

RF TEST REPORT

FCC ID: 2AOVX-GM2

Test Report No.....: RF241112008-01-001

Product(s) Name.....: keyless transmitter

Model(s).....: PRX-OHT

Trade Mark.....: N/A

Applicant.....: Green Start Industries LLC

Address.....: 3305 Fairmount Ave Ocean NJ USA

Receipt Date.....: 2024.11.14

Test Date.....: 2024.11.15~2024.11.18

Issued Date.....: 2024.11.18

Standards.....: 47 CFR FCC Part 15, Subpart C(Section 15.231)
ANSI C63.10:2013

Testing Laboratory.....: Shenzhen Haiyun Standard Technical Co., Ltd.

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History of the test report

Original Report Issue Date: 2024.11.18

- No additional attachment
- Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General information

1.1. Basic information of EUT

Test sample No.	POC241112008-S001
Product Name	keyless transmitter
Product Model	PRX-OHT
Trade Mark	N/A
Power supply	DC 3V from battery
Operation Frequency	314.9 MHz
Modulation	ASK
Antenna Designation	PCB antenna
Antenna gain	-11.25dBi
Field Strength	65.66dBuV/m@3m
Applicant	Green Start Industries LLC 3305 Fairmount Ave Ocean NJ USA
Manufacturer	Green Start Industries LLC 3305 Fairmount Ave Ocean NJ USA

Note:

1. For more detailed features description, please refer to the User manual.

2. Measured equipment list

2.1. Test facility

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110, 111, 112, 113, 115, 116, Block B, Jinyuan business Building, No. 302, Xixiang Avenue, Laodong Community, Xixiang Street, Bao'an District, Shenzhen P.R.C.
CNAS Registration Number:	CNAS L18252
CAB identifier:	CN0145
Company Number	30427
A2LA Certificate Number:	6823.01
Telephone:	0755-26024411

2.2. Test instruments list

Radiated Emissions							
No.	Equipment	Manufacturer	Type No.	Serial No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	Test receiver	Rohde&Schwarz	ESU	100184	JLE011	2024/4/24	2025/4/23
2	Log periodic antenna	Schwarzbeck	VULB 9168	1151	JLE012	2024/4/20	2025/4/19
3	Low frequency amplifier	/	LNA 0920N	2014	JLE023	2024/4/24	2025/4/23
4	High frequency amplifier	Schwarzbeck	BBV 9718	284	JLE024	2024/4/24	2025/4/23
5	Horn Antenna	SCHWARZBEC K	BBHA 9120 D	9120D-12 73	JLE028	2024/4/20	2025/4/19
6	Temp&Humid ity Recorder	Meideshi	JR900	/	JLE021	2024/4/24	2025/4/23
7	Horn Antenna	SCHWARZBEC K	BBHA 9170	9170#685	JLE029	2024/7/15	2025/7/14
8	Loop Antenna	SCHWARZBEC K	FMZB15 19B	00029	JLE030	2024/7/15	2025/7/14
9	Broadband preamplifier	Schwarzbeck	BBV9721	9721-019	JLE025	2024/4/24	2025/4/23
10	MXA Signal Analyzer	Keysight	N9010A	MY51440 158	JLE076	2024/4/20	2025/4/19
11	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2				
RF Conducted Emission							
1	MXA Signal Analyzer	Keysight	N9021B	MY60080 169	JLE050	2024/4/20	2025/4/19

2.3. Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 102\text{kHz}$
Power Spectral Density	$\pm 0.377\text{dB}$
Conducted Spurious Emission	$\pm 0.743\text{dB}$
RF power conducted	$\pm 1.328\text{dB}$
Conducted emission(9kHz~30MHz) AC main	$\pm 2.68\text{dB}$
Radiated emission(9kHz~30MHz)	$\pm 2.74\text{dB}$
Radiated emission (30MHz~1GHz)	$\pm 4.22\text{dB}$
Radiated emission (1GHz~18GHz)	$\pm 5.06\text{dB}$
Radiated emission (18GHz~40GHz)	$\pm 4.98\text{dB}$
Time	$\pm 0.19\%$

3. Test system information

3.1. Test result summary

47 CFR FCC Part 15, Subpart C(Section 15.231)			
Test item	Standard(s) Section	Results	Remarks
AC Power Conducted Emission	15.207(a)	N/A	---
Radiated Emissions	15.205; 15.209; 15.231(b)	Pass	Meet the requirement of the limit
Bandwidth	15.231(c)	Pass	Meet the requirement of the limit
Timing Testing	15.231(a)	Pass	Meet the requirement of the limit
Antenna requirement	15.203	Compliance	Note2
Note: 1. "N/A" denotes test is not applicable in this test report. 2. According to the manufacturer declared, the EUT has one PCB antenna arrangement which was permanently attached.			

3.2. Description of test mode

Operating mode	
Test mode 1	314.9MHz Transmitting

3.3. Power setting and test software

Power setting	Default power
Test software	Button control

3.4. Description of support units

No.	Equipment	Model	Manufacturer	Length	Provide By
/	/	/	/	/	/

4. Summary of Test Projects

4.1. Conducted emission test

4.1.1. Limit

FREQUENCY (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	59 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

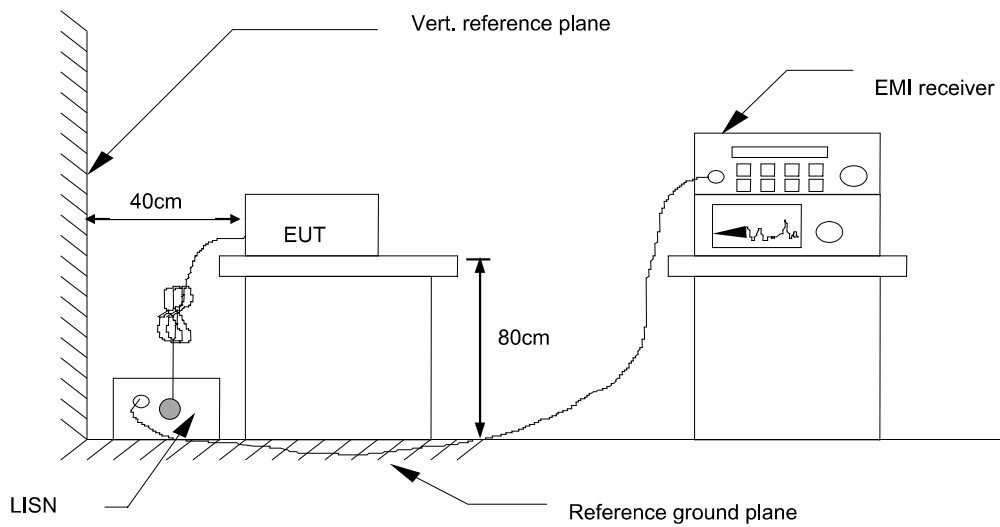
Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2. Test procedures

1. Test limits and test methods reference ANSI C63.10:2013.
2. The EUT was placed 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (AMN). All other support equipment powered from additional AMN. The AMN provide 50 Ohm/ 50 μ H of coupling impedance for the measuring instrument.
3. Interconnecting cables that hang closer than 0.4 m to the ground plane shall be folded back and forth in the center forming a bundle 0.3 m to 0.4 m long.
4. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance.
5. The frequency range from 150 kHz to 30 MHz was searched.
6. Actual test configuration, please refer to the related Item – EUT Test Photos.
7. AAN, CP or CVP at least 0.8 m from nearest part of EUT chassis.
8. The thickness of the insulation shall not be more than 150 mm.

4.1.3. Test set-up



For the actual test configuration, please refer to the related item – Photographs of the test configuration

4.1.4. Test results

The EUT is powered by battery, so this test is not applicable.

4.2. Radiated emission test

4.2.1. Limit

In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

Note: (1) Emission level dB μ V = 20 log Emission level μ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

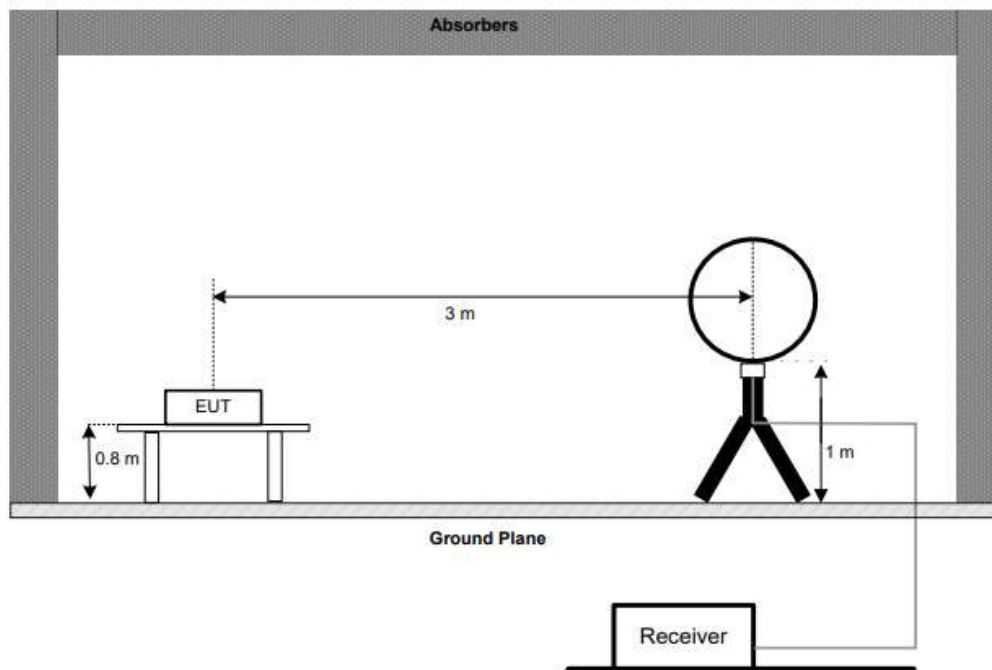
(3) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges

4.2.2. Test procedures

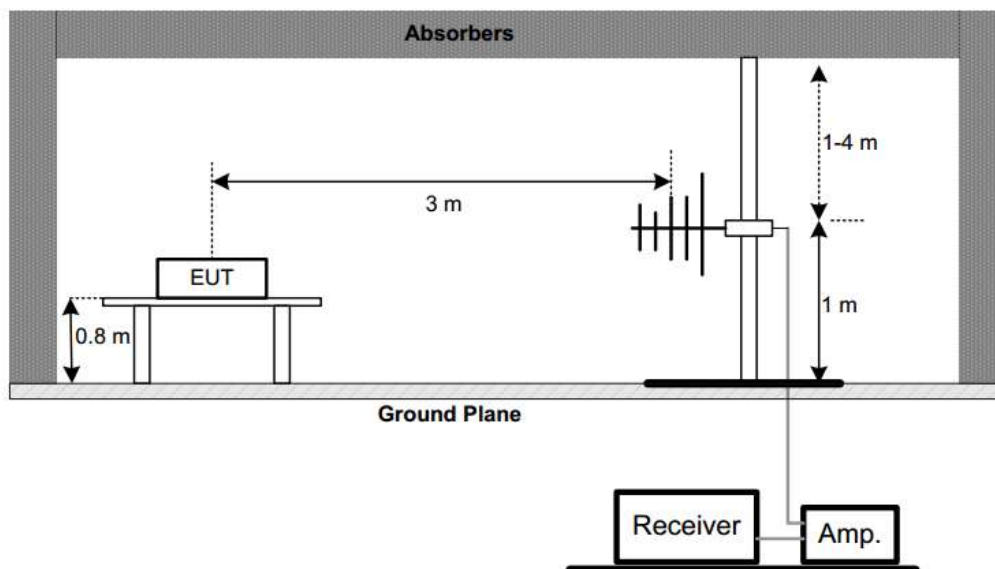
1. Test limits and test methods reference ANSI C63.10:2013.
2. Below 1GHz, the measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
3. Above 1GHz, the measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
5. The initial step in collecting radiated emission data is a receiver peak detector mode.
6. Pre - scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
7. For above 1GHz, If the emission level of the EUT In “Peak Detection” mode is 20 dB lower than the “Average” limit (means that the emission level in “Peak Detection” mode also complies with the limit in “Average Mode”), testing will be stopped and “Peak” values of the EUT will be reported, otherwise, the emissions of the EUT will be measured in “Average Mode” again and then reported.
8. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz).
9. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform.(above 1GHz)

4.2.3. Test set-up

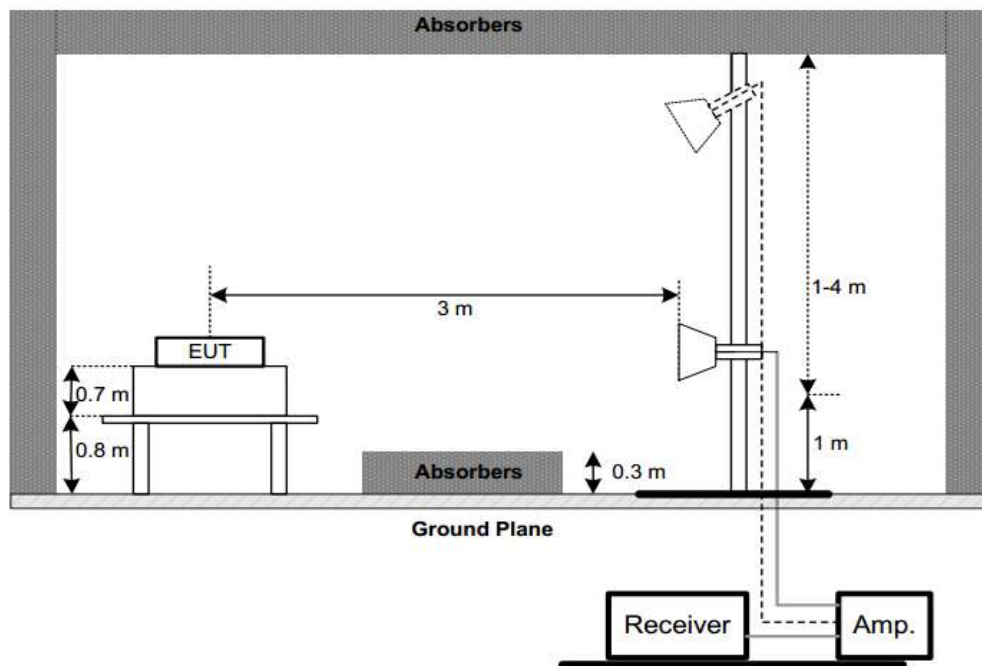
1) Radiated Emission Test Set-Up Frequency 9 kHz-30 MHz



2) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



3) Radiated Emission Test Set-Up Frequency Above 1 GHz



4.2.4. Test results

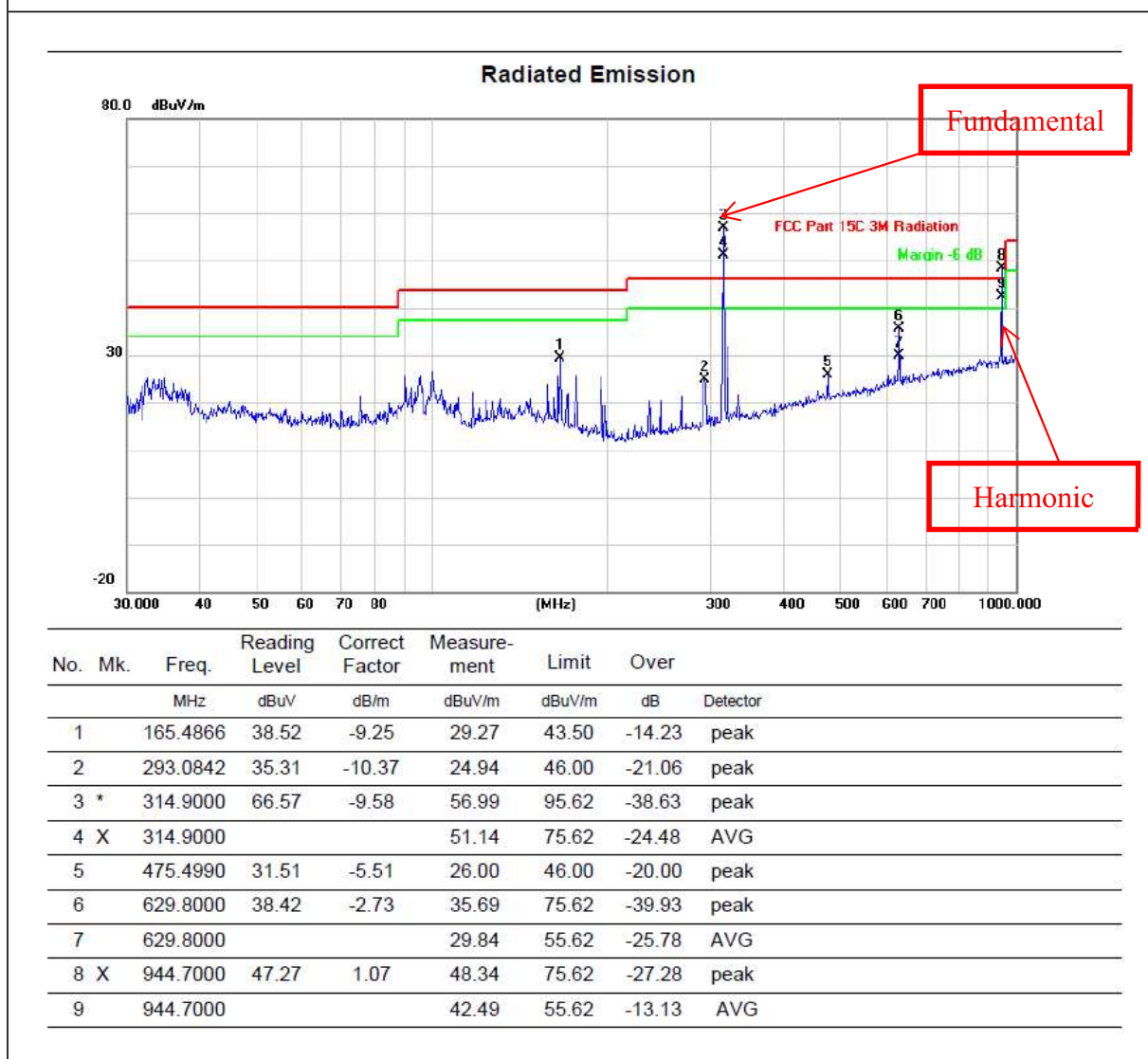
1) Radiated emission: 9kHz-30MHz

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

2) Radiated emission: 30MHz-1G

EUT Model	PRX-OHT	Location	3m chamber
Environmental Conditions	24°C, 50% RH	Test Mode	314.9MHz TX
Antenna Pole	Vertical	RBW	120 kHz
Tested by	Albert Fan	Test Results	PASS
Test Date	2024-11-15		

Note: DC 3V



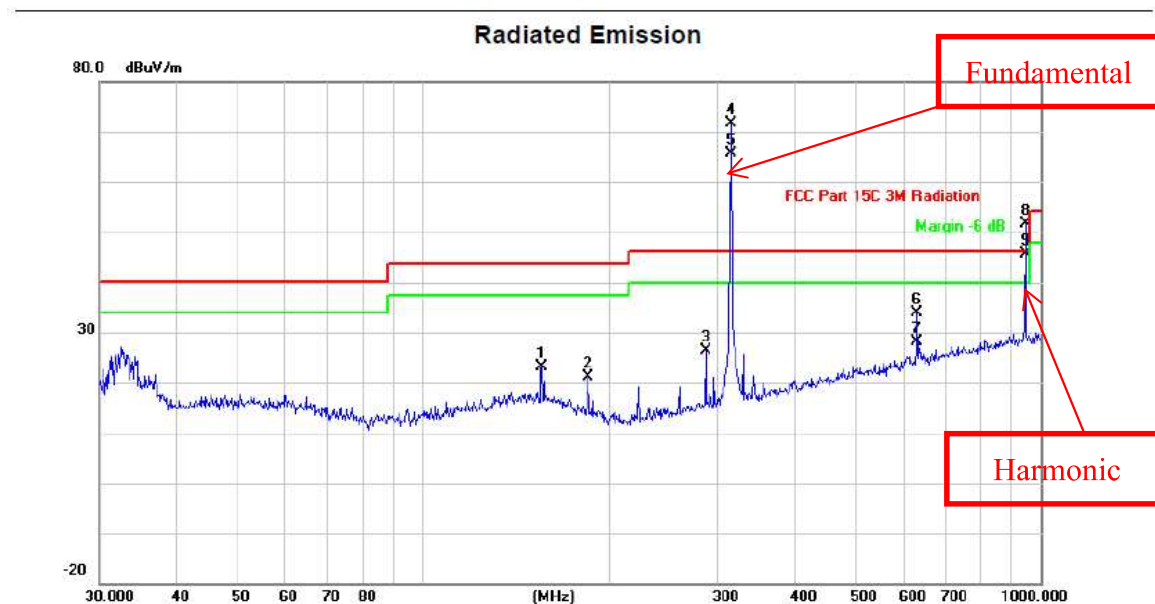
Note: 1.QP= Quasi-peak Reading.

2.The other emission levels were very low against the limit.

3. Measurement = Reading Level+Correct Factor, Over = Measurement- Limit

EUT Model	PRX-OHT	Location	3m chamber
Environmental Conditions	24°C, 50% RH	Test Mode	314.9MHz TX
Antenna Pole	Horizontal	RBW	120 kHz
Tested by	Albert Fan	Test Results	PASS
Test Date	2024-11-15		

Note: DC 3V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		155.9100	31.84	-8.69	23.15	43.50	-20.35	peak
2		185.1377	32.84	-11.72	21.12	43.50	-22.38	peak
3		286.9823	37.10	-10.63	26.47	46.00	-19.53	peak
4 *		314.9000	81.09	-9.58	71.51	95.62	-24.11	peak
5 X		314.9000			65.66	75.62	-9.96	AVG
6		629.8000	36.68	-2.73	33.95	75.62	-41.67	peak
7		629.8000			28.10	55.62	-27.52	AVG
8 X		944.7000	50.49	1.07	51.56	75.62	-24.06	peak
9		944.7000			45.71	55.62	-9.91	AVG

Note: 1.QP= Quasi-peak Reading.

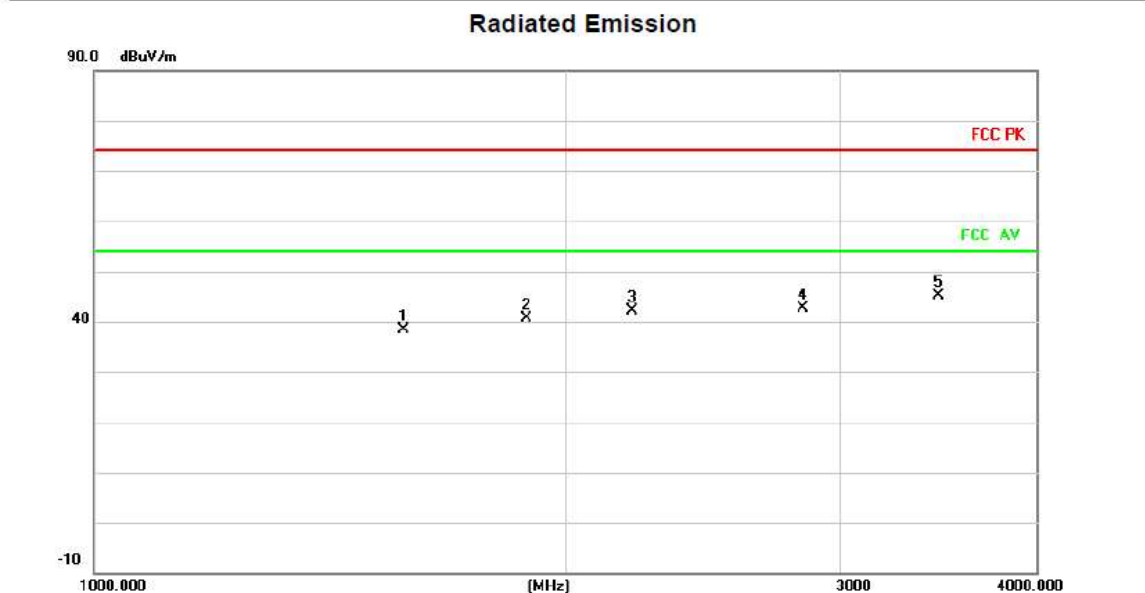
2.The other emission levels were very low against the limit.

3. Measurement = Reading Level+ Correct Factor, Over = Measurement- Limit

3) Radiated emission: Above 1G

EUT Model	PRX-OHT	Location	3m chamber
Environmental Conditions	24°C, 50% RH	Test Mode	314.9MHz TX
Antenna Pole	Vertical	RBW	120 kHz
Tested by	Albert Fan	Test Results	PASS
Test Date	2024-11-15		

Note: DC 3V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		1574.500	53.91	-15.60	38.31	74.00	-35.69	peak
2		1889.400	54.87	-14.34	40.53	74.00	-33.47	peak
3		2204.300	55.25	-13.23	42.02	74.00	-31.98	peak
4		2834.100	52.69	-9.94	42.75	74.00	-31.25	peak
5	*	3463.900	53.44	-8.20	45.24	74.00	-28.76	peak

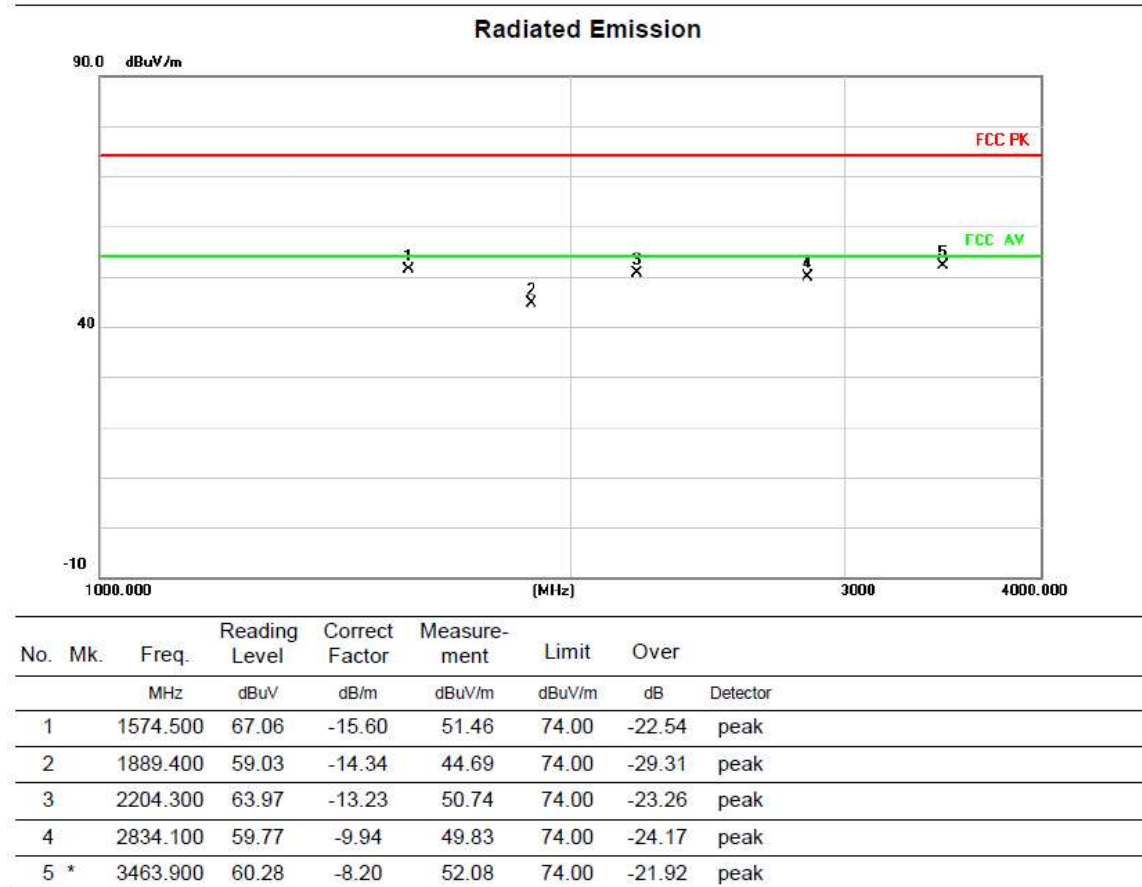
Note: 1.QP= Quasi-peak Reading.

2.The other emission levels were very low against the limit.

3. Measurement = Reading Level+Correct Factor, Over = Measurement- Limit

EUT Model	PRX-OHT	Location	3m chamber
Environmental Conditions	24°C, 50% RH	Test Mode	314.9MHz TX
Antenna Pole	Horizontal	RBW	1MHz
Tested by	Albert Fan	Test Results	PASS
Test Date	2024-11-15		

Note: DC 3V



Note: 1.QP= Quasi-peak Reading.

2.The other emission levels were very low against the limit.

3. Measurement = Reading Level+ Correct Factor, Over = Measurement- Limit

4.3. 20dB Bandwidth & 99% Bandwidth

4.3.1. Limit

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table

Fundamental Frequency	Limits (MHz)
314.9 MHz	0.78725

4.3.2. Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ 314.9MHz	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

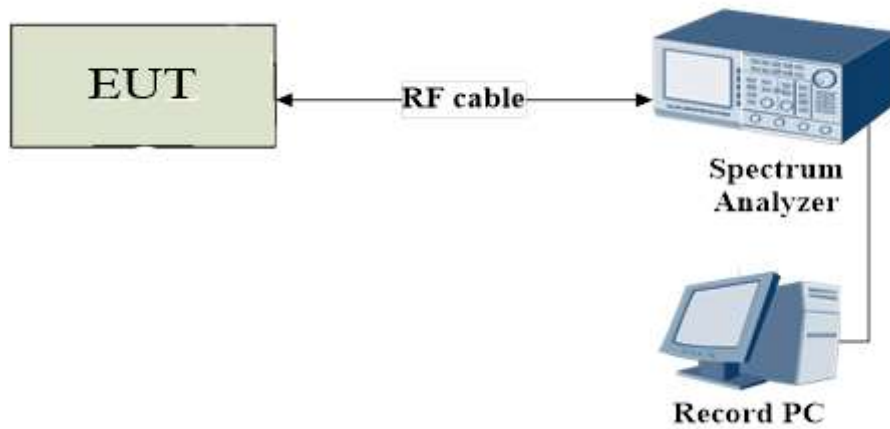
Centre Frequency	The centre frequency of the channel under test
RBW	1%-5% OCB
VBW	3*RBW
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) The EUT was programmed to be in continuously transmitting mode, Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.

c) Use the -20dB bandwidth function of the spectrum analyser to measure the 20dB Bandwidth of the EUT. This value shall be recorded.

d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

4.3.3. Test set-up



4.3.4. Test Result

Frequency(MHz)	20dB Bandwidth(MHz)	99% Occupied BW(MHz)	20dB bandwidth Limits (MHz)
314.9	0.01411	0.05405	0.78725

Test plot



4.4. TIMING TESTING

4.4.1. Limit

A manually operated transmitter shall be equipped with a push-to-operate switch and be under manual control at all times during transmission. When released, the transmitter shall cease transmission within no more than 5 seconds of being released.

4.4.2. Test procedures

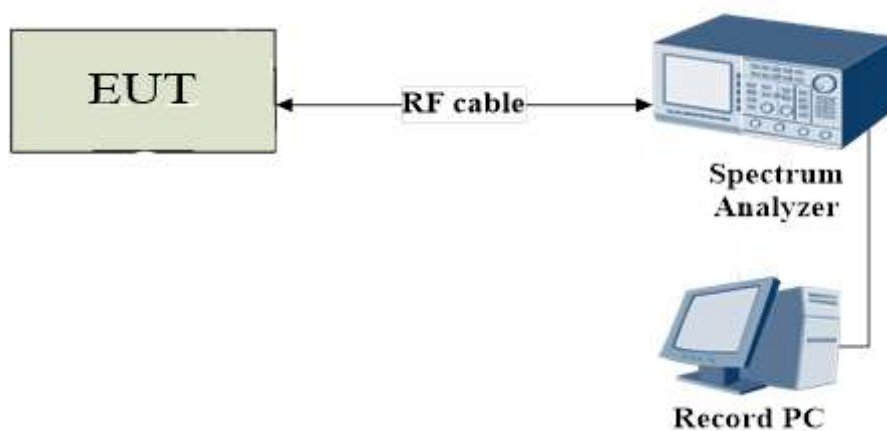
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ 314.9MHz	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

Centre Frequency	The centre frequency of the channel under test
RBW	1MHz
VBW	3MHz
Frequency span	Zero Span
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	10 seconds

b) The EUT was programmed to be in normal mode.

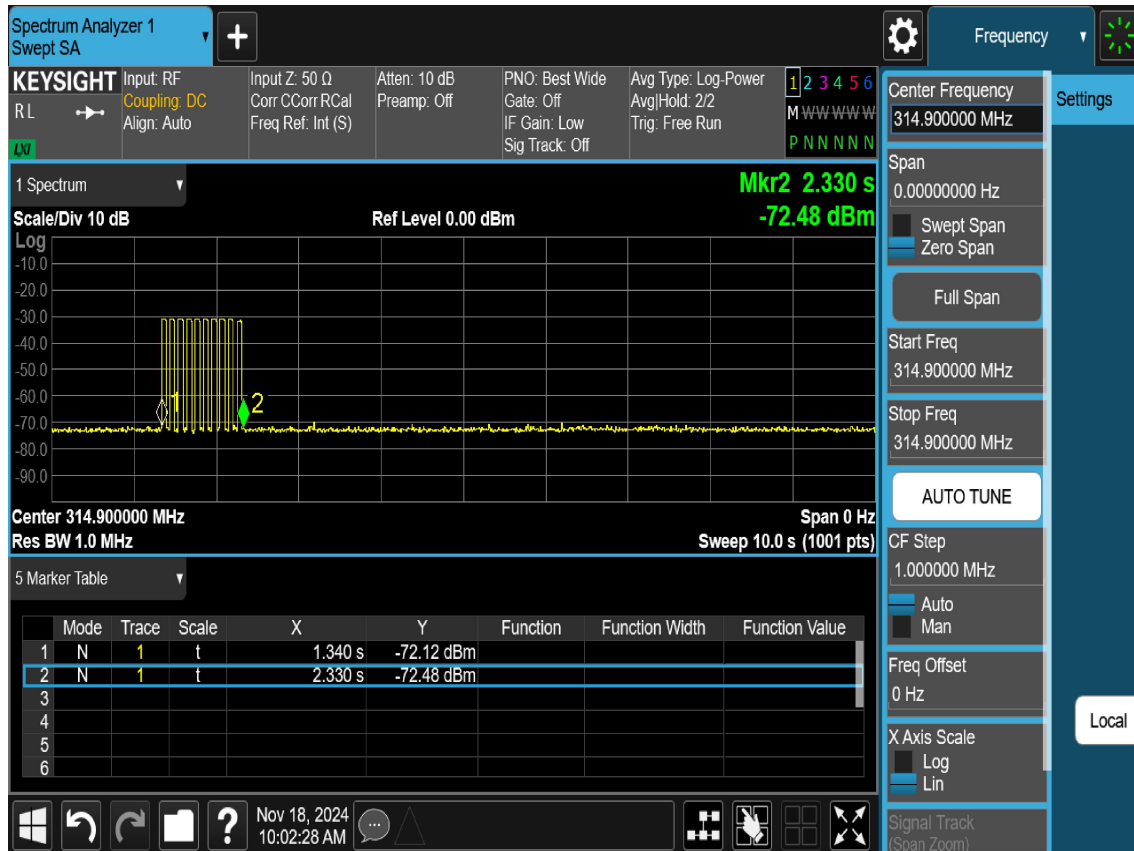
4.4.3. Test set-up



4.4.4. Test results

Frequency(MHz)	On Time(Sec)	Limits (Sec)
314.9	0.99	<5

Test plot



Note: Long press the button, the product can automatically stop transmitting.

4.5. Duty Cycle of Test Signal

4.5.1. Test procedures

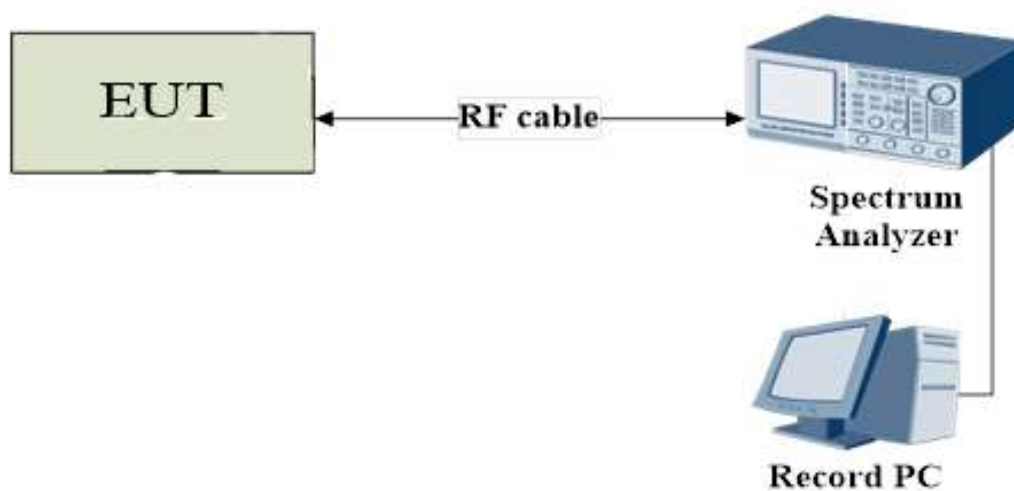
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ 314.9MHz	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

c) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

Centre Frequency	The centre frequency of the channel under test
RBW	1MHz
VBW	3MHz
Frequency span	Zero Span
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	0.1 seconds

d) The EUT was programmed to be in normal mode.

4.5.2. Test set-up



4.5.3. Test results

All the duty factor of other test mode have been considered.

Dwell time of periodic operation measurement

Duty Cycle = $(N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n) / 100$ or T

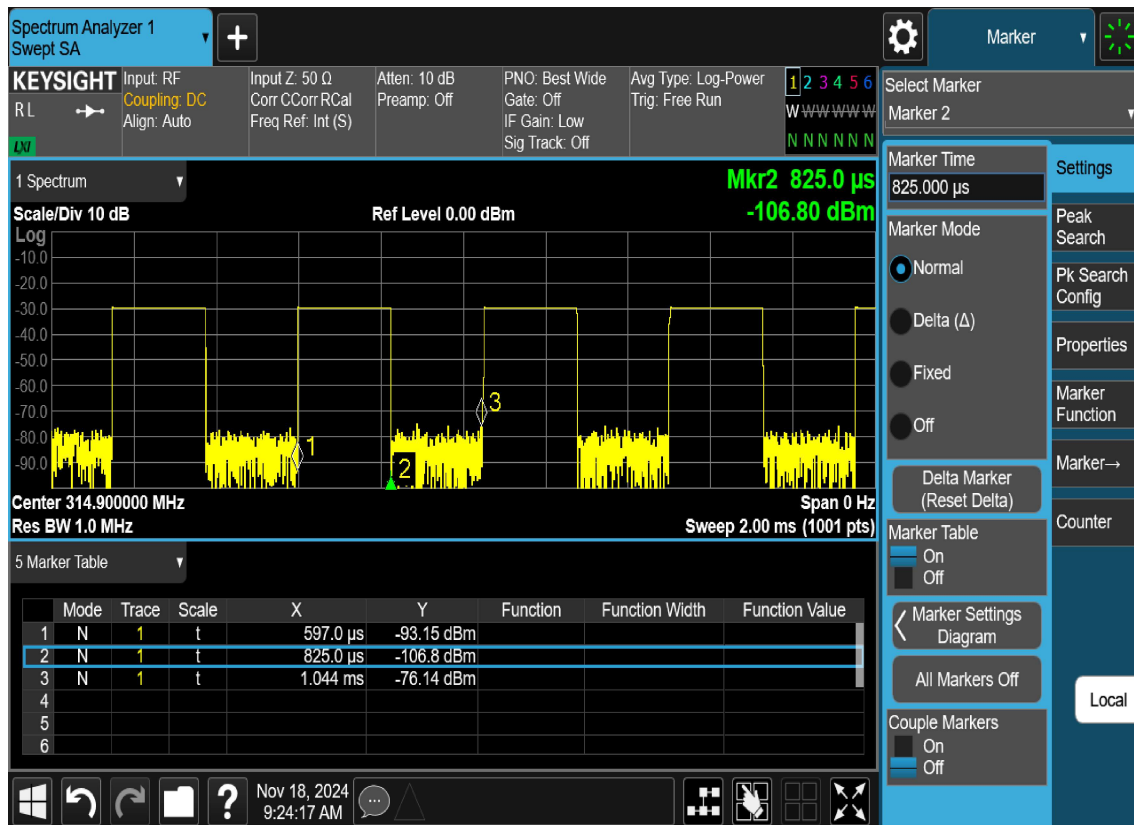
On time=0.228ms, T=0.447ms

Duty Cycle = $0.228 / 0.447 = 0.51$

Average Reading = Peak Reading (dBuV/m) + $20 \log$ (Duty cycle)

Average Reading = Peak+ $20 \cdot \log$ (Duty Cycle) = Peak-5.85

Test plot



Statement

1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
2. The report is invalid without the signature of the approver.
3. The report is invalid if altered arbitrarily.
4. The report shall not be partially copied without the written approval of the unit.
5. The reported test results are only valid for the tested samples.
6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

Shenzhen Haiyun Standard Technology Co., Ltd.

Address: Room 110, 111, 112, 113, 115, 116, Block B, Jinyuan Business Building, No. 302, Xixiang Avenue, Labor Community, Xixiang Street, Baoan District, Shenzhen, China

Tel: 0755-26024411

Email: service@hy-lab.cn

(END OF REPORT)