

TEST REPORT

Applicant: Shenzhen Zhongdun Joint Investment Technology Co., Ltd

Address of Applicant: 4th Floor, Building B, Beidou Industrial Park, No. 44, Xintang Road, Fuhai Sub-District, Bao an District, Shenzhen, China

Manufacturer/Factory: Shenzhen Zhongdun Joint Investment Technology Co., Ltd

Address of Manufacturer/Factory: 4th Floor, Building B, Beidou Industrial Park, No. 44, Xintang Road, Fuhai Sub-District, Bao an District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Smart Pet Door

Model No.: M1, M2, M3, M4, M5, M6, M7, M8, M9, M10

Trade Mark: N/A

FCC ID: 2BBVS-M2

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

Date of sample receipt: Mar. 27, 2025

Date of Test: Mar. 27, 2025 to Apr. 14, 2025

Date of report issued: Apr. 16, 2025

Test Result : PASS *

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

Authorized Signature:

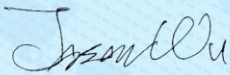
Robinson Luo
Laboratory Manager

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	Apr. 16, 2025	Original

Prepared By:

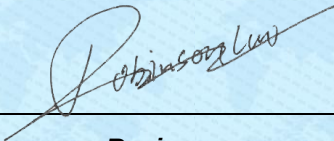


Date:

2025-04-16

Project Engineer

Check By:



Date:

2025-04-16

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
Conduction Emission	15.207	N/A
Field strength of the Fundamental Signal	15.231 (b)	Pass
Spurious Emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell Time	15.231 (a)(1)	Pass

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

"N/A" denotes test is not applicable in this Test Report.

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)

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:	Smart Pet Door
Model No.:	M1, M2, M3, M4, M5, M6, M7, M8, M9, M10
Test Model No.:	M1
Remark: All model's the function, software and electric circuit are the same, only with a product color and model named different.	
Serial No.:	M2, M3, M4, M5, M6, M7, M8, M9, M10
Test sample(s) ID:	GTSL2025040087-1
Sample(s) Status:	Engineer sample
Operation Frequency:	433.92MHz
Channel Number	1CH
Modulation technology:	ASK
Antenna Type:	PCB Antenna
Antenna gain:	0dBi
Power supply:	DC 3V from battery

Remark:

1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode.
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Per-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 only the worst case was shown in this test report and defined as follows:

433.92MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	74.03	--	--

5.3 Description of Support Units

None.

5.4 Test Facility

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

- **FCC—Registration No.: 381383**

Designation Number: CN5029

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.

- **ISED —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 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

5.6 Other Information Requested by the Customer

None.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Additional instructions

Software (Used for test) from client

Mode	Special test SW was built-in by manufacturer.
Power set	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	Apr. 11, 2025	Apr. 10, 2026
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	Apr. 12, 2025	Apr. 11, 2026
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Apr. 12, 2025	Apr. 11, 2026
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jul. 02, 2024	Jul. 01, 2025
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.16, 2024	Nov.15, 2025
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2025	Apr. 10, 2026
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2025	Apr. 10, 2026
10	Horn Antenna (18GH-40GHz)	Schwarzbeck	BBHA 9170	GTS691	Apr. 11, 2025	Apr. 10, 2026
11	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 11, 2025	Mar. 10, 2026
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2025	Apr. 10, 2026
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 13, 2024	Nov. 12, 2025
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2025	Apr. 10, 2026
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 15, 2025	Apr. 14, 2026
16	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
17	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
18	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
23	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

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	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 11, 2025	Apr. 10, 2026
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 15, 2025	Apr. 14, 2026
6	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 12, 2025	Apr. 11, 2026
7	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 11, 2025	Apr. 10, 2026
8	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 11, 2025	Apr. 10, 2026
9	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 11, 2025	Apr. 10, 2026
10	EMI Test Software	AUDIX	E3-6.100622	GTS726	N/A	N/A
11	Current probe	CYBERTEK	EM5011	GTS698	Jan. 13, 2025	Jan. 12, 2026

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	Apr. 11, 2025	Apr. 10, 2026
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	Apr. 11, 2025	Apr. 10, 2026
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	Apr. 11, 2025	Apr. 10, 2026
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Power Meter	Keysight	N1924A	GTS673	Apr. 11, 2025	Apr. 10, 2026
7	USB RF Power Sensor	DARE	RPR3006W	GTS569	Apr. 11, 2025	Apr. 10, 2026
8	RF Switch Box	Shongyi	RFSW3003328	GTS571	Apr. 11, 2025	Apr. 10, 2026
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	Apr. 11, 2025	Apr. 10, 2026
10	Thermo meter	JINCHUANG	GSP-8A	GTS641	Apr. 15, 2025	Apr. 14, 2026

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	Aug. 17, 2024	Aug. 16, 2025

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.	
EUT Antenna:	
The antenna is PCB antenna, reference to the appendix II for details.	

7.2 Conducted Emissions

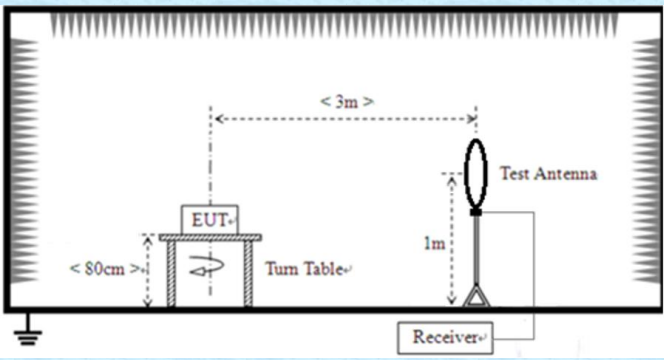
Measurement data:

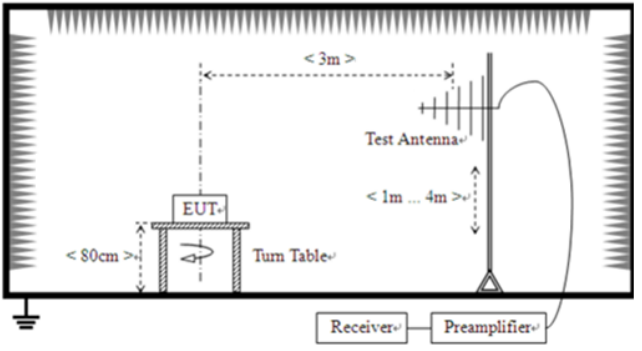
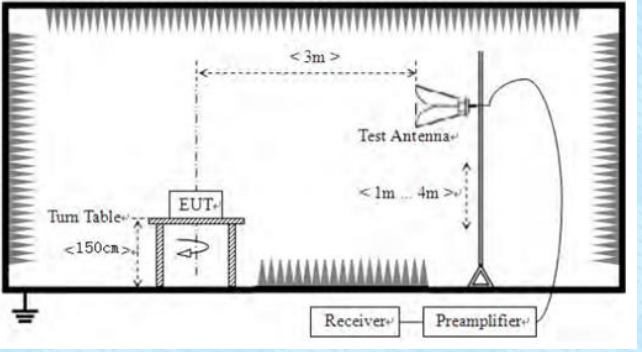
N/A

Remark:

The EUT is powered by DC 3V battery.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.231 (b)& Section 15.209						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	9kHz to 5000MHz						
Test site:	Measurement Distance: 3m						
Receiver setup:	Frequency	Detector	RBW	VBW	Value		
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak		
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak		
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak		
	Above 1GHz	Peak	1MHz	3MHz	Peak		
		Peak	1MHz	10Hz	Average		
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark			
	433.92MHz	100.83		Peak Value			
		80.83		Average Value			
Limit: (Spurious Emissions)	Fundamental Frequency (MHz)		Field Strength of fundamental (microvolts/meter)		Field Strength of Unwanted Emissions (microvolts/meter)		
	40.66-40.70		1,000		100		
	70-130		500		50		
	130-174		500 to 1,500**		50 to 1,50**		
	174-260		1,500		1,50		
	260-470		1,500 to 5,000**		1,50 to 5,00**		
	Above 470		5,000		5,00		
	Frequency (MHz)		Class B(dBuV/m @3m)				
			Peak		Average		
	Above 1000		74		54		
	Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.						
Test setup:	Below 30MHz						
							

	Below 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8 meters 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 50% Press.: 1 010mbar
Test voltage:	DC 3V
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.9250	74.03	-12.64	61.39	80.53	-19.14	Horizontal
867.8164	34.19	-12.64	21.55	60.53	-38.98	Horizontal
433.9250	65.68	-12.64	53.04	80.53	-27.49	Vertical
867.8164	27.95	-12.64	15.31	60.53	-45.22	Vertical

Remarks:

1. *Average value=Peak value + Duty cycle factor*

7.3.2 Spurious Emissions

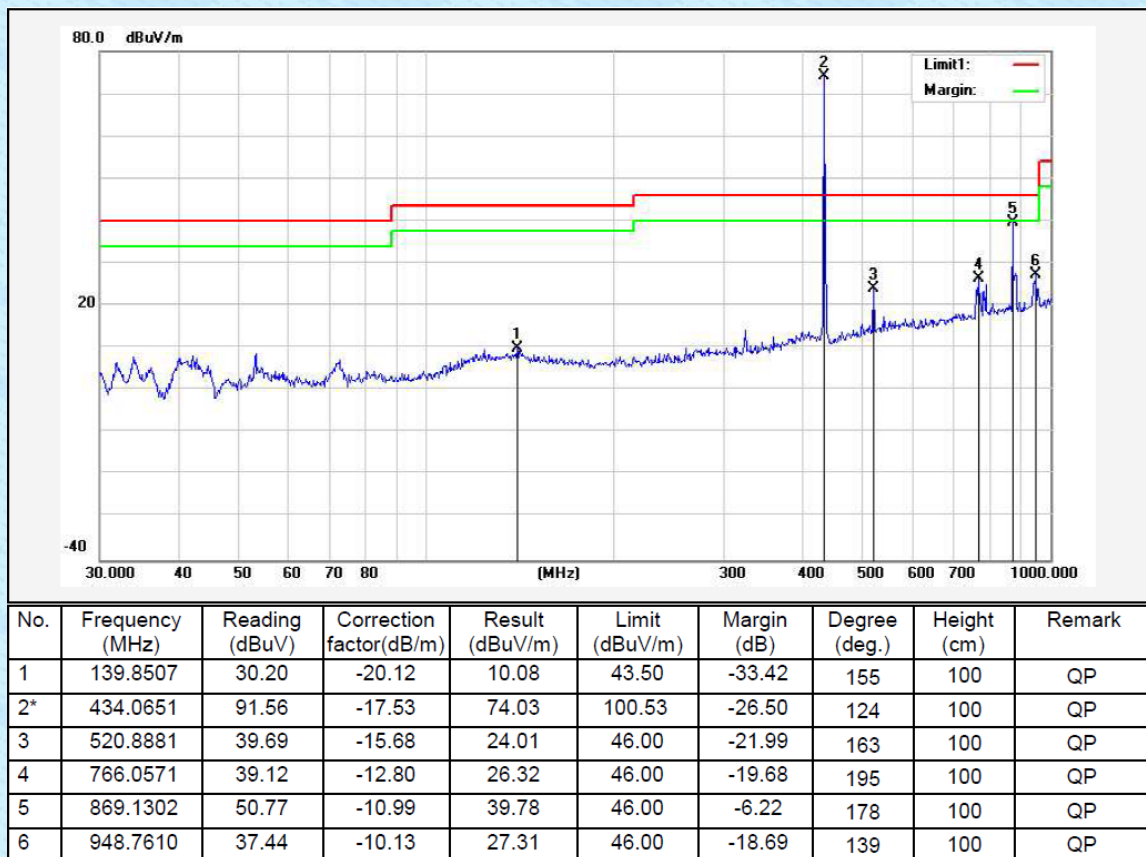
Measurement data:

9 kHz ~ 30 MHz

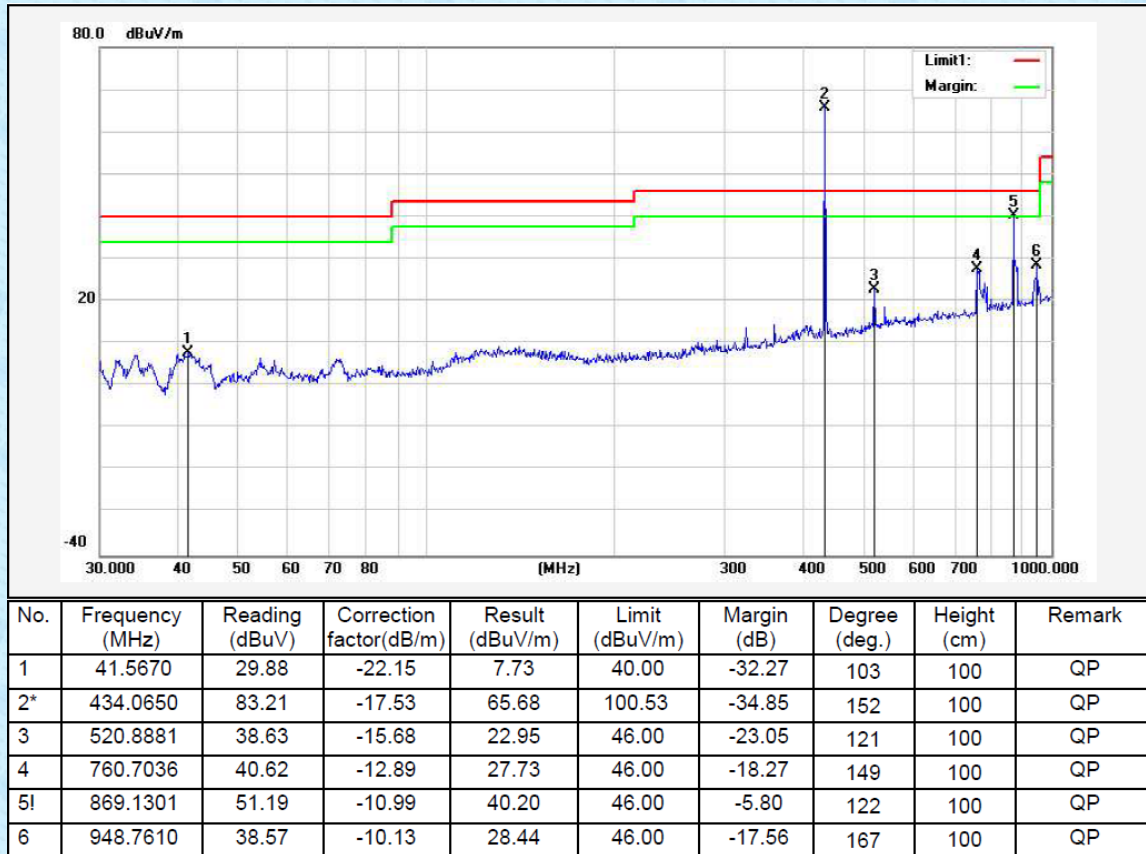
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz:

Horizontal



Vertical



Above 1G:

Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1303.25	49.42	-5.34	44.08	60.53	-16.45	Horizontal
1736.83	46.86	-5.02	41.84	60.53	-18.69	Horizontal
2169.64	51.12	-4.76	46.36	60.53	-14.17	Horizontal
1303.25	48.37	-5.34	43.03	60.53	-17.50	Vertical
1736.83	46.72	-5.02	41.70	60.53	-18.83	Vertical
2169.64	50.49	-4.76	45.73	60.53	-14.80	Vertical

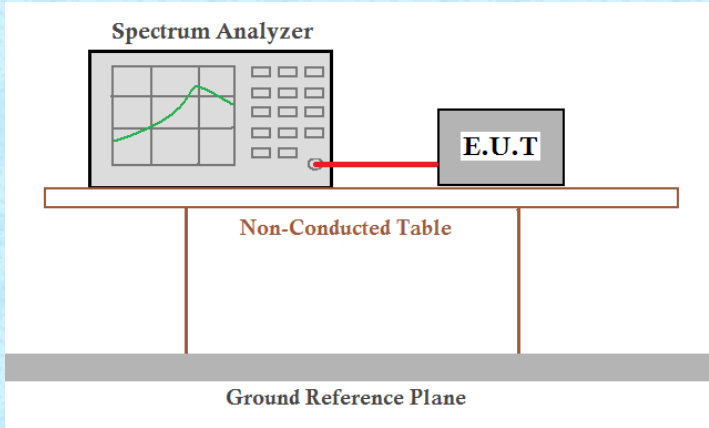
Average value:

Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1303.25	44.08	-12.64	31.44	40.53	-9.09	Horizontal
1736.83	41.84	-12.64	29.20	40.53	-11.33	Horizontal
2169.64	46.36	-12.64	33.72	40.53	-6.81	Horizontal
1303.25	43.03	-12.64	30.39	40.53	-10.14	Vertical
1736.83	41.70	-12.64	29.06	40.53	-11.47	Vertical
2169.64	45.73	-12.64	33.09	40.53	-7.44	Vertical

Remarks:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. Average value=Peak value + Duty cycle factor

7.4 20dB Occupy Bandwidth

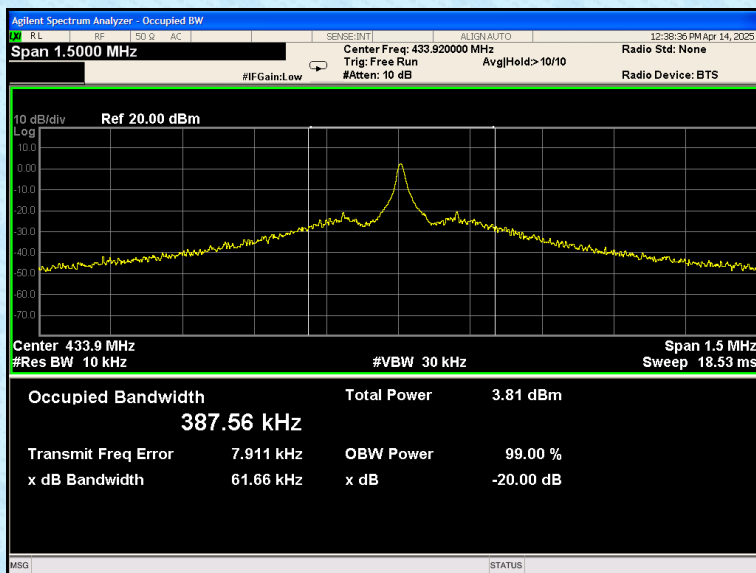
Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test setup:	 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

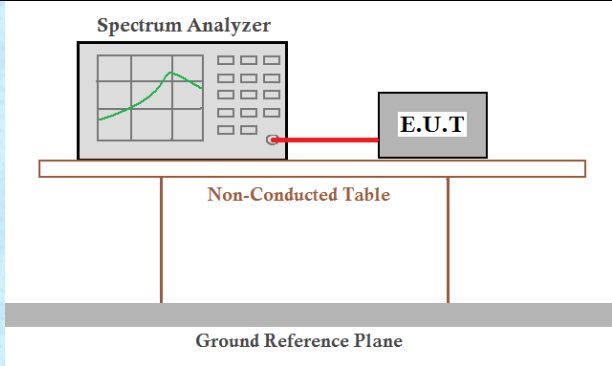
Test Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Result
433.92	61.66	$0.25\% \times 433.92 = 1.0848$	Pass

Note: Limit= Fundamental frequency $\times$ 0.25%

Test plot as follows:



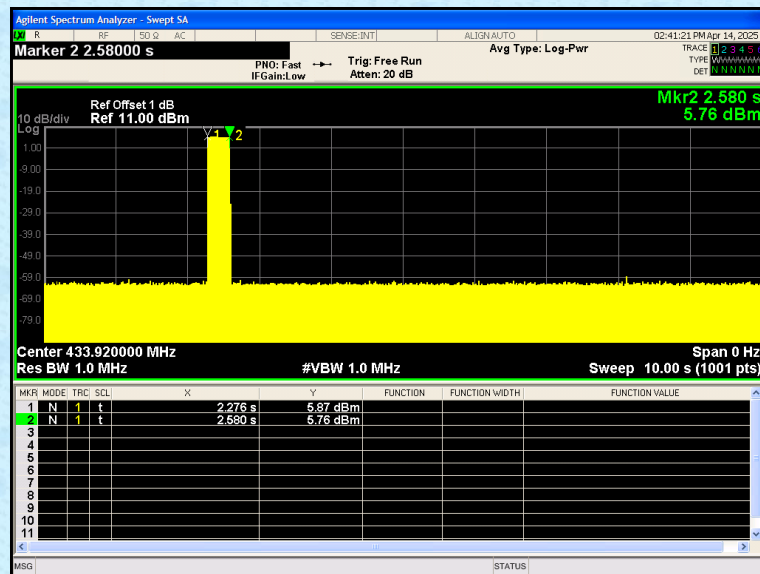
7.5 Dwell Time

Test Requirement:	FCC Part15 C Section 15.231 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

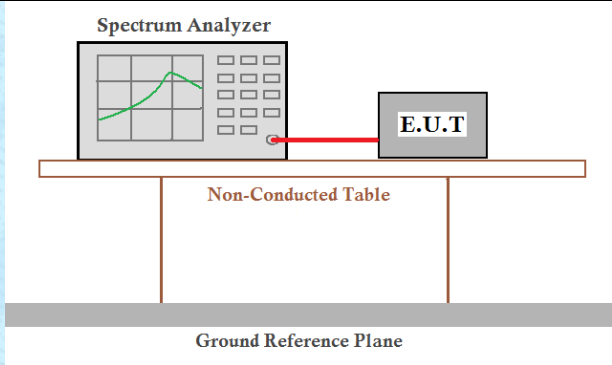
Measurement data:

Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
433.92	0.304	<5.0	Pass

Test plot as follows:



7.6 Duty Cycle

Test Requirement:	FCC Part15 C Section 15.231
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	No dedicated limit specified in the Rules.
Test Procedure:	1. Place the EUT on the table and set it in transmitting mode. 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. 3. Set centre frequency of spectrum analyzer=operating frequency. 4. Set the spectrum analyzer as RBW=100kHz, VBW=100KHz, Span=0Hz, Adjust Sweep=100ms to obtain the “worst-case” pulse on time 5. Repeat above procedures until all frequency measured was complete.
Test setup:	 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

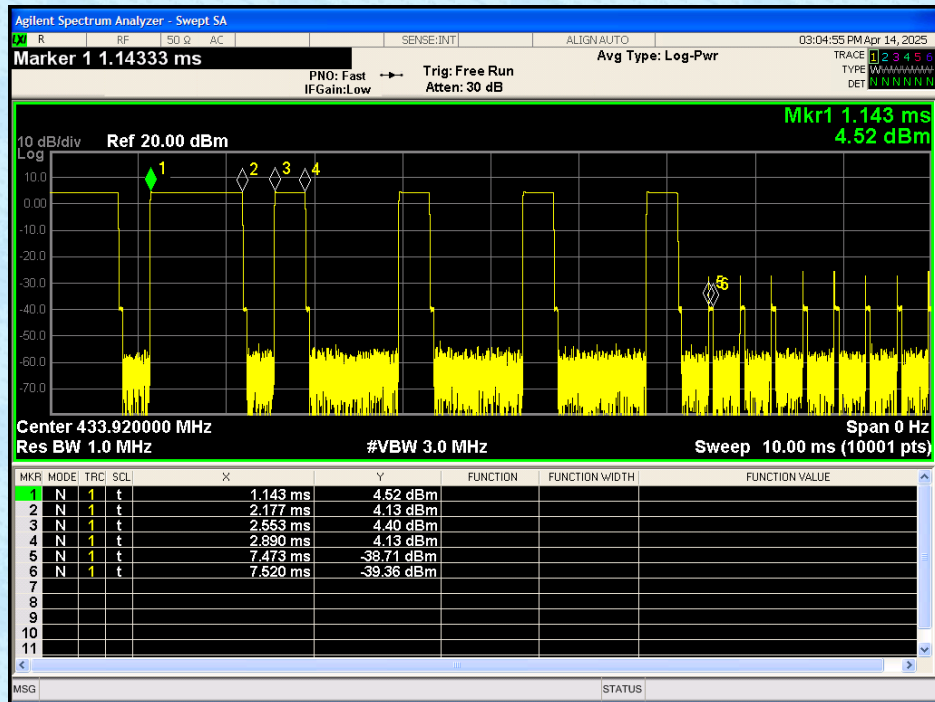
Measurement data:

Calculate Formula: Duty cycle factor = $20 \log(\text{Duty cycle})$
Duty cycle = on time / 0.1 seconds or period, whichever is less

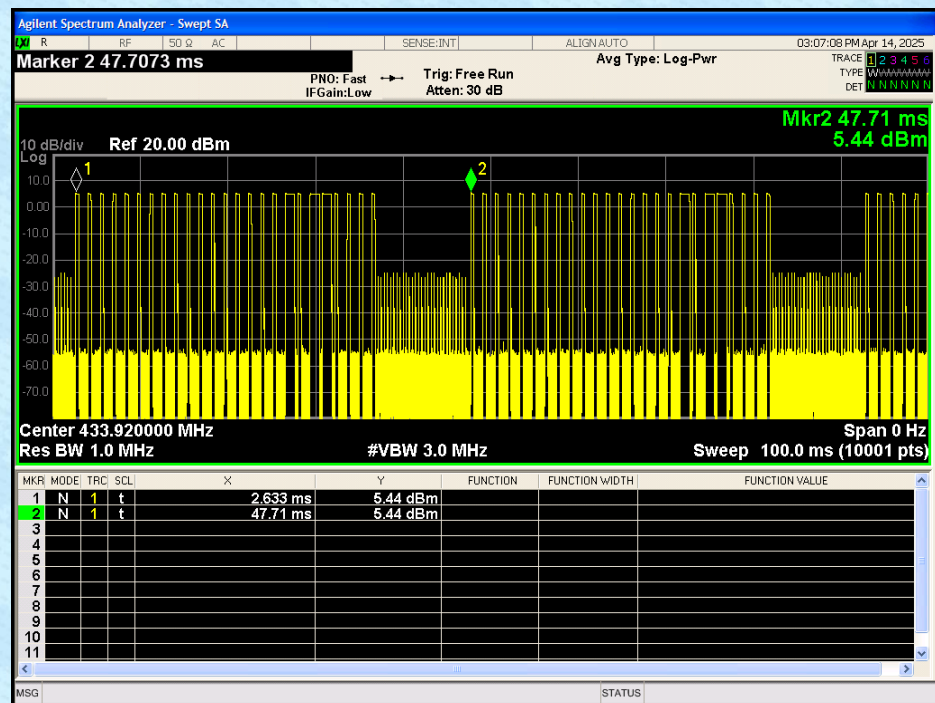
Test data:

$T_{\text{on time}} = 3 \times 1.034 + 22 \times 0.337 = 10.516(\text{ms})$
 $T_{\text{period}} = 45.077(\text{ms})$
Duty cycle = $10.516 / 45.077 = 23.33\%$
Duty cycle factor (dB) = $20 \log(T_{\text{on time}} / (T_{\text{on time}} + T_{\text{period}})) = -12.64$

Test plot as follows:



Pulse 1



$T_{on} + T_{off}$

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----