

EMC TEST REPORT

FCC 47 CFR Part 15B Industry Canada RSS-Gen

Electromagnetic compatibility - Unintentional radiators

Report Reference No. G0M-1501-4486-EF0115B-V03

Testing Laboratory: Eurofins Product Service GmbH

Address: Storkower Str. 38c

15526 Reichenwalde

Germany

Accreditation:



A2LA Accredited Testing Laboratory, Certificate No.: 1983.01

FCC Filed Test Laboratory, Reg.-No.: 96970

IC OATS Filing assigned code: 3470A

Applicant's name: Olympus Winter & Ibe GmbH

Address: Kuehnstr. 61

22045 Hamburg

Germany

Test specification:

Standard.....: 47 CFR Part 15 Subpart B

RSS-Gen, Issue 4, 2014-11

ANSI C63.4:2009

Equipment under test (EUT):

Product description Electrosurgical Generator

Model No. CELON ELITE ESG-200 (WA90001A, WA90002A)

Additional Models CELON Precision (WA90008A, WA90009A)

Hardware version W7106586-02 - Zero Series / (incl. Rework to W7112354-03)

Firmware / Software version CELON ELITE (EMC Test) Software Version 3.06-X

Contains FCC-ID: 2AERUESG200 IC: 20280-ESG200

Test result Passed



_						
ш	ossib	10	toot	0200	MARC	icte:
_	USSID	16	rest	Lase	VEIL	ILLIS.

- not applicable to test object N/A

- test object does meet the requirement...... P (Pass)

- test object does not meet the requirement...... F (Fail)

Testing:

Compiled by: Jens Marquardt

Tested by (+ signature)...... Jens Marquardt

Approved by (+ signature):

Head of Lab

Marcus Klein

Date of issue 2016-01-28

Total number of pages: 33

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

The EUT exists in four variants. There are two different types of CELON Elite ESG-200 and two different types of CELON Precision. The differences between these variants are types of the front sockets. It is described in the following attached costumer document.





OLYMPUS SURGICAL TECHNOLOGIES EUROPE, Rheinstraße 8, 14513 Teltow

To whom it may concern

Ihr Zeichen: Ihre Nachricht vom: Unser Zeichen: Unsere Nachricht vom:

Name: Erik Paul

Telefax: +49 3328 3519-247 Telefax: +49 3328 3519-23

E-Mail: erik.paul

@olympus-oste.eu

Datum: 2015-09-09

Differences between CELON Elite ESG-200 and CELON Precision

The ESG-200 exists in four variants. There are two different types of CELON Elite ESG-200 (WA90001A, WA90002A) and two different types of CELON Precision (WA90008A, WA90009A).

The hardware is identical except for the following differences: E-type (WA90001A; WA90008A) and B-type (WA90002A; WA90009A) feature different monopolar front sockets (E = "Erbe" socket; B = "Bovie" socket). Each of the four variants has its proper type plate, front panel and labelling.

The software is 100% identical. During final assembly the software is programmed and a software flag is set in order to define the product type – CELON Elite ESG-200 or CELON Precision. This flag enables and disables certain output modes. Only for CELON Elite ESG-200 the monopolar cut mode PulseCut is available. In addition the dedicated RFITT modes are only available with certain RFITT probes and enabled via instrument recognition. For CELON Elite ESG-200 these are Fine RFITT, Pure RFITT, Strong RFITT, and Strong RFITT + RCAP. For CELON Precision these are Pulse RFITT, RFITT, and Strong RFITT.

Best regards,

Erik Paul

Manager Regulatory Affairs

Regulatory Affairs

1/1

OLYMPUS SURGICAL TECHNOLOGIES EUROPE

Olympus Winter & Ibe GmbH, Kuehnstraße 61, 22045 Hamburg, Postfach 70 17 09, 22017 Hamburg
Telefon: 040 669 66-0, Fax: 040 669 66-2109, www.olympus-oste.eu
Geschäftsführer: Dr. André Roggan (Vorsitzender), Stefan Kaufmann, Tetsuski Mori, Alkiniro Taguchi, Ken Yoshimasu, Reinhard Zentner
Sitz der Gesellschaft: Hamburg, Handelsregister, Amtspericht Hamburg HRB 16 328



Version History

Version	Issue Date	Remarks		Revised by
V01	2015-06-29	Initial Release		
V02	2015-10-22	Replaced document: Replaced by:	G0M-1501-4486-EF0115B-V01 G0M-1501-4486-EF0115B -V02	S. Zunke
		Reason:		
		Change of models. Cost added.	tumer declaration for different models	
V03	2016-01-28	Hardware version and S	oftware version corrected	J. Marquardt



REPORT INDEX

1	EQUIPMENT (TEST ITEM) DESCRIPTION	6
1.1	Photos – Equipment external	7
1.2	Photos – Equipment internal	8
1.3	Photos – Test setup	16
1.4	Supporting Equipment Used During Testing	17
1.5	Input / Output Ports	17
1.6	Operating Modes and Configurations	18
1.7	Test Equipment Used During Testing	19
1.8	Sample emission level calculation	20
2	RESULT SUMMARY	21
3	TEST CONDITIONS AND RESULTS	22
3.1	Test Conditions and Results – Radiated emissions	22
3.2	Test Conditions and Results – AC power line conducted emissions	30

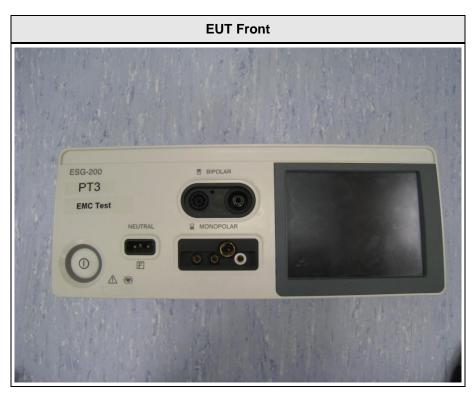


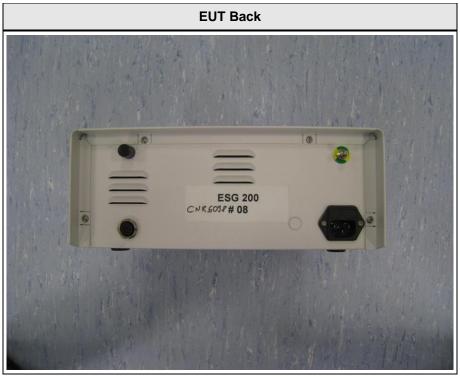
1 Equipment (Test item) Description

Description	Electrosurgical Gene	rator	
Model	CELON ELITE ESG-200 (WA90001A, WA90002A)		
Additional Models	CELON Precision (W	A90008A, WA90009A)	
Serial number	W000004		
Hardware version	W7106586-02 - Zero	Series / (incl. Rework to W7112354-03)	
Software / Firmware version	CELON ELITE (EMC Test) Software Version 3.06-X		
Contains FCC-ID	20280-ESG200		
Contains IC	N/A		
Power supply	100 – 120 / 220 – 24	0 V 50/60Hz	
Radio	Туре	RFID 13.56 MHz	
Manufacturer	Olympus Winter & Ibo Kuehnstr. 61 22045 Hamburg Germany	e GmbH	
Highest emission frequency	Fmax [MHz] = 400		
Device classification	Class B		
Equipment type	Tabletop		
Number of tested samples	1		



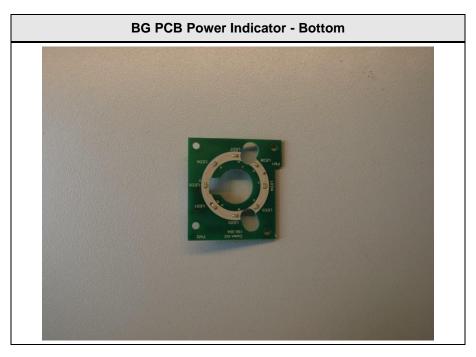
1.1 Photos – Equipment external

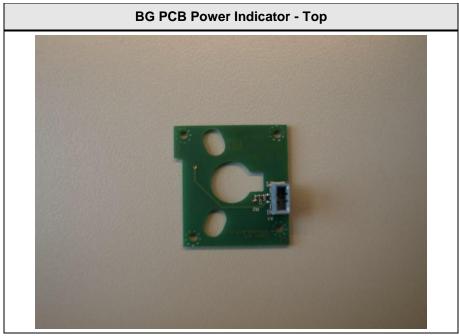






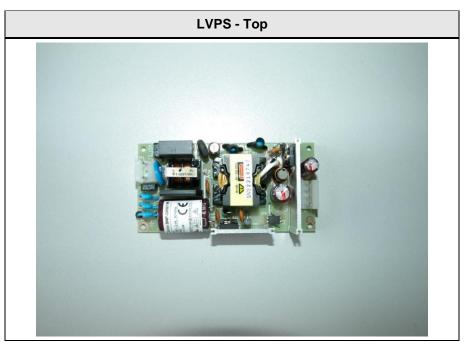
1.2 Photos – Equipment internal

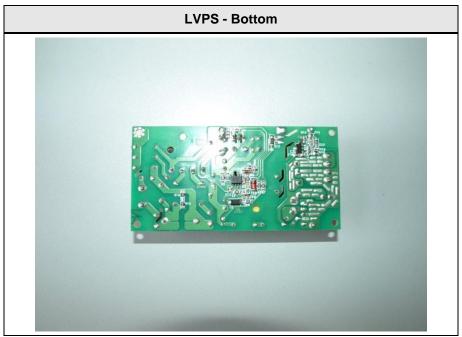




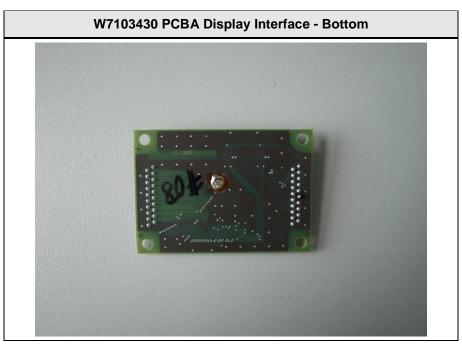


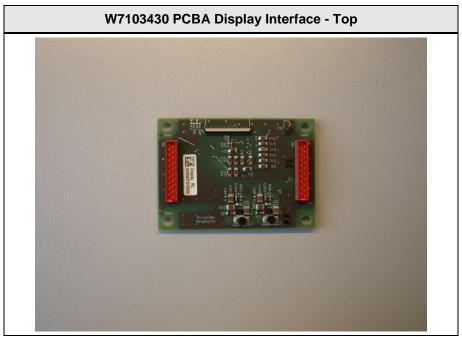
Product Service





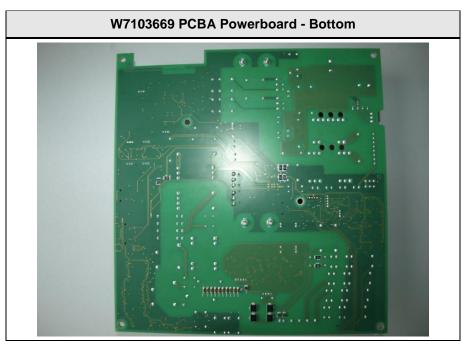








Product Service







Product Service











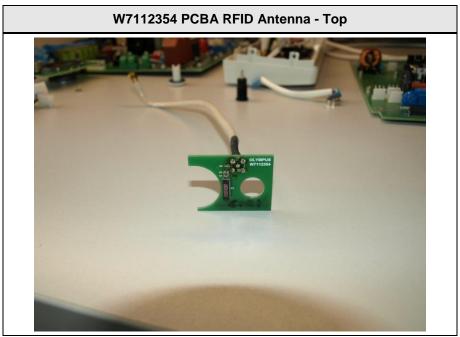






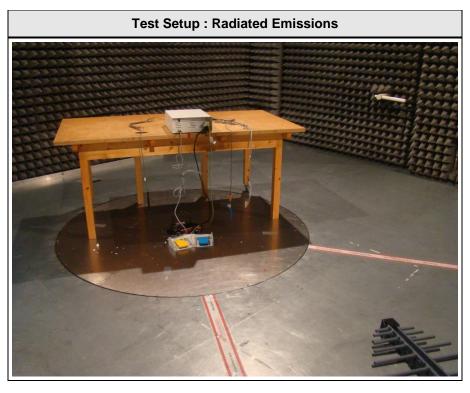


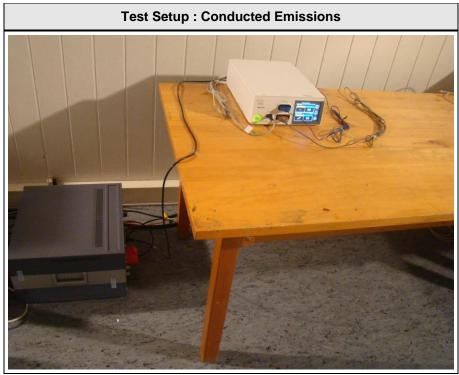






1.3 Photos - Test setup







1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Neutral electrode cable	OLYMPUS	MAJ-814	
AE	Active electrode cable w/ handswitch	BOWA	215-045 (4.5m)	
AE	Bipolar electrode cable	BOWA	351-040 (4.5m)	
AE	Neutral electrode	OLYMPUS	MAJ-897	
AE	Bipolar forceps	BOWA	605-002	
AE	Active electrode	BOWA	500-011	
AE	PE connection cable	N/A	N/A	
AE	Bipolar electrode with RDIF	OLYMPUS	WB990310	

*Note: Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or SIM : Simulator (Not Subjected to Test)

CABL: Connecting cables

1.5 Input / Output Ports

Port #	Name	Type*	Max. Cable Length	Cable Shielded	Comments
1	AC Power	AC	>3m	no	
2	Foot switch	I/O	4m	yes	
3	Neutral	I/O	>3m	no	
4	Bipolar	I/O	4.5m	no	
5	Monopolar	I/O	4.5m	no	
6	Potential equalization conductor		<3m	no	

*Note: Use the following abbreviations:

AC : AC power port
DC : DC power port
N/E : Non electrical

I/O : Signal input or output port

TP : Telecommunication port



1.6 Operating Modes and Configurations

Mode #	Description
1	RFID Permanent-Standby

Configuration	# EUT Configuration
1	EUT fully equipped and powered



1.7 Test Equipment Used During Testing

	Measurement	Software	
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.15

Radiated emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD-Antenne	R&S	HL 223	EF00187	2014-03	2017-03
Horn antenna	Schwarzbeck	BBHA 9120D	EF00018	2013-09	2016-09
EMI Test Receiver	R&S	ESU26	EF00887	2015-01	2016-01

Conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2014-11	2016-11
AMN	R&S	ESH3-Z5	EF00036	2014-12	2016-12
EMI Test Receiver	R&S	ESCS 30	EF00295	2014-10	2015-10



1.8 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 ($dB\mu V$) + A.F. (dB) = Net field strength ($dB\mu V/m$)

Net:

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

Limit:

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

Limit $(dB\mu V/m) = 20*log (\mu V/m)$

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 dB μ V + 26 dB = 47.5 dB μ V/m : 47.5 dB μ V/m - 57.0 dB μ V/m = -9.5 dB



2 Result Summary

Requirement – Test	Reference Method	Result	Remarks
Radiated emissions	ANSI C 63.4	PASS	
AC power line conducted emissions	ANSI C63.4	PASS	
	adiated emissions	adiated emissions ANSI C 63.4	adiated emissions Method ANSI C 63.4 PASS



3 Test Conditions and Results

3.1 Test Conditions and Results - Radiated emissions

Radiated emission	ons acc. FCC 47 C	FR 15.109) / IC RSS-Gen	Verdict: PASS					
Laboratory	Parameters:	Requir	ed prior to the test						
Ambient Temperature			15 to 35 °C	23°C					
Relative Humidity			30 to 60 %	32%					
Test according referenced standards		Reference Method							
		ANSI C63.4							
Sample is tested with respect to the requirements of the equipment class		Equipment class							
		Class B							
Test frequency range determined from highest emission frequency		Highest emission frequency							
		Fmax [MHz] = 400							
Fully configured sample scanned over the following frequency range		Frequency range							
		30 MHz to 2 GHz							
Operating mode		1							
Configuration		1							
	L	imits and	results Class B						
Frequency [MHz]	Quasi-Peak [dBµV/r	n] Result	Average [dBµV/m]	Result	Peak [dBµV/m]	Result			
30 – 88	40	PASS	-		-	-			
88 – 216	43.5	PASS	-		-	-			
216 – 960	46	PASS	-		-	-			
960 – 1000	54	PASS	-		-	-			
> 1000	-	-	54	PASS	74	PASS			
Comments:		<u> </u>		•		•			



Test Procedure:

The test site is in accordance with ANSI C63-4:2009 requirements and is listed by FCC. The measurement procedure is as follows:

- 1) The EUT was placed on a 0.8 m non conductive table at a 3 m distance from the receive antenna (ANSI C63.4: 2009 item 6.2)
- 2) The antenna output was connected to the measurement receiver
- 3) 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
- 4) Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.



Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH
EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC
Antenna: Rohde & Schwarz HK 116, Vertical

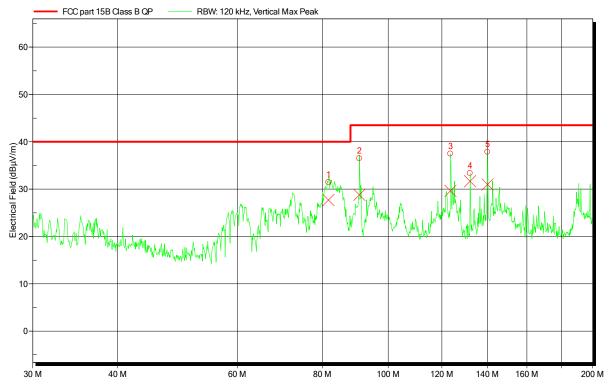
Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:

Index 44



Frequency (Hz)

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
81.72 MHz	27.69 dBµV/m	40 dBμV/m	-12.31 dB	Pass
90.732 MHz	28.77 dBµV/m	43.5 dBµV/m	-14.73 dB	Pass
123.486 MHz	29.64 dBµV/m	43.5 dBµV/m	-13.86 dB	Pass
132 MHz	31.66 dBµV/m	43.5 dBµV/m	-11.84 dB	Pass
140.04 MHz	31 dBµV/m	43.5 dBµV/m	-12.5 dB	Pass



Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC

Antenna: Rohde & Schwarz HK 116, Horizontal

Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:

Index 46 FCC part 15B Class B QP RBW: 120 kHz, Horizontal Max Peak 60 50 Electrical Field (dBµV/m) 10 0 60 M 80 M 100 M 120 M 140 M 160 M 30 M 40 M 200 M Frequency (Hz) Quasi-Peak Quasi-Peak Limit Quasi-Peak Difference Quasi-Peak Status Frequency -9.5 dB 90.894 MHz 34 dBµV/m 43.5 dBµV/m Pass $43.5~dB\dot{\mu}V/m$ -18.33 dB 110.76 MHz $25.17~dB\mu V/m$ Pass 131.994 MHz 33.21 dBµV/m $43.5 dB\mu V/m$ -10.29 dB Pass 27.71 dBµV/m $43.5~dB\mu V/m$ 189.6 MHz -15.79 dB **Pass** 197.988 MHz $29.15 dB\mu V/m$ $43.5 dB\mu V/m$ -14.35 dB Pass



Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC
Antenna: Rohde & Schwarz HL 223, Vertical

Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:

Index 42 FCC part 15B Class B QP RBW: 120 kHz, Vertical Max Peak 60 55 50 45 Electrical Field (dBµV/m) 20 15 10 400 M 200 M 300 M 500 M 600 M 700 M 800 M 1 G Frequency (Hz) Quasi-Peak Quasi-Peak Limit Quasi-Peak Difference Quasi-Peak Status Frequency 43.5 dBµV/m 202.94 MHz 26.21 dBµV/m -17.29 dB Pass 28.13 dBµV/m 217.712 MHz 46 dBµV/m -17.87 dB Pass 223.712 MHz 30.76 dBµV/m 46 dBµV/m -15.24 dB Pass 31.23 dBµV/m $46~dB\mu V/m$ 229.706 MHz -14.77 dB **Pass** 461.996 MHz 38.99 dBµV/m $46 dB\mu V/m$ -7.01 dB Pass



Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC

Antenna: Rohde & Schwarz HL 223, Horizontal

Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:

Index 38 FCC part 15B Class B QP RBW: 120 kHz, Horizontal Max Peak 60 55 50 45 Electrical Field (dBμV/m) 40 25 20 15 10 200 M 300 M 400 M 500 M 600 M 700 M 800 M 1 G Frequency (Hz) Quasi-Peak Quasi-Peak Limit Quasi-Peak Difference Quasi-Peak Status Frequency 201.32 MHz -9.54 dB 33.96 dBµV/m 43.5 dBµV/m Pass -10.87 dB 32.63 dBµV/m $43.5~dB\mu V/m$ Pass 213.38 MHz 220.292 MHz 31.65 dBµV/m 46 dBµV/m -14.35 dB Pass 29.52 dBµV/m 229.706 MHz 46 dBµV/m -16.48 dB **Pass** 263.996 MHz $41.56 dB\mu V/m$ $46 dB\mu V/m$ -4.44 dB Pass



Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC

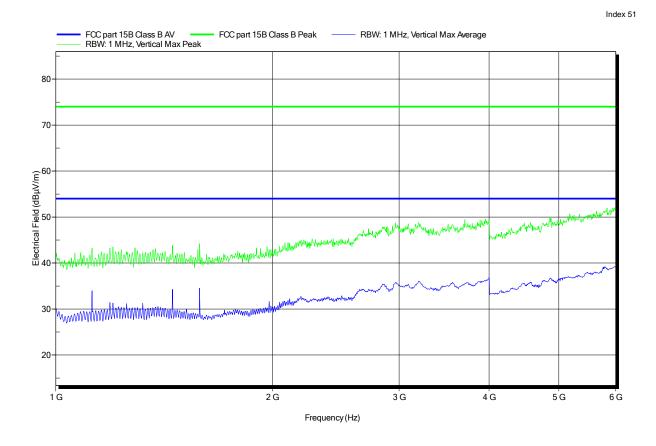
Antenna: Schwarzbeck BBHA 9120D, Vertical

Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:





Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Pflug

Test Conditions: Tnom: 23°C, Unom: 120VAC

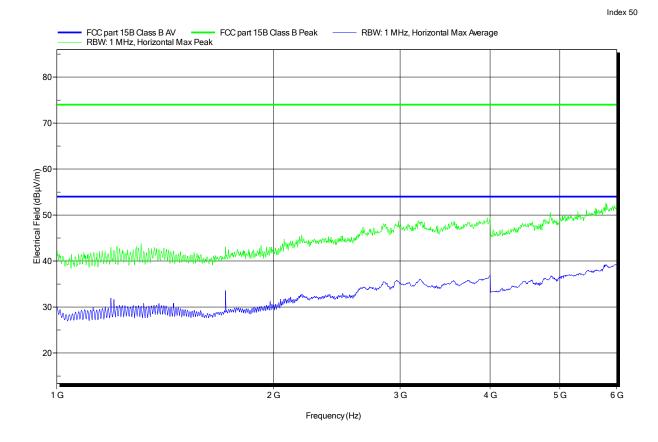
Antenna: Schwarzbeck BBHA 9120D, Horizontal

Measurement distance: 3m

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:





3.2 Test Conditions and Results – AC power line conducted emissions

Conducted emission	s acc. FCC 47	CFR 15.107 / IC RSS-Gen			Verdict: PASS		
Laboratory Para	meters:	Requ	uired prior to the t	est	During the test		
Ambient Temp	erature		15 to 35 °C		23°C		
Relative Hun	nidity		30 to 60 %		;	32%	
Test according referenced standards		Reference Method					
		ANSI C63.4					
Fully configured sample scanned over the following frequency range		Frequency range					
		0.15 MHz to 30 MHz					
Sample is tested with respect to the requirements of the equipment class		Equipment class					
		Class B					
Points of Application		Application Interface					
AC Mains		LISN					
Operating mode		1					
Configuration		1					
	L	imits and	l results Class B				
Frequency [MHz]	Quasi-Peak [dBµV]	Result	Avera	age [dBµV]	Result	
0.15 to 5	66 to 56	*	PASS	50	6 to 46*	PASS	
0.5 to 5	56		PASS	46		PASS	
5 to 30	60		PASS	50		PASS	

= min accidaces milearly min are regarding of are in



Test Procedure:

- 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: 2009 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



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

Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH
EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Yu

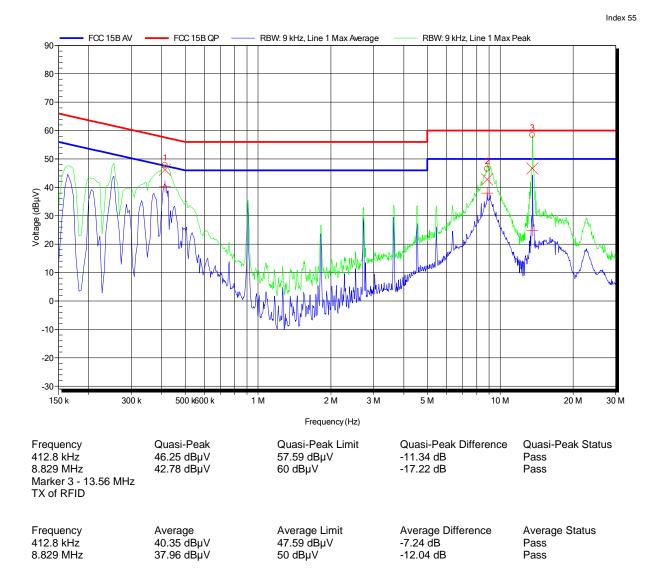
Test Conditions: Tnom: 23°C, Unom: 120VAC

LISN: ESH2-Z5 L

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:





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

Project number: G0M-1501-4486

Manufacturer: Olympus Winter & Ibe GmbH
EUT Name: High frequency surgical generator

Model: ESG-200 incl. RFID

Test Site: Eurofins Product Service GmbH

Operator: Mr. Yu

Test Conditions: Tnom: 23°C, Unom: 120VAC

LISN: ESH2-Z5 N

Mode: RFID permanent+standby

Test Date: 2015-03-12

Note:

