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: 06U10574-1

ISSUE DATE: OCTOBER 2, 2006

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

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

LAB CODE:200065-0

Revision History

Rev.	Date	Revisions	Revised By
---	10/02/06	Initial Issue	Thu

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SIERRA WIRELESS 2290 COSMOS CT. CARLSBAD, CA 92009, USA
EUT DESCRIPTION:	Express Mini-PCI USB Wireless CDMA Modem Module
MODEL NUMBER:	MC5720
SERIAL NUMBER:	01799
DATE TESTED:	SEPTEMBER 8-11, 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:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
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 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 1 C2-Note 15 inch Screen ThinkPad T60 Series with ABS Metal Frame Laptop.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum average & peak conducted output powers as follows:

824 to 849 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Average Power (dBm)	Conducted Average Power (mW)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 824.7	1xRTT RC3	25.5	354.81	28.88	772.68
Mid CH - 836.5		25.4	346.74	28.44	698.23
High CH - 848.3		25.40	346.74	28.52	711.21

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Average Power (dBm)	Conducted Average Power (mW)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 1851.25	1xRTT RC3	25.3	338.84	28.77	753.36
Mid CH - 1880		25.3	338.84	28.9	776.25
High CH - 1908.75		25.2	331.13	28.66	734.51

NOTE: RBW=VBW=3MHz.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

FOXCONN HON HAI Precision IND. Co., LTD., dual band monopole antenna with maximum antenna gain of 0.44dBi for Cell band and 0.52dBi for PCS band.

5.5. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent Communication Test Set.

5.6. WORST-CASE CONFIGURATION AND MODE

Pre-scan was performed on RF conducted port to determine the worst-case scenario:

Cellular Band	Avg. Output Power (dBm) Mid CH	99% BW (MHz) Mid CH	26 dB BW (MHz) Mid CH	Band edge (dBm) Low CH	Band edge (dBm) High CH
1xRRT RC3, SO2	25.30	1.2722	1.402	-16.56	-13.809
1xRRT RC3, SO32 (+F-SCH)	**25.40**	**1.2783**	**1.397**	**-15.554**	**-13.589**
1xRRT RC3, SO32 (+SCH)	25.40	1.2613	1.404	-16.492	-13.729
1xRRT RC3, SO55	25.20	1.2516	1.408	-17.664	-14.177
EVDO	25.20	1.2664	1.4	-16.646	-13.675

PCS Band	Avg. Output Power (dBm) Mid CH	99% BW (MHz) Mid CH	26 dB BW (MHz) Mid CH	Band edge (dBm) Low CH	Band edge (dBm) High CH
1xRRT RC3, SO2	25.20	1.265	1.405	-36.399	-32.943
1xRRT RC3, SO32 (+F-SCH)	**25.30**	**1.269**	**1.403**	**-35.231**	**-32.207**
1xRRT RC3, SO32 (+SCH)	25.30	1.253	1.411	-35.453	-32.445
1xRRT RC3, SO55	25.20	1.266	1.403	-35.839	-32.4
EVDO	25.20	1.262	1.403	-35.867	-32.711

Based on the above results from the different modulations, 1xRTT CDMA is determined to be the worst-case scenario for fundamental ERP /EIRP measurement and radiated spurious emissions tests; and 1xRRT RC3, SO32 (+F-SCH) to be the worst-case scenario for RF conducted band-edge and bandwidth tests.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at mid channel for both bands.

The laptop used in the final configuration was the ThinkPad T60 Series with pulled-out antenna position.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	IBM	ThinkPad T60	1S874126UZZ9E232	DoC
AC Adapter	IBM	92P1113	11S92P1113Z1ZBEL676114	DoC

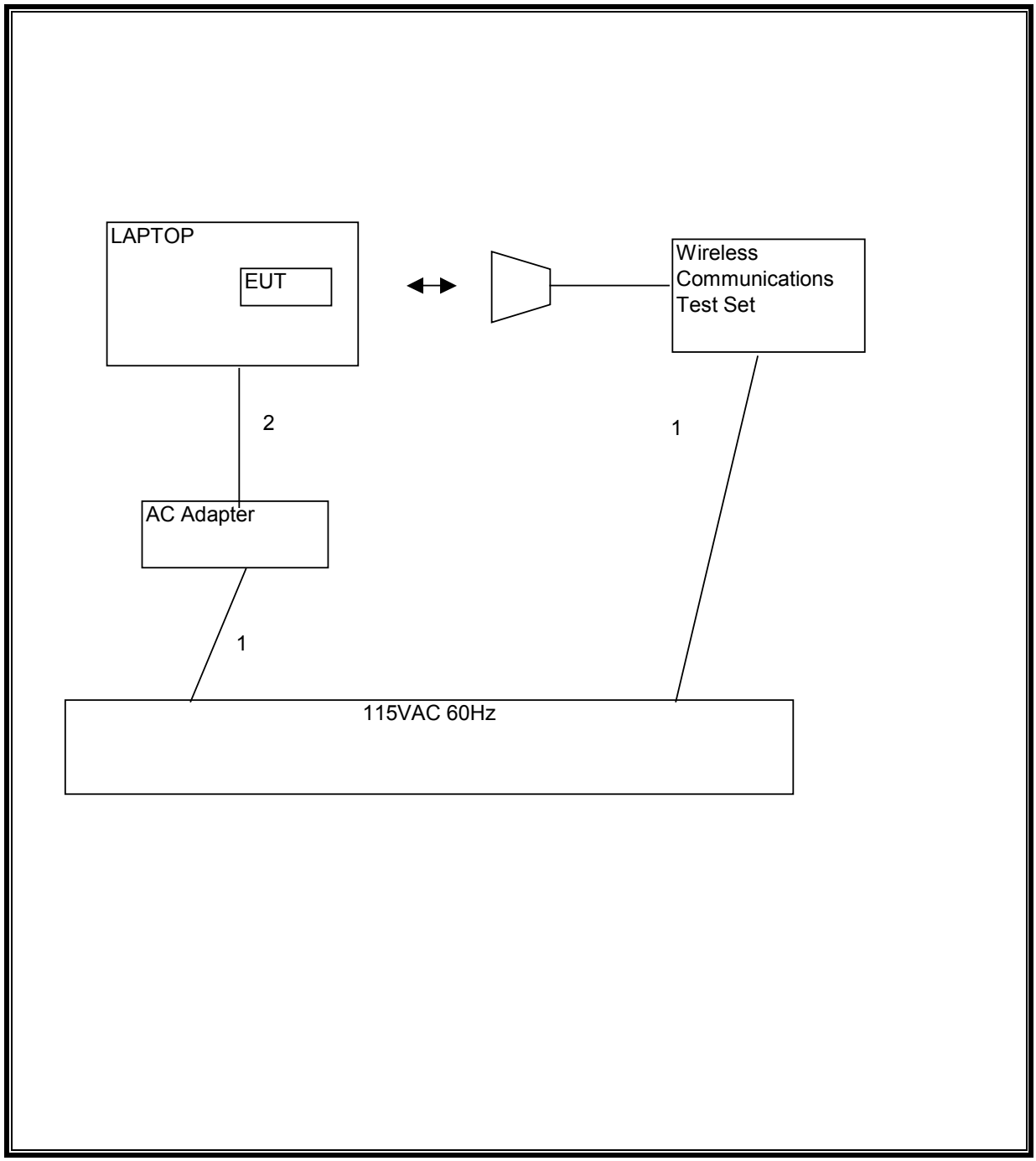
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	2m	Ferrite on DC cable

TEST SETUP

The EUT is installed inside the Laptop during 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**
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	12/3/06
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/22/07
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	2/4/07
RF Filter Section	Agilent / HP	85420E	3705A00256	2/4/07
Peak Power Meter	Agilent / HP	E4416A	GB41291160	12/2/07
Peak / Average Power Sensor	Agilent	E9327A	US40440755	12/2/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/22/07
Signal Generator 2 -40 GHz	R & S	SMP04	DE 34210	6/2/07
Signal Generator 1024 MHz	R & S	SMY01	DE 12311	5/11/07
Dipole	EMCO	3121C-DB2	22435	5/7/07
2.7GHz HPF	MicroTronic	HPM13194	2	CNR
1.5GHz HPF	MicroTronic	HPM13195	1	CNR
Communication Test Set	Agilent	E5515C	91936	4/8/07
Power Splitter	HP	11667B	324	CNR

7. LIMITS AND RESULTS

7.1. OCCUPIED BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the –26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal –26 dB bandwidth function is utilized.

RESULTS

No non-compliance noted:

800MHz CELL CDMA Modulation

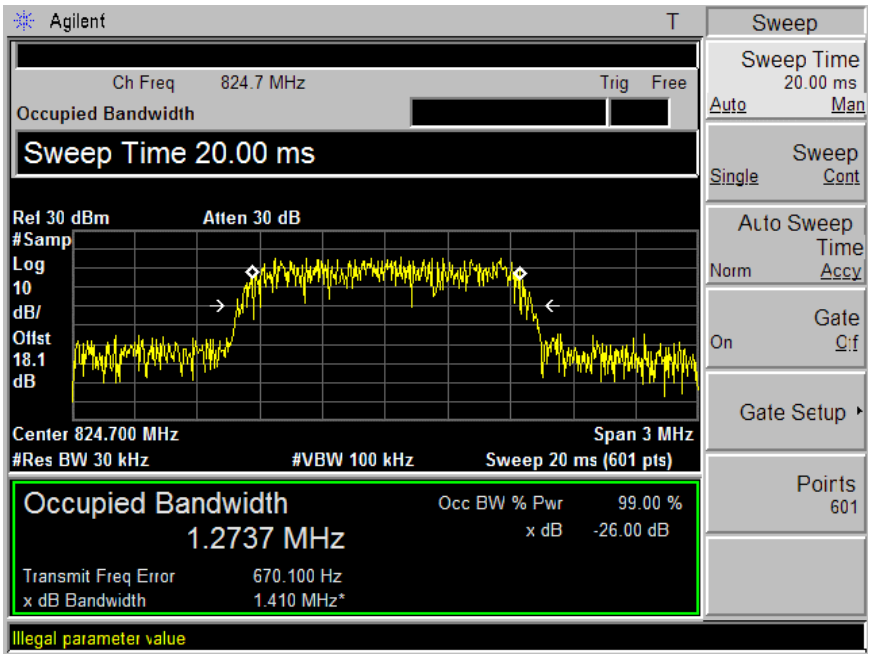
Channel	Frequency (MHz)	Bandwidth (MHz)
Low	824.70	1.410
Middle	836.52	1.397
High	848.31	1.414

1900MHz PCS Modulation

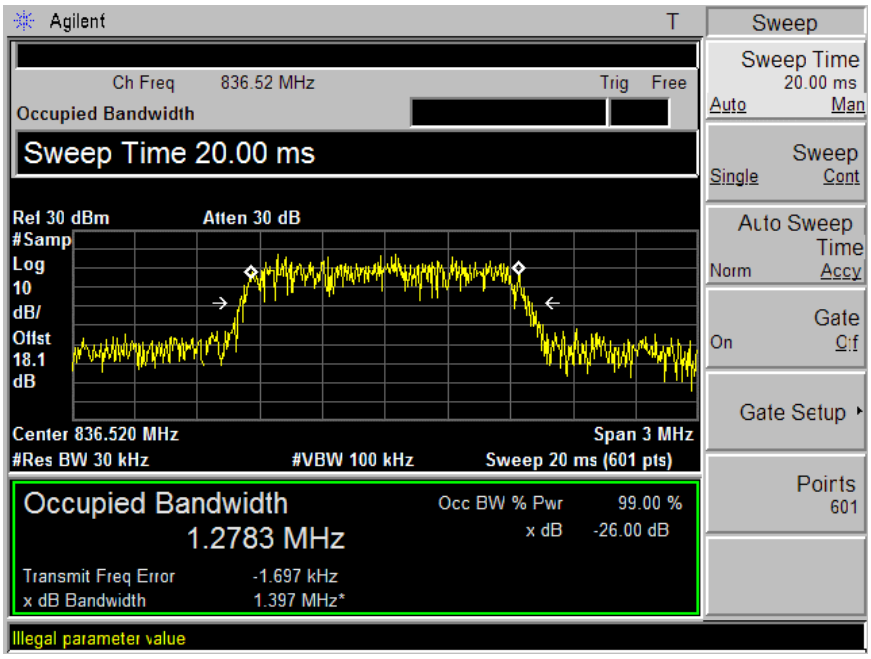
Channel	Frequency (MHz)	Bandwidth (MHz)
Low	1851.25	1.406
Middle	1880.00	1.403
High	1908.75	1.410

800MHz CELLULAR 26 dB BANDWIDTH

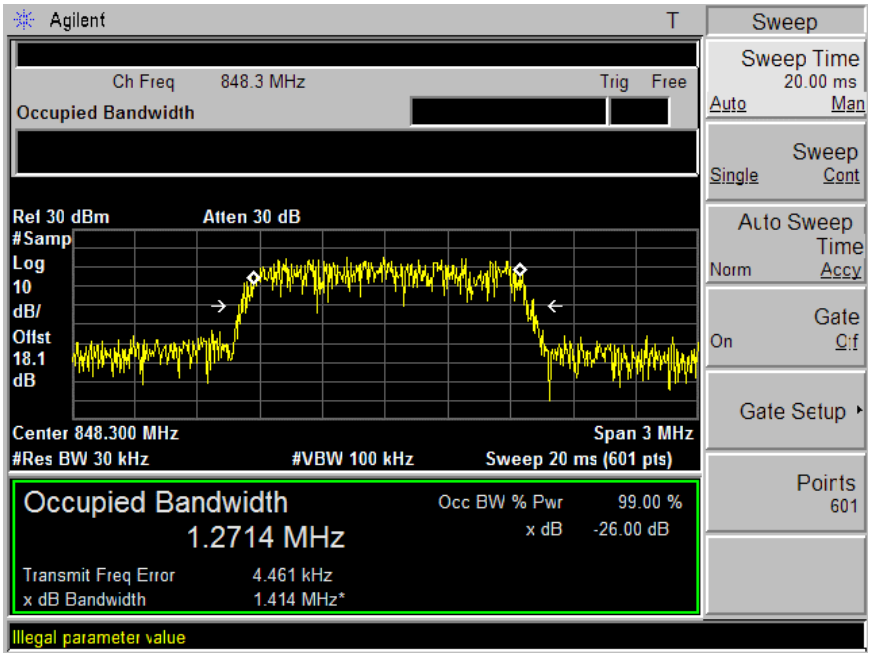
BANDWIDTH LOW CH



BANDWIDTH MID CH

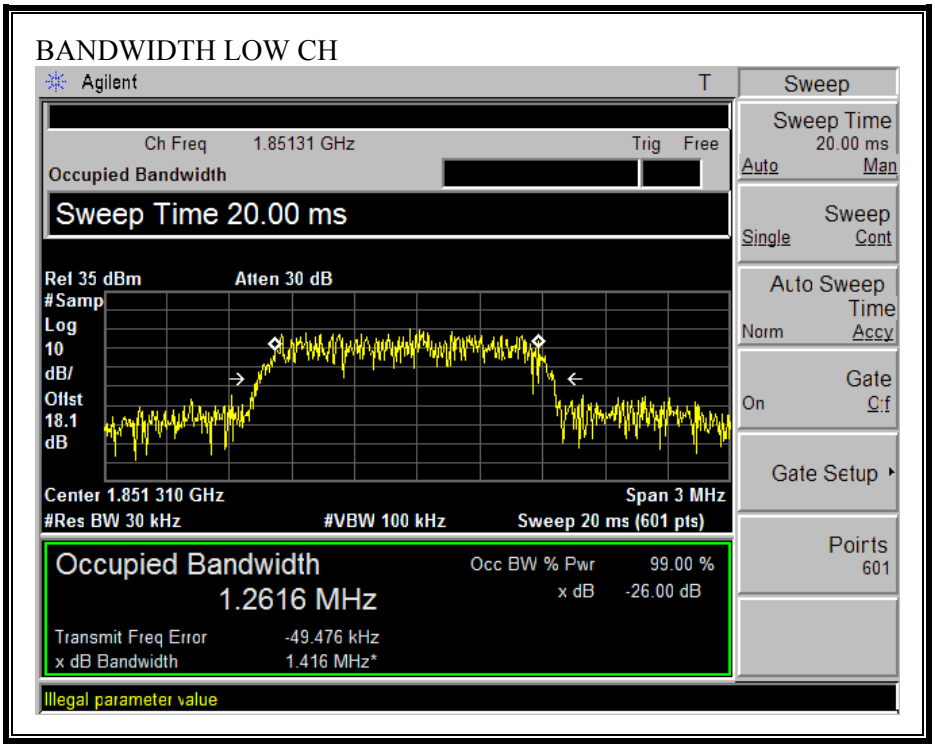


BANDWIDTH HIGH CH

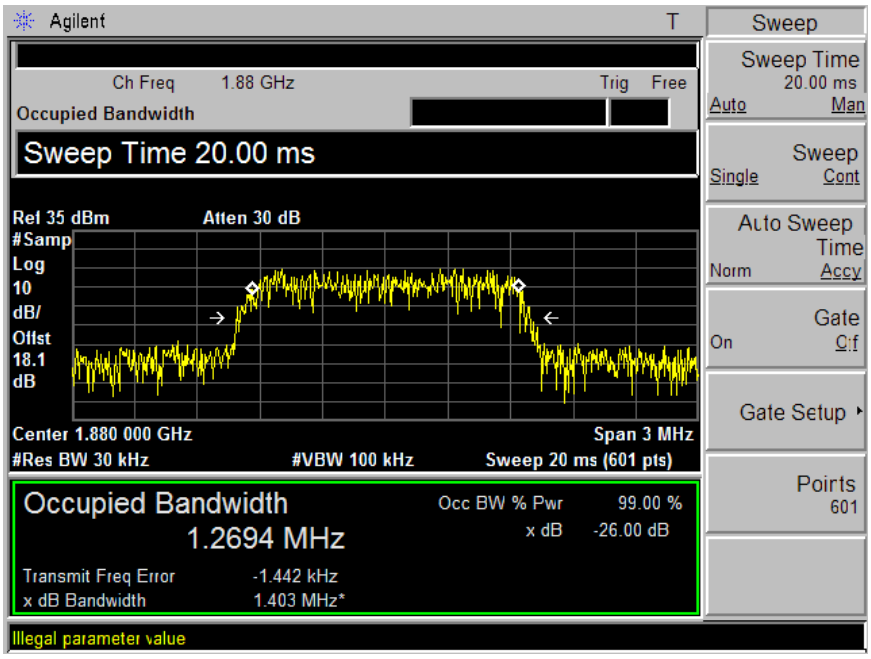


1900MHz PCS 26 dB BANDWIDTH

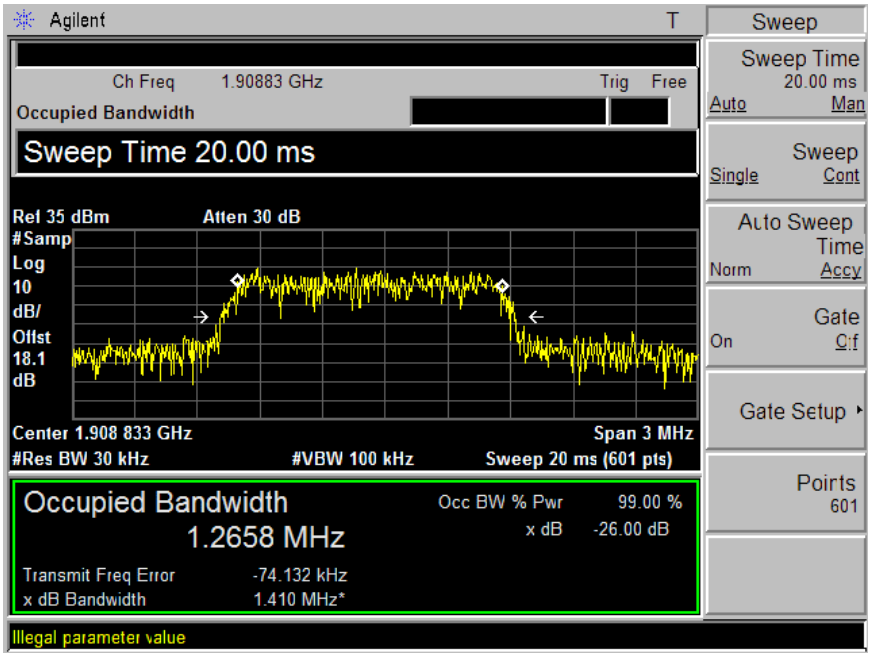
BANDWIDTH LOW CH



BANDWIDTH MID CH



BANDWIDTH HIGH CH



7.2. 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

RESULTS

No non-compliance noted.

800MHz CELL CDMA Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	824.7	28.88	772.68
Middle	836.5	28.44	698.23
High	848.3	28.52	711.21

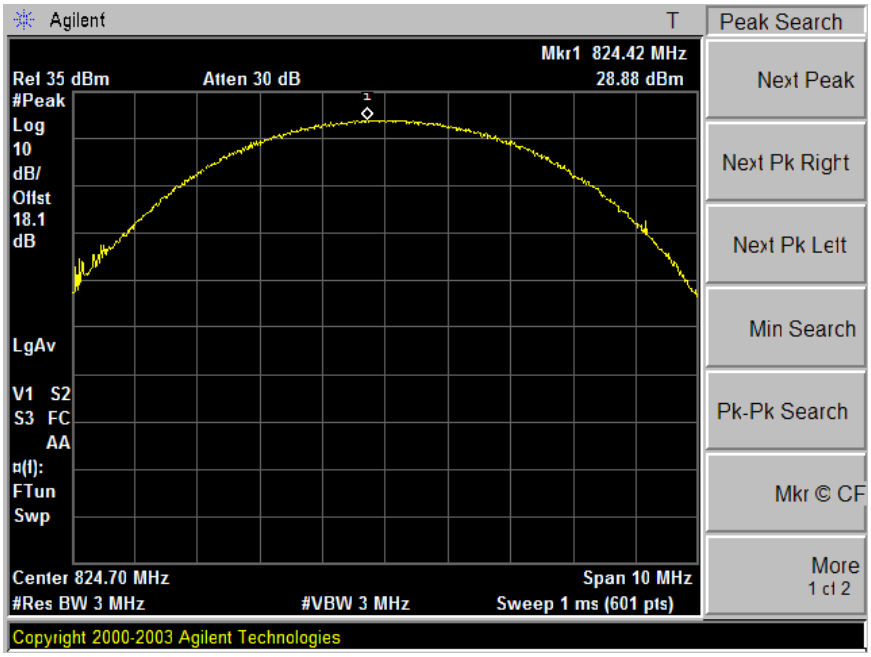
1900MHz PCS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low	1851.25	28.77	753.36
Middle	1880.00	28.90	776.25
High	1908.75	28.66	734.51

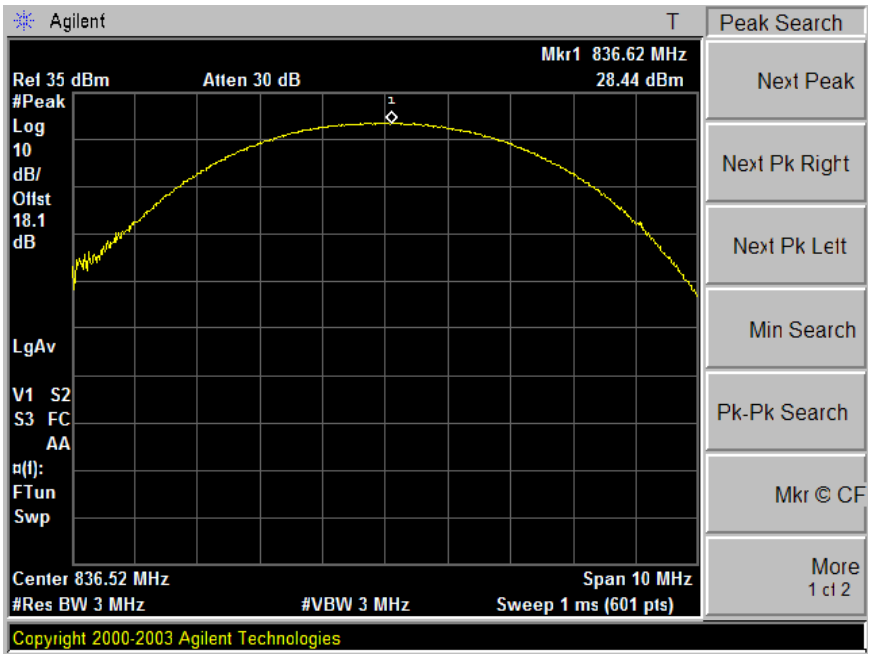
NOTE: RBW=VBW=3MHz

800MHz CELLULLAR (RF CONDUCTED OUTPUT POWER)

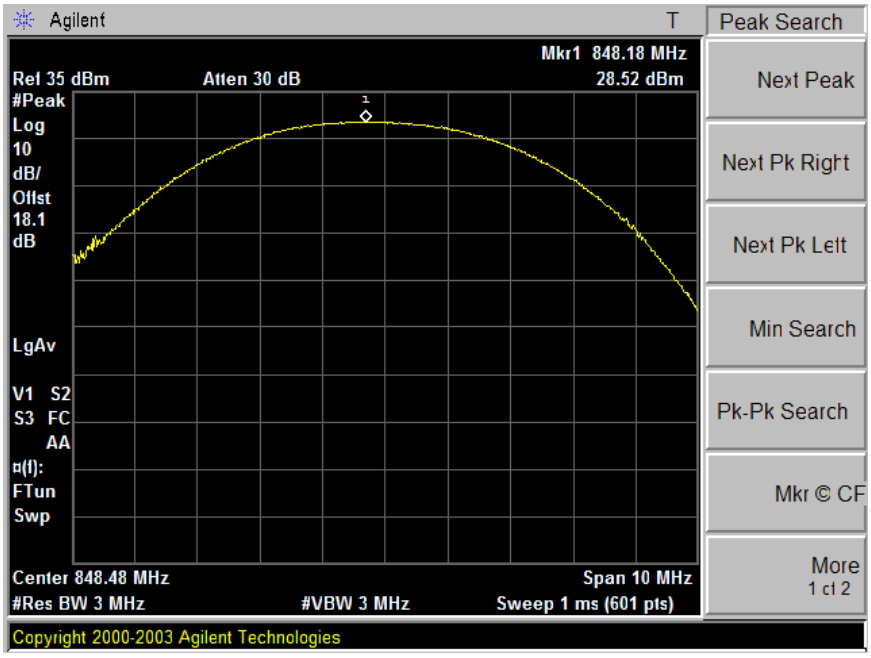
OUTPUT POWER LOW CH



OUTPUT POWER MID CH

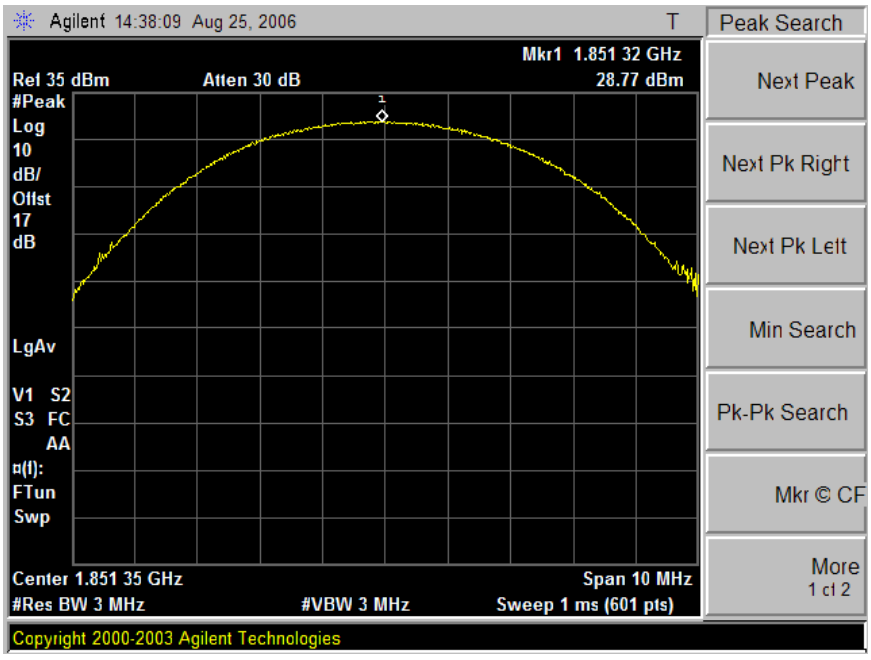


OUTPUT POWER HIGH CH

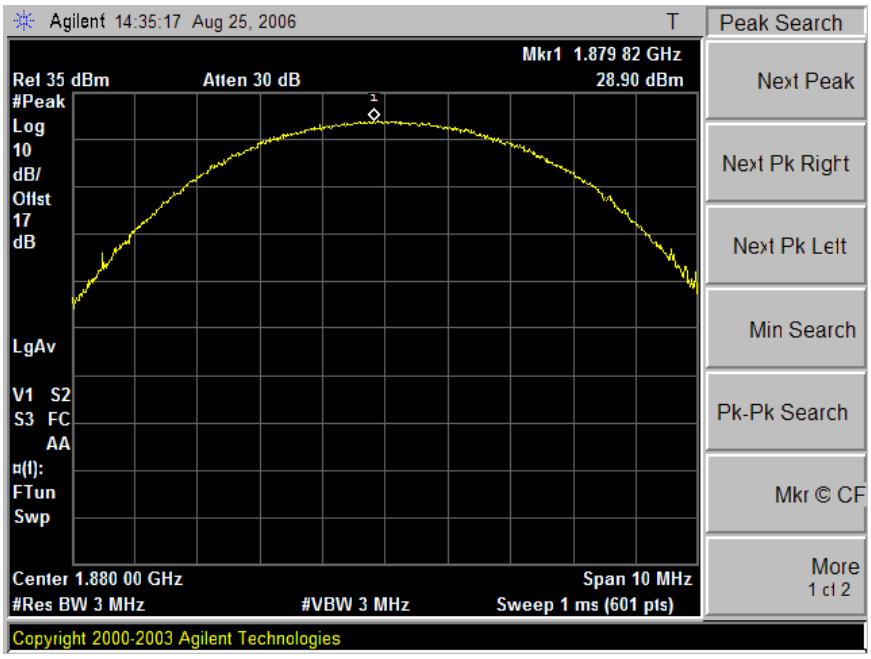


1900MHz PCS (RF CONDUCTED OUTPUT POWER)

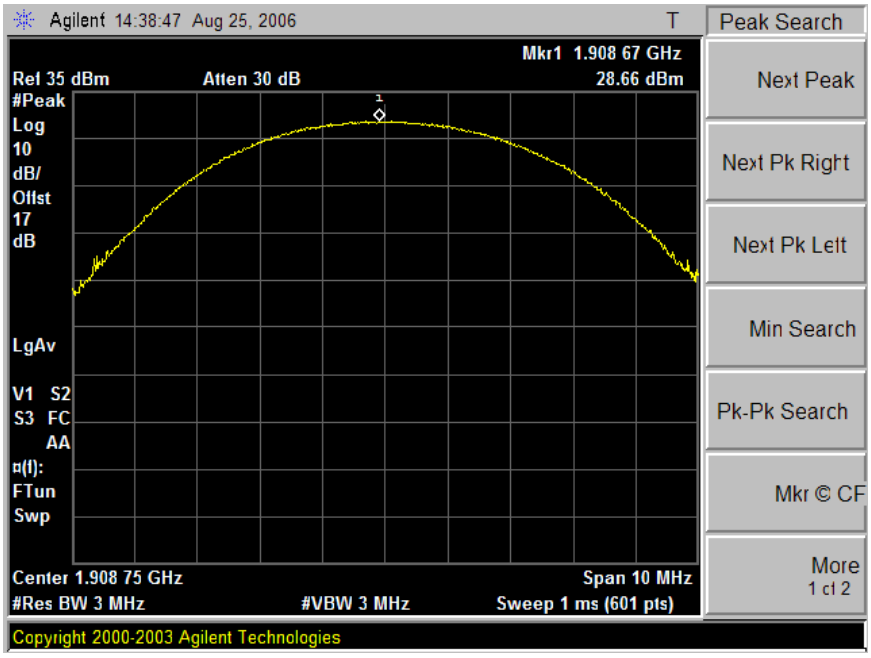
OUTPUT POWER LOW CH



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



Cellular Output Power (ERP)

f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
824.20	99.2	V	22.3	0.5	0.0	21.8	38.5	-16.7	
824.20	104.4	H	26.1	0.5	0.0	25.6	38.5	-12.9	
Mid ZCh									
836.50	100.0	V	24.0	0.6	0.0	23.4	38.5	-15.0	
836.50	104.5	H	26.3	0.6	0.0	25.7	38.5	-12.7	
High Ch									
848.80	99.0	V	23.6	0.7	0.0	22.9	38.5	-15.5	
848.80	104.0	H	25.9	0.7	0.0	25.2	38.5	-13.2	

NOTE: EUT tested at worst antenna open position, RBW=VBW=3MHz

PCS Output Power (EIRP)

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
1.850	95.0	H	17.8	0.9	8.3	25.2	33.0	-7.8	
1.850	94.0	V	16.6	0.9	8.3	24.0	33.0	-9.0	
1.880	94.6	H	17.7	0.9	8.3	25.2	33.0	-7.9	
1.880	94.4	V	16.7	0.9	8.3	24.2	33.0	-8.9	
1.910	94.0	H	17.4	0.9	8.4	24.9	33.0	-8.1	
1.910	93.7	V	16.7	0.9	8.4	24.2	33.0	-8.8	

NOTE: EUT tested at worst antenna close position, RBW=VBW=3MHz

7.3. SPURIOUS EMISSION AT ANTENNA TERMINAL

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

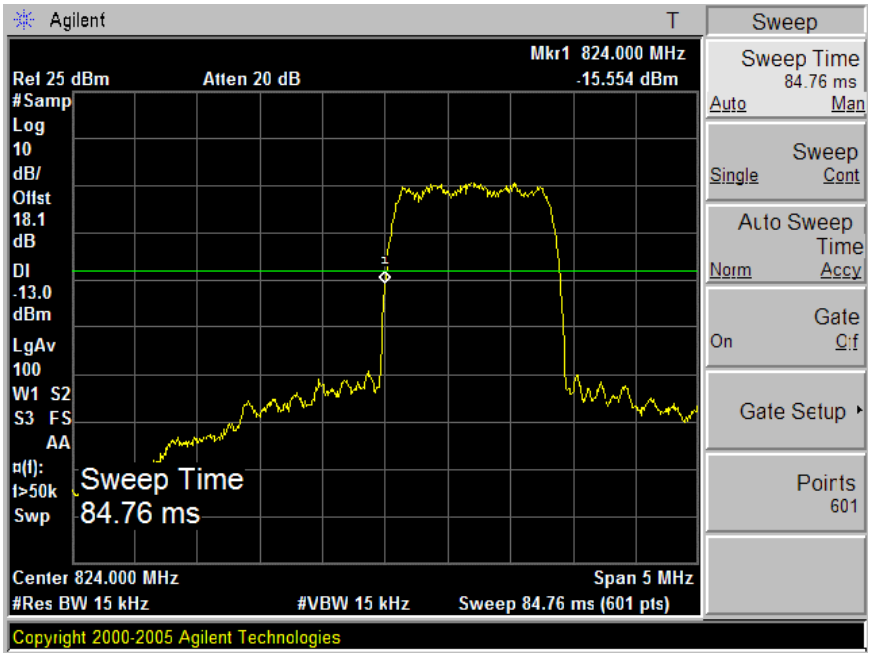
ANSI / TIA / EIA 603C Clause 2.2.12, FCC 22.917 (h), & FCC 24.238 (b)

RESULTS

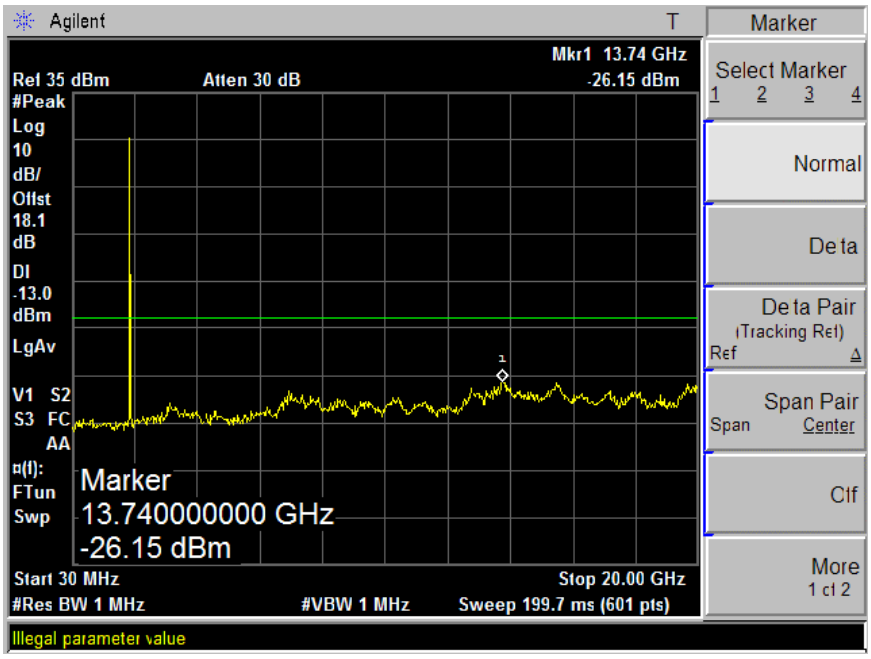
No non-compliance noted.

800MHz CELLULAR

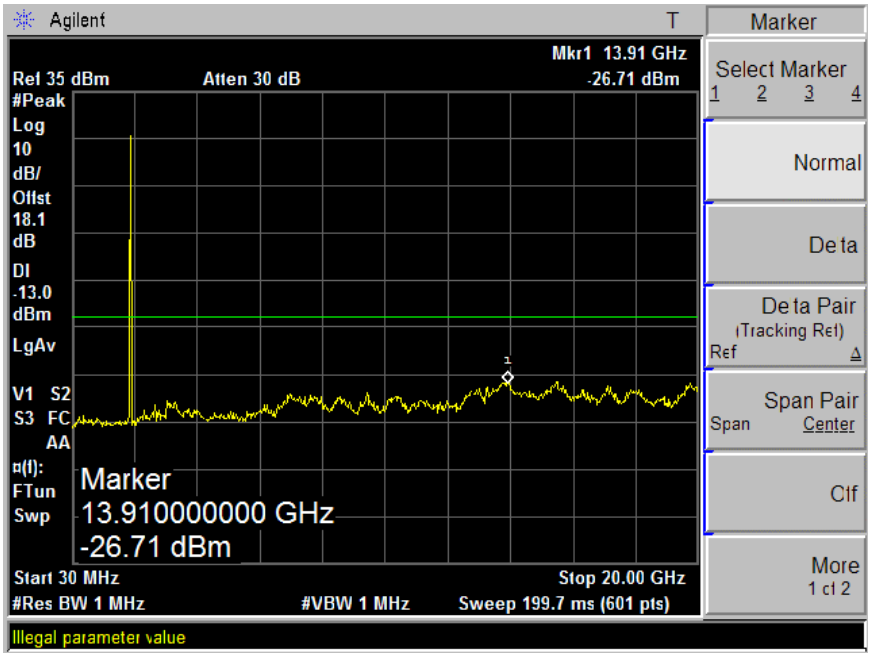
CELLULAR LOW CH BANDEDGE



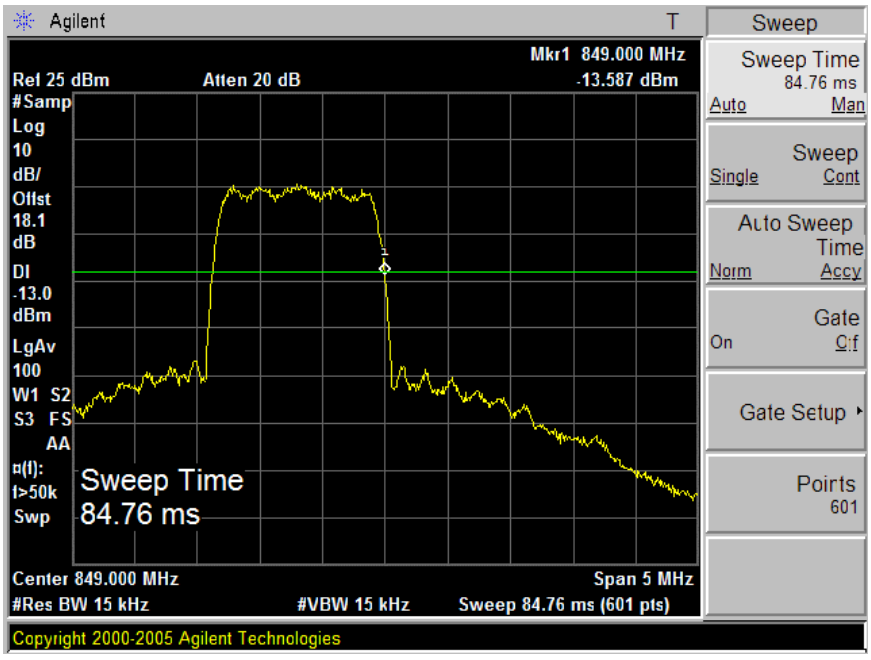
CELLULAR LOW CH SPURIOUS



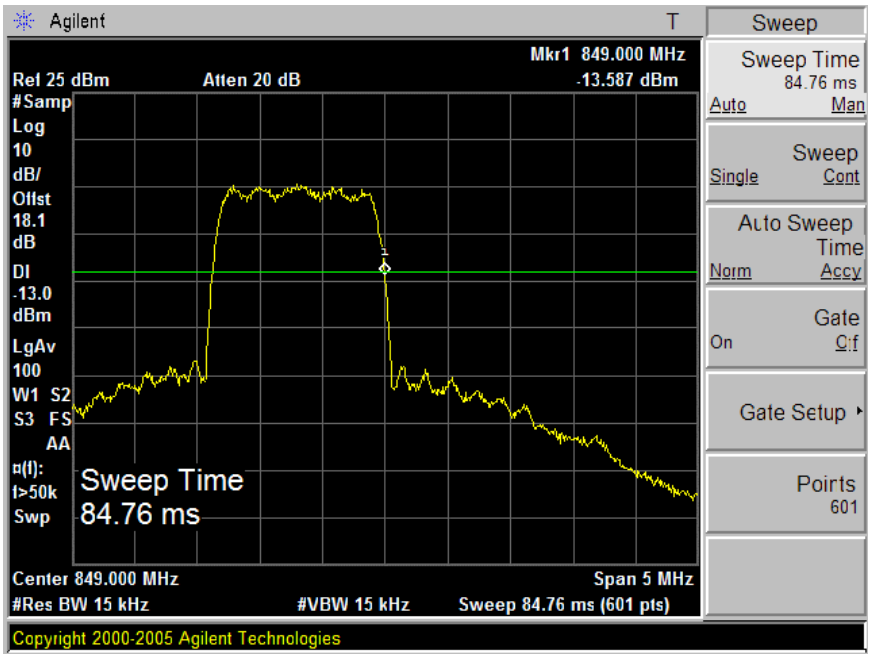
CELLULAR MID CH SPURIOUS



CELLULAR HIGH CH BANDEDGE

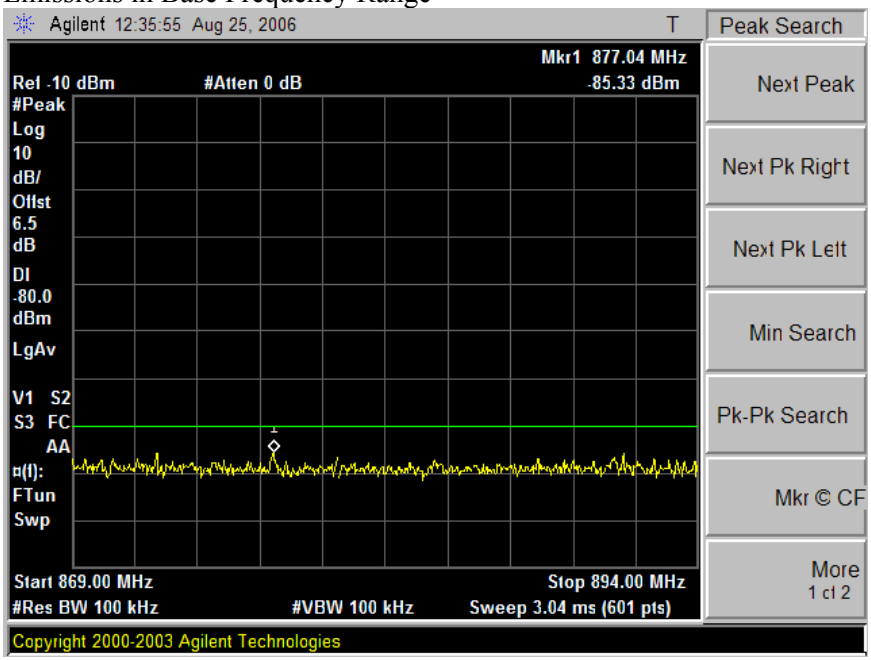


CELLULAR HIGH CH SPURIOUS



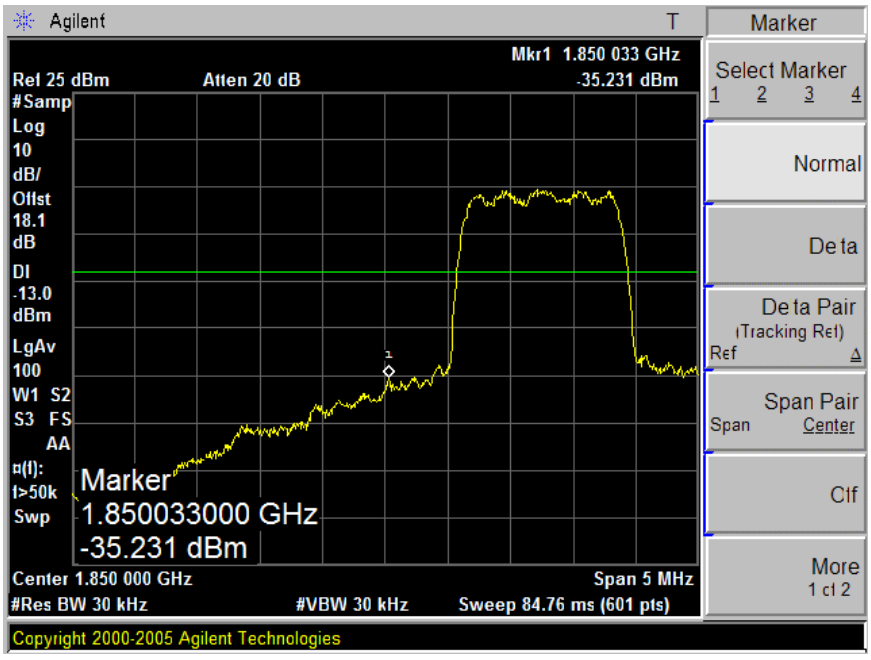
800MHz Cellular Mobile Emissions in Base Frequency Range

Emissions in Base Frequency Range

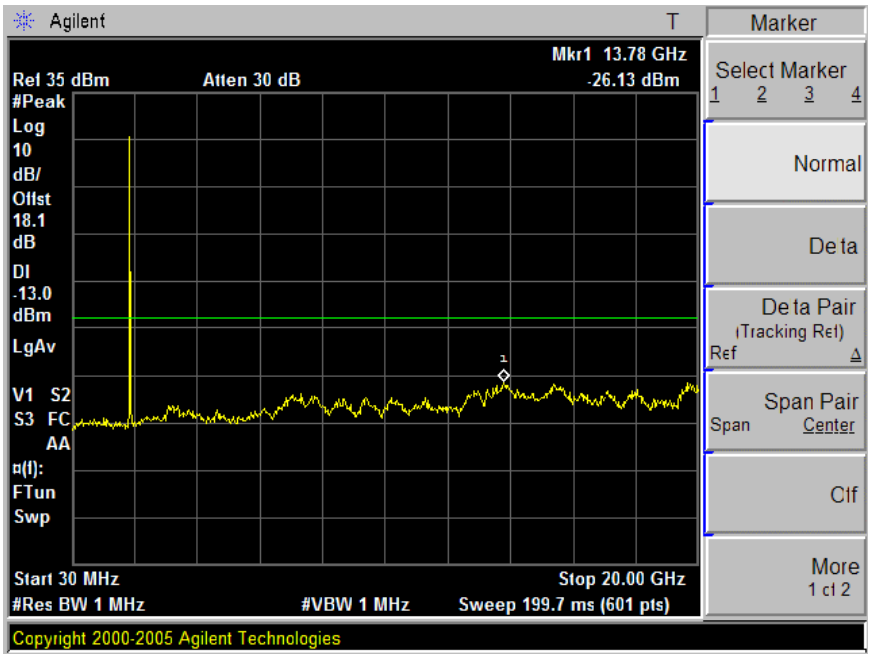


1900MHZ PCS

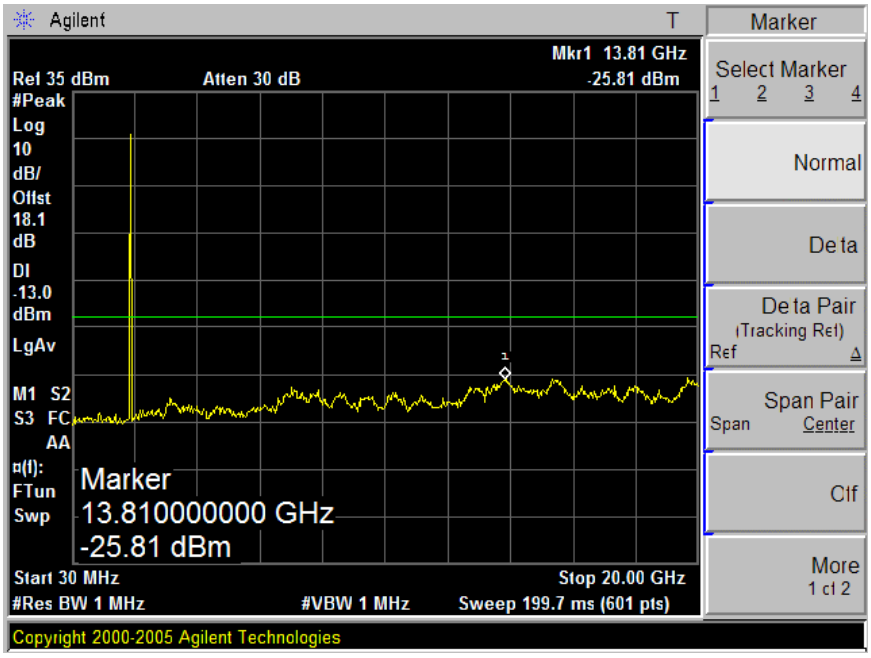
PCS LOW CH BANDEDGE



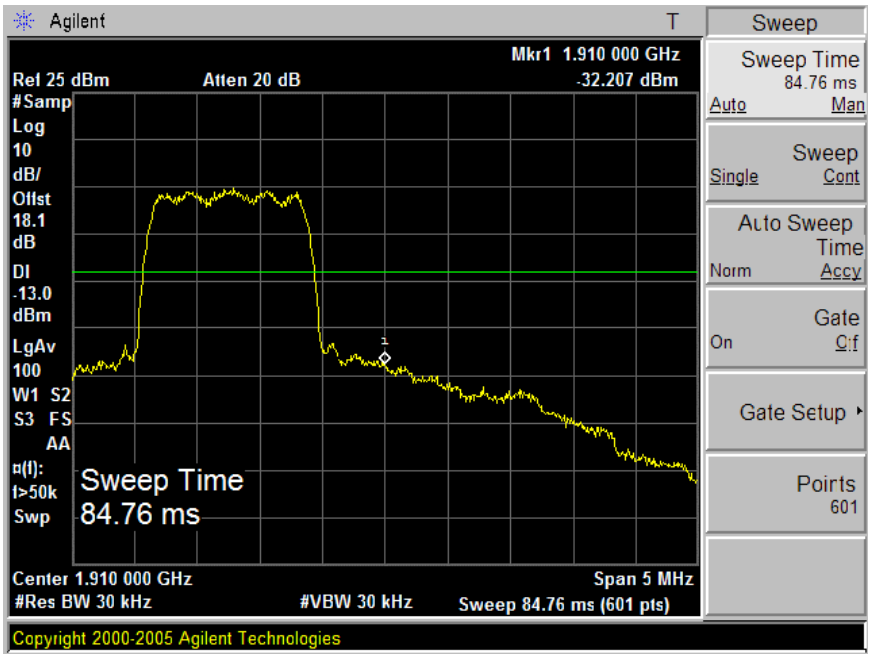
PCS LOW CH SPURIOUS



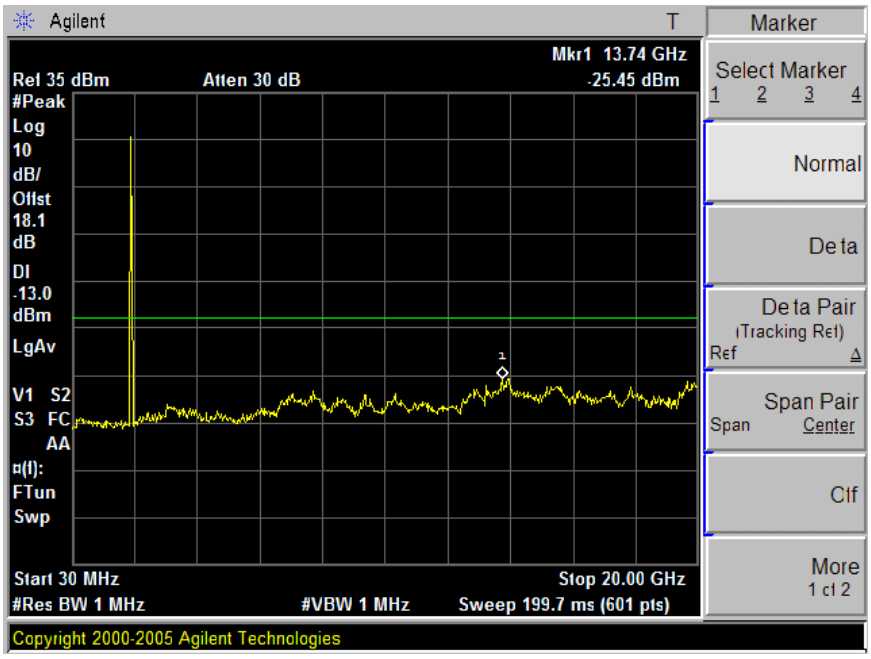
PCS MID CH SPURIOUS



PCS HIGH CH BANDEDGE



PCS HIGH CH SPURIOUS



7.4. 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 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)

09/10/06 **High Frequency Substitution Measurement**
Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr:Chin Pang
Project #:06U10574-1
Company:Sierra Wireless
EUT Descrip.:Express Mini-PCI USB Wireless CDMA Modem Module.
EUT M/N:MC5720-CDMA Module
Test Target:Part 22
Mode Oper:TX, CDMA

Test Equipment:

EMCO Horn 1-18GHz: T60; S/N: 2238 @3m
Horn > 18GHz:
Limit: FCC 22
☑ High Pass Filter
Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)
Pre-amplifer 1-26GHz: T144 Miteq 3008A0(
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
Low Ch, 824.70MHz										
1.649	52.0	H	-59.8	1.6	7.5	5.4	-56.0	-13.0	-43.0	
2.474	53.6	H	-56.9	1.9	9.5	7.4	-51.4	-13.0	-38.4	
3.299	53.6	H	-53.7	2.3	9.6	7.5	-48.5	-13.0	-35.5	
1.649	56.0	V	-56.5	1.6	7.5	5.4	-52.7	-13.0	-39.7	
2.474	55.0	V	-55.7	1.9	9.5	7.4	-50.2	-13.0	-37.2	
3.299	50.4	V	-57.0	2.3	9.6	7.5	-51.8	-13.0	-38.8	
Mid Ch, 836.52MHz										
1.673	52.0	H	-59.7	1.6	7.6	5.4	-55.9	-13.0	-42.9	
2.510	52.6	H	-57.7	1.9	9.5	7.4	-52.3	-13.0	-39.3	
3.346	49.0	H	-58.1	2.3	9.6	7.5	-52.9	-13.0	-39.9	
1.673	55.0	V	-57.4	1.6	7.6	5.4	-53.6	-13.0	-40.6	
2.510	52.0	V	-58.5	1.9	9.5	7.4	-53.1	-13.0	-40.1	
3.346	52.4	V	-54.8	2.3	9.6	7.5	-49.6	-13.0	-36.6	
High Ch, 848.3MHz										
1.697	56.0	H	-55.6	1.6	7.6	5.5	-51.7	-13.0	-38.7	
2.545	53.0	H	-57.2	2.0	9.5	7.4	-51.8	-13.0	-38.8	
3.393	51.3	H	-55.6	2.3	9.6	7.5	-50.5	-13.0	-37.5	
1.697	56.7	V	-55.6	1.6	7.6	5.5	-51.8	-13.0	-38.8	
2.546	54.0	V	-56.4	2.0	9.5	7.4	-51.0	-13.0	-38.0	
3.393	51.0	V	-56.0	2.3	9.6	7.5	-50.9	-13.0	-37.9	
Note: No other emissions were detected above the system noise floor.										

PCS Spurious & Harmonic (EIRP):

09/10/06 **High Frequency Substitution Measurement**
Compliance Certification Services, Morgan Hill 5m Chamber Site

Test Engr:Chin Pang
Project #:06U10574-1
Company:Sierra Wireless
EUT Descrip.:Express Mini-PCI USB Wireless Modem Module
EUT M/N:MC5720-CDMA Module.
Test Target:Part 24
Mode Oper:TX, CDMA

Test Equipment:

EMCO Horn 1-18GHz: T60; S/N: 2238 @3m
Horn > 18GHz:
Limit: FCC 24
☑ High Pass Filter
Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)
Pre-amplifer 1-26GHz: 4 Miteq 3008A00931
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
Low Ch,18521.25MHz										
3.703	53.8	H	-51.8	2.4	9.6	7.4	-44.7	-13.0	-31.7	
5.554	52.9	H	-47.4	3.2	10.8	8.6	-39.8	-13.0	-26.8	
7.405	45.8	H	-51.9	3.7	11.3	9.2	-44.3	-13.0	-31.3	
3.703	58.0	V	-47.7	2.4	9.6	7.4	-40.6	-13.0	-27.6	
5.554	63.0	V	-38.3	3.2	10.8	8.6	-30.7	-13.0	-17.7	
7.405	51.0	V	-47.5	3.7	11.3	9.2	-39.9	-13.0	-26.9	
Mid Ch, 1880MHz										
3.760	54.3	H	-51.1	2.5	9.6	7.4	-44.0	-13.0	-31.0	
5.640	48.6	H	-51.7	3.3	10.9	8.7	-44.0	-13.0	-31.0	
7.520	46.0	H	-51.6	3.7	11.4	9.2	-44.0	-13.0	-31.0	
3.760	64.0	V	-41.5	2.5	9.6	7.4	-34.4	-13.0	-21.4	
5.640	60.2	V	-41.1	3.3	10.9	8.7	-33.4	-13.0	-20.4	
7.520	52.0	V	-46.4	3.7	11.4	9.2	-38.8	-13.0	-25.8	
High Ch, 1908.75MHz										
3.818	58.2	H	-46.9	2.5	9.6	7.4	-39.9	-13.0	-26.9	
5.726	51.5	H	-48.8	3.3	11.0	8.8	-41.1	-13.0	-28.1	
7.635	48.6	H	-48.9	3.8	11.4	9.2	-41.2	-13.0	-28.2	
3.818	59.0	V	-46.2	2.5	9.6	7.4	-39.2	-13.0	-26.2	
5.726	60.0	V	-41.3	3.3	11.0	8.8	-33.6	-13.0	-20.6	
7.635	54.1	V	-44.2	3.8	11.4	9.2	-36.5	-13.0	-23.5	
Note: No other emissions were detected above the system noise floor.										

7.5. 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)

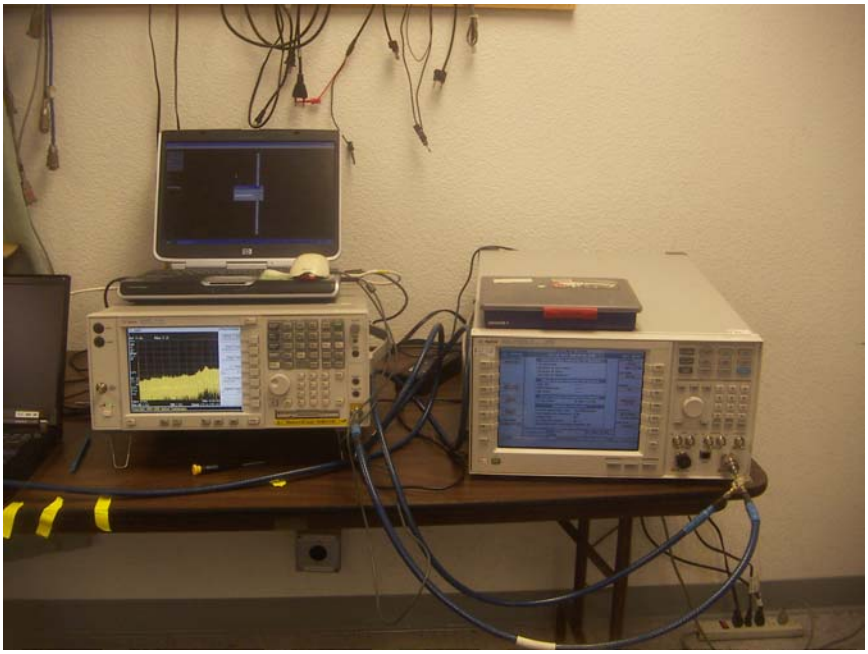
NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)
800MHz Celllar	20.0	28.88	0.44	0.170
1900 MHz PCS	20.0	28.90	0.52	0.174

8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO



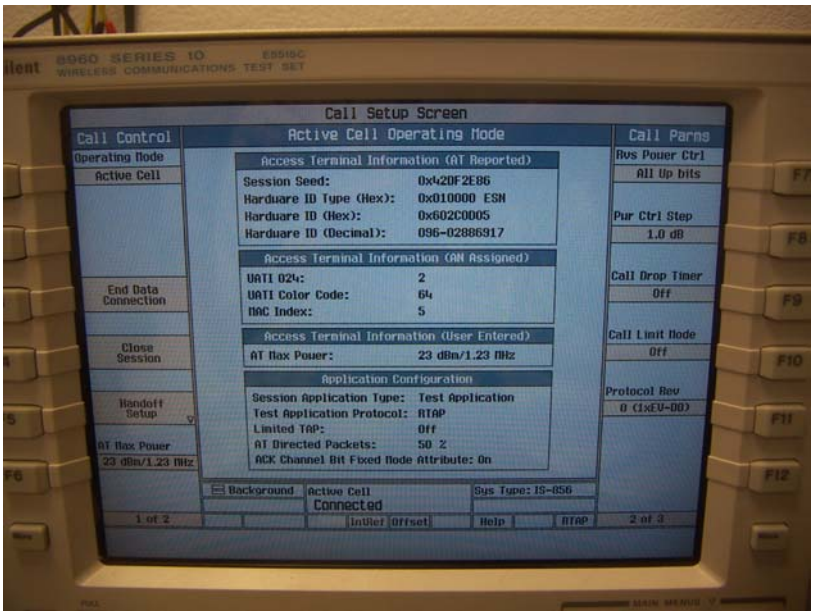
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

FRONT PHOTO

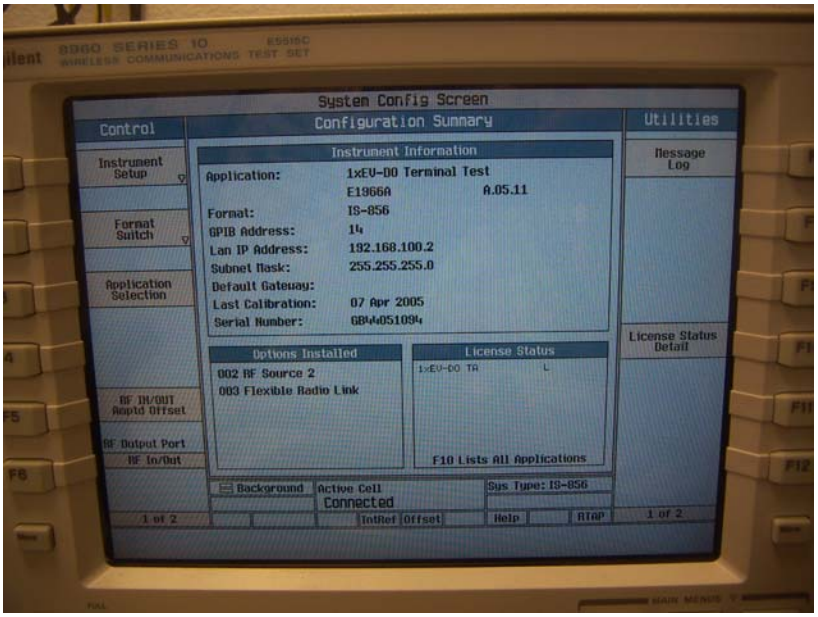
BACK PHOTO

AGILENT SETTING SCREEN SHOTS

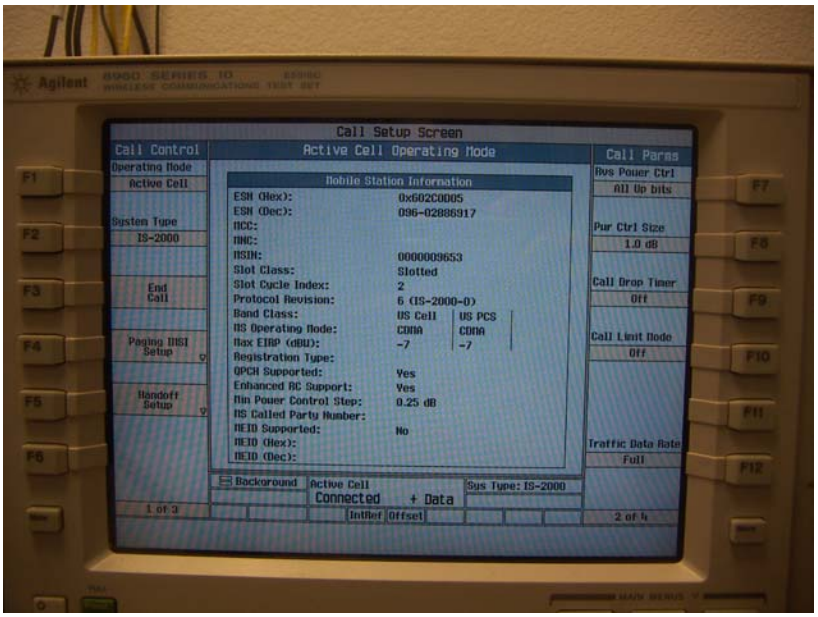
AGILENT SETTING SCREEN SHOTS – 1xEVDO



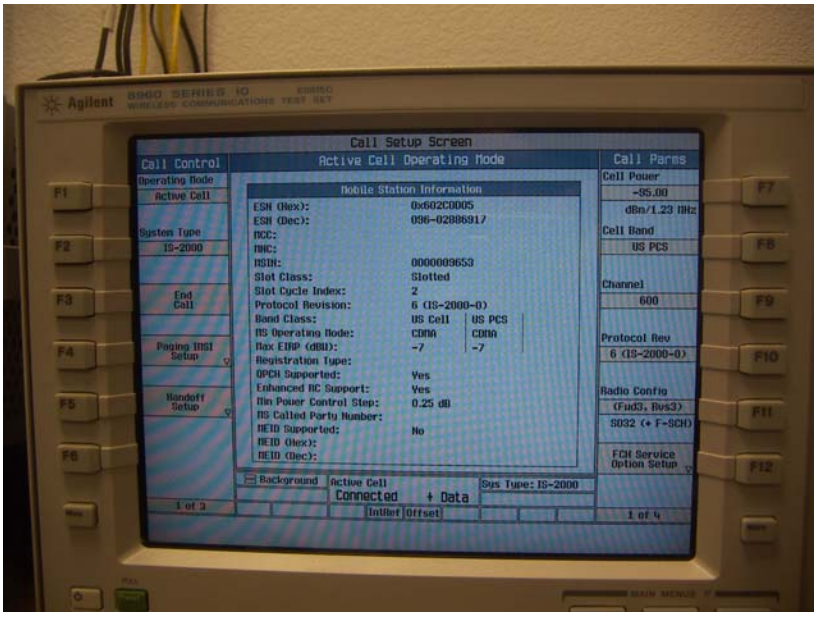
AGILENT SETTING SCREEN SHOTS – 1xEVDO



AGILENT SETTING SCREEN SHOTS – RTT



AGILENT SETTING SCREEN SHOTS – RTT



END OF REPORT