TEST REPORT

Product Name	:	14 4-in-1 par lights with remote control
Model Number	:	Please refer to model list on page 5
FCC ID	:	2A6EW-ZQ01424

Prepared for	:	Shenzhen Zhuoqiong Technology Co., Ltd.
Address	:	B503, Block B, Donghaiwang Industrial Zone, No.369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen Guangdong, China
Prepared by	:	EMTEK (DONGGUAN) CO., LTD.
Address	:	-1&2/F.,Building 2, Zone A, Zhongda Marine Biotechnology Reserch and Development Base, No.9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China TEL: +86-0769-22807078 FAX: +86-0769-22807079

Report Number	:	EDG2410110123E00101R
Date(s) of Tests	:	Oct 11, 2024 to Nov 18, 2024
Date of issue	:	Nov 18, 2024

1 TEST RESULT CERTIFICATION

Applicant	:	Shenzhen Zhuoqiong Technology Co., Ltd.
Address：	:	B503, Block B, Donghaiwang Industrial Zone, No.369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen Guangdong, China
Manufacturer	:	Shenzhen Zhuoqiong Technology Co., Ltd.
Address：	:	B503, Block B, Donghaiwang Industrial Zone, No.369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen Guangdong, China
Factory	:	Shenzhen Zhuoqiong Technology Co., Ltd.
Address：	:	B503, Block B, Donghaiwang Industrial Zone, No.369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen Guangdong, China
EUT	:	14 4-in-1 par lights with remote control
Model Name	:	Please refer to model list on page 5
Trademark	:	N/A

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C	**PASS**

The above equipment was tested by EMTEK (DONGGUAN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.231 REQUIREMENTS.

Date of Test : Oct 11, 2024 to Nov 18, 2024

Prepared by : Jessica Zhang /Editor

Reviewer : Warren Deng /Supervisor

Approved & Authorized Signer : Sam Lv / Manager

Modified Information

Version	Report No.	Revision Date	Summary
	EDG2410110123E00101R	/	Original Report

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2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product Name:	14 4-in-1 par lights with remote control
Model Number:	Please refer to model list on page 5. All products are identical except the model number and model appearance.Here we selected ZQ01424 for all the test.
Device Type:	Remote Control
Modulation:	FSK
Operating Frequency Range(s):	433.92MHz
Number of Channels:	1 channel
Antenna Type :	PCB antenna
Antenna Gain:	-1.22 dBi
Power supply:	DC 3V from battery

Note: for more details, please refer to the User's manual of the EUT.

Model list
ZQ01424, ZQ07030, ZQ10016, ZQ10140, ZQ10137, ZQ10139, ZQ10141, ZQ10134, ZQ03021, ZQ05199, ZQ05198, ZQ05200, ZQ05168, ZQ06017, ZQ01422, ZQ01423, ZQ01425, ZQ01427, ZQ01445, ZQ01639, ZQ01640, ZQ02354, ZQ02061, ZQ02100, ZQ02101, ZQ02024, ZQ02025, ZQ02038, ZQ10133, ZQ10144, ZQ10145, ZQ10146, ZQ10147, ZQ10148, ZQ10149, ZQ10150, ZQ10151, ZQ07032, ZQ07033, ZQ07034, ZQ07035, ZQ07036, ZQ06190, ZQ06191, ZQ06192, ZQ06193, ZQ06194, ZQ06195, ZQ05295, ZQ05296, ZQ05297, ZQ05298, ZQ05299, ZQ03307, ZQ03308, ZQ03309, ZQ03310, ZQ03311, ZQ01138, ZQ01139, ZQ01140, ZQ01141, ZQ01143, ZQ01144, ZQ01145, ZQ01146, ZQ05204, ZQ05189, ZQ05190, ZQ05191, ZQ05192, ZQ05193, ZQ05194, ZQ05195, ZQ02104, ZQ02105, ZQ02106, ZQ02107, ZQ02108, ZQ02570, ZQ02571, ZQ02572, ZQ02573, ZQ02574

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

3 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
15.231(c)	Occupied Bandwidth	PASS	
15.231(b)	Radiated Spurious Emissions	PASS	
15.231(b)	Transmission Requirement	PASS	
15.203	Antenna Requirement	PASS	
15.207(a)	Conducted Emission	N/A	See NOTE
NOTE1: N/A (Not Applicable) ,EUT powered by battery.			

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2A6EW-ZQ01424 filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart C

4.2 MEASUREMENT EQUIPMENT USED

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI	101415	2024/4/28	1Year
Bi-log Hybrid Antenna	Schwarzbeck	VULB9163	141	2024/5/5	1Year
Pre-Amplifie	HP	8447F	OPTH64	2024/4/28	1 Year
Signal Analyzer	R&S	FSV30	103039	2024/4/28	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	1272	2024/5/5	1Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-567	2024/5/5	1Year
Pre-Amplifie	LUNAR EM	PM1-18-40	J10100000081	2024/4/28	1Year
Loop antenna	Schwarzbeck	FMZB1519	1519-012	2024/5/5	1Year

For other test items:

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Wireless Connectivity Tester	R&S	CMW270	102543	2024/4/29	1Year
Automatic Control Unit	Tonscend	JS0806-2	21I8060480	2024/4/29	1Year
Signal Analyzer	KEYSIGHT	N9010B	MY60242456	2024/4/29	1Year
Analog Signal Generator	KEYSIGHT	N5173B	MY61252625	2024/4/29	1Year
UP/DOWN-Converter	R&S	CMW-Z800A	100274	2024/4/29	1Year
Vector Signal Generator	KEYSIGHT	N5182B	MY61252674	2024/4/29	1Year
Frequency Extender	KEYSIGHT	N5182BX07	MY59362541	2024/4/29	1Year
Temperature&Humidity test chamber	ESPEC	EL-02KA	12107166	2024/4/29	1 Year

Remark: *Each piece of equipment is scheduled for calibration once a year.*

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting mode is programmed.

Frequency and Channel list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	433.9			…	…

Test Frequency and Channel list:

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	433.9				

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at
-1&2/F.,Building 2, Zone A, Zhongda Marine Biotechnology Reserch and Development Base, No.9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description		
EMC Lab.	:	Accredited by CNAS, 2024.07.06 The certificate is valid until 2030.07.05 The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 The Certificate Registration Number is L3150 Accredited by FCC Designation Number: CN1300 Test Firm Registration Number: 945551 Accredited by A2LA, April 05, 2021 The Certificate Registration Number is 4321.02 Accredited by Industry Canada The Certificate Registration Number is CN0113
Name of Firm	:	EMTEK (DONGGUAN) CO., LTD.
Site Location	:	-1&2/F.,Building 2, Zone A, Zhongda Marine Biotechnology Reserch and Development Base, No.9, Xincheng Avenue, Songshanhu High-technology Industrial Development Zone, Dongguan, Guangdong, China

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

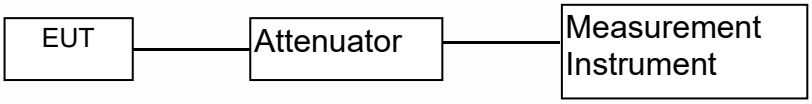
Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

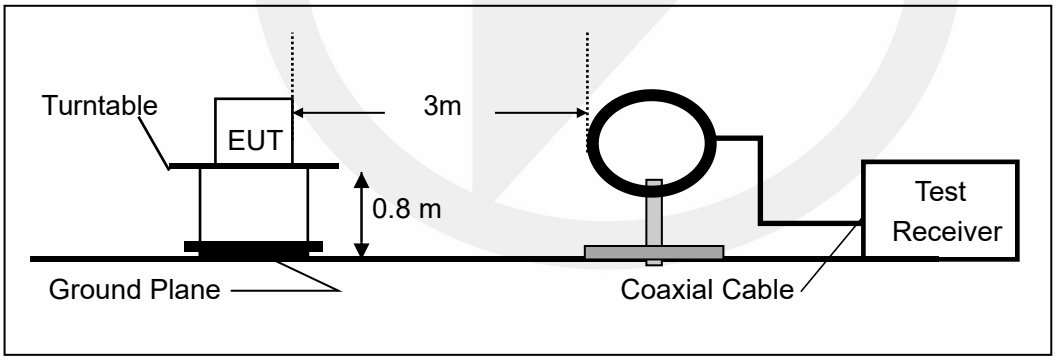
Below 30MHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

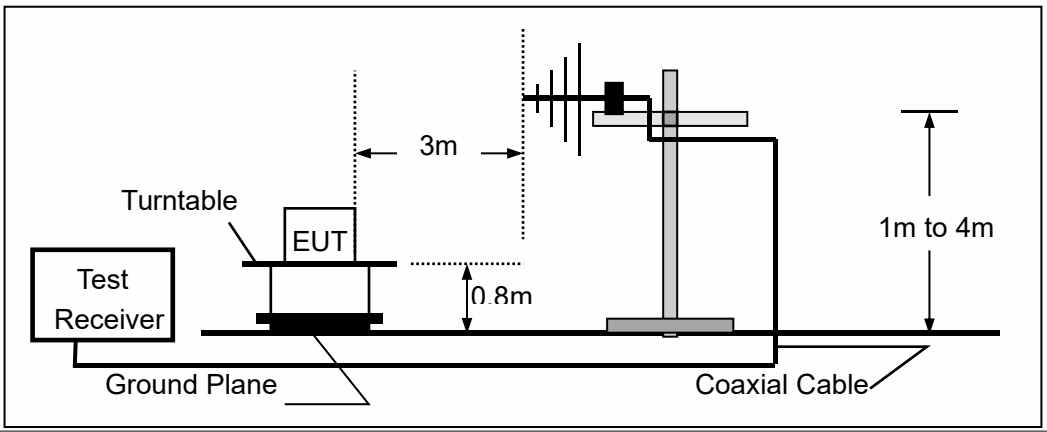
Above 30MHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

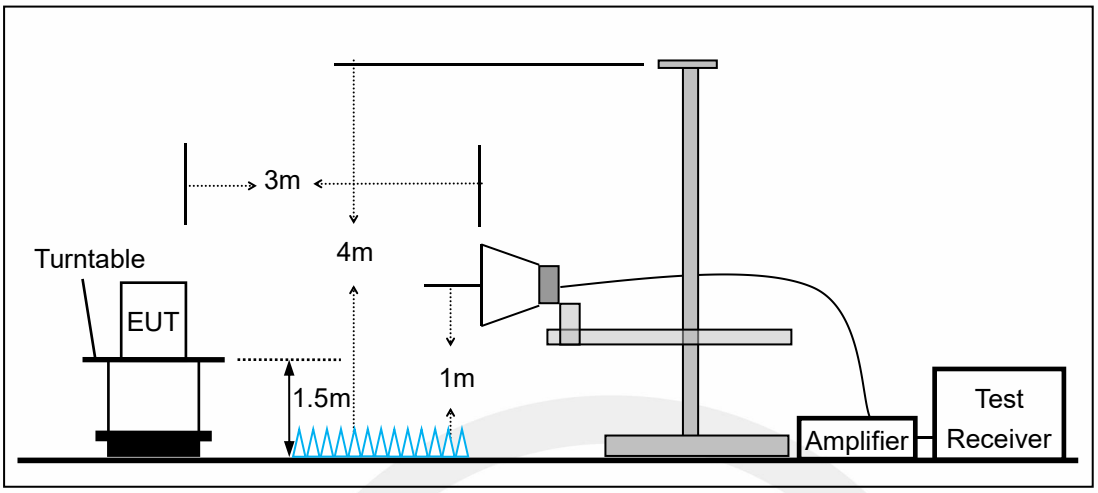
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

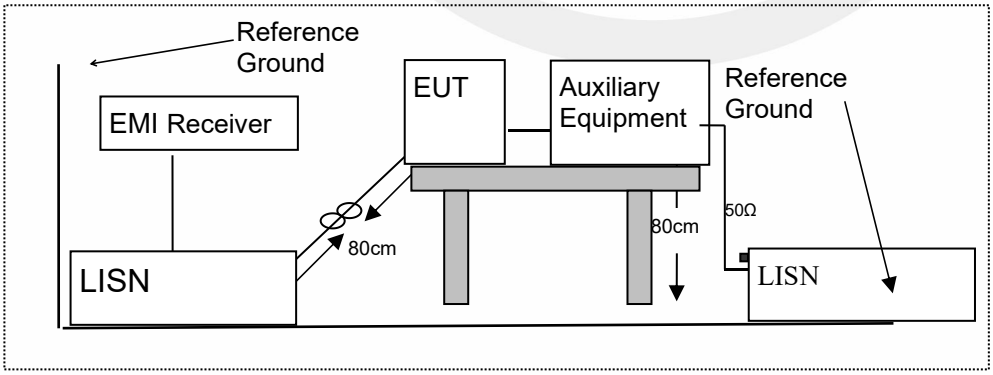


(C) Radiated Emission Test Set-Up, Frequency above 1000MHz

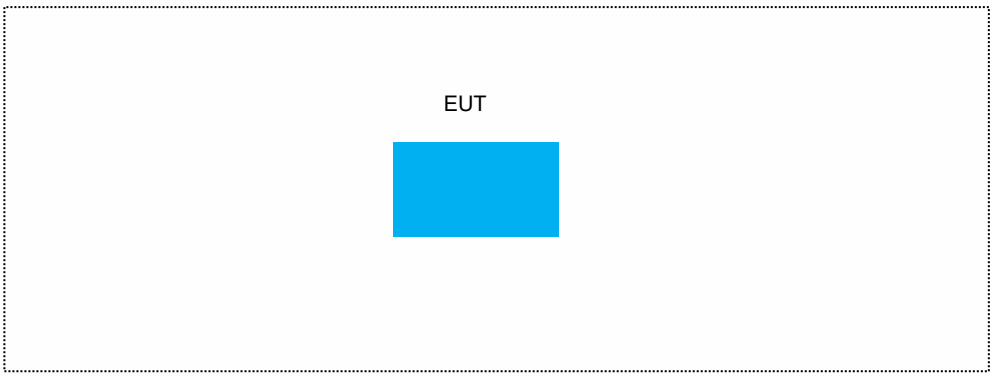


7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.
According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



7.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	N/A	N/A	N/A	N/A	

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

8 TEST REQUIREMENTS

8.1 OCCUPIED BANDWIDTH

8.1.1 Applicable Standard
According to FCC Part 2.1049 and part 15.231(c)

8.1.2 Conformance 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 900 MHz. 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.

8.1.3 Test Configuration
Test according to clause 6.1 radio frequency test setup 1

8.1.4 Test Procedure
The EUT was operating in transmit mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 1% occupied bandwidth (3KHz).
Set the video bandwidth (VBW) =10KHz.
Set Span= approximately 2 to 3 times the occupied bandwidth
Set Detector = Peak.
Set Trace mode = max hold.
Set Sweep = auto couple.
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 99% down one side of the emission. Reset the markerdelta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 99% bandwidth of the emission.
If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.
Measure and record the results in the test report.

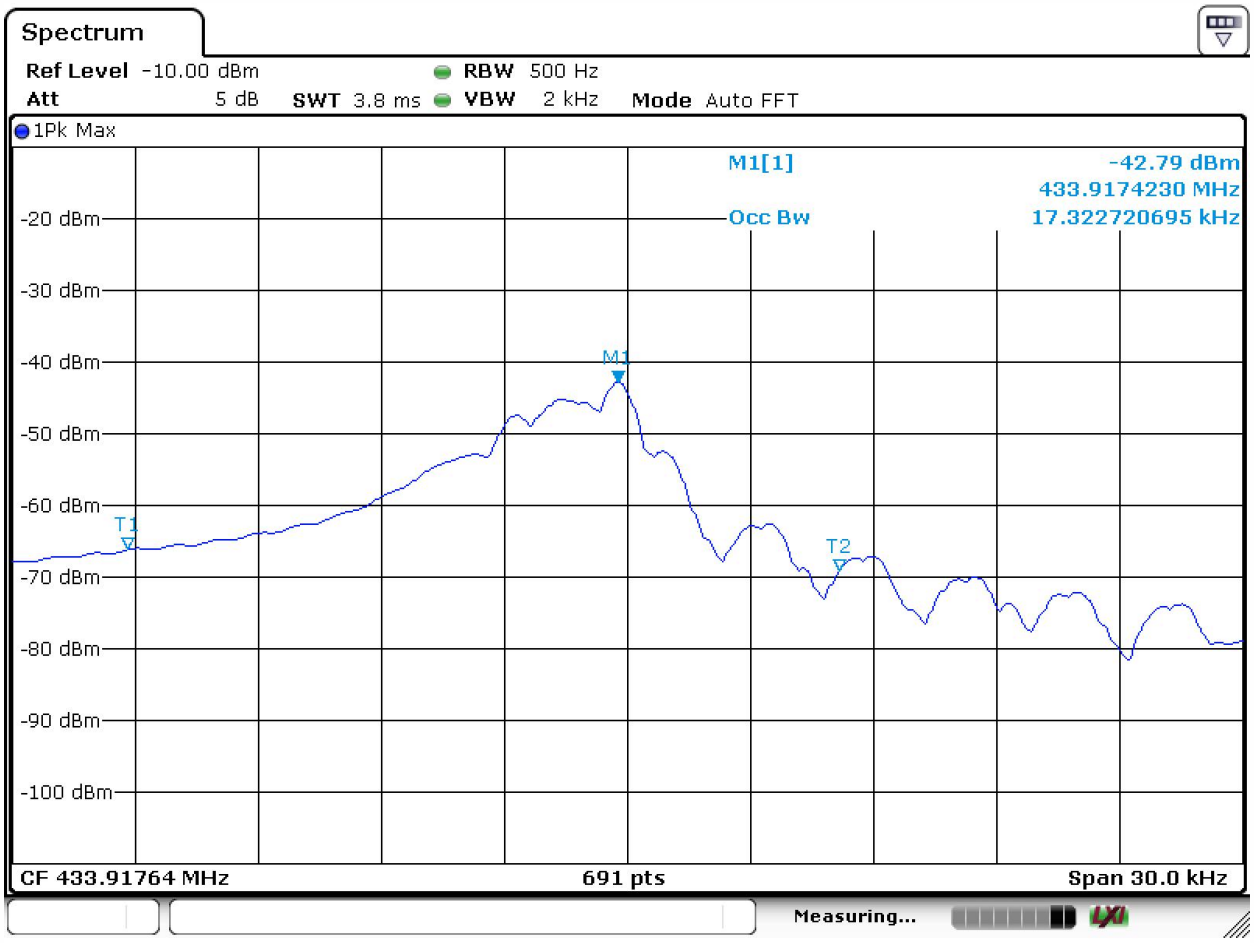
Test Results

Temperature :	22.4℃	Test Date :	Nov 04, 2024
Humidity :	53.1 %	Test By:	Clavin

Modulation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
FSK	0	433.92	17.32	≤1084.9KHz	PASS
Note: N/A (Not Applicable) BW=0.25% of the center frequency					

Occupied Bandwidth

Channel : 433.9MHz



8.2 RADIATED SPURIOUS EMISSION

8.2.1 Applicable Standard

According to FCC Part 15.231(b) and 15.209

8.2.2 Conformance Limit

Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following:

FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

FCC 15.209 Limited

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3
Above 1GHz	74 dBuV/m (PEAK) 54 dBuV/m (AVERAGE)	

15.231 Limited

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	1,250 to 3,750 **	125 to 375 **
174 - 260	3,750	375
260 - 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

The field intensity in micro-volts per meter can then be determined by the following equation: FI(V/ m) = 10FI (dBV/ m) / 20 The FCC specified emission limits were calculated according the EUT operating frequency and obtained by following linear interpolation equations:

(a) For fundamental frequency:

fEUT : EUT Operating Frequency Emission Limit (V/m)

$$= [fEUT(MHz) - 260(MHz)] \times \frac{12500(V/m) - 3750(V/m)}{470(MHz) - 260(MHz)} + 3750(V/m)$$

(b) For spurious frequencies:

fEUT : EUT Operating Frequency Emission Limit (V/m)

$$= [fEUT(MHz) - 260(MHz)] \times \frac{1250(V/m) - 375(V/m)}{470(MHz) - 260(MHz)} + 375(V/m)$$

Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 1 5.209(a) limit in the table below has to be followed.

Note:

(1) The tighter limit applies at the band edges.

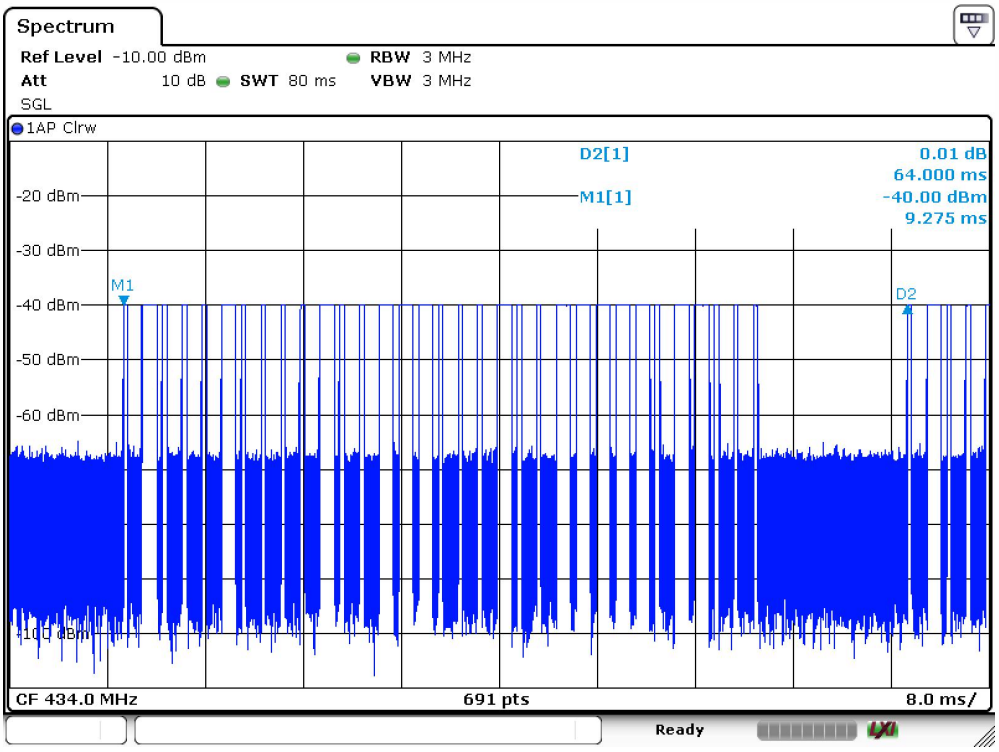
(2) Emission level (dBuV/m)=20log Emission level (uV/m).

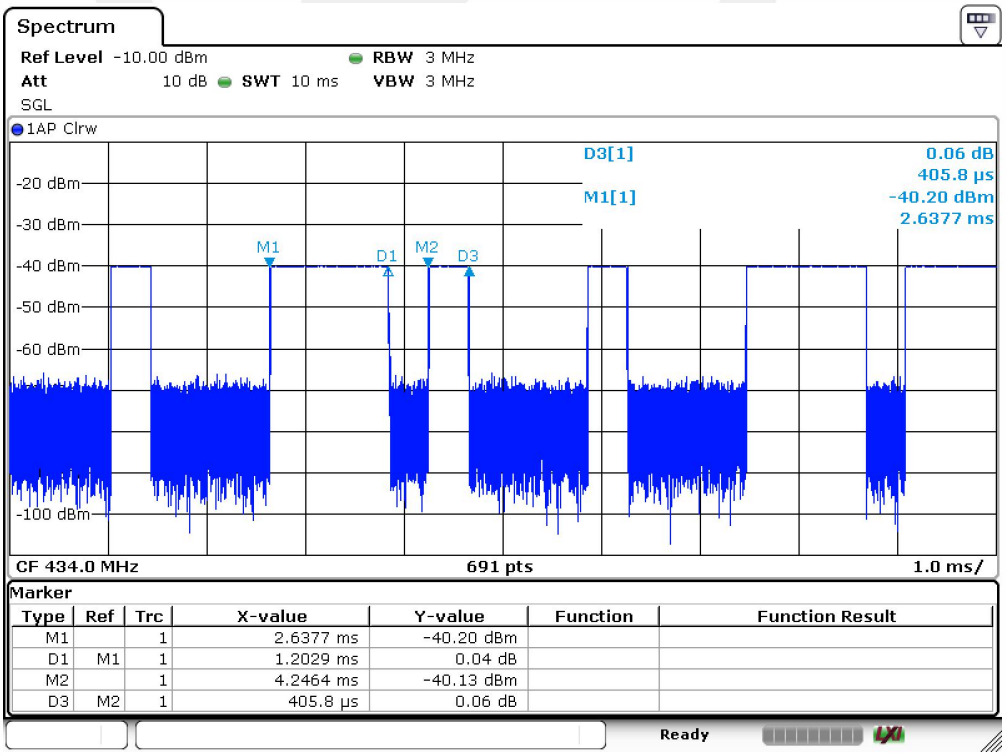
FCC Part15 (15.231) , Subpart C		
Fundamental Frequency	Field Strength Of Fundamental	Field Strength of Spurious Emissions
433.9MHz	AV:80.83 dBuV/m at 3m distance	AV:60.83 dBuV/m at 3m distance
	PK:100.83dBuV/m at 3m distance	PK:80.83 dBuV/m at 3m distance

8.2.3 Calculation of Average factor

The average correction factor is computed by analyzing the on time in 100ms over one complete pulse train. Analysis of the remote transmitter on time in one complete pulse train, therefore the average value of fundamental frequency is: Average= Peak Value+20log(Duty Cycle), where the duty factor is calculated from following formula:
The duty cycle is simply the on-time divided by the period:
The duration of one cycle=19*0.4058+14*1.2029ms=24.5508ms
Effective period of the cycle=64.00ms
Duty Cycle=24.5508 /64.00ms=0.3836
Therefore, the averaging factor is found by 20log(0.3836)=-8.32

Please see the test plot below:

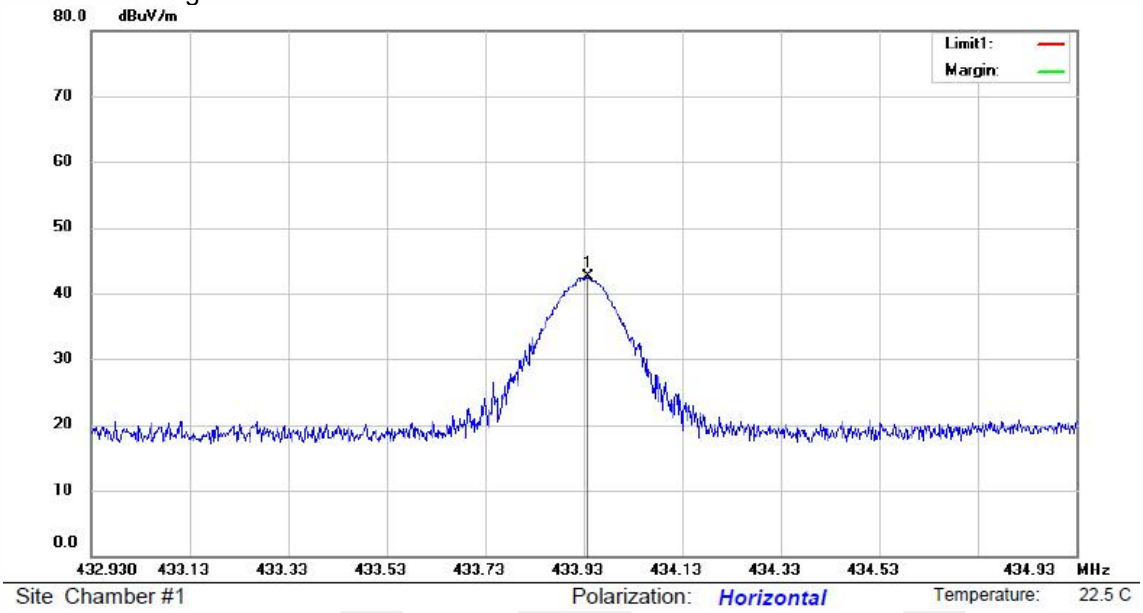




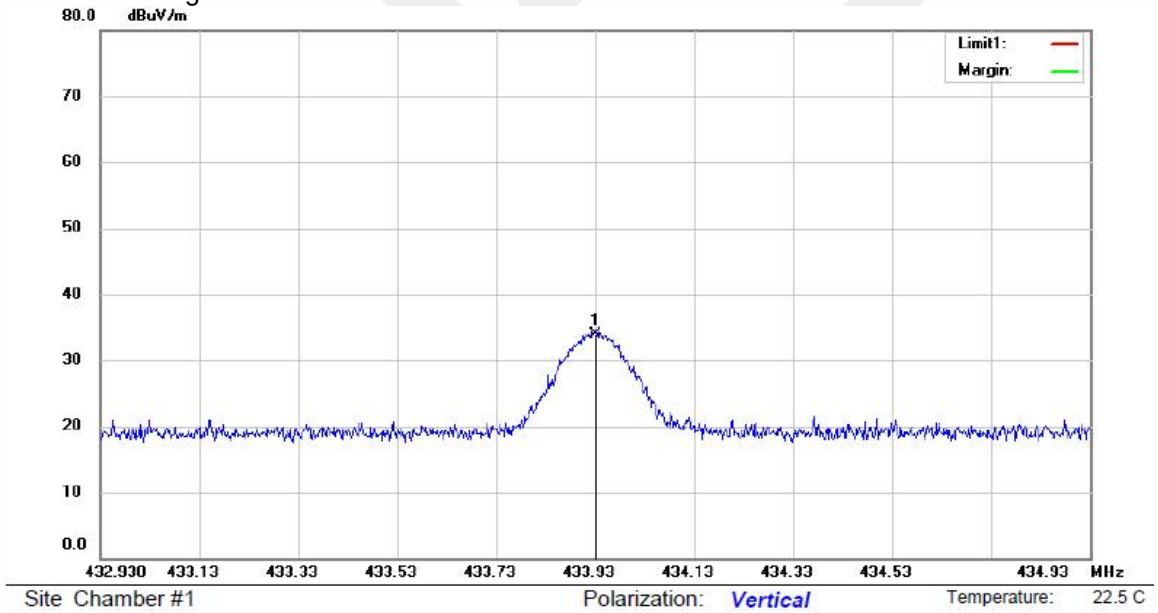
Field Strength of the fundamental signal

Freq.	Ant. Pol.	Emission Level(dBuV/m)	AV Factor	Emission Level(dBuV/m)	Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK		AV	PK	AV	PK	AV
433.94	H	42.48	-8.32	34.16	100.83	80.83	-58.35	-46.67
433.93	V	33.88	-8.32	25.56	100.83	80.83	-66.95	-55.27

Fundamental signal-H



Fundamental signal-V



8.2.4 Measurement Result

Spurious Emission below 30MHz (9KHz to30MHz)

Modulation:	FSK	Test Date :	Nov 04, 2024
Frequency Range:	9KHz-30MHz	Temperature :	24.1 ℃
Test Result:	PASS	Humidity :	53.2 %
Measured Distance:	3m	Test By:	Ccyf

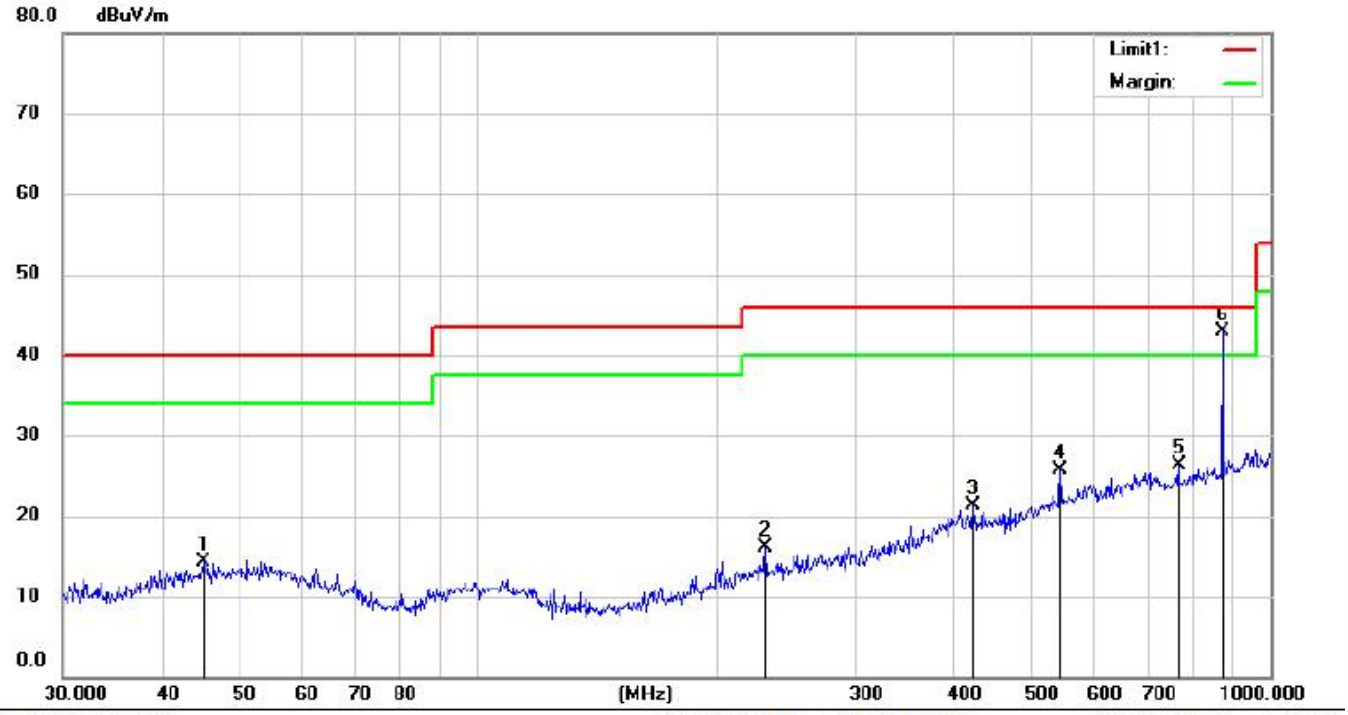
Freq.	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		AVG Factor	Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	dB	PK	AV	dB	PK	AV	PK	AV
-	-	-	-	-	-	-	-	-	-	-	-

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

8.2.5 Radiated spurious emission below 1GHz

Modulation:	FSK	Test Date :	Nov 04, 2024
Frequency Range:	30-1000MHz	Temperature :	24.1 ℃
Test Result:	PASS	Humidity :	53.2 %
Measured Distance:	3m	Test By:	Ccyf

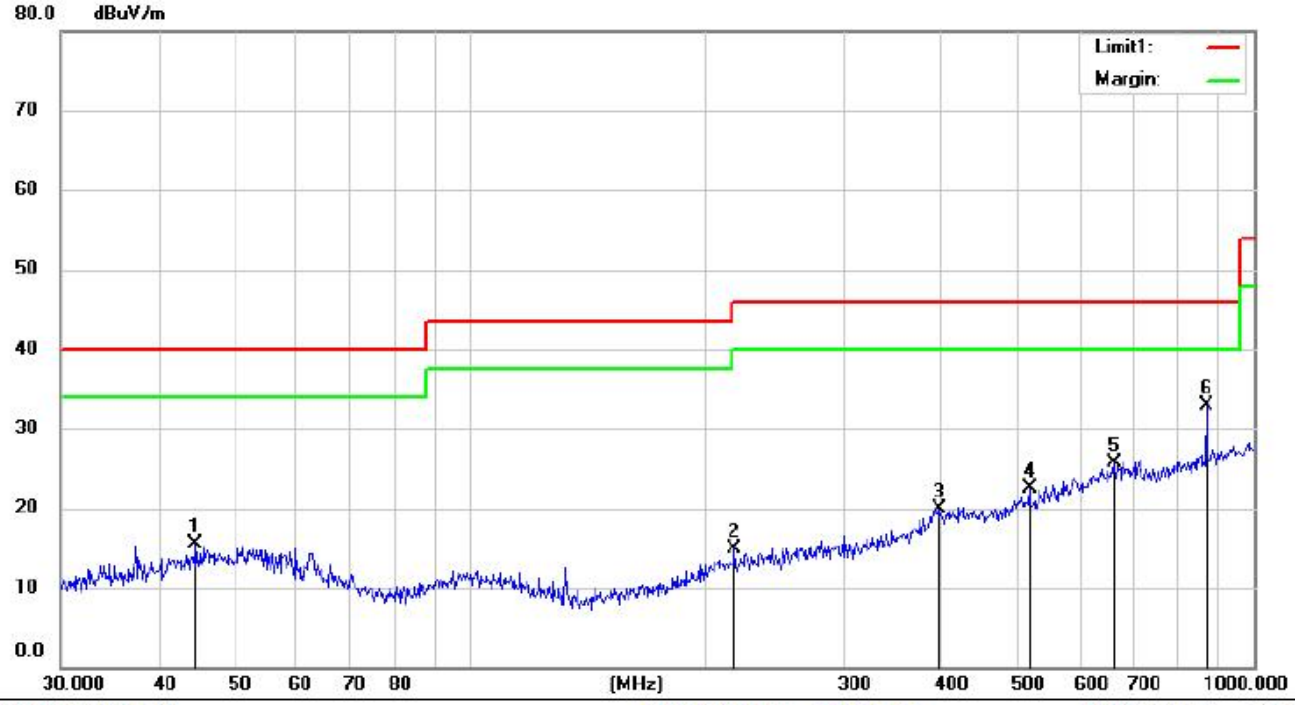
Note: (1) All Readings are Peak Value.
(2) Correct Factor= Antenna Factor +Cable Loss- Amplifier Gain
(3) Emission Level= Reading Level+Probe Factor +Cable Loss
(4) True Value = Emission Level + Duty Cycle Correction Factor
(5) DF= Duty Cycle Correction Factor
(6) Duty Cycle Correction Factor (dB) = 20log(Duty cycle)= -8.32dB
(7) Margin = PK Level – AV limit
(8) The “*” means restricted bands
(9) All the x/y/z orientation has been investigated, and only worst case is presented in this report.
(10) The EUT has been evaluated in xyz orientation, and the worst result have been recorded in the report.



Site Chamber #1 Polarization: *Horizontal* Temperature: 22.5 C

No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure-ment	Limit	Over		HI	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1		45.2165	30.23	13.81	30.5	0.7	14.24	40.00	-25.76	QP			
2		230.9067	31.90	12.47	30.2	1.97	16.14	46.00	-29.86	QP			
3		422.0577	31.24	16.56	29.82	3.25	21.23	46.00	-24.77	QP			
4		543.2741	33.79	18.75	29.87	3.08	25.75	46.00	-20.25	QP			
5		766.0571	31.77	21.02	30.2	3.79	26.38	46.00	-19.62	QP			
6	*	869.1302	46.43	22.53	29.95	3.93	42.94	46.00	-3.06	QP			

*:Maximum data x:Over limit !:over margin Operator: Ccyf



Site Chamber #1 Polarization: *Vertical* Temperature: 22.5 C

No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure-ment	Limit	Over		HI	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1		44.5867	31.58	13.73	30.5	0.69	15.50	40.00	-24.50	QP			
2		217.5441	31.30	12.09	30.27	1.85	14.97	46.00	-31.03	QP			
3		396.2412	30.02	16.2	29.82	3.6	20.00	46.00	-26.00	QP			
4		517.2480	31.29	18.18	29.84	2.95	22.58	46.00	-23.42	QP			
5		663.4728	31.12	21.14	30.05	3.47	25.68	46.00	-20.32	QP			
6	*	869.1302	36.33	22.53	29.95	3.93	32.84	46.00	-13.16	QP			

*:Maximum data x:Over limit !:over margin Operator: Ccyf

8.2.6 Radiated spurious emission above 1GHz

Modulation:	FSK	Test Date :	Nov 04, 2024
Frequency Range:	1000-6000MHz	Temperature :	24.1 ℃
Test Result:	PASS	Humidity :	53.2 %
Measured Distance:	3m	Test By:	Ccyf

Freq.	Ant. Pol.	Reading Level(dBuV/m)		Correct Factor	Emission Level(dBuV/m)		AVG Factor	Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	dB	PK	AV	dB	PK	AV	PK	AV
1302.01	V	44.25	35.93	-20.42	23.83	15.51	-8.32	80.83	60.83	-57.00	-45.32
1736.42	V	43.18	34.86	-20.96	22.22	13.9	-8.32	80.83	60.83	-58.61	-46.93
2169.71	V	30.52	22.2	-9.56	20.96	12.64	-8.32	80.83	60.83	-59.87	-48.19
2603.10	V	23.57	15.25	-7.03	16.54	8.22	-8.32	80.83	60.83	-64.29	-52.61
3037.50	V	22.08	13.76	-7.08	15.00	6.68	-8.32	80.83	60.83	-65.83	-54.15
1303.01	H	40.89	32.57	-19.93	20.96	12.64	-8.32	80.83	60.83	-59.87	-48.19
1735.38	H	41.26	32.94	-19.99	21.27	12.95	-8.32	80.83	60.83	-59.56	-47.88
2171.36	H	31.56	23.24	-10.95	20.61	12.29	-8.32	80.83	60.83	-60.22	-48.54
2602.66	H	23.87	15.55	-8.15	15.72	7.4	-8.32	80.83	60.83	-65.11	-53.43
3034.85	H	24.89	16.57	-8.31	16.58	8.26	-8.32	80.83	60.83	-64.25	-52.57

Note: (1) All Readings are Peak Value.

(2) Correct Factor= Antenna Factor +Cable Loss- Amplifier Gain

(3) Emission Level= Reading Level+Probe Factor +Cable Loss

(4) True Value = Emission Level + Duty Cycle Correction Factor

(5) DF= Duty Cycle Correction Factor

(6) Duty Cycle Correction Factor (dB) = 20log(Duty cycle)=]= -8.32

(7) Margin = PK Level – AV limit

(8) The “*” means restricted bands

(9) All the x/y/z orientation has been investigated, and only worst case is presented in this report.

(10) The EUT has been evaluated in xyz orientation, and the worst result have been recorded in the report.

8.3 TRANSMISSION REQUIREMENT

8.3.1 Applicable Standard

According to FCC Part 15.231(a)

8.3.2 Conformance Limit

According to FCC Part 15.231(a): A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

8.3.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2

8.3.4 Test Procedure

The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
Span Frequency	0Hz
RBW	1M
VBW	3M
Detector	Peak
Trace	Max hold
Sweep Time	5S

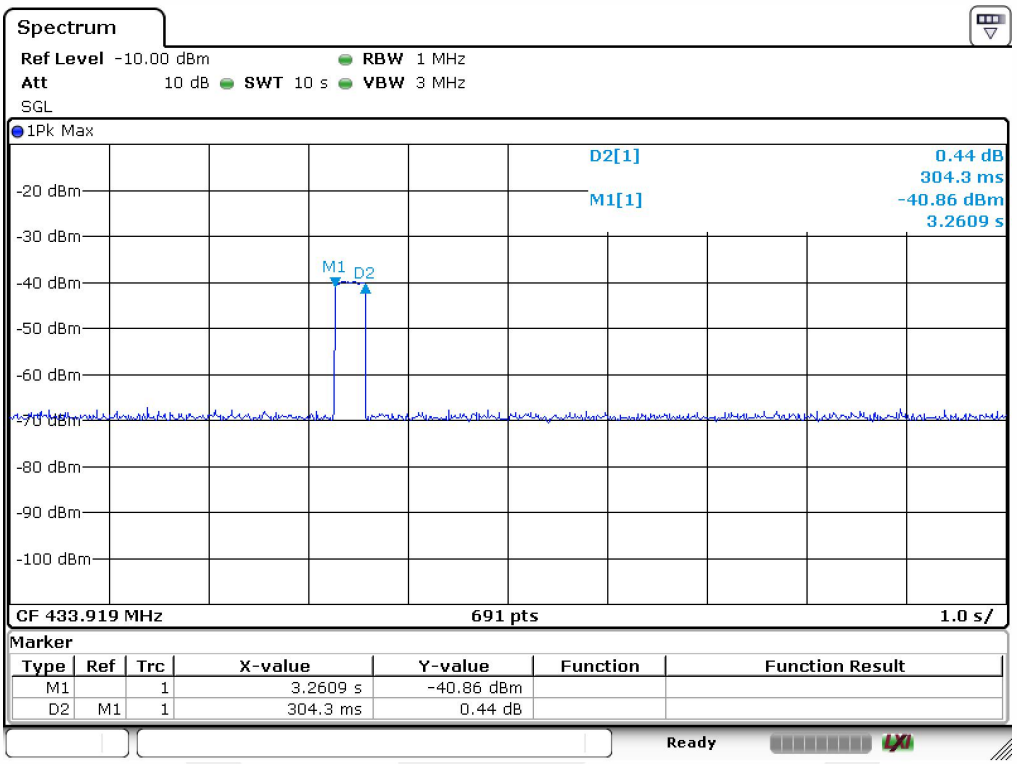
a. The transmitter output (antenna port) was connected to the spectrum analyzer.
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz, Set Detector to Peak, Trace to Max Hold.
c. Set the span to 0Hz and the sweep time to 10s and record the value.

8.3.5 Test Results

Temperature:	24℃	Test Date:	Nov 18, 2024
Humidity:	53 %	Test By:	KK
Test mode:	TX Mode		

Frequency.(MHz)	individual transmission time	Limit	Verdict
433.92	304.3ms	5 seconds	PASS

Test Model	Transmitter Requirement	
	Channel 0: 433.92MHz	individual transmission time



8.4 CONDUCTED EMISSION TEST

8.4.1 Applicable Standard

According to FCC Part 15.207(a)

8.4.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	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 0.50MHz.

8.4.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

8.4.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.4.5 Test Results

N/A

8.5 Antenna Application

8.5.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, 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.

8.5.2 Result

PASS.

The EUT has 1 antenna: a Metal Antenna for 433.9MHz TX model, the gain is -1.22 dBi;

Note: ☒ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

which in accordance to section 15.203, please refer to the internal photos.

----------The end ----------

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