

EMC TEST REPORT

FCC 47 CFR Part 15B Industry Canada ICES-003

Electromagnetic compatibility - Unintentional radiators

Testing Laboratory: Eurofins Product Service GmbH

Address: Storkower Str. 38c

15526 Reichenwalde

Germany

Accreditation:





A2LA Accredited Testing Laboratory, Certificate No.: 1983.01

FCC Test Firm Designation Number: DE0008

IC Testing Laboratory site: 3470A-2

Applicant's name: peiker CEE GmbH

Address: Gartenstraße 25

61352 Bad Homburg

GERMANY

Test specification:

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

ICES-003, Issue 6:2016

ANSI C63.4:2014

Equipment under test (EUT):

Product description CEECOACH

Model No. CC2

Additional Models None

Hardware version 2.0

Firmware / Software version 2.0

FCC-ID: 2ANUYCC2 IC: 23265-CEECOACH

Test result Passed



Possible test case verdicts:			
- not applicable to test object		N/A	
- test object does meet the requirement.		P (Pass)	
- test object does not meet the requirem	ent:	F (Fail)	
Testing:			
Date of receipt of test item	:	2017-09-29	
Date (s) of performance of tests	:	2018-08-06 - 20	18-08-07
Compiled by:	Matthias Handr	ik	ik D
Tested by (+ signature):	Matthias Handr	ik	7,50
Approved by (+ signature): Deputy Head of Lab	Jens Marquard	t	Z- S. Y
Date of issue:	2021-06-14		
Total number of pages::	35		
General remarks:			
The test results presented in this report is the responsibility of the manufactor requirements detailed within this report. This report shall not be reproduced, excellaboratory.	reflect the resul urer to ensure t ort.	ts for this particulation that all production	ular model and serial number. It n models meet the intent of the
Additional comments:			



Version History

Version	Issue Date	Remarks	Revised by
V01	2018-08-13	Initial Release	
V02	2021-06-14	Replaced document: G0M-1709-6878-EF0115B- Replaced by: G0M-1709-6878-EF0115B	
		Reason: Applicant's name corrected.	



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1 Equipment (Test item) Description

Description	CEECOACH				
Model	CC2				
Additional Models	None				
Serial number	None				
Hardware version	2.0				
Software / Firmware version	2.0				
FCC-ID	2ANUYCC2				
IC	23265-CEECOACH				
Power supply	3.7 VDC (internal bar	ttery)			
AC/DC-Adaptor	Model: KSA01A5210100D5 Manufacturer: KUANTECH Input: 100-240 VAC Output: 5V DC				
	Туре	Bluetooth 2.1 +EDR			
	Model	CSR8670			
	Manufacturer	CSR			
Radio module I	HW Version	unspecified			
radio module i	SW Version	gdn_16unified_fl_bt4.0_26h_1304260705 _ble_encr128 2013-04-26			
	FCC-ID	N/A			
	IC	N/A			
	Туре	Bluetooth 4.0 without Bluetooth Low Energy			
	Model	CSR8670			
	Manufacturer	CSR			
Radio module II	HW Version	unspecified			
readio module ii	SW Version	gdn_16unified_fl_bt5.0_u28c_1705050747 _ble_encr128 2017-05-05			
	FCC-ID	N/A			
	IC N/A				
Manufacturer	peiker CEE GmbH Gartenstraße 25 61352 Bad Homburg GERMANY				



Highest emission frequency	Fmax [MHz] = 2480
Device classification	Class B
Equipment type	Tabletop
Number of tested samples	1



1.1 Photos – Equipment external

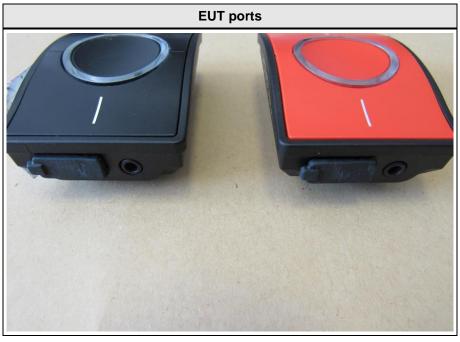






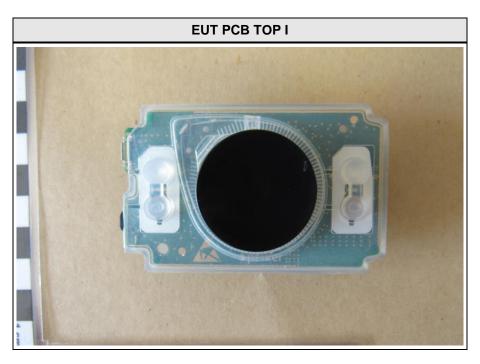
Product Service

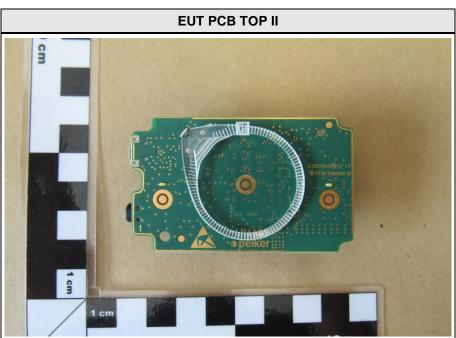




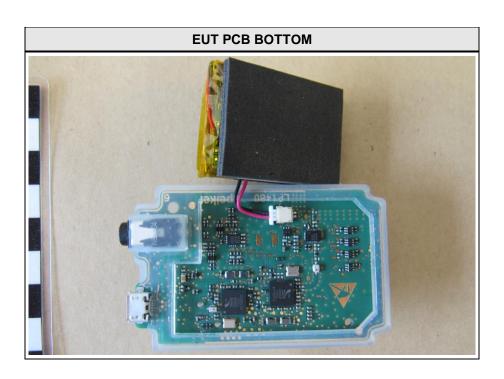


1.2 Photos – Equipment internal



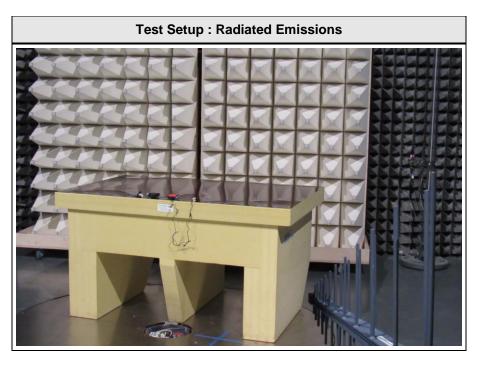


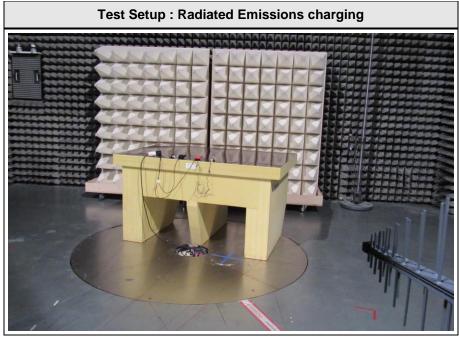




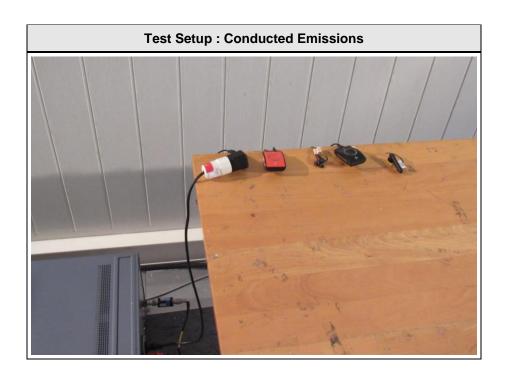


1.3 Photos – Test setup











1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments (e.g. serial no.)
AE	Corded stereo headset	Jabra	JABRA CHILL	
AE	Wireless headset	Jabra	JABRA STEEL	

*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 (e.g. Cat. of Cable)
1	USB	I/O	1m	Yes	Charging / software update/settings
2	Headset connection	I/O	unspecified	No	3.5 mm jack

*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	EUT's powered up via internal battery. Active BT communication between devices over BT1 Devices itself communicate local with BT headset over BT2.
2	EUT's powered up. Active BT communication between devices over BT1 Devices itself communicate local with BT headset over BT2. Charging of both EUT's, ac/dc adaptor via USB.

Configuration #	EUT Configuration
1	Both EUT's placed in measurement chamber on table top. Wired headset is connected to "moderator" EUT. Wireless headset is connected to "participant" EUT.



1.7 Test Equipment Used During Testing

Measurement Software						
Description Manufacturer Name Version						
EMC Test Software	Dare Instruments	Radimation	2016.1.10			

Conducted emissions SR1						
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due	
AMN	R&S	ESH2-Z5	EF00182	2017-01	2019-01	
AMN	R&S	ESH3-Z5	EF00036	2017-01	2019-01	
EMI Test Receiver	Rohde & Schwarz Vertriebs GmbH	ESCS 30	EF00297	2018-07	2019-07	
Cable	-	RG223/U	-	System Cal.	System Cal.	

Radiated emissions AC1						
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due	
Biconical antenna	R&S	HK116	EF00203	2018-06	2020-06	
LPD Antenna	R&S	HL 223	EF00187	2016-05	2019-05	
Horn antenna	Schwarzbeck	BBHA 9120D	EF00018	2016-09	2019-09	
MXE EMI Receiver	Keysight Technologies	N9038A- 526/WXP	EF01070	2017-08	2018-08	
RF Cable			-	System Cal.	System Cal	
RF Cable			-	System Cal.	System Cal	



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

FCC 47 CFR Part 15B, Industry Canada ICES-003								
Product Specific Standard	Requirement – Test	Reference Method	Result	Remarks				
47 CFR 15.109 ICES-003 Item 6.2	Radiated emissions	ANSI C 63.4	PASS					
47 CFR 15.107 ICES-003 Item 6.1	AC power line conducted emissions	ANSI C63.4	PASS					
Remarks:								



3 Test Conditions and Results

3.1 Test Conditions and Results - Radiated emissions

Radiated emission	ons acc. FCC 47 C	FR 15.109 / ICES-003 Verdict:							
Laboratory	Parameters:	Requir	ed prior to the test	During the test					
Ambient T	emperature		15 to 35 °C	23°C					
Relative	Humidity		30 to 60 %		50%				
Test accordi	ng referenced	Reference Method							
stan	dards		ANSI	C63.4					
Sample is tested	with respect to the		Equipmo	ent class	·				
requirements of the	ne equipment class	Class B							
Test frequency ran	ge determined from	Highest emission frequency							
highest emiss	sion frequency	Fmax [MHz] = 2480							
Fully configured sample scanned over		Frequency range							
the following fi	requency range	30 MHz to 13 GHz							
Operati	ng mode	1/2							
Config	juration	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:									



Test Procedure:

The test site is in accordance with ANSI C63-4:2014 requirements and is listed by FCC. The measurement procedure is as follows:

Exploratory measurement:

- The EUT was placed on a non-conductive table at a height of 0.8m.
- The EUT and support equipment, if needed, were set up to simulate typical usage.
- 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.
- The antenna was placed at a distance of 3 or 10 m.
- The received signal was monitored at the measurement receiver.
 - Cables not bundled were manipulated within the range of likely arrangements to produce the highest emission amplitude
 - To maximize the suspected emissions the EUT is rotated 360 degrees. If the signal exceeds the previous amplitude, go back to the corresponding azimuth and manipulate the cables again for maximizing the emissions if possible.
 - o Move the antenna from 1 to 4m to maximize the suspected highest amplitude signal.
- This procedure has to be performed in both antenna polarizations, horizontal and vertical.
- The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 1.3.

Final measurement:

- 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
- 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
- The EUT and cable arrangement were based on the exploratory measurement results
- Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded.
- The test data of the worst-case conditions were recorded and shown on the next pages.



Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

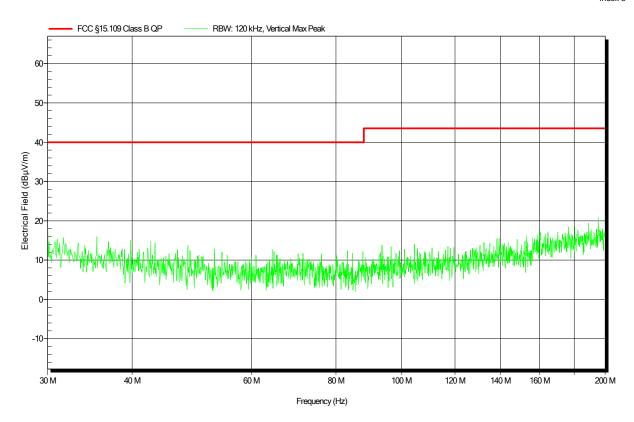
Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC
Antenna: Rohde & Schwarz HK 116, Vertical

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

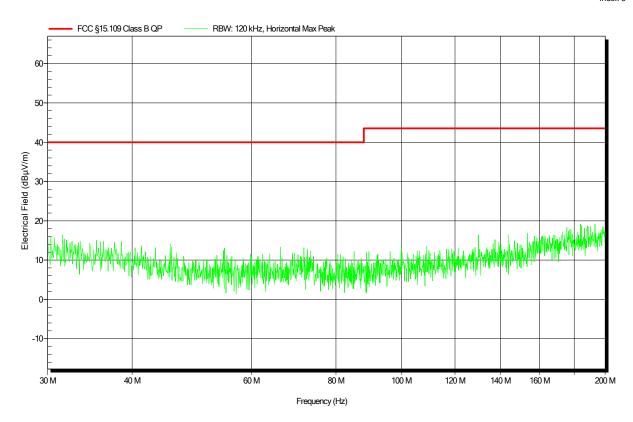
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC

Antenna: Rohde & Schwarz HK 116, Horizontal

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

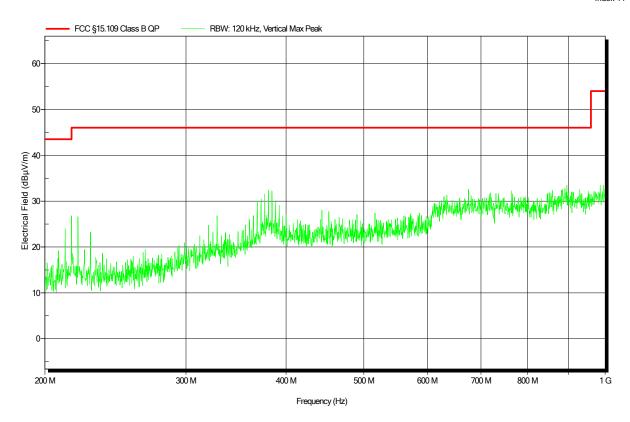
Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC
Antenna: Rohde & Schwarz HL 223, Vertical

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

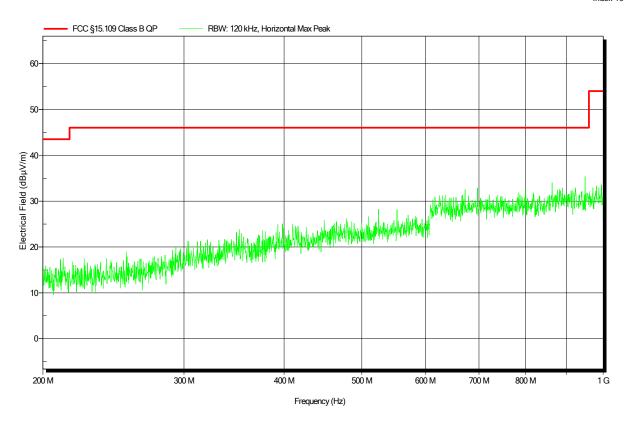
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC

Antenna: Rohde & Schwarz HL 223, Horizontal

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

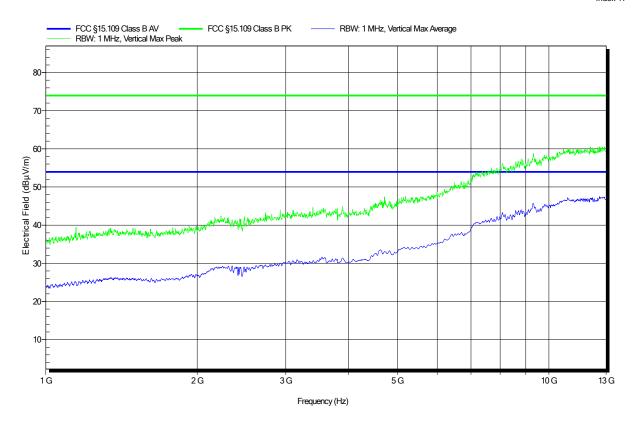
Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC
Antenna: Schwarzbeck BBHA 9120D, Vertical

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-07

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

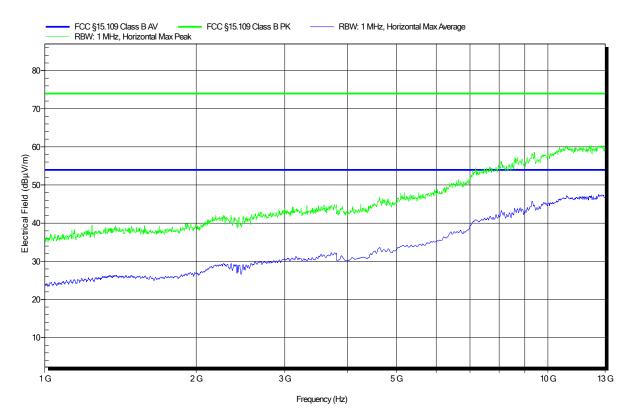
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 3.7V DC

Antenna: Schwarzbeck BBHA 9120D, Horizontal

Measurement distance: 3m Mode: Mode# 1 Test Date: 2018-08-07

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

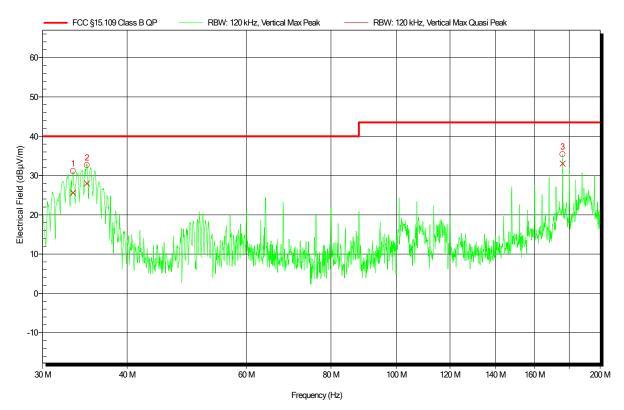
Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

Antenna: Rohde & Schwarz HK 116, Vertical

Measurement distance: 3m

Mode: Mode# 2 Test Date: 2018-08-06

Note:



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	33.285 MHz	25.59 dBµV/m	40 dBµV/m	-14.41 dB	Pass	69 Degree	1 m
2	34.888 MHz	27.98 dBµV/m	40 dBµV/m	-12.02 dB	Pass	69 Degree	1 m
3	175.992 MHz	33.03 dBuV/m	43.52 dBuV/m	-10.49 dB	Pass	69 Degree	1 m



Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

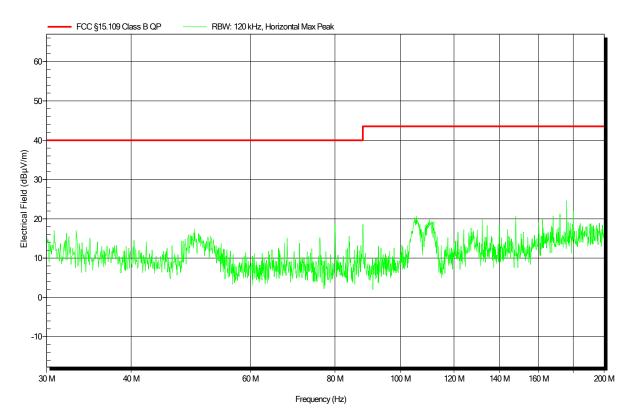
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

Antenna: Rohde & Schwarz HK 116, Horizontal

Measurement distance: 3m Mode: Mode# 2 Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

peiker CEE GmbH Applicant: **EUT Name: CEECOACH**

Model: CC2

Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

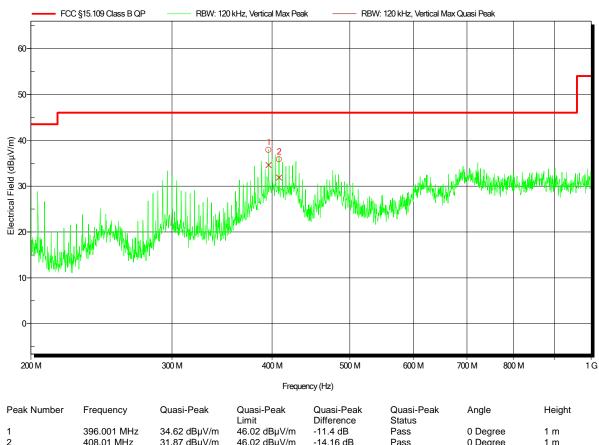
Tnom: 24°C, Unom: 120V AC (AC/DC adaptor) **Test Conditions:**

Rohde & Schwarz HL 223, Vertical Antenna:

Measurement distance: 3m

Mode# 2 Mode: Test Date: 2018-08-06

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

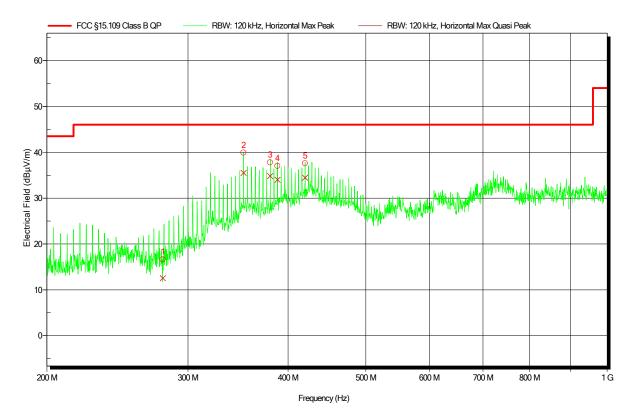
Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

Antenna: Rohde & Schwarz HL 223, Horizontal

Measurement distance: 3m

Mode: Mode# 2
Test Date: 2018-08-06

Note:



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
1	279.189 MHz	12.53 dBµV/m	46.02 dBµV/m	-33.49 dB	Pass	75 Degree	1 m
2	351.99 MHz	35.5 dBµV/m	46.02 dBµV/m	-10.52 dB	Pass	75 Degree	1 m
3	379.994 MHz	34.81 dBµV/m	46.02 dBµV/m	-11.21 dB	Pass	75 Degree	1 m
4	388.004 MHz	34.01 dBµV/m	46.02 dBµV/m	-12.01 dB	Pass	75 Degree	1 m
5	419.994 MHz	34.46 dBµV/m	46.02 dBµV/m	-11.56 dB	Pass	75 Degree	1 m



Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

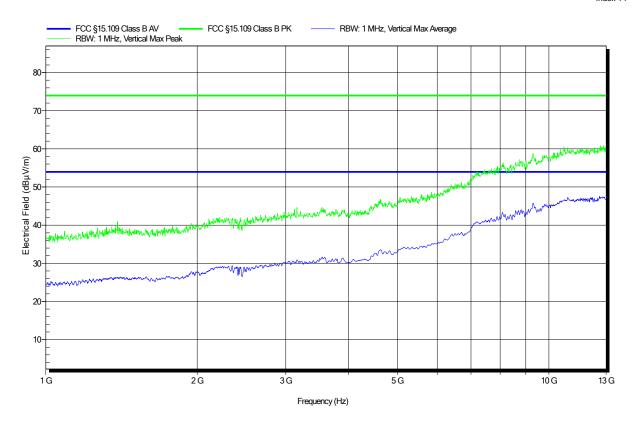
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

Antenna: Schwarzbeck BBHA 9120D, Vertical

Measurement distance: 3m Mode: Mode# 2 Test Date: 2018-08-07

Note:





Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

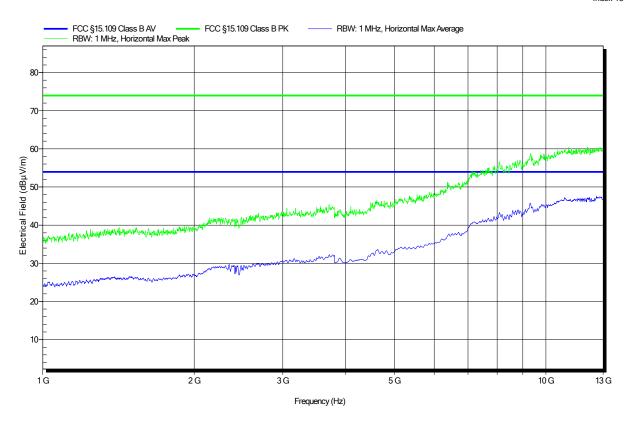
Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

Antenna: Schwarzbeck BBHA 9120D, Horizontal

Measurement distance: 3m Mode: Mode# 2 Test Date: 2018-08-07

Note:





3.2 Test Conditions and Results – AC power line conducted emissions

Conducted emissions acc. FCC 47 CFR 15.107 / ICES-003					Verdict: PASS		
Laboratory Para	ameters:	Req	uired prior to the t	est	During the test		
Ambient Temperature			15 to 35 °C		2	24°C	
Relative Hur	nidity		30 to 60 %		50%		
Test according re	eferenced	Reference Method					
standard		ANSI C63.4					
Fully configured sampl	e scanned over	Frequency range					
the following frequ	ency range	0.15 MHz to 30 MHz					
Sample is tested with	respect to the	Equipment class					
requirements of the equipment class		Class B					
Points of Appl	Application Interface						
AC Main	LISN						
Operating m	2						
Configurat	1						
	L	imits and	d results Class B				
Frequency [MHz]	Quasi-Peak [dBµV]		Result	Avera	age [dBµV]	Result	
0.15 to 5	66 to 56	*	PASS	56	6 to 46*	PASS	
0.5 to 5	56		PASS		46	PASS	
5 to 30	60	PASS 50		50	PASS		

^{*} Limit decreases linearly with the logarithm of the frequency.



Test Procedure:

The test site is in accordance with ANSI C63-4:2014 requirements and is listed by FCC. The measurement procedure is as follows:

Exploratory measurement:

- 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)
- The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
- 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).
- The LISN measurement port was connected to a measurement receiver
- I/O cables were bundled not longer than 0.4 m
- Measurement was performed in the frequency range 0.15 30MHz on each current-carrying conductor
- To maximize the emissions the cable positions were manipulated
- The worst configuration of EUT and cables is shown on a test setup picture at item 1.3

Test Procedure:

Final measurement:

- 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)
- The power cord that is normally supplied or recommended by the manufacturer was connected to the LISN.
- 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).
- The LISN measurement port was connected to a measurement receiver
- The EUT and cable arrangement were based on the exploratory measurement results
- The test data of the worst-case conditions were recorded and shown on the next pages.



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

Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

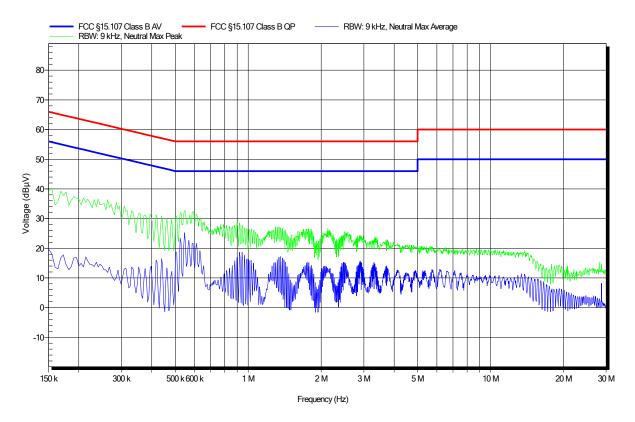
Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

LISN: ESH2-Z5 N Mode: Mode# 2 Test Date: 2018-08-07

Note:





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

Project number: G0M-1709-6878

Applicant: peiker CEE GmbH EUT Name: CEECOACH

Model: CC2

Test Site: Eurofins Product Service GmbH

Operator: Mr. Handrik

Test Conditions: Tnom: 24°C, Unom: 120V AC (AC/DC adaptor)

LISN: ESH2-Z5 L Mode: Mode# 2 Test Date: 2018-08-07

Note:

