

Test report No:
3447ERM.001A2

Assessment report

RF EXPOSURE REPORT ACCORDING TO FCC 47 CFR Part 2.1091

(*) Identification of item under evaluation	EV Charging Station
(*) Trademark	EVBox
(*) Model and /or type reference	EVBox Iqon
(*) Other identification of the product	Charging station with RF Technologies: RFID, LTE, WiFi, Bluetooth , RFComm (902-928MHz)
(*) Features	N/A
(*) Manufacturer	EVBox BV Kabelweg 47, 1014 BA, Amsterdam, The Netherlands
Test method requested, standard	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	2022-02-07
Report template No	FERMUSA_200 (*) "Data provided by the client"

Index

Competences and guarantees3

General conditions3

Data provided by the client.....3

Identification of the client.....3

Document history3

Modifications to the reference test report4

Appendix A: FCC RF Exposure assessment result5

General description of the device under evaluation6

RF Exposure Assessment result and verdict.....7

Appendix B: FCC RF Exposure information8

RF Exposure evaluation.....9

MPE Evaluation10

Competences and guarantees

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification Inc. at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Assessment Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Certification Inc.

General conditions

1. This report is only referred to the item that has undergone the assessment.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "General description of the device").
2. Maximum antenna gain and use distance information.

DEKRA Certification Inc. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Identification of the client

EV Box BV

Kabelweg 47, 1014 BA, Amsterdam, The Netherlands.

Document history

Report number	Date	Description
3447ERM.001	2022-02-07	First release
3447ERM.001A1	2022-02-07	Second release
3447ERM.001A2	2022-02-03	Third release

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 3447ERM.001A1 related with the same samples, in the next clauses and sub-clauses:

Clauses/ Sub-Clauses	Modification	Justification
Page 7/ Power Density Values	Modified to enter the correct value	Calculation error

This modification test report cancels and replaces the test report 3447ERM.001A1

Appendix A: FCC RF Exposure assessment result

General description of the device under evaluation

The device under evaluation consists of a EVBox Iqon which is a charging station with RF technologies RFID, LTE, WiFi, Bluetooth, RfComm(902-928MHz).

According to the manufacturer, during its normal use, the separation distance between the radiating structures of the device and nearby users will be greater than distance (>20cm). In order to perform the assessment a conservative evaluation distance of 20 cm has been used.

As stated the maximum measured output power levels for each supported technology are:

Technology / Mode	Band	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Duty Cycle (%)	Time Averaged Conducted Power (dBm)	Antenna peak gain (dBi)	Maximum Averaged E.I.R.P. (dBm)	Maximum Averaged E.I.R.P. (mW)
LTE	2	1850 - 1910	23.00	100.00	23.00	3.60	26.60	457.09
LTE	4	1710 - 1755	23.00	100.00	23.00	3.60	26.60	457.09
LTE	12	699 - 716	23.00	100.00	23.00	3.60	26.60	457.09
WLAN (802.11b/g/n)	2,4 GHz	2412 - 2484	15.00	99.00	14.96	3.00	17.96	62.46
WLAN (802.11a/n/ac)	5 GHz	5150 - 5850	15.00	99.00	14.96	3.00	17.96	62.46
Bluetooth	2,4 GHz	2400 - 2483,5	11.00	99.00	10.96	3.00	13.96	24.87
SRD	ISM	902 - 928	0.00	99.00	-0.04	1.00	0.96	1.25
RFID	13,56	13,56	23.80	99.00	23.76	1.00	24.76	298.98

Table 1: Equipment specifications

RF Exposure Assessment result and verdict

Limits for Maximum Permissible Exposure (MPE) to comply with FCC 47 CFR § 2.1091 are defined in “§1.1310 Radiation Exposure limits, paragraph (e)”:

Technology / Mode	Band	Frequency (MHz)	Distance (cm)	Power density (mW/cm ²)	FCC General Population Limit (mW/cm ²)	Verdict
LTE	2	1850 - 1910	20,00	0.09	1.00	Pass
LTE	4	1710 - 1755	20,00	0.09	1.00	Pass
LTE	12	699 - 716	20,00	0.20	0.47	Pass
WLAN (802.11b/g/n)	2,4 GHz	2412 - 2484	20,00	0.01	1.00	Pass
WLAN (802.11a/n/ac)	5 GHz	5150 - 5850	20,00	0.01	1.00	Pass
Bluetooth	2,4 GHz	2400 - 2483,5	20,00	0.00	1.00	Pass
SRD	ISM	902 - 928	20,00	0.00	0.60	Pass
RFID	13,56	13,56	20,00	0.06	0.98	Pass

Table 2: Assessment result and verdict

Simultaneous transmission assessment:

Simultaneous technologies and modes	Result	Limit	Verdict
LTE 12 + Bluetooth 2,4 GHz + SRD ISM + RFID 13,56	0.26	1	Pass
WLAN (802.11b/g/n) 2,4 GHz + SRD ISM + RFID 13,56	0,07	1	Pass
WLAN (802.11a/n/ac) 5 GHz + SRD ISM + RFID 13,56	0,07	1	Pass

Table 3: Simultaneous Transmission assessment

Appendix B: FCC RF Exposure information

RF Exposure evaluation

Devices operating in standalone mobile device exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile device exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.

When a device qualifies for the categorical exclusion provision of § 2.1091(c), the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to §1.1310 Radiofrequency radiation exposure limits, paragraph (e), the limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are:

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

MPE Evaluation

Each supported transmission technology will be evaluated to determine if it is in compliance with limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

In order to perform the assessment, the following equations have been used for the calculations; these equations are accurate in the far-field of an antenna and will over-predict power density in the near field, where they could be used for making a "worst-case" or conservative prediction:

$$\text{Power density: } S[\text{mW} / \text{cm}^2] = \frac{P_{E.I.R.P.}[\text{mW}]}{4\pi R[\text{cm}]^2}$$

Where:

S = power density

$P_{E.I.R.P.}$ = Equivalent isotopically radiated power

R = distance to the center of radiation of the antenna (evaluation distance)

$$P_{E.I.R.P.} = P_T + G_T - L_C$$

Where:

P_T = transmitter output power (including tune-up tolerance)

G_T = gain of the transmitting antenna

L_C = signal attenuation in the connecting cable between the transmitter and the antenna if applicable

Multiple frequencies assessment

When multiple sources are introduced into an environment, it becomes necessary to address the sources interdependently, since each source will contribute some percentage of the maximum exposure towards the total exposure at a fixed location. The sum of the ratios of the exposure from each source to the corresponding maximum exposure for the frequency of each source must be evaluated.

The exposure complies with the maximum permissible exposure if the sum of the ratios is less than unity:

$$\sum_{i=1}^n \frac{S_i}{Lim_i}$$

Where

S_i is the applicable contribution of each source (e.g. power flux density).

Lim_i is the limit for the applicable contribution of each source (e.g. MPE power flux density basic restriction).