



## FCC Test Report

**Report No.:** ULC-19OC1446VTSHPB-2

**FCC ID:** 2AG62LP66

**Product:** Motorized TV Mount

**Model:** LP66-44M

**Serial Model:** LP66-44M-P01, LP66-46M, LP66-46M-P01

**Received Date:** Oct.18, 2019

**Test Date:** Oct.28 to Nov.15, 2019

**Issued Date:** Dec.02, 2019

**Applicant:** LUMI LEGEND CORPORATION

**Address:** 22/F., Building 1, Lisi Plaza, Huifeng East Road, Ningbo, China 315100

**Manufacturer:** LUMI LEGEND CORPORATION

**Address:** 22/F., Building 1, Lisi Plaza, Huifeng East Road, Ningbo, China 315100

**Issued By:** BUREAU VERITAS ADT (Shanghai) Corporation

**Address:** No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)

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### RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
ULC-19OC1446VTSHPB-2	Original release	Dec.02, 2019

## 1 Certificate of Conformity

**Product:** Motorized TV Mount

**Brand:** --

**Model:** LP66-44M

**Serial Model:** LP66-44M-P01, LP66-46M, LP66-46M-P01

**Applicant:** LUMI LEGEND CORPORATION

**Test Date:** Oct.28 to Nov.15, 2019

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.10:2013

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**

*Will Yan*

, **Date:**

Dec.02, 2019

Will YAN

Project Engineer

**Approved by :**

*Daniel Sun*

, **Date:**

Dec.02, 2019

Daniel SUN

RF Supervisor

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used
§15.207 (a)	Conducted Emission	N/A	The EUT is powered by battery
§15.205	Restricted Band of Operation	PASS	Compliant
§15.209 §15.249(a)	Radiated Emission	PASS	Compliant
§15.215(c)	20dB Bandwidth Test	PASS	Compliant

## 3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Measurement	Frequency	Expanded Uncertainty ( $k=2$ ) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

#### 4 GENERAL INFORMATION

##### 4.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Motorized TV Mount
<b>MODEL NO.</b>	LP66-44M
<b>SERIAL MODEL</b>	LP66-44M-P01, LP66-46M, LP66-46M-P01
<b>MODEL DIFFERENCE</b>	--
<b>FCC ID</b>	2AG62LP66
<b>NOMINAL VOLTAGE</b>	DC 3.0V
<b>MODULATION TECHNOLOGY</b>	GFSK
<b>OPERATING FREQUENCY</b>	2437MHz
<b>ANTENNA TYPE</b>	PCB Antenna
<b>ANTENNA GAIN</b>	1.0dBi
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 4.2 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X Y Z axis and packet type. The worst case was found when the EUT was positioned on Y axis for radiated emission. The EUT was tested under the following mode.

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE <sup>3</sup> 1G	PLC	BW	
A	√	√	-	√	DC 3.0V

Where **RE<1G**: Radiated Emission below 1GHz

**RE<sup>3</sup> 1G**: Radiated Emission above 1GHz

**PLC**: Power Line Conducted Emission

**BW**: 20db bandwidth

**NOTE**: No need to concern of Conducted Emission due to the EUT is powered by battery.

Following channel(s) was (were) selected for the test as listed below.

TESTED CHANNEL	TESTED FREQUENCY
1	2437MHz

Note: The more detailed channel, please refer to the product specifications

### TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	22deg. C, 58%RH	DC 3.0V	Will
BW	22deg. C, 58%RH	DC 3.0V	Will
PLC	-	-	-



#### **4.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

**FCC Part 15, Subpart C, Section 15.249**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.

#### **4.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit together without any other necessary accessories or support units

## 5 TEST TYPES AND RESULTS

### 5.1 RADIATED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF RADIATED EMISSION MEISSON MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of harmonics (micro- volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

#### NOTE:

The lower limit shall apply at the transition frequencies.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

### 5.1.2 TEST PROCEDURES

- 1 The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 3 The antenna is a broadband antenna, and its 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.
- 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.
- 5 The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6 For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- 7 If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

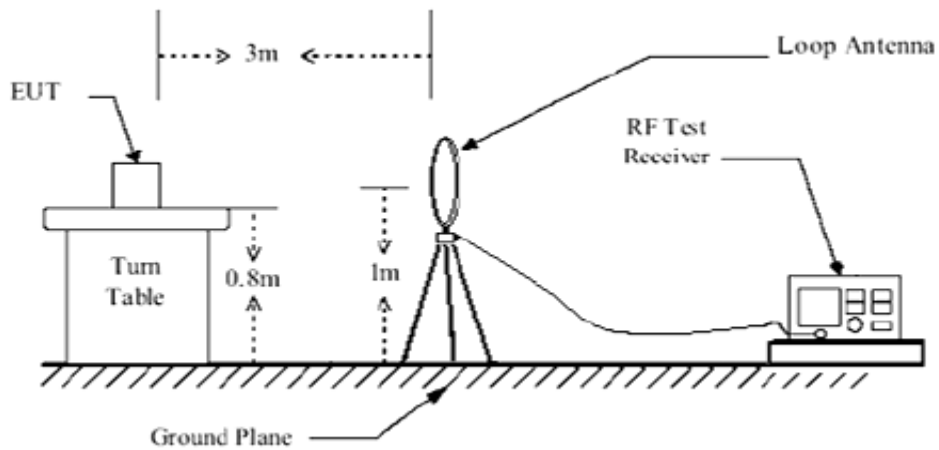
- 1 The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2 The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
- 3 The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
- 4 All modes of operation were investigated and the worst-case emissions are reported.
- 5 The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

### 5.1.3 DEVIATION FROM TEST STANDARD

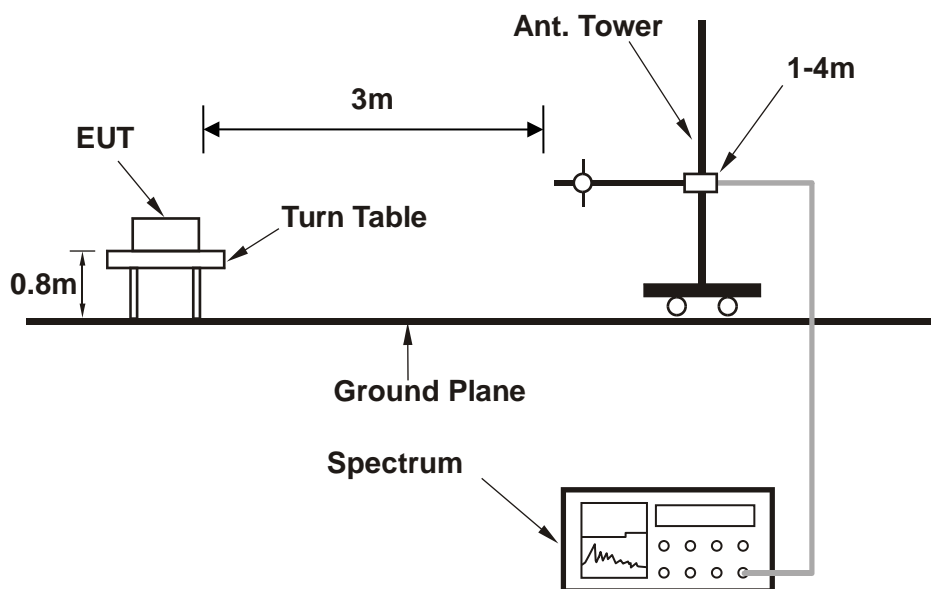
No deviation.

### 5.1.4 TEST SETUP

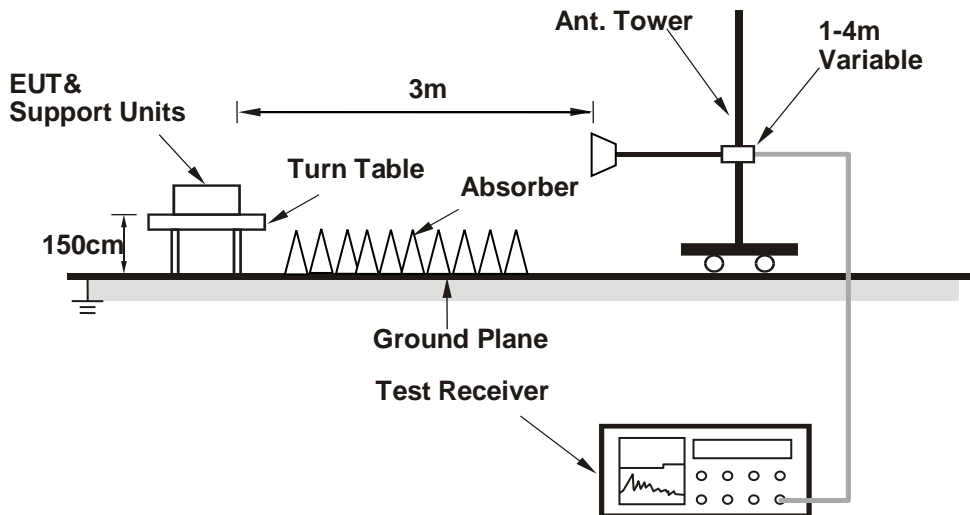
#### Below 30MHz test setup



#### Below 1GHz test setup



#### Above 1GHz test setup



**Note:** For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 5.1.5 EUT OPERATING CONDITIONS

- 6 Turned on the power of all equipment.
- 7 EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

### 5.1.6 TEST RESULTS

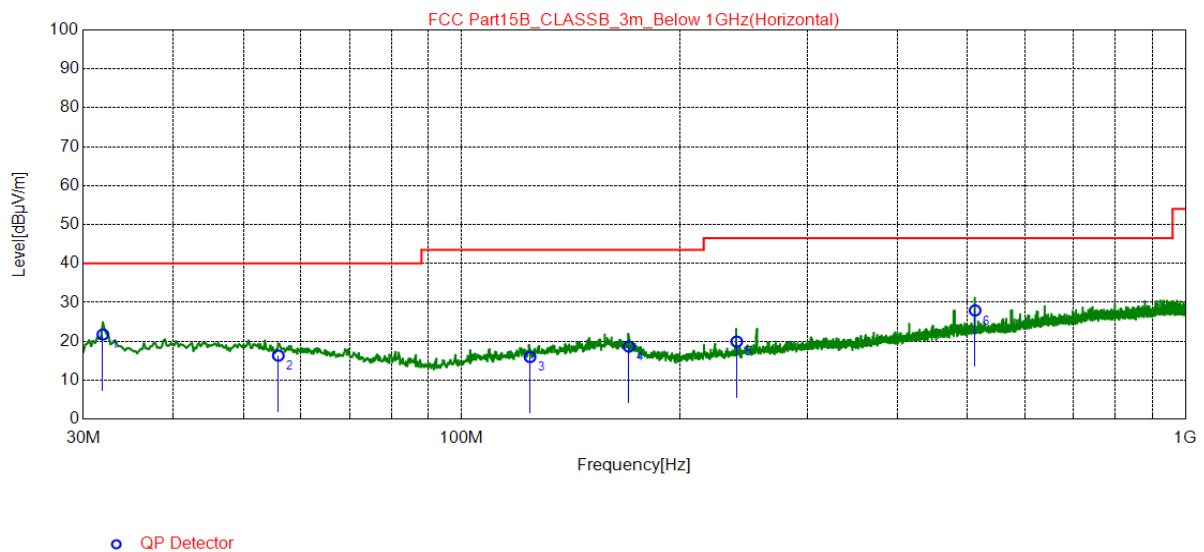
#### BELOW 1GHz WORST-CASE DATA

CHANNEL	TX High Channel	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.9400	21.76 QP	40.00	-18.24	100	237	32.23	-10.47
2	55.8020	16.32 QP	40.00	-23.68	100	315	26.52	-10.20
3	124.2840	15.95 QP	43.50	-27.55	100	262	27.25	-11.30
4	170.2620	18.64 QP	43.50	-24.86	100	61	28.06	-9.42
5	239.9080	19.93 QP	46.50	-26.57	100	58	30.71	-10.78
6	512.0900	27.93 QP	46.50	-18.57	100	230	33.52	-5.59

#### REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

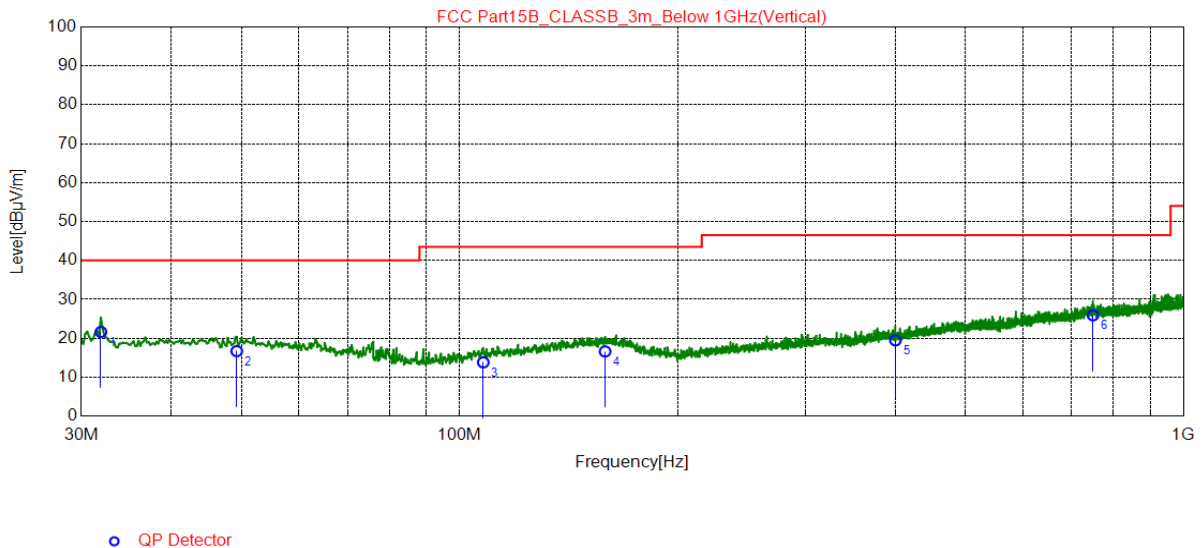


CHANNEL	TX High Channel	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.9400	21.63 QP	40.00	-18.37	100	260	32.1	-10.47
2	49.2060	16.70 QP	40.00	-23.30	100	151	26.38	-9.68
3	107.7940	13.82 QP	43.50	-29.68	100	244	26.21	-12.39
4	158.8160	16.62 QP	43.50	-26.88	100	343	25.6	-8.98
5	399.9580	19.47 QP	46.50	-27.03	100	331	27.31	-7.84
6	749.9340	25.92 QP	46.50	-20.58	100	170	27.39	-1.47

#### REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



**ABOVE 1GHz WORST-CASE DATA:**

<b>CHANNEL</b>	TX Low Channel	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 30GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2380.0910	38.32 AV	54.00	-15.68	155	325	39.42	-1.10
2	2380.1195	47.35 PK	74.00	-26.65	155	360	48.45	-1.10
3	2390.0090	42.47 PK	74.00	-31.53	169	97	43.55	-1.08
4	2390.0090	36.47 AV	54.00	-17.53	169	97	37.55	1.08
5	*2437.0000	91.27 PK	114.00	-22.76	155	20	92.26	-0.99
6	*2437.0000	91.24 AV	94.00	-2.73	155	58	91.23	-0.99
7	2483.5080	47.71 PK	74.00	-26.29	155	58	48.62	-0.91
8	2483.5080	37.68 AV	54.00	-16.32	155	325	38.59	-0.91
9	2489.3790	48.3 PK	74.00	-25.70	155	58	49.2	-0.90
10	2489.3885	39.11 AV	54.00	-14.89	155	58	40.01	-0.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2338.6330	44.72 PK	74.00	-29.28	155	226	45.91	-1.19
2	2338.6425	37.28 AV	54.00	-16.72	155	226	38.47	-1.19
3	2390.0090	42.86 PK	74.00	-31.14	155	188	43.94	-1.08
4	2390.0090	37.25 AV	54.00	-16.75	155	301	38.33	-1.08
5	*2437.0000	74.90 AV	114.00	-39.10	155	264	75.89	-0.99
6	*2437.0000	74.94 PK	94.00	-19.06	155	264	75.93	-0.99
7	2483.5080	37.40 AV	54.00	-16.60	155	340	38.31	-0.91
8	2483.5080	42.53 PK	74.00	-31.47	155	32	43.44	-0.91
9	2491.1460	44.09 PK	74.00	-29.91	155	72	44.99	-0.90
10	2491.1745	37.40 AV	54.00	-16.60	155	32	38.3	-0.90

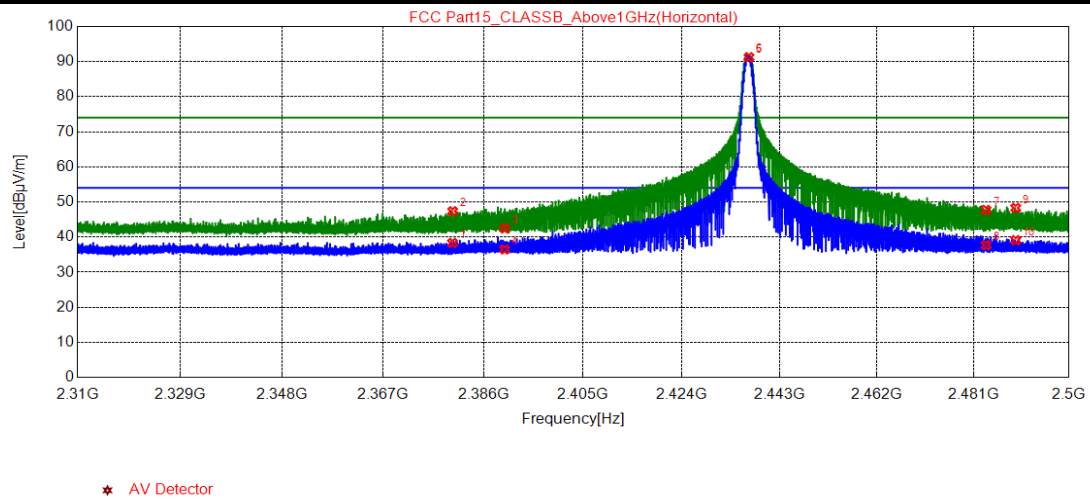
**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

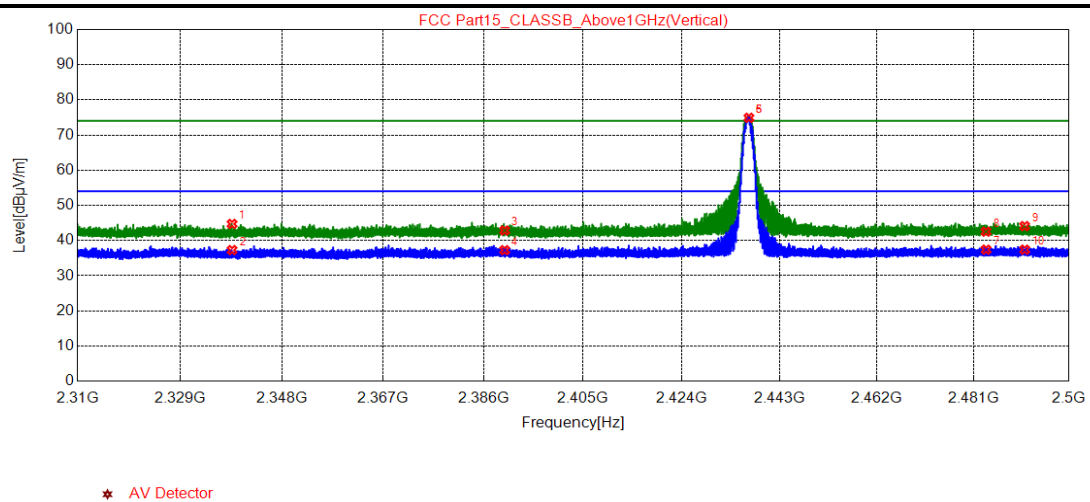


## Band edge Plot

### 2437MHz Horizontal



### 2437MHz Vertical



Note: The green line is the PK detection method and The red line is the AV detection method.

## 5.2 20dB BANDWIDTH MEASUREMENT

### 5.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

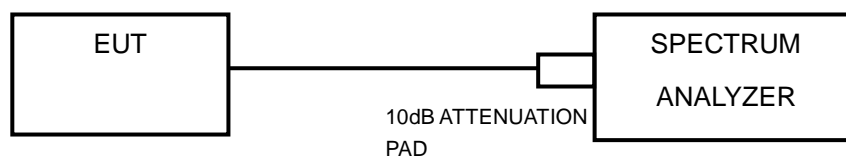
### 5.2.2 TEST PROCEDURE

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

### 5.2.3 DEVIATION FROM TEST STANDARD

No deviation.

### 5.2.4 TEST SETUP



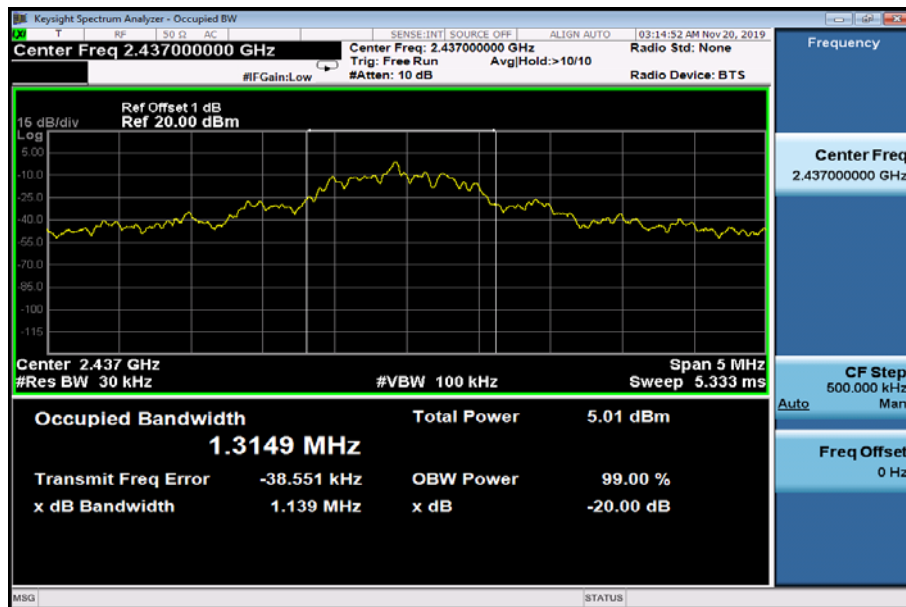
### 5.2.5 EUT OPERATING CONDITIONS

- Turned on the power of all equipment.
- EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

manufacturer's specifications or the User's Manual.

## 5.2.6 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
1	2437	1.139



### 5.3 CONDUCTED EMISSION MEASUREMENT

#### 5.3.1 LIMITS

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

10 The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### 5.3.2 TEST PROCEDURES

- 11 The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- 12 Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 13 The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) was not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 5.3.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 5.3.4 TEST SETUP

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### **5.3.5 EUT OPERATING CONDITIONS**

Same as 4.1.6.

### **5.3.6 TEST RESULTS**

The Sample support battery powered, so not need show test result.

## 6 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

## **7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGE TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**---END---**