

Test Report

Report No.: MTi241202011-01E2

Date of issue: 2024-12-05

Applicant: Joint Chinese Ltd

Product: Charging Case

Model(s): X2C-13, X2C-06, X2C-07, X2C-08, X2C-09, X2C-10
X2C-11, X2C-12, X2A-06, X2A-07, X2A-08, X2A-09
X2A-10, X2A-11, X2A-12, X2A-13, X2C, X2A, X2A-06
X2A-07, X2A-08, X2A-09, X2A-10, X2A-11, X2A-12, X2A-13

FCC ID: 2AB73-X2C

Shenzhen Microtest Co., Ltd.

[http:// Web: www.mtitest.cn](http://www.mtitest.cn)

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Test Result Certification	
Applicant:	Joint Chinese Ltd
Address:	Building 4 & 6, Huafeng Tech Park, Guangtian Road, Luotian Industrial Area, Songgang Town, Bao' an District, Shenzhen, China
Manufacturer:	Joint Chinese Ltd
Address:	Building 4 & 6, Huafeng Tech Park, Guangtian Road, Luotian Industrial Area, Songgang Town, Bao' an District, Shenzhen, China
Product description	
Product name:	Charging Case
Trademark:	N/A
Model name:	X2C-13
Series Model:	X2C-06, X2C-07, X2C-08, X2C-09, X2C-10, X2C-11, X2C-12, X2A-06, X2A-07, X2A-08, X2A-09, X2A-10, X2A-11, X2A-12, X2A-13, X2C, X2A, X2A-06, X2A-07, X2A-08, X2A-09, X2A-10, X2A-11, X2A-12, X2A-13
Standards:	FCC CFR 47 PART 1, § 1.1310 FCC CFR 47 PART 2, § 2.1093
Test method:	KDB 680106 D01 Wireless Power Transfer v04
Date of Test	
Date of test:	2024-12-03 to 2024-12-05
Test result:	Pass

Test Engineer	:	James Qin
		(James Qin)
Reviewed By	:	David. Lee
		(David Lee)
Approved By	:	Leon Chen
		(Leon Chen)

1 General Description

1.1 Description of the EUT

Product name:	Charging Case
Model name:	X2C-13
Series Model:	X2C-06, X2C-07, X2C-08, X2C-09, X2C-10, X2C-11, X2C-12, X2A-06, X2A-07, X2A-08, X2A-09, X2A-10, X2A-11, X2A-12, X2A-13, X2C, X2A, X2A-06, X2A-07, X2A-08, X2A-09, X2A-10, X2A-11, X2A-12, X2A-13
Model difference:	All the models are the same circuit and module, except the model name.
Electrical rating:	Input: DC 5V Wireless Output: 160mA Battery: DC 3.7V, 200mAh
Accessories:	Cable: USB-A to USB-C Cable 30cm
Hardware version:	2330-MB10-V1
Software version:	X2AV0
Test sample(s) number:	MTi241202011-01S1001
RF specification:	
Operation frequency:	290kHz
Modulation type:	Load modulation
Antenna type:	Coil Antenna

1.2 Description of test modes

All the test modes were carried out with the EUT in normal operation, the final test mode of the EUT was the worst test mode for emission test, which was shown in this report and defined as:

No.	Emission test modes
Mode1	Wireless Charging
Mode1	Stand by

1.3 Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support equipment list			
Description	Model	Serial No.	Manufacturer
/	/	/	/
Support cable list			
Description	Length (m)	From	To
/	/	/	/

2 Measurement uncertainty

Parameter	Expanded Uncertainty
Magnetic field measurements(3kHz~10MHz)	$\pm 14.8\%$
Electric field measurements(3kHz~10MHz)	$\pm 17.5\%$

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3 Test facilities and accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573

4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
MTI-E143	Near-field Electric and Magnetic Field Sensor System	Speag	MAGPy-8H3D +ED3 V2	3101	2024/3/12	2027/3/11

No.	Equipment	Manufacturer	Model	Software version:	Cal. date	Cal. Due
MTI-E016S	MPE test software	SPEAG	MAGPY 2.4	2.4.1	/	/

5 Test result

5.1.1 Requirement

§1.1310: The criteria listed in the following table shall be used to evaluate the environment 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 FCC part 2.1093 of this chapter.

Table 1 to §1.1310(e)(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)
(i) 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
300-1500			f/300	<6
1500-100000			5	<6
(ii) 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
300-1500			f/1500	<30
1500-100000			1.0	<30

f = frequency in MHz

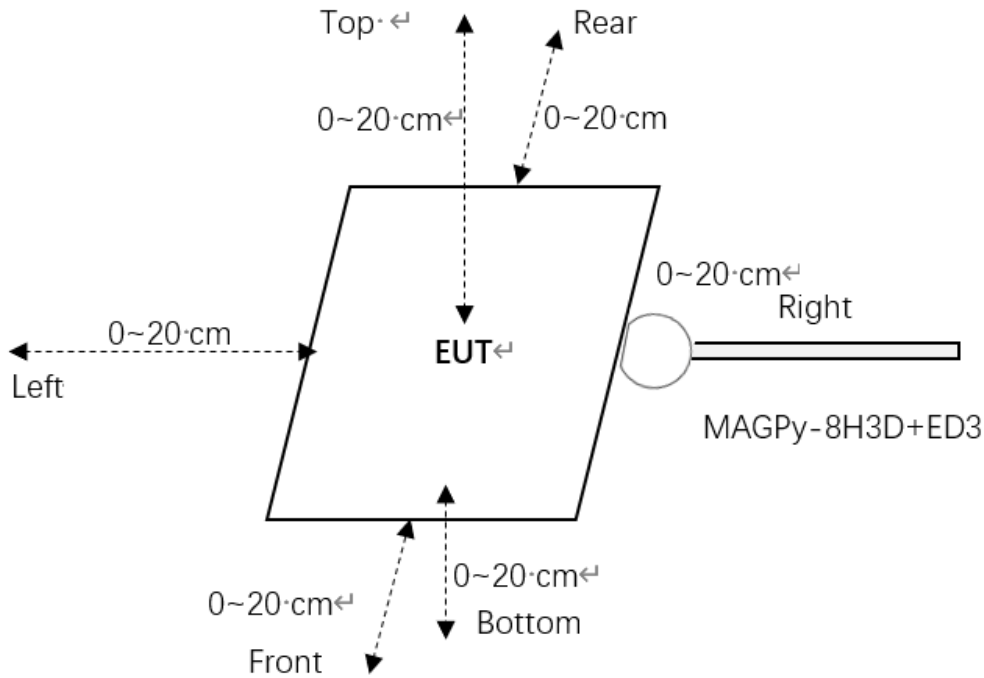
* = Plane-wave equivalent power density

Note 1: Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

Note 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.2 Test setup

0~20cm distance:



Note: tips mode of the test probe is used for 0cm measurement.

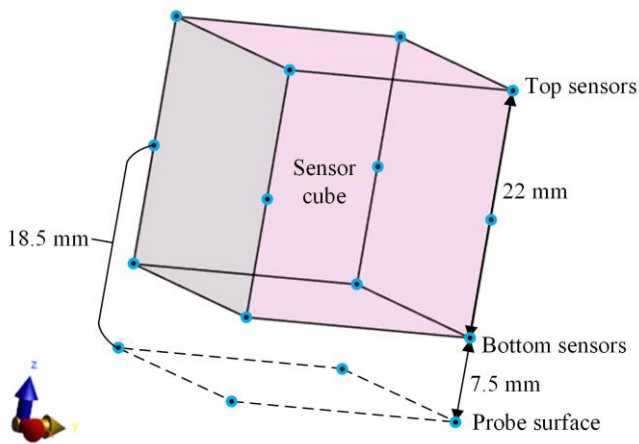
5.3 Test Procedures

a. H-field measurements should be taken 0 cm ~ 20 cm with 2 cm increments from the center of the probe.

The center of the probe to the tip surface of the probe is 18.5 mm, so the directly testing can be performed at the probe center from 2 cm to 20 cm.

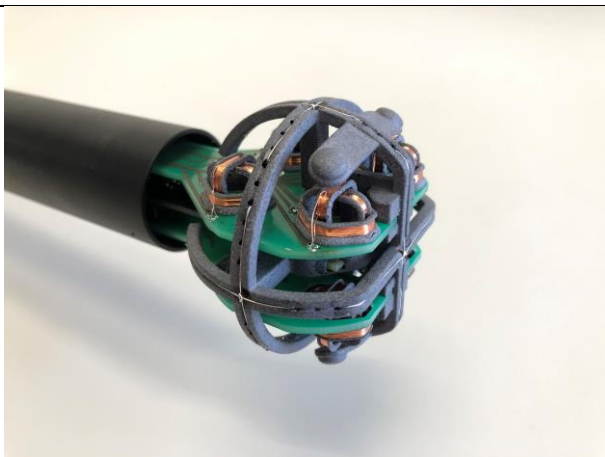
To measure the 0 cm H-field, the probe tip mode is used. The total H-field at the tip-surface $H_{tip-surface}$ can be extrapolated using the total H-field measured at the top and bottom sensors, H_{top} and H_{bottom} , as well as the normalized H-field gradient G_n . The field extrapolation formula is a polynomial function of G_n ($\Delta d = 18.5$ mm)

$$H_{tip-surface} = \frac{H_{bottom} + H_{top}}{2} \sum_{i=0}^7 ci(G_n \Delta d)^i$$



5.4 Information of test equipment

Test equipment: MAGPy-8H3D+ED3	
Diameter	60mm
8 isotropic H-field sensors	Concentric loops of 1cm ² arranged at the corner of a cube of 22mm side length
1 isotropic E-field sensor	Orthogonal dipole/monopole (arm length: 50mm)
Measurement center	18.5mm from the probe tip
Dimensions	110*635*35mm (MAGPy-8H3D+E3D V2 & MAGPy-DAS V2)



Test probe, without the casing

Item	Specification
Test frequency range:	3kHz ~ 10MHz
Probe sensitivity	E-field: 0.08-2000 V/m H-field: 0.1-3200 A/m
Probe level response	E-field: ± 1 dB H-field: ± 1 dB
linearity error	E-field: ± 0.3 dB H-field: ± 0.3 dB
Isotropy	E-field: ± 0.8 dB H-field: ± 0.6 dB

5.5

Requirement	Device
1. The power transfer frequency is below 1 MHz.	Yes. The operating frequencies are: 289 kHz
2. The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.	Yes. The maximum output power is: 0.8W
3. A client device providing the maximum permitted load is placed in physical contact with the transmitter (i.e., the surfaces of the transmitter and client device enclosures need to be in physical contact)	Yes. The client device is placed directly in contact with the transmitter.
4. Only § 2.1091-Mobile exposure conditions apply (i.e., this provision does not cover § 2.1093-Portable exposure conditions).	No., portable exposure conditions.
5. The E-field and H-field strengths, at and beyond 20 cm surrounding the device surface, are demonstrated to be less than 50% of the applicable MPE limit, per KDB 447498, Table 1. These measurements shall be taken along the principal axes of the device, with one axis oriented along the direction of the estimated maximum field strength, and for three points per axis or until a 1/d (inverse distance from the emitter structure) field strength decay is observed. Symmetry considerations may be used for test reduction purposes. The device shall be operated in documented worst-case compliance scenarios (i.e., the ones that lead to the maximum field components), and while all the radiating structures (e.g., coils or antennas) that by design can simultaneously transmit are energized at their nominal maximum power.	Yes. See the test result in item 5.6.
6. For systems with more than one radiating structure, the conditions specified in (5) must be met when the system is fully loaded (i.e., clients absorbing maximum power available), and with all the radiating structures operating at maximum power at the same time, as per design conditions. If the design allows one or more radiating structures to be powered at a higher level while other radiating structures are not powered, then those cases must be tested as well. For instance, a device may use three RF coils powered at 5 W, or one coil powered at 15 W: in this case, both scenarios shall be tested.	Yes. The EUT has a radiating structure and all scenarios have been tested.

5.6 Test results

Test condition 1: Mode 1 operating mode with client device (1 % battery status of client device)

-estimated value: 0cm

1% The battery status of the client device is the worst.

Estimated value for H-Filed Strength at 0 cm from the edges surrounding the EUT (A/m)

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	1.53	1.63	93.87%
	Left	1.06		
	Right	0.98		
	Front	0.88		
	Rear	0.56		
	Bottom	0.43		

Test condition 2: Mode 1 operating mode with client device (1 % battery status of client device)

- Test distance: 2cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.74	1.63	45.40%
	Left	0.63		
	Right	0.43		
	Front	0.41		
	Rear	0.29		
	Bottom	0.21		

Test condition 3: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 4cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.44	1.63	26.99%
	Left	0.25		
	Right	0.16		
	Front	0.14		
	Rear	0.17		
	Bottom	0.11		

Test condition 4: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 6cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.28	1.63	17.18%
	Left	0.21		
	Right	0.09		
	Front	0.08		
	Rear	0.08		
	Bottom	0.06		

Test condition 5: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 8cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.13	1.63	7.98%
	Left	0.09		
	Right	0.05		
	Front	0.04		
	Rear	0.03		
	Bottom	0.01		

Test condition 6: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 10cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.08	1.63	4.91%
	Left	0.04		
	Right	0.01		
	Front	0.009		
	Rear	0.006		
	Bottom	0.005		

Test condition 7: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 12cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.07	1.63	4.41%
	Left	0.04		
	Right	0.009		
	Front	0.008		
	Rear	0.005		
	Bottom	0.004		

Test condition 8: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 14cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.06	1.63	3.48%
	Left	0.03		
	Right	0.007		
	Front	0.006		
	Rear	0.004		
	Bottom	0.004		

Test condition 9: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 16cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.04	1.63	2.28%
	Left	0.02		
	Right	0.005		
	Front	0.004		
	Rear	0.003		
	Bottom	0.002		

Test condition 10: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 18cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.02	1.63	1.04%
	Left	0.008		
	Right	0.002		
	Front	0.002		
	Rear	0.001		
	Bottom	0.001		

Test condition 11: Mode 1 operating mode with client device (1 % battery status of client device)
- Test distance 20cm

Antenna	Probe Position	H-field (A/m)		
		Measurement	Limit	Max. Percentage (%)
1	Z axis	0.01	1.63	0.43%
	Left	0.007		
	Right	0.001		
	Front	0.002		
	Rear	0.001		
	Bottom	0.001		

Photographs of the Test Setup

See the Appendix - Test Setup Photos.

Photographs of the EUT

See the Appendix - EUT Photos.

----End of Report----