



EUROFINS PRODUCT SERVICE GMBH



Testing Cert #1983.01

RADIO TEST- REPORT

Compliance Test Report

**Medical Device Radiocommunication Service (MedRadio)
FCC 47 CFR Part 95E & 95I & 15B
RSS 243 Issue 3 & RSS Gen Issue 3**

CardioMessenger II

CM II with G24-L

**FCC ID: QRICMII
IC: 4708A-CMII**

TEST REPORT NUMBER: G0M-1106-1164-C-1



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Germany

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1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

Eurofins Product Service GmbH is not responsible for any generalisations and conclusions drawn from this report. Any modification of the test item can lead to invalidity of test results and this test report may therefore be not applicable to the modified test item.

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Operator:

12.10.2011

C. Weber



Date

Eurofins-Lab.

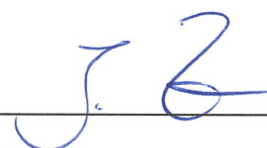
Name

Signature

Technical responsibility for area of testing:

12.10.2011

J. Zimmermann



Date

Eurofins

Name

Signature

1.2 Testing laboratory

EUROFINS PRODUCT SERVICE GMBH
Storkower Strasse 38c
D-15526 Reichenwalde b. Berlin
Germany
Telefon : +49 33631 888 00
Telefax : +49 33631 888 660

DAR ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-268/08

RECOGNIZED NOTIFIED BODY EMC
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

RECOGNIZED NOTIFIED BODY R&TTE
REGISTRATION NUMBER: BNetzA-bS-02/51-53

FCC FILED TEST LABORATORY
REG.-No. 96970

A2LA ACCREDITED TESTING LABORATORY
CERTIFICATE NO. 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

INDUSTRY CANADA FILED TEST LABORATORY
REG. No. IC 3470

Test location, where different:

Name	: ./.
Street	: ./.
Town	: ./.
Country	: ./.
Telephone	: ./.
Fax	: ./.

1.3 Details of approval holder

Name	: BIOTRONIK SE & Co. KG
Street	: Woermannkehre 1
Town	: 12359 Berlin
Country	: Germany
Telephone	: +49 30 68905 1213
Fax	: +49 30 68905 5409
Contact	: Herr Gunnar Börsch

1.4 Application details

Date of receipt of application	: 09.06.2011
Date of receipt of test item	: 09.06.2011
Date of test	: 30.06.2011

1.5 Test item

Description of test item	: CardioMessenger II
Type identification	: CM II with G24-L
Hardware Version	: CardioMessenger II (CE): DMR 356073 (with G24-L) CardioMessenger II LLT (CA): DMR 358226 (with G24-L) CardioMessenger II LLT (US): DMR 359592 (with G24-L)
Software Version	: 0.6X
Equipment type	: End product

Technical data

Frequency range	: 402 - 405MHz
Number of channels	: 9
Channel spacing	: 300kHz
Assigned frequency band	: 402 – 405MHz, Power limit: 25µW e.i.r.p.
Tested frequencies	: F ₁ 402.45MHz F ₂ 403.65MHz F ₃ 404.85MHz
Antenna	: integrated, antenna diversity
Number of antennas	: 2
Antenna gain(s)	: 0dBi
Duty cycle	: N/A (LTB is used for channel selection)
Spectrum access	: LBT (Listen before transmit)
Modulations	: 2GSK
Supply voltage	: 3.7VDC (Lithium-Battery)

Manufacturer:
(if applicable)

Name	: BIOTRONIK SE & Co. KG
Street	: Woermannkehre 1
Town	: 12359 Berlin
Country	: Germany

1.6 Test standards

Technical standard	: ☒	FCC 47 CFR Part 95E, most current CFR (eCFR) Personal Radio Services, Technical Regulations
	☒	FCC 47 CFR Part 95I, most current CFR (eCFR) Medical Device Radiocommunication Service (MedRadio)
	☒	FCC 47 CFR Part 15B, most current CFR (eCFR) Unintentional Radiators
	☒	IC RSS 243 Issue 3 February 2010 Medical Devices Operating in the 401-406MHz Frequency Band
	☒	IC RSS Gen Issue 3 December 2010 General Requirements and Information for the Certification of Radio Apparatus

1.7 Additional information

The GSM module also integrated into the device has been replaced. All former results except spurious emissions are considered unaffected by this modification.

1.8 Acronyms and Abbreviations

EUT	: Equipment under Test
TX	: Transmission
RX	: Reception
RBW	: Measurement Resolution Bandwidth
Pol	: Measurement Polarization
e.i.r.p.	: Equivalent isotropic radiated power
T _{nom}	: Nominal Temperature
T _{min}	: Minimum Temperature
T _{max}	: Maximum Temperature
V _{nom}	: Nominal Supply Voltage
V _{min}	: Minimum Supply Voltage
V _{max}	: Maximum Supply Voltage
VDC	: DC voltage
N/A	: Not applicable

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified in 2.4 were ascertained in the course of the tests performed.



2.2 Test environment

Temperature : 22 ... 26°C

Relative humidity content : 20 ... 75%

Air pressure : 86 ... 103kPa

Extreme conditions parameters:

V_{nom} : 3.7VDC
 V_{min} : --
 V_{max} : --

T_{nom} : 25°C
 T_{min} : --
 T_{max} : --

Other parameter: None

2.3 Test equipment utilized

Measurement Equipment List					
No.	Measurement device:	Type:	Manufacturer:	Last Cal.	Next Cal.
ETS 0086	Semi-anechoic chamber	AC1	Frankonia	09.12.2010	09.12.2012
ETS 0253	Spectrum Analyzer	FSIQ26	Rohde & Schwarz	04.11.2010	04.11.2012
ETS 0030	Biconical Antenna	HK 116	Rohde & Schwarz	10.02.2011	20.02.2012
ETS 0295	LPD Antenna	HL 223	Rohde & Schwarz	09.02.2011	09.02.2012
ETS 0018	Horn Antenna	BBHA 9120D	Schwarzbeck	26.08.2010	26.08.2011
ETS 0432	Amplifier-Matrix			02.06.2010	02.06.2012
ETS 0496	Spectrum Analyzer	FSP30	Rohde & Schwarz	26.08.2010	26.08.2011
ETS 0497	Power Meter	NRVD	Rohde & Schwarz	28.02.2011	28.02.2013
ETS 0278	Power Sensor	NRV-Z31	Rohde & Schwarz	25.11.2010	25.11.2012
ETS 0288	LISN	ESH2-Z5	Rohde & Schwarz	07.09.2010	07.09.2012

2.4 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

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

2.5 Test results

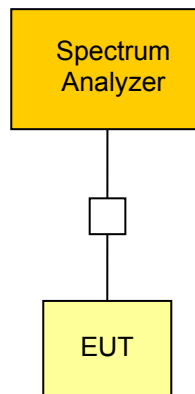
Test case	Clause	Required	Result	Remarks
INFORMATIONAL TRANSMITTER PARAMETERS				
Occupied Bandwidth	RSS-243 3.2 RSS-Gen 4.6.1	☒		
TRANSMITTER PARAMETERS				
Frequency stability	95.628(e) RSS-243 3.3 RSS-243 5.3 RSS-Gen 4.7	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Emission bandwidth	95.628(a)(6)(i) 95.628(d) 95.633(e) RSS-243 3.6	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Effective radiated power	95.639(f) RSS-243 5.4	☒	PASS	
Transmitter spurious emissions	95.635(d) RSS-243 3.4 RSS-243 5.5 RSS-Gen 4.9	☒	PASS	
AC powerline conducted emissions	15.107 15.207 RSS-Gen 7.2.4	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
RECEIVER PARAMETERS				
Receiver (unintentional) spurious emissions	15.109 RSS-243 3.5 RSS-243 5.6 RSS-Gen 4.10 RSS-Gen 6.1	☒	PASS	
MONITORING PARAMETERS				
LBT threshold power level	95.628(a)(3) RSS-243 3.6 RSS-243 5.7.1	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Monitoring system bandwidth	95.628(a)(1) RSS-243 3.6 RSS-243 5.7.2	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Monitoring system scan cycle time	95.628(a)(2) RSS-243 3.6 RSS-243 5.7.3	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Minimum channel monitoring period	95.628(a)(2) RSS-243 3.6 RSS-243 5.7.4	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Channel access	95.628(a)(4) RSS-243 3.6 RSS-243 5.7.5	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Discontinuation of MICS session	95.628(a)(4) RSS-243 3.6 RSS-243 5.7.6	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47
Use of pre-scanned alternative channel	95.628(a)(5) RSS-243 3.6 RSS-243 5.7.7	☐	N/A	Test results unaffected by modification. See G0M20512-0062-T-47

3 Transmitter parameters

3.1 Occupied Bandwidth

According to IC RSS-243 Section 3.2 the 99% emission bandwidth occupied by the modulated transmitted signal has to be measured as outlined in RSS-Gen 4.6.1.

3.1.1 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode with maximum power under normal test conditions. The span of the analyzer is set wide enough to capture all significant emissions of the modulation spectrum. The resolutions bandwidth is set as close as possible to 1% of the selected span without being below 1%. The occupied bandwidth is then measured evaluated by an internal measurement procedure of the analyzer.

3.1.2 Results

Transmitter occupied bandwidth			
Measurement Conditions			
Power occupation :		99%	
Channel [MHz]	Lower edge frequency [MHz]	Upper edge frequency [MHz]	Occupied Bandwidth [kHz]
403.65	403.5384	403.7688	144

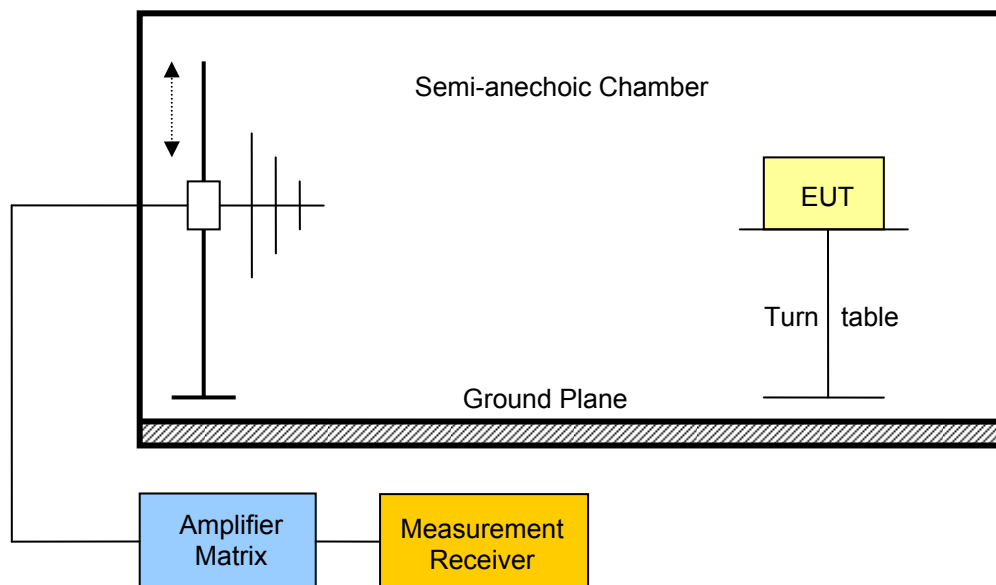
3.2 Equivalent isotropic radiated power

According to FCC 47 CFR 95§639(f) and IC RSS-243 Section 5.4 the maximum effective isotropic radiated power has to be verified.

3.2.1 Limits

Equivalent isotropic radiated power limit
$\leq 25\mu\text{W}$ (-16dBm) e.i.r.p.

3.2.2 Measurement procedure



The EUT is placed on a turn table inside a fully anechoic chamber and activated with normal modulation and highest power level. First the duty cycle of the signal is measured via a spectrum analyzer connected to the measurement antenna. Then the transmitted power is measured by the measurement antenna and a wideband power meter connected to the measurement antenna. The maximum emission is obtained by rotating the EUT through 360°. The measurement procedure is performed for both polarizations of the measurement antenna. The highest power value measured is corrected by the duty cycle and recorded.

3.2.3 Results

Equivalent isotropic radiated power	
Channel [MHz]	Transmitter Power [dBm/ μ W] e.i.r.p.
402.45	-18.3 / 14.79 (antenna 1)
402.45	-16.5 / 22.39 (antenna 2)
Verdict	
PASS	

3.3 Transmitter radiated spurious emissions

The transmitter unwanted emission shall be verified according to FCC 47 CFR 15§635(d) and IC RSS-243 Section 3.4 & 5.5.

3.3.1 Limits

Emissions from a MedRadio transmitter more than 250 kHz outside of the 402–405 MHz band shall be attenuated to a level no greater than the following field strength limits:

Transmitter out-of-band spurious emission limits				
Frequency range [MHz]	Detector	Limit [$\mu\text{V/m}$]	Calculated Limit 3m [dB $\mu\text{V/m}$]	Measurement 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

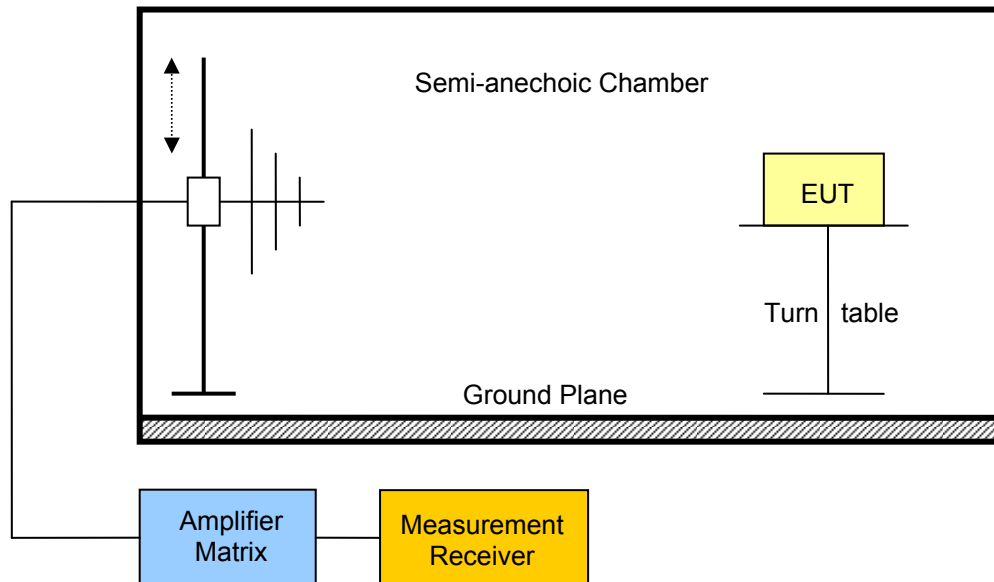
The following in-band and band-edge condition apply:

Emissions within the 402-405 MHz MICS band which are more than 150 kHz away from the centre frequency of the spectrum, and the transmissions that occupy up to 250 kHz above and below the band shall be attenuated at least 20 dB below the maximum transmitter output power. Compliance with this limit is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

The emissions from a MedRadio/MICS transmitter must be measured to at least the tenth harmonic of the highest fundamental frequency designed to be emitted by the transmitter.

3.3.2 Measurement procedure

The spurious emission measurement is performed on 3m a semi-anechoic test site.



The EUT is placed on a non-metallic table. Any emission is received by the measurement antenna and measured via a measurement receiver connected to the antenna. To obtain the maximum emission the EUT is rotated through 360°.

Due to practical reasons the spurious emission level check is first performed with a peak detector and the quasi-peak and average limits.

If any emission is detected that gets close to the emission limit the detector is changed and the quasi-peak or average detector is used. Which detector is used is determined by the emission frequency. If pulsed transmission is used, averaging over the pulse train is used.

The measurement values are also corrected to obtain the field strength values at the defined measurement distances of the emission limits.

The measurement is performed over the frequency range of 30MHz up to the tenth harmonic.

3.3.3 Results

Out-of-band transmitter radiated spurious emissions						
Measurement Conditions						
Measurement distance :		3m				
Modulated :		☒ Yes ☐ No				
Channel Frequency [MHz]	Emission Frequency [MHz]	Pol.	Measured Field Strength [dBµV/m]	Limit@3m [dBµV/m]	Detector	Margin [dB]
Antenna 1						
402.45MHz	401.75	v	42.2	46	peak	-3.8
	401.75	h	31.1	46	peak	-14.9
	405.25	v	38.0	46	peak	-8,0
	405.25	h	27.5	46	peak	-18.5
	808.1	v	38.5	46	peak	-7.5
Antenna 2						
402.45MHz	401.75	v	43.6	46	peak	-2.4
	401.75	h	34.7	46	peak	-11.3
	405.25	v	38.8	46	peak	-5.2
	405.25	h	35.2	46	peak	-10.8
	808.1	v	43.7	46	peak	-2.3
	808.1	h	31.7	46	peak	-14.3
See attached diagrams in Annex						
Verdict					PASS	

3.4 Receiver parameters

3.5 Receiver spurious emissions

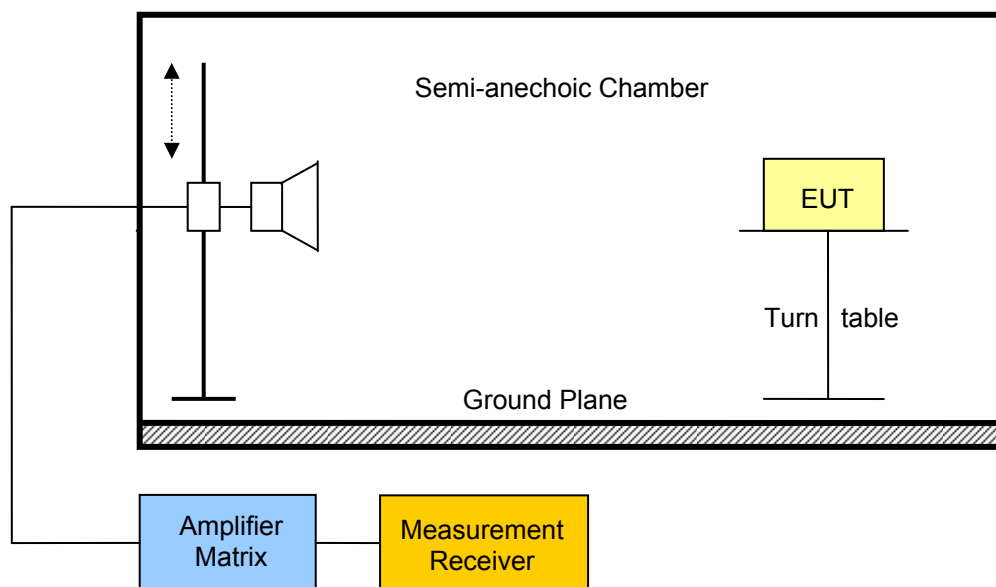
According FCC 47 CFR 15§109 and RSS-243 Section 3.5, RSS-Gen Section 4.10 & 6.1 the emission of unintentional radiators have to comply with limits stated in the rules.

3.5.1 Limits

Receiver (unintentional class B) spurious emission limits @ 3m				
Frequency range [MHz]	Detector	Limit@3m [$\mu\text{V/m}$]	Calculated Limit @ 3m [dB $\mu\text{V/m}$]	Measurement 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

3.5.2 Measurement procedure

The spurious emission measurement is performed on a 3m open area test site.



The eut is placed on a non-metallic table. Any emission is received by a loop antenna and measured via a measurement receiver connected to the loop antenna. To obtain the maximum emission the eut is rotated through 360°.

Due to practical reasons the spurious emission level check is first performed with a peak detector and the quasi-peak and average limits.

If any emission is detected that gets close to the emission limit the detector is changed and the quasi-peak or average detector is used. Which detector is used is determined by the emission frequency. If pulsed transmission is used, averaging over the pulse train is used.

The measurement values are also corrected to obtain the field strength values at the defined measurement distances of the emission limits.

The measurement is performed over the frequency range of 30MHz up to the 3rd harmonic.

3.5.3 Results

Receiver (unintentional) spurious emissions							
Measurement Conditions							
Measurement distance :		3m					
Channel Frequency [MHz]	Emission Frequency [MHz]	Pol.	Measured Field Strength [dBμV/m]	Field Strength [μV/m]	Limit@3m [μV/m]	Detector	Margin [μV/m]
403.64	729.058	V	25.68	21.58	150	Peak	-128.42
See attached diagrams in Annex							
Verdict						PASS	

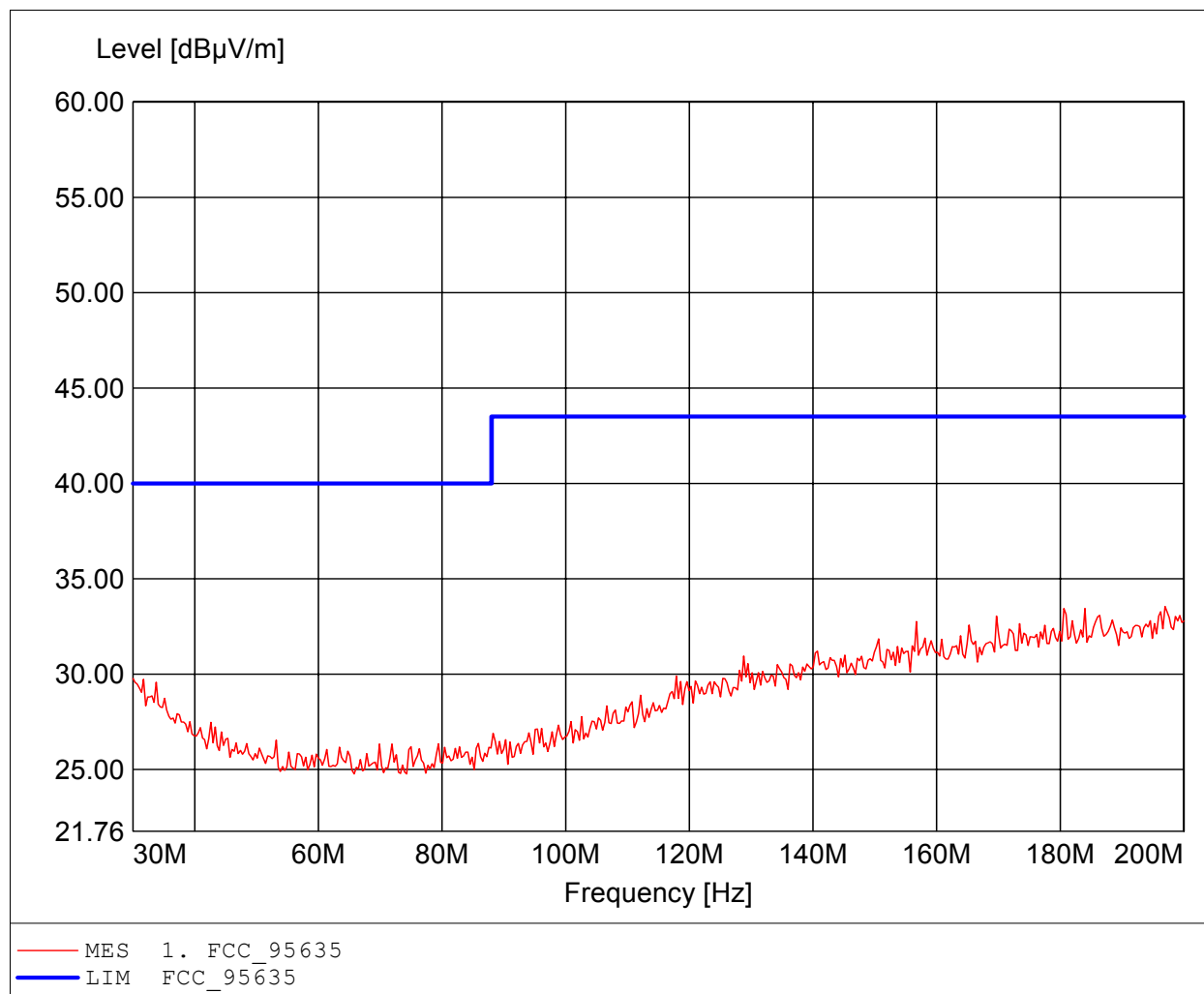
* **Note** : The stated emission level corresponds to noise floor. The EUT emits no spurious emissions.

Annex B Transmitter spurious emissions

Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

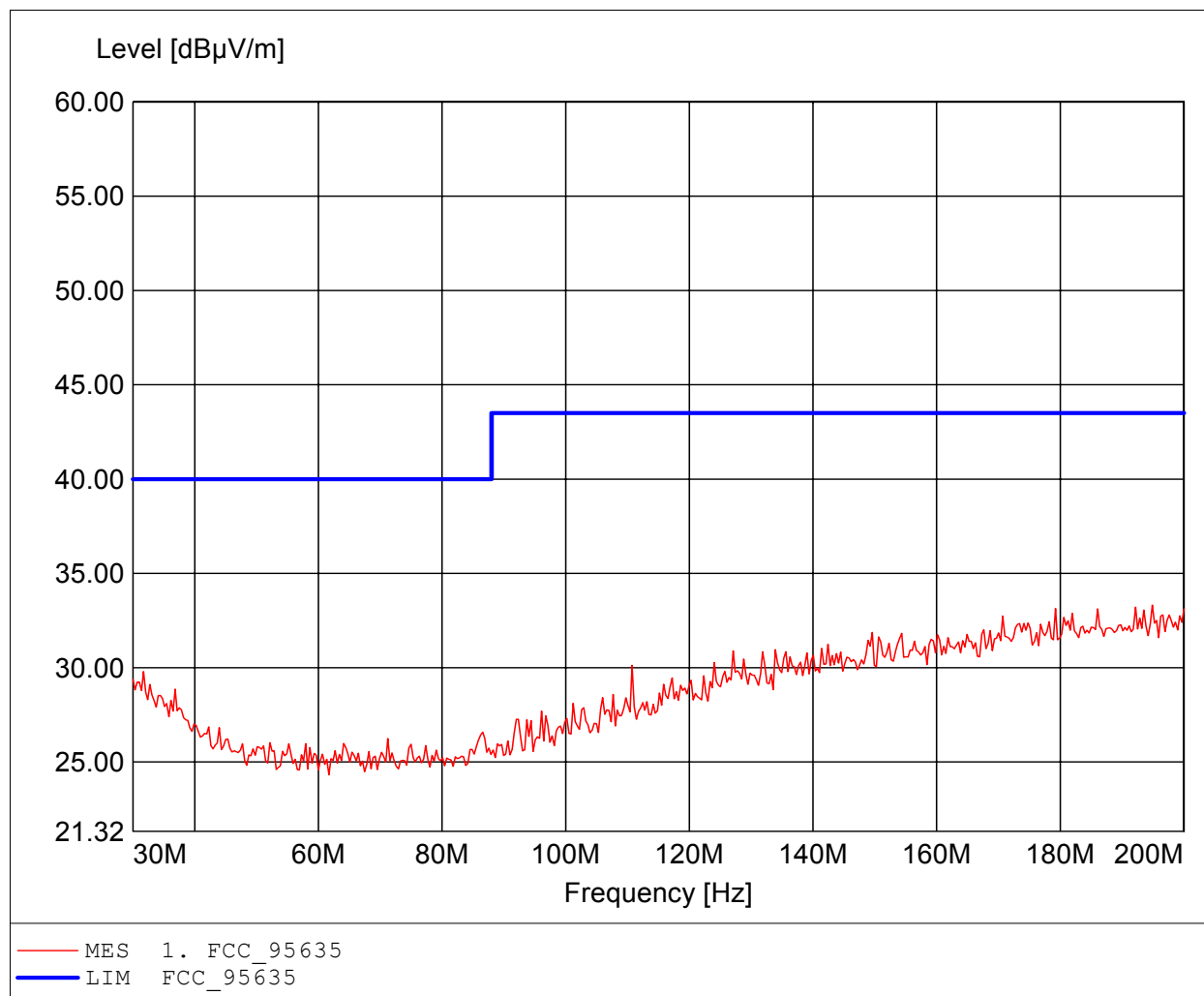
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 196.934MHz, Emax: 33.54dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

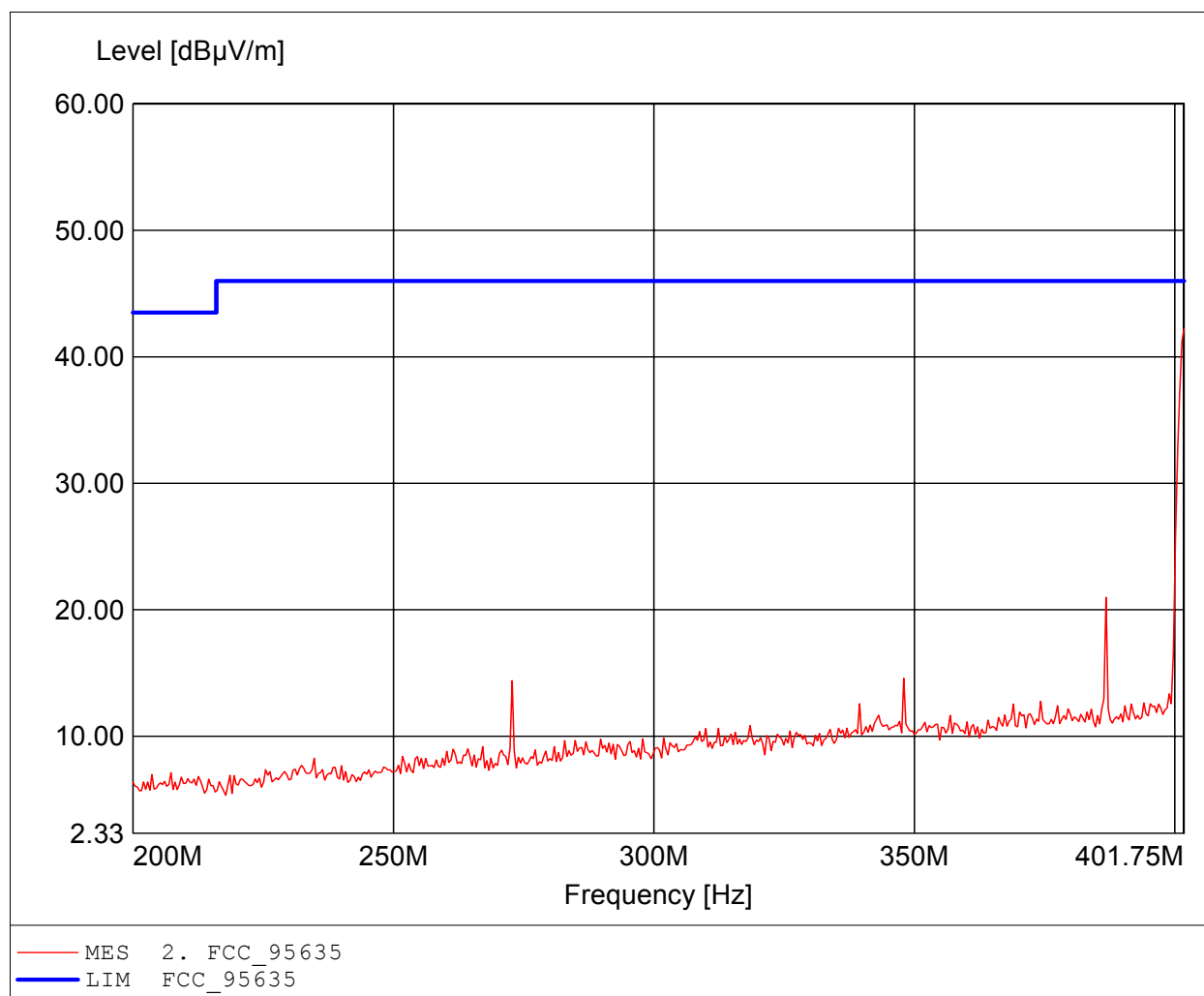
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 194.890MHz, Emax: 33.31dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

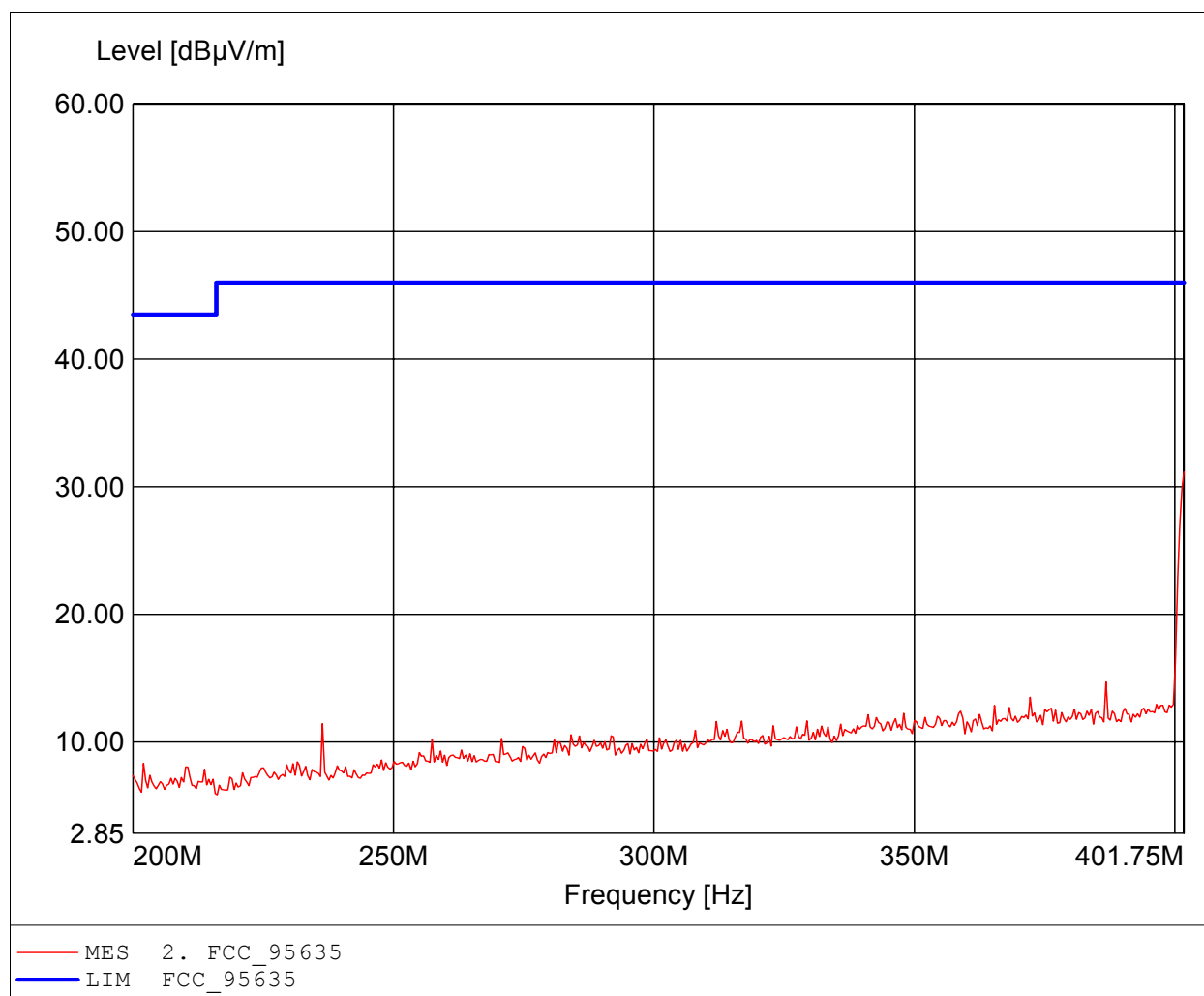
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 401.750MHz, Emax: 42.20dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

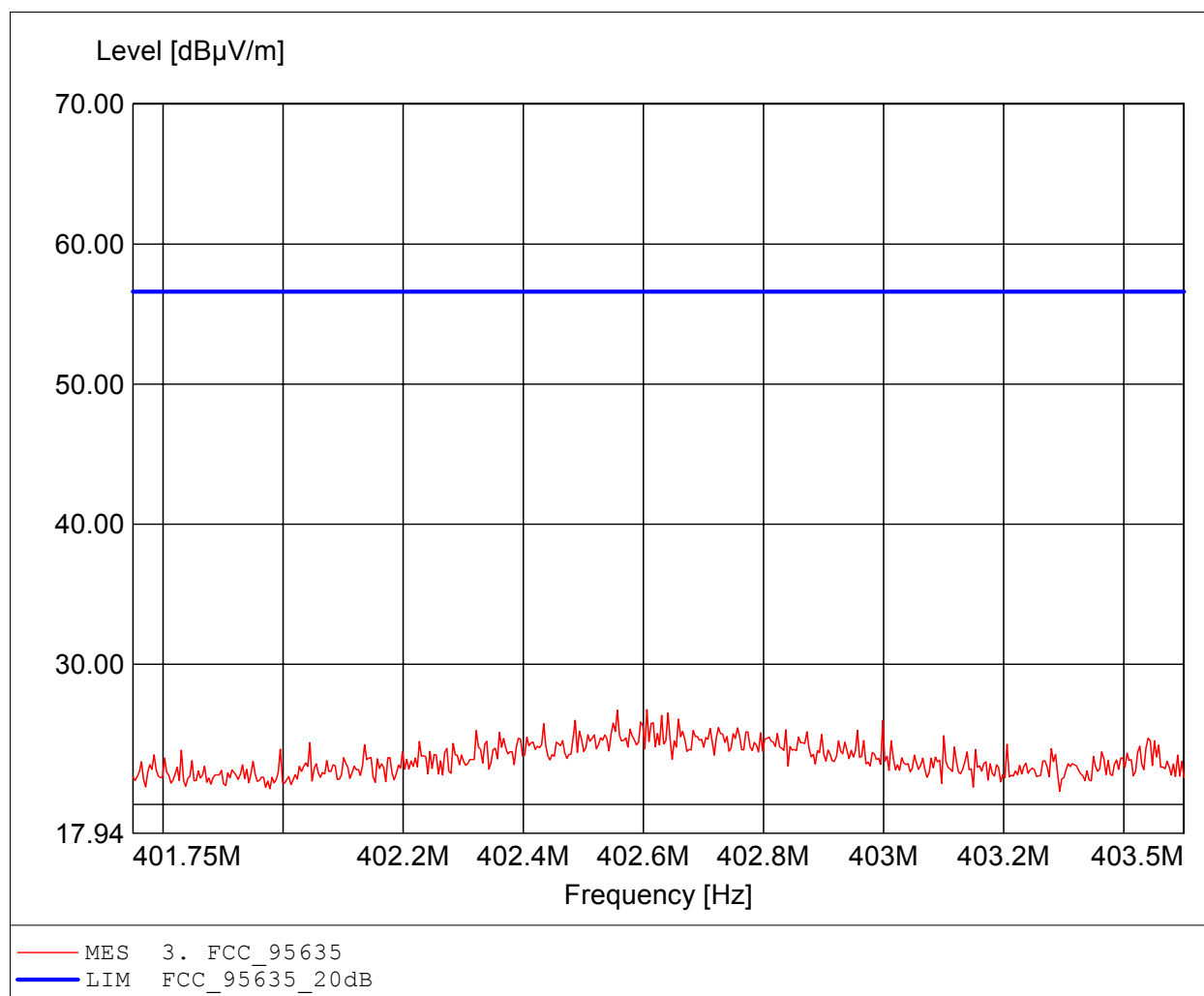
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 401.750MHz, Emax: 31.15dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

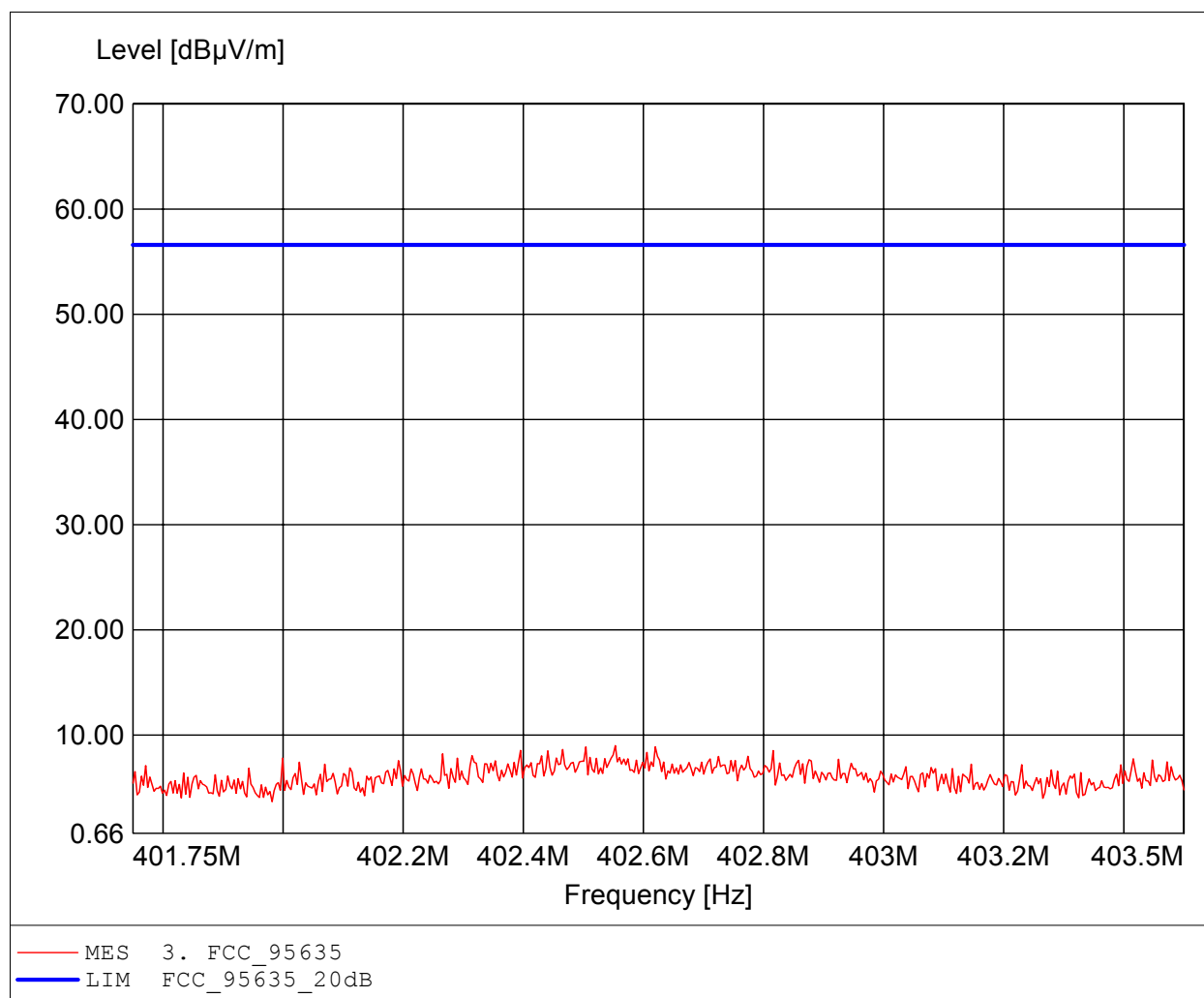
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 402.606MHz, Emax: 26.76dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

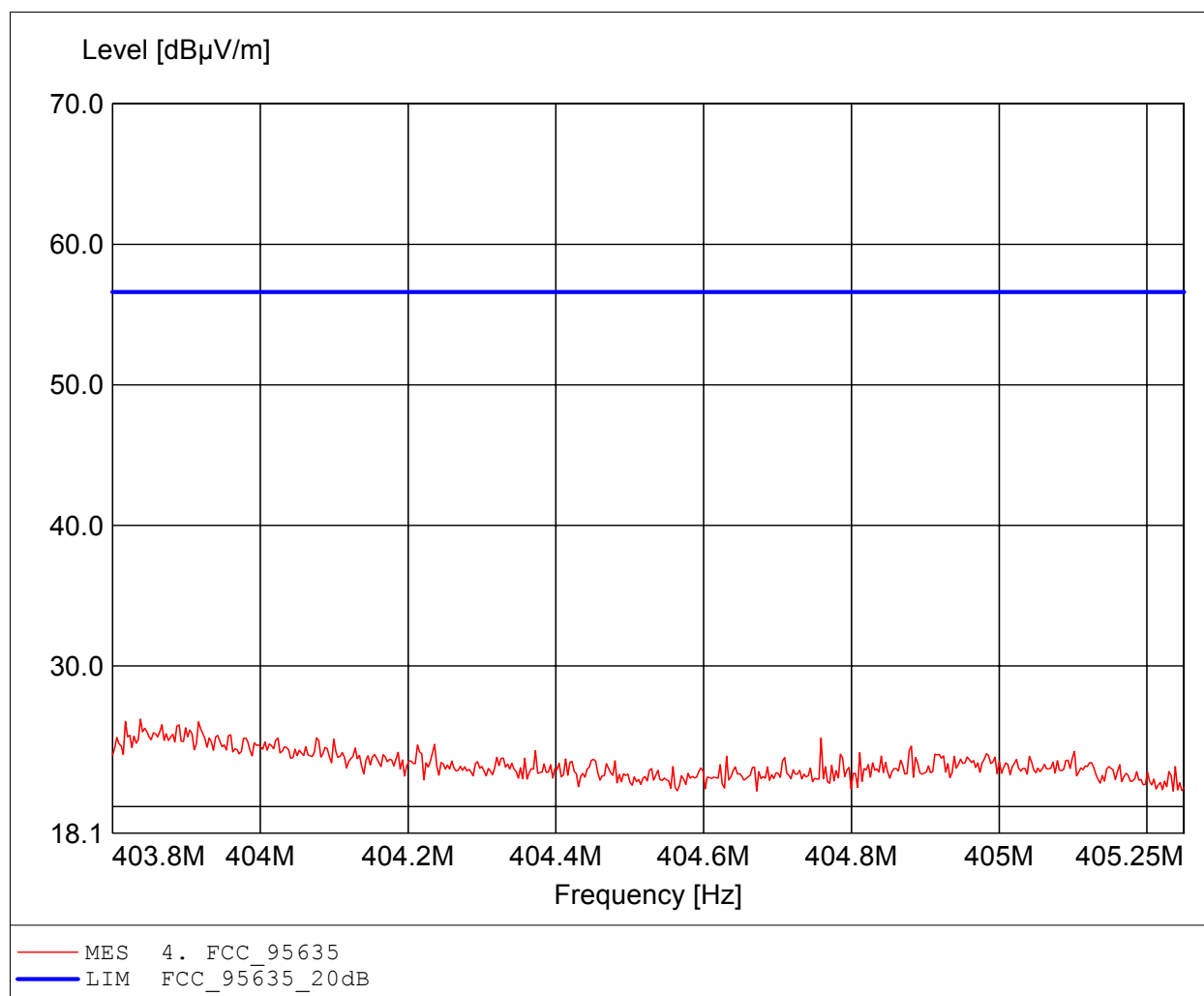
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 402.553MHz, Emax: 8.99dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

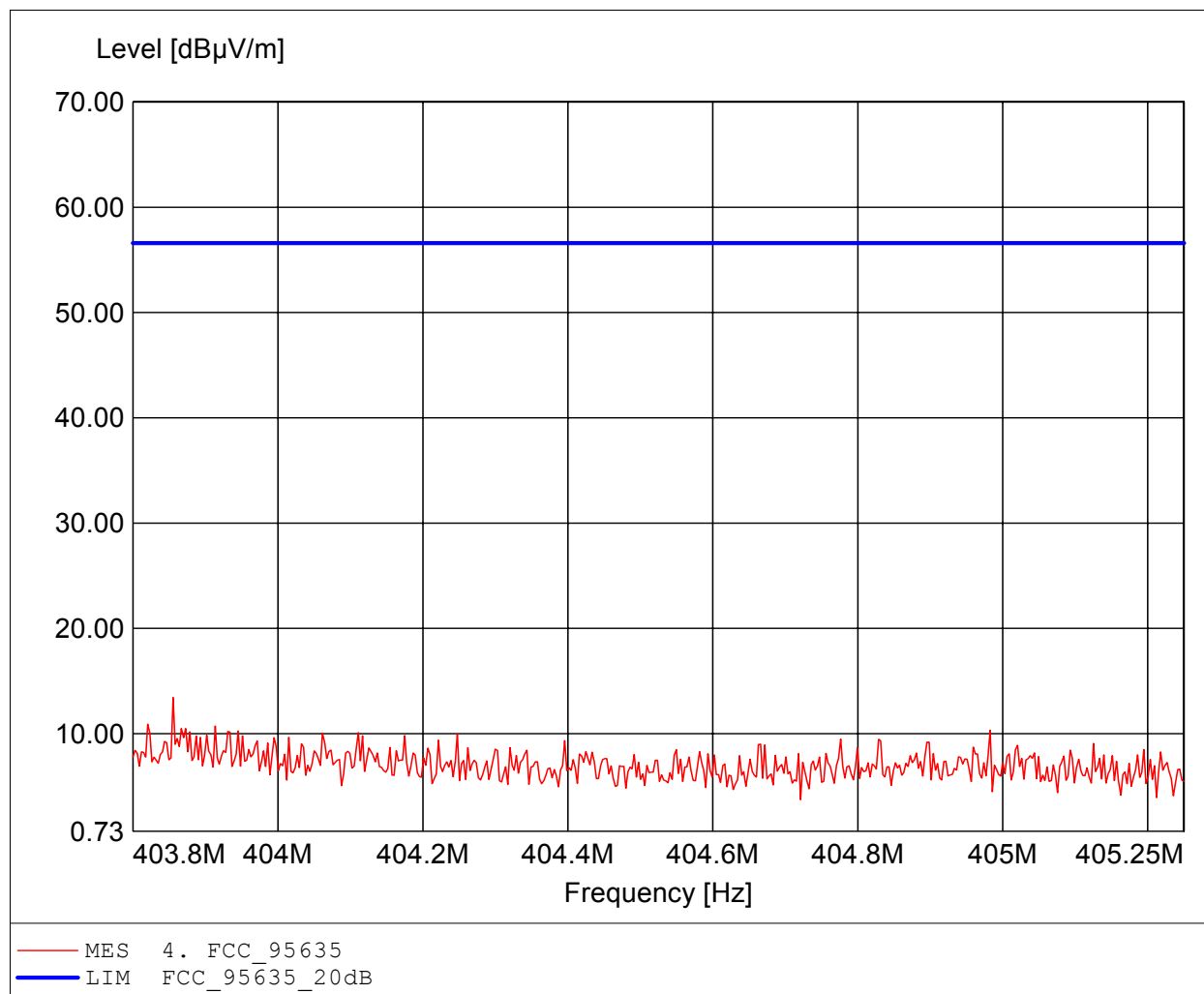
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 403.838MHz, Emax: 26.21dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

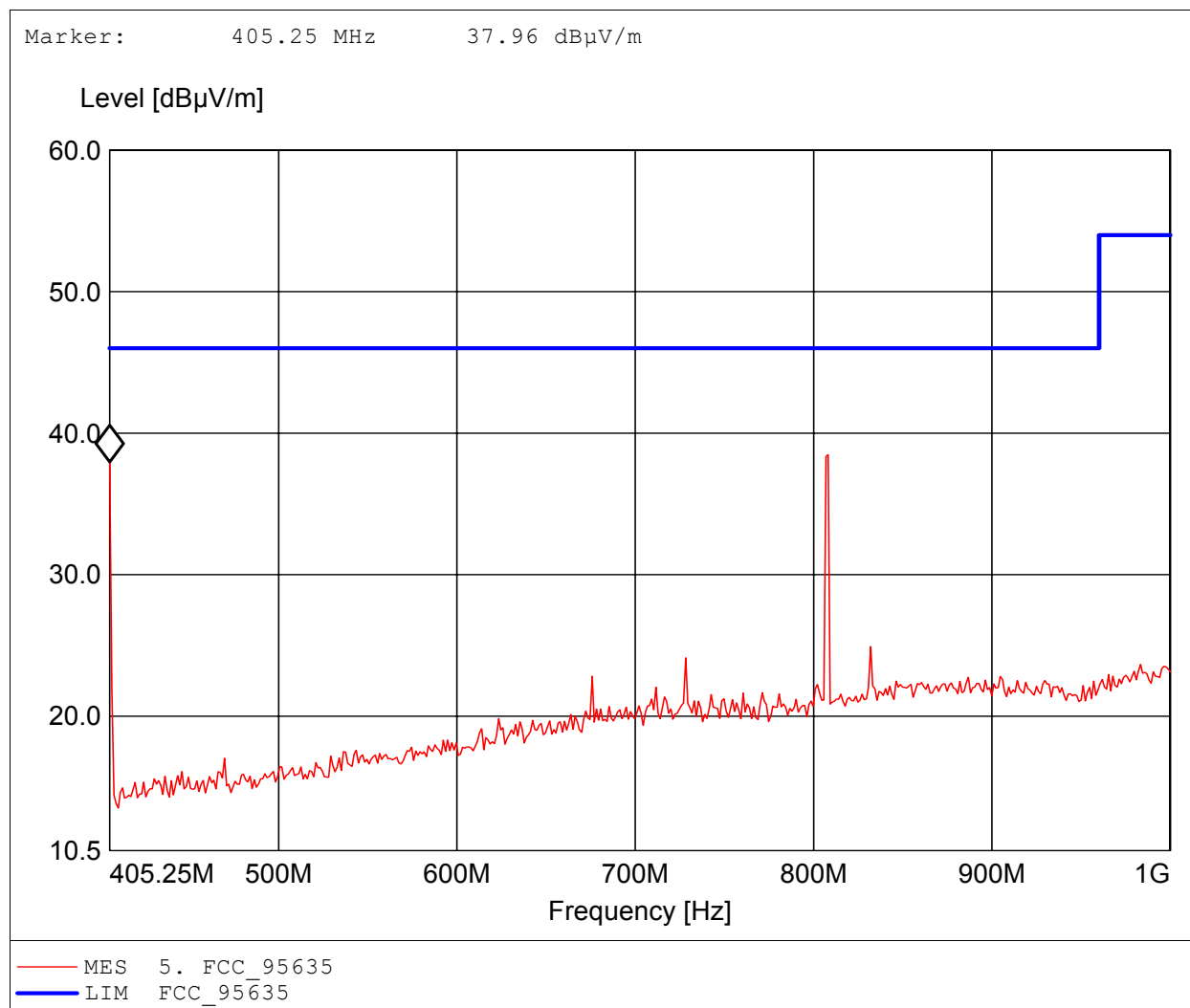
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 403.855MHz, Emax: 13.43dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

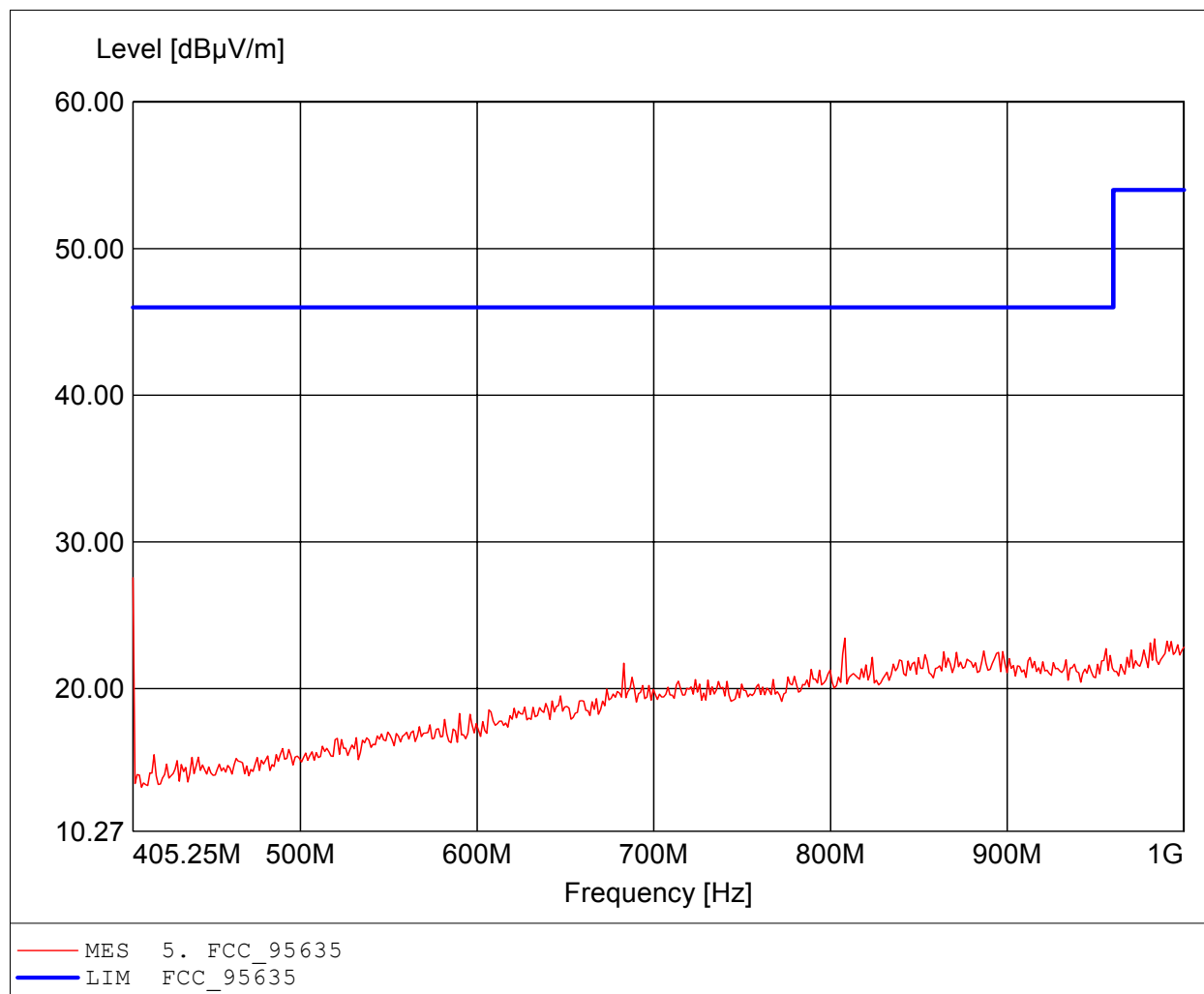
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 808.107MHz, Emax: 38.47dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

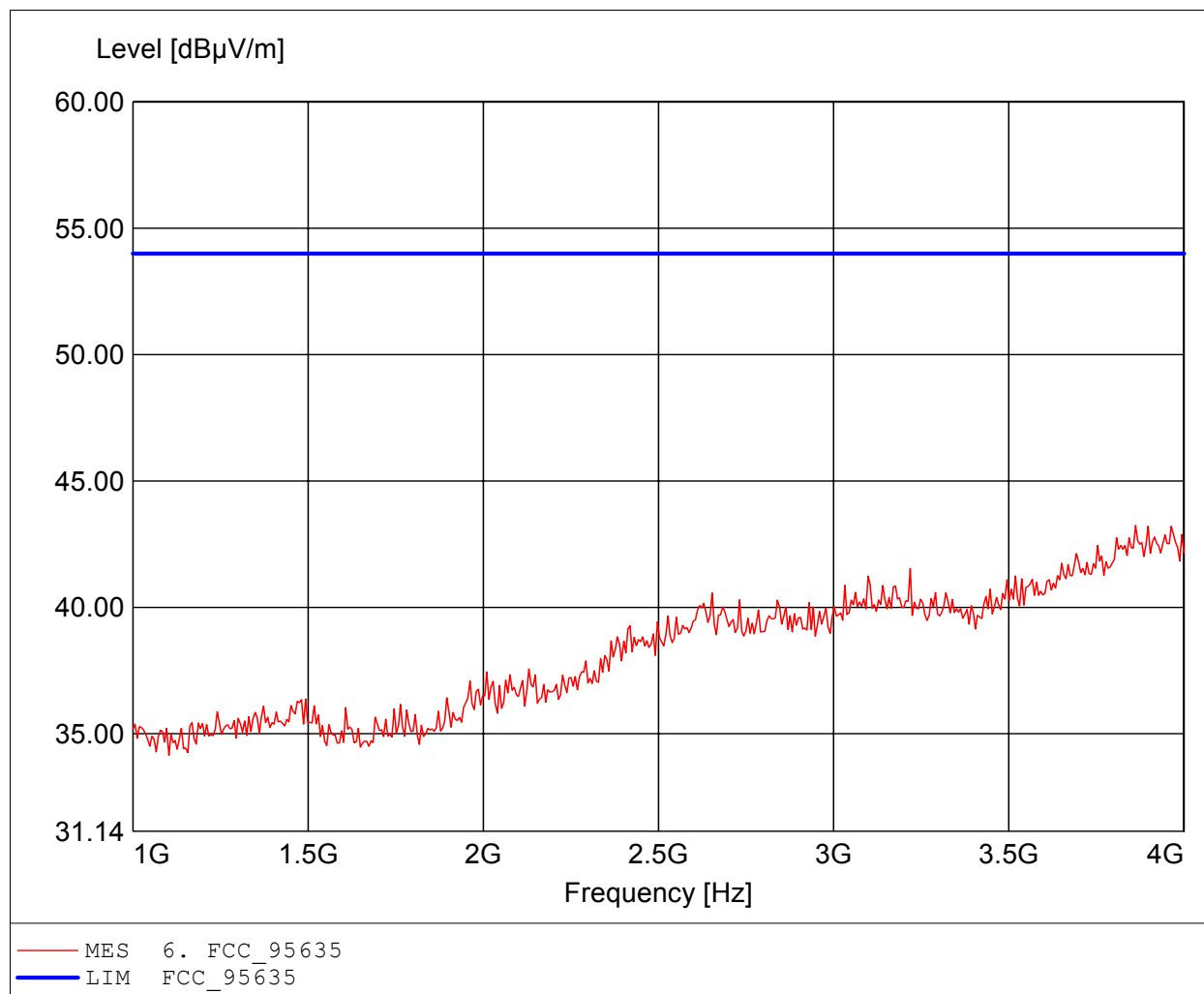
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 405.250MHz, Emax: 27.55dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

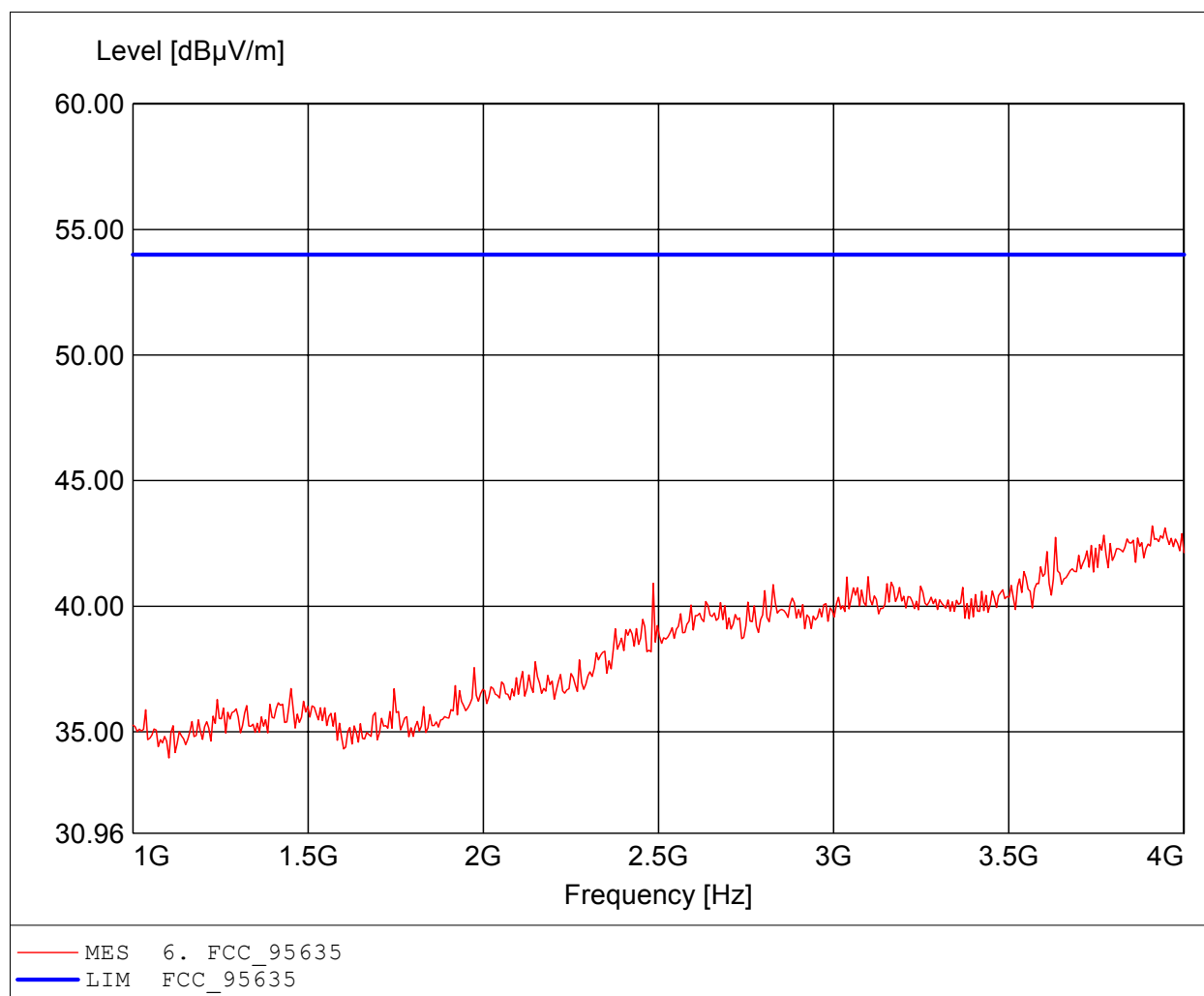
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 3.862GHz, Emax: 43.24dBuV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

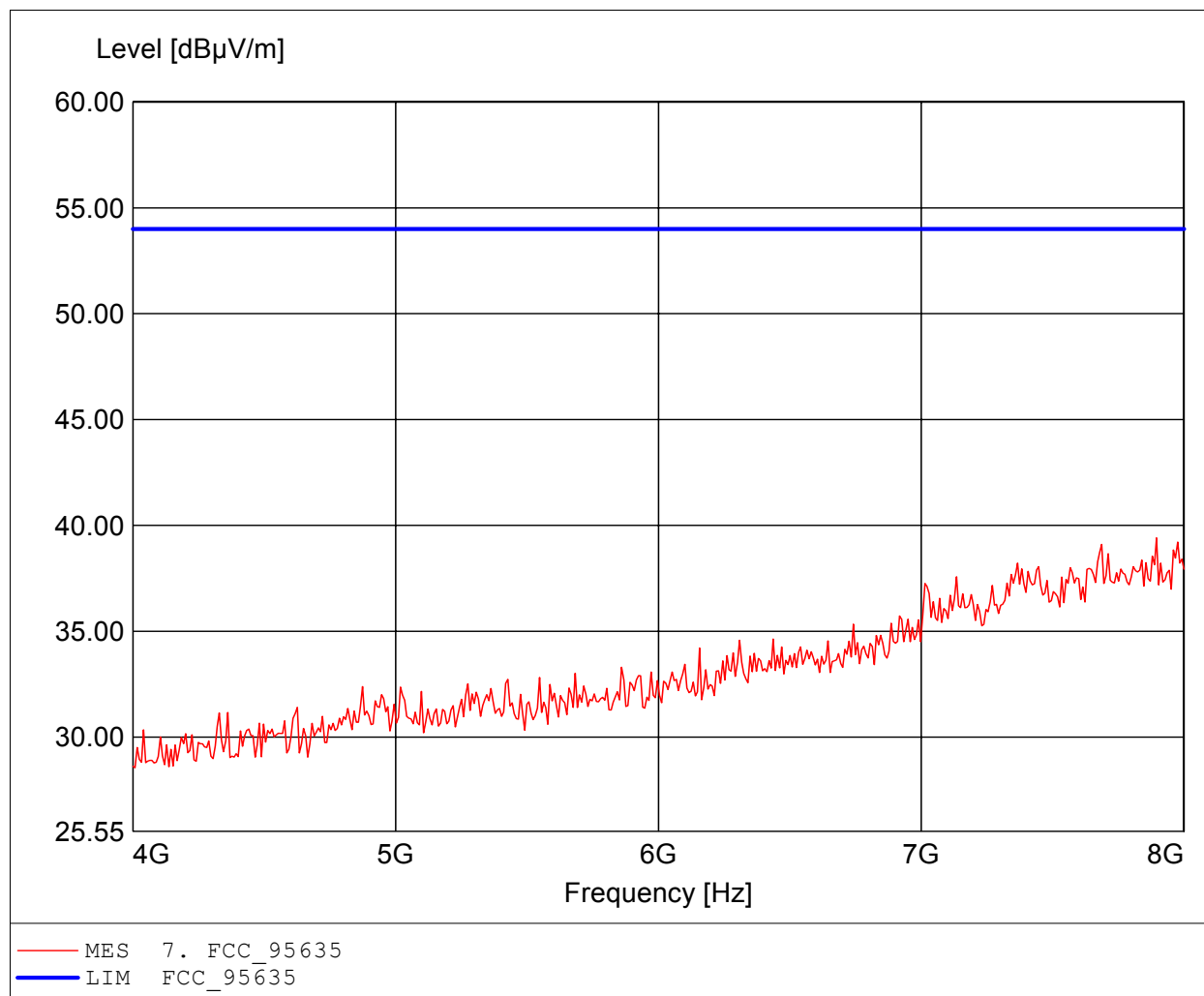
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 3.910GHz, Emax: 43.20dBuV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

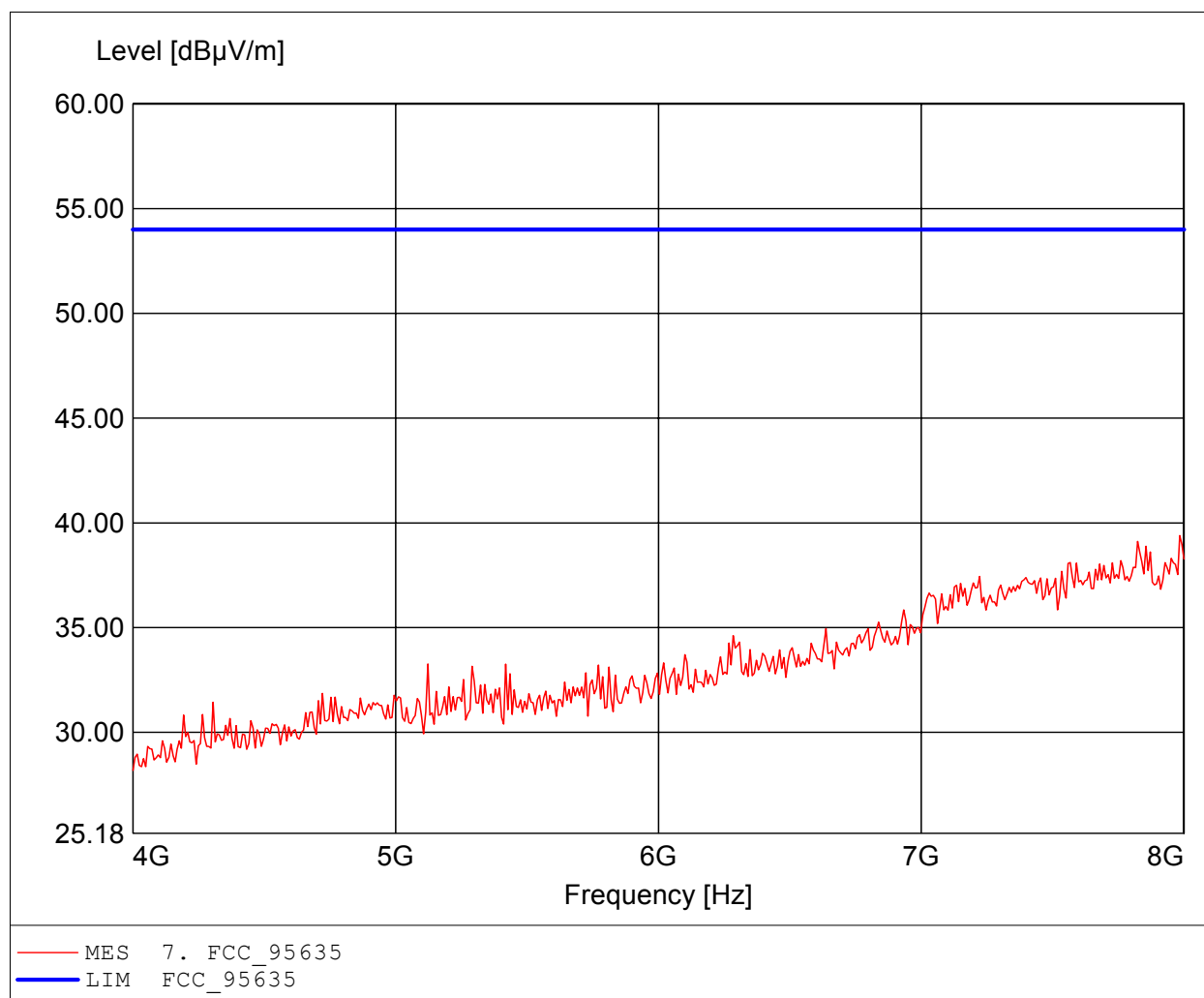
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: BBHA2190D, amplif.
Comment 2: Freq: 7.896GHz, Emax: 39.41dBµV/m, RBW: 1MHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

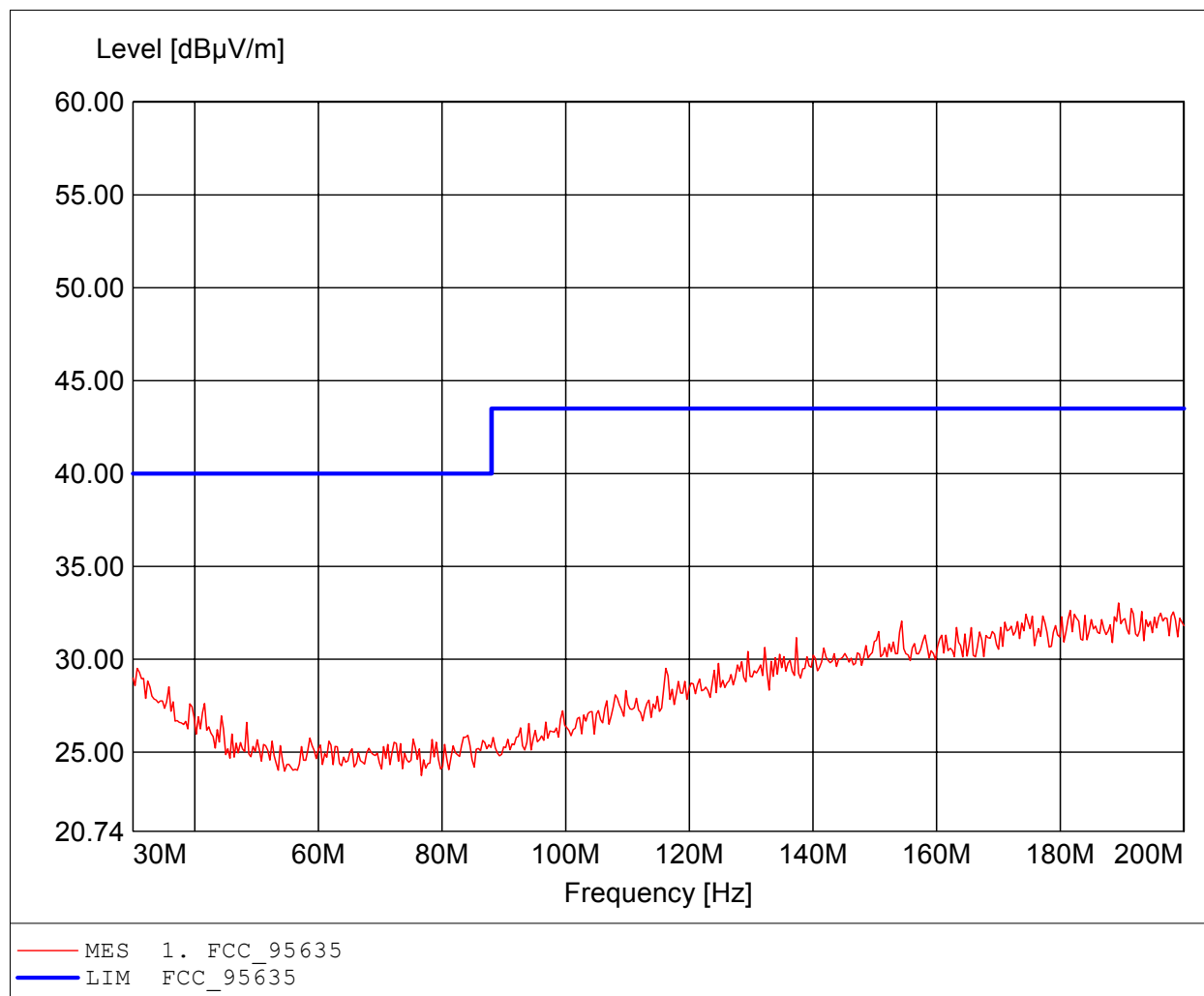
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 1
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: BBHA2190D, amplif.
Comment 2: Freq: 7.984GHz, Emax: 39.39dBµV/m, RBW: 1MHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

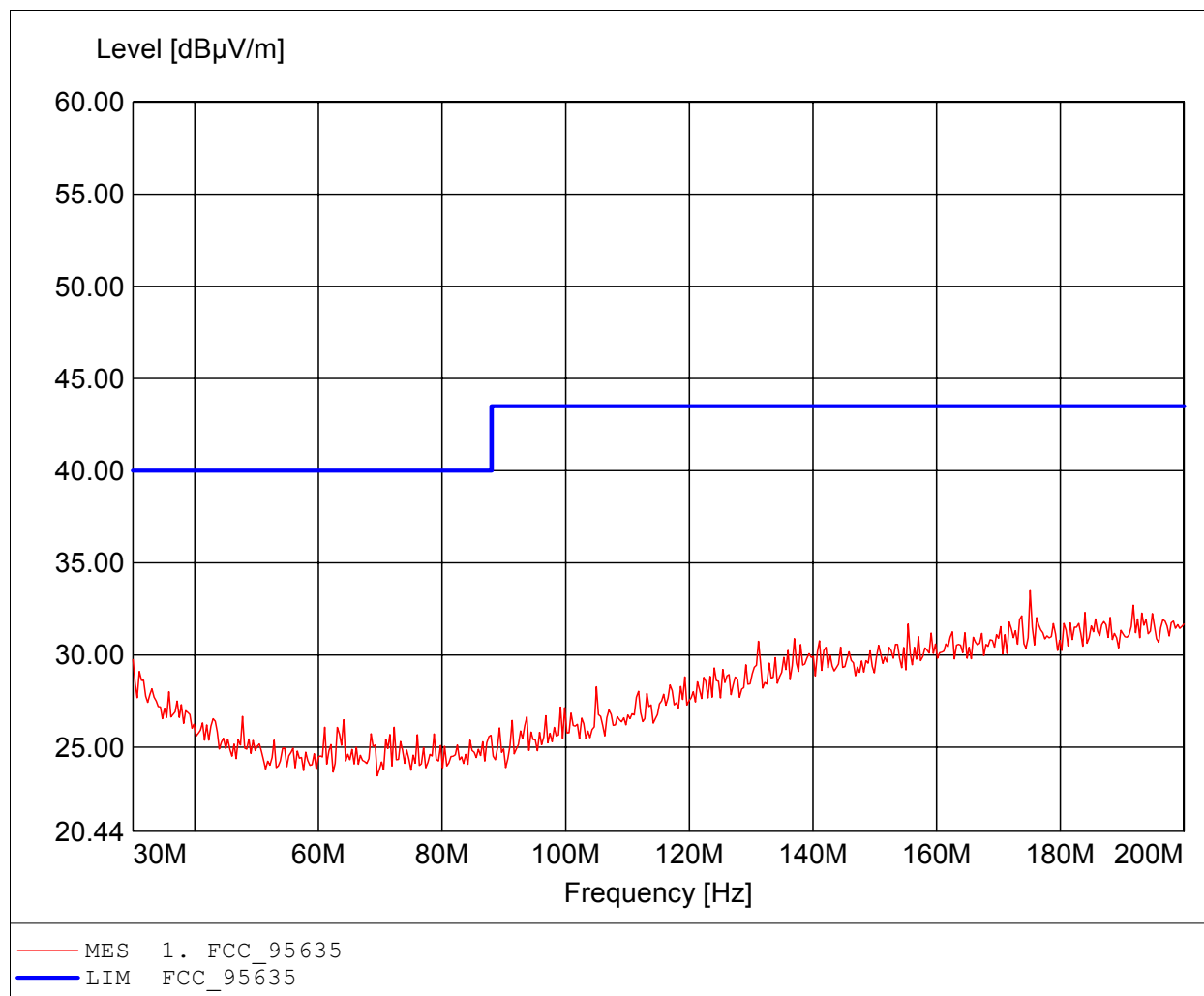
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 189.439MHz, Emax: 33.03dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

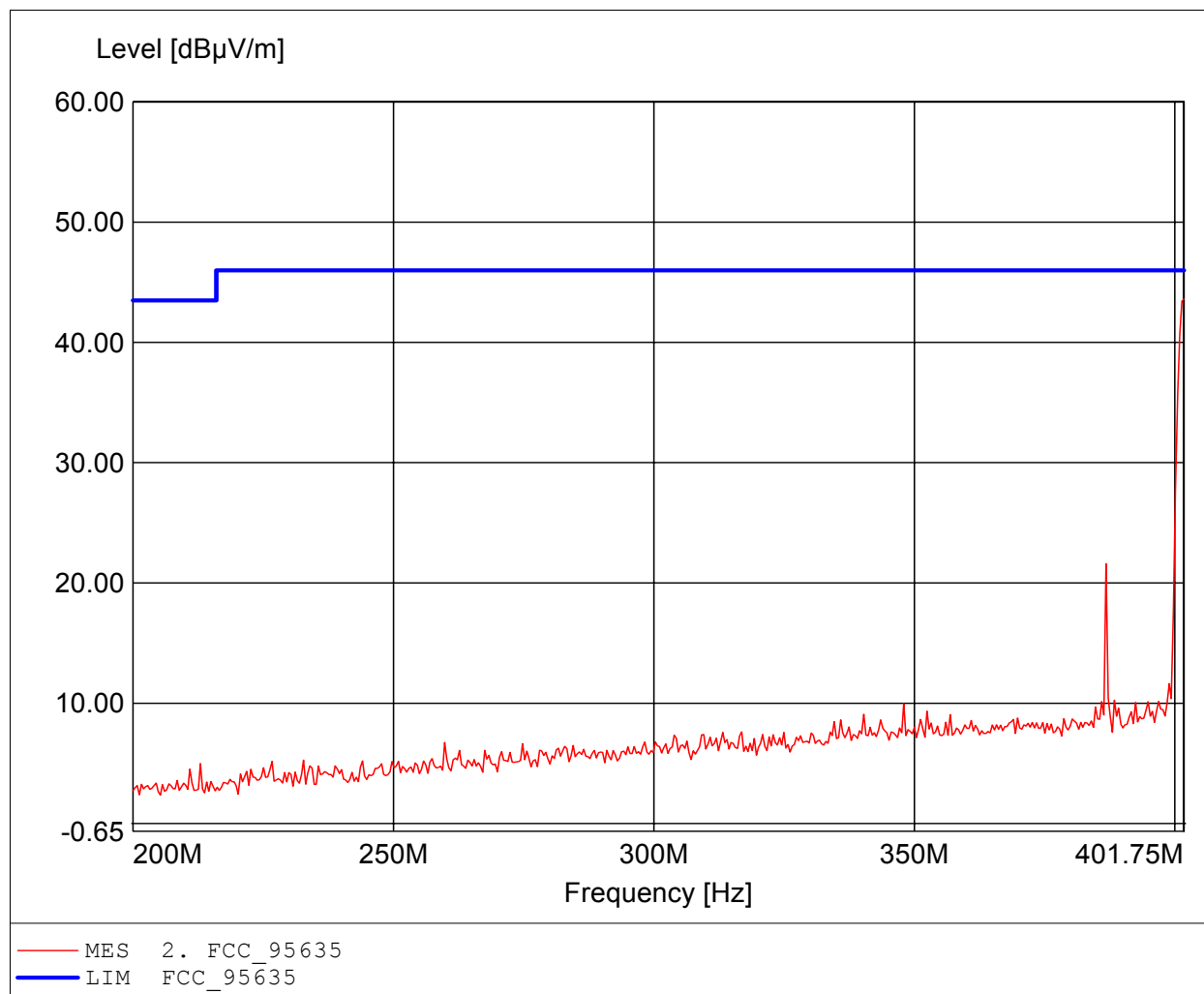
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 175.130MHz, Emax: 33.49dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

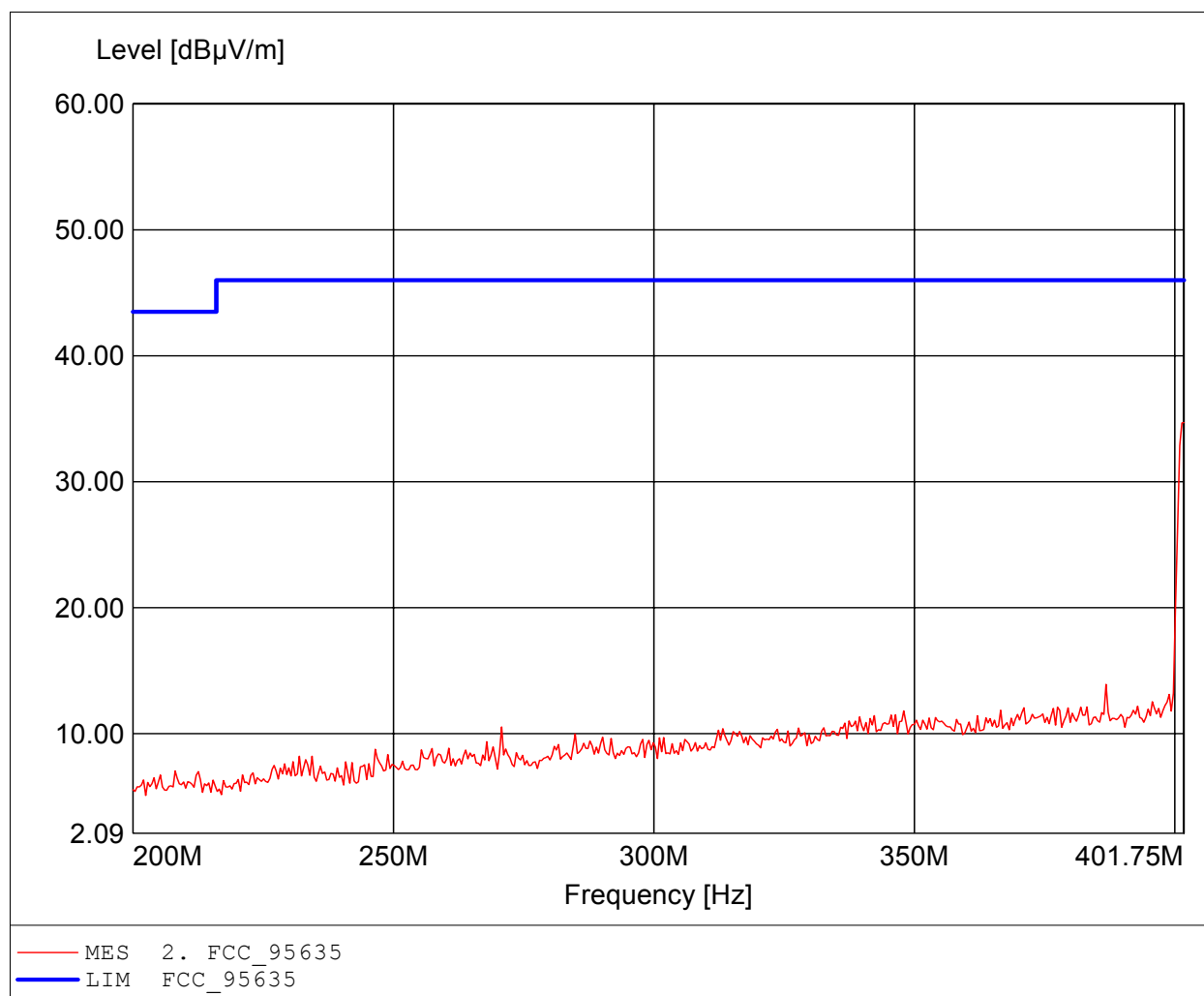
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 401.750MHz, Emax: 43.61dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

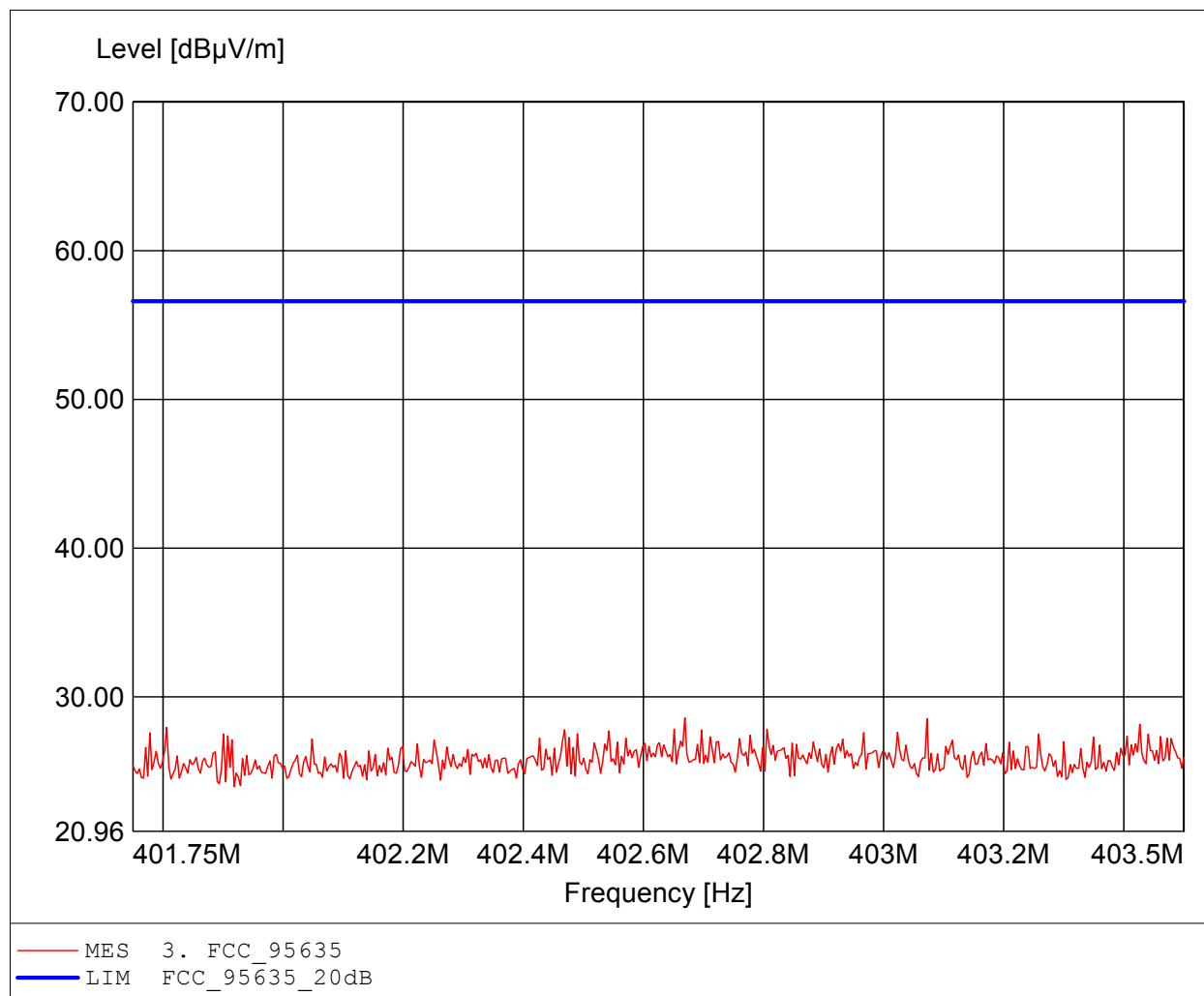
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 401.750MHz, Emax: 34.70dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

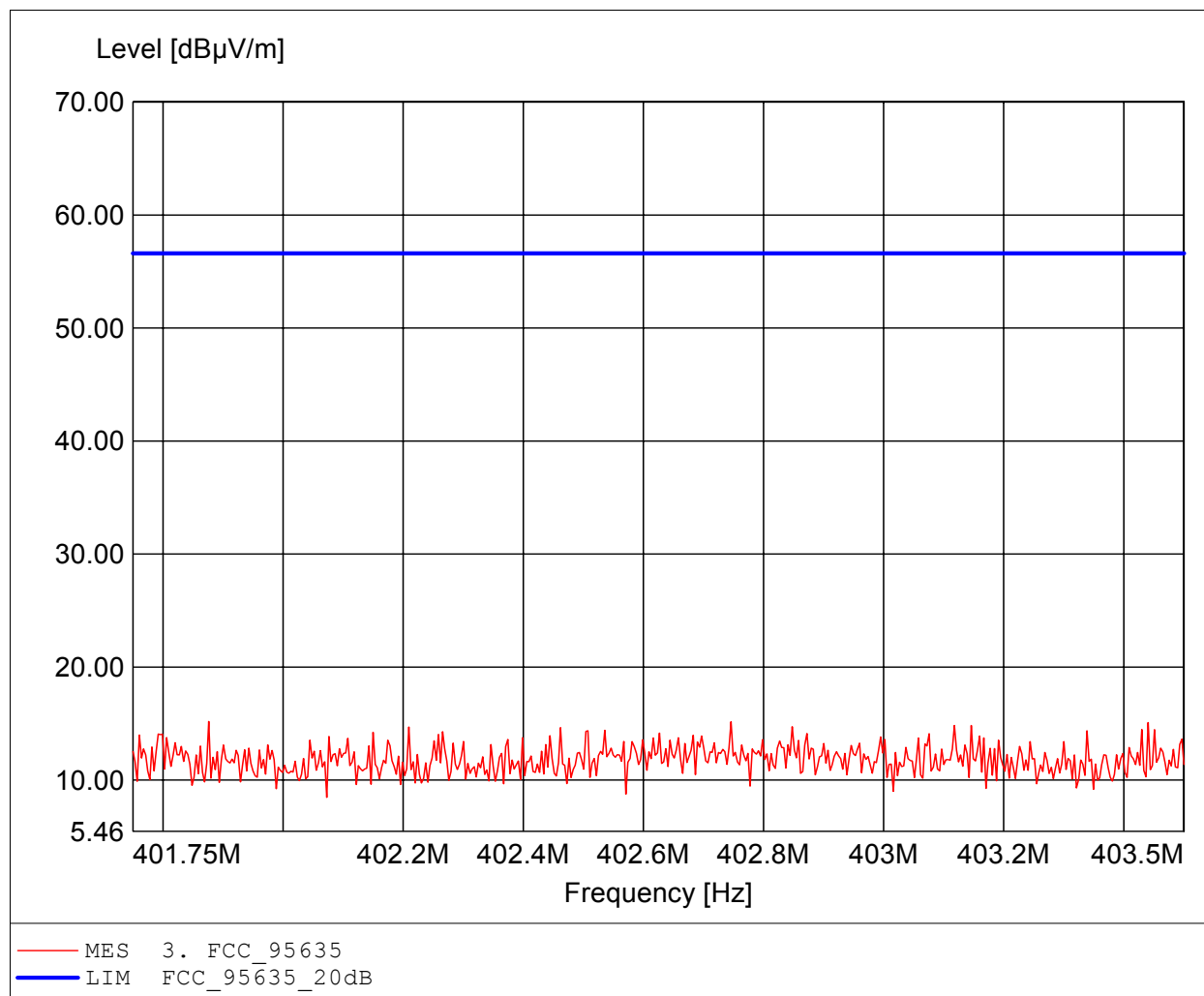
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 402.669MHz, Emax: 28.60dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

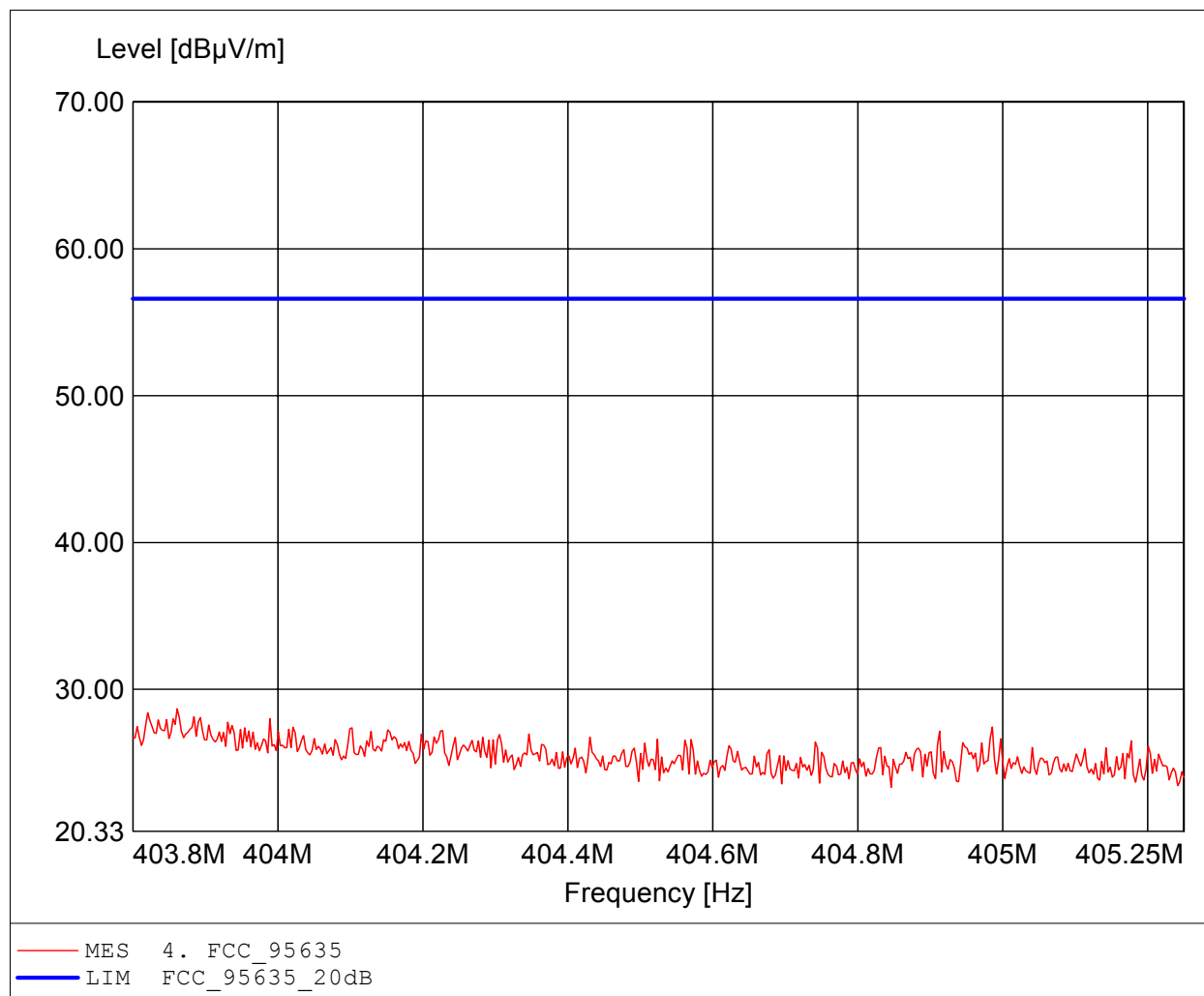
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 401.876MHz, Emax: 15.18dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

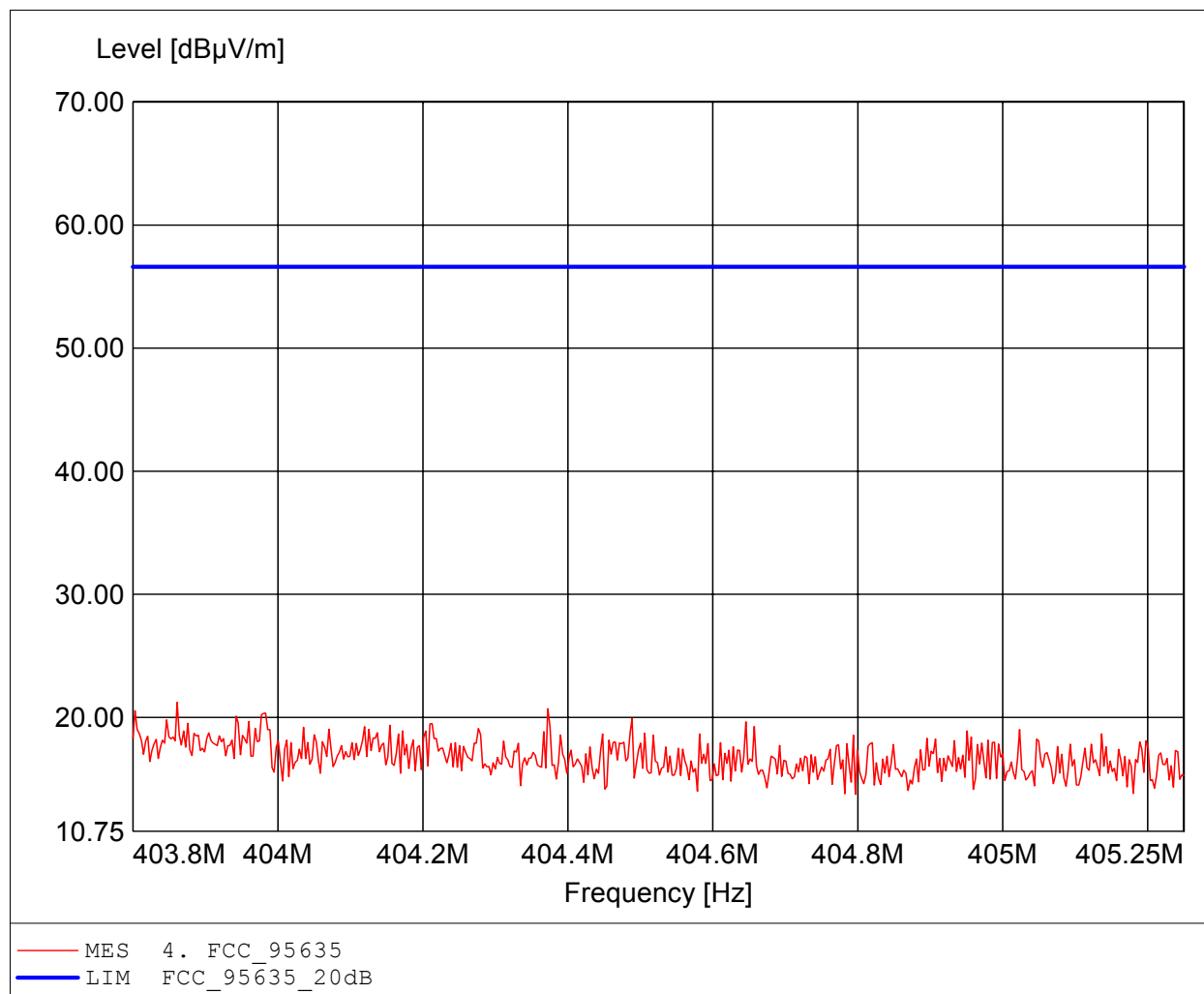
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 403.861MHz, Emax: 28.68dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

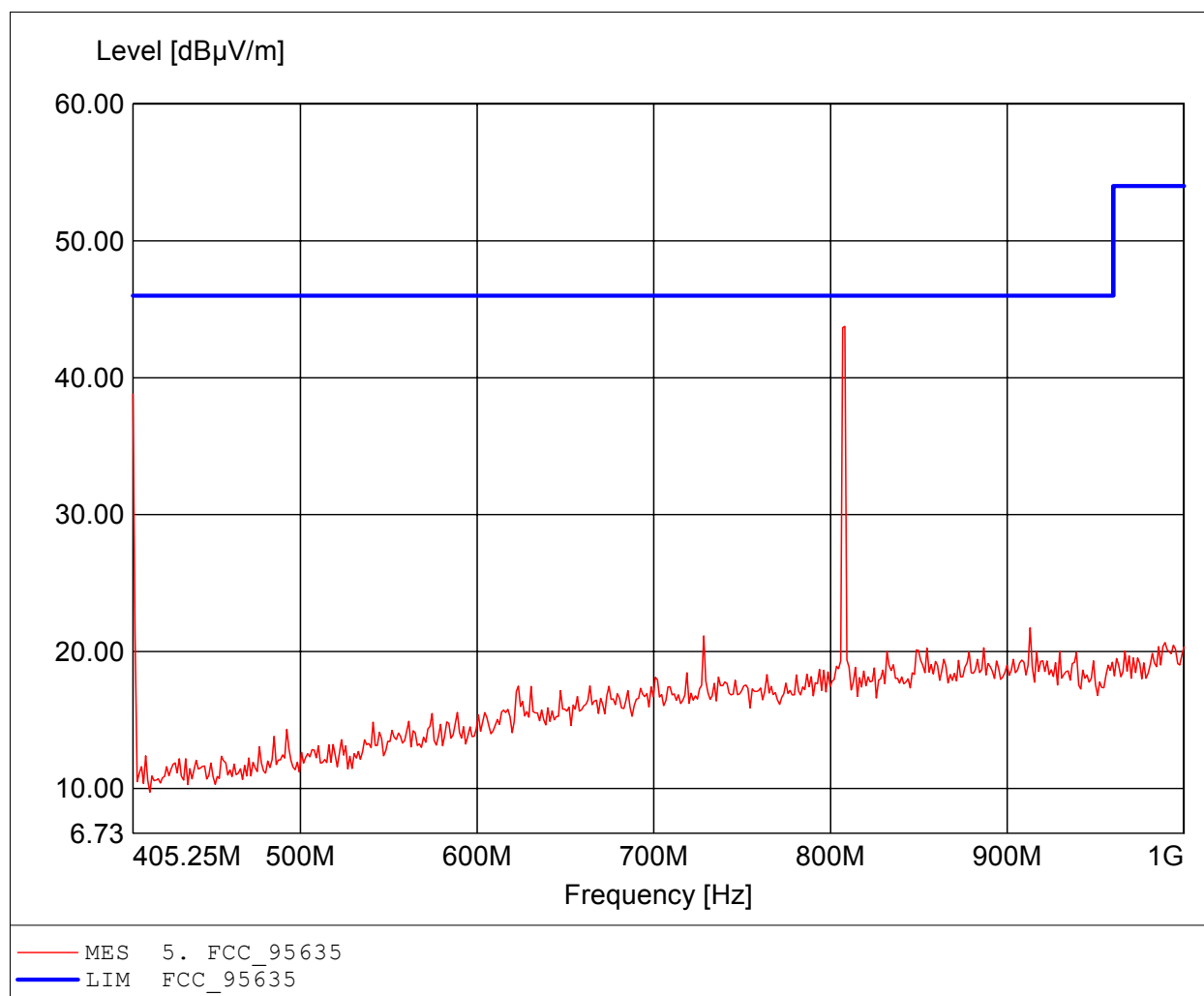
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 403.861MHz, Emax: 21.22dBµV/m, RBW: 1% of EBW



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

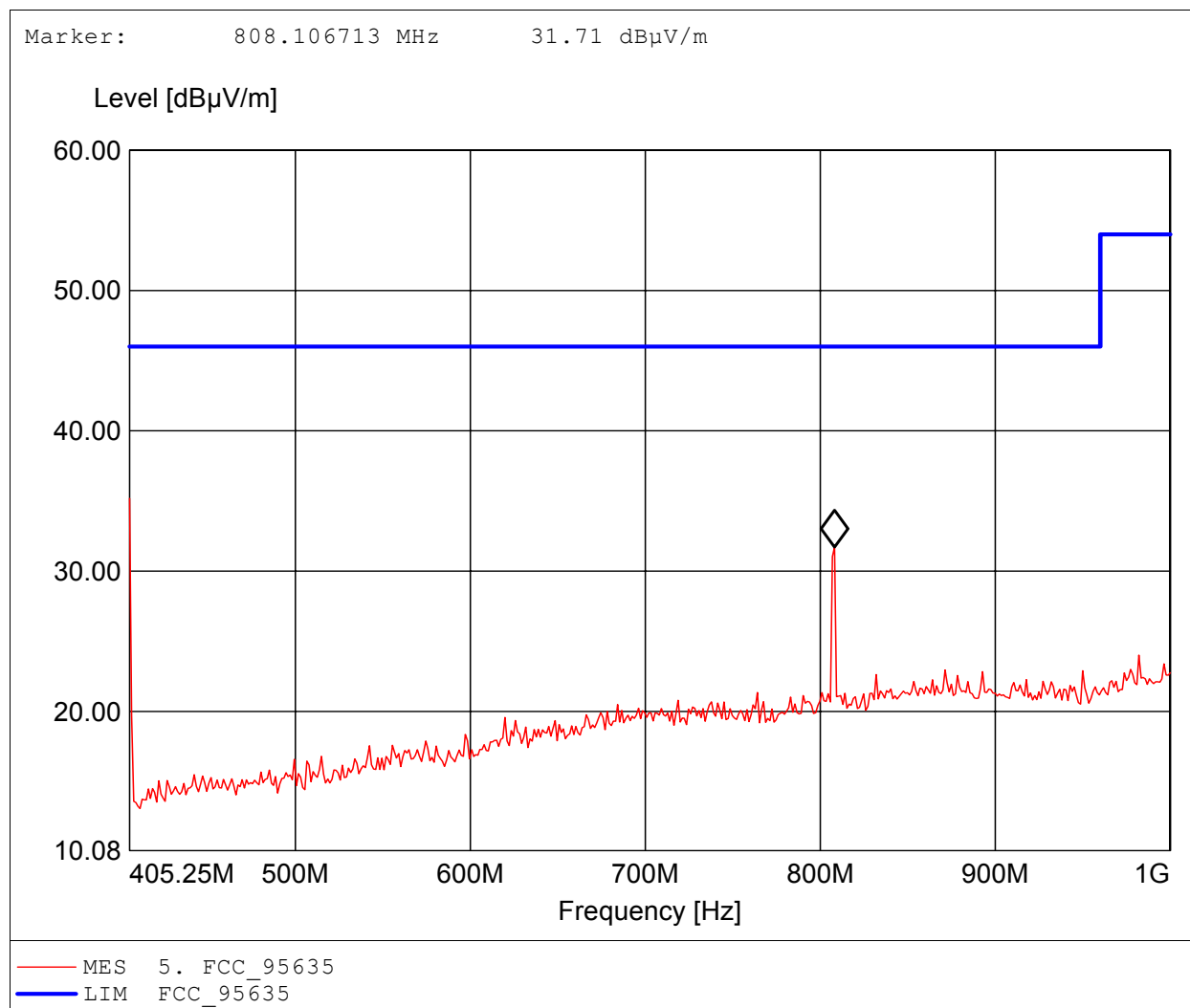
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 808.107MHz, Emax: 43.75dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

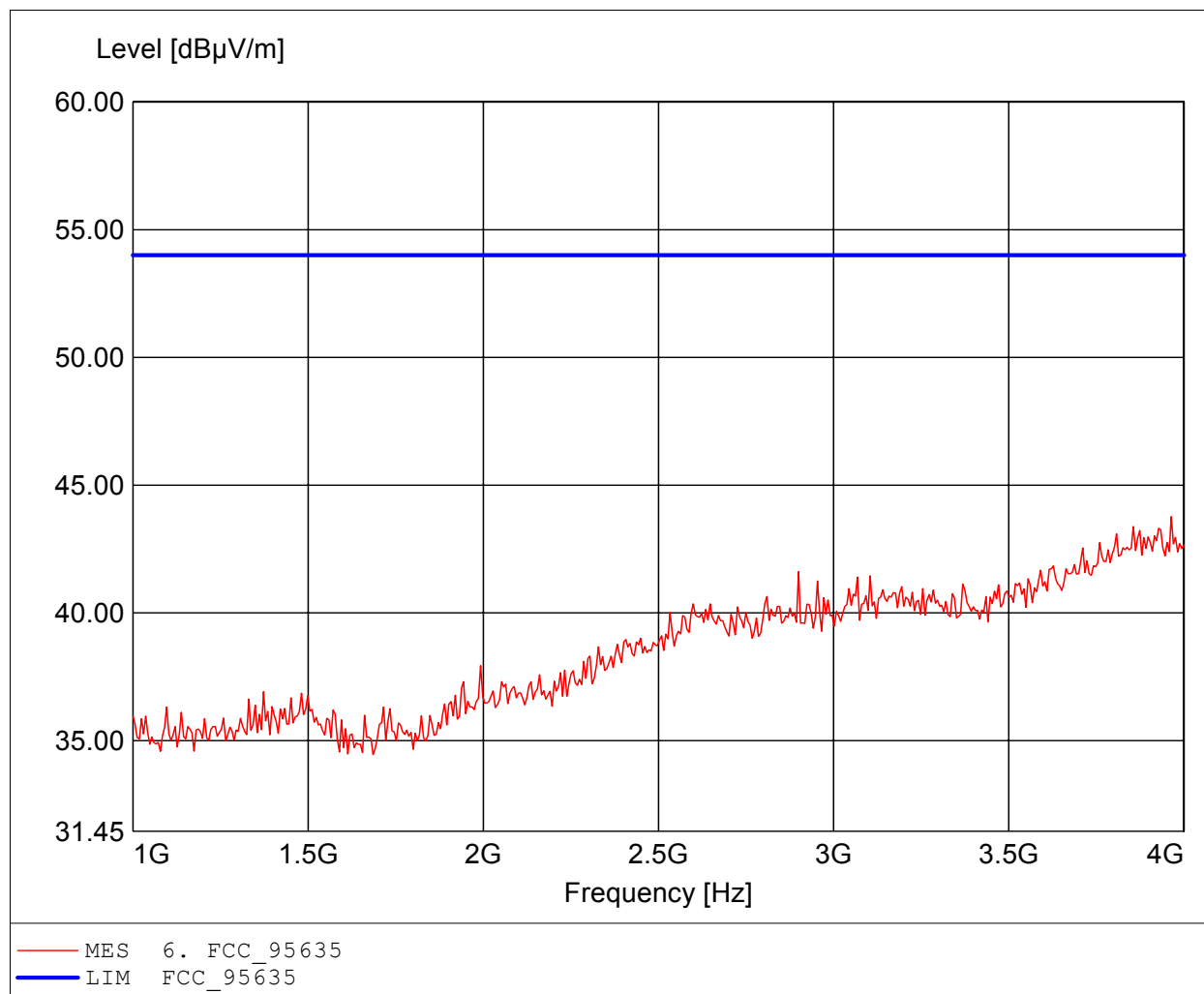
Approval Holder: BIOTRONIK SE & Co. KG / GOM-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 405.250MHz, Emax: 35.18dBµV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

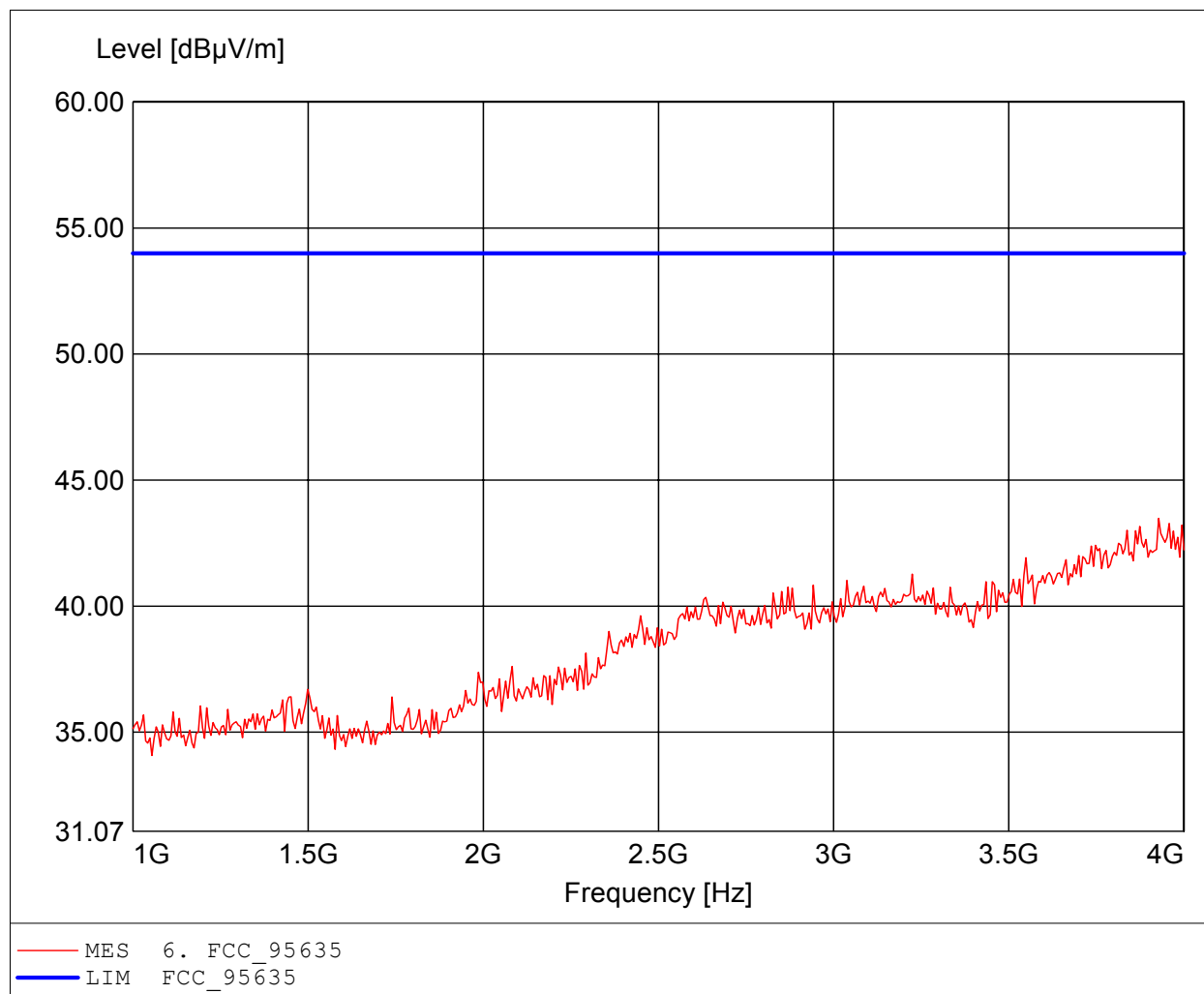
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 3.964GHz, Emax: 43.76dBuV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

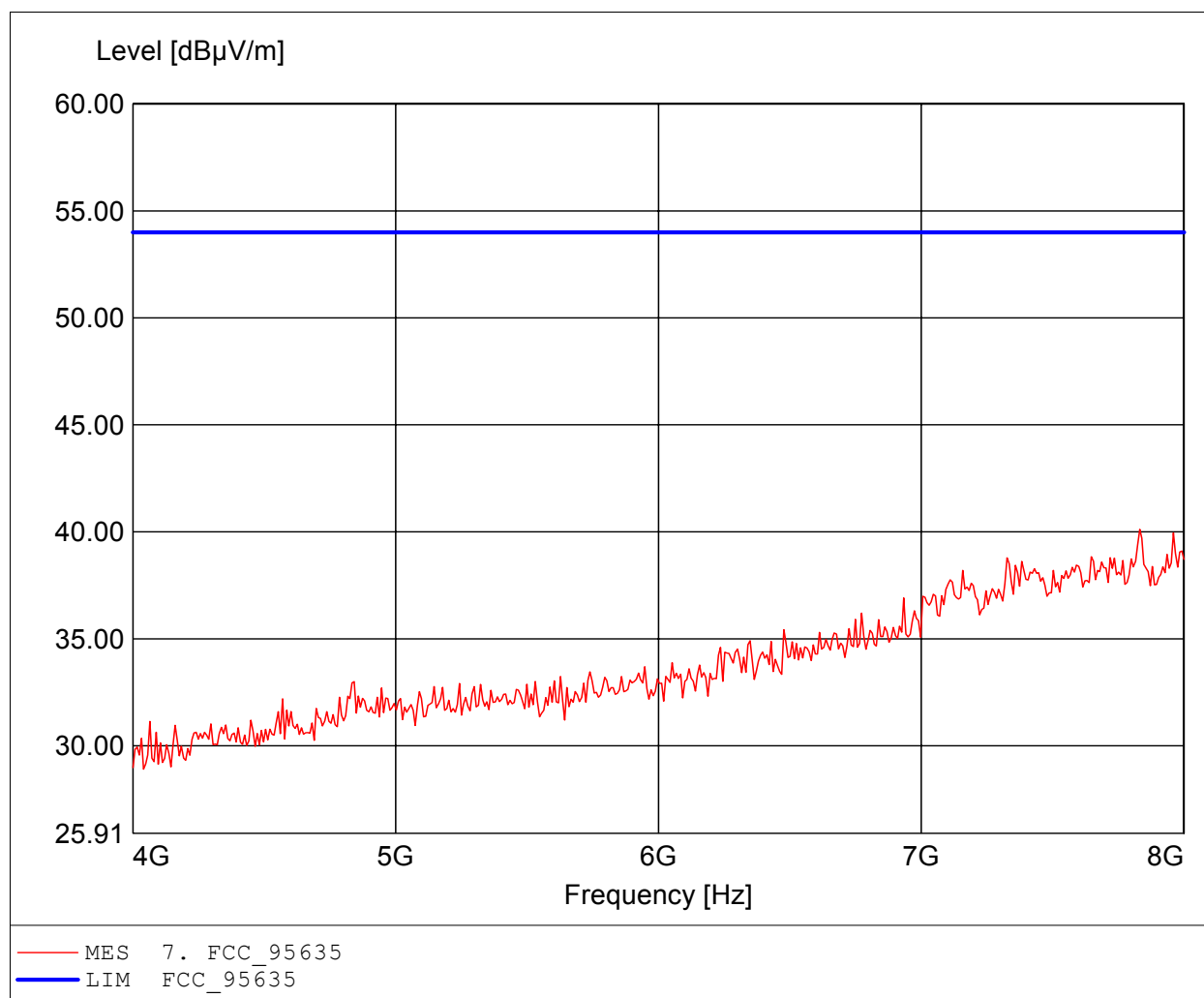
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 3.928GHz, Emax: 43.48dBuV/m, RBW: 100kHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

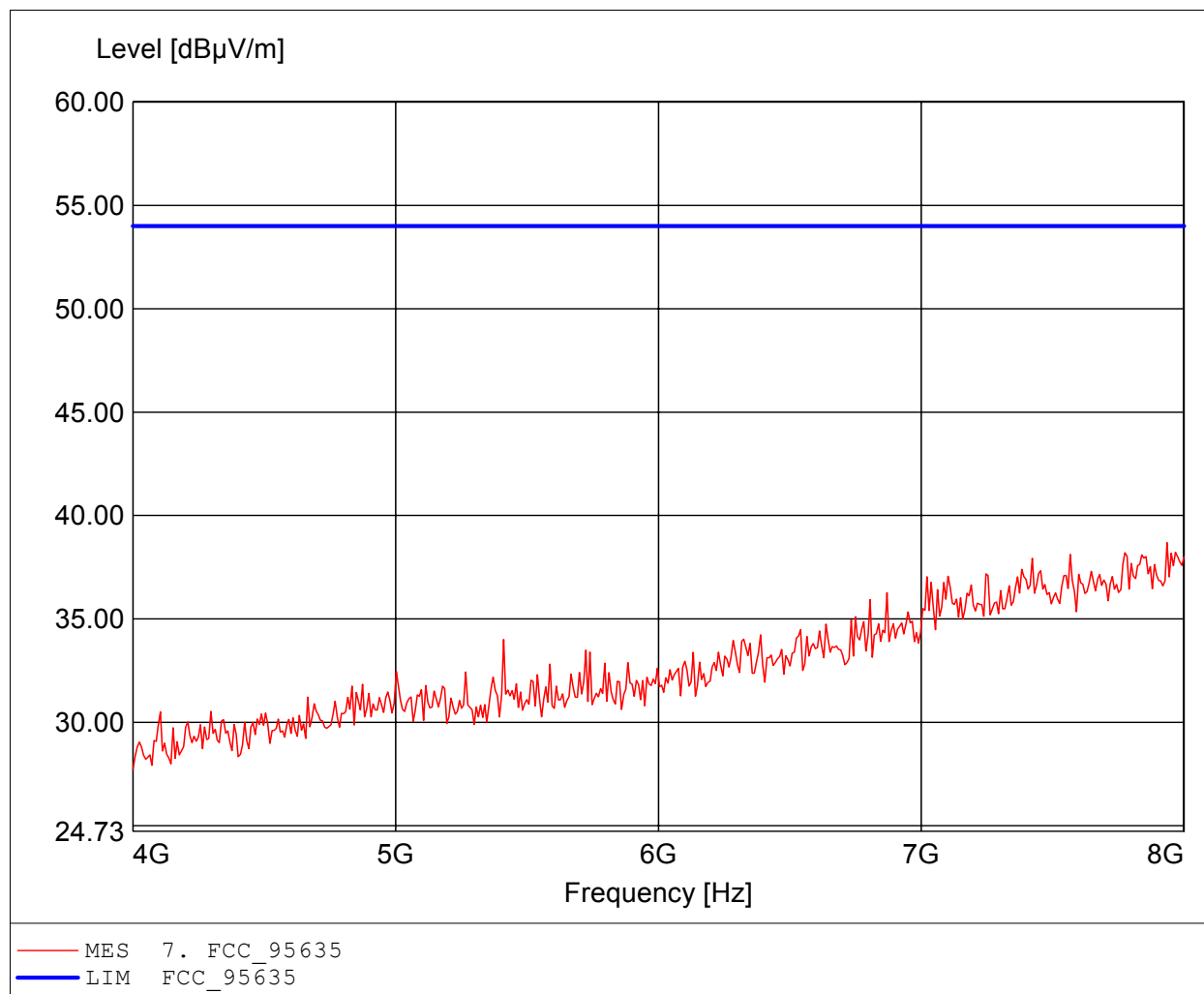
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: BBHA2190D, amplif.
Comment 2: Freq: 7.832GHz, Emax: 40.12dBµV/m, RBW: 1MHz



Spurious emissions Field Strength Tx

FCC RULES PART 95, SUBPART D

Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Tx 403.64 MHz / Antenna 2
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: according to §95.635, peak detector
Comment 1: Dist.: 3m, Ant.: BBHA2190D, amplif.
Comment 2: Freq: 7.936GHz, Emax: 38.69dBµV/m, RBW: 1MHz

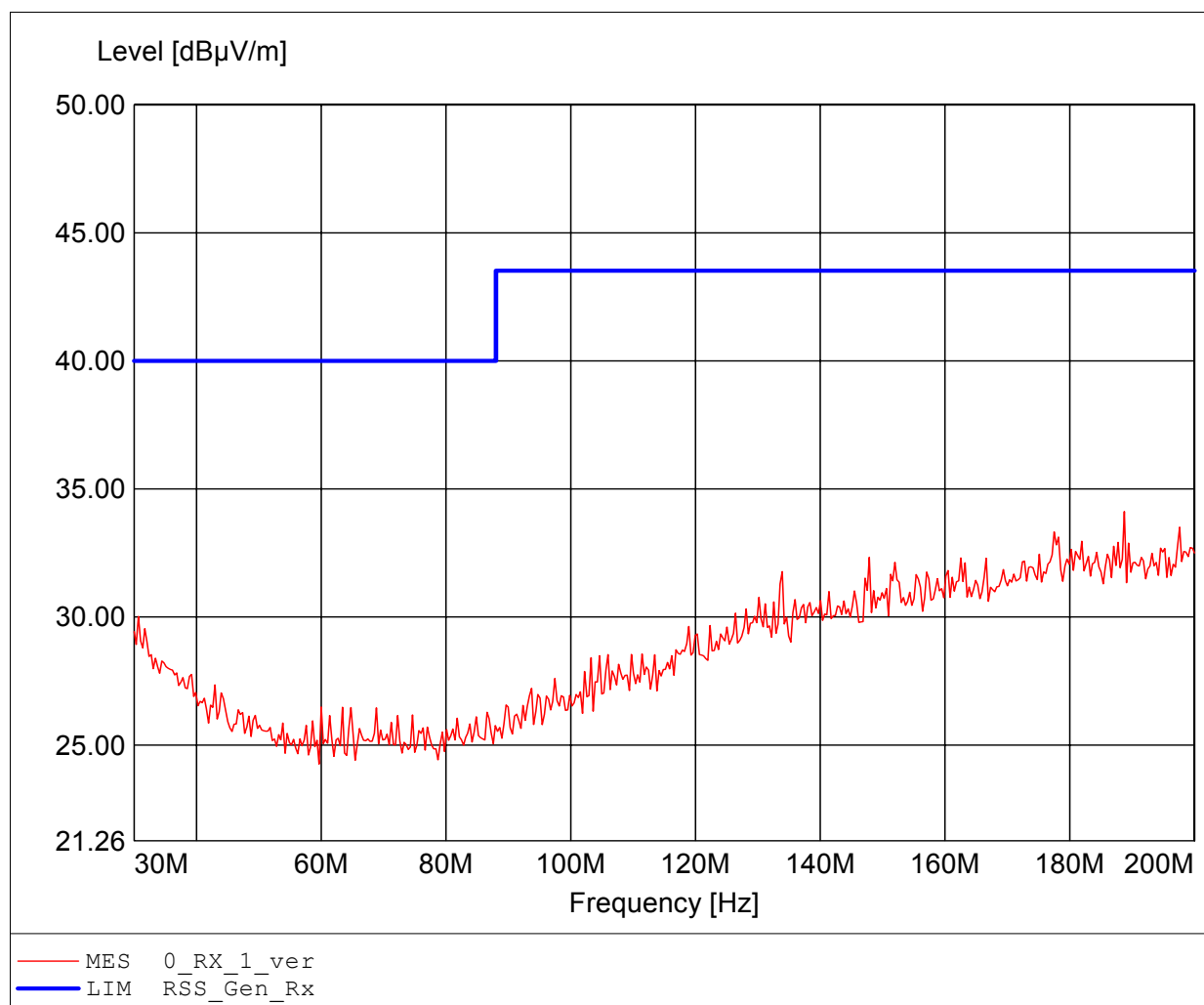


Annex C Receiver spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

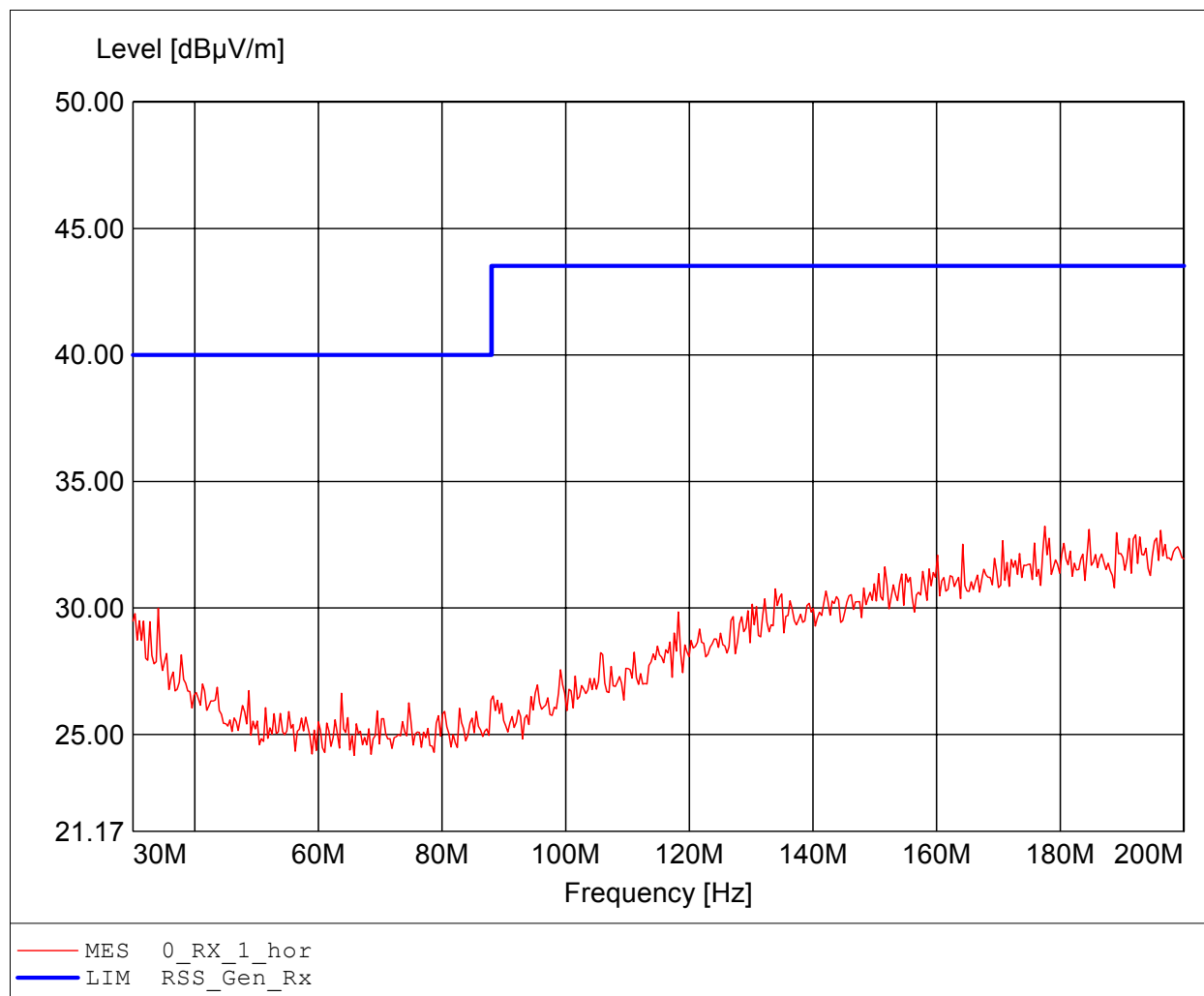
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq:188.758MHz Emax:34.11dBuV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

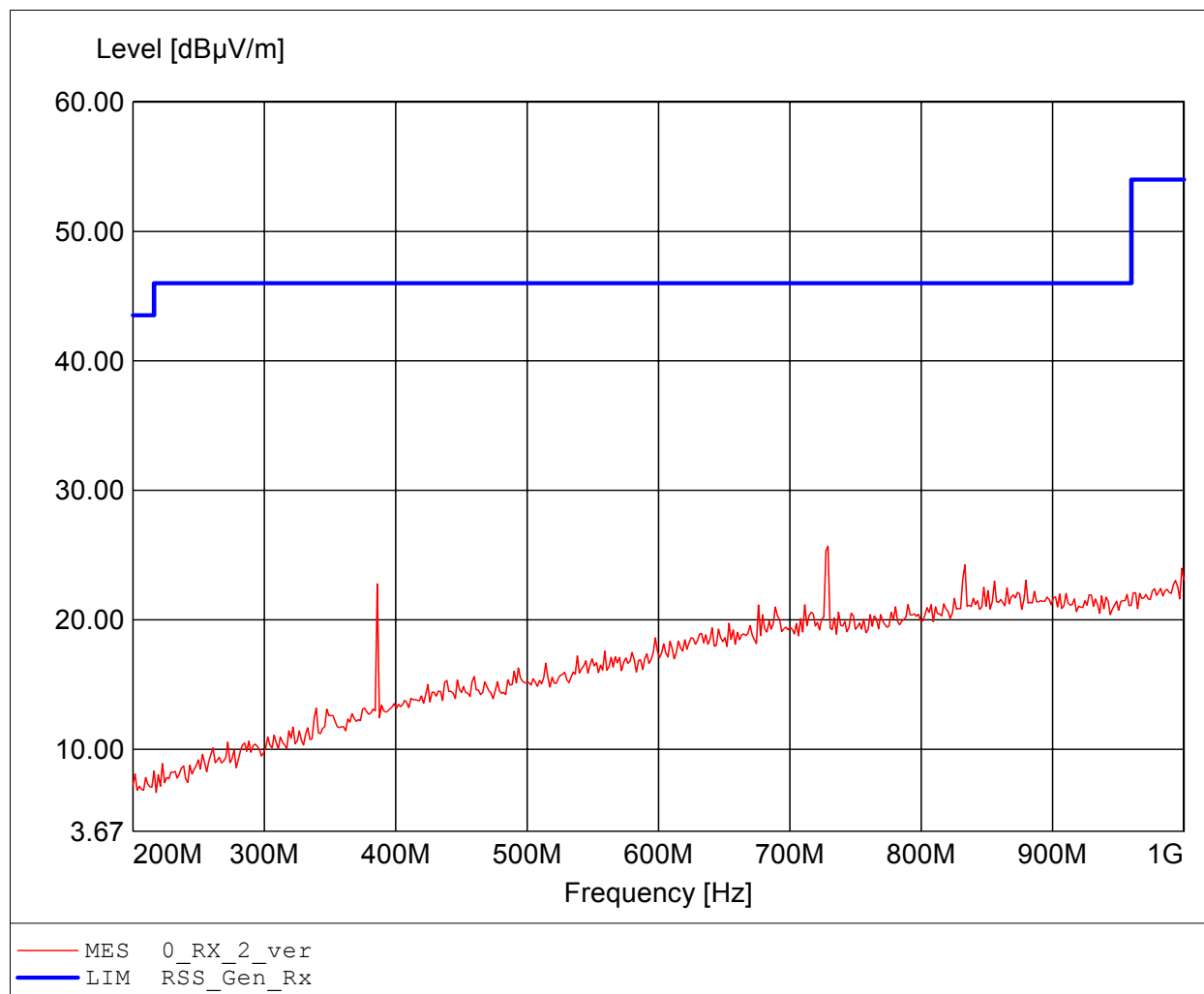
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq:177.515MHz Emax:33.23dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

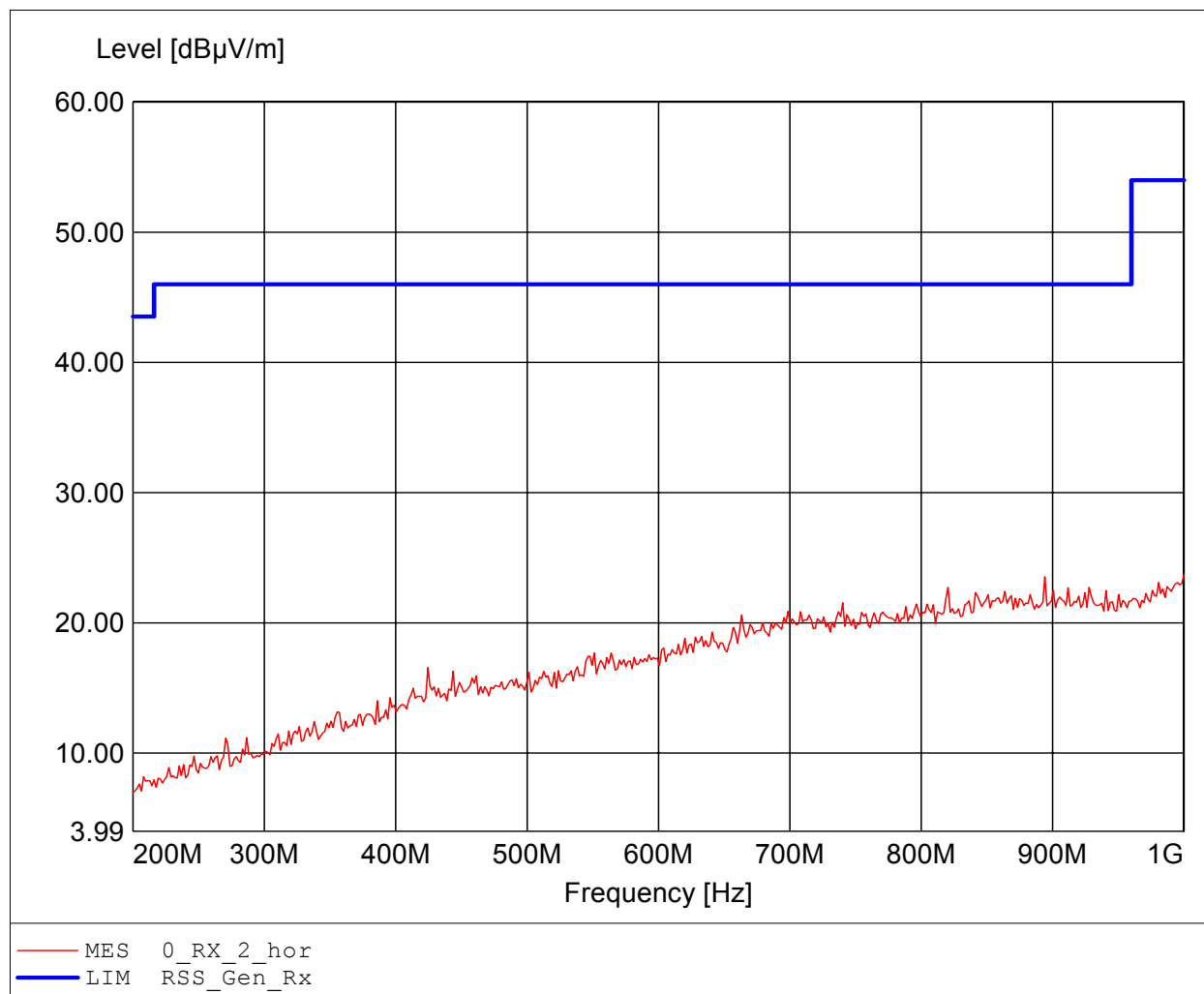
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.
Comment 2: Freq: 729.058MHz Emax: 25.68dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

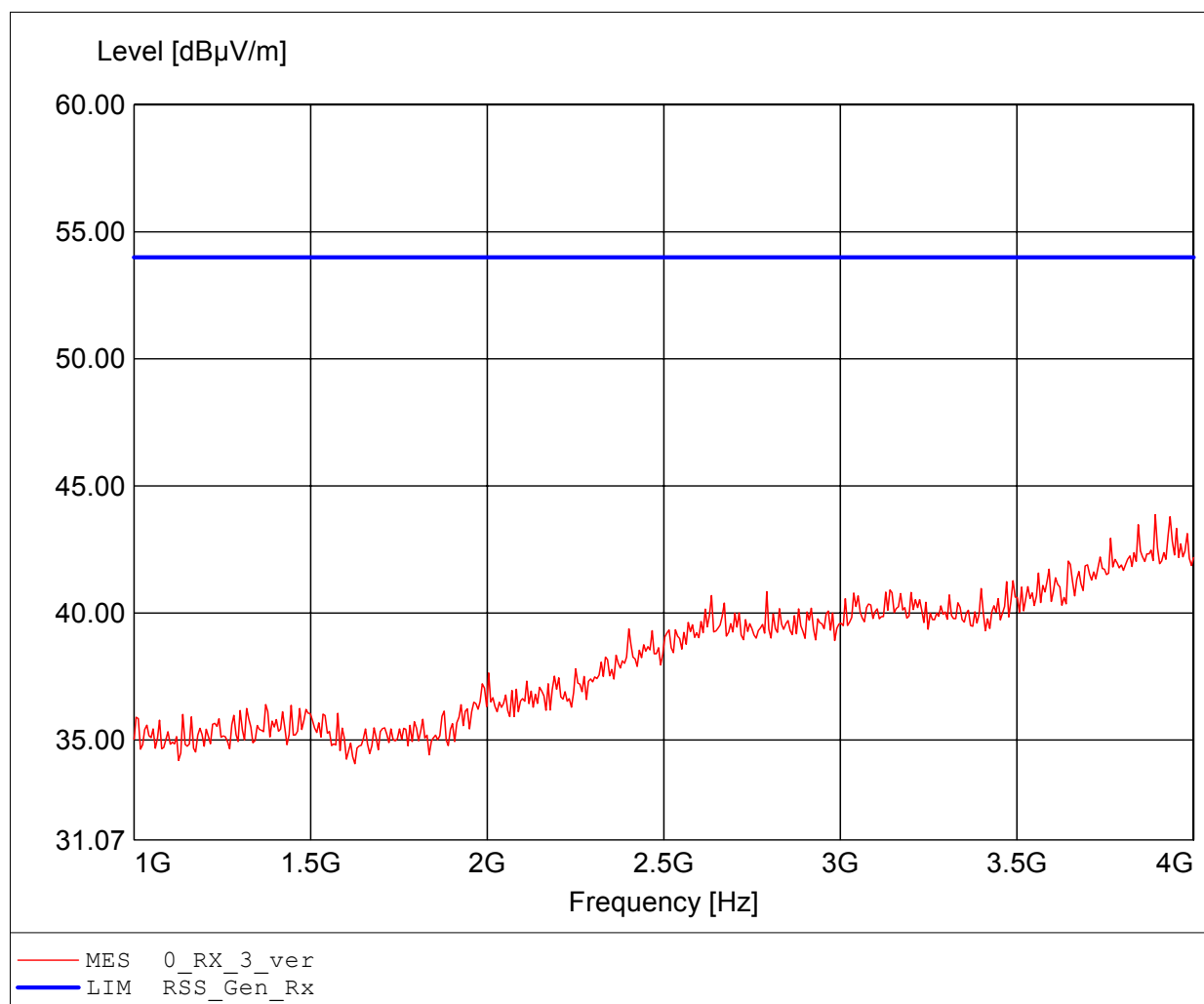
Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.
Comment 2: Freq:1.000GHz Emax:23.71dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HL025, ampl.
Comment 2: Freq:3.892GHz Emax:43.87dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder: BIOTRONIK SE & Co. KG / G0M-1105-1164
EUT / Model: CardioMessenger II with G24-L / CM II
Configuration: Setup: Rx 403.64 MHz worst case
Test Site / Operator: Eurofins Product Service GmbH / Mr. Treffke
Test Condition: Tnom.: 25°C / Vnom: 3.7V Li-ion battery
Test Specification: Freq. / CH: 0
Comment 1: Dist.: 3m, Ant.: HL025, ampl.
Comment 2: Freq:3.952GHz Emax:44.61dBµV/m RBW: 1 MHz

