

Test Report

Report No.: MTi230907015-01E2

Date of issue: 2023-11-07

Applicant: Shenzhen Yongfengwang Technology Co., LTD

Product: Watch Wireless Charger

Model(s): YFW-W010, YOFEW_F010_W, YOFEW_F010_B,
YOFEW_F010_RJ, YOFEW_F010_F, W010_US_W,
W010_US_B, W010_US_RJ, W010_US_F, W010_B, W010_W

FCC ID: 2AY3K-YFW-W010

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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Test Result Certification


Applicant:	Shenzhen Yongfengwang Technology Co., LTD
Address:	302 3/F, Buding B, NO.154, Huating Road, Langkou Community, Dalang Street, Longhua District, Shenzhen
Manufacturer:	Shenzhen Yongfengwang Technology Co., LTD
Address:	302 3/F, Buding B, NO.154, Huating Road, Langkou Community, Dalang Street, Longhua District, Shenzhen
Product description	
Product name:	Watch Wireless Charger
Trademark:	YoFeW
Model name:	YFW-W010
Series Model:	YOFEW_F010_W, YOFEW_F010_B, YOFEW_F010_RJ, YOFEW_F010_F, W010_US_W, W010_US_B, W010_US_RJ, W010_US_F, W010_B, W010_W
Standards:	FCC CFR 47 PART 1, § 1.1310
Test method:	KDB 680106 D01 v04
Date of Test	
Date of test:	2023-09-14 to 2023-11-03
Test result:	Pass

Test Engineer :



(Letter Lan)

Reviewed By :



(Leon Chen)

Approved By :



(Tom Xue)

1 General Description

1.1 Description of the EUT

Product name:	Watch Wireless Charger
Model name:	YFW-W010
Series Model:	YOFEW_F010_W, YOFEW_F010_B, YOFEW_F010_RJ, YOFEW_F010_F, W010_US_W, W010_US_B, W010_US_RJ, W010_US_F, W010_B, W010_W
Model difference:	All the models are the same circuit and module, except the model name and color.
Electrical rating:	Input: 5V1A Output: 2.5W battery: 3.7V 1000mAh
Accessories:	N/A
Hardware version:	wO10-HC-V1.1
Software version:	D81E
RF specification:	
Operation frequency:	300-350KHz
Modulation type:	ASK
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	Watch(2.5W)
Mode2	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
iwatch	/	/	Apple
Support cable list			
Description	Length (m)	From	To
/	/	/	/

2 Measurement uncertainty

Parameter	Expanded Uncertainty
Magnetic field measurement (9kHz~30MHz)	$\pm 7.8\%$
Electric field measurements (9kHz~30MHz)	$\pm 7.8\%$

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-E115	Electric and Magnetic Field Probe – Analyzer	Narda	EHP-200A	101166	202308/15	202508/14

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

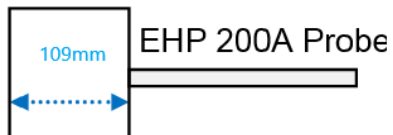
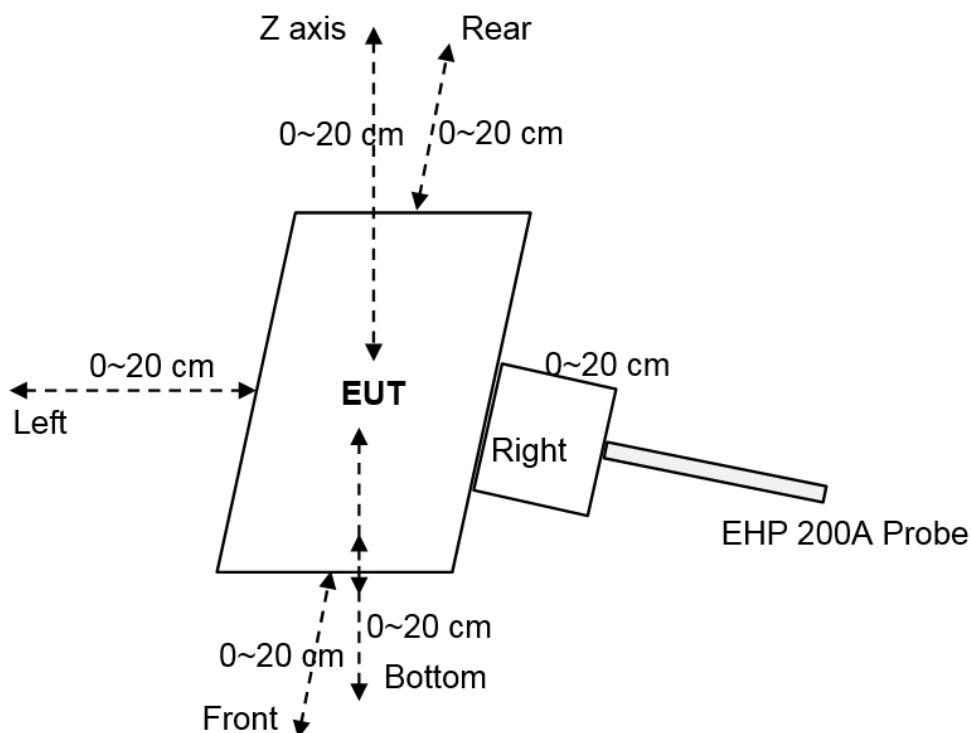
* = Plane-wave equivalent power density

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

For portable exposure conditions:



Notes: The EHP 200A Probe has a diameter of 10.9cm and a radius of 5.45cm.

5.3 Test Procedures

For portable exposure conditions:

- a. The RF exposure test was performed in anechoic chamber.
- b. Perform H-field measurements for each edge/top surface of the host/client pair at every 2 cm, starting from as close as possible out to 20 cm
- c. The highest emission level was recorded and compared with limit.

Notes: The EUT was setted to transmit continuously with the duty cycle of 100%.

5.4 Equipment Approval Considerations

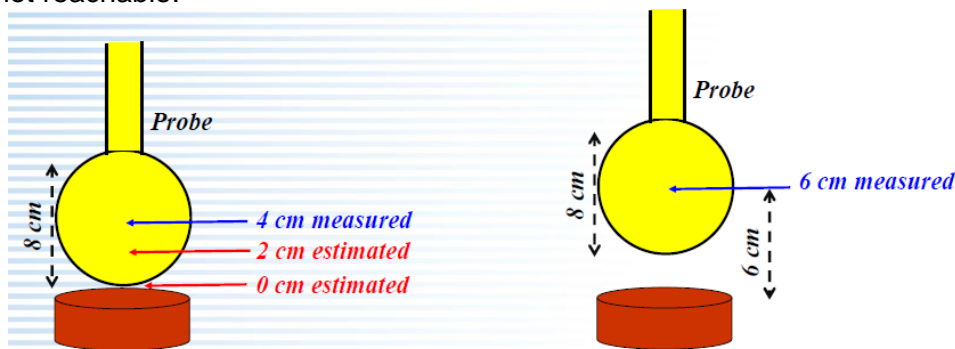
Requirement	Device
1. The power transfer frequency is below 1 MHz.	Yes. The operating frequencies: 300-350 kHz
2. The output power from each transmitting element (e.g., coil) is less than or equal to 15 watts.	Yes. The maximum output power is: 5W
3. A client device providing the maximum permitted load 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. The EUT has portable exposure condition.
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 5.5.
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.

5.5 Test results

5.6 Test results

For portable exposure condition: Note:

- (1). The portable test modes have covered the considerations of the mobile test, only record the test data of the portable conditions in this report.
- (2) Operating modes with client device (1 %, 50%, 99% battery status of client device) have been test, only show the data of worst case of 1% battery status of client device.
- (3) 20-2cm is the actual test value, and 0 cm is the estimated value.
- (4) Perform H-field/E-field measurements are taken along all three axes the device from 0cm~20cm in 2cm minimum increment for each edge surface of the host/client pair. If the center of the probe sensing element is more than 5mm from the probe outer edge, the field strengths need to be estimated for the positions that are not reachable.



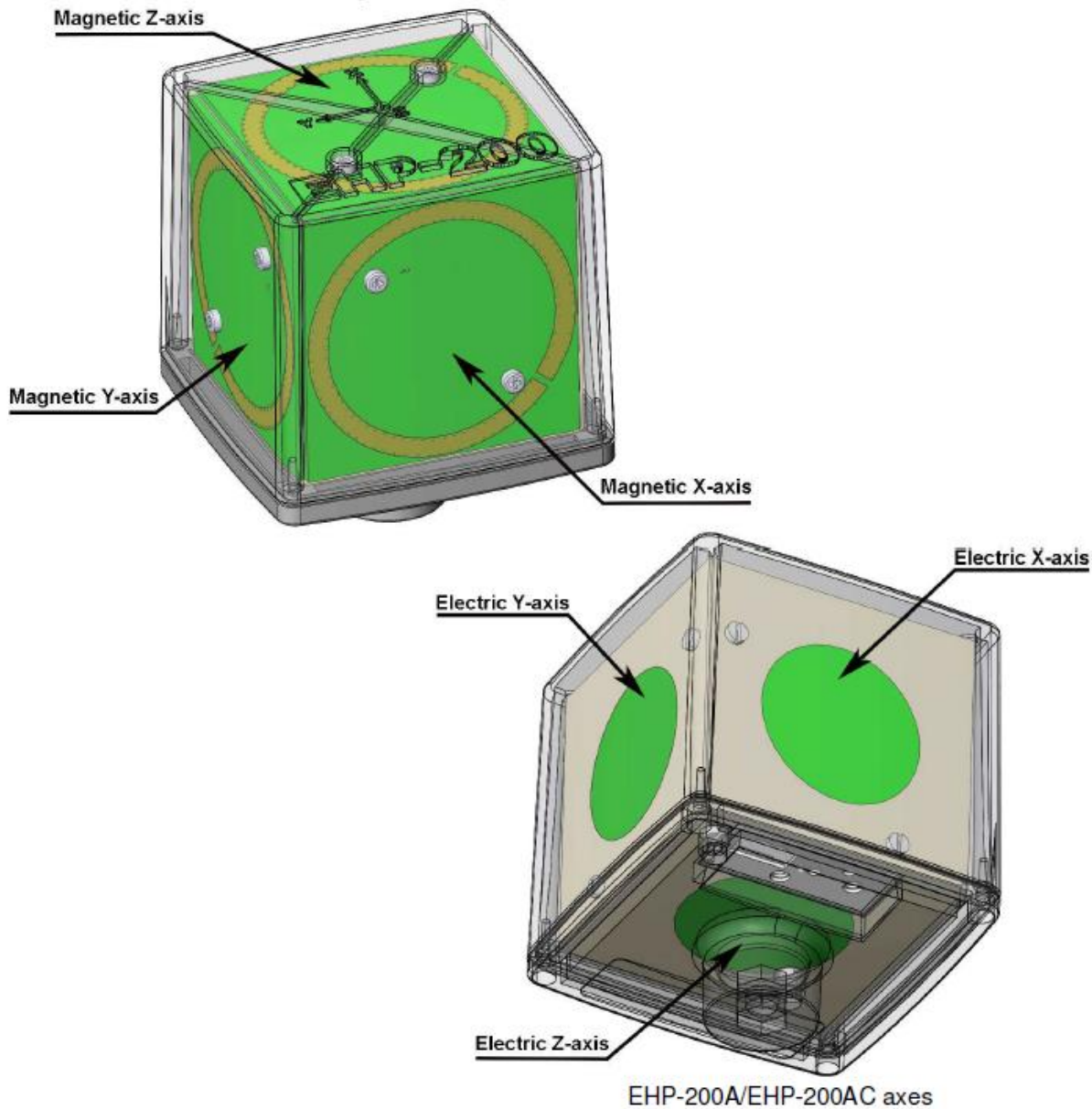
*Example of probe measurements in points close to the device surface:
estimates compared with measurements at 4 and 6 cm provide validation*

According to Calibration information and specification about EHP-200A, The Probe EHP-200A's sensitive elements center are 8mm below the external surface, and the dimensions is 92x92x109mm. so the actual 0cm field strengths need to be estimated for the positions that are not reachable. The Extrapolated Value Calculation Method please below). And the result of test distance 2cm~20cm was measured value.

Probe	Length	Width	Height
	109mm	92mm	92mm



Note: EUT is a loop/coil emitting structure, so E-field not required. Just recorded the H-field value.

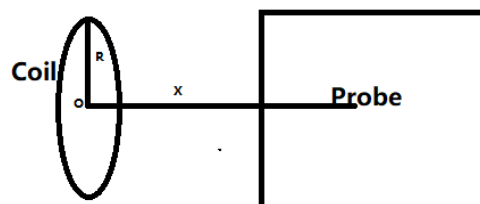


The sensitive elements are located approximately 8 mm below the external surface

(5) Estimated method for portable RF Exposure condition:

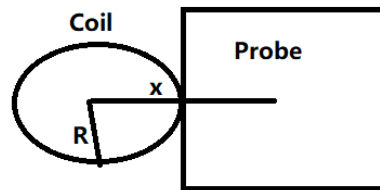
We use Biot-Savart formula theory to estimate the strength of the magnetic field that the measuring instrument cannot measure. According to Biot-Savart formula:

Top & Bottom Side:



$$B = \frac{\mu_0 * I * N * R^2}{2 * (R^2 + x^2)^{3/2}}$$

Front, left, right & rear Side:



$$B = \frac{\mu_0 * I * N}{2 * x}$$

B: means H-field value;

μ_0 is space permeability; $\mu_0=4\pi*10^{-7}$;

I: A current element passing through a coil;

R: means the Radius of coil(According to provided Antenna specification: We can get the minimum $R=20.7/2=10.35\text{mm}=0.01035\text{m}$);

Test Distance: The distance from the sensing element of the probe to the edge of the device surface.

x: means the center of the coil to the sensing elements of the probe. (For top & bottom side: $x=\text{test distance}$; For other side: $x=\text{test distance}+R$)

N: Number of turns, according to providing "Antenna specification" files: $N=10$.

(6) For validation purposes: If the value to show a **30% agreement** between the mode and the (E- and/or H-field) probe measurements for the two closest points to the device surface, and with 2cm increments. Then this extrapolation method is reasonable.

Note: The percent ratio of agreement is the difference between the estimated and measured values divided by the average of the estimated and measured values.

Validation:

Magnetic Field Emissions							Conclusion
Test Distance(cm)	Top	Left	Right	Front	Rear	Bottom	
Agreement -2cm	25.46	29.70	27.17	28.70	28.59	19.42	Compliance (Within 30%)
2cm(estimated)	0.1976	0.0676	0.0694	0.0685	0.0689	0.1859	
2cm(measured)	0.153	0.0501	0.0528	0.0513	0.0517	0.153	

Test condition 1: Mode 1 operating mode with client device (1 % battery status of client device)
-estimated value: 0cm

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	1.5759	1.63	96.68%
	Left	1.2366		
	Right	1.3313		
	Front	1.2935		
	Rear	1.3036		
	Bottom	1.5759		

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	0.1530	1.63	9.39%
	Left	0.0501		
	Right	0.0528		
	Front	0.0513		
	Rear	0.0517		
	Bottom	0.1530		

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	0.032	1.63	1.96%
	Left	0.0148		
	Right	0.0152		
	Front	0.0150		
	Rear	0.0151		
	Bottom	0.0301		

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	0.0318	1.63	1.95%
	Left	0.0147		
	Right	0.0152		
	Front	0.0149		
	Rear	0.0150		
	Bottom	0.0301		

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	0.0317	1.63	1.94%
	Left	0.0147		
	Right	0.0151		
	Front	0.0148		
	Rear	0.0149		
	Bottom	0.0300		

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	0.0317	1.63	1.94%
	Left	0.0145		
	Right	0.0150		
	Front	0.0147		
	Rear	0.0149		
	Bottom	0.0296		

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	0.0315	1.63	1.93%
	Left	0.0143		
	Right	0.0150		
	Front	0.0147		
	Rear	0.0148		
	Bottom	0.0295		

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	0.0314	1.63	1.93%
	Left	0.0142		
	Right	0.0150		
	Front	0.0146		
	Rear	0.0148		
	Bottom	0.0293		

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	0.0313	1.63	1.92%
	Left	0.0141		
	Right	0.0150		
	Front	0.0146		
	Rear	0.0147		
	Bottom	0.0292		

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	0.0312	1.63	1.91%
	Left	0.0141		
	Right	0.0150		
	Front	0.0145		
	Rear	0.0147		
	Bottom	0.0291		

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	0.0310	1.63	1.90%
	Left	0.0141		
	Right	0.0149		
	Front	0.0145		
	Rear	0.0146		
	Bottom	0.0291		

Photographs of the Test Setup

MPE



Photographs of the EUT

See the Appendix - EUT Photos.

----End of Report----