

Global United Technology Services Co., Ltd.

Report No.: GTS202202000044F01

TEST REPORT

Applicant: Shenzhen Realink Technology Co., Ltd.

Address of Applicant: 1026 maker building, 72-6 huanguan south road, xintian

community, guanhu street, Longhua district, Shenzhen,

Guangdong, China

Shenzhen Realink Technology Co., Ltd. Manufacturer/Factory:

Address of 1026 maker building, 72-6 huanguan south road, xintian

community, quanhu street, Longhua district, Shenzhen, Manufacturer/Factory:

Guangdong, China

Equipment Under Test (EUT)

Product Name: Wireless electronic pet fence system

Model No.: PF-07. PF-07-2. PF-07W.PF-07B. PF-07G. PF-07W2. PF-

07B2, PF-07G2, PF-07Pro, PF-07-2Pro

FCC ID: 2A4TE-PF-07

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

Date of sample receipt: February 16, 2022

February 17-23, 2022 **Date of Test:**

Date of report issued: February 23, 2022

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	February 23, 2022	Original

Prepared ву:	Project Engineer	Date:	rebruary 23, 2022
Check By:	(Lobinson lun)	Date:	February 23, 2022

Reviewer



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4 Test Summary

Test Item	Section in	Result
Antenna requirement	CFR 47 15.203	Pass
Conduction Emission	CFR 47 15.207	Pass
Field strength of the fundamental signal	CFR 47 15.231(e)	Pass
Spurious emissions	CFR 47 15.231(e) &15.209	Pass
Occupy Bandwidth	CFR 47 15.231(c)	Pass
Dwell time	CFR 47 15.231(e)	Pass

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz-30MHz	3.1dB	(1)
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 electronic pet fence system
Model No.:	PF-07, PF-07-2, PF-07W,PF-07B, PF-07G, PF-07W2, PF-07B2, PF-07G2, PF-07Pro, PF-07-2Pro
Test Model No.:	PF-07
Remark:All above models are	identical in the same PCB layout, interior structure and electrical circuits.
The differences are appearance	ce color and model name for commercial purpose.
Serial No.:	RLK20200111PF07
Test sample(s) ID:	GTS202202000044-1
Sample(s) Status	Engineer sample
Operation Frequency:	433.2MHz
Modulation type:	FSK
Antenna Type:	Integral Antenna
Antenna gain:	0dBi(declare by applicant)
Power supply:	AC/DC ADAPTER
	Model: XSC-0501000SU
	Input: AC100-240V, 50/60Hz, 0.4A
	Output:DC5V, 1000mA
	TX: DC3.7V, 2000mAh, 7.4Wh Li-ion Battery
	RX: DC3.7V, 400mAh, 1.48Wh Li-ion Battery

Note: The report is only for TX device



5.2 Test mode

Transmitting mode Keep the EUT in transmitting mode, the full battery	was used in test.
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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 was shown in this test report and defined as follows:

433.2MHz	Axis	X	Y	Z
433.2IVITZ	Field Strength(dBuV/m)	65.27	66.15	64.33

Final Test Mode:

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

Y axis (see the test setup photo)

5.3 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.

• IC —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 Industry Canada 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).

5.4 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

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.



6 Test Instruments list

	Destination Francisco								
Rad	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. 02 2020	July. 01 2025			
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. 24 2021	June. 23 2022			
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022			
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022			
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022			
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A			
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022			
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022			
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022			
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022			
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022			
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022			
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022			
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022			
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022			
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022			
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022			
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022			
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022			
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022			
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022			
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022			
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022			



Con	Conducted Emission							
Item	tem Test Equipment Manufacturer		Manufacturer Model No. Inven		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. 24 2021	June. 23 2022		
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022		
4	ENV216 2-L-V- NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022		
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. 24 2021	June. 23 2022		
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022		
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 24 2021	June. 23 2022		
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022		

RF C	RF Conducted Test:							
Item	Test Equipment	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. 24 2021	June. 23 2022		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022		
3	Spectrum Analyzer	Analyzer Agilent E4440A	GTS533	June. 24 2021	June. 23 2022			
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022		
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022		
6	USB RF Power Sensor	SB RF Power Sensor DARE RPR3006W		GTS569 June. 24 2021		June. 23 2022		
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022		
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022		

Gene	General used equipment:							
Item	Test Equipment	Test Equipment Manufacturer	Model No.	Inventory	Cal.Date	Cal.Due date		
				No.	(mm-dd-yy)	(mm-dd-yy)		
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022		
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022		



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 integral antenna, reference to the appendix II for details.



7.2 Conducted Emissions

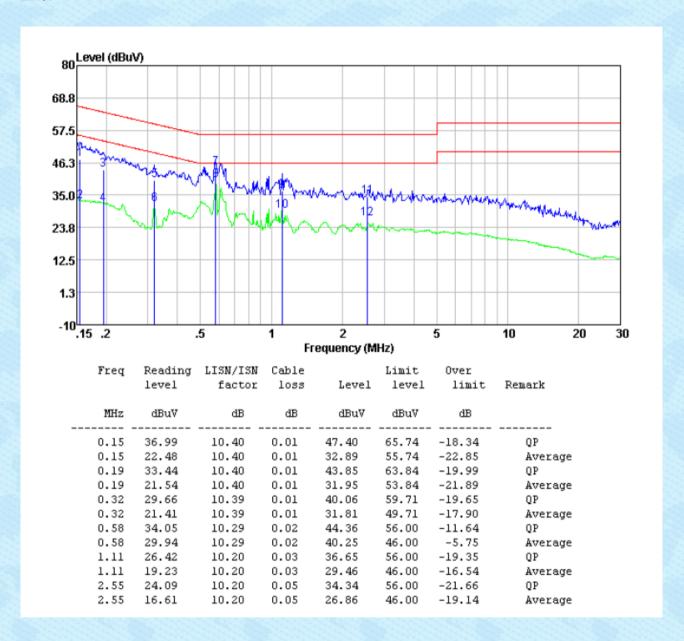
T I D					
Test Requirement:	FCC Part15 C Section 15.207				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	150KHz to 30MHz				
Class / Severity:	Class B				
Receiver setup:	RBW=9KHz, VBW=30KHz,	Sweep time=auto			
Limit:	Limit (dBuV)				
	Frequency range (MHz)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the logarith	nm of the frequency.			
Test setup:	Reference Plan	ie			
	AUX Equipment E.U.T EMI Receiver Remark E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m				
Test procedure:	 The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and photographs). 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:	AC 120V, 60Hz				
Test results:	Pass				

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.



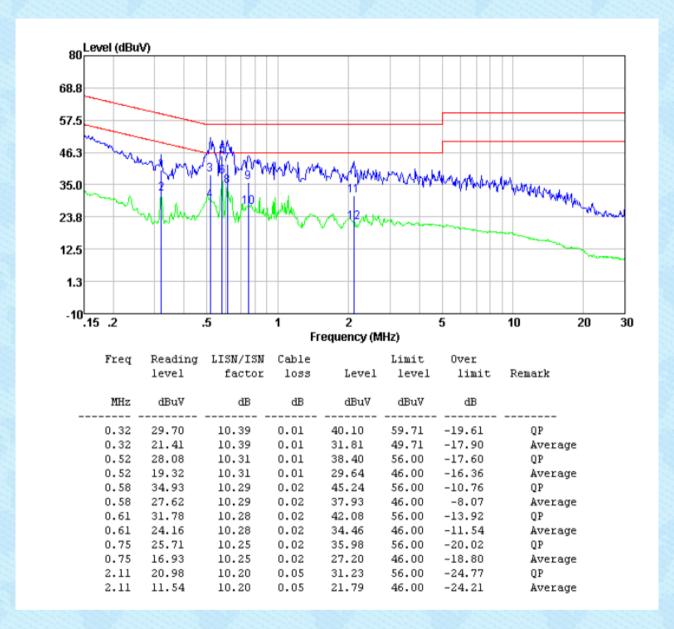
Measurement data

Line:





Neutral:



Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level = Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.



7.3 Radiated Emission Method

7.3 Radiated Emission Method							
Test Requirement:	FCC Part15 C Section	on 15.	231e				
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	9kHz to 6000MHz						
Test site:	Measurement Distance: 3m						
Receiver setup:	Frequency	De	etector	RBV	N	VBW	Value
	9KHz-150KHz	Qua	asi-peak	200H	Ηz	600H	z Quasi-peak
	150KHz-30MHz	Qua	asi-peak	9KH	Hz 30KH		z Quasi-peak
	30MHz-1GHz	Qua	asi-peak	120K	20KHz 300KH		Iz Quasi-peak
	Above 1GHz		Peak	1MH	lz	3MHz	z Peak
	7,0000 10112		Peak	1MH		10Hz	9
Limit:	Frequency		Limit ((dBuV/i		3m)	Remark
(Field strength of the fundamental signal)	433.2MHz			72.8 ⁴ 92.8 ⁴			Average Value Peak Value
Limit: (Spurious Emissions)	Frequency		Limit (uV			alue	Measurement Distance
	0.009MHz-0.490M		2400/F(K	- '		QΡ	300m
	0.490MHz-1.705M		24000/F(KHz)		QP		30m
	1.705MHz-30MHz		30		QP		30m
	30MHz-88MHz	75-15-15-1	100			QP	
	88MHz-216MHz		150		QP		
	216MHz-960MH		200			QP	3m
	960MHz-1GHz		500			QP	
	Above 1GHz		5000		Average Peak		
			3000			eak	
	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						
	Tum Table Sum > Su		< 3m > Test A	ntenna lm			
DGIOW TOTIZ							



Test Procedure:

Report No.: GTS202202000044F01 Test Antenna < 1m ... 4m > EUT. Turn Table < 80cm Turn Table+ Receiver-Preamplifier. Above 1GHz Test Antenna+ < 1m ... 4m > EUT+ Turn Table <150cm Receiver-Preamplifier+ 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. Refer to section 6.0 for details

50%

Press.:

Humid .:

Test Instruments:

Test environment:

Test mode:

Test voltage:

Temp.:

DC 3.7V

Refer to section 5.2 for details

25 °C

1 010mbar



		Report No.: GTS202202000044F01
Test results	s: Pass	

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
433.20	85.10	15.56	3.01	37.52	66.15	72.84	-6.69	Horizontal
433.20	83.77	15.56	3.01	37.52	64.82	72.84	-8.02	Vertical

Remarks:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. PK Value under AV limit, then pass for AV value.



7.3.2 Spurious emissions

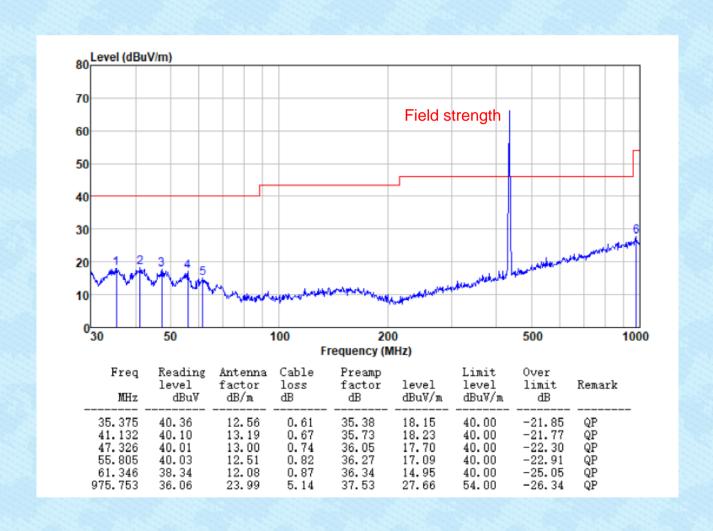
Measurement data:

9 kHz ~ 30 MHz

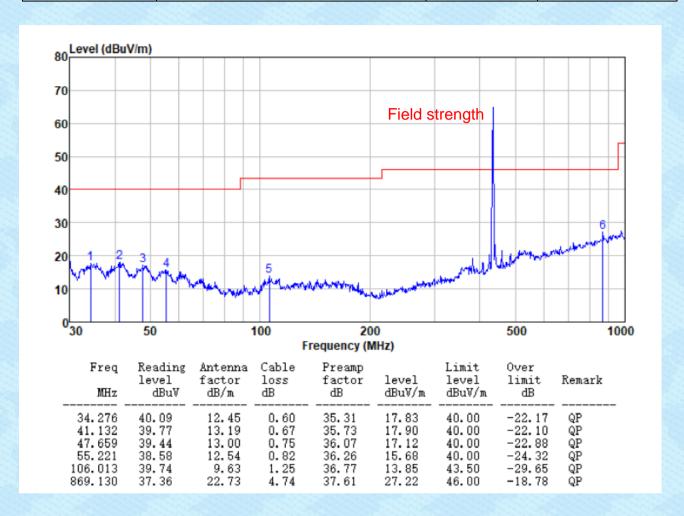
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz:

Test channel:	433.2MHz	Polarization:	Horizontal

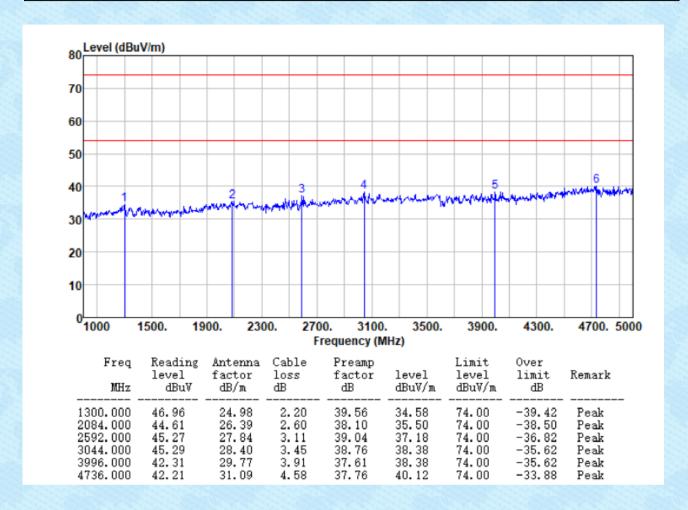






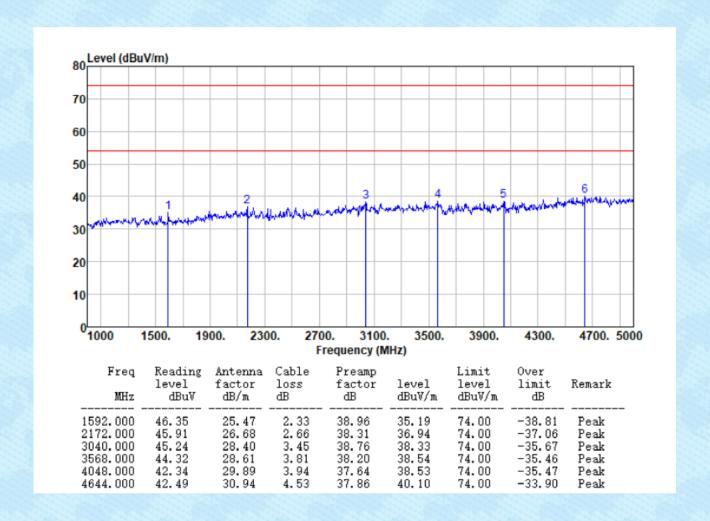


Above 1G:





Test channel: 433.2MHz Polarization:	Vertical
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Remarks:

Final Level = Receiver Read level + Antenna Factor + Cable Loss - Preamplifier Factor



7.4 Occupy Bandwidth

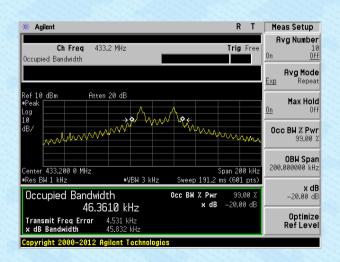
Test Requirement:	FCC Part15 C Section 15.231 (c)			
Test Method:	ANSI C63.10:2013			
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.			
Test setup:	Spectrum Analyzer Non-Conducted Table Ground Reference Plane			
Test Instruments:	Refer to section 6.0 for details			
Test mode:	Refer to section 5.3 for details			
Test results:	Pass			

Measurement Data

Test Frequency (MHz)	20dB bandwidth (kHz)	99% bandwidth(kHz)	Limit (MHz)	Result
433.2	45.832	46.3610	1.083	Pass

Note: Limit= Fundamental frequency x 0.25%

Test plot as follows:





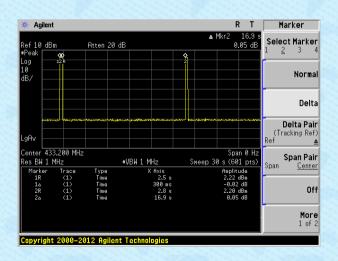
7.5 Dwell time

To at Danwinson surt	FOO Death FO Continue 45 004 (a)		
Test Requirement:	FCC Part15 C Section 15.231 (e)		
Test Method:	ANSI C63.10:2013		
Receiver setup:	RBW=1MHz, VBW=1MHz, span=0Hz, detector: Peak		
Limit:	Not more than 1 seconds		
Test setup:	Spectrum Analyzer Non-Conducted Table 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)	Duration of each TX (second)	Limit (second)	Result
433.2	0.3	<1.0	Pass

Test plot as follows:





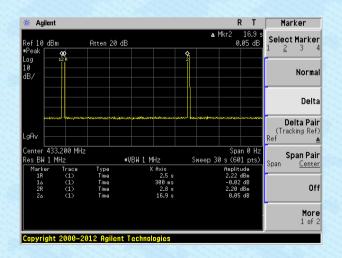
7.6 Silent period

Test Requirement:	FCC Part15 C Section 15.231 (e)		
Test Method:	ANSI C63.10:2013		
Receiver setup:	RBW=1MHz, VBW=1MHz, span=0Hz, detector: Peak		
Limit:	at least 30 times the duration of the transmission		
	or more than 10 seconds		
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.		
	2. Set the EUT to proper test channel.		
	3. Single scan the transmit, and read the transmission time.		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table 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)	Silent period (second)	Limit (second)	Result
433.2	16.9	>10	Pass

Test plot as follows:





8 Test Setup Photo

Reference to the appendix I for details.

9 EUT Constructional Details

Reference to the appendix II for details.

-----End-----