



Global United Technology Services Co., Ltd.

Report No.: GTS202103000066-02

TEST REPORT

Applicant: CartaSense Ltd.

Address of Applicant: 6 Ravnitzki street, Petach-Tikva, Israel 49277

Manufacturer: CartaSense Ltd.

Address of 6 Ravnizki St., Petah Tikva, Israel 4900617

Manufacturer:

Equipment Under Test (EUT)

Product Name: O-Sensor stationary / O-Sensor mobile

Model No.: 100700-XX

FCC ID: 2AAEP-OSENSOR

IC: 11128A-OSENSOR

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

RSS-Gen Issue 5

RSS-210 Issue 10

Date of sample receipt: March 05, 2023

Date of Test: March 05, 2023-August 31, 2023

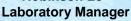
Date of report issued: August 31, 2023

Test Result: PASS *

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

Authorized Signature:





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.

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2 Version

Version No.	Date	Description
00	August 31, 2023	Original

Prepared By:	JasankOu Date:	August 31, 2023
	Project Engineer	
Check By:	Popular Date:	August 31, 2023
	Reviewer	



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4 Test Summary

Test Item	Section in	Result
Antonno roquiroment	CFR 47 15.203	Pass
Antenna requirement	RSS-Gen Section 6.8	F d 5 5
Conduction Emission	CFR 47 15.207	N/A
Conduction Emission	RSS-Gen Clause 8.8	IV/A
Field strength of the fundamental signal	CFR 47 15.231(e)	Pass
ried strength of the fundamental signal	RSS-210 Clause A.1.4(Table A2)	rass
	CFR 47 15.231(e) &15.209	
Spurious emissions	RSS-210 Clause A.1.4(Table A2)& RSS-Gen Clause 8.9&8.10	Pass
	CFR 47 15.231(c)	
Occupy Bandwidth	RSS-210 A.1.3 & RSS-Gen Clause 6.7	Pass
Dwell time	CFR 47 15.231(e)	Pass
Dwell title	RSS-210 Clause A.1.4(b)	Fd55

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes			
Radiated Emission	30MHz-200MHz	3.8039dB	(1)			
Radiated Emission	nission 200MHz-1GHz 3.9679dB (1)					
Radiated Emission	1GHz-18GHz	4.29dB	(1)			
Radiated Emission	18GHz-40GHz 3.30dB					
AC Power Line Conducted Emission 0.15MHz ~ 30MHz 3.44dB (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:	O-Sensor stationary / O-Sensor mobile			
Model No.:	100700-XX			
S/N:	000001			
Test sample(s) ID:	GTS202103000066-1			
Sample(s) Status	Engineer sample			
Operation Frequency:	433.75MHz, 433.9MHz, 434.05MHz ,434.2MHz			
Number of Channels:	annels: 4			
Modulation type:	FSK			
Antenna Type:	Integral Antenna			
Antenna gain:	-0.68dBi(declare by applicant)			
Power supply:	NON-RECHEARGEABLE: 1.8 Volt - 3.3 Volt			
	Or			
	RECHEARGEABLE: 4.5 Volt - 5.5 Volt			

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.

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:

422 75MU-	Axis	X	Υ	Z
433.75MHz	Field Strength(dBuV/m)	67.16	68.48	68.26

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

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.

• ISED —Registration No.: 9079A

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 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:600179-0

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

	Dedicted Enterior						
Rad	iated Emission:						
Item	Test Equipment	Manufacturer	Model No. Inventor		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	June 23, 2021	June 22, 2024	
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	April 14, 2023	April 13, 2024	
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025	
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025	
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A	
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024	
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023	
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024	
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024	
11	Horn Antenna (18- 26.5GHz)	1	UG-598A/U	GTS664	Oct. 30, 2022	Oct. 29, 2023	
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 30, 2022	Oct. 29, 2023	
13	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024	
14	Amplifier		LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024	
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS668	Dec. 20, 2022	Dec.19, 2023	
16	Wideband Amplifier		WDA-01004000-15P35	GTS602	April 14, 2023	April 13, 2024	
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024	
18	RE cable 1	GTS	N/A	GTS675	July 31. 2023	July 30. 2024	
19	RE cable 2	GTS	N/A	GTS676	July 31. 2023	July 30. 2024	
20	RE cable 3	GTS	N/A	GTS677	July 31. 2023	July 30. 2024	
21	RE cable 4	GTS	N/A	GTS678	July 31. 2023	July 30. 2024	
22	RE cable 5	GTS	N/A	GTS679	July 31. 2023	July 30. 2024	
23	RE cable 6	GTS	N/A	GTS680	July 31. 2023	July 30. 2024	
24	RE cable 7	GTS	N/A	GTS681	July 31. 2023	July 30. 2024	
25	RE cable 8	GTS	N/A	GTS682	July 31. 2023	July 30. 2024	





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	April 14, 2023	April 13, 2024	
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024	
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	April 14, 2023	April 13, 2024	
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 14, 2023	April 13, 2024	
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 14, 2023	April 13, 2024	
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 14, 2023	April 13, 2024	
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 14, 2023	April 13, 2024	
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 14, 2023	April 13, 2024	
9	Thermo meter	JINCHUANG	GSP-8A	GTS641	April 19, 2023	April 18, 2024	

Gene	General used equipment:					
Item	Test Equipment	Manufacturer	Model No.	Cal.Date Inventory No.		Cal.Due date
					(IIIII-dd-yy)	(IIIII-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024





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.

Standard requirement: RSS-Gen 6.8

A transmitter can only be sold or operated with antennas with which it was approved.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.

EUT Antenna:

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

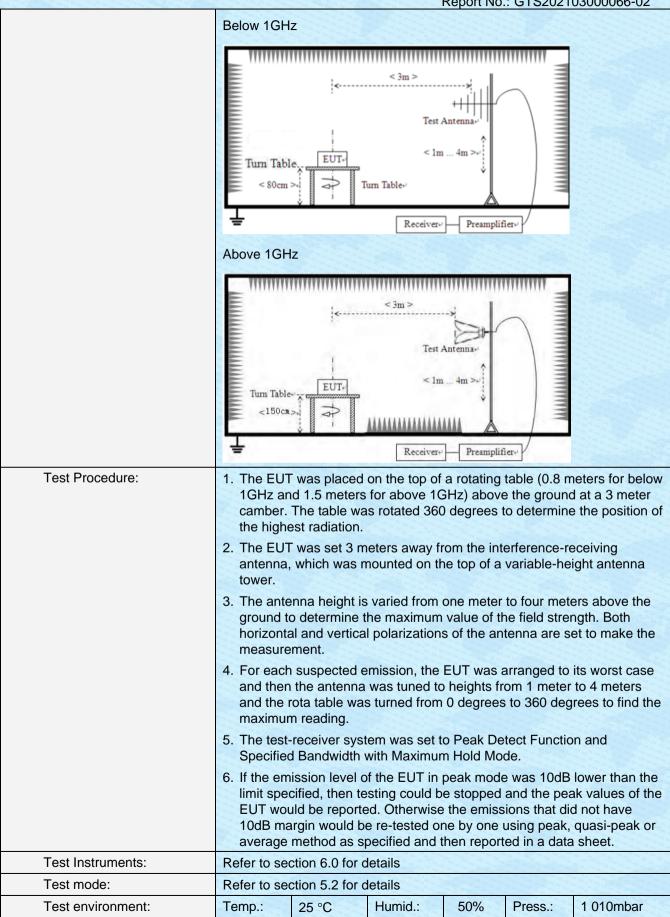




7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209						
	RSS-210 A.1.4 & RSS-Gen 8.9& RSS-Gen 8.10						
Test Method:	ANSI C63.10:2013&	RSS-	-Gen				
Test Frequency Range:	9kHz to 6000MHz						
Test site:	Measurement Distar	nce: 3	m				
Receiver setup:	Frequency	De	etector	RBW	VBV	N	Value
	9KHz-150KHz	Qua	asi-peak	200Hz	600H	Ηz	Quasi-peak
	150KHz-30MHz	Qua	asi-peak	9KHz	30KI	Ηz	Quasi-peak
	30MHz-1GHz	Qua	asi-peak	120KHz	300K	Hz	Quasi-peak
	Above 1GHz	F	Peak	1MHz	3MF	łz	Peak
	Above 1GHz		Peak	1MHz	10H	lz	Average
Limit:	Frequency		Limit	(dBuV/m @	3m)		Remark
(Field strength of the	433.75MHz			72.86 92.86			verage Value Peak Value
fundamental signal)				72.87			verage Value
	434MHz			92.87			Peak Value
	434.2MHz			72.88			verage Value
Limit:	92.88 Peak Value						
(Spurious Emissions)	Frequency L				Value		Measurement Distance
	0.009MHz-0.490MHz		2400/F(KHz)		QP QP		300m
	0.490MHz-1.705M			24000/F(KHz)			30m
	1.705MHz-30MH	-	30		QP		30m
	30MHz-88MHz		100		QP		
	88MHz-216MHz		150		QP		
	216MHz-960MH	Z	200		QP		3m
	960MHz-1GHz		500		QP		
	Above 1GHz	·			Average Peak		
			5000	5000 Pe			
	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						
	BOIOW CONTILE						
	< 3m >						
	Test Antenna						
	Turn Table EUT						
	Tum Table Tum Table Tum Table						
	Ţ	ž	ſ	Receiver.			
							the state of the s









Test voltage:	AC 120V
Test results:	Pass

Measurement data:

7.2.1 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
433.75	86.95	16.03	3.02	37.52	68.48	92.86	-24.38	Vertical
433.75	80.31	16.03	3.02	37.52	61.84	92.86	-31.02	Horizontal
434.2	86.23	16.03	3.02	37.52	67.76	92.88	-25.12	Vertical
434.2	80.28	16.03	3.02	37.52	61.81	92.88	-31.07	Horizontal

Remarks:

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

2. PK Value under PK limit more than 20db, then pass for AV value.





7.2.2 Spurious emissions

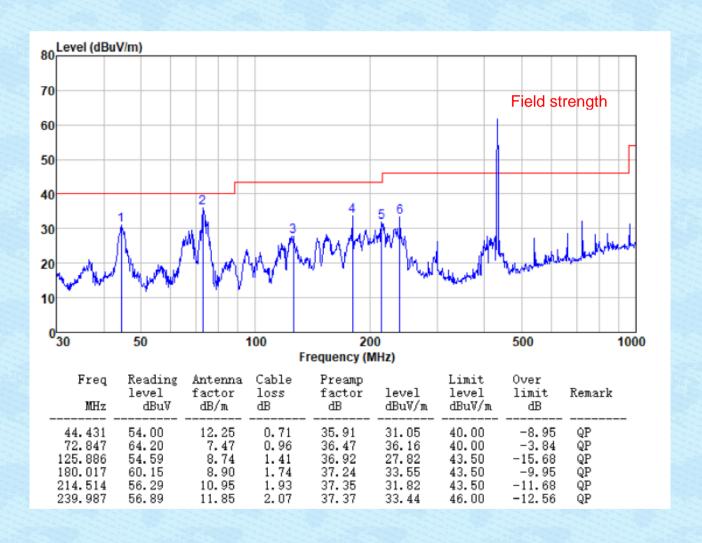
Measurement data:

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.

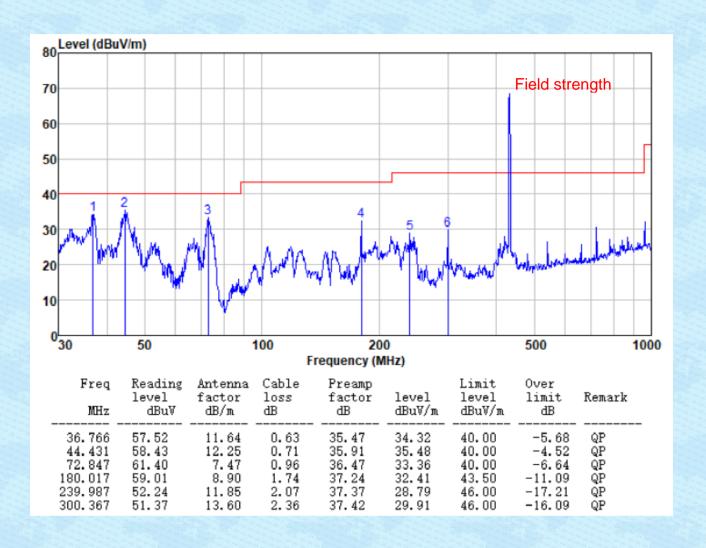
Below 1GHz:

Test channel: 433.75 MHz	Polarization: Horizontal
--------------------------	--------------------------



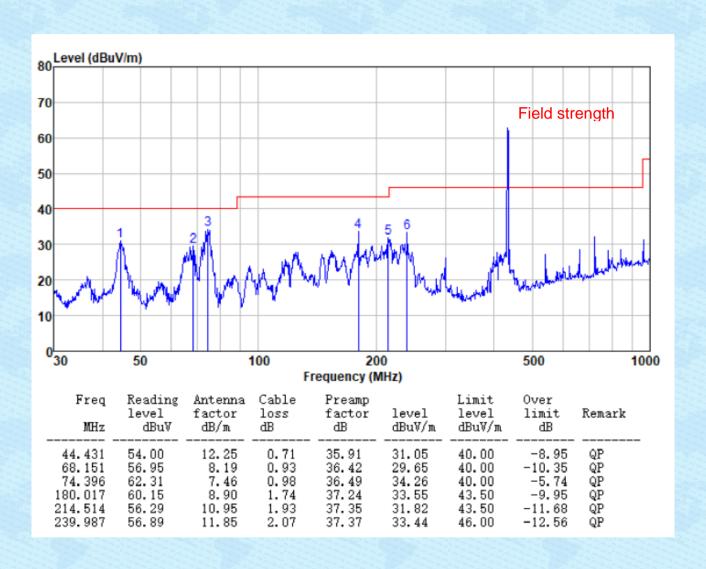


Test channel:	433.75 MHz	Polarization:	Vertical



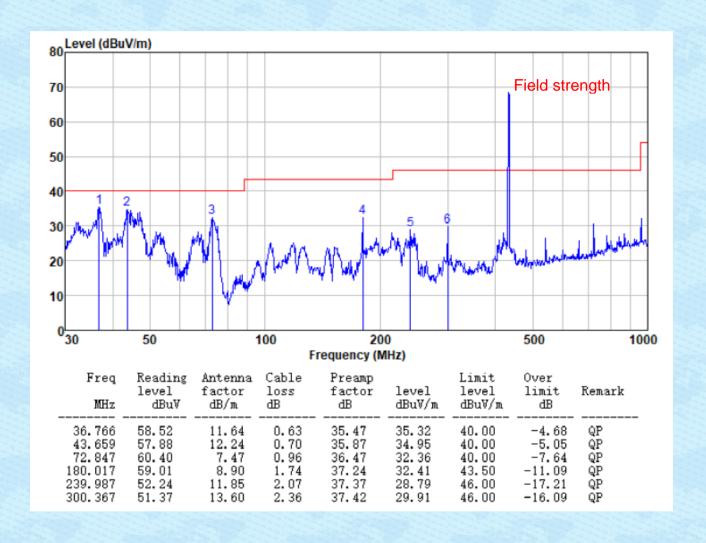


Test channel:	434.2 MHz	Polarization:	Horizontal





Test channel: 434.2 MHz Polar	ization: Vertical
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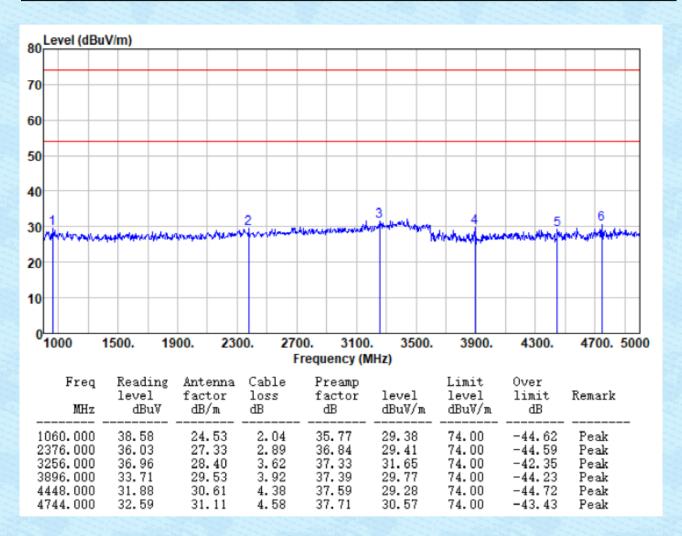






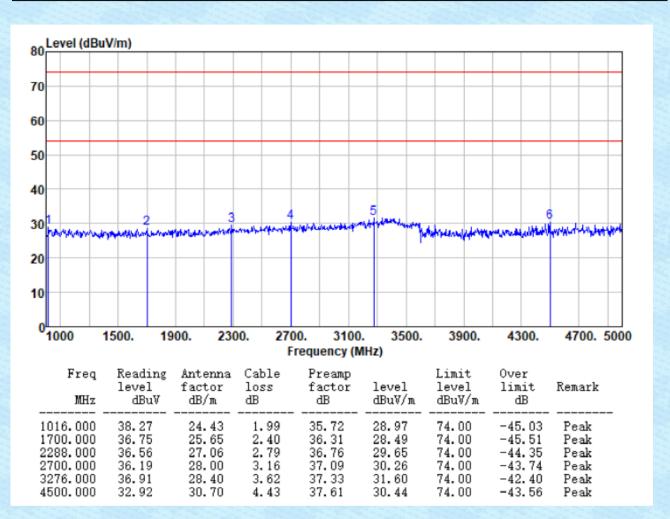
Above 1G:

Test channel:	433.75 MHz	Polarization:	Horizontal



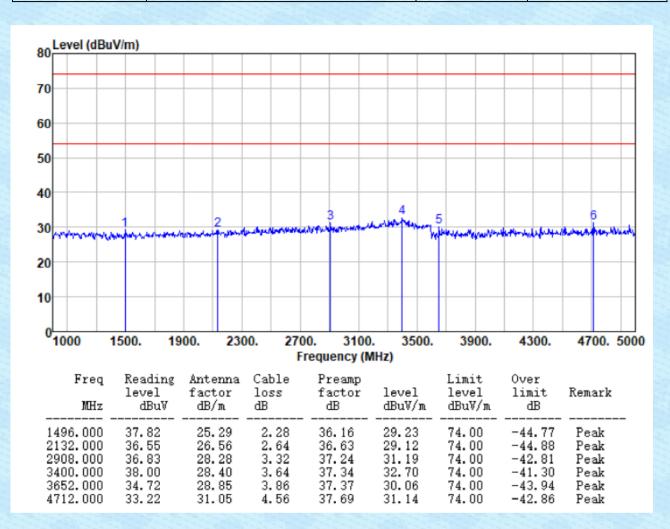


Test channel:	433.75 MHz	Polarization:	Vertical



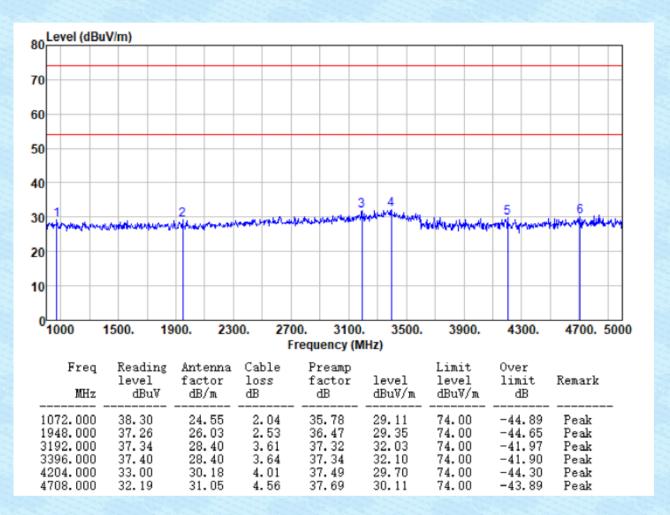


Test channel: 434.2 MHz Polarization: Horizontal









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)		
	RSS-210 A.1.3		
Test Method:	ANSI C63.10:2013& RSS-Gen		
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:			
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

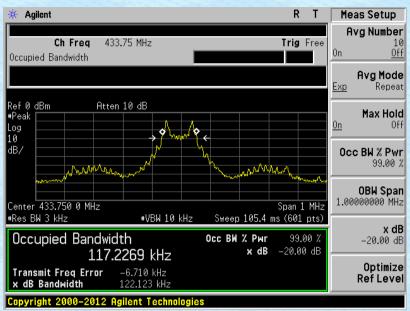
Measurement Data

Test Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth(MHz)	Limit (MHz)	Result
433.75	0.122123	0.1172269	1.0844	Pass
434.20	0.122001	0.1173105	1.0855	Pass

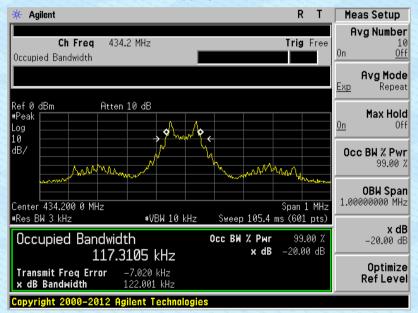
Note: Limit= Fundamental frequency×0.25%



Test plot as follows:



433.75 MHz

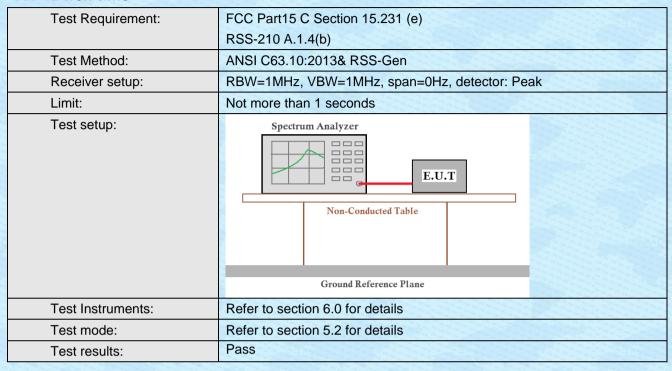


434.2 MHz





7.4 Dwell time



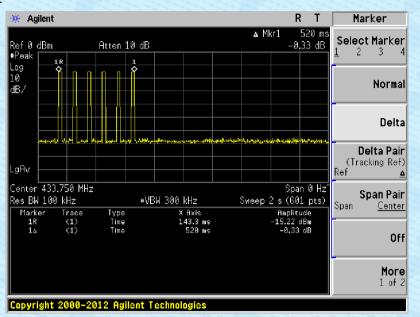
Measurement data:

Test Frequency (MHz)	Duration of each TX (second)	Limit (second)	Result
433.75	0.52	<1.0	Pass
434.20	0.52	<1.0	Pass

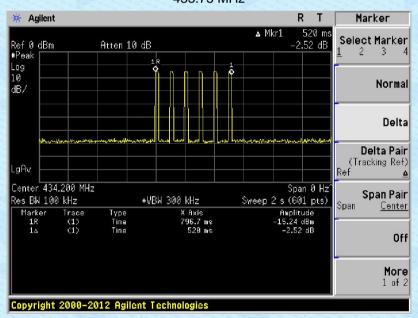




Test plot as follows:



433.75 MHz



434.2 MHz



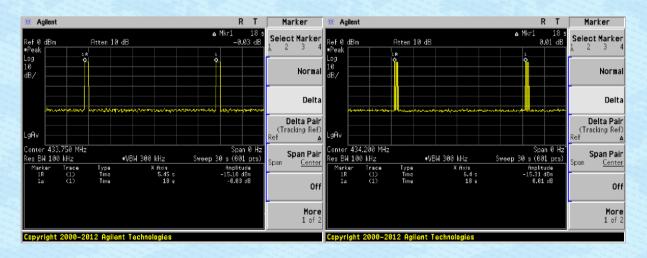


7.5 Silent period

Test Requirement:	FCC Part15 C Section 15.231 (e)		
	RSS-210 A.1.4(b)		
Test Method:	ANSI C63.10:2013& RSS-Gen		
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
433.75	18	>10	Pass
434.20	18	>10	Pass
433.75	18	>15.6	Pass
434.20	18	>15.6	Pass







8 Test Setup Photo

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

9 EUT Constructional Details

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

----- End -----