



EMC TEST REPORT

Report No.:	EZT20240723415ER
Product:	Jump Starter with Air Pump
Model No. :	FJS-950
Other Model:	FJS-900, FJS-800, FJS-700
Trade Mark:	FOXSUR
Date of Test:	Jul.16,2024-Jul.23,2024
Date of Issue:	Jul.23,2024



The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from EZT Testing Technology.



Test Report

Product.....: Jump Starter with Air Pump

Trade Mark.....: FOXSUR

Model No.: FJS-950

Applicant.....: DongGuan Foxsur Electronic Equipment Co., Ltd.

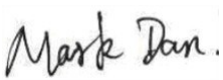
Applicant Address.....: No.5,Hengjiangxia Industrial Zone, ChangPin Tower,
DongGuan City, Guangdong Province

Manufacturer.....: DongGuan Foxsur Electronic Equipment Co., Ltd.

Manufacturer Address.....: No.5,Hengjiangxia Industrial Zone, ChangPin Tower,
DongGuan City, Guangdong Province

Test Standards.....: EN 55032:2015+A11:2020
EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A1:2019+A2:2021

Test Result.....: Pass

Tested by: 
Mark Dan


Approved by.....: 
Steven





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1 General Information

1.1 Description of EUT

Product:	Jump Starter with Air Pump
Model No.:	FJS-950
Rating:	12V $\overline{=}$ (Internal Li-ion Battery Supply)
Accessories	Start the clip line

NOTE:

1. The EUT is class B multimedia equipment according to EN55032. For more detailed features description about the EUT, please refer to User's Manual.



1.2 Objective

Perform ElectroMagnetic Interference (EMI) and ElectroMagnetic Susceptibility (EMS) tests for CE Marking.

1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

1.4 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

- Uncertainty of Conducted Emission, $U_c = \pm 3.6\text{dB}$
- Uncertainty of Radiated Emission, $U_c = \pm 4.7\text{dB}$



1.5 Test Standards and Results

The EUT has been tested according to the following specifications:

EMISSION		
Standard	Test Type	Result
EN 55032:2015+A11:2020	Radiated disturbance	PASS
IMMUNITY (EN 55035:2017+A11:2020)		
Basic Standard	Test Type	Result
IEC 61000-4-2:2008	Electrostatic discharge immunity	PASS
IEC 61000-4-3: 2010	Radiated, radio frequency electromagnetic field immunity	PASS
IEC 61000-4-8: 2009	Power frequency magnetic field immunity	PASS



1.6 List of Equipments Used

Description	Manufacturer	Model No.	Cal. Date	Cal. Due Date	Serial No.
Test Receiver	ROHDE&SCHWARZ	ESIB7	Oct.09,2023	Oct.08,2024	A0501375
Broadband Ant.	ETC	MCTD2786	Oct.09,2023	Oct.08,2024	A150402239
Anechoic Chamber	Albatross	9X6X6M	Oct.09,2023	Oct.08,2024	A0412372
Power Frequency Magnetic Field Generator	HAEFELY	MAG 100.1	Oct.09,2023	Oct.08,2024	A0103109
ESD Test System	EM TEST	ESD30N	Oct.09,2023	Oct.08,2024	A130301203
Signal Generator	ROHDE&SCHWARZ	SML01	Oct.09,2023	Oct.08,2024	A0802532
Power meter	Agilent	E4417A	Oct.09,2023	Oct.08,2024	A151102418
Power meter	ROHDE&SCHWARZ	NRVS	Oct.09,2023	Oct.08,2024	A0306319
Power Amplifier	Amplifier Research	80RF1000-250	Oct.09,2023	Oct.08,2024	A0304247
Power Amplifier	Amplifier Research	AR 75A250M	Oct.09,2023	Oct.08,2024	A0304255
6/75 attenuator	Amplifier Research	ATT6/75	Oct.09,2023	Oct.08,2024	A0304254

NOTE: Equipments above have been calibrated and are in the period of validation.



2 Emission Test

2.1 EUT Setup and Operation

During the test, the EUT worked at rated power.

2.2 Radiated Disturbance Measurement

2.2.1 Limits of Radiated Disturbance

Frequency range (MHz)	Quasi peak limits(dB μ V/m), for Class B ITE, at 3m measurement distance
30 – 230	40
230 - 1000	47

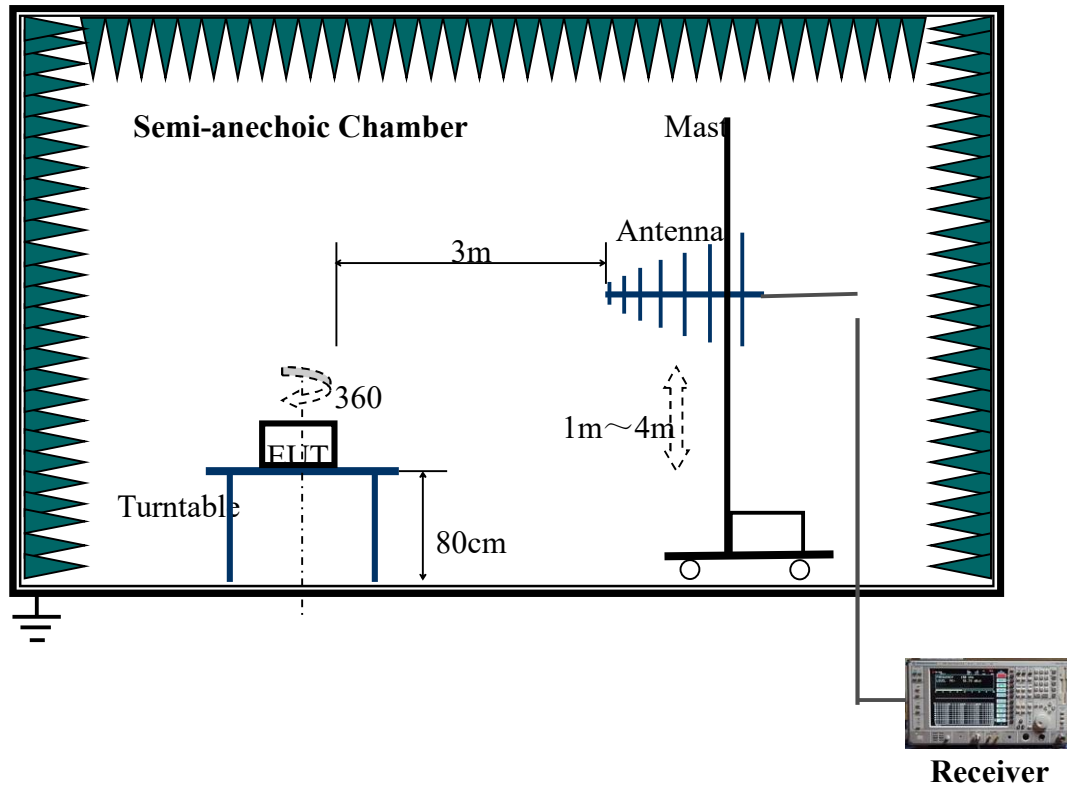
Notes:

- (1) The lower limit shall apply at the transition frequency.
- (2) Additional provisions may be required for cases where interference occurs.

2.2.2 Test Procedure

- a. The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

2.2.3 Test Setup

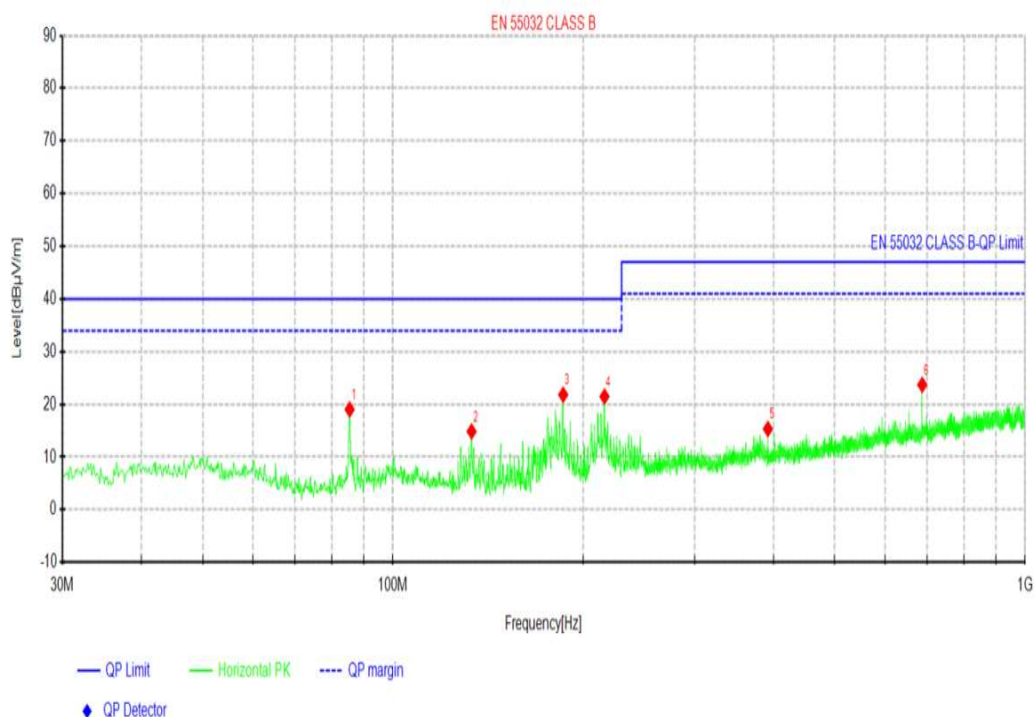


For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

2.2.4 Test Result

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dB μ V/m)	Emission Level (dB μ V/m)
1	152.62	H	100	30	40	30.08
2	47.33	V	100	30	40	30.08
3	230-1000	H/V	100-400	0-360	47	<40

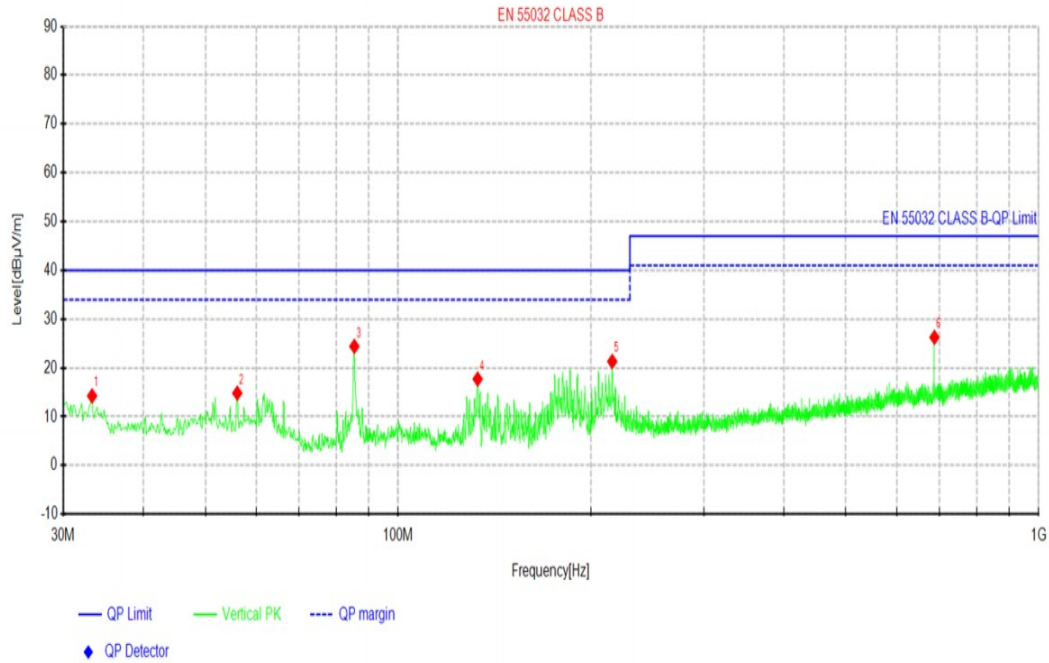
1. Radiation disturbances, antenna polarization: Horizontal



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	85.4112	39.60	19.03	-20.57	40.00	20.97	100	2	Horizontal
2	133.183	36.31	14.84	-21.47	40.00	25.16	100	254	Horizontal
3	185.927	41.98	21.82	-20.16	40.00	18.18	100	84	Horizontal
4	216.118	40.40	21.48	-18.92	40.00	18.52	100	237	Horizontal
5	391.931	30.87	15.31	-15.56	47.00	31.69	100	245	Horizontal
6	687.538	35.44	23.70	-11.74	47.00	23.30	100	271	Horizontal

2. Radiation disturbances, antenna polarization: Vertical



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.2738	32.41	14.25	-18.16	40.00	25.75	100	87	Vertical
2	56.0688	32.18	14.82	-17.36	40.00	25.18	100	359	Vertical
3	85.4112	44.98	24.41	-20.57	40.00	15.59	100	129	Vertical
4	133.062	39.18	17.72	-21.46	40.00	22.28	100	360	Vertical
5	215.876	40.26	21.33	-18.93	40.00	18.67	100	349	Vertical
6	687.538	38.01	26.27	-11.74	47.00	20.73	100	360	Vertical



3 Immunity Test

3.1 EUT Setup and Operating Conditions

Same as 2.1

3.2 Performance Criteria

Criterion A	The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion B	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion C	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

3.3 Electrostatic Discharge Immunity Test

3.3.1 Test Specification

Basic Standard:	IEC 61000-4-2
Discharge Impedance	330 Ω / 150 pF
Discharge Voltage:	Air Discharge :8 kV Contact Discharge :4 kV
Polarity:	Positive / Negative
Discharge Mode:	Single discharge
Discharge Period:	1 second minimum

3.3.2 Test Procedure

The discharges shall be applied in two ways:

- Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect



discharges to the center of the front edge of the horizontal coupling plane. The remaining three contact test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

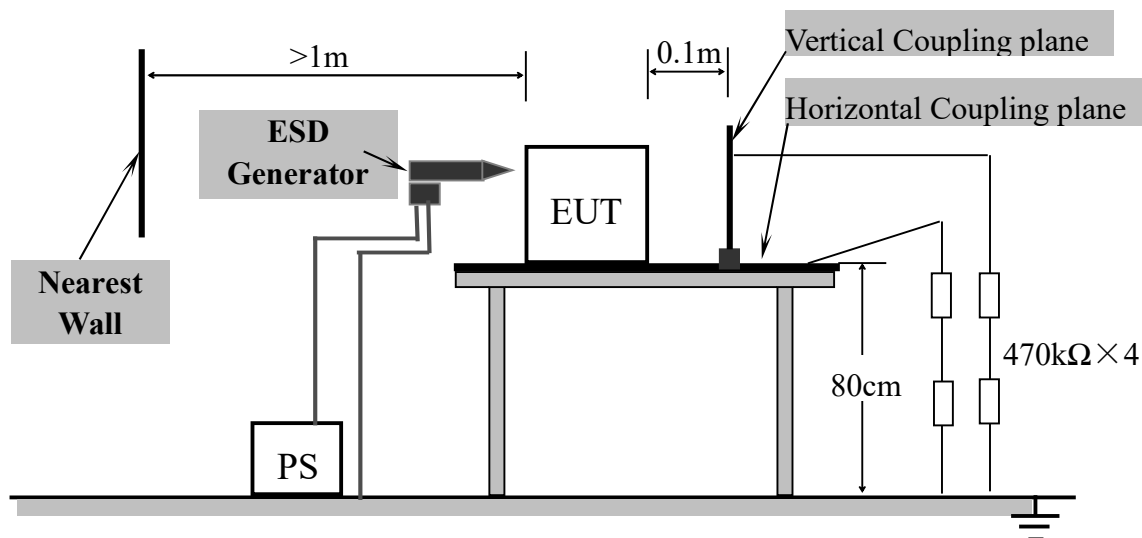
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
- g. At least 50 single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- h. At least 50 single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed

vertically to and 0.1 meters from the EUT.

3.3.3 Test Setup



For the actual test configuration, please refer to Appendix II : Photographs of the Test Configuration.

3.3.4 Test Result

Test Points	Discharge Level (kV)	Discharge Mode	Observation	Comply with Criterion
Aperture of the cover	± 8	Air	Note(1)	A
HCP	± 4	Contact	Note(1)	A
VCP	± 4	Contact	Note(1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed.



3.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test

3.4.1 Test Specification

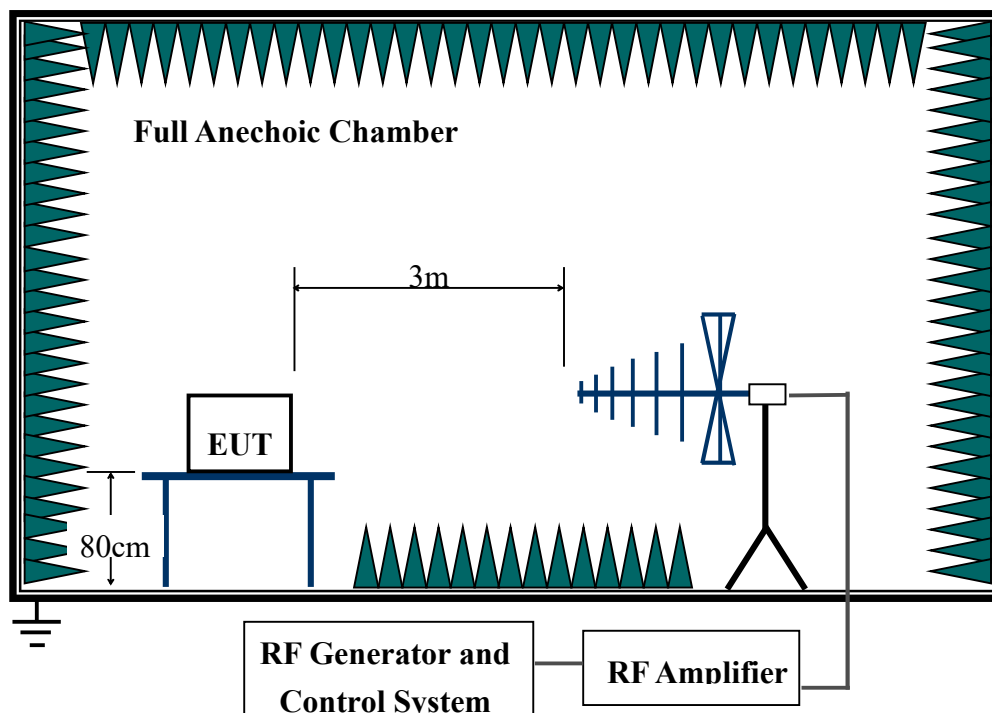
Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz – 1000MHz,1800 MHz,2600 MHz,3500 MHz,5000 MHz
Field Strength:	3V/m
Modulation:	1kHz sine wave, 80%, AM modulation
Frequency Step:	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance:	3m
Antenna Height:	1.5m
Dwell Time:	3 seconds

3.4.2 Test Procedure

The test procedure was in accordance with IEC 61000-4-3.

- The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The frequency range is swept from 80 MHz to 1000MHz with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level was 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

3.4.3 Test Setup



For the actual test configuration, please refer to Appendix II : Photographs of the Test Configuration.

3.4.4 Test Result

Frequency	Polarity	Azimuth	Field Strength (V/m)	Observation	Comply with Criterion
80-1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000 MHz	V&H	0	3	Note(1)	A
80-1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000 MHz	V&H	90	3	Note(1)	A



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80-1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000 MHz	V&H	180	3	Note(1)	A
80-1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000 MHz	V&H	270	3	Note(1)	A

NOTE:

(1). The EUT continued to operate as intended. No degradation of performance was observed.

3.5 Power Frequency Magnetic Field Immunity Test

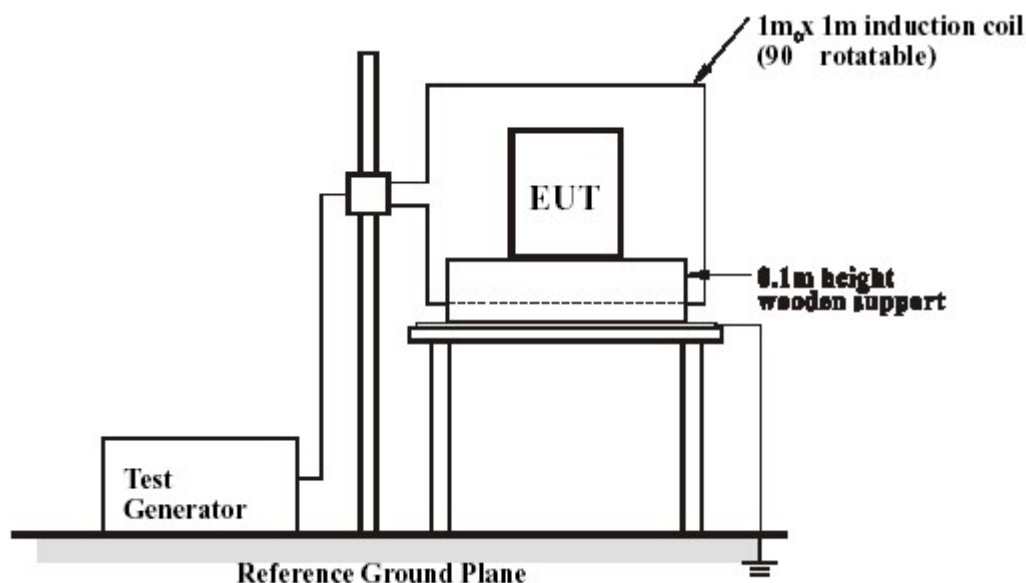
3.5.1 Test Specification

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1A/m
Observation Time:	5 minutes
Inductance Coil:	Rectangular type, 1m×1m
Performance Criterion:	Criterion A

3.5.2 Test Procedure

- The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m thick insulating support.
- The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

3.5.3 Test Setup





For the actual test configuration, please refer to Appendix II : Photographs of the Test Configuration.

3.5.4 Test Result

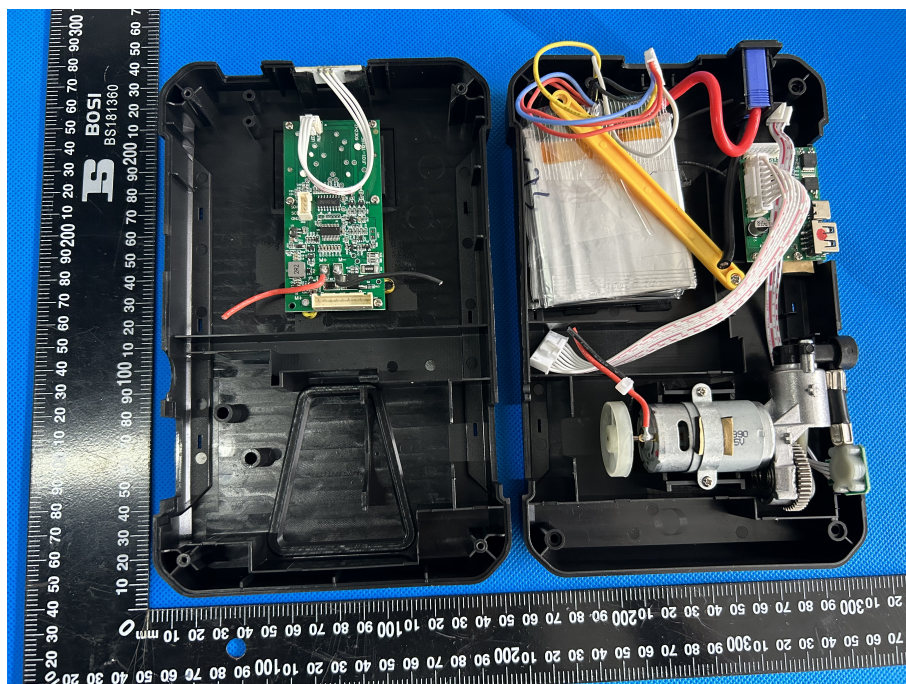
Direction	Field Strength(A/m)	Observation	Comply with Criterion
X	1	Note(1)	A
Y	1	Note(1)	A
Z	1	Note(1)	A

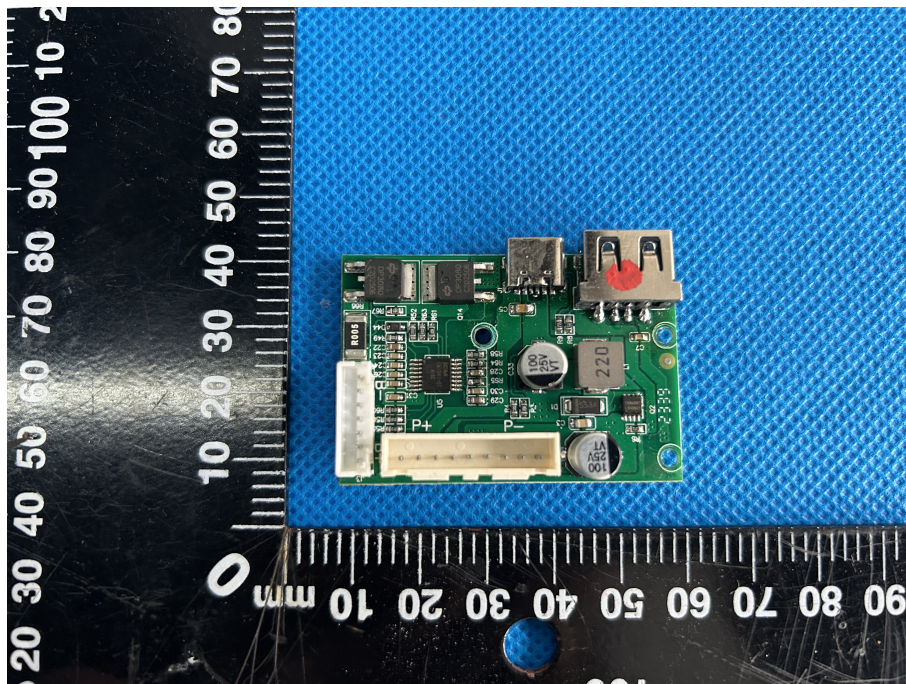
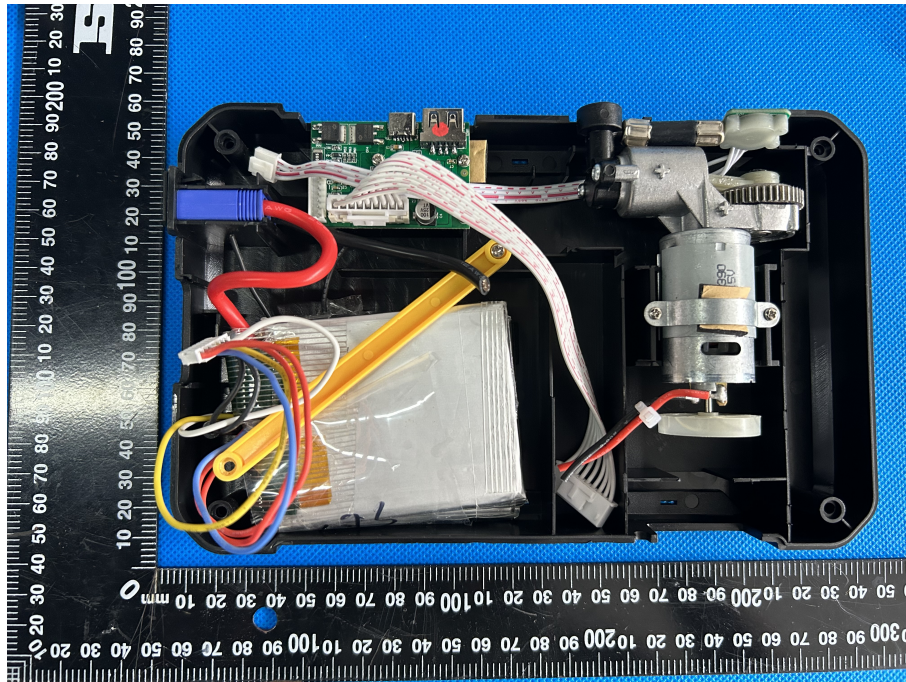
NOTE:

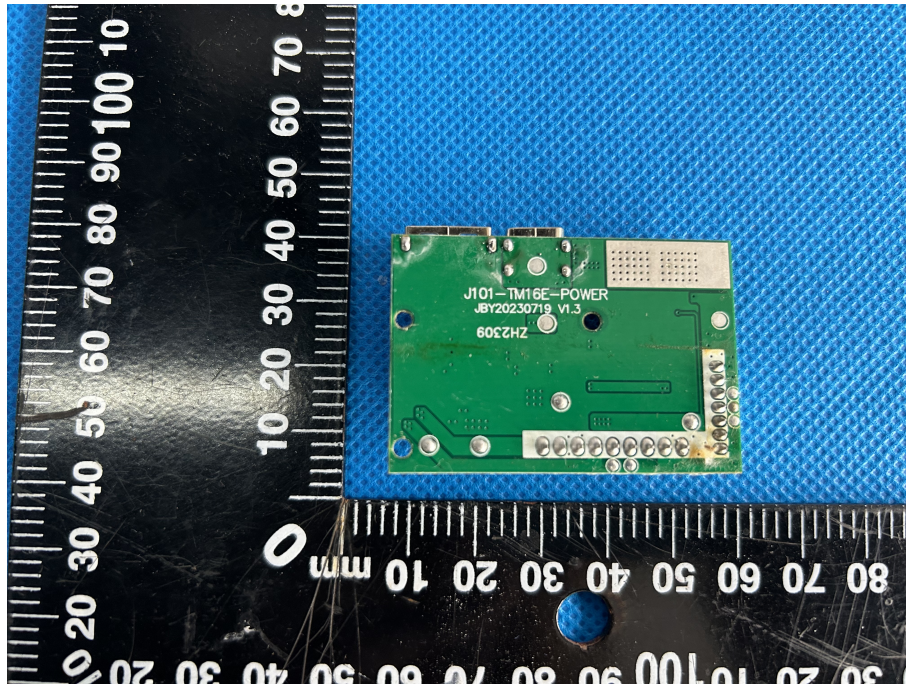
(1). The EUT continued to operate as intended. No degradation of performance was observed.

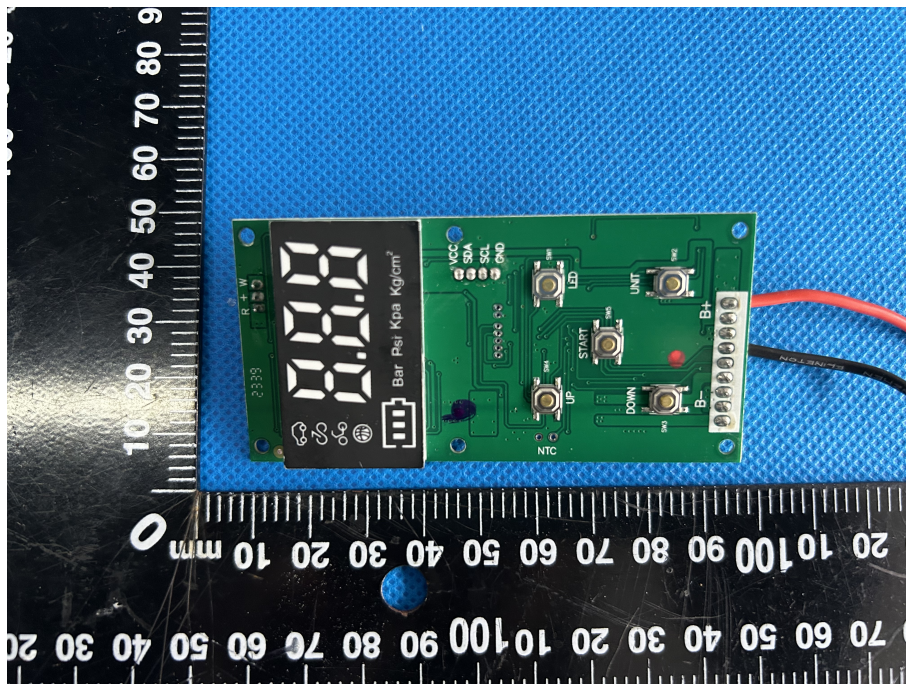
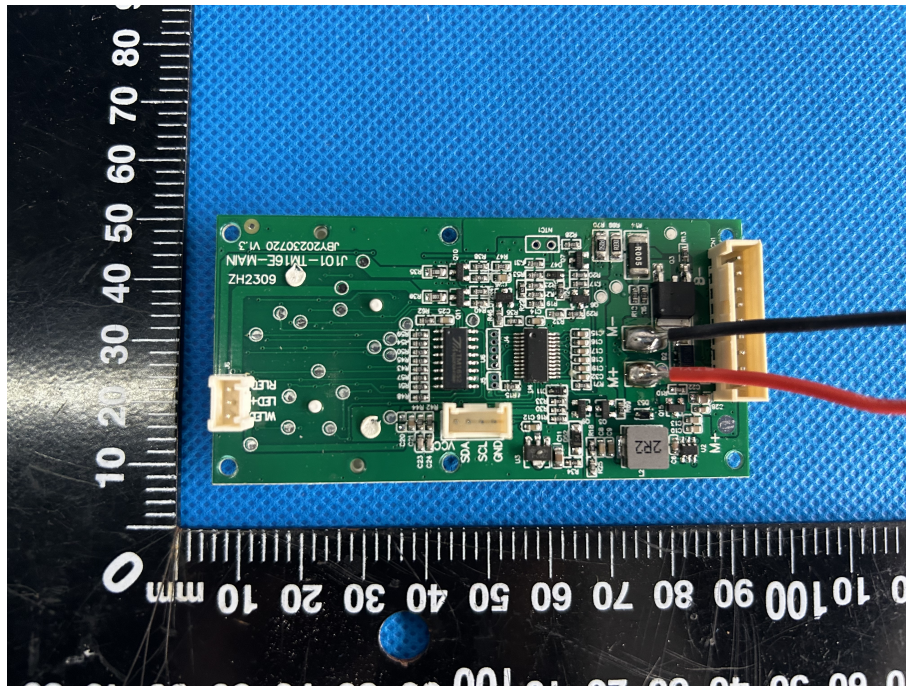
Appendix I: Photos of the EUT











END OF REPORT