
# EMC Test Report

## Product Name: EML-L29

## Model Number: Smart Phone

**Report No: SYBH(Z-EMC)20180131018001-2**

**FCC ID：QISEML-L29**
**IC:6369A-EMLL29**

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

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# Notice

1. **The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.**
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 listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1.**
4. **The laboratory (Reliability Lab of Huawei Technologies Co., Ltd) is also named as "Global Compliance and Testing Center of Huawei Technologies Co., Ltd", the both names have coexisted since 2009.**
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9. **Normally, the test report is only responsible for the samples that have undergone the test.**
10. **Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.**

| | |
|---|---|
| **Applicant:** | Huawei Technologies Co., Ltd. |
| **Address:** | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |
| **Date of Receipt Test Item:** | Jan., 17 2018 |
| **Start Date of Test:** | Jan., 18 2018 |
| **End Date of Test:** | Jan., 28 2018 |
| **Test Result:** | Pass |

| | | | |
|---|---|---|---|
| **Approved By (Lab Manager)** | **2018-1-29** | **Roger Zhang** | Roger zhang |
| | **Date** | **Name** | **Signature** |
| **Prepared by (Test Engineer)** | **2018-1-28** | **Peng Shao Hua** | Peng Shaohua |
| | **Date** | **Name** | **Signature** |

**Modification Record**

| No. | Last Report No. | Modification Description |
|---|---|---|
| 1 | NA | First Report. |

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# 1 General Information

## 1.1 EUT Description

| EUT Description | |
|---|---|
| Product Name | Smart Phone |
| Model Number | EML-L29 |
| Input voltage | 3.82V DC |
| TX Frequency | GSM 850: 824MHz to 849MHz<br>PCS 1900: 1850MHz to 1910MHz<br>WCDMA Band II: 1850MHz to 1910MHz<br>WCDMA Band IV: 1710MHz to 1755MHz<br>WCDMA Band V:: 824MHz to 849MHz<br>LTE BAND 2: 1850MHz to 1910MHz<br>LTE BAND 4: 1710MHz to 1755MHz<br>LTE BAND 5: 824MHz to 849MHz<br>LTE BAND 7: 2500MHz to 2570MHz<br>LTE BAND 12: 699MHz to 716MHz<br>LTE BAND 17: 704MHz to 716MHz<br>LTE BAND 26: 814MHz to 849MHz<br>LTE BAND 38: 2570MHz to 2620MHz<br>LTE BAND 40: 2305MHz to 2315MHz<br>LTE BAND 41: 2545MHz to 2655MHz<br>WIFI/Bluetooth: 2400MHz to 2483.5MHz<br>WIFI 5G:5150MHz to 5350MHz<br>5470MHz to 5850MHz<br>NFC: 13.56MHz |
| RX Frequency | GSM 850: 869MHz to 894MHz<br>GSM 1900: 1930MHz to 1990MHz<br>WCDMA Band II: 1930MHz to 1990MHz<br>WCDMA Band IV: 2110MHz to 2155MHz<br>WCDMA Band V:: 869MHz to 894MHz<br>LTE BAND 2: 1930MHz to 1990MHz<br>LTE BAND 4: 2110MHz to 2155MHz<br>LTE BAND 5: 869MHz to 894MHz<br>LTE BAND 7: 2620MHz to 2690MHz<br>LTE BAND 12: 729MHz to 746MHz<br>LTE BAND 17: 704MHz to 716MHz<br>LTE BAND 26: 859MHz to 894MHz<br>LTE BAND 38: 2570MHz to 2620MHz<br>LTE BAND 40: 2305MHz to 2315MHz<br>LTE BAND 41: 2545MHz to 2655MHz<br>WIFI/Bluetooth: 2400MHz to 2483.5MHz<br>WIFI 5G:5150MHz to 5350MHz<br>5470MHz to 5850MHz<br>NFC:13.56MHz<br>GPS: 1575.42MHz |
| S/N | AEJ0117C11000215 |
| HW Version | HL1EMLM |
| SW Version | EML-L29 8.1.0.71(SP9C900) |
| EUT Accessory | |

| | |
|---|---|
| USB(04071289) | Data Cable USB A Male to USB Type C, Shielded<br>Manufacturer: LUXSHARE-ICT Co., Ltd.<br>Chang Shu Honglin Technology Co.,Ltd.<br>Fuyu Electronical Technology(Huaian) Co., Ltd.<br>MING JI ELECTRONICS CO.,LTD. |
| Earphone(22040296) | Manufacturer:<br>JIANGXI LIANCHUANG HONGSHENG ELECTRONIC CO., LTD<br>BOLUO COUNTY QUANCHENG ELECTRONIC CO., LTD<br>Goer Tek Inc<br>MERRY ELECTRONICS (SHENZHEN) CO., LTD. |
| Earphone Transfer Line(22040294) | Manufacturer:<br>JIANGXI LIANCHUANG HONGSHENG ELECTRONIC CO., LTD<br>MERRY ELECTRONICS (SHENZHEN) CO., LTD.<br>FOSTER ELECTRIC CO.(HONG KONG)LTD<br>BOLUO COUNTY QUANCHENG ELECTRONIC CO., LTD |
| Adapter | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: HW-050450U00<br>Input voltage: 100-240V 50/60Hz ,0.75A<br>Output voltage: 5V ⎓ 2A OR 5V ⎓ 4.5A OR 4.5V ⎓ 5A<br>Rated Power: 10W/22.5W<br>SN: K83059H4V07826<br>P82810H6920076<br>H828K8H3V05002<br>P8281OH6920035 |
| Adapter | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: HW-050450E00<br>nput voltage: 100-240V 50/60Hz ,0.75A<br>Output voltage: 5V ⎓ 2A OR 5V ⎓ 4.5A OR 4.5V ⎓ 5A<br>Rated Power: 10W/22.5W<br>SN:P8301OH7412711<br>P83009H4X00378<br>P83009H4XO4326<br>K83059H4V07826 |
| Adapter | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: HW-050450B00<br>nput voltage: 100-240V 50/60Hz ,0.75A<br>Output voltage: 5V ⎓ 2A OR 5V ⎓ 4.5A OR 4.5V ⎓ 5A<br>Rated Power: 10W/22.5W<br>SN:P82922H3J31705<br>K82971H3W11159<br>K82971H3R11886<br>P82922H3J31706 |
| Adapter | Manufacturer: Huawei Technologies Co.,Ltd.<br>Model: HW-050450A00<br>nput voltage: 100-240V 50/60Hz ,0.75A<br>Output voltage: 5V ⎓ 2A OR 5V ⎓ 4.5A OR 4.5V ⎓ 5A<br>Rated Power: 10W/22.5W<br>SN:K83171H4J04782 |

| | |
|---|---|
| | K83171H4J05584<br>K83171H4J05592 |
| Rechargeable Li-ion | Manufacturer: Huawei Technologies Co.,Ltd.<br>Battery Model: HB396285ECW<br>Rated capacity: 3320mAh<br>Nominal Voltage: ⎓ +3.82V<br>Charging Voltage: ⎓ +4.4V<br>SN:4XSCAYH315X000FS<br>4XTDLCH319900131<br>4XSDSIH405X00092 |

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 Test Site Information

| | |
|---|---|
| Test Site 1: | RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD. |
| Test Site Location: | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |

## 1.3 Applied Standards

**APPLIED STANDARD**

**47 CFR FCC Part 15:2016, Subpart B**
**ICES-2003 Issue 6**

## 2 Summary of Results

| Summary of Results | | | | |
|---|---|---|---|---|
| **Test Items** | **Test Mode** | **Performance Class & Required Performance Criteria** | **Result** | **Site** |
| Radiated Emissions<br>Enclosure Port | Mode1~ Mode4<br>Mode7 | CLASS B | Pass | Site1 |
| Conducted Emissions<br>☐DC Power Port<br>☒AC Power Port<br>☐Telecommunication Ports | Mode1<br>Mode3<br>Mode6<br>Mode7 | CLASS B | Pass | Site1 |
| Note:<br>1, Measurement taken is within the uncertainty of test system.<br>2, ☒ The item has been tested; ☐ 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+ Camera On + Idle |
| Mode 2: | Earphone + Camera On + Idle |
| Mode 3: | Charging+ video Playing + Idle |
| Mode 4: | Earphone + video Playing + Idle |
| Mode 5: | Earphone +Traffic |
| Mode 6: | Charging+Traffic+BT+WIFI+NFC+GPS |
| Mode 7: | USB Copy(EUT with PC) |

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.

Traffic Mode:
When the EUT state is switched on and with Radio Resource Control (RRC) connection established.

Idle Mode:
When the EUT state is switched on but without Radio Resource Control (RRC) connection.

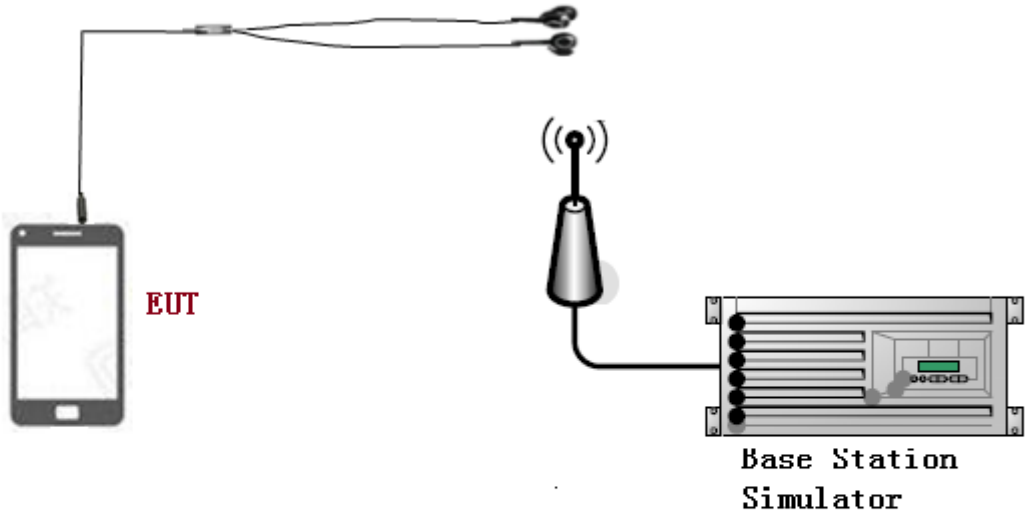
Worst Case:

1) Radiated Emission
Adapter(Model: HW-050450U00, SN: K83059H4V07826) + Camera On + Idle
the result is the worst(30MHz~1GHz).
USB Copy(EUT with PC) the result is the worst(1GHz~18GHz).

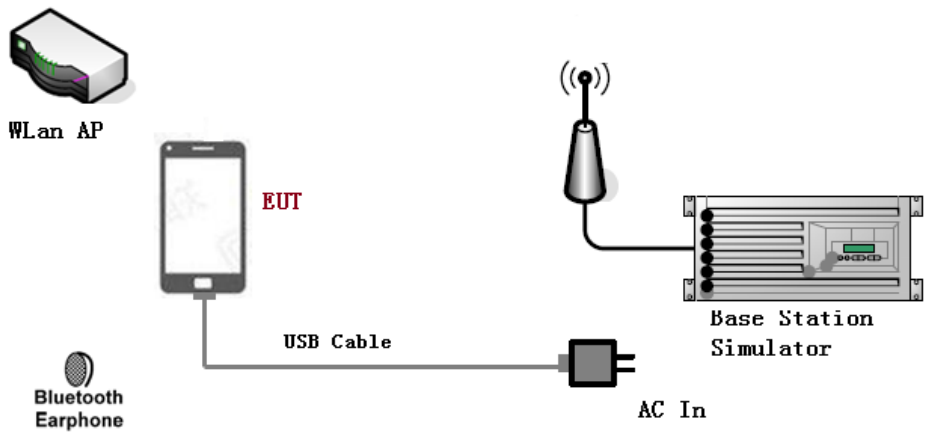
2) Conducted Emission
Adapter(Model: HW-050450U00, SN: P8281OH6920035) + Camera On + Idle
the result is the worst.

## 3.2 Test System Configuration

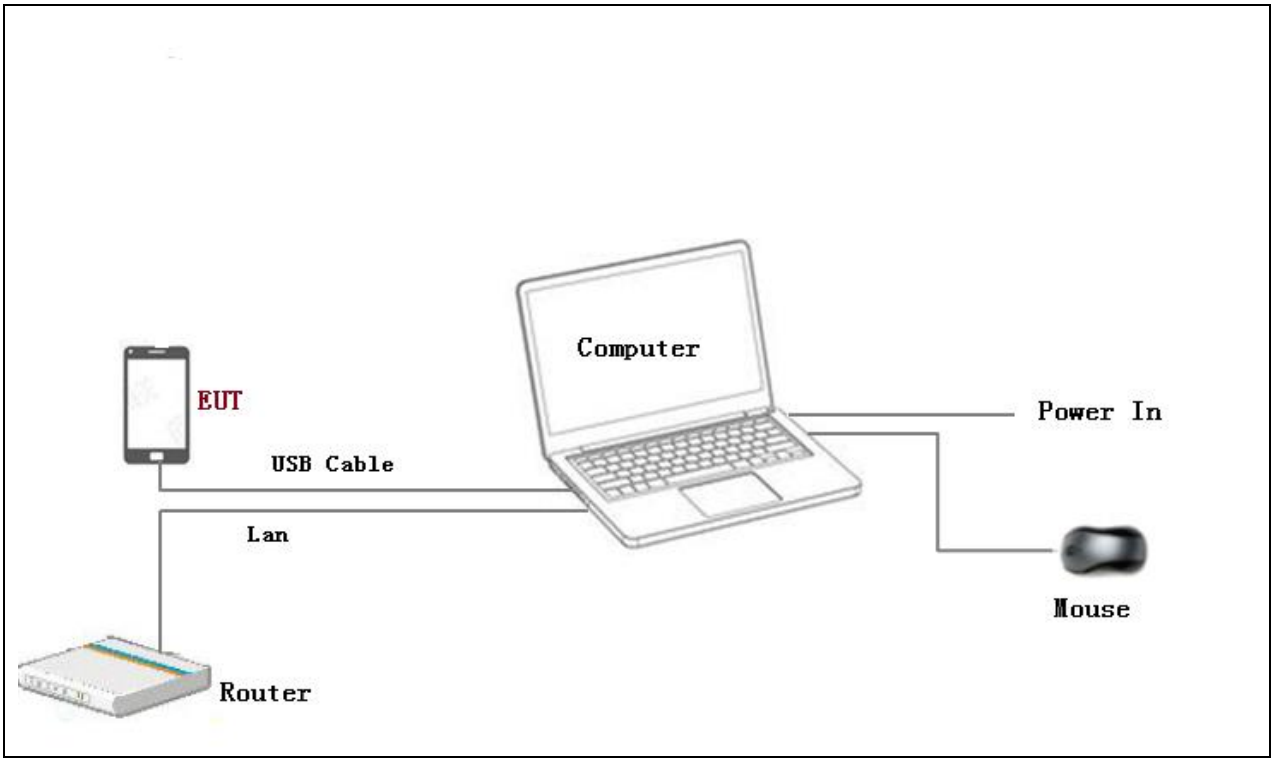
Connection Diagram (Mode 2/Mode 4/Mode 5)




Connection Diagram (Mode 1/Mode 3/Mode 6)




Connection Diagram (Mode 7)


Computer
EUT
Power In
USB Cable
Lan
Mouse
Router

### 3.3 Cables Used during Test

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

### 3.4 Associated Equipment Used during Test

| Name | Model | Manufacturer | S/N | Calibrated Deadline | Cal interval |
|---|---|---|---|---|---|
| Radio Communication Tester | CMU200 | R&S | 3608082535 | 2018-03-01 | 12 |
| Radio Communication Tester | MT8820C | Anritsu | A110518805 | 2018-05-15 | 12 |
| Notebook | S3 | ThinkPad | A140714638 | / | / |
| Mouse | MOHQUO | HP | GIK28AA | | / |

# 4 Electromagnetic Interference (EMI)

## 4.1 Radiated Disturbance 30MHz to 18GHz

### 4.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANCI C63.4: 2014. The test distance was 3m.The set-up and test methods were according to ANCI C63.4: 2014.
A preliminary scan and a final scan of the emissions were made from 30 MHz to18 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 18000 MHz: 1MHz;
EUT was configured in idle mode and the test performed at worst emission state.

### 4.1.2 Test setup

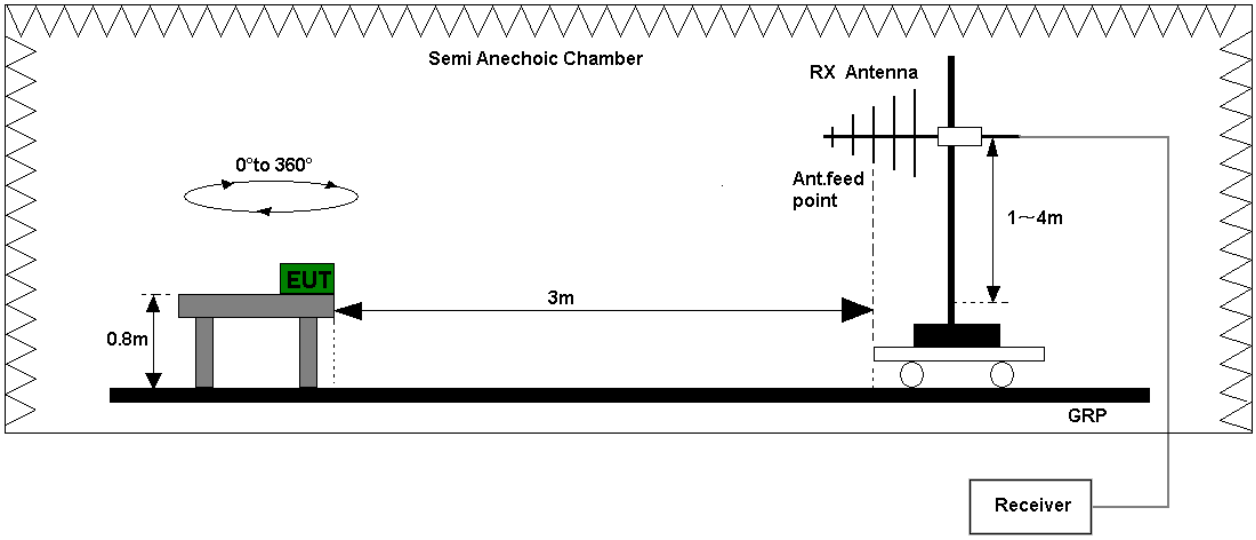



Figure 1.Test set-up of radiated disturbance(30MHz-1GHz )

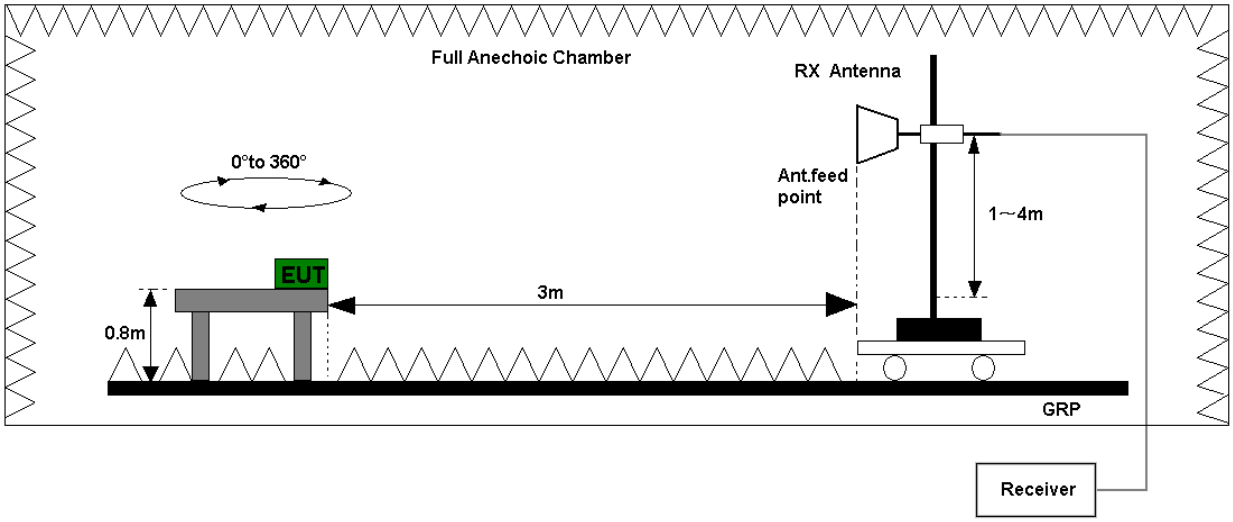



Figure 2.Test set-up of radiated disturbance(above 1GHz)

### 4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.
Refer to the section 7.1.1 of this report for test data.

| Test Limits (Class B) | | | | |
|---|---|---|---|---|
| Frequency of Emission (MHz) | Radiated Limit | | | |
| | Unit(μV/m) | | Unit(dBμV/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 ANCI 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

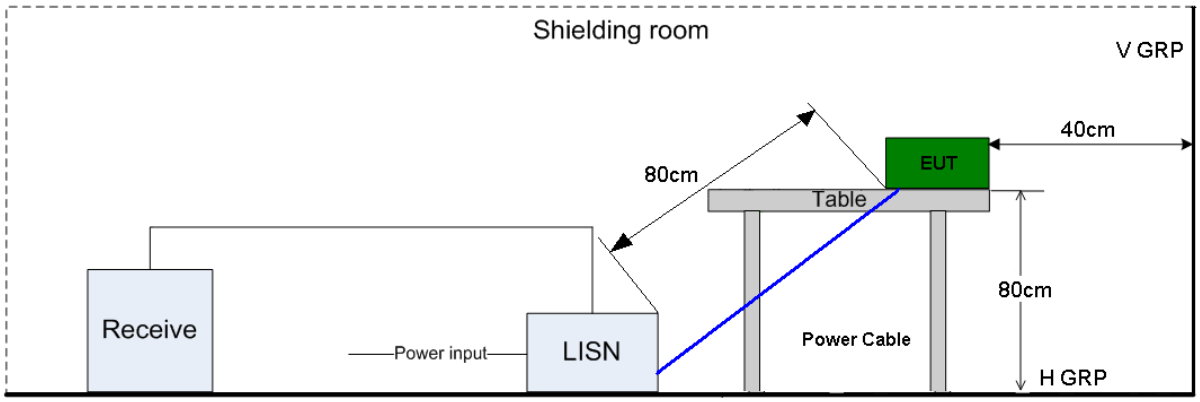



Figure 3.Test Set-up of conducted disturbance

### 4.2.3 Test Results

The EUT has met requirements for Conducted disturbance of power lines.
Refer to the section 7.2.1 of this report for test data.

| Test Limit of AC Power Port | | |
|---|---|---|
| Frequency range | 150kHz ~ 30MHz | |
| Frequency | Voltage limits | |
| | QP (dBμV) | AV (dBμV) |
| 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 | Jun. 20, 2018 | 12 |
| | Broadband Antenna | VULB 9163 | 9163-491 | SCHWARZBECK | Mar. 28, 2019 | 24 |
| | Horn Antenna | HF906 | 100683 | R&S | Mar. 28, 2019 | 24 |
| CE | EMI Test receiver | ESU26 | 100150 | R&S | May. 15, 2018 | 12 |
| | Artificial Mains Network | ENV4200 | 100134 | R&S | May. 15, 2018 | 12 |
| | Artificial Mains Network | ENV216 | 100382 | R&S | May. 15, 2018 | 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 (dBμV/m) | U=4.1dB; k=2 |
| RE(1GHz-18GHz) | Field strength (dBμV/m) | U=5.1dB; k=2 |
| CE | Disturbance Voltage (dBμV) | U=2.5dB; k=2 |

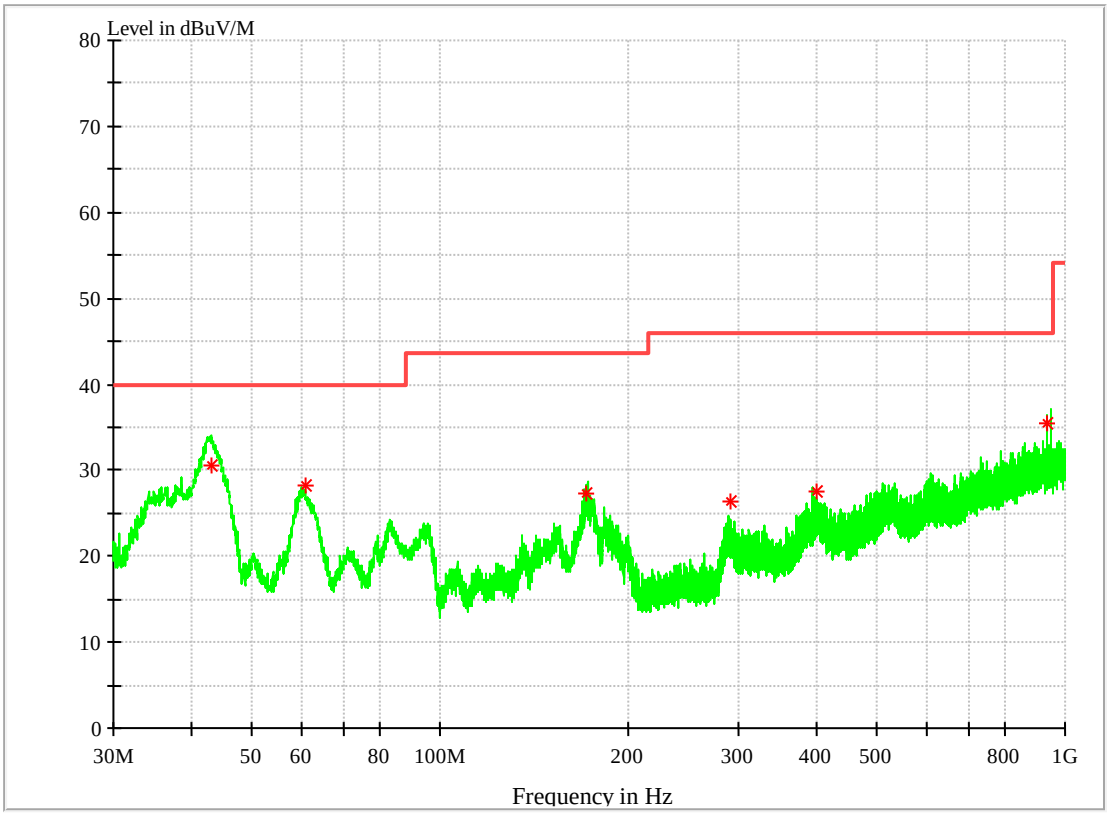
# 7 Test Data and Graph

Only the worst test results were shown

## 7.1 Radiated Disturbance

### 7.1.1 30MHz~1GHz

Test Mode 1: Charging+Camera On +idle



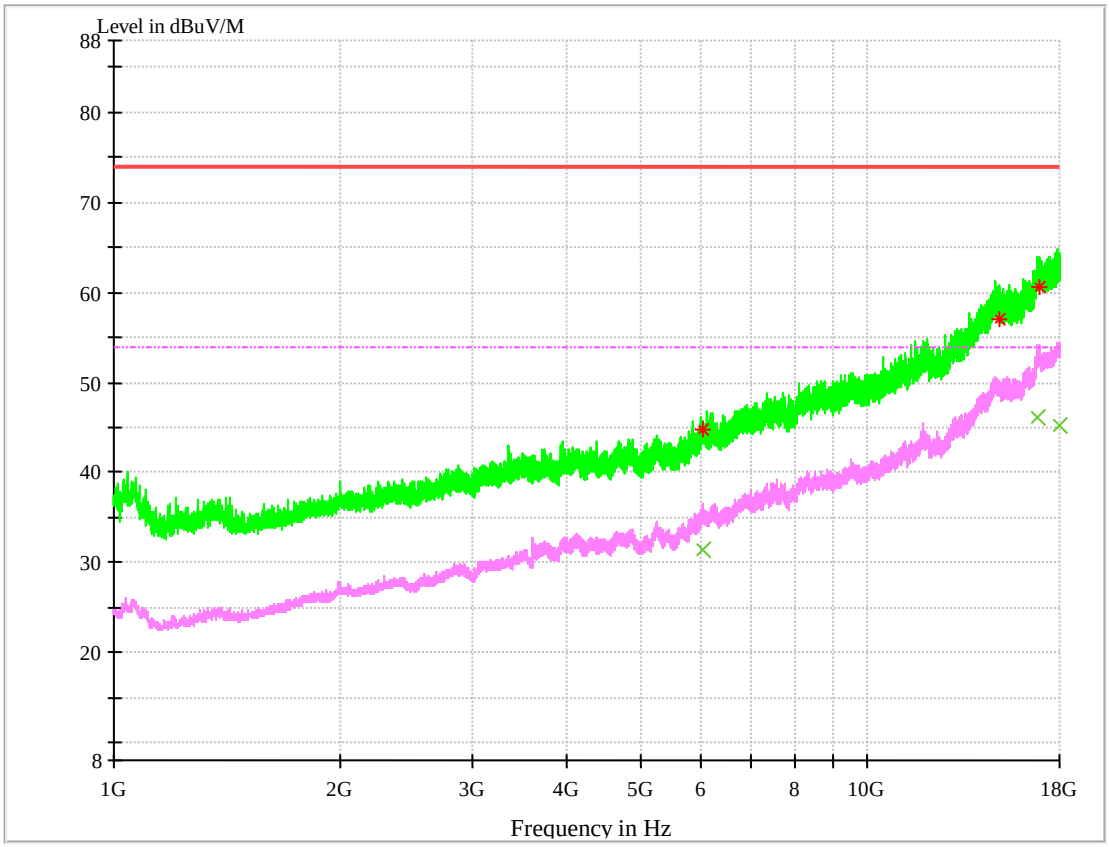

**MEASUREMENT RESULT: QP Detector**

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 43.090380 | 30.53 | 17.2 | 40.00 | 9.47 | 100.0 | 12.0 | VERTICAL |
| 60.775520 | 28.12 | 11.8 | 40.00 | 11.88 | 100.0 | 334.0 | VERTICAL |
| 171.311960 | 27.17 | 11.4 | 43.50 | 16.33 | 220.0 | 63.0 | HORIZONTAL |
| 292.011660 | 26.31 | 15.3 | 46.00 | 19.69 | 107.0 | 122.0 | HORIZONTAL |
| 399.635480 | 27.44 | 19.2 | 46.00 | 18.56 | 228.0 | 8.0 | VERTICAL |
| 935.679200 | 35.52 | 26.4 | 46.00 | 10.48 | 211.0 | 186.0 | HORIZONTAL |

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 Mode 7: USB Copy(EUT with PC)




MEASUREMENT RESULT: PK Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 6059.502666 | 44.79 | -2.3 | 74.00 | 29.21 | 136.0 | -36.0 | HORIZONTAL |
| 14942.498667 | 57.12 | 11.0 | 74.00 | 16.88 | 152.0 | 265.0 | HORIZONTAL |
| 16879.651333 | 60.49 | 20.5 | 74.00 | 13.51 | 256.0 | 217.0 | VERTICAL |

MEASUREMENT RESULT: AV Detector

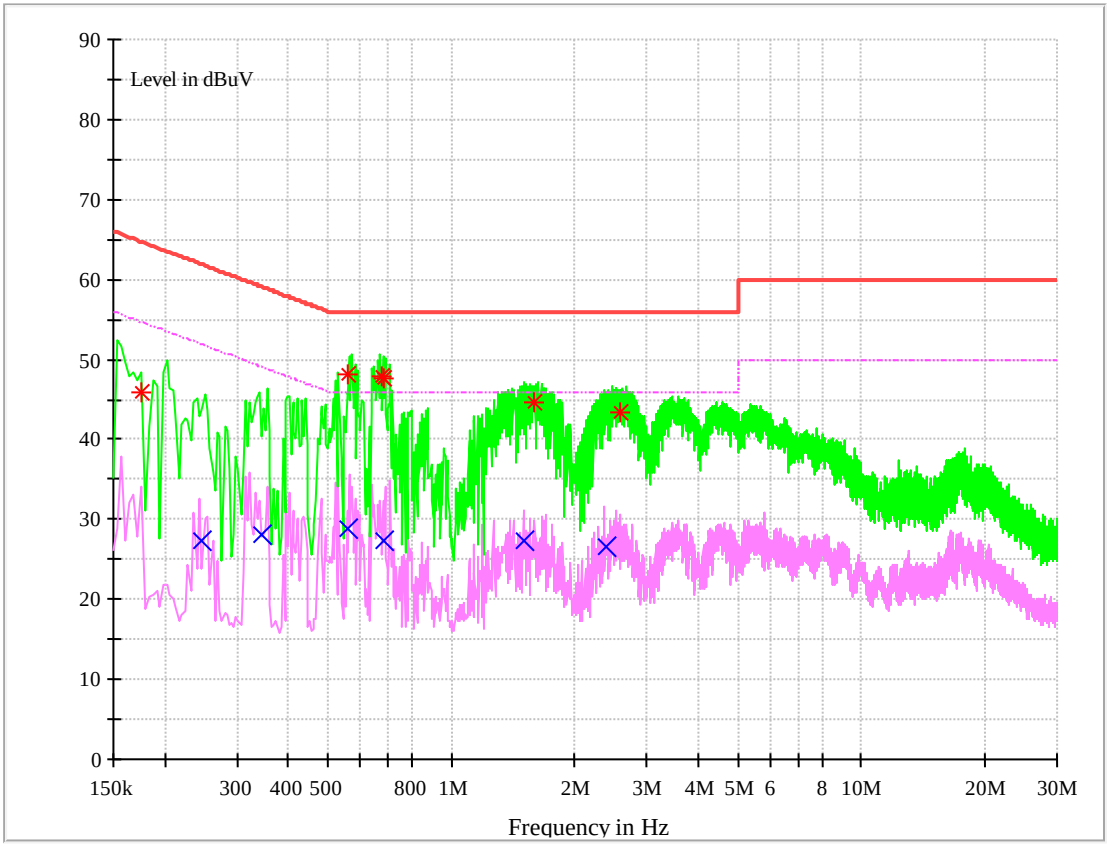
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 6062.004667 | 31.47 | -3.0 | 54.00 | 22.53 | 300.0 | -44.0 | HORIZONTAL |
| 16855.130667 | 46.17 | 20.8 | 54.00 | 7.83 | 234.0 | 126.0 | HORIZONTAL |
| 17974.245333 | 45.15 | 21.6 | 54.00 | 8.85 | 100.0 | 181.0 | HORIZONTAL |

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.

## 7.2 Conducted Disturbance

### 7.2.1 AC Port Test Data

8 Test Mode 7: Charging+Camera On +idle




**MEASUREMENT RESULT: QP Detector**

| Frequency MHz | Level dBµV | Line | Transd dB | Margin dB | Limit dBµV | PE |
|---|---|---|---|---|---|---|
| 0.175764 | 45.97 | N | 9.7 | 18.71 | 64.68 | FLO |
| 0.559792 | 48.13 | N | 9.7 | 7.87 | 56.00 | FLO |
| 0.675082 | 47.81 | N | 9.7 | 8.19 | 56.00 | FLO |
| 0.687811 | 47.75 | N | 9.7 | 8.25 | 56.00 | FLO |
| 1.594505 | 44.55 | N | 9.7 | 11.45 | 56.00 | FLO |
| 2.582710 | 43.25 | N | 9.7 | 12.75 | 56.00 | FLO |

MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV | Line | Transd dB | Margin dB | Limit dBµV | PE |
|---|---|---|---|---|---|---|
| 0.246541 | 27.40 | L1 | 9.7 | 24.47 | 51.87 | FLO |
| 0.345263 | 28.15 | N | 9.7 | 20.93 | 49.08 | FLO |
| 0.561341 | 28.95 | L1 | 9.7 | 17.05 | 46.00 | FLO |
| 0.682742 | 27.25 | L1 | 9.7 | 18.75 | 46.00 | FLO |
| 1.510855 | 27.22 | N | 9.7 | 18.78 | 46.00 | FLO |
| 2.390304 | 26.61 | N | 9.7 | 19.39 | 46.00 | FLO |

**----------END----------**