



# EMC Test Report

**Product Name: HUAWEI MateBook**

**Product Model: MACHR-W29, MACHR-W19**

**Report Number: SYBH(Z-EMC) 20190123011002-2**

**FCC ID: QISMACHR-WX9  
IC: 6369A-MACHRWX9**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01
3. The laboratory has been recognized by the Innovation, Science and Economic Development Canada (ISED) to test to Canadian radio equipment requirements. The CAB identifier is CN0003, and the ISED# is 21741.
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**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** No.2 New City Avenue Songshan Lake Sci. &Tech.  
Industry Park, Dongguan, Guangdong, P.R.C

**Date of Receipt Test Item:** 2019-2-18  
**Start Date of Test:** 2019-2-18  
**End Date of Test:** 2019-3-05

**Test Result:** Pass

**Approved By**  
(Lab Manager)

2019-3-8  
Date

He Hao  
Name

He Hao  
Signature

**Operator**  
(Test Engineer)

2018-3-6  
Date

Hu haizhou  
Name

Hu Haizhou  
Signature



**Modification Record**

| No. | Last Report Version | Modification Description |
|-----|---------------------|--------------------------|
| 1   | N/A                 | First report             |



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# 1 General Information

## 1.1 EUT Description

| EUT Description |   |
|-----------------|---|
| Product Name    | HUAWEI MateBook   |
| Model Number    | MACHR-W29, MACHR-W19  |
| Input voltage   | DC: 20V 3.25A   |
| TX Frequency    | Bluetooth: 2402MHz to 2480MHz<br>WIFI:2412MHz to 2462MHz<br>5150MHz to 5250MHz<br>5250MHz to 5350MHz<br>5470MHz to 5725MHz<br>5725MHz to 5850MHz  |
| RX Frequency    | Bluetooth: 2402MHz to 2480MHz<br>WIFI:2412MHz to 2462MHz<br>5150MHz to 5250MHz<br>5250MHz to 5350MHz<br>5470MHz to 5725MHz<br>5725MHz to 5850MHz  |
| S/N             | 96GBB18C24000029(MACHR-W29)   |
| HW Version      | SP2MACHRW19M  |
| SW Version      | 1.5.0.7(C001)   |
| EUT Accessory   |   |
| Data cable      | Signal Cable,5V/9V/12V/20V 3.3A USB2.0 OD3.6,1.8m,Type C,null,Type C<br>Manufacturer:<br>Luxshare Precision Industry Co., Ltd<br>NingBo Broad Telecommunication Co., Ltd.<br>HONGLIN TECHNOLOGY CO.,LTD<br>Dongguan Mingji Electronics Technology Group Co.,Ltd |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325EP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A<br>SN: C974Y1JBH02481  |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325BP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A<br>SN:C978Y1K1C01314   |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325UP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A<br>SN:C976Y1JC503200   |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325AP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A  |



|                 |   |
|-----------------|---|
|                 | SN:CA71Y1JBJ01790   |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325CP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: --- 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A<br>SN:C973YCJCJ00562                             |
| Adapter         | Manufacturer: Huawei Technologies Co.,Ltd.<br>Adapter Model: HW-200325JP0<br>Input Voltage :100-240V ~50/60Hz, 1.8A<br>Output Voltage: --- 5V,2A/9V,2A/12V,2A/15V,3A/20V,3.25A<br>SN:C976Y1JC502852                             |
| Docking Station | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: AD11<br>Rated:5V-20V,2A  |
| Bluetooth Mouse | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: AF30   |
| Battery         | Huawei Technologies Co.,Ltd.<br>Model : HB4593R1ECW<br>Rated capacity: 7410mAh<br>Rated Voltage: 7.6V<br>Limited Charge Voltage: 8.7V<br>Manufacturer:<br>DYNAPACK INTERNATIONAL TECHNOLOGY CORP<br>SUNWODA Electronic Co., Ltd |

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

## 1.2 Differences Description

The difference between MACHR-W29, and MACHR-W19 is show in the following table:

|   | MACHR-W29<br>(with GPU<br>version)           | MACHR-W29<br>(without GPU version)         | MACHR-W19<br>(with GPU version)              | MACHR-W19<br>(without GPU<br>version)           |
|---|--|--|--|---|
| PCB layout  | The same                                     | The same                                   | The same                                     | The same  |
| Main board  | The same                                     | Delete GPU chip and<br>related components  | The same                                     | Delete GPU chip<br>and related<br>components    |
| Frequency bands   | The same,support<br>Wi-Fi 2.4G&5G,BT<br>2.4G | The same,support Wi-<br>Fi 2.4G&5G,BT 2.4G | The same,support<br>Wi-Fi 2.4G&5G,BT<br>2.4G | The<br>same,support<br>Wi-Fi<br>2.4G&5G,BT 2.4G |
| BT/ Wi-Fi antenna   | The same                                     | The same                                   | The same                                     | The same  |
| Appearance  | The same                                     | The same                                   | The same                                     | The same  |
| Dimension   | The same                                     | The same                                   | The same                                     | The same  |
| CPU   | Whiskey lake-U i7,<br>Support max<br>4.6GHz  | Whiskey lake-U i7,<br>Support max 4.6GHz   | Whiskey lake-U i5,<br>Support max 3.9GHz     | Whiskey lake-U<br>i5,<br>Support max<br>3.9GHz  |
| GPU   | Support                                      | Not support                                | Support                                      | Not support                                     |
| Memory  | 16/8G  | 16/8G                                      | 8G   | 8G  |
| SSD   | 512G/1T                                      | 512G/1T                                    | 256G/512G                                    | 256G/512G                                       |
| Rear camera   | Not support                                  | Not support                                | Not support                                  | Not support                                     |
| Front camera  | The same                                     | The same                                   | The same                                     | The same  |
| Adapter   | The same                                     | The same                                   | The same                                     | The same  |
| Battery   | The same                                     | The same                                   | The same                                     | The same  |
| Optional<br>accessories(Docking<br>station, Bluetooth<br>Mouse) | The same                                     | The same                                   | The same                                     | The same  |

According to the difference above, MACHR-W29 all new test; MACHR-W19 mapping test the worst case of RE, RS, ESD on MACH-W29. Only the worst test result was shown in this report.





### 1.3 Test Site Information

|                     |   |
|---------------------|---|
| Test Site 1:        | RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.                                     |
| Test Site Location: | No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park,<br>Dongguan, Guangdong, P.R.C |

### 1.4 Applied Standards

APPLIED STANDARD

47 CFR FCC Part 15, Subpart B  
ICES-003 Issue 6

## 2 Summary of Results

| Summary of Results   |           |   |        |       |
|--|-----------|---|--------|-------|
| Test Items   | Test Mode | Performance Class & Required Performance Criteria | Result | Site  |
| <u>Radiated Emissions</u><br>Enclosure Port  | Mode1-5   | CLASS B   | Pass   | Site1 |
| <u>Conducted Emissions</u><br><input type="checkbox"/> DC Power Port<br><input checked="" type="checkbox"/> AC Power Port<br><input type="checkbox"/> Telecommunication<br>Ports                   | Mode1-4   | CLASS B   | Pass   | Site1 |
| Note:<br>1, Measurement taken is within the uncertainty of test system.<br>2, <input checked="" type="checkbox"/> The item has been tested; <input type="checkbox"/> The item has not been tested. |           |   |        |       |

During the measurement, the environmental conditions complied with the range listed as below.

| Item                 | Required       |
|----------------------|----------------|
| Ambient temperature  | 15°C ~ 35°C    |
| Relative humidity    | 25% ~ 75%      |
| Atmospheric pressure | 86kPa ~ 106kPa |

### 3 System Configuration during EMC Test

#### 3.1 Test Mode

The EUT was configured, installed, arranged and operated in a manner consistent with typical application. The following mode(s) were applied during the compliance test.

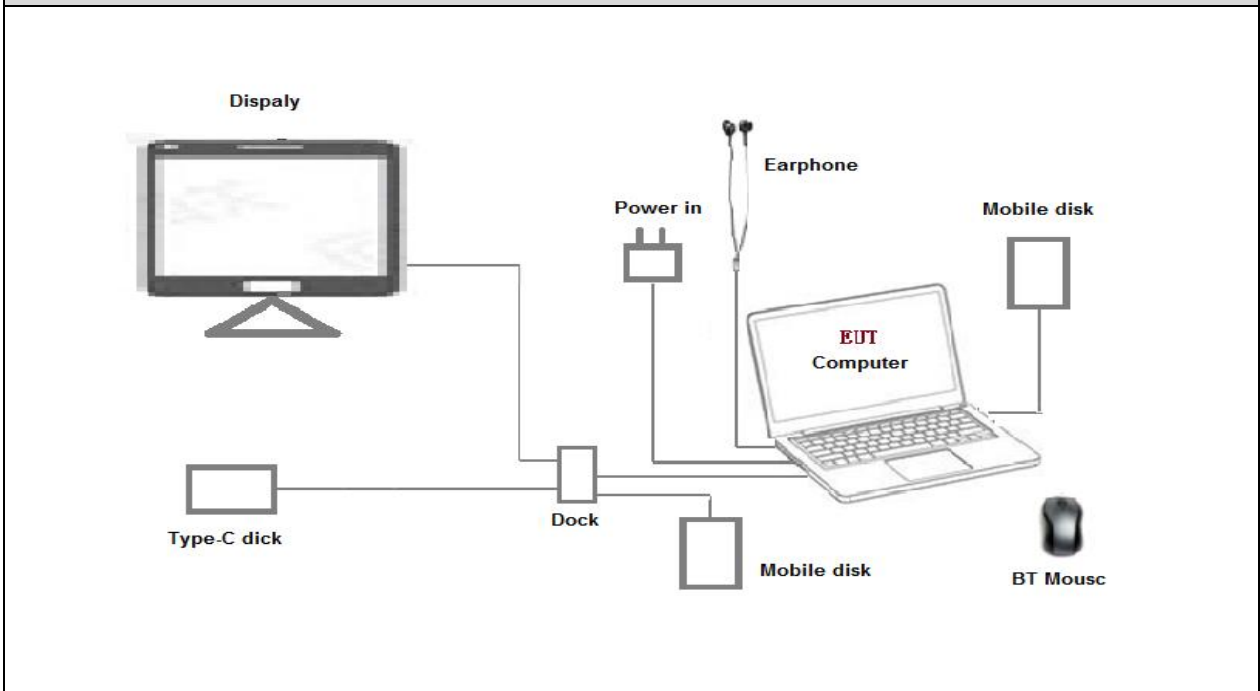
| Test Mode   |   |
|---|---|
| Mode 1:   | Charging + Earphone + Bluetooth Mouse + Camera + USB-A + Dock (Type C + Type C to USB-A + VGA) + WIFI On + BurnIntest         |
| Mode 2:   | Charging + Earphone + Bluetooth Mouse + Video Playing + USB-A + Dock (Type C + Type C to USB-A + HDMI) + WIFI On + BurnIntest |
| Mode 3:   | Charging + Bluetooth Mouse + Data Transmitting (Type C + USB-A) + WIFI On   |
| Mode 4:   | Charging + Camera   |
| Mode 5:   | Video Playing   |
| Note:USB-A(Mobile disk)<br>Type C(Lighting hard disk) |   |

Remark:

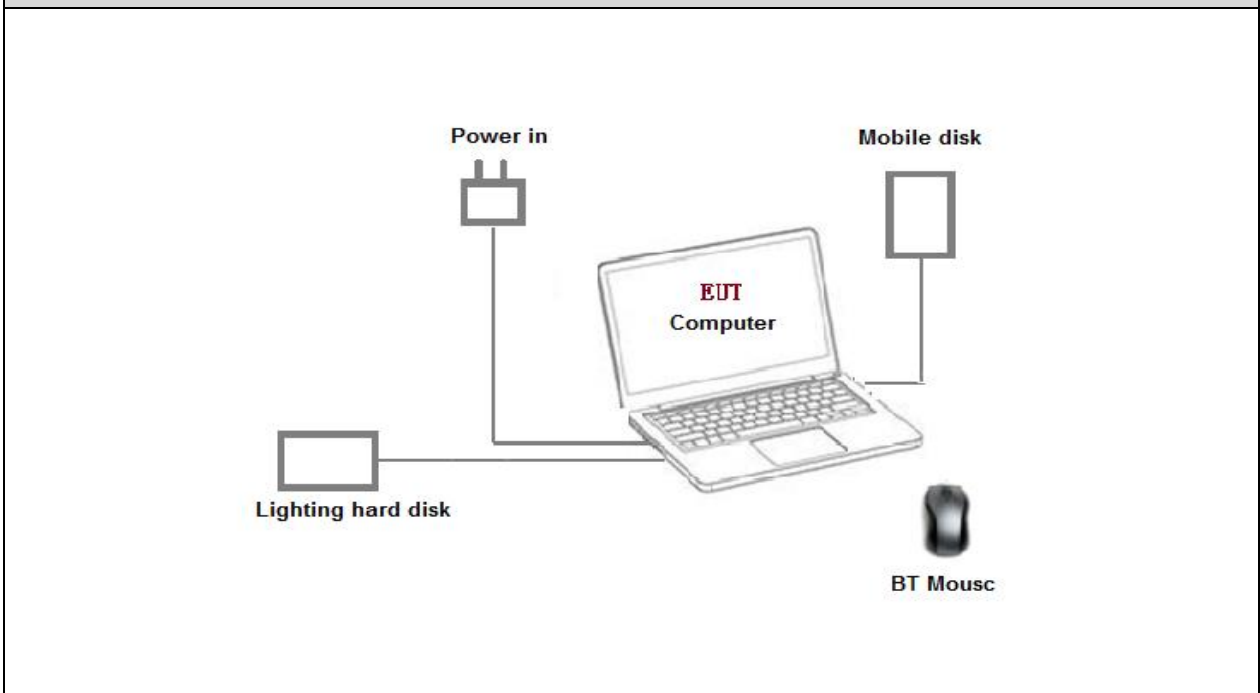
- 1) If there is one kind of accessories with different models, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.
- 2) If EUT has more than one typical operation, only the worst test mode will be recorded in this report.

### 3.2 Test System Configuration

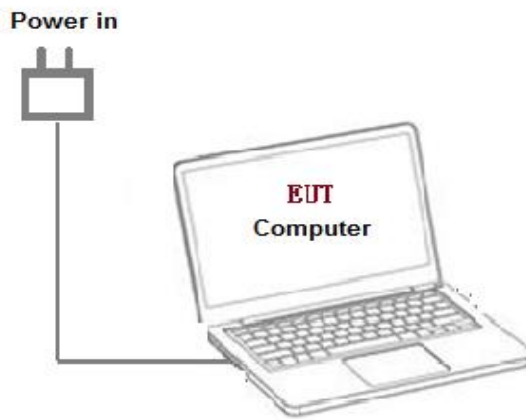
Connection Diagram (Mode 1, Mode 2)



Connection Diagram (Mode 3)



Connection Diagram (Mode 4)



Connection Diagram (Mode 5)





### 3.3 Cables Used during Test

| Cable | Quantity | Length | Type of Cable |
|-------|----------|--------|---------------|
| USB   | 1        | <3m    | Shielded      |

### 3.4 Associated Equipment Used during Test

| Name               | Model           | Manufacturer | S/N             | Calibrated Deadline |
|--------------------|-----------------|--------------|-----------------|---------------------|
| Earphone           | HA1-3W          | HuaWei       | 22040300        | /                   |
| Display            | L197wA          | Lenovo       | 8M03373A0956983 | /                   |
| Display            | WP2780-4K-CN    | ViewSonic    | U81160100233    | /                   |
| Mobile disk        | HD-E1           | SONY         | 3GDL0U1731401BE | /                   |
| Mobile disk        | HD-E1           | SONY         | 3GDL0U177190496 | /                   |
| Type C disk        | Portable SSD T5 | SAMSUNG      | S49ZNVOKC04293Z | /                   |
| Lighting hard disk | LRD0TU1         | LACIE        | NL31BHOR        | /                   |

## 4 Electromagnetic Interference (EMI)

### 4.1 Radiated Disturbance 30MHz to 40GHz

#### 4.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4-2014. The test distance was 3m. The set-up and test methods were according to ANSI C63.4-2014.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 40 GHz by using test script of software; The emissions were measured using Quasi-Peak Detector (30MHz~1GHz) and AV/PK detector (above 1GHz). The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m. The azimuth range of turntable was 0° to 360°. The receiving antenna has two polarizations V and H.

Measurement bandwidth (RBW) for 30MHz to 1000 MHz: 120 kHz;

Measurement bandwidth (RBW) for 1000MHz to 40000 MHz: 1MHz;

EUT was configured in idle mode and the test performed at worst emission state.

#### 4.1.2 Test setup

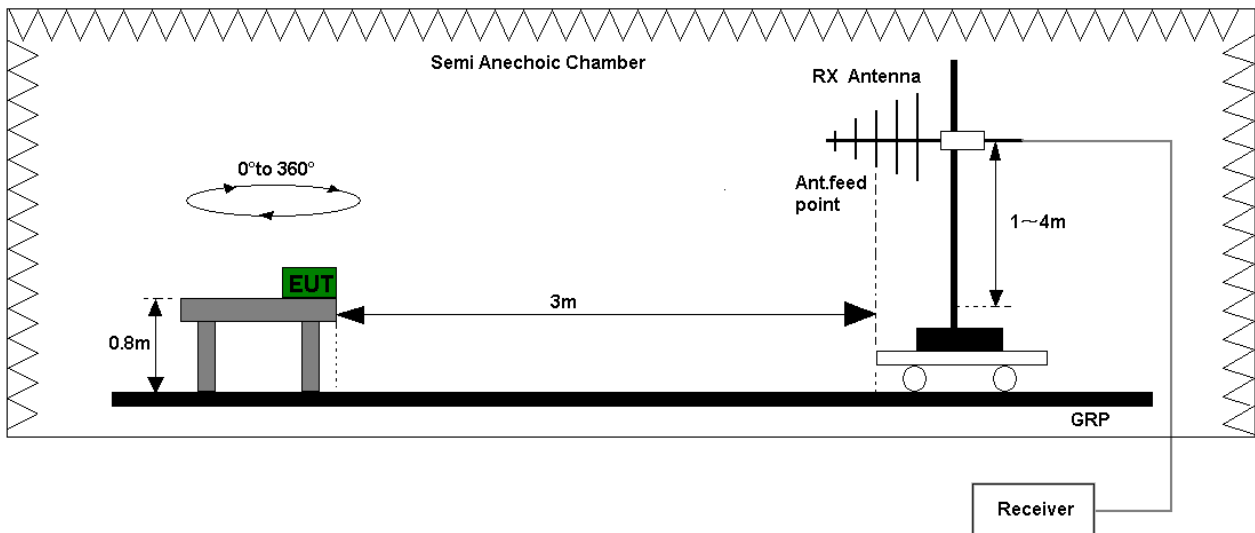


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz )

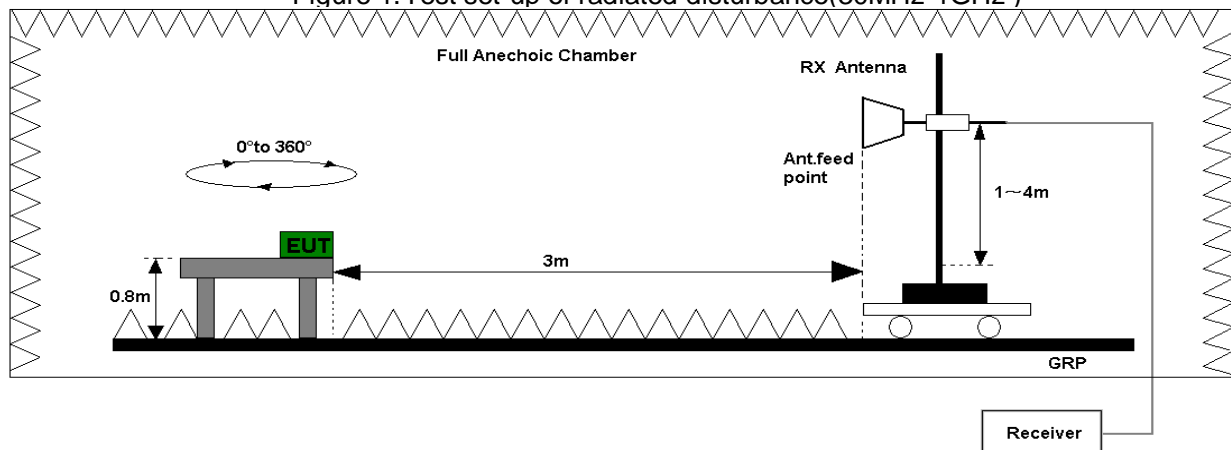


Figure 2. Test set-up of radiated disturbance(above 1GHz)



### 4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.  
Refer to the section 7.1 of this report for test data.

| Test Limits (Class B)       |                  |      |                    |    |
|-----------------------------|------------------|------|--------------------|----|
| Frequency of Emission (MHz) | Radiated Limit   |      |                    |    |
|                             | Unit( $\mu$ V/m) |      | Unit(dB $\mu$ V/m) |    |
| 30-88                       | 100              |      | 40                 |    |
| 88-216                      | 150              |      | 43.5               |    |
| 216-960                     | 200              |      | 46                 |    |
| Above 960                   | 500              |      | 54                 |    |
| Above 1000                  | AV               | PK   | AV                 | PK |
|                             | 500              | 5000 | 54                 | 74 |



## 4.2 Conducted Disturbance 0.15 MHz to 30MHz

### 4.2.1 Test Procedure

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm away from LISN. The set-up and test methods were according to ANSI C63.4-2014. Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector. EUT was communicated with the simulator through Air interface, the simulator controls the EUT to transmitter the maximum power which defined in specification of product. The EUT operated on the typical channel.

Measurement bandwidth (RBW) for 150 kHz to 30 MHz: 9 kHz;

The EUT was set in the shielded chamber and operated under nominal conditions.

### 4.2.2 Test Setup

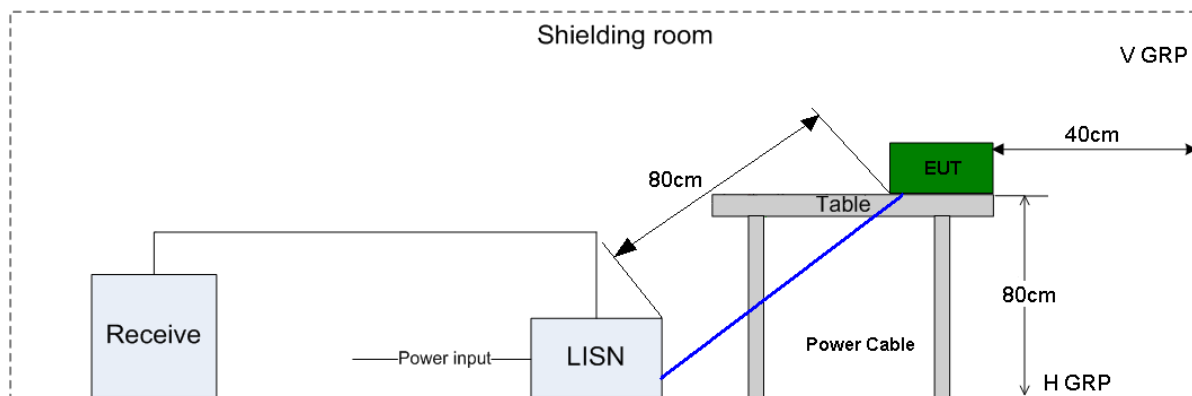


Figure 3. Test Set-up of conducted disturbance

### 4.2.3 Test Results

The EUT has met requirements for Conducted disturbance of power lines. Refer to the section 7.2 of this report for test data.

| Test Limit of AC Power Port |                 |                 |
|-----------------------------|-----------------|-----------------|
| Frequency range             | 150kHz ~ 30MHz  |                 |
| Frequency                   | Voltage limits  |                 |
|                             | QP (dB $\mu$ V) | AV (dB $\mu$ V) |
| 0.15MHz~0.5MHz              | 66-56           | 56-46           |
| 0.5MHz-5MHz                 | 56              | 46              |
| 5MHz~30MHz                  | 60              | 50              |

## 5 Main Test Instruments

| Main Test Equipments |                            |              |          |              |                     |              |
|----------------------|----------------------------|--------------|----------|--------------|---------------------|--------------|
| Test item            | Test Instrument            | Model        | S/N      | Manufacturer | Calibrated Deadline | Cal interval |
| RE                   | EMI Test receiver          | ESU26        | 100150   | R&S          | Jan. 20, 2020       | 12           |
|                      | Spectrum Analyzer          | FSU43        | 100048   | R&S          | Jun. 29, 2019       | 12           |
|                      | Broadband Antenna          | VULB 9163    | 9163-491 | SCHWARZBECK  | Mar. 28, 2019       | 24           |
|                      | Horn Antenna               | HF906        | 100683   | R&S          | Mar. 28, 2019       | 24           |
|                      | Horn antenna (18 to 26.5G) | 3160-09      | 5140299  | ETS          | Jul. 20, 2019       | 24           |
|                      | Horn antenna (26.5 to 40G) | 3160-10      | LM5947   | ETS          | Jul. 19, 2019       | 24           |
|                      | Amplifier                  | SCU26        | 10021    | R&S          | May. 08, 2019       | 12           |
|                      | Amplifier                  | SCU40        | 10016    | R&S          | May. 08, 2019       | 12           |
| CE                   | EMI Test receiver          | ESCI         | 101163   | R&S          | Jan.14, 2020        | 12           |
|                      | Artificial Mains Network   | ENV216       | 100382   | R&S          | May. 15, 2019       | 12           |
|                      | Artificial Mains Network   | ENV4200      | 100134   | R&S          | May. 07, 2019       | 12           |
| Software Information |                            |              |          |              |                     |              |
| Test Item            | Software Name              | Manufacturer |          | Version      |                     |              |
| RE                   | EMC32                      | R&S          |          | V9.25.0      |                     |              |
| CE                   | EMC32                      | R&S          |          | V9.25.0      |                     |              |

## 6 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| System Measurement Uncertainty |                                  |                |
|--------------------------------|----------------------------------|----------------|
| Items                          | Extended Uncertainty             |                |
| RE(30MHz - 1GHz)               | Field strength (dB $\mu$ V/m)    | U=5.52 dB; k=2 |
| RE(1GHz - 18GHz)               | Field strength (dB $\mu$ V/m)    | U=4.94 dB; k=2 |
| RE(18GHz - 26.5GHz)            | Field strength (dB $\mu$ V/m)    | U=4.82dB; k=2  |
| RE(26.5GHz - 40GHz)            | Field strength (dB $\mu$ V/m)    | U=5.22dB; k=2  |
| CE                             | Disturbance Voltage (dB $\mu$ V) | U=2.3 dB; k=2  |

## 7 Test Data and Graph

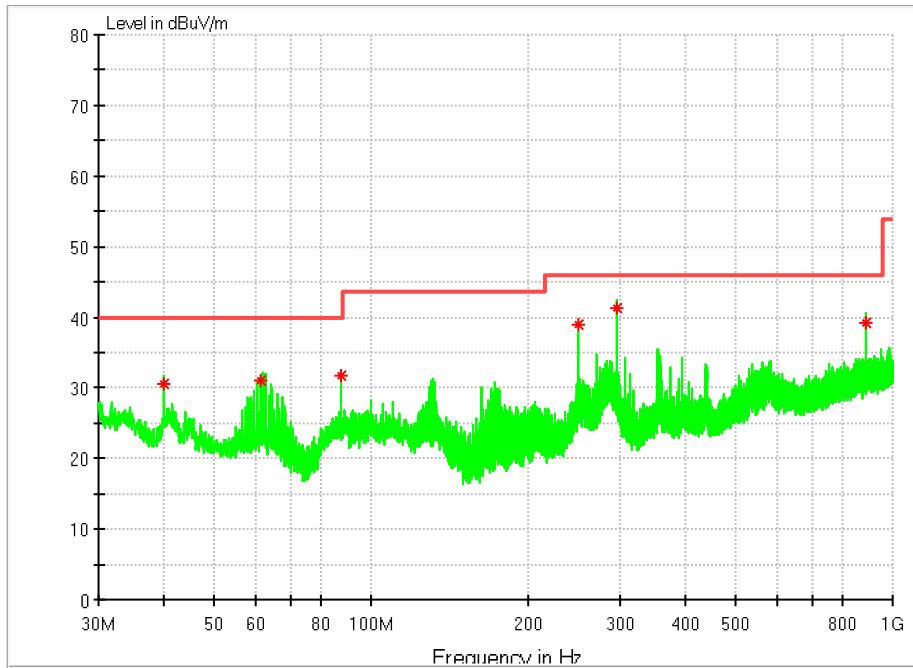
Only the worst test results were shown

### 7.1 Radiated Disturbance

#### 7.1.1 30MHz~1GHz

**Test Mode2:** Charging + Earphone + Bluetooth Mouse + Video Playing + USB-A + Dock (Type C + Type C to USB-A + HDMI) + WIFI On + BurnIntest

Full Spectrum



#### MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dB $\mu$ V/m | Transd dB | Limit dB $\mu$ V/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------------|-----------|--------------------|-----------|-----------|-------------|--------------|
| 39.988480     | 30.54              | 14.4      | 40.00              | 9.46      | 100.0     | 155.0       | V            |
| 61.280900     | 31.09              | 12.7      | 40.00              | 8.91      | 100.0     | 84.0        | V            |
| 87.694480     | 31.64              | 11.8      | 40.00              | 8.36      | 100.0     | 237.0       | V            |
| 249.994440    | 38.89              | 13.3      | 46.00              | 7.11      | 100.0     | 233.0       | H            |
| 296.715180    | 41.25              | 14.6      | 46.00              | 4.75      | 100.0     | 192.0       | H            |
| 890.103940    | 39.18              | 23.5      | 46.00              | 5.82      | 100.0     | 168.0       | H            |

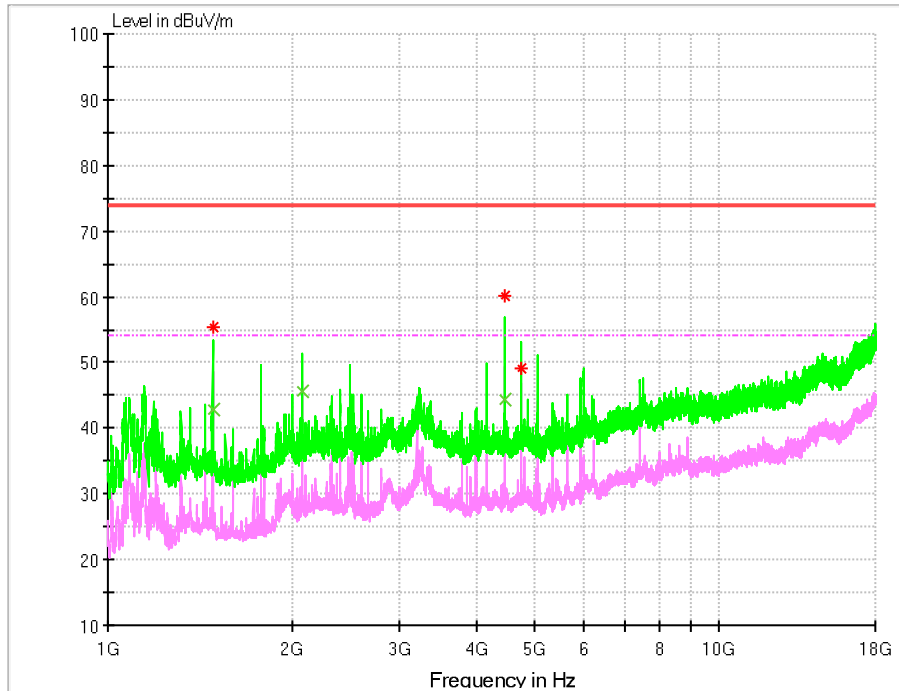
Note:

Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.

### 7.1.2 1GHz~18GHz

**Test Mode2:** Charging + Earphone + Bluetooth Mouse + Video Playing + USB-A + Dock (Type C + Type C to USB-A + HDMI) + WIFI On + BurnIntest



**MEASUREMENT RESULT: PK Detector**

| Frequency MHz | Level dB $\mu$ V/m | Transd dB | Limit dB $\mu$ V/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------------|-----------|--------------------|-----------|-----------|-------------|--------------|
| 1483.560667   | 55.37              | -15.5     | 74.00              | 18.63     | 100.0     | 215.0       | H            |
| 4450.584666   | 60.06              | -4.8      | 74.00              | 13.94     | 100.0     | 93.0        | V            |
| 4747.403334   | 49.12              | -4.5      | 74.00              | 24.88     | 100.0     | 26.0        | H            |

**MEASUREMENT RESULT: AV Detector**

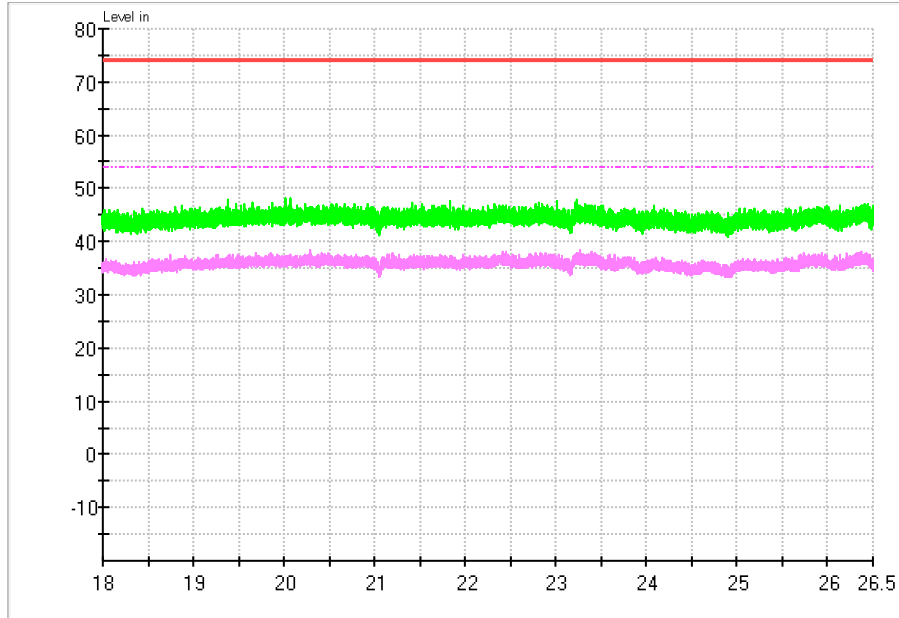
| Frequency MHz | Level dB $\mu$ V/m | Transd dB | Limit dB $\mu$ V/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------------|-----------|--------------------|-----------|-----------|-------------|--------------|
| 1483.782000   | 42.72              | -15.5     | 54.00              | 11.28     | 100.0     | 216.0       | H            |
| 2076.949334   | 45.68              | -11.8     | 54.00              | 8.32      | 100.0     | 329.0       | H            |
| 4450.556666   | 44.44              | -4.8      | 54.00              | 9.56      | 100.0     | 93.0        | V            |

Note:

Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)  
 The reading level is calculated by software which is not shown in the sheet.

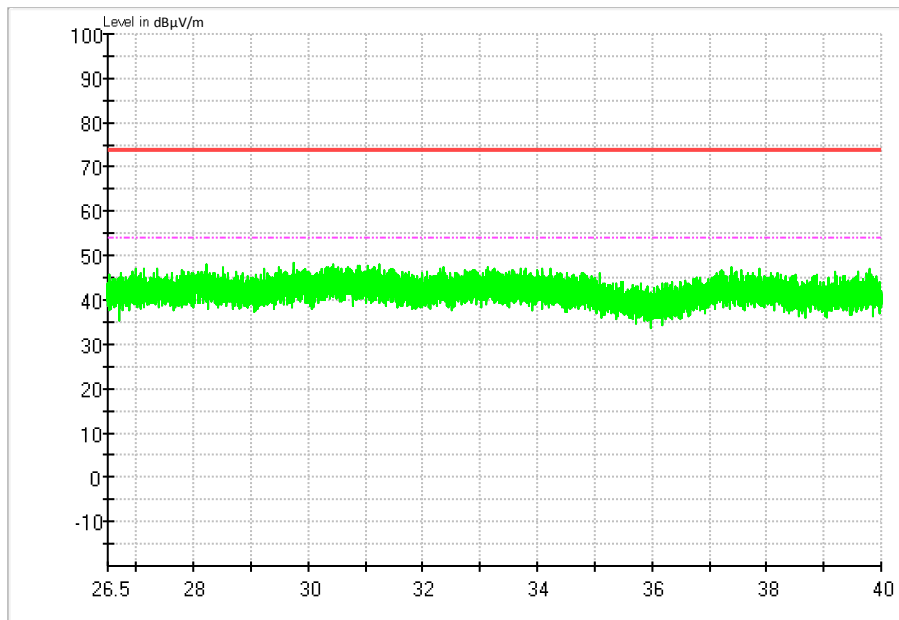
### 7.1.3 18GHz~26.5GHz

**Test Mode2:** Charging + Earphone + Bluetooth Mouse + Video Playing + USB-A + Dock (Type C + Type C to USB-A + HDMI) + WIFI On + BurnIntest



### 7.1.4 26.5GHz~40GHz

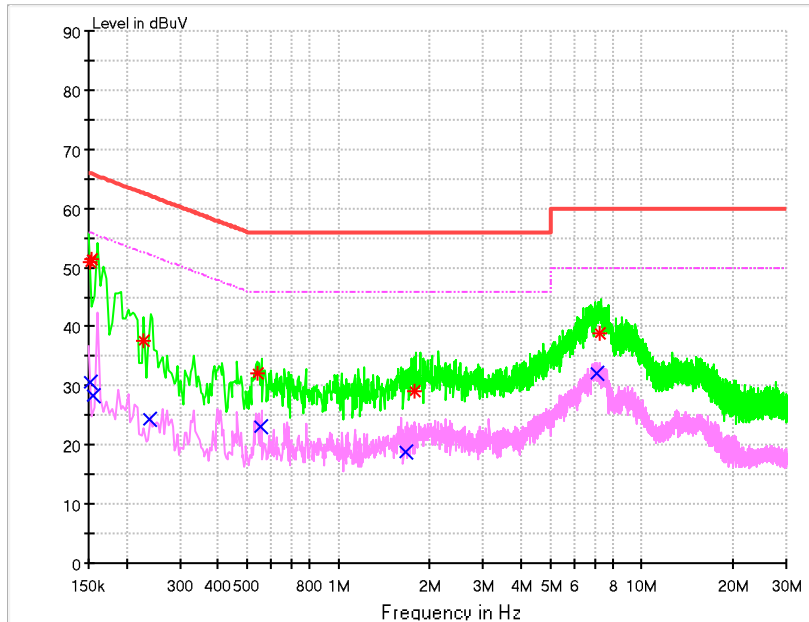
**Test Mode2:** Charging + Earphone + Bluetooth Mouse + Video Playing + USB-A + Dock (Type C + Type C to USB-A + HDMI) + WIFI On + BurnIntest



## 7.2 Conducted Disturbance

### 7.2.1 AC Port Test Data

**Test Mode1:** Charging + Earphone + Bluetooth Mouse + Camera + USB-A + Dock (Type C + Type C to USB-A + VGA) + WIFI On + BurnIntest



#### MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dB $\mu$ V | Line | Transd dB | Margin dB | Limit dB $\mu$ V | PE  |
|---------------|------------------|------|-----------|-----------|------------------|-----|
| 0.151905      | 50.90            | N    | 9.7       | 15.00     | 65.90            | FLO |
| 0.153912      | 51.27            | N    | 9.7       | 14.52     | 65.79            | FLO |
| 0.227258      | 37.62            | N    | 9.7       | 24.93     | 62.55            | FLO |
| 0.543004      | 32.09            | L1   | 9.7       | 23.91     | 56.00            | FLO |
| 1.778138      | 28.96            | L1   | 9.8       | 27.04     | 56.00            | FLO |
| 7.306790      | 38.91            | N    | 9.9       | 21.09     | 60.00            | FLO |

#### MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dB $\mu$ V | Line | Transd dB | Margin dB | Limit dB $\mu$ V | PE  |
|---------------|------------------|------|-----------|-----------|------------------|-----|
| 0.151029      | 30.70            | N    | 9.7       | 25.24     | 55.94            | FLO |
| 0.154789      | 28.40            | N    | 9.7       | 27.34     | 55.74            | FLO |
| 0.238590      | 24.23            | L1   | 9.7       | 27.92     | 52.15            | FLO |
| 0.552767      | 23.02            | L1   | 9.7       | 22.98     | 46.00            | FLO |
| 1.670128      | 18.71            | N    | 9.7       | 27.29     | 46.00            | FLO |
| 7.080462      | 32.19            | L1   | 9.9       | 17.81     | 50.00            | FLO |

Note:

Level= Reading level+ Transd (cable loss + correction factor)

The reading level is calculated by software which is not shown in the sheet.

**END**