RF Test Report

Report No.: AGC05443231016ER04

PRODUCT DESIGNATION	:	Magnetic wireless charger
BRAND NAME	:	N/A
TEST MODEL	:	MO2145
APPLICANT	:	MID OCEAN BRANDS B.V
DATE OF ISSUE	:	Nov. 03, 2023
STANDARD(S)	:	ETSI EN 300 330 V2.1.1(2017-02)
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 03, 2023	Valid	Initial release

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1. TEST RESULT CERTIFICATION

Applicant	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Manufacturer	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Factory Name	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Product Designation	Magnetic wireless charger
Brand Name	N/A
Test Model	MO2145
Series Model	N/A
Declaration of Difference	N/A
Date of receipt of test item	Oct. 16, 2023
Date of test	Oct. 16, 2023~Nov. 03, 2023
Test Result	PASS
Condition of Test Sample	Normal
Report Template	AGCRT-EC-SRD/RF

The above equipment was tested by SHENZHEN ATTESTATION OF GLOBAL COMPLIANCE (SHENZHEN) CO., LTD. for compliance with the requirements set forth in the European Standard ETSI EN 300 330 V2.1.1. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. The test results of this report relate only to the tested sample identified in this report.

Prepared By

Cici Li
(Project Engineer) Nov. 03, 2023

Reviewed By

Calvin Liu
(Reviewer) Nov. 03, 2023

Approved By

Max Zhang
Authorized Officer Nov. 03, 2023

2. EUT DESCRIPTION

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

Hardware Version	V1.0
Software Version	V1.0
Permitted Range Of Operating Frequency	148.5 KHz to 5 MHz (Manufacturer's declared frequency of product operation: 325KHz-330KHz)
Operation Frequency	326.5kHz
Modulation	ASK
Corrected Amplitude H-field	-34.54dBuA/m
RF Output Power (ERP)	0.00000010mW
Number of Channels:	1 Channel
Antenna Gain	0dBi
Antenna Type:	Coil Antenna
Power Supply	Input: DC 9V/3A, 9V/2.22A, 5V/2A
Wireless Charging Output Power	WPT 1: 5W/7.5W/10W/15W (Max) WPT 2: 5W (Max) WPT 3: 2.5W (Max)
Receiver category	3
Product Class:	1
Equipment type:	WPT systems

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

Test Site-1	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao 'an District, Shenzhen, Guangdong, 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.

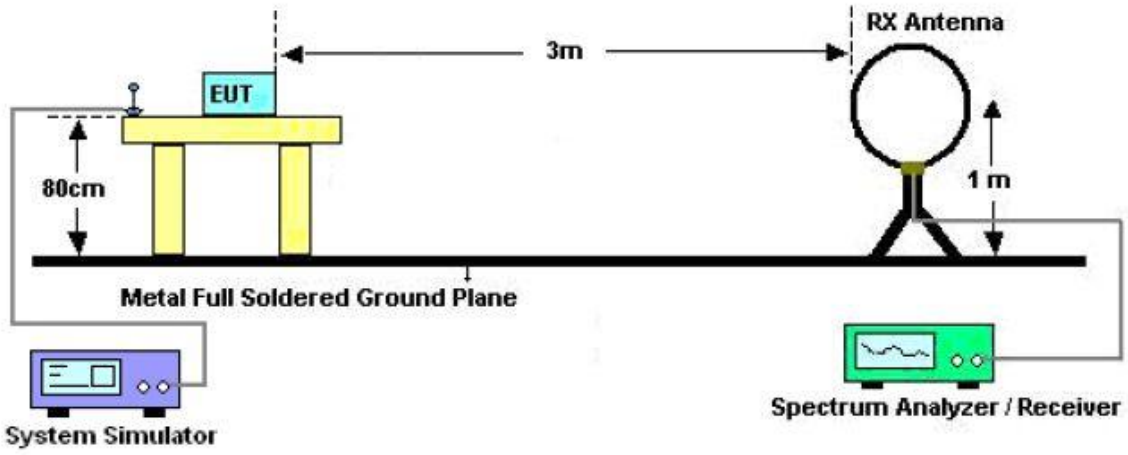
6. ETSI EN 300 330 REQUIREMENT TO TRANSMITTER

6.1 RF H-FIELD (RADIATED)

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100694	Jun. 03, 2023	June 02, 2024
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 03, 2023	June 02, 2024
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-D69250	May 11, 2023	May 10, 2025
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

TEST SETUP:



TEST LIMITS:

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 326.5KHz:

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 83 dBuA/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)

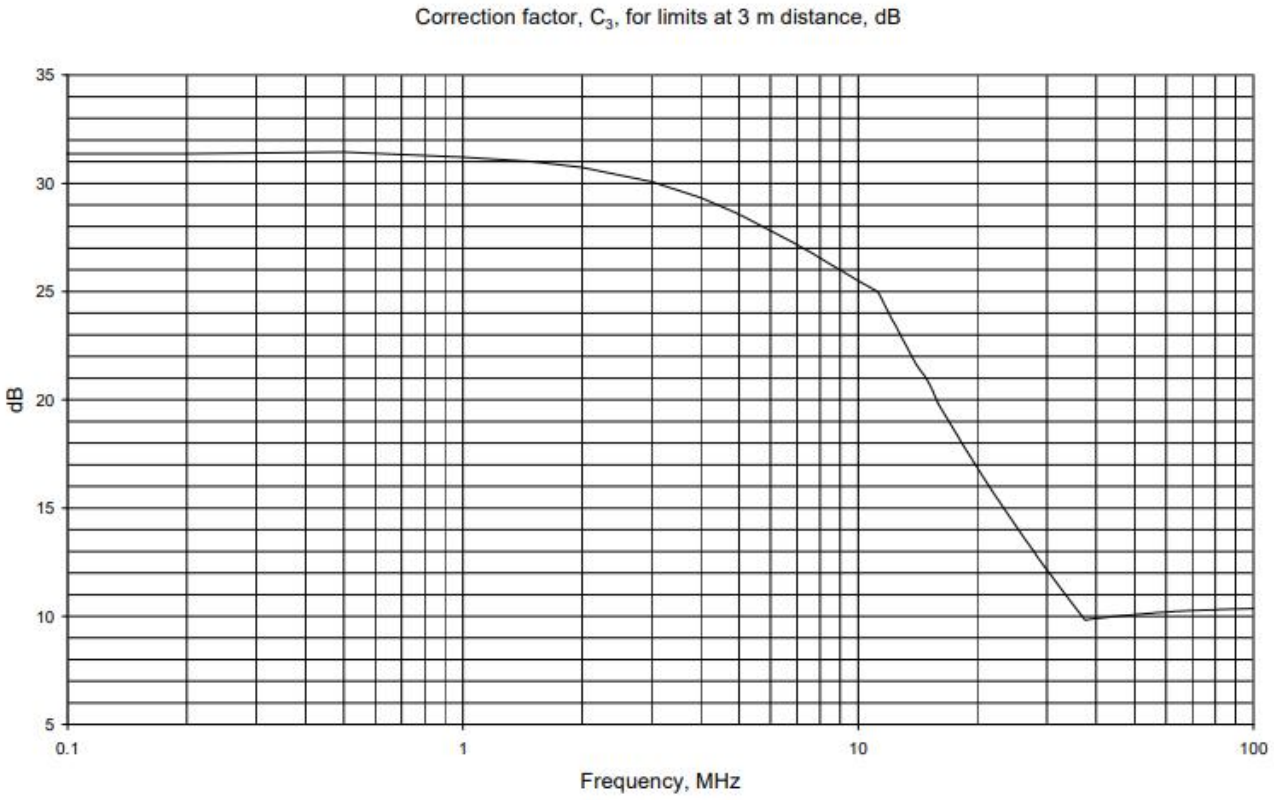


Figure H.2: Conversion factor C_3 versus frequency

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℃	12.0	Worst case
TL/ VL	-10℃	13.8	
TH/VL	40℃	13.8	
TL/VH	-10℃	10.2	
TH/VH	40℃	10.2	

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
0.3265	26.89	21.72	48.61	-2.89	-34.54	-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

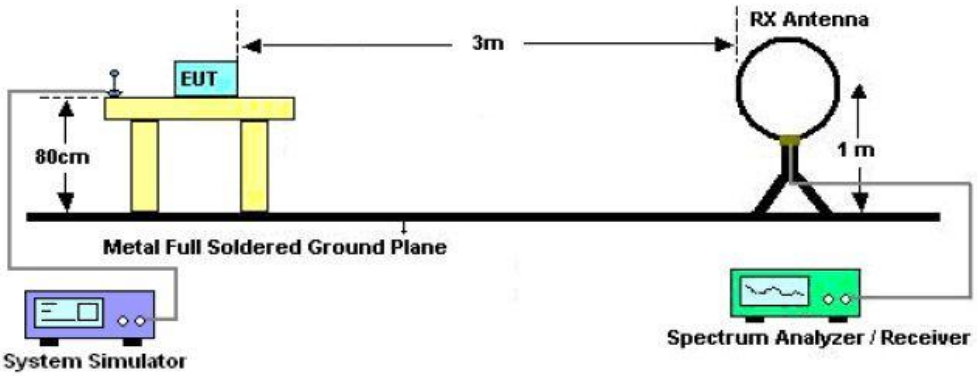
TEST LIMITS

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:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100694	Jun. 03, 2023	June 02, 2024
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 03, 2023	June 02, 2024
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

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 RESULT

Test Temperature	Test Voltage (V DC)	Lower Frequency (KHZ)	Upper Frequency (KHZ)	Limit
-10℃	10.2	325.142	327.431	333 KHz≤&≤387 KHz
	13.8	325.135	327.405	333 KHz≤&≤387 KHz
25℃	12.0	325.142	327.428	333 KHz≤&≤387 KHz
40℃	10.2	325.136	327.414	333 KHz≤&≤387 KHz
	13.8	325.138	327.432	333 KHz≤&≤387 KHz
Results		PASS		

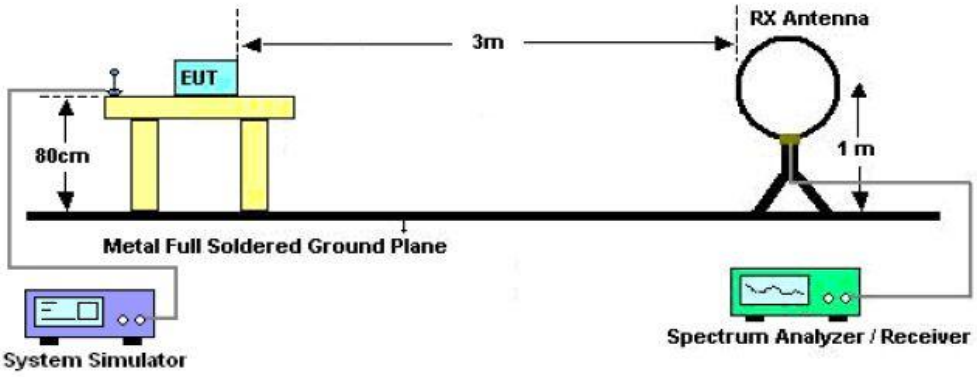
6.3 SPURIOUS DOMAIN EMISSION

MEASUREMENT EQUIPMENT USED:

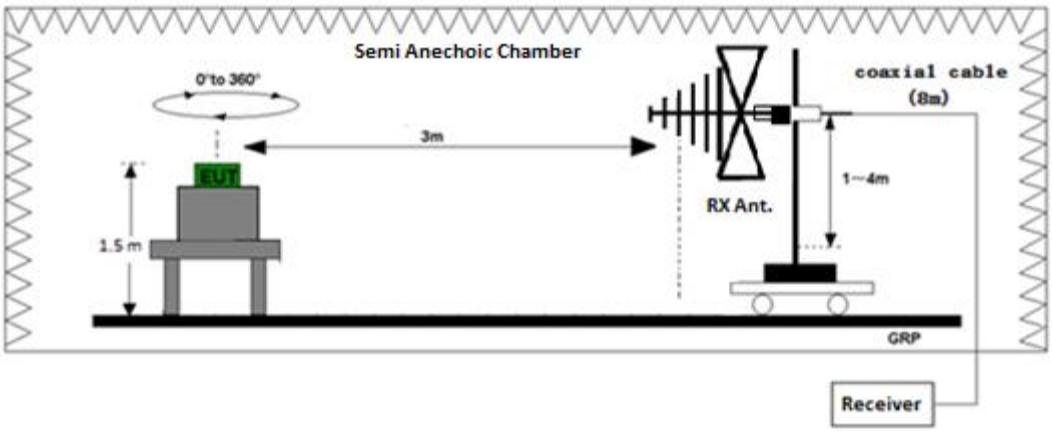
NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100694	Jun. 03, 2023	June 02, 2024
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 03, 2023	June 02, 2024
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-D69250	May 11, 2023	May 10, 2025
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

TEST SETUP:

FREQUENCY RANGE (9KHZ-30MHZ)



FREQUENCY RANGE (ABOVE 30MHZ)



TEST PROCEDURE:

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:

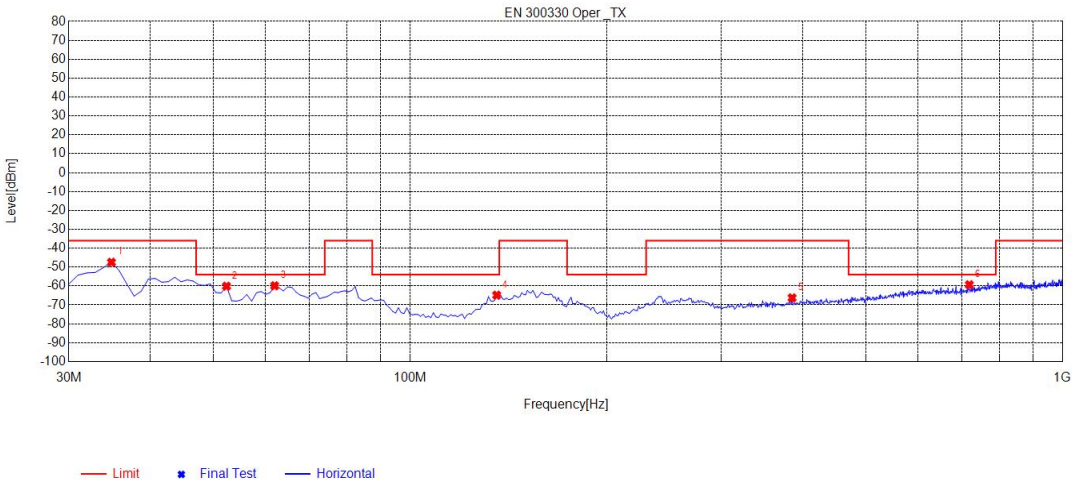
(1) Corrected Power (dBm) = Total Factor + Reading Level

(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.

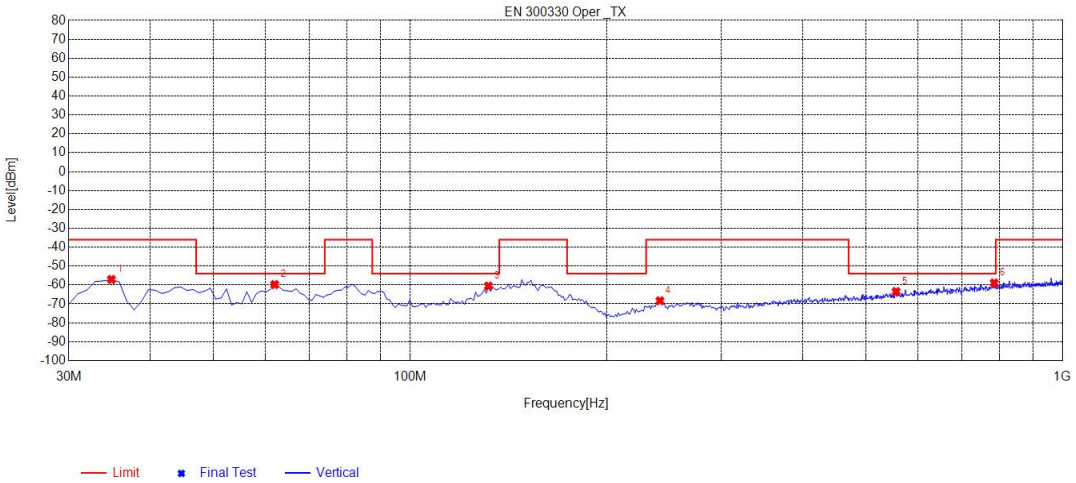
FREQUENCY RANGE (ABOVE 30MHZ)

EUT OPERATION MODE – HORIZONTAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	34.85	-82.22	-47.46	-36.00	11.46	34.76	70	Horizontal
2	52.31	-93.10	-60.11	-54.00	6.11	32.99	20	Horizontal
3	62.01	-90.23	-59.89	-54.00	5.89	30.34	240	Horizontal
4	135.73	-93.43	-64.87	-54.00	10.87	28.56	110	Horizontal
5	385.02	-100.33	-66.28	-36.00	30.28	34.05	80	Horizontal
6	719.67	-100.13	-59.36	-54.00	5.36	40.77	70	Horizontal

EUT OPERATION MODE – VERTICAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	34.85	-83.27	-57.06	-36.00	21.06	26.21	190	Vertical
2	62.01	-90.44	-59.76	-54.00	5.76	30.68	340	Vertical
3	131.85	-94.41	-60.57	-54.00	6.57	33.84	270	Vertical
4	241.46	-97.45	-68.36	-36.00	32.36	29.09	60	Vertical
5	555.74	-101.19	-63.51	-54.00	9.51	37.68	260	Vertical
6	785.63	-101.02	-58.92	-54.00	4.92	42.10	140	Vertical

6.4 ETSI EN 300 330 Subclasses 4.4.2: Receiver spurious radiation

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100694	Jun. 03, 2023	June 02, 2024
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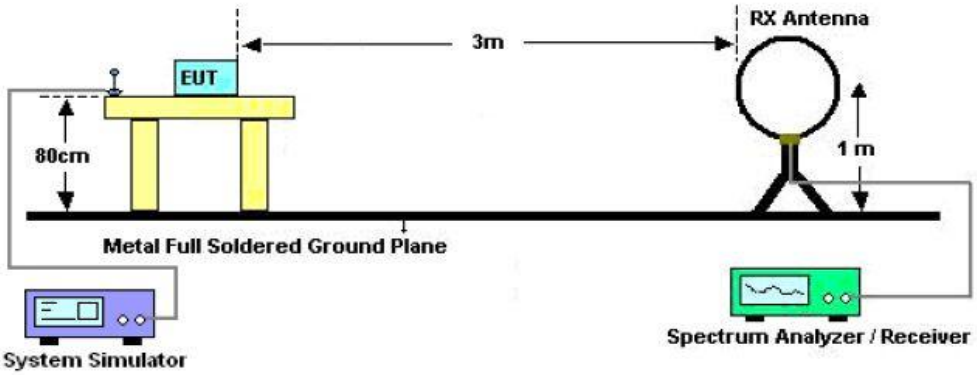
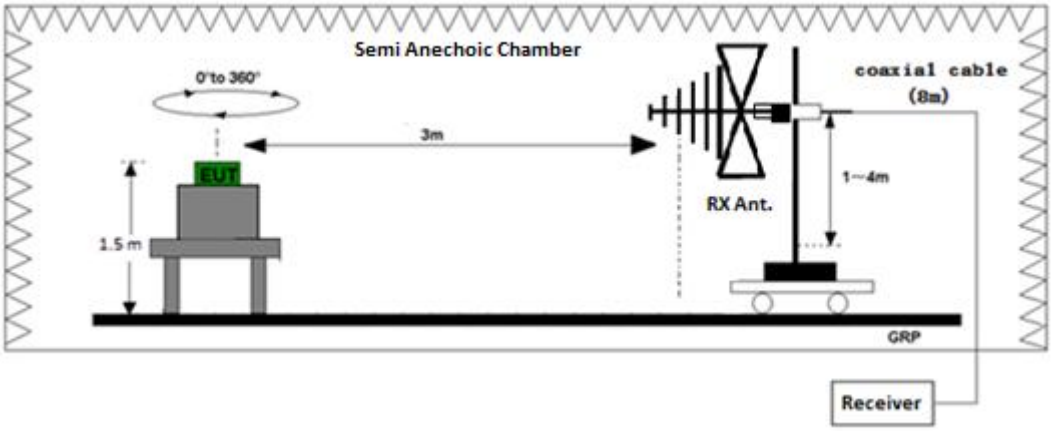
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-D69250	May 11, 2023	May 10, 2025
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

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:

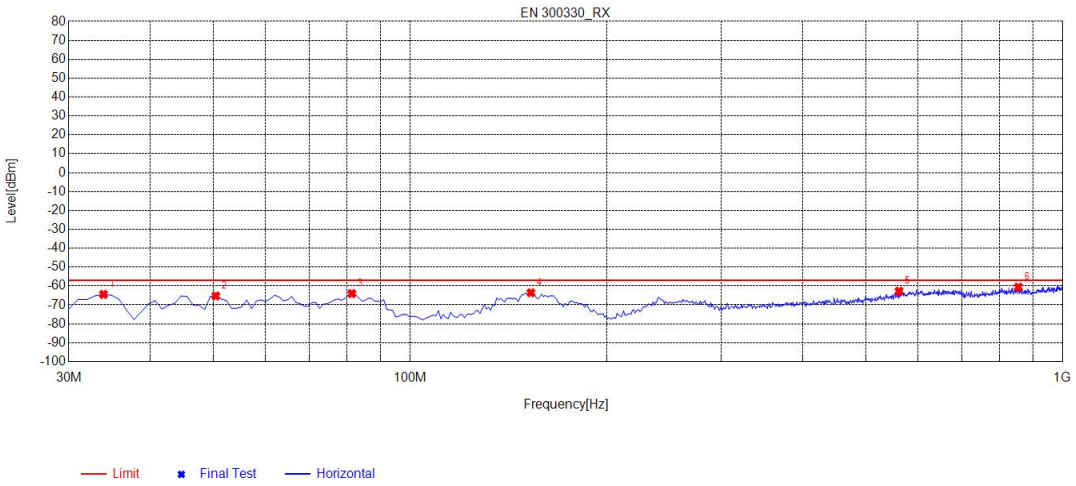
(1) Corrected Power (dBm) = Total Factor + Reading Level

(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.

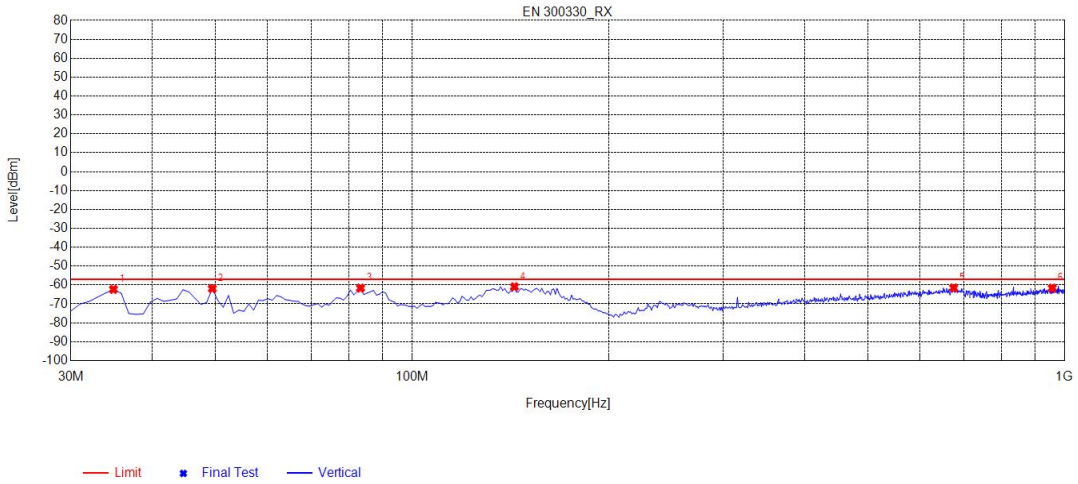
FREQUENCY RANGE (ABOVE 30MHZ)

EUT OPERATION MODE – HORIZONTAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	33.88	-99.15	-64.44	-57.00	7.44	34.71	330	Horizontal
2	50.37	-98.83	-65.28	-57.00	8.28	33.55	270	Horizontal
3	81.41	-90.46	-63.99	-57.00	6.99	26.47	20	Horizontal
4	153.19	-92.89	-63.56	-57.00	6.56	29.33	320	Horizontal
5	561.56	-101.28	-62.78	-57.00	5.78	38.50	310	Horizontal
6	855.47	-103.77	-60.62	-57.00	3.62	43.15	140	Horizontal

EUT OPERATION MODE – VERTICAL



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	34.85	-88.53	-62.32	-57.00	5.32	26.21	290	Vertical
2	49.4	-91.62	-61.91	-57.00	4.91	29.71	160	Vertical
3	83.35	-90.13	-61.65	-57.00	4.65	28.48	40	Vertical
4	143.49	-95.08	-60.93	-57.00	3.93	34.15	140	Vertical
5	676.02	-101.60	-61.55	-57.00	4.55	40.05	20	Vertical
6	957.32	-105.56	-61.67	-57.00	4.67	43.89	20	Vertical

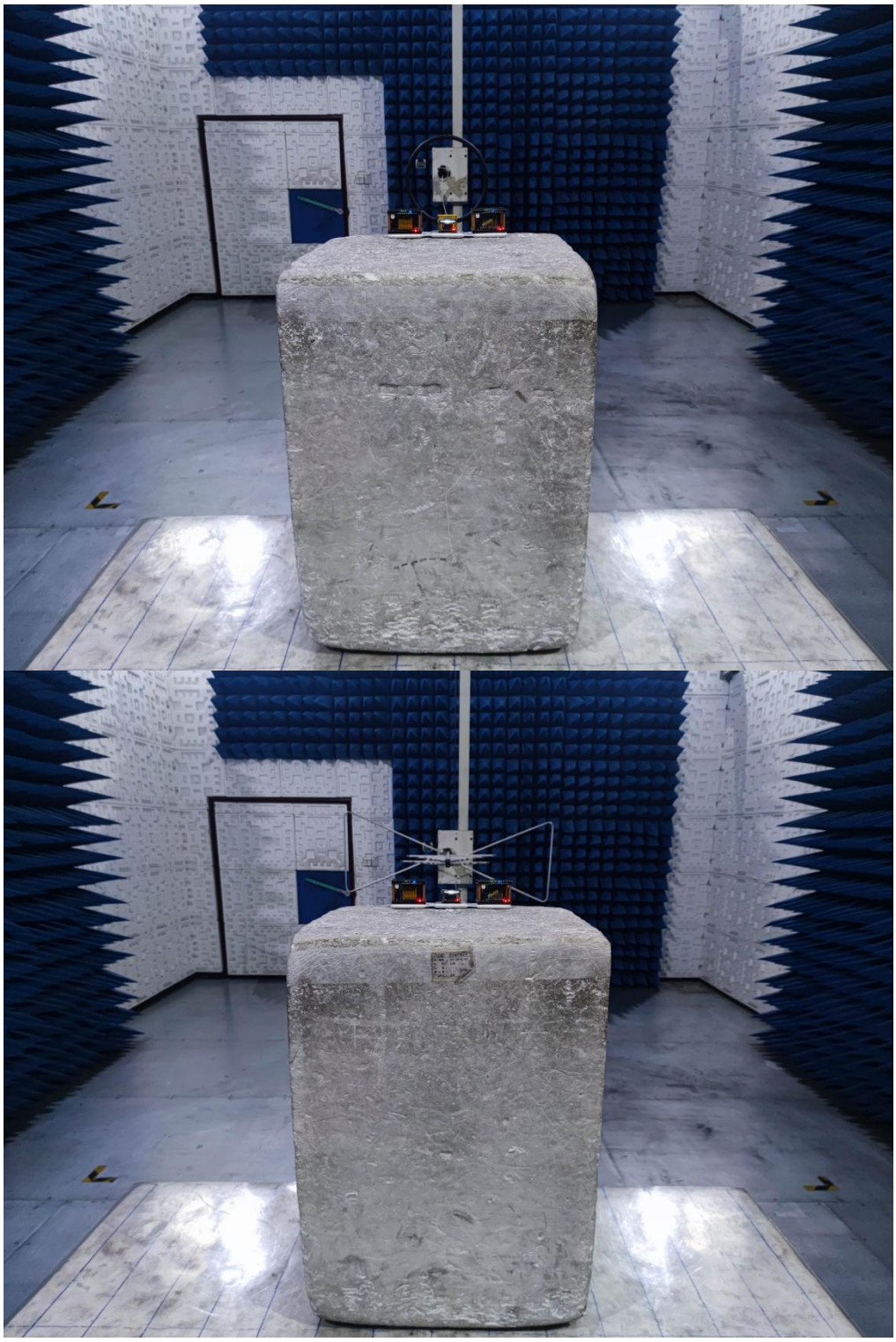
7. ETSI EN 300 330 V2.1.1: INTERPRETATION OF MEASUREMENT RESULTS

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 I PHOTOGRAPHS OF TEST SETUP



APPENDIX II PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC05443231016AP01

----END OF REPORT----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

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RF Test Report

Report No.: AGC05443231016ER02

PRODUCT DESIGNATION	:	Magnetic wireless charger
BRAND NAME	:	N/A
MODEL NAME	:	MO2145
APPLICANT	:	MID OCEAN BRANDS B.V
DATE OF ISSUE	:	Nov. 03, 2023
STANDARD(S)	:	ETSI EN 303 417 V1.1.1(2017-09)
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 03, 2023	Valid	Initial Release

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Manufacturer	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Factory	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Product Designation	Magnetic wireless charger
Brand Name	N/A
Test Model	MO2145
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Oct. 16, 2023
Date of test	Oct. 16, 2023~Nov. 03, 2023
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-RF

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

Prepared By	Cici Li (Project Engineer)	Nov. 03, 2023
Reviewed By	Calvin Liu (Reviewer)	Nov. 03, 2023
Approved By	Max Zhang (Authorized Officer)	Nov. 03, 2023

2. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

Hardware Version	V1.0
Software Version	V1.0
Frequency Band	110KHz-205KHz
OCW	Energy transmission: Low channel 0.836KHz, Middle Channel 0.821kHz, High channel 0.877KHz Data communication: 0.862KHz
Test Channels	Energy transmission: Low channel 124.4KHz, Middle Channel 143.8kHz, High channel 161.0KHz Data communication: 143.8KHz
Antenna Type	Coil Antenna
Operational Mode	Mode 1: base station in stand-by, idle mode Mode 3: communication Mode 4: energy transmission
Power Supply	Input: DC 9V/3A, 9V/2.22A, 5V/2A
Wireless Charging Output Power	WPT 1: 5W/7.5W/10W/15W (Max) WPT 2: 5W (Max) WPT 3: 2.5W (Max)

NOTE: 1. For more information, please refer to User's Manual.

2. During the initial establishment of the charging mode (mode 2), no or very low emission occur (below the sensitivity level of the test set-up), so the mode 2 can be assumed as irrelevant for the test.

3. Mode 3 and mode 4 have been performed within one set-up, worst-case alignment. But each mode have been tested separately with specific test software.

4. The maximum temperature of 40 is not a standard requirement and is measured according to the maximum service temperature stated by the manufacturer.

3. DESCRIPTION OF TEST ITEMS

Harmonised Standard ETSI EN 303 417		
Requirement		Requirement Conditionality
No	Description	
1	Permitted range of operating frequencies	☒ Applicable ☐ Not Applicable
2	Operating frequency ranges	☒ Applicable ☐ Not Applicable
3	H-field requirements	☒ Applicable ☐ Not Applicable
4	Transmitter spurious emissions	☒ Applicable ☐ Not Applicable
5	Transmitter out of band (OOB) emissions	☒ Applicable ☐ Not Applicable
6	WPT system unwanted conducted emissions	☐ Applicable ☒ Not Applicable
7	Receiver blocking	☒ Applicable ☐ Not Applicable

4. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

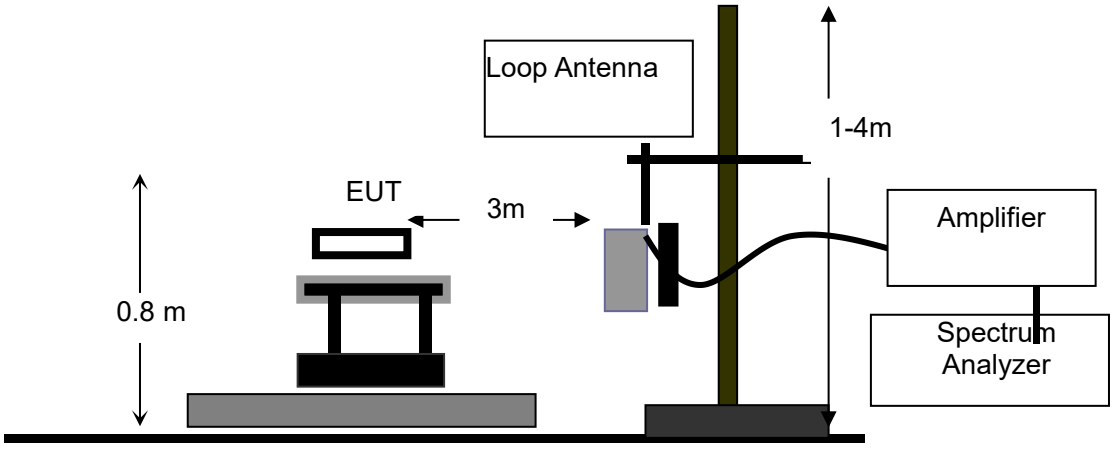
5. ETSI EN 303 417 REQUIREMENT

5.1 TRANSMITTER H-FIELD REQUIREMENTS

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
Power amplifer	AR	75A250	18464	N/A	N/A
Active loop antenna(9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

TEST SETUP:



TEST LIMITS:

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.

According to EN 303 417 Tablet 3,

Table 3: H-field limits

Frequency range [MHz]	H-field strength limit [dBµA/m at 10 m]	Comments
0,019 ≤ f < 0,021	72	
0,059 ≤ f < 0,061	69,1 descending 10 dB/dec above 0,059 MHz	See note 1
0,079 ≤ f < 0,090	67,8 descending 10 dB/dec above 0,079 MHz	See note 2
0,100 ≤ f < 0,119	42	
0,119 ≤ f < 0,135	66 descending 10 dB/dec above 0,119 MHz	See note 1
0,135 ≤ f < 0,140	42	
0,140 ≤ f < 0,1485	37,7	
0,1485 ≤ f < 0,30	-5	
6,765 ≤ f < 6,795	42	
NOTE 1: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz and 129,1 kHz ± 500 Hz. NOTE 2: At the time of preparation of the present document the feasibility of increased limits for high power wireless power transmission systems to charge vehicles [i.4] was prepared. New specific requirements for such systems (e.g. higher H-field emission limits in the 79 - 90 kHz band) will be reflected within a future revision of the present document.		

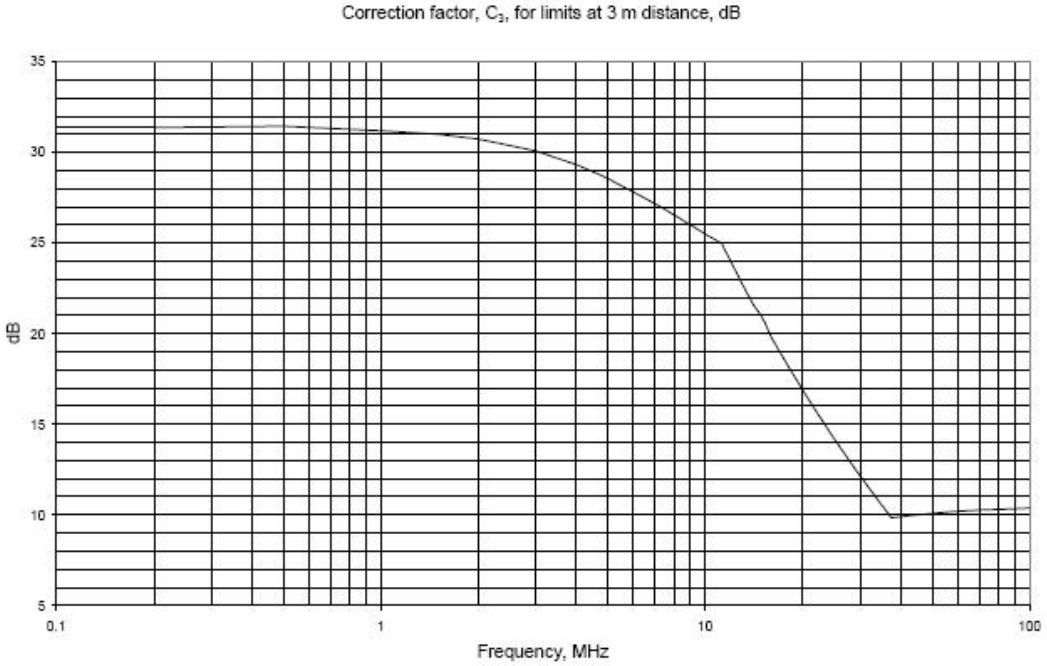


Figure F.2: Conversion factor C_3 versus frequency

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 Table 11.
The EUT operate with modulation under normal and extreme conditions.

TEST RESULTS:

Test Mode: Mode 1

Extreme conditions state

conditions	Test Temp	Test Volt.(V)	Note
TN/VN	25℃	12.00	Worst case
TL/VL	-10℃	10.80	
TH/VL	45℃	10.80	
TL/VH	-10℃	13.20	
TH/VH	45℃	13.20	

Test results tested at 3m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1438	23.53	-0.25	23.28	68.90

Test results calculated to 10m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1438	23.53	-31.45	-7.92	37.70

Test Mode: Mode 3

Extreme conditions state

conditions	Test Temp	Test Volt.(V)	Note
TN/VN	25℃	12.00	Worst case
TL/VL	-10℃	10.80	
TH/VL	45℃	10.80	
TL/VH	-10℃	13.20	
TH/VH	45℃	13.20	

Test results tested at 3m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1438	23.53	2.87	26.40	62.40

Test results calculated to 10m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1438	23.53	-28.33	-4.80	31.20

Test Mode: Mode 4

Extreme conditions state

conditions	Test Temp	Test Volt.(V)	Note
TN/VN	25℃	12.00	Worst case
TL/VL	-10℃	10.80	
TH/VL	40℃	10.80	
TL/VH	-10℃	13.20	
TH/VH	40℃	13.20	

Test results tested at 3m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1244	23.53	1.67	25.20	97.01
0.1438	23.53	2.35	25.88	68.90
0.1610	23.53	-8.36	15.17	26.20

Test results calculated to 10m test sites:

Freq.	Antenna Factor	Reading Level	Corrected Level	Limit
(MHz)	(dB/m)	(dBuA)	(dBuA/m)	(dBuA/m)
0.1244	23.53	-29.53	-6.00	65.81
0.1438	23.53	-28.85	-5.32	37.70
0.161	23.53	-39.56	-16.03	-5.00

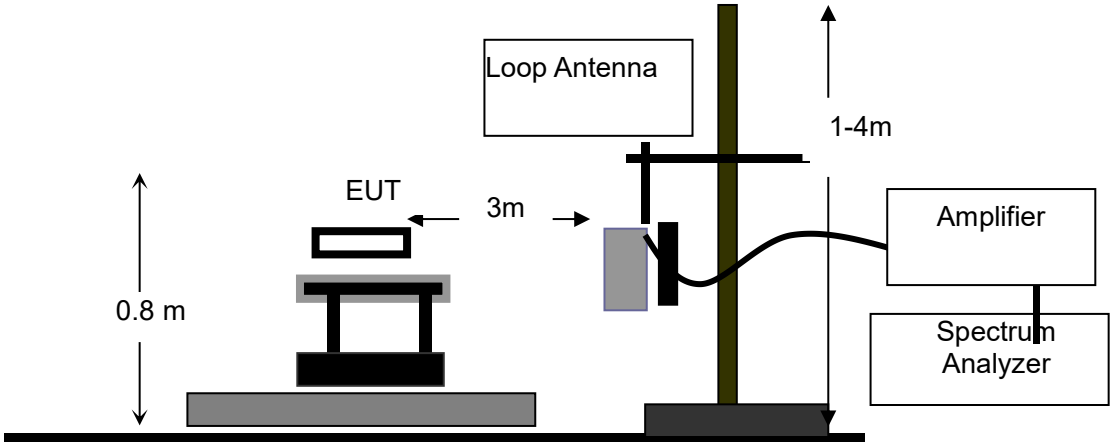
Remark:
(1) Corrected Level (dBuA/m) = Reading Level + Antenna Factor
(2) For the calculated method, please refer to Annex F at EN 300330.
(3) All extreme conditions were considered for test, but only record the worst case.

5.2 OPERATING FREQUENCY RANGES

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
Power amplifer	AR	75A250	18464	N/A	N/A
Active loop antenna(9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

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=VBW=200Hz, Span=5kHz, Detector=RMS. The 99 % OBW function shall be used to determine the operating frequency range, fH is the frequency of the upper marker resulting from the OFR, fL is the frequency of the lower marker resulting from the OFR.

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

LIMITS

The operating frequency range for emissions shall be within one of the following limits: 19 - 21 kHz, 59 - 61 kHz, 79 - 90 kHz, 100 - 300 kHz, 6 765 - 6 795 kHz.

TEST RESULT

Test Mode: Mode 1

Frequency Range Test Result

Test Temperature	Test Voltage (V DC)	Lowest Frequency(KHz)	Highest Frequency (KHz)	Limit
-10℃	13.20	143.561	144.039	100kHz≤&≤300kHz
	10.80	143.562	144.040	100kHz≤&≤300kHz
25℃	12.00	143.558	144.043	100kHz≤&≤300kHz
45℃	13.20	143.562	144.040	100kHz≤&≤300kHz
	10.80	143.562	144.040	100kHz≤&≤300kHz
OFR		0.485kHz		
Results		PASS		

Test Mode: Mode 3

Frequency Range Test Result

Test Temperature	Test Voltage (V DC)	Lowest Frequency(KHz)	Highest Frequency (KHz)	Limit
-10℃	13.20	143.314	144.284	100kHz≤&≤300kHz
	10.80	143.316	144.286	100kHz≤&≤300kHz
25℃	12.00	143.314	144.287	100kHz≤&≤300kHz
40℃	13.20	143.316	144.284	100kHz≤&≤300kHz
	10.80	143.315	144.283	100kHz≤&≤300kHz
OFR		0.973kHz		
Results		PASS		

Test Mode: Mode 4

Frequency Range Test Result

Test Temperature	Test Voltage (V DC)	Lowest Frequency(KHz)	Highest Frequency (KHz)	Limit
-10℃	13.20	128.119	164.179	100kHz≤&≤300kHz
	10.80	128.119	164.180	100kHz≤&≤300kHz
25℃	12.00	128.119	164.181	100kHz≤&≤300kHz
40℃	13.20	128.120	164.178	100kHz≤&≤300kHz
	10.80	128.123	164.180	100kHz≤&≤300kHz
OFR		36.062kHz		
Results		PASS		

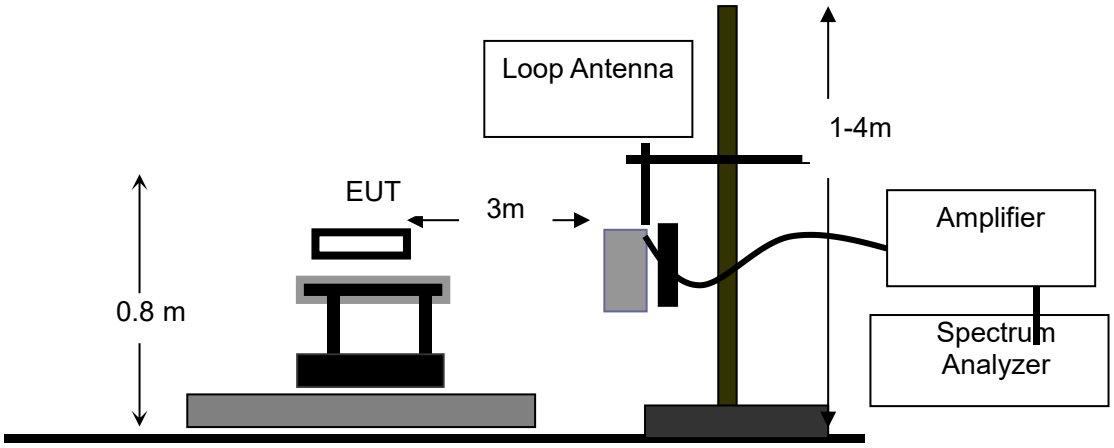
NOTE: *All the modes had been tested, but only the worst data recorded in the report.*

5.3TRANSMITTER OUT OF BAND (OOB) EMISSIONS

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
Power amplifer	AR	75A250	18464	N/A	N/A
Active Loop Antenna (9K-30Mhz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024

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=VBW=200Hz, Span=5KHz, Detector=RMS. The 99 % OBW function shall be used to determine the operating frequency range, fH is the frequency of the upper marker resulting from the OFR, fL is the frequency of the lower marker resulting from the OFR.

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

LIMITS

The OOB limits are visualized in figures; they are descending from the intentional limits from Table 3 at fH/fL with 10 dB/decade.

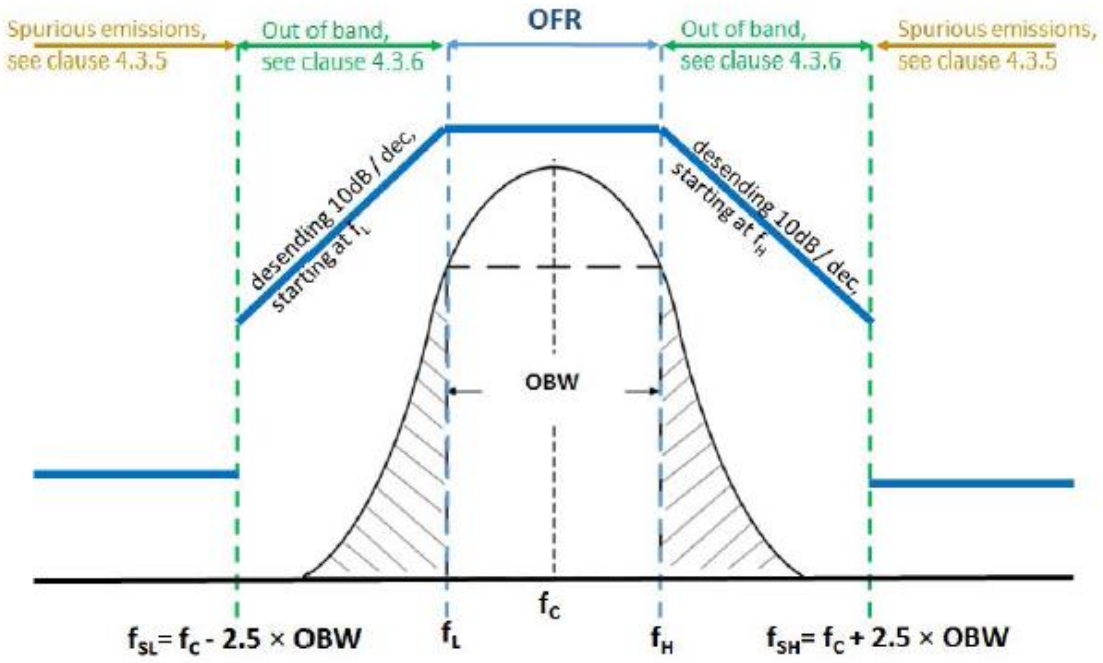


Figure 4: Out of band and spurious domain of a single frequency WPT system

TEST RESULT

Test Mode: Mode 1

Frequency range (KHz)		Maximum level @10m (dBuA/m)	Limit @ 10m (dBuA/m)	Result
fSL -fL	142.588 to 143.558	Less than -17.08	See figure 4	Pass
fL	143.558	-17.08	37.70	Pass
fH	144.043	-17.60	37.70	Pass
fH - fSH	144.043 to 145.013	Less than -17.6	See figure 4	Pass

Test Mode: Mode 3

Frequency range (KHz)		Maximum level @10m (dBuA/m)	Limit @ 10m (dBuA/m)	Result
fSL-fL	141.368 to 143.314	Less than -13.96	See figure 4	Pass
fL	143.314	-13.96	31.20	Pass
fH	144.287	-14.48	31.20	Pass
fH-fSH	144.287 to 146.233	Less than -14.48	See figure 4	Pass

Test Mode: Mode 4

Frequency range (KHz)		Maximum level @10m (dBuA/m)	Limit @ 10m (dBuA/m)	Result
fSL-fL	121.995 to 123.919	Less than -15.16	See figure 4	Pass
fL	123.919	-15.16	65.81	Pass
fH	161.481	-25.71	-5.00	Pass
fH-fSH	161.481 to 163.405	Less than -25.71	See figure 4	Pass

NOTE: *All the modes had been tested, but only the worst data recorded in the report.*

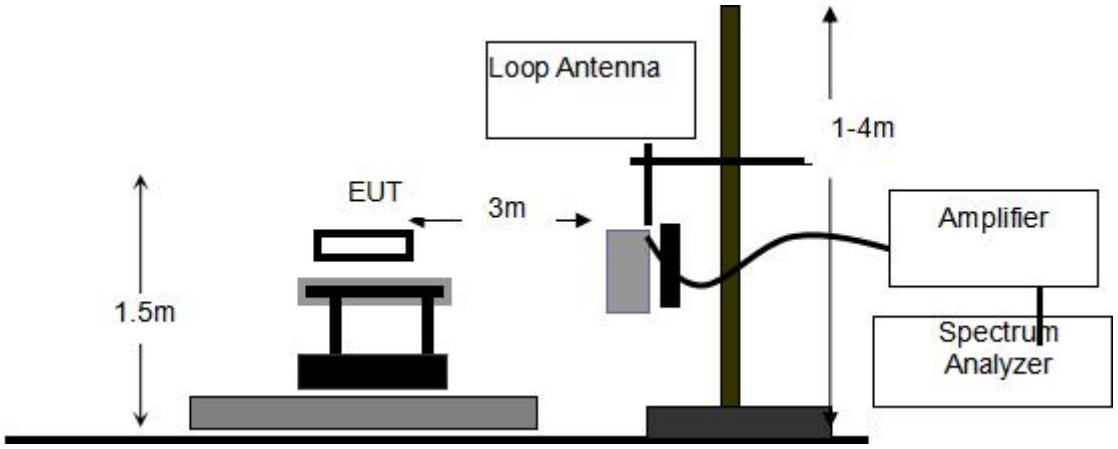
5.4TRANSMITTER SPURIOUS EMISSIONS

MEASUREMENT EQUIPMENT USED:

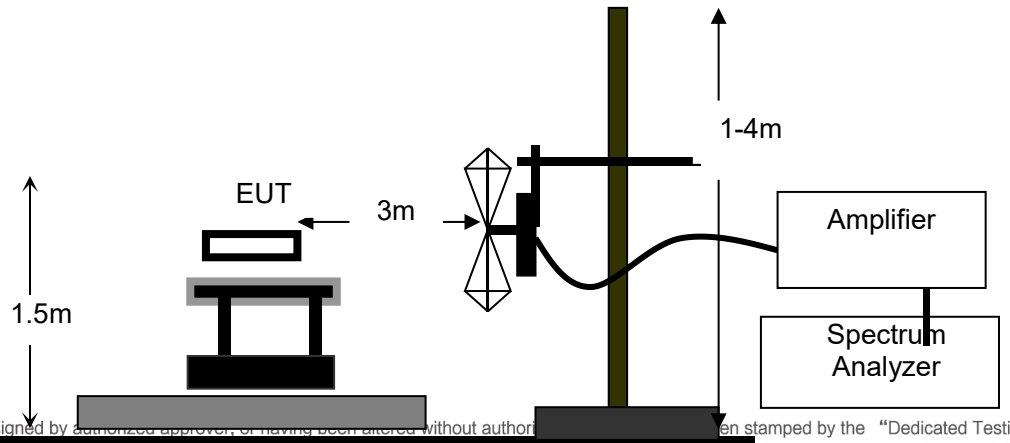
NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
Power amplifer	AR	75A250	18464	N/A	N/A
Active Loop Antenna (9K-30Mhz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Wideband Antenna	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025

TEST SETUP:

FREQUENCY RANGE (9KHZ-30MHZ)

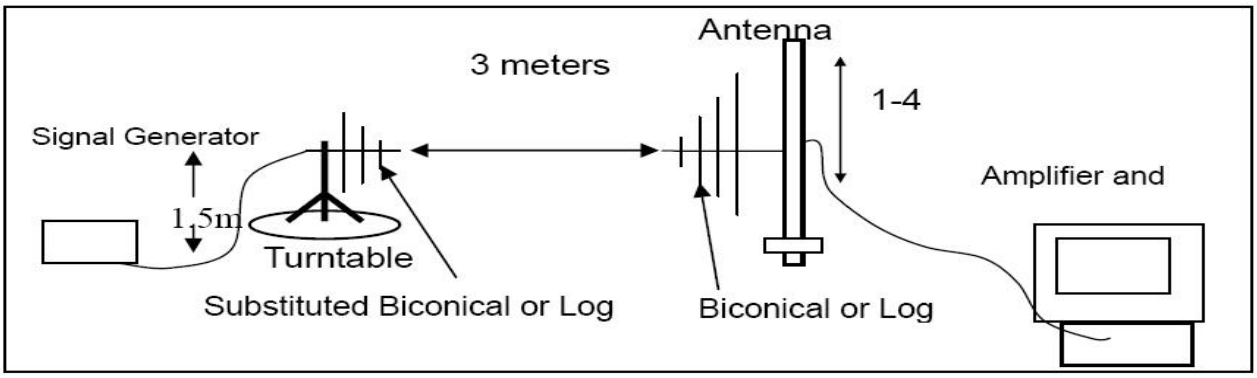


FREQUENCY RANGE (ABOVE 30MHZ)



SUBSTITUTION METHOD:

RADIATED BELOW 1GHZ



TEST PROCEDURE:

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

The EUT was placed on the top of an insulating table 1.5 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 Table 1.

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

Table 4

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

Table 5

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	250 nW
Standby	2 nW	2 nW
NOTE: "Operating" means mode 2, 3 and 4 according to Table 2; "standby" means mode 1 according to Table 2.		

TEST LIMITS & RESULT

Test Mode: Mode 3
FREQUENCY RANGE (9KHZ-30MHZ)

Operation Mode					
Frequency	Reading level	Total Factor	Emission level	Limit	Margin
(MHz)	(dB μA)	(dB/m)	(dB μA/m)	(dBμA/m)	(dBμA/m)
0.029	-7.94	-7.96	-15.90	21.98	37.87
0.233	-11.15	-7.96	-19.11	12.86	31.97
0.753	-12.56	-7.96	-20.52	7.77	28.29
1.860	-14.69	-3.98	-18.67	3.85	22.52
2.854	-13.09	-3.09	-16.18	1.99	18.17
3.187	-12.81	-1.25	-14.06	1.51	15.57

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)

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuv/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
76.86	28.41	V	-63.52	0.04	-0.90	-64.46	-36.00	28.46
234.44	29.12	V	-70.50	0.11	6.60	-64.01	-36.00	28.01
381.46	28.08	V	-70.45	0.28	6.49	-64.24	-36.00	28.24
387.54	29.30	V	-69.43	0.29	6.43	-63.29	-36.00	27.29
422.81	27.05	V	-73.86	0.33	7.06	-67.13	-36.00	31.13
827.66	31.66	V	-67.25	0.66	6.45	-61.46	-36.00	25.46
140.07	31.00	H	-62.20	0.05	0.00	-62.25	-36.00	26.25
339.24	31.84	H	-67.72	0.23	5.74	-62.21	-36.00	26.21
397.92	29.14	H	-70.32	0.30	6.54	-64.08	-36.00	28.08
459.83	28.40	H	-71.88	0.37	6.67	-65.58	-36.00	29.58
613.40	31.35	H	-68.15	0.50	6.62	-62.03	-54.00	8.03
764.69	31.20	H	-67.90	0.61	6.72	-61.79	-36.00	25.79

Note: 1.The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Mode: Mode 4(The low channel is the worst case)
FREQUENCY RANGE (9KHZ-30MHZ)

Operation Mode					
Frequency	Reading level	Total Factor	Emission level	Limit	Margin
(MHz)	(dB μA)	(dB/m)	(dB μA/m)	(dBμA/m)	(dBμA/m)
0.063	-7.73	-7.96	-15.69	18.58	34.26
0.270	-11.54	-7.96	-19.50	12.23	31.73
0.495	-12.68	-7.96	-20.64	9.60	30.24
2.013	-14.74	-3.98	-18.72	3.50	22.23
3.033	-13.33	-3.09	-16.42	1.72	18.14
4.956	-12.83	-1.25	-14.08	-0.41	13.67

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)

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuv/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
78.00	27.57	V	-64.22	0.04	-0.70	-64.96	-36.00	28.96
238.00	30.21	V	-69.38	0.11	6.60	-62.89	-36.00	26.89
383.33	28.09	V	-71.84	0.28	6.47	-65.65	-36.00	29.65
385.11	28.77	V	-70.11	0.29	6.45	-63.94	-36.00	27.94
422.85	28.15	V	-71.53	0.33	7.06	-64.80	-36.00	28.80
829.66	30.43	V	-68.00	0.66	6.35	-62.31	-36.00	26.31
138.86	31.32	H	-61.78	0.05	0.00	-61.83	-36.00	25.83
340.29	32.67	H	-65.95	0.23	5.70	-60.48	-36.00	24.48
397.19	30.44	H	-69.98	0.30	6.54	-63.74	-36.00	27.74
457.48	29.36	H	-69.79	0.37	6.61	-63.55	-36.00	27.55
616.57	31.43	H	-68.40	0.51	6.74	-62.16	-54.00	8.16
765.23	30.84	H	-69.04	0.61	6.75	-62.90	-36.00	26.90

Note: 1.The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “--” remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that’s already beyond the background noise floor.

Test Mode: Mode 1
FREQUENCY RANGE (9KHZ-30MHZ)

Standby Mode					
Frequency	Reading level	Total Factor	Emission level	Limit	Margin
(MHz)	(dB μA)	(dB/m)	(dB μA/m)	(dBμA/m)	(dBμA/m)
0.067	-7.66	-7.96	-15.62	-3.25	12.37
0.251	-10.41	-7.96	-18.37	-8.96	9.41
0.596	-11.39	-7.96	-19.35	-12.71	6.64
1.742	-23.38	-3.98	-27.36	-17.37	9.99
3.888	-28.08	-3.09	-31.17	-20.86	10.31
5.610	-26.58	-1.25	-27.83	-22.45	5.38

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)

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuv/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
93.19	28.41	V	-66.78	0.04	1.64	-65.18	-57.00	8.18
237.24	30.32	V	-70.32	0.11	6.60	-63.84	-57.00	6.84
312.30	28.82	V	-70.16	0.20	6.34	-64.02	-57.00	7.02
384.68	28.98	V	-69.56	0.28	6.46	-63.39	-57.00	6.39
474.54	28.36	V	-71.89	0.39	6.84	-65.44	-57.00	8.44
829.03	31.37	V	-66.75	0.66	6.35	-61.06	-57.00	4.06
136.46	28.28	H	-65.86	0.05	0.00	-65.91	-57.00	8.91
333.82	30.00	H	-68.30	0.23	5.98	-62.54	-57.00	5.54
395.86	30.88	H	-69.34	0.30	6.50	-63.14	-57.00	6.14
569.00	29.38	H	-70.49	0.47	6.81	-64.15	-57.00	7.15
615.62	28.92	H	-70.97	0.50	6.70	-64.78	-57.00	7.78
815.25	29.12	H	-70.15	0.65	6.95	-63.85	-57.00	6.85

Note: 1.The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

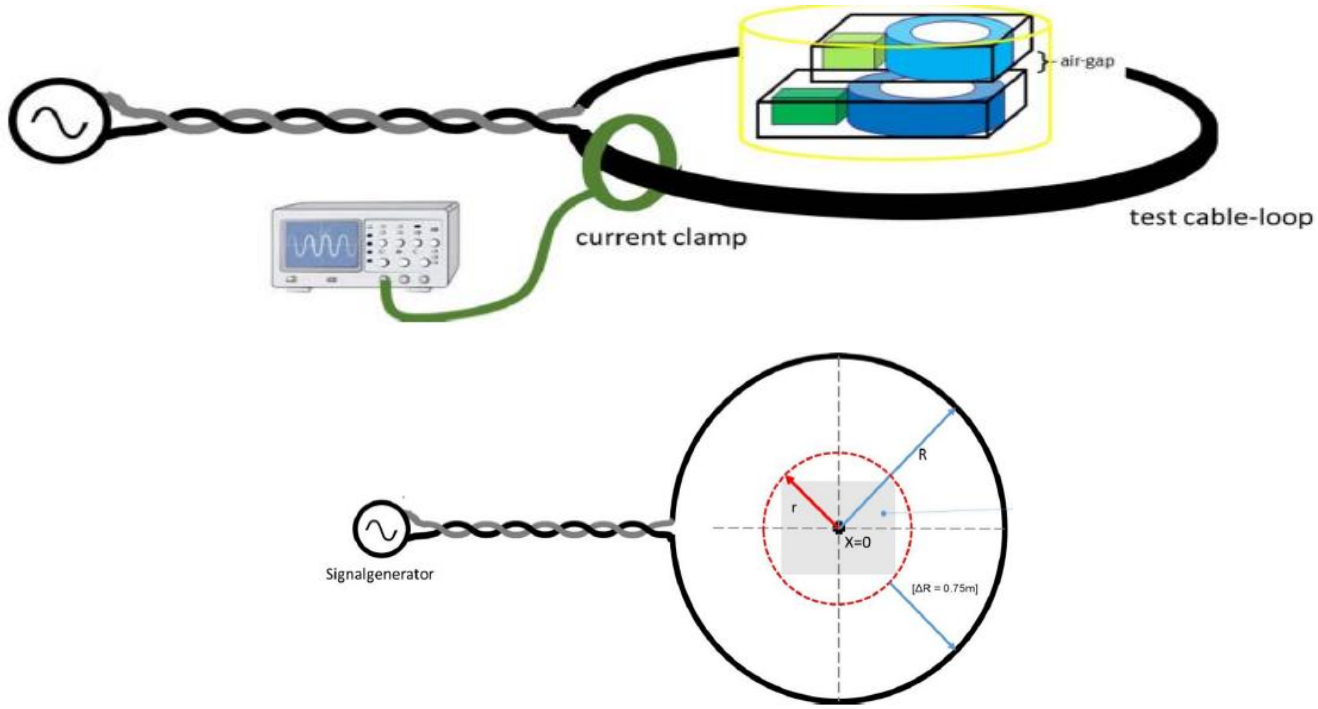
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “--” remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that’s already beyond the background noise floor.

5.5RECEIVER BLOCKING

MEASUREMENT EQUIPMENT USED:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
MXG X-Series Vector Signal Generator	Agilent	N5182B	MY53050647	Mar. 03, 2023	Mar. 02, 2024
Active Loop Antenna (9K-30Mhz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Clamp meter	PROVA	PROVA-11	17200101	Sep. 12, 2022	Sep. 13, 2023
Clamp meter	PROVA	PROVA-11	17200101	Sep. 14, 2023	Sep. 13, 2024

TEST SETUP:



TEST PROCEDURE:

1). The test shall be carried out inside a test chamber according to clauses C.1.1 and C.1.2 in ETSI EN 300 330

2). A test loop with a radius r shall be used to create the magnetic field; the test loop shall lie on a non-metallic ground and the minimum distance to metallic objects (e.g. ground plane) shall be 0,75 m.The EUT shall be placed to the centre of the test-loop

3).The test loop shall be sufficiently large so that the test loop itself does not influence the WPT system; The radius R of the test-loop shall be in minimum ΔR = 0,75 m larger than the maximum dimension r of the EUT.

$$R >= r + \Delta R.$$

The maximum H-Field can be calculated from the loop current I (into the test-loop) with the following formula:

H=I/2R

4)The required output current to achieve the required magnetic field at the WPT system shall be generated with a signal generator (unmodulated signal) at the test frequencies. For each test frequency the "reaction" of the device shall be recorded and checked against the performance criterion

LIMITS

The EUT shall achieve the wanted performance criterion, in the presence of the blocking signal.

Table 6: Receiver blocking limits

	In-band signal	OOB signal	Remote-band signal
Frequency	Centre frequency (f_c) of the WPT system (see clause 4.3.3)	$f = f_c \pm F$ (see note)	$f = f_c \pm 10 \times F$ (see note)
Signal level field strength at the EUT	72 dBµA/m	72 dBµA/m	82 dBµA/m
NOTE: F = OFR see clause 4.3.3.			

TEST RESULT

Test Mode: Mode 1

Test Frequency(KHz)		Signal level @ EUT	Performance	Result
In-band signal	143.800	72dBuA/m	No function loss	Pass
OOB signal	143.315	72dBuA/m	No function loss	Pass
	144.285	72dBuA/m	No function loss	Pass
Remote-band signal	138.950	82dBuA/m	No function loss	Pass
	148.650	82dBuA/m	No function loss	Pass

Test Mode: Mode 3

Test Frequency(KHz)		Signal level @ EUT	Performance	Result
In-band signal	143.800	72dBuA/m	No function loss	Pass
OOB signal	142.827	72dBuA/m	No function loss	Pass
	144.773	72dBuA/m	No function loss	Pass
Remote-band signal	134.070	82dBuA/m	No function loss	Pass
	153.530	82dBuA/m	No function loss	Pass

6. 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

P.S. Uncertainty figures are valid to confidence level of 95% calculated according to the methods described in the ETSI TR 100 028.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

APPENDIX B: PHOTOGRAPHS OF THE EUT

Refer to the Report No.: AGC05443231016AP01

----END OF REPORT---

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

Health Test Report

Report No.: AGC05443231016EH01

PRODUCT DESIGNATION	:	Magnetic wireless charger
BRAND NAME	:	N/A
MODEL NAME	:	MO2145
APPLICANT	:	MID OCEAN BRANDS B.V
DATE OF ISSUE	:	Nov. 03, 2023
STANDARD(S)	:	EN IEC 62311:2020 EN 50665:2017
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 03, 2023	Valid	Initial release

TABLE OF CONTENTS

1. GENERAL INFORMATION

Applicant	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Manufacturer	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Factory	MID OCEAN BRANDS B.V
Address	Unit 201 2/F,. Laford Centre,838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, Hongkong
Product Designation	Magnetic wireless charger
Brand Name	N/A
Test Model	MO2145
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Oct. 16, 2023
Date of test	Oct. 16, 2023~Nov. 03, 2023
Test Result	Pass

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

Prepared By	Cici Li (Project Engineer)	Nov. 03, 2023
Reviewed By	Calvin Liu (Reviewer)	Nov. 03, 2023
Approved By	Max Zhang (Authorized Officer)	Nov. 03, 2023

2. TECHNICAL INFORMATION

Note: the following data is based on the information by the applicant.

Product Designation	Magnetic wireless charger
Brand Name	N/A
Test Model	MO2145
Hardware Version	V1.0
Software Version	V1.0
Frequency Band	110KHz-205KHz 325kHz-330kHz
Antenna Type	Coil Antenna
Power Supply	Input: DC 9V/3A, 9V/2.22A, 5V/2A
Wireless Charging Output Power	WPT 1: 5W/7.5W/10W/15W (Max) WPT 2: 5W (Max) WPT 3: 2.5W (Max)

Note: For more details, please refer to the user's manual of the EUT.

3. RF EXPOSURE MEASUREMENT

3.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

This generic standard applies to electronic and electrical apparatus for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields and induced and contact current.

NOTE: This standard is intended to cover both intentional and non-intentional radiators. If the equipment complies with the requirements in another relevant standard, e.g. EN 62479 covering low power equipment, then the requirements of this standard (IEC 62311) are considered to be met and the application of this standard to that equipment is not necessary.

3.2 TEST LIMIT

According to EN IEC 62311:2020, Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz).

Annex F Measurement of E and H field

A commonly used probe size is 100 cm^2, also the contribution of the three axes X, Y and Z can be evaluated separately.

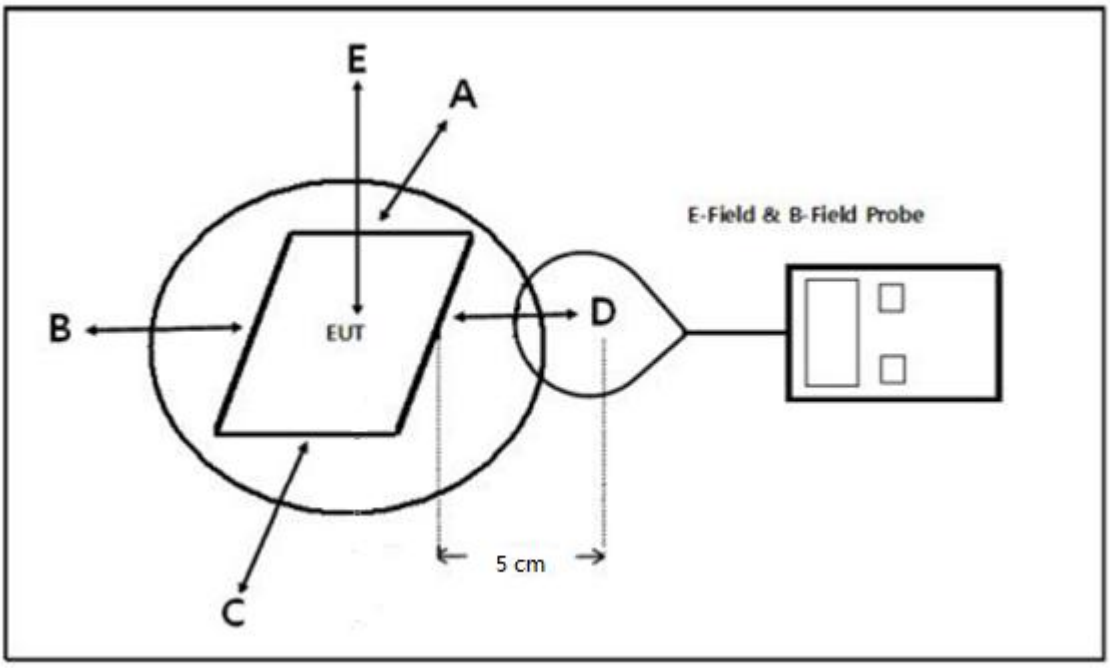
Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m^2)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	4 000/f	5 000/f	—
0,025-0,8 kHz	250/f	4/f	5/f	—
0,8-3 kHz	250/f	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	0,73/f	0,92/f	—
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

3.3 EVALUATION METHODS

Measurement of E and H field

A commonly used probe size is 100 cm^2, also the contribution of the three axes X, Y and Z can be evaluated separately.



Note: Position A: Front of EUT; Position B: Left of EUT; Position C: back of EUT; Position D: Right of EUT; Position E: Top of EUT

Based on the above standard limit, any device with output power below 5A/m cannot produce an exposure exceeding this restriction under the most pessimistic exposure conditions.

4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Broadband Field Meter	WAVECONTROL	SMP2	19SN1101	Feb. 24, 2023	Feb. 23, 2025
Probe FHP	WAVECONTROL	WP400	19WP100558	Feb. 24, 2023	Feb. 23, 2025

5. EUT OPERATION CONDITION

NO.	TEST MODE DESCRIPTION
1	Wireless Full Load Mode
2	Wireless Half Load Mode
3	Wireless Null Load Mode
4	Wireless Full Load Mode with USB-A port
5	Wireless Half Load Mode with USB-A port
6	Wireless Null Load Mode with USB-A port
Note: 1. All modes have been tested and only the worst mode test data recorded in the test report.	

6. TEST RESULT

Frequency	Maximum Radiated H-Field at 5cm		Limit	Result
MHz	A/m		A/m	Pass/Fail
0.1438	position E	0.020	5	Pass
	position A	0.033		
	position B	0.042		
	position C	0.019		
	position D	0.017		

Since Radiated H-Field at worse case is 0.089A/m which cannot exceed the exempt condition, 5A/m. It is deemed to full fit the requirement of RF exposure basic restrisction specified in EC Council Recommendation (1999/519/EC)

Frequency	Maximum Radiated H-Field at 5cm		Limit	Result
MHz	A/m		A/m	Pass/Fail
0.1182	position E	0.047	5	Pass
	position A	0.032		
	position B	0.024		
	position C	0.018		
	position D	0.023		

Since Radiated H-Field at worse case is 0.089A/m which cannot exceed the exempt condition, 5A/m. It is deemed to full fit the requirement of RF exposure basic restrisction specified in EC Council Recommendation (1999/519/EC)

Frequency	Maximum Radiated H-Field at 5cm		Limit	Result
MHz	A/m		A/m	Pass/Fail
0.3265	position E	0.040	5	Pass
	position A	0.018		
	position B	0.023		
	position C	0.040		
	position D	0.042		

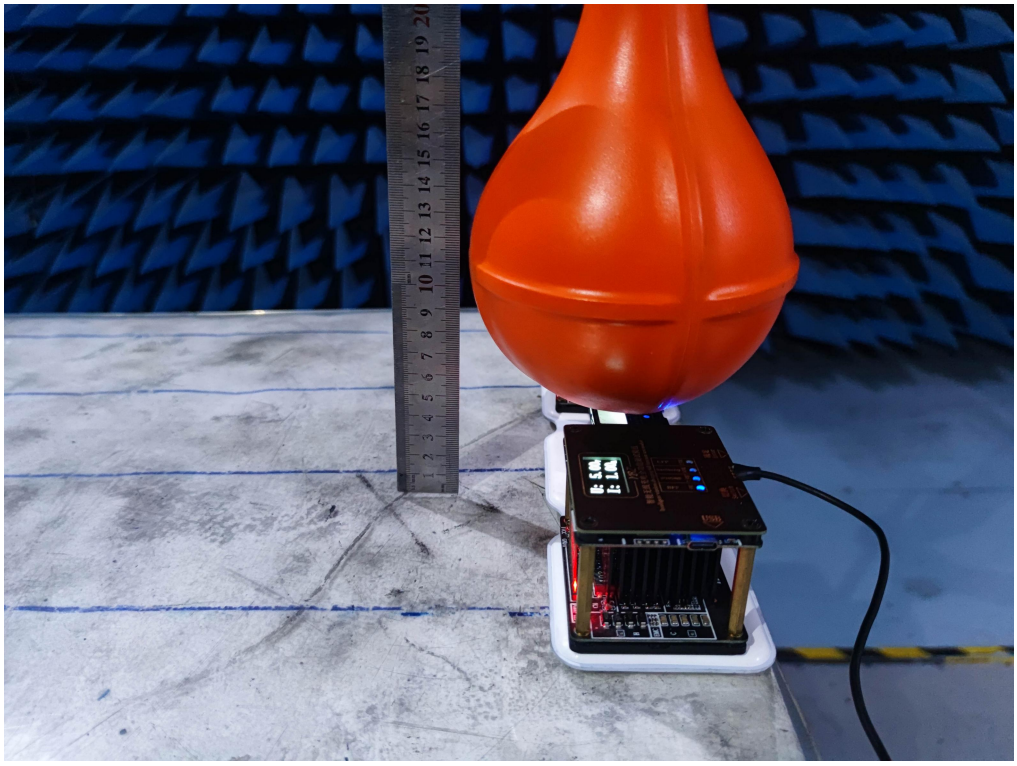
Since Radiated H-Field at worse case is 0.089A/m which cannot exceed the exempt condition, 5A/m. It is deemed to full fit the requirement of RF exposure basic restrisction specified in EC Council Recommendation (1999/519/EC).

7. CONCLUSION

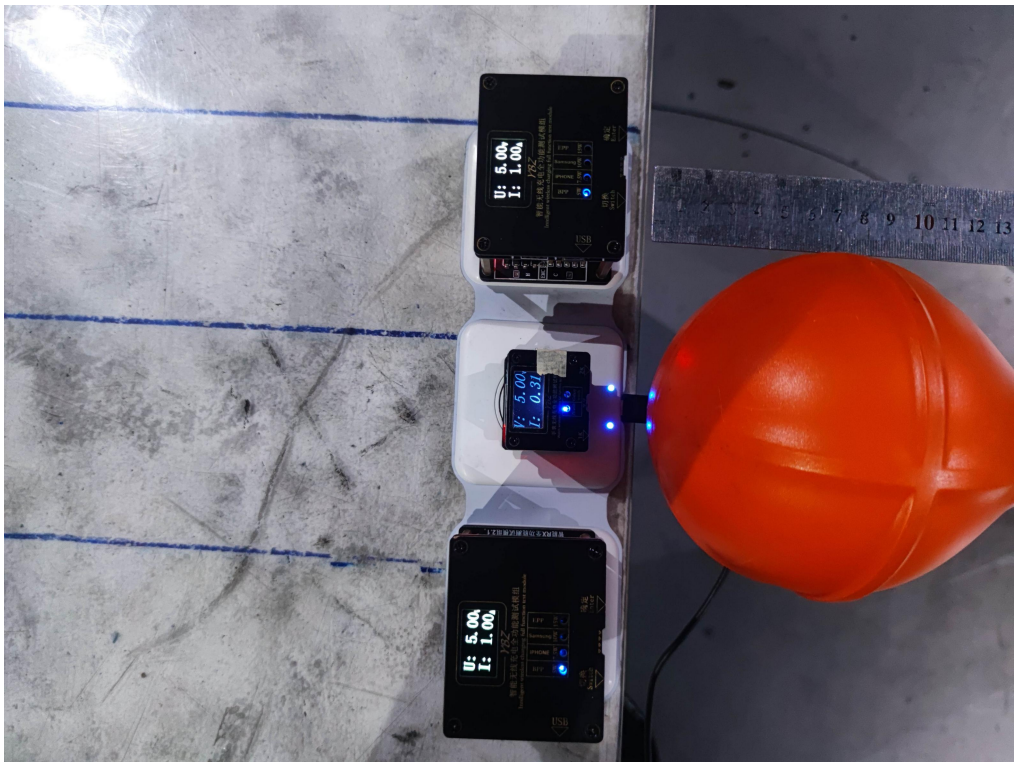
Remark: EUT meets the basic requirements in the standard.

APPENDIX I: PHOTOGRAPHS OF TEST SETUP

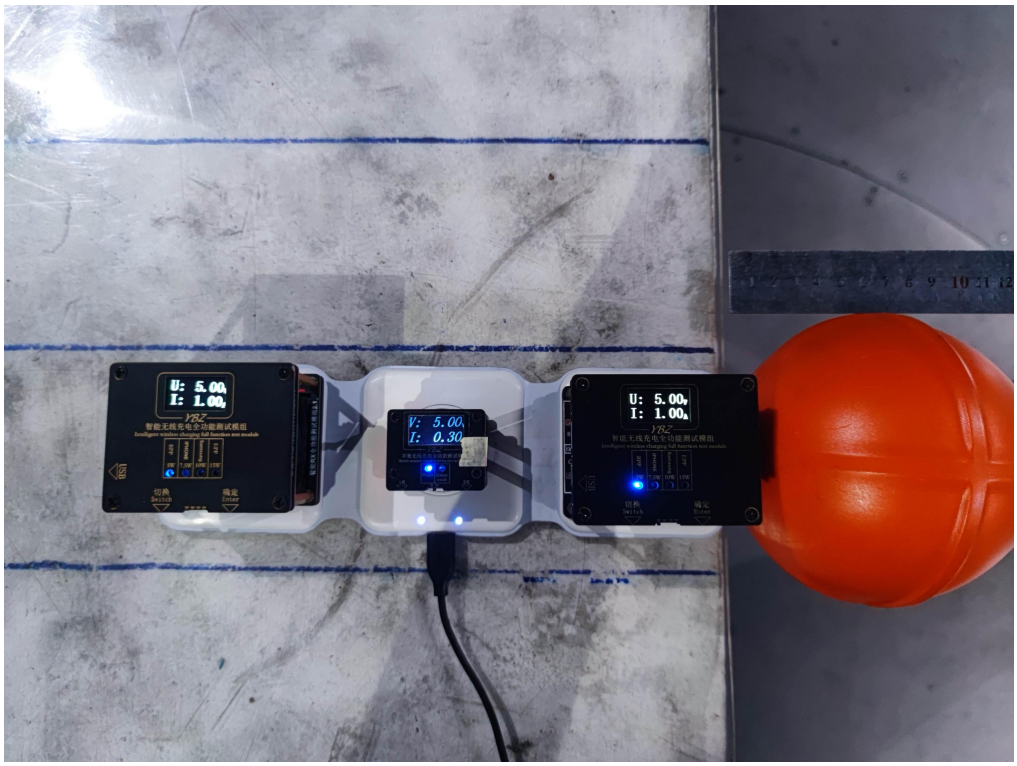
WPT Equipment_ Position E



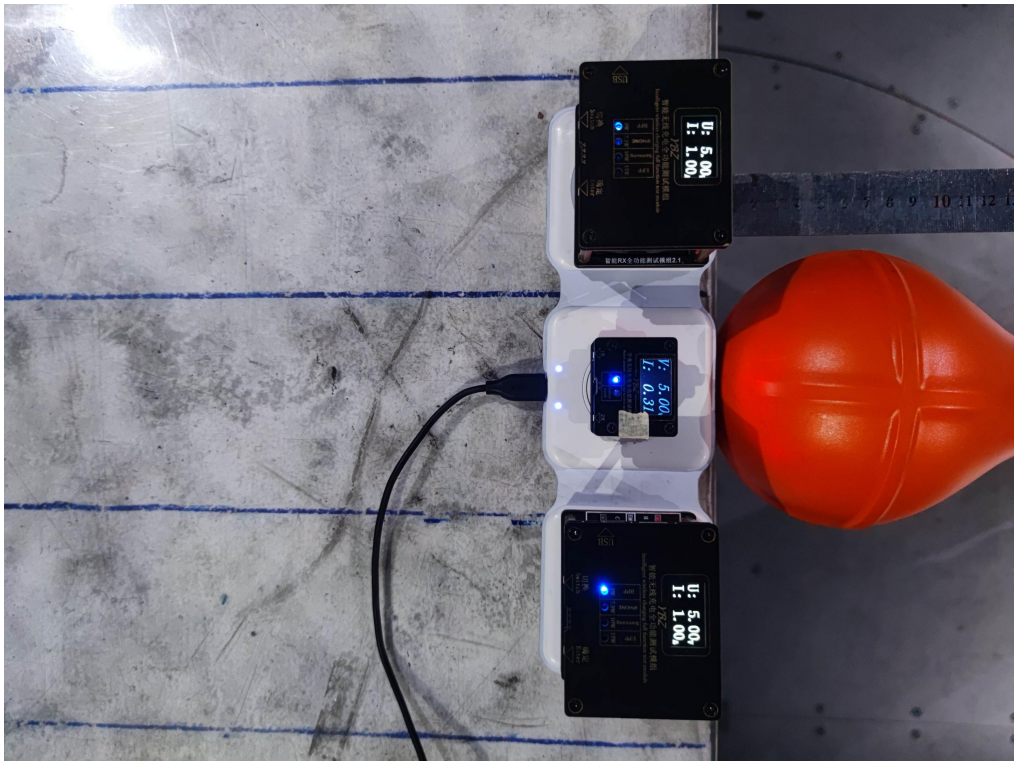
WPT Equipment_ Position A



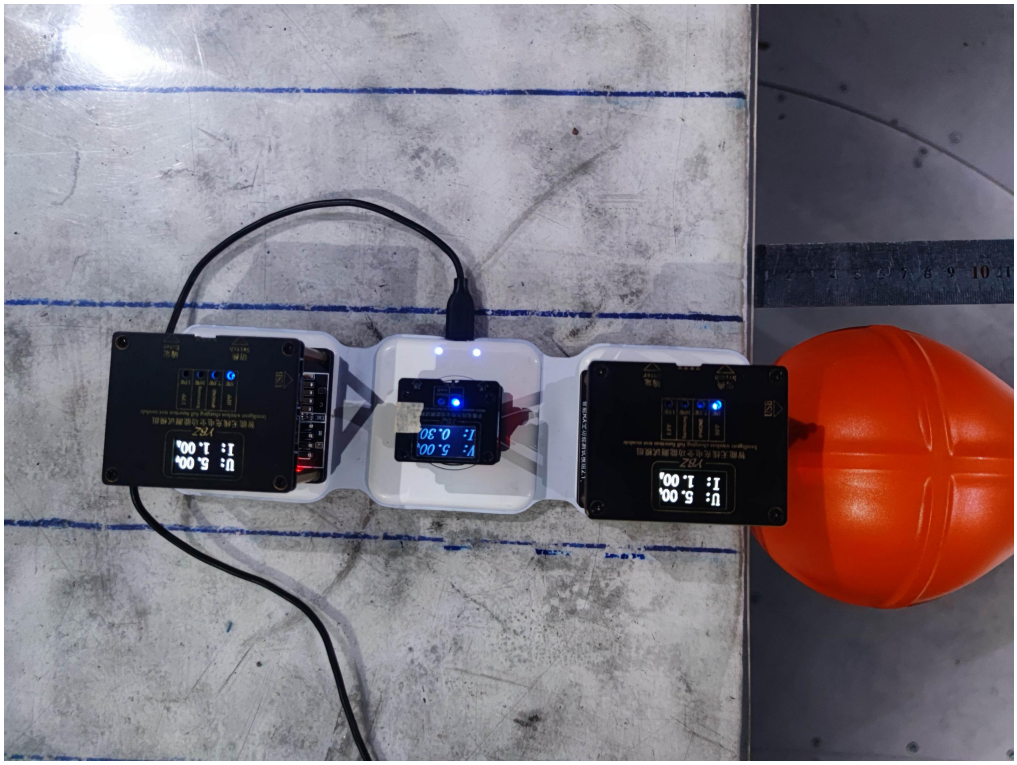
WPT Equipment_ Position B



WPT Equipment_ Position C



WPT Equipment_ Position D



----END OF REPORT----

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