# FCC RF Test Report

**Product Name: Smart Phone**

**Model Number: HUAWEI D2-6114, D2-6114, HW-03E**

**Report No: SYBH(Z-RF)014012013-2004**

**FCC ID: QISD2-6114**


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

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## 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 and 6369A-3.
5. The laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers of test site No.1 are R-2364, G-415, C-2583, and T-256, and the accreditation numbers of test site No.2 are R-3760, G-485, C-4210 and T-1237.
6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
7. The test report is invalid if there is any evidence of erasure and/or falsification.
8. The test report is only valid for the test samples.
9. 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.

| | |
|---|---|
| **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 Test Item:** | 2013-01-21 |
| **Start Date of Test:** | 2013-01-22 |
| **End Date of Test:** | 2013-02-07 |
| | |
| | |
| **Test Result:** | Pass |

| | | | |
|---|---|---|---|
| **Approved by Senior Engineer:** | 2013-2-24 | Dai Linjun | Dai Linjun |
| | Date | Name | Signature |
| **Prepared by:** | 2013-2-24 | Guo Xingxing | Guo Xingxing |
| | Date | Name | Signature |

# Contents

# 1 General Information

| | |
|---|---|
| **1.1 Applied Standard** | |
| | |
| Applied Rules: | FCC Part 15 Subpart C (15.225): 2012 |
| | |
| **1.2 Test Location** | |
| | |
| 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 |
| | |
| **1.3 Test Environmental Condition** | |
| | |
| Ambient Temperature: | 20 – 25 °C |
| Ambient Relative Humidity: | 45 – 55 % |
| Atmospheric Pressure: | 101 kPa |
| | |

# 2 Summary

Table 1 Summary of results

| FCC Part Section | Test Description | Test Limit | Test Condition | Test Result | Reference |
|---|---|---|---|---|---|
| TRANSMITTER MODE | | | | | |
| 15.225 (a) | In-Band Emissions | 15,848μV/m @ 30m<br>13.553 – 13.567 MHz | RADIATED | Pass | Section 4.2 |
| 2.1049 | 20 dB Bandwidth | N/A | | Pass | Section 4.1 |
| 15.225(b) | In-Band Emissions | 334μV/m @ 30m<br>13.410 – 13.553 MHz<br>13.567 – 13.710 MHz | | Pass | Section 4.2 |
| 15.225(c) | In-Band Emissions | 106μV/m @ 30m<br>13.110 – 13.410 MHz<br>13.710 – 14.010 MHz | | Pass | Section 4.2 |
| 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 4.3 |
| 15.225(e) | Frequency Stability Tolerance | ± 0.01% of Operating Frequency | Temperature Chamber | Pass | Section 4.4 |
| 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

HUAWEI D2-6114, D2-6114, HW-03E is subscriber equipment in the LTE/UMTS/GSM system. The LTE frequency band is Band I, Band XIX and Band XXI, not included in this report. The HSUPA/HSDPA/UMTS frequency band is Band I, Band V, Band VI, 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/UMTS/GSM protocol processing, voice, video, MMS service, GPS, AGPS, Felica and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. 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.

### 3.1.2 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.

### 3.1.3 Board

| Board | | |
|---|---|---|
| Software | Hardware Version | Description |
| 4.1..1301141 | HL1U9701LM | Main board of Mobile Phone |

### 3.1.4 Sub-Assembly

| Sub-Assembly | | | |
|---|---|---|---|
| Sub-Assembly Name | Model | Manufacturer | Description |
| Rechargeable Li-ion | HB5R1HV | Huawei Technologies Co., Ltd. | Battery Model: HB5R1HV<br>Rated capacity: 2150mAh<br>Nominal Voltage: ⎓ +3.8V<br>Charging Voltage: ⎓ +4.35V |

# 4 Main Test Instruments

Table 2 Main Test Equipments

| Equipment Name | Manufacturer | Model | Serial Number | Cal Date | Cal. Due |
|---|---|---|---|---|---|
| Power supply | KEITHLEY | 2303 | 1288003 | 2012-11-19 | 2014-11-18 |
| Spectrum Analyzer | Agilent | E4440A | MY48250119 | 2012-08-20 | 2013-08-19 |
| Signal Analyzer | R&S | FSQ31 | 200021 | 2012-11-09 | 2013-11-08 |
| Spectrum Analyzer | Agilent | N9030A | MY49431698 | 2012-11-09 | 2013-11-08 |
| Temperature Chamber | WEISS | WKL64 | 56246002940010 | 2013-01-29 | 2014-01-28 |
| Signal generator | Agilent | E8257D | MY49281095 | 2012-09-14 | 2013-09-13 |
| Spectrum analyzer | R&S | FSU3 | 200474 | 2013-01-29 | 2014-01-28 |
| Spectrum analyzer | R&S | FSU43 | 100144 | 2013-01-29 | 2014.01.28 |
| Double-Ridged Waveguide Horn Antenna (1G~18GHz) | R&S | HF907 | 100304 | 2013-02-02 | 2014-02-01 |
| Double-Ridged Waveguide Horn Antenna (1G~18GHz) | R&S | HF907 | 100391 | 2011-10-12 | 2013-10-11 |
| Trilog Broadband Antenna (30M~3GHz) | SCHWARZBECK | VULB 9163 | 9163-521 | 2011-12-09 | 2013-12-08 |
| Pyramidal Horn Antenna(26GHz-40GHz) | ETS-Lindgren | 3160-10 | 00123940 | 2011-02-28 | 2013-02-27 |
| Pyramidal Horn Antenna(18GHz-26.5GHz) | ETS-Lindgren | 3160-09 | 00125912 | 2011-02-28 | 2013-02-27 |

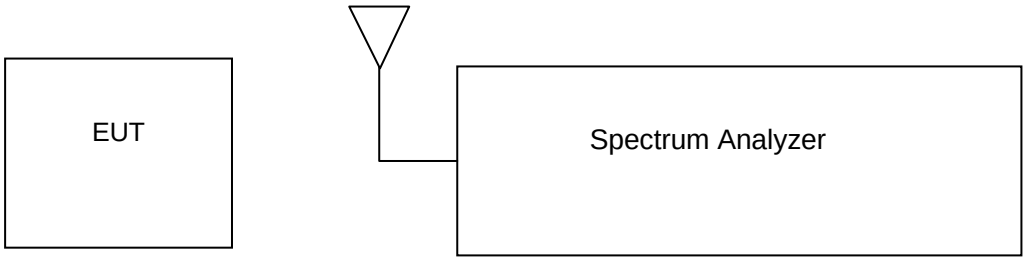
NOTE: All the test equipment are calibrated once a year.

# 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



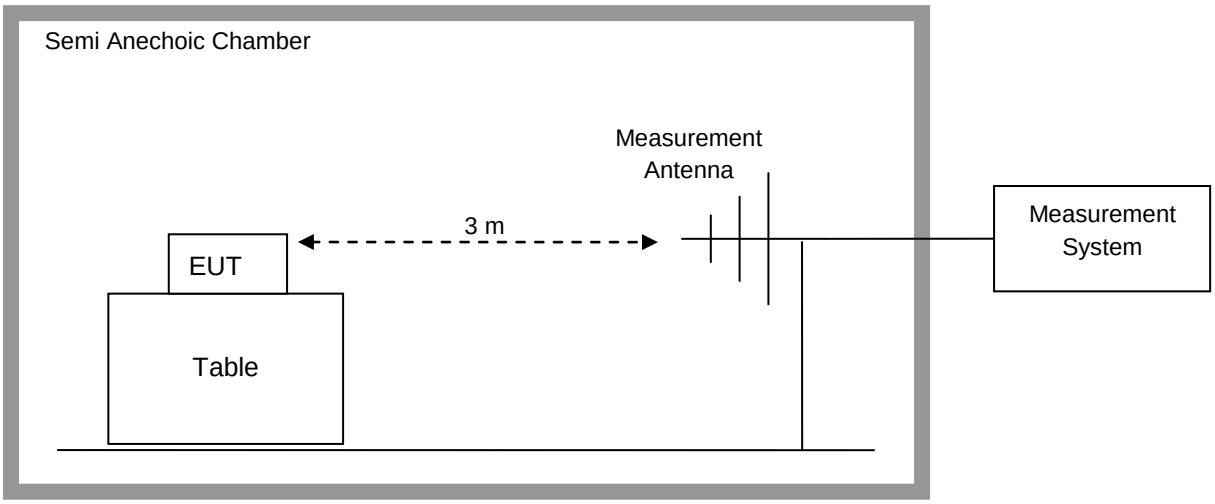

### 5.1.2 Test Result

| Frequency | Occupied Bandwidth |
|---|---|
| 13.56MHz | 110KHz |

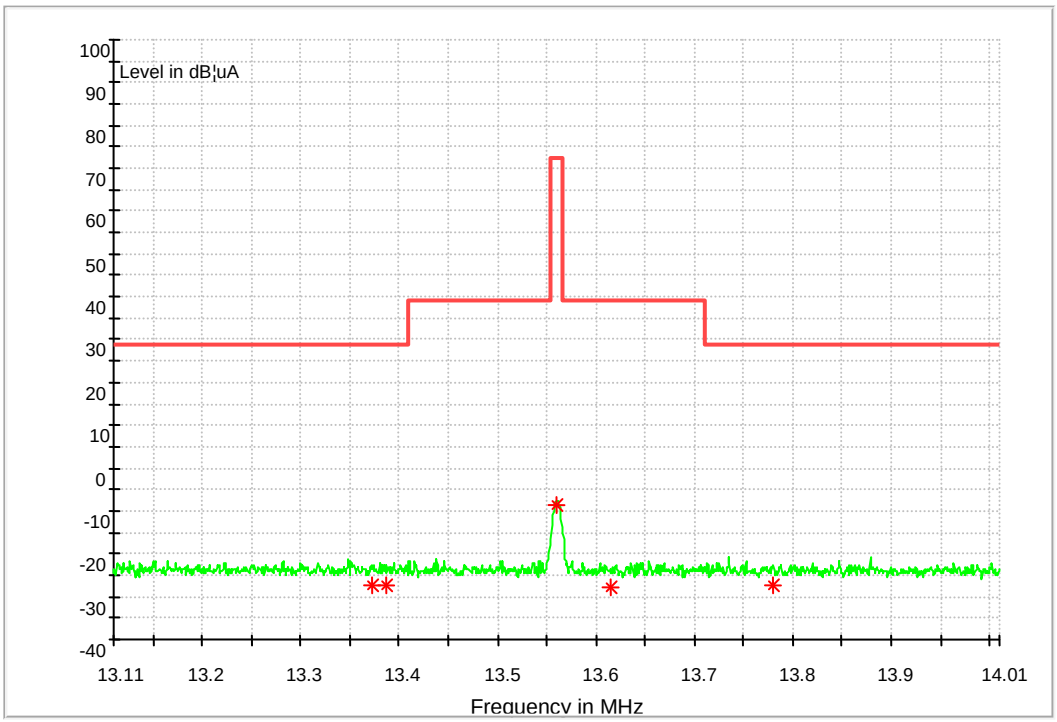
**The result of the measurement is passed.**

## 5.2 In-Band Radiated Spurious Emission Measurements

### 5.2.1 Test Setup




### 5.2.2 Test Result



| Frequency (MHz) | QuasiPeak (dBμ A/m) | Bandwidth (kHz) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμ A/m) |
|---|---|---|---|---|---|---|---|
| 13.372944 | -27.5 | 9.000 | V | 141.0 | -31.2 | 56.5 | 29.0 |
| 13.387200 | -27.5 | 9.000 | V | 82.0 | -31.2 | 56.5 | 29.0 |
| 13.560864 | -8.5 | 9.000 | V | 196.0 | -31.2 | 81.0 | 72.5 |
| 13.615872 | -27.6 | 9.000 | V | 312.0 | -31.2 | 66.6 | 39.0 |
| 13.780320 | -27.5 | 9.000 | V | 143.0 | -31.2 | 56.5 | 29.0 |

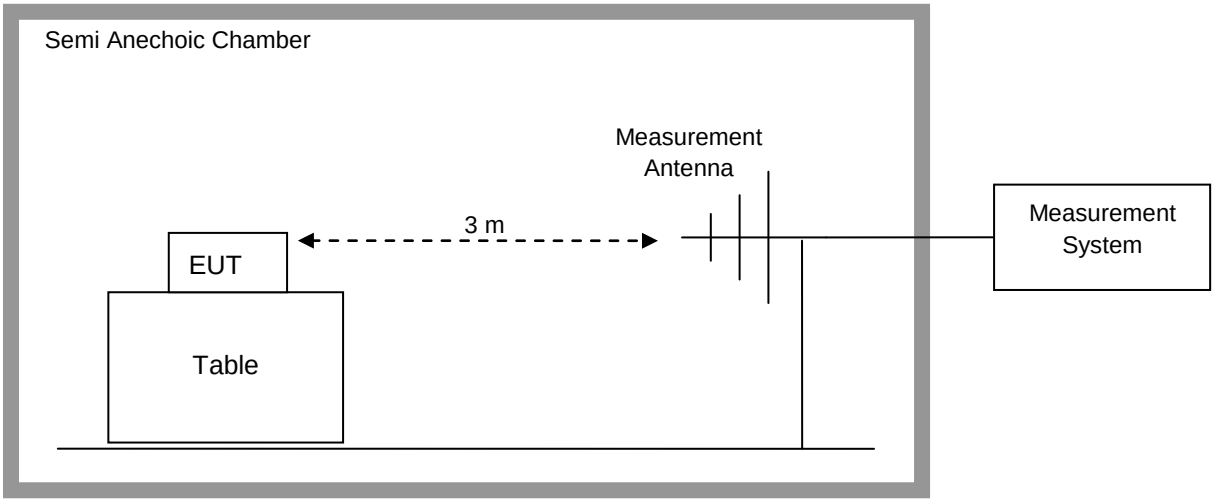
**NOTES:**

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 log10(30/3)2 = 40dB
3. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.

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

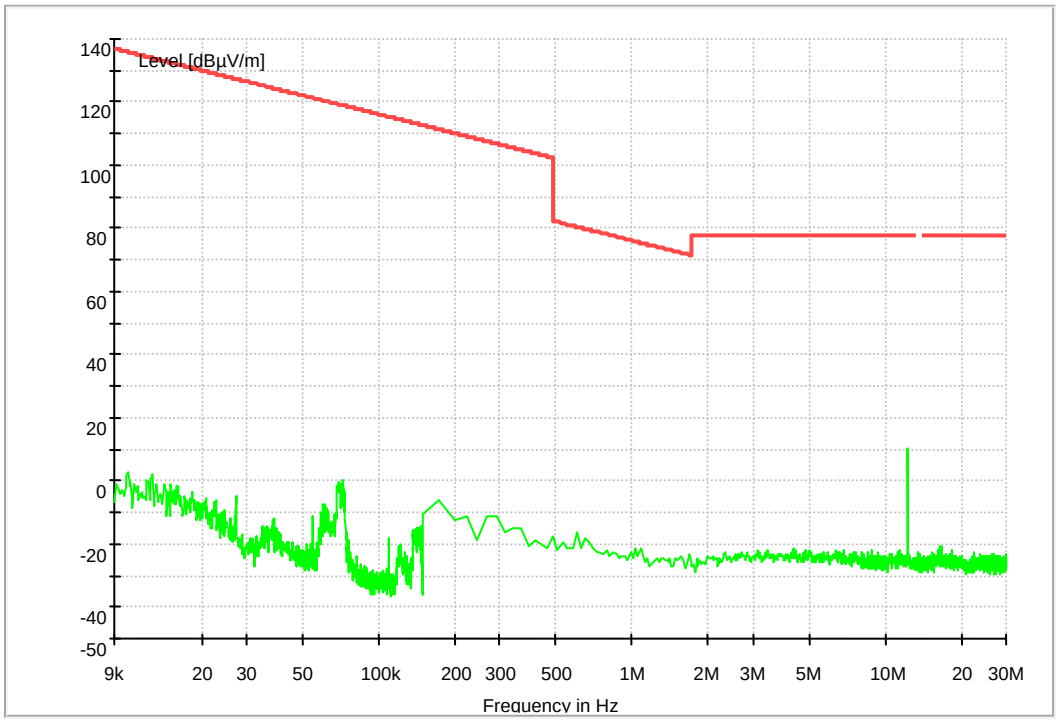
## 5.3 Radiated Spurious Emission Measurements, Out-of-Band

### 5.3.1 Test Setup

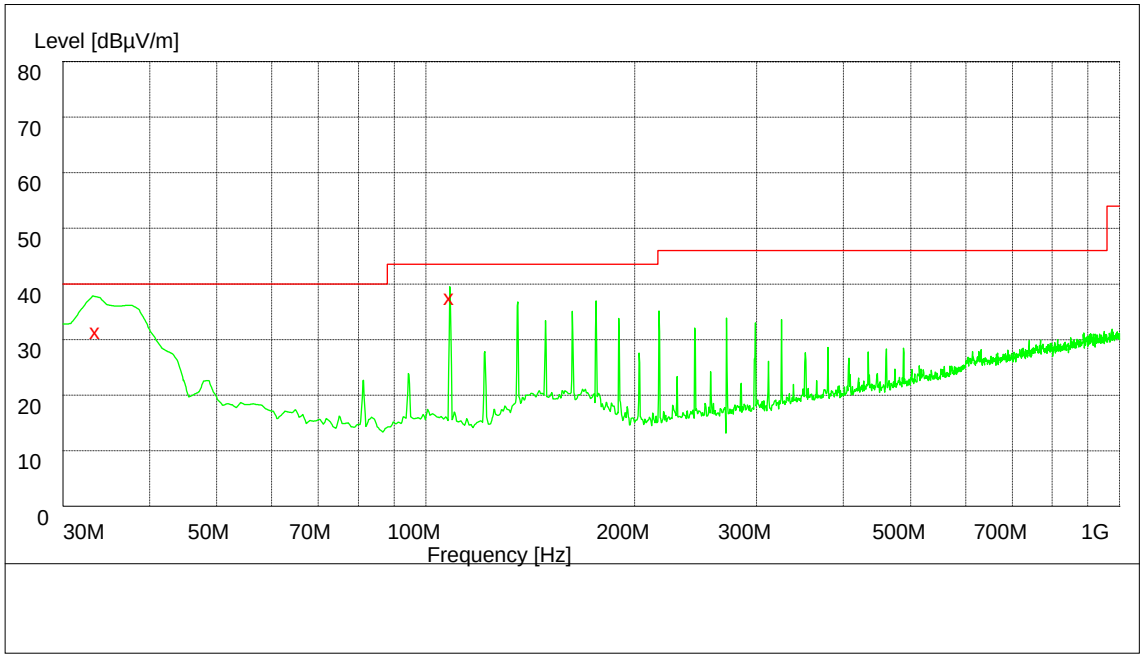



### 5.3.2 Test Result

9k~30MHz



30M~1GHz




| Frequency MHz | Level dBuV/m | Transd dB | Limit dBuV/m | Margin dB | Det. | Height cm | Azimuth dge | Polarization |
|---|---|---|---|---|---|---|---|---|
| 33.540000 | 33.40 | 14.9 | 40.0 | 6.6 | QP | 100.0 | 71.00 | VERTICAL |
| 108.480000 | 39.60 | 13.1 | 43.5 | 3.9 | QP | 100.0 | 191.00 | VERTICAL |

**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.

**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 (ºC) | Frequency (MHz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100% | | -20 | 13559985 | -15 | -0.000111 |
| 100% | | -10 | 13560014 | 14 | 0.000103 |
| 100% | | 0 | 13560016 | 16 | 0.000118 |
| 100% | | 10 | 13559995 | -5 | -0.000037 |
| 100% | | 20 | 13559994 | -4 | -0.000029 |
| 100% | | 30 | 13559986 | -14 | -0.000103 |
| 100% | | 40 | 13560011 | 11 | 0.000081 |
| 100% | | 50 | 13559984 | -16 | -0.000118 |
| Battery End Point | 3.5 | 20 | 13560011 | 11 | 0.000081 |
| 115% | 4.35 | 20 | 13560015 | 15 | 0.000111 |

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

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