



中国认可  
国际互认  
检测  
TESTING  
CNAS L0310



# FCC RF Test Report

**Product Name: Smart Phone**

**Model Number: MHA-L29**

**Report No: SYBH(Z-RF)028072016-2006**

**FCC ID: QISMHA-L29**

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

**(Global Compliance and Testing Center of Huawei Technologies Co., Ltd)**

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District,  
Shenzhen, 518129, P.R.C

Tel: +86 755 28780808 Fax: +86 755 89652518



## Notice

1. The laboratory has Passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
9. The laboratory has Passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
10. The laboratory (Reliability Lab of Huawei Technologies Co., Ltd) is also named as "Global Compliance and Testing Center of Huawei Technologies Co., Ltd", the both names have coexisted since 2009.



**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** Administration Building, Headquarters of Huawei Technologies Co., Ltd.,  
Bantian, Longgang District, Shenzhen, 518129, P.R.C

**Date of Receipt Sample:** 2016-08-04  
**Start Date of Test:** 2016-08-04  
**End Date of Test:** 2016-08-20

**Test Result:** Pass

|                                     |            |             |                    |
|-------------------------------------|------------|-------------|--------------------|
| <b>Approved by Senior Engineer:</b> | 2016-08-31 | Roger Zhang | <i>Roger Zhang</i> |
|                                     | Date       | Name        | Signature          |

|                     |            |           |                  |
|---------------------|------------|-----------|------------------|
| <b>Prepared by:</b> | 2016-08-31 | Wu Tingsi | <i>Wu Tingsi</i> |
|                     | Date       | Name      | Signature        |



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# 1 General Information

|   |   |
|---|---|
| <b>1.1 Applied Standard</b>             |   |
|   |   |
| Applied Rules:                          | 47 CFR FCC Part 02: 2014<br>FCC Part 15 Subpart C (15.225): 2014  |
| <b>1.2 Test Location</b>                |   |
|   |   |
| Test Location 1:                        | Reliability Laboratory of Huawei Technologies Co., Ltd.   |
| Address:                                | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |
|   |   |
| <b>1.3 Test Environmental Condition</b> |   |
|   |   |
| Ambient Temperature:                    | 20 – 25 °C  |
| Ambient Relative Humidity:              | 45 – 55 %   |
| Atmospheric Pressure:                   | 101 kPa   |
|   |   |



## 2 Summary

| FCC Section         | Part | Test Description                      | Test Limit   | Test Condition      | Test Result | Reference       |
|---------------------|------|---------------------------------------|--|---------------------|-------------|-----------------|
| TRANSMITTER MODE    |      |                                       |  |                     |             |                 |
| 15.225 (a)          |      | In-Band Emissions                     | 15,848 $\mu$ V/m @ 30m<br>13.553 – 13.567 MHz  | RADIATED            | Pass        | Section 5.2     |
| 2.1049              |      | 20 dB Bandwidth                       | N/A  |                     | Pass        | Section 5.1     |
| 15.225(b)           |      | In-Band Emissions                     | 334 $\mu$ V/m @ 30m<br>13.410 – 13.553 MHz<br>13.567 – 13.710 MHz  |                     | Pass        | Section 5.2     |
| 15.225(c)           |      | In-Band Emissions                     | 106 $\mu$ V/m @ 30m<br>13.110 – 13.410 MHz<br>13.710 – 14.010 MHz  |                     | Pass        | Section 5.2     |
| 15.225(d)<br>15.209 |      | Out-of-Band Emissions                 | Emissions outside of the specified band (13.110 – 14.010 MHz) must meet the radiated limits detailed in 15.209 |                     | Pass        | Section 5.3     |
| 15.225(e)           |      | Frequency Stability Tolerance         | $\pm$ 0.01% of Operating Frequency   | Temperature Chamber | Pass        | Section 5.4     |
| 15.207              |      | AC Conducted Emissions 150kHz – 30MHz | < FCC 15.207 limits  | LINE CONDUCTED      | Pass        | Part 15B report |



### 3 Product Description

#### 3.1 Product Information

##### 3.1.1 General Description

MHA-L29 is subscriber equipment in the LTE/ WCDMA/GSM system. The LTE frequency band is Band I,Band II,Band III,Band IV,Band V, Band VII,Band VIII, Band VIII, Band XII,BandXVII, Band XVIII ,Band XIX, Band XX, Band XXVI, Band XXVIII, Band XXIX,Band XXXVIII,BandXXXIX, Band XL and Band XLI. The HSUPA/HSDPA/UMTS frequency band is Band I, Band II, Band IV, Band V, Band VI, Band VIII and Band XIX, The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/ WCDMA /GSM protocol processing, voice, video, MMS service, GPS, AGPS,NFC and WIFI etc. Externally it provides earphone port (to provide voice service) and dual USIM card interfaces. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

NOTE: Only NFC test data included in this report.

#### 3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

##### 3.2.1 Board

| Board       |                  |                  |
|-------------|------------------|------------------|
| Description | Hardware Version | Software Version |
| Main Board  | HLIAMHAM         | M300-L29C900B094 |



### 3.2.2 Sub-Assembly

| Sub-Assembly        |              |                               |   |
|---------------------|--------------|-------------------------------|---|
| Sub-Assembly Name   | Model        | Manufacturer                  | Description   |
| Adapter             | HW-050450B00 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.75A<br>Output Voltage: 5V  2A/4.5A<br>Rated Power: 10W/22.5W  |
| Adapter             | HW-050450E00 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.75A<br>Output Voltage: 5V  2A/4.5A<br>Rated Power: 10W/22.5W  |
| Adapter             | HW-050450U00 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.75A<br>Output Voltage: 5V  2A/4.5A<br>Rated Power: 10W/22.5W  |
| Adapter             | HW-050450A00 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.75A<br>Output Voltage: 5V  2A/4.5A<br>Rated Power: 10W/22.5W  |
| Rechargeable Li-ion | HB396689ECW  | Huawei Technologies Co., Ltd. | Rated capacity: 3900mAh<br>Nominal Voltage:  +3.82V<br>Charging Voltage:  +4.4V |



## 4 Main Test Instruments

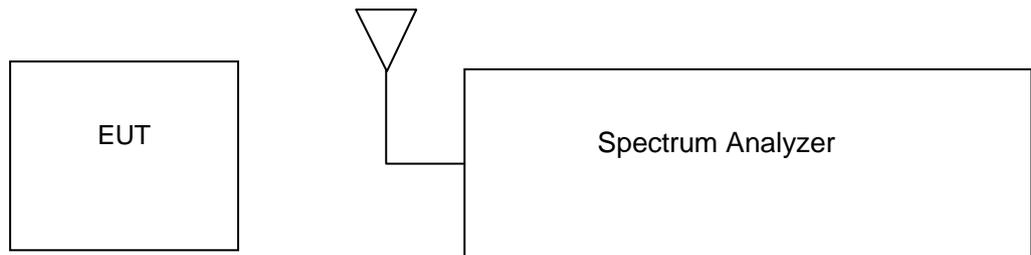
| Main Test Equipments                            |               |           |               |            |            |
|---|---------------|-----------|---------------|------------|------------|
| Equipment Name                                  | Manufacturer  | Model     | Serial Number | Cal Date   | Cal- Due   |
| Test receiver                                   | R&S           | ESU26     | 100387        | 2015-06-24 | 2016-06-23 |
| Test receiver                                   | R&S           | ESCI      | 101163        | 2015-11-11 | 2016-11-10 |
| Spectrum analyzer                               | R&S           | FSU3      | 200474        | 2016-05-24 | 2017-05-23 |
| Spectrum analyzer                               | R&S           | FSU43     | 100144        | 2015-06-02 | 2017-06-02 |
| LOOP Antennas(9kHz-30MHz)                       | R&S           | HFH2-Z2   | 100262        | 2015-04-30 | 2017-04-29 |
| LOOP Antennas(9kHz-30MHz)                       | R&S           | HFH2-Z2   | 100263        | 2015-04-30 | 2017-04-29 |
| Trilog Broadband Antenna (30M~3GHz)             | SCHWARZ BECK  | VULB 9163 | 9163-490      | 2015-04-30 | 2017-04-29 |
| Trilog Broadband Antenna (30M~3GHz)             | SCHWARZ BECK  | VULB 9163 | 9163-520      | 2015-04-30 | 2017-04-29 |
| Double-Ridged Waveguide Horn Antenna (1G~18GHz) | R&S           | HF907     | 100304        | 2015-04-30 | 2017-04-29 |
| double ridged horn antenna (0.8G-18GHz)         | R&S           | HF907     | 100305        | 2015-04-30 | 2017-04-29 |
| Pyramidal Horn Antenna(18GHz-26.5GHz)           | ETS-Lindgren  | 3160-09   | 5140299       | 2015-07-15 | 2017-07-14 |
| Artificial Main Network                         | R&S           | ENV4200   | 100134        | 2016-06-02 | 2017-06-01 |
| Line Impedance Stabilization Network            | R&S           | ENV216    | 100382        | 2016-06-02 | 2017-06-01 |
| Signal Generator                                | Agilent       | E4438C    | MY49071538    | 2016-03-01 | 2017-03-01 |
| Software Information                            |               |           |               |            |            |
| Test Item                                       | Software Name |           | Manufacturer  | Version    |            |
| RE  | EMC32         |           | R&S           | V9.25.0    |            |
| CE  | EMC32         |           | R&S           | V9.25.0    |            |

## 5 Test Results

### 5.1 20dB Bandwidth Measurement

The 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

#### 5.1.1 Test Setup



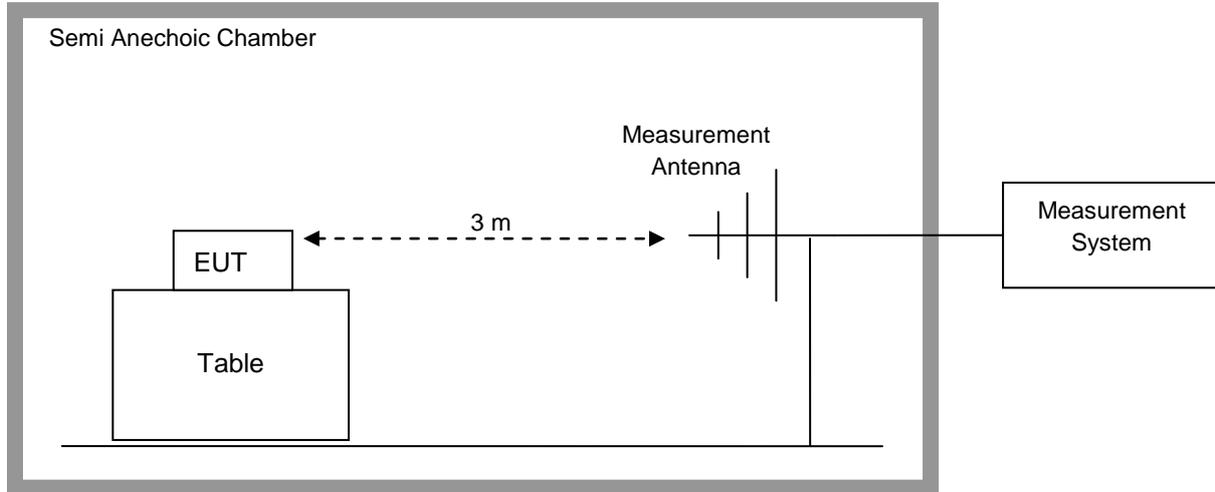
#### 5.1.2 Test Result

| Frequency | Occupied Bandwidth |
|-----------|--------------------|
| 13.56MHz  | 200KHz             |

**The result of the measurement is passed.**

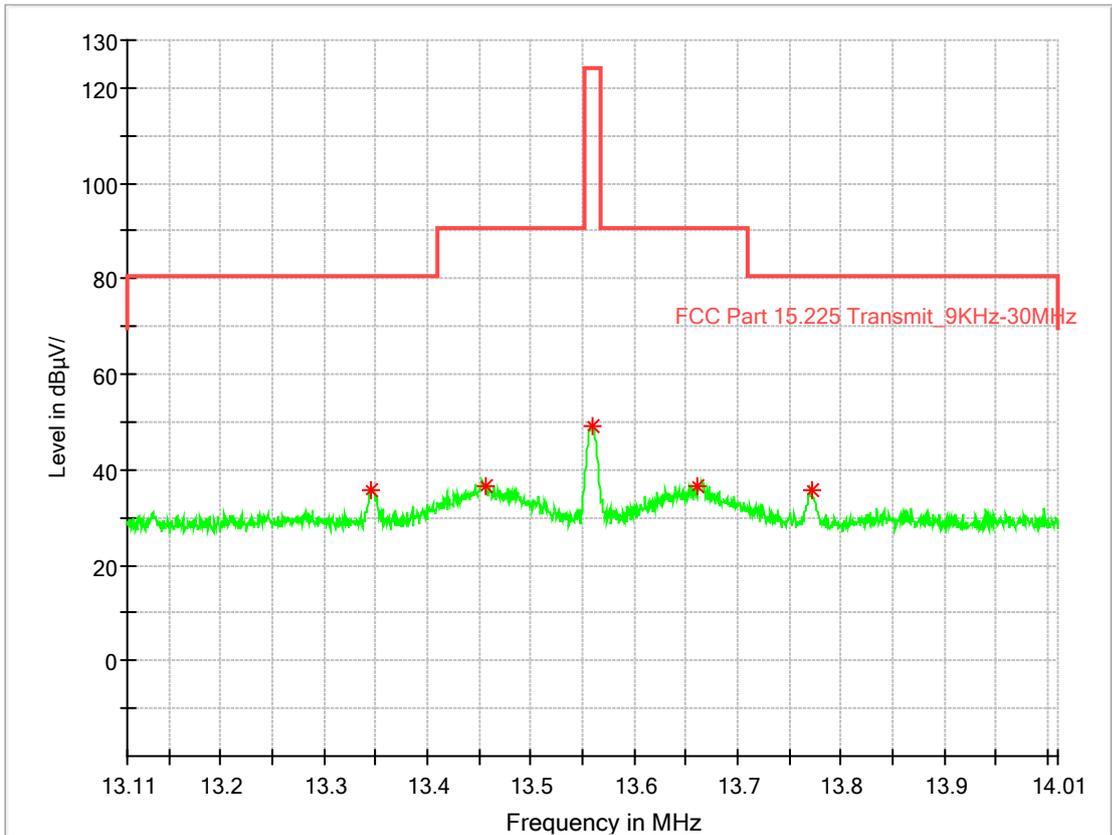
## 5.2 In-Band Radiated Spurious Emission Measurements

### 5.2.1 Test Setup



| Measurement parameters |            |
|------------------------|------------|
| Detector:              | Quasi Peak |
| Sweep time:            | -/-        |
| Resolution bandwidth:  | 10 kHz     |
| Video bandwidth:       | 10 kHz     |
| Span:                  | -/-        |
| Trace-Mode:            | Max Hold   |

### 5.2.2 Test Result



**MEASUREMENT RESULT: QP Detector**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Azimuth (deg) | Transd (dB) |
|-----------------|--------------------|----------------|-------------|---------------|-------------|
| 13.345286       | 35.54              | 80.50          | 44.96       | 128.0         | 20.8        |
| 13.455857       | 36.70              | 90.50          | 53.80       | 260.0         | 20.8        |
| 13.559357       | 49.31              | 124.00         | 74.69       | 236.0         | 20.8        |
| 13.661571       | 36.39              | 90.50          | 54.11       | 53.0          | 20.8        |
| 13.772143       | 35.69              | 80.50          | 44.81       | 86.0          | 20.8        |

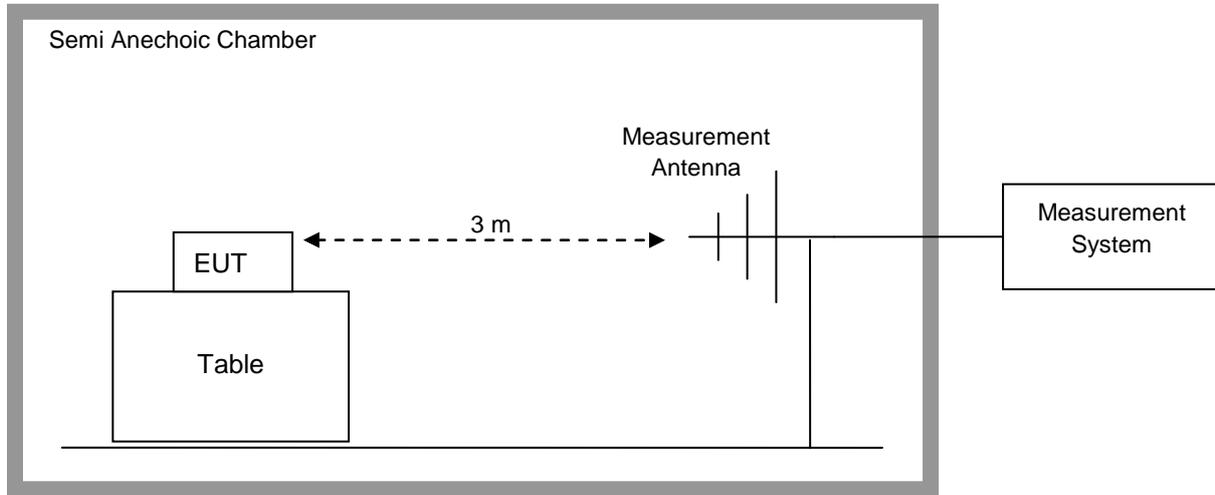
**NOTES:**

1. All measurements were performed using a loop antenna. The antenna was positioned in three orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2). Extrapolation Factor =  $20 \log_{10}(30/3)^2 = 40\text{dB}$
3. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
4. Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain). The reading level is calculated by software which is not shown in the sheet.

**The result of the measurement is passed.**

### 5.3 Radiated Spurious Emission Measurements, Out-of-Band

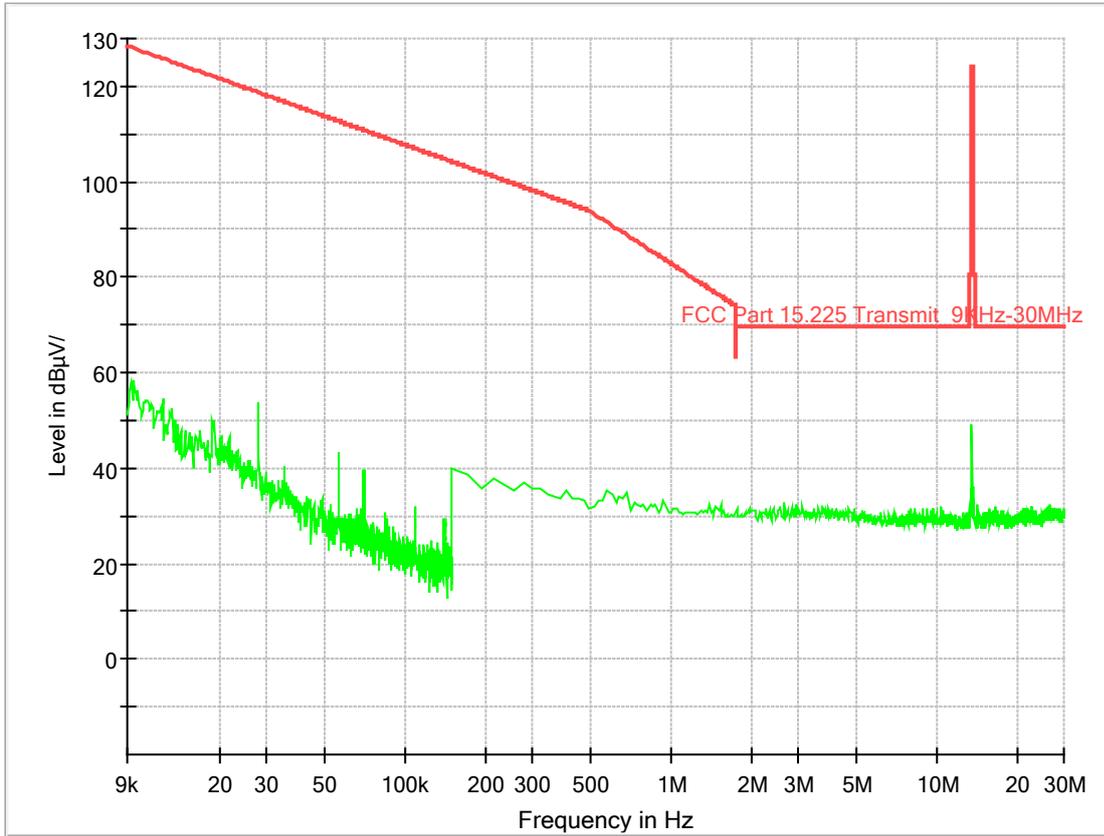
#### 5.3.1 Test Setup



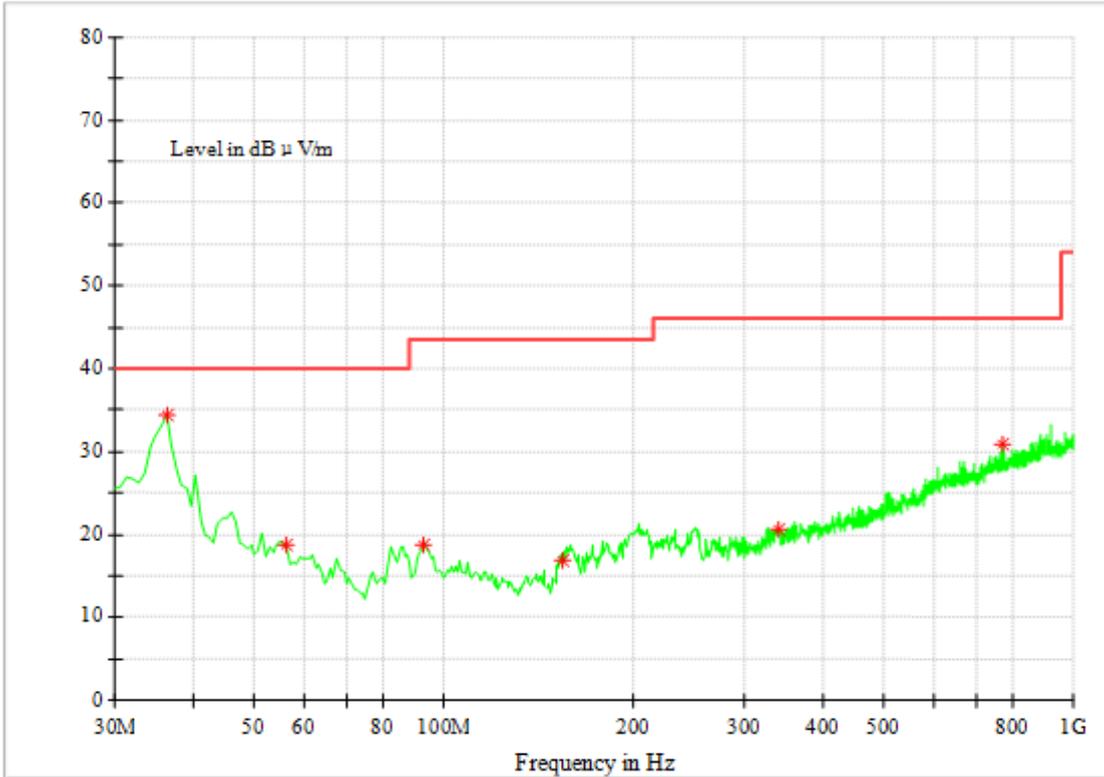
| Measurement parameters |  |
|------------------------|--|
| Detector:              | Quasi Peak   |
| Sweep time:            | Auto   |
| Resolution bandwidth:  | 9 kHz – 150 kHz: 200 Hz<br>150 kHz – 30 MHz: 9 kHz<br>30 MHz – 1000 MHz: 100 kHz |
| Video bandwidth:       | 9 kHz – 150 kHz: 200 Hz<br>150 kHz – 30 MHz: 9 kHz<br>30 MHz – 1000 MHz: 100 kHz |
| Span:                  | See Plots  |
| Trace-Mode:            | Max Hold   |

### 5.3.2 Test Result

9k~30MHz



30M~1GHz



| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Polarisation | Azimuth (deg) | Transd (dB) |
|-----------------|--------------------|----------------|-------------|-------------|--------------|---------------|-------------|
| 36.235714       | 34.31              | 40.00          | 5.69        | 100.0       | V            | 267.0         | 14.6        |
| 56.328571       | 18.66              | 40.00          | 21.34       | 100.0       | V            | 167.0         | 14.2        |
| 93.050000       | 18.73              | 43.50          | 24.77       | 100.0       | V            | 58.0          | 12.4        |
| 154.714286      | 16.93              | 43.50          | 26.57       | 100.0       | V            | 267.0         | 10.1        |
| 340.400000      | 20.64              | 46.00          | 25.36       | 100.0       | H            | 312.0         | 16.6        |
| 774.821429      | 30.91              | 46.00          | 15.09       | 100.0       | H            | 50.0          | 23.6        |

**NOTES:**

1. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector for emissions below 960MHz.
2. Both Vertical and Horizontal polarities of the receive antenna were evaluated with the worst case emissions being reported. Below 30MHz the Loop antenna was positioned in 3 separate radials.
3. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
4. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
5. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain). The reading level is calculated by software which is not shown in the sheet.

**The result of the measurement is passed.**



## 5.4 Frequency Stability

### 5.4.1 Test Setup

The EUT was placed in a Climatic Chamber. A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer. Measurement performed without modulation on TX.

### 5.4.2 Test Result

| VOLTAGE (%)       | POWER Battery | TEMP (°C) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%)    |
|-------------------|---------------|-----------|----------------|-----------------|------------------|
| 100%              |               | -20       | 13559980       | 11              | 0.0000008112135  |
| 100%              |               | -10       | 13560007       | -14             | -0.0000010324483 |
| 100%              |               | 0         | 13560002       | 8               | 0.0000005899700  |
| 100%              |               | 10        | 13560003       | 13              | 0.0000011061935  |
| 100%              |               | 20        | 13560007       | -15             | -0.0000011061941 |
| 100%              |               | 30        | 13560010       | 11              | 0.0000015486713  |
| 100%              |               | 40        | 13560002       | -12             | -0.0000011061941 |
| 100%              |               | 50        | 13560009       | 14              | 0.0000008849551  |
| Battery End Point |               | 3.6       | 20             | 13559993        | -7               |
| 115%              | 4.35          | 20        | 13560003       | 13              | 0.0000011061935  |

The result of the measurement is passed.

-----The END-----