RADIO REPORT

FCC 47 CFR Part 22H, FCC 47 CFR Part 24E

ISED Canada RSS-132 Issue 3, ISED RSS-133, Issue 6 Amendment 1

Report Reference No	G0M-1908-8377-TFCMOCORSEGSM-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	BIOTRONIK SE & Co. KG
Address	Woermannkehre 1 12359 Berlin GERMANY
Test Specification	47 CFR Part 22H 47 CFR Part 24E ISED RSS-132, Issue 3: 2013-01 ISED RSS-133, Issue 6+A1: 2018-01
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	CardioMessenger Smart / Telemonitoring System
Model(s)	CardioMessenger Smart 4G
Additional Model(s)	None
Brand Name(s)	BIOTRONIK
Hardware Version(s)	CardioMessenger Smart 4G mit LP best. LP1/Telex Smart 4G Rev Cx
Software Version(s)	ULP_HIGH_1_32_0, ULP_LOW_1_13_0, M0B.800004
FCC ID	QRI-CMSMART4GWW
IC	4708A-CMSMART4GWW
Test Result	**PASSED**

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C – 23 °C	
Test Lab Humidity	32 % – 38 %	
Date of receipt of test item	2021-01-26	
Report:		
Compiled by	Charline Graf	
Tested by (+ signature)	Charline Graf	
Tested by (+ signature) (Responsible for Test)	Burkhard Pudell	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2021-09-01	
Total number of pages	72	
General Remarks:		
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2021-05-31	Initial Release	
02	2021-09-01	Replaced document: G0M-1707-6689-TEU220SD-V01 Replaced by: G0M-1707-6689-TEU220SD-V02 Reason: Correction of Test Results - GSM1900	C.Graf

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

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1 Equipment (Test Item) Under Test

Description	CardioMessenger Smart / Telemonitoring System	
Model	CardioMessenger Smart 4G	
Additional Model(s)	None	
Brand Name(s)	BIOTRONIK	
Serial Number(s)	91630228	
Hardware Version(s)	CardioMessenger Smart 4G mit LP best. LP1/Telex Smart 4G Rev Cx	
Software Version(s)	ULP_HIGH_1_32_0, ULP_LOW_1_13_0, M0B.800004	
PMN	CardioMessenger Smart 4G	
HVIN	CardioMessenger Smart 4G	
FVIN	n/a	
HMN	n/a	
IC	4708A-CMSMART4GWW	
FCC ID	QRI-CMSMART4GWW	
Equipment type	End Product	
Radio type	Transceiver	
Radio technologies	GSM	
GSM frequency bands	GSM 850 = UL : 824 - 849 MHz DL : 869 – 894 MHz GSM 1900 = UL : 1850 – 1910 MHz DL : 1930 – 1990 MHz	
GSM Modulations	GMSK, 8-PSK	
Number of modules	1	
Radio Module	Type	4G Radio Module
	Model	ME910C1-WW
	Manufacturer	Telit
	HW Version	0.0
	SW Version	M0B.800004
	FCC-ID	RI7ME910C1WW
	IC	5131A-ME910C1WW
Antenna	Type	Integrated
	Model	PCB antenna
	Manufacturer	BIOTRONIK SE & Co. KG
	Gain	GSM850 = -2.92 DCS1900 = -2.37
Supply Voltage	V_{NOM}	3.7 VDC
AC/DC-Adaptor	Model	GTM96180-1107-2.0
	Vendor	GlobTek, Inc.
	Input	100-240 VAC
	Output	5 VDC
Manufacturer	BIOTRONIK SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
SIM	Communication Tester	R&S	CMW500	Base Station Simulator
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test Modes

Mode	Description
GSM850 / EGPRS	Channel = 128 Mode = Transmit Power = Maximum Modulation = 8PSK Number of time slots = 1 Duty cycle = 12.5 %
GSM1900 / GPRS	Channel = 512 Mode = Transmit Power = Maximum Modulation = GMSK Number of time slots = 1 Duty cycle = 12.5 %
Receive	Modulation = GMSK Number of time slots = 1
Comment: Above worst case scenarios were found in module test report: 1860156R-HPUSP50V00, 2019-07-05 issued by DEKRA Testing and Certification Co., Ltd. and NIE: 60375RRRF.001, 2019-06-24 issued by DEKRA Testing and Certification S.A.U.	

1.6 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

Test Summary)				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
47 CFR §22.913 47 CFR §24.232 ISED RSS-132 §5.4 ISED RSS-133 §6.4	Radiated power	ANSI C63.26 KDB 971168	PASS	
47 CFR §22.917 47 CFR §24.238 ISED RSS-132 §5.5 ISED RSS-133 §6.5	Transmitter conducted emissions	ANSI C63.26 KDB 971168	N/T	
47 CFR §22.917 47 CFR §24.238 ISED RSS-132 §5.5 ISED RSS-133 §6.5	Transmitter radiated emissions	ANSI C63.26 KDB 971168	PASS	
ISED RSS-132 §3.1 ISED RSS-133 §3.1 ISED RSS-Gen §7	Receiver conducted emissions	ANSI C63.26 KDB 971168	N/T	
ISED RSS-132 §3.1 ISED RSS-133 §3.1 ISED RSS-Gen §7	Receiver radiated emissions	ANSI C63.26 KDB 971168	PASS	
Comment:				

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

3 Test Conditions and Results

3.1 Test Conditions and Results - Radiated power

3.1.1 Information

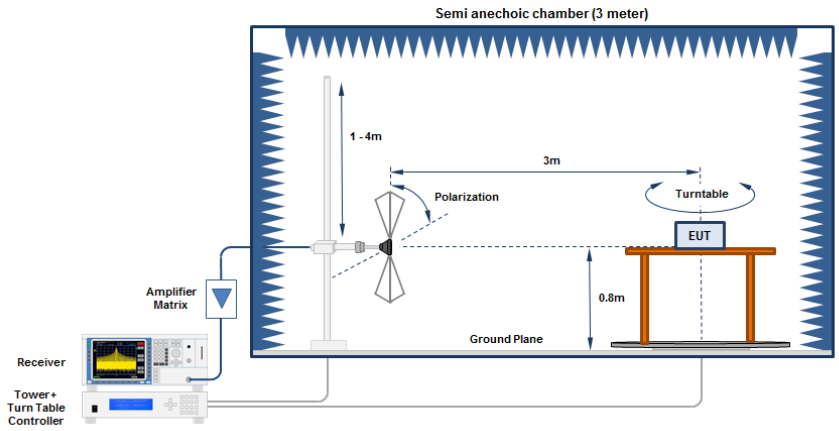
Test Information	
Reference	47 CFR §22.913 47 CFR §24.232 ISED RSS-132 §5.4 ISED RSS-133 §6.4
Measurement Method	FCC KDB 971168 D01 Section 5 ANSI C63.26-2015 5.2
Measurement Uncertainty	± 5.95 dB
Operator	Charline Graf
Date	2021-02-08

3.1.2 Limits

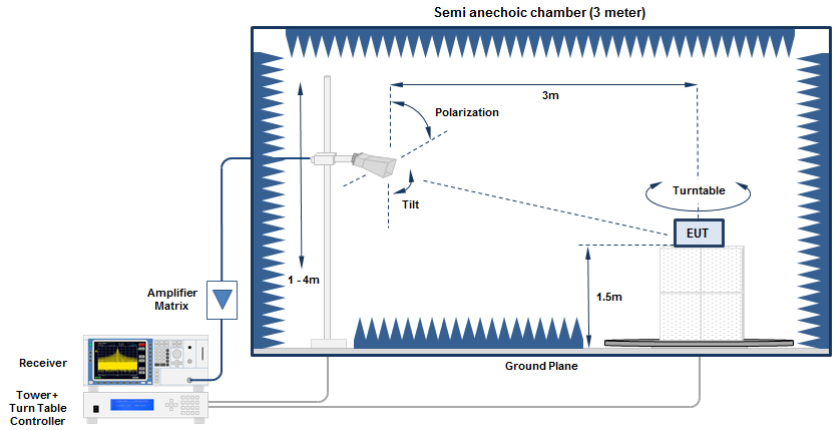
Limits - Portable equipment					
Band	Frequency range [MHz]	Power limit [dBm ERP]	Power limit [W ERP]	Power limit [dBm EIRP]	Power limit [W EIRP]
GSM850	824 - 849	38.45	7	40.6	11.5
GSM1900	1850 - 1910	30.85	1.22	33	2

3.1.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	R&S	HL 223	EF00212	2019-05	2022-05
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

3.1.5 Procedure

Test Procedure
1. EUT set to test mode 2. The radiated power is measured with a measurement antenna in vertical polarization 3. To obtain maximum level the EUT is rotated 4. The EUT is replaced with a half-wave dipole and the power to the dipole is adjusted to obtain same radiated power measurement value

3.1.6 Results

Test Results - GSM850					
Mode	Pol.	Power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
GSM850 / EGPRS	ver	31.3	40.6	-09.30	PASS
GSM850 / EGPRS	hor	26.9	40.6	-13.70	PASS

Test Results - GSM1900					
Mode	Pol.	Power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
GSM1900 / GPRS	ver	30.2	33	-02.80	PASS
GSM1900 / GPRS	hor	25.6	33	-07.40	PASS

Radiated carrier according to FCC

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	

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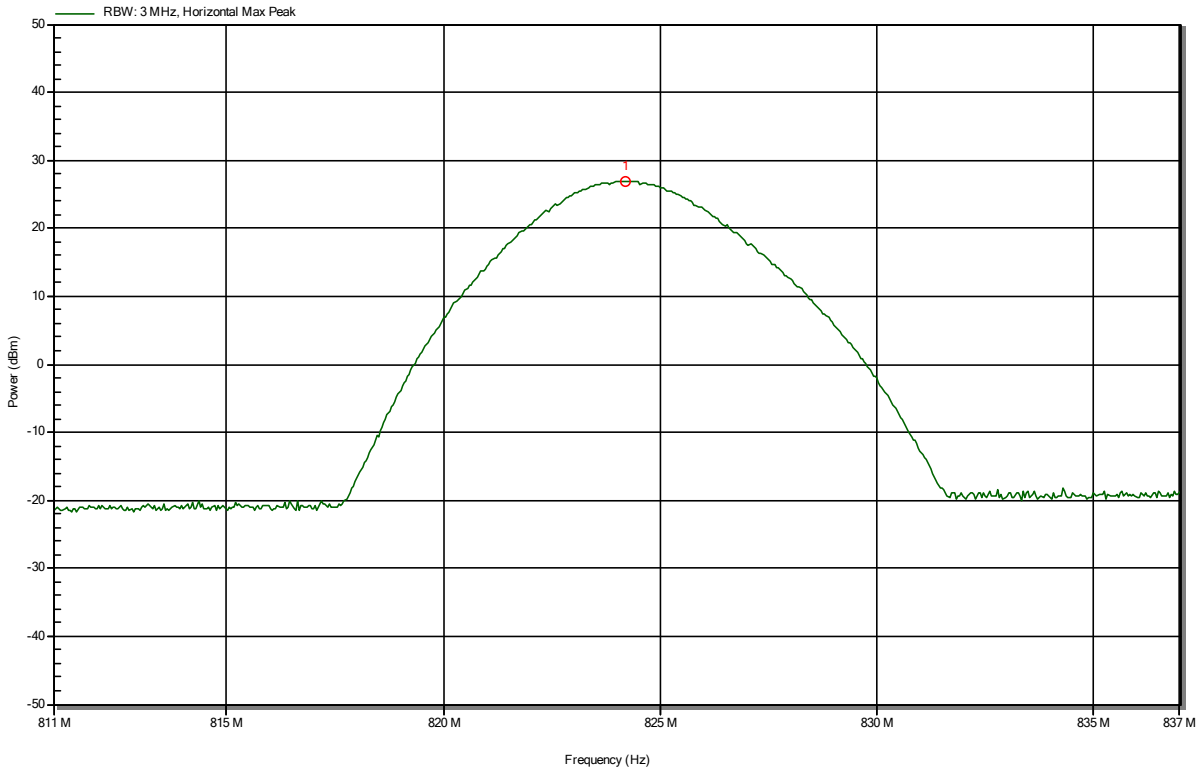
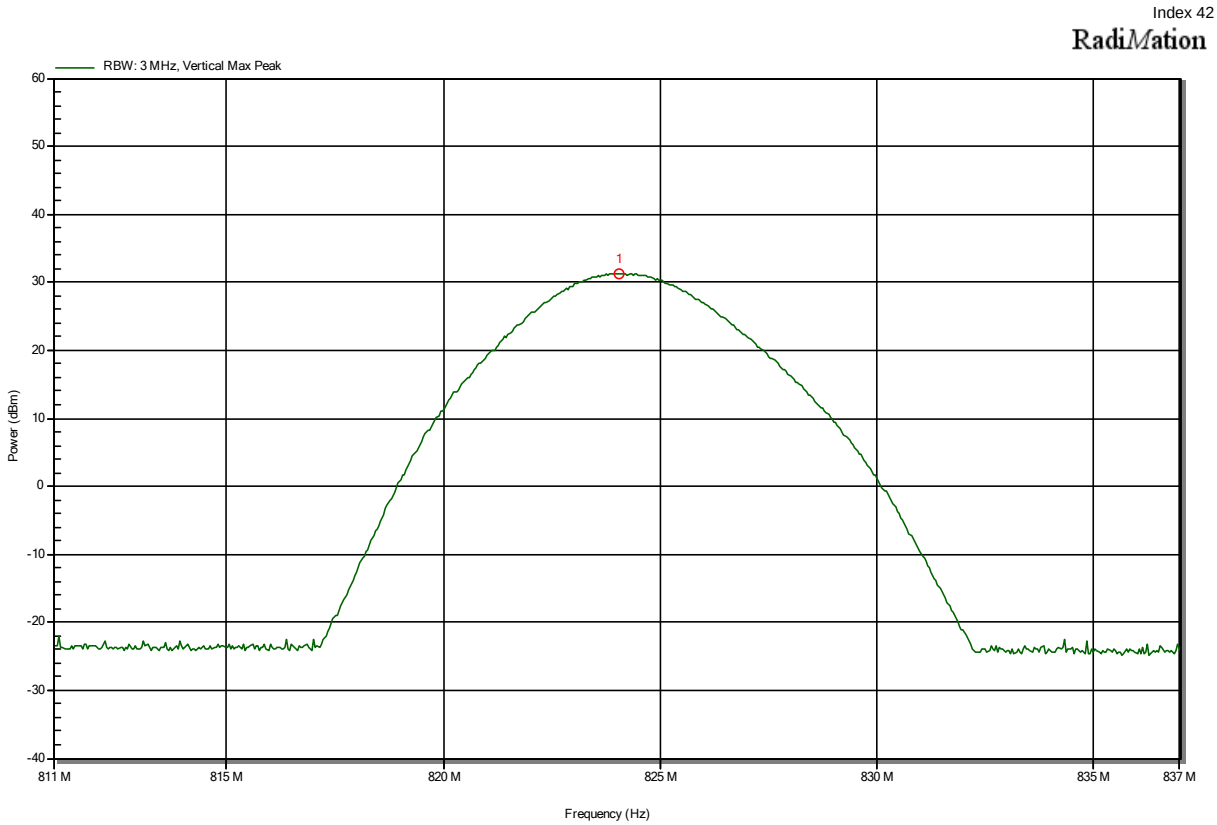
RadiMation



Frequency	Peak
824.208 MHz	26.9 dBm

Radiated carrier according to FCC

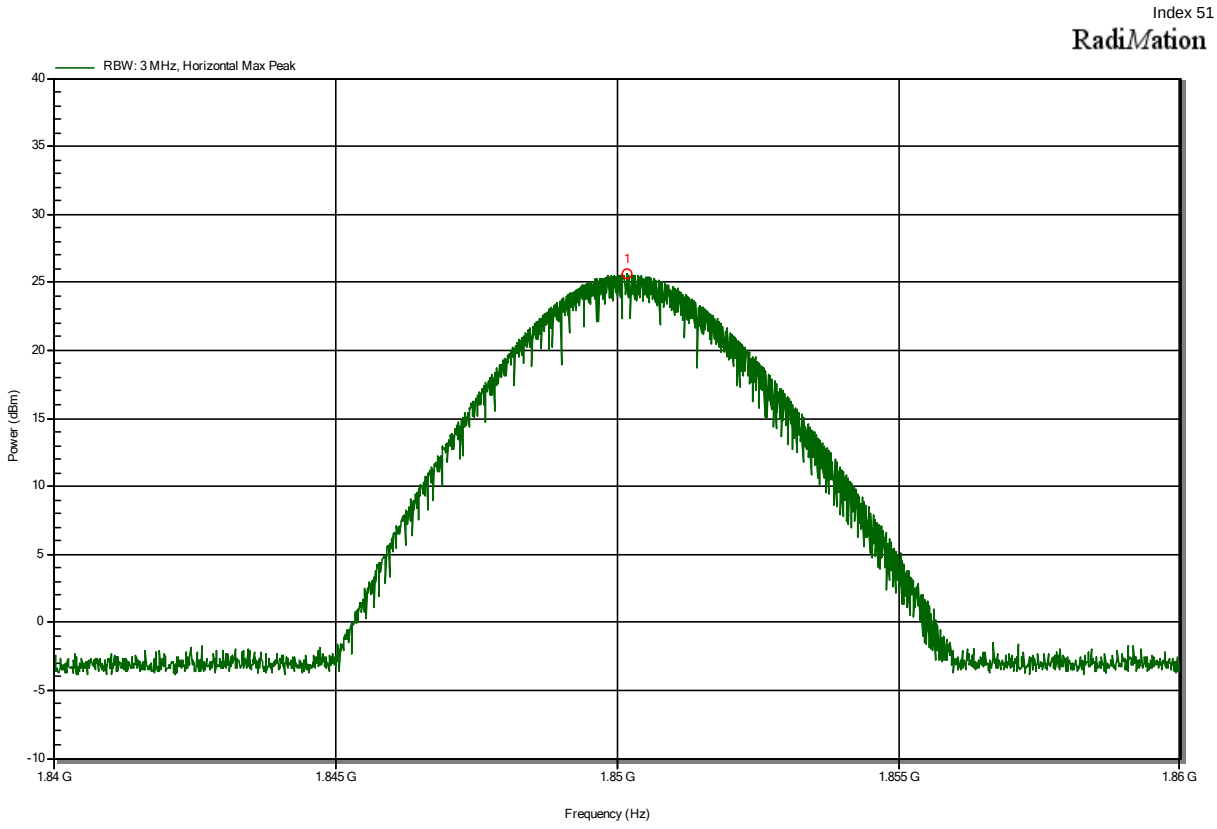
Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	



Frequency	Peak
824.042 MHz	31.3 dBm

Radiated carrier according to FCC

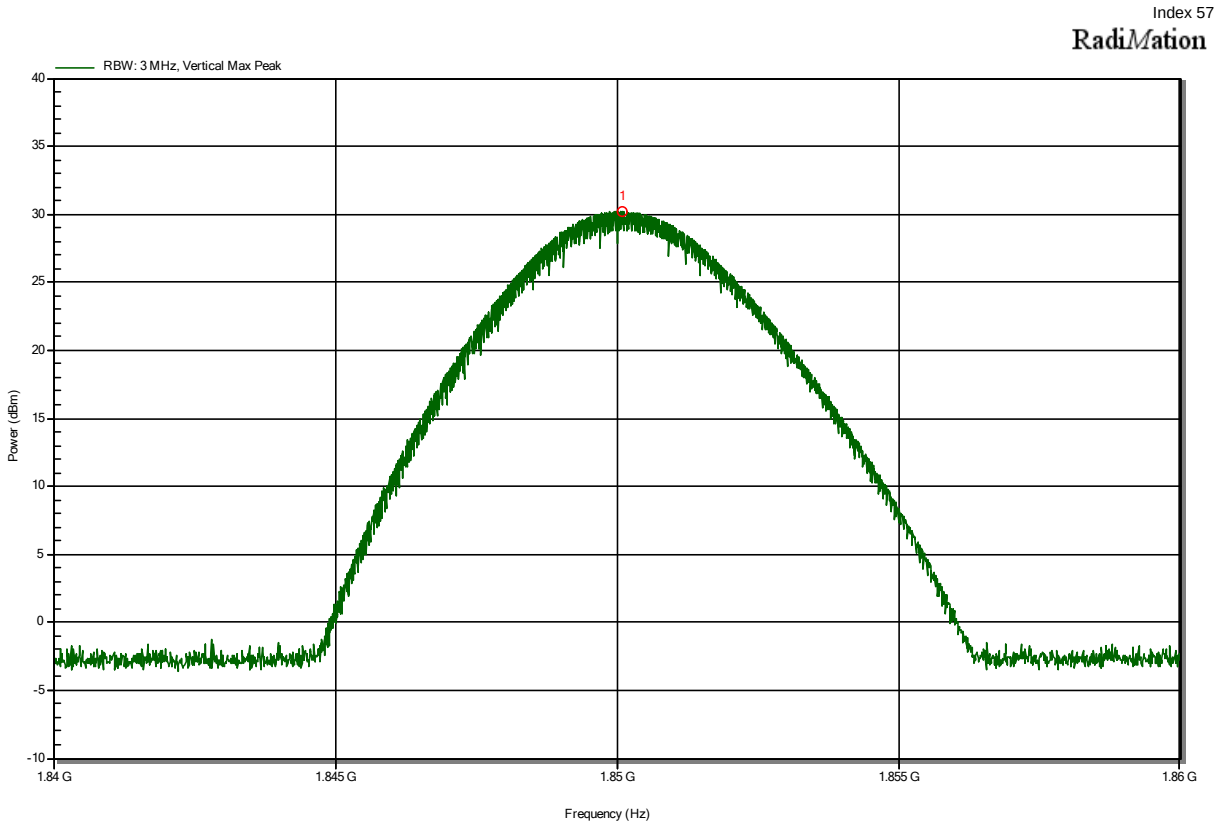
Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	



Frequency	Peak
1.8502 GHz	25.6 dBm

Radiated carrier according to FCC

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	



Frequency	Peak
1.8501 GHz	30.2 dBm

3.2 Test Conditions and Results - Transmitter radiated emissions

3.2.1 Information

Test Information	
Reference	47 CFR §22.917 47 CFR §24.238 ISED RSS-132 §5.5 ISED RSS-133 §6.5
Measurement Method	FCC KDB 971168 D01 Section 7 ANSI C63.26-2015 5.5
Measurement Uncertainty	± 5.95 dB
Operator	Charline Graf
Date	2021-02-08

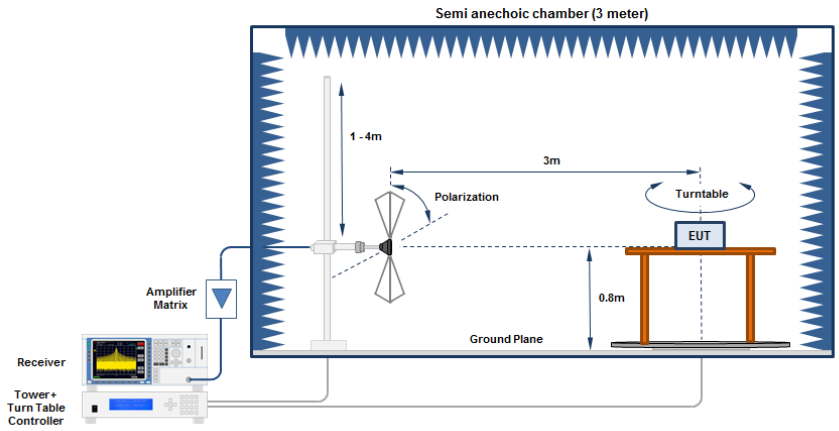
3.2.2 Limits

Limits FCC				
Band	Frequency range [MHz]	Bandwidth	Attenuation [dB]	Limit [dBm EIRP]
GSM850	-	100 kHz / 1 MHz	$43+Log_{10}(P[W])$	-13
GSM1900	-	1 MHz	$43+Log_{10}(P[W])$	-13

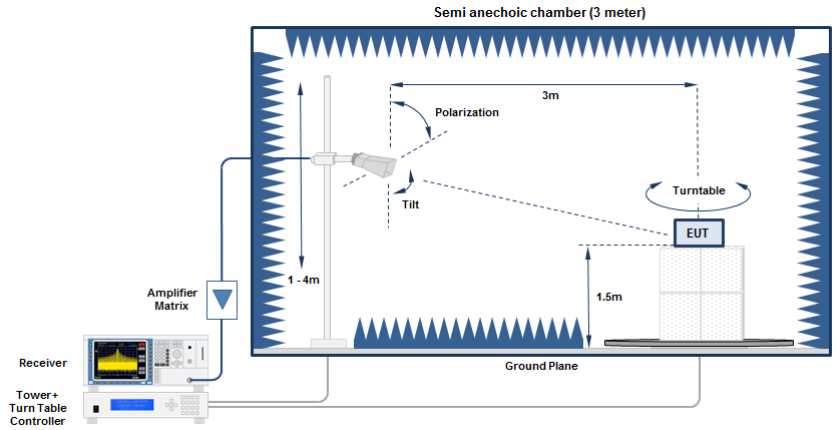
Limits ISED				
Band	Frequency range [MHz]	Bandwidth	Attenuation [dB]	Limit [dBm EIRP]
GSM850	-	100 kHz	$43+Log_{10}(P[W])$	-13
GSM1900	-	1 MHz	$43+Log_{10}(P[W])$	-13

3.2.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz



3.2.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2021-05

3.2.5 Procedure

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

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

3.2.6 Results

Test Results - GSM850					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
GSM850 / EGPRS	89.391	-35.20	-13.00	-22.18	Pass
GSM850 / EGPRS	1674	-35.60	-13.00	-22.63	Pass
GSM850 / EGPRS	1674	-29.10	-13.00	-16.05	Pass

Test Results - GSM1900					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
No emission detected.					

3.3 Test Conditions and Results - Receiver radiated emissions

3.3.1 Information

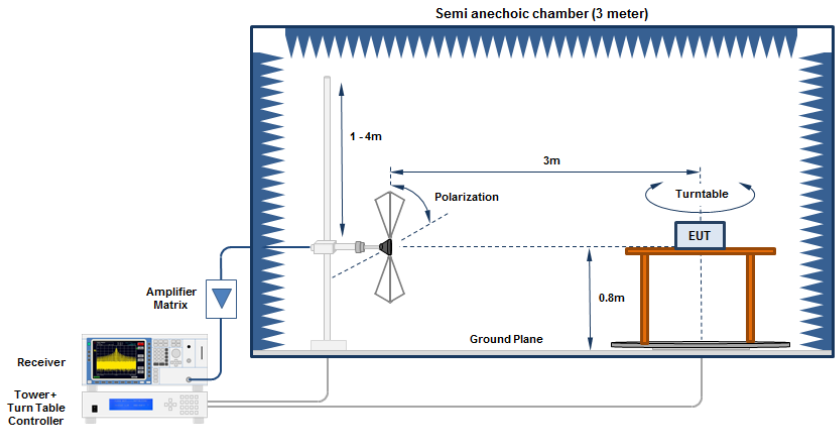
Test Information	
Reference	ISED RSS-132 §3.1 ISED RSS-133 §3.1 ISED RSS-Gen §7.4
Measurement Method	ANSI C63.10-2013 6.3-6.6
Measurement Uncertainty	± 5.95 dB
Operator	Charline Graf
Date	2021-02-08

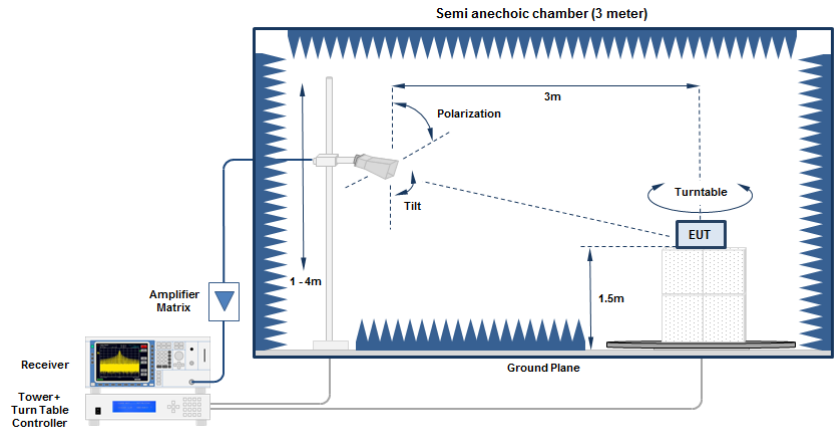
3.3.2 Limits

Limits			
Frequency range [MHz]	Bandwidth	Detector	Limit [dBµV/m @ 3 m]
30 - 88	100 kHz	Quasi-peak	40
88 - 216	100 kHz	Quasi-peak	43.5
216 - 960	100 kHz	Quasi-peak	46
960 - 1000	100 kHz	Quasi-peak	54
> 1000	1 MHz	Average	54

3.3.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.3.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	R&S	ESU 26	EF00887	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2021-05

3.3.5 Procedure

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

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

3.3.6 Results

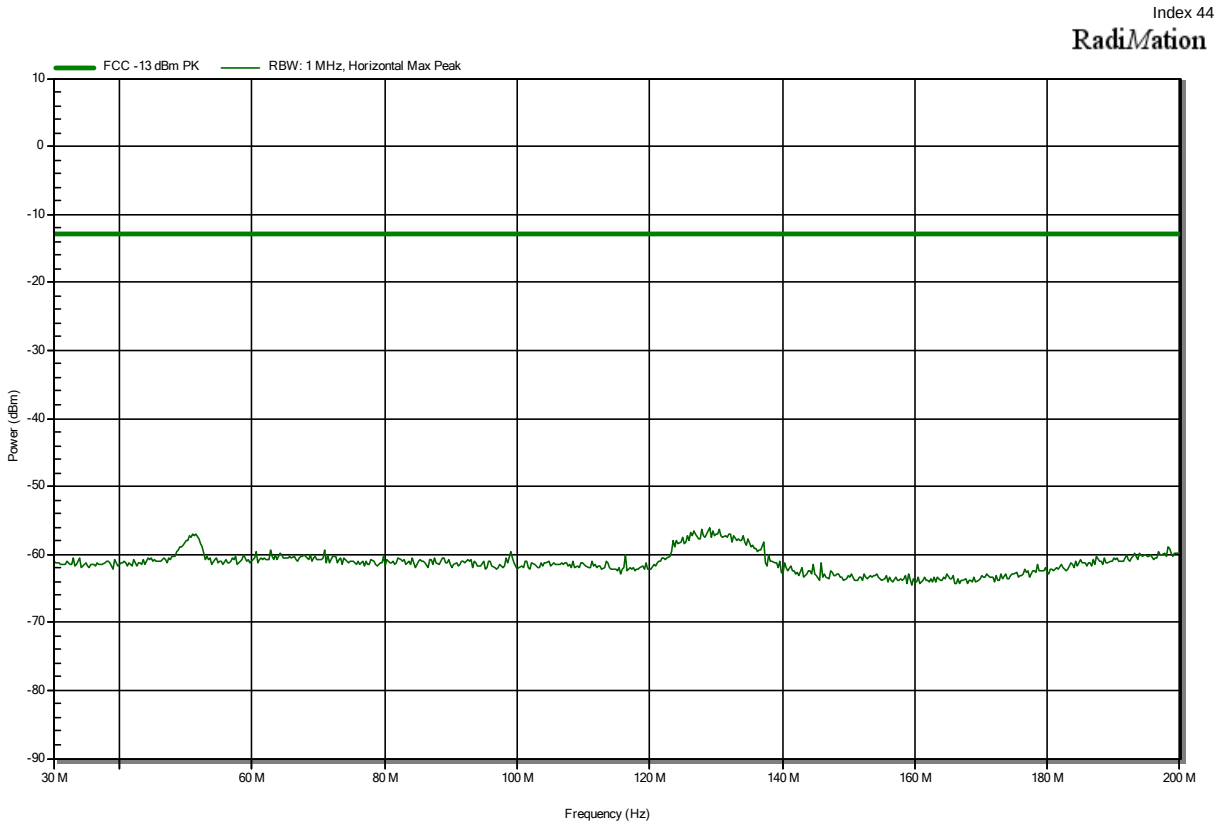
Test Results - GSM850					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	869.2	41.32	46.00	-04.68	Pass
Receive Mode	869.6	34.11	46.00	-11.89	Pass
Receive Mode	889.2	42.25	46.00	-03.75	Pass

Test Results - GSM1900					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	1930	39.85	53.98	-14.13	Pass

ANNEX A Transmitter radiated emissions

Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical

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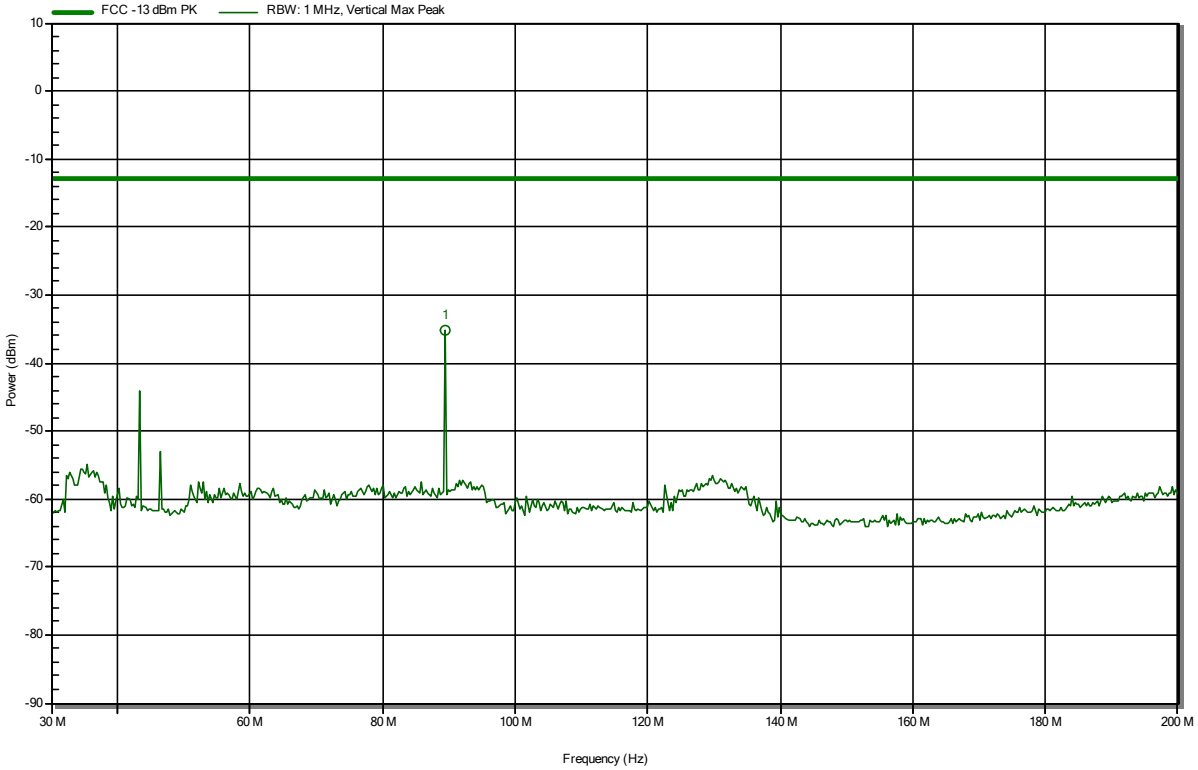
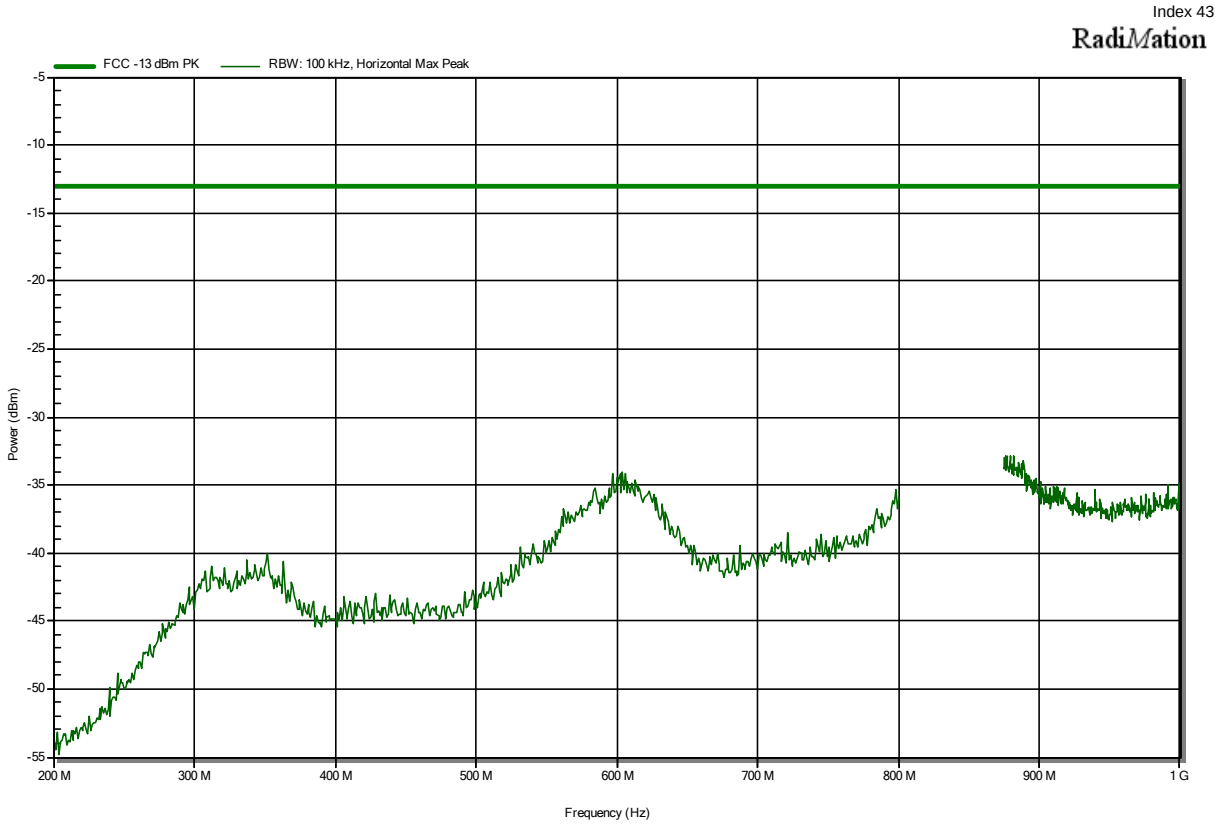
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
89.391 MHz	-35.2 dBm	-13 dBm	-22.18 dB	Pass

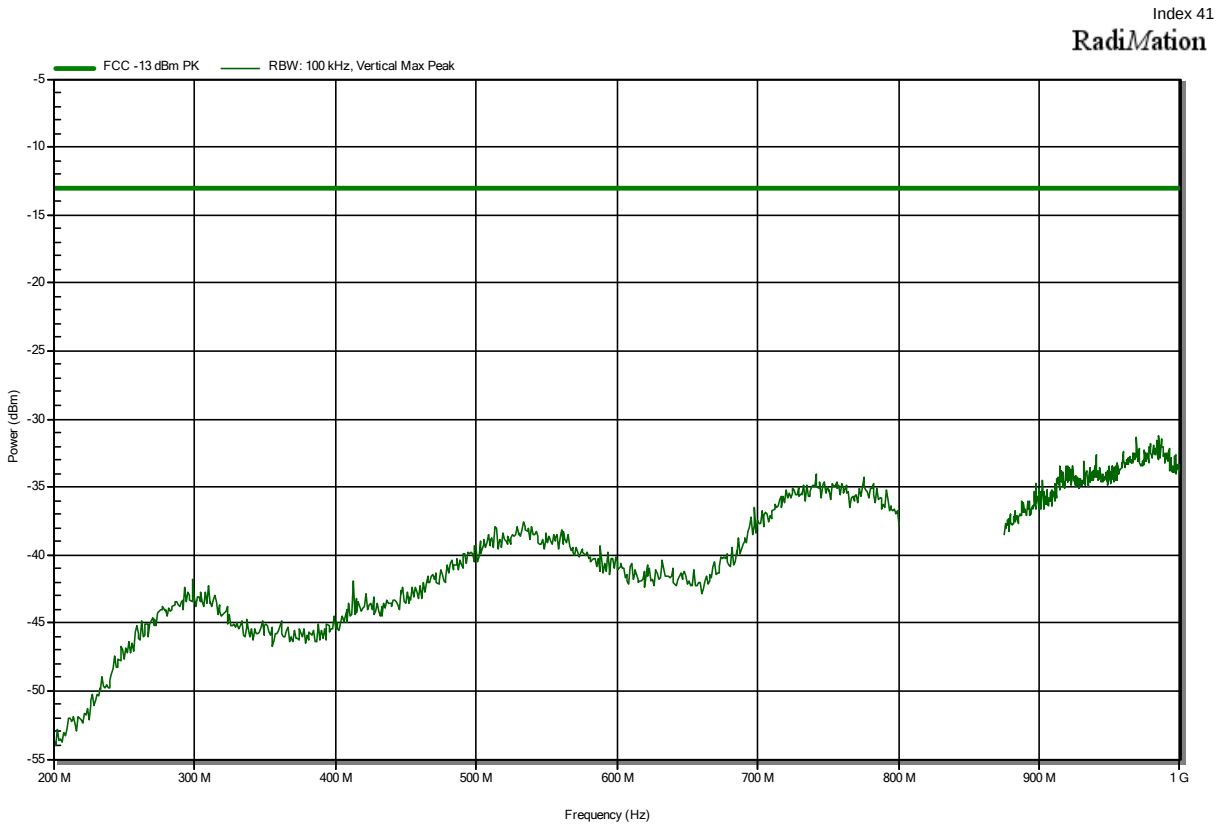
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical

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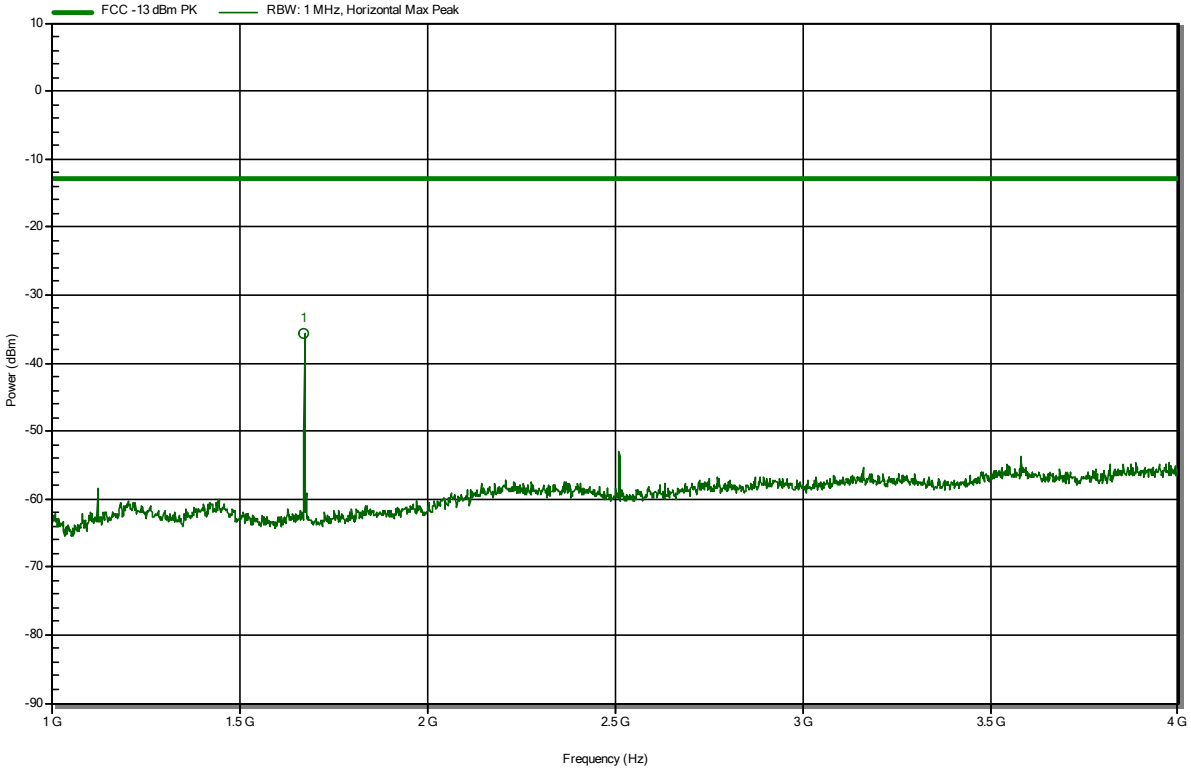
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.674 GHz	-35.6 dBm	-13 dBm	-22.63 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUt vertical

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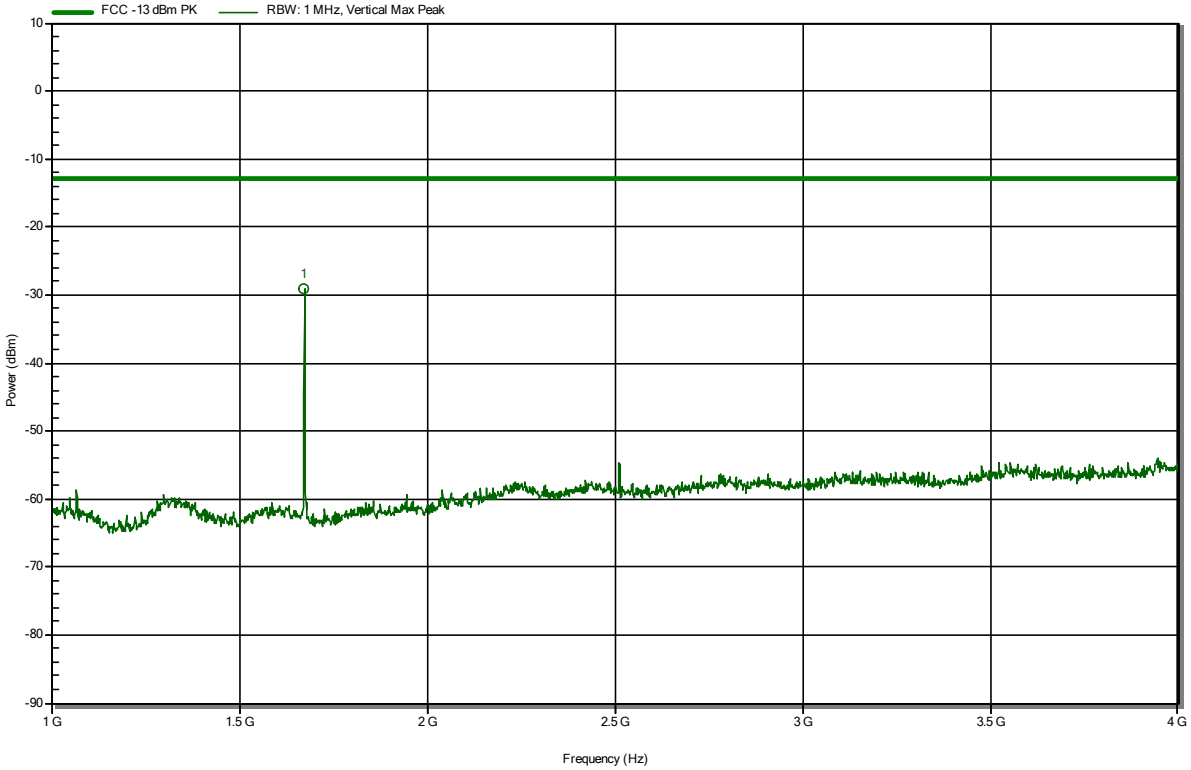
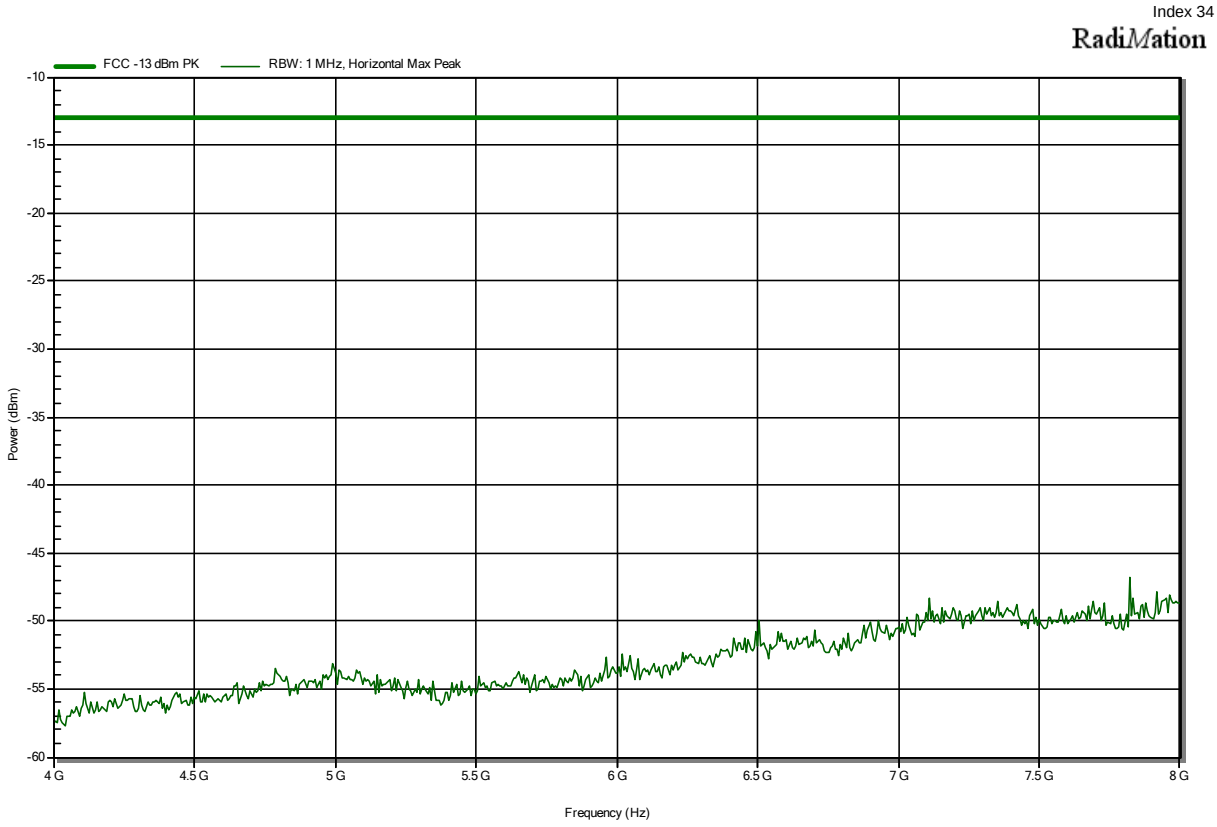
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.674 GHz	-29.1 dBm	-13 dBm	-16.05 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical

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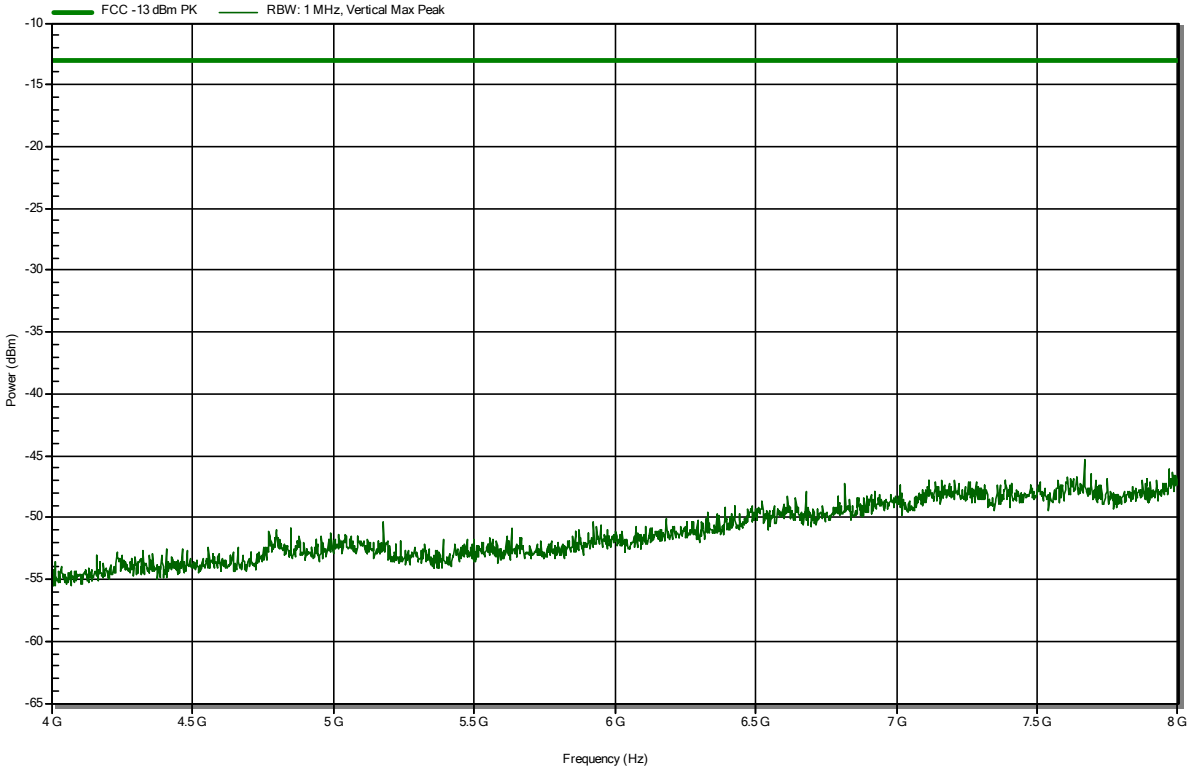
RadiMation



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical

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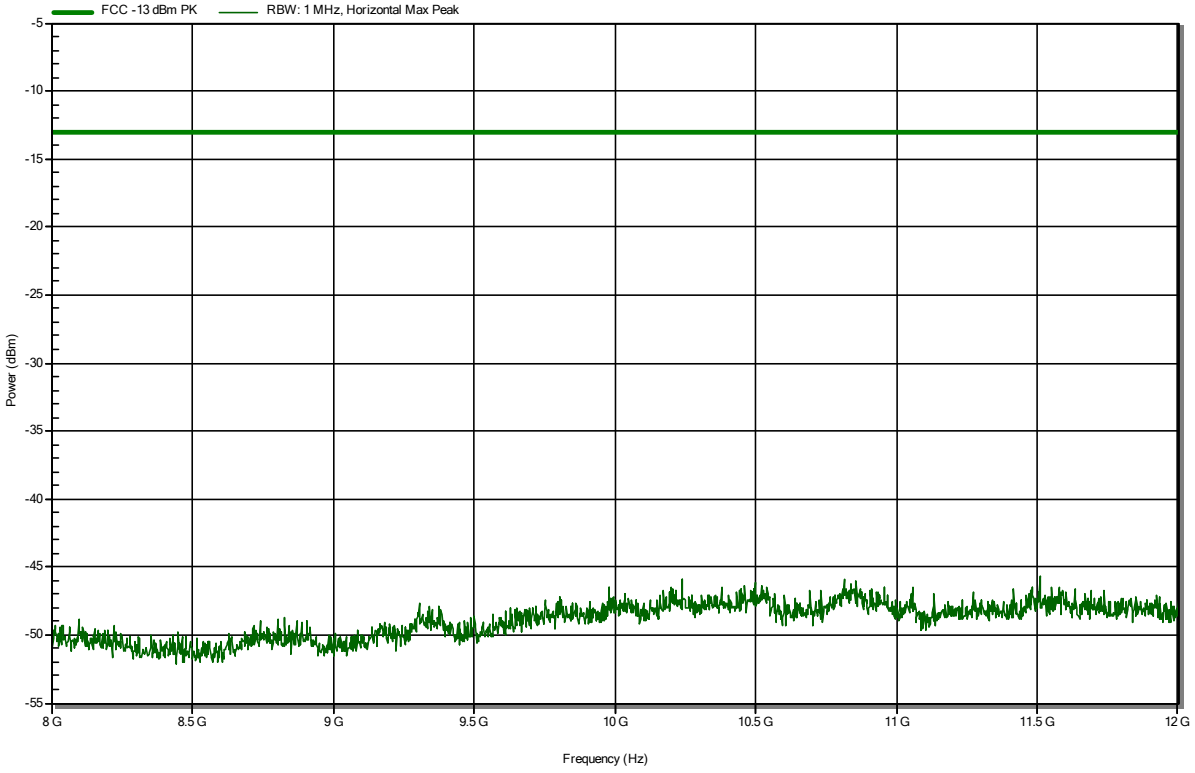
RadiMation



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; GSM850, EGPRS, Channel 128, PCL= 5, slot 2, gamma 3
Test Date:	2021-02-08
Note:	EUT vertical

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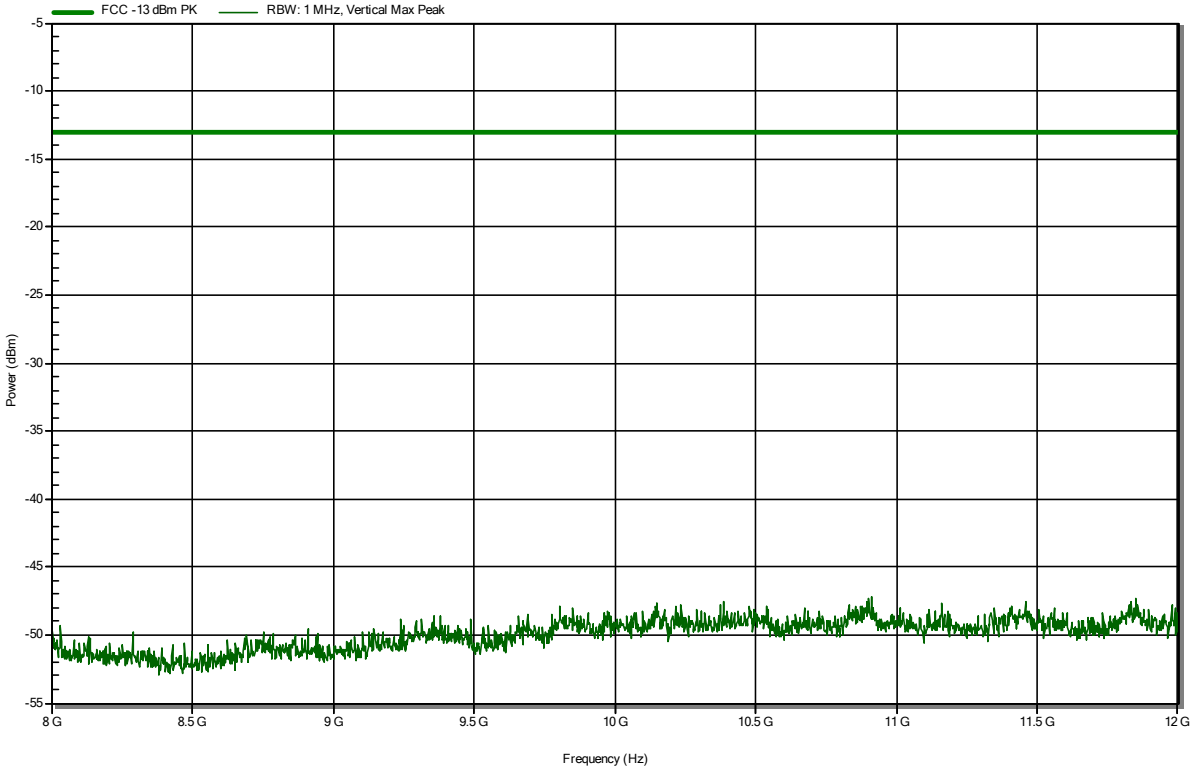
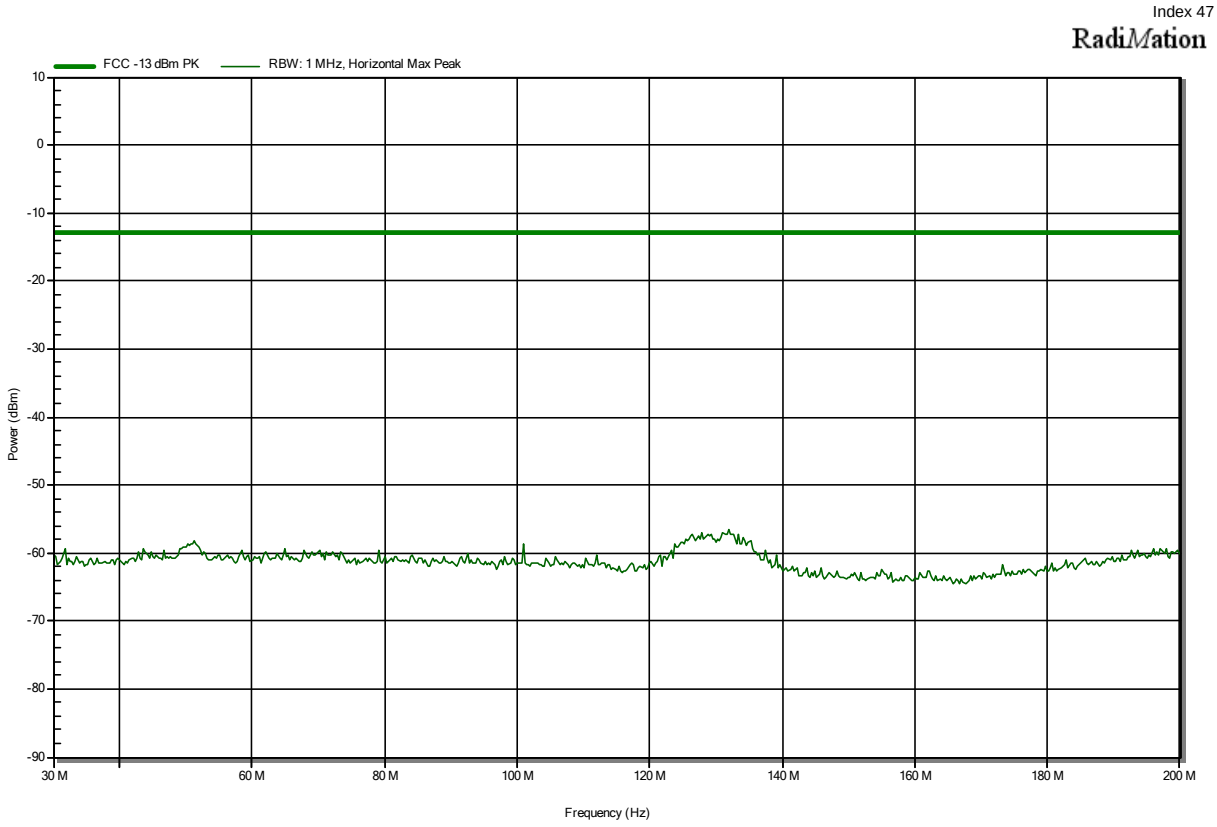
RadiMation



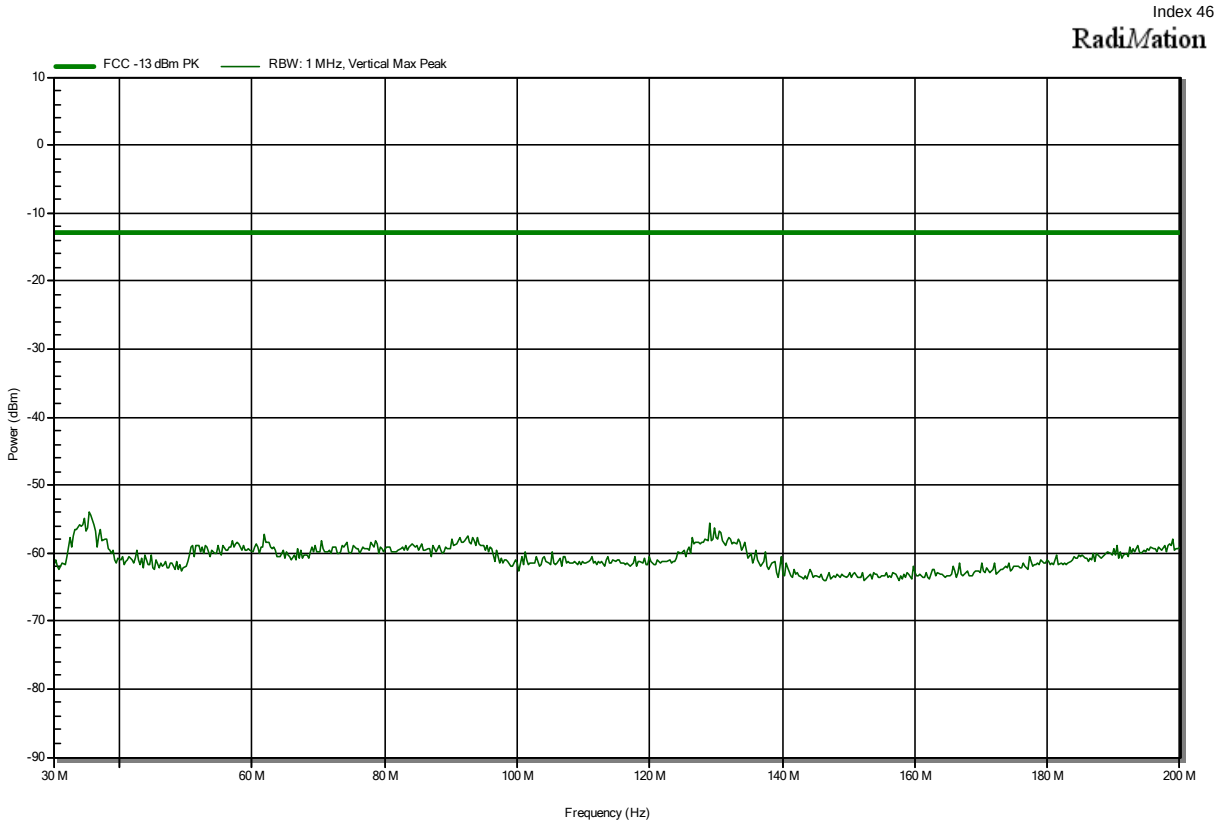
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



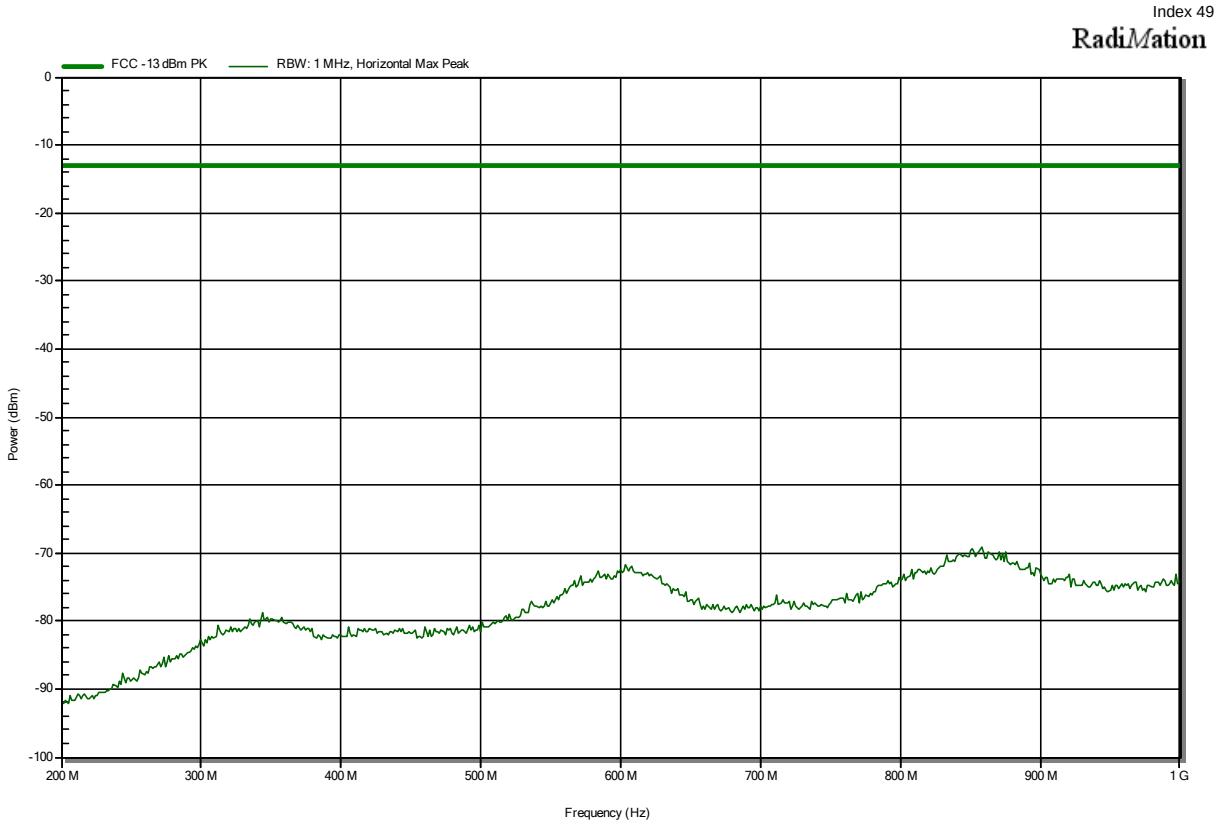
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical

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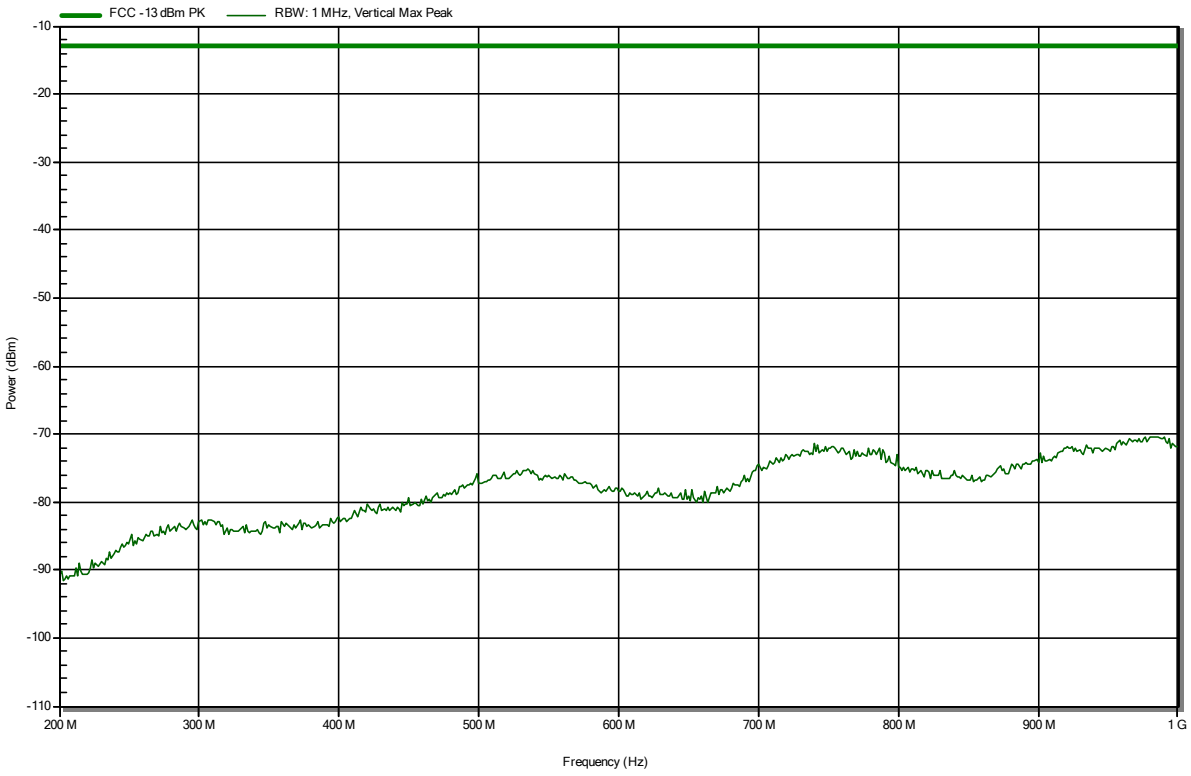
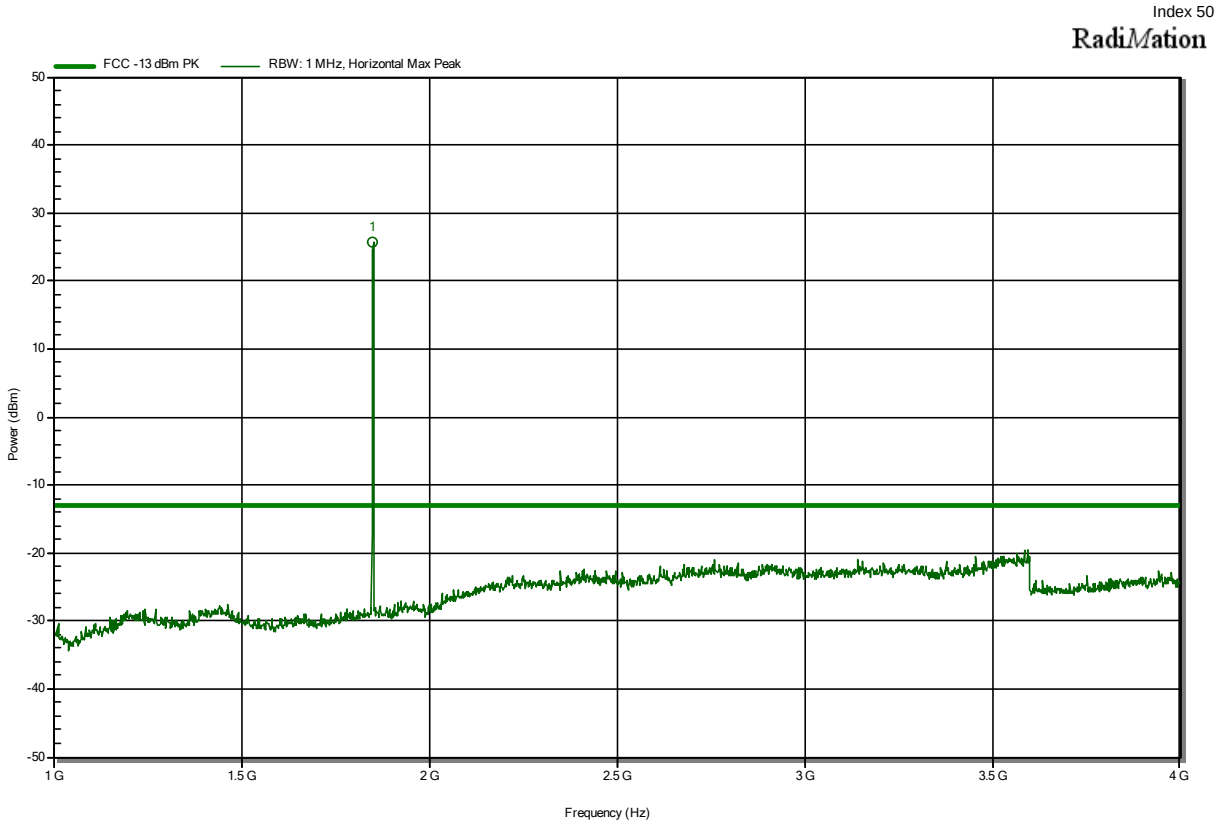
RadiMation



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



Frequency	
1.851 GHz	Uplink Carrier

Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
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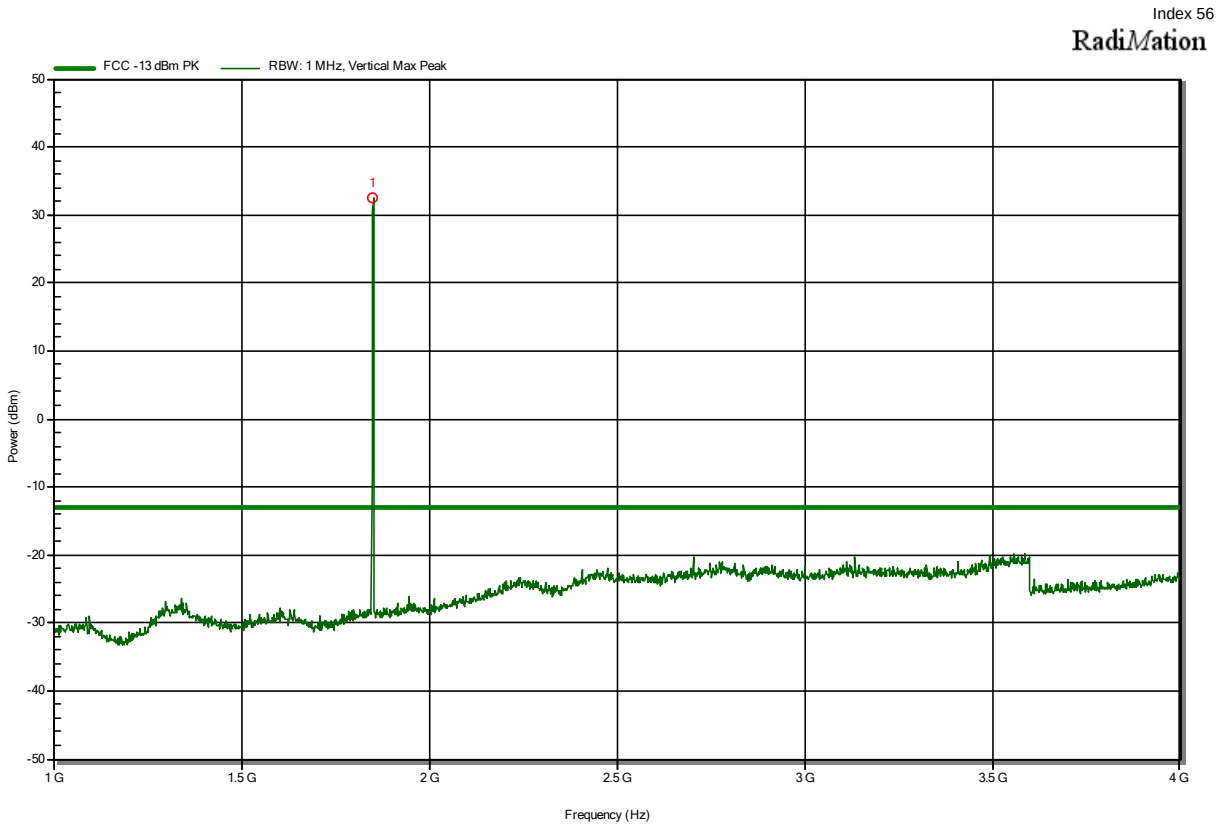
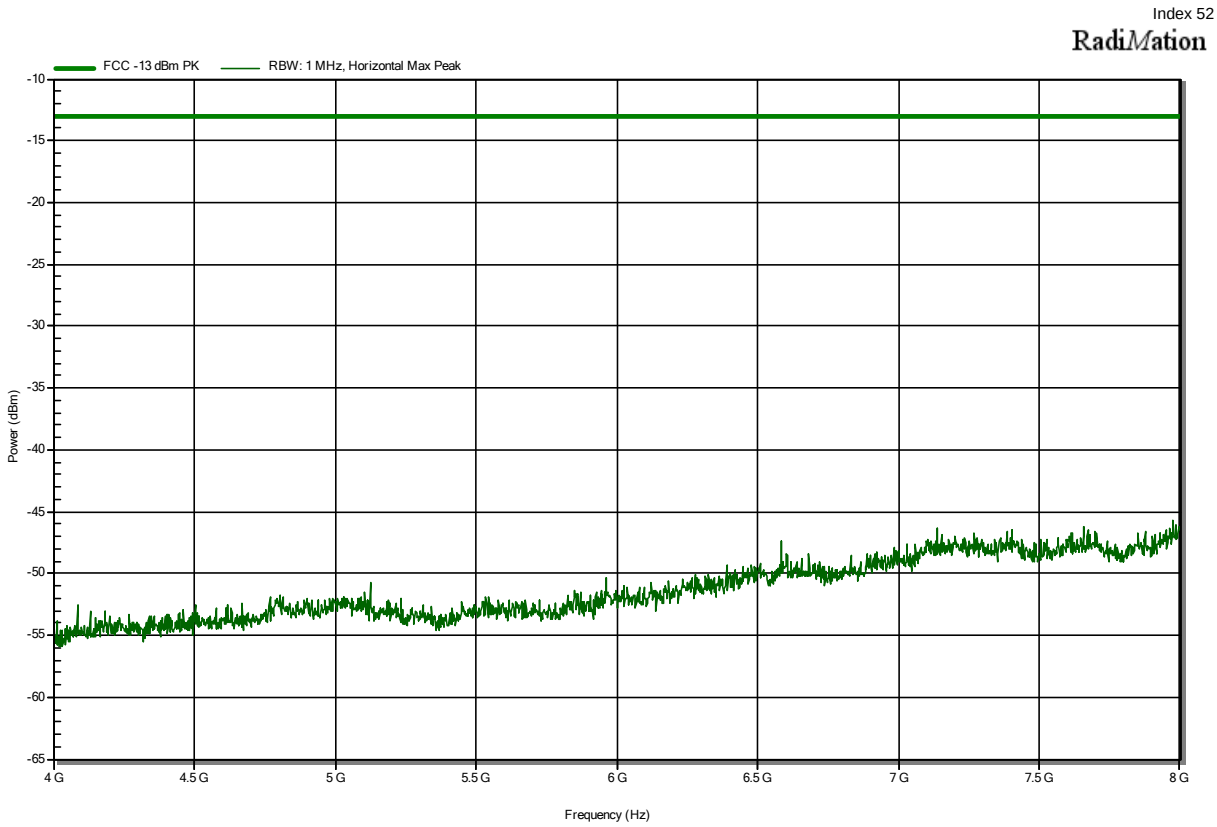
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



Frequency	
1.851 GHz	Uplink Carrier

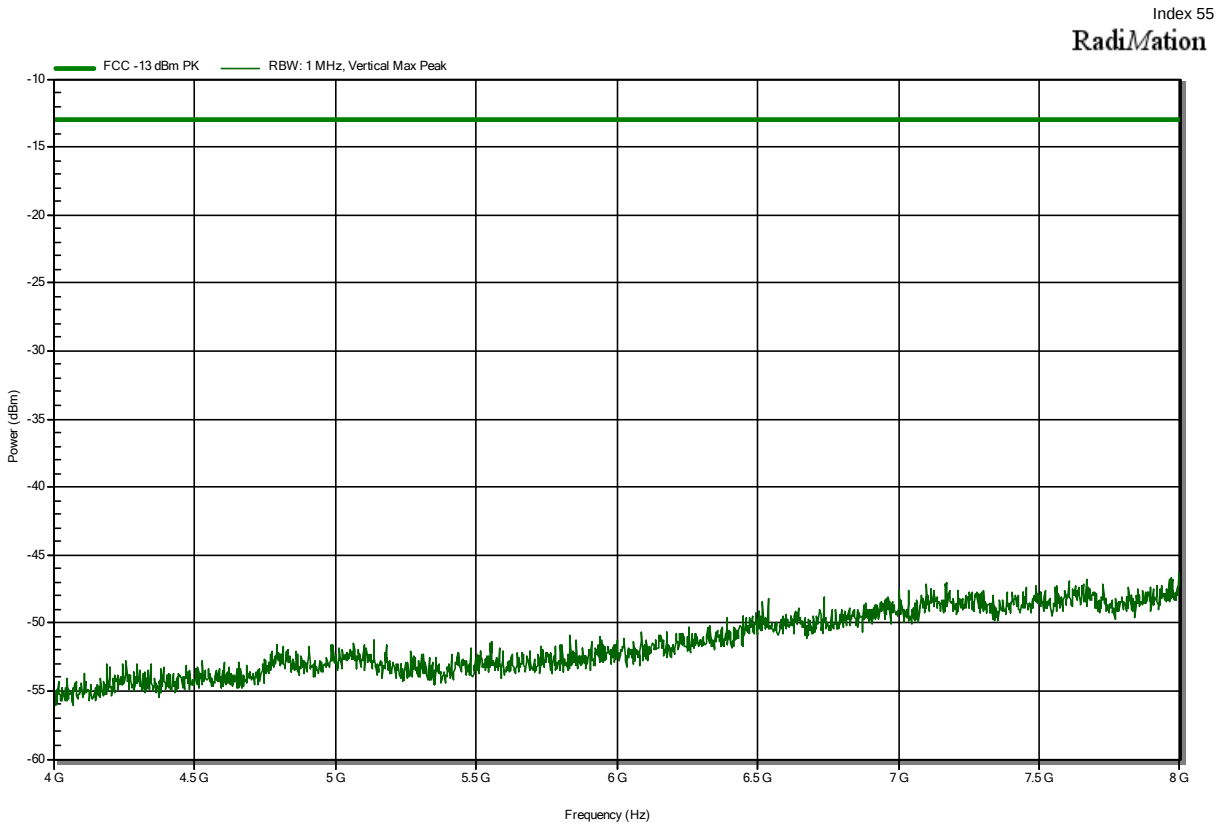
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



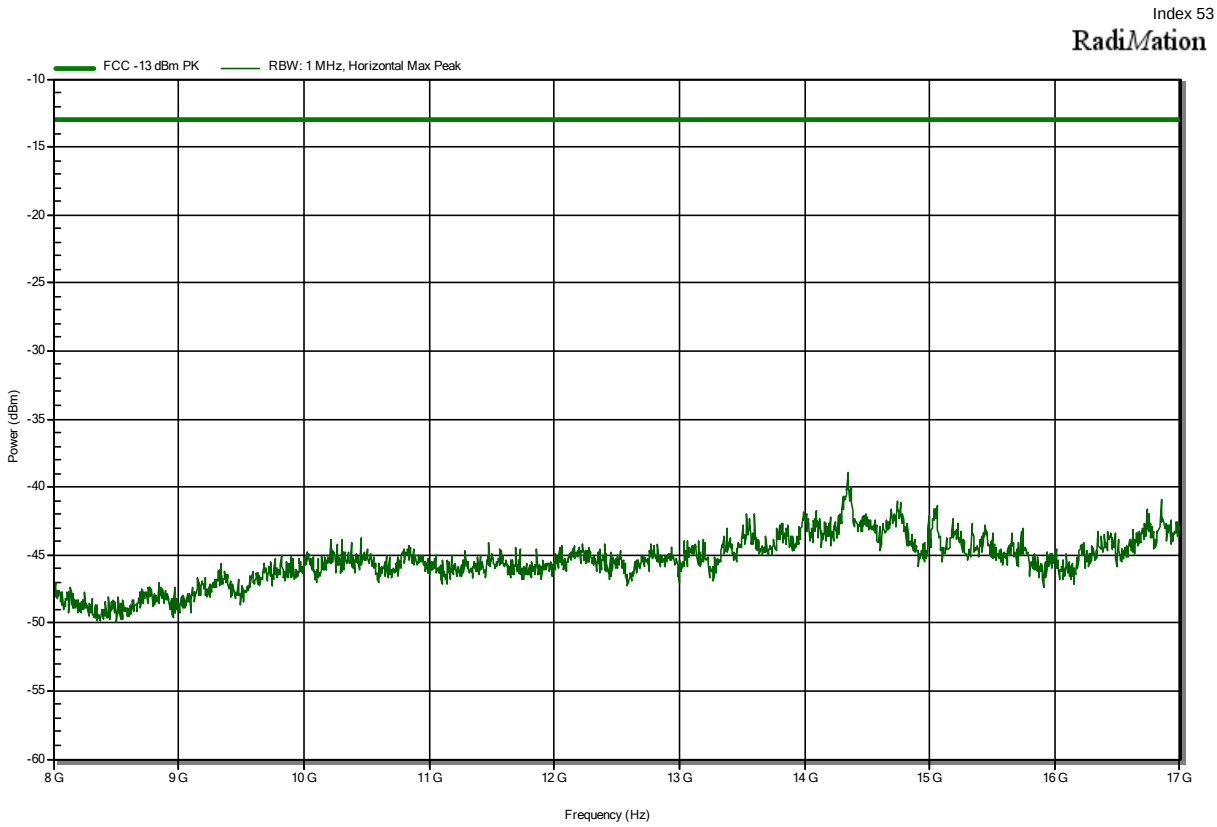
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



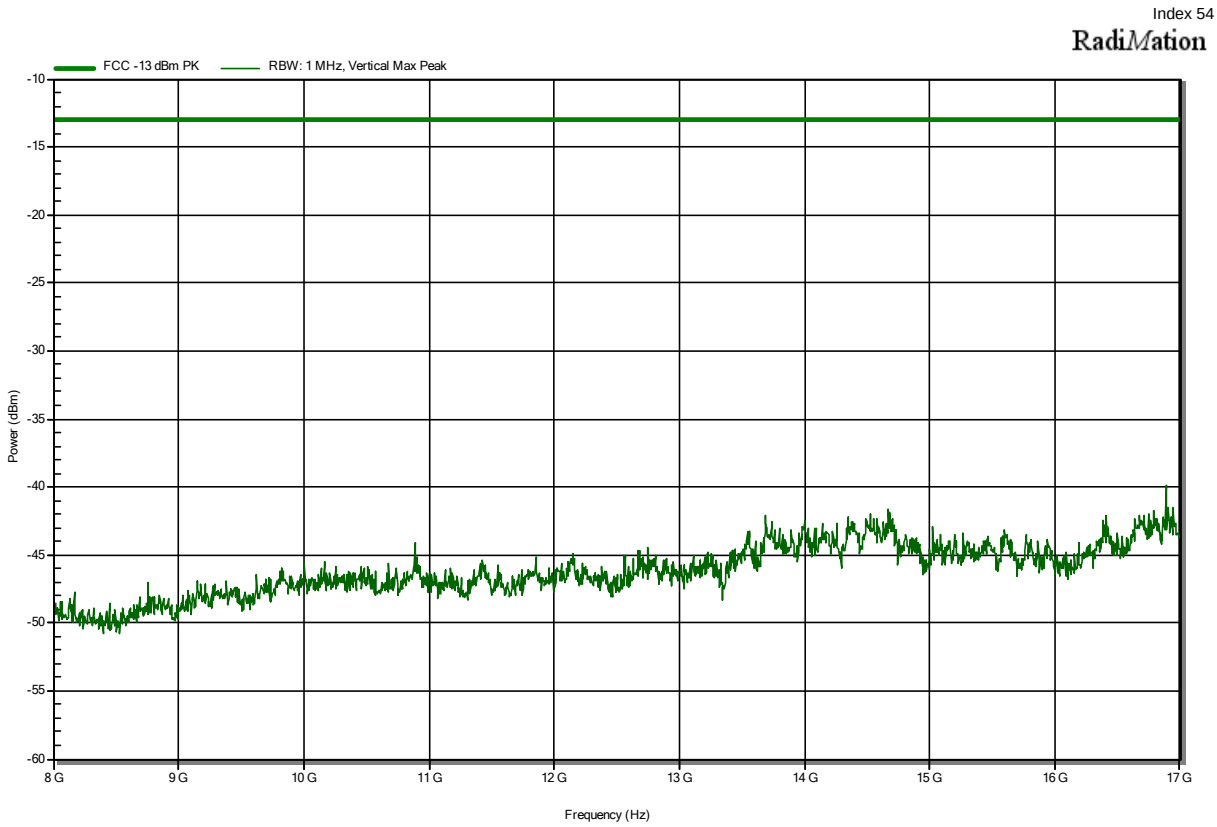
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



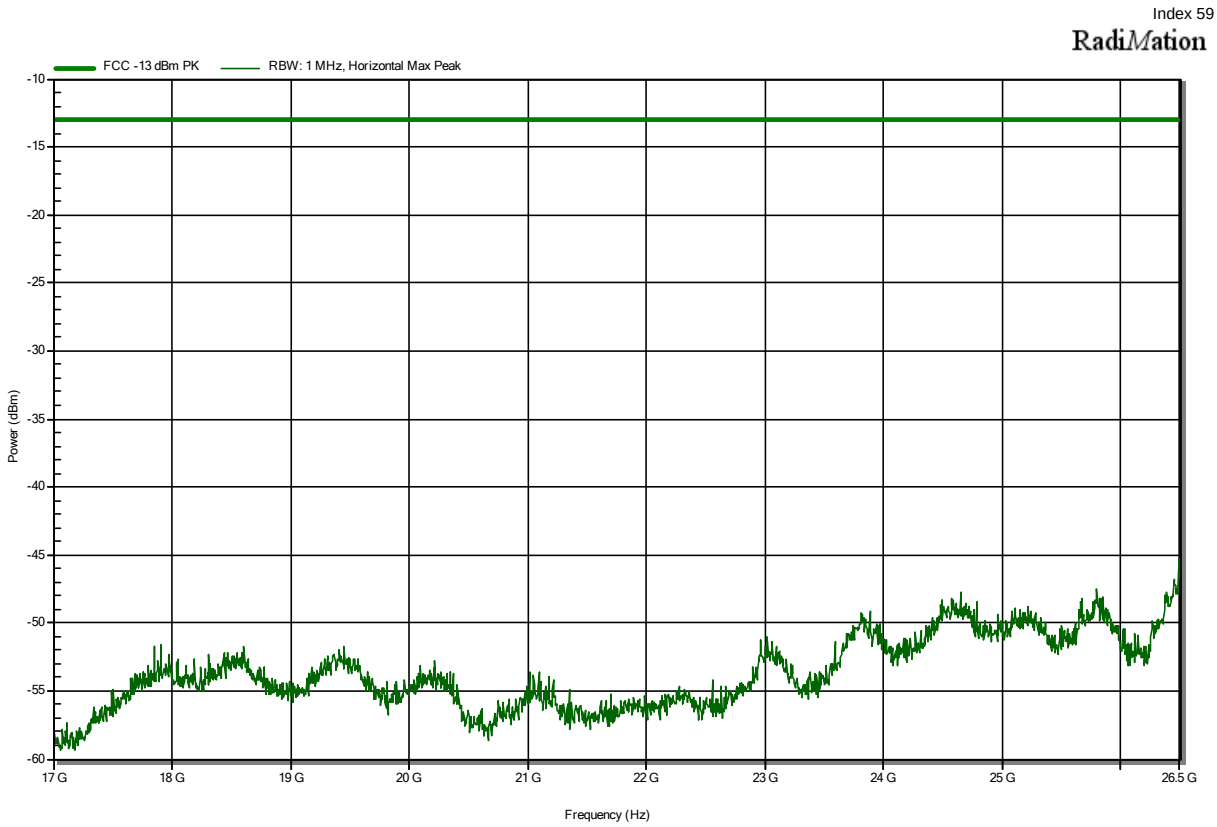
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



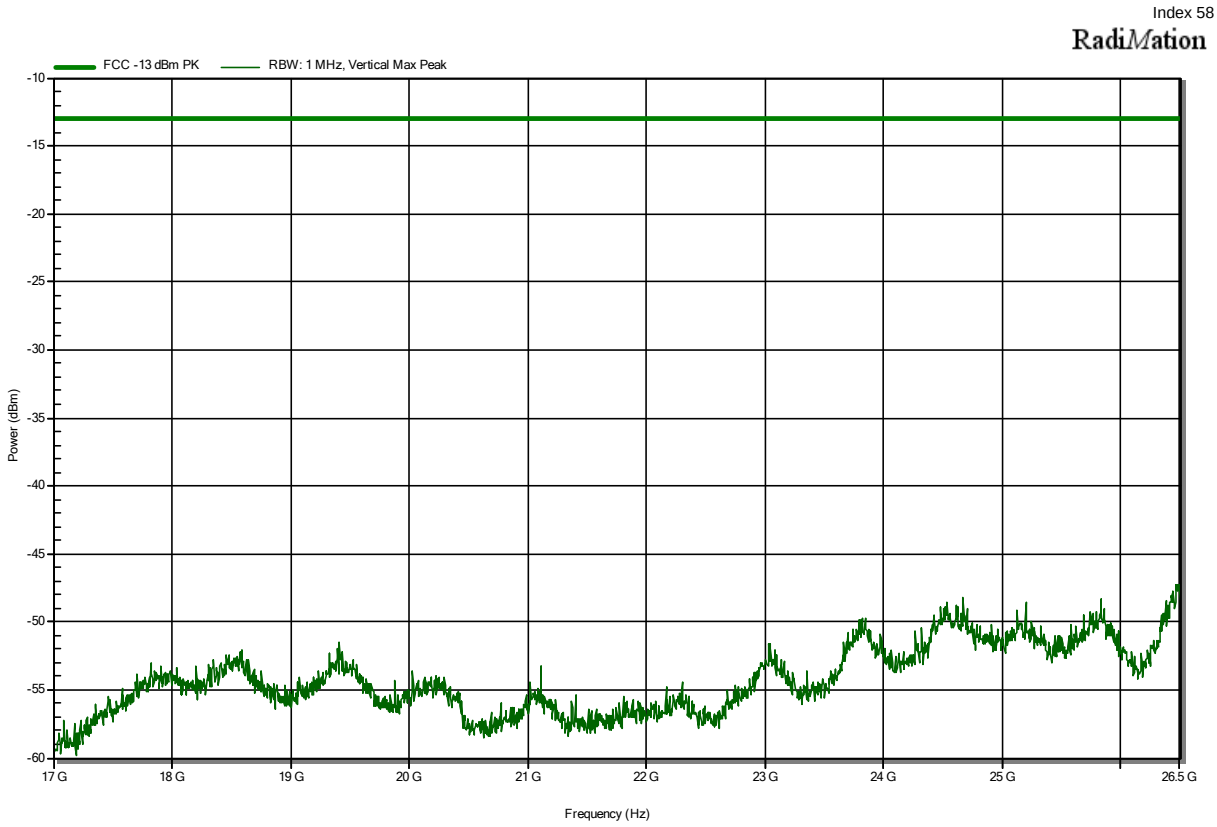
Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to FCC 47 CFR Part 24 Subpart E; RSS-132, Issue 3, January 2013; RSS-133, Issue 6

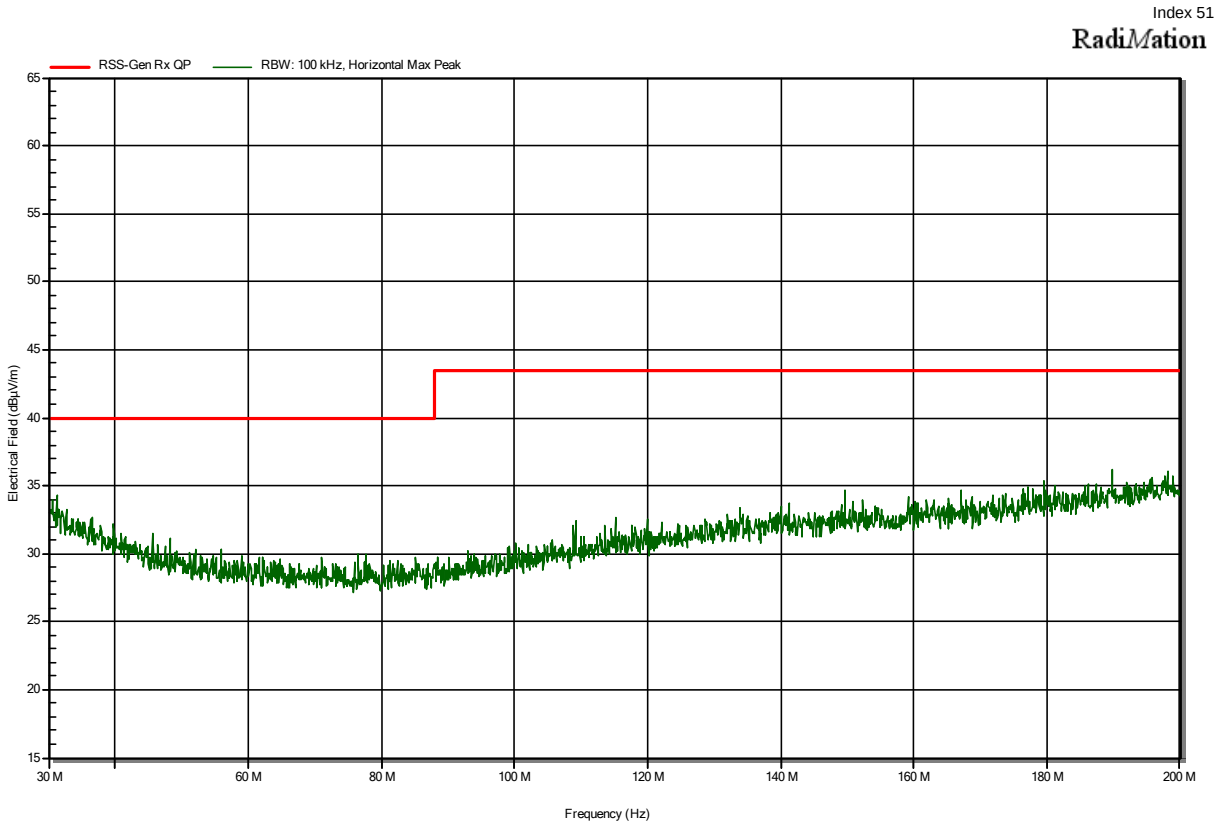
Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	3 m
Mode:	Tx; PCS1900, GPRS, Channel 512, PCL= 0, slot 2, gamma 0
Test Date:	2021-02-08
Note:	EUT vertical



ANNEX B Receiver radiated emissions

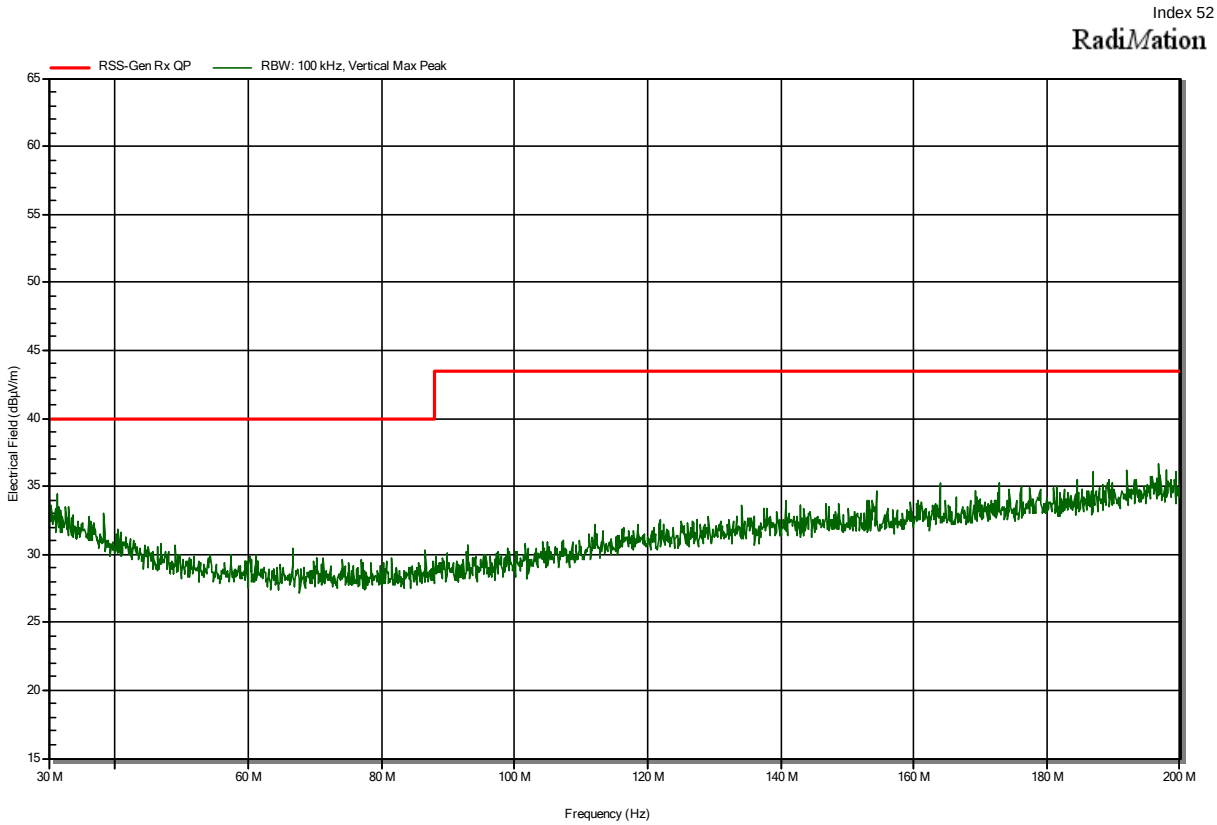
Radiated Spurious Emissions according to RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK116, Horizontal
Measurement distance:	3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK116, Vertical
Measurement distance:	3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



Radiated Spurious Emissions according to RSS-132, Issue 3, January 2013; RSS-133, Issue 6

Project Number:	G0M-1908-8377
Applicant:	BIOTRONIK SE & Co. KG
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Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
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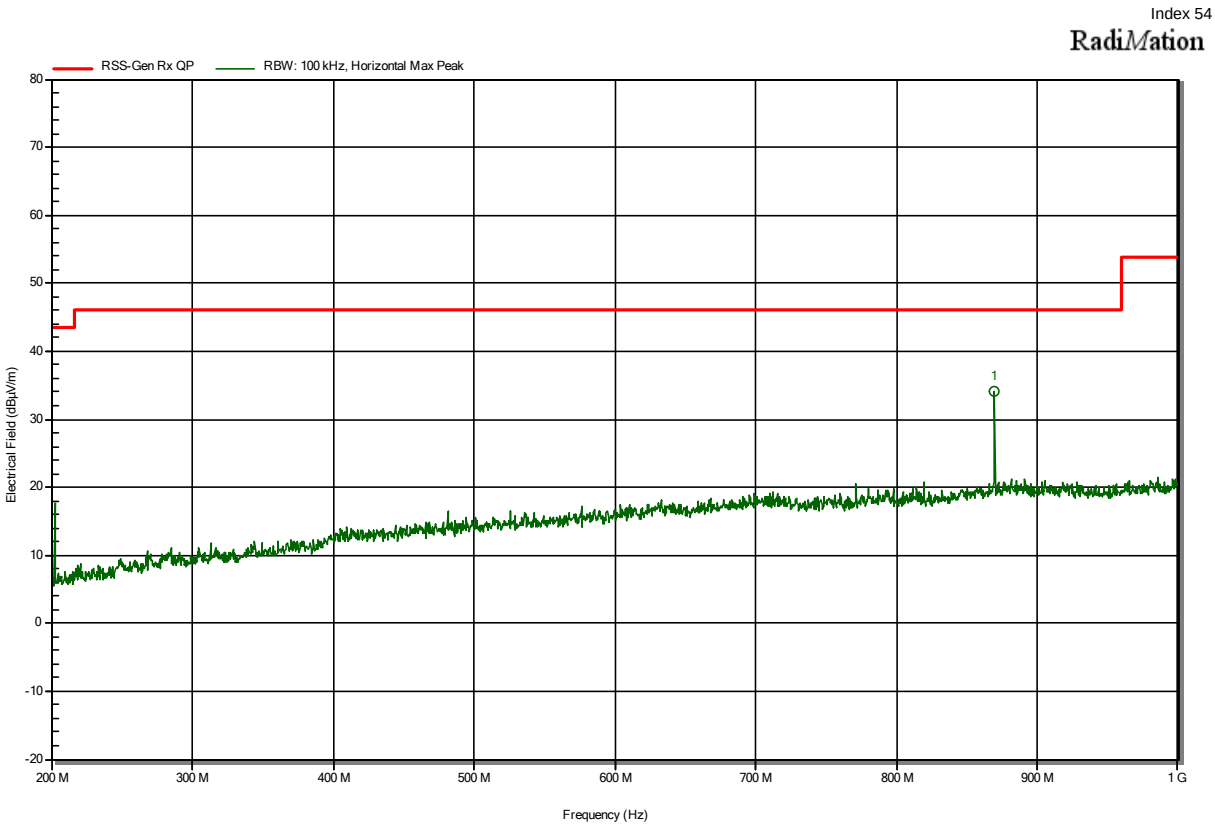
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
869.6 MHz	34.11 dBµV/m	46 dBµV/m	-11.89 dB	Pass

Radiated Spurious Emissions according to RSS-132, Issue 3, January 2013; RSS-133, Issue 6

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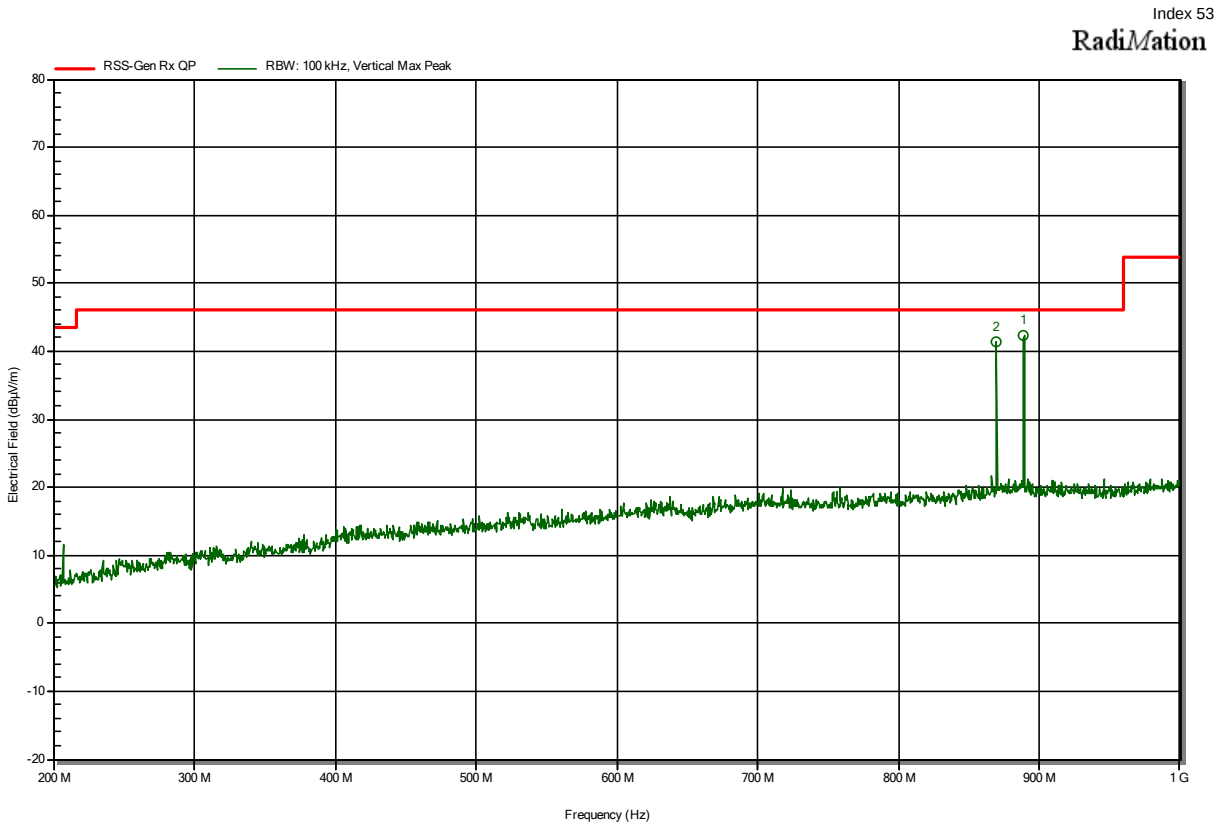
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
869.2 MHz	41.32 dBµV/m	46 dBµV/m	-4.68 dB	Pass
889.2 MHz	42.25 dBµV/m	46 dBµV/m	-3.75 dB	Pass

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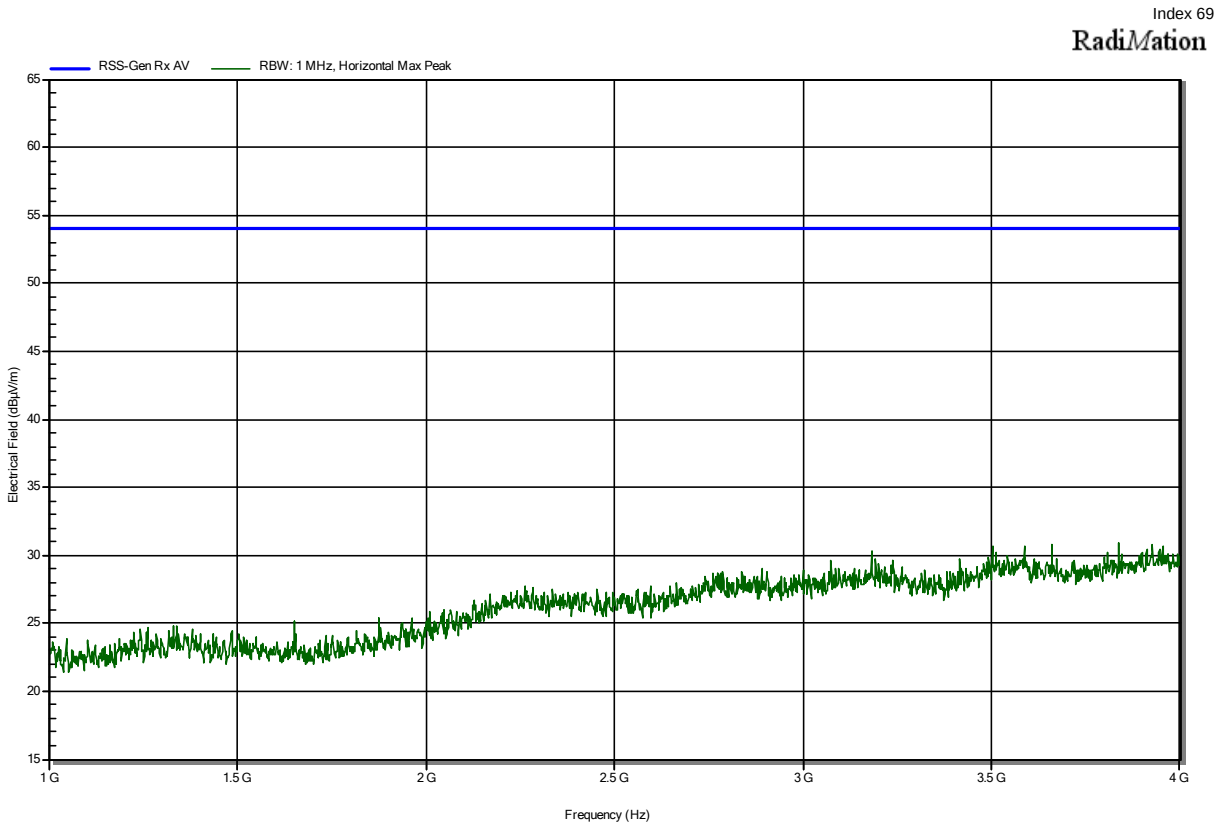
Model Description:	CardioMessenger Smart / Telemonitorig System
Model:	CardioMessenger Smart 4G
Test Sample ID:	32958
Test Site:	Eurofins Product Service GmbH
Operator:	Charline Graf (supervised)
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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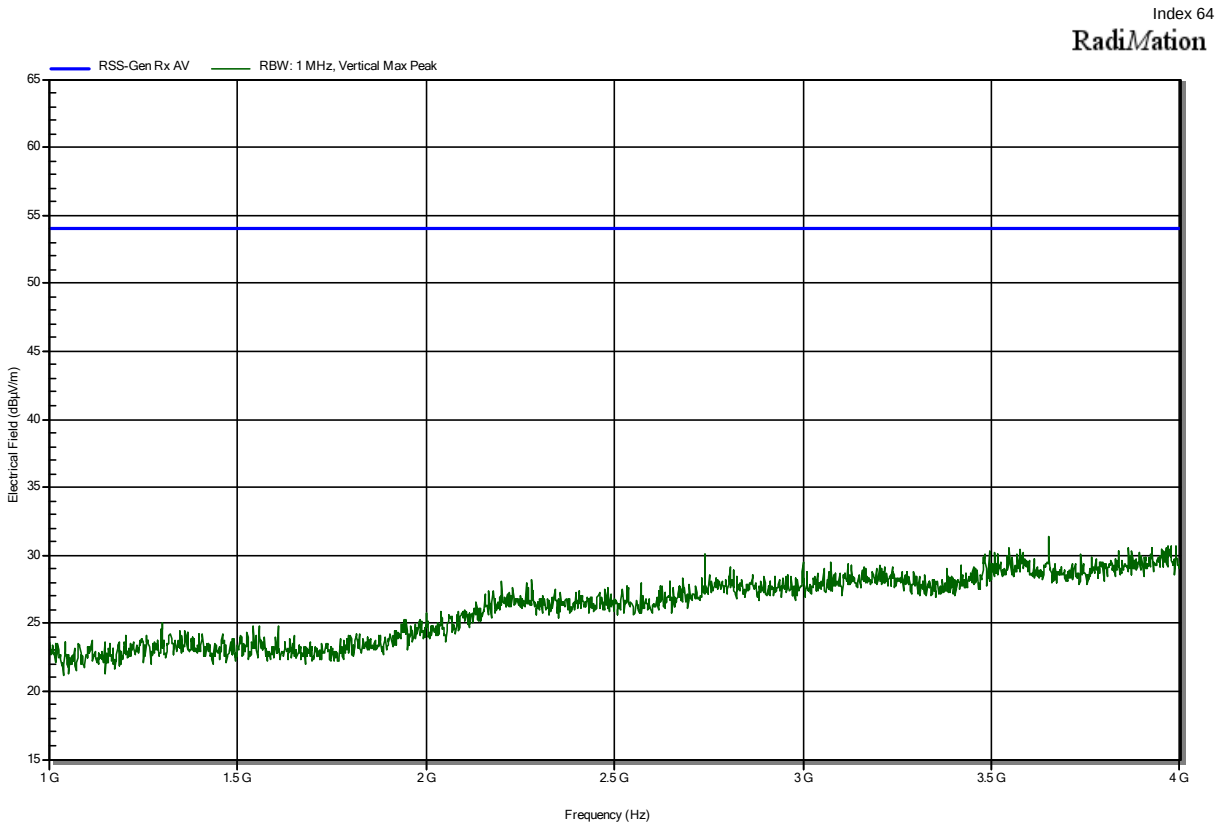
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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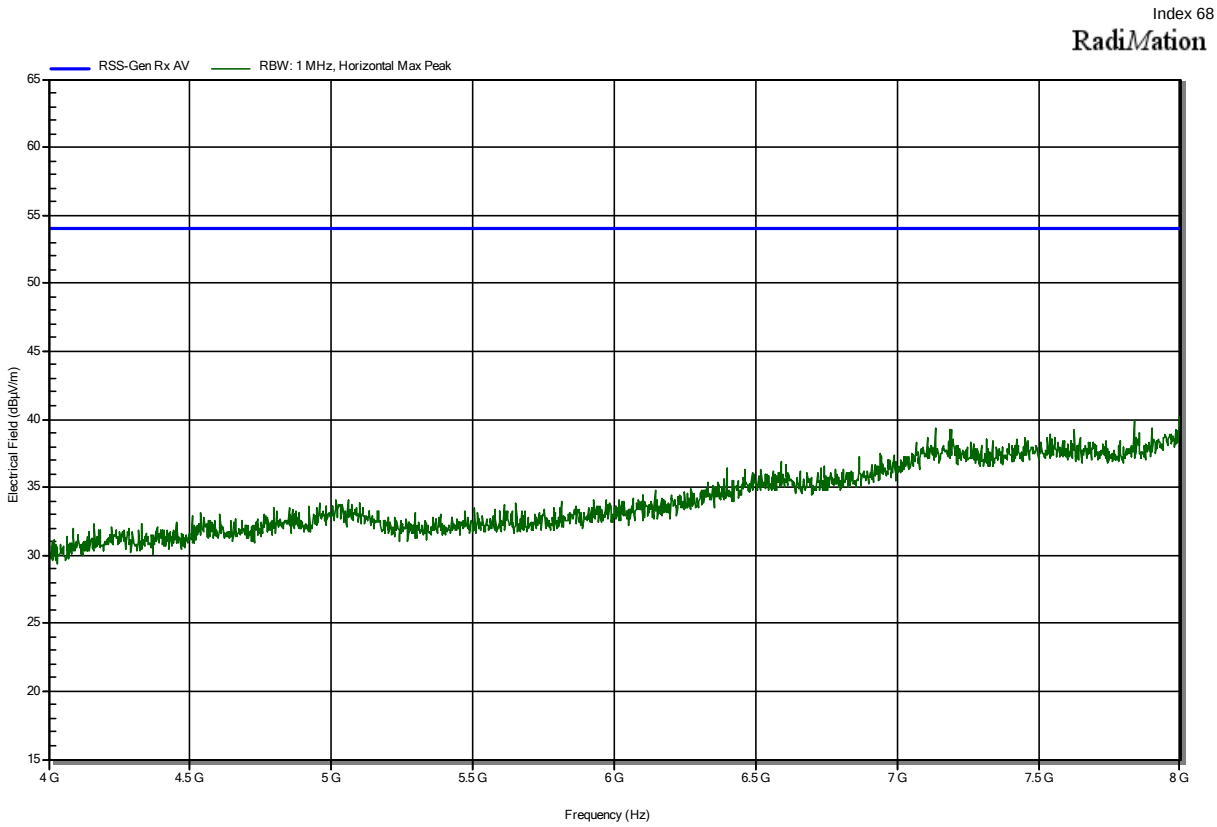
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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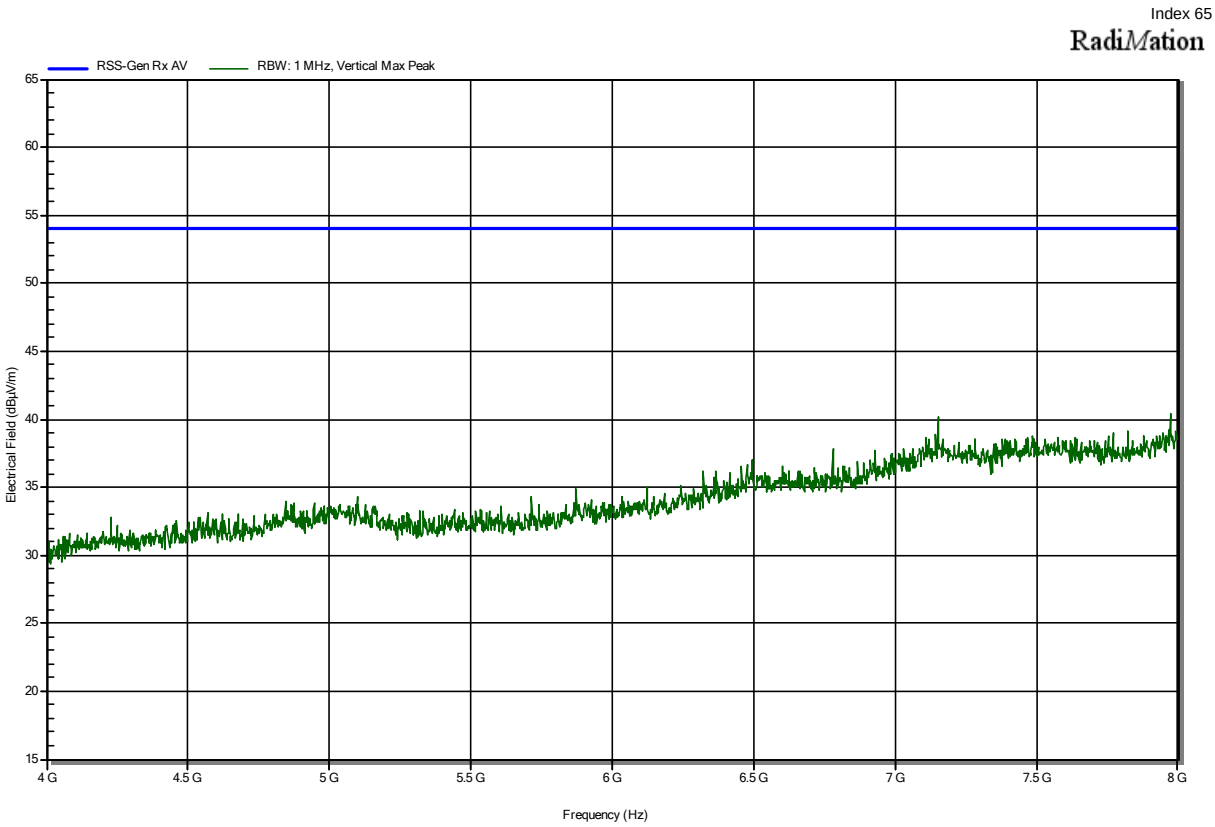
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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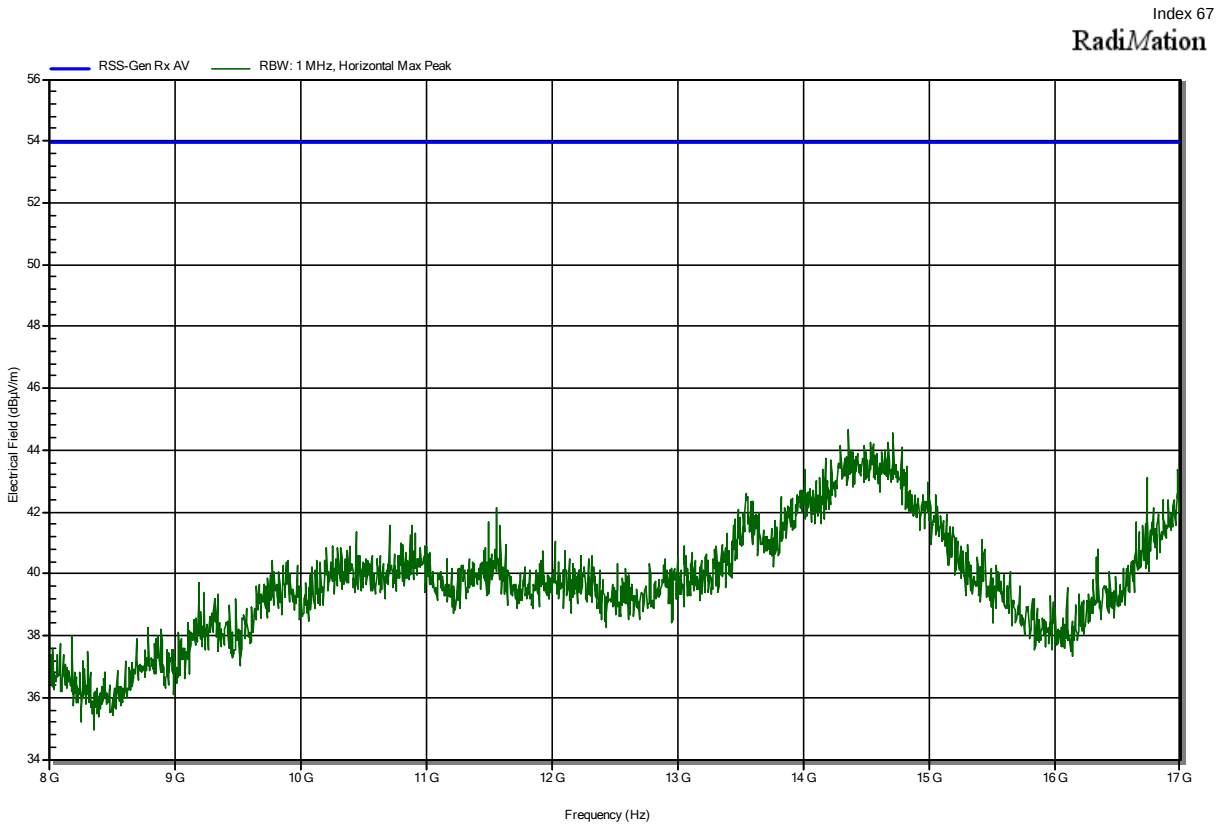
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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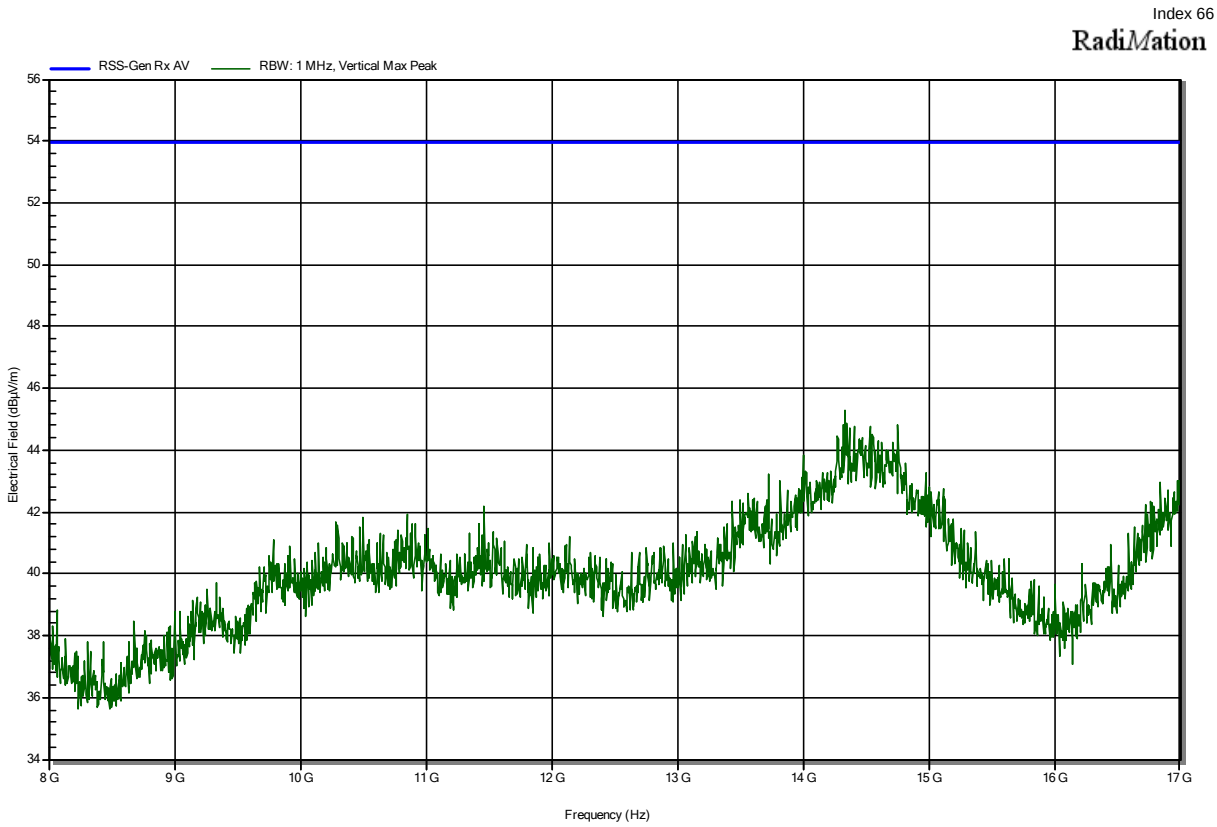
Mode:	Rx; GSM850, EGPRS, Channel 128
Test Date:	2021-02-08
Note:	EUT vertical



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Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Rohde & Schwarz HK116, Horizontal
Measurement distance:	3 m
Mode:	Rx; PCS1900, GPRS, Channel 512
Test Date:	2021-02-08
Note:	EUT vertical

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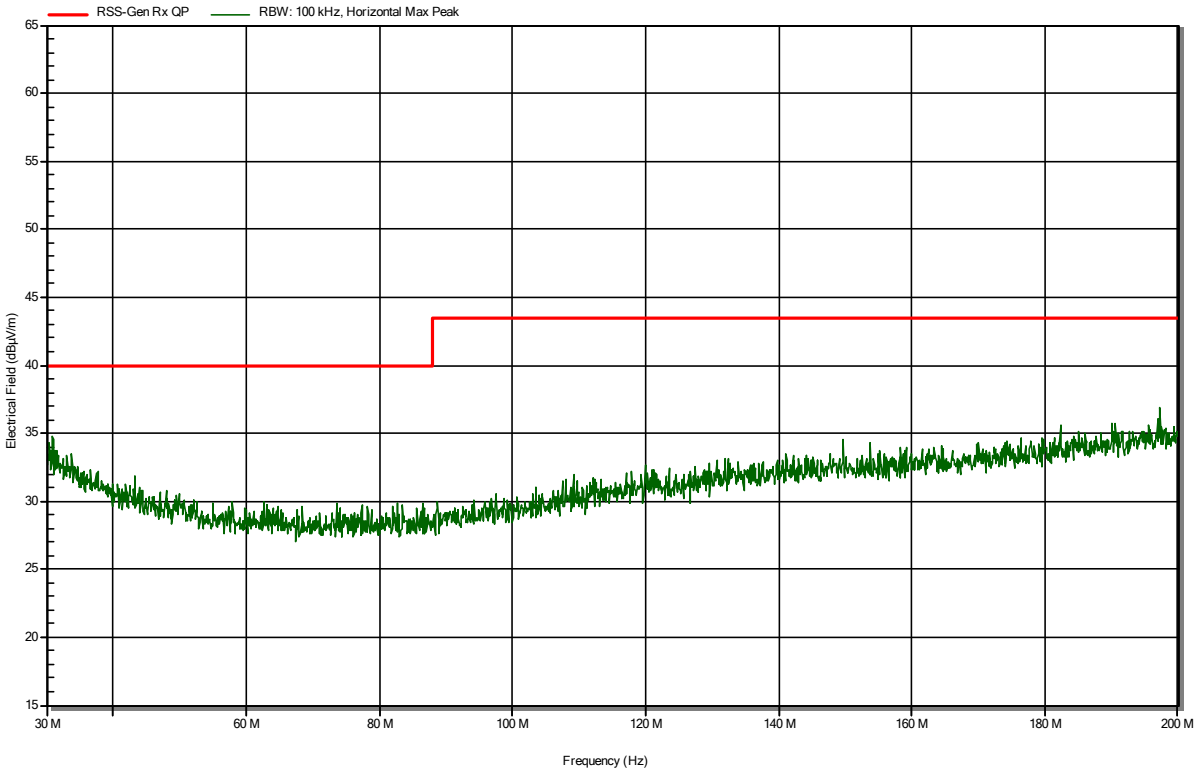
RadiMation



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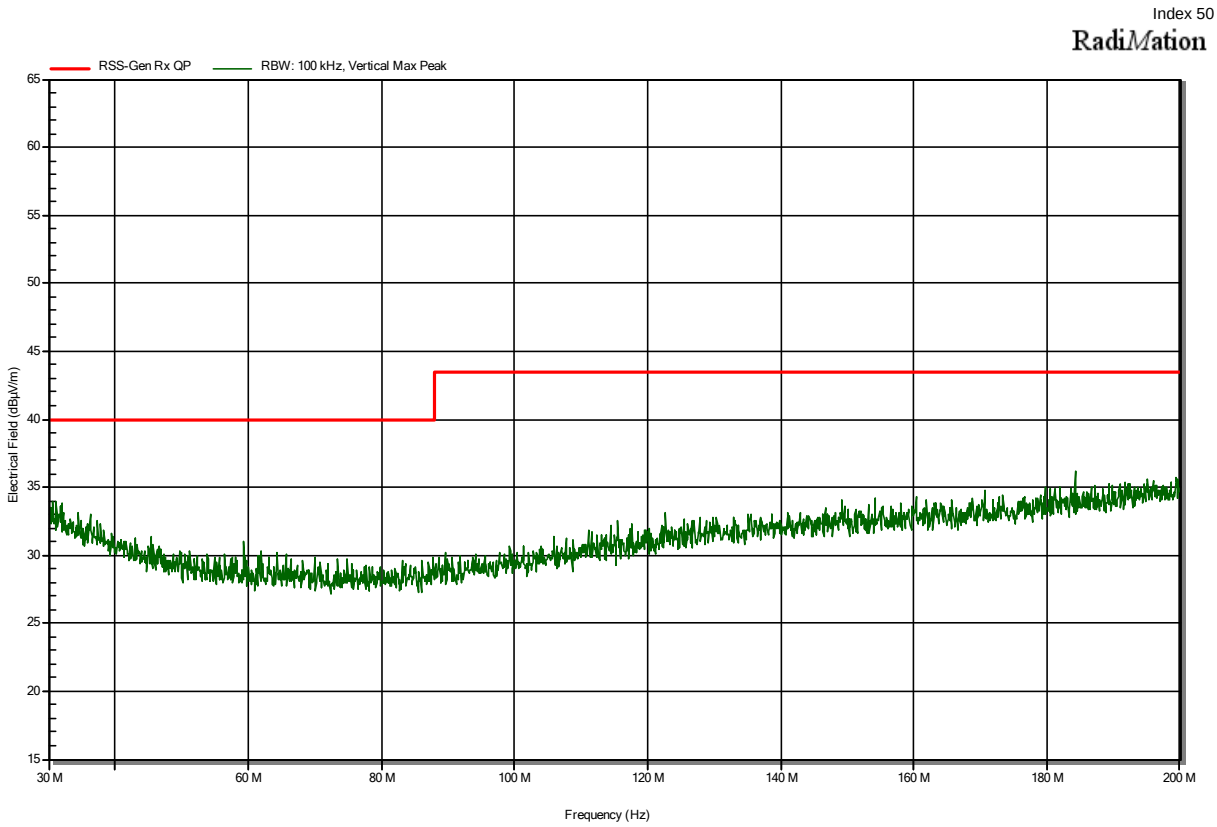

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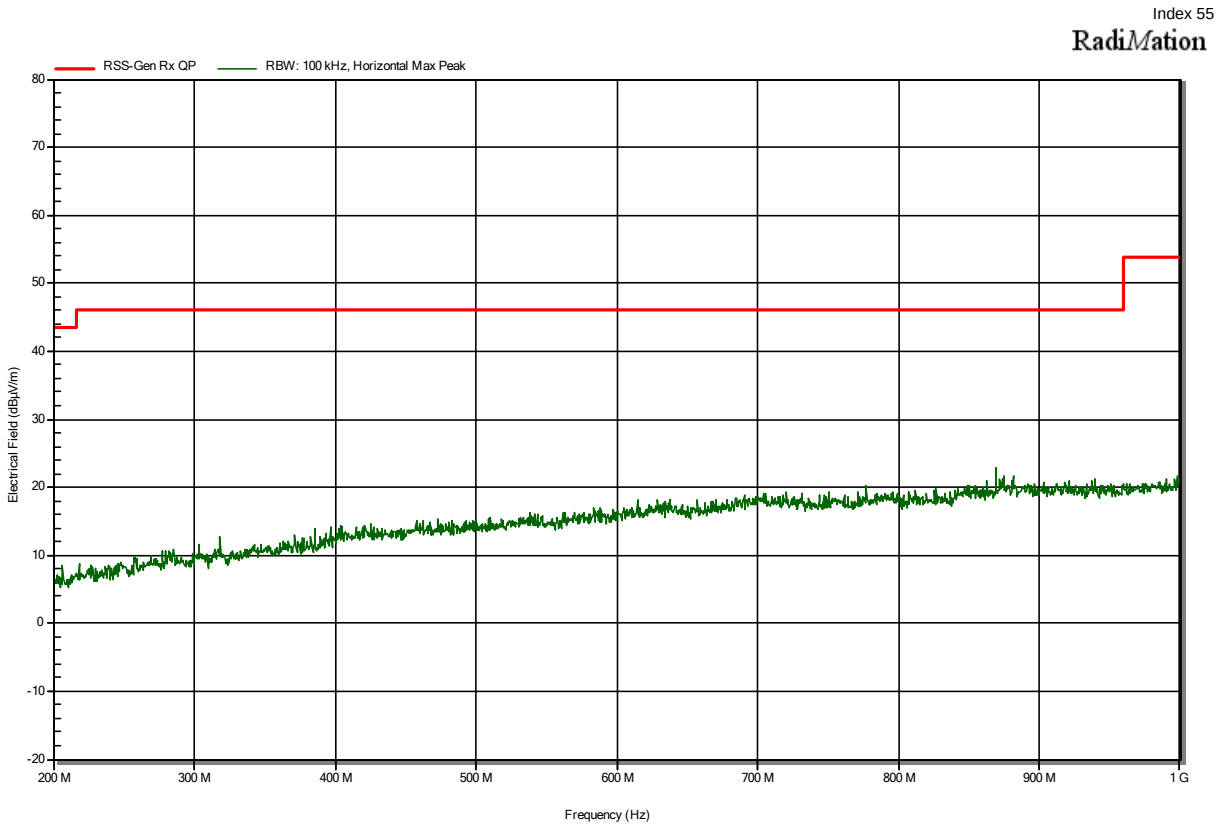
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Rx; PCS1900, GPRS, Channel 512
Test Date:	2021-02-08
Note:	EUT vertical



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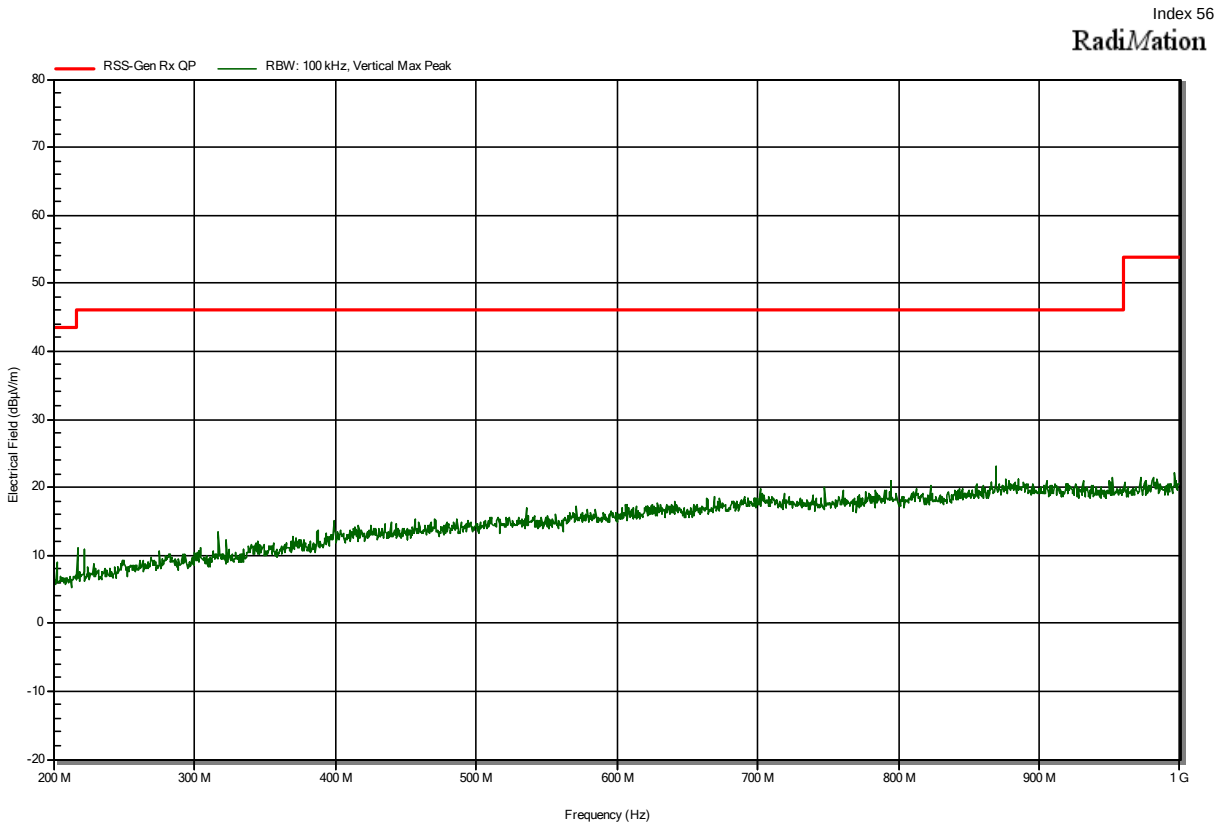
Measurement distance:	3 m
Mode:	Rx; PCS1900, GPRS, Channel 512
Test Date:	2021-02-08
Note:	EUT vertical



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Test Conditions:	Tnom: 22 °Celsius, Vnom: 120 VAC (5V AC/DC adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Rx; PCS1900, GPRS, Channel 512
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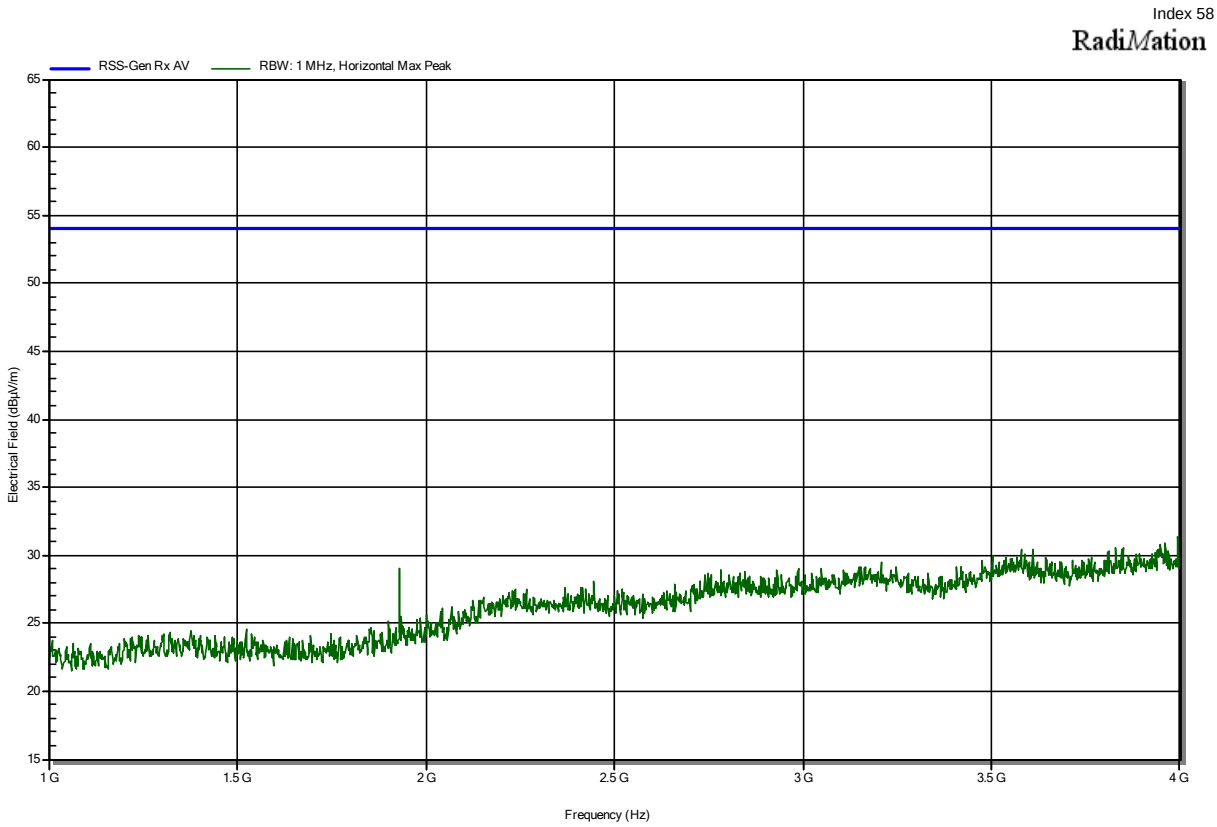

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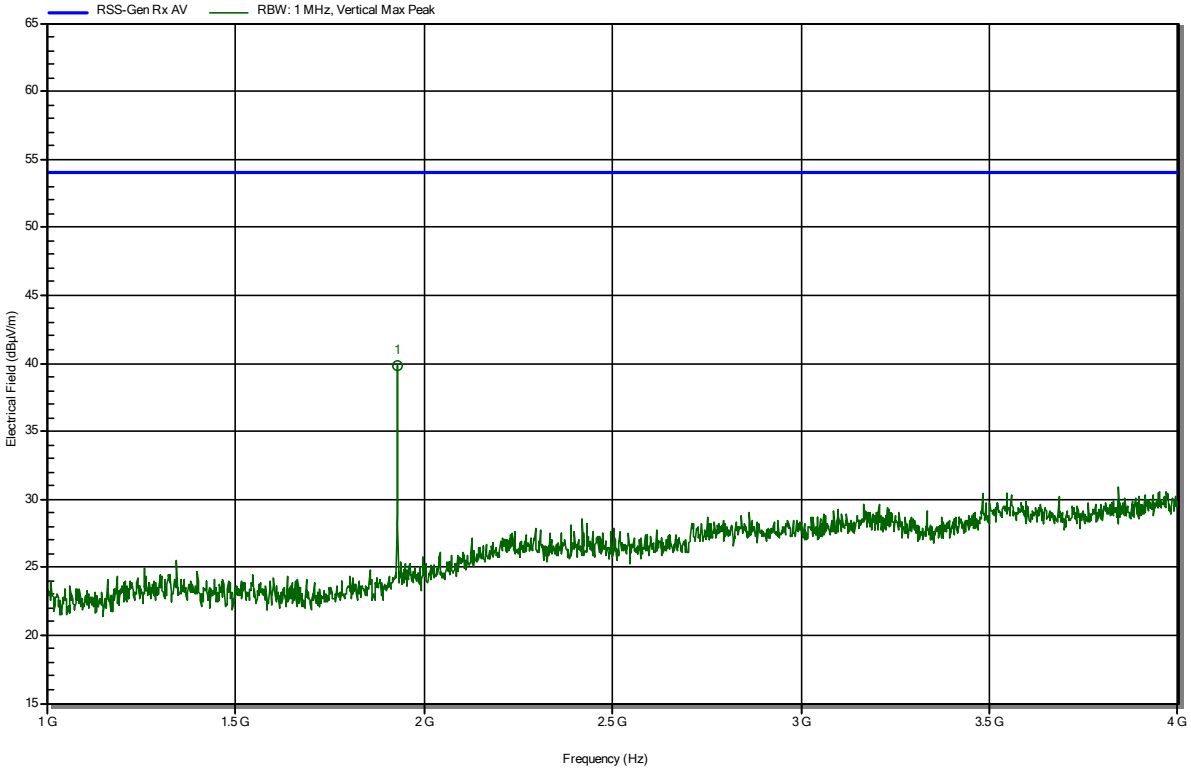
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.93 GHz	39.85 dBµV/m	53.98 dBµV/m	-14.13 dB	Pass

Radiated Spurious Emissions according to RSS-132, Issue 3, January 2013; RSS-133, Issue 6

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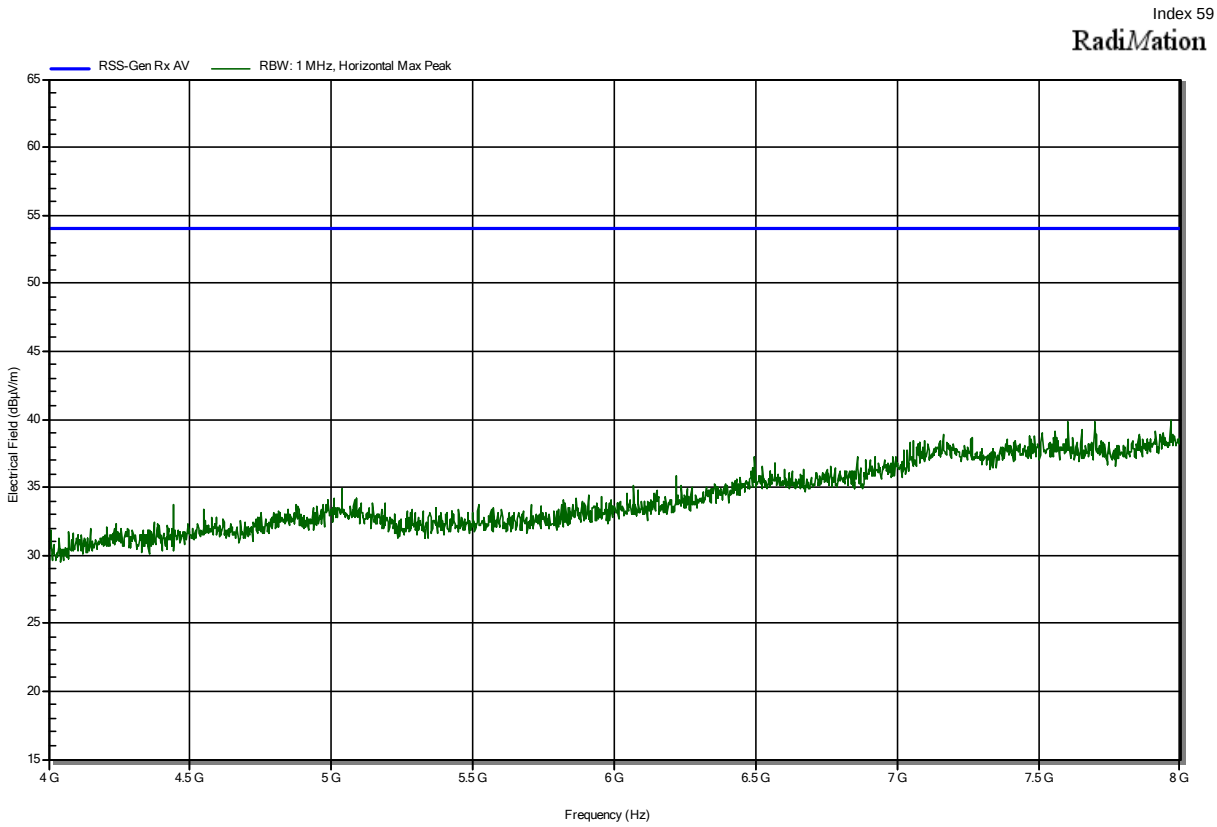

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Note:	EUT vertical

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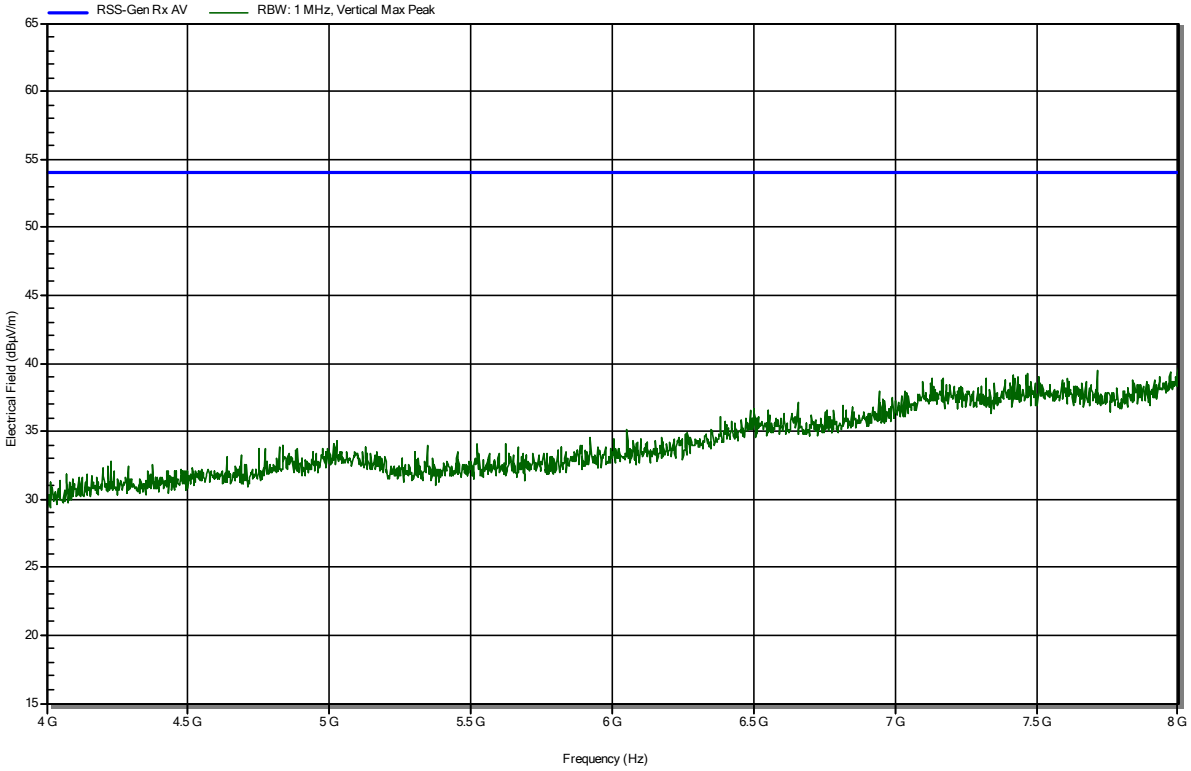
RadiMation



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Test Date:	2021-02-08
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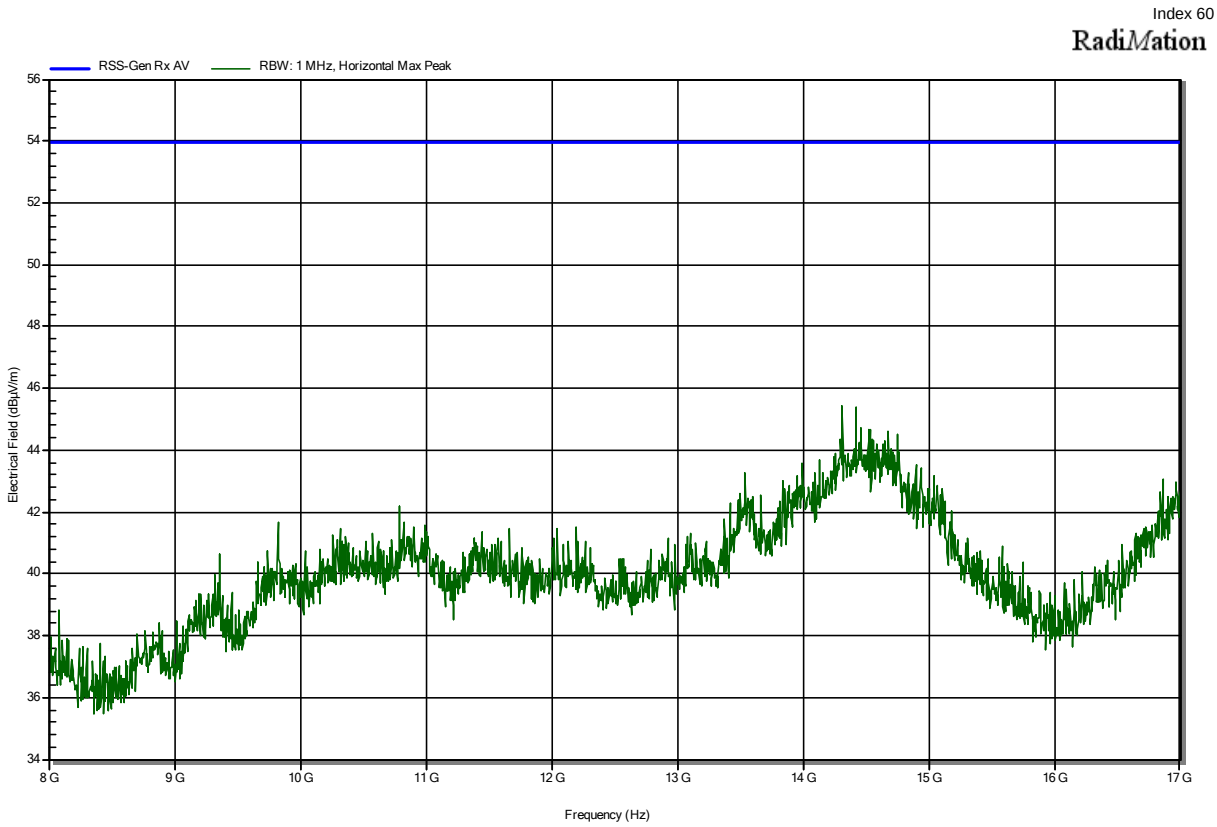

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Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
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Test Date:	2021-02-08
Note:	EUT vertical