



**FCC CFR47 PART 22 SUBPART H  
AND PART 24 SUBPART E  
CLASS II PERMISSIVE CHANGE  
CERTIFICATION TEST REPORT**

**FOR**

**VODAFONE 850/900/1800/1900/2100 MHZ MULTI-BAND MODULE**

**MODEL NUMBER: MC8775**

**FCC ID: N7NMC8775-L**

**REPORT NUMBER: 07U11026-1**

**ISSUE DATE: APRIL 21, 2007**

*Prepared for*  
**SIERRA WIRELESS INC.  
13811 WIRELESS WAY  
RICHMOND, BC V6V 3A4, CANADA**

*Prepared by*  
**COMPLIANCE CERTIFICATION SERVICES  
47173 BENICIA STREET  
FREMONT, CA 94538, USA  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u> | <u>Revised By</u> |
|-------------|-------------------|------------------|-------------------|
| ---         | 04/23/07          | Initial Issue    | T. Chan           |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SIERRA WIRELESS  
13811 WIRELESS WAY  
RICHMOND, BC V6V 3A4, CANADA

**EUT DESCRIPTION:** VODAFONE 850/900/1800/1900/2100 MHZ MULTI-BAND MODULE

**MODEL:** MC8775

**SERIAL NUMBER:** LV-00548

**DATE TESTED:** APRIL 18-20, 2007

| APPLICABLE STANDARDS  |                       |
|-----------------------|-----------------------|
| STANDARD              | STANDARD              |
| FCC PART 22 SUBPART H | FCC PART 22 SUBPART H |
| FCC PART 24 SUBPART E | FCC PART 24 SUBPART E |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

ANOOP SINGH  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15 and FCC CFR 47 Part 22H and 24E.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                           | UNCERTAINTY    |
|-------------------------------------|----------------|
| Radiated Emission, 30 to 200 MHz    | +/- 3.3 dB     |
| Radiated Emission, 200 to 1000 MHz  | +4.5 / -2.9 dB |
| Radiated Emission, 1000 to 2000 MHz | +4.5 / -2.9 dB |
| Radiated Emission Above 2000 MHz    | +/- 4.3 dB     |
| Power Line Conducted Emission       | +/- 2.9 dB     |

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 850/900/1800/1900/2100 MHz multi-band module and manufactured by Sierra Wireless, Inc. The module supports GSM, GPRS, EGPRS and WCDMA, WCDMA+HSPDA. Device capabilities are documented in the theory of operation. Only the 850/1900 MHz frequency bands were investigated under this project, and the test result documented in this report only applies to EUT operating in the 850/1900 MHz frequency bands. This device contains 900 MHz /1800 MHz/2100 MHz functions but these frequency bands are not operational in the U.S. territories.

### 5.2. DESCRIPTION OF CLASS II CHANGE

Add ThinkPad X61 Tablet Series (DL2) for Vodafone with different antenna gain.

### 5.3. MAXIMUM OUTPUT POWER

The transmitter has maximum ERP and EIRP output powers as follows:

| Frequency Range<br>(MHz) | Modulation  | ERP<br>Peak Power<br>(dBm) | ERP<br>Peak Power<br>(mW) |
|--------------------------|-------------|----------------------------|---------------------------|
| 824.2 - 848.75           | GPRS        | 29.60                      | 912.01                    |
| 824.2 - 848.75           | EGPRS       | 27.10                      | 512.86                    |
| 826.5 - 846.6            | WCDMA       | 22.60                      | 181.97                    |
| 826.5 - 846.6            | WCDMA+HSDPA | 23.90                      | 245.47                    |

| Frequency Range<br>(MHz) | Modulation  | EIRP<br>Peak Power<br>(dBm) | EIRP<br>Peak Power<br>(mW) |
|--------------------------|-------------|-----------------------------|----------------------------|
| 1850.25 - 1909.8         | GPRS        | 29.90                       | 977.24                     |
| 1850.25 - 1909.8         | EGPRS       | 29.00                       | 794.33                     |
| 1852.4 - 1907.6          | WCDMA       | 27.40                       | 549.54                     |
| 1852.4 - 1907.6          | WCDMA+HSDPA | 28.60                       | 724.44                     |

NOTE: RBW=VBW=8MHz

## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an Inverted F antenna with a maximum gain of 0.49dBi for Cellular band and 1.79 dBi for PCS bands.

## 5.5. SOFTWARE AND FIRMWARE

The following setting is used to configure the CMU200 to establish the link for testing.

### GSM850/1900 GPRS & EGPRS Mode

|                   |  |
|-------------------|--|
| Service selection | Test Mode A – Auto Slot Config: off  |
| Main Service      | Packet Data  |
| Network Support   | GSM+GPRS   |
| Slot Config       | 33 dBm for GSM850 and 30 dBm for GSM1900 (for GSM/GPRS modes)<br>27 dBm for GSM850 and 26 dBm for GSM1900 (for EGPRS mode) |

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

|                    |                     |
|--------------------|---------------------|
| <u>Application</u> | <u>Rev. License</u> |
| WCDMA Mobile Test  | A.09.06             |

### WCDMA

Call Setup > Shift & Preset  
Cell Parameters: PS Domain Information > Present  
ATT (IMSI Attach) Flag State > Set  
Security Parameter - System Operations > None  
Channel Type:  
RMC: 12.2k, 64k, 144k, or 384k  
AMC: 12.2 UL / 64/ DL AM RMC, 12.2 UL / 144/ DL AM RMC, or  
12.2 UL / 384/ DL AM RMC,

Paging Service: RB Test Mode

Channel (UARFCN) Params:

|             | <u>PCS band</u>                         | <u>Cell band</u> |
|-------------|---|------------------|
| DL Channel: | 9662 / 9800 / 9938 / 4357 / 4407 / 4458 |                  |
| UL Channel: | 9262 / 9400 / 9538 / 4132 / 4182 / 4233 |                  |

DL DTCH Data: All Ones

RLC Reestablish: Off

Call Limit State: Off

Call Drop Timer: Off

SRB Config.: 13.6k DCCH

UE Target Power: 25 dBm

UL CL Power Ctrl Parameters

UL CL Power Ctrl Mode: All Up Bits

WCDMA + HSDPA

Uplink Parameter:

UPLINK DPCH Bc / Bd Control: Manual

Manual Uplink DPCH Bc: 9

Manual Uplink DPCH Bd: 15

Channel Type: 12.2k + HSDPA

HSDPA Parameters:

HSDPA RB Test Mode Setup

HS-DSCH Configuration Type: FRC

FRC Type: H-Set 3

CN Domain: CS Domain

Uplink 64k DTCH for HSDPA Loopback State: On

HS-DSCH Data Pattern: All Ones

RLC Header on HS-DSCH: Present

HSDPA Uplink Parameters

DelatACK: 5

DeltaNACK: 5

DeltaCQI: 2



## 5.6. WORST-CASE CONFIGURATION AND MODE

Based on previous experiment, GPRS 1 slot has the worst case between GSM & GPRS modulations, and the HSDPA mode for WCDMA modulation, also the worst-case at mobile position of both mobile & portable configurations has been evaluated for both bands 850MHz and 1900MHz by comparing the fundamental ERP / EIRP output power.

The worst-case configuration has been evaluated the EUT @ mobile position has the worst configuration by comparing the fundamental output power.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST |              |                            |                       |        |
|-----------------------------------|--------------|----------------------------|-----------------------|--------|
| Description                       | Manufacturer | Model                      | Serial Number         | FCC ID |
| AC Adapter                        | Lenovo       | 92P1158                    | 11S92P1158Z1ZBGG6BW2H | DoC    |
| Communications Test Set           | Agilent      | E5515C                     | 10092                 | DoC    |
| Laptop                            | Lenovo       | ThinkPad X61 Tablet Series | LV-00548              | DoC    |

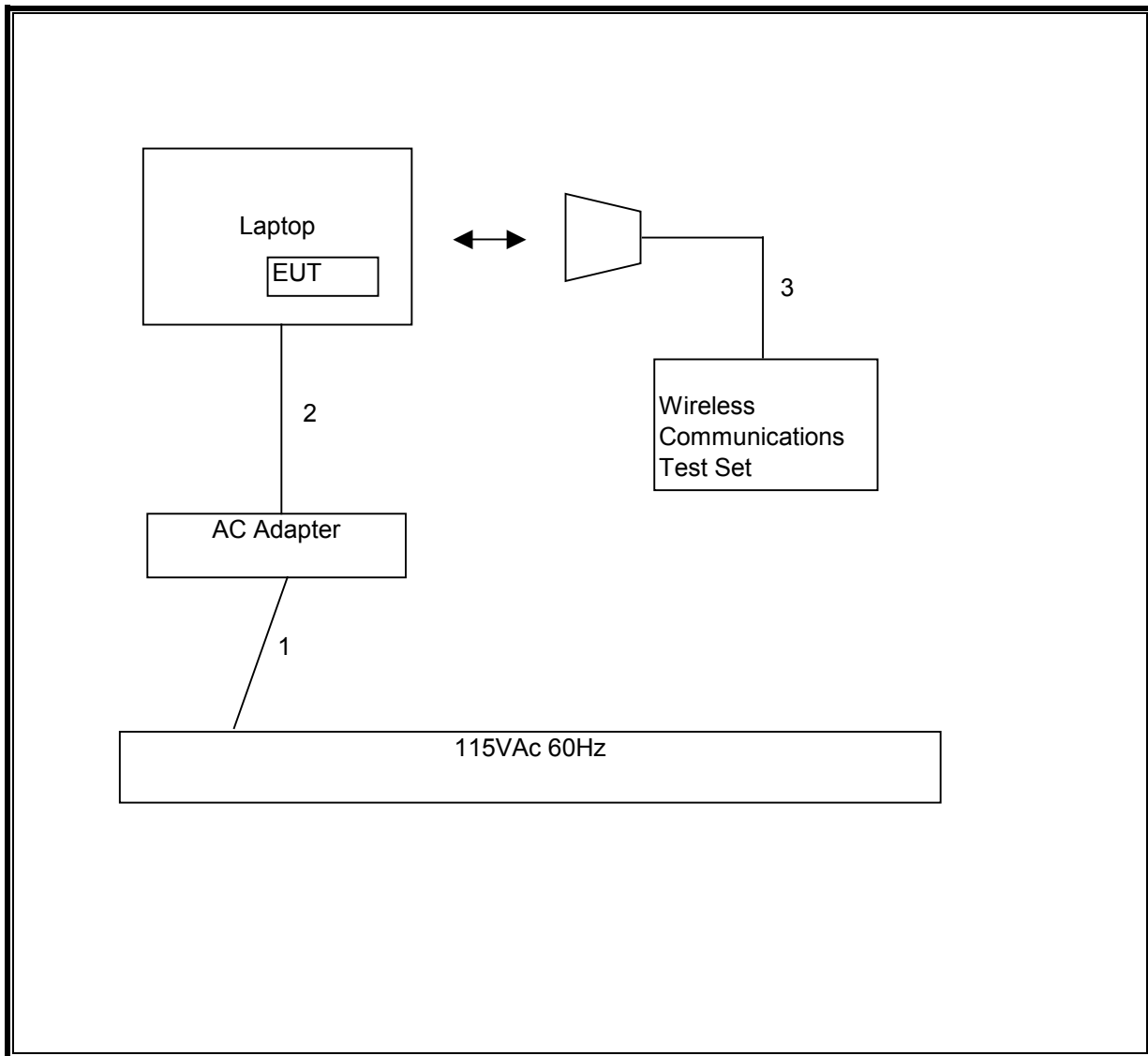
### I/O CABLES

| I/O CABLE LIST |           |                      |                |             |              |         |
|----------------|-----------|----------------------|----------------|-------------|--------------|---------|
| Cable No.      | Port      | # of Identical Ports | Connector Type | Cable Type  | Cable Length | Remarks |
| 1              | AC        | 1                    | US 115V        | Un-shielded | 2m           | NA      |
| 2              | DC        | 1                    | DC             | Un-shielded | 2m           | NA      |
| 3              | RF In/Out | 1                    | Horn           | Un-shielded | 3m           | NA      |

### TEST SETUP

The EUT is installed in a Lenovo ThinkPad X61 Tablet Series during the test. The Wireless Communication test set exercised the EUT.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST              |                |           |               |          |
|----------------------------------|----------------|-----------|---------------|----------|
| Description                      | Manufacturer   | Model     | Serial Number | Cal Due  |
| Antenna, Horn 1 ~ 18 GHz         | ETS            | 3117      | 29301         | 04/22/08 |
| Antenna, Horn 1 ~ 18 GHz         | EMCO           | 3115      | 6717          | 04/22/08 |
| Preamplifier, 1 ~ 26.5 GHz       | Agilent / HP   | 8449B     | 3008A00561    | 10/03/07 |
| Spectrum Analyzer 3 Hz ~ 44 GHz  | Agilent / HP   | E4446A    | MY43360112    | 05/03/07 |
| Antenna, Bilog 30 MHz ~ 2 Ghz    | Sunol Sciences | JB1       | A0022704      | 09/03/07 |
| Wireless Communications Test Set | Agilent        | E5515C    | 10092         | 10/19/07 |
| 2.7GHz HPF                       | MicroTronic    | HPM13194  | 2             | CNR      |
| 1.5GHz HPF                       | MicroTronic    | HPM13195  | 1             | CNR      |
| Signal Generator 2 -40 GHz       | R & S          | SMP04     | DE 34210      | 06/02/07 |
| Signal Generator 1024 MHz        | R & S          | SMY01     | DE 12311      | 05/11/07 |
| Dipole                           | EMCO           | 3121C-DB2 | 22435         | 06/25/07 |

## 7. LIMITS AND RESULTS

### 7.1. RADIATED OUTPUT POWER

#### LIMIT

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.  
24.232(b) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

#### TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.2.17

#### RESULTS

No non-compliance noted.

850 MHz GPRS Mode

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>ERP<br/>Peak Power<br/>(dBm)</b> | <b>ERP<br/>Peak Power<br/>(mW)</b> |
|----------------|----------------------------|-------------------------------------|------------------------------------|
| Low            | 824.2                      | 28.50                               | 707.95                             |
| Middle         | 837                        | 29.30                               | 851.14                             |
| High           | 848.8                      | 29.60                               | 912.01                             |

850 MHz EGPRS Mode

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>ERP<br/>Peak Power<br/>(dBm)</b> | <b>ERP<br/>Peak Power<br/>(mW)</b> |
|----------------|----------------------------|-------------------------------------|------------------------------------|
| Low            | 824.2                      | 26.40                               | 436.52                             |
| Middle         | 837                        | 26.90                               | 489.78                             |
| High           | 848.8                      | 27.10                               | 512.86                             |

850 MHz WCDMA Modulation

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>ERP<br/>Peak Power<br/>(dBm)</b> | <b>ERP<br/>Peak Power<br/>(mW)</b> |
|----------------|----------------------------|-------------------------------------|------------------------------------|
| Low            | 826.4                      | 21.20                               | 131.83                             |
| Middle         | 836.4                      | 22.00                               | 158.49                             |
| High           | 846.6                      | 22.60                               | 181.97                             |

850 MHz WCDMA+HSPDA Modulation

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>ERP<br/>Peak Power<br/>(dBm)</b> | <b>ERP<br/>Peak Power<br/>(mW)</b> |
|----------------|----------------------------|-------------------------------------|------------------------------------|
| Low            | 826.4                      | 23.00                               | 199.53                             |
| Middle         | 836.4                      | 23.60                               | 229.09                             |
| High           | 846.6                      | 23.90                               | 245.47                             |

1900 MHz GPRS Mode

| Channel | Frequency<br>(MHz) | EIRP<br>Peak Power<br>(dBm) | EIRP<br>Peak Power<br>(mW) |
|---------|--------------------|-----------------------------|----------------------------|
| Low     | 1850.2             | 29.00                       | 794.33                     |
| Middle  | 1880.00            | 29.40                       | 870.96                     |
| High    | 1909.8             | 29.90                       | 977.24                     |

1900 MHz EGPRS Mode

| Channel | Frequency<br>(MHz) | EIRP<br>Peak Power<br>(dBm) | EIRP<br>Peak Power<br>(mW) |
|---------|--------------------|-----------------------------|----------------------------|
| Low     | 1850.2             | 28.30                       | 676.08                     |
| Middle  | 1880.00            | 28.70                       | 741.31                     |
| High    | 1909.8             | 29.00                       | 794.33                     |

1900 MHz WCDMA Modulation

| Channel | Frequency<br>(MHz) | EIRP<br>Peak Power<br>(dBm) | EIRP<br>Peak Power<br>(mW) |
|---------|--------------------|-----------------------------|----------------------------|
| Low     | 1852.4             | 26.70                       | 467.74                     |
| Middle  | 1880.00            | 27.10                       | 512.86                     |
| High    | 1907.6             | 27.40                       | 549.54                     |

1900 MHz WCDMA+HSPDA Modulation

| Channel | Frequency<br>(MHz) | EIRP<br>Peak Power<br>(dBm) | EIRP<br>Peak Power<br>(mW) |
|---------|--------------------|-----------------------------|----------------------------|
| Low     | 1852.40            | 27.80                       | 602.56                     |
| Middle  | 1880.00            | 28.10                       | 645.65                     |
| High    | 1907.60            | 28.60                       | 724.44                     |

**GSM850 GPRS Output Power (ERP)**

| High Frequency Substitution Measurement<br>Compliance Certification Services, Fremont 5m Chamber B  |                        |                    |                     |            |               |              |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|--------------|----------------|----------------|-------|
| Company: Sierra Wireless Lenova<br>Project #: 07U10964<br>Date: 4/19/2007<br>Test Engineer: Anoop Singh<br>Configuration: EUT Only<br>Mode: Cell Tx, GSM/GPRS Fundamental Worst Case Y Mode     |                        |                    |                     |            |               |              |                |                |       |
| <b>Test Equipment:</b><br>Receiving: Sunol T122, and 5m Chamber N-type Cable (Setup this one for testing EUT)<br>Substitution: Dipole S/N: 00022117, and 4ft SMA Cable Warehouse S/N: 177081002 |                        |                    |                     |            |               |              |                |                |       |
| f<br>MHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 824.20  | 102.6                  | V                  | 29.0                | 0.5        | 0.0           | 28.5         | 38.5           | -10.0          |       |
| 824.20  | 101.5                  | H                  | 26.2                | 0.5        | 0.0           | 25.7         | 38.5           | -12.7          |       |
| 837.00  | 102.9                  | V                  | 29.9                | 0.6        | 0.0           | 29.3         | 38.5           | -9.1           |       |
| 837.00  | 100.4                  | H                  | 25.3                | 0.6        | 0.0           | 24.7         | 38.5           | -13.8          |       |
| 848.80  | 103.5                  | V                  | 30.3                | 0.7        | 0.0           | 29.6         | 38.5           | -8.8           |       |
| 848.80  | 100.6                  | H                  | 25.1                | 0.7        | 0.0           | 24.4         | 38.5           | -14.1          |       |

Rev. 1.24.7

**GSM850 EGPRS Output Power (ERP)**

| High Frequency Substitution Measurement   |                        |                    |                     |            |               |              |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|--------------|----------------|----------------|-------|
| Compliance Certification Services, Fremont 5m Chamber B                             |                        |                    |                     |            |               |              |                |                |       |
| Company: Sierra Wireless Lenova   |                        |                    |                     |            |               |              |                |                |       |
| Project #: 07U10964   |                        |                    |                     |            |               |              |                |                |       |
| Date: 4/19/2007   |                        |                    |                     |            |               |              |                |                |       |
| Test Engineer: Anoop Singh  |                        |                    |                     |            |               |              |                |                |       |
| Configuration: EUT Only   |                        |                    |                     |            |               |              |                |                |       |
| Mode: Cell Tx, GSM850, EGPRS (Worst Case)   |                        |                    |                     |            |               |              |                |                |       |
| <b>Test Equipment:</b>  |                        |                    |                     |            |               |              |                |                |       |
| Receiving: Sunol T122, and 5m Chamber N-type Cable (Setup this one for testing EUT) |                        |                    |                     |            |               |              |                |                |       |
| Substitution: Dipole S/N: 00022117, and 4ft SMA Cable Warehouse S/N: 177081002      |                        |                    |                     |            |               |              |                |                |       |
| f<br>MHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 824.20  | 100.5                  | V                  | 26.9                | 0.5        | 0.0           | 26.4         | 38.5           | -12.0          |       |
| 824.20  | 97.8                   | H                  | 22.5                | 0.5        | 0.0           | 22.0         | 38.5           | -16.4          |       |
| 837.00  | 100.5                  | V                  | 27.5                | 0.6        | 0.0           | 26.9         | 38.5           | -11.5          |       |
| 837.00  | 98.3                   | H                  | 23.2                | 0.6        | 0.0           | 22.6         | 38.5           | -15.8          |       |
| 848.80  | 101.0                  | V                  | 27.8                | 0.7        | 0.0           | 27.1         | 38.5           | -11.3          |       |
| 848.80  | 97.6                   | H                  | 22.1                | 0.7        | 0.0           | 21.4         | 38.5           | -17.1          |       |
| Rev. 1.24.7   |                        |                    |                     |            |               |              |                |                |       |



**Cell Band WCDMA Output Power (ERP)**

| High Frequency Substitution Measurement   |                        |                    |                     |            |               |              |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|--------------|----------------|----------------|-------|
| Compliance Certification Services, Fremont 5m Chamber Site                          |                        |                    |                     |            |               |              |                |                |       |
| Company: Sierra Wireless Lenova   |                        |                    |                     |            |               |              |                |                |       |
| Project #: 07U10964   |                        |                    |                     |            |               |              |                |                |       |
| Date: 4/19/2007   |                        |                    |                     |            |               |              |                |                |       |
| Test Engineer: Mengistu Mekuria   |                        |                    |                     |            |               |              |                |                |       |
| Configuration: EUT Only   |                        |                    |                     |            |               |              |                |                |       |
| Mode: Cell Tx, WCDMA Fundamental Worst Case   |                        |                    |                     |            |               |              |                |                |       |
| <b>Test Equipment:</b>  |                        |                    |                     |            |               |              |                |                |       |
| Receiving: Sunol T122, and 5m Chamber N-type Cable (Setup this one for testing EUT) |                        |                    |                     |            |               |              |                |                |       |
| Substitution: Dipole S/N: 00022117, and 4ft SMA Cable Warehouse S/N: 177081002      |                        |                    |                     |            |               |              |                |                |       |
| f<br>MHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 826.40  | 95.3                   | V                  | 21.7                | 0.5        | 0.0           | 21.2         | 38.5           | -17.2          |       |
| 826.40  | 94.5                   | H                  | 19.2                | 0.5        | 0.0           | 18.7         | 38.5           | -19.8          |       |
| 836.40  | 95.6                   | V                  | 22.6                | 0.6        | 0.0           | 22.0         | 38.5           | -16.4          |       |
| 836.40  | 92.5                   | H                  | 17.4                | 0.6        | 0.0           | 16.8         | 38.5           | -21.7          |       |
| 846.60  | 96.5                   | V                  | 23.3                | 0.7        | 0.0           | 22.6         | 38.5           | -15.8          |       |
| 846.60  | 93.2                   | H                  | 17.7                | 0.7        | 0.0           | 17.0         | 38.5           | -21.4          |       |
| Rev. 1.24.7   |                        |                    |                     |            |               |              |                |                |       |

**Cell Band WCDMA+HSPDA Output Power (ERP)**

| High Frequency Substitution Measurement   |                        |                    |                     |            |               |              |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|--------------|----------------|----------------|-------|
| Compliance Certification Services, Fremont 5m Chamber Site                          |                        |                    |                     |            |               |              |                |                |       |
| Company: Sierra Wireless Lenova   |                        |                    |                     |            |               |              |                |                |       |
| Project #: 07U10964   |                        |                    |                     |            |               |              |                |                |       |
| Date: 4/19/2007   |                        |                    |                     |            |               |              |                |                |       |
| Test Engineer: Mengistu Mekuria   |                        |                    |                     |            |               |              |                |                |       |
| Configuration: EUT Only   |                        |                    |                     |            |               |              |                |                |       |
| Mode: Cell Tx, WCDMA & HSPDA Fundamental Worst Case                                 |                        |                    |                     |            |               |              |                |                |       |
| <b>Test Equipment:</b>  |                        |                    |                     |            |               |              |                |                |       |
| Receiving: Sunol T122, and 5m Chamber N-type Cable (Setup this one for testing EUT) |                        |                    |                     |            |               |              |                |                |       |
| Substitution: Dipole S/N: 00022117, and 4ft SMA Cable Warehouse S/N: 177081002      |                        |                    |                     |            |               |              |                |                |       |
| f<br>MHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 826.40  | 97.1                   | V                  | 23.5                | 0.5        | 0.0           | 23.0         | 38.5           | -15.4          |       |
| 826.40  | 95.0                   | H                  | 19.7                | 0.5        | 0.0           | 19.2         | 38.5           | -19.2          |       |
| 836.40  | 97.2                   | V                  | 24.2                | 0.6        | 0.0           | 23.6         | 38.5           | -14.8          |       |
| 836.40  | 92.8                   | H                  | 17.7                | 0.6        | 0.0           | 17.1         | 38.5           | -21.3          |       |
| 846.60  | 97.8                   | V                  | 24.6                | 0.7        | 0.0           | 23.9         | 38.5           | -14.5          |       |
| 846.60  | 93.5                   | H                  | 18.0                | 0.7        | 0.0           | 17.3         | 38.5           | -21.1          |       |
| Rev. 1.24.7   |                        |                    |                     |            |               |              |                |                |       |

**GSM1900 Band GPRS Output Power (EIRP)**

| <b>High Frequency Fundamental Measurement</b>                                 |                     |                 |                  |         |            |            |             |             |       |
|---|---------------------|-----------------|------------------|---------|------------|------------|-------------|-------------|-------|
| <b>Compliance Certification Services, Fremont 5m Chamber Site</b>             |                     |                 |                  |         |            |            |             |             |       |
| Company: Sierra Wireless Lenova   |                     |                 |                  |         |            |            |             |             |       |
| Project #: 07U10964   |                     |                 |                  |         |            |            |             |             |       |
| Date: 4/19/2007   |                     |                 |                  |         |            |            |             |             |       |
| Test Engineer: Mnegistu Mekuria   |                     |                 |                  |         |            |            |             |             |       |
| Configuration: EUT Only   |                     |                 |                  |         |            |            |             |             |       |
| Mode:PCS Tx, GPRS ( Worst Case)   |                     |                 |                  |         |            |            |             |             |       |
| <b>Test Equipment:</b>  |                     |                 |                  |         |            |            |             |             |       |
| Receiving: Horn T73, and 12ft S/N: 197209005 (Setup this one for testing EUT) |                     |                 |                  |         |            |            |             |             |       |
| Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse S/N: 177081002   |                     |                 |                  |         |            |            |             |             |       |
| f GHz   | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading (dBm) | CL (dB) | Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Notes |
| 1.850   | 95.0                | V               | 21.6             | 0.9     | 8.3        | 29.0       | 33.0        | -4.0        |       |
| 1.850   | 89.7                | H               | 15.8             | 0.9     | 8.3        | 23.2       | 33.0        | -9.8        |       |
| 1.880   | 96.3                | V               | 22.0             | 0.9     | 8.3        | 29.4       | 33.0        | -3.6        |       |
| 1.880   | 88.6                | H               | 13.8             | 0.9     | 8.3        | 21.2       | 33.0        | -11.8       |       |
| 1.910   | 95.7                | V               | 22.4             | 0.9     | 8.4        | 29.9       | 33.0        | -3.1        |       |
| 1.910   | 86.8                | H               | 14.0             | 0.9     | 8.4        | 21.5       | 33.0        | -11.6       |       |
| Rev. 1.24.7   |                     |                 |                  |         |            |            |             |             |       |

**GSM1900 Band EGPRS Output Power (EIRP)**

| High Frequency Fundamental Measurement  |                     |                 |                  |         |            |            |             |             |       |
|---|---------------------|-----------------|------------------|---------|------------|------------|-------------|-------------|-------|
| Compliance Certification Services, Fremont 5m Chamber Site                    |                     |                 |                  |         |            |            |             |             |       |
| Company: Sierra Wireless Lenova   |                     |                 |                  |         |            |            |             |             |       |
| Project #: 07U10964   |                     |                 |                  |         |            |            |             |             |       |
| Date: 4/19/2007   |                     |                 |                  |         |            |            |             |             |       |
| Test Engineer: Mnegistu Mekuria   |                     |                 |                  |         |            |            |             |             |       |
| Configuration: EUT Only   |                     |                 |                  |         |            |            |             |             |       |
| Mode:PCS Tx, EGPRS ( Worst Case)  |                     |                 |                  |         |            |            |             |             |       |
| <b>Test Equipment:</b>  |                     |                 |                  |         |            |            |             |             |       |
| Receiving: Horn T73, and 12ft S/N: 197209005 (Setup this one for testing EUT) |                     |                 |                  |         |            |            |             |             |       |
| Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse S/N: 177081002   |                     |                 |                  |         |            |            |             |             |       |
| f GHz   | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading (dBm) | CL (dB) | Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Notes |
| 1.850   | 94.3                | V               | 20.9             | 0.9     | 8.3        | 28.3       | 33.0        | -4.7        |       |
| 1.850   | 85.9                | H               | 11.9             | 0.9     | 8.3        | 19.3       | 33.0        | -13.7       |       |
| 1.880   | 95.6                | V               | 21.3             | 0.9     | 8.3        | 28.7       | 33.0        | -4.3        |       |
| 1.880   | 85.7                | H               | 10.9             | 0.9     | 8.3        | 18.3       | 33.0        | -14.7       |       |
| 1.910   | 94.8                | V               | 21.5             | 0.9     | 8.4        | 29.0       | 33.0        | -4.0        |       |
| 1.910   | 84.2                | H               | 11.4             | 0.9     | 8.4        | 18.9       | 33.0        | -14.2       |       |
| Rev. 1.24.7   |                     |                 |                  |         |            |            |             |             |       |

**PCS Band WCDMA Output Power (EIRP)**

| <b>High Frequency Fundamental Measurement</b>                                 |                        |                    |                     |            |               |               |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|---------------|----------------|----------------|-------|
| Compliance Certification Services, Fremont 5m Chamber Site                    |                        |                    |                     |            |               |               |                |                |       |
| Company: Sierra Wireless Lenova   |                        |                    |                     |            |               |               |                |                |       |
| Project #: 07U10964   |                        |                    |                     |            |               |               |                |                |       |
| Date: 4/19/2007   |                        |                    |                     |            |               |               |                |                |       |
| Test Engineer: Mnegistu Mekuria   |                        |                    |                     |            |               |               |                |                |       |
| Configuration: EUT Only   |                        |                    |                     |            |               |               |                |                |       |
| Mode:PCS Tx, WDMA ( Worst Case)   |                        |                    |                     |            |               |               |                |                |       |
| <b>Test Equipment:</b>  |                        |                    |                     |            |               |               |                |                |       |
| Receiving: Horn T73, and 12ft S/N: 197209005 (Setup this one for testing EUT) |                        |                    |                     |            |               |               |                |                |       |
| Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse S/N: 177081002   |                        |                    |                     |            |               |               |                |                |       |
| f<br>GHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 1.852   | 92.7                   | V                  | 19.3                | 0.9        | 8.3           | 26.7          | 33.0           | -6.3           |       |
| 1.852   | 89.2                   | H                  | 15.3                | 0.9        | 8.3           | 22.7          | 33.0           | -10.3          |       |
| 1.880   | 94.0                   | V                  | 19.7                | 0.9        | 8.3           | 27.1          | 33.0           | -5.9           |       |
| 1.880   | 87.1                   | H                  | 12.3                | 0.9        | 8.3           | 19.7          | 33.0           | -13.3          |       |
| 1.908   | 93.2                   | V                  | 19.9                | 0.9        | 8.4           | 27.4          | 33.0           | -5.6           |       |
| 1.908   | 84.9                   | H                  | 12.0                | 0.9        | 8.4           | 19.5          | 33.0           | -13.5          |       |
| Rev. 1.24.7   |                        |                    |                     |            |               |               |                |                |       |

**PCS Band WCDMA + HSPDA Output Power (EIRP)**

| <b>High Frequency Fundamental Measurement</b>                                 |                        |                    |                     |            |               |               |                |                |       |
|---|------------------------|--------------------|---------------------|------------|---------------|---------------|----------------|----------------|-------|
| <b>Compliance Certification Services, Fremont 5m Chamber Site</b>             |                        |                    |                     |            |               |               |                |                |       |
| Company: Sierra Wireless Lenova   |                        |                    |                     |            |               |               |                |                |       |
| Project #: 07U10964   |                        |                    |                     |            |               |               |                |                |       |
| Date: 4/19/2007   |                        |                    |                     |            |               |               |                |                |       |
| Test Engineer: Mnegistu Mekuria   |                        |                    |                     |            |               |               |                |                |       |
| Configuration: EUT Only   |                        |                    |                     |            |               |               |                |                |       |
| Mode: PCS Tx, WCDMA & HSDPA (Worst Case)                                      |                        |                    |                     |            |               |               |                |                |       |
| <b>Test Equipment:</b>  |                        |                    |                     |            |               |               |                |                |       |
| Receiving: Horn T73, and 12ft S/N: 197209005 (Setup this one for testing EUT) |                        |                    |                     |            |               |               |                |                |       |
| Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse S/N: 177081002   |                        |                    |                     |            |               |               |                |                |       |
| f<br>GHz  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
| 1.852   | 93.8                   | V                  | 20.4                | 0.9        | 8.3           | 27.8          | 33.0           | -5.2           |       |
| 1.852   | 90.0                   | H                  | 16.1                | 0.9        | 8.3           | 23.5          | 33.0           | -9.5           |       |
| 1.880   | 95.0                   | V                  | 20.7                | 0.9        | 8.3           | 28.1          | 33.0           | -4.9           |       |
| 1.880   | 88.1                   | H                  | 13.3                | 0.9        | 8.3           | 20.7          | 33.0           | -12.3          |       |
| 1.908   | 94.4                   | V                  | 21.1                | 0.9        | 8.4           | 28.6          | 33.0           | -4.4           |       |
| 1.908   | 85.4                   | H                  | 12.6                | 0.9        | 8.4           | 20.0          | 33.0           | -13.0          |       |
| Rev. 1.24.7   |                        |                    |                     |            |               |               |                |                |       |

## 7.2. MAXIMUM PERMISSIBLE EXPOSURE

### LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz)                                   | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                               |                               |                                     |                          |
| 0.3–3.0 .....   | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0–30 .....  | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30–300 .....  | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300–1500 .....  | .....                         | .....                         | f/300                               | 6                        |
| 1500–100,000 .....                                      | .....                         | .....                         | 5                                   | 6                        |
| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
| 0.3–1.34 .....  | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30 .....   | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 30–300 .....          | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300–1500 .....        | .....                         | .....                         | f/1500                              | 30                       |
| 1500–100,000 .....    | .....                         | .....                         | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

## **CALCULATIONS**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of Power to mW and Distance to cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

yields

$$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm<sup>2</sup>

Substituting the logarithmic form of power and gain using:

$$P \text{ (mW)} = 10^{(P \text{ (dBm)} / 10)} \text{ and}$$

$$G \text{ (numeric)} = 10^{(G \text{ (dBi)} / 10)}$$

yields

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S} \quad \text{Equation (1)}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm<sup>2</sup>

Equation (1) and the measured peak power is used to calculate the MPE distance.



**LIMITS**

From §1.1310 Table 1 (B),  $S = 1.0 \text{ mW/cm}^2$

**RESULTS**

No non-compliance noted: (MPE distance equals 20 cm)

| <b>Mode</b>        | <b>MPE Distance (cm)</b> | <b>Output Power (dBm)</b> | <b>Antenna Gain (dBi)</b> | <b>Power Density (mW/cm<sup>2</sup>)</b> |
|--------------------|--------------------------|---------------------------|---------------------------|--|
| GSM850 GPRS        | 20.0                     | 29.60                     | 0.49                      | 0.20                                     |
| GSM1900 GPRS       | 20.0                     | 29.90                     | 1.79                      | 0.29                                     |
| WCDMA+HSPDA Cellar | 20.0                     | 27.10                     | 0.49                      | 0.11                                     |
| WCDMA+HSPDA PCS    | 20.0                     | 28.60                     | 1.79                      | 0.22                                     |

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

### **7.3. FIELD STRENGTH OF SPURIOUS RADIATION**

#### **LIMIT**

§22.917 (e) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

#### **TEST PROCEDURE**

ANSI / TIA / EIA 603 Clause 3.2.12, FCC 22.917 (h), & FCC 24.238 (b)

#### **RESULTS**

No non-compliance noted.

**GSM850 GPRS Spurious & Harmonic (ERP)**

| High Frequency Substitution Measurement   |                     |                 |                 |                       |            |                        |  |             |             |       |
|---|---------------------|-----------------|-----------------|-----------------------|------------|------------------------|--|-------------|-------------|-------|
| Compliance Certification Services, Fremont Chamber B  |                     |                 |                 |                       |            |                        |  |             |             |       |
| Company: Sierra Wireless Lenova   |                     |                 |                 |                       |            |                        |  |             |             |       |
| Project #: 07U10964   |                     |                 |                 |                       |            |                        |  |             |             |       |
| Date: 4/20/2007   |                     |                 |                 |                       |            |                        |  |             |             |       |
| Test Engineer: Anoop Singh  |                     |                 |                 |                       |            |                        |  |             |             |       |
| Configuration: EUT Only   |                     |                 |                 |                       |            |                        |  |             |             |       |
| Mode: Cell TX, GPRS   |                     |                 |                 |                       |            |                        |  |             |             |       |
| <b>Test Equipment:</b>  |                     |                 |                 |                       |            |                        |  |             |             |       |
| EMCO Horn 1-18GHz   |                     | Horn > 18GHz    |                 |                       | Limit      |                        | <input checked="" type="checkbox"/> High Pass Filter |             |             |       |
| T73; S/N: 6717 @3m  |                     |                 |                 |                       | FCC 22     |                        |  |             |             |       |
| Hi Frequency Cables   |                     |                 |                 | Pre-amplifier 1-26GHz |            | Pre-amplifier 26-40GHz |  |             |             |       |
| <input type="checkbox"/> (2 ft) <input type="checkbox"/> (2~3 ft) <input type="checkbox"/> (4~6 ft) <input checked="" type="checkbox"/> (12 ft) |                     |                 |                 | T145 Agilent 3008A    |            |                        |  |             |             |       |
| f GHz   | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading 75.0 | CL (dB)               | Gain (dBi) | Gain (dBd)             | ERP (dBm)  | Limit (dBm) | Margin (dB) | Notes |
| <b>Low Ch 824.2Mhz</b>  |                     |                 |                 |                       |            |                        |  |             |             |       |
| 1.64840   | 63.6                | V               | -42.4           | 3.8                   | 8.0        | 5.8                    | -40.4  | -13.0       | -27.4       |       |
| 2.47260   | 65.5                | V               | -36.9           | 4.9                   | 9.5        | 7.4                    | -34.4  | -13.0       | -21.4       |       |
| 1.64820   | 64.1                | H               | -41.2           | 3.8                   | 8.0        | 5.8                    | -39.2  | -13.0       | -26.2       |       |
| 2.47410   | 60.7                | H               | -41.5           | 4.9                   | 9.5        | 7.4                    | -39.0  | -13.0       | -26.0       |       |
| <b>Mid Ch 837.0Mhz</b>  |                     |                 |                 |                       |            |                        |  |             |             |       |
| 1.67400   | 63.6                | V               | -42.2           | 3.9                   | 8.0        | 5.9                    | -40.2  | -13.0       | -27.2       |       |
| 2.51100   | 68.6                | V               | -33.7           | 4.9                   | 9.6        | 7.4                    | -31.2  | -13.0       | -18.2       |       |
| 1.67400   | 66.9                | H               | -38.2           | 3.9                   | 8.0        | 5.9                    | -36.2  | -13.0       | -23.2       |       |
| 2.51100   | 66.2                | H               | -35.9           | 4.9                   | 9.6        | 7.4                    | -33.4  | -13.0       | -20.4       |       |
| <b>High Ch 848.8Mhz</b>   |                     |                 |                 |                       |            |                        |  |             |             |       |
| 1.69760   | 62.7                | V               | -43.1           | 3.9                   | 8.1        | 5.9                    | -41.1  | -13.0       | -28.1       |       |
| 2.54640   | 68.1                | V               | -34.0           | 4.9                   | 9.6        | 7.4                    | -31.6  | -13.0       | -18.6       |       |
| 1.69760   | 67.0                | H               | -38.0           | 3.9                   | 8.1        | 5.9                    | -36.0  | -13.0       | -23.0       |       |
| 2.54640   | 62.0                | H               | -39.9           | 4.9                   | 9.6        | 7.4                    | -37.5  | -13.0       | -24.5       |       |
| Rev. 1.24.7   |                     |                 |                 |                       |            |                        |  |             |             |       |
| Note: No other emissions were detected above the system noise floor.  |                     |                 |                 |                       |            |                        |  |             |             |       |

**GSM850 EGPRS Spurious & Harmonic (ERP)**

**High Frequency Substitution Measurement**  
 Compliance Certification Services, Fremont Chamber B

Company: Sierra Wireless Lenova  
 Project #: 07U10964  
 Date: 4/20/2007  
 Test Engineer: Anoop Singh  
 Configuration: EUT Only  
 Mode: Cell TX, EGPRS

**Test Equipment:**

EMCO Horn 1-18GHz  
T 73; S/N: 6717 @3m

Horn > 18GHz

Limit  
FCC 22

✓ High Pass Filter

Hi Frequency Cables  
 (2 ft)   
  (2 ~ 3 ft)   
  (4 ~ 6 ft)   
  (12 ft)

Pre-amplifier 1-26GHz  
T145 Agilent 3008A

Pre-amplifier 26-40GHz

| f<br>GHz                | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>75.0 | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | ERP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|-------------------------|------------------------|--------------------|--------------------|------------|---------------|---------------|--------------|----------------|----------------|-------|
| <b>Low Ch</b> 824.2Mhz  |                        |                    |                    |            |               |               |              |                |                |       |
| 1.64840                 | 62.2                   | V                  | -43.8              | 3.8        | 8.0           | 5.8           | -41.8        | -13.0          | -28.8          |       |
| 2.47260                 | 66.9                   | V                  | -35.5              | 4.9        | 9.5           | 7.4           | -33.0        | -13.0          | -20.0          |       |
| 1.64820                 | 65.9                   | H                  | -39.4              | 3.8        | 8.0           | 5.8           | -37.4        | -13.0          | -24.4          |       |
| 2.47410                 | 62.0                   | H                  | -40.2              | 4.9        | 9.5           | 7.4           | -37.7        | -13.0          | -24.7          |       |
| <b>Mid Ch</b> 837.0Mhz  |                        |                    |                    |            |               |               |              |                |                |       |
| 1.67400                 | 64.4                   | V                  | -41.5              | 3.9        | 8.0           | 5.9           | -39.5        | -13.0          | -26.5          |       |
| 2.51100                 | 67.4                   | V                  | -34.9              | 4.9        | 9.6           | 7.4           | -32.4        | -13.0          | -19.4          |       |
| 1.67400                 | 66.4                   | H                  | -38.8              | 3.9        | 8.0           | 5.9           | -36.8        | -13.0          | -23.8          |       |
| 2.51100                 | 66.1                   | H                  | -36.0              | 4.9        | 9.6           | 7.4           | -33.5        | -13.0          | -20.5          |       |
| <b>High Ch</b> 848.8Mhz |                        |                    |                    |            |               |               |              |                |                |       |
| 1.69760                 | 62.8                   | V                  | -42.9              | 3.9        | 8.1           | 5.9           | -40.9        | -13.0          | -27.9          |       |
| 2.54640                 | 65.0                   | V                  | -37.2              | 4.9        | 9.6           | 7.4           | -34.7        | -13.0          | -21.7          |       |
| 1.69760                 | 63.7                   | H                  | -41.4              | 3.9        | 8.1           | 5.9           | -39.4        | -13.0          | -26.4          |       |
| 2.54640                 | 64.8                   | H                  | -37.2              | 4.9        | 9.6           | 7.4           | -34.7        | -13.0          | -21.7          |       |

Rev. 1.24.7  
 Note: No other emissions were detected above the system noise floor.

**CELL Band WCDMA Spurious & Harmonic (ERP)**

| High Frequency Substitution Measurement   |                     |                 |                 |   |            |                        |           |  |             |       |  |
|---|---------------------|-----------------|-----------------|---|------------|------------------------|-----------|--|-------------|-------|--|
| Compliance Certification Services, Fremont Chamber B  |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Company: Sierra Wireless Lenova   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Project #: 07U10964   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Date: 4/20/2007   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Test Engineer: Anoop Singh  |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Configuration: EUT Only   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Mode: CELL TX, WCDMA  |                     |                 |                 |   |            |                        |           |  |             |       |  |
| <b>Test Equipment:</b>  |                     |                 |                 |   |            |                        |           |  |             |       |  |
| EMCO Horn 1-18GHz<br>T 73; S/N: 6717 @3m  |                     |                 | Horn > 18GHz    |   |            | Limit<br>FCC 22        |           | <input checked="" type="checkbox"/> High Pass Filter |             |       |  |
| Hi Frequency Cables<br><input type="checkbox"/> (2 ft) <input checked="" type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft) |                     |                 |                 | Pre-amplifier 1-26GHz<br>T145 Agilent 3008A |            | Pre-amplifier 26-40GHz |           |  |             |       |  |
| f GHz   | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading 75.0 | CL (dB)                                     | Gain (dBi) | Gain (dBd)             | ERP (dBm) | Limit (dBm)  | Margin (dB) | Notes |  |
| <b>Low Ch: 826.4Mhz</b>   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| 1.653   | 53.2                | V               | -52.1           | 4.2   | 8.0        | 5.8                    | -50.5     | -13.0  | -37.5       |       |  |
| 2.479   | 60.1                | V               | -41.6           | 5.2   | 9.6        | 7.4                    | -39.5     | -13.0  | -26.5       |       |  |
| 1.653   | 58.3                | H               | -46.3           | 4.2   | 8.0        | 5.8                    | -44.6     | -13.0  | -31.6       |       |  |
| 2.479   | 53.1                | H               | -48.5           | 5.2   | 9.6        | 7.4                    | -46.3     | -13.0  | -33.3       |       |  |
| <b>Mid Ch: 836.4Mhz</b>   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| 1.673   | 57.6                | V               | -47.7           | 4.2   | 8.0        | 5.9                    | -46.0     | -13.0  | -33.0       |       |  |
| 2.509   | 61.3                | V               | -40.4           | 5.2   | 9.6        | 7.4                    | -38.2     | -13.0  | -25.2       |       |  |
| 1.673   | 58.6                | H               | -45.9           | 4.2   | 8.0        | 5.9                    | -44.2     | -13.0  | -31.2       |       |  |
| 2.509   | 57.3                | H               | -44.1           | 5.2   | 9.6        | 7.4                    | -41.9     | -13.0  | -28.9       |       |  |
| <b>High Ch: 846.6Mhz</b>  |                     |                 |                 |   |            |                        |           |  |             |       |  |
| 1.693   | 57.5                | V               | -47.7           | 4.2   | 8.1        | 5.9                    | -45.9     | -13.0  | -32.9       |       |  |
| 2.540   | 60.6                | V               | -41.0           | 5.3   | 9.6        | 7.4                    | -38.8     | -13.0  | -25.8       |       |  |
| 1.693   | 62.2                | H               | -42.3           | 4.2   | 8.1        | 5.9                    | -40.6     | -13.0  | -27.6       |       |  |
| 2.540   | 58.3                | H               | -43.0           | 5.3   | 9.6        | 7.4                    | -40.9     | -13.0  | -27.9       |       |  |
| Rev. 1.24.7   |                     |                 |                 |   |            |                        |           |  |             |       |  |
| Note: No other emissions were detected above the system noise floor.  |                     |                 |                 |   |            |                        |           |  |             |       |  |

**CELL Band WCDMA+HSPDA Spurious & Harmonic (ERP)**

**High Frequency Substitution Measurement**  
 Compliance Certification Services, Fremont 5m B-Chamber

Company: Sierra Wireless  
 Project #: 07U10964  
 Date: 4/20/2007  
 Test Engineer: Mengistu Mekuria  
 Configuration: EUT Only  
 Mode: CELL TX, WCDMA HSDPA (Worse Case)  
 Worse Case Configuration  
 Test Equipment:

EMCO Horn 1-18GHz  
T 60; S/N: 2238 @3m

Horn > 18GHz

Limit  
FCC 22

High Pass Filter

Hi Frequency Cables  
 (2 ft)  
  (2 ~ 3 ft)  
  (4 ~ 6 ft)  
  (12 ft)

Pre-amplifier 1-26GHz  
T145 Agilent 3008A

Pre-amplifier 26-40GHz

| f GHz          | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading (dBm) | CL (dB) | Gain (dBi) | Gain (dBd) | EIRP ERP | Limit (dBm) | Margin (dB) | Notes |
|----------------|---------------------|-----------------|------------------|---------|------------|------------|----------|-------------|-------------|-------|
| <b>Low CH</b>  |                     |                 |                  |         |            |            |          |             |             |       |
| 1.652          | 57.7                | V               | -46.6            | 3.8     | 7.1        | 4.9        | -43.3    | -13.0       | -30.3       |       |
| 2.479          | 54.2                | V               | -47.7            | 4.9     | 9.3        | 7.1        | -43.3    | -13.0       | -30.3       |       |
| 3.305          | 50.1                | V               | -48.3            | 5.6     | 9.4        | 7.3        | -44.5    | -13.0       | -31.5       |       |
| 1.652          | 57.1                | H               | -46.4            | 3.8     | 7.1        | 4.9        | -43.2    | -13.0       | -30.2       |       |
| 2.479          | 57.4                | H               | -44.3            | 4.9     | 9.3        | 7.1        | -39.9    | -13.0       | -26.9       |       |
| 3.305          | 48.0                | H               | -50.3            | 5.6     | 9.4        | 7.3        | -46.4    | -13.0       | -33.4       |       |
| <b>Mid CH</b>  |                     |                 |                  |         |            |            |          |             |             |       |
| 1.672          | 60.1                | V               | -44.0            | 3.9     | 7.1        | 5.0        | -40.8    | -13.0       | -27.8       |       |
| 2.509          | 56.3                | V               | -45.5            | 4.9     | 9.3        | 7.1        | -41.1    | -13.0       | -28.1       |       |
| 3.346          | 49.3                | V               | -49.0            | 5.6     | 9.5        | 7.3        | -45.1    | -13.0       | -32.1       |       |
| 1.672          | 59.9                | H               | -43.6            | 3.9     | 7.1        | 5.0        | -40.3    | -13.0       | -27.3       |       |
| 2.509          | 57.2                | H               | -44.3            | 4.9     | 9.3        | 7.1        | -40.0    | -13.0       | -27.0       |       |
| 3.346          | 48.6                | H               | -49.5            | 5.6     | 9.5        | 7.3        | -45.7    | -13.0       | -32.7       |       |
| <b>High CH</b> |                     |                 |                  |         |            |            |          |             |             |       |
| 1.693          | 63.9                | V               | -40.3            | 3.9     | 7.2        | 5.1        | -36.9    | -13.0       | -23.9       |       |
| 2.540          | 58.8                | V               | -42.8            | 4.9     | 9.3        | 7.1        | -38.5    | -13.0       | -25.5       |       |
| 3.386          | 52.4                | V               | -45.7            | 5.7     | 9.5        | 7.3        | -41.9    | -13.0       | -28.9       |       |
| 1.693          | 64.5                | H               | -38.9            | 3.9     | 7.2        | 5.1        | -35.6    | -13.0       | -22.6       |       |
| 2.540          | 57.2                | H               | -44.2            | 4.9     | 9.3        | 7.1        | -39.9    | -13.0       | -26.9       |       |
| 3.386          | 47.7                | H               | -50.3            | 5.7     | 9.5        | 7.3        | -46.5    | -13.0       | -33.5       |       |

Rev. 5.1.6  
 Note: No other emissions were detected above the system noise floor.

**GSM1900 Band GPRS Spurious & Harmonic (EIRP)**

| High Frequency Substitution Measurement  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
|--|---------------------|-----------------|------------------|-----------------------|------------|------------------------|-------------------------------------|-------------|-------------|-------|
| Compliance Certification Services, B- 5m Chamber Fremont Site  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Company: Sierra Wireless Lenova  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Project #: 07U10964  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Date: 4/20/2007  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Test Engineer: Anoop Singh   |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Configuration: EUT Only  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Mode: PCS TX, GPRS   |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| <b>Test Equipment:</b>   |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| EMCO Horn 1-18GHz  |                     | Horn > 18GHz    |                  |                       | Limit      |                        | High Pass Filter                    |             |             |       |
| T 73; S/N: 6717 @3m  |                     |                 |                  |                       | FCC 24     |                        | <input checked="" type="checkbox"/> |             |             |       |
| Hi Frequency Cables  |                     |                 |                  | Pre-amplifier 1-26GHz |            | Pre-amplifier 26-40GHz |                                     |             |             |       |
| <input type="checkbox"/> (2 ft) <input checked="" type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft) |                     |                 |                  | T145 Agilent 3008A    |            |                        |                                     |             |             |       |
| f GHz  | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading (dBm) | CL (dB)               | Gain (dBi) | Gain (dBd)             | EIRP (dBm)                          | Limit (dBm) | Margin (dB) | Notes |
| <b>Low Ch (1.8502 GHz)</b>   |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| 3.700  | 54.0                | V               | -42.2            | 6.4                   | 9.7        | 7.6                    | -38.9                               | -13.0       | -25.9       |       |
| 5.551  | 53.1                | V               | -38.2            | 8.0                   | 11.3       | 9.1                    | -34.9                               | -13.0       | -21.9       |       |
| 3.700  | 55.0                | H               | -41.1            | 6.4                   | 9.7        | 7.6                    | -37.7                               | -13.0       | -24.7       |       |
| 5.551  | 50.5                | H               | -39.7            | 8.0                   | 11.3       | 9.1                    | -36.4                               | -13.0       | -23.4       |       |
| <b>Mid Ch (1.88 GHz)</b>   |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| 3.760  | 54.0                | V               | -41.8            | 6.4                   | 9.7        | 7.6                    | -38.6                               | -13.0       | -25.6       |       |
| 5.640  | 60.5                | V               | -30.9            | 8.1                   | 11.5       | 9.3                    | -27.5                               | -13.0       | -14.5       |       |
| 3.760  | 60.9                | H               | -34.9            | 6.4                   | 9.7        | 7.6                    | -31.6                               | -13.0       | -18.6       |       |
| 5.640  | 56.3                | H               | -34.2            | 8.1                   | 11.5       | 9.3                    | -30.8                               | -13.0       | -17.8       |       |
| <b>High Ch (1.9098 GHz)</b>  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| 3.820  | 49.6                | V               | -46.0            | 6.5                   | 9.7        | 7.5                    | -42.8                               | -13.0       | -29.8       |       |
| 5.729  | 48.3                | V               | -43.3            | 8.1                   | 11.7       | 9.5                    | -39.8                               | -13.0       | -26.8       |       |
| 3.820  | 50.2                | H               | -45.3            | 6.5                   | 9.7        | 7.5                    | -42.1                               | -13.0       | -29.1       |       |
| 5.729  | 45.1                | H               | -45.5            | 8.1                   | 11.7       | 9.5                    | -42.0                               | -13.0       | -29.0       |       |
| Rev. 1.24.7  |                     |                 |                  |                       |            |                        |                                     |             |             |       |
| Note: No other emissions were detected above the system noise floor.   |                     |                 |                  |                       |            |                        |                                     |             |             |       |

**GSM1900 Band EGPRS Spurious & Harmonic (EIRP)**

**High Frequency Substitution Measurement**

Compliance Certification Services, B- 5m Chamber Fremont Site

Company: Sierra Wireless Lenova  
 Project #: 07U10964  
 Date: 4/20/2007  
 Test Engineer: Anoop Singh  
 Configuration: EUT Only  
 Mode: PCS TX, EGPRS

**Test Equipment:**

EMCO Horn 1-18GHz  
T 73; S/N: 6717 @3m

Horn > 18GHz

Limit  
FCC 24

High Pass Filter

Hi Frequency Cables  
 (2 ft)    (2 ~ 3 ft)    (4 ~ 6 ft)    (12 ft)

Pre-amplifier 1-26GHz  
T145 Agilent 3008A

Pre-amplifier 26-40GHz

| f GHz                       | SA reading (dBuV/m) | Ant. Pol. (H/V) | SG reading (dBm) | CL (dB) | Gain (dBi) | Gain (dBd) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Notes |
|-----------------------------|---------------------|-----------------|------------------|---------|------------|------------|------------|-------------|-------------|-------|
| <b>Low Ch (1.8502 GHz)</b>  |                     |                 |                  |         |            |            |            |             |             |       |
| 3.700                       | 61.3                | V               | -34.9            | 6.4     | 9.7        | 7.6        | -31.5      | -13.0       | -18.5       |       |
| 5.551                       | 57.2                | V               | -34.1            | 8.0     | 11.3       | 9.1        | -30.8      | -13.0       | -17.8       |       |
| 3.700                       | 59.4                | H               | -36.7            | 6.4     | 9.7        | 7.6        | -33.3      | -13.0       | -20.3       |       |
| 5.551                       | 50.2                | H               | -40.0            | 8.0     | 11.3       | 9.1        | -36.8      | -13.0       | -23.8       |       |
| <b>Mid Ch (1.88 GHz)</b>    |                     |                 |                  |         |            |            |            |             |             |       |
| 3.760                       | 53.6                | V               | -42.3            | 6.4     | 9.7        | 7.6        | -39.0      | -13.0       | -26.0       |       |
| 5.640                       | 55.3                | V               | -36.2            | 8.1     | 11.5       | 9.3        | -32.8      | -13.0       | -19.8       |       |
| 3.760                       | 60.3                | H               | -35.5            | 6.4     | 9.7        | 7.6        | -32.3      | -13.0       | -19.3       |       |
| 5.640                       | 58.3                | H               | -32.1            | 8.1     | 11.5       | 9.3        | -28.7      | -13.0       | -15.7       |       |
| <b>High Ch (1.9098 GHz)</b> |                     |                 |                  |         |            |            |            |             |             |       |
| 3.820                       | 49.7                | V               | -45.8            | 6.5     | 9.7        | 7.5        | -42.6      | -13.0       | -29.6       |       |
| 5.729                       | 42.6                | V               | -49.0            | 8.1     | 11.7       | 9.5        | -45.5      | -13.0       | -32.5       |       |
| 3.820                       | 51.4                | H               | -44.1            | 6.5     | 9.7        | 7.5        | -40.9      | -13.0       | -27.9       |       |
| 5.729                       | 43.3                | H               | -47.3            | 8.1     | 11.7       | 9.5        | -43.8      | -13.0       | -30.8       |       |

Rev. 1.24.7  
 Note: No other emissions were detected above the system noise floor.



**PCS Band WCDMA Spurious & Harmonic (EIRP)**

**High Frequency Substitution Measurement**  
 Compliance Certification Services, Fremont Chamber B

Company: Sierra Wireless Lenova  
 Project #: 07U10964  
 Date: 4/20/2007  
 Test Engineer: Anoop Singh  
 Configuration: EUT Only  
 Mode: PCS TX, WCDMA

**Test Equipment:**

EMCO Horn 1-18GHz  
T 73; S/N: 6717 @3m

Horn > 18GHz

Limit  
FCC 24

High Pass Filter

Hi Frequency Cables  
 (2 ft)  (2 ~ 3 ft)  (4 ~ 6 ft)  (12 ft)

Pre-amplifier 1-26GHz  
T145 Agilent 3008A

Pre-amplifier 26-40GHz

| f<br>GHz                  | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>75.0 | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|---------------------------|------------------------|--------------------|--------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| <b>Low Ch: 1852.4Mhz</b>  |                        |                    |                    |            |               |               |               |                |                |       |
| 3.705                     | 56.4                   | V                  | -39.8              | 6.4        | 9.7           | 7.6           | -36.4         | -13.0          | -23.4          |       |
| 5.557                     | 46.1                   | V                  | -45.2              | 8.0        | 11.3          | 9.1           | -41.9         | -13.0          | -28.9          |       |
| 3.705                     | 58.3                   | H                  | -37.8              | 6.4        | 9.7           | 7.6           | -34.4         | -13.0          | -21.4          |       |
| 5.557                     | 44.3                   | H                  | -46.0              | 8.0        | 11.3          | 9.1           | -42.7         | -13.0          | -29.7          |       |
| <b>Mid Ch: 1880.0Mhz</b>  |                        |                    |                    |            |               |               |               |                |                |       |
| 3.760                     | 58.9                   | V                  | -37.0              | 6.4        | 9.7           | 7.6           | -33.7         | -13.0          | -20.7          |       |
| 5.640                     | 49.7                   | V                  | -41.8              | 8.1        | 11.5          | 9.3           | -38.4         | -13.0          | -25.4          |       |
| 3.760                     | 60.4                   | H                  | -35.4              | 6.4        | 9.7           | 7.6           | -32.1         | -13.0          | -19.1          |       |
| 5.640                     | 47.9                   | H                  | -42.5              | 8.1        | 11.5          | 9.3           | -39.1         | -13.0          | -26.1          |       |
| <b>High Ch: 1907.6Mhz</b> |                        |                    |                    |            |               |               |               |                |                |       |
| 3.815                     | 75.2                   | V                  | -20.5              | 6.5        | 9.7           | 7.5           | -17.2         | -13.0          | -4.2           |       |
| 5.723                     | 38.5                   | V                  | -53.1              | 8.1        | 11.6          | 9.5           | -49.6         | -13.0          | -36.6          |       |
| 3.815                     | 70.3                   | H                  | -25.2              | 6.5        | 9.7           | 7.5           | -22.0         | -13.0          | -9.0           |       |
| 5.723                     | 37.3                   | H                  | -53.3              | 8.1        | 11.6          | 9.5           | -49.8         | -13.0          | -36.8          |       |

Rev. 1.24.7  
 Note: No other emissions were detected above the system noise floor.

**PCS Band WCDMA+HSPDA Spurious & Harmonic (EIRP)**

**High Frequency Substitution Measurement**  
 Compliance Certification Services, Fremont 5m B-Chamber

Company: Sierra Wireless  
 Project #: 07U10964  
 Date: 4/20/2007  
 Test Engineer: Mengistu Mekuria  
 Configuration: EUT Only  
 Mode: PCS TX, WCDMA HSDPA (Worst Case)

**Test Equipment:**

EMCO Horn 1-18GHz

T60; S/N: 2238 @3m

Horn > 18GHz

Limit

FCC 24

High Pass Filter

Hi Frequency Cables

(2 ft)    (2~3 ft)    (4~6 ft)    (12 ft)

Pre-amplifier 1-26GHz

T145 Agilent 3008A

Pre-amplifier 26-40GHz

| f<br>GHz       | SA reading<br>(dBuV/m) | Ant. Pol.<br>(H/V) | SG reading<br>(dBm) | CL<br>(dB) | Gain<br>(dBi) | Gain<br>(dBd) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Notes |
|----------------|------------------------|--------------------|---------------------|------------|---------------|---------------|---------------|----------------|----------------|-------|
| <b>Low CH</b>  |                        |                    |                     |            |               |               |               |                |                |       |
| 3.705          | 49.6                   | V                  | -47.3               | 5.9        | 9.7           | 7.5           | -43.6         | -13.0          | -30.6          |       |
| 5.557          | 42.6                   | V                  | -49.4               | 7.4        | 11.0          | 8.9           | -45.8         | -13.0          | -32.8          |       |
| 3.705          | 51.5                   | H                  | -45.3               | 5.9        | 9.7           | 7.5           | -41.6         | -13.0          | -28.6          |       |
| 5.557          | 43.5                   | H                  | -47.4               | 7.4        | 11.0          | 8.9           | -43.8         | -13.0          | -30.8          |       |
| <b>Mid CH</b>  |                        |                    |                     |            |               |               |               |                |                |       |
| 3.760          | 54.6                   | V                  | -42.1               | 6.0        | 9.7           | 7.5           | -38.4         | -13.0          | -25.4          |       |
| 5.640          | 45.8                   | V                  | -46.3               | 7.4        | 11.2          | 9.0           | -42.6         | -13.0          | -29.6          |       |
| 3.760          | 57.3                   | H                  | -39.3               | 6.0        | 9.7           | 7.5           | -35.6         | -13.0          | -22.6          |       |
| 5.640          | 49.0                   | H                  | -42.1               | 7.4        | 11.2          | 9.0           | -38.4         | -13.0          | -25.4          |       |
| <b>High CH</b> |                        |                    |                     |            |               |               |               |                |                |       |
| 3.815          | 67.9                   | V                  | -28.6               | 6.0        | 9.7           | 7.6           | -24.9         | -13.0          | -11.9          |       |
| 5.723          | 49.9                   | V                  | -42.2               | 7.5        | 11.3          | 9.1           | -38.4         | -13.0          | -25.4          |       |
| 3.815          | 65.7                   | H                  | -30.7               | 6.0        | 9.7           | 7.6           | -27.0         | -13.0          | -14.0          |       |
| 5.723          | 48.2                   | H                  | -43.0               | 7.5        | 11.3          | 9.1           | -39.2         | -13.0          | -26.2          |       |

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 Note: No other emissions were detected above the system noise floor.