# FCC Test Report (Part 15C)

## WPT

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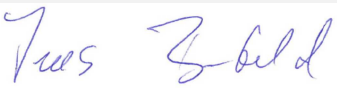
|---|---|---|---|
| **Test Report no.:** | EMC_BO_001972(v1.0) | **Date of Report:** | 20-May-2015 |
| **Number of pages:** | 11 | **Project support engineer:** | Robert Müller |
| **Test period:** | 10-Apr. – 20.May 2015 | | |

| | | | |
|---|---|---|---|
| **Applicant:** | Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Mr. Bodo Nickel | | |
| **Manufacturer:** | Novero Dabendorf GmbH, Märkische Straße 72, 15806 Zossen, Germany | | |
| **EUT ident.:** | Novero, WCH-173 | | |
| **FCC ID:** | RK7173-00 | **IC ID:** | -- |

| | |
|---|---|
| **Referred documents:** | CFR 47, FCC rules Part 15 Subpart C and ANSI C63.4 (2009). Deviations or clarifications to these standards are noted in the related test result under “test method and limit”. |

| | | | | |
|---|---|---|---|---|
| **Testing Laboratory:** | 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. |

| | | | |
|---|---|---|---|
| **Approver:** | Ines Baufeld | **Author:** | Robert Müller |
| **Title:** | Laboratory Quality Manager | **Title:** | Product Certification Manager |
| **Signature:** |  | **Signature:** |  |

# 1. Summary for FCC Part 15C Test Report

| | |
|---|---|
| **Date of receipt** | 08-Apr-2015 |
| **Testing completed** | 20-May-2015 |
| **The customer's contact person** | Bodo Nickel |
| **Notes** | none |

## 1.1. EUT and Accessory Information

The EUT is an inductive wireless charger device operating in a frequency range from 120 to 205 kHz, depending on requested power from the client. Tests were done with a self designed and shielded receiver simulator which requests and consumes always 5W.

| Product | Type | SN | HW | MV | SW | DUT |
|---|---|---|---|---|---|---|
| Wireless charger unit | WCH-173 | 682726 | 03 | -- | 2.17 | DAB15290E |
| Receiver Simulator | -- | -- | -- | -- | -- | DAB15069E |
| Power Cable | -- | -- | -- | -- | -- | DAB122 |

## 1.2. Summary of Test Results

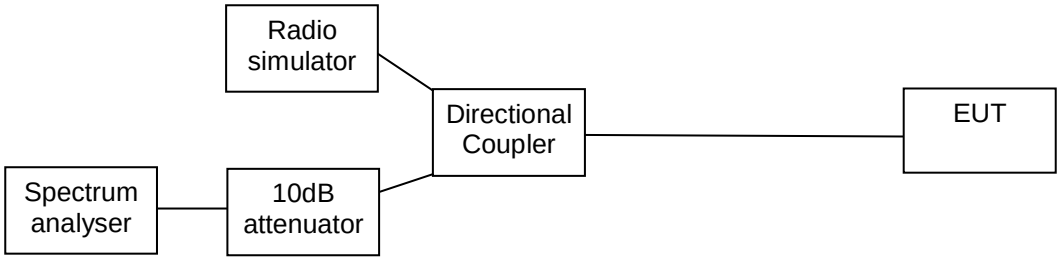
| Section | Section in CFR 47 | Name of the test | Result |
|---|---|---|---|
| 3&4 | 15.209 | Spurious radiated emissions | PASS |
| - | 15.207 | AC powerline conducted emissions | NA |

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.

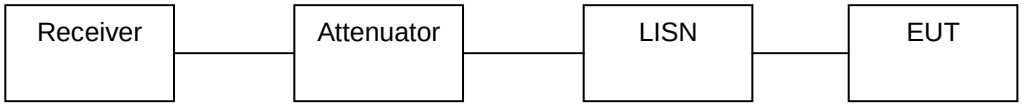
# CONTENTS

# 2. Test setups

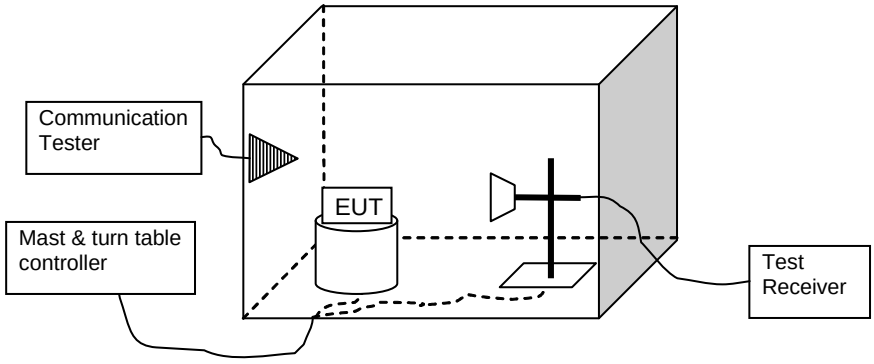
## 2.1. Conducted RF test setup




## 2.2. AC power line conducted emissions test setup




## 2.3. Radiated emissions test setup



# 3. Radiated emissions below 30MHz

**(FCC §15.209)**

| | |
|---|---|
| **EUT with DUT number** | DAB15290U |
| **Accessories with DUT numbers** | DAB15069E (Receiver Simulator), DAB122 (power cable) |
| **Operation Voltage [V] / [Hz]** | 12 / DC |
| **Result** | PASS |
| **Remarks** | OP1 (5Ω/5W load, Primary Coil 1) |
| **Temp [°C] / Humidity [%RH]** | 24.2 / 38.5 |
| **Date of measurements** | 10-Apr-2015 |
| **Measured by** | Robert Müller |

## 3.1. Test method and limit

The measurement is made according to ANSI C63.4:2009 as follows:

The measurement distance is 3m with a shielded loop antenna

The Limit has been adjusted with the distance correction factor (+40dB for 30m distance and +80dB for 300m distance)

The measurement is divided into the Preliminary Measurement and the Final Measurement.
The suspected frequencies are searched for in Preliminary Measurement with measuring antenna at fixed height using 2-axis EUT position system, set on the turntable, which is rotated 360 degrees.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:
$E\ [\mu V/m] = U_{RX} + A_{CF}$

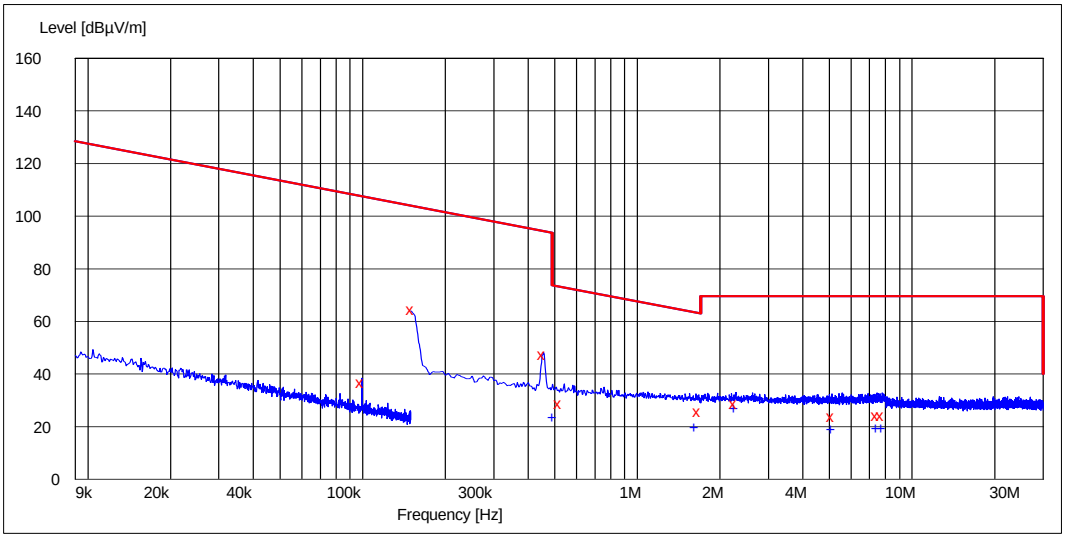
Where $U_{RX}$ is receiver reading and $A_{CF}$ is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{CF} = L_{CABLES} + AF - G_{PREAMP}$).

Limits for spurious radiated emissions measurements (3 m measurement distance)

| Frequency range [MHz] | Limit [µV/m] | Limit [dBµV/m] | Detector |
|---|---|---|---|
| 0.009 – 0.09 | 10000 * 2400/f(kHz) | 128.5 – 93.8 | AV |
| 0.09 – 0.11 | | | QP |
| 0.11 – 0.19 | | | AV |
| 0.19 - 0.49 | | | AV |
| 0.490 – 1.705 | 100 * 24000/f(kHz) | 73.8 – 63.0 | QP |
| 1.705 – 30.0 | 100 * 30 | 69.5 | QP |

## 3.2. Test results

Peak (<150kHz: RBW: 200Hz, >150kHz: RBW: 10kHz)




QuasiPeak (<150kHz: RBW: 200Hz, >150kHz: RBW: 9kHz)

| Frequency [MHz] | Level [dBµV/m] | Transducer [dB] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Polarisation | Azimuth [Deg] | Result |
|---|---|---|---|---|---|---|---|---|
| 0.099 | 36.90 | 23.40 | 107.70 | 70.80 | 170 | VERTICAL | 90 | PASS |
| 0.152 | 64.60 | 23.30 | 104.00 | 39.40 | 170 | VERTICAL | 90 | PASS |
| 0.456 | 47.50 | 23.40 | 94.40 | 46.90 | 170 | VERTICAL | 0 | PASS |
| 0.523 | 28.70 | 23.40 | 73.20 | 44.50 | 170 | VERTICAL | 90 | PASS |
| 1.670 | 25.60 | 23.20 | 63.20 | 37.60 | 170 | VERTICAL | 0 | PASS |
| 2.275 | 29.10 | 23.10 | 69.50 | 40.40 | 170 | VERTICAL | 0 | PASS |
| 5.136 | 23.90 | 23.40 | 69.50 | 45.60 | 170 | VERTICAL | 90 | PASS |
| 7.463 | 24.30 | 23.40 | 69.50 | 45.20 | 170 | VERTICAL | 90 | PASS |
| 7.777 | 24.40 | 23.50 | 69.50 | 45.10 | 170 | VERTICAL | 0 | PASS |

No further emissions found less than 20dB to the regulatory limit

Average (<150kHz: RBW: 200Hz, >150kHz: RBW: 9kHz)

| Frequency [MHz] | Level [dBµV/m] | Transducer [dB] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Polarisation | Azimuth [Deg] | Result |
|---|---|---|---|---|---|---|---|---|
| 0.497 | 23.70 | 23.40 | 73.70 | 50.00 | 170 | VERTICAL | 90 | PASS |
| 1.632 | 19.80 | 23.20 | 63.40 | 43.60 | 170 | VERTICAL | 0 | PASS |
| 2.279 | 26.80 | 23.10 | 69.50 | 42.70 | 170 | VERTICAL | 0 | PASS |
| 5.144 | 18.90 | 23.40 | 69.50 | 50.60 | 170 | VERTICAL | 90 | PASS |
| 7.474 | 19.30 | 23.40 | 69.50 | 50.20 | 170 | VERTICAL | 90 | PASS |
| 7.825 | 19.50 | 23.50 | 69.50 | 50.00 | 170 | VERTICAL | 0 | PASS |

No further emissions found less than 20dB to the regulatory limit

# 4. Radiated emissions above 30MHz

**(FCC §15.209)**

| | |
|---|---|
| **EUT with DUT number** | DAB15290U |
| **Accessories with DUT numbers** | DAB15069E (Receiver Simulator), DAB122 (power cable) |
| **Operation Voltage [V] / [Hz]** | 12 / DC |
| **Result** | PASS |
| **Remarks** | OP1 (5Ω/5W load, Primary Coil 1) |
| **Temp [°C] / Humidity [%RH]** | 24.2 / 38.5 |
| **Date of measurements** | 10-Apr-2015 |
| **Measured by** | Robert Müller |

## 4.1. Test method and limit

The measurement is made according to ANSI C63.4:2009 as follows:

Below 1GHz:

The Preliminary Measurement and the Final Measurement is performed in 3m distance by rotating the turntable of 360 degrees and moving the antenna height between 1-4m.

The Preliminary Measurement is performed with floor absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed without floor absorbers, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

Between 1-3GHz:

The Preliminary Measurement and the Final Measurement is performed in 3m distance by rotating the turntable of 360 degrees at fixed height.

The Preliminary Measurement and the Final Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

Above 3GHz:

The Preliminary Measurement and the Final Measurement is performed in 1.5m distance by rotating the turntable of 360 degrees at fixed height.

The Preliminary Measurement and the Final Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed, if the Preliminary Measurement results are closer than 20 dB to the permissible limit.

General:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The EUT is placed at nonconductive plate at the turntable center.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$E\ [\mu V/m] = U_{RX} + A_{CF}$

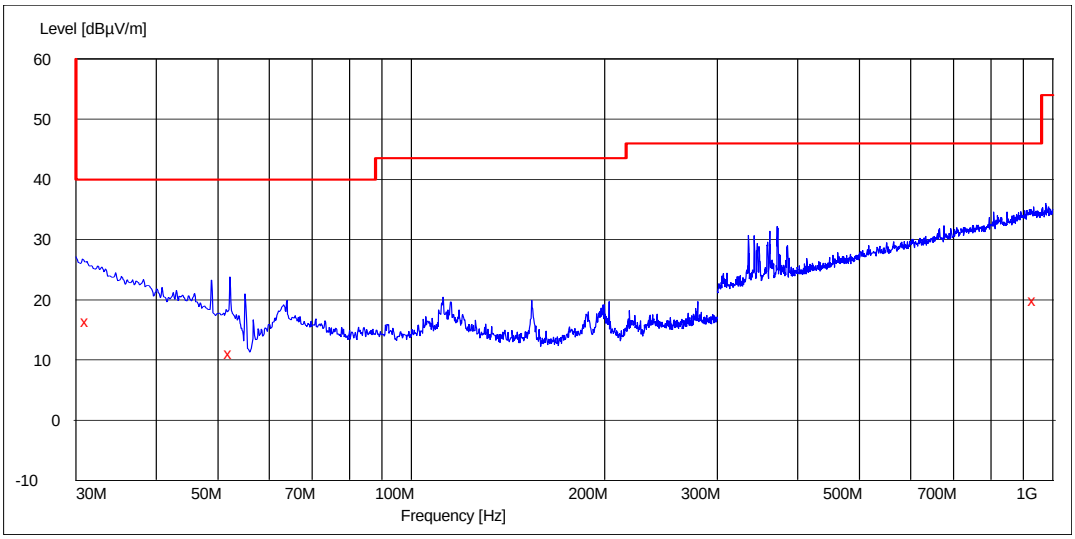
Where $U_{RX}$ is receiver reading and $A_{CF}$ is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{CF} = L_{CABLES} + AF - G_{PREAMP}$).

Limits for spurious radiated emissions measurements (3 m measurement distance)

| Frequency range [MHz] | Limit [µV/m] | Limit [dBµV/m] | Detector |
|---|---|---|---|
| 30 – 88 | 100 | 40 | QP |
| 88 – 216 | 150 | 43.5 | QP |
| 216 – 960 | 200 | 46 | QP |
| 960 – 1000 | 500 | 54 | QP |
| Above 1000 | 500 | 54 | AV |
| Above 1000 | 5000 | 74 | PK |

## 4.2. Test results

Peak (<300MHz: RBW: 300kHz, >300MHz: RBW: 1MHz)




QuasiPeak (RBW: 120kHz)

| Frequency [MHz] | Level [dBµV/m] | Transducer [dB] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Polarisation | Azimuth [Deg] | Result |
|---|---|---|---|---|---|---|---|---|
| 31.200 | 16.50 | -13.00 | 40.00 | 23.50 | 248 | VERTICAL | 256 | PASS |
| 52.224 | 11.10 | -29.40 | 40.00 | 28.90 | 125 | VERTICAL | 310 | PASS |
| 934.468 | 20.00 | -16.70 | 46.00 | 26.00 | 245 | VERTICAL | 202 | PASS |

No emissions found less than 20dB to the regulatory limit

# 5. Test Equipment

## 5.1. Conducted measurements

| Equipment | Manufacturer | Type | Serial No. | Calibration | Interval |
|---|---|---|---|---|---|
| Communication tester | Agilent | N4010A | MY46320388 | 14-Jul-14 | 3 years |
| Communication tester | R&S | CMU200 | 101138 | 13-Aug-13 | 2 years |
| EMI Testreceiver | R&S | ESU 26 | 100077/026 | 12-Aug-13 | 2 years |
| Power Supply | Agilent | E3632A | KR75303332 | 4-Sep-14 | 2 years |
| Climatic Chamber | Vötsch | VT 4004 | 566031450010 | 9-Sep-14 | 2 years |
| Power Sensor | ETS Lindgren | 7002-006 | 13I00030SNO83 | 7-Apr-14 | 3 years |
| Signal Generator | R&S | SMP02 | 828269 / 008 | 8-Jul-14 | 3 years |
| Vector Signal Generator | R&S | SMJ100A | 100845 | 20-Aug-14 | 2 years |
| Directional Coupler | Tyco | 0.5 - 18GHz | 2026-6010-10 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 0.3m | 199748/4 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 0.5m | 123746/4 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 1.2m | 143748/4 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 1.3m | 143781/4 | 15-Mar-15 | 1 year |
| Splitter | Mini-Circuits | ZN2PD2-50 | SF002300417 | 15-Mar-15 | 1 year |
| Directional Coupler | M/A-Com | 2026-6003-20 | 001 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 1.3m | 125434/4 | 15-Mar-15 | 1 year |
| Cable | Huber+Suhner | Sucoflex 104 / 1.3m | 126838/4 | 15-Mar-15 | 1 year |
| Attenuator | Huber+Suhner | 10dB | 002 | 15-Mar-15 | 1 year |

## 5.2. Radiated measurements

| Equipment | Manufacturer | Type | Serial No. | Calibration | Interval |
|---|---|---|---|---|---|
| Chamber: Euroshield | ETS | RFD-F/ A-100 | 3069 | 30-Jun-14 | 3 years |
| Control Room | ETS | RFD-100 | 3070 | - | - |
| Communication Tester | R&S | CMU200 | 101138 | 13-Aug-13 | 2 years |
| Signal Generator | R&S | SMP02 | 828269 / 008 | 8-Jul-14 | 3 years |
| Signal Generator | R&S | SML01 | 100651 | 23-Sep-14 | 3 years |
| Bluetooth Tester | Anritsu | MT 8850A | 6k00001358 | 22-Aug-12 | 3 years |
| Power Supply | Agilent | E3632A | MY40011318 | 18-Aug-14 | 1 year |
| Antenna | R&S | HL562 | 100249 | 24-Jul-12 | 3 years |
| Antenna | Schwarzbeck | BBHA9120LF | 1298 | 24-Oct-14 | 3 years |
| Antenna | EMCO | 3160-09 | 001814-006 | - | - |
| EMI Test Receiver | R&S | ESI 26 | 827769/010 | 25-Jul-13 | 2 years |
| Band Reject Filter | Wainwright | CH9750/1950 MHz | 371133 | 15-Mar-15 | 1 year |
| Band Reject Filter | Wainwright | 2.4-2.4835 GHz | 1 | 15-Mar-15 | 1 year |
| Notch Filter GSM 1800 | Wainwright | TCH700/1747,8 MHz | 371136 | 15-Mar-15 | 1 year |
| Notch Filter GSM 1900 | Wainwright | TCH661/1880 MHz | 371137 | 15-Mar-15 | 1 year |
| Notch Filter GSM 900 | Wainwright | TCH62/902,4 MHz | 371135 | 15-Mar-15 | 1 year |
| Notch Filter GSM 850 | Wainwright | TCH190/836,6 MHz | 371134 | 15-Mar-15 | 1 year |