

# **TEST REPORT**

# No. I19Z60845-EMC03

## Samsung Electronics Co Ltd

## Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Model Name: SM-T295C

FCC ID: ZCASMT295C

with

Hardware Version: REV0.4

Software Version: T295CZCU0ASEA

Issued Date: 2019-06-13



#### Note:

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



# **REPORT HISTORY**

| Report Number   | Revision | Description             | Issue Date |
|-----------------|----------|-------------------------|------------|
| I19Z60845-EMC03 | Rev.0    | 1 <sup>st</sup> edition | 2019-06-13 |



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## 1. Test Laboratory

#### 1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 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 (CN0066). The detail accreditation scope can be found on NVLAP website.

## 1.2. Testing Location

CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development

Area, Beijing, P. R. China 100176

1.3. Testing Environment

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

1.4. Project data

Testing Start Date: 2019-04-15
Testing End Date: 2019-05-10

1.5. Signature

Li Yan

(Prepared this test report)

张和

**Zhang Ying** 

(Reviewed this test report)

Liu Baodian

**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: //
Telephone: //

## 2.2. Manufacturer Information

Company Name: Jiaxing Yongrui Electron Technology Co., Ltd.

NO.777 Yazhong Road, Daqiao Town, Nanhu District, Jiaxing

City ,Zhejiang

City: /
Postal Code: /
Country: /
Contact: /
Email: /
Telephone: /

Address:



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

#### 3.1. About EUT

Description Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Model Name SM-T295C FCC ID ZCASMT295C

Extreme vol. Limits 3.6VDC to 4.2VDC (nominal: 3.8VDC)

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* | SN or IMEI | HW Version | SW Version |
|---------|------------|------------|------------|
| EUT2    | /          | /          | /          |

<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    | Battery          | /  | /       |
| AE2    | Battery          | /  | /       |
| AE3    | Charger          | /  | /       |
| AE4    | Charger          | /  | /       |
| AE5    | <b>USB</b> Cable | /  | /       |

AE1

Model SWD-WT-N8

Manufacturer Sunwoda Electronic Co., Ltd.

Capacitance 4980mAh Nominal voltage 3.82 V

AE2

Model SCUD-WT-N8

Manufacturer SCUD(Fujian) Electronic Co., Ltd.

Capacitance 4980mAh Nominal voltage 3.82 V

AE3

Model EP-TA50JWS

Manufacturer RFTECH ELECTRONICS (HuiZhou) Co.,Ltd.

Length of cable /

AE4

Model EP-TA50JWE /

Manufacturer RFTECH ELECTRONICS (HuiZhou) Co.,Ltd.

Length of cable / /



AE5

Model GH39-02004A

Manufacturer RFTECH ELECTRONICS (HuiZhou) Co.,Ltd.

Length of cable /

Note: The USB cables are shielded.

#### 3.4. EUT set-ups

 EUT set-up No.
 Combination of EUT and AE
 Remarks

 Set.1
 EUT2+ AE1/AE2+ AE3 +AE5
 Charger + Camera

 Set.2
 EUT2+ AE1/AE2 + AE5
 USB mode+MP3+GNSS

 Set.3
 EUT2+ AE1/AE2+ AE4 +AE5
 Charger

Note: SM-T295C is a variant model based on SM-T295, According to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01; all results are cited from the initial model. The report number for initial model is I19Z60464-EMC03.



## 4. Reference Documents

## 4.1. Reference Documents for testing

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

| Reference              | Title   | Version |
|------------------------|---|---------|
| FCC Part 15, Subpart B | Radio frequency devices - Unintentional Radiators | 2016    |
| ANSI C63.4             | American National Standard for                    | 2014    |
|                        | Methods of 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×17 meters×10 meters) did not exceed following limits along the EMC testing:

| Temperature   | Min. = 15 °C, Max. = 35 °C              |  |
|---|---|--|
| Relative humidity                                     | Min. = 15 %, Max. = 75 %                |  |
| Shielding effectiveness                               | 0.014MHz - 1MHz, >60dB;                 |  |
|   | 1MHz - 1000MHz, >90dB.                  |  |
| Electrical insulation                                 | > 2 MΩ                                  |  |
| Ground system resistance                              | < 4Ω                                    |  |
| Normalised site attenuation (NSA)                     | < ± 4 dB, 3m/10m distance,              |  |
|   | from 30 to 1000 MHz                     |  |
| Site voltage standing-wave ratio (S <sub>VSWR</sub> ) | Between 0 and 6 dB, from 1GHz to 18GHz  |  |
| Uniformity of field strength                          | Between 0 and 6 dB, from 80 to 3000 MHz |  |

**Semi-anechoic chamber SAC-2** (10 meters × 6.7 meters × 6.1 meters) did not exceed following limits along the EMC testing:

| Temperature                                     | Min. = 15 °C, Max. = 35 °C                 |
|---|--|
| Relative humidity                               | Min. = 15 %, Max. = 75 %                   |
| Shielding offeetiveness                         | 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 3000 MHz    |

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

| 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: |    |   |
|------------------------------------|----|---|
| Р                                  |    | Pass                                      |
| Variation California               | NA | Not applicable                            |
| Verdict Column                     | F  | Fail                                      |
|                                    | BR | Re-use test data from basic model report. |

| Items | Test Name             | Clause in FCC rules | Section in this report | Verdict | Test<br>Location |
|-------|-----------------------|---------------------|------------------------|---------|------------------|
| 1     | Radiated<br>Emission  | 15.109(a)           | A.1                    | BR      | CTTL(BDA)        |
| 2     | Conducted<br>Emission | 15.107(a)           | A.2                    | BR      | CTTL(BDA)        |



# 7. Test Equipments Utilized

| NO. | Description                                | TYPE     | SERIES<br>NUMBER | MANUFACTURE  | CAL DUE<br>DATE | CALIBRATI<br>ON<br>INTERVAL |
|-----|--|----------|------------------|--------------|-----------------|-----------------------------|
| 1   | Test Receiver                              | ESU26    | 100376           | R&S          | 2019-11-27      | 1 year                      |
| 2   | Test Receiver                              | ESCI     | 100766           | R&S          | 2020-03-20      | 1 year                      |
| 3   | Universal Radio<br>Communication<br>Tester | CMW500   | 127406           | R&S          | 2020-01-19      | 1 year                      |
| 4   | LISN                                       | ESH3-Z5  | 825562/028       | R&S          | 2019-08-22      | 1 year                      |
| 5   | EMI Antenna                                | VULB9163 | 9163-482         | Schwarzbeck  | 2019-09-21      | 1 year                      |
| 6   | EMI Antenna                                | 3117     | 00139065         | ETS-Lindgren | 2019-10-15      | 1 year                      |
| 7   | Printer                                    | P1606dn  | VNC3L52122       | HP           | N/A             | N/A                         |
| 8   | Keyboard                                   | KU-1601  | 2048361          | Lenovo       | N/A             | N/A                         |
| 9   | Mouse                                      | EMS-537A | 8021S3MC         | Lenovo       | N/A             | N/A                         |

| Test Item                    | Test Software and Version | Software Vendor |
|------------------------------|---------------------------|-----------------|
| Radiated Continuous Emission | EMC32 V9.01               | 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).

#### A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (USB mode of MS and charging mode of MS) at distances of 3 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. 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. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

#### A.1.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. During the charging mode the camera is keeping on taking photos. During the USB mode The EUT is keeping on playing MP3 and the GNSS application is started up. The model of the PC is Lenovo M4000e-17, and the serial number of the PC is M706RMW2. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### A.1.3 Measurement Limit

| Frequency range | Field strength limit (μV/m) |         |      |  |  |  |
|-----------------|-----------------------------|---------|------|--|--|--|
| (MHz)           | Quasi-peak                  | Average | Peak |  |  |  |
| 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.

#### A.1.4 Test Condition

| Frequency range (MHz) | RBW/VBW               | Sweep Time (s) | Detector        |
|-----------------------|-----------------------|----------------|-----------------|
| 30-1000               | 120kHz (IF Bandwidth) | 5              | Peak/Quasi-peak |
| Above 1000            | 1MHz/1MHz             | 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: 5.40dB, 1GHz-18GHz: 4.32dB, k=2.

#### Measurement results for Set.1:

#### Charging Mode+ Camera / Average detector

| 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) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17090.000          | 39.13                             | -25.5                 | 41.3                        | 23.3                          | 54.0              | 14.9           | V                        |
| 17088.000          | 39.10                             | -25.5                 | 41.3                        | 23.3                          | 54.0              | 14.9           | V                        |
| 17089.500          | 39.09                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 14.9           | V                        |
| 17109.000          | 39.08                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 14.9           | V                        |
| 17059.000          | 39.08                             | -25.5                 | 41.4                        | 23.2                          | 54.0              | 14.9           | Н                        |
| 17094.500          | 39.06                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 14.9           | Н                        |

#### Charging Mode+ Camera /Peak detector

| 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) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17023.500          | 51.8                              | -25.6                 | 41.4                        | 35.97                         | 74.0              | 22.2           | V                        |
| 17085.000          | 51.6                              | -25.5                 | 41.3                        | 35.75                         | 74.0              | 22.4           | Н                        |
| 17072.000          | 51.4                              | -25.5                 | 41.3                        | 35.54                         | 74.0              | 22.6           | Н                        |
| 16781.000          | 51.3                              | -26.2                 | 41.5                        | 36.06                         | 74.0              | 22.7           | Н                        |
| 17113.000          | 51.3                              | -25.5                 | 41.3                        | 35.45                         | 74.0              | 22.7           | Н                        |
| 17087.500          | 51.3                              | -25.5                 | 41.3                        | 35.46                         | 74.0              | 22.7           | V                        |



#### Measurement results for Set.2:

## USB Mode +MP3+GNSS /Average detector

| Frequency<br>(MHz) | Measurement Result (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) |
|--------------------|-----------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 4=0=0=00           |                             | , ,                   |                             |                               |                   |                |                          |
| 17053.500          | 39.16                       | -25.5                 | 41.4                        | 23.3                          | -25.5             | 41.4           | Н                        |
| 17095.500          | 39.12                       | -25.5                 | 41.3                        | 23.3                          | -25.5             | 41.3           | V                        |
| 17105.500          | 39.12                       | -25.5                 | 41.3                        | 23.3                          | -25.5             | 41.3           | V                        |
| 17094.000          | 39.12                       | -25.5                 | 41.3                        | 23.3                          | -25.5             | 41.3           | ٧                        |
| 17085.000          | 39.10                       | -25.5                 | 41.3                        | 23.3                          | -25.5             | 41.3           | ٧                        |
| 17087.500          | 39.08                       | -25.5                 | 41.3                        | 23.2                          | -25.5             | 41.3           | Н                        |

#### USB Mode +MP3+GNSS /Peak detector

| 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) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 3585.500           | 59.9                              | -34.2                 | 33.5                        | 60.57                         | 74.0              | 14.1           | Н                        |
| 3587.500           | 56.5                              | -34.2                 | 33.5                        | 57.17                         | 74.0              | 17.5           | Н                        |
| 3596.000           | 55.0                              | -34.1                 | 33.5                        | 55.64                         | 74.0              | 19.0           | Н                        |
| 3590.500           | 54.9                              | -34.2                 | 33.5                        | 55.61                         | 74.0              | 19.1           | ٧                        |
| 3591.000           | 54.9                              | -34.2                 | 33.5                        | 55.58                         | 74.0              | 19.1           | Н                        |
| 3597.000           | 54.8                              | -34.1                 | 33.5                        | 55.45                         | 74.0              | 19.2           | Н                        |



## **Measurement results for Set.3**:

## **Charging Mode / Average detector**

| 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) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17093.000          | 39.14                             | -25.5                 | 41.3                        | 23.3                          | 54.0              | 14.9           | Н                        |
| 17090.500          | 39.09                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 14.9           | V                        |
| 17051.500          | 39.05                             | -25.5                 | 41.4                        | 23.2                          | 54.0              | 14.9           | Н                        |
| 17093.500          | 39.05                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 15.0           | V                        |
| 17088.500          | 39.03                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 15.0           | Н                        |
| 17110.000          | 39.00                             | -25.5                 | 41.3                        | 23.2                          | 54.0              | 15.0           | V                        |

#### **Charging Mode /Peak detector**

| 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) |
|--------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------|-------------------|----------------|--------------------------|
| 17037.000          | 52.3                              | -25.6                 | 41.4                        | 36.52                         | 74.0              | 21.7           | V                        |
| 16972.500          | 51.3                              | -25.6                 | 41.4                        | 35.56                         | 74.0              | 22.7           | V                        |
| 17118.000          | 51.3                              | -25.5                 | 41.3                        | 35.46                         | 74.0              | 22.7           | V                        |
| 17509.000          | 51.3                              | -25.4                 | 41.2                        | 35.49                         | 74.0              | 22.7           | V                        |
| 17109.000          | 51.3                              | -25.5                 | 41.3                        | 35.41                         | 74.0              | 22.7           | Н                        |
| 16718.500          | 51.3                              | -26.1                 | 41.4                        | 35.93                         | 74.0              | 22.7           | V                        |



## Charging Mode + Camera, Set.1

#### 15B RE 30MHz-1GHz

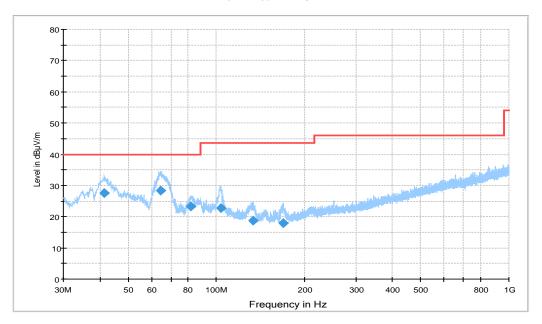


Figure A.1 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak | Height | Polarization | Azimuth | Corr. | Margin | Limit    |
|-----------|-----------|--------|--------------|---------|-------|--------|----------|
| (MHz)     | (dBµV/m)  | (cm)   |              | (deg)   | (dB)  | (dB)   | (dBµV/m) |
| 41.446000 | 27.6      | 100.0  | V            | 27.0    | 0.1   | 12.4   | 40.0     |
| 64.435000 | 28.3      | 100.0  | V            | 293.0   | -2.4  | 11.7   | 40.0     |
| 81.992000 | 23.3      | 125.0  | Н            | 187.0   | -5.6  | 16.7   | 40.0     |
| 103.72000 | 22.7      | 119.0  | V            | 302.0   | -1.0  | 20.8   | 43.5     |
| 133.30500 | 18.6      | 110.0  | V            | 190.0   | -4.5  | 24.9   | 43.5     |
| 169.29200 | 17.9      | 100.0  | V            | -31.0   | -4.0  | 25.6   | 43.5     |





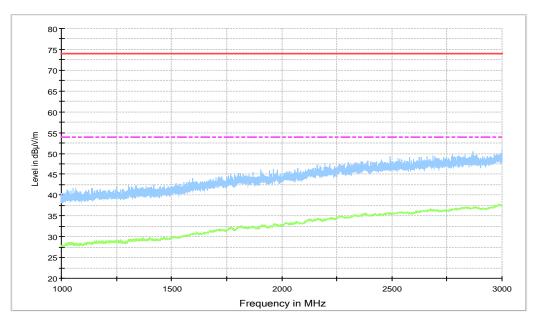
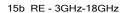


Figure A.2 Radiated Emission from 1GHz to 3GHz



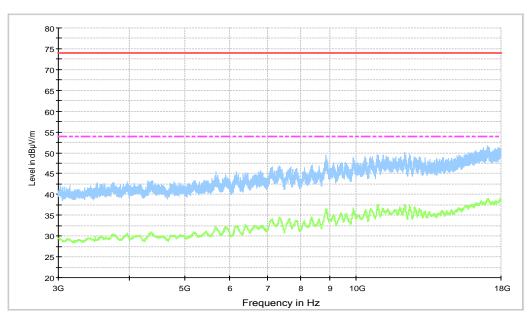
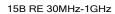


Figure A.3 Radiated Emission from 3GHz to 18GHz



#### USB Mode +MP3+GNSS, Set.2



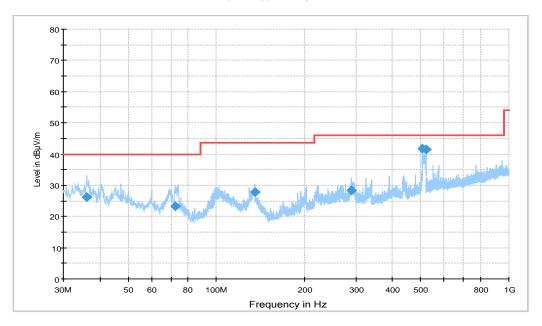


Figure A.4 Radiated Emission from 30MHz to 1GHz

Note: the spike (520 MHz) is occurred by Printer

| Frequency | QuasiPeak     | Height | Polarization | Azimuth | Corr. | Margin | Limit    |
|-----------|---------------|--------|--------------|---------|-------|--------|----------|
| (MHz)     | $(dB\mu V/m)$ | (cm)   |              | (deg)   | (dB)  | (dB)   | (dBµV/m) |
| 36.014000 | 26.3          | 100.0  | V            | 145.0   | -0.8  | 13.7   | 40.0     |
| 72.098000 | 23.2          | 119.0  | V            | 90.0    | -4.7  | 16.8   | 40.0     |
| 135.53600 | 27.7          | 125.0  | Н            | 69.0    | -4.7  | 15.8   | 43.5     |
| 289.28100 | 28.3          | 100.0  | Н            | 0.0     | -0.1  | 17.7   | 46.0     |
| 506.07600 | 41.7          | 100.0  | V            | -24.0   | 5.9   | 4.3    | 46.0     |
| 520.14100 | 41.4          | 100.0  | V            | -28.0   | 6.1   | 4.6    | 46.0     |





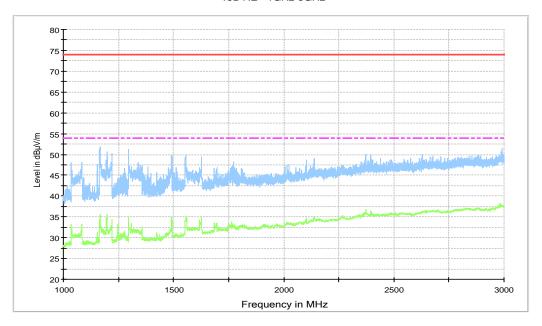
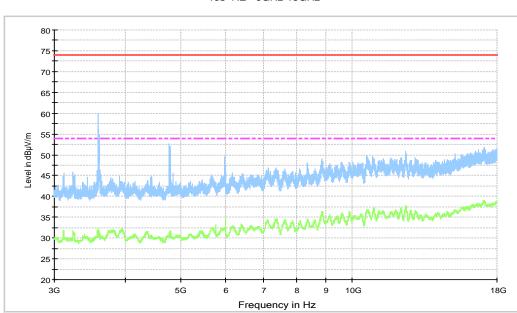


Figure A.5 Radiated Emission from 1GHz to 3GHz



15b RE - 3GHz-18GHz

Figure A.6 Radiated Emission from 3GHz to 18GHz



## **Charging Mode, Set.3**

#### 15B RE 30MHz-1GHz

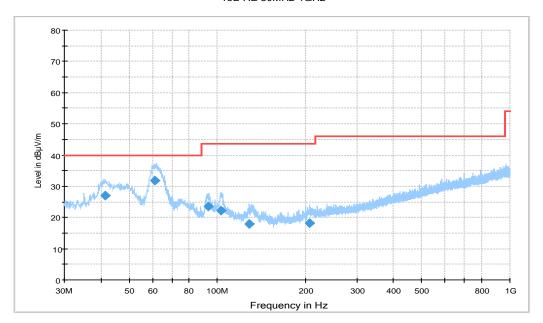


Figure A.7 Radiated Emission from 30MHz to 1GHz

| Frequency | QuasiPeak | Height | Polarization | Azimuth | Corr. | Margin | Limit    |
|-----------|-----------|--------|--------------|---------|-------|--------|----------|
| (MHz)     | (dBµV/m)  | (cm)   |              | (deg)   | (dB)  | (dB)   | (dBµV/m) |
| 41.252000 | 27.0      | 100.0  | V            | 113.0   | 0.1   | 13.0   | 40.0     |
| 61.234000 | 31.8      | 100.0  | V            | 266.0   | -1.3  | 8.2    | 40.0     |
| 93.050000 | 23.4      | 111.0  | V            | 283.0   | -2.2  | 20.1   | 43.5     |
| 102.55600 | 22.3      | 100.0  | V            | 200.0   | -0.9  | 21.2   | 43.5     |
| 128.16400 | 17.8      | 125.0  | V            | -15.0   | -3.9  | 25.7   | 43.5     |
| 206.54000 | 18.2      | 100.0  | V            | 7.0     | -2.2  | 25.3   | 43.5     |





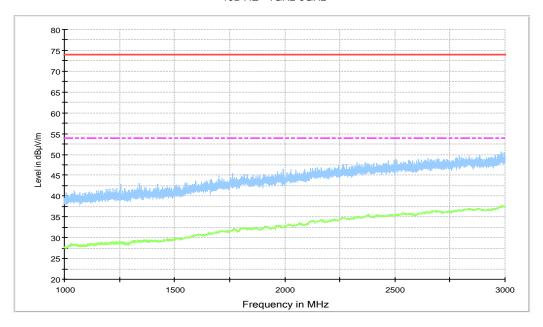
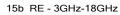


Figure A.8 Radiated Emission from 1GHz to 3GHz



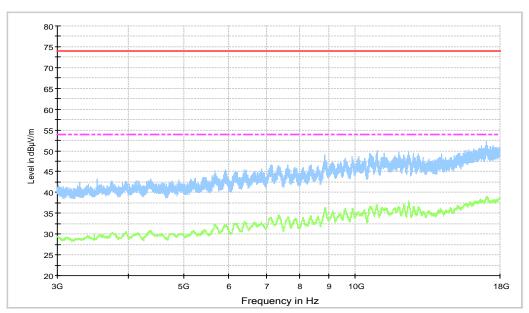


Figure A.9 Radiated Emission from 3GHz to 18GHz



# A.2 Conducted Emission Reference

FCC: CFR Part 15.107(a).

#### 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.

#### A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. During the charging mode the camera is keeping on taking photos. During the USB mode the EUT is keeping on playing MP3 and the GNSS application is started up. The model of the PC is Lenovo M4000e-17, and the serial number of the PC is M706RMW2. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### 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             |

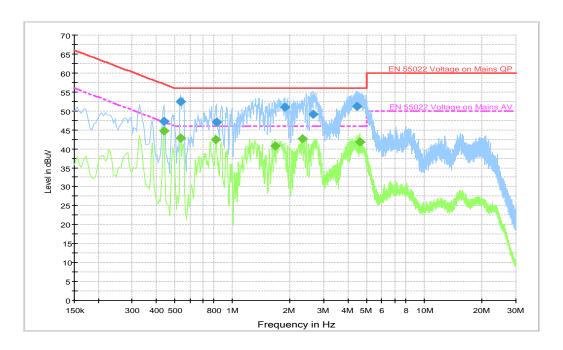
| RBW/IF bandwidth | Sweep Time(s) |  |  |  |
|------------------|---------------|--|--|--|
| 9kHz             | 1             |  |  |  |



#### A.2.5 Measurement Results

Measurement uncertainty: *U*= 3.10 dB, *k*=2.

## Charging Mode + Camera, Set.1



**Figure A.10 Conducted Emission** 

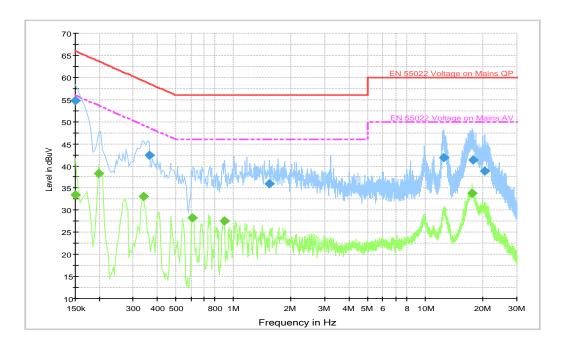
## **Final Result 1**

| Frequency | QuasiPeak | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|-----------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)    | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.442500  | 47.3      | 10000.0    | 9.000     | GND | N    | 10.3  | 9.7    | 57.0   |
| 0.537000  | 52.5      | 10000.0    | 9.000     | GND | L1   | 10.3  | 3.5    | 56.0   |
| 0.825000  | 47.0      | 10000.0    | 9.000     | GND | L1   | 10.4  | 9.0    | 56.0   |
| 1.873500  | 50.9      | 10000.0    | 9.000     | GND | L1   | 10.4  | 5.1    | 56.0   |
| 2.625000  | 49.0      | 10000.0    | 9.000     | GND | L1   | 10.5  | 7.0    | 56.0   |
| 4.483500  | 51.3      | 10000.0    | 9.000     | GND | L1   | 10.5  | 4.7    | 56.0   |

| Frequency | Average | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|---------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)  | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.438000  | 44.8    | 10000.0    | 9.000     | GND | L1   | 10.3  | 2.3    | 47.1   |
| 0.537000  | 42.9    | 10000.0    | 9.000     | GND | L1   | 10.3  | 3.1    | 46.0   |
| 0.820500  | 42.5    | 10000.0    | 9.000     | GND | L1   | 10.4  | 3.5    | 46.0   |
| 1.662000  | 40.8    | 10000.0    | 9.000     | GND | L1   | 10.4  | 5.2    | 46.0   |
| 2.319000  | 42.6    | 10000.0    | 9.000     | GND | L1   | 10.4  | 3.4    | 46.0   |
| 4.600500  | 41.8    | 10000.0    | 9.000     | GND | L1   | 10.5  | 4.2    | 46.0   |



## .USB Mode +MP3+GNSS, Set.2



**Figure A.11 Conducted Emission** 

## **Final Result 1**

| Frequency | QuasiPeak | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|-----------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)    | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.150000  | 54.7      | 10000.0    | 9.000     | GND | L1   | 10.2  | 11.3   | 66.0   |
| 0.366000  | 42.4      | 10000.0    | 9.000     | GND | L1   | 10.3  | 16.2   | 58.6   |
| 1.545000  | 36.0      | 10000.0    | 9.000     | GND | N    | 10.4  | 20.0   | 56.0   |
| 12.525000 | 42.0      | 10000.0    | 9.000     | GND | N    | 10.9  | 18.0   | 60.0   |
| 17.704500 | 41.4      | 10000.0    | 9.000     | GND | L1   | 11.3  | 18.6   | 60.0   |
| 20.391000 | 38.9      | 10000.0    | 9.000     | GND | N    | 11.3  | 21.1   | 60.0   |

| Frequency | Average | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|---------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)  | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.150000  | 33.6    | 10000.0    | 9.000     | GND | L1   | 10.2  | 22.5   | 56.0   |
| 0.199500  | 38.3    | 10000.0    | 9.000     | GND | N    | 10.3  | 15.3   | 53.6   |
| 0.339000  | 33.2    | 10000.0    | 9.000     | GND | N    | 10.3  | 16.0   | 49.2   |
| 0.609000  | 28.3    | 10000.0    | 9.000     | GND | N    | 10.4  | 17.7   | 46.0   |
| 0.897000  | 27.6    | 10000.0    | 9.000     | GND | N    | 10.4  | 18.4   | 46.0   |
| 17.587500 | 33.8    | 10000.0    | 9.000     | GND | L1   | 11.3  | 16.2   | 50.0   |



## **Charging Mode, Set.3**

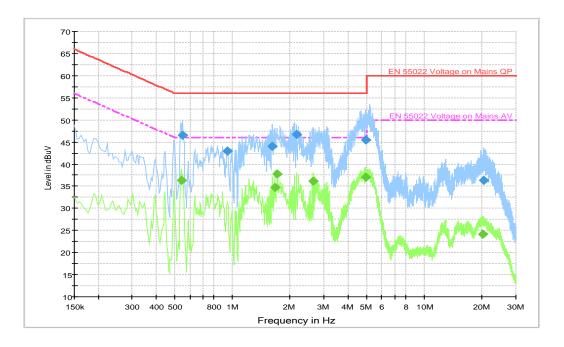


Figure A.12 Conducted Emission

## **Final Result 1**

| Frequency | QuasiPeak | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|-----------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)    | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.550500  | 46.6      | 10000.0    | 9.000     | GND | L1   | 10.3  | 9.4    | 56.0   |
| 0.942000  | 42.9      | 10000.0    | 9.000     | GND | L1   | 10.4  | 13.1   | 56.0   |
| 1.617000  | 44.0      | 10000.0    | 9.000     | GND | L1   | 10.4  | 12.0   | 56.0   |
| 2.152500  | 46.7      | 10000.0    | 9.000     | GND | L1   | 10.4  | 9.3    | 56.0   |
| 4.929000  | 45.6      | 10000.0    | 9.000     | GND | L1   | 10.5  | 10.5   | 56.0   |
| 20.422500 | 36.3      | 10000.0    | 9.000     | GND | L1   | 11.4  | 23.7   | 60.0   |

| Frequency | Average | Meas. Time | Bandwidth | PE  | Line | Corr. | Margin | Limit  |
|-----------|---------|------------|-----------|-----|------|-------|--------|--------|
| (MHz)     | (dBµV)  | (ms)       | (kHz)     |     |      | (dB)  | (dB)   | (dBµV) |
| 0.541500  | 36.3    | 10000.0    | 9.000     | GND | L1   | 10.3  | 9.7    | 46.0   |
| 1.666500  | 34.8    | 10000.0    | 9.000     | GND | L1   | 10.4  | 11.2   | 46.0   |
| 1.716000  | 37.7    | 10000.0    | 9.000     | GND | L1   | 10.4  | 8.3    | 46.0   |
| 2.647500  | 36.1    | 10000.0    | 9.000     | GND | L1   | 10.5  | 9.9    | 46.0   |
| 4.924500  | 37.0    | 10000.0    | 9.000     | GND | L1   | 10.5  | 9.0    | 46.0   |
| 20.044500 | 24.2    | 10000.0    | 9.000     | GND | L1   | 11.4  | 25.8   | 50.0   |



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

| Test Item          | Tester       |
|--------------------|--------------|
| Radiated Emission  | Zhao Wenhui  |
| Conducted Emission | Li Zongliang |

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