EMC TEST REPORT

FCC 47 CFR Part 15B, ISED ICES-003 Issue 6

Report Reference No	G0M-1809-7680-EF0115B-V01
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 Testing Laboratory site: 3470A-2
Applicant	BIOTRONIK SE & Co. KG
Address	Woermannkehre 1 12359 Berlin GERMANY
Test Specification	Full compliance test
Standard	47 CFR Part 15 Subpart B ISED ICES-003 Issue 6 ANSI C63.4:2014
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	CardioMessenger Smart
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. B
Software Version(s)	MICS-FW: ULP_LOW_1_13_0 / Modem-FW: 30.00.102
FCC-ID	QRI-CMSMART4GNA
IC	N/A
Test Result	**PASSED**

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
required by standard but not appl. to test object	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Date of receipt of test item	2018-09-24	
Report:		
Compiled by	Manuel Engel	
Tested by (+ signature) (Responsible for Test)	Manuel Engel Matthias Handrik	
Approved by (+ signature) (Deputy Head of Lab)	Jens Marquardt	
Date of Issue	2018-10-16	
Total number of pages	38	
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:		

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
T_{NOM}	Nominal operating temperature
V_{NOM}	Nominal supply voltage

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2018-10-16	Initial Release	

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1 Equipment (Test Item) Under Test

Description	CardioMessenger Smart	
Model	CardioMessenger Smart 4G	
Additional Model(s)	None	
Brand Name(s)	BIOTRONIK	
Serial Number(s)	None	
Hardware Version(s)	CardioMessenger Smart 4G mit LP, best.LP1/Telex Smart 4G Rev. B	
Software Version(s)	MICS-FW: ULP_LOW_1_13_0 / Modem-FW: 30.00.102	
FCC-ID	QRI-CMSMART4GNA	
IC	N/A	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	2155	
Radio Module	Type	LTE module
	Model	ME910C1-NA
	Manufacturer	TELIT COMMUNICATIONS
	FCC-ID	RI7ME910C1NA
	IC	5131A-ME910C1NA
Supply Voltage	V_{NOM}	3.7V DC
AC/DC-Adaptor	Model	FW7520/05
	Vendor	FRIWO Gerätebau GmbH
	Input	100 – 240 V AC
	Output	5 V DC
Manufacturer	BIOTRONIK SE & Co. KG Woermannkehre 1 12359 Berlin GERMANY	

1.1 Equipment Ports

Name	Type	Attributes		Comment
Power	AC	Count: Direction: Service only:	1 In No	
USB	IO	Count: Direction: Service only:	1 In Yes	

Description:	
AC	AC mains power input/output port
DC	DC power input/output port
IO	Input/Output port
TP	Telecommunication port
NE	Non-electrical port

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
SIM	Communication Tester	Rohde & Schwarz	CMW 500	Signaling
Description:				
AE	Auxillary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 Operational Modes

Mode #	Description
1	EUT powered up LTE connection on E-UTRA band 2, 4 or 12 to CMW. Active MICS transmission.
Comment: The selection of LTE band for worst case in this report based on manual prescan with emi reciever.	

1.6 EUT Configuration

Configuration #	Description
1	EUT powered via internal battery. EUT is placed inside the measurement chamber on table top. CMW is placed outside the measurement chamber. LTE connection is set to max power.
2	EUT powered via AC/DC adaptor. AC/DC adaptor is powered via laboratory power supply. EUT is placed inside the measurement chamber on table top. CMW is placed outside the measurement chamber. LTE connection is set to max power.
Comment:	

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/m) = Net field strength (dBµV/m)

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15B, ISED ICES-003 Issue 6				
Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
Emission				
FCC 15.109 ICES-003, 8, 6.1	Radiated emissions	ANSI C63.4:2014	PASS	
FCC 15.107 ICES-003, 8, 6.2	AC power line conducted emissions	ANSI C63.4:2014	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

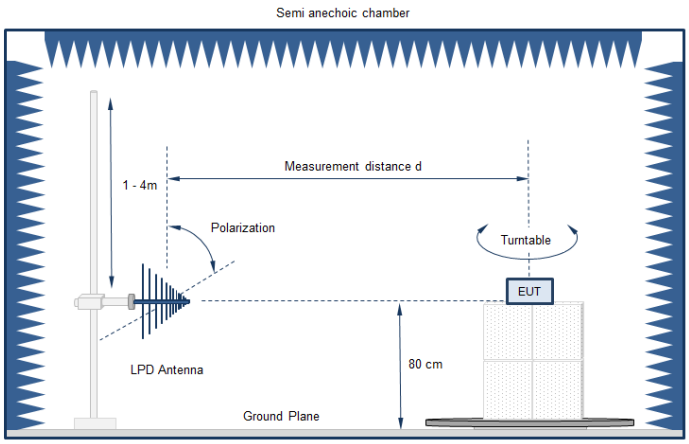
2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

2.1.1 Information

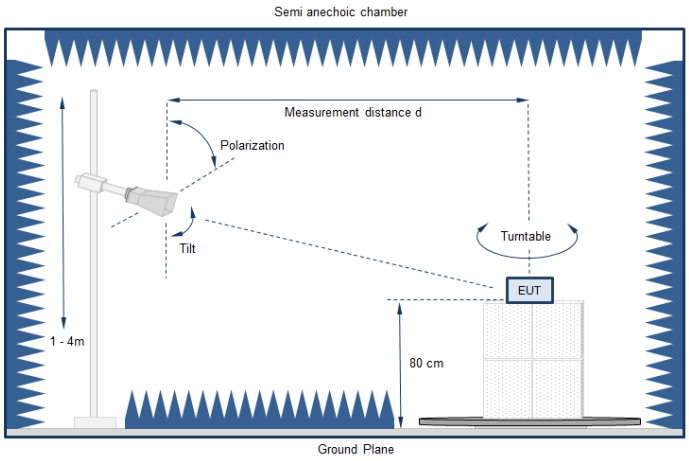
Test Information	
Reference	FCC 15.109, ICES-003, 8, 6.1
Reference method	ANSI C63.4:2014 Section 8
Equipment class	Class B
Equipment type	Table top
Highest internal frequency [MHz]	2155
Measurement range	30 MHz to 10775 MHz
Temperature [°C]	24 °C
Humidity [%]	39 %
Operator	Manuel Engel
Date	2018-09-27

2.1.2 Setup

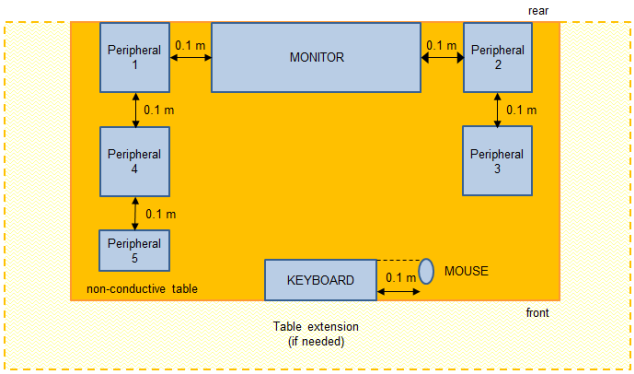
Measurement up to 1 GHz



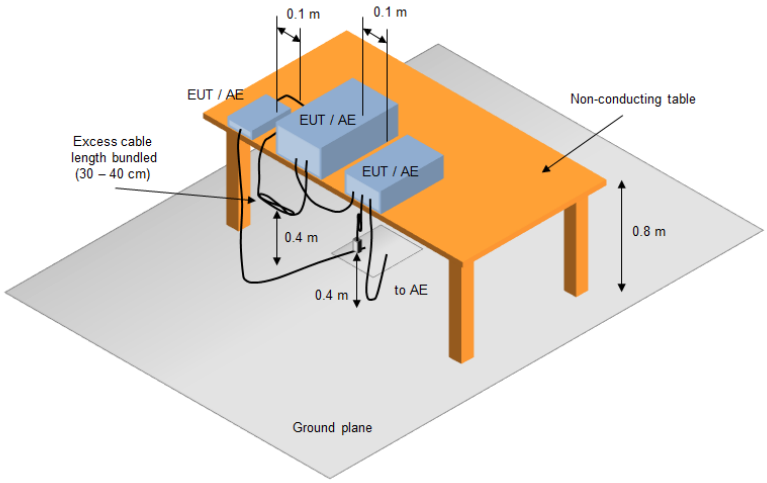
Measurement above 1 GHz



Equipment placement - Table top



Test Setup



2.1.3 Equipment

Test Equipment					
Manufacturer	Description	Model	Identifier	Cal. Date	Cal. Due
Frankonia	Anechoic chamber	AC1	EF00200	functional test	functional test
Keysight	EMI Test Receiver	N9038A-526/WXP	EF01070	2018-08	2019-08
R&S	Biconical Antenna	HK 116	EF00186	2018-03	2020-03
R&S	LPD Antenna	HL 223	EF00187	2016-05	2019-05
Schwarzbeck	Horn Antenna	BBHA 9120D (1-18GHz)	EF00018	2016-09	2019-09

2.1.4 Procedure

Exploratory measurement
1. The EUT was placed on a non-conductive table at a height of 0.8m. 2. The EUT and support equipment, if needed, were set up to simulate typical usage. 3. Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage. 4. The antenna was placed at a distance of 3 or 10 m. 5. The received signal was monitored at the measurement receiver. 6. This procedure has to be performed in both antenna polarizations, horizontal and vertical. 7. The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3

Final measurement
1. The EUT was placed on a 0.8 m non-conductive table at a 3 m distance from the receive antenna. The antenna output was connected to the measurement receiver. 2. A biconical antenna was used for the frequency range 30 – 200 MHz, a logarithmic periodical antenna was used for the frequency range from 200 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast. 3. The EUT and cable arrangement were based on the exploratory measurement results. 4. Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded. 5. The test data of the worst-case conditions were recorded and shown on the next pages.

2.1.5 Limits

Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dBµV/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak Average	74 54

Class A @ 10 m		
Frequency [MHz]	Detector	Limit [dBµV/m]
30 - 88	Quasi-peak	39
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46.5
960 - 1000	Quasi-peak	49.5
> 1000	Peak Average	69.5 49.5

2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1,2	PASS	

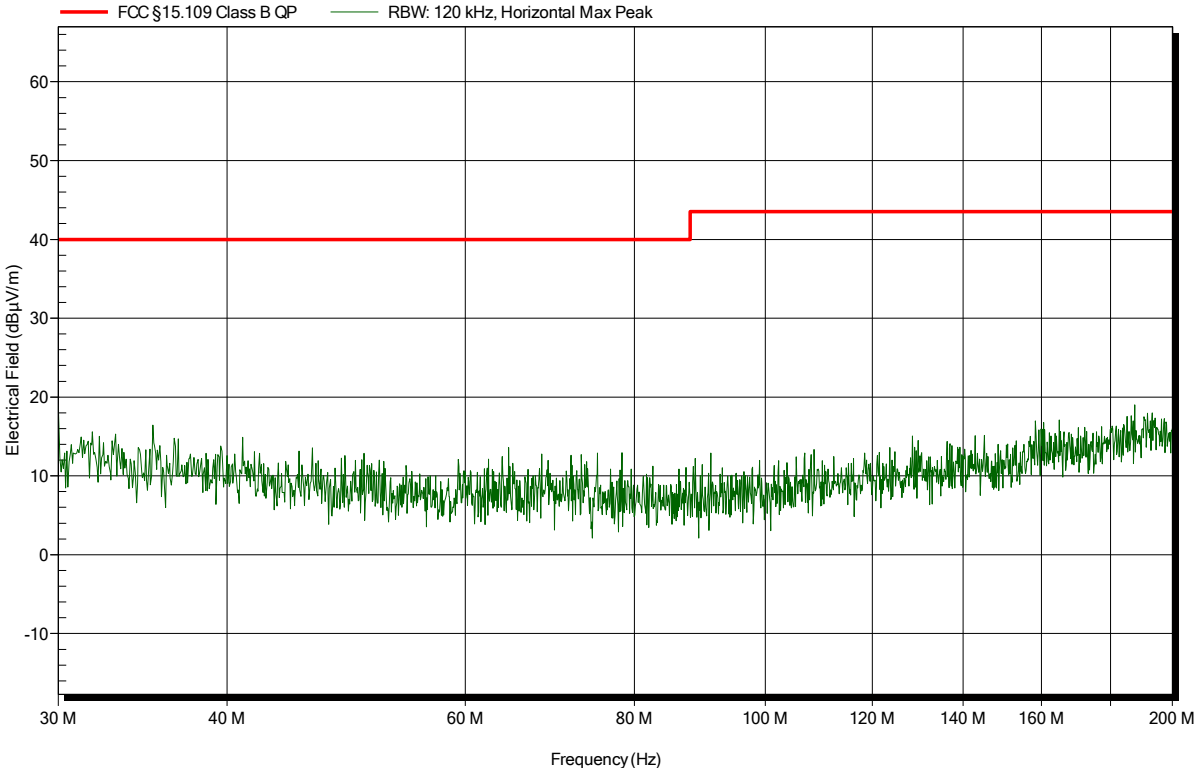
2.1.8 Records

Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	position height 1m, angle 0°

Index 1

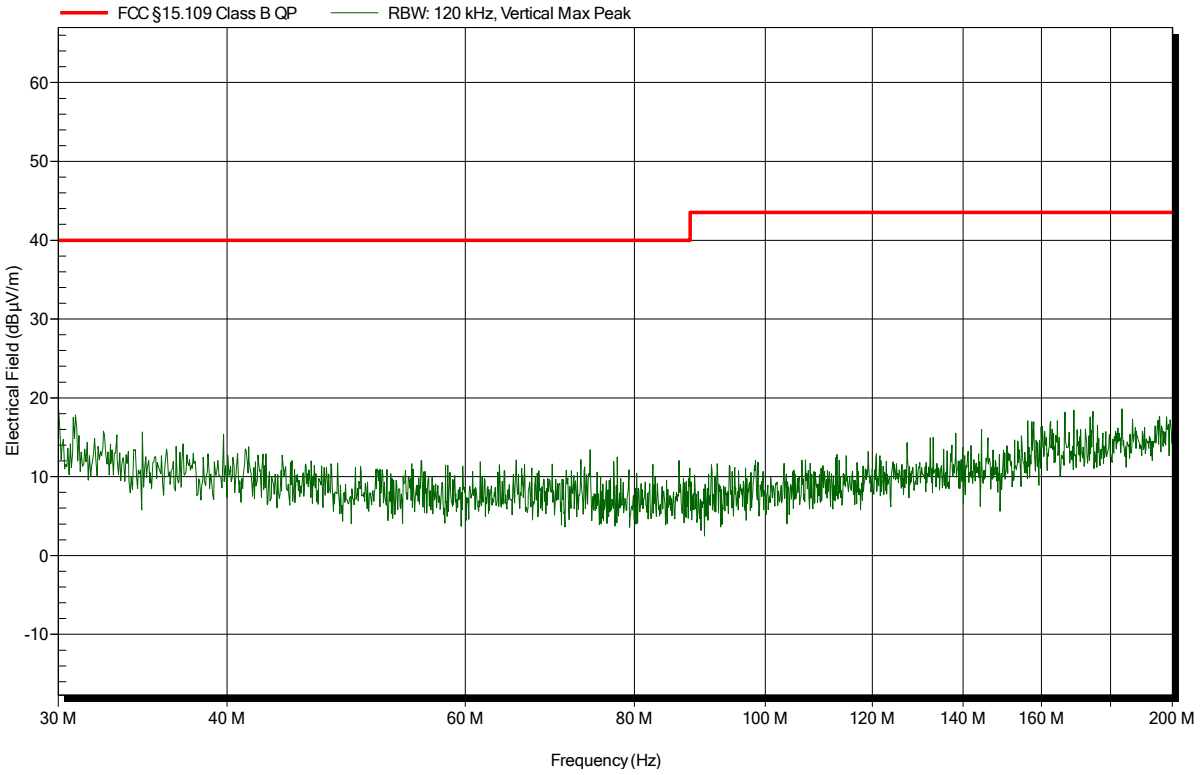


Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	position height 1 m, angle 0°

Index 2

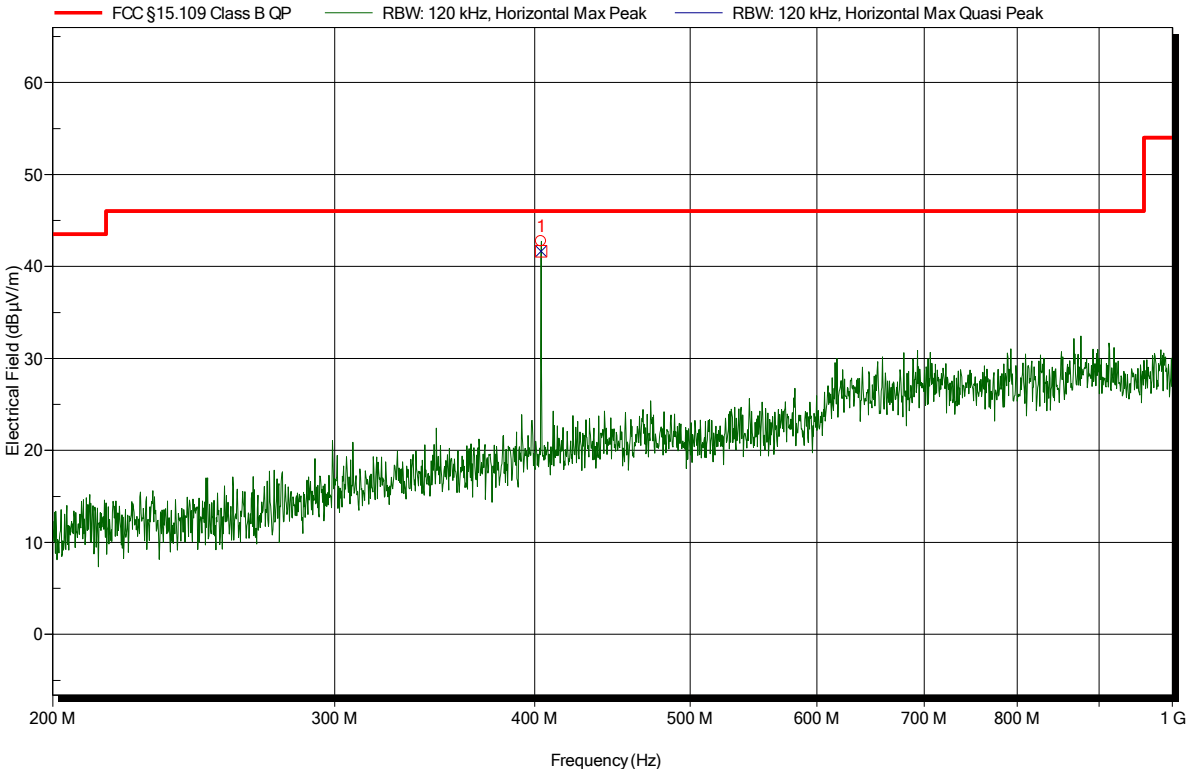


Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	

Index 4



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	403.711 MHz	41.64 dBµV/m	46.02 dBµV/m	-4.38 dB	Pass	0 Degree	1 m

Radiated emissions under normal conditions according to FCC Part 15b

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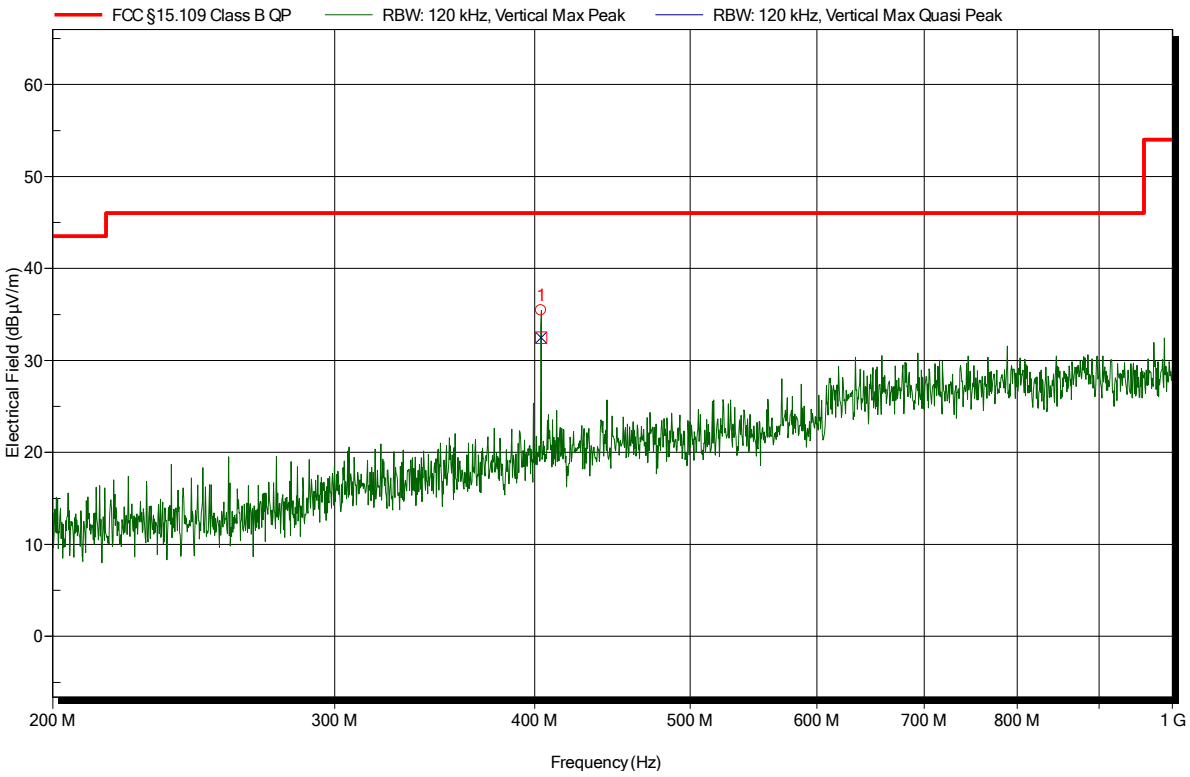
Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	

Index 3



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	403.585 MHz	32.48 dBµV/m	46.02 dBµV/m	-13.54 dB	Pass	0 Degree	1 m

Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	ETS-Lindgren 3117, Horizontal
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	

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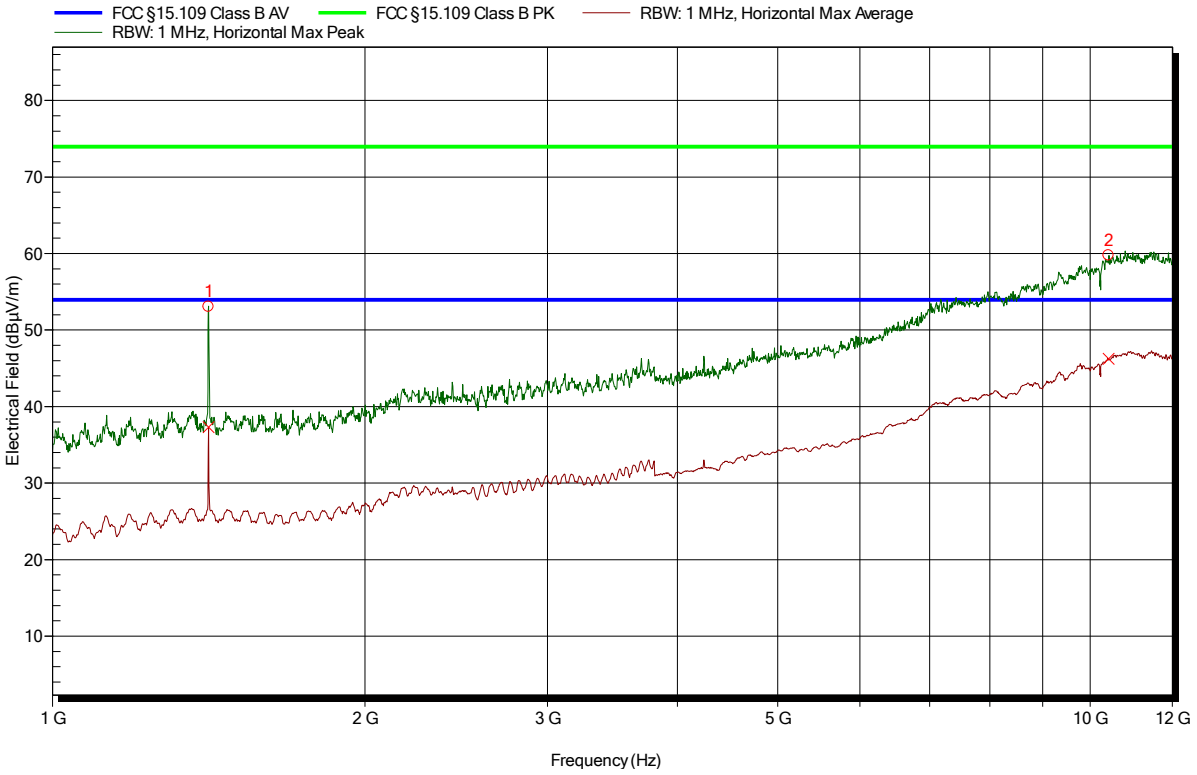

Peak Number	Frequency	Peak	Angle	Height
1	1.414 GHz	Second harmonic LTE Cat-M1 band 12		
2	10.414 GHz	59.74 dBµV/m	0 Degree	1 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.414 GHz	37.3 dBµV/m	Second harmonic LTE Cat-M1 band 12			0 Degree	1 m
2	10.414 GHz	46.23 dBµV/m	53.98 dBµV/m	-7.74 dB	Pass	0 Degree	1 m

Radiated emissions under normal conditions according to FCC Part 15b

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 3.7 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3m
Mode:	configuration 1
Test Date:	2018-09-27
Note:	

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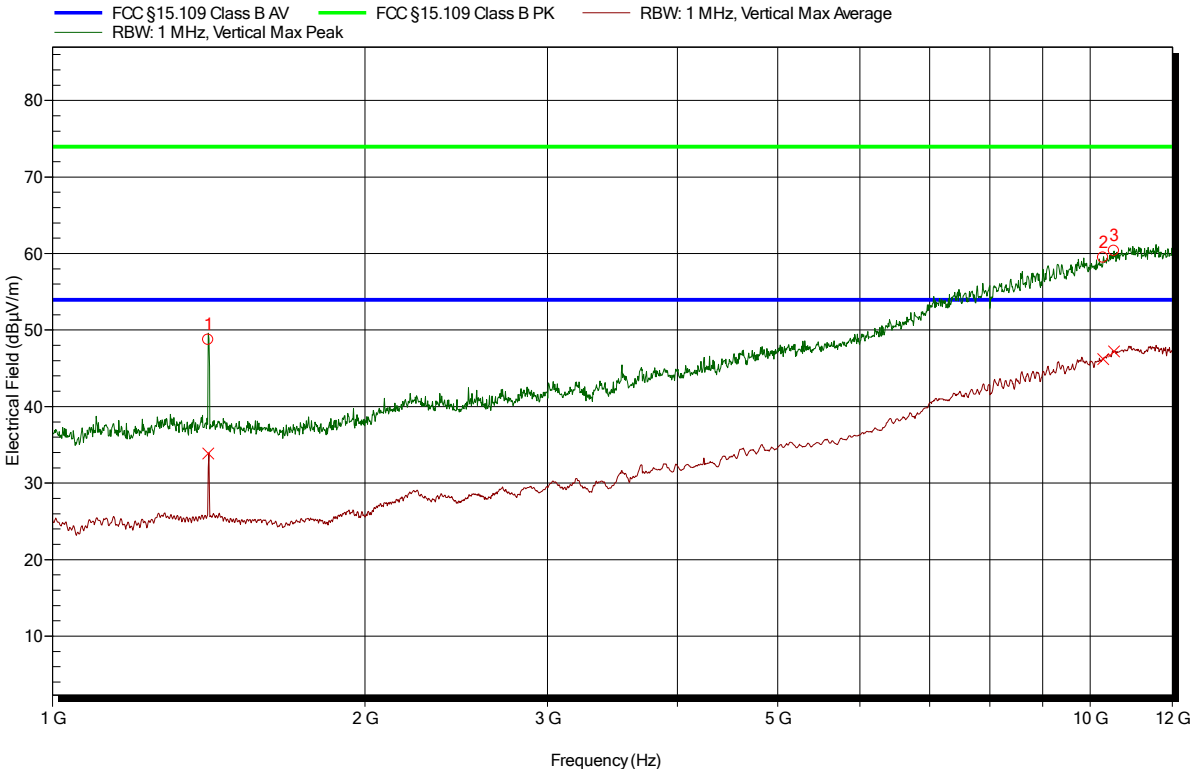

Peak Number	Frequency	Peak	Angle	Height
1	1.414 GHz	Second harmonic LTE Cat-M1 band 12		
2	10.288 GHz	59.46 dBµV/m	0 Degree	1.44 m
3	10.542 GHz	60.35 dBµV/m	0 Degree	1.44 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.414 GHz	33.88 dBµV/m	Second harmonic LTE Cat-M1 band 12			0 Degree	1.44 m
2	10.288 GHz	46.19 dBµV/m	53.98 dBµV/m	-7.79 dB	Pass	0 Degree	1.44 m
3	10.542 GHz	47.21 dBµV/m	53.98 dBµV/m	-6.77 dB	Pass	0 Degree	1.44 m

Radiated emissions under normal conditions according to FCC Part 15b

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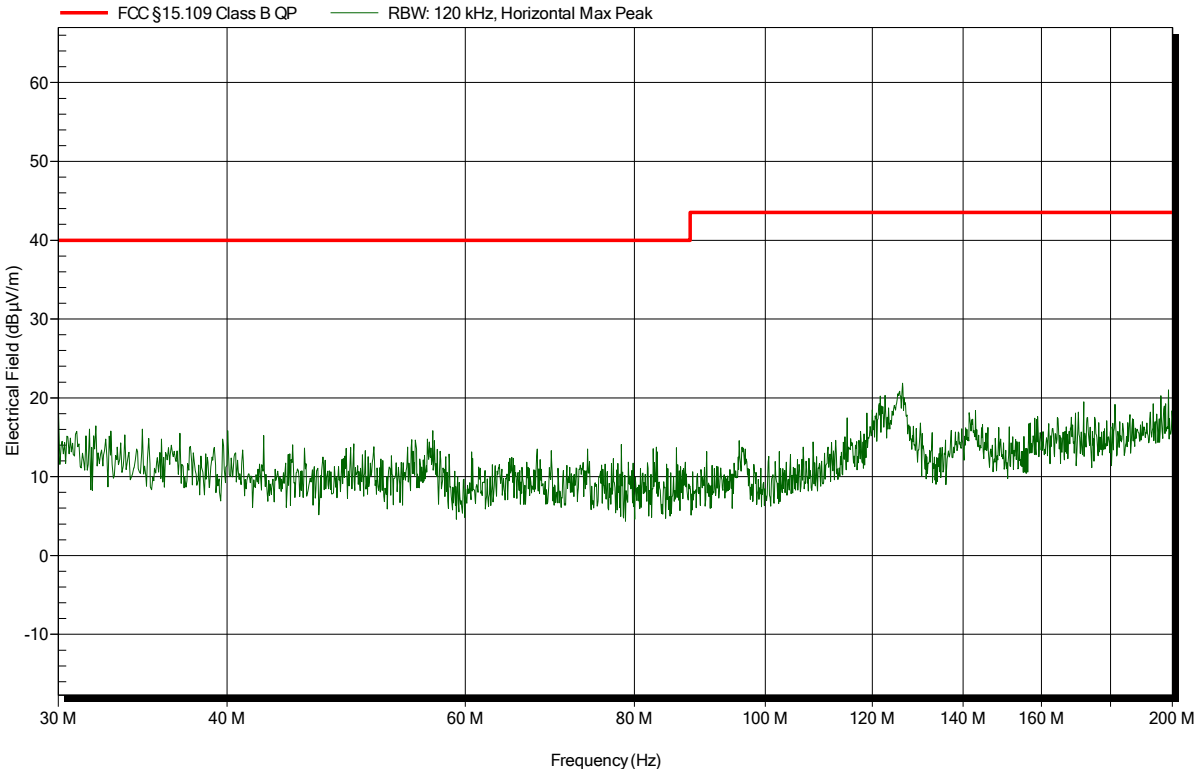
Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 120 V AC (AC/DC adapter)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	position height 1.96 m, angle 144°

Index 6



Radiated emissions under normal conditions according to FCC Part 15b

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Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 120 V AC (AC/DC adapter)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	

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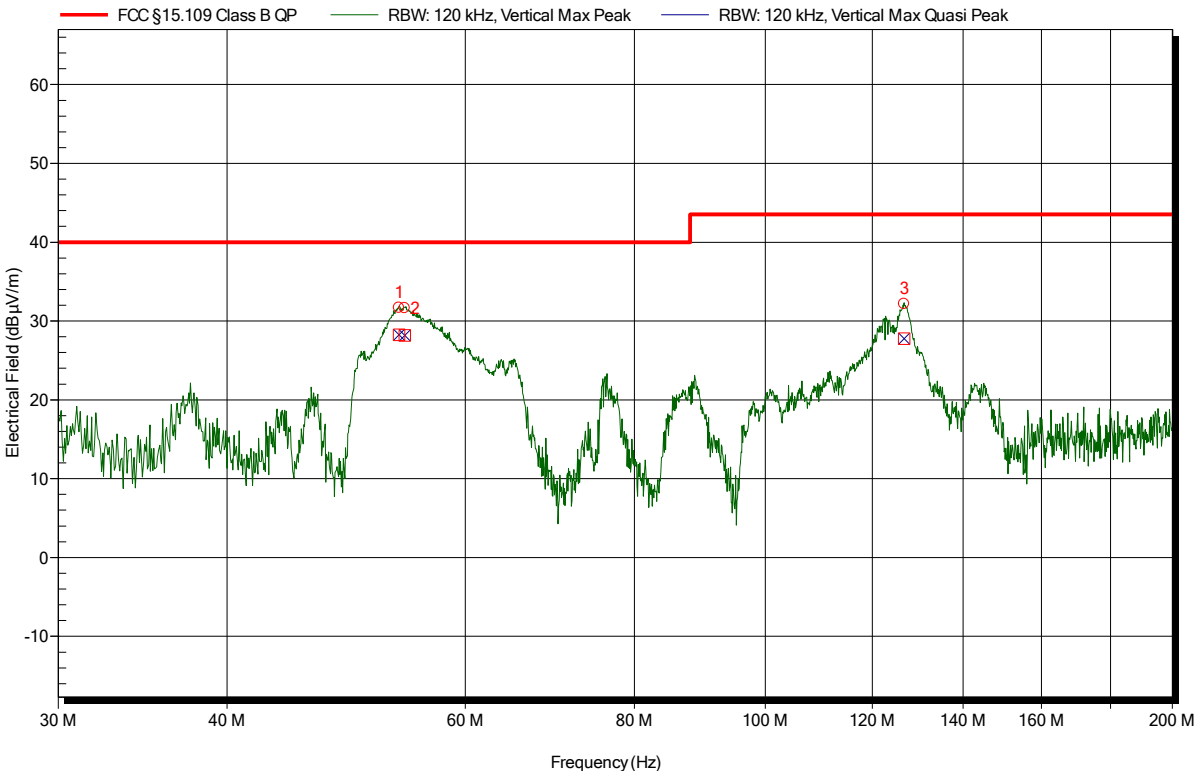

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	53.599 MHz	28.24 dBµV/m	40 dBµV/m	-11.76 dB	Pass	90 Degree	1 m
2	54.14 MHz	28.17 dBµV/m	40 dBµV/m	-11.83 dB	Pass	90 Degree	1 m
3	126.655 MHz	27.75 dBµV/m	43.52 dBµV/m	-15.77 dB	Pass	90 Degree	1 m

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Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	

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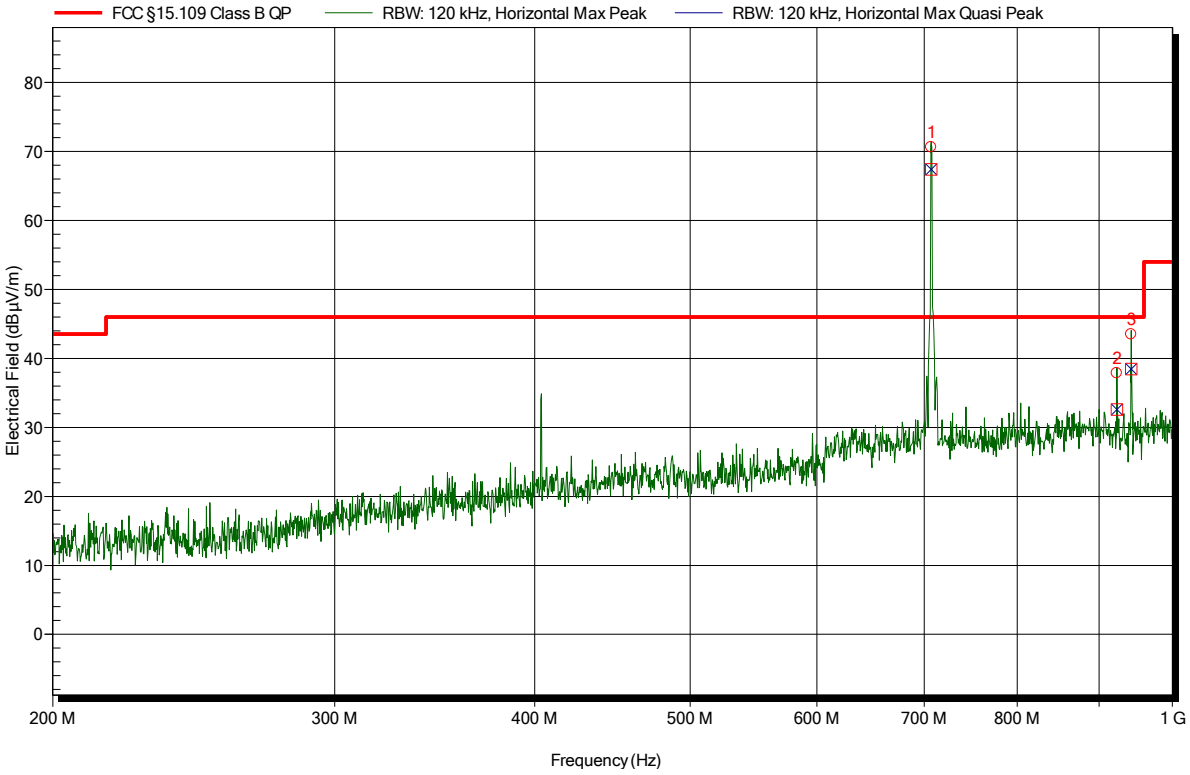

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	707.049 MHz		Carrier signal LTE Cat-M1 band 12			144 Degree	1 m
2	923.284 MHz	32.57 dBµV/m	46.02 dBµV/m	-13.45 dB	Pass	144 Degree	1 m
3	942.496 MHz	38.46 dBµV/m	46.02 dBµV/m	-7.56 dB	Pass	144 Degree	1 m

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Test Conditions:	Tnom: 23°C, Unom: 120 V AC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	

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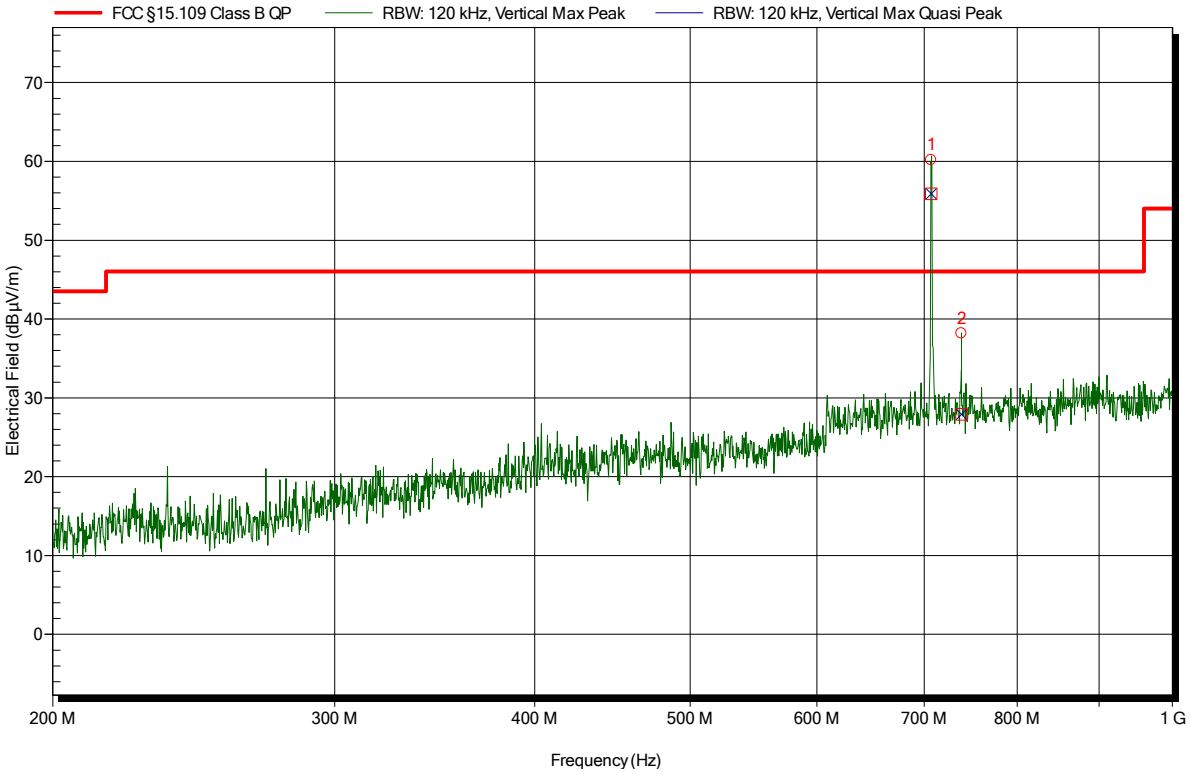

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	707.031 MHz		Carrier signal LTE Cat-M1 band 12			0 Degree	1 m
2	738.439 MHz	27.91 dBµV/m	46.02 dBµV/m	-18.11 dB	Pass	0 Degree	1 m

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Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 120 V AC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	

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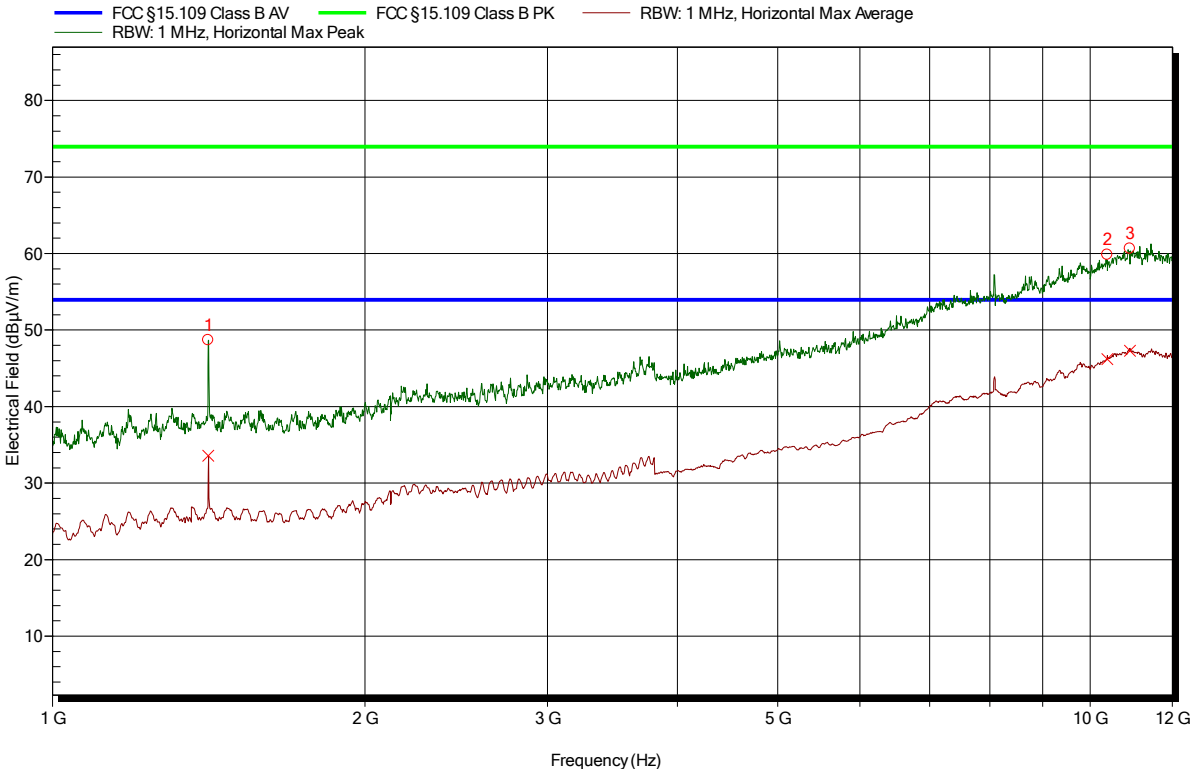

Peak Number	Frequency	Peak	Angle	Height
1	1.414 GHz	Second harmonic LTE Cat-M1 band 12		
2	10.386 GHz	59.85 dBµV/m	0 Degree	2.28 m
3	10.917 GHz	60.64 dBµV/m	0 Degree	2.28 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.414 GHz	33.58 dBµV/m	Second harmonic LTE Cat-M1 band 12			0 Degree	2.28 m
2	10.386 GHz	46.19 dBµV/m	53.98 dBµV/m	-7.79 dB	Pass	0 Degree	2.28 m
3	10.917 GHz	47.28 dBµV/m	53.98 dBµV/m	-6.7 dB	Pass	0 Degree	2.28 m

Radiated emissions under normal conditions according to FCC Part 15b

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Applicant:	BIOTRONIK SE & Co. KG
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Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 23°C, Unom: 120 V AC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3m
Mode:	configuration 2
Test Date:	2018-09-27
Note:	

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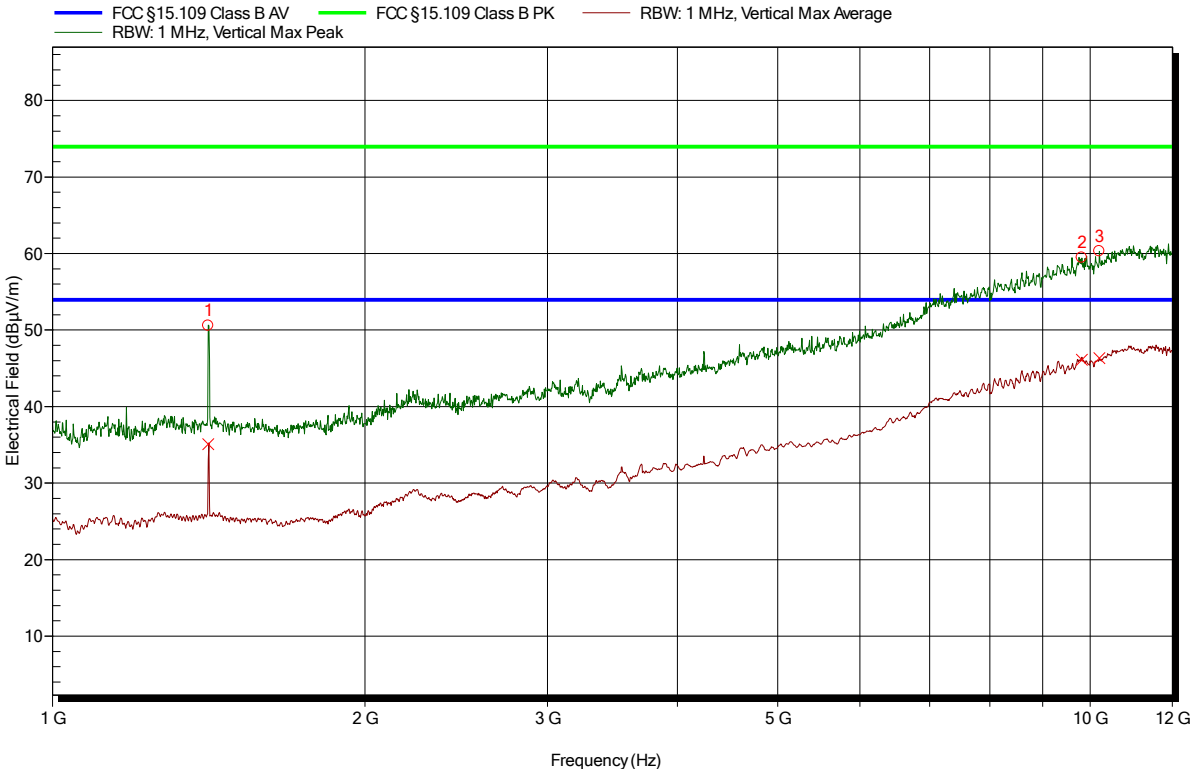


Peak Number	Frequency	Peak	Angle	Height
1	1.414 GHz	Second harmonic LTE Cat-M1 band 12		
2	9.812 GHz	59.44 dBµV/m	0 Degree	3.54 m
3	10.201 GHz	60.31 dBµV/m	0 Degree	3.54 m

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height
1	1.414 GHz	35.09 dBµV/m	Second harmonic LTE Cat-M1 band 12			0 Degree	3.54 m
2	9.812 GHz	46.13 dBµV/m	53.98 dBµV/m	-7.85 dB	Pass	0 Degree	3.54 m
3	10.201 GHz	46.33 dBµV/m	53.98 dBµV/m	-7.65 dB	Pass	0 Degree	3.54 m

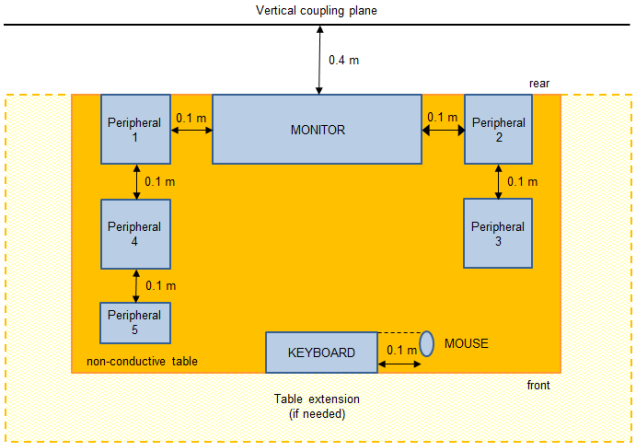
2.2 Test Conditions and Results - Conducted emissions acc. to ANSI C63.4

2.2.1 Information

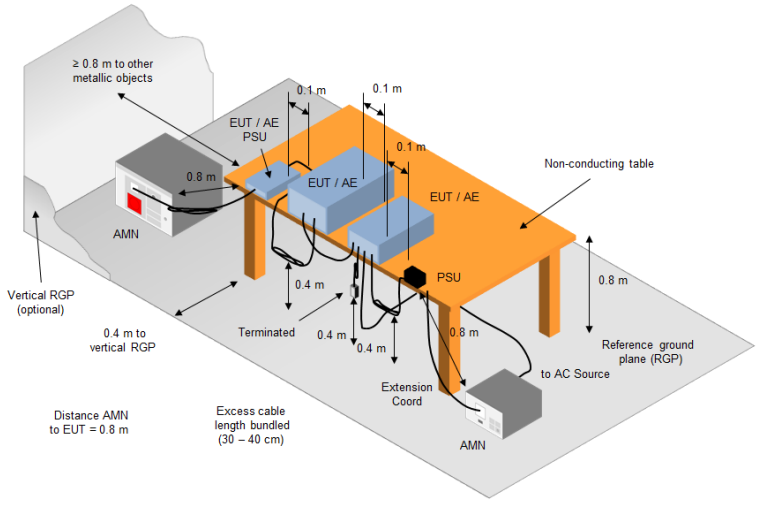
Test Information	
Reference	FCC 15.107, ICES-003, 8, 6.2
Reference method	ANSI C63.4:2014 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class B
Equipment type	Table top
Temperature [°C]	24 °C
Humidity [%]	40 %
Operator	Manuel Engel
Date	2018-09-27

2.2.2 Setup

Equipment placement



Test Setup



2.2.3 Equipment

Test Equipment					
Manufacturer	Description	Model	Identifier	Cal. Date	Cal. Due
R&S	AMN	ESH3-Z5	EF00036	2017-01	2019-01
R&S	Pulse Limiter	ESH3-Z2	EF01063	2018-07	2019-07
R&S	EMI Test Receiver	ESR 7	EF00943	2018-07	2019-07

2.2.4 Procedure

Exploratory measurement
1. The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1)
2. The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
3. The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length).
4. The LISN measurement port was connected to a measurement receiver
5. I/O cables were bundled not longer than 0.4 m
6. Measurement was performed in the frequency range 0.15 – 30MHz on each current-carrying conductor
7. To maximize the emissions the cable positions were manipulated
8. The worst configuration of EUT and cables is shown on a test setup picture at item 1.3

Final measurement
1. The EUT was placed on a non conductive table 0.8 m above the reference ground plane and 0.4 m away from the vertical conducting plane (ANSI C63.4: 2014 item 7.3.1)
2. The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
3. The distance between the outer edge of the EUT and the LISN shall be set to 0.8 m. A longer power cord shall be bundled to this length (bundling shall not exceed 40 cm in length).
4. The LISN measurement port was connected to a measurement receiver
5. The EUT and cable arrangement were based on the exploratory measurement results
6. The test data of the worst-case conditions were recorded and shown on the next pages

2.2.5 Limits

Class B		
Frequency [MHz]	Quasi-peak Limit [dBµV]	Average Limit [dBµV]
0.15 - 0.5	66 - 56 *	56 - 46 *
0.5 - 5	56	46
5 - 30	60	50
* Decreases with the logarithm of the frequency		

2.2.6 Results

AC power line conducted emissions					
Port	Coupling	Operational mode	EUT Configuration	Verdict	Remark
Power	AMN	1	1,2	PASS	

2.2.8 Records

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

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 24°C, Unom: AC/DC adapter 120 V
LISN:	ESH3-Z5 (L)
Mode:	configuration 2, worst case LTE band 12
Test Date:	2018-09-27
Note:	

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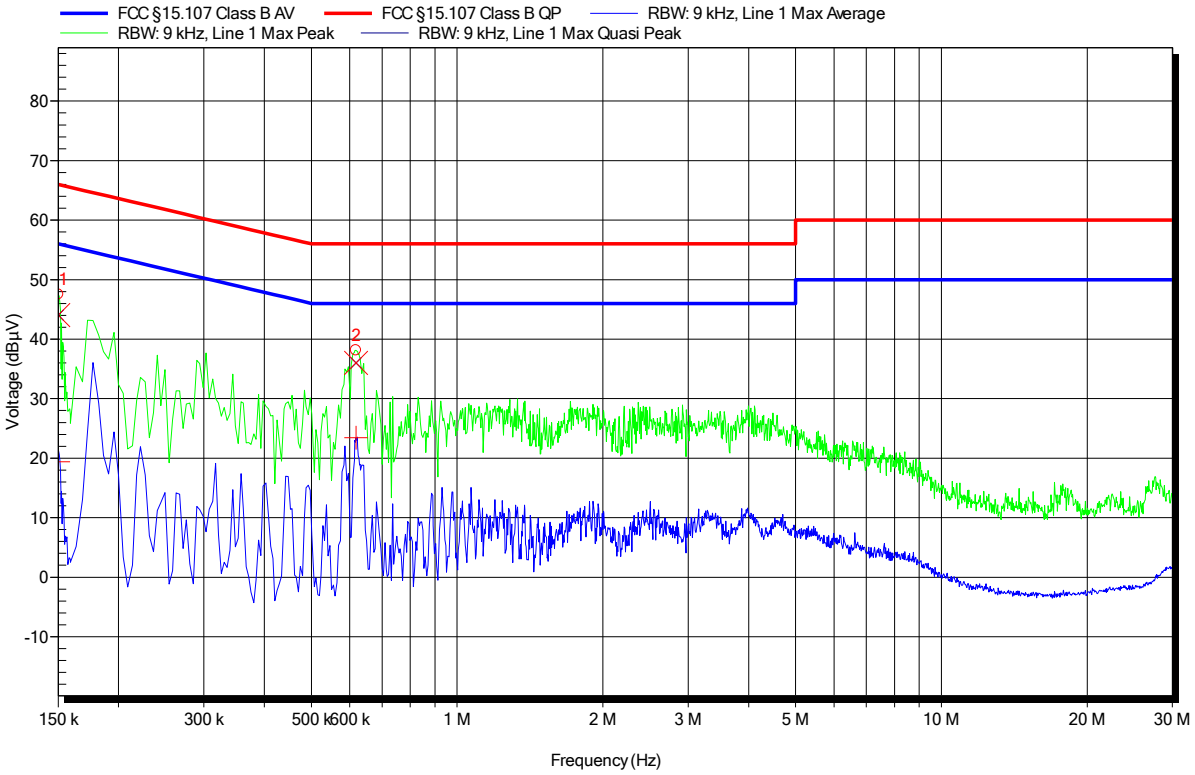

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	150 kHz	44.05 dBµV	66 dBµV	-21.95 dB	Pass
2	618 kHz	35.99 dBµV	56 dBµV	-20.01 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	150 kHz	19.39 dBµV	56 dBµV	-36.61 dB	Pass
2	618 kHz	23.44 dBµV	46 dBµV	-22.56 dB	Pass

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

Project number: G0M-1809-7680

Applicant:	BIOTRONIK SE & Co. KG
EUT Name:	CardioMessenger Smart
Model:	CardioMessenger Smart 4G
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Engel
Test Conditions:	Tnom: 24°C, Unom: AC/DC adapter 120 V
LISN:	ESH3-Z5 (N)
Mode:	configuration 2, worst case LTE band 12
Test Date:	2018-09-27
Note:	

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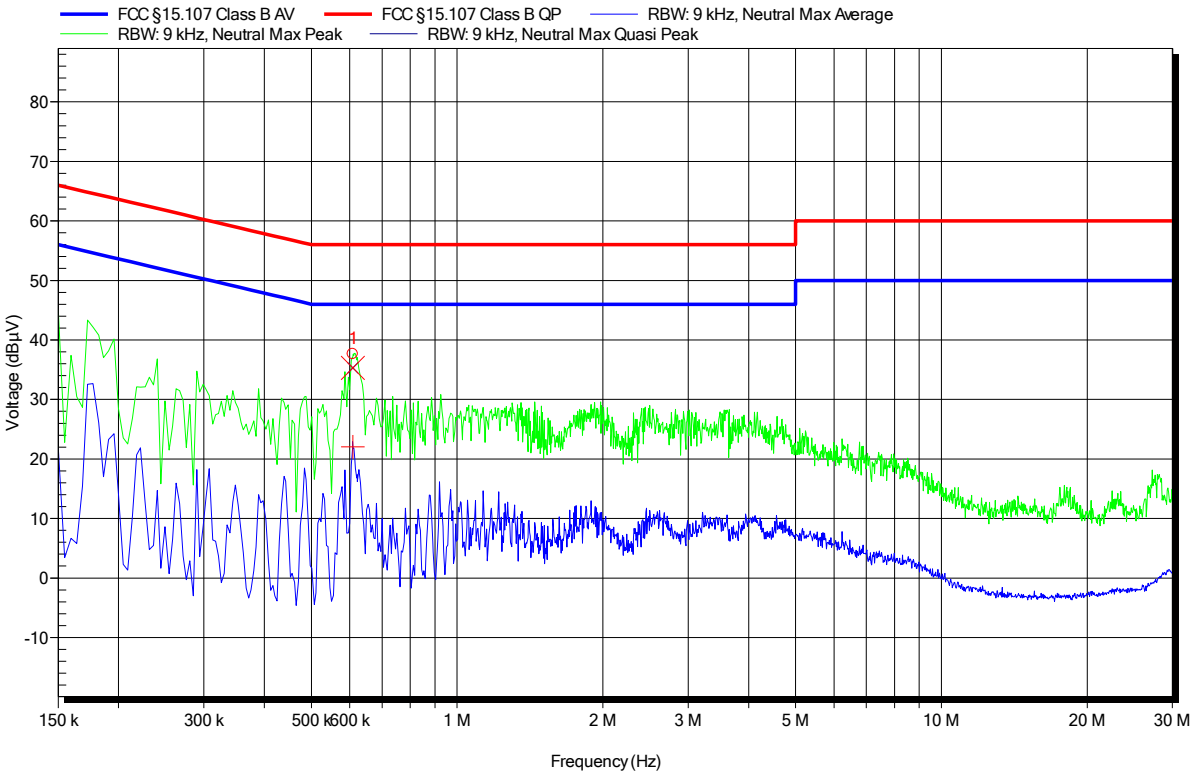

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	609 kHz	35.3 dBµV	56 dBµV	-20.7 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	609 kHz	22.02 dBµV	46 dBµV	-23.98 dB	Pass