# SHENZHEN KENXINDA TECHNOLOGY CO.,LTD

### **GSM&WCDMA MOBILE PHONE**

Model: S-502

28 September, 2011 Report No.: 11070066-FCC 15.247 (This report supersedes NONE)



| Modifications made to the product : None |  |  |  |  |
|--|--|--|--|--|
| thority of:                              |  |  |  |  |
| Spring show                              |  |  |  |  |
| Spring Zhou                              |  |  |  |  |
| Compliance Engineer Technical Manager    |  |  |  |  |
|  |  |  |  |  |

This test report may be reproduced in full only. Test result presented in this test report is applicable to the representative sample only.

То

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# Laboratory Introduction

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In addition to testing and certification, SIEMIC provides initial design reviews and compliance management through out a project. Our extensive experience with China, Asia Pacific, North America, European, and international compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

| Country/Region | Accreditation Body     | Scope                              |
|----------------|------------------------|------------------------------------|
| USA            | FCC, A2LA              | EMC, RF/Wireless, Telecom          |
| Canada         | IC, A2LA, NIST         | EMC, RF/Wireless, Telecom          |
| Taiwan         | BSMI, NCC, NIST        | EMC, RF, Telecom , Safety          |
| Hong Kong      | OFTA , NIST            | RF/Wireless ,Telecom               |
| Australia      | NATA, NIST             | EMC, RF, Telecom , Safety          |
| Korea          | KCC/RRA, NIST          | EMI, EMS, RF, Telecom, Safety      |
| Japan          | VCCI, JATE, TELEC, RFT | EMI, RF/Wireless, Telecom          |
| Mexico         | NOM, COFETEL, Caniety  | Safety, EMC , RF/Wireless, Telecom |
| Europe         | A2LA, NIST             | EMC, RF, Telecom , Safety          |

### Accreditations for Product Certifications

| Country   | Accreditation Body | Scope                 |
|-----------|--------------------|-----------------------|
| USA       | FCC TCB, NIST      | EMC , RF , Telecom    |
| Canada    | IC FCB , NIST      | EMC , RF , Telecom    |
| Singapore | iDA, NIST          | EMC, RF, Telecom      |
| EU        | NB                 | EMC & R&TTE Directive |



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#### **Executive Summary & EUT information** 1

The purpose of this test programme was to demonstrate compliance of the SHENZHEN KENXINDA TECHNOLOGY CO., LTD GSM&WCDMA MOBILE PHONE, and model S-502 against the current Stipulated Standards. The GSM&WCDMA MOBILE PHONE has demonstrated compliance with the FCC 15.247:2010.

**EUT Information** 

| EUT<br>Description<br>Model No<br>Serial No       | : | GSM&WCDMA MOBILE PHONE<br><b>S-502</b><br>N/A<br>Powered by Power Adapter   |
|---|---|---|
| Input Power                                       | • | Trade Name.: ti.phone<br>Input: AC100-240V, 50/60Hz, 0.25A<br>Output: DC5.0V, 500mA<br>Li-ion Battery<br>Model No.: BL-4D<br>Rating: 3.7V, 1200mAh<br>Restrictive Voltage: 4.2V |
| Classification<br>Per Stipulated<br>Test Standard | : | Spread Spectrum System/Device   |

 
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# 2 TECHNICAL DETAILS

|                                 | Compliance testing of  |
|---------------------------------|--|
| Purpose                         | GSM&WCDMA MOBILE PHONE with stipulated standard  |
| Applicant / Client              | SHENZHEN KENXINDA TECHNOLOGY CO.,LTD<br>18th FLOOR, FUCHUN ORIENT BUILDING,SHENNAN AV7006,FUTIAN<br>DISTRICT,SHENZHEN,P.R.CHINA  |
| Manufacturer                    | SHENZHEN KENXINDA TECHNOLOGY CO.,LTD BAO'AN BRANCH<br>1-6 FLOOR,NO.105 WORK SHOP&1-5 FLOOR,NO.104 WORK<br>SHOP,XINWEIHUANING ROAD,DALANG COMMUNITY,DALANG<br>STREET,BAO'AN DISTRICT,SHENZHEN,P.R.CHINA   |
| Laboratory performing the tests | SIEMIC Nanjing (China) Laboratories<br>NO.2-1,Longcang Dadao, Yuhua Economic Development Zone,<br>Nanjing, China<br>Tel:+86(25)86730128/86730129<br>Fax:+86(25)86730127<br><u>Email:info@siemic.com</u>  |
| Test report reference number    | 11070066-FCC 15.247  |
| Date EUT received               | 25 September, 2011   |
| Standard applied                | FCC 15.247:2010  |
| Dates of test (from – to)       | 26 September, 2011   |
| No of Units:                    | #1   |
| Equipment Category:             | DTS  |
| Trade Name:                     | SEFTON   |
| Model :                         | S-502  |
| RF Operating Frequency (ies)    | GSM850 TX : 824.2 ~ 848.8 MHz RX :869.2 ~ 893.8 MHz<br>PCS1900 TX : 1850.2 ~ 1909.8 MHz RX :1930.2 ~ 1989.8 MHz<br>UMTS Band V TX : 826.4 ~ 846.6 MHz RX :871.4 ~ 891.6 MHz<br>UMTS Band II TX : 1852.4 ~ 1907.6 MHz RX :1932.4 ~ 1987.6 MHz<br>BT:2402MHz-2480MHz<br>WIFI:2.4GHz band: 802.11b/g: 2412MHz-2462MHz |
| Number of Channels :            | 300 (PCS1900) and 125 (PCS850)<br>BT: 79CH<br>WIFI:2.4GHz band: 802.11b/g-20MHz 11CH   |
| Modulation:                     | GSM / GPRS/ EGPRS : GMSK, 8PSK<br>WCDMA:QPSK<br>BT: GFSK, π/4 DPSK, 8DPSK<br>WIFI:DSSS   |
| FCC ID:                         | ZSHS-502   |



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#### **MODIFICATION** 3

NONE





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#### TEST SUMMARY 4

The product was tested in accordance with the following specifications. All testing has been performed according to below product classification:

#### Spread Spectrum System/Device

#### **Test Results Summary**

| Test Standard            | Description                      | Pass / Fail |
|--------------------------|----------------------------------|-------------|
| CFR 47 Part 15.247: 2010 |                                  |             |
| 15.203                   | Antenna Requirement              | Pass        |
| 15.205                   | Restricted Band of Operation     | Pass        |
| 15.207(a)                | Conducted Emissions Voltage      | Pass        |
| 15.247(a)(1)             | Channel Separation               | N/A         |
| 15.247(a)(1)             | Occupied Bandwidth               | Pass        |
| 15.247(a)(2)             | 6dB Bandwidth                    | Pass        |
| 15.247(a)(1)             | Number of Hopping Channels       | N/A         |
| 15.247(a)(1)             | Time of Occupancy                | N/A         |
| 15.247(b)                | Output Power                     | Pass        |
| 15.247(c)                | Antenna Gain > 6 dBi             | Pass        |
| 15.247(d)                | Conducted Spurious Emissions     | Pass        |
| 15.209; 15.247(d)        | Radiated Spurious Emissions      | Pass        |
| 15.247(e)                | Power Spectral Density           | Pass        |
| 15.247(f)                | Hybrid System Requirement        | N/A         |
| 15.247(g)                | Hopping Capability               | N/A         |
| 15.247(h)                | Hopping Coordination Requirement | N/A         |
| 15.247(i)                | RF Exposure requirement          | Pass        |

ANSI C63.4: 2009

PS: All measurement uncertainties are not taken into consideration for all presented test result.

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# 5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

### 5.1 Antenna Requirement

#### Requirement(s): 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The EUT antenna is using a unique type of connector. Antenna maximum gain is 2dBi.

### 5.2 Conducted Emissions Voltage

Requirement:

|                             | Conducted limit (dBµV) |           |
|-----------------------------|------------------------|-----------|
| Frequency of emission (MHz) | 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.

#### **Procedures:**

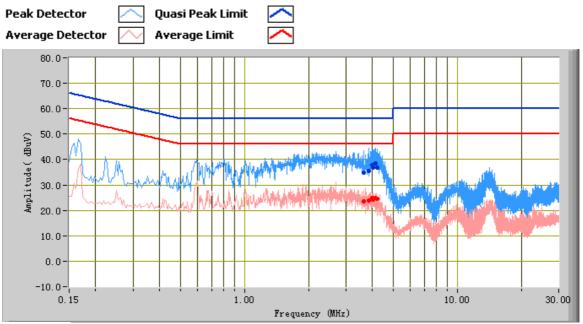
- 1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
- 2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
- <u>Conducted Emissions Measurement Uncertainty</u> All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.
- 4. Environmental Conditions Tempe Relativ

Temperature Relative Humidity Atmospheric Pressure 16°C 50% 1019mbar

5. Test date : 26 September, 2011 Tested By : Andy Wang



Note: Other modes were verified, only 802.11g-20MHz 2.4GHz band mode presented in this report as the worst case.



### Test Data

Line

| Frequency<br>(MHz) | Quasi<br>Peak            | Limit<br>(dBuV) | Margin<br>(dB) | Average<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Factors<br>(dB) |
|--------------------|--------------------------|-----------------|----------------|-------------------|-----------------|----------------|-----------------|
| 3.85               | ( <b>dBuV</b> )<br>35.63 | 56.00           | -20.37         | 24.04             | 46.00           | -21.96         | 10.46           |
| 4.14               | 38.54                    | 56.00           | -17.46         | 24.78             | 46.00           | -21.22         | 10.48           |
| 4.19               | 36.73                    | 56.00           | -19.27         | 24.62             | 46.00           | -21.38         | 10.47           |
| 4.01               | 36.83                    | 56.00           | -19.17         | 24.08             | 46.00           | -21.92         | 10.51           |
| 3.97               | 37.77                    | 56.00           | -18.23         | 24.82             | 46.00           | -21.18         | 10.50           |
| 3.65               | 34.75                    | 56.00           | -21.25         | 23.58             | 46.00           | -22.42         | 10.40           |

Quasi Peak Limit Peak Detector  $\overline{\sim}$ Average Detector Average Limit 80.0-70.0-60.0-50.0-Amplitude( dBuV) 40.0-١Å 30.0 Ally at 20.0 10.0-0.0- $-10.0 - \frac{1}{10}$ 0.15 1.00 10.00 30.00 Frequency (MHz)

### Test Data

### Neutral

| Frequency<br>(MHz) | Quasi<br>Peak<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Average<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Factors<br>(dB) |
|--------------------|-------------------------|-----------------|----------------|-------------------|-----------------|----------------|-----------------|
| 4.24               | 36.79                   | 56.00           | -19.21         | 22.75             | 46.00           | -23.25         | 10.47           |
| 4.09               | 38.28                   | 56.00           | -17.72         | 25.70             | 46.00           | -20.30         | 10.49           |
| 4.04               | 37.88                   | 56.00           | -18.12         | 25.18             | 46.00           | -20.82         | 10.50           |
| 2.87               | 38.44                   | 56.00           | -17.56         | 27.43             | 46.00           | -18.57         | 10.20           |
| 3.81               | 34.93                   | 56.00           | -21.07         | 23.63             | 46.00           | -22.37         | 10.45           |
| 3.19               | 37.34                   | 56.00           | -18.66         | 26.45             | 46.00           | -19.55         | 10.26           |



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### 5.3 6dB Occupied Bandwidth

- 1. Conducted Measurement EUT was set for low, mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal. 16°C 2. **Environmental Conditions** Temperature Relative Humidity 50% Atmospheric Pressure 1019mbar 3. **Conducted Emissions Measurement Uncertainty** All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB. 4. Test date : 26 September, 2011
- Tested By : Andy Wang

#### Requirement(s): 47 CFR § 15.247(a)(1)

**Procedures:** The 6dB Bandwidths were measured conducted using a spectrum analyzer at low, mid, and hi channels. 6dB Bandwidth Limit: >500kHz.

#### 2.4GHz band

| Protocol | Channel | Channel<br>Frequency<br>(MHz) | 6dB Occupied<br>Bandwidth Limit<br>(MHz) | 6dB Channel<br>Bandwidth<br>(MHz) |
|----------|---------|-------------------------------|--|-----------------------------------|
| 802.11b  | Low     | 2412                          | 0.5                                      | 12.17                             |
| 802.11b  | Mid     | 2437                          | 0.5                                      | 12.17                             |
| 802.11b  | High    | 2462                          | 0.5                                      | 12.25                             |
| 802.11g  | Low     | 2412                          | 0.5                                      | 16.83                             |
| 802.11g  | Mid     | 2437                          | 0.5                                      | 16.83                             |
| 802.11g  | High    | 2462                          | 0.5                                      | 16.75                             |



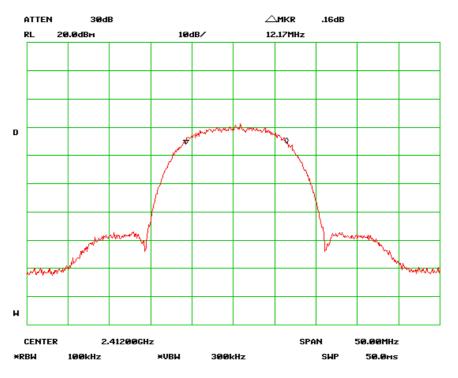
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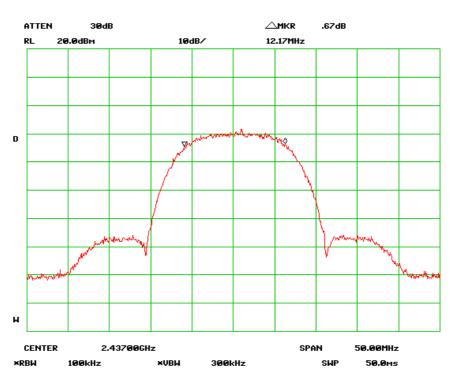
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# Refer to the attached plots. **2.4GHz band**



6dB Bandwidth - Low Channel (802.11b)



6dB Bandwidth – Mid Channel (802.11b)

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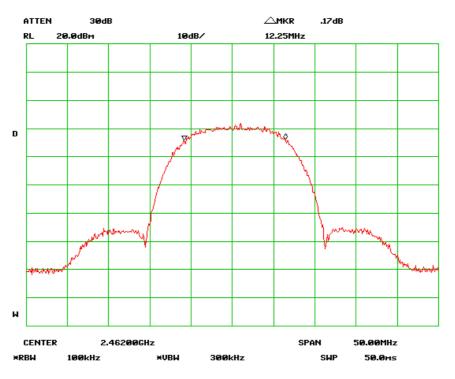
 Model:
 S-502

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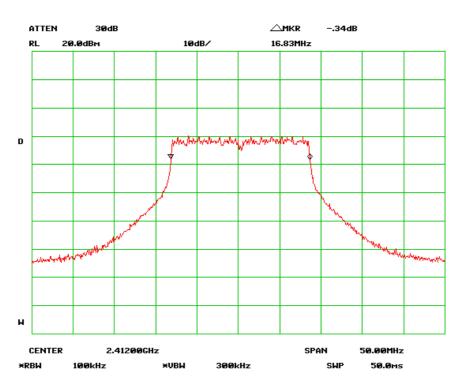
 
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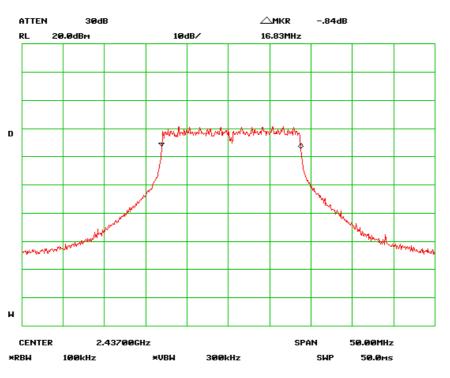
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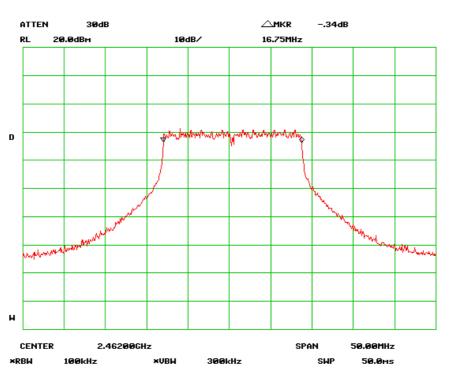
6dB Bandwidth – High Channel (802.11b)





6dB Bandwidth – Low Channel (802.11g)

6dB Bandwidth - Mid Channel (802.11g)



6dB Bandwidth – High Channel (802.11g)



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50% 1019mbar

### 5.4 Power Spectral Density

1. <u>Conducted Measurement</u>

EUT was set for low, mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal. Environmental Conditions Temperature 16°C

| 2. | Environmental Conditions | Temperature          |
|----|--------------------------|----------------------|
|    |                          | Relative Humidity    |
|    |                          | Atmospheric Pressure |

 Conducted Emissions Measurement Uncertainty All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.

4. Test date : 26 September, 2011 Tested By : Andy Wang

Requirement(s): 47 CFR § 15.247(e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3KHz band during any time interval of continuous transmission.

Procedures: The power spectral density measurement was taken conducted using a spectrum analyzer.

RBW=3KHz, VBW>RBW, Sweep time to SPAN/RBW(s).

The result:

### 2.4GHz band

| Protocol | Channel | Channel<br>Frequency<br>(MHz) | Peak Spectral<br>Density Limit<br>(dBm/3KHz) | Peak Spectral<br>Density<br>(dBm/3KHz) |
|----------|---------|-------------------------------|--|--|
| 802.11b  | Low     | 2412                          | 8  | -9.33                                  |
| 802.11b  | Mid     | 2437                          | 8  | -8.50                                  |
| 802.11b  | High    | 2462                          | 8  | -7.83                                  |
| 802.11g  | Low     | 2412                          | 8  | -11.17                                 |
| 802.11g  | Mid     | 2437                          | 8  | -10.50                                 |
| 802.11g  | High    | 2462                          | 8  | -9.33                                  |

Refer to the attached plots. **2.4GHz band** 

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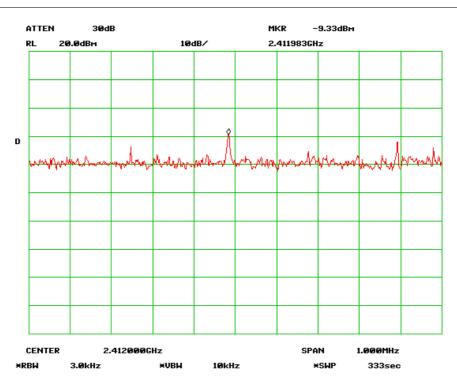
Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

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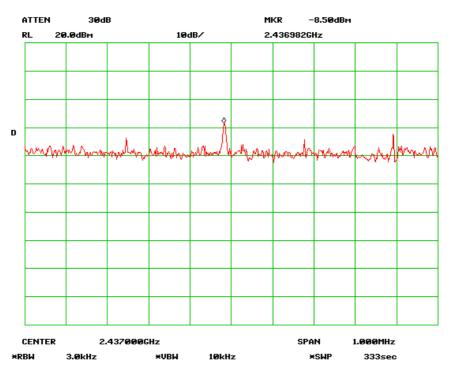
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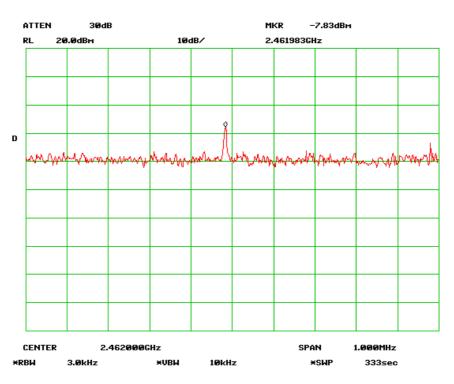


PSD - Mid Channel (802.11b)

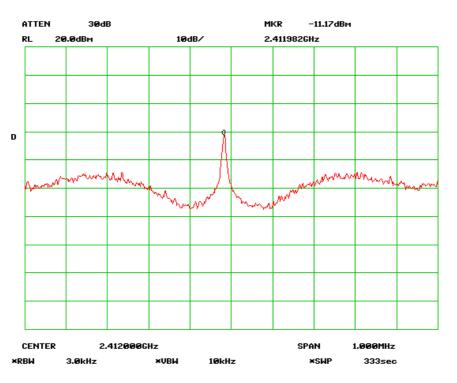
 
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PSD - High Channel (802.11b)

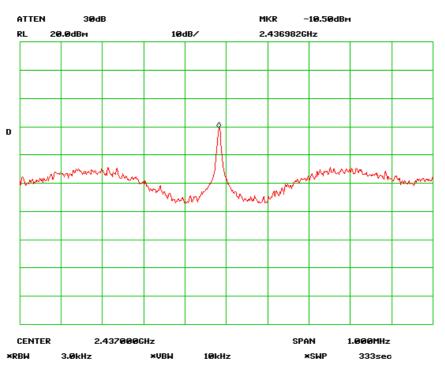


PSD - Low Channel (802.11g)

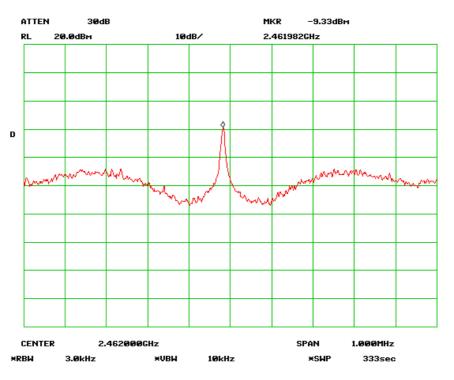
 
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PSD - Mid Channel (802.11g)



PSD - High Channel (802.11g)





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### 5.5 Peak Output Power

| 1. | Conducted Measurement   |                      |          |  |  |
|----|---|----------------------|----------|--|--|
|    | EUT was set for low, mid, high channel with modulated mode and highest RF output powe         |                      |          |  |  |
|    | The spectrum analyzer was connected to the antenna terminal.                                  |                      |          |  |  |
| 2. | Conducted Emissions Measurement Uncertainty   |                      |          |  |  |
|    | All test measurements carried out are traceable to national standards. The uncertainty of the |                      |          |  |  |
|    | measurement at a confidence level of approximately 95% (in the case where distributions a     |                      |          |  |  |
|    | normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.                   |                      |          |  |  |
| 3. | Environmental Conditions  | Temperature          | 16°C     |  |  |
|    |   | Relative Humidity    | 50%      |  |  |
|    |   | Atmospheric Pressure | 1019mbar |  |  |
| 4. | Test date : 26 September, 2011  |                      |          |  |  |
|    | Tested By : Andy Wang   |                      |          |  |  |

#### Standard Requirement: 47 CFR § 15.247(b)

**Procedures:** The peak output power was measured conducted using a spectrum analyzer at low, mid, and hi channels. Peak detector was set to measure the power output. The power is converted from watt to dBm, therefore, 1 watt = 30 dBm. The highest antenna gain that will be used is 2dBi.

Test Result:

### 2.4GHz band

| Protocol | Channel | Channel<br>Frequency<br>(MHz) | Peak Output<br>Power Limit<br>(dBm) | Measured<br>Output Power<br>(dBm) |
|----------|---------|-------------------------------|-------------------------------------|-----------------------------------|
| 802.11b  | Low     | 2412                          | 30                                  | 11.50                             |
| 802.11b  | Mid     | 2437                          | 30                                  | 11.90                             |
| 802.11b  | High    | 2462                          | 30                                  | 11.80                             |
| 802.11g  | Low     | 2412                          | 30                                  | 10.00                             |
| 802.11g  | Mid     | 2437                          | 30                                  | 10.10                             |
| 802.11g  | High    | 2462                          | 30                                  | 10.50                             |

Refer to the attached plots. **2.4GHz band** 

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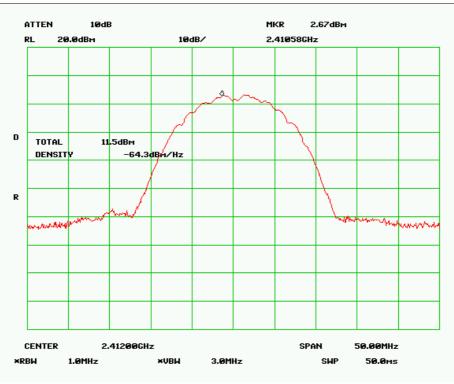
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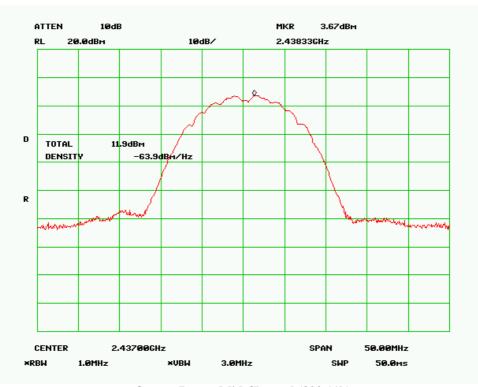
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**Output Power Mid Channel (802.11b)** 



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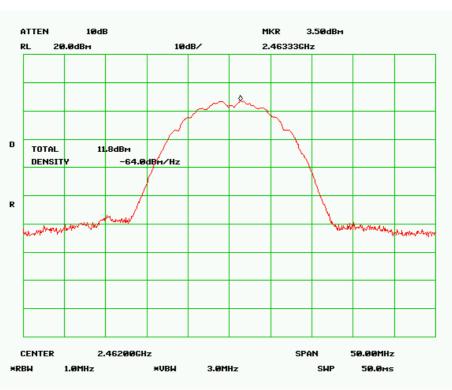
 Model:
 S-502

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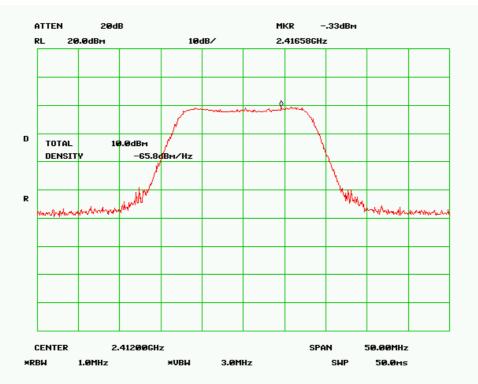
 
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**Output Power High Channel (802.11b)** 





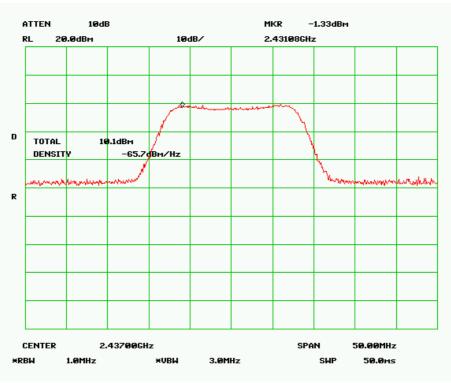
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 Serial#:
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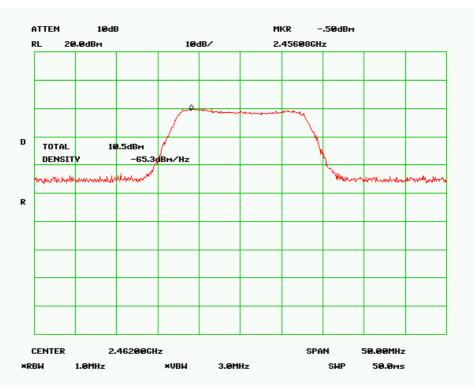
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#### **Output Power Mid Channel (802.11g)**



**Output Power High Channel (802.11g)** 



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### 5.6 Antenna Port Emission

#### 1. Conducted Measurement EUT was set for low, mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal. 2. Conducted Emissions Measurement Uncertainty All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz - 40GHz is ±1.5dB. **Environmental Conditions** 16°C 3. Temperature 50% Relative Humidity Atmospheric Pressure 1019mbar

4. Test date : 26 September, 2011 Tested By : Andy Wang

Standard Requirement: Radiated emission limits: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

**Procedures:** The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels. The limit was determined by attenuating 20 dB of the RF peak power output.

Test Result:

Title: Mode To:

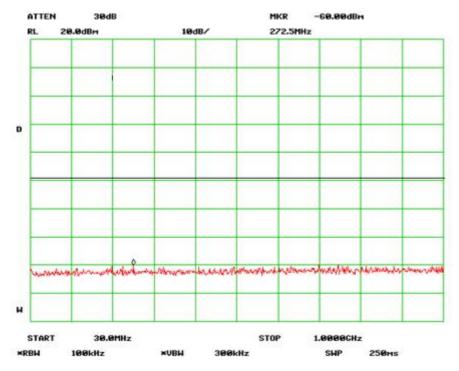
Accessing global markets Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

 Serial#:
 11070066-FCC 15.247

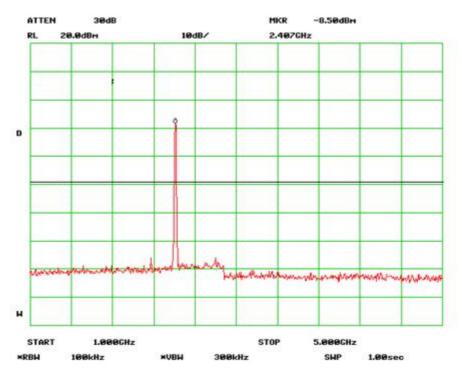
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Antenna Port Emission Low Channel -1(802.11b)



Antenna Port Emission Low Channel -2(802.11b)



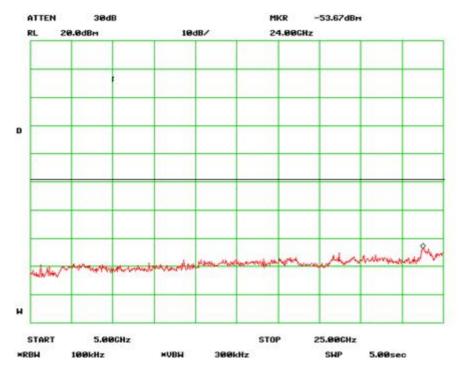
Accessing global markets
Title: RF Test Report for GSM&WCDMA MOBILE PHONE
Model: S-502
To: FCC 15.247:2010

 Serial#:
 11070066-FCC 15.247

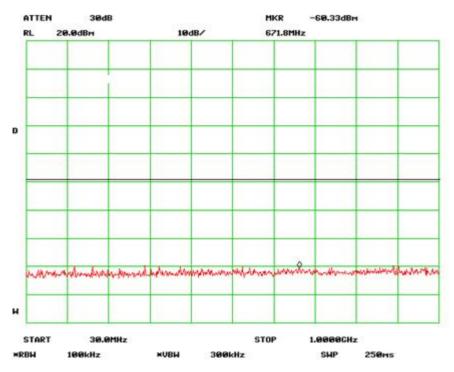
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Antenna Port Emission Low Channel -3(802.11b)





ATTEN



SIEMIC, INC. Accessing global markets Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

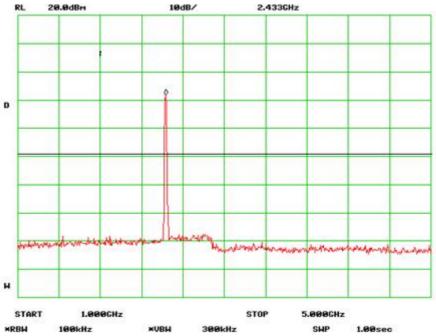
30dB

 
 Serial#:
 11070066-FCC 15.247

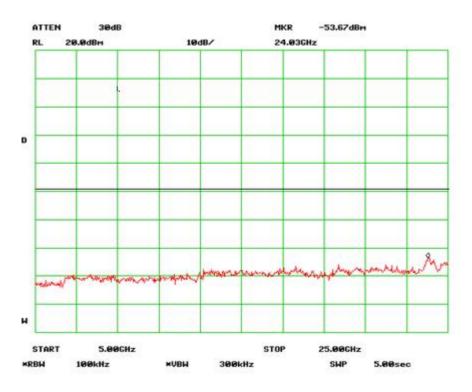
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MKR -8.17dBH 2.433GHz

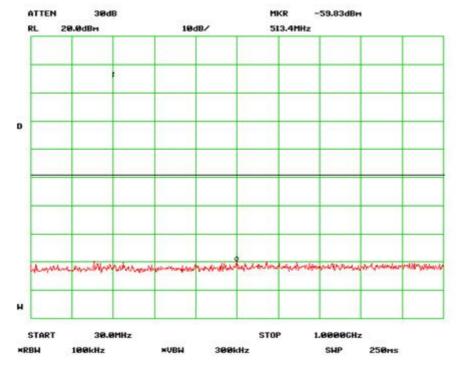


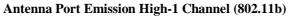
Antenna Port Emission Mid-2 Channel (802.11b)

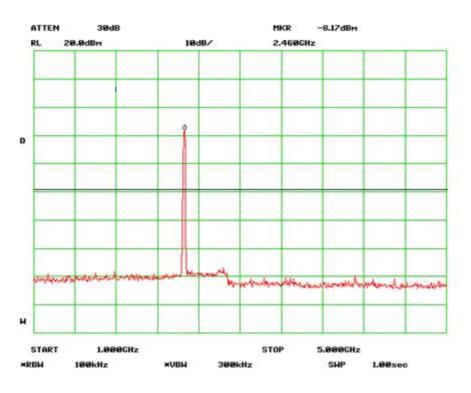






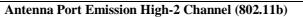


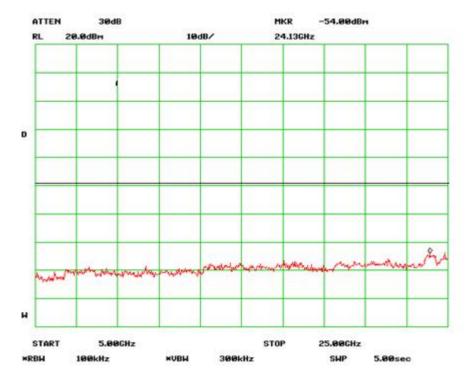












Antenna Port Emission High-3 Channel (802.11b)

D



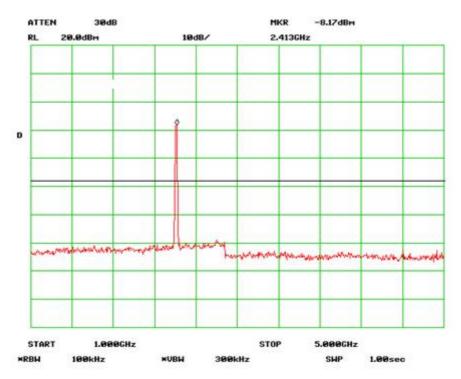
Accessing global markets Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

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ATTEN 30dB MKR -51.50dBH RL 20.0dBm 10d8/ 715.5MHz all a require the conversion of the second of the second second water the second second and the second s START 30.0MHz STOP 1.0000CHz RBH 100kHz NUBH 300kHz SHP 250Hs

Antenna Port Emission Low-1 Channel (802.11g)







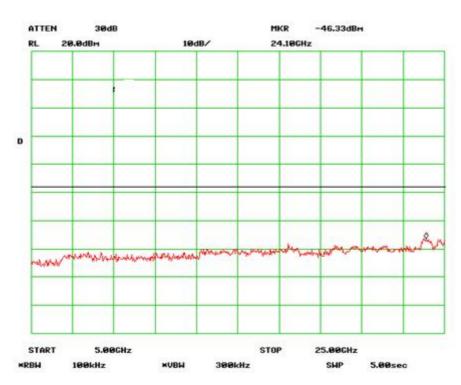
Accessing global markets Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

 Serial#:
 11070066-FCC 15.247

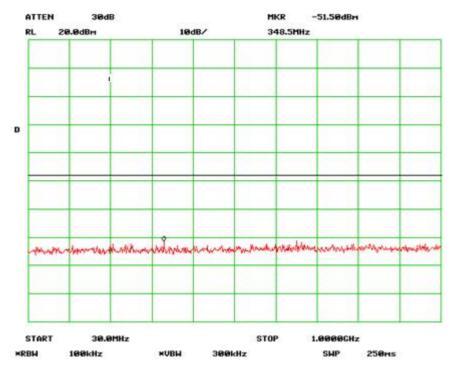
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Antenna Port Emission Low-3 Channel (802.11g)



Antenna Port Emission Mid-1 Channel (802.11g)

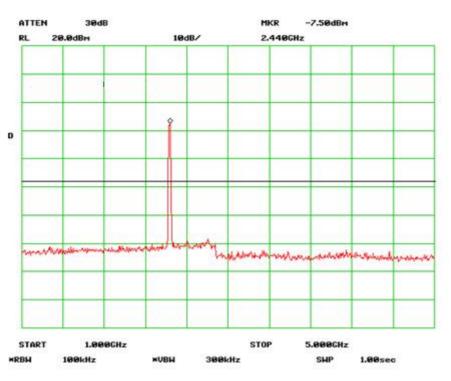


Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

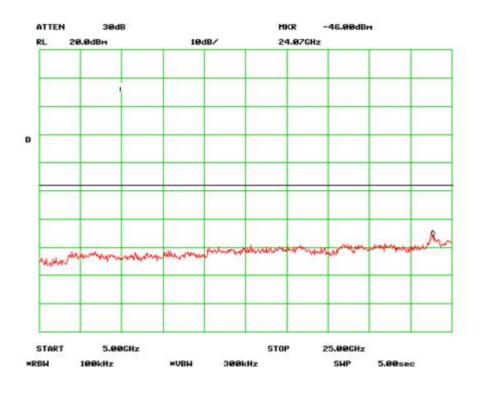
 
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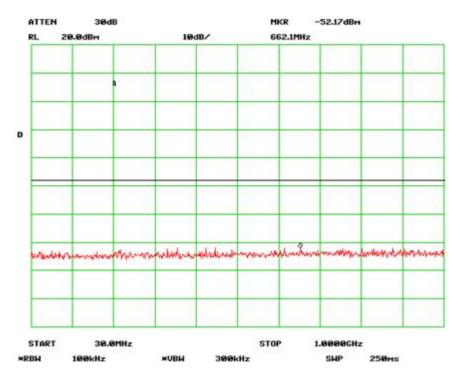
Antenna Port Emission Mid-2 Channel (802.11g)



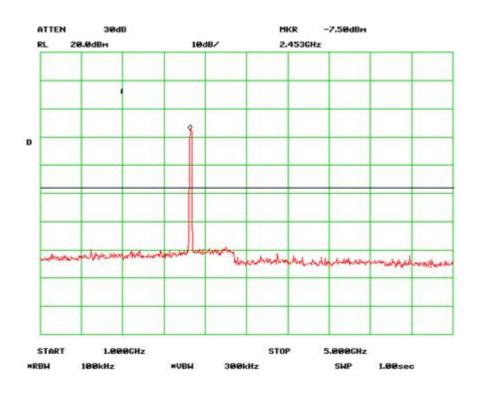




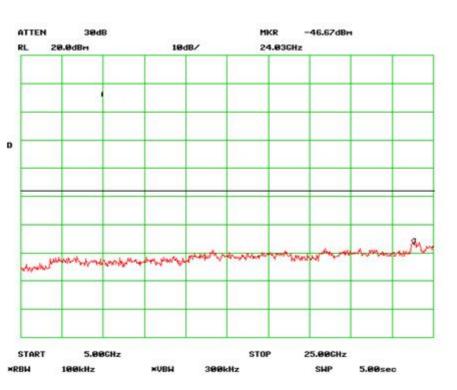












Antenna Port Emission High-2 Channel (802.11g)

Antenna Port Emission High-3 Channel (802.11g)

### 5.7 Radiated Spurious Emission < 1GHz

 All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
 A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
 Radiated Emissions Measurement Uncertainty All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above ( 3m & 10m) is +/-6dB.

4. Environmental Conditions

Temperature Relative Humidity Atmospheric Pressure 16°C 50% 1019mbar

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5. Test date : 26 September, 2011 Tested By : Andy Wang

Standard Requirement: The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.



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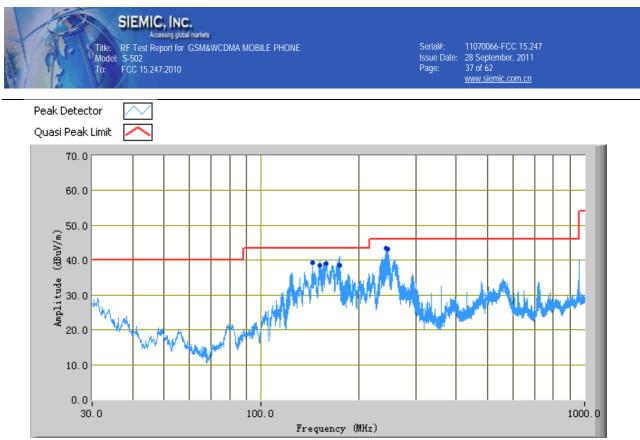
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**Test Result:** 

2.4GHz band

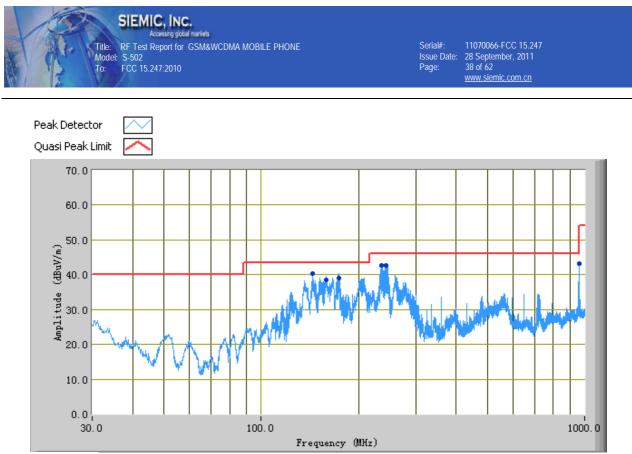
Mode: 802.11b

**Radiated Emission Plot** 



# Test Data

| Frequency<br>(MHz) | Quasi<br>Peak<br>(dBuV/m) | Azimuth | Polarity(H<br>/V) | Height<br>(cm) | Factors<br>(dB) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|---------------------------|---------|-------------------|----------------|-----------------|-------------------|----------------|
| 174.68             | 38.49                     | 7.00    | Н                 | 124.00         | -33.86          | 43.50             | -5.01          |
| 245.68             | 43.21                     | 348.00  | Н                 | 124.00         | -32.66          | 46.00             | -2.79          |
| 151.49             | 38.50                     | 2.00    | Н                 | 207.00         | -32.25          | 43.50             | -5.00          |
| 158.25             | 39.16                     | 354.00  | Н                 | 177.00         | -32.17          | 43.50             | -4.34          |
| 242.65             | 43.42                     | 346.00  | Н                 | 124.00         | -33.73          | 46.00             | -2.58          |
| 144.00             | 39.26                     | 355.00  | V                 | 210.00         | -32.49          | 43.50             | -4.24          |



# Test Data

| Frequency<br>(MHz) | Quasi<br>Peak<br>(dBuV/m) | Azimuth | Polarity(H<br>/V) | Height<br>(cm) | Factors<br>(dB) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|---------------------------|---------|-------------------|----------------|-----------------|-------------------|----------------|
| 243.80             | 42.63                     | 352.00  | Н                 | 122.00         | -34.46          | 46.00             | -3.37          |
| 174.30             | 39.12                     | 12.00   | Н                 | 172.00         | -33.78          | 43.50             | -4.38          |
| 234.75             | 42.76                     | 359.00  | Н                 | 141.00         | -30.94          | 46.00             | -3.24          |
| 143.99             | 40.26                     | 4.00    | V                 | 206.00         | -32.49          | 43.50             | -3.24          |
| 959.99             | 43.23                     | 57.00   | Н                 | 101.00         | -19.50          | 46.00             | -2.77          |
| 158.62             | 38.56                     | 8.00    | Н                 | 155.00         | -32.17          | 43.50             | -4.94          |



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# 5.8 Radiated Spurious Emissions > 1GHz & Band Edge

- 1. <u>All possible modes of operation were investigated</u>. <u>Only the 6 worst case emissions measured</u>, <u>using the correct CISPR detectors, are reported</u>. <u>All other emissions were relatively insignificant</u>.
- <u>A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.</u>
   <u>Radiated Emissions Measurement Uncertainty</u> All test measurements carried out are traceable to national standards. The uncertainty of the
  - All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz 1GHz & 1GHz above (3m & 10m) is +/-6dB.
- 4. Environmental Conditions

Temperature Relative Humidity Atmospheric Pressure 16°C 50% 1019mbar

5. Test date : 26 September, 2011 Tested By : Andy Wang

Standard Requirement: The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.

**Test Result:** 



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## 2.4GHz band

## Mode: 802.11b

| <u>@ 2412MHz @ 3 Meter</u> |           |        |       |            |           |                   |                |               |          |
|----------------------------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| Frequency                  | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
| GHz                        | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.824                      | 9.00      | 1.07   | V     | 5.15       | 55.00     | 55.4              | 74.00          | -18.6         | Peak     |
| 4.824                      | 12.00     | 1.10   | h     | 5.15       | 55.00     | 51.8              | 74.00          | -22.2         | Peak     |
| 4.824                      | 9.00      | 1.07   | V     | 5.15       | 55.00     | 42.6              | 54.00          | -11.4         | Ave      |
| 4.824                      | 12.00     | 1.10   | h     | 5.15       | 55.00     | 40.6              | 54.00          | -13.4         | Ave      |
| 7.236                      | 5.30      | 1.12   | V     | 7.23       | 55.00     | 65.6              | 74.00          | -8.4          | Peak     |
| 7.236                      | 6.11      | 1.15   | h     | 7.23       | 55.00     | 63.7              | 74.00          | -10.3         | Peak     |
| 7.236                      | 5.30      | 1.12   | V     | 7.23       | 55.00     | 49.5              | 54.00          | -4.5          | Ave      |
| 7.236                      | 6.11      | 1.15   | h     | 7.23       | 55.00     | 47.9              | 54.00          | -6.1          | Ave      |
| 9.648                      | 31.0      | 1.26   | V     | 8.56       | 55.00     | 55.1              | 74.00          | -18.9         | Peak     |
| 9.648                      | 3.0       | 1.34   | h     | 8.56       | 55.00     | 54.3              | 74.00          | -19.7         | Peak     |
| 9.648                      | 31.0      | 1.26   | V     | 8.56       | 55.00     | 44.3              | 54.00          | -9.7          | Ave      |
| 9.648                      | 3.0       | 1.34   | h     | 8.56       | 55.00     | 43.2              | 54.00          | -10.8         | Ave      |

#### @ 2412MHz @ 3 Meter

Emission was scanned up to 25GHz.

| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.874     | 31.00     | 1.10   | V     | 5.16       | 55.00     | 56.5              | 74.00          | -17.6         | Peak     |
| 4.874     | 25.00     | 1.00   | h     | 5.16       | 55.00     | 53.1              | 74.00          | -20.9         | Peak     |
| 4.874     | 31.00     | 1.10   | V     | 5.16       | 55.00     | 44.9              | 54.00          | -9.1          | Ave      |
| 4.874     | 25.00     | 1.00   | h     | 5.16       | 55.00     | 43.6              | 54.00          | -10.4         | Ave      |
| 7.311     | 13.00     | 1.20   | V     | 7.31       | 55.00     | 68.1              | 74.00          | -5.9          | Peak     |
| 7.311     | 4.00      | 1.03   | h     | 7.31       | 55.00     | 66.4              | 74.00          | -7.6          | Peak     |
| 7.311     | 13.00     | 1.20   | V     | 7.31       | 55.00     | 50.5              | 54.00          | -3.5          | Ave      |
| 7.311     | 4.00      | 1.03   | h     | 7.31       | 55.00     | 50.1              | 54.00          | -3.9          | Ave      |
| 9.748     | 22.0      | 1.30   | V     | 8.66       | 55.00     | 57.6              | 74.00          | -16.4         | Peak     |
| 9.748     | 7.0       | 1.00   | h     | 8.66       | 55.00     | 56.0              | 74.00          | -18.0         | Peak     |
| 9.748     | 22.0      | 1.30   | V     | 8.66       | 55.00     | 44.3              | 54.00          | -9.7          | Ave      |
| 9.748     | 7.0       | 1.00   | h     | 8.66       | 55.00     | 45.2              | 54.00          | -8.8          | Ave      |

#### @ 2437MHz @ 3Meter

Emission was scanned up to 25GHz.

#### @ 2462MHz @ 3Meter

| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.924     | 15.00     | 1.07   | V     | 5.17       | 55.00     | 54.3              | 74.00          | -19.7         | Peak     |
| 4.924     | 25.00     | 1.10   | h     | 5.17       | 55.00     | 53.1              | 74.00          | -20.9         | Peak     |
| 4.924     | 15.00     | 1.07   | V     | 5.17       | 55.00     | 44.5              | 54.00          | -9.5          | Ave      |
| 4.924     | 25.00     | 1.10   | h     | 5.17       | 55.00     | 42.6              | 54.00          | -11.4         | Ave      |
| 7.386     | 0         | 1.20   | V     | 7.36       | 55.00     | 66.4              | 74.00          | -7.6          | Peak     |
| 7.386     | 3.00      | 1.00   | h     | 7.36       | 55.00     | 64.4              | 74.00          | -9.6          | Peak     |
| 7.386     | 0         | 1.20   | V     | 7.36       | 55.00     | 48.9              | 54.00          | -5.1          | Ave      |
| 7.386     | 3.00      | 1.00   | h     | 7.36       | 55.00     | 48.2              | 54.00          | -5.8          | Ave      |
| 9.848     | 6.00      | 1.10   | V     | 8.74       | 55.00     | 55.3              | 74.00          | -18.7         | Peak     |
| 9.848     | 21.00     | 1.08   | h     | 8.74       | 55.00     | 54.8              | 74.00          | -19.2         | Peak     |
| 9.848     | 6.00      | 1.10   | V     | 8.74       | 55.00     | 43.3              | 54.00          | -10.7         | Ave      |
| 9.848     | 21.00     | 1.08   | h     | 8.74       | 55.00     | 45.2              | 54.00          | -8.8          | Ave      |

Emission was scanned up to 25GHz.

## Mode: 802.11g

|           |           |        |       | w.         | 2412MH7   | z @ 3 Meter       |                |               |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.824     | 9.00      | 1.07   | V     | 5.15       | 55.00     | 54.7              | 74.00          | -19.3         | Peak     |
| 4.824     | 12.00     | 1.10   | h     | 5.15       | 55.00     | 51.6              | 74.00          | -22.4         | Peak     |
| 4.824     | 9.00      | 1.07   | V     | 5.15       | 55.00     | 41.4              | 54.00          | -12.6         | Ave      |
| 4.824     | 12.00     | 1.10   | h     | 5.15       | 55.00     | 40.0              | 54.00          | -14.0         | Ave      |
| 7.236     | 5.30      | 1.12   | V     | 7.23       | 55.00     | 64.2              | 74.00          | -9.8          | Peak     |
| 7.236     | 6.11      | 1.15   | h     | 7.23       | 55.00     | 62.8              | 74.00          | -11.2         | Peak     |
| 7.236     | 5.30      | 1.12   | V     | 7.23       | 55.00     | 48.1              | 54.00          | -5.9          | Ave      |
| 7.236     | 6.11      | 1.15   | h     | 7.23       | 55.00     | 47.4              | 54.00          | -6.6          | Ave      |
| 9.648     | 31.0      | 1.26   | V     | 8.56       | 55.00     | 54.6              | 74.00          | -19.4         | Peak     |
| 9.648     | 3.0       | 1.34   | h     | 8.56       | 55.00     | 53.5              | 74.00          | -20.5         | Peak     |
| 9.648     | 31.0      | 1.26   | V     | 8.56       | 55.00     | 42.8              | 54.00          | -11.2         | Ave      |
| 9.648     | 3.0       | 1.34   | h     | 8.56       | 55.00     | 41.9              | 54.00          | -12.1         | Ave      |

@ 2412MHz @ 3 Meter

Emission was scanned up to 25GHz.



| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.874     | 31.00     | 1.10   | V     | 5.16       | 55.00     | 54.6              | 74.00          | -19.4         | Peak     |
| 4.874     | 25.00     | 1.00   | h     | 5.16       | 55.00     | 52.2              | 74.00          | -21.8         | Peak     |
| 4.874     | 31.00     | 1.10   | V     | 5.16       | 55.00     | 43.5              | 54.00          | -10.5         | Ave      |
| 4.874     | 25.00     | 1.00   | h     | 5.16       | 55.00     | 42.6              | 54.00          | -11.4         | Ave      |
| 7.311     | 13.00     | 1.20   | V     | 7.31       | 55.00     | 64.7              | 74.00          | -9.3          | Peak     |
| 7.311     | 4.00      | 1.03   | h     | 7.31       | 55.00     | 63.1              | 74.00          | -10.9         | Peak     |
| 7.311     | 13.00     | 1.20   | V     | 7.31       | 55.00     | 48.2              | 54.00          | -5.8          | Ave      |
| 7.311     | 4.00      | 1.03   | h     | 7.31       | 55.00     | 47.6              | 54.00          | -6.4          | Ave      |
| 9.748     | 22.0      | 1.30   | V     | 8.66       | 55.00     | 55.1              | 74.00          | -18.9         | Peak     |
| 9.748     | 7.0       | 1.00   | h     | 8.66       | 55.00     | 53.2              | 74.00          | -20.8         | Peak     |
| 9.748     | 22.0      | 1.30   | V     | 8.66       | 55.00     | 41.3              | 54.00          | -12.7         | Ave      |
| 9.748     | 7.0       | 1.00   | h     | 8.66       | 55.00     | 43.6              | 54.00          | -10.4         | Ave      |

### @ 2437MHz @ 3Meter

Emission was scanned up to 25GHz.

#### @ 2462MHz @ 3Meter

| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 4.924     | 15.00     | 1.07   | V     | 5.17       | 55.00     | 51.9              | 74.00          | -22.1         | Peak     |
| 4.924     | 25.00     | 1.10   | h     | 5.17       | 55.00     | 52.8              | 74.00          | -21.2         | Peak     |
| 4.924     | 15.00     | 1.07   | V     | 5.17       | 55.00     | 45.6              | 54.00          | -8.4          | Ave      |
| 4.924     | 25.00     | 1.10   | h     | 5.17       | 55.00     | 43.1              | 54.00          | -10.9         | Ave      |
| 7.386     | 0         | 1.20   | V     | 7.36       | 55.00     | 63.6              | 74.00          | -10.4         | Peak     |
| 7.386     | 3.00      | 1.00   | h     | 7.36       | 55.00     | 62.0              | 74.00          | -12.0         | Peak     |
| 7.386     | 0         | 1.20   | V     | 7.36       | 55.00     | 47.7              | 54.00          | -6.3          | Ave      |
| 7.386     | 3.00      | 1.00   | h     | 7.36       | 55.00     | 46.4              | 54.00          | -7.6          | Ave      |
| 9.848     | 6.00      | 1.10   | V     | 8.74       | 55.00     | 54.3              | 74.00          | -19.7         | Peak     |
| 9.848     | 21.00     | 1.08   | h     | 8.74       | 55.00     | 52.8              | 74.00          | -21.2         | Peak     |
| 9.848     | 6.00      | 1.10   | V     | 8.74       | 55.00     | 41.5              | 54.00          | -12.5         | Ave      |
| 9.848     | 21.00     | 1.08   | h     | 8.74       | 55.00     | 43.1              | 54.00          | -10.9         | Ave      |

Emission was scanned up to 25GHz.

# **Band Edge**

## 2.4GHz band

| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 2.400     | 2         | 1.06   | V     | 5.15       | 55.00     | 60.3              | 74.00          | -13.7         | Peak     |
| 2.4835    | 5         | 1.18   | h     | 5.15       | 55.00     | 57.6              | 74.00          | -16.4         | Peak     |
| 2.400     | 2         | 1.06   | V     | 5.15       | 55.00     | 49.2              | 54.00          | -4.8          | Ave      |
| 2.4835    | 5         | 1.18   | h     | 5.15       | 55.00     | 47.9              | 54.00          | -6.1          | Ave      |

Mode: 802.11b

## Mode: 802.11g

| Frequency | Direction | Height | Polar | Cable loss | Amplifier | Corrected Reading | 15.247/15.209  | 15.247/15.209 |          |
|-----------|-----------|--------|-------|------------|-----------|-------------------|----------------|---------------|----------|
| GHz       | Degree    | Meter  | H/V   | (dB)       | (dB)      | (dBuV/m)          | Limit (dBuV/m) | Margin        | Comments |
| 2.400     | 0         | 1.03   | V     | 5.15       | 55.00     | 58.2              | 74.00          | -15.8         | Peak     |
| 2.4835    | 11        | 1.20   | h     | 5.15       | 55.00     | 56.9              | 74.00          | -17.1         | Peak     |
| 2.400     | 0         | 1.03   | V     | 5.15       | 55.00     | 48.6              | 54.00          | -5.4          | Ave      |
| 2.4835    | 11        | 1.20   | h     | 5.15       | 55.00     | 47.3              | 54.00          | -6.7          | Ave      |
|           |           |        |       |            |           |                   |                |               |          |
| 5.850     | 5         | 1.18   | h     | 5.15       | 55.00     | 57.6              | 74.00          | -16.4         | Peak     |
| 5.725     | 2         | 1.06   | V     | 5.15       | 55.00     | 49.2              | 54.00          | -4.8          | Ave      |
| 5.850     | 5         | 1.18   | h     | 5.15       | 55.00     | 47.9              | 54.00          | -6.1          | Ave      |



# Annex A. TEST INSTRUMENT & METHOD

#### **TEST INSTRUMENTATION & GENERAL PROCEDURES** Annex A.i.

| Instrument                           | Model                  | Calibration Due  |
|--------------------------------------|------------------------|------------------|
| AC Conducted Emissions               |                        |                  |
| R&S EMI Test Receiver                | ESPI3                  | 05/25/2012       |
| R&S LISN                             | LI-115                 | 05/25/2012       |
| R&S LISN                             | LI-115                 | 05/25/2012       |
| Universal Radio Communication Tester | CMU200                 | 02/22/2012       |
| Radiated Emissions                   |                        |                  |
| Spectrum Analyzer                    | 8563E                  | 01/10/2012       |
| EMI Receiver                         | ESPI3                  | 05/18/2012       |
| Antenna(1 ~18GHz)                    | 3115                   | 6/2/2012         |
| Antenna (30MHz~2GHz)                 | JB1                    | 05/25/2012       |
| Chamber                              | 3m                     | 4/13/2012        |
| Pre-Amplifier(1 ~ 18GHz)             | AMF-7D-00101800-30-10P | 5/25/2012        |
| Horn Antenna (18~40GHz)              | AH-840                 | 7/23/2013        |
| Microwave Pre-Amp (18~40GHz)         | PA-840                 | Every 2000 Hours |
| Universal Radio Communication Tester | CMU200                 | 02/22/2012       |
| Signal Analyzer                      | 8665B                  | 1/21/2012        |
| Temperature/Humidity Chamber         | 1007H                  | 06/08/2012       |

Note: Functional Verification



## Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION

### **Test Set-up**

- 1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in <u>Annex B</u>.
- 2. The power supply for the EUT was fed through a  $50\Omega/50\mu$ H EUT LISN, connected to filtered mains.
- 3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
- 4. All other supporting equipments were powered separately from another main supply.

### Test Method

- 1. The EUT was switched on and allowed to warm up to its normal operating condition.
- 2. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
- 3. High peaks, relative to the limit line, were then selected.
- 4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 KHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.
- 5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

## Sample Calculation Example

| At 20 MHz  | limit = 250 $\mu$ V = 47.96 dB $\mu$ V         |
|--|--|
| Transducer factor of LISN, pulse limiter & cable los | ss at 20 MHz = 11.20 dB                        |
| Q-P reading obtained directly from EMI Receiver =    | = 40.00 dBμV<br>(Calibrated for system losses) |
| Therefore, Q-P margin = 47.96 – 40.00 = 7.96         | i.e. 7.96 dB below limit                       |



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#### RADIATED EMISSIONS TEST DESCRIPTION Annex A. iii

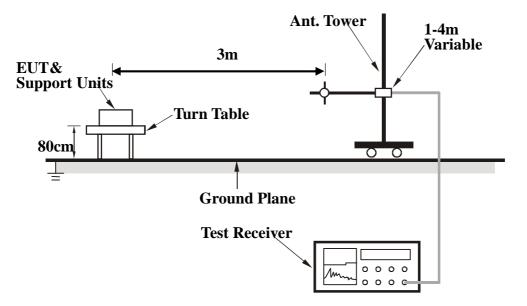
# EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10th Harmonic, was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS).

### **Test Set-up**

- 1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
- 2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
- 3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.





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## Test Method

The following procedure was performed to determine the maximum emission axis of EUT:

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.

2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.

3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

#### Final Radiated Emission Measurement

1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.

3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.

4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from  $0 \circ to 360 \circ$  with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.

5. Repeat step 4 until all frequencies need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

| Frequency Band (MHz) | Function | Resolution bandwidth | Video Bandwidth |
|----------------------|----------|----------------------|-----------------|
| 30 to 1000           | Peak     | 100 kHz              | 100 kHz         |
| Above 1000           | Peak     | 1 MHz                | 1 MHz           |
|                      | Average  | 1 MHz                | 10 Hz           |

### Sample Calculation Example

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows: Peak = Reading + Corrected Factor

where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any) And the average value is

Average = Peak Value + Duty Factor or Set RBW = 1MHz, VBW = 10Hz.

Note :

If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.



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# Annex B. EUT AND TEST SETUP PHOTOGRAPHS

#### Photograph 1: EUT External Photo Annex B.i.



Front View of EUT

 
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Rear View of EUT



Top View of EUT



 
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Bottom View of EUT



#### Annex B.ii. Photograph 2: EUT Internal Photo

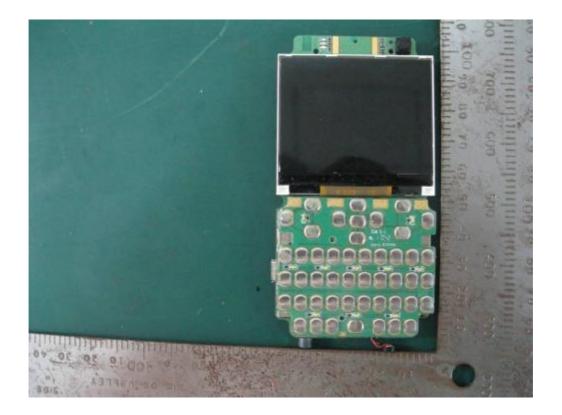
SIEMIC, INC.



Accessing global markets Title: RF Test Report for GSM&WCDMA MOBILE PHONE Model: S-502 To: FCC 15.247:2010

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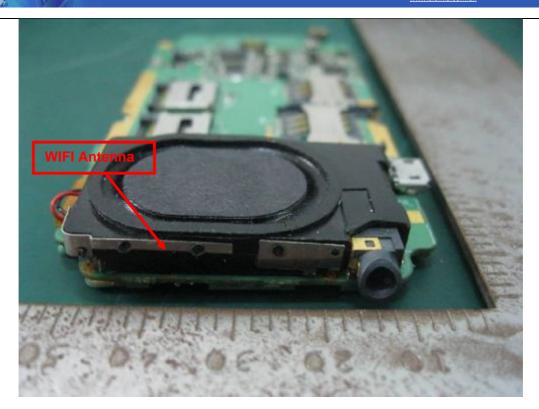


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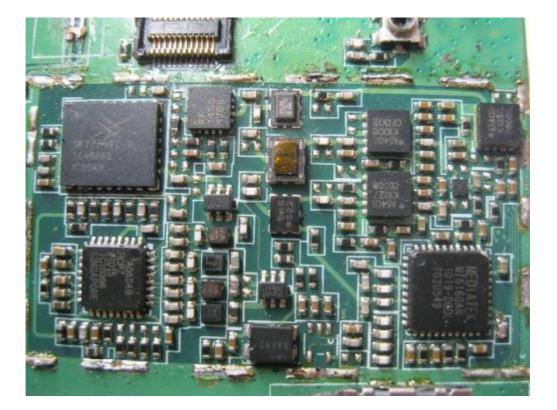
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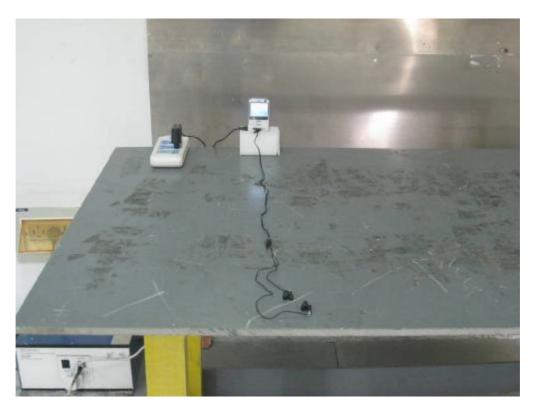
# SIEMIC, INC. Accessing global m



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#### Photograph 3: Test Setup Photo Annex B.iii.



Conducted Emissions Test Setup Front View

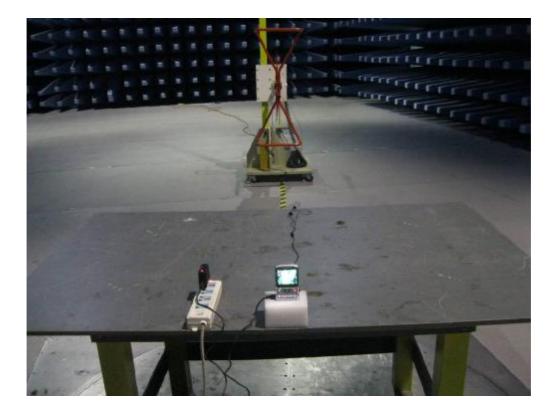


Conducted Emissions Test Setup Side View

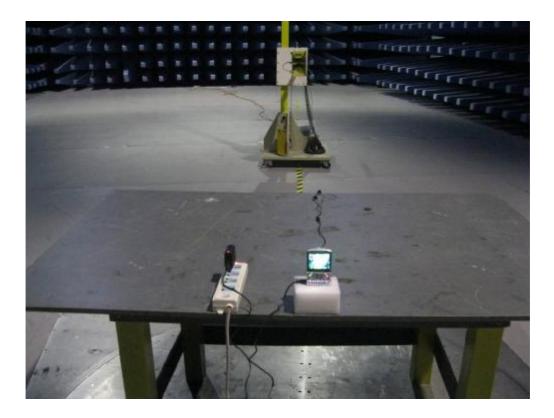


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Radiated Emission Test Setup Front View below 1GHz



Radiated Emission Test Setup Front View above 1GHz



# Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

# EUT TEST CONDITIONS

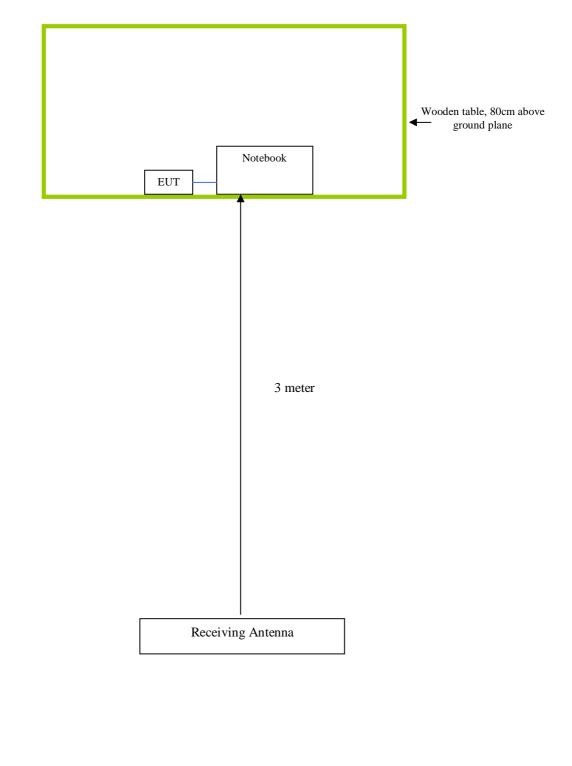
# Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

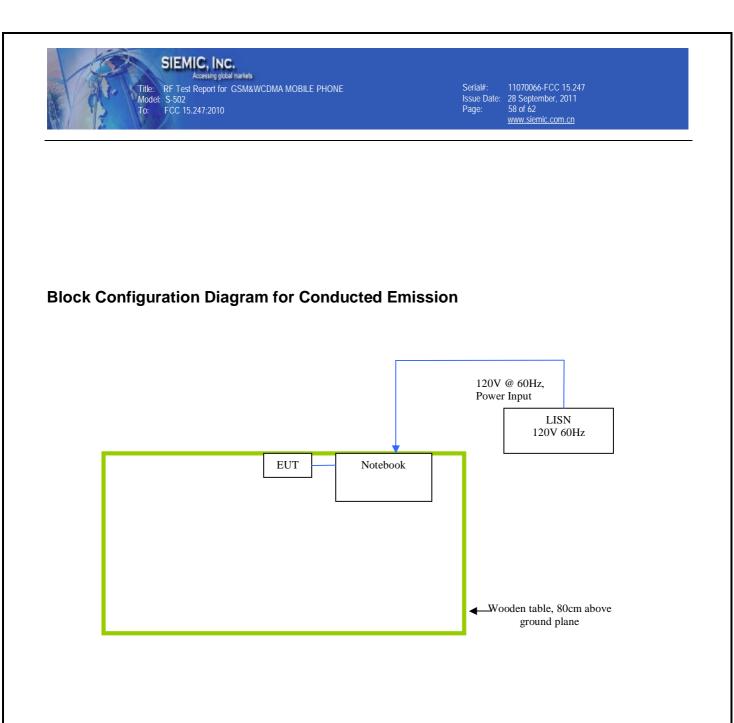
The following is a description of supporting equipment and details of cables used with the EUT.

| Equipment Description<br>(Including Brand Name) | Model & Serial Number           | Cable Description<br>(List Length, Type & Purpose) |
|---|---------------------------------|--|
| Gateway Laptop                                  | MS2288 & LXWHF02013951C3CA92200 | N/A  |



# Block Configuration Diagram for Radiated Emission







 
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#### Annex C.ii. EUT OPERATING CONDITIONS

The following is the description of how the EUT is exercised during testing.

| Test      | Description Of Operation   |  |
|-----------|--|--|
| Emissions | The EUT was continuously transmitting to stimulate the worst case. |  |

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# Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST

Please see attachment



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# Annex E. SIEMIC ACCREDITATION CERTIFICATES

SIEMIC ACREDITATION DETAILS: FCC Test Site Registration No. 986914

### FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division 7435 Oakland Mills Road Columbia, MD 21046

April 19, 2011

Registration Number: 986914

SIEMIC Nanjing (China) Laboratories 2-1 Longcang Avenue, Yuhua Economic and Technology Development Park, Nanjing, 210039 China

Attention: Leslie Bai,

Re:

Measurement facility located at 2-1 Longcang Avenue, Nanjing, China Anechoic chamber (3 meters) and 3&10 meter OATS Date of Renewal: April 19, 2011

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website <u>www.fcc.gov</u> under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Parrish Industry Analyst

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#### SIEMIC ACREDITATION DETAILS: Industry of Canada Test Site Registration No. 4842B

Ander State Canada

January 25, 2011

To:

OUR FILE: 46405-4842 Submission No: 145222

Siemic Nanjing (China) Laboratories 2-1 Longcang Avenue Yuhua Economic & Technology Dev. Park, Nanjing China

Attention: Leslie Bai

Dear Sir/Madame:

The Bureau has received your application for the registration of a 3/10m OATS. Be advised that the information received was satisfactory to Industry Canada. The following number(s) is now associated to the site(s) for which registration / renewal was sought ( Site# 4842B-2 ). Please reference the appropriate site number in the body of test reports containing measurements performed on the site. In addition, please keep for your records the following information;

- The company address code associated to the site(s) located at the above address is: 4842B

Furthermore, to obtain or renew a unique site number, the applicant shall demonstrate that the site has been accredited to ANSI C63.4-2003 or later. A scope of accreditation indicating the accreditation by a recognized accreditation body to ANSI C63.4-2003 or later shall be accepted. Please indicate in a letter the previous assigned site number if applicable and the type of site (example: 3 metre OATS or 3 metre chamber). If the test facility is not accredited to ANSI C63.4-2003 or later, the test facility shall submit test data demonstrating full compliance with the ANSI standard. The Bureau will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to enceed three years. There is no fee or form associated with an OATS filing. OATS submissions are encouraged to be submitted electronically to the Bureau using the following URL;

http://strategis.ic.gc.ca/epic/internet/inceb-bhst.nsf/en/h\_tt00052e.html.

If you have any questions, you may contact the Bureau by e-mail at certification bureau@ic.gc.ca Please reference our file and submission number above for all correspondence.

Yours sincerely,

Delander

Delwinder Cill For: Wireless Laboratory Manager Certification and Engineering Bureau 3701 Carling Ave., Building 94 P.O. Box 11490, Station "H Otawa, Ontario \$211852 firmit datwinder gillidie go en Tel. No. (611) 998-8141 Fax, No. (613) 990-4752