



Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community,
Fenghuang Street, Guangming District, Shenzhen, China

TEST REPORT
FCC Rules and Regulations Part PART 15.249

Report Reference No.....: GRCTR240603057-01

FCC ID.....: N82-KOHLER058

Compiled by

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Date of issue.....: Jul. 04, 2024

Testing Laboratory Name.....: Shenzhen GUOREN Certification Technology Service Co., Ltd.

Address.....: 101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

Applicant's name.....: Kohler Co.

Address.....: 444 HIGHLAND DR, KOHLER, WI, 53044, USA

Test specification.....:

Standard.....: FCC Rules and Regulations PART 15.249

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Test item description.....: Smart Fan Remote Control

Trade Mark.....: KOHLER

Manufacturer.....: Shenzhen Jinghua Displays Electronics Co., Ltd.

Model/Type reference.....: 1475870

Listed Models: 1475853

Firmware Version.....: V0.4.0

Hardware Version.....: REV:B

Modulation: GFSK

Frequency.....: From 2414.5MHz to 2449.5MHz

Ratings.....: Button cell CR2032 DC 3.0V*2

Result.....: PASS

TEST REPORT

Equipment under Test : Smart Fan Remote Control

Model /Type : 1475870

Listed Models : 1475853

Applicant : **Kohler Co.**

Address : 444 HIGHLAND DR, KOHLER, WI, 53044, USA

Manufacturer : **Shenzhen Jinghua Displays Electronics Co., Ltd.**

Address : Jinghua Displays Park, No.3 Liuhe Road, Longgang District, Shen
zhen 518173, China

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Jun. 26, 2024
Testing commenced on	:	Jun. 26, 2024
Testing concluded on	:	Jul. 04, 2024

2.2 Product Description

Product Name:	Smart Fan Remote Control
Model/Type reference:	1475870
Listed Models:	1475853(The products are identical in interior structure, electrical circuits and components, just model names is different.)
Power supply:	Button cell CR2032 DC 3.0V*2
Testing sample ID:	GRCTR240603057-1# (Engineer sample), GRCTR240603057-2# (Normal sample)
2.4G	
Operation frequency:	From 2414.5MHz to 2449.5MHz
Modulation Type:	GFSK
Channel separation:	5MHz
Channel number:	8
Antenna Type:	PCB antenna
Antenna gain*(Supplied by the customer):	1.51 dBi
Remark:*When the information provided by the customer was used to calculate test results, if the information provided by the customer is not accurate, shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.	

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	☐ 230V / 50 Hz	☐ 120V / 60Hz
		☐ 12 V DC	☐ 24 V DC
		☒ Other (specified in blank below)	

Button cell CR2032 DC 3.0V*2

2.4 Short description of the Equipment under Test (EUT)

This is a Smart Fan Remote Control.
For more details, refer to the user's manual of the EUT.

2.5 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○ /	M/N: /
	Manufacturer: /

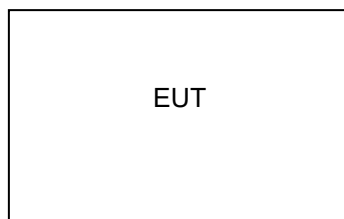
2.6 EUT operation mode

The Applicant provides communication tools software(SecureCRT) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 8 channels provided to the EUT and 2414.5MHz/2434.5MHz/2449.5MHz were selected to test.

Operation Frequency:

Frequency (MHz)
2414.5
2419.5
2424.5
2429.5
2434.5
2439.5
2444.5
2449.5

2.7 Block Diagram of Test Setup



2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 920798 Designation Number: CN1304

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6202.01

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27264 CAB identifier: CN0115

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

CNAS-Lab Code: L15631

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories for the Competence of Testing and Calibration Laboratories.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature	15-35 °C
Relative Humidity	30-60 %
Air Pressure	950-1050mbar

3.4 Summary of measurement results

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.209	Band edge	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.203	Antenna Requirement	PASS

Remark:

1. The measurement uncertainty is not included in the test result.
2. We tested all test mode and recorded worst case in report.
3. N/A means “not applicable”.

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 “Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1” and TR-100028-02 “Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 “ and is documented in the Shenzhen GUOREN Certification Technology Service Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GUOREN Certification Technology Service Co., Ltd.:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Max output power	30MHz~18GHz	0.54 dB	(1)
Power spectral density	/	0.56 dB	(1)
Spectrum bandwidth	/	1.2%	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

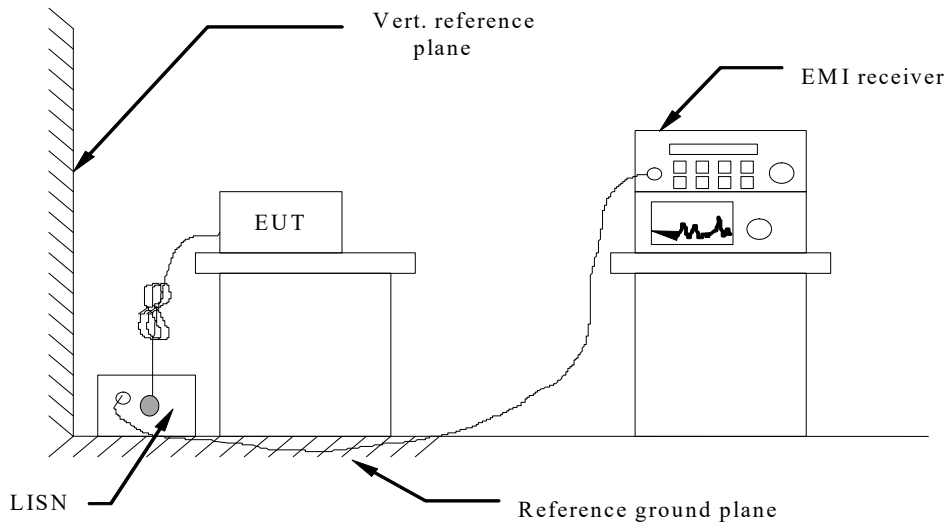
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	GRCTEE009	2023/09/27	2024/09/26
LISN	R&S	ENV216	GRCTEE010	2023/09/27	2024/09/26
EMI Test Receiver	R&S	ESPI	GRCTEE017	2023/09/28	2024/09/27
EMI Test Receiver	R&S	ESCI	GRCTEE008	2023/09/27	2024/09/26
Spectrum Analyzer	Agilent	N9020A	GRCTEE002	2023/09/27	2024/09/26
Spectrum Analyzer	R&S	FSP	GRCTEE003	2023/09/28	2024/09/27
Vector Signal generator	Agilent	N5181A	GRCTEE007	2023/09/27	2024/09/26
Analog Signal Generator	R&S	SML03	GRCTEE006	2023/09/27	2024/09/26
Climate Chamber	QIYA	LCD-9530	GRCTES016	2023/09/27	2024/09/26
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	GRCTEE018	2023/09/28	2026/09/27
Horn Antenna	Schwarzbeck	BBHA 9120D	GRCTEE019	2023/09/28	2026/09/27

Loop Antenna	Zhinan	ZN30900C	GRCTEE020	2023/10/15	2026/10/14
Horn Antenna	Beijing Hangwei Dayang	OBH100400	GRCTEE049	2023/09/28	2026/09/27
Amplifier	Schwarzbeck	BBV 9745	GRCTEE021	2023/09/27	2024/09/26
Amplifier	Taiwan chengyi	EMC051845B	GRCTEE022	2023/09/28	2024/09/27
Temperature/Humidity Meter	Huaguan	HG-308	GRCTES037	2023/09/27	2024/09/26
Directional coupler	NARDA	4226-10	GRCTEE004	2023/09/27	2024/09/26
High-Pass Filter	XingBo	XBLBQ-GTA18	GRCTEE053	2023/09/27	2024/09/26
High-Pass Filter	XingBo	XBLBQ-GTA27	GRCTEE054	2023/09/27	2024/09/26
Automated filter bank	Tonscend	JS0806-F	GRCTEE055	2023/09/27	2024/09/26
Power Sensor	Agilent	U2021XA	GRCTEE070	2023/09/27	2024/09/26
EMI Test Software	ROHDE & SCHWARZ	ESK1-V1.71	GRCTEE060	N/A	N/A
EMI Test Software	Fera	EZ-EMC	GRCTEE061	N/A	N/A

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
- 4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

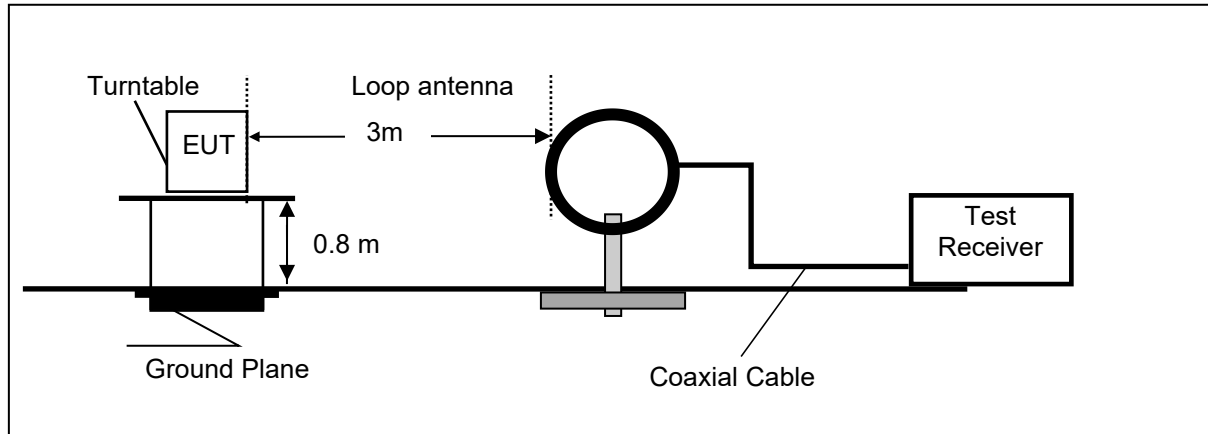
TEST RESULTS

The EUT is powered by Button cell, so this test item is not applicable for the EUT.

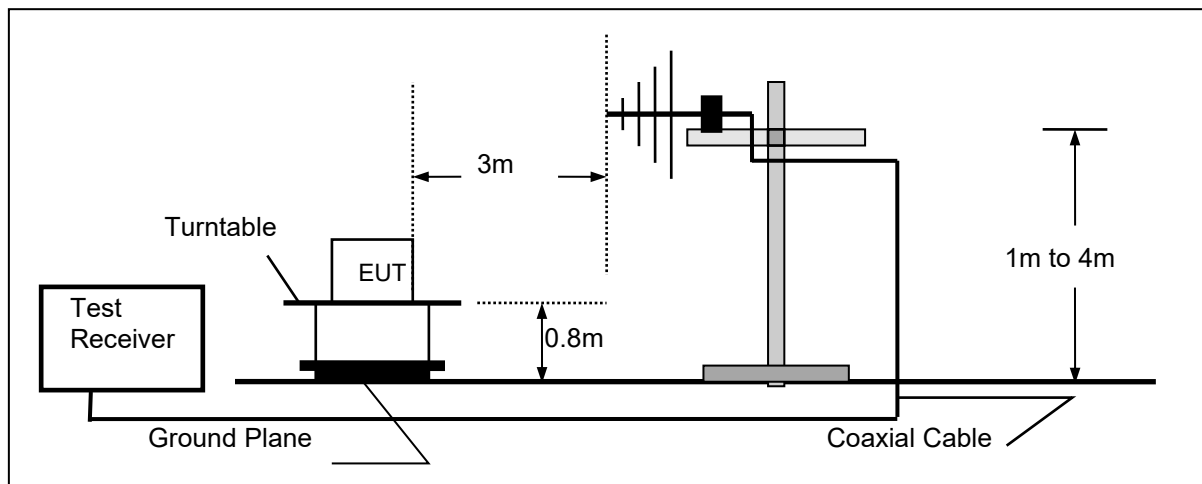
4.2 Radiated Emissions and Band Edge

TEST CONFIGURATION

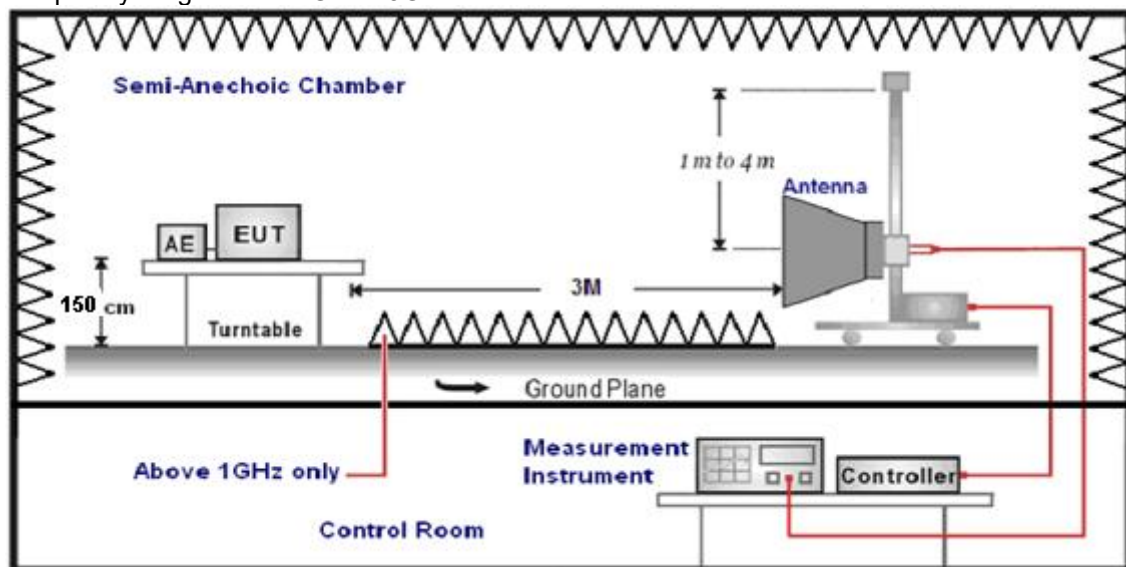
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz, the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

$$\text{Transd} = \text{AF} + \text{CL} - \text{AG}$$

RADIATION LIMIT

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBμV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

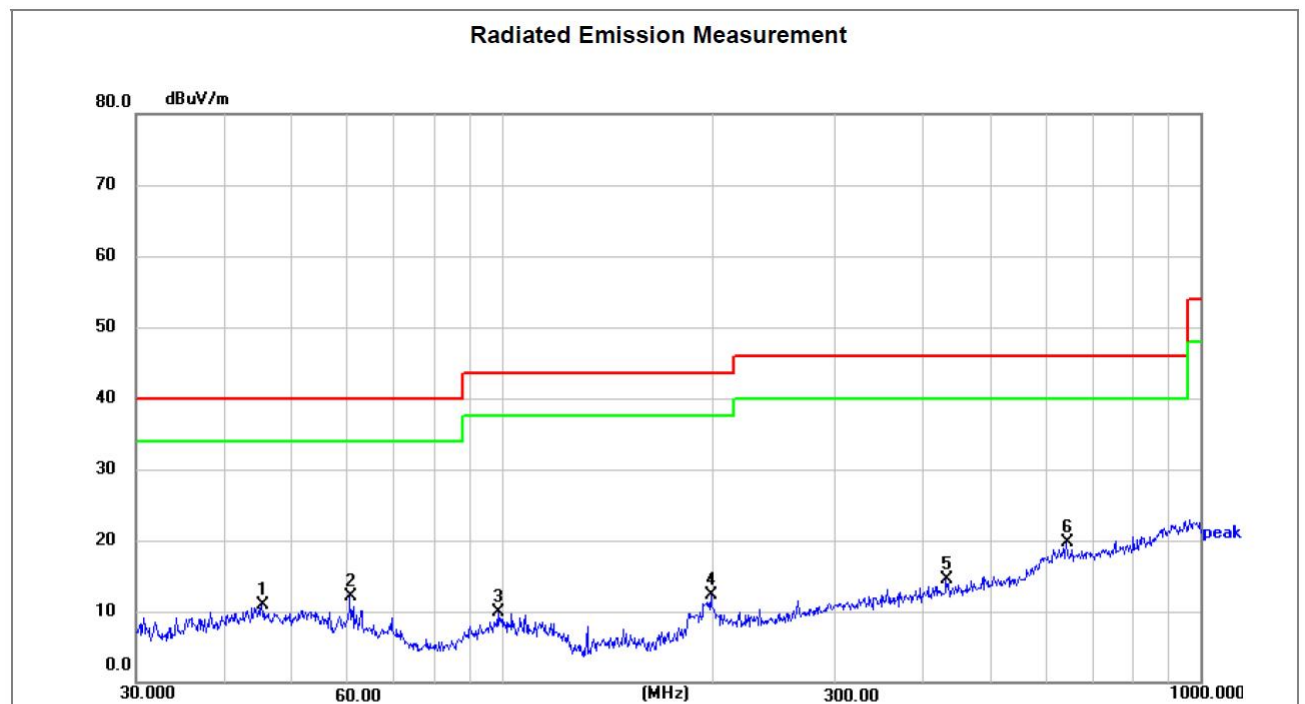
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100

88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. 2414.5MHz/2434.5MHz/2449.5MHz were tested and recorded worst mode at 2414.5MHz below 1GHz.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz**Horizontal**

Site LAB

Polarization: **Horizontal**

Temperature: 24(C)

Limit: FCC Part15 RE-Class B_30-1000MHz

Power: Button cell

Humidity: 52 %

EUT:

Distance: 3m

M/N:

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	45.3755	28.51	-17.55	10.96	40.00	-29.04	peak	200	170	P	
2	60.7044	31.26	-19.06	12.20	40.00	-27.80	peak	200	351	P	
3	98.8326	29.11	-19.25	9.86	43.50	-33.64	peak	200	74	P	
4	199.2855	31.37	-19.08	12.29	43.50	-31.21	peak	100	182	P	
5	432.5457	29.91	-15.36	14.55	46.00	-31.45	peak	100	53	P	
6 *	642.8613	30.44	-10.82	19.62	46.00	-26.38	peak	200	351	P	

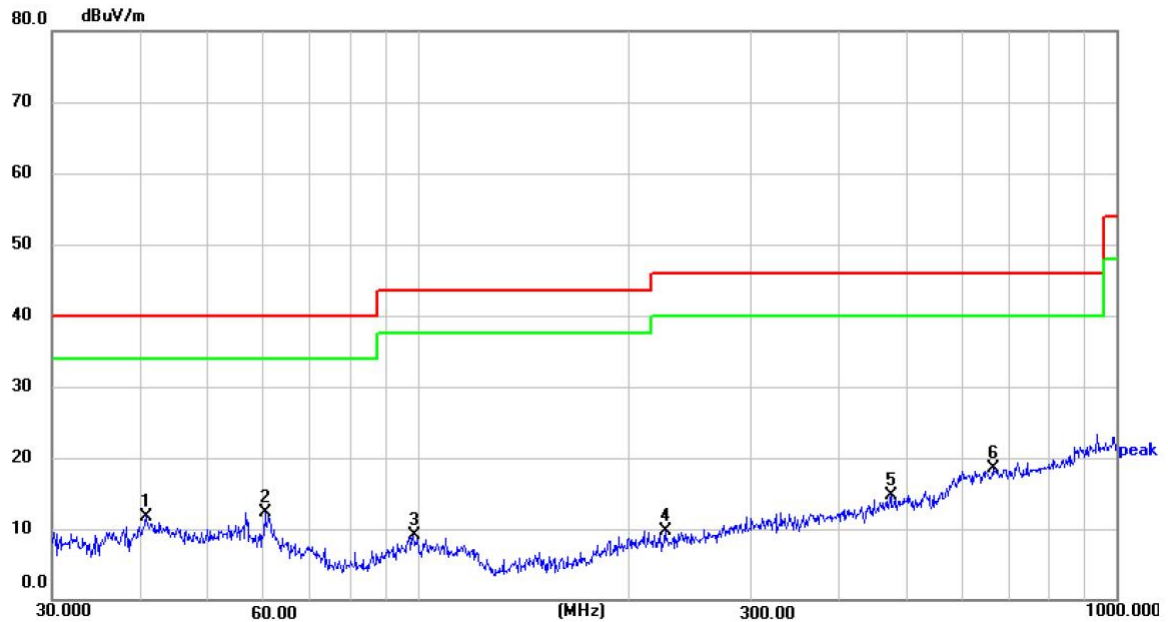
Note:1).Level (dBuV/m)= Reading (dBuV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Level (dBuV/m) - Limit (dBuV/m)

Vertical

Radiated Emission Measurement



Site LAB

Polarization: **Vertical**

Temperature: 24(C)

Limit: FCC Part15 RE-Class B_30-1000MHz

Power: Button cell

Humidity: 52 %

EUT:

Distance: 3m

M/N:

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	40.8446	29.63	-17.83	11.80	40.00	-28.20	peak	100	148	P	
2	60.4919	31.40	-19.02	12.38	40.00	-27.62	peak	100	286	P	
3	98.4866	28.50	-19.31	9.19	43.50	-34.31	peak	100	87	P	
4	226.0994	28.32	-18.63	9.69	46.00	-36.31	peak	100	165	P	
5	475.4991	29.37	-14.73	14.64	46.00	-31.36	peak	100	217	P	
6 *	665.8035	29.30	-10.71	18.59	46.00	-27.41	peak	100	79	P	

Note:1).Level (dBuV/m)= Reading (dBuV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Level (dBuV/m) - Limit (dBuV/m)

For 1GHz to 25GHz

(above 1GHz)

Frequency(MHz):			2414.5		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2414.5	98.26	PK	114.00	15.74	122.75	25.71	4.36	54.56	-24.49
2414.5	84.43	AV	94.00	9.57	108.92	25.71	4.36	54.56	-24.49
4829.0	53.04	PK	74.00	20.96	74.16	28.39	5.12	54.63	-21.12
4829.0	42.20	AV	54.00	11.80	63.32	28.39	5.12	54.63	-21.12
7243.5	49.54	PK	74.00	24.46	63.73	34.16	6.47	54.82	-14.19
7243.5	38.28	AV	54.00	15.72	52.47	34.16	6.47	54.82	-14.19

Frequency(MHz):			2414.5		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2414.5	99.51	PK	114.00	14.49	124.00	25.71	4.36	54.56	-24.49
2414.5	85.02	AV	94.00	8.98	109.51	25.71	4.36	54.56	-24.49
4829.0	52.24	PK	74.00	21.76	73.36	28.39	5.12	54.63	-21.12
4829.0	41.52	AV	54.00	12.48	62.64	28.39	5.12	54.63	-21.12
7243.5	50.17	PK	74.00	23.83	64.36	34.16	6.47	54.82	-14.19
7243.5	39.31	AV	54.00	14.69	53.50	34.16	6.47	54.82	-14.19

Frequency(MHz):			2434.5		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2434.5	99.08	PK	114.00	14.92	123.60	25.73	4.38	54.63	-24.52
2434.5	84.83	AV	94.00	9.17	109.35	25.73	4.38	54.63	-24.52
4869.0	53.07	PK	74.00	20.93	73.54	28.71	5.31	54.49	-20.47
4869.0	41.50	AV	54.00	12.50	61.97	28.71	5.31	54.49	-20.47
7303.5	50.18	PK	74.00	23.82	63.77	34.37	6.78	54.74	-13.59
7303.5	38.55	AV	54.00	15.45	52.14	34.37	6.78	54.74	-13.59

Frequency(MHz):			2434.5		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2434.5	99.47	PK	114.00	14.53	123.99	25.73	4.38	54.63	-24.52
2434.5	85.13	AV	94.00	8.87	109.65	25.73	4.38	54.63	-24.52
4869.0	53.85	PK	74.00	20.15	74.32	28.71	5.31	54.49	-20.47
4869.0	42.04	AV	54.00	11.96	62.51	28.71	5.31	54.49	-20.47
7303.5	51.01	PK	74.00	22.99	64.60	34.37	6.78	54.74	-13.59
7303.5	39.05	AV	54.00	14.95	52.64	34.37	6.78	54.74	-13.59

Frequency(MHz):			2449.5		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2449.5	98.53	PK	114.00	15.47	122.87	25.76	4.39	54.49	-24.34
2449.5	84.62	AV	94.00	9.38	108.96	25.76	4.39	54.49	-24.34
4899.0	54.81	PK	74.00	19.19	75.16	28.72	5.38	54.45	-20.35
4899.0	42.39	AV	54.00	11.61	62.74	28.72	5.38	54.45	-20.35
7348.5	52.45	PK	74.00	21.55	65.71	34.46	7.03	54.75	-13.26
7348.5	41.01	AV	54.00	12.99	54.27	34.46	7.03	54.75	-13.26

Frequency(MHz):			2449.5		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2449.5	98.87	PK	114.00	15.13	123.21	25.76	4.39	54.49	-24.34
2449.5	85.73	AV	94.00	8.27	110.07	25.76	4.39	54.49	-24.34
4899.0	53.79	PK	74.00	20.21	74.14	28.72	5.38	54.45	-20.35
4899.0	42.41	AV	54.00	11.59	62.76	28.72	5.38	54.45	-20.35
7348.5	50.63	PK	74.00	23.37	63.89	34.46	7.03	54.75	-13.26
7348.5	39.97	AV	54.00	14.03	53.23	34.46	7.03	54.75	-13.26

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

Results of Band Edges Test (Radiated)**GFSK**

Frequency(MHz):			2414.5		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	57.15	PK	74	16.85	81.87	25.72	4.32	54.76	-24.72
2390.00	40.10	AV	54	13.90	64.82	25.72	4.32	54.76	-24.72
Frequency(MHz):			2414.5		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	56.92	PK	74	17.08	81.64	25.72	4.32	54.76	-24.72
2390.00	41.96	AV	54	12.04	66.68	25.72	4.32	54.76	-24.72
Frequency(MHz):			2449.5		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	57.14	PK	74	16.86	81.71	25.78	4.48	54.83	-24.57
2483.50	40.04	AV	54	13.96	64.61	25.78	4.48	54.83	-24.57
Frequency(MHz):			2449.5		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	56.96	PK	74	17.04	81.53	25.78	4.48	54.83	-24.57
2483.50	42.17	AV	54	11.83	66.74	25.78	4.48	54.83	-24.57

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3 20dB Bandwidth Measurement

Limit

N/A

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30KHz RBW and 100KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

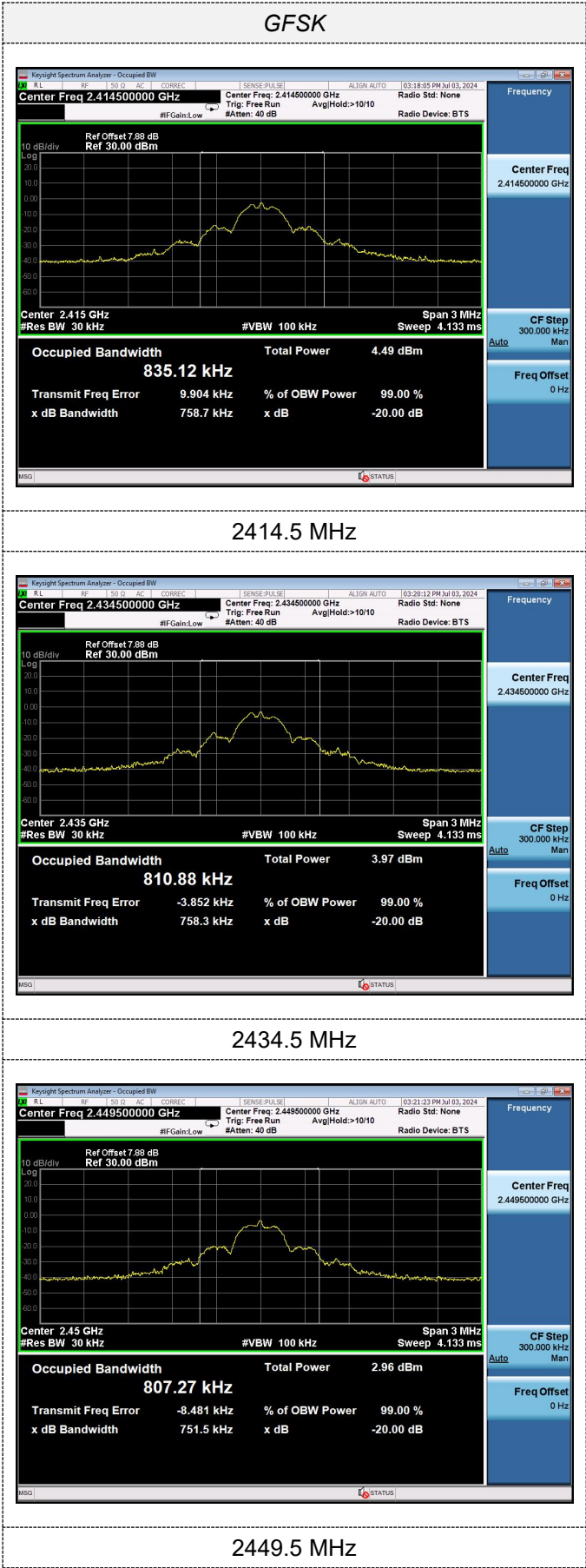
Test Configuration



Test Results

Type	Frequency(MHz)	20dB Bandwidth (MHz)	Result
GFSK	2414.5	0.7587	Pass
	2434.5	0.7583	
	2449.5	0.7515	

Test plot as follows:



4.4 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance

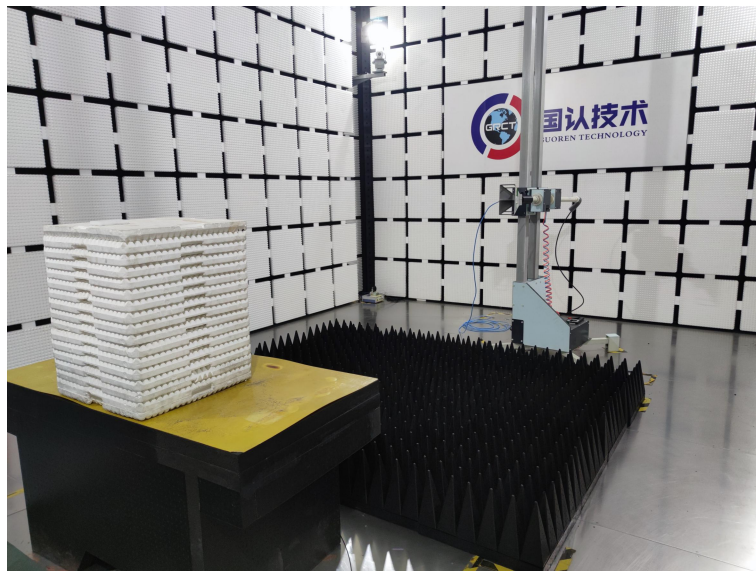
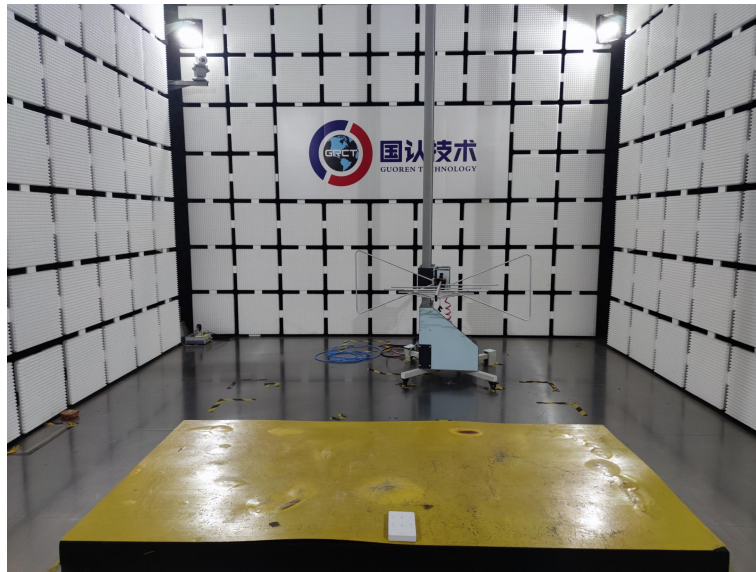
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

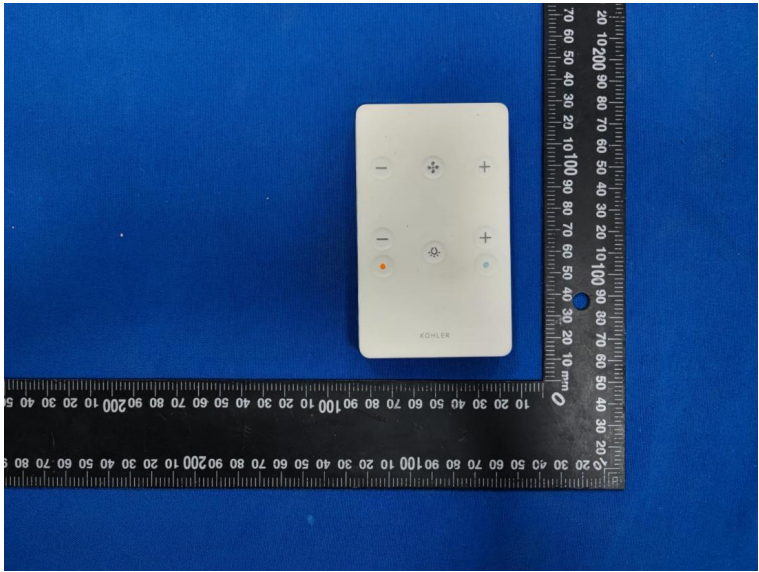
The maximum gain of antenna was 1.51 dBi.

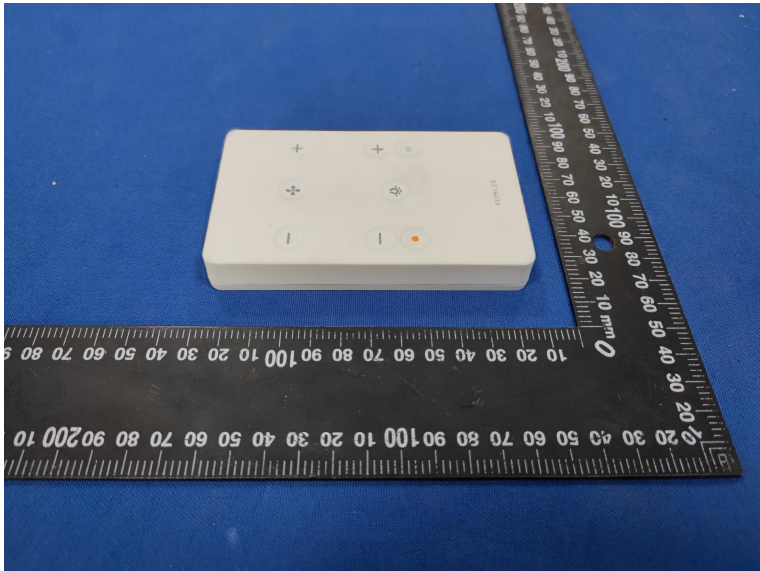
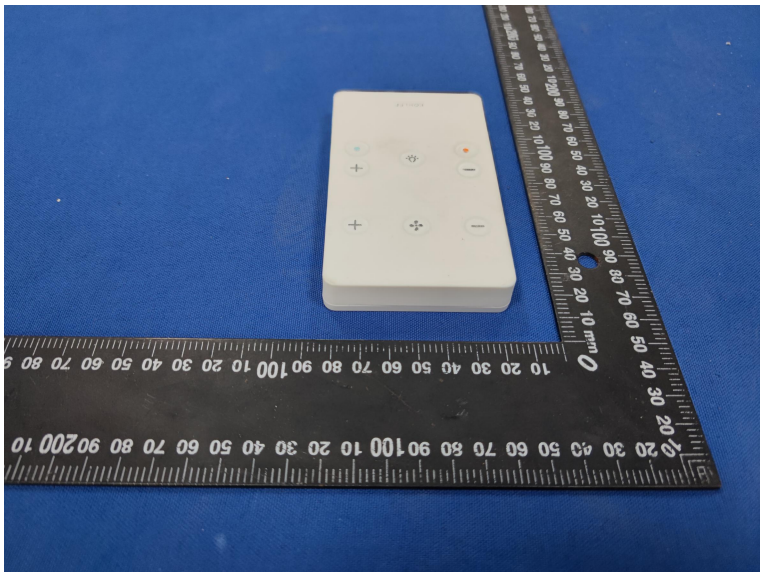
Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.

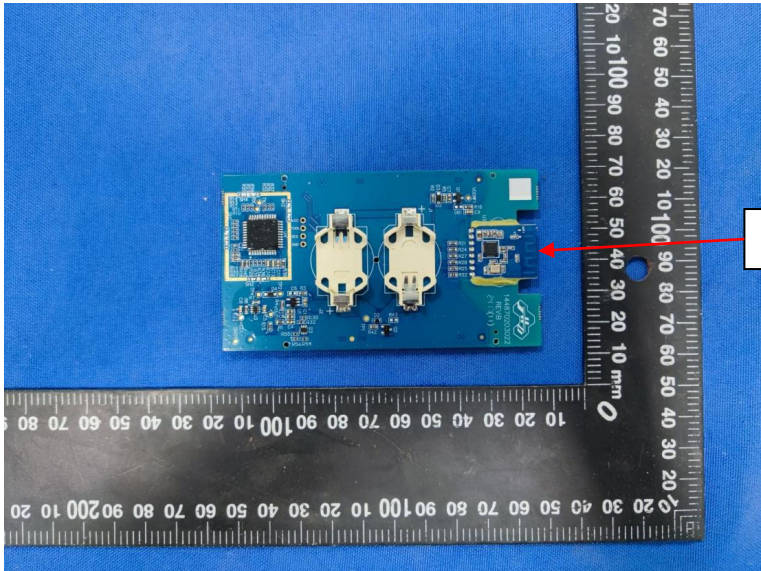
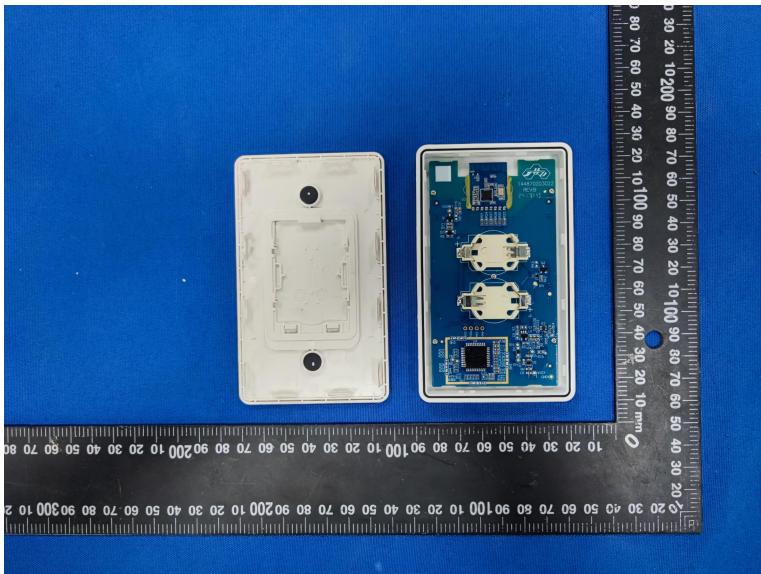
5 Test Setup Photos of the EUT



6 Photos of the EUT







2.4G Antenna

