54 dBµV/m	-7.25 dB	Pass	Vertical
36.464 GHz	49.35 dBµV/m	54 dBµV/m	-4.65 dB	Pass	Vertical
39.89 GHz	51.42 dBµV/m	54 dBµV/m	-2.58 dB	Pass	Vertical

Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Polarization
31.775 GHz	36.74 dBµV/m	54 dBµV/m	-17.26 dB	Pass	Vertical
36.464 GHz	39.25 dBµV/m	54 dBµV/m	-14.75 dB	Pass	Vertical
39.89 GHz	43.46 dBµV/m	54 dBµV/m	-10.54 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Qawasmeh
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 23 °Celsius, Vnom: 12.0 V DC
Antenna:	Configurable Antenna
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 120 (5600 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-05-27
Note:	EUT horizontal

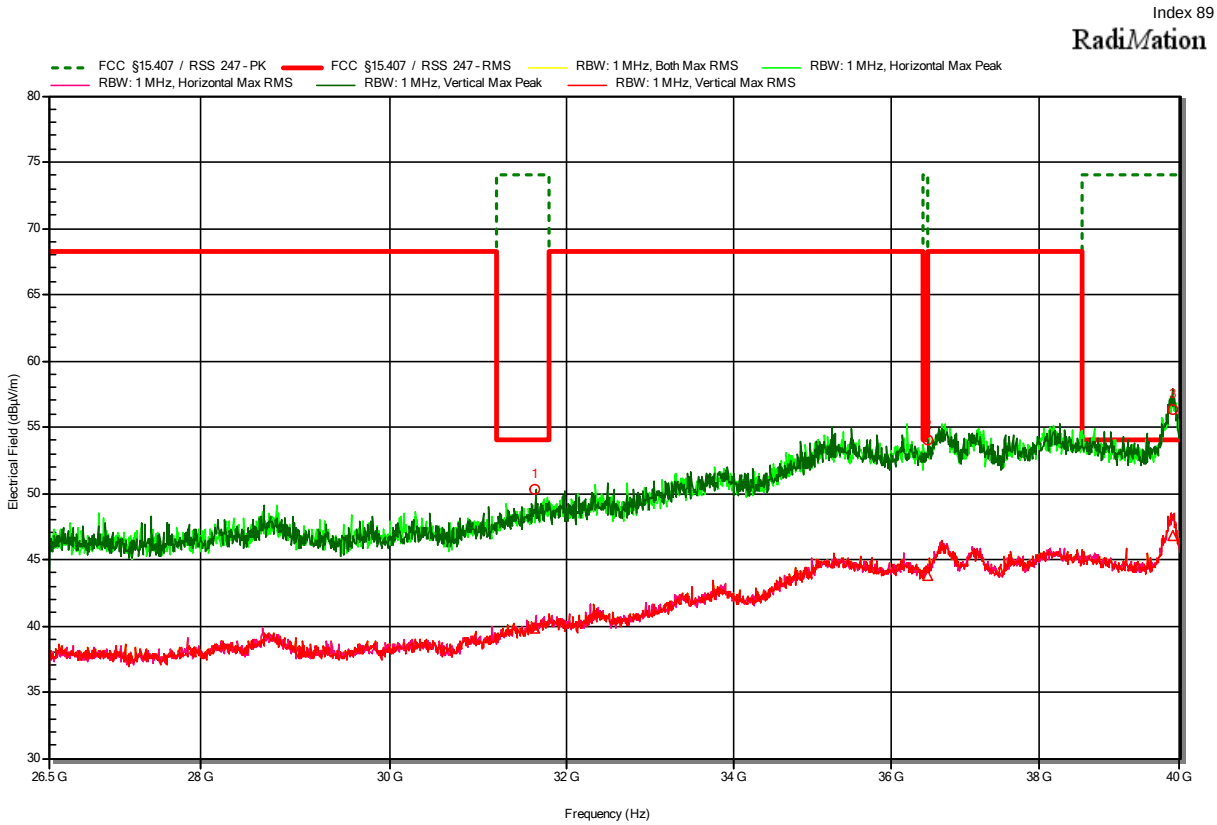


Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
31.797 GHz	46.87 dBµV/m	54 dBµV/m	-7.13 dB	Pass	Vertical
36.499 GHz	48.67 dBµV/m	54 dBµV/m	-5.33 dB	Pass	Vertical
39.888 GHz	53.06 dBµV/m	54 dBµV/m	-0.94 dB	Pass	Vertical

Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Polarization
31.797 GHz	37.43 dBµV/m	54 dBµV/m	-16.57 dB	Pass	Vertical
36.499 GHz	39.12 dBµV/m	54 dBµV/m	-14.88 dB	Pass	Vertical
39.888 GHz	42.89 dBµV/m	54 dBµV/m	-11.11 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.407, RSS-247

Project Number:	G0M-2206-1512
Applicant:	BIOTRONIK
Model Description:	Data Gateway for Electrophysiology Lab
Model:	Qubic Connect
Test Sample ID:	40181 (SN: 00298859)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Qawasmeh
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 12.0 V DC
Antenna:	Flann 22240-25
Measurement distance:	3 m
Mode:	Tx; WLAN 5GHz 802.11 a_CH: 157 (5785 MHz)_BW20_6 Mbps_ANT 1
Test Date:	2022-06-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
31.632 GHz	50.26 dBµV/m	74 dBµV/m	-23.74 dB	Pass	Vertical
36.486 GHz	53.99 dBµV/m	74 dBµV/m	-20.01 dB	Pass	Vertical
39.885 GHz	56.37 dBµV/m	74 dBµV/m	-17.63 dB	Pass	Vertical

Frequency	RMS	RMS Limit	RMS Difference	RMS Status	Polarization
31.632 GHz	39.78 dBµV/m	54 dBµV/m	-14.22 dB	Pass	Vertical
36.486 GHz	43.85 dBµV/m	54 dBµV/m	-10.15 dB	Pass	Vertical
39.885 GHz	46.8 dBµV/m	54 dBµV/m	-7.2 dB	Pass	Vertical

= = = END OF TEST REPORT = = =