

TECHNICAL REPORT



Report No.:

TW2010168-03E

File Reference No.:

2020-12-03

Applicant: MACVON LLC

Product: Macvon Reflection

Model No.: Model R, Model R-01, Model R-02, Model R-03,  
Model R-04, Model R-05, Model R-06

Trademark: Macvon

Test Standards: FCC Part 15.247

Test Result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15.247 for the evaluation of electromagnetic compatibility

Approved By

A handwritten signature in black ink, appearing to read "Jack Chung".

Jack Chung

Manager

Dated: December 03, 2020

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TESTING LABORATORIES**

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



## **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

### **FCC-Registration No.: 744189**

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

### **Industry Canada (IC) —Registration No.:5205A**

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

### **A2LA (Certification Number:5013.01)**

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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## Test Report Conclusion

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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.  
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China  
Telephone: (755) 83448688  
Fax: (755) 83442996

### 1.2 Applicant Details

Applicant: MACVON LLC  
Address: 101 Morgan Lane Suite 302, Plainsboro, NJ, US 08536  
Telephone: +12016370158  
Fax: --

### 1.3 Description of EUT

Product: Macvon Reflection  
Manufacturer: MACVON LLC  
Address: 101 Morgan Lane Suite 302, Plainsboro, NJ, US 08536  
Brand Name: Macvon  
Additional Brand Name: N/A  
Model Number: Model R  
Additional Model Number: Model R-01, Model R-02, Model R-03, Model R-04, Model R-05, Model R-06  
Type of Modulation GFSK (Bluetooth BLE)  
Frequency range 2402-2480MHz  
Frequency Selection By software  
Channel Number 40  
Input Voltage: 110-240V~, 50/60HZ, 0.3A, 75W  
Antenna: Integral antenna used.  
The gain of the antennas is 2.0dBi

### 1.4 Submitted Sample: 2 Samples

### 1.5 Test Duration

2020-10-26 to 2020-12-03

### 1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB  
Radiated Emissions below 1GHz Uncertainty =4.7dB  
Radiated Emissions above 1GHz Uncertainty =6.0dB  
Conducted Power Uncertainty =6.0dB  
Occupied Channel Bandwidth Uncertainty =5%

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Note: The measurement uncertainty is for coverage factor of  $k=2$  and a level of confidence of 95%.

1.7 Test Engineer

*Terry Tang*

The sample tested by \_\_\_\_\_

Print Name: Terry Tang

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<b>2.0 Test Equipment</b>					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2020-06-23	2021-06-22
LISN	R&S	EZH3-Z5	100294	2020-06-23	2021-06-22
LISN	R&S	EZH3-Z5	100253	2020-06-23	2021-06-22
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2020-06-23	2021-06-22
Loop Antenna	EMCO	6507	00078608	2018-06-25	2021-06-24
Spectrum	R&S	FSIQ26	100292	2020-06-23	2021-06-22
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2019-06-21	2021-06-20
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08
Power meter	Anritsu	ML2487A	6K00003613	2020-08-22	2021-08-21
Power sensor	Anritsu	MA2491A	32263	2020-08-22	2021-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03
9*6*6 Anechoic	--	--	N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2020-06-23	2021-06-22
EMI Test Receiver	RS	ESH3	860904/006	2020-06-23	2021-06-22
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2020-06-23	2021-06-22
Spectrum	HP/Agilent	E4407B	MY50441392	2020-06-23	2021-06-22
Spectrum	RS	FSP	1164.4391.38	2020-01-16	2021-01-15
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2020-06-23	2021-06-22
RF Cable	Zhengdi	7m	--	2020-06-23	2021-06-22
RF Switch	EM	EMSW18	060391	2020-06-23	2021-06-22
Pre-Amplifier	Schwarebeck	BBV9743	#218	2020-06-23	2021-06-22
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2020-06-23	2021-06-22
LISN	SCHAFFNER	NNB42	00012	2020-01-06	2021-01-07

## 2.2 Automation Test Software

### For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

### For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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### 3.0 Technical Details

#### 3.1 Summary of test results

<b>The EUT has been tested according to the following specifications:</b>			
<b>Standard</b>	<b>Test Type</b>	<b>Result</b>	<b>Notes</b>
<b>FCC Part 15, Paragraph 15.107 &amp; 15.207</b>	<b>Conducted Emission Test</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit</b>	<b>Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth&gt;500kHz</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(b)</b>	<b>Maximum peak output power Limit: max. 30dBm</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.109,15.205 &amp; 15.209</b>	<b>Transmitter Radiated Emission Limit: Table 15.209</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(e)</b>	<b>Power Spectral Density Limit: max. 8dBm</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(d)</b>	<b>Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209</b>	<b>PASS</b>	<b>Complies</b>

#### 3.2 Test Standards

**FCC Part 15 Subpart & Subpart C, Paragraph 15.247**

#### 4.0 EUT Modification

**No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.**

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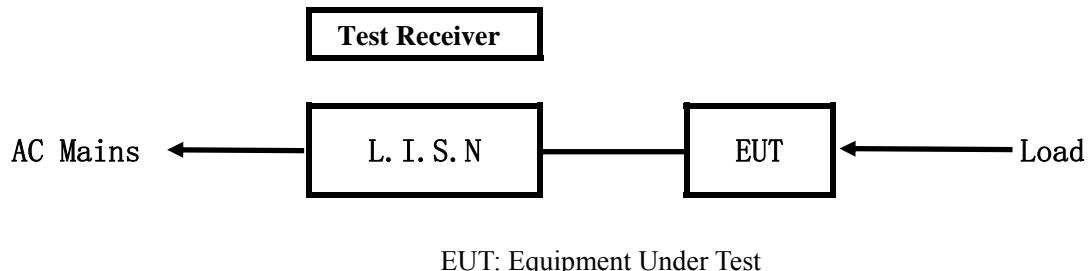
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## 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test



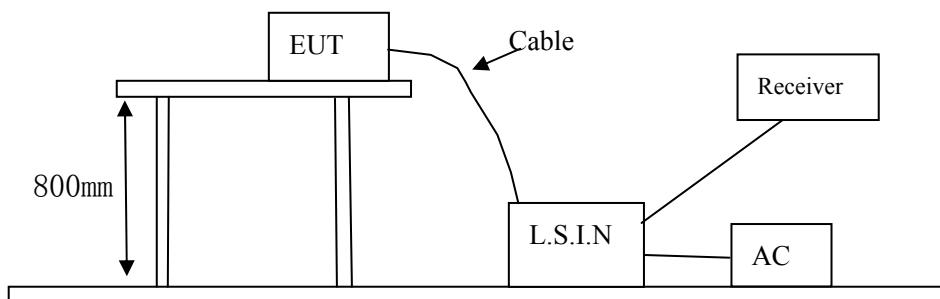
EUT: Equipment Under Test

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 –2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

Device	Manufacturer	Model	FCC ID
Macvon Reflection	MACVON LLC	Model R, Model R-01, Model R-02, Model R-03, Model R-04, Model R-05, Model R-06	2AX7UX0278

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B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating
N/A			

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

A Setup the EUT and simulators as shown on follow  
B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Class B Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

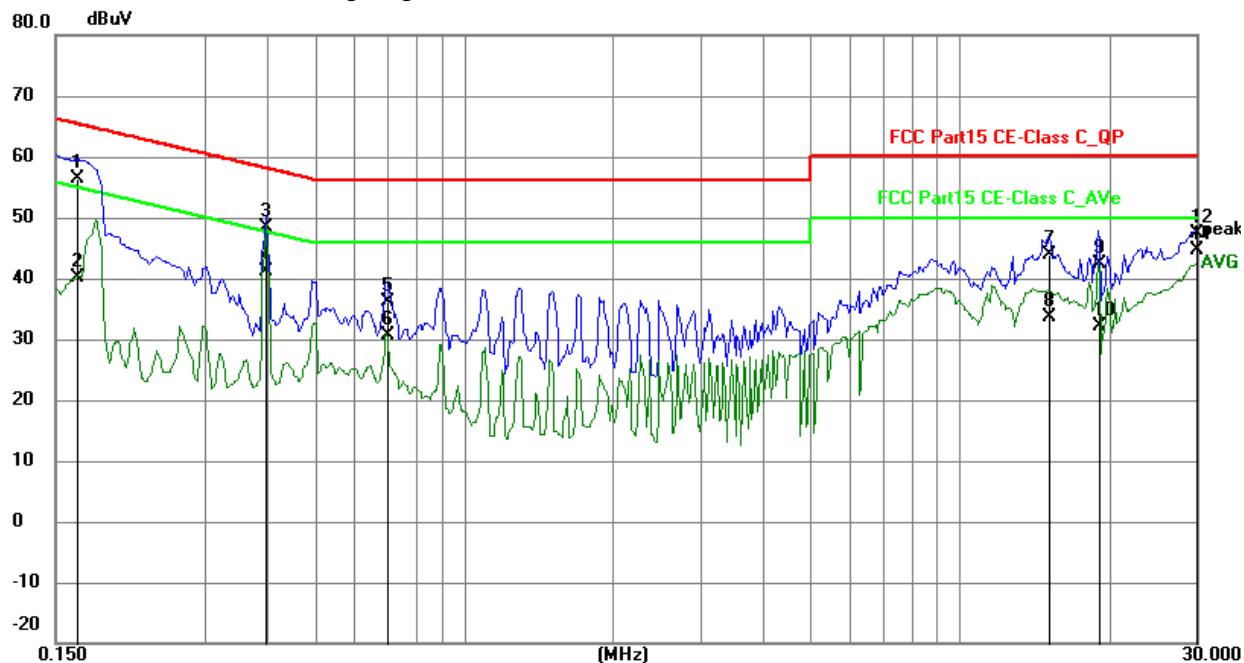
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 KPa

**EUT set Condition: Keep Bluetooth Transmitting**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1655	46.61	9.77	56.38	65.18	-8.80	QP	P
2	0.1655	30.44	9.77	40.21	55.18	-14.97	AVG	P
3	0.3996	38.67	9.76	48.43	57.86	-9.43	QP	P
4	0.3996	31.44	9.76	41.20	47.86	-6.66	AVG	P
5	0.6999	26.34	9.78	36.12	56.00	-19.88	QP	P
6	0.6999	20.83	9.78	30.61	46.00	-15.39	AVG	P
7	15.1251	33.40	10.39	43.79	60.00	-16.21	QP	P
8	15.1251	23.19	10.39	33.58	50.00	-16.42	AVG	P
9	19.1070	31.74	10.63	42.37	60.00	-17.63	QP	P
10	19.1070	21.38	10.63	32.01	50.00	-17.99	AVG	P
11	30.0000	35.96	11.30	47.26	60.00	-12.74	QP	P
12	30.0000	33.41	11.30	44.71	50.00	-5.29	AVG	P

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**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

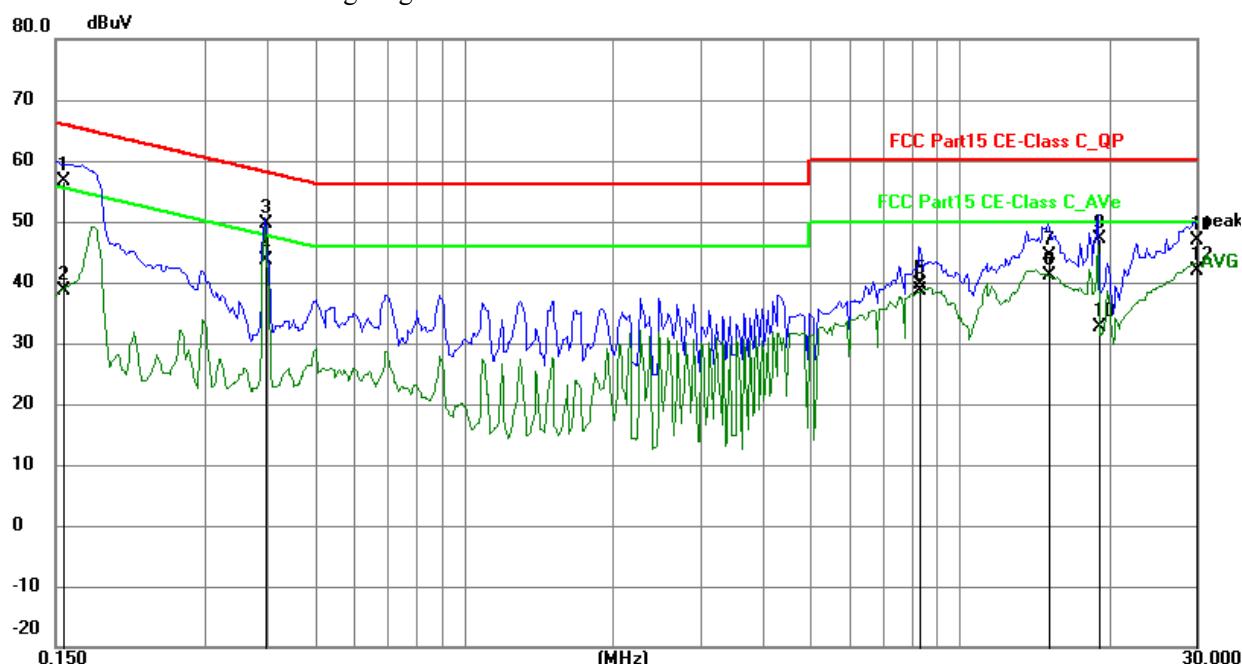
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 KPa

**EUT set Condition: Keep Bluetooth Transmitting**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1556	46.87	9.78	56.65	65.70	-9.05	QP	P
2	0.1556	28.91	9.78	38.69	55.70	-17.01	AVG	P
3	0.3957	39.82	9.76	49.58	57.94	-8.36	QP	P
4	0.3957	33.81	9.76	43.57	47.94	-4.37	AVG	P
5	8.3118	29.66	10.08	39.74	60.00	-20.26	QP	P
6	8.3118	28.49	10.08	38.57	50.00	-11.43	AVG	P
7	15.1095	34.08	10.39	44.47	60.00	-15.53	QP	P
8	15.1095	30.84	10.39	41.23	50.00	-8.77	AVG	P
9	19.0992	36.56	10.63	47.19	60.00	-12.81	QP	P
10	19.0992	21.96	10.63	32.59	50.00	-17.41	AVG	P
11	30.0000	35.67	11.30	46.97	60.00	-13.03	QP	P
12	30.0000	30.65	11.30	41.95	50.00	-8.05	AVG	P

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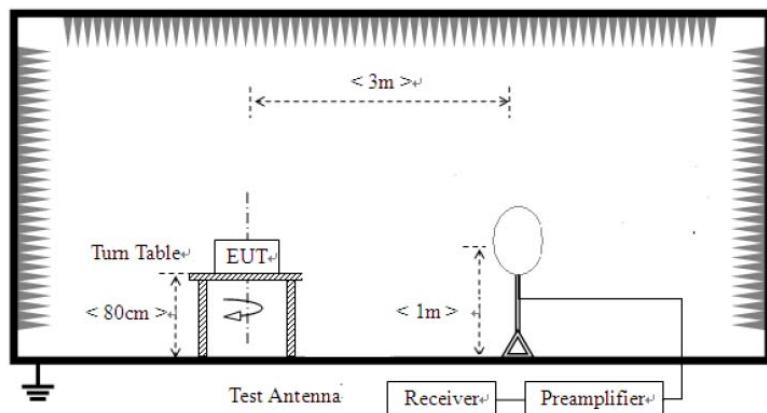
## 6 Radiated Emission Test

### 6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No.744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna height is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a “QP” in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

### Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



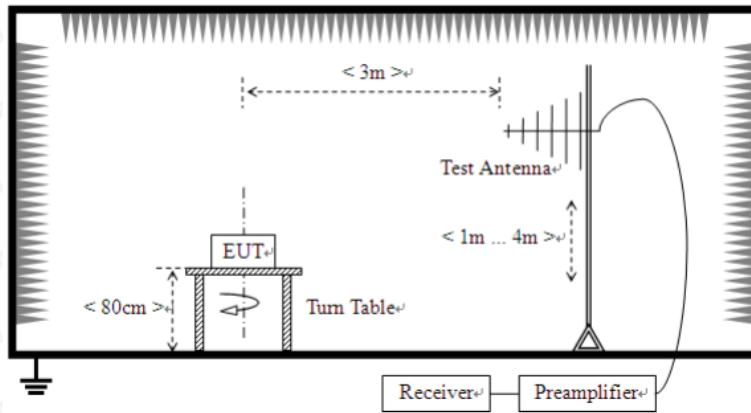
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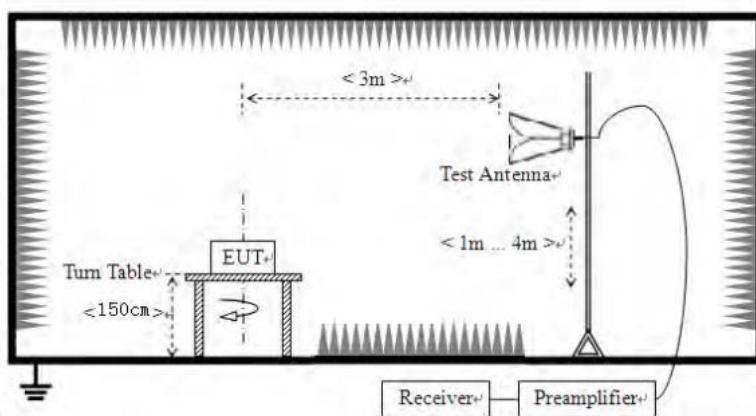
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For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



## 6.2 Configuration of The EUT

Same as section 5.3 of this report

## 6.3 EUT Operating Condition

Same as section 5.4 of this report.

## 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

**Frequencies in restricted band are complied to limit on Paragraph 15.209**

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Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

1. RF Voltage (dB $\mu$ V) = 20 log RF Voltage (uV)
2. In the Above Table, the higher limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

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### Test result

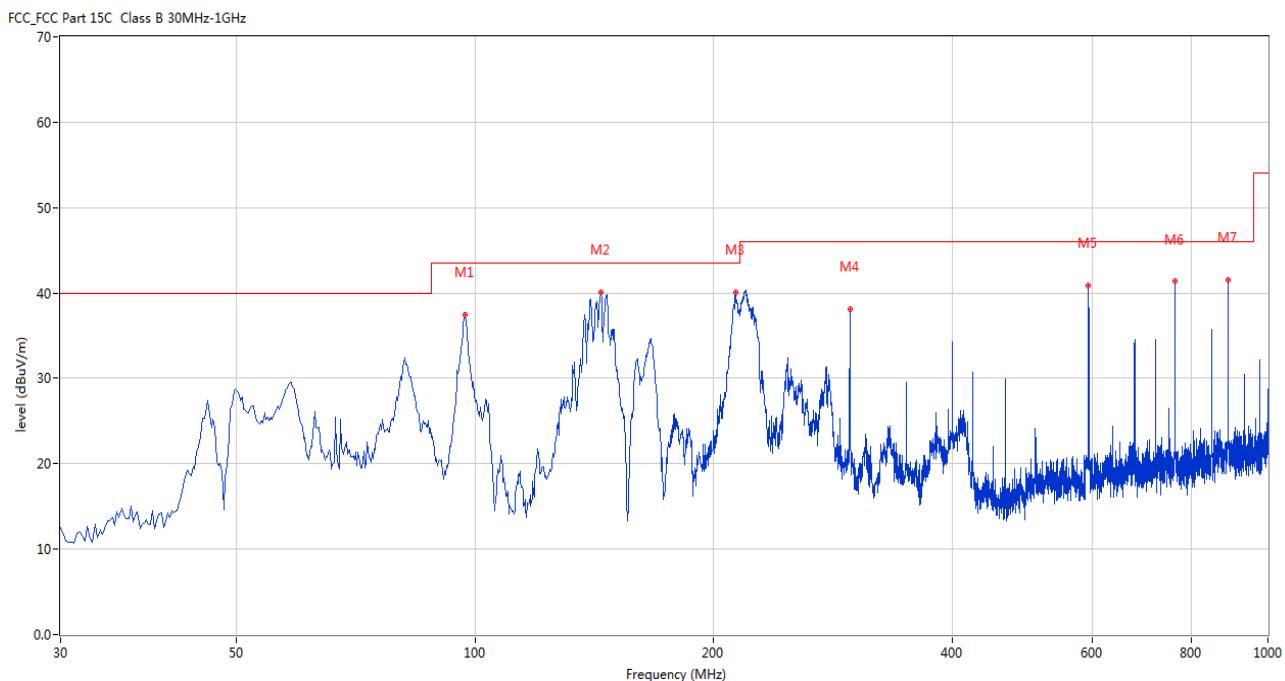
### General Radiated Emission Data and Harmonics Radiated Emission Data

#### Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: **Keep Bluetooth Transmitting**

**Results:** **Pass**

Test Figure:



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	97.156	37.45	-13.90	43.5	-6.05	Peak	347.00	100	Horizontal	Pass
2	144.189	39.64	-17.09	43.5	-3.86	Peak	354.00	100	Horizontal	Pass
3	213.042	40.10	-13.66	43.5	-3.40	Peak	360.00	100	Horizontal	Pass
4	296.926	38.07	-11.07	46.0	-7.93	Peak	360.00	100	Horizontal	Pass
5	593.914	41.82	-5.25	46.0	-4.18	Peak	357.00	100	Horizontal	Pass
6	763.622	42.39	-3.27	46.0	-3.61	Peak	347.00	100	Horizontal	Pass
7	891.145	42.59	-1.92	46.0	-3.41	Peak	354.00	100	Horizontal	Pass

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### Test result

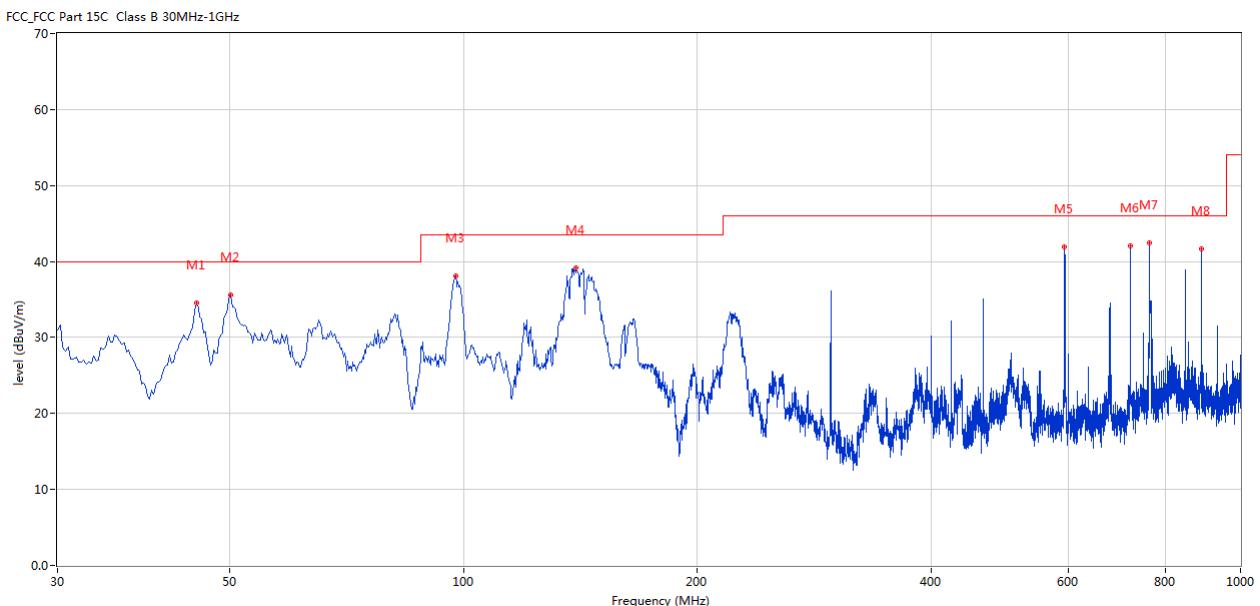
### General Radiated Emission Data and Harmonics Radiated Emission Data

#### Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: **Keep Transmitting**

**Results:** **Pass**

Test Figure:



No.	Frequen cy (MHz)	Results (dBuV/m )	Factor (dB)	Limit (dBuV/m )	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	45.274	35.58	-11.40	40.0	-4.42	Peak	1.00	100	Vertical	Pass
2	50.122	36.59	-11.38	40.0	-3.41	Peak	0.00	100	Vertical	Pass
3	97.641	38.16	-13.79	43.5	-5.34	Peak	7.00	100	Vertical	Pass
4	139.340	39.18	-17.19	43.5	-4.32	Peak	4.00	100	Vertical	Pass
5	593.914	41.87	-5.25	46.0	-4.13	Peak	1.00	100	Vertical	Pass
6	721.437	42.07	-3.93	46.0	-3.93	Peak	1.00	100	Vertical	Pass
7	763.622	42.42	-3.27	46.0	-3.68	Peak	0.00	100	Vertical	Pass
8	891.145	40.59	-1.92	46.0	-5.41	Peak	7.00	100	Vertical	Pass

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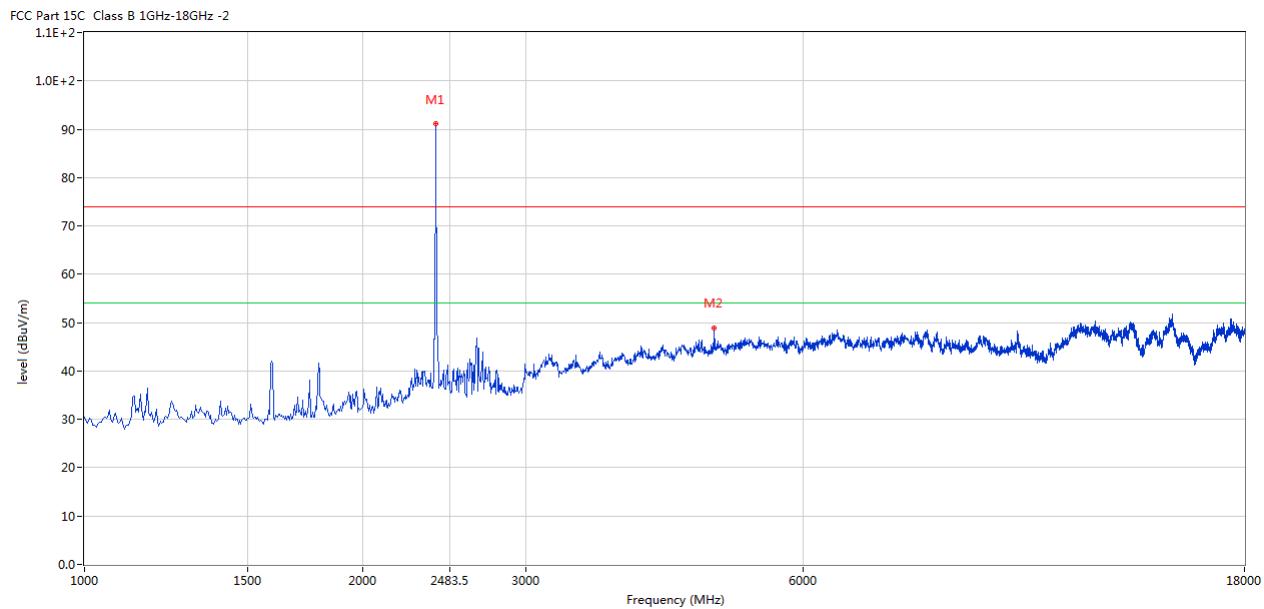
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### Test Figures above 1GHz:

Please refer to the following test plots for details:

#### Low Channel: Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4803.750	49.86	3.13	54.0	-3.14	Peak	210.00	100	Vertical	Pass

The report refers only to the sample tested and does not apply to the bulk.

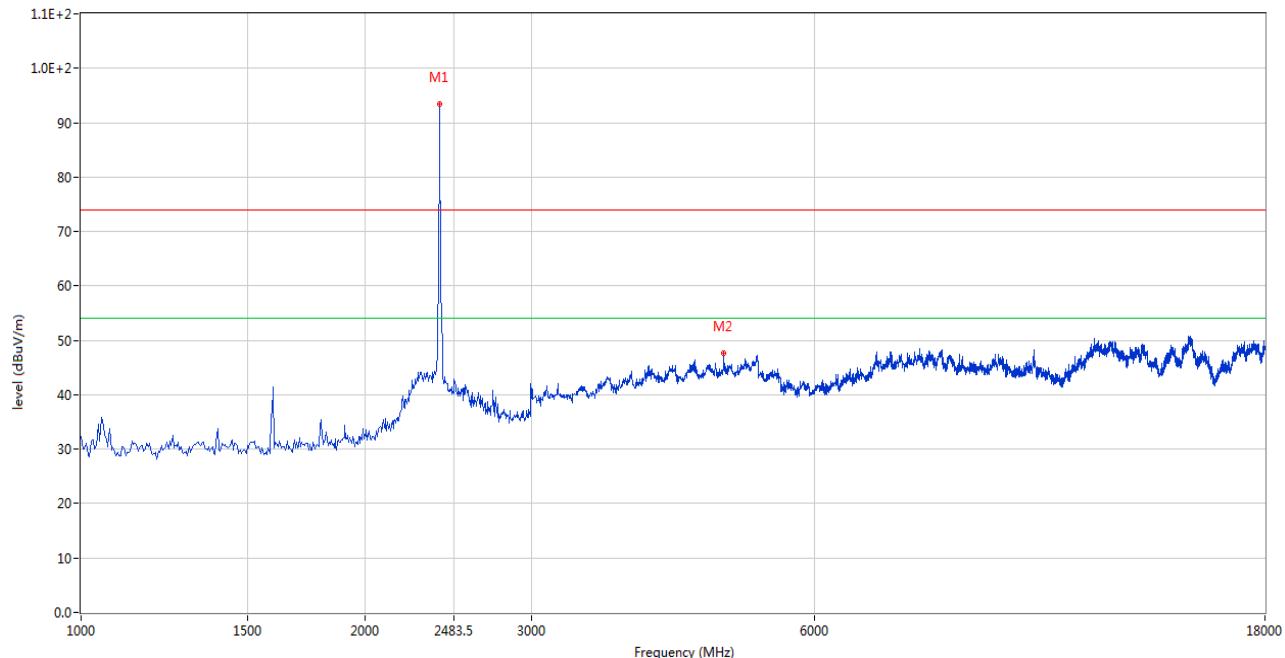
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### Low Channel : Horizontal

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4803.750	48.59	3.13	54.0	-5.41	Peak	69.00	100	Horizontal	Pass

The report refers only to the sample tested and does not apply to the bulk.

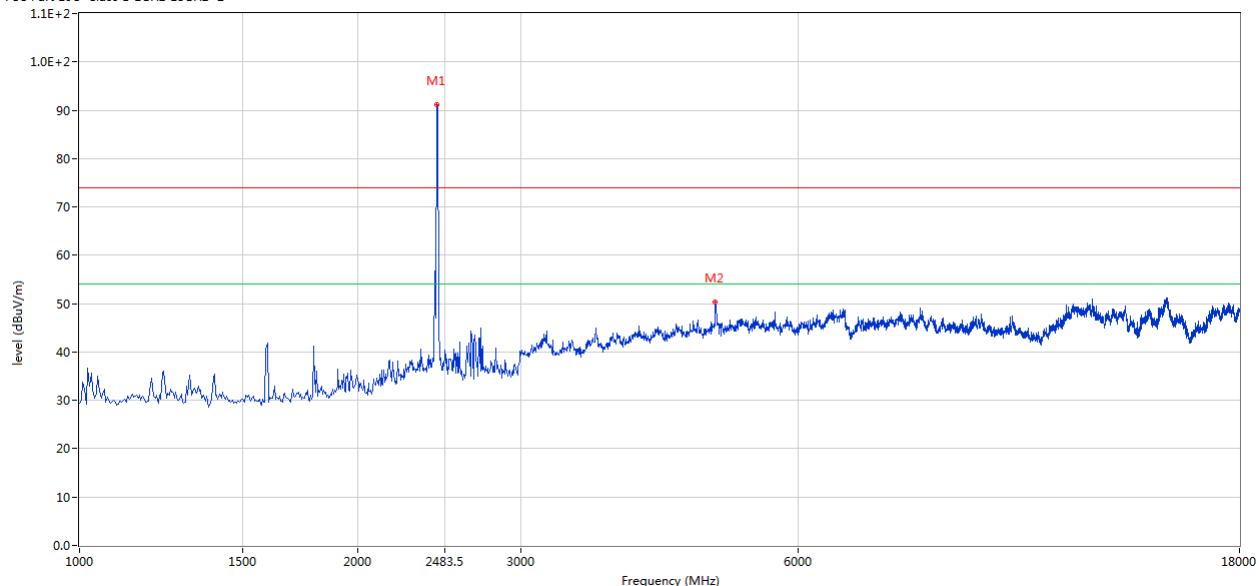
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### Middle Channel : Vertical

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4880.250	50.51	3.20	54.0	-3.49	Peak	207.00	100	Vertical	Pass

The report refers only to the sample tested and does not apply to the bulk.

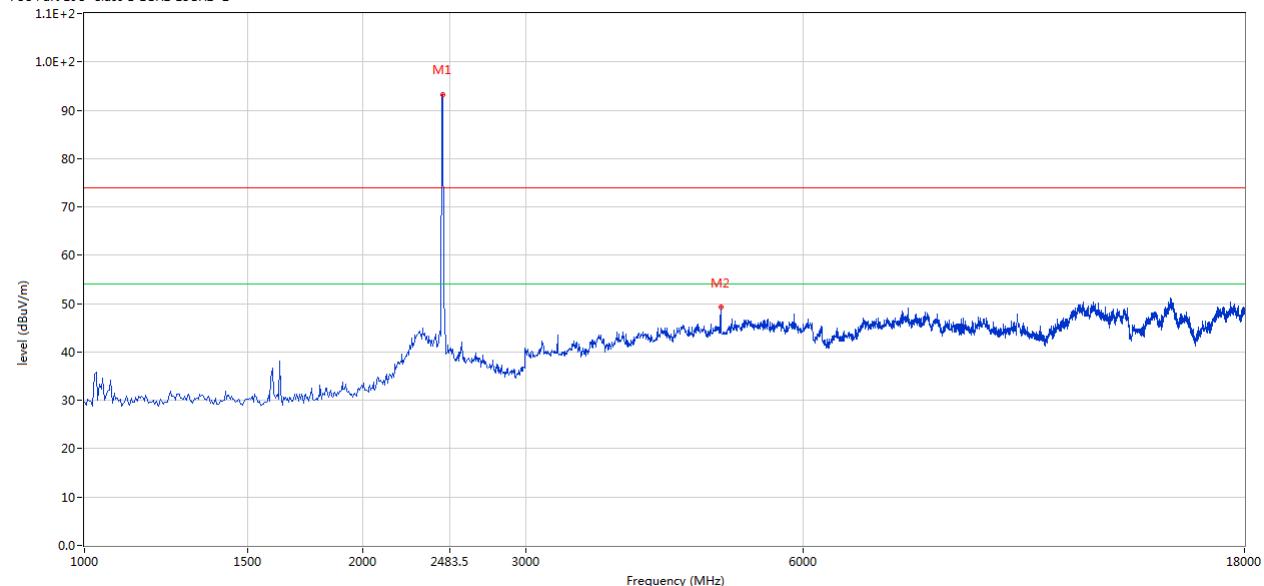
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### Middle Channel : Horizontal

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4880.250	49.39	3.20	54.0	-4.61	Peak	233.00	100	Horizontal	Pass

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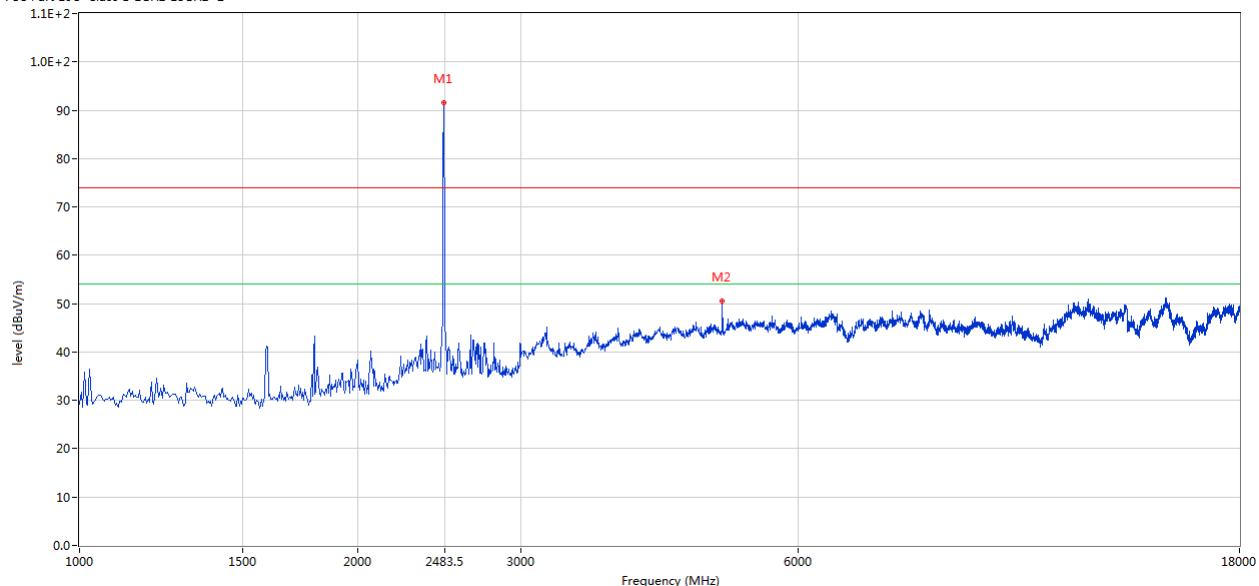
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### High Channel : Vertical

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4961.000	50.45	3.36	54.0	-3.55	Peak	342.00	100	Vertical	Pass

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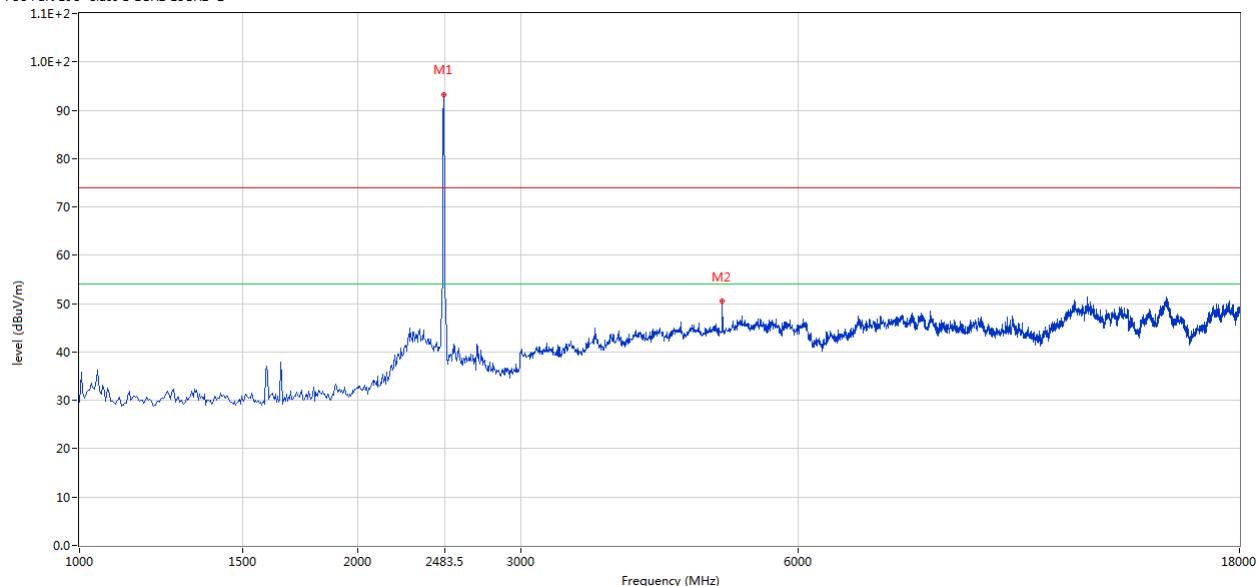
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### High Channel : Horizontal

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	4961.000	50.48	3.36	54.0	-3.52	Peak	251.00	100	Horizontal	Pass

Note: 1. Level = Reading + AF + Cable - Preamp  
2. For the radiated emissions above 18G and below 30MHz, it is the floor noise.  
3. The measured PK value less than the AV limit, no necessary to take down the AV measurement result.

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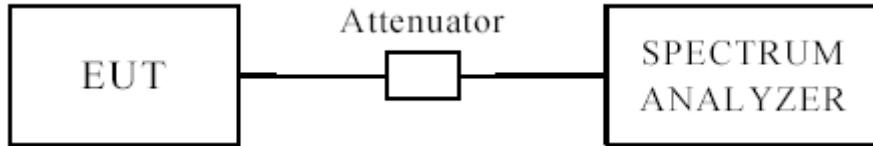
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## 7.0 6dB Bandwidth Measurement

### 7.1 Test Setup



### 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

### 7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.4 Test Result

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## 6dB BW

EUT		Macvon Reflection	Model	Model R
Mode		Keep Transmitting	Input Voltage	120V~
Temperature		24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/ Fail
Low	2402	745	500	Pass
Middle	2440	745	500	Pass
High	2480	752	500	Pass

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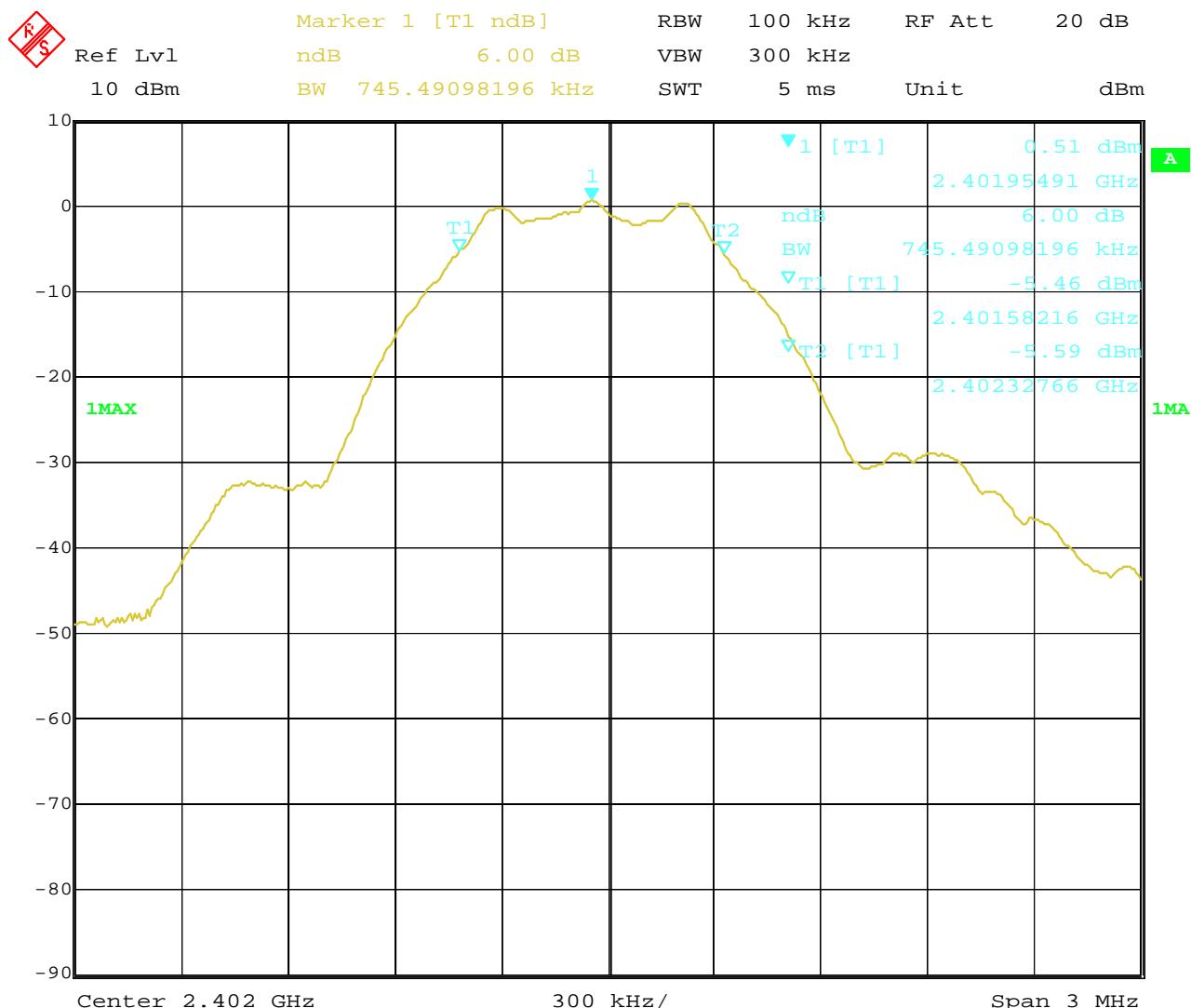
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Test Figure:

### 1. Condition: Low Channel



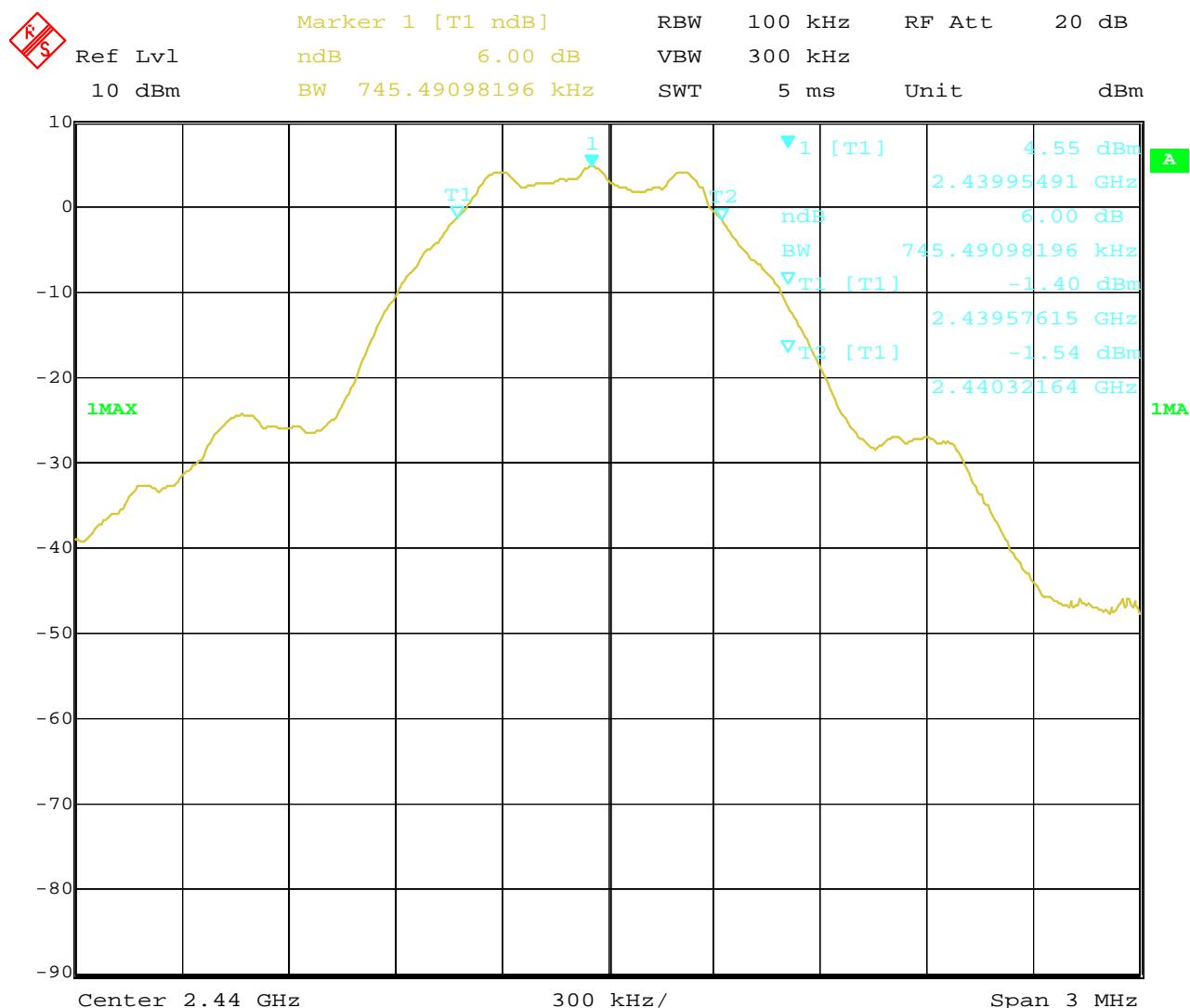
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## 2. Condition: Middle Channel



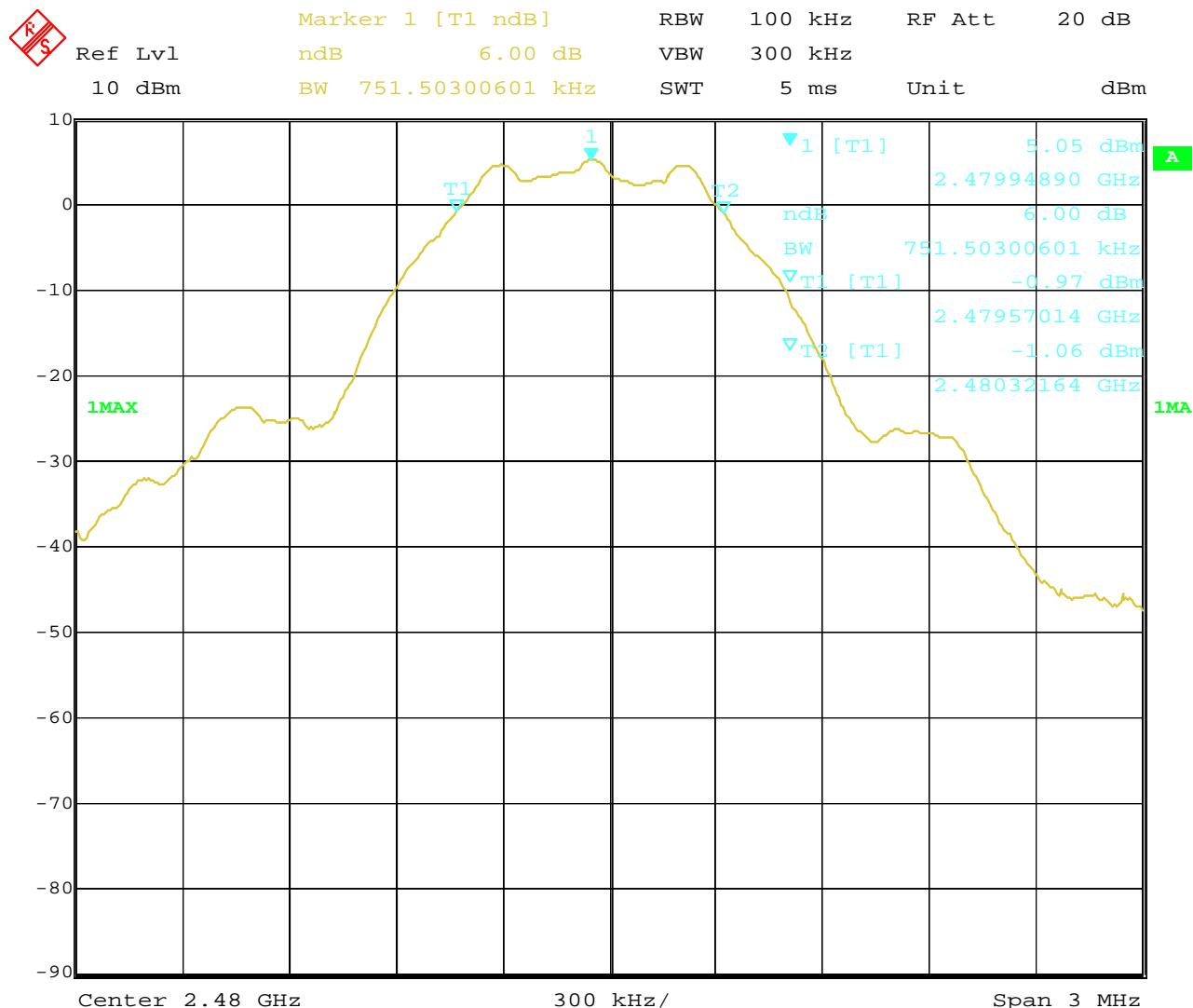
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### 3. High Channel



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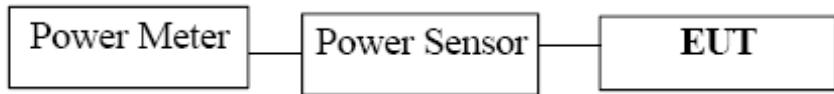
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## 8. Maximum Output Power

### 8.1 Test Setup



### 8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

### 8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

**Note: the Peak power were measured.**

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#### 8.4 Test Results

EUT		Macvon Reflection	Model	Model R	
Mode		Keep Transmitting	Input Voltage	120V~	
Temperature		24 deg. C,	Humidity	56% RH	
Channel	Channel Frequency (MHz)	Max. Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail
		Peak			
Low	2402	2.36		30	Pass
Middle	2440	5.68		30	Pass
High	2480	5.95		30	Pass

Note: 1. the result basic equation calculation as follow:

$$\text{Max. Power Output} = \text{Power Reading} + \text{Cable loss} + \text{Attenuator}$$

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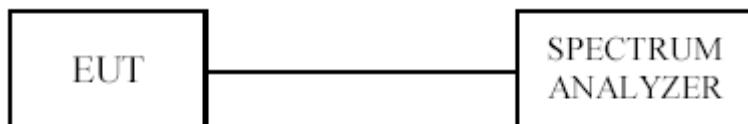
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## 9. Power Spectral Density Measurement

### 9.1 Test Setup



### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

### 9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 10 kHz.
3. Set the VBW  $\geq$  30 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
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 3 kHz) and repeat.
11. The resulting peak PSD level must be  $\leq$  8 dBm/3kHz.

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#### 9.4 Test Result

EUT		Macvon Reflection		Model	Model R	
Mode		Keep Transmitting		Input Voltage	120V~	
Temperature		24 deg. C,		Humidity	56% RH	
Channel	Peak Power Reading (dBm)	Cable Loss (dB)	Final Power Spectral Density (dBm/10kHz)		Maximum Limit (dBm/3kHz)	Pass/ Fail
Low	-6.16	0.2	-5.96		8	Pass
Middle	-2.84	0.2	-2.64		8	Pass
High	-2.66	0.2	-2.46		8	Pass

Note: The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss

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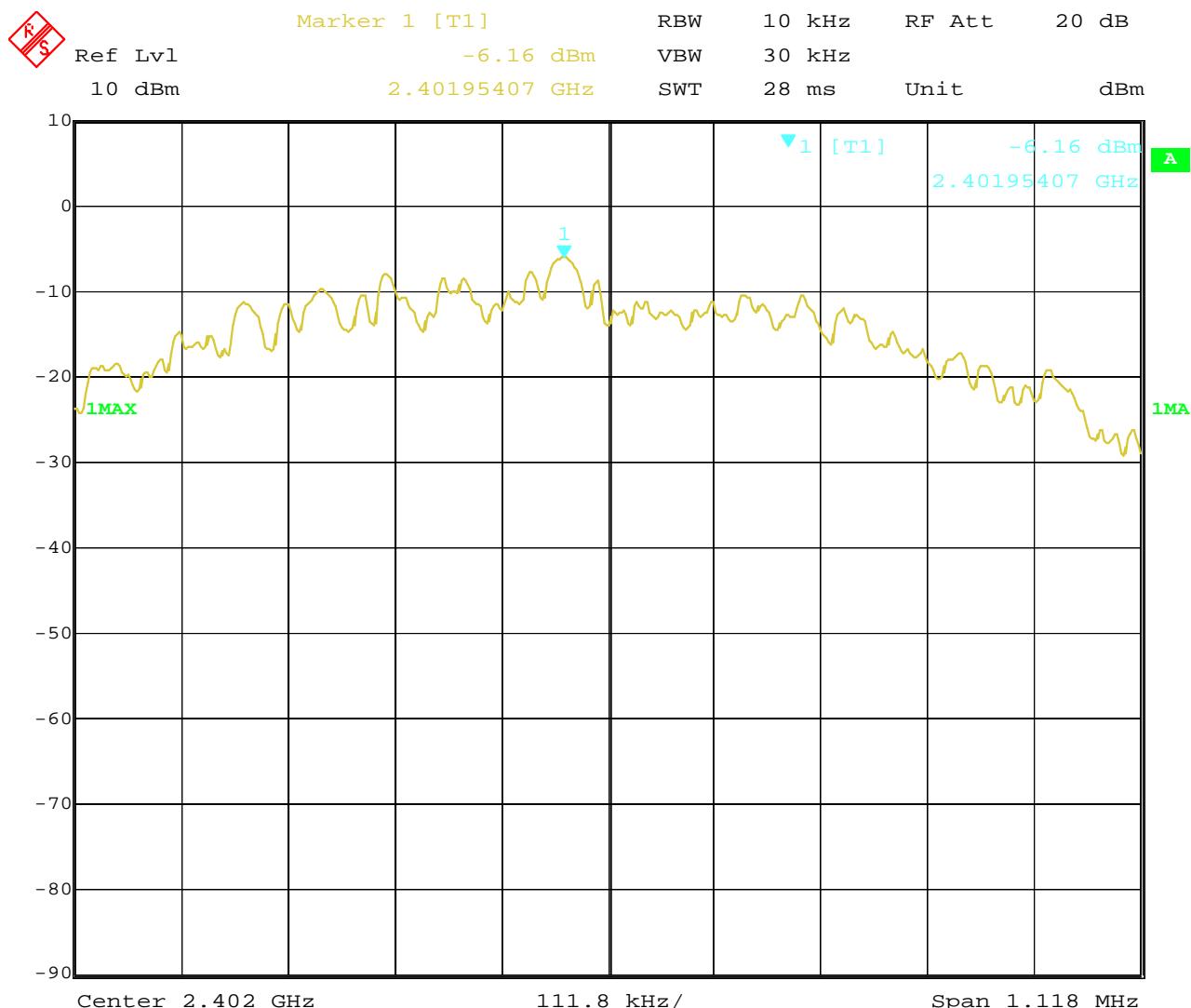
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Test Figure:

### 1. Condition: Low Channel



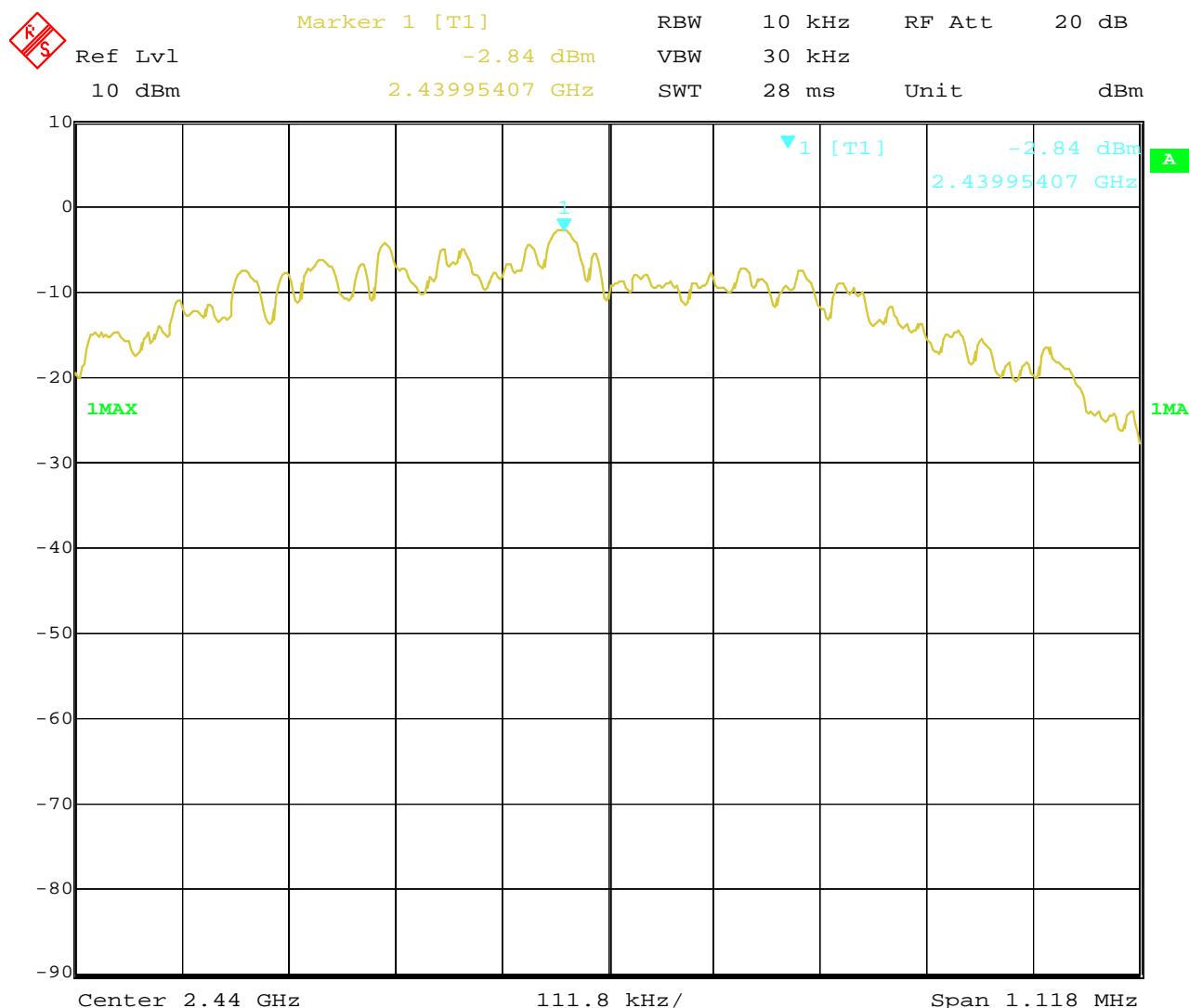
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## 2. Condition: Middle Channel



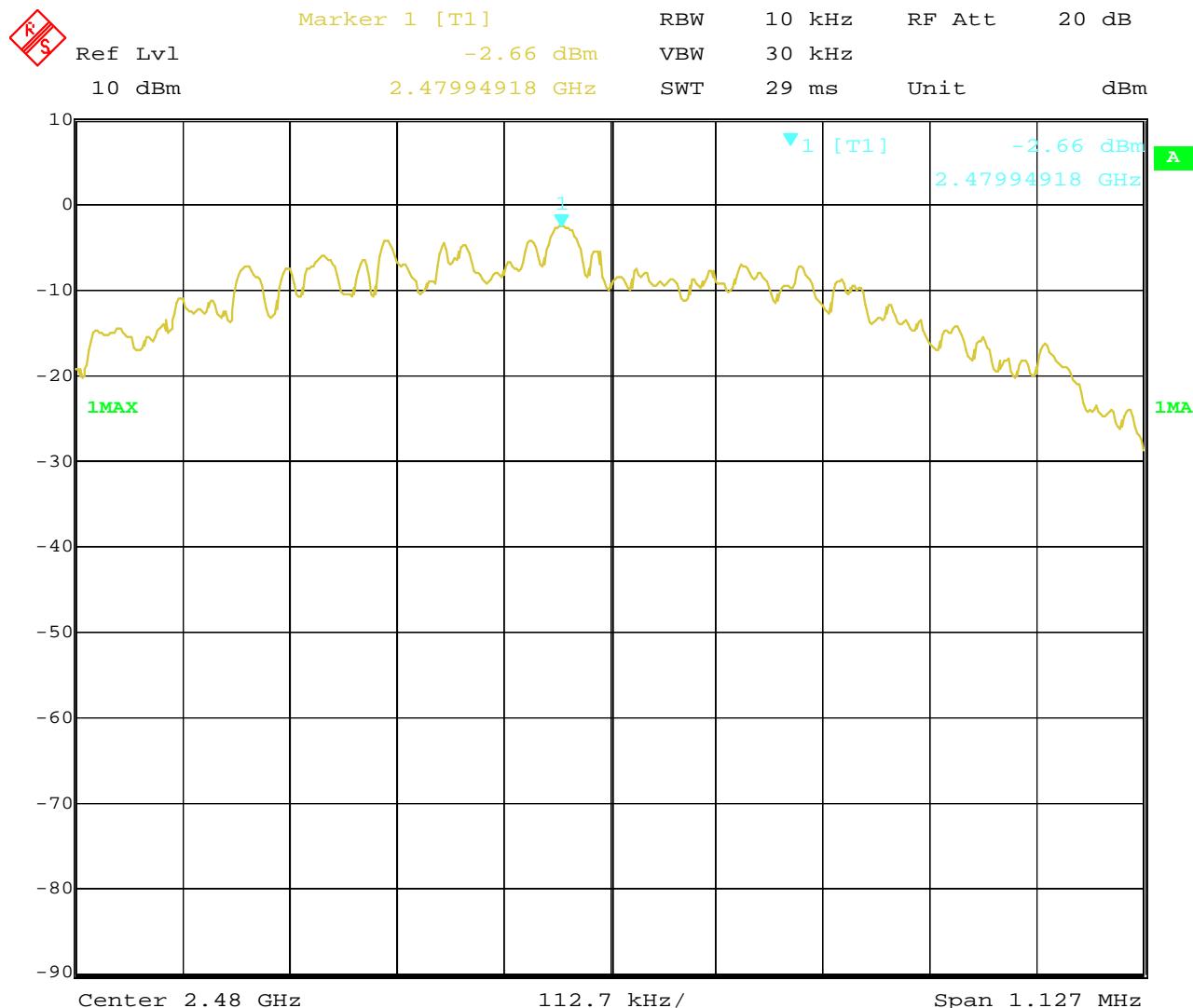
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### 3. High Channel



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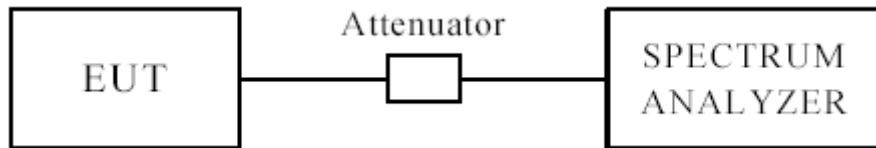
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## 10 Out of Band Measurement

### 10.1 Test Setup for band edge



**The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup**

### 10.2 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

### 10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of Radiated emission test. (Peak values with RBW=1MHz, VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector)

For bandage test, the spectrum set as follows: RBW=100 kHz, VBW=300 kHz. A conducted measurement used

### 10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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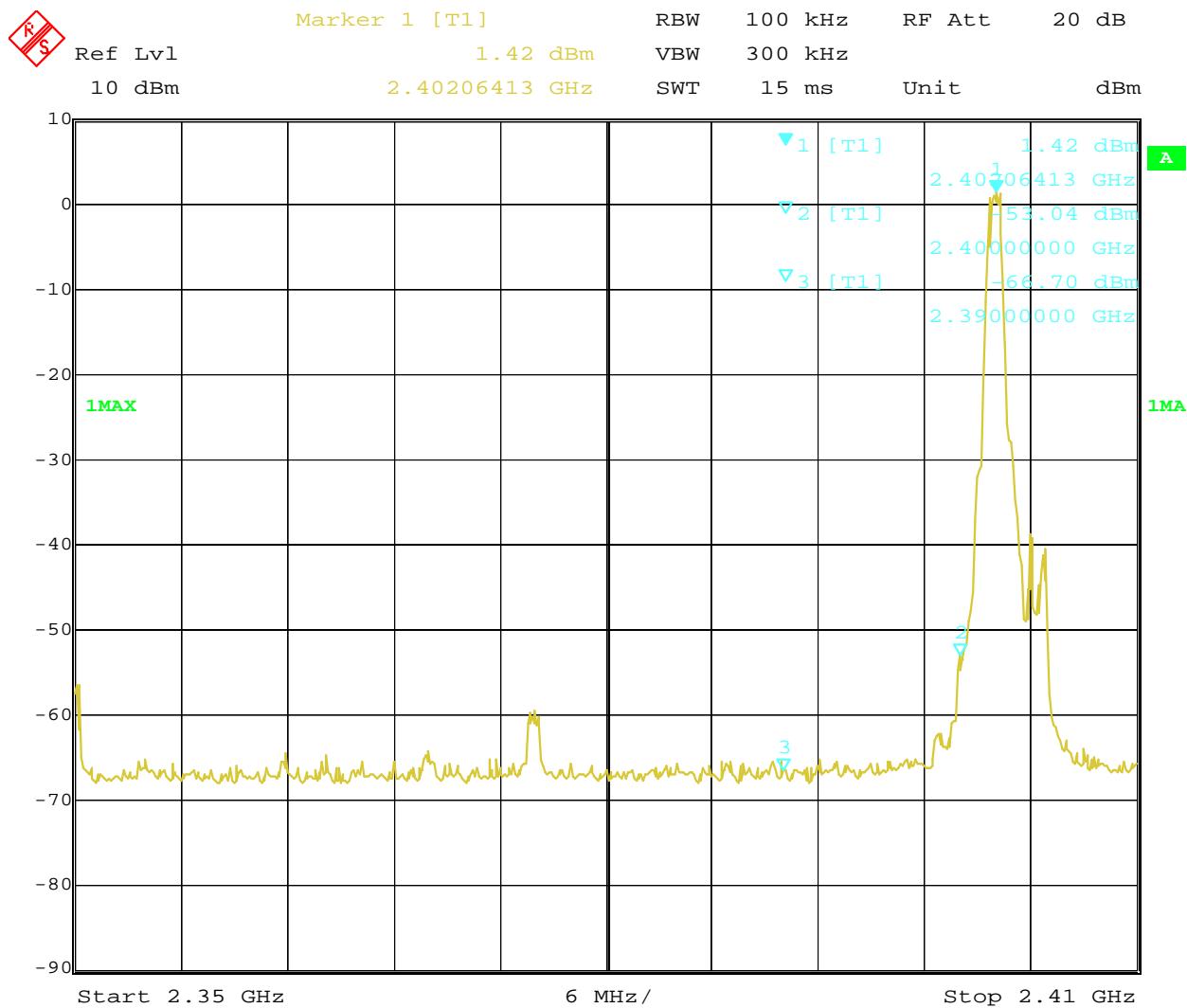
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#### 10.4 Band-edge Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

##### Test Figure:



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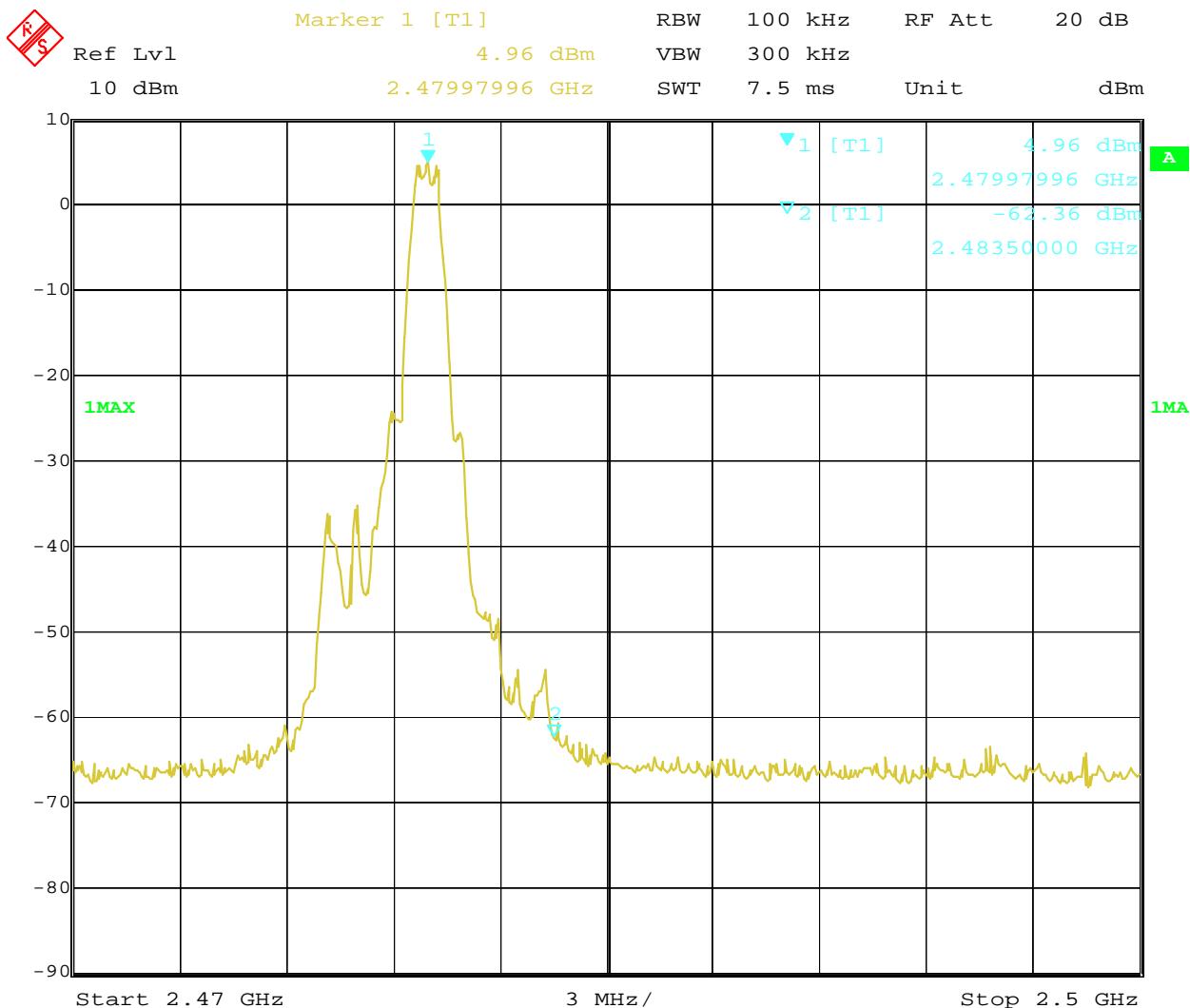
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#### 10.4 Band-edge Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

##### Test Figure:



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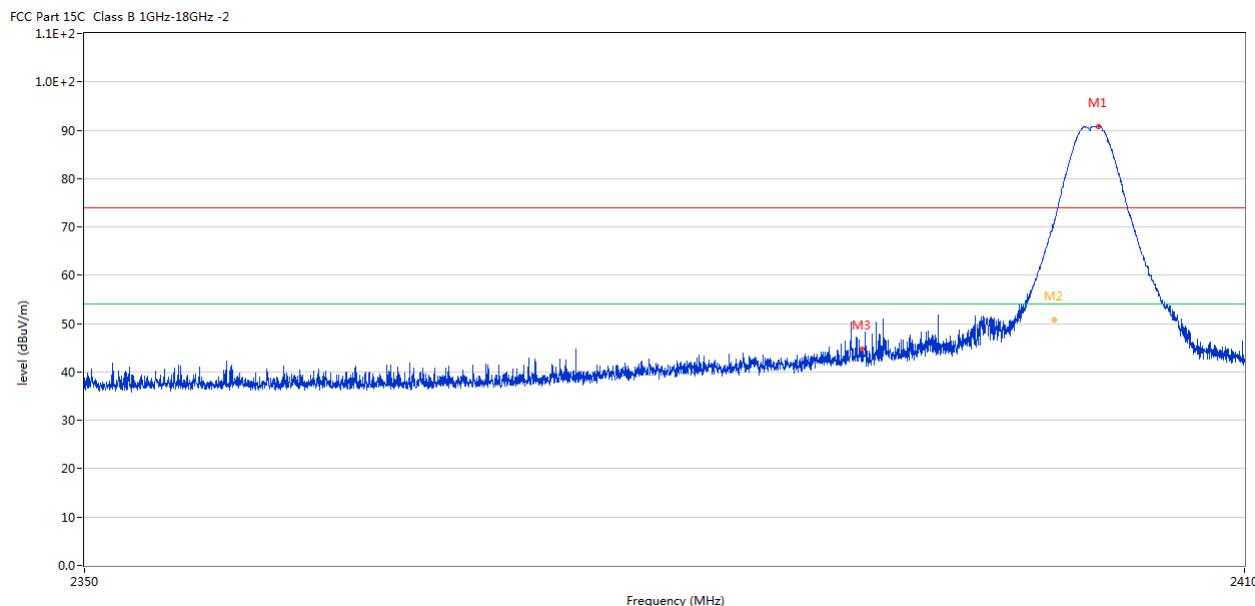
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#### 10.4 Restrict Band Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2400.040	67.20	-3.57	74.0	-6.80	Peak	138.00	100	Horizontal	Pass
2**	2400.040	50.83	-3.57	54.0	-3.17	AV	138.00	100	Horizontal	Pass
3	2390.065	44.17	-3.53	54.0	-9.83	Peak	148.00	100	Horizontal	Pass

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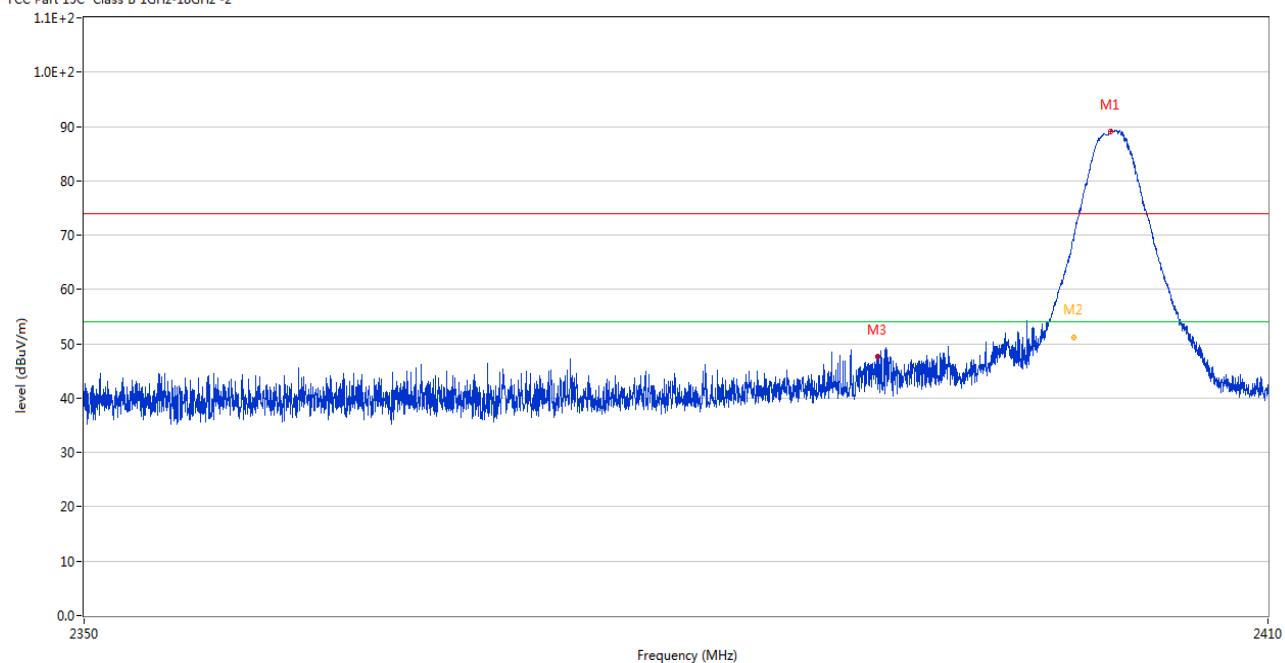
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#### 10.4 Restrict Band Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		

FCC Part 15C Class B 1GHz-18GHz -2



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2400.055	67.00	-3.57	74.0	-7.00	Peak	40.00	100	Vertical	Pass
2**	2400.055	51.08	-3.57	54.0	-2.92	AV	40.00	100	Vertical	Pass
3	2390.080	45.65	-3.53	54.0	-8.35	Peak	40.00	100	Vertical	Pass

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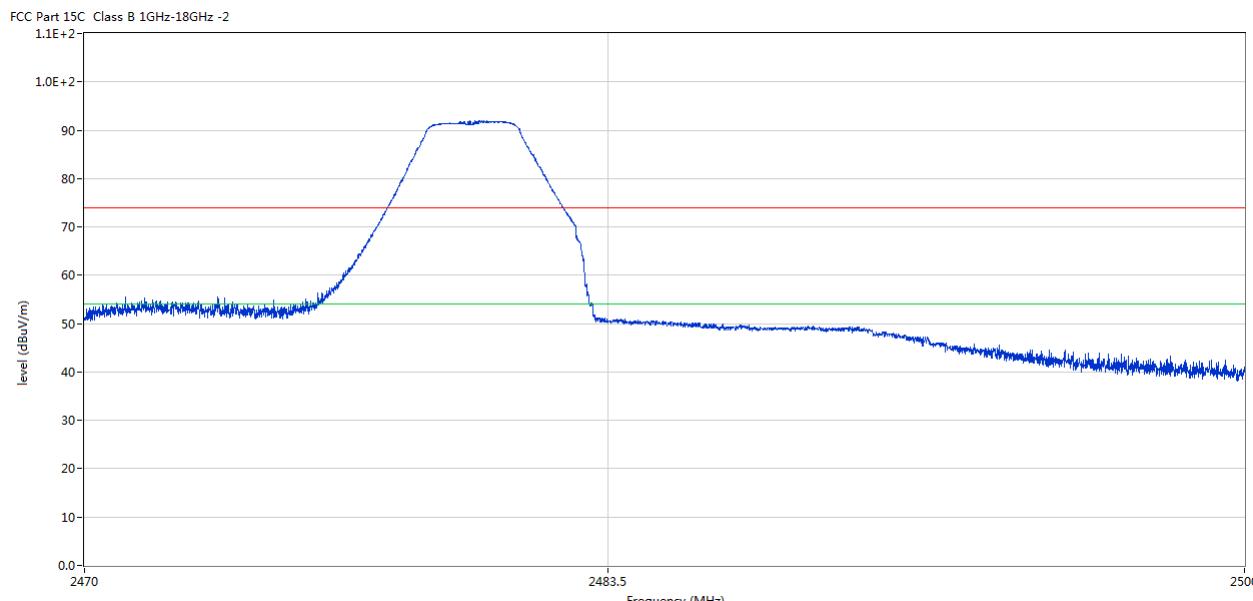
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#### 10.4 Restrict Band Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2483.290	50.27	-3.57	54.0	-3.73	Peak	238.00	100	Horizontal	Pass

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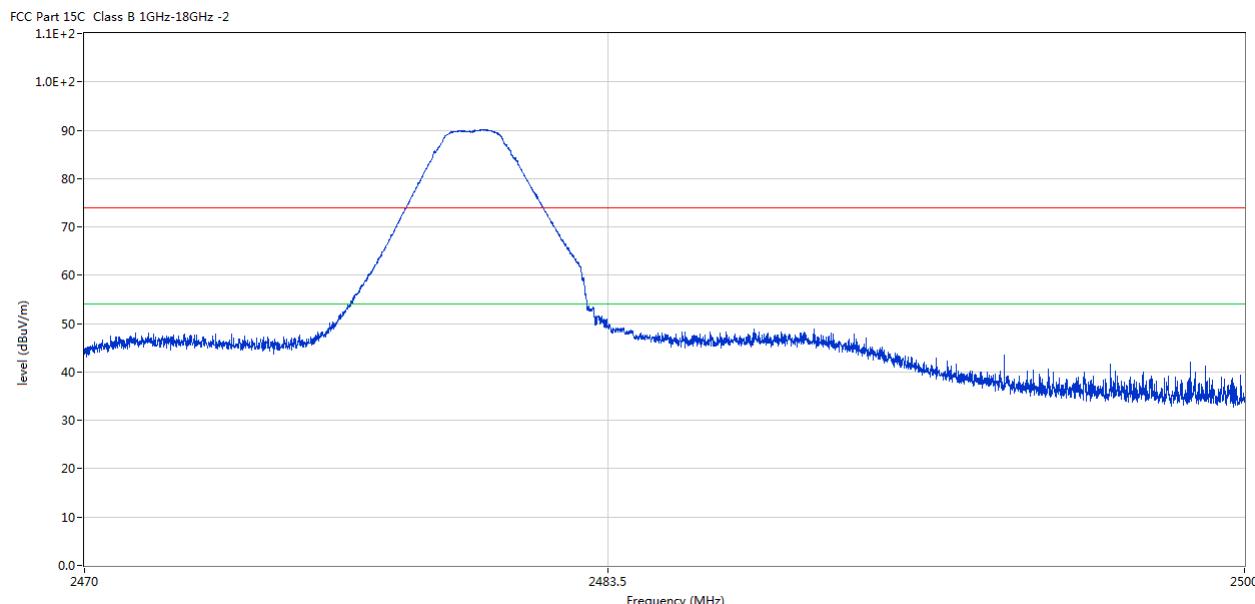
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#### 10.4 Restrict Band Measurement

EUT	Macvon Reflection	Model	Model R
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
2	2483.395	50.51	-3.57	54.0	-3.49	Peak	10.00	100	Vertical	Pass

Note: The measured PK value less than the AV limit, no necessary to take down the AV measurement result.

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## 11.0 Antenna Requirement

### 11.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

### 11.2 Antenna Connected construction

Integral antenna used. The gain of the antennas is 2.0dBi. (get from the antenna specification provided the applicant)

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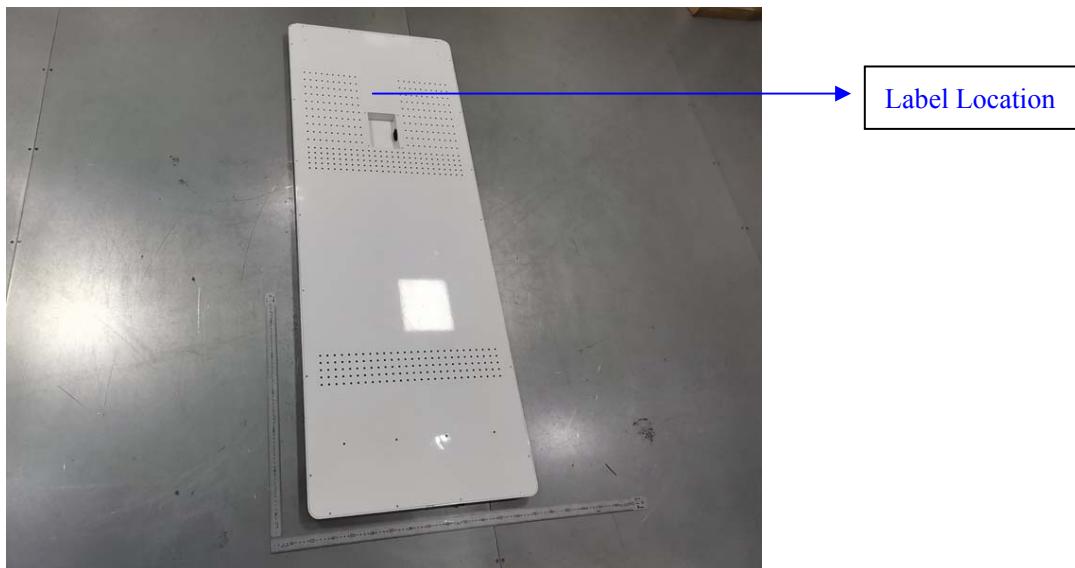
## 12.0 FCC ID Label

**FCC ID: 2AX7UX0278**

**This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

**Mark Location:**



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### 13.0 Photo of testing

Conducted Emission Test Setup:



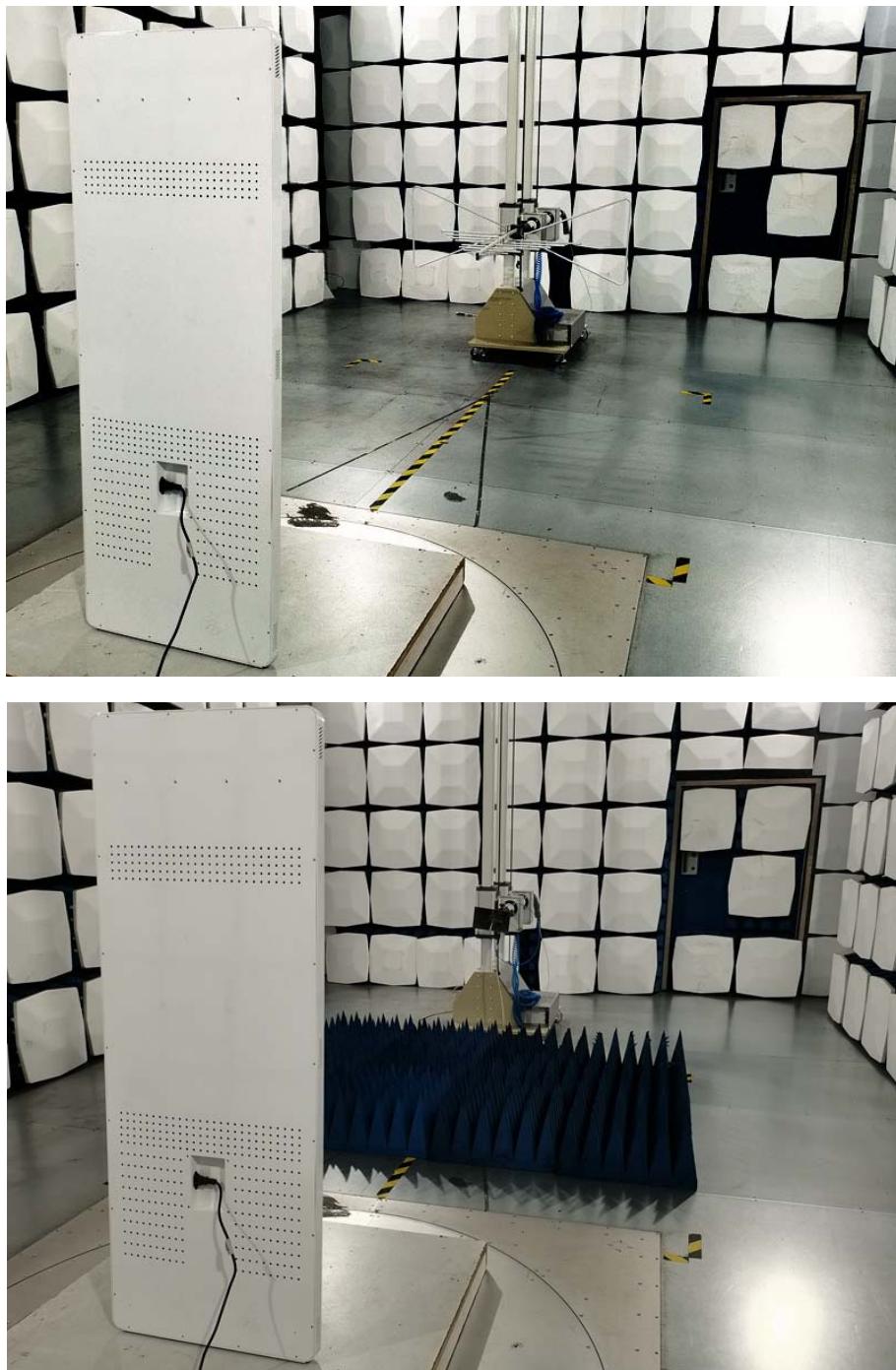
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Radiated Emission Test Setup:



**Photographs – EUT**

Please refer test report TW2010168-01E

**End of the report**

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