eurofins | Product Service

FCC TEST REPORT

FCC 47 CFR Part 95I

Medical Device Radiocommunication Service (MedRadio)

Industry Canada RSS-243

Medical Devices Operating in the 401 – 406 MHz Frequency Band

Report Reference No. ..... :	G0M-1612-6098-TFC95IM-V02
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	Biotronik SE & Co. KG
Address ..... :	Woermannkehre 1 12359 Berlin GERMANY
Test specification:	
Standard..... :	47 CFR Part 95I RSS-243, Issue 3, 2010-02
Test scope…….. ..... :	complete Radio compliance test (C2PC)
Equipment under test (EUT):	
Product description	CardioMessenger Smart
Model No.	CardioMessenger Smart 3G
Additional Model(s)	None
Brand Name(s)	BIOTRONIK
Hardware version	Cardiomessenger Smart 3G mit LP, Best. LP1//TelexSmart3G,Rev. Fx
Firmware / Software version	SMARTAPP 1.xx
	FCC-ID: QRICMSMART IC: 4708A-CMSMART
Test result	**Passed**

Possible test case verdicts:

- neither assessed nor tested ..... : N/N
- required by standard but not appl. to test object ..... : N/A
- required by standard but not tested ..... : N/T
- not required by standard for the test object ..... : N/R
- 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 ..... : 2016-12-19

Date (s) of performance of tests ..... : 2016-12-21

Compiled by ..... : Wilfried Treffke

Tested by (+ signature) ..... : Wilfried Treffke .....W. Treffke.....
(Responsible for Test)

Approved by (+ signature) ..... : Christian Weber .....C. Weber.....
(Head of Lab)

Date of issue ..... : 2017-03-16

Total number of pages ..... : 100

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:

The EUT can operate with different data rates (4.106kbit/s / 16.425kbit/s / 32.849kbit/s / 197.095kbit/s). Evaluation measurements were performed for worst case selection. For testing the EUT is configured to operate with 197.095 kbit/s as worst case situation.

Version History

Version	Issue Date	Remarks	Revised by
01	2017-02-17	Initial Release	
02	2017-03-16	Page 36, Frequency stability results corrected	W. Treffke

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1 Equipment (Test item) Description

Description	CardioMessenger Smart	
Model	CardioMessenger Smart 3G	
Additional Model(s)	None	
Brand Name(s)	BIOTRONIK	
Serial number	64740589	
Hardware version	Cardiomessenger Smart 3G mit LP, Best. LP1//TelexSmart3G,Rev. Fx	
Software / Firmware version	SMARTAPP 1.xx	
PMN	N/A	
HVIN	CardioMessenger Smart 3G	
FVIN	N/A	
HMN	N/A	
FCC-ID	QRICMSMART	
IC	4708A-CMSMART	
Equipment type	End product	
Radio type	Transceiver	
Number of Radios	1 Transceivers are built into the device	
Radio technology	MedRadio (MICS) programmer / control tranmitter	
Operating frequency range	402 - 405 MHz	
Assigned frequency band	402 - 405 MHz	
Main test frequencies	F_{LOW}	402.45 MHz
	F_{MID}	403.65 MHz
	F_{HIGH}	404.85 MHz
Modulations	2-FSK	
Emission designator	F1D	
Number of channels	9	
Channel spacing	300 kHz	
Spectrum access	Listen before transmit	
Number of antennas	2	
Antenna 1	Type	integrated
	Model	loop antenna
	Manufacturer	see Manufacturer
	Gain	-1.37 dBi (Determined by measurements)
Manufacturer	Biotronik SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	

Power supply	V_{NOM}	3.7 VDC
	V_{MIN}	3.1 VDC
	V_{MAX}	4.16 VDC
Temperature	T_{NOM}	20°C
	T_{MIN}	-20 °C
	T_{MAX}	40 °C
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

1.1 Photos - Equipment external

EUT TOP

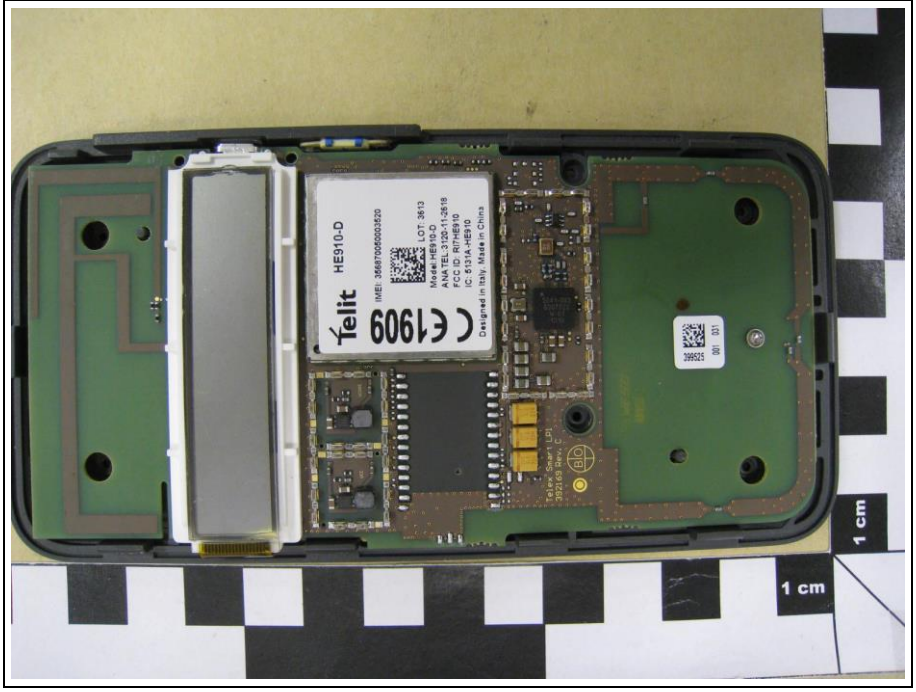
EUT BOTTOM

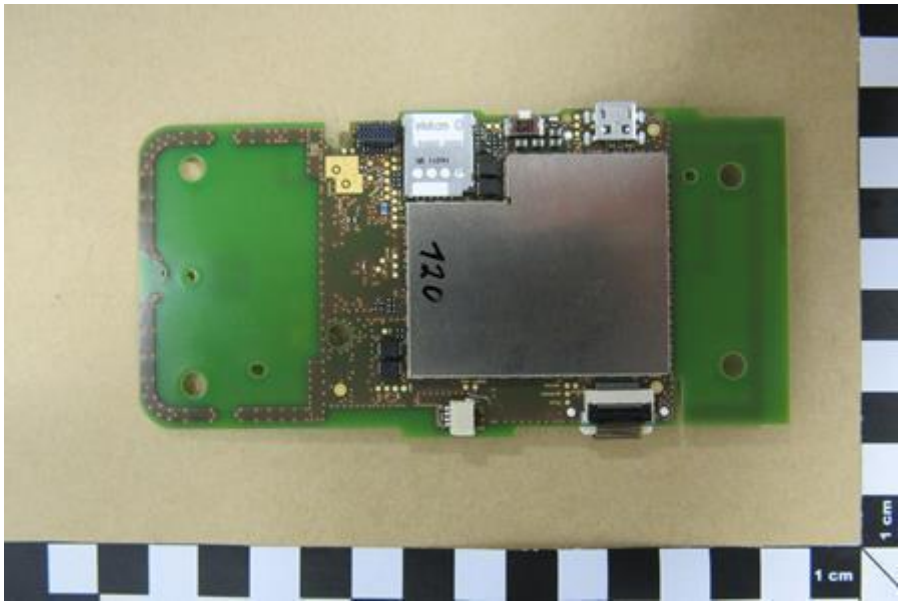
EUT CONNECTORS

1.2 Photos - Equipment internal

PCB TOP

PCB TOP WITHOUT SHIELDING



PCB BOTTOM


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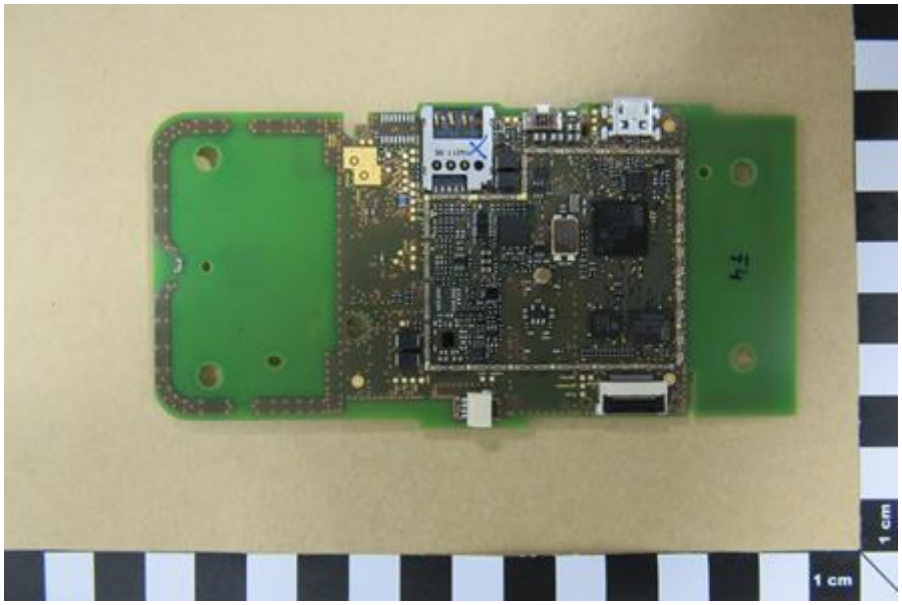
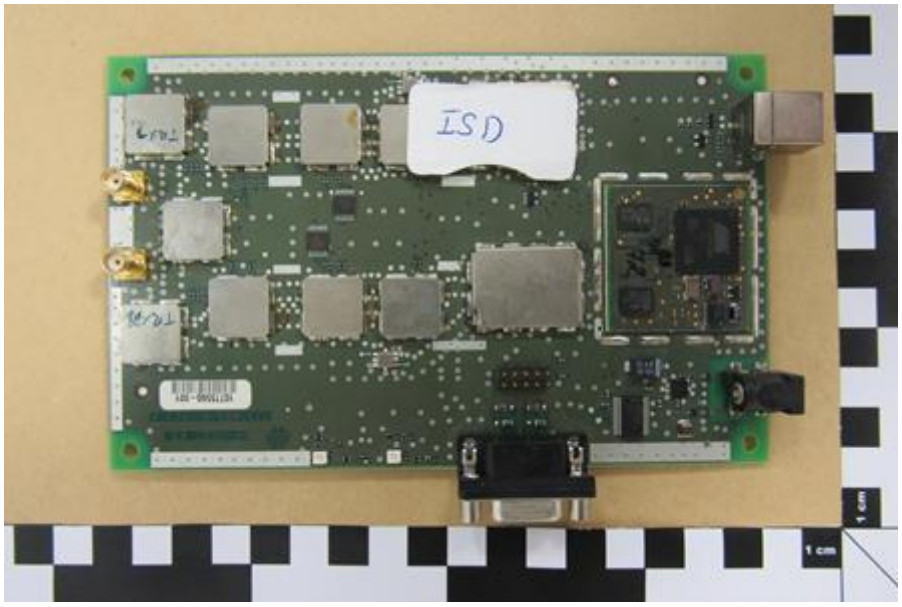


SIM: COMPANION DEVICE IMPLANT SIMULATOR TOP


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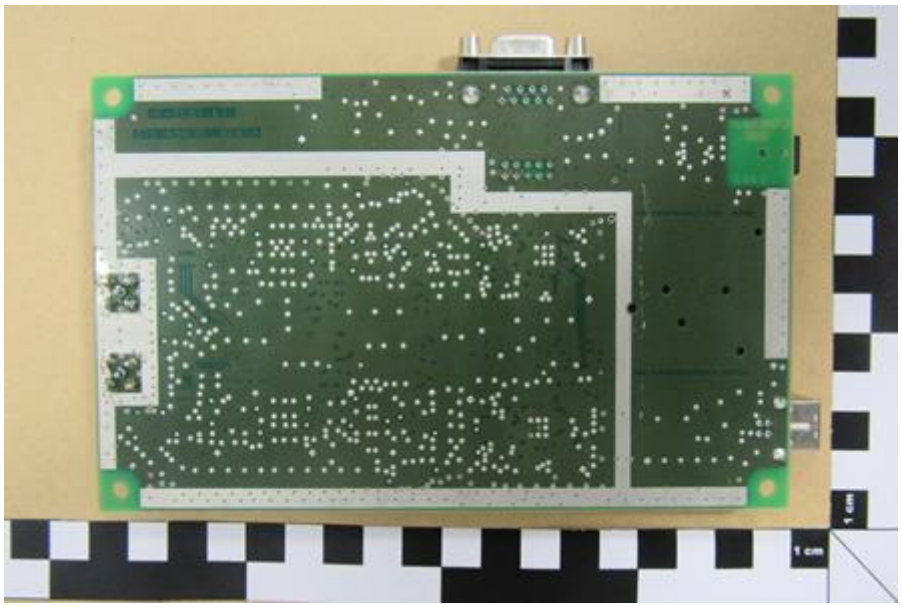


1.3 Photos – Test setup

Test setup – Radiated emissions

Test setup – Conducted Emissions

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
SIM	Test board Implant Simulator	Biotronik SE & Co. KG	None	Companion device for monitoring test

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes:

Mode #	Description	
Unmodulated	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = None Modulation = None Duty cycle = 100 % Power level = Maximum
Modulated	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Modulation = FSK Duty cycle = 100 % Power level = Maximum
Monitoring A	General conditions:	EUT powered by laboratory power supply. EUT channels adjusted to monitoring conditions by administrative commands without companion device.
	Radio conditions:	Mode = standalone transmit Modulation = FSK Duty cycle = normal
Monitoring B	General conditions:	EUT powered by laboratory power supply. EUT with communication session to companion device.
	Radio conditions:	Mode = standalone transmit Modulation = FSK Duty cycle = normal
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive Modulation = FSK
AC-Powerline	General conditions:	EUT connected to and powered by base unit via USB. Active data connection between EUT and base unit. AC connection to base unit.
	Radio conditions:	Mode = transmit Modulation = FSK Duty cycle = normal Power level = Maximum

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2015.2.4

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSU 26	EF01003	2016-03	2017-03

Emission Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSU 26	EF01003	2016-03	2017-03

Frequency Stability					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSU 26	EF01003	2016-03	2017-03

Effective radiated power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 2	EF00196	-	-
Spectrum Analyzer	R&S	FSEK30	EF00168	2016-12	2017-12
LPD Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 2	EF00196	-	-
Spectrum Analyzer	R&S	FSEK30	EF00168	2016-12	2017-12
Biconical Antenna	R&S	HK 116	EF00012	2016-05	2019-05
LPD Antenna	R&S	HL 223	EF00187	2016-05	2019-05
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10

AC powerline conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH3-Z5	EF00036	2014-12	2016-12
EMI Test Receiver	R&S	ESCS 30	EF00295	2016-11	2017-11

Monitoring system scan cycle time					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2016-04	2017-04
Signal Generator	R&S	SMP 02	EF00165	2015-05	2017-05

Minimum channel monitoring period					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2016-04	2017-04
Signal Generator	R&S	SMP 02	EF00165	2015-05	2017-05

Channel access					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2016-04	2017-04
Signal Generator	R&S	SMP 02	EF00165	2015-05	2017-05

Discontinuation of MICS session					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2016-04	2017-04
Signal Generator	R&S	SMP 02	EF00165	2015-05	2017-05

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 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) = 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	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m = -9.5 dB

2 Result Summary

FCC 47 CFR Part 95E, 95I, 15C, IC RSS-243, IC RSS-Gen				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
IC RSS-243 3.2 IC RSS-Gen 6.6	Occupied bandwidth	RSS-Gen 6.6	N/A	Informational only
FCC 95.628(d) FCC § 95.633(e) IC RSS-243 3.6, 5.1	Emission bandwidth	FCC § 95.628(a)(6)(i) FCC § 95.633(e)(3)	PASS	
FCC 95.628(e) IC RSS-243 3.3, 5.3 RSS-Gen 8.11	Frequency stability	EN 301 839-1 8.1	PASS	
FCC § 95.6369(f) IC RSS-243 § 5.4	Transmitter output power	EN 301 839-1 8.3	PASS	
FCC § 95.635(d) IC RSS-243 § 3.4, 5.5	Band edge compliance	FCC § 95.635(d) ANSI C63.4	PASS	
FCC § 95.635(d) IC RSS-243 § 3.4, 5.5 RSS-Gen 6.13	Transmitter unwanted emissions	FCC § 95.635(d) ANSI C63.4	PASS	
IC RSS-243 3.5, 5.6 IC RSS-Gen 7.1	Receiver spurious emissions	ANSI C63.4	PASS	
FCC § 15.207 IC RSS-Gen 8.8	AC power line conducted emissions	ANSI C63.4	PASS	
FCC § 95.628(a)(3) IC RSS-243 3.6, 5.7.1	System threshold power levels	EN 301 839-1 10.1	PASS	
FCC § 95.628(a)(1) IC RSS-243 3.6, 5.7.2	Monitoring system bandwidth	EN 301 839-1 10.2	PASS	
FCC § 95.628(a)(2) IC RSS-243 3.6, 5.7.3	Scan cycle time	EN 301 839-1 10.3	PASS	
FCC § 95.628(a)(2) IC RSS-243 3.6, 5.7.4	Minimum channel monitoring period	EN 301 839-1 10.3	PASS	
FCC § 95.628(a)(4) IC RSS-243 3.6, 5.7.5	Channel Access	EN 301 839-1 10.4	PASS	
FCC § 95.628(a)(4) IC RSS-243 3.6, 5.7.6	Discontinuation of MICS or MEDS session	EN 301 839-1 10.5	PASS	
FCC § 95.628(a)(5) IC RSS-243 3.6, 5.7.7	Use of the pre-scanned alternate channel	EN 301 839-1 10.6	N/A	
Remarks:				

3 Test Conditions and Results

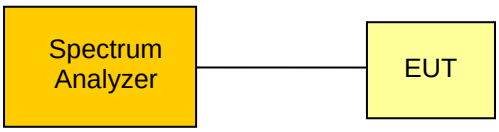
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to IC RSS-243	**Verdict: PASS**
Test according to measurement reference	Reference Method
	RSS-Gen 6.6
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
EUT test mode	Modulated

Limits

None (Informational only)

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set to 1 % of span
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

Test results – Transmitter & Antenna 1

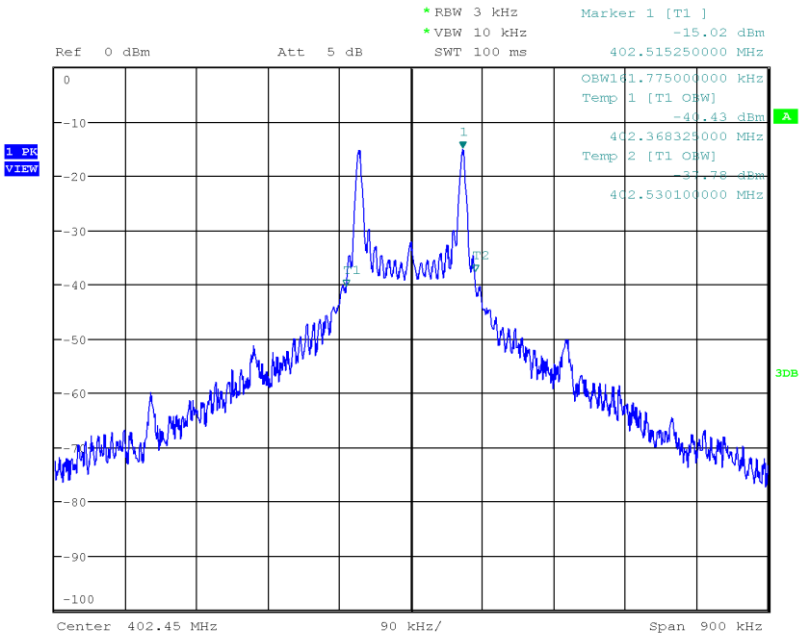
Channel	Frequency [MHz]	Data rate [kbps]	Occupied Bandwidth [kHz]
F_{LOW}	402.45	4	162.000
F_{MID}	403.65	4	164.700
F_{HIGH}	404.85	4	163.800
F_{LOW}	402.45	16	96.525
F_{MID}	403.65	16	94.275
F_{HIGH}	404.85	16	94.500
F_{LOW}	402.45	32	115.650
F_{MID}	403.65	32	115.875
F_{HIGH}	404.85	32	115.650
F_{LOW}	402.45	197	233.100
F_{MID}	403.65	197	231.750
F_{HIGH}	404.85	197	232.425

Comments:

Occupied Bandwidth – Transmitter 4kbps F_{LOW}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 4 kbps, Channel: 8, 402.45 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	161.775



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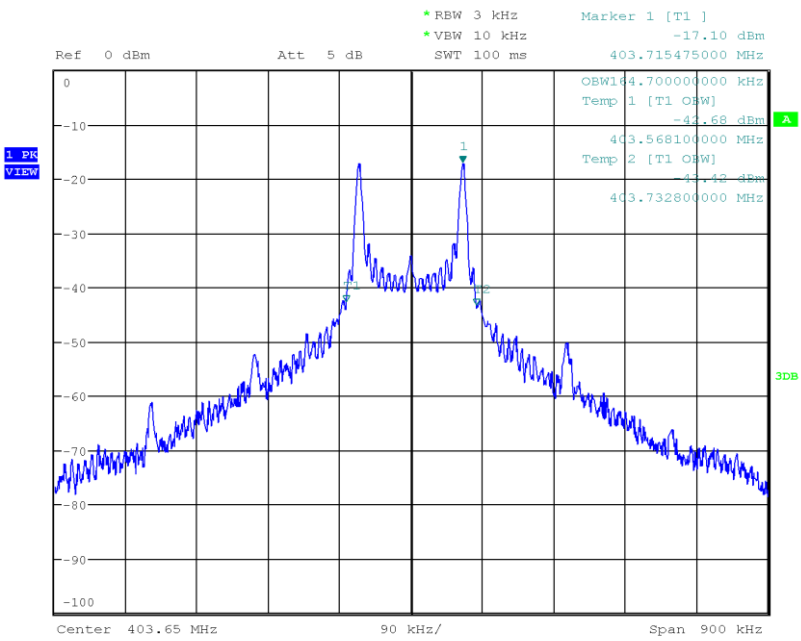
Occupied Bandwidth - Transmitter 4kbps F_{MID}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 4 kbps, Channel: 0, 403.65 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	164.700

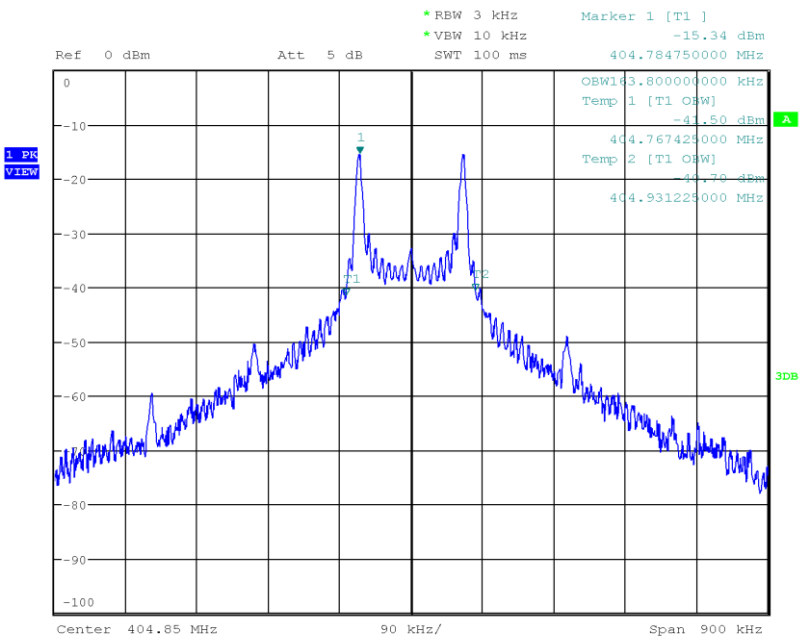


Date: 20.DEC.2016 15:07:05

Occupied Bandwidth - Transmitter 4kbps F_{HIGH}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 4 kbps, Channel: 7, 404.85 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	163.800



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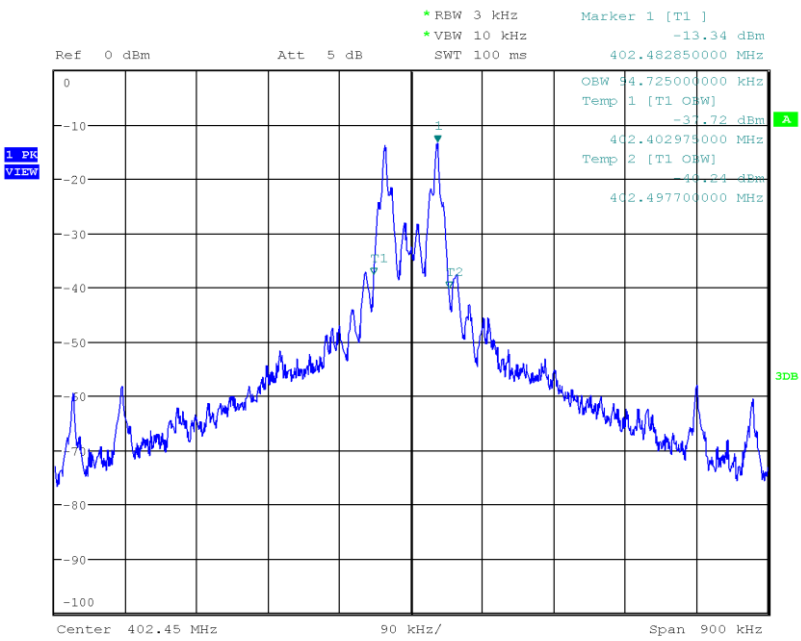
Occupied Bandwidth - Transmitter 16kbps F_{LOW}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 16 kbps, Channel: 8, 402.45 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	94.725

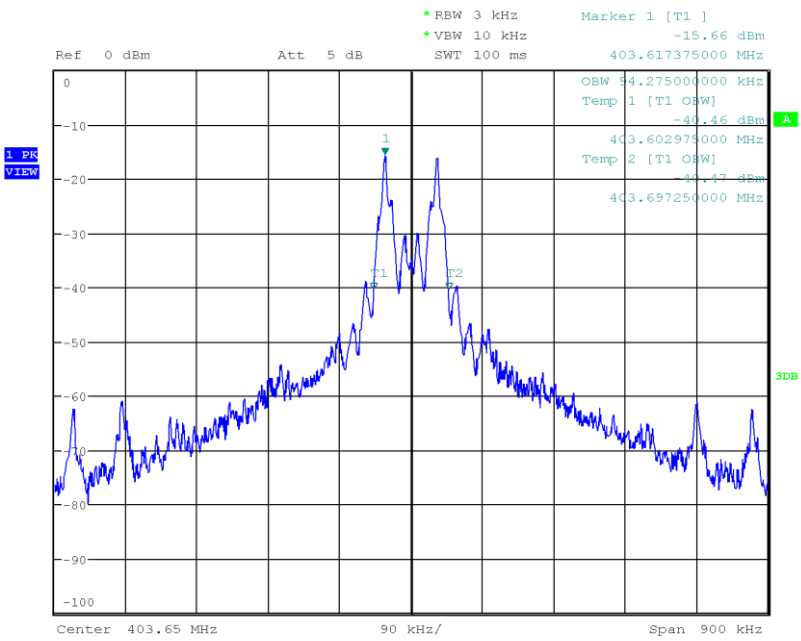


Date: 20.DEC.2016 14:47:18

Occupied Bandwidth - Transmitter 16kbps F_{MID}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 16 kbps, Channel: 0, 403.65 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	94.275



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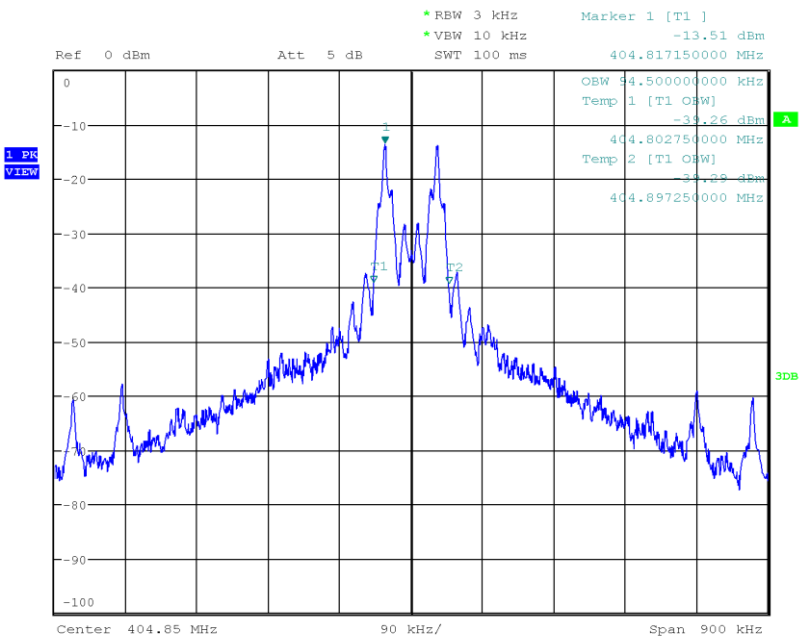
Occupied Bandwidth - Transmitter 16kbps F_{HIGH}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 16 kbps, Channel: 7, 404.85 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	94.500

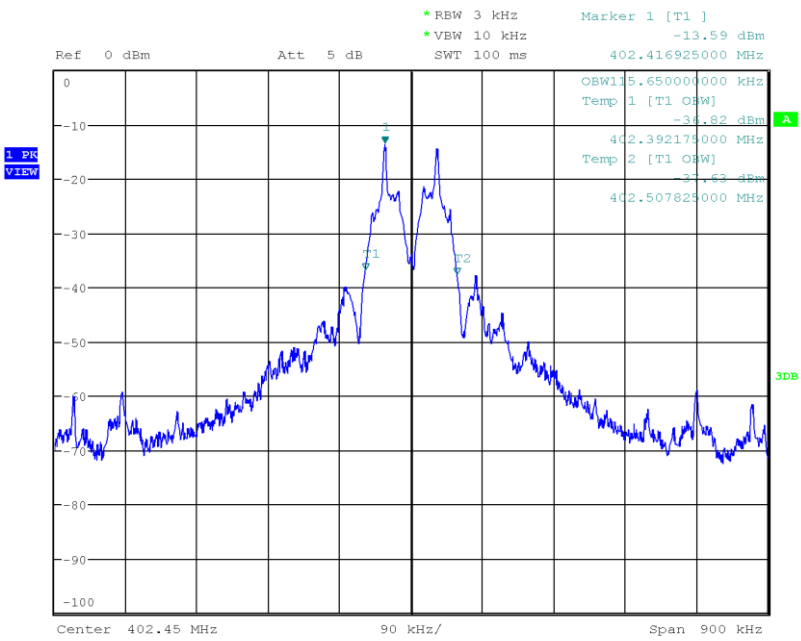


Date: 20.DEC.2016 15:20:15

Occupied Bandwidth - Transmitter 32kbps F_{LOW}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 32 kbps, Channel: 8, 402.45 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	115.650

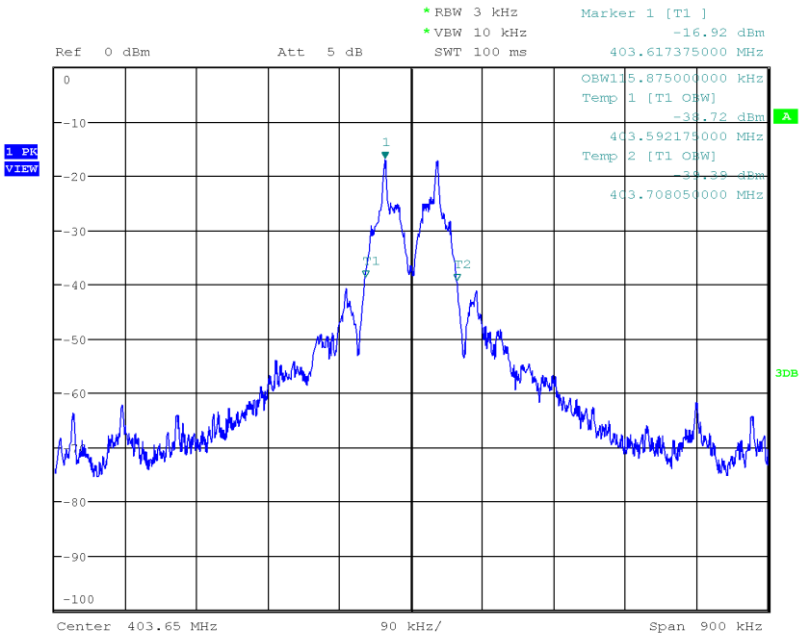


Date: 20.DEC.2016 14:58:04

Occupied Bandwidth - Transmitter 32bps F_{MID}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 32 kbps, Channel: 0, 403.65 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	115.875

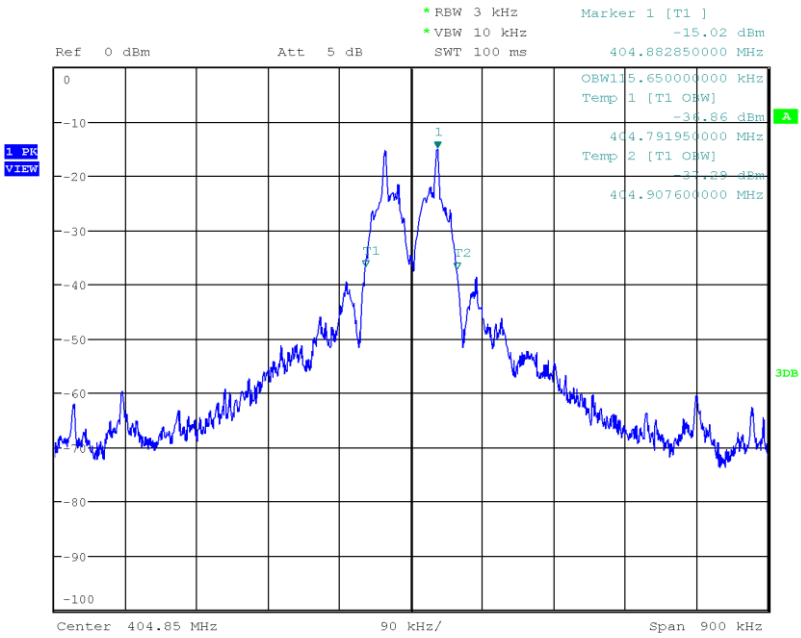


Date: 20.DEC.2016 15:12:28

Occupied Bandwidth - Transmitter 32kbps F_{HIGH}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 32 kbps, Channel: 7, 404.85 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	115.650



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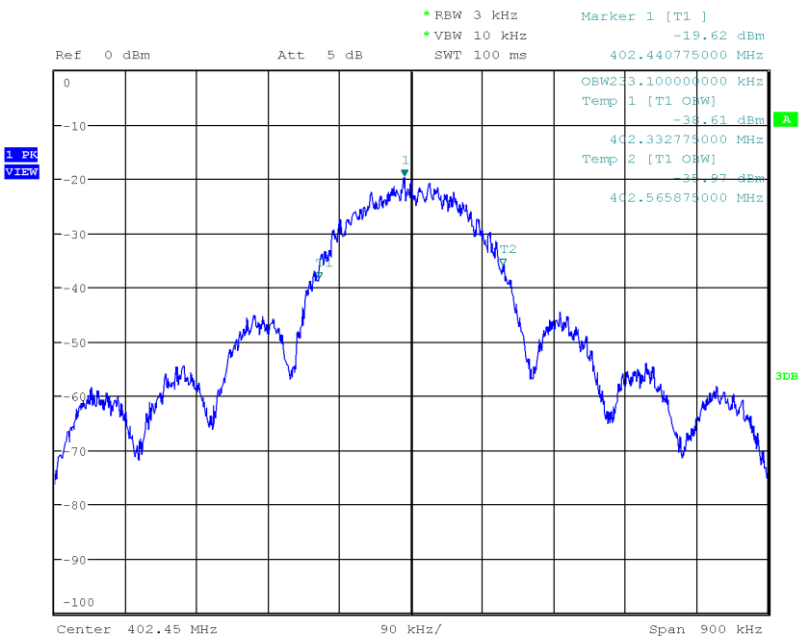
Occupied Bandwidth - Transmitter 197kbps F_{LOW}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 197 kbps, Channel: 8, 402.45 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	233.100

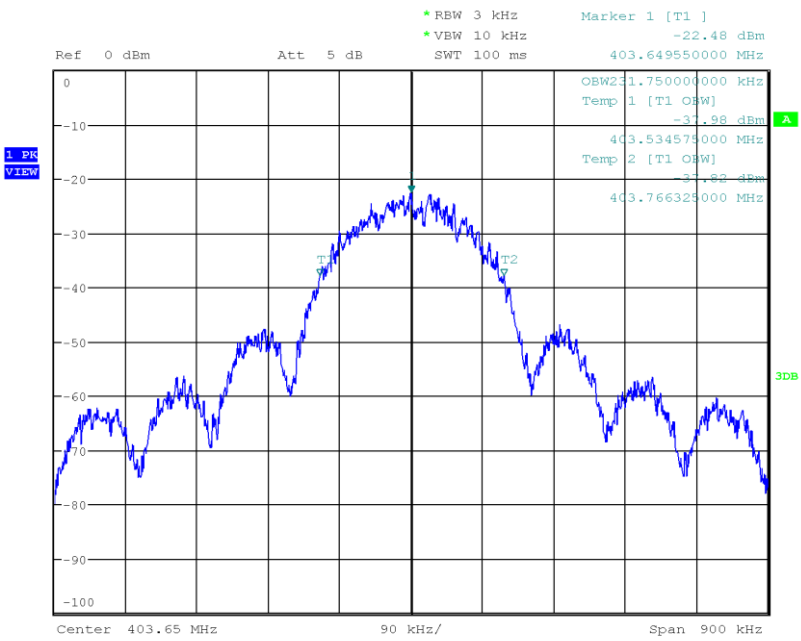


Date: 20.DEC.2016 15:01:10

Occupied Bandwidth - Transmitter 197kbps F_{MID}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 197 kbps, Channel: 0, 403.65 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	231.750

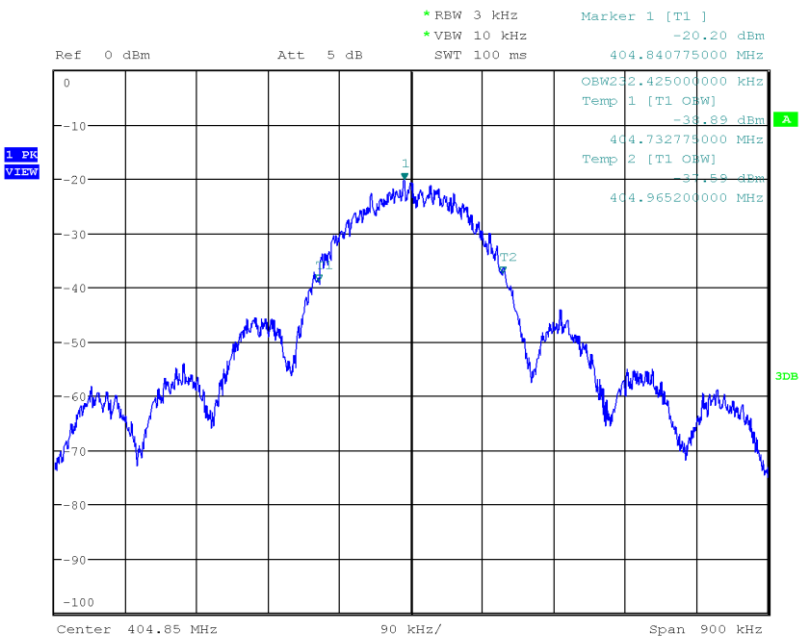


Date: 20.DEC.2016 15:15:02

Occupied Bandwidth - Transmitter 197kbps F_{HIGH}

Occupied Bandwidth RSS-243

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Method:	RSS-Gen Issue 4 6.6 (Occupied Bandwidth)
Operational Mode:	2FSK, 197 kbps, Channel: 7, 404.85 MHz
Operating Conditions:	Tnom / Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Occupied Bandwidth [kHz]:	232.425



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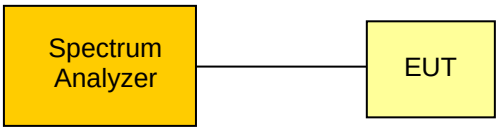
3.2 Test Conditions and Results – Emission Bandwidth

Emission Bandwidth acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 95.628(d) / FCC 95.633(e) / IC RSS-243 3.3 5.1
Test according to measurement reference	Reference Method
	FCC 95.628(a)(6)(i) / FCC 95.633(e)(3)
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
EUT test mode	Modulated

Limits

≤ 300 kHz

Test setup



Test procedure

1. EUT set to test mode
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold
4. Envelope peak value of emission spectrum is selected
5. Marker on envelope of spectrum is set to level of -20 dB to the left of the peak
6. Marker on envelope of spectrum is set to level of -20 dB to the right of the peak
7. 20 dB Emission Bandwidth is determined by marker frequency separation

Test results – Transmitter

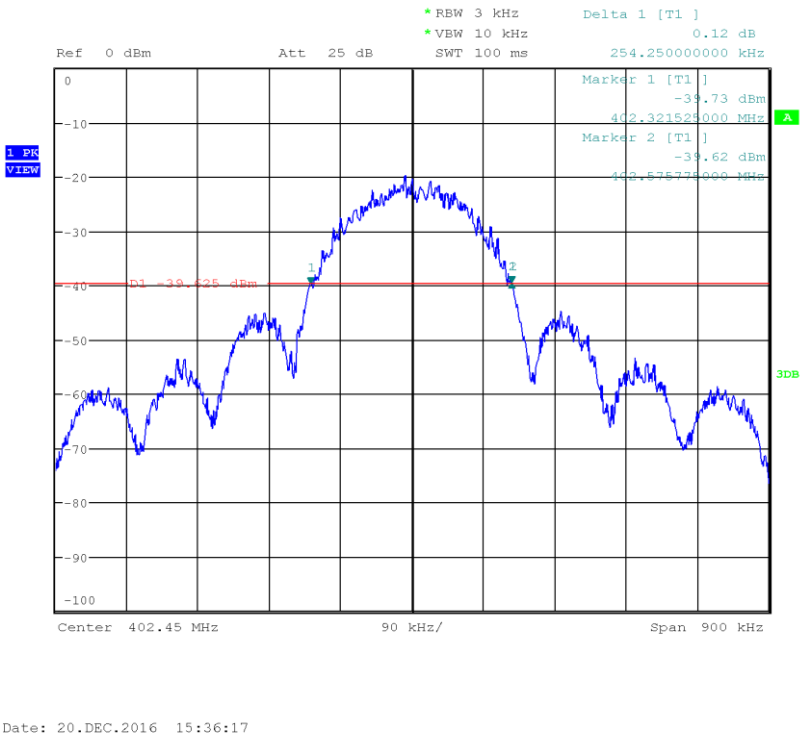
Channel	Frequency [MHz]	Emission Bandwidth [kHz]	Limit [kHz]	Result
F_{LOW}	402.45	254.250	≤ 300	PASS
F_{MID}	403.65	256.050	≤ 300	PASS
F_{HIGH}	404.85	255.600	≤ 300	PASS

Comments:

Emission Bandwidth – Transmitter 197kbps F_{LOW}

20 dB Bandwidth FCC

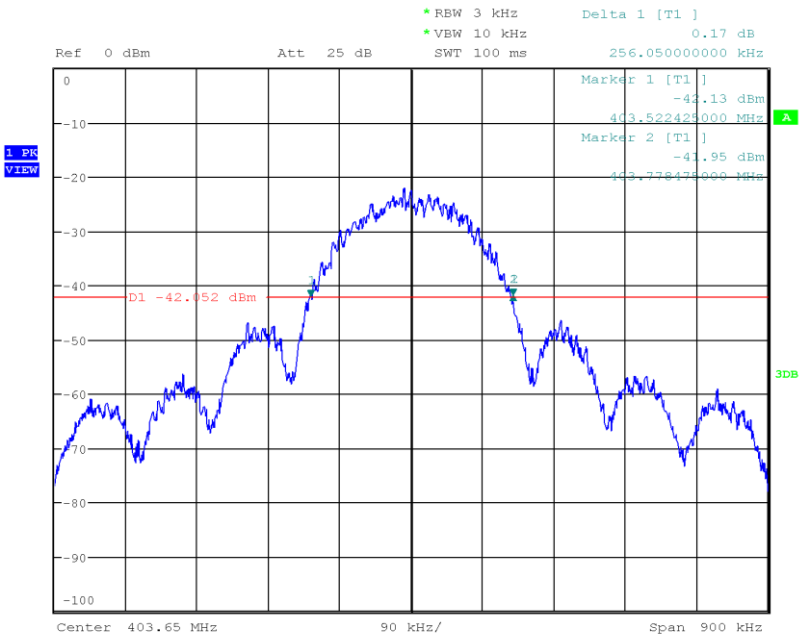
Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Standards:	FCC 95.627
Reference Method:	47 CFR § 95.627(a)(6)(i)
Operational Mode:	2FSK, 197 kbps, Channel: 8, 402.45 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Lower Frequency [MHz]:	402.322
Upper Frequency [MHz]:	402.576
20 dB Bandwidth [kHz]:	254.250



Emission Bandwidth – Transmitter 197kbps F_{MID}

20 dB Bandwidth FCC

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Standards:	FCC 95.627
Reference Method:	47 CFR § 95.627(a)(6)(i)
Operational Mode:	2FSK, 16 kbps, Channel: 0, 403.65 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Lower Frequency [MHz]:	403.522
Upper Frequency [MHz]:	403.778
20 dB Bandwidth [kHz]:	256.050



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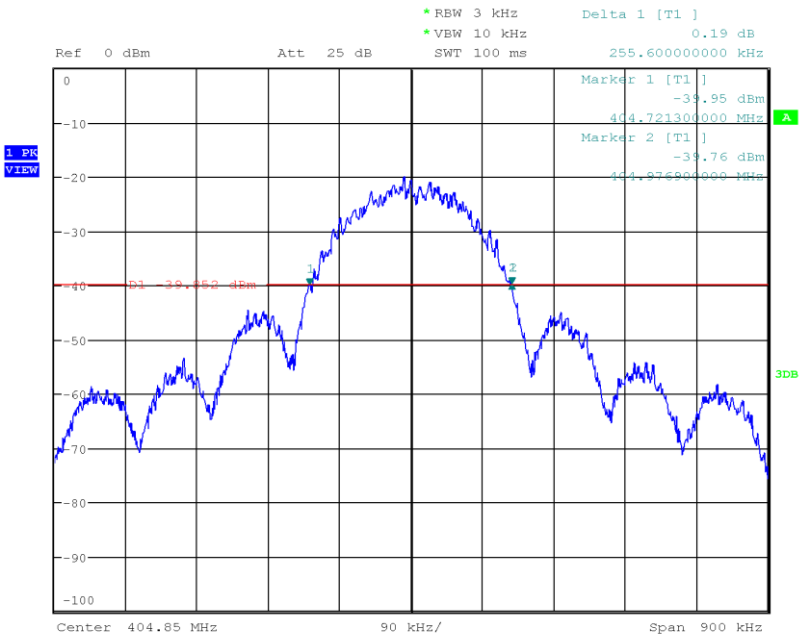
Emission Bandwidth – Transmitter 197kbps F_{HIGH}

20 dB Bandwidth FCC

Project Number:	G0M-1612-6098
Applicant	Biotronik SE & Co.KG
Model Description	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Sample ID:	01 005
Reference Standards:	FCC 95.627
Reference Method:	47 CFR § 95.627(a)(6)(i)
Operational Mode:	2FSK, 16 kbps, Channel: 7, 404.85 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2016-12-20
Lower Frequency [MHz]:	404.721
Upper Frequency [MHz]:	404.977
20 dB Bandwidth [kHz]:	255.600



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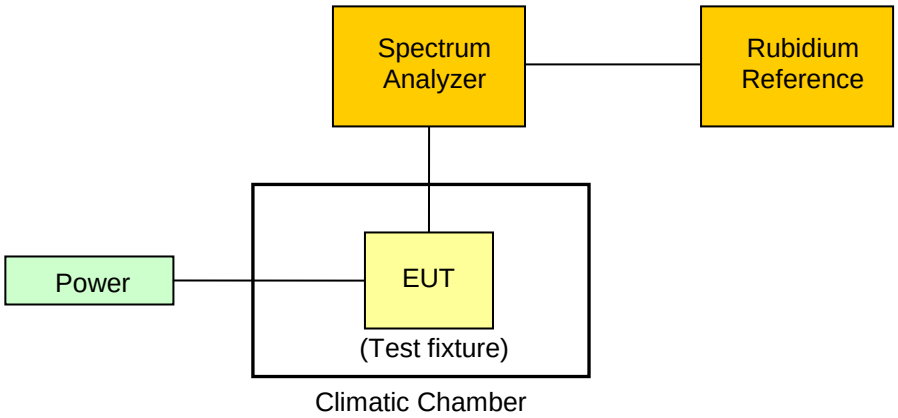
3.3 Test Conditions and Results – Frequency stability

Frequency stability acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 95.628(e) / IC RSS-243 3.3 5.3 / RSS-Gen 4.7
Test according to measurement reference	Reference Method
	EN 301 839-1 8.1
Test frequency range	Tested frequencies
	F_{LOW} / F_{HIGH}
EUT test mode	Unmodulated

Limits

≤ ±100 ppm

Test setup



Test procedure

1. EUT set to test mode with supply voltage and temperature set to nominal conditions
2. EUT transmits without modulation
3. Detector set to peak and max hold
4. Peak of emission is measured using a frequency counter
5. The frequency error is determined as the deviation of the emission frequency from the nominal frequency stated by the customer.

Test results					
Channel	Nominal Frequency [MHz]	Temperature [°C]	Supply voltage	Frequency [MHz]	Drift [ppm]
F_{LOW}	402.45	-20	V_{NOM} = 3.7 VDC	402.448958	-02.59
F_{HIGH}	404.85	-20	V_{NOM} = 3.7 VDC	404.849141	-02.12
F_{LOW}	402.45	-10	V_{NOM} = 3.7 VDC	402.449354	-01.61
F_{HIGH}	404.85	-10	V_{NOM} = 3.7 VDC	404.849489	-01.26
F_{LOW}	402.45	0	V_{NOM} = 3.7 VDC	402.450846	02.10
F_{HIGH}	404.85	0	V_{NOM} = 3.7 VDC	404.851015	02.51
F_{LOW}	402.45	10	V_{NOM} = 3.7 VDC	402.450636	01.58
F_{HIGH}	404.85	10	V_{NOM} = 3.7 VDC	404.850835	02.06
F_{LOW}	402.45	20	V_{NOM} = 3.7 VDC	402.449881	-00.30
F_{HIGH}	404.85	20	V_{NOM} = 3.7 VDC	404.850038	00.09
F_{LOW}	402.45	20	V_{MIN} = 3.1 VDC	402.449845	-00.39
F_{HIGH}	404.85	20	V_{MIN} = 3.1 VDC	404.850052	00.13
F_{LOW}	402.45	20	V_{MAX} = 4.16 VDC	402.449874	-00.31
F_{HIGH}	404.85	20	V_{MAX} = 4.16 VDC	404.850043	00.11
F_{LOW}	402.45	30	V_{NOM} = 3.7 VDC	402.449319	-01.69
F_{HIGH}	404.85	30	V_{NOM} = 3.7 VDC	404.849430	-01.41
F_{LOW}	402.45	40	V_{NOM} = 3.7 VDC	402.448446	-03.86
F_{HIGH}	404.85	40	V_{NOM} = 3.7 VDC	404.848634	-03.37
Comments:					

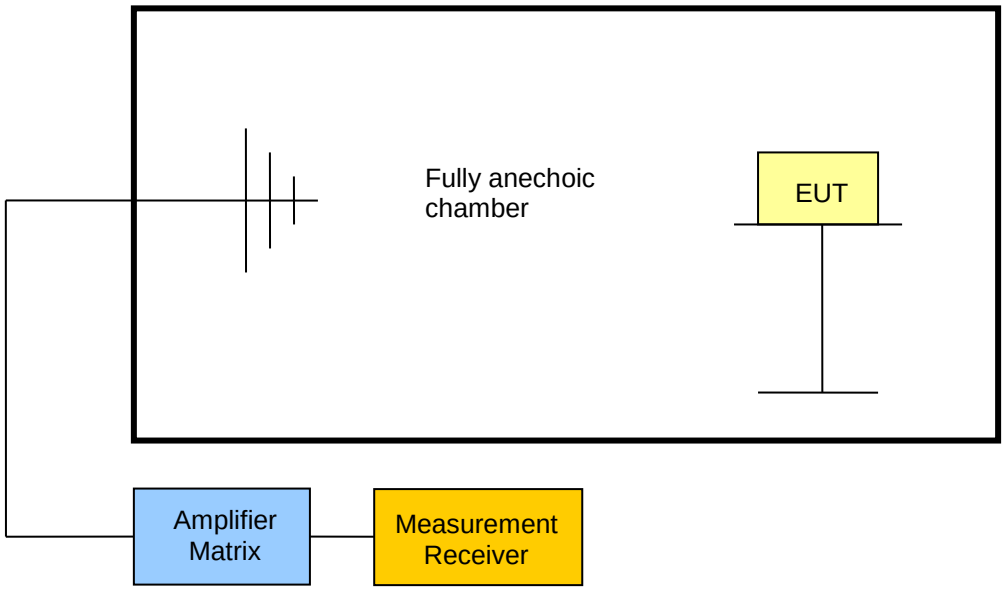
3.4 Test Conditions and Results – Transmitter output power

Transmitter output power acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 95.639(f) / IC RSS-243 5.4
Test according to measurement reference	Reference Method
	EN 301 839-1 8.3
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
EUT test mode	Modulated

Limits

≤ 25 µW (-16 dBm) e.i.r.p.

Test setup



Test procedure

1. EUT set to test frequency with modulation
2. Measurement polarization is set to vertical
3. Span it set according to measurement range and detector is set to peak and max hold
4. Resolution bandwidth is set two be at least twice the emission bandwidth
5. During the sweep the EUT is rotated to obtain maximum emission level
6. Measurement is repeated with horizontal measurement polarization

Test results – Transmitter						
Channel	Frequency [MHz]	Emission Level [dBm e.i.r.p.]	Pol	Detector	Limit [dBm e.i.r.p.]	Margin [dB]
F_{LOW}	402.45	-18.1	Hor	pk	-16	-02.10
F_{LOW}	402.45	-42.7	Ver	pk	-16	-26.70
F_{HIGH}	404.85	-16.5	Hor	pk	-16	-00.50
F_{HIGH}	404.85	-42.9	Ver	pk	-16	-26.90
Comments:						

3.5 Test Conditions and Results – Band-edge and In-band Emissions

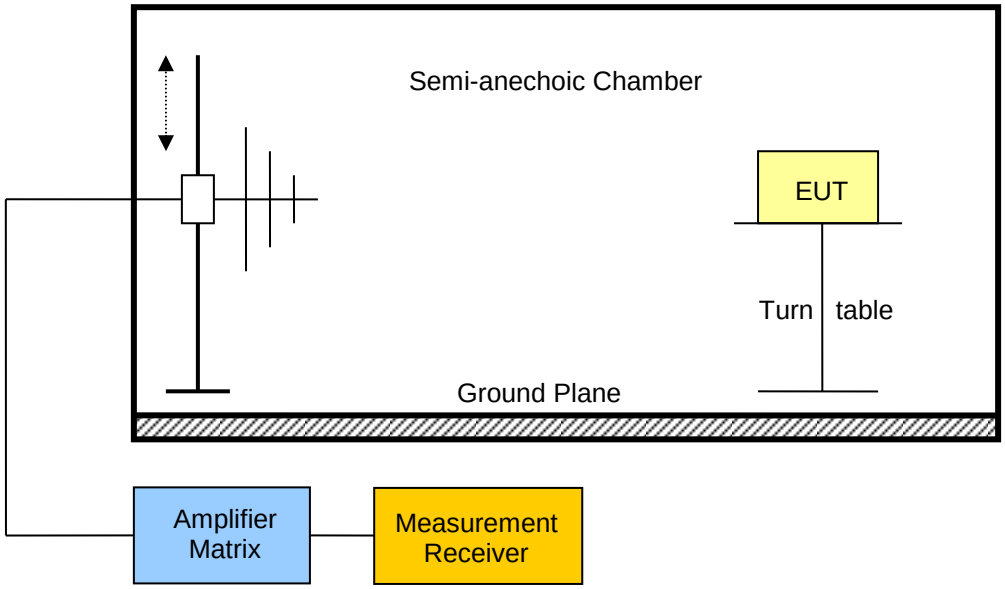
Band-edge and in-band emission compliance acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 95.635(d) / IC RSS-243 3.5 5.5 / RSS-Gen 4.9
Test according to measurement reference	Reference Method
	FCC 95.635(d) / ANSI C 63.4
Test frequency range	Tested frequencies
	F_{LOW} / F_{HIGH}
EUT test mode	Modulated

Limits - FCC	
Frequency range	Limit
402 MHz – 250 kHz ≤ f ≤ 402 MHz	20 dB below maximum permitted output power
402 MHz < f < 150 kHz - f_C	20 dB below transmitter output power
150 kHz + f_C < f < 405 Mhz	20 dB below transmitter output power
405 MHz ≤ f ≤ 405 MHz + 250 kHz	20 dB below maximum permitted output power

Limits - IC	
Frequency range	Limit
402 MHz – 250 kHz < f < 150 kHz-f_C	20 dB below maximum permitted output power
150 kHz+f_C < f < 405 MHz + 250 kHz	20 dB below maximum permitted output power

Because the FCC limits are more stringent than the Industry Canada limits, the FCC limits are used to show compliance with the band-edge emission requirements.

Test setup



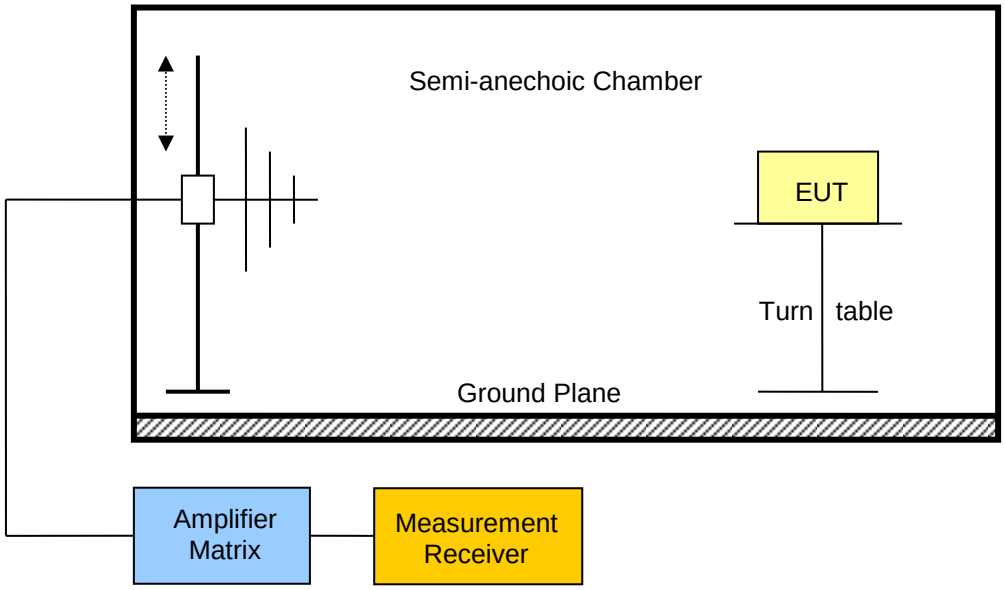
Test procedure
1. EUT set to test frequency with modulation 2. Measurement polarization is set to vertical 3. Span it set according to measurement range 4. Resolution bandwidth is set to 1% of the emission bandwidth and detector is set to peak 5. During the sweep the EUT is rotated to obtain maximum emission level 6. Measurement is repeated with horizontal measurement polarization

Test results – Transmitter

Channel	Frequency [MHz]	Emission [MHz]	Level [dBµV/m]	Pol.	Limit [dBµV/m]	Margin [dB]
F_{LOW}	402.45	401.991	25.08	hor	59.40	-34.32
F_{LOW}	402.45	402.293	35.58	hor	54.00	-18.42
F_{LOW}	402.45	402.293	10.73	ver	54.00	-43.27
F_{LOW}	402.45	402.605	35.43	hor	54.00	-18.57
F_{LOW}	402.45	402.605	11.53	ver	54.00	-42.47
F_{HIGH}	404.85	404.678	36.25	hor	54.00	-17.75
F_{HIGH}	404.85	404.695	11.15	ver	54.00	-42.85
F_{HIGH}	404.85	405.000	38.13	hor	54.00	-15.87
F_{HIGH}	404.85	405.000	12.14	ver	54.00	-41.86
F_{HIGH}	404.85	405.006	36.74	hor	59.40	-22.66
F_{HIGH}	404.85	405.006	13.84	ver	59.40	-45.56

3.6 Test Conditions and Results – Transmitter unwanted emissions

Transmitter unwanted emissions acc. to FCC Part 95 / IC RSS-243				**Verdict: PASS**
Test according referenced standards		Reference Method		
		FCC 95.635(d) / IC RSS-243 3.4 5.5 / IC RSS-Gen 4.9		
Test according to measurement reference		Reference Method		
		FCC 95.635(d) / ANSI C 63.4		
Test frequency range		Tested frequencies		
		30 MHz – 10th Harmonic		
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



Test procedure
1. EUT set to test mode 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels within restricted bands

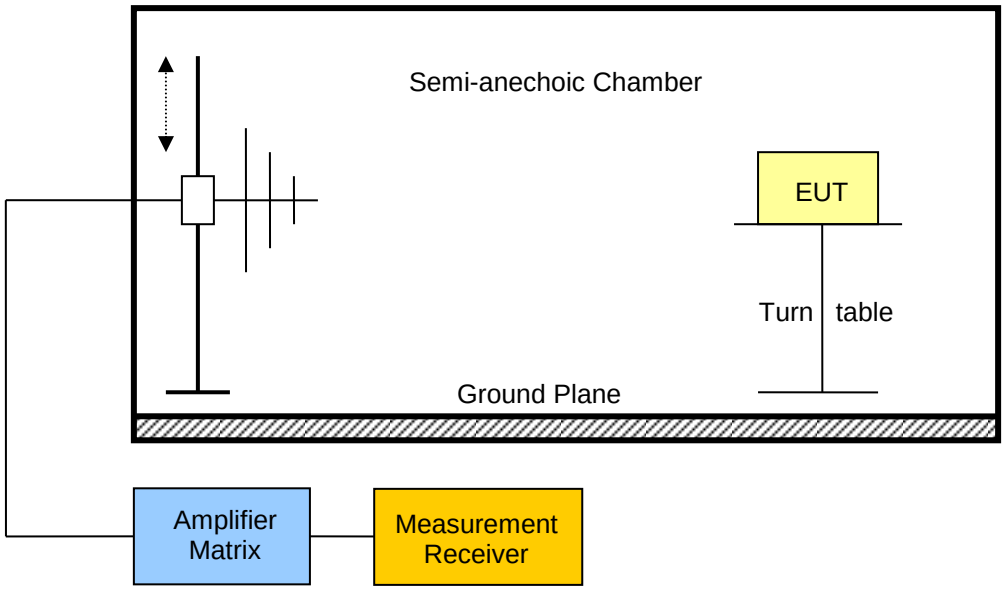
Test results – Transmitter

Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
F_{LOW}	402.45	Modulated	401.347	27.87	pk	hor	46.00	-18.13
F_{LOW}	402.45	Modulated	406.44	19.88	pk	hor	46.00	-26.12
F_{LOW}	402.45	Modulated	804.922	33.14	pk	hor	46.00	-12.86
F_{HIGH}	404.85	Modulated	400.943	29.36	pk	hor	46.00	-16.64
F_{HIGH}	404.85	Modulated	405.25	37.93	pk	hor	46.00	-08.07
F_{HIGH}	404.85	Modulated	808.49	34.90	pk	hor	46.00	-11.10
F_{HIGH}	404.85	Modulated	850.123	32.64	pk	ver	46.00	-13.36
F_{HIGH}	404.85	Modulated	854.881	29.34	pk	hor	46.00	-16.66

Comments:

3.7 Test Conditions and Results – Receiver spurious emissions

Receiver spurious emissions acc. to IC RSS-243				**Verdict: PASS**
Test according referenced standards	Reference Method			
	IC RSS-243 3.5 5.6 / IC RSS-Gen 4.10 6.1			
Test according to measurement reference	Reference Method			
	ANSI C 63.4			
Test frequency range	Tested frequencies			
	30 MHz – 5th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



Test procedure
1. EUT set to receive mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [µV/m]
F_{MID}	403.65	3772	39.84	pk	hor	53.9	-14.06 dB

Comments:

3.8 Test Conditions and Results – AC power line conducted emissions

Power line conducted emissions acc. to FCC 47 CFR 15.207 / IC RSS-Gen				**Verdict: PASS**
Test according referenced standards	Reference Method			
	ANSI C 63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application Interface			
AC Mains	LISN			
EUT test mode	AC-Powerline			
Limits and results				
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.				

Conducted Emissions

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

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	CardioMessenger Smart 3G
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Meili
Test Conditions:	Tnom: 23°C, Unom: 120 VAC 50 Hz
LISN:	ESH3-Z5 (L)
Mode:	Mode 1
Test Date:	2016-12-19
Note:	

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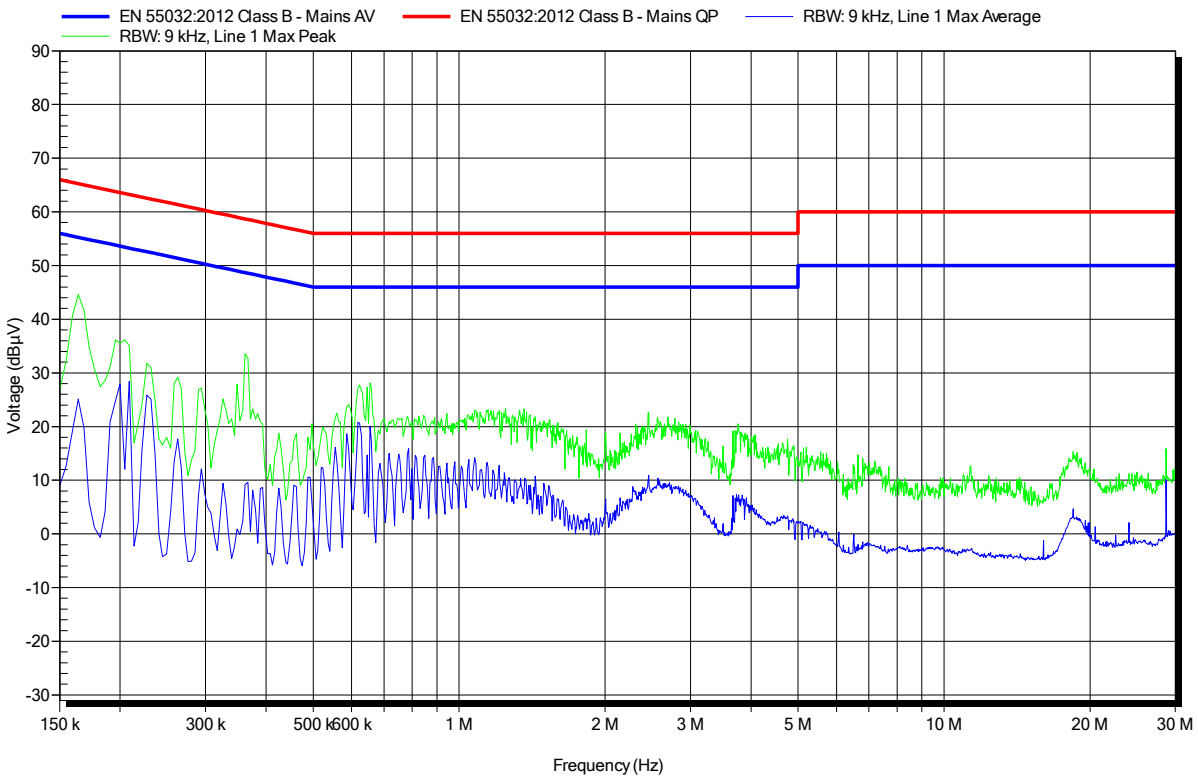

Conducted Emissions

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

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	CardioMessenger Smart 3G
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Meili
Test Conditions:	Tnom: 23°C, Unom: 120 VAC 50 Hz
LISN:	ESH3-Z5 (N)
Mode:	Mode 1
Test Date:	2016-12-19
Note:	

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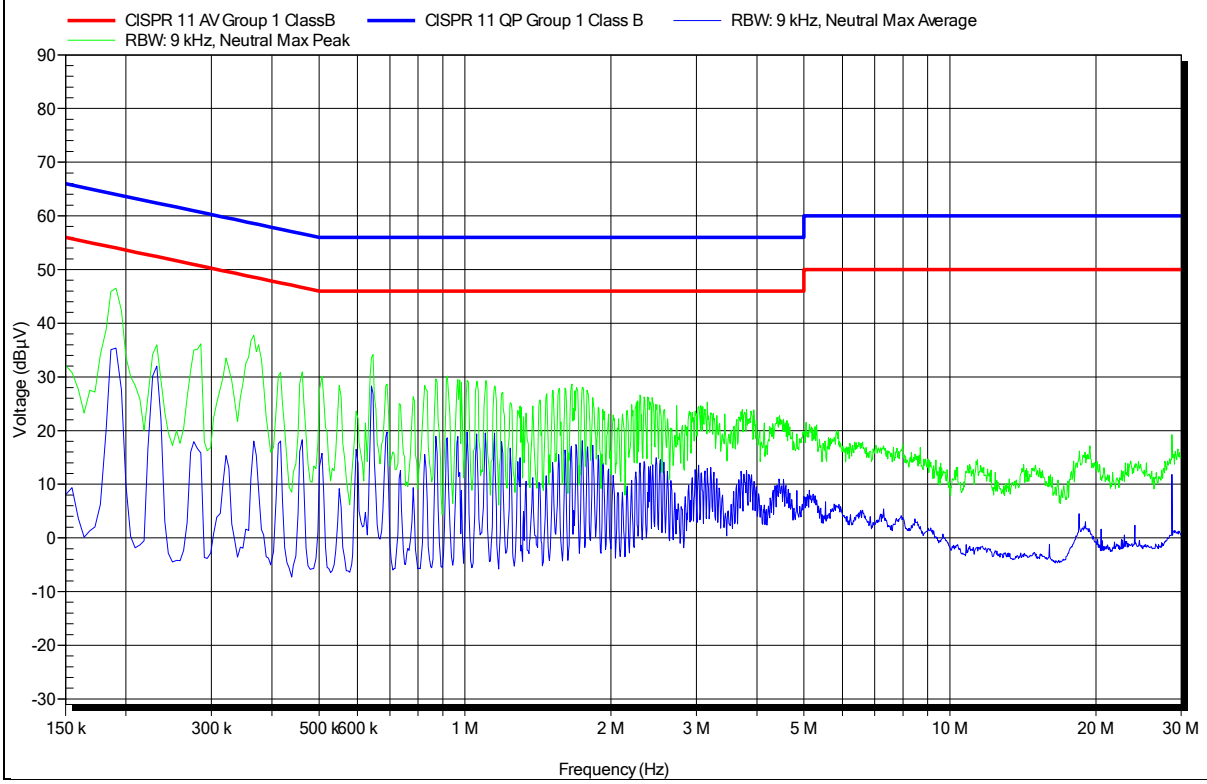


3.9 Test Conditions and Results – System threshold power levels

System threshold power levels acc. to FCC Part 95 / IC RSS-243	Verdict: PASS
Test according referenced standards	Reference Method
	FCC 95.628(a)(3) / IC RSS-243 3.6 5.7.1
Test according to measurement reference	Reference Method
	EN 301 839-1 10.1

Limits

$$P_{TH}\,[dBm] = 10 \cdot Log_{10}(EB[Hz]) - 150 + G[dBi]$$

P_{TH} = LBT threshold level in dBm
EB = Emission bandwidth in Hz
G = Monitoring system antenna gain in dBi

If an ULP-AMI device is used to select the frequency of operation for a MICS system, the above LBT threshold level requirement may be adjusted higher by 1 dB for every 1 dB the e.r.p. of the device performing the LBT and AFA function is below the maximum permitted level of -16 dBm e.r.p..

Test procedure

It is not necessary to measure the actual threshold power level of a MICS system; however, it shall be determined that the system uses the LIC selection process if no channel is available with an ambient power level at or below the calculated threshold power level.

Test results

Emission bandwidth of companion device [Hz]	Antenna gain [dBi]	Calculated threshold level [dBm]	Measured threshold level [dBm]
256000	-1.37	-97.3	-97.3

Comments: The EUT changed the channel from f_c (channel 0) to channel1 at a CW level of -93.3 dBm

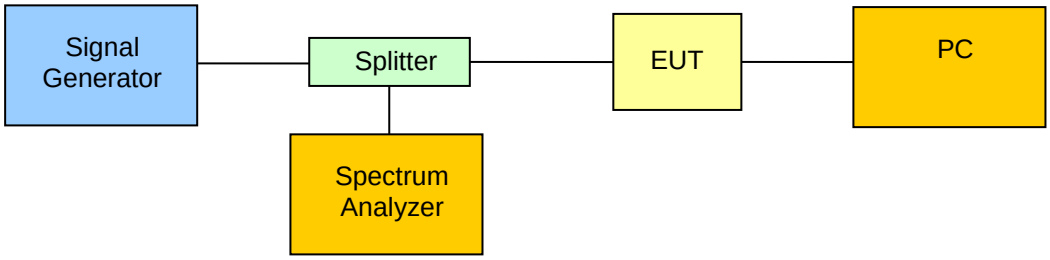
3.10 Test Conditions and Results – Monitoring system bandwidth

Monitoring system bandwidth acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC 95.628(a)(1) / IC RSS-243 3.6 5.7.2
Test according to measurement reference	Reference Method
	EN 301 839-1 10.2
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Monitoring A

Limits

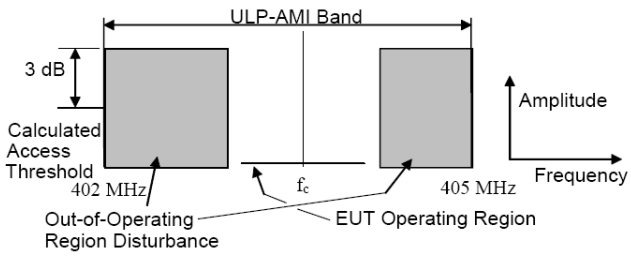
≥ Emission bandwidth (equals to measured power level differences ≤ 20 dB)

Test setup



Test procedure

1. By administration commands the following channel occupation is simulated to the device so that the EUT can only send on frequency f_c.



2. A CW signal is generated by the signal generator on frequency f_c with a level sufficient to block transmission of the EUT on channel f_c. It is verified that the EUT stops transmission.
3. A new communication session is established and the level of the signal generator is reduced until the EUT starts to transmit on channel f_c.
4. Then the frequency of the generator is set to the measured lower edge frequency of the emission bandwidth and the level of the signal generator is increased until the EUT starts to transmit in the out-of-band region again. The signal level is recorded.
5. The procedure is repeated at the upper edge frequency of the emission bandwidth measurement. The power level difference between the center and the edge frequency is recorded.

Test results						
Channel	Frequency [MHz]	Center Interferer Level [dBm]	Edge ±EBW/2 [kHz]	Edge Interferer Level [dBm]	Level Difference [dB]	Limit [dB]
F_{MID}	403.65	-94.3	-128	-92.3	2	≤ 20
F_{MID}	403.65	-94.3	+128	-86.3	8	≤ 20
Comments:						

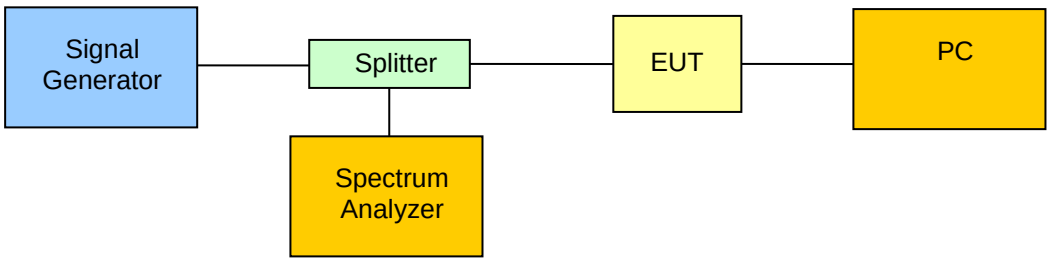
3.11 Test Conditions and Results – Scan cycle time

Scan cycle time acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC 95.628(a)(2) / IC RSS-243 3.6 5.7.3
Test according to measurement reference	Reference Method
	EN 301 839-1 10.3
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Monitoring A

Limits

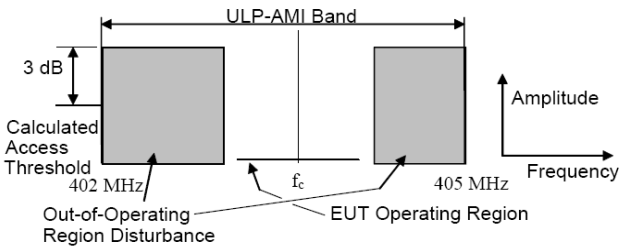
≤ 5 s

Test setup



Test procedure

1. By administration commands the following channel occupation is simulated to the device so that the EUT can only send on frequency f_c.



2. A CW signal is generated by the signal generator on frequency f_c with a level 3 dB above the out-of-band region level to block transmission of the EUT on channel f_c. It is verified that the EUT does not transmit on f_c.
3. The CW interferer is removed, a new communication session is established and the time until the EUT starts to transmit is measured.
4. If the EUT does not transmit on f_c a 1 second delay is added between the removal of the interferer and the establishment of the communication session. The addition of delay is repeated until the EUT always starts transmission on f_c. The delay time measurement is repeated several times. At the end 1 second is subtracted from all delays measured.

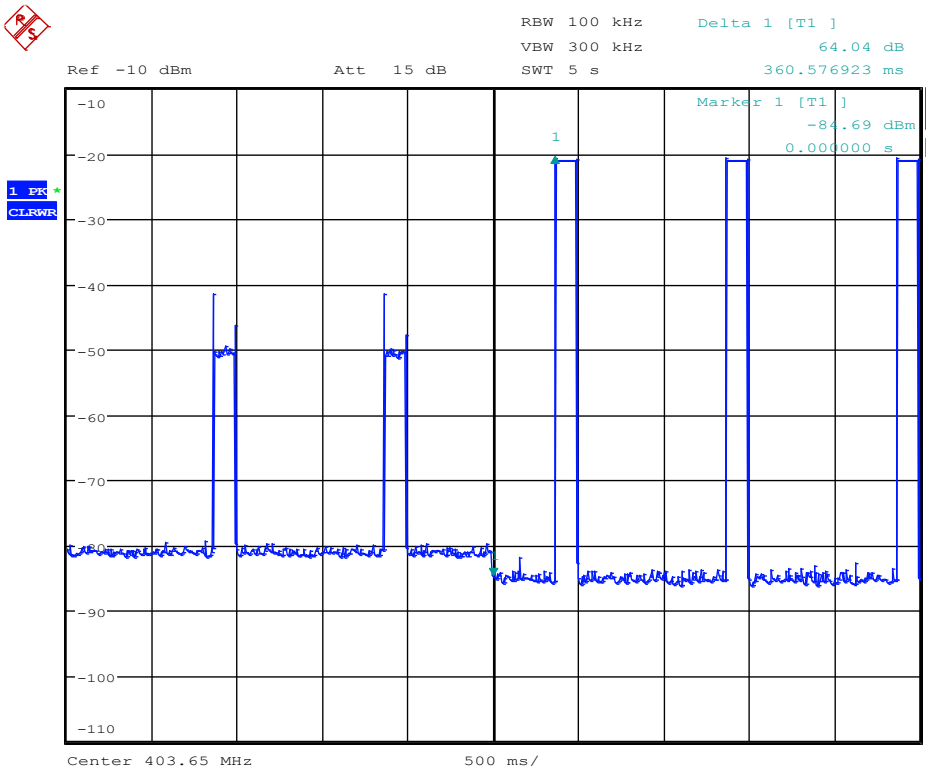
Test results			
Channel	Frequency [MHz]	Scan cycle time [s]	Limit [s]
F_{MID}	403.65	0.3606	≤ 5
Comments:			

Spectrum Access – Monitoring system scan cycle time

Monitoring system scan cycle time

Project Number: G0M-1309-3225

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	EN 301 839
Test Date:	2016-12-21
Verdict:	PASS
Note 1:	Comm. Channel = Ch1, changing to ch.0 after release of interferer @ ch0
Note 2:	Result 360.6 ms; Limit < 5 sec PASS



Date: 21.DEC.2016 11:21:24

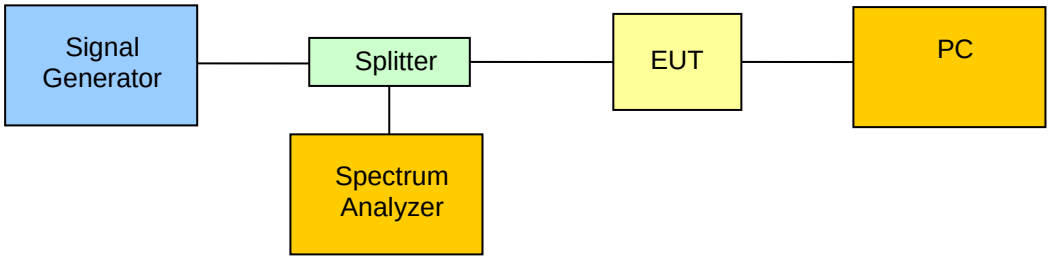
3.12 Test Conditions and Results – Minimum channel monitoring period

Minimum channel monitoring period acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC 95.628(a)(2) / IC RSS-243 3.6 5.7.4
Test according to measurement reference	Reference Method
	EN 301 839-1 10.3
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Monitoring A

Limits

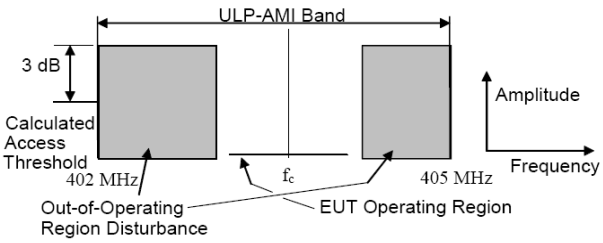
≥ 10 ms

Test setup



Test procedure

1. By administration commands the following channel occupation is simulated to the device so that the EUT can only send on frequency f_c.



2. A CW signal is generated by the signal generator on frequency f_c with a level equal to the out-of-band region level to block transmission of the EUT on channel f_c and the out-of-band interference is removed. It is verified that the EUT does not transmit on f_c.
3. Then the out-of-band interference level is set to 3 dB higher and it is verified that the EUT transmits on f_c.
4. The out-of-band interferer are pulsed with a pulse width of 0.1 ms and a repetition frequency of 100Hz. The EUT is placed in a state where it is seeking to initiate a communication session with the ULP-AMI compainion device.
5. The EUT shall not initiate a communication session on a channel different from f_c.
   This condition is checked more than 10 times.

Test results					
Channel	Frequency [MHz]	Interferer Channel	Interferer level [dBm]	Carrier transmits on Channel	Result
F_{MID}	403.65	0	OFF	0	Pass
F_{MID}	403.65	0	-91.3	1	Pass
Comments: For practical reasons the test has been performed with a fixed interferer level in the out-of-band region and a pulsed interferer level on center channel. To make sure that the monitoring period requirement was met, it was verified that no communication on center channel had been initiated.					

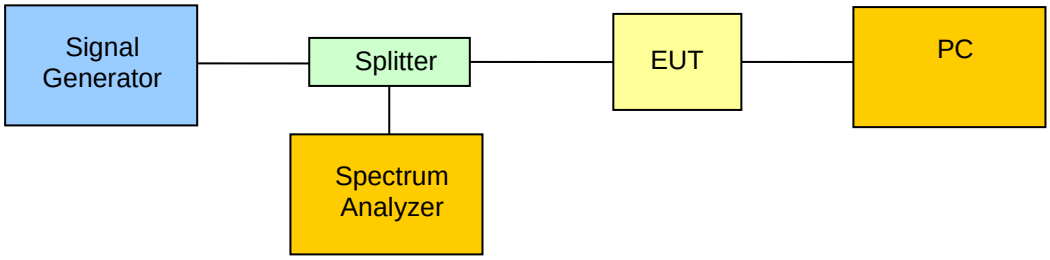
3.13 Test Conditions and Results – Channel access

Channel access acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC 95.628(a)(4) / IC RSS-243 3.6 5.7.1
Test according to measurement reference	Reference Method
	EN 301 839-1 10.4
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Monitoring A

Limits

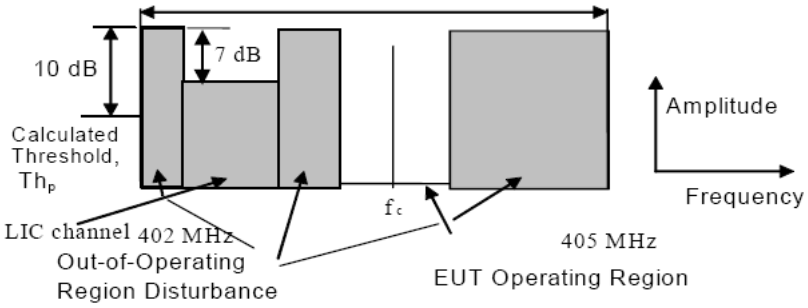
EUT has to select and transmit on least interfered channel (LIC)

Test setup



Test procedure

1. By administration commands the following channel occupation is simulated to the device so that the EUT can only send on frequency f_c.



2. A CW signal is generated by the signal generator on frequency f_c with a level 3 dB lower than the calculated LBT threshold level. It is determined that the EUT communicates on f_c.
3. The CW interferer level is increased by 9dB and a new communication session is initiated. Now it is checked that the EUT communicates on the LIC center frequency.

Test results						
Step	Frequency [MHz]	LIC channel	Frequency [MHz]	Interferer level channel 0 [dBm]	Communication channel	Result
1	403.65	N/A	N/A	N/A	0	Pass
2	403.65	4	403.04	-100.3	0	Pass
3	403.65	4	403.04	-91.3	4	Pass
Comments:						

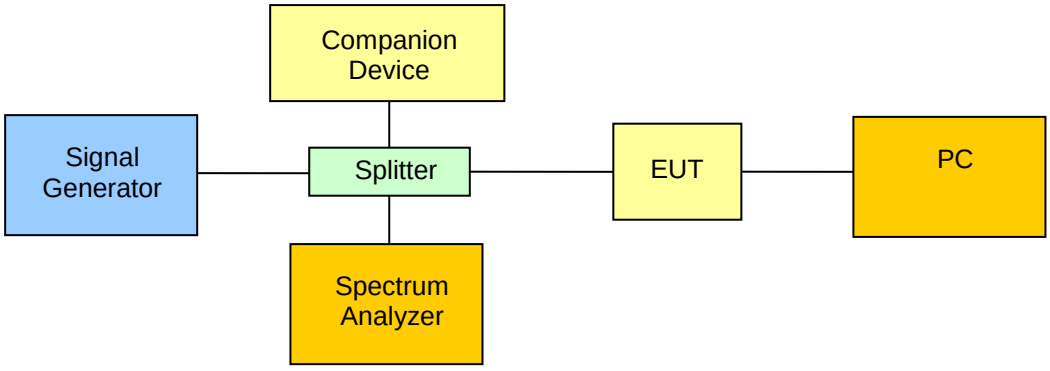
3.14 Test Conditions and Results – Discontinuation of MICS or MEDS session

Discontinuation of MICS or MEDS session acc. to FCC Part 95 / IC RSS-243	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC 95.628(a)(4) / IC RSS-243 3.6 5.7.7
Test according to measurement reference	Reference Method
	EN 301 839-1 10.5
Test frequency range	Tested frequencies
	F_{MID}
EUT test mode	Monitoring B

Limits

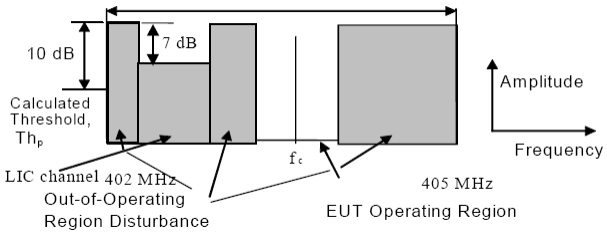
Cease transmission for silent period ≥ 5 s

Test setup



Test procedure

1. By administration commands the following channel occupation is simulated to the device so that the EUT can only send on frequency f_c.



2. A CW signal is generated by the signal generator on frequency f_c with a level 9 dB higher than the calculated LBT threshold level. It is determined that the EUT communicates on LIC channel.
3. The CW interferer level is reduced to a level 3 dB below the threshold level and the ULP-AMI is switched off. The transmission of the EUT (ULP-AMI-P) is captured until the transmission is finished and the time is recorded.
4. The ULP-AMI is enabled again and the communication session should not restart on previous LIC channel.

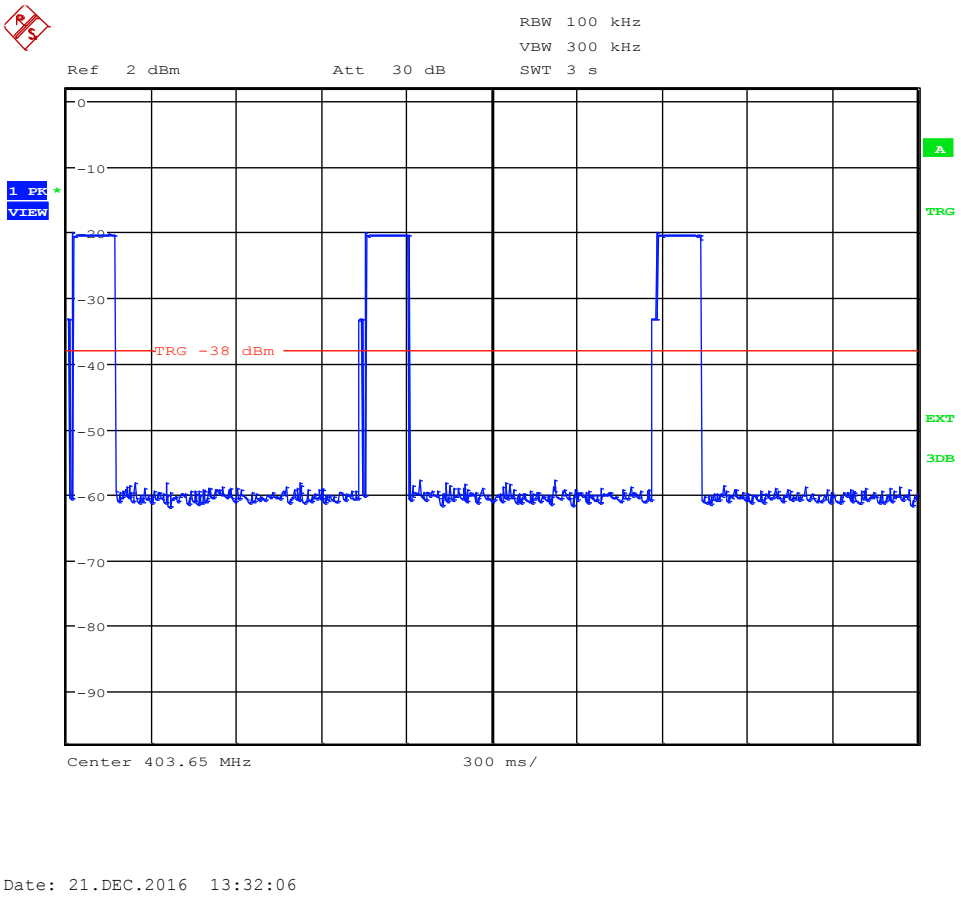
Test results							
Step	Frequency [MHz]	LIC Channel	Frequency [MHz]	Interferer channel	Interferer Level [dBm]	Communication channel	Result
1	403.65	N/A	N/A	N/A	N/A	0	Pass
2	403.65	4	403.04	0	-88.3	4	Pass
3	403.65	4	403.04	0	-100.3	4, Communication ends 0.2 ms after ULP-AMI switched off	Pass
4	403.65	4	403.04	0	-100.3	0, After restart	Pass
Comments:							

Spectrum Access – Discontinuation of MICS session - regular traffic

Discontinuation of MICS session if a silent period greater than or equal 5 s

Project Number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx 403.65 MHz
Test Date:	2016-12-21
Verdict:	PASS
Note 1:	communication channel
Note 2:	Mode: communication link, fully message

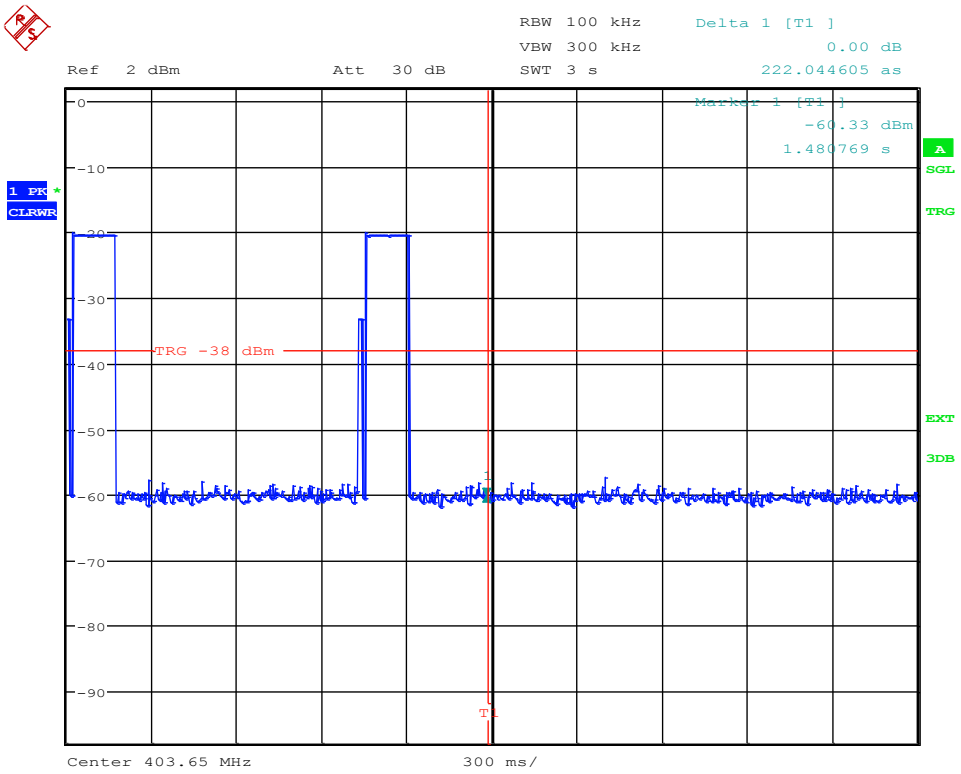


Spectrum Access – Discontinuation of MICS session – traffic after ULP-AMI switched off

Discontinuation of MICS session if a silent period greater than or equal 5 s

Project Number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom / Vnom
Mode:	Tx 403.65 MHz
Test Date:	2016-12-21
Verdict:	PASS
Note 1:	No communication after 0.2 ms silent period @ communication channel



Date: 21.DEC.2016 13:23:05

ANNEX A Transmitter output power

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; 402.45 MHz, CW
Test Date:	2016-12-19
Note:	Tx Power EIRP

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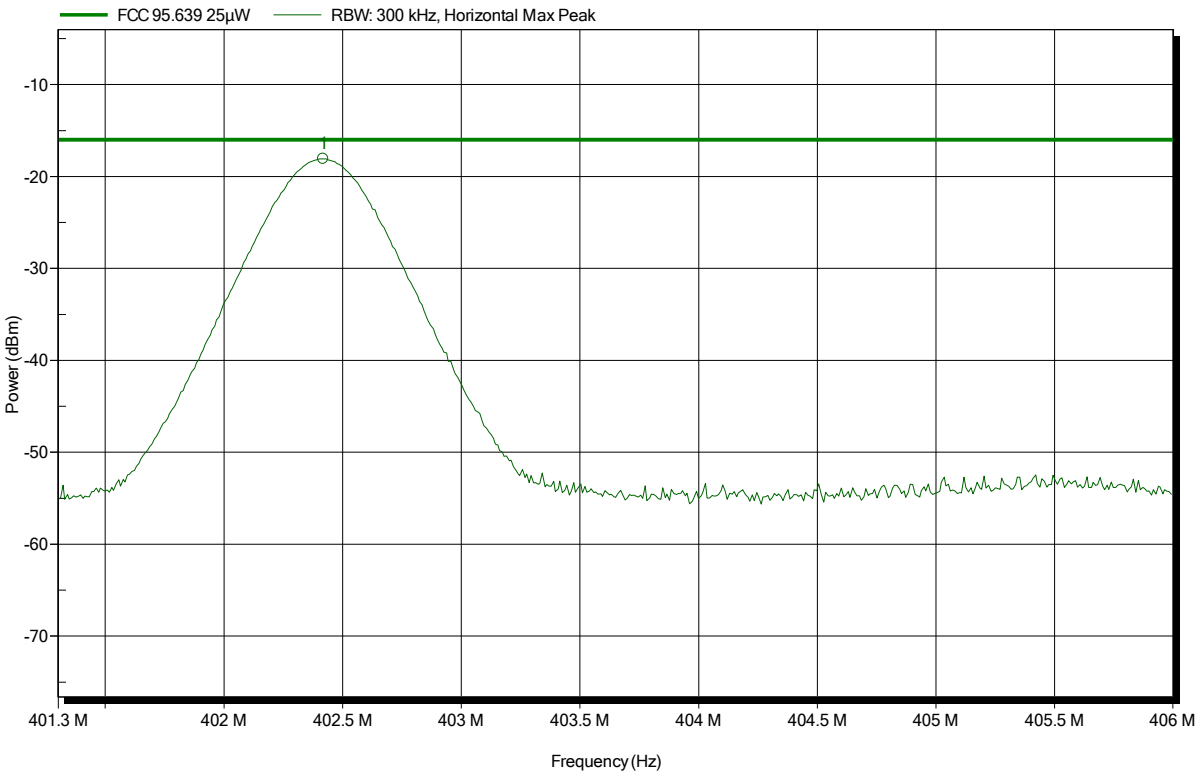

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
402.419 MHz	-18.1 dBm	-16 dBm	-2.1 dB	Pass

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; 402.45 MHz, CW
Test Date:	2016-12-19
Note:	Tx Power EIRP

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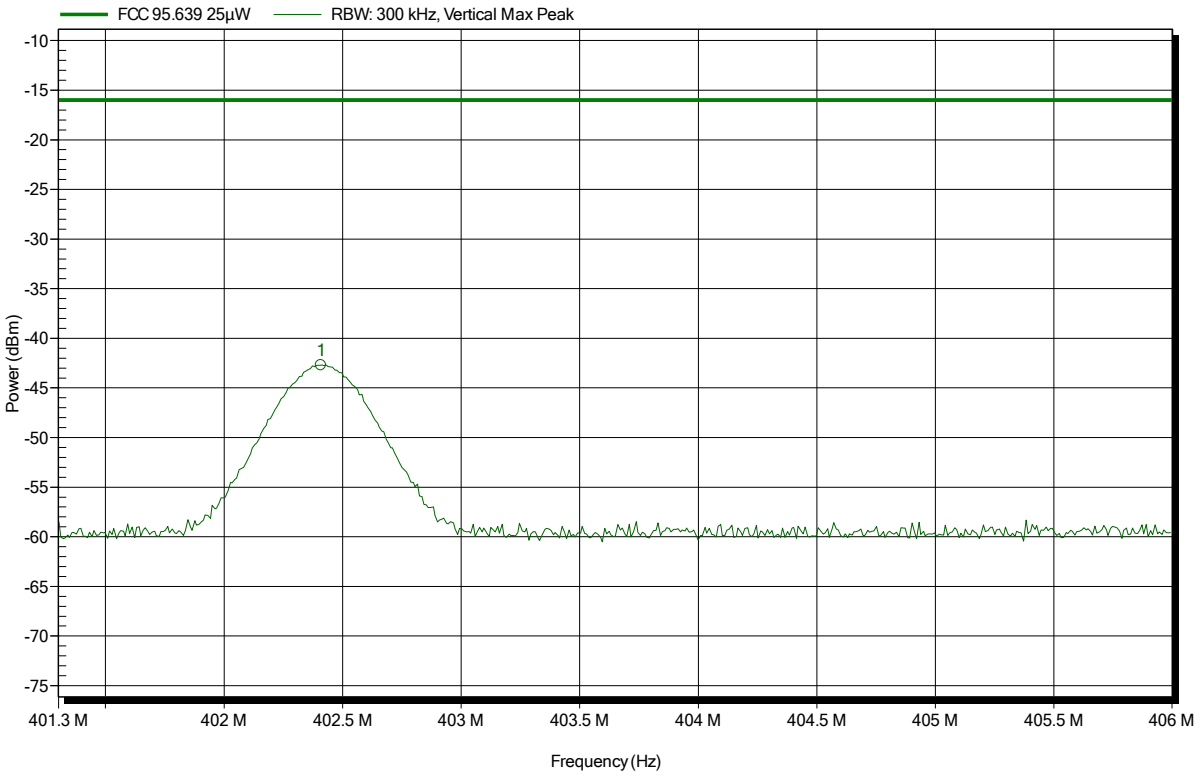

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
402.409 MHz	-42.7 dBm	-16 dBm	-26.71 dB	Pass

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; 404.85 MHz, CW
Test Date:	2016-12-19
Note:	Tx Power EIRP

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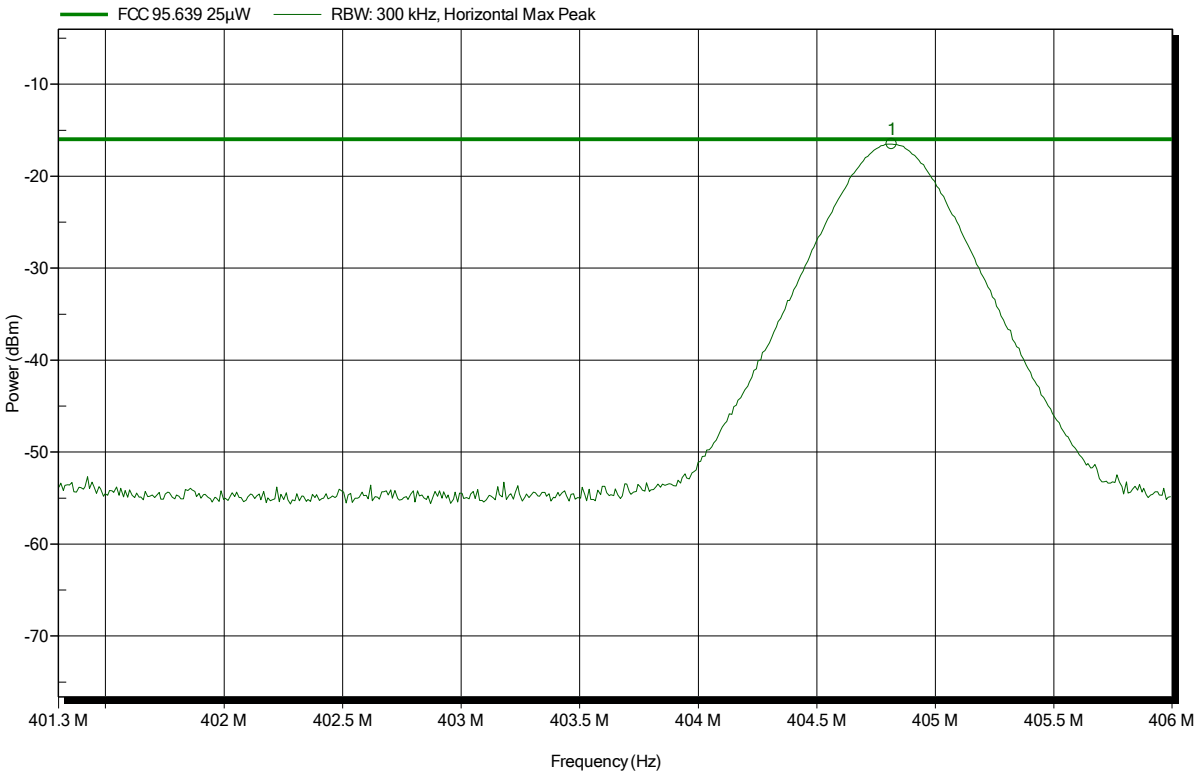

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
404.816 MHz	-16.5 dBm	-16 dBm	-0.51 dB	Pass

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; 404.85 MHz, CW
Test Date:	2016-12-19
Note:	Tx Power EIRP

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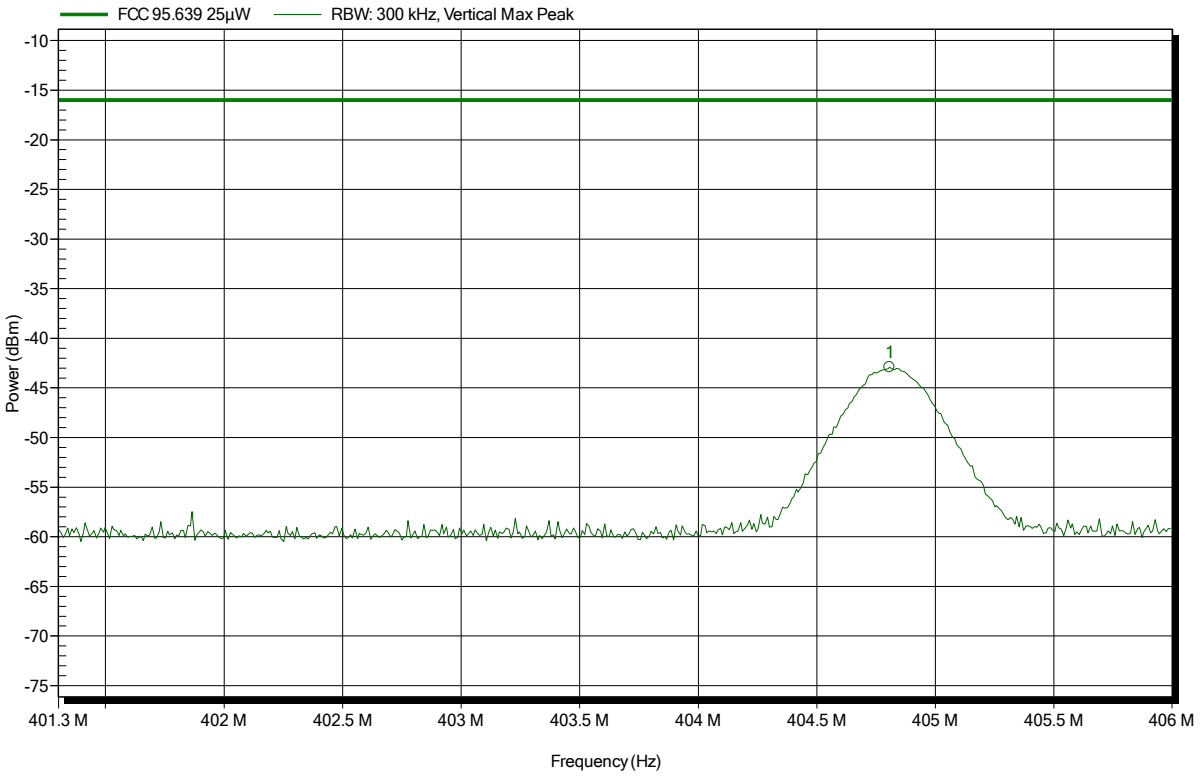

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
404.806 MHz	-42.9 dBm	-16 dBm	-26.92 dB	Pass

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; 402.45 MHz, CW
Test Date:	2016-12-19
Note:	Power dBµV/m ERP

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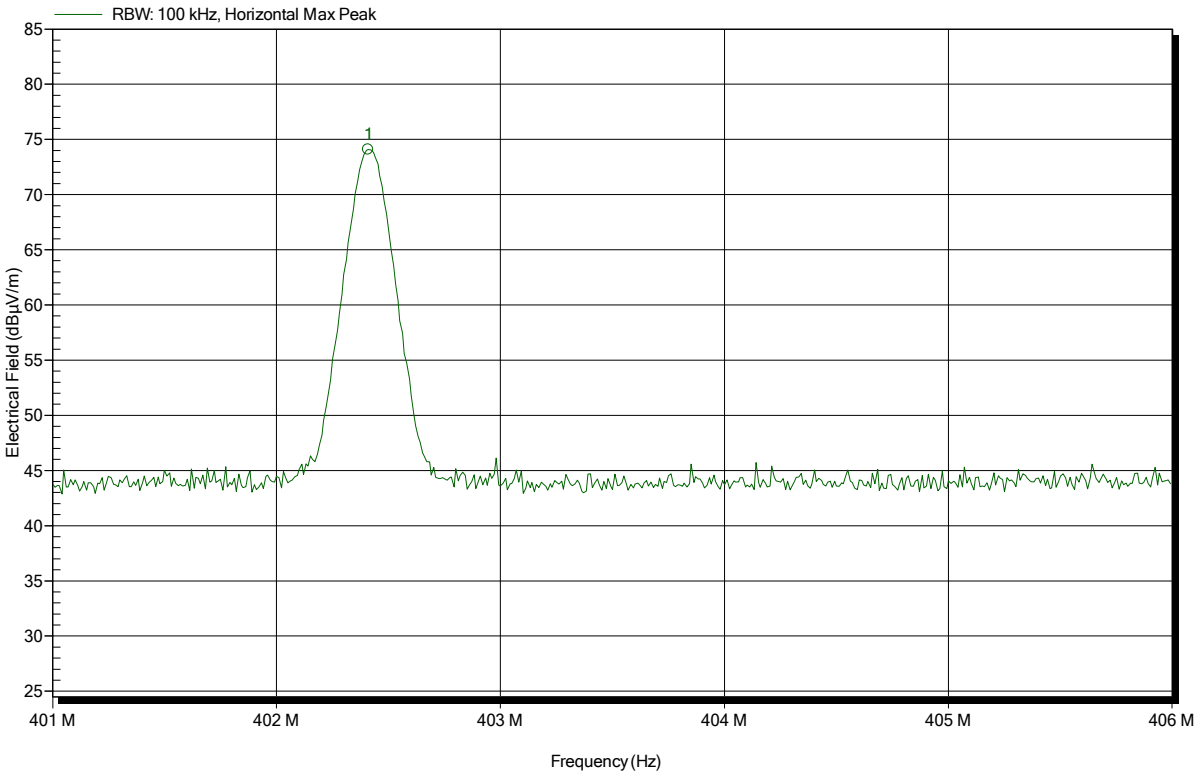

Frequency	Peak
402.41 MHz	74.07 dBµV/m

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; 402.45 MHz, CW
Test Date:	2016-12-19
Note:	Power dBµV/m ERP

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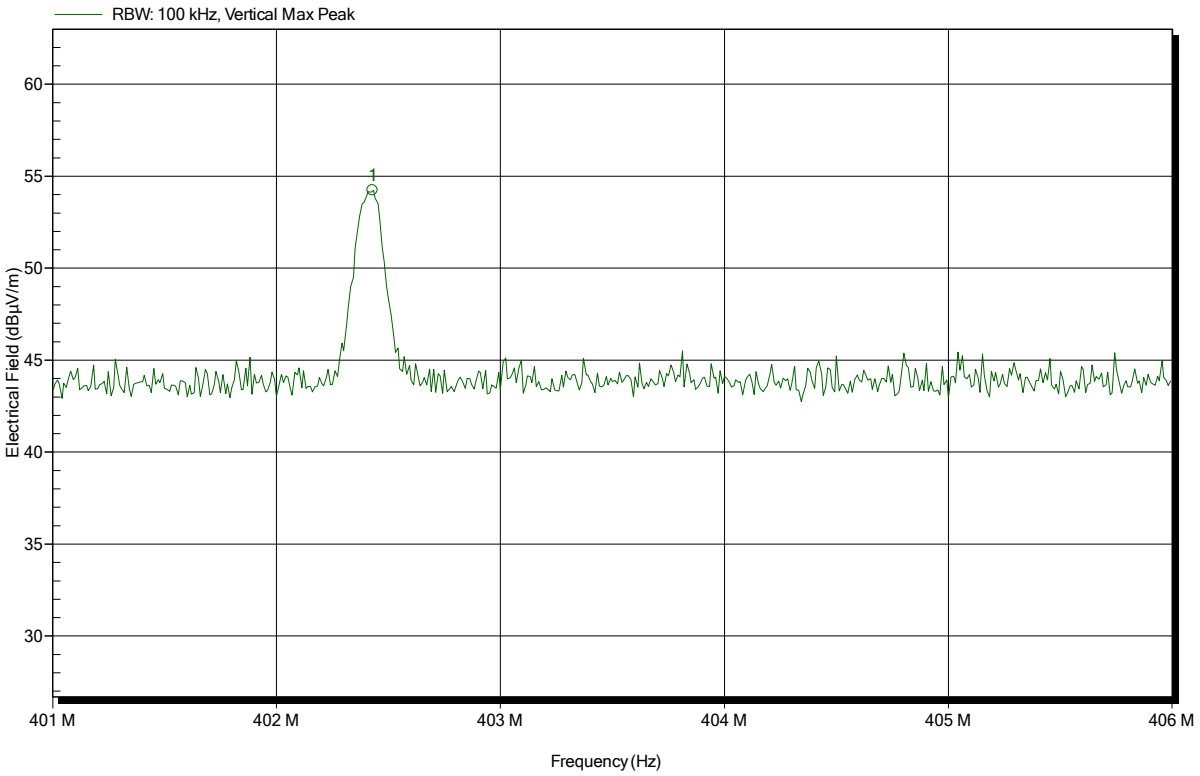

Frequency	Peak
402.43 MHz	54.23 dBµV/m

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; 404.85 MHz, CW
Test Date:	2016-12-19
Note:	Power dBµV/m ERP

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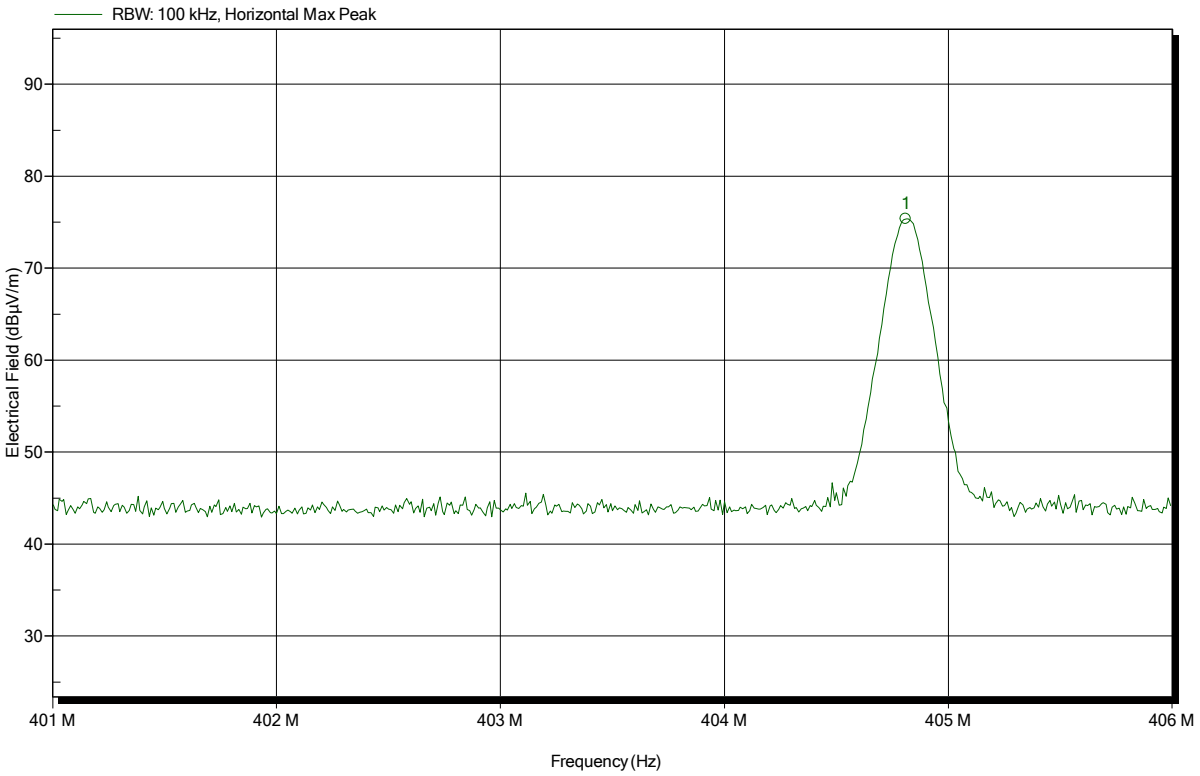

Frequency	Peak
404.81 MHz	75.36 dBµV/m

Radiated power according to FCC part 95 MedRadio (402-405MHz)

Order number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; 404.85 MHz, CW
Test Date:	2016-12-19
Note:	Power dBµV/m ERP

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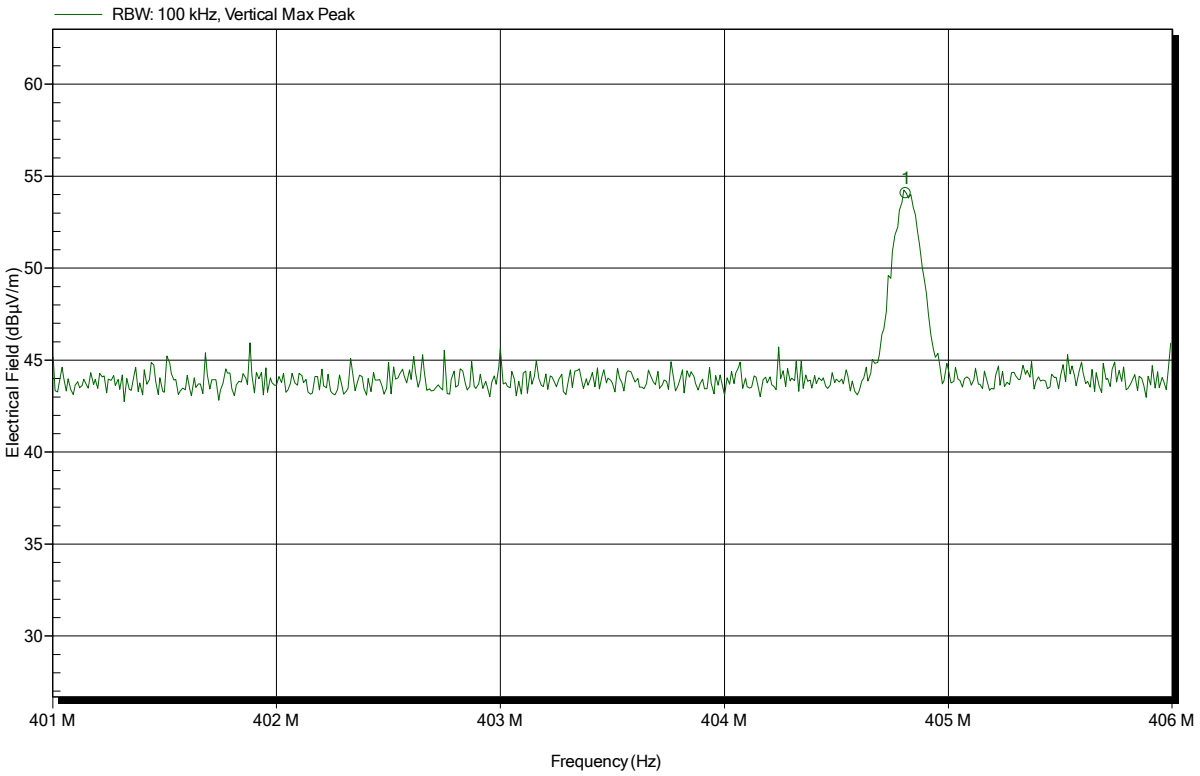

Frequency	Peak
404.81 MHz	54.06 dBµV/m

ANNEX B Transmitter Band-edge and In-band emissions

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	Band-edge

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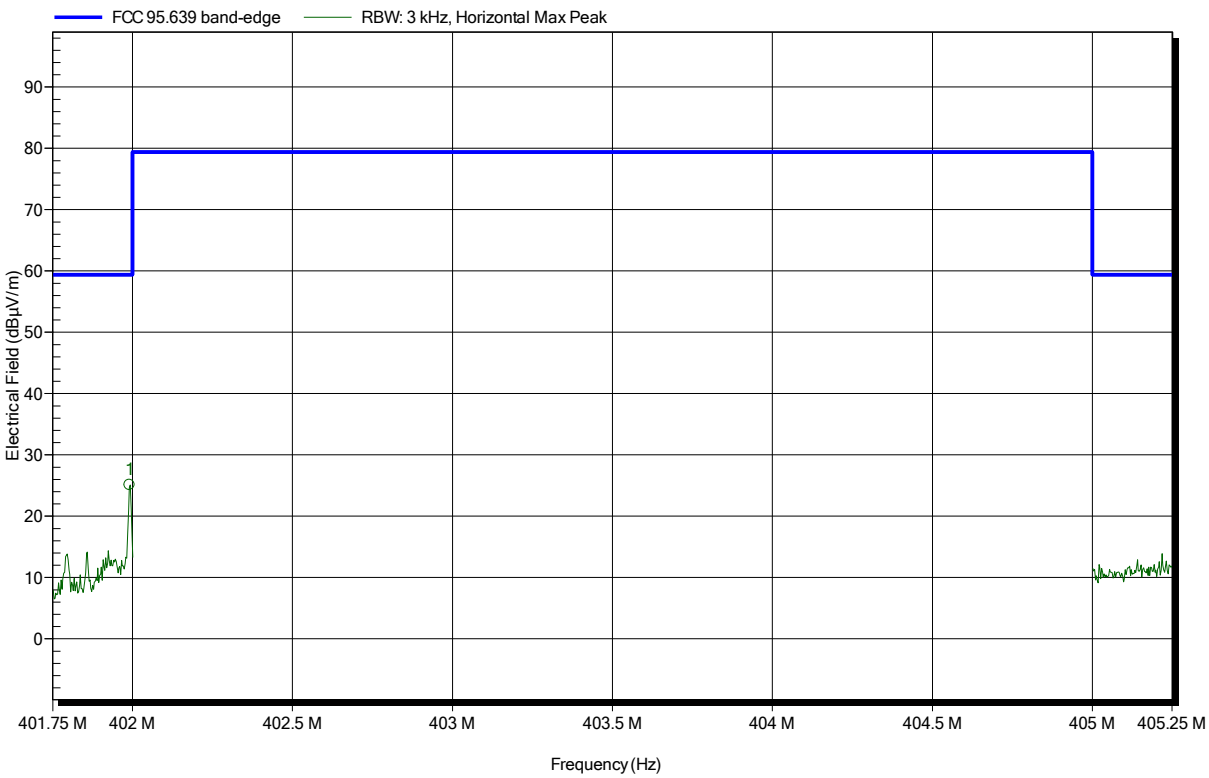

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
401.991 MHz	25.08 dBµV/m	59.4 dBµV/m	-34.32 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	Band-edge

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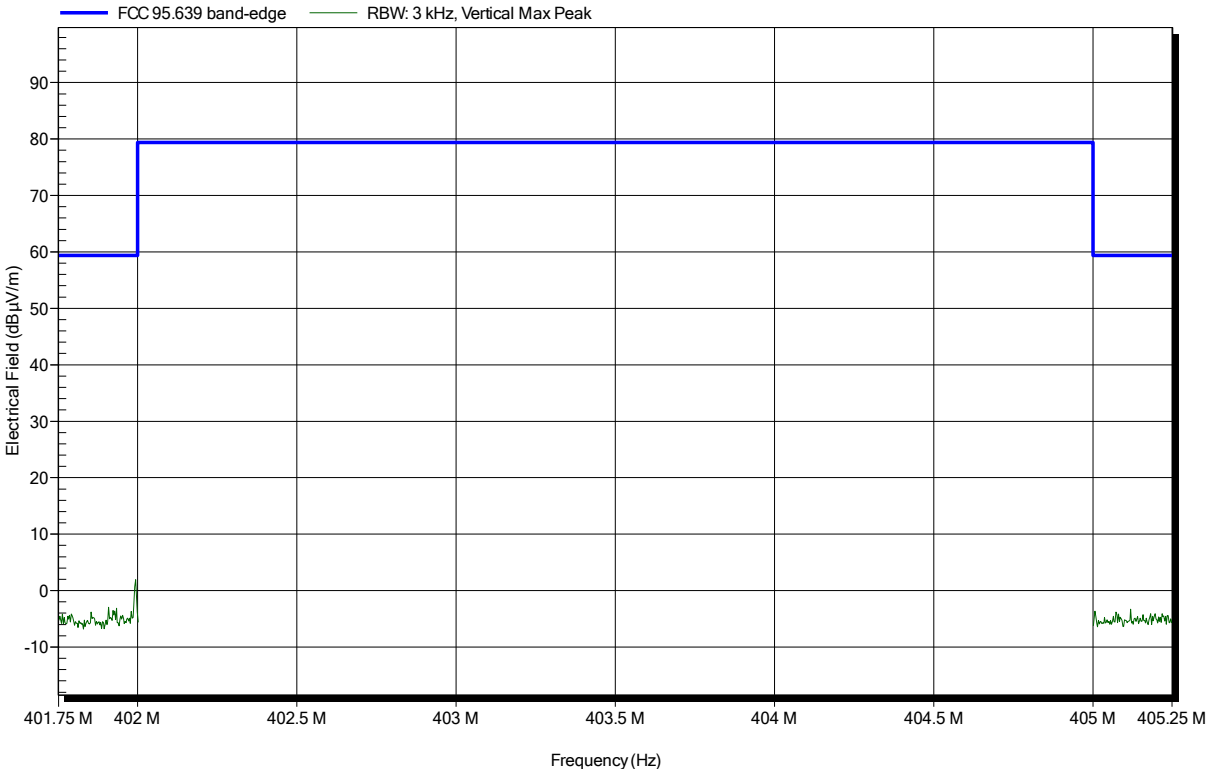

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	In-band emissions

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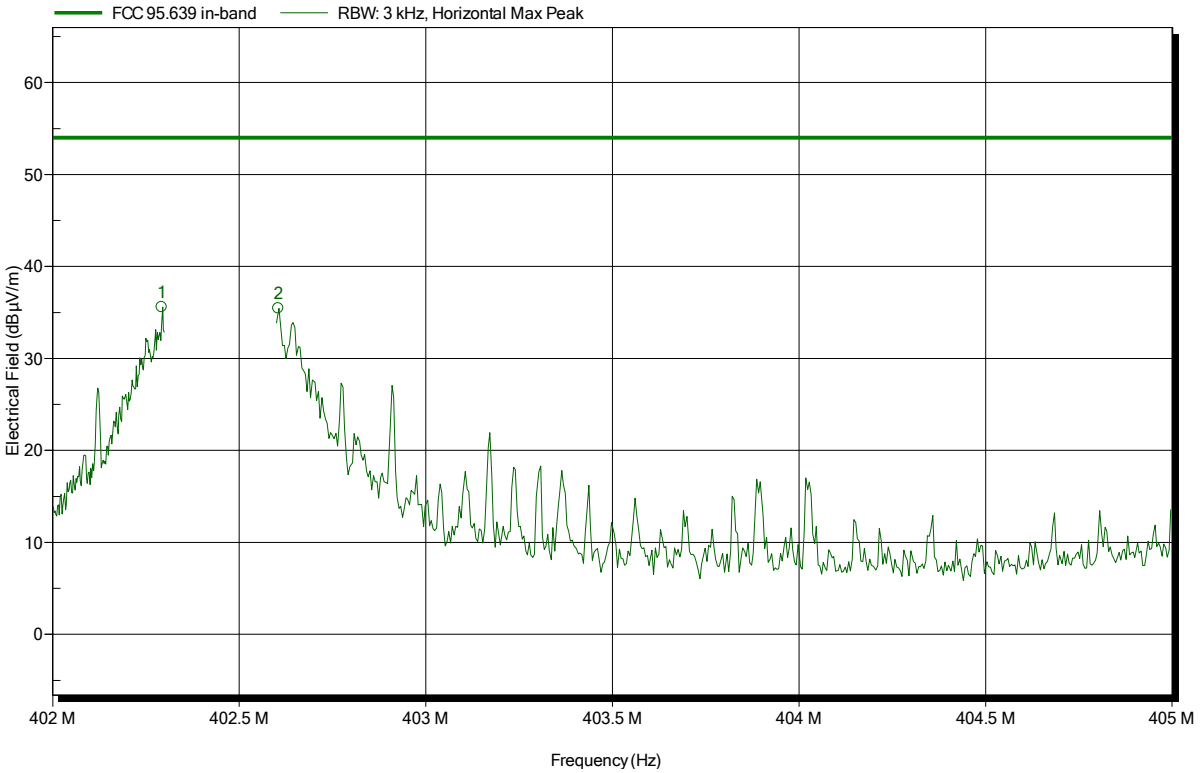

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
402.293 MHz	35.58 dBµV/m	54 dBµV/m	-18.42 dB	Pass
402.605 MHz	35.43 dBµV/m	54 dBµV/m	-18.57 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	In-band emissions

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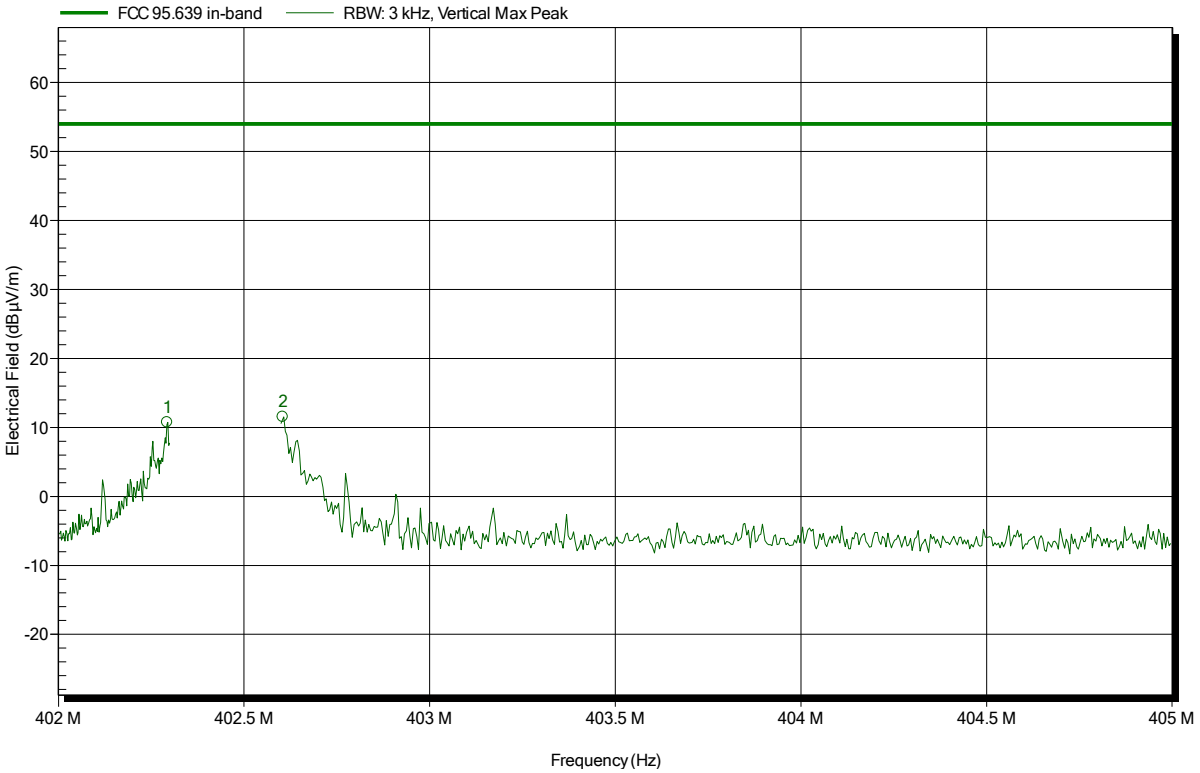

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
402.293 MHz	10.73 dBµV/m	54 dBµV/m	-43.27 dB	Pass
402.605 MHz	11.53 dBµV/m	54 dBµV/m	-42.47 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	Band-edge

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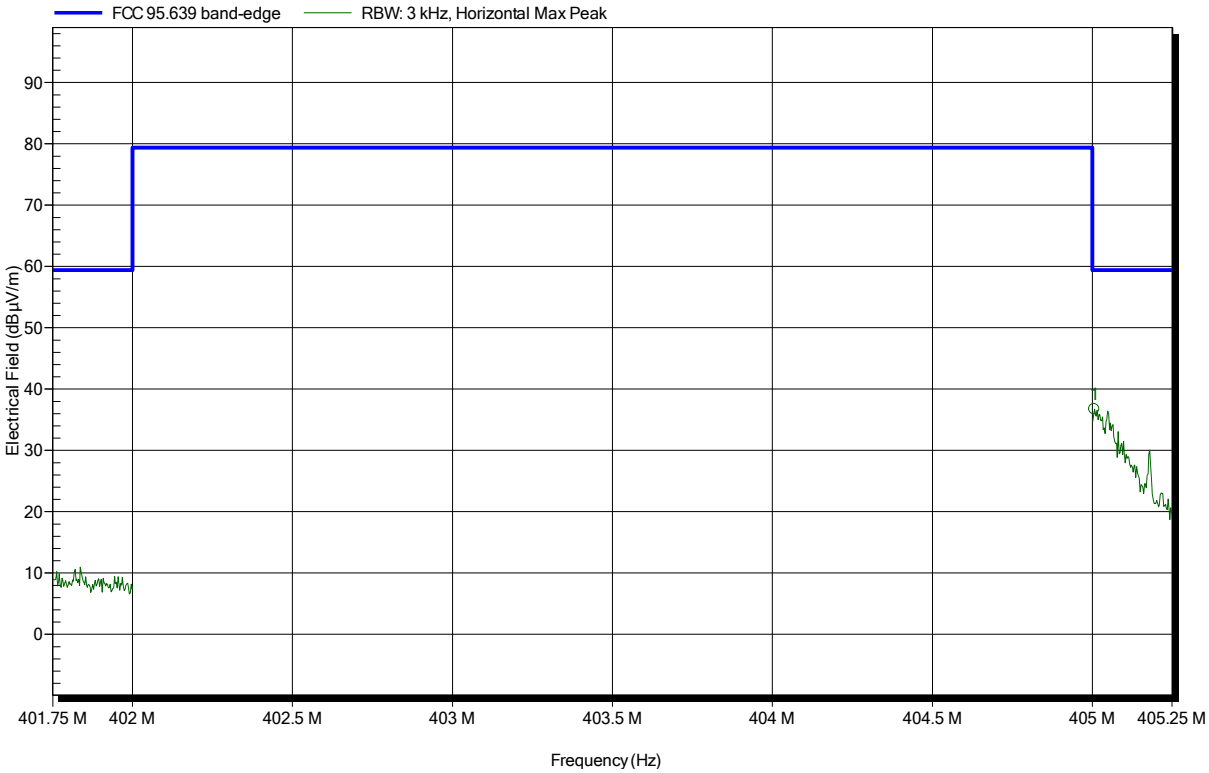

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
405.006 MHz	36.74 dBµV/m	59.4 dBµV/m	-22.66 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	Band-edge

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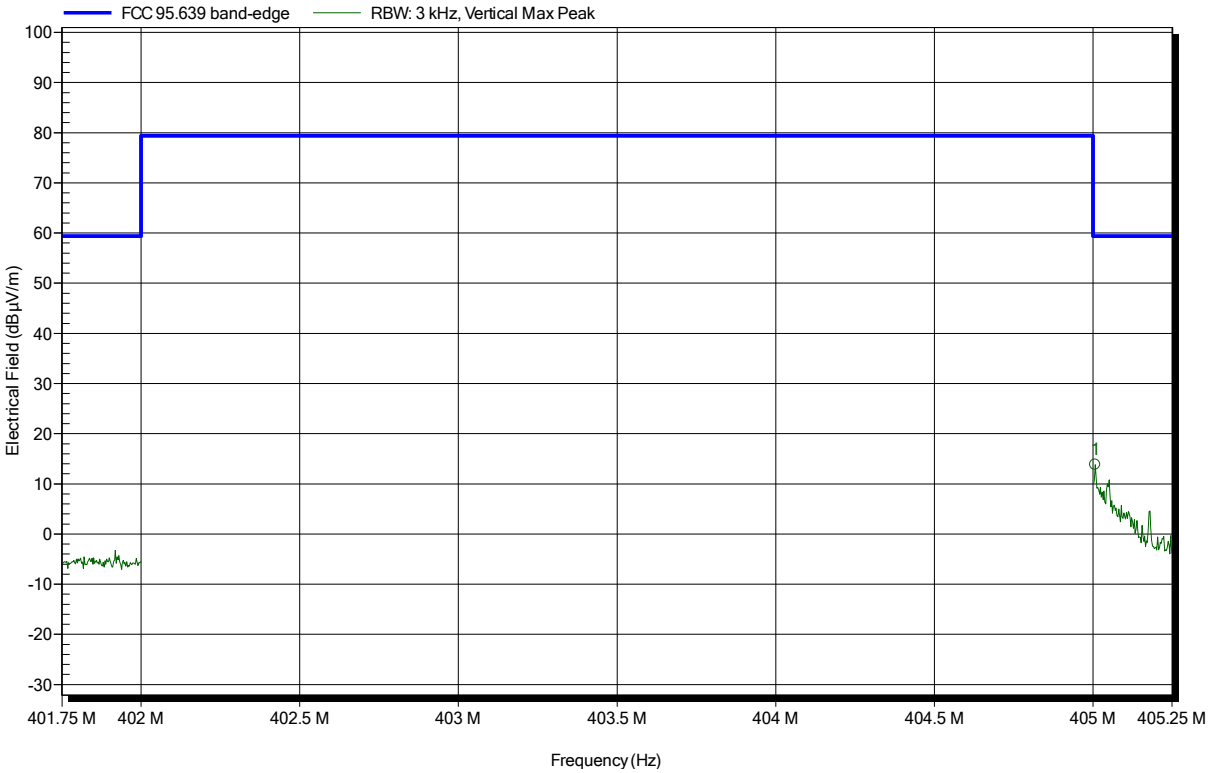

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
405.006 MHz	13.84 dBµV/m	59.4 dBµV/m	-45.56 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	In-band emissions

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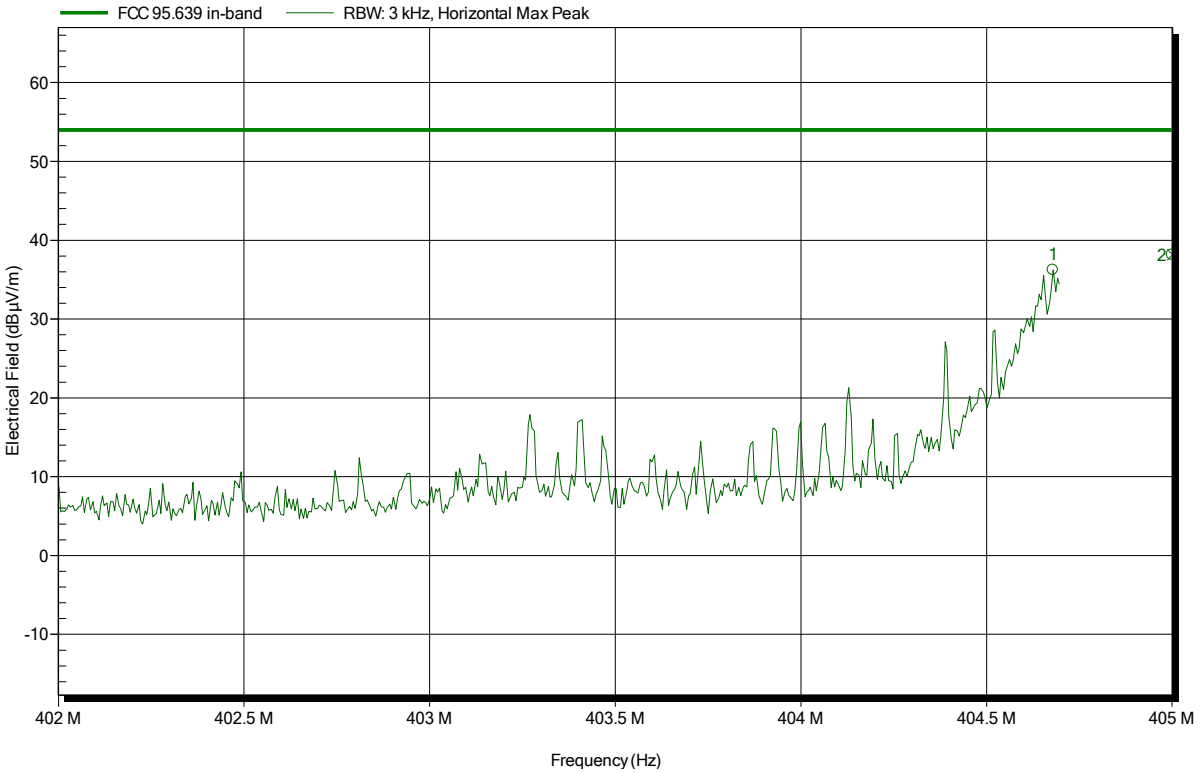

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
404.678 MHz	36.25 dBµV/m	54 dBµV/m	-17.75 dB	Pass
405 MHz	38.13 dBµV/m	54 dBµV/m	-15.87 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	In-band emissions

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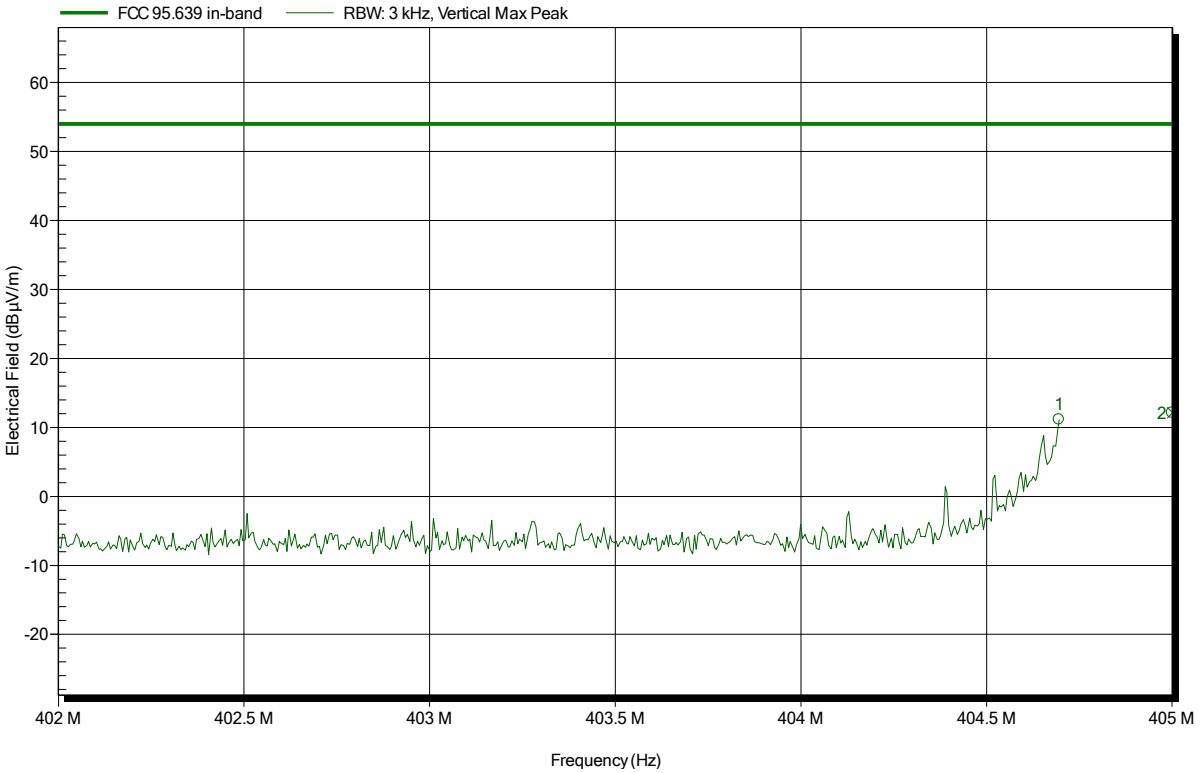

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
404.695 MHz	11.15 dBµV/m	54 dBµV/m	-42.85 dB	Pass
405 MHz	12.14 dBµV/m	54 dBµV/m	-41.86 dB	Pass

ANNEX C Transmitter radiated spurious emissions

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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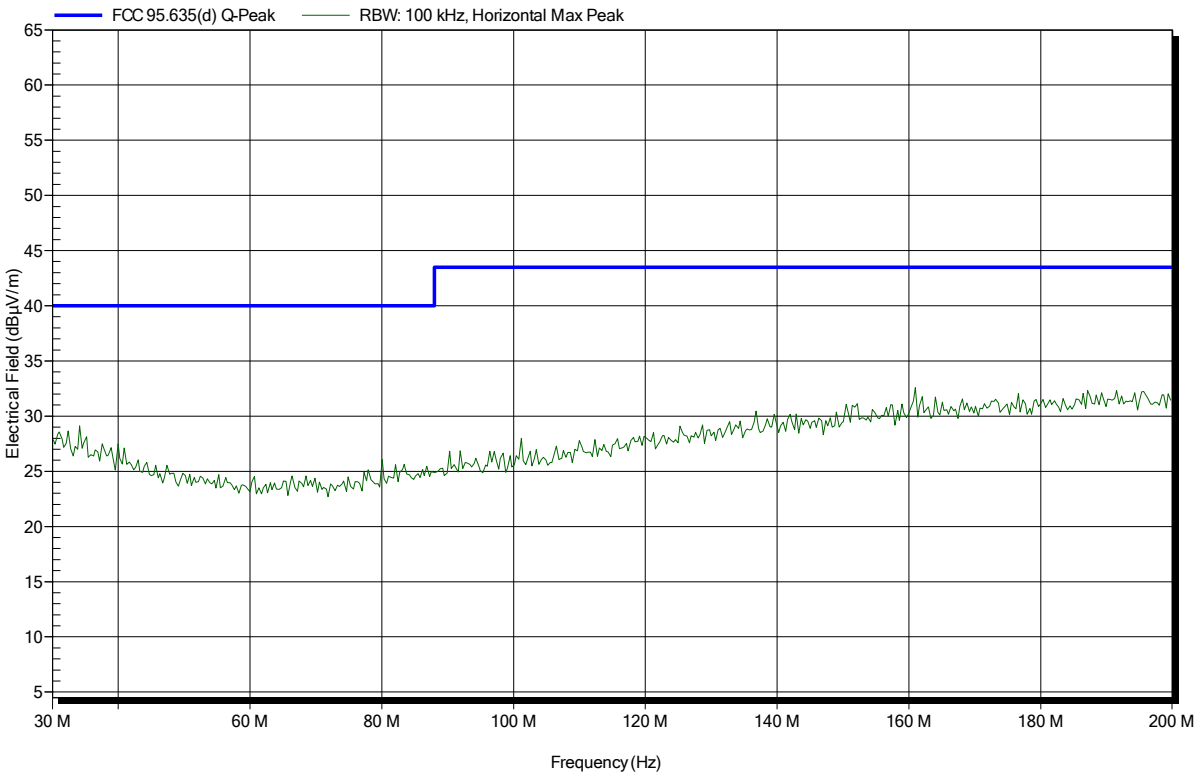

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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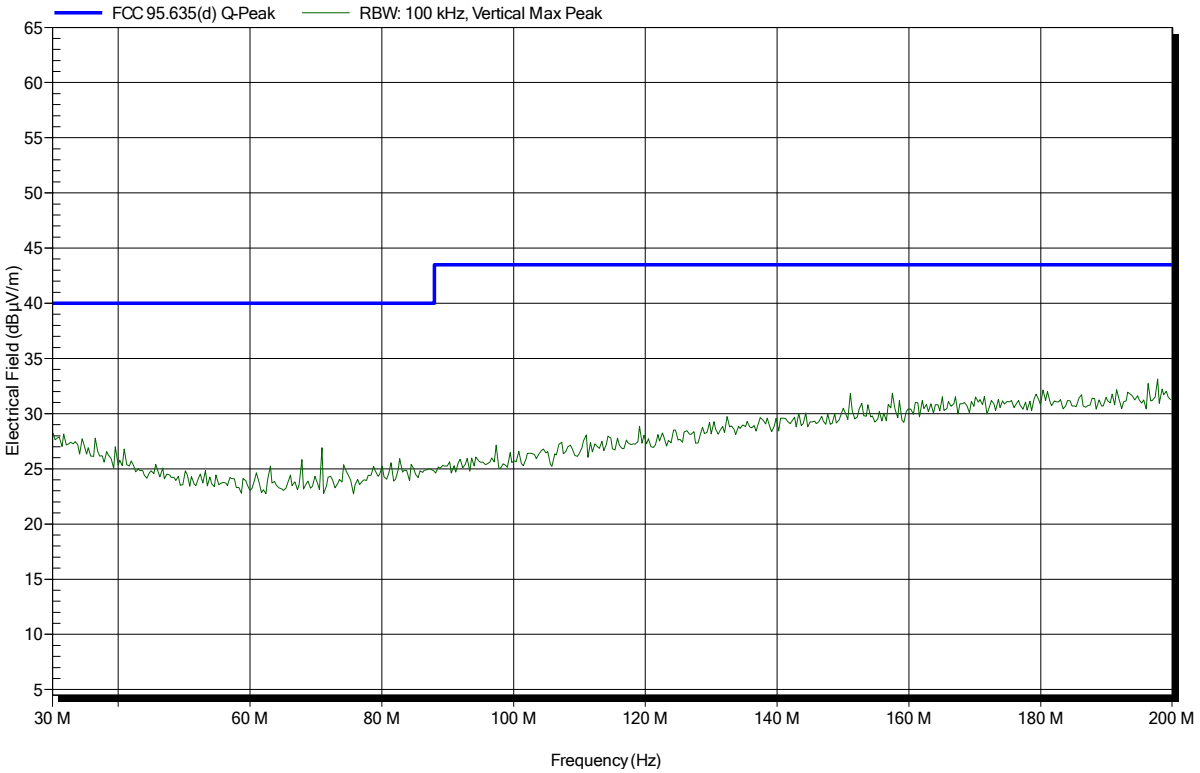

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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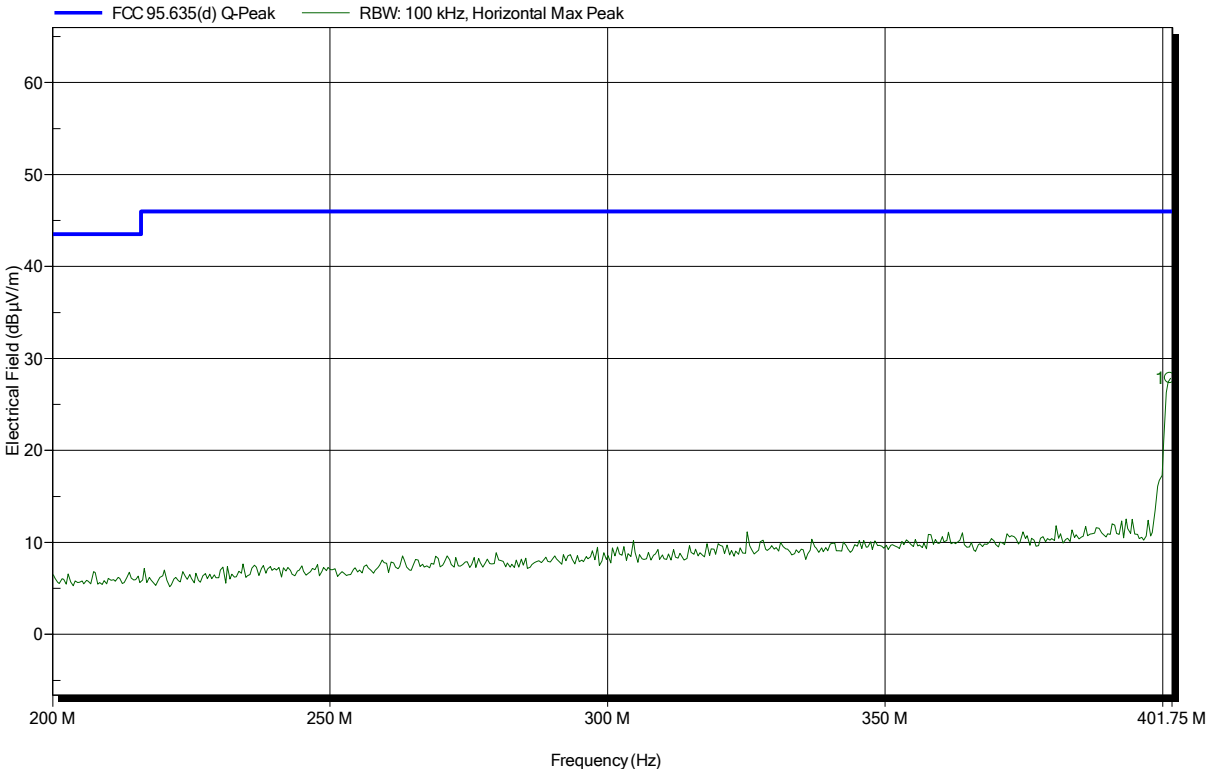

Frequency	Peak	Peak Limit	Peak Difference	Status
401.347 MHz	27.87 dBµV/m	46 dBµV/m	-18.13 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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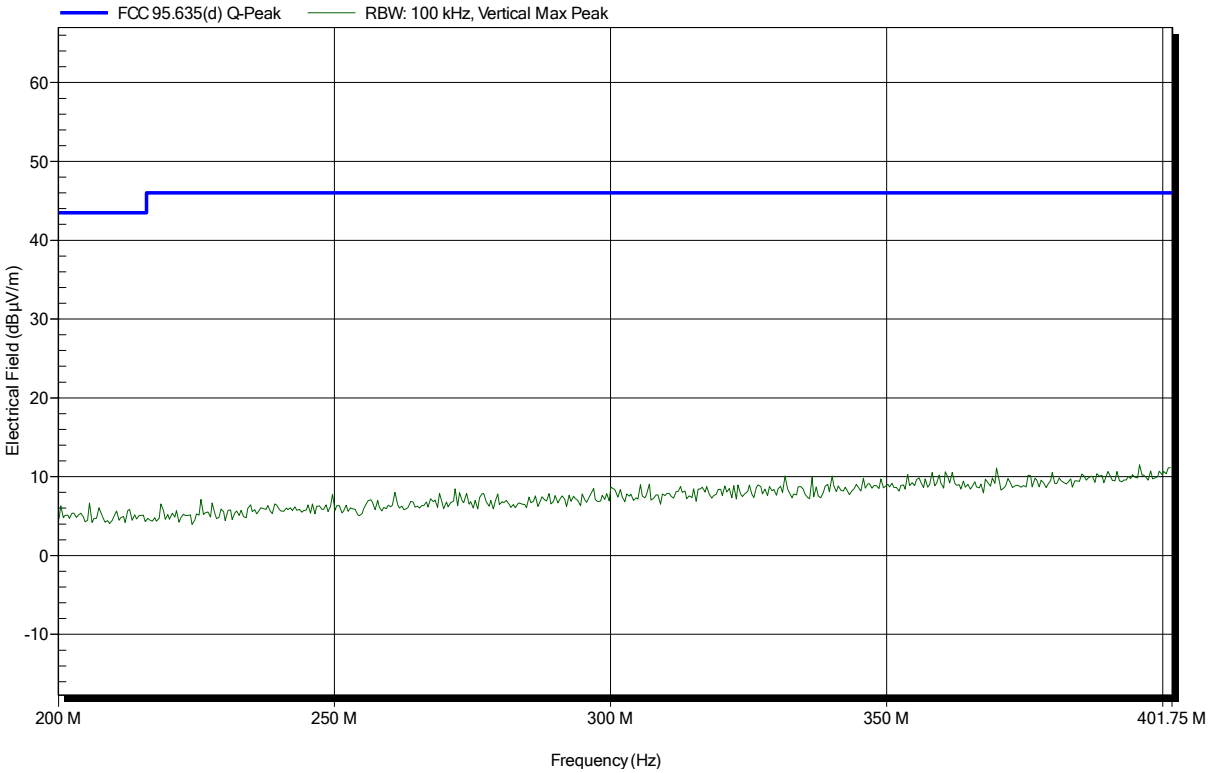

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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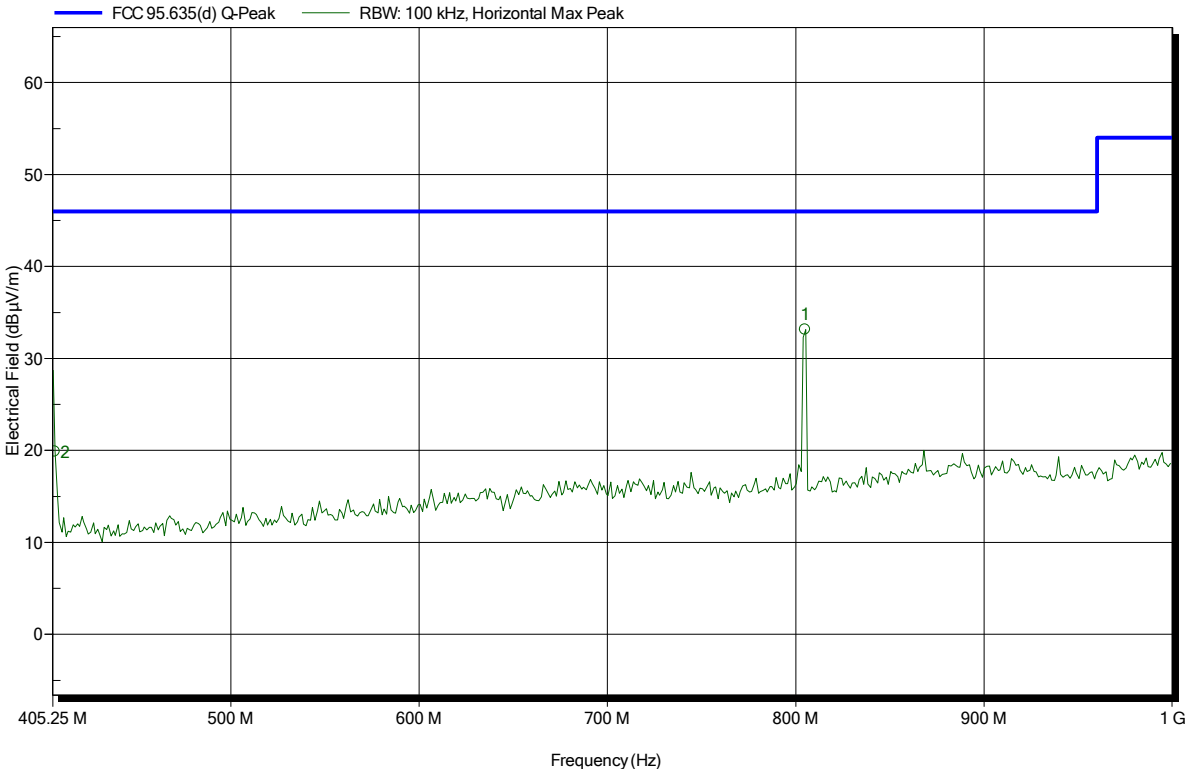

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
406.44 MHz	19.88 dBµV/m	46 dBµV/m	-26.12 dB	Pass
804.922 MHz	33.14 dBµV/m	46 dBµV/m	-12.86 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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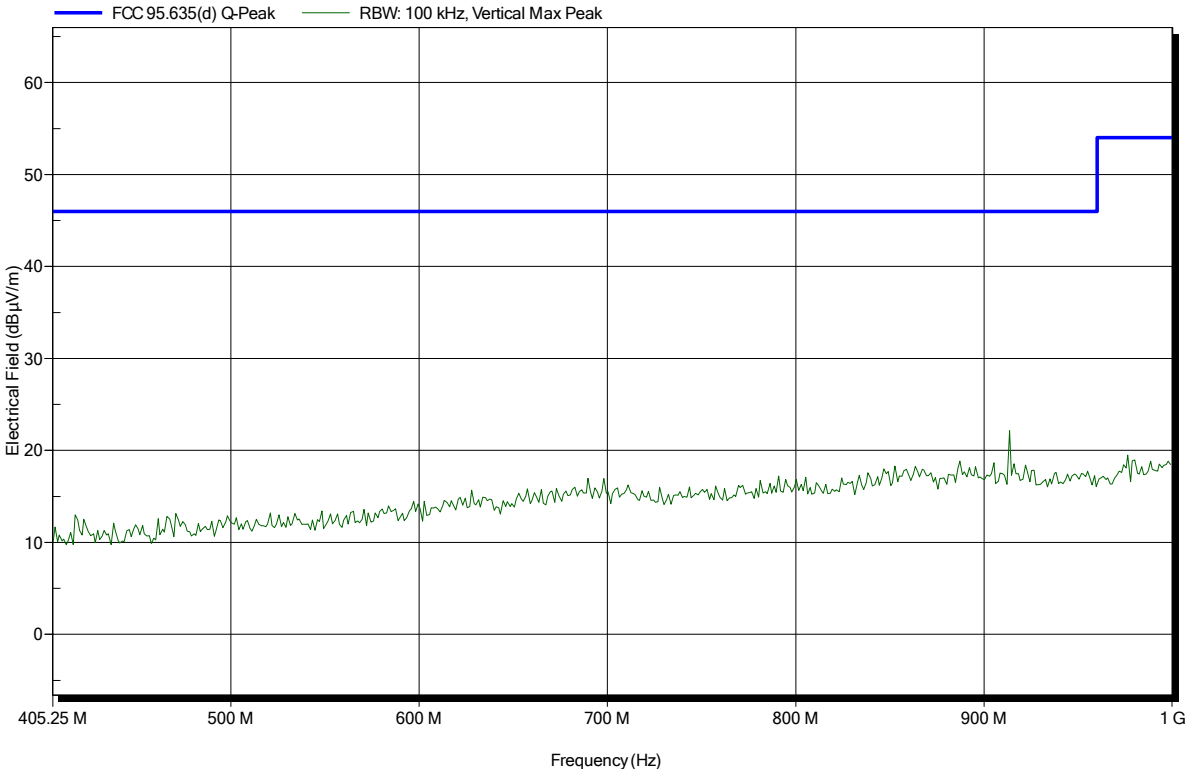

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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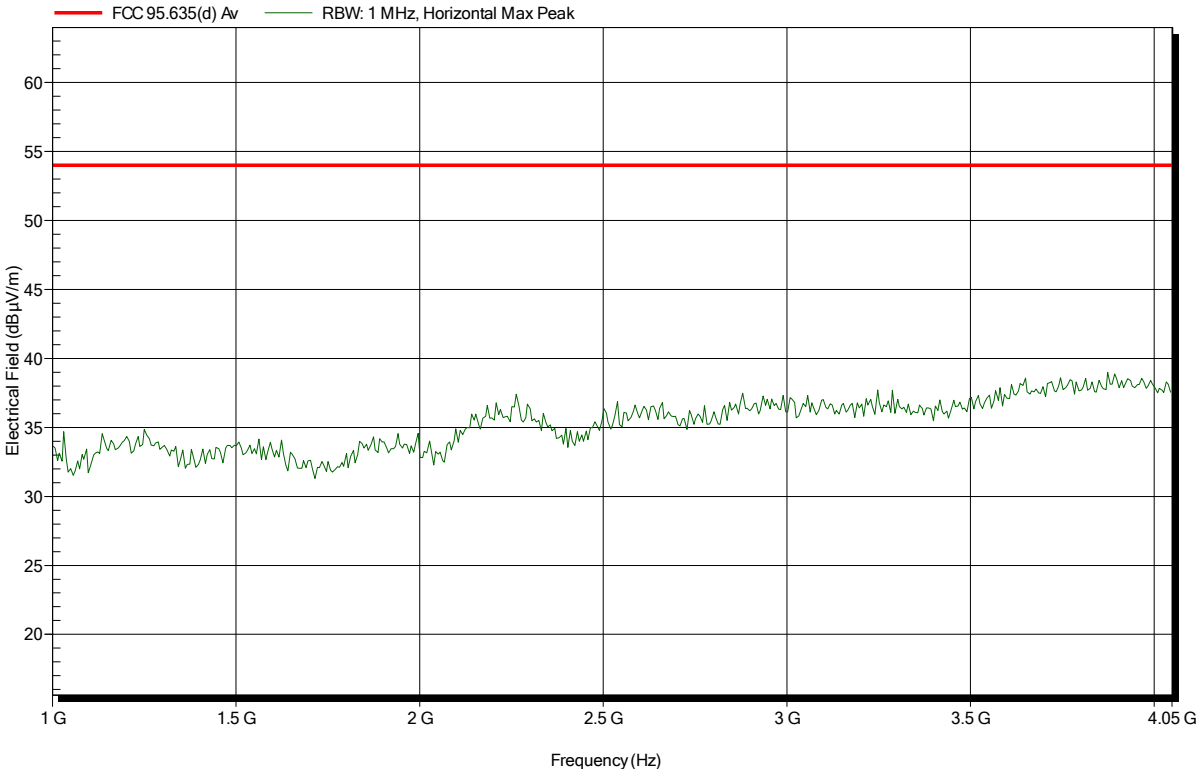

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 402.45 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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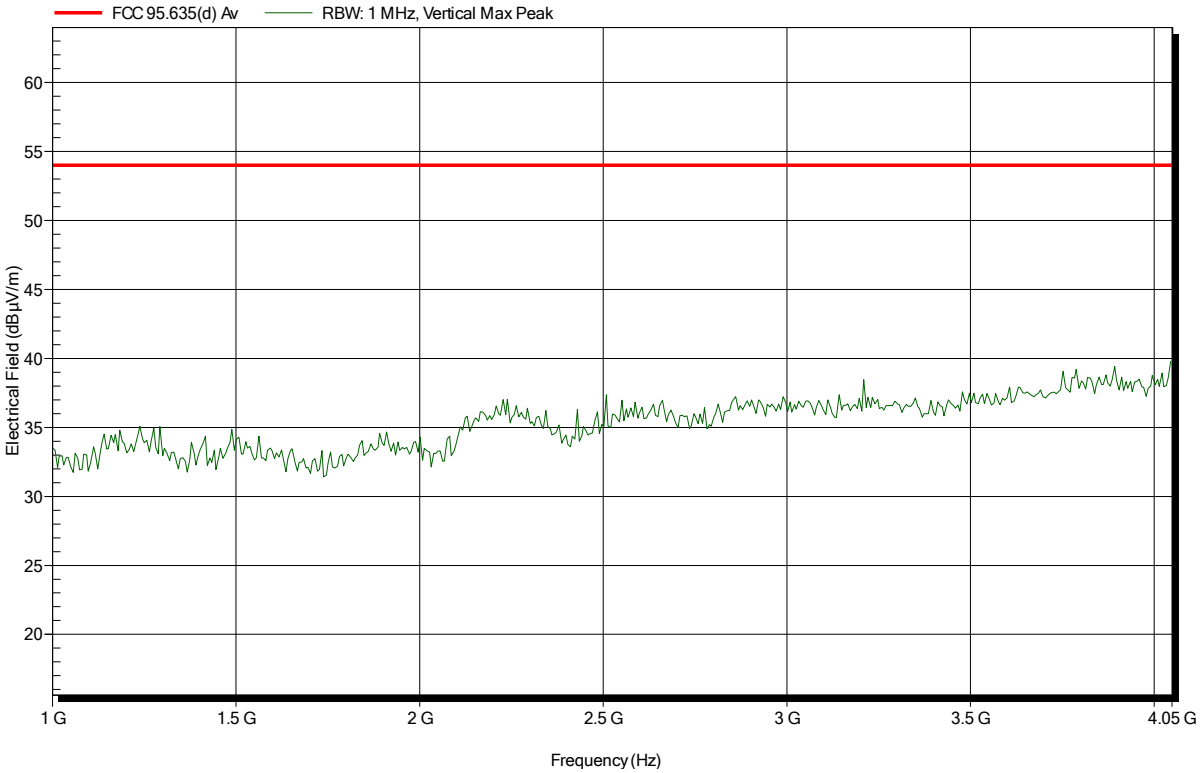

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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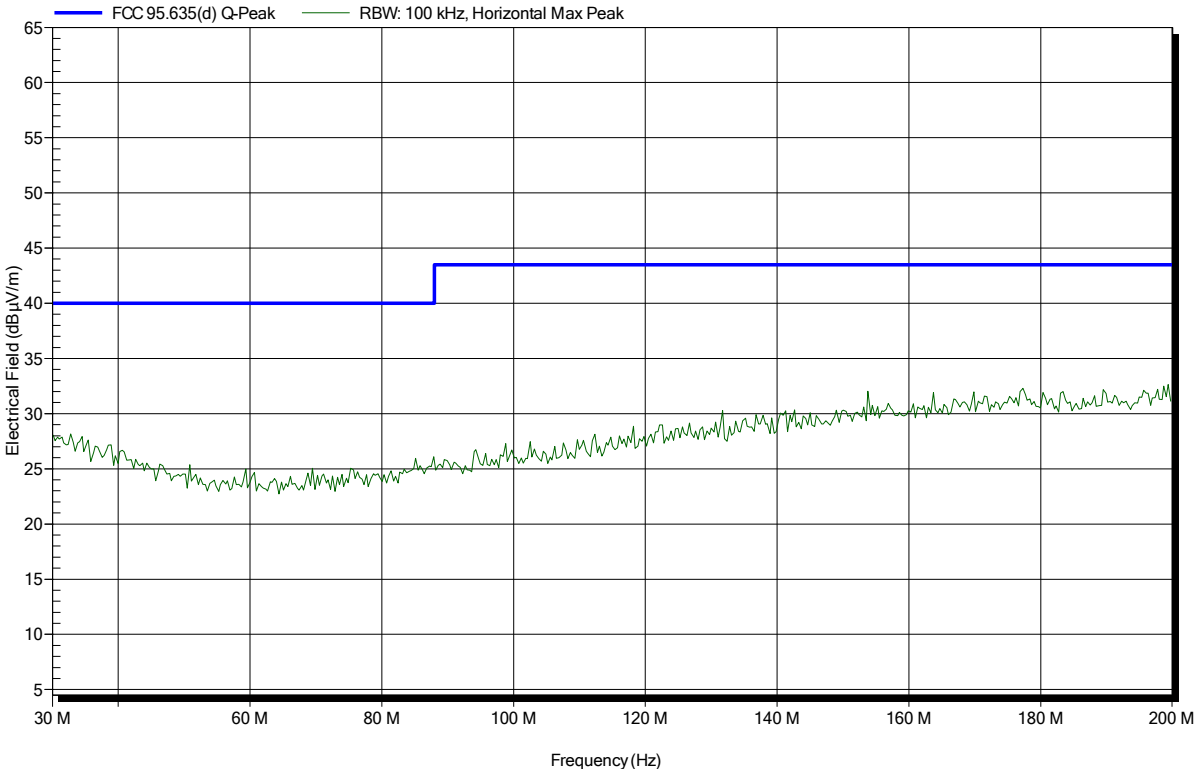

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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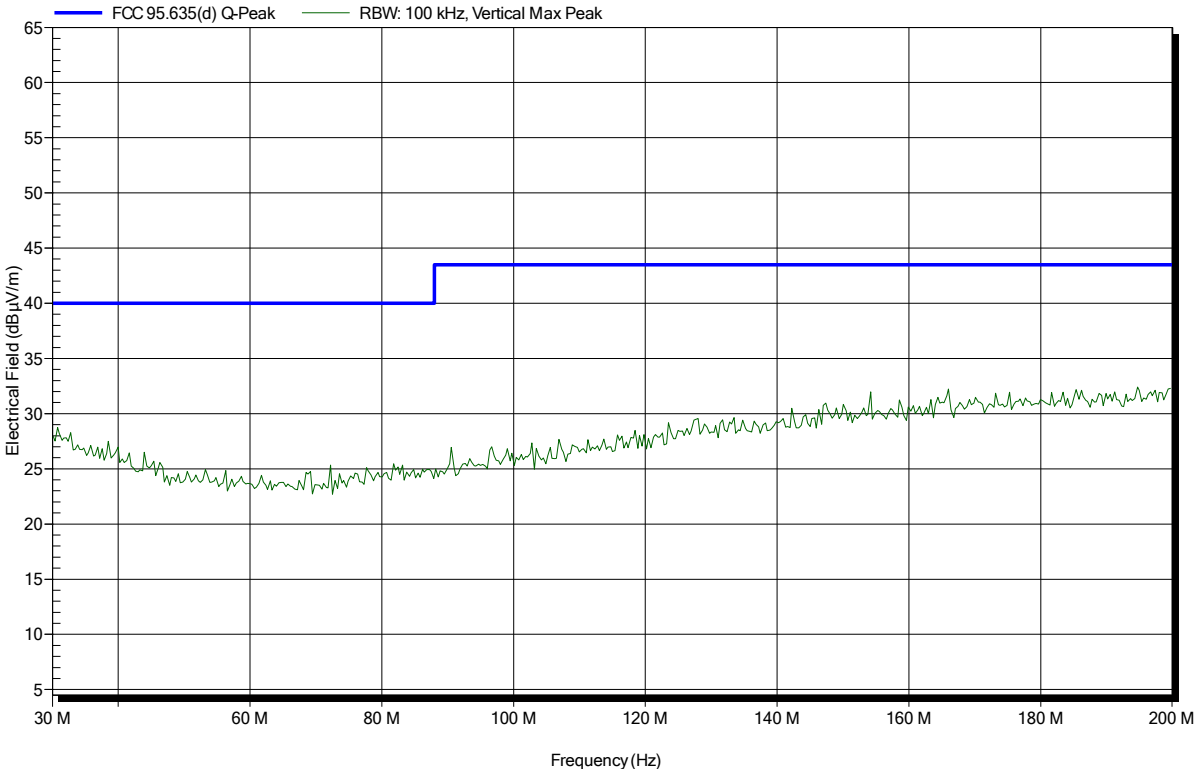

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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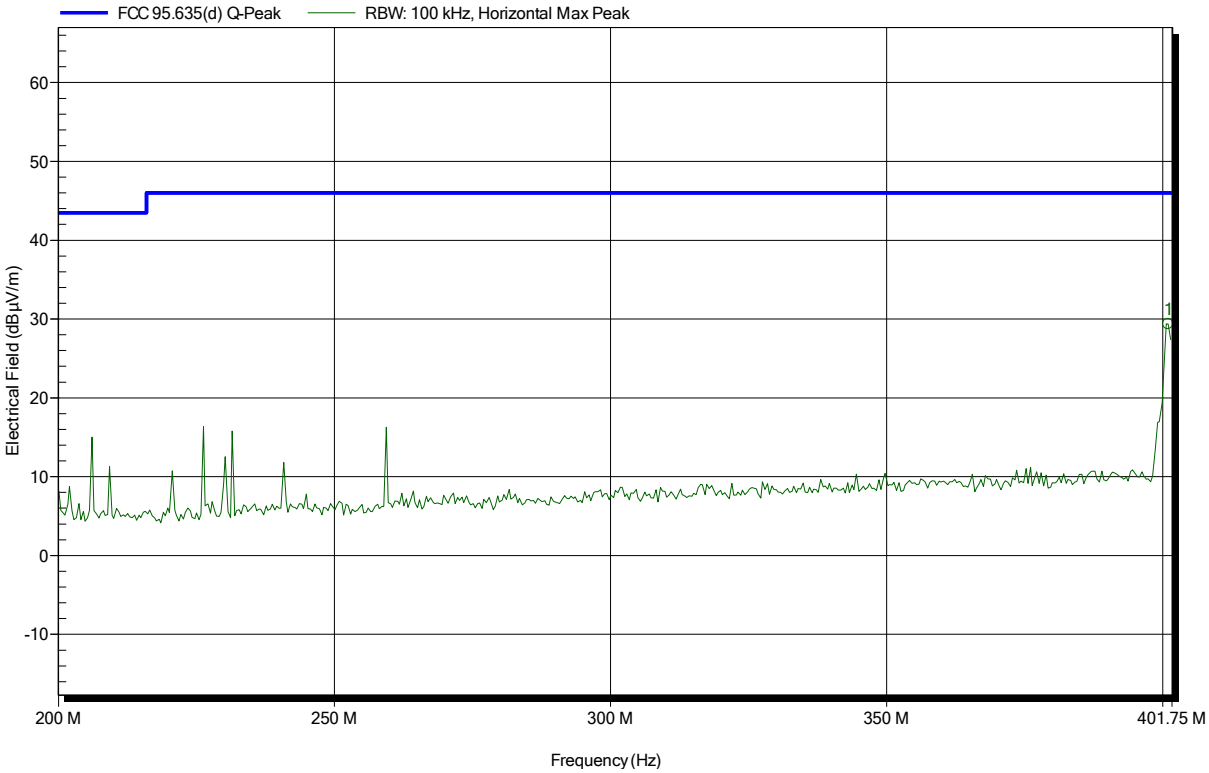

Frequency	Peak	Peak Limit	Peak Difference	Status
400.943 MHz	29.36 dBµV/m	46 dBµV/m	-16.64 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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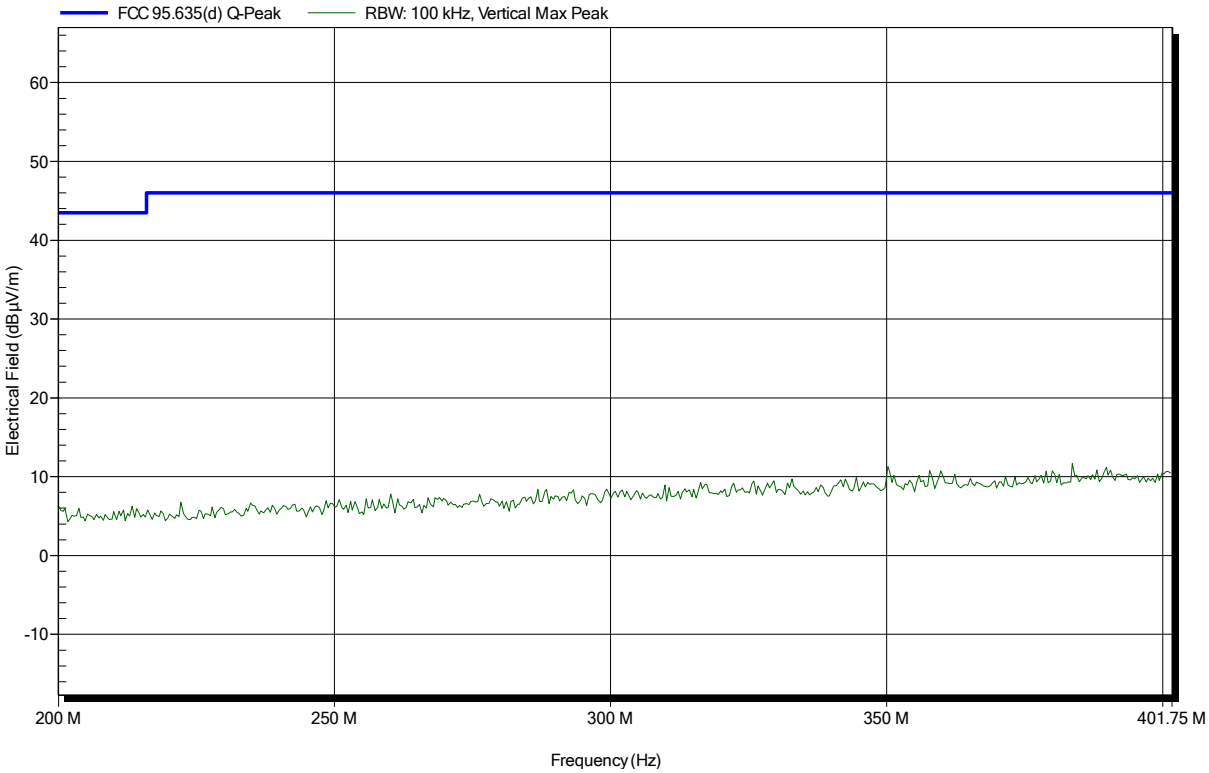

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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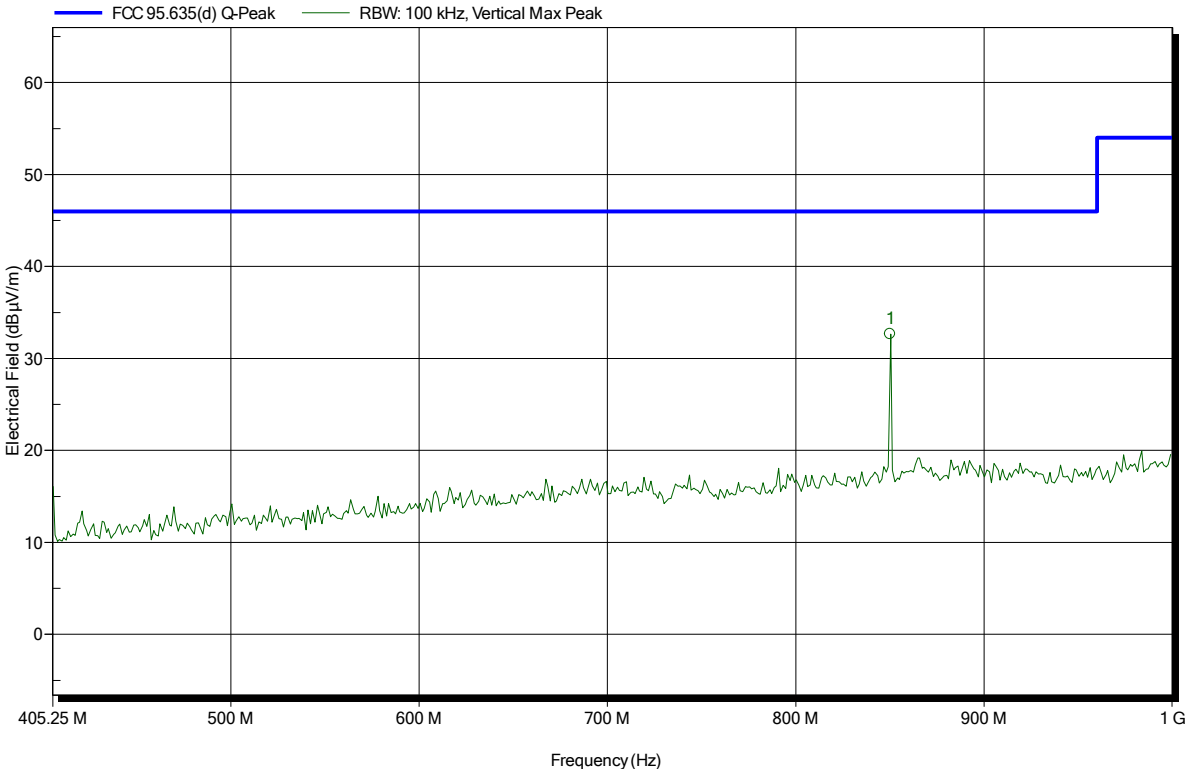

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
850.123 MHz	32.64 dBµV/m	46 dBµV/m	-13.36 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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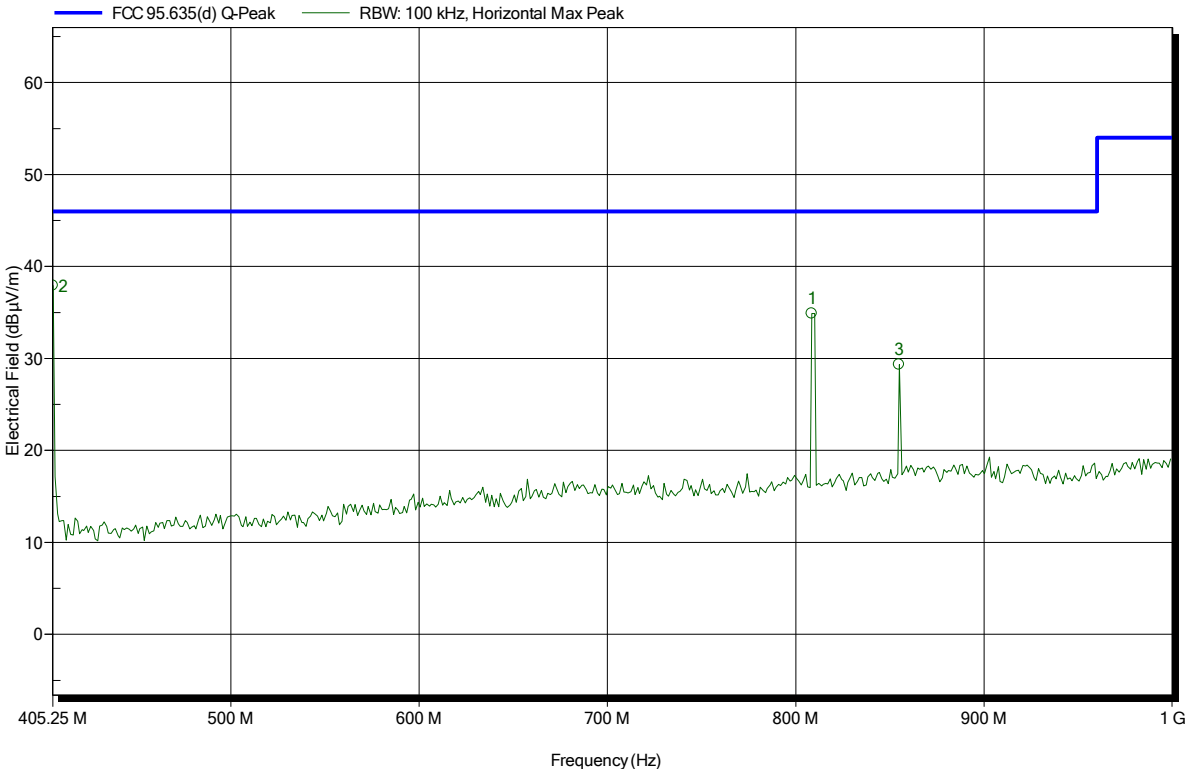

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
405.25 MHz	37.93 dBµV/m	46 dBµV/m	-8.07 dB	Pass
808.49 MHz	34.9 dBµV/m	46 dBµV/m	-11.1 dB	Pass
854.881 MHz	29.34 dBµV/m	46 dBµV/m	-16.66 dB	Pass

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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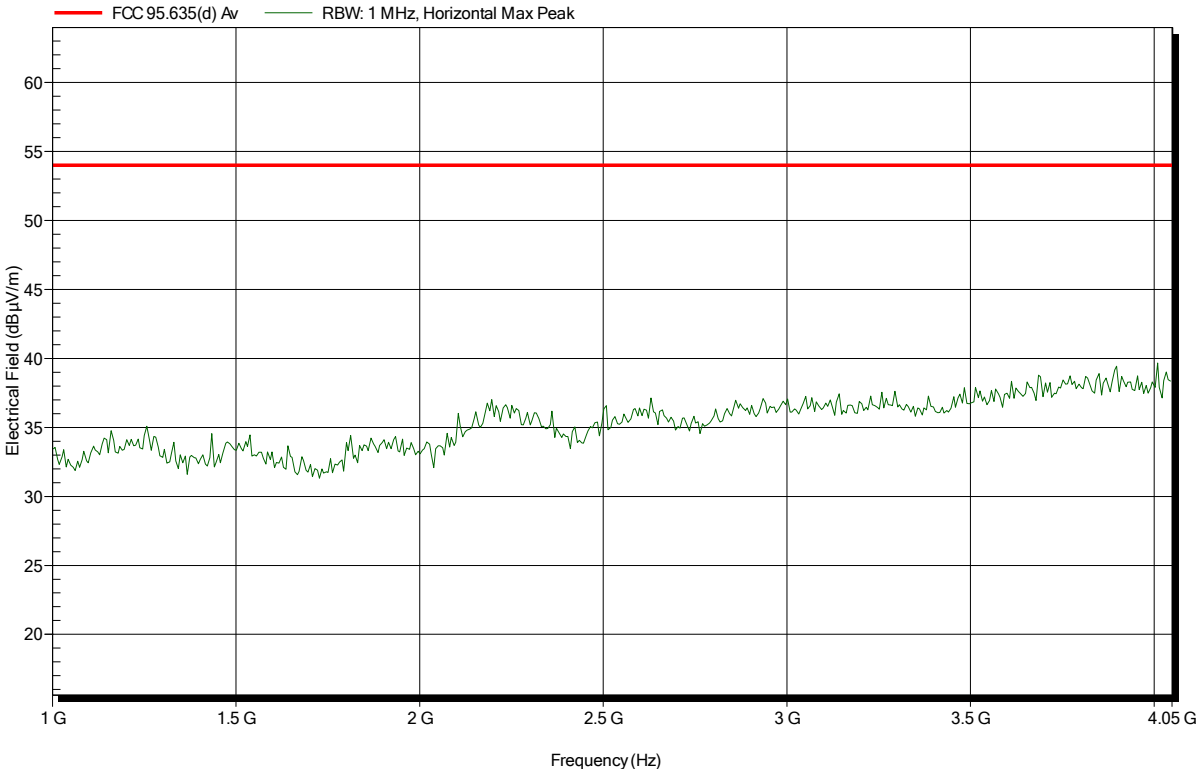

Spurious emissions according to FCC part 95 MedRadio (402-405MHz)

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom:
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	TX; 404.85 MHz, 2FSK
Test Date:	2016-12-19
Note:	

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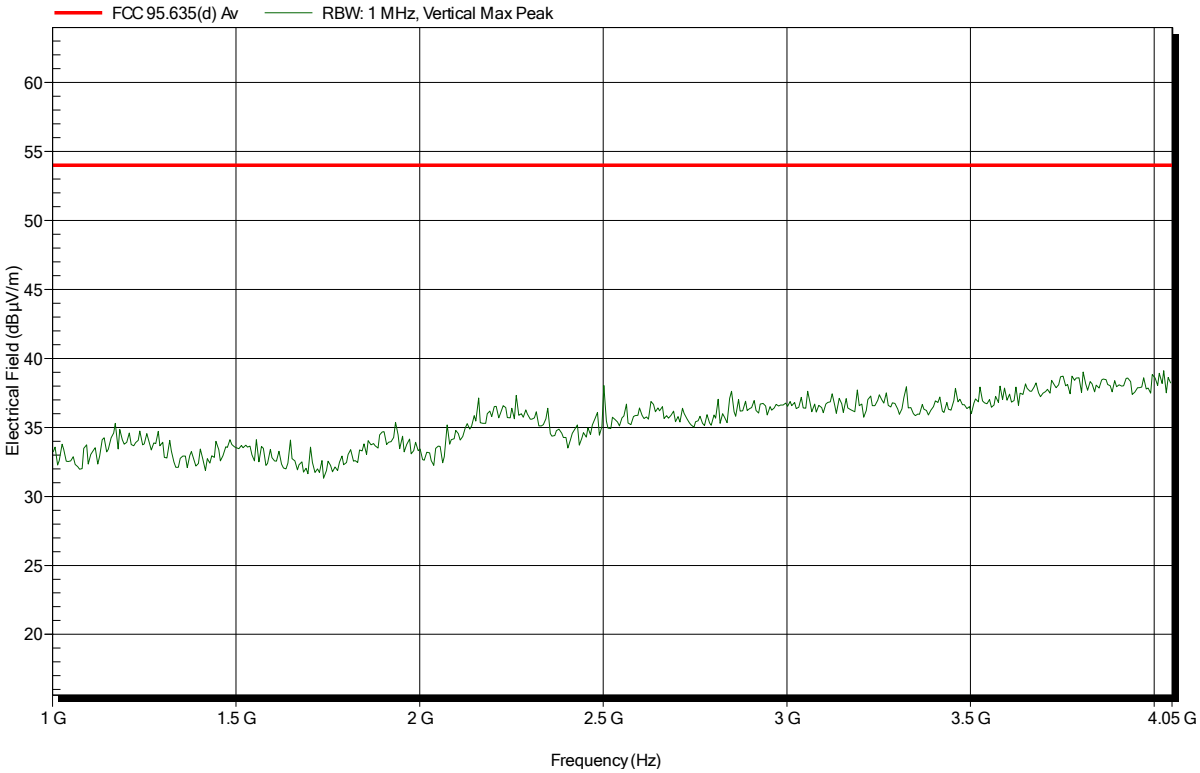

ANNEX D Receiver radiated spurious emissions

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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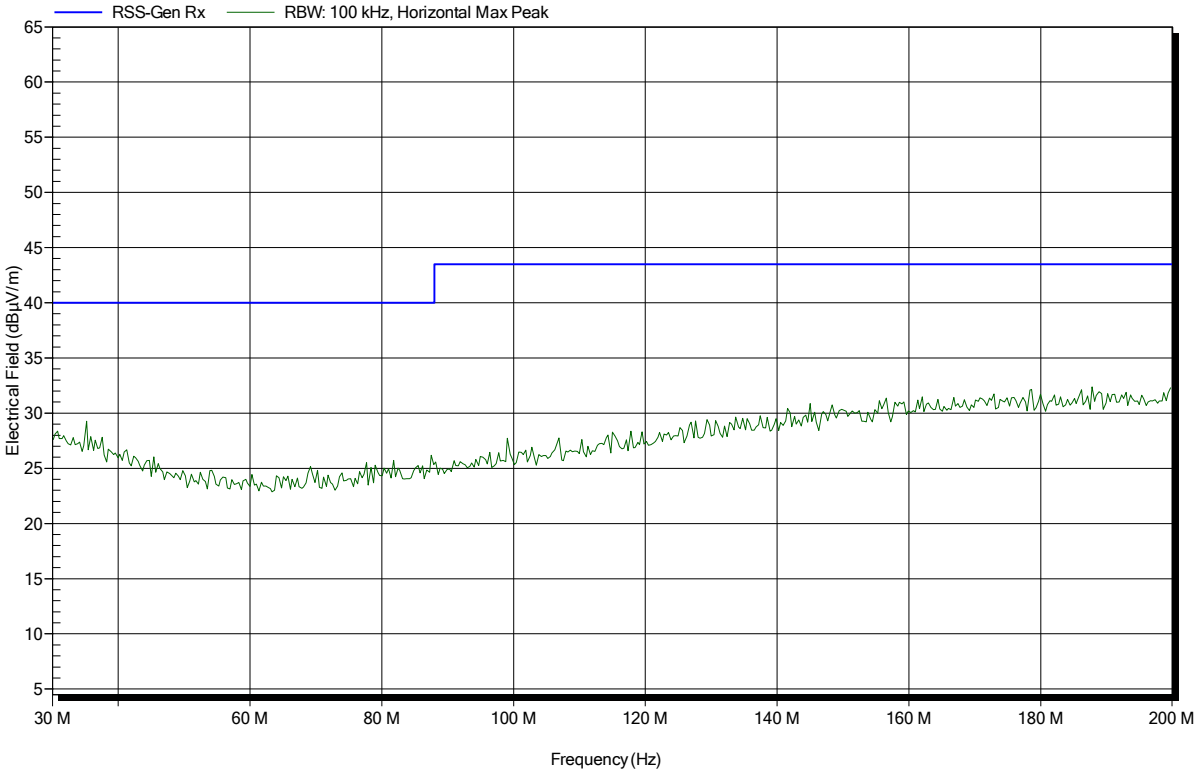

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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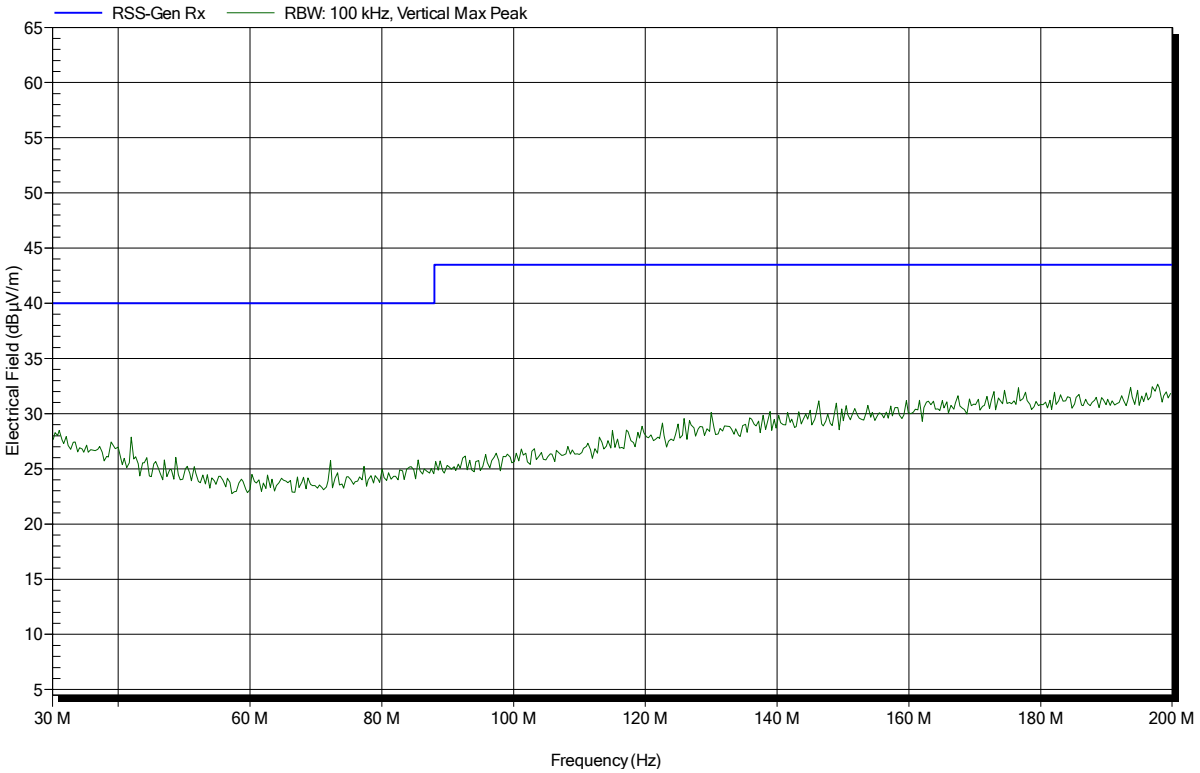

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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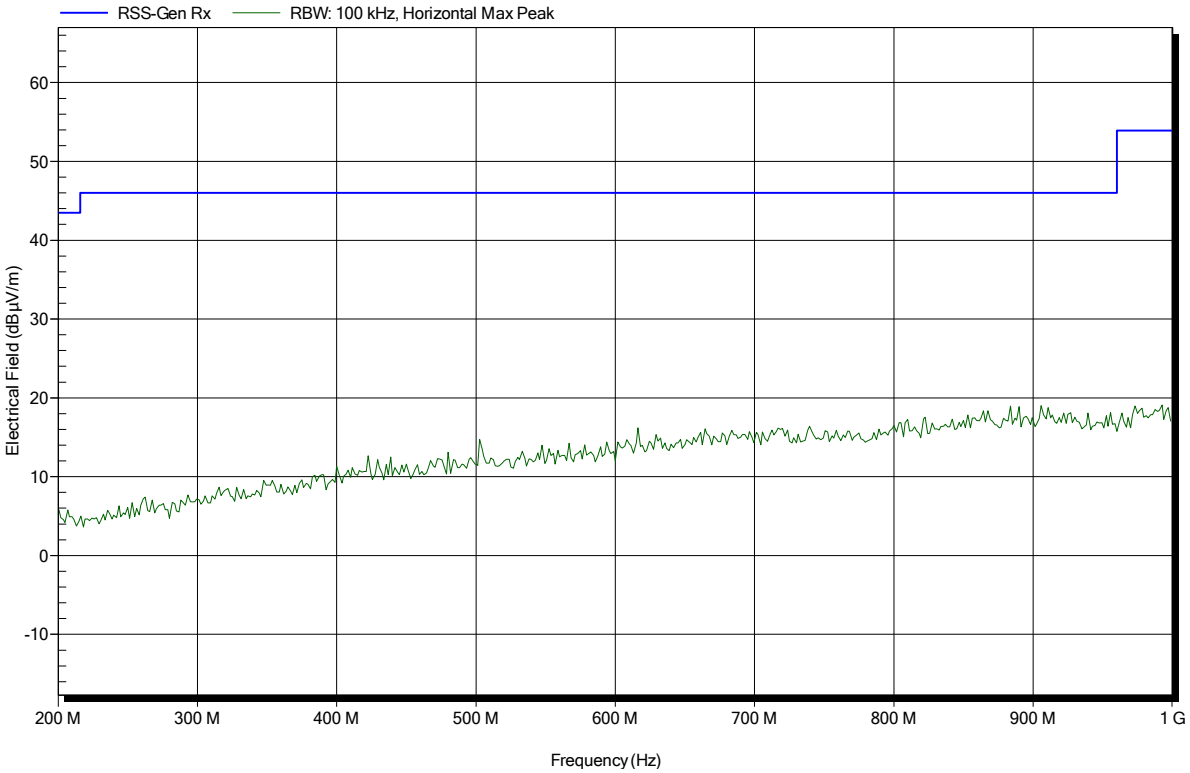

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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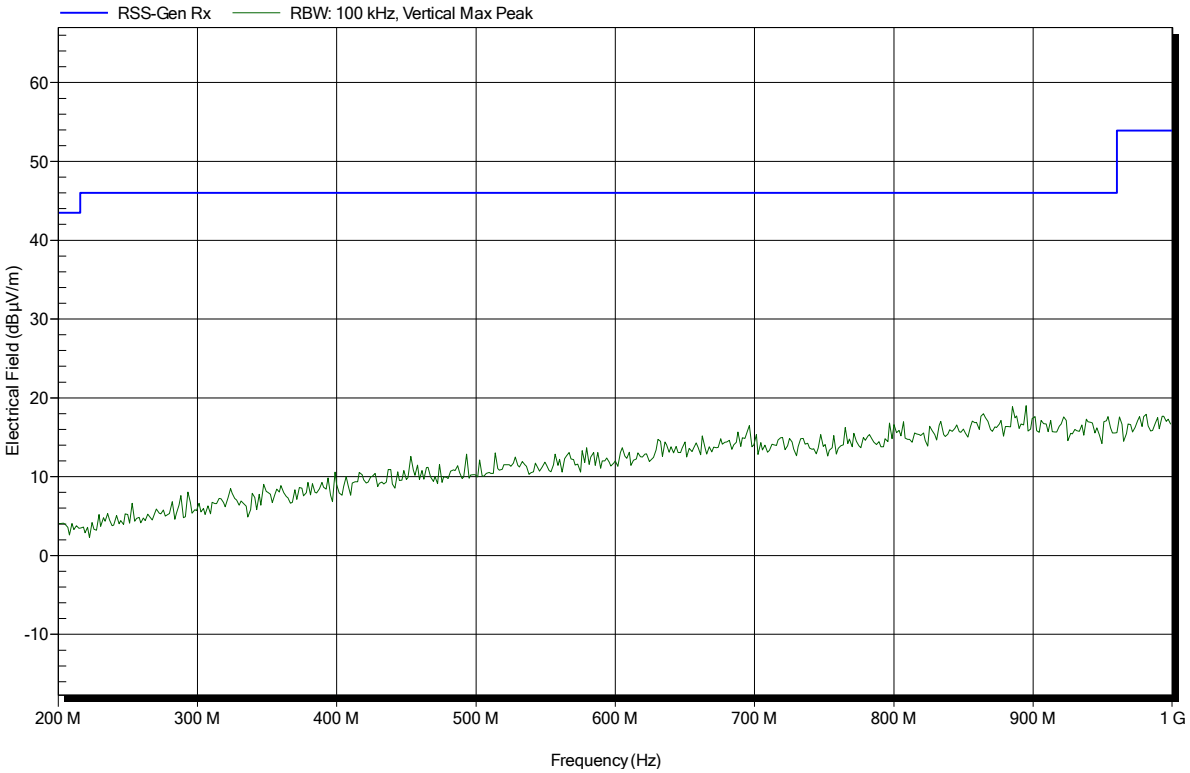

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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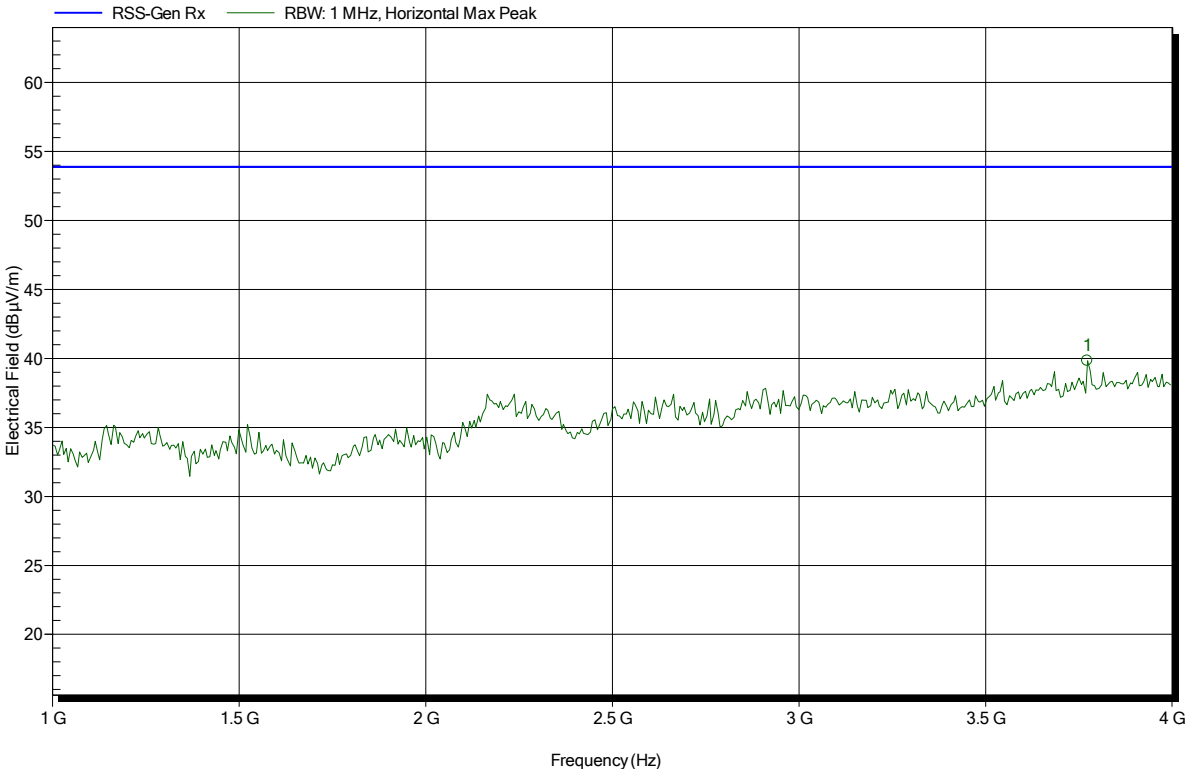
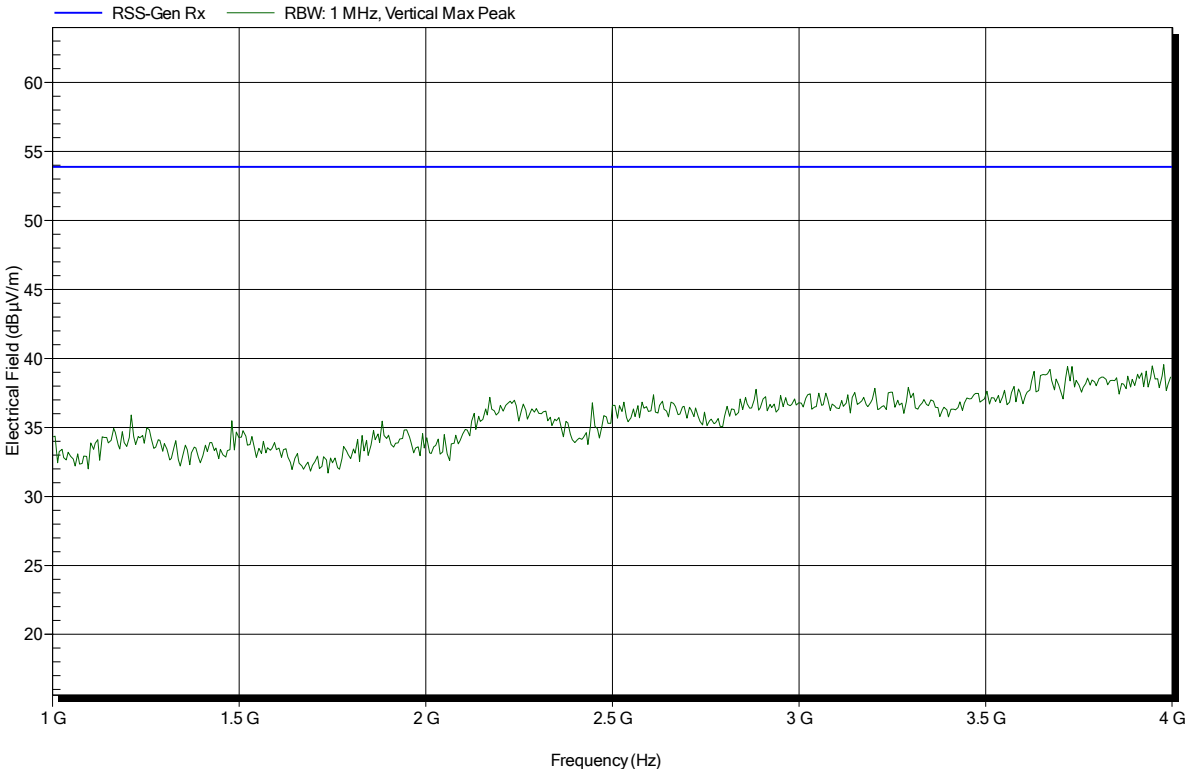


Frequency	Peak	Peak Limit	Peak Difference	Status
3.772 GHz	39.84 dBµV/m	53.9 dBµV/m	-14.06 dB	Pass

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1612-6098

Applicant:	Biotronik SE & Co. KG
EUT Name:	Telemonitoring System
Model:	CardioMessenger Smart 3G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 3.7 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; 403.65 MHz
Test Date:	2016-12-19
Note:	

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