RF TEST REPORT

Report No: FCS202501111W01

Issued for

Applicant:	Mid Ocean Brands B.V.
Address:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2458
Series Model:	N/A
Test Standard:	ETSI EN 300 330 V2.1.1(2017-02)

Issued By: Dongguan Funas Testing Technology Co.,Ltd.
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TEST REPORT CERTIFICATION

Applicant's name..... : Mid Ocean Brands B.V.

Address..... : 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Manufacture's Name..... : 117486

Address..... : N/A

Product description

Product Name..... : Wireless charger

Brand Name ..... : N/A

Model Name: ..... : MO2458

Series Model..... : N/A

Test Standards..... : ETSI EN 300 330 V2.1.1(2017-02)

This device described above has been tested by FCS, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date (s) of performance of tests.....: Jan. 09, 2025~ Jan. 15, 2025

Date of Issue.....: Jan. 15, 2025

Test Result .....: Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Duke Qian

(Duke Qian)

Approved by : Jack Wang

(Jack Wang)

Revision history

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 15, 2025	Valid	Initial release

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

See the below report

Note: The test results of this report relate only to the tested sample identified in this report.

4

2. EUT DESCRIPTION

Details of technical specification for WPT refer to the description in follows:

EUT* Name	Wireless charger
Model Number	MO2458
EUT function description	Please reference user manual of this device
Power supply	Wireless Output Power (Phone): 15W Max. Wireless Output Power (Airpods): 5W Wireless Output Power (Watch): 3W Output(Phone): DC 5V 1A, 7.5V 1A,9V 1.1A, 9V 1.67A Output(Airpods): DC 5V 1A Output(Watch): DC 5V 0.6A
Wireless charging Operation frequency	320kHz-325kHz
Antenna Type	Inductive loop coil antenna
WPT operational modes	Mode 4: energy transmission
Sample Type	Series production

NOTE: For more information, please refer to User's Manual.

3. DESCRIPTION OF TEST MODES

The EUT has been tested under Normal Operation and standby condition.

4. TEST FACILITY

Company Name:	Dongguan Funas Testing Technology Co.,Ltd.
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan, China

5. TEST ITEMS AND THE RESULTS

The EUT has been tested according to ETSI EN 300 330 V2.1.1(2017-02).

ETSI EN 300330 V2.1.1(2017-02)	Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

№	Basic Standard	Test Type	Test Mode	Result
1	ETSI EN 300 330 4.3.1	Permitted range of operating frequencies	TX	Pass
2	ETSI EN 300 330 4.3.2	Operating frequency ranges	TX	Pass
3	ETSI EN 300 330 4.3.3	Modulation bandwidth	TX	Pass
4	ETSI EN 300 330 4.3.4	Transmitter H-field requirements	TX	Pass
5	ETSI EN 300 330 4.3.8	Transmitter radiated spurious domain emission limits < 30 MHz	TX	Pass
6	ETSI EN 300 330 4.3.9	Transmitter radiated spurious domain emission limits > 30 MHz	TX	Pass
7	ETSI EN 300 330 4.4.2	Receiver spurious emissions	RX	Pass
8	ETSI EN 300 330 4.4.3	Adjacent channel selectivity	RX	N/A
9	ETSI EN 300 330 4.4.4	Receiver blocking or desensitization	RX	N/A

Note: 1.N/A means not applicable.

2. According to the standard section 4.4.1, this equipment belongs to other equipment (WPT system), and only has a single working channel, so it is not necessary to meet 4.3.3&4.3.4.

3. The EUT support 5V/9V/12V voltage input and recorded in this report as the worst case.

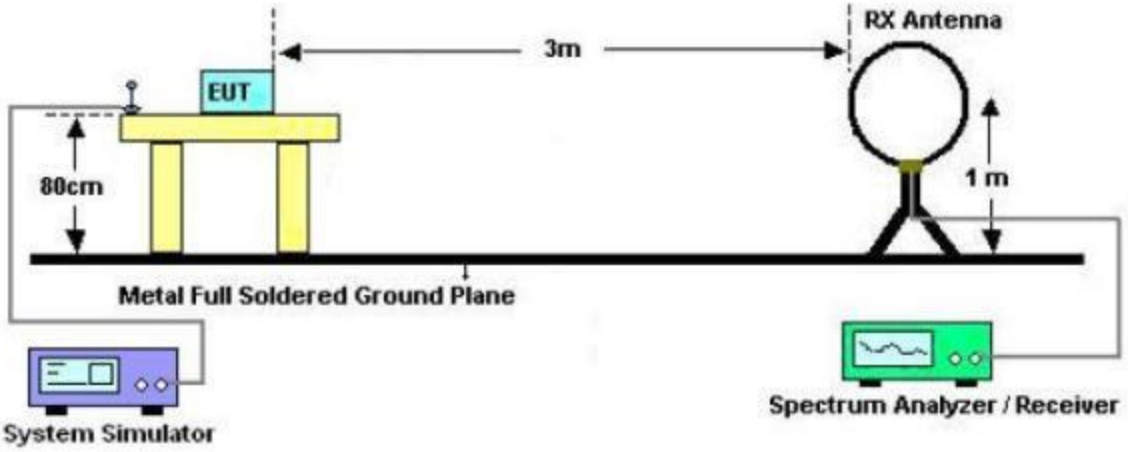
6. ETSI EN 300 330 REQUIREMENT TO TRANSMITTER

6.1 RF H-FIELD (RADIATED)

MEASUREMENT EQUIPMENT USED:

Kind of Equipment	Manufacturer	Model	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	2024.08.28	2025.08.27
Amplifier	Schwarzbeck	BBV 9718	2024.08.28	2025.08.27
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	2024.08.28	2025.08.27
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	2024.08.28	2025.08.27
LOOP ANTENNA	ZHINAN	ZN30900C	2024.08.28	2025.08.27

TEST SETUP:



TEST LIMITS:

Table 2: H-field limits at 10 m

Frequency range (MHz)	H-field strength limit (H_f) dBµA/m at 10 m or specified in mW e.r.p.
0,009 ≤ f < 0,090	72 descending 3 dB/oct above 0,03 MHz or according to note 1 (see note 5)
0,09 ≤ f < 0,119	42
0,119 ≤ f < 0,135	66 descending 3 dB/oct above 0,119 MHz or according to note 1 (see notes 3 and 5)
0,135 ≤ f < 0,140	42
0,140 ≤ f < 0,1485	37,7
0,1485 ≤ f < 30	-5 (see note 4)
0,315 ≤ f < 0,600	-5
3,155≤ f < 3,400	13,5
4,234	9 (see note 9)
4,516	7
7,400 ≤ f < 8,800	9
10,2 ≤ f < 11,00	9
12,5 ≤ f ≤ 20	-7
6,765 ≤ f ≤ 6,795	42 (see notes 3 and 7)
26,957 ≤ f ≤ 27,283	42 (see note 3)
13,410 ≤ f ≤13,553, 13,567 ≤ f ≤ 13,710	9 (see note 6)
13,110 ≤ f ≤ 13,410, 13,710 ≤ f ≤ 14,010	-3,5 (see note 6)
12,660 ≤ f ≤ 13,110, 14,010 ≤ f ≤ 14,460	-10 (see note 6)
11,810 ≤ f ≤ 12,660, 14,460 ≤ f ≤ 15,310	-16 (see note 6)
13,460 ≤ f ≤ 13,553, 13,567 ≤ f ≤ 13,660	27 (see note 6)
13,360 ≤ f ≤ 13,460, 13,660 ≤ f ≤ 13,760	Linear transition from 27 to -3,5 (see note 6)
13,110 ≤ f ≤ 13,360, 13,760 ≤ f ≤ 14,010	-3,5 (see note 6)
12,660 ≤ f ≤ 13,110, 14,010 ≤ f ≤ 14,460	-5 (see note 6)
13,553 ≤ f ≤ 13,567	42 (see note 3) or 60 (see notes 2 and 3)
27,095	42

Frequency range (MHz)	H-field strength limit (H_f) dBµA/m at 10 m or specified in mW e.r.p.
26,995, 27,045, 27,095, 27,145, 27,195 (see note 8)	100 mW

NOTE 1: For the frequency ranges 9 kHz to 135 kHz, the following additional restrictions apply to limits above 42 dBµA/m:
- for loop coil antennas with an area ≥ 0,16 m^2 this table and table B.1 with the antenna limitations apply;
- for loop coil antennas with an area between 0,05 m^2 and 0,16 m^2 table B.1 applies with a correction factor. The limit is: table value + 10 × log (area/0,16 m^2);
- for loop coil antennas with an area < 0,05 m^2 the limit is 10 dB below table B.1.

NOTE 2: For RFID (incl. NFC) and EAS applications only.
NOTE 3: Spectrum mask limit, see annex I.
NOTE 4: For further information see annex G.
NOTE 5: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz, 66,6 kHz ± 750 Hz, 75 kHz ± 250 Hz, 77,5 kHz ± 250 Hz, and 129,1 kHz ± 500 Hz.
NOTE 6: Only in conjunction with spectrum mask, see annex I.
NOTE 7: The frequency range 6,765 MHz - 6,795 MHz is not a harmonised ISM frequency band according article 5.138 of the ITU Radio Regulations [i.13].
NOTE 8: Center frequencies for channelized systems by using ≤ 10 kHz bandwidth.
NOTE 9: The limit is valid in the range 984 kHz - 7 484 kHz for Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.

The H-field limit in dBµA/m at 3 m, H_{3m}, is determined by the following equation:

$$H_{3m} = H_{10m} + C_3 \quad (F.2)$$

Where: H_{10m} is the H-field limit in dBμA/m at 10 m distance according to the present document; and C_3 is a conversion factor in dB determined from figure F.2.

The limit at 10 m(H_{10m}) is -5 dBμA/m

For 325.7KHz:

Owing to the frequency EUT is 0.3265MHz, so the C_3 approach to 31.65dB.

Then the limit at 3m(H_{3m}) = H_{10m} + C_3 = -5 + 31.65 =26.65 dBμA/m.

The H Field Strength shall not exceed the values 26.65dBuA/m 3m Distance under normal test conditions.

- E(dBuV/m) = dBuA/m+51.5;
- ERP (dBm)=E(dBuV/m) +20lg(D)-104.8, D is the measurement distance;
- ERP=10lgP(mW)

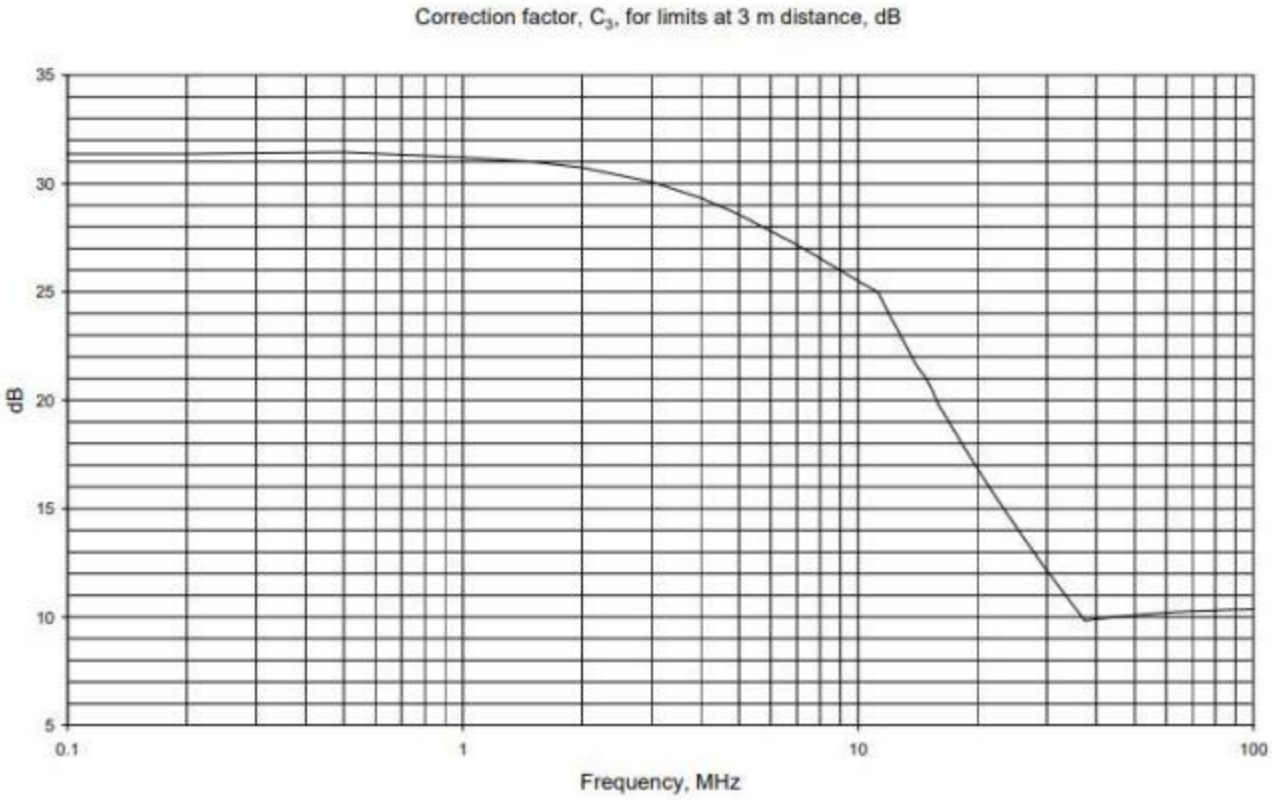


Figure H.2: Conversion factor C_3 versus frequency

TEST PROCEDURE:

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.

The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The H-field is measured with a shielded loop antenna connected to a measurement receiver.

The measuring bandwidth and detector type of the measurement receiver shall be in accordance with EN 300 330 V2.1.1 clause 5.12.

The EUT operate with modulation under normal and extreme conditions.

TEST RESULTS:

Test Mode: Transmitting

Extreme conditions state

conditions	Test Temp	Test Volt.(V)	Note
TN/VN	25℃	9.0	Worst case
TL/ VL	-10℃	9.9	
TH/VL	40℃	9.9	
TL/VH	-10℃	8.1	
TH/VH	40℃	8.1	

Frequency	Reading	Corrected Factor	Corrected Amplitude E-field	Corrected Amplitude H-field(3m)	Corrected Amplitude H-field(10m)	Limit (10m)	Result
MHz	dBμV/m	dB	dBμV/m	dBμA/m	dBμA/m	dBμA/m	Pass
0.3257	25.94	21.86	47.80	-3.70	-35.35	-5	

Remark:

(1) Corrected Level (dBuA/m) = Reading Level + Antenna Factor

(2) For the calculated method, please refer to Annex F at EN 300330.

(3) All extreme conditions were considered for test, but only record the worst case.

(4) EIRP(dBm)=E(dBuV/m)+20lg(D)-104.8, D is the measurement distance.
E(dBuV/m)=dBuA/m+51.5, so the dBuA/m=EIRP(dBm)+43.7, EIRP=10lgP(mW)

6.2 PERMITTED FREQUENCY RANGE AND THE MODULATION BANDWIDTH

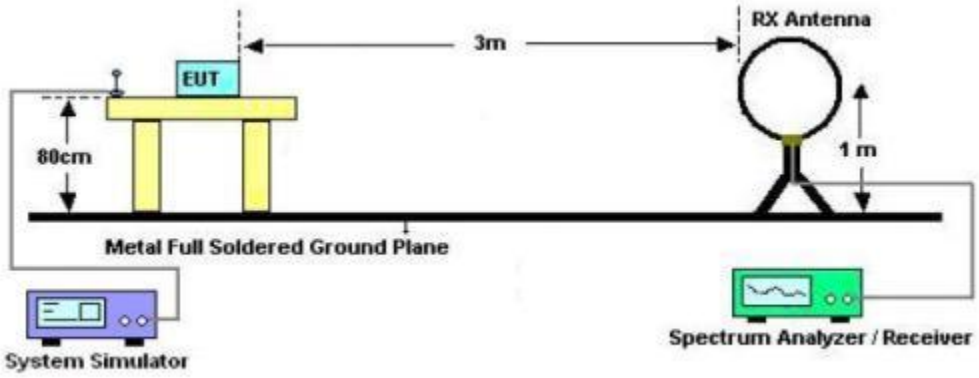
TEST LIMITS

The modulation bandwidth shall be within the assigned frequency band see table 1 or ±7,5 % of the carrier frequency whichever is the smallest. For RFID and EAS Systems, the modulation bandwidth shall be within the transmitter emission boundary of figures I.1, I.2, I.3 and I.4. For further information, see CEPT/ERC/REC 70-03 [i.1] or ERC/ECC/CEPT Decisions as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.

MEASUREMENT EQUIPMENT USED:

Kind of Equipment	Manufacturer	Model	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	2024.08.28	2025.08.27
Amplifier	Schwarzbeck	BBV 9718	2024.08.28	2025.08.27
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	2024.08.28	2025.08.27
LOOP ANTENNA	ZHINAN	ZN30900C	2024.08.28	2025.08.27

TEST SETUP:



TEST PROCEDURE:

1). The EUT was placed on a turn table which is 0.8m above ground plane.

2). The EUT was modulated by normal signal,

3). Set SPA Center Frequency = fundamental frequency, RBW:300Hz,VBW=1000Hz, Span=2MHz.

4), Both normal test condition and extreme test condition applied

Test Limit

Table 1: Short Range Devices within the 9 kHz to 30 MHz permitted frequency bands

	Frequency Bands/frequencies	Applications
Transmit and Receive	9 kHz to 90 kHz	Inductive devices, Generic use
Transmit and Receive	90 kHz to 119 kHz	Inductive devices, Generic use
Transmit and Receive	119 kHz to 140 kHz	Inductive devices, Generic use
Transmit and Receive	140 kHz to 148,5 kHz	Inductive devices, Generic use
Transmit and Receive	148,5 kHz to 5 MHz	Inductive devices, Generic use
Transmit and Receive	400 kHz to 600 kHz	RFID only
Transmit and Receive	5 MHz to 30 MHz	Inductive devices, Generic use
Transmit and Receive	3 155 kHz to 3 400 kHz	Inductive devices, Generic use
Transmit and Receive	984 kHz to 7 484 kHz (Note 3, Centre frequency is 4 234 kHz)	Inductive devices, Railway applications
Transmit and Receive	4 516 kHz	Inductive devices, Railway applications
Transmit and Receive	6 765 kHz to 6 795 kHz	Inductive devices, Generic use
Transmit and Receive	7 400 kHz to 8 800 kHz	Inductive devices, Generic use
Transmit and Receive	10 200 kHz to 11,000 MHz	Inductive devices, Generic use
Transmit and Receive	11,810 MHz to 15,310 MHz (Centre frequency is 13,56 MHz)	RFID only
Transmit and Receive	12,5 MHz to 20 MHz	Inductive devices, Wireless healthcare
Transmit and Receive	13,553 MHz to 13,567 MHz	Inductive devices, Generic use
Transmit and Receive	26,957 MHz to 27,283 MHz	Inductive devices, Generic use
Transmit and Receive	27,090 MHz to 27,100 MHz	Inductive devices, Railway applications

NOTE 1: In addition, it should be noted that other frequency bands may be available in a country within the frequency range 9 kHz to 30 MHz.

NOTE 2: On non-harmonised parameters, national administrations may impose certain conditions such as the type of modulation, frequency, channel/frequency separations, maximum transmitter radiated power, duty cycle, and the inclusion of an automatic transmitter shut-off facility, as a condition for the issue of an Individual Rights for use of spectrum or General Authorization, or as a condition for use under "licence exemption" as it is in most cases for Short Range Devices.

NOTE 3: Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.

TEST RESULT

Test Conditions			99% Bandwidth (kHz)	F_L at 99% BW (kHz)	F_H at 99% BW (kHz)	Limit Band (kHz)	Result
Frequency (kHz)	Temperature (。C)	Voltage (V)					
325.7	25℃	9.0	0.925	325.2375	326.1625	325~330	Pass
	-10℃	9.9	0.917	325.2415	326.1585		Pass
	40℃	9.9	0.934	325.233	326.167		Pass
	-10℃	8.1	0.954	325.223	326.177		Pass
	40℃	8.1	0.915	325.2425	326.1575		Pass

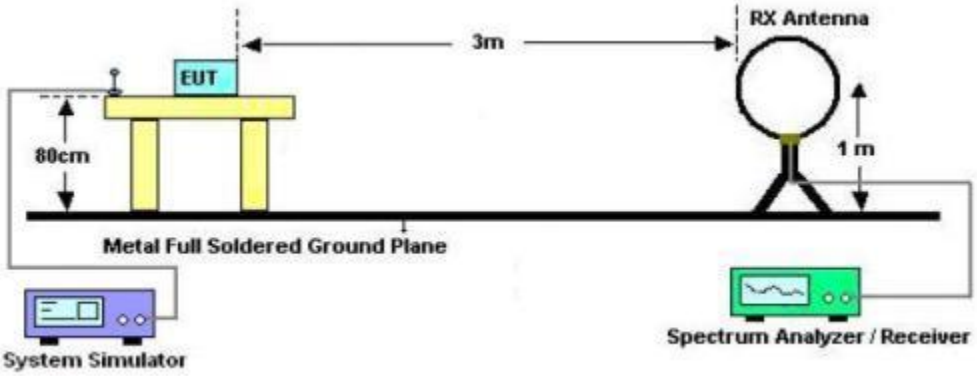
6.3 SPURIOUS DOMAIN EMISSION

MEASUREMENT EQUIPMENT USED:

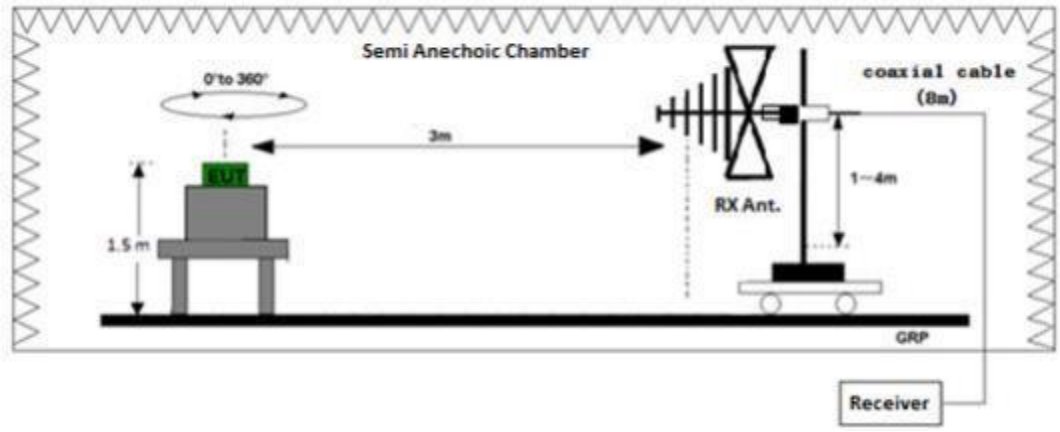
Same the above

TEST SETUP:

FREQUENCY RANGE (9KHZ-30MHZ)



FREQUENCY RANGE (ABOVE 30MHZ)



For test method of frequency range (9 kHz-30MHz)

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.

The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The H-field is measured with a shielded loop antenna connected to a measurement receiver.

The measuring bandwidth and detector type of the measurement receiver shall be in accordance with EN 300 330 V2.1.1 clause 5.12

The EUT operate with modulation under normal and extreme conditions.

For test method of frequency range (30 MHz-1000MHz)

EUT was placed on a 1.5m height wooden table. The search antenna is placed at 3m distances from the EUT and search antenna height is from 1-4m. With the transmitter operating at continuously mode, the turntable was slowly rotated to locate the direction of maximum emission. Once maximum direction is determined, the search antenna was raised and lowered in both vertical and horizontal polarizations.

The EUT was removed from the turntable and replaced with a linearly polarized antenna connected to a calibrated RF signal generator. The RF generator was set to a measured emission frequency and the search antenna was raised and lowered to produce a maximum received reading. The generator output was increased to match the radiated emission reading measured previously, and the result expressed in dB EIRP or ERP, correcting for substitution antenna gain at each frequency.

LIMITS OF RADIATED DISTURBANCES

Below 30MHz

Operating		
Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBμA/m Q.P.)
9 kHz ≤ f < 10 MHz	10	27dB μ A/m at 9 kHz descending 3 dB/oct
10 MHz ≤ f < 30 MHz	10	-3,5 dB μ A/m

Standby		
Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBμA/m Q.P.)
9 kHz ≤ f < 10 MHz	10	5,5 dB μ A/m at 9 kHz descending 3 dB/oct
10 MHz ≤ f < 30 MHz	10	-25 dB μ A/m

TEST LIMITS & RESULT

FREQUENCY RANGE (9KHZ-30MHZ)

OPERATION MODE					
Frequency	Reading level	Total Factor	Emission level	10M Limit	Margin
(MHz)	(dBμA/m)	(dB)	(dB μA/m)	(dBμA/m)	(dBμA/m)
--	--	--	--	27 dBμA/m at 9KHz descending 3dB/oct(9KHz – 10MHz)	--
--	--	--	--		--
--	--	--	--	-3.5 dBμA/m(10MHz – 30MHz)	--
--	--	--	--		--

STANDBY MODE					
Frequency	Reading level	Total Factor	Emission level	10M Limit	Margin
(MHz)	(dBμA/m)	(dB)	(dB μA/m)	(dBμA/m)	(dBμA/m)
--	--	--	--	5.5 dBμA/m at 9KHz descending 3dB/oct (9KHz – 10MHz)	--
--	--	--	--		--
--	--	--	--	-25 dBμA/m (10MHz – 30MHz)	--
--	--	--	--		--

Remark:

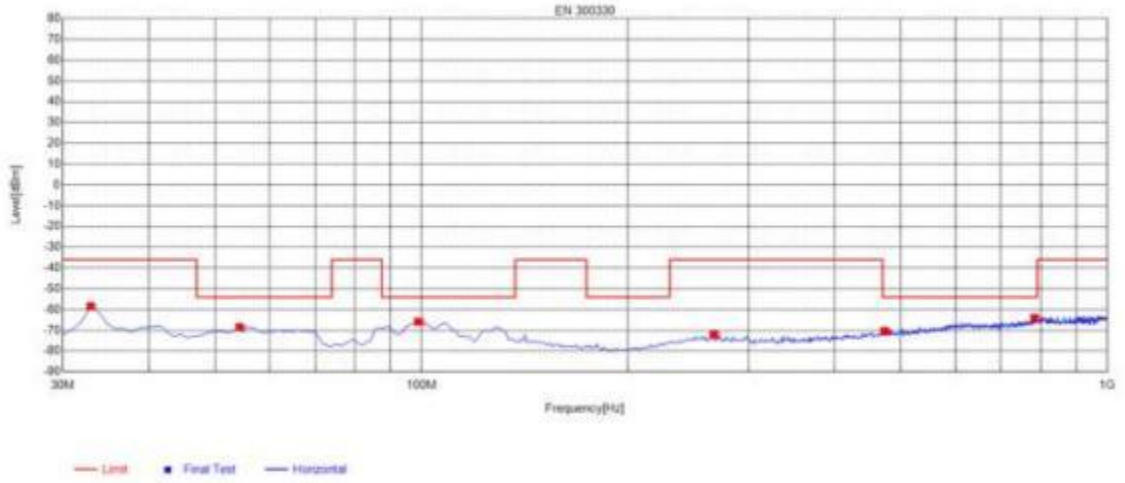
(1) Corrected Power (dBm) = Total Factor + Reading Level

(2) Measuring frequencies from 9KHz to the 30MHz.

(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

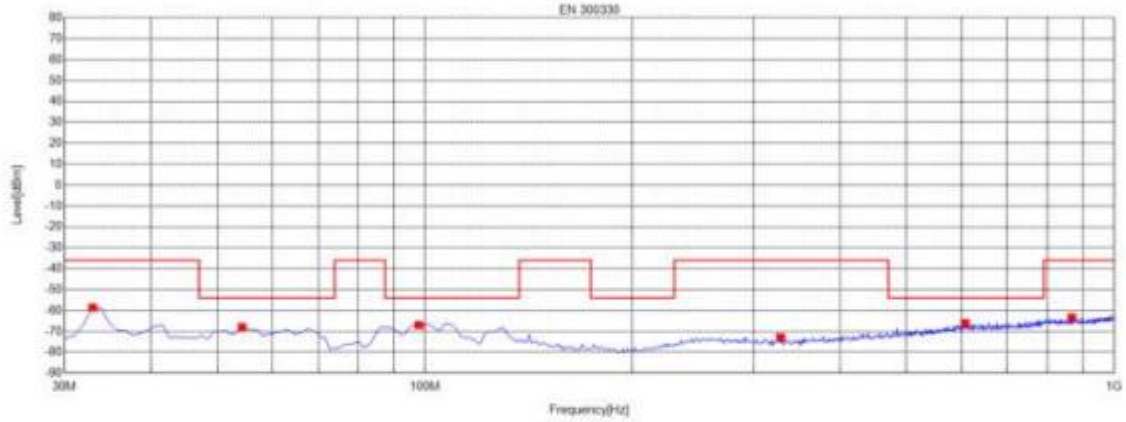
FREQUENCY RANGE (ABOVE 30MHZ)

EUT OPERATION MODE – HORIZONTAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	32.91	-87.57	-58.39	-36.00	22.39	29.18	360	Horizontal
2	54.25	-96.17	-68.47	-54.00	14.47	27.70	170	Horizontal
3	98.87	-86.41	-65.86	-54.00	11.86	20.55	160	Horizontal
4	266.68	-100.49	-72.04	-36.00	36.04	28.45	100	Horizontal
5	473.29	-101.69	-70.29	-54.00	16.29	31.40	330	Horizontal
6	782.72	-101.03	-64.03	-54.00	10.03	37.00	340	Horizontal

EUT OPERATION MODE – VERTICAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	32.91	-87.82	-58.64	-36.00	22.64	29.18	310	Vertical
2	54.25	-95.64	-67.94	-54.00	13.94	27.70	320	Vertical
3	97.9	-87.73	-66.98	-54.00	12.98	20.75	260	Vertical
4	327.79	-101.07	-72.89	-36.00	36.89	28.18	230	Vertical
5	607.15	-100.84	-66.01	-54.00	12.01	34.83	330	Vertical
6	867.11	-100.62	-63.37	-36.00	27.37	37.25	280	Vertical

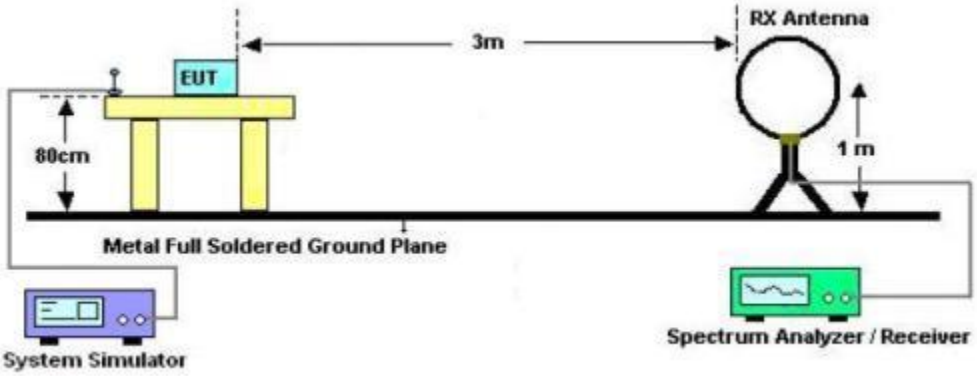
6.4 ETSI EN 300 330 Subclasses 4.4.2: Receiver spurious radiation

MEASUREMENT EQUIPMENT USED:

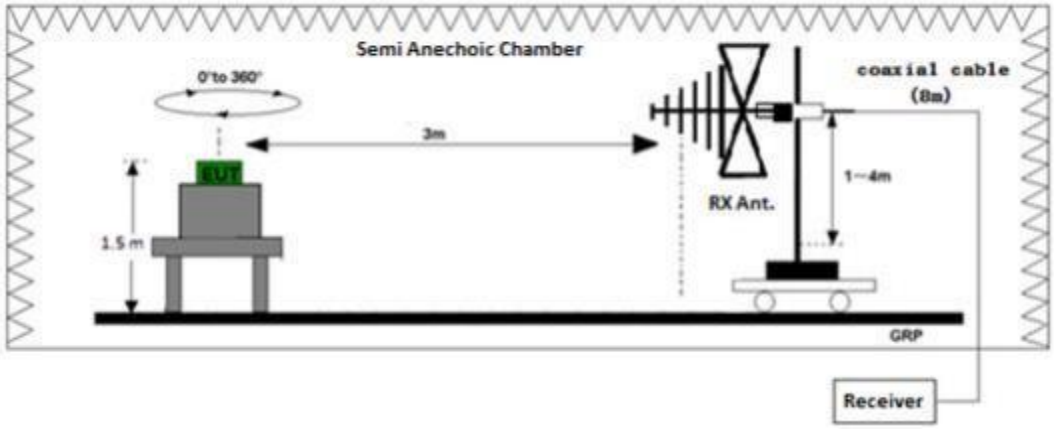
Same the above

TEST SETUP:

FREQUENCY RANGE (9KHZ-30MHZ)



FREQUENCY RANGE (ABOVE 30MHZ)



TEST RESULT AND LIMIT

FREQUENCY RANGE (9KHZ-30MHZ)

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBμA/m Q.P.)
9 kHz ≤ f < 10 MHz	10	5.5dB μ A/m at 9 kHz descending 3 dB/oct
10 MHz ≤ f < 30 MHz	10	-25 dB μ A/m

RECEIVER MODE					
Frequency	Reading level	Total Factor	Emission level	10M Limit	Margin
(MHz)	(dBμA/m)	(dB)	(dBμA/m)	(dBμA/m)	(dBμA/m)
--	--	--	--	5.5 dBuA/m at 9KHz descending 3dB/oct (9KHz – 10MHz)	--
--	--	--	--		--
--	--	--	--	-25 dBuA/m (10MHz – 30MHz)	--
--	--	--	--		--

Remark:

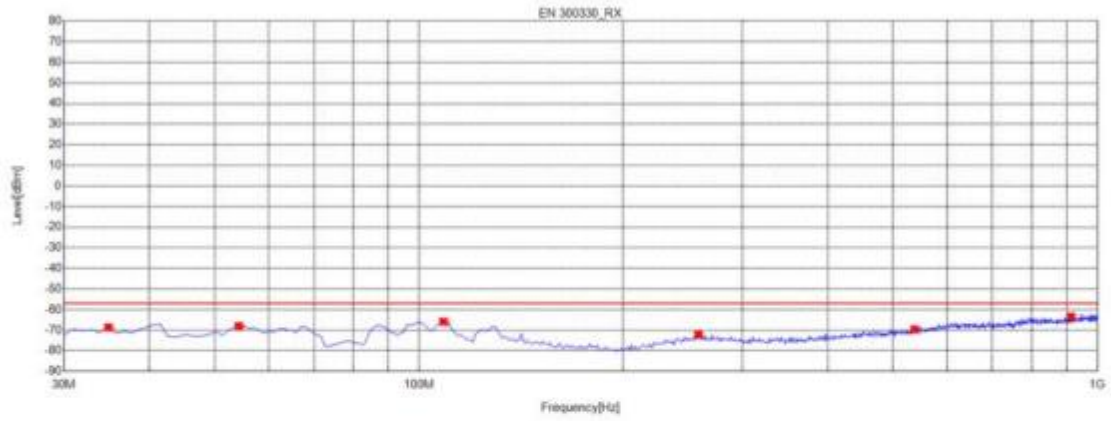
(1) Corrected Power (dBm) = Total Factor + Reading Level

(2) Measuring frequencies from 9KHz to the 30MHz.

(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

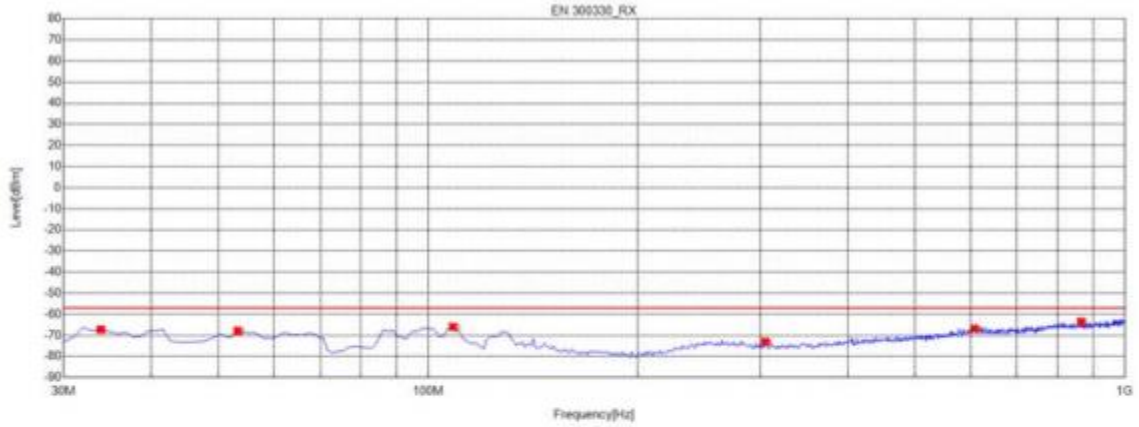
FREQUENCY RANGE (ABOVE 30MHZ)

EUT OPERATION MODE – HORIZONTAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	34.85	-97.93	-68.67	-57.00	11.67	29.26	160	Horizontal
2	54.25	-95.67	-67.97	-57.00	10.97	27.70	250	Horizontal
3	108.57	-86.44	-65.85	-57.00	8.85	20.59	20	Horizontal
4	257.95	-100.81	-72.24	-57.00	15.24	28.57	330	Horizontal
5	537.31	-102.17	-69.60	-57.00	12.60	32.57	210	Horizontal
6	913.67	-101.20	-63.41	-57.00	6.41	37.79	80	Horizontal

EUT OPERATION MODE – VERTICAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	33.88	-96.47	-67.26	-57.00	10.26	29.21	170	Vertical
2	53.28	-95.80	-67.88	-57.00	10.88	27.92	60	Vertical
3	108.57	-86.61	-66.02	-57.00	9.02	20.59	200	Vertical
4	304.51	-101.11	-73.08	-57.00	16.08	28.03	210	Vertical
5	608.12	-101.70	-66.87	-57.00	9.87	34.83	60	Vertical
6	865.17	-100.77	-63.53	-57.00	6.53	37.24	270	Vertical

7. ETSI EN 300 330 V2.1.1: INTERPRETATION OF MEASUREMENT RESULTS

All the measurement equipments and accessories have been carefully selected to meet the maximum measurement uncertainty specified below:

RF Frequency	± 1 x 10^{-7}
RF Power, Conducted	± 0.75dB
Maximum Frequency Deviation: _ Within 300Hz and 6KHz of Audio Frequency _ Within 6KHz and 25KHz of Audio Frequency	± 5% ± 3dB
Adjacent channel power	± 3dB
Conducted Emission of Transmitter, Valid Up to 12.75GHz	± 4dB
Conducted Emissions of Receivers	± 3dB
Radiated Emission of Transmitter, Valid Up to 12.75GHz	± 6dB
Radiated Emissions of Receivers	± 6dB

P.S. Uncertainty figures are valid to confidence level of 95% calculated according to the methods described in the ETR 028[3].

APPENDIX II PHOTOGRAPHS OF TEST SETUP

----END OF REPORT---

RF TEST REPORT

Report No: FCS202501111W01

Issued for

Applicant:	Mid Ocean Brands B.V.
Address:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2458
Series Model:	N/A
Test Standard:	ETSI EN 303417 V1.1.1(2017-09)

Issued By: Dongguan Funas Testing Technology Co.,Ltd.
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan, China
Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com
E-mail:andy.yue@fcs-lab.com

TEST REPORT CERTIFICATION

Applicant's name.....: Mid Ocean Brands B.V.

Address.....: 7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Manufacture's Name.....: 117486

Address.....: N/A

Product description

Product Name.....: Wireless charger

Brand Name .....: N/A

Model Name:.....: MO2458

Series Model.....: N/A

Test Standards.....: ETSI EN 303417 V1.1.1(2017-09)

This device described above has been tested by FCS, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date (s) of performance of tests.....: Jan. 09, 2025~ Jan. 15, 2025

Date of Issue.....: Jan. 15, 2025

Test Result.....: Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Duke Qian

(Duke Qian)

Approved by : Jack Wang

(Jack Wang)

TABLE OF CONTENTS

Revision history

Rev.	Revisions	Issue Date	Revised By
---	N/A	Jan. 15, 2025	

1. Summary of test results

1.1. Standard description

ETSI EN 303417 V1.1.1(2017-09): Wireless power transmission systems, using technologies other than radio frequency beam in the 19-21 kHz, 59-61 kHz, 79-90 kHz, 100-300 kHz, 6765-6795 kHz ranges; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

1.2. Test result

ETSI EN 303417 V1.1.1(2017-09)				
No	Test Parameter	Clause No	Condition	Results
1	Permitted range of operating frequencies	4.3.2	U	PASS
2	Operating frequency ranges	4.3.3	U	PASS
3	H-field requirements	4.3.4	U	PASS
4	Transmitter spurious emissions	4.3.5	U	PASS
5	Transmitter out of band (OOB) emissions	4.3.6	U	PASS
6	WPT system unwanted conducted emissions	4.3.7	Only for equipment which has a cable between the off board power supply and the primary coil which is longer than 3 m	N/A
7	Receiver blocking	4.4.2	Only for Mode 1, Mode 2 and Mode 3 (see Table 2)	N/A
Note 1: N/A is an abbreviation for not applicable, means according technology of EUT, this test item is not applicable for this reported device. Note 2: U means unconditionally applicable.				

2. General test information

2.1. Description of EUT

EUT* Name	:	Wireless charger
Model Number	:	MO2458
EUT function description	:	Please reference user manual of this device
Power supply	:	Wireless Output Power (Phone): 15W Max. Wireless Output Power (Airpods): 5W Wireless Output Power (Watch): 3W Output(Phone): DC 5V 1A, 7.5V 1A,9V 1.1A, 9V 1.67A Output(Airpods): DC 5V 1A Output(Watch): DC 5V 0.6A
Wireless charging Operation frequency	:	110kHz-205kHz
Antenna Type	:	Inductive loop coil antenna
WPT operational modes	:	Mode 4: energy transmission
Sample Type	:	Series production

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

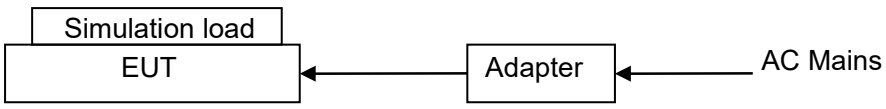
Description of Accessories	Manufacturer	Model number	Serial No.	Other
AC Adapter	Wentong	WT0903500G	N/A	N/A

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
Simulation load	/	/	/

2.4. Block diagram of EUT configuration for test

TX mode:



2.5. Test environment conditions

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

/	Normal Conditions	Extreme Conditions
Temperature range	15℃-35℃	-20℃-55℃
Humidity range	20%-75%	20%-75%
Power supply	DC 5V	Low voltage: DC 4.5V, High voltage: DC 5.5V (±10% of nominal voltage)

2.6. Test laboratory

Company Name:	Dongguan Funas Testing Technology Co.,Ltd.
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan, China
Telephone:	+86-769-27280901
Fax:	+86-769-27280901

FCC Test Firm Registration Number: 514908
Designation number: CN0127
A2LA accreditation number：5545.01

2.7. Measurement uncertainty

Test Item	Uncertainty
RF frequency	3×10^{-8}
Radiated RF power	±3.57dB
Peak Output Power (Conducted)(Spectrum analyzer)	0.86 dB (10 MHz ≤ f < 3.6GHz);
	1.38 dB (3.6GHz≤ f < 8GHz)
Peak Output Power (Conducted)(Power Sensor)	0.74dB
Maximum frequency deviation -within 300Hz and 6kHz of audio frequency -within 6kHz and 25kHz of audio frequency	2.1% 1.5dB
Adjacent channel power	1.2dB
Conducted spurious emission	0.86 dB (10 MHz ≤ f < 3.6GHz);
	1.40 dB (3.6GHz≤ f < 8GHz)
	1.66 dB (8GHz≤ f < 22GHz)
Radiated Emissions	±3.57dB (f<26GHz)
Temperature	±0.4℃
Humidity	±2%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment used during test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2024.08.28	2025.08.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2024.08.28	2025.08.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2024.08.28	2025.08.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2024.08.28	2025.08.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2024.08.28	2025.08.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2024.08.28	2025.08.27
Pre-Amplifier(0.1M-3GHz)	EMCI	EM330N	FCS-E004	2024.08.28	2025.08.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2024.08.28	2025.08.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2024.08.28	2025.08.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2024.08.28	2025.08.27
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2024.08.28	2025.08.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2024.08.28	2025.08.27
Spectrum Analyzer	R&S	FSV-40	101499	2024.08.28	2025.08.27

4. Permitted range of operating frequencies and Operating frequency ranges

4.1. Limits

The limit specified in EN 300 417 V1.1.1, Sub clause 4.3.2.3 or 4.3.3.3 as applied, the permitted range of operating frequencies and operating frequency ranges shall be within 100-300 kHz.

4.2. Block diagram of test setup

Spectrum analyzer

4.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer though suitable attenuator.

(2) Configure EUT work in carrier trasmit mode.

(3) Set the spectrum analyzer as follows:

Start frequency: lower than the lower edge of the permitted frequency range.

Stop frequency: higher than the upper edge of the permitted frequency range.

RBW= 300Hz; VBW=1kHz; Detector mode: Quasi Peak; Display mode: Maxhold

(4) The 99% OBW function shall be used to determine the operating frequency range:

f_H is determined. f_H is the frequency of the upper marker resulting from the OFR.

f_L is determined. f_L is the frequency of the lower marker resulting from the OFR.

(5) For multi-frequency systems the OFR is described in Figure 2.

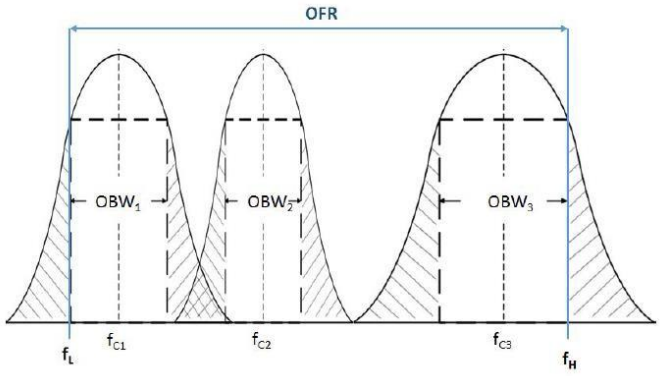


Figure 2: OFR of a multi - frequency WPT system within one frequency range of Table 2 and within one WPT system cycle time

4.4. Test result

Test Conditions		F_L [kHz]	F_H [kHz]	Assigned Frequency Band Limit (kHz)	Result
Volt	Temp				
Normal Volt DC 12V	25℃	115.120	205.260	100-300	PASS
Low Volt DC 10.8V	-20℃	115.391	205.360	100-300	PASS
Low Volt DC 10.8V	55℃	115.488	205.550	100-300	PASS
High Volt DC 13.2V	-20℃	115.692	205.392	100-300	PASS
High Volt DC 13.2V	55℃	115.538	205.516	100-300	PASS

5. H-field requirements

5.1. Limits

Table 3:

Frequency range [MHz]	H-field strength limit [dBμA/m at 10 m]	Comments
0.100 < f ≤ 0.119	42	
0.119 ≤ f < 0.135	66 descending 10 dB/dec above 0.119MHz	See note 1
0.135 ≤ f < 0.140	42	
0.140 ≤ f < 0.1485	37.7	
NOTE 1: Limit is 42 dBuA/m for the following spot frequencies: 60 kHz ± 250 Hz and 129,1 kHz ± 500 Hz.		

Note:
Refer to EN 300 417 V1.1.1, Subclause 6.1.1, An alternative measurement distance (e.g. 3 m) may be used as long as the measured values at the actual test distance are extrapolated to 10 m according to ETSI EN 300 330 [1], Annex H.

1) Refer to EN 300 330 V2.1.1, Annex H.2, the H-field limit in dBμA/m at 3 m, H3m, is determined by the following equation:

$H_{3m} = H_{10m} + C_3$

where:

H10m is the H-field limit in dBμA/m at 10m distance according to the present document; and

C3 is a conversion factor in dB determined from figure H.2.

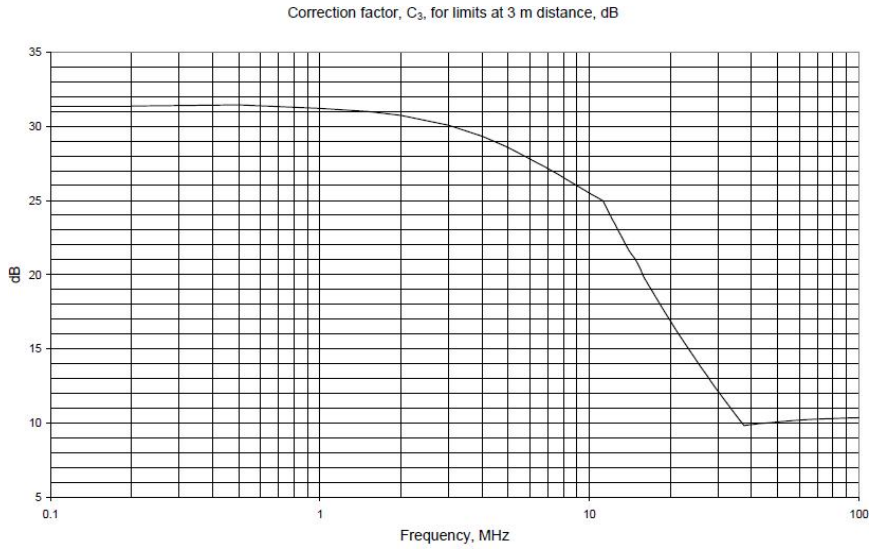


Figure H.2: Conversion factor C_3 versus frequency

2) For 115kHz, C_3=31.2

$H_{3m} = H_{10m} + C_3$=42+31.3=73.3 dBμA/m

For 119kHz, C_3=31.2

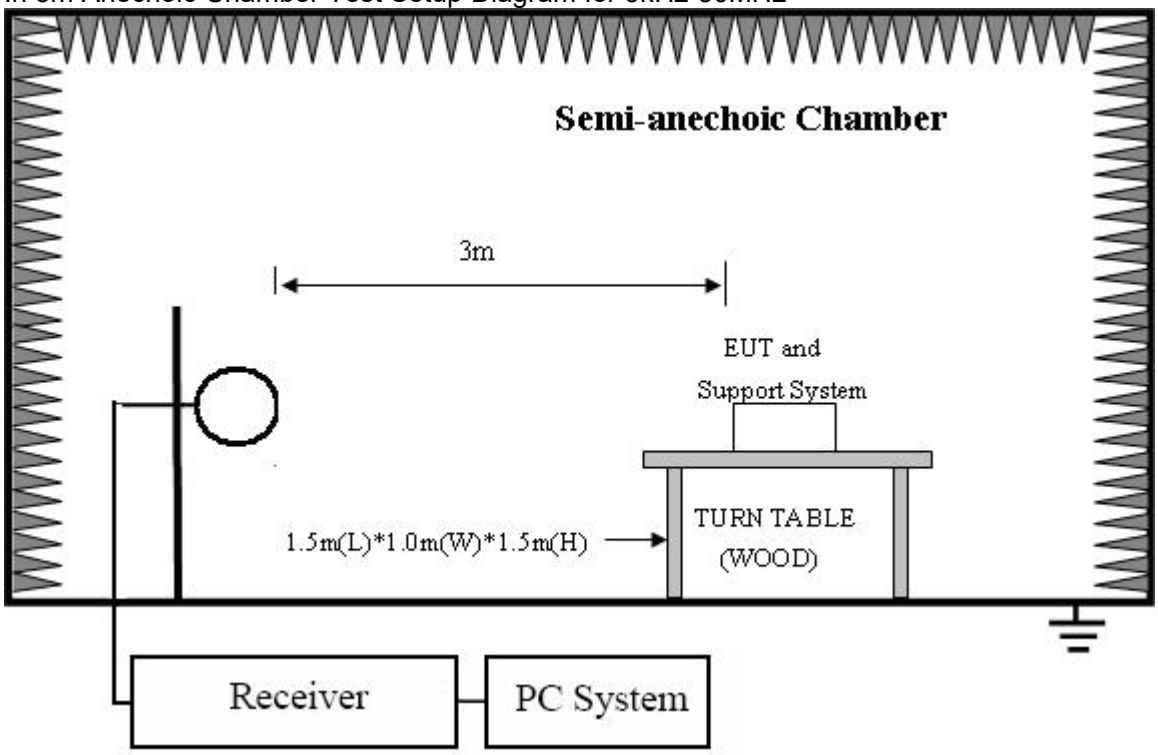
$H_{3m} = H_{10m} + C_3$=66+31.3=97.3 dBμA/m

For 140kHz, C_3=31.2

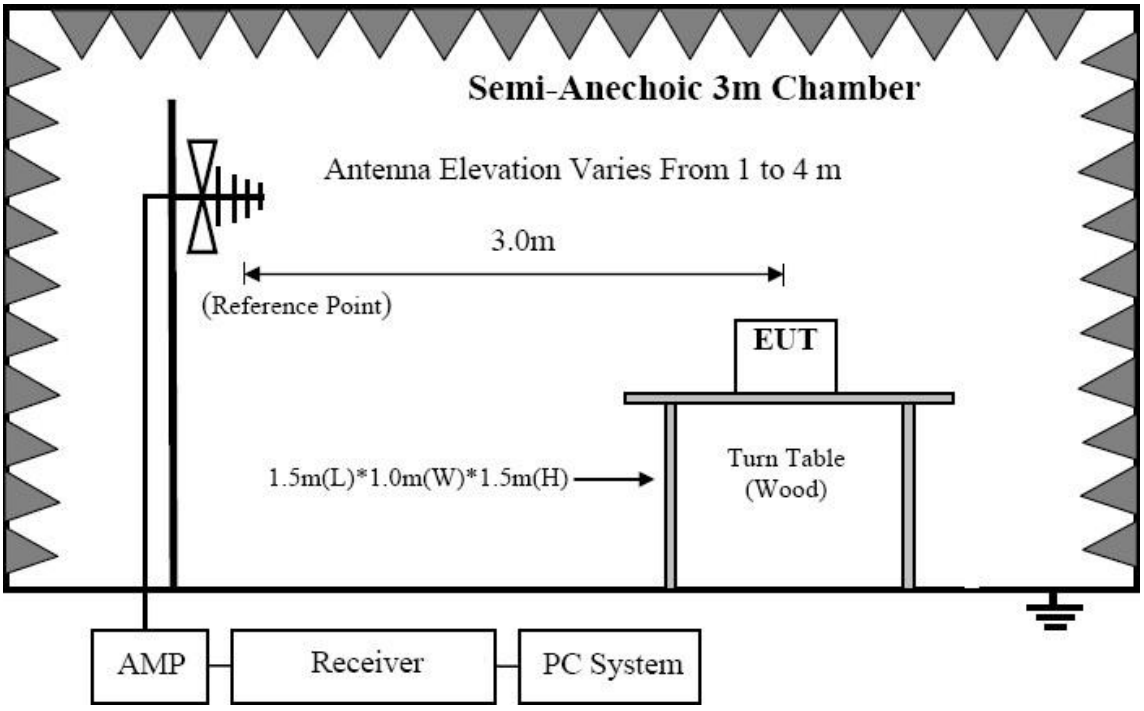
$H_{3m} = H_{10m} + C_3$=42+31.3=73.3 dBμA/m

5.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for 9kHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



5.3. Test procedure

1) Scan from 9kHz to 150kHz, find the maximum H-field frequency to measure.

2) The measuring bandwidth and detector type of the measurement receiver see below:

Frequency: (f)	Detector type	Measurement receiver bandwidth	Spectrum analyser bandwidth
9 kHz ≤ f < 150 kHz	Quasi Peak	200 Hz	300 Hz
150 kHz ≤ f < 30 MHz	Quasi Peak	9 kHz	10 KHz
30 MHz ≤ f ≤ 1 000 MHz	Quasi Peak	120 kHz	100 kHz
NOTE: For the measurement of the ranges 6,765 MHz ≤ f ≤ 6,795 MHz and 11,810 MHz ≤ f ≤ 15,310 MHz, the measurement bandwidth has to be 200 Hz respectively 300 Hz.			

3) Refer to ETSI EN 300 330 V2.1.1 Clause 6.2.4 and Annex C

5.4. Test result

Test Conditions Mode 4		Frequency [kHz]	Measured power (dBμA/m) @3m	Corr. (dB)	Limit (dBμA/m) @3m	Result
Volt	Temp					
Normal Volt	25℃	115	33.26	31.3	73.3	PASS
Normal Volt	25℃	130	26.54	31.3	97.3	PASS
Normal Volt	25℃	205	40.32	31.3	73.3	PASS

6. Transmitter spurious emissions

6.1. Limits

Below 30MHz (at 10m)

State (see note)	Frequency 9 kHz ≤ f < 10 MHz	Frequency 10 MHz ≤ f < 30 MHz
Operating	27 dBµA/m at 9 kHz descending 10 dB/dec	-3.5 dBµA/m
Standby	5.5 dBµA/m at 9 kHz descending 10 dB/dec	-25 dBµA/m
NOTE: “Operating” means mode 2, 3 and 4 according to Table 2; “standby” means mode 1 according to Table 2.		

Above 30MHz (at 3m)

State (see note)	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW (-54dBm)	250 nW (-36dBm)
Standby	2 nW (-57dBm)	2 nW (-57dBm)
NOTE: “Operating” means mode 2, 3 and 4 according to Table 2; “standby” means mode 1 according to Table 2.		

6.2. Block diagram of test setup

The same as clause 5.2

6.3. Test procedure

1) Scan from 9kHz to 1GHz, find the maximum radiation frequency to measure.

2) The measuring bandwidth and detector type of the measurement receiver see below:

Frequency: (f)	Detector type	Measurement receiver bandwidth	Spectrum analyser bandwidth
9 kHz ≤ f < 150 kHz	Quasi Peak	200 Hz	300 Hz
150 kHz ≤ f < 30 MHz	Quasi Peak	9 kHz	10 KHz
30 MHz ≤ f ≤ 1 000 MHz	Quasi Peak	120 kHz	100 kHz
NOTE: For the measurement of the ranges 6,765 MHz ≤ f ≤ 6,795 MHz and 11,810 MHz ≤ f ≤ 15,310 MHz, the measurement bandwidth has to be 200 Hz respectively 300 Hz.			

3) Refer to ETSI EN 300 330 V2.1.1 Clause 6.2.8, 6.2.9 and Annex C

6.4. Test result

9 kHz-30MHz:

Mode 4:						
Frequency (MHz)	Result **@3m** (dBuA/m)	Limit (dBμA/m) @10m	Corr. (dB)	Limit **@3m** (dBuA/m)	Antenna polarization	Conclusion
0.01	33.70	25.54	31.3	56.84	H	PASS
0.02	29.35	23.46	31.3	54.76	H	PASS
0.04	26.04	20.50	31.3	51.80	H	PASS
0.70	4.69	8.10	31.3	39.40	H	PASS
1.64	0.54	4.40	31.0	35.40	H	PASS
5.00	-1.98	-0.42	28.6	28.18	H	PASS
0.02	28.23	22.62	31.3	53.92	V	PASS
0.04	23.06	20.43	31.3	51.73	V	PASS
0.06	20.98	18.50	31.3	49.80	V	PASS
0.26	11.15	12.47	31.3	43.77	V	PASS
1.30	-1.93	5.43	31.1	36.53	V	PASS
3.15	-3.89	1.59	29.7	31.29	V	PASS

30MHz-1GHz:

Frequency (MHz)	Result (dBm)	Limit (dBm)	Antenna polarization	Conclusion
49.88	-73.58	-53.99	H	PASS
100.93	-62.54	-53.99	H	PASS
123.70	-62.18	-35.99	H	PASS
217.54	-62.38	-53.99	H	PASS
406.09	-69.35	-35.99	H	PASS
675.21	-64.06	-53.99	H	PASS
47.16	-59.97	-53.99	V	PASS
77.05	-58.46	-35.99	V	PASS
135.98	-68.72	-35.99	V	PASS
218.31	-66.79	-53.99	V	PASS
295.15	-65.66	-35.99	V	PASS
709.18	-62.95	-53.99	V	PASS

Note: All the emissions are measured with PK detector.

7. Transmitter out of band (OOB) emissions

7.1. Limits

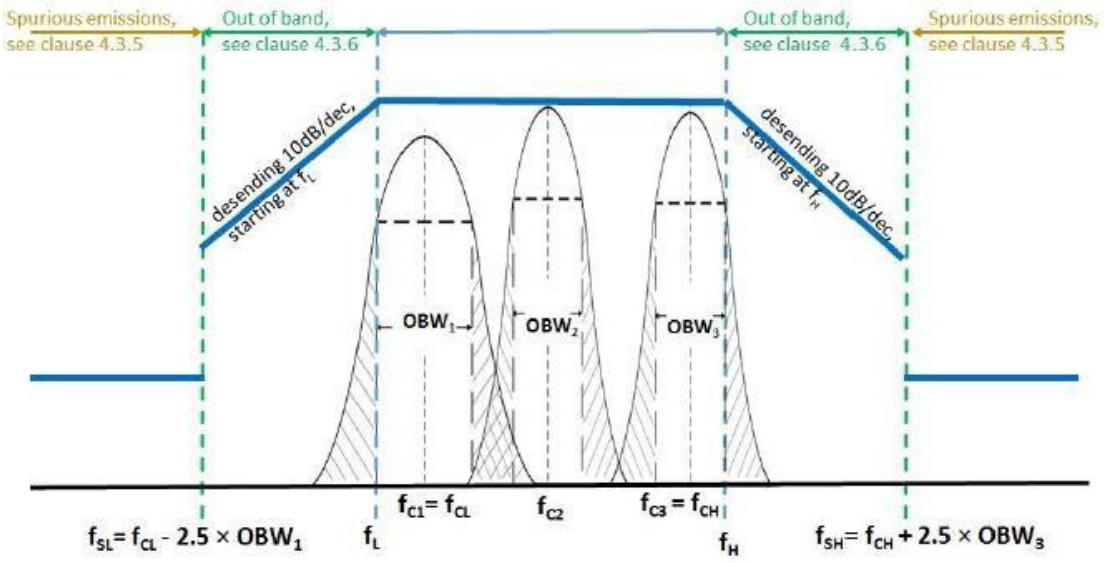


Figure 5: Out of band and spurious domain of a multi - frequency system (during one WPT system cycle time)

7.2. Block diagram of test setup

The same as clause 5.2

7.3. Test procedure

1) Scan from 9kHz to 150kHz, find the maximum H-field frequency to measure.

2) The measuring bandwidth and detector type of the measurement receiver see below:

Frequency: (f)	Detector type	Measurement receiver bandwidth	Spectrum analyser bandwidth
9 kHz ≤ f < 150 kHz	Quasi Peak	200 Hz	300 Hz
150 kHz ≤ f < 30 MHz	Quasi Peak	9 kHz	10 KHz
30 MHz ≤ f ≤ 1 000 MHz	Quasi Peak	120 kHz	100 kHz
NOTE: For the measurement of the ranges 6,765 MHz ≤ f ≤ 6,795 MHz and 11,810 MHz ≤ f ≤ 15,310 MHz, the measurement bandwidth has to be 200 Hz respectively 300 Hz.			

3) Refer to ETSI EN 300 330 V2.1.1 Annex C

7.4. Test result

The equipment met the requirement of this clause.

8. WPT system unwanted conducted emissions

Not applicable
Since this requirement applies to all WPT systems where the cable to the primary coil exceeds a length of 3m and where the cable is not installed in the ground or any metallic structures.

9. Receiver blocking

Not applicable
Since this requirement applies to all WPT systems operation in Mode 1, Mode 2 and Mode 3,but the EUT only operated in Mode

※※※※※END OF THE REPORT※※※※※

EN62311: TEST Report

Report No: FCS202501111H01

Issued for

Applicant:	Mid Ocean Brands B.V.
Address:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Product Name:	Wireless charger
Brand Name:	N/A
Model Name:	MO2458
Series Model:	N/A
Test Standard:	EN 62311:2020

Issued By: Dongguan Funas Testing Technology Co.,Ltd
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan, China
Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com
E-mail:andy.yue@fcs-lab.com

TEST RESULT CERTIFICATION

Applicant's Name	:	Mid Ocean Brands B.V.
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Manufacture's Name	:	117486
Address	:	N/A

Product Description

Product Name	:	Wireless charger
Brand Name	:	N/A
Model Name	:	MO2458
Series Model	:	N/A
Test Standards	:	EN 62311:2020

This device described above has been tested by FCS, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of FCS, this document may be altered or revised by FCS, personal only, and shall be noted in the revision of the document.

Date of Test.....:

Date (s) of performance of tests.	:	Jan. 09, 2025~ Jan. 15, 2025
Date of Issue	:	Jan. 15, 2025
Test Result	:	Pass

Tested by : Karl. Huang
(Karl. Huang)

Reviewed by : Duke Qian
(Duke Qian)

Approved by : Jack Wang
(Jack Wang)

Table of Contents

Page

1. Testing laboratory

Company Name:	Dongguan Funas Testing Technology Co.,Ltd.
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan, China
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
Laboray Accreditations	
FCC Test Firm Registration Number: 514908 CNAS Number： L15566 Designation number：CN0127 A2LA accreditation number：5545.01 ISED Number：25801	

2. GENERAL INFORMATION

<table>
<tr><td>Equipment</td><td>Wireless charger</td></tr>
<tr><td>Brand Name</td><td>N/A</td></tr>
<tr><td>Model Name.</td><td>MO2458</td></tr>
<tr><td>Serial Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>PCB board, structure and internal of these model(s) are the same, only differing in appearance and color. So no additional models were tested</td></tr>
<tr><td>Product Description</td><td>The is a Wireless charger.<table><tr><td>Operation Frequency</td><td>110kHz-205kHz</td></tr><tr><td>Antenna Designation</td><td>PCB Antenna</td></tr><tr><td>Antenna Gain(Peak)</td><td>1.2 dBi</td></tr><tr><td>Power Rating</td><td>DC 5V</td></tr></table>More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Ratings</td><td>Wireless Output Power (Phone): 15W Max.
Wireless Output Power (Airpods): 5W
Wireless Output Power (Watch): 3W
Output(Phone): DC 5V 1A, 7.5V 1A,9V 1.1A, 9V 1.67A
Output(Airpods): DC 5V 1A
Output(Watch): DC 5V 0.6A</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

GENERAL DESCRIPTION OF EUT

3.EN 62311 REQUIREMENT

GENERAL INFORMATION

According to its specifications, the EUT must comply with the requirements of the following standards:

EN 62311: 2020 [Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)]

LIMIT

A. Typical usage, installation and the physical characteristics of equipment make it inherently compliant with the applicable EMF exposure levels such as those listed in the bibliography. This low-power equipment includes unintentional (or non-intentional) radiators, for example incandescent light bulbs and audio/visual (A/V) equipment, information technology equipment (ITE) and multimedia equipment (MME) that does not contain radio transmitters.

NOTE Equipment is described as A/V equipment, ITE or MME if its main use is playback/recording of music, voice or images, or processing of digital information.

B. The input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available antenna power and/or the average total radiated power cannot exceed the low-power exclusion level defined in 4.2.

C. The available antenna power and/or the average total radiated power are limited by product standards for transmitters to levels below the low-power exclusion level defined in 4.2.

D. Measurements or calculations show that the available antenna power and/or the average total radiated power are below the low-power exclusion level defined in 4.2.

4. RESULT

It is found that the max result is 3.61 dBm (2.30mW) less than 20 mW (please refer to the test report “FCS202501111W01”. The SAR-based Pmax follows Guideline / Standard: ICNIRP. Therefore, the EUT is deemed to comply with EMF basic restrictions.