

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

Test Report no.:	EMC_BO_002047(v3.0)	Date of Report:	04-July-2016
Number of pages:	9	Project support engineer:	Frank Wittmann
Test period:	27/31-May-2016		

Applicant:	Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Mr. Thomas Roes		
Manufacturer:	Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Germany		
EUT ident.:	Novero, WCH-182		
FCC ID:	RK7182-00	IC ID:	4774A-18200

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".
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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.
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Approver:	Ines Baufeld	Author:	Robert Müller
Title:	Laboratory Quality Manager	Title:	Product Certification Manager
Signature:		Signature:	

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1. Summary for FCC Part 1 EMF Test Report

Date of receipt	24-May-2016
Testing completed	31-May-2016
The customer's contact person	Thomas Roes
Notes	none

1.1. EUT and Accessory Information

The EUT is an inductive wireless power transfer device (wireless charger) with load management operating between 120 and 205 kHz. 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-182	00000027913E	02	--	--	DAB16046E
Artificial load	WCH Rec.	0001	3.4	--	--	DAB16050E
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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.

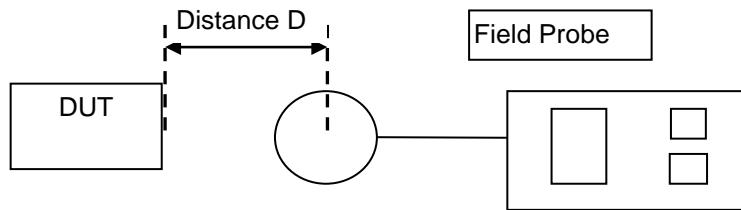
1.3. Measurement Uncertainties

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

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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	DAB16046E
Accessories with DUT numbers	DAB16050E (Novero EMC WCH Receiver)
Operation Voltage [V] / [Hz]	12 / DC
Result	PASS
Remarks	OP1 & OP2 (5Ω/5W load, best & worst coupling)
Temp [°C] / Humidity [%RH]	22.2 / 40.5
Date of measurements	27/30/31-May-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 ²]	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) ²)	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				
0.3 – 1.34	614	1.63	*(100)	30
1.34 – 30	824/f(MHz)	2.19/f(MHz)	*(180/f(MHz) ²)	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 ²]	Average Time [minutes]
0.003 – 10	83	90	-	Instantaneous
0.1 – 10	-	0.73 / f	-	6
1.1 – 10	87 / f ^{0.5}	-	-	6
10 – 20	27.46	0.0728	-2	6
20 – 48	58.07 / f ^{0.25}	0.1540 / f ^{0.25}	8.944 / f ^{0.5}	6
48 -300	22.06	0.05852	1.291	6
300 – 6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000 – 15000	61.4	0.163	10	6
15000 – 150000	61.4	0.163	10	616000/f
150000 - 300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}		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, Trace: Average

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	149	10	0.48	0.32	0.32	0.45	0.62	614	83	PASS
1	149	9	0.40	0.32	0.34	0.50	0.74	614	83	PASS
1	149	8	0.39	0.38	0.41	0.61	0.83	614	83	PASS
1	149	7	0.43	0.44	0.43	0.71	0.95	614	83	PASS
1	149	6	0.46	0.51	0.46	0.94	1.18	614	83	PASS
1	149	5	0.74	0.63	0.51	1.10	Note1	614	83	PASS

Detector: RMS, Trace: Average

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
2	125	10	0.49	0.39	0.41	0.60	0.61	614	83	PASS
2	125	9	0.57	0.47	0.43	0.68	0.88	614	83	PASS
2	125	8	0.59	0.63	0.51	0.74	0.99	614	83	PASS
2	125	7	0.67	0.71	0.59	1.00	1.11	614	83	PASS
2	125	6	0.74	0.80	0.69	1.19	Note1	614	83	PASS
2	125	5	0.90	0.96	0.74	1.57	Note1	614	83	PASS

Note1: not possible due to artificial load dimension

3.2.2 Worst case position setup photo



3.2.3 H-field Strength

OP1, Detector: RMS, Mode: 320 μ 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	149	10	0.14	0.13	0.28	0.15	0.25	1.63	90/6.57	PASS
1	149	9	0.18	0.15	0.34	0.18	0.37	1.63	90/6.57	PASS
1	149	8	0.21	0.19	0.40	0.26	0.55	1.63	90/6.57	PASS
1	149	7	0.25	0.23	0.53	0.31	Note3	1.63	90/6.57	PASS
1	149	6	0.38	0.49	0.67	0.59	1.04	1.63	90/6.57	PASS
1	149	5	0.43	0.64	0.93	0.76	2.08	1.63	90/6.57	FAIL

OP2, Detector: RMS, Mode: 320 μ 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
2	125	10	0.22	0.24	0.48	0.26	0.98	1.63	90/6.57	PASS
2	125	9	0.26	0.31	0.59	0.32	1.08	1.63	90/6.57	PASS
2	125	8	0.28	0.35	0.79	0.43	1.72	1.63	90/6.57	FAIL
2	125	7	0.34	0.45	1.02	0.56	2.52	1.63	90/6.57	FAIL
2	125	6	0.48	0.76	1.26	0.71	3.57	1.63	90/6.57	FAIL
2	125	5	0.53	1.08	1.63	1.05	7.05	1.63	90/6.57	FAIL

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

Note2: Measurements for distances 10, 9, 8, 7cm were done with 100cm² probe. Other distances with 3 cm² probe. For TOP position, 3 cm² probe was used for distances 9, 8, 7, 6, 5 cm.

Note3: not possible, due to artificial load dimension

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 ²	Narda	2300/90.20	C-0111	02-Mar-14	3 years
H-field probe 100cm ²	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