TEST REPORT

Product Name	:	Orange
Brand Mark	:	N/A
Model No.	:	Orange
FCC ID	:	2AZGU-ORANGE
Report Number	:	BLA-EMC-202101-A7903
Date of Sample Receipt	:	2021/1/26
Date of Test	:	2021/1/28 to 2021/3/5
Date of Issue	:	2021/5/31
Test Standard	:	47 CFR Part 15, Subpart C 15.231
Test Result	:	Pass

Prepared for:

OUTSHINE IOT TECH LIMITED

RM22 2/F FU TAO BUILDING NO.98 ARGYLE STREET KOWLOON

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

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Compiled by: Jozu.

Review by: Sweet.Liang

Approved by: Tomen Li

Date: 2021/5/31

REPORT REVISE RECORD

Version No.	Date	Description
00	2021/5/31	Original

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.231(b)	Pass
Field Strength of the Fundamental Signal (15.231(b))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.5	47 CFR Part 15, Subpart C 15.231(b)	Pass
Dwell Time (15.231(a))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.231(a)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.231(c)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.231	N/A	47 CFR Part 15, Subpart C 15.203	Pass

2 GENERAL INFORMATION

Applicant	OUTSHINE IOT TECH LIMITED
Address	RM22 2/F FU TAO BUILDING NO.98 ARGYLE STREET KOWLOON
Manufacturer	SHENZHEN FRACTAL AUTO TECHNOLOGY COMPANY LIMITED
Address	Room B906, Chang Jiang Mansion, No. 16, Zhong Xin Road, Baoan District, Shenzhen City
Factory	SHENZHEN FRACTAL AUTO TECHNOLOGY COMPANY LIMITED
Address	Room B906, Chang Jiang Mansion, No. 16, Zhong Xin Road, Baoan District, Shenzhen City
Product Name	Orange
Test Model No.	Orange

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	2.5
Software Version	2.1

Operation Frequency:	433.92MHz
Channel numbers:	1
Modulation type:	ASK
Antenna Type:	Internal antenna
Antenna gain:	-6.7dBi（Provided by the customer）
Power supply:	DC 3.0V

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25℃	DC3.0V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
TX	Keep the EUT in transmitting mode with modulation
Remark: New battery is used during all test. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
N/A	N/A	N/A	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25
Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Field Strength of the Fundamental Signal (15.231(b))					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25

Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Dwell Time (15.231(a))					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of 20dB Bandwidth					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

1 RADIATED EMISSIONS

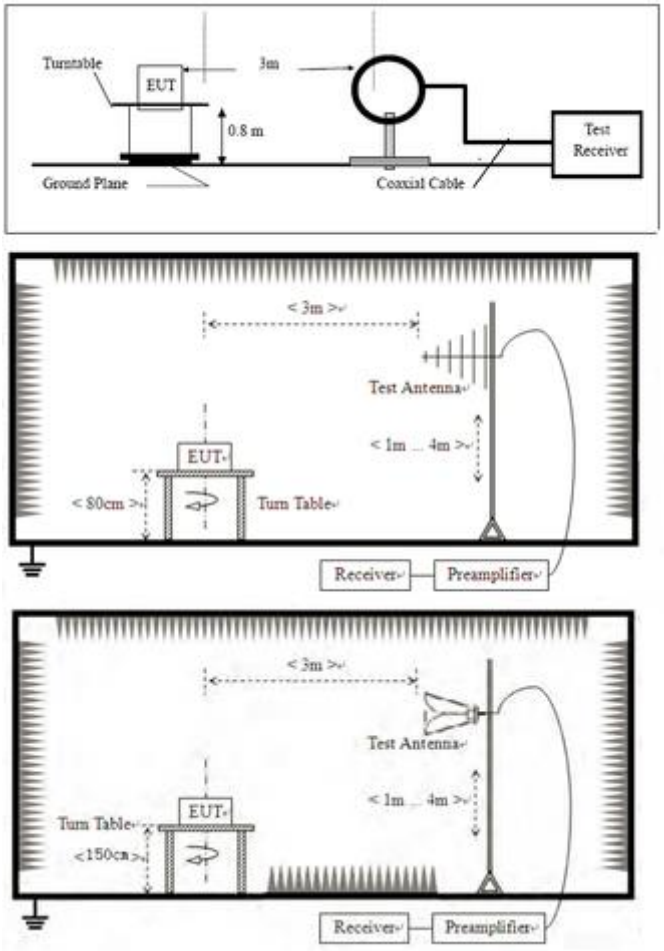
Test Standard	47 CFR Part 15, Subpart C 15.231
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

1.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

1.2 BLOCK DIAGRAM OF TEST SETUP

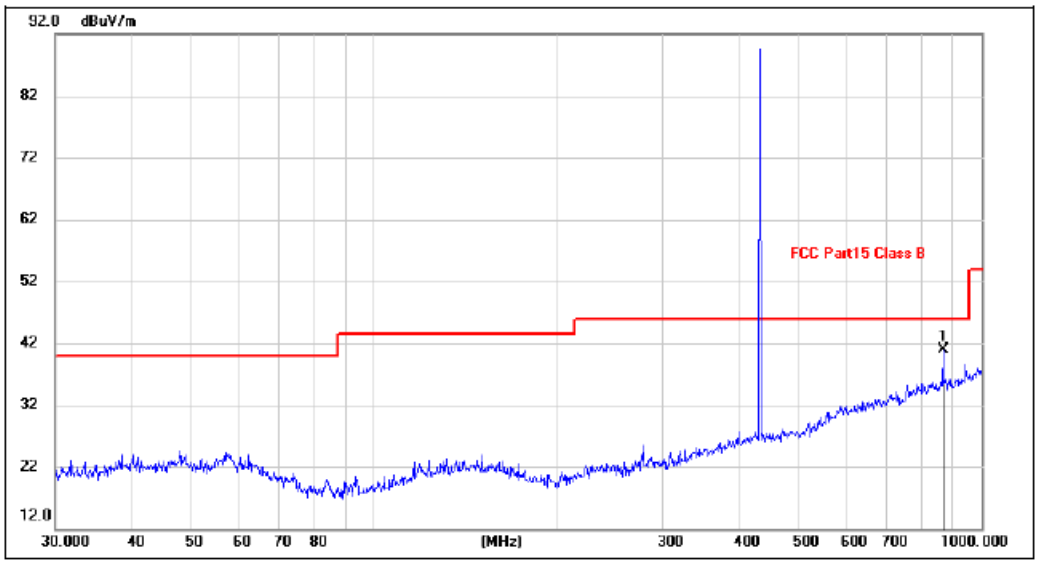


1.3 PROCEDURE

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

1.4 TEST DATA

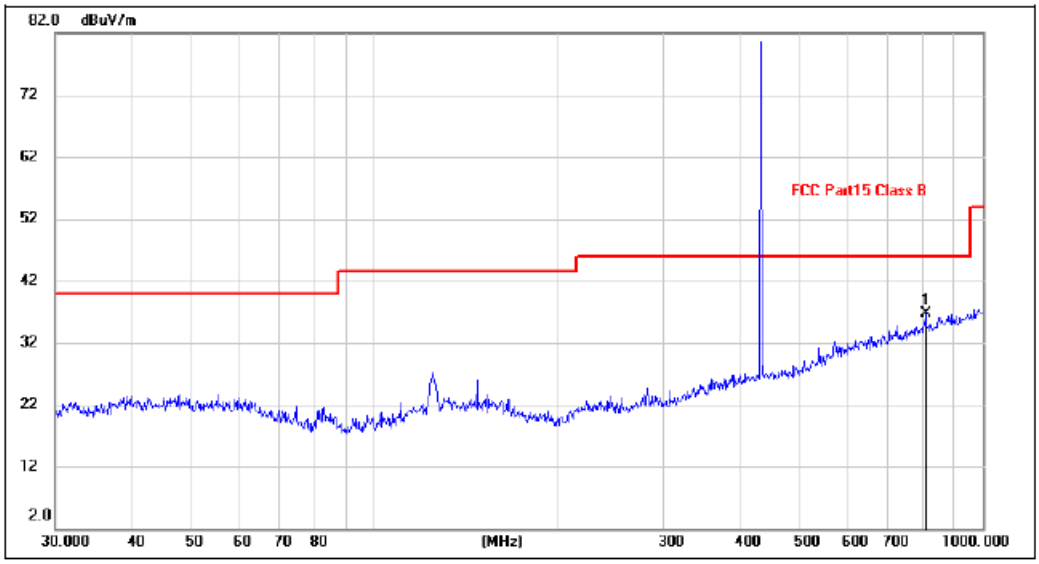
[TestMode: TX]; [Polarity: Horizontal]



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Dutycycle Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
3	869.13	5.92	35.04	N/A	40.96	80.82	-39.86	peak
4	869.13			-10.84	30.12	60.82	-30.70	AVG

Test Result: Pass

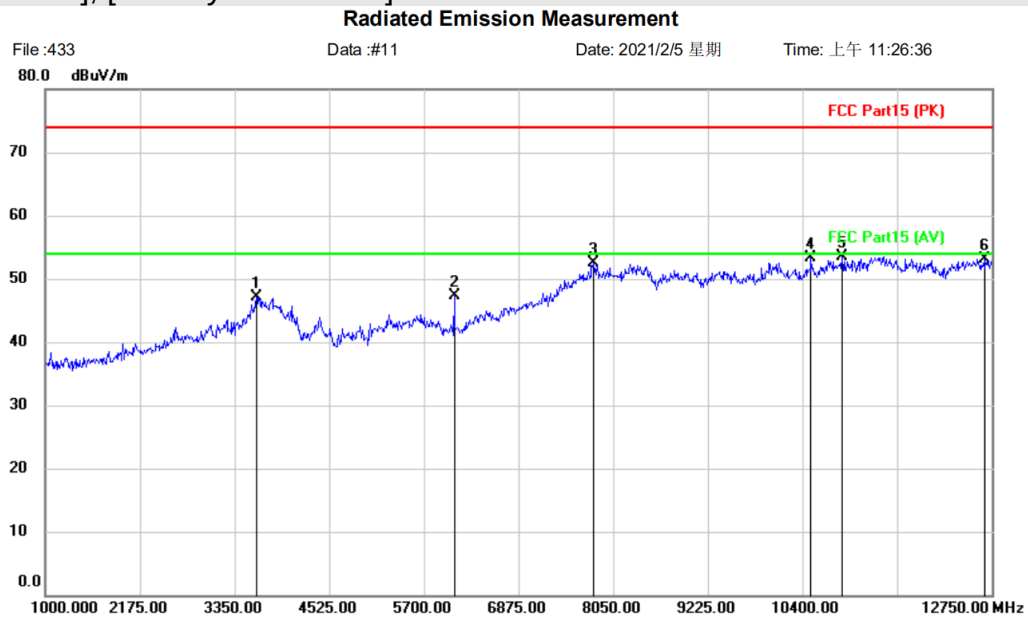
[TestMode: TX]; [Polarity: Vertical]



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Dutycycle Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	810.2653	2.16	34.49	N/A	36.65	80.82	-44.17	peak
2	810.2653	/	/	-10.84	25.81	60.82	-35.01	AVG

Test Result: Pass

[TestMode: TX]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT: Orange
M/N: Orange
Mode: TX mode
Note:

Polarization: ***Horizontal***
Power: DC3V
Distance: 3m

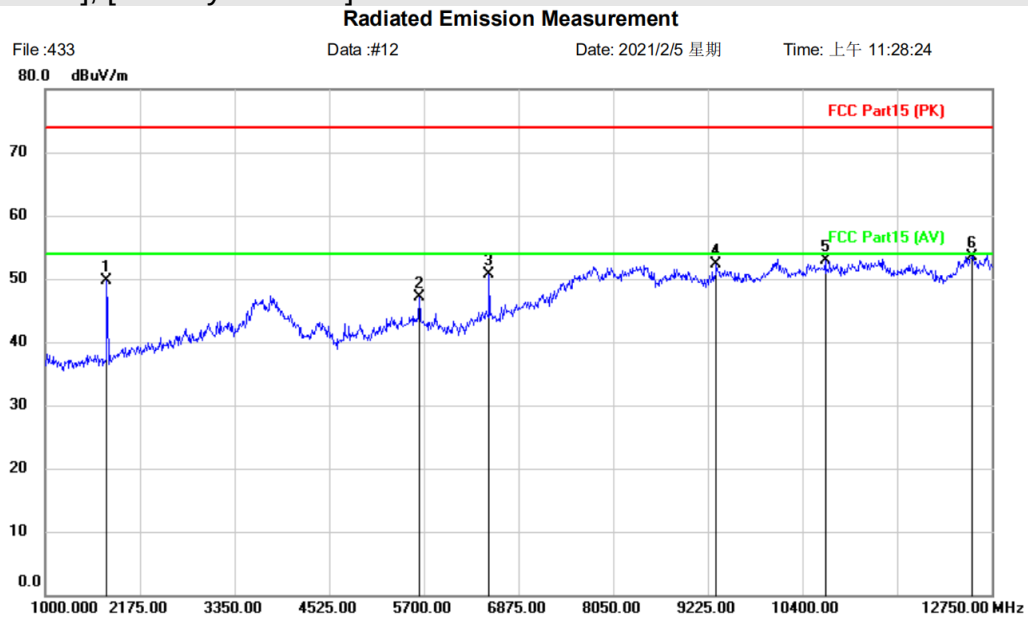
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		3620.250	54.28	-7.12	47.16	74.00	-26.84	peak			
2		6076.000	55.98	-8.67	47.31	74.00	-26.69	peak			
3		7803.250	53.07	-0.62	52.45	74.00	-21.55	peak			
4		10505.750	50.65	2.70	53.35	74.00	-20.65	peak			
5	*	10893.500	50.07	3.39	53.46	74.00	-20.54	peak			
6		12667.750	49.32	3.87	53.19	74.00	-20.81	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT: Orange
M/N: Orange
Mode: TX mode
Note:

Polarization: ***Vertical***
Power: DC3V
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1763.750	67.74	-17.94	49.80	74.00	-24.20	peak			
2		5641.250	54.92	-7.83	47.09	74.00	-26.91	peak			
3		6510.750	57.20	-6.54	50.66	74.00	-23.34	peak			
4		9330.750	52.24	-0.02	52.22	74.00	-21.78	peak			
5		10682.000	50.21	2.74	52.95	74.00	-21.05	peak			
6	*	12503.250	49.77	3.81	53.58	74.00	-20.42	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

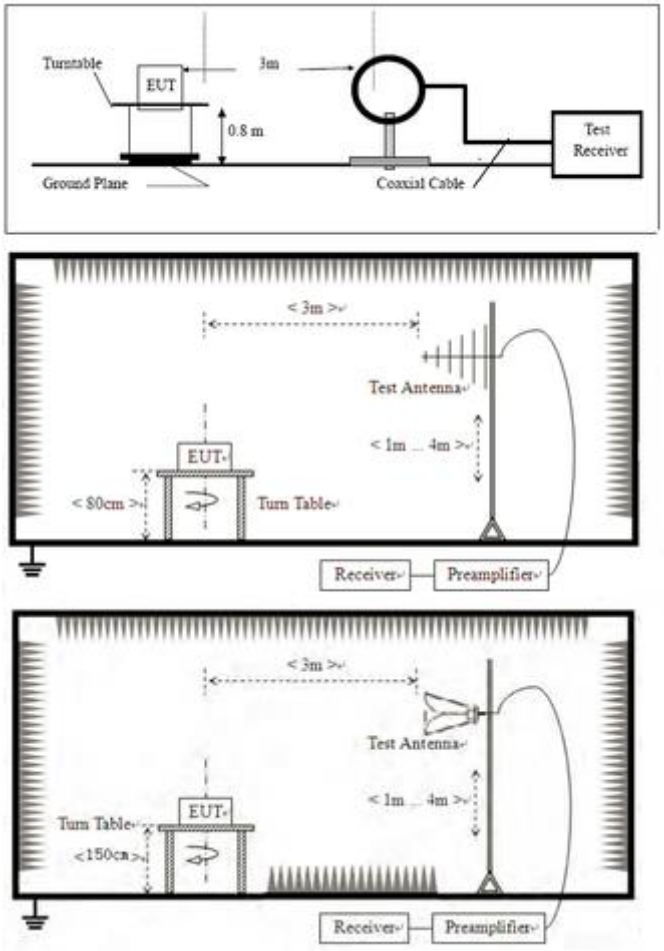
2 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.231(B))

Test Standard	47 CFR Part 15, Subpart C 15.231
Test Method	ANSI C63.10 (2013) Section 6.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

2.1 LIMITS

Fundamental frequency(MHz)	Field strength of fundamental(microvolts/meter)	Field strength of spurious emissions(microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750	125 to 375
174-260	3750	375
260-470	3750 to 12500	375 to 1250
Above 470	12500	1250
Remark: the emission limit is based on measurement instrumentation employing an average detector at a distance of 3 meters. The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

2.2 BLOCK DIAGRAM OF TEST SETUP



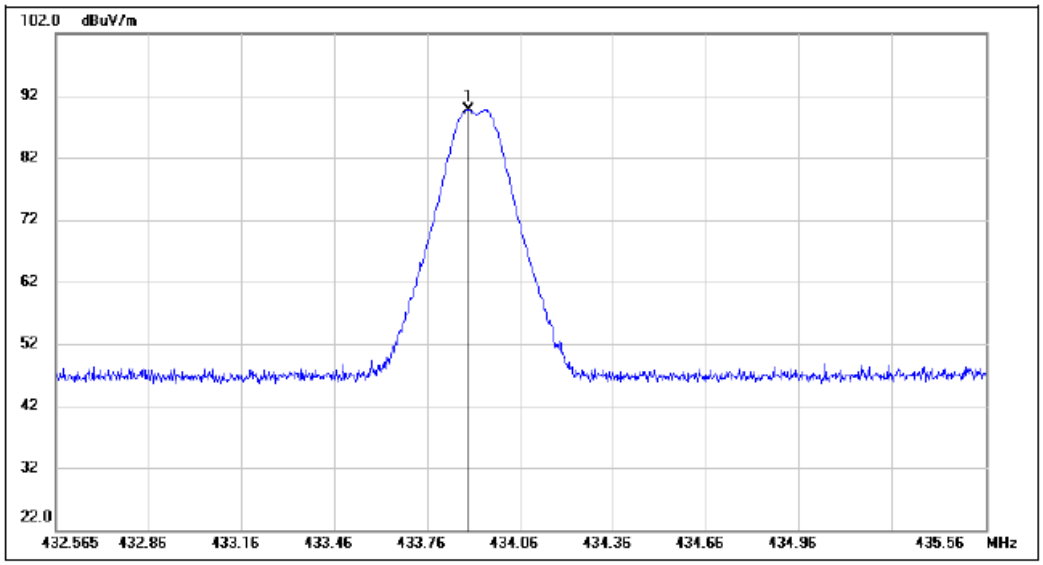
2.3 PROCEDURE

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2.4 TEST DATA

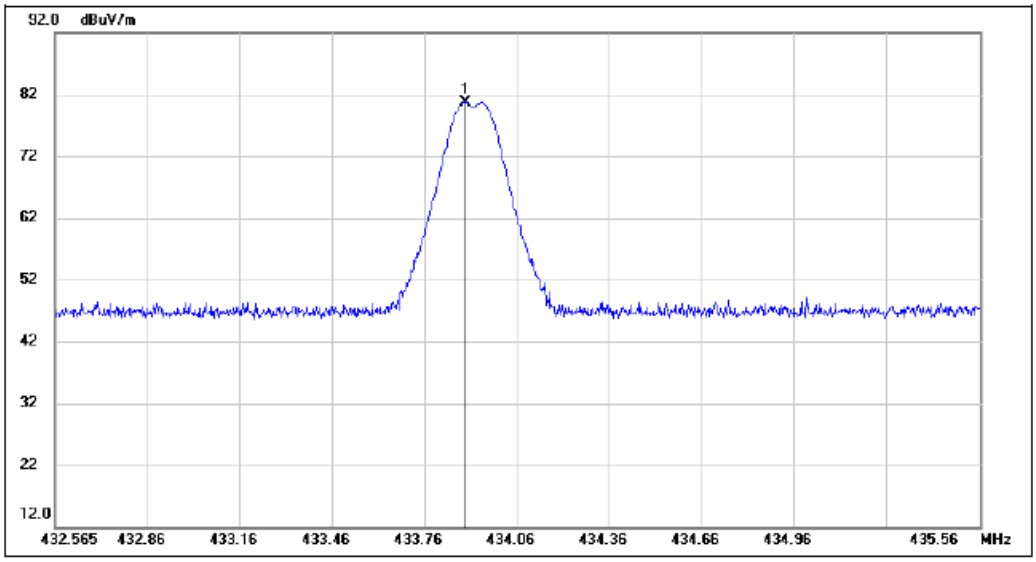
[TestMode: TX]; [Polarity: Horizontal]



No.	Frequency	Reading	Correct	Dutycycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	433.8971	62.08	27.63	N/A	89.71	100.82	-11.11	peak
	433.8971	/	/	-10.84	78.87	80.82	-1.95	AVG

Test Result: Pass

[TestMode: TX]; [Polarity: Vertical]



No.	Frequency (MHz)	Reading (dBuV)	Correct dB/m	Dutycycle Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	433.8941	53.11	27.63	N/A	80.74	100.82	-20.08	peak
2	433.8941	/	/	-10.84	69.90	80.82	-10.92	AVG

Test Result: Pass

3 DWELL TIME (15.231(A))

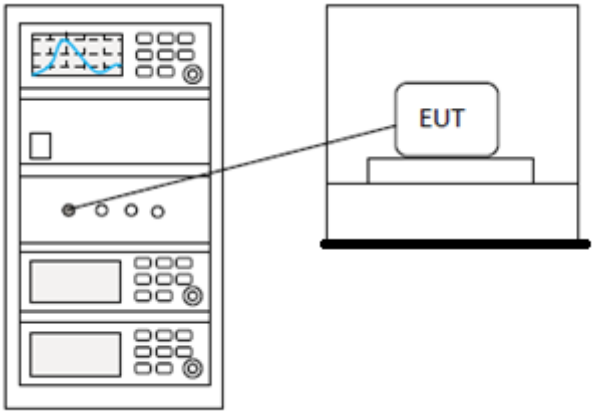
Test Standard	47 CFR Part 15, Subpart C 15.231(a)(2)
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

3.1 LIMITS

Device type	Limit
Manually operated transmitter	The switch automatically deactivate the transmitter within not more than 5 seconds of being released
Automatically actived transmitter	Cease transmission within 5 seconds after activation
Periodic transmissions to determine system integrity of transmitters used in security or safety applications	The total transmission time does not exceed 2 seconds per hour

Remark: The device will receive Bluetooth control single, then it will trigger 433.92MHz transmitter to transmit, 433.92MHz transmitter send transmission of a control signal ,and it do not transmit periodic transmissions and do not transmit continuous transmissions such as voice, video and the radio control of toys .

3.2 BLOCK DIAGRAM OF TEST SETUP



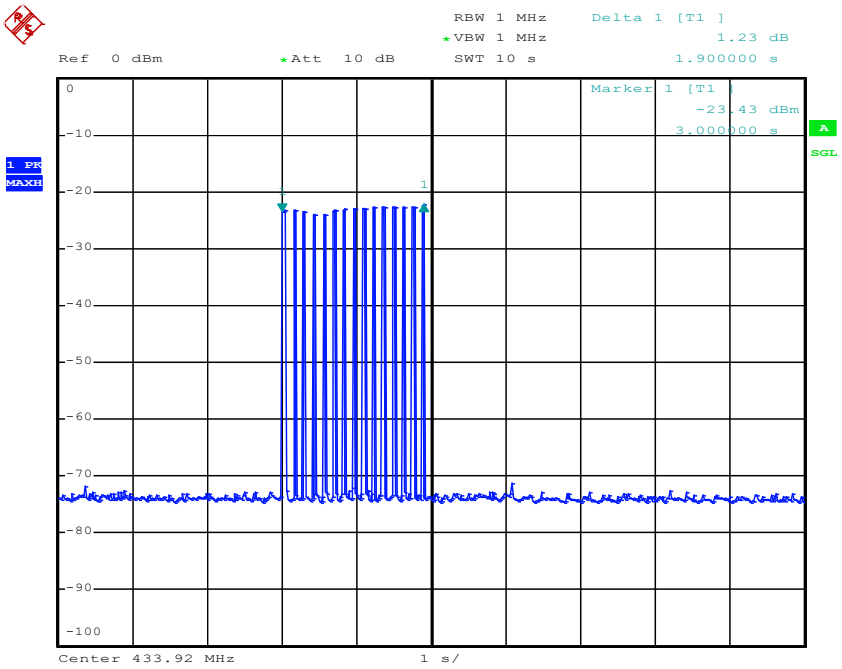
3.3 TEST DATA

Duration time (second)	Limit (second)	Result
1.9	<5.0	Pass

Type of Pulse	Width of Pulse	Quantity of Pulse	Transmission Time	Total Time (T_{on})
	(ms)		(ms)	(ms)
Pulse 1	28.696	1	28.696	28.696

Test Period (T_p)	Total Time (T_{on})	Duty Cycle	Duty Cycle Factor
ms	ms	%	dB
100	28.696	28.696	-10.84

3.4 TEST PLOTS



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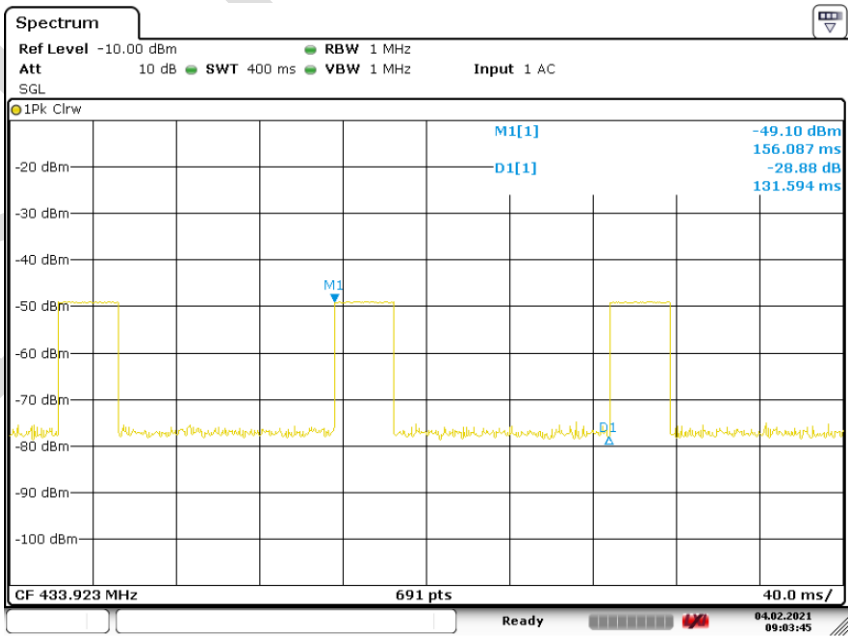

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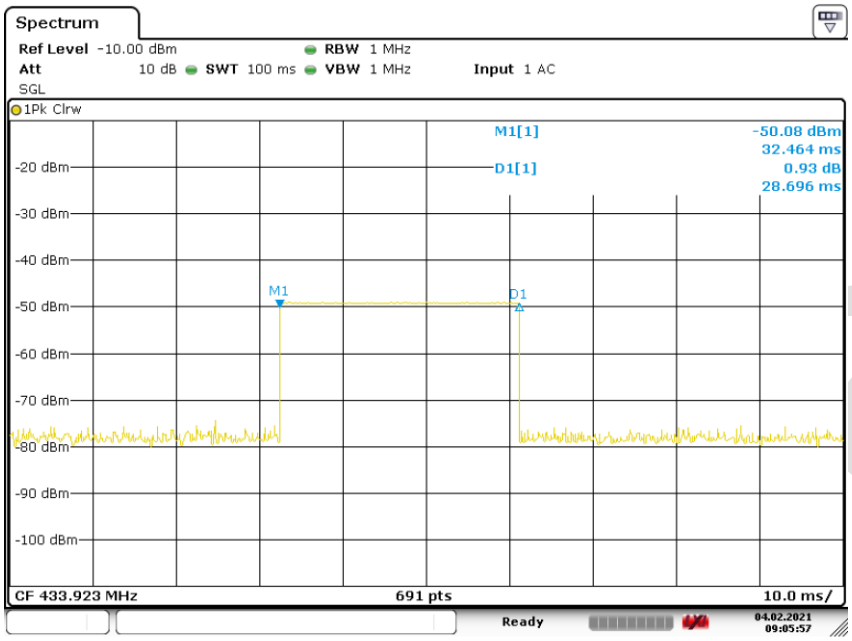


Date: 4.FEB.2021 09:05:57

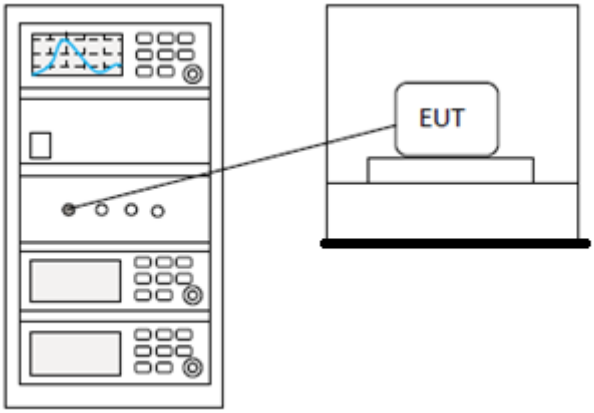
4 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.231
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

4.1 LIMITS

Frequency range(MHz)	Limit
70-900	No wider than 0.25% of the center frequency
Above 900	No wider than 0.5% of the center frequency

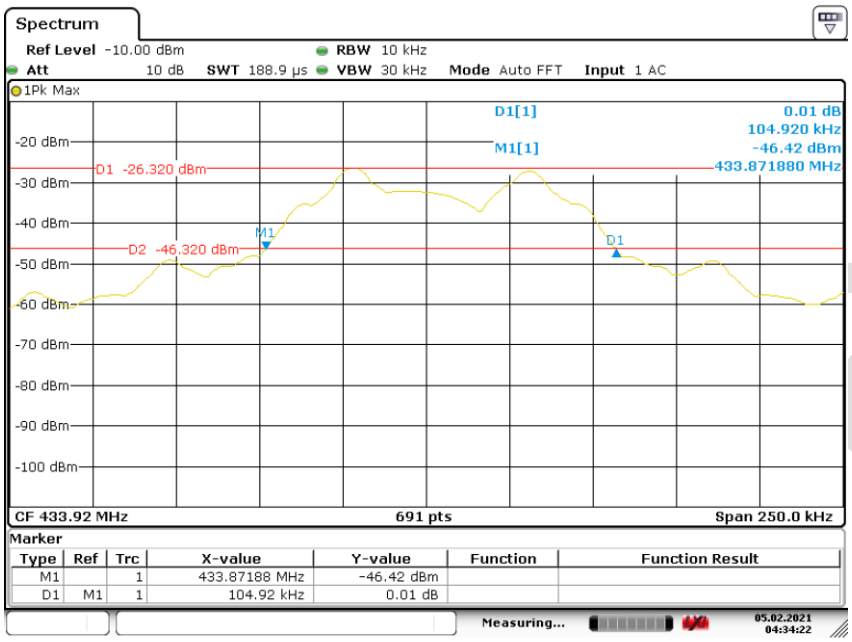
4.2 BLOCK DIAGRAM OF TEST SETUP



4.3 TEST DATA

Test Frequency	20dB Bandwidth	Limit	Result
MHz	kHz	kHz	
433.92	104.92	1084.8	Pass
Limit = Fundamental Frequency X 0.25% = 433.92 MHz X 0.25% = 1084 kHz			

4.4 TEST PLOTS



Date: 5.FEB.2021 04:34:22

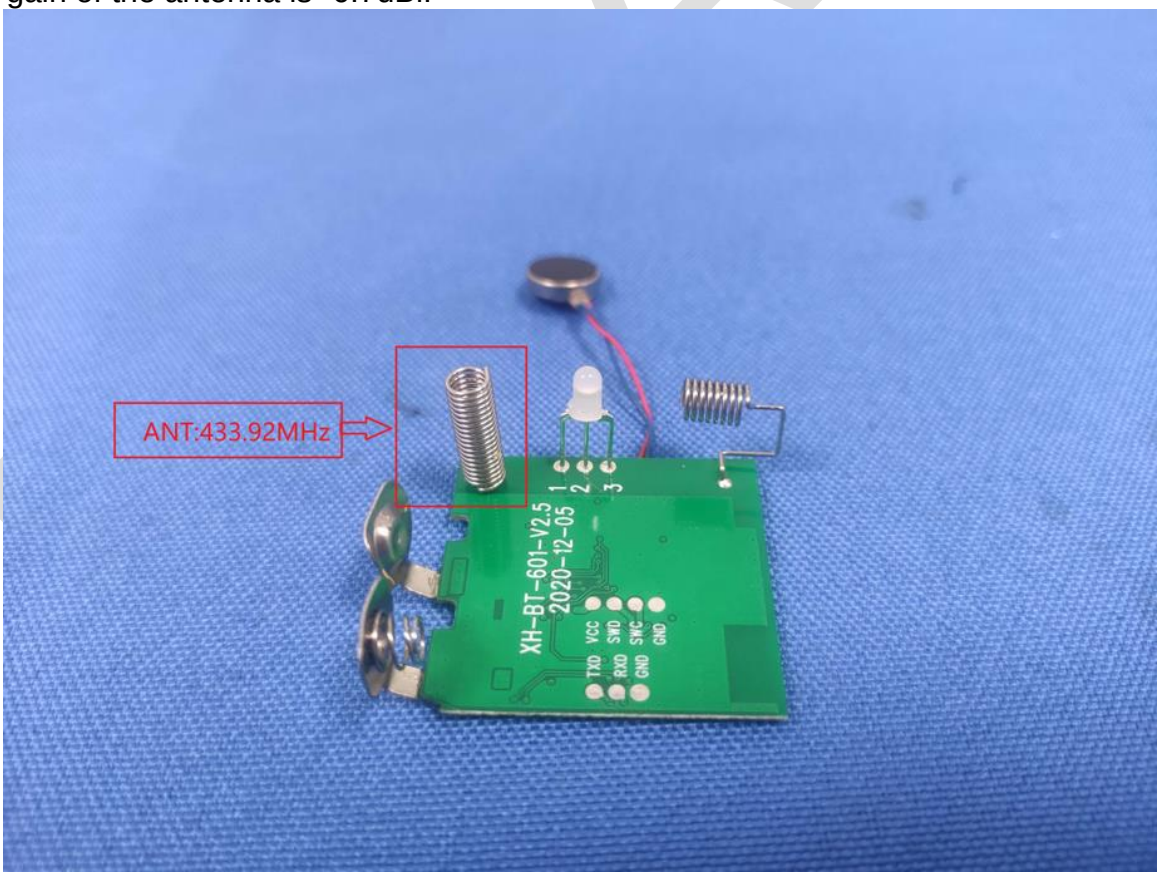
5 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.231
Test Method	N/A

5.1 CONCLUSION

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

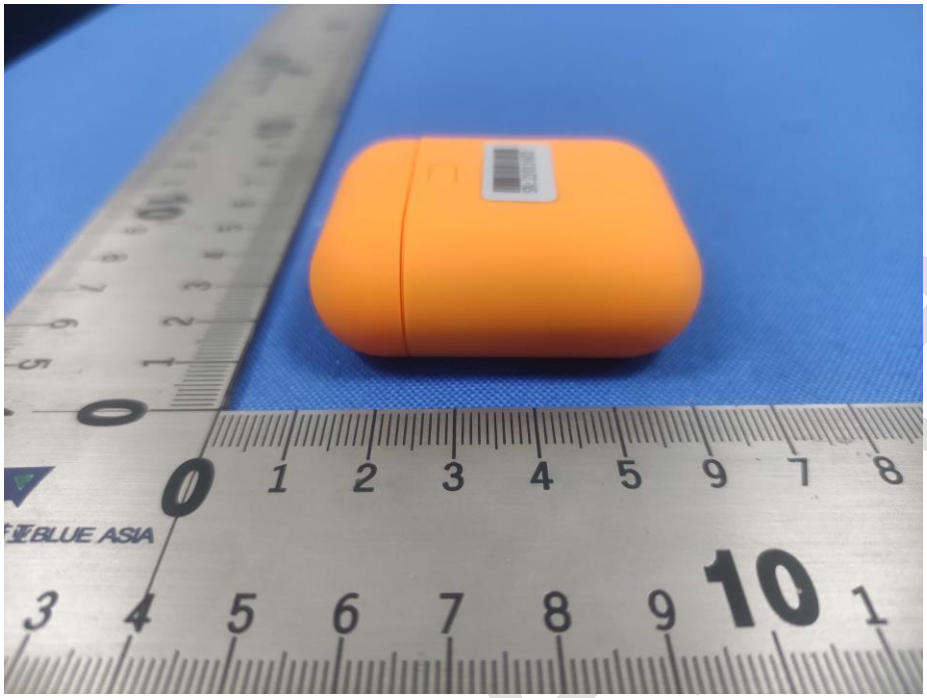
EUT Antenna:
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -6.7dBi.



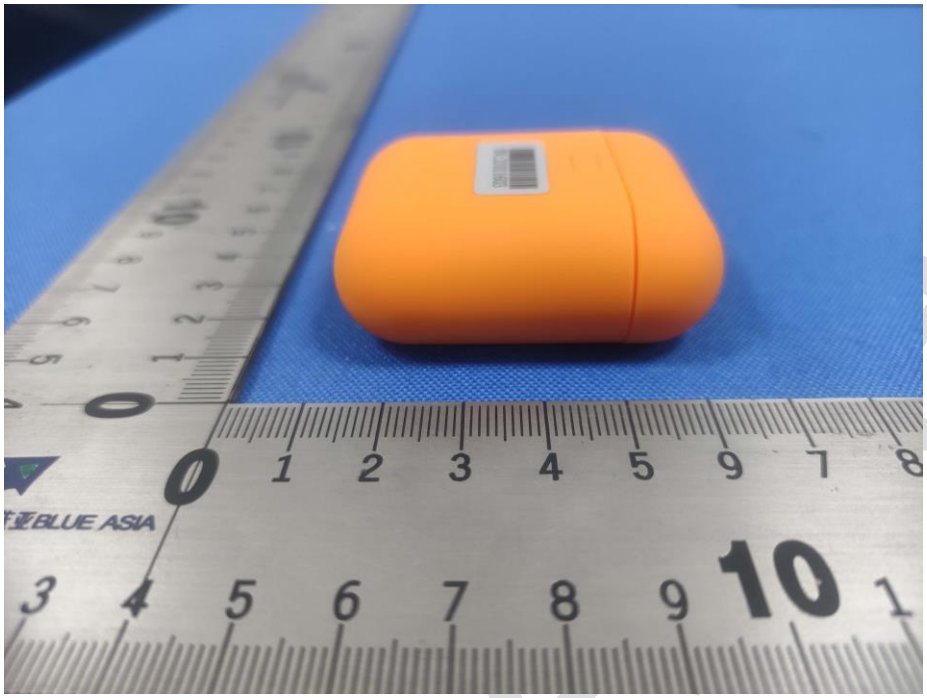
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Spurious Emissions

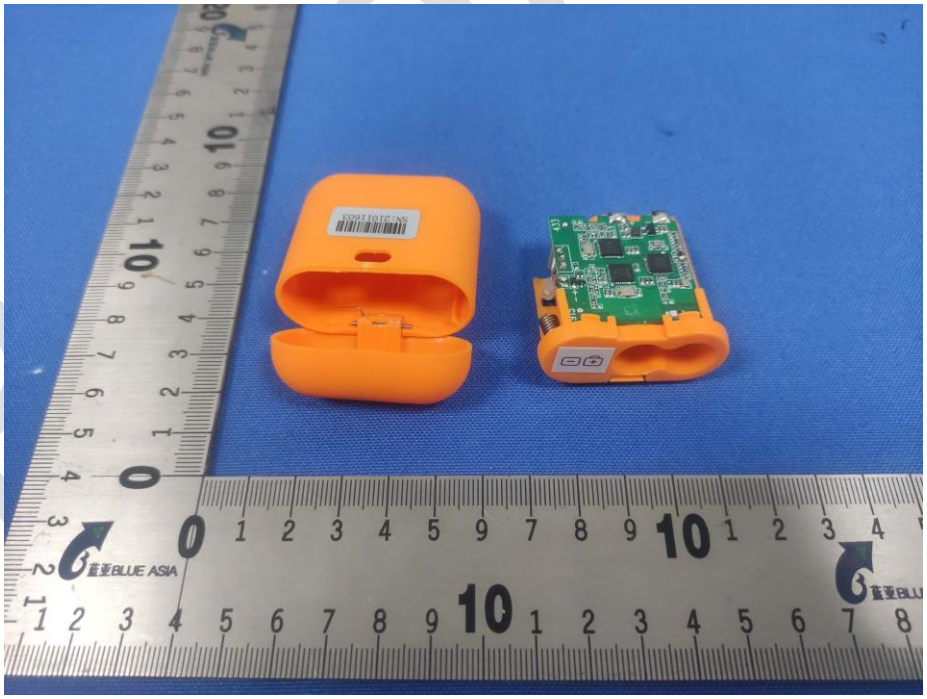
APPENDIX B: PHOTOGRAPHS OF EUT

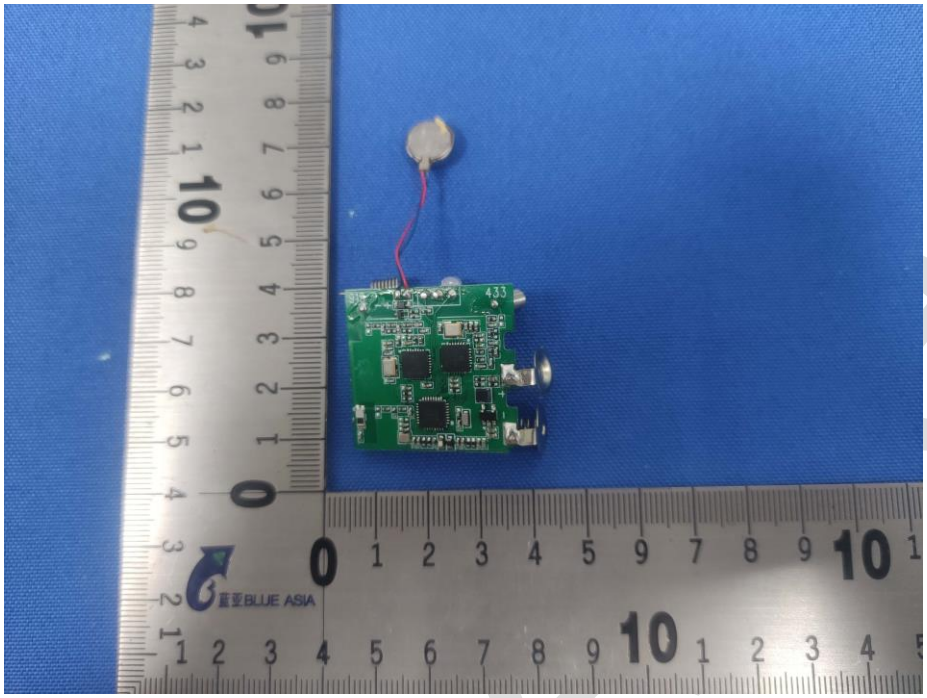

BLUE ASIA

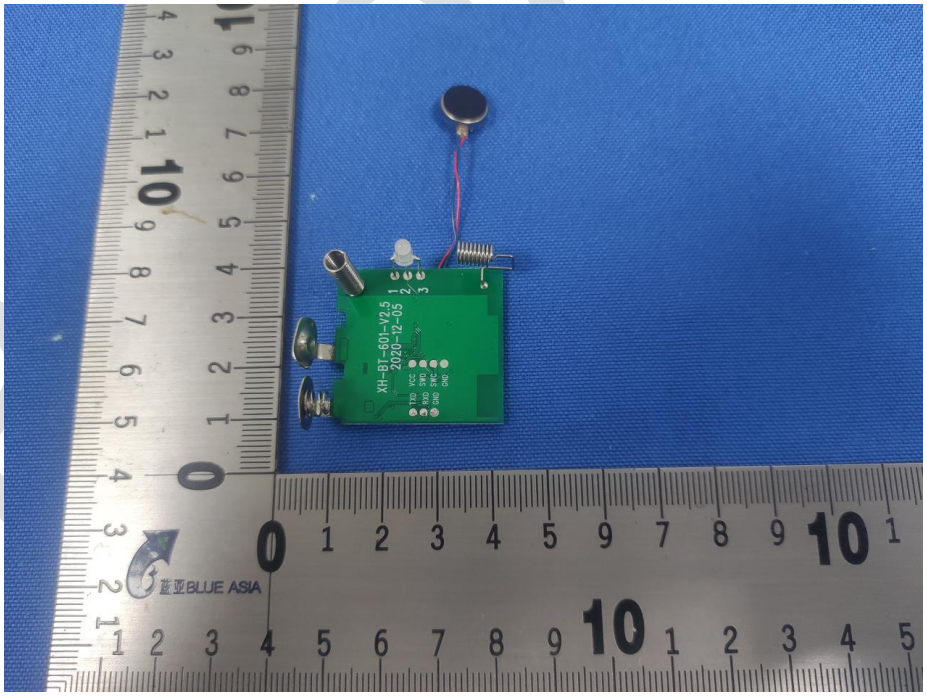

BLUE ASIA

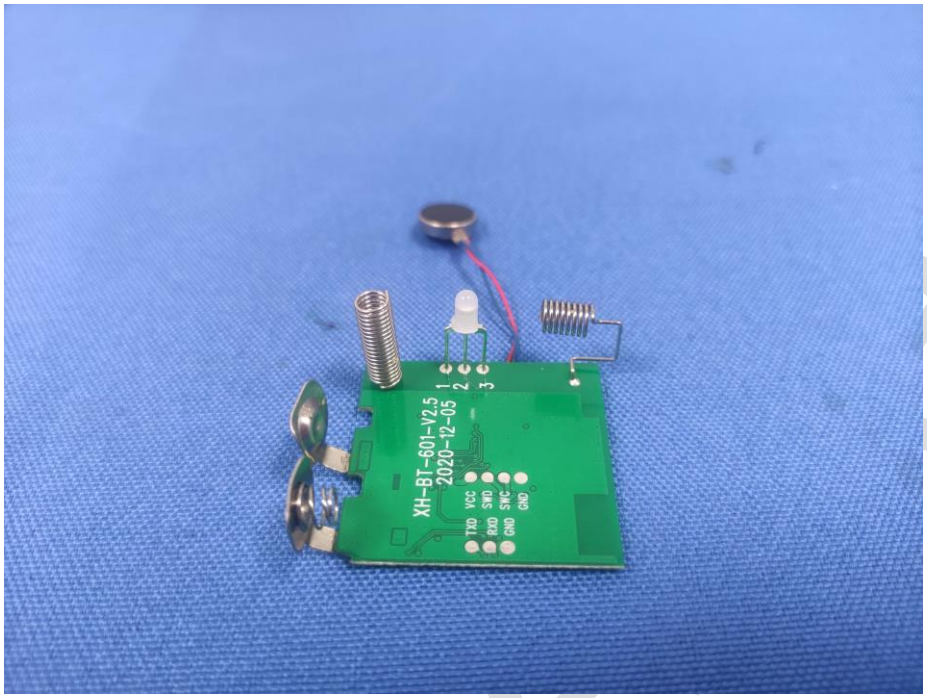

BLUE ASIA


蓝亚BLUE ASIA






XH-BT-601-V2.5
2020-12-05


XH-BT-601-V2.5
2020-12-05
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SWD
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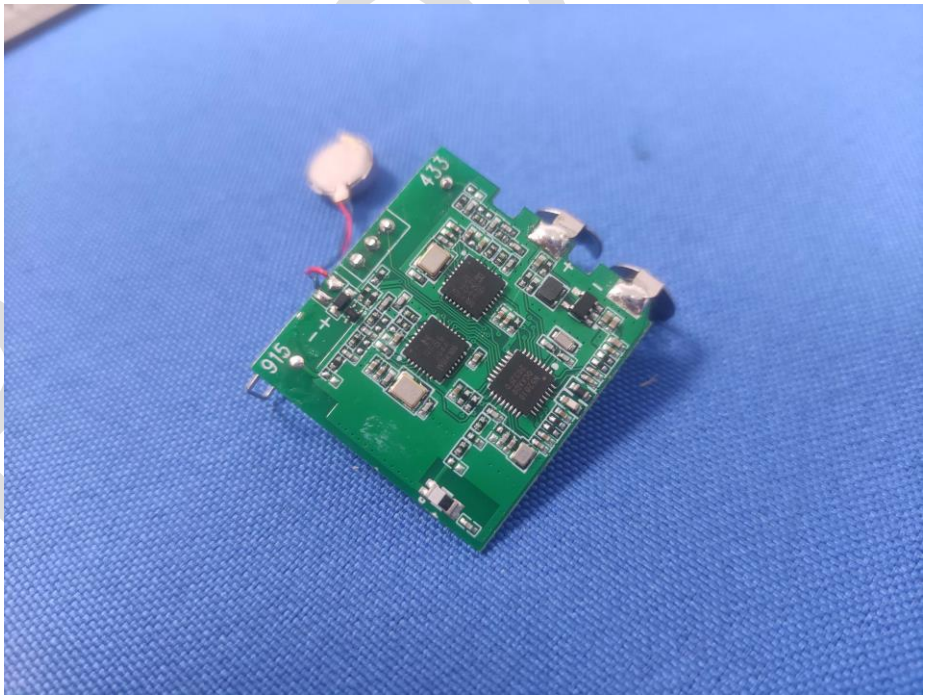
433
915

----END OF REPORT----

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