

# FCC REPORT

**Applicant:** XTIM SARL

**Address of Applicant:** 77, rue de Lyon - 13015 Marseille - France

Equipment Under Test (EUT)

**Product Name:** Metafly controller

**Model No.:** META1

**FCC ID:** 2ADQDMETA1

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.249

**Date of sample receipt:** 18 Nov., 2019

**Date of Test:** 18 Nov., to 10 Dec., 2019

**Date of report issued:** 13 Dec., 2019

**Test Result:** PASS\*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	22 Nov., 2019	Original
01	13 Dec., 2019	Update page 17~18

**Prepared By:**



Project Engineer

**Date:**

13 Dec., 2019

**Check By:**



Reviewer

**Date:**

13 Dec., 2019

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conducted Emission	15.207	N/A
Field strength of the fundamental signal	15.249 (a)(e)	Pass
Spurious emissions	15.249 (d)/15.209	Pass
20dB Occupy Bandwidth	15.215	Pass

*Pass: The EUT comply with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	XTIM SARL
Address:	77, rue de Lyon - 13015 Marseille - France
Manufacturer:	XTIM SARL
Address:	77, rue de Lyon - 13015 Marseille - France
Factory:	Rokotech (ShenZhen) limited
Address:	4F, No.16 Xingye West Road, Heyi, Shajing Baoan District, ShenZhen

### 5.2 General Description of E.U.T.

Product Name:	Metafly controller
Model No.:	META1
Operation Frequency:	2408MHz~2475MHz
Channel numbers:	17
Modulation type:	GFSK
Antenna Type:	Wire antenna
Antenna gain:	1.8 dBi
Power supply:	DC 6V (4 × "AA" Battery)
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2408MHz	6	2431MHz	12	2456MHz
1	2410MHz	7	2435MHz	13	2460MHz
2	2415MHz	8	2440MHz	14	2469MHz
3	2420MHz	9	2442MHz	15	2472MHz
4	2424MHz	10	2445MHz	16	2475MHz
5	2428MHz	11	2449MHz		

**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. Channel No. 0, 8 & 16 were selected as Lowest, Middle and Highest channel.

### 5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation. (New battery is used)					
<b>Pre-Test Mode:</b> (highest channel=2475MHz)						
CCIS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:						
Axis	X	Y	Z			
Field Strength(dBuV/m)	82.08	81.74	80.46			
<b>Final Test Mode:</b>						
According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup": X axis (see the test setup photo)						

### 5.4 Description of Support Units

N/A

### 5.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

### 5.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,

Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

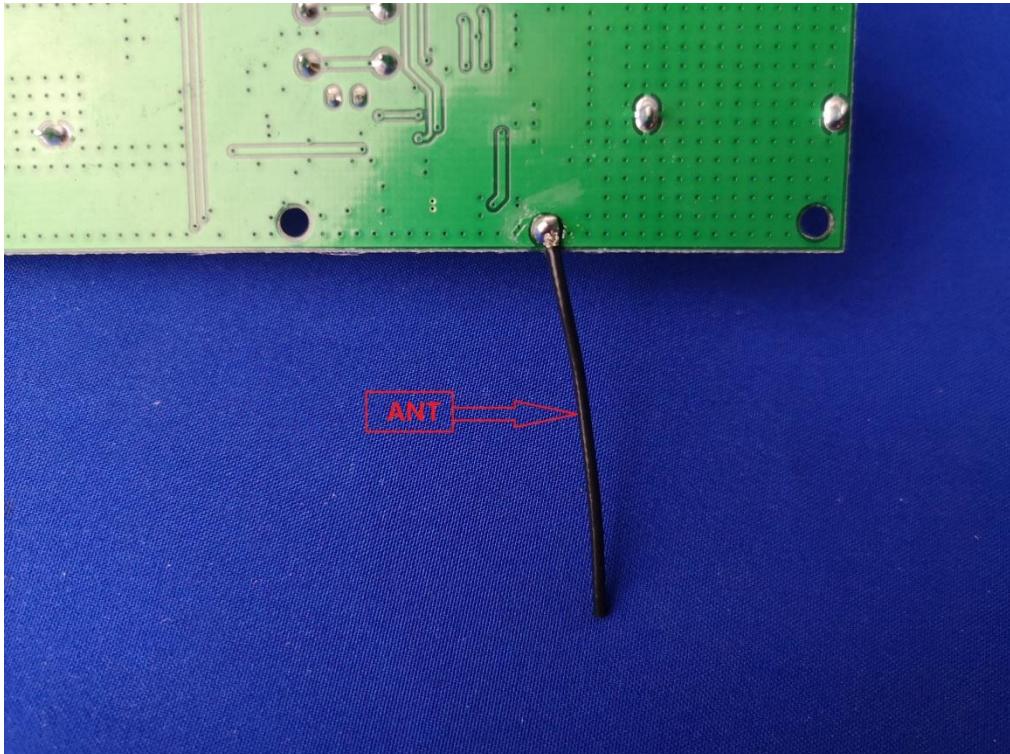
## 5.7 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
				11-21-2019	11-20-2020
Loop Antenna	SCHWARZBECK	FMZB 1519 B	00044	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
				11-21-2019	11-20-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Simulated Station	Anritsu	MT8820C	6201026545	03-18-2019	03-17-2020
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020

## 6 Test results and Measurement Data

### 6.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
15.203 requirement: <i>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>	
<b>E.U.T Antenna:</b>	<i>The antenna is Wire Antenna which cannot detachable . The best case gain of the antenna is 1.8 dBi.</i>

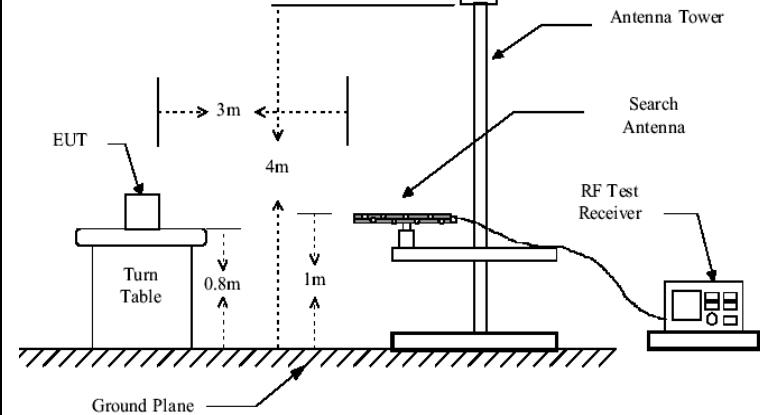
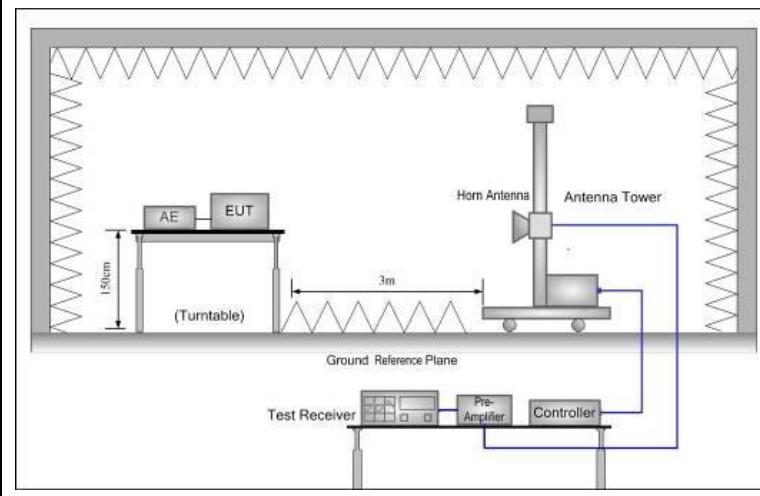


## 6.2 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dB $\mu$ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	0.5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>AUX Equipment</p> <p>E.U.T</p> <p>Test table/Insulation plane</p> <p>80cm</p> <p>40cm</p> <p>EMI Receiver</p> <p>Filter</p> <p>AC power</p> <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test procedure	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). They provide a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</li> </ol>		
Test Instruments:	Refer to section 5.9 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	The power supply of the EUT is by the Battery, so not need to be tested.		

### 6.3 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.249 and 15.209									
Test Method:	ANSI C63.10: 2013									
Test Frequency Range:	9KHz to 10000MHz									
Test site:	Measurement Distance: 3m									
Receiver setup:	Frequency	Detector	RBW	VBW	Remark					
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value					
	Above 1GHz	Peak	1MHz	3MHz	Peak Value					
Limit: (Field strength of the fundamental signal)	Frequency		Limit (dBuV/m @3m)		Remark					
	902.928MHz		94.00		Average Value					
			114.00		Peak Value					
Limit: (Spurious Emissions)	Frequency	Limit (dBuV/m @3m)			Remark					
	30MHz-88MHz	40.00			Quasi-peak Value					
	88MHz-216MHz	43.50			Quasi-peak Value					
	216MHz-960MHz	46.00			Quasi-peak Value					
	960MHz-1GHz	54.00			Quasi-peak Value					
	Above 1GHz	54.00			Average Value					
		74.00			Peak Value					
Limit: (outside of the specified frequency band)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.									
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. 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.</li> <li>4. 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>									

<p>Test setup:</p>	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 5.7</p>
<p>Test mode:</p>	<p>Refer to section 5.3</p>
<p>Test results:</p>	<p>Passed</p>
<p>Remark:</p>	<ol style="list-style-type: none"> <li>1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.</li> <li>2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.</li> </ol>

## 6.3.1 Field Strength Of The Fundamental Signal

Peak value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2408	49.11	27.41	4.71	81.23	114.00	-32.77	Vertical
	46.17	27.41	4.71	78.29	114.00	-35.71	Horizontoal
2440	49.08	27.48	4.75	81.31	114.00	-32.69	Vertical
	49.07	27.48	4.75	81.30	114.00	-32.70	Horizontoal
2475	49.72	27.56	4.8	82.08	114.00	-31.92	Vertical
	46.55	27.56	4.8	78.91	114.00	-35.09	Horizontoal
Average value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2408	43.52	27.41	4.71	75.64	94.00	-18.36	Vertical
	40.25	27.41	4.71	72.37	94.00	-21.63	Horizontoal
2440	43.68	27.48	4.75	75.91	94.00	-18.09	Vertical
	43.25	27.48	4.75	75.48	94.00	-18.52	Horizontoal
2475	43.92	27.56	4.8	76.28	94.00	-17.72	Vertical
	40.82	27.56	4.8	73.18	94.00	-20.82	Horizontoal

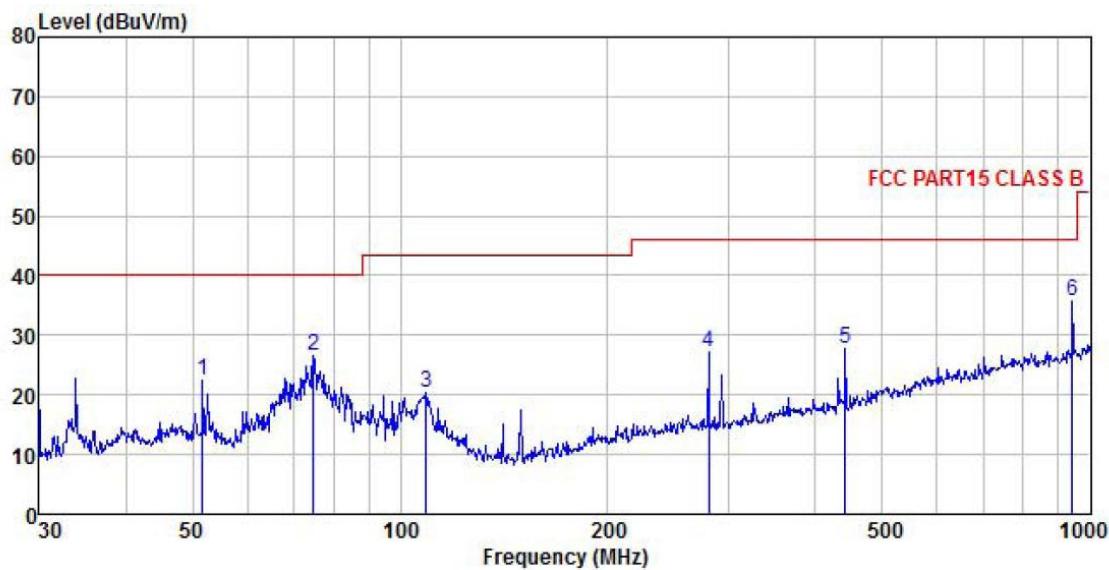
NOTE: Field strength of the fundamental signal test, RBW >20dB BW, VBW>=3XRBW.

### 6.3.2 Spurious Emissions

Measurement Data (worst case):

Below 1GHz:

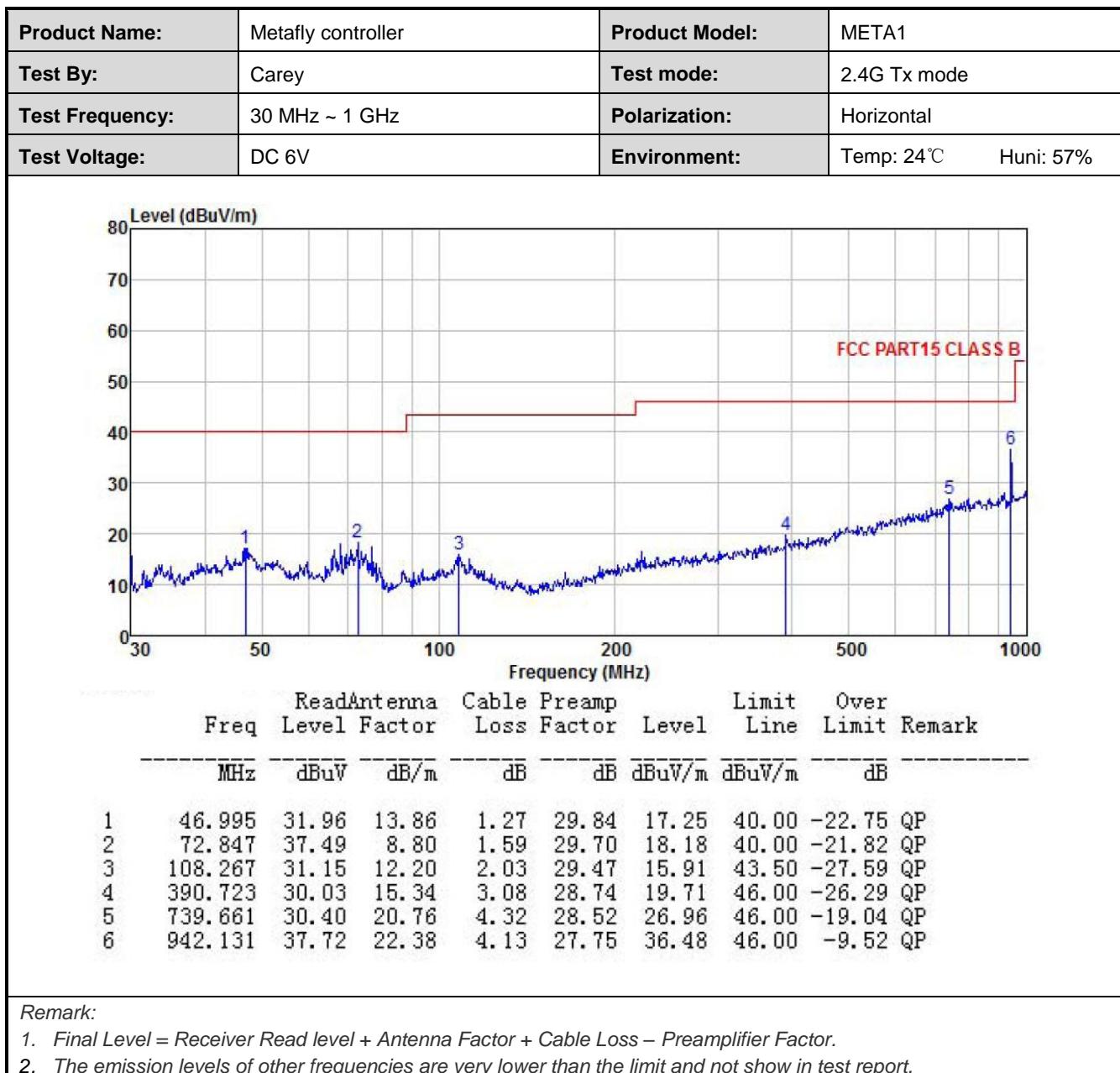
Product Name:	Metafly controller	Product Model:	META1
Test By:	Carey	Test mode:	2.4G Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 6V	Environment:	Temp: 24°C Huni: 57%



Freq	ReadAntenna		Cable Preamp		Limit	Over	Remark
	Freq	Level	Antenna	Loss	Preamp	Line	Limit
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	51.662	37.11	13.80	1.27	29.81	22.37	40.00 -17.63 QP
2	74.919	45.92	8.59	1.63	29.68	26.46	40.00 -13.54 QP
3	109.029	35.40	12.24	2.04	29.46	20.22	43.50 -23.28 QP
4	280.024	39.22	13.49	2.89	28.48	27.12	46.00 -18.88 QP
5	441.743	37.54	16.01	3.18	28.86	27.87	46.00 -18.13 QP
6	942.131	36.84	22.38	4.13	27.75	35.60	46.00 -10.40 QP

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.



## Above 1GHz

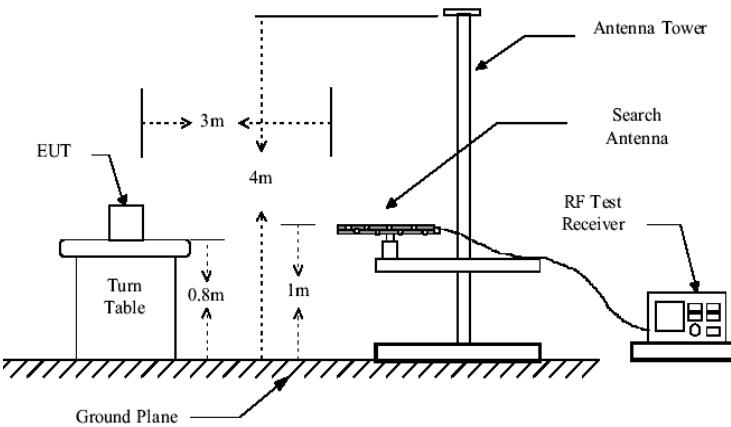
Test channel: Lowest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4816.00	44.25	31.62	6.81	41.82	40.86	74.00	-33.14	Vertical
4816.00	42.36	31.62	6.81	41.82	38.97	74.00	-35.03	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4816.00	33.51	31.62	6.81	41.82	30.12	54.00	-23.88	Vertical
4816.00	33.26	31.62	6.81	41.82	29.87	54.00	-24.13	Horizontal
Test channel: Middle channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	43.39	31.72	6.86	41.84	40.13	74.00	-33.87	Vertical
4880.00	44.29	31.72	6.86	41.84	41.03	74.00	-32.97	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4880.00	33.59	31.72	6.86	41.84	30.33	54.00	-23.67	Vertical
4880.00	33.17	31.72	6.86	41.84	29.91	54.00	-24.09	Horizontal
Test channel: Highest channel								
Detector: Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	44.26	31.82	6.90	41.86	41.12	74.00	-32.88	Vertical
4950.00	44.15	31.82	6.90	41.86	41.01	74.00	-32.99	Horizontal
Detector: Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4950.00	33.92	31.82	6.90	41.86	30.78	54.00	-23.22	Vertical
4950.00	33.48	31.82	6.90	41.86	30.34	54.00	-23.66	Horizontal

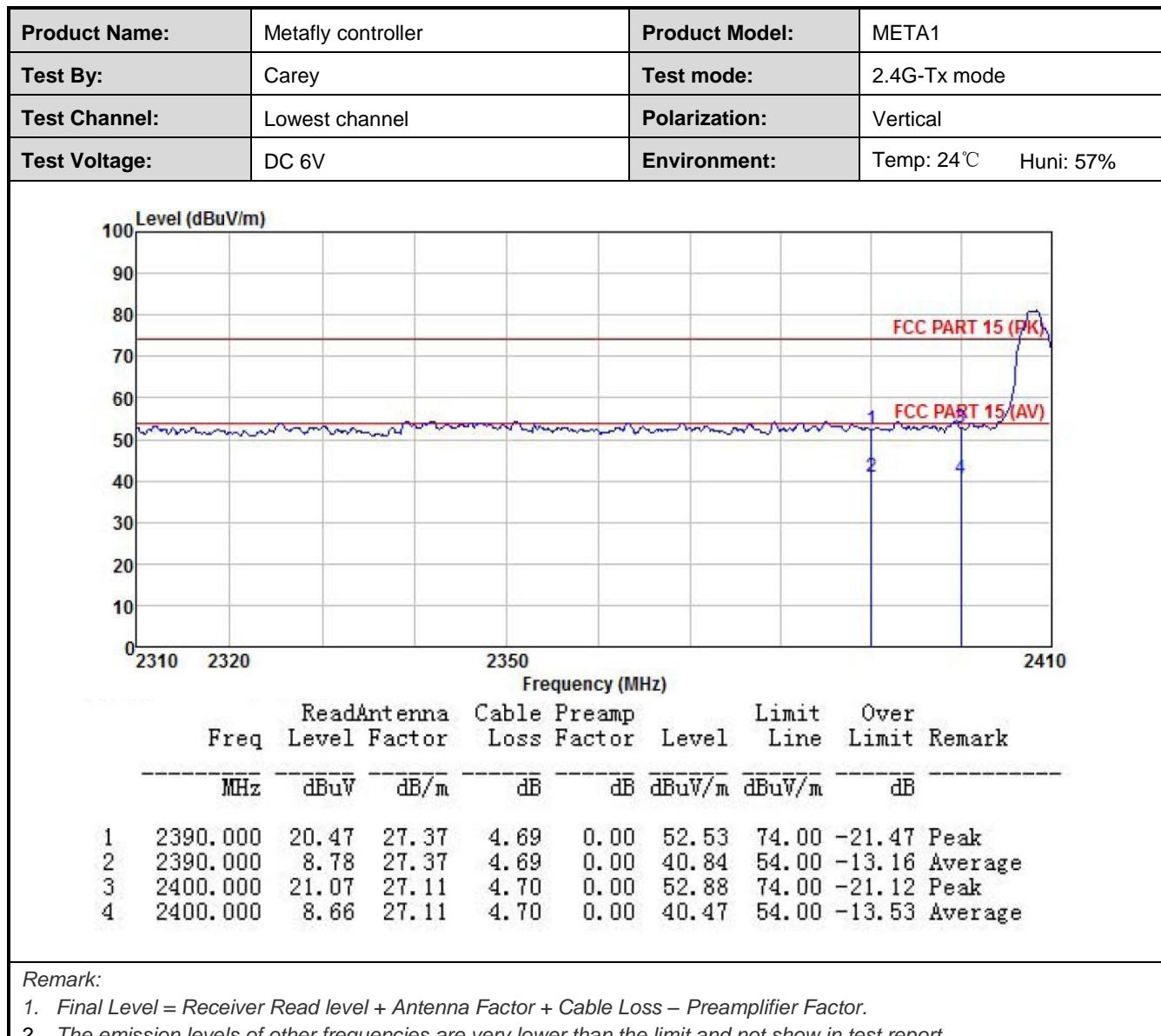
Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

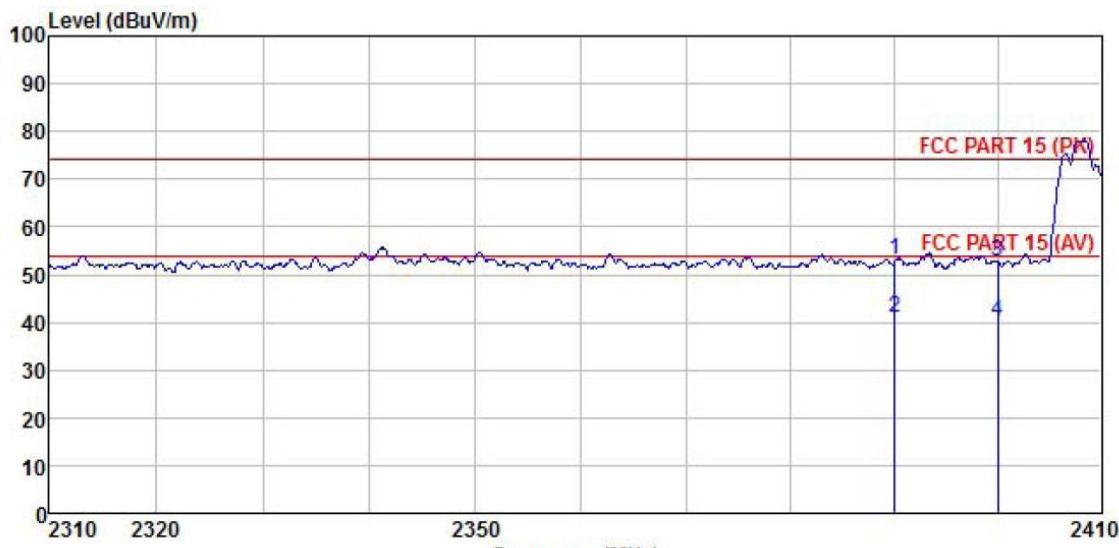
### 6.3.3 Band Edge

#### Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209								
Test Method:	ANSI C63.10: 2013								
Test Frequency Range:	15.205								
Test Distance:	3m								
Receiver setup:	Frequency	Detector	RBW	VBW	Remark				
	above 1GHz	Peak	1MHz	3MHz	Peak Value				
Limit:	Frequency	Limit (dBuV/m @3m)		Remark					
	30MHz-88MHz	40.00		Quasi-peak Value					
	88MHz-216MHz	43.50		Quasi-peak Value					
	216MHz-960MHz	46.00		Quasi-peak Value					
	960MHz-1GHz	54.00		Quasi-peak Value					
Test Procedure:	<p>7. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>8. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>9. 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.</p> <p>10. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>11. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>12. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>								
Test setup:									
Test Instruments:	Refer to section 5.7 for details								
Test mode:	Refer to section 5.3 for details								
Test results:	Passed								



<b>Product Name:</b>	Metafly controller	<b>Product Model:</b>	META1
<b>Test By:</b>	Carey	<b>Test mode:</b>	2.4G-Tx mode
<b>Test Channel:</b>	Lowest channel	<b>Polarization:</b>	Horizontal
<b>Test Voltage:</b>	DC 6V	<b>Environment:</b>	Temp: 24°C Huni: 57%

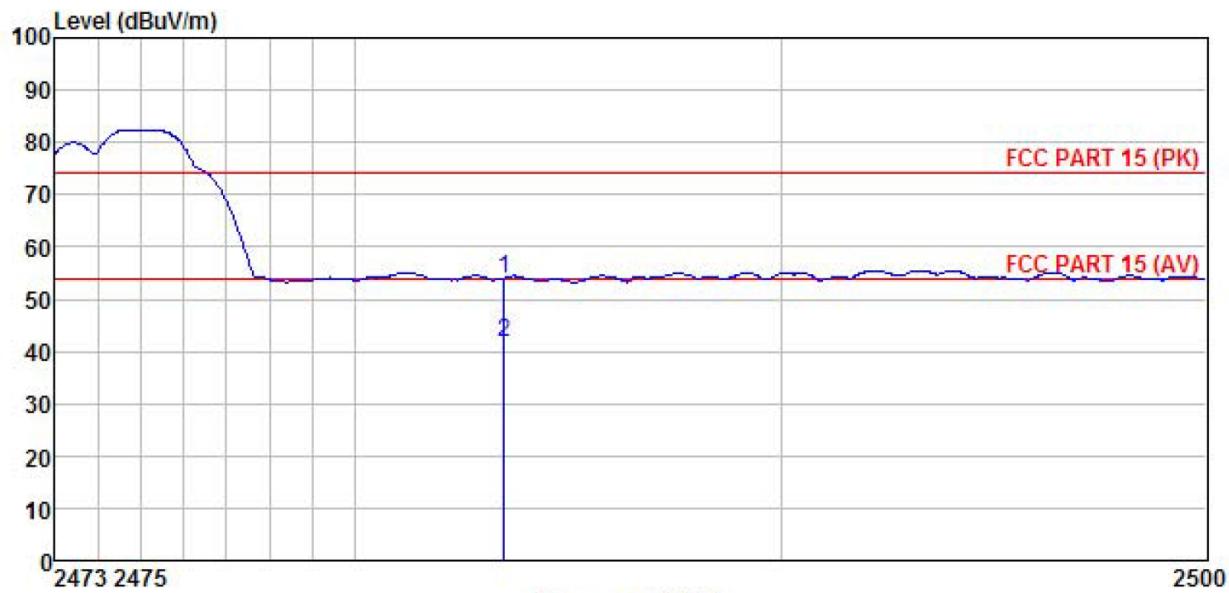


Freq MHz	Read Level MHz	Antenna Factor	Cable Loss Factor	Preamp Level dB	Limit dBuV/m	Line dBuV/m	Over Line dB	Over Limit dB	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	dB	
1	2390.000	21.04	27.37	4.69	0.00	53.10	74.00	-20.90	Peak
2	2390.000	9.06	27.37	4.69	0.00	41.12	54.00	-12.88	Average
3	2400.000	20.92	27.11	4.70	0.00	52.73	74.00	-21.27	Peak
4	2400.000	8.38	27.11	4.70	0.00	40.19	54.00	-13.81	Average

## Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

<b>Product Name:</b>	Metafly controller	<b>Product Model:</b>	META1
<b>Test By:</b>	Carey	<b>Test mode:</b>	2.4G-Tx mode
<b>Test Channel:</b>	Highest channel	<b>Polarization:</b>	Vertical
<b>Test Voltage:</b>	DC 6V	<b>Environment:</b>	Temp: 24°C Huni: 57%

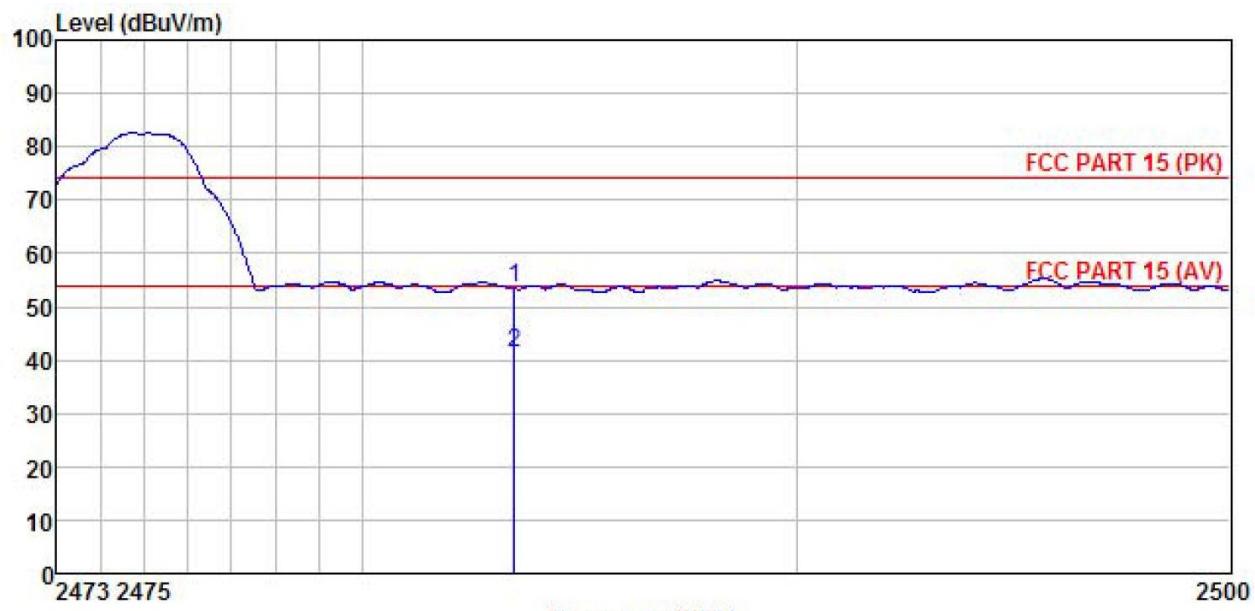


Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark	
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit
MHz	dBuV	dB/m		dB	dB	dBuV/m	dBuV/m	dB
1	2483.500	21.67	27.57	4.81	0.00	54.05	74.00	-19.95
2	2483.500	9.21	27.57	4.81	0.00	41.59	54.00	-12.41

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

<b>Product Name:</b>	Metafly controller	<b>Product Model:</b>	META1
<b>Test By:</b>	Carey	<b>Test mode:</b>	2.4G-Tx mode
<b>Test Channel:</b>	Highest channel	<b>Polarization:</b>	Horizontal
<b>Test Voltage:</b>	DC 6V	<b>Environment:</b>	Temp: 24°C Huni: 57%

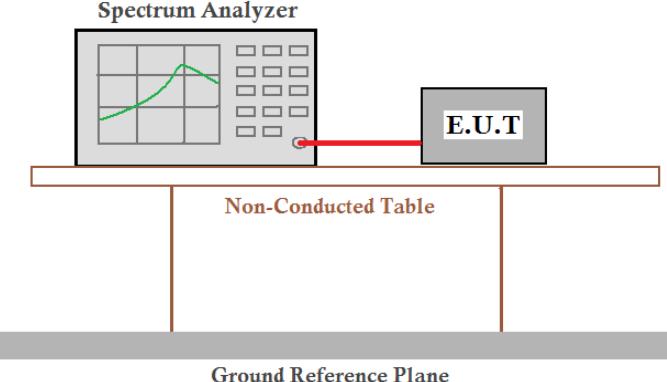


Freq	Read	Antenna	Cable	Preamp	Limit	Over	Line	Limit	Remark
	Freq	Level	Level	Loss					
MHz	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	21.02	27.57	4.81	0.00	53.40	74.00	-20.60	Peak
2	2483.500	9.06	27.57	4.81	0.00	41.44	54.00	-12.56	Average

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.215
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30 kHz, VBW=100 kHz, detector=Peak
Limit:	N/A
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Transmitting mode
Test results:	Pass

### Measurement Data:

20dB Occupy Bandwidth (MHz)			
Lowest channel	Middle channel	Highest	Highest
2.18	2.03		1.96

Test plot as follows:

