

# **Health Test Report**

Report No.: AGC05443240949EH01

**PRODUCT DESIGNATION**: 3 in 1 cable w/ watch charger

**BRAND NAME** : N/A

MODEL NAME : MO2451

**APPLICANT**: MID OCEAN BRANDS B.V.

**DATE OF ISSUE** : Oct. 28, 2024

**STANDARD(S)** : EN IEC 62311:2020 EN 50665:2017

**REPORT VERSION**: V1.0

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



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# REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	1	Oct. 28, 2024	Valid	Initial release



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# 1. GENERAL INFORMATION

Applicant	MID OCEAN BRANDS B.V.	
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong	
Manufacturer	MID OCEAN BRANDS B.V.	
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong	
Factory	MID OCEAN BRANDS B.V.	
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong	
Product Designation	3 in 1 cable w/ watch charger	
Brand Name	N/A	
Test Model	MO2451	
Series Model	N/A	
Difference Description	N/A	
Date of receipt of test item	Sep. 23, 2024	
Date of test	Sep. 23, 2024~ Oct. 28, 2024	
Test Result	Pass	

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

Prepared By	Bibo Zhang		
	Bibo Zhang (Project Engineer)	Oct. 28, 2024	
Reviewed By	Calin Lin		
	Calvin Liu (Reviewer)	Oct. 28, 2024	
Approved By	Max Zhang		
	Max Zhang Authorized Officer	Oct. 28, 2024	



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# 2. TECHNICAL INFORMATION

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

Product Designation 3 in 1 cable w/ watch charger	
Brand Name	N/A
Test Model	MO2451
Hardware Version	V1.0
Software Version	V1.0
Operation Frequency	325KHz-330KHz
Modulation type	ASK
Antenna Type	Coil Antenna
Power Supply	Output ratings: USB-A to Type-C:18W USB-Ato2in1:10W Type-C to Type-C:60W Type-C to 2in1:10W Input for watch charger: DC 5V,1A
WIRELESS WATCH	2W

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



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# 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.



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#### 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<sup>2</sup>, 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 <sub>eq</sub> (W/m²)
0-1 Hz	_	3,2 × 10 <sup>4</sup>	4 × 10 <sup>4</sup>	_
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	<u></u>
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	<u></u>
3-150 kHz	87	5	6,25	<u></u>
0,15-1 MHz	87	0,73/f	0,92/f	-
1-10 MHz	87/f <sup>1/2</sup>	0,73/f	0,92/f	
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	1,375 f <sup>1/2</sup>	0,0037 f <sup>1/2</sup>	0,0046 f <sup>1/2</sup>	f/200
2-300 GHz	61	0,16	0,20	10



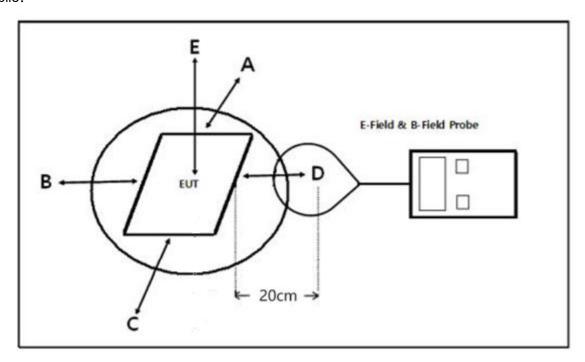
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#### 3.3 EVALUATION METHODS

#### Measurement of E and H field

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

For Mobile:



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

The measurement probe was placed at test distance (20cm) which is between the edge and center of probe 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.



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# 4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Broadband Field	Narda Safety Test	ELT-400	J-0004	Jun. 06, 2024	Jun. 05, 2025
Meter	Solutions GmbH	EL1-400	J-000 <del>4</del>	Juli. 00, 2024	Juli. 03, 2023
Drobo EUD	Narda Safety Test	2200/00 10	1.0045	Jun. 06, 2024	Jun. 05, 2025
Probe FHP	Solutions GmbH	2300/90.10	J-0015	Juli. 00, 2024	Juli. 05, 2025

# 5. EUT OPERATION CONDITION

TEST MODE DESCRIPTION
Type-C Input + EUT+Wireless load (2W)
Type-C Input + EUT+Wireless load(1W)
Type-C Input + EUT+ Null load
USB-A Input +EUT+Wireless load (2W)
USB-A Input +EUT+Wireless load 〔1W)
USB-A Input +EUT+ Null load

Note: All modes have been tested and only the worst mode test data recorded in the test report.



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# 6. TEST RESULT

#### Mobile

Frequency	Maximum Radiated H-Field at 20cm		Limit	Result
kHz	A/m		A/m	Pass/Fail
	position E	0.059		
	position A	0.044		
326.5kHz	position B	0.043	2.24	Pass
	position C	0.045		
	position D	0.042		

Since Radiated H-Field at worse case is 0.059A/m which cannot exceed the exempt condition, 2.24A/m. It is deemed to full fit the requirement of RF exposure basic restrisction specified in EC Council Recommendation (1999/519/EC).

#### 7. CONCLUSION

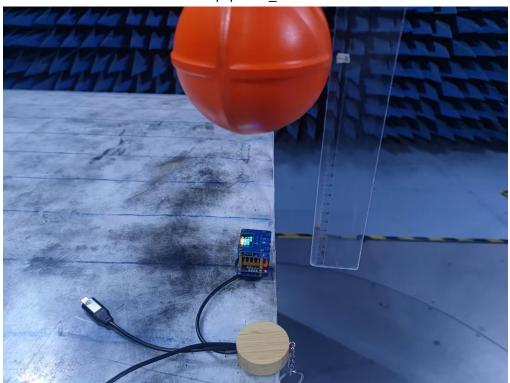
Remark: EUT meets the basic requirements in the standard.



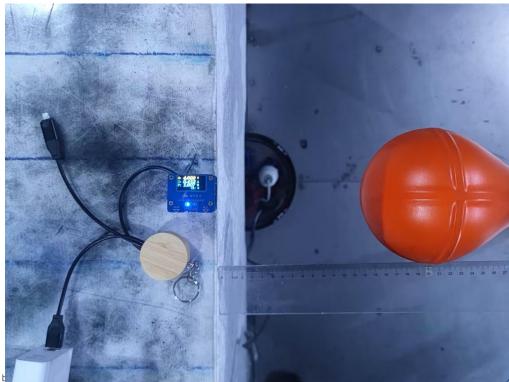
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# **APPENDIX I: PHOTOGRAPHS OF TEST SETUP**

For Frequency: (Mobile)
WPT Equipment\_ Position E



WPT Equipment Position A



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Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

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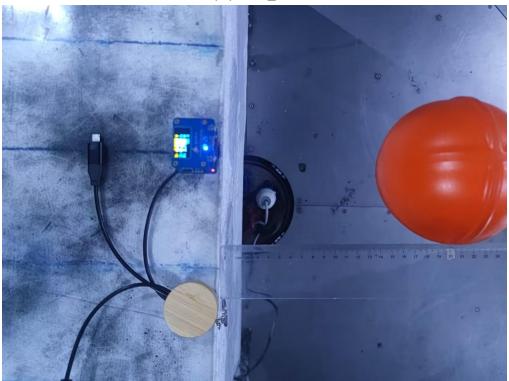
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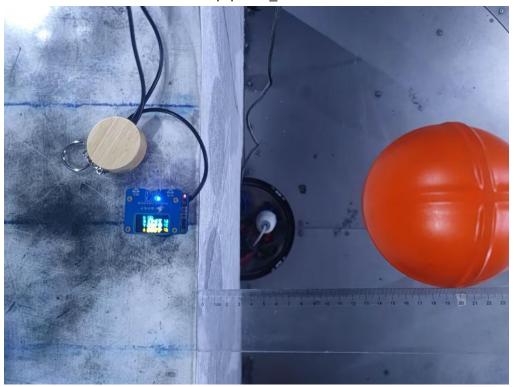


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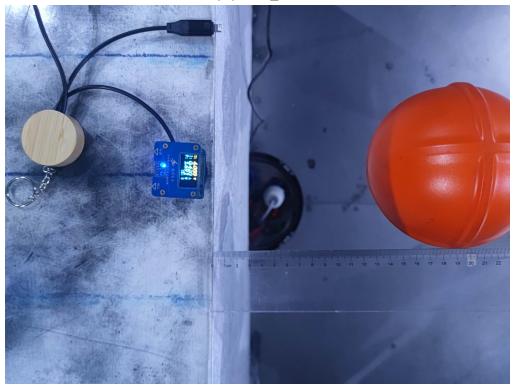
WPT Equipment\_ Position C





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----END OF REPORT----



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- 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.
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- 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.



# **RF Test Report**

Report No.: AGC05443240949ER03

**PRODUCT DESIGNATION** : 3 in 1 cable w/ watch charger

BRAND NAME : N/A

TEST MODEL : MO2451

**APPLICANT** : MID OCEAN BRANDS B.V.

**DATE OF ISSUE** : Oct. 28, 2024

**STANDARD(S)** : ETSI EN 300 330 V2.1.1(2017-02)

**REPORT VERSION**: V1.0

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



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# **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	1	Oct. 28, 2024	Valid	Initial release



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# 1. TEST RESULT CERTIFICATION

Applicant	MID OCEAN BRANDS B.V.
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer	MID OCEAN BRANDS B.V.
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Factory Name	MID OCEAN BRANDS B.V.
Address	7/F. Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Product Designation	3 in 1 cable w/ watch charger
Brand Name	N/A
Test Model	MO2451
Series Model	N/A
Declaration of Difference	N/A
Date of receipt of test item	Sep. 23, 2024
Date of test	Sep. 23, 2024~ Oct. 28, 2024
Test Result	PASS
Condition of Test Sample	Normal
Report Template	AGCRT-EC-SRD/RF

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

Prepared By	Bibo zhang	
	Bibo Zhang (Project Engineer)	Oct. 28, 2024
Reviewed By	Calin Lin	
	Calvin Liu (Reviewer)	Oct. 28, 2024
Approved By	Max Zhang	
	Max Zhang Authorized Officer	Oct. 28, 2024



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# 2. EUT DESCRIPTION

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

Hardware Version	V1.0
Tiaraware version	V 1.0
Software Version	V1.0
Permitted Range Of Operating Frequency	325kHz-330kHz
Operation Frequency	326.5kHz
Modulation	ASK
Corrected Amplitude H-field	-33.45dBuA/m
RF Output Power (ERP)	0.0000013mW
Antenna Gain	0dBi
Antenna Type:	Coil Antenna
Power Supply	Output ratings: USB-A to Type-C:18W USB-Ato2in1:10W Type-C to Type-C:60W Type-C to 2in1:10W Input for watch charger: DC 5V,1A
Wireless Charging Output Power	2W (Max)
Receiver category	3
Product Class	1
Equipment type:	WPT systems

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



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### 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).

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

Nº	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.

<sup>2.</sup> 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.

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



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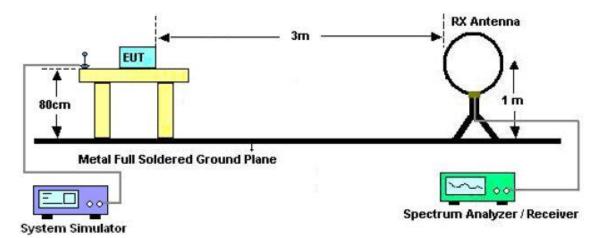
# 6. ETSI EN 300 330 REQUIREMENT TO TRANSMITTER

# 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. 02, 2024	Jun. 01, 2025
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 02, 2024	Jun. 01, 2025
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. 05, 2024	Mar. 04, 2026

#### **TEST SETUP:**



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#### **TEST LIMITS:**

Table 2: H-field limits at 10 m

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

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

NOTE 1: For the frequency ranges 9 kHz to 135 kHz, the following additional restrictions apply to limits above 42 dBμA/m:

- for loop coil antennas with an area ≥ 0,16 m<sup>2</sup> this table and table B.1 with the antenna limitations apply;
- for loop coil antennas with an area between 0,05 m<sup>2</sup> and 0,16 m<sup>2</sup> table B.1 applies with a correction factor. The limit is: table value + 10 × log (area/0,16 m<sup>2</sup>);
- for loop coil antennas with an area < 0,05 m<sup>2</sup> the limit is 10 dB below table B.1.
- NOTE 2: For RFID (incl. NFC) and EAS applications only.
- NOTE 3: Spectrum mask limit, see annex I.
- NOTE 4: For further information see annex G.
- NOTE 5: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz, 66,6 kHz ± 750 Hz, 75 kHz ± 250 Hz, 77,5 kHz ± 250 Hz,
- and 129,1 kHz ± 500 Hz.

  NOTE 6: Only in conjunction with spectrum mask, see annex I.
- NOTE 7: The frequency range 6,765 MHz 6,795 MHz is not a harmonised ISM frequency band according article 5.138 of the ITU Radio Regulations [i.13].
- NOTE 8: Center frequencies for channelized systems by using ≤ 10 kHz bandwidth.
- NOTE 9: The limit is valid in the range 984 kHz 7 484 kHz for Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.

# The H-field limit in $dB\mu A/m$ at 3 m, $H_{3m}$ , is determined by the following equation:

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

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Where: H<sub>10m</sub> is the H-field limit in dBµA/m at 10 m distance according to the present document; and C<sub>3</sub> is a conversion factor in dB determined from figure F.2.

The limit at 10 m( $H_{10m}$ ) is -5 dB $\mu$ A/m

For 326.5KHz:

Owing to the frequency EUT is 0.3265MHz, so the C<sub>3</sub> approach to 31.65dB.

Then the limit at  $3m(H_{3m}) = H_{10m} + C_3 = -5 + 31.65 = 26.65 \text{ dB}\mu\text{A/m}$ .

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

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

Correction factor, C3, for limits at 3 m distance, dB

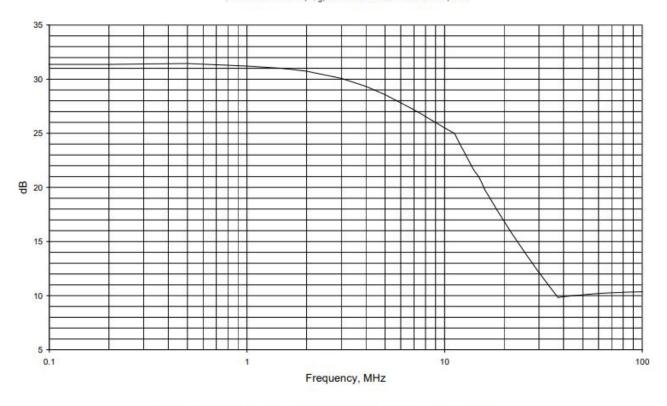


Figure H.2: Conversion factor C<sub>3</sub> versus frequency



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#### **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℃	5.0	Worst case
TL/ VL	-10℃	5.5	
TH/VL	40℃	5.5	
TL/VH	-10℃	4.5	
TH/VH	40℃	4.5	

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	28.46	21.15	49.61	-1.89	-33.54	-5	Pass

#### 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.
- EIRP(dBm)=E(dBuV/m)+20lg(D)-104.8, D is the measurement distance.
- (4)  $E(dBuV/m)=E(dBuV/m)^{-1}20ig(D)^{-1}04.0$ , D is the measurement distance. E(dBuV/m)=dBuA/m+51.5, so the dBuA/m=EIRP(dBm)+43.7, EIRP=10igP(mW)



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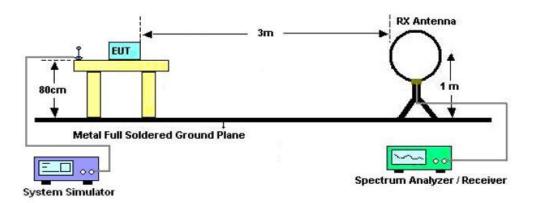
# 6.2 PERMITTED FREQUENCY RANGE AND THE MODULATION BANDWIDTH TEST LIMITS

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. 02, 2024	Jun. 01, 2025
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 02, 2024	Jun. 01, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
LOOP ANTENNA	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:300Hz, VBW=1000Hz, Span=2MHz.
- 4), Both normal test condition and extreme test condition applied

# **Test Limit**

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



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

- NOTE 1: In addition, it should be noted that other frequency bands may be available in a country within the frequency range 9 kHz to 30 MHz.
- NOTE 2: On non-harmonised parameters, national administrations may impose certain conditions such as the type of modulation, frequency, channel/frequency separations, maximum transmitter radiated power, duty cycle, and the inclusion of an automatic transmitter shut-off facility, as a condition for the issue of an Individual Rights for use of spectrum or General Authorization, or as a condition for use under "licence exemption" as it is in most cases for Short Range Devices.
- NOTE 3: Transmitting only on receipt of a Balise/Eurobalise tele-powering signal from a train.



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#### **TEST RESULT**

ILO I KLOOL							
Test Conditions  Frequency Temperature Voltage (kHz) (°C) (V)			99% Bandwidth (kHz)	F∟at 99% BW (kHz)	F <sub>H</sub> at 99% BW (kHz)	Limit Band (kHz)	Result
	25℃	5.0	2.657	325.172	327.829	325~330	Pass
	-10℃	5.5	2.649	325.176	327.825		Pass
326.5	40℃	5.5	2.642	325.179	327.821		Pass
	-10℃	4.5	2.631	325.185	327.816		Pass
	40℃	4.5	2.646	325.18	327.823		Pass



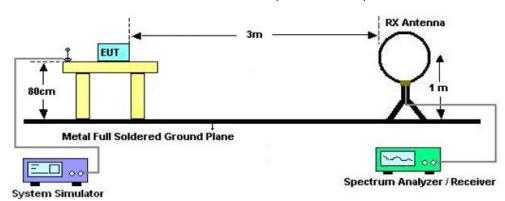
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# 6.3 SPURIOUS DOMAIN EMISSION MEASUREMENT EQUIPMENT USED:

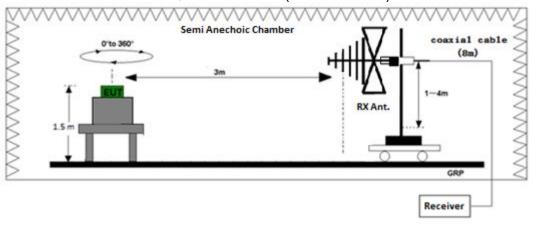
NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCI	100694	Jun. 02, 2024	Jun. 01, 2025
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 02, 2024	Jun. 01, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168- D69250	May 11, 2023	May 10, 2025
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 05, 2024	Mar. 04, 2026

#### **TEST SETUP:**

# FREQUENCY RANGE (9KHZ-30MHZ)



# FREQUENCY RANGE (ABOVE 30MHZ)





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#### **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					



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# 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)								
				2.5 dDuA/m/40MHz 20MHz\								
				-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.

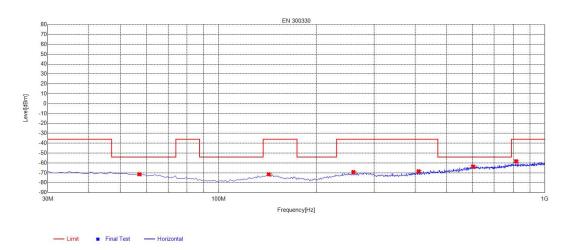
Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



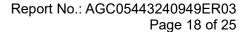
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# FREQUENCY RANGE (ABOVE 30MHZ)

# **EUT OPERATION MODE - HORIZONTAL**

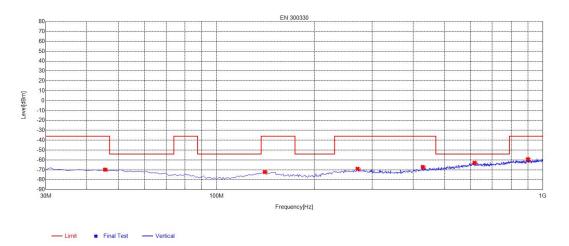


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	57.16	-98.47	-71.44	-54.00	17.44	27.03	310	Horizontal
2	142.52	-98.59	-71.50	-36.00	35.50	27.09	220	Horizontal
3	258.92	-97.78	-69.22	-36.00	33.22	28.56	90	Horizontal
4	410.24	-98.38	-68.45	-36.00	32.45	29.93	70	Horizontal
5	602.3	-98.45	-63.61	-54.00	9.61	34.84	170	Horizontal
6	816.67	-95.78	-58.26	-36.00	22.26	37.52	20	Horizontal





**EUT OPERATION MODE - VERTICAL** 



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	45.52	-98.83	-69.80	-36.00	33.80	29.03	280	Vertical
2	140.58	-99.51	-72.22	-36.00	36.22	27.29	150	Vertical
3	270.56	-97.39	-69.00	-36.00	33.00	28.39	170	Vertical
4	428.67	-97.53	-67.10	-36.00	31.10	30.43	220	Vertical
5	617.82	-97.72	-62.92	-54.00	8.92	34.80	190	Vertical
6	900.09	-96.90	-59.37	-36.00	23.37	37.53	140	Vertical



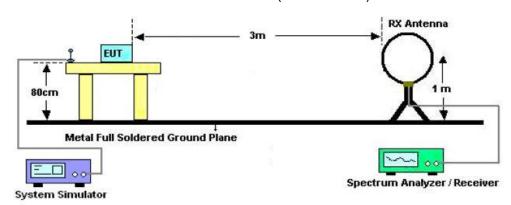
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# 6.4 ETSI EN 300 330 Subclasses 4.4.2: Receiver spurious radiation MEASUREMENT EQUIPMENT USED:

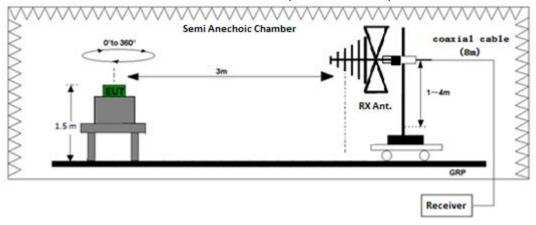
NAME OF EQUIPMENT	MANUFACTURER	MODEL	S/N	Cal. Date	Cal. Due	
EMI Test Receiver	R&S	ESCI	100694	Jun. 02, 2024	Jun. 01, 2025	
Amplifier	Schwarzbeck	BBV 9718	9718-205	Jun. 02, 2024	Jun. 01, 2025	
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025	
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168- D69250	May 11, 2023	May 10, 2025	
LOOP ANTENNA	ZHINAN	ZN30900C	18051	Mar. 05, 2024	Mar. 04, 2026	

# **TEST SETUP:**

# FREQUENCY RANGE (9KHZ-30MHZ)



# FREQUENCY RANGE (ABOVE 30MHZ)





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# 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
ı	10 MHz ≤ f < 30 MHz	10	-25 dB u A/m

	RECEIVER MODE											
Frequenc y	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.

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

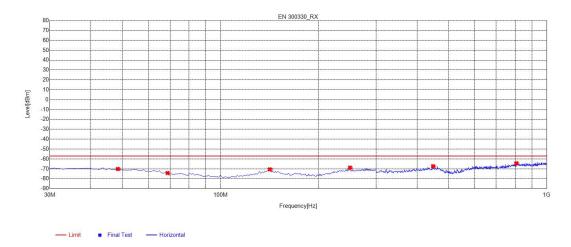
strength is too small to be measured.



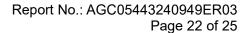
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# FREQUENCY RANGE (ABOVE 30MHZ)

#### **EUT OPERATION MODE - HORIZONTAL**

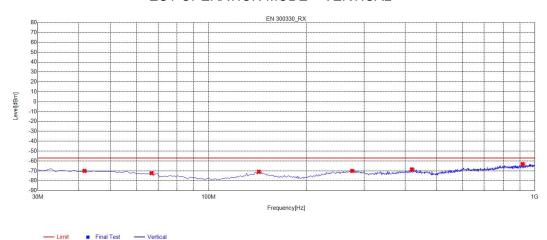


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	48.43	-98.95	-70.14	-57.00	13.14	28.81	20	Horizontal
2	68.8	-99.14	-74.27	-57.00	17.27	24.87	160	Horizontal
3	141.55	-97.69	-70.51	-57.00	13.51	27.18	190	Horizontal
4	249.22	-97.36	-68.76	-57.00	11.76	28.60	240	Horizontal
5	448.07	-98.28	-67.33	-57.00	10.33	30.95	230	Horizontal
6	806	-101.93	-64.29	-57.00	7.29	37.64	300	Horizontal





# **EUT OPERATION MODE - VERTICAL**



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	41.64	-99.34	-70.01	-57.00	13.01	29.33	90	Vertical
2	66.86	-97.53	-72.34	-57.00	15.34	25.19	200	Vertical
3	142.52	-97.98	-70.89	-57.00	13.89	27.09	30	Vertical
4	275.41	-98.38	-70.05	-57.00	13.05	28.33	330	Vertical
5	419.94	-98.63	-68.44	-57.00	11.44	30.19	340	Vertical
6	917.55	-101.00	-63.13	-57.00	6.13	37.87	100	Vertical



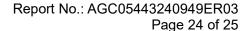
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# 7. ETSI EN 300 330 V2.1.1: INTERPRETATION OF MEASUREMENT RESULTS

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

RF Frequency	± 1 x 10 <sup>-7</sup>
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





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# APPENDIX II PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC05443240949AP01
----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.