FCC TEST REPORT

Report No. .....: NTC-ER2007072

Applicant's name: CWCE Lighting (Shenzhen) Co., Ltd.

Address .....: A/area, 9F/Bldg,Cuijing Rd 28, Longtian Town,Pingshan New District,SHENZHEN Guangdong 518122

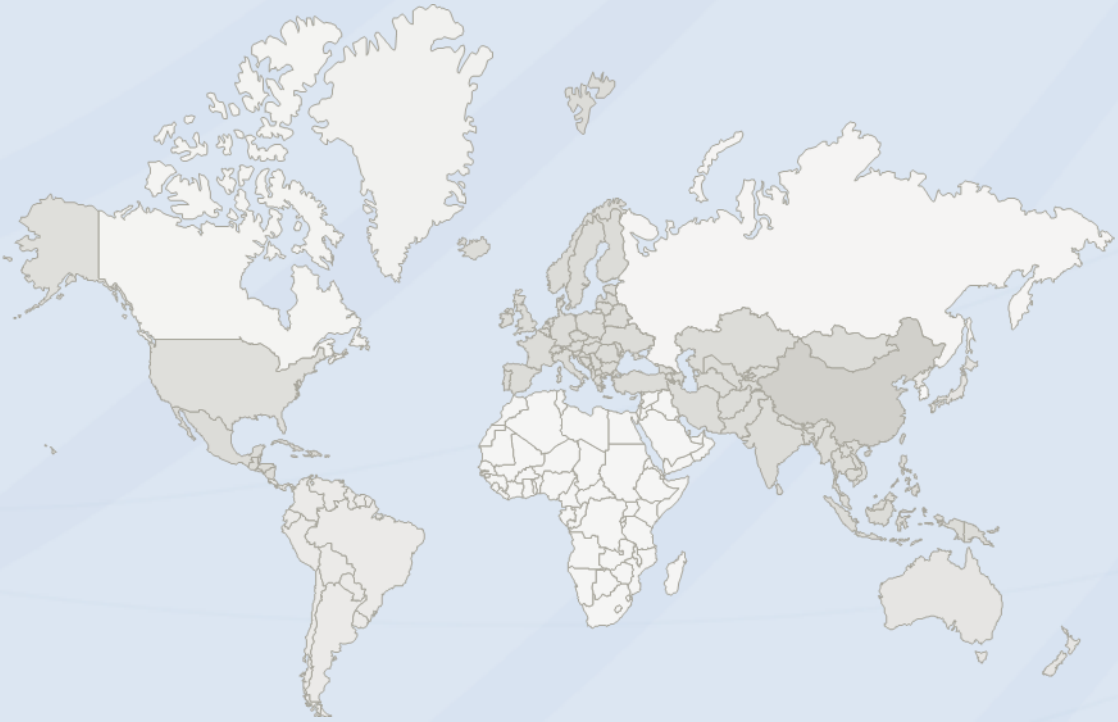


TABLE OF CONTENTS

Test Report Declare 3
1. Summary of test results 3
2. General test information 3
2.1. Description of EUT 3
2.2. Detail models 4
2.3. Block diagram EUT configuration for test 4
2.4. Test environment conditions 4
2.5. Measurement uncertainty 5
2.6. Support Equipment 5
3. Power Line Conducted Emission Test 6
3.1. Test equipment 6
3.2. Block diagram of test setup 6
3.3. Power Line Conducted Emission Limits (Class B) 6
3.4. Test Procedure 7
3.5. Test Result 7
4. Radiated emission test 10
4.1. Test equipment 10
4.2. Block diagram of test setup 11
4.3. Limit 13
4.4. Test Procedure 14
4.5. Test result 14
5. -20dB Bandwidth 18
5.1. Test equipment 18
5.2. Block diagram of test setup 18
5.3. Limit 18
5.4. Test Procedure 18
5.5. Test result 19
6. Antenna Requirements 20
6.1. Limit 20
6.2. Result 20
7. Test setup photograph 21
7.1. Photos of power line conducted emission test 21
7.2. Photos of radiated emission test 21
8. Photos of the EUT 23

TEST REPORT DECLARE

FCC ID	:	2AXAA-HN022-01V
Applicant	:	CWCE Lighting (Shenzhen) Co., Ltd.
Address	:	A/area, 9F/Bldg,Cuijing Rd 28, Longtian Town,Pingshan New District,SHENZHEN Guangdong 518122
Equipment under Test	:	Microwave Motion Sensor
Model No	:	HN022-01V
Trade Mark	:	中奇创宇
Manufacturer	:	CWCE Lighting (Shenzhen) Co., Ltd.
Address	:	A/area, 9F/Bldg,Cuijing Rd 28, Longtian Town,Pingshan New District,SHENZHEN Guangdong 518122
Test Laboratory	:	Dongguan New Testing Centre Co., Ltd
Address	:	3F, No. 1 the 1st North Industry Road, Songshan Lake Science &Technology Park, Dongguan, Guangdong, China, 523808

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C: 2017, ANSI C63.10:2013.

We Declare:

The equipment described above is tested by Dongguan New Testing Centre Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan New Testing Centre Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No.:	NTC-ER2007072		
Date of Test:	Jun.26, 2020 to Aug.01, 2020	**Date of Report**:	Aug.02, 2020

Prepared By: ***Approved By:***

Jeffrey Zhang Dave

Jeffery Zhang/Engineer ***Dave Gao/LAB Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan New Testing Centre Co., Ltd

1. Summary of test results

Description of Test Item	Standard	Results
20dB Bandwidth	&15. 215(c) ANSI C63.10 :2013	PASS
Radiated Emission	15.209,&15.205,&15.249 ANSI C63.10 :2013	PASS
Conducted Emissions	&15.207(a) ANSI C63.10 :2009	PASS
Antenna requirement	&15.203	PASS

2. General test information

2.1. Description of EUT

EUT* Name	:	Microwave Motion Sensor
Test model	:	HN022-01V
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 12V
Trade mark	:	中奇创享
Operation frequency	:	915 MHz
Antenna Type	:	Wire antenna
Antenna Gain	:	0 dBi

Note: 1,EUT is the ab. of equipment under test.

2.2. Detail models

Model	Rating	Note
HN022-01V	DC 12V 50mA	Microwave / constant illumination+ RF(915MHz)

2.3. Block diagram EUT configuration for test

For EUT Tx mode:

EUT → DC 12V

2.4. Test environment conditions

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

Temperature range:	21-24℃
Humidity range:	40-75%
Pressure range:	86-106kPa

2.5. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (30MHz – 1GHz)	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz – 18GHz)	4.27 dB (Polarize: V)
	4.51 dB (Polarize: H)
Bandwidth	±1.2%
Stop Transmitting Time Test	±0.5%
Frequency error	5.8×10^{-8}

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.6. SUPPORT EQUIPMENT

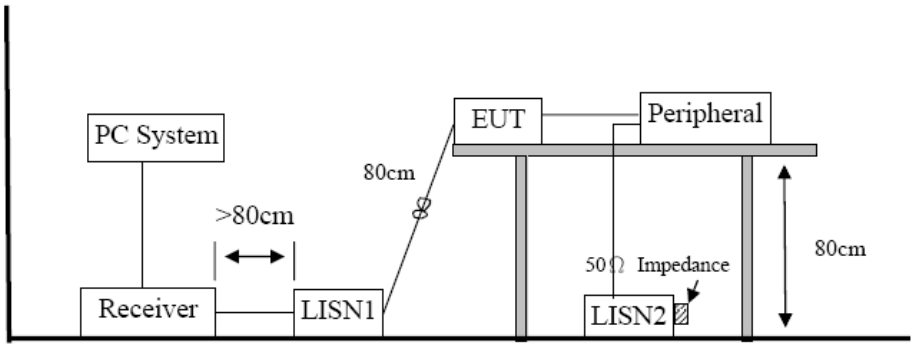
Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Adapter	yuewei	YW-212W	--	--	--

3. Power Line Conducted Emission Test

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESCS30	8341151006	2019-12-09	1 Year
2	LISN	R&S	ENV216	3650.6550.06	2020-05-25	1 Year
3	Pulse Limiter	R&S	ESH3-Z2	0357-8810.54	2020-05-25	1 Year
4	RF Cable	HUBER	SUCOFLEX100	30722/4E	2019-05-13	2 Year
5	MEASUREMENT SOFTWARE	FARAD	EZ-EMC(VER:1.1.4.2)	N/A	N/A	N/A

3.2. BLOCK DIAGRAM OF TEST SETUP



3.3. Power Line Conducted Emission Limits (Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

3.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 3.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.3 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

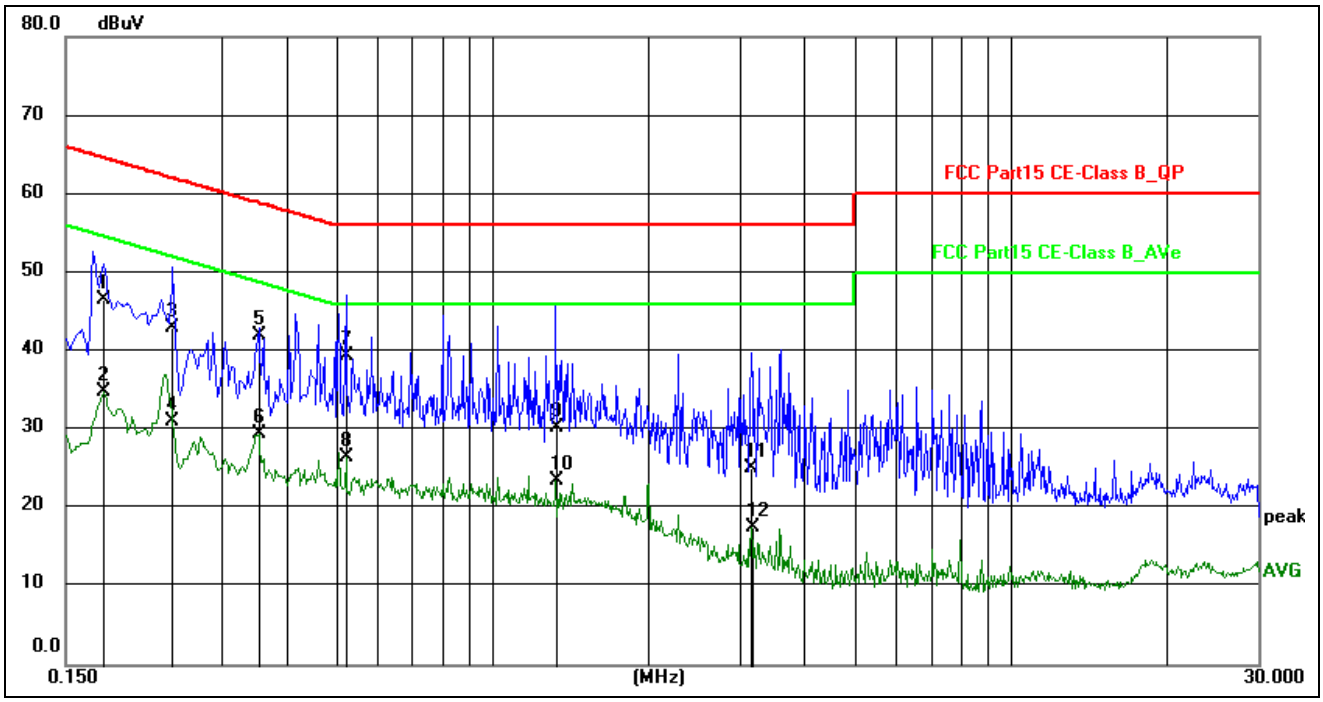
The bandwidth of test receiver is set at 9 KHz.

3.5. Test Result

PASS. (See below detailed test result)

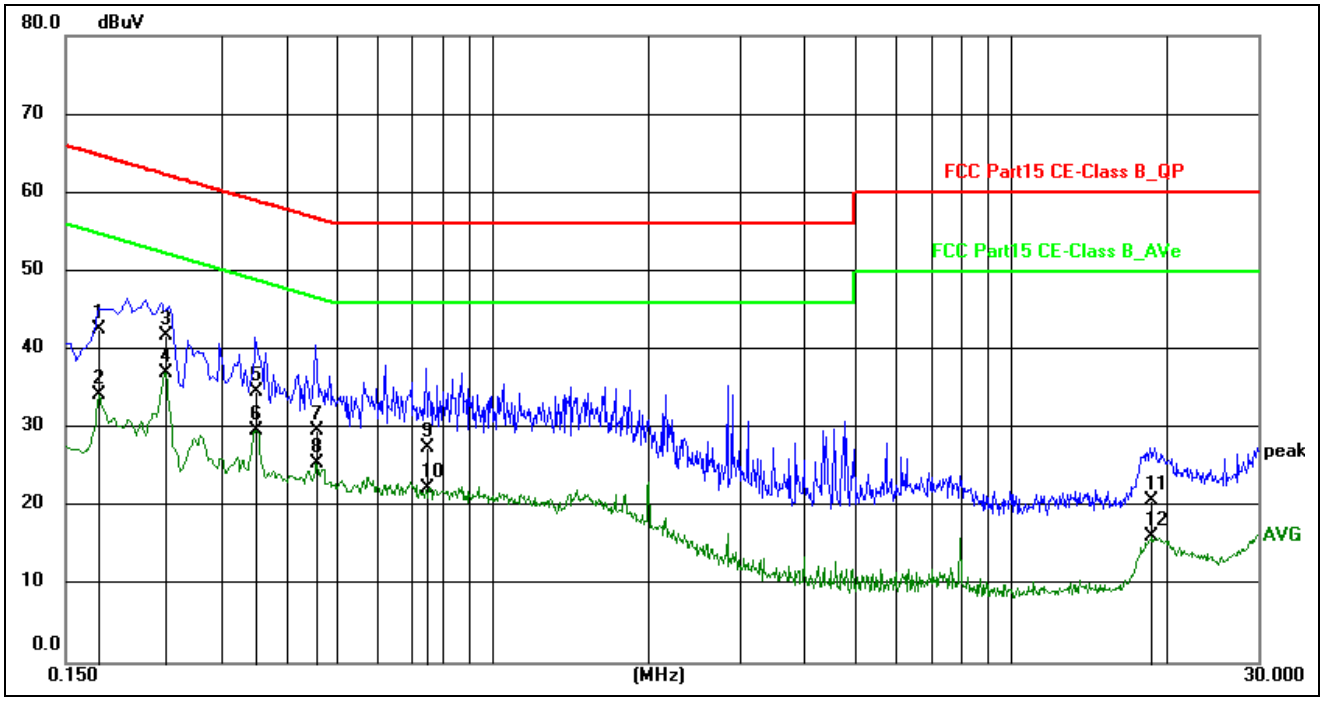
Note1: All emissions not reported below are too low against the prescribed limits.
Note2: “-----” means Peak detection; “-----” mans Average detection
Note3: Measurement = Reading Level + Factor, Margin= Measurement-Limit

Conducted Emission Test Result



Site:	**844LAB**	**Phase:N**	**Temperature(C):24(C)**
Limit:	**FCC Part15 CE-Class B_QP**		**Humidity(%):63%**
EUT:	**Microwave Motion Sensor**	**Test Time:**	**2020/7/7 17:10:18**
M/N.:	**HN022-01V**	**Power Rating:**	**DC 12V by adapter input 120/60Hz**
Mode:	**Tx**	**Test Engineer:**	
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.1773	36.70	9.91	46.61	64.61	-18.00	QP	
2	0.1774	24.90	9.91	34.81	54.61	-19.80	AVG	
3	0.2407	33.07	9.88	42.95	62.07	-19.12	QP	
4	0.2407	21.24	9.88	31.12	52.07	-20.95	AVG	
5	0.3521	32.24	9.82	42.06	58.91	-16.85	QP	
6	0.3524	19.63	9.82	29.45	48.91	-19.46	AVG	
7 *	0.5193	29.57	9.75	39.32	56.00	-16.68	QP	
8	0.5196	16.66	9.75	26.41	46.00	-19.59	AVG	
9	1.3253	20.67	9.64	30.31	56.00	-25.69	QP	
10	1.3283	13.84	9.64	23.48	46.00	-22.52	AVG	
11	3.1548	15.44	9.58	25.02	56.00	-30.98	QP	
12	3.1571	7.92	9.58	17.50	46.00	-28.50	AVG	



Site:	**844LAB**	**Phase:L1**	**Temperature(C):24(C)**
Limit:	**FCC Part15 CE-Class B_QP**		**Humidity(%):63%**
EUT:	**Microwave Motion Sensor**	**Test Time:**	**2020/7/7 17:14:23**
M/N.:	**HN022-01V**	**Power Rating:**	**DC 12V by adapter input 120/60Hz**
Mode:	**Tx**	**Test Engineer:**	
Note:			

No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
1	0.1732	32.64	9.90	42.54	64.81	-22.27	QP	
2	0.1732	24.32	9.90	34.22	54.81	-20.59	AVG	
3	0.2329	31.82	9.88	41.70	62.35	-20.65	QP	
4 *	0.2330	27.16	9.88	37.04	52.34	-15.30	AVG	
5	0.3500	24.73	9.82	34.55	58.96	-24.41	QP	
6	0.3501	19.82	9.82	29.64	48.96	-19.32	AVG	
7	0.4580	19.94	9.77	29.71	56.73	-27.02	QP	
8	0.4580	15.68	9.77	25.45	46.73	-21.28	AVG	
9	0.7460	17.76	9.70	27.46	56.00	-28.54	QP	
10	0.7460	12.57	9.70	22.27	46.00	-23.73	AVG	
11	18.5820	11.07	9.77	20.84	60.00	-39.16	QP	
12	18.5820	6.40	9.77	16.17	50.00	-33.83	AVG	

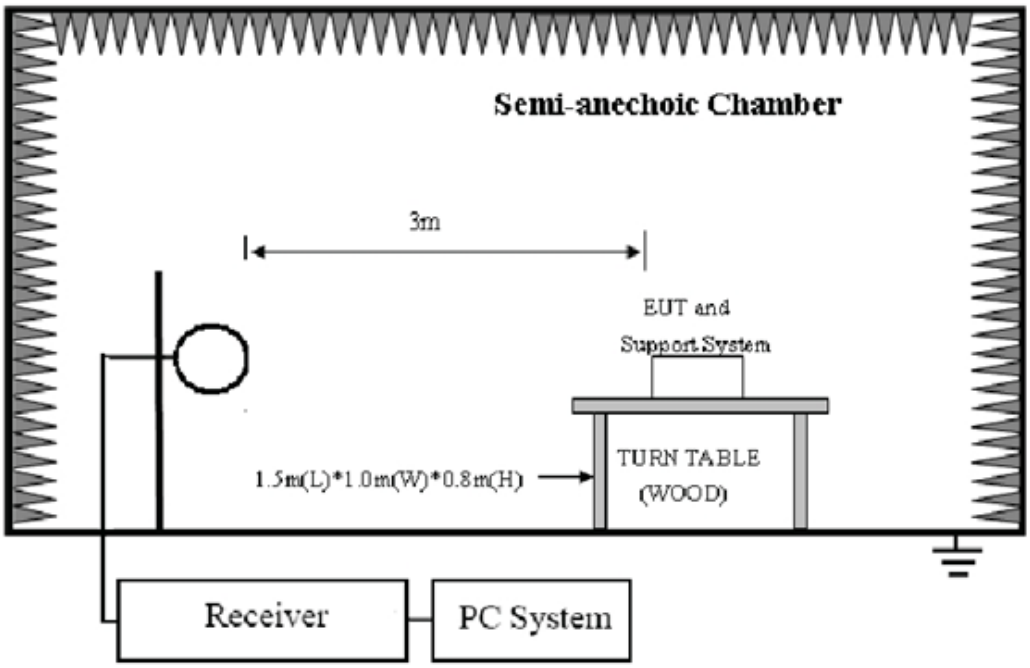
4. Radiated emission test

4.1. Test equipment

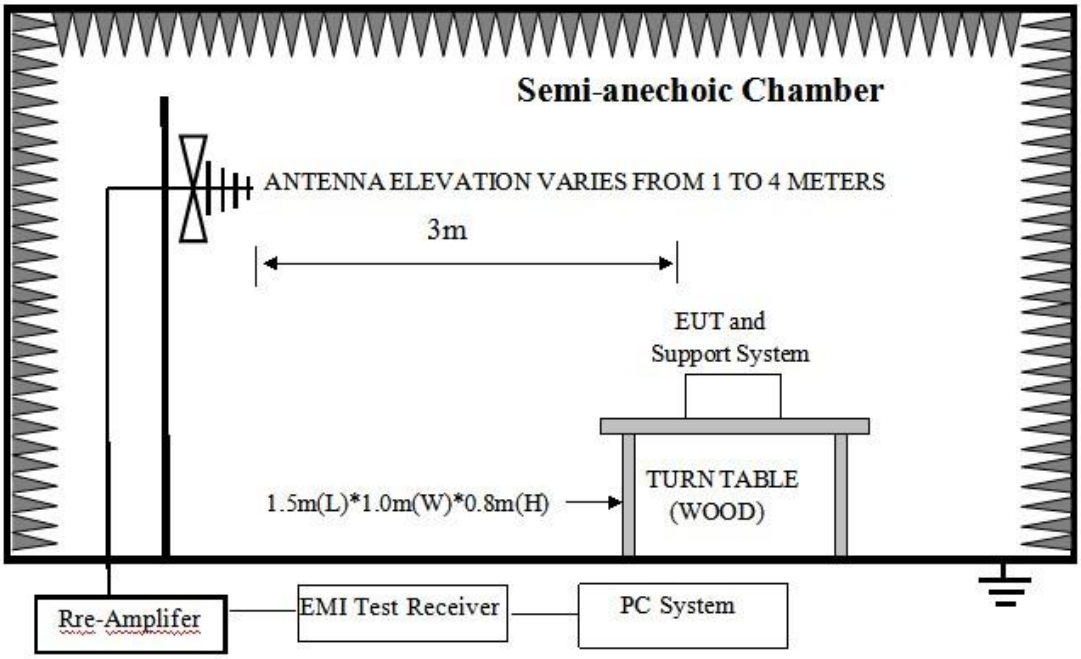
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESR	7250-304067528	2020-05-24	1Year
2	Trilog Broadband Antenna	Schwarzbeck	VULB9168	00969	2019-06-14	2 Year
3	Pre-amplifier	R&S	8447F	3113A04553	2020-05-24	1Year
4	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2019-05-23	2Year
5	Horn antenna	Schwarzbeck	BBHA9120D	453	2019-05-23	2Year
6	Double Ridged Horn Antenna	A.H. System	SAS-574	584	2019-05-23	2Year
7	Pre-amplifier	R&S	SCU18	105326	2020-05-24	1Year
8	RF Cable	GORE	OSQ01Q01078.7	SN15458473	2019-05-23	2Year
9	RF Cable	GORE	OSQ01Q01078.7	SN15458474	2019-05-23	2Year
10	RF Cable	ESCO	ETS-LINGREN	RFC-SMS-100-SMS-340-IN	2019-05-23	2Year
11	Measurement software	Farad	EZ-EMC(VER:1.1.4.2)	N/A	N/A	N/A

4.2. Block diagram of test setup

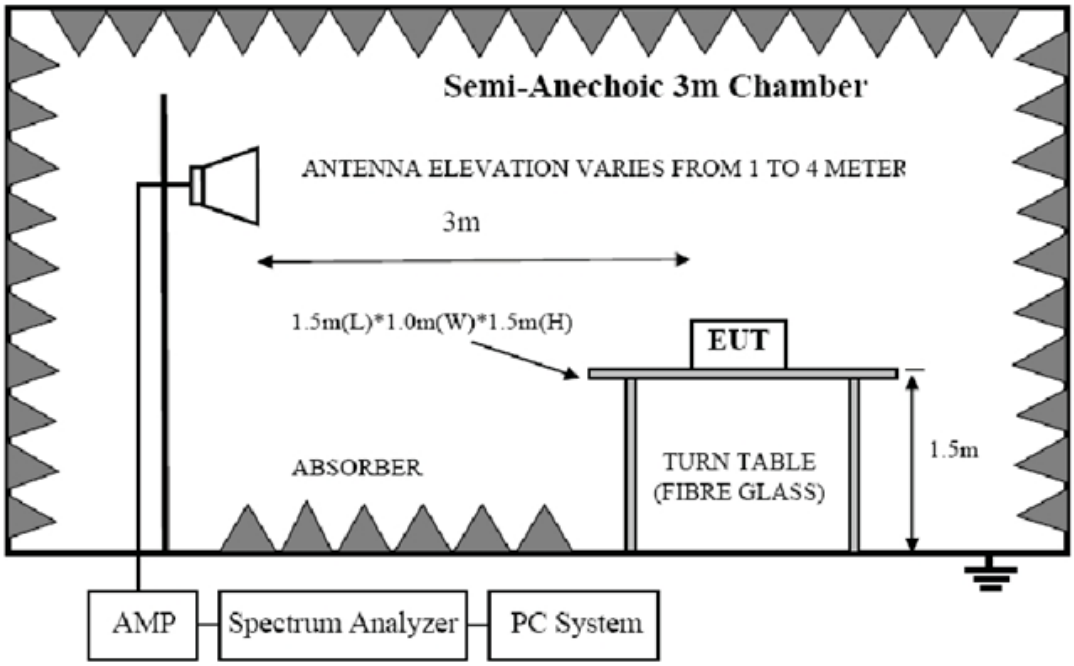
In 3m Anechoic Chamber Test Setup Diagram for 9KHz to 30MHz:



In 3m Anechoic Chamber Test Setup Diagram for 30MHz to 1GHz:



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz:



4.3. Limit

FCC 15.205 Restricted frequency band:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

FCC 15.109 Limit

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μV)/m
30--88	3	40.0
88--216	3	43.5
216--960	3	46.0
960--1000	3	54.0
Above 1GHz	3	Peak: 74.0
	3	Average:54.0

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

(2)Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(3)The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz.Radiated emissions limits in these three bands are based on measurements employing an average detector.

(4) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:

Limit3m(dBuV/m)= Limit30m(dBuV/m) + 40Log(30m/3m)

(5)All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.109, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.109 limits.

4.4. Test Procedure

Procedure of Preliminary Test

Configuration EUT to simulate typical usage as described in clause 2.3 and test equipment as described in clause 4.2 of this report.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

EUT height should be 0.8m for below 1GHz and 1.5m for above 1GHz at ground with absorbers.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.10. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 18GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The X, Y, Z three axial are tested and the report only the worst case.

The emissions from 9KHz to 1GHz, QP or average values were measured with EMI receiver with below RBW:

Frequency band	RBW
9KHz-150KHz	200Hz
150KHz-30MHz	9KHz
30MHz-1GHz	120KHz

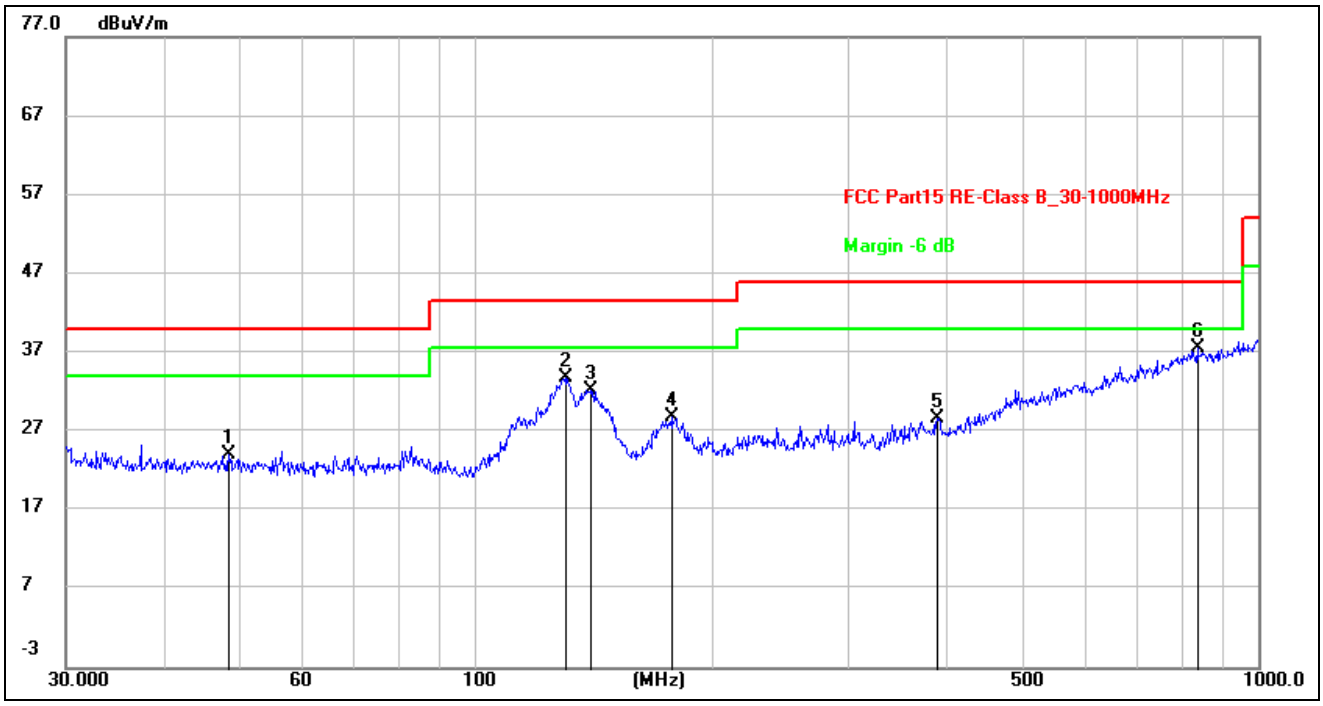
For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RMS detector RBW 1MHz VBW 3MHz for Average measure.

4.5. Test result

PASS. (See below detailed test result)

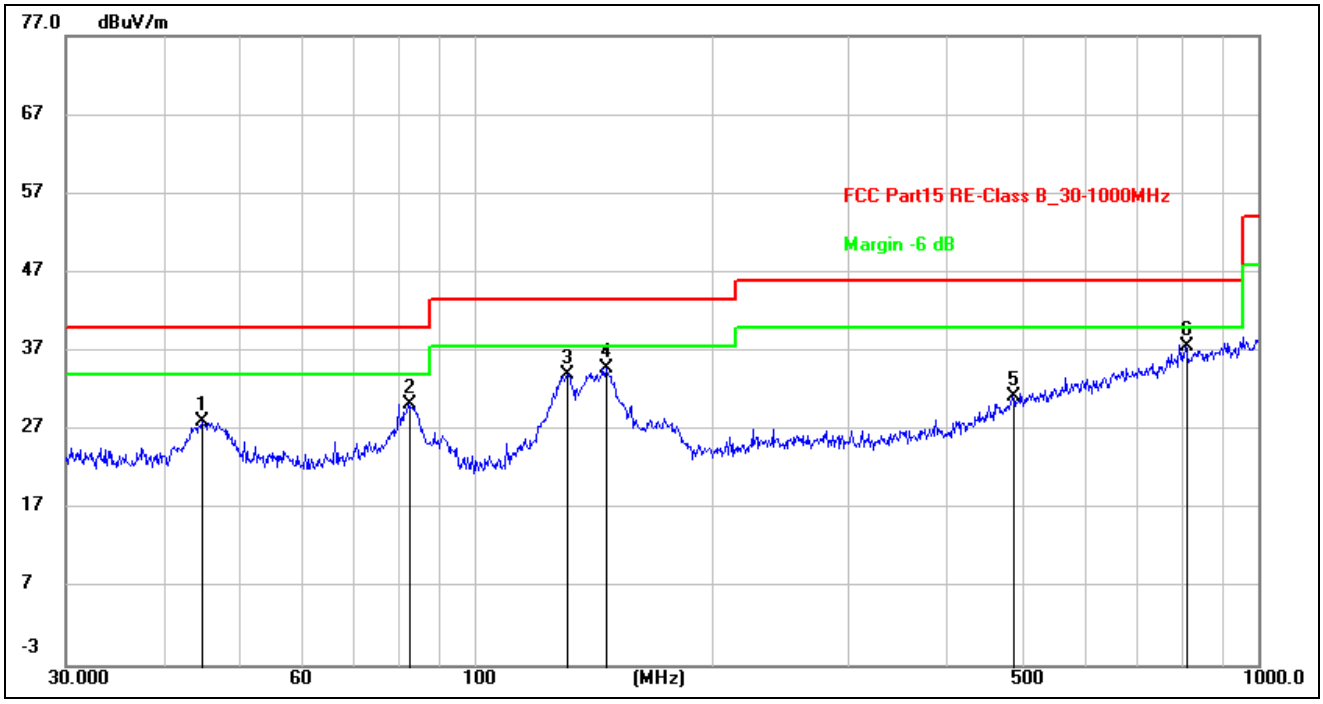
All the emissions except fundamental emission from 9 KHz to 40GHz were comply with FCC PART 15.109 limits limit.
Note1: According exploratory test no any obvious emission were detected from 9KHz to 30MHz and
18GHz to 40GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.
Note2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply
with AV limit.
Note3: Level = Reading Level + Factor, Margin= Level-Limit

Radiated Emission Test Result



Site:	**966LAB**	**Antenna::Horizontal**	**Temperature(C):24(C)**
Limit:	**FCC Part15 RE-Class B_30-1000MHz**		**Humidity(%):60%**
EUT:	**Microwave Motion Sensor**	**Test Time:**	**2020/7/8 10:58:59**
M/N.:	**HN022-01V**	**Power Rating:**	**DC 12V by adapter input 120/60Hz**
Mode:	**Tx**	**Test Engineer:**	
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	48.5015	10.98	13.10	24.08	40.00	-15.92	peak	200	3	
2	130.3789	20.91	12.82	33.73	43.50	-9.77	peak	200	3	
3	140.8350	19.51	12.78	32.29	43.50	-11.21	peak	200	34	
4	178.7584	16.12	12.79	28.91	43.50	-14.59	peak	200	3	
5	389.3548	13.37	15.26	28.63	46.00	-17.37	peak	100	21	
6 *	836.2443	13.95	23.73	37.68	46.00	-8.32	peak	100	63	



Site:	**966LAB**	**Antenna::Vertical**	**Temperature(C):24(C)**
Limit:	**FCC Part15 RE-Class B_30-1000MHz**		**Humidity(%):60%**
EUT:	**Microwave Motion Sensor**	**Test Time:**	**2020/7/8 11:01:32**
M/N.:	**HN022-01V**	**Power Rating:**	**DC 12V by adapter input 120/60Hz**
Mode:	**Tx**	**Test Engineer:**	
Note:			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	44.7433	15.00	13.13	28.13	40.00	-11.87	peak	100	97	
2	82.0706	18.82	11.38	30.20	40.00	-9.80	peak	200	174	
3	131.2965	21.23	12.81	34.04	43.50	-9.46	peak	100	3	
4	146.8877	21.96	12.92	34.88	43.50	-8.62	peak	100	345	
5	485.6093	13.00	18.30	31.30	46.00	-14.70	peak	200	19	
6 *	807.4291	13.95	23.64	37.59	46.00	-8.41	peak	200	237	

Site:	**966 LAB**	**Antenna::H / V**	**Temperature(C):24(C)**
Limit:	**FCC Part 15.249**		**Humidity(%):60%**
EUT:	**Microwave Motion Sensor**	**Test Time:**	**2020/08/01**
M/N.:	**HN022-01V**	**Power Rating:**	**DC 12V by adapter input 120/60Hz**
Mode:	**Tx mode**	**Test Engineer:**	
Note:			

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Pre-amp (dB)	Cable lost (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detect	Antenna polarization
901.00	41.66	20.80	25.85	3.16	39.77	46.00	-6.23	QP	H
915.00	93.82	20.93	25.86	3.23	92.12	114.00	-21.88	Peak	H
915.00	82.15	20.93	25.86	3.23	80.45	94.00	-13.55	Average	H
930.00	40.66	20.98	25.88	3.25	39.01	46.00	-6.99	QP	H
1830.00	64.82	25.60	40.37	4.52	54.57	74.00	-19.43	Peak	H
1830.00	50.28	25.60	40.37	4.52	40.03	54.00	-13.97	Average	H
2745.00	63.82	26.43	40.21	4.85	54.89	74.00	-19.11	Peak	H
2745.00	55.66	26.43	40.21	4.85	46.73	54.00	-7.27	Average	H
901.00	36.28	20.80	25.85	3.16	34.39	46.00	-11.61	QP	V
915.00	85.82	20.93	25.86	3.23	84.12	114.00	-29.88	Peak	V
915.00	75.28	20.93	25.86	3.23	73.58	94.00	-20.42	Average	V
930.00	40.82	20.98	25.88	3.25	39.17	46.00	-6.83	QP	V
1830.00	61.66	25.60	40.37	4.52	51.41	74.00	-22.59	Peak	V
1830.00	48.28	25.60	40.37	4.52	38.03	54.00	-15.97	Average	V
2745.00	58.82	26.43	40.21	4.85	49.89	74.00	-24.11	Peak	V
2745.00	46.15	26.43	40.21	4.85	37.22	54.00	-16.78	Average	V

Note: 1. Result Level = Reading Level + Antenna Factor + Cable loss – Pre-amp Factor.

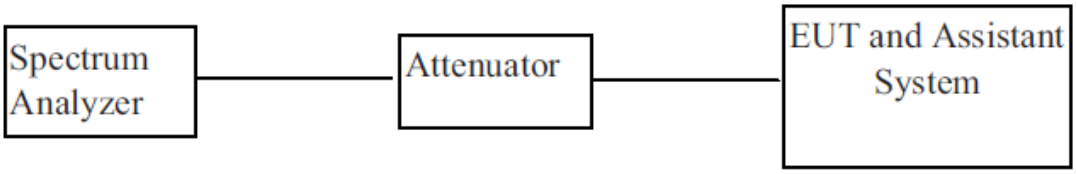
2. Antenna polarization: “H” means Horizontal, “V” means Vertical.

5. -20dB Bandwidth

5.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Analyzer	Agilent	N9020A	MY54510476	2020-05-25	1 Year

5.2. BLOCK DIAGRAM OF TEST SETUP



5.3. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained

in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB

bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.4. Test Procedure

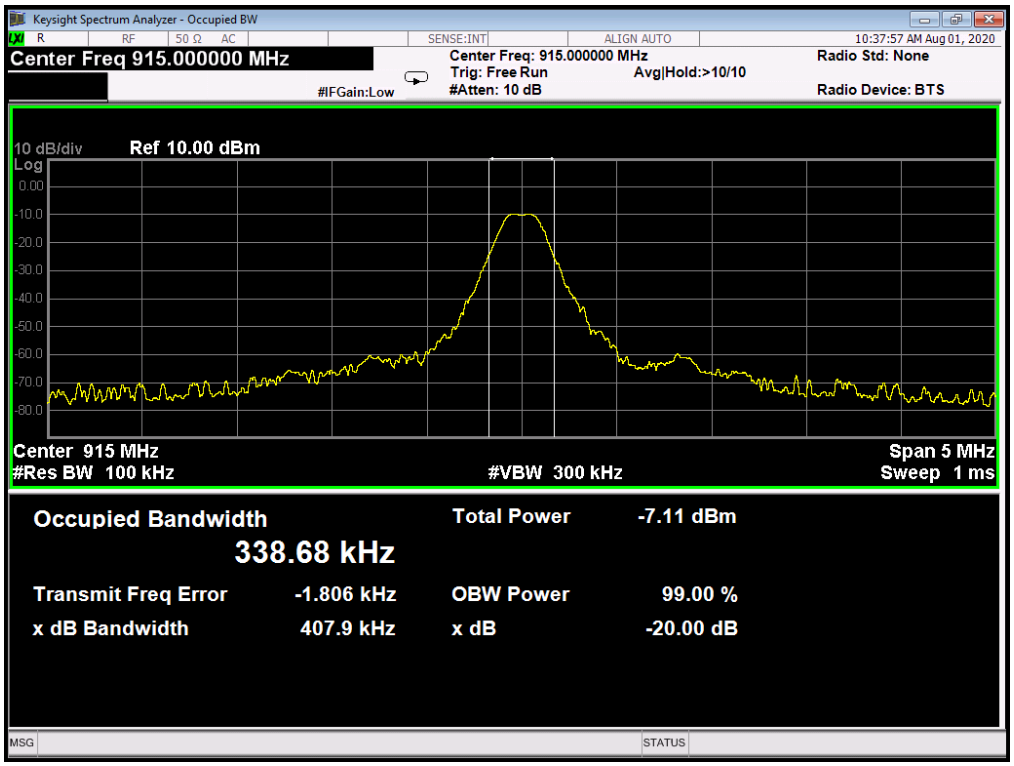
(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW

and 300 kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.5. Test result

Cent. Freq.	-20dB bandwidth
(MHz)	Result (KHz)
915	407.9



6. Antenna Requirements

6.1. Limit

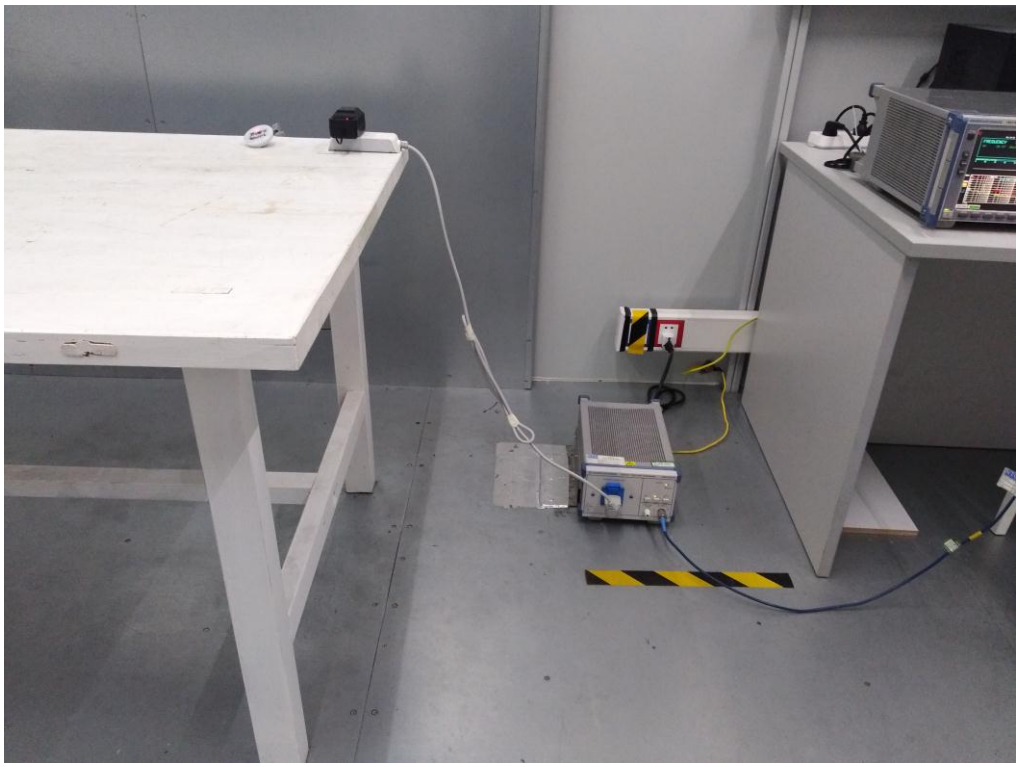
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.2. Result

The EUT has an internal chip antenna permanently soldering on the printed circuit board, which complied with 15.203, the maximum gain was 0 dBi.

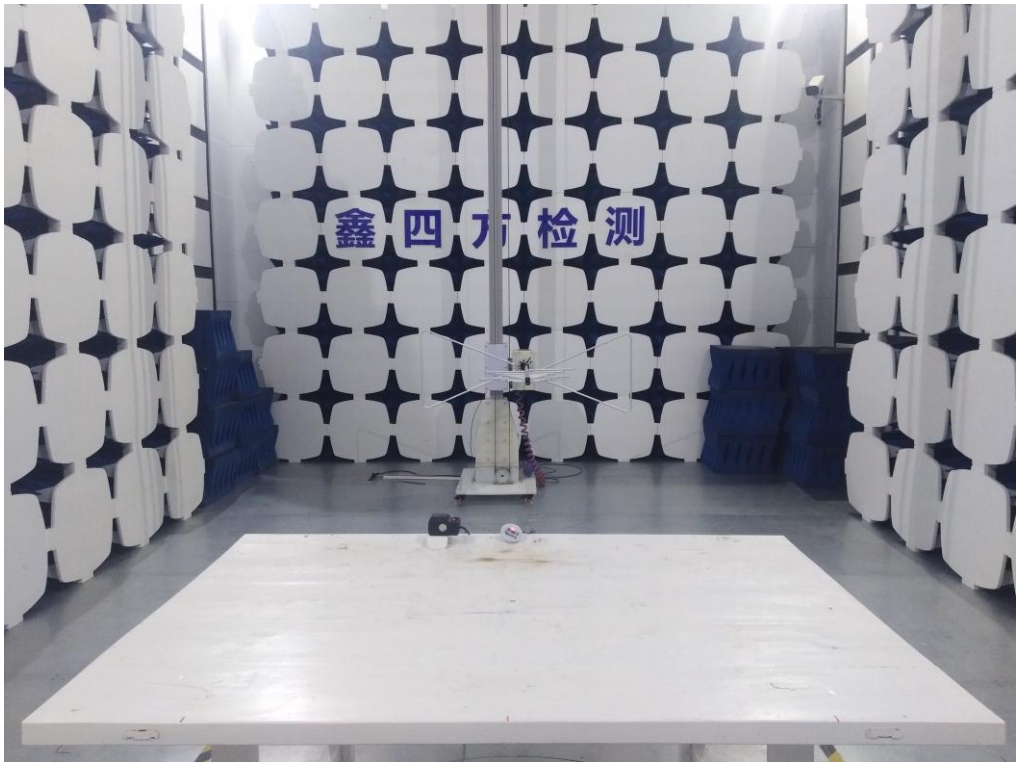
7. Test setup photograph

7.1. Photos of power line conducted emission test

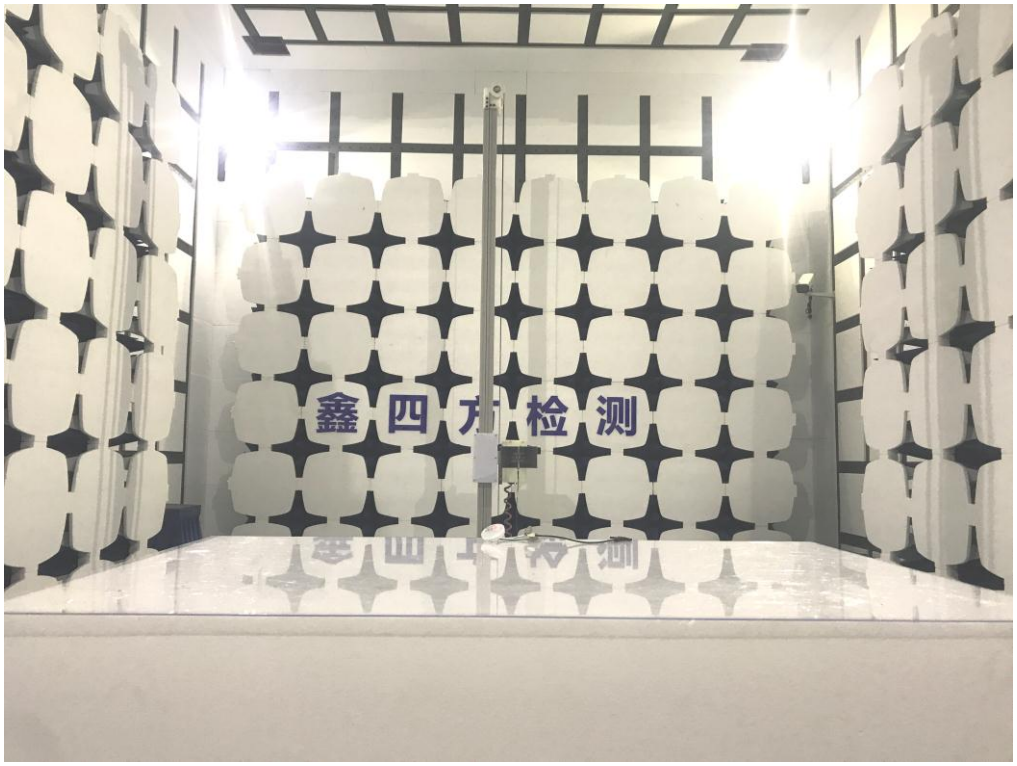


7.2. Photos of radiated emission test

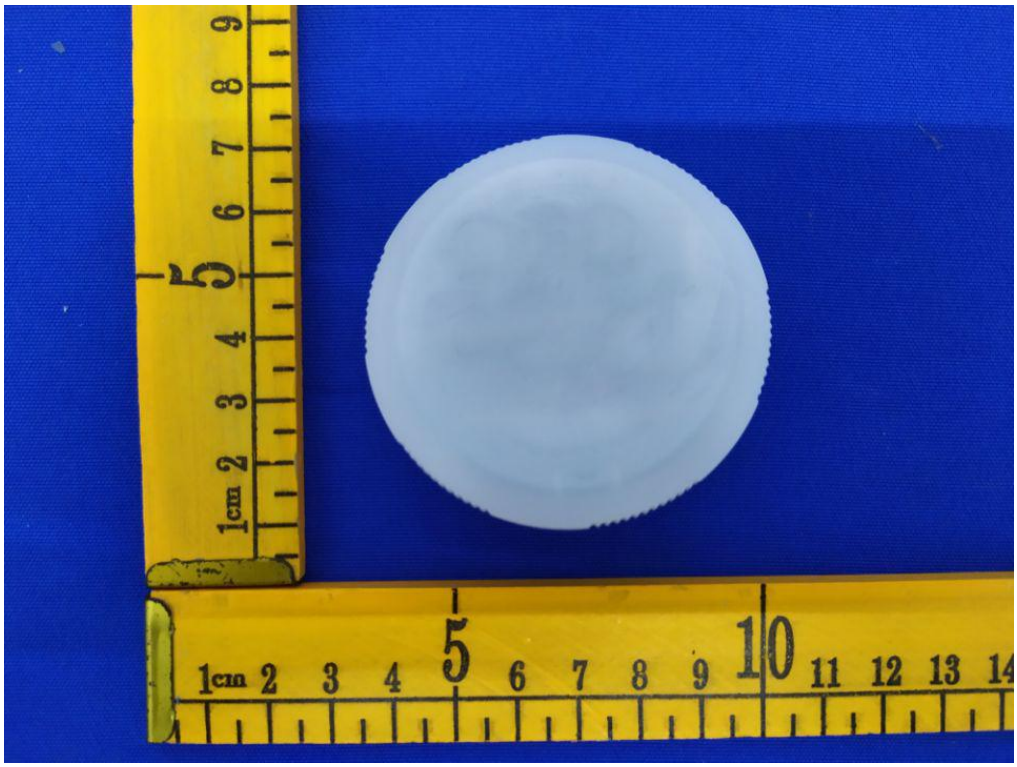
30MHz – 1GHz

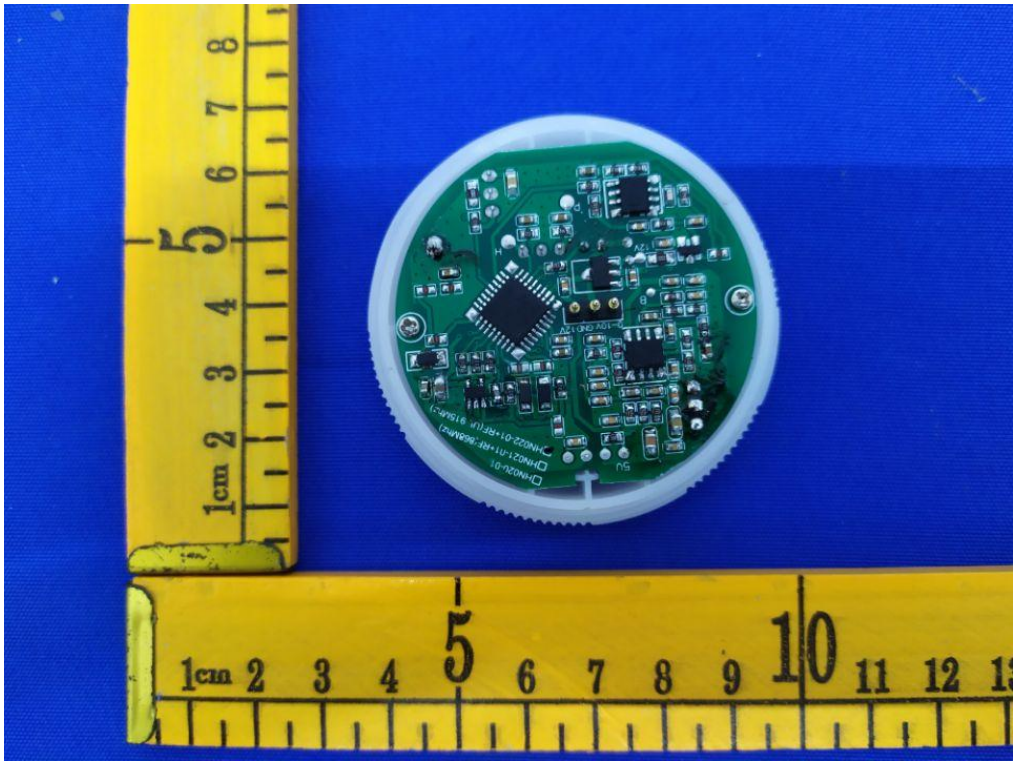


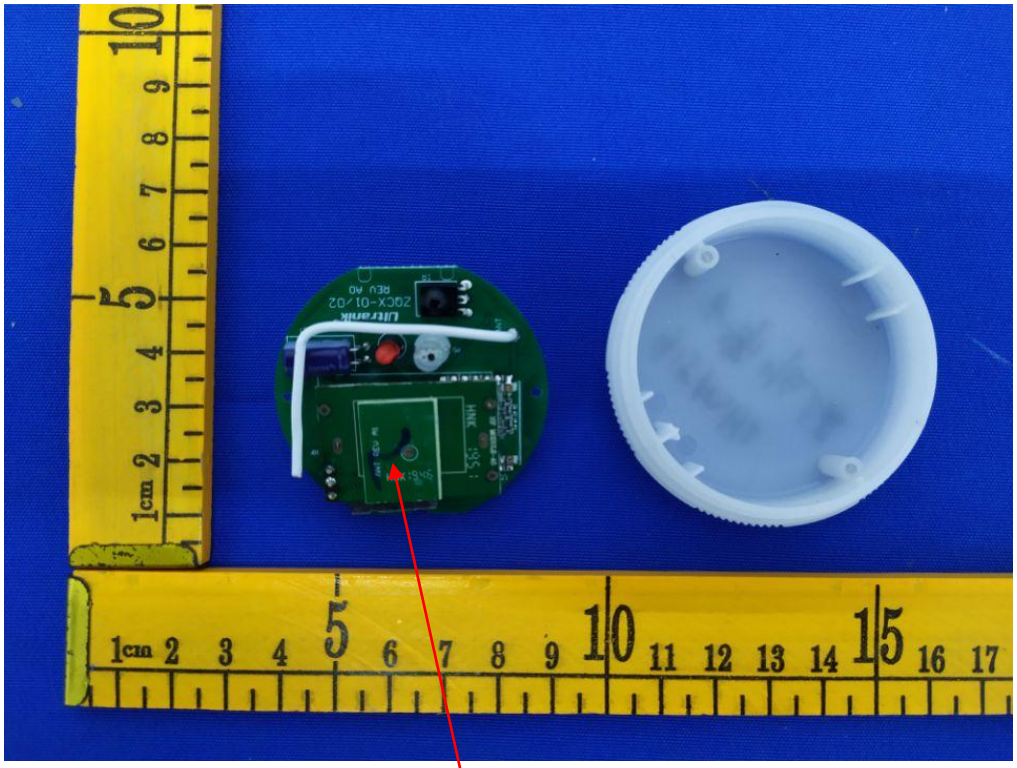
Above 1GHz



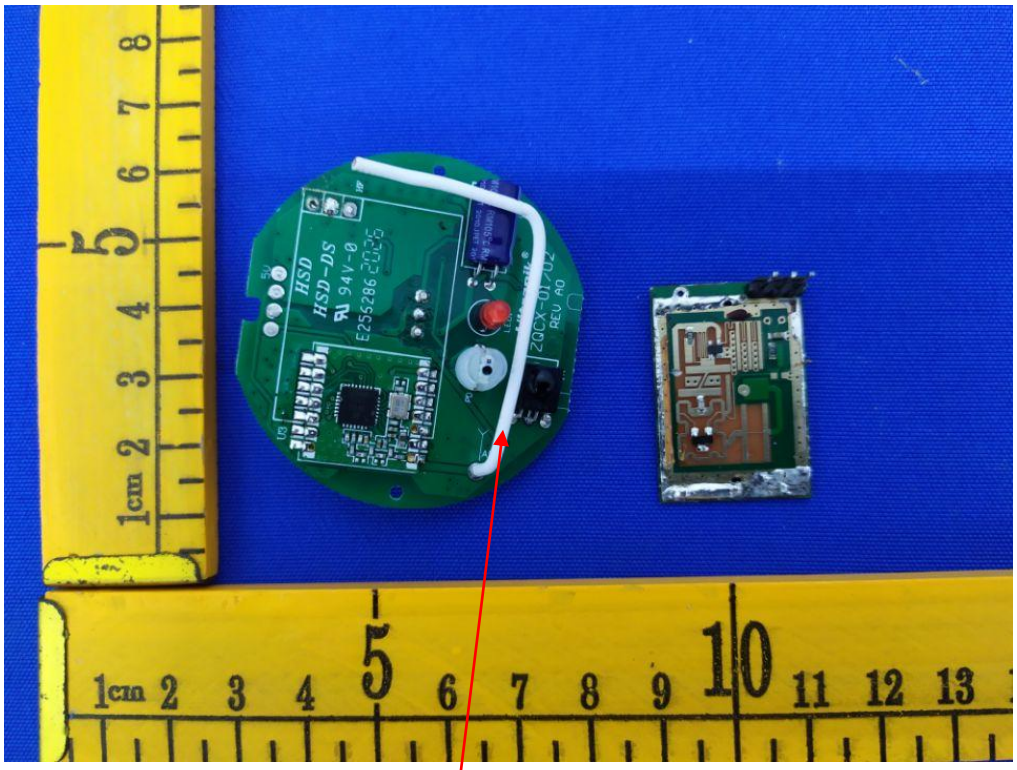
8. Photos of the EUT



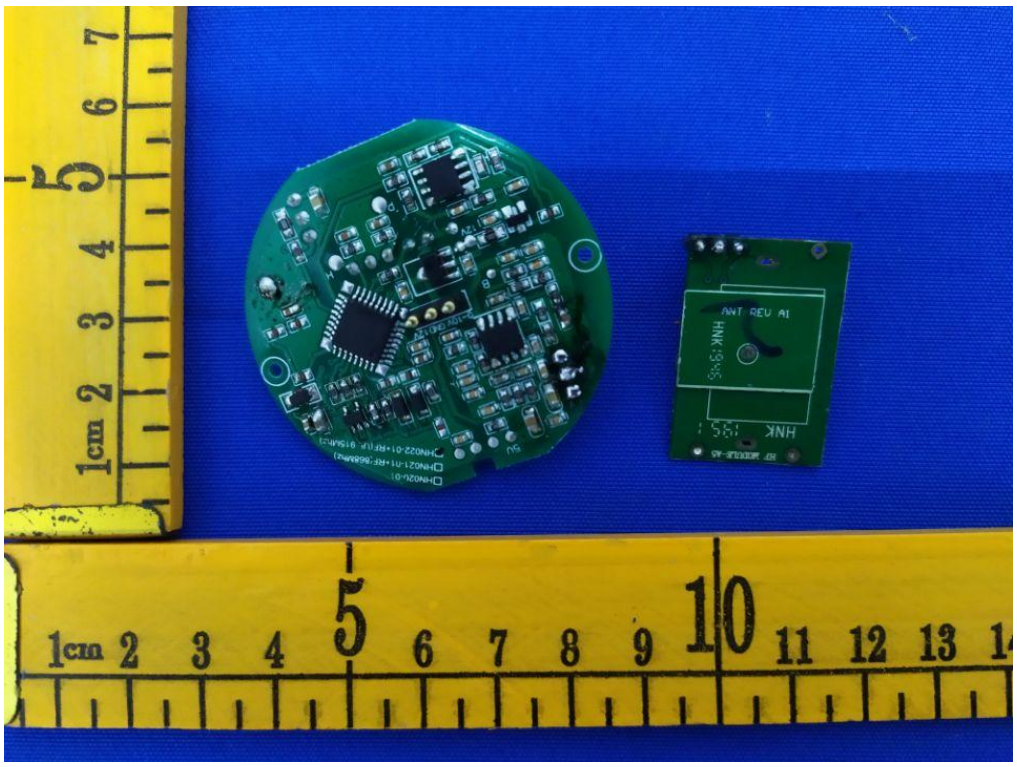




5.8GHz Antenna



915MHz Antenna



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