TEST REPORT

Product	:	318MHz Transmitter
Trade mark	:	N/A
Model/Type reference	:	WB-602
Serial Number	:	N/A
Report Number	:	EED32R80013701
FCC ID	:	KUTWB602
Date of Issue	:	Jan. 22, 2025
Test Standards	:	47 CFR Part 15 Subpart C
Test result	:	PASS

Prepared for:

Capital Prospect Ltd
Rm 03, 13/F, Block B, Veristrong Ind Bdg 34-36, Au Pui Wan Street, Fo Tan, NT, Hong Kong

Prepared by:

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Date: Jan. 22, 2025

CENTRE TESTING INTERNATIONAL GROUP CO.,LTD. CTI Report Seal

Check No.: 1519030125

1 Version

Version No.	Date	Description
00	Jan. 22, 2025	Original

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10:2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10:2013	N/A
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.231 (b)	ANSI C63.10:2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.231 (b)/15.209	ANSI C63.10:2013	PASS
20dB Bandwidth	47 CFR Part 15 Subpart C Section 15.231 (c)	ANSI C63.10:2013	PASS
Dwell Time	47 CFR Part 15 Subpart C Section 15.231 (a)	ANSI C63.10:2013	PASS

Remark:
N/A: The product is powered by battery.

3 Contents

1 VERSION 2
2 TEST SUMMARY 3
3 CONTENTS 4
4 GENERAL INFORMATION 5
4.1 CLIENT INFORMATION 5
4.2 GENERAL DESCRIPTION OF EUT 5
4.3 TEST ENVIRONMENT AND MODE 6
4.4 DESCRIPTION OF SUPPORT UNITS 6
4.5 TEST LOCATION 6
4.6 DEVIATION FROM STANDARDS 6
4.7 ABNORMALITIES FROM STANDARD CONDITIONS 6
4.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER 6
4.9 MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2) 7
5 EQUIPMENT LIST 8
6 TEST RESULTS AND MEASUREMENT DATA 10
6.1 ANTENNA REQUIREMENT 10
6.2 SPURIOUS EMISSIONS 11
6.2.1 Duty Cycle *11*
6.2.2 Spurious Emissions *13*
6.3 20DB BANDWIDTH 19
6.4 DWELL TIME 20
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP 22
APPENDIX 2 PHOTOGRAPHS OF EUT 23

4 General Information

4.1 Client Information

Applicant:	Capital Prospect Ltd
Address of Applicant:	Rm 03, 13/F, Block B, Veristrong Ind Bdg 34-36, Au Pui Wan Street, Fo Tan, NT, Hong Kong
Manufacturer:	Capital Prospect Ltd
Address of Manufacturer:	Rm 03, 13/F, Block B, Veristrong Ind Bdg 34-36, Au Pui Wan Street, Fo Tan, NT, Hong Kong

4.2 General Description of EUT

Product Name:	318MHz Transmitter	
Model No.(EUT):	WB-602	
Trade Mark:	N/A	
Product Type:	☐ Mobile ☐ Portable ☒ Fixed Location	
Frequency Range:	318MHz	
Modulation Type:	OOK	
Number of Channels:	1	
Antenna Type:	Integral Antenna	
Power Supply:	Battery:	DC 3V
Test voltage:	DC 3V	
Sample Received Date:	Jan. 08, 2025	
Sample tested Date:	Jan. 08, 2025 to Jan. 11, 2025	

4.3 Test Environment and Mode

Operating Environment:	
Radiated Spurious Emissions:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Conducted Emissions:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

1）support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
/	/	/	/	/

4.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

4.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

5 Equipment List

3M Semi-anechoic Chamber (2)- Radiated disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05/22/2022	05/21/2025
Receiver	R&S	ESCI7	100938-003	09/07/2024	09/06/2025
Spectrum Analyzer	R&S	FSV40	101200	07/18/2024	07/17/2025
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-618	05/22/2022	05/21/2025
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04/16/2024	04/15/2025
Microwave Preamplifier	Tonscend	EMC051845SE	980380	12/05/2024	12/04/2025
Horn Antenna	A.H.SYSTEMS	SAS-574	374	07/02/2023	07/01/2026
Horn Antenna	ETS-LINGREN	BBHA 9120D	9120D-1869	04/16/2024	04/15/2025
Preamplifier	Agilent	11909A	12-1	03/22/2024	03/21/2025
Preamplifier	CD	PAP-1840-60	6041.6042	06/19/2024	06/18/2025
Test software	Fara	EZ-EMC	EMEC-3A1-Pre	---	---
Cable line	Fulai(7M)	SF106	5219/6A	05/22/2022	05/21/2025
Cable line	Fulai(6M)	SF106	5220/6A	05/22/2022	05/21/2025
Cable line	Fulai(3M)	SF106	5216/6A	05/22/2022	05/21/2025
Cable line	Fulai(3M)	SF106	5217/6A	05/22/2022	05/21/2025

3M full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. Date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2024	01-08-2027
Receiver	Keysight	N9038A	MY57290136	01-04-2025	01-03-2026
Spectrum Analyzer	Keysight	N9020B	MY57111112	01-29-2024	01-28-2025
Spectrum Analyzer	Keysight	N9030B	MY57140871	01-23-2024	01-22-2025
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2024	04-27-2025
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-16-2024	04-15-2025
Horn Antenna	ETS-LINDGREN	3117	57407	07-03-2024	07-02-2025
Preamplifier	EMCI	EMC001330	980563	03-08-2024	03-07-2025
Preamplifier	Tonscend	TAP-011858	AP21B806112	07-18-2024	07-17-2025
Preamplifier	Tonscend	EMC051845SE	980380	12-05-2024	12-04-2025
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-07-2024	04-06-2025
RSE Automatic test software	JS Tonscend	JS36-RSE	V4.0.0.0	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	01-09-2024	01-08-2027
Cable line	Times	EMC104-NMNM-1000	SN160710	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	01-09-2024	01-08-2027
Cable line	Times	HF160-KMKM-3.00M	393493-0001	01-09-2024	01-08-2027

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C 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.	
EUT Antenna:	Please see Internal photos
The antenna is integrated on the main PCB and no consideration of replacement.	

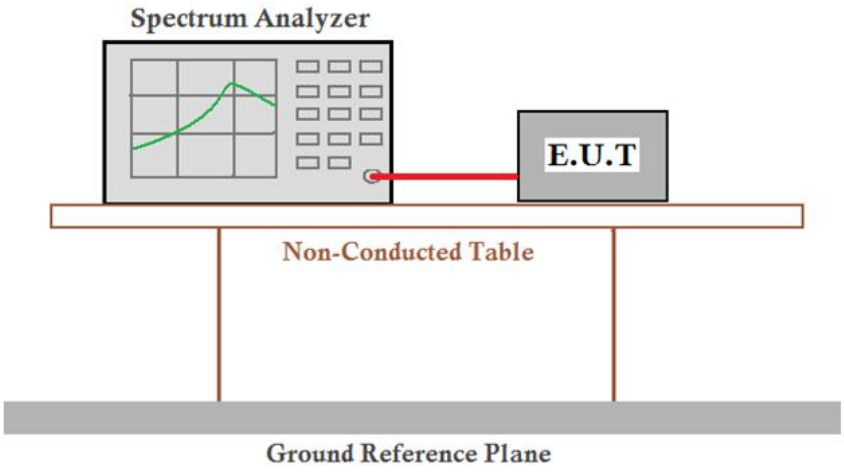
6.2 Spurious Emissions

6.2.1 Duty Cycle

Test Requirement: 47 CFR Part 15C Section 15.35 (c)

Test Method: ANSI C63.10:2013

Test Setup:



Limit: N/A

Test Mode: Transmitting mode

Test Results: Pass

Large pulse numbers	Large pulse time(ms)	Small pulse numbers	Small pulse time(ms)	T on time(ms)	T period(ms)	Duty cycle(%)
2	1.3623	36	0.6957	27.7698	100	27.7698

Note:

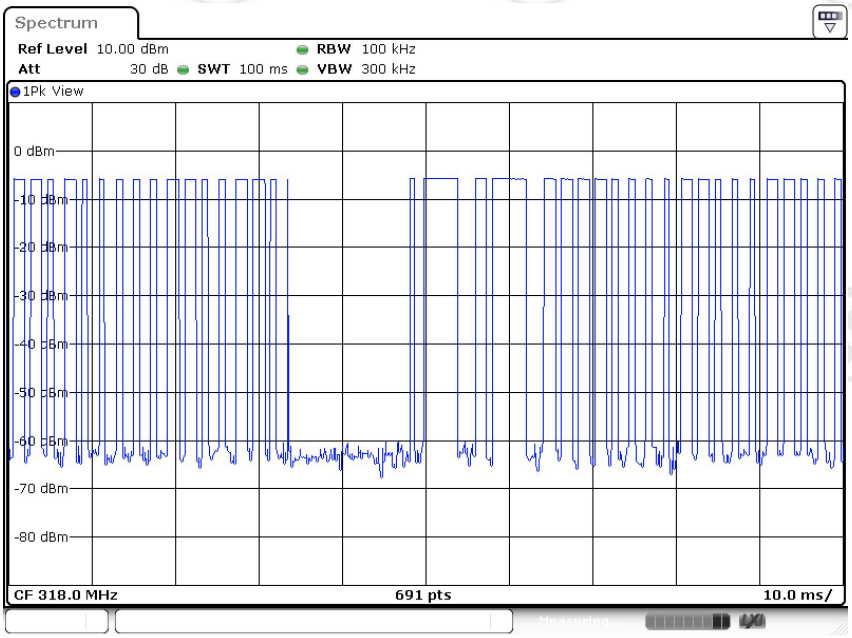
①T on time=Large pulse numbers*Large pulse time(ms)+Small pulse numbers*Small pulse time(ms);
②Duty cycle=T on time / T period(ms);

Test plot as follows:

Duty cycle numbers:

Large pulse numbers: 2;

Small pulse numbers: 36;

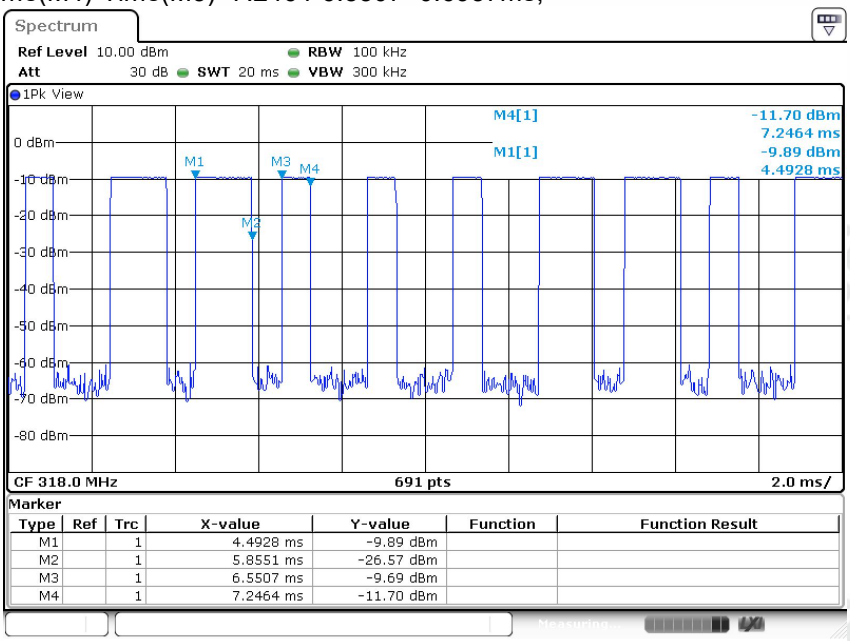


Date: 10.JAN.2025 16:39:07

Time slot:

Large pulse time:Time(M2)-Time(M1)=5.8551-4.4928=1.3623ms;

Small pulse time:Time(M4)-Time(M3)=7.2464-6.5507=0.6957ms;



Date: 10.JAN.2025 16:41:18

6.2.2 Spurious Emissions

Test Requirement: 47 CFR Part 15C Section 15.231(b) and 15.209

Test Method: ANSI C63.10: 2013

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Setup:

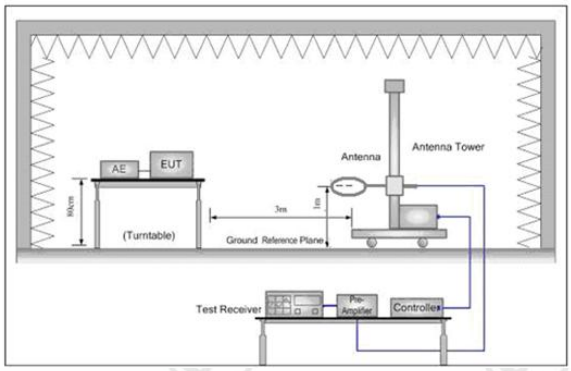


Figure 1. Below 30MHz

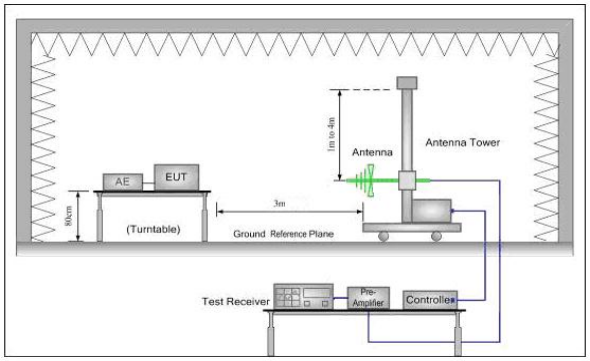


Figure 2. 30MHz to 1GHz

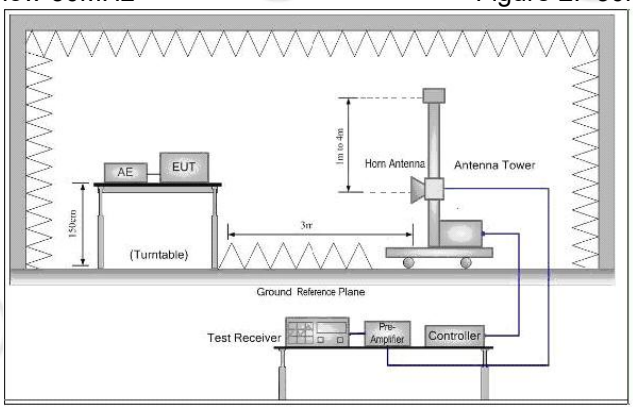


Figure 3. Above 1GHz

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the only channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit: (Spurious Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Limit: (Field strength of the fundamental signal)

Frequency(MHz)	Limit (dBμV/m @3m)	Remark
318	67.85	Average Value
	87.85	Peak Value

Test Mode: Transmitting mode

Test Results: Pass

Test data

Field Strength of the Fundamental Signal

Average value:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20*lg(Duty cycle)
	Duty cycle= T on time / T period
Test data:	T on time =27.7698ms
	T period =100ms
	PDCF= -11.13

Antenna polarization: Horizontal						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
318	62.71	16.49	64.70	87.85	-23.15	Peak
318	-	-	53.57	67.85	-12.28	Average

Antenna polarization: Vertical						
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
318	49.18	16.49	65.67	87.85	-22.18	Peak
318	-	-	54.54	67.85	-13.31	Average

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

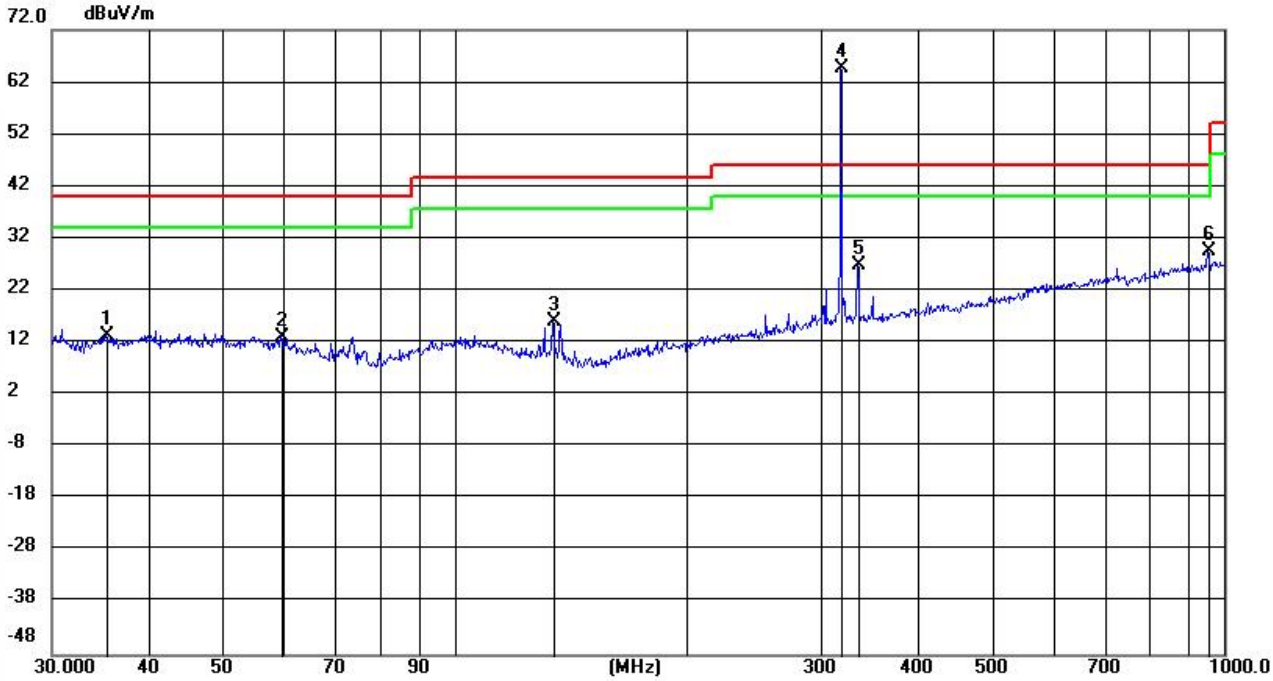
Spurious Emissions

9kHz-30MHz:

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30MHz-1GHz:

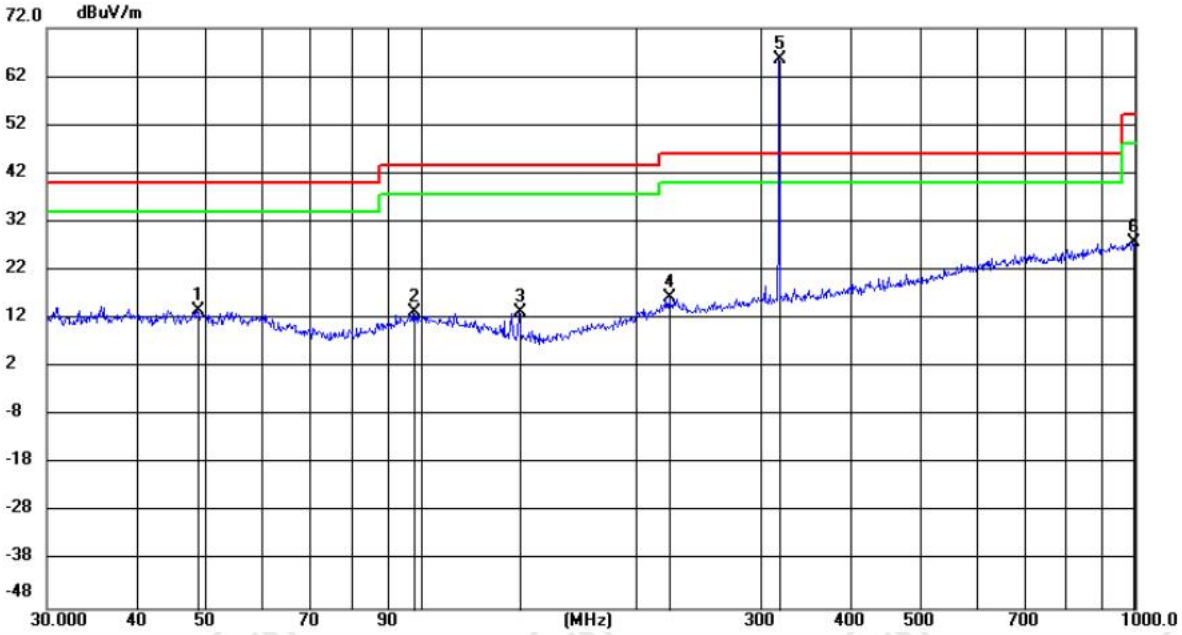
Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.2635	0.53	12.97	13.50	40.00	-26.50	QP	100	16	
2		59.5866	0.23	12.97	13.20	40.00	-26.80	QP	100	281	
3		134.3234	6.62	9.57	16.19	43.50	-27.31	QP	100	179	
4	*	318.0353	48.21	16.49	64.70	46.00	18.70	QP	100	6	
5		334.0379	9.92	16.79	26.71	46.00	-19.29	QP	100	0	
6		954.0989	3.39	26.23	29.62	46.00	-16.38	QP	100	98	

Note:The point of No.4 is the fundamental center frequency;

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		48.7146	0.15	13.55	13.70	40.00	-26.30	QP	200	118	
2		97.9699	0.37	12.87	13.24	43.50	-30.26	QP	100	327	
3		137.5166	4.01	9.33	13.34	43.50	-30.16	QP	200	16	
4		223.3806	3.14	13.26	16.40	46.00	-29.60	QP	100	337	
5	*	318.0353	49.18	16.49	65.67	46.00	19.67	QP	100	244	
6		994.5796	1.35	26.47	27.82	54.00	-26.18	QP	100	7	

Note:The point of No.5 is the fundamental center frequency;

Above 1GHz

EUT_Name	318MHz Transmitter	Test_Model	WB-602
Test_Mode	TX	Test_Frequency	318MHz
Tset_Engineer	chenjun	Test_Date	2025/01/09
Remark	23.5°C56.9%\		

Suspected List									
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1272.0272	-23.61	76.56	52.95	74.00	21.05	PASS	Horizontal	PK
2	1590.059	-21.97	84.50	62.53	74.00	11.47	PASS	Horizontal	PK
3	2226.1226	-18.10	73.33	55.23	74.00	18.77	PASS	Horizontal	PK
4	2862.1862	-15.47	73.35	57.88	74.00	16.12	PASS	Horizontal	PK
5	4133.8134	-11.81	61.97	50.16	74.00	23.84	PASS	Horizontal	PK
6	5405.9406	-8.35	55.58	47.23	74.00	26.77	PASS	Horizontal	PK
7	1590.5591	-21.95	73.23	51.28	54.00	2.72	PASS	Horizontal	AV
8	2226.6227	-18.09	69.11	51.02	54.00	2.98	PASS	Horizontal	AV
9	2862.6863	-15.47	66.39	50.92	54.00	3.08	PASS	Horizontal	AV
10	1590.059	-21.97	76.01	54.04	74.00	19.96	PASS	Vertical	PK
11	2544.1544	-16.21	69.80	53.59	74.00	20.41	PASS	Vertical	PK
12	2861.6862	-15.46	70.99	55.53	74.00	18.47	PASS	Vertical	PK
13	4133.8134	-11.81	62.03	50.22	74.00	23.78	PASS	Vertical	PK
14	4769.877	-10.31	57.91	47.60	74.00	26.40	PASS	Vertical	PK
15	5405.9406	-8.35	55.34	46.99	74.00	27.01	PASS	Vertical	PK
16	1590.5591	-21.95	74.14	52.19	54.00	1.81	PASS	Vertical	AV
17	2544.6545	-16.20	65.43	49.23	54.00	4.77	PASS	Vertical	AV
18	2862.6863	-15.47	66.56	51.09	54.00	2.91	PASS	Vertical	AV

Remark:

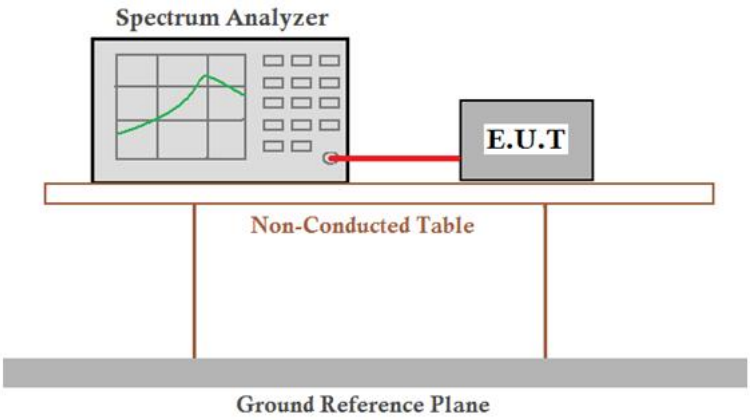
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading - Correct Factor
   Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
2) Scan from 9kHz to 6GHz, the disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

6.3 20dB Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.231 (c)

Test Method:

Test Setup:



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.

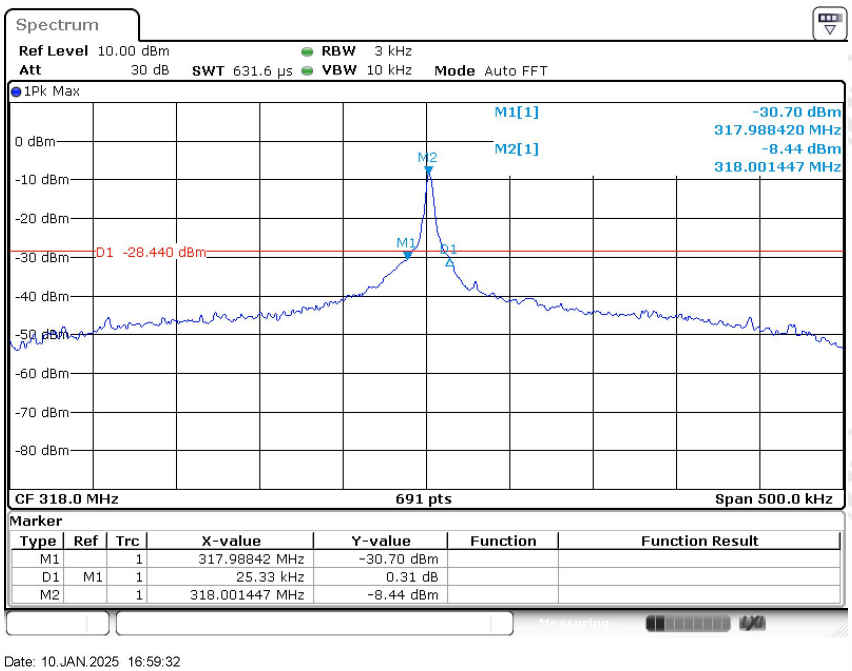
Test Mode: Transmitting mode

Test Results: Pass

Test data

20dB Bandwidth (kHz)	Limit (kHz)	Results
25.33	795	Pass

Test plot as follows:



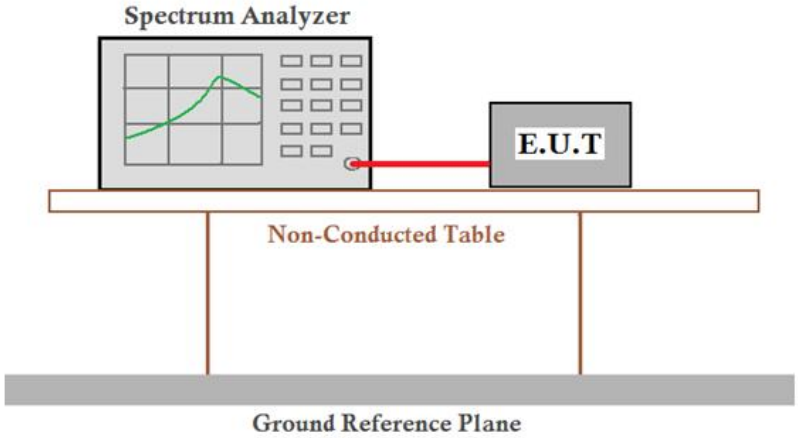
Date: 10.JAN.2025 16:59:32

6.4 Dwell Time

Test Requirement: 47 CFR Part 15C Section 15.231 (a)

Test Method: ANSI C63.10:2013

Test Setup:



Limit: Not more than 5 seconds

Test Mode: Transmitting mode

Test Results: Pass

Requirements:

1. Regulation 15.231 (a) The provisions of this Section are restricted to periodic operation within the band 40.66~40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

Result:

The EUT is a remote switch without audio or video transmitted.

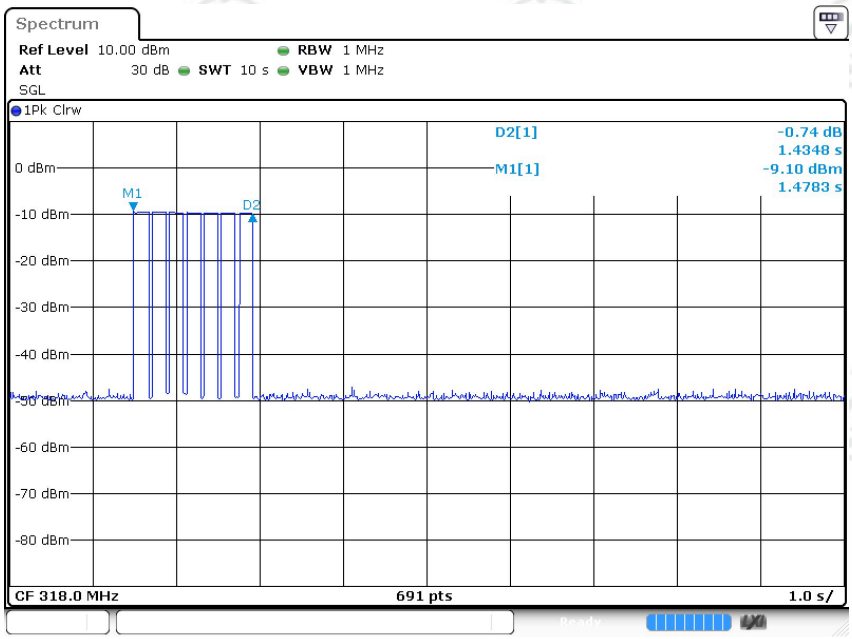
The EUT meets the requirements of this section.

2. Regulation 15.231 (a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result:

Test item	Limit (S)	Results(S)
Transmitting time	≤5	1.4348

Test plot as follows:



Date: 10.JAN.2025 16:46:50

3. Regulation 15.231 (a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Result:

The EUT does not have automatic transmission.

4. Regulation15.231 (a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

Result:

The EUT does not employ periodic transmission.

5. Regulation 15.231 (a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

Result:

This section is not applicable to the EUT.

Statement

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;

2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;

3. The result(s) shown in this report refer(s) only to the sample(s) tested;

4. Unless otherwise stated,the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule stated in ILAC-G8:09/2019/CNAS-GL015:2022;

5. Without written approval of CTI, this report can't be reproduced except in full.

*** End of Report ***