

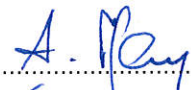



EMC TEST REPORT FCC 47 CFR Part 15B Industry Canada RSS-Gen Electromagnetic compatibility - Unintentional radiators	
Report Reference No.	G0M-1309-3226-EF01-V03
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	<div style="text-align: center;">   </div> <p style="text-align: center;"> A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A </p>
Applicant's name	Biotronik SE & Co. KG
Address	Woermannkehre 1 12359 Berlin GERMANY
Test specification:	
Standard.....	47 CFR Part 15 Subpart B RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	Telemonitoring System
Model No.	CardioMessenger Smart 3G
Additional Models	None
Hardware version	CardioMessenger Smart 3G mit LP, Best.LP1/TelexSmart3G, LP, Best.LP1/TelexSmart3G_JP Rev. Dx
Firmware / Software version	SMARTAPP 1.x
Contains	FCC-ID: QRICMSMART IC: 4708A-CMSMART
Test result	Passed

Test Report No.: G0M-1309-3226-EF01-V03

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Possible test case verdicts:	
- not applicable to test object	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing:	
Date of receipt of test item	2013-12-19
Date (s) of performance of tests	2013-11-18 – 2013-11-29
Compiled by.....	Marcus Klein
Tested by (+ signature).....	Andreas Pflug 
Approved by (+ signature)	Marcus Klein 
Date of issue.....	2013-12-17
Total number of pages.....	38
General remarks:	
<p>The test results presented in this report relate only to the object tested.</p> <p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>	
Additional comments:	

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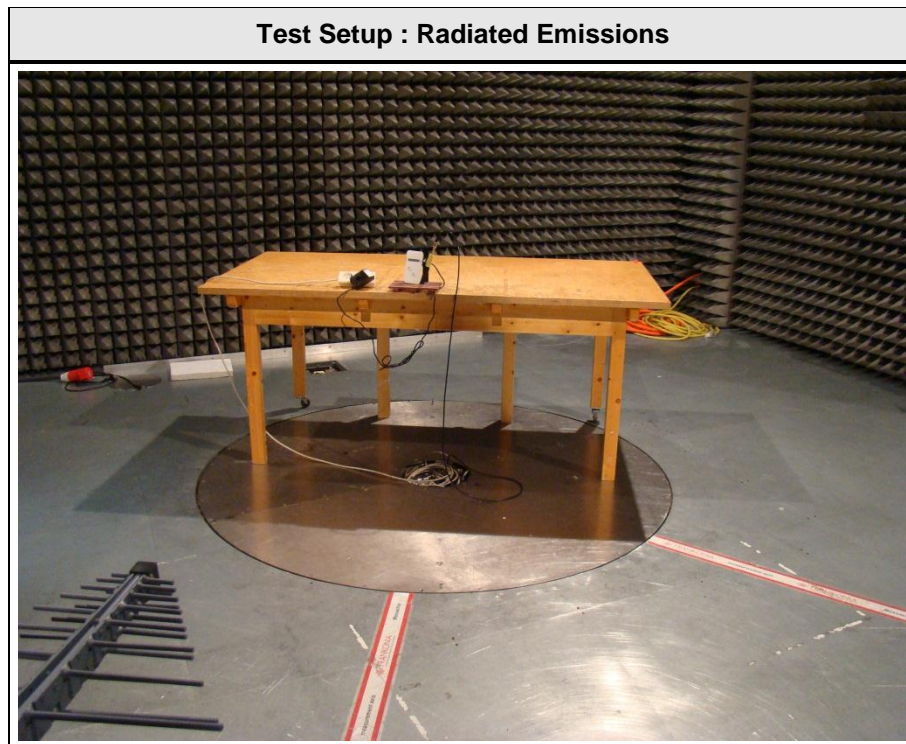
1 Equipment (Test item) Description

Description	Telemonitoring System	
Model	CardioMessenger Smart 3G	
Hardware version	CardioMessenger Smart 3G mit LP, Best.LP1/TelexSmart3G, LP, Best.LP1/TelexSmart3G_JP Rev. Dx	
Software / Firmware version	SMARTAPP 1.x	
Contains FCC-ID	QRICMSMART	
Contains IC	4708A-CMSMART	
Power supply	120 VAC	
AC/DC-Adaptor	Model : FW7520/05 Manufacturer : Friwo Input : 100 - 240 / 50-60Hz Output : 5VDC / 3.0A	
Radio module	Type	Module
	Model	HE910-D
	Manufacturer	Telit
	HW Version	0
	SW Version	12.00.024
	FCC-ID	RI7HE910
	IC	5131A-HE910
	IMEI	356870050003520
Manufacturer	Biotronik SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	
Highest emission frequency	168 MHz	
Device classification	Class B	
Equipment type	Tabletop	
Number of tested samples	1	

1.1 Photos – Equipment external



1.3 Photos – Test setup



Test Setup : Conducted Emissions



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
EUT	Power Supply	Friwo	FW7520/05	-
AE	Radio Communication Tester	R&S	CMU200	-

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Operating Modes

Mode #	Description
1	UMTS Band V link to Radio Communication Tester + MICS
2	UMTS Band V link to Radio Communication Tester + MICS + charging
3	GSM850 link to Radio Communication Tester + MICS + charging

1.6 Test Equipment Used During Testing

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD-Antenne	R&S	HL 223	EF00187	2011-02	2014-02
LPD-Antenna	R&S	HL 025	EF00327	2013-02	2016-02
EMI Test Receiver	R&S	ESU8	EF00379	2013-03	2014-03
EMI Test Receiver	R&S	ESCS30	EF00295	2013-10	2014-10

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2012-10	2014-10
AMN	R&S	ESH3-Z5	EF00036	2012-11	2014-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2013-10	2014-10

1.7 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 dB μ V. 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:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

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

Limit:

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

$$\text{Limit (dB}\mu\text{V/m)} = 20 * \log (\mu\text{V/m})$$

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:

$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{ dB} \end{array}$$

2 Result Summary

FCC 47 CFR Part 15B, Industry Canada RSS-Gen				
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks
47 CFR 15.109 RSS-Gen 4.9 & 4.10	Radiated emissions	ANSI C 63.4	PASS	
47 CFR 15.107 RSS-Gen 7.2.4	AC power line conducted emissions	ANSI C63.4	PASS	
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Radiated emissions

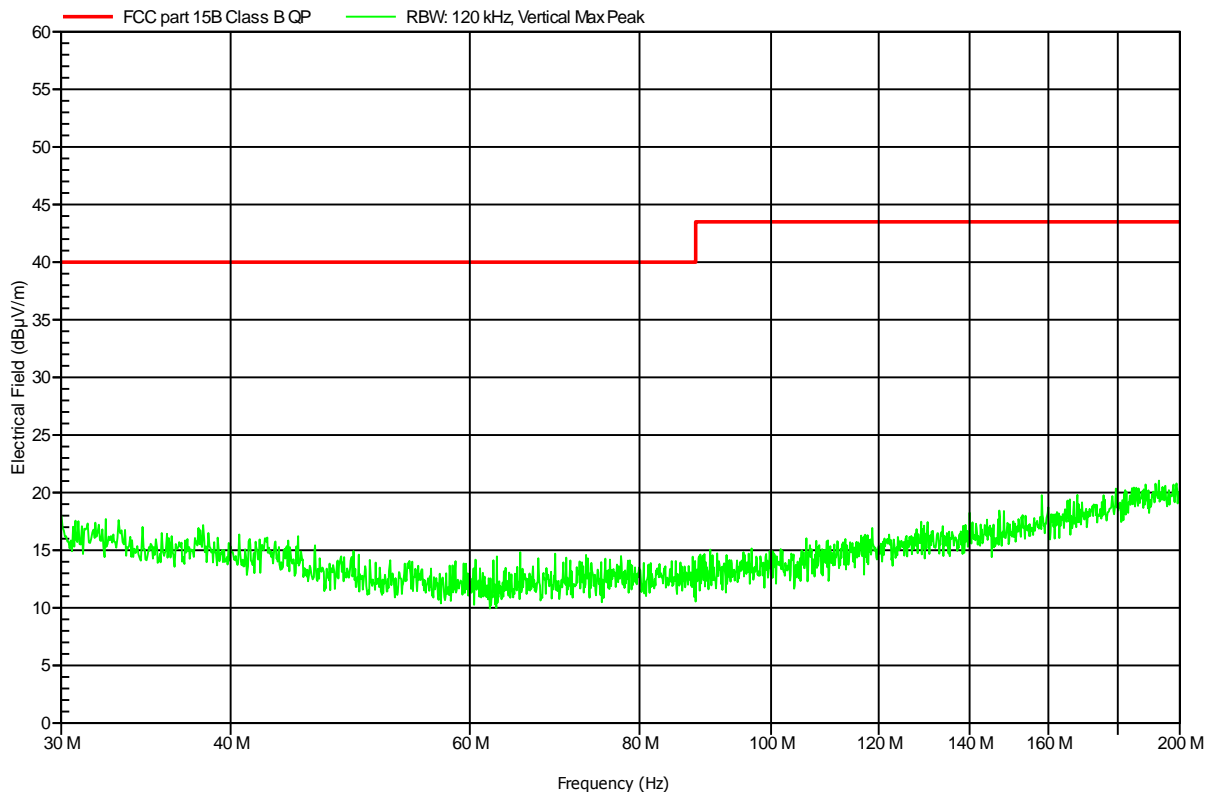
Radiated emissions acc. FCC 47 CFR 15.109 / IC RSS-Gen			Verdict: PASS			
Laboratory Parameters:	Required prior to the test		During the test			
Ambient Temperature	15 to 35 °C		23°C			
Relative Humidity	30 to 60 %		35%			
Test according referenced standards	Reference Method					
	ANSI C63.4					
Sample is tested with respect to the requirements of the equipment class	Equipment class					
	Class B					
Test frequency range determined from highest emission frequency	Highest emission frequency					
	168 MHz					
Fully configured sample scanned over the following frequency range	Frequency range					
	30 MHz to 2 GHz					
Operating mode	1 + 2 + 3					
Limits and results Class B						
Frequency [MHz]	Quasi-Peak [dB μ V/m]	Result	Average [dB μ V/m]	Result	Peak [dB μ V/m]	Result
30 – 88	40	PASS	-		-	-
88 – 216	43.5	PASS	-		-	-
216 – 960	46	PASS	-		-	-
960 – 1000	54	PASS	-		-	-
> 1000	-	-	54	PASS	74	PASS
Comments:						
GSM 850 and UMTS Band V were declared as worst case by test laboratory. GSM 1900 and UMTS Band II / IV were also considered but no additional measurements were performed.						

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 3,7V Accu
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	UMTS Band V
Test Date:	2013-11-29
Note:	

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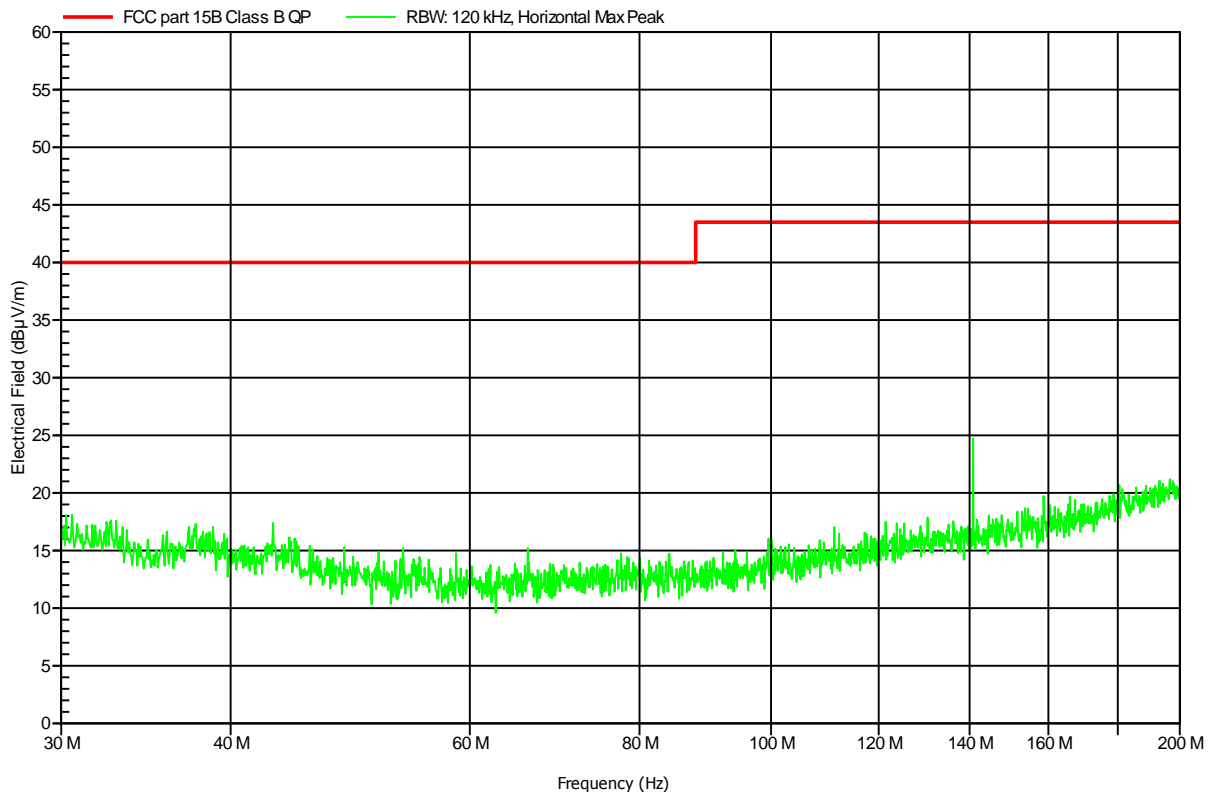


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 3,7V Accu
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	UMTS Band V
Test Date:	2013-11-29
Note:	

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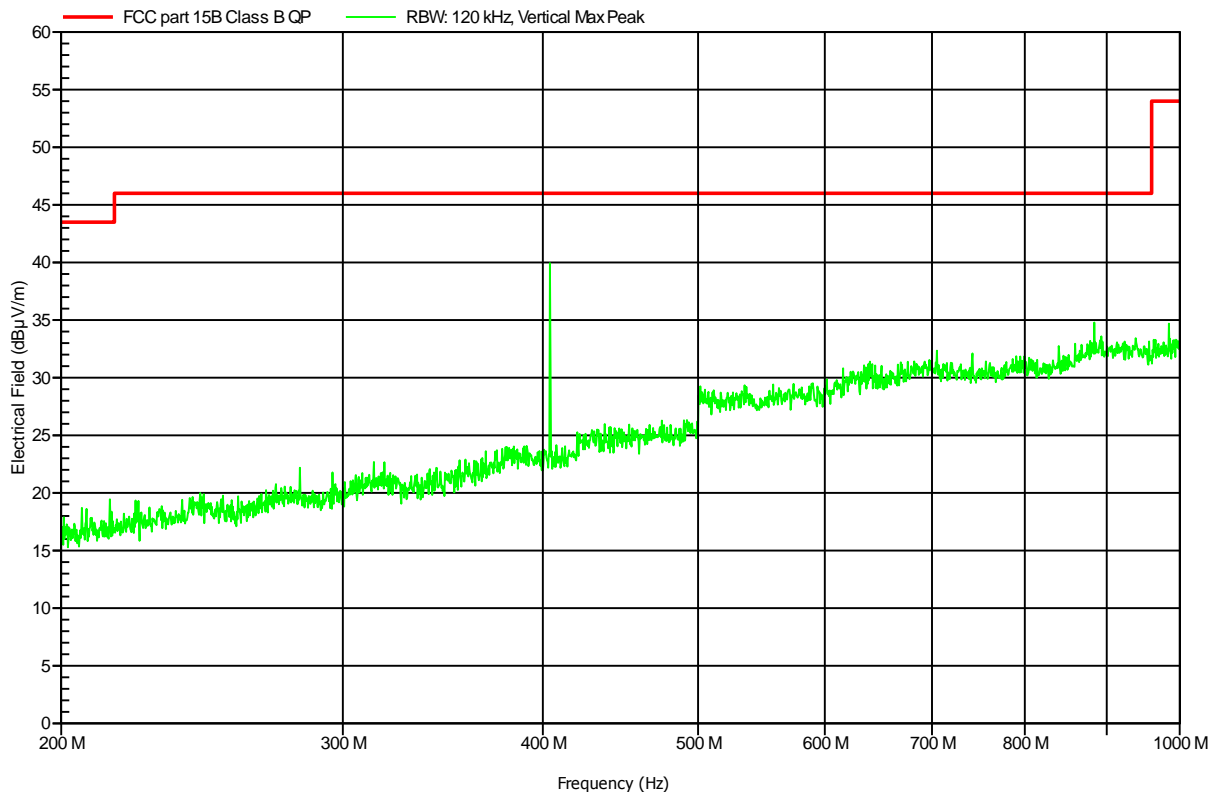


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 3,7V Accu
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	UMTS Band V
Test Date:	2013-11-29
Note:	

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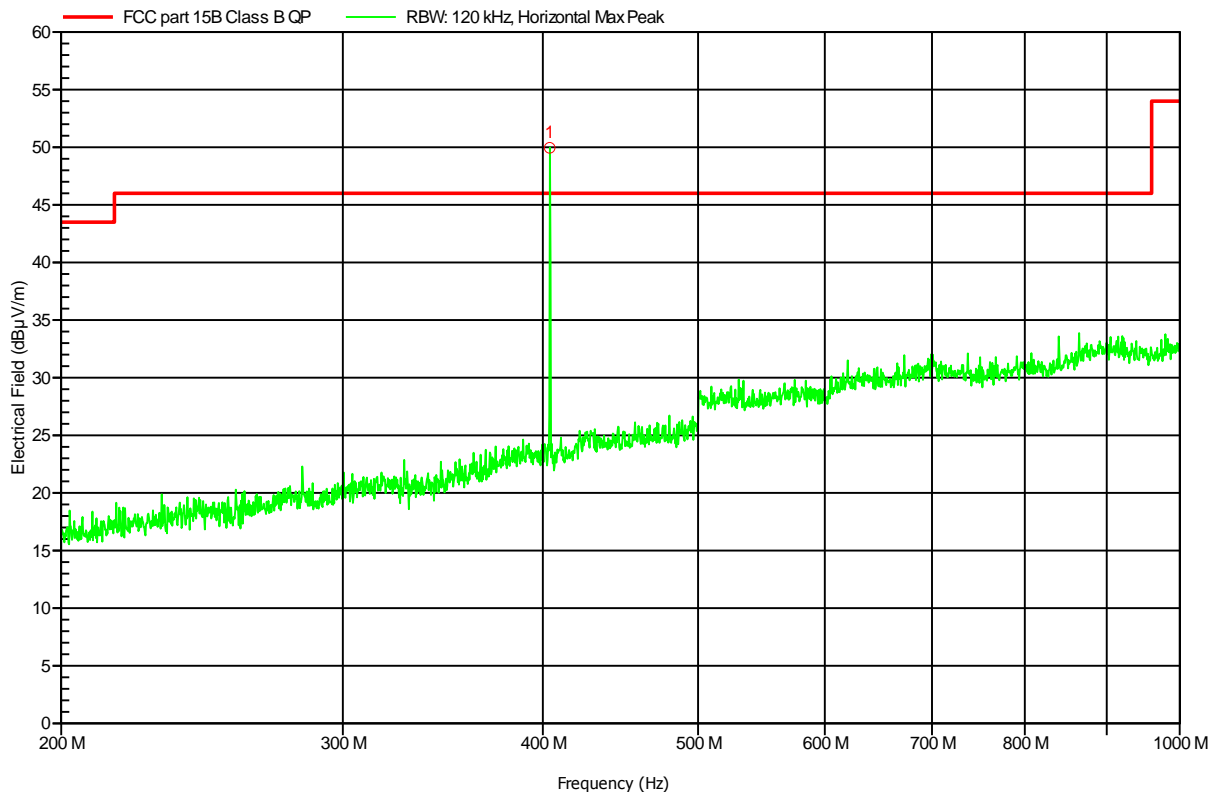


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 3,7V Accu
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3m
 Mode: UMTS Band V
 Test Date: 2013-11-29
 Note:

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 Nr
1

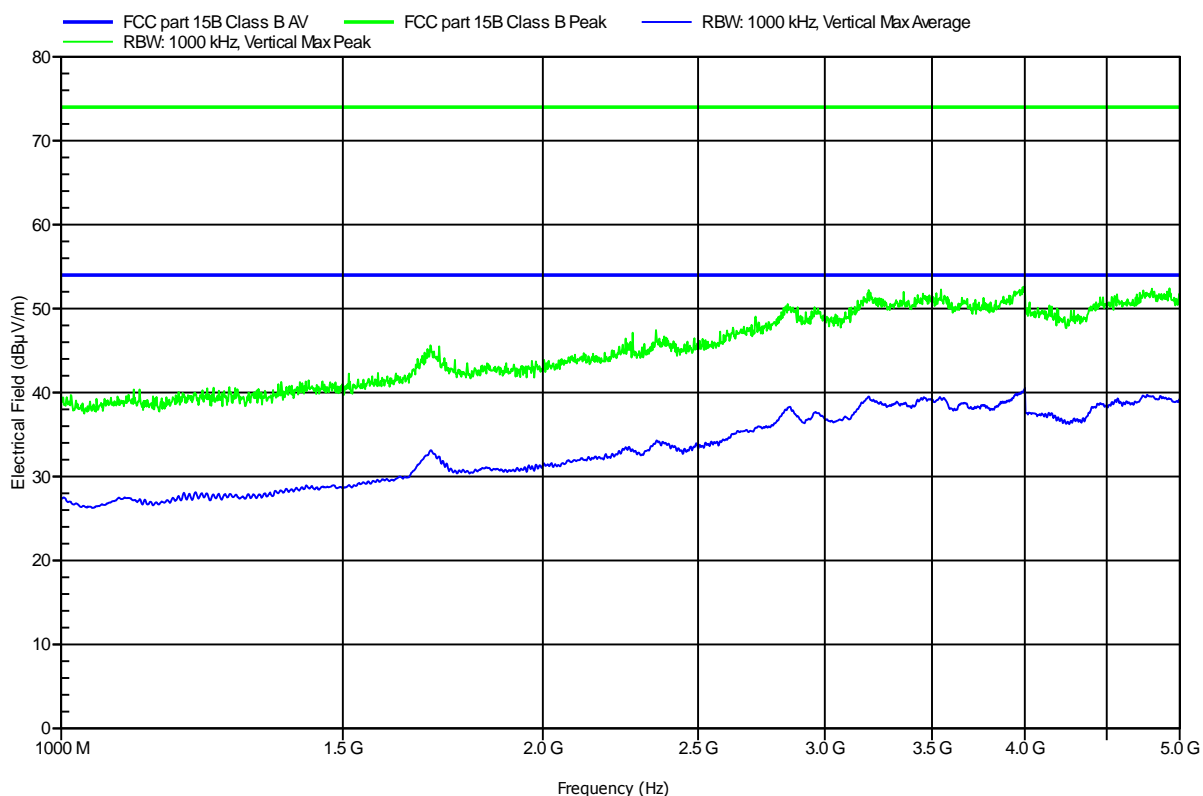
 Frequency
403.94 MHz TX

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 3,7V Accu
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	UMTS Band V
Test Date:	2013-11-29
Note:	

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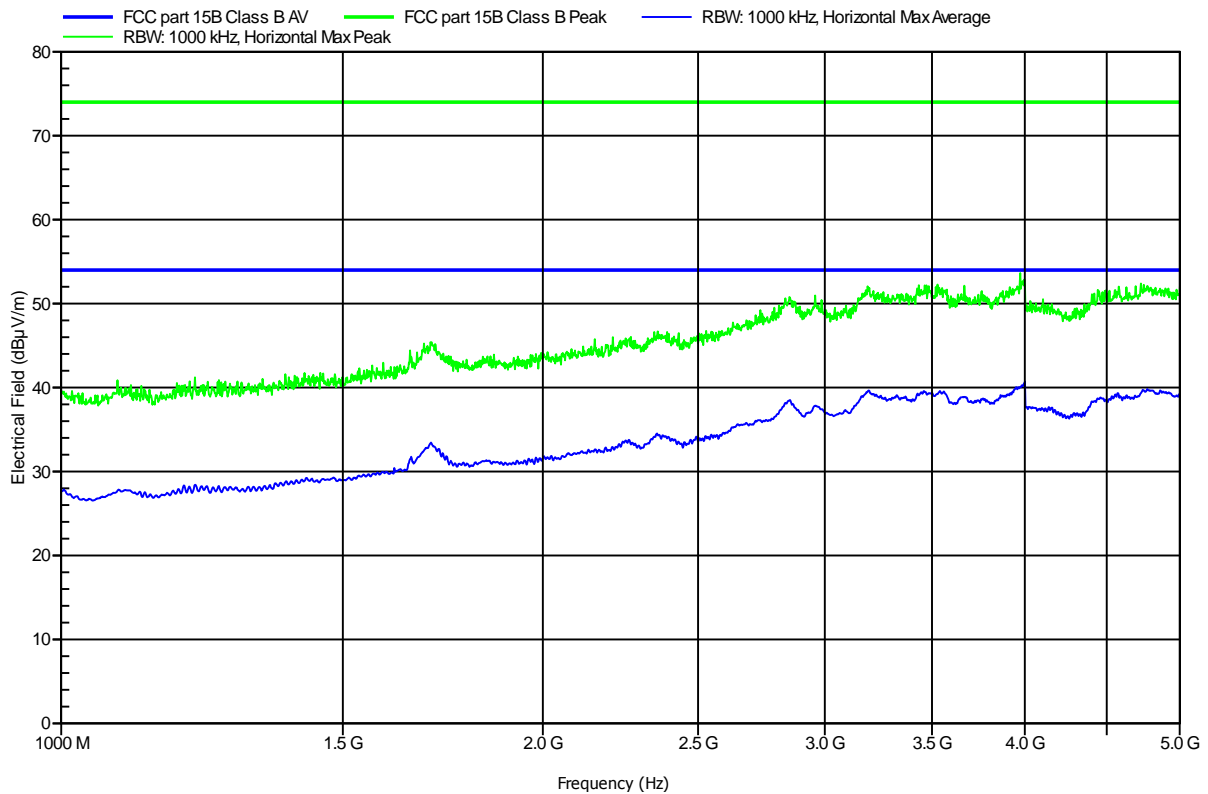


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 3,7V Accu
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3m
Mode:	UMTS Band V
Test Date:	2013-11-29
Note:	

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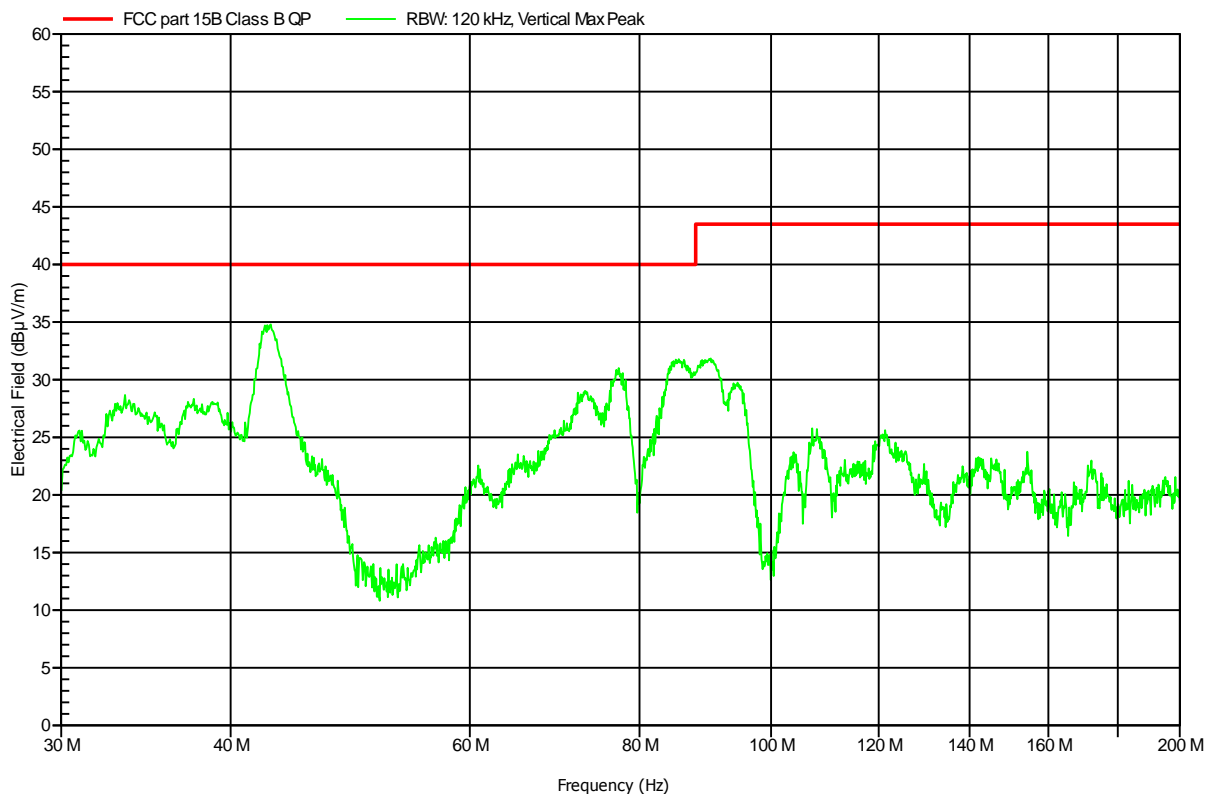


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	UMTS Band V + charging mode
Test Date:	2013-11-29
Note:	

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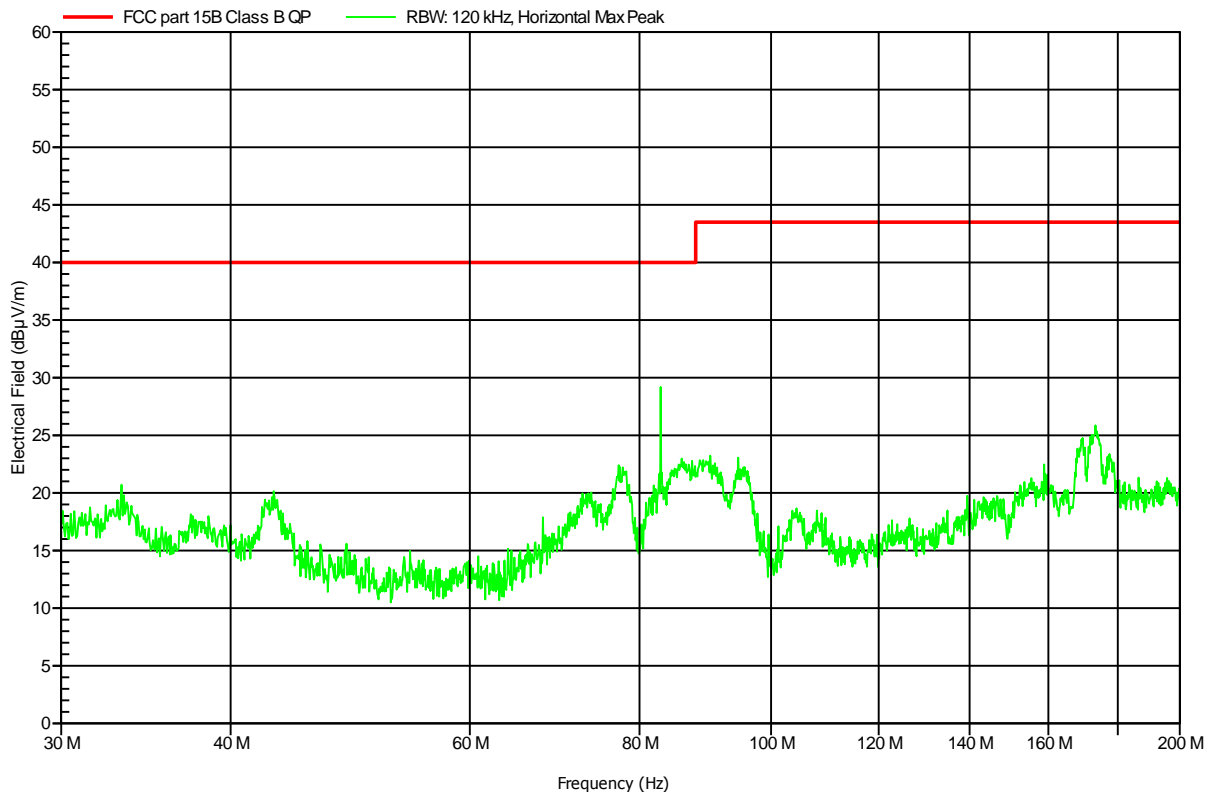


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	UMTS Band V + charging mode
Test Date:	2013-11-29
Note:	

Index 2

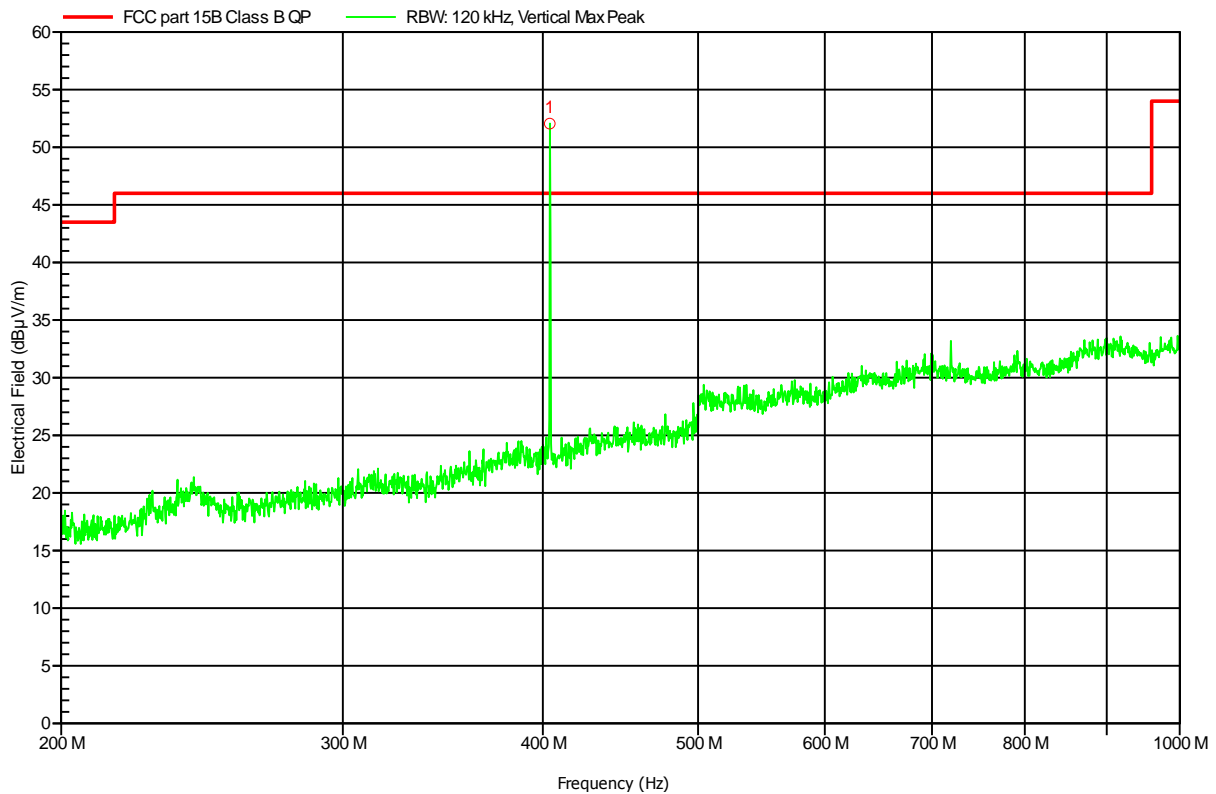


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3m
 Mode: UMTS Band V+ charging mode
 Test Date: 2013-11-29
 Note:

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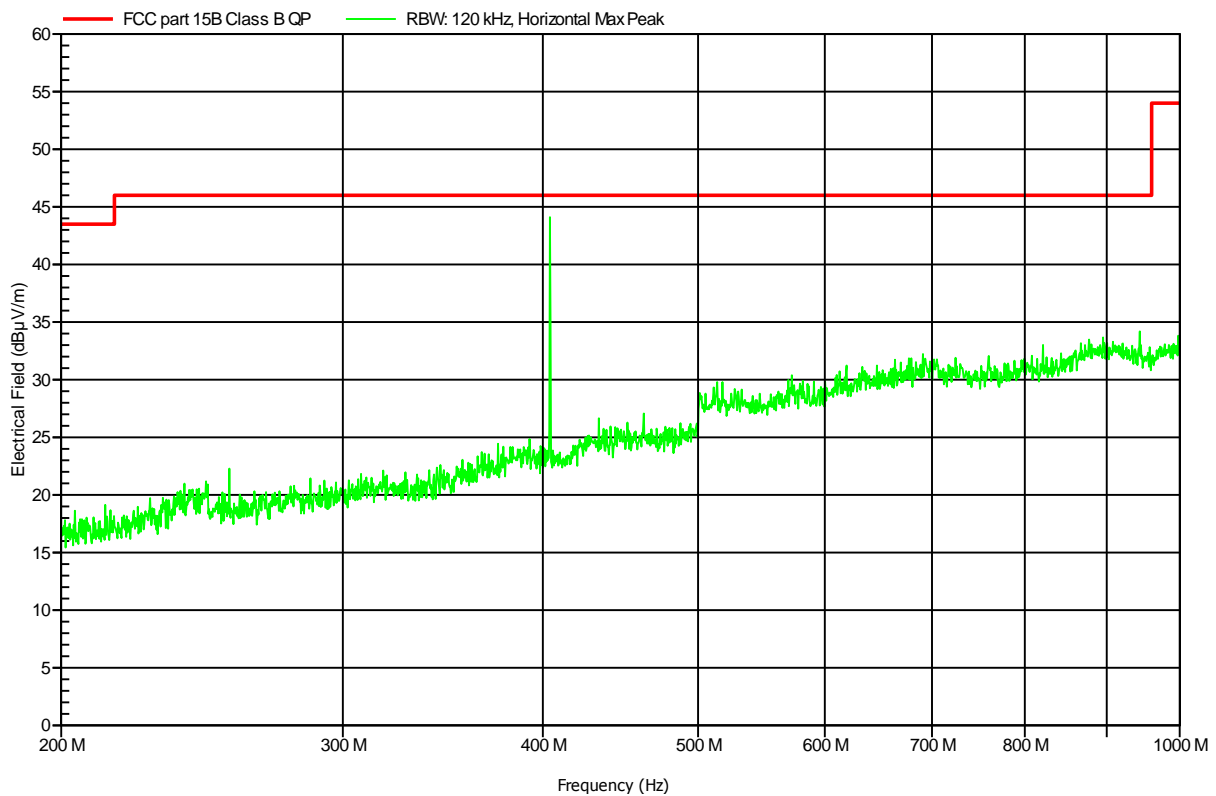
Nr 1
 Frequency 404 MHz TX

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	UMTS Band V + charging mode
Test Date:	2013-11-29
Note:	

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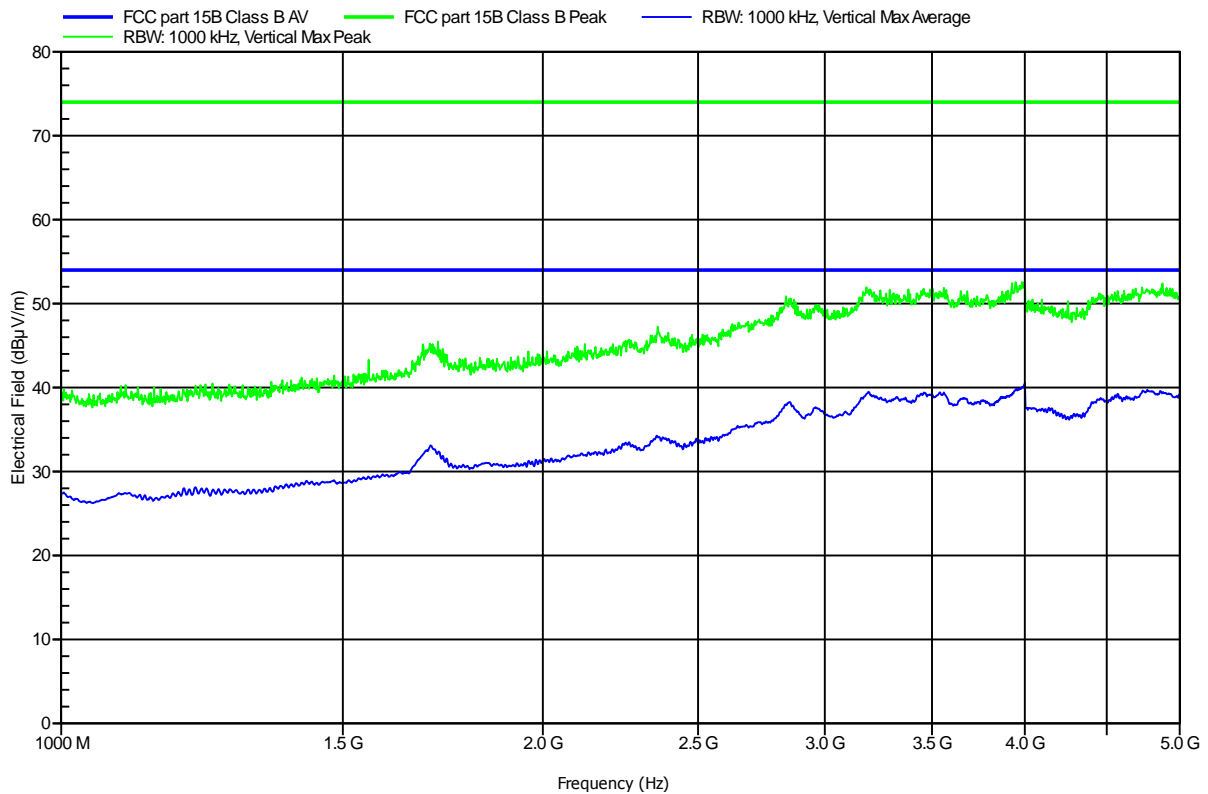


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	UMTS Band V + charging mode
Test Date:	2013-11-29
Note:	

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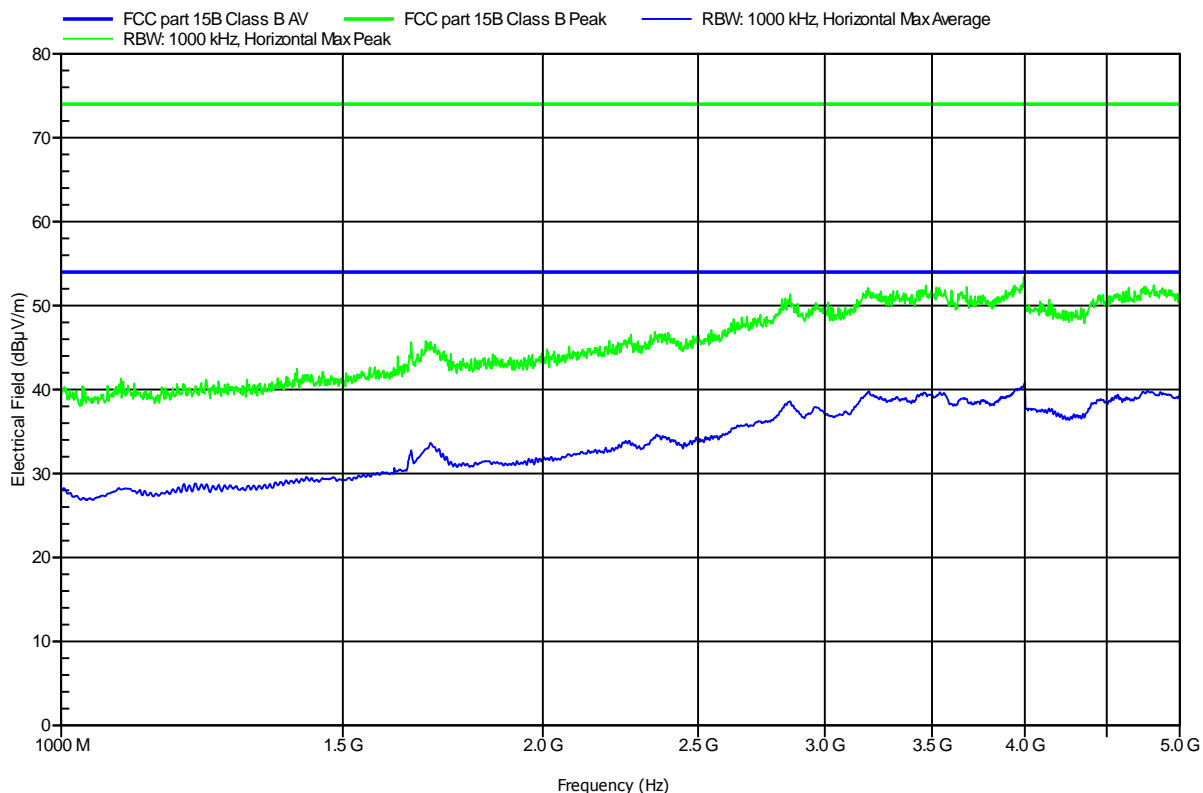


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3m
 Mode: UMTS Band V + charging mode
 Test Date: 2013-11-29
 Note:

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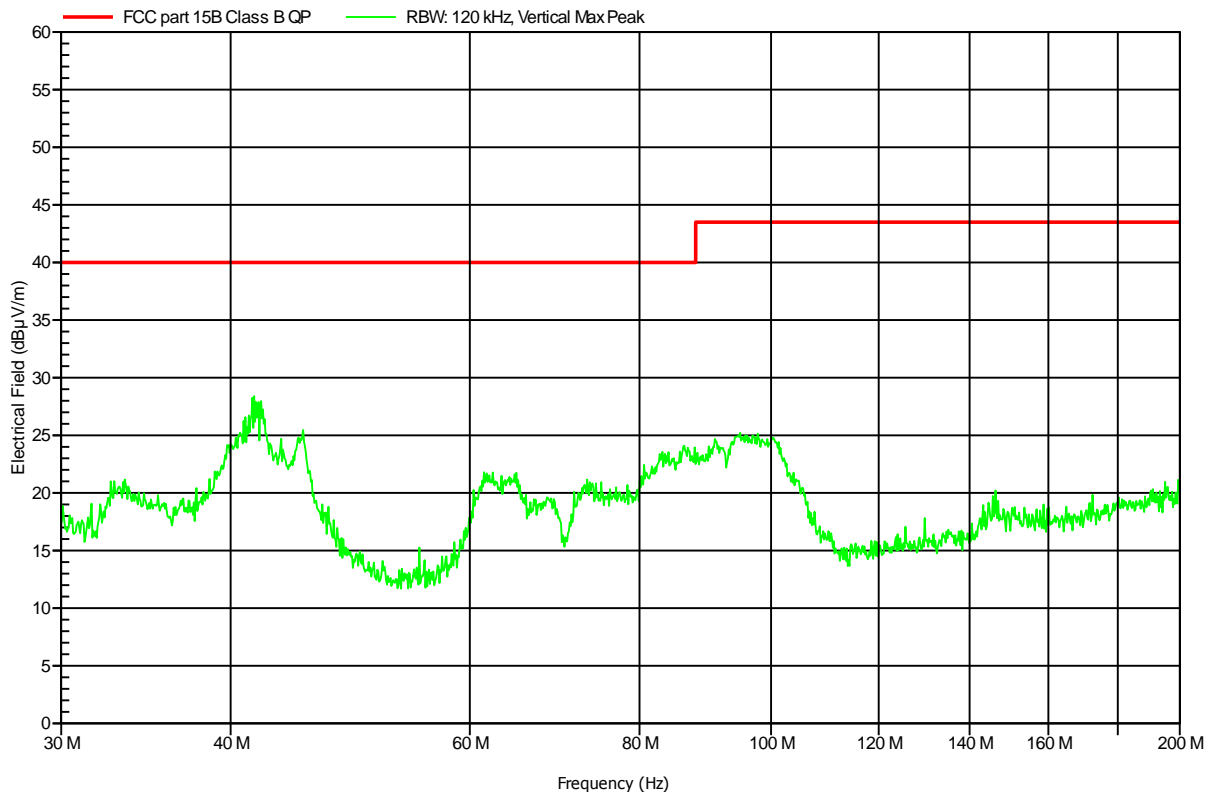


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	GSM 850 MHz + charging mode
Test Date:	2013-12-10
Note:	

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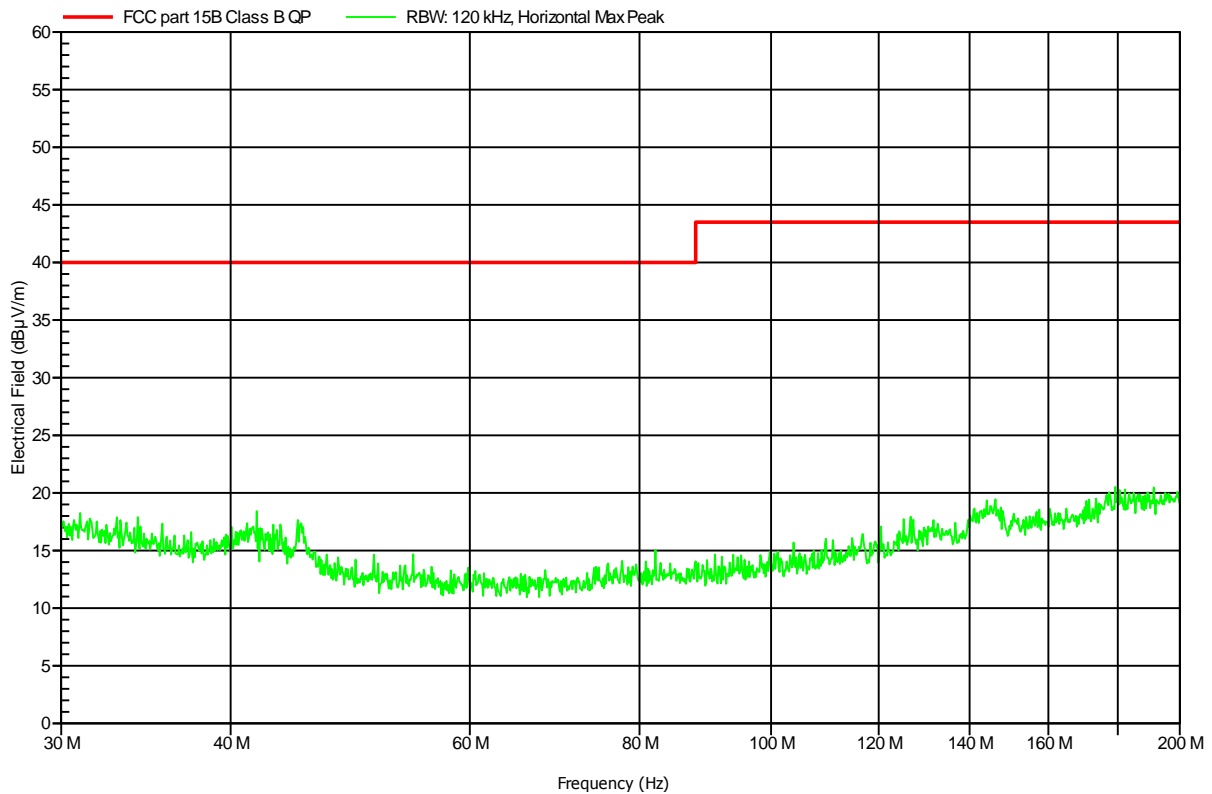


Spurious emissions under normal conditions according to FCC 15B

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Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	GSM 850 MHz + charging mode
Test Date:	2013-12-10
Note:	

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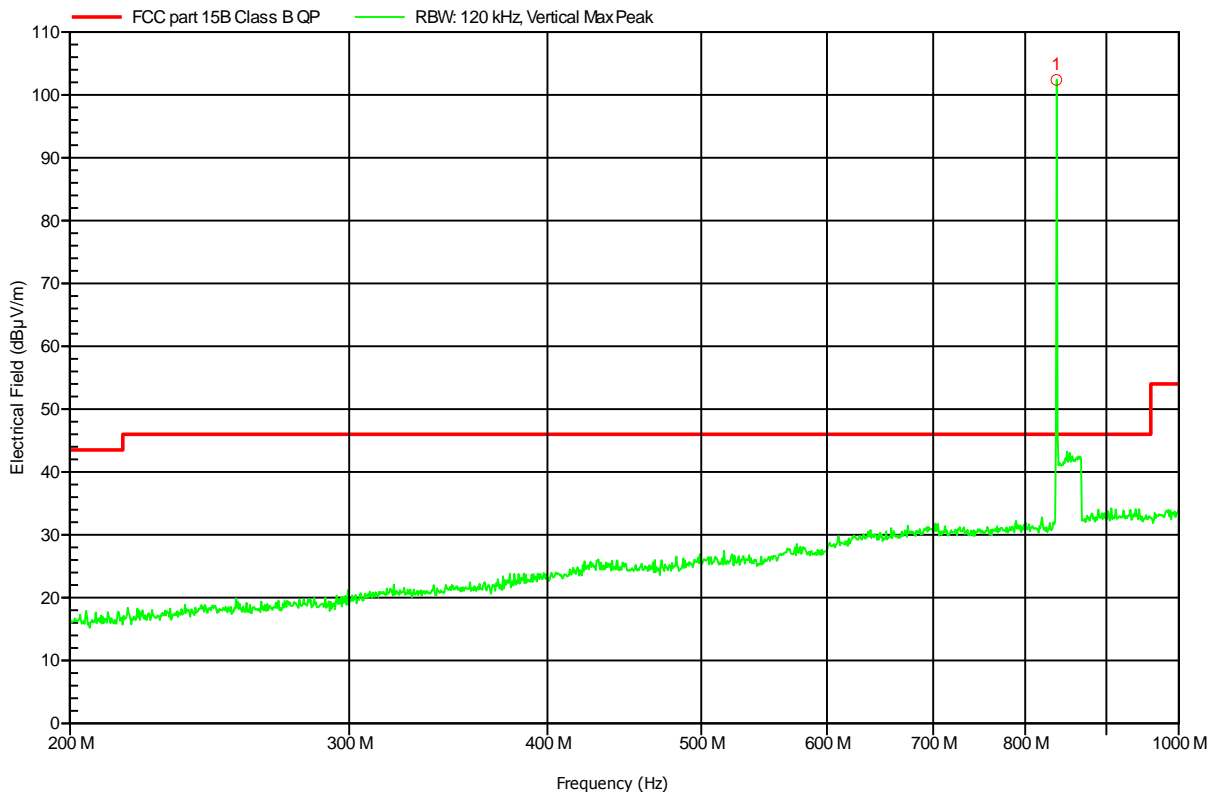


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3m
 Mode: GSM 850 MHz + charging mode
 Test Date: 2013-12-10
 Note:

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Nr	Frequency
1	837.08 MHz

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3m
 Mode: GSM 850 MHz + charging mode
 Test Date: 2013-12-10
 Note:

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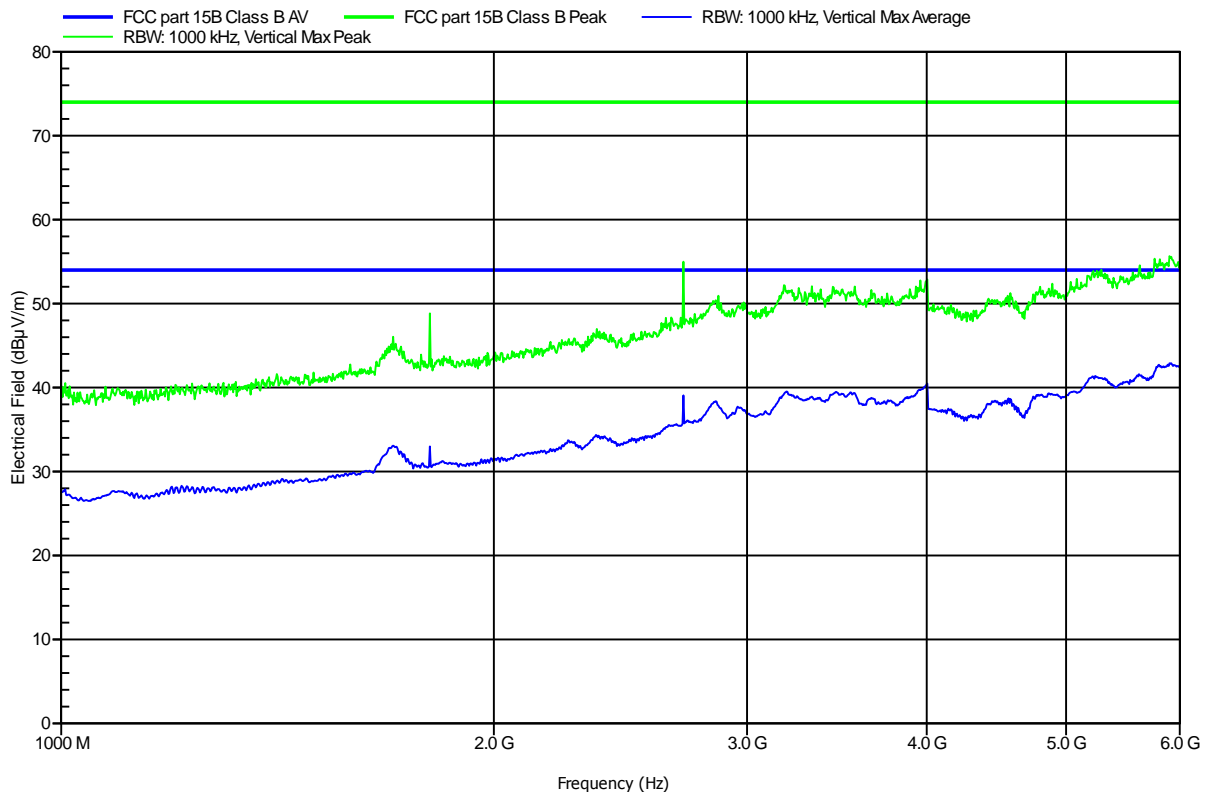
Nr	Frequency
1	836.999 MHz

Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3m
Mode:	GSM 850 MHz + charging mode
Test Date:	2013-12-10
Note:	

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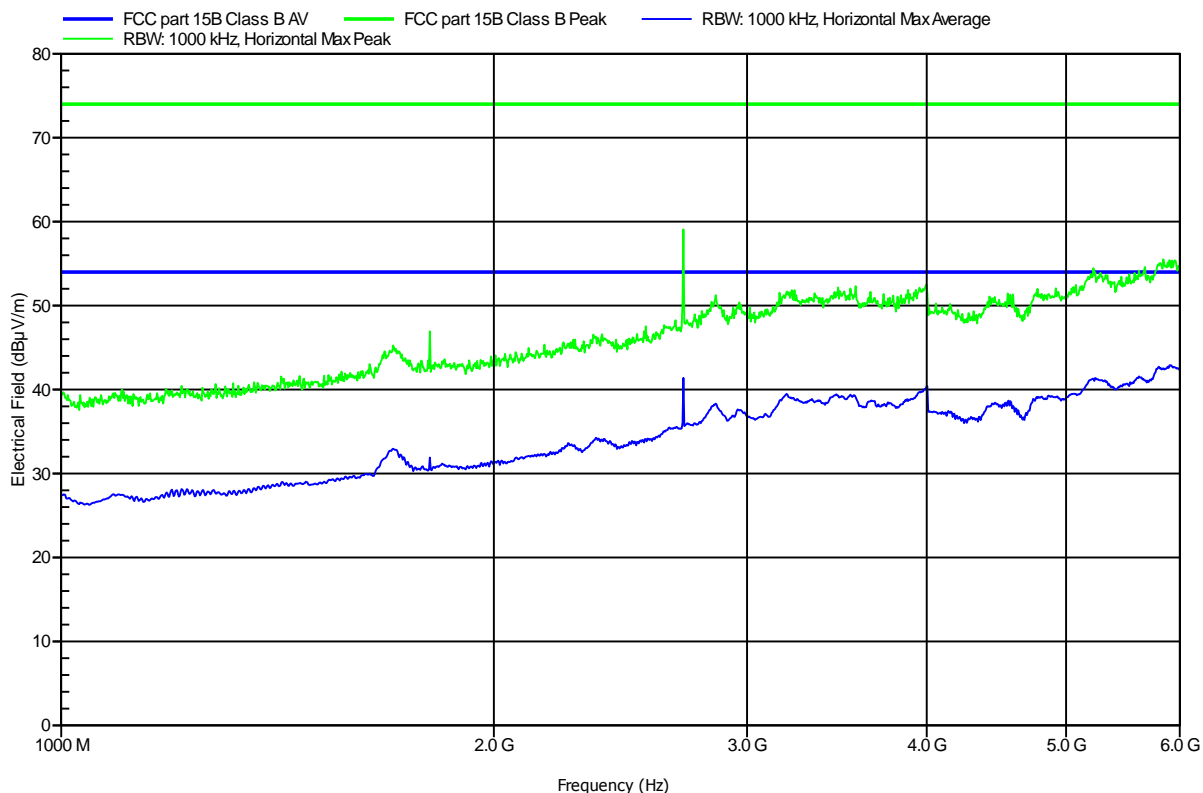


Spurious emissions under normal conditions according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC (FW7520/05 AC/DC-adapter)
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3m
 Mode: GSM 850 MHz + charging mode
 Test Date: 2013-12-10
 Note:

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3.2 Test Conditions and Results – AC power line conducted emissions

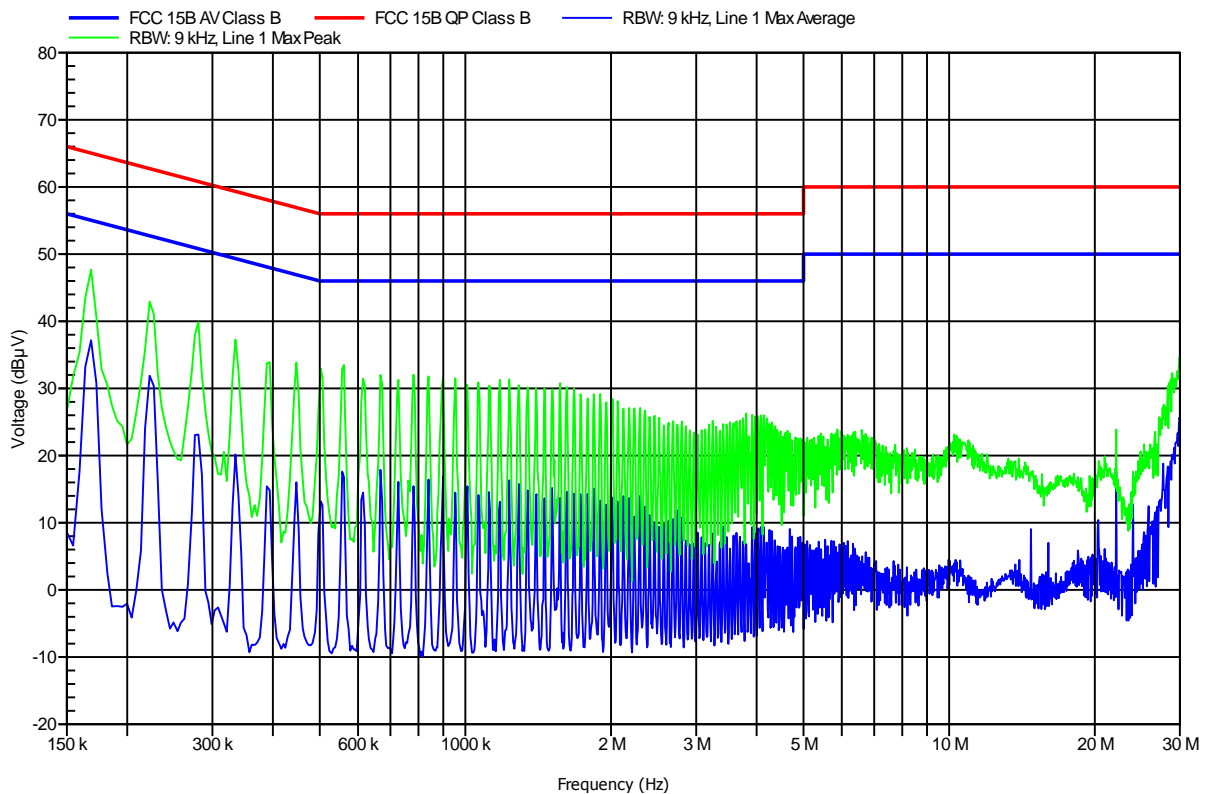
Conducted emissions acc. FCC 47 CFR 15.107 / IC RSS-Gen		Verdict: PASS		
Laboratory Parameters:	Required prior to the test	During the test		
Ambient Temperature	15 to 35 °C	23°C		
Relative Humidity	30 to 60 %	35%		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Sample is tested with respect to the requirements of the equipment class	Equipment class			
	Class B			
Points of Application	Application Interface			
AC Mains	LISN			
Operating mode	2 + 3			
Limits and results Class B				
Frequency [MHz]	Quasi-Peak [dBµV]	Result	Average [dBµV]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS
Comments: * Limit decreases linearly with the logarithm of the frequency. GSM 850 and UMTS Band V were declared as worst case by test laboratory. GSM 1900 and UMTS Band II / IV were also considered but no additional measurements were performed.				

EMI voltage test in the ac-mains according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC/60Hz (FW7520/05 AC/DC-adapter)
LISN:	ESH2-Z5 L
Mode:	UMTS Band 5 link + charge mode
Test Date:	2013-11-19
Note:	

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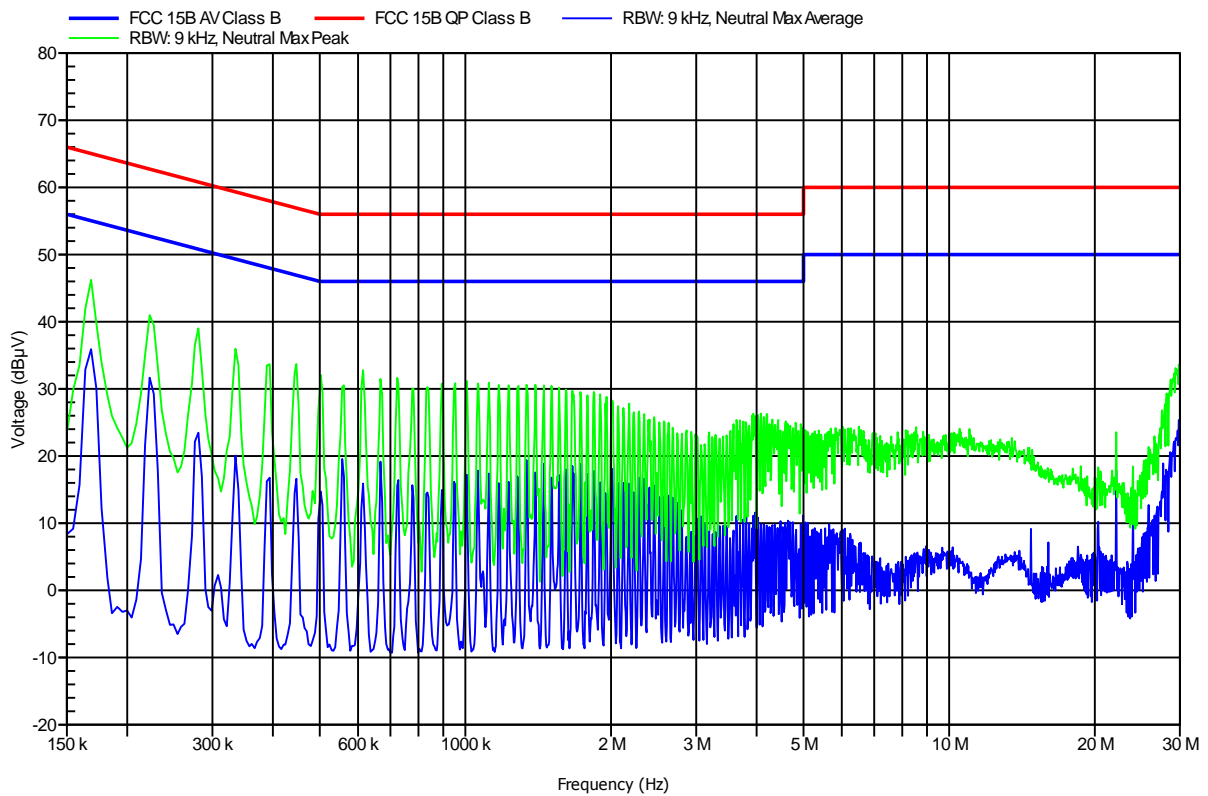


EMI voltage test in the ac-mains according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC/60Hz (FW7520/05 AC/DC-adapter)
LISN:	ESH2-Z5 N
Mode:	UMTS Band V link + charge mode
Test Date:	2013-11-19
Note:	

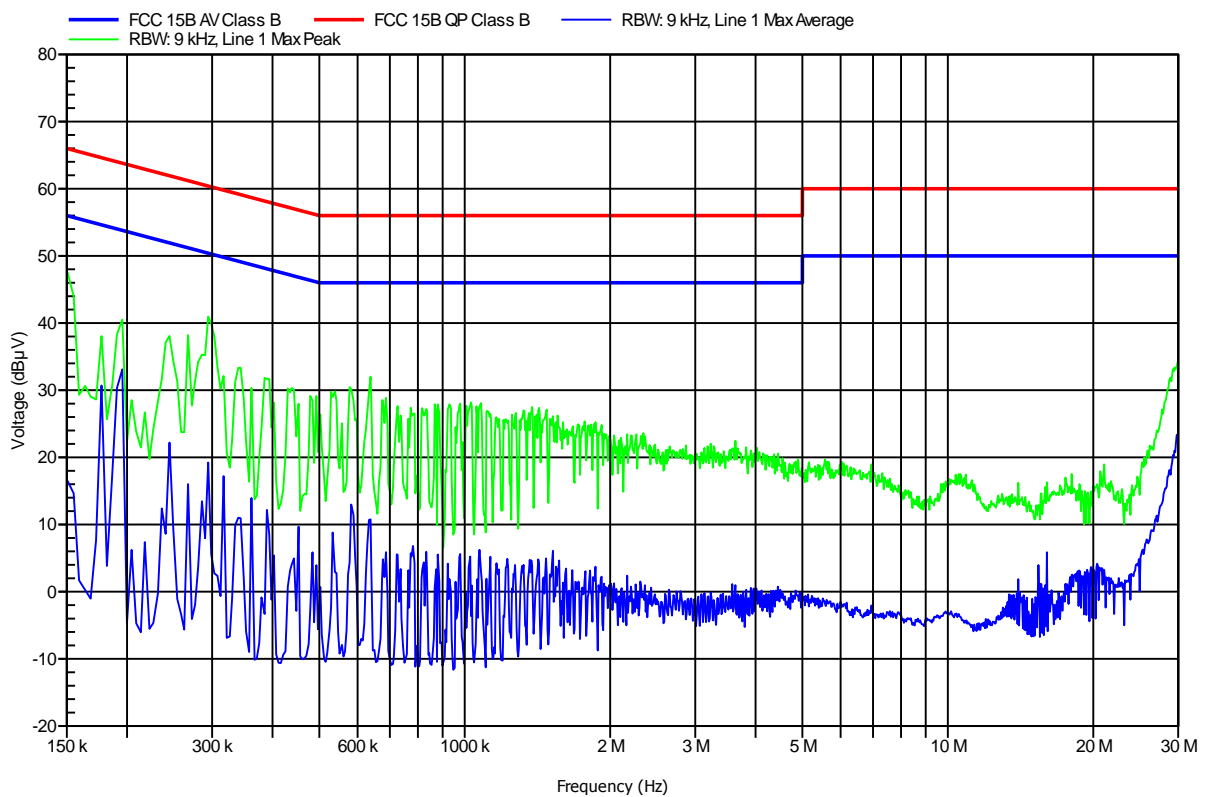
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EMI voltage test in the ac-mains according to FCC 15B

Project number: G0M-1309-3226

Manufacturer: Biotronik SE & Co. KG
 EUT Name: CardiomessengerSmart3G
 Model: 399525001009
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pflug
 Test Conditions: Tnom: 23°C, Unom: 120VAC/60Hz (FW7520/05 AC/DC-adapter)
 LISN: ESH2-Z5 L
 Mode: GSM 850 link + charge mode
 Test Date: 2013-11-19
 Note:



EMI voltage test in the ac-mains according to FCC 15B

Project number: G0M-1309-3226

Manufacturer:	Biotronik SE & Co. KG
EUT Name:	CardiomessengerSmart3G
Model:	399525001009
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pflug
Test Conditions:	Tnom: 23°C, Unom: 120VAC/60Hz (FW7520/05 AC/DC-adapter)
LISN:	ESH2-Z5 N
Mode:	GSM 850 link + charge mode
Test Date:	2013-11-19
Note:	

