NVLAP TESTING
NVLAP LAB CODE 600341-0

BACL Bay Area Compliance Labs Corp.

TEST REPORT

Applicant:	**FOURSTAR GROUP INC**
Address:	**Tefa Community, No. 2003 Xiangmei North Road Futian District Shenzhen China**
Product Name:	**REMOTE CONTROL STUNT VEHICLE**
FCC ID:	**2AYNN62100966F-2**
Standard(s):	**47 CFR Part 15, Subpart C(15.235) ANSI C63.10-2013**
Report Number:	**2402S71497E-RF-00**
Report Date:	**2024/6/5**

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

Reviewed By: Gavin Xu	**Approved By:** Ivan Cao
Title: RF Engineer	Title: EMC Manager

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402S71497E-RF-00	Original Report	2024/6/5

1. GENERAL INFORMATION

1.1 General Description of Equipment under Test

EUT Name:	REMOTE CONTROL STUNT VEHICLE
EUT Model:	62100966F
Operation Frequency:	49.86MHz
Maximum Field Strength@3m:	69.56 dBμV/m
Rated Input Voltage:	DC 3V from battery
Serial Number:	2K9R-1
EUT Received Date:	2024/4/22
EUT Received Status:	Good

1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

1.3 Antenna Information Detail▲

Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Shantou Chenghai QIHAN Hardware Factory	Helical	Unknown	49.82-49.90MHz	Unknown
The design of compliance with §15.203:				
☒ Unit uses a permanently attached antenna.				
☐ Unit uses a unique coupling to the intentional radiator.				
☐ Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.				

1.4 Equipment Modifications

No modifications are made to the EUT during all test items.

2. SUMMARY OF TEST RESULTS

Standard(s)/Rule(s)	Description of Test	Result
§15.207(a)	Conduction Emissions	Not Applicable
§15.235(a)& 15.235(b)&15.209	Emissions Field Strength	Compliant
§15.215 (c)	20 dB Emission Bandwidth	Compliant
§15.203	Antenna Requirement	Compliant
Note: Not Applicable: the device was powered by battery.		

3. DESCRIPTION OF TEST CONFIGURATION

3.1 Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

3.2 EUT Exercise Software

No software was used in test.

3.3 Support Equipment List and Details

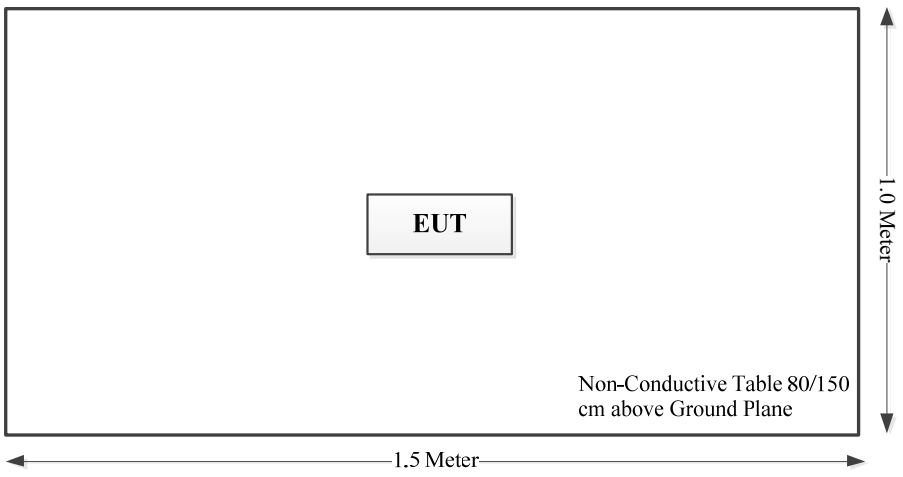
Manufacturer	Description	Model	Serial Number
/	/	/	/

3.4 Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

3.5 Block Diagram of Test Setup

Radiated Spurious Emissions:



3.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

3.7 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Radiated Field Strength Emissions	9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB, 18GHz~26.5GHz:5.47 dB, 26.5GHz~40GHz:5.63 dB
Temperature	±1℃
Humidity	±5%
AC Power Lines Conducted Emission	3.11 dB (150 kHz to 30 MHz)
DC and low frequency voltages	±0.4%
Occupied Channel Bandwidth	±5 %

4. REQUIREMENTS AND TEST RESULTS

4.1 AC Line Conducted Emissions

Not Applicable, the device was power by battery.

4.2 Radiated Field Strength Emissions

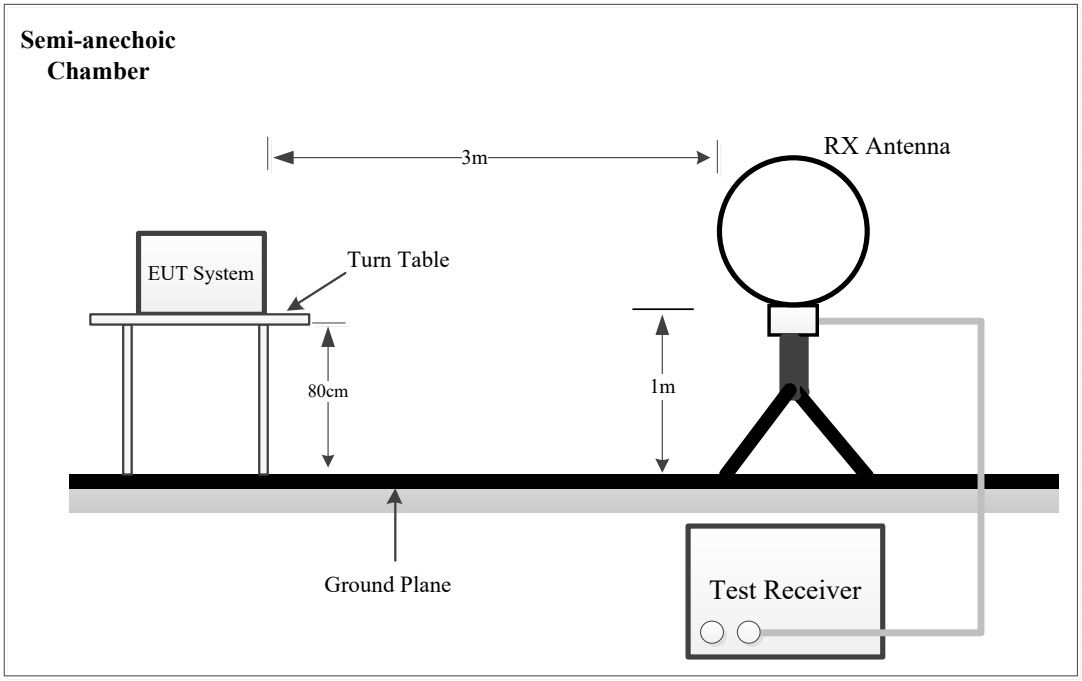
4.2.1 Applicable Standard

FCC 15.235(a)
The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

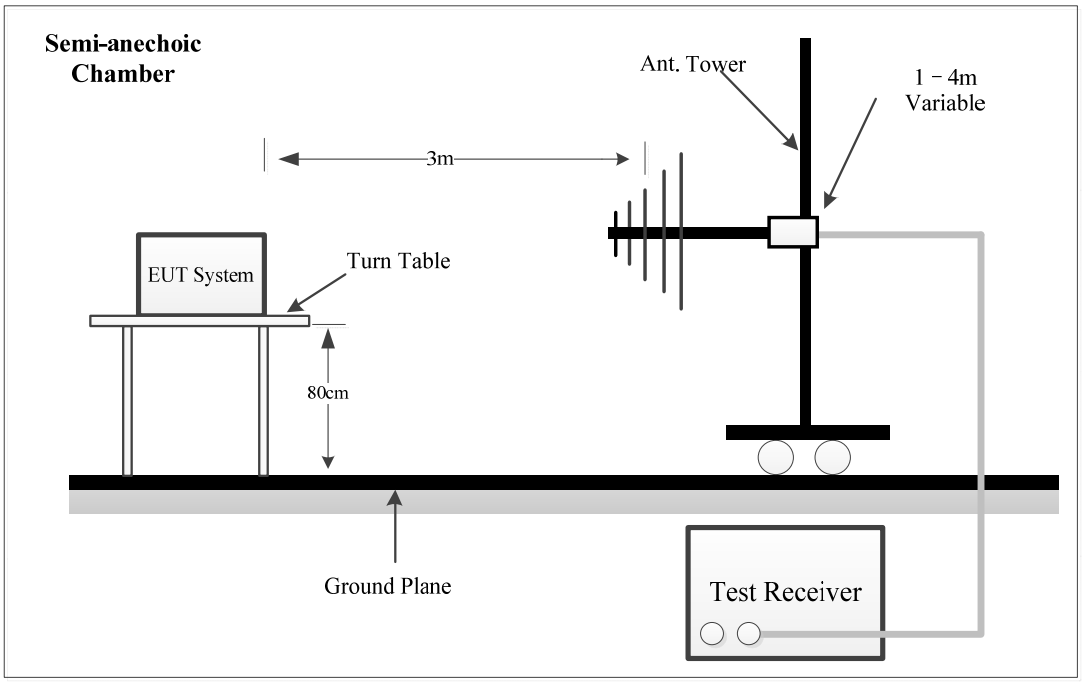
FCC 15.235(b)
The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification.

4.2.2 EUT Setup

9kHz~30MHz:



30MHz~1GHz:



The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC Part 15.235(a) & 15.235 (b) limits.

The spacing between the peripherals was 10 cm.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 1000MHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	/	/	200 Hz	QP
	300 Hz	1 kHz	/	PK
150 kHz – 30 MHz	/	/	9 kHz	QP
	10 kHz	30 kHz	/	PK
30 MHz – 1000 MHz	/	/	120 kHz	QP
	100 kHz	300 kHz	/	PK

If the maximized peak measured value complies with under the QP limit more than 6dB, then it is unnecessary to perform an QP measurement.

If the maximized peak measured value complies with under the Average limit, then it is unnecessary to perform an Average measurement.

4.2.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz - 1 GHz.

4.2.5 Corrected Result & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4.2.6 Test Result

Serial Number:	2K9R-1	Test Date:	2024/6/1~2024/6/5
Test Site:	Chamber 10m	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.2~26.7	Relative Humidity: (%)	51~70	ATM Pressure: (kPa)	100.8~101

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/21	2026/10/20
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2023/8/18	2024/8/17
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

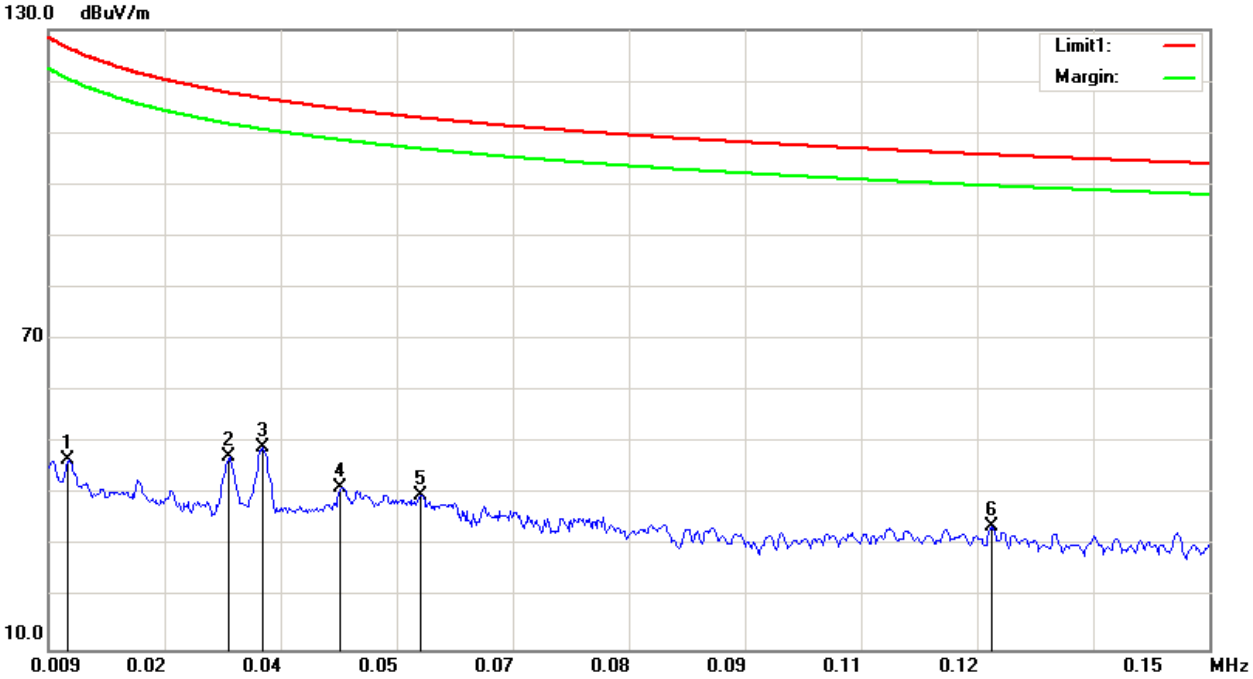
Test Data:

Please refer to the below table and plots.

After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

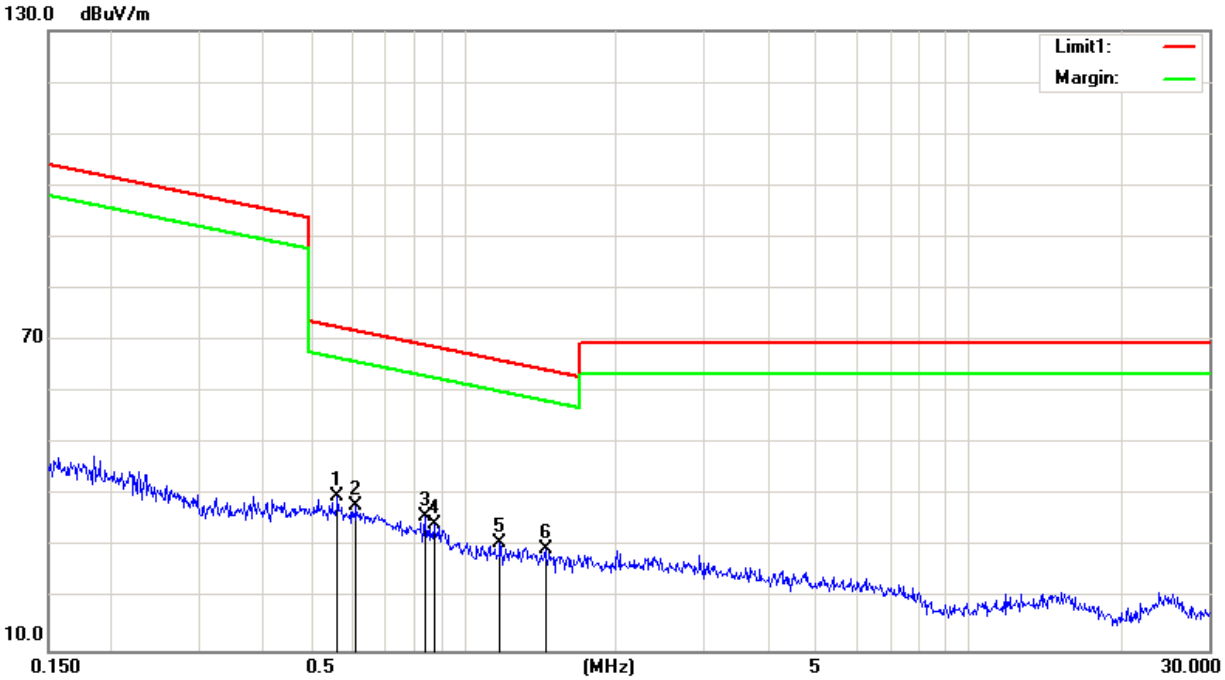
1) 9kHz~30MHz(the worst Polarization was reported)

Project No:	2402S71497E-RF
Test Engineer:	Zoo Zou
Test Date:	2024-6-1
Polarization:	Parallel
Test Mode:	Transmitting
Power Source:	DC 3V



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.0114	-5.66	peak	52.46	46.80	126.47	79.67
2	0.0310	-0.15	peak	47.37	47.22	117.78	70.56
3	0.0350	2.37	peak	46.66	49.03	116.72	67.69
4	0.0444	-3.63	peak	45.01	41.38	114.66	73.28
5	0.0543	-3.35	peak	43.32	39.97	112.91	72.94
6	0.1236	-0.37	peak	34.09	33.72	105.76	72.04

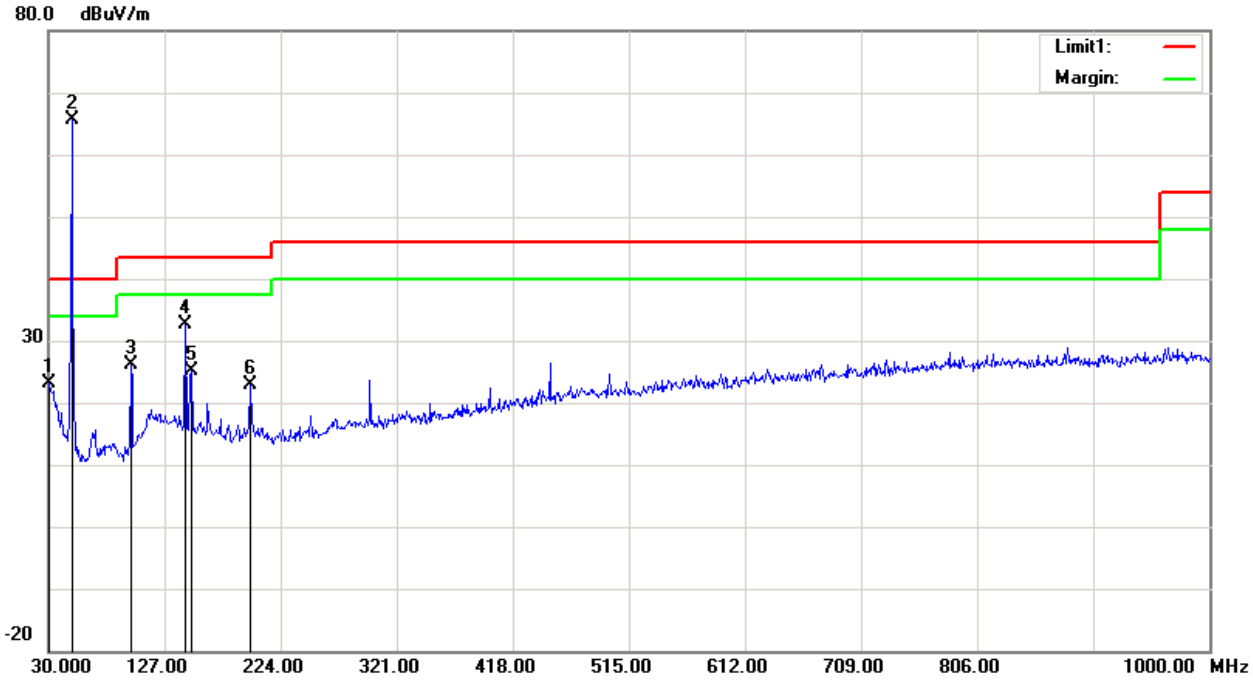
Project No:	2402S71497E-RF
Test Engineer:	Zoo Zou
Test Date:	2024-6-1
Polarization:	Parallel
Test Mode:	Transmitting
Power Source:	DC 3V



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	0.5611	17.04	peak	22.88	39.92	72.62	32.70
2	0.6108	15.81	peak	22.35	38.16	71.88	33.72
3	0.8350	16.14	peak	19.86	36.00	69.15	33.15
4	0.8710	15.20	peak	19.14	34.34	68.78	34.44
5	1.1781	14.97	peak	15.77	30.74	66.15	35.41
6	1.4485	14.98	peak	14.57	29.55	64.34	34.79

2) 30MHz-1GHz

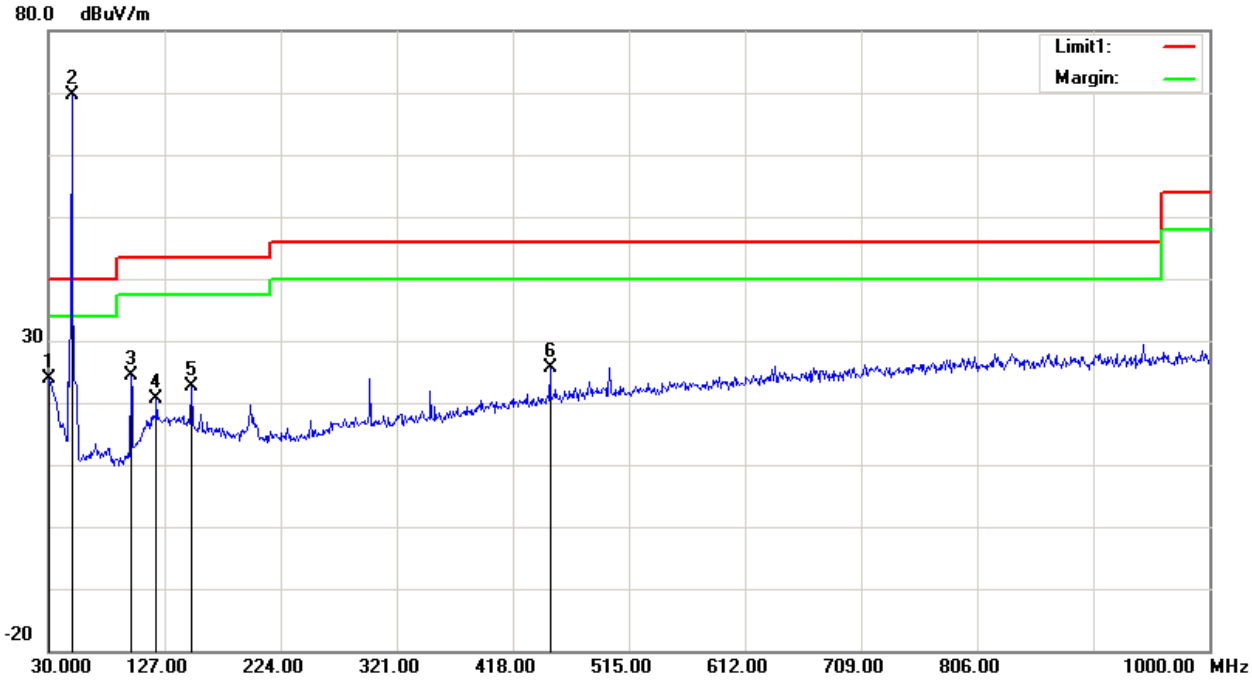
Project No:	2402S71497E-RF
Test Engineer:	Zoo Zou
Test Date:	2024-6-1
Polarization:	Horizontal
Test Mode:	Transmitting
Power Source:	DC 3V



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	30.0000	27.02	peak	-3.80	23.22	40.00	16.78
2*	**49.8600**	**81.94**	**peak**	**-16.34**	**65.60**	**80.00**	**14.40**
3	98.8700	40.80	peak	-14.68	26.12	43.50	17.38
4	144.4600	43.41	peak	-10.76	32.65	43.50	10.85
5	149.3100	36.16	peak	-10.99	25.17	43.50	18.33
6	198.7800	34.30	peak	-11.54	22.76	43.50	20.74

*Fundamental

Project No:	2402S71497E-RF
Test Engineer:	Zoo Zou
Test Date:	2024-6-1
Polarization:	Vertical
Test Mode:	Transmitting
Power Source:	DC 3V



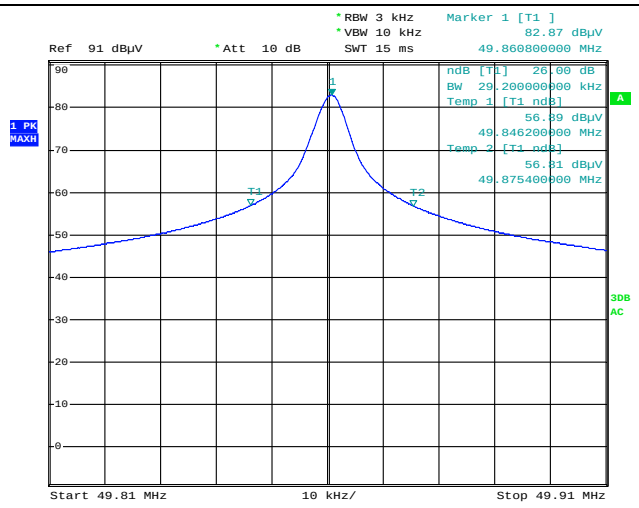
No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.65	peak	-3.80	23.85	40.00	16.15
2*	**49.8600**	**85.90**	**peak**	**-16.34**	**69.56**	**80.00**	**10.44**
3	98.8700	39.06	peak	-14.68	24.38	43.50	19.12
4	120.2100	30.64	peak	-9.92	20.72	43.50	22.78
5	149.3100	33.72	peak	-10.99	22.73	43.50	20.77
6	449.0400	31.12	AV	-5.49	25.63	46.00	20.37

*Fundamental

Bandedge:

Test Frequency (MHz)	26dB F_L (MHz)	26dB F_L Limit (MHz)	26dB F_H (MHz)	26dB F_H Limit (MHz)	Result
49.86	49.8462	49.81	49.8754	49.91	Pass

Bandedge



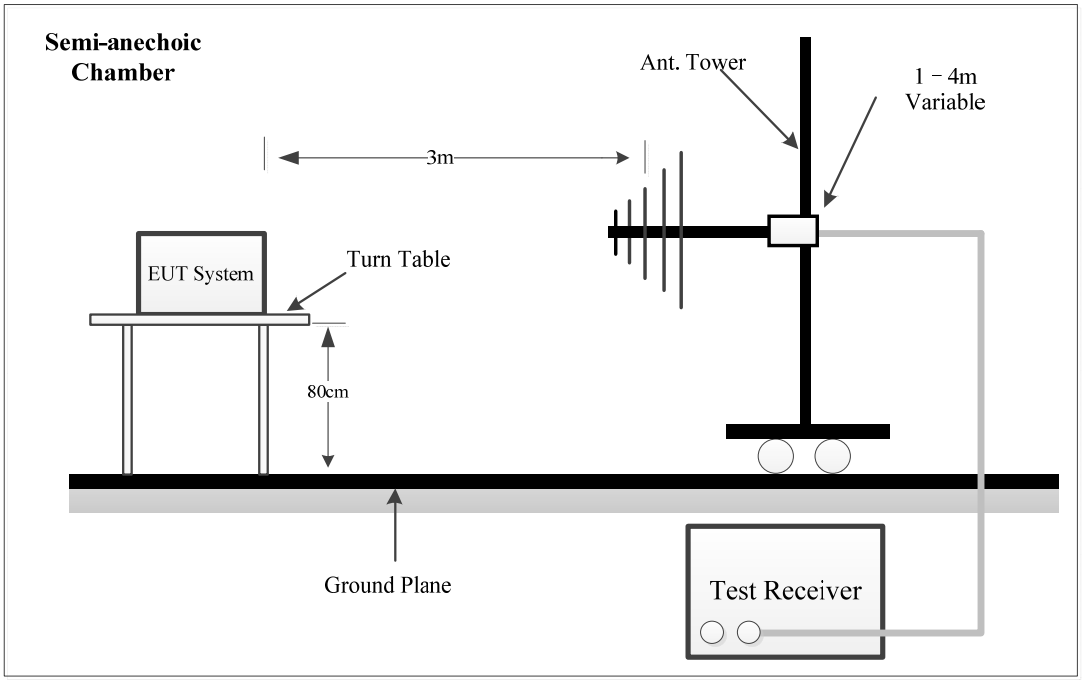
4.3 20 dB Emission Bandwidth

4.3.1 Applicable Standard

FCC §15.215

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.3.2 EUT Setup



4.3.3 Test Procedure

According to ANSI C63.10-2013 Section 6.9.2

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.

g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "−xx dB down amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "−xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3.4 Test Result

Serial Number:	2K9R-1	Test Date:	2024/6/5
Test Site:	Chamber 10m	Test Mode:	Transmitting
Tester:	Zoo Zou	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.2	Relative Humidity: (%)	51	ATM Pressure: (kPa)	101

Test Equipment List and Details:

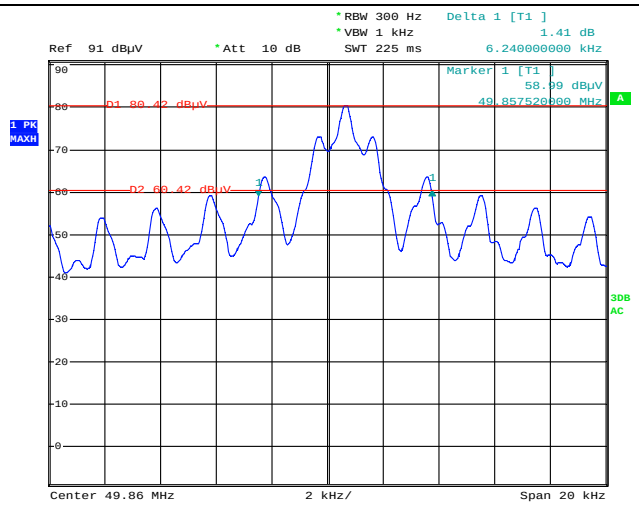
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2023/8/18	2024/8/17

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Frequency (MHz)	20dB Bandwidth (kHz)
49.86	6.24

20dB Emission Bandwidth



ProjectNo: 2402S71497E-RF Tester:Zoo Zou

Date: 5.JUN.2024 11:31:24

4.4 Antenna Requirement

4.4.1 Applicable Standard

FCC §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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

4.4.2 Judgment

Compliant. Please refer to the Antenna Information detail in Section 1.3.

APPENDIX A - EUT PHOTOGRAPHS

Please refer to the attachment 2402S71497E-RF-EXP EUT external photographs and 2402S71497E-RF-INP EUT internal photographs.

APPENDIX B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2402S71497E-RF-00-TSP test setup photographs.

APPENDIX C - RF EXPOSURE EVALUATION

Applicable Standard

FCC §1.1307(b)(3)(i)(A)

a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

Procedure

According to 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.2- 1-mW Test Exemption:

Per §1.1307(b)(3)(i)(A), a single RF source is *exempt RF device* (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Measurement Result

Frequency (MHz)	Maximum EIRP (dBm)	Maximum ERP		1-mW Test Exemption
		dBm	mW	
48.96	-25.64	-27.79	0.002	Compliant

Note:
1. This device maximum E-Field level is 69.56dBμV/m at 3m, so the EIRP power is -25.64 dBm.
2. Pout EIRP(dBm)=Field Strength of Fundamental(dBuV/m)-95.2
3. ERP(dBm) = EIRP(dBm)-2.15

Result: Compliant. RF Exposure is exemption**.**

******* END OF REPORT *******