

RF - TEST REPORT

Report Number : 64.911.24.00149.01-R1 Date of Issue: October 9, 2024

Model : MDDO-10DEN7-QA3, MDDO1-10DEN7-QA3, MDDO2-10DEN7-QA3, MDDO3-10DEN7-QA3, MDDO-12DEN7-QA3, MDDO1-12DEN7-QA3, MDDO2-12DEN7-QA3, MDDO3-12DEN7-QA3

Product Type : Air dehumidifier (Dehumidifier)

Applicant : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.

Manufacturer : GD Midea Air-Conditioning Equipment Co., Ltd.

Address : Lingang Road, Beijiao, Shunde 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.

Test Result : Positive Negative



Total pages including Appendices : 21

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1 Report Version

Revision	Release Date	History/Memo.
1.0	October 9, 2024	Initial Release

2 General Information

2.1 Notes

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Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details please see testing and certification regulation, chapter A-3.4.

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH -

Reviewed by:



Kevin Ouyang 

Prepared by:



Tim Yue 

2.2 Testing Laboratory

Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2,
Nanshan District, Shenzhen City, 518052, P. R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

2.3 Application Details

For module EU-SK105:

Sample Received Date: 2020-12-01

Testing Start Date: 2020-12-07

Testing End Date: 2021-01-13

For Dehumidifier:

Sample Received Date: 2024-06-17

Testing Start Date: 2024-06-19

Testing End Date: 2024-07-02

2.4 Applied Standard

APPLIED PRODUCT STANDARD

Test Standards	
ETSI EN 300 328 V2.2.2 (2019-07)	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum
EN 62311:2008 EN IEC 62311:2020	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)

2.5 Test Summary

Summary of results

Conformance requirement according to ETSI EN 300 328 V2.2.2 (2019-07)		Result	Remark
Essential parameter	Corresponding technical requirements		
Transmitter requirements	4.3.2.2 RF output power	PASS	Note 4
	4.3.2.3 Power Spectral Density	PASS	Note 4
	4.3.2.4 Duty Cycle, Tx-sequence, Tx-gap*	N/A	Note 2
	4.3.2.5 Medium Utilisation (MU) factor*	N/A	Note 2
	4.3.2.6 Adaptivity	PASS	Note 4
	4.3.2.7 Occupied Channel Bandwidth	PASS	Note 4
	4.3.2.8 Transmitter unwanted emissions in the out-of-band domain	PASS	Note 4
	4.3.2.9 Transmitter unwanted emissions in the spurious domain	PASS	Note 4
Receiver requirements	4.3.2.10 Receiver spurious emissions	PASS	Note 4
	4.3.2.11 Receiver Blocking	PASS	Note 4
	4.3.2.12 Geo-location capability**	N/A	Note 3

NOTE1: Measurement taken is within the measurement uncertainty of measurement system.

NOTE2: "*" This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode.

NOTE3: "***" This requirement only applies to equipment with geo-location capability as defined in clause 4.3.2.12.2.

NOTE4: Radiated spurious emission test were test in this report, other data refer to report 64.920.20.05186.01-R2.

3 Equipment Specification

3.1 General Description

EUT is kind of Air dehumidifier (Dehumidifier) which support 2.4G Wi-Fi and BLE function.
 This report is only for 2.4G Wi-Fi function.
 RF Module EU-SK105 was deemed to fulfil requirements of EN 300328 V2.2.2 in report 64.920.20.05186.01-R1 and 64.920.20.05186.01-R2. It was fully plugged into Air dehumidifier (Dehumidifier) as a complete component.
 MDDO1-12DEN7-QA3 is same as MDDO-12DEN7-QA3 except the display board and appearance.
 MDDO-10DEN7-QA3, MDDO1-10DEN7-QA3 are respectively same as the MDDO-12DEN7-QA3, MDDO1-12DEN7-QA3 except the compressor, evaporator and condenser.
 MDDO3-10DEN7-QA3 is same as MDDO-10DEN7-QA3 except the appearance of display panel;
 MDDO2-10DEN7-QA3 is same as MDDO1-10DEN7-QA3 except the appearance of display panel;
 MDDO3-12DEN7-QA3 is same as MDDO-12DEN7-QA3 except the appearance of display panel;
 MDDO2-12DEN7-QA3 is same as MDDO1-12DEN7-QA3 except the appearance of display panel.
 Added alternative fan motor for all models.
 According to a technical evaluation, radiated spurious emission test were performed on MDDO1-12DEN7-QA3. Other data are referred from 64.920.20.05186.01-R2.

3.2 Technical Data

Description:	Air dehumidifier (Dehumidifier)
Models:	MDDO-10DEN7-QA3, MDDO1-10DEN7-QA3, MDDO2-10DEN7-QA3, MDDO3-10DEN7-QA3, MDDO-12DEN7-QA3, MDDO1-12DEN7-QA3, MDDO2-12DEN7-QA3, MDDO3-12DEN7-QA3
RF Module	EU-SK105
Input Rated:	220-240V AC
Maximum EIRP (RF Output Power):	6.6 dBm for BLE 18.1 dBm for 2.4G Wi-Fi
Antenna gain	2.0 dBi

Mode	Work Frequency	
	Transmitt Frequency (MHz)	Receive Frequency (MHz)
Bluetooth Low Energy	2402MHz-2480 MHz	2402MHz-2480 MHz
2.4G Wi-Fi	2412MHz-2472 MHz	2412MHz-2472 MHz

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

4 Product Description –manufacturer description

4.1 Type of Equipment

<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in radio
<input type="checkbox"/> Combined equipment	<input type="checkbox"/> Other

4.2 Extreme operating condition as declared by manufacturer

EXTREME TEMPERATURE RANGE over which equipment is to be type tested		
<input type="checkbox"/>	Outdoor and indoor usage	-20°C to +50°C
<input type="checkbox"/>	Indoor usage only	0°C to +35°C
<input checked="" type="checkbox"/>	Other	[5°C to +32°C declared by manufacturer]

Power source description			
<input checked="" type="checkbox"/>	AC mains voltage		
<input type="checkbox"/>	DC voltage Nominal		
Type of DC			
External Power Supply	External AC/DC Adapter	Battery	Other
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.3 Transmit operating mode

<input checked="" type="checkbox"/>	Single antenna equipment		
<input type="checkbox"/>	Multiple antenna without beam forming		
<input type="checkbox"/>	Multiple antenna with beam forming	Beam forming gain Y =	[dB]

4.4 Operating Frequency Range

Transmitter / Receiver Frequency Range			
<input checked="" type="checkbox"/>	Range 1 : from :	2412 MHz	To 2472 MHz
<input type="checkbox"/>	Range 2 : from :		
<input type="checkbox"/>	Other - (include frequency ranges supported):		

4.5 Modulation type

Modulation type	
[]	GFSK
[]	$\pi/4$ -DQPSK
[]	8DPSK
[✓]	IEEE 802.11™ [i.3] modulations using a single or multiple transmitters with or without transmit CSD.
[✓]	HT20: 20 MHz channels with one to four spatial streams (MCS 0 to MCS 7).
[]	HT40: 40 MHz channels with one to four spatial streams (MCS 0 to MCS 7).

4.6 Equipment type tested path

Transmitter operate modulation:	
[]	Bluetooth Low Energy
[✓]	IEEE 802.11
[]	Other supply full details: _____

4.7 Type of antenna

Type of antenna		
Type of Transmitter's antenna	[✓]	Integrated Antenna(s)
	[]	Antenna connector for dedicated antenna(s)
Antenna gain:	[✓]	2.0 dBi
Temporary RF connector provided	[✓]	
No temporary RF connector provided	[]	

4.8 Additional information

The transmitter can operate only:

- Modulated
- Un-modulated

ITU Class of emissions 1. 22

Receiver categories

- Receiver category 1
- Receiver category 2
- Receiver category 3

About the EUT:

- The equipment submitted are representative production models.
- If not, the equipment submitted are pre-production models.
- If preproduction equipment are submitted, the final production equipment will be identical in all respects with the equipment tested.
- If not, supply full details: _____

5 Measurements Result

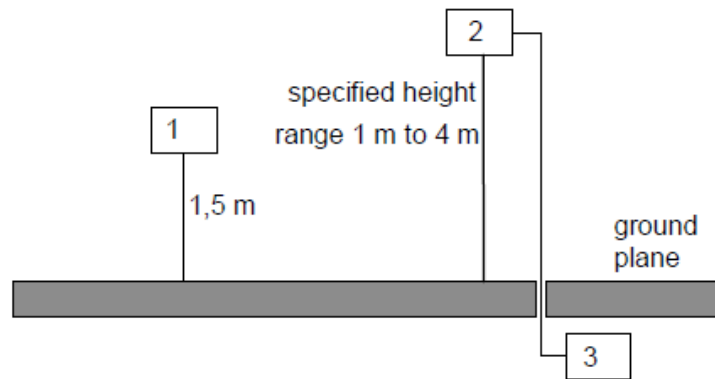
5.1 Spurious emissions

5.1.1 Test Procedure and limit

A test site fulfilling the requirements of ITU-R Recommendation SM329-10 was used. The EUT was placed on a non-conducting support in the anechoic chamber and was operated from a power source via an RF filter to avoid radiation from the power leads.

Step 1 Radiated measurements:

- a) A test site which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization unless otherwise stated and the transmitter under test shall be placed on the support in its standard position and switched on;
- b) The measurement equipment shall be connected to the measurement antenna and set-up according to the specifications of the test.

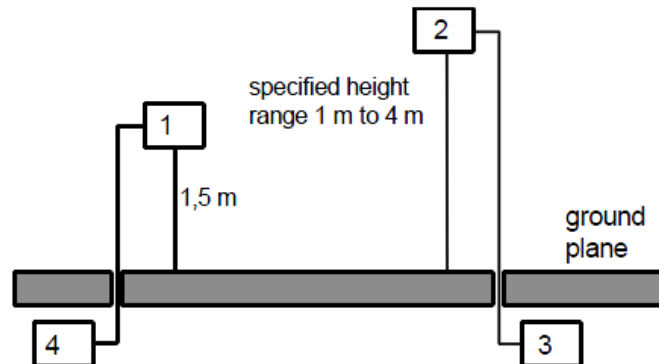


- 1) UUT
- 2) Measurement antenna
- 3) Measurement equipment

- c) The UUT shall be rotated through 360° in a horizontal plane until a higher maximum signal is received.
- d) The measurement antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be recorded.

Step 2 Substitution measurements:

- a) Replacing the UUT with the substitution antenna. The substitution antenna will have vertical polarization.



- 1) Substitution antenna.
 2) Measurement antenna
 3) Measurement equipment
 4) Signal generator.

- b) Connect a signal generator to the substitution antenna, and adjust it to the measurement frequency.
 c) The measurement antenna shall be raised or lowered, to ensure that the maximum signal is received.
 d) Subsequently, the power of the signal generator is adjusted until the same level is obtained again at the measurement equipment.
 e) The radiated power is equal to the power supplied by the signal generator, increased the substitution antenna gain minus the cable losses (values in dB).
 f) This measurement shall be repeated with horizontal polarization.

Radiated Spurious Emissions Limits for Transmitter

Frequency range	Maximum Power e.r.p(≤1G) e.i.r.p(>1G)	Measurement Bandwidth
30MHz to 47MHz	-36dBm	100kHz
47MHz-74MHz	-54dBm	100kHz
74MHz-87.5MHz	-36dBm	100kHz
87.5MHZ-118MHz	-54dBm	100kHz
118MHz-174MHz	-36dBm	100kHz
174MHz-230MHz	-54dBm	100kHz
230MHz-470MHz	-36dBm	100kHz
470MHz-694MHz	-54dBm	100kHz
694MHz-1GHz	-36dBm	100kHz
Above 1GHz to 12.75GHz	-30dBm	1MHz

Radiated Spurious Emissions Limits for Receiver

Frequency range	Maximum power, e.r.p	Measurement Bandwidth
30MHz to 1GHz	-57dBm	100kHz
Above 1GHz to 12.75GHz	-47dBm	1MHz

Test condition

Test Mode:	Transmitting
Relative humidity:	48.6%
Ambient Pressure:	101.1Kpa

5.1.2 Test Result

Note: The test results for testing range of “30 MHz to 12.75 GHz” showed as below is the WORST case for all Test Modes and Channels. The detected values which are noise floor or below the limit 20dB will not be recorded.

5.1.2.1 Test result for Transmitter

Emission:

EUT: Dehumidifier
M/N: MDDO1-12DEN7-QA3
Operating Condition: Wi-Fi (TX)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
49.507778	-70.66	-54.00	16.66	H	-117.8
205.300556	-71.53	-54.00	17.53	H	-128.3
590.175000	-66.55	-54.00	12.55	H	-118.3
2624.437500	-57.99	-30.00	27.99	H	-102.7
4012.406250	-55.01	-30.00	25.01	H	-99.3
12724.29687	-48.24	-30.00	18.24	H	-91.6
89.223889	-66.83	-54.00	12.83	V	-123.4
107.384445	-67.71	-54.00	13.71	V	-121.6
592.384444	-68.95	-54.00	14.95	V	-117.3
2633.617188	-58.50	-30.00	28.50	V	-103.0
5013.726563	-52.87	-30.00	22.87	V	-97.3
12667.01562	-48.32	-30.00	18.32	V	-91.5

5.1.2.2 Test result for receiver

EUT: Dehumidifier
M/N: MDDO1-12DEN7-QA3
Operating Condition: Wi-Fi (RX)

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
240.112778	-68.61	-57.00	11.61	H	-122.0
342.825000	-62.33	-57.00	5.33	H	-122.8
800.072222	-64.71	-57.00	7.71	H	-115.1
2232.648438	-70.46	-47.00	23.46	H	-104.5
3276.929688	-66.81	-47.00	19.81	H	-100.9
12509.85937	-57.89	-47.00	10.89	H	-91.8
128.077778	-65.63	-57.00	8.63	V	-128.7
180.835000	-66.02	-57.00	9.02	V	-123.6
400.001111	-64.26	-57.00	7.26	V	-119.9
2004.257813	-70.61	-47.00	23.61	V	-105.2
4475.429688	-63.48	-47.00	16.48	V	-98.2
9648.367188	-55.79	-47.00	8.79	V	-93.6

5.1.3 Result

The equipment met the requirement of this clause.

6 Estimation of Exposure of Human to Electromagnetic Fields

According to EN 62311:2008, EN IEC 62311:2020 the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/519/EC.

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

Notes

- f as indicated in the frequency range column.
- For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
- For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
- No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

For the 2.4GHz band the reference level is E field strength 61V/m

The Formula

$$r = \frac{\sqrt{30PG(\theta, \phi)}}{E}$$

Whereas,

G=antenna gain relative to an isotropic antenna

$\Theta \Phi$ = elevation and azimuth angles to point of investigation

r=distance from observation point to the antenna

P=the maximum output power of transmitter.

The maximum e.i.r.p of the transmitter is 18.1dBm= 64.57mW = 0.06457W

Since e.i.r.p is used for this calculation, the antenna gain is assumed as 2.0dBi=1.58

$$r = 0.029\text{m}$$

The antenna of the product, under normal use condition is at least 2.9cm away from the body of the user. Warning statement to the user for keeping at least 2.9cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

So the requirement is easily met for the user if only user is not close extremely to the product.

7 Lists of Test Instruments

TS8997 Test System

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Generator	Rohde & Schwarz	SMB100A	108272	2025-05-11
Vector Signal Generator	Rohde & Schwarz	SMBV100A	262825	2025-05-11
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270	101251	2025-05-11
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2025-05-11
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2025-05-11
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2025-05-11
Power Splitter	Weinschel	1580	SC319	2025-05-11
10dB Attenuator	Weinschel	4M-10	43152	2025-05-11
10dB Attenuator	R&S	DNF	DNF-001	2025-05-11
10dB Attenuator	R&S	DNF	DNF-002	2025-05-11
10dB Attenuator	R&S	DNF	DNF-003	2025-05-11
10dB Attenuator	R&S	DNF	DNF-004	2025-05-11
Test software	Rohde & Schwarz	EMC32	Version 10.60.10	N/A

Radiated Spurious Emission Test

Description	Manufacturer	Model no.	Serial no.	Cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2025-05-11
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2025-05-11
Horn Antenna	Rohde & Schwarz	HF907	102295	2025-07-05
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K- SG	12827	2025-07-02
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2025-07-24
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2025-05-11
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2025-07-17
Fully Anechoic Chamber	TDK	8X4X4	--	2024-09-02
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

8 Measurement Uncertainty

For the test methods, according to the harmonized standard and conformance testing standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 and shall correspond to an expansion factor (coverage factor) $k = 1.96$ (which provides a confidence level of 95 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 25MHz-1000MHz	Horizontal: 4.79dB; Vertical: 4.79dB;
Uncertainty for Radiated Spurious Emission 1000MHz-18000MHz	Horizontal: 5.11dB; Vertical: 5.11dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-8} or 1%

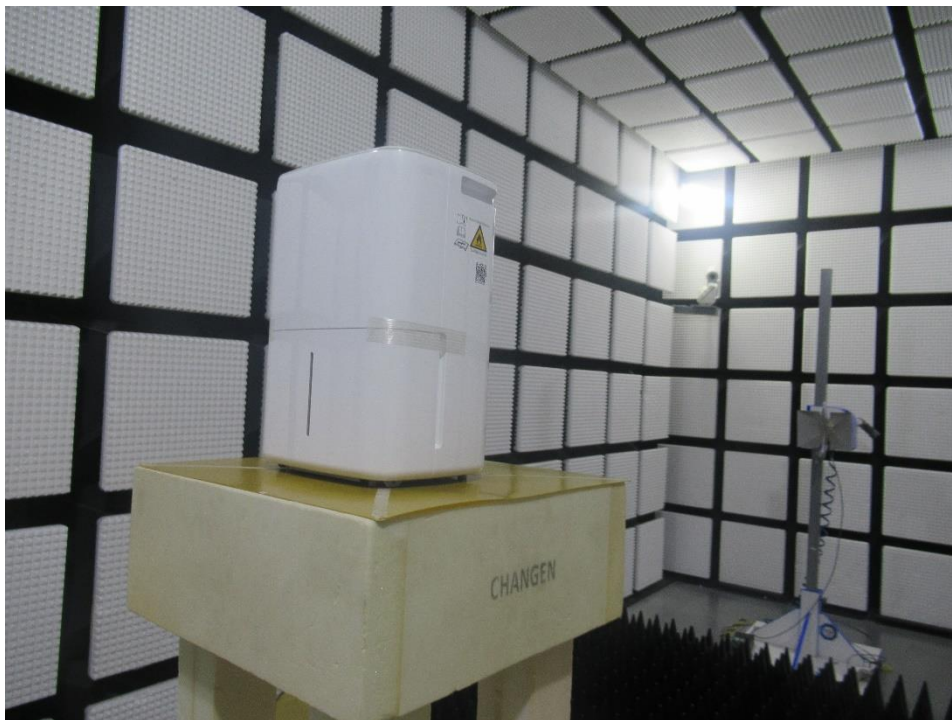
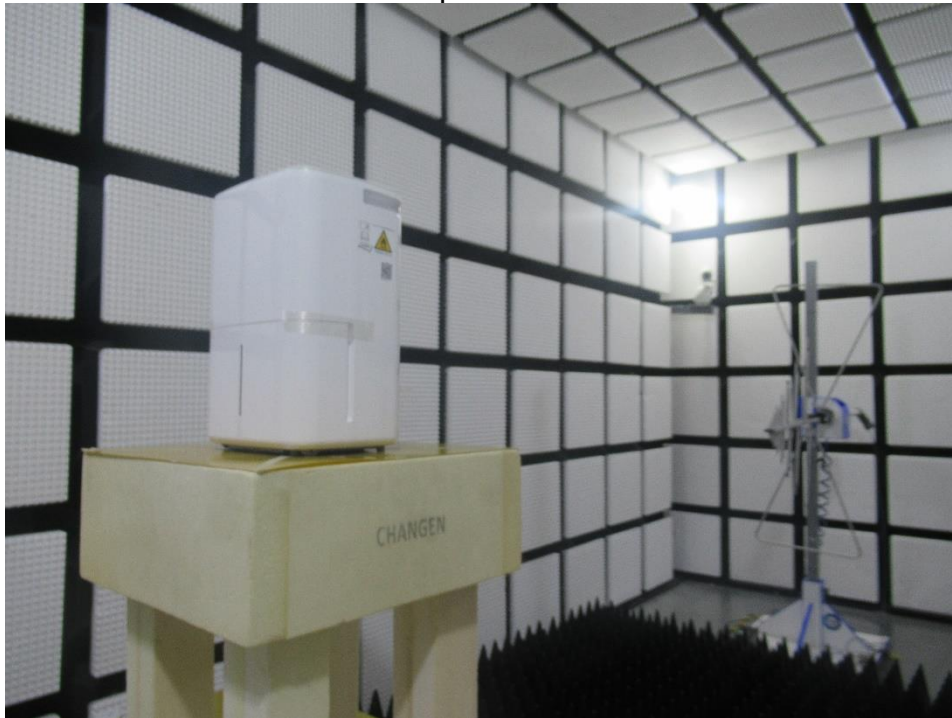
Remark:

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.

9 Photographs of Test Setup

Radiated Spurious Emission



10 Photographs of EUT

Refer to EMC report No.:64.911.24.00149.01-E for complete information.

--END--