H.B. Compliance Solutions

RF Exposure Evaluation Report

For the

Aarcomm Systems, Inc.

Universal Charger

August 11, 2022

Prepared for:

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Cert # ATL-0062-E

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1. Equipment Overview

Product Name:	Universal Charger
Model(s) Tested:	U150
FCC ID:	2AAXWU150022
Supply Voltage Input:	Primary Power: 12-24 VDC
Frequency Range:	0.100 – 0.200 MHz
No. of Channels:	1
Type(s) of Modulation:	Sinewave
Range of Operation Power:	0.0011 Watts (Radiated)
Emission Designator:	N/A
Channel Spacing(s)	None
Test Item:	Pre-Production
Type of Equipment:	Fixed
Antenna Requirement (§15.203):	Type of Antenna: Integral Loop Gain of Antenna: 0dBi
Environmental Test Conditions:	Temperature: 15-35°C Humidity: 30-60% Barometric Pressure: 860-1060 mbar
Modification to the EUT:	None
Evaluated By:	Staff at H.B Compliance Solutions
Test Date(s):	08/08/2022

2. Applicable Standard

According to §1.1307 the criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter. RF exposure is calculated according to KDB680106 D01v03: RF Exposure Wireless Charging.

3. Test Limits

Evaluated against exposure limits: General Use _X_ or Controlled Use ___

Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	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/f²	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/f²	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
RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules.
The emissions should be within the limits at 300kHz in the above table. (Use 300kHz limits for 150kHz)

4. RF Exposure Requirements

This device and the test results is in compliance with item 5 of FCC KDB 680106 D01v03 below and can be excluded from submitting an RF exposure evaluation

1. Power transfer frequency is less than 1MHz
2. Output power from each primary coil is less than or equal to 15 watts
3. 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.
4. Client device is placed directly in contact with the transmitter
5. Mobile exposure conditions only (portable exposure conditions are not covered by the exclusion)
6. The aggregate H-field strengths at 15cm surrounding the device and 20cm above the top surface from all simultaneous coils are demonstrated to be less than 50% of the MPE Limit.

5. Test Limits

Evaluated against exposure limits: General Use _X_ or Controlled Use ___

Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
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f = frequency in MHz* = Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules.

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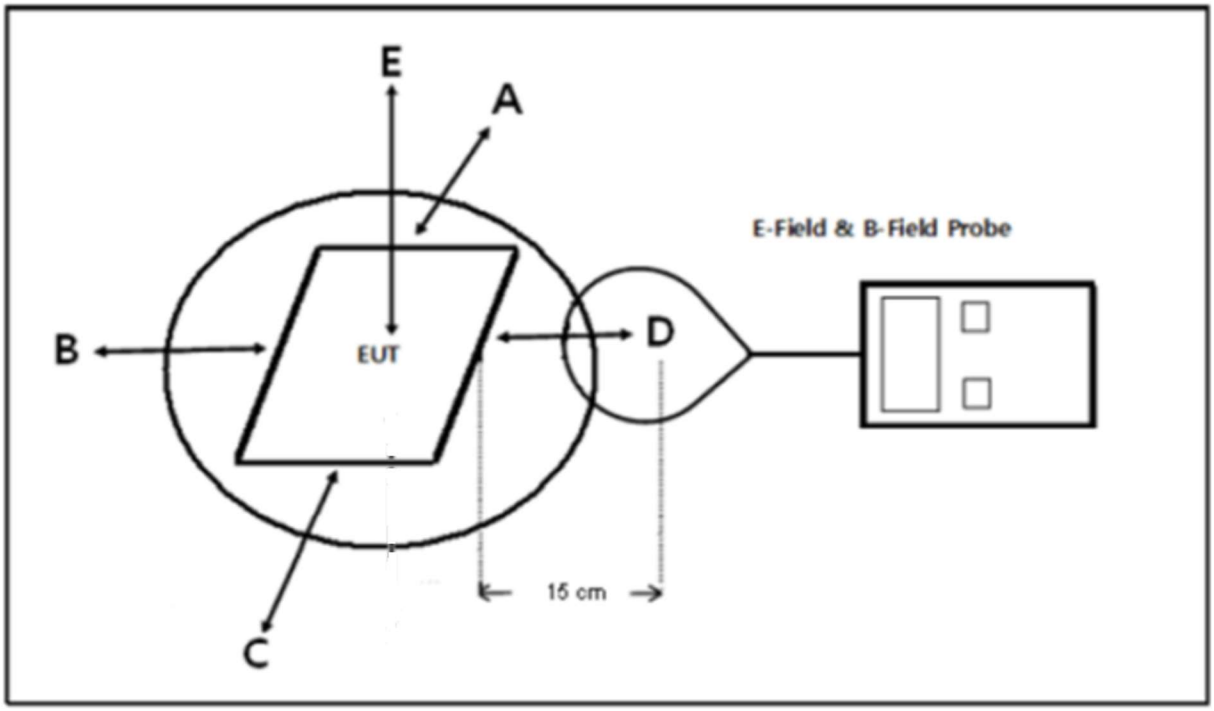
6. Measurement Procedure



Test Setup

1. The RF exposure test was performed in a Shield Room
2. For RF exposure purposes, the E and H field strengths were measured separately with E and H field probes.
3. EUT was placed on a turntable and the measurement probe was placed at distance of 15cm from the center of the probe to the edge of the device.
4. The measurement probe used to search for the highest strength
5. The highest emission level was recorded and compared with the limit for each point (A, B, C, D & E)
6. The EUT were measured according to the KDB 680106d01v03.

7. Test Results

Frequency Range (MHz)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Probe Position E (A/m)	FCC Limits (A/m)
0.125	0.0302	0.07	0.0613	0.0756	0.1138	1.63

H-Field Strength at 15cm from the edges surrounding the EUT

Frequency Range (MHz)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Probe Position E (V/m)	FCC Limits (V/m)
0.125	0.701	1.07	0.871	0.9	1.76	614

E-Field Strength at 15cm from the edges surrounding the EUT

Note: The worst-case data were reported.

The field strength limit refers to Part 1.1310 and the test results of exposure is compliant. 50% of the MPE limit (E-Field: 307 V/m; H-field: 0.815A/m)

Device meets the RF Exposure limits based on the above measurement.

According to KDB 680106 D01 V03 section 5, b, this device satisfies the following conditions.

Requirement of KDB 680106	Yes/No	Description
Power transfer frequency is less than 1MHz	Yes	The device operates in frequency range 100 – 200kHz
Output power from each primary coil is less than or equal to 15 watts	Yes	The maximum output power of the primary coil is 15W
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	Yes	The transfer system includes only single coil that is able to detect receiver device
Client device is placed directly in contact with the transmitter	Yes	Client device is placed directly in contact with the transmitter
Mobile exposure conditions only (portable exposure conditions are not covered by the exclusion)	Yes	Mobile exposure conditions only
The aggregate H-field strengths at 15cm surrounding the device and 20cm above the top surface from all simultaneous coils are demonstrated to be less than 50% of the MPE Limit.	Yes	The EUT H-field strengths at 15cm surrounding the device and 20cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE Limit.

8. Test Equipment

Equipment	Manufacturer	Model	Serial #	Last Cal Date	Cal Due Date
Electric Field Probe	ETS Lindgren	HI-6105	58758	Aug-02-22	Aug-02-23
RF Screen Room	Lindgren	18-2/2-0	6500	NCR	N/A
Magnetic Field Meter	Combinova	MFM-1000	301	Verified	

Table – Test Equipment List

*__Statement of Traceability:__ Test equipment is maintained and calibrated on a regular basis. All calibrations have been performed by a 17025 accredited test facility, traceable to National Institute of Standards and Technology (NIST)

END OF TEST REPORT