RF TEST REPORT

For

Xiamen Fuyuan Electronic Technology Co., Ltd
Product Name: multi frequency remote control duplicator
Test Model(s).: FTDBF00EN

Report Reference No.	:	**DACE240422003RL001**
FCC ID	:	**2BF6L-FTDBF00EN**
Applicant's Name	:	Xiamen Fuyuan Electronic Technology Co., Ltd
Address	:	2nd Floor, Independent 2nd Floor, No. 193 Tongji North Road, Tong'an District, Xiamen City, Fujian Province
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**47 CFR Part 15.231 & ANSI C63.10-2013**
Date of Receipt	:	April 22, 2024
Date of Test	:	April 22, 2024 -- May 06, 2024
Data of Issue	:	May 06, 2024
Result	:	**Pass**

Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE240422003RL001	May 06, 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:
Keren Huang	Stone Yin	Tom Chen
Keren Huang / Test Engineer	Stone Yin / Project Engineer	Tom Chen / Manager

CONTENTS

1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15.231: Periodic operation in the band 40.66-40.70 MHz and above 70 MHz

1.2 Summary of Test Result

Item	Method	Requirement	Result
Antenna requirement	/	47 CFR 15.203	Pass
Conducted Emission at AC power line	ANSI C63.10-2013 section 6.2	47 CFR 15.207(a)	N/A
20dB Bandwidth	ANSI C63.10-2013, section 6.9.2	47 CFR 15.231(c)	Pass
Dwell Time	ANSI C63.10-2013, Section 7.4	47 CFR 15.231(a)(1) & (a)(2)	Pass
Duty Cycle	ANSI C63.10-2013, Section 7.5	47 CFR 15.231(b) & (e)	Pass
Field Strength of The Fundamental Signal	ANSI C63.10-2013, Section 6.5	47 CFR 15.231(b)	Pass
Radiated Emission (below 1GHz)	ANSI C63.10-2013, Section 6.5	47 CFR 15.231	Pass
Radiated Emission (above 1GHz)	ANSI C63.10-2013, Section 6.6	47 CFR 15.231	Pass

N/A-- Not applicable to the this test clause.

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Xiamen Fuyuan Electronic Technology Co., Ltd
Address : 2nd Floor, Independent 2nd Floor, No. 193 Tongji North Road, Tong'an District, Xiamen City, Fujian Province

Manufacturer : Xiamen Fuyuan Electronic Technology Co., Ltd
Address : 2nd Floor, Independent 2nd Floor, No. 193 Tongji North Road, Tong'an District, Xiamen City, Fujian Province

2.2 Description of Device (EUT)

Product Name:	multi frequency remote control duplicator
Model/Type reference:	FTDBF00EN
Series Model:	FTDBF01EN, FDABF01EN, FDABF01EN, FMABF01EN, FTDBF02EN, FDABF02EN, FDABF02EN, FMABF02EN, FTDBF03EN, FDABF03EN, FDABF03EN, FMABF03EN, FTDBF04EN, FDABF04EN, FDABF04EN, FMABF04EN, FTDBF05EN, FDABF05EN, FDABF05EN, FMABF05EN, FTDBF06EN, FDABF06EN, FDABF06EN, FMABF06EN, FTDBF07EN, FDABF07EN, FDABF07EN, FMABF07EN, FTDBF08EN, FDABF08EN, FDABF08EN, FMABF08EN, FTDBF09EN, FDABF09EN, FDABF09EN, FMABF09EN
Model difference:	Their electrical circuit design, layout, components used and internal wiring are identical, The product name is slightly different according to the needs(color or appearance), but it will not affect any EMC/RF performance of the product .
Trade Mark:	N/A
Product Description:	multi frequency remote control duplicator
Power Supply:	DC3.0V from battery
Operation Frequency:	433.92MHz
Number of Channels:	1
Modulation Type:	ASK
Antenna Type:	PCB ANTENNA
Antenna Gain:	-0.95dBi
Hardware Version:	V1.0
Software Version:	N/A

2.3 Description of Test Modes

No	Title	Description
TM1	TM1	Continuous TX

2.4 Description of Support Units

Title	Manufacturer	Model No.	Serial No.
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2.5 Equipments Used During The Test

Duty Cycle **20dB Bandwidth** **Dwell Time**					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RF Test Software	Tachoy Information	RTS-01	V2.0.0.0	/	/
RF Sensor Unit	Tachoy Information	TR1029-2	000001	/	/
Vector 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 The Fundamental Signal **Radiated Emission (below 1GHz)** **Radiated Emission (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	2021-07-05	2024-07-04
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	2024-02-19	2025-02-18
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2024-02-19	2025-02-18
Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2023-06-13	2024-06-12
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2023-06-13	2024-06-12
Spectrum Analyzer	R&S	FSP30	1321.3008K40 -101729-jR	2023-06-14	2024-06-13
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
Test Receiver	R&S	ESCI	102109	2023-06-13	2024-06-12

2.6 Statement Of The Measurement Uncertainty

Test Item	**Measurement Uncertainty**
Conducted Disturbance (0.15~30MHz)	±3.41dB
Occupied Bandwidth	±3.63%
Duty cycle	±3.1%
Radiated Emission (Below 1GHz)	±5.79dB

Radiated Emission (Above 1GHz)	±5.46dB
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:	101-102 Building H5 & 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:	101-102 Building H5 & 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 No.:	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.

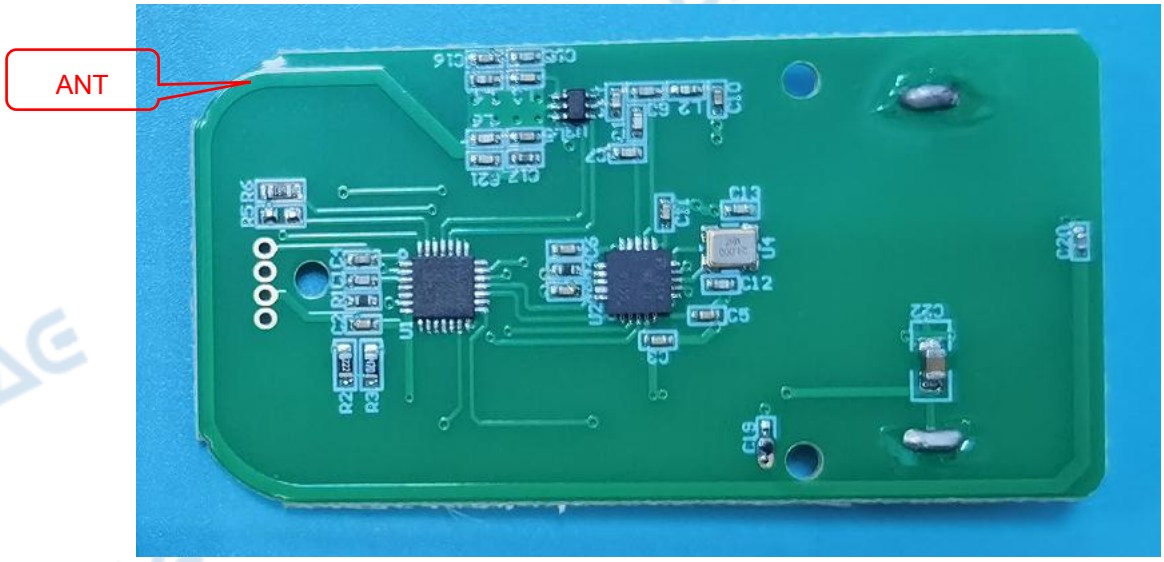
(6) We hereby declare that the laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant. the laboratory is not responsible for the accuracy of the information provided by the client. When the information provided by the customer may affect 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)

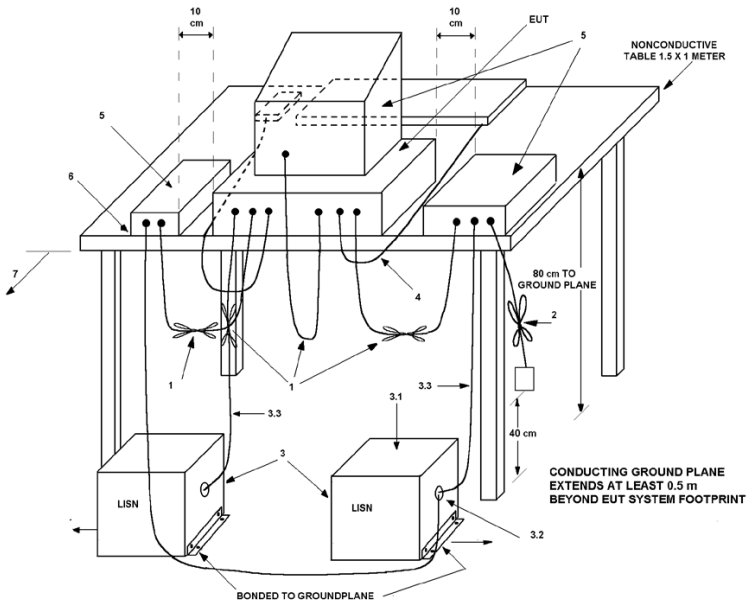
4.1 Conducted Emission at AC power line

Test Requirement:	Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 *Decreases with the logarithm of the frequency.
Test Method:	ANSI C63.10-2013 section 6.2
Procedure:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.3 °C	Humidity:	58 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.1.2 Test Setup Diagram:



4.1.3 Test Data:

N/A (Not applicable to the sub test clause. The device is battery powered)

4.2 20dB Bandwidth

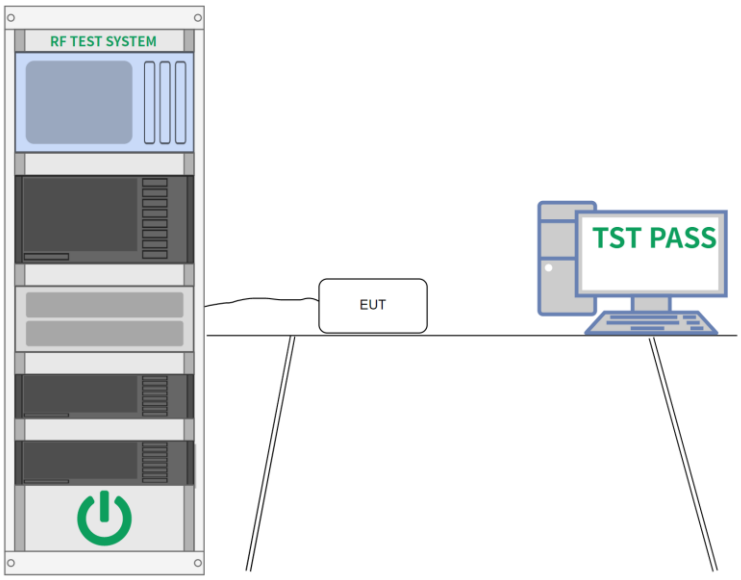
Test Requirement:	47 CFR 15.231(c)
Test Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test 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 “íxx 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 “íxx 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).

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.4 °C	Humidity:	48.2 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				

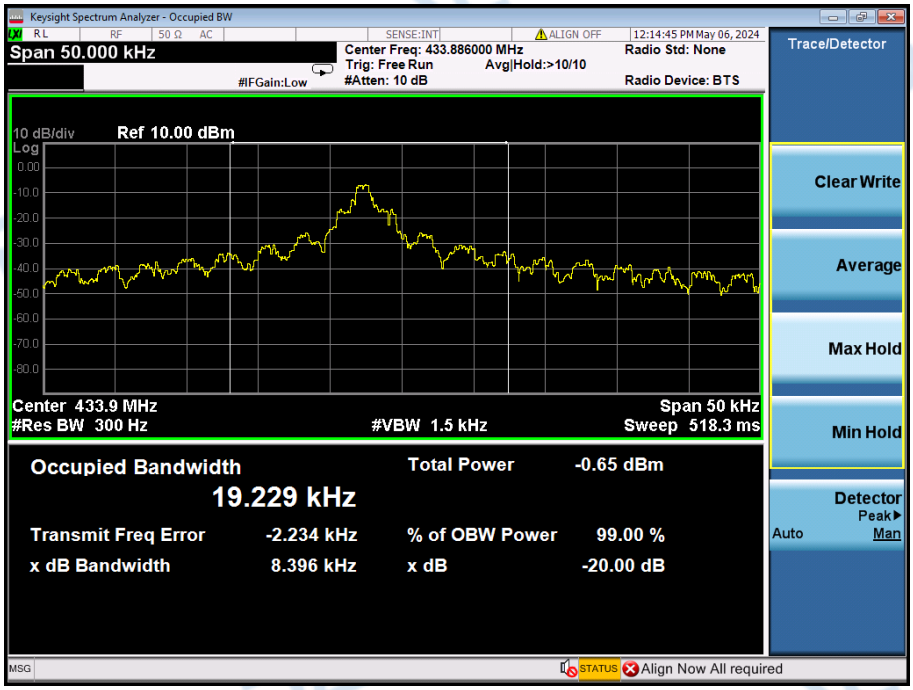
Final test mode:	TM1

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Condition	Antenna	Frequency (MHz)	20dB BW(kHz)	limit(MHz)	Result
NVNT	ANT1	433.92	8.396	1.0848	Pass



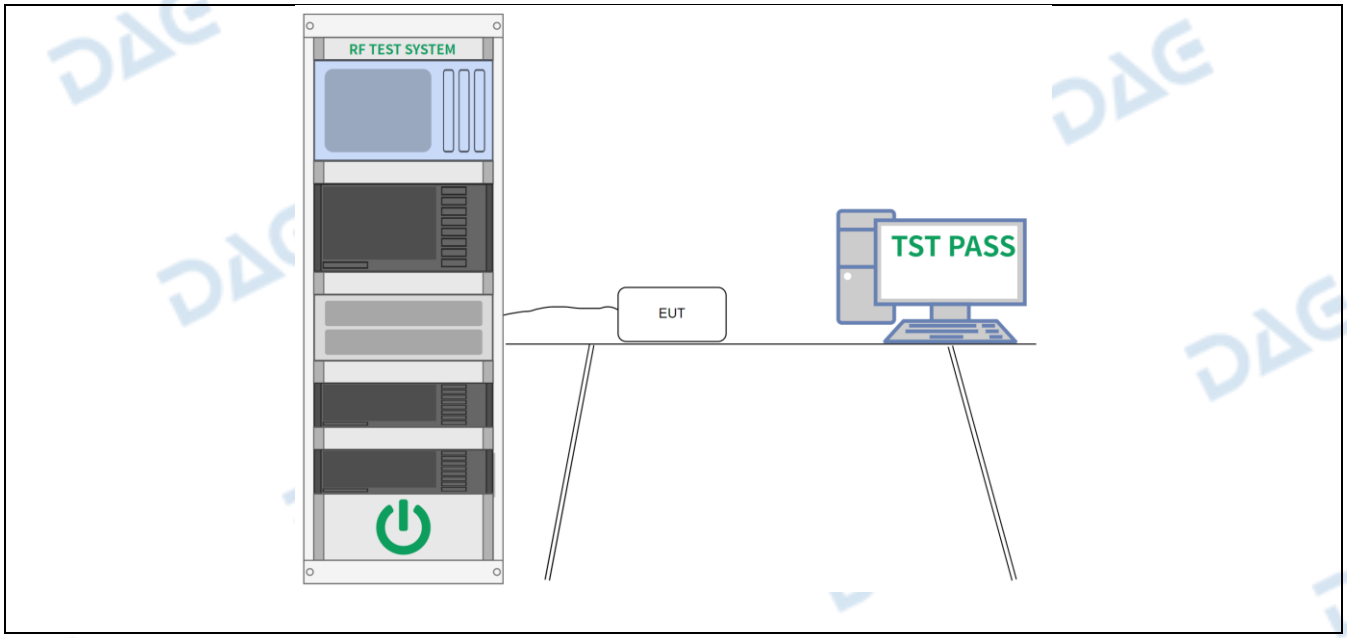
4.3 Duty Cycle

Test Requirement:	47 CFR 15.231(b) & (e)
Test Limit:	No limit, only for Report Use.
Test Method:	ANSI C63.10-2013, Section 7.5
Procedure:	a) Adjust and configure any EUT switches, controls, or input data streams to ensure that the EUT is transmitting or encoded to obtain the “worst-case” pulse ON time. b) Couple the final radio frequency output signal to the input of a spectrum analyzer. This may be performed by a radiated, direct connection (i.e., conducted) or by a “near-field” coupling method. The signal received shall be of sufficient level to trigger adequately the spectrum analyzer sweep display. NOTE—If the bandwidth of the pulse is greater than the RBW of the spectrum analyzer, then a similar measurement may be performed using a wideband digital storage oscilloscope (DSO). c) Adjust the center frequency of the spectrum analyzer to the center of the RF signal. d) Set the spectrum analyzer for ZERO SPAN. e) Adjust the SWEEP TIME to obtain at least a 100 ms period of time on the horizontal display axis of the spectrum analyzer. f) If the pulse train is periodic (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms, then: 1) Set the TRIGGER on the spectrum analyzer to capture at least one period of the pulse train, including any blanking intervals. 2) Determine the total maximum pulse “ON time” (t_{ON}) over one period of the pulse train. An example of a periodic pulse train and the associated period is shown in Figure 14. If the pulse train contains pulses of different widths, then t_{ON} is determined by summing the duration of all of the pulses within the pulse train [i.e., $t_{ON} = \Sigma(t1 + t2 + \ldots tn)$]. 3) The duty cycle is then determined by dividing the total maximum “ON time” by the period of the pulse train (t_{ON}/T). g) If the pulse train is nonperiodic or is periodic with a period that exceeds 100 ms, or as an alternative to step f), then: 1) Set the TRIGGER on the spectrum analyzer to capture the greatest amount of pulse “ON time” over 100 ms. 2) Find the 100 ms period that contains the maximum “on time”; this may require summing the duration of multiple pulses as described in step f2). 3) Determine the duty cycle by dividing the total maximum “ON time” by 100 ms (t_{ON}/100 ms).

4.3.1 E.U.T. Operation:

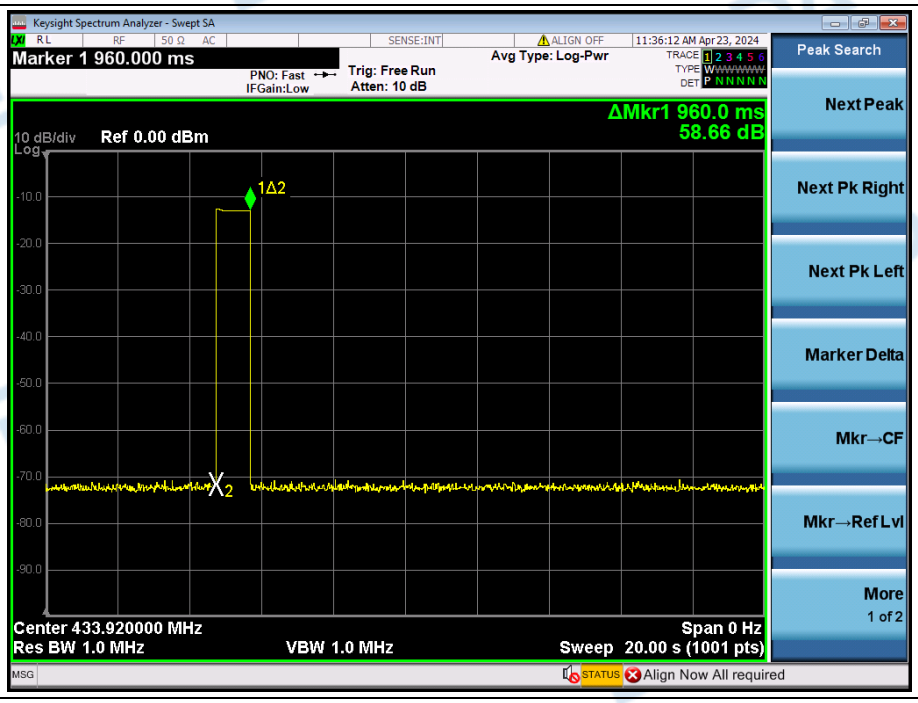
Operating Environment:					
Temperature:	23.4 °C	Humidity:	48.2 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Condition	Antenna	Frequency (MHz)	Dwell time(s)	limit(s)	Result
NVNT	ANT1	433.92	0.96	5s	Pass



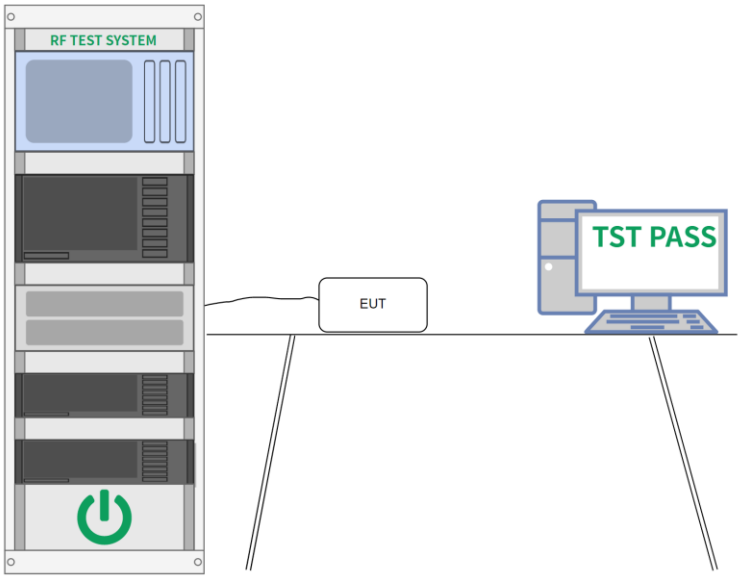
4.4 Average Factor

Procedure:	The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector. The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.
Factor:	Averaging factor in dB =20log (duty cycle) The duration of one cycle =45.10ms The duty cycle is simply the on-time divided the duration of one cycle Duty Cycle =(1.095*10+0.380*15)/45.10=16.65/45.10=0.3692 Therefore, the averaging factor is found by 20*log(0.3692) =-8.65dB Test plot as follows: Note: During the 100ms, the amount of pulse and on-time of pulse are the same for every pulse train.

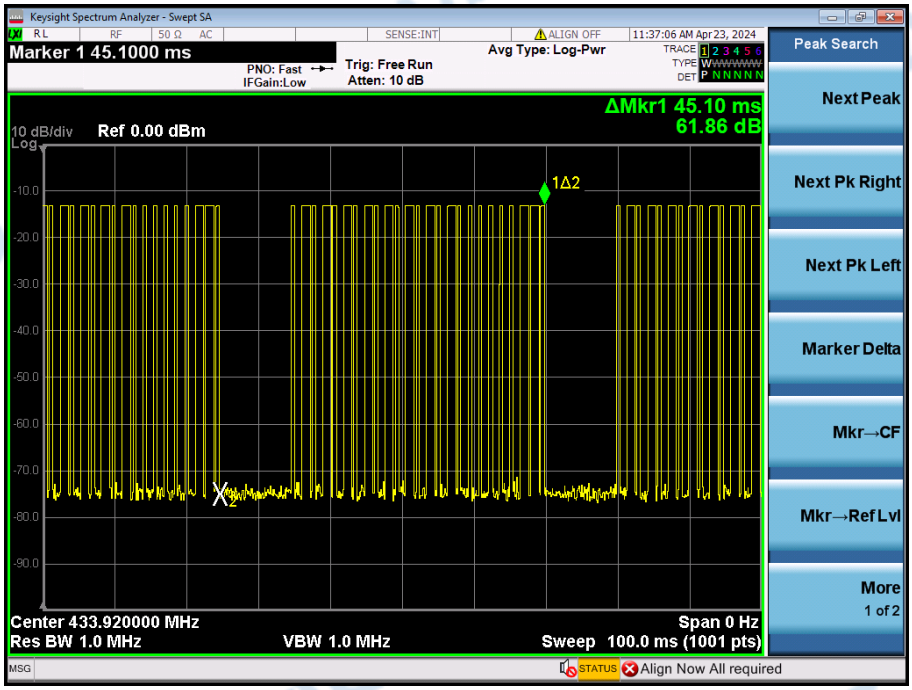
4.4.1 E.U.T. Operation:

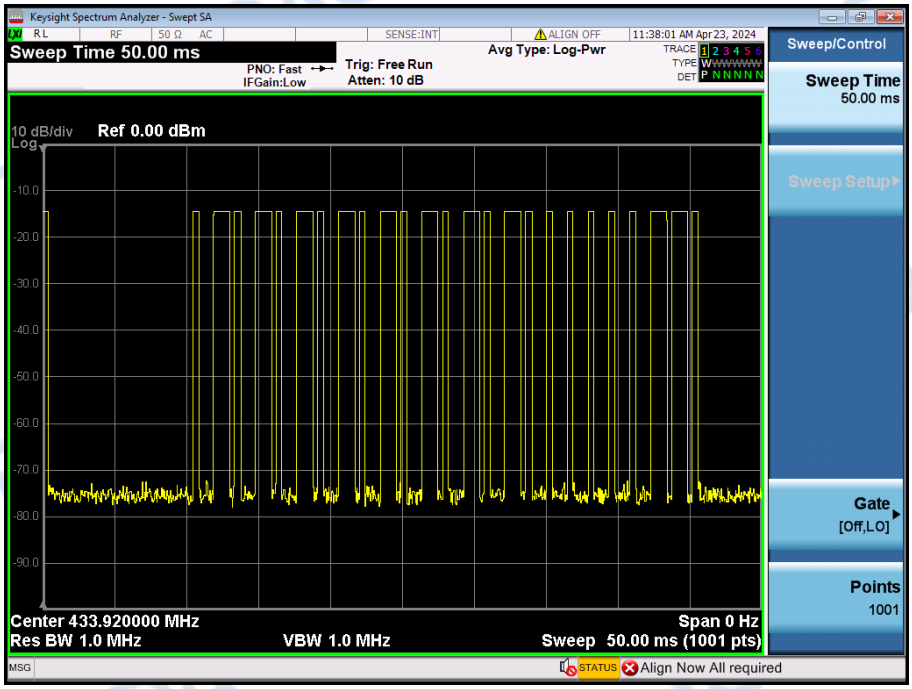
Operating Environment:					
Temperature:	22.3 °C	Humidity:	51.7 %	Atmospheric Pressure:	102 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

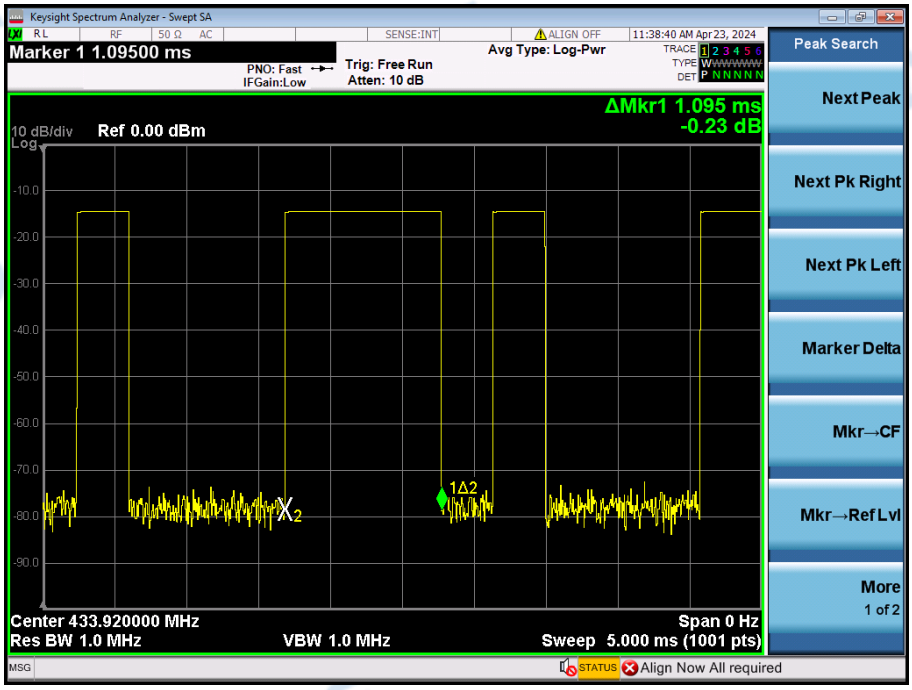
4.4.2 Test Setup Diagram:

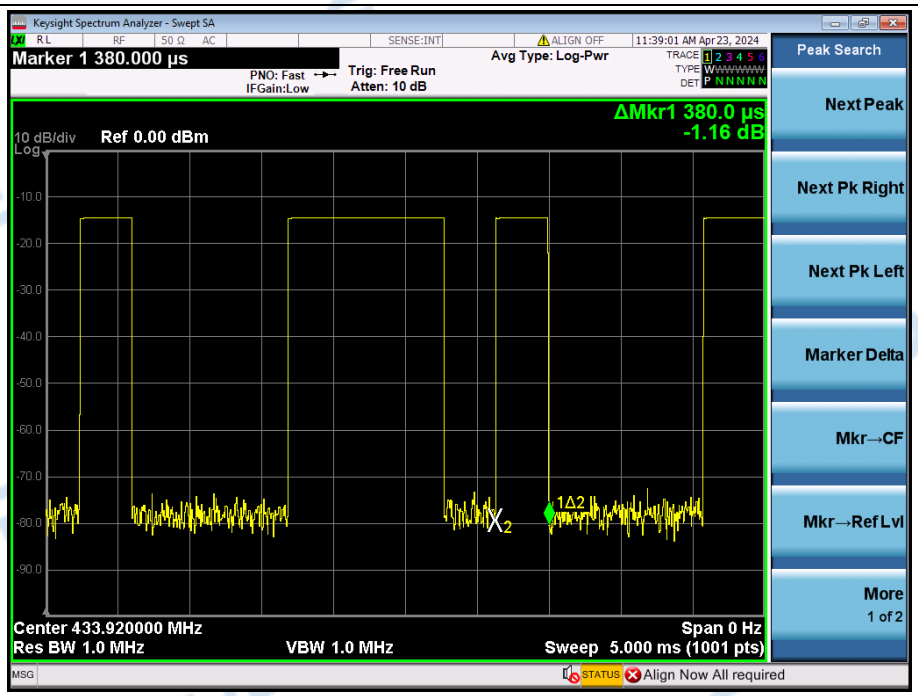


4.4.3 Test Data:






Keysight Spectrum Analyzer - Swept SA
Marker 1 1.09500 ms
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
11:38:40 AM Apr 23, 2024
ΔMkr1 1.095 ms
-0.23 dB
10 dB/div
Log
Ref 0.00 dBm
Center 433.920000 MHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Align Now All required


Keysight Spectrum Analyzer - Swept SA
Marker 1 380.000 µs
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
11:39:01 AM Apr 23, 2024
ΔMkr1 380.0 µs
-1.16 dB
10 dB/div
Log
Ref 0.00 dBm
Center 433.920000 MHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Align Now All required

4.5 Radiated Emission (below 1GHz)

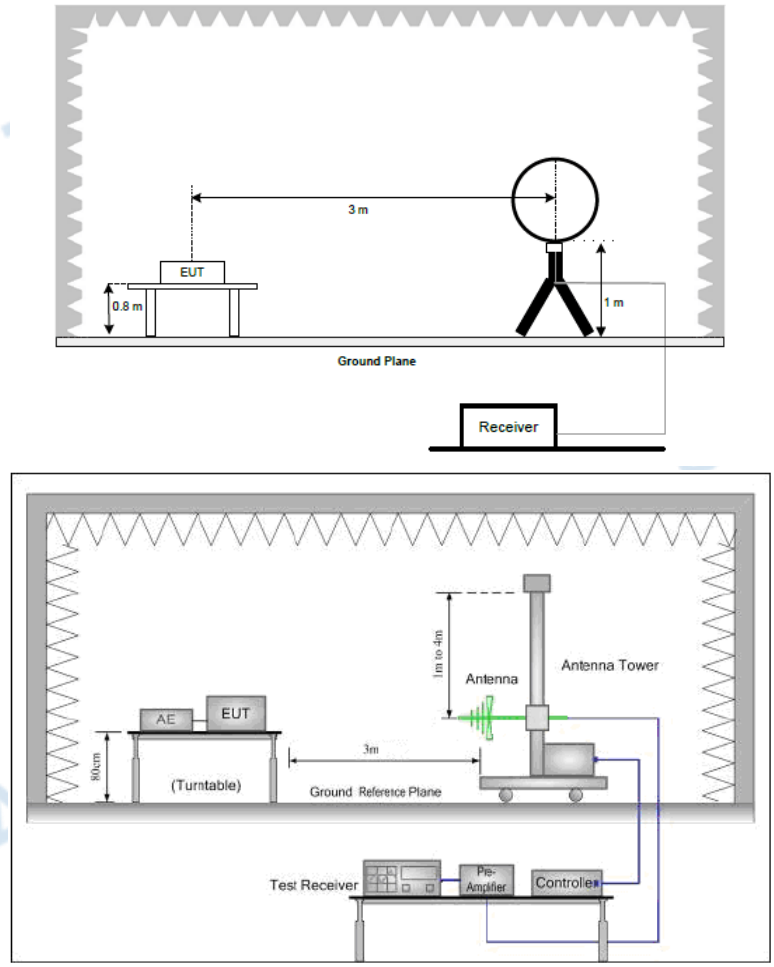
<table>
<tr><td>Test Requirement:</td><td>47 CFR 15.231</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2013, Section 6.5</td></tr>
<tr><td>Procedure:</td><td>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 or 10 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 quasi-peak 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 the worst case.
i. Repeat above procedures until all frequencies measured was complete.
Remark:
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been</td></tr>
</table>

	displayed.

4.5.1 E.U.T. Operation:

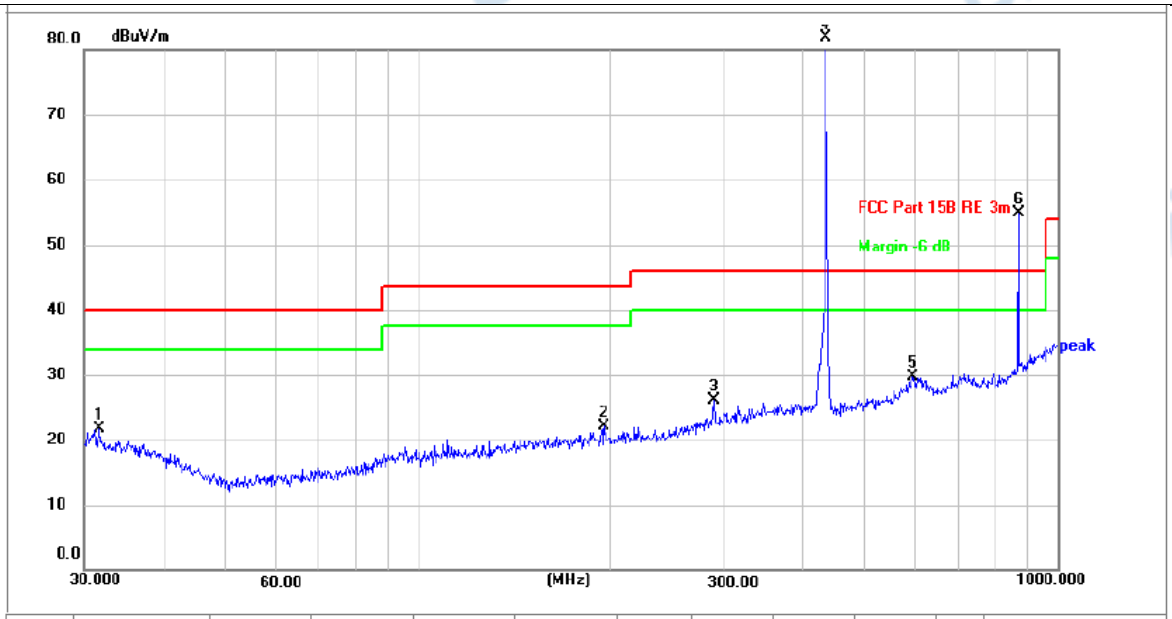
Operating Environment:					
Temperature:	25.6 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

TM1 / Polarization: Horizontal

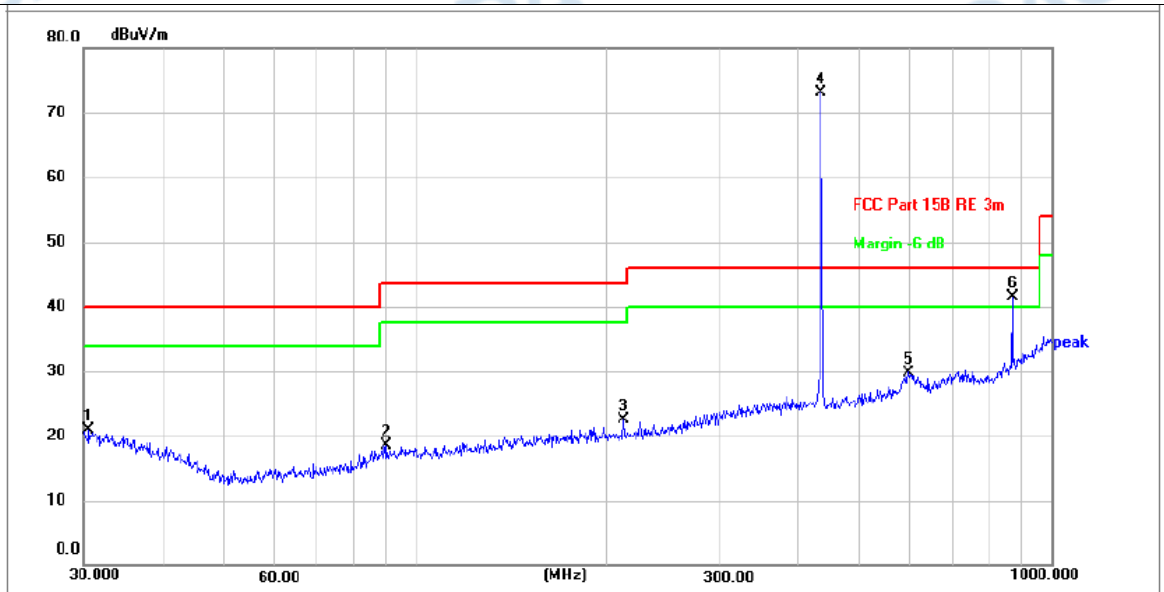


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	31.6202	25.09	-3.30	21.79	40.00	-18.21	peak	100	242.5	P	
2	195.1365	25.09	-2.98	22.11	43.50	-21.39	peak	100	247.9	P	
3	290.0172	26.04	0.13	26.17	46.00	-19.83	peak	100	343.1	P	
4 *	434.0651	80.64	1.21	81.85	100.8	-18.95	peak	100	110.6	P	
5	593.0497	26.78	2.96	29.74	46.00	-16.26	peak	100	89.3	P	
6 X	869.1302	47.68	7.20	54.88	80.80	-25.92	peak	100	306.5	P	

Frequency (MHz)	Level (dBuV/m)	AV factor (dB)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Result
434.0650	81.85	/	81.85	100.8	-18.95	PK	Pass
434.0650	/	-8.65	73.20	80.80	-7.60	AV	Pass
869.1301	54.88	/	54.88	80.80	-25.92	PK	Pass
869.1301	/	-8.65	46.23	60.80	-14.57	AV	Pass

AV Level =PK Level + AV factor, Margin= Final Level - Limit

TM1 / Polarization: Vertical / BW: 0.02 / 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	30.5306	23.88	-3.00	20.88	40.00	-19.12	peak	100	17.8	P	
2	89.9047	24.54	-5.98	18.56	43.50	-24.94	peak	100	168.4	P	
3	212.2695	25.27	-2.74	22.53	43.50	-20.97	peak	100	212.7	P	
4 *	434.0651	71.99	1.21	73.20	100.8	-27.60	peak	100	282.0	P	
5	595.1329	24.82	4.98	29.80	46.00	-16.20	peak	100	114.6	P	
6 !	869.1302	34.64	6.81	41.45	80.80	-39.35	peak	100	290.0	P	

Frequency (MHz)	Level (dBuV/m)	AV factor (dB)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Result
434.0650	73.20	/	73.20	100.8	-27.60	PK	Pass
434.0650	/	-8.65	64.55	80.80	-16.25	AV	Pass
869.1301	41.45	/	41.45	80.80	-39.35	PK	Pass
869.1301	/	-8.65	32.80	60.80	-28.00	AV	Pass

AV Level =PK Level + AV factor, Margin= Final Level - Limit

Note: During testing, it was found that during the process of raising or lowering the antenna, the maximum radiation emission value occurred at 1m, so only the peak value at 1m was recorded.

4.6 Radiated Emission (above 1GHz)

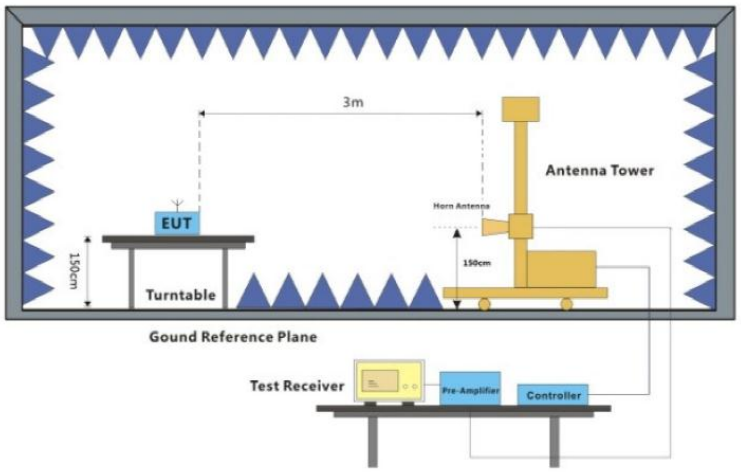
<table>
<tr><td>Test Requirement:</td><td>47 CFR 15.231</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2013, Section 6.6</td></tr>
<tr><td>Procedure:</td><td>a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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 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 the worst case.
i. Repeat above procedures until all frequencies measured was complete.
Remark:
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not</td></tr>
</table>

	exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

4.6.1 E.U.T. Operation:

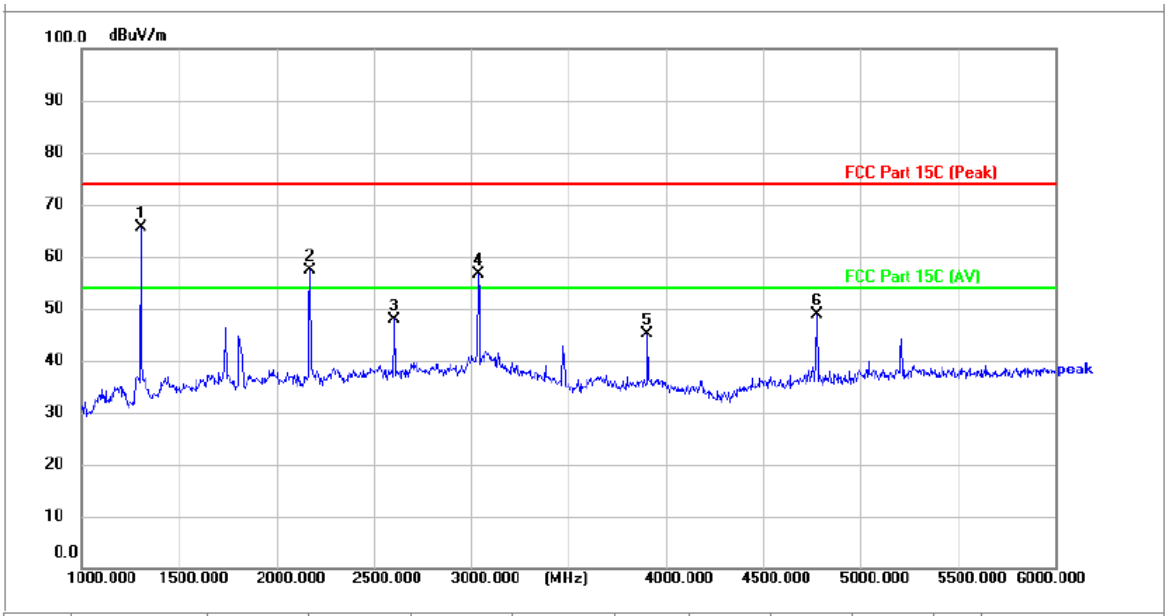
Operating Environment:					
Temperature:	23.4 °C	Humidity:	48.2 %	Atmospheric Pressure:	101 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.6.2 Test Setup Diagram:



4.6.3 Test Data:

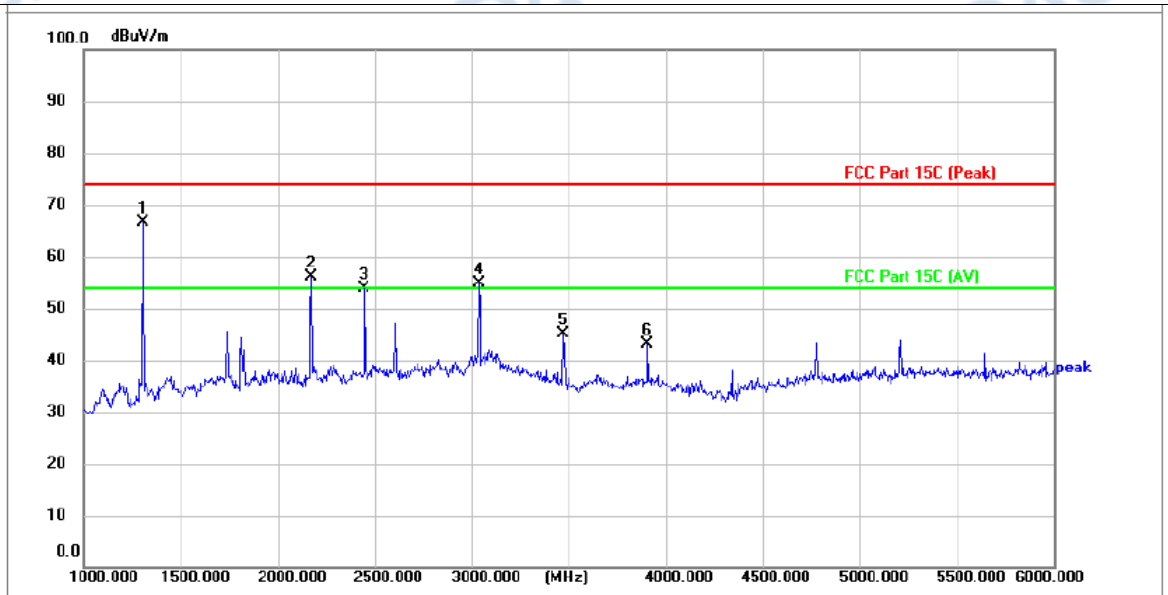
TM1 / Polarization: Horizontal



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 *	1300.000	70.21	-4.62	65.59	74.00	-8.41	peak	150	128.7	P	
2	2170.000	58.66	-1.29	57.37	74.00	-16.63	peak	200	217.0	P	
3	2605.000	48.11	-0.22	47.89	74.00	-26.11	peak	150	137.9	P	
4	3035.000	62.23	-5.49	56.74	74.00	-17.26	peak	150	238.8	P	
5	3905.000	48.10	-3.05	45.05	74.00	-28.95	peak	150	109.3	P	
6	4775.000	49.88	-0.99	48.89	74.00	-25.11	peak	350	345.5	P	

Frequency (MHz)	Level (dBuV/m)	AV factor (dB)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Result
1300.00	65.59	/	65.59	80.8	-15.21	PK	Pass
1300.00	/	-8.65	56.94	60.8	-3.86	AV	Pass
2170.00	57.37	/	57.37	80.8	-23.43	PK	Pass
2170.00	/	-8.65	48.72	60.8	-12.08	AV	Pass
2605.00	47.89	/	47.89	80.8	-32.91	PK	Pass
2605.00	/	-8.65	39.24	60.8	-21.56	AV	Pass
3035.00	56.74	/	56.74	80.8	-24.06	PK	Pass
3035.00	/	-8.65	48.09	60.8	-12.71	AV	Pass
3905.00	45.05	/	45.05	80.8	-35.75	PK	Pass
3905.00	/	-8.65	36.4	60.8	-24.4	AV	Pass
4775.00	48.89		48.89	80.8	-31.91	PK	Pass
4775.00	/	-8.65	40.24	60.8	-20.56	AV	Pass

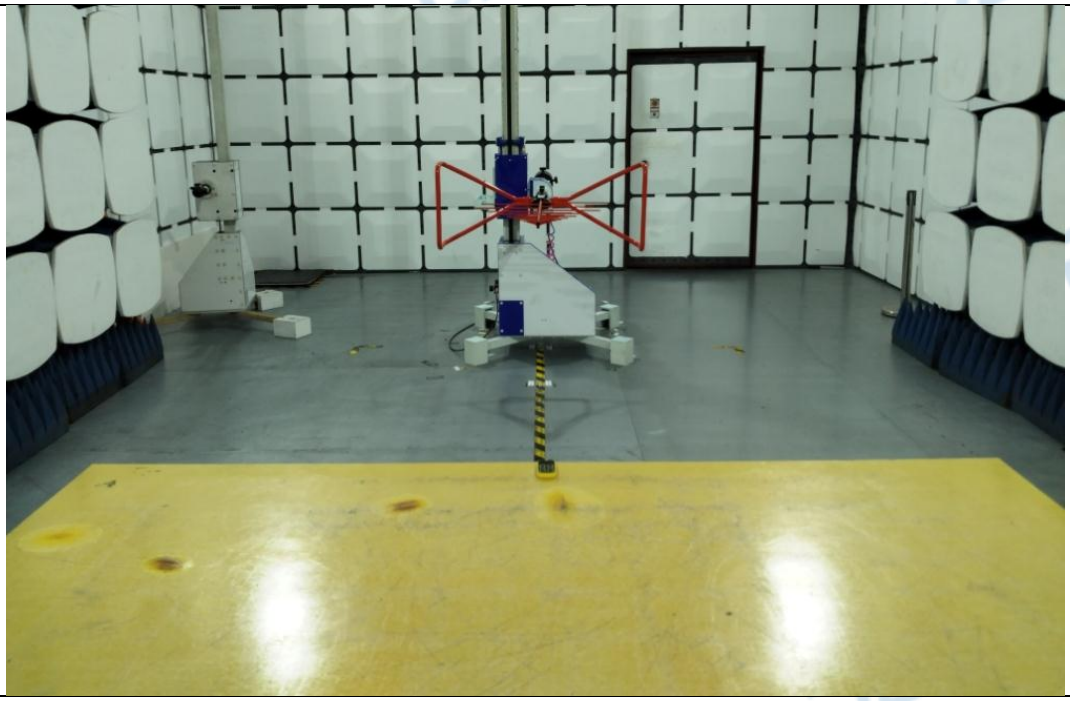
TM1 / Polarization: Vertical



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 *	1300.000	72.51	-5.98	66.53	74.00	-7.47	peak	150	275.8	P	
2	2170.000	59.00	-2.77	56.23	74.00	-17.77	peak	200	347.7	P	
3	2445.000	55.60	-1.71	53.89	74.00	-20.11	peak	150	59.5	P	
4	3035.000	60.33	-5.42	54.91	74.00	-19.09	peak	250	304.3	P	
5	3470.000	49.55	-4.31	45.24	74.00	-28.76	peak	150	56.1	P	
6	3905.000	46.45	-3.20	43.25	74.00	-30.75	peak	150	352.7	P	

Frequency (MHz)	Level (dBuV/m)	AV factor (dB)	Final Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Result
1300.00	66.53	/	66.53	80.8	-14.27	PK	Pass
1300.00	/	-8.65	57.88	60.8	-2.92	AV	Pass
2170.00	56.23	/	56.23	80.8	-24.57	PK	Pass
2170.00	/	-8.65	47.58	60.8	-13.22	AV	Pass
2445.00	53.89	/	53.89	80.8	-26.91	PK	Pass
2445.00	/	-8.65	45.24	60.8	-15.56	AV	Pass
3035.00	54.91	/	54.91	80.8	-25.89	PK	Pass
3035.00	/	-8.65	46.26	60.8	-14.54	AV	Pass
3470.00	45.24	/	45.24	80.8	-35.56	PK	Pass
3470.00	/	-8.65	36.59	60.8	-24.21	AV	Pass
3905.00	43.25	/	43.25	80.8	-37.55	PK	Pass
3905.00	/	-8.65	34.6	60.8	-26.20	AV	Pass

5 TEST SETUP PHOTOS

Radiated Emission (below 1GHz)


Radiated Emission (above 1GHz)

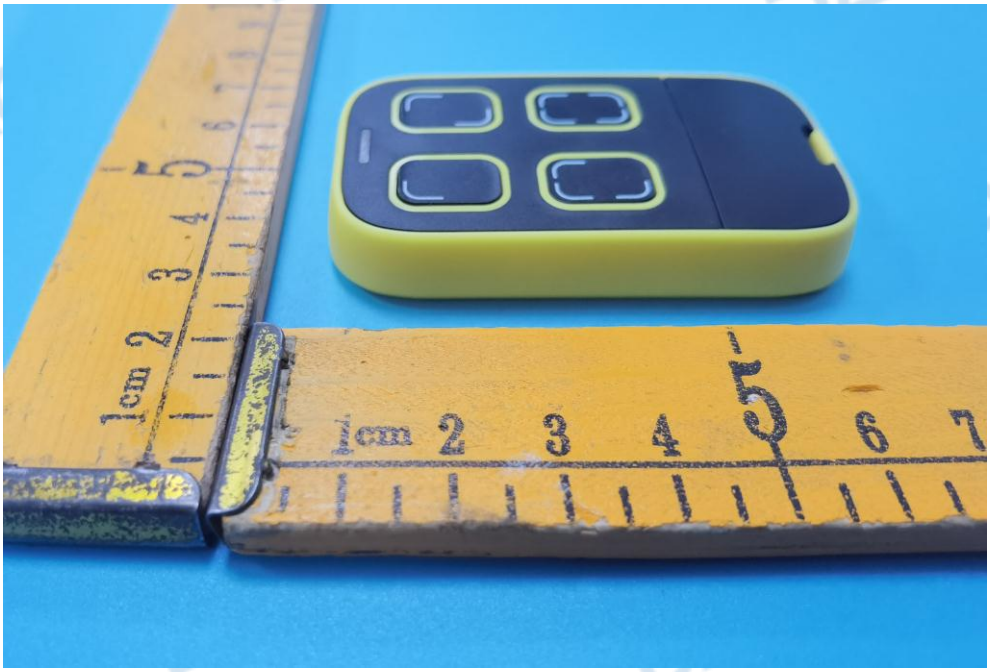

6 PHOTOS OF THE EUT

External



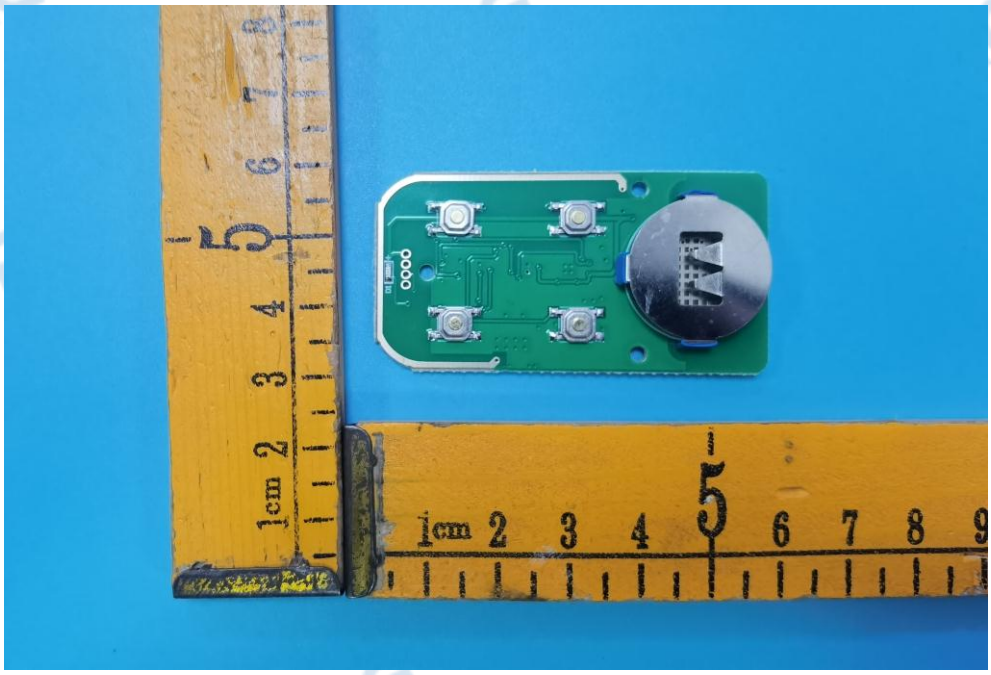
1cm 2 3 4 5 6 7 8 9 10

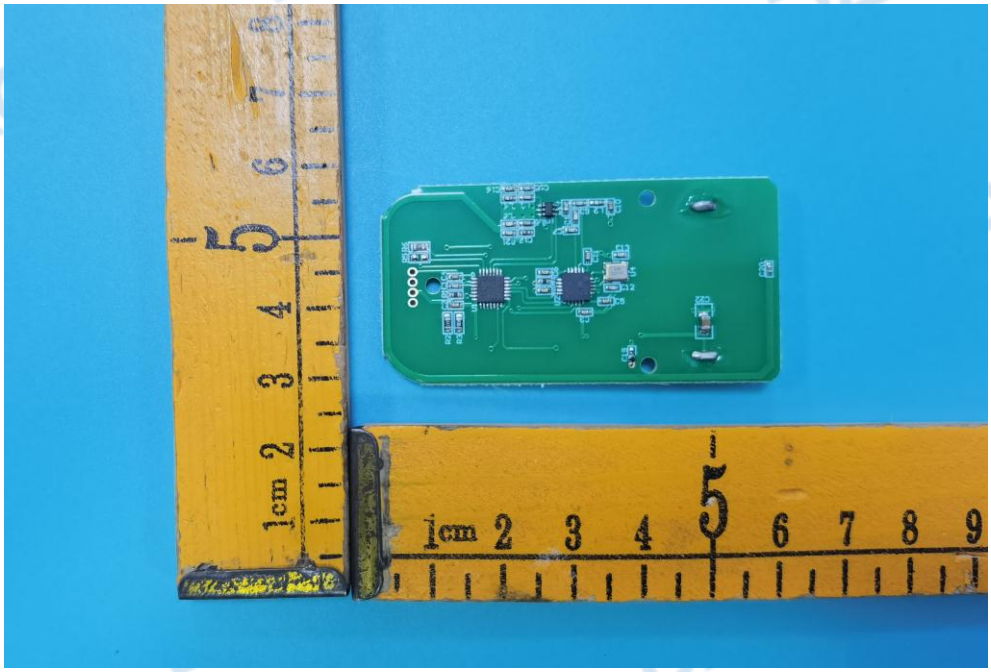

1cm 2 3 4 5 6 7

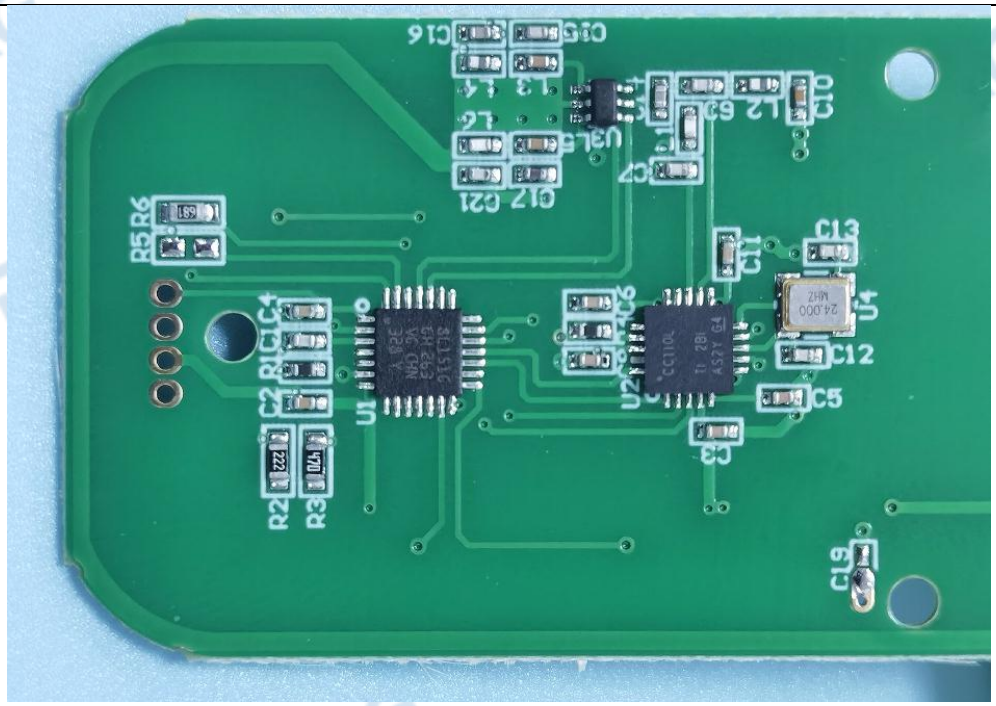


Internal


CR2032
LITHIUM BATTERY
3V







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