# RF Test Report

Report No.: AGC05443240620ER02

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wireless charger |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | MO6679 |
| **APPLICANT** | : | MID OCEAN BRANDS B.V. |
| **DATE OF ISSUE** | : | Jul. 15, 2024 |
| **STANDARD(S)** | : | ETSI EN 303 417 V1.1.1(2017-09) |
| **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 | / | Jul. 15, 2024 | 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** | N/A |
| **Address** | N/A |
| **Product Designation** | Wireless charger |
| **Brand Name** | N/A |
| **Test Model** | MO6679 |
| **Series Model** | N/A |
| **Difference Description** | N/A |
| **Date of receipt of test item** | Jun. 20, 2024 |
| **Date of Test:** | Jun. 20, 2024 to Jul. 15, 2024 |
| **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 | Thea Huang<br>Thea Huang<br>(Project Engineer) | Jul. 15, 2024 |
| Reviewed By | Calvin Liu<br>Calvin Liu<br>(Reviewer) | Jul. 15, 2024 |
| Approved By | Max Zhang<br>Max Zhang<br>(Authorized Officer) | Jul. 15, 2024 |

## 2. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

| | |
|---|---|
| **Hardware Version** | V1.0 |
| **Software Version** | V1.0 |
| **Operate Frequency** | 110kHz-205kHz |
| **Modulation Type** | ASK |
| **OCW** | Energy transmission: Low channel 0.970kHz, Middle Channel 0.983kHz, High channel 0.990kHz<br>Data communication: 0.955kHz |
| **Test Channels** | Energy transmission: Low channel 126.7kHz, Middle Channel 157.1kHz, High channel 163.2kHz<br>Data communication: 146.8kHz |
| **Antenna Type** | Coil Antenna |
| **Operational Mode** | Mode 1: base station in stand-by, idle mode<br>Mode 3: communication<br>Mode 4: energy transmission |
| **EUT Input& Output Rating** | Micro-USB Input: DC 9V / 3A, DC 5V / 2.1A<br>USB Type-A Output: DC 5V / 2A Max |
| **Wireless Charging Output Power** | 15W 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.

5. The communication frequency 146.8kHz corresponds to the maximum field strength.

## 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 |

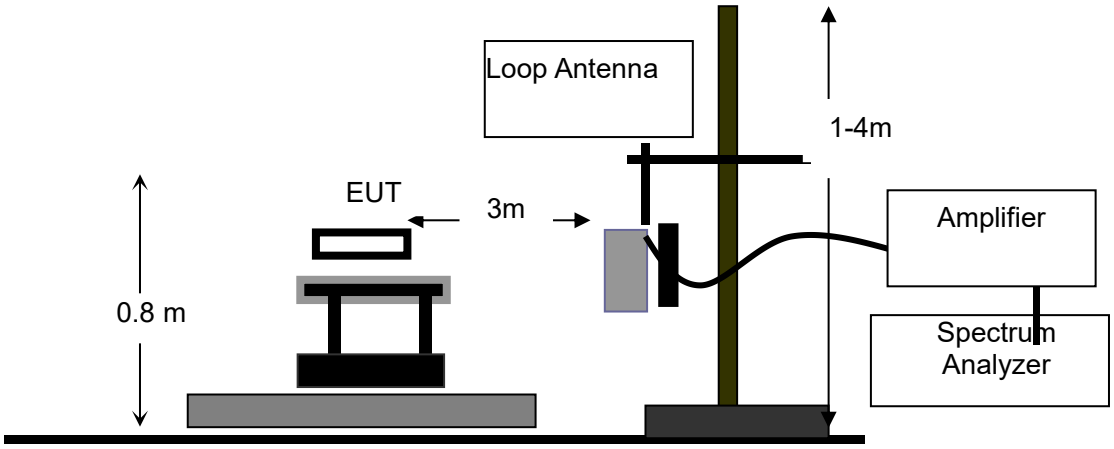
# 5. ETSI EN 303 417 REQUIREMENT

## 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. 01, 2024 | Jan. 31, 2025 |
| Power amplifier | AR | 75A250 | 18464 | N/A | N/A |
| Active Loop Antenna (9K-30Mhz) | ZHINAN | ZN30900C | 18051 | Mar. 05, 2024 | Mar. 04, 2026 |

**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.

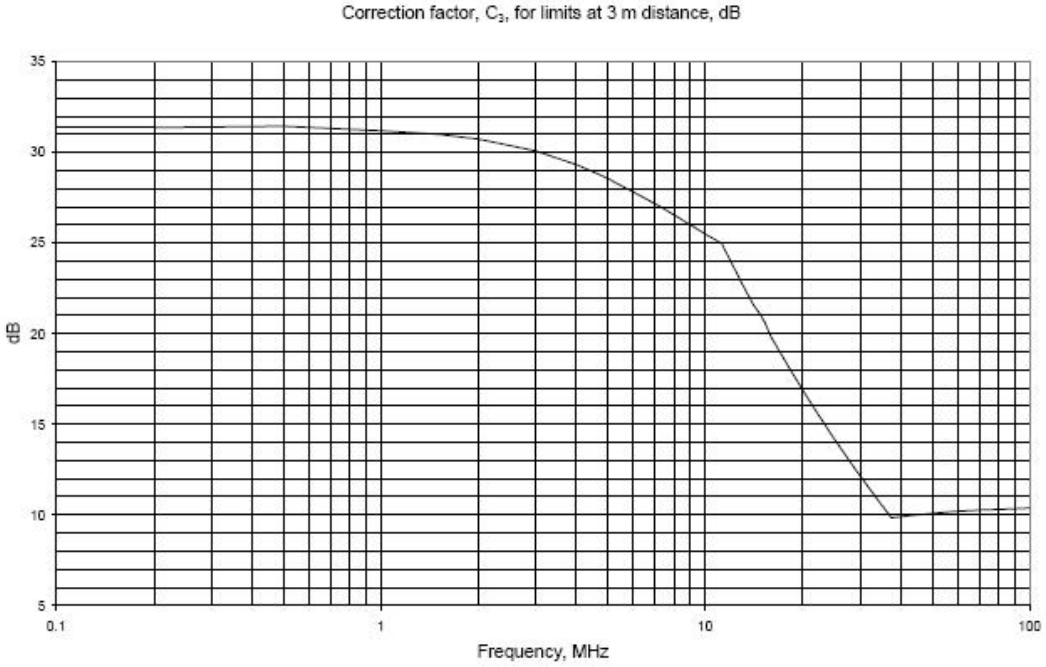



**Figure F.2: Conversion factor $C_3$ versus frequency**

**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℃ | 9 | Worst case |
| TL/VL | 0℃ | 8.1 | |
| TH/VL | 40℃ | 8.1 | |
| TL/VH | 0℃ | 9.9 | |
| TH/VH | 40℃ | 9.9 | |

Test results tested at 3m test sites:

| Freq. | Antenna Factor | Reading Level | Corrected Level | Limit |
|---|---|---|---|---|
| (MHz) | (dB/m) | (dBuA) | (dBuA/m) | (dBuA/m) |
| 0.1574 | 23.53 | -0.23 | 23.30 | 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) |
| 0.1574 | 23.53 | -31.43 | -7.90 | -5.00 |

Test Mode: Mode 3

Extreme conditions state

| conditions | Test Temp | Test Volt.(V) | Note |
|---|---|---|---|
| TN/VN | 25℃ | 9 | Worst case |
| TL/VL | -10℃ | 8.1 | |
| TH/VL | 45℃ | 8.1 | |
| TL/VH | -10℃ | 9.9 | |
| TH/VH | 45℃ | 9.9 | |

Test results tested at 3m test sites:

| Freq. | Antenna Factor | Reading Level | Corrected Level | Limit |
|---|---|---|---|---|
| (MHz) | (dB/m) | (dBuA) | (dBuA/m) | (dBuA/m) |
| 0.1468 | 23.53 | 2.76 | 26.29 | 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) |
| 0.1468 | 23.53 | -28.44 | -4.91 | 37.70 |

Test Mode: Mode 4

Extreme conditions state

| conditions | Test Temp | Test Volt.(V) | Note |
|---|---|---|---|
| TN/VN | 25℃ | 9 | Worst case |
| TL/VL | -10℃ | 8.1 | |
| TH/VL | 45℃ | 8.1 | |
| TL/VH | -10℃ | 9.9 | |
| TH/VH | 45℃ | 9.9 | |

Test results tested at 3m test sites:

| Freq. | Antenna Factor | Reading Level | Corrected Level | Limit |
|---|---|---|---|---|
| (MHz) | (dB/m) | (dBuA) | (dBuA/m) | (dBuA/m) |
| 0.1267 | 23.53 | 1.57 | 25.10 | 96.93 |
| 0.1571 | 23.53 | 2.46 | 25.99 | 26.20 |
| 0.1632 | 23.53 | -8.48 | 15.05 | 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) |
| 0.1267 | 23.53 | -29.63 | -6.10 | 65.73 |
| 0.1571 | 23.53 | -28.74 | -5.21 | -5.00 |
| 0.1632 | 23.53 | -39.68 | -16.15 | -5.00 |

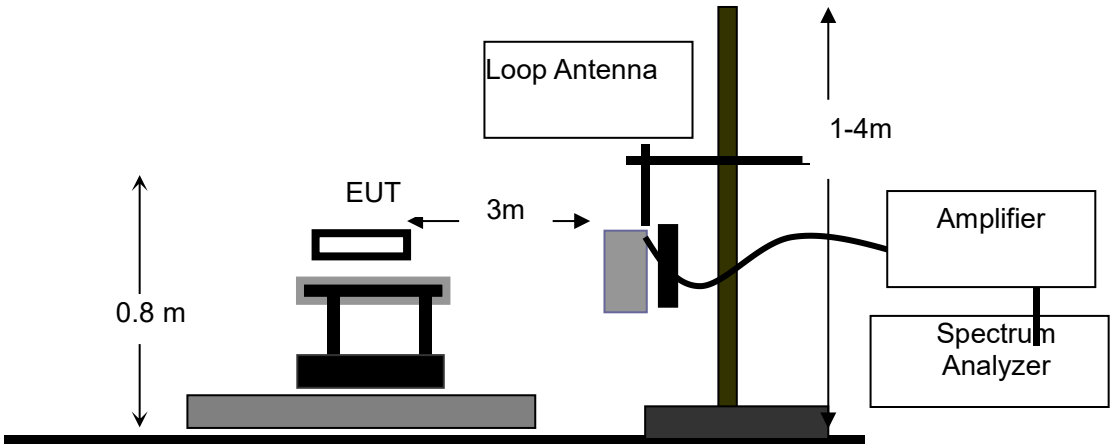
Remark:
(1) Corrected Level (dBuA/m) = Reading Level + Antenna Factor
(2) For the calculated method, please refer to Annex F at EN 300330.
(3) All extreme conditions were considered for test, but only record the worst case.

## 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. 01, 2024 | Jan. 31, 2025 |
| Power amplifer | AR | 75A250 | 18464 | N/A | N/A |
| Active loop antenna(9K-30MHz) | ZHINAN | ZN30900C | 18051 | Mar. 05, 2024 | Mar. 04, 2026 |

**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 |
|---|---|---|---|---|
| 0℃ | 9 | 157.158 | 157.640 | 100kHz≤&≤300kHz |
| | 8.1 | 157.159 | 157.643 | 100kHz≤&≤300kHz |
| 25℃ | 8.1 | 157.157 | 157.643 | 100kHz≤&≤300kHz |
| 40℃ | 9.9 | 157.160 | 157.638 | 100kHz≤&≤300kHz |
| | 9.9 | 157.161 | 157.641 | 100kHz≤&≤300kHz |
| OFR | | 0.486kHz | | |
| Results | | PASS | | |

Test Mode: Mode 3

Frequency Range Test Result

| Test Temperature | Test Voltage (V DC) | Lowest Frequency(KHz) | Highest Frequency (KHz) | Limit |
|---|---|---|---|---|
| -10℃ | 9 | 146.326 | 147.276 | 100kHz≤&≤300kHz |
| | 8.1 | 146.325 | 147.277 | 100kHz≤&≤300kHz |
| 25℃ | 8.1 | 146.323 | 147.278 | 100kHz≤&≤300kHz |
| 45℃ | 9.9 | 146.324 | 147.273 | 100kHz≤&≤300kHz |
| | 9.9 | 146.324 | 147.276 | 100kHz≤&≤300kHz |
| OFR | | 0.955kHz | | |
| Results | | PASS | | |

Test Mode: Mode 4

Frequency Range Test Result

| Test Temperature | Test Voltage (V DC) | Lowest Frequency(K Hz) | Highest Frequency (KHz) | Limit |
|---|---|---|---|---|
| -10℃ | 9 | 126.216 | 163.695 | 100kHz≤&≤300kHz |
| | 8.1 | 126.217 | 163.692 | 100kHz≤&≤300kHz |
| 25℃ | 8.1 | 126.215 | 163.695 | 100kHz≤&≤300kHz |
| 45℃ | 9.9 | 126.217 | 163.691 | 100kHz≤&≤300kHz |
| | 9.9 | 126.216 | 163.694 | 100kHz≤&≤300kHz |
| OFR | | 37.480kHz | | |
| Results | | PASS | | |

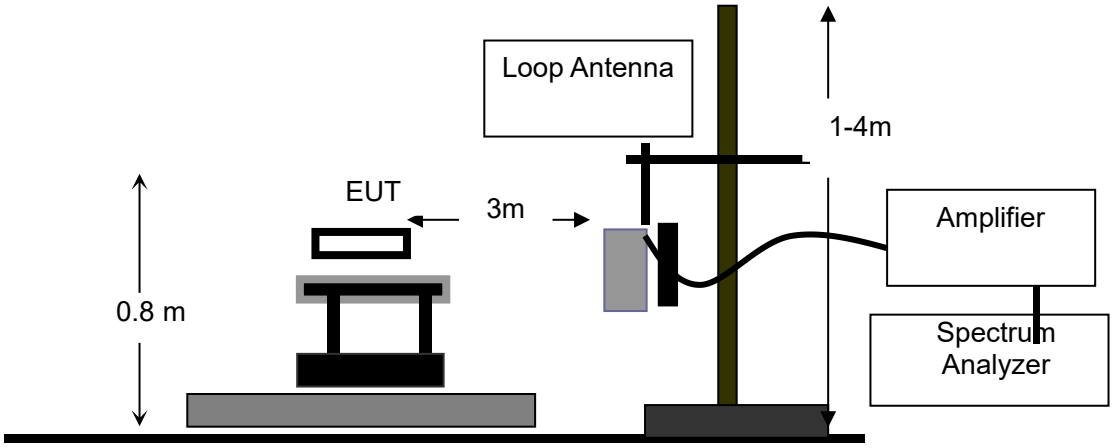
***NOTE:*** *All the modes had been tested, but only the worst data recorded in the report.*

## 5.3 TRANSMITTER 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. 01, 2024 | Jan. 31, 2025 |
| Power amplifer | AR | 75A250 | 18464 | N/A | N/A |
| Active loop antenna(9K-30MHz) | ZHINAN | ZN30900C | 18051 | Mar. 05, 2024 | Mar. 04, 2026 |

**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.

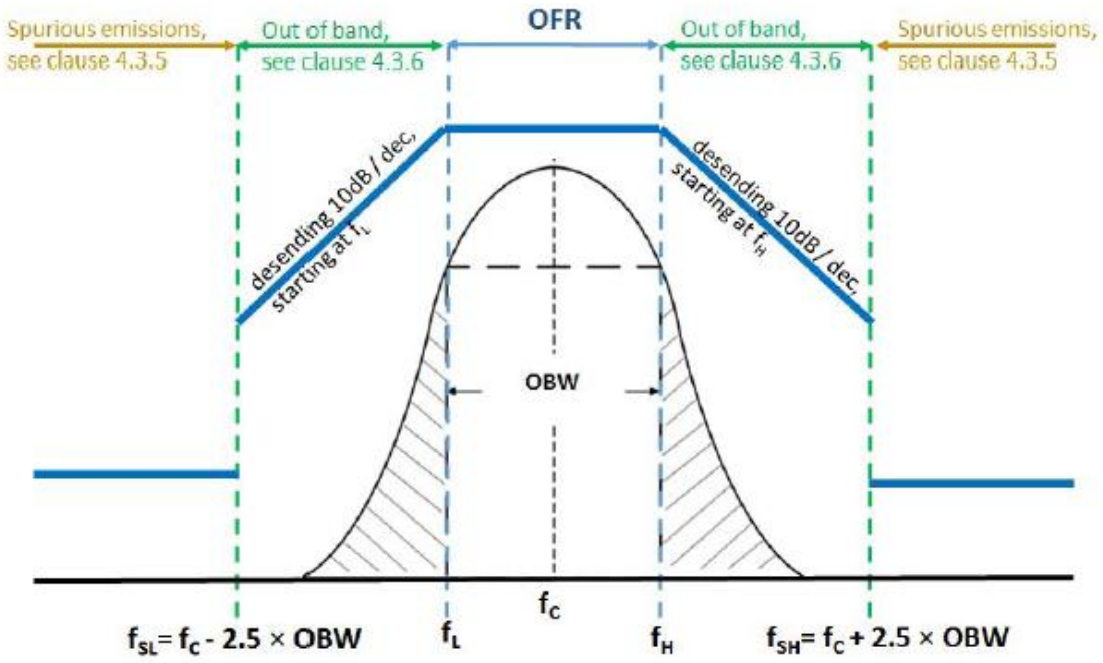



**Figure 4: Out of band and spurious domain of a single frequency WPT system**

**TEST RESULT**

Test Mode: Mode 1

| Frequency range (KHz) | | Maximum level @10m (dBuA/m) | Limit @ 10m (dBuA/m) | Result |
|---|---|---|---|---|
| fSL -fL | 156.185 to 157.157 | Less than -17.06 | See figure 4 | Pass |
| fL | 157.157 | -17.06 | -5.00 | Pass |
| fH | 157.643 | -17.58 | -5.00 | Pass |
| fH - fSH | 157.643 to 158.615 | Less than -17.58 | See figure 4 | Pass |

Test Mode: Mode 3

| Frequency range (KHz) | | Maximum level @10m (dBuA/m) | Limit @ 10m (dBuA/m) | Result |
|---|---|---|---|---|
| fSL-fL | 144.413 to 146.323 | Less than -14.07 | See figure 4 | Pass |
| fL | 146.323 | -14.07 | 37.70 | Pass |
| fH | 147.278 | -14.59 | 37.70 | Pass |
| fH-fSH | 147.278 to 149.188 | Less than -14.59 | See figure 4 | Pass |

Test Mode: Mode 4

| Frequency range (KHz) | | Maximum level @10m (dBuA/m) | Limit @ 10m (dBuA/m) | Result |
|---|---|---|---|---|
| fSL-fL | 124.275 to 126.215 | Less than -15.26 | See figure 4 | Pass |
| fL | 126.215 | -15.26 | 65.73 | Pass |
| fH | 163.695 | -25.83 | -5.00 | Pass |
| fH-fSH | 163.695 to 165.675 | Less than -25.83 | See figure 4 | Pass |

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

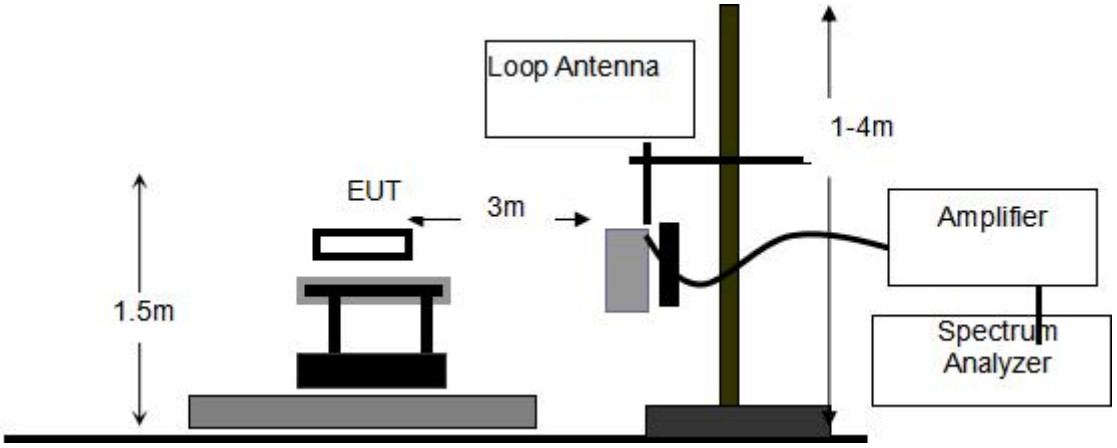
## 5.4 TRANSMITTER SPURIOUS EMISSIONS

**MEASUREMENT EQUIPMENT USED:**

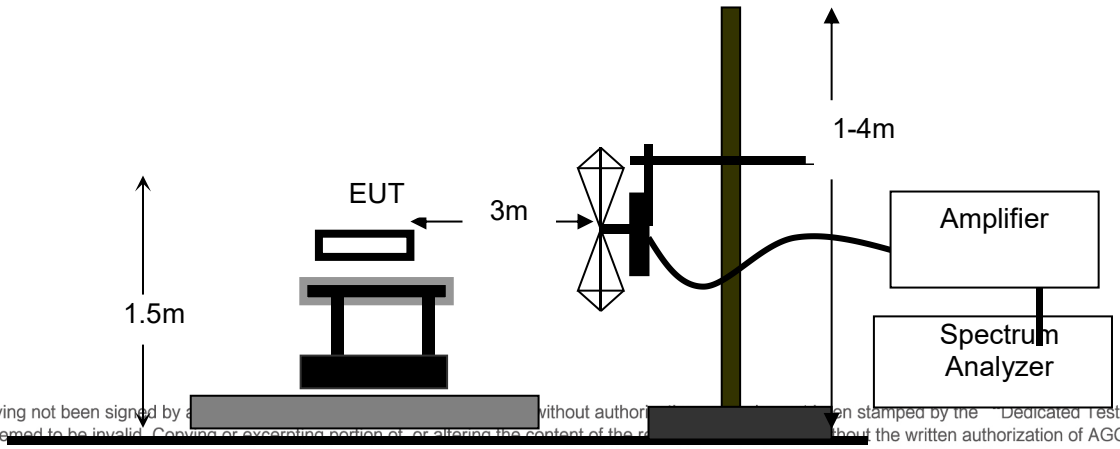
| NAME OF EQUIPMENT | MANUFACTURER | MODEL | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCI | 10096 | Feb. 01, 2024 | Jan. 31, 2025 |
| Power amplifer | AR | 75A250 | 18464 | N/A | N/A |
| Active loop antenna(9K-30MHz) | ZHINAN | ZN30900C | 18051 | Mar. 05, 2024 | Mar. 04, 2026 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 05, 2023 | Jan. 04, 2025 |

**TEST SETUP:**

FREQUENCY RANGE (9KHZ-30MHZ)

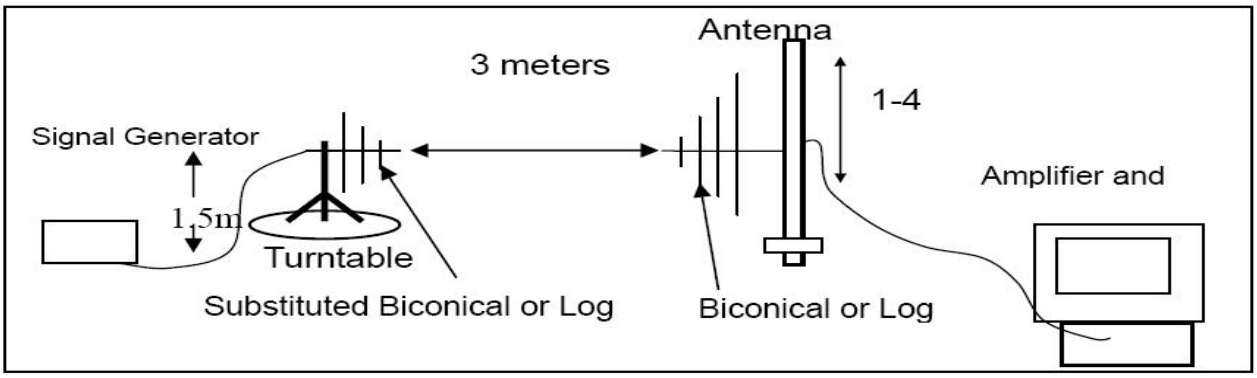



FREQUENCY RANGE (ABOVE 30MHZ)



**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<br>87,5 MHz to 118 MHz<br>174 MHz to 230 MHz<br>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) |
| 0.048 | -8.11 | -7.96 | -16.07 | 19.72 | 35.79 |
| 0.294 | -11.53 | -7.96 | -19.49 | 11.86 | 31.36 |
| 0.481 | -12.67 | -7.96 | -20.63 | 9.72 | 30.35 |
| 1.402 | -14.70 | -3.98 | -18.68 | 5.07 | 23.75 |
| 2.219 | -13.00 | -3.09 | -16.09 | 3.08 | 19.17 |
| 3.493 | -12.83 | -1.25 | -14.08 | 1.11 | 15.19 |

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) |
| 85.17 | 31.43 | V | -62.89 | 0.04 | 0.70 | -62.23 | -36.00 | 26.23 |
| 161.00 | 28.43 | V | -66.48 | 0.06 | 1.20 | -65.34 | -36.00 | 29.34 |
| 356.66 | 31.81 | V | -67.72 | 0.25 | 6.28 | -61.69 | -36.00 | 25.69 |
| 424.73 | 27.09 | V | -72.48 | 0.33 | 7.02 | -65.79 | -36.00 | 29.79 |
| 629.86 | 29.29 | V | -70.51 | 0.51 | 7.26 | -63.77 | -54.00 | 9.77 |
| 760.22 | 27.94 | V | -70.89 | 0.61 | 6.60 | -64.90 | -36.00 | 28.90 |
| | | | | | | | | |
| 90.66 | 30.35 | H | -64.64 | 0.04 | 1.40 | -63.28 | -54.00 | 9.28 |
| 153.22 | 27.50 | H | -65.93 | 0.06 | 0.70 | -65.29 | -36.00 | 29.29 |
| 348.52 | 28.76 | H | -69.02 | 0.24 | 5.54 | -63.72 | -36.00 | 27.72 |
| 429.98 | 26.94 | H | -73.76 | 0.34 | 6.92 | -67.18 | -36.00 | 31.18 |
| 632.77 | 29.28 | H | -70.28 | 0.52 | 7.26 | -63.54 | -54.00 | 9.54 |
| 731.58 | 27.85 | H | -72.21 | 0.59 | 6.76 | -66.04 | -36.00 | 30.04 |

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) |
| 0.018 | -8.06 | -7.96 | -16.02 | 24.02 | 40.04 |
| 0.281 | -11.41 | -7.96 | -19.37 | 12.06 | 31.42 |
| 0.888 | -12.83 | -7.96 | -20.79 | 7.06 | 27.85 |
| 2.173 | -14.66 | -3.98 | -18.64 | 3.17 | 21.81 |
| 3.214 | -12.99 | -3.09 | -16.08 | 1.47 | 17.55 |
| 4.045 | -12.54 | -1.25 | -13.79 | 0.47 | 14.26 |

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) |
| 87.46 | 32.60 | V | -60.78 | 0.04 | 0.98 | -59.84 | -36.00 | 23.84 |
| 153.79 | 28.15 | V | -64.84 | 0.06 | 0.70 | -64.20 | -36.00 | 28.20 |
| 357.10 | 30.25 | V | -69.67 | 0.25 | 6.41 | -63.51 | -36.00 | 27.51 |
| 429.36 | 26.45 | V | -72.81 | 0.34 | 6.92 | -66.23 | -36.00 | 30.23 |
| 628.73 | 29.99 | V | -68.99 | 0.51 | 7.22 | -62.29 | -54.00 | 8.29 |
| 758.72 | 27.47 | V | -71.55 | 0.61 | 6.50 | -65.66 | -36.00 | 29.66 |
| | | | | | | | | |
| 93.57 | 31.52 | H | -63.06 | 0.04 | 1.64 | -61.46 | -54.00 | 7.46 |
| 156.65 | 26.74 | H | -66.53 | 0.06 | 0.80 | -65.79 | -36.00 | 29.79 |
| 352.17 | 29.72 | H | -69.35 | 0.25 | 5.76 | -63.83 | -36.00 | 27.83 |
| 430.10 | 27.37 | H | -71.79 | 0.34 | 6.90 | -65.23 | -36.00 | 29.23 |
| 632.40 | 29.96 | H | -70.66 | 0.52 | 7.26 | -63.91 | -54.00 | 9.91 |
| 726.07 | 27.89 | H | -71.07 | 0.59 | 6.60 | -65.06 | -36.00 | 29.06 |

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) |
| 0.030 | -7.63 | -7.96 | -15.59 | 0.21 | 15.80 |
| 0.233 | -10.15 | -7.96 | -18.11 | -8.63 | 9.48 |
| 0.453 | -11.43 | -7.96 | -19.39 | -11.52 | 7.86 |
| 1.555 | -23.11 | -3.98 | -27.09 | -16.87 | 10.22 |
| 3.603 | -27.75 | -3.09 | -30.84 | -20.52 | 10.32 |
| 4.141 | -26.43 | -1.25 | -27.68 | -21.13 | 6.56 |

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) |
| 97.10 | 26.60 | V | -67.48 | 0.04 | 1.60 | -65.92 | -57.00 | 8.92 |
| 158.43 | 29.90 | V | -64.83 | 0.06 | 1.00 | -63.89 | -57.00 | 6.89 |
| 357.46 | 29.78 | V | -70.41 | 0.25 | 6.41 | -64.25 | -57.00 | 7.25 |
| 534.25 | 26.50 | V | -73.97 | 0.44 | 6.84 | -67.58 | -57.00 | 10.58 |
| 676.26 | 30.16 | V | -68.63 | 0.55 | 6.56 | -62.62 | -57.00 | 5.62 |
| 830.96 | 29.00 | V | -68.98 | 0.66 | 6.30 | -63.34 | -57.00 | 6.34 |
| | | | | | | | | |
| 133.26 | 28.64 | H | -64.11 | 0.05 | 0.04 | -64.12 | -57.00 | 7.12 |
| 164.58 | 28.08 | H | -67.07 | 0.06 | 1.52 | -65.61 | -57.00 | 8.61 |
| 342.86 | 30.60 | H | -67.35 | 0.24 | 5.66 | -61.92 | -57.00 | 4.92 |
| 538.97 | 27.63 | H | -72.54 | 0.45 | 7.08 | -65.91 | -57.00 | 8.91 |
| 679.92 | 28.32 | H | -70.85 | 0.55 | 6.44 | -64.96 | -57.00 | 7.96 |
| 828.99 | 27.58 | H | -71.53 | 0.66 | 6.40 | -65.79 | -57.00 | 8.79 |

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.

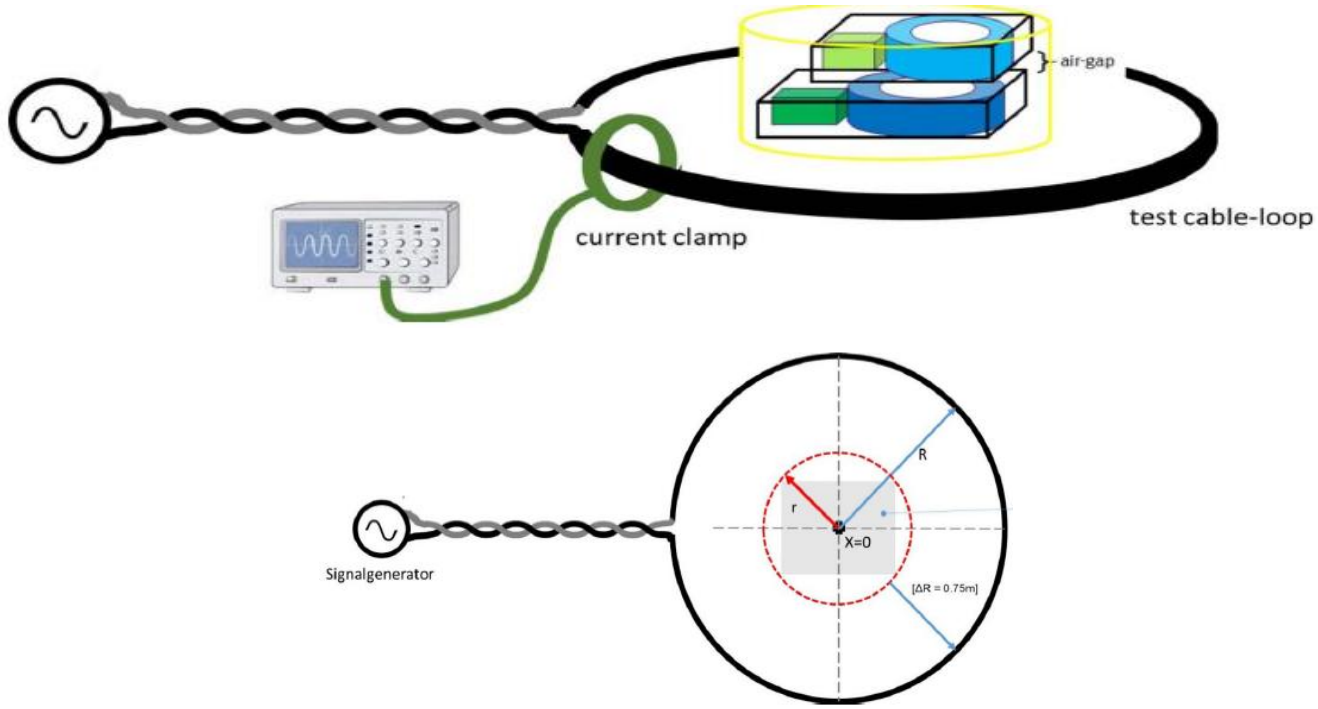
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “--” remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that’s already beyond the background noise floor.

## 5.5 RECEIVER BLOCKING

**MEASUREMENT EQUIPMENT USED:**

| NAME OF EQUIPMENT | MANUFACTURER | MODEL | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| MXG X-Series Vector Signal Generator | Agilent | N5182B | MY53050647 | Feb. 01, 2024 | Jan. 31, 2025 |
| Active loop antenna(9K-30MHz) | ZHINAN | ZN30900C | 18051 | Mar. 05, 2024 | Mar. 04, 2026 |
| Clamp meter | PROVA | PROVA-11 | 17200101 | Sep. 11, 2023 | Sep. 10, 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 = $f_c$ ± F (see note) | f = $f_c$ ± 10 × 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 | 157.400 | 72dBuA/m | No function loss | Pass |
| OOB signal | 156.914 | 72dBuA/m | No function loss | Pass |
| | 157.886 | 72dBuA/m | No function loss | Pass |
| Remote-band signal | 152.540 | 82dBuA/m | No function loss | Pass |
| | 162.260 | 82dBuA/m | No function loss | Pass |

Test Mode: Mode 3

| Test Frequency(KHz) | | Signal level @ EUT | Performance | Result |
|---|---|---|---|---|
| In-band signal | 146.800 | 72dBuA/m | No function loss | Pass |
| OOB signal | 145.845 | 72dBuA/m | No function loss | Pass |
| | 147.755 | 72dBuA/m | No function loss | Pass |
| Remote-band signal | 137.250 | 82dBuA/m | No function loss | Pass |
| | 156.350 | 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:<br>_ Within 300Hz and 6KHz of Audio Frequency<br>_ Within 6KHz and 25KHz of Audio Frequency | ± 5%<br>± 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 I: PHOTOGRAPHS OF TEST SETUP

## APPENDIX II: PHOTOGRAPHS OF THE EUT

Refer to the Report No.: AGC05443240620AP01

**----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.: AGC05443240620EH01

| | | |
|---|---|---|
| **PRODUCT DESIGNATION** | : | Wireless charger |
| **BRAND NAME** | : | N/A |
| **MODEL NAME** | : | MO6679 |
| **APPLICANT** | : | MID OCEAN BRANDS B.V. |
| **DATE OF ISSUE** | : | Jul. 15, 2024 |
| **STANDARD(S)** | : | EN IEC 62311:2020<br>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 | / | Jul. 15, 2024 | 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** | N/A |
| **Address** | N/A |
| **Product Designation** | Wireless charger |
| **Brand Name** | N/A |
| **Test Model** | MO6679 |
| **Series Model** | N/A |
| **Difference Description** | N/A |
| **Date of receipt of test item** | Jun. 20, 2024 |
| **Date of test** | Jun. 20, 2024 to Jul. 15, 2024 |
| **Test Result** | Pass |

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

| | | |
|---|---|---|
| Prepared By | Thea Huang<br>Thea Huang<br>(Project Engineer) | Jul. 15, 2024 |
| Reviewed By | Calvin Liu<br>Calvin Liu<br>(Reviewer) | Jul. 15, 2024 |
| Approved By | Max Zhang<br>Max Zhang<br>(Authorized Officer) | Jul. 15, 2024 |

## 2. TECHNICAL INFORMATION

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

| | |
|---|---|
| **Product Designation** | Wireless charger |
| **Brand Name** | N/A |
| **Test Model** | MO6679 |
| **Hardware Version** | V1.0 |
| **Software Version** | V1.0 |
| **Operation Frequency** | 110kHz-205kHz |
| **Modulation type** | ASK |
| **Antenna Type** | Coil Antenna |
| **EUT Input& Output Rating** | Micro-USB Input: DC 9V / 3A, DC 5V / 2.1A<br>USB Type-A Output: DC 5V / 2A Max |
| **Wireless Charging Output Power** | 15W 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 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.

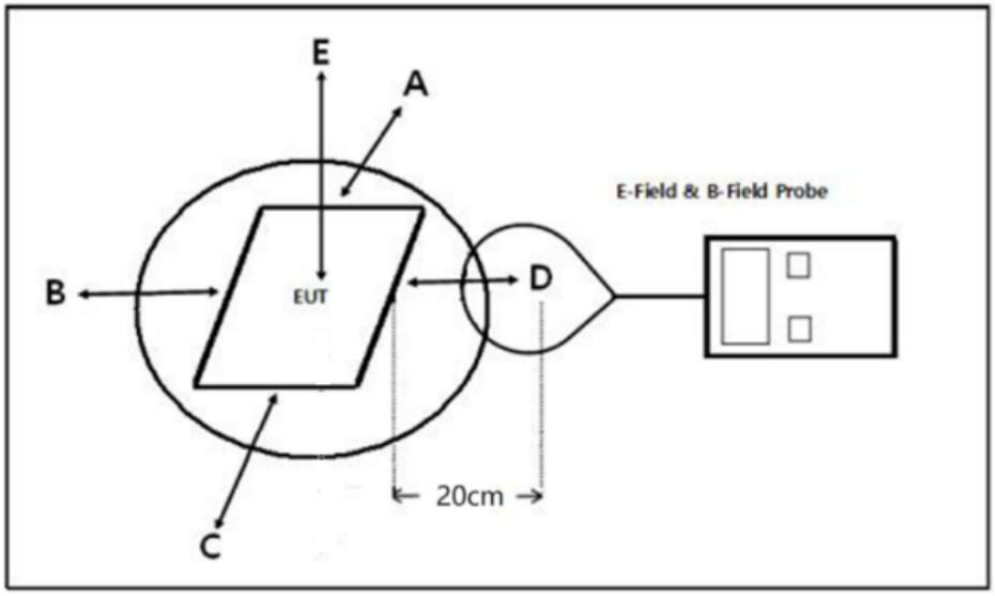
**Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)**

| 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 | — | $3,2 \times 10^4$ | $4 \times 10^4$ | — |
| 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 | AC/DC Adapter + EUT + Wireless load(Full load) |
| 2 | AC/DC Adapter + EUT + Wireless load(half load) |
| 3 | AC/DC Adapter + EUT + Wireless load(null load) |
| Note:<br>1. The Mode 1 was the worst case and only the data of the worst case record in this report. | |

## 4. TEST RESULT

| Frequency | Maximum Radiated H-Field at 20cm | | Limit | Result |
|---|---|---|---|---|
| MHz | A/m | | A/m | Pass/Fail |
| 146.8kHz | position E | 0.081 | 5 | Pass |
| | position A | 0.053 | | |
| | position B | 0.040 | | |
| | position C | 0.036 | | |
| | position D | 0.031 | | |

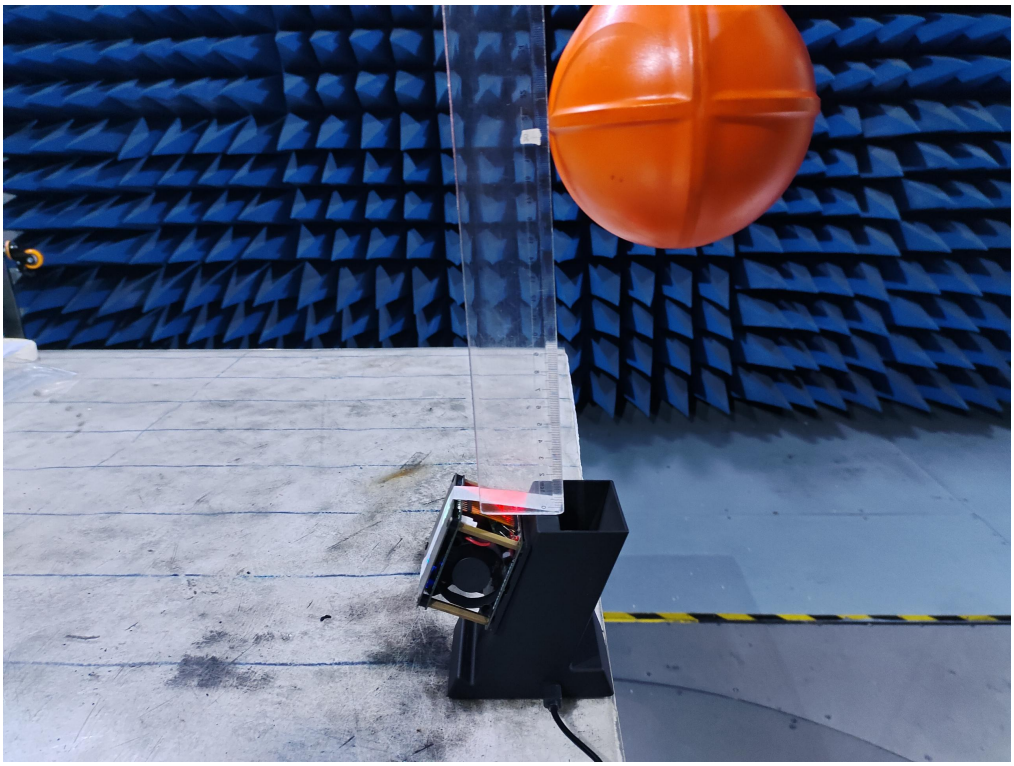
Since Radiated H-Field at worse case is 0.081A/m which cannot exceed the exempt condition, 5A/m. It is deemed to full fit the requirement of RF exposure basic restriction specified in EC Council Recommendation (1999/519/EC).

## 5. CONCLUSION

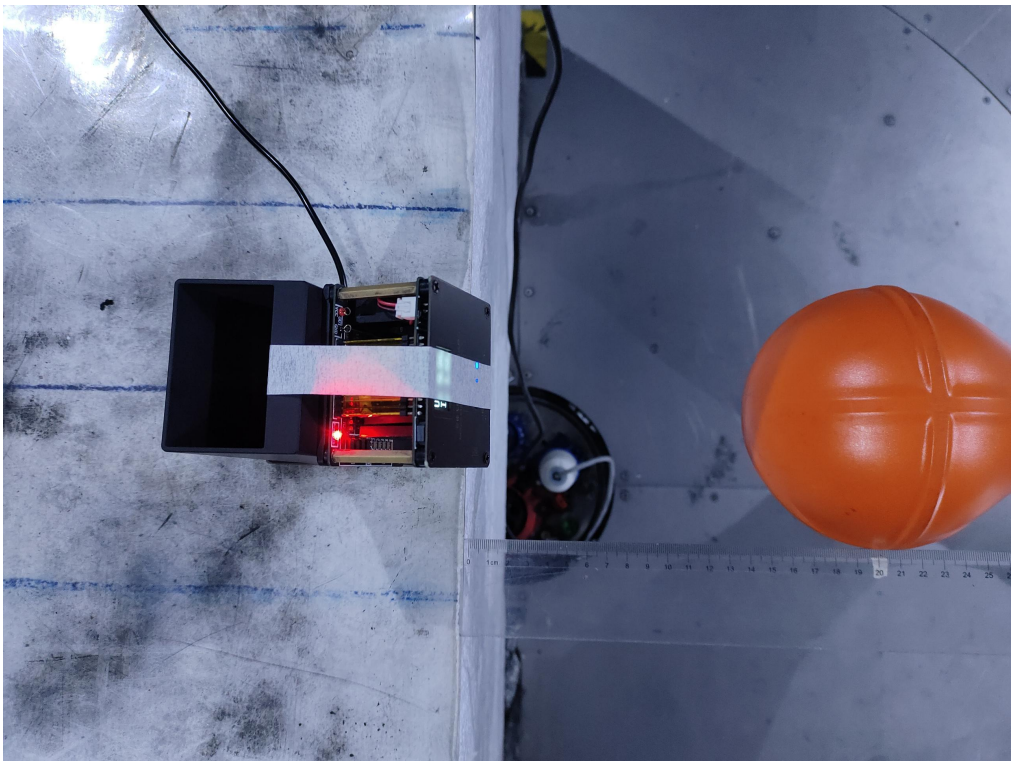
Remark: EUT meets the basic requirements in the standard.

# APPENDIX I: PHOTOGRAPHS OF TEST SETUP

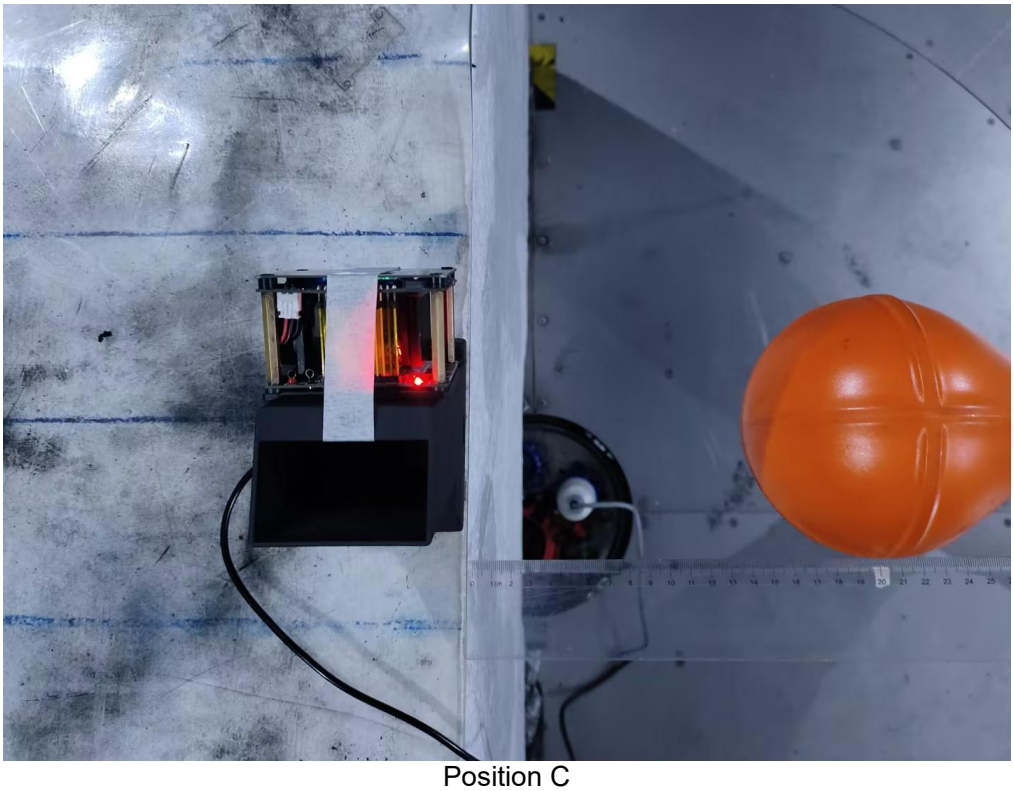
Position E



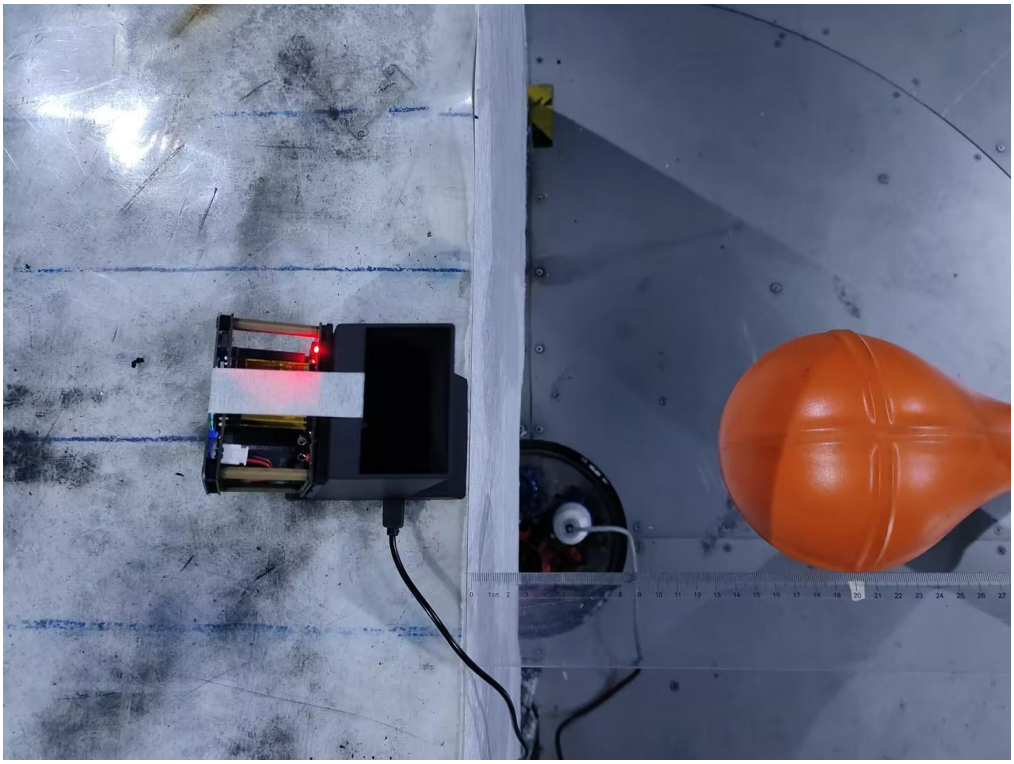
Position A



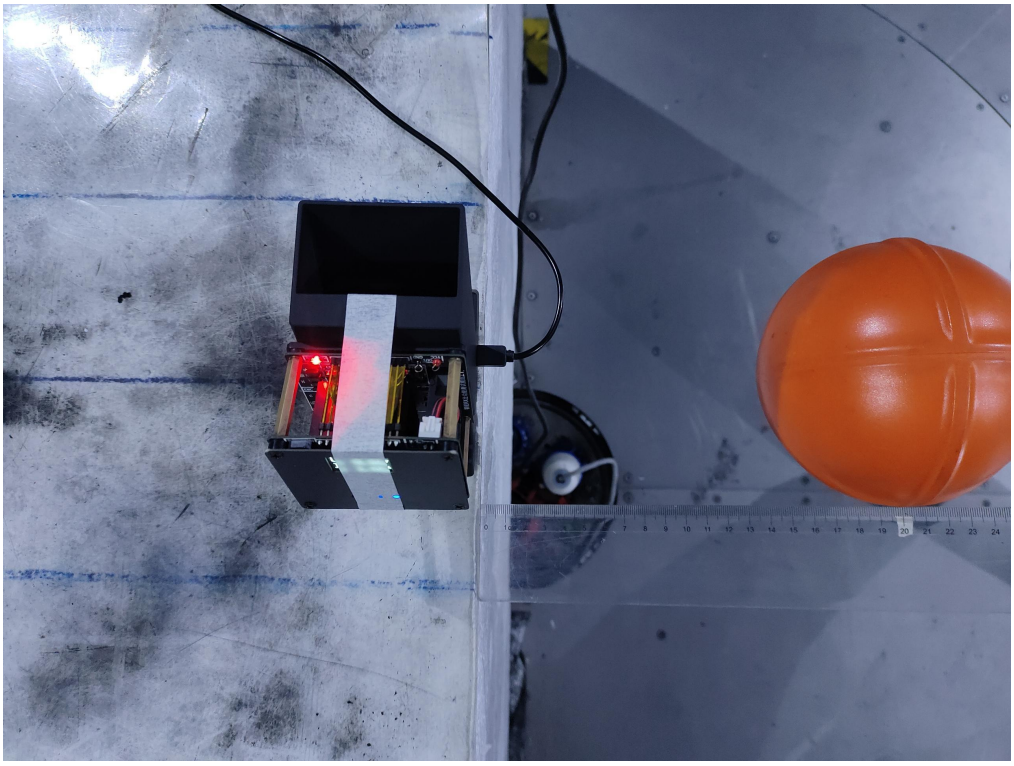
Position B



Position C



Position D



**----END OF REPORT----**

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