



# **FCC RF Test Report**

**Product Name: HSPA+ USB Stick**

**Model Number: K4305**

**Report No: SYBH(Z-RF)009082012-2001  
FCC ID:QISK4305**

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2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
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|             |                |                |                                                                                       |
|-------------|----------------|----------------|---------------------------------------------------------------------------------------|
| Operated By | Aug., 20, 2012 | Huang Qiuliang |  |
|             | Date           | Name           | Signature                                                                             |

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## 1 General Information

|                                         |                                                                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>1.1 Applied Standard</b>             |                                                                                               |
|                                         |                                                                                               |
| Applied Rules:                          | 47 CFR FCC Part 2:2011, Subpart J<br>47 CFR FCC Part 22:2011, Subpart H<br>ANSI/TIA 603C:2004 |
|                                         |                                                                                               |
| <b>1.2 Test Location</b>                |                                                                                               |
|                                         |                                                                                               |
| Test Location 1:                        | Reliability Laboratory of Huawei Technologies Co., Ltd.                                       |
| Address:                                | Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China                          |
|                                         |                                                                                               |
| <b>1.3 Test Environmental Condition</b> |                                                                                               |
|                                         |                                                                                               |
| Ambient Temperature:                    | 20 – 25 °C                                                                                    |
| Ambient Relative Humidity:              | 45 – 55 %                                                                                     |
| Atmospheric Pressure:                   | 101 kPa                                                                                       |
|                                         |                                                                                               |

## 2 Summary

Table 1 Summary of results

| Test Case                              | FCC Part No.    | Requirements                                                                                                                                    | Result |
|----------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Cellular Band                          |                 |                                                                                                                                                 |        |
| Transmitter Output Power               | 2.1046 & 22.913 | ERP not exceed 7 W                                                                                                                              | Pass   |
| Modulation Characteristics             | 2.1047          | Digital modulation                                                                                                                              | Pass   |
| Occupied Bandwidth                     | 2.1049          | (Not specified)                                                                                                                                 | Pass   |
| Band Edges Compliance                  | 2.1051 & 917    | Below -13 dBm/1%*EBW, in 1 MHz range                                                                                                            | Pass   |
| Spurious Emission at Antenna Terminals | 2.1051 & 2.917  | Below -13 dBm/1 kHz, 9 kHz to 150 kHz<br>Below -13 dBm/10 kHz, 150 kHz to 30 MHz<br>Below -13 dBm/100 kHz, 30 MHz to 10 <sup>th</sup> harmonics | Pass   |
| Field Strength of Spurious Radiation   | 2.1053 & 22.917 | Below -13 dBm/100 kHz                                                                                                                           | Pass   |
| Frequency Stability                    | 2.1055 & 22.355 | Maintained within the tolerances of $\pm 1.5$ ppm                                                                                               | Pass   |

### 3 Product Description

#### 3.1 Product Information

##### 3.1.1 General Description

K4305 HSPA+/WCDMA/EDGE/GPRS/GSM dual mode USB Stick is subscriber equipment in the UMTS/GSM system. K4305 implements such functions as RF signal receiving/transmitting, HSPA+/WCDMA and EDGE/GPRS/GSM protocol processing, data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface and Micro SD card interface.

##### 3.1.2 Board Information

Table 2 Board Information

|                                     |                 |                  |
|-------------------------------------|-----------------|------------------|
| HSPA+ USB Stick                     |                 |                  |
| K4305                               |                 |                  |
| Board and Module                    |                 |                  |
| Equipment Designation / Description | Serial Number   | Hardware Version |
| MAINBOARD                           | 864979010000286 | CH2E303SM        |

## 4 Test Description

### 4.1 Supported Frequency Range

| Characteristics | Description    |
|-----------------|----------------|
| Downlink        | 869 to 894 MHz |
| Uplink          | 824 to 849 MHz |

### 4.2 Transmitter / Receiver Characteristics

| Characteristics                    | Description                                                         |
|------------------------------------|---------------------------------------------------------------------|
| System Type                        | GSM                                                                 |
| TX Output Power (per Antenna Port) | GSM system: 33dBm                                                   |
| Channel Spacing(s) / Bandwidth(s)  | GSM system: 200 kHz                                                 |
| Designation of Emissions           | GSM system: 248KGXW (GMSK modulation),<br>244KG7W (8PSK modulation) |

### 4.3 Antenna Gain

|                   |       |
|-------------------|-------|
| Antenna Gain(dBi) | 1.67  |
| Antenna Gain(dBd) | -0.48 |

## 5 General Test Conditions / Configurations

### 5.1 RF Channels under Test

| Test Mode | TX / RX | RF Channel  |             |             |
|-----------|---------|-------------|-------------|-------------|
|           |         | Low (L)     | Middle (M)  | High (H)    |
| TM1/TM2   | TX      | Channel 128 | Channel 192 | Channel 251 |
|           |         | 824.2MHz    | 837.0MHz    | 848.8MHz    |
|           | RX      | Channel 128 | Channel 192 | Channel 251 |
|           |         | 869.2MHz    | 882.0MHz    | 893.8MHz    |

### 5.2 Test Modes

| Test Mode | Test Modes Description    |
|-----------|---------------------------|
| TM1       | GSM/GPRS, GMSK modulation |
| TM2       | EDGE, 8PSK modulation     |

### 5.3 Test Environment

| Environment Parameter | Selected Values During Tests |         |
|-----------------------|------------------------------|---------|
| Relative Humidity     | Ambient                      |         |
| Temperature           | TN                           | Ambient |
| Voltage               | VL                           | 4.75V   |
|                       | VN                           | 5V      |
|                       | VH                           | 5.25V   |

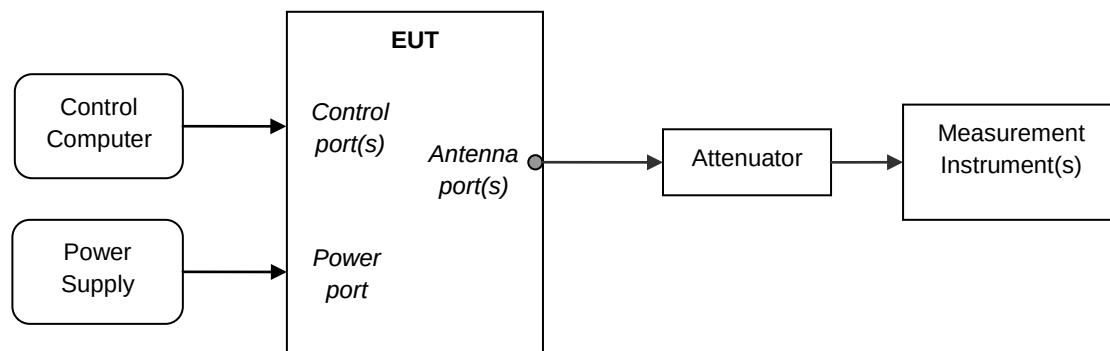
NOTE: VL= lower extreme test voltage  
VN= nominal voltage  
VH= upper extreme test voltage  
TN= normal temperature

## 5.4 Test Setup

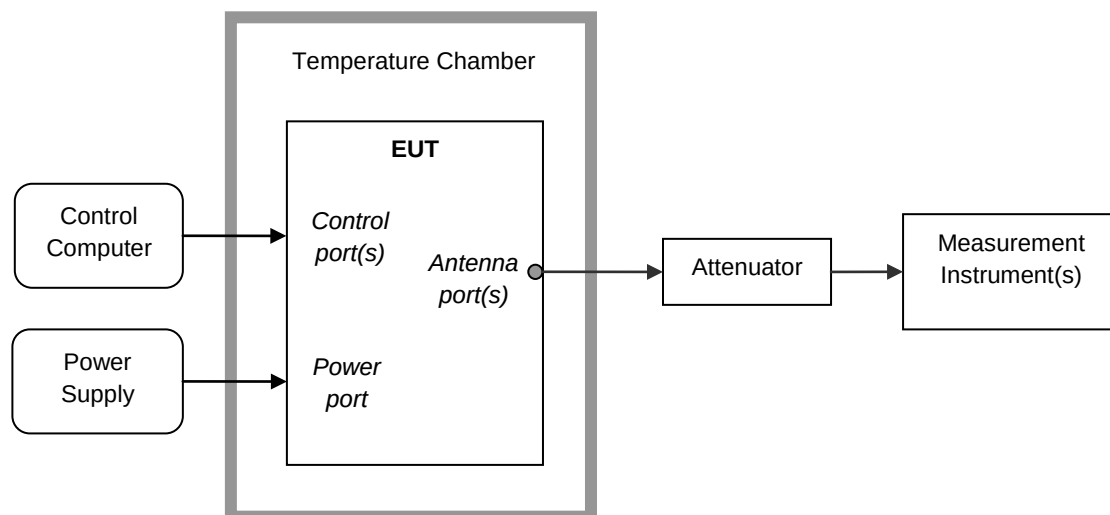
### 5.4.1 General Test Setup Configurations

| Configuration       | Description                                                                                                                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Antenna Ports  | Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT. |
| Multiple RF Sources | Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.                                                                                                                                       |

### 5.4.2 Test Setup 1



### 5.4.3 Test Setup 2



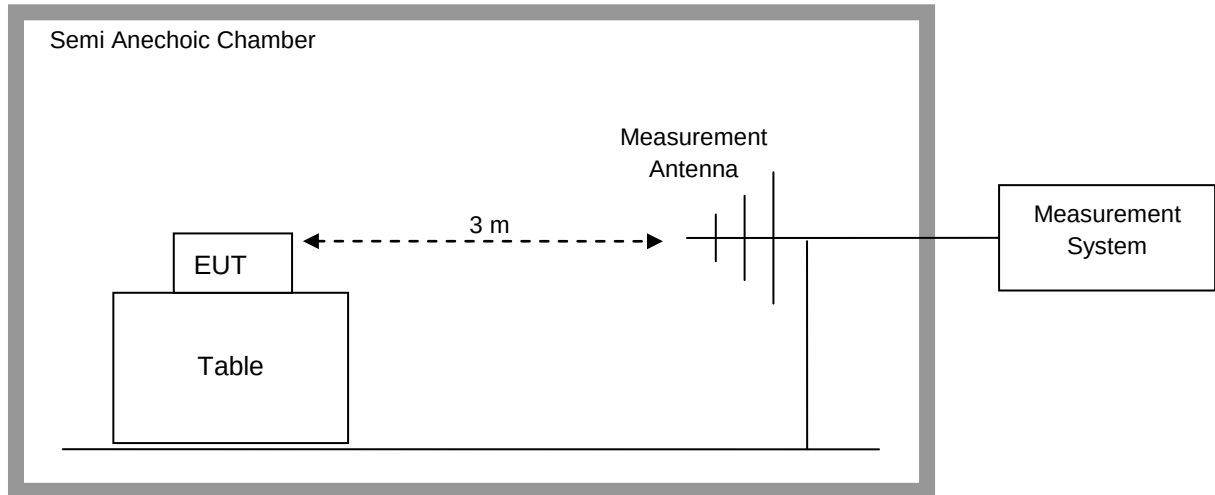
### 5.4.4 Test Setup 3

NOTE1: Effective radiated power (ERP) or Effective Isotropic radiated power (EIRP) refers to the EUT radiation power output, assuming all emissions are radiated from half-wave dipole antennas horn antennas.

NOTE2: The EUT was set on insulator 80cm above the Ground Plane. The setup and test methods were according to ANSI-TIA-603C 2004. The measurements were carried through with a Rohde and Schwarz Test Receiver and control software.

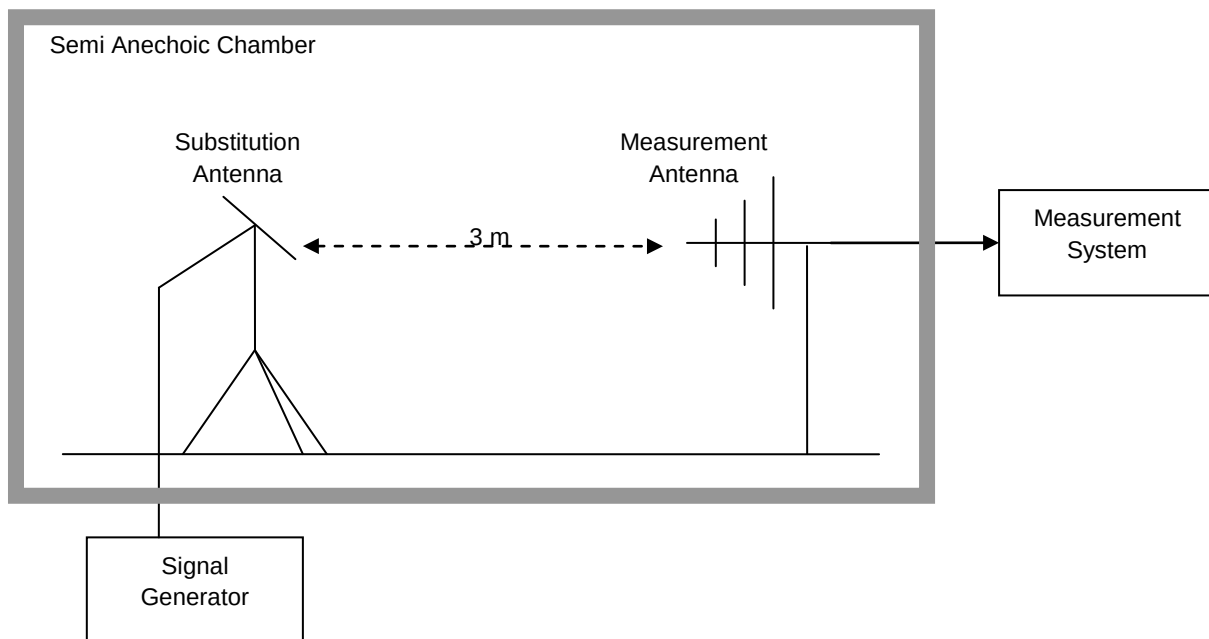
#### Step 1: Pre-test to find the Maximum ERP or EIRP

1. Connect the test system according to the following figure. EUT is running for 30 minutes before test, and measurement instruments are warming-up for 30 minutes.
2. Set up communication link between Universal radio communication tester and EUT, set EUT working frequency, and control EUT to transmit at maximum power.
3. Set the center frequency of the signal analyzer or receiver to the EUT's operating frequency, the RBW is equal to the emission bandwidth of the signal. Set RMS detector for the test, and the span is equal to 2 times of emission bandwidth, the other settings should remain automatic. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°. The receiver antenna has two polarizations V and H. A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.
4. Changing EUT working frequency and measuring the RF power at channel L, M, H respectively.  
Complete the test data.



## Step 2: Substitution method to verify the maximum ERP or EIRP

1. Measurement setup is according to the following figure. EUT was substituted by antenna, and the polarization is identical with the test antenna; the signal generator was connected to the substitution antenna.
2. The radiated output power, measured by signal analyzer set, is the same as recorded in above item 5). Then this power level is matched by a signal from a calibrated signal generator which is substituted for EUT. The power supplied by the generator is then equal to the ERP or EIRP after corrected by the antenna gain and cable loss.



## 5.5 Test Conditions

| Test Case                              | Test Conditions    |                                                                                                                           |
|----------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| Transmitter Output Power               | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1 & Test Setup 3                                                                                               |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | L, M, H                                                                                                                   |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Modulation Characteristics             | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Occupied Bandwidth                     | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | L, M, H                                                                                                                   |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Band Edges Compliance                  | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | L, H                                                                                                                      |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Spurious Emission at Antenna Terminals | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | L, M, H                                                                                                                   |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Field Strength of Spurious Radiation   | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 3                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM2                                                                                                                   |
| Frequency Stability                    | Test Configuration | (1) -30 °C to +50 °C with step 10 °C at Rated Voltage;<br>(2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature. |
|                                        | Test Setup         | Test Setup 2                                                                                                              |
|                                        | RF Channels (TX)   | M                                                                                                                         |



|           |                 |         |
|-----------|-----------------|---------|
| Test Case | Test Conditions |         |
|           | Test Mode       | TM1/TM2 |

## 6 Main Test Instruments

Table 3 Main Test Equipments

| Equipment Description                | Manufacturer | Model                   | Serial Number | Calibrated until |
|--------------------------------------|--------------|-------------------------|---------------|------------------|
| Power supply                         | KEITHLEY     | 2303                    | 1288003       | Sept., 27, 2012  |
| Universal Radio Communication Tester | R&S          | CMU200                  | 105822        | Oct., 24, 2012   |
| Wireless Communication Test set      | Agilent      | N4010A                  | MY49081592    | Dec., 14, 2012   |
| Universal Radio Communication Tester | Agilent      | E5515C                  | MY50260239    | Aug., 31, 2013   |
| Spectrum Analyzer                    | Agilent      | E4440A                  | MY49420179    | Apr., 20, 2013   |
| Signal Analyzer                      | R&S          | FSQ31                   | 200021        | Sept., 27, 2012  |
| Temperature Chamber                  | WEISS        | WKL64                   | 24600294      | Jan., 03, 2013   |
| Signal generator                     | Agilent      | E8257D                  | MY49281095    | Jul., 09, 2013   |
| Vector Signal Generator              | R&S          | SMU200A                 | 104162        | Sept., 07, 2012  |
| Test receiver                        | R&S          | ESU26                   | 100150        | May., 24, 2013   |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 919/1009      | Dec., 13, 2012   |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 979/917       | Dec., 13, 2012   |
| Horn Antenna                         | R & S        | HF906                   | 100683        | May., 16, 2013   |
| Horn Antenna                         | R & S        | HF906                   | 100684        | May., 16, 2013   |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-357      | Sept., 27, 2012  |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-356      | Sept., 27, 2012  |

## 7 Test Results

| No. | Test Item                              | Test Result |
|-----|----------------------------------------|-------------|
| 1   | Transmitter Output Power               | Appendix A  |
| 2   | Modulation Characteristics             | Appendix B  |
| 3   | Occupied Bandwidth                     | Appendix C  |
| 4   | Band Edges Compliance                  | Appendix D  |
| 5   | Spurious Emission at Antenna Terminals | Appendix E  |
| 6   | Field Strength of Spurious Radiation   | Appendix F  |
| 7   | Frequency Stability                    | Appendix G  |
| 8   | Photos of Test Setup                   | Appendix H  |

NOTE: There is no test data in Appendix H, only Photos of Test Setup for Field Strength of Spurious Radiation.

## 8 Measurement Uncertainty

For a 95% confidence level ( $k=2$ ), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

| Test Item                            |                          | Extended Uncertainty                               |
|--------------------------------------|--------------------------|----------------------------------------------------|
| Transmitter Output Power             | Power (dBm)              | U =0.39 dB                                         |
| Occupied Bandwidth                   | Magnitude (%)            | U=0.2%                                             |
| Band Edge Compliance                 | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Conducted Spurious Emissions         | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Field Strength of Spurious Radiation | ERP (dBm)                | U=4.6 dB (30 MHz – 1GHz)<br>U=3.0 dB (above 1 GHz) |
| Frequency Stability                  | Frequency Accuracy (ppm) | U=0.21 ppm                                         |

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