RF TEST REPORT

For

Chenghai Black Horse toy factory, Shantou
Product Name: Quadcopter
Test Model(s).: E99

Report Reference No.	:	**DACE240920003RF001**
FCC ID	:	**2BLFO-E99**
Applicant's Name	:	Chenghai Black Horse toy factory, Shantou
Address	:	1F, 336 Wang, Lung Tin Lung Chung Wai, Lung Tin Lung Yick Street, Chenghai District, Shantou
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**47 CFR Part 15.249**
Date of Receipt	:	September 20, 2024
Date of Test	:	September 20, 2024 to September 26, 2024
Data of Issue	:	September 26, 2024
Result	:	**Pass**

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE240920003RF001	September 26, 2024

NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:	Supervised by:	Approved by:
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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz

1.2 Summary of Test Result

Item	Standard	Method	Requirement	Result
Antenna requirement	47 CFR Part 15.249	/	47 CFR Part 15.203	Pass
Occupied Bandwidth	47 CFR Part 15.249	ANSI C63.10-2013, section 6.9.2	47 CFR 15.215(c)	Pass
Field strength of fundamental	47 CFR Part 15.249	ANSI C63.10-2013 section 6.6	47 CFR 15.249(a) 47 CFR 15.249(b)(1)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.249	ANSI C63.10-2013 section 6.6.4	47 CFR 15.249(d)	Pass
Emissions in frequency bands (below 1GHz)	47 CFR Part 15.249	ANSI C63.10-2013 section 6.5	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)	Pass
Emissions in frequency bands (above 1GHz)	47 CFR Part 15.249	ANSI C63.10-2013 section 6.6	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)	Pass

Note:1. N/A-- Not applicable to the this test clause.
2. The results of all conduction method tests include cable loss.

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Chenghai Black Horse toy factory, Shantou
Address : 1F, 336 Wang, Lung Tin Lung Chung Wai, Lung Tin Lung Yick Street, Chenghai District, Shantou

Manufacturer : Chenghai Black Horse toy factory, Shantou
Address : 1F, 336 Wang, Lung Tin Lung Chung Wai, Lung Tin Lung Yick Street, Chenghai District, Shantou

2.2 Description of Device (EUT)*

Product Name:	Quadcopter
Sample No.:	Q240920005-1
Model/Type reference:	E99
Series Model:	E88, E99Pro, E88Pro, E99Max, E88Max, E99ProMax, E88ProMax, E89, E79, H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35, H36, H37, H38, H39, H40, H41, H42, H43, H44, H45, H46, H47, H48, H49, H50
Model Difference:	There are many EUT models because of the model number requested by the client and the multiple colors and models on the RX side of the product, but all TX sides are the same, so the test model number is E99.
Trade Mark:	MHD
Product Description:	Quadcopter
Power Supply:	DC4.5V from AAA*3 battery
Operation Frequency:	2405-2475MHz
Number of Channels:	36
Modulation Type:	GFSK
Antenna Type:	PCB ANT
Antenna Gain:	2.75dBi

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	10	2423MHz	19	2441MHz	28	2459MHz
2	2407MHz	11	2425MHz	20	2443MHz	29	2461MHz
3	2409MHz	12	2427MHz	21	2445MHz	30	2463MHz
4	2411MHz	13	2429MHz	22	2447MHz	31	2465MHz
5	2413MHz	14	2431MHz	23	2449MHz	32	2467MHz
6	2415MHz	15	2433MHz	24	2451MHz	33	2469MHz
7	2417MHz	16	2435MHz	25	2453MHz	34	2471MHz
8	2419MHz	17	2437MHz	26	2455MHz	35	2473MHz
9	2421MHz	18	2439MHz	27	2457MHz	36	2475MHz

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:

Test channel	Frequency (MHz)-2.4GHz
Lowest channel	2405MHz
Middle channel	2445MHz
Highest channel	2475MHz

2.3 Description of Test Modes

No	Title	Description
TM1	working mode	working mode

2.4 Description of Support Units

Title	Manufacturer	Model No.	Serial No.
RX	Chenghai Black Horse toy factory, Shantou	/	/

2.5 Equipments Used During The Test

Occupied Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RF Test Software	TACHOY	RTS-01	V1.0.0	/	/
Signal Generator	Keysight	N5181A	MY48180415	2023-11-09	2024-11-08
Signal Generator	Keysight	N5182A	MY50143455	2023-11-09	2024-11-08
Spectrum Analyzer	Keysight	N9020A	MY53420323	2023-12-12	2024-12-11

Field strength of fundamental Band edge emissions (Radiated) Emissions in frequency bands (below 1GHz) Emissions in frequency bands (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EMI Test software	Farad	EZ -EMC	V1.1.42	/	/
Positioning Controller	/	MF-7802	/	/	/
Amplifier(18-40G)	COM-POWER	AH-1840	10100008-1	2022-04-05	2025-04-04
Horn antenna	COM-POWER	AH-1840 (18-40G)	10100008	2023-04-05	2025-04-04
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2024-06-14	2026-06-13
Cable(LF)#2	Schwarzbeck	/	/	2024-02-19	2025-02-18
Cable(LF)#1	Schwarzbeck	/	/	2024-02-19	2025-02-18
Cable(HF)#2	Schwarzbeck	AK9515E	96250	2024-03-20	2025-03-19
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2024-03-20	2025-03-19
Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2024-06-12	2025-06-11
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2024-06-12	2025-06-11
Spectrum Analyzer	R&S	FSP30	1321.3008K40-101729-jR	2024-06-12	2025-06-11
Test Receiver	R&S	ESCI 3	1166.5950K03-101431-Jq	2024-06-13	2025-06-12

Horn Antenna	Sunol Sciences	DRH-118	A091114	2023-05-13	2025-05-12
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2023-05-21	2025-05-20

2.6 Statement Of The Measurement Uncertainty

Test Item	Measurement Uncertainty
Occupied Bandwidth	±3.63%
Radiated Emission (Above 1GHz)	±5.46dB
Radiated Emission (Below 1GHz)	±5.79dB
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

2.7 Identification of Testing Laboratory

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102 Building H1 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao′ an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102 Building H1 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao′ an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252
FCC Registration Number:	0032847402
Designation Number:	CN1342
Test Firm Registration Number:	778666
A2LA Certificate Number:	6270.01

2.8 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by DACE and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

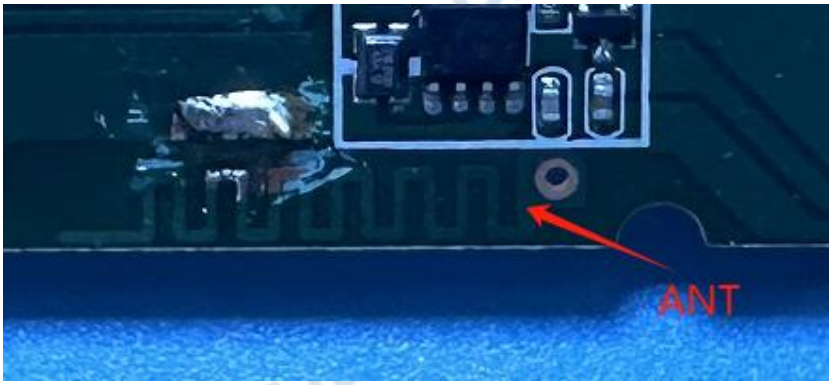
(6) We hereby declare that the laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant(information with "*" provided by applicant). the laboratory is not responsible for the accuracy of the information provided by the client. When the information provided by the customer may affect the effectiveness of the results, the responsibility lies with the customer, and the laboratory does not assume any responsibility.

3 Evaluation Results (Evaluation)

3.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.1.1 Conclusion:



4 Radio Spectrum Matter Test Results (RF)

4.1 Occupied Bandwidth

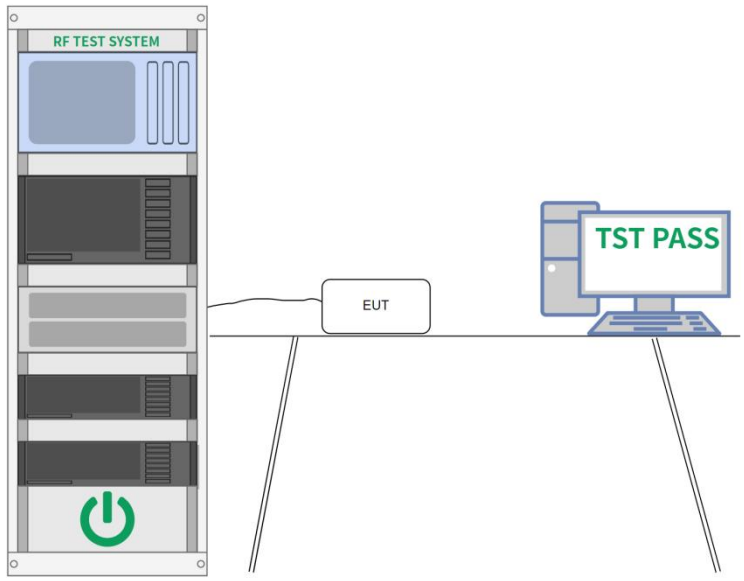
Test Requirement:	47 CFR 15.215(c)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the 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.
Test Method:	ANSI C63.10-2013, section 6.9.2
Procedure:	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).

4.1.1 E.U.T. Operation:

Operating Environment:

Temperature:	23.3 °C	Humidity:	50 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.1.2 Test Setup Diagram:



4.1.3 Test Data:

Please Refer to Appendix for Details.

4.2 Field strength of fundamental

Test Requirement:	Except as provided in paragraph (b)of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

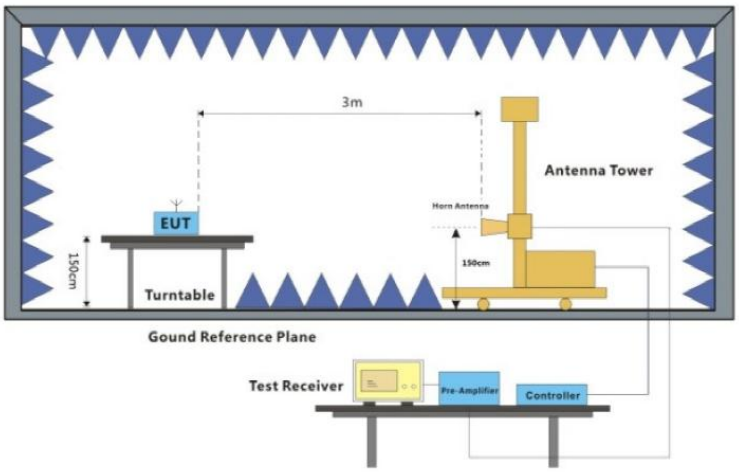
The field strength of emissions in this band shall not exceed 2500 millivolts/meter.

Test Method:	ANSI C63.10-2013 section 6.6
Procedure:	ANSI C63.10-2013 section 6.6

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.3 °C	Humidity:	50 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Frequency	Emission Level	Limits	Margin	Detector	Polarization
(MHz)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(PK/AV)	(H/V)
2405	92.52	114.00	-21.48	PK	H
2405	90.61	114.00	-23.39	PK	V
2445	92.79	114.00	-21.21	PK	H
2445	91.61	114.00	-22.39	PK	V
2475	89.23	114.00	-24.77	PK	H
2475	88.39	114.00	-25.61	PK	V

Note: Margin = Emission Level – Limit; For fundamental frequency, RBW>20dB BW, VBW>=3XRBW.

4.3 Band edge emissions (Radiated)

Test Requirement:	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 § 15.209, whichever is the lesser attenuation.
Test Limit:	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 § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

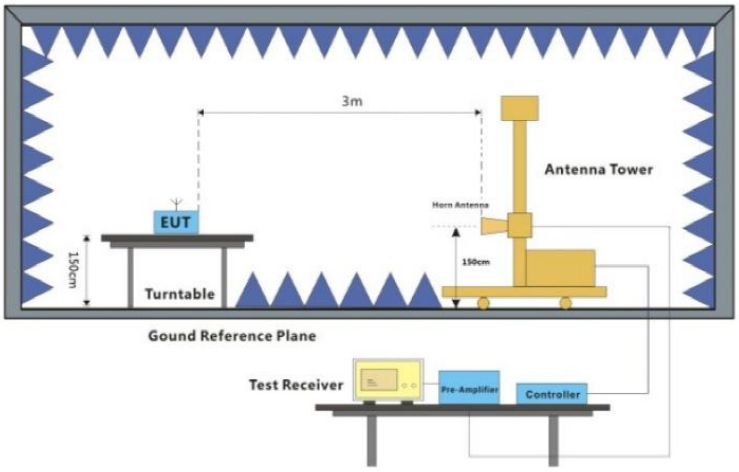
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2013 section 6.6.4
Procedure:	ANSI C63.10-2013 section 6.6.4

4.3.1 E.U.T. Operation:

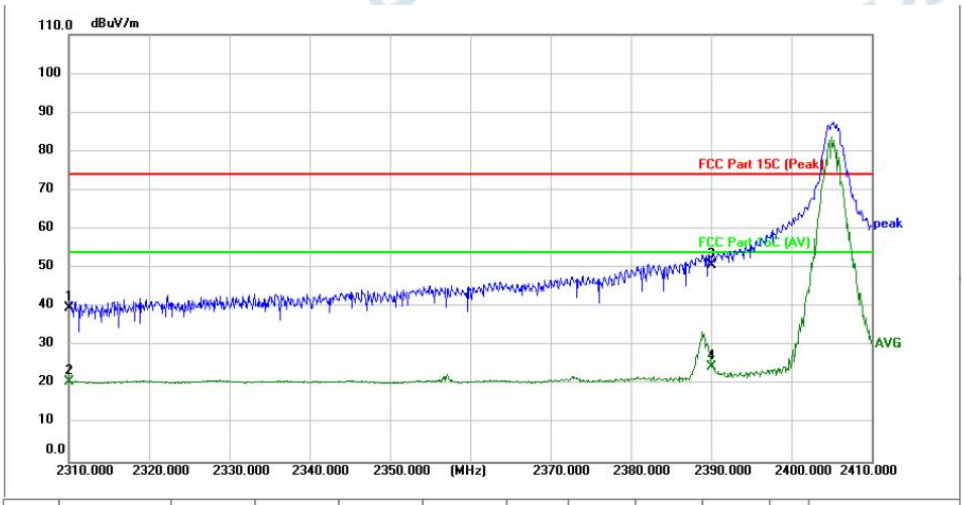
Operating Environment:					
Temperature:	23.3 °C	Humidity:	50 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.3.2 Test Setup Diagram:



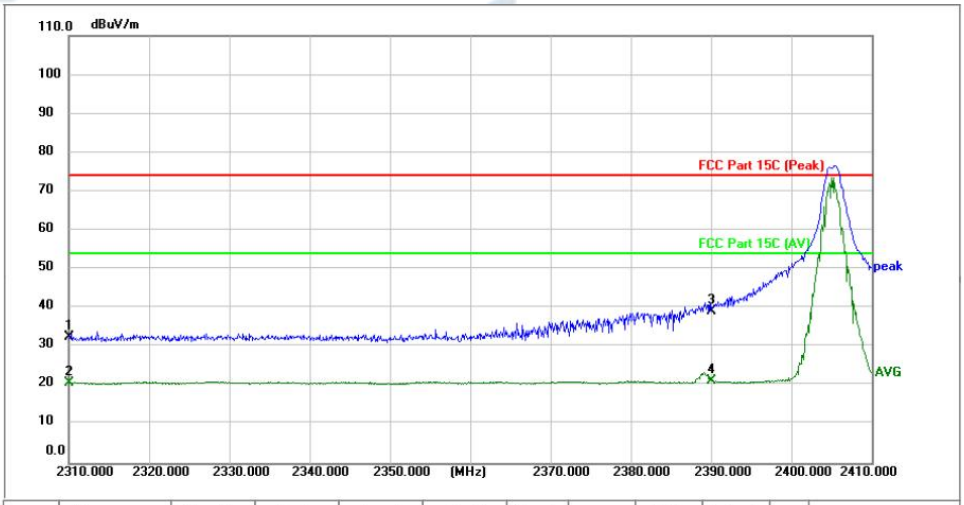
4.3.3 Test Data:

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: L



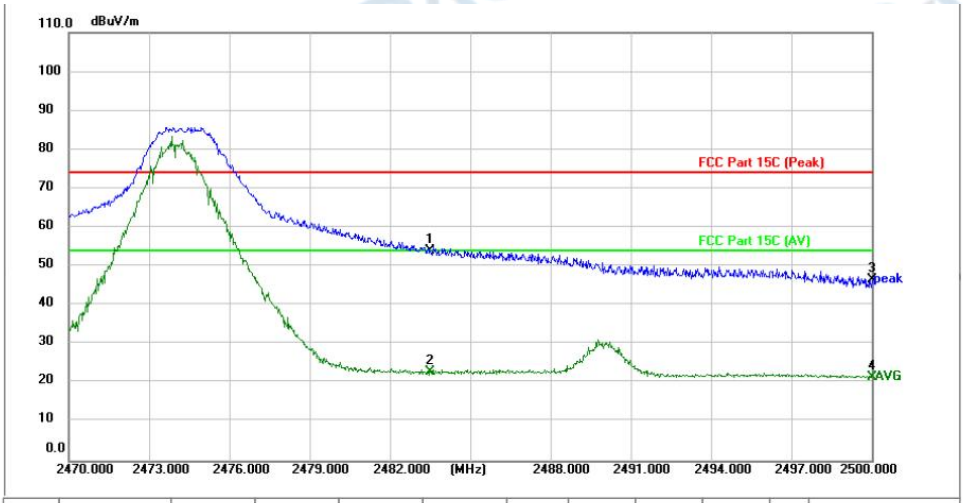
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	43.08	-3.43	39.65	74.00	-34.35	peak	150		P	
2	2310.000	24.17	-3.43	20.74	54.00	-33.26	AVG	150		P	
3 *	2390.000	53.94	-3.17	50.77	74.00	-23.23	peak	150		P	
4	2390.000	27.89	-3.17	24.72	54.00	-29.28	AVG	150		P	

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: L



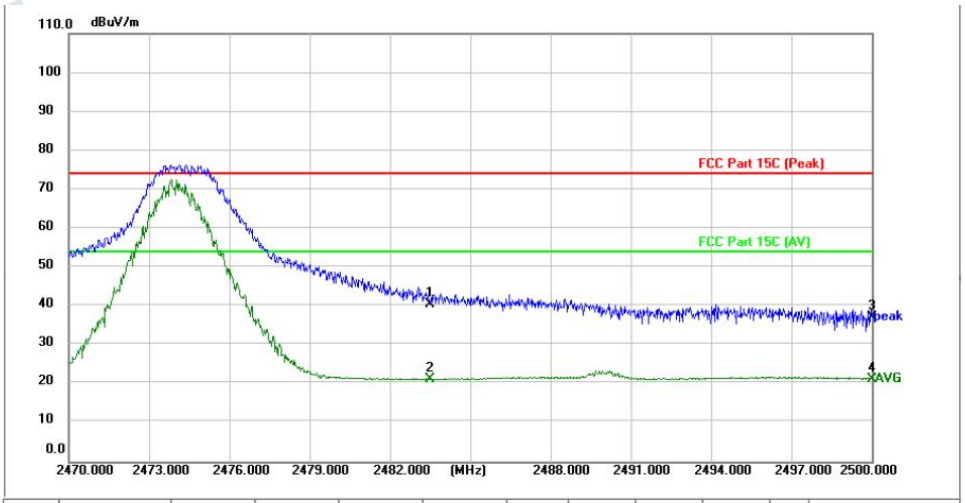
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	36.08	-3.43	32.65	74.00	-41.35	peak	150		P	
2	2310.000	24.21	-3.43	20.78	54.00	-33.22	AVG	150		P	
3	2390.000	42.40	-3.17	39.23	74.00	-34.77	peak	150		P	
4 *	2390.000	24.43	-3.17	21.26	54.00	-32.74	AVG	150		P	

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2483.500	56.80	-2.86	53.94	74.00	-20.06	peak	150		P	
2	2483.500	25.87	-2.86	23.01	54.00	-30.99	AVG	150		P	
3	2500.000	49.53	-2.81	46.72	74.00	-27.28	peak	150		P	
4	2500.000	24.46	-2.81	21.65	54.00	-32.35	AVG	150		P	

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	43.49	-2.86	40.63	74.00	-33.37	peak	150		P	
2	2483.500	24.15	-2.86	21.29	54.00	-32.71	AVG	150		P	
3	2500.000	40.08	-2.81	37.27	74.00	-36.73	peak	150		P	
4 *	2500.000	24.25	-2.81	21.44	54.00	-32.56	AVG	150		P	

1. Margin = Measurement Level - Limit ; Measurement Level=Test receiver reading + correction factor

2.The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

4.4 Emissions in frequency bands (below 1GHz)

Test Requirement:	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)
Test Limit:	Except as provided in paragraph (b)of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

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 § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a)and (b)of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b)of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

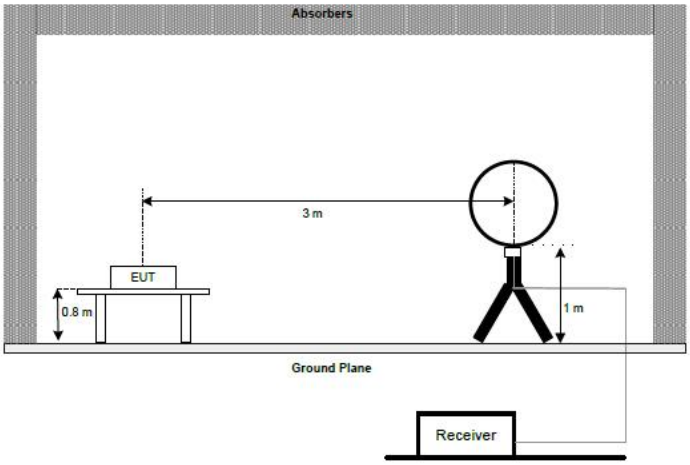
Test Method:	ANSI C63.10-2013 section 6.5
Procedure:	ANSI C63.10-2013 section 6.5

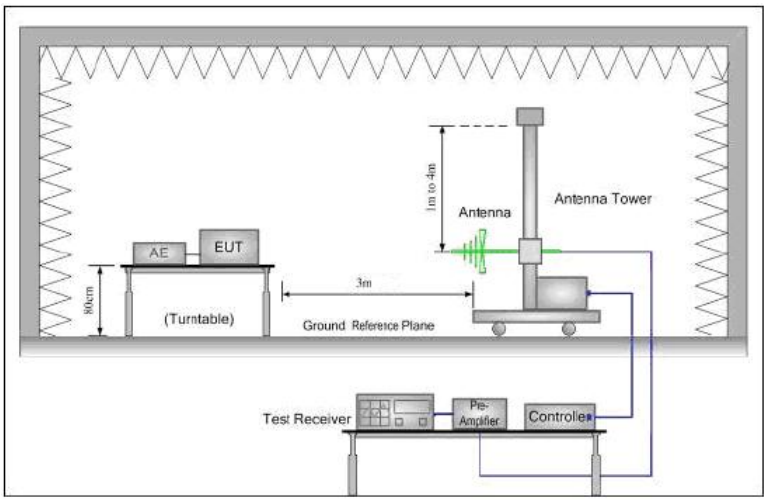
4.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.3 °C	Humidity:	50 %	Atmospheric Pressure:	102 kPa

Pretest mode:	TM1
Final test mode:	TM1

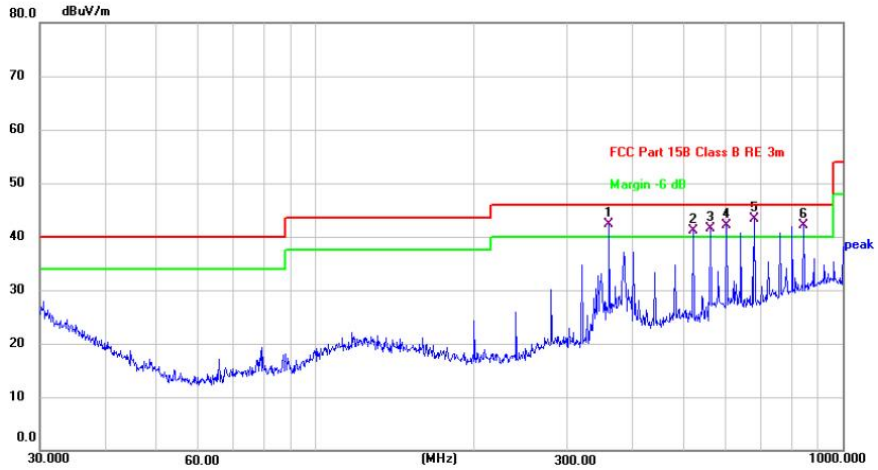
4.4.2 Test Setup Diagram:





4.4.3 Test Data:

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	360.4476	46.80	-4.51	42.29	46.00	-3.71	QP			P	
2 !	520.8881	42.23	-1.22	41.01	46.00	-4.99	QP			P	
3 !	560.6928	42.12	-0.64	41.48	46.00	-4.52	QP			P	
4 !	601.4265	41.70	0.31	42.01	46.00	-3.99	QP			P	
5 *	679.9600	41.61	1.65	43.26	46.00	-2.74	QP			P	
6 !	842.1295	37.83	4.27	42.10	46.00	-3.90	QP			P	

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	199.9855	37.03	-8.33	28.70	43.50	-14.80	QP			P	
2 !	319.9370	48.21	-5.57	42.64	46.00	-3.36	QP			P	
3 *	360.4476	47.01	-4.26	42.75	46.00	-3.25	QP			P	
4 !	385.2803	46.44	-4.07	42.37	46.00	-3.63	QP			P	
5	640.6110	37.65	0.65	38.30	46.00	-7.70	QP			P	
6 !	842.1295	37.69	4.27	41.96	46.00	-4.04	QP			P	

1. Margin = Measurement Level - Limit ; Measurement Level=Test receiver reading + correction factor

2.The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

4.5 Emissions in frequency bands (above 1GHz)

Test Requirement:	47 CFR 15.249(a) 47 CFR 15.249(d) 47 CFR 15.249(e)
Test Limit:	Except as provided in paragraph (b)of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

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 § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a)and (b)of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b)of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

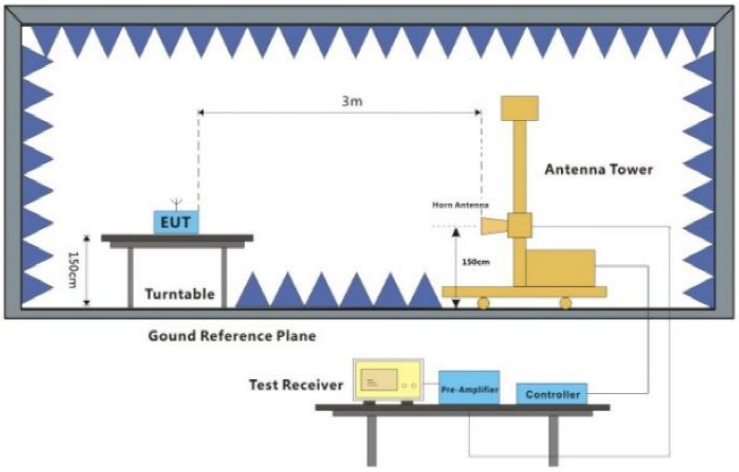
Test Method:	ANSI C63.10-2013 section 6.6
Procedure:	ANSI C63.10-2013 section 6.6

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.3 °C	Humidity:	50 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				

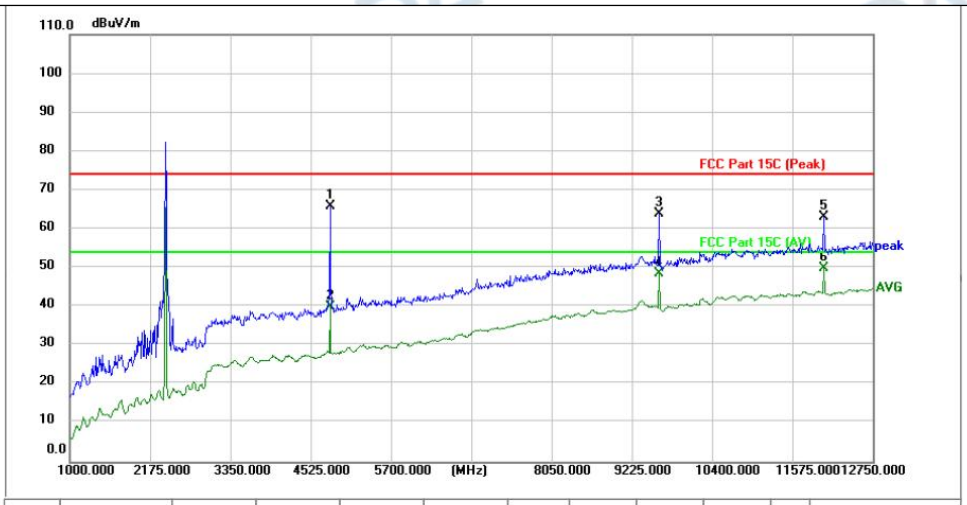
Final test mode:	TM1

4.5.2 Test Setup Diagram:



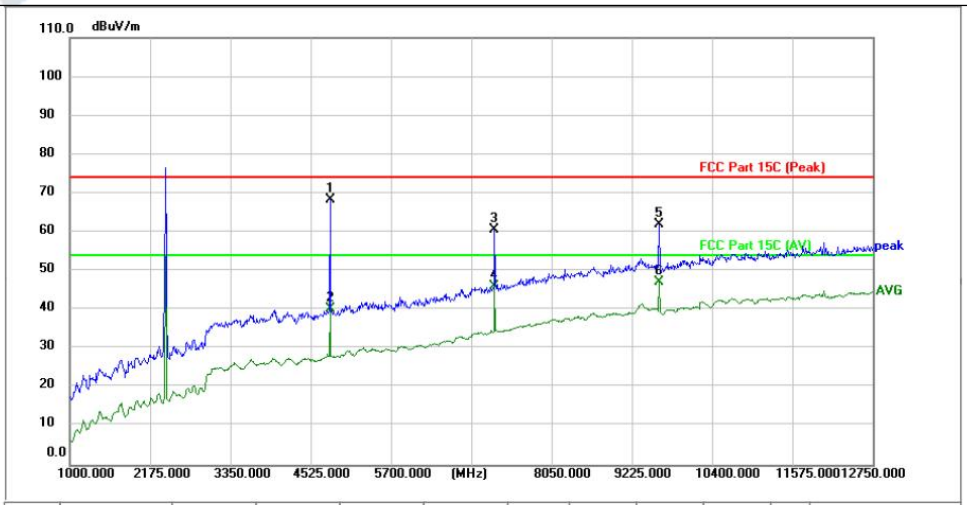
4.5.3 Test Data:

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: L



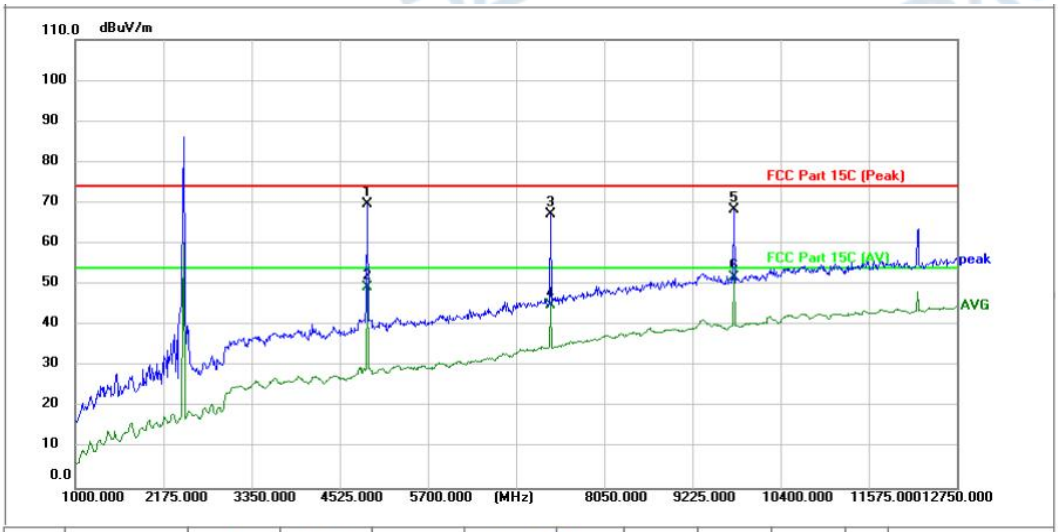
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4807.000	62.14	3.75	65.89	74.00	-8.11	peak	150		P	
2	4807.000	36.35	3.75	40.10	54.00	-13.90	AVG	150		P	
3	9624.500	48.12	15.74	63.86	74.00	-10.14	peak	150		P	
4	9624.500	32.84	15.74	48.58	54.00	-5.42	AVG	150		P	
5	12033.250	44.50	18.59	63.09	74.00	-10.91	peak	150		P	
6 *	12033.250	31.39	18.59	49.98	54.00	-4.02	AVG	150		P	

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: L



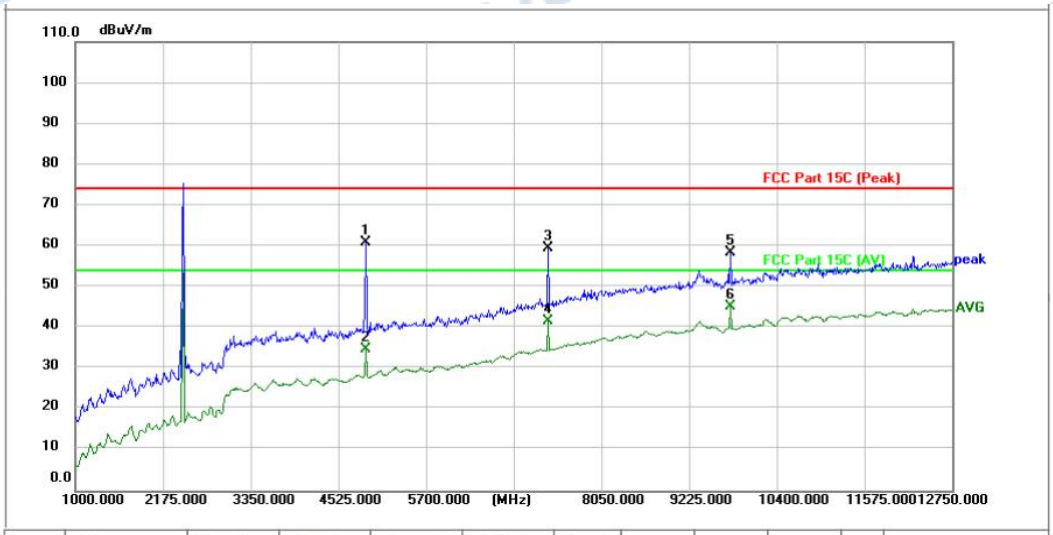
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	4807.000	64.55	3.75	68.30	74.00	-5.70	peak	150		P	
2	4807.000	36.44	3.75	40.19	54.00	-13.81	AVG	150		P	
3	7215.750	50.05	10.69	60.74	74.00	-13.26	peak	150		P	
4	7215.750	35.40	10.69	46.09	54.00	-7.91	AVG	150		P	
5	9624.500	46.24	15.74	61.98	74.00	-12.02	peak	150		P	
6	9624.500	31.40	15.74	47.14	54.00	-6.86	AVG	150		P	

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: M



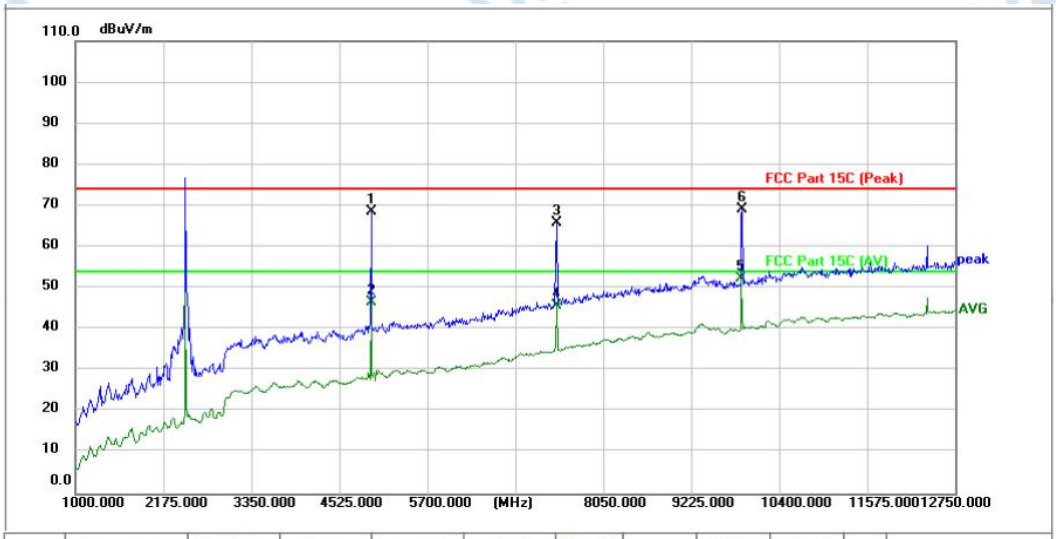
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4889.250	65.80	4.05	69.85	74.00	-4.15	peak			P	
2	4889.250	45.32	4.05	49.37	54.00	-4.63	AVG			P	
3	7333.250	56.29	10.93	67.22	74.00	-6.78	peak			P	
4	7333.250	34.05	10.93	44.98	54.00	-9.02	AVG			P	
5	9777.250	52.59	15.86	68.45	74.00	-5.55	peak			P	
6 *	9777.250	35.93	15.86	51.79	54.00	-2.21	AVG			P	

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: M



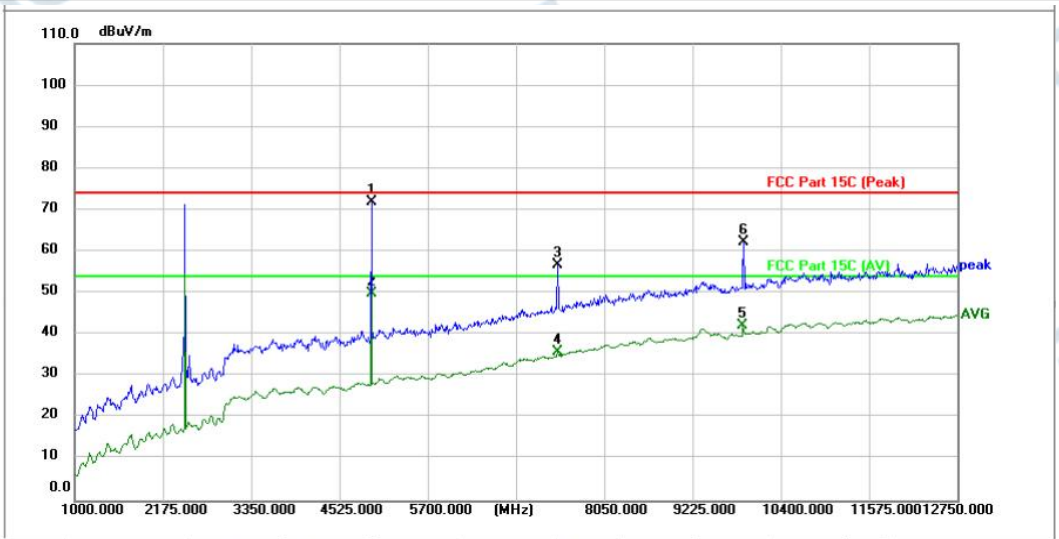
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4889.250	56.75	4.05	60.80	74.00	-13.20	peak	150		P	
2	4889.250	30.67	4.05	34.72	54.00	-19.28	AVG	150		P	
3	7333.250	48.72	10.93	59.65	74.00	-14.35	peak	150		P	
4	7333.250	30.85	10.93	41.78	54.00	-12.22	AVG	150		P	
5	9777.250	42.61	15.86	58.47	74.00	-15.53	peak	150		P	
6 *	9777.250	29.34	15.86	45.20	54.00	-8.80	AVG	150		P	

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 2 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4948.000	64.30	4.26	68.56	74.00	-5.44	peak			P	
2	4948.000	42.49	4.26	46.75	54.00	-7.25	AVG			P	
3	7427.250	54.66	11.14	65.80	74.00	-8.20	peak			P	
4	7427.250	34.68	11.14	45.82	54.00	-8.18	AVG			P	
5 *	9894.750	36.47	15.94	52.41	54.00	-1.59	AVG			P	
6	9906.500	53.21	15.95	69.16	74.00	-4.84	peak			P	

TM1 / Polarization: Vertical / Band: 2.4G / BW: 2 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	4948.000	67.75	4.26	72.01	74.00	-1.99	peak	150		P	
2	4948.000	45.63	4.26	49.89	54.00	-4.11	AVG	150		P	
3	7427.250	45.65	11.14	56.79	74.00	-17.21	peak	150		P	
4	7427.250	24.72	11.14	35.86	54.00	-18.14	AVG	150		P	
5	9894.750	26.14	15.94	42.08	54.00	-11.92	AVG	150		P	
6	9906.500	46.47	15.95	62.42	74.00	-11.58	peak	150		P	

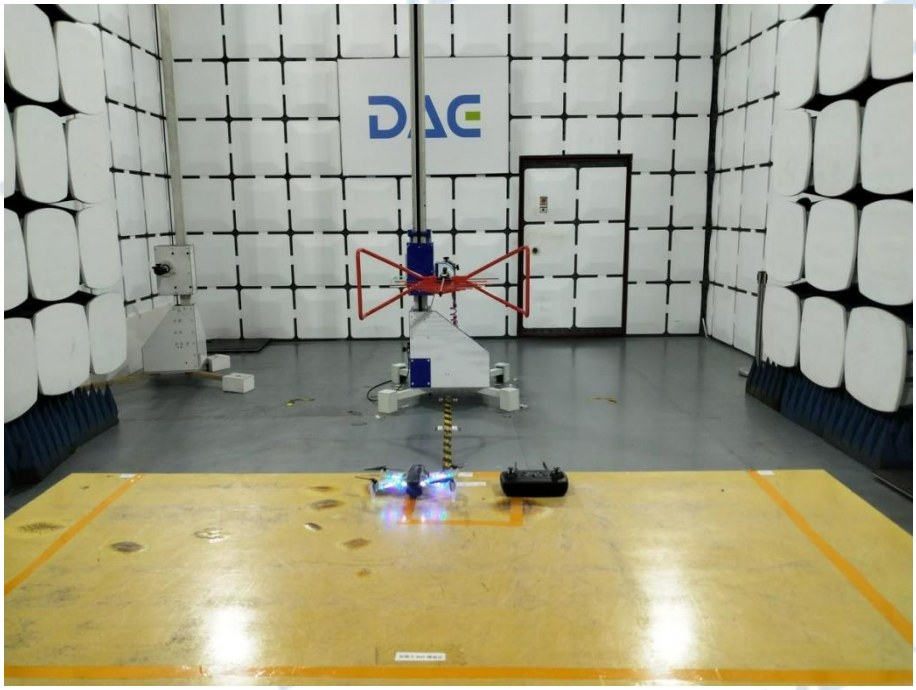
1. Margin = Measurement Level - Limit ; Measurement Level=Test receiver reading + correction factor

2.The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

5 TEST SETUP PHOTOS

Emissions in frequency bands (above 1GHz)
Band edge emissions (Radiated)

Emissions in frequency bands (below 1GHz)



6 PHOTOS OF THE EUT

External

OFF ON

OFF ON

OFF NO

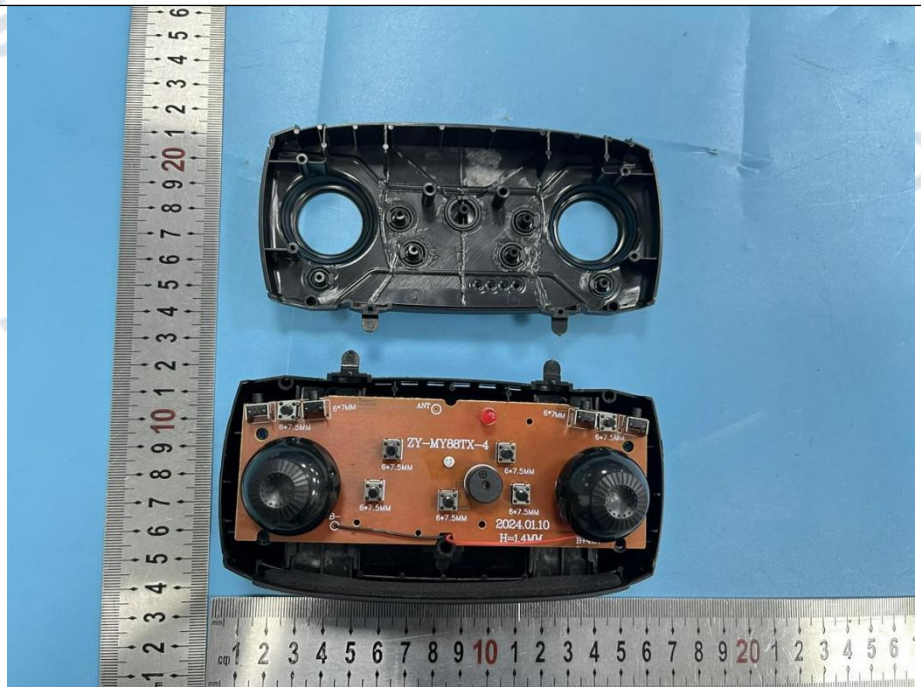
OFF NO

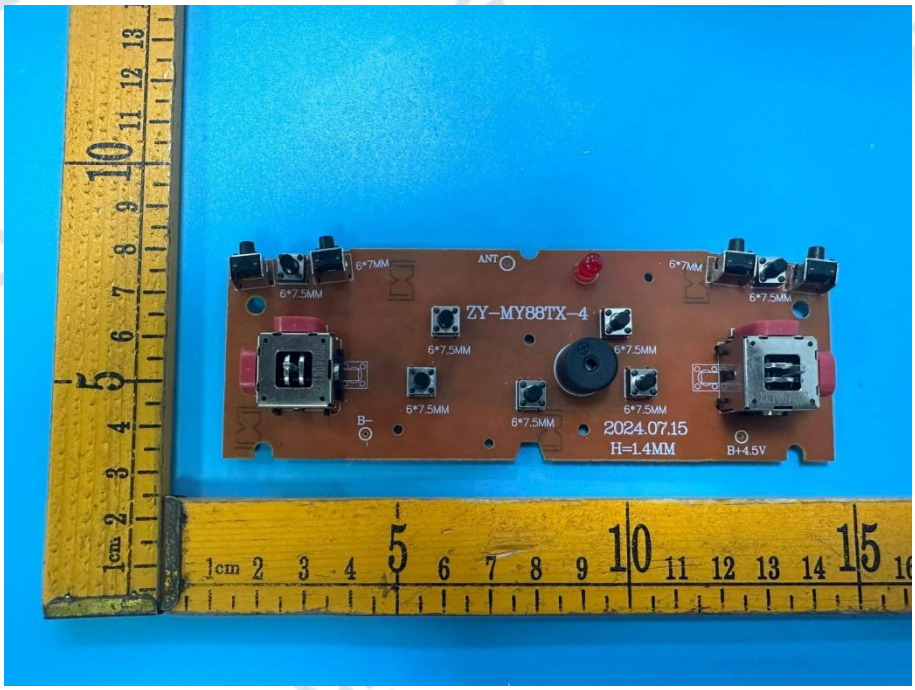
OFF NO

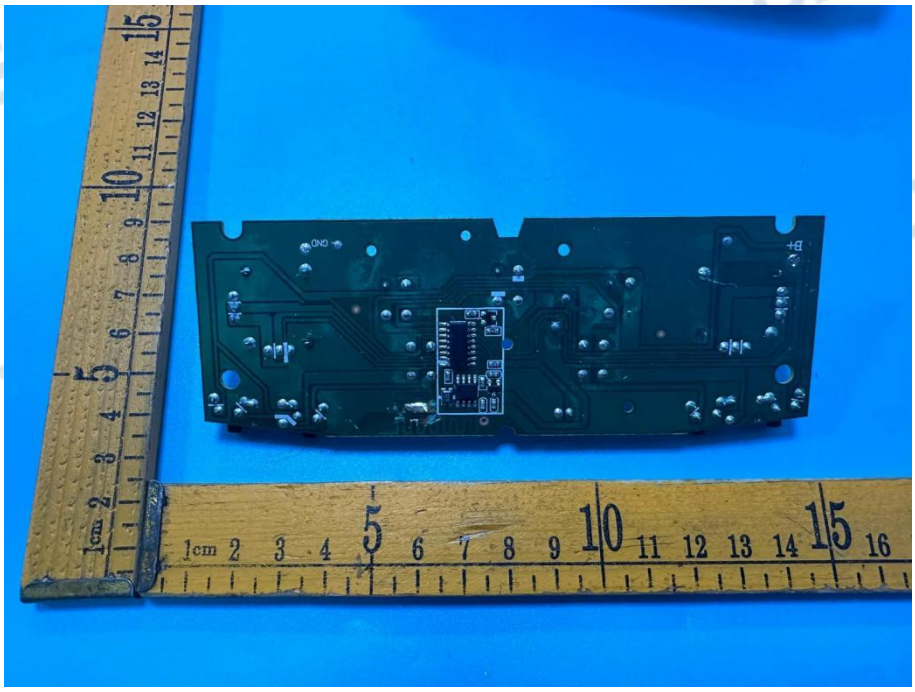
OFF ON

ON OFF

Internal







********** End of Report **********