

# Datalogic S.r.l.

## TEST REPORT

### SCOPE OF WORK

EMC TESTING–AELVSD

### REPORT NUMBER

250305086GZU-003

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## TEST REPORT

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Intertek Report No: 250305086GZU-003  
FCC ID: U4G-AELVSD

## Test standards

**47 CFR PART 1, Subpart I, Section 1.1310**  
**KDB 680106 D01 Wireless Power Transfer v04**

## Sample Description

Product : Vehicle Charger  
Model No. : AELVSD  
Electrical Rating : INPUT:9VDC3A  
Serial No. : Not Labeled  
Date Received : 05 March 2025  
Date Test : 17 May 2025  
Conducted

Prepared and Checked By

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## TEST REPORT

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## TEST REPORT

### 1.0 TEST RESULT SUMMARY

Classification of EUT: Class B

Test Item	Standard	Result
EMF	47 CFR PART 1, Subpart I, Section 1.1310	PASS

Remark:

When determining the test results, measurement uncertainty of tests has been considered.

## TEST REPORT

### 2.0 General Description

#### 2.1 Product Description

Operating Frequency	111-147KHz
Type of Modulation:	Load modulation
Antenna Type	Inductive loop coil antenna
Power Supply:	Mode 1:Test with adaptor(E018-1A120150C8) 5VDC 3.0A/9VDC 2.0A/12DC V1.5A Mode 2:Test with adaptor(GDS-CHARGE-V7B1U) 5VDC 2.5A max; 9VDC 2.5A max
Power cord:	1.5 m unscreened USB cable 900 mm x 2wires unscreened DC supply cable

#### 2.2 Test Facility

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

A2LA Certificate Number 0078.10

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

#### 2.3 EUT Exercising Software

N/A

#### 2.4 Special Accessories

N/A

#### 2.5 Equipment Modification

Any modifications installed previous to testing by Datalogic ADC S.r.l. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

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### 2.6 Support Equipment List and Description

This product was tested with corresponding support equipment as below:

Support Equipment:

Equipment	Model No.	Rating	Supplier
Adapter	E018-1A120150C8	Input: 12VDC/24VDC Output: 5VDC 3.0A/9VDC 2.0A/12DC V1.5A	Clinet
Battery	38B19L-MFZ	DC 12V	Intertek
Mobile phone	AELWF	5V/2A	Clinet
USB Cable	12V Sync Cable	1.5m length(unshielded)	Clinet
Car cigarette lighter& Power cord	--	450mm length(unshielded)	Intertek

**Remark:** Mobile phone was one of typical client devices, it's selected such that the EUT was fully exercised at maximum power from its transmitter. It will not be sold together.

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above evaluated respectively

Pretest mode	Description	
Standby Mode	kept transmitting continuously	
Charging Mode	CH: Low	WPT client is charging at 1% battery power, 50% and 99% battery power respectively, keep transmitting continuously
	CH: Middle	
	CH: High	

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### 3.0 EMF TEST

#### 3.1 Standard Requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.1m normally can be maintained between the user and the device.

##### (a) Limits for Occupational / Controlled Exposure

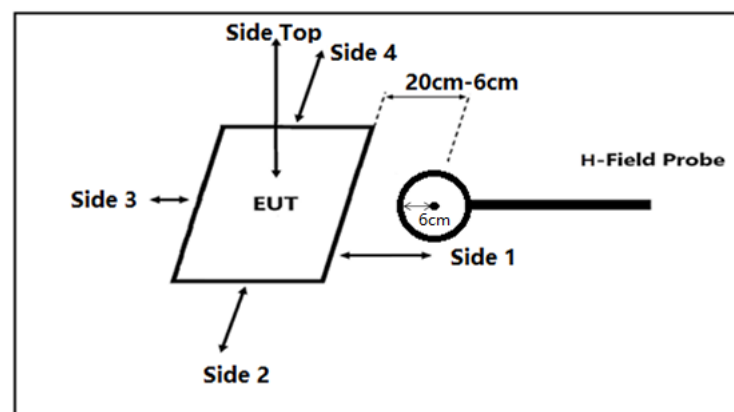
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm <sup>2</sup> )	Averaging Times  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	F/300	6
1500-100000	--	--	5	6

##### (b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm <sup>2</sup> )	Averaging Times  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	F/1500	30
1500-100000	--	--	1.0	30

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

#### 3.2 Test Setup Configuration



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### 3.3 Test Data

Input Voltage: DC 12V

Ambient Condition: 24°C, 50%RH

Test distance: H-field data is taken along all three axes the device, from 0 cm to 20 cm, in 2 cm minimum increment measured from the edge of the device, with one axis coincident with the axis of the main coil, the worst data was tested at Mobile in 1% battery power(the worst case) and shown as below.

Probe has 6 cm radius enclosure, so the test distance can only reach 6cm.

For the H-field strength at 4cm, 2cm and 0cm, it is calculated by theoretical estimation.

H-Filed Strength:

Test Position	Test distance(cm)								Limit (A/m)
	6	8	10	12	14	16	18	20	
Side 1	0.050	0.042	0.037	0.028	0.019	0.011	0.006	0.005	1.63
Side 2	0.047	0.040	0.035	0.025	0.016	0.008	0.004	0.002	1.63
Side 3	0.051	0.043	0.038	0.028	0.018	0.011	0.008	0.004	1.63
Side 4	0.052	0.043	0.038	0.029	0.019	0.012	0.008	0.004	1.63
Top	0.055	0.045	0.039	0.031	0.022	0.016	0.012	0.006	1.63

### Calculation of theoretical H-field strength with Biot-Savart's law

According to the self-inductance formula,  $\mu_r$ (relative permeability) can be obtained.

$$x = \sqrt{1 + \left(\frac{d}{2l}\right)^2}$$

$$L = 2l \left[ \ln \left\{ \left( \frac{2l}{d} \right) (1 + x) \right\} - x + \frac{\mu_r}{4} + \frac{d}{2l} \right]$$

$$\mu_r = 4 \left[ \frac{L}{2l} - \ln \left\{ \left( \frac{2l}{d} \right) (1 + x) \right\} + x - \frac{d}{2l} \right]$$

Where:

L: self inductance [nH]

d: diameter of the wire [cm]

l: length of the wire in [cm]

$\mu_r$ : relative permeability

L[nH]	d [cm]	l[cm]	$\mu_r$
11000	0.08	105	179.3



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According to Biot-Savart law, the value of the B-field at the distance z from the coil is expressed as follows.

$$B_z = \frac{\mu_0 I R^2}{2(R^2 + z^2)^{3/2}}$$

Convert the value of the B-field to the H-field.

$$B_z = \mu_0 \times H_z,$$

$$H_z = \frac{I R^2}{2(R^2 + z^2)^{3/2}}$$

Considering the number of turns and relative permeability of coil, it is expressed as follows.

$$H_z = \frac{I R^2}{2(R^2 + z^2)^{3/2}} \times \frac{N}{\mu_r}$$

Where:

I: the maximum current to the EUT during charging can be obtained from the power supply equipment [A]

R: the radial of EUT's coil antenna [m]

z: the distance from the coil antenna to the point to be measured [m]

N: the number of turns in the coil

$\mu_r$ : relative permeability

Test Condition	I[A]	R[m]	$\mu_r$	N	z[m]	Actual measuring distance <sup>3)</sup> [m]	Theoretical H-field Value [A/m]
10W	1.1	0.024	179.3	12	0.0714 <sup>1)</sup>	0.06	0.050
10W	1.1	0.024	179.3	12	0.0014 <sup>2)</sup>	0	1.526

Note:

1) Distance z is from the EUT's coil antenna to the measurement point and includes all of the following.

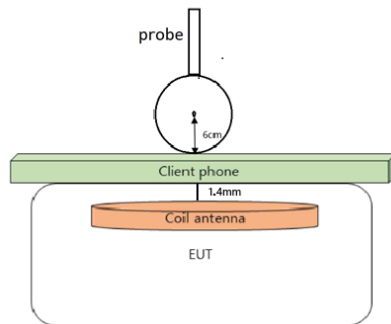
- 6 cm, the distance from the center to the probe outer edge
- 1 cm, the client phone thickness
- 1.4 mm, the gap from EUT's coil antenna to edge of the EUT

2) Distance z is from the EUT's coil antenna to the measurement point and includes all of the following.

- 6 cm, the distance from the center to the probe outer edge

3) In the actual measurement, it means the distance between the EUT and the center of the probe.

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6cm, the distance from the center to the probe outer edge
1cm, the client phone thickness
1.4mm, the gap from EUT's coil antenna to edge of the EUT

### 3.5 The validation of H-field strength

Test Condition	Distance(cm)	Theoretical H-field value [A/m]	30% tolerance of Theoretical H-field value[A/m]		Measured value	Limits (A/m)
			Min.	Max		
10W	6	0.050	0.035	0.065	0.055	1.63
	8	0.035	0.025	0.046	0.045	

### 3.6 The establishment of H-field strength

Test Condition	Distance(cm)	Theoretical H-field value [A/m]	Limits (A/m)	Result
10W	4	0.194	1.63	Pass
	2	0.638		Pass
	0	1.526		Pass

Estimation formula and theoretical value have 30% agreement with actual measurement. Estimation for 0mm field strength with validated formula complies limit.

## TEST REPORT

### 4.0 Test Equipment List

Equip. No.	Equipment	Model	Manufacturer	Cal. date	Due date
EM007-03	Exposure Level Tester	ELT-400	NARDA	2025/3/05	2026/3/04

\*\*\*\*\*End of the test report\*\*\*\*\*