





# TEST REPORT No. I21Z70185-EMC07

for

Samsung Electronics Co., Ltd.

**Notebook PC** 

XE310XDA

with

FCC ID: ZCAXE310XDA

ISED Number: 25314-XE310XDA

Hardware Version: REV1.0

**Software Version: Chrome** 

Issued Date: 2021-08-08

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#### **Test Laboratory:**

#### CTTL-Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: <a href="mailto:cttl">cttl</a> terminals@caict.ac.cn, website: <a href="mailto:www.caict.ac.cn">www.caict.ac.cn</a>





# **REPORT HISTORY**

| Report Number   | Revision | Description                | Issue Date |
|-----------------|----------|----------------------------|------------|
| I21Z70185-EMC07 | Rev.0    | 1 <sup>st</sup> edition    | 2021-06-21 |
| I21Z70185-EMC07 | Rev.1    | Revised the description of | 2021-08-08 |
|                 |          | key component in section   |            |
|                 |          | 3.5                        |            |

Note: the latest revision of the test report supersedes all previous versions.





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### 1. Test Laboratory

#### 1.1. Introduction & Accreditation

**Telecommunication Technology Labs, CAICT** is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

#### 1.2. Testing Location

**CTTL** (Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R.

China100191

1.3. <u>Testing Environment</u>

Normal Temperature: 15-35°C Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2021-05-06 Testing End Date: 2021-06-18

1.5. Signature

Li Yan

(Prepared this test report)

狄

Zhang Ying

(Reviewed this test report)

Zhang Xia

**Deputy Director of the laboratory** 

(Approved this test report)





# 2. Client Information

### 2.1. Applicant Information

Company Name: Samsung Electronics Co., Ltd.

Address: 19 Chapin Rd., Building D Pine Brook, NJ 07058

City: /
Postal Code: /
Country: /

Contact: Jenni Chun

Email: j1.chun@samsung.com

Telephone: +1-201-937-4203

#### 2.2. Manufacturer Information

Company Name: Samsung Electronics. Co., Ltd.

Samsung R5, Maetan dong 129, Samsung ro

Youngtong gu, Suwon city 443 742, Korea

City: /
Postal Code: /
Country: /

Contact: Sunghoon Cho

Email: ggobi.cho@samsung.com

Telephone: +82-10-2722-4159





# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description Notebook PC

Model name XE310XDA

FCC ID ZCAXE310XDA

ISED Number 25314-XE310XDA

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

#### 3.2. Internal Identification of EUT used during the test

| EUT ID* | IMEI/SN      | <b>HW Version</b> | SW Version |
|---------|--------------|-------------------|------------|
| EUT1    | 2170185UT35a | REV1.0            | Chrome     |
| EUT2    | 2170185UT15a | REV1.0            | Chrome     |

<sup>\*</sup>EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE used during the test

| AE ID*    | Description    | SN               | Remarks |
|-----------|----------------|------------------|---------|
| AE1       | Travel adapter | /                | /       |
| AE2       | Travel adapter | /                | /       |
| AE3       | USB Cable      | /                | /       |
| AE4       | Headset        | /                | /       |
| AE5       | Hard Disk      | /                | /       |
| AE6       | SD card        | /                | /       |
| AE1       |                |                  |         |
| Model     |                | EP-TA845         |         |
| Manufact  | urer           | DONGYANG E&P Inc |         |
| Length of | cable          | /                |         |
| AE2       |                |                  |         |
| Model     |                | EP-TA845         |         |
| Manufact  | urer           | SOLUM CO.,LTD    |         |
| Length of | cable          | /                |         |
|           |                |                  |         |

Note: The USB cables are shielded.

#### 3.4. General Description

Equipment under Test (EUT) is a model of Notebook PC with integrated antenna.

It consists of normal options: lithium battery and charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.





# 3.5. Key component list

| Item       | Spec.              | Vendor | Vendor P/N                |
|------------|--------------------|--------|---------------------------|
| CPU        | Jasper lake_QS     | Intel  | N4500                     |
| CPU        | Jasper lake_MP     | Intel  | N4500                     |
| WLAN       | 802.11 ax 2x2      | Intel  | Harrison Peak. HrP2-AX201 |
| Memory     | LPDDR4X 4GB        | SEC    | K4U6E3S4AA-MGCR           |
|            | LPDDR4X 8GB        | SEC    | K4U6E3S4AA-MGCR           |
| SSD        | eMMC 32GB          | SEC    | KLMBG2JETD-B041003        |
| 330        | eMMC 64GB          | SEC    | KLMCG4JETD-B041004        |
| LCD        | 11.6" HD non touch | BOE    | NT116WHM-N21              |
|            |                    | SDI    | P21GER-A1-S03             |
| Battery    | 40.2Wh             | BYD    | EB-BW720ABA               |
| DLC        | use for 3A         | BIEL   | GH39-02071A               |
| Antenna    | /                  | AWAN   | 1                         |
| AIILEIIIIA | /                  | Speed  | /                         |

Note: EUT1 and EUT2 correspond to different key component configurations.

| 3.6. <u>EUT se</u> | t-ups                     |                 |
|--------------------|---------------------------|-----------------|
| EUT set-up No.     | Combination of EUT and AE | Remarks         |
| Set.1              | EUT1+ AE1+AE3+AE4+AE5+AE6 | EUT1+ Adapter 1 |
| Set.2              | EUT2+ AE1+AE3+AE4+AE5+AE6 | EUT2+ Adapter 1 |
| Set.3              | EUT1+ AE2+AE3+AE4+AE5+AE6 | EUT1+ Adapter 2 |
| Set.4              | EUT2+ AE2+AE3+AE4+AE5+AE6 | EUT2+ Adapter 2 |





# 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference  | Title   | Version |
|------------|---|---------|
| FCC 47 CFR | Radio frequency devices - Unintentional Radiators | 2019    |

Part 15, Subpart B

ICES-003 Information Technology Equipment (including Digital Issue 7 2020

Apparatus)

ANSI C63.4 American National Standard for Methods of 2014

Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in

the Range of 9 kHz to 40 GHz

Note: The test methods have no deviation with standards.





# 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (23 meters × 17meters × 10meters) did not exceed following limits along the EMC testing:

| Temperature                                     | Min. = 15 °C, Max. = 35 °C                 |  |  |
|---|--|--|--|
| Relative humidity                               | Min. = 15 %, Max. = 75 %                   |  |  |
| Chielding offectiveness                         | 0.014MHz - 1MHz, >60dB;                    |  |  |
| Shielding effectiveness                         | 1MHz - 1000MHz, >90dB.                     |  |  |
| Electrical insulation                           | > 2 MΩ                                     |  |  |
| Ground system resistance                        | < 4 Ω                                      |  |  |
| Normalised site attenuation (NSA)               | < ± 4 dB, 3m distance, from 30 to 1000 MHz |  |  |
| Site voltage standing-wave ratio ( $S_{VSWR}$ ) | Between 0 and 6 dB, from 1GHz to 18GHz     |  |  |
| Uniformity of field strength                    | Between 0 and 6 dB, from 80 to 6000 MHz    |  |  |

#### **Shielded room** did not exceed following limits along the EMC testing:

| <u> </u>                 |                            |
|--------------------------|----------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C |
| Relative humidity        | Min. = 20 %, Max. = 75 %   |
| Shielding effectiveness  | 0.014MHz-1MHz, >60dB;      |
|                          | 1MHz-1000MHz, >90dB.       |
| Electrical insulation    | > 2 MΩ                     |
| Ground system resistance | < 4 Ω                      |





# 6. SUMMARY OF TEST RESULTS

| Abbreviations used in this clause:              |      |   |
|---|------|---|
| Verdict Column         P           F         BR | Pass |   |
|   | NA   | Not applicable                            |
|   | F    | Fail                                      |
|   | BR   | Re-use test data from basic model report. |

| Items | Test Name | Clause in | Clause in  | Section in    | Verdict | Test         |             |
|-------|-----------|-----------|------------|---------------|---------|--------------|-------------|
|       |           | FCC rules | ISED rules | this report   |         | Location     |             |
| 1     | Radiated  | 15.109(a) | Section 3  | A.1           | D       | CTTL(Huayuan |             |
| !     | Emission  | 15.109(a) | Section 3  | Α. Ι          | 1 2 1   | North Road)  |             |
| 2     | Conducted | 15.107(a) | Section 3  | A.2           | Р       | CTTL(Huayuan |             |
| 2     | Emission  | 15.107(a) | Section 3  | Section 5 A.2 | A.2     | Г            | North Road) |





# 7. Test Equipments Utilized

| NO. | Description   | TYPE     | SERIES<br>NUMBER | MANUFACTURE | CAL DUE<br>DATE | CALIBRATI<br>ON<br>INTERVAL |
|-----|---------------|----------|------------------|-------------|-----------------|-----------------------------|
| 1   | Test Receiver | ESCI     | 100344           | R&S         | 2022-02-23      | 1 year                      |
| 2   | LISN          | ESH3-Z5  | 825562/028       | R&S         | 2021-09-05      | 1 year                      |
| 3   | Test Receiver | ESU 26   | 100235           | R&S         | 2022-02-23      | 1 year                      |
| 4   | BiLog Antenna | VULB9163 | 9163-483         | Schwarzbeck | 2021-08-07      | 1 year                      |
| 5   | EMI Antenna   | 3115     | 6914             | R&S         | 2022-02-23      | 1 year                      |

| Test Item                    | Test Software and Version | Software Vendor |  |  |
|------------------------------|---------------------------|-----------------|--|--|
| Radiated Continuous Emission | EMC32 V9.01.00            | R&S             |  |  |
| Conducted Emission           | EMC32 V8.52.0             | R&S             |  |  |





### **ANNEX A: MEASUREMENT RESULTS**

#### A.1 Radiated Emission

#### Reference

FCC: CFR Part 15.109(a). ISED: ICES-003 Section 3.2.2.

#### A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator at distances of 10 meters(for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions. The measurement antenna was placed at a distance of 3 /10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

For the test setup photographs please see the test setup photos document.

#### A.1.2 EUT Operating Mode

The system was configured for testing in a typical mode that a customer would normal use. Cables were attached to each of the available I/O ports. Where applicable, peripherals were attached to the I/O cables. All the external I/O ports were exercised.

During the test, the EUT was charged by a travel adapter; EUT continuously copy data to external (Hard Disk & SD card) storage media; the camera was in video mode; the music was repetitively played through the headset; the WIFI and BT function was on and worked in receiver mode.

#### A.1.3 Measurement Limit

| Frequency range | F          | Field strength limit (µV/m) |      |  |  |  |  |
|-----------------|------------|-----------------------------|------|--|--|--|--|
| (MHz)           | Quasi-peak | Quasi-peak Average          |      |  |  |  |  |
| 30-88           | 100        |                             |      |  |  |  |  |
| 88-216          | 150        |                             |      |  |  |  |  |
| 216-960         | 200        |                             |      |  |  |  |  |
| 960-1000        | 500        |                             |      |  |  |  |  |
| >1000           |            | 500                         | 5000 |  |  |  |  |

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting. Limit (10m) = limit (3m) + 20(log (3/10))





#### A.1.4 Test Condition

| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120         | 60             |

| Frequency range (MHz) | RBW/VBW               | Sweep Time (s) | Detector        |  |
|-----------------------|-----------------------|----------------|-----------------|--|
| 30-1000               | 120kHz (IF Bandwidth) | 5              | Peak/Quasi-peak |  |
| Above 1000            | 1MHz/3MHz             | 15             | Peak, Average   |  |

#### A.1.5 Measurement Results

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

Result =  $P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}$ 

Where

G<sub>A</sub>: Antenna factor of receive antenna

G<sub>PL</sub>: Path Loss

P<sub>Mea</sub>: Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz: 5.16dB, 1GHz-18GHz: 5.44dB, *k*=2.

Note: Test data in this section has been taken against the FCC 15.109(a) limit as it is the most stringent limit. By complying with more restrictive FCC 15.109 limit compliance with the ICES-003 Issue 7 limit also demonstrated.





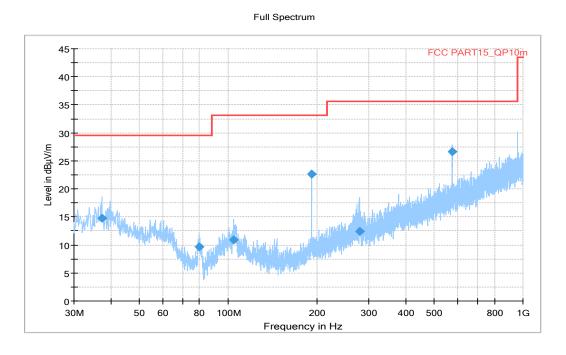


Figure A.1 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak     | Limit    | Margin | Meas.  | Bandwidth | Height | Polarization | Azimuth |
|-----------|---------------|----------|--------|--------|-----------|--------|--------------|---------|
| (MHz)     | $(dB\mu V/m)$ | (dBµV/m) | (dB)   | Time   | (kHz)     | (cm)   |              | (deg)   |
|           |               |          |        | (ms)   |           |        |              |         |
| 37.27500  | 14.77         | 29.50    | 14.77  | 1000.0 | 120.000   | 103.0  | V            | 63.0    |
| 79.56700  | 9.73          | 29.50    | 19.81  | 1000.0 | 120.000   | 200.0  | V            | 23.0    |
| 104.5930  | 10.95         | 33.10    | 22.11  | 1000.0 | 120.000   | 336.0  | V            | 300.0   |
| 191.5050  | 22.63         | 33.10    | 10.43  | 1000.0 | 120.000   | 108.0  | V            | 176.0   |
| 278.4170  | 12.43         | 35.60    | 23.13  | 1000.0 | 120.000   | 121.0  | V            | 120.0   |
| 574.4610  | 26.59         | 35.60    | 8.97   | 1000.0 | 120.000   | 223.0  | V            | 165.0   |







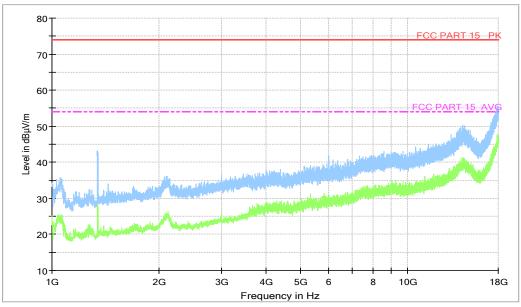


Figure A.2 Radiated Emission from 1GHz to 18GHz

### Average detector result

| Frequency<br>(MHz) | Measurement<br>Result<br>(dBµV/m) | Cable<br>loss<br>(dB) | Antenna<br>Factor<br>(dB/m) | Receiver<br>Reading<br>(dBµV) | Limit<br>(dBµV/m) | Margin<br>(dB) | Antenna<br>Pol.<br>(H/V) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17945.600          | 47.3                              | -28.9                 | 46.7                        | 29.583                        | 54.0              | 6.7            | Н                        |
| 17962.600          | 47.0                              | -29.1                 | 46.7                        | 29.401                        | 54.0              | 7.0            | V                        |
| 17992.633          | 46.8                              | -29.1                 | 46.7                        | 29.198                        | 54.0              | 7.2            | V                        |
| 17972.800          | 46.8                              | -29.1                 | 46.7                        | 29.201                        | 54.0              | 7.2            | Н                        |
| 17969.400          | 46.6                              | -29.1                 | 46.7                        | 29.001                        | 54.0              | 7.4            | Н                        |
| 17964.867          | 46.5                              | -29.1                 | 46.7                        | 28.901                        | 54.0              | 7.5            | Н                        |

#### Peak detector result

| Frequency | Measurement | Cable | Antenna | Receiver | Limit      | Margin | Antenna |
|-----------|-------------|-------|---------|----------|------------|--------|---------|
| (MHz)     | Result      | loss  | Factor  | Reading  | (dBµV/m)   | (dB)   | Pol.    |
| (IVITZ)   | (dBµV/m)    | (dB)  | (dB/m)  | (dBµV)   | (ασμν/ιιι) |        | (H/V)   |
| 17905.933 | 55.6        | -29.3 | 46.0    | 38.972   | 74.0       | 18.4   | Н       |
| 17939.367 | 55.6        | -29.4 | 46.7    | 38.339   | 74.0       | 18.4   | V       |
| 17986.967 | 55.5        | -29.1 | 46.7    | 37.898   | 74.0       | 18.5   | Н       |
| 17969.400 | 55.4        | -29.1 | 46.7    | 37.801   | 74.0       | 18.6   | Н       |
| 17968.833 | 55.3        | -29.1 | 46.7    | 37.701   | 74.0       | 18.7   | V       |
| 17989.233 | 55.2        | -29.1 | 46.7    | 37.598   | 74.0       | 18.8   | Н       |





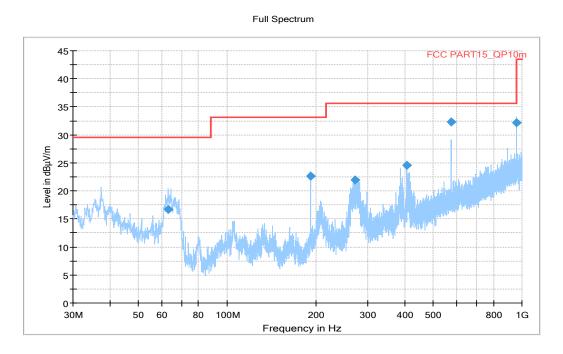


Figure A.3 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak     | Limit    | Margin | Meas.  | Bandwidth | Height | Polarization | Azimuth |
|-----------|---------------|----------|--------|--------|-----------|--------|--------------|---------|
| (MHz)     | $(dB\mu V/m)$ | (dBµV/m) | (dB)   | Time   | (kHz)     | (cm)   |              | (deg)   |
|           |               |          |        | (ms)   |           |        |              |         |
| 63.17400  | 16.68         | 29.50    | 12.86  | 1000.0 | 120.000   | 125.0  | V            | -29.0   |
| 191.5050  | 22.61         | 33.10    | 10.45  | 1000.0 | 120.000   | 105.0  | V            | 10.0    |
| 270.6570  | 21.95         | 35.60    | 13.61  | 1000.0 | 120.000   | 109.0  | V            | 210.0   |
| 407.6210  | 24.51         | 35.60    | 11.05  | 1000.0 | 120.000   | 100.0  | V            | 210.0   |
| 574.4610  | 32.33         | 35.60    | 3.23   | 1000.0 | 120.000   | 235.0  | V            | 20.0    |
| 961.4910  | 32.23         | 43.50    | 11.29  | 1000.0 | 120.000   | 345.0  | V            | 73.0    |







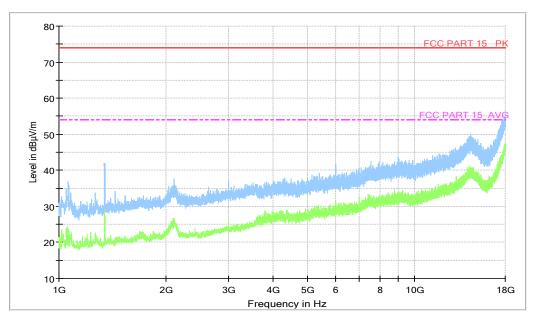


Figure A.4 Radiated Emission from 1GHz to 18GHz

#### Average detector result

| Frequency<br>(MHz) | Measurement<br>Result<br>(dBµV/m) | Cable loss (dB) | Antenna<br>Factor<br>(dB/m) | Receiver<br>Reading<br>(dBµV) | Limit<br>(dBµV/m) | Margin<br>(dB) | Antenna<br>Pol.<br>(H/V) |
|--------------------|-----------------------------------|-----------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17995.467          | 47.3                              | -29.1           | 46.7                        | 29.698                        | 54.0              | 6.7            | Н                        |
| 17954.667          | 47.0                              | -28.9           | 46.7                        | 29.283                        | 54.0              | 7.0            | Н                        |
| 17998.300          | 46.9                              | -29.1           | 46.7                        | 29.298                        | 54.0              | 7.1            | V                        |
| 17901.967          | 46.7                              | -29.3           | 46.0                        | 30.072                        | 54.0              | 7.3            | V                        |
| 17930.867          | 46.7                              | -29.4           | 46.7                        | 29.439                        | 54.0              | 7.3            | V                        |
| 17972.800          | 46.7                              | -29.1           | 46.7                        | 29.101                        | 54.0              | 7.3            | Н                        |

#### Peak detector result

| Frequency | Measurement | Cable | Antenna | Receiver | Limit      | Margin | Antenna |
|-----------|-------------|-------|---------|----------|------------|--------|---------|
| (MHz)     | Result      | loss  | Factor  | Reading  | (dBµV/m)   | (dB)   | Pol.    |
| (IVITZ)   | (dBµV/m)    | (dB)  | (dB/m)  | (dBµV)   | (ασμν/ιιι) |        | (H/V)   |
| 17978.467 | 55.8        | -29.1 | 46.7    | 38.201   | 74.0       | 18.2   | Н       |
| 17977.333 | 55.6        | -29.1 | 46.7    | 38.001   | 74.0       | 18.4   | V       |
| 17990.367 | 55.4        | -29.1 | 46.7    | 37.798   | 74.0       | 18.6   | Н       |
| 17970.533 | 55.3        | -29.1 | 46.7    | 37.701   | 74.0       | 18.7   | Н       |
| 17976.200 | 55.3        | -29.1 | 46.7    | 37.701   | 74.0       | 18.7   | V       |
| 17972.233 | 55.3        | -29.1 | 46.7    | 37.701   | 74.0       | 18.7   | V       |





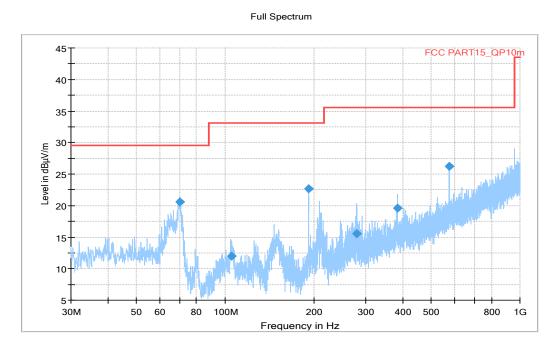


Figure A.5 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak     | Limit    | Margin | Meas.  | Bandwidth | Height | Polarization | Azimuth |
|-----------|---------------|----------|--------|--------|-----------|--------|--------------|---------|
| (MHz)     | $(dB\mu V/m)$ | (dBµV/m) | (dB)   | Time   | (kHz)     | (cm)   |              | (deg)   |
|           |               |          |        | (ms)   |           |        |              |         |
| 70.06100  | 20.64         | 29.50    | 8.90   | 1000.0 | 120.000   | 105.0  | V            | 300.0   |
| 105.4660  | 12.01         | 33.10    | 21.05  | 1000.0 | 120.000   | 187.0  | V            | 240.0   |
| 192.1840  | 22.68         | 33.10    | 10.38  | 1000.0 | 120.000   | 102.0  | V            | 181.0   |
| 278.7080  | 15.58         | 35.60    | 19.98  | 1000.0 | 120.000   | 125.0  | V            | 172.0   |
| 384.4380  | 19.64         | 35.60    | 15.92  | 1000.0 | 120.000   | 125.0  | V            | 210.0   |
| 576.7890  | 26.22         | 35.60    | 9.34   | 1000.0 | 120.000   | 320.0  | V            | 120.0   |







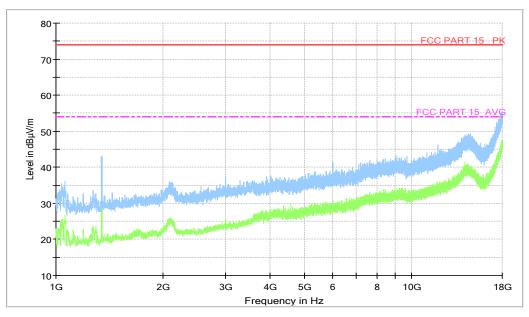


Figure A.6 Radiated Emission from 1GHz to 18GHz

### Average detector result

| Frequency | Measurement<br>Result | Cable loss | Antenna<br>Factor | Receiver<br>Reading | Limit    | Margin | Antenna<br>Pol. |
|-----------|-----------------------|------------|-------------------|---------------------|----------|--------|-----------------|
| (MHz)     | (dBµV/m)              | (dB)       | (dB/m)            | (dBµV)              | (dBµV/m) | (dB)   | (H/V)           |
| 17989.800 | 47.1                  | -29.1      | 46.7              | 29.498              | 54.0     | 6.9    | V               |
| 17980.733 | 47.1                  | -29.1      | 46.7              | 29.498              | 54.0     | 6.9    | V               |
| 17973.933 | 46.7                  | -29.1      | 46.7              | 29.101              | 54.0     | 7.3    | V               |
| 17990.933 | 46.6                  | -29.1      | 46.7              | 28.998              | 54.0     | 7.4    | Н               |
| 17996.033 | 46.5                  | -29.1      | 46.7              | 28.898              | 54.0     | 7.5    | Н               |
| 17937.100 | 46.5                  | -29.4      | 46.7              | 29.239              | 54.0     | 7.5    | V               |

#### Peak detector result

| Fraguency          | Measurement | Cable | ble Antenna Receiver Limit |         | Margin     | Antenna |       |
|--------------------|-------------|-------|----------------------------|---------|------------|---------|-------|
| Frequency<br>(MHz) | Result      | loss  | Factor                     | Reading | (dBµV/m)   | •       | Pol.  |
| (IVITZ)            | (dBµV/m)    | (dB)  | (dB/m)                     | (dBµV)  | (ασμν/ιιι) | (dB)    | (H/V) |
| 17981.867          | 55.5        | -29.1 | 46.7                       | 37.898  | 74.0       | 18.5    | Н     |
| 17953.533          | 55.5        | -28.9 | 46.7                       | 37.783  | 74.0       | 18.5    | V     |
| 17957.500          | 55.5        | -28.9 | 46.7                       | 37.783  | 74.0       | 18.5    | V     |
| 17924.633          | 55.2        | -29.4 | 46.7                       | 37.939  | 74.0       | 18.8    | V     |
| 17996.033          | 55.2        | -29.1 | 46.7                       | 37.598  | 74.0       | 18.8    | V     |
| 17982.433          | 55.1        | -29.1 | 46.7                       | 37.498  | 74.0       | 18.9    | Н     |





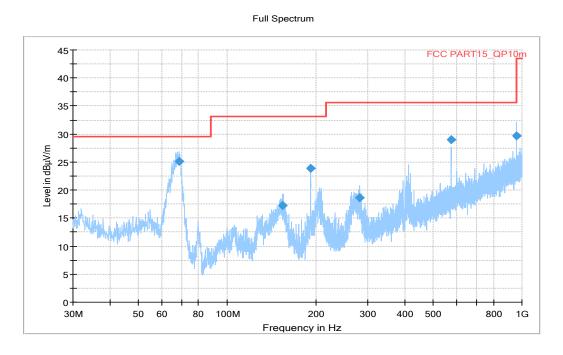


Figure A.7 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak | Limit    | Margin | Meas.  | Bandwidth | Height | Polarization | Azimuth |
|-----------|-----------|----------|--------|--------|-----------|--------|--------------|---------|
| (MHz)     | (dBµV/m)  | (dBµV/m) | (dB)   | Time   | (kHz)     | (cm)   |              | (deg)   |
|           |           |          |        | (ms)   |           |        |              |         |
| 68.89700  | 25.14     | 29.50    | 4.40   | 1000.0 | 120.000   | 102.0  | V            | -15.0   |
| 154.0630  | 17.19     | 33.10    | 15.87  | 1000.0 | 120.000   | 98.0   | V            | 300.0   |
| 191.5050  | 23.85     | 33.10    | 9.21   | 1000.0 | 120.000   | 102.0  | V            | 177.0   |
| 282.2970  | 18.65     | 35.60    | 16.91  | 1000.0 | 120.000   | 107.0  | V            | 255.0   |
| 574.3640  | 29.02     | 35.60    | 6.54   | 1000.0 | 120.000   | 232.0  | V            | 178.0   |
| 957.7080  | 29.66     | 35.60    | 5.90   | 1000.0 | 120.000   | 345.0  | V            | 88.0    |







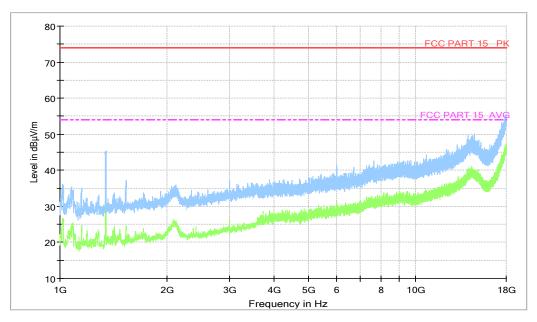


Figure A.8 Radiated Emission from 1GHz to 18GHz

#### Average detector result

| Frequency<br>(MHz) | Measurement<br>Result<br>(dBµV/m) | Cable<br>loss<br>(dB) | Antenna<br>Factor<br>(dB/m) | Receiver<br>Reading<br>(dBµV) | Limit<br>(dBµV/m) | Margin<br>(dB) | Antenna<br>Pol.<br>(H/V) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17975.633          | 47.4                              | -29.1                 | 46.7                        | 29.801                        | 54.0              | 6.6            | V                        |
| 17961.467          | 47.0                              | -29.1                 | 46.7                        | 29.401                        | 54.0              | 7.0            | V                        |
| 17988.667          | 46.7                              | -29.1                 | 46.7                        | 29.098                        | 54.0              | 7.3            | V                        |
| 17973.933          | 46.6                              | -29.1                 | 46.7                        | 29.001                        | 54.0              | 7.4            | V                        |
| 17970.533          | 46.5                              | -29.1                 | 46.7                        | 28.901                        | 54.0              | 7.5            | Н                        |
| 17963.167          | 46.4                              | -29.1                 | 46.7                        | 28.801                        | 54.0              | 7.6            | V                        |

#### Peak detector result

| Frequency | Measurement | Cable | Antenna | Receiver | Limit    | Margin | Antenna<br>Pol. |
|-----------|-------------|-------|---------|----------|----------|--------|-----------------|
| (MHz)     | Result      | loss  | Factor  | Reading  | (dBµV/m) | (dB)   |                 |
| ` ,       | (dBµV/m)    | (dB)  | (dB/m)  | (dBµV)   | ` ' '    | ` ,    | (H/V)           |
| 17995.467 | 55.7        | -29.1 | 46.7    | 38.098   | 74.0     | 18.3   | Н               |
| 17990.367 | 55.5        | -29.1 | 46.7    | 37.898   | 74.0     | 18.5   | Н               |
| 17979.033 | 55.3        | -29.1 | 46.7    | 37.701   | 74.0     | 18.7   | V               |
| 17996.033 | 55.3        | -29.1 | 46.7    | 37.698   | 74.0     | 18.7   | Н               |
| 18000.000 | 55.2        | -29.2 | 47.0    | 37.443   | 74.0     | 18.8   | V               |
| 17908.200 | 55.2        | -29.3 | 46.0    | 38.572   | 74.0     | 18.8   | Н               |





#### A.2 Conducted Emission

#### Reference

FCC: CFR Part 15.107(a). ISED: ICES-003 Section 3.2.1

#### A.2.1 Method of measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

For the test setup photographs please see the test setup photos document.

#### A.2.2 EUT Operating Mode

The system was configured for testing in a typical mode that a customer would normal use. Cables were attached to each of the available I/O ports. Where applicable, peripherals were

attached to the I/O cables. All the external I/O ports were exercised.

During the test, the EUT was charged by a travel adapter; EUT continuously copy data to external (Hard Disk & SD card) storage media; the camera was in video mode; the music was repetitively played through the headset; the WIFI and BT function was on and worked in receiver mode.

#### A.2.3 Measurement Limit

| Frequency of emission (MHz)                    | Conducted limit (dBµV) |           |  |  |  |
|--|------------------------|-----------|--|--|--|
|  | Quasi-peak             | Average   |  |  |  |
| 0.15-0.5                                       | 66 to 56*              | 56 to 46* |  |  |  |
| 0.5-5  | 56                     | 46        |  |  |  |
| 5-30   | 60                     | 50        |  |  |  |
| *Decreases with the logarithm of the frequency |                        |           |  |  |  |

#### A.2.4 Test Condition in charging mode

| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120         | 60             |

| RBW/IF bandwidth | Sweep Time(s) |
|------------------|---------------|
| 9kHz             | 1             |



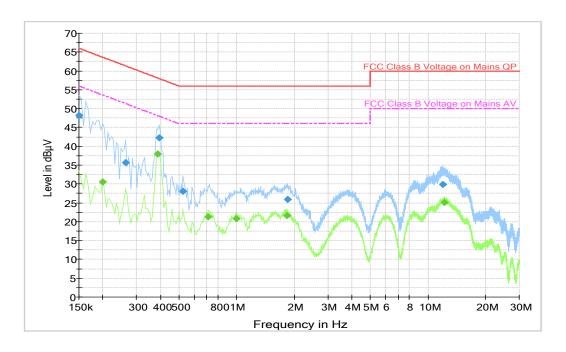


#### A.2.5 Measurement Results

Measurement uncertainty: *U*= 3.08 dB, *k*=2.

Note: all modes have been tested and the worst results shown here.

Set.1



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

**Figure A.9 Conducted Emission** 

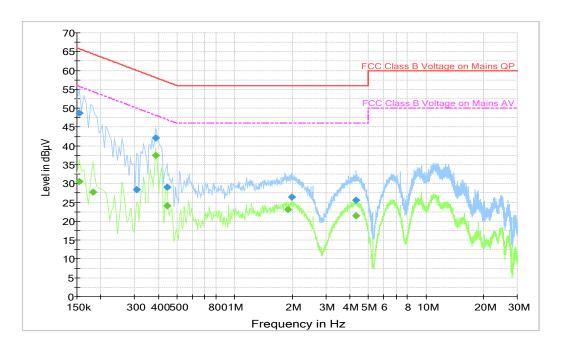
#### **Final Result 1**

| Frequency | QuasiPeak | PE  | Line | Corr. | Margin | Limit  |
|-----------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)    |     |      | (dB)  | (dB)   | (dBµV) |
| 0.150000  | 48.2      | GND | L1   | 9.8   | 17.8   | 66.0   |
| 0.262500  | 35.7      | GND | L1   | 9.8   | 25.6   | 61.4   |
| 0.393000  | 42.3      | GND | L1   | 9.8   | 15.7   | 58.0   |
| 0.523500  | 28.1      | GND | N    | 9.8   | 27.9   | 56.0   |
| 1.851000  | 25.9      | GND | L1   | 9.7   | 30.1   | 56.0   |
| 11.940000 | 29.8      | GND | L1   | 9.0   | 30.2   | 60.0   |

| ao        | <u> </u> |     |      |       |        |        |
|-----------|----------|-----|------|-------|--------|--------|
| Frequency | Average  | PE  | Line | Corr. | Margin | Limit  |
| (MHz)     | (dBµV)   |     |      | (dB)  | (dB)   | (dBµV) |
| 0.199500  | 30.5     | GND | L1   | 9.8   | 23.1   | 53.6   |
| 0.388500  | 38.0     | GND | N    | 9.8   | 10.1   | 48.1   |
| 0.712500  | 21.2     | GND | L1   | 9.8   | 24.8   | 46.0   |
| 1.000500  | 20.8     | GND | L1   | 9.8   | 25.2   | 46.0   |
| 1.833000  | 21.6     | GND | L1   | 9.7   | 24.4   | 46.0   |
| 12.151500 | 25.2     | GND | L1   | 8.9   | 24.8   | 50.0   |







Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

#### **Figure A.10 Conducted Emission**

# **Final Result 1**

| Frequency | QuasiPeak | PE  | Line | Corr. | Margin | Limit  |
|-----------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)    |     |      | (dB)  | (dB)   | (dBµV) |
| 0.154500  | 48.6      | GND | L1   | 9.8   | 17.1   | 65.8   |
| 0.307500  | 28.4      | GND | L1   | 9.8   | 31.7   | 60.0   |
| 0.388500  | 42.0      | GND | N    | 9.8   | 16.1   | 58.1   |
| 0.442500  | 29.1      | GND | L1   | 9.8   | 27.9   | 57.0   |
| 1.990500  | 26.4      | GND | L1   | 9.7   | 29.6   | 56.0   |
| 4.321500  | 25.6      | GND | N    | 9.7   | 30.4   | 56.0   |

# **Final Result 2**

| Frequency | Average | PE  | Line | Corr. | Margin | Limit  |
|-----------|---------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)  |     |      | (dB)  | (dB)   | (dBµV) |
| 0.154500  | 30.6    | GND | N    | 9.8   | 25.1   | 55.8   |
| 0.181500  | 27.8    | GND | N    | 9.8   | 26.6   | 54.4   |
| 0.388500  | 37.5    | GND | L1   | 9.8   | 10.6   | 48.1   |
| 0.442500  | 24.2    | GND | L1   | 9.8   | 22.8   | 47.0   |
| 1.905000  | 23.1    | GND | L1   | 9.7   | 22.9   | 46.0   |
| 4.321500  | 21.5    | GND | L1   | 9.7   | 24.5   | 46.0   |

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# **ANNEX B: Persons involved in this testing**

| Test Item          | Tester                 |  |  |
|--------------------|------------------------|--|--|
| Radiated Emission  | Zhang Tianli, Ding Zai |  |  |
| Conducted Emission | Yang Mengke            |  |  |

\*\*\*END OF REPORT\*\*\*