

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

PCA, EVDO, MINI-PCI EXPRESS CARD CDMA MODEM

MODEL NUMBER: MC5725

FCC ID: N7N-MC5725-L

REPORT NUMBER: 07U10898-1, REVISION B

ISSUE DATE: MARCH 19, 2007

Prepared for SIERRA WIRELESS 2290 COSMOS CT. CARLSBAD, CA 92010, U.S.A.

Prepared by

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DATE: MARCH 19, 2007 FCC ID: N7N-MC5725-L

Revision History

Rev.	Issue Date	Revisions	Revised By
ICV.		140 (1510115	Tevised By
	3/13/07	Initial Issue	T. Chan
В	3/19/07	Updated Description of Class II Change	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS

2290 COSMOS CT.

CARLSBAD, CA 92010, U.S.A.

EUT DESCRIPTION: PCA, EVDO MINI-PCI EXPRESS CARD CDMA MODEM

MODEL: MC5725

SERIAL NUMBER: LV-01426

DATE TESTED: FEBRUARY 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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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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a dual band 800/1900MHz PCA, EVDO REV. A, Mini-PCI Express Card CDMA Modem, and the module is manufactured by Sierra Wireless, Inc.

5.2. DESCRIPTION OF CLASS II CHANGE

The change filed under this application is adding a new laptop ThinkPad X61 series.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 2x monopile antennas with a maximum gain of 0.08dBi for Cellular and 1.15dBi PCS bands.

5.4. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent Communication Test Set.

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5.5. WORST-CASE CONFIGURATION AND MODE

PROCEDURE USED TO ESTABLISH TEST SIGNAL

3G-CDMA2000 1xEV-DO Revision A (Rev A)

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

Application Rev, License 1xEV-DO Terminal Test A.06.06, L

RETAP

- Call Setup > Shift & Preset
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- R-Data Pkt Size > 4096 (for PCS band), 12288 (for Cellular band)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots
 ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

The worst case of configuration is antenna pull-up position.

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EUT: PCA, EVDO MINI-PCI EXPRESS CARD CDMA MODEM

DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

	I/O CABLELIST									
Cable	Port	# of Connector		Cable	Cable	Remarks				
No.	Identical		Type	Type	Length					
		Ports								
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				

I/O CABLES

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description Manufacturer Model Serial Number FCC ID							
Laptop Computer	IBM	814B-28G	LV-01426 07/01	N/A			
AC Adapter	Lenovo	92P1156	11S92P1156Z1ZBGF6CKH75	DoC			

TEST SETUP

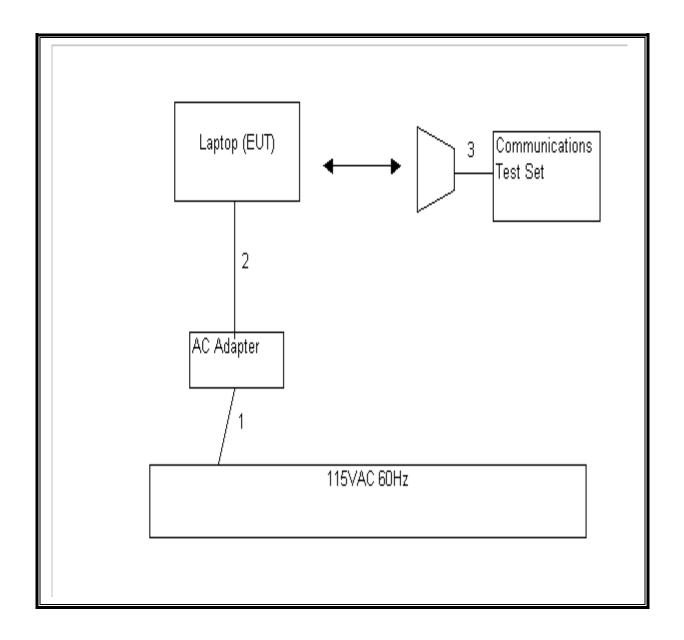
The EUT is installed into a laptop computer system during the tests. The EUT is linked with Agilent Communication Test Set.

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SETUP DIAGRAM FOR TESTS



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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				

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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.

1xEVDO Rev. A Cell RETAP (Antenna Pull-up)

THE VE O TOV. IT CONTRETT (THROUGH TUT UP)								
Channel	Frequency	ERP	ERP					
		Peak Power	Peak Power					
	(MHz)	(dBm)	(mW)					
Low	824.7	26.70	467.74					
Middle	837	27.60	575.44					
High	848.8	27.10	512.86					

1xEVDO Rev. A PCS RETAP (Antenna Pull-up)

Channel	Frequency	EIRP	EIRP
		Peak Power	Peak Power
	(MHz)	(dBm)	(mW)
Low	1851	29.60	912.01
Middle	1880.00	28.90	776.25
High	1909	30.90	1230.27

NOTE: RBW=VBW=3MHz

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1xEVDO Rev. A Cell RETAP (Antenna Re-tracted)

Channel	Frequency	ERP	ERP
		Peak Power	Peak Power
	(MHz)	(dBm)	(mW)
Low	824.7	16.90	48.98
Middle	837	18.20	66.07
High	848.8	17.60	57.54

1xEVDO Rev. A PCS RETAP (Antenna Re-tracted)

Channel	Frequency	EIRP	EIRP
		Peak Power	Peak Power
	(MHz)	(dBm)	(mW)
Low	1851	23.40	218.78
Middle	1880.00	22.00	158.49
High	1909	21.80	151.36

NOTE: RBW=VBW=3MHz

1xEVDO Rev. A Cell RETAP (Antenna Pull-up)

High Frequency Substitution Measurement

Compliance Certification Services, Fremont 5m A-Chamber

Company: Lenovo Project #:07U10898 Date: 2/28/2007

Test Engineer: YuChien Ho Configuration:EUT only

Mode: 1xEV-DO Rev. A Cell RETAP(Antenna Pull-up)

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	SA reading	Ant. Pol.	SG reading	CL	Gain	ERP	Limit	Margin	Notes
МHz	(dBuV/m)	(H/V)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch									
824.70	100.8	V	27.2	0.5	0.0	26.7	38 <i>.</i> 5	-11.7	
824.70	100.0	H	24.7	0.5	0.0	24.2	38.5	-143	
Mid Ch									
836.52	101.2	V	28.2	0.0	0.0	27.6	38.5	-10.8	
836.52	100.4	H	25.3	0.0	0.0	24.7	38 <i>.</i> 5	-13.7	
High Ch									
848.31	101.0	V	27.8	0.7	0.0	27.1	38.5	-11 <i>3</i>	
848.31	99.8	H	24.3	0.7	0.0	23.6	38.5	-14.8	

1xEVDO Rev. A PCS RETAP (Antenna Pull-up)

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

Company:Lenovo Project #:07U10898 Date: 2/28/2007

Test Engineer: YuChien Ho Configuration:EUT only

Mode: 1xEV-DO Rev. A PCS RETAP(Antenna Pull-up)

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	SA reading	Ant. Pol.	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
GHz	(dBuV/m)	(H/V)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch									
1.851	95 <i>5</i>	V	22.1	0.9	8.3	29 <i>.</i> 5	33.0	-3.5	
1.851	96.1	H	22.2	0.9	8.3	29.6	33.0	-3.4	
Mid Ch									
1.880	88.5	V	14.2	0.9	8.3	21.7	33.0	-11.4	
1.880	96.1	H	21.3	0.9	8.3	28.7	33.0	-43	
High Ch									
1.909	94.7	V	21.4	0.9	8.4	28.9	33.0	-4.1	
1.909	96.2	H	23.4	0.9	8.4	30.9	33.0	-2.1	

1xEVDO Rev. A Cell RETAP (Antenna Re-tracted)

High Frequency Substitution Measurement

Compliance Certification Services, Fremont 5m A-Chamber

Company: Lenovo Project #:07U10898 Date: 2/28/2007

Test Engineer: YuChien Ho Configuration:EUT only

Mode:1xEV-DO Rev. A Cell RETAP(Antenna Retracted)

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	SA reading	Ant. Pol.	SG reading	CL	Gain	ERP	Limit	Margin	Notes
MHz	(dBuV/m)	(H/V)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch									
824.70	91.0	V	17.4	0.5	0.0	16.9	38.5	-21.6	
824.70	90.4	H	15.1	0.5	0.0	14.6	38.5	-23.8	
Mid Ch									
836.52	91.8	V	18.8	0.0	0.0	18.2	38.5	-20.2	
836.52	92.2	H	17.1	0.0	0.0	16 <i>5</i>	38 <i>.</i> 5	-21.9	
High Ch									
848.31	91 <i>5</i>	V	18.3	0.7	0.0	17.6	38.5	-20.9	
848.31	91.3	H	15.8	0.7	0.0	15.1	38.5	-23.4	

1xEVDO Rev. A PCS RETAP (Antenna Re-tracted)

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

Company: Lenovo Project #:07U10898 Date: 2/28/2007

Test Engineer: YuChien Ho Configuration:EUT only

Mode: 1xEV-DO Rev. A PCS RETAP(Antenna Retracted)

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	SA reading	Ant. Pol.	SG reading	CL	Gain	EIRP	Limit	Margin	Notes
GHz	(dBuV/m)	(H/V)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch									
1.851	89.2	V	15.8	0.9	8.3	23.2	33.0	-9.8	
1.851	89.9	H	16.0	0.9	8.3	23.4	33.0	-9.6	
Mid Ch									
1.880	88.88	V	14.5	0.9	8.3	22.0	33.0	-11.0	
1.880	87.2	H	12.4	0.9	8.3	19.8	33.0	-13.2	
High Ch									
1.909	87.7	V	14.4	0.9	8.4	21.8	33.0	-11.2	
1.909	85.8	H	13.0	0.9	8.4	20.4	33.0	-12.6	

7.2. 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)

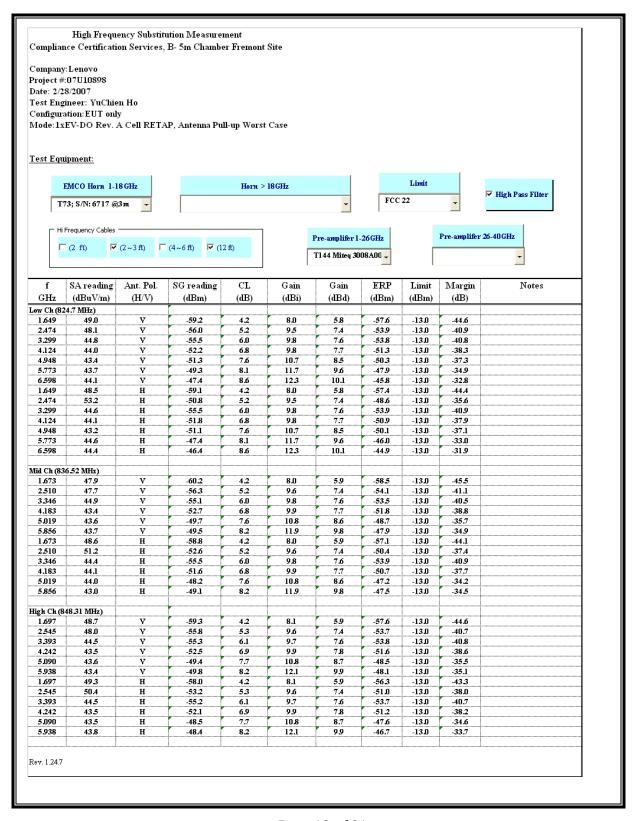
RESULTS

No non-compliance noted.

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

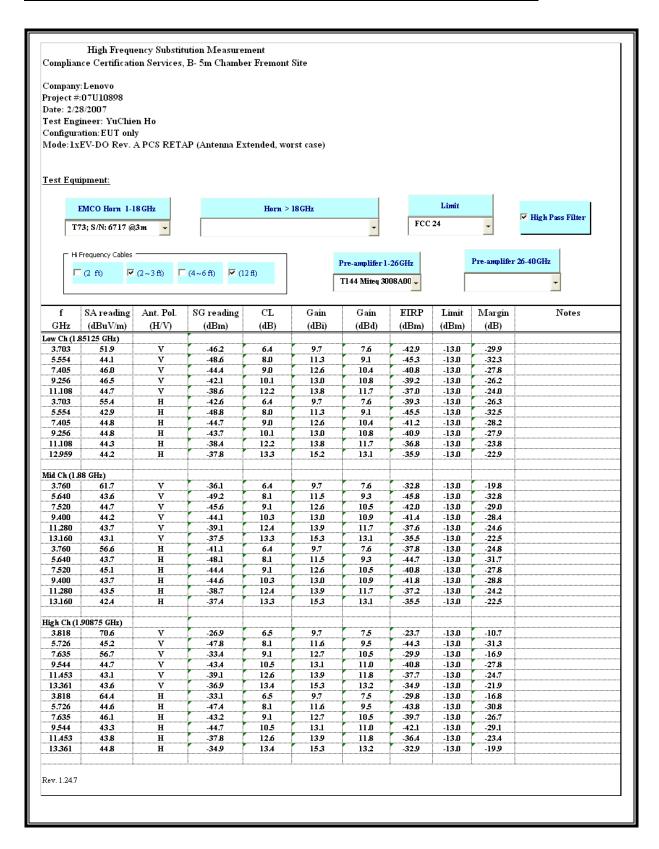
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1xEVDO Rev. A Cell RETAP Spurious & Harmonic (Antenna Pull-up, Worst Case)



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1xEVDO Rev. A PCS RETAP Spurious & Harmonic (Antenna Pull-up, Worst Case)



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