



# TEST REPORT

## No. I22Z70462-EMC01

for

**Samsung Electronics Co., Ltd.**

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

**Model Name: SM-A145R/DSN**

**FCC ID: ZCASMA145RN**

with

**Hardware Version: REV1.0**

**Software Version: A145R.001**

**Issued Date: 2022-12-08**

**Note:**

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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## **REPORT HISTORY**

| Report Number   | Revision | Description             | Issue Date |
|-----------------|----------|-------------------------|------------|
| I22Z70462-EMC01 | Rev.0    | 1 <sup>st</sup> edition | 2022-12-08 |

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 (BDA)**

Address: No. 18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, 100176, P.R. China

### **1.3. Testing Environment**

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

### **1.4. Project data**

Testing Start Date: 2022-11-01

Testing End Date: 2022-12-07

### **1.5. Signature**



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Li Yan

(Prepared this test report)



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Zhang Ying

(Reviewed this test report)



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Shi Suolan

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: /  
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### **2.2. Manufacturer Information**

Company Name: Samsung Electronics. Co., Ltd.  
Address: Samsung R5, Maetan dong 129, Samsung ro  
Youngtong gu, Suwon city 443 742, Korea  
City: /  
Postal Code: /  
Country: /  
Contact: Sunghoon Cho  
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Telephone: +82-10-2722-4159

### 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-A145R/DSN                                        |
| FCC ID      | ZCASMA145RN                                         |

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* | IME/SNI      | HW Version | SW Version |
|---------|--------------|------------|------------|
| UT13a   | 2270462UT13a | REV1.0     | A145R.001  |
| UT14a   | 2270462UT14a | REV1.0     | A145R.001  |

\*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    | Adapter     | /  | C to C  |
| AE2    | USB Cable1  | /  | C to C  |
| AE3    | USB Cable2  | /  | C to C  |
| AE4    | USB Cable3  | /  | C to A  |
| AE5    | Headset     | /  | /       |
| AE6    | Battery1    | /  | /       |
| AE7    | Battery2    | /  | /       |
| AE8    | Adapter     | /  | C to A  |

##### AE1

|                 |              |
|-----------------|--------------|
| Model           | EP-T1510     |
| Manufacturer    | HAEM Co.,Ltd |
| Length of cable | /            |

##### AE2

|                 |                               |
|-----------------|-------------------------------|
| Model           | EP-DN980BWZ                   |
| Manufacturer    | Samsung Electronics Co., Ltd. |
| Length of cable | /                             |

##### AE3

|                 |                               |
|-----------------|-------------------------------|
| Model           | EP-DN980BWE                   |
| Manufacturer    | Samsung Electronics Co., Ltd. |
| Length of cable | /                             |

##### AE4

|                 |                               |
|-----------------|-------------------------------|
| Model           | EP-DR140AWE                   |
| Manufacturer    | Samsung Electronics Co., Ltd. |
| Length of cable | /                             |

##### AE5

|              |            |
|--------------|------------|
| Model        | EHS61ASFWE |
| Manufacturer | ALMUS      |

|                 |                                   |
|-----------------|-----------------------------------|
| Length of cable | /                                 |
| AE6             |                                   |
| Model           | HQ-50SD                           |
| Type            | Secondary Li-ion Polymer Battery  |
| Manufacturer    | SCUD (Fujian) Electronics CO.,LTD |
| AE7             |                                   |
| Model           | HQ-50S                            |
| Type            | Secondary Li-ion Polymer Battery  |
| Manufacturer    | SCUD (Fujian) Electronics CO.,LTD |

Note:

1. The USB cables are shielded.
2. AE1 and AE5 are provided by client for relevant testing.
3. AE8 is provided by Lab for relevant testing.

### 3.4. General Description

The Equipment under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN with integrated antenna and inbuilt battery.

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

Samples undergoing test were selected by the client.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA Band 5, and LTE Band 5.

### 3.5. EUT set-ups

#### Set-up

| EUT set-up No. | Combination of EUT and AE   | Remarks                      |
|----------------|-----------------------------|------------------------------|
| Set.1          | UT13a + AE1 + AE2/AE3 +AE5  | Adapter + cable+ headset     |
| Set.2          | UT13a + AE1 + AE2/AE3       | Adapter + cable              |
| Set.3          | UT13a + AE8 + AE4 +AE5      | Adapter + cable+ headset     |
| Set.4          | UT13a + AE2/AE3 +UT14a +AE5 | EUT+EUT                      |
| Set.5          | UT13a + AE2/AE3 + HD        | EUT+HD                       |
| Set.6          | UT13a + AE2/AE3 + AE6 +PC   | Type C communication with PC |
| Set.7          | UT13a + AE4 + AE6 +PC       | USB communication with PC+SD |

#### Test mode

| Mode No. | Operating mode           | Remarks                  |
|----------|--------------------------|--------------------------|
| mode.1   | MP4 Play                 | RE, CE                   |
| mode.2   | Front Camera             | RE, CE                   |
| mode.3   | Rear Camera              | RE, CE                   |
| mode.4   | OTG Phone to Phone+MP3   | RE only                  |
| mode.5   | OTG + Mobile HD+MP4      | RE only                  |
| mode.6   | USB DATA (TYPE C)        | RE, CE                   |
| mode.7   | USB DATA (USB, SD TO PC) | RE, CE                   |
| mode.9   | CXX RX mode              | GSM850, WCDMA B5, LTE B5 |

## **4. Reference Documents**

### **4.1. Reference Documents for testing**

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

| <b>Reference</b>       | <b>Title</b>                                                                                                                                                                     | <b>Version</b> |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| FCC Part 15, Subpart B | Radio frequency devices - Unintentional Radiators                                                                                                                                | 2020           |
| ANSI C63.4             | American National Standard for<br>Methods of Measurement of Radio-<br>Noise Emissions from Low-Voltage<br>Electrical and Electronic Equipment<br>in the Range of 9 kHz to 40 GHz | 2014           |

Note: The test methods have no deviation with standards.

## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC** 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;<br>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:

|                          |                                               |
|--------------------------|-----------------------------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C                    |
| Relative humidity        | Min. = 20 %, Max. = 75 %                      |
| Shielding effectiveness  | 0.014MHz-1MHz, >60dB;<br>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  | Pass                                      |
|                                    | NA | Not applicable                            |
|                                    | F  | Fail                                      |
|                                    | BR | Re-use test data from basic model report. |

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

## 7. Test Equipment Utilized

### Test Equipment

| NO. | Description                                | TYPE      | SERIES<br>NUMBER | MANUFACTURER | CAL DUE<br>DATE | CALIBRATION<br>INTERVAL |
|-----|--------------------------------------------|-----------|------------------|--------------|-----------------|-------------------------|
| 1   | Test Receiver                              | ESU26     | 100376           | R&S          | 2023-09-22      | 1 year                  |
| 2   | Test Receiver                              | ESCI      | 100766           | R&S          | 2023-03-02      | 1 year                  |
| 3   | LISN                                       | ENV216    | 101459           | R&S          | 2023-03-16      | 1 year                  |
| 4   | BiLog Antenna                              | VULB9163  | 01177            | Schwarzbeck  | 2023-08-03      | 1 year                  |
| 5   | EMI Antenna                                | 3115      | 00167252         | ETS-Lindgren | 2022-12-26      | 1 year                  |
| 6   | Universal Radio<br>Communication<br>Tester | CMW500    | 159408           | R&S          | 2023-03-01      | 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                     |
| 10  | PC                                         | M4000e-17 | M706RMW2         | Lenovo       | N/A             | N/A                     |

### Test Software

| Test Item                    | Test Software and Version | Software Vendor |
|------------------------------|---------------------------|-----------------|
| Radiated Continuous Emission | EMC32 V8.53.0             | R&S             |
| Conducted Emission           | EMC32 V8.53.0             | 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 meters from the EUT. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m 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. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept.

#### **A.1.2 EUT Operating Mode**

The MS is operating in the USB mode, charging mode, MP4, MP3, CAMERA, OTG, RX and SD mode.

The WIFI and BT function was on and worked in receiving mode.

The EUT was tested while operating in licensed band RX mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in the Section 3.4, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

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

#### **A.1.3 Measurement Limit**

| Frequency range<br>(MHz) | Field strength limit (μV/m) |         |      |
|--------------------------|-----------------------------|---------|------|
|                          | 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/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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{\text{PL}}$ : Path Loss

$P_{\text{Mea}}$ : Measurement result on receiver.

Measurement uncertainty (worst case): 30MHz-1GHz: 5.37dB, 1GHz-18GHz: 5.58dB,  $k=2$ .

Note: all the set-up and operating mode list in section 3.5 were tested, only the worst test data are showed in this section.

#### Measurement results for Set.1+Mode3:

##### Adapter+ Rear Camera+ Headset /Average detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16950.000       | 38.84                       | -27.1           | 41.7                  | 24.31                   | 54.0           | 15.2        | V                  |
| 16922.000       | 38.82                       | -27.2           | 41.6                  | 24.36                   | 54.0           | 15.2        | V                  |
| 16948.000       | 38.81                       | -27.1           | 41.6                  | 24.29                   | 54.0           | 15.2        | V                  |
| 16932.000       | 38.80                       | -27.1           | 41.6                  | 24.32                   | 54.0           | 15.2        | V                  |
| 17037.000       | 38.80                       | -27.0           | 41.6                  | 24.19                   | 54.0           | 15.2        | V                  |
| 17028.500       | 38.80                       | -27.0           | 41.7                  | 24.18                   | 54.0           | 15.2        | V                  |

##### Adapter+ Rear Camera + Headset /Peak detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16838.500       | 52.0                        | -27.3           | 41.5                  | 37.70                   | 74.0           | 22.0        | V                  |
| 16869.500       | 52.0                        | -27.2           | 41.6                  | 37.61                   | 74.0           | 22.0        | V                  |
| 17741.000       | 51.5                        | -26.5           | 41.1                  | 36.93                   | 74.0           | 22.5        | H                  |
| 16623.000       | 51.4                        | -27.6           | 41.3                  | 37.61                   | 74.0           | 22.6        | V                  |
| 16657.000       | 51.2                        | -27.5           | 41.4                  | 37.40                   | 74.0           | 22.8        | V                  |
| 16927.500       | 51.2                        | -27.2           | 41.6                  | 36.75                   | 74.0           | 22.8        | H                  |

## Measurement results for Set.2+Mode2

### Adapter +F camera /Average detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17034.000       | 38.93                       | -27.0           | 41.6                  | 24.32                   | 54.0           | 15.1        | V                  |
| 17036.000       | 38.90                       | -27.0           | 41.6                  | 24.29                   | 54.0           | 15.1        | V                  |
| 17033.500       | 38.88                       | -27.0           | 41.6                  | 24.27                   | 54.0           | 15.1        | V                  |
| 17028.000       | 38.86                       | -27.0           | 41.7                  | 24.25                   | 54.0           | 15.1        | V                  |
| 17104.500       | 38.85                       | -27.0           | 41.5                  | 24.28                   | 54.0           | 15.1        | V                  |
| 16924.000       | 38.85                       | -27.2           | 41.6                  | 24.38                   | 54.0           | 15.2        | V                  |

### Adapter +F camera /Peak detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16815.000       | 51.6                        | -27.3           | 41.5                  | 37.39                   | 74.0           | 22.4        | V                  |
| 17567.500       | 51.6                        | -26.7           | 41.0                  | 37.31                   | 74.0           | 22.4        | V                  |
| 17044.000       | 51.5                        | -27.0           | 41.6                  | 36.91                   | 74.0           | 22.5        | H                  |
| 16872.500       | 51.5                        | -27.2           | 41.6                  | 37.12                   | 74.0           | 22.5        | V                  |
| 17026.500       | 51.5                        | -27.0           | 41.7                  | 36.85                   | 74.0           | 22.5        | V                  |
| 16374.000       | 51.4                        | -27.6           | 41.1                  | 37.87                   | 74.0           | 22.6        | V                  |

## Measurement results for Set.4+Mode5

### OTG + Headset+ MP4 /Average detector

| Frequency (MHz) | Measurement Result (dB $\mu$ V/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dB $\mu$ V) | Limit (dB $\mu$ V/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------------|-----------------|-----------------------|-------------------------------|----------------------|-------------|--------------------|
| 17033.000       | 38.98                             | -27.0           | 41.6                  | 24.37                         | 54.0                 | 15.0        | V                  |
| 17122.000       | 38.96                             | -26.9           | 41.5                  | 24.40                         | 54.0                 | 15.0        | V                  |
| 17118.500       | 38.91                             | -26.9           | 41.5                  | 24.35                         | 54.0                 | 15.1        | V                  |
| 17037.000       | 38.90                             | -27.0           | 41.6                  | 24.30                         | 54.0                 | 15.1        | V                  |
| 17121.500       | 38.90                             | -26.9           | 41.5                  | 24.34                         | 54.0                 | 15.1        | V                  |
| 16651.000       | 38.89                             | -27.5           | 41.4                  | 25.07                         | 54.0                 | 15.1        | V                  |

### OTG + Headset+ MP4 /Peak detector

| Frequency (MHz) | Measurement Result (dB $\mu$ V/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dB $\mu$ V) | Limit (dB $\mu$ V/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------------|-----------------|-----------------------|-------------------------------|----------------------|-------------|--------------------|
| 16448.000       | 51.5                              | -27.6           | 41.1                  | 38.01                         | 74.0                 | 22.5        | V                  |
| 16630.500       | 51.5                              | -27.6           | 41.3                  | 37.70                         | 74.0                 | 22.5        | V                  |
| 17116.500       | 51.3                              | -26.9           | 41.5                  | 36.77                         | 74.0                 | 22.7        | V                  |
| 17648.000       | 51.3                              | -26.6           | 41.0                  | 36.94                         | 74.0                 | 22.7        | V                  |
| 15853.000       | 51.1                              | -28.1           | 40.5                  | 38.76                         | 74.0                 | 22.9        | H                  |
| 17856.500       | 51.1                              | -26.3           | 41.2                  | 36.22                         | 74.0                 | 22.9        | V                  |

# Measurement results for Set.7+Mode7+Mode9

## USB mode (SD) + Headset + RX LTE Band5 /Average detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17032.000       | 31.48                       | -27.0           | 41.6                  | 16.87                   | 54.0           | 22.5        | V                  |
| 17030.000       | 32.59                       | -27.0           | 41.7                  | 17.98                   | 54.0           | 21.4        | V                  |
| 17035.500       | 31.79                       | -27.0           | 41.6                  | 17.19                   | 54.0           | 22.2        | V                  |
| 17030.500       | 31.57                       | -27.0           | 41.7                  | 16.96                   | 54.0           | 22.4        | V                  |
| 16948.000       | 31.72                       | -27.1           | 41.6                  | 17.21                   | 54.0           | 22.3        | V                  |
| 17028.500       | 32.44                       | -27.0           | 41.7                  | 17.83                   | 54.0           | 21.6        | V                  |

## USB mode (SD) + Headset + RX LTE Band5 /Peak detector

| Frequency (MHz) | Measurement Result (dBμV/m) | Cable loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBμV) | Limit (dBμV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16765.000       | 51.6                        | -27.3           | 41.5                  | 37.53                   | 74.0           | 22.4        | H                  |
| 16664.000       | 51.5                        | -27.5           | 41.4                  | 37.65                   | 74.0           | 22.5        | V                  |
| 16599.000       | 51.5                        | -27.6           | 41.3                  | 37.76                   | 74.0           | 22.5        | V                  |
| 17609.500       | 51.4                        | -26.7           | 41.0                  | 37.04                   | 74.0           | 22.6        | H                  |
| 16957.500       | 51.3                        | -27.1           | 41.7                  | 36.76                   | 74.0           | 22.7        | V                  |
| 16742.500       | 51.3                        | -27.4           | 41.4                  | 37.21                   | 74.0           | 22.7        | V                  |

### Adapter+ Rear Camera + Headset, Set.1+Mode3

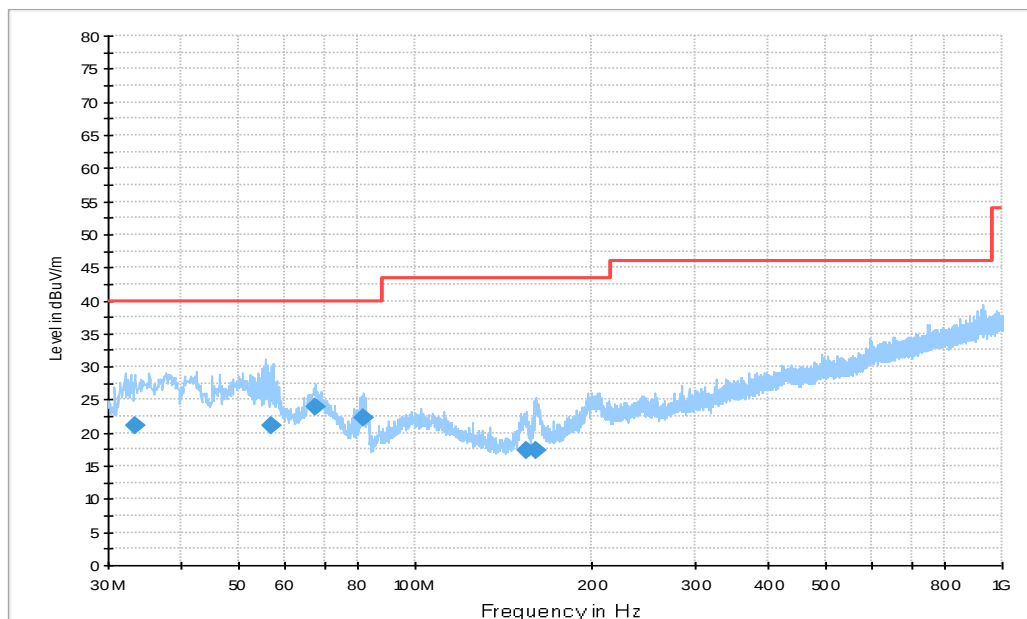
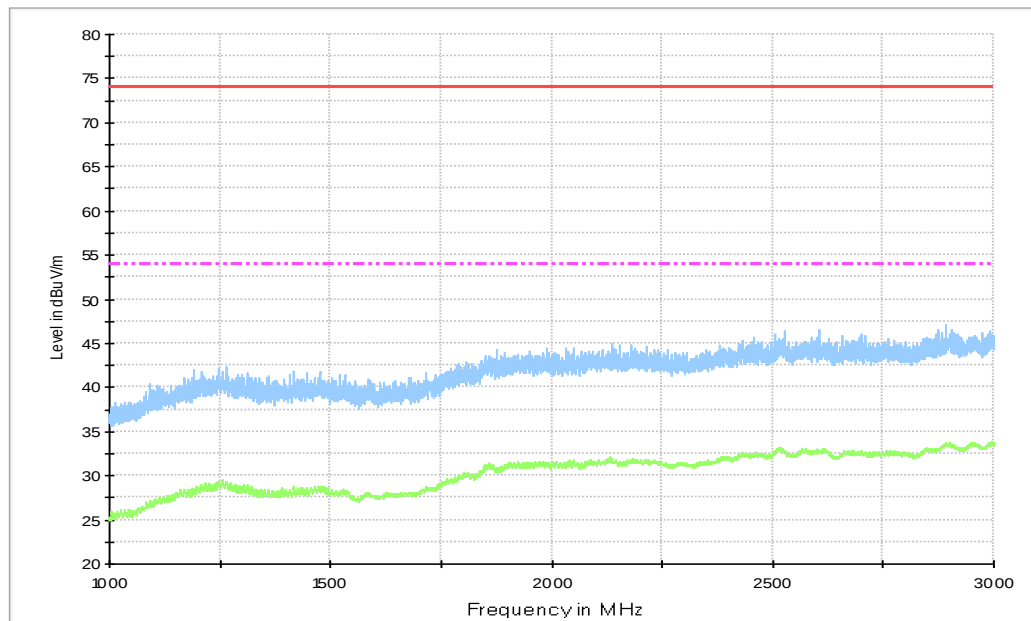


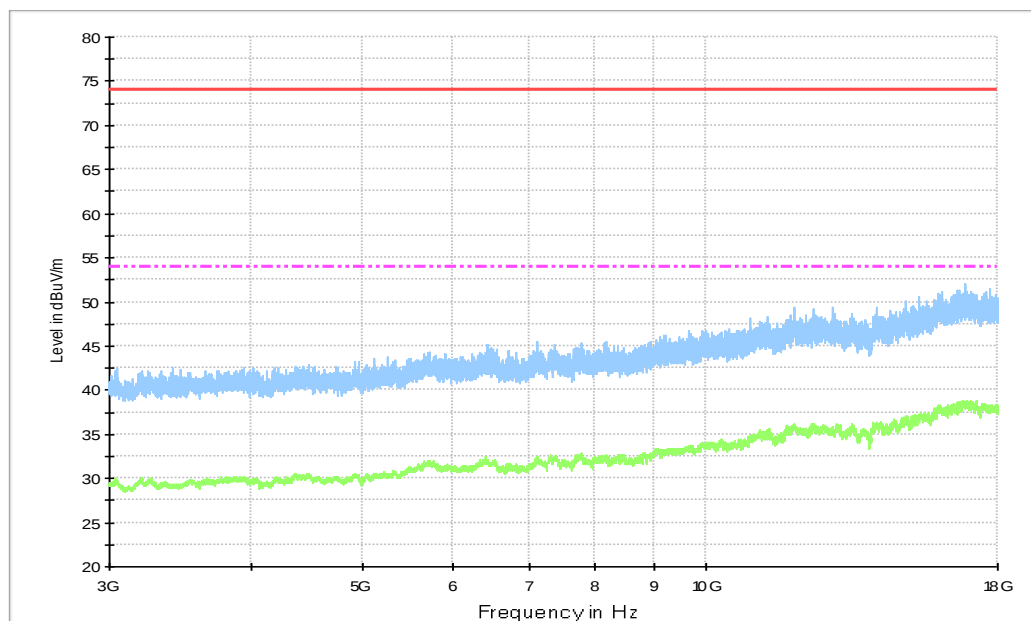
Figure A.1 Radiated Emission from 30MHz to 1GHz

### Final Result 1

| Frequency (MHz) | QuasiPeak (dB $\mu$ V/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB $\mu$ V/m) |
|-----------------|--------------------------|-------------|--------------|---------------|------------|-------------|----------------------|
| 33.298000       | 21.1                     | 100.0       | V            | 76.0          | -3.2       | 18.9        | 40.0                 |
| 56.772000       | 21.0                     | 125.0       | V            | 57.0          | -0.2       | 19.0        | 40.0                 |
| 67.733000       | 23.9                     | 100.0       | V            | 83.0          | -3.1       | 16.1        | 40.0                 |
| 81.507000       | 22.4                     | 125.0       | V            | 237.0         | -6.1       | 17.6        | 40.0                 |
| 154.25700       | 17.3                     | 113.0       | V            | 0.0           | -4.4       | 26.2        | 43.5                 |
| 160.85300       | 17.4                     | 113.0       | V            | -1.0          | -3.9       | 26.1        | 43.5                 |



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



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

Adapter +F camera, Set.2+Mode2

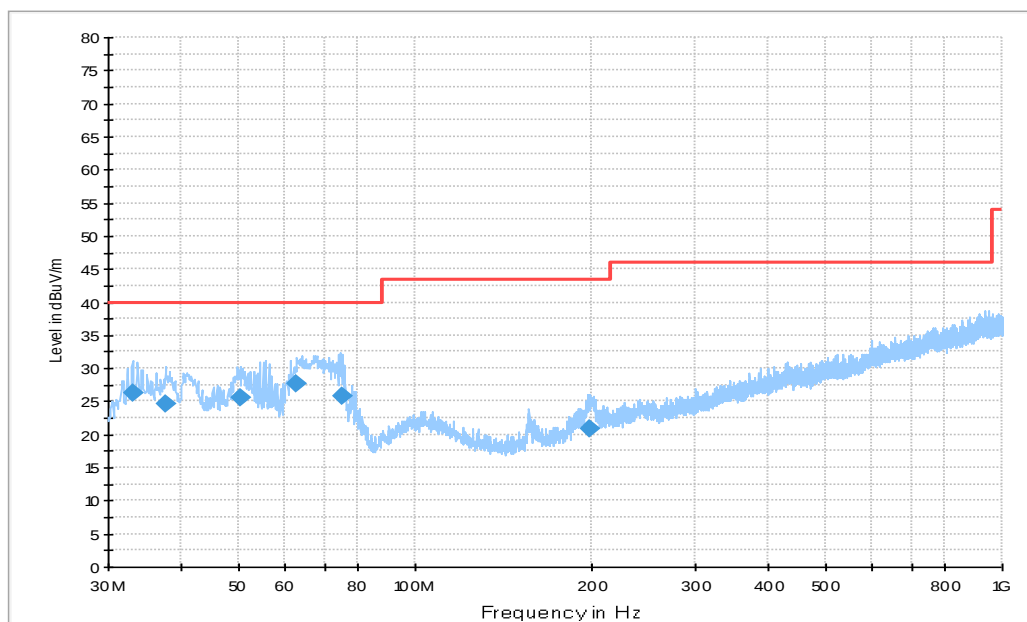
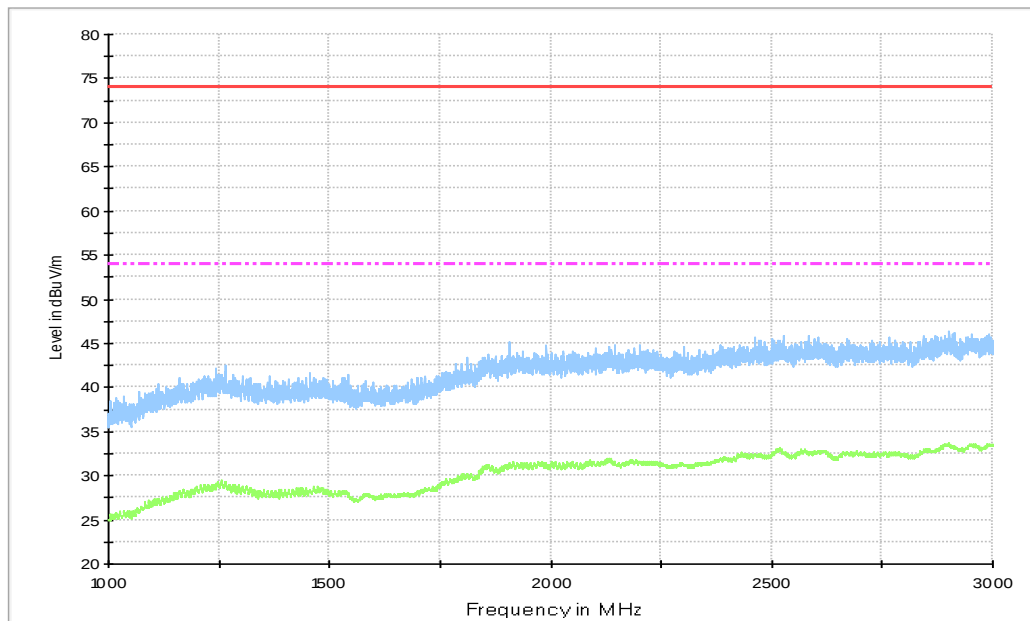


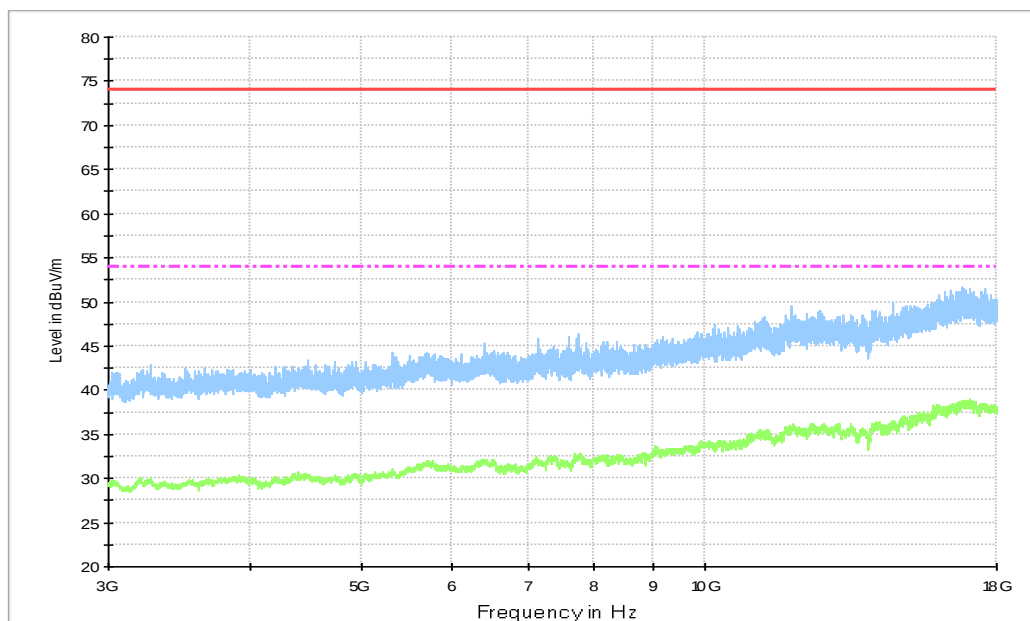
Figure A.4 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 33.007000       | 26.2               | 100.0       | V            | 135.0         | -3.3       | 13.8        | 40.0           |
| 37.566000       | 24.7               | 113.0       | V            | 180.0         | -1.6       | 15.3        | 40.0           |
| 50.467000       | 25.5               | 100.0       | V            | 45.0          | 0.6        | 14.5        | 40.0           |
| 62.786000       | 27.6               | 100.0       | V            | 270.0         | -1.5       | 12.4        | 40.0           |
| 75.105000       | 25.9               | 100.0       | V            | 289.0         | -5.7       | 14.1        | 40.0           |
| 199.07100       | 20.8               | 113.0       | V            | 206.0         | -0.6       | 22.7        | 43.5           |



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



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

# OTG + Headset+ MP4, Set.4+Mode5

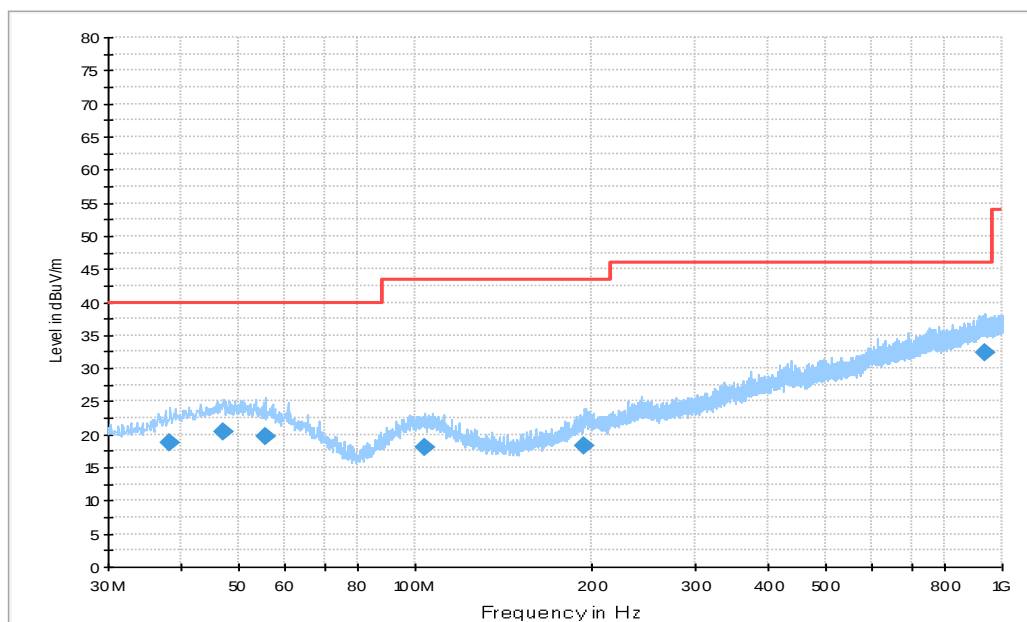
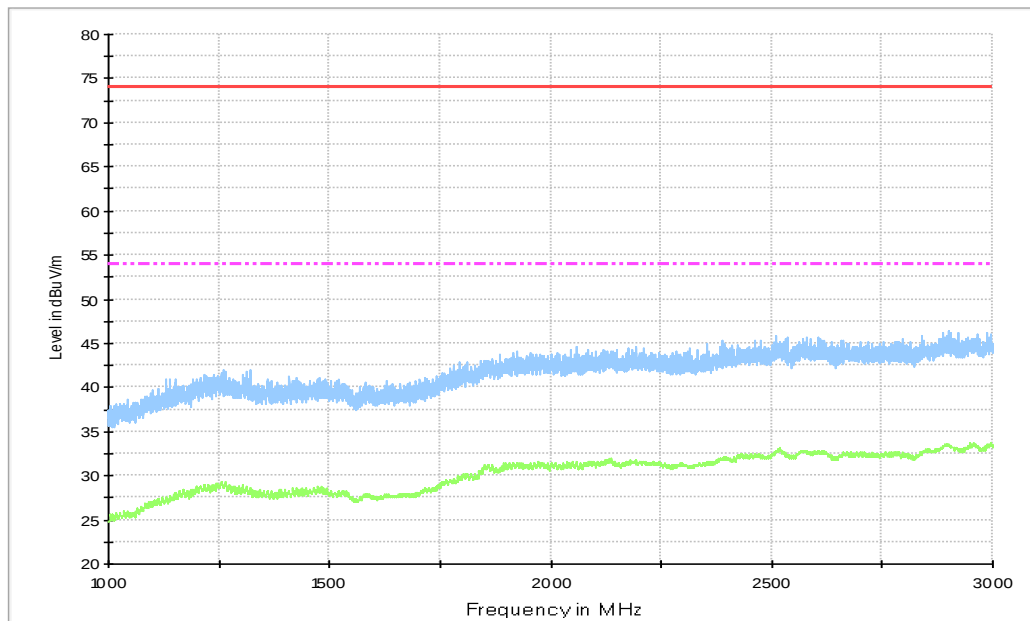


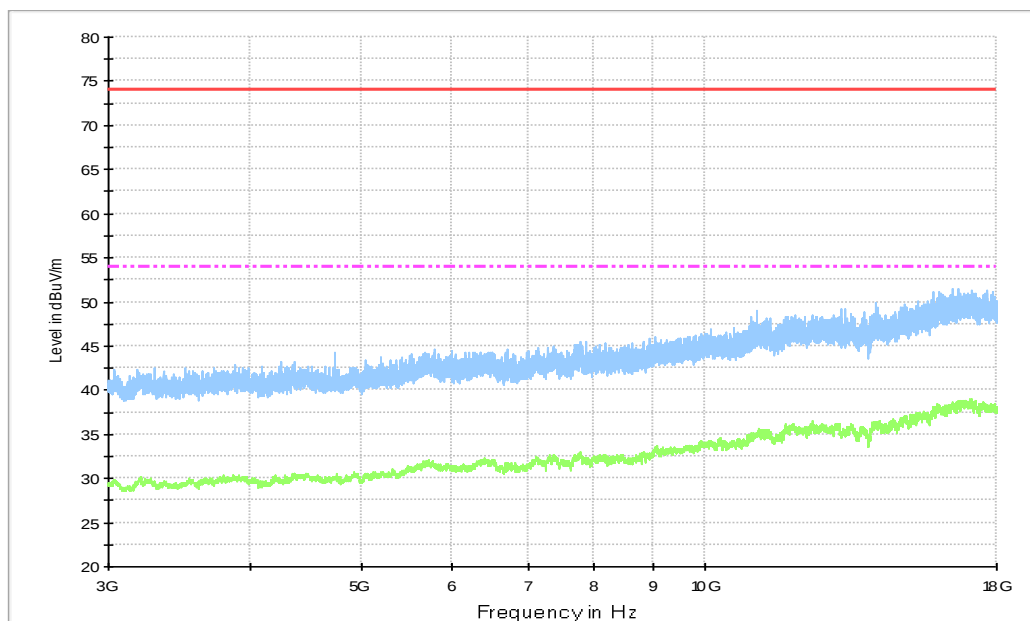
Figure A.7 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 38.245000       | 18.8               | 100.0       | V            | 173.0         | -1.4       | 21.2        | 40.0           |
| 47.169000       | 20.5               | 100.0       | V            | 225.0         | 0.4        | 19.5        | 40.0           |
| 55.705000       | 19.8               | 100.0       | H            | 192.0         | -0.1       | 20.2        | 40.0           |
| 104.10800       | 18.1               | 113.0       | H            | 135.0         | -1.2       | 25.4        | 43.5           |
| 194.60900       | 18.4               | 100.0       | V            | 83.0          | -0.8       | 25.1        | 43.5           |
| 936.07700       | 32.4               | 100.0       | V            | 38.0          | 13.1       | 13.6        | 46.0           |



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



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

# USB mode (SD) + Headset + RX LTE Band5, Set.6+Mode7+Mode9

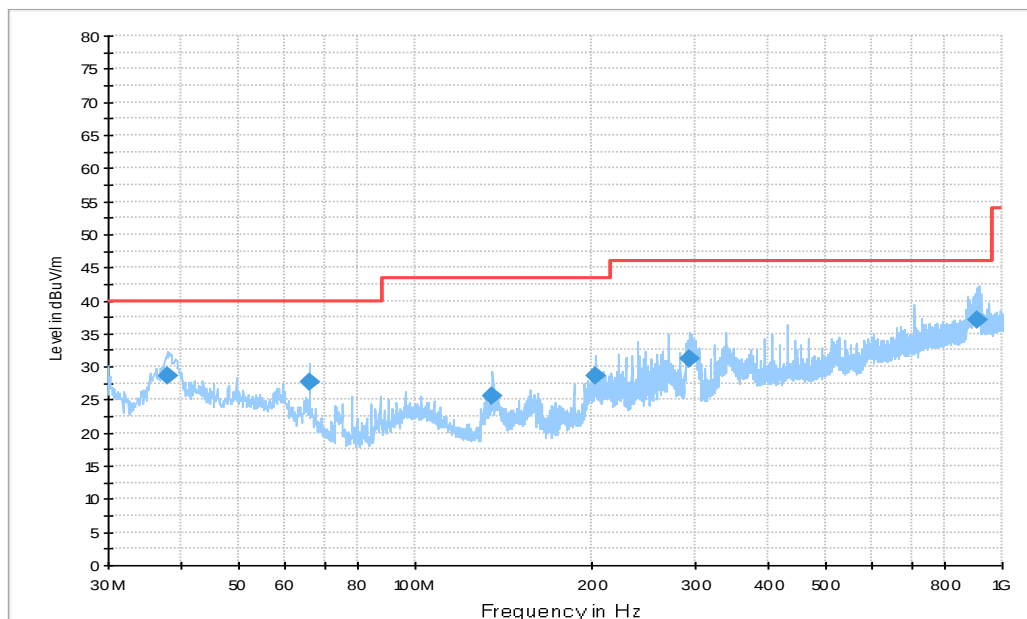
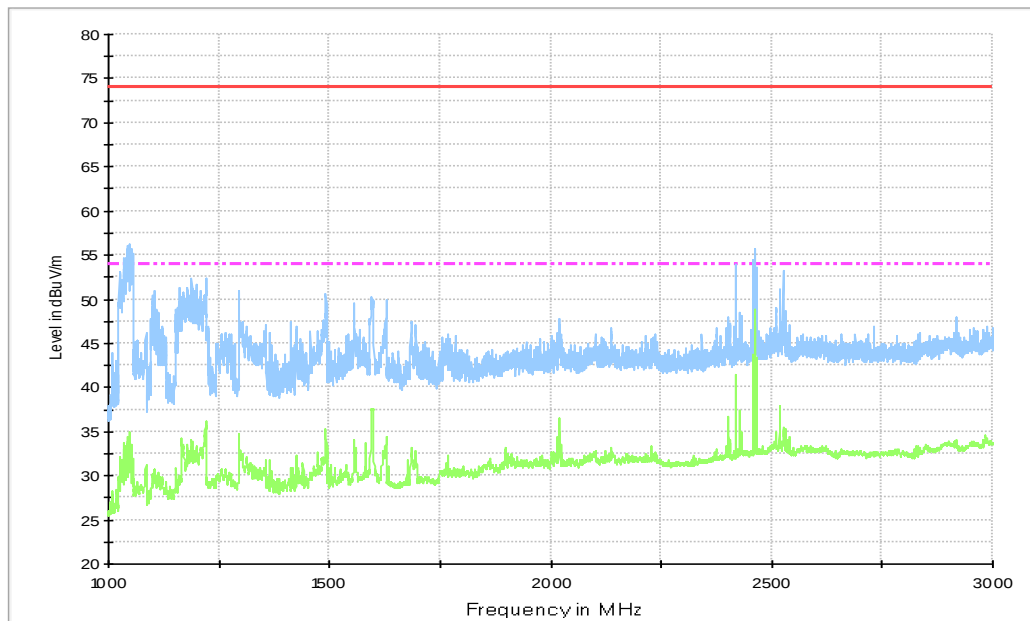


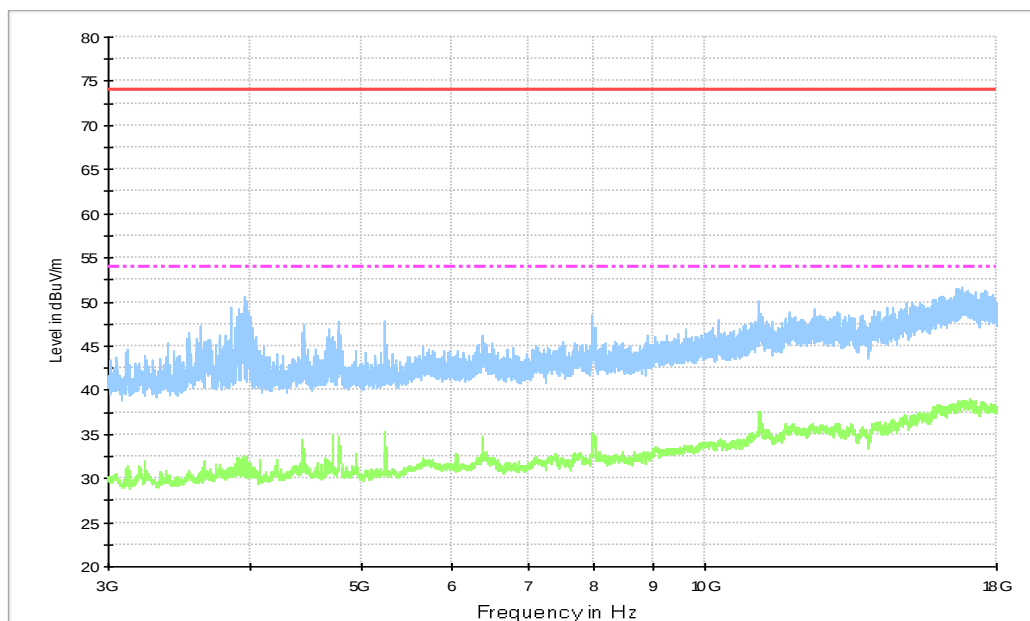
Figure A.10 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 37.954000       | 28.6               | 100.0       | V            | -39.0         | -1.4       | 11.4        | 40.0           |
| 66.084000       | 27.7               | 100.0       | V            | 270.0         | -2.4       | 12.3        | 40.0           |
| 135.43900       | 25.5               | 113.0       | H            | 263.0         | -4.5       | 18.0        | 43.5           |
| 203.24200       | 28.7               | 125.0       | H            | 198.0         | -1.0       | 14.8        | 43.5           |
| 293.25800       | 31.3               | 100.0       | H            | 173.0         | 1.2        | 14.7        | 46.0           |
| 905.52200       | 37.2               | 113.0       | V            | 186.0         | 12.9       | 8.8         | 46.0           |



**Figure A.11 Radiated Emission from 1GHz to 3GHz**



**Figure A.12 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, charging mode, MP4, MP3, CAMERA and SD mode.

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 (dB $\mu$ V) |           |
|------------------------------------------------|------------------------------|-----------|
|                                                | 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             |

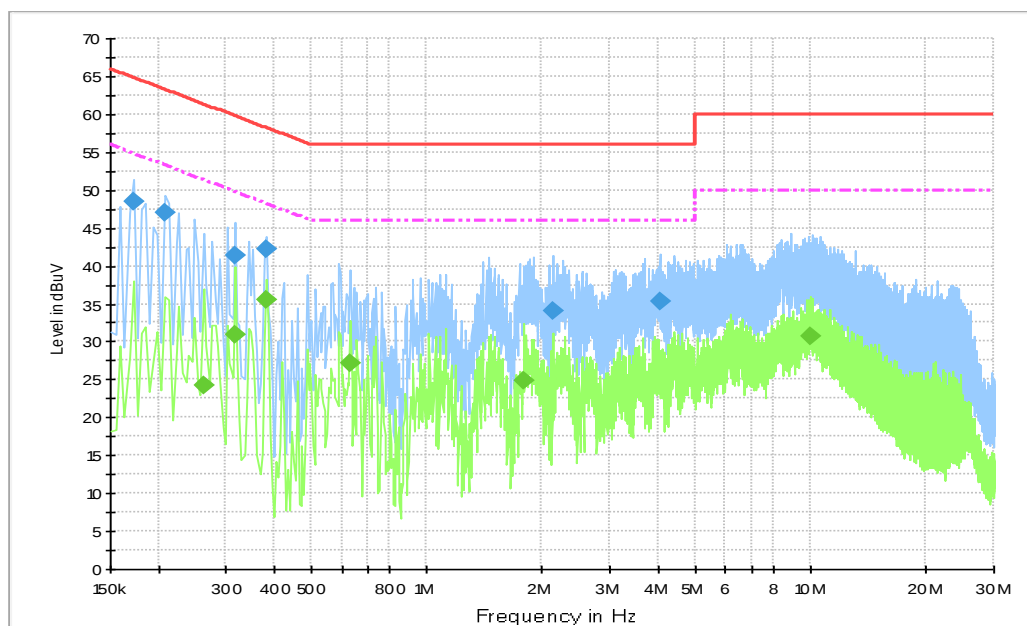
|                  |               |
|------------------|---------------|
| RBW/IF bandwidth | Sweep Time(s) |
| 9kHz             | 1             |

### A.2.5 Measurement Results

Measurement uncertainty:  $U=3.10\text{dB}$ ,  $k=2$ .

Note: all the set-up and operating mode list in section 3.5 were tested, only the worst test data are showed in this section.

#### Set.1+Mode3



**Figure A.13 Conducted Emission**

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

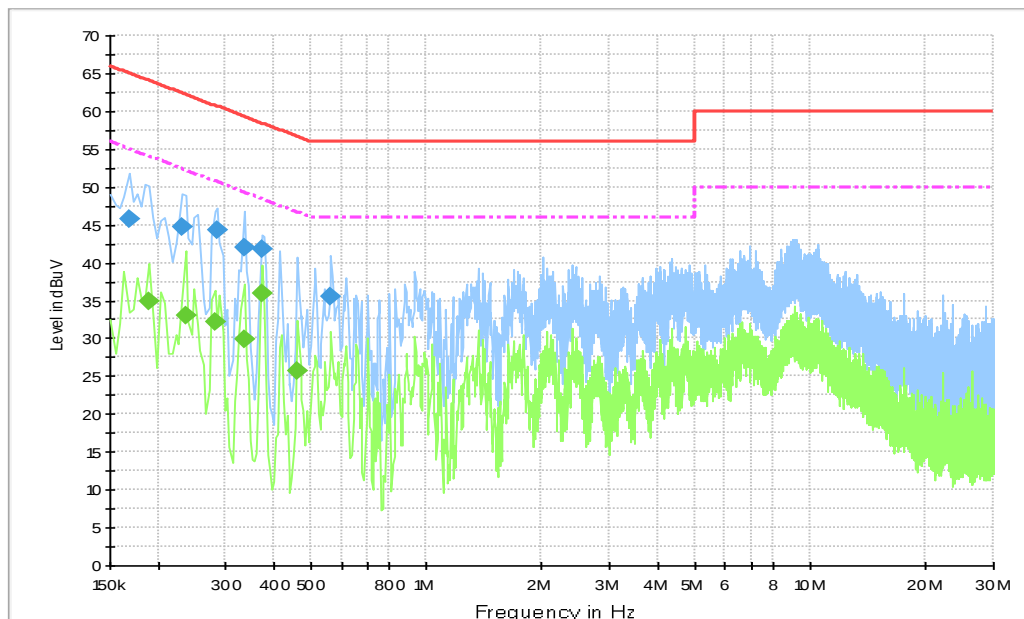
#### Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|--------|------|------------|-------------|--------------|
| 0.172500        | 48.5             | 9.000           | On     | L1   | 19.9       | 16.3        | 64.8         |
| 0.208500        | 47.0             | 9.000           | On     | L1   | 19.7       | 16.3        | 63.3         |
| 0.316500        | 41.3             | 9.000           | On     | L1   | 19.8       | 18.5        | 59.8         |
| 0.384000        | 42.3             | 9.000           | On     | L1   | 19.8       | 15.9        | 58.2         |
| 2.139000        | 34.0             | 9.000           | On     | N    | 19.6       | 22.0        | 56.0         |
| 4.038000        | 35.2             | 9.000           | On     | L1   | 19.6       | 20.8        | 56.0         |

#### Final Result 2

| Frequency (MHz) | Average (dBμV) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.262500        | 24.2           | 9.000           | On     | N    | 19.8       | 27.1        | 51.4         |
| 0.316500        | 30.9           | 9.000           | On     | N    | 19.8       | 18.9        | 49.8         |
| 0.384000        | 35.5           | 9.000           | On     | L1   | 19.8       | 12.7        | 48.2         |
| 0.631500        | 27.3           | 9.000           | On     | N    | 19.7       | 18.7        | 46.0         |
| 1.792500        | 24.9           | 9.000           | On     | N    | 19.6       | 21.1        | 46.0         |
| 9.982500        | 30.7           | 9.000           | On     | N    | 19.7       | 19.3        | 50.0         |

## Set.2+Mode2



**Figure A.14 Conducted Emission**

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

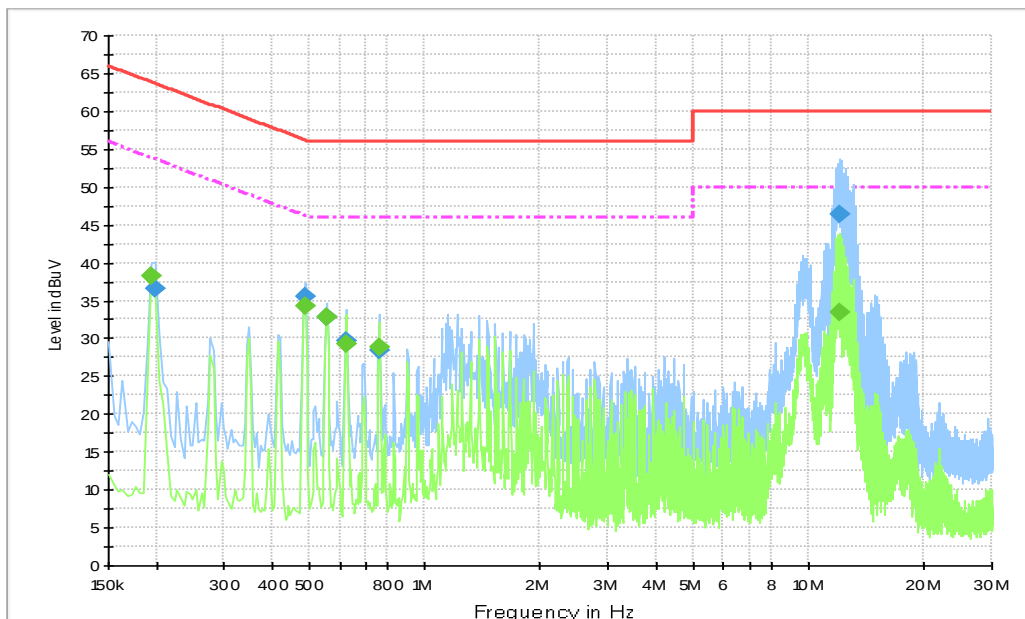
## Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.168000           | 45.7                | 9.000              | On     | N    | 19.9          | 19.3           | 65.1            |
| 0.231000           | 44.6                | 9.000              | On     | N    | 19.8          | 17.8           | 62.4            |
| 0.285000           | 44.2                | 9.000              | On     | N    | 19.7          | 16.4           | 60.7            |
| 0.334500           | 42.1                | 9.000              | On     | N    | 19.8          | 17.2           | 59.3            |
| 0.375000           | 41.8                | 9.000              | On     | N    | 19.8          | 16.6           | 58.4            |
| 0.564000           | 35.5                | 9.000              | On     | N    | 19.8          | 20.5           | 56.0            |

## Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.190500           | 34.9              | 9.000              | On     | N    | 19.8          | 19.2           | 54.0            |
| 0.235500           | 33.0              | 9.000              | On     | L1   | 19.8          | 19.2           | 52.3            |
| 0.280500           | 32.1              | 9.000              | On     | L1   | 19.7          | 18.7           | 50.8            |
| 0.334500           | 29.9              | 9.000              | On     | L1   | 19.8          | 19.4           | 49.3            |
| 0.375000           | 35.8              | 9.000              | On     | L1   | 19.8          | 12.6           | 48.4            |
| 0.460500           | 25.7              | 9.000              | On     | L1   | 19.8          | 21.0           | 46.7            |

## Set.7+Mode7, USB (SD) mode



**Figure A.15 Conducted Emission**

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

### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.199500           | 36.5                | 9.000              | On     | L1   | 19.7          | 27.2           | 63.6            |
| 0.487500           | 35.5                | 9.000              | On     | N    | 19.8          | 20.7           | 56.2            |
| 0.555000           | 32.8                | 9.000              | On     | L1   | 19.8          | 23.2           | 56.0            |
| 0.622500           | 29.6                | 9.000              | On     | L1   | 19.7          | 26.4           | 56.0            |
| 0.762000           | 28.4                | 9.000              | On     | N    | 19.7          | 27.6           | 56.0            |
| 12.106500          | 46.5                | 9.000              | On     | N    | 19.8          | 13.5           | 60.0            |

### Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.195000           | 38.3              | 9.000              | On     | N    | 19.7          | 15.6           | 53.8            |
| 0.487500           | 34.4              | 9.000              | On     | N    | 19.8          | 11.9           | 46.2            |
| 0.555000           | 32.8              | 9.000              | On     | N    | 19.8          | 13.2           | 46.0            |
| 0.622500           | 29.2              | 9.000              | On     | N    | 19.7          | 16.8           | 46.0            |
| 0.762000           | 28.8              | 9.000              | On     | L1   | 19.7          | 17.2           | 46.0            |
| 12.102000          | 33.5              | 9.000              | On     | N    | 19.8          | 16.5           | 50.0            |

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

| Test Item          | Tester      |
|--------------------|-------------|
| Radiated Emission  | Zhao Wenhui |
| Conducted Emission | Guo Qian    |

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