

EMC TEST REPORT

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

Report Reference No	G0M-1908-8402-EF0115B-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-3 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	eResearchTechnology GmbH
Address	Sieboldstrasse 3 97230 Estenfeld GERMANY
Test Specification	
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	Electrical System (Charging Station)
Model(s)	WSCS
Additional Model(s)	None
Brand Name(s)	MasterScope
Hardware Version(s)	WSCS 0101
Software Version(s)	N/A (no software installed on device)
FCC-ID	2AAUFWSCS01
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	2019-08-25
Report:	
Compiled by	Ruslan Colbasiuc
Tested by (+ signature) (Responsible for Test)	Ruslan Colbasiuc 
Approved by (+ signature) (Deputy Head of Lab)	Jens Marquardt 
Date of Issue	2020-01-30
Total number of pages	29
General Remarks:	
<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>	
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	2020-01-30	Initial Release	

REPORT INDEX

1	Equipment (Test Item) Under Test.....	6
1.1	Equipment Ports.....	7
1.2	Equipment Photos – Internal	8
1.3	Equipment Photos – External.....	10
1.4	Support Equipment.....	14
1.5	Operational Modes	15
1.6	EUT Configuration.....	16
1.7	Sample emission level calculation.....	17
2	Result Summary.....	18
2.1	Test Conditions and Results - Radiated emissions acc. to ANSI C63.4.....	19
2.2	Test Conditions and Results - Conducted emissions acc. to ANSI C63.4.....	25

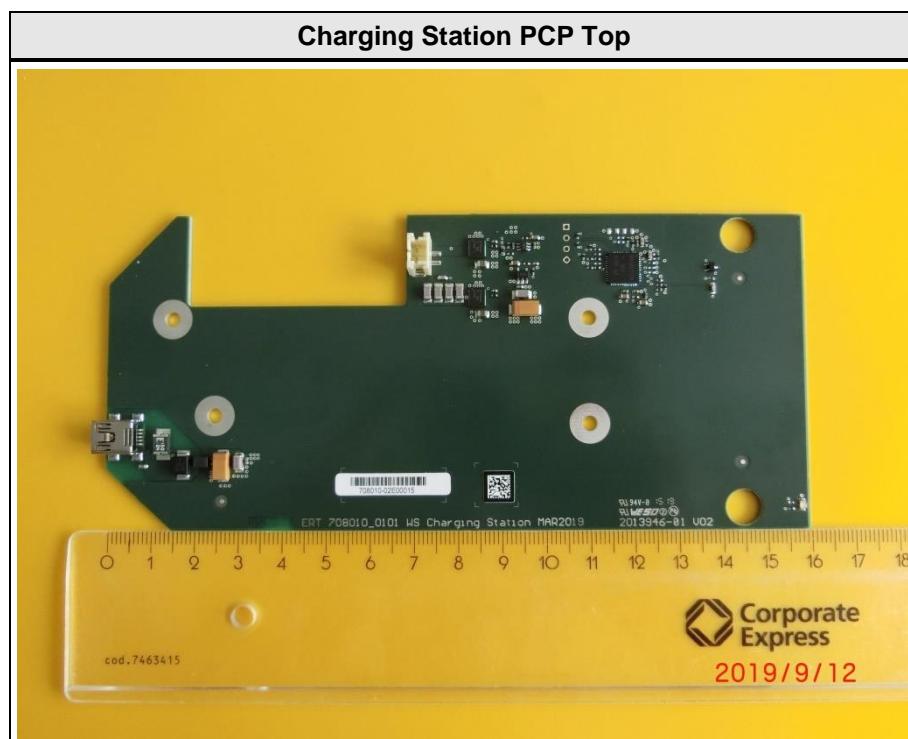
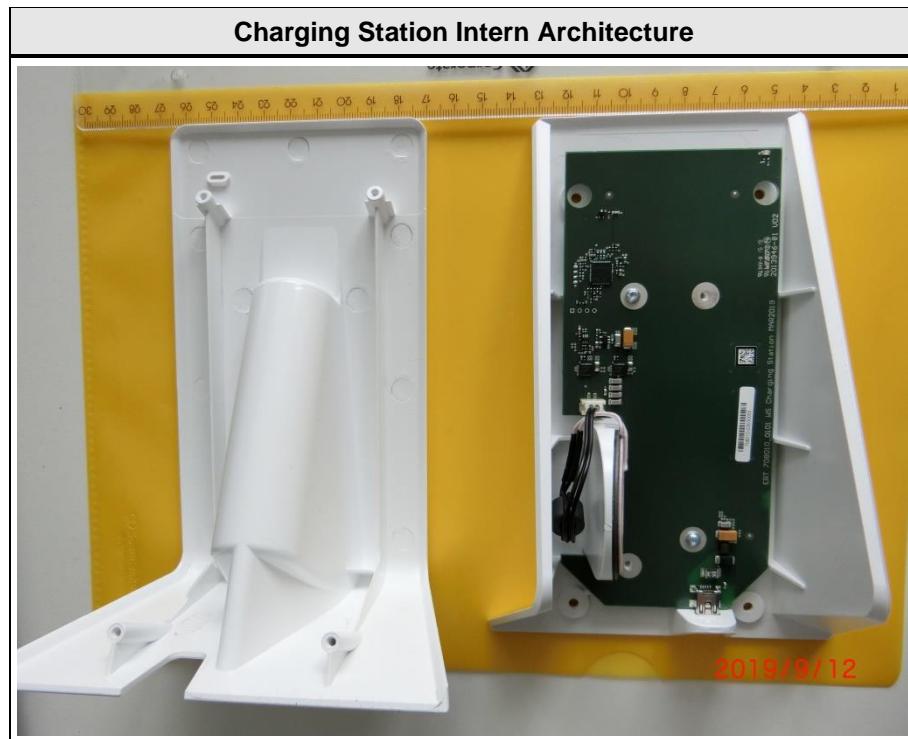
1 Equipment (Test Item) Under Test

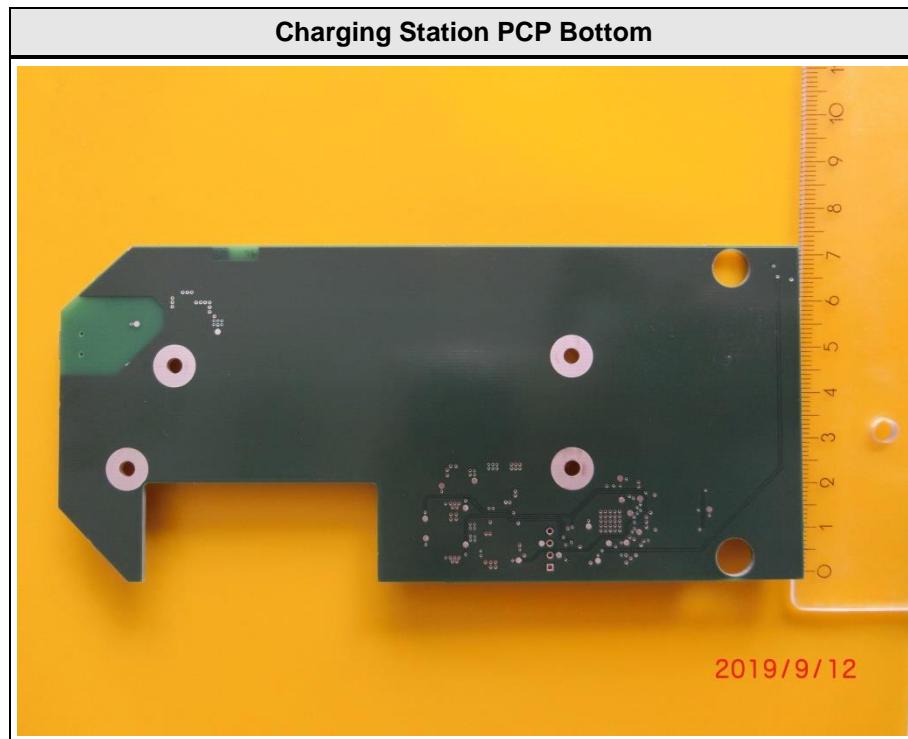
Description	Electrical System (Charging Station)	
Model	WSCS	
Additional Model(s)	None	
Brand Name(s)	MasterScope	
Serial Number(s)	5100000C	
Hardware Version(s)	WSCS 0101	
Software Version(s)	N/A (no software installed on device)	
FCC-ID	2AAUFWSCS01	
IC	n/a	
Class	Class B	
Equipment type	Table top	
Highest internal frequency [MHz]	42	
Supply Voltage	V_{NOM}	120 VDC / 60 Hz
AC/DC-Adaptor	Model	GTM41134-0606-1.0
	Vendor	GlobTek
	Input	100 – 240 VAC / 50 / 60 Hz
	Output	5 VDC / 1.2 A
Manufacturer	eResearchTechnology GmbH Sieboldstrasse 3 97230 Estenfeld GERMANY	

1.1 Equipment Ports

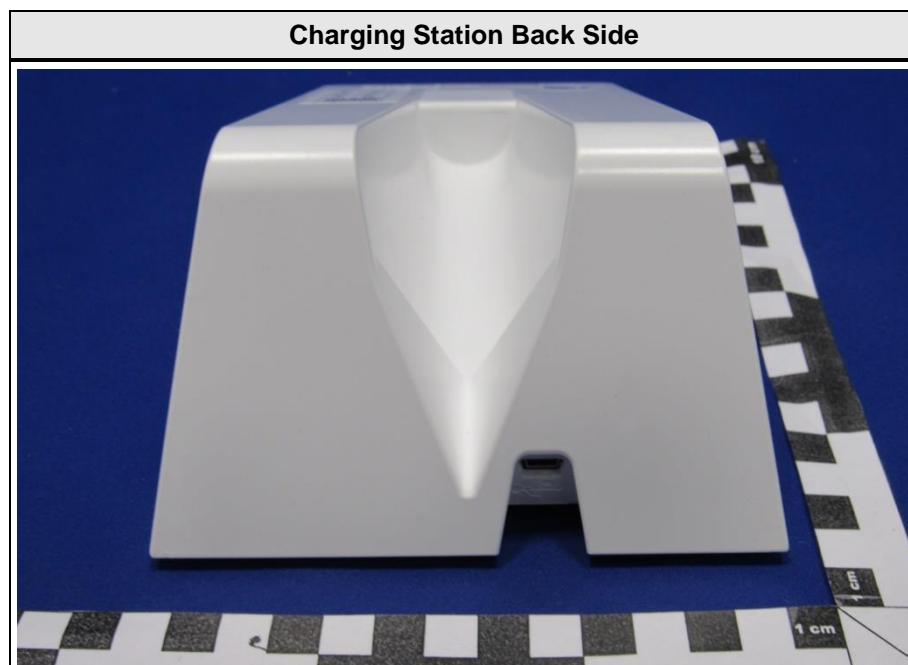
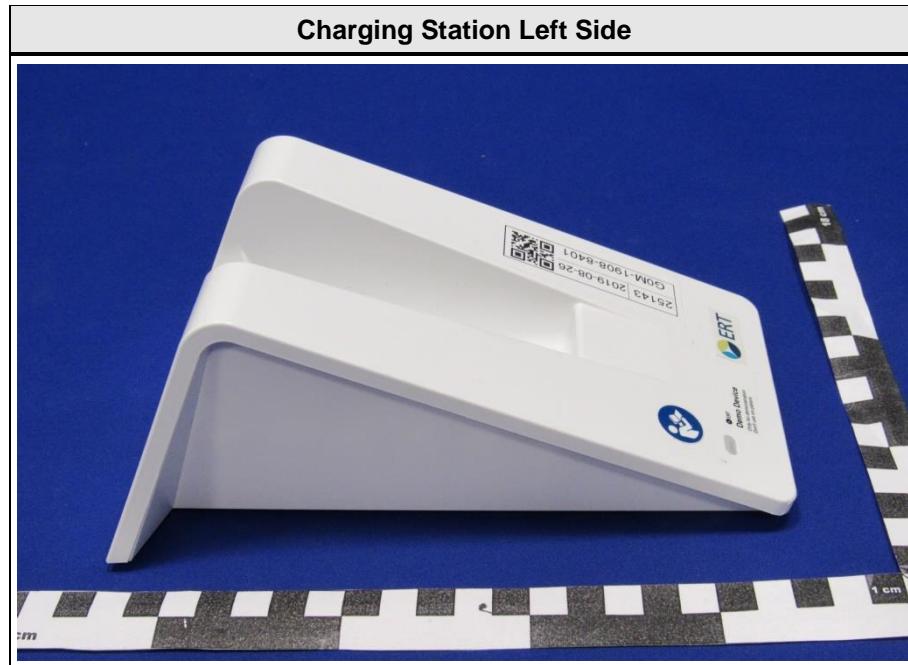
Name	Type	Attributes	Comment
Mains	AC	Count: 1 Direction: In Service only: No	
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
NE	Non-electrical port		

1.2 Equipment Photos – Internal





1.3 Equipment Photos – External



Charging Station Back Side

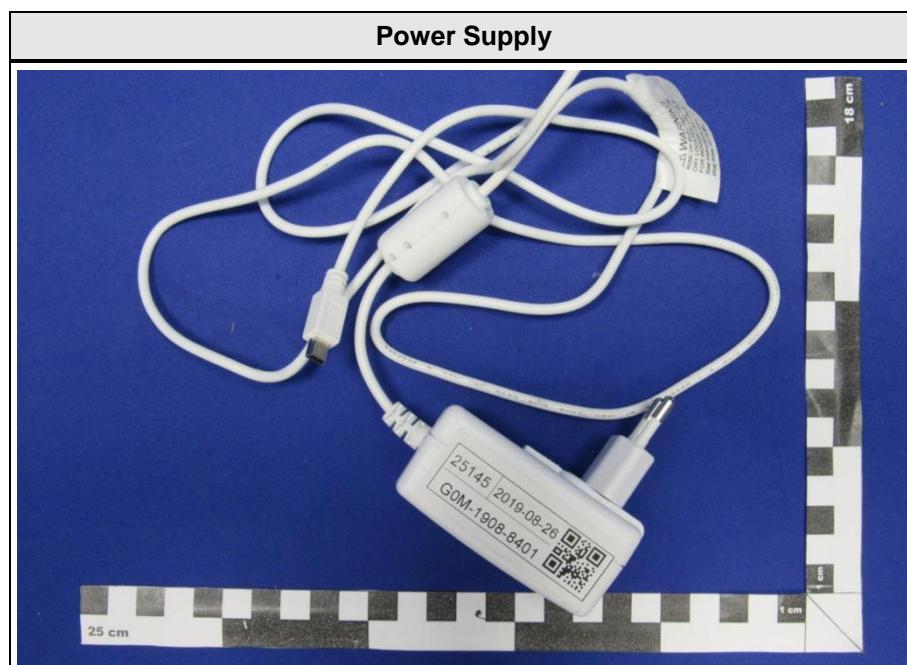
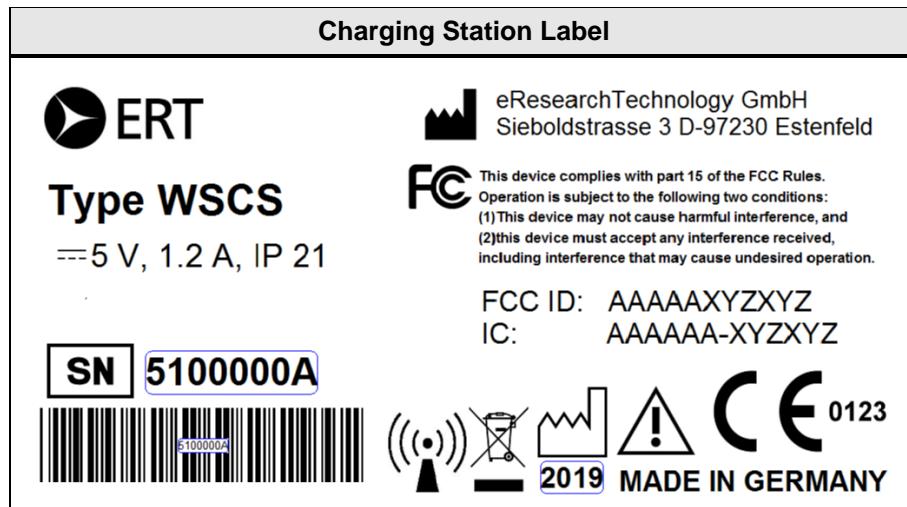


Charging Station Top Side



Test Report No.: GOM-1908-8402-EF0115B-V01

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





Test Report No.: G0M-1908-8402-EF0115B-V01

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

Page 13 of 29

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Spirometer	eResearch	WSCS	
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
MON	Monitoring Equipment			
CBL	Connecting Cable			
Comment:				

1.5 Operational Modes

Mode #	Description
1	Charging
Comment:	

1.6 EUT Configuration

Configuration #	Description
1	EUT is connected with the power supply. On the EUT is mounted the WSSU sensor, charging process is active, RF communication active.
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 dB μ V. 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 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:

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

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 +21.5 dB μ V + 26 dB/m	= Net Reading = 47.5 dB μ V/m	:	Net reading - FCC limit 47.5 dB μ V/m - 57.0 dB μ V/m	= Margin = -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:				

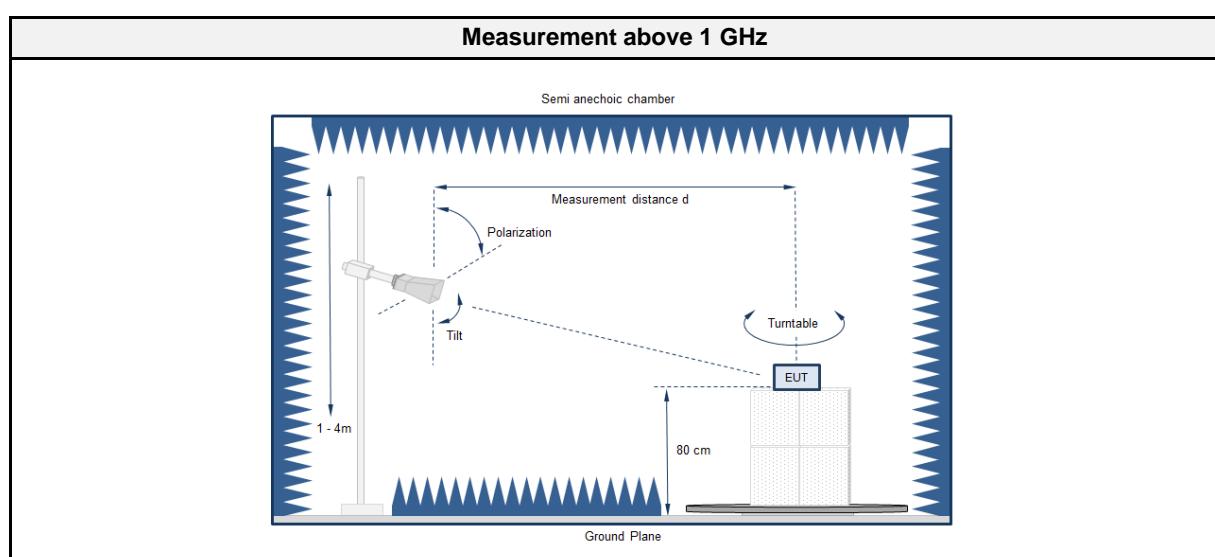
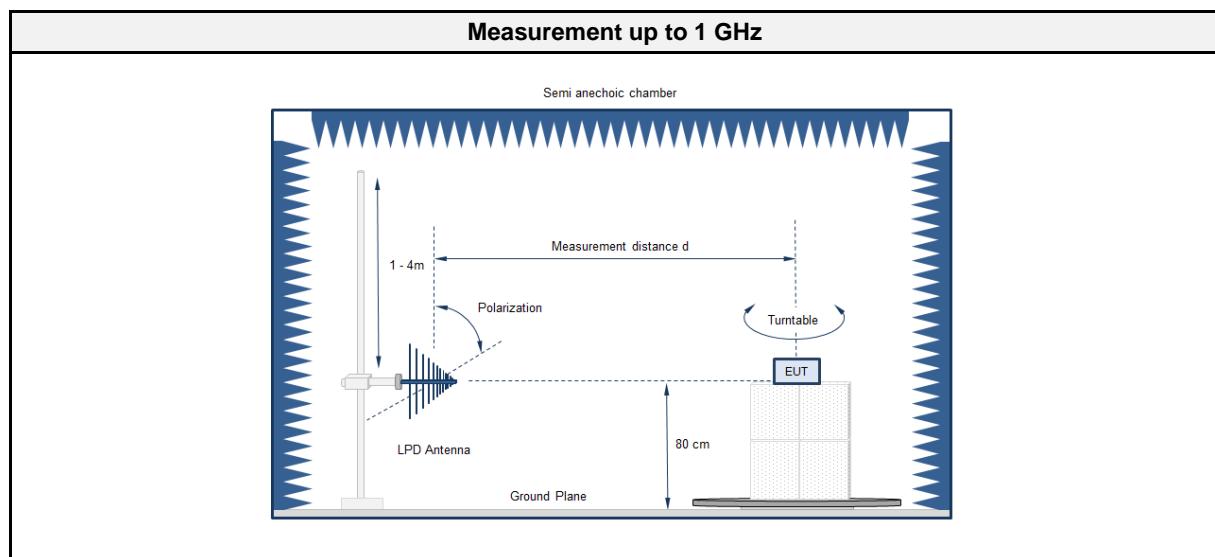
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

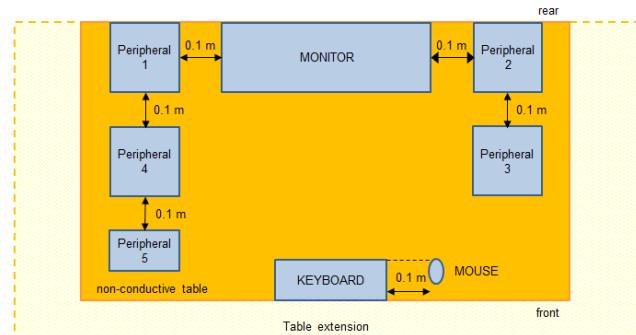
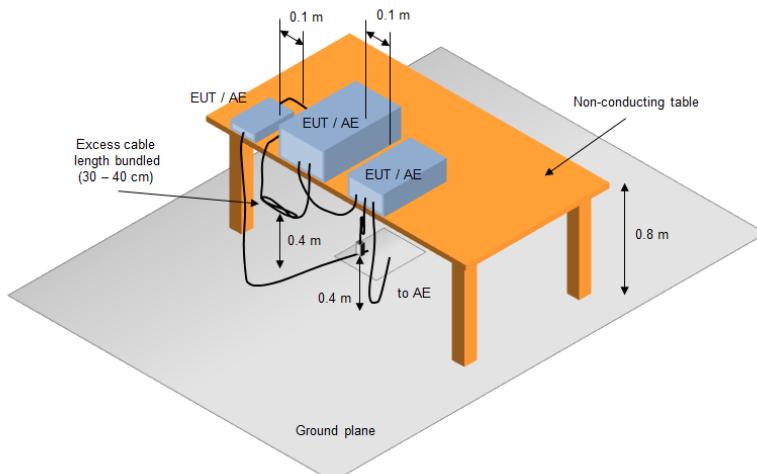
2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

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]	42
Measurement range	30 MHz to 1 GHz
Temperature [°C]	23
Humidity [%]	32
Operator	Ruslan Colbasiuc
Date	2020-01-15

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	AC6	EF00910	2019-05	2022-05
EMI Test Receiver	Keysight	N9038A-526/WXP	EF01070	2019-07	2020-07
TRILOG Broadband Antenna	Schwarzbeck	VULB 9162 (30MHz - 7GHz, 100W)	EF00978	2019-10	2022-10

Test Report No.: G0M-1908-8402-EF0115B-V01

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

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.

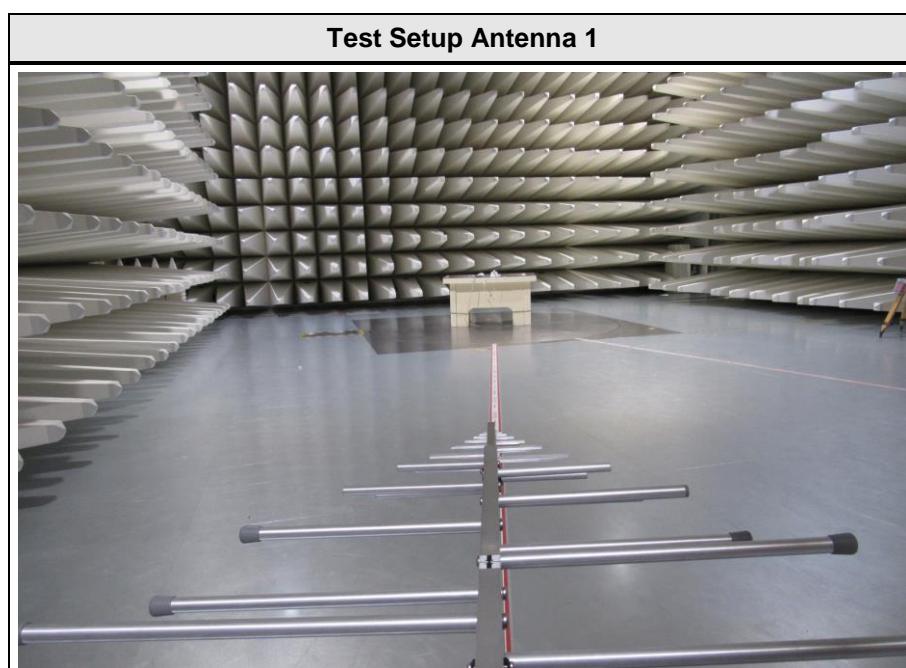
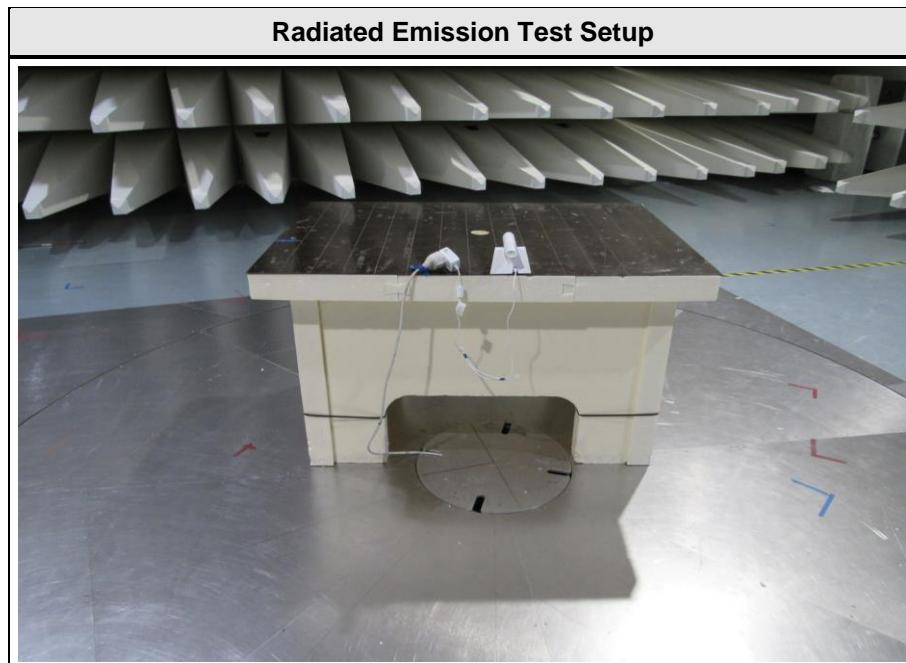
2.1.5 Limits

Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB μ 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 Average	74 54

2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1	PASS	

2.1.7 Setup Photos



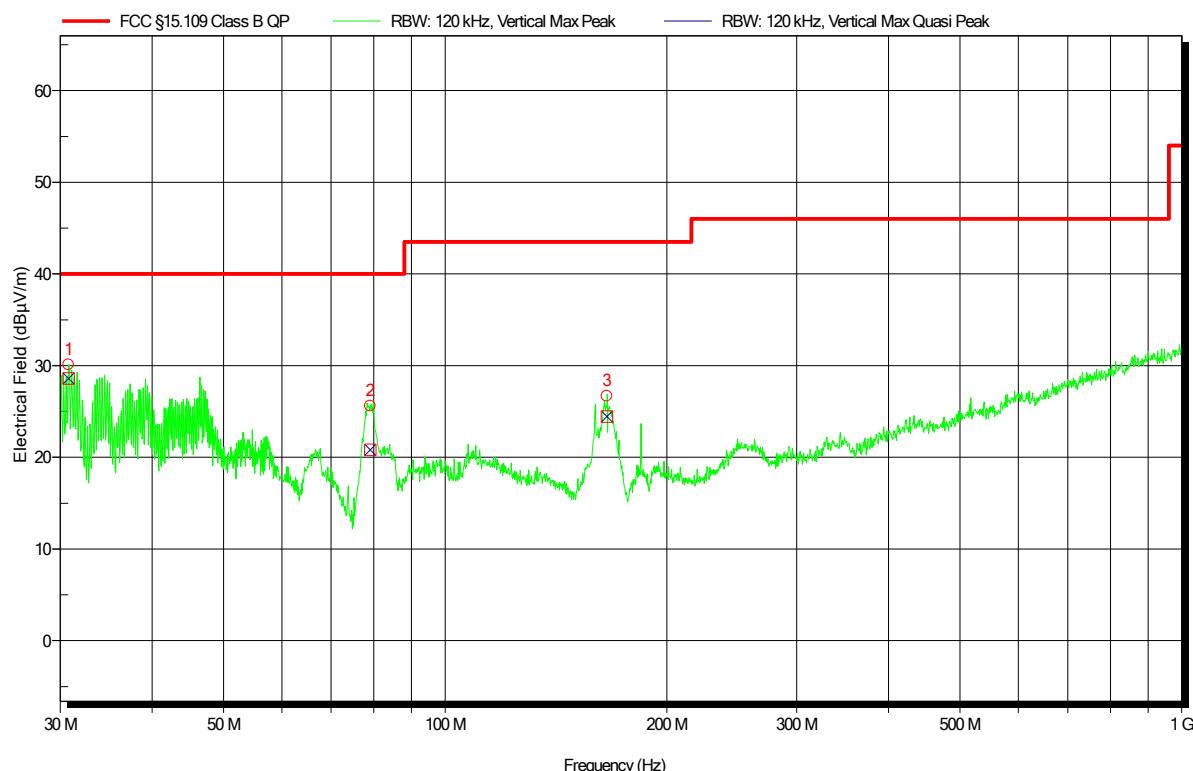
2.1.8 Records

Radiated emissions according to FCC 15B

Radiated emissions according to FCC 15B

Project Number: G0M-1908-8402
 Applicant: eResearchTechnology GmbH
 Model Description: Electrical System (Charging Station)
 Model: WSCS
 Test Sample ID: 5100000C
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Colbasiuc
 Test Date: 2020-01-15
 Operating Conditions: ambient temperature: 23°C
 power input: 120 VAC / 60 Hz
 Antenna: Schwarzbeck VULB 9162, Vertical
 Measurement Distance: 10 m calculated to 3 m limit
 Mode: 1
 Note 1:

Index 7

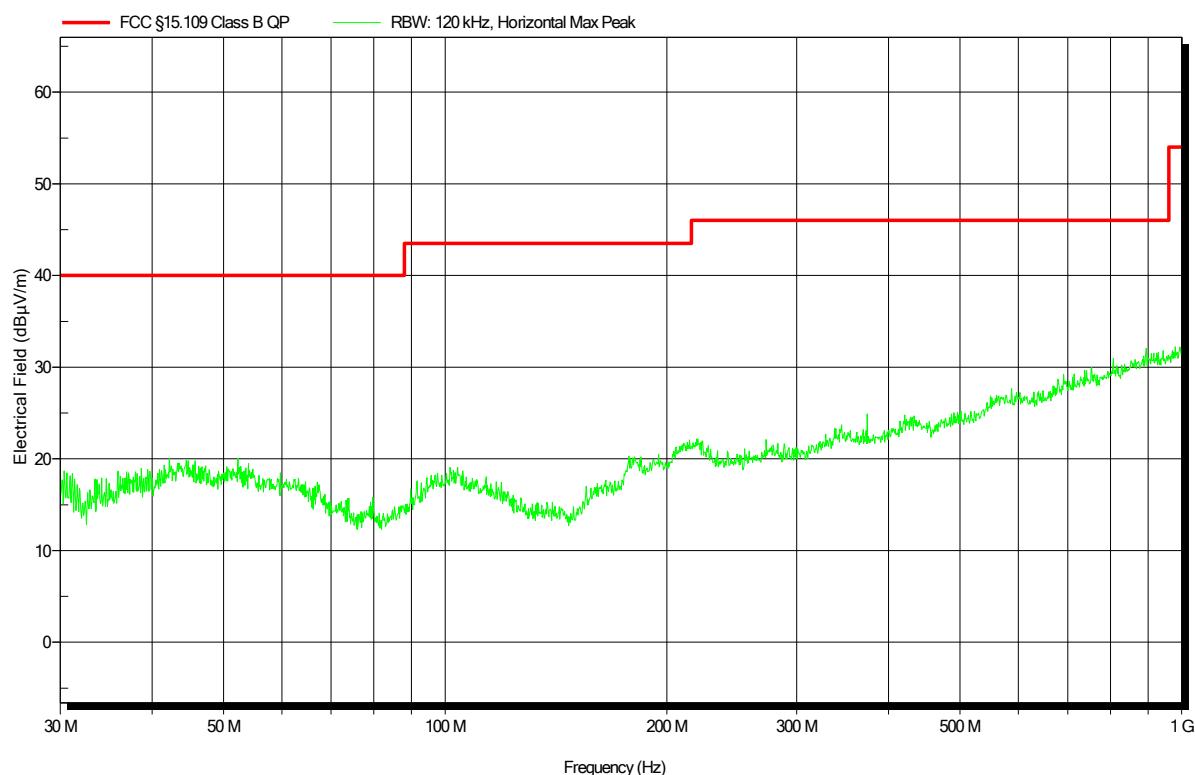


Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	30.804 MHz	28.6 dBµV/m	40 dBµV/m	-11.4 dB	Pass	-100 Degree	1 m
2	79.14 MHz	20.8 dBµV/m	40 dBµV/m	-19.2 dB	Pass	-100 Degree	1 m
3	165.834 MHz	24.4 dBµV/m	43.5 dBµV/m	-19.1 dB	Pass	-100 Degree	1 m

Radiated emissions according to FCC 15B

Project Number: G0M-1908-8402
Applicant: eResearchTechnology GmbH
Model Description: Electrical System (Charging Station)
Model: WSCS
Test Sample ID: 5100000C
Test Site: Eurofins Product Service GmbH
Operator: Mr. Colbasiuc
Test Date: 2020-01-15
Operating Conditions: ambient temperature: 23°
Measurement Distance: power input: 120 VAC / 60 Hz
Antenna: Schwarzbeck VULB 9162, Horizontal
Mode: 1
Note 1: Table position 0°, Antenna position 4 m

Index 8

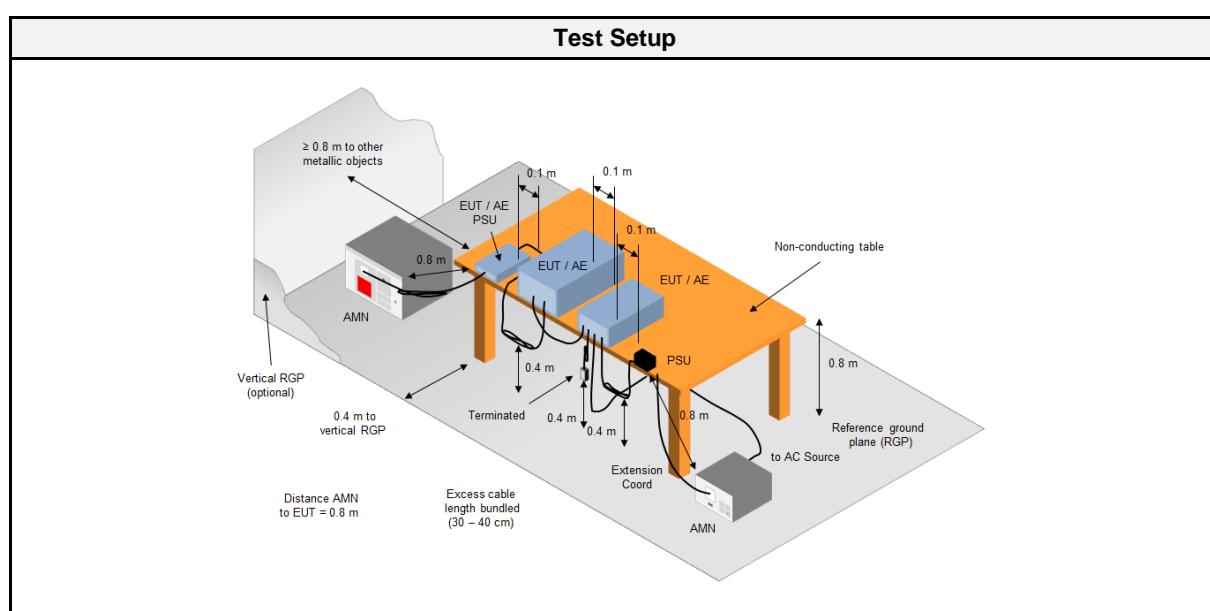
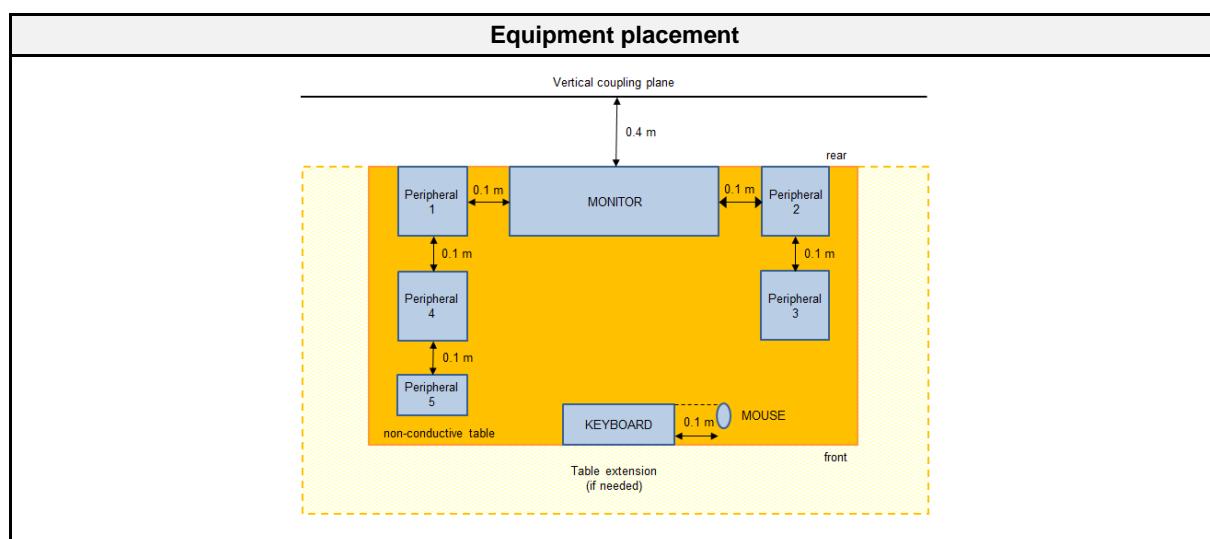


2.2 Test Conditions and Results - Conducted emissions acc. to ANSI C63.4

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
Humidity [%]	59
Operator	Ruslan Colbasiuc
Date	2019-08-29

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
AMN	Schwarzbeck	NSLK 8128	EF00975	2019-07	2021-07
Pulse Limiter	R&S	ESH3-Z2	EF01063	2019-07	2020-07
EMI Test Receiver	R&S	ESU26	EF00887	2019-07	2020-07

2.2.4 Procedure

Exploratory measurement
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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 [dB μ V]	Average Limit [dB μ V]
0.15 - 0.5	66 - 56 *	56 - 46 *
0.5 - 5	56	46
5 - 30	60	50

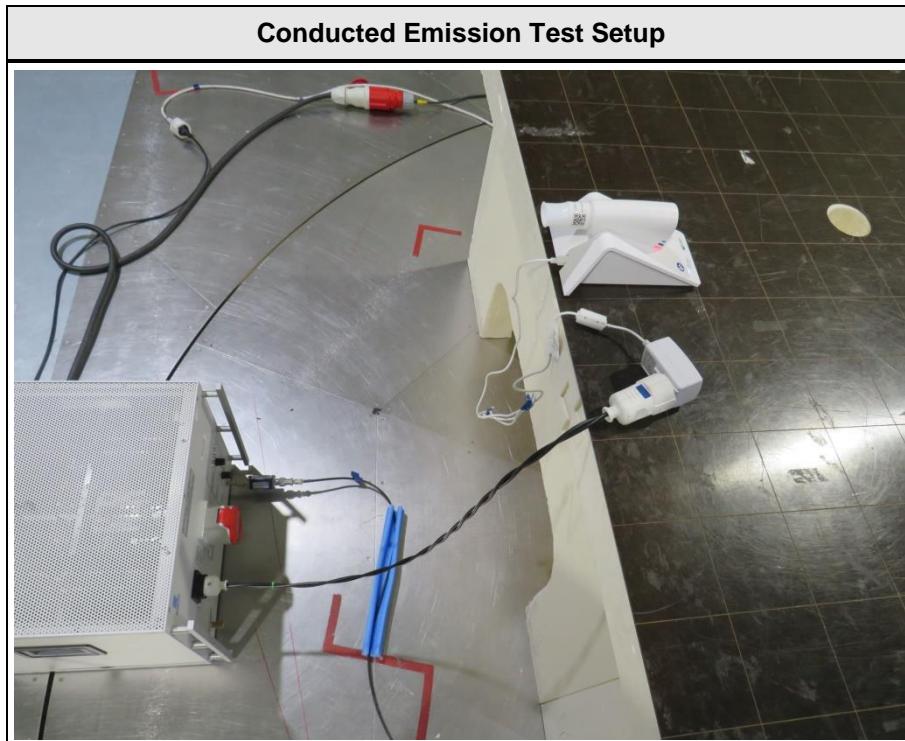
* Decreases with the logarithm of the frequency

2.2.6 Results

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

Test Report No.: G0M-1908-8402-EF0115B-V01

2.2.7 Setup Photos

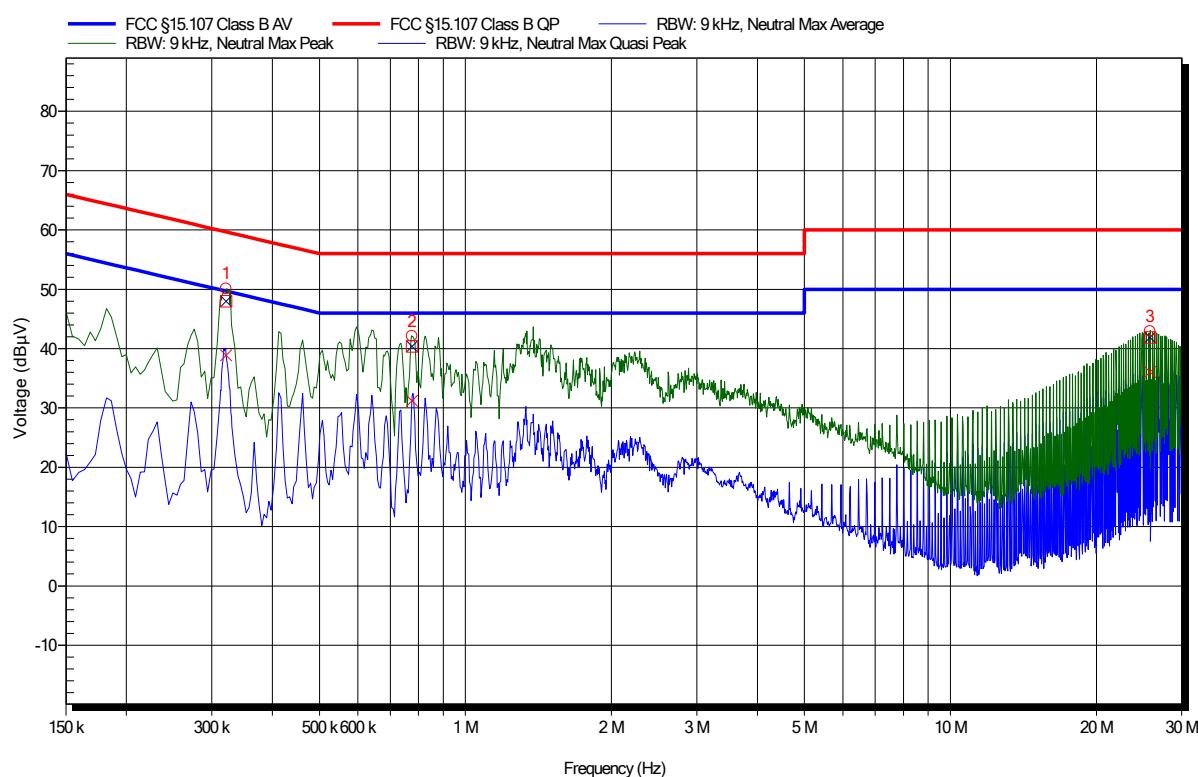


2.2.8 Records

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

Project Number: G0M-1908-8402
 Applicant: eResearchTechnology GmbH
 Model Description: Electrical System (Charging Station)
 Model: WSCS
 Test Sample ID: 5100000C
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Colbasiuc
 Test Date: 2019-08-29
 Operating Conditions: ambient temperature: 24 °C
 power input: 120 VAC / 60 Hz
 LISN: Schwarzbeck NSLK 8128 (N)
 Mode: 1
 Applied to Port: Mains
 Note 1:

Index 1



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	321 kHz	48 dB μ V	59.7 dB μ V	-11.7 dB	Pass	Neutral
2	775.95 kHz	40.4 dB μ V	56 dB μ V	-15.6 dB	Pass	Neutral
3	25.821 MHz	41.9 dB μ V	60 dB μ V	-18.1 dB	Pass	Neutral
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	321 kHz	38.9 dB μ V	49.7 dB μ V	-10.8 dB	Pass	Neutral
2	775.95 kHz	31.2 dB μ V	46 dB μ V	-14.8 dB	Pass	Neutral
3	25.821 MHz	36.1 dB μ V	50 dB μ V	-13.9 dB	Pass	Neutral

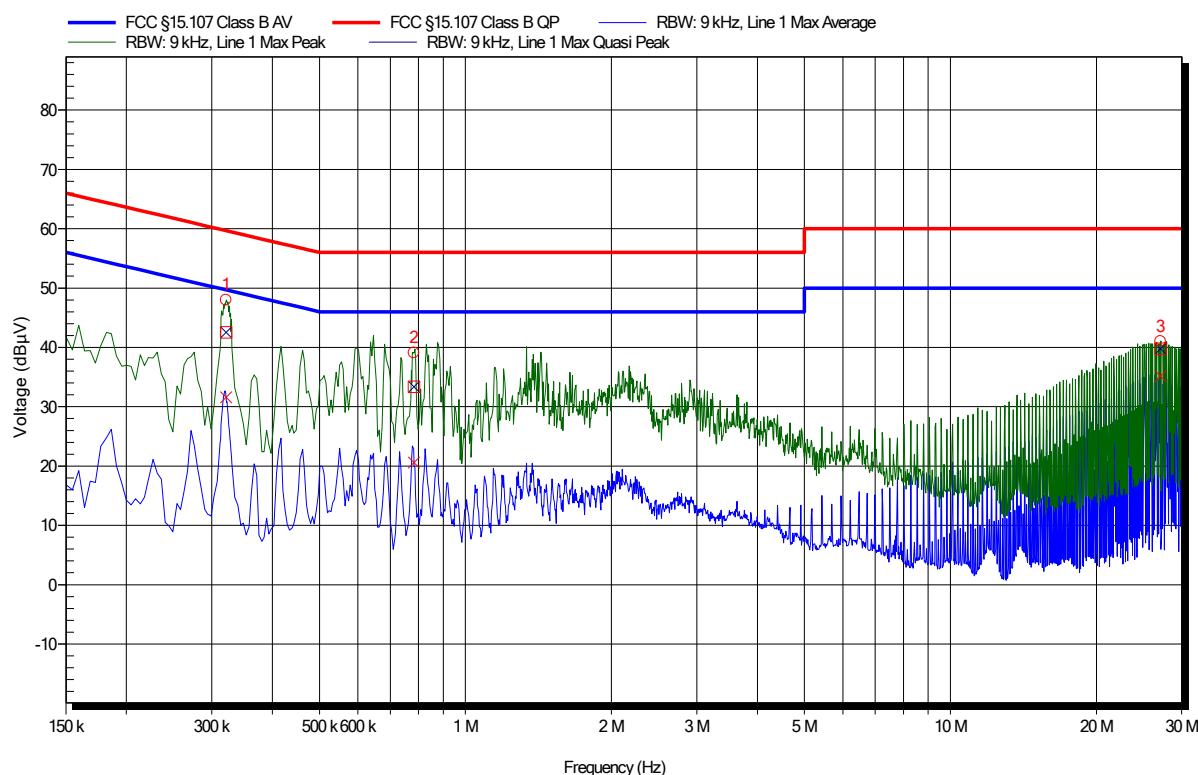
Test Report No.: G0M-1908-8402-EF0115B-V01

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

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

Project Number: G0M-1908-8402
 Applicant: eResearchTechnology GmbH
 Model Description: Electrical System (Charging Station)
 Model: WSCS
 Test Sample ID: 5100000C
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Colbasiuc
 Test Date: 2019-08-29
 Operating Conditions: ambient temperature: 24°
 power input: 120 VAC / 60 Hz
 LISN: Schwarzbeck NSLK 8128 (L)
 Mode: 1
 Applied to Port: Mains
 Note 1:

Index 2



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	321 kHz	42.5 dB μ V	59.7 dB μ V	-17.1 dB	Pass	Line 1
2	783.15 kHz	33.4 dB μ V	56 dB μ V	-22.6 dB	Pass	Line 1
3	27.14 MHz	39.8 dB μ V	60 dB μ V	-20.2 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	321 kHz	31.6 dB μ V	49.7 dB μ V	-18.1 dB	Pass	Line 1
2	783.15 kHz	20.6 dB μ V	46 dB μ V	-25.4 dB	Pass	Line 1
3	27.14 MHz	35.1 dB μ V	50 dB μ V	-14.9 dB	Pass	Line 1