

APPLICATION CERTIFICATION FCC Part 15C

On Behalf of
Libre Home Inc

Wireless Smart Remote

Model No.: RMT

FCC ID: 2AQXA-RMT

Prepared for : Libre Home Inc
Address : 13 Crestview Ter. Montvale, New Jersey, United States 07645

Prepared by : Shenzhen Accurate Technology Co., Ltd.
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Report No. : ATE20191314
Date of Test : Sep. 02, 2019-Sep. 12, 2019
Date of Report : Sep. 19, 2019

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Test Report Certification

Applicant : Libre Home Inc
Address : 13 Crestview Ter. Montvale, New Jersey, United States 07645
Product : Wireless Smart Remote
Model No. : RMT
Trade name : Libre Home

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

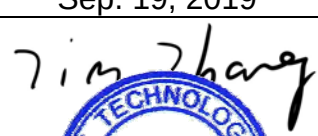
The EUT was tested according to DTS test procedure of April 02, 2019 KDB558074 D01 DTS Meas Guidance v05r02 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by SHENZHEN ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and SHENZHEN ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Sep. 02, 2019-Sep. 12, 2019
Date of Report: Sep. 19, 2019

Prepared by :


(Tim Zhang, Engineer)

Approved & Authorized Signer :


(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Wireless Smart Remote
 Model Number : RMT
 Radio device : Zigbee
 Frequency Range : 2405MHz-2480MHz
 Number of Channels : 16
 Antenna Gain : 2dBi
 Antenna type : PCB Antenna
 Power Supply : DC 3V
 Modulation mode : OQPSK
 Applicant : Libre Home Inc
 Address : 13 Crestview Ter. Montvale, New Jersey, United States 07645
 Date of sample received : Aug. 23, 2019
 Date of Test : Sep. 02, 2019-Sep. 12, 2019
 Sample Number : 1901071

1.2. Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460	26	2480

1.3. Special Accessory and Auxiliary Equipment

N/A

1.4. Description of Test Facility

EMC Lab	: Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358
	Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2
	Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193
	Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	: Shenzhen Accurate Technology Co., Ltd.
Site Location	: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.5. Measurement Uncertainty

Conducted Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	= 2.72dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	= 2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	= 4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	= 4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	= 5.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

2.1.For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan.05, 2019	1 Year
2.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan.05, 2019	1 Year
3.	Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan.05, 2019	1 Year
4.	Test Receiver	Rohde& Schwarz	ESPI	100396/003	Jan.05, 2019	1 Year
5.	Test Receiver	Rohde& Schwarz	ESPI	101526/003	Jan.05, 2019	1 Year
6.	Test Receiver	Rohde& Schwarz	ESR	101817	Jan.05, 2019	1 Year
7.	Bilog Antenna	Schwarzbeck	VULB9163	9163-194	Jan.05, 2019	1 Year
8.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan.05, 2019	1 Year
9.	Log.-Per.Antenna	Schwarzbeck	VUSLP 9111B	9111B-074	Jan.05, 2019	1 Year
10.	Biconical Broad Band Antenna	Schwarzbeck	VHBB 9124+BBA 9106	9124-617	Jan.05, 2019	1 Year
11.	Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan.05, 2019	1 Year
12.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan.05, 2019	1 Year
13.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan.05, 2019	1 Year
14.	Vertical Active Monopole Antenna	Schwarzbeck	VAMP 9243	9243-370	Jan.05, 2019	1 Year
15.	RF Switching Unit+PreAMP	Compliance Direction	RSU-M2	38322	Jan.05, 2019	1 Year
16.	Pre-Amplifier	Agilent	8447D	294A10619	Jan.05, 2019	1 Year
17.	Pre-Amplifier	Rohde&Schwarz	CBLU11835 40-01	3791	Jan.05, 2019	1 Year
18.	50 Coaxial Switch	Anritsu Corp	MP59B	6200237248	Jan.05, 2019	1 Year
19.	50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.05, 2019	1 Year
20.	RF Coaxial Cable	Schwarzbeck	N-5m	No.1	Jan.05, 2019	1 Year
21.	RF Coaxial Cable	Schwarzbeck	N-1m	No.6	Jan.05, 2019	1 Year
22.	RF Coaxial Cable	Schwarzbeck	N-1m	No.7	Jan.05, 2019	1 Year
23.	RF Coaxial Cable	SUHNER	N-3m	No.8	Jan.05, 2019	1 Year
24.	RF Coaxial Cable	RESENBERGER	N-3.5m	No.9	Jan.05, 2019	1 Year
25.	RF Coaxial Cable	SUHNER	N-6m	No.10	Jan.05, 2019	1 Year
26.	RF Coaxial Cable	RESENBERGER	N-12m	No.11	Jan.05, 2019	1 Year
27.	RF Coaxial Cable	RESENBERGER	N-0.5m	No.12	Jan.05, 2019	1 Year
28.	RF Coaxial Cable	SUHNER	N-2m	No.13	Jan.05, 2019	1 Year
29.	RF Coaxial Cable	SUHNER	N-0.5m	No.15	Jan.05, 2019	1 Year
30.	RF Coaxial Cable	SUHNER	N-2m	No.16	Jan.05, 2019	1 Year
31.	RF Coaxial Cable	RESENBERGER	N-6m	No.17	Jan.05, 2019	1 Year
Radiated Emission Measurement Software: EZ EMC V1.1.4.2						

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2405MHz

Middle Channel: 2450MHz

High Channel: 2480MHz

3.2.Configuration and peripherals

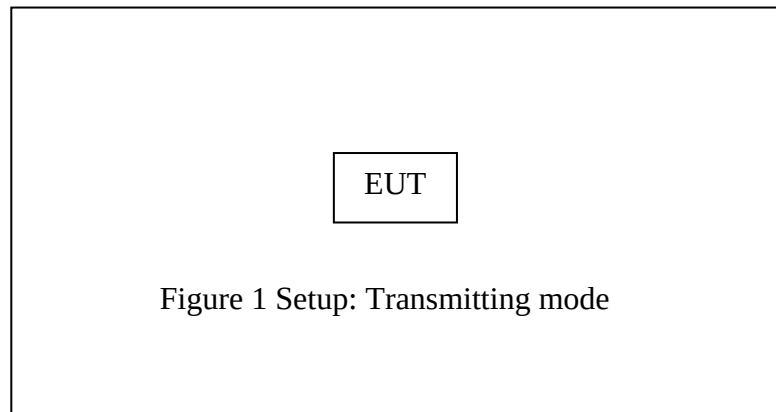


Figure 1 Setup: Transmitting mode

(EUT: Wireless Smart Remote)

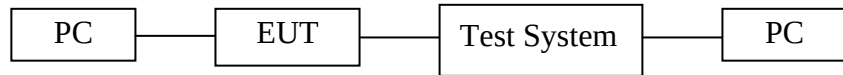
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

Note: The power supply mode of the EUT is DC 3V, According to the FCC standard's requirements, conducted emission is not applicable.

5. 6DB BANDWIDTH MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.3. EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4. Operating Condition of EUT

5.4.1. Setup the EUT and simulator as shown as Section 5.1.

5.4.2. Turn on the power of all equipment.

5.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2450MHz, and 2480MHz TX frequency to transmit.

5.5. Test Procedure

5.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

5.5.3. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

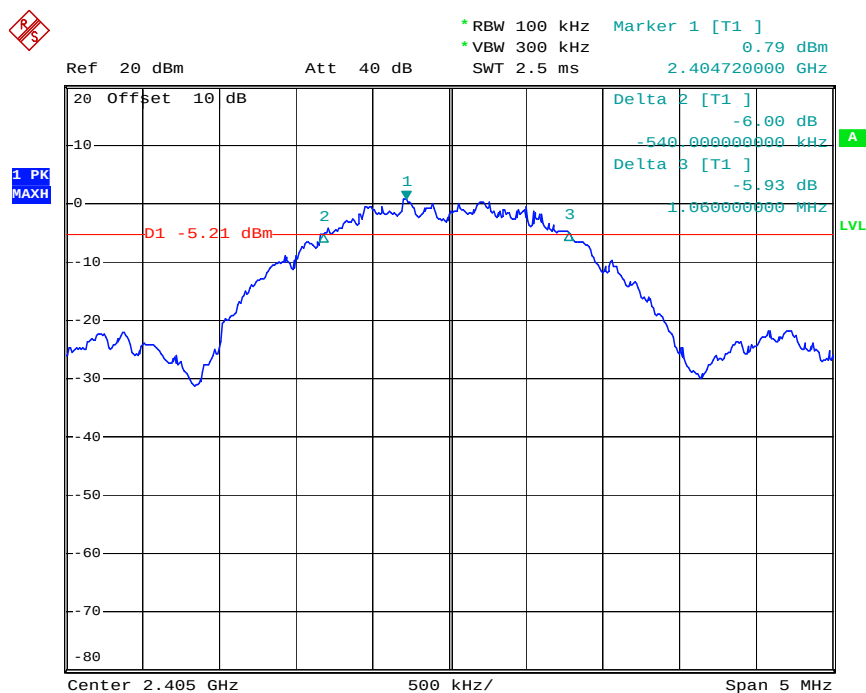
5.6. Test Result

The test data of zigbee:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit(MHz)	PASS/FAIL
11	2405	1.600	0.5	PASS
20	2450	1.640	0.5	PASS
26	2480	1.630	0.5	PASS

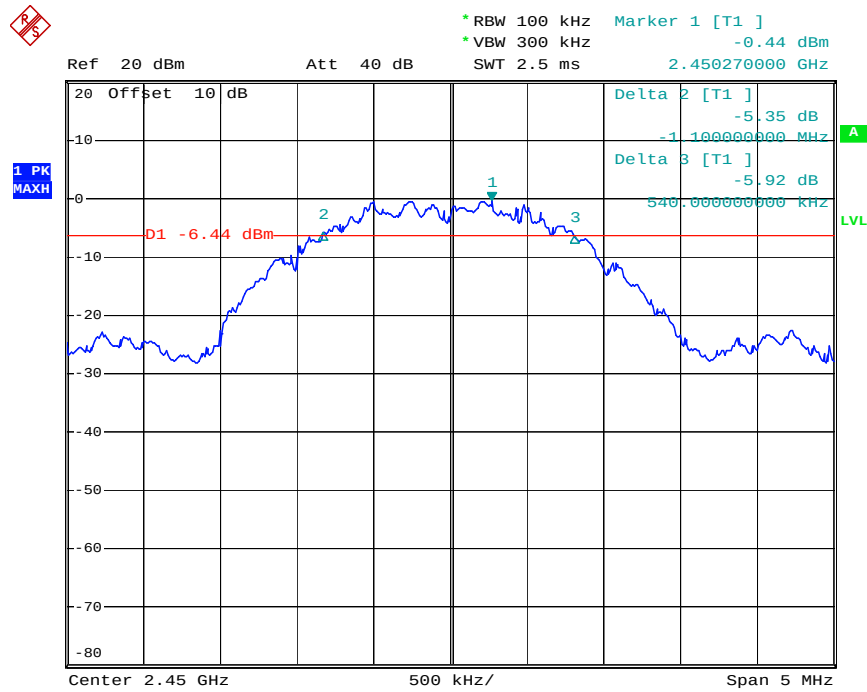
The spectrum analyzer plots are attached as below.

channel 11



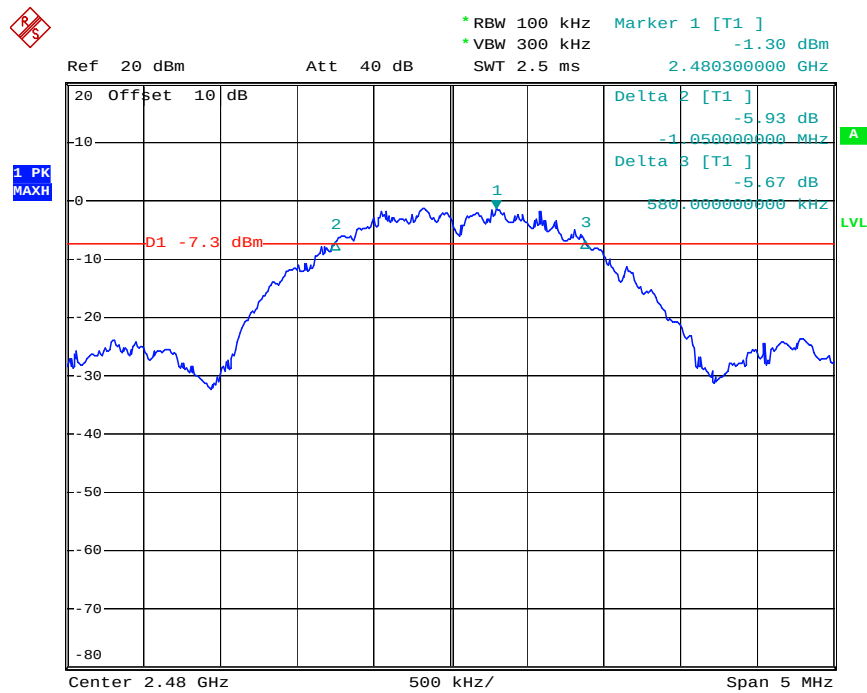
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channel 20



Date: 12.SEP.2019 16:44:13

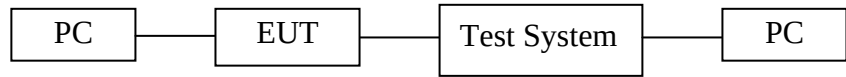
channel 26



Date: 12.SEP.2019 17:12:47

6. MAXIMUM PEAK OUTPUT POWER

6.1. Block Diagram of Test Setup



6.2. The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

6.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4. Operating Condition of EUT

6.4.1. Setup the EUT and simulator as shown as Section 6.1.

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2450MHz, and 2480MHz TX frequency to transmit.

6.5. Test Procedure

6.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2. Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz.

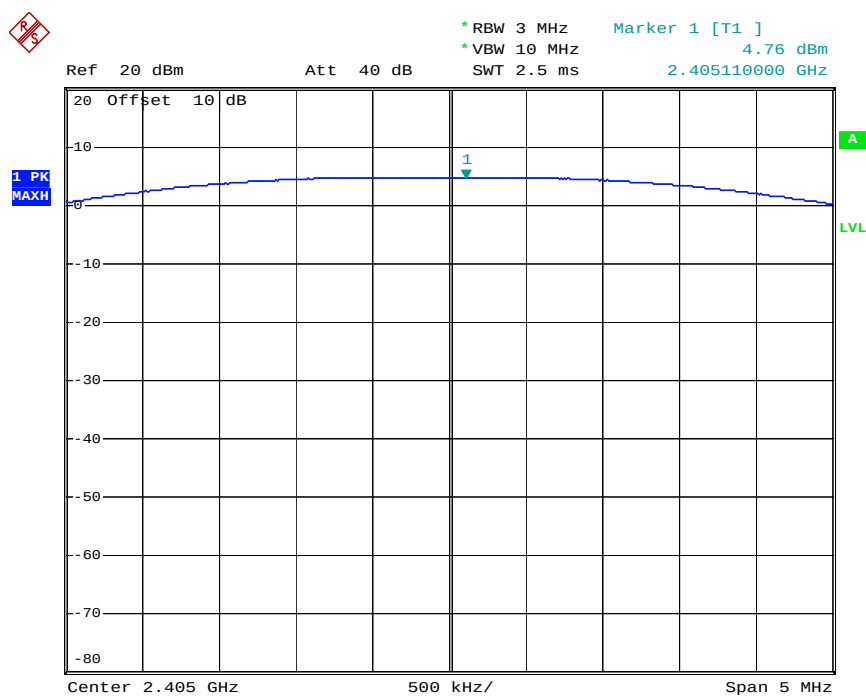
6.5.3. Measurement the maximum peak output power.

6.6.Test Result

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
11	2405	4.76	30	PASS
20	2450	4.00	30	PASS
26	2480	3.27	30	PASS

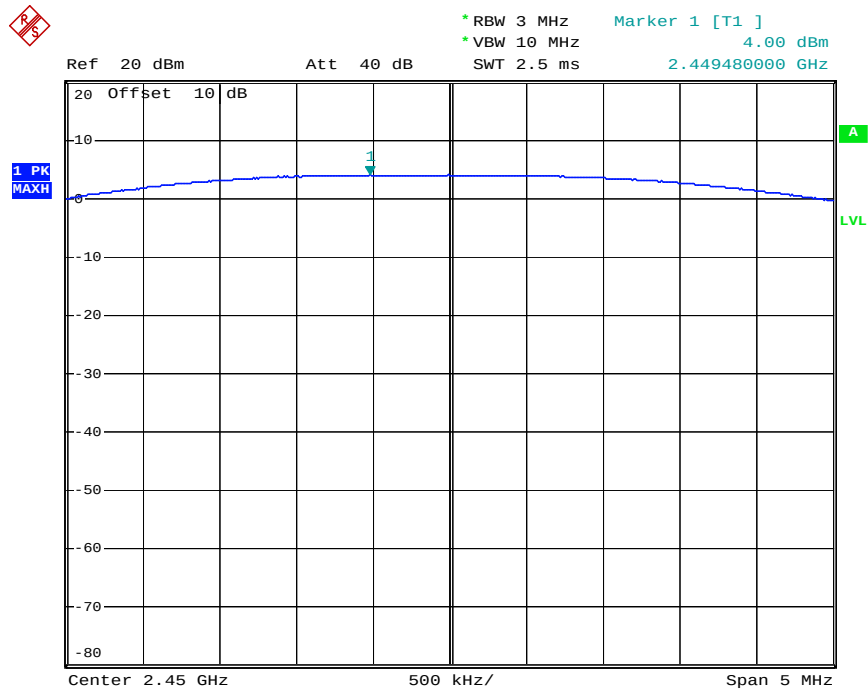
The spectrum analyzer plots are attached as below.

channel 11



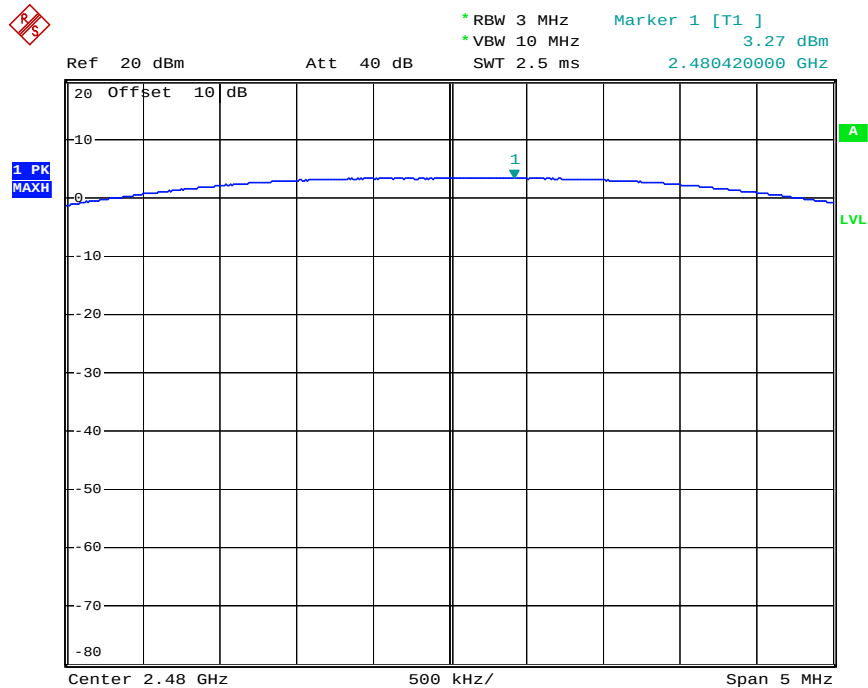
Date: 12.SEP.2019 16:40:18

channel 20



Date: 12.SEP.2019 16:42:45

channel 26



Date: 12.SEP.2019 17:14:21

7. POWER SPECTRAL DENSITY MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4. Operating Condition of EUT

7.4.1. Setup the EUT and simulator as shown as Section 7.1.

7.4.2. Turn on the power of all equipment.

7.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2450MHz, and 2480MHz TX frequency to transmit.

7.5. Test Procedure

7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2. Measurement Procedure PKPSD:

7.5.3. This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.

4. Set the VBW $\geq 3 \times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

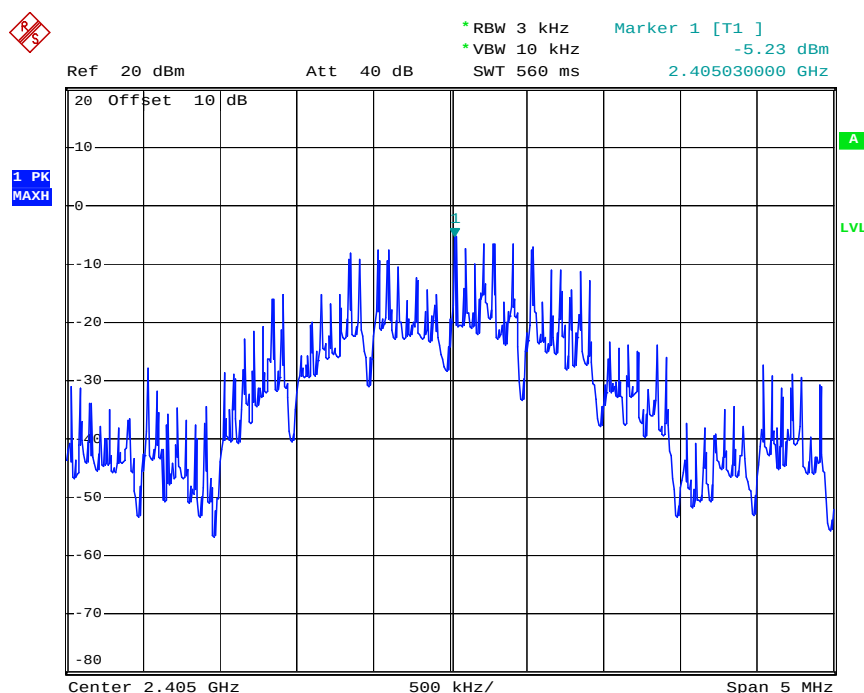
7.5.4.Measurement the maximum power spectral density.

7.6.Test Result

CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
11	2405	-5.23	8	PASS
20	2450	-5.94	8	PASS
26	2480	-6.82	8	PASS

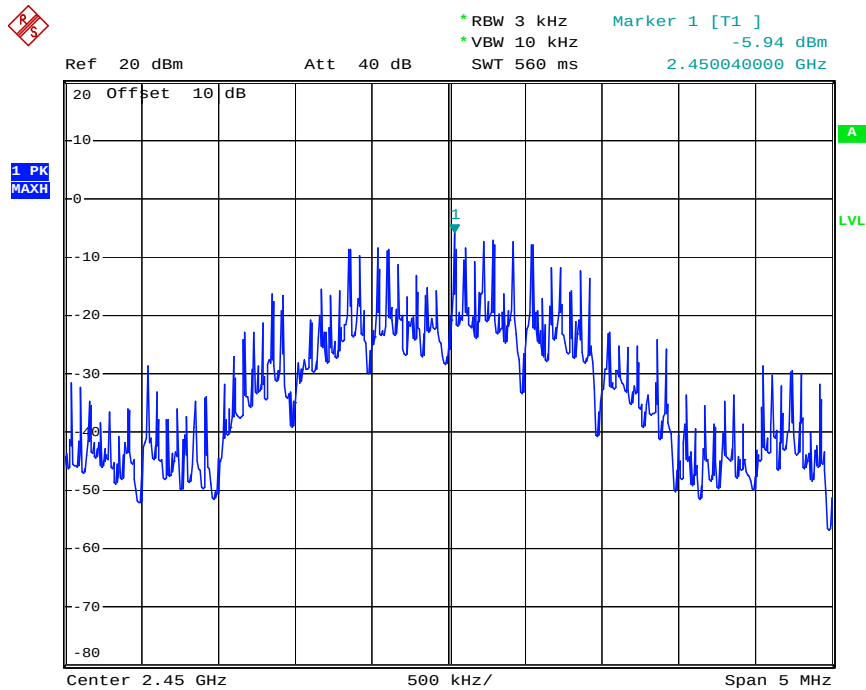
The spectrum analyzer plots are attached as below.

channel 11



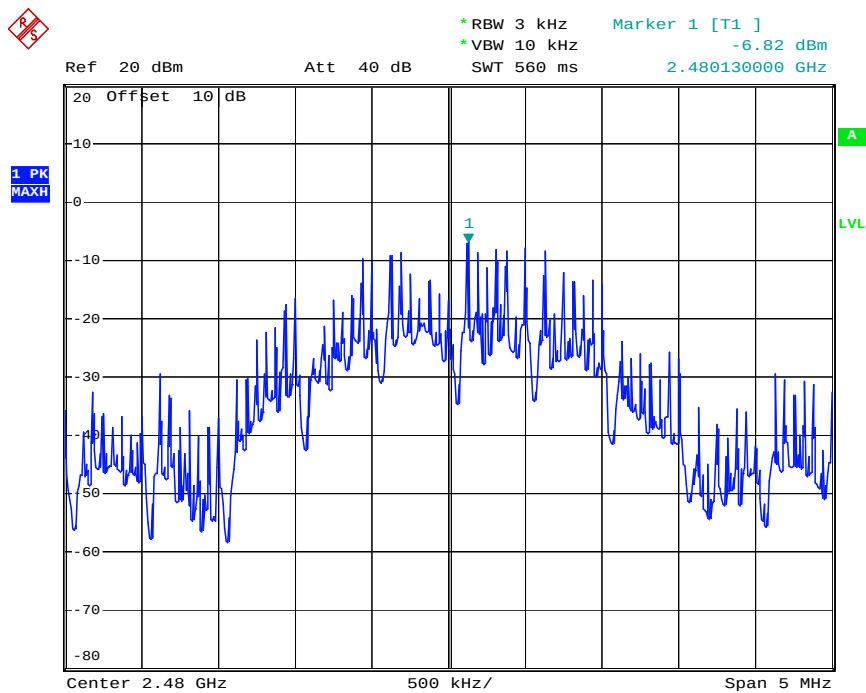
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channel 20



Date: 12.SEP.2019 16:42:28

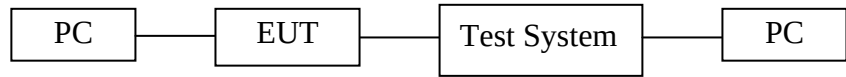
channel 26



Date: 12.SEP.2019 17:14:50

8. BAND EDGE COMPLIANCE TEST

8.1. Block Diagram of Test Setup



8.2. The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

8.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4. Operating Condition of EUT

8.4.1. Setup the EUT and simulator as shown as Section 8.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2480MHz TX frequency to transmit.

8.5. Test Procedure

Conducted Band Edge:

8.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

8.5.3. Radiate Band Edge:

8.5.4. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

8.5.5. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.6. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.7. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

8.5.8. RBW=1MHz, VBW=1MHz

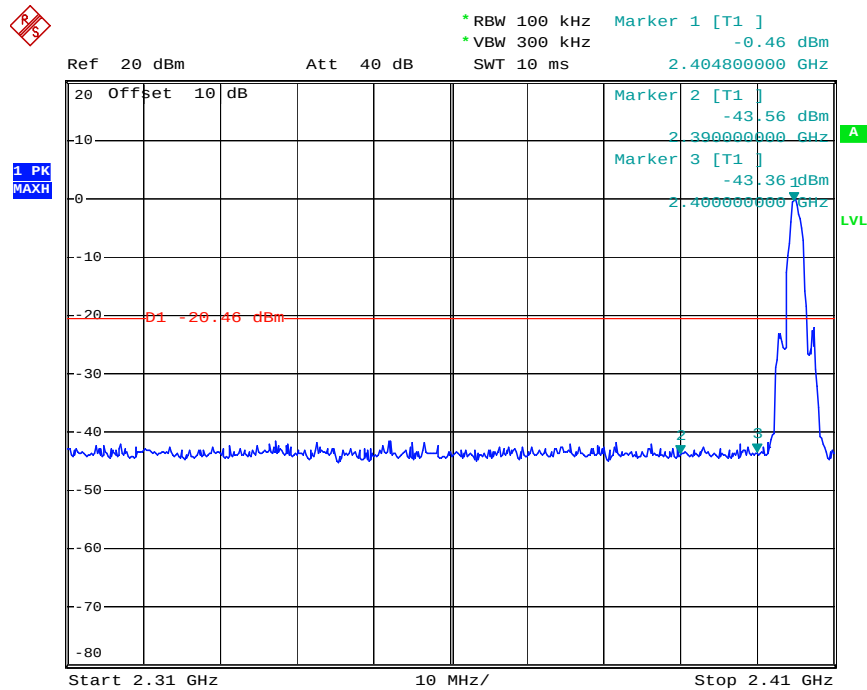
8.5.9. The band edges was measured and recorded.

8.6. Test Result

Pass

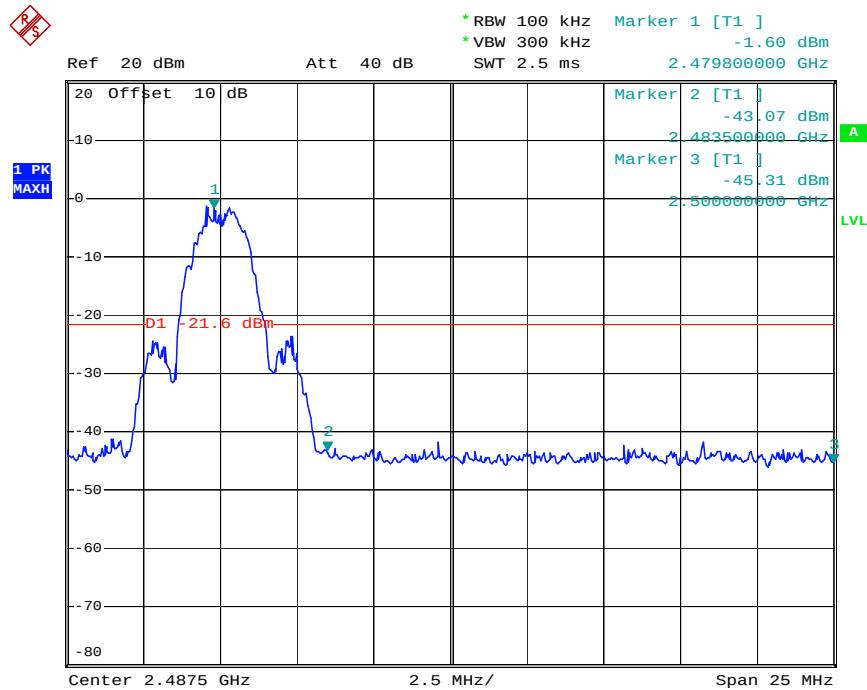
Frequency	Delta peak to band emission	Limit(dBc)
2.4GHz	42.90	20
2.4835GHz	41.47	20

channel 11



Date: 12.SEP.2019 16:39:43

channel 26



Date: 12.SEP.2019 17:13:43

Radiated Band Edge Result



ACCURATE TECHNOLOGY CO., LTD.

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Site: 1# Chamber

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Fax:+86-0755-26503396

Job No.: FRANK2019-W #182

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2405MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Horizontal

Power Source: DC 3V

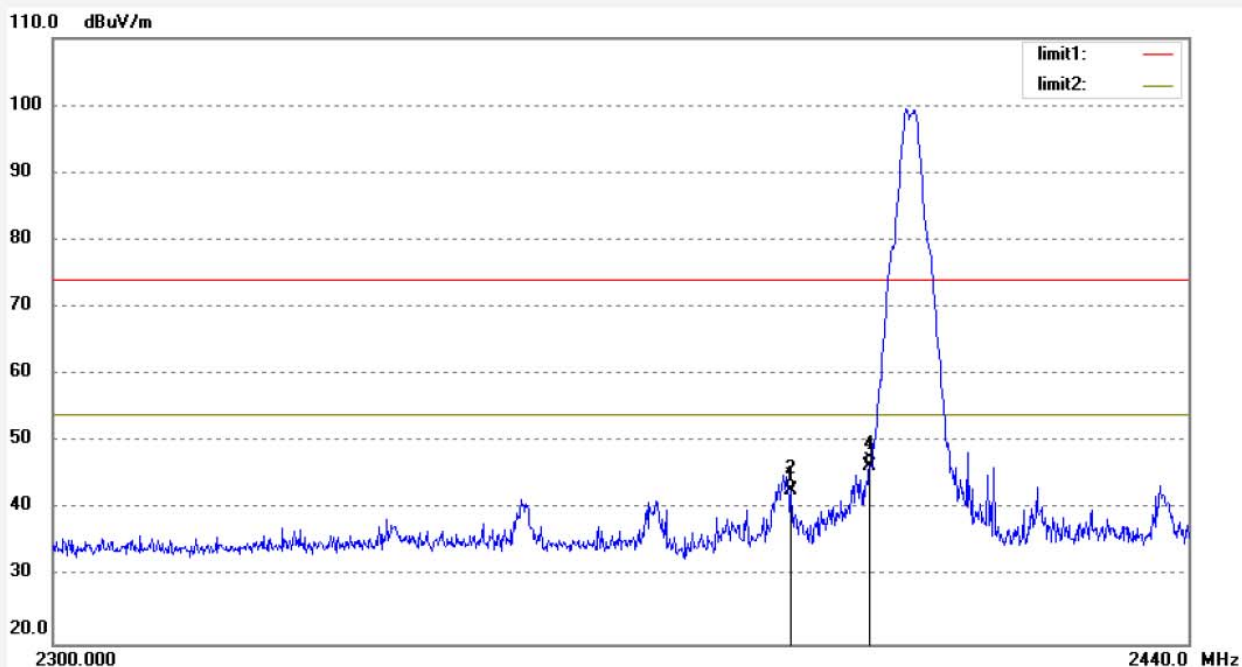
Date: 2019/09/02

Time: 15:53:47

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	49.17	-6.32	42.85	74.00	-31.15	peak	200	58	
2	2390.000	49.17	-6.32	42.85	54.00	-11.15	AVG	200	221	
3	2400.000	52.60	-6.27	46.33	74.00	-27.67	peak	200	93	
4	2400.000	52.60	-6.27	46.33	54.00	-7.67	AVG	200	211	

Job No.: FRANK2019-W #181

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2405MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Vertical

Power Source: DC 3V

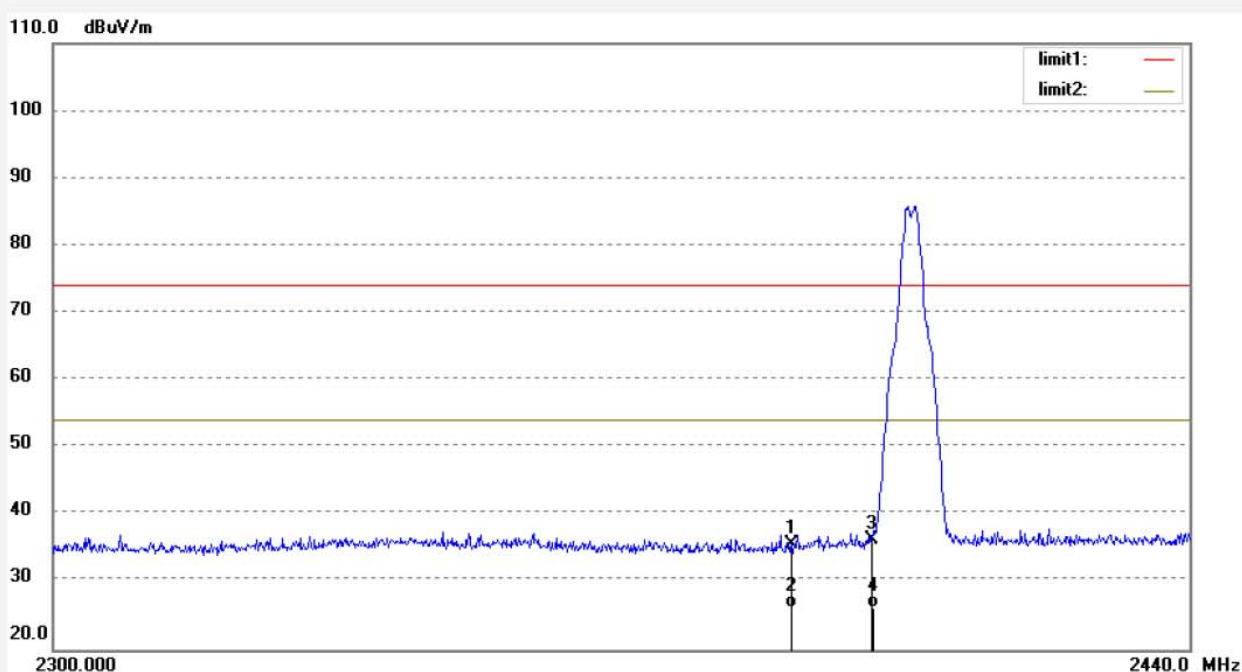
Date: 2019/09/02

Time: 15:52:10

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.90	-6.32	35.58	74.00	-38.42	peak	150	215	
2	2390.000	32.45	-6.32	26.13	54.00	-27.87	AVG	150	58	
3	2400.000	42.54	-6.27	36.27	74.00	-37.73	peak	150	332	
4	2400.000	32.48	-6.27	26.21	54.00	-27.79	AVG	150	193	

Job No.: FRANK2019-W #183

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2480MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Horizontal

Power Source: DC 3V

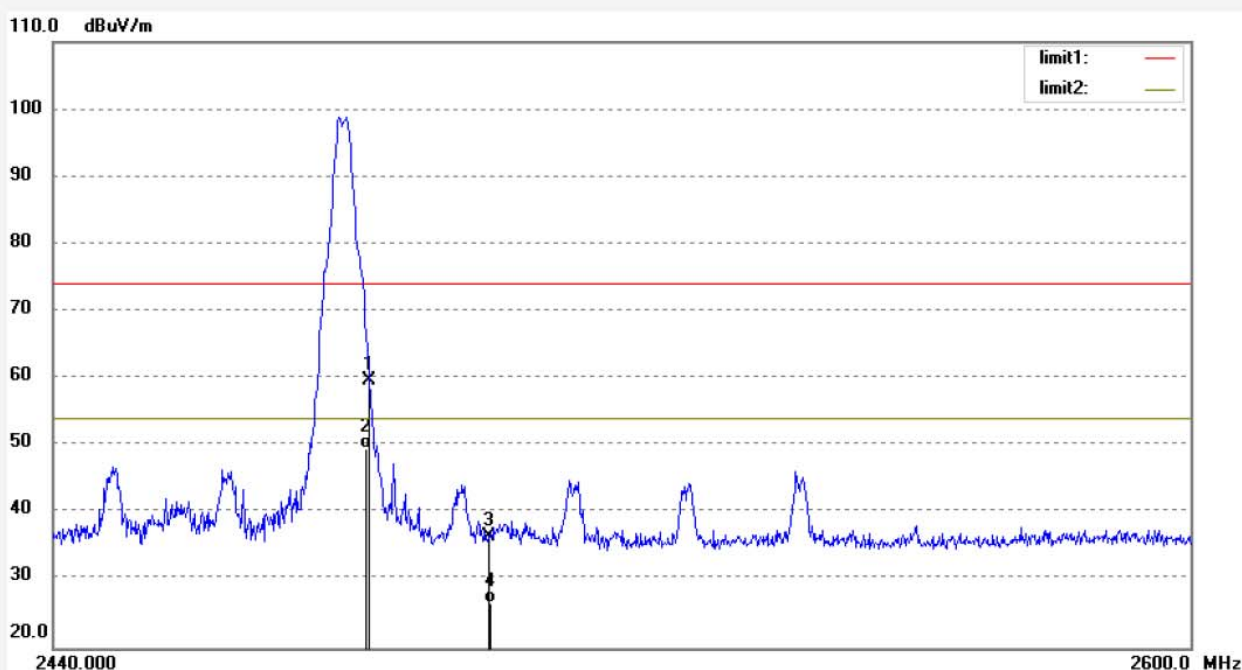
Date: 2019/09/02

Time: 15:56:01

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	65.52	-5.89	59.63	74.00	-14.37	peak	200	63	
2	2483.500	55.45	-5.89	49.56	54.00	-4.44	AVG	200	105	
3	2500.000	42.35	-5.81	36.54	74.00	-37.46	peak	200	62	
4	2500.000	32.49	-5.81	26.68	54.00	-27.32	AVG	200	193	

Job No.: FRANK2019-W #184

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2480MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Vertical

Power Source: DC 3V

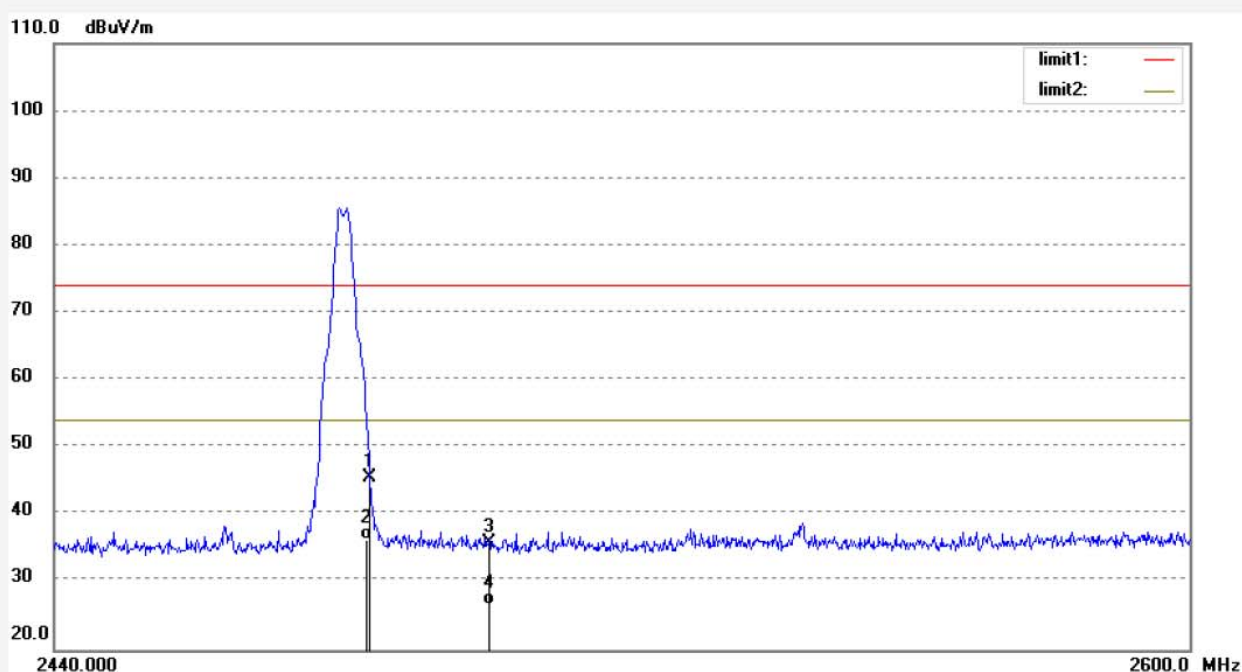
Date: 2019/09/02

Time: 15:57:31

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	51.41	-5.89	45.52	74.00	-28.48	peak	150	93	
2	2483.500	42.15	-5.89	36.26	54.00	-17.74	AVG	150	325	
3	2500.000	41.61	-5.81	35.80	74.00	-38.20	peak	150	119	
4	2500.000	32.49	-5.81	26.68	54.00	-27.32	AVG	150	41	

Note:

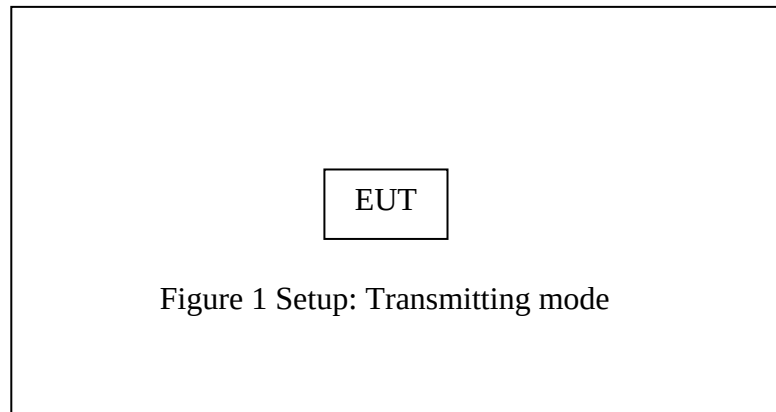
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

9. RADIATED SPURIOUS EMISSION TEST

9.1. Block Diagram of Test Setup

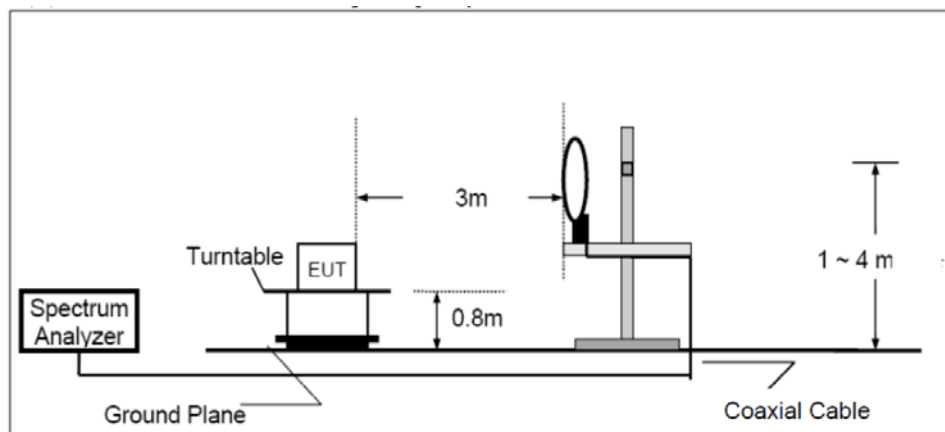
9.1.1. Block diagram of connection between the EUT and peripherals



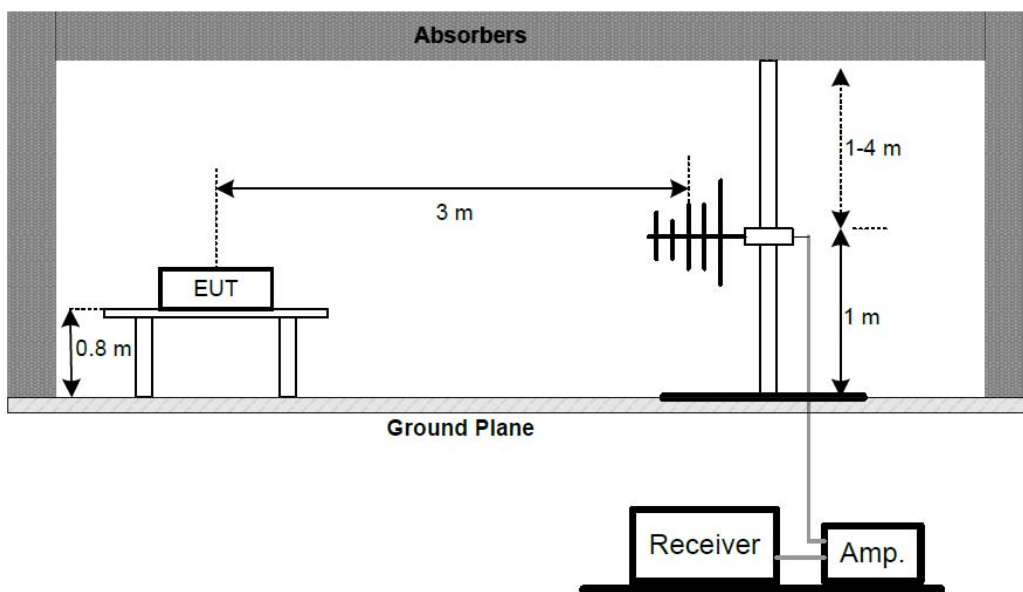
(EUT: Wireless Smart Remote)

9.1.2. Semi-Anechoic Chamber Test Setup Diagram

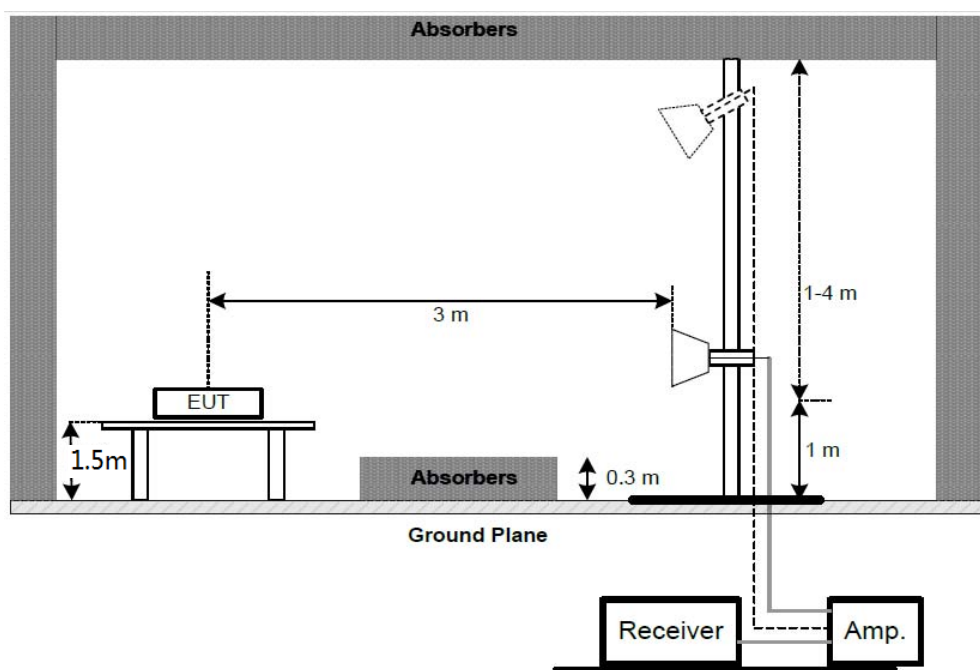
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz



9.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

9.3.Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

9.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.5.Operating Condition of EUT

9.5.1.Setup the EUT and simulator as shown as Section 9.1.

9.5.2.Turn on the power of all equipment.

9.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2405-2480MHz. We select 2405MHz, 2450MHz, and 2480MHz TX frequency to transmit.

9.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 25GHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

9.7.Data Sample

Frequency (MHz)	Reading (dB μ v)	Factor (dB/m)	Result (dB μ v/m)	Limit (dB μ v/m)	Margin (dB)	Remark
X.XX	28.66	-15.19	13.47	40.0	-26.53	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ v) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ v/m) = Reading(dB μ v) + Factor(dB/m)

Limit (dB μ v/m) = Limit stated in standard

Margin (dB) = Result(dB μ v/m) - Limit (dB μ v/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

9.8.The Field Strength of Radiation Emission Measurement Results

PASS.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The radiation emissions from 9kHz-30MHz and 18-25GHz are not reported, because the test values lower than the limits of 20dB.

Below 1GHz



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Site: 1# Chamber

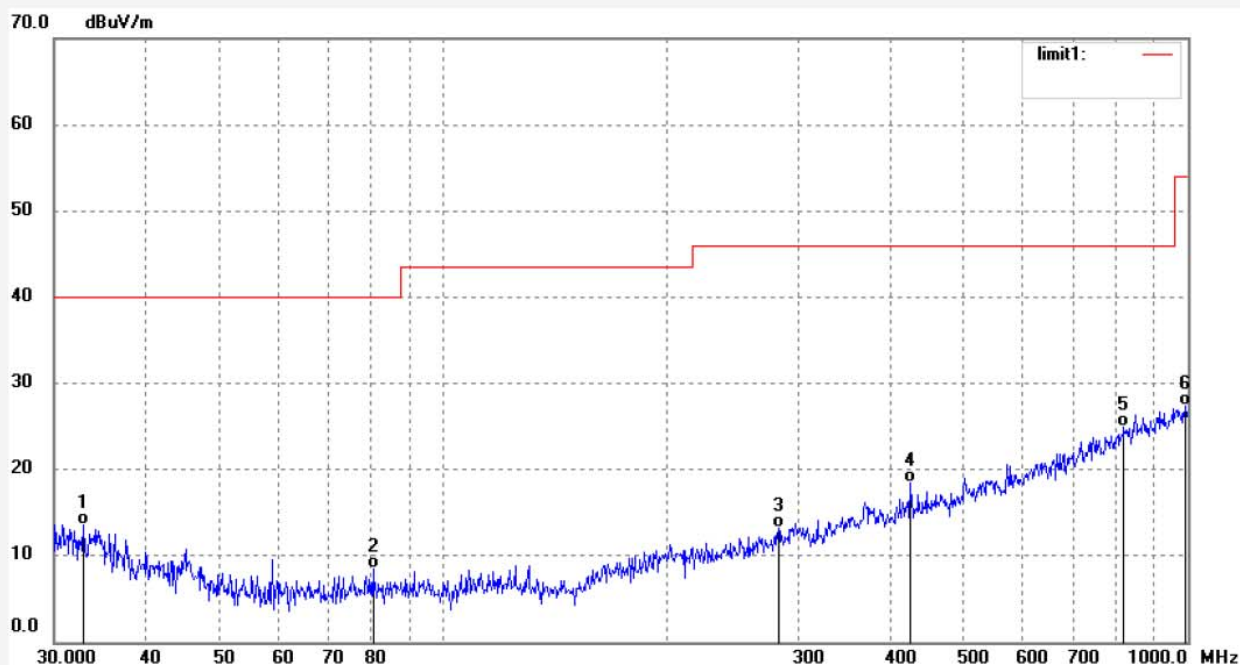
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: FRANK2019-W #191
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2405MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Horizontal
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:00
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314

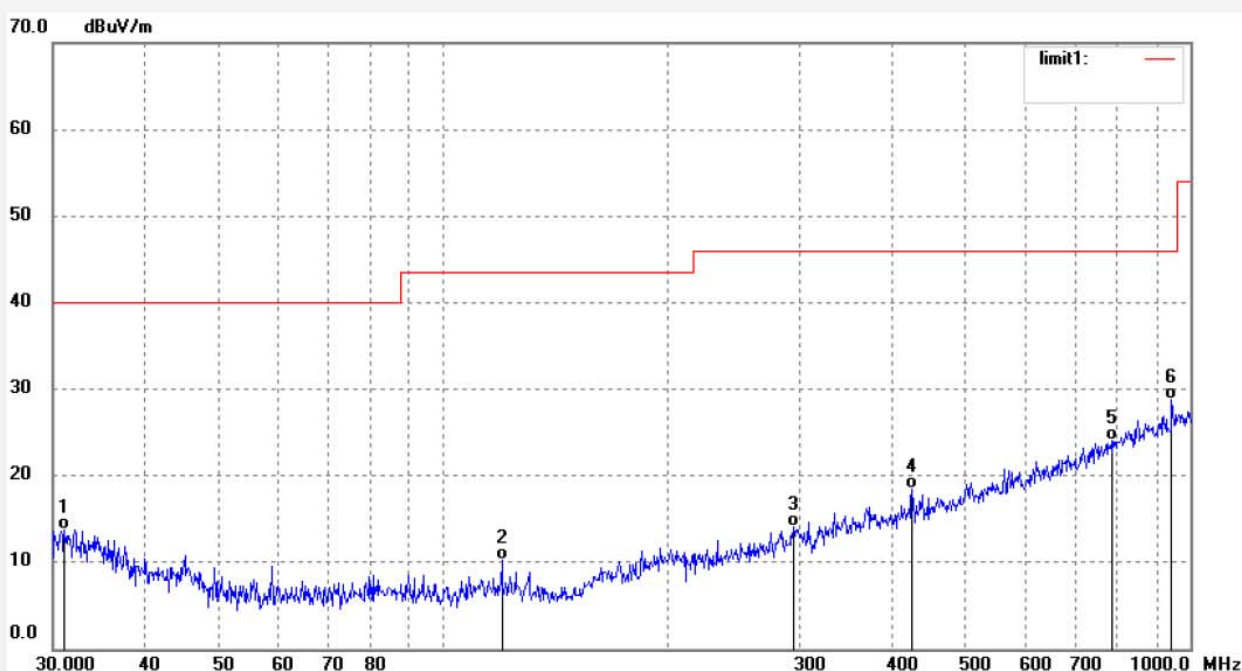


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.8697	34.55	-20.91	13.64	40.00	-26.36	QP	200	82	
2	80.5207	35.93	-27.41	8.52	40.00	-31.48	QP	200	221	
3	282.2701	35.16	-22.01	13.15	46.00	-32.85	QP	200	301	
4	424.2998	36.44	-17.94	18.50	46.00	-27.50	QP	200	89	
5	821.3871	33.46	-8.58	24.88	46.00	-21.12	QP	200	221	
6	992.9973	32.61	-5.19	27.42	54.00	-26.58	QP	200	193	

Job No.: FRANK2019-W #192
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2405MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Vertical
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:08
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314

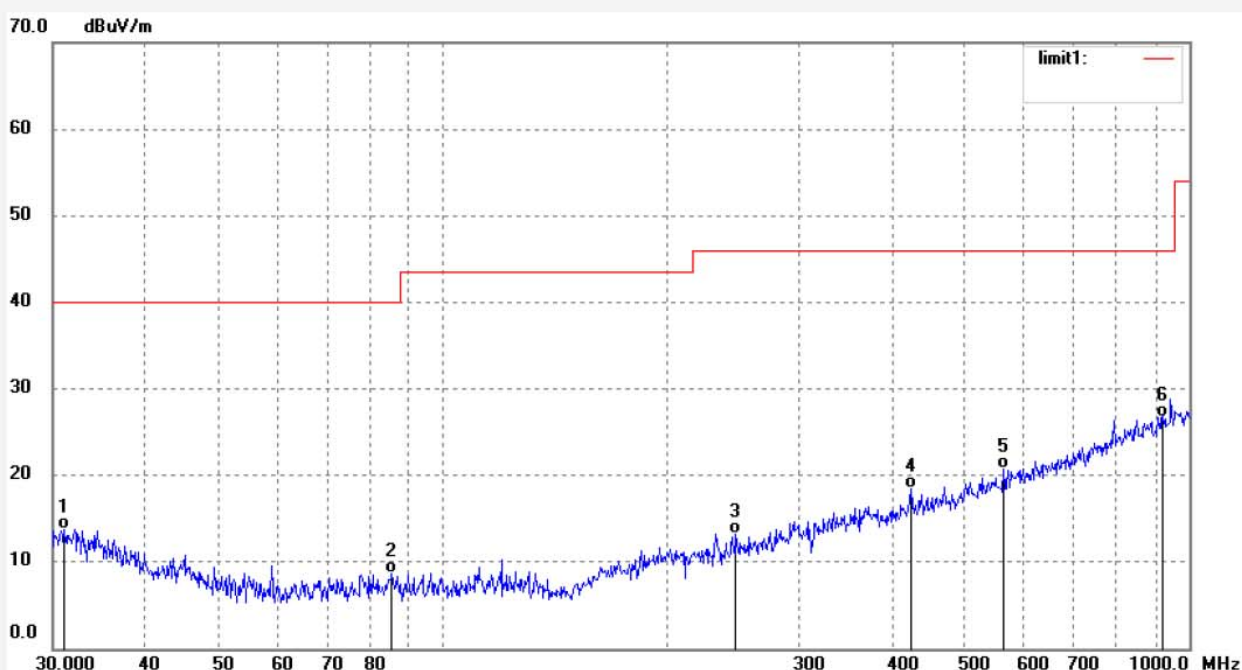


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.0728	34.27	-20.47	13.80	40.00	-26.20	QP	100	201	
2	119.7672	37.63	-27.43	10.20	43.50	-33.30	QP	100	166	
3	294.4259	35.47	-21.45	14.02	46.00	-31.98	QP	100	83	
4	424.2998	36.44	-17.94	18.50	46.00	-27.50	QP	100	210	
5	784.7128	33.43	-9.40	24.03	46.00	-21.97	QP	100	63	
6	945.3336	35.25	-6.41	28.84	46.00	-17.16	QP	100	112	

Job No.: FRANK2019-W #194
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2450MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Horizontal
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:23
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314

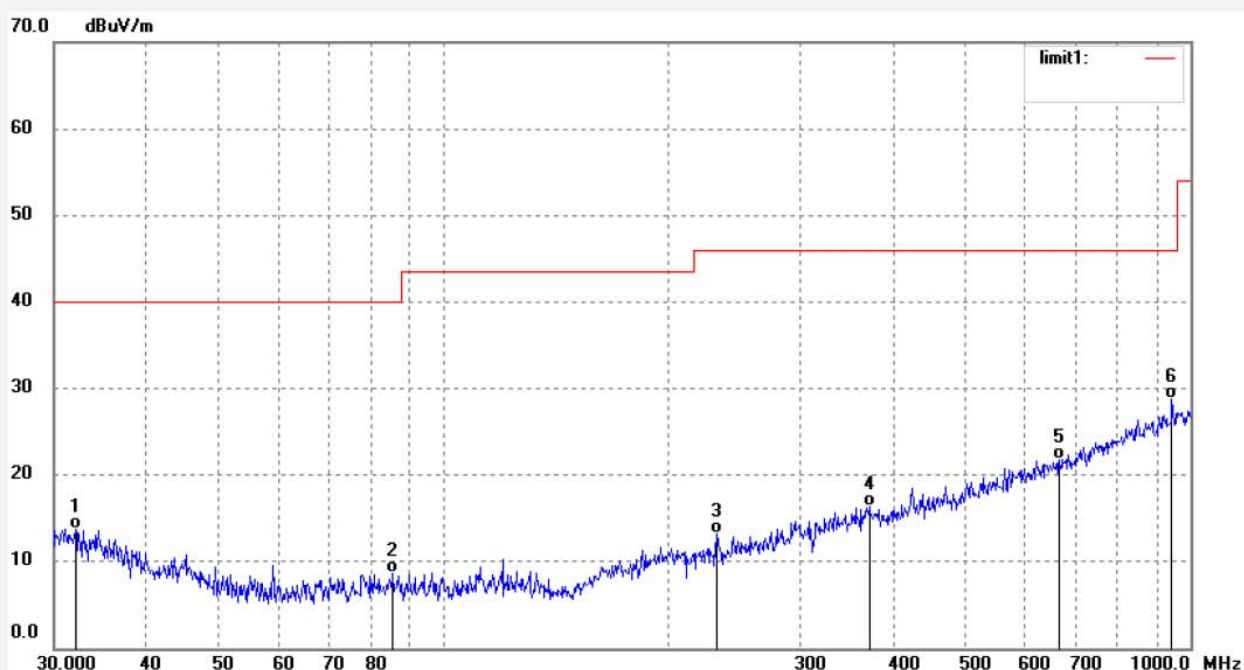


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.0728	34.27	-20.47	13.80	40.00	-26.20	QP	200	21	
2	85.4769	36.18	-27.45	8.73	40.00	-31.27	QP	200	320	
3	246.9901	36.93	-23.66	13.27	46.00	-32.73	QP	200	98	
4	424.2998	36.44	-17.94	18.50	46.00	-27.50	QP	200	221	
5	563.9923	35.29	-14.49	20.80	46.00	-25.20	QP	200	63	
6	915.9076	33.53	-6.91	26.62	46.00	-19.38	QP	200	136	

Job No.: FRANK2019-W #193
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2450MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Vertical
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:21
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314

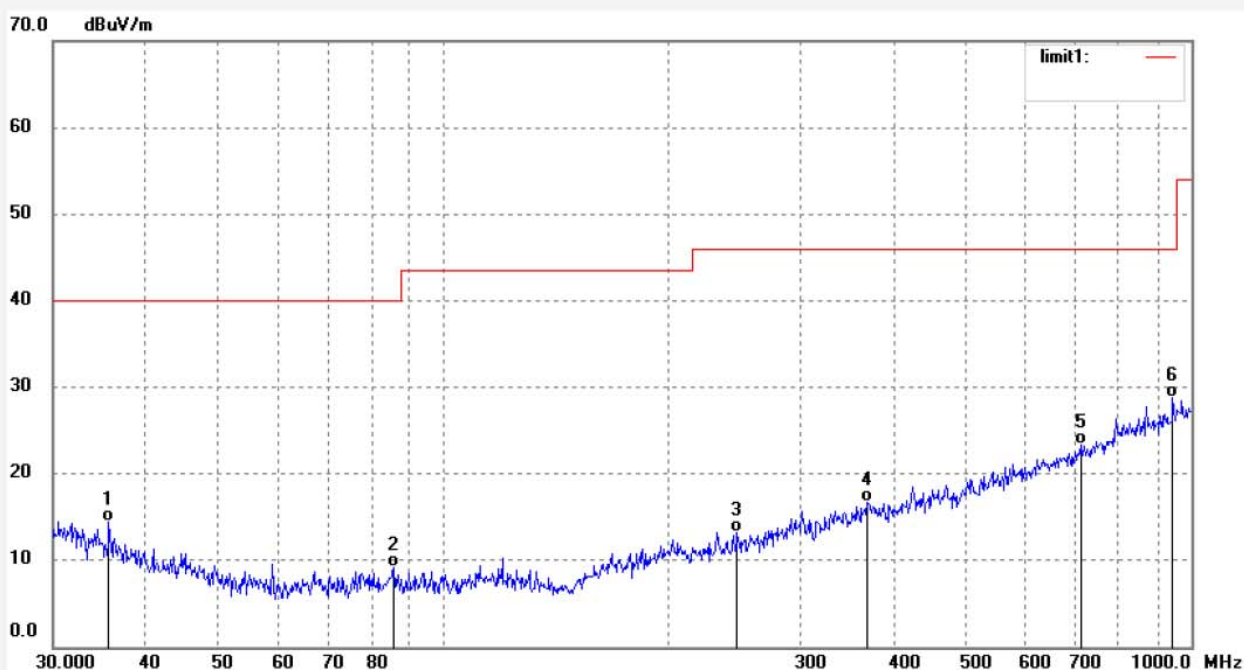


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.0711	34.47	-20.72	13.75	40.00	-26.25	QP	100	213	
2	85.4769	36.18	-27.45	8.73	40.00	-31.27	QP	100	85	
3	231.8531	36.99	-23.85	13.14	46.00	-32.86	QP	100	112	
4	371.2678	35.06	-18.75	16.31	46.00	-29.69	QP	100	320	
5	667.6023	33.93	-12.21	21.72	46.00	-24.28	QP	100	63	
6	945.3336	35.25	-6.41	28.84	46.00	-17.16	QP	100	198	

Job No.: FRANK2019-W #195
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2480MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Horizontal
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:46
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.6362	36.12	-21.72	14.40	40.00	-25.60	QP	200	218	
2	85.7776	36.66	-27.45	9.21	40.00	-30.79	QP	200	325	
3	246.9901	36.93	-23.66	13.27	46.00	-32.73	QP	200	156	
4	368.6681	35.49	-18.80	16.69	46.00	-29.31	QP	200	62	
5	711.1884	34.53	-11.21	23.32	46.00	-22.68	QP	200	332	
6	945.3336	35.25	-6.41	28.84	46.00	-17.16	QP	200	193	



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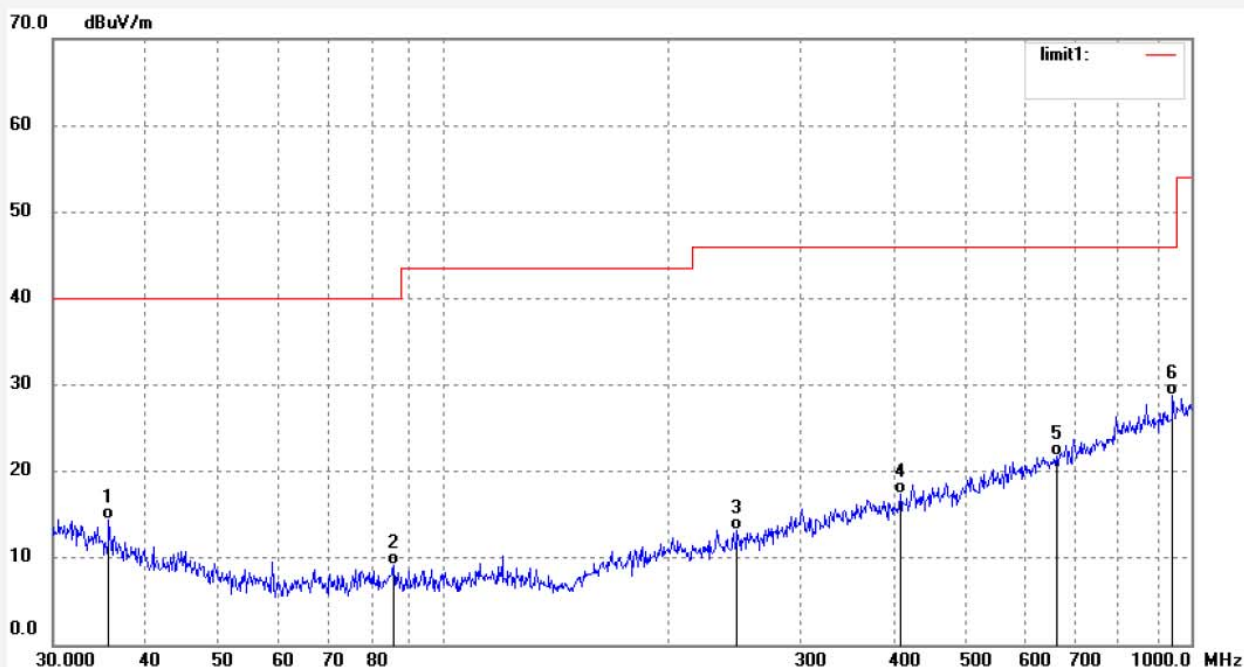
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: FRANK2019-W #196
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless Smart Remote
Mode: TX 2480MHz
Model: RMT
Applicant: Libre Home Inc

Polarization: Vertical
Power Source: DC 3V
Date: 2019/09/02
Time: 16:14:50
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.6362	36.12	-21.72	14.40	40.00	-25.60	QP	100	256	
2	85.7776	36.66	-27.45	9.21	40.00	-30.79	QP	100	321	
3	246.9901	36.93	-23.66	13.27	46.00	-32.73	QP	100	65	
4	408.2137	35.53	-18.16	17.37	46.00	-28.63	QP	100	311	
5	660.6024	34.20	-12.38	21.82	46.00	-24.18	QP	100	63	
6	945.3336	35.25	-6.41	28.84	46.00	-17.16	QP	100	149	

Above 1GHz



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Job No.: FRANK2019-W #190

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2405MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Horizontal

Power Source: DC 3V

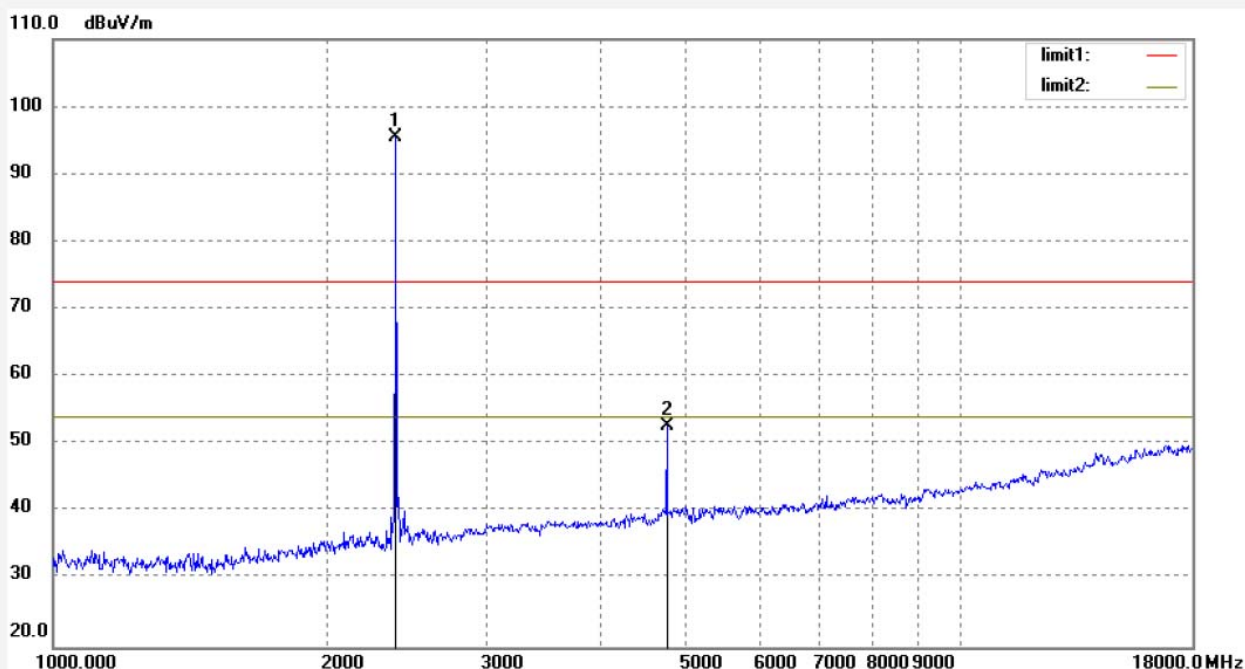
Date: 2019/09/02

Time: 16:11:54

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2405.359	101.86	-6.33	95.53			peak	200	66	
2	4810.751	52.04	0.76	52.80	74.00	-21.20	peak	250	193	

Job No.: FRANK2019-W #189

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2405MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Vertical

Power Source: DC 3V

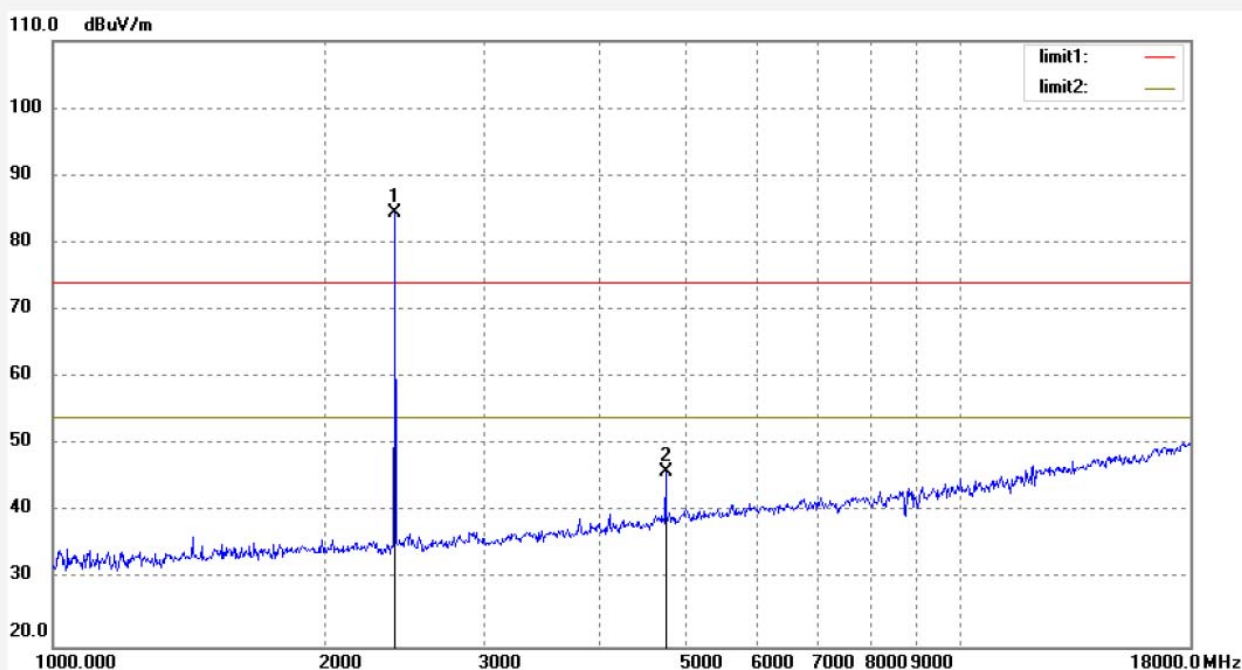
Date: 2019/09/02

Time: 16:10:34

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2405.359	90.86	-6.33	84.53			peak	150	93	
2	4810.751	45.30	0.76	46.06	74.00	-27.94	peak	150	103	

Job No.: FRANK2019-W #187

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2450MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Horizontal

Power Source: DC 3V

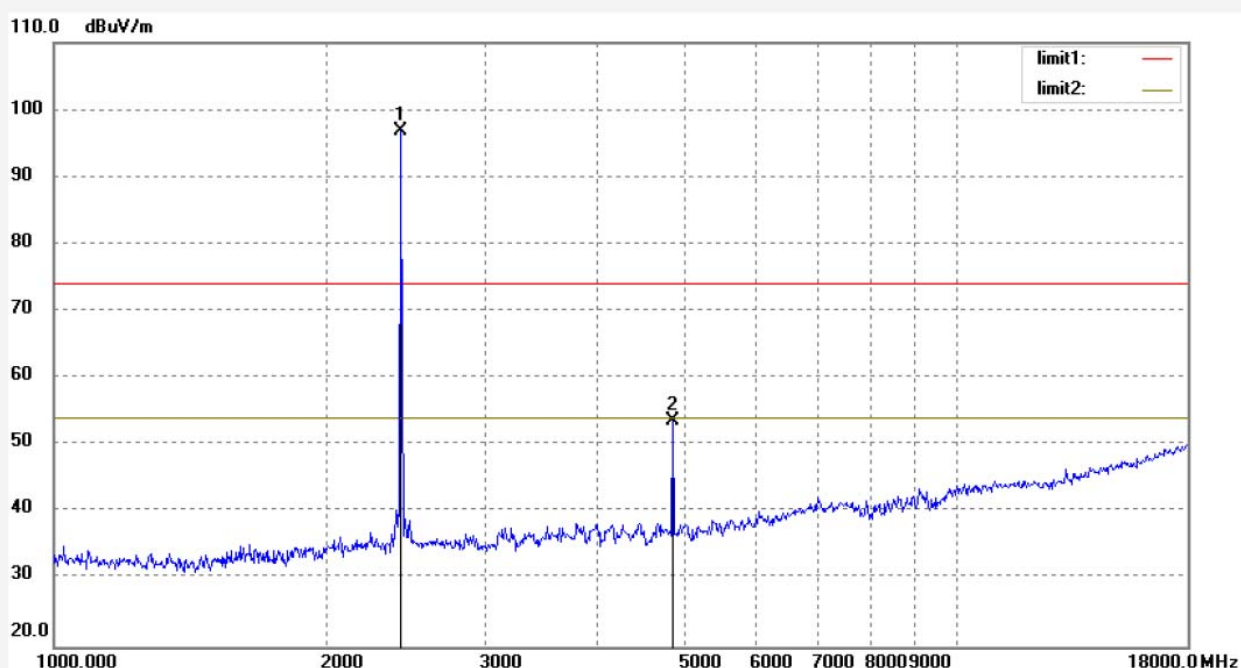
Date: 2019/09/02

Time: 16:04:21

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2450.262	103.08	-6.17	96.91			peak	250	179	
2	4900.438	52.50	1.19	53.69	74.00	-20.31	peak	250	33	

Job No.: FRANK2019-W #188

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2450MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Vertical

Power Source: DC 3V

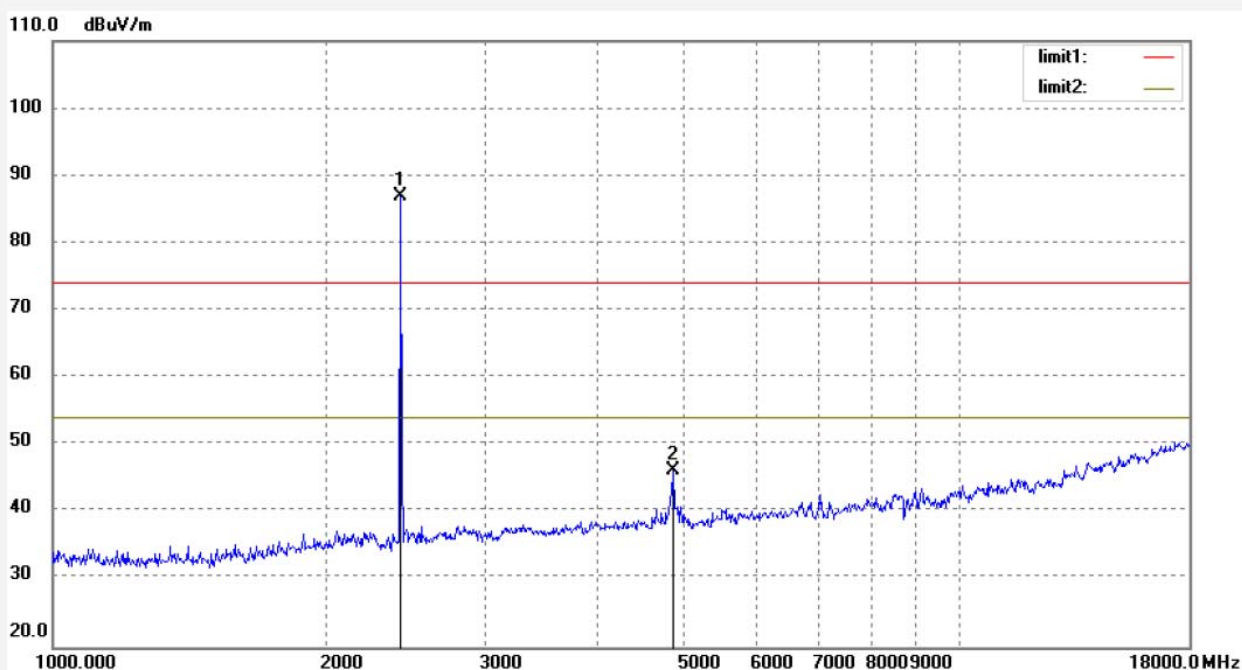
Date: 2019/09/02

Time: 16:07:15

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2450.262	93.19	-6.17	87.02			peak	150	93	
2	4900.438	45.11	1.19	46.30	74.00	-27.70	peak	150	148	

Job No.: FRANK2019-W #186

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2480MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Horizontal

Power Source: DC 3V

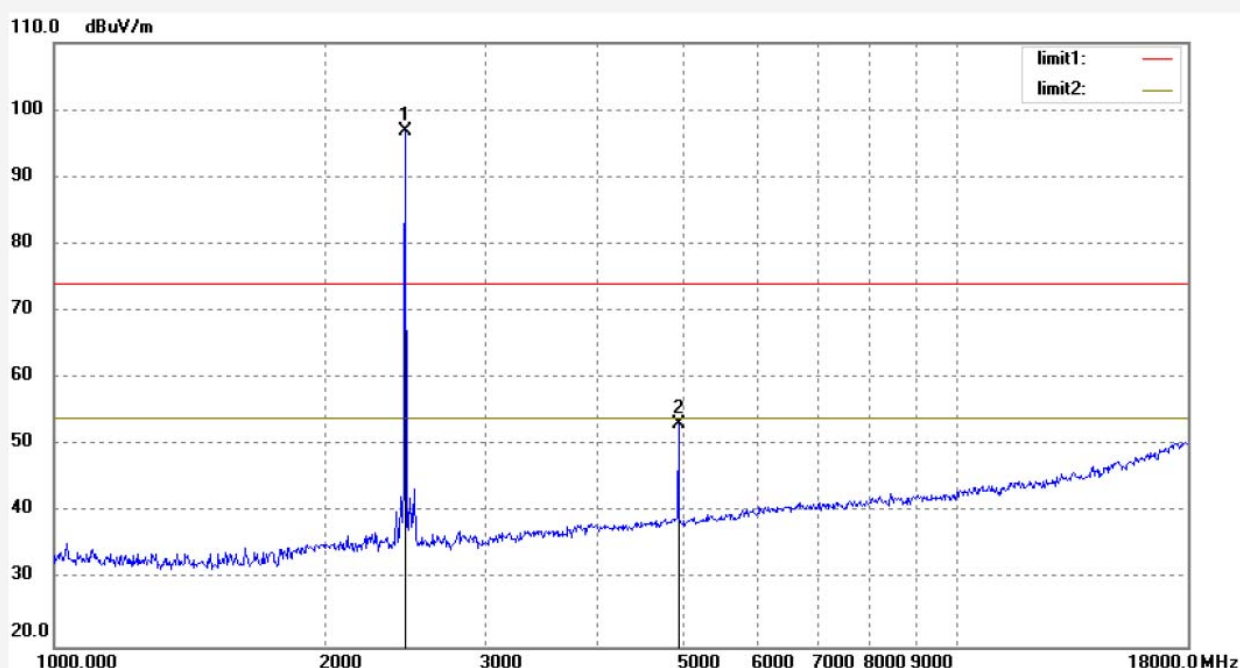
Date: 2019/09/02

Time: 16:02:19

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	102.94	-6.04	96.90			peak	200	93	
2	4960.444	51.62	1.50	53.12	74.00	-20.88	peak	200	148	

Job No.: FRANK2019-W #185

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Wireless Smart Remote

Mode: TX 2480MHz

Model: RMT

Applicant: Libre Home Inc

Polarization: Vertical

Power Source: DC 3V

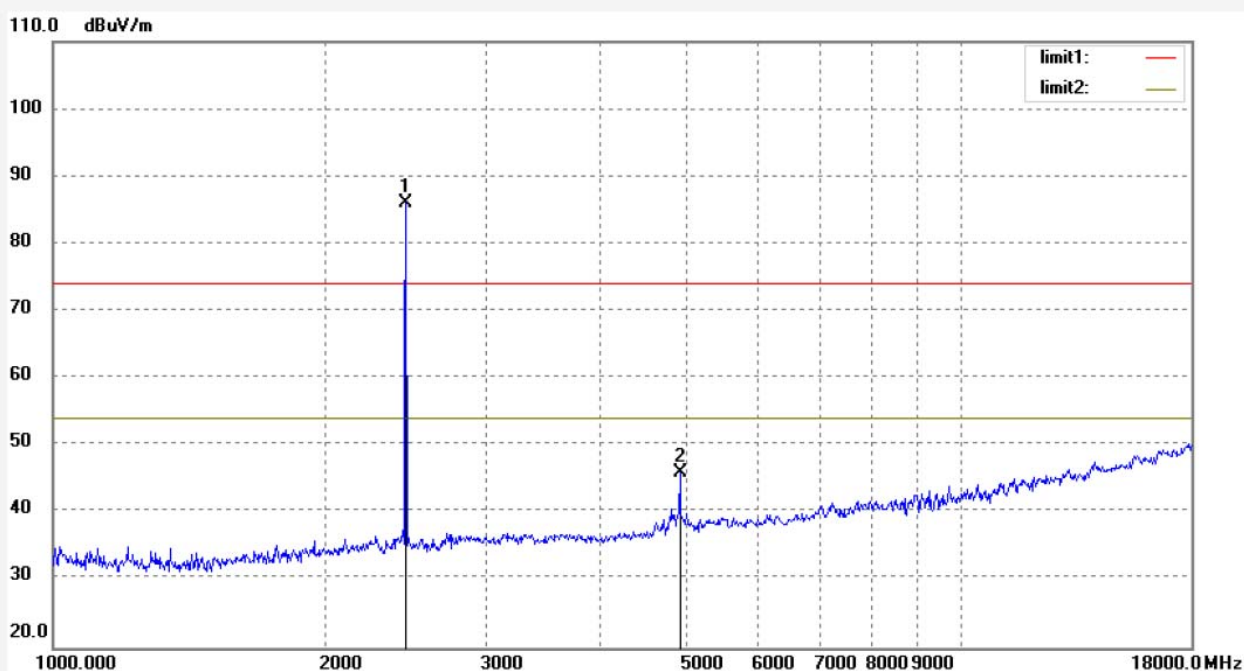
Date: 2019/09/02

Time: 15:59:58

Engineer Signature: CHARLEY

Distance: 3m

Note: Report NO.:ATE20191314



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	92.13	-6.04	86.09			peak	150	93	
2	4960.444	44.47	1.50	45.97	74.00	-28.03	peak	150	108	

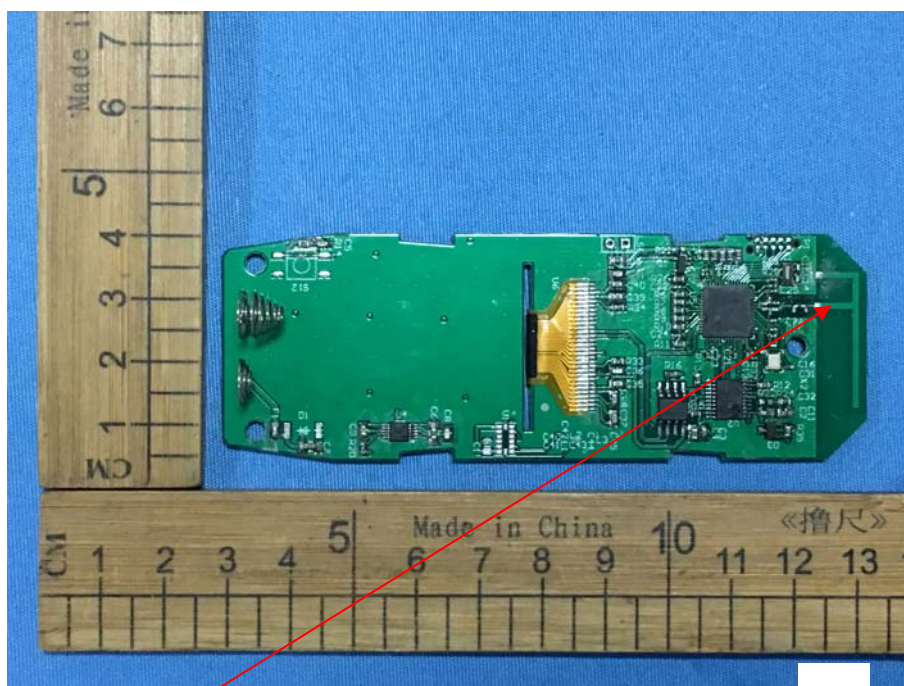
10.ANTENNA REQUIREMENT

10.1.The Requirement

According to Section 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.

10.2.Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 2dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna