

TEST REPORT

Applicant:	Shenzhen Macross Automation Technology Co., Ltd.			
Address of Applicant:	Room 301-3, #5 Building, Jianghao Technical Park, Bantian St. Longgang District, Shenzhen, China			
Manufacturer/Factory:	Shenzhen Macross Automation Technology Co., Ltd.			
Address of Manufacturer/Factory:	Room 301-3, #5 Building, Jianghao Technical Park, Bantian St. Longgang District, Shenzhen, China			
Equipment Under Test (E	EUT)			
Product Name:	Indoor/Outdoor Wireless Motion Sensor and Driveway Alarm for Home Security System			
Model No.:	HS-003			
Trade Mark:	eMACROS			
FCC ID:	2AXOF-HS003			
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.231			
Date of sample receipt:	January 11, 2022			
Date of Test:	January 12-20, 2022			
Date of report issued:	January 20, 2022			
Test Result :	PASS *			

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

Authorized Signature:



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.	Version No. Date		
00	January 20, 2022	Original	

Prepared By:

sandly

Date:

January 20, 2022

January 20, 2022

Project Engineer

Check By:

this out (14) Date:

Reviewer

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 Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960

GTS

Report No.: GTS202201000053F01

3 Contents

		Pa	ge
1	COVI	ER PAGE	.1
2	VER	SION	2
3	CON	ITENTS	3
4	TES	T SUMMARY	. 4
	4.1	MEASUREMENT UNCERTAINTY	. 4
5	GEN	IERAL INFORMATION	5
	5.1	GENERAL DESCRIPTION OF EUT	. 5
	5.2	TEST MODE	6
	5.3	TEST FACILITY	6
	5.4	TEST LOCATION	6
	5.5	DESCRIPTION OF SUPPORT UNITS	6
	5.6	DEVIATION FROM STANDARDS	
	5.7	ABNORMALITIES FROM STANDARD CONDITIONS	6
	5.8	OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
6	TES	T INSTRUMENTS LIST	.7
7	TES	T RESULTS AND MEASUREMENT DATA	9
	7.1	ANTENNA REQUIREMENT	9
	7.2	RADIATED EMISSION METHOD	10
	7.2.	1 Field Strength of The Fundamental Signal	12
	7.2.2		
	7.3	OCCUPY BANDWIDTH	
	7.4	Dwell time	
	7.5	SILENT PERIOD	
8	TES	T SETUP PHOTO	20
9	EUT	CONSTRUCTIONAL DETAILS	20

4 Test Summary

Test Item	Section in	Result
Antenna requirement	CFR 47 15.203	Pass
Conduction Emission	CFR 47 15.207	N/A
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

Frequency Range	Measurement Uncertainty	Notes			
9kHz-30MHz	3.1dB	(1)			
30MHz-200MHz	3.8039dB	(1)			
200MHz-1GHz	3.9679dB	(1)			
1GHz-18GHz	4.29dB	(1)			
18GHz-40GHz	3.30dB	(1)			
AC Power Line Conducted 0.15MHz ~ 30MHz 3.44dB (1)					
	9kHz-30MHz 30MHz-200MHz 200MHz-1GHz 1GHz-18GHz 18GHz-40GHz	9kHz-30MHz 3.1dB 30MHz-200MHz 3.8039dB 200MHz-1GHz 3.9679dB 1GHz-18GHz 4.29dB 18GHz-40GHz 3.30dB			



5 General Information

5.1 General Description of EUT

Product Name:	Indoor/Outdoor Wireless Motion Sensor and Driveway Alarm for Home Security System
Model No.:	HS-003
Serial No.:	HS003N2112020412
Hardware Version:	HS_003_T_V1
Software Version:	HS_003_T_V1.2
Test sample(s) ID:	GTS202201000053-1
Sample(s) Status	Engineer sample
Operation Frequency:	433.92MHz
Modulation type:	OOK
Antenna Type:	Internal Antenna
Antenna gain:	2dBi(declare by applicant)
Power supply:	TX: DC 3V(2*3V Size"CR2450" Battery)

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode, the new battery was used in test.
5	

	est mode.				
		he construction and function in type. X axis, Y axis, Z axis. which was			
polai		Axis	X	Y	z z
43	33.92MHz	Field Strength(dBuV/m)	62.18	65.62	62.11
Final	Test Mode:				
Ассо	rding to ANS	C63.10 standards, the test result	s are both the "wors	t case" and "worst s	etup":
Y axi	s (see the tes	t setup photo)			
5.3	Test Faci	lity			
 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: 0755-27798060				
		7798480	anguong, enina ere		
5.5	Fax: 0755-2	7798480			
5.5	Fax: 0755-2	7798480 27798960			
	Fax: 0755-2 Description None.	7798480 27798960			
	Fax: 0755-2 Description None.	7798480 27798960 on of Support Units			
5.5 5.6 5.7	Fax: 0755-2 Description None. Deviation None.	7798480 27798960 on of Support Units			
5.6	Fax: 0755-2 Description None. Deviation None.	7798480 27798960 on of Support Units from Standards			
5.6	Fax: 0755-2 Description None. Deviation None. Abnorma None.	7798480 27798960 on of Support Units from Standards	tions		



6 Test Instruments list

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



RF C	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. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum 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	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

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	КТJ	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:

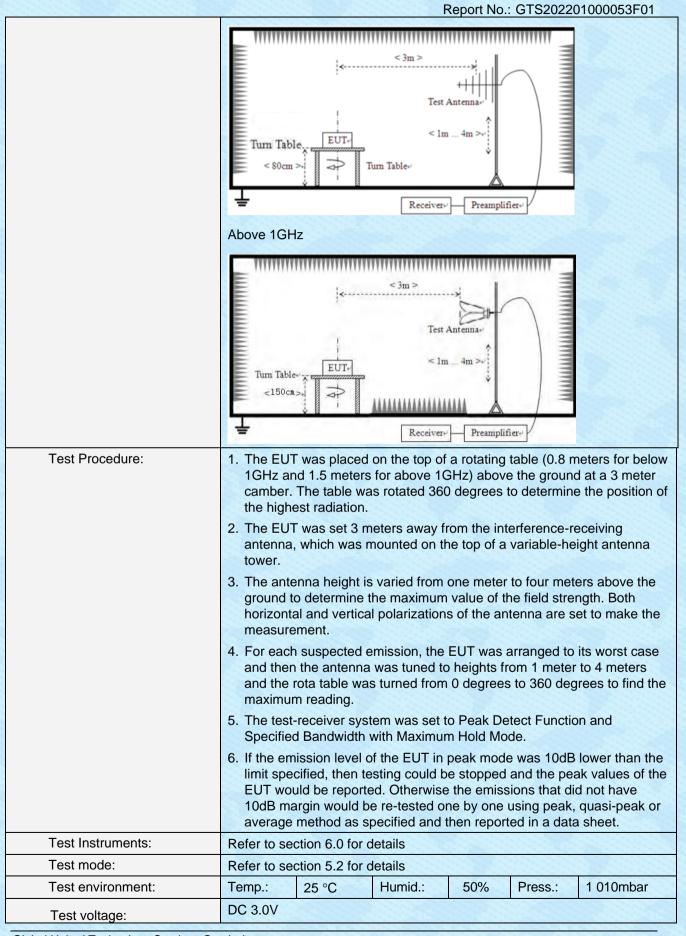
The antenna is internal antenna, reference to the appendix II for details.



7.2 Radiated Emission Method

7.2 Radiated Emission Me	liiou			1.0.2			12.1		
Test Requirement:	FCC Part15 C Section 15.209								
Test Method:	ANSI C63.10:2013								
Test Frequency Range:	9kHz to 6000MHz								
Test site:	Measurement Distance: 3m								
Receiver setup:	Frequency Detector RBW VE			VBV	N	Value			
	9KHz-150KHz	Qua	asi-peak	200	Ηz	600H	Ηz	Quasi-peak	
	150KHz-30MHz	Qua	asi-peak	9K⊢	łz	30KH	Ηz	Quasi-peak	
	30MHz-1GHz	Qua	asi-peak	120K	Hz	300K	Hz	Quasi-peak	
	Above 1GHz	ł	Peak	1M⊦	Hz 3MHz		łz	Peak	
	Above Teriz	I	Peak	1MH	łz	10H	z	Average	
Limit:	Frequency		Limit (dBuV/		3m)	•	Remark	
(Field strength of the fundamental signal)	433.92MHz			72.87 92.87				verage Value Peak Value	
Limit: (Spurious Emissions)	Frequency		Limit (uV	′/m)	V	alue	ſ	Veasurement Distance	
	0.009MHz-0.490MHz			00/F(KHz)		QP		300m	
	0.490MHz-1.705MHz			000/F(KHz)		QP		30m	
	1.705MHz-30MH		30			QP		30m	
	30MHz-88MHz		100		QP				
	88MHz-216MHz		150			QP		3m	
	216MHz-960MHz		200		_	QP			
	960MHz-1GHz		500		QP Average				
	Above 1GHz		500			_			
			5000		P	eak			
	Or The maximum pe maximum permitted f strength.								
Test setup:	Below 30MHz								
	Image: Solution of the second seco								





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 Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960



Test results:

Pass

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

_			
Pea	k V	alui	0.
1 60	n v	aiu	с.

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
433.92	84.54	15.58	3.02	37.52	65.62	72.87	-7.25	Horizontal
433.92	83.54	15.58	3.02	37.52	64.62	72.87	-8.25	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.



7.2.2 Spurious emissions

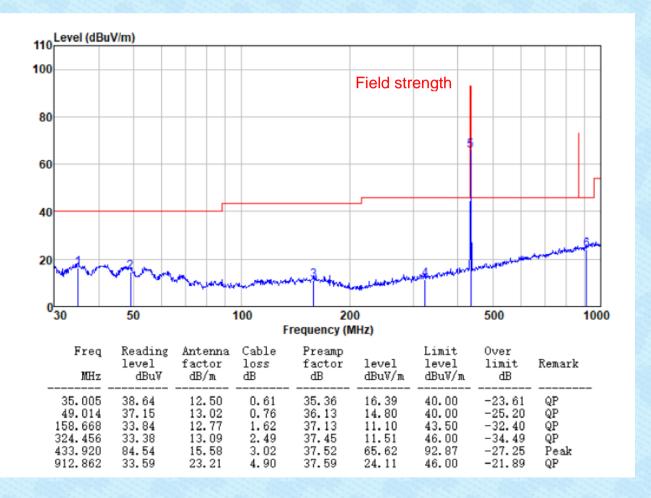
Measurement data:

9 kHz ~ 30 MHz

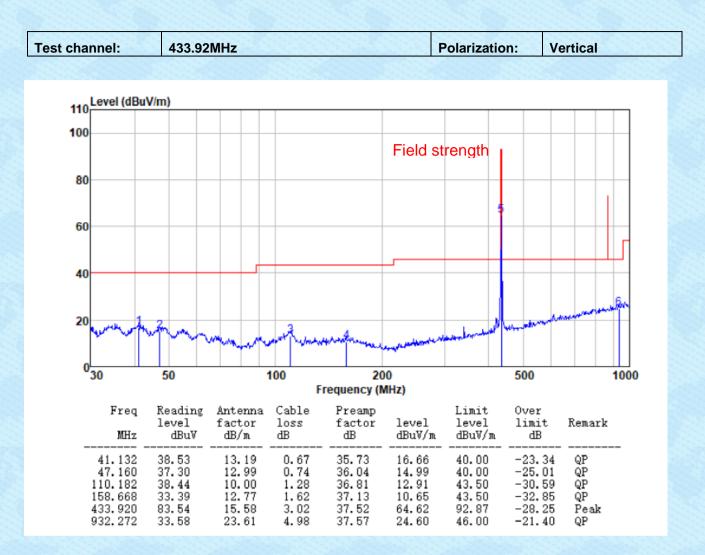
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz:

Test channel:	433.92MHz	Polarization:	Horizontal
A CARLES AND A STREET AND A CARLES			



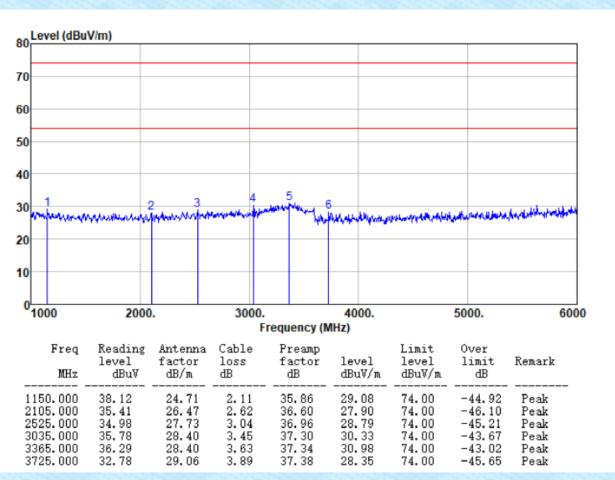




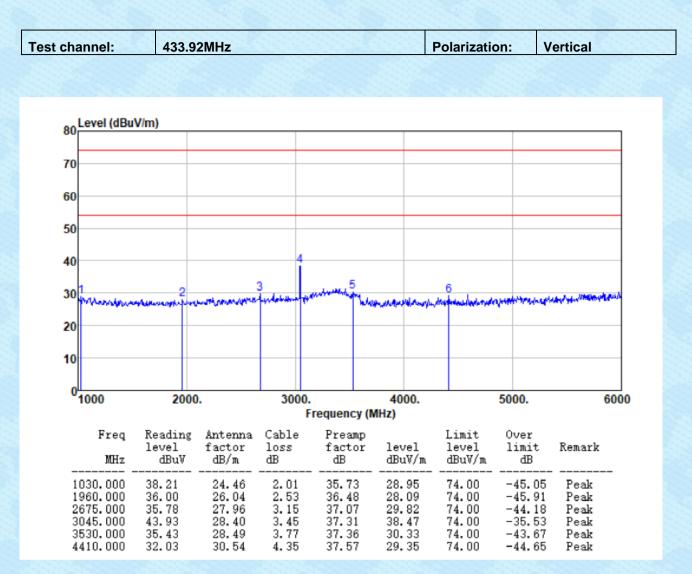


Above 1G:









Remarks:

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



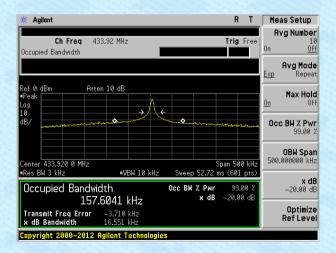
7.3 Occupy Bandwidth

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 E.U.T 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 433.92 16.551 157.6041 1.0848 Pass

Note: Limit= Fundamental frequency×0.25%

Test plot as follows:





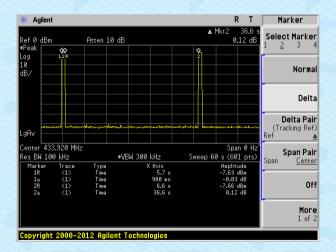
7.4 Dwell time

Test Requirement:	FCC Part15 C Section 15.231 (e)		
Test Method:	ANSI C63.10:2013		
Receiver setup:	RBW=100kHz, VBW=300kHz, span=0Hz, detector: Peak		
Limit:	Not more than 1 seconds		
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	Duration of each TX	Limit	Result
(MHz)	(second)	(second)	
433.92	0.9	<1.0	Pass

Test plot as follows:



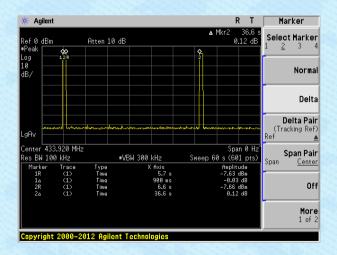
7.5 Silent period

Test Requirement:	FCC Part15 C Section 15.231 (e)		
Test Method:	ANSI C63.10:2013		
Receiver setup:	RBW=100kHz, VBW=300kHz, 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		
Management data.			

Measurement data:

Test Frequency (MHz)	Silent period (second)	Limit (second)	Result
433.92	36.6	>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-----