



TEST REPORT
FCC ID: 2ACC6GR-304N
For
U-Fairy G.R. IOT Tech CO., Ltd
Sensor siren

Model No. : GR-304N

Prepared for : U-Fairy G.R. IOT Tech CO., Ltd
Address : Baihuali Industry District, Changping Town, Dongguan city, China

Prepared by : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building B, East Area of Nanchang Second, Industrial Zone,
Gushu 2nd Road, Bao'an, Shenzhen, China

Report No. : T1850857 01

Date of Receipt : July 17, 2015

Date of Test : July 18, 2015- July 29, 2015

Date of Report : July 30, 2015

Version Number : REV0

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DECLARATION

Applicant : U-Fairy G.R. IOT Tech CO., Ltd
 Manufacturer : U-Fairy G.R. IOT Tech CO., Ltd
 Product : Sensor siren
 (A) Model No. : GR-304N
 (B) Trade Name : N/A
 (C) Power supply : DC 4.8V from battery or
 DC 5V from adapter with AC 120V/60Hz

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249: 2014, ANSI C63.4:2009

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Peter Kang
 Test Engineer



Approved by (name + signature).....: Simple Guan
 Project Manager



Date of issue.....: July 30, 2015

1 General Information

1.1 Description of Device (EUT)

EUT	: Sensor siren
Model No.	: GR-304N
Trade Name	: N/A
Type of Antenna	: PCB Antenna, Maximum Gain is 1.0dBi.
Operation Frequency	: 908.42MHz
Data rate	: 9.6/40/100kbps
Channel number	: 1
Modulation type	: ASK
Power Supply	: DC 4.8V from battery or DC 5V from adapter with AC 120V/60Hz
Fundamental field strength (PK)	: 79.31 dBuV/m
Hardware Version	: REV:0.1
Software Version	: REV.01 2014-0806
Applicant	: U-Fairy G.R. IOT Tech CO., Ltd
Address	: Baihuali Industry District, Changping Town, Dongguan city, China
Manufacturer	: U-Fairy G.R. IOT Tech CO., Ltd
Address	: Baihuali Industry District, Changping Town, Dongguan city, China

1.2 Description of Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd
Road, Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2 Summary of Measurement

2.1 Summary of test result

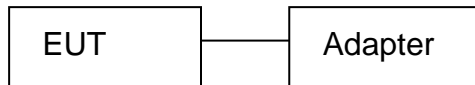
Description of Test Item	Standard	Results
Radiated Emission	Section 15.249&15.209	PASS
Occupied bandwidth	FCC Part 15: 15.215& FCC Part 15: 15.249	PASS
Band Edge Compliance	Section 15.249	N/A
Power Line Conducted Emissions	FCC Part 15: 15.207	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Note: 1 N/A is not applicable.		

2.2 Test mode

Tested mode, channel information		
Mode	Channel	Frequency (MHz)
ASK	CH1	908.42
Note:1 For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50 Ω , Cable Loss: 1.0 dB 2 Test for all Data rate 9.6/40/100kbps is performed and only the worst case of Data rate 9.6 kbps was recorded in the test report.		

Channel list			
CH1	908.42MHz	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

2.3 Block Diagram



2.4 Assistant equipment used for test

Description : Adapter
 Manufacturer : JODEWAY
 Model No. : JOD-S-050100A

2.5 Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.6 Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.70dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.90 dB	Polarize: V
	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.26 dB	Polarize: H
	4.28 dB	Polarize: V
Uncertainty for conducted RF Power	0.16dB	

2.7 Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	CHENYU	9*6*6	N/A	2014.01.20	3Year
Spectrum analyzer	Agilent	E4407B	MY49510055	2015.01.19	1 Year
Receiver	R&S	ESCI	101165	2015.01.19	1 Year
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2014.01.22	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2015.01.21	2Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2015.01.21	1 Year
Cable	Resenberger	SUCOFLEX 104	MY6562/4	2015.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	309972/4	2015.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	329112/4	2015.01.19	1 Year
Pre-amplifier	Agilent	8449B	3008A02664	2015.03.21	1 Year
Pre-amplifier	HP	HP8347A	2834A00455	2015.03.21	1 Year
LISN	Schwarzbeck	NSLK8126	8126466	2015.01.19	1 Year
Pulse Limiter	Schwarzbeck	9516F	9618	2015.01.19	1 Year

Note: Cable test frequency range:

Equipment	Manufacture	Model No.	Serial No.	Test Location	Frequency Rang
Cable	Resenberger	SUCOFLEX 104	MY6562/4	Conducted	150KHz-30M Hz
Cable	Resenberger	SUCOFLEX 104	309972/4	Radiation	30MHz-2GHz
Cable	Resenberger	SUCOFLEX 104	329112/4	Radiation	1GHz-26.5G Hz

3 Radiation Emission

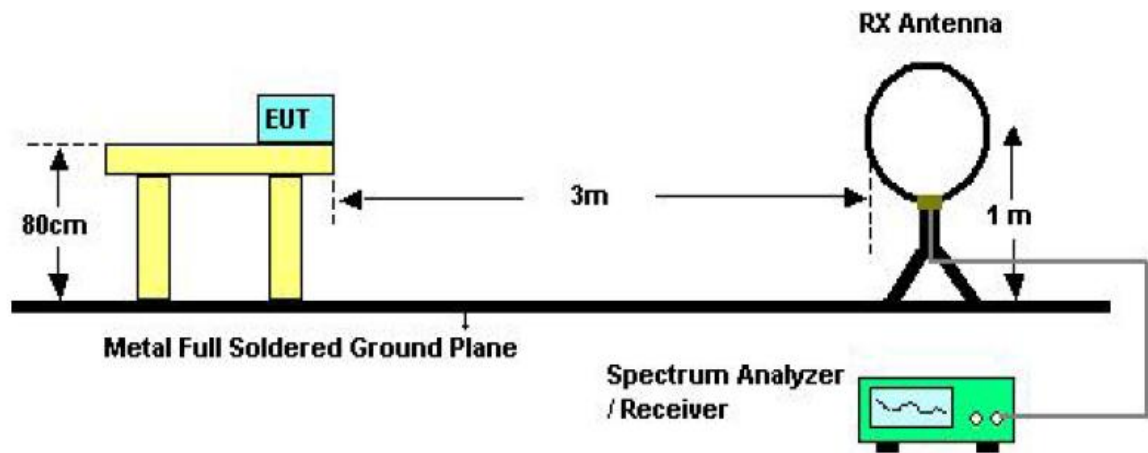
3.1 Radiation Emission Limits(15.209&249)

Frequency (MHz)	Field Strength Limits at 3 metres (watts, e.i.r.p.)		
	uV/m	dB uV/m	Measurement distance(m)
0.009-0.490	2400/F(kHz)	XX	300
0.490-1.705	24000/F(kHz)	XX	30
1.705-30	30	29.5	30
30~88	100(3nW)	40	3
88~216	150(6.8nW)	43.5	3
216~960	200(12nW)	46	3
Above960	500(75nW)	54	3
Carrier frequency		93.97(AV)	3
Carrier frequency		113.97(PK)	3

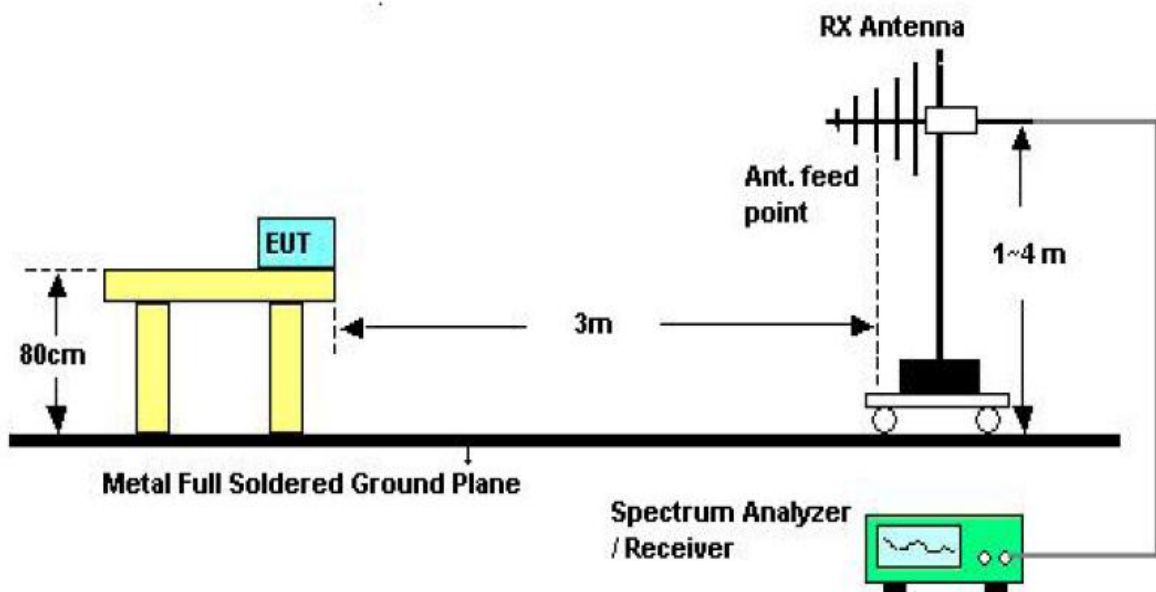
NOTE:

- a) The tighter limit applies at the band edges.
- b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

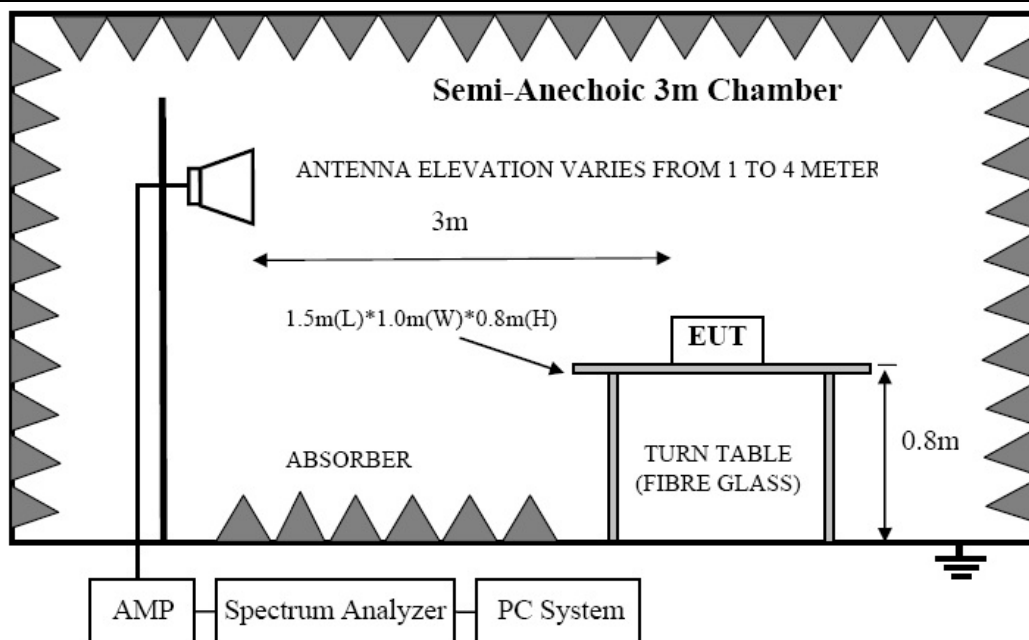
3.2 Test Setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

3.3 Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) For the actual test configuration, please see the test setup photo.
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
- (4) Spectrum frequency from 9KHz to 12GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2009 on Radiated Emission test.
- (6) 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; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

(7) For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane

3.4 Test Equipment Setting For emission test.

9KHz~150KHz	RBW 200Hz	VBW 1KHz
150KHz~30MHz	RBW 9KHz	VBW 30KHz
30MHz~1GHz	RBW 120KHz	VBW 300KHz
Above 1GHz	RBW 1MHz	VBW 3MHz

3.5 Test Condition

Continual Transmitting in maximum power.

3.6 Test Result

PASS.

We have scanned the 10th harmonic from 9KHz to the EUT.

Detailed information please see the following page.

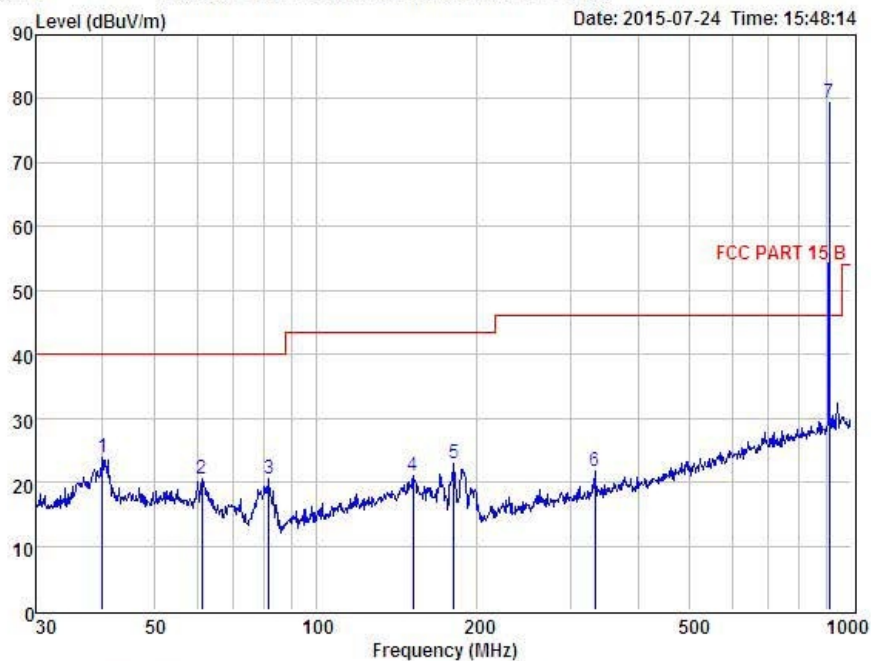
From 9KHz to 30MHz: Conclusion: **PASS**

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



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Data: 1 File: D:\REPORT DATA\G\GuanRong\GR-304N.EM6 (8)



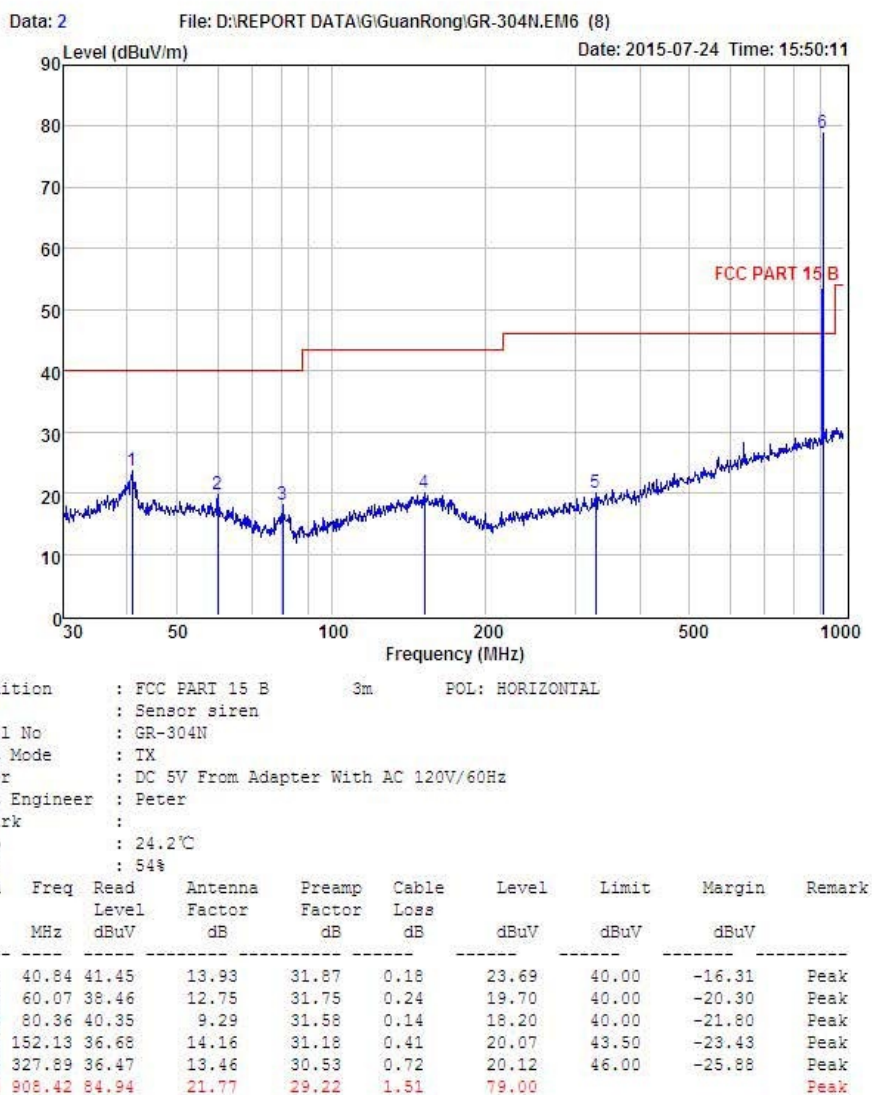
Condition : FCC PART 15 B 3m POL: VERTICAL
 EUT : Sensor siren
 Model No : GR-304N
 Test Mode : TX
 Power : DC 5V From Adapter With AC 120V/60Hz
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	39.99	41.60	14.07	31.89	0.17	23.95	40.00	-16.05	Peak
2	61.35	39.64	12.36	31.75	0.17	20.42	40.00	-19.58	Peak
3	81.78	42.69	9.32	31.58	0.17	20.60	40.00	-19.40	Peak
4	152.13	37.56	14.16	31.18	0.41	20.95	43.50	-22.55	Peak
5	181.28	41.74	11.68	31.03	0.51	22.90	43.50	-20.60	Peak
6	332.52	37.84	13.55	30.52	0.79	21.66	46.00	-24.34	Peak
7	908.42	85.25	21.77	29.22	1.51	79.31			Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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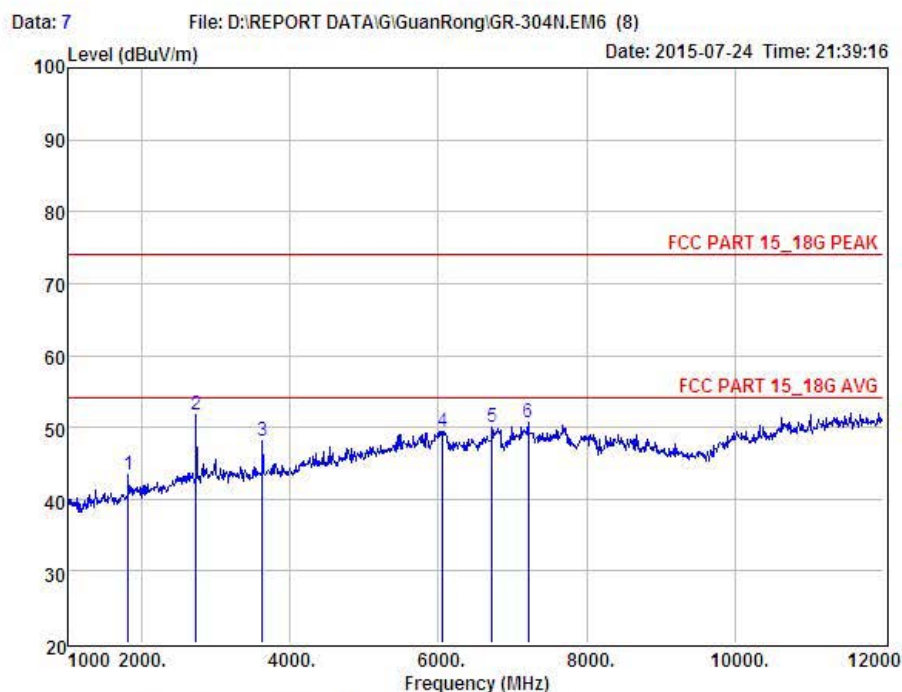


Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Notes: Above is below 1GHz test data.



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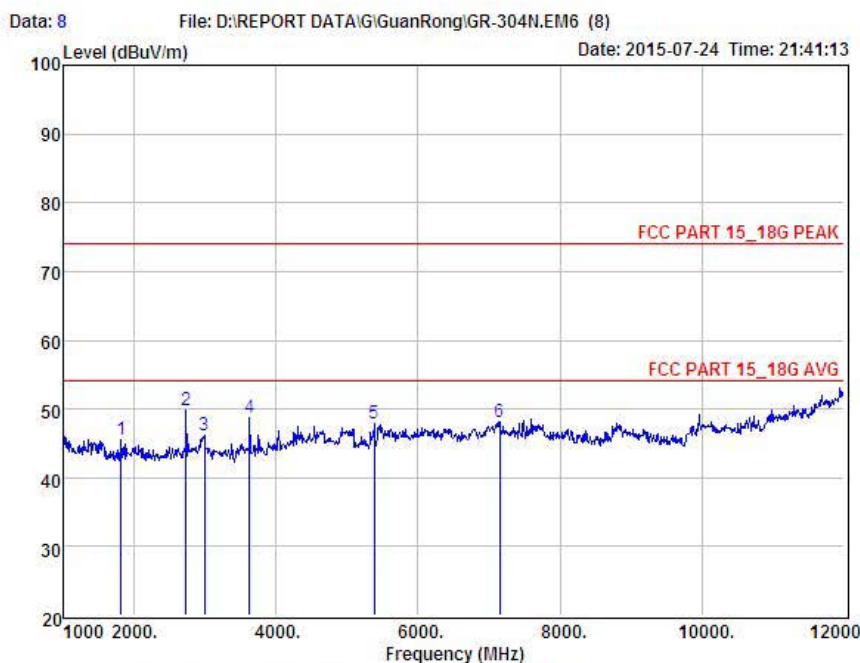
Condition : FCC PART 15_18G PEAK 3m POL: VERTICAL
 EUI : Sensor siren
 Model No : GR-304N
 Test Mode : TX
 Power : DC 5V From Adapter With AC 120V/60Hz
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBUV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBUV	Limit dBUV	Margin dBUV	Remark
	11814.00	48.93	25.93	34.85	3.45	43.46	74.00	-30.54	Peak
	22727.00	54.70	27.85	34.98	4.21	51.78	74.00	-22.22	Peak
	33629.00	49.18	28.89	34.87	4.94	48.14	74.00	-25.86	Peak
	46060.00	43.62	33.06	33.71	6.44	49.41	74.00	-24.59	Peak
	56720.00	41.83	34.94	33.47	6.81	50.11	74.00	-23.89	Peak
	67215.00	40.55	36.08	33.08	7.09	50.64	74.00	-23.36	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



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Condition : FCC PART 15_18G PEAK 3m POL: HORIZONTAL
 EUT : Sensor siren
 Model No : GR-304N
 Test Mode : TX
 Power : DC 5V From Adapter With AC 120V/60Hz
 Test Engineer : Peter
 Remark :
 Temp : 24.2°C
 Hum : 54%

Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamplifier Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
	11814.00	42.28	34.61	34.85	3.45	45.49	74.00	-28.51	
	22727.00	46.15	34.52	34.98	4.21	49.90	74.00	-24.10	
	32991.00	42.26	34.50	34.98	4.43	46.21	74.00	-27.79	
	43629.00	44.24	34.43	34.87	4.94	48.74	74.00	-25.26	
	55378.00	41.78	33.73	33.70	6.06	47.87	74.00	-26.13	
	67149.00	40.61	33.48	33.05	7.05	48.09	74.00	-25.91	

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Notes: Above is Above 1GHz test data

Radiated Emissions Result of Inside band (908.42MHz)

EUT	Sensor siren	Model Name	GR-304N
Temperature	25°C	Relative Humidity	56%
Pressure	960hPa	Test voltage	AC 120V/60Hz
Test Mode	TX	Antenna polarization	Horizontal/Vertical

Channel (908.42MHz)									
Fre. MHz	Plority H/V	Reading dBuV	Antenna Factor dB	Cable Loss dB	Amplifier Gain dB	Correct Factor dB	Measure Result dBuV/m	Limit dBuV/m	Margin dB
908.42	H	84.94 (PK)	21.77	1.51	29.22	-5.94	79.00	113.97 (PK)	-34.97
--	H	--	--	--	--	--	--	--	--
908.42	V	85.25 (PK)	21.77	1.51	29.22	-5.94	79.31	113.97 (PK)	-34.66
--	V	--	--	--	--	--	--	--	--

Notes: 1 --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+Antenna Factor-Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

2 –Spectrum setting:

a. Peak setting 30MHz-1GHz, RBW=100KHz,VBW=300KHz.

3- PK measure result values is less than the AVG limit values, so AV measure result values test not applicable.

4 POWER LINE CONDUCTED EMISSION

4.1 Conducted Emission Limits(15.207)

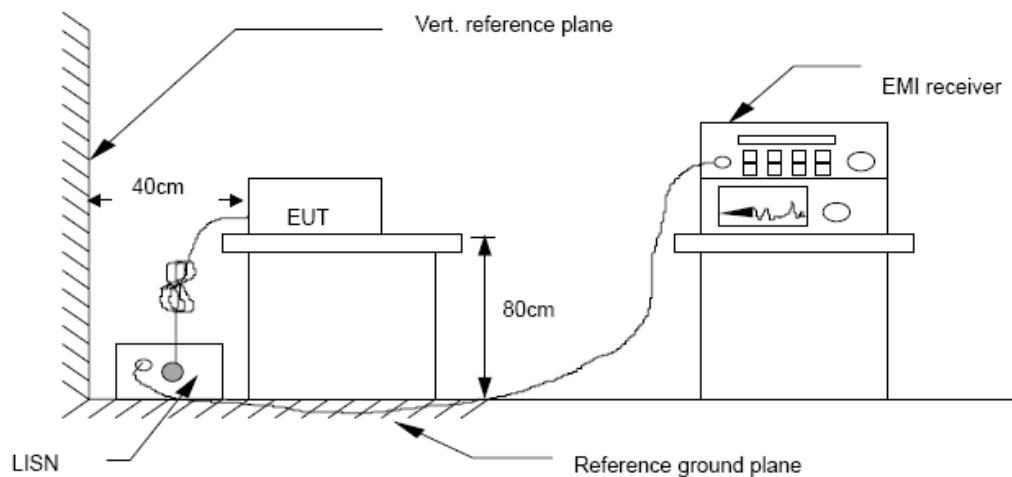
Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

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

3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2009 on Conducted Emission Measurement. The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

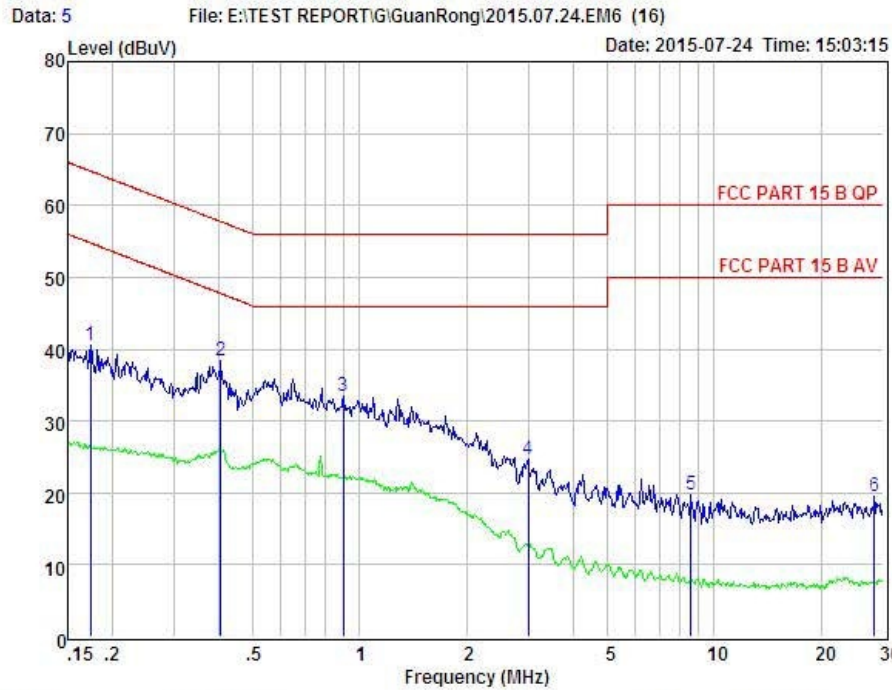
4.4 Test Results

PASS.

Detailed information please see the following page.



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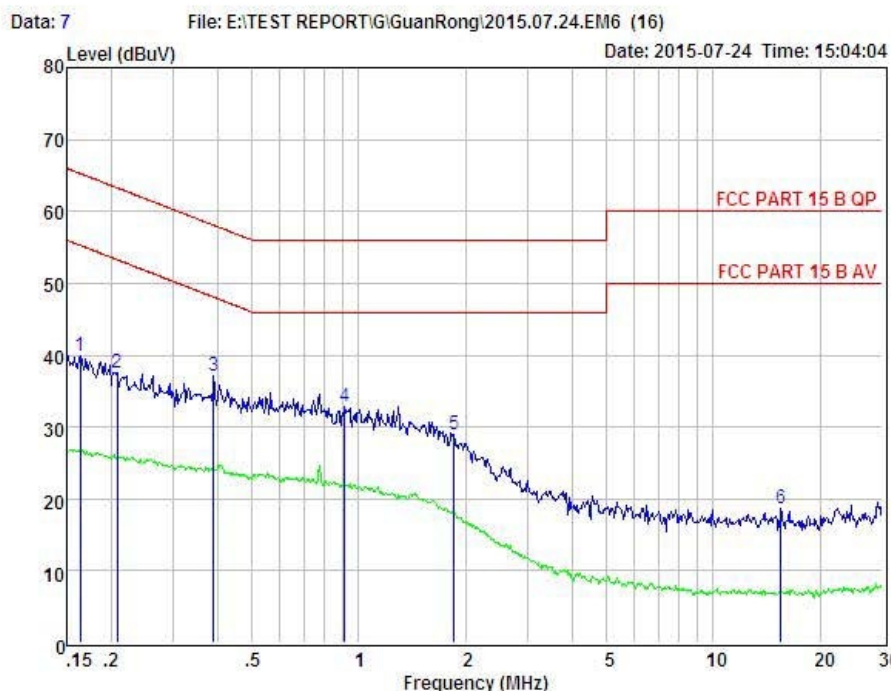
Condition : FCC PART 15 B QP POL: NEUTRAL Temp: 20.1 °C Hum: 45 %
 EUI : Sensor siren
 Model No : GR-304N
 Test Mode : TX mode
 Power : DC 5V from adapter with AC 120V/60Hz
 Test Engineer: Peter
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.174	30.74	0.03	-9.72	0.10	40.59	64.77	-24.18	Peak
2	0.406	28.64	0.03	-9.72	0.10	38.49	57.73	-19.24	Peak
3	0.899	23.57	0.04	-9.71	0.10	33.42	56.00	-22.58	Peak
4	2.993	14.82	0.07	-9.69	0.12	24.70	56.00	-31.30	Peak
5	8.592	10.02	0.15	-9.44	0.17	19.78	60.00	-40.22	Peak
6	28.302	8.71	0.48	-9.75	0.58	19.52	60.00	-40.48	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss



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Condition : FCC PART 15 B QP POL: LINE Temp: 20.1 °C Hum: 45 %
 EUI : Sensor siren
 Model No : GR-304N
 Test Mode : TX mode
 Power : DC 5V from adapter with AC 120V/60Hz
 Test Engineer: Peter
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.164	30.11	0.03	-9.72	0.10	39.96	65.25	-25.29	Peak
2	0.208	27.77	0.03	-9.72	0.10	37.62	63.27	-25.65	Peak
3	0.389	27.28	0.03	-9.72	0.10	37.13	58.08	-20.95	Peak
4	0.914	22.99	0.04	-9.71	0.10	32.84	56.00	-23.16	Peak
5	1.858	19.08	0.05	-9.70	0.10	28.93	56.00	-27.07	Peak
6	15.552	8.70	0.25	-9.39	0.25	18.59	60.00	-41.41	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

5 Occupied bandwidth

5.1 Test limit

Please refer section 15.249

5.2 Method of measurement

- a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver RBW set 30KHz, VBW set 100KHz, Sweep time set auto.

5.3 Test Setup

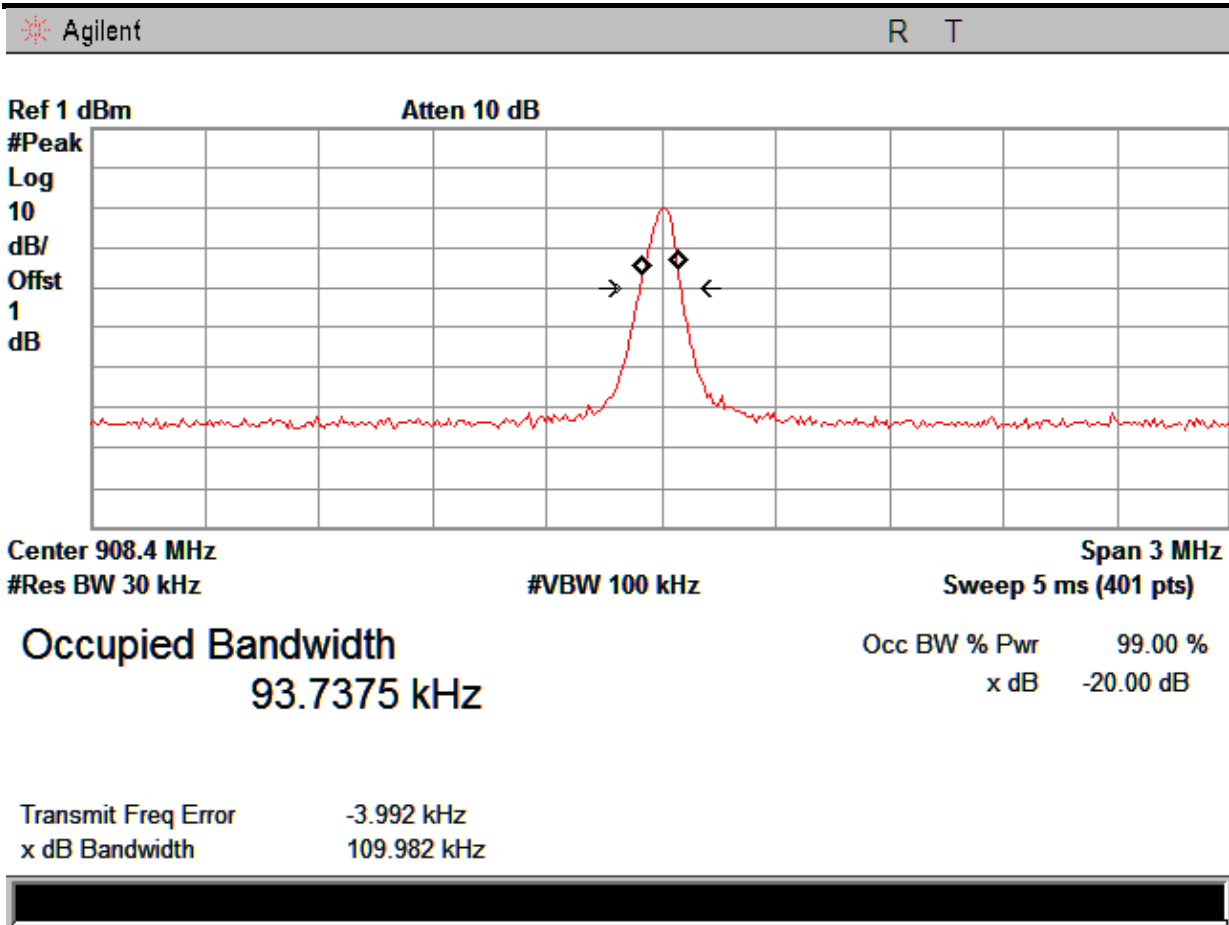


5.4 Test Results

PASS.

Detailed information please see the following page.

Frequency	Test Result	Limit	Result
908.42MHz	109.982KHz	/	Pass



6 Antenna Requirement

6.1 Standard Requirement

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2 Antenna Connected Construction

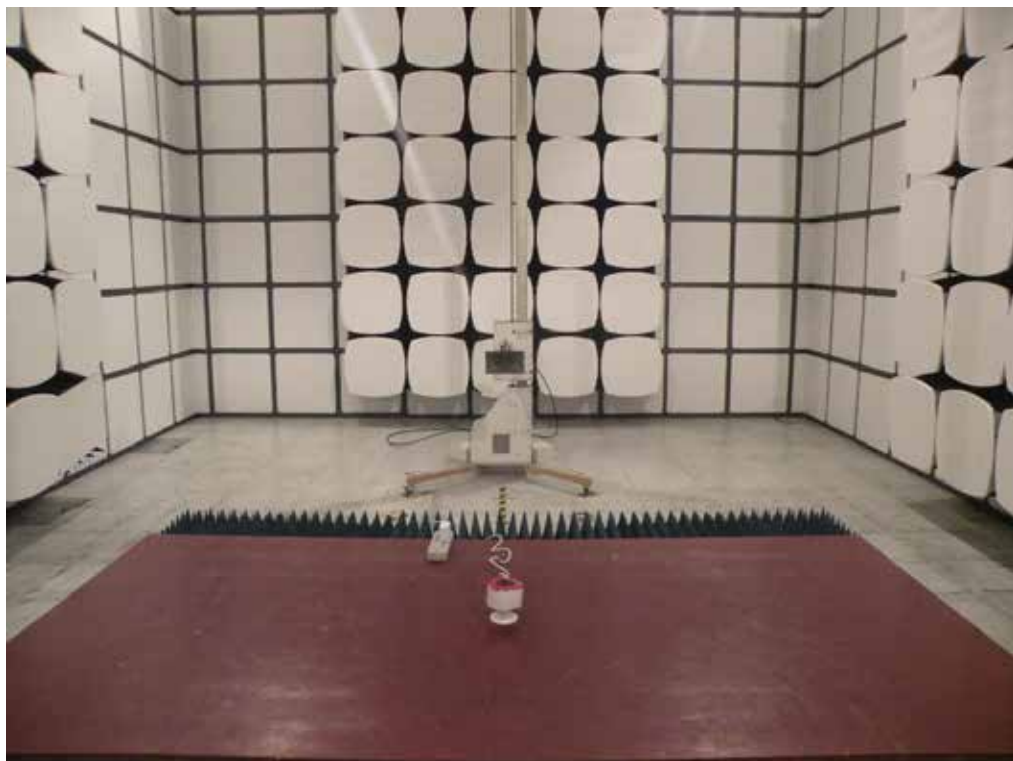
The directional gains of antenna used for transmitting is 1 dBi, and the antenna is designed with no consideration of replacement. Please see EUT photo for details.

6.3 Result

The EUT antenna is PCB Antenna. It comply with the standard requirement.

7 Photographs of Test Setup

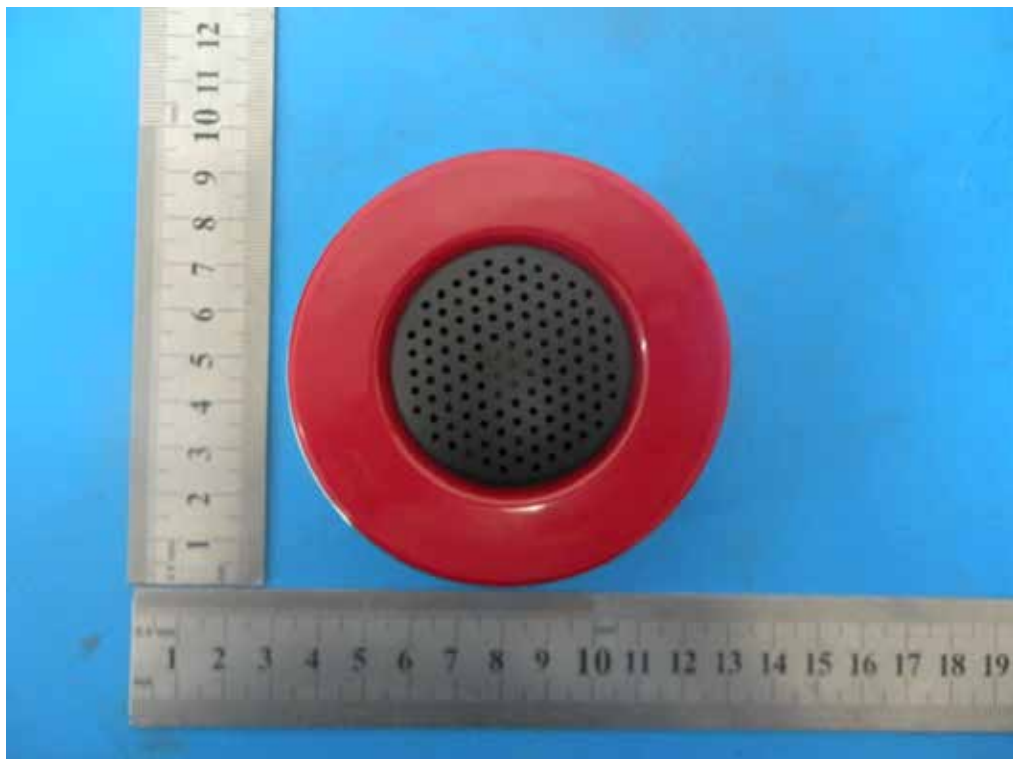
Photographs-Radiated Emission Test Setup in Chamber



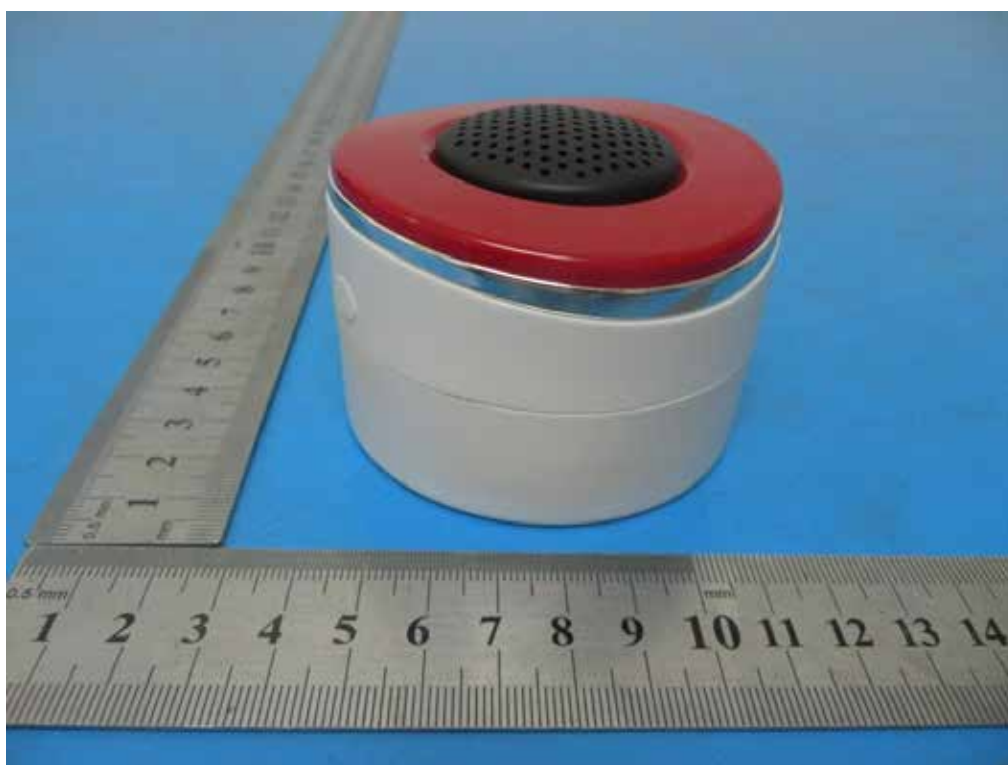
Photographs-Conducted Emission Test Setup

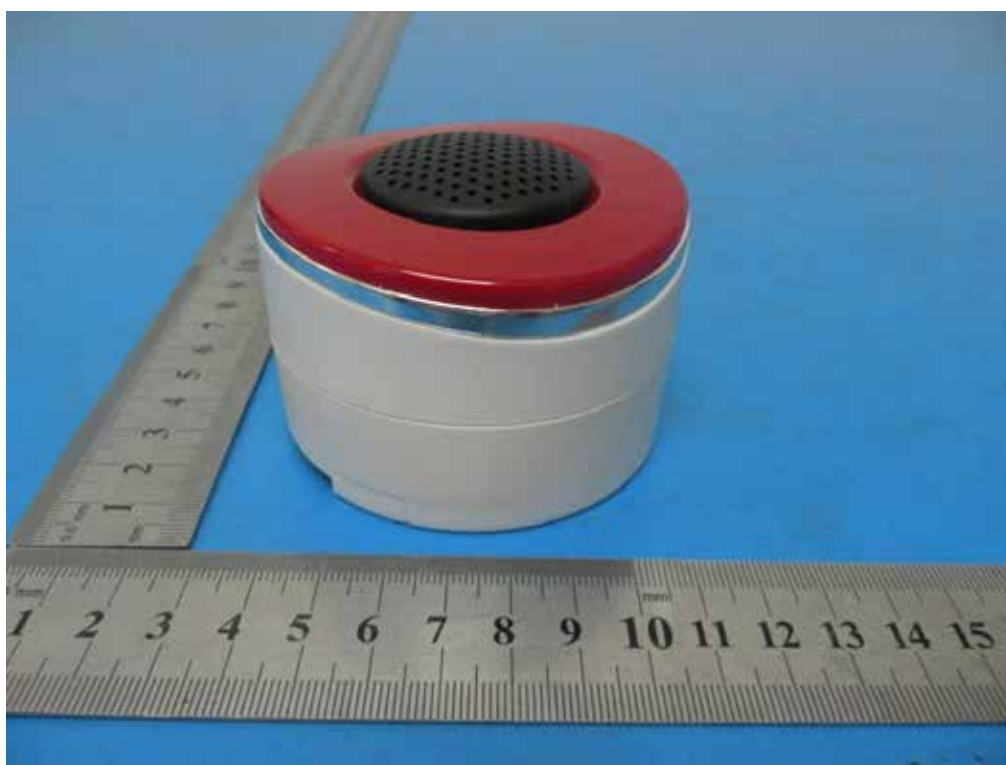


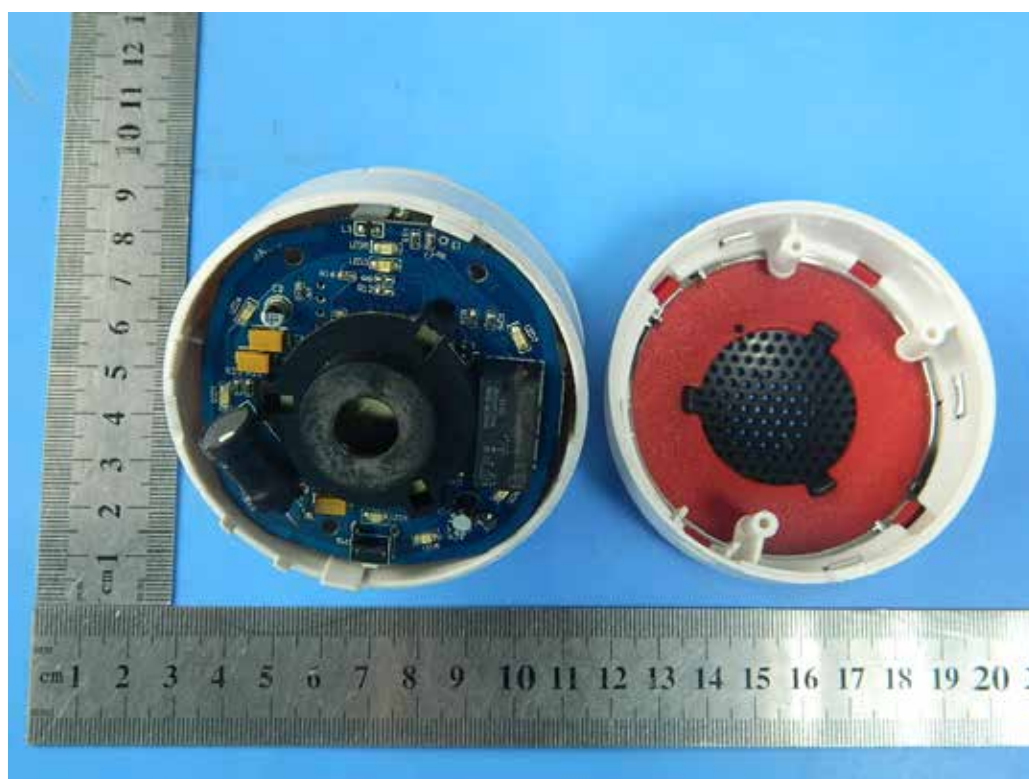
8 Photographs of EUT



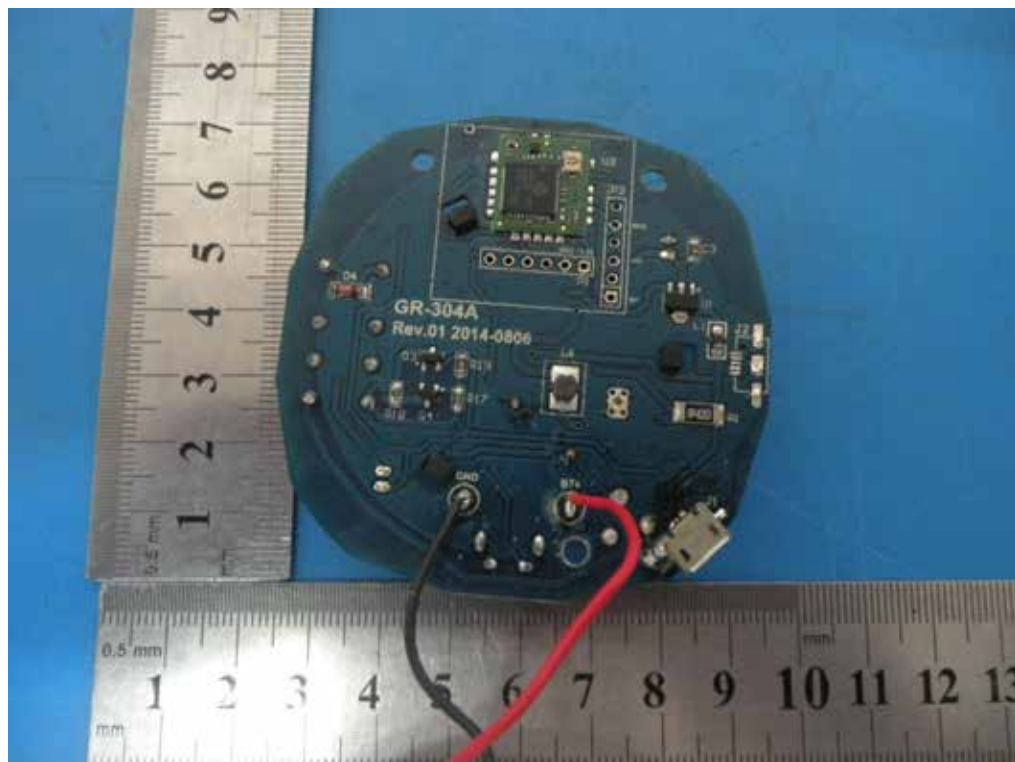
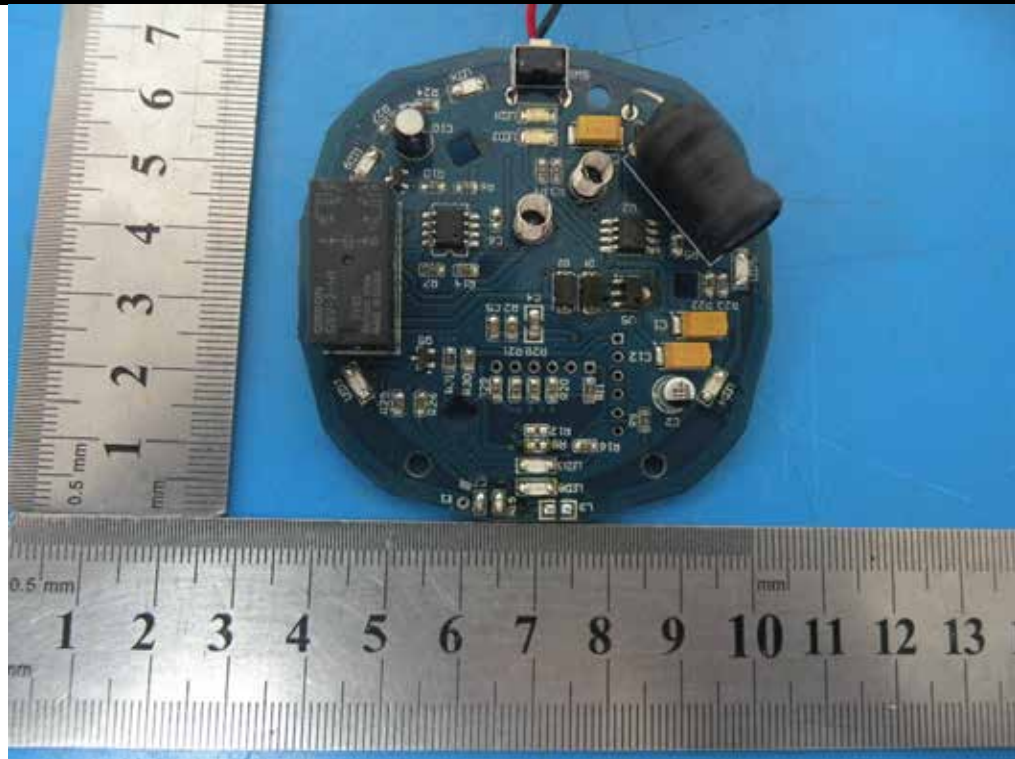












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