FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

EGLO Hong Kong Lighting Ltd

Remote control

Model Number: ET4271

FCC ID: 2AEBXET4271

Applicant:	EGLO Hong Kong Lighting Ltd
Address:	Rm 1803, 18/F Multifield Centre, 426 Shanghai Street, Mongkok,
	Kowloon, Hong Kong, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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Report Number:	ESTE-R2309011
Date of Test:	Jul. 17~Sep. 05, 2023
Date of Report:	Sep. 22, 2023

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EST Technology Co., Ltd.

Applicant: **Address:**	EGLO Hong Kong Lighting Ltd Rm 1803, 18/F Multifield Centre, 426 Shanghai Street, Mongkok, Kowloon, Hong Kong, China		
Manufacturer: **Address:**	EGLO Hong Kong Lighting Ltd Rm 1803, 18/F Multifield Centre, 426 Shanghai Street, Mongkok, Kowloon, Hong Kong, China		
Factory: **Address:**	Zhongshan co-tech industries Ltd Nanlang Industries area, Nanlang, Zhongshan, GuangDong, China		
E.U.T:	Remote control		
Model Number:	ET4271		
Power Supply:	DC 3V From Battery		
Trade Name:	------	Serial No.:	------
Date of Receipt:	Jul. 17, 2023	Date of Test:	Jul. 17~Sep. 05, 2023
Test Specification:	FCC Part 15 Subpart C (15.231) ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.		
		Date: Sep. 22, 2023	
Prepared by:	Reviewed by:	Approved by:	
Ring Yang / Assistant	Seven Wang / Engineer	Iceman Hu / Manager	
Other Aspects: None.			
Abbreviations: OK/P=passed	*fail/F=failed*	*n.a/N=not applicable*	*E.U.T=equipment under tested*
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	Remote control
Model Number	:	ET4271
Software Version	:	N/A
Hardware Version	:	N/A
Operation frequency	:	433.92MHz
Number of channel	:	1
Field Strength of Fundamental	:	83.75dBμV/m@3m
Modulation Type	:	ASK
Sample Type	:	Prototype production

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	Internal	-	3

Note: This information is provided by the applicant.

1.3. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	EGLO Hong Kong Lighting Ltd
Note: 1.The customer declared the loss value of the RF Cable, and the test results of this report only apply to the sample as received. 2.This information is provided by the applicant.	

2. SUMMARY OF TEST

2.1. Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	Field Strength of Fundamental	15.231(a)	PASS
2	Radiated Spurious Emissions	15.209 15.231(a)	PASS
3	20dB Bandwidth	15.231(c)	PASS
4	Duration Time	15.231(a)(1)	PASS
5	AC Power Line Conducted Emissions	15.207	N/A
6	Antenna Requirement	15.203	PASS

Note:“N/A” denotes test is not applicable in this test report.

2.2. Test Facilities

EMC Lab	:	Certificated by CNAS, CHINA Registration No.: L5288 This Certificate is valid until: November 12, 2023 Certificated by FCC, USA Designation Number: CN1215 This Certificate is valid until: January 31, 2024 Certificated by A2LA, USA Registration No.: 4366.01 This Certificate is valid until: January 31, 2024 Certificated by Industry Canada CAB identifier No.: CN0035 This Certificate is valid until: January 31, 2024 Certificated by VCCI, Japan Registration No.:C-14103; T-20073; R-13663; R-20103; G-20097 Date of registration: Apr. 20, 2020 This Certificate is valid until: Apr. 19, 2026 Certificated by TUV Rheinland, Germany Registration No.: UA 50413872 0001 Date of registration: July 31, 2018 Certificated by Intertek Registration No.: 2011-RTL-L2-64 Date of registration: November 08, 2018
Name of Firm	:	EST Technology Co., Ltd.
Site Location	:	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	±3.48dB
Uncertainty for spurious emissions test (Below 30MHz)	±1.62 dB
Uncertainty for spurious emissions test (30MHz-1GHz)	±4.60 dB(Polarize: H)
	±4.68 dB(Polarize: V)
Uncertainty for spurious emissions test (1GHz to 18GHz)	±4.96dB
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

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

2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into test mode by software before test.

EUT

DC 3V From Battery

(EUT: Remote control)

2.6. Test Mode

The test mode was selected for the final test as listed below.

Test Item	Test Mode	Test Frequency
Duty Cycle	TX	433.92MHz
Field Strength of Fundamental	TX	433.92MHz
Radiated Spurious Emissions	TX	433.92MHz
20dB Bandwidth	TX	433.92MHz
Duration Time	TX	433.92MHz

Note:

1. In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane.**
2. The EUT uses new battery.

2.7. Channel List

Channel	Frequency(MHz)
01	433.92

2.8. Test Equipment List

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 12,23	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 12,23	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 12,23	1 Year
Active Loop Antenna	SCHWAREBECK	FMZB 1519B	EST-E054	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 12,23	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

For radiated emission test(Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA9120D	EST-E144	LISAI	June 12,23	1 Year
Horn Antenna	Com-Power	AHA-840	EST-E133	LISAI	June 12,23	1 Year
Low Noise Amplifier	RF	TRLA-010180G45N	EST-E142	LISAI	June 12,23	1 Year
Spectrum Analyzer	Rohde &Schwarz	FSV40	EST-E069	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
Above 1GHz Cable	N/A	EST-003	N/A	N/A	N/A	N/A

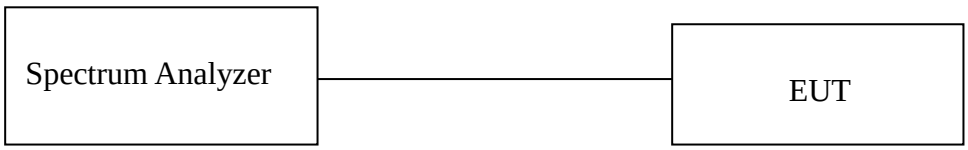
For connect EUT antenna terminal test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
TS 1120	Tonscend	/	/	/	/	/
Test Software	Tonscend	TS1120-3	3.3.38	/	/	/
RF Control Unit	Tonscend	JS0806-2	EST-E134	LISAI	June 12,23	1 Year
Signal and Spectrum Analyzer	Rohde &Schwarz	FSV 40	EST-E136	LISAI	June 12,23	1 Year

3. DUTY CYCLE

3.1. Limit

N/A

3.2. Test Setup



3.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test Frequecncy
RBW	≥OBW
VBW	≥RBW
Span	Zero
Sweep Time	At least one period of the pulse train or over 100 ms
Detector	PEAK

3.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 3.3.
c. Adjust and configure any EUT switches, controls, or input data streams to ensure that the EUT is transmitting or encoded to obtain the "worst-case" pulse ON time.
d. If the pulse train is periodic (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms, then:
   1) Set the TRIGGER on the spectrum analyzer to capture at least one period of the pulse train, including any blanking intervals.
   2) Determine the total maximum pulse "ON time" (t_{ON}) over one period of the pulse train. If the pulse train contains pulses of different widths, then t_{ON} is determined by summing the duration of all of the pulses within the pulse train [i.e., $t_{ON} = \Sigma(t_1 + t_2 + \ldots t_n)$].
   3) The duty cycle is then determined by dividing the total maximum "ON time" by the period of the pulse train (t_{ON}/T).
e. If the pulse train is nonperiodic or is periodic with a period that exceeds 100 ms, or as an alternative to step d, then:
   1) Set the TRIGGER on the spectrum analyzer to capture the greatest amount of pulse "ON time" over 100 ms.
   2) Find the 100 ms period that contains the maximum "on time"; this may require summing the duration of multiple pulses as described in step d 2).
   3) Determine the duty cycle by dividing the total maximum "ON time" by 100 ms (t_{ON}/100 ms).
f. Determine the duty cycle correction factor by below Equation to the duty cycle determined in the preceding steps.

$$\delta(dB) = 20\log(\Delta)$$

where

δ is the duty cycle correction factor (dB)
Δ is the duty cycle (dimensionless)

3.5. Test Conditions

Temperature	24.8℃	Relative Humidity	56%	Test Voltage	DC 3V

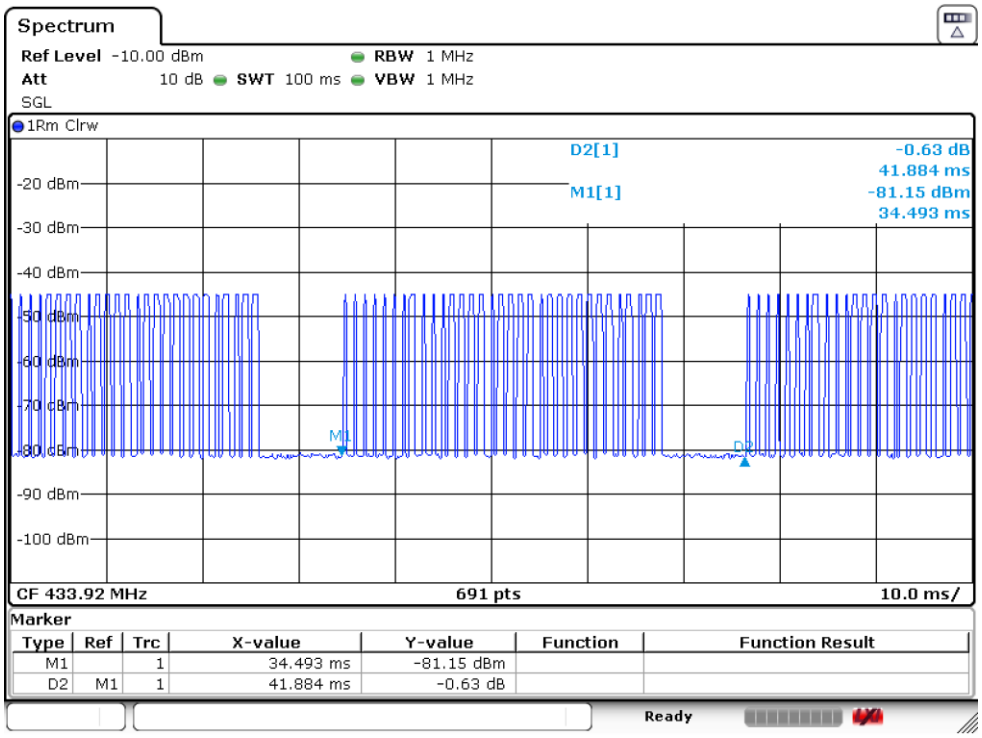
3.6. Test Result

Test Frequency (MHz)	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
433.92	23.83	41.88	56.89	-4.90

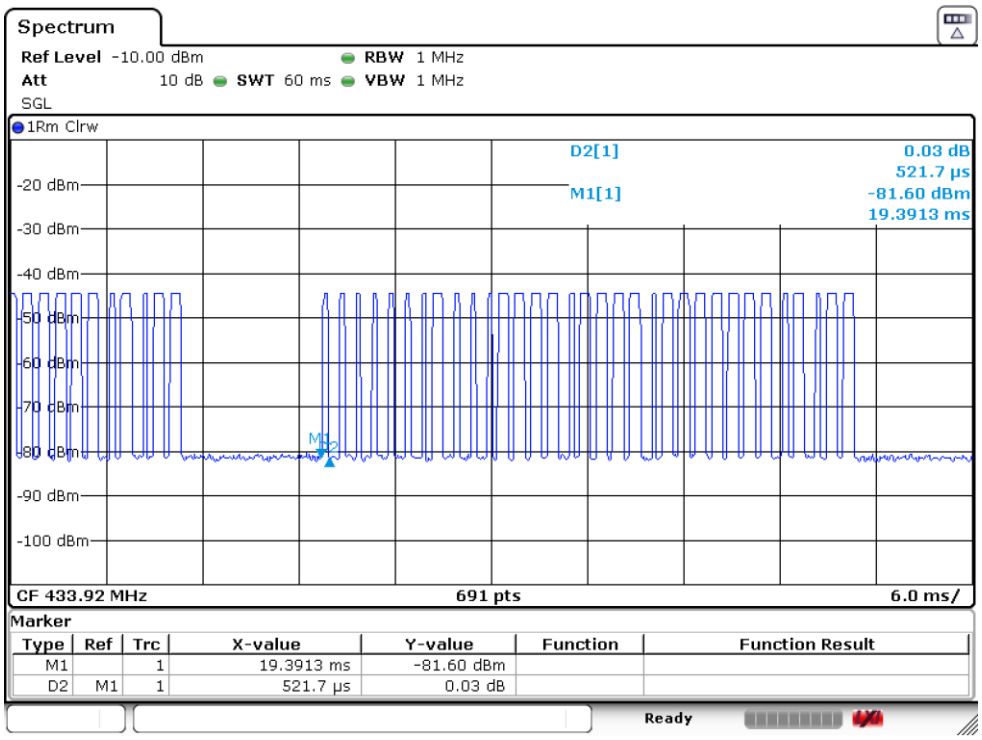
Note:

1. $T_{ON\ time}=t_{on\ 1}\times N_{Burst\ 1}+t_{on\ 2}\times N_{Burst\ 2}+\cdots t_{on\ n}\times N_{Burst\ n}$
   $N_{Burst\ n}$ is the number of Burst n in one period or 100ms
2. Duty Cycle=(On Time/ Total Time)*100%
3. Duty Cycle Correction Factor =20×LOG(Duty Cycle)

Total Time



Burst 1



$t_{on\ 1}$=0.5217ms **$N_{Burst\ 1}$=14**

Burst 2

$t_{on\ 2}$=0.8696ms **$N_{Burst\ 2}$=19**

4. FIELD STRENGTH OF FUNDAMENTAL

4.1. Limit

Fundamental frequency (MHz)	Field strength of fundamental@3m (microvolts/meter)
40.66-40.70	2,250
70-130	1,250
130-174	[1]1,250 to 3,750
174-260	3,750
260-470	[1]3,750 to 12,500
Above 470	12,500
[1]Linear interpolations	

The EUT fundamental frequency is 433.92MHz,So the Average Limit& Peak Limit is show in below table:

Fundamental frequency (MHz)	Field strength of fundamental@3m (dBμV/m)	
	Average Limit	Peak Limit
433.92	80.83	100.83

Note:

1. According to ANSI C63.10:2013 section 7.6.2:
   The effective limit at the frequency of interest is found by linearly interpolating using the familiarslope-intercept formula, y = mx+b, rewritten as in Equation：

   $$\text{Limit}[\mu V/m]=\text{Lim}_{lower}+\Delta F[(\text{Lim}_{upper}-\text{Lim}_{lower})/(f_{upper}-f_{lower})]$$

   where

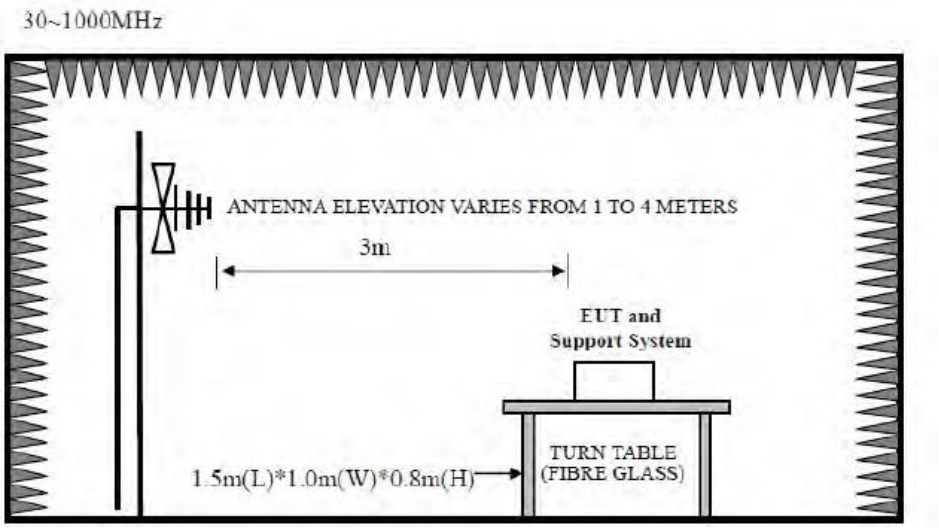
   Lim_{lower} is the limit at the lower frequency of the intended band of operation
   Lim_{upper} is the limit at the upper frequency of the intended band of operation
   f_{lower} is the lower frequency of the intended band of operation
   f_{upper} is the upper frequency of the intended band of operation
   ΔF equals $f_c - f_{lower}$
   f_c is the center frequency of the emission signal

   For fundamental frequency 433.92MHz:

   Average Limit(μV/m)=3750+(433.92-260)[(12500-3750)/(470-260)]=10996.67.

2. Average Limit (dBμV/m)=20×LOG[Field Strength (μV/m)]=20×LOG(10996.67)=80.83.
3. According to §15.35(b):
   Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB=80.83+20=100.83.

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test frequency
RBW	120KHz
VBW	300KHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

4.4. Test Procedure

a. EUT was placed on a turn table, which is 1.5 meter high above the ground.
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Spectrum analyzer setting parameters in accordance with section 4.4.
d. Set the EUT transmit continuously with maximum output power.
e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
f. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test,record the peak value.
g. Repeat above procedures until all channels were measured.
h. Record the results in the test report.

4.5. Test Result

Frequency (MHz)	Field strength of fundamental level (dBμV/m)		Limit (dBμV/m)		Result	Antenna Pole (H/V)
	Peak	Avg	Peak	Avg		
433.92	67.15	62.25	100.83	80.83	Pass	V
	83.75	78.85			Pass	H

Note :

1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor.
2. Duty Cycle Correction Factor=-4.9.(refer to section 3 of this report)

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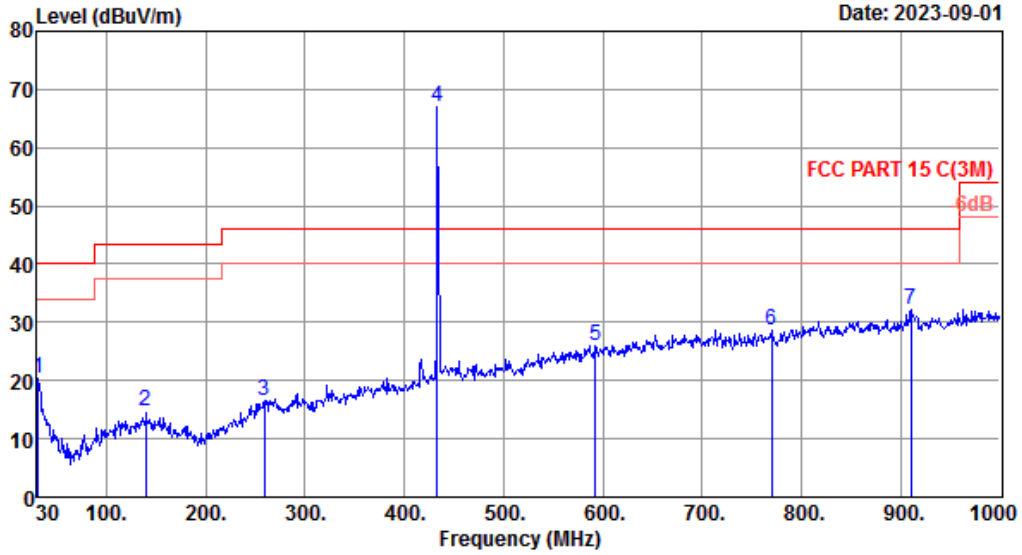
Data: 1 File: \\Emc-966-1\test data\2023\RF\Y\Yi Gao\ET4271.EM6 (6)



Site no. : 1# 966 Chamber Data no. : 1
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp;24.5℃;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.97	18.10	0.71	1.57	20.38	40.00	19.62	Peak
2	139.61	12.80	1.69	0.39	14.88	43.50	28.62	Peak
3	258.92	14.02	2.37	0.22	16.61	46.00	29.39	Peak
4	433.52	17.53	3.18	46.44	67.15	46.00	-21.15	Peak
5	592.60	20.54	3.81	1.77	26.12	46.00	19.88	Peak
6	770.11	23.30	4.42	0.86	28.58	46.00	17.42	Peak
7	910.76	25.38	4.86	1.96	32.20	46.00	13.80	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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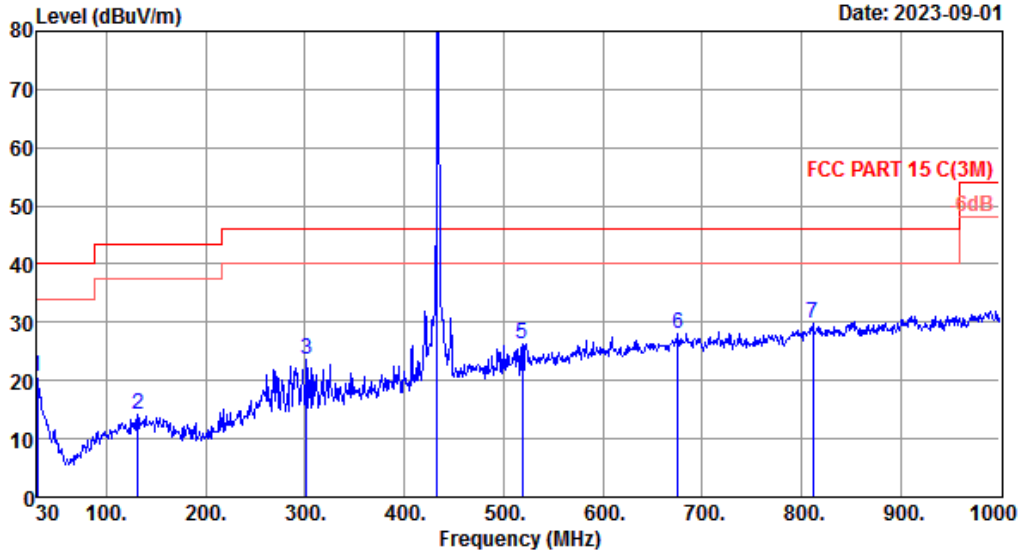
Data: 2 File: \\Emc-966-1\test data\2023\RF\Y\Yi Gao\ET4271.EM6 (6)



Site no. : 1# 966 Chamber Data no. : 2
Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp;24.5℃;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	19.00	0.70	0.88	20.58	40.00	19.42	Peak
2	131.85	12.00	1.63	0.59	14.22	43.50	29.28	Peak
3	301.60	13.90	2.64	7.16	23.70	46.00	22.30	Peak
4	433.52	17.53	3.18	63.04	83.75	46.00	-37.75	Peak
5	518.88	18.28	3.50	4.52	26.30	46.00	19.70	Peak
6	676.02	22.20	4.11	1.72	28.03	46.00	17.97	Peak
7	811.82	23.98	4.55	1.28	29.81	46.00	16.19	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

5. RADIATED SPURIOUS EMISSIONS

5.1. Limit

The limits on the field strength of the spurious emissions in the below table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

Fundamental frequency (MHz)	**Field strength of spurious emission@3m (microvolts/meter)**
40.66-40.70	225
70-130	125
130-174	[1]125 to 375
174-260	375
260-470	[1]375 to 1,250
Above 470	1,250
[1]Linear interpolations	

The EUT fundamental frequency is 433.92MHz,So the Average Limit& Peak Limit is show in below table:

Fundamental frequency (MHz)	**Field strength of spurious emission@3m (dBμV/m)**	
	Average Limit	**Peak Limit**
433.92	60.83	80.83

Note:

1. According to ANSI C63.10:2013 section 7.6.2:
   The effective limit at the frequency of interest is found by linearly interpolating using the familiarslope-intercept formula, y = mx + b, rewritten as in Equation

   $$\text{Limit}[\mu V/m]=\text{Lim}_{lower}+\Delta F[(\text{Lim}_{upper}-\text{Lim}_{lower})/(f_{upper}-f_{lower})]$$

   where

   Lim_{lower} is the limit at the lower frequency of the intended band of operation
   Lim_{upper} is the limit at the upper frequency of the intended band of operation
   f_{lower} is the lower frequency of the intended band of operation
   f_{upper} is the upper frequency of the intended band of operation
   ΔF equals $f_c - f_{lower}$
   f_c is the center frequency of the emission signal

   For fundamental frequency 433.92MHz:

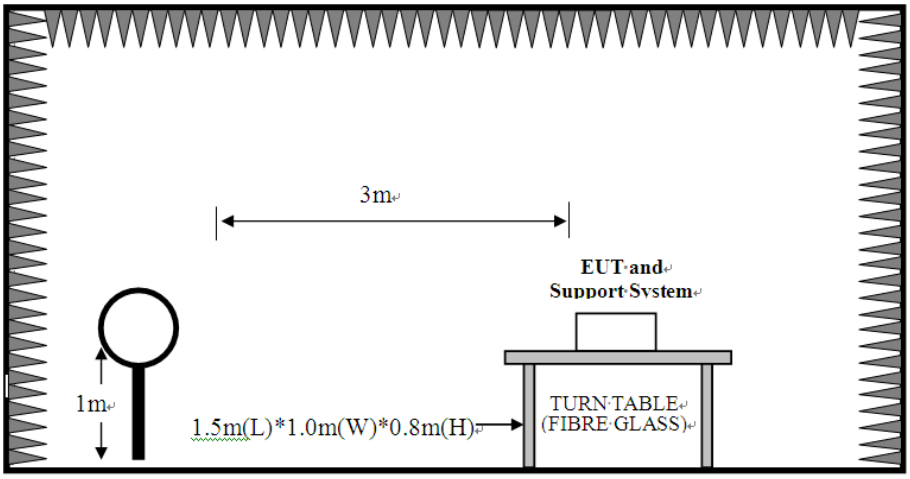
   Average Limit(μV/m)=375+(433.92-260)[(1250-375)/(470-260)]=1099.67.
2. Average Limit (dBμV/m)=20×LOG[Field Strength (μV/m)]=20×LOG(1099.67)=60.83.
3. According to §15.35(b):
   Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB=60.83+20=80.83.

15.209 Radiated emission limits

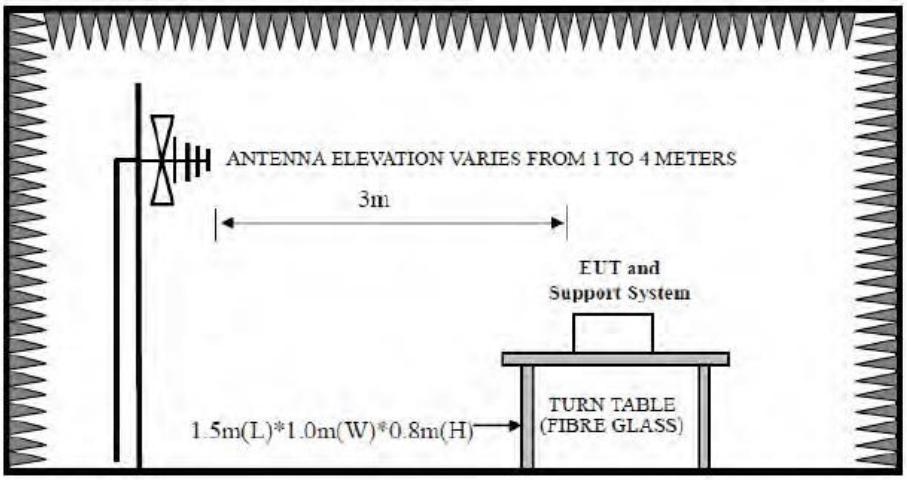
Frequency (MHz)	Field Strength(μV/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

5.2. Test Setup

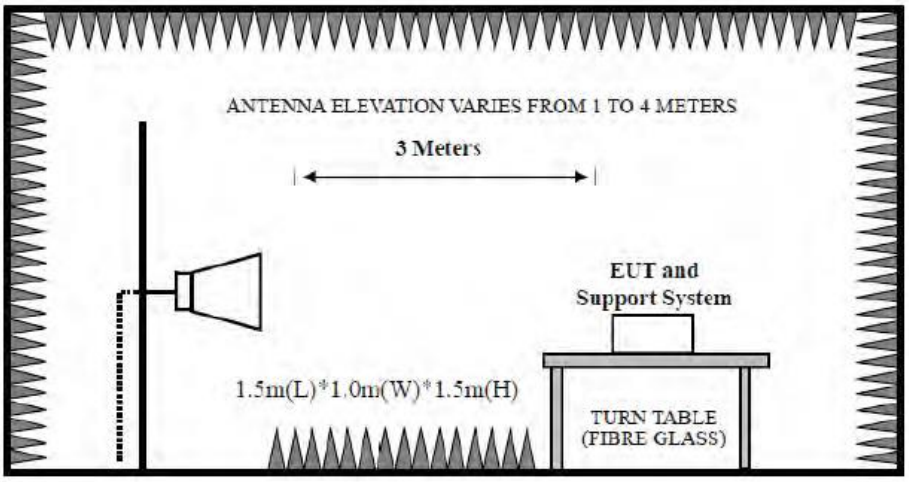
9kHz~30MHz



30~1000MHz



Above 1GHz



5.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For 30MHz-1000MHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1000MHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

For Above 1GHz

Spectrum Parameters	Setting
RBW	1MHz
VBW	3MHz
Start frequency	1GHz
Stop frequency	10 Times Carrier Frequency
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

5.4. Test Procedure

a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Set the EUT transmit continuously with maximum output power.
d. Spectrum analyzer setting parameters in accordance with section 5.3.
e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
f. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
g. Record the results in the test report.

5.5. Test Result

Below 1GHz						
Frequency (MHz)	Field strength level (dBμV/m)		Limit (dBμV/m)		Result	Antenna Pole (H/V)
	Peak	-	-	QP		
30.97	20.38	-	-	40.00	Pass	V
139.61	14.88	-	-	43.52	Pass	V
258.92	16.61	-	-	46.00	Pass	V
592.60	26.12	-	-	46.00	Pass	V
770.11	28.58	-	-	46.00	Pass	V
910.76	32.20	-	-	46.00	Pass	V
30.00	20.58	-	-	40.00	Pass	H
131.85	14.22	-	-	43.52	Pass	H
301.60	23.70	-	-	46.00	Pass	H
518.88	26.30	-	-	46.00	Pass	H
676.02	28.03	-	-	46.00	Pass	H
811.82	29.81	-	-	46.00	Pass	H
Above 1GHz						
Frequency (MHz)	Field strength level (dBμV/m)		Limit (dBμV/m)		Result	Antenna Pole (H/V)
	Peak	Avg	Peak	Avg		
1300.00	41.28	36.38	74	54	Pass	V
1735.00	42.26	37.36			Pass	V
2170.00	51.20	46.30			Pass	V
2605.00	53.81	48.91			Pass	V
3035.00	50.22	45.32			Pass	V
4065.00	37.27	32.37			Pass	V
1300.00	47.72	42.82			Pass	H
1735.00	37.48	32.58			Pass	H
2170.00	44.52	39.62			Pass	H
2605.00	46.80	41.90			Pass	H
3035.00	46.07	41.17			Pass	H
3905.00	39.37	34.47			Pass	H

Note :

1. Avg Emission Level=Peak Emission Level+Duty Cycle Correction Factor
2. Duty Cycle Correction Factor=-4.9.(refer to section 3 of this report)

Radiated Emissions Below 1GHz

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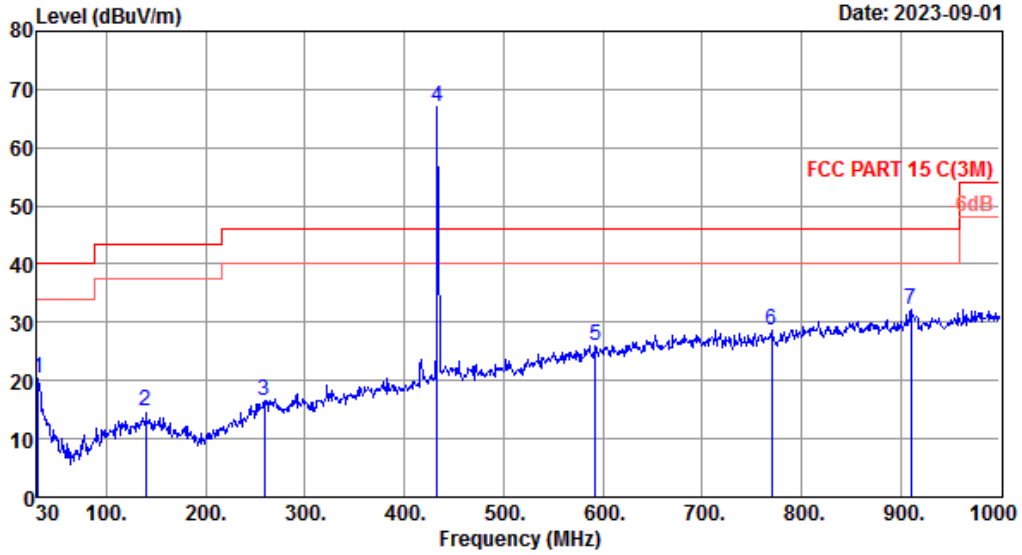
Data: 1 File: \\Emc-966-1\test data\2023\RF\Y\Yi Gao\ET4271.EM6 (6)



Site no. : 1# 966 Chamber Data no. : 1
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp;24.5℃;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.97	18.10	0.71	1.57	20.38	40.00	19.62	Peak
2	139.61	12.80	1.69	0.39	14.88	43.50	28.62	Peak
3	258.92	14.02	2.37	0.22	16.61	46.00	29.39	Peak
4	433.52	17.53	3.18	46.44	67.15	46.00	-21.15	Peak
5	592.60	20.54	3.81	1.77	26.12	46.00	19.88	Peak
6	770.11	23.30	4.42	0.86	28.58	46.00	17.42	Peak
7	910.76	25.38	4.86	1.96	32.20	46.00	13.80	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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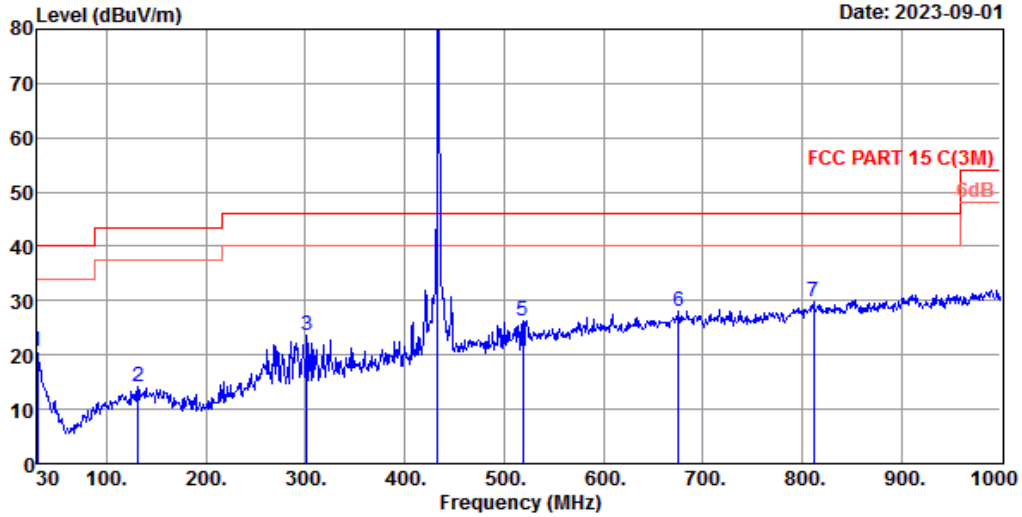
Data: 2 File: \\Emc-966-1\test data\2023\RF\Y\Yi Gao\ET4271.EM6 (6)



Site no. : 1# 966 Chamber Data no. : 2
Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp;24.5℃;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	19.00	0.70	0.88	20.58	40.00	19.42	Peak
2	131.85	12.00	1.63	0.59	14.22	43.50	29.28	Peak
3	301.60	13.90	2.64	7.16	23.70	46.00	22.30	Peak
4	433.52	17.53	3.18	63.04	83.75	46.00	-37.75	Peak
5	518.88	18.28	3.50	4.52	26.30	46.00	19.70	Peak
6	676.02	22.20	4.11	1.72	28.03	46.00	17.97	Peak
7	811.82	23.98	4.55	1.28	29.81	46.00	16.19	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All channels had been pre-test,only the worst case was reported.

Radiated Emissions Above 1G

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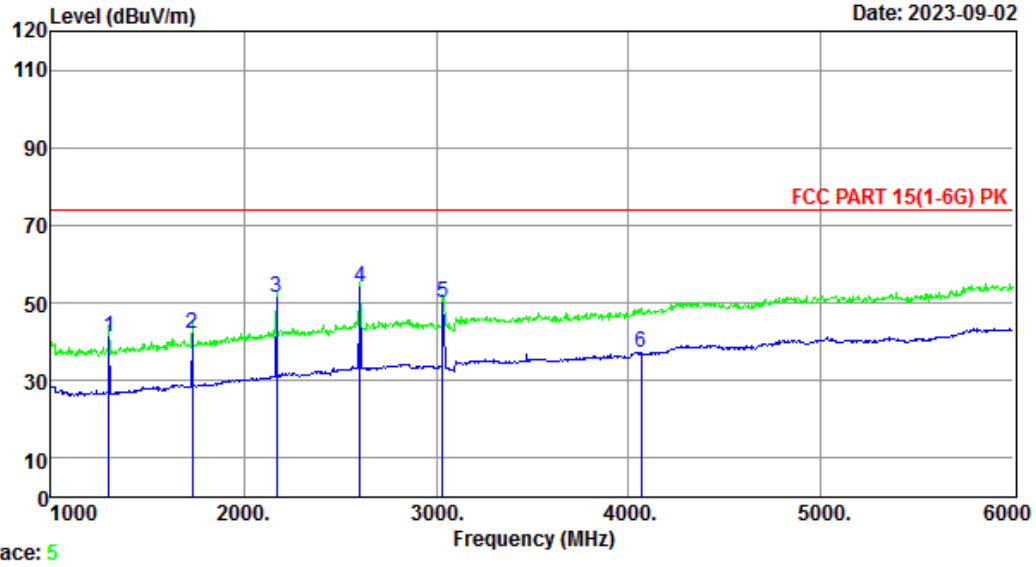
Data: 6 File: \\Emc-966-1\test data\2023\RF\Y\Yi Gao\ET4271.EM6 (6)



Trace: 5

Site no. : 1# 966 Chamber Data no. : 6
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15(1-6G) PK
Env. / Ins. : Temp:24.5℃,Humi:55.2%;Press:101.62KPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1300.00	24.70	2.53	14.05	41.28	74.00	32.72	Peak
2	1735.00	25.57	2.98	13.71	42.26	74.00	31.74	Peak
3	2170.00	27.37	3.39	20.44	51.20	74.00	22.80	Peak
4	2605.00	28.30	3.70	21.81	53.81	74.00	20.19	Peak
5	3035.00	29.20	4.02	17.00	50.22	74.00	23.78	Peak
6	4065.00	31.03	4.37	1.87	37.27	74.00	36.73	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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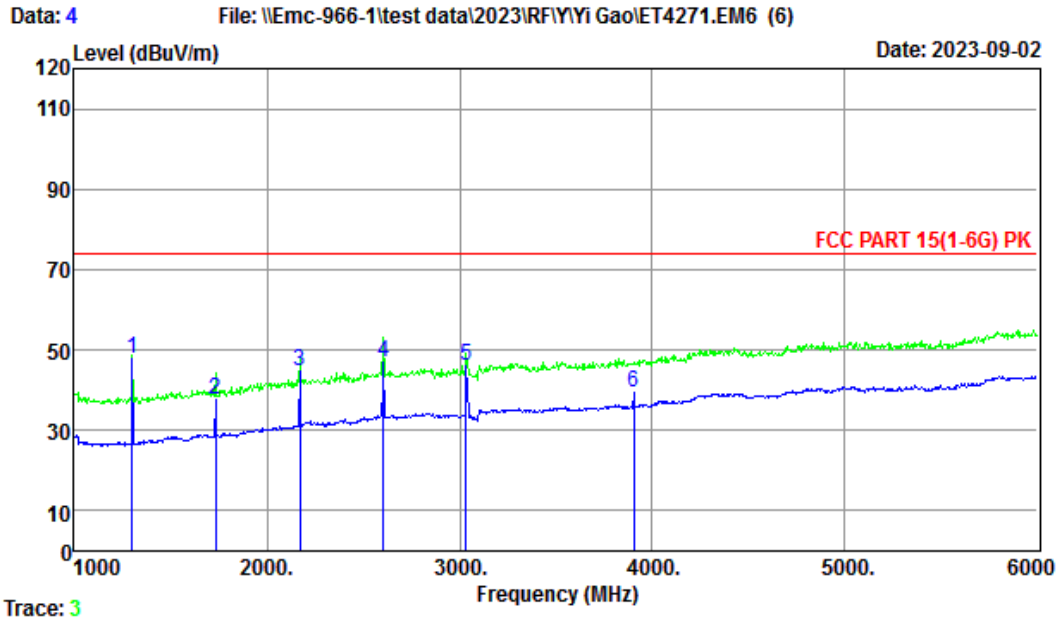


Site no. : 1# 966 Chamber Data no. : 4
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15(1-6G) PK
Env. / Ins. : Temp:24.5℃,Humi:55.2%;Press:101.62KPa
Engineer : DCY
EUT : Remote control
Power : DC 3V From Battery
M/N : ET4271
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1300.00	24.70	2.53	20.49	47.72	74.00	26.28	Peak
2	1735.00	25.57	2.98	8.93	37.48	74.00	36.52	Peak
3	2170.00	27.37	3.39	13.76	44.52	74.00	29.48	Peak
4	2605.00	28.30	3.70	14.80	46.80	74.00	27.20	Peak
5	3035.00	29.20	4.02	12.85	46.07	74.00	27.93	Peak
6	3905.00	30.20	4.27	4.90	39.37	74.00	34.63	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

6. 20DB BANDWIDTH

6.1. 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.

6.2. Test Setup

6.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1%~5% OBW
VBW	3×RBW
Span	Two times and five times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 6.3.
c. Set the EUT transmit continuously with maximum output power.
d. Allow trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.
e. Record the results in the test report.

6.5. Test Condition

Temperature	24.8℃	Relative Humidity	56%	Test Voltage	DC 3V

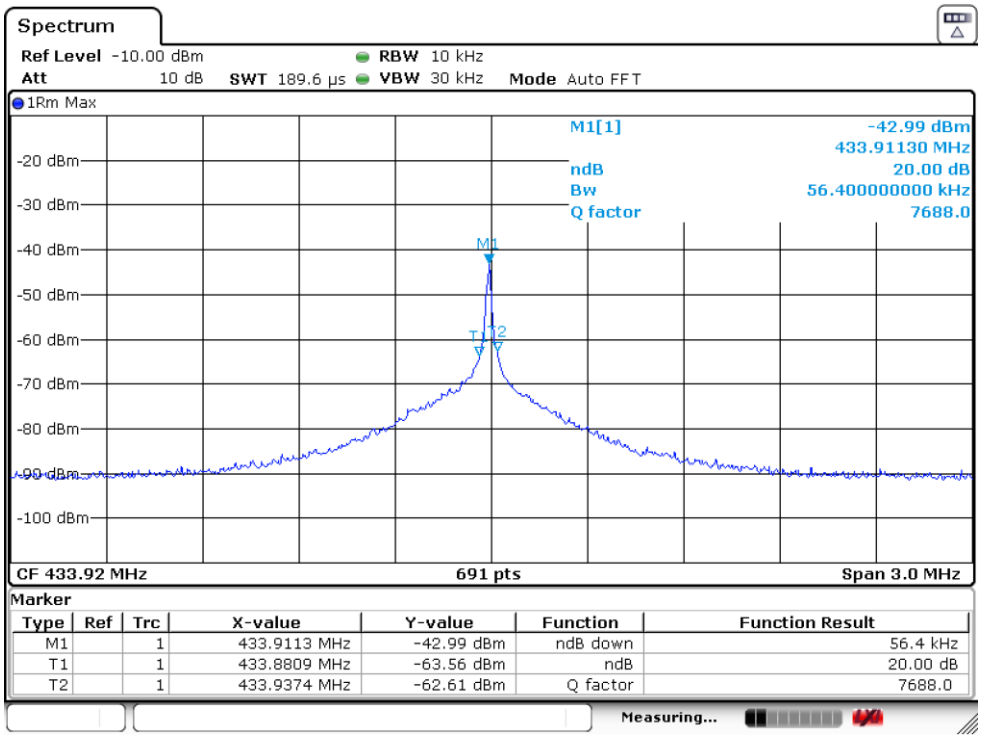
6.6. Test Result

Test Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.5640	1.0848	Pass

Note:

Limit(MHz)=433.92×0.25%=1.0848

20dB Bandwidth

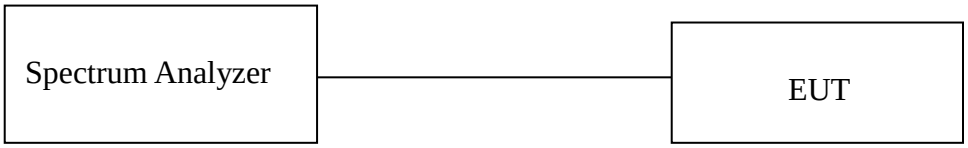


7. DURATION TIME

7.1. Limit

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

7.2. Test Setup



7.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
Center Frequency	Test Frequency
RBW	≥OBW
VBW	≥RBW
Span	Zero
Sweep Time	At least one period of the pulse train
Detector	PEAK

7.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 7.3.
c. Set the EUT transmit in normal use.
d. Adjust sweep time on the spectrum analyzer to capture at least one period of the pulse train of the EUT.
e. Allow trace to stabilize, use the marker-delta function to measure the on time and off time of the signal.
f. Record the results in the test report.

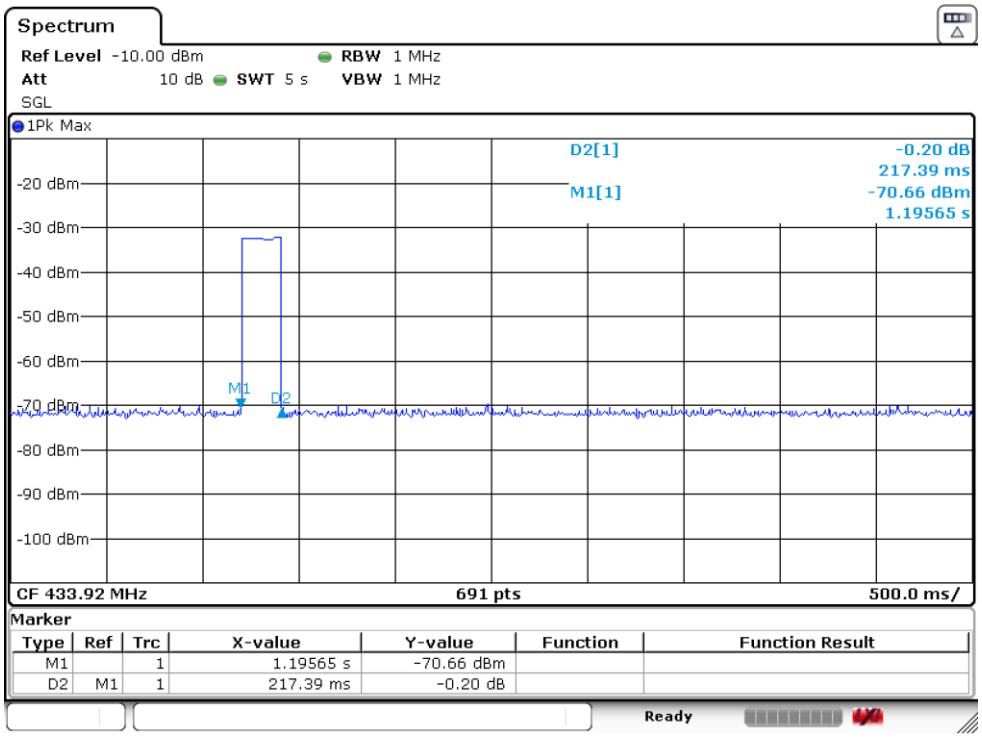
7.5. Test Condition

Temperature	24.8℃	Relative Humidity	56%	Test Voltage	DC 3V

7.6. Test Result

Test Frequency (MHz)	On Time (s)	Limit (s)	Result
433.92	0.217	5	Pass

ON Time



8. ANTENNA REQUIREMENTS

8.1. Limit

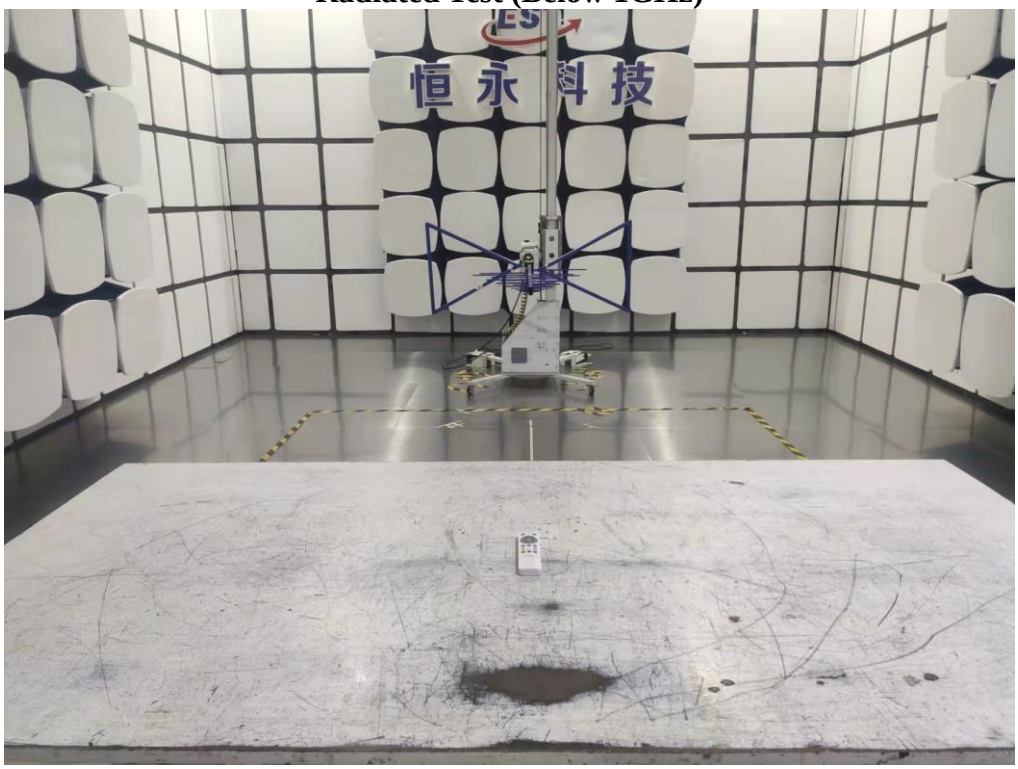
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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, 15.221, or §15.236. 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.

8.2. Test Result

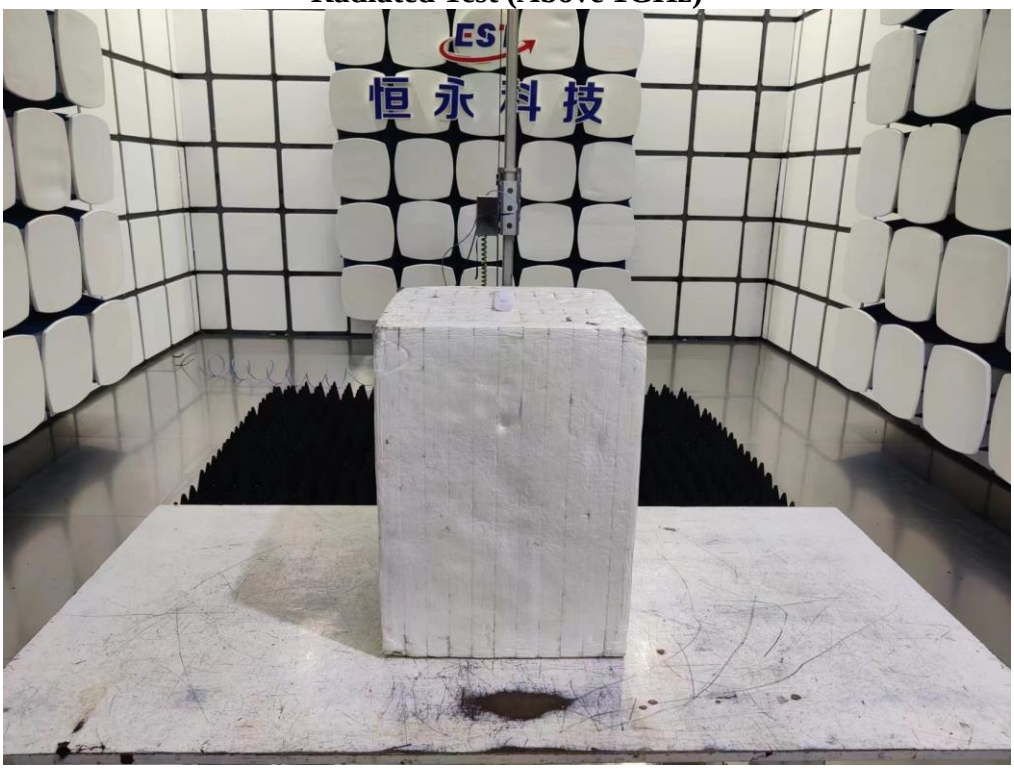
The antennas used for this product is internal antenna, so compliance with antenna requirements. (Please refer to the EUT photo for details)

9. TEST SETUP PHOTO

Radiated Test (Below 1GHz)



Radiated Test (Above 1GHz)



10. EUT PHOTO

External Photos

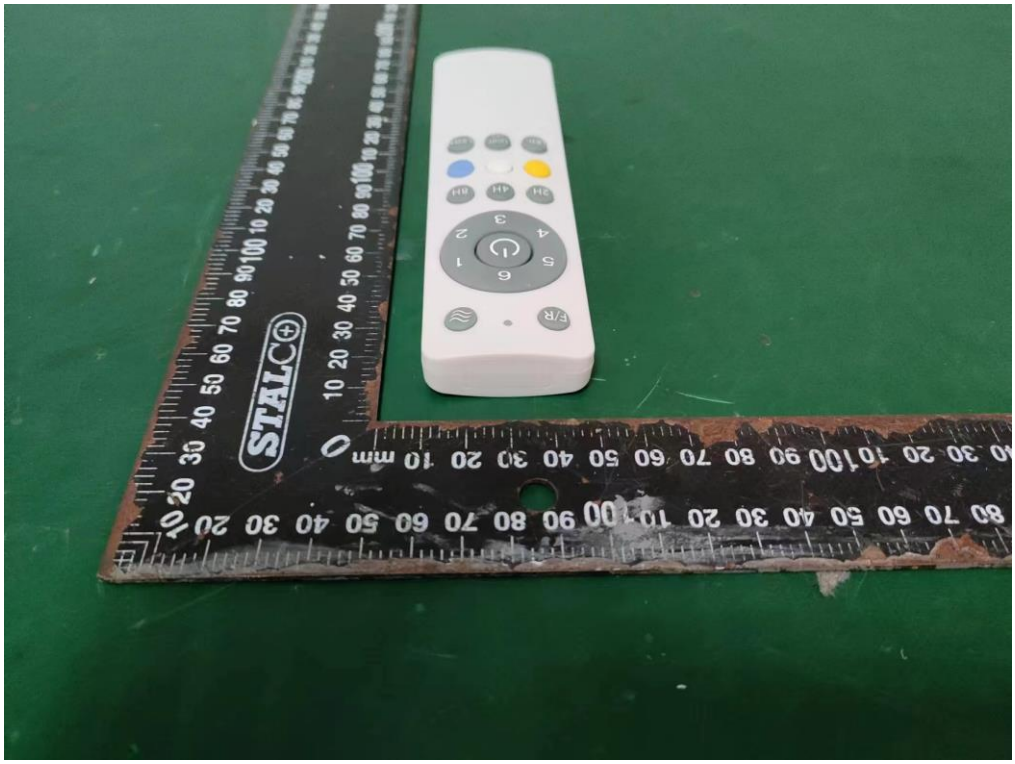
M/N: ET4271

External Photos

M/N: ET4271

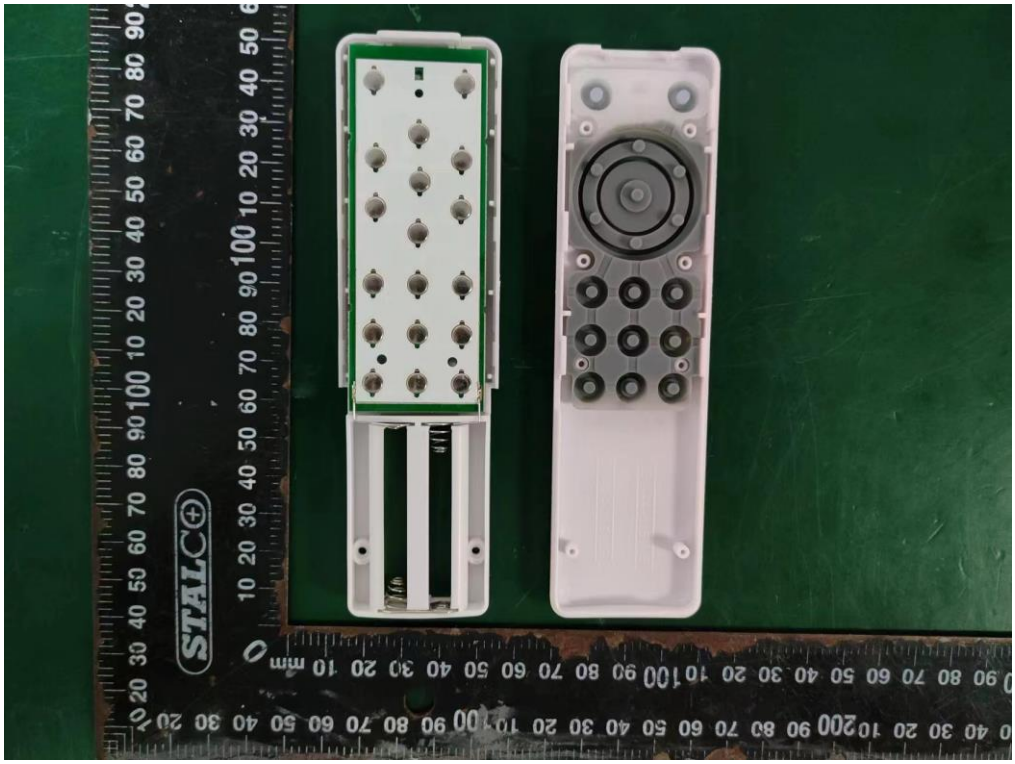
External Photos

M/N: ET4271



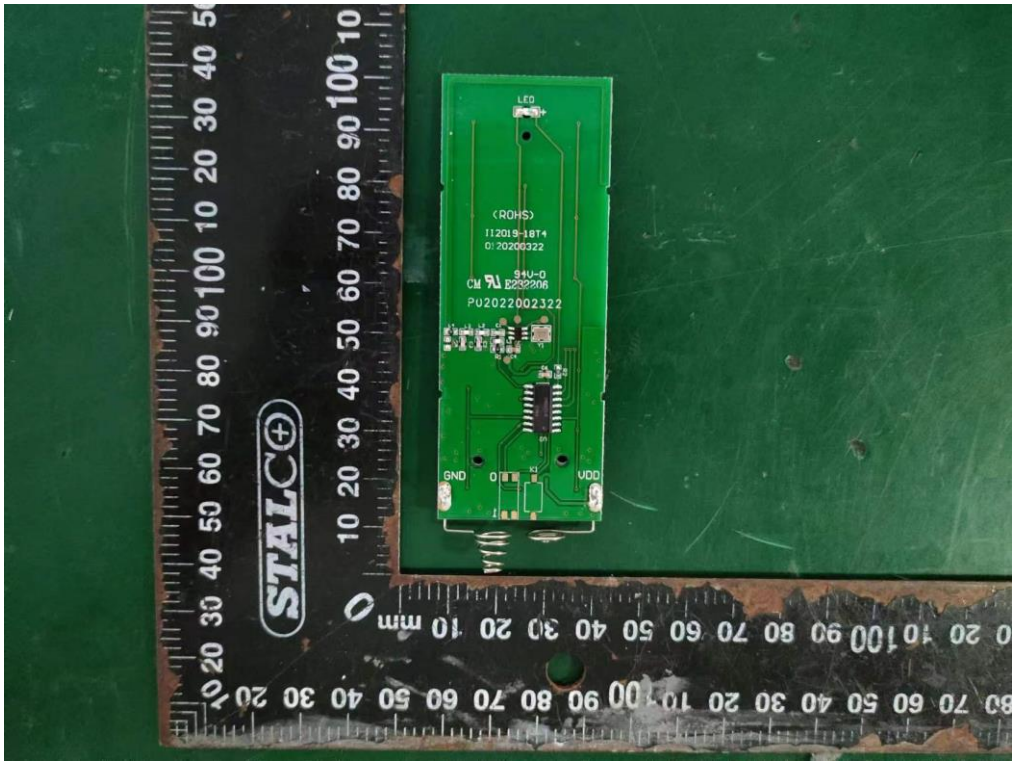
Internal Photos

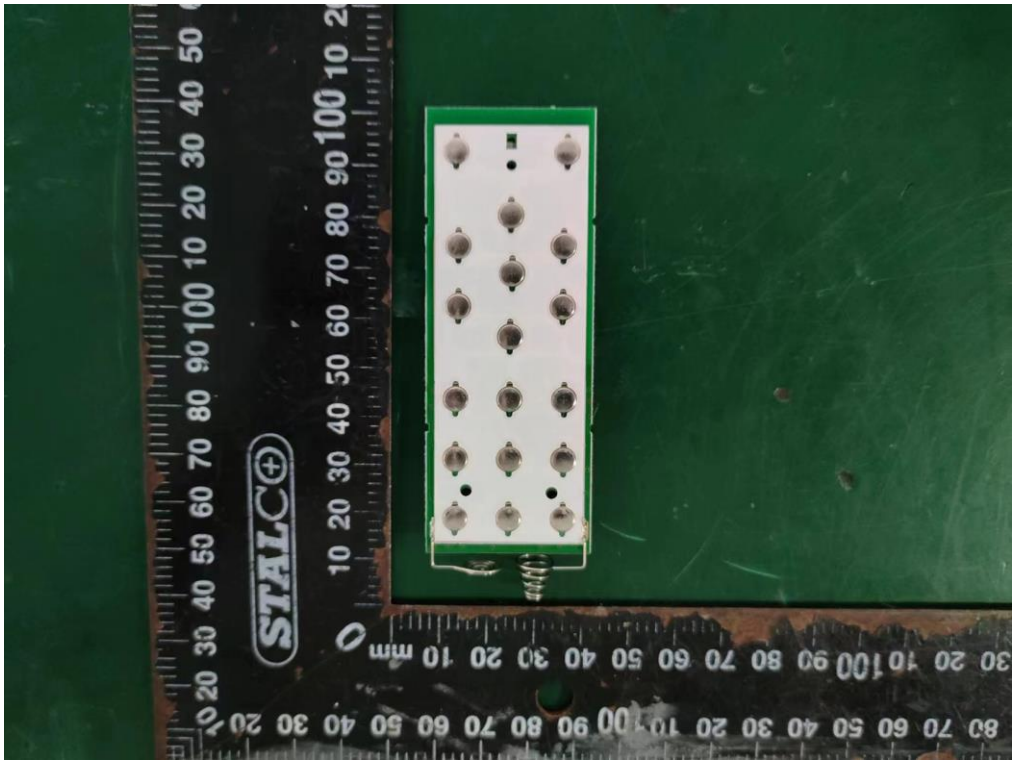
M/N: ET4271



Internal Photos

M/N: ET4271





Internal Photos

M/N: ET4271

End of Test Report