



BNetzA-CAB-21/21-21

# Test Report

**Test report no.:** 22107920-32952-1

**Date of issue:** 2024-02-01

**Test result:** The test item - **passed** - and complies with the listed standards.

## Applicant

*Bury GmbH & Co. KG*

## Manufacturer

*Same as applicant*

## Test Item

*SCB*

## Radio Frequency Testing according to:

**FCC 47 CFR Part 15**

Radio frequency devices

**Parts 1.1307, 1.1310, 2.1091, 2.1093**

**680106 D01 RF Exposure Wireless Charging Apps v03r01**

**Canada RSS-102 Issue 5**

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

Tested by  
(name, function, signature)

*Andreas Bender*  
*Deputy Managing Director*

Approved by  
(name, function, signature)

*Karsten Gerdly*  
*Lab Manager*

<b>Applicant and Test item details</b>	
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<b>Manufacturer</b>	Same as applicant
<b>Test item description</b>	Wireless Charger with NFC
<b>Model/Type reference (unique)</b>	SCB
<b>Standard specific information</b>	
<b>Frequency</b>	13.56 MHz / 125 kHz
<b>Technology</b>	RFID / WPT
<b>Antenna</b>	PCB antenna
<b>Power supply</b>	Vehicle Battery (Vnom: 12; Vmax: 16; Vmin: 6)
<b>Temperature range</b>	-40 °C ~ +80 °C
<b>FCC ID</b>	QZ9-SCB

### Disclaimer and Notes

The content of this report relates to the mentioned test sample(s) only.  
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Signatures are done electronically, if signer does not match stated signer, it is signed per order.  
Information supplied by the applicant can affect the validity of results. The data is marked accordingly.

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Within this test report, a  point /  comma is used as a decimal separator.  
If otherwise, a detailed note is added adjoined to its use.

Decision rule:

Decision rule based on simple acceptance without guard bands, binary statement, based on mutually agreed uncertainty tolerances with expansion factor k=2.

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## 2 GENERAL INFORMATION

### 2.1 Administrative details

Testing laboratory	<b>IBL-Lab GmbH</b> Heinrich-Hertz-Allee 7 66386 St. Ingbert / Germany Fon: +49 6894 38938-0 Fax: +49 6894 38938-99 URL: <a href="https://ib-lenhardt.com/">https://ib-lenhardt.com/</a> E-Mail: <a href="mailto:info@ib-lenhardt.com">info@ib-lenhardt.com</a>
Accreditation / Designation	<p>The testing laboratory is accredited by Deutsche Akkreditierungsstelle GmbH (DAkKS) in compliance with DIN EN ISO/IEC 17025:2018.</p> <p>Scope of testing and registration number:</p> <ul style="list-style-type: none"> <li>• Attachment to the accreditation certificate <a href="#">D-PL-21375-01-00</a> <ul style="list-style-type: none"> <li>○ Electronics</li> <li>○ Electromagnetic Compatibility</li> <li>○ Radio</li> <li>○ Electromagnetic Compatibility and Telecommunication (FCC requirements)</li> <li>○ Telecommunication (TC) and Electromagnetic Compatibility (EMC) for Canadian Standards</li> <li>○ Automotive EMC</li> </ul> </li> </ul> <p>Website DAkKS: <a href="https://www.dakks.de/">https://www.dakks.de/</a></p> <p>The Deutsche Akkreditierungsstelle GmbH (DAkKS) is also a signatory to the <a href="#">ILAC Mutual Recognition Arrangement</a>.</p> <ul style="list-style-type: none"> <li>• Designations           <ul style="list-style-type: none"> <li>○ FCC Testing Laboratory Designation No. DE0024</li> <li>○ ISED Company Number 27156</li> <li>○ Testing Laboratory CAB Identifier DE0020</li> <li>○ Krafftahrt-Bundesamt KBA-P 00120-23</li> </ul> </li> </ul>
Testing location	<b>IBL-Lab GmbH</b> Heinrich-Hertz-Allee 7 66386 St. Ingbert / Germany
Date of receipt of test samples	2023-10-10
Start – End of tests	2023-10-10 – 2023-10-12

## 2.2 Possible test case verdicts

Test sample meets the requirements	P (PASS)
Test sample does not meet the requirements	F (FAIL)
Test case does not apply to the test sample	N/A (Not applicable)
Test case not performed	N/P (Not performed)

## 2.3 Observations

No additional observations other than the reported observations within this test report have been made.

## 2.4 Opinions and interpretations

No appropriate opinions or interpretations according ISO/IEC 17025:2017 clause 7.8.7 are within this test report.

## 2.5 Document history

### -0 Initial Version

-

### -1 Revision: technical modification 1/3

Added assessment for ISED for RFID only.  
 Revised safety distance antenna to any body part: 20cm -> 1.1mm  
 Added distance surface of enclosure to any body part: 0cm

**This test report 22107920-32952-1 replaces the previous test report 22107920-32952-0. Utilisation, publication and control of previous report editions is under responsibility of the applicant.**

### 3 ENVIRONMENTAL CONDITIONS

#### 3.1 Environmental conditions of lab

Temperature	25°C ± 10°C
Relative humidity	25-75% r.H.
Barometric Pressure	860-1060 mbar
Power supply	230/400 V AC , 50 Hz

### 4 TEST STANDARDS AND REFERENCES

Test standard (accredited)	Description
FCC 47 CFR Part 15	RADIO FREQUENCY DEVICES
RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

Test standard (not accredited)	Description
none	-

Reference	Description
447498 D04 Interim General RF Exposure Guidance v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
680106 D01 RF Exposure Wireless Charging Apps v03r01	RF EXPOSURE CONSIDERATIONS FOR LOW POWER CONSUMER WIRELESS POWER TRANSFER APPLICATIONS

## 5 Device Data

Parameters declared by the manufacturer:

The declared maximum output powers including tune-up tolerances are used with regard to the maximum antenna gains to find the maximum EIRP and ERP values.

Type	Band [MHz]	Simultaneous transmission	Max. EIRP (average) [dBm]
RFID	13.56	N/A	-18.5

Measurements of power levels and declared antenna gains detailed in this test report and were taken from the following RF module test report(s). EUT test information such as test equipment used, date of actual test, environmental conditions, measurement uncertainty and the person who performed the original tests are referenced in the listed test report/s.

Type	Test Report	Radio Standard	Issued by	Band [MHz]	RF output Power + Antenna Gain (average) [dBm]	P.
RFID	22107920-32949-1	47 CFR Part 15 RSS-247, Issue 2; RSS-Gen, Issue 5	IBL-Lab GmbH	13.56 MHz	(75.14 dBµV/m @ 3 m) Calculated: -20.09	9

## 6 MPE Assessment Requirements - RFID

### 6.1 FCC 47 CFR

#### 6.1.1 FCC 47 CFR Part 1.1307 (b)(3) - Determine that they qualify for an exemption

(i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by:

(C) Or using Table 1 and the minimum separation distance ( $R$  in meters) from the body of a nearby person for the frequency ( $f$  in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply,  $R$  must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

RF Source frequency (MHz)	Threshold ERP (watts)
0.3 – 1.34	1,920 $R^2$
1.34 – 30	3,450 $R^2/f^2$
30 - 300	3.83 $R^2$
300 – 1,500	0.0128 $R^2f$
1,500 – 100,000	19.2 $R^2$



**6.1.2 FCC 47 CFR Part 1.1310 Radiofrequency radiation exposure limits.**

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

f = frequency in MHz \* = Plane-wave equivalent power density

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Frequency range <sup>a</sup>	FCC Rules	OET Equipment Authorization Policies
≤ 100 kHz	N/A (under consideration) <sup>c</sup>	All devices assessed case-by-case, with field strength limits of E = 83 V/m and H = 90 A/m, in all body exposure relevant positions
100 kHz < f ≤ 300 kHz <sup>b</sup>	SAR limits in § 1.1310 (b), (c)	MPE limits at 300 kHz in Table 1 to § 1.1310(e)(1): E = 614 V/m and H = 1.63 A/m
300 kHz < f ≤ 4 MHz <sup>b</sup>	§ 2.1091 Mobile Devices: MPE limits in Table 1 to § 1.1310(e)(1)	MPE limits in Table 1 to § 1.1310(e)(1)
	§ 2.1093 Portable Devices: SAR limits in § 1.1310 (b), (c)	

<sup>a</sup> = For all f ≤ 6 GHz, SAR limits in §§ 1.1310 (b), (c) can always be applied where available, in place of MPE limits

<sup>b</sup> = Policies for 100 kHz < f ≤ 4 MHz reflect capabilities of available SAR measurement equipment. Numerical simulations may be also acceptable, under PAG

<sup>c</sup> = NPRM, ET Docket No. 19-226; FCC 19-126, 34 FCC Rcd 11743

**6.1.3 FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.**

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular §1.1307(b), chapter (6.1.2).

(b) For purposes of this section, the definitions in § 1.1307(b)(2) of this chapter shall apply. A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least **20 centimeters** is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons. In this context, the term **“fixed location”** means that the device is physically secured at one location and is not able to be easily moved to another location while transmitting. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal desktop computer, are considered to be **mobile devices** if they meet the **20-centimeter** separation requirement.

(c)(1) Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for mobile devices with single RF sources having either more than an available maximum time-averaged power of **1 mW** or more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), whichever is greater. For mobile devices not exempt by § 1.1307(b)(3)(i)(C) at distances from **20 centimeters** to **40 centimeters** and frequencies from **0.3 GHz to 6 GHz**, evaluation of compliance with the exposure limits in § 1.1310 of this chapter is necessary if the ERP of the device is greater than  $ERP_{20cm}$  in the formula below. If the ERP of a single RF source at distances from **20 centimeters** to **40 centimeters** and frequencies from **0.3 GHz to 6 GHz** is not easily obtained, then the available maximum time-averaged power may be used (*i.e.*, without consideration of ERP) in comparison with the following formula only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

$$P_{th}(\text{mW}) = ERP_{20\text{ cm}}(\text{mW}) = \begin{cases} 2040f & 0.3\text{ GHz} \leq f < 1.5\text{ GHz} \\ 3060 & 1.5\text{ GHz} \leq f \leq 6\text{ GHz} \end{cases}$$

(c)(2) For multiple mobile or portable RF sources within a device operating in the same time averaging period, routine environmental evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

(c)(3) Unless otherwise specified in this chapter, any other single mobile or multiple mobile and portable RF source(s) associated with a device is exempt from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in § 1.1307(c) and (d) of this chapter.

**6.1.4 FCC 47 CFR Part 2.1093 Radiofrequency radiation exposure evaluation: portable devices.**

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular § 1.1307(b).

(b) For purposes of this section, the definitions in § 1.1307(b)(2) of this chapter shall apply. A portable device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are within **20 centimeters** of the body of the user.

(c) (1) Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for portable devices having single RF sources with more than an available maximum time-averaged power of 1 mW, more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), or more than the  $P_{th}$  in the following formula, whichever is greater. The following formula shall only be used in conjunction with portable devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 0.5 centimeters to 20 centimeters and frequencies from 0.3 GHz to 6 GHz.

$$P_{th}(\text{mW}) = \begin{cases} ERP_{20\text{ cm}}(d/20\text{ cm})^x & d \leq 20\text{ cm} \\ ERP_{20\text{ cm}} & 20\text{ cm} < d \leq 40\text{ cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\text{ cm}}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

$$ERP_{20\text{ cm}}(\text{mW}) = \begin{cases} 2040f & 0.3\text{ GHz} \leq f < 1.5\text{ GHz} \\ 3060 & 1.5\text{ GHz} \leq f \leq 6\text{ GHz} \end{cases}$$

(2) For multiple mobile or portable RF sources within a device operating in the same time averaging period, evaluation is required if the formula in § 1.1307(b)(3)(ii)(B) of this chapter is applied to determine the exemption ratio and the result is greater than 1.

(3) Unless otherwise specified in this chapter, any other single portable or multiple mobile and portable RF source(s) associated with a device is exempt from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in § 1.1307(c) and (d) of this chapter.

## 6.2 447498 D04 Interim General RF Exposure Guidance v01

### 6.2.1 Tolerances in RF Exposure Test Methodologies

Device samples used for compliance testing must have the same physical, mechanical, and thermal characteristics, and operational tolerances as for production units.

All devices must be tested within the tune-up tolerance specification range. More specifically, each device must be evaluated for SAR or MPE compliance in the required operating modes and test configurations, at the maximum rated output power, and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance.

### 6.2.2 1-mW Test Exemption for Multiple Sources

As discussed in § 1.1307(b)(3)(ii)(A), the 1-mW exemption intended for single transmitters may be also applied to simultaneous transmission conditions, within the same host device, according one of the following criteria:

a) When maximum available power each individual transmitting antenna within the same time averaging period is  $\leq 1$  mW, and the nearest parts of the antenna structures of the simultaneously operating transmitters are separated by at least 2 cm.

b) When the aggregate maximum available power of all transmitting antennas is  $\leq 1$  mW in the same time-averaging period.

This exemption may not be combined with any other exemption.

### 6.2.3 Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions

This case is described in detail in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of Formula (1) is satisfied.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1 \quad (1)$$

Appendix C of KDB provides additional details.

For these test exemptions to apply, the maximum output power, duty factor, and other applicable parameters used in the standalone ERP determination tests, must be the same, or corresponding to a more conservative choice, than those required for simultaneous transmission.

The power level of the standalone SAR used to qualify for SAR test exemption, or additional test exemption, must be clearly explained in the SAR report. When simultaneous transmission SAR- based test exemptions, or when the SPLSR test exemption [Section 2.2.3] cannot be applied, enlarged zoom scan [Glossary] SAR measurements must be performed at the maximum output power required for the applicable simultaneous transmission scenarios. This power level shall account for the tune-up tolerance [Glossary] requirements of all transmitters, but not more than **2 dB lower than the maximum tune-up tolerance limit**.

**6.3 ISED RSS-102 Issue 5 - Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)**

**6.3.1 RSS-102 Section 2.5 - Exemption Limits for Routine Evaluation**

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2. **If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C).** The information contained in the RF exposure technical brief may be limited to the value(s) of the maximum output power, the information that demonstrates how the maximum output power of the transmitter was derived and the rationale for the separation distances applied (see Table 1), which must be based on the most conservative exposure condition for the applicable module or host platform test procedure requirements.

**6.3.2 RSS-102 Section 2.5.1 - Exemption Limits for Routine Evaluation – SAR Evaluation**

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is **less than or equal to 20 cm**, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
<300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
<300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW

5800	56 mW	71 mW	85 mW	97 mW	106 mW
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Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For **controlled use** devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a **factor of 5**. For **limb-worn devices** where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a **factor of 2.5**. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance.

For test **separation distance less than 5 mm**, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required. For **medical implants devices**, the exemption limit for routine evaluation is set at **1 mW**. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

The exemption limits in Table 1 are based on measurements and simulations of half-wave dipole antennas at separation distances of **5 mm to 25 mm** from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

Transmitters operating between **0.003-10 MHz**, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in Section 4 of RSS-102.

**6.3.3 RSS-102 Section 2.5.2 - Exemption Limits for Routine Evaluation – RF Exposure Evaluation**

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device’s radiating element **is greater than 20 cm**, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

**6.3.4 RSS-102 Section 3.1.2 SAR Measurement of Devices Containing Multiple Transmitters**

Compliance of devices with multiple transmitters capable of simultaneous transmission shall be assessed in accordance with the latest version of IEEE 1528. However, other recognized methods — such as the procedures published by the FCC proven to provide a conservative estimate of the SAR value (KDB 447498 D01) — can also be used. Applicants shall include in the RF exposure technical brief all information relevant to the exact test methodology used.

**6.3.5 RSS-102 Section 4 Exposure Limits**

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada’s RF exposure guideline, Safety Code 6.

Table 2: Internal Electric Field Strength Basic Restrictions (3 kHz-10 MHz)

Condition*	Internal Electric Field Strength** (V/m) (any part of the body)
Controlled Environment	$2.7 \times 10^{-4} f$
Uncontrolled Environment	$1.35 \times 10^{-4} f$

Note:  $f$  is frequency in Hz.

\*\*Instantaneous, RMS values apply.

\*: For provisions related to instantaneous nerve stimulation measurements see Notice 2015-DRS001.

Table 3: SAR Limits for Devices Used by the **General Public** (Uncontrolled Environment)

Body Region	Average SAR (W/kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

Table 4: RF Field Strength Limits for Devices Used by the **General Public** (Uncontrolled Environment)

Frequency Range [MHz]	Electric Field [V/m rms]	Magnetic Field [A/m rms]	Power Density [W/m <sup>2</sup> ]	Reference Period [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	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

**Note:**  $f$  is in frequency in MHz

\* Based on nerve stimulation (NS)

\*\* Based on specific absorption rate (SAR)

Table 5: SAR Limits for **Controlled Use Devices** (Controlled Environment)

Body Region	Average SAR (W/kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.4	6	Whole Body
Localized Head, Neck and Trunk	8	6	1
Localized Limbs	20	6	10

Table 6: RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range [MHz]	Electric Field [V/m rms]	Magnetic Field [A/m rms]	Power Density [W/m <sup>2</sup> ]	Reference Period [minutes]
0.003-10	170	180	-	Instantaneous*
1-10	-	1.6/f	-	6**
1.29-10	193/f <sup>0.5</sup>	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/f <sup>0.25</sup>	0.3444/f <sup>0.25</sup>	44.72/f <sup>0.5</sup>	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 f <sup>0.25</sup>	0.04138 f <sup>0.25</sup>	0.6455 f <sup>0.5</sup>	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/f <sup>1.2</sup>
150000-300000	0.354 f <sup>0.5</sup>	9.40 x 10 <sup>-4</sup> f <sup>0.5</sup>	3.33 x 10 <sup>-5</sup> f	616000/f <sup>1.2</sup>

**Note:** f is in frequency in MHz

\* Based on nerve stimulation (NS)

\*\* Based on specific absorption rate (SAR)

**General public use** is the type of approval given to a device that can be used by the general public.

**Controlled use** is the type of approval given to a device that is intended to be used by persons who are fully aware of, and can exercise control over, their exposure. **Controlled use devices** are typically installed in non-public areas and are not intended for use by members of the general public.

For provisions related to instantaneous nerve stimulation measurements see **Notice 2015-DRS001**. Please note, that the notice has been replaced by **SPR-002**.

## 7 MPE Calculation Method

### 7.1 Standalone MPE Calculation Method

#### Conversion of output power

$$P(mW) = 10^{\left(\frac{Lp(dBm)}{10}\right)} \times 1mW$$

E:	E-field strength [V/m]
P:	Power input to antenna [W]
G:	Gain of the antenna in the direction of interest relative to an isotropic radiator [dBi]
PG:	EIRP (effective isotropic radiated power) [W]
r:	Distance [m]

$$E = \frac{\sqrt{30PG}}{r}$$

S:	Power density [W/m <sup>2</sup> ]
P:	Power input to antenna [W]
G:	Gain of the antenna in the direction of interest relative to an isotropic radiator [dBi]
PG:	EIRP (effective isotropic radiated power) [W]
r:	Distance [m]

$$S = \frac{PG}{4\pi r^2}$$

The EUT is a wireless device with a distance of at least 0.0011m from any body part of nearby persons to the antenna; and with a distance of 0m from any body part of nearby persons to the surface of the enclosure.

FCC: § 1.1307(b)(3)(i)(A)

RSS: 2.5.1 Table 1

Type	Band [MHz]	Max. EIRP [dBm]	Max. EIRP [W]	Power Density [W/m <sup>2</sup> ]	Power Density [mW/cm <sup>2</sup> ]	FCC Limit [mW/cm <sup>2</sup> ]	FCC Verdict	FCC Exemp. [W]	FCC Exemp. fulfilled	ISED Limit [W/m <sup>2</sup> ]	ISED Verdict	ISED Exemp. [W]	ISED Exemp. fulfilled
<b>Manufacturer declared values</b>													
RFID	13.56	-18.5	0.0000142	0.0000282	0.0000029	N/A	N/A	0.001	yes	N/A	N/A	0.071	yes
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Measured values for reference</b>													
RFID	13.56	-20.09	0.0000098	0.0000196	0.00000196	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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**Requirement:** Values for MPE compliance in the required operating modes and test configurations, at the maximum rated output power, are not within 2 dB lower than the maximum *tune-up tolerance limit*.

**Verdict:** Passed



## 8 MPE Assessment Requirements - WPT

### 8.1 FCC – KDB 680106 D01 RF Exposure Wireless Charging Apps v03r01

Requirement	Implementation	Verdict
Power transfer frequency is less than 1 MHz.	Operation frequency range is within Qi limits < 1MHz (~127 kHz)	P
Output power from each primary coil is less than or equal to 15 watts.	15 W	P
The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Coupling only between individual pairs of coils.	P
Client device is placed directly in contact with the transmitter.	No gap, but direct contact is intended use.	P
Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	Mobile exposure is intended.	P
The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	See measurement tables E-Limit: 614 V/m -> 50% -> 307 V/m H-Limit: 1.63 A/m -> 50% -> 0.815 A/m	P

#### 8.1.1 Limits – 3. RF Exposure Requirements

c) For devices designed for typical desktop applications, such as wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: **614 V/m** and **1.63 A/m**. Below 100 kHz, applicable reference levels for maximum instantaneous exposure field strengths are defined in clause 3.a).(2).

**8.1.2 EUT setup + Measurements**

Set-up #	Setup modes	Remark
1	NFC polling	--
2	NFC with NFC Card	--
3	Wireless polling, digital ping only, no load	--
4	Wireless charging	15W

Section	Setup	Orientation	Frequency [MHZ]	Distance [cm]	E-Field [V/m]	E-Field limit [V/m]	H-Field [A/m]	H-Field limit [A/m]	Note	Verdict
C	3	Top	0.125	15	0.116	307	0.3131	0.815	--	P
C	3	High	0.125	15	0.095	307	0.2924	0.815	--	P
C	3	Low	0.125	15	0.101	307	0.3705	0.815	--	P
C	3	Left	0.125	15	0.096	307	0.1348	0.815	--	P
C	3	Right	0.125	15	0.141	307	0.106	0.815	--	P
Supplementary information:										
D	4	Top	0.125	15	0.101	307	0.3460	0.815	--	P
D	4	High	0.125	15	0.089	307	0.6577	0.815	--	P
D	4	Low	0.125	15	0.109	307	0.0503	0.815	--	P
D	4	Left	0.125	15	0.090	307	0.0519	0.815	--	P
D	4	Right	0.125	15	0.0480	307	0.0310	0.815	--	P
Supplementary information:										

## 9 List of test equipment used

#	Equipment Class	Manufacturer	Type	S/N	ID	Cal.	Calibration due date
1	WPC QI	nok9	RERX- BST	800103-1914	LAB000432	C	2023-06-26 → 12M → 2024-06-26
2	Caliper	TURATA	Schieblehre LCD	4018737	LAB000266	C	2023-01-02 → 12M → 2024-01-02
3	Tape Measure	Bosch	Professional 5m	1600 a01 6ld	LAB000265	C	2023-01-02 → 24M → 2024-01-02
4	Datalogger	T&D Corp.	TR-72nw	621803EB	LAB000255	C	2022-09-14 → 24M → 2024-09-14
5	Field Probe	narda Safety Test Solutions	HF 3061	D-0856	LAB000233	C	2023-04-13 → 12M → 2024-04-13
6	Field Probe	narda Safety Test Solutions	EHP-50F	510WY91127	LAB000232	C	2023-05-08 → 12M → 2024-05-08
7	Field Probe	narda Safety Test Solutions	NBM-550	H-1188	LAB000231	C	2023-04-13 → 12M → 2024-04-13

## Annex 1 Photo Documentation

### Section A – exemplary

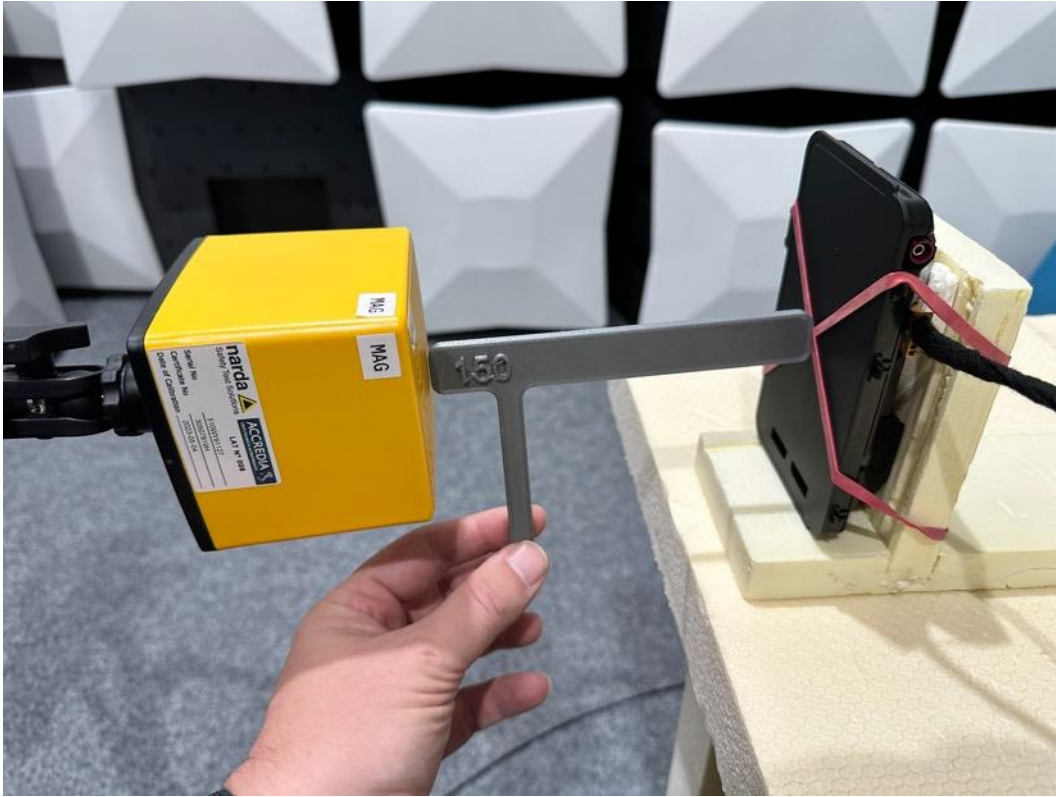


Photo : 1



Photo : 2



Photo : 3

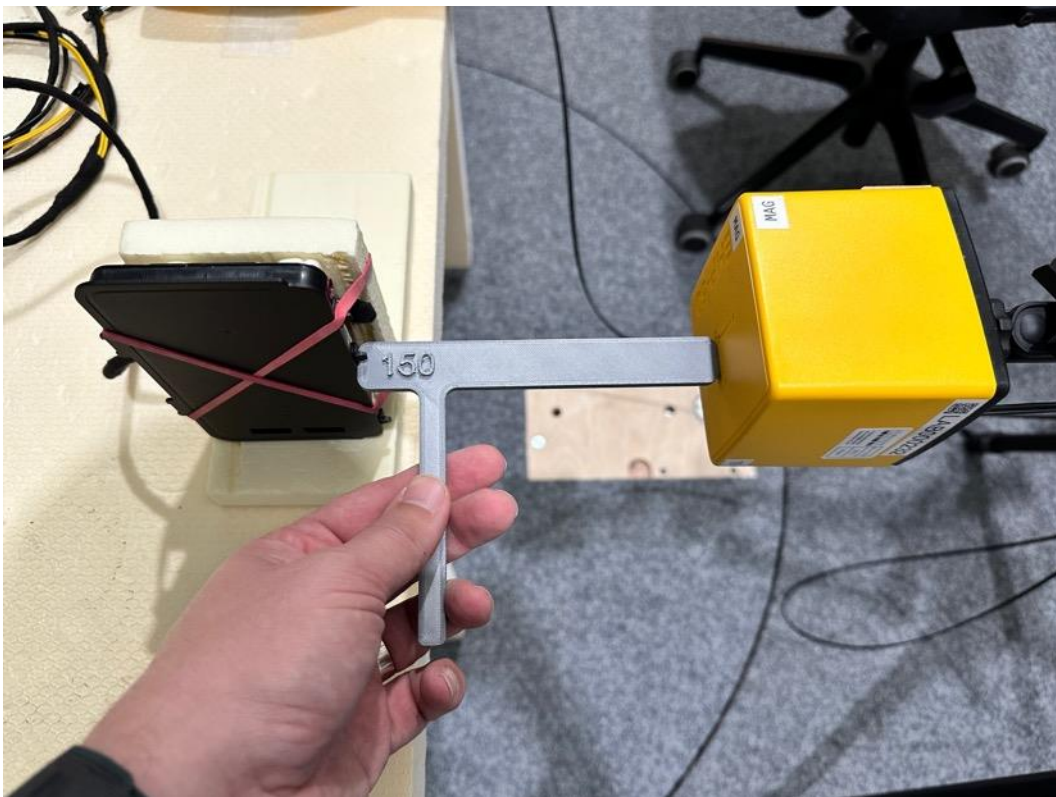


Photo : 4

Section B - exemplary



Photo : 5

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**End of Test Report**

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