



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

**FOR**

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

**MODEL NUMBER: MC8775**

**FCC ID: N7NMC8775-L**

**REPORT NUMBER: 07U10871-1**

**ISSUE DATE: MARCH 6, 2007**

*Prepared for*  
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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
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## 1. ATTESTATION OF TEST RESULTS

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

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

**MODEL:** MC8775

**SERIAL NUMBER:** 11S42T0898Z1ZD3G71A06Z

**DATE TESTED:** FEBRUARY 26-28, 2007

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22 SUBPART H	NO NON-COMPLIANCE NOTED
FCC PART 24 SUBPART E	NO NON-COMPLIANCE NOTED

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:



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THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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YU-CHIEN HO  
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
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 installed in a Lenovo ThinkPad T61 14.1-inch Laptop 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. CLASS II PERMISSIVE CHANGE DESCRIPTION

Add Lenovo ThinkPad T61 14.1-inch Laptop.

### 5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak ERP and EIRP as follows:

#### Part 22 (824 - 849MHz) & Part 24 (1850 - 1910MHz) Authorized Band:

Frequency Range (MHz)	Modulation	ERP Peak Power (dBm)	ERP Peak Power (mW)
824.2 - 848.75	GPRS	29.50	891.25
824.2 - 848.75	EGPRS	25.50	354.81
826.5 - 846.6	WCDMA	24.40	275.42
826.5 - 846.6	WCDMA+HSPDA	25.40	346.74

Frequency Range (MHz)	Modulation	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
1850.25 - 1909.8	GPRS	30.20	1047.13
1850.25 - 1909.8	EGPRS	27.20	524.81
1852.4 - 1907.6	WCDMA	26.00	398.11
1852.4 - 1907.6	WCDMA+HSPDA	27.40	549.54

## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an inverted F antenna with a maximum gain of -0.37dBi for Cell band and 0.96dBi for PCS band.

## 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) 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 the above results from the different modulations, GSM850, GPRS, and WCDMA+HSPDA are the worst-case scenario for all measurements.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at high channel for both GSM cell band GSM PCS band. For WCDMA+HSPDA modulation, the highest power was at mid channel for cell band and high channel for PCS band.



## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	IBM	Thinkpad T60	ZZBC227	DoC
AC Adapter	IBM	Lenovo	11S92P1156Z1ZBGF6A6080	DoC
Communications Test Set	Agilent	E5515C	10092	DoC

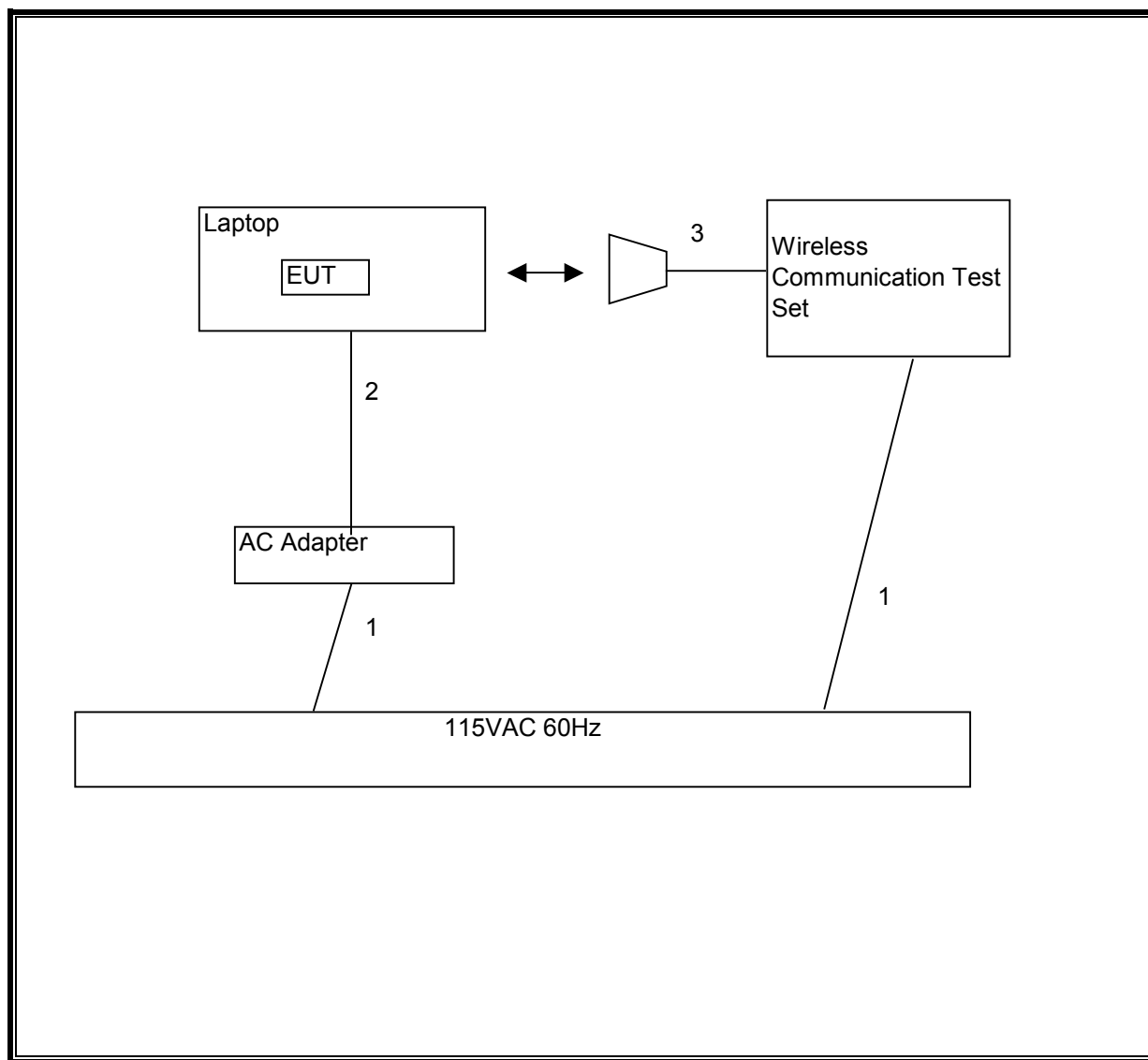
### I/O CABLES

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

### TEST SETUP

The EUT module is installed in an IBM laptop during the tests. 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
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	05/03/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/07
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00369	08/17/07
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	09/03/07
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	05/04/07
RF Filter Section	Agilent / HP	85420E	3705A00256	05/04/07
Communications Test Set	Agilent	E5515C	US41070176	10/19/07
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	03/25/07

## **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

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	28.70	741.31
Middle	837	29.10	812.83
High	848.8	29.50	891.25

850 MHz EGPRS Mode

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	25.20	331.13
Middle	837	25.40	346.74
High	848.8	25.50	354.81

850 MHz WCDMA Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	826.4	23.70	234.42
Middle	836.4	24.40	275.42
High	846.6	23.40	218.78

850 MHz WCDMA+HSPDA Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	826.4	24.80	302.00
Middle	836.4	25.40	346.74
High	848.6	24.20	263.03

1900 MHz GPRS Mode

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	29.80	954.99
Middle	1880.00	29.50	891.25
High	1909.8	30.20	1047.13

1900 MHz EGPRS Mode

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	27.20	524.81
Middle	1880.00	26.70	467.74
High	1909.8	26.50	446.68

1900 MHz WCDMA Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1852.4	25.30	338.84
Middle	1880.00	24.40	275.42
High	1907.6	26.00	398.11

1900 MHz WCDMA+HSPDA Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1852.40	26.90	489.78
Middle	1880.00	25.70	371.54
High	1907.60	27.40	549.54

**GSM850 GPRS Output Power (ERP)**

High Frequency Substitution Measurement Compliance Certification Services, Fremont Chamber A									
Company:Sierra Wireless Inc. Project #:07U10871 Date: 2/26/2007 Test Engineer: William Zhuang Configuration:EUT only Mode:GSM850 GPRS									
<u>Test Equipment:</u> 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 MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	102.8	V	29.2	0.5	0.0	28.7	38.5	-9.7	
824.20	100.7	H	25.4	0.5	0.0	24.9	38.5	-13.5	
837.00	102.7	V	29.7	0.6	0.0	29.1	38.5	-9.3	
837.00	100.2	H	25.1	0.6	0.0	24.5	38.5	-13.9	
848.80	103.4	V	30.2	0.7	0.0	29.5	38.5	-8.9	
848.80	102.3	H	26.8	0.7	0.0	26.1	38.5	-12.3	
Rev. 1.24.7									

**GSM850 EGPRS Output Power (ERP)**

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

Company: Sierra Wireless Inc.  
Project #: 07U10871  
Date: 2/26/2007  
Test Engineer: William Zhuang  
Configuration: EUT only  
Mode: GSM850 EGPRS

**Test Equipment:**

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 MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	99.3	V	25.7	0.5	0.0	25.2	38.5	-13.2	
824.20	97.1	H	21.8	0.5	0.0	21.3	38.5	-17.1	
837.00	99.0	V	26.0	0.6	0.0	25.4	38.5	-13.0	
837.00	97.2	H	22.1	0.6	0.0	21.5	38.5	-16.9	
848.80	99.4	V	26.2	0.7	0.0	25.5	38.5	-12.9	
848.80	97.6	H	22.1	0.7	0.0	21.4	38.5	-17.0	

Rev. 1.24.7



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

<p align="center"><b>High Frequency Substitution Measurement</b>  <b>Compliance Certification Services, Fremont Chamber A</b></p> <p>Company:Sierra Wireless Inc.  Project #:07U10871  Date: 2/27/2007  Test Engineer: YuChien Ho  Configuration:EUT only  Mode:WCDMA850 (WCDMA)</p> <p><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</p>									
f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
<b>Low Ch</b>									
826.40	97.8	V	24.2	0.5	0.0	23.7	38.5	-14.8	
826.40	98.2	H	22.9	0.5	0.0	22.4	38.5	-16.0	
<b>Mid Ch</b>									
836.40	98.0	V	25.0	0.6	0.0	24.4	38.5	-14.0	
836.40	98.4	H	23.3	0.6	0.0	22.7	38.5	-15.7	
<b>High Ch</b>									
846.60	97.3	V	24.1	0.7	0.0	23.4	38.5	-15.0	
846.60	97.8	H	22.3	0.7	0.0	21.6	38.5	-16.8	
Rev. 1.24.7									

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

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

Company:Sierra Wireless Inc.  
Project #:07U10871  
Date: 2/27/2007  
Test Engineer: YuChien Ho  
Configuration:EUT only  
Mode:WCDMA850 (HSDPA)

**Test Equipment:**

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 MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
<b>Low Ch</b>									
826.40	98.9	V	25.3	0.5	0.0	24.8	38.5	-13.6	
826.40	98.5	H	23.2	0.5	0.0	22.7	38.5	-15.7	
<b>Mid Ch</b>									
836.40	99.0	V	26.0	0.6	0.0	25.4	38.5	-13.0	
836.40	99.2	H	24.1	0.6	0.0	23.5	38.5	-15.0	
<b>High Ch</b>									
846.60	98.1	V	24.9	0.7	0.0	24.2	38.5	-14.3	
846.60	98.3	H	22.8	0.7	0.0	22.1	38.5	-16.4	

Rev. 1.24.7

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

**High Frequency Fundamental Measurement**  
**Compliance Certification Services, Fremont Chamber A**

Company: Sierra Wireless Inc.  
Project #: 07U10871  
Date: 2/26/2007  
Test Engineer: William Zhuang  
Configuration: EUT only  
Mode: GSM1900 GPRS

**Test Equipment:**

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	93.0	V	19.6	0.9	8.3	27.0	33.0	-6.1	
1.850	96.3	H	22.4	0.9	8.3	29.8	33.0	-3.2	
1.880	93.6	V	19.3	0.9	8.3	26.7	33.0	-6.3	
1.880	96.9	H	22.1	0.9	8.3	29.5	33.0	-3.5	
1.910	94.3	V	21.0	0.9	8.4	28.5	33.0	-4.5	
1.910	95.5	H	22.7	0.9	8.4	30.2	33.0	-2.9	

Rev. 1.24.7

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

<p align="center"><b>High Frequency Fundamental Measurement</b>  <b>Compliance Certification Services, Fremont Chamber A</b></p> <p>Company: Sierra Wireless Inc.  Project #: 07U10871  Date: 2/26/2007  Test Engineer: William Zhuang  Configuration: EUT only  Mode: GSM1900 EGPRS</p> <p><u>Test Equipment:</u>  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</p>									
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
<b>Low Ch</b>									
1.850	91.0	V	17.6	0.9	8.3	25.0	33.0	-8.0	
1.850	93.7	H	19.8	0.9	8.3	27.2	33.0	-5.8	
<b>Mid Ch</b>									
1.880	91.3	V	17.0	0.9	8.3	24.4	33.0	-8.6	
1.880	94.1	H	19.3	0.9	8.3	26.7	33.0	-6.3	
<b>High Ch</b>									
1.910	89.6	V	16.3	0.9	8.4	23.8	33.0	-9.2	
1.910	91.8	H	19.0	0.9	8.4	26.5	33.0	-6.6	
Rev. 1.24.7									

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

<p align="center"><b>High Frequency Fundamental Measurement</b>  Compliance Certification Services, Fremont Chamber A</p> <p>Company:Sierra Wireless Inc.  Project #:07U10871  Date: 2/27/2007  Test Engineer: William Zhuang  Configuration:EUT only  Mode:WCDMA1900 (WCDMA)</p> <p><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</p>									
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
<b>Low Ch</b>									
1.852	90.8	V	17.4	0.9	8.3	24.8	33.0	-8.2	
1.852	91.9	H	17.9	0.9	8.3	25.3	33.0	-7.7	
<b>Mid Ch</b>									
1.880	91.1	V	16.8	0.9	8.3	24.2	33.0	-8.8	
1.880	91.8	H	17.0	0.9	8.3	24.4	33.0	-8.6	
<b>High Ch</b>									
1.908	90.3	V	17.0	0.9	8.4	24.5	33.0	-8.5	
1.908	91.3	H	18.5	0.9	8.4	26.0	33.0	-7.0	
Rev. 1.24.7									

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

**High Frequency Fundamental Measurement  
Compliance Certification Services, Fremont Chamber A**

Company: Sierra Wireless Inc.  
Project #: 07U10871  
Date: 2/27/2007  
Test Engineer: William Zhuang  
Configuration: EUT only  
Mode: WCDMA1900 (HSDPA)

**Test Equipment:**

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
<b>Low Ch</b>									
1.852	92.9	V	19.5	0.9	8.3	26.9	33.0	-6.1	
1.852	93.1	H	19.2	0.9	8.3	26.6	33.0	-6.4	
<b>Mid Ch</b>									
1.880	92.4	V	18.1	0.9	8.3	25.5	33.0	-7.5	
1.880	93.1	H	18.3	0.9	8.3	25.7	33.0	-7.3	
<b>High Ch</b>									
1.908	91.7	V	18.4	0.9	8.4	25.9	33.0	-7.1	
1.908	92.8	H	19.9	0.9	8.4	27.4	33.0	-5.6	

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## 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	29.50	-0.37	0.16
GSM1900 GPRS	20.0	30.20	0.96	0.26
WCDMA+HSPDA Cellar	20.0	25.40	-0.37	0.06
WCDMA+HSPDA PCS	20.0	27.40	0.96	0.14

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, B- 5m Chamber Fremont Site										
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/26/07 Test Engineer: Yu-Chien Ho Configuration: Laptop only. Mode: GSM850, GPRS										
<b>Test Equipment:</b> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 20%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">EMCO Horn 1-18GHz</div> <div style="border: 1px solid black; padding: 2px;">T 73; S/N: 6717 @3m</div> </div> <div style="width: 20%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Horn &gt; 18GHz</div> <div style="border: 1px solid black; padding: 2px;"></div> </div> <div style="width: 15%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Limit</div> <div style="border: 1px solid black; padding: 2px;">FCC 22</div> </div> <div style="width: 15%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><input checked="" type="checkbox"/> High Pass Filter</div> </div> <div style="width: 20%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Hi Frequency Cables</div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div><input type="checkbox"/> (2 ft)</div> <div><input checked="" type="checkbox"/> (2 ~ 3 ft)</div> <div><input type="checkbox"/> (4 ~ 6 ft)</div> <div><input checked="" type="checkbox"/> (12 ft)</div> </div> </div> <div style="width: 15%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Pre-amplifier 1-26GHz</div> <div style="border: 1px solid black; padding: 2px;">T144 Miteq 3008A00</div> </div> <div style="width: 15%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Pre-amplifier 26-40GHz</div> <div style="border: 1px solid black; padding: 2px;"></div> </div> </div>										
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
<b>Low Ch (824.2 MHz)</b>										
1.648	62.6	V	-45.7	4.2	8.0	5.8	-44.0	-13.0	-31.0	
2.473	71.0	V	-33.2	5.2	9.5	7.4	-31.0	-13.0	-18.0	
4.121	55.0	V	-41.2	6.8	9.8	7.7	-40.3	-13.0	-27.3	
5.769	44.3	V	-48.7	8.1	11.7	9.6	-47.3	-13.0	-34.3	
1.648	61.4	H	-46.1	4.2	8.0	5.8	-44.5	-13.0	-31.5	
2.473	64.5	H	-39.4	5.2	9.5	7.4	-37.2	-13.0	-24.2	
3.297	49.4	H	-50.7	6.0	9.8	7.6	-49.1	-13.0	-36.1	
4.945	48.0	H	-46.3	7.5	10.7	8.5	-45.3	-13.0	-32.3	
5.769	48.1	H	-43.9	8.1	11.7	9.6	-42.5	-13.0	-29.5	
<b>Mid Ch (837 MHz)</b>										
1.674	62.6	V	-45.5	4.2	8.0	5.9	-43.8	-13.0	-30.8	
2.511	70.4	V	-33.6	5.2	9.6	7.4	-31.4	-13.0	-18.4	
5.022	48.2	V	-45.0	7.6	10.8	8.6	-44.0	-13.0	-31.0	
1.674	60.8	H	-46.6	4.2	8.0	5.9	-44.9	-13.0	-31.9	
2.511	65.5	H	-38.3	5.2	9.6	7.4	-36.1	-13.0	-23.1	
4.185	47.2	H	-48.6	6.8	9.9	7.7	-47.7	-13.0	-34.7	
5.022	48.0	H	-44.2	7.6	10.8	8.6	-43.2	-13.0	-30.2	
<b>High Ch (848.8 MHz)</b>										
1.698	65.8	V	-42.2	4.2	8.1	5.9	-40.5	-13.0	-27.5	
2.546	70.5	V	-33.3	5.3	9.6	7.4	-31.2	-13.0	-18.2	
4.244	54.7	V	-41.2	6.9	9.9	7.8	-40.3	-13.0	-27.3	
5.093	48.3	V	-44.7	7.7	10.8	8.7	-43.7	-13.0	-30.7	
1.698	61.0	H	-46.3	4.2	8.1	5.9	-44.6	-13.0	-31.6	
2.546	64.0	H	-39.6	5.3	9.6	7.4	-37.5	-13.0	-24.5	
4.244	53.3	H	-42.3	6.9	9.9	7.8	-41.4	-13.0	-28.4	
5.093	48.1	H	-43.9	7.7	10.8	8.7	-42.9	-13.0	-29.9	
Rev. 1.24.7										

# GSM850 EGPRS Spurious & Harmonic (ERP)

High Frequency Substitution Measurement										
Compliance Certification Services, B- 5m Chamber Fremont Site										
Company: Sierra Wireless Inc.										
Project #: 07U10871										
Date: 2/26/07										
Test Engineer: Yu-Chien Ho										
Configuration: Laptop only.										
Mode: GSM850, EGPRS										
Test Equipment:										
EMCO Horn 1-18GHz		Horn > 18GHz		Limit		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 checked="" type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft)				T144 Miteq 3008A01						
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch (824.2 MHz)										
1.648	62.3	V	-46.0	4.2	8.0	5.8	-44.3	-13.0	-31.3	
2.473	71.1	V	-33.1	5.2	9.5	7.4	-30.9	-13.0	-17.9	
4.121	55.7	V	-40.5	6.8	9.8	7.7	-39.6	-13.0	-26.6	
4.945	48.0	V	-46.6	7.5	10.7	8.5	-45.7	-13.0	-32.7	
5.769	48.0	V	-45.0	8.1	11.7	9.6	-43.6	-13.0	-30.6	
1.648	61.2	H	-46.3	4.2	8.0	5.8	-44.7	-13.0	-31.7	
2.473	62.9	H	-41.1	5.2	9.5	7.4	-38.9	-13.0	-25.9	
4.121	54.1	H	-41.7	6.8	9.8	7.7	-40.9	-13.0	-27.9	
4.945	47.5	H	-46.8	7.5	10.7	8.5	-45.8	-13.0	-32.8	
5.769	48.5	H	-43.5	8.1	11.7	9.6	-42.1	-13.0	-29.1	
Mid Ch (837 MHz)										
1.674	62.4	V	-45.7	4.2	8.0	5.9	-44.0	-13.0	-31.0	
2.511	70.4	V	-33.6	5.2	9.6	7.4	-31.4	-13.0	-18.4	
4.185	56.3	V	-39.8	6.8	9.9	7.7	-38.9	-13.0	-25.9	
5.022	48.4	V	-44.8	7.6	10.8	8.6	-43.8	-13.0	-30.8	
5.859	47.9	V	-45.2	8.2	11.9	9.8	-43.6	-13.0	-30.6	
6.696	49.0	V	-42.3	8.6	12.3	10.1	-40.8	-13.0	-27.8	
1.674	61.4	H	-46.0	4.2	8.0	5.9	-44.3	-13.0	-31.3	
2.511	62.0	H	-41.8	5.2	9.6	7.4	-39.6	-13.0	-26.6	
4.185	53.5	H	-42.2	6.8	9.9	7.7	-41.3	-13.0	-28.3	
5.022	48.5	H	-43.7	7.6	10.8	8.6	-42.7	-13.0	-29.7	
High Ch (848.8 MHz)										
1.698	65.8	V	-42.2	4.2	8.1	5.9	-40.5	-13.0	-27.5	
2.546	70.4	V	-33.4	5.3	9.6	7.4	-31.3	-13.0	-18.3	
5.093	47.4	V	-45.6	7.7	10.8	8.7	-44.6	-13.0	-31.6	
5.942	48.4	V	-44.8	8.2	12.1	10.0	-43.0	-13.0	-30.0	
6.790	50.8	V	-40.3	8.7	12.3	10.1	-38.8	-13.0	-25.8	
1.698	62.4	H	-44.9	4.2	8.1	5.9	-43.2	-13.0	-30.2	
2.546	64.1	H	-39.5	5.3	9.6	7.4	-37.4	-13.0	-24.4	
4.244	53.1	H	-42.5	6.9	9.9	7.8	-41.6	-13.0	-28.6	
5.093	47.5	H	-44.5	7.7	10.8	8.7	-43.5	-13.0	-30.5	
Rev. 1.24.7										

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

High Frequency Substitution Measurement											
Compliance Certification Services, B- 5m Chamber Fremont Site											
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/26/07 Test Engineer: Yu-Chien Ho Configuration: Laptop only. Mode: WCDMA850 (WCDMA)											
Test Equipment:											
EMCO Horn 1-18GHz T73; S/N: 6717 @3m			Horn > 18GHz			Limit FCC 22		<input checked="" type="checkbox"/> High Pass Filter			
Hi Frequency Cables <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 T144 Miteq 3008A0		Pre-amplifier 26-40GHz			
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	
<b>Low Ch (826.4 MHz)</b>											
1.653	49.7	V	-58.5	4.2	8.0	5.8	-56.8	-13.0	-43.8		
2.479	46.1	V	-58.0	5.2	9.6	7.4	-55.9	-13.0	-42.9		
3.306	46.2	V	-54.0	6.0	9.8	7.6	-52.4	-13.0	-39.4		
4.132	44.3	V	-51.8	6.8	9.8	7.7	-50.9	-13.0	-37.9		
4.958	44.7	V	-50.0	7.6	10.7	8.5	-49.0	-13.0	-36.0		
1.653	48.5	H	-59.0	4.2	8.0	5.8	-57.3	-13.0	-44.3		
2.479	47.0	H	-56.9	5.2	9.6	7.4	-54.7	-13.0	-41.7		
3.306	46.5	H	-53.6	6.0	9.8	7.6	-52.0	-13.0	-39.0		
4.132	45.0	H	-50.9	6.8	9.8	7.7	-50.0	-13.0	-37.0		
<b>Mid Ch (836.4 MHz)</b>											
1.673	48.3	V	-59.8	4.2	8.0	5.9	-58.2	-13.0	-45.2		
2.509	47.2	V	-56.8	5.2	9.6	7.4	-54.6	-13.0	-41.6		
3.346	46.5	V	-53.5	6.0	9.8	7.6	-52.0	-13.0	-39.0		
4.182	44.9	V	-51.2	6.8	9.9	7.7	-50.3	-13.0	-37.3		
1.673	49.5	H	-58.0	4.2	8.0	5.9	-56.3	-13.0	-43.3		
2.509	47.0	H	-56.8	5.2	9.6	7.4	-54.6	-13.0	-41.6		
3.346	46.1	H	-53.8	6.0	9.8	7.6	-52.2	-13.0	-39.2		
4.182	44.4	H	-51.3	6.8	9.9	7.7	-50.4	-13.0	-37.4		
<b>High Ch (846.6 MHz)</b>											
1.693	47.5	V	-60.5	4.2	8.1	5.9	-58.8	-13.0	-45.8		
2.540	46.4	V	-57.4	5.3	9.6	7.4	-55.3	-13.0	-42.3		
3.386	46.8	V	-52.9	6.1	9.7	7.6	-51.4	-13.0	-38.4		
4.233	44.9	V	-51.1	6.9	9.9	7.8	-50.2	-13.0	-37.2		
1.693	49.3	H	-58.0	4.2	8.1	5.9	-56.3	-13.0	-43.3		
2.540	46.8	H	-56.8	5.3	9.6	7.4	-54.7	-13.0	-41.7		
3.386	46.0	H	-53.7	6.1	9.7	7.6	-52.2	-13.0	-39.2		
4.233	44.7	H	-51.0	6.9	9.9	7.8	-50.1	-13.0	-37.1		
Rev. 1.24.7											

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

High Frequency Substitution Measurement											
Compliance Certification Services, B- 5m Chamber Fremont Site											
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/26/07 Test Engineer: Yu-Chien Ho Configuration: Laptop only. Mode: WCDMA850 (HSDPA)											
<b>Test Equipment:</b>											
EMCO Horn 1-18GHz T 73; S/N: 6717 @3m			Horn > 18GHz			Limit FCC 22		<input checked="" type="checkbox"/> High Pass Filter			
Hi Frequency Cables <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 T144 Miteq 3008A0		Pre-amplifier 26-40GHz			
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes	
<b>Low Ch (826.4 MHz)</b>											
1.653	49.7	V	-58.5	4.2	8.0	5.8	-56.9	-13.0	-43.9		
2.479	46.2	V	-58.0	5.2	9.6	7.4	-55.8	-13.0	-42.8		
3.306	45.4	V	-54.8	6.0	9.8	7.6	-53.2	-13.0	-40.2		
4.132	44.3	V	-51.9	6.8	9.8	7.7	-51.0	-13.0	-38.0		
4.958	44.9	V	-49.7	7.6	10.7	8.5	-48.8	-13.0	-35.8		
1.653	49.4	H	-58.1	4.2	8.0	5.8	-56.5	-13.0	-43.5		
2.479	46.0	H	-57.9	5.2	9.6	7.4	-55.8	-13.0	-42.8		
3.306	45.9	H	-54.2	6.0	9.8	7.6	-52.6	-13.0	-39.6		
4.132	44.3	H	-51.5	6.8	9.8	7.7	-50.6	-13.0	-37.6		
<b>Mid Ch (836.4 MHz)</b>											
1.673	49.0	V	-59.1	4.2	8.0	5.9	-57.4	-13.0	-44.4		
2.509	51.5	V	-52.5	5.2	9.6	7.4	-50.3	-13.0	-37.3		
3.346	45.7	V	-54.3	6.0	9.8	7.6	-52.8	-13.0	-39.8		
4.182	44.5	V	-51.6	6.8	9.9	7.7	-50.7	-13.0	-37.7		
1.673	50.2	H	-57.2	4.2	8.0	5.9	-55.5	-13.0	-42.5		
2.509	46.9	H	-56.9	5.2	9.6	7.4	-54.7	-13.0	-41.7		
3.346	46.5	H	-53.4	6.0	9.8	7.6	-51.9	-13.0	-38.9		
4.182	44.8	H	-50.9	6.8	9.9	7.7	-50.0	-13.0	-37.0		
<b>High Ch (846.6 MHz)</b>											
1.693	48.0	V	-60.0	4.2	8.1	5.9	-58.3	-13.0	-45.3		
2.540	47.5	V	-56.4	5.3	9.6	7.4	-54.2	-13.0	-41.2		
3.386	47.3	V	-52.4	6.1	9.7	7.6	-50.9	-13.0	-37.9		
4.233	44.4	V	-51.5	6.9	9.9	7.8	-50.6	-13.0	-37.6		
1.693	48.0	H	-59.3	4.2	8.1	5.9	-57.6	-13.0	-44.6		
2.540	46.9	H	-56.7	5.3	9.6	7.4	-54.6	-13.0	-41.6		
3.386	46.0	H	-53.7	6.1	9.7	7.6	-52.2	-13.0	-39.2		
4.233	45.4	H	-50.2	6.9	9.9	7.8	-49.3	-13.0	-36.3		
Rev. 1.24.7											

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

High Frequency Substitution Measurement										
Compliance Certification Services, B- 5m Chamber Fremont Site										
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/26/07 Test Engineer: Yu-Chien Ho Configuration: Laptop only. Mode: GSM1900, 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 24						
Hi Frequency Cables <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		Pre-amplifier 26-40GHz								
T144 Mireq 3008A00										
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	48.6	V	-49.5	6.4	9.7	7.6	-46.2	-13.0	-33.2	
5.551	47.3	V	-45.3	8.0	11.3	9.1	-42.1	-13.0	-29.1	
7.401	50.4	V	-40.0	9.0	12.5	10.4	-36.4	-13.0	-23.4	
9.251	50.5	V	-38.0	10.1	13.0	10.8	-35.2	-13.0	-22.2	
11.101	49.5	V	-33.8	12.2	13.8	11.7	-32.2	-13.0	-19.2	
3.700	48.4	H	-49.6	6.4	9.7	7.6	-46.3	-13.0	-33.3	
5.551	48.0	H	-43.7	8.0	11.3	9.1	-40.4	-13.0	-27.4	
7.401	50.4	H	-39.2	9.0	12.5	10.4	-35.6	-13.0	-22.6	
11.101	50.7	H	-32.0	12.2	13.8	11.7	-30.4	-13.0	-17.4	
<b>Mid Ch (1.88 GHz)</b>										
3.760	47.9	V	-49.9	6.4	9.7	7.6	-46.6	-13.0	-33.6	
5.640	47.5	V	-45.4	8.1	11.5	9.3	-42.0	-13.0	-29.0	
7.520	51.2	V	-39.1	9.1	12.6	10.5	-35.5	-13.0	-22.5	
9.400	50.8	V	-37.5	10.3	13.0	10.9	-34.8	-13.0	-21.8	
11.280	50.1	V	-32.6	12.4	13.9	11.7	-31.2	-13.0	-18.2	
3.760	49.3	H	-48.4	6.4	9.7	7.6	-45.1	-13.0	-32.1	
5.640	48.5	H	-43.3	8.1	11.5	9.3	-39.9	-13.0	-26.9	
7.520	50.7	H	-38.8	9.1	12.6	10.5	-35.2	-13.0	-22.2	
9.400	49.9	H	-38.4	10.3	13.0	10.9	-35.7	-13.0	-22.7	
<b>High Ch (1.9098 GHz)</b>										
3.820	48.1	V	-49.4	6.5	9.7	7.5	-46.2	-13.0	-33.2	
5.729	47.8	V	-45.2	8.1	11.7	9.5	-41.6	-13.0	-28.6	
7.639	50.9	V	-39.3	9.1	12.7	10.5	-35.7	-13.0	-22.7	
9.549	50.4	V	-37.7	10.5	13.1	11.0	-35.0	-13.0	-22.0	
3.820	49.6	H	-47.8	6.5	9.7	7.5	-44.6	-13.0	-31.6	
5.729	47.9	H	-44.1	8.1	11.7	9.5	-40.5	-13.0	-27.5	
7.639	51.2	H	-38.2	9.1	12.7	10.5	-34.6	-13.0	-21.6	
9.549	49.4	H	-38.7	10.5	13.1	11.0	-36.0	-13.0	-23.0	
Rev. 1.24.7										

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

High Frequency Substitution Measurement										
Compliance Certification Services, B- 5m Chamber Fremont Site										
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/26/07 Test Engineer: Yu-Chien Ho Configuration: Laptop only. Mode: GSM1900, EGPRS										
Test Equipment:										
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Horn > 18GHz		Limit FCC 24		<input checked="" type="checkbox"/> High Pass Filter				
Hi Frequency Cables <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 T144 Miteq 3008A0		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	48.9	V	-49.2	6.4	9.7	7.6	-45.9	-13.0	-32.9	
5.551	47.7	V	-45.0	8.0	11.3	9.1	-41.7	-13.0	-28.7	
7.401	50.9	V	-39.5	9.0	12.5	10.4	-35.9	-13.0	-22.9	
9.251	50.8	V	-37.7	10.1	13.0	10.8	-34.9	-13.0	-21.9	
11.101	49.7	V	-33.6	12.2	13.8	11.7	-32.0	-13.0	-19.0	
5.551	48.3	H	-43.4	8.0	11.3	9.1	-40.1	-13.0	-27.1	
7.401	51.0	H	-38.6	9.0	12.5	10.4	-35.0	-13.0	-22.0	
9.251	50.9	H	-37.6	10.1	13.0	10.8	-34.8	-13.0	-21.8	
11.101	51.5	H	-31.2	12.2	13.8	11.7	-29.6	-13.0	-16.6	
<b>Mid Ch (1.88 GHz)</b>										
3.760	48.2	V	-49.6	6.4	9.7	7.6	-46.3	-13.0	-33.3	
5.640	47.2	V	-45.6	8.1	11.5	9.3	-42.2	-13.0	-29.2	
7.520	51.5	V	-38.8	9.1	12.6	10.5	-35.2	-13.0	-22.2	
9.400	50.5	V	-37.8	10.3	13.0	10.9	-35.1	-13.0	-22.1	
11.280	50.4	V	-32.3	12.4	13.9	11.7	-30.9	-13.0	-17.9	
5.640	48.8	H	-43.0	8.1	11.5	9.3	-39.6	-13.0	-26.6	
7.520	50.4	H	-39.1	9.1	12.6	10.5	-35.5	-13.0	-22.5	
9.400	50.2	H	-38.1	10.3	13.0	10.9	-35.4	-13.0	-22.4	
11.280	50.9	H	-31.2	12.4	13.9	11.7	-29.8	-13.0	-16.8	
<b>High Ch (1.9098 GHz)</b>										
3.820	48.4	V	-49.1	6.5	9.7	7.5	-45.9	-13.0	-32.9	
5.729	47.2	V	-45.8	8.1	11.7	9.5	-42.3	-13.0	-29.3	
7.639	51.3	V	-38.8	9.1	12.7	10.5	-35.3	-13.0	-22.3	
9.549	49.6	V	-38.5	10.5	13.1	11.0	-35.8	-13.0	-22.8	
3.820	49.3	H	-48.1	6.5	9.7	7.5	-44.9	-13.0	-31.9	
5.729	48.2	H	-43.8	8.1	11.7	9.5	-40.3	-13.0	-27.3	
7.639	50.9	H	-38.4	9.1	12.7	10.5	-34.9	-13.0	-21.9	
9.549	49.7	H	-38.4	10.5	13.1	11.0	-35.7	-13.0	-22.7	
11.459	51.4	H	-30.1	12.6	13.9	11.8	-28.8	-13.0	-15.8	
Rev. 1.24.7										



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

High Frequency Substitution Measurement										
Compliance Certification Services, B- 5m Chamber Fremont Site										
Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/27/07 Test Engineer: William Zhuang Configuration: Laptop only. Mode: WCDMA1900, WCDMA										
<b>Test Equipment:</b>										
EMCO Horn 1-18GHz		Horn > 18GHz		Limit		<input checked="" type="checkbox"/> High Pass Filter				
T 73; S/N: 6717 @3m				FCC 24						
Hi Frequency Cables <input checked="" type="checkbox"/> (2 ft) <input type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft)				Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz				
				T144 Miteq 3008A01						
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 (1.8524 GHz)</b>										
3.705	49.1	V	-48.9	6.4	9.7	7.6	-45.6	-13.0	-32.6	
5.557	43.8	V	-48.7	8.1	11.3	9.1	-45.5	-13.0	-32.5	
3.705	45.4	H	-52.6	6.4	9.7	7.6	-49.3	-13.0	-36.3	
5.557	43.4	H	-48.1	8.1	11.3	9.1	-44.9	-13.0	-31.9	
<b>Mid Ch (1.88 GHz)</b>										
3.760	48.3	V	-49.5	6.5	9.7	7.6	-46.2	-13.0	-33.2	
5.640	43.5	V	-49.1	8.1	11.5	9.3	-45.8	-13.0	-32.8	
3.760	45.7	H	-51.9	6.5	9.7	7.6	-48.7	-13.0	-35.7	
5.640	43.9	H	-47.8	8.1	11.5	9.3	-44.5	-13.0	-31.5	
<b>High Ch (1.9076 GHz)</b>										
3.815	60.9	V	-36.6	6.5	9.7	7.5	-33.4	-13.0	-20.4	
5.723	44.2	V	-48.7	8.2	11.6	9.5	-45.2	-13.0	-32.2	
3.815	52.9	H	-44.4	6.5	9.7	7.5	-41.2	-13.0	-28.2	
5.723	44.2	H	-47.6	8.2	11.6	9.5	-44.2	-13.0	-31.2	
Rev. 1.24.7										

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

<b>High Frequency Substitution Measurement</b> Compliance Certification Services, B- 5m Chamber Fremont Site  Company: Sierra Wireless Inc. Project #: 07U10871 Date: 2/27/07 Test Engineer: William Zhuang Configuration: Laptop only. Mode: WCDMA1900, HSDPA										
<b>Test Equipment:</b>										
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Horn > 18GHz		Limit FCC 24		<input checked="" type="checkbox"/> High Pass Filter				
Hi Frequency Cables <input checked="" type="checkbox"/> (2 ft) <input type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft)				Pre-amplifier 1-26GHz T144 Miteq 3008A0(		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
Low Ch (1.8524 GHz)										
3.705	48.8	V	-49.3	6.4	9.7	7.6	-46.0	-13.0	-33.0	
5.557	43.6	V	-48.9	8.1	11.3	9.1	-45.7	-13.0	-32.7	
3.705	46.5	H	-51.5	6.4	9.7	7.6	-48.2	-13.0	-35.2	
5.557	43.8	H	-47.7	8.1	11.3	9.1	-44.5	-13.0	-31.5	
Mid Ch (1.88 GHz)										
3.760	49.9	V	-47.9	6.5	9.7	7.6	-44.6	-13.0	-31.6	
5.640	44.2	V	-48.4	8.1	11.5	9.3	-45.1	-13.0	-32.1	
3.760	46.0	H	-51.7	6.5	9.7	7.6	-48.4	-13.0	-35.4	
5.640	43.9	H	-47.8	8.1	11.5	9.3	-44.4	-13.0	-31.4	
High Ch (1.9076 GHz)										
3.815	61.4	V	-36.1	6.5	9.7	7.5	-32.9	-13.0	-19.9	
5.723	45.3	V	-47.6	8.2	11.6	9.5	-44.1	-13.0	-31.1	
3.815	53.9	H	-43.4	6.5	9.7	7.5	-40.2	-13.0	-27.2	
5.723	44.3	H	-47.5	8.2	11.6	9.5	-44.1	-13.0	-31.1	
Rev. 1.24.7										