



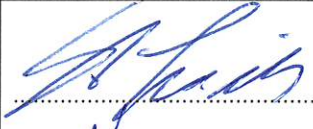




<b>EMC TEST REPORT</b> <b>FCC 47 CFR Part 15B, ISED ICES-003 Issue 6</b>	
<b>Report Reference No</b>	G0M-2003-8908-EF0115B-V01
<b>Testing Laboratory</b>	Eurofins Product Service GmbH
<b>Address</b>	Storkower Str. 38c 15526 Reichenwalde Germany
<b>Accreditation</b>	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
<b>Applicant</b>	W.O.M. WORLD OF MEDICINE GmbH
<b>Address</b>	Salzufer 8 10587 Berlin GERMANY
<b>Test Specification Standard(s)</b>	47 CFR Part 15 Subpart B ISED ICES-003 Issue 6 ANSI C63.4:2014+A1:2017
<b>Non-Standard Test Method</b>	None
<b>Equipment under Test (EUT):</b>	
<b>Product Description</b>	Irrigation and Suction Pump for Laparoscopy
<b>Model(s) Type</b>	LAP SUCT./ IRRIG. PUMP
<b>Additional Model(s)</b>	None
<b>Brand Name(s)</b>	Fluid Control Lap 2216
<b>Hardware Version(s)</b>	2019/12
<b>Software Version(s)</b>	P106_008_A_FREI_03.01
<b>FCC-ID</b>	2AS5K-TSHW42
<b>IC</b>	25004-TSHW42A
<b>Test Result</b>	<b>PASSED</b>

<b>Possible test case verdicts:</b>		
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)	
<b>Testing:</b>		
Date of receipt of test item	2020-03-18	
<b>Report:</b>		
Compiled by	Stephan Liebich	
Tested by (+ signature) (Responsible for Test)	Stephan Liebich	
	Matthias Handrik	
Approved by (+ signature) (Deputy Head of Lab)	Jens Marquardt	
Date of Issue	2021-01-25	
Total number of pages	32	
<b>General Remarks:</b>		
<p>The test results presented in this report relate only to the object tested.</p> <p>The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>		
<b>Additional Comments:</b>		

## ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
T <sub>NOM</sub>	Nominal operating temperature
V <sub>NOM</sub>	Nominal supply voltage

## VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2021-01-25	Initial Release	-

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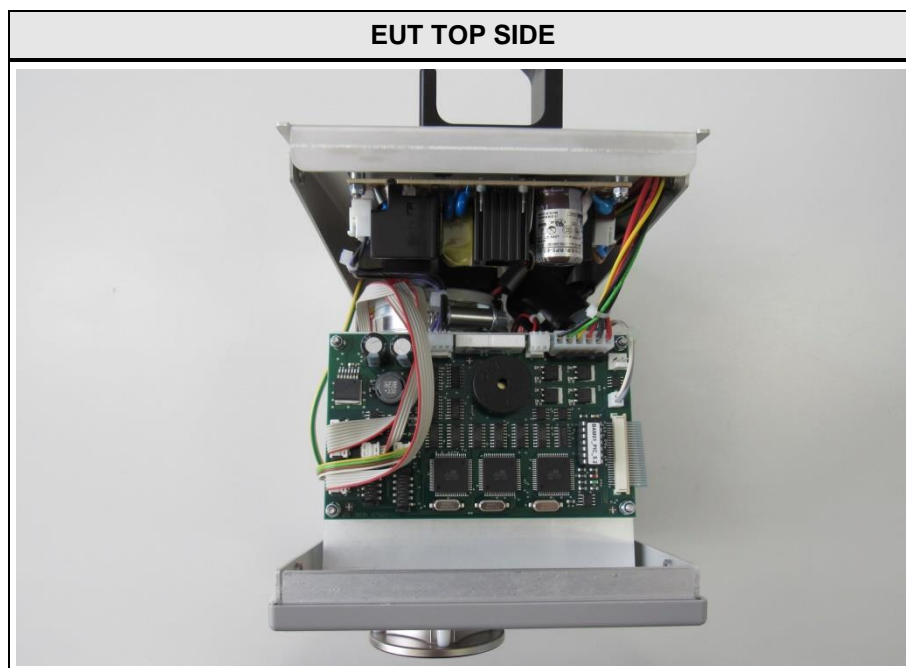
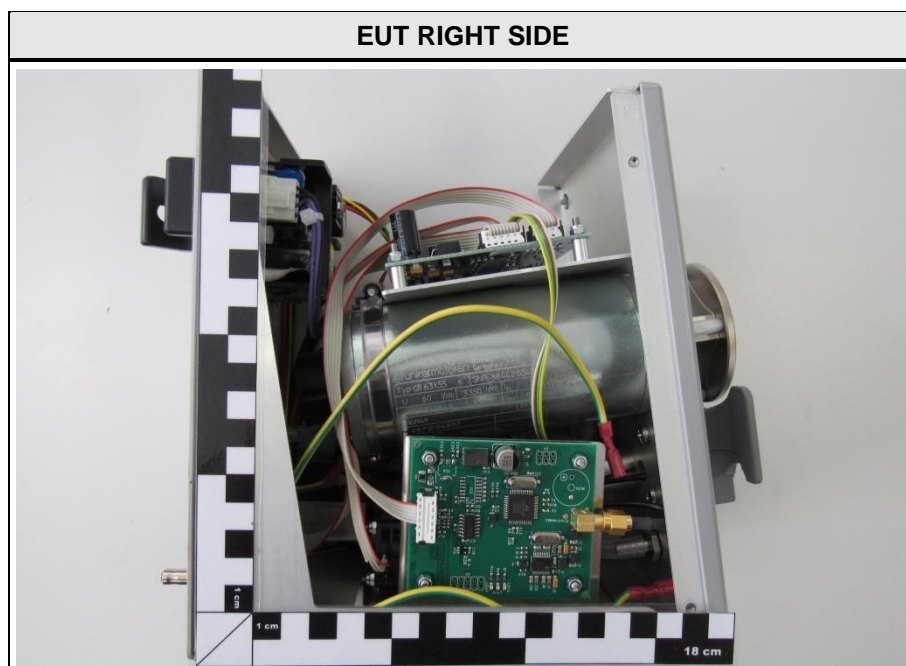
## 1 Equipment (Test Item) Under Test

Description	Irrigation and Suction Pump for Laparoscopy	
Model / Type	LAP SUCT./ IRRIG. PUMP	
Additional Model(s)	None	
Brand Name(s)	Fluid Control Lap 2216	
Serial Number(s)	1912CE0011	
Sample ID	28770	
Hardware Version(s)	2019/12	
Software Version(s)	P106_008_A_FREI_03.01	
FCC-ID	2AS5K-TSHW42	
IC	25004-TSHW42A	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	16	
Radio Module	Type	RFID
	Model	TS-HW42
	Manufacturer	GiS GmbH
	FCC-ID	2AS5K-TSHW42
	IC	25004-TSHW42A
Supply Voltage	V <sub>NOM</sub>	100 - 240 V AC
AC/DC-Adaptor	None	
Manufacturer	Richard Wolf GmbH Pforzheimer Straße 32 75438 Knittlingen Germany	

## 1.1 Equipment Ports

Name	Type	Attributes	Comment
AC Mains	AC	Count: 1 Direction: In Service only: No	-
Service Interface	IO	Count: 1 Direction: IO Service only: Yes	-
Earth	GND	Count: 1 Direction: Out Service only: No	EUT is connected to Earth
Irrigation	NE	Count: 1 Direction: Out Service only: No	Holder for irrigation Tube Set
Suction	NE	Count: 1 Direction: Out Service only: No	Connector for vacuum Tube Set
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		
GND	Protective earth port		

## 1.2 Equipment Photos - Internal

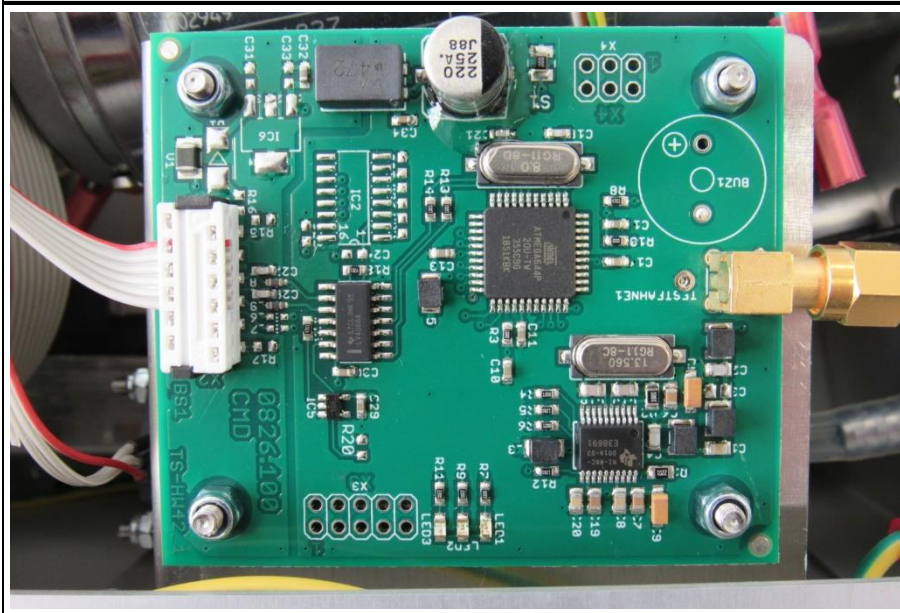




EUT LEFT SIDE



EUT PCB



### 1.3 Equipment Photos - External



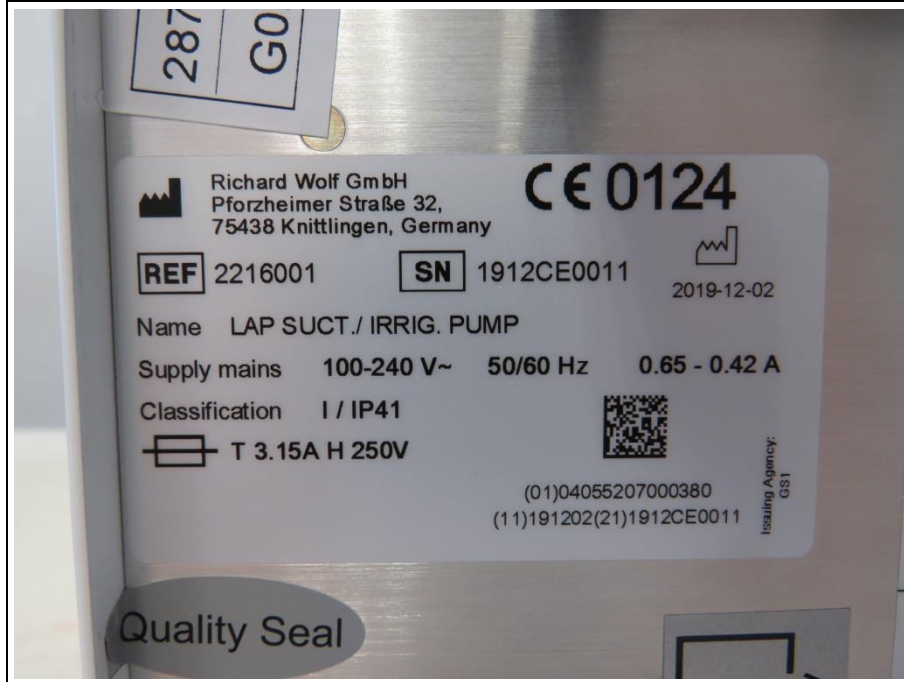
**EUT RIGHT SIDE**



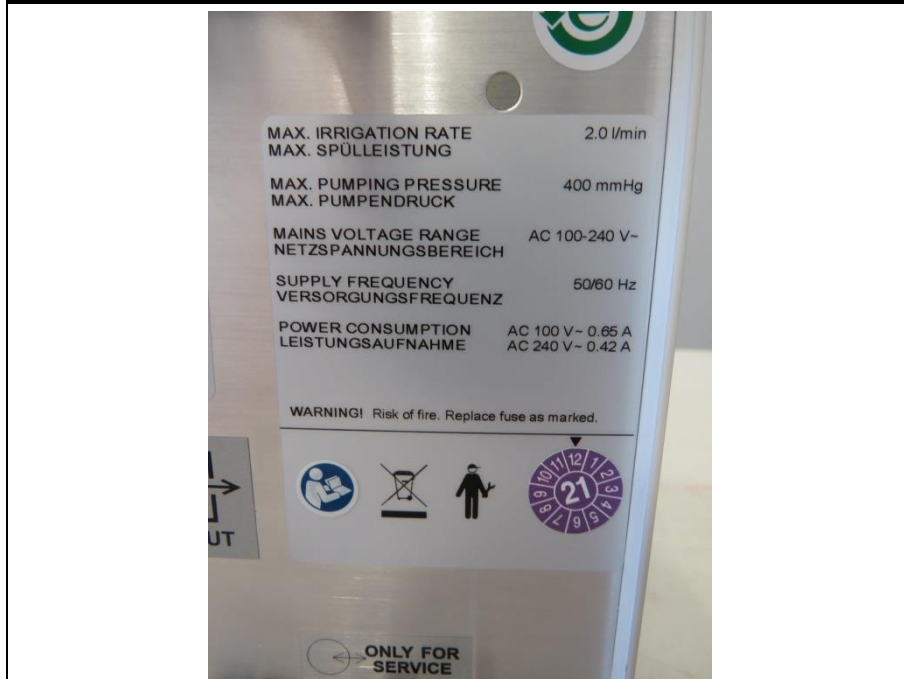
## EUT REAR SIDE



### EUT LABEL I



### EUT LABEL II



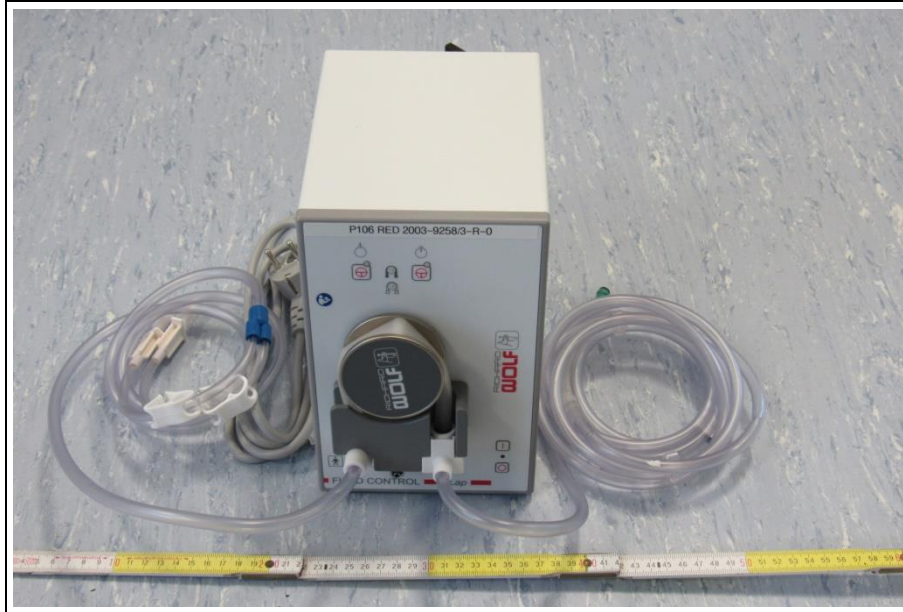
**EUT TOP SIDE**



**EUT BOTTOM SIDE**



### EUT WITH ANCILLARY EQUIPMENT



#### 1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Tube Set	WOM	4171223	-
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
MON	Monitoring Equipment			
CBL	Connecting Cable			
Comment:				

#### 1.5 Operational Modes

Mode #	Description
1	RFID Tx/Rx (EUT permanently sends/receives status information to/from inserted Tube Set via RFID connection)
Comment:	

#### 1.6 EUT Configuration

Configuration #	Description
1	EUT powered up and powered with 120 V / 60 Hz. EUT is grounded.
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 analyser in dBµV. Any external preamplifiers used are taken into account through internal analyser 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 analyser. 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:

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

Net:

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

Limit:

This is the FCC Class B radiated emission limit (in units of 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:

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

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:

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, 6.2	Radiated emissions	ANSI C63.4:2014 +A1:2017	PASS	-
FCC 15.107 ICES-003, 6.1	AC power line conducted emissions	ANSI C63.4:2014 +A1:2017	PASS	-
Comment:				

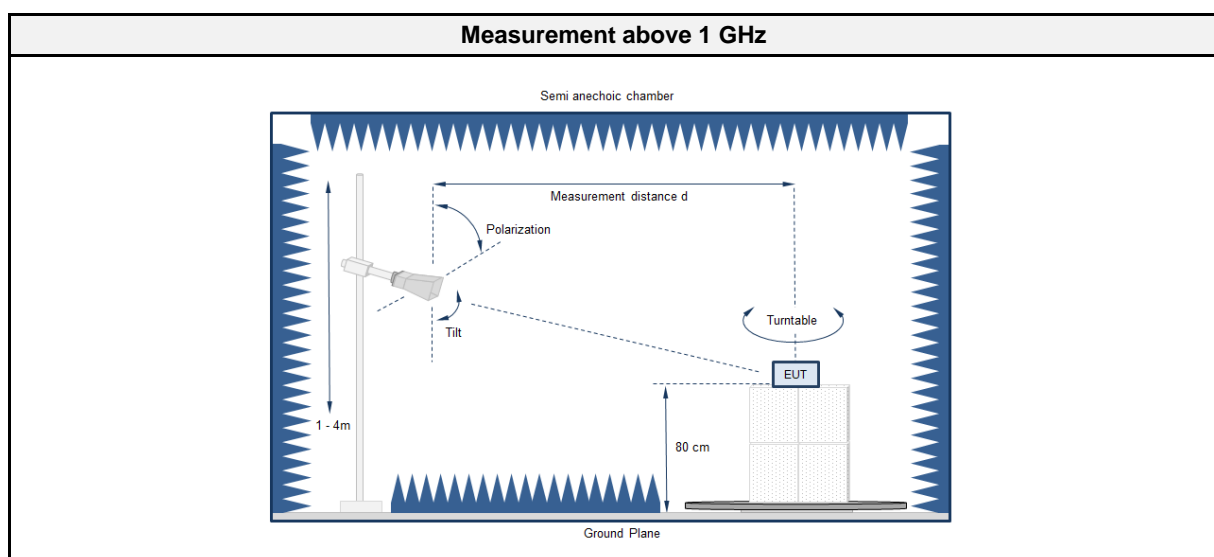
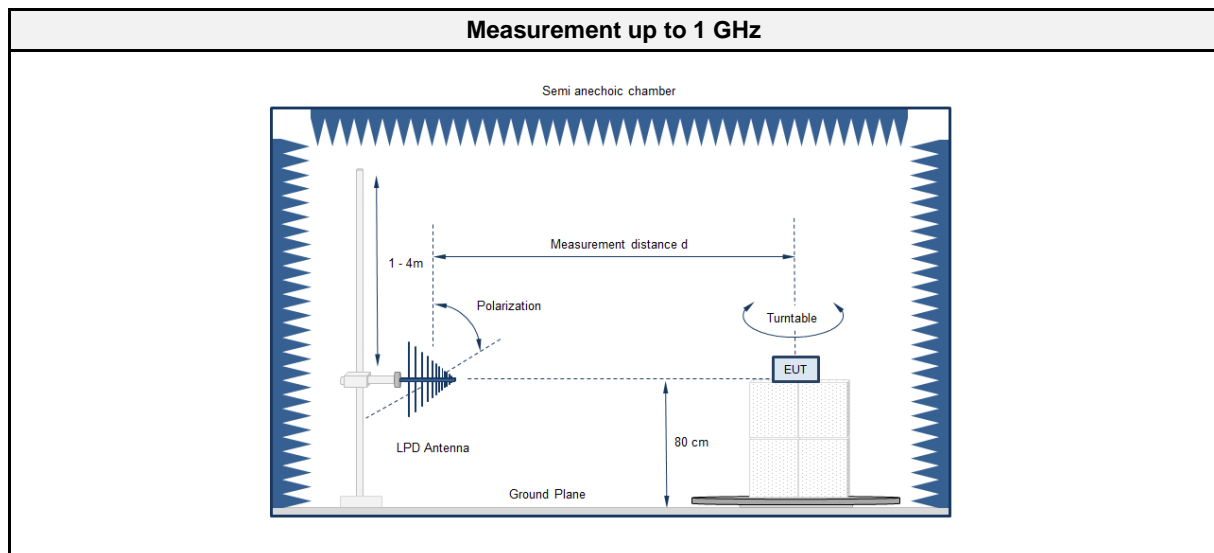
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

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

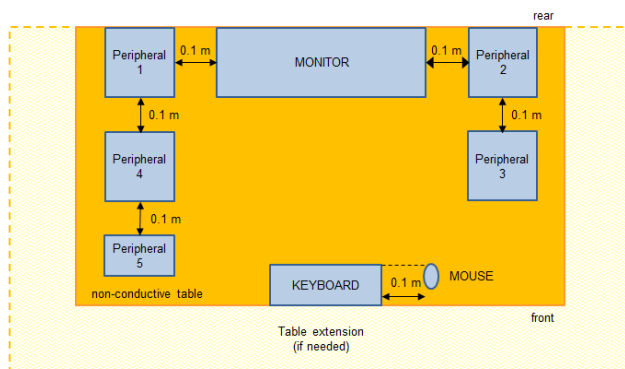
### 2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 6.2
Reference method	ANSI C63.4:2014+A1:2017 Section 8
Equipment class	Class B
Equipment type	Table top
Highest internal frequency [MHz]	16
Measurement range	30 MHz to 1 GHz
Temperature [°C]	23
Humidity [%]	24
Operator	Stephan Liebich
Date	2020-04-20

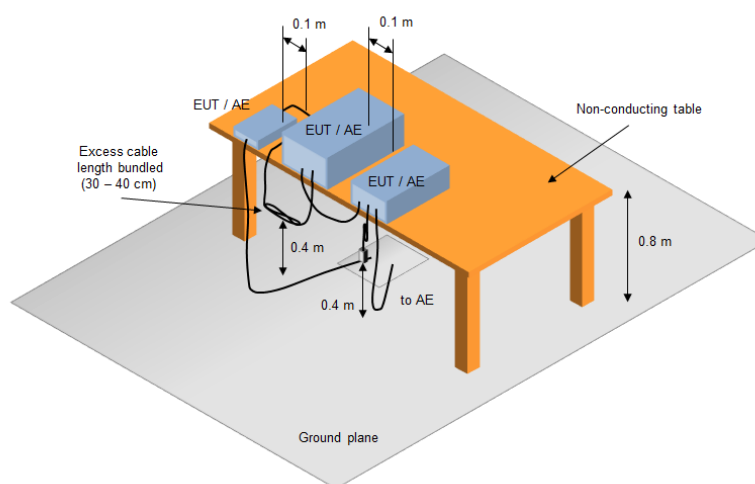
### 2.1.2 Setup



### Equipment placement - Table top



### Test Setup



#### 2.1.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC1	EF00062	2018-07	2021-07
EMI Test Receiver	Keysight	N9038A-526/WXP	EF01070	2019-09	2020-09
Biconical Antenna	R&S	HK 116	EF00030	2019-04	2022-04
LPD Antenna	R&S	HL 223	EF00187	2019-05	2022-05
Temperature/Humidity Sensor	Embedded Data Systems, LLC.	OW-ENV-THR	EF01062	2019-03	2020-03

#### 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

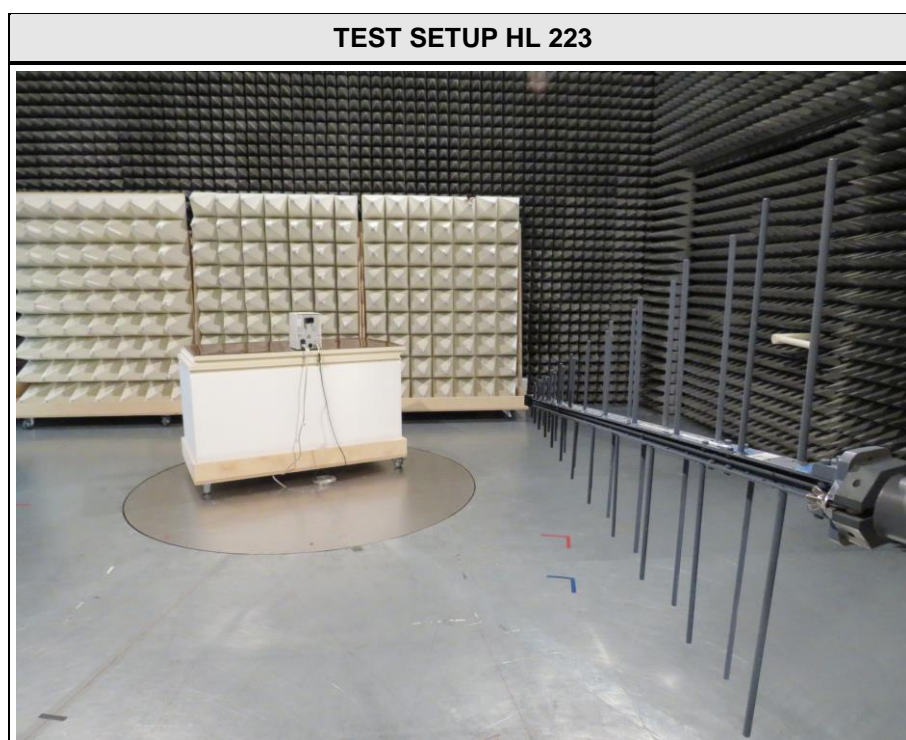
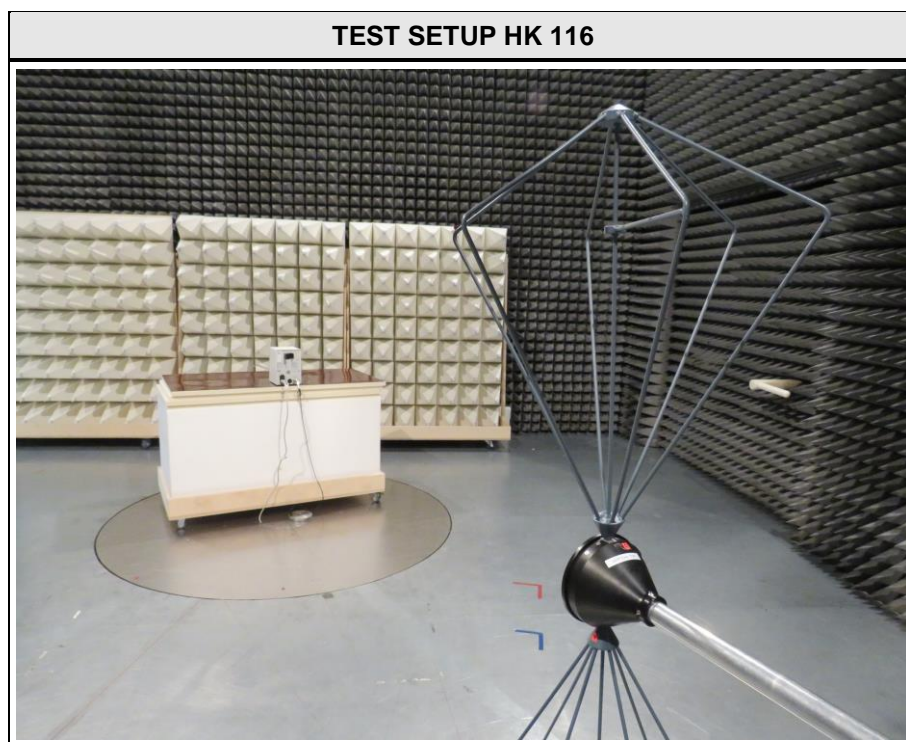
Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB $\mu$ V/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak	74
	Average	54

Class A @ 10 m		
Frequency [MHz]	Detector	Limit [dB $\mu$ V/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	69.5
	Average	49.5

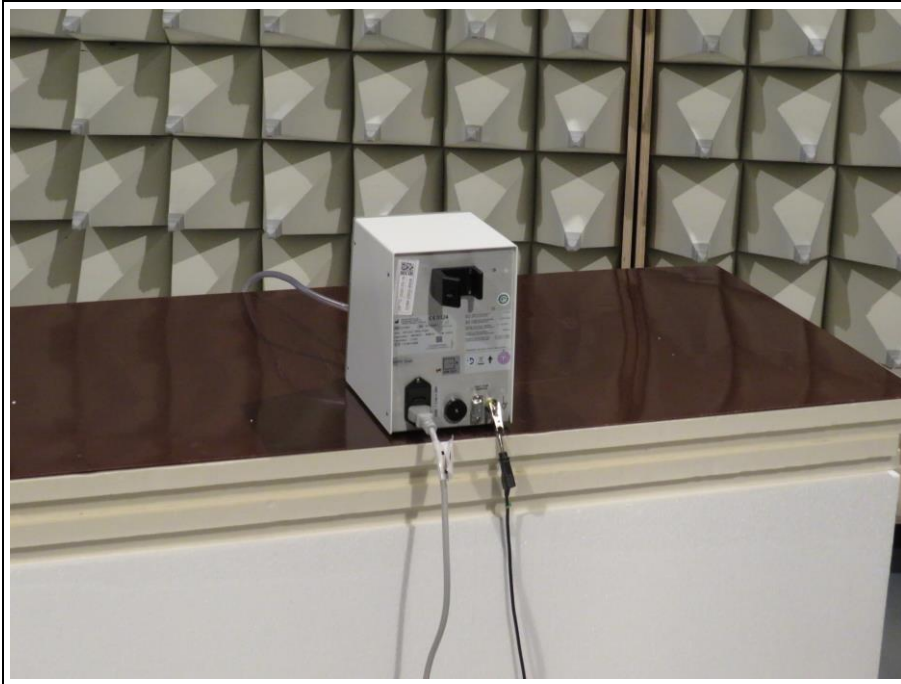
#### 2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1	PASS	-

### 2.1.7 Setup Photos



**TEST SETUP**

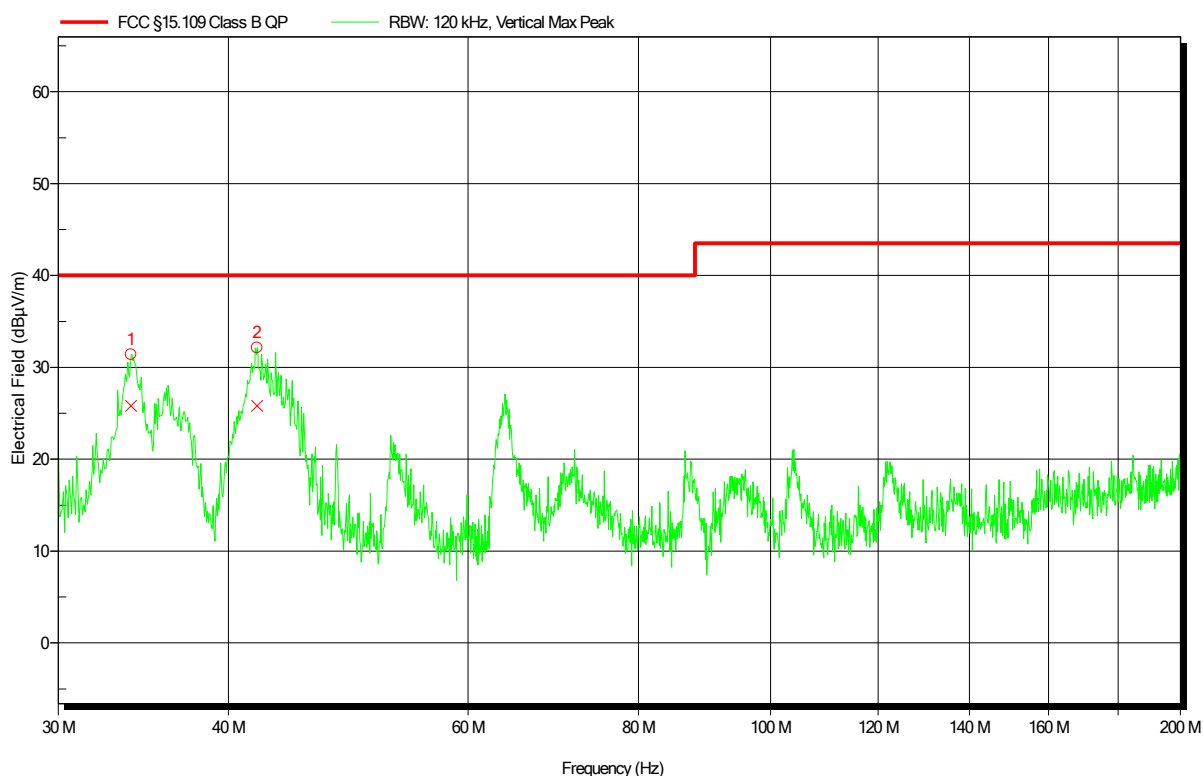


## 2.1.8 Records

### Radiated emissions according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement Distance: 3m  
 Mode: 1  
 Note 1:

Index 1



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	33.933 MHz	25.8 dBµV/m	40 dBµV/m	-14.2 dB	Pass	180 Degree	1 m
2	41.986 MHz	25.82 dBµV/m	40 dBµV/m	-14.18 dB	Pass	180 Degree	1 m

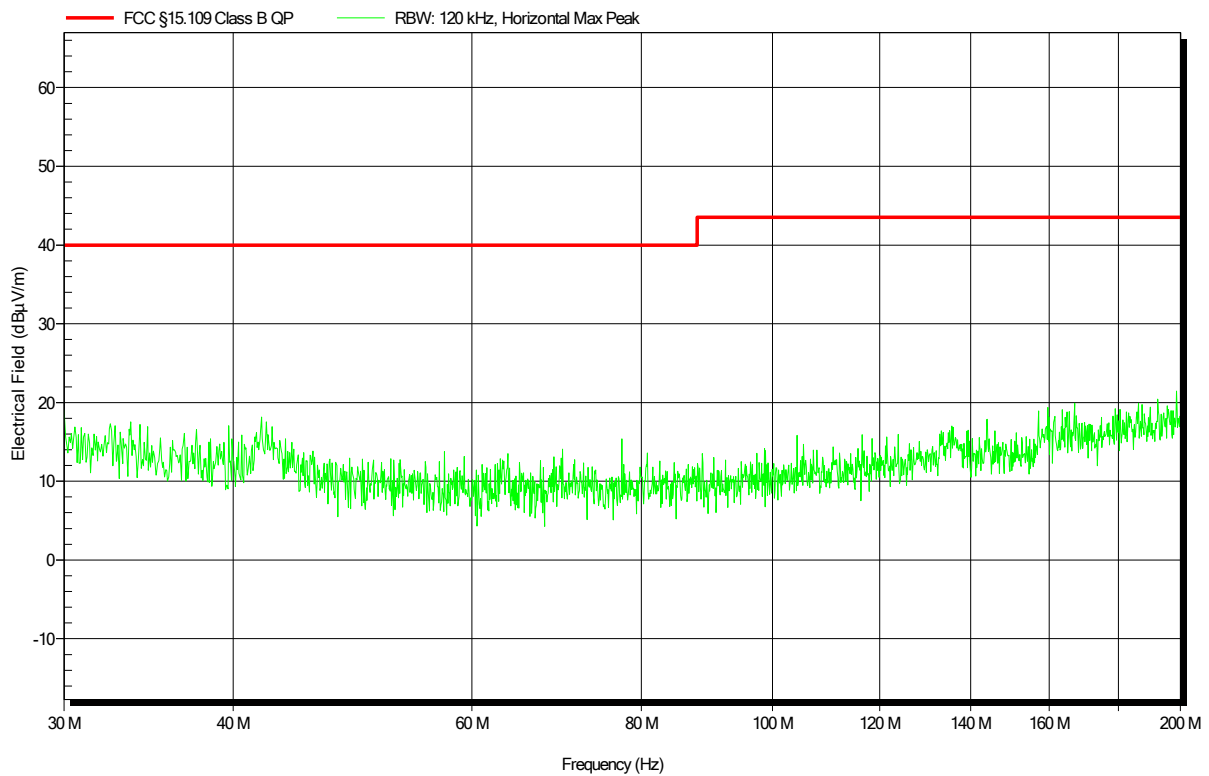
Test Report No.: G0M-2003-8908-EF0115B-V01

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

## Radiated emissions according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement Distance: 3m  
 Mode: 1  
 Note 1:

Index 2

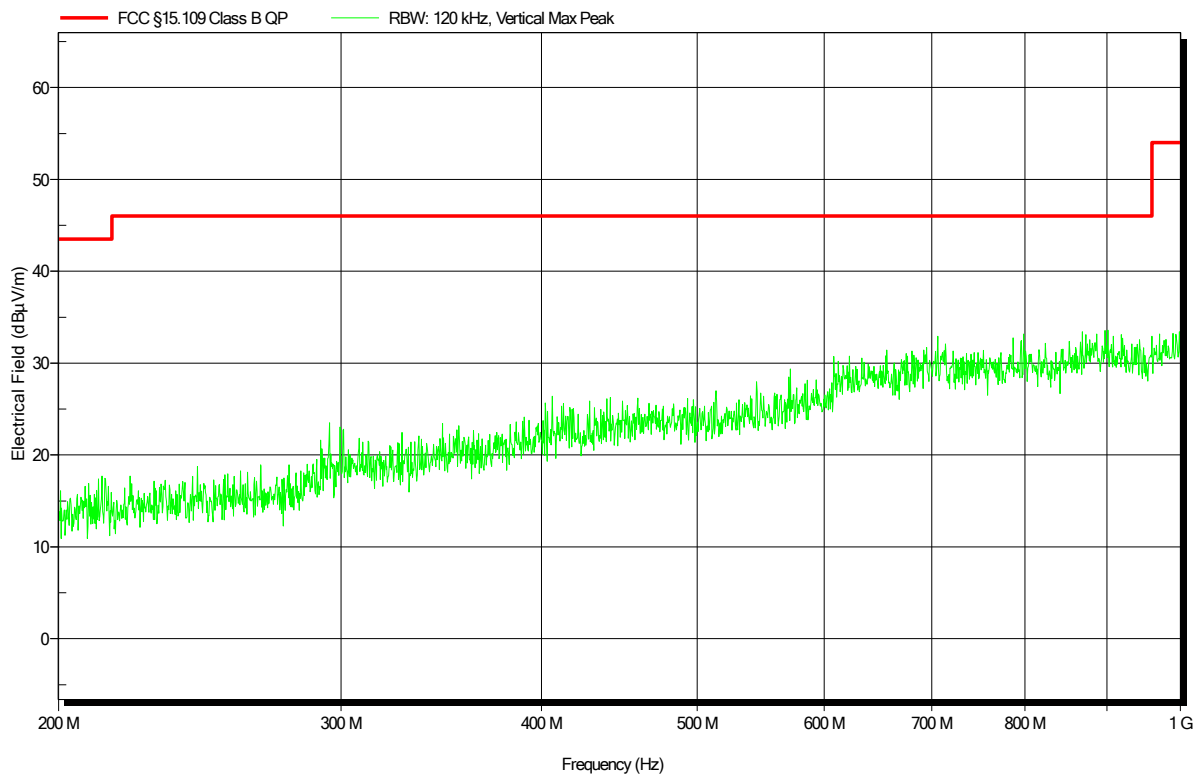




## Radiated emissions according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement Distance: 3m  
 Mode: 1  
 Note 1:

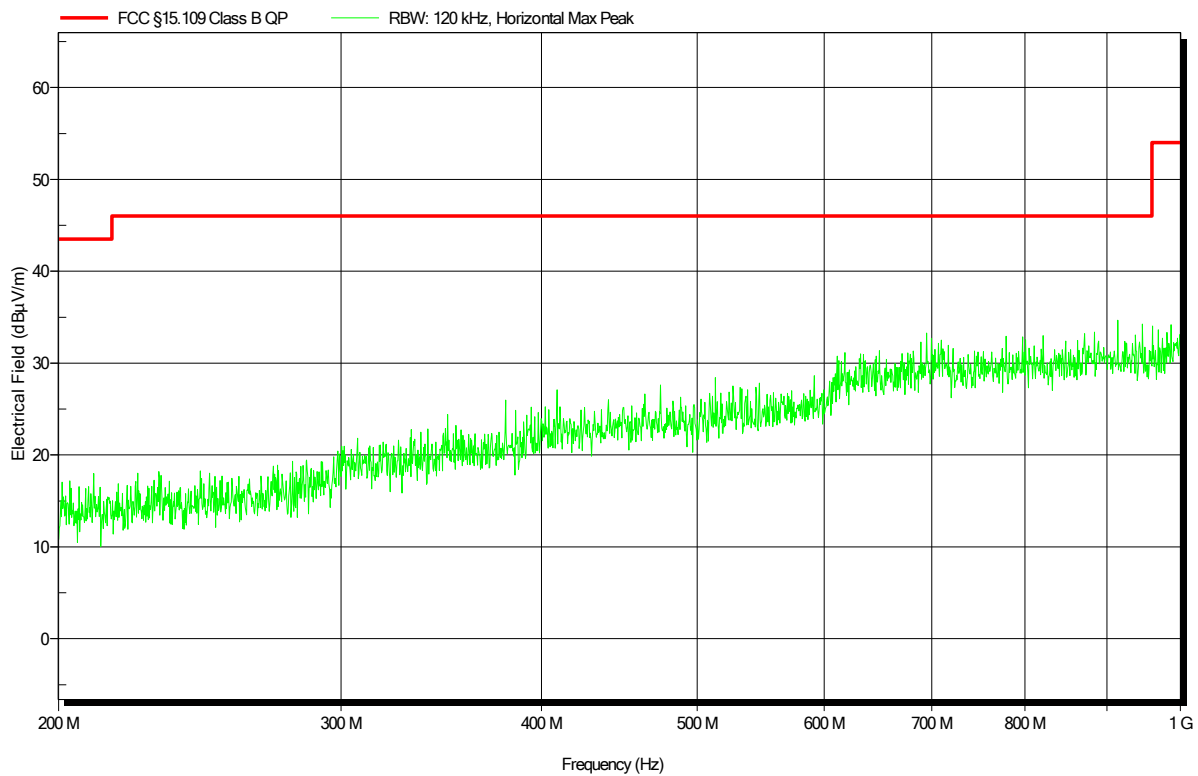
Index 3



## Radiated emissions according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement Distance: 3m  
 Mode: 1  
 Note 1:

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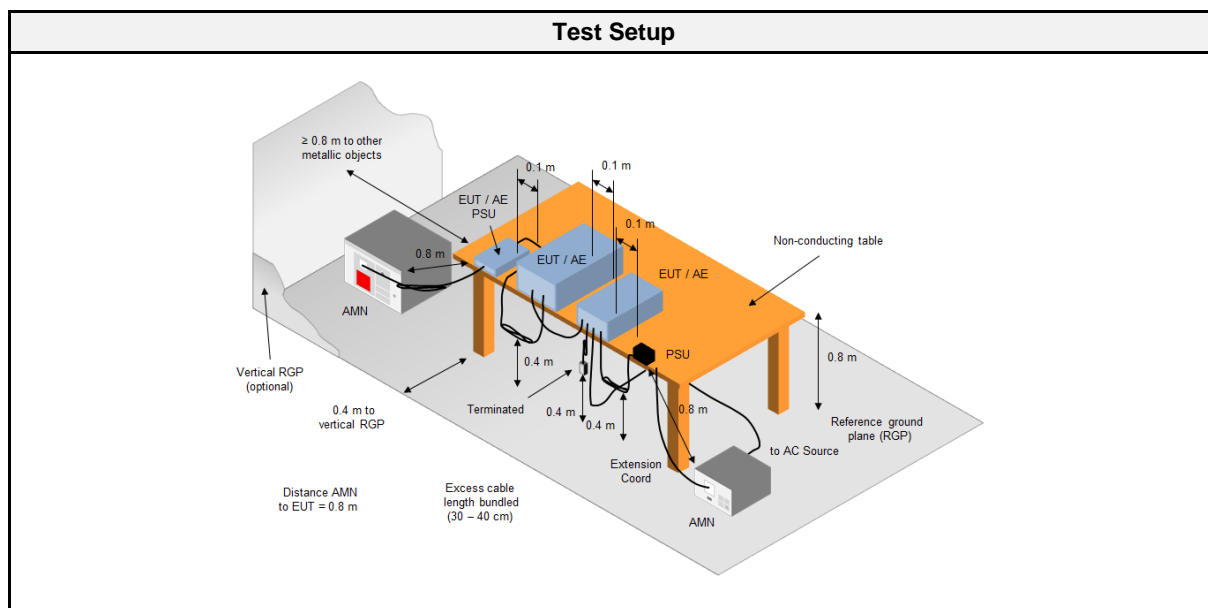
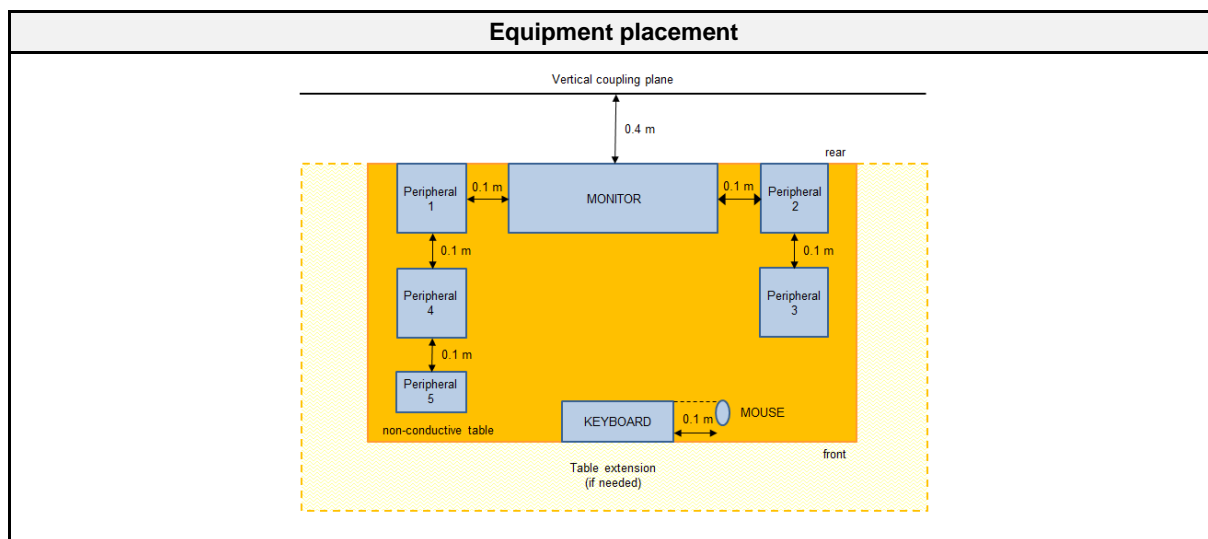


## 2.2 Test Conditions and Results - Conducted emissions acc. to ANSI C63.4

### 2.2.1 Information

Test Information	
Reference	FCC 15.107, ICES-003, 6.1
Reference method	ANSI C63.4:2014+A1:2017 Section 12
Measurement range	150 kHz to 30 MHz
Equipment class	Class B
Equipment type	Table top
Temperature [°C]	23
Humidity [%]	24
Operator	Stephan Liebich
Date	2020-04-20

### 2.2.2 Setup



### 2.2.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	Radimation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Pulse Limiter	R&S	ESH3-Z2	EF01063	2019-07	2020-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2019-10	2020-10
EMI Test Receiver	R&S	ESR 7	EF00943	2019-10	2020-10
Temperature/Humidity Sensor	Embedded Data Systems, LLC.	OW-ENV-THR	EF01062	2019-03	2020-03

### 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

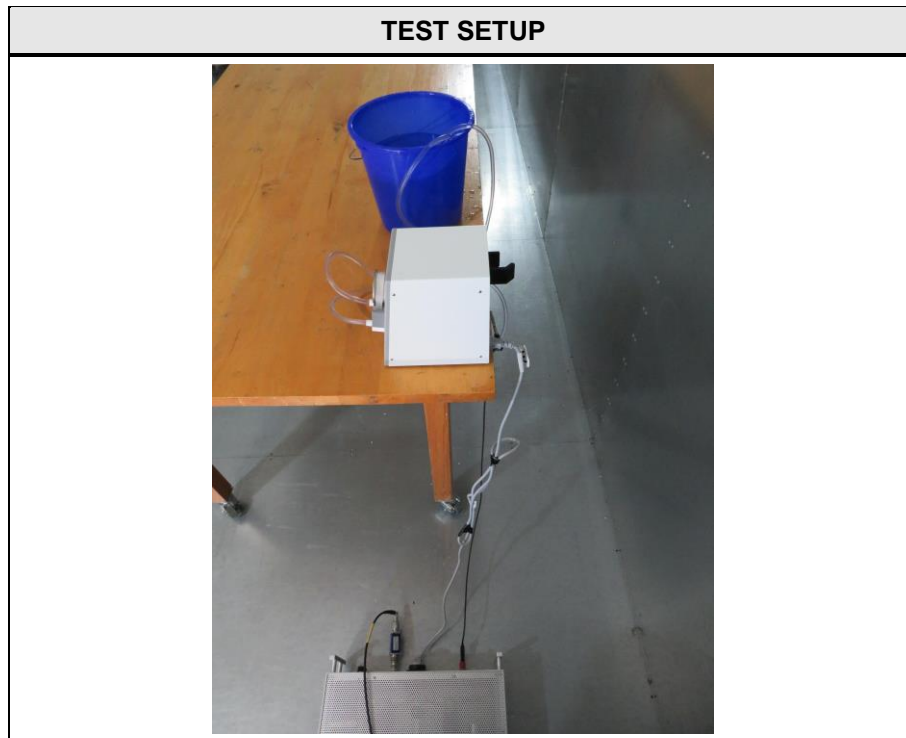
### 2.2.5 Limits

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
AC Mains	AMN	1	1	PASS	-

#### 2.2.7 Setup Photos

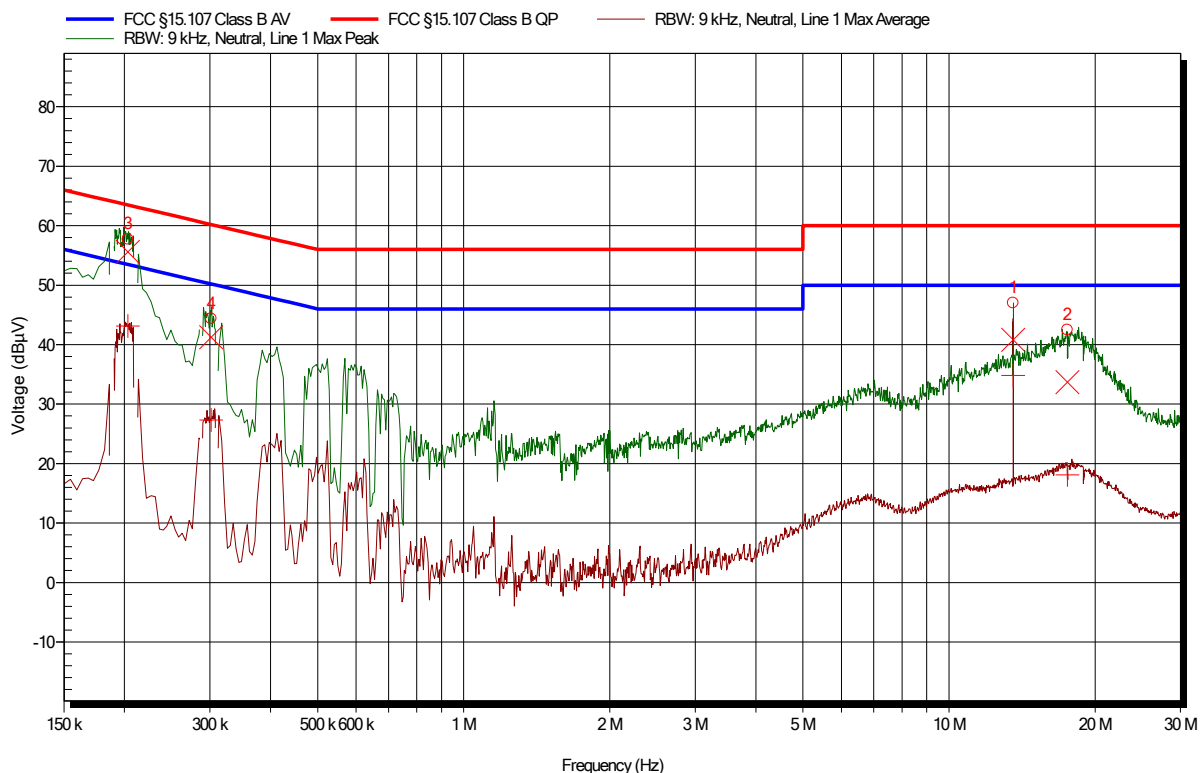


## 2.2.8 Records

### Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 LISN: Schwarzbeck NSLK 8127 RC  
 Mode: 1  
 Applied to Port: AC Mains  
 Note 1: floating

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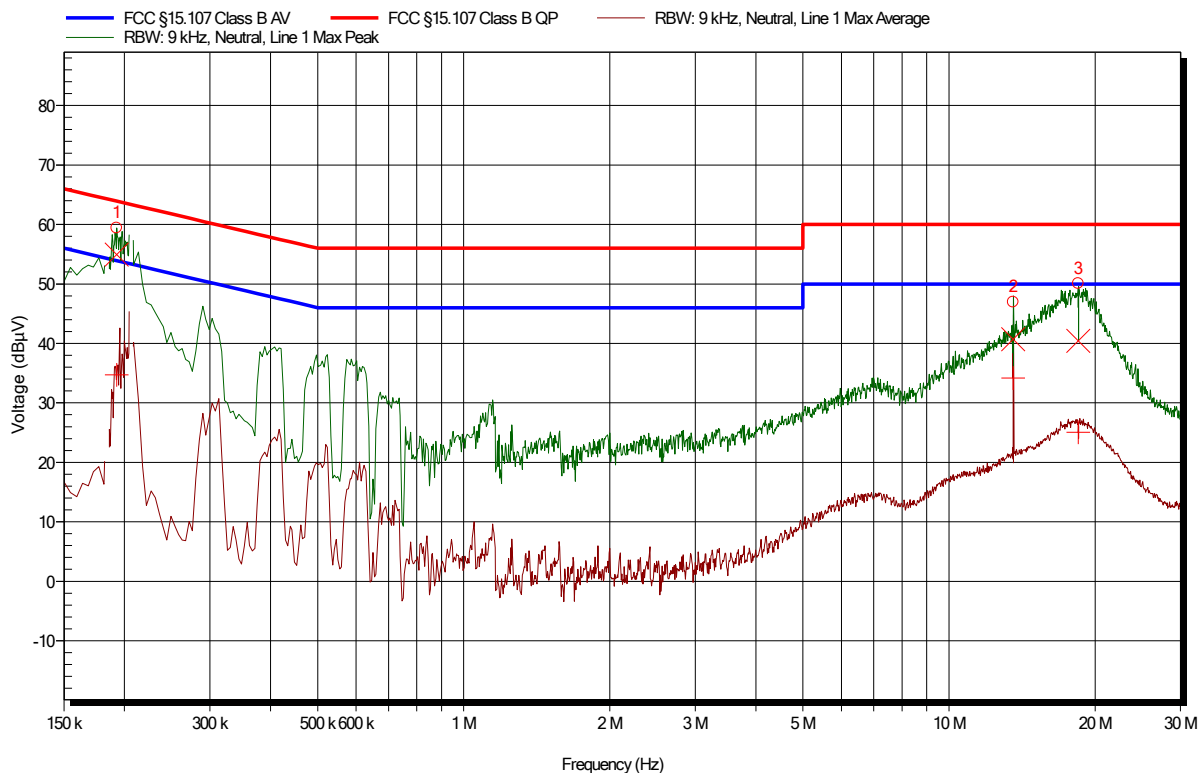
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	13.559 MHz	40.82 dBµV	60 dBµV	-19.18 dB	Pass	Neutral
2	17.543 MHz	33.71 dBµV	60 dBµV	-26.29 dB	Pass	Neutral
3	203.1 kHz	55.6 dBµV	63.48 dBµV	-7.88 dB	Pass	Line 1
4	301.65 kHz	41.26 dBµV	60.2 dBµV	-18.94 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	13.559 MHz	34.84 dBµV	50 dBµV	-15.16 dB	Pass	Neutral
2	17.543 MHz	18.11 dBµV	50 dBµV	-31.89 dB	Pass	Neutral
3	203.1 kHz	43.1 dBµV	53.48 dBµV	-10.38 dB	Pass	Line 1
4	301.65 kHz	27.35 dBµV	50.2 dBµV	-22.85 dB	Pass	Line 1

## Conducted emissions at the mains power port according to FCC part 15B

Project Number: G0M-2003-8908  
 Applicant: W.O.M. WORLD OF MEDICINE GmbH  
 Model Description: Irrigation and Suction Pump for Laparoscopy  
 Model: LAP SUCT./ IRRIG. PUMP  
 Test Sample ID: 28770  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Liebich  
 Test Date: 2020-04-20  
 Operating Conditions: ambient temperature: 23°C  
 power input: 120 V / 60 Hz  
 LISN: Schwarzbeck NSLK 8127 RC (ground)  
 Mode: 1  
 Applied to Port: AC Mains  
 Note 1: ground

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	192.75 kHz	54.93 dBμV	63.92 dBμV	-8.99 dB	Pass	Neutral
2	13.563 MHz	40.69 dBμV	60 dBμV	-19.31 dB	Pass	Neutral
3	18.479 MHz	40.44 dBμV	60 dBμV	-19.56 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	192.75 kHz	34.71 dBμV	53.92 dBμV	-19.21 dB	Pass	Neutral
2	13.563 MHz	34.19 dBμV	50 dBμV	-15.81 dB	Pass	Neutral
3	18.479 MHz	25.06 dBμV	50 dBμV	-24.94 dB	Pass	Neutral

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