

## FCC Test Report (Part 1) RF Exposure (EMF)

<b>Test Report no.:</b>	EMC_BO_002010(v1.0)	<b>Date of Report:</b>	15-Feb-2016
<b>Number of pages:</b>	9	<b>Project support engineer:</b>	Frank Wittmann
<b>Test period:</b>	15-Jan - 19-Jan-2016		

<b>Applicant:</b>	Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Mr. Heiko Dörschel		
<b>Manufacturer:</b>	Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Germany		
<b>EUT ident.:</b>	Novero, WCH-183		
<b>FCC ID:</b>	RK7183-00	<b>IC ID:</b>	4774A-18300

**Referred documents:** CFR 47, FCC rules Part 1, KDB 680106 D01 RF Exposure Wireless Charging Apps v02, IC standards 216 Issue 1, Safety Code 6 (2015). Deviations or clarifications to these standards are noted in the related test result under "test method and limit".

<b>Testing Laboratory:</b>	novero Test Center, Meesmannstr.103, 44807 Bochum, Germany		
Tel.:	+49 234/51668-0	e-mail:	product-validation@novero.com
FCC listing no.:	881111	IC recognition no.:	7847A-1
Laboratory manager:	Jürgen Mitterer		

**Test result** The EUT complies with the requirements made in the referred test documents.

<b>Approver:</b>	Ines Baufeld	<b>Author:</b>	Robert Müller
<b>Title:</b>	Laboratory Quality Manager	<b>Title:</b>	Product Certification Manager
<b>Signature:</b>		<b>Signature:</b>	

This test report may not be reproduced, except in full, without written permission of testing laboratory. The test results in this test report relates only to the tested sample, which is mentioned in this test report. Novero GmbH cannot be made responsible for any generalisations or conclusions drawn from this test report. Modification of the tested sample is prohibited and leads to invalidity of this test report.

## 1. Summary for FCC Part 1 EMF Test Report

<b>Date of receipt</b>	15-Jan-2016
<b>Testing completed</b>	19-Jan-2016
<b>The customer's contact person</b>	Heiko Dörschel
<b>Notes</b>	none

### 1.1. EUT and Accessory Information

The EUT is an inductive wireless power transfer device (wireless charger) with load management operating at 111kHz. EUT is tested with a self designed and shielded receiver simulator which requests and consumes always maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Wireless charger unit	WCH-183	000002682805	1/1	--	0415	DAB15748U
Artificial load	WCH Rec.	0001	1.0	--	--	--
Power cable	--	--	--	--	--	DAB15159U
RF cable	--	--	--	--	--	DAB14039

### 1.2. Summary of Test Results

Section	Section in CFR 47	Section in RSS-102 / SC6	Name of the test	Result
3	1.307(b), 1.1310	4 / 2.2.1	RF Exposure	PASS

PASS: The EUT complies with the essential requirements in the standard.  
 FAIL: The EUT does not comply with the essential requirements in the standard.  
 NP: The test was not performed.  
 NA: The test was not applicable.

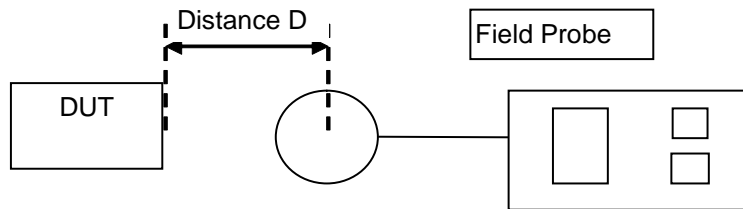
### 1.3. Measurement Uncertainties

Parameter	Worst Case Uncertainty	Max. Uncertainty
H-field probe 100cm <sup>2</sup>	3.33%	<30%
H-field probe 3cm <sup>2</sup>	4.17%	
H-field level tester	12.60%	
E-field probe+level tester	20%	

## CONTENTS

<b>1. SUMMARY FOR FCC PART 1 EMF TEST REPORT .....</b>	<b>2</b>
<b>1.1. EUT AND ACCESSORY INFORMATION .....</b>	<b>2</b>
<b>1.2. SUMMARY OF TEST RESULTS.....</b>	<b>2</b>
<b>1.3. MEASUREMENT UNCERTAINTIES .....</b>	<b>2</b>
<b>2. EMF TEST SETUP.....</b>	<b>4</b>
<b>3. E AND H-FIELD STRENGTH (FCC §1.307(B), §1.1310, RSS-102, SAFETY CODE 6) .....</b>	<b>5</b>
<b>3.1. TEST METHOD AND LIMIT .....</b>	<b>5</b>
<b>3.2. EMF TEST RESULTS .....</b>	<b>7</b>
<b>4. TEST EQUIPMENT .....</b>	<b>9</b>

## 2. EMF Test setup



### 3. E and H-field strength (FCC §1.307(b), §1.1310, RSS-102, Safety Code 6)

EUT with DUT number	DAB15748U
Accessories with DUT numbers	Novero WCH Receiver (Receiver Simulator) DAB15159E (power cable), DAB14039 (RF cable)
Operation Voltage [V] / [Hz]	12 / DC
Result	PASS
Remarks	OP1 (5Ω/5W load, Primary Coil 1)
Temp [°C] / Humidity [%RH]	22.2 / 40.5
Date of measurements	15&19-Jan-2016
Measured by	Robert Müller

#### 3.1. Test method and limit

Measurement was made from all sides of the DUT in 10, 9, 8, 7, 6 and 5cm distance (DUT edge to the center of probe)

Different probes were used to measure E and H-field separately

The highest emission level was recorded

EUT was cooled during measurements to avoid overheating and therefore power shut down

FCC limits for maximum permissible exposure

Frequency range [MHz]	Electric Field Strength Limit [V/m]	Magnetic Field Strength Limit [A/m]	Power Density [mW/cm <sup>2</sup> ]	Average Time [minutes]
(A) Limits for Occupational/Control Exposures				
0.3 – 3.0	614	1.63	*(100)	6
3.0 – 30	1842/f(MHz)	4.89/f(MHz)	*(900/f(MHz) <sup>2</sup> )	6
30 – 300	61.4	0.163	1.0	6
300 – 1500			f(MHz)/300	6
1500 - 100000			5	6
(B) Limits for General Population/Uncontrol Exposures				
<b>0.3 – 1.34</b>	<b>614</b>	<b>1.63</b>	<b>*(100)</b>	<b>30</b>
1.34 – 30	824/f(MHz)	2.19/f(MHz)	*(180/f(MHz) <sup>2</sup> )	30
30 – 300	27.5	0.073	0.2	30
300 – 1500			F(MHz)/1500	30
1500 - 100000			1.0	30

Note: According to DUT operating frequency and installation definition, the limit in bold letters (300kHz) was applied

IC limits for maximum permissible exposure for general public and uncontrolled environment

Frequency range [MHz]	Electric Field Strength Limit [V/m]	Magnetic Field Strength Limit [A/m]	Power Density [mW/cm <sup>2</sup> ]	Average Time [minutes]
<b>0.003 – 10</b>	<b>83</b>	<b>90</b>	-	<b>Instantaneous</b>
<b>0.1 – 10</b>	-	<b>0.73 / f</b>	-	<b>6</b>
1.1 – 10	87 / f <sup>0.5</sup>	-	-	6
10 – 20	27.46	0.0728	-2	6
20 – 48	58.07 / f <sup>0.25</sup>	0.1540 / f <sup>0.25</sup>	8.944 / f <sup>0.5</sup>	6
48 -300	22.06	0.05852	1.291	6
300 – 6000	3.142 f <sup>0.3417</sup>	0.008335 f <sup>0.3417</sup>	0.02619 f <sup>0.6834</sup>	6
6000 – 15000	61.4	0.163	10	6
15000 – 150000	61.4	0.163	10	616000/f
150000 - 300000	0.158 f <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> f <sup>0.5</sup>		616000/f

Note: According to DUT operating frequency and installation definition, the limit in bold letters was applied

### 3.2. EMF Test Results

#### 3.2.1 E-field Strength

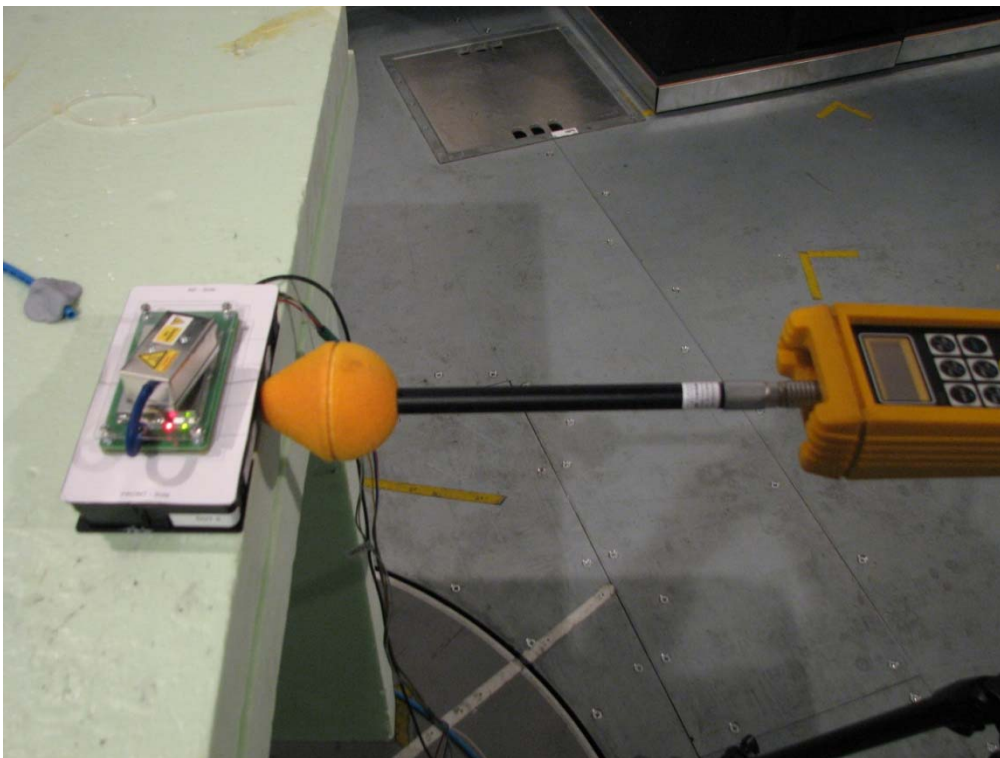
Detector: RMS

Operation Mode	Frequency [kHz]	Distance [cm]	Level Pos A [V/m]	Level Pos B [V/m]	Level Pos C [V/m]	Level Pos D [V/m]	Level Top [V/m]	FCC Limit [V/m]	IC Limit [V/m]	Result
1	111	10	2)	2)	2)	2)	0.30	614	83	PASS
1	111	9	2)	2)	2)	2)	0.30	614	83	PASS
1	111	8	2)	2)	2)	2)	0.38	614	83	PASS
1	111	7	2)	2)	2)	2)	0.45	614	83	PASS
1	111	6	2)	2)	0.36	2)	0.52	614	83	PASS
1	111	5	2)	0.32	<b>0.48</b>	2)	1)	614	83	PASS

1) not possible due to artificial load dimension

2) noise floor level

#### 3.2.2 Worst case position setup photo



### 3.2.3 H-field Strength

Detector: RMS, Mode: 320 $\mu$ T; Range: normal; Low Cut: 10Hz

Operation Mode	Frequency [kHz]	Distance [cm]	Level Pos A [A/m]	Level Pos B [A/m]	Level Pos C [A/m]	Level Pos D [A/m]	Level TOP [A/m]	FCC Limit [A/m]	IC Limit [A/m]	Result
1	111	10	0.11	0.09	0.11	0.09	0.40	1.63	90/6.57	PASS
1	111	9	0.14	0.12	0.15	0.11	0.46	1.63	90/6.57	PASS
1	111	8	0.21	0.16	0.19	0.15	0.67	1.63	90/6.57	PASS
1	111	7	0.28	0.21	0.26	0.18	0.88	1.63	90/6.57	PASS
1	111	6	0.38	0.23	0.35	0.22	0.95	1.63	90/6.57	PASS
1	111	5	0.46	0.34	0.55	0.42	<b>1.57</b>	1.63	90/6.57	PASS

Note1: Measurement values were transformed from  $\mu$ T to A/m, where 1 A/m = 1.256  $\mu$ T

Note2: Measurements for distances 10, 9, 8, 7, 6cm were done with 100cm<sup>2</sup> probe

### 3.2.4 Worst case position setup photo





#### 4. Test Equipment

Equipment	Manufacturer	Type	Serial No.	Calibration	Interval
H-field Level Meter	Narda	ELT-400	N-0385	01-Dec-14	3 years
H-field probe 3cm <sup>2</sup>	Narda	2300/90.20	C-0111	02-Mar-14	3 years
H-field probe 100cm <sup>2</sup>	Narda	2300/90.10	M-0823	02-Dec-14	3 years
E-field Level Meter	Wandel & Goltermann	EMR 20	P-0030	03-Dec-14	3 years
E-field probe	Wandel & Goltermann	Type8	M-0082	03-Dec-14	3 years