

# TEST REPORT

**Reference No.** : WTS18S06116713-1W  
**FCC ID** : 2ACWB-VENTR  
**Applicant** : mophie LLC  
**Address** : 6244 Technology Ave. Kalamazoo, MI 49009 U.S.A.  
**Manufacturer** : mophie LLC  
**Address** : 6244 Technology Ave. Kalamazoo, MI 49009 U.S.A.  
**Product** : mophie charge stream vent mount  
**Model(s)** : CS-WRLS-VNTMT-10W  
**Standards** : FCC Part 15 subpart C  
**Date of Receipt sample** : 2018-06-29  
**Date of Test** : 2018-07-02 to 2018-07-10  
**Date of Issue** : 2018-07-11  
**Test Result** : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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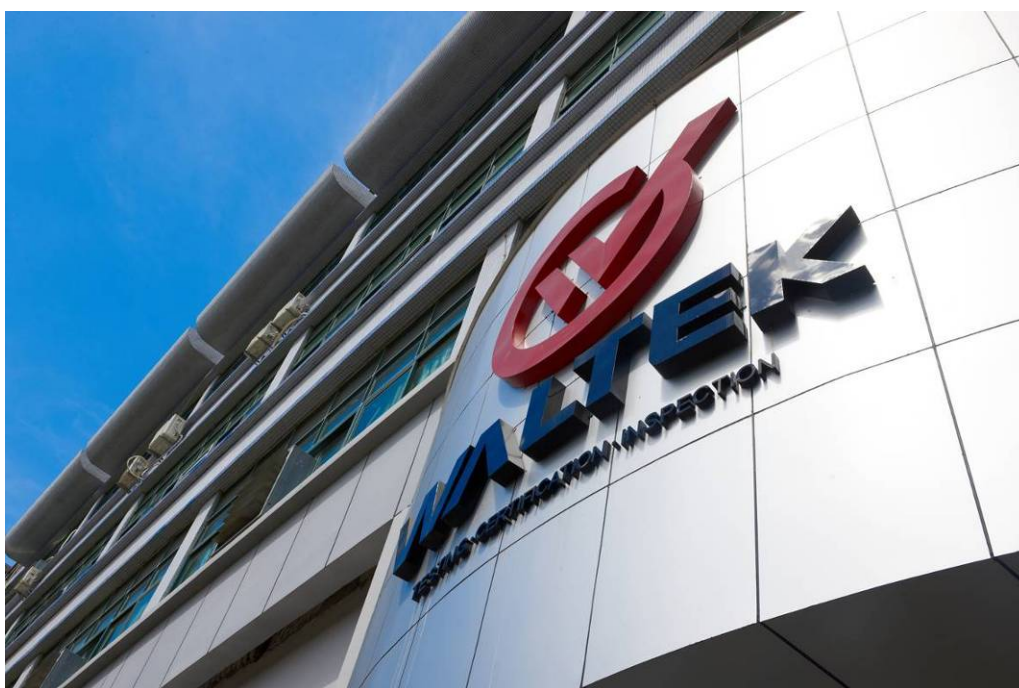


Philo Zhong

Philo Zhong / Manager

## 2 Laboratories Introduction

**Waltek Services (Shenzhen) Co., Ltd** is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

## 2.1 Test Facility

### A. Accreditations for Conformity Assessment (International)

| Country/Region                                                      | Accreditation Body                               | Scope                         | Note |
|---------------------------------------------------------------------|--------------------------------------------------|-------------------------------|------|
| USA                                                                 | <b>A2LA</b><br><b>(Certificate No.: 4243.01)</b> | FCC ID \ DOC \ VOC            | 1    |
| Canada                                                              |                                                  | IC ID \ VOC                   | 2    |
| Japan                                                               |                                                  | MIC-T \ MIC-R                 | -    |
| Europe                                                              |                                                  | EMCD \ RED                    | -    |
| Taiwan                                                              |                                                  | NCC                           | -    |
| Hong Kong                                                           |                                                  | OFCA                          | -    |
| Australia                                                           |                                                  | RCM                           | -    |
| India                                                               |                                                  | <b>International Services</b> | WPC  |
| Thailand                                                            | NTC                                              |                               | -    |
| Singapore                                                           | IDA                                              |                               | -    |
| Note:                                                               |                                                  |                               |      |
| 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. |                                                  |                               |      |
| 2. IC Canada Registration No.: 7760A                                |                                                  |                               |      |

### B.TCBs and Notify Bodies Recognized Testing Laboratory.

| Recognized Testing Laboratory of ...     | Notify body number |
|------------------------------------------|--------------------|
| TUV Rheinland                            | Optional.          |
| Intertek                                 |                    |
| TUV SUD                                  |                    |
| SGS                                      |                    |
| Phoenix Testlab GmbH                     | 0700               |
| Element Materials Technology Warwick Ltd | 0891               |
| Timco Engineering, Inc.                  | 1177               |
| Eurofins Product Service GmbH            | 0681               |

### 3 Test Summary

| Test Items                  | Test Requirement | Result |
|-----------------------------|------------------|--------|
| Conducted Emissions         | 15.207           | N/A    |
| Radiated Spurious Emissions | 15.209           | PASS   |
| Occupied Bandwidth          | 15.215           | PASS   |
| Antenna Requirement         | 15.203           | PASS   |

## 4 Contents

|                                               | Page      |
|-----------------------------------------------|-----------|
| <b>1 COVER PAGE.....</b>                      | <b>1</b>  |
| <b>2 LABORATORIES INTRODUCTION.....</b>       | <b>2</b>  |
| 2.1 TEST FACILITY .....                       | 3         |
| <b>3 TEST SUMMARY .....</b>                   | <b>4</b>  |
| <b>4 CONTENTS .....</b>                       | <b>5</b>  |
| <b>5 REPORT REVISION HISTORY.....</b>         | <b>6</b>  |
| <b>6 GENERAL INFORMATION.....</b>             | <b>7</b>  |
| 6.1 GENERAL DESCRIPTION OF E.U.T.....         | 7         |
| 6.2 DETAILS OF ACCESSORIES.....               | 7         |
| <b>7 EQUIPMENT USED DURING TEST .....</b>     | <b>8</b>  |
| 7.1 EQUIPMENTS LIST .....                     | 8         |
| 7.2 DESCRIPTION OF SUPPORT UNITS.....         | 8         |
| 7.3 MEASUREMENT UNCERTAINTY.....              | 9         |
| 7.4 TEST EQUIPMENT CALIBRATION .....          | 9         |
| <b>8 RADIATED SPURIOUS EMISSIONS.....</b>     | <b>10</b> |
| 8.1 EUT OPERATION.....                        | 10        |
| 8.2 TEST SETUP .....                          | 11        |
| 8.3 SPECTRUM ANALYZER SETUP .....             | 12        |
| 8.4 TEST PROCEDURE.....                       | 12        |
| 8.5 SUMMARY OF TEST RESULTS .....             | 13        |
| <b>9 BANDWIDTH MEASUREMENT.....</b>           | <b>14</b> |
| 9.1 TEST PROCEDURE.....                       | 14        |
| 9.2 TEST RESULT PLOT:.....                    | 14        |
| <b>10 ANTENNA REQUIREMENT .....</b>           | <b>15</b> |
| <b>11 PHOTOGRAPHS-TEST SETUP AND EUT.....</b> | <b>16</b> |

## 5 Report Revision History

| Test report No.   | Date of Receipt sample | Date of Test                | Date of Issue | Purpose  | Comment | Approved |
|-------------------|------------------------|-----------------------------|---------------|----------|---------|----------|
| WTS18S06116713-1W | 2018-06-29             | 2018-07-02 to<br>2018-07-10 | 2018-07-11    | original | N/A     | Valid    |

## **6 General Information**

### **6.1 General Description of E.U.T**

|                       |                                 |
|-----------------------|---------------------------------|
| Product:              | mophie charge stream vent mount |
| Model(s):             | CS-WRLS-VNTMT-10W               |
| Type of Modulation:   | ASK                             |
| Frequency Range:      | 0.1277MHz                       |
| Antenna installation: | Coil Antenna                    |
| Antenna gain:         | 0dBi                            |

### **6.2 Details of accessories**

|          |                                              |
|----------|----------------------------------------------|
| Ratings: | Input: DC 12V, 1.5A (powered by car charger) |
|----------|----------------------------------------------|

## 7 Equipment Used during Test

### 7.1 Equipments List

| Conducted Emissions Test Site                              |                              |                                  |               |            |                       |                      |
|------------------------------------------------------------|------------------------------|----------------------------------|---------------|------------|-----------------------|----------------------|
| Item                                                       | Equipment                    | Manufacturer                     | Model No.     | Serial No. | Last Calibration Date | Calibration Due Date |
| 1.                                                         | EMI Test Receiver            | R&S                              | ESCI          | 100947     | 2017-09-12            | 2018-09-11           |
| 2.                                                         | LISN                         | R&S                              | ENV216        | 101215     | 2017-09-12            | 2018-09-11           |
| 3.                                                         | Cable                        | Top                              | TYPE16(3.5M)  | -          | 2017-09-12            | 2018-09-11           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site |                              |                                  |               |            |                       |                      |
| Item                                                       | Equipment                    | Manufacturer                     | Model No.     | Serial No  | Last Calibration Date | Calibration Due Date |
| 1                                                          | Test Receiver                | R&S                              | ESCI          | 101296     | 2018-04-06            | 2019-04-05           |
| 2                                                          | Active Loop Antenna          | Beijing Dazhi                    | ZN30900A      | -          | 2017-10-17            | 2018-10-16           |
| 3                                                          | Trilog Broadband Antenna     | SCHWARZBECK                      | VULB9160      | 9160-3325  | 2018-04-07            | 2019-04-06           |
| 4                                                          | Amplifier                    | ANRITSU                          | MH648A        | M43381     | 2018-04-07            | 2019-04-06           |
| 5                                                          | Amplifier                    | Compliance pirection systems inc | PAP-0203      | 22024      | 2017-09-12            | 2018-09-11           |
| 6                                                          | Cable                        | HUBER+SUHNER                     | CBL2          | 525178     | 2018-04-07            | 2019-04-06           |
| RF Conducted Testing                                       |                              |                                  |               |            |                       |                      |
| Item                                                       | Equipment                    | Manufacturer                     | Model No.     | Serial No. | Last Calibration Date | Calibration Due Date |
| 1.                                                         | EMC Analyzer (9k~26.5GHz)    | Agilent                          | E7405A        | MY45114943 | 2017-09-15            | 2018-09-14           |
| 2.                                                         | Spectrum Analyzer (9k-6GHz)  | R&S                              | FSL6          | 100959     | 2017-09-15            | 2018-09-14           |
| 3.                                                         | Signal Analyzer (9k~26.5GHz) | Agilent                          | N9010A        | MY50520207 | 2017-09-15            | 2018-09-14           |
| 4.                                                         | Humidity Chamber             | GF                               | GTH-225-40-1P | IAA061213  | 2017-09-15            | 2018-09-14           |

### 7.2 Description of Support Units

| Equipment | Manufacturer | Model No. | Series No. |
|-----------|--------------|-----------|------------|
| /         | /            | /         | /          |

### 7.3 Measurement Uncertainty

| Test Item                   | Frequency Range | Uncertainty         | Note |
|-----------------------------|-----------------|---------------------|------|
| Conducted Emissions         | 150kHz~30MHz    | $\pm 3.64\text{dB}$ | (1)  |
| Radiated Spurious Emissions | 26KHz~30MHz     | $\pm 3.03\text{dB}$ | (1)  |
| Radiated Spurious Emissions | 30MHz~1000MHz   | $\pm 5.03\text{dB}$ | (1)  |

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

### 7.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

## 8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

FCC Part15 Paragraph 15.209

| Frequency<br>(MHz) | Field Strength |                 | Field Strength Limit at 3m Measurement Dist |                                |
|--------------------|----------------|-----------------|---------------------------------------------|--------------------------------|
|                    | uV/m           | Distance<br>(m) | uV/m                                        | dBuV/m                         |
| 0.009 ~ 0.490      | 2400/F(kHz)    | 300             | 10000 * 2400/F(kHz)                         | $20\log^{(2400/F(kHz))} + 80$  |
| 0.490 ~ 1.705      | 24000/F(kHz)   | 30              | 100 * 24000/F(kHz)                          | $20\log^{(24000/F(kHz))} + 40$ |
| 1.705 ~ 30         | 30             | 30              | 100 * 30                                    | $20\log^{(30)} + 40$           |
| 30 ~ 88            | 100            | 3               | 100                                         | $20\log^{(100)}$               |
| 88 ~ 216           | 150            | 3               | 150                                         | $20\log^{(150)}$               |
| 216 ~ 960          | 200            | 3               | 200                                         | $20\log^{(200)}$               |
| Above 960          | 500            | 3               | 500                                         | $20\log^{(500)}$               |

### 8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

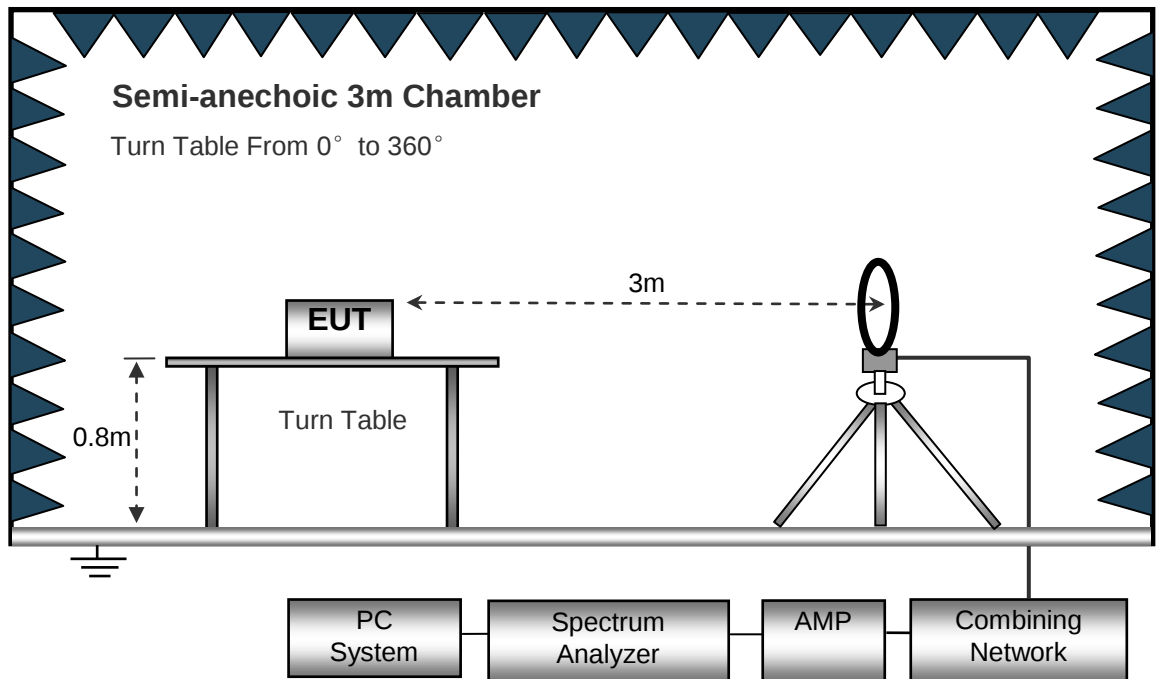
EUT Operation :

Only the worst case transmitting mode were record in the report.

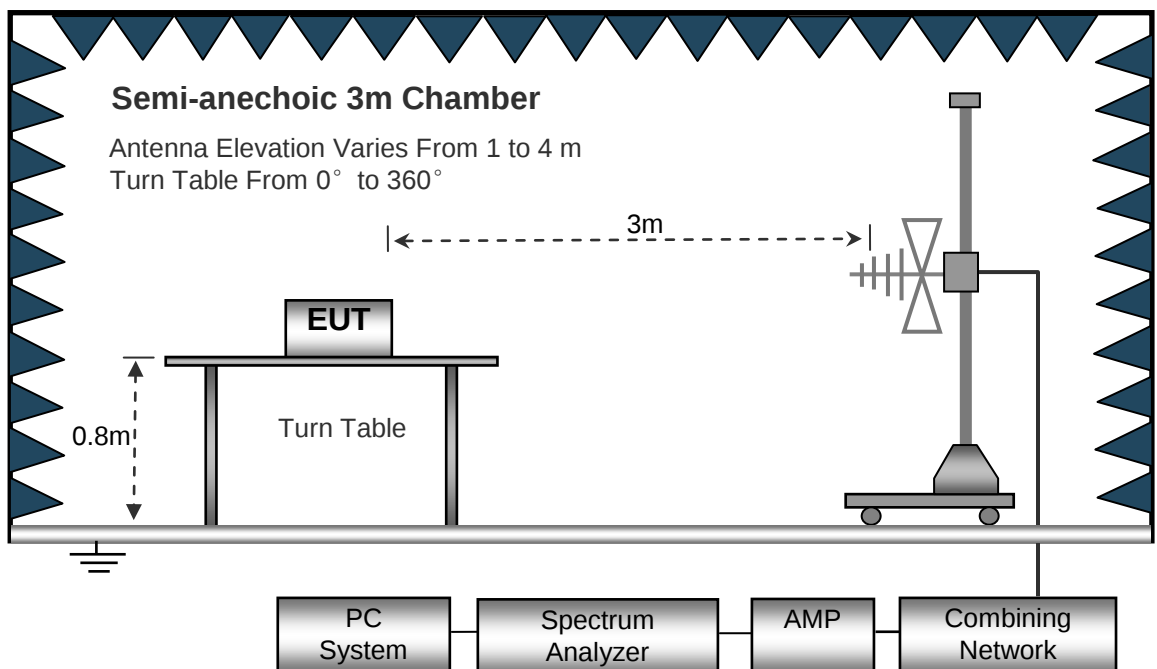
## 8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



### 8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto  
IF Bandwidth..... 10kHz  
Video Bandwidth..... 10kHz  
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto  
Detector ..... PK  
Resolution Bandwidth..... 100kHz  
Video Bandwidth..... 300kHz

### 8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

## 8.5 Summary of Test Results

Test Frequency: 9KHz ~ 30MHz, Note: Correct factor = Cable loss + Antenna factor

| Frequency | Receiver Reading | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15. 209 |        |
|-----------|------------------|------------------|------------|-------|------------------|---------------------|------------------|--------|
|           |                  |                  | Height     | Polar |                  |                     | Limit            | Margin |
| (MHz)     | (dBμV)           | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)         | (dB)   |
| 0.1277    | 68.21            | 156              | 1.5        | H     | 18.72            | 86.93               | 105.48           | -18.55 |
| 0.1277    | 74.32            | 276              | 1.5        | V     | 18.72            | 93.04               | 105.48           | -12.44 |

Test Frequency: 30MHz ~ 1GHz

| Frequency | Receiver Reading | Detector     | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15. 209 |        |
|-----------|------------------|--------------|------------------|------------|-------|------------------|---------------------|------------------|--------|
|           |                  |              |                  | Height     | Polar |                  |                     | Limit            | Margin |
| (MHz)     | (dBμV)           | (PK/QP /Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV /m)        | (dB)   |
| 37.26     | 33.13            | QP           | 250              | 1.2        | H     | -14.3            | 18.83               | 40               | -21.17 |
| 37.26     | 37.48            | QP           | 89               | 1.0        | V     | -14.3            | 23.18               | 40               | -16.82 |
| 224.36    | 33.31            | QP           | 347              | 1.1        | H     | -13.58           | 19.73               | 46               | -26.27 |
| 224.36    | 39.97            | QP           | 238              | 1.6        | V     | -13.58           | 26.39               | 46               | -19.61 |
| 523.52    | 38.57            | QP           | 20               | 1.7        | H     | -5.63            | 32.94               | 46               | -13.06 |
| 523.52    | 37.51            | QP           | 234              | 1.6        | V     | -5.63            | 31.88               | 46               | -14.12 |

9 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.215

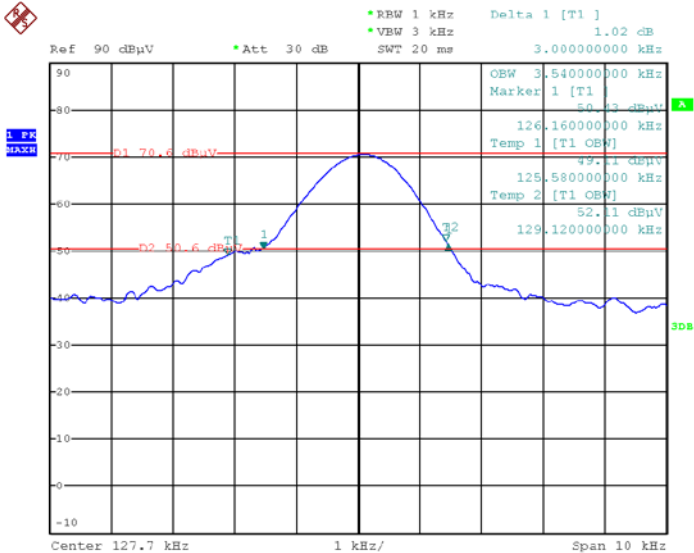
9.1 Test Procedure

- 1. The transmitter shall be operated at its maximum carrier power measured under normal test conditions;
- 2. The span of the analyzer shall be set to capture all products of the modulation process,including the emission skirts.
- 3. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.2 Test Result Plot:

| Test Channel(kHz) | 99% Bandwidth(kHz) | 20dB Bandwidth Emission(KHz) |
|-------------------|--------------------|------------------------------|
| 127.700           | 3.540              | 3.000                        |

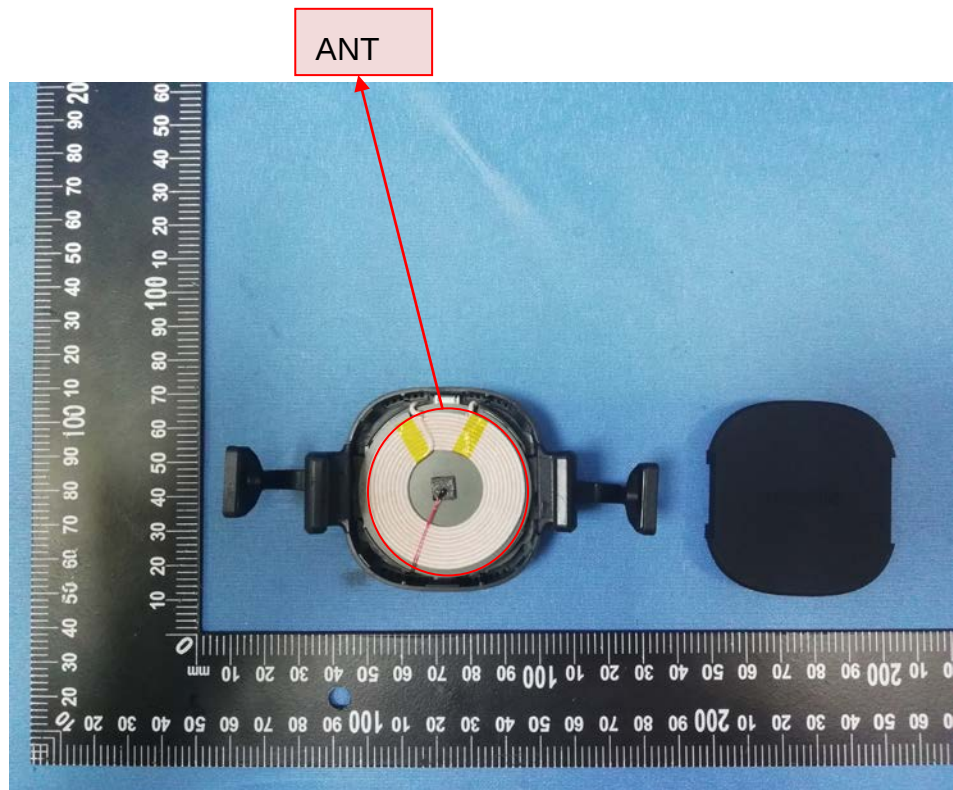
Test result plot as follows:



Date: 10.JUL.2018 08:28:24

## 10 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a Coil antenna, fulfill the requirement of this section.



## **11 Photographs-Test Setup and EUT**

Refer to the file CS-WRLS-VNTMT-10W\_Ext Photos, CS-WRLS-VNTMT-10W\_Int Photos and CS-WRLS-VNTMT-10W\_Tsup Photos.

===== End of Report =====