

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:	Outdoor Smart Camera
Model No.:	MC-007
Trade Mark:	eMACROS
FCC ID:	2AXOF-MC007
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.231
Date of sample receipt:	April 12, 2022
Date of Test:	April 13, 2022-May 11, 2022
Date of report issued:	May 11, 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	May 11, 2022	Original

Prepared By:

for the

Date:

May 11, 2022

May 11, 2022

Project Engineer

Check By:

this out (14) Date:

Reviewer

GTS

Report No.: GTS202204000128F01

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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 Emission0.15MHz ~ 30MHz3.44dB(1)				
Note (1): The measurement unce	ertainty is for coverage factor of k	=2 and a level of confidence of 9	95%.	



5 General Information

5.1 General Description of EUT

Product Name:	Outdoor Smart Camera
Model No.:	MC-007
S/N:	MC007W2201150119
Hardware Version:	C4_MAIN_A0_A/C4_SENSOR_A0_B/C4_PIR_A0_C
Software Version:	10.6.81
Test sample(s) ID:	GTS202204000128-1
Sample(s) Status	Engineer sample
Operation Frequency:	433.935MHz
Modulation type:	FSK
Antenna Type:	Integral Antenna
Antenna gain:	0dBi(declare by applicant)
Power supply:	TX: DC 3.6V, 18650/10000mAh, 36Wh for Li-ion battery
	AC/DC Adapter for transmitter
	Model:MKC-0502000DEXU
	Input: AC 100-240V, 50/60Hz, 0.4A
	Output: DC 5.0V, 2.0A, 10.0W

	Transmitting	mode	Keep the EUT in tr	ansmitting mode.		
Per-t	test mode.					
			on and function in typ xis, Z axis. which was			
40			Axis	Х	Y	Z
43	33.935MHz	Field Stre	ength(dBuV/m)	71.59	70.66	71.23
Final	I Test Mode:					
Acco	ording to ANS	C63.10 stan	dards, the test results	are both the "wors	t case" and "worst se	etup":
r axi	is (see the tes	st setup photo))			
5.3	Test Faci	lity				
5.4	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). 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					
		ed Technolog 28, Tower A, A ad, Baoan Dis 7798480	y Services Co., Ltd. Jinyuan Business Bui			
5.5	Xixiang Roa Tel: 0755-2 Fax: 0755-2	ed Technolog 28, Tower A, A ad, Baoan Dis 7798480	y Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua			
5.5	Xixiang Roa Tel: 0755-2 Fax: 0755-2	ed Technolog 28, Tower A, ad, Baoan Dis 7798480 27798960	y Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua			
	Xixiang Roa Tel: 0755-2 Fax: 0755-2 Description None.	ed Technolog 28, Tower A, ad, Baoan Dis 7798480 27798960	gy Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua Dort Units			
	Xixiang Roa Tel: 0755-2 Fax: 0755-2 Description None.	ed Technolog 28, Tower A, a ad, Baoan Dia 7798480 27798960 on of Supp	gy Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua Dort Units			
5.5 5.6 5.7	Xixiang Roa Tel: 0755-2 Fax: 0755-2 Description None. Deviation None.	ed Technolog 28, Tower A, a ad, Baoan Dia 7798480 27798960 on of Supp from Star	gy Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua Dort Units	ngdong, China 518		
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5.6	Xixiang Roa Tel: 0755-2 Fax: 0755-2 Description None. Deviation None. Abnorma None.	ed Technolog 28, Tower A, a ad, Baoan Dia 7798480 27798960 on of Supp from Star	y Services Co., Ltd. Jinyuan Business Bui strict, Shenzhen, Gua port Units	ngdong, China 518		



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. 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						
ltem	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. 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	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

Gene	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
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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

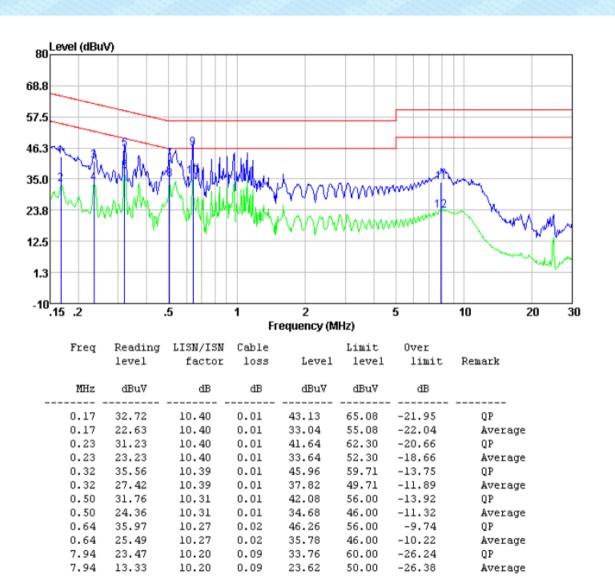
Test Requirement:	FCC Part15 C Section 15.207	FCC Part15 C Section 15.207				
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz	150KHz to 30MHz				
Class / Severity:	Class B	Class B				
Receiver setup:	RBW=9KHz, VBW=30KHz, Sw	veep time=auto				
Limit:		Limit (dBuV)				
	Frequency 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 logarithm	of the frequency.				
Test setup:	Reference Plane					
	Test table/Insulation plane Remark: E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m	EMI Receiver				
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 50ohm/50uH coupling impedance for the measuring equipment. 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). 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 Humi	id.: 52%	Press.: 1012mbar			
Test voltage:	AC 120V, 60Hz					
Test results:	Pass	and the second second				

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



Measurement data

Line:

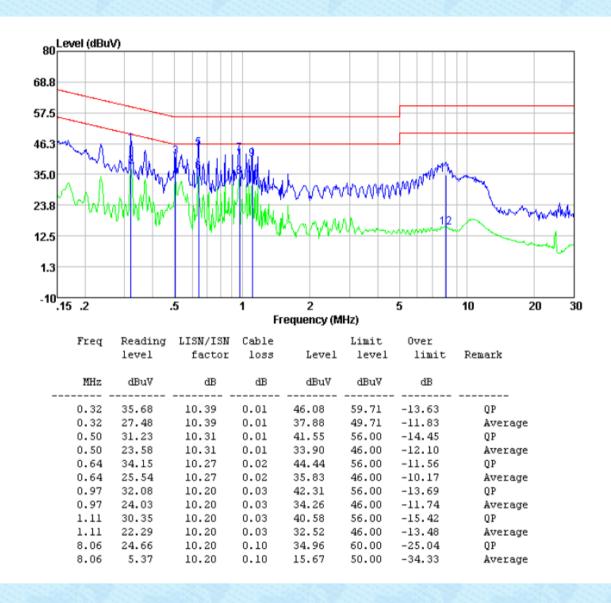


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Neutral:



Notes:

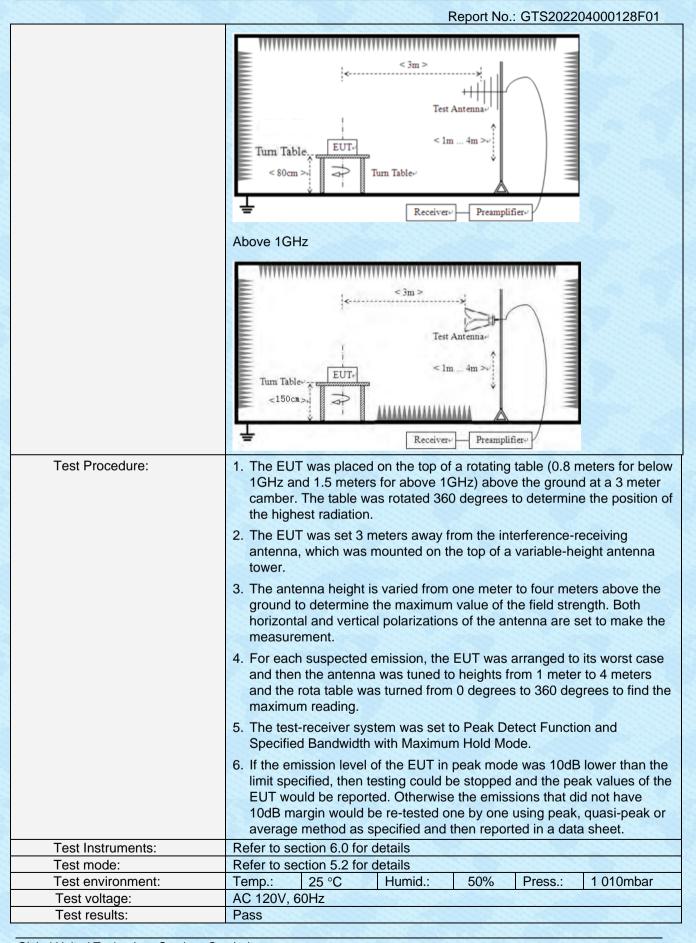
- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using 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 Me	linea			1.1.1.1	1.1		1.1.1		
Test Requirement:	FCC Part15 C Section 15.209								
Test Method:	ANSI C63.10:2013								
Test Frequency Range:	9kHz to 5000MHz								
Test site:	Measurement Distar	nce: 3r	n						
Receiver setup:	Frequency Detector RBW VBW Val				Value				
	9KHz-150KHz	Qua	isi-peak	200Hz		600Hz		Quasi-peak	
	150KHz-30MHz	Qua	isi-peak	9KH	lz	30KH	Ηz	Quasi-peak	
	30MHz-1GHz	Qua	isi-peak	120K	KHz 300KH		Hz	Quasi-peak	
	Above 1GHz	F	Peak	1M⊢	Hz 3MHz		łz	Peak	
	Above ronz	F	Peak	1MH	lz	10H	z	Average	
Limit:	Frequency		Limit (dBuV/		3m)	1	Remark	
(Field strength of the fundamental signal)	433.935MHz	2		72.87 92.87	_		_	verage Value Peak Value	
Limit: (Spurious Emissions)	Frequency		Limit (uV	_imit (uV/m)		/alue		Measurement Distance	
	0.009MHz-0.490M	Hz	2400/F(K	(Hz)	(QP		300m	
	0.490MHz-1.705M	Hz	24000/F(H	KHz)		QP		30m	
	1.705MHz-30MHz		30	30		QP		30m	
	30MHz-88MHz		100	100		QP			
	88MHz-216MHz		150			QP			
	216MHz-960MHz		200			QP		3m	
	960MHz-1GHz		500		(QP	22	onn	
	Above 1GHz 500 5000			erage					
			P	eak					
Test setup:	Or The maximum per maximum permitted f strength.								
rest setup.	Below 30MHz								
	<pre></pre>								







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
433.935	90.51	15.58	3.02	37.52	71.59	72.87	-0.28	Horizontal
433.935	88.33	15.58	3.02	37.52	69.41	72.87	-3.46	Vertical

PK value lower than AV limit, so AV value will compliant

7.3.2 Spurious emissions

Measurement data:

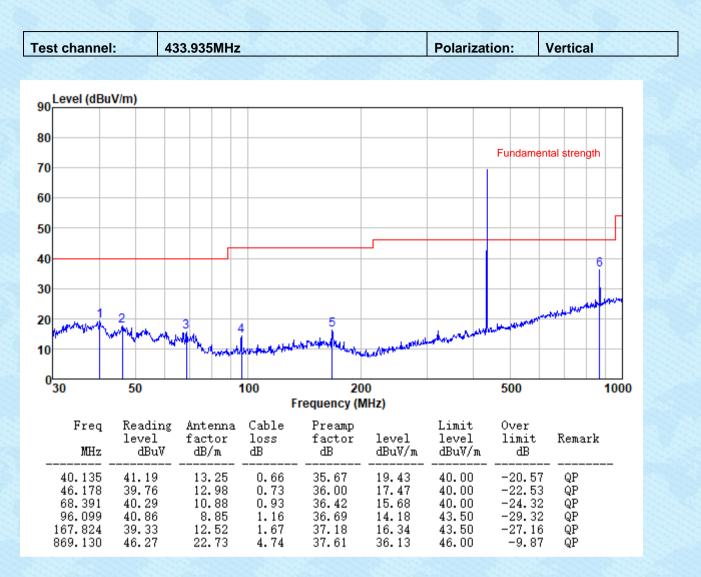
9 kHz ~ 30 MHz

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.

Polarization: Test channel: 433.935MHz Horizontal Level (dBuV/m) 90 80 Fundamental strength 70 60 50 40 30 2 20 45 1.00 and whether the 10 ditte to the 0^{LL} 30 50 100 200 500 1000 Frequency (MHz) Freq Reading Antenna Cable Preamp Limit Over level factor loss factor level level Remark limit MHzdBu∛ dB/m dB dB dBuV/m dBuV/m dB 44.00 31.399 12.26 0.57 35.11 21.72 40.00 -18.28 QP 39.715 42.94 13.22 0.66 35.65 21.17 40.00 -18.83 QP QΡ 45.695 39.76 12.97 35.97 40.00 -22.51 0.73 17.4953.131 56.792 12.73 12.46 36.23 36.28 40.13 0.80 17.43 40.00 -22.57 QP QP 39.87 0.83 16.88 40.00-23.12 869.130 51.49 22.73 4.74 37.61 41.35 46.00 -4.65QP

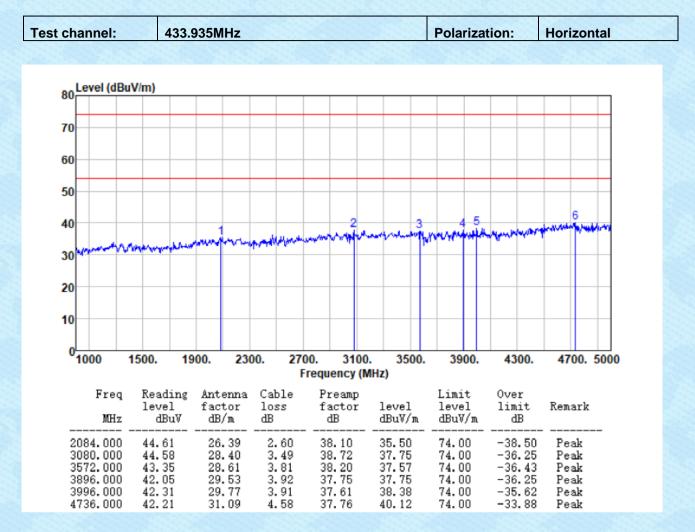
Below 1GHz:



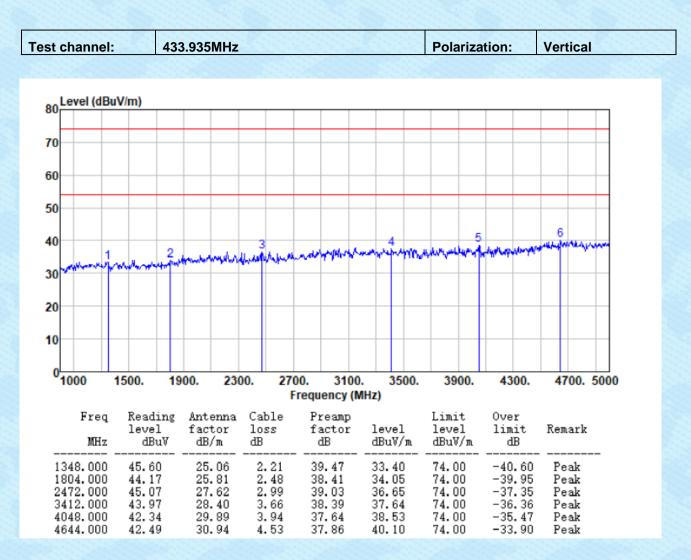




Above 1G:







Remarks:

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



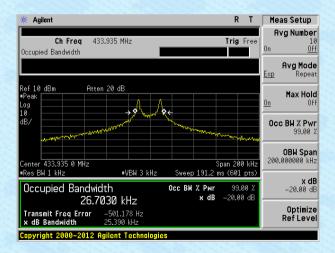
7.4 Occupy Bandwidth

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 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	78 78 78 78			

Test Frequency (MHz)20dB bandwidth (kHz)99% bandwidth (kHz)Limit (MHz)Result433.93525.39026.70301.0848Pass

Note: Limit= Fundamental frequency×0.25%

Test plot as follows:





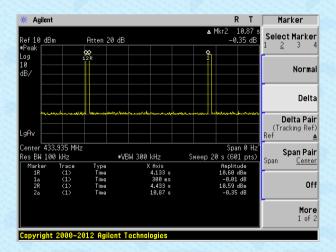
7.5 Dwell time

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)	
433.935	0.3	<1.0	Pass

Test plot as follows:



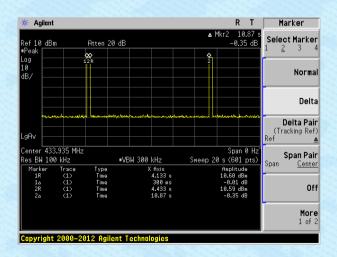
7.6 Silent period

Test Requirement:	FCC Part15 C Section 15.231 (e)			
Test Method:	ANSI C63.10:2013			
Receiver setup:	RBW=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			

Measurement data:

Test Frequency (MHz)	Silent period (second)	Limit (second)	Result
433.935	10.87	>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-----