



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

EXPRESS MINI-PCI USB WIRELESS CDMA MODEM MODULE

MODEL NUMBER: MC5720

FCC ID: N7N-MC5720

REPORT NUMBER: 06U10026-1

ISSUE DATE: FEBRUARY 10, 2006

Prepared for
**SIERRA WIRELESS
2290 COSMOS CT.
CARLSBAD, CA 92009, USA**

Prepared by
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS
2290 COSMOS CT.
CARLSBAD CALIFORNIA 92009
U.S.A

EUT DESCRIPTION: EXPRESS MINI-PCI USB WIRELESS CDMA MODEM MODULE

MODEL: MC5720

SERIAL NUMBER: AAGH349

DATE TESTED: JANUARY 23-24, 2006

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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EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

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EMC ENGINEER
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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 561F Monterey Road, Morgan Hill, 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 a dual band 800 / 1900MHz Express Mini-PCI USB Wireless CDMA Modem Module, and manufactured by Sierra Wireless, Inc.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

Add one Laptop of ThinkPad X60 series.

5.3. MAXIMUM OUTPUT POWER

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

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

Frequency Range (MHz)	Modulation	ERP Peak Power (dBm)	ERP Peak Power (mW)
824.7 - 848.31	CDMA	22.40	173.78

Frequency Range (MHz)	Modulation	ERP Peak Power (dBm)	ERP Peak Power (mW)
1851.25 - 1908.75	CDMA	26.70	467.74

NOTE: RBW=VBW=3MHz

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -0.59 dBi for Cellular band and 1.92 dBi for PCS band.

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was Hyperterminal.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is used same as previous project 05U3389.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

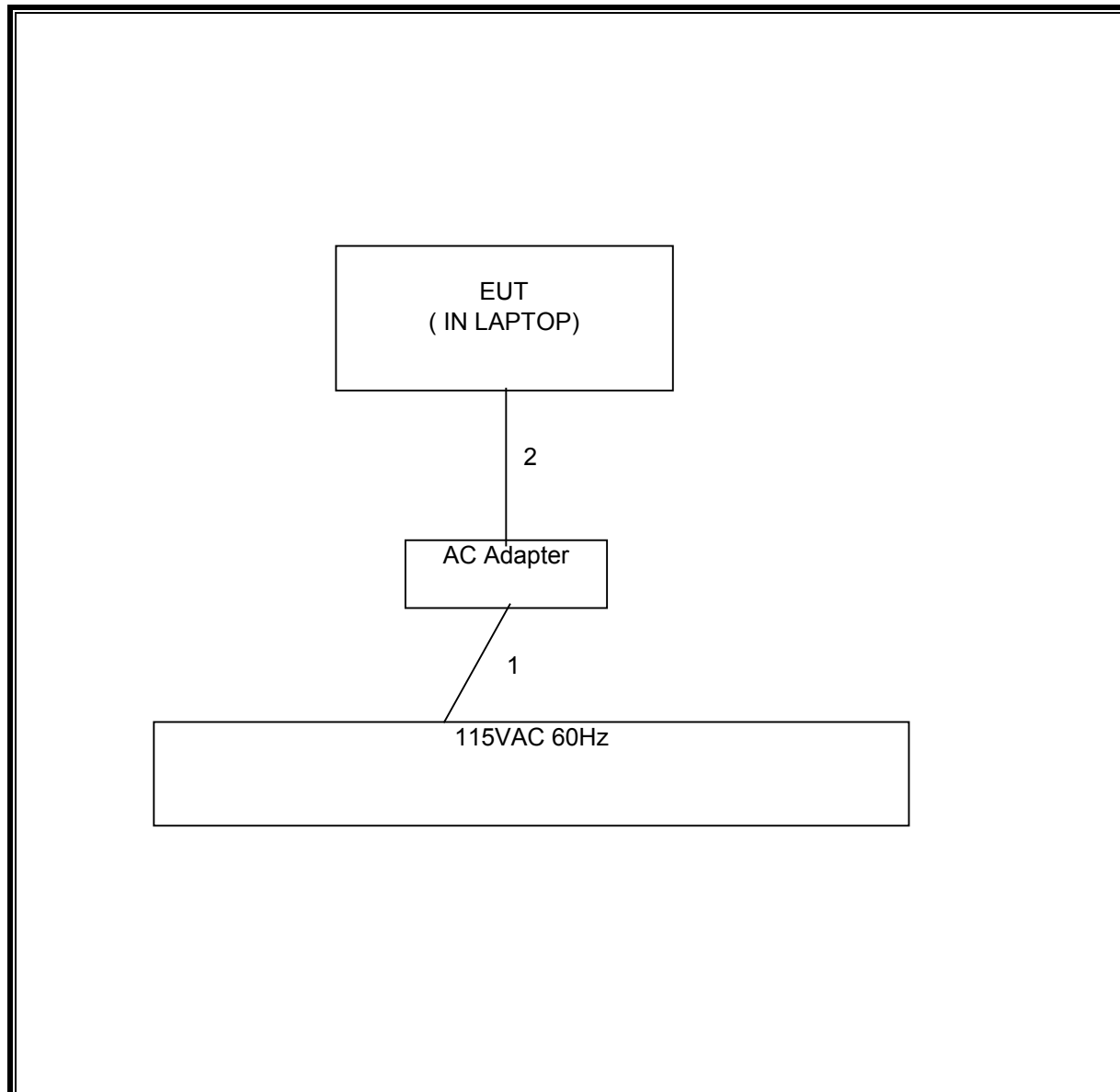
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	IBM	92P1160	570001030B	NA
Laptop	IBM	Thinkpad X60	AAGH349	DoC

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	0.5m	NA

TEST SETUP

The EUT is installed as a stand-alone device during the tests. The Wireless Communication test set exercised the EUT.

RADIATED TEST SETUP DIAGRAM

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, Bilog 30 MHz ~ 2 GHz	Sunol Sciences	JB1	A121003	3/3/06
Preamplifier, 1300 MHz	HP	8447D	1937A02062	1/7/07
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	7/26/06
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/06
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/06
Preamplifier, 1 ~ 26.5 GHz	HP	8449B	3008A00369	8/17/06
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	7/6/06
Dipole	EMCO	3121C-DB2	22435	3/25/06
Signal Generator, 1024 MHz	R & S	SMY01	DE 12311	04/11/06
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	US42510266	10/19/06
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/06
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	04/22/06

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 603C Clause 2.2.17

The transmitter output is connected to the spectrum analyzer.

RESULTS

No non-compliance noted.

800 MHz CELL CDMA Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	22.40	173.78
Middle	836.5	20.10	102.33
High	848.3	18.30	67.61

1900 MHz PCS CDMA Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	26.70	467.74
Middle	1880.00	26.40	436.52
High	1908.75	26.30	426.58

NOTE: RBW=VBW=3MHz.

CDMA Cellular Band Output Power (ERP)

01/23/06 **High Frequency Substitution Measurement**
Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr: Chin Pang
Project #: 06U10026-1
Company: Sierra Wireless
EUT Descrip.: Express Mini-PCI USB Wireless CDMA Modem Module
EUT M/N: MC5720-CDMA Module-Class II, Add 1 K-Note Laptop
Test Target: CDMA Cell Part 22
Mode Oper: TX, Fundamental

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	96.2	V	19.2	0.5	0.0	18.7	38.5	-19.7	
824.70	100.6	H	22.9	0.5	0.0	22.4	38.5	-16.0	
836.52	93.4	V	18.6	0.6	0.0	18.0	38.5	-20.4	
836.52	97.6	H	20.7	0.6	0.0	20.1	38.5	-18.3	
848.31	92.2	V	17.0	0.7	0.0	16.3	38.5	-22.1	
848.31	96.4	H	19.0	0.7	0.0	18.3	38.5	-20.1	

NOTE: RBW=VBW=3MHz

PCS Output Power (EIRP)01/24/06 **High Frequency Substitution Measurement****Compliance Certification Services, Morgan Hill 5m Chamber Site****Test Engr: Chin Pang****Project #: 06U10026-1****Company: Sierra Wireless****EUT Descrip.: Express Mini-PCI USB Wireless CDMA Modem Module****EUT M/N: MC5720-CDMA Module-Class II, Add 1 K-Note Laptop****Test Target: CDMA PCS Part 24****Mode Oper: TX, Fundamental**

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	94.5	H	17.2	0.9	8.3	24.6	33.0	-8.4	
1.850	96.0	V	19.3	0.9	8.3	26.7	33.0	-6.3	
1.880	94.6	H	18.0	0.9	8.3	25.4	33.0	-7.6	
1.880	95.6	V	19.0	0.9	8.3	26.4	33.0	-6.6	
1.910	94.9	H	18.8	0.9	8.4	26.3	33.0	-6.7	
1.910	93.5	V	16.8	0.9	8.4	24.3	33.0	-8.7	

NOTE: RBW=VBW=3MHz

7.2. FIELD STRENGTH OF SPURIOUS EMISSION

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 603C Clause 2.2.12, FCC 22.917 (h), & FCC 24.238 (b)

RESULTS

No non-compliance noted.

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

800MHz Band CDMA Spurious & Harmonic (ERP)

01/23/06 High Frequency Substitution Measurement
Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr: Chin Pang
Project #: 06U10026-1
Company: Sierra Wireless
EUT Descrip.: Express Mini-PCI USB Wireless CDMA Modem Module.
EUT M/N: MC5720-CDMA Module. Class II, Add 1 K-Note Laptop, 2 WLAN Module.
Test Target: Part 22
Mode Oper: TX, CDMA

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-amplifier 1-26GHz T34 HP 8449B	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
Low Ch, 824.70MHz										
1.649	51.0	H	-60.6	1.6	8.1	5.9	-56.3	-13.0	-43.3	
2.474	48.8	H	-60.5	1.9	9.6	7.4	-55.0	-13.0	-42.0	
3.299	46.6	H	-59.0	2.3	9.5	7.4	-53.9	-13.0	-40.9	
1.649	53.5	V	-58.8	1.6	8.1	5.9	-54.5	-13.0	-41.5	
2.474	52.0	V	-57.5	1.9	9.6	7.4	-52.0	-13.0	-39.0	
3.299	48.0	V	-57.7	2.3	9.5	7.4	-52.6	-13.0	-39.6	
Mid Ch, 836.52MHz										
1.673	55.0	H	-56.6	1.6	8.1	6.0	-52.2	-13.0	-39.2	
2.510	50.5	H	-58.7	1.9	9.6	7.4	-53.2	-13.0	-40.2	
3.346	46.0	H	-59.4	2.3	9.5	7.4	-54.3	-13.0	-41.3	
1.673	54.0	V	-58.3	1.6	8.1	6.0	-53.9	-13.0	-40.9	
2.510	52.4	V	-57.0	1.9	9.6	7.4	-51.5	-13.0	-38.5	
3.346	51.6	V	-53.9	2.3	9.5	7.4	-48.8	-13.0	-35.8	
High Ch										
1.697	57.2	H	-54.3	1.6	8.2	6.0	-49.9	-13.0	-36.9	
2.545	50.0	H	-59.0	2.0	9.6	7.4	-53.5	-13.0	-40.5	
3.393	45.8	H	-59.4	2.3	9.5	7.4	-54.3	-13.0	-41.3	
1.697	57.8	V	-54.4	1.6	8.2	6.0	-50.0	-13.0	-37.0	
2.546	53.3	V	-55.9	2.0	9.6	7.4	-50.4	-13.0	-37.4	
3.393	49.0	V	-56.3	2.3	9.5	7.4	-51.2	-13.0	-38.2	
Note: No other emissions were detected above the system noise floor.										

PCS Spurious & Harmonic (EIRP):

1/23/2006 1 High Frequency Substitution Measurement

Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr: Chin Pang

Project #: 06U10026-1

Company: Sierra Wireless

EUT Descrip.: Express Mini-PCI USB Wireless Modem Module

EUT M/N: MC5720-CDMA Module, Class II. Add 1 K-Note Laptop, 2 WLAN Module.

Test Target: Part 24

Mode Oper: TX, CDMA

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-amplifier 1-26GHz T34 HP 8449B	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, 1852.125MHz										
3.703	55.6	H	-48.3	2.4	9.5	7.3	-41.2	-13.0	-28.2	
5.554	53.3	H	-45.3	3.2	10.7	8.6	-37.8	-13.0	-24.8	
7.405	45.1	H	-51.7	3.7	12.0	9.8	-43.5	-13.0	-30.5	
3.703	53.5	V	-50.5	2.4	9.5	7.3	-43.4	-13.0	-30.4	
5.554	53.0	V	-46.6	3.2	10.7	8.6	-39.1	-13.0	-26.1	
7.405	48.0	V	-49.6	3.7	12.0	9.8	-41.4	-13.0	-28.4	
Mid Ch, 1880MHz										
3.760	55.0	H	-48.6	2.5	9.5	7.3	-41.6	-13.0	-28.6	
5.640	48.0	H	-50.8	3.3	10.9	8.7	-43.1	-13.0	-30.1	
7.520	45.0	H	-51.6	3.7	11.9	9.8	-43.4	-13.0	-30.4	
3.760	56.6	V	-47.1	2.5	9.5	7.3	-40.1	-13.0	-27.1	
5.640	56.5	V	-43.3	3.3	10.9	8.7	-35.6	-13.0	-22.6	
7.520	47.2	V	-50.2	3.7	11.9	9.8	-42.0	-13.0	-29.0	
High Ch, 1908.75MHz										
3.818	58.3	H	-45.1	2.5	9.5	7.3	-38.1	-13.0	-25.1	
5.726	50.0	H	-49.0	3.3	11.1	8.9	-41.2	-13.0	-28.2	
7.635	49.7	H	-46.6	3.8	11.9	9.8	-38.4	-13.0	-25.4	
3.818	62.5	V	-41.0	2.5	9.5	7.3	-34.0	-13.0	-21.0	
5.726	55.0	V	-45.0	3.3	11.1	8.9	-37.2	-13.0	-24.2	
7.635	52.0	V	-45.1	3.8	11.9	9.8	-36.9	-13.0	-23.9	
Note: No other emissions were detected above the system noise floor.										