

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

mophie LLC

mophie powerstation plus XL

Model Number: PSP-WRLS-PD

FCC ID: 2ACWB-PSP8KA

| | |
|---------------|---|
| Prepared for: | mophie LLC |
| | 6244 Technology Ave. Kalamazoo, MI49009 United States of America |
| | |
| Prepared By: | EST Technology Co., Ltd. |
| | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| | Tel: 86-769-83081888-808 |

| | |
|-----------------|-----------------------|
| Report Number: | ESTE-R1912001 |
| Date of Test: | Nov. 19~Dec. 02, 2019 |
| Date of Report: | Dec. 03, 2019 |

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EST Technology Co., Ltd.

| | | | |
|---|---|----------------------|----------------------------|
| Applicant: | mophie LLC | | |
| Address: | 6244 Technology Ave. Kalamazoo, MI49009 United States of America | | |
| Manufacturer: | mophie LLC | | |
| Address: | 6244 Technology Ave. Kalamazoo, MI49009 United States of America | | |
| E.U.T: | mophie powerstation plus XL | | |
| Model Number: | PSP-WRLS-PD | | |
| Power Supply: | Input: DC 5V/ 2.4A Output Qi:5W Lightning: DC5V/2.4A, DC 5V/3A, DC 9V/2A USB-A: DC 5V/1A Battery: DC 3.8V, 8000mAh | | |
| Trade Name: | Mophie | Serial No.: | ----- |
| Date of Receipt: | Nov. 19, 2019 | Date of Test: | Nov. 19~Dec. 02, 2019 |
| Test Specification: | FCC Part 15 Subpart C ANSI C63.10:2013 | | |
| Test Result: | <p>The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.</p> <p>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p> | | |
| Prepared by: | | Reviewed by: | Date: Dec. 03, 2019 |
| _____ Ring | | _____ Shawn | _____ Iceman Hu |
| Ring / Assistant | | Shawn / Engineer | Iceman Hu / Manager |
| Other Aspects: | None. | | |
| Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested | | | |
| This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. | | | |

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

| | | |
|-----------------------------------|---|-----------------------------|
| Product Name | : | mophie powerstation plus XL |
| Model Number | : | PSP-WRLS-PD |
| Operation Frequency | : | 110.5KHz-205KHz |
| Max Charge Power | : | 5W |
| Max Field Strength of Fundamental | : | 68.86dB μ V/m |
| Modulation Type | : | FSK |
| Antenna Type | : | Induction coil |
| Sample Type | : | Prototype production |

Note:

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

2. SUMMARY OF TEST

2.1. Summary of test result

| Report Section | Description of Test Item | FCC Standard Section | Results |
|----------------|-----------------------------------|----------------------|---------|
| 3 | Radiated Emission | 15.205 15.209 | PASS |
| 4 | AC Power Line Conducted Emissions | 15.207 | PASS |
| 5 | Antenna Requirement | 15.203 | PASS |

Note:

1. "N/A" denotes test is not applicable in this test report

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
Date of registration: November 13, 2017

Certificated by FCC, USA
Designation Number: CN1215
Test Firm Registration Number: 722932
Date of registration: November 21, 2017

Certificated by A2LA, USA
Registration No.: 4366.01
Date of registration: November 07, 2017

Certificated by Industry Canada
CAB identifier No.: CN0035
Date of registration: January 04, 2019

Certificated by VCCI, Japan
Registration No.: R-13663; C-14103
Date of registration: July 25, 2017
This Certificate is valid until: July 24, 2020

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L2-64
Date of registration: April 28, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

| Test Item | Uncertainty |
|---|-----------------------|
| Uncertainty for Conduction emission test | ±3.48dB |
| Uncertainty for spurious emissions test (30MHz-1GHz) | ±4.60 dB(Polarize: H) |
| | ±4.68 dB(Polarize: V) |
| Uncertainty for spurious emissions test (1GHz to 18GHz) | ±4.96dB |
| Uncertainty for radio frequency | 7×10^{-8} |
| Uncertainty for conducted RF Power | 0.20dB |
| Uncertainty for Power density test | 0.26dB |

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

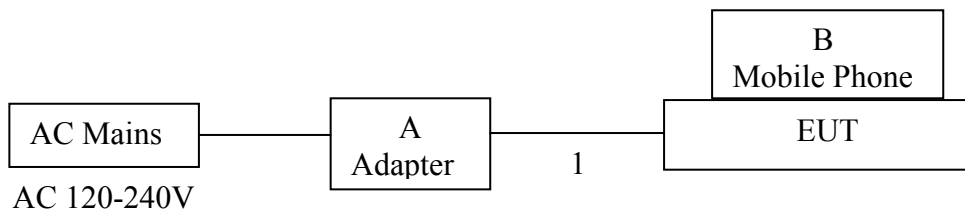
2.4. Assistant equipment used for test

| Item | Equipment | Brand | Model Name/Type No. | FCC ID | Series No. |
|------|--------------|-------|---------------------|------------|-------------|
| A | adapter | N/A | MDY-08-EV | N/A | N/A |
| B | Mobile Phone | N/A | SM-G9300 | A3LSMG9300 | R28H524KKZN |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|-----------|
| 1 | NO | NO | 1.8m | USB Cable |

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground.



(EUT: mophie powerstation plus XL)

2.6. Test Mode

The test mode was selected for the final test as listed below.

| Test Item | Test Mode |
|-----------------------------------|-----------------------------------|
| Radiated Emission | Wireless Charging with Empty Load |
| | Wireless Charging with Half Load |
| | Wireless Charging with Full Load |
| AC Power Line Conducted Emissions | Wireless Charging with Empty Load |
| | Wireless Charging with Half Load |
| | Wireless Charging with Full Load |

Note:

1. The Full Load is worst case, will be recorded in the report.

2.7. Test Equipment List

| For AC Power Line Conducted Emissions Test | | | | | | |
|--|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESHS30 | EST-E001 | LISAI | June 14,19 | 1 Year |
| Artificial Mains Network | Rohde & Schwarz | ENV216 | EST-E002 | LISAI | June 14,19 | 1 Year |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | EST-E078 | LISAI | June 14,19 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |

| For Radiated Emission Test(9kHz-30MHz) | | | | | | |
|--|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 14,19 | 1 Year |
| Active Loop Antenna | SCHWABE ECK | FMZB 1519B | EST-E054 | LISAI | June 14,19 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 9kHz-30MHz Cable | N/A | EST-001 | N/A | N/A | N/A | N/A |

| For Radiated Emission Test (30MHz-1000MHz) | | | | | | |
|--|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 14,19 | 1 Year |
| Bilog Antenna | Teseq | CBL 6111D | EST-E034 | LISAI | June 14,19 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 30-1000MHz Cable | N/A | EST-002 | N/A | N/A | N/A | N/A |

3. RADIATED EMISSION

3.1. Limit

15.209 Radiated emission limits

| Frequency (MHz) | Field Strength(μV/m) | Distance(m) |
|-----------------|----------------------|-------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

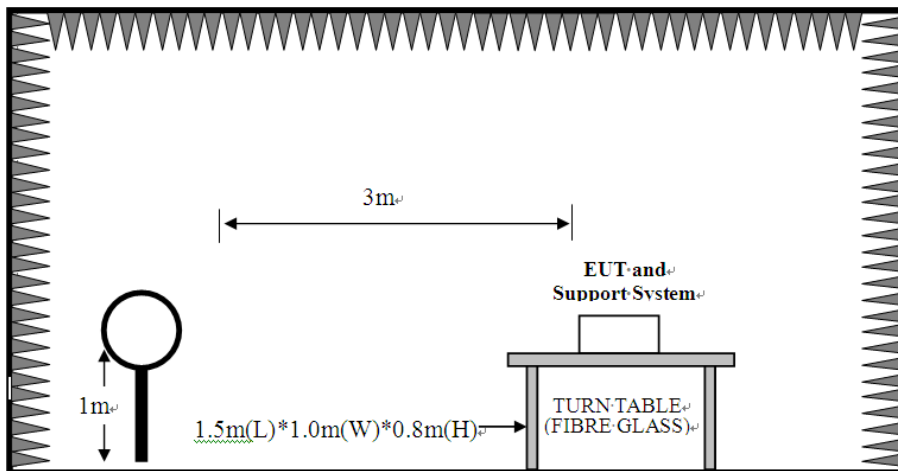
1. Emission level dBμV = 20 log Emission level μV/m.
2. The smaller limit shall apply at the cross point between two frequency bands.
3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system

15.205 Restricted frequency band

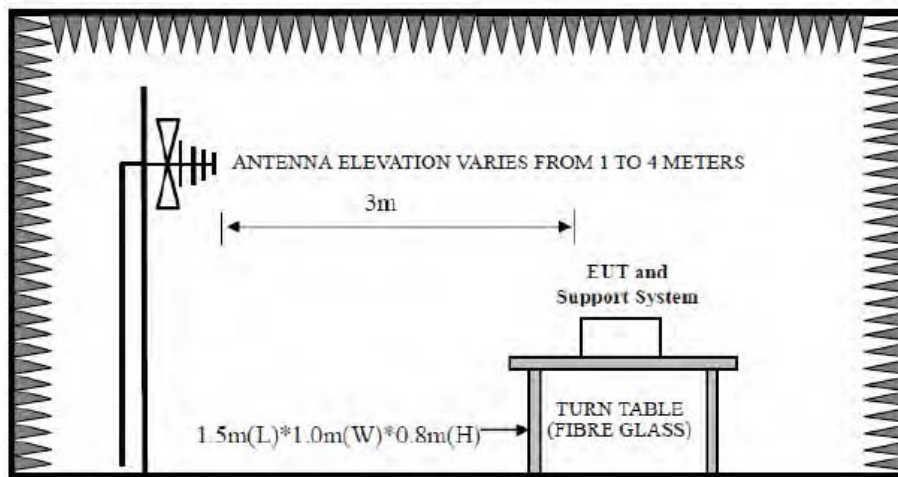
| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240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

3.2. Test Setup

9kHz~30MHz



30~1000MHz



3.3. Spectrum Analyzer Setting

For 9KHz-150KHz

| Spectrum Parameters | Setting |
|---------------------|---|
| RBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| VBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| Start frequency | 9KHz |
| Stop frequency | 150KHz |
| Sweep Time | Auto |
| Detector | PEAK/QP/AVG |
| Trace Mode | Max Hold |

For 150KHz-30MHz

| Spectrum Parameters | Setting |
|---------------------|----------|
| RBW | 9KHz |
| VBW | 9KHz |
| Start frequency | 150KHz |
| Stop frequency | 30MHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

For 30MHz-1000MHz

| Spectrum Parameters | Setting |
|---------------------|----------|
| RBW | 120KHz |
| VBW | 300KHz |
| Start frequency | 30MHz |
| Stop frequency | 1000MHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

3.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. Spectrum analyzer setting parameters in accordance with section 3.3.
- e. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- f. For below 30MHz test, the center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates both horizontal and vertical polarization to find out the maximum emission level.
- g. For above 30MHz test, the antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- h. Record the results in the test report.

Note:

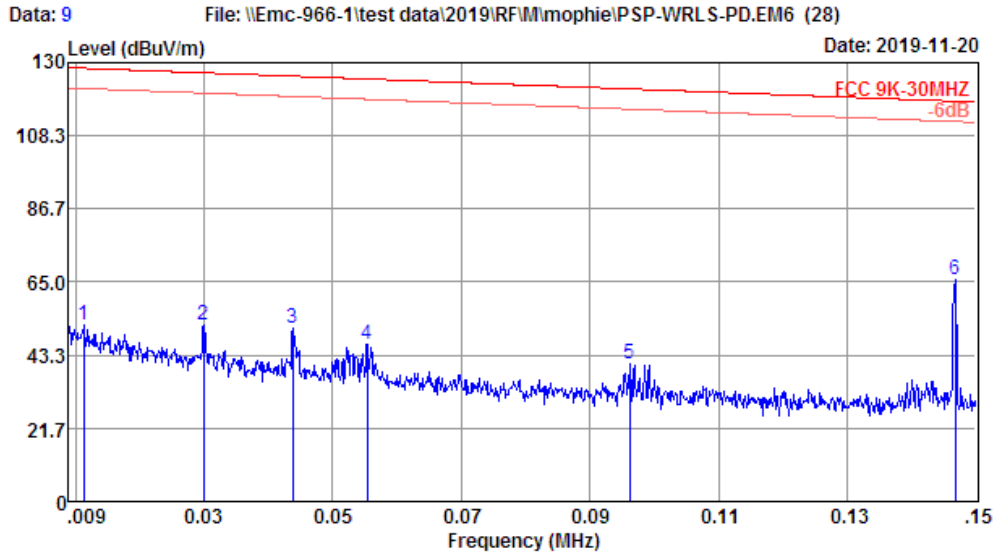
1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 146KHz are fundamental frequency.

3.5. Test Result

Radiated Emission Below 30MHz

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Site no. : 1# 966 chamber Data no. : 9
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : VERTICAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:20.5';Humi:59%;Press:101.52kPa
 Engineer : SEVEN
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

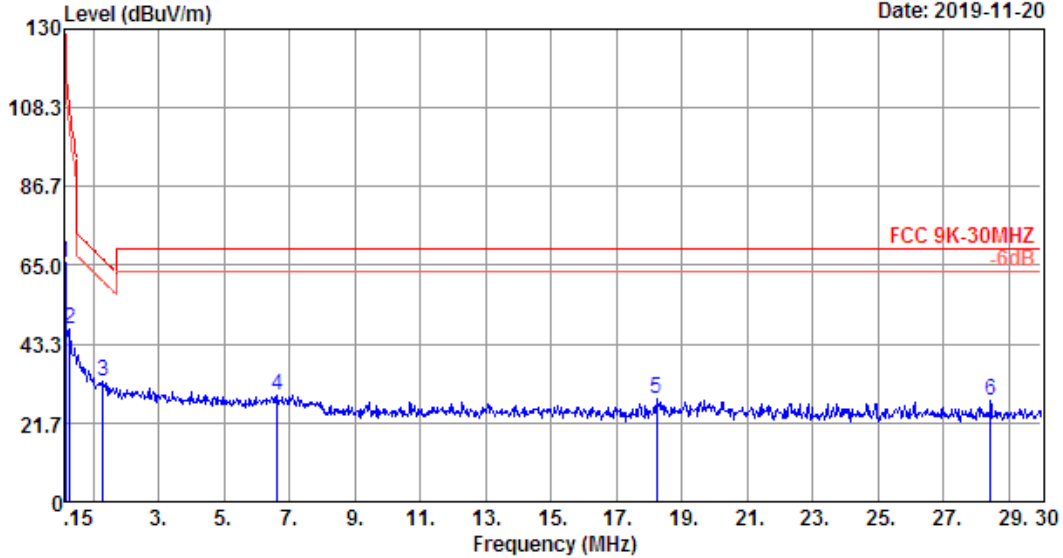
| | ANT | Cable | Emission | | | | | |
|-------|--------|-------|----------|----------|----------|--------|--------|------|
| Freq. | Factor | Loss | Reading | Level | Limit | Margin | Remark | |
| (MHz) | (dB/m) | (dB) | (dBuV) | (dBuV/m) | (dBuV/m) | (dB) | | |
| 1 | 0.01 | 20.65 | 0.10 | 31.35 | 52.10 | 128.36 | 76.26 | Peak |
| 2 | 0.03 | 20.42 | 0.10 | 31.68 | 52.20 | 127.00 | 74.80 | Peak |
| 3 | 0.04 | 20.42 | 0.10 | 30.99 | 51.51 | 126.01 | 74.50 | Peak |
| 4 | 0.06 | 20.29 | 0.10 | 26.34 | 46.73 | 125.17 | 78.44 | Peak |
| 5 | 0.10 | 20.24 | 0.10 | 20.51 | 40.85 | 122.23 | 81.38 | Peak |
| 6 | 0.15 | 20.26 | 0.10 | 45.31 | 65.67 | 118.58 | 52.91 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

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Data: 10 File: \\Emc-966-1\test data\2019\RF\mophie\PSP-WRLS-PD.EM6 (28) Date: 2019-11-20



Site no. : 1# 966 chamber Data no. : 10
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : VERTICAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:20.5';Humi:59%;Press:101.52kPa
 Engineer : SEVEN
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

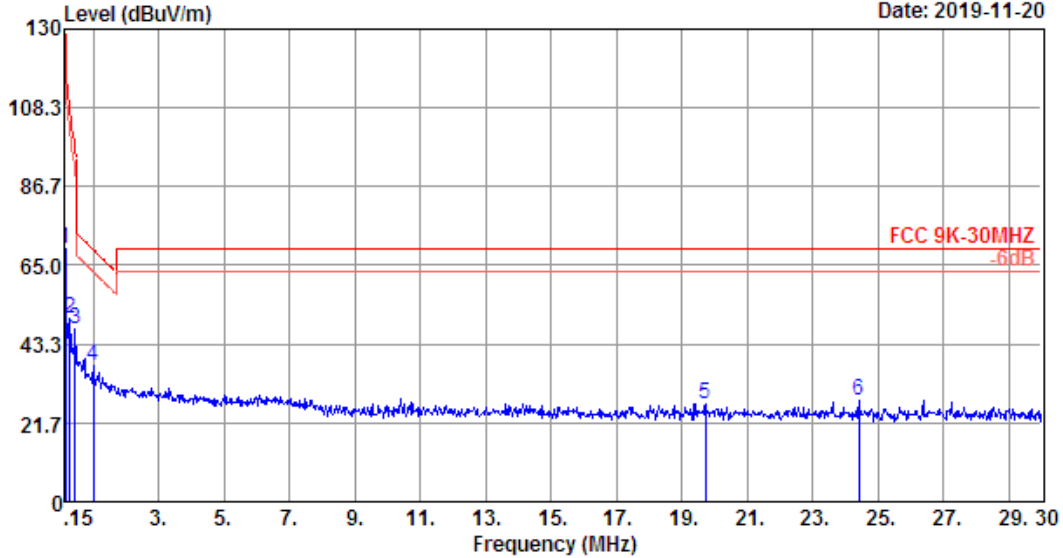
| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 0.15 | 20.26 | 0.10 | 45.49 | 65.85 | 118.34 | 52.49 | Peak |
| 2 | 0.30 | 20.07 | 0.10 | 27.50 | 47.67 | 107.57 | 59.90 | Peak |
| 3 | 1.31 | 20.03 | 0.10 | 13.02 | 33.15 | 66.45 | 33.30 | Peak |
| 4 | 6.63 | 20.00 | 0.12 | 9.03 | 29.15 | 69.54 | 40.39 | Peak |
| 5 | 18.24 | 20.04 | 0.16 | 8.14 | 28.34 | 69.54 | 41.20 | Peak |
| 6 | 28.45 | 20.52 | 0.19 | 7.01 | 27.72 | 69.54 | 41.82 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

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Data: 11 File: \\Emc-966-1\test data\2019\RF\mophie\PSP-WRLS-PD.EM6 (28) Date: 2019-11-20



Site no. : 1# 966 chamber Data no. : 11
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : HORIZONTAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:20.5';Humi:59%;Press:101.52kPa
 Engineer : SEVEN
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

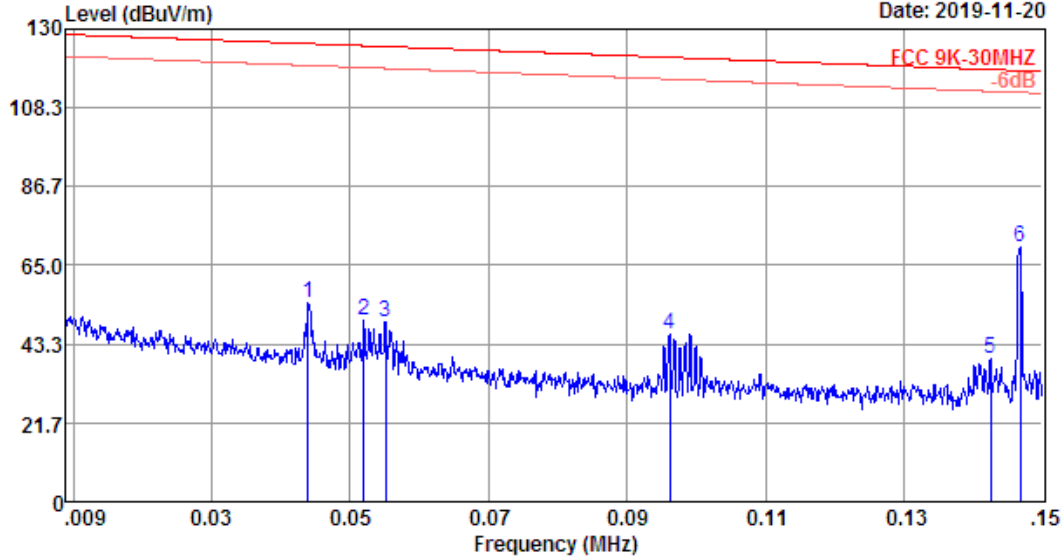
| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 0.15 | 20.26 | 0.10 | 49.36 | 69.72 | 118.34 | 48.62 | Peak |
| 2 | 0.30 | 20.07 | 0.10 | 30.12 | 50.29 | 107.57 | 57.28 | Peak |
| 3 | 0.45 | 20.08 | 0.10 | 27.08 | 47.26 | 96.80 | 49.54 | Peak |
| 4 | 1.02 | 20.01 | 0.10 | 17.38 | 37.49 | 69.11 | 31.62 | Peak |
| 5 | 19.73 | 20.07 | 0.17 | 6.63 | 26.87 | 69.54 | 42.67 | Peak |
| 6 | 24.42 | 20.26 | 0.18 | 7.42 | 27.86 | 69.54 | 41.68 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

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Data: 12 File: \\Emc-966-1\test data\2019\RF\mophie\PSP-WRLS-PD.EM6 (28) Date: 2019-11-20



Site no. : 1# 966 chamber Data no. : 12
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : HORIZONTAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:20.5';Humi:59%;Press:101.52kPa
 Engineer : SEVEN
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 0.04 | 20.42 | 0.10 | 33.96 | 54.48 | 126.00 | 71.52 | Peak |
| 2 | 0.05 | 20.42 | 0.10 | 29.35 | 49.87 | 125.42 | 75.55 | Peak |
| 3 | 0.06 | 20.29 | 0.10 | 29.13 | 49.52 | 125.19 | 75.67 | Peak |
| 4 | 0.10 | 20.24 | 0.10 | 25.90 | 46.24 | 122.23 | 75.99 | Peak |
| 5 | 0.14 | 20.25 | 0.10 | 18.81 | 39.16 | 118.88 | 79.72 | Peak |
| 6 | 0.15 | 20.26 | 0.10 | 49.50 | 69.86 | 118.58 | 48.72 | Peak |

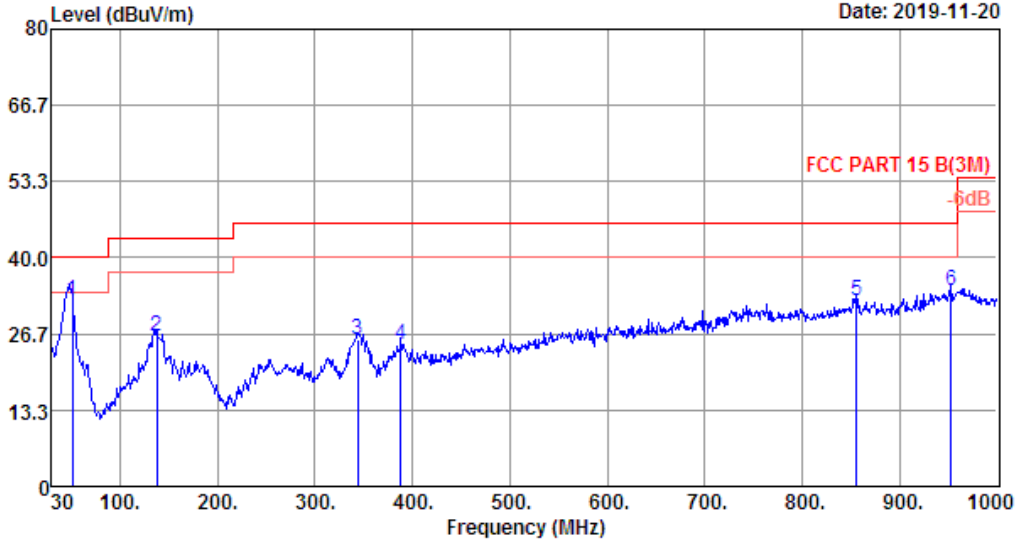
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Radiated Emission Above 30MHz

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Data: 27 File: \\Emc-966-1\test data\2019\RF\m\mophie\PSP-WRLS-PD.EM6 (28) Date: 2019-11-20



Site no. : 2# 966 chamber Data no. : 27
 Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:21.7';Humi:50.5%;Press:101.52kPa
 Engineer : Frank
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 51.34 | 7.90 | 0.31 | 24.21 | 32.42 | 40.00 | 7.58 | QP |
| 2 | 137.67 | 12.14 | 1.02 | 13.12 | 26.28 | 43.50 | 17.22 | QP |
| 3 | 344.28 | 14.98 | 2.07 | 8.62 | 25.67 | 46.00 | 20.33 | QP |
| 4 | 387.93 | 16.12 | 2.13 | 6.64 | 24.89 | 46.00 | 21.11 | QP |
| 5 | 855.47 | 23.59 | 3.73 | 5.11 | 32.43 | 46.00 | 13.57 | QP |
| 6 | 952.47 | 24.63 | 4.57 | 4.91 | 34.11 | 46.00 | 11.89 | QP |

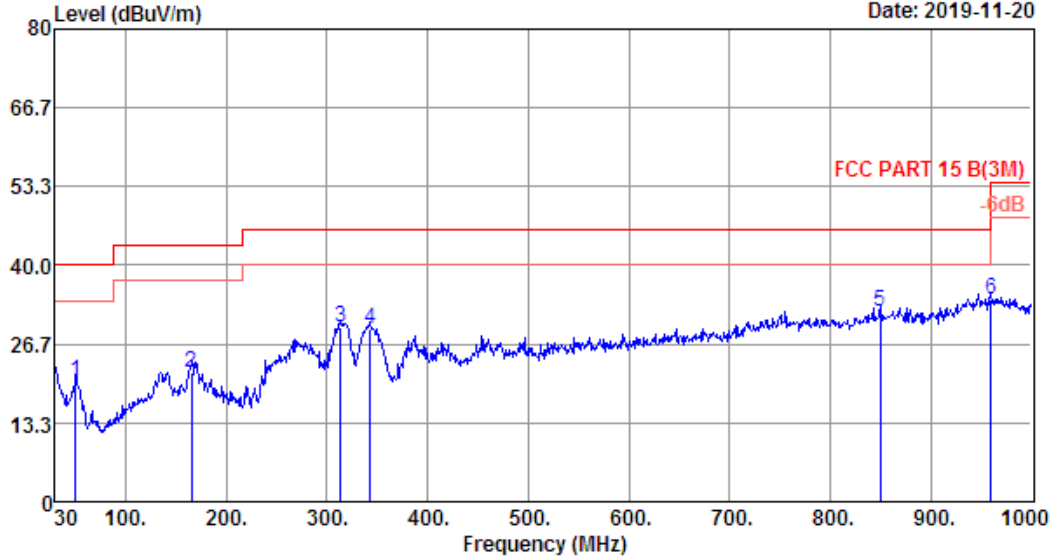
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



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Data: 28 File: \\Emc-966-1\test data\2019\RF\mophie\PSP-WRLS-PD.EM6 (28) Date: 2019-11-20



Site no. : 2# 966 chamber Data no. : 28
 Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:21.7';Humi:50.5%;Press:101.52kPa
 Engineer : Frank
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 50.37 | 8.30 | 0.30 | 11.91 | 20.51 | 40.00 | 19.49 | QP |
| 2 | 165.80 | 10.34 | 1.17 | 10.27 | 21.78 | 43.50 | 21.72 | QP |
| 3 | 313.24 | 13.79 | 1.89 | 13.71 | 29.39 | 46.00 | 16.61 | QP |
| 4 | 343.31 | 14.91 | 2.07 | 12.35 | 29.33 | 46.00 | 16.67 | QP |
| 5 | 849.65 | 23.10 | 3.72 | 5.36 | 32.18 | 46.00 | 13.82 | QP |
| 6 | 960.23 | 24.70 | 4.61 | 4.92 | 34.23 | 54.00 | 19.77 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

4. AC POWER LINE CONDUCTED EMISSIONS

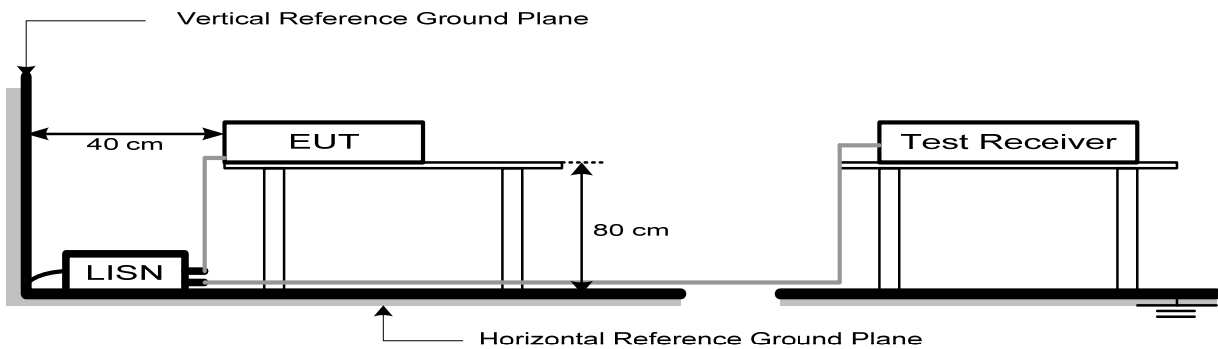
4.1. Limit

| Frequency | Maximum RF Line Voltage | |
|-----------------|----------------------------|-------------------------|
| | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 150kHz ~ 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz ~ 5MHz | 56 | 46 |
| 5MHz ~ 30MHz | 60 | 50 |

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.2. Test Setup



4.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---------------------|----------|
| RBW | 9KHz |
| VBW | 9KHz |
| Start frequency | 150KHz |
| Stop frequency | 30MHz |
| Sweep Time | Auto |
| Detector | QP/AVG |
| Trace Mode | Max Hold |

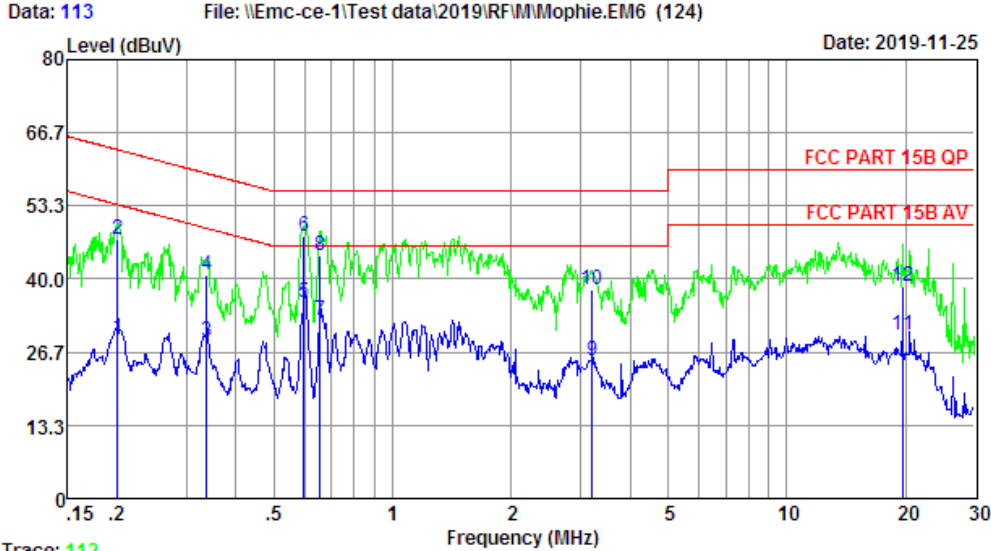
4.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 4.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.

4.5. Test Result

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Trace: 112
 Site no. : 844 Shield Room Data no. : 113
 Dis. / Ant. : -----antenna Ant. pol. : LINE
 Limit : FCC PART 15B QP
 Env. / Ins. : Temp:26.5°C Humi:52% Press:101.50kPa
 Engineer : Zero
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 240V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

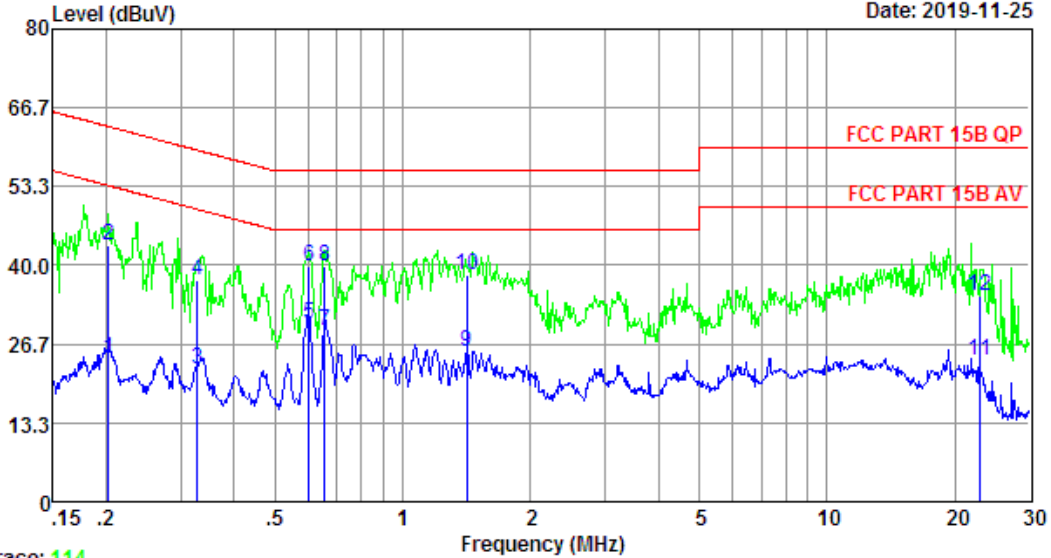
| | ANT | Cable | | Emission | | | | |
|----|-------------|---------------|-----------|----------------|----------------|----------------|-------------|---------|
| 1 | Freq. (MHz) | Factor (dB/m) | Loss (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Remark |
| 1 | 0.20 | 9.80 | 9.77 | 9.59 | 29.16 | 63.58 | 34.42 | Average |
| 2 | 0.20 | 9.80 | 9.77 | 27.53 | 47.10 | 63.58 | 16.48 | QP |
| 3 | 0.34 | 9.68 | 9.92 | 9.01 | 28.61 | 59.27 | 30.66 | Average |
| 4 | 0.34 | 9.68 | 9.92 | 21.00 | 40.60 | 59.27 | 18.67 | QP |
| 5 | 0.59 | 9.86 | 9.92 | 15.99 | 35.77 | 56.00 | 20.23 | Average |
| 6 | 0.59 | 9.86 | 9.92 | 27.92 | 47.70 | 56.00 | 8.30 | QP |
| 7 | 0.65 | 9.82 | 9.92 | 12.72 | 32.46 | 56.00 | 23.54 | Average |
| 8 | 0.65 | 9.82 | 9.92 | 24.66 | 44.40 | 56.00 | 11.60 | QP |
| 9 | 3.21 | 9.86 | 9.98 | 5.11 | 24.95 | 56.00 | 31.05 | Average |
| 10 | 3.21 | 9.86 | 9.98 | 18.16 | 38.00 | 56.00 | 18.00 | QP |
| 11 | 19.64 | 9.87 | 10.15 | 9.69 | 29.71 | 60.00 | 30.29 | Average |
| 12 | 19.64 | 9.87 | 10.15 | 18.68 | 38.70 | 60.00 | 21.30 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

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Data: 115 File: \\Emc-ce-1\Test data\2019\RF\MMophie.EM6 (124) Date: 2019-11-25



Trace: 114
 Site no. : 844 Shield Room Data no. : 115
 Dis. / Ant. : -----antenna Ant. pol. : NEUTRAL
 Limit : FCC PART 15B QP
 Env. / Ins. : Temp:26.5'C Humi:52% Press:101.50kPa
 Engineer : Zero
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 240V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

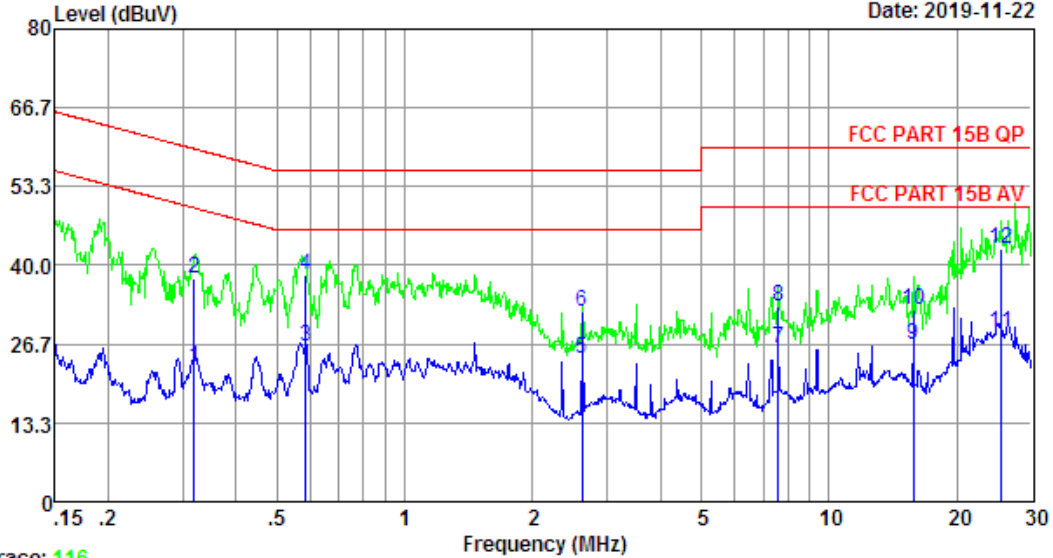
| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|----|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|---------|
| 1 | 0.20 | 9.69 | 9.77 | 4.81 | 24.27 | 63.49 | 39.22 | Average |
| 2 | 0.20 | 9.69 | 9.77 | 23.80 | 43.26 | 63.49 | 20.23 | QP |
| 3 | 0.33 | 9.74 | 9.92 | 2.92 | 22.58 | 59.49 | 36.91 | Average |
| 4 | 0.33 | 9.74 | 9.92 | 17.92 | 37.58 | 59.49 | 21.91 | QP |
| 5 | 0.60 | 9.76 | 9.92 | 10.30 | 29.98 | 56.00 | 26.02 | Average |
| 6 | 0.60 | 9.76 | 9.92 | 20.30 | 39.98 | 56.00 | 16.02 | QP |
| 7 | 0.65 | 9.75 | 9.92 | 9.16 | 28.83 | 56.00 | 27.17 | Average |
| 8 | 0.65 | 9.75 | 9.92 | 20.16 | 39.83 | 56.00 | 16.17 | QP |
| 9 | 1.42 | 9.67 | 9.95 | 5.63 | 25.25 | 56.00 | 30.75 | Average |
| 10 | 1.42 | 9.67 | 9.95 | 18.62 | 38.24 | 56.00 | 17.76 | QP |
| 11 | 22.90 | 9.80 | 10.17 | 3.81 | 23.78 | 60.00 | 36.22 | Average |
| 12 | 22.90 | 9.80 | 10.17 | 14.80 | 34.77 | 60.00 | 25.23 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

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Data: 117 File: \\Emc-ce-1\Test data\2019\RF\MM\ophie.EM6 (124) Date: 2019-11-22



Trace: 116
 Site no. : 844 Shield Room Data no. : 117
 Dis. / Ant. : -----antenna Ant. pol. : NEUTRAL
 Limit : FCC PART 15B QP
 Env. / Ins. : Temp:26.5'C Humi:52% Press:101.50kPa
 Engineer : Zero
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|----|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|---------|
| 1 | 0.32 | 9.73 | 9.92 | 3.13 | 22.78 | 49.75 | 26.97 | Average |
| 2 | 0.32 | 9.73 | 9.92 | 18.13 | 37.78 | 59.75 | 21.97 | QP |
| 3 | 0.59 | 9.77 | 9.92 | 6.62 | 26.31 | 46.00 | 19.69 | Average |
| 4 | 0.59 | 9.77 | 9.92 | 18.62 | 38.31 | 56.00 | 17.69 | QP |
| 5 | 2.62 | 9.80 | 9.97 | 4.52 | 24.29 | 46.00 | 21.71 | Average |
| 6 | 2.62 | 9.80 | 9.97 | 12.52 | 32.29 | 56.00 | 23.71 | QP |
| 7 | 7.61 | 9.86 | 10.04 | 6.22 | 26.12 | 50.00 | 23.88 | Average |
| 8 | 7.61 | 9.86 | 10.04 | 13.22 | 33.12 | 60.00 | 26.88 | QP |
| 9 | 15.80 | 9.82 | 10.13 | 6.48 | 26.43 | 50.00 | 23.57 | Average |
| 10 | 15.80 | 9.82 | 10.13 | 12.48 | 32.43 | 60.00 | 27.57 | QP |
| 11 | 25.32 | 9.92 | 10.17 | 8.69 | 28.78 | 50.00 | 21.22 | Average |
| 12 | 25.32 | 9.92 | 10.17 | 22.69 | 42.78 | 60.00 | 17.22 | QP |

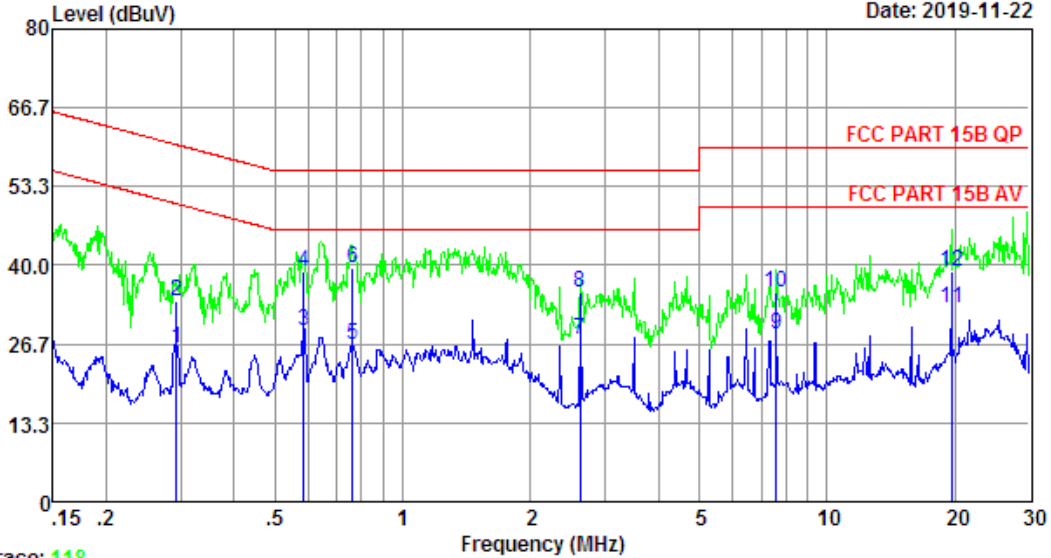
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



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Data: 119 File: \\Emc-ce-1\Test data\2019\RF\MM\ophie.EM6 (124) Date: 2019-11-22



Trace: 118
 Site no. : 844 Shield Room Data no. : 119
 Dis. / Ant. : -----antenna Ant. pol. : LINE
 Limit : FCC PART 15B QP
 Env. / Ins. : Temp:26.5'C Humi:52% Press:101.50kPa
 Engineer : Zero
 EUT : mophie powerstation plus XL
 Power : DC 5V From Adapter Input AC 120V/60Hz
 M/N : PSP-WRLS-PD
 Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|----|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|---------|
| 1 | 0.29 | 9.65 | 9.92 | 6.35 | 25.92 | 50.46 | 24.54 | Average |
| 2 | 0.29 | 9.65 | 9.92 | 14.35 | 33.92 | 60.46 | 26.54 | QP |
| 3 | 0.59 | 9.89 | 9.92 | 9.20 | 29.01 | 46.00 | 16.99 | Average |
| 4 | 0.59 | 9.89 | 9.92 | 19.20 | 39.01 | 56.00 | 16.99 | QP |
| 5 | 0.76 | 9.80 | 9.93 | 6.77 | 26.50 | 46.00 | 19.50 | Average |
| 6 | 0.76 | 9.80 | 9.93 | 19.76 | 39.49 | 56.00 | 16.51 | QP |
| 7 | 2.62 | 9.84 | 9.97 | 7.69 | 27.50 | 46.00 | 18.50 | Average |
| 8 | 2.62 | 9.84 | 9.97 | 15.69 | 35.50 | 56.00 | 20.50 | QP |
| 9 | 7.61 | 9.86 | 10.04 | 8.45 | 28.35 | 50.00 | 21.65 | Average |
| 10 | 7.61 | 9.86 | 10.04 | 15.45 | 35.35 | 60.00 | 24.65 | QP |
| 11 | 19.64 | 9.87 | 10.15 | 12.86 | 32.88 | 50.00 | 17.12 | Average |
| 12 | 19.64 | 9.87 | 10.15 | 18.85 | 38.87 | 60.00 | 21.13 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.



5. ANTENNA REQUIREMENTS

5.1. Limit

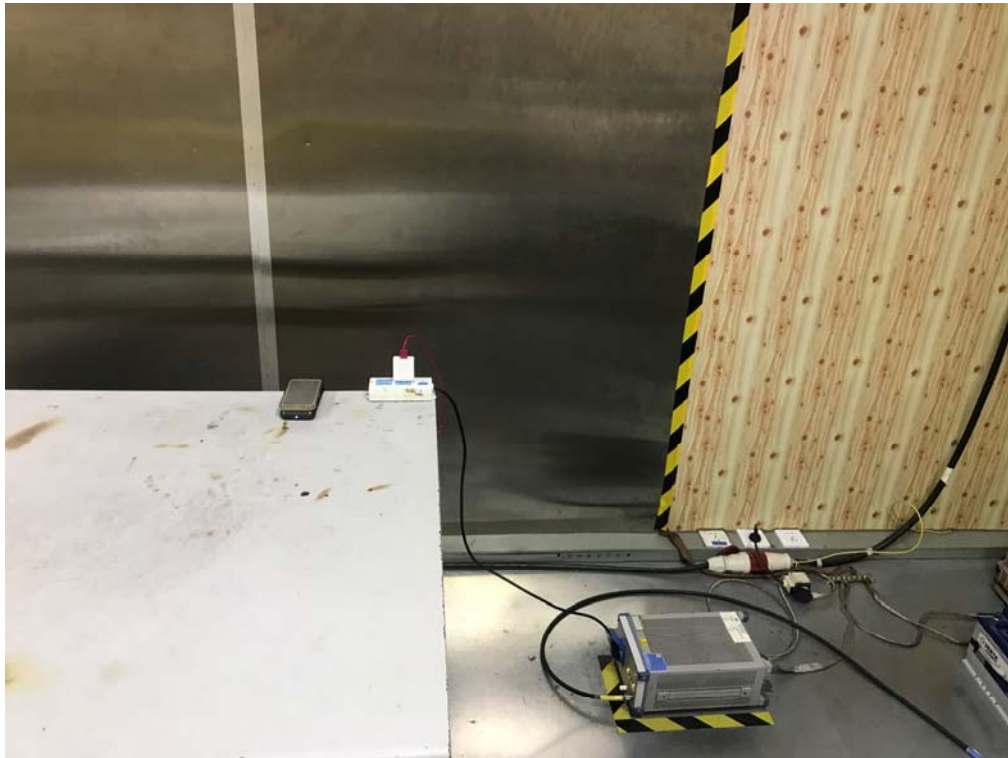
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.2. Test Result

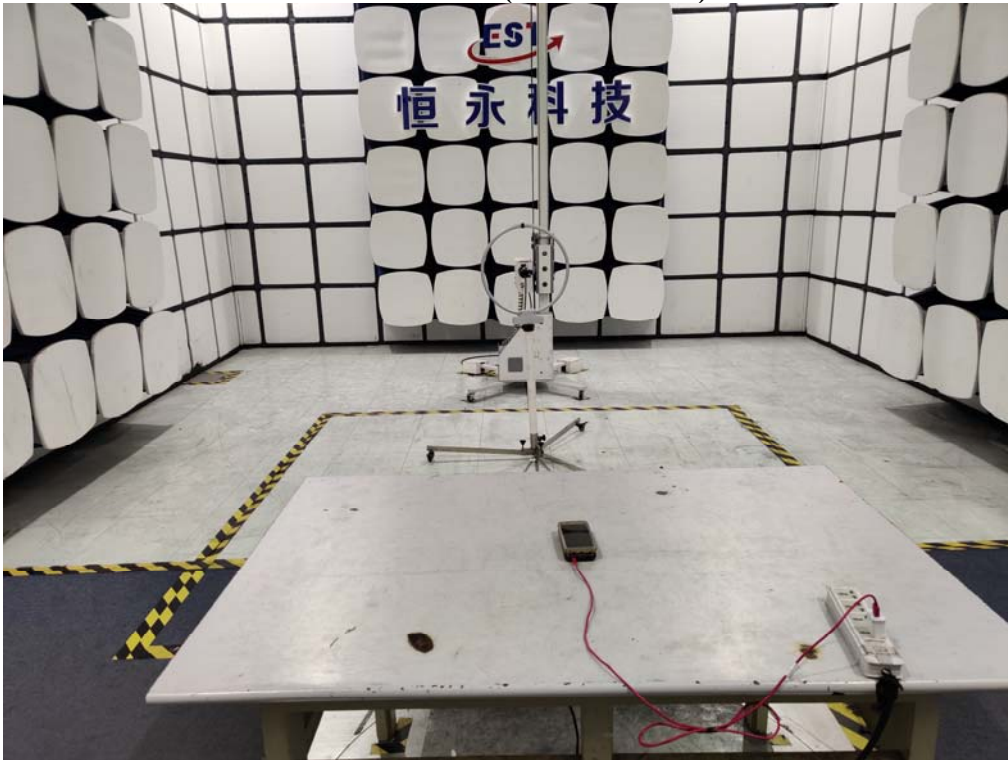
The antennas used for this product is coil antenna ,so compliance with antenna requirements.
(Please refer to the EUT photo for details)

6. TEST SETUP PHOTO

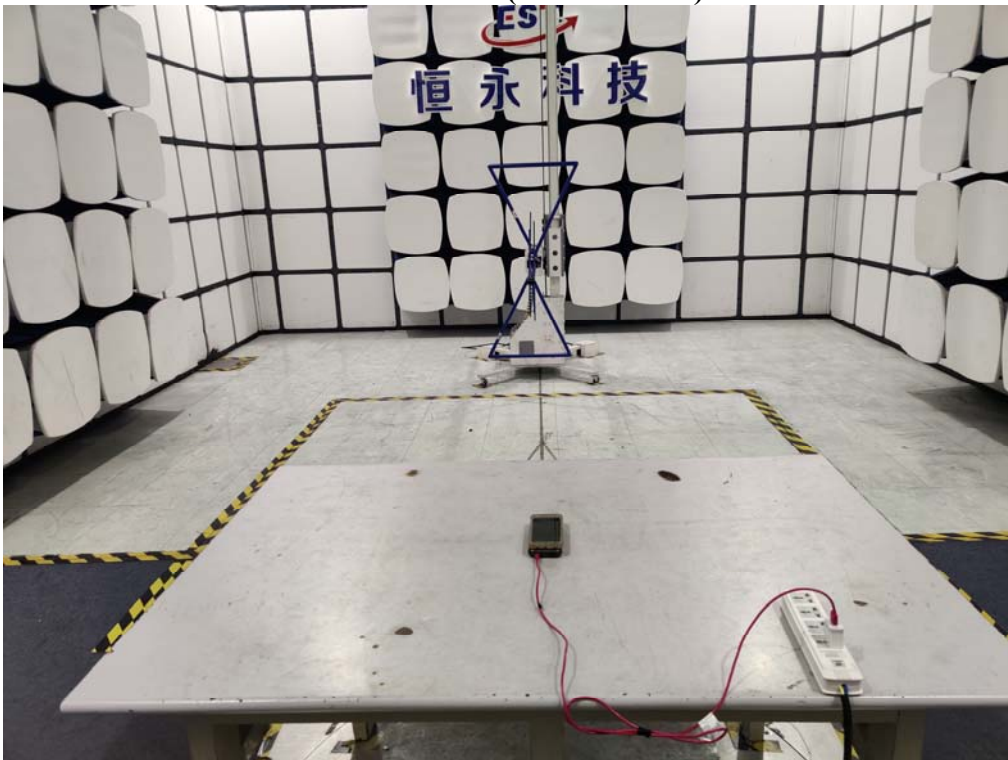
Conducted Emissions Test



Radiated Test (9kHz-30MHz)



Radiated Test (30MHz-1GH)



7. EUT PHOTO

External Photos
M/N: 2ACWB-PSP8KA



External Photos
M/N: 2ACWB-PSP8KA



External Photos
M/N: 2ACWB-PSP8KA



External Photos
M/N: 2ACWB-PSP8KA

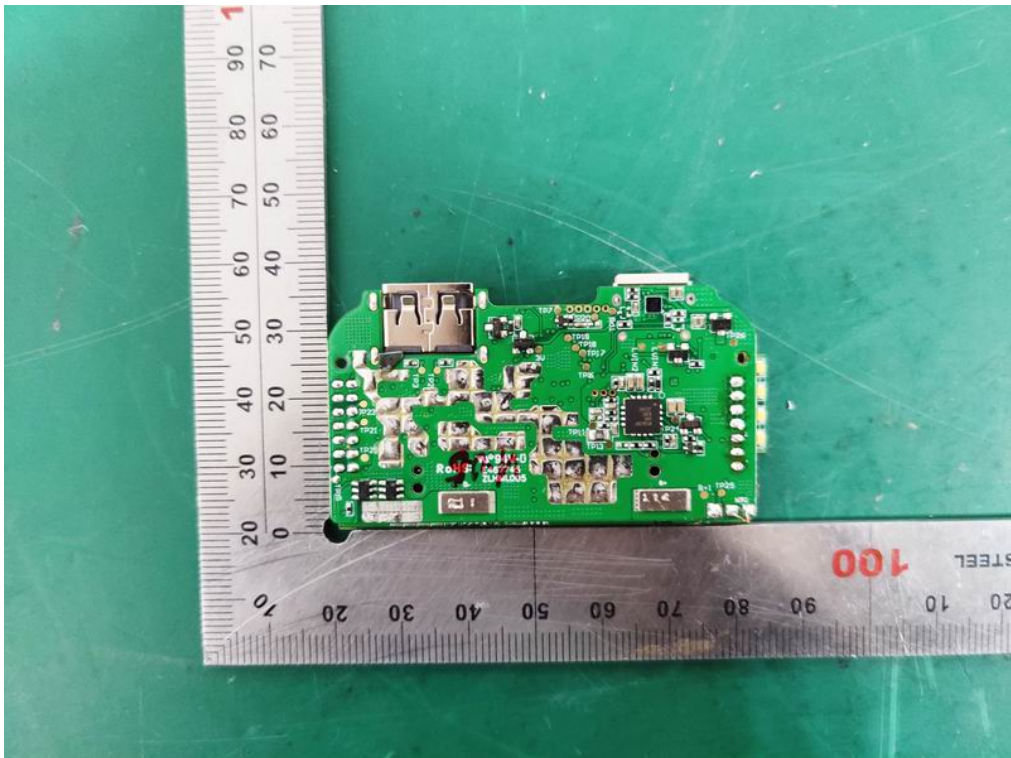
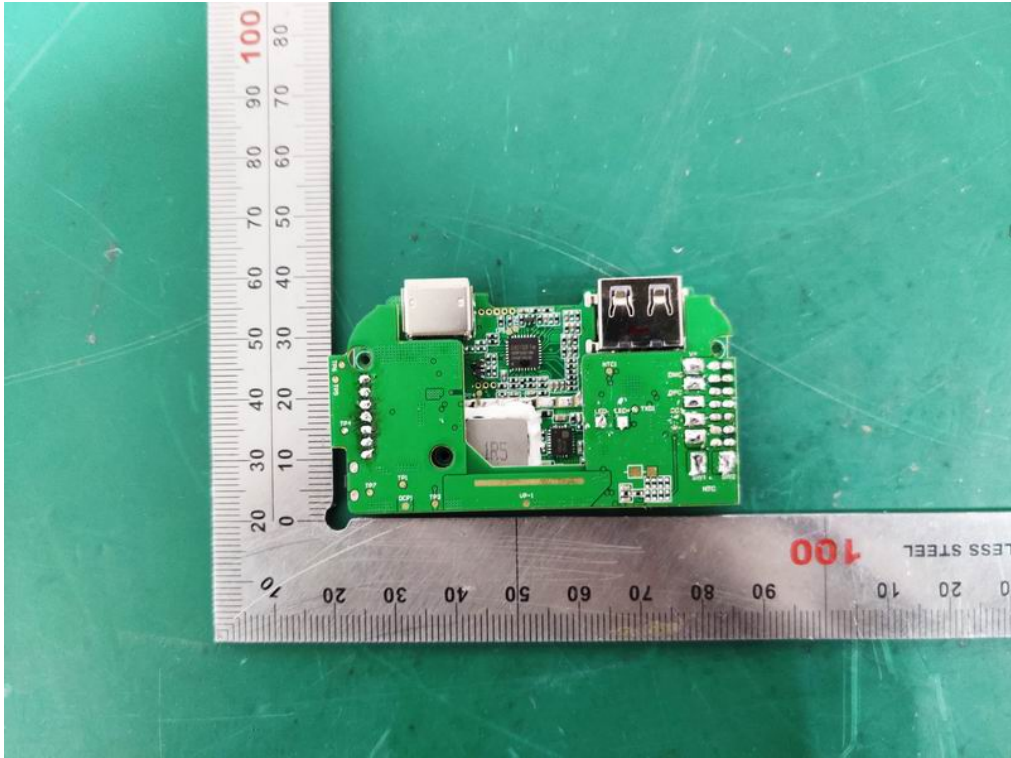


Internal Photos
M/N: 2ACWB-PSP8KA

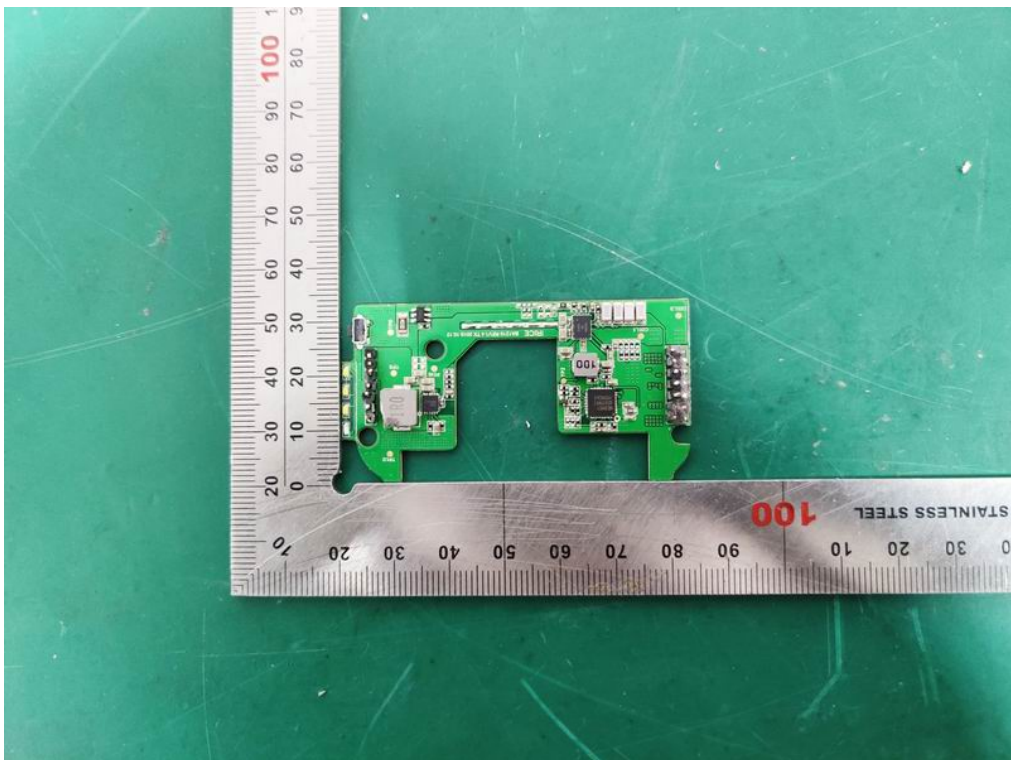
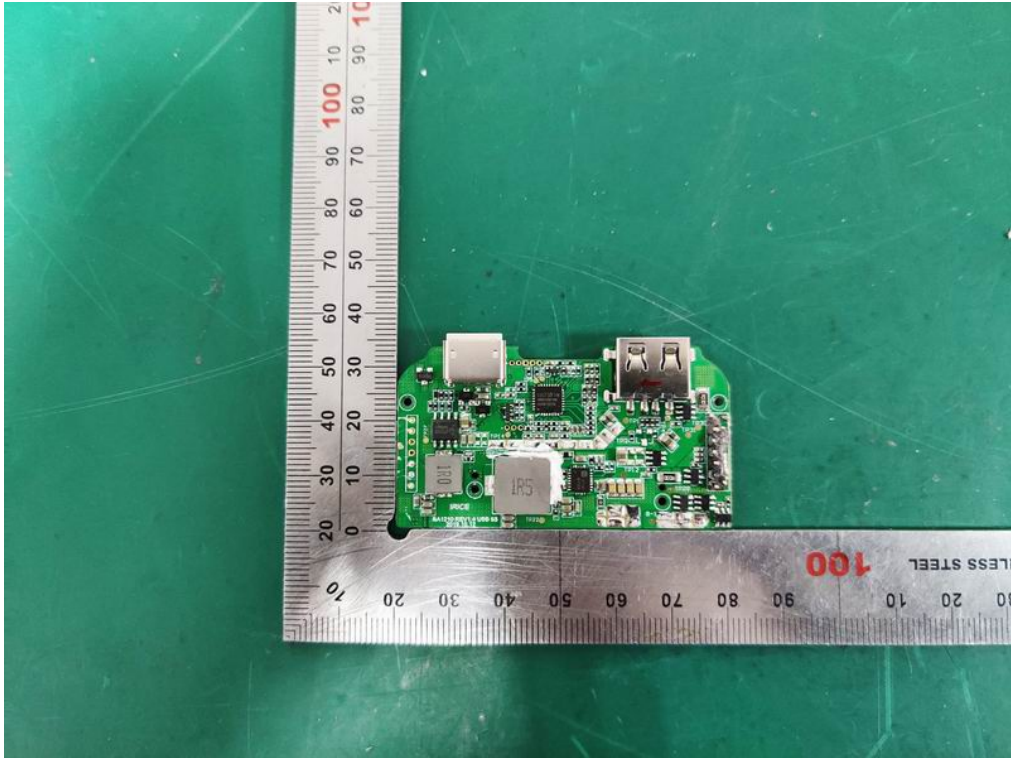


Coil Antenna

Internal Photos
M/N: 2ACWB-PSP8KA



Internal Photos
M/N: 2ACWB-PSP8KA



Internal Photos
M/N: 2ACWB-PSP8KA



End of Test Report