TEST REPORT NUMBER: (8523)191-0356

TEST REPORT

Applicant:	GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD	Fax:	---
		E-mail:	---
Address :	NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENG HAI, Shantou, China		
Test Date :	2023-7-18 to 2023-7-26		

Manufacturer or Supplier :	GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD
Address :	NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENG HAI, Shantou, China
Sample Description:	DRONE
Model number:	K11, SMPTC-90025, SMPTC-90040
Additional Model :	N/A
Rated Voltage:	DC 6V(1.5V*AA*4)
FCC ID :	QV7-GC88752-93
The submitted sample of the above equipment has been tested according to following standard(s)	
47 CFR Part 15, Subpart C 249	
CONCLUSION: The submitted sample was found to COMPLY with the test requirement	

Assistant Manager

Name: Nick Lung

Date: NOV 28,2023

1 Test Summary

Test Item	IC 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 15.249 (a)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15, Subpart C Section 15.249 (a)/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency	47 CFR Part 15, Subpart C Section 15.249(a)/15.205	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215 (c)	ANSI C63.10-2013	PASS

2 Contents

3 General Information

3.1 Client Information

Applicant:	GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD
Address of Applicant:	NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENG HAI, Shan tou, China
Manufacturer:	GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD
Address of Manufacturer:	NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENG HAI, Shan tou, China

3.2 General Description of EUT

Name:	DRONE
Test Model No.:	SMPTC-90040
Trade Mark :	N/A
Serial No.:	---
Software Version:	1.0
Hardware Version:	1.0
Frequency Range:	2408-2472MHz
Modulation Type:	GFSK
Number of Channels:	65
Sample Type:	Portable product
Antenna Type:	Internal antenna
Antenna Gain:	-1.14dBi
Power Supply:	DC 6V(1.5V*AA*4)

Note:

Model number:K11, SMPTC-90025, SMPTC-90040

Test Model number:SMPTC-90040

Their electrical circuit design, layout, components used and internal wiring are identical, Only the difference in appearance,color is different.

Operation Frequency each of channel									
CH	FREQ	CH	FREQ	CH	FREQ	CH	FREQ	CH	FREQ
1	2.408GHz	16	2.423GHz	31	2.438GHz	46	2.453GHz	61	2.468GHz
2	2.409GHz	17	2.424GHz	32	2.439GHz	47	2.454GHz	62	2.469GHz
3	2.410GHz	18	2.425GHz	33	2.440GHz	48	2.455GHz	63	2.470GHz
4	2.411GHz	19	2.426GHz	34	2.441GHz	49	2.456GHz	64	2.471GHz
5	2.412GHz	20	2.427GHz	35	2.442GHz	50	2.457GHz	65	2.472GHz
6	2.413GHz	21	2.428GHz	36	2.443GHz	51	2.458GHz		
7	2.414GHz	22	2.429GHz	37	2.444GHz	52	2.459GHz		
8	2.415GHz	23	2.430GHz	38	2.445GHz	53	2.460GHz		
9	2.416GHz	24	2.431GHz	39	2.446GHz	54	2.461GHz		
10	2.417GHz	25	2.432GHz	40	2.447GHz	55	2.462GHz		
11	2.418GHz	26	2.433GHz	41	2.448GHz	56	2.463GHz		
12	2.419GHz	27	2.434GHz	42	2.449GHz	57	2.464GHz		
13	2.420GHz	28	2.435GHz	43	2.450GHz	58	2.465GHz		
14	2.421GHz	29	2.436GHz	44	2.451GHz	59	2.466GHz		
15	2.422GHz	30	2.437GHz	45	2.452GHz	60	2.467GHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel	2408MHz
The Middle channel	2440MHz
The Highest channel	2472MHz

3.3 Test Environment and Mode

Operating Environment:	
Temperature:	29 °C
Humidity:	59 % RH
Atmospheric Pressure:	1001mbar
Test mode:	
Test Mode:	Use test software (RF test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.

3.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
/	/	/	/	/

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **CQA** laboratory is reported:

No.	Item	Uncertainty
1	Radiated Emission (Below 1GHz)	5.12dB
2	Radiated Emission (Above 1GHz)	4.60dB
3	Conducted Disturbance (0.15~30MHz)	3.34dB
4	Radio Frequency	3×10^{-8}
5	Duty cycle	0.6 %
6	Occupied Bandwidth	1.1%
7	RF conducted power	0.86dB
8	RF power density	0.74
9	Conducted Spurious emissions	0.86dB
10	Temperature test	0.8℃
11	Humidity test	2.0%
12	Supply voltages	0.5 %
13	time	0.6 %.
14	Frequency Error	5.5 Hz

3.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

3.7 Tsters and auditors

The tester in this report is Timo Lei， The auditor of this report is Lewis Zhou, The test site is:Shenzhen Huaxia Testing Technology Co., Ltd.

3.8 Test Facility

• ISED No.: 22984

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

3.9 Deviation from Standards

None.

3.10 Abnormalities from Standard Conditions

None.

3.11 Other Information Requested by the Customer

None.

3.12 Equipment List

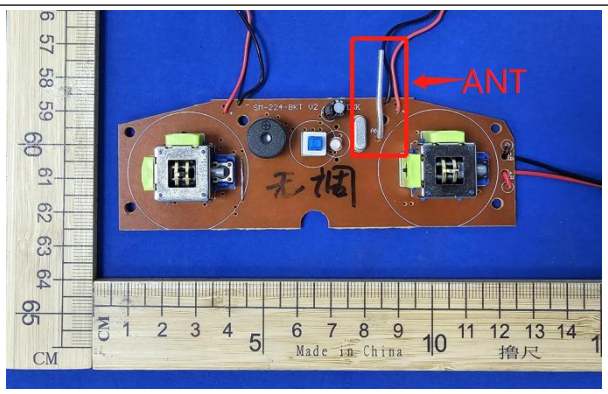
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2022/9/9	2023/9/8
Spectrum analyzer	R&S	FSU26	CQA-038	2022/9/9	2023/9/8
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2022/9/9	2023/9/8
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2022/9/9	2023/9/8
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2021/9/16	2024/9/15
Bilog Antenna	R&S	HL562	CQA-011	2021/9/16	2024/9/15
Horn Antenna	R&S	HF906	CQA-012	2021/9/16	2024/9/15
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2021/9/16	2024/9/15
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2022/9/9	2023/9/8
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2022/9/9	2023/9/8
Antenna Connector	CQA	RFC-01	CQA-080	2022/9/9	2023/9/8
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2022/9/9	2023/9/8
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2022/9/9	2023/9/8

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
EUT Antenna:	
The antenna is soldered on the PCB, no need to consider replacement. best case gain Antenna is -1.14dBi.	

4.2 Radiated Emission

Test Requirement:	47 CFR Part 15, Subpart C Section 15.205/15.209
Test Method:	ANSI C63.10
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	100 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Note: For fundamental frequency, RBW=5MHz, VBW=5MHz, Peak detector is for PK value, RMS detector is for Average value.

Limit:
(Spurious Emissions and band edge)

Frequency	Field strength (microvolt/meter)	Limit (dBuV/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: 1) 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.

2) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Limit:
(Field strength of the

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value

fundamental signal)		114.0	Peak Value	
Test Setup:				

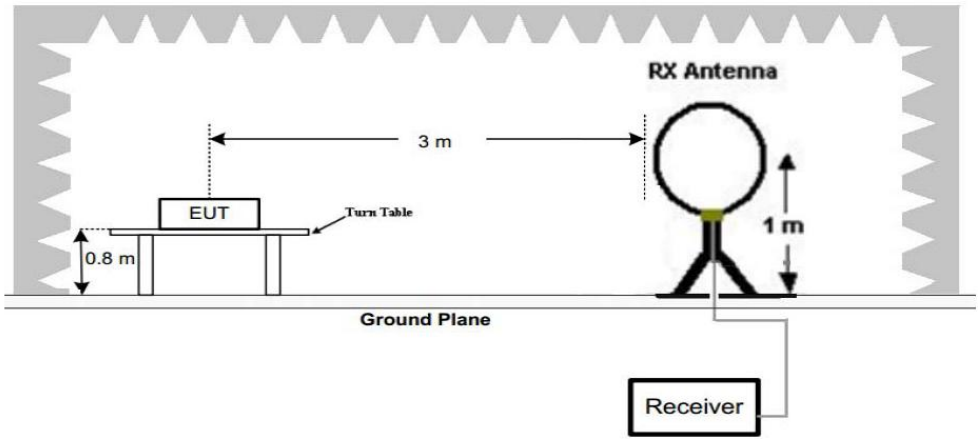


Figure 1. Below 30MHz

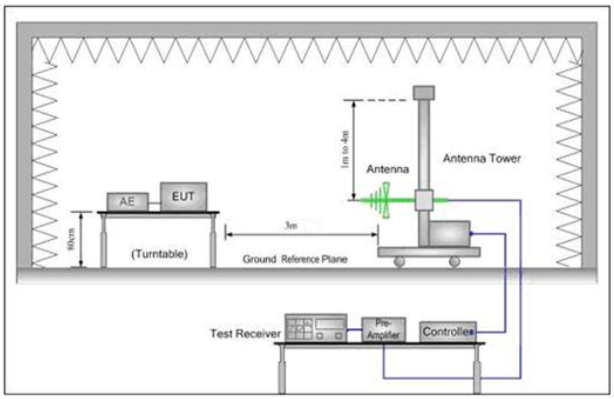


Figure 2. 30MHz to 1GHz

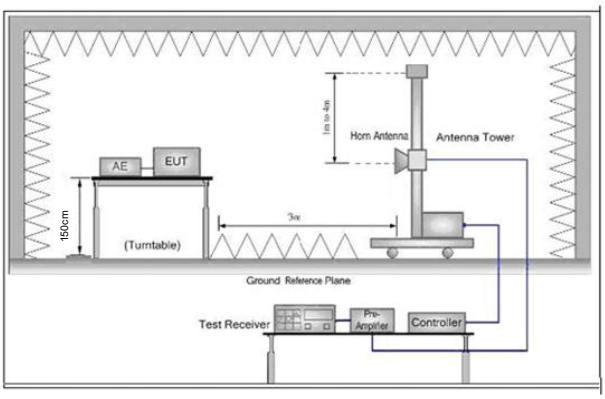


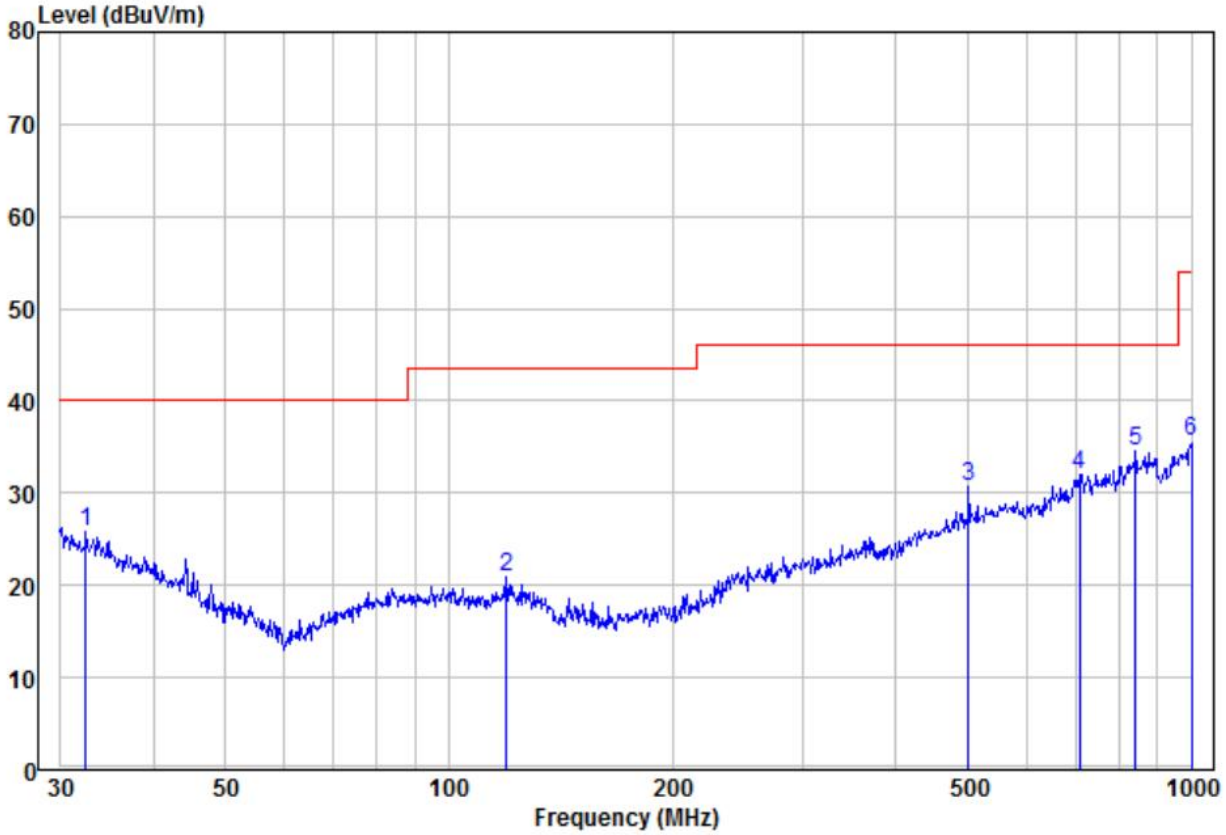
Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: 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. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 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. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. 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. g. Test the EUT in the lowest channel,the middle channel,the Highest channel h. 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. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with GFSK at lowest, middle and highest channel.
Final Test Mode:	Pretest the EUT at Transmitting mode, For below 1GHz part, through pre-scan, the worst case is the lowest channel. Only the worst case is recorded in the report.
Test Voltage:	DC6V (1.5V*AA*4)
Test Results:	Pass

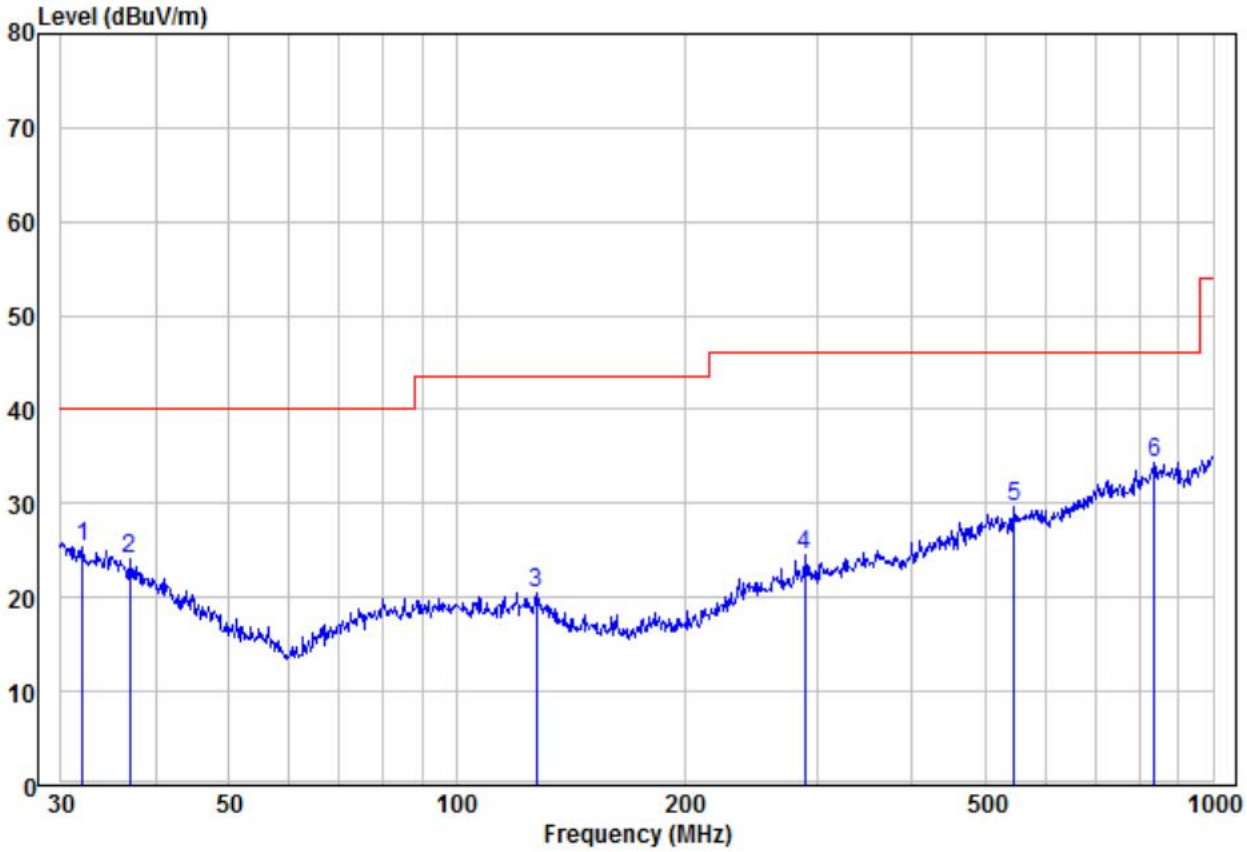
Measurement Data

30MHz~1GHz (the worst case)		
Test mode:	Transmitting (Lowest channel)	Vertical



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	32.41	10.53	15.28	25.81	40.00	-14.19	QP	VERTICAL
2	119.44	10.34	10.67	21.01	43.50	-22.49	QP	VERTICAL
3	501.18	12.40	18.29	30.69	46.00	-15.31	QP	VERTICAL
4	706.70	10.82	21.13	31.95	46.00	-14.05	QP	VERTICAL
5 pp	842.13	10.51	24.10	34.61	46.00	-11.39	QP	VERTICAL
6	1000.00	10.56	25.14	35.70	54.00	-18.30	QP	VERTICAL

30MHz~1GHz (the worst case)		
Test mode:	Transmitting (Lowest channel)	Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	32.07	9.98	15.38	25.36	40.00	-14.64	QP	HORIZONTAL
2	37.02	10.15	13.87	24.02	40.00	-15.98	QP	HORIZONTAL
3	127.66	10.10	10.41	20.51	43.50	-22.99	QP	HORIZONTAL
4	289.00	11.25	13.37	24.62	46.00	-21.38	QP	HORIZONTAL
5	545.18	10.87	18.75	29.62	46.00	-16.38	QP	HORIZONTAL
6 pp	836.24	10.24	24.12	34.36	46.00	-11.64	QP	HORIZONTAL

Above 1GHz			
Test mode:	Transmitting	Test channel:	Lowest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390	59.09	-9.2	49.89	74	-24.11	Peak	H
2390	44.07	-9.2	34.87	54	-19.13	AVG	H
2400	60.16	-9.39	50.77	74	-23.23	Peak	H
2400	46.68	-9.39	37.29	54	-16.71	AVG	H
2408	99.22	-9.33	89.89	114	-24.11	peak	H
2408	96.57	-9.33	87.24	94	-6.76	AVG	H
4816	56.39	-4.28	52.11	74	-21.89	peak	H
4816	42.28	-4.28	38.00	54	-16.00	AVG	H
7224	51.72	1.13	52.85	74	-21.15	peak	H
7224	37.17	1.13	38.30	54	-15.70	AVG	H
2390	59.15	-9.2	49.95	74	-24.05	peak	V
2390	44.26	-9.2	35.06	54	-18.94	AVG	V
2400	59.79	-9.39	50.40	74	-23.60	peak	V
2400	46.94	-9.39	37.55	54	-16.45	AVG	V
2408	95.96	**-9.33**	86.63	114	-27.37	peak	V
2408	90.95	-9.33	81.62	94	-12.38	AVG	V
4816	55.72	-4.28	51.44	74	-22.56	peak	V
4816	41.61	-4.28	37.33	54	-16.67	AVG	V
7224	51.79	1.13	52.92	74	-21.08	peak	V
7224	37.63	1.13	38.76	54	-15.24	AVG	V

Test mode:	Transmitting	Test channel:	Middle

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2440	98.41	-9.37	89.04	114	-24.96	peak	H
2440	97.56	-9.37	88.19	94	-5.81	AVG	H
4880	56.71	-4.14	52.57	74	-21.43	peak	H
4880	43.52	-4.14	39.38	54	-14.62	AVG	H
7320	52.74	0.56	53.30	74	-20.70	peak	H
7320	36.80	0.56	37.36	54	-16.64	AVG	H
2440	95.83	-9.36	86.47	114	-27.53	peak	V
2440	93.27	-9.36	83.91	94	-10.09	AVG	V
4880	55.39	-4.14	51.25	74	-22.75	peak	V
4880	40.80	-4.14	36.66	54	-17.34	AVG	V
7320	51.38	0.56	51.94	74	-22.06	peak	V
7320	38.65	0.56	39.21	54	-14.79	AVG	V

Test mode:	Transmitting	Test channel:	Highest

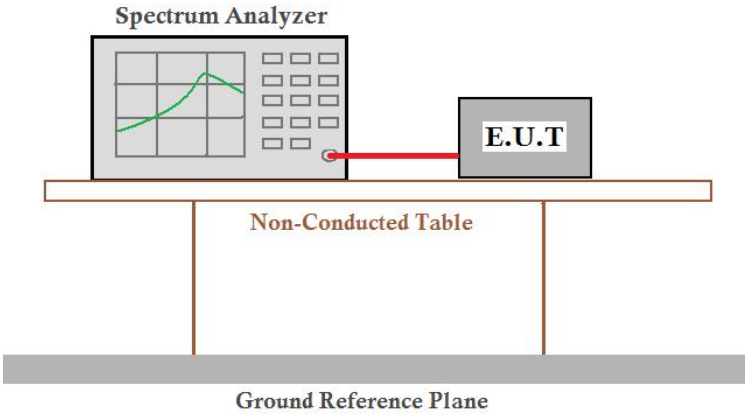
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2472	98.12	-9.23	88.89	114	-25.11	peak	H
2472	96.43	-9.23	87.20	94	-6.80	AVG	H
2483.5	61.85	-9.29	52.56	74	-21.44	Peak	H
2483.5	45.38	-9.29	36.09	54	-17.91	AVG	H
4944	56.21	-4.03	52.18	74	-21.82	peak	H
4944	43.61	-4.03	39.58	54	-14.42	AVG	H
7416	53.31	1.68	54.99	74	-19.01	peak	H
7416	36.67	1.68	38.35	54	-15.65	AVG	H
2472	97.20	-9.23	87.97	114	-26.03	peak	V
2472	94.54	-9.23	85.31	94	-8.69	AVG	V
2483.5	61.23	-9.29	51.94	74	-22.06	peak	V
2483.5	44.27	-9.29	34.98	54	-19.02	AVG	V
4944	55.29	-4.03	51.26	74	-22.74	peak	V
4944	40.81	-4.03	36.78	54	-17.22	AVG	V
7416	52.10	1.68	53.78	74	-20.22	peak	V
7416	37.95	1.68	39.63	54	-14.37	AVG	V

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 + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz,The disturbance above 8GHz and 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 .

4.3 20dB Bandwidth

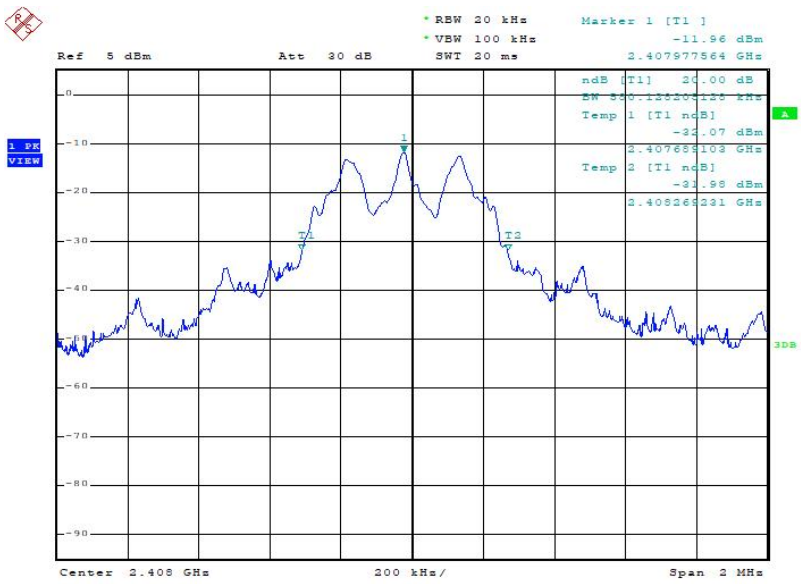
Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013 & RSS-Gen Section 6.7
Test Setup:	
Test Mode:	Transmitting with GFSK at lowest, middle and highest channel.
Limit:	N/A
Test Results:	Pass

Measurement Data

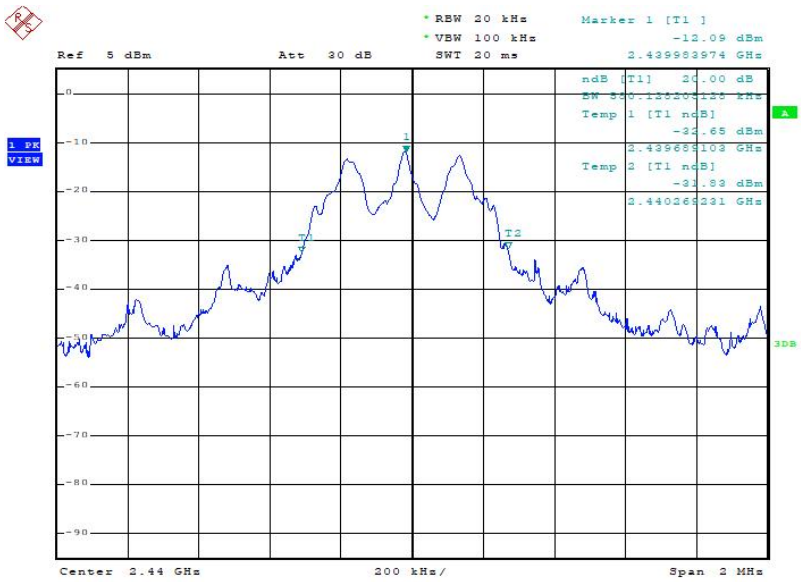
Test channel	20dB bandwidth (MHz)	Results
Lowest	0.580	Pass
Middle	0.580	Pass
Highest	0.580	Pass

Test plot as follows:

Test channel:	Lowest



Test channel:	Middle



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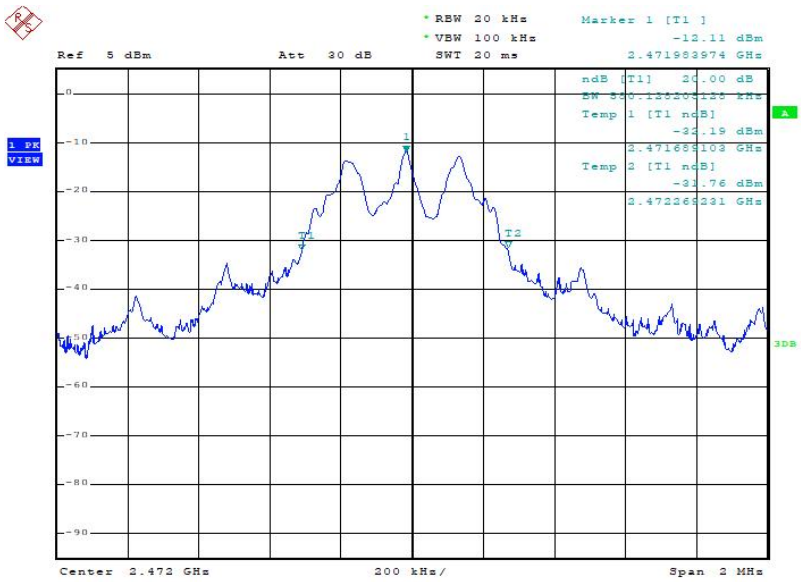
Test channel:	Highest



Date: 19.JUL.2023 15:51:27

5 Photographs

5.1 Radiated Emission Test Setup

See the Appendix 1- Test Setup Photos

5.2 EUT Constructional Details

See the Appendix 2- EUT Photos

*** END OF REPORT ***