



# FCC RF Test Report

**Product Name: Smart Phone**

**Model Number: HUAWEI RIO-L01, RIO-L01**

**Report No: SYBH(Z-RF)025042015-2003**

**FCC ID: QISRIO-L01**

**Reliability Laboratory 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-2.
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.



**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:** 2015-06-15  
**Start Date of Test:** 2015-06-15  
**End Date of Test:** 2015-06-30

**Test Result:** Pass

|                                     |            |             |   |
|-------------------------------------|------------|-------------|---|
| <b>Approved by Senior Engineer:</b> | 2015-06-30 | Liu Chunlin |  |
|                                     | Date       | Name        | Signature   |

|                     |            |          |   |
|---------------------|------------|----------|---|
| <b>Prepared by:</b> | 2015-06-30 | maowenli |  |
|                     | Date       | Name     | Signature   |



**Modification Record**

| No. | Last Report No. | Modification Description |
|-----|-----------------|--------------------------|
| 1   |                 | First report.            |
|     |                 |                          |
|     |                 |                          |
|     |                 |                          |



## CONTENT

|     |   |    |
|-----|---|----|
| 1   | General Information .....                           | 6  |
| 1.1 | Applied Standard.....                               | 6  |
| 1.2 | Test Location .....                                 | 6  |
| 1.3 | Test Environment Condition.....                     | 6  |
| 2   | Test Summary .....                                  | 7  |
| 3   | Description of the Equipment under Test (EUT) ..... | 8  |
| 3.1 | General Description .....                           | 8  |
| 3.2 | EUT Identity .....                                  | 8  |
| 3.3 | Technical Description.....                          | 9  |
| 4   | General Test Conditions / Configurations .....      | 10 |
| 4.1 | EUT Configurations.....                             | 10 |
| 4.2 | Test Environments .....                             | 10 |
| 4.3 | Test Setups.....                                    | 11 |
| 4.4 | Test Conditions .....                               | 14 |
| 5   | Main Test Instruments .....                         | 15 |



## 1 General Information

### 1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J 2014  
47 CFR FCC Part 15, Subpart C 2014

Test Method: FCC KDB 558074 D01 DTS Meas Guidance v03r02  
ANSI C63.10-2009, American National Standard for Testing Unlicensed  
Wireless Devices.

### 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

Test Location 2: BTL Laboratory  
Address : No.3,Jinshagang 1st Road,ShiXia,Dalang Town,DongGuan,China.

### 1.3 Test Environment Condition

Ambient Temperature: 19.5to 25 °C  
Ambient Relative Humidity: 40 to 55 %  
Atmospheric Pressure: Not applicable



**2 Test Summary**

| Test Item   | FCC Part No.                    | Requirements   | Test Result | Verdict |
|---|---------------------------------|--|-------------|---------|
| DTS (6 dB) Bandwidth  | 15.247(a)(2)                    | ≥ 500 kHz.   | Appendix A  | Pass    |
| Occupied Bandwidth  | ---                             | ---  | Appendix B  | Pass    |
| Duty Cycle  | KDB 558074<br>(6.0)             | No limit   | Appendix C  | Pass    |
| Maximum Conducted Average Output Power  | 15.247(b)(3)                    | For directional gain: < 30 dBm – (G[dBi] – 6 [dB]), Average; Otherwise: < 30 dBm, Average;           | Appendix D  | Pass    |
| Maximum Power Spectral Density Level  | 15.247(e)                       | For directional gain: < 8 dBm/3 kHz – (G[dBi] – 6 [dB]), Average. Otherwise: < 8 dBm/3 kHz, Average. | Appendix E  | Pass    |
| Band Edges Compliance   | 15.247(d)                       | < -30 dBm/100 kHz if total peak power ≤ power limit.   | Appendix F  | Pass    |
| Unwanted Emissions into Non-Restricted Frequency Bands  |                                 |  | Appendix G  | Pass    |
| Unwanted Emissions into Restricted Frequency Bands (Radiated)   | 15.247(d)<br>15.209<br>(NOTE 1) | FCC Part 15.209 field strength limit;  | Appendix H  | Pass    |
| AC Power Line Conducted Emissions   | 15.207                          | FCC Part 15.207 conducted limit;   | Appendix I  | Pass    |
| <p>NOTE 1: According to KDB 558074, antenna-port conducted measurements are acceptable as an alternative to radiated measurements for demonstrating compliance to the limits in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions will also be required.</p> |                                 |  |             |         |



### 3 Description of the Equipment under Test (EUT)

#### 3.1 General Description

HUAWEI RIO-L01, RIO-L01 is subscriber equipment in the LTE/WCDMA/GSM system. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The HSPA+/UMTS frequency band is Band I and Band VIII. The LTE frequency band is B1 and B3 and B7 and B8 and B20. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS, NFC and WIFI etc. Externally it provides SIM card interface (it can also used as 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.

#### 3.2 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  | HL1RIOL01M       | RIO-L01 C00B035  |

##### 3.2.2 Sub-Assembly

| Sub-Assembly      |              |                               |   |
|-------------------|--------------|-------------------------------|---|
| Sub-Assembly Name | Model        | Manufacturer                  | Description   |
| Adapter           | HW-050100U01 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.2A<br>Output Voltage: 5V  1A<br>Rated Power: 5W |
| Adapter           | HW-050100E01 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.2A<br>Output Voltage: 5V  1A<br>Rated Power: 5W |
| Adapter           | HW-050100B01 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.2A<br>Output Voltage: 5V  1A<br>Rated Power: 5W |
| Adapter           | HW-050100A01 | Huawei Technologies Co., Ltd. | Input Voltage: ~100-240V 50/60Hz 0.2A<br>Output Voltage: 5V  1A<br>Rated Power: 5W |
| Battery           | HB396481EBC  | Huawei Technologies           | Rated capacity: 3000 mAh<br>Nominal Voltage:  +3.8V                                |



| Sub-Assembly      |       |              |  |
|-------------------|-------|--------------|--|
| Sub-Assembly Name | Model | Manufacturer | Description  |
|                   |       | Co., Ltd.    | Charging Voltage:  +4.35V |

### 3.3 Technical Description

| Characteristics       | Description              |   |
|-----------------------|--------------------------|---|
| TX/RX Operating Range | 2400-2483.5 MHz band     | $f_c = 2402 \text{ MHz} + N * 2 \text{ MHz}$ , where: <ul style="list-style-type: none"><li>- <math>f_c</math> = "Operating Frequency" in MHz,</li><li>- <math>N</math> = "Channel Number" with the range from 0 to 39.</li></ul> |
| Modulation Type       | Digital                  | GFSK,   |
| Emission Designator   | GFSK for BT 4.0: 680KGXD |   |
| Bluetooth Power Class | Class 1                  |   |



## 4 General Test Conditions / Configurations

### 4.1 EUT Configurations

#### 4.1.1 General Configurations

| Configuration       | Description  |
|---------------------|--|
| Test Antenna Ports  | Until otherwise specified, <ul style="list-style-type: none"><li>- All TX tests are performed at all TX antenna ports of the EUT, and</li><li>- All RX tests are performed at all RX antenna ports of the EUT.</li></ul> |
| Multiple RF Sources | Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.   |

#### 4.1.2 Customized Configurations

| # EUT Conf. | Signal Description   | Operating Frequency  | Duty cycle |
|-------------|--|----------------------|------------|
| TM1_Ch0     | GFSK for BT 4.0 modulation, package type DH5, hopping off. | Ch No. 0 / 2402 MHz  | 63%        |
| TM1_Ch19    | GFSK for BT 4.0 modulation, package type DH5, hopping off. | Ch No. 19 / 2440 MHz | 63%        |
| TM1_Ch39    | GFSK for BT 4.0 modulation, package type DH5, hopping off. | Ch No. 39 / 2480 MHz | 63%        |

### 4.2 Test Environments

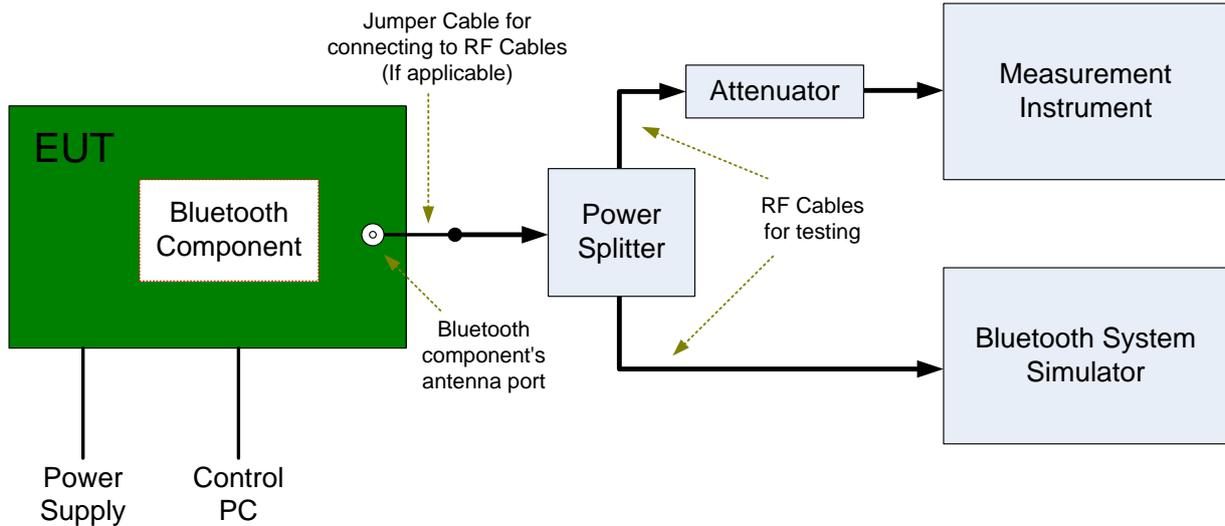
NOTE: The values used in the test report may be stringent than the declared.

| Environment Parameter | Selected Values During Tests |         |                   |
|-----------------------|------------------------------|---------|-------------------|
|                       | Temperature                  | Voltage | Relative Humidity |
| NTNV                  | Ambient                      | 3.8 VDC | Ambient           |

## 4.3 Test Setups

### 4.3.1 Test Setup 1

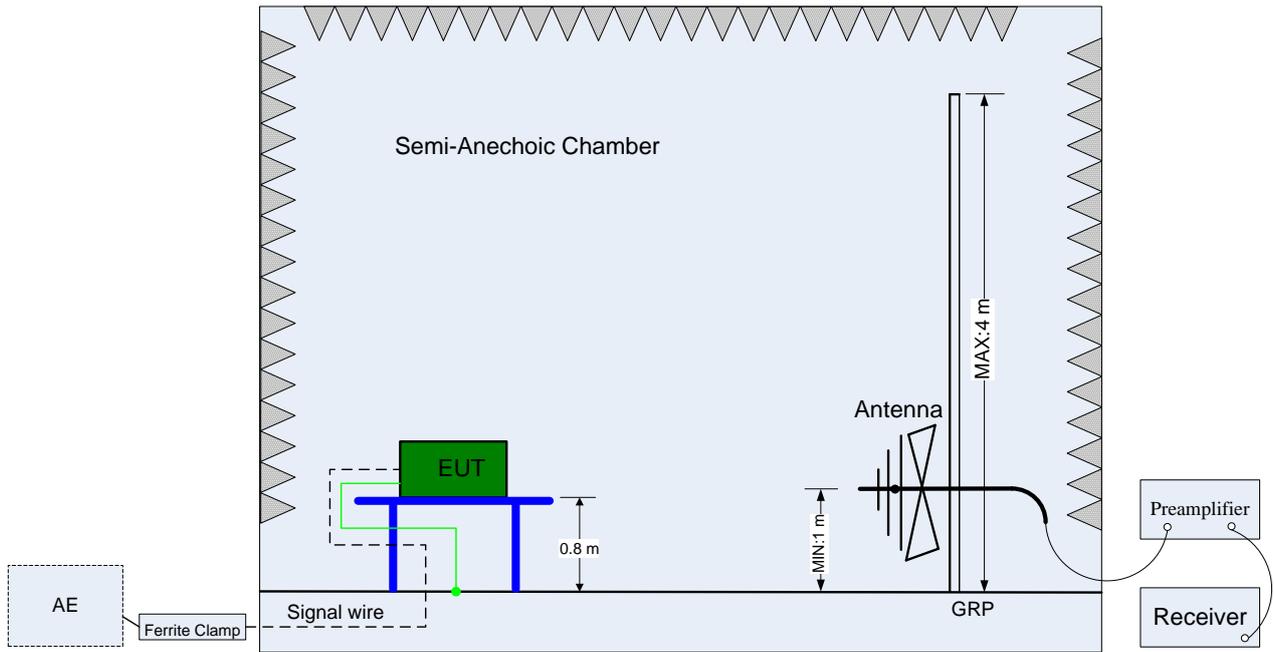
The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by Bluetooth System Simulator and/or PC/software to emit the specified signals for the purpose of measurements.



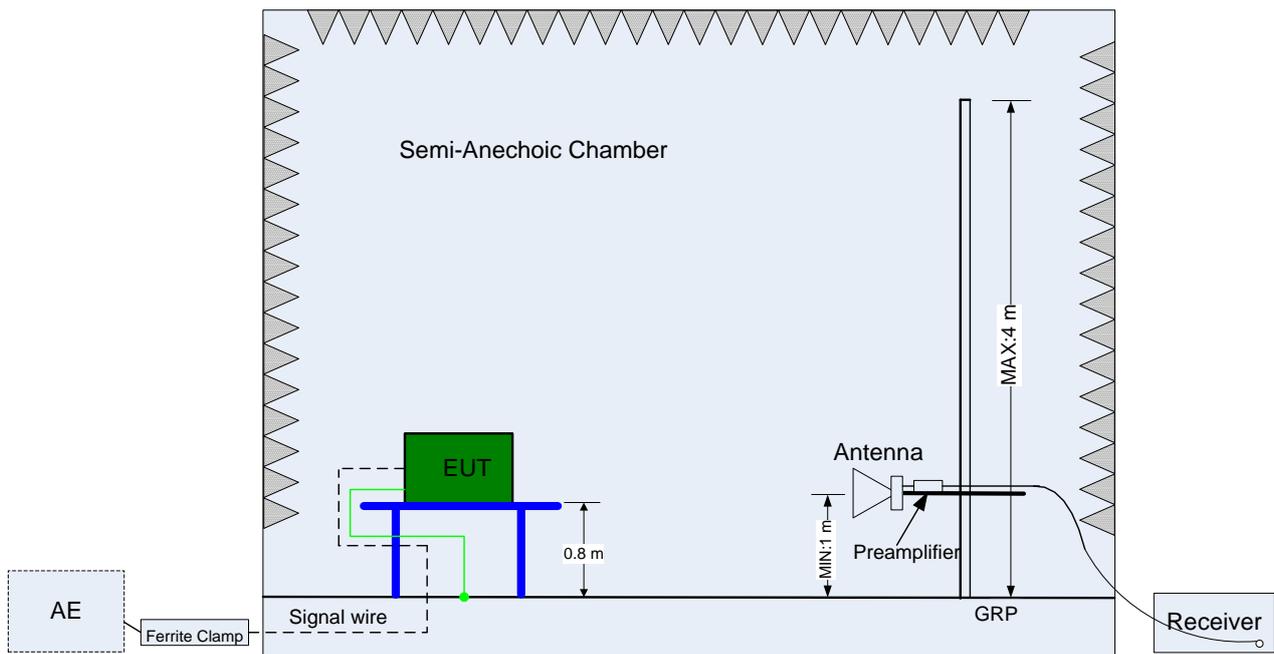
### 4.3.2 Test Setup 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



(Below 1 GHz)

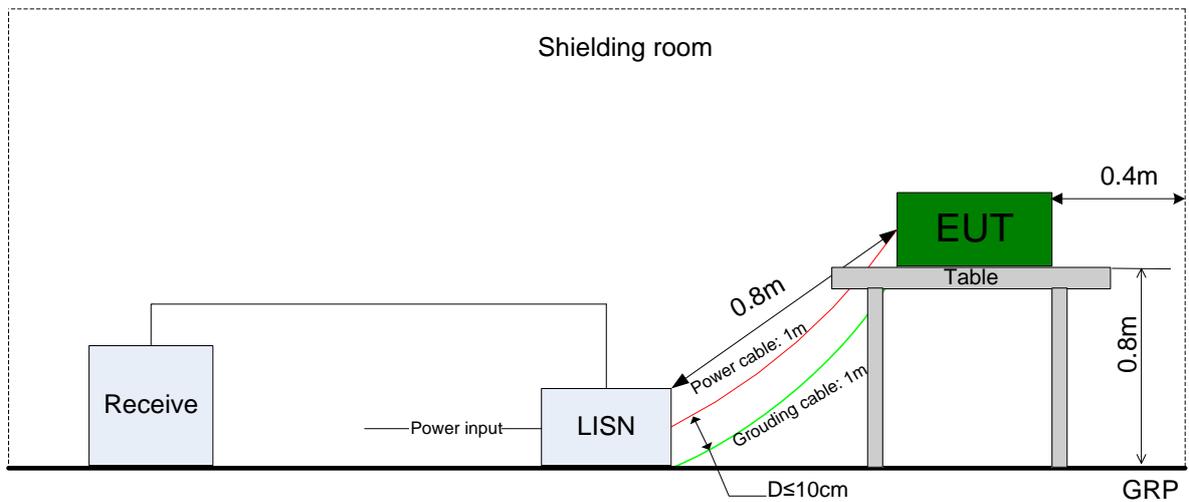


(Above 1 GHz)

### 4.3.3 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



#### 4.4 Test Conditions

| Test Case   | Test Conditions |  |                              |
|---|-----------------|--|------------------------------|
|   | Configuration   | Description  |                              |
| 6dB Emission Bandwidth (EBW)                                  | Meas. Method    | FCC KDB 558074 §8.2 Option 2.  |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 1   |                              |
|   | EUT Conf.       | TM1_Ch0, TM1_Ch19, TM1_Ch39.   |                              |
| Maximum Conducted Average Output Power                        | Meas. Method    | FCC KDB 558074 §9.2 .2. 4  |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 1   |                              |
|   | EUT Conf.       | TM1_Ch0, TM1_Ch19, TM1_Ch39.   |                              |
| Maximum Power Spectral Density Level                          | Meas. Method    | FCC KDB 558074 §10.5   |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 1   |                              |
|   | EUT Conf.       | TM1_Ch0, TM1_Ch19, TM1_Ch39.   |                              |
| Band edge spurious emission                                   | Meas. Method    | FCC KDB 558074 §13.0.  |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 1   |                              |
|   | EUT Conf.       | TM1_Ch0, TM1_Ch39.   |                              |
| Unwanted Emissions into Non-Restricted Frequency Bands        | Meas. Method    | FCC KDB 558074 §11.0   |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 1   |                              |
|   | EUT Conf.       | TM1_Ch0, TM1_Ch19, TM1_Ch39.   |                              |
| Unwanted Emissions into Restricted Frequency Bands (Radiated) | Meas. Method    | ANSI C63.10; FCC KDB 558074 §12.1, Radiated  |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 2   |                              |
|   | EUT Conf.       | 30 MHz -1 GHz  | TM1_Ch0 (Worst Conf.).       |
|   |                 | 1-3 GHz  | TM1_Ch0, TM1_Ch19, TM1_Ch39. |
| 3-18 GHz  |                 | TM1_Ch19 (Worse Conf.),  |                              |
| 18-26.5 GHz   |                 | TM1_Ch0 (Worst Conf.).   |                              |
| AC Power Line Conducted Emissions                             | Meas. Method    | AC mains conducted.<br>Pre: RBW = 10 kHz; Det. = Peak.<br>Final: RBW = 9 kHz; Det. = CISPR Quasi-Peak & Average. |                              |
|   | Test Env.       | NTNV   |                              |
|   | Test Setup      | Test Setup 3   |                              |
|   | EUT Conf.       | TM1_Ch39.  |                              |



## 5 Main Test Instruments

Test Location 1:

| Equipment Name                       | Manufacturer | Model    | Serial Number  | Cal Date   | Cal- Due   |
|--------------------------------------|--------------|----------|----------------|------------|------------|
| Power supply                         | KEITHLEY     | 2303     | A120714713     | 2014-08-07 | 2016-08-06 |
| Wireless Communication Test set      | Agilent      | N4010A   | MY49081592     | 2014-11-04 | 2015-11-03 |
| Universal Radio Communication Tester | R&S          | CMU200   | 123299         | 2014-11-04 | 2015-11-03 |
| Spectrum Analyzer                    | Agilent      | N9020A   | MY52090652     | 2014-07-11 | 2015-07-10 |
| Universal Radio Communication Tester | R & S        | CMW500   | 126854         | 2015-02-13 | 2016-02-12 |
| Spectrum Analyzer                    | Agilent      | E4440A   | MY48250119     | 2014-07-11 | 2015-07-10 |
| Signal Analyzer                      | R&S          | FSQ31    | 200021         | 2014-11-04 | 2015-11-03 |
| Spectrum Analyzer                    | Agilent      | N9030A   | MY49431698     | 2014-11-04 | 2015-11-03 |
| Temperature Chamber                  | WEISS        | WKL64    | 56246002940010 | 2015-02-13 | 2016-02-12 |
| Signal generator                     | Agilent      | E8257D   | MY49281095     | 2014-11-04 | 2015-11-03 |
| Vector Signal Generator              | R&S          | SMU200A  | 104162         | 2014-11-04 | 2015-11-03 |
| Power Detecting & Sampling Unit      | R&S          | OSP-B157 | 100881         | 2014-09-08 | 2015-09-07 |
| Signal Generator                     | Agilent      | E4438C   | MY47271904     | 2014-10-28 | 2015-10-27 |



## Test Location 2:

| Description                                | TYPE       | SERIES NUMBER | MANUFACTURE    | CAL DUE DATE  |
|--|------------|---------------|----------------|---------------|
| EXA Spectrum Analyzer                      | N9010A     | MY5052044     | Agilent        | Mar.28,2016   |
| Microwave Preamplifier With Adaptor        | EMC012645B | 980221        | EMC INSTRUMENT | Oct.22,2015   |
| Amplifier                                  | 8449B      | 3008A02274    | Agilent        | Mar.28,2016   |
| Double Ridged Guide Antenna (1 GHz ~18GHz) | 3115       | 00075846      | ETS.LINDGREN   | Mar.28,2016   |
| Antenna (1 GHz ~18GHz)                     | 3115       | 00075789      | ETS            | Mar.28,2016   |
| Antenna(30M~1GHz)                          | VULB9160   | 9160-3231     | SCHWARZBECK    | Mar.28,2016   |
| Antenna(30M~1GHz)                          | VULB9160   | 9160-3232     | SCHWARZBECK    | Mar.28,2016   |
| Triple Loop Antenna(9K~30M)                | HXYZ9170   | 9170-110      | SCHWARZBECK    | Mar.28,2016   |
| Horn Antenna(18GHz~26.5GHz)                | 3116C      | 00152324      | ETS            | Mar.28,2016   |
| controller                                 | SC100      | 9163-235      | CT             | N/A           |
| Amplifier                                  | 8447D      | 1937A02847    | HP             | Mar. 17, 2016 |
| Receiver                                   | N9038A     | MY52130039    | AGILENT        | Sep. 30, 2015 |

---

END