



# TEST REPORT

## No. 23T04Z70626-01

for

**Samsung Electronics Co., Ltd.**

**Multi-band GSM/WCDMA/LTE/5GNR Phone with Bluetooth, WLAN**

**Model Name: SM-M556B/DS**

with

**FCC ID: ZCASMM556B**

**Hardware Version: REV1.0**

**Software Version: M556B.001**

**Issued Date: 2024-01-15**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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 |
|----------------|----------|-------------------------|------------|
| 23T04Z70626-01 | Rev.0    | 1 <sup>st</sup> edition | 2024-01-15 |

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 American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA 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: 2023-12-01

Testing End Date: 2024-01-05

### 1.5. Signature



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Li Yan

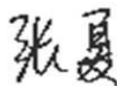
(Prepared this test report)



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Zhang Ying

(Reviewed this test report)



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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 Person: Jenni Chun  
Contact Email: j1.chun@samsung.com  
Telephone: +1-201-937-4203  
Fax: /

### **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 Person: Sunghoon Cho  
Contact Email: ggobi.cho@samsung.com  
Telephone: +82-10-2722-4159  
Fax: /

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

#### **3.1. About EUT**

|             |                                                           |
|-------------|-----------------------------------------------------------|
| Description | Multi-band GSM/WCDMA/LTE/5G NR Phone with Bluetooth, WLAN |
| Model name  | SM-M556B/DS                                               |
| FCC ID      | ZCASMM556B                                                |

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      | HW Version | SW Version |
|---------|--------------|------------|------------|
| UT22a   | 2370626UT22a | REV1.0     | M556B.001  |
| UT23a   | 2370626UT23a | REV1.0     | M556B.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* | Name            | Model       | Manufacturer                          |
|--------|-----------------|-------------|---------------------------------------|
| AE1    | Battery         | HQ-6887NAS  | Ningde Amperex Technology Limited     |
| AE2-1* | Adapter         | EP-TA845    | SoluM Co.,Ltd.                        |
| AE2-2* | Adapter         | EP-T1510JWE | DONGYANG E&P INC                      |
| AE3-1  | Date Cable1 C-C | EP-DN975BWE | ASAP TECHNOLOGY(JIANGXI) CO.,LTD.     |
| AE3-2  | Date Cable2 C-C | EP-DN975BWE | RFTECH ELECTRONICS (HUIZHOU) CO., LTD |
| AE4*   | Date Cable3 C-A | EP-DR140AWE | CRESYN HANOI Co., Ltd                 |
| AE5*   | Headset         | QL6601A     | Quancheng Electronics                 |
| AE6*   | PC              | /           | /                                     |
| AE7*   | SD card         | /           | /                                     |
| AE8*   | MHD             | /           | /                                     |
| AE9*   | Keyboard        | /           | Samsung Electronics Co.,Ltd           |

\* The USB cables are shielded.

\*AE ID: is used to identify the test sample in the lab internally.

\*AE2-1, AE2-2, AE4 and A5 are not the AE for EUT, provided by the client for relevant tests.

\*AE6, AE7 and AE8 are not the AE for EUT, provided by the Lab for relevant tests.

### 3.4. General Description

Equipment under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE/5G NR Phone with Bluetooth, WLAN with integrated antenna.

|                      |                                                                                                                                                                                                                                        |                                                                                                                                                                         |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description          | Multi-band GSM/WCDMA/LTE/5G NR Phone with Bluetooth, WLAN                                                                                                                                                                              |                                                                                                                                                                         |
| Model name           | SM-M556B/DS                                                                                                                                                                                                                            |                                                                                                                                                                         |
| Marketing name       | /                                                                                                                                                                                                                                      |                                                                                                                                                                         |
| Brand name           | SAMSUNG                                                                                                                                                                                                                                |                                                                                                                                                                         |
| Cellular Bands       | <input type="checkbox"/> GSM                                                                                                                                                                                                           | Bands 850/900/1800/1900MHz                                                                                                                                              |
|                      | <input type="checkbox"/> CDMA                                                                                                                                                                                                          | /                                                                                                                                                                       |
|                      | <input checked="" type="checkbox"/> WCDMA                                                                                                                                                                                              | Bands 1/2/4/5/8                                                                                                                                                         |
|                      | <input checked="" type="checkbox"/> LTE                                                                                                                                                                                                | Bands 1/2/3/4/5/7/8/12/17/20/25/26/28/38/40/41/66                                                                                                                       |
|                      | <input checked="" type="checkbox"/> 5G NR SA                                                                                                                                                                                           | Bands 1/3/5/7/8/20/28/38/40/41/66/77/78                                                                                                                                 |
|                      | <input checked="" type="checkbox"/> 5G NR NSA                                                                                                                                                                                          | Refer to the manufacturer's specifications                                                                                                                              |
| Unlicensed Radio     | <input checked="" type="checkbox"/> Wi-Fi 2.4GHz                                                                                                                                                                                       | 802.11b/g/n(20MHz,40MHz)/ax(20MHz,40MHz)                                                                                                                                |
|                      | <input checked="" type="checkbox"/> Wi-Fi 5GHz                                                                                                                                                                                         | 802.11a/n(20MHz,40MHz)/ac(20MHz,40MHz,80MHz)/ax(20MHz,40MHz,80MHz,160MHz)                                                                                               |
|                      | <input checked="" type="checkbox"/> Wi-Fi 5.8GHz                                                                                                                                                                                       | 802.11a/n(20MHz,40MHz)/ac(20MHz,40MHz,80MHz)/ax(20MHz,40MHz,80MHz,160MHz)                                                                                               |
|                      | <input checked="" type="checkbox"/> Bluetooth                                                                                                                                                                                          | <input checked="" type="checkbox"/> EDR <input type="checkbox"/> BLE4 <input checked="" type="checkbox"/> BLE5                                                          |
| Other                | <input checked="" type="checkbox"/> GNSS                                                                                                                                                                                               | <input checked="" type="checkbox"/> GPS <input checked="" type="checkbox"/> BDS <input checked="" type="checkbox"/> Galileo <input checked="" type="checkbox"/> Glonass |
|                      | <input type="checkbox"/> FM <input checked="" type="checkbox"/> MP3 <input checked="" type="checkbox"/> MP4 <input checked="" type="checkbox"/> Camera <input checked="" type="checkbox"/> USB <input checked="" type="checkbox"/> NFC |                                                                                                                                                                         |
|                      | <input checked="" type="checkbox"/> External memory                                                                                                                                                                                    |                                                                                                                                                                         |
| Temperature          | -10-55℃                                                                                                                                                                                                                                |                                                                                                                                                                         |
| Normal Voltage       | 3.85V                                                                                                                                                                                                                                  |                                                                                                                                                                         |
| Extreme Low Voltage  | 3.60V                                                                                                                                                                                                                                  |                                                                                                                                                                         |
| Extreme High Voltage | 4.4V                                                                                                                                                                                                                                   |                                                                                                                                                                         |

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA Band 5, LTE Band 5, LTE Band 12, LTE Band 17, LTE Band 26, 5G NR Band5.

Samples undergoing test were selected by the client.

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

For more EUT information please refers to the manufacturer's specifications or user's manual.

### 3.5. EUT set-ups

#### Set-up

| EUT set-up No. | Combination of EUT and AE | Remarks                      |
|----------------|---------------------------|------------------------------|
| Set.1          | UT22a + AE1 + AE3-1 +AE5  | Adapter1 + cable1            |
| Set.2          | UT22a + AE2 + AE3-2 +AE5  | Adapter2 + cable2            |
| Set.3          | UT22a +AE5                | headset                      |
| Set.4          | UT22a + AE3-1/2 + UT23a   | EUT+EUT                      |
| Set.5          | UT22a + AE3-1/2 + HD      | EUT+HD                       |
| Set.6          | UT22a + AE3-1/2 + PC      | Type C communication with PC |
| Set.7          | UT22a + AE4 + PC + SD     | 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       | 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.8   | CXX RX mode              | GSM850, WCDMA Band 5, LTE Band 5, LTE Band 12, LTE Band 17, LTE Band 26, 5G NR Band5 (Low/Mid/High channel) |

## 4. Reference Documents

### 4.1. Documents supplied by applicant

EUT parameters are supplied by the client or manufacturer, which is the basis of testing.

### 4.2. Reference Documents for testing

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

| Reference                        | Title                                                                                                                                                                        | Version |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| FCC 47 CFR<br>Part 15, Subpart B | Radio frequency devices - Unintentional Radiators                                                                                                                            | 2021    |
| ANSI C63.4                       | American National Standard for Methods of<br>Measurement of Radio-Noise Emissions from<br>Low-Voltage Electrical and Electronic Equipment in<br>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;          |
| Electrical insulation    | 1MHz—1000MHz, >90dB.<br>> 2 MΩ |
| Ground system resistance | < 4 Ω                          |
| Temperature              | Min. = 15 °C, Max. = 35 °C     |

## 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 Equipments Utilized

### Test Equipment

| NO. | Description                          | TYPE      | SERIES NUMBER | MANUFACTURER | CAL DUE DATE | CALIBRATION INTERVAL |
|-----|--------------------------------------|-----------|---------------|--------------|--------------|----------------------|
| 1   | Test Receiver                        | ESU26     | 100376        | R&S          | 2024-06-29   | 1 year               |
| 2   | Test Receiver                        | ESCI      | 100766        | R&S          | 2024-02-29   | 1 year               |
| 3   | LISN                                 | ENV216    | 101459        | R&S          | 2024-03-30   | 1 year               |
| 4   | BiLog Antenna                        | VULB9163  | 01223         | Schwarzbeck  | 2024-08-18   | 1 year               |
| 5   | EMI Antenna                          | 3115      | 00119021      | ETS-Lindgren | 2024-06-24   | 1 year               |
| 6   | Universal Radio Communication Tester | CMW500    | 159408        | R&S          | 2024-04-26   | 1 year               |
| 7   | Universal Radio Communication Tester | SP9500    | 20482         | StarPoint    | 2024-11-29   | 1 Year               |
| 8   | Printer                              | P1606dn   | VNC3L52122    | HP           | N/A          | N/A                  |
| 9   | Keyboard                             | KU-1601   | 2048361       | Lenovo       | N/A          | N/A                  |
| 10  | Mouse                                | EMS-537A  | 8021S3MC      | Lenovo       | N/A          | N/A                  |
| 11  | PC                                   | M4000e-17 | M706RMW2      | Lenovo       | N/A          | N/A                  |
| 12  | PC                                   | T14S      | PC-1RP0TY     | 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 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 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 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 EUT is operating in the USB mode, charging mode, MP3, MP4, CAMERA, OTG, SD and cellular RX 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 ( $\mu\text{V/m}$ ) |         |      |
|--------------------------|------------------------------------------|---------|------|
|                          | 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.

#### 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:

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

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: 5.73dB, 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.

# Set.1+Mode3, Rear Camera

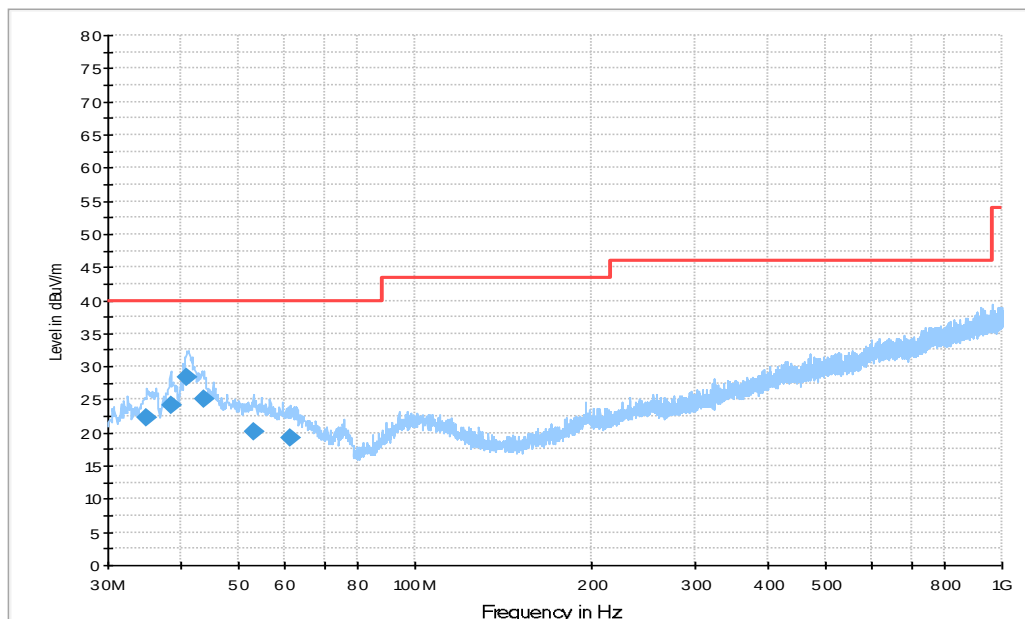


Figure A.1 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 34.947000       | 22.4               | 100.0       | V            | 90.0          | -2.2       | 17.6        | 40.0           |
| 38.342000       | 24.1               | 100.0       | V            | 108.0         | -1.0       | 15.9        | 40.0           |
| 40.961000       | 28.5               | 100.0       | V            | 64.0          | -0.2       | 11.5        | 40.0           |
| 43.677000       | 25.0               | 100.0       | V            | 45.0          | 0.3        | 15.0        | 40.0           |
| 52.989000       | 20.3               | 125.0       | H            | 45.0          | 0.4        | 19.7        | 40.0           |
| 61.234000       | 19.2               | 100.0       | V            | 135.0         | -1.1       | 20.8        | 40.0           |

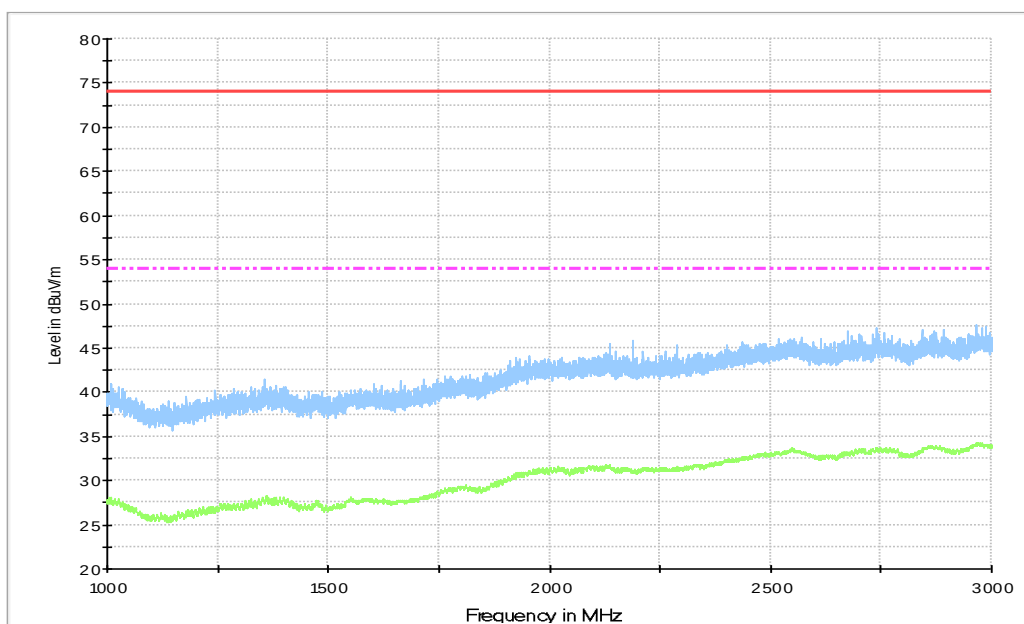


Figure A.2 Radiated Emission from 1GHz to 3GHz

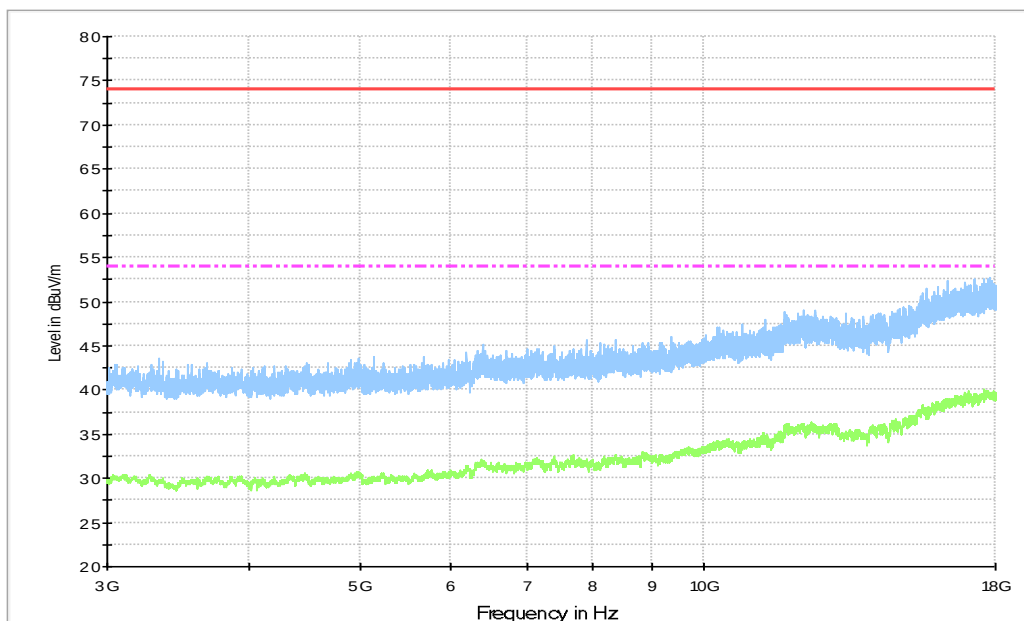


Figure A.3 Radiated Emission from 3GHz to 18GHz

### Average detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17602.000       | 39.83                       | -23.75          | 40.60                 | 22.98                   | 54.00          | 14.17       | V                  |
| 17618.000       | 39.83                       | -23.72          | 40.60                 | 22.94                   | 54.00          | 14.17       | V                  |
| 17713.000       | 39.82                       | -23.66          | 40.59                 | 22.89                   | 54.00          | 14.18       | H                  |
| 17623.500       | 39.81                       | -23.70          | 40.60                 | 22.91                   | 54.00          | 14.19       | H                  |
| 17605.500       | 39.80                       | -23.75          | 40.60                 | 22.95                   | 54.00          | 14.20       | V                  |
| 17604.000       | 39.77                       | -23.75          | 40.60                 | 22.92                   | 54.00          | 14.23       | H                  |

### Peak detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17471.500       | 52.69                       | -24.06          | 40.63                 | 36.12                   | 74.00          | 21.31       | V                  |
| 17592.500       | 52.64                       | -23.78          | 40.60                 | 35.82                   | 74.00          | 21.36       | V                  |
| 17702.500       | 52.54                       | -23.66          | 40.60                 | 35.60                   | 74.00          | 21.46       | V                  |
| 17866.500       | 52.30                       | -23.52          | 40.50                 | 35.32                   | 74.00          | 21.70       | H                  |
| 17746.500       | 52.30                       | -23.65          | 40.55                 | 35.39                   | 74.00          | 21.70       | H                  |
| 17694.000       | 52.24                       | -23.66          | 40.60                 | 35.30                   | 74.00          | 21.76       | H                  |

## Set.2+Mode2+Mode8, Front Camera + RX LTE Band 12

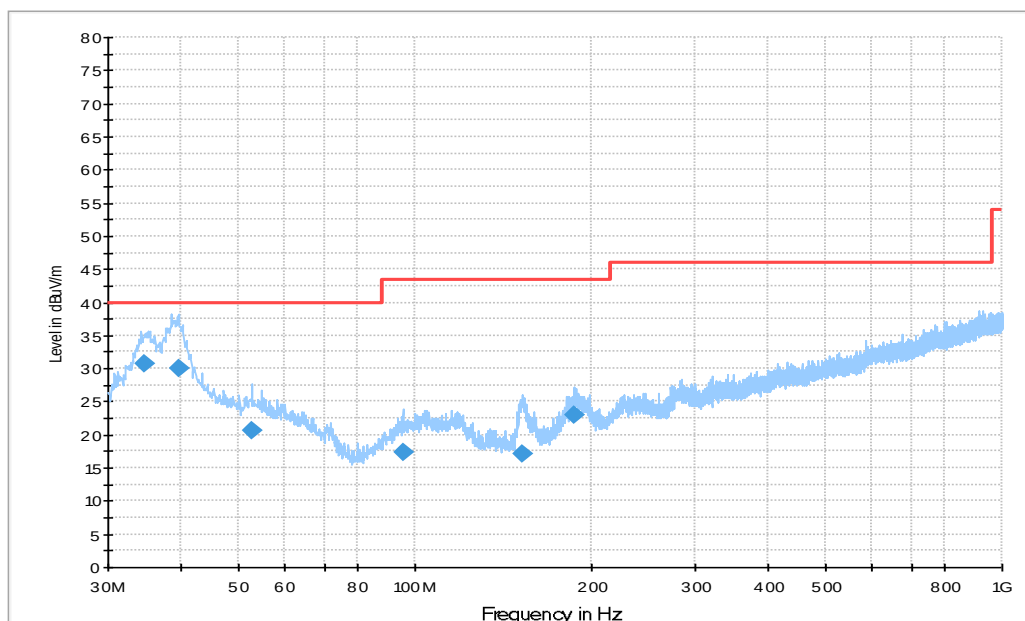


Figure A.4 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 34.656000       | 30.8               | 100.0       | V            | 45.0          | -2.4       | 9.2         | 40.0           |
| 39.603000       | 30.0               | 100.0       | V            | -45.0         | -0.6       | 10.0        | 40.0           |
| 52.698000       | 20.7               | 100.0       | V            | 70.0          | 0.4        | 19.3        | 40.0           |
| 95.281000       | 17.5               | 125.0       | V            | 218.0         | -1.9       | 26.0        | 43.5           |
| 152.51100       | 17.2               | 113.0       | V            | 200.0         | -4.4       | 26.3        | 43.5           |
| 186.26700       | 23.0               | 100.0       | V            | 0.0           | -1.9       | 20.5        | 43.5           |

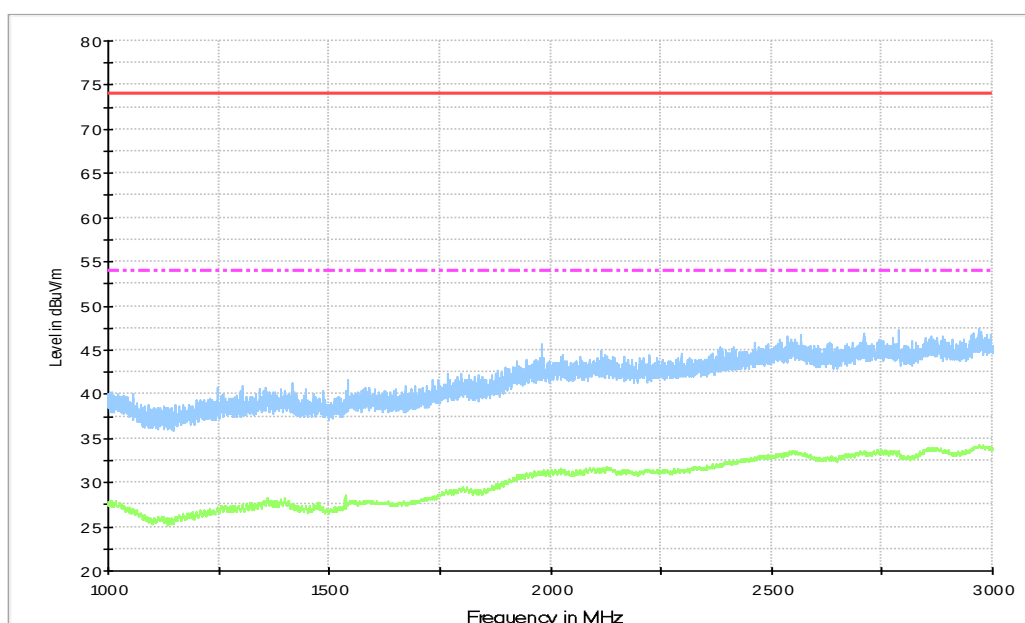


Figure A.5 Radiated Emission from 1GHz to 3GHz

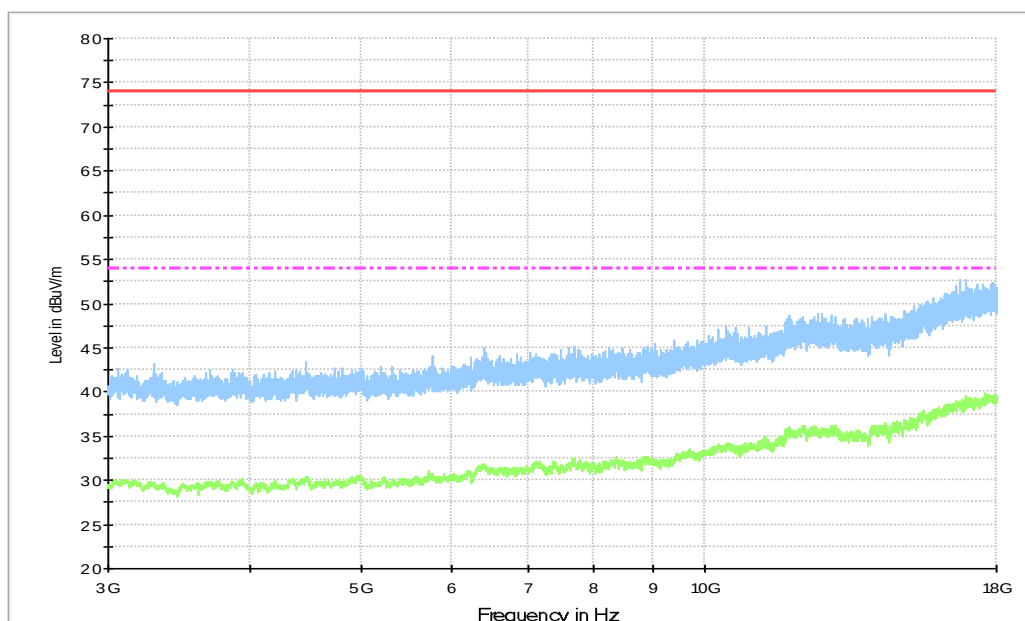


Figure A.6 Radiated Emission from 3GHz to 18GHz

### Average detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17602.000       | 39.85                       | -23.75          | 40.60                 | 23.00                   | 54.00          | 14.15       | V                  |
| 17621.500       | 39.76                       | -23.71          | 40.60                 | 22.87                   | 54.00          | 14.24       | V                  |
| 17707.500       | 39.75                       | -23.66          | 40.59                 | 22.82                   | 54.00          | 14.25       | V                  |
| 17612.000       | 39.73                       | -23.73          | 40.60                 | 22.86                   | 54.00          | 14.27       | V                  |
| 17707.000       | 39.71                       | -23.66          | 40.59                 | 22.78                   | 54.00          | 14.29       | H                  |
| 17605.000       | 39.71                       | -23.75          | 40.60                 | 22.85                   | 54.00          | 14.29       | V                  |

### Peak detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16709.500       | 52.81                       | -25.24          | 41.48                 | 36.57                   | 74.00          | 21.19       | H                  |
| 16916.500       | 52.71                       | -24.68          | 41.27                 | 36.12                   | 74.00          | 21.29       | H                  |
| 17853.500       | 52.37                       | -23.55          | 40.50                 | 35.42                   | 74.00          | 21.63       | V                  |
| 17518.000       | 52.27                       | -23.95          | 40.60                 | 35.62                   | 74.00          | 21.73       | V                  |
| 17812.000       | 52.16                       | -23.63          | 40.50                 | 35.29                   | 74.00          | 21.84       | H                  |
| 17960.000       | 52.14                       | -23.34          | 40.56                 | 34.92                   | 74.00          | 21.86       | V                  |

### Set.3+Mode1+Mode8, MP4 +RX LTE B5

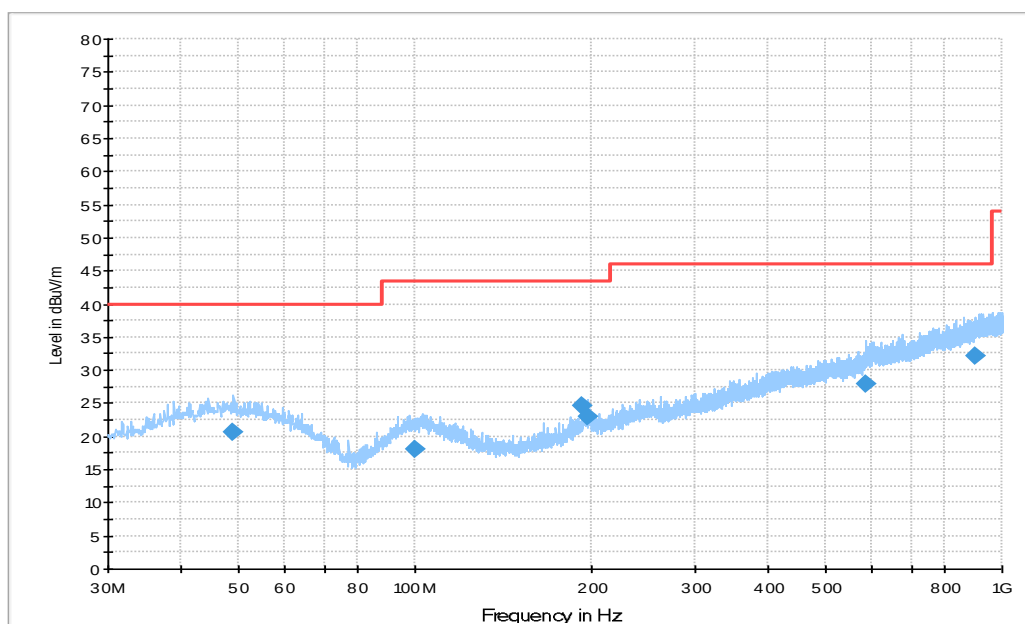


Figure A.7 Radiated Emission from 30MHz to 1GHz

### Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 49.109000       | 20.6               | 100.0       | H            | 25.0          | 0.9        | 19.4        | 40.0           |
| 99.840000       | 18.0               | 100.0       | H            | 147.0         | -1.3       | 25.5        | 43.5           |
| 191.99000       | 24.7               | 100.0       | H            | 77.0          | -1.1       | 18.8        | 43.5           |
| 196.64600       | 23.0               | 100.0       | H            | 90.0          | -0.3       | 20.5        | 43.5           |
| 587.16800       | 27.8               | 113.0       | V            | 19.0          | 9.1        | 18.2        | 46.0           |
| 898.53800       | 32.1               | 100.0       | V            | 166.0         | 13.1       | 13.9        | 46.0           |

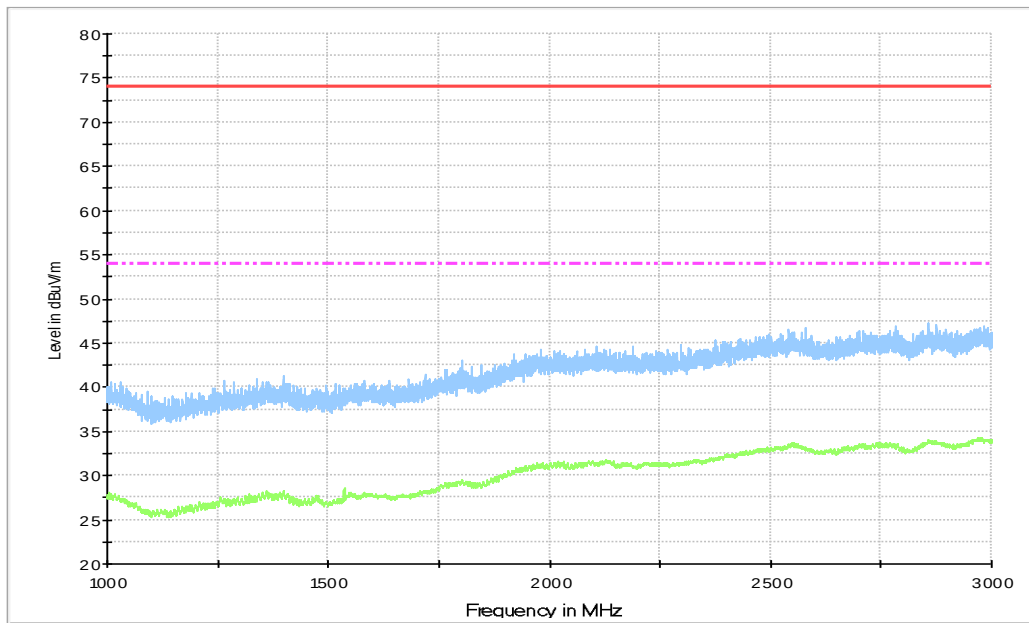


Figure A.8 Radiated Emission from 1GHz to 3GHz

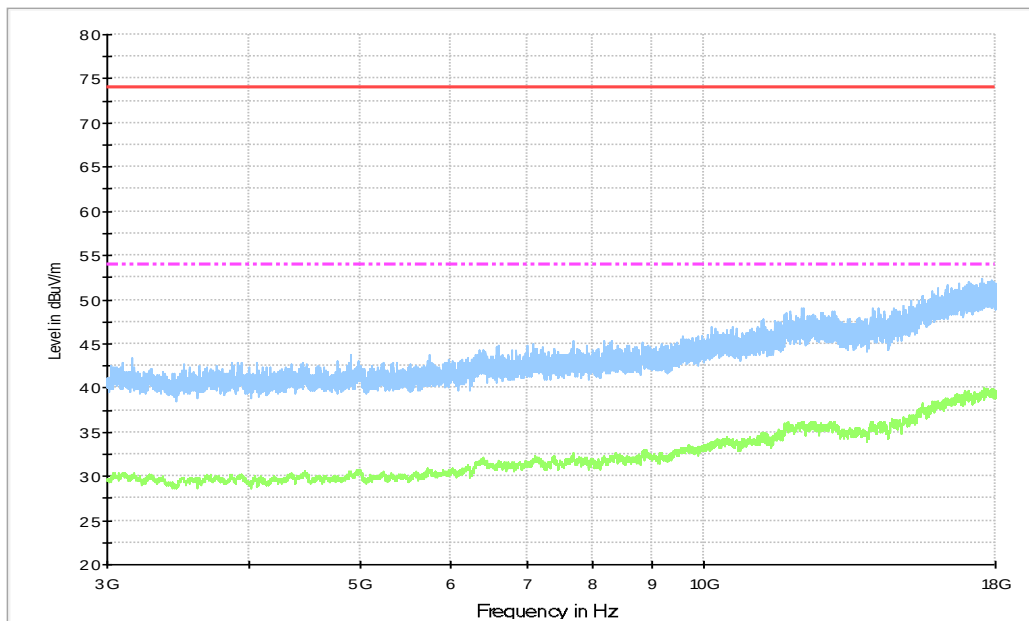


Figure A.9 Radiated Emission from 3GHz to 18GHz

### Average detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17613.500       | 40.12                       | -23.73          | 40.60                 | 23.25                   | 54.00          | 13.88       | V                  |
| 17609.000       | 40.10                       | -23.74          | 40.60                 | 23.24                   | 54.00          | 13.90       | V                  |
| 17604.500       | 39.92                       | -23.75          | 40.60                 | 23.07                   | 54.00          | 14.08       | H                  |
| 17714.500       | 39.91                       | -23.66          | 40.59                 | 22.98                   | 54.00          | 14.09       | V                  |
| 17713.000       | 39.90                       | -23.66          | 40.59                 | 22.97                   | 54.00          | 14.10       | H                  |
| 17622.500       | 39.90                       | -23.71          | 40.60                 | 23.00                   | 54.00          | 14.10       | V                  |

### Peak detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 16709.500       | 52.81                       | -25.24          | 41.48                 | 36.57                   | 74.00          | 21.19       | H                  |
| 16916.500       | 52.71                       | -24.68          | 41.27                 | 36.12                   | 74.00          | 21.29       | H                  |
| 17853.500       | 52.37                       | -23.55          | 40.50                 | 35.42                   | 74.00          | 21.63       | V                  |
| 17518.000       | 52.27                       | -23.95          | 40.60                 | 35.62                   | 74.00          | 21.73       | V                  |
| 17812.000       | 52.16                       | -23.63          | 40.50                 | 35.29                   | 74.00          | 21.84       | H                  |
| 17960.000       | 52.14                       | -23.34          | 40.56                 | 34.92                   | 74.00          | 21.86       | V                  |

# Set.4+Mode4+Mode8, OTG + RX NR Band5

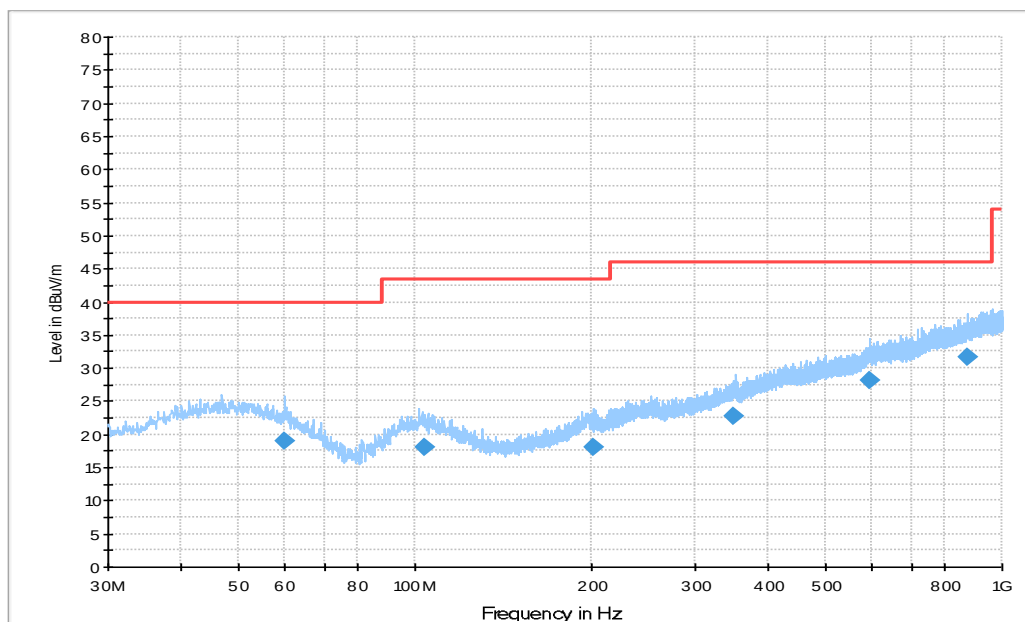
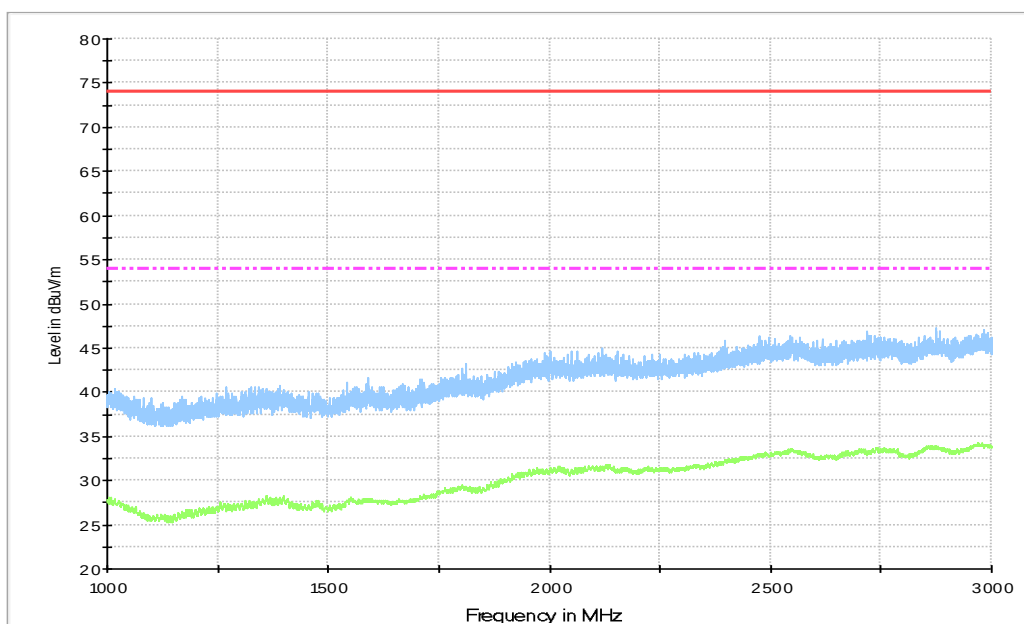


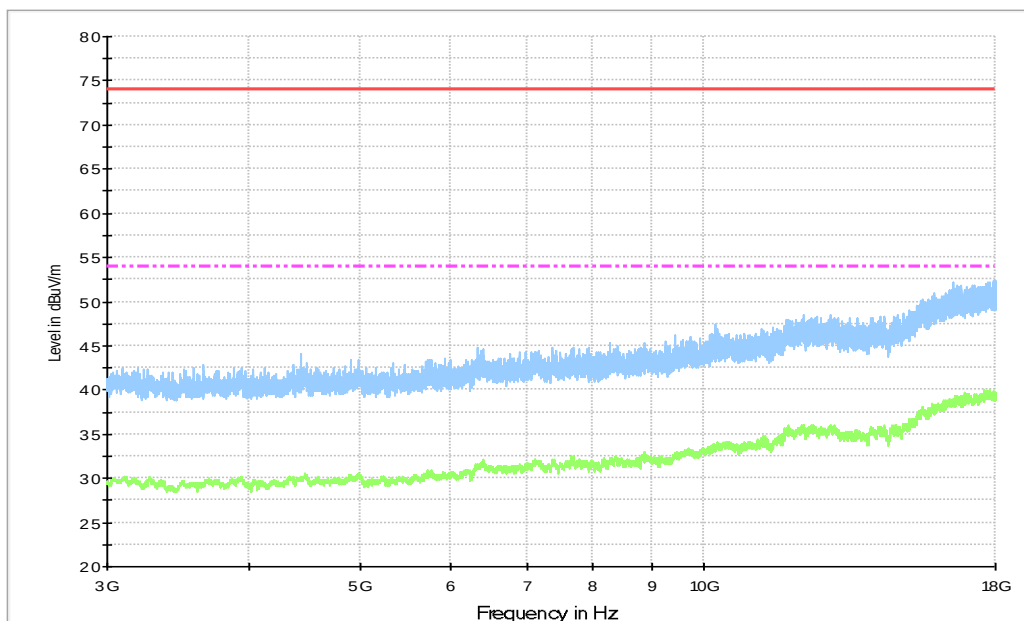
Figure A.10 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 60.070000       | 19.0               | 100.0       | V            | 308.0         | -0.7       | 21.0        | 40.0           |
| 104.01100       | 18.0               | 100.0       | V            | 109.0         | -1.1       | 25.5        | 43.5           |
| 201.59300       | 18.1               | 100.0       | H            | 231.0         | -0.8       | 25.4        | 43.5           |
| 349.22700       | 22.8               | 100.0       | V            | 225.0         | 4.1        | 23.2        | 46.0           |
| 594.15200       | 28.1               | 100.0       | V            | -39.0         | 9.3        | 17.9        | 46.0           |
| 875.54900       | 31.8               | 100.0       | V            | 167.0         | 12.7       | 14.2        | 46.0           |



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



**Figure A.12 Radiated Emission from 3GHz to 18GHz**

### Average detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 18000.000       | 39.59                       | -23.41          | 40.60                 | 22.39                   | 54.00          | 14.41       | V                  |
| 17999.500       | 39.48                       | -23.40          | 40.60                 | 22.28                   | 54.00          | 14.52       | V                  |
| 17999.000       | 39.60                       | -23.40          | 40.60                 | 22.40                   | 54.00          | 14.40       | H                  |
| 17998.500       | 39.57                       | -23.39          | 40.60                 | 22.36                   | 54.00          | 14.43       | H                  |
| 17998.000       | 39.64                       | -23.39          | 40.60                 | 22.43                   | 54.00          | 14.36       | V                  |
| 17997.500       | 39.46                       | -23.38          | 40.60                 | 22.25                   | 54.00          | 14.54       | H                  |

### Peak detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17898.500       | 52.34                       | -23.46          | 40.50                 | 35.30                   | 74.00          | 21.66       | H                  |
| 17997.000       | 52.29                       | -23.38          | 40.60                 | 35.08                   | 74.00          | 21.71       | H                  |
| 16504.000       | 52.28                       | -25.55          | 41.21                 | 36.62                   | 74.00          | 21.72       | V                  |
| 17770.500       | 52.24                       | -23.64          | 40.53                 | 35.35                   | 74.00          | 21.76       | V                  |
| 17897.000       | 52.19                       | -23.46          | 40.50                 | 35.15                   | 74.00          | 21.81       | V                  |
| 17743.000       | 52.11                       | -23.65          | 40.56                 | 35.21                   | 74.00          | 21.89       | H                  |

Set.7+Mode7+Mode9, USB (SD TO PC) +RX LTE Band26

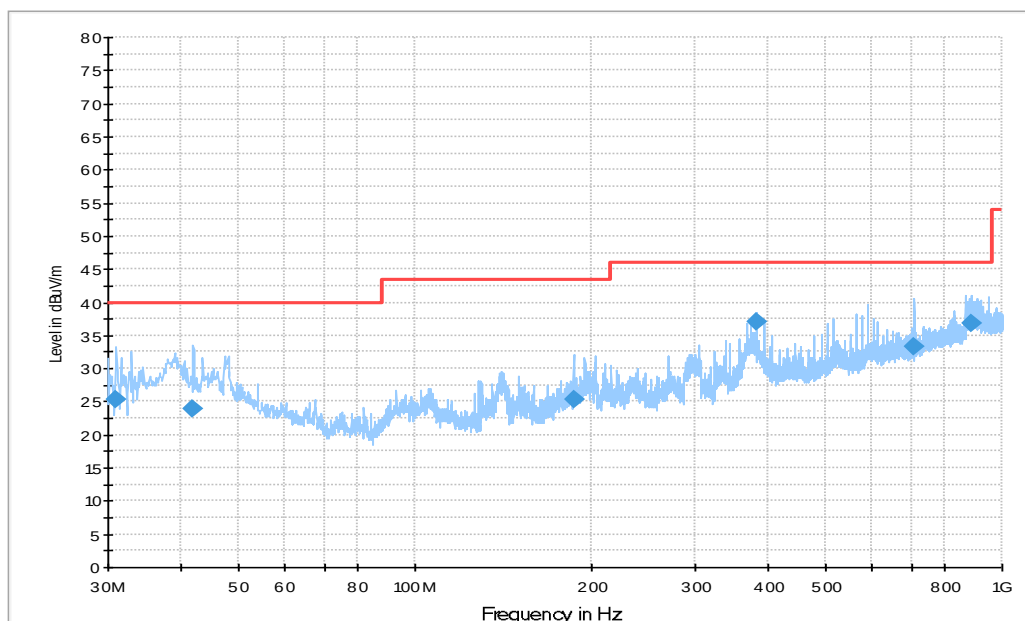


Figure A.13 Radiated Emission from 30MHz to 1GHz

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|--------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 30.970000       | 25.2               | 100.0       | V            | 211.0         | -3.5       | 14.8        | 40.0           |
| 41.931000       | 23.9               | 113.0       | V            | 0.0           | -0.2       | 16.1        | 40.0           |
| 186.07300       | 25.5               | 113.0       | H            | 180.0         | -2.0       | 18.0        | 43.5           |
| 380.94600       | 37.0               | 100.0       | V            | 12.0          | 4.7        | 9.0         | 46.0           |
| 707.06000       | 33.4               | 113.0       | H            | 154.0         | 10.1       | 12.6        | 46.0           |
| 885.24900       | 36.9               | 113.0       | V            | 6.0           | 12.8       | 9.1         | 46.0           |

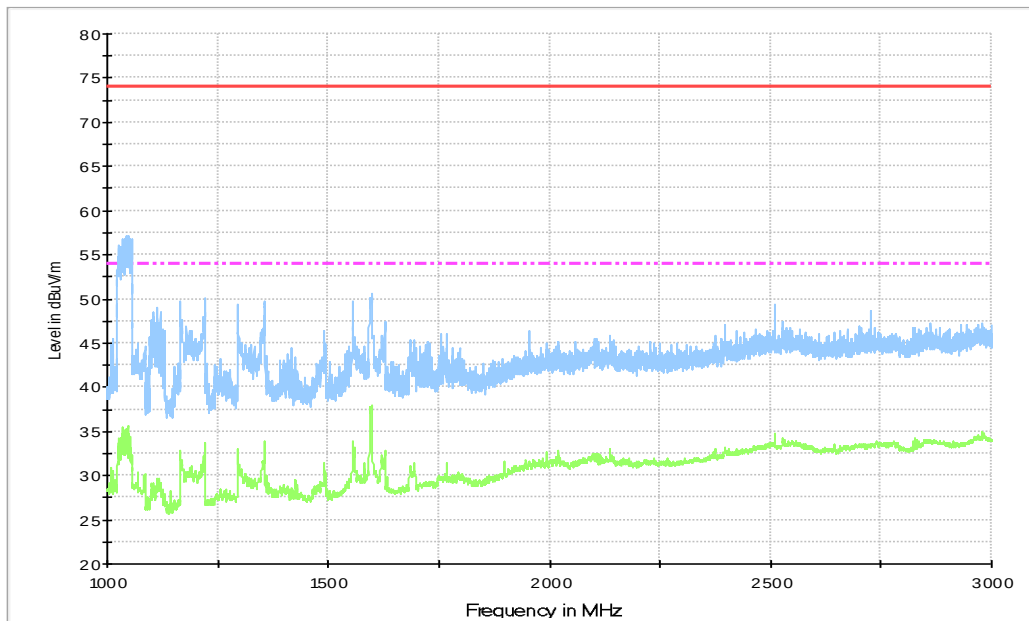


Figure A.14 Radiated Emission from 1GHz to 3GHz

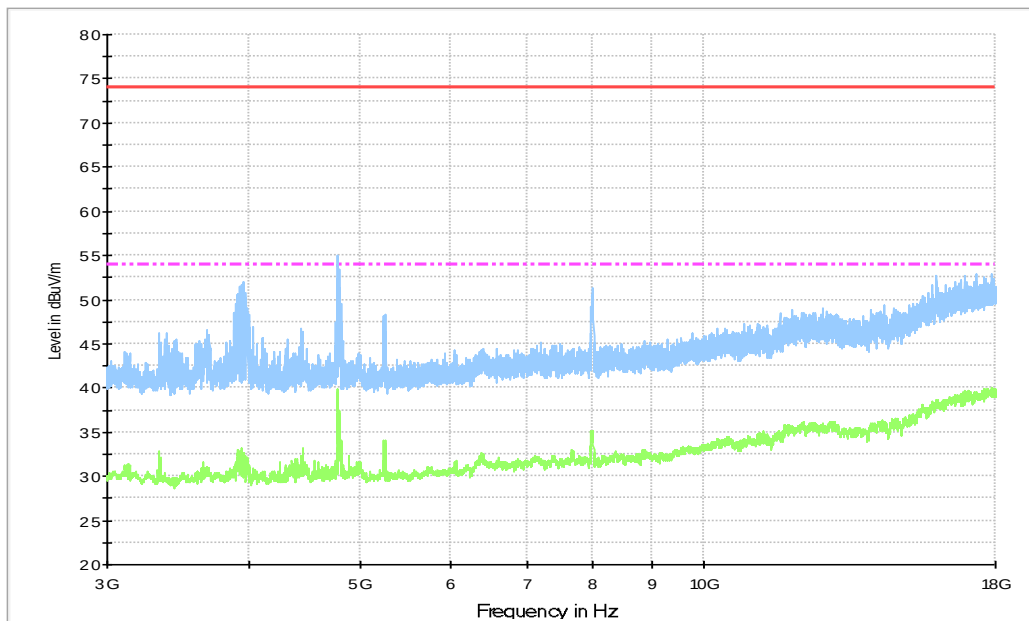


Figure A.15 Radiated Emission from 3GHz to 18GHz

### Average detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 1045.600        | 35.61                       | -38.46          | 28.39                 | 45.67                   | 54.00          | 18.39       | V                  |
| 1220.400        | 33.74                       | -38.27          | 27.91                 | 44.11                   | 54.00          | 20.26       | V                  |
| 1596.000        | 37.86                       | -37.69          | 28.52                 | 47.03                   | 54.00          | 16.14       | V                  |
| 3935.500        | 33.11                       | -35.17          | 33.19                 | 35.10                   | 54.00          | 20.89       | H                  |
| 4780.000        | 39.85                       | -35.09          | 33.96                 | 40.98                   | 54.00          | 14.15       | H                  |
| 7970.000        | 35.09                       | -32.80          | 35.68                 | 32.21                   | 54.00          | 18.91       | V                  |

### Peak detector result

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 1046.000        | 57.19                       | -38.46          | 28.39                 | 67.27                   | 74.00          | 16.81       | V                  |
| 1295.400        | 49.40                       | -38.04          | 28.38                 | 59.06                   | 74.00          | 24.60       | V                  |
| 1599.200        | 50.53                       | -37.71          | 28.50                 | 59.73                   | 74.00          | 23.47       | V                  |
| 3949.500        | 52.04                       | -35.16          | 33.10                 | 54.09                   | 74.00          | 21.96       | V                  |
| 4780.000        | 54.98                       | -35.09          | 33.96                 | 56.11                   | 74.00          | 19.03       | H                  |
| 7982.500        | 51.29                       | -32.83          | 35.73                 | 48.39                   | 74.00          | 22.71       | V                  |

## 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.

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

### A.2.2 EUT Operating Mode

The EUT is operating in the USB mode, charging mode, MP3, MP4, CAMERA, SD and cellular RX 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 (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             |

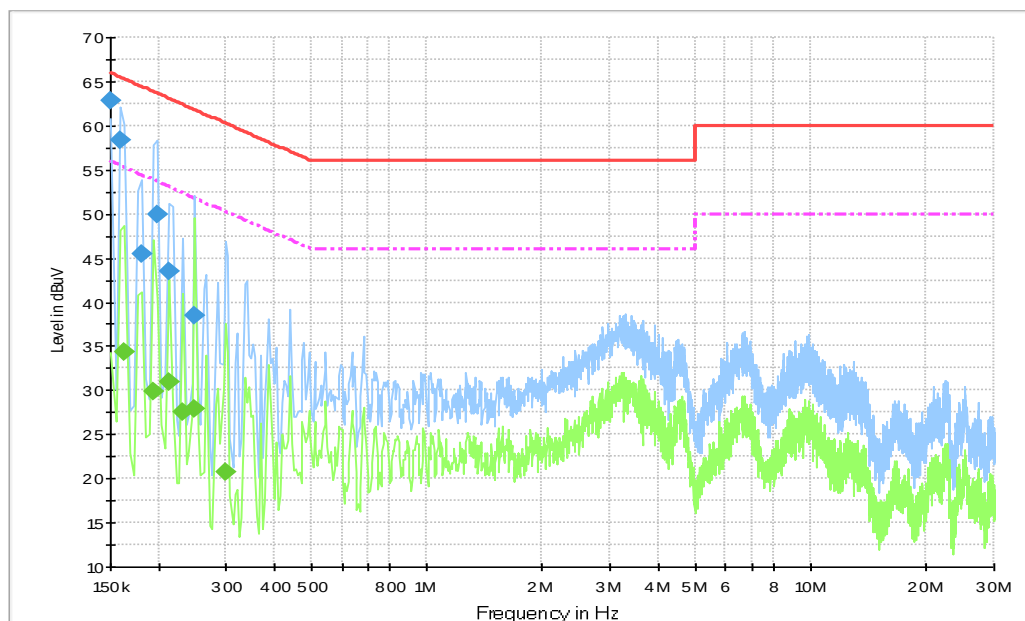
| RBW/IF bandwidth | Sweep Time(s) |
|------------------|---------------|
| 9kHz             | 1             |

### A.2.5 Measurement Results

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

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



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

**Figure A.16 Conducted Emission**

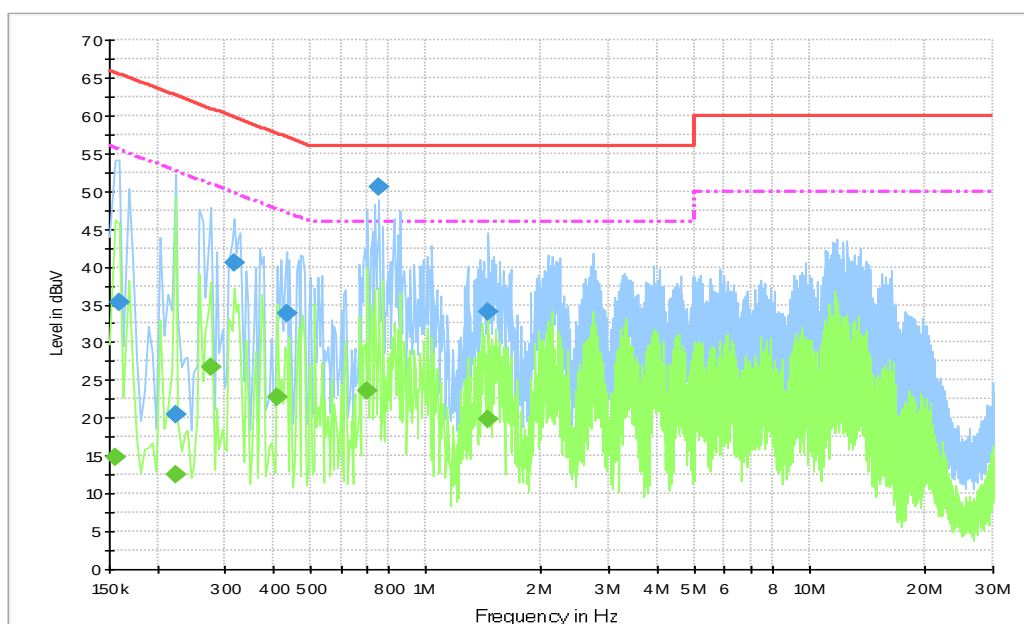
#### Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 62.8             | 2000.0          | 9.000           | L1   | 19.7       | 3.2         | 66.0         |
| 0.159000        | 58.4             | 2000.0          | 9.000           | N    | 19.7       | 7.1         | 65.5         |
| 0.181500        | 45.5             | 2000.0          | 9.000           | L1   | 19.7       | 18.9        | 64.4         |
| 0.199500        | 50.0             | 2000.0          | 9.000           | L1   | 19.7       | 13.7        | 63.6         |
| 0.213000        | 43.5             | 2000.0          | 9.000           | L1   | 19.7       | 19.6        | 63.1         |
| 0.249000        | 38.5             | 2000.0          | 9.000           | L1   | 19.7       | 23.3        | 61.8         |

#### Final Result 2

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.163500        | 34.4           | 2000.0          | 9.000           | L1   | 19.7       | 20.8        | 55.3         |
| 0.195000        | 29.9           | 2000.0          | 9.000           | L1   | 19.7       | 24.0        | 53.8         |
| 0.213000        | 31.0           | 2000.0          | 9.000           | L1   | 19.7       | 22.1        | 53.1         |
| 0.231000        | 27.5           | 2000.0          | 9.000           | L1   | 19.7       | 24.9        | 52.4         |
| 0.249000        | 27.8           | 2000.0          | 9.000           | N    | 19.7       | 24.0        | 51.8         |
| 0.298500        | 20.7           | 2000.0          | 9.000           | L1   | 19.6       | 29.5        | 50.3         |

## Set.2+Mode2+ Mode9



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

**Figure A.17 Conducted Emission**

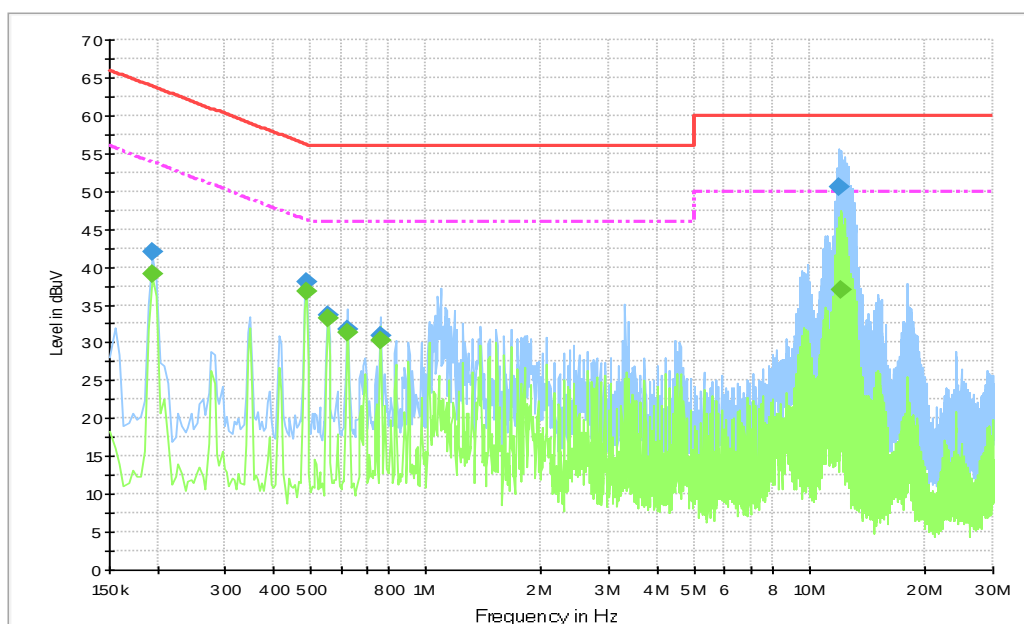
### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|--------------------|--------------------|------|---------------|----------------|-----------------|
| 0.159000           | 35.3                | 2000.0             | 9.000              | N    | 19.7          | 30.2           | 65.5            |
| 0.222000           | 20.5                | 2000.0             | 9.000              | L1   | 19.7          | 42.2           | 62.7            |
| 0.316500           | 40.6                | 2000.0             | 9.000              | N    | 19.6          | 19.2           | 59.8            |
| 0.433500           | 33.8                | 2000.0             | 9.000              | N    | 19.7          | 23.4           | 57.2            |
| 0.757500           | 50.6                | 2000.0             | 9.000              | L1   | 19.7          | 5.4            | 56.0            |
| 1.455000           | 34.1                | 2000.0             | 9.000              | N    | 19.7          | 21.9           | 56.0            |

### Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | Meas. Time<br>(ms) | Bandwidth<br>(kHz) | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|--------------------|--------------------|------|---------------|----------------|-----------------|
| 0.154500           | 14.8              | 2000.0             | 9.000              | N    | 19.7          | 40.9           | 55.8            |
| 0.222000           | 12.5              | 2000.0             | 9.000              | N    | 19.7          | 40.2           | 52.7            |
| 0.276000           | 26.7              | 2000.0             | 9.000              | L1   | 19.7          | 24.2           | 50.9            |
| 0.411000           | 22.9              | 2000.0             | 9.000              | L1   | 19.7          | 24.8           | 47.6            |
| 0.703500           | 23.7              | 2000.0             | 9.000              | L1   | 19.6          | 22.3           | 46.0            |
| 1.455000           | 20.0              | 2000.0             | 9.000              | L1   | 19.7          | 26.0           | 46.0            |

# Set.7+Mode7+Mode8



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

**Figure A.18 Conducted Emission**

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.195000        | 42.1             | 2000.0          | 9.000           | L1   | 19.7       | 21.8        | 63.8         |
| 0.487500        | 37.9             | 2000.0          | 9.000           | N    | 19.6       | 18.3        | 56.2         |
| 0.555000        | 33.6             | 2000.0          | 9.000           | L1   | 19.6       | 22.4        | 56.0         |
| 0.622500        | 31.8             | 2000.0          | 9.000           | N    | 19.6       | 24.2        | 56.0         |
| 0.762000        | 30.9             | 2000.0          | 9.000           | N    | 19.7       | 25.1        | 56.0         |
| 11.935500       | 50.5             | 2000.0          | 9.000           | L1   | 19.9       | 9.5         | 60.0         |

## Final Result 2

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.195000        | 39.1           | 2000.0          | 9.000           | L1   | 19.7       | 14.8        | 53.8         |
| 0.487500        | 36.9           | 2000.0          | 9.000           | N    | 19.6       | 9.3         | 46.2         |
| 0.555000        | 33.2           | 2000.0          | 9.000           | N    | 19.6       | 12.8        | 46.0         |
| 0.622500        | 31.3           | 2000.0          | 9.000           | L1   | 19.6       | 14.7        | 46.0         |
| 0.762000        | 30.4           | 2000.0          | 9.000           | L1   | 19.7       | 15.6        | 46.0         |
| 12.039000       | 37.0           | 2000.0          | 9.000           | L1   | 19.9       | 13.0        | 50.0         |

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

| Test Item          | Tester       |
|--------------------|--------------|
| Radiated Emission  | Sun Tianyuan |
| Conducted Emission | Yan Xaorui   |

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