EMF Evaluation Report

Date of Report	4/04/2019	**Client's Contact person:**	Gerald Mueller
Number of pages:	13	**Responsible Test engineer:**	Ilari Kinnunen
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**Peiker acustic GmbH** Max-Planck-Straße 28-32 61381 Friedrichsdorf Germany
Tested device	**WMI2-15W-W167**		
Related reports:	-		
Testing has been carried out in accordance with:	**680106 D01 RF Exposure Wireless Charging App v03** Rf exposure considerations for low power consumer wireless power transfer applications		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory		
Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		

Date and signatures:

04.04.2019

Miia Nurkkala

Digitally signed by Miia Nurkkala
Date: 2019.04.04 15:37:00 +03'00'

Laboratory Manager

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1. SUMMARY OF EMF TEST REPORT

1.1 Test Details

Equipment under Test (EUT):

Product:	WMI2-15W-W167
Manufacturer:	Peiker acustic GmbH
Serial Number:	2609-095-200-51, P18004275024
HW/ SW ID	0000 (18/16 01) / A 000 448 09 96 000
FCC ID:	FCC ID: QWY-WMI2W167W15
Type:	LU ZB STG VST
DUT Number:	22628
State of the Sample	Production sample

Testing information:

Testing performed:	28.03.2019 – 02.04.2019
Notes:	NXP LDO power receiver with SW WPR1500_MPRX_V2.1 was used
Document ID:	FCC_EMF_Report_WMI2-W167_ID3542_04042019.docx
Measurement performed by:	Ilari Kinnunen

1.2 Maximum Results

1.2.1 KDB 680106 D01

The maximum reported electric field and magnetic field strength values are shown in tables below. The device conforms to the requirements of the standards when the maximum measurement value is less than the MPE limit.

1.2.1.1 Front side

Test	Distance to EUT* [cm]	Measurement direction	MPE Limits	Measured value	Result
Electric field strength	11	Front	614 V/m	6.3 V/m	PASS
Magnetic field strength	11	Front	1.63 A/m	1.48 A/m	PASS

*measured from the center of the probe(s) to the edge of the device

1.2.1.2 Other sides

Test	Distance to EUT* [cm]	Measurement direction	MPE Limits	Measured value	Result
Electric field strength	8.5	Left	614 V/m	2.43 V/m	PASS
Magnetic field strength	8.5	Bottom	1.63 A/m	1.46 A/m	PASS

*measured from the center of the probe(s) to the edge of the device

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT is a wireless charger module.

Device Category	Mobile
Exposure Environment	Uncontrolled

2.1 Technical data of the DUT

Operating Frequency	125 kHz
Antenna Type	Inductive loop coil antenna
Power Supply	12V
Maximum Nominal Power	15W

3. TEST EQUIPMENT

Test Equipment	Model	Serial Number	Calibration Date
E and H field meter	Narda EHP-200AC	170WX80310	19.3.2018

3.1 Test setup

3.1.1 KDB 680106 D01

E- and H-field was measured from all sides and top of the DUT. The separation distance reported is measured from the center of the probe to the edge of the device. Photos of the test setup are shown in Appendix A.

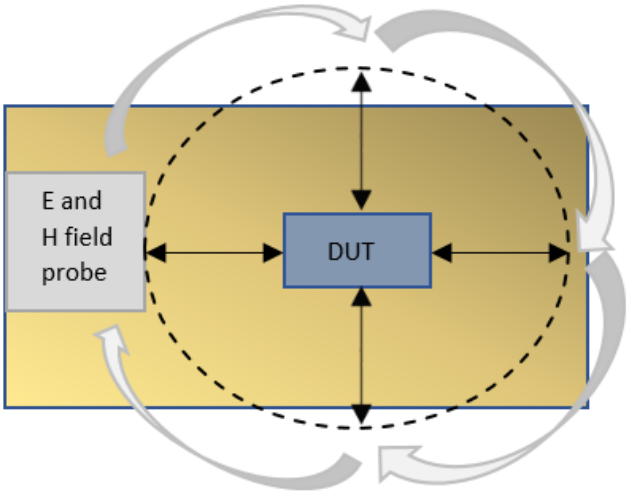


Figure 1 The top view of the test setup.

3.2 Limits

Limits for MPE

TABLE 1 - LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* $900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* 100	30
1.34-30	824/f	2.19/f	* $180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

3.3 Measurement uncertainty

Magnetic field 30kHz-30MHz

Quantity	Relative standard uncertainty in (%)	Probability distribution	Sensitivity coefficient	Degrees of freedom	Relative uncertainty contribution
Uncertainty of the calibration of the sensor	3.9	normal	1	infinite	0.039
Uncertainty of the frequency response of the sensor	2.7	rectangular	1	infinite	0.027
Uncertainty of the non-linearity	3.4	rectangular	1	infinite	0.034
Uncertainty of the anisotropy	4.5	rectangular	1	infinite	0.045
Uncertainty of the resolution of the measurement system	1	rectangular	1	infinite	0.01
Uncertainty of the temperature variation	2.3	rectangular	1	infinite	0.023
Uncertainty of the repeatability of the measurements	2	normal	1	4	0.02
Combined standard uncertainty		normal		infinite	0.08
Expanded uncertainty (k=2)					16 %

Electric field 9kHz-27MHz

Quantity	Relative standard uncertainty in (%)	Probability distribution	Sensitivity coefficient	Degrees of freedom	Relative uncertainty contribution
Uncertainty of the calibration of the sensor	3.9	normal	1	infinite	0.039
Uncertainty of the frequency response of the sensor	1.7	rectangular	1	infinite	0.017
Uncertainty of the non-linearity	2.7	rectangular	1	infinite	0.027
Uncertainty of the anisotropy	4.1	rectangular	1	infinite	0.041
Uncertainty of the resolution of the measurement system	1.9	rectangular	1	infinite	0.019
Uncertainty of the temperature variation	2.3	rectangular	1	infinite	0.023
Uncertainty of the repeatability of the measurements	2	normal	1	4	0.02
Combined standard uncertainty		normal		infinite	0.074
Expanded uncertainty (k=2)					14.8 %

4. TEST RESULTS

Test description	Findings
A frequency span from 3 kHz to 30 MHz was scanned to check for spurious. NXP LDO power receiver with SW WPR1500_MPRX_V2.1 was used with power limiter 5/15W as a charging load.	Spurious emission above -20 dBc was identified at 375 kHz and 625 kHz. The Spurious emission above -20 dBc were summed to the fields generated at the operational frequency. 15W power was found to generate higher e- and h-fields than 5W power thus measurements were made with output power 15W.
Occupied Band Width check.	OBW was measured and found to be less than 3 kHz. RBW set to 10 kHz, Span 0.88 MHz.
All sides and top of DUT were scanned.	Maximum emissions were found from front side of loop (Appendix A: Photos of DUT)
E- and H-field measurement was performed with increased monitoring period.	Results in the table below.

4.1 Electric Field Results

Measurement direction	Separation distance* [cm]	Measured E-Field [V/m]	Power supply	Charging output power
Front	11	6.302	12V	15W
Bottom	8.5	2.090	12V	15W
Top	8.5	2.204	12V	15W
Left	8.5	2.434	12V	15W
Right	8.5	2.358	12V	15W

*measured from the center of the probe(s) to the edge of the device

Charging output power e-field comparison under similar condition:

Measured E-Field [V/m]	Power supply	Charging output power
6.302	DC 12V	15W
2.701	DC 12V	5W

4.2 Magnetic Field Results

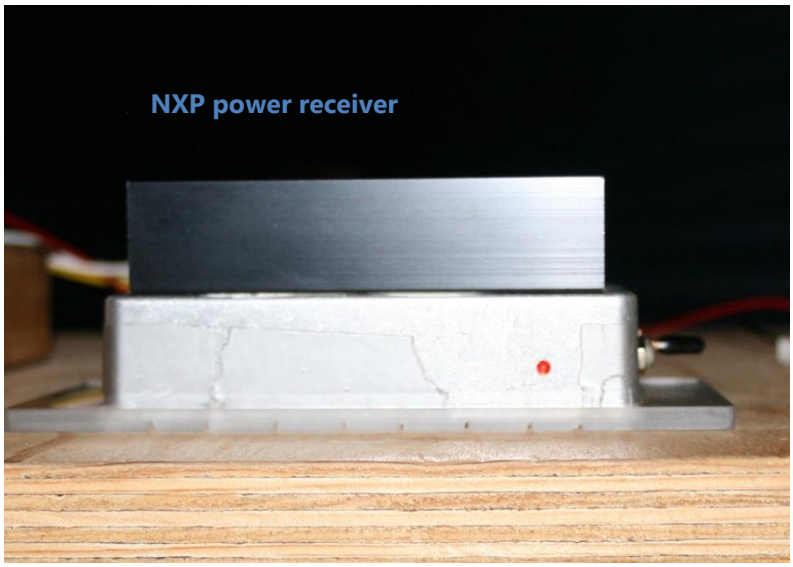
Measurement direction	Separation distance* [cm]	Measured H-Field [A/m]	Power supply	Charging output power
Front	11	1.478	12V	15W
Bottom	8.5	1.465	12V	15W
Top	8.5	1.051	12V	15W
Left	8.5	1.038	12V	15W
Right	8.5	1.424	12V	15W

*measured from the center of the probe(s) to the edge of the device

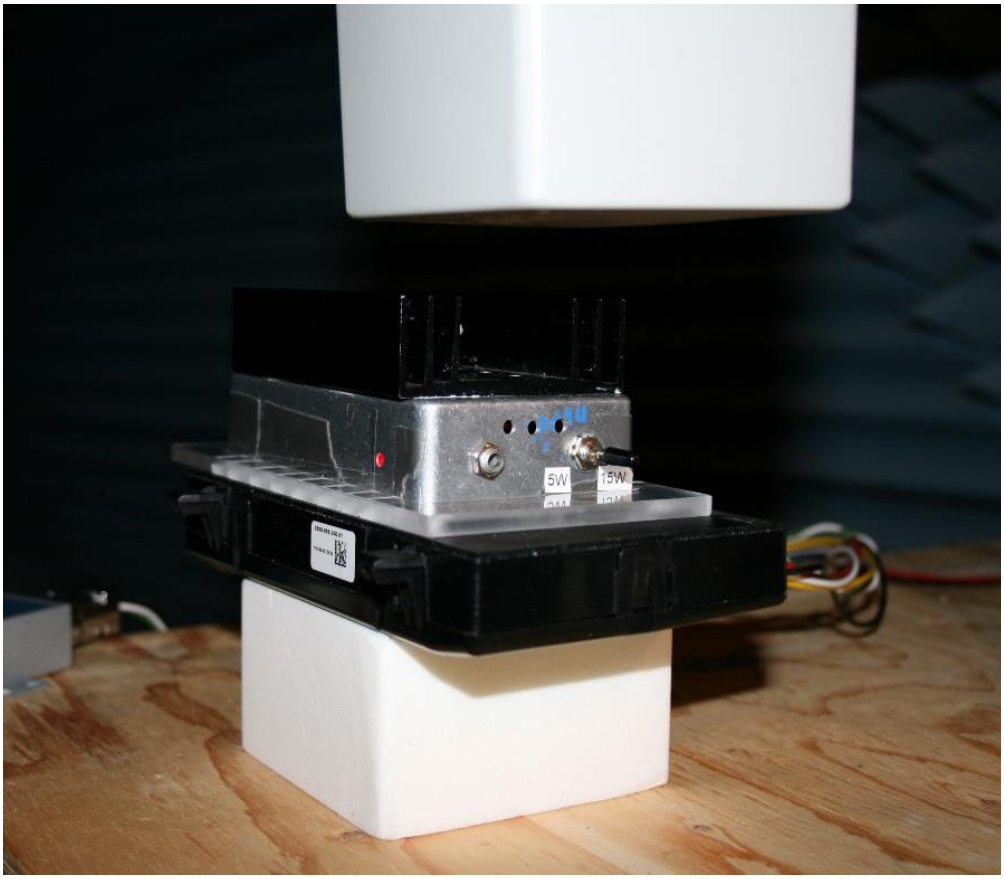
Charging output power h-field comparison under similar condition:

Measured H-Field [A/m]	Power supply	Charging output power
1.336	DC 12V	15W
1.102	DC 12V	5W

APPENDIX A: PHOTOS OF THE DUT



Measurement: Front, 11 cm center of probe



Measurement: Bottom, 8.5 cm to center of probe

Measurement: Top, 8.5 cm to center of probe

Measurement: Left, 8.5 cm to center of probe	Measurement: Right, 8.5 cm to center of probe