RF TEST REPORT

Report No: FCS202404288W01

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:	MO2281
Series Model:	N/A
Test Standard:	EN 303417 V1.1.1(2017-09)
Issued By: Dongguan Funas Testing Technology Co., Ltd. Add: Room 105, 1/F.. Baohao Technology Building 1, No.15, Gongye West Road.Songshan Lake Hi-Tech Industrial Area, Dongguan, Guangdong, China Tel: 769-27280901 Fax:769-27280901 http://www.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	:	Mid Ocean Brands B.V.
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Product description

Product Name	:	Wireless Charger
Brand Name	:	N/A
Model Name:	:	MO2281
Series Model	:	N/A
Test Standards	:	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:		Apr 22. 2024 ~ Apr 28. 2024
Date of Issue	:	Apr 29. 2024
Test Result	:	Pass

Tested by : Scott Shen

(Scott Shen)

Reviewed by : Scott Shen

(Scott Shen)

Approved by : Jack Wang

(Jack Wang)

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Revision history

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Apr 29. 2024	

1. Summary of test results

1.1. Standard description

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

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	:	MO2281
EUT function description	:	Please reference user manual of this device
Power supply	:	Wireless Output Power:15W Max. Input:9V 2A,5V 2A Output:DC 5V 1A,7.5V 1A 9V 1.1A, 9V 1.67A
Wireless charging Operation frequency	:	105kHz-205kHz
Antenna Type	:	Inductive Loop Antenna
WPT operational modes	:	Mode 1: energy transmission
Sample Type	:	Series production

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

2.2. Accessories of EUT

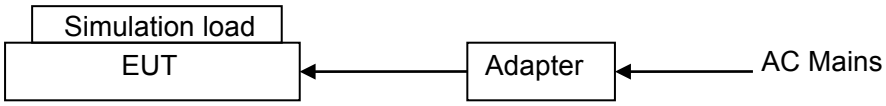
Description of Accessories	Manufacturer	Model number	Serial No.	Other
N/A	N/A	N/A	N/A	N/A

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
Load	N/A	N/A	Load
Adapter	Xiaomi	MDY-11-EB	Adapter

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 9V	Low voltage: DC 5V, High voltage: DC 9V (±10% of nominal voltage)

2.6. Test laboratory

Company Name:	Dongguan Funas Testing Technology Co., Ltd.
Address:	Room 105, 1/F.. Baohao Technology Building 1, No.15, Gongye West Road.Songshan Lake Hi-Tech Industrial Area, Dongguan, Guangdong, 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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
RF Connected Test (Tonscend RF Measurement System)					
Spectrum analyzer	R&S	FSU26	200071	2024.08.28	1 Year
Wideband Radio Communication tester	R&S	CMW500	117491	2024.08.28	1 Year
Vector Signal Generator	Agilent	E8267D	US49060192	2024.08.28	1 Year
Vector Signal Generator	Agilent	N5182A	MY48180737	2024.08.28	1 Year
Power Sensor	Agilent	U2021XA	MY55150010	2024.08.28	1 Year
Power Sensor	Agilent	U2021XA	MY55150011	2024.08.28	1 Year
DC Power Source	MATRIS	MPS-3005L-3	D813058W	2024.08.28	1 Year
Attenuator	Mini-Circuits	BW-S10W2	101109	2024.08.28	1 Year
RF Cable	Micable	C10-01-01-1	100309	2024.08.28	1 Year
Temp&Humi Programmable	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2024.08.28	1 Year
Test Software	JS Tonscend	JS1120-3	Ver.2.7	N/A	N/A
Radiated Emission Test Chamber 1#					
EMI Test Receiver	R&S	ESU8	100316	2024.08.28	1 Year
Spectrum analyzer	Agilent	E4447A	MY50180031	2024.08.28	1 Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2024.08.28	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	2024.08.28	1 Year
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	790	2024.08.28	1 Year
Pre-amplifier	A.H.	PAM-0118	360	2024.08.28	1 Year
Pre-amplifier	TERA-MW	TRLA-0040G35	101303	2024.08.28	1 Year
RF Cable	HUBSER	CP-X2+ CP-X1	W11.03+ W12.02	2024.08.28	1 Year
RF Cable	N/A	SMAJ-SMAJ-1M + 11M	17070133+1707 0131	2024.08.28	1 Year
MI Cable	HUBSER	C10-01-01-1M	1091629	2024.08.28	1 Year
Test software	Audix	E3	V 6.11111b	N/A	N/A

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.

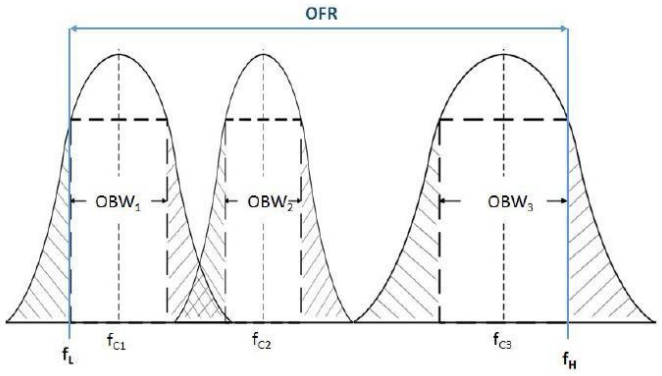


Figure 2: OFR of a multi - frequency WPT system within one frequency range of Table 2 and within one WPT system cycle time

4.4. Test result

Test Conditions		F_L [kHz]	F_H [kHz]	Assigned Frequency Band Limit (kHz)	Result
Volt	Temp				
Normal Volt DC 5V	25℃	115.820	205.820	100-300	PASS
Low Volt DC 4.5V	-20℃	115.671	205.780	100-300	PASS
Low Volt DC 4.5V	55℃	115.378	205.760	100-300	PASS
High Volt DC 5.5V	-20℃	115.692	205.442	100-300	PASS
High Volt DC 5.5V	55℃	115.648	205.446	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.

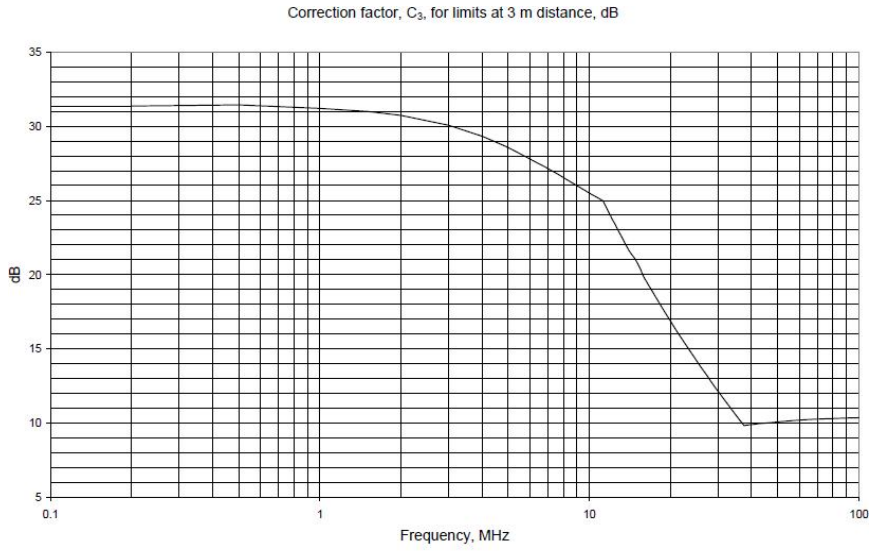


Figure H.2: Conversion factor C_3 versus frequency

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

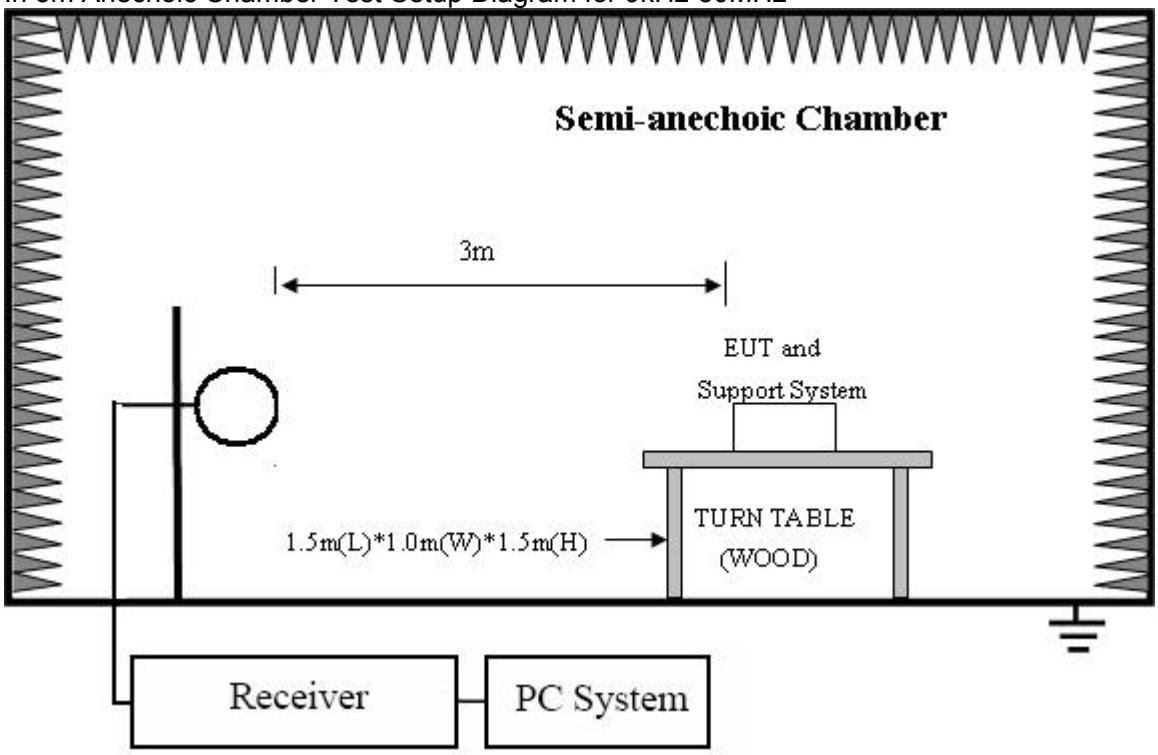
$H_{3m} = H_{10m} + C_3$=66+31.3=97.3 dBμA/m

For 140kHz, C_3=31.2

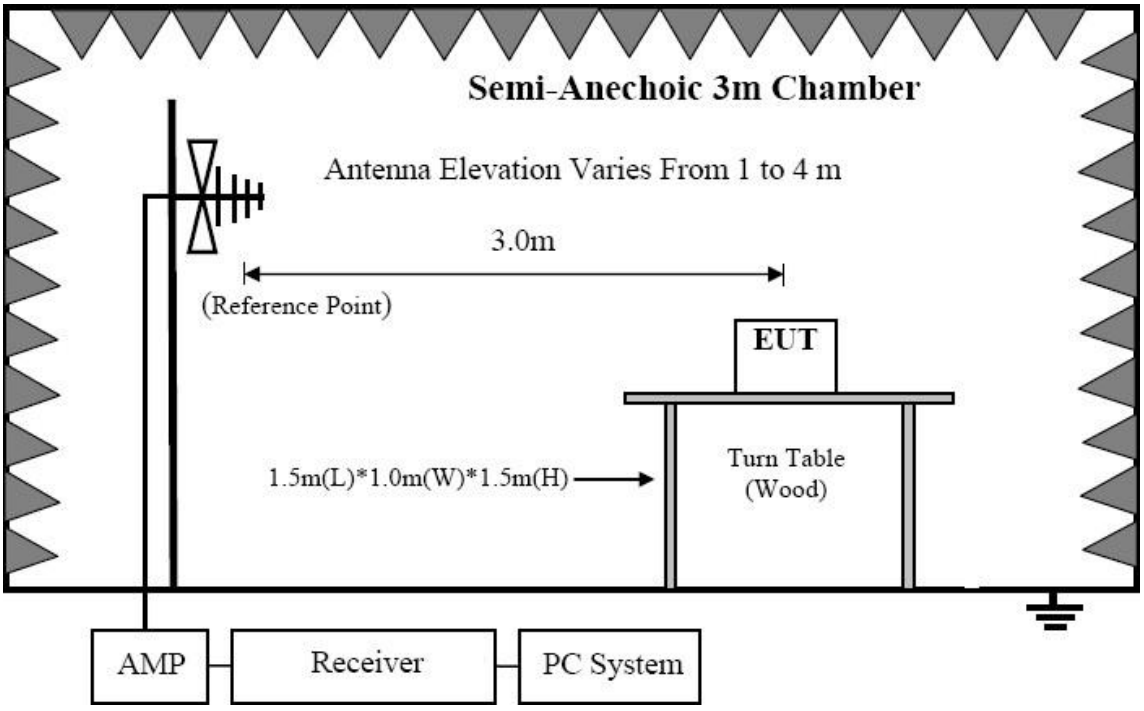
$H_{3m} = H_{10m} + C_3$=42+31.3=73.3 dBμA/m

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	33.13	31.3	73.3	PASS
Normal Volt	25℃	130	27.70	31.3	97.3	PASS
Normal Volt	25℃	205	41.61	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

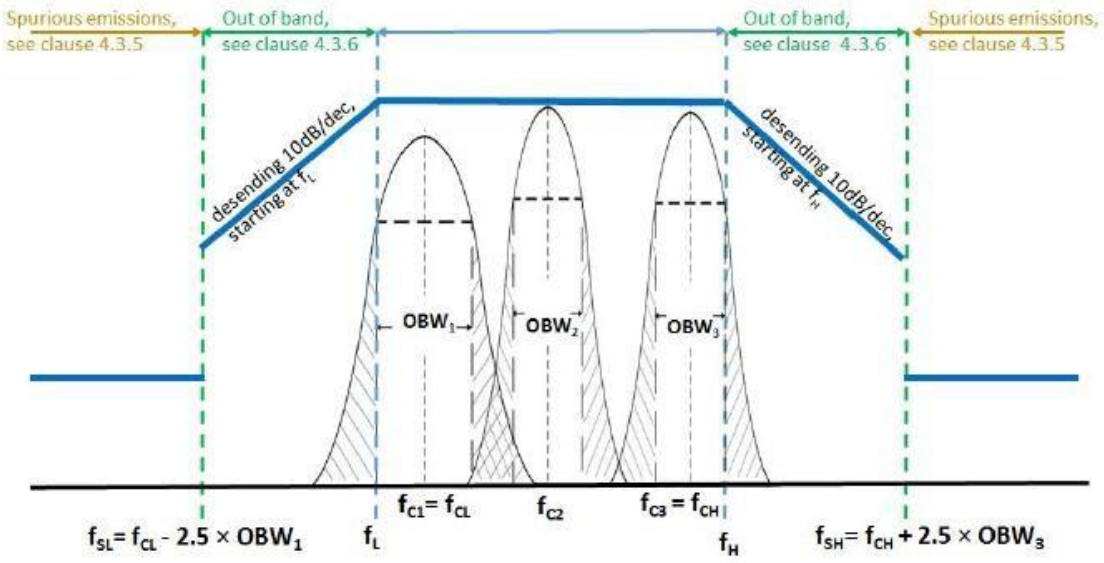


Figure 5: Out of band and spurious domain of a multi - frequency system (during one WPT system cycle time)

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: 2020 TEST Report

Report No: FCS202404288H01

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:	MO2281
Series Model:	N/A
Test Standard:	EN 62311:2020

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..... :	Mid Ocean Brands B.V.
Address..... :	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Product Description

Product Name..... :	Wireless Charger
Brand Name .....:	N/A
Model Name..... :	MO2281
Series Model.....:	N/A
Test Standards.....:	EN62311:2020

This device described above has been tested by FCS, the test results show that the equipment under test (EUT) is in compliance with the CE 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. :	Apr 22. 2024 ~ Apr 28. 2024
Date of Issue.....:	Apr 29. 2024
Test Result..... :	Pass

Tested by : Sam Wang
(Sam Wang)

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, 1/F.. Baohao Technology Building 1, No.15, Gongye West Road.Songshan Lake Hi-Tech Industrial Area, Dongguan, Guangdong, 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	
http://www.fcs-lab.com	

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>MO2281</td></tr>
<tr><td>Serial Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is Wireless Charger
<table>
<tr><td>Operation Frequency:</td><td>105-205kHz</td></tr>
<tr><td>Modulation Type:</td><td>☑MSK</td></tr>
<tr><td>Antenna Designation:</td><td>Inductive Loop Antenna</td></tr>
<tr><td>Antenna Gain(Peak)</td><td>1.0dBi</td></tr>
</table>
More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Power Supply</td><td>Wireless Output Power:15W Max.
Input:9V 2A,5V 2A
Output:DC 5V 1A,7.5V 1A 9V 1.1A, 9V 1.67A</td></tr>
<tr><td>Battery</td><td>N/A</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 1.90dBm (1.548mW) less than 20 mW (please refer to the test report “FCS202404288W02”. The SAR-based Pmax follows Guideline / Standard: ICNIRP. Therefore, the EUT is deemed to comply with EMF basic restrictions