FCC TEST REPORT

FCC ID: 2AXJA-BN253

On Behalf of

Shenzhen Burn Technology Co.,Ltd

315 remote control

Model No.: BN253

Prepared for	:	Shenzhen Burn Technology Co.,Ltd
Address	:	Rm.1902, Bld.A, Mengxiangjiayuan, Xiandaicheng, East NanhaiRoad, Nanshan, Shenzhen, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2008169-C01-R01
Date of Receipt	:	August 20, 2020
Date of Test	:	August 20, 2020-August 25, 2020
Date of Report	:	August 25, 2020
Version Number	:	V0

Contents

1. General Information 5
1.1. Description of Device (EUT) 5
1.2. Accessories of Device (EUT) 6
1.3. Tested Supporting System Details 6
1.4. Test Facility 6
2. Summary of test 7
2.1. Summary of test result 7
2.2. Block Diagram 7
2.3. Test mode 8
2.4. Test Conditions 8
2.5. Measurement Uncertainty (95% confidence levels, k=2) 8
2.6. Test Equipment 9
3. Radiation Emission 10
3.1. Radiation Emission Limits(15.209&231) 10
3.2. Test Setup 10
3.3. Test Procedure 11
3.4. Test Equipment Setting For emission test. 12
3.5. Test Condition 12
3.6. Test Result 12
4. Power Line Conducted Emission 17
4.1. Conducted Emission Limits (15.209) 17
4.2. Test Setup 17
4.3. Test Procedure 17
4.4. Test Results 18
5. Occupied bandwidth 19
5.1. Test limit 19
5.2. Method of measurement 19
5.3. Test Setup 19
5.4. Test Results 19
6. Transmission time 21
6.1. Test limit 21
6.2. Method of measurement 21
6.3. Test Setup 21
6.4. Test Results 21
7. Antenna Requirement 23
7.1. Standard Requirement 23
7.2. Antenna Connected Construction 23
7.3. Result 23
8. Test setup photo 24
9. Photos of EUT 25

TEST REPORT DECLARATION

Applicant	:	Shenzhen Burn Technology Co.,Ltd
Address	:	Rm.1902, Bld.A, Mengxiangjiayuan, Xiandaicheng, East NanhaiRoad, Nanshan, Shenzhen, China
Manufacturer	:	Shenzhen Burn Technology Co.,Ltd
Address	:	Rm.1902, Bld.A, Mengxiangjiayuan, Xiandaicheng, East NanhaiRoad, Nanshan, Shenzhen, China
EUT Description	:	315 remote control
		(A) Model No. : BN253
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.231

ANSI C63.10-2013

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 C 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).....…..:	Lucas Pang Project Engineer	Lucas Pang
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	August 25, 2020	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	August 25, 2020	Initial released Issue	Lucas Pang

1. General Information

1.1. Description of Device (EUT)

EUT	:	315 remote control
Model No.	:	BN253
DIFF.	:	N/A
Power supply	:	DC 3V by button cell
Operation frequency	:	315MHz
Modulation	:	ASK
Antenna Type	:	Internal Antenna, Maximum Gain is 0dBi
Software version	:	V1.0
Hardware version	:	V1.0
Intend use environment	:	Residential, commercial and light industrial environment

1.2. Accessories of Device (EUT)

Accessories1 : /
Manufacturer : /
Model : /
Power supply : /

1.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
/	/	/	/	/	/

1.4. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
July 15, 2019 Certificated by IC
Registration Number: CN0085

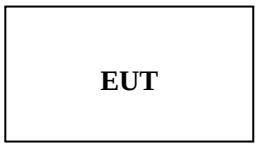
2. Summary of test

2.1. Summary of test result

Description of Test Item	Standard	Results
Spurious Emission	Section 15.231&15.209	PASS
Conduction Emission	Section 15.207	N/A
Occupied bandwidth	Section 15.231	PASS
Transmission time	Section 15.231	PASS
Band Edge	Section 15.231	N/A
Antenna Requirement	Section 15.203	PASS
Note : Test according to ANSI C63.10-2013		

2.2. Block Diagram

1. For radiated emissions test: EUT was placed on a turn table, which is 0.8 meters high above ground for below 1 GHz test and 1.5 meters high above ground for below 1 GHz test . EUT was set into test mode before test. New battery is used during all test



2.3. Test mode

EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
1	CH1	315MHz

2.4. Test Conditions

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

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

Item	**Uncertainty**
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB(Polarize: H)
	4.16dB(Polarize: V)
Uncertainty for radio frequency	5.4×10-8
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.6. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2019.09.05	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2019.09.07	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.08.26	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.06	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2019.09.06	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.05	1 Year

3. Radiation Emission

3.1. Radiation Emission Limits(15.209&231)

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		75.6(AV)	3
Carrier frequency		95.6(PK)	3

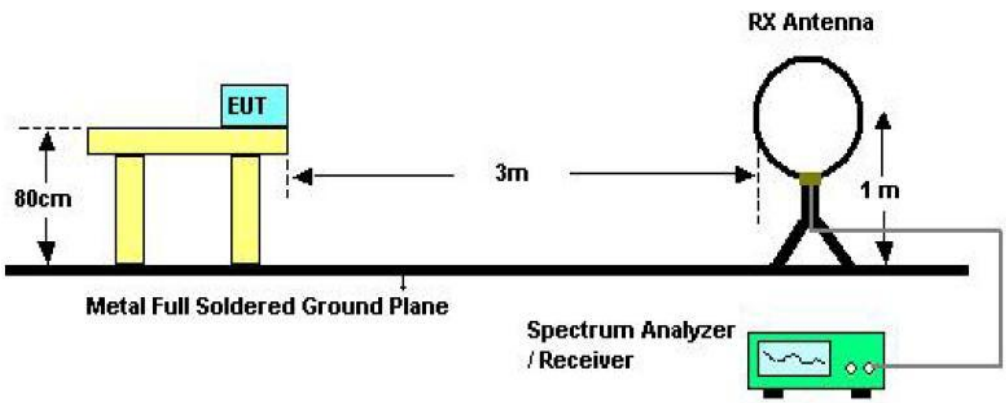
Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	[1]1,250 to 3,750	[1]125 to 375
174-260	3,750	375
260-470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

NOTE:

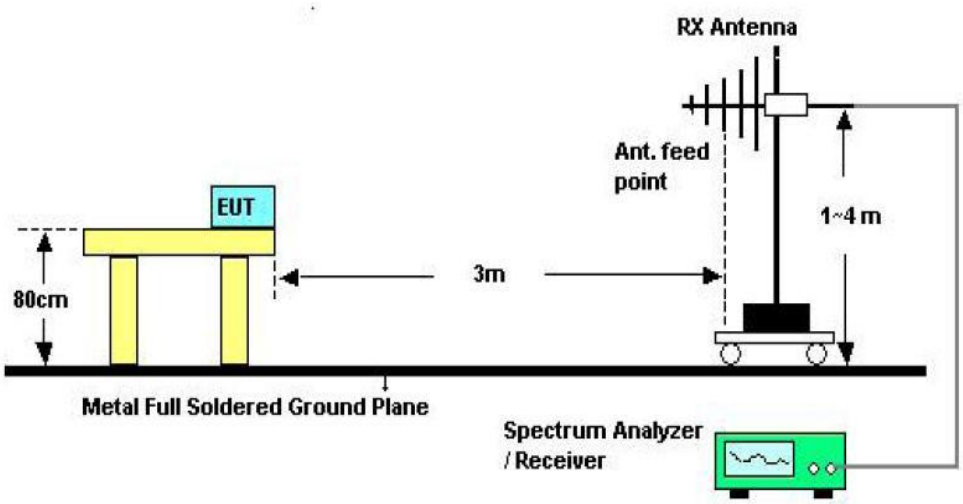
a) The tighter limit applies at the band edges.

b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

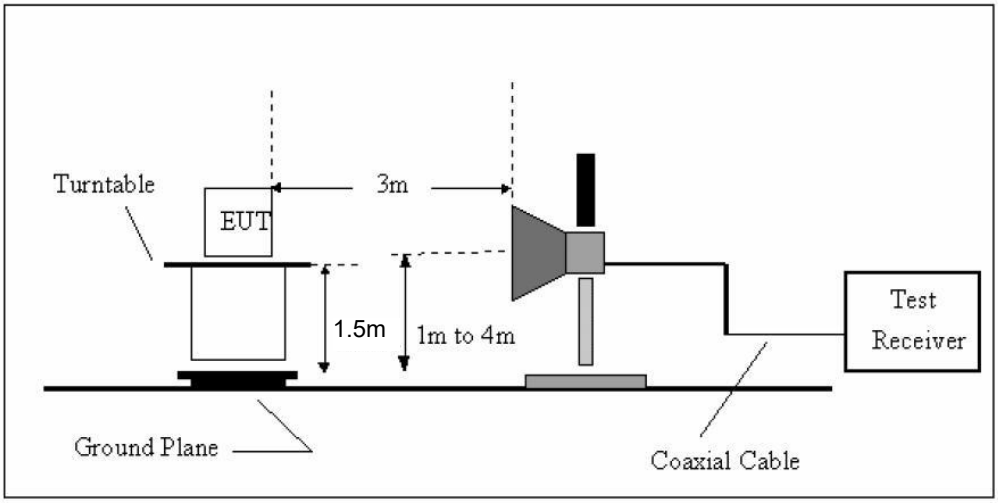
3.2. Test Setup



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.3. Test Procedure

a) The measureing distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground,The table was rotated 360 degrees to determine the position of the highest radiation
b) The Test antenna shall vary between 1m and 4m,Both Horizontal and Vertical antenna are set ot make measurement.
c) The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significent Peaks are then marked. and then Qusia Peak Detector mode remeasured
d) If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable

limit above 1GHz.

e) For the actual test configuration, please see the test setup photo.

3.4. Test Equipment Setting For emission test.

9kHz~150kHz	RBW 200Hz	VBW1kHz
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(The new battery be used during Test)

3.6. Test Result

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.

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:

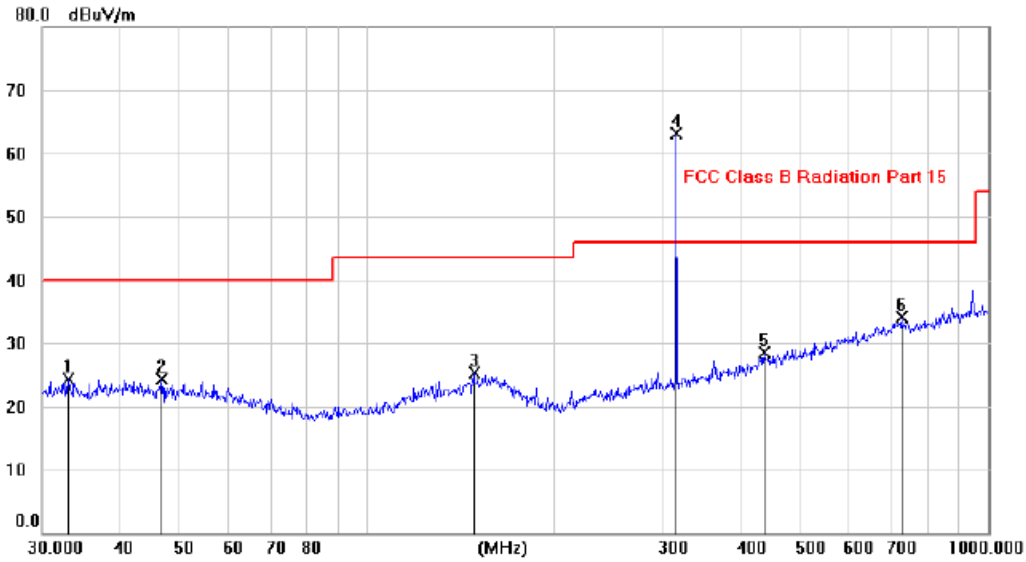
a. Peak setting 30MHz-1GHz, RBW=100kHz, VBW=300kHz.

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

Radiated Emissions Result of Inside band

Below 1GHz:

Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		33.0602	10.73	13.66	24.39	40.00	-15.61	peak			
2		46.7811	10.30	14.08	24.38	40.00	-15.62	peak			
3		148.5452	10.39	14.96	25.35	43.50	-18.15	peak			
4	*	315.0386	48.67	14.49	63.16	46.00	17.16	peak			
5		436.6603	11.33	17.24	28.57	46.00	-17.43	peak			
6		726.0410	12.01	22.09	34.10	46.00	-11.90	peak			

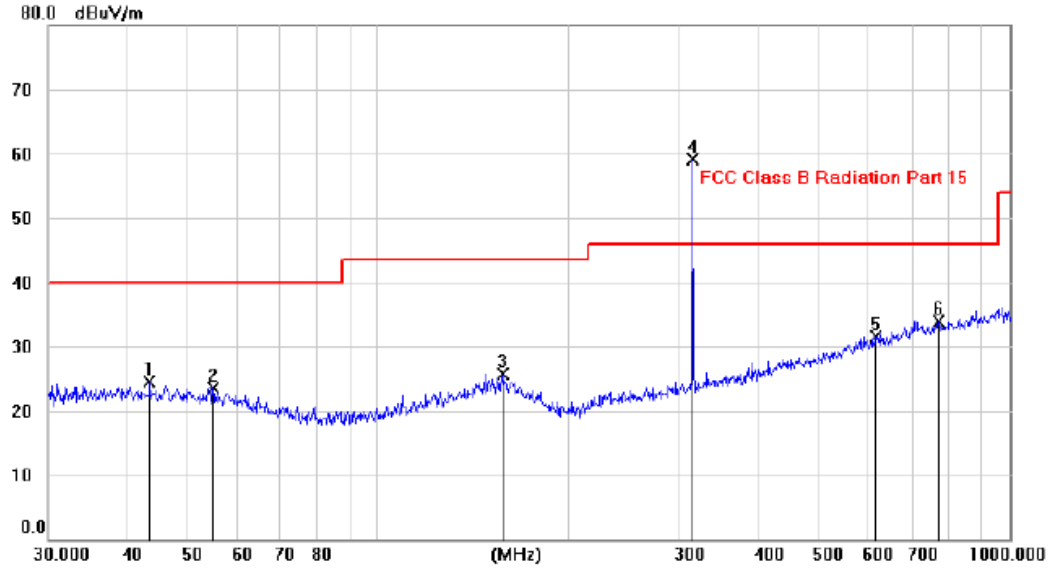
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	315	48.67	14.49	63.16	95.62	-32.46	PK
2	315	/	/	/	75.62	/	AV

Remark: 1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result =Reading + Factor)–Limit

3. When peak value applied to AVG limit, the AVG value is not calculated.

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		43.3686	10.36	14.22	24.58	40.00	-15.42	peak			
2		54.7580	9.89	13.61	23.50	40.00	-16.50	peak			
3		157.8907	10.69	15.04	25.73	43.50	-17.77	peak			
4	*	315.0386	44.65	14.49	59.14	46.00	13.14	peak			
5		613.3533	11.14	20.46	31.60	46.00	-14.40	peak			
6		771.9898	11.25	22.72	33.97	46.00	-12.03	peak			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	315	44.65	14.49	59.14	95.62	-17.55	PK
2	315	/	/	/	75.62	/	AV

Remark: 1. All readings are Quasi-Peak and Average values.

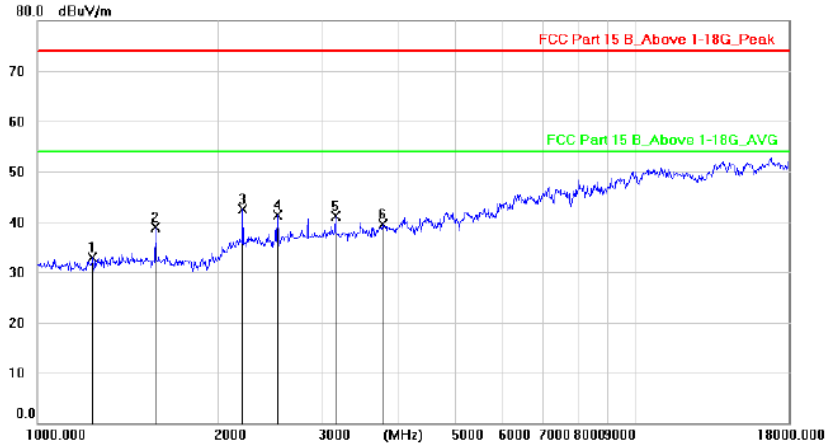
2. Margin = Result (Result =Reading + Factor)– Limit

3. When peak value applied to AVG limit, the AVG value is not calculated.

Note : Average = peak value-6.47 dB=83.28 -6.47=76.81

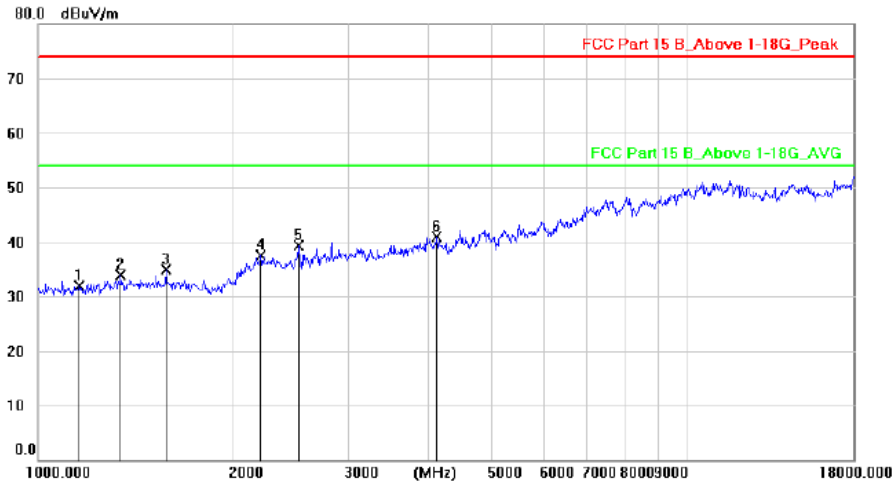
Above 1GHz:

Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1234.909	52.93	-19.96	32.97	74.00	-41.03	peak			
2		1575.175	58.02	-19.17	38.85	74.00	-35.15	peak			
3	*	2204.535	57.93	-15.37	42.56	74.00	-31.44	peak			
4		2519.478	56.33	-15.12	41.21	74.00	-32.79	peak			
5		3150.237	54.32	-13.24	41.08	74.00	-32.92	peak			
6		3768.514	56.03	-16.61	39.42	74.00	-34.58	peak			

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1156.151	52.47	-20.49	31.98	74.00	-42.02	peak			
2		1341.330	53.21	-19.36	33.85	74.00	-40.15	peak			
3		1574.720	54.06	-19.17	34.89	74.00	-39.11	peak			
4		2205.172	52.80	-15.37	37.43	74.00	-36.57	peak			
5		2519.478	54.50	-15.12	39.38	74.00	-34.62	peak			
6	*	4114.626	57.19	-16.20	40.99	74.00	-33.01	peak			

4. Power Line Conducted Emission

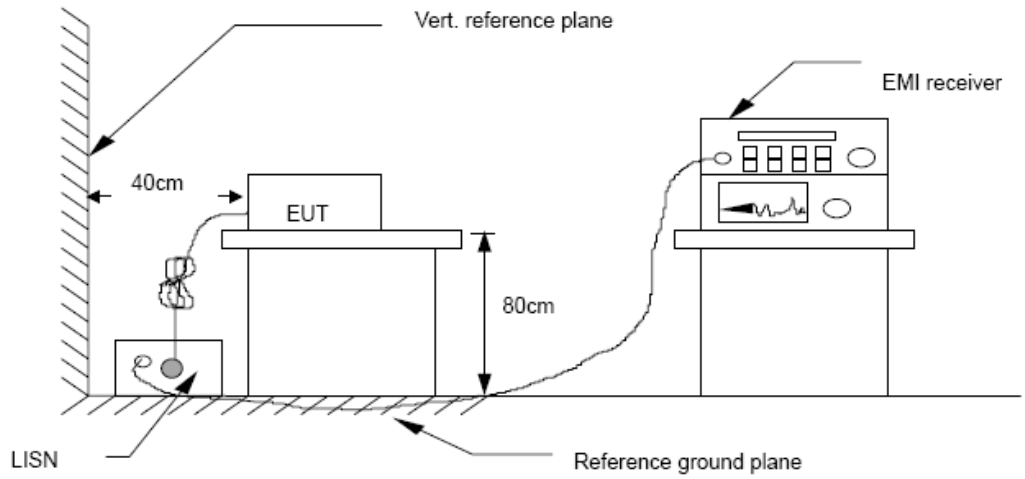
4.1. Conducted Emission Limits (15.209)

Frequency MHz	Limits dB(μV)	
	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 C63.10:2013

on Conducted Emission Measurement.
The bandwidth of test receiver (R & S ESCI) is set at 9 kHz.

4.4. Test Results

EUT power supply by battery, so the test not applicable.

5. Occupied bandwidth

5.1. Test limit

Please refer section RSS-210 & 15.231

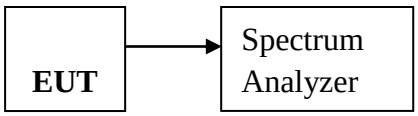
According to §15.231(C), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz.

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 30KHz,Sweep time set auto.

5.3. Test Setup



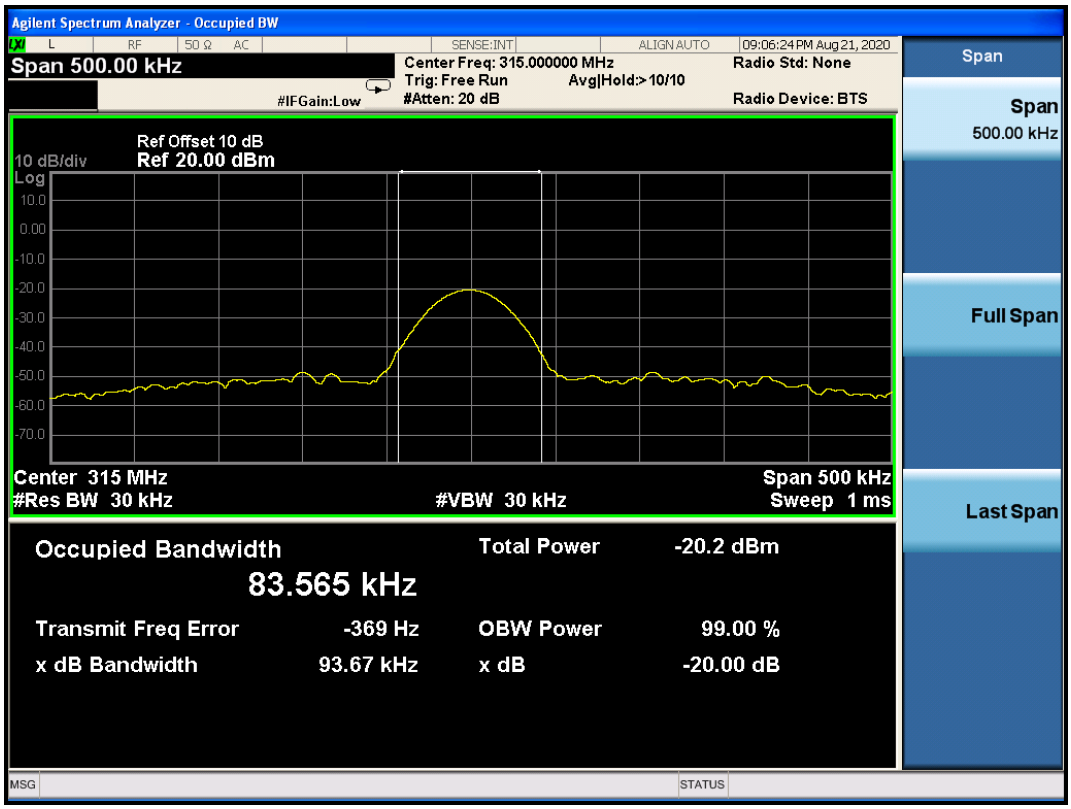
5.4. Test Results

Mode	Freq (MHz)	20dB Bandwidth (kHz)	99% Bandwidth	Limit (kHz)	Conclusion
ASK	315	93.67	/	787.5	PASS

Note:

Limit = 315MHz *0.25% = 787.5 kHz

315MHz


Agilent Spectrum Analyzer - Occupied BW
Span 500.00 kHz
Center Freq: 315.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
09:06:24 PM Aug 21, 2020
Ref Offset 10 dB
10 dB/div
Ref 20.00 dBm
Log
Center 315 MHz
#Res BW 30 kHz
#VBW 30 kHz
Span 500 kHz
Sweep 1 ms
Occupied Bandwidth
83.565 kHz
Total Power -20.2 dBm
Transmit Freq Error -369 Hz
OBW Power 99.00 %
x dB Bandwidth 93.67 kHz
x dB -20.00 dB
Span
Span 500.00 kHz
Full Span
Last Span

6. Transmission time

6.1. Test limit

Please refer sectionRSS-210 & 15.231

According to §15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.2. Method of measurement

6.2.1. Place the EUT on the table and set it in transmitting mode.

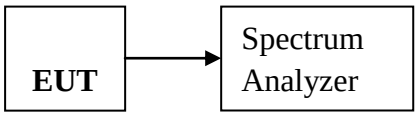
6.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3. Set spectrum analyzer Center= 433.92MHz, Span = 0MHz, Sweep = 5s.

6.2.4. Set the spectrum analyzer as RBW, VBW=1MHz,

6.2.5. Max hold, view and count how many channel in the band.

6.3. Test Setup



6.4. Test Results

Freq (MHz)	Test Result(s)	Limit (s)	Conclusion
315	0.16	< 5s	PASS

EUT After Release the button, EUT emission Continue 0.16 seconds, Compliance with 15.231 a(1) section.

315MHz

Agilent Spectrum Analyzer - Swept SA
Center Freq 315.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 2/100
09:29:36 PM Aug 21, 2020
Ref Offset 10 dB
10 dB/div
Ref 20.00 dBm
Log
ΔMkr1 160.0 ms
2.370 dB
1Δ2
Center 315.000000 MHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 10.00 s (1001 pts)
Frequency
Auto Tune
Center Freq
315.000000 MHz
Start Freq
315.000000 MHz
Stop Freq
315.000000 MHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

7. Antenna Requirement

7.1. 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.

7.2. Antenna Connected Construction

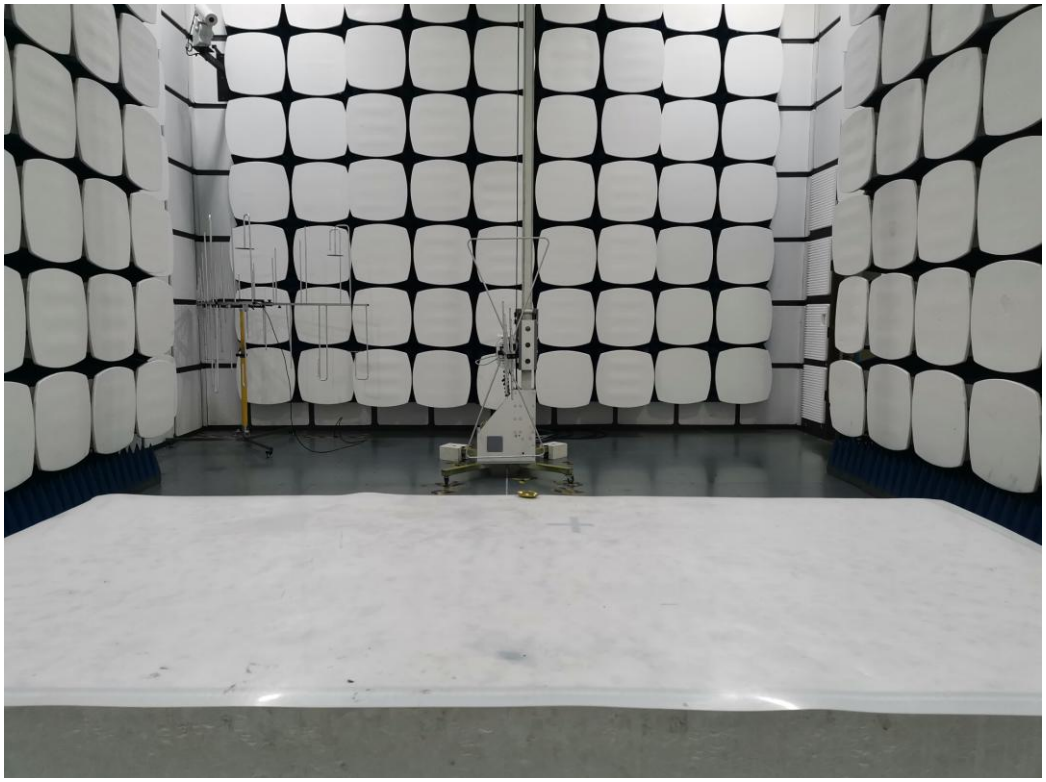
The directional gains of antenna used for transmitting is 0 dBi, and the antenna connector is de- signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

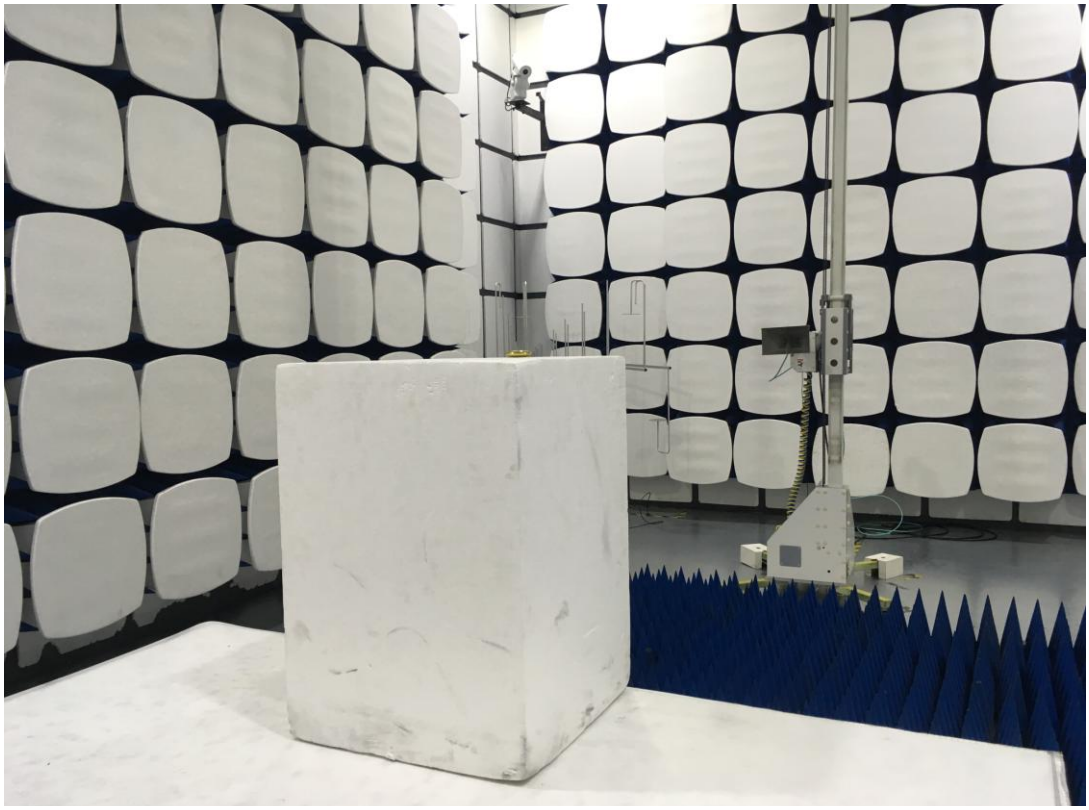
7.3. Result

The EUT antenna is Internal antenna. It comply with the standard requirement.

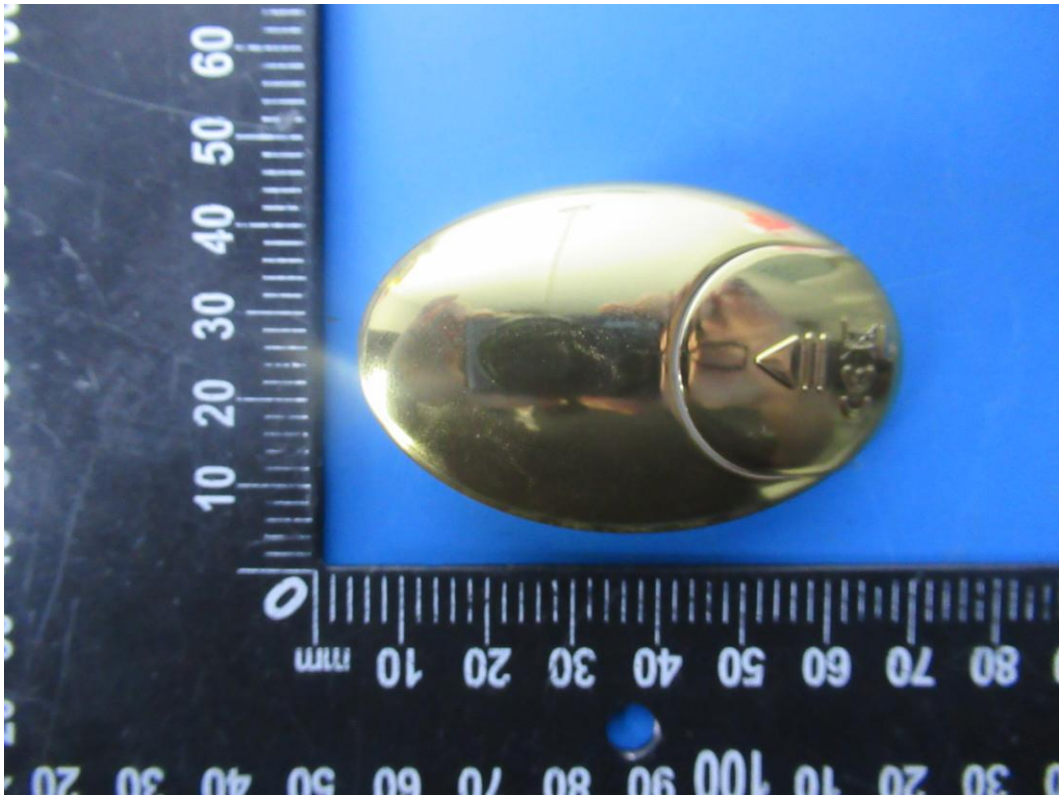
8. Test setup photo

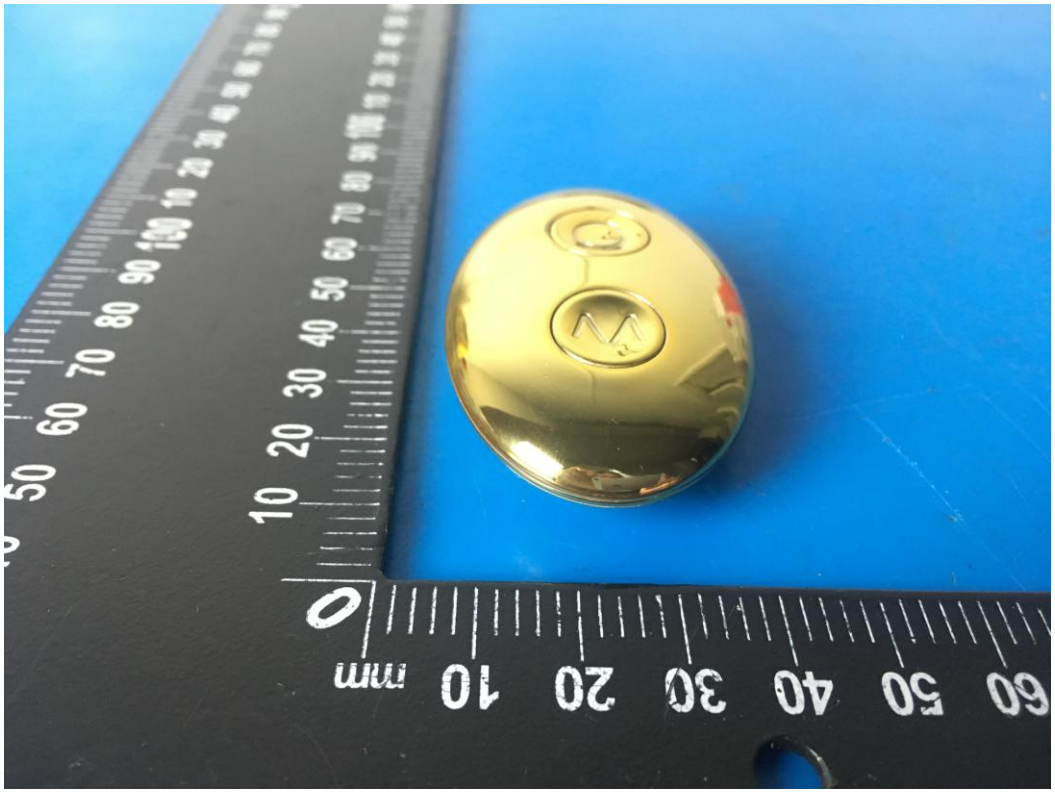
Photos of Radiated emission

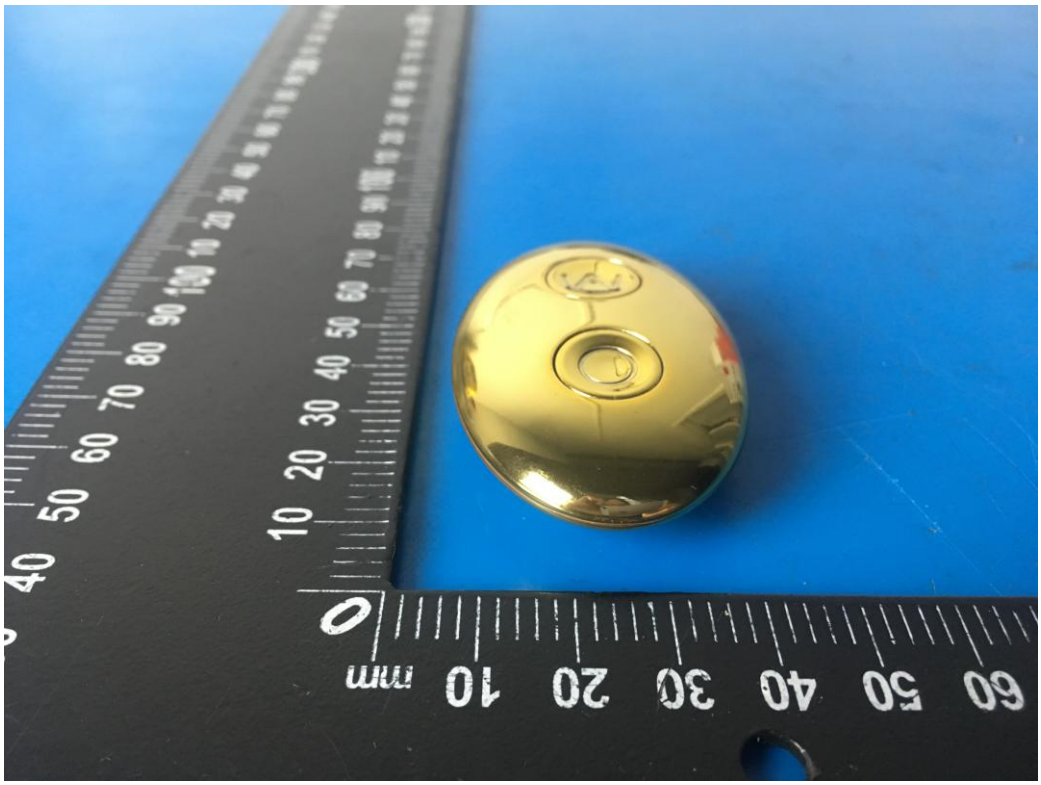


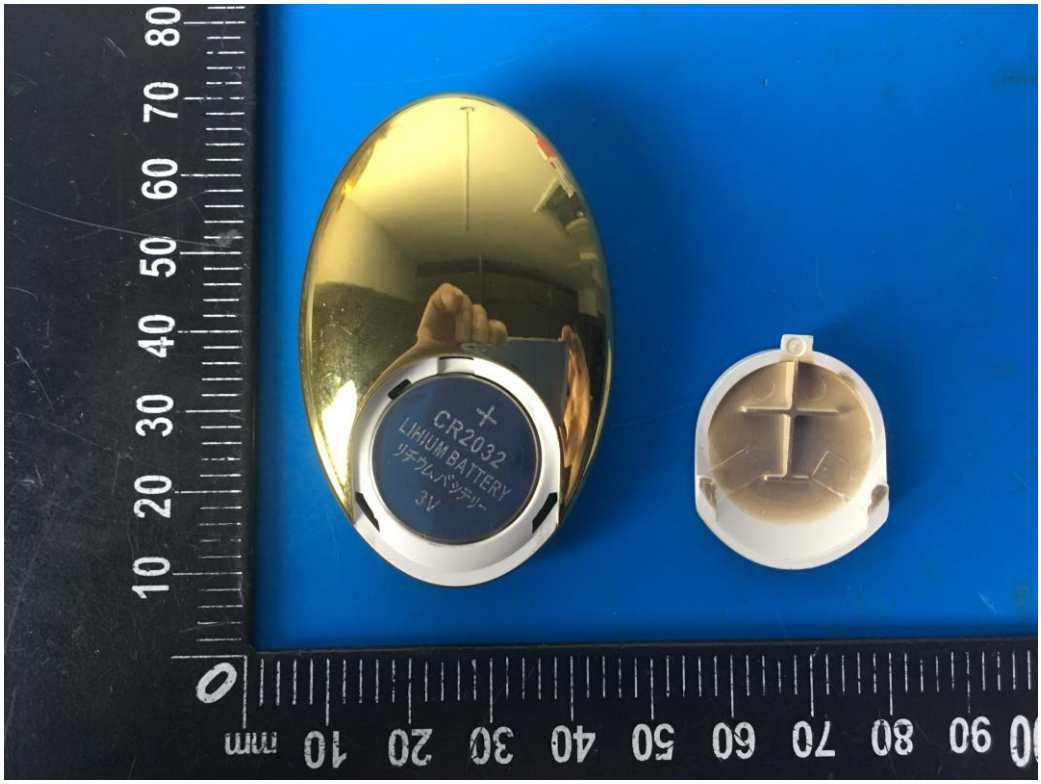


9. Photos of EUT

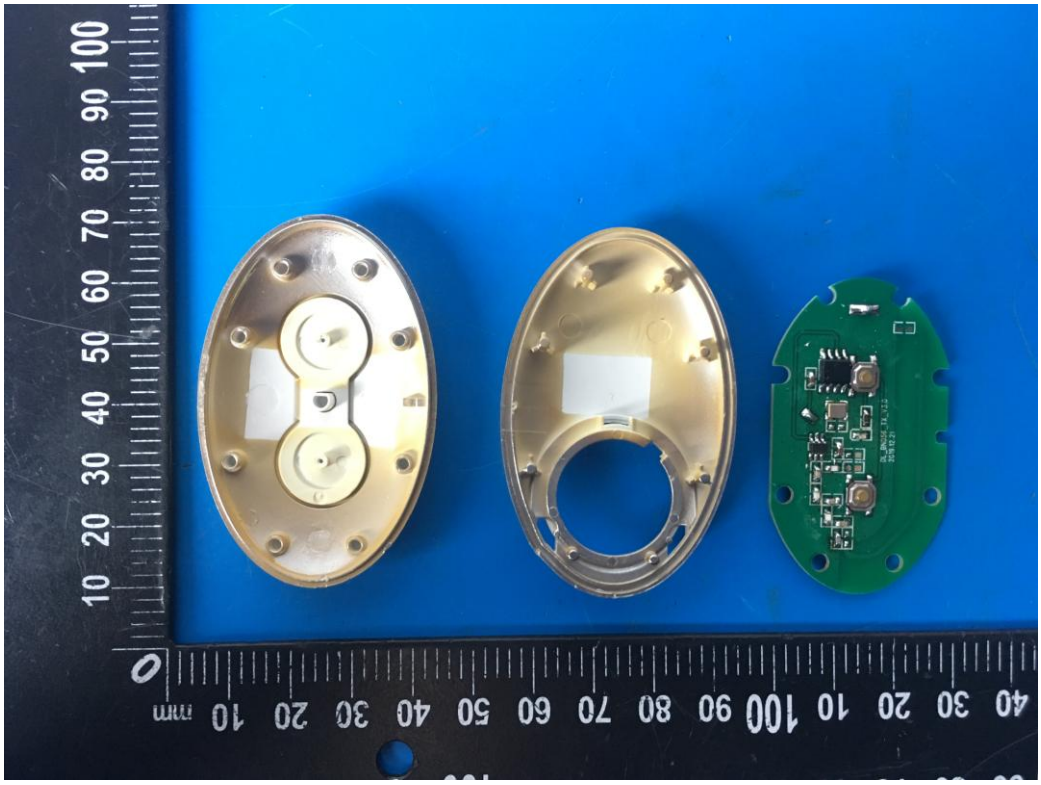


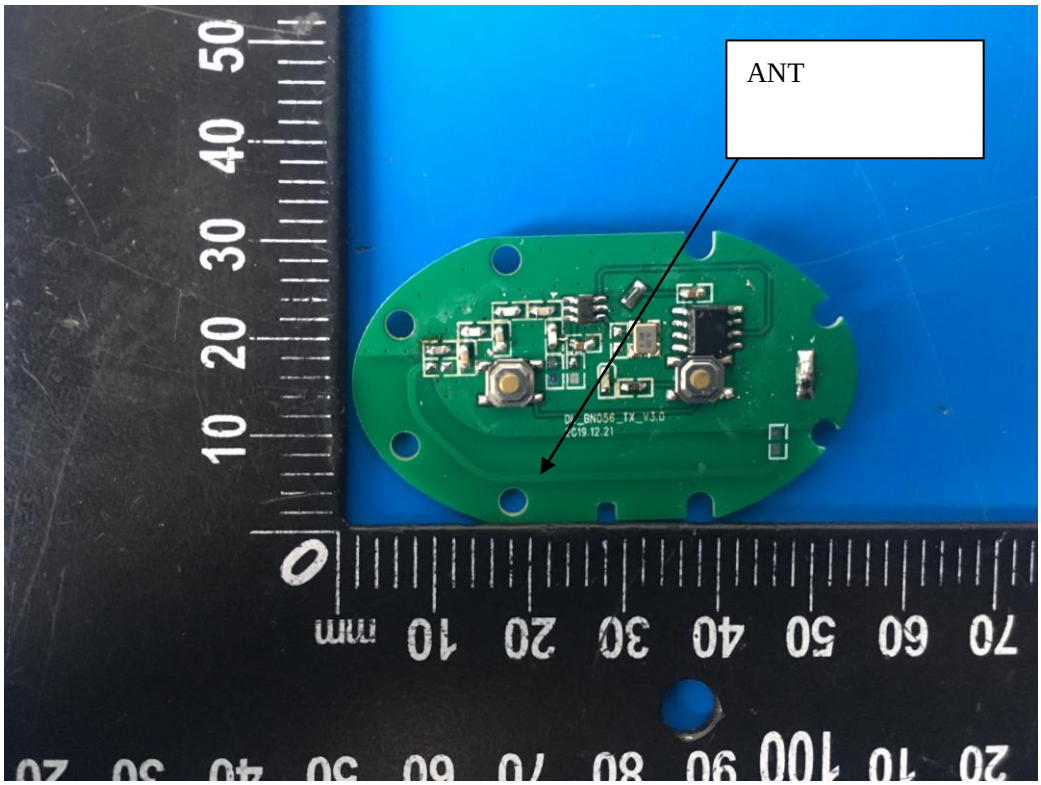


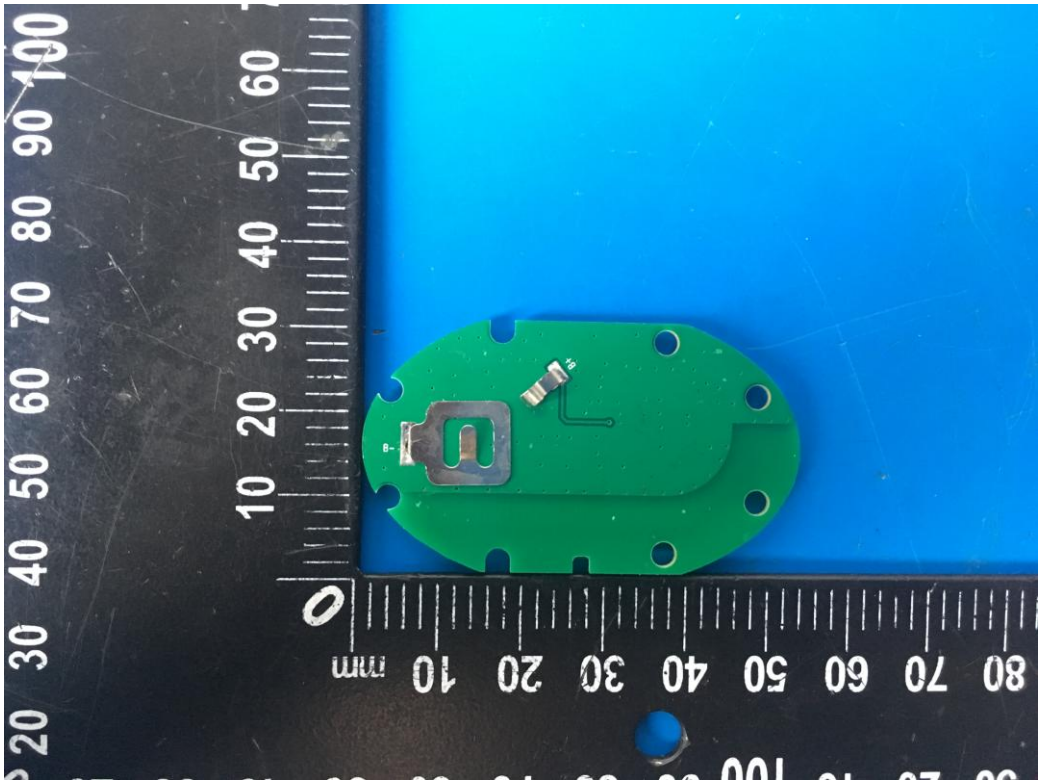



CR2032
LIHIUM BATTERY
リチウムバッテリー
3V

CR2032
LIHIUM BATTERY
リチウムバッテリー
3V




ANT



---------END OF THE REPORT-------