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

850/900/1800/1900MHz MULTI-BAND MODULE

MODEL NUMBER: MC8775

FCC ID: N7NMC8775-L

REPORT NUMBER: 07U10924-1

ISSUE DATE: MARCH 28, 2007

Prepared for
SIERRA WIRELESS
2290 COSMOS CT.
CARLSBAD, CA 92010, USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	03/28/07	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS
2290 COSMOS CT.
CARLSBAD, CA 92010, USA

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

MODEL: MC8775

SERIAL NUMBER: ZZF5307

DATE TESTED: FEBRUARY 16-19, 2007

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

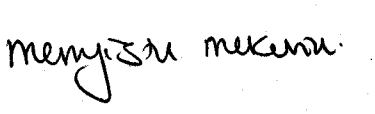
Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MENGISTU MEKURIA
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 and manufactured by Sierra Wireless, Inc.

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

Collocate the MC8775 with Bluetooth radio FCC ID: MCLJ07H081 in a new host laptop.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak ERP & 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	26.90	489.78
824.2 - 848.75	EGPRS	25.50	354.81
826.5 - 846.6	WCDMA	22.80	190.55
826.5 - 846.6	WCDMA+HSPDA	23.50	223.87

Frequency Range (MHz)	Modulation	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
1850.25 - 1909.8	GPRS	30.00	1000.00
1850.25 - 1909.8	EGPRS	27.50	562.34
1852.4 - 1907.6	WCDMA	26.10	407.38
1852.4 - 1907.6	WCDMA+HSPDA	26.70	467.74

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an inverted F antenna with a maximum gain of 3.01dBi for Cellular and 3.32dBi PCS bands.

5.5. SOFTWARE AND FIRMWARE

The following settings were used to configure the Wireless Communications Test Set, Agilent 8960 Series 10, E5515C.

Instrument information: (by press SYSTEM CONFIG)

Application: WCDMA Lap App C
E6703C C.03.11
Format: WCDMA

Call Control: (by press CALL SETUP)

2 of 4 Cell Parameters: PS Domain Information > Present
ATT (IMSI Attach) Flag State > Set
4 of 4 Security Info: Security Parameter - System Operations > None

Call Parms: (by press CALL SETUP)
1 of 3
Channel Type: 12.2k RMC
Paging Service: RB Test Mode

HSDPA Parameters:
1 of 2
HSDPA RB Test Mode Setup
FRC Type > H-Set 5 QPSK
CN Domain > PS Domain

Uplink 64k DTCH for HSDPA Loopback State > On
HS-DSCH Data Pattern > CCITT PRBS15
RLC Header on HS-DSCH > Present

Channel (UARFCN) Parms: DL Channel: 4357 / 4407 / 4458
UL Channel: 4132 / 4182 / 4233
UL Sep (Band) > 400MHz (Band 4)
Freq Bnad Ind > On
2 of 3
DL DTCH Data: CCITT PRBS15
RLC Reestablish: Off
Call Limit State: Off
Call Drop Timer: Off
SRB Config.: 13.6k DCCH
3 of 3
UE Target Power: -5 dBm
UL CL Pwr Ctrl Parms: Active bits (Select “All Up bits” after linked to get maximum power)

DL Channel: 9662 / 9800 / 9938 / 4357 / 4407 / 4458

UL Channel: 9262 / 9400 / 9538 / 4132 / 4182 / 4233

5.6. WORST-CASE CONFIGURATION AND MODE

Based on previous experiment, GPRS has the worst case between GSM & GPRS modulations, and the worst case on HSPDA mode for WCDMA modulation.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop Computer	Lenovo	ThinkPad T61/R61 14.1-inch widescreen	ZZF5305	N/A
AC Adapter	Lenovo	92P1111	11S92P1111Z1ZACV505023 Rev E	DoC

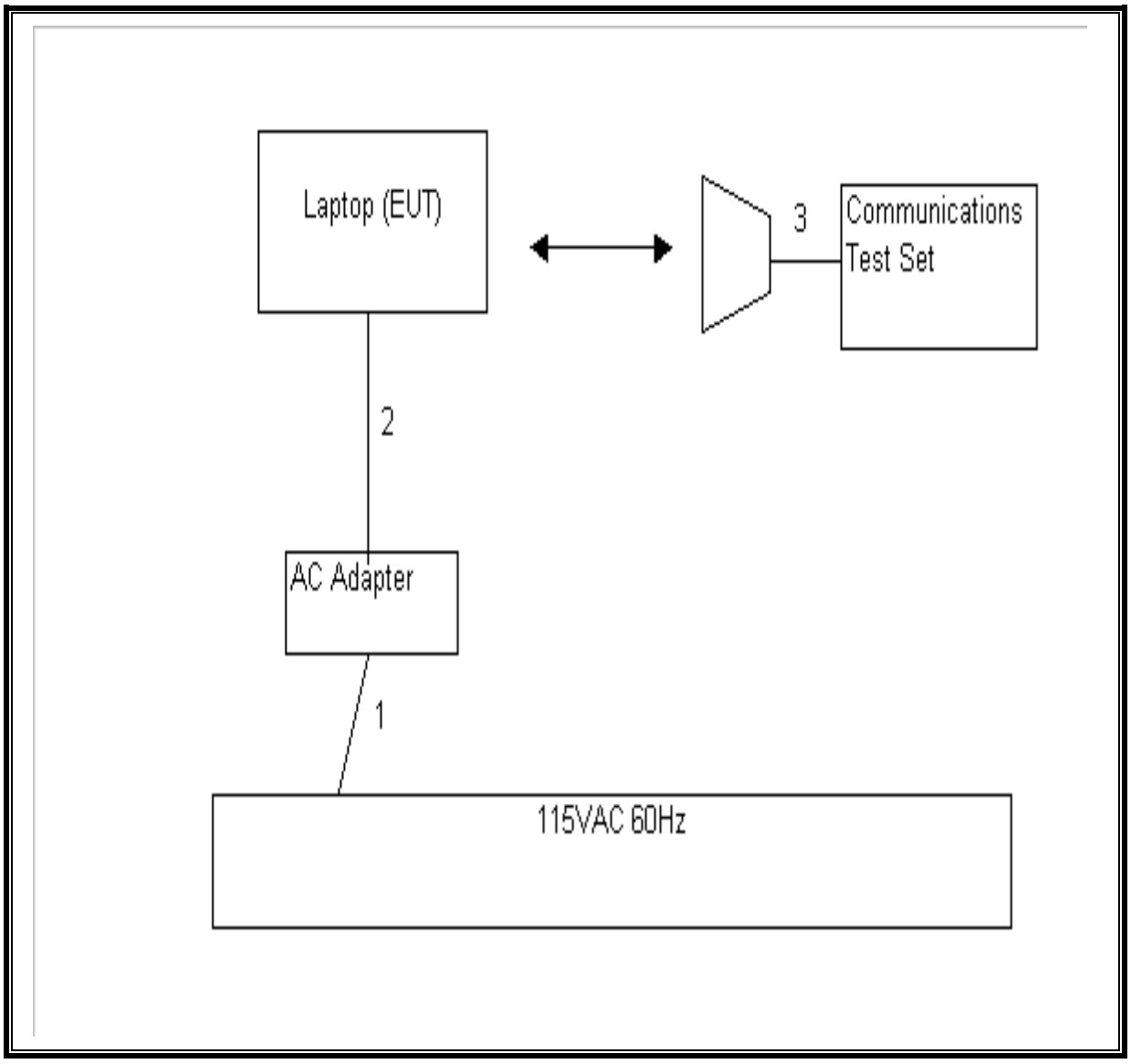
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US115V	Un-shielded	1.5m	N/A
2	DC	1	DC	Un-shielded	1.5m	Ferrite on Laptop End
3	RF In/Out	1	N-Type	Shielded	1m	N/A

TEST SETUP

The EUT is installed into a ThinkPad T61/R61 14.1-inch widescreen laptop computer system during the tests. The EUT is linked with Agilent Communication Test Set.

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, 1.8 GHz	Agilent / HP	8591A	3009A00791	10/12/07
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	08/13/07
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	01/23/08
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/07
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00369	08/01/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/07
2.7GHz HPF	MicroTronic	HPM13194	2	CNR
1.5GHz HPF	MicroTronic	HPM13195	1	CNR
Communication Test Set	Agilent	E5515C	91936	04/08/07
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	05/07/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/07

7. LIMITS AND RESULTS

7.1. RADIATED RF POWER OUTPUT

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
The transmitter output is connected to the spectrum analyzer.

RESULTS

No non-compliance noted.

850MHZ GPRS

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	25.70	371.54
Middle	836.52	26.20	416.87
High	848.8	26.90	489.78

1900 MHz GPRS

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	30.00	1000.00
Middle	1880.00	29.30	851.14
High	1909.75	29.40	870.96

NOTE: RBW=VBW=3MHz

850MHz EDGE

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.2	23.80	239.88
Middle	836.52	24.30	269.15
High	848.8	25.50	354.81

1900MHz EDGE

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1850.2	27.50	562.34
Middle	1880.00	26.90	489.78
High	1909.75	27.30	537.03

850MHz WCDMA

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	826.5	22.40	173.78
Middle	837	22.80	190.55
High	848.8	22.30	169.82

1900MHz WCDMA

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1852.4	26.10	407.38
Middle	1880.00	25.30	338.84
High	1907.6	24.80	302.00

NOTE: RBW=VBW=3MHz

850MHz WCDMA_HSPDA

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	826.5	23.10	204.17
Middle	837	23.40	218.78
High	848.8	23.50	223.87

1900MHz WCDMA+HSPDA

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1852.4	26.70	467.74
Middle	1880.00	26.30	426.58
High	1907.6	26.20	416.87

GSM850 GPRS

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/16/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz GPRS

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	99.8	V	26.2	0.5	0.0	25.7	38.5	-12.8	
824.20	99.7	H	24.4	0.5	0.0	23.9	38.5	-14.5	
837.00	99.8	V	26.8	0.6	0.0	26.2	38.5	-12.2	
837.00	100.1	H	25.0	0.6	0.0	24.4	38.5	-14.0	
848.80	100.8	V	27.6	0.7	0.0	26.9	38.5	-11.5	
848.80	100.7	H	25.2	0.7	0.0	24.5	38.5	-14.0	

Rev. 1.24.7

GSM850 EGPRS

High Frequency Substitution Measurement
Compliance Certification Services, Fremontl 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/16/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz 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	97.9	V	24.3	0.5	0.0	23.8	38.5	-14.7	
824.20	98.1	H	22.8	0.5	0.0	22.3	38.5	-16.2	
837.00	97.9	V	24.9	0.6	0.0	24.3	38.5	-14.2	
837.00	98.6	H	23.5	0.6	0.0	22.9	38.5	-15.6	
848.80	99.4	V	26.2	0.7	0.0	25.5	38.5	-13.0	
848.80	99.2	H	23.7	0.7	0.0	23.0	38.5	-15.4	

Rev. 1.24.7

WCDMA850_12.2K RMC

High Frequency Substitution Measurement
Compliance Certification Services, Fremontl 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz WCDMA

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
826.40	96.5	V	22.9	0.5	0.0	22.4	38.5	-16.0	
826.40	95.1	H	19.8	0.5	0.0	19.3	38.5	-19.1	
836.40	96.4	V	23.4	0.6	0.0	22.8	38.5	-15.6	
836.40	95.7	H	20.6	0.6	0.0	20.0	38.5	-18.5	
846.60	96.2	V	23.0	0.7	0.0	22.3	38.5	-16.1	
846.60	94.6	H	19.1	0.7	0.0	18.4	38.5	-20.0	

Rev. 1.24.7

WCDMA850_+ HSDPA

High Frequency Substitution Measurement
Compliance Certification Services, Fremont 5m Chamber Site

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz WCDMA + H

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
826.40	97.2	V	23.6	0.5	0.0	23.1	38.5	-15.3	
826.40	95.1	H	19.8	0.5	0.0	19.3	38.5	-19.1	
836.40	97.0	V	24.0	0.6	0.0	23.4	38.5	-15.0	
836.40	95.7	H	20.6	0.6	0.0	20.0	38.5	-18.5	
846.60	97.4	V	24.2	0.7	0.0	23.5	38.5	-14.9	
846.60	96.0	H	20.5	0.7	0.0	19.8	38.5	-18.6	

Rev. 1.24.7

GSM1900, GPRS

High Frequency Fundamental Measurement
Compliance Certification Services, Fremont 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/16/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz 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	96.0	V	22.6	0.9	8.3	30.0	33.0	-3.1	
1.850	93.4	H	19.5	0.9	8.3	26.9	33.0	-6.1	
1.880	96.2	V	21.9	0.9	8.3	29.3	33.0	-3.7	
1.880	93.5	H	18.7	0.9	8.3	26.1	33.0	-6.9	
1.910	95.2	V	21.9	0.9	8.4	29.4	33.0	-3.6	
1.910	92.0	H	19.2	0.9	8.4	26.7	33.0	-6.4	

Rev. 1.24.7

GSM1900, EGPRS

High Frequency Fundamental Measurement
Compliance Certification Services,Fremont 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/16/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz EGPRS

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	93.5	V	20.1	0.9	8.3	27.5	33.0	-5.5	
1.850	90.1	H	16.1	0.9	8.3	23.5	33.0	-9.5	
1.880	93.8	V	19.5	0.9	8.3	26.9	33.0	-6.1	
1.880	88.2	H	13.4	0.9	8.3	20.8	33.0	-12.2	
1.910	93.1	V	19.8	0.9	8.4	27.3	33.0	-5.7	
1.910	87.9	H	15.1	0.9	8.4	22.6	33.0	-10.4	

Rev. 1.24.7

WCDMA1900_12.2K RMC

High Frequency Fundamental Measurement
Compliance Certification Services, Fremont 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz WCDMA

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
1.852	92.1	V	18.7	0.9	8.3	26.1	33.0	-6.9	
1.852	90.6	H	16.7	0.9	8.3	24.1	33.0	-8.9	
1.880	92.1	V	17.8	0.9	8.3	25.3	33.0	-7.7	
1.880	89.6	H	14.8	0.9	8.3	22.3	33.0	-10.7	
1.908	90.6	V	17.3	0.9	8.4	24.8	33.0	-8.2	
1.908	87.9	H	15.0	0.9	8.4	22.5	33.0	-10.5	

Rev. 1.24.7

WCDMA1900 +HSDPA

High Frequency Fundamental Measurement
Compliance Certification Services, Fremont 5m Chamber B

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz WCDMA + H

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
1.852	92.7	V	19.3	0.9	8.3	26.7	33.0	-6.3	
1.852	90.9	H	17.0	0.9	8.3	24.4	33.0	-8.6	
1.880	93.2	V	18.9	0.9	8.3	26.3	33.0	-6.7	
1.880	91.0	H	16.2	0.9	8.3	23.6	33.0	-9.4	
1.908	92.0	V	18.7	0.9	8.4	26.2	33.0	-6.8	
1.908	89.7	H	16.9	0.9	8.4	24.4	33.0	-8.7	

Rev. 1.24.7

7.1.1. 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.

Note: No emissions were found within 30-1000MHz & after the third harmonic of 20dB below the system noise.

GSM850 GPRS

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz GPRS

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
1.698	61.5	V	-44.3	3.9	8.1	5.9	-42.3	-13.0	-29.3	
2.546	59.8	V	-42.4	4.9	9.6	7.4	-39.9	-13.0	-26.9	
4.244	46.7	V	-48.4	6.4	9.9	7.8	-47.0	-13.0	-34.0	
1.698	58.7	H	-46.3	3.9	8.1	5.9	-44.3	-13.0	-31.3	
2.546	60.5	H	-41.4	4.9	9.6	7.4	-39.0	-13.0	-26.0	
4.244	44.4	H	-50.4	6.4	9.9	7.8	-49.0	-13.0	-36.0	
Mid Ch										
1.674	57.7	V	-48.2	3.9	8.0	5.9	-46.2	-13.0	-33.2	
2.511	57.8	V	-44.5	4.9	9.6	7.4	-42.0	-13.0	-29.0	
4.185	50.6	V	-44.6	6.4	9.9	7.7	-43.2	-13.0	-30.2	
1.674	55.5	H	-49.7	3.9	8.0	5.9	-47.7	-13.0	-34.7	
2.511	57.2	H	-44.9	4.9	9.6	7.4	-42.4	-13.0	-29.4	
4.185	52.9	H	-42.0	6.4	9.9	7.7	-40.6	-13.0	-27.6	
Low Ch										
1.648	56.5	V	-49.5	3.8	8.0	5.8	-47.5	-13.0	-34.5	
2.473	56.6	V	-45.9	4.9	9.5	7.4	-43.4	-13.0	-30.4	
4.121	53.9	V	-41.4	6.3	9.8	7.7	-40.0	-13.0	-27.0	
1.648	51.4	H	-53.9	3.8	8.0	5.8	-51.9	-13.0	-38.9	
2.473	58.6	H	-43.6	4.9	9.5	7.4	-41.1	-13.0	-28.1	
4.121	54.9	H	-40.1	6.3	9.8	7.7	-38.7	-13.0	-25.7	

Rev. 5.1.6

GSM850 EGPRS

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz EGPRS

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
1.698	57.6	V	-48.2	3.9	8.1	5.9	-46.1	-13.0	-33.1	
2.546	58.2	V	-44.0	4.9	9.6	7.4	-41.5	-13.0	-28.5	
4.244	45.5	V	-49.6	6.4	9.9	7.8	-48.2	-13.0	-35.2	
1.698	55.0	H	-50.0	3.9	8.1	5.9	-48.0	-13.0	-35.0	
2.546	57.6	H	-44.3	4.9	9.6	7.4	-41.8	-13.0	-28.8	
4.244	47.7	H	-47.0	6.4	9.9	7.8	-45.7	-13.0	-32.7	
Mid Ch										
1.674	56.0	V	-49.9	3.9	8.0	5.9	-47.9	-13.0	-34.9	
2.511	55.3	V	-47.0	4.9	9.6	7.4	-44.5	-13.0	-31.5	
4.185	49.5	V	-45.7	6.4	9.9	7.7	-44.3	-13.0	-31.3	
1.674	53.3	H	-51.9	3.9	8.0	5.9	-49.9	-13.0	-36.9	
2.511	55.9	H	-46.2	4.9	9.6	7.4	-43.7	-13.0	-30.7	
4.185	47.7	H	-47.2	6.4	9.9	7.7	-45.8	-13.0	-32.8	
Low Ch										
1.648	54.6	V	-51.4	3.8	8.0	5.8	-49.4	-13.0	-36.4	
2.473	54.3	V	-48.2	4.9	9.5	7.4	-45.6	-13.0	-32.6	
4.121	51.8	V	-43.5	6.3	9.8	7.7	-42.1	-13.0	-29.1	
1.648	53.2	H	-52.1	3.8	8.0	5.8	-50.1	-13.0	-37.1	
2.473	53.6	H	-48.7	4.9	9.5	7.4	-46.2	-13.0	-33.2	
4.121	53.0	H	-42.0	6.3	9.8	7.7	-40.6	-13.0	-27.6	

Rev. 5.1.6

WCDMA850

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz WCDMA

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
1.693	46.9	V	-58.9	3.9	8.1	5.9	-56.9	-13.0	-43.9	
1.693	45.2	H	-59.8	3.9	8.1	5.9	-57.8	-13.0	-44.8	
Mid Ch										
1.673	47.9	V	-57.9	3.9	8.0	5.9	-55.9	-13.0	-42.9	
1.673	46.0	H	-59.2	3.9	8.0	5.9	-57.2	-13.0	-44.2	
Low Ch										
1.653	51.1	V	-54.9	3.8	8.0	5.8	-52.9	-13.0	-39.9	
1.653	48.6	H	-56.7	3.8	8.0	5.8	-54.7	-13.0	-41.7	

Rev. 5.1.6

WCDMA850+HSDPA

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 850MHz WCDMA + HSDPA

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
1.693	47.3	V	-58.5	3.9	8.1	5.9	-56.5	-13.0	-43.5	
1.693	46.8	H	-58.3	3.9	8.1	5.9	-56.2	-13.0	-43.2	
Mid Ch										
1.673	48.7	V	-57.2	3.9	8.0	5.9	-55.2	-13.0	-42.2	
1.673	47.9	H	-57.3	3.9	8.0	5.9	-55.3	-13.0	-42.3	
Low Ch										
1.653	50.2	V	-55.8	3.8	8.0	5.8	-53.8	-13.0	-40.8	
1.653	52.8	H	-52.5	3.8	8.0	5.8	-50.5	-13.0	-37.5	

Rev. 5.1.6

GSM1900 GPRS

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz GPRS

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
5.729	42.4	V	-50.5	7.5	11.7	9.5	-46.3	-13.0	-33.3	
5.729	42.9	H	-49.0	7.5	11.7	9.5	-44.8	-13.0	-31.8	
Mid Ch										
3.760	45.0	V	-51.8	6.0	9.7	7.6	-48.1	-13.0	-35.1	
3.760	46.5	H	-50.2	6.0	9.7	7.6	-46.5	-13.0	-33.5	
Low Ch										
3.700	45.5	V	-51.6	5.9	9.7	7.6	-47.8	-13.0	-34.8	
5.551	42.5	V	-50.0	7.4	11.3	9.1	-46.1	-13.0	-33.1	
3.700	46.1	H	-50.9	5.9	9.7	7.6	-47.1	-13.0	-34.1	
5.551	42.3	H	-49.1	7.4	11.3	9.1	-45.3	-13.0	-32.3	

Rev. 5.1.6

GSM1900 EGPRS

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/17/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz EGPRS

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Hi Ch										
5.729	42.9	V	-50.0	7.5	11.7	9.5	-45.8	-13.0	-32.8	
5.729	42.2	H	-49.7	7.5	11.7	9.5	-45.6	-13.0	-32.6	
Mid Ch										
3.760	46.9	V	-49.9	6.0	9.7	7.6	-46.2	-13.0	-33.2	
3.760	47.8	H	-48.9	6.0	9.7	7.6	-45.2	-13.0	-32.2	
Low Ch										
3.700	43.3	V	-53.8	5.9	9.7	7.6	-50.0	-13.0	-37.0	
3.700	44.8	H	-52.2	5.9	9.7	7.6	-48.4	-13.0	-35.4	

Rev. 5.1.6

WCDMA1900

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz WCDMA

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Mid Ch										
3.815	72.5	V	-24.0	6.0	9.7	7.5	-20.3	-13.0	-7.3	
3.815	69.7	H	-26.7	6.0	9.7	7.5	-23.0	-13.0	-10.0	
Mid Ch										
3.760	56.2	V	-40.6	6.0	9.7	7.6	-36.9	-13.0	-23.9	
3.760	53.8	H	-42.8	6.0	9.7	7.6	-39.1	-13.0	-26.1	
Low Ch										
3.705	51.2	V	-45.9	5.9	9.7	7.6	-42.1	-13.0	-29.1	
5.557	46.6	V	-45.8	7.4	11.3	9.1	-42.0	-13.0	-29.0	
3.705	51.4	H	-45.5	5.9	9.7	7.6	-41.7	-13.0	-28.7	
5.557	42.4	H	-49.0	7.4	11.3	9.1	-45.1	-13.0	-32.1	

Rev. 5.1.6

WCDMA1900+HSDPA

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

Company: Sierra Wireless Inc.
Project #: 07U10924
Date: 03/18/2007
Test Engineer: Mengistu Mekuria
Configuration: EUT Alone
Mode: Tx 1900MHz WCDMA + HSDPA

Test Equipment:

EMCO Horn 1-18GHz: T73; 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-amplifer 1-26GHz: T145 Agilent 3008A
Pre-amplifer 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
Mid Ch										
3.815	77.6	V	-18.0	6.5	9.7	7.5	-14.8	-13.0	-1.8	
3.815	69.9	H	-25.6	6.5	9.7	7.5	-22.4	-13.0	-9.4	
Mid Ch										
3.760	57.8	V	-38.1	6.4	9.7	7.6	-34.8	-13.0	-21.8	
3.760	54.2	H	-41.6	6.4	9.7	7.6	-38.3	-13.0	-25.3	
Low Ch										
3.705	52.7	V	-43.4	6.4	9.7	7.6	-40.1	-13.0	-27.1	
5.557	47.2	V	-44.0	8.0	11.3	9.1	-40.8	-13.0	-27.8	
3.705	52.6	H	-43.5	6.4	9.7	7.6	-40.2	-13.0	-27.2	
5.557	43.3	H	-46.9	8.0	11.3	9.1	-43.6	-13.0	-30.6	

Rev. 5.1.6

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^2)	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	*($900/f^2$)	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	*($180/f^2$)	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^2)	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 (mW) = P (W) / 1000 and
d (cm) =100 * d (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^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

yields

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

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

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

LIMITS

From §1.1310 Table 1 (B), S = 1.0 mW/cm^2

RESULTS

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

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)
GSM850 GPRS	20.0	26.90	3.01	0.19
GSM850 EGPRS	20.0	25.50	3.01	0.14
WCDMA850	20.0	22.80	3.01	0.08
WCDMA850+HSPDA	20.0	23.50	3.01	0.09
GSM1900 GPRS	20.0	30.00	3.32	0.43
GSM1900 EGPRS	20.0	27.50	3.32	0.24
WCDMA1900	20.0	26.10	3.32	0.17
WCDMA1900+HSPDA	20.0	26.70	3.32	0.20

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.