

TEST REPORT

Applicant: Shenzhen Wandiyuan Electronic Technology Co., Ltd.
Address of Applicant: 1806, Taohua Jinhua Building, Gaofeng Community, Dalang Street, Longhua District, Shenzhen, China
Manufacturer: Shenzhen Wandiyuan Electronic Technology Co., Ltd.
Address of Manufacturer: 1806, Taohua Jinhua Building, Gaofeng Community, Dalang Street, Longhua District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Wireless door bell
F5
F2, F2-2, F3, F3-2, F5-2, F6, F6-2, F80, F80-2, F90, F90-2, F89, F89-2, F99, F99-2, F89-DC, F99-DC, A2, A2-2, A5, A5-2, A6, A6-2, A80, A80-2, A9, A9-2, C1, C1-2, C2, C2-2, C5, C5-2, C6, C6-2, C9, C9-2, D2, D2-2, D5, D5-2, D6, D6-2, D9, D9-2, D10, D10-2, W28, W28-2, W29, W29-2, E28, E28-2, E29, E29-2, D28, D28-2, D29, D29-2

Model No.:

Trade Mark: N/A

FCC ID: 2AWSS-F5

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.231

Date of sample receipt: Jun. 16, 2020

Date of Test: Jun. 17, 2020 - Jun. 23, 2020

Date of report issued: Jun. 23, 2020

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	Jun. 23, 2020	Original

Prepared By:



Date:

Jun. 23, 2020

Project Engineer

Check By:



Date:

Jun. 23, 2020

Reviewer

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS.....	3
4 TEST SUMMARY.....	4
4.1 MEASUREMENT UNCERTAINTY.....	4
5 GENERAL INFORMATION.....	5
5.1 GENERAL DESCRIPTION OF EUT.....	5
5.2 TEST MODE.....	5
5.3 DESCRIPTION OF SUPPORT UNITS.....	5
5.4 DEVIATION FROM STANDARDS.....	6
5.5 ABNORMALITIES FROM STANDARD CONDITIONS.....	6
5.6 TEST FACILITY.....	6
5.7 TEST LOCATION.....	6
5.8 ADDITIONAL INSTRUCTIONS.....	6
6 TEST INSTRUMENTS LIST.....	7
7 TEST RESULTS AND MEASUREMENT DATA.....	9
7.1 ANTENNA REQUIREMENT.....	9
7.2 CONDUCTED EMISSIONS.....	10
7.3 RADIATED EMISSION METHOD.....	11
7.3.1 Spurious emissions.....	13
7.4 20dB OCCUPY BANDWIDTH.....	17
7.5 CALCULATION OF AVERAGE FACTOR.....	19
7.6 DWELL TIME.....	21
8 TEST SETUP PHOTO.....	23
9 EUT CONSTRUCTIONAL DETAILS.....	24

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	N/A
Fundamental & Radiated Spurious Emission Measurement	15.209, 15.231b	Pass
Occupy Bandwidth	15.231c	Pass
Dwell time	15.231a	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10:2013.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Wireless door bell
Model No.:	F5 F2, F2-2, F3, F3-2, F5-2, F6, F6-2, F80, F80-2, F90, F90-2, F89, F89-2, F99, F99-2, F89-DC, F99-DC, A2, A2-2, A5, A5-2, A6, A6-2, A80, A80-2, A9, A9-2, C1, C1-2, C2, C2-2, C5, C5-2, C6, C6-2, C9, C9-2, D2, D2-2, D5, D5-2, D6, D6-2, D9, D9-2, D10, D10-2, W28, W28-2, W29, W29-2, E28, E28-2, E29, E29-2, D28, D28-2, D29, D29-2
Hardware Version:	HV01
Software Version:	SV01
Test sample(s) ID:	GTS202006000267
Sample(s) Status	Engineered sample
Operation Frequency:	433.92MHz
Channel numbers:	1
Modulation type:	ASK
Antenna Type:	PCB Antenna
Antenna gain:	0dBi(declare by applicant)
Power supply:	DC 12V from battery

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: (1) New battery is used during the test.</i>	

Pre-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	75.38	74.59	75.21

Final Test Mode:

According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup":

X axis (see the test setup photo)

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
/	/	/	/

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None

5.6 Test Facility

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

- **FCC —Registration No.: 381383**
Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.
- **IC —Registration No.: 9079A**
The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A
- **NVLAP (LAB CODE:600179-0)**
Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0d by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

7.1 Antenna requirement

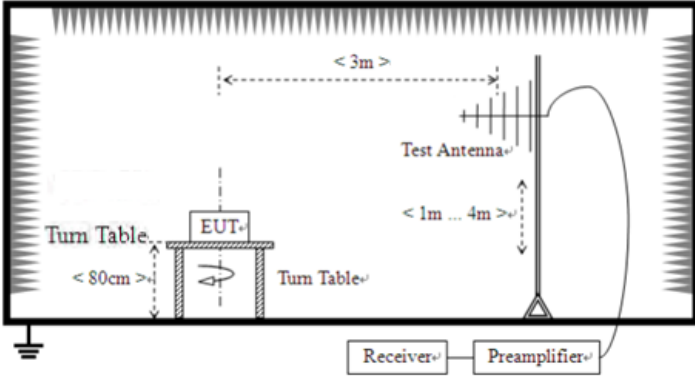
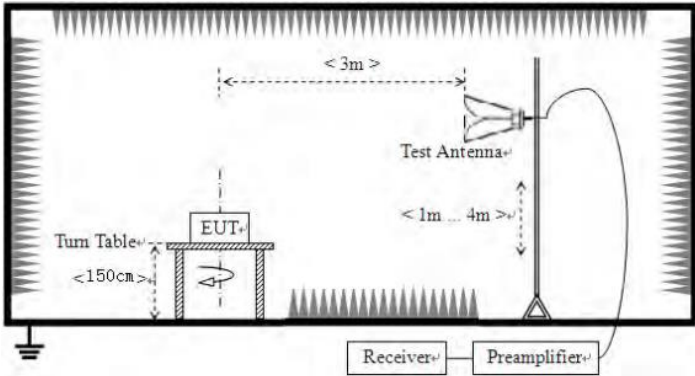
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.	
15.231 requirement: For intentional device, according to 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.	
EUT Antenna:	
<i>The antenna is PCB antenna, the best case gain of the antenna is 0dBi, reference to the appendix II for details</i>	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	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 setup:	<p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>					
Test procedure:	<ol style="list-style-type: none"> 1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	/					
Test results:	The EUT's power provide by battery, no requirements for this item.					

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
	150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit: (Field strength of the fundamental signal)	Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)		
	40.66 - 40.70 70 - 130 130 - 174 174 - 260 260 - 470 Above 470	2,250 1,250 1,250 to 3,750 ** 3,750 3,750 to 12,500 ** 12,500	225 125 125 to 375 ** 375 375 to 1,250 ** 1,250		
** linear interpolations					
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Remark		
	0.009MHz-0.490MHz	2400/F(kHz) @300m	Quasi-peak Value		
	0.490MHz-1.705MHz	24000/F(kHz) @30m	Quasi-peak Value		
	1.705MHz-30.0MHz	30 @30m	Quasi-peak Value		
	30MHz-88MHz	100 @3m	Quasi-peak Value		
	88MHz-216MHz	150 @3m	Quasi-peak Value		
	216MHz-960MHz	200 @3m	Quasi-peak Value		
	960MHz-1GHz	500 @3m	Quasi-peak Value		
Above 1GHz	500 @3m	Average Value			
	5000 @3m	Peak Value			
Test setup:	For radiated emissions from 9kHz to 30MHz				
	<p>The diagram illustrates the test setup for radiated emissions from 9kHz to 30MHz. It shows an Equipment Under Test (EUT) placed on a turn table. A test antenna is positioned at a distance of 3m from the EUT. The antenna is 1m high. A receiver is connected to the antenna. The turn table has a diameter of 80cm.</p>				
For radiated emissions from 30MHz to 1GHz					

	 <p>For radiated emissions above 1GHz</p> 						
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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. 						
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>						
<p>Test mode:</p>	<p>Refer to section 5.2 for details</p>						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>52%</td> <td>Press.:</td> <td>1012mbar</td> </tr> </table>	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		
<p>Test voltage:</p>	<p>DC 12V</p>						
<p>Test results:</p>	<p>Pass</p>						

Measurement data:

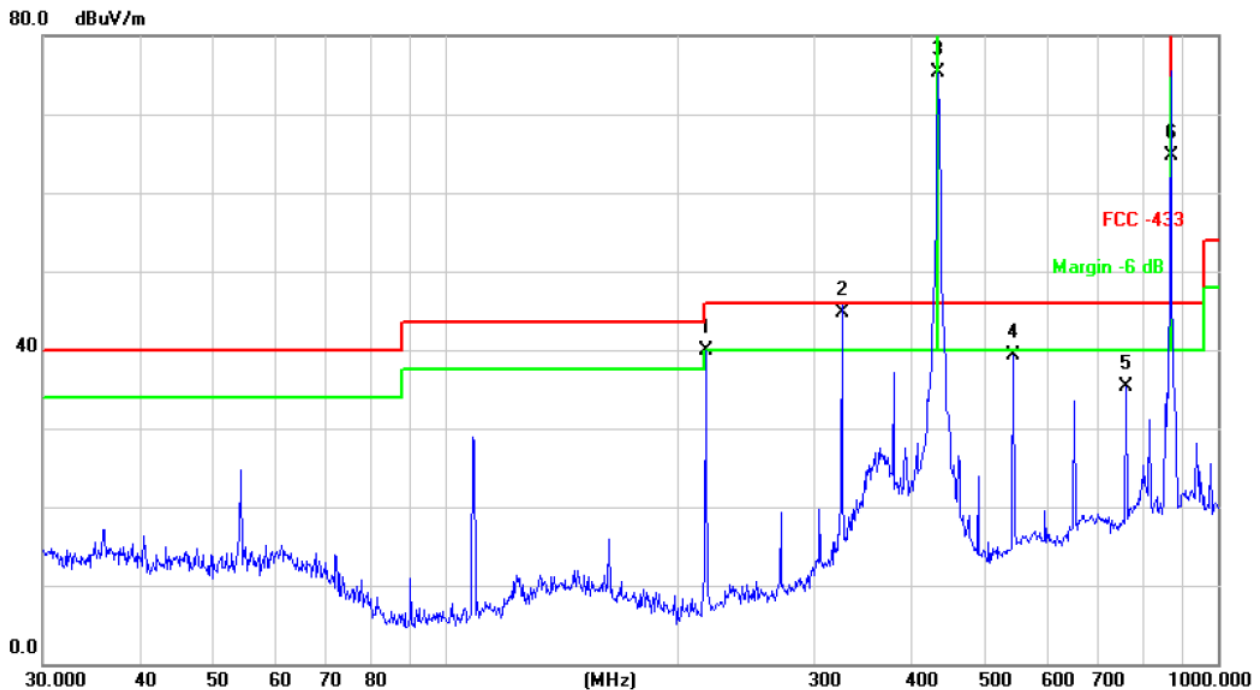
7.3.1 Spurious emissions

■ Below 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

■ Below 1GHz

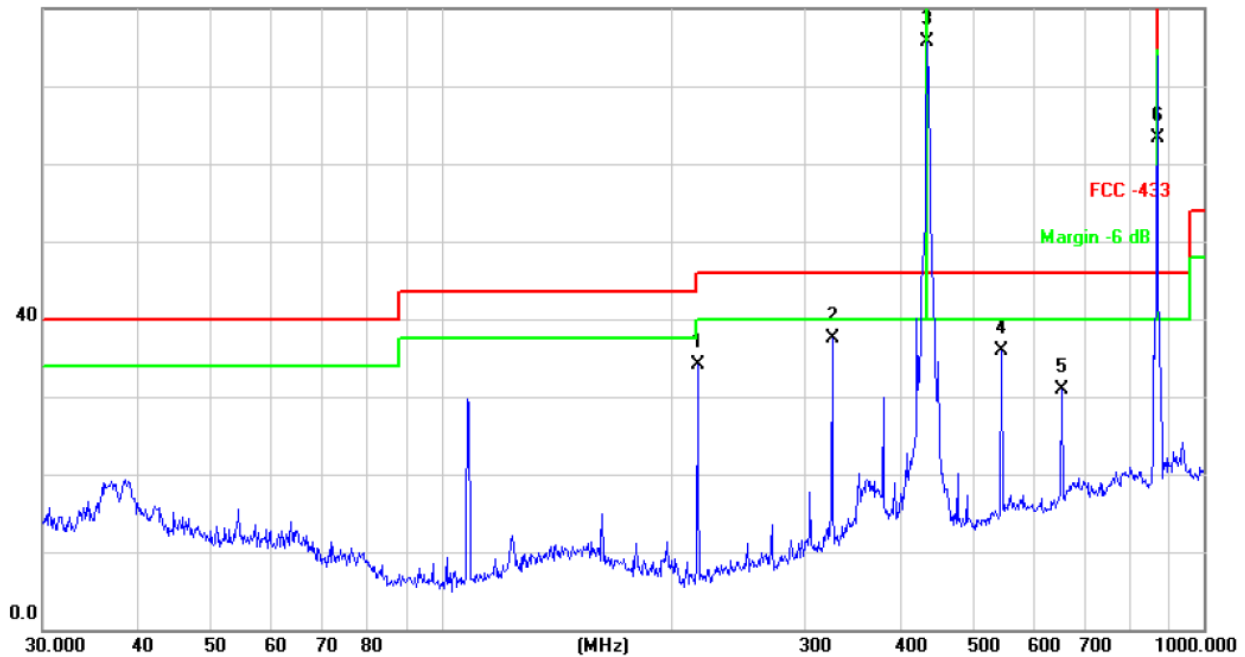
Horizontal:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		216.7828	55.66	-15.72	39.94	46.00	-6.06	QP
2	*	325.5957	56.60	-11.92	44.68	46.00	-1.32	QP
3		433.9200	84.75	-9.37	75.38	100.80	-25.42	peak
4		543.2741	46.56	-7.29	39.27	46.00	-6.73	QP
5		760.7036	38.32	-2.99	35.33	46.00	-10.67	QP
6		867.8400	66.53	-1.85	64.68	80.80	-16.12	peak

Vertical:

80.0 dBuV/m



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		216.7828	49.92	-15.72	34.20	46.00	-11.80	QP
2	*	325.5958	49.45	-11.92	37.53	46.00	-8.47	QP
3		433.9200	85.00	-9.37	75.63	100.80	-25.17	peak
4		543.2741	43.19	-7.29	35.90	46.00	-10.10	QP
5		651.9416	35.87	-5.06	30.81	46.00	-15.19	QP
6		867.8400	65.13	-1.85	63.28	80.80	-17.52	peak

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
433.92	75.63	-8.40	67.23	80.80	-13.57	Vertical
867.84	63.28	-8.40	54.88	60.80	-5.92	Vertical

Notes: 1. Average emission Level = Peak Level + Duty cycle factor

2. Duty cycle level please see clause 7.5.

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit AV	Margin	Polarization
433.92	75.38	-8.40	66.98	80.80	-13.82	Horizontal
867.84	64.68	-8.40	56.28	60.80	-4.52	Horizontal

Notes: 1. Average emission Level = Peak Level + Duty cycle factor

2. Duty cycle level please see clause 7.5.

■ Above 1GHz

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1301.76	67.57	-8.40	59.17	80.8	60.8	-13.23	-1.63	Vertical
1735.68	65.63	-8.40	57.23	80.8	60.8	-15.17	-3.57	Vertical
2169.60	62.05	-8.40	53.65	80.8	60.8	-18.75	-7.15	Vertical
2603.52	59.75	-8.40	51.35	80.8	60.8	-21.05	-9.45	Vertical
3037.44	58.63	-8.40	50.23	80.8	60.8	-22.17	-10.57	Vertical
3471.36	56.38	-8.40	47.98	80.8	60.8	-24.42	-12.82	Vertical
1301.76	66.81	-8.40	58.41	80.8	60.8	-13.99	-2.39	Horizontal
1735.68	65.89	-8.40	57.49	80.8	60.8	-14.91	-3.31	Horizontal
2169.60	64.37	-8.40	55.97	80.8	60.8	-16.43	-4.83	Horizontal
2603.52	61.05	-8.40	52.65	80.8	60.8	-19.75	-8.15	Horizontal
3037.44	58.45	-8.40	50.05	80.8	60.8	-22.35	-10.75	Horizontal
3471.36	56.29	-8.40	47.89	80.8	60.8	-24.51	-12.91	Horizontal

Notes: 1.Average emission Level = Peak Level + Duty cycle factor

2. Duty cycle level please see clause 7.5.

3. Pulse Desensitization Correction Factor

Pulse Width (PW) = 10.7ms

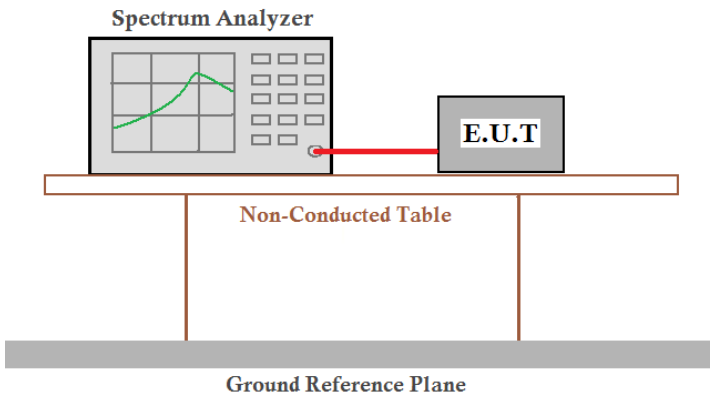
$2/PW = 2/10.7ms = 0.19kHz$

RBW (100 kHz) > 2/PW (0.028kHz)

Therefore PDCF is not needed

4. Other harmonics emissions are lower than 20dB below the allowable limit.

7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231
Test Method:	ANSI C63.10:2013
Limit:	<p>According to FCC 15.231(c) requirement:</p> <p>The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating between 70 MHz to 900 MHz. Those devices operating above 900 MHz, the emission spurious shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.</p> <p>B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 433.92MHz = 1.0843MHz</p>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Test channel	20dB bandwidth(kHz)	Limit(kHz)	Result
Lowest	786.00	1084.3	Pass

7.5 CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

Averaging factor in dB = $20\log(\text{duty cycle})$

The duration of one cycle = 10.7ms

The duty cycle is simply the on-time divided the duration of one cycle

Duty Cycle = $(0.12\text{ms} \times 17 + 0.25\text{ms} \times 8) / 10.7$

= $4.04\text{ms} / 10.7\text{ms}$

= 0.38

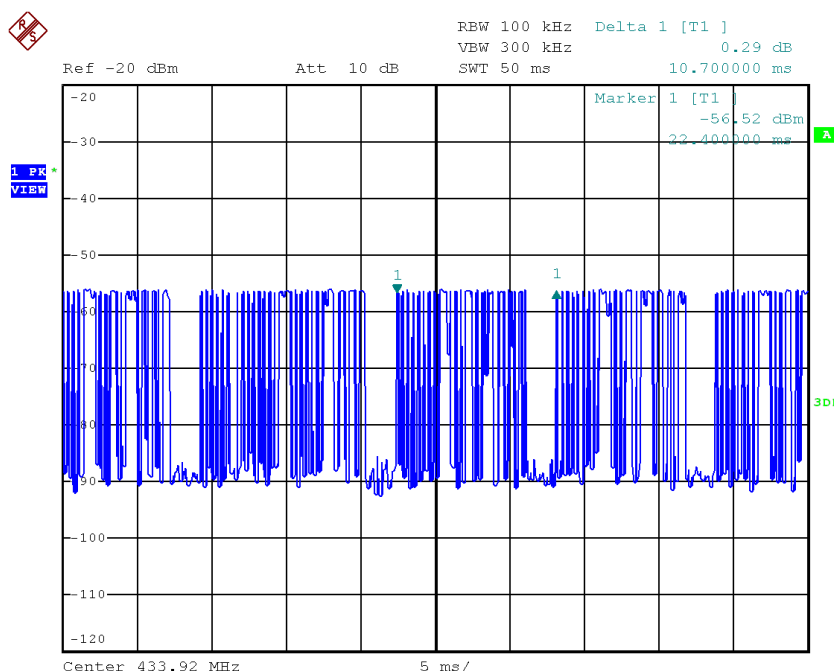
Therefore, the averaging factor is found by $20\log 0.38 = -8.40\text{dB}$

Test plot as follows:

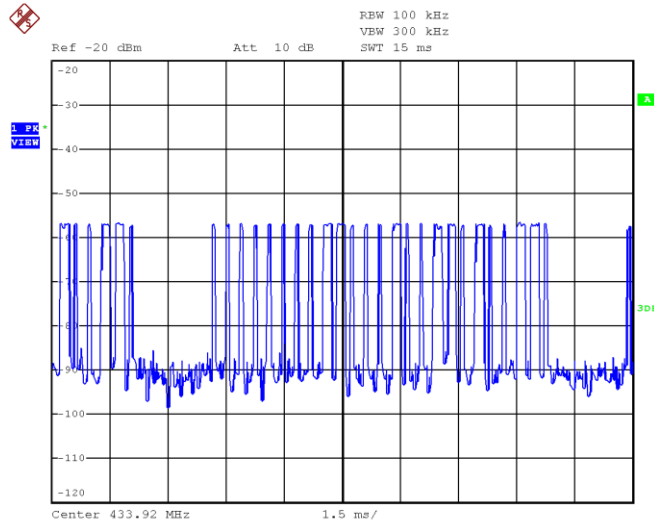
Note: During the 100ms, the amount of pulse and on-time of pulse are the same for every pulse train.

Measurement Data

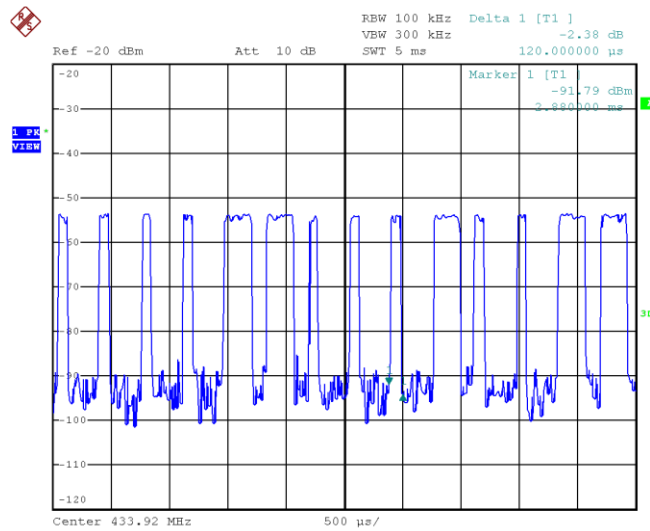
Cycle



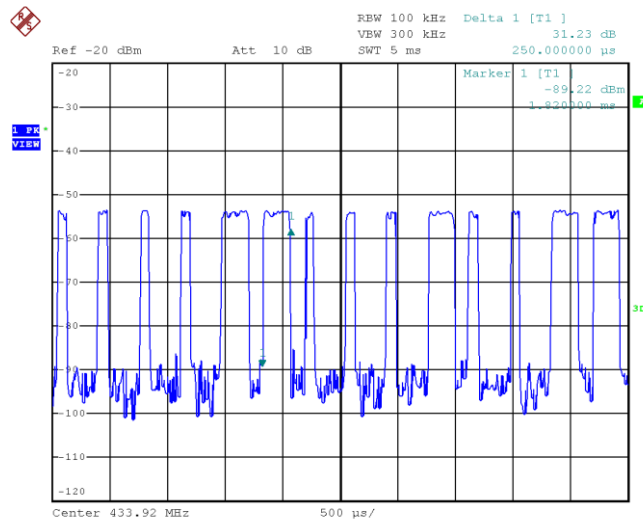
Pulse



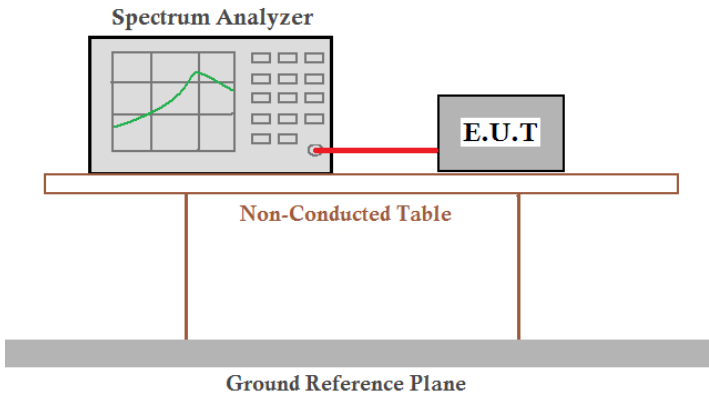
On-time



On-time



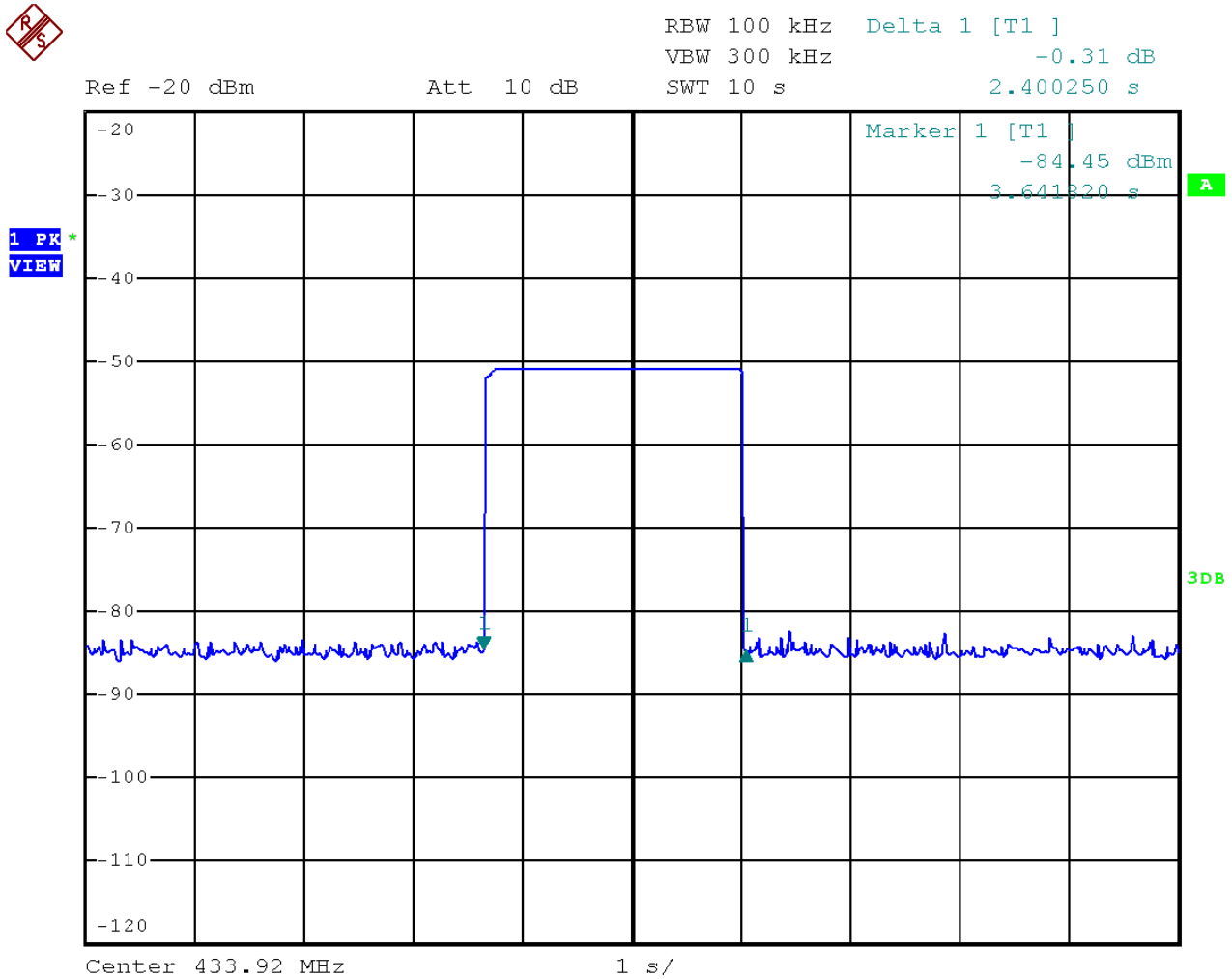
7.6 DWELL TIME

Test Requirement:	FCC Part15 C Section 15.231
Test Method:	ANSI C63.10:2013
Limit:	According to FCC 15.231(a) requirement: A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	<p>Test Procedure</p> <ol style="list-style-type: none"> Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. Repeat above procedures until all measured frequencies were complete.
Test results:	Pass

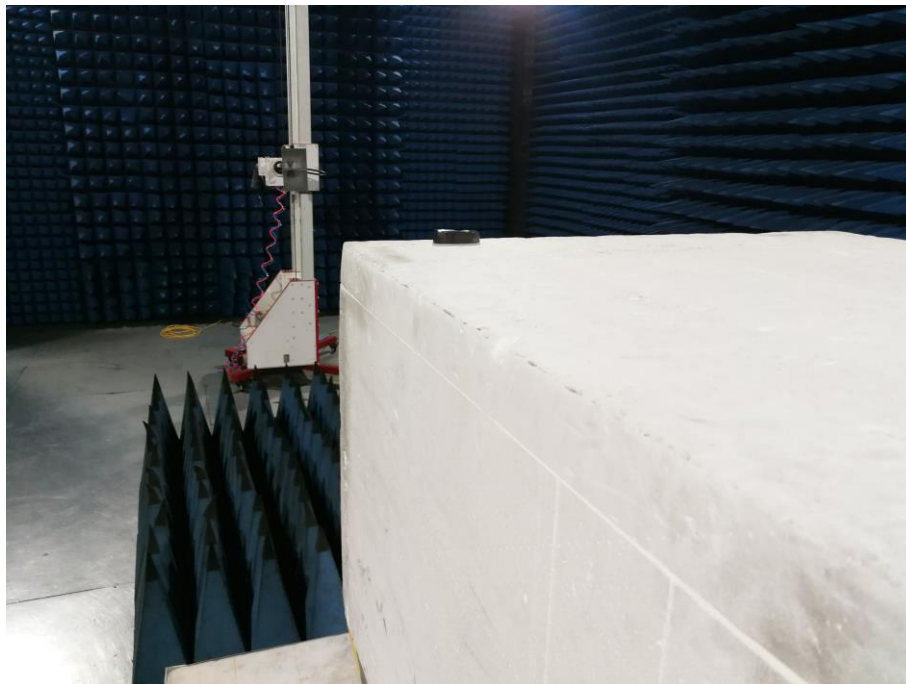
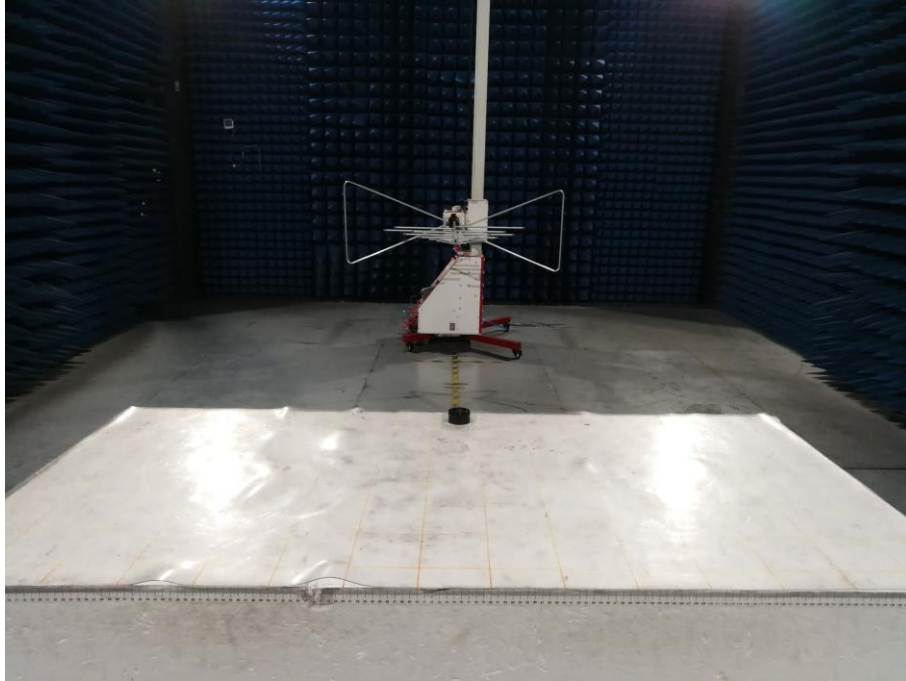
Measurement Data

Dwell time (second)	Limit (second)	Result
2.4s	<5s	Pass

Test plot as follows:

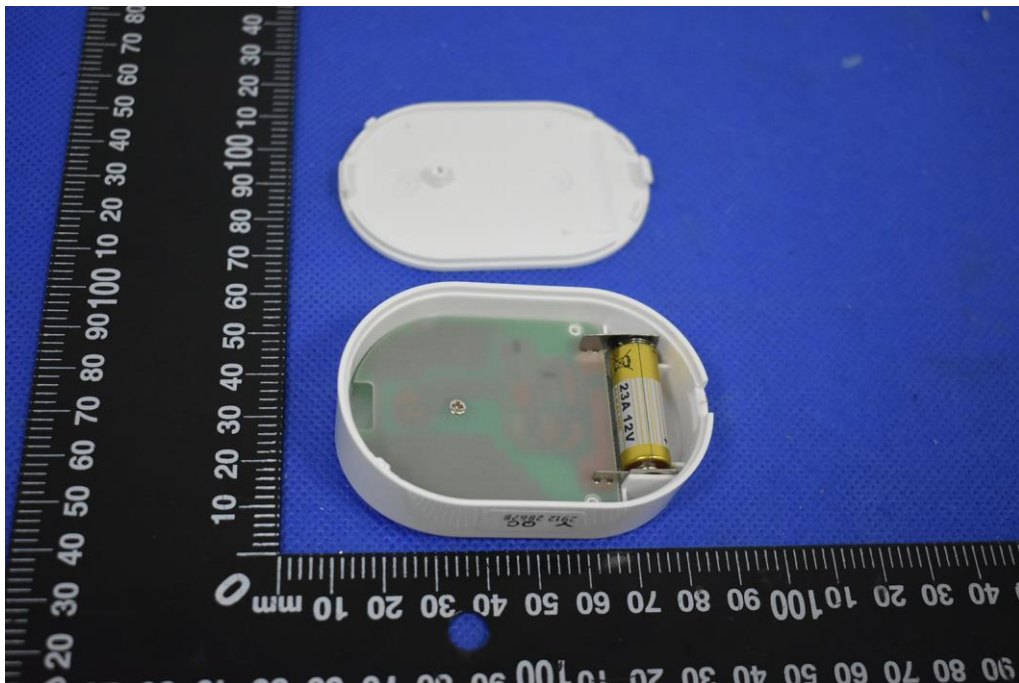
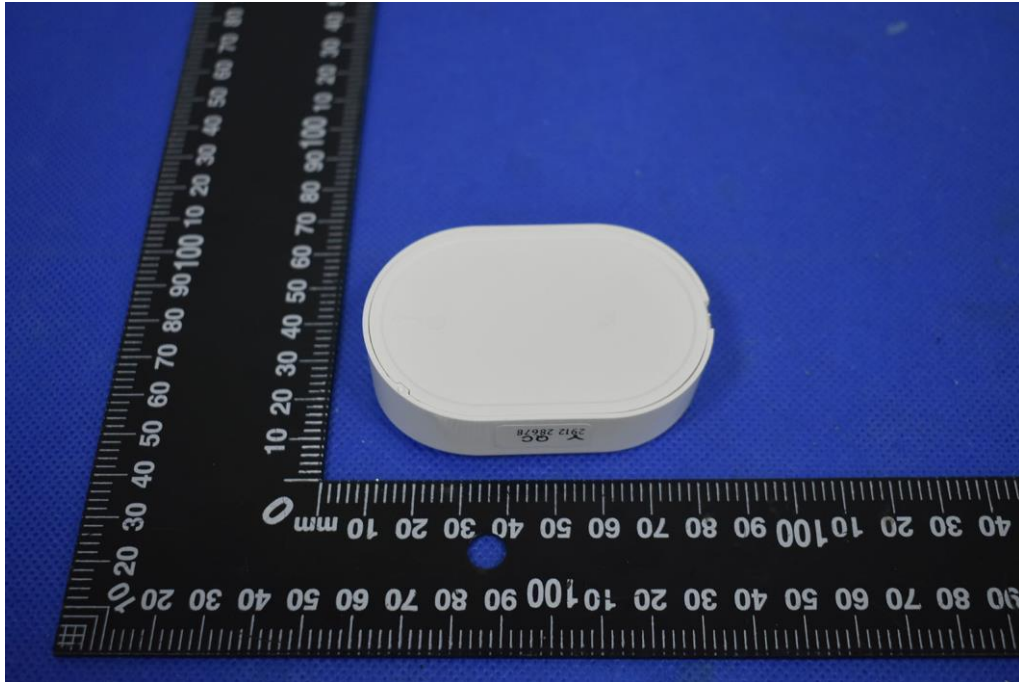


8 Test Setup Photo



9 EUT Constructional Details





-----End-----