



FCC CFR47 PART 22 SUBPART H AND PART 24 E

&

INDUSTRY CANADA RSS-132 AND RSS-133

CERTIFICATION TEST REPORT  
FOR

USB MODEM

MODEL NUMBER: COMPASS 597

FCC ID: N7NC597

IC: 2417C-C597

REPORT NUMBER: 07U11455-1

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*Prepared for*

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

*Prepared by*

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## 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** USB MODEM

**MODEL:** COMPASS 597

**SERIAL NUMBER:** 2079

**DATE TESTED:** DECEMBER 17-21, 2007 and JANUARY 18-19, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 24E	No Non-Compliance Noted
IC RSS-132 ISSUE 2 and RSS-133 ISSUE 3	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  
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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA/EIA 603C (2004), FCC CFR 47 Part 2, FCC CFR 47 Part 22H, 24E, RSS-GEN, RSS132, RSS133, SPSR503, and SPSR510.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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 USB Modem CDMA Module, model Compass 597, manufactured by Sierra Wireless, Inc.

New FCC/IC approval with new Qualcomm chip 6500 series.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

824 to 849 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 824.7	1 x EVDO, Rev A	28.14	651.63
Mid CH - 836.5		28.59	722.77
High CH - 848.3		28.15	653.13

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 1851.25	1 x EVDO, Rev A	27.80	602.56
Mid CH - 1880		27.91	618.02
High CH - 1908.75		27.10	512.86

**L704 and C705 changed to improve Antenna Matching:**

824 to 849 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 824.7	1 x EVDO, Rev A	28.37	687.07
Mid CH - 836.5		28.58	721.11
High CH - 848.3		28.22	663.74

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)
Low CH - 1851.25	1 x EVDO, Rev A	28.05	638.26
Mid CH - 1880		28.04	636.80
High CH - 1908.75		27.32	539.51

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an encapsulating monopole and slot antenna with maximum gain as below:

824-894MHz with 1.3dBi (peak)  
1850-1990MHz with 2.7dBi (peak)

### **5.4. SOFTWARE AND FIRMWARE**

The EUT is linked with Agilent Communication Test Set.

## 5.5. WORST-CASE CONFIGURATION AND MODE

### PROCEDURE USED TO ESTABLISH TEST SIGNAL

#### **3G-CDMA2000 1xRTT**

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

<u>Application</u>	<u>Rev, License</u>
CDMA2000 Mobil Test	B.10.11, L

#### 1xRTT

- Call Setup > Shift & Preset
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > RC3 (Fwd3, Rvs3)
- FCH Service Option (SO) Setup > 32 (+ F-SCH)
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps  
    > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Cell Info > Cell Parameters > System ID (SID) > 8  
    > Network ID (NID) > 65535

Once "Active Cell" show "Connected" then change "Rvs Power Ctrl" from "Active bits" to "All Up bits" to get the maximum power.

#### Worst-case Measurement Result @ Low, Middle and High Channel

##### **Cellular Band**

Radio Configuration (RC)	Service Option (SO)	Channel	Frequency	Output Power (dBm)	
				Average	Peak
RC3 (Fwd3, Rvs3)	SO32 (+F-SCH)	1013	824.70	24.38	27.88
		384	836.52	24.58	28.19
		777	848.31	24.54	28.10

##### **PCS Band**

Radio Configuration (RC)	Service Option (SO)	Channel	Frequency	Output Power (dBm)	
				Average	Peak
RC3 (Fwd3, Rvs3)	SO32 (+F-SCH)	25	1851.25	24.31	27.52
		600	1880.00	24.41	27.59
		1175	1908.75	23.90	26.76

### 3G-CDMA2000 1xRTT

#### Preliminary Measurement Results @ Middle channel

Radio Configuration (RC)	Service Option (SO)	Output Power (dBm)					
		Cellular Band @ M-ch		PCS Band @ M-ch			
Average		Peak		Average		Peak	
RC1 (Fwd1, Rvs1)	1 (Voice)						
	2 (Loopback)	24.58	28.18	24.41	27.58		
	3 (Voice)						
	55 (Loopback)	24.58	28.18	24.41	27.58		
RC2 (Fwd2, Rvs2)	9 (Loopback)	24.58	28.18	24.41	27.58		
	17 (Voice)						
	55 (Loopback)	24.58	28.18	24.41	27.58		
RC3 (Fwd3, Rvs3)	1 (Voice)						
	2 (Loopback)	24.58	28.18	24.41	27.58		
	3 (Voice)						
	55 (Loopback)	24.58	18.18	24.41	27.58		
	32 (+ F-SCH)	<b>24.58</b>	<b>28.19</b>	<b>24.41</b>	<b>27.59</b>		
	32 (+ SCH)	23.90	28.00	23.77	27.43		
RC4 (Fwd4, Rvs3)	1 (Voice)						
	2 (Loopback)	24.58	28.18	24.40	27.61		
	3 (Voice)						
	55 (Loopback)	24.58	28.18	24.40	27.59		
	32 (+ F-SCH)	24.58	28.18	24.40	27.59		
	32 (+ SCH)	23.90	28.08	23.77	27.43		
RC54 (Fwd5, Rvs4)	9 (Loopback)	24.58	28.18	24.40	27.60		
	17 (Voice)						
	55 (Loopback)	24.58	28.18	24.40	27.66		

### 3G-CDMA2000 1xEV-DO Release 0 (Rel 0)

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

<u>Application</u>	<u>Rev, License</u>
1xEV-DO Terminal Test	A.06.06, L

#### FTAP

- Call Setup > Shift & Preset
- Protocol Rev > 0 (1xEV-DO)
- Application Config > Enhanced Test Application Protocol > FTAP
- FTAP Rate > 307.2 kbps (2 Slot, QPSK)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Rvs Power Ctrl > All Up bits (to get the maximum power)

#### RTAP

- Call Setup > Shift & Preset
- Protocol Rev > 0 (1xEV-DO)
- Application Config > Enhanced Test Application Protocol > RTAP
- RTAP Rate > 153.6 kbps
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Rvs Power Ctrl > All Up bits (to get the maximum power)

Worst-case Measurement Result @ Low, Middle and High Channel

Cellular Band - RTAP				Cellular Band - FTAP					
Channel	f (MHz)	RTAP Rate	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
1013	824.70	153.6	24.27	28.20	1013	824.70	307.2 kbps (2 slot, QPSK)	24.04	27.80
384	836.52		<b>24.57</b>	<b>28.28</b>	384	836.52		<b>24.33</b>	<b>28.22</b>
777	848.31		24.61	28.30	777	848.31		24.26	27.95

PCS Band - RTAP				PCS Band - FTAP					
Channel	f (MHz)	RTAP Rate	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
25	1851.25	153.6	24.27	27.26	25	1851.25	307.2 kbps (2 slot, QPSK)	24.06	27.42
600	1880.00		<b>24.40</b>	<b>27.80</b>	600	1880.00		<b>24.22</b>	<b>2749</b>
1175	1908.75		23.18	26.28	1175	1908.75		23.12	26.60

**3G-CDMA2000 1xEV-DO Release 0 (Rel 0)**

**Preliminary Measurement Results @ Middle channel**

Cellular Band - RTAP				Cellular Band - FTAP					
Channel	f (MHz)	RTAP Rate	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
384	836.52	9.6	24.22	28.20	384	836.52	307.2 kbps (2 slot, QPSK)	<b>24.33</b>	<b>28.22</b>
		19.2	24.40	28.23					
		38.4	24.47	28.25					
		76.8	24.56	28.27					
		<b>153.6</b>	<b>24.57</b>	<b>28.28</b>					

PCS Band - RTAP				PCS Band - FTAP					
Channel	f (MHz)	RTAP Rate	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
600	1880.00	9.6	24.10	27.42	600	1880.00	307.2 kbps (2 slot, QPSK)	<b>24.22</b>	<b>27.49</b>
		19.2	24.13	27.42					
		38.4	24.20	27.38					
		76.8	24.24	27.30					
		<b>153.6</b>	<b>24.40</b>	<b>27.80</b>					

### 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.

<u>Application</u>	<u>Rev, License</u>
1xEV-DO Terminal Test	A.06.06, L

#### FETAP

- Call Setup > Shift & Preset
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- FTAP Rate > 307.2 kbps (2 Slot, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 0
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots
- Rvs Power Ctrl > All Up bits (to get the maximum power)

#### 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)

#### Worst-case Measurement Result @ Low, Middle and High Channel

Cellular Band - RETAP				Cellular Band - FETAP				Conducted power (dBm)	
Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Average	Peak
			Average	Peak					
1013	824.70	12288	24.47	28.23	1013	824.70	307.2 (2 slot)	23.95	27.90
384	836.52		24.73	28.30	384	836.52		24.43	28.27
777	848.31		24.68	28.30	777	848.31		24.21	28.10
PCS Band - RETAP				PCS Band - FETAP					
Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
25	1851.25	4096	24.34	27.50	25	1851.25	307.2 (2 slot)	24.06	27.38
600	1880.00		24.44	27.91	600	1880.00		24.18	27.42
1175	1908.75		23.22	26.48	1175	1908.75		23.00	26.47

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

Preliminary Measurement Results @ Middle channel

Cellular Band - RETAP				Cellular Band - FETAP				Cellular Band - FETAP	
Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
384	836.52	128	24.00	28.32	384	836.52	307.2 (2 slot)	24.43	28.27
		256	24.09	28.28			307.2 (4 slot)	24.20	28.19
		512	24.17	28.28					
		768	24.27	28.28					
		1024	24.30	28.25					
		1536	24.40	28.32					
		2048	24.45	28.19					
		3072	24.62	28.38					
		4096	24.64	28.32					
		6144	24.65	28.38					
		8192	24.68	28.39					
		<b>12288</b>	<b>24.73</b>	<b>28.41</b>					

PCS Band - RETAP				PCS Band - FETAP				PCS Band - FETAP	
Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)		Channel	f (MHz)	FTAP Rate	Conducted power (dBm)	
			Average	Peak				Average	Peak
600	1880.00	128	24.00	27.51	600	1880	307.2 (2 slot)	24.18	27.42
		256	24.01	27.51			307.2 (4 slot)	23.92	27.23
		512	24.10	27.42					
		768	24.14	27.42					
		1024	24.18	27.42					
		1536	24.23	27.42					
		2048	24.27	27.38					
		3072	24.43	27.53					
		<b>4096</b>	<b>24.44</b>	<b>27.91</b>					
		6144	24.40	27.56					
		8192	24.40	27.60					
		12288	24.42	27.56					

**EV-DO REV A Worst Case Data**

Based on the above results among the different modulations, the EVDO REV A is 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 mid channel for Cell and PCS bands.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Gateway	W350A	N1AA81011809	DoC
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	MY43360112	NA
Communication Test Set	Agilent	E5515C	6B46160222	NA

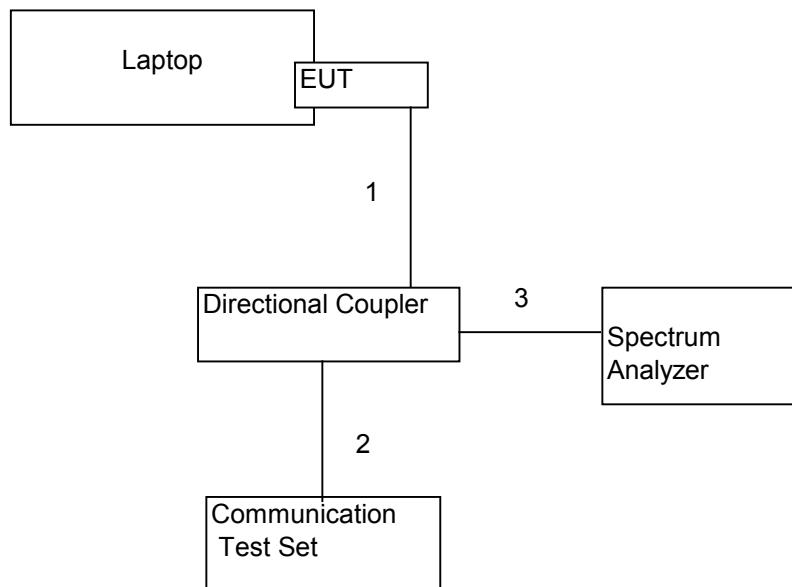
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	RF IN	1	Antenna port	Shielded	0.5m	NA
2	RF IN/OUT	1	Communication Test Set	Shielded	0.6m	NA
3	RF Out	1	Spectrum Analyzer	Shielded	0.9m	NA

### TEST SETUP

The EUT is Plug in to a host Computer during the tests. The Communication test set is used to link the USB modem.

**SETUP DIAGRAM FOR TESTS**



## 5.7. 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	Asset	Cal Date	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	05/02/07	08/07/08
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	10/13/07	10/13/08
Power Sensor	Agilent	E9327A	C00964	12/02/07	12/02/08
Peak Power Meter	Agilent / HP	E4416A	C00963	12/02/07	12/02/08
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/15/07	04/15/08
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	09/15/07	09/15/08
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	01/27/07	01/27/08
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	09/27/07	09/27/08
Communication Test Set	Agilent	E5515C	6B46160222	06/29/07	06/29/08
Signal Generator 2 -40 GHz	R & S	SMP04	C00953	11/16/07	02/16/09
Signal Generator 1024 MHz	R & S	SMY01	C00979	11/28/07	05/28/09
Dipole	EMCO	3121C-DB4	C00993	06/08/07	06/08/08
2.7GHz HPF	MicroTronic	HPM13194	N02689	CNR	CNR
1.5GHz HPF	MicroTronic	HPM13195	N02687	CNR	CNR

## 6. LIMITS AND RESULTS

### 6.1. OCCUPIED BANDWIDTH

#### LIMITS

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

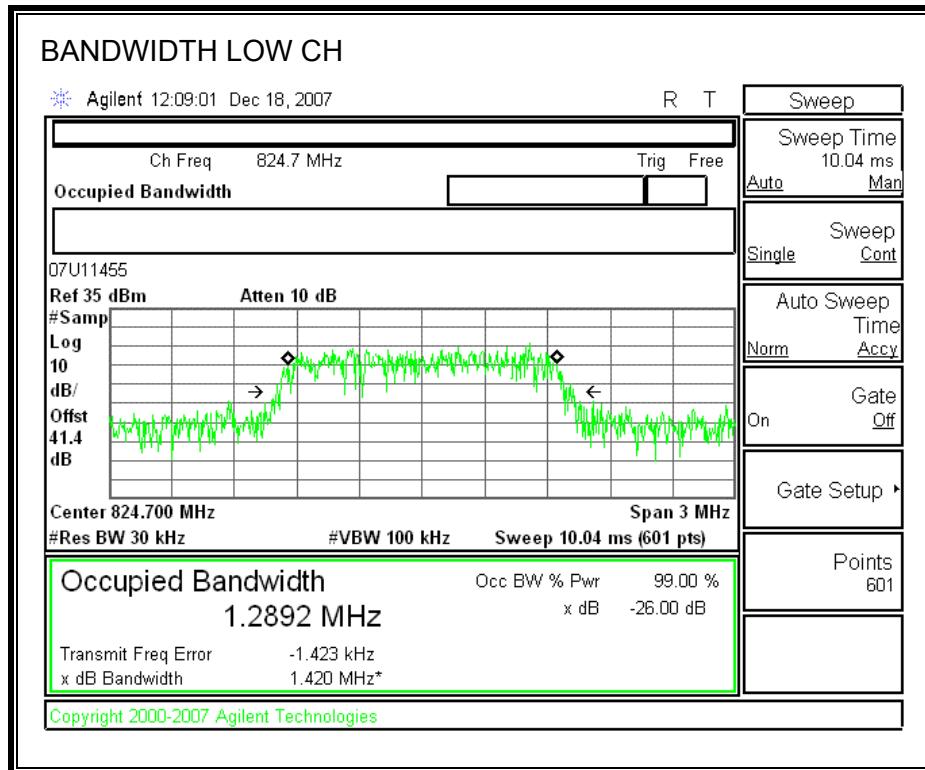
##### EVDO CELL REV A Modulation

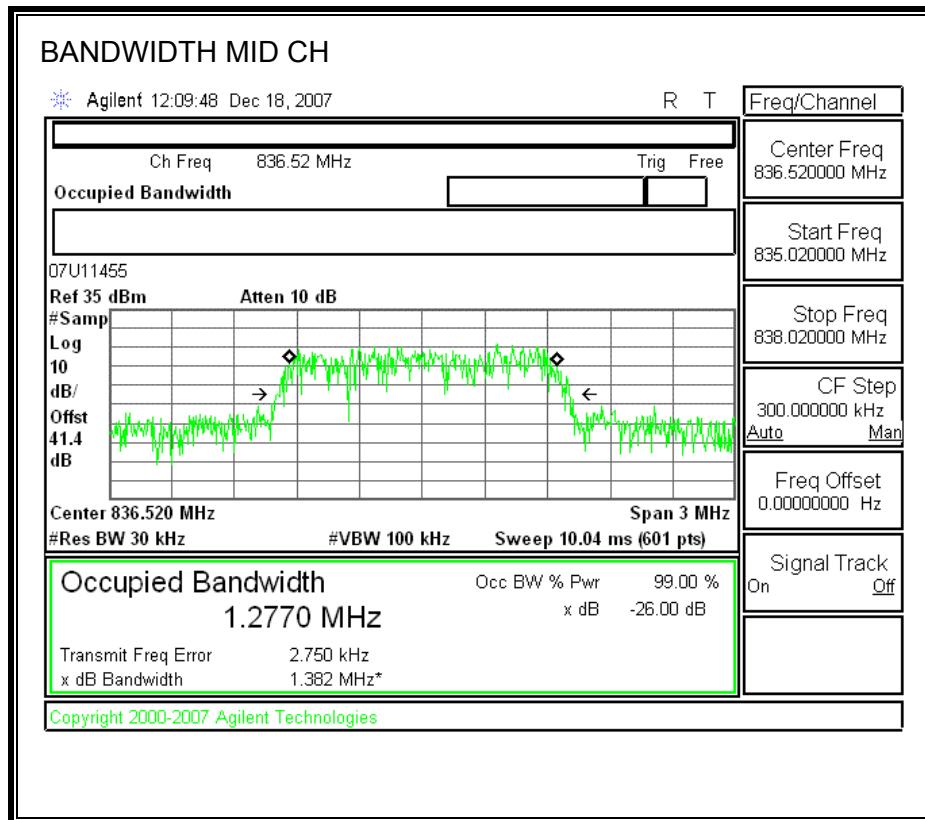
Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dB Bandwidth (MHz)
Low	824.7	1.2892	1.420
Middle	836.52	1.2770	1.382
High	848.31	1.2745	1.421

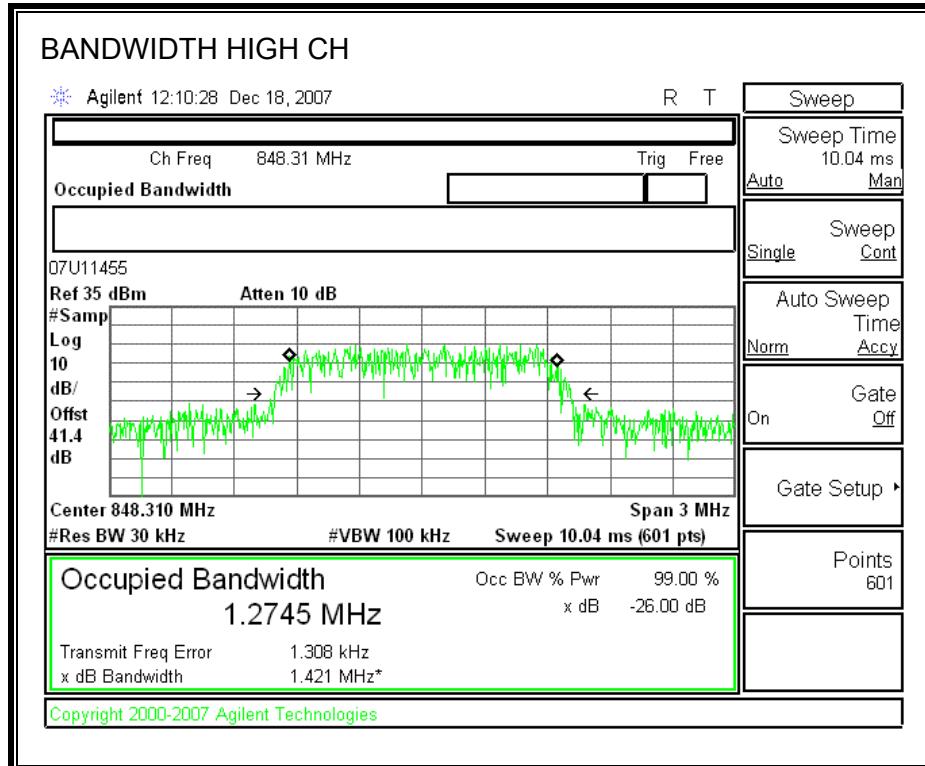
##### EVDO REV A PCS Modulation

Channel	Frequency (MHz)	99 %Bandwidth (MHz)	-26dB Bandwidth (MHz)
Low	1.851	1.2876	1.412
Middle	1.88	1.2843	1.408
High	1.908	1.2792	1.431

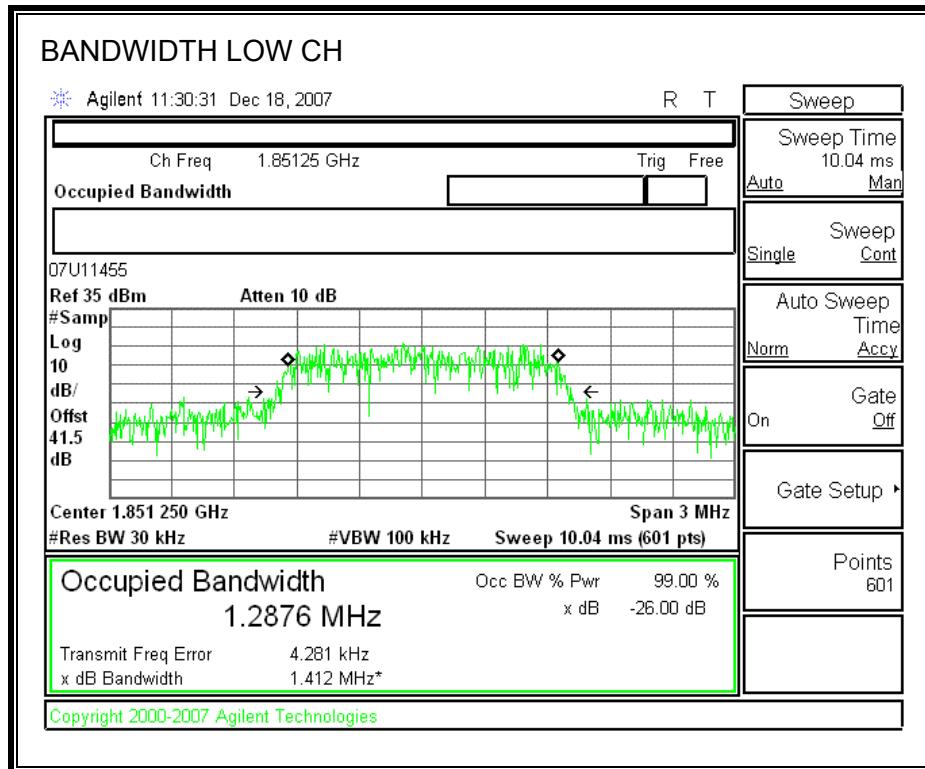
**800MHz CELL EVDO REV A -26 dB BANDWIDTH**

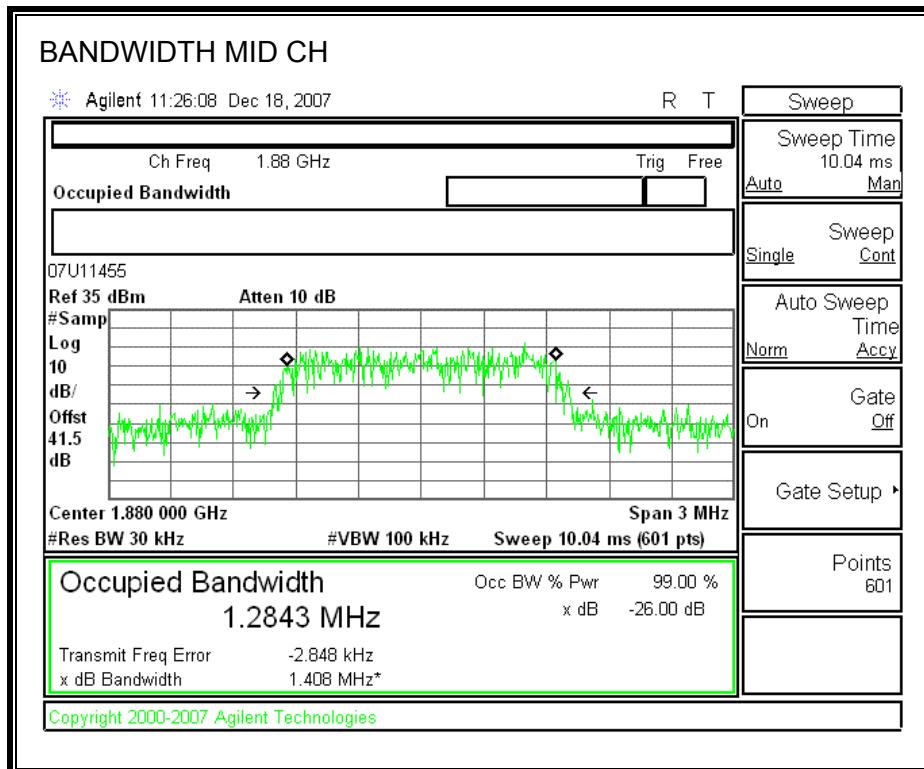


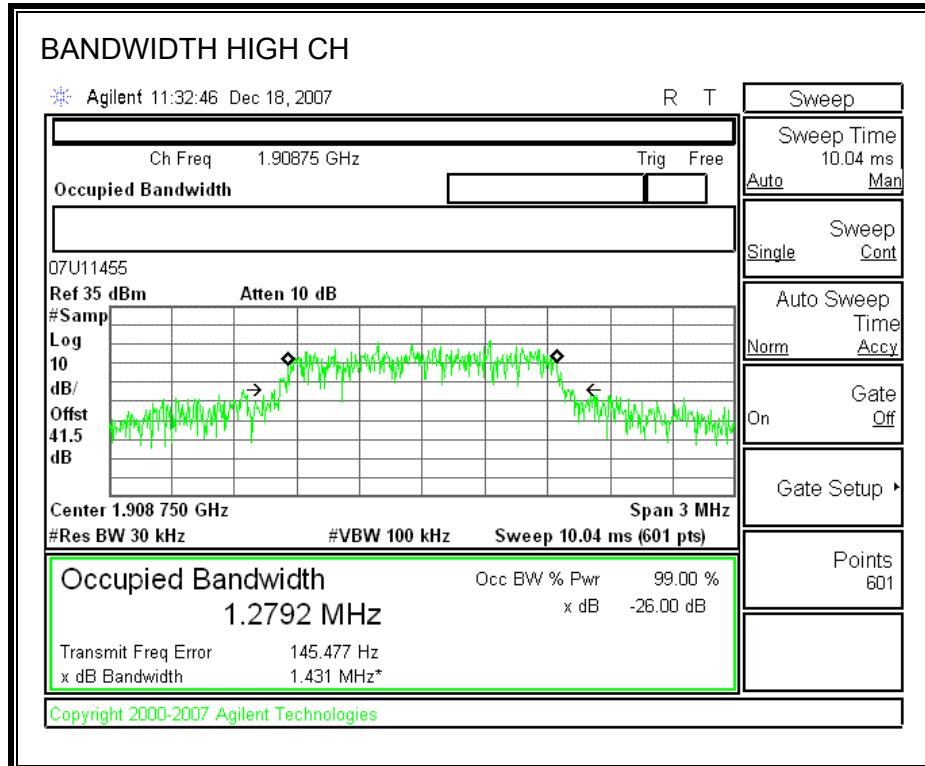




**EVDO REV A PCS -26 dB BANDWIDTH**







## 6.2. RF OUTPUT POWER

### LIMITS

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(b) & RSS133 § 6.4 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.

RSS-132 § 4.4 The maximum ERP shall be 6.3 Watts for mobile stations.

### TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.17

### RESULTS

No non-compliance noted.

### EVDO REV A

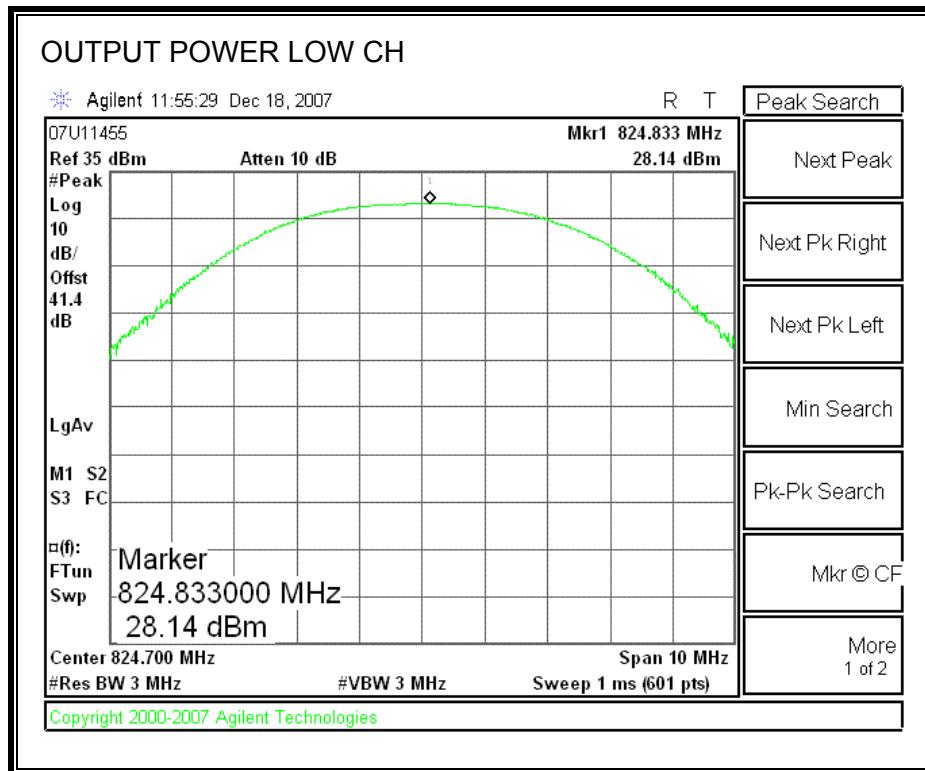
800MHz CELL CDMA Modulation

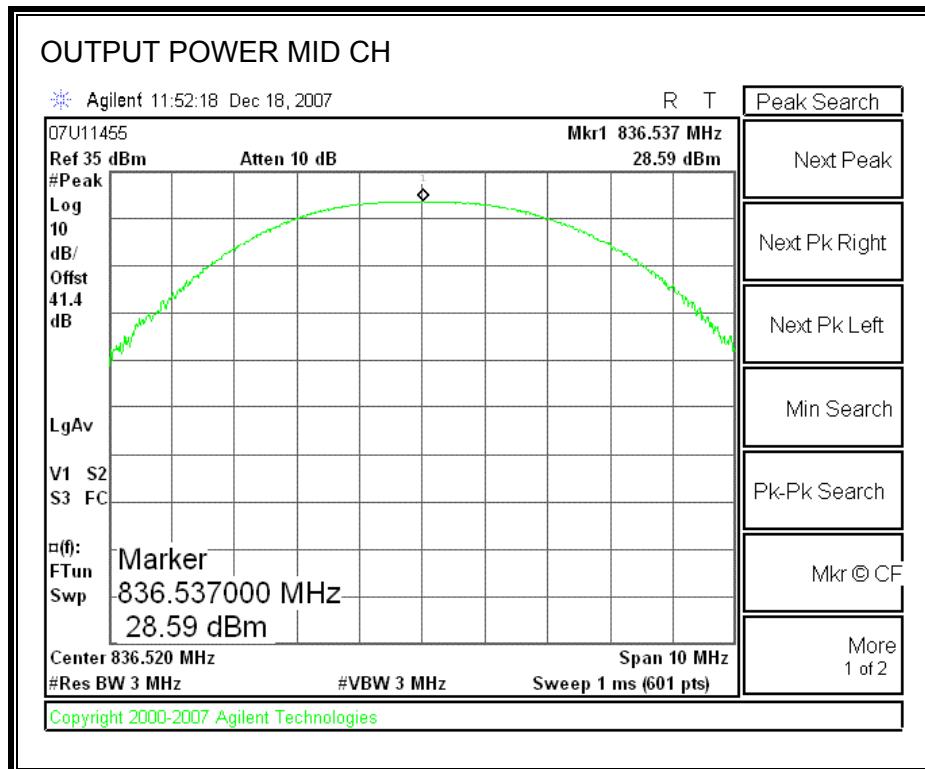
Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	28.14	651.63	26.20	416.87
Middle	836.5	28.59	722.77	26.60	457.09
High	848.3	28.15	653.13	25.30	338.84

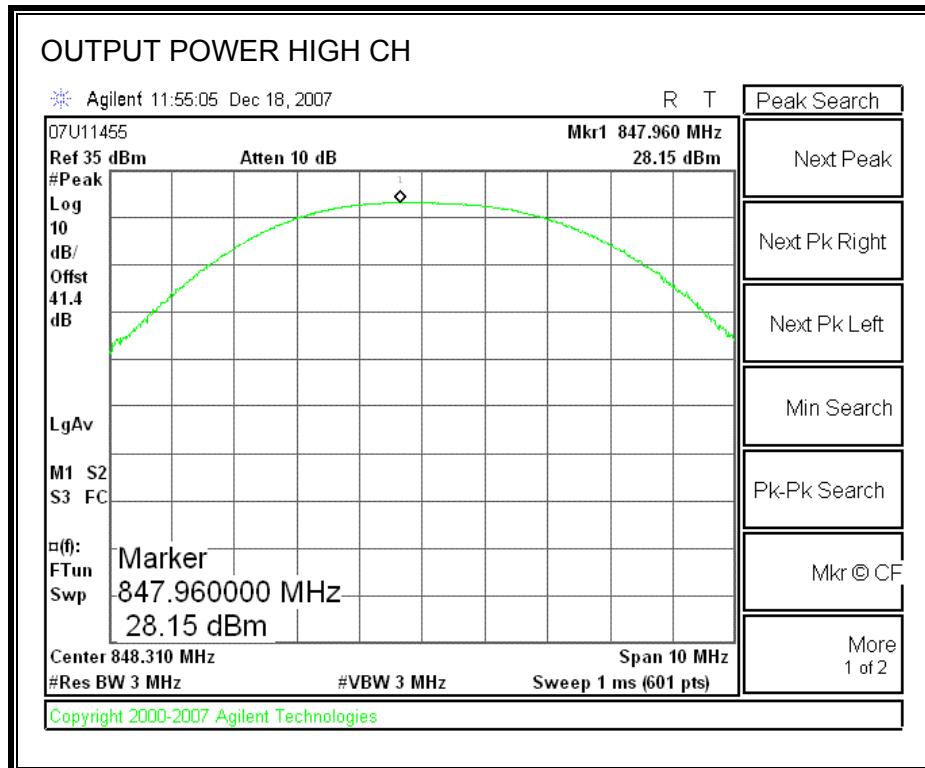
1900MHz PCS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	27.80	602.56	24.00	251.19
Middle	1880.00	27.91	618.02	23.60	229.09
High	1908.75	27.10	512.86	23.90	245.47

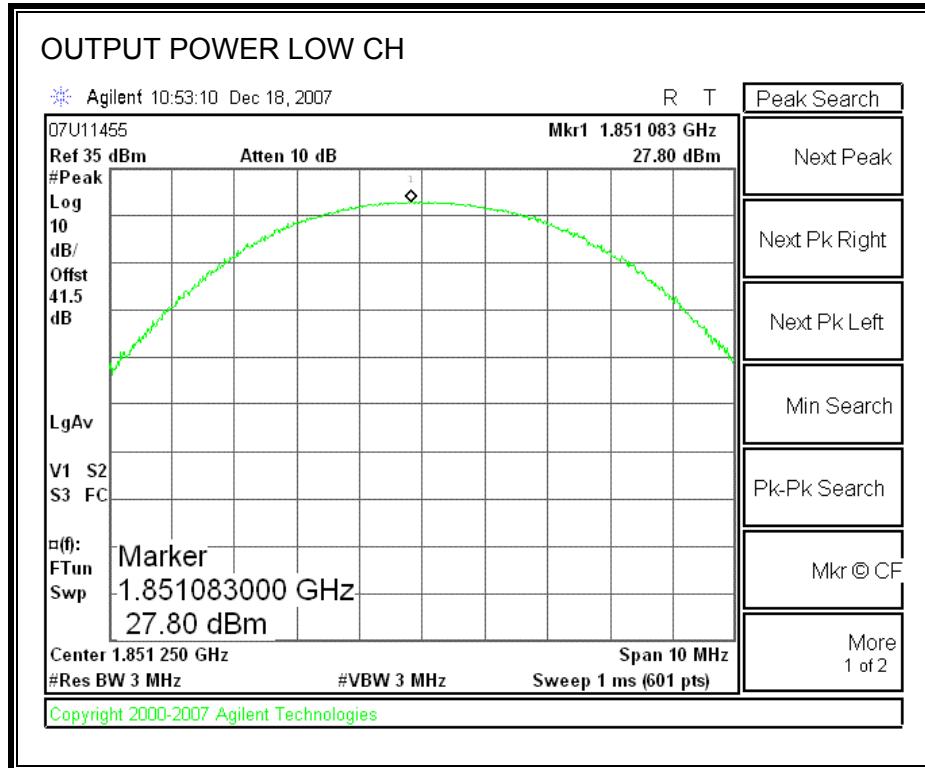
EVDO REV A , CELL

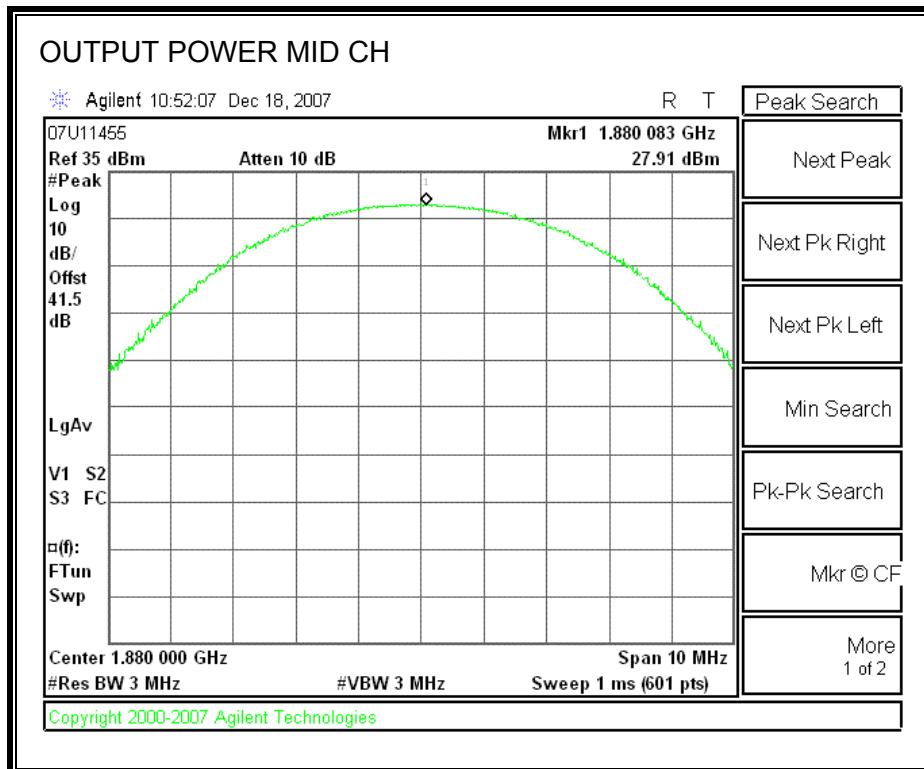


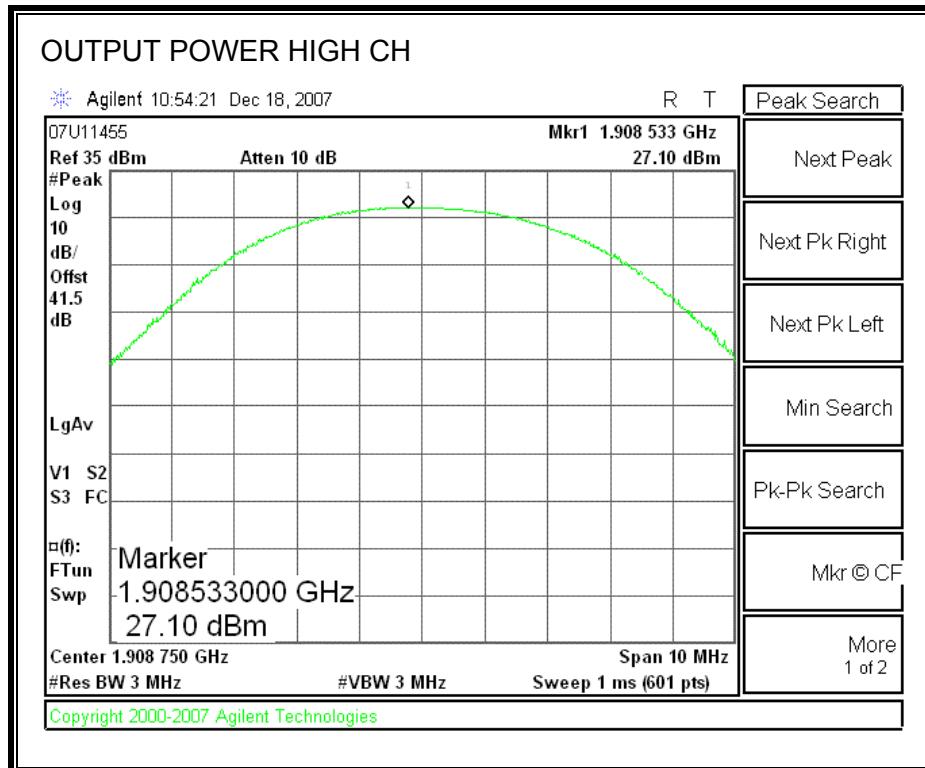




**EVDO REV A PCS)**







**EVDO REV A Output Power (ERP)**

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

Company: Sierra Wireless  
Project #: 07U11455  
Date: 12/20/2007  
Test Engineer: Chin Pang  
Configuration: EUT/Laptop  
Mode: TX, CELL, EVDO REV A

**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>									
824.70	98.0	V	24.4	0.5	0.0	23.9	38.5	-14.5	
824.70	102.0	H	26.7	0.5	0.0	26.2	38.5	-12.2	
<b>Mid Ch</b>									
836.52	97.5	V	24.5	0.6	0.0	23.9	38.5	-14.5	
836.52	102.3	H	27.2	0.6	0.0	26.6	38.5	-11.8	
<b>High Ch</b>									
848.30	97.0	V	23.8	0.7	0.0	23.1	38.5	-15.3	
848.30	101.5	H	26.0	0.7	0.0	25.3	38.5	-13.1	

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**EVDO REV A Output Power (EIRP)**

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

Company: Sierra Wireless

Project #: 07U11455

Date: 12/20/2007

Test Engineer: Chin Pang

Configuration: EUT/Laptop

Mode: TX, EVDO, PCS

**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>									
1.851	90.0	V	16.6	0.9	8.3	24.0	33.0	-9.0	
1.851	87.0	H	13.1	0.9	8.3	20.5	33.0	-12.5	
<b>Mid Ch</b>									
1.880	90.5	V	16.2	0.9	8.3	23.6	33.0	-9.4	
1.880	89.0	H	14.2	0.9	8.3	21.6	33.0	-11.4	
<b>High Ch</b>									
1.909	89.7	V	16.4	0.9	8.4	23.9	33.0	-9.1	
1.909	87.0	H	14.2	0.9	8.4	21.7	33.0	-11.4	

Rev. 1.24.7

**L704 and C705 changed to improve Antenna Matching:**

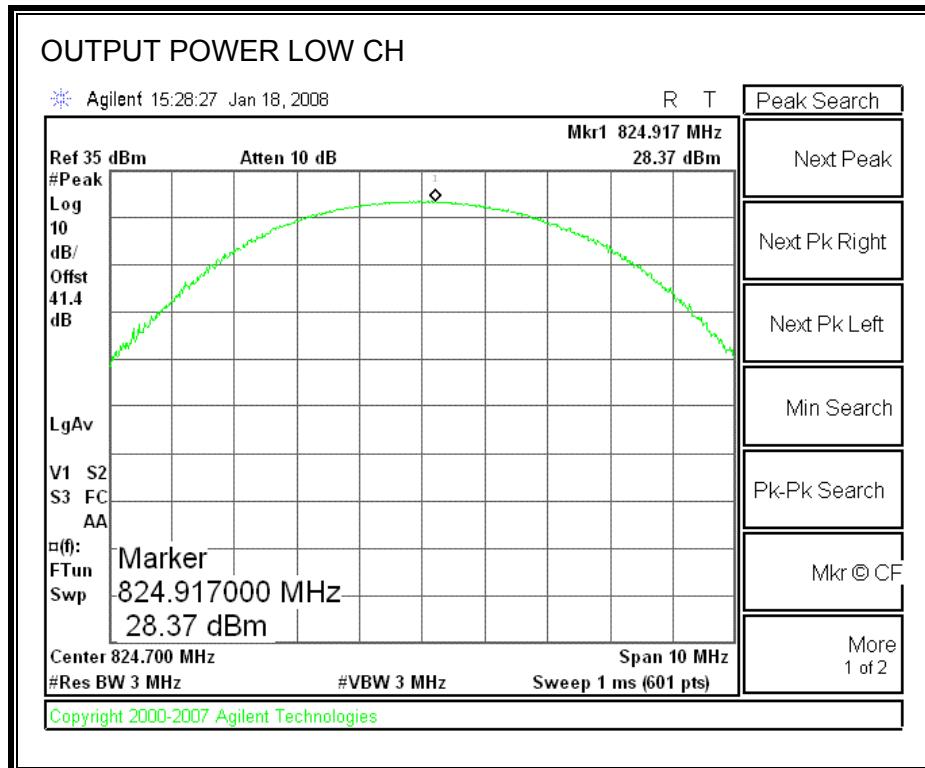
800MHz CELL CDMA Modulation

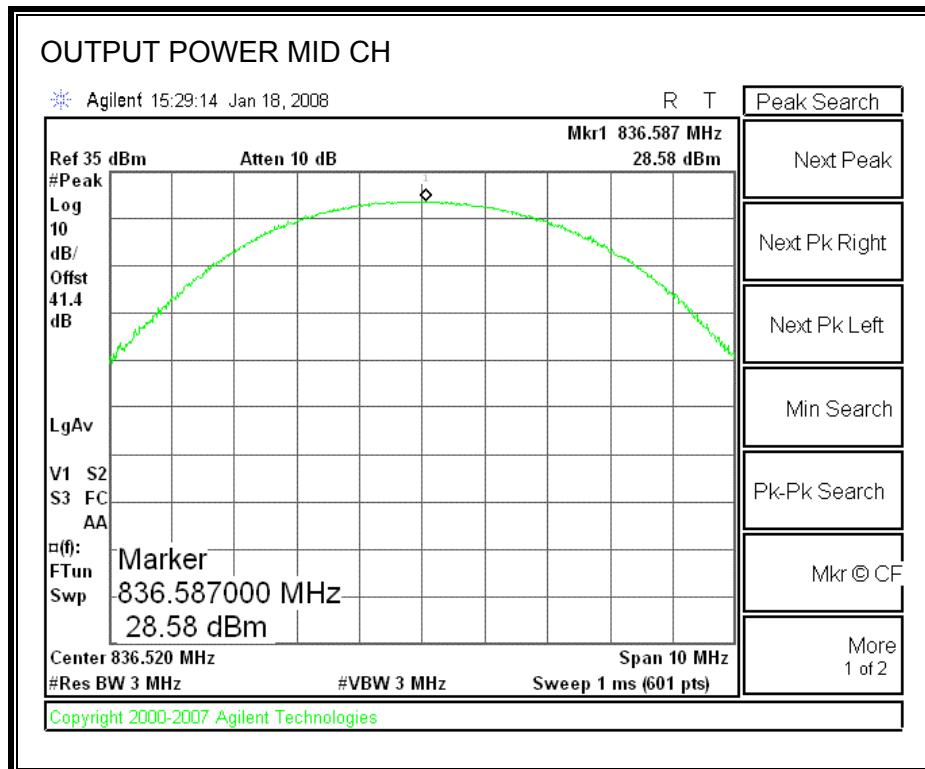
Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	28.37	687.07	26.20	416.87
Middle	836.5	28.58	721.11	26.60	457.09
High	848.3	28.22	663.74	25.30	338.84

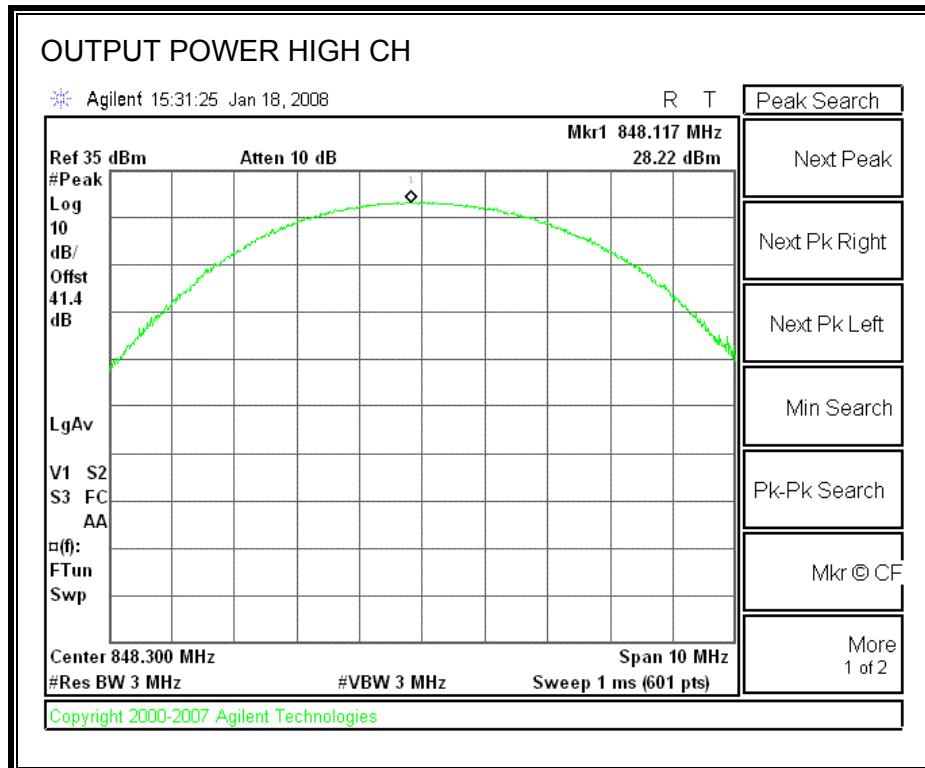
1900MHz PCS Modulation

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	28.05	638.26	24.00	251.19
Middle	1880.00	28.04	636.80	23.60	229.09
High	1908.75	27.32	539.51	23.90	245.47

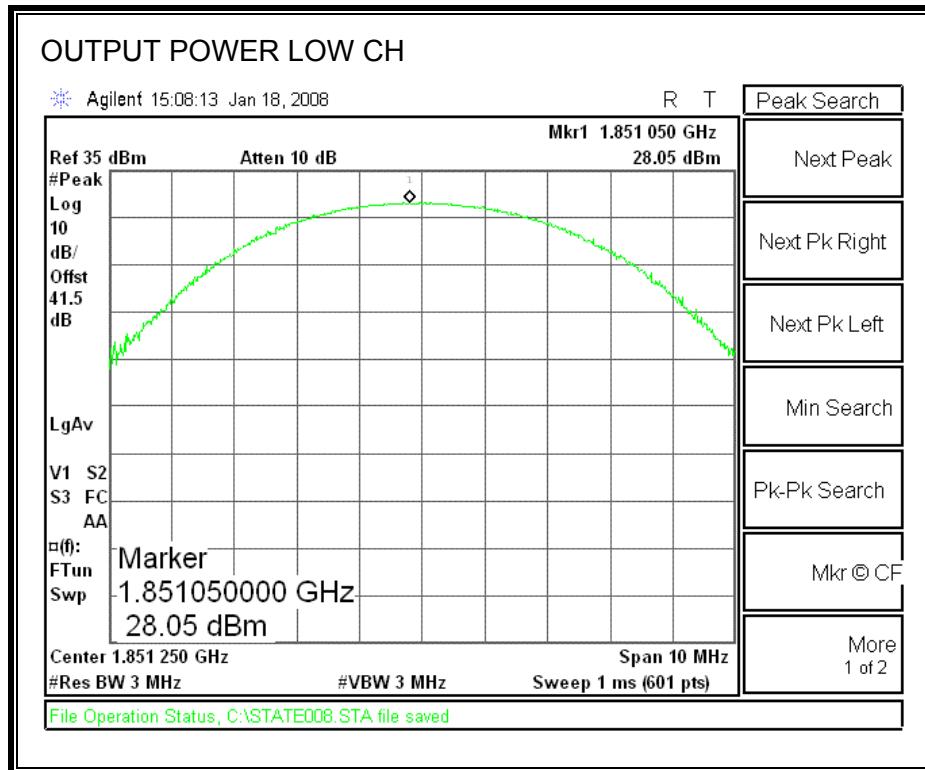
**EVD0 REV A , CELL**

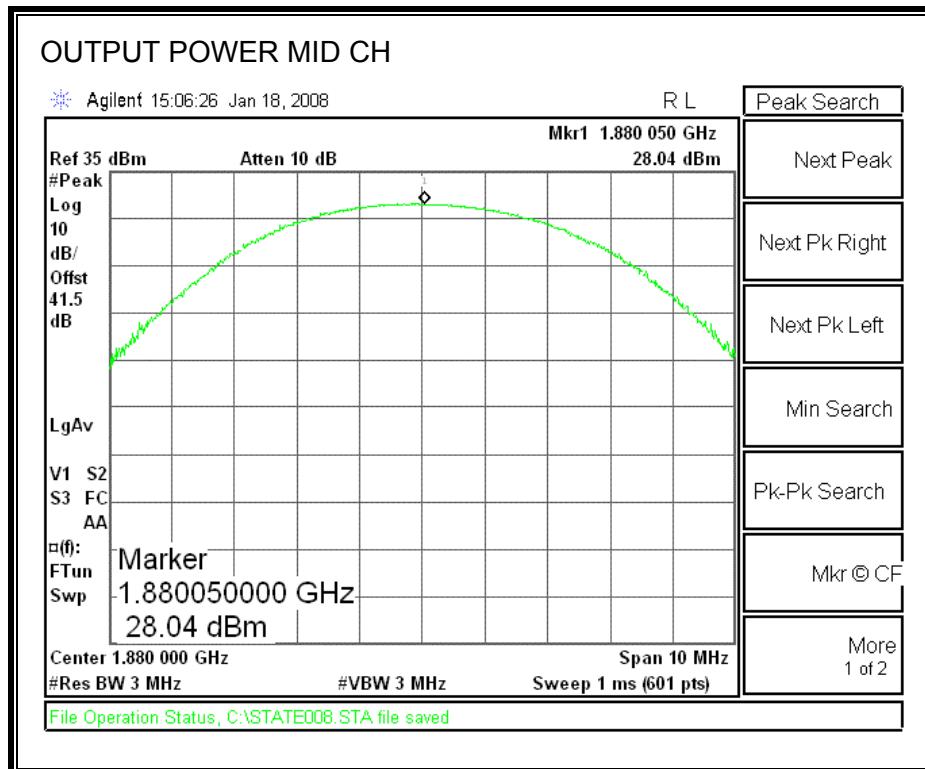


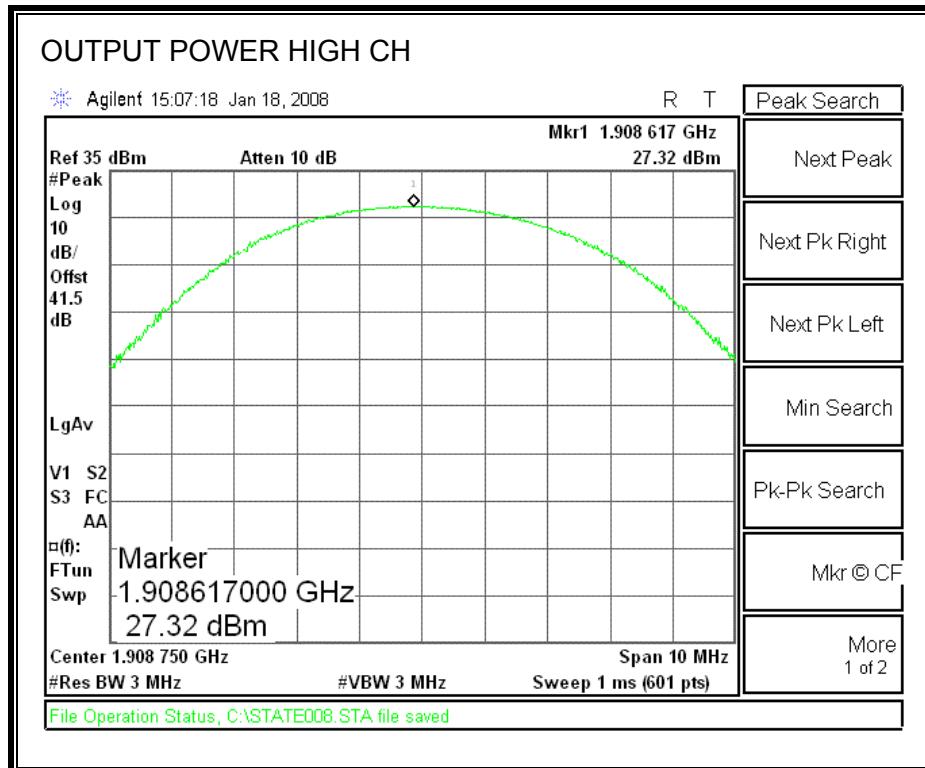




**EVD0 REV A PCS)**







**With Metal-Plated Decorative Rings and L704 and C705 changed to improve Antenna Matching:**

800MHz CELL CDMA Modulation

Channel	Frequency (MHz)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	30.10	1023.29
Middle	836.5	30.90	1230.27
High	848.3	28.60	724.44

1900MHz PCS Modulation

Channel	Frequency (MHz)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	25.40	346.74
Middle	1880.00	25.80	380.19
High	1908.75	25.40	346.74

**EVDO REV A Output Power (ERP)**

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

Company: Sierra Wireless  
Project #: 07U11455  
Date: 02/14/2008  
Test Engineer: Mengistu Mekuria  
Configuration: EUT/Laptop  
Mode: TX, CELL, EVDO REV A

**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>									
824.70	97.2	V	23.6	0.5	0.0	23.1	38.5	-15.3	
824.70	105.9	H	30.6	0.5	0.0	30.1	38.5	-8.3	
<b>Mid Ch</b>									
836.52	97.7	V	24.7	0.6	0.0	24.1	38.5	-14.4	
836.52	106.6	H	31.5	0.6	0.0	30.9	38.5	-7.6	
<b>High Ch</b>									
848.30	95.3	V	22.1	0.7	0.0	21.4	38.5	-17.0	
848.30	104.8	H	29.3	0.7	0.0	28.6	38.5	-9.8	

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**EVDO REV A Output Power (EIRP)**

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

Company: Sierra Wireless  
Project #: 07U11455  
Date: 02/14/2008  
Test Engineer: Mengistu Mekuria  
Configuration: EUT/Laptop  
Mode: TX, EVDO, PCS

**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>									
1.851	85.6	V	18.0	0.9	8.3	25.4	33.0	-7.6	
1.851	82.9	H	13.6	0.9	8.3	21.0	33.0	-12.0	
<b>Mid Ch</b>									
1.880	85.9	V	18.4	0.9	8.3	25.8	33.0	-7.2	
1.880	83.8	H	14.8	0.9	8.3	22.3	33.0	-10.8	
<b>High Ch</b>									
1.909	85.6	V	17.9	0.9	8.4	25.4	33.0	-7.6	
1.909	82.5	H	13.8	0.9	8.4	21.3	33.0	-11.7	

Rev. 1.24.7

### 6.3. SPURIOUS EMISSION AT ANTENNA TERMINAL

#### LIMIT

§22.917 (e), §24.238 (a), RSS-132 § 4.5.1, & RSS-133 § 6.5.1 (a) (i) & (b) 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

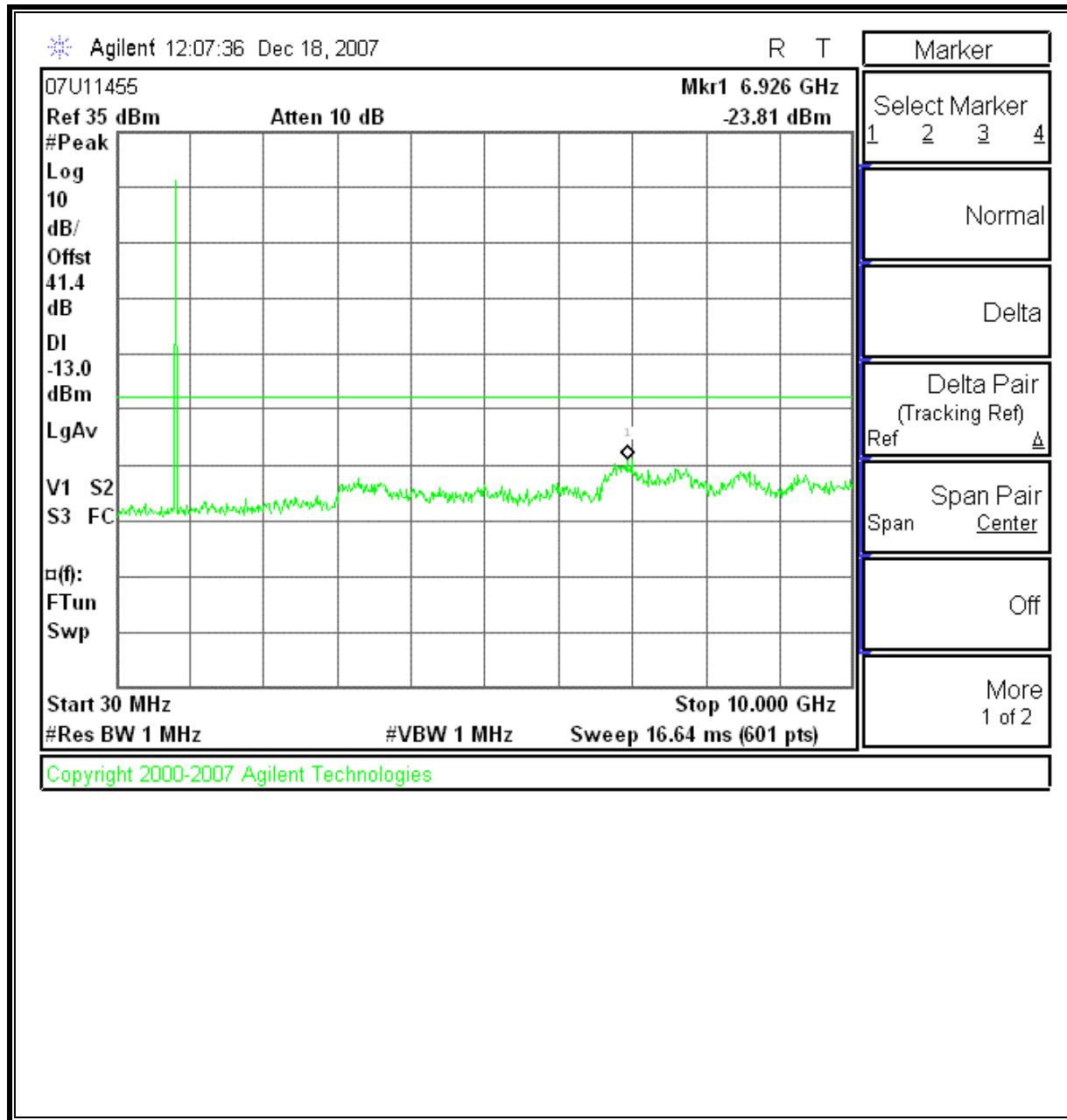
RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.12

#### RESULTS

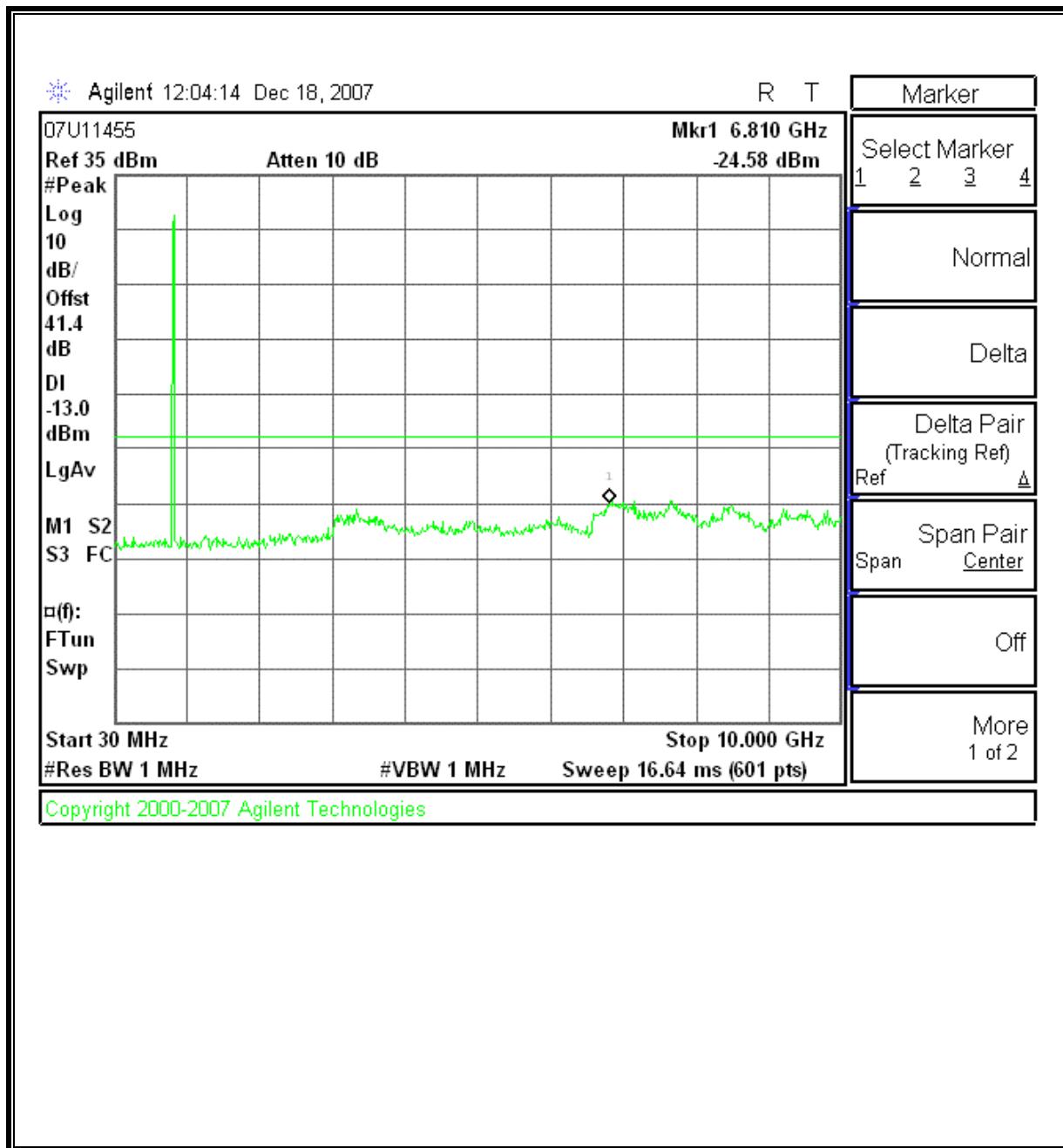
No non-compliance noted.

**800MHz CELLULAR**

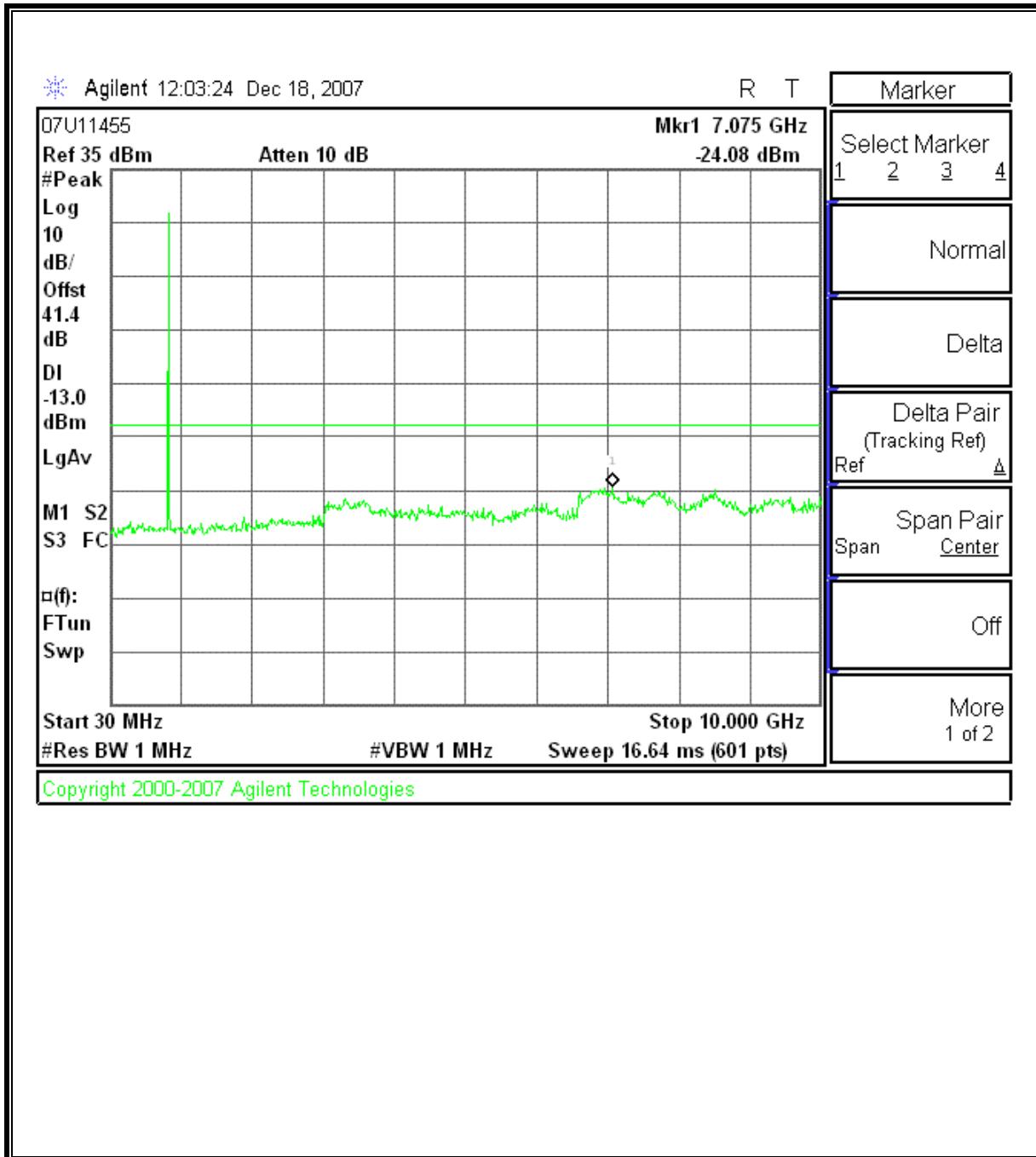
**EVDO REV A Modulation: Low Channel Out-Of-Band Emissions**



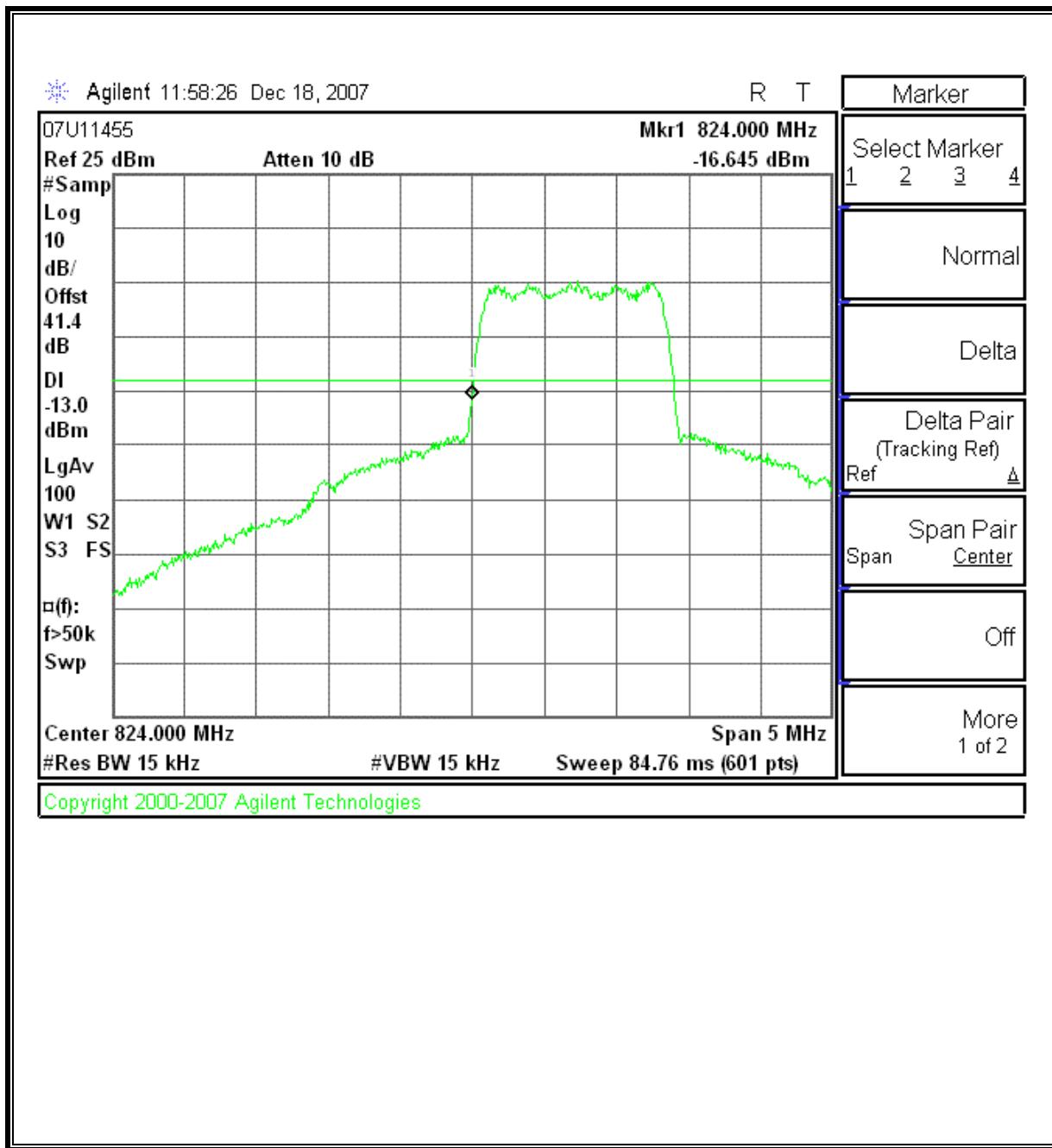
**EVDO REV A Modulation: Mid Channel Out-Of-Band Emissions**



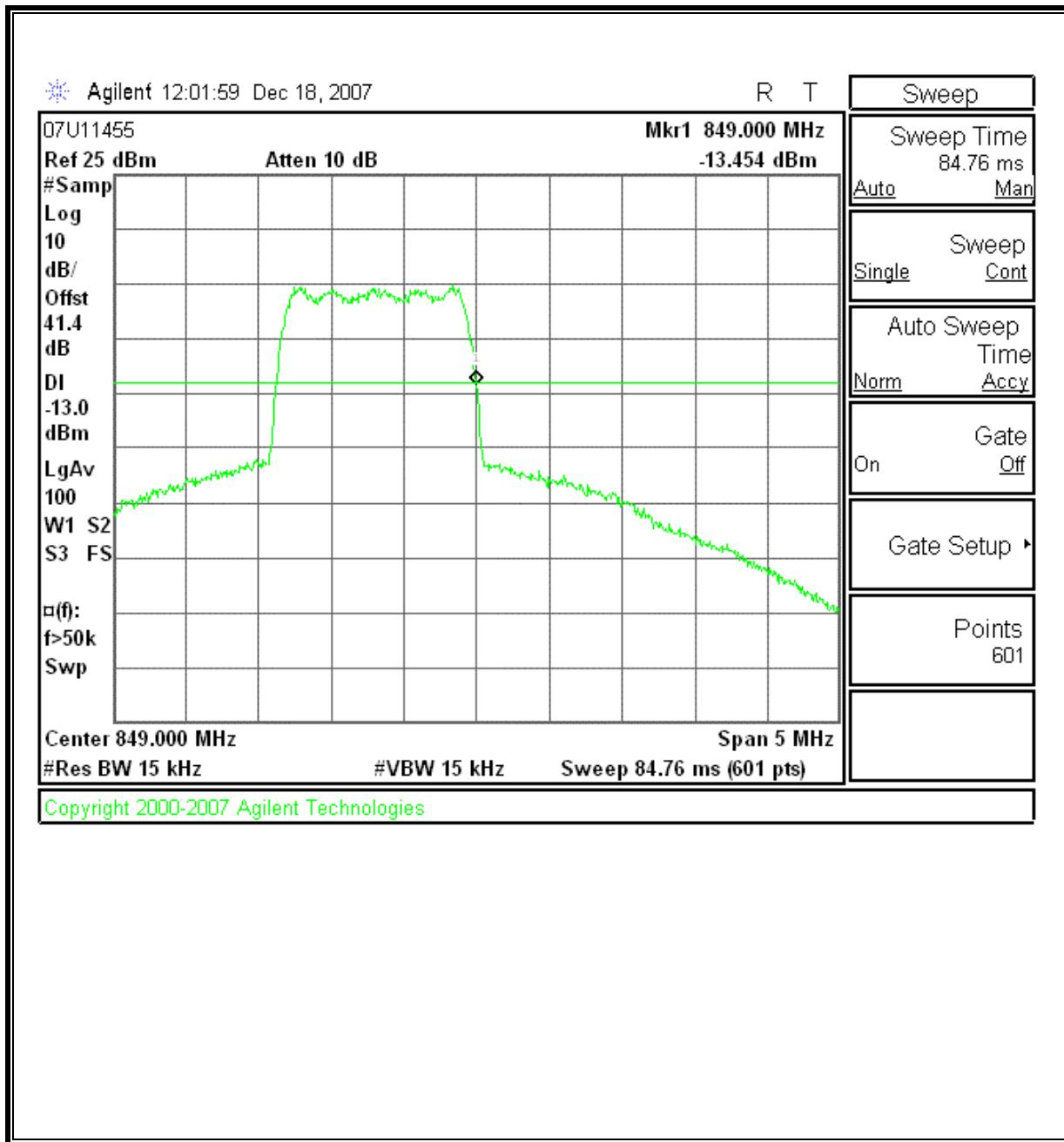
**EVD0 REV A Modulation: High Channel Out-Of-Band Emissions**



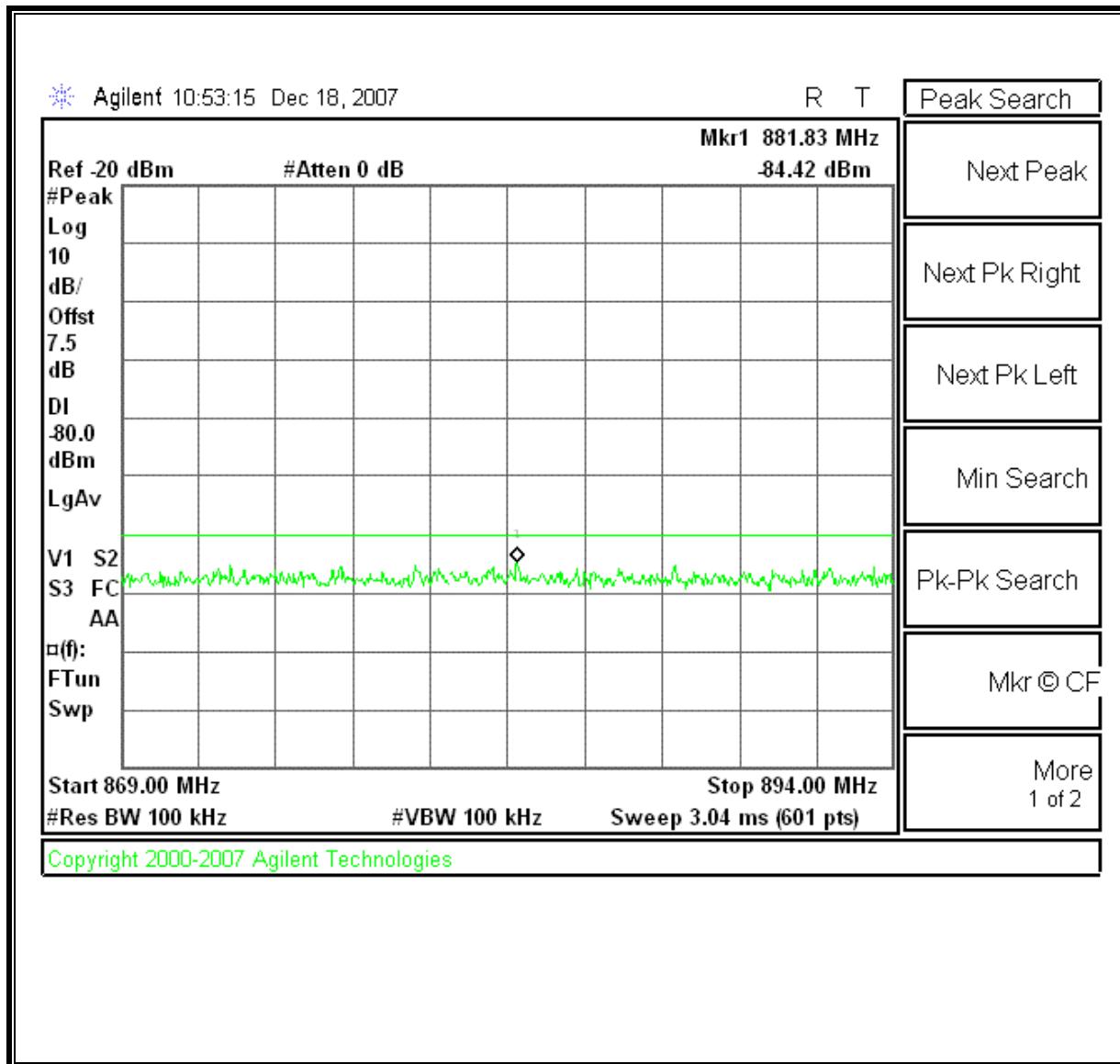
**EVD0 REV A Modulation: Low Channel Band Edge**



**EVDO REV A Modulation: High Channel Band Edge**

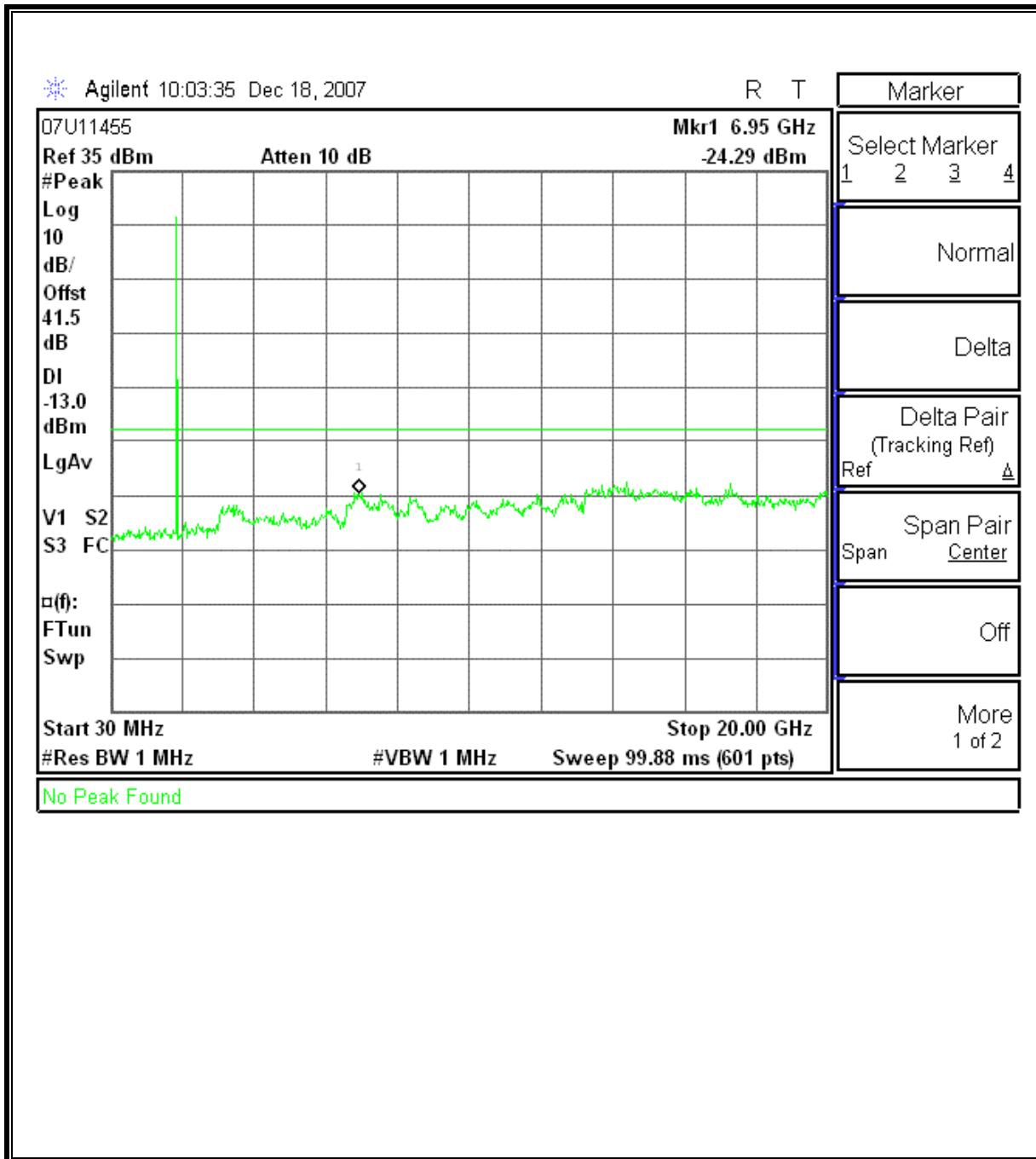


**EVDO REV A Modulation Mobile Emissions in Base Frequency Range**

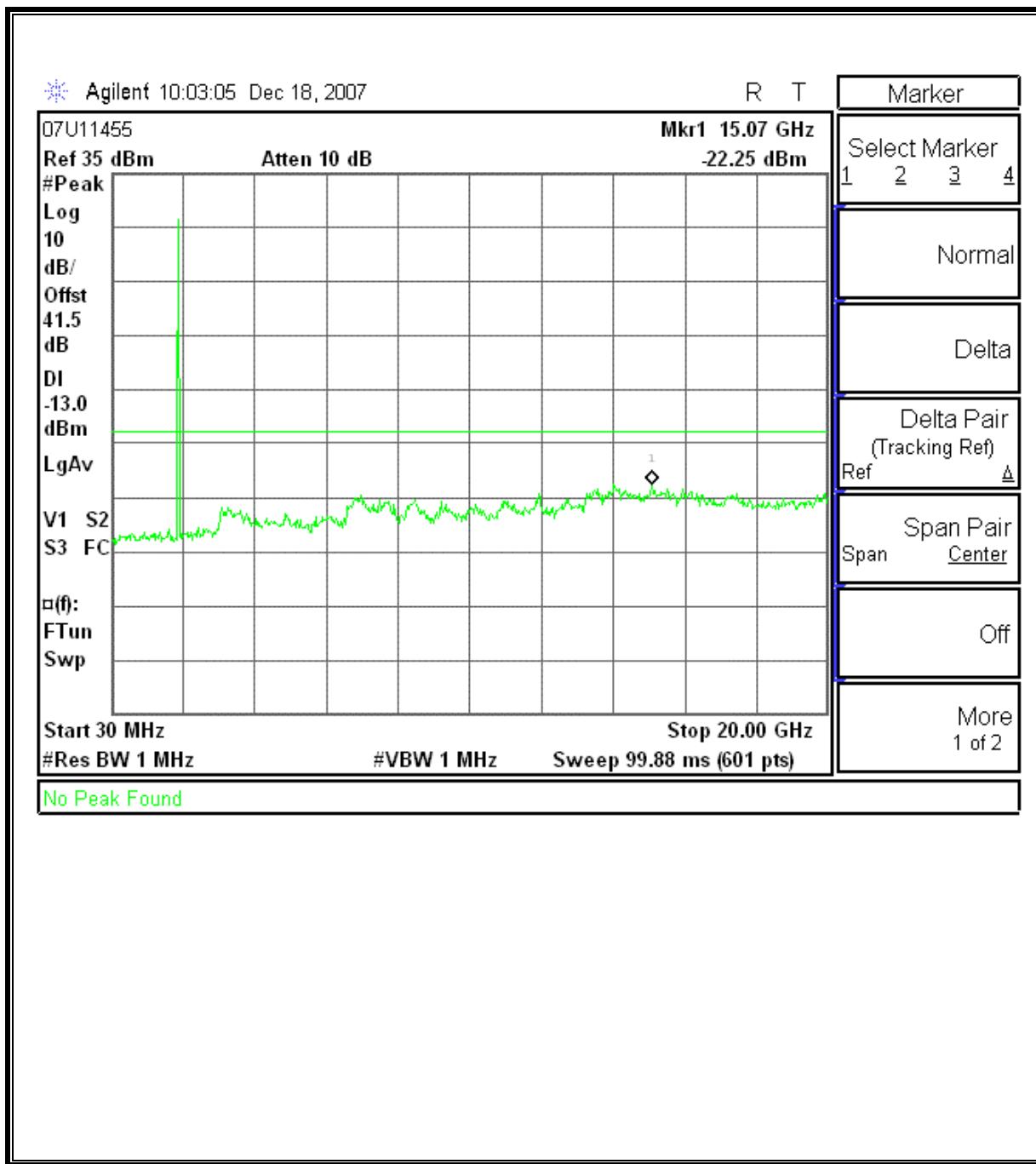


**1900MHz PCS MODULATION RESULTS**

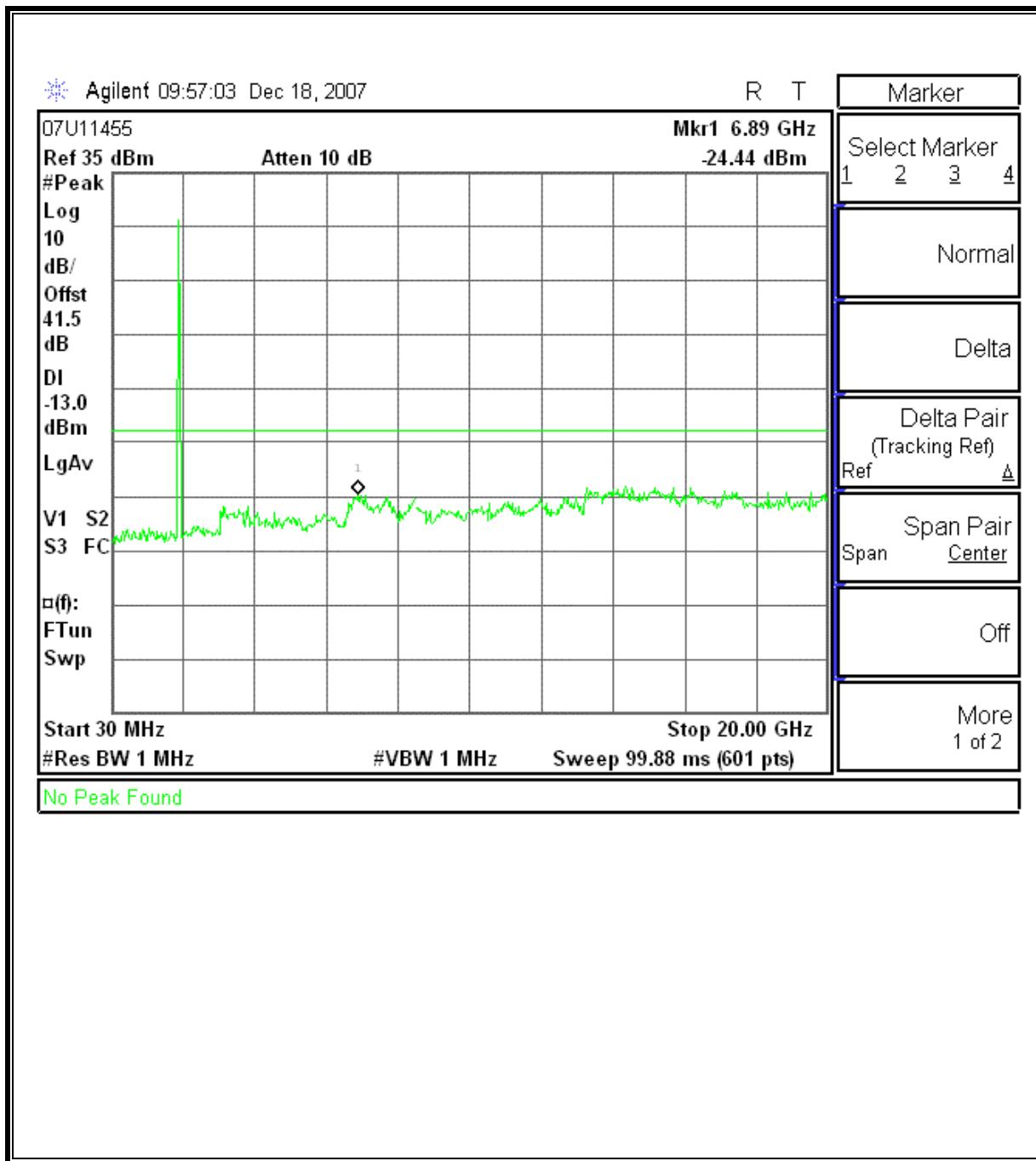
**Low Channel, Out-Of-Band Emissions**



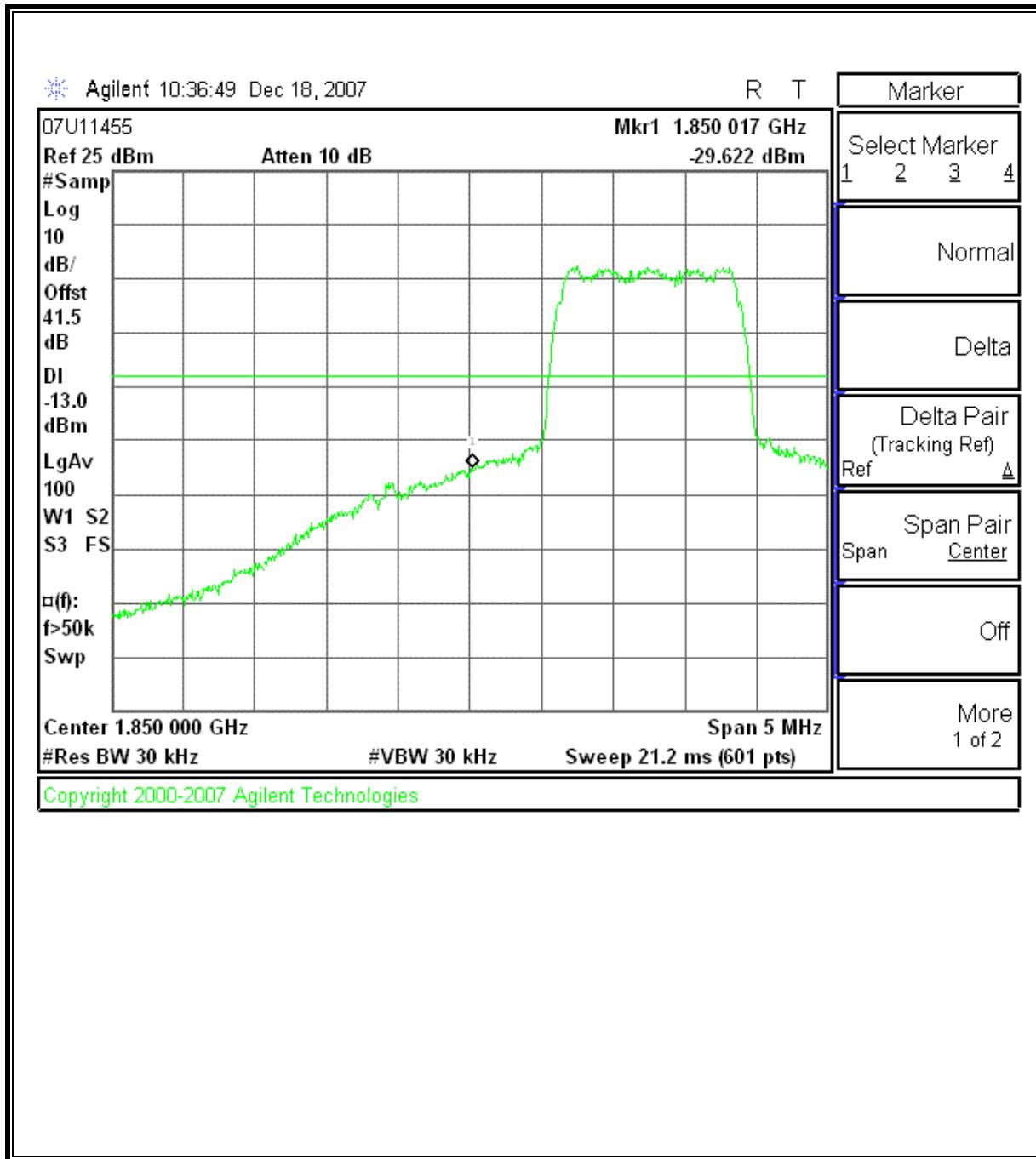
**Mid Channel, Out-Of-Band Emissions**



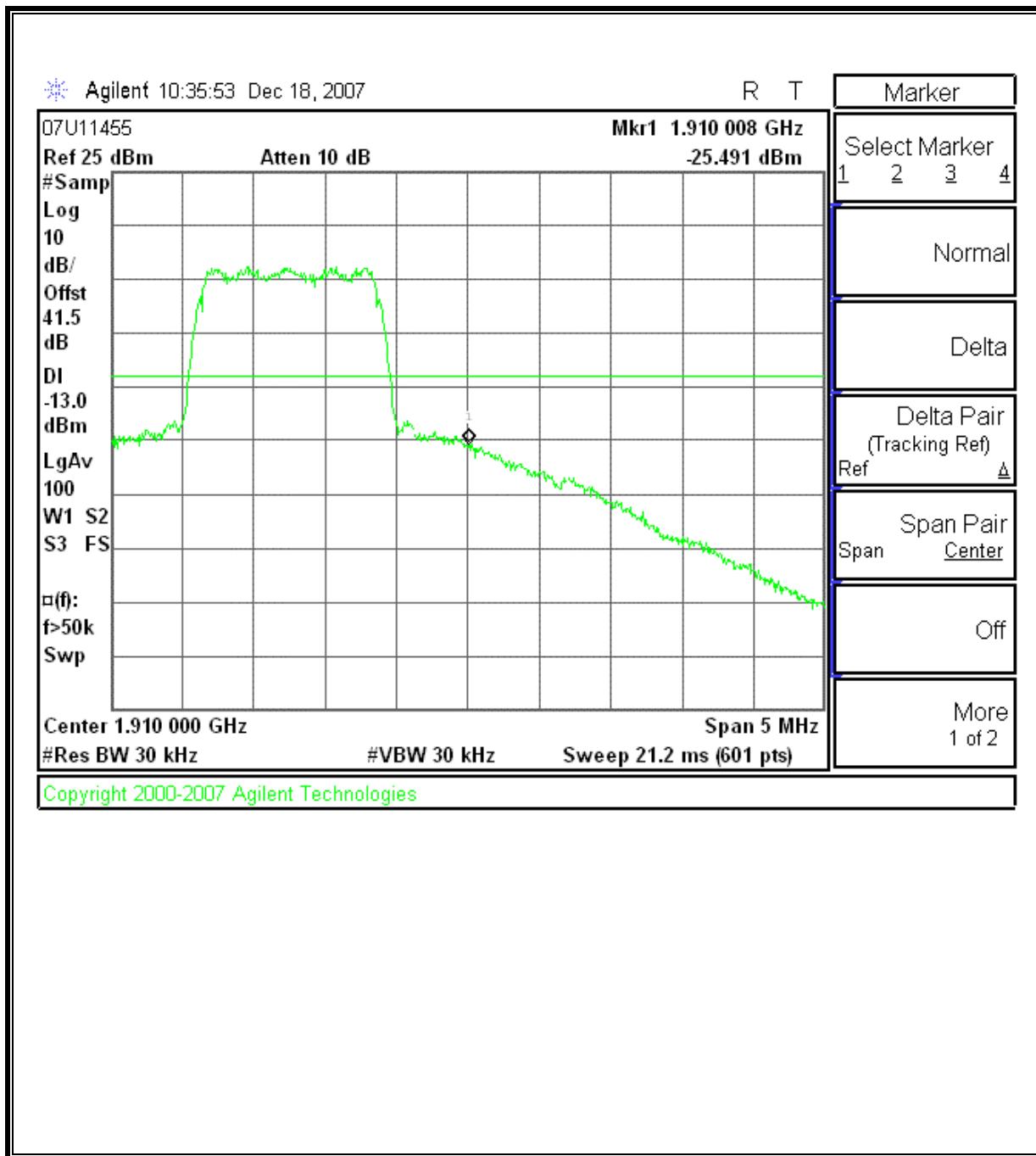
**High Channel, Out-Of-Band Emissions**



Low Channel Band Edge



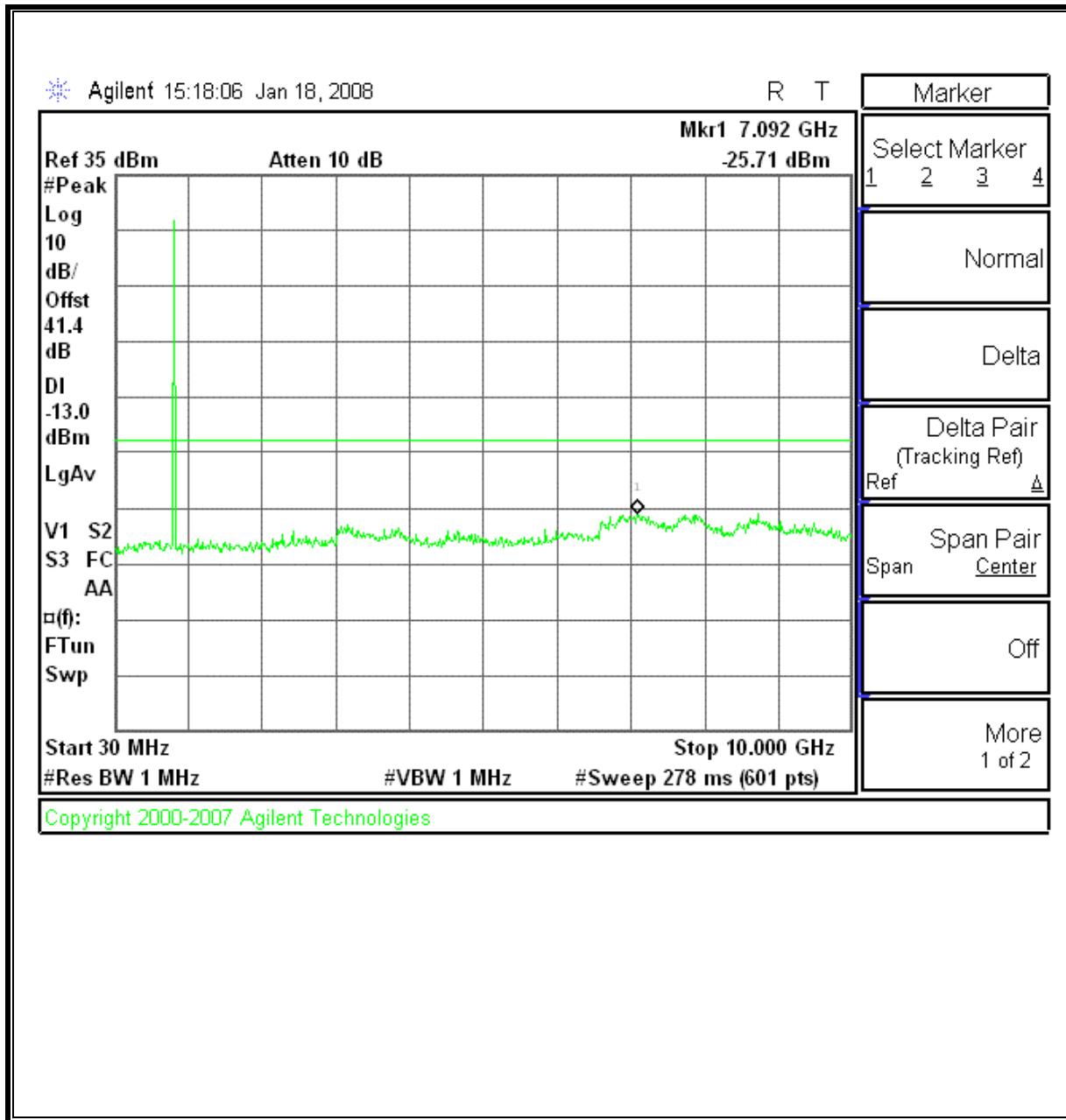
High Channel Band Edge



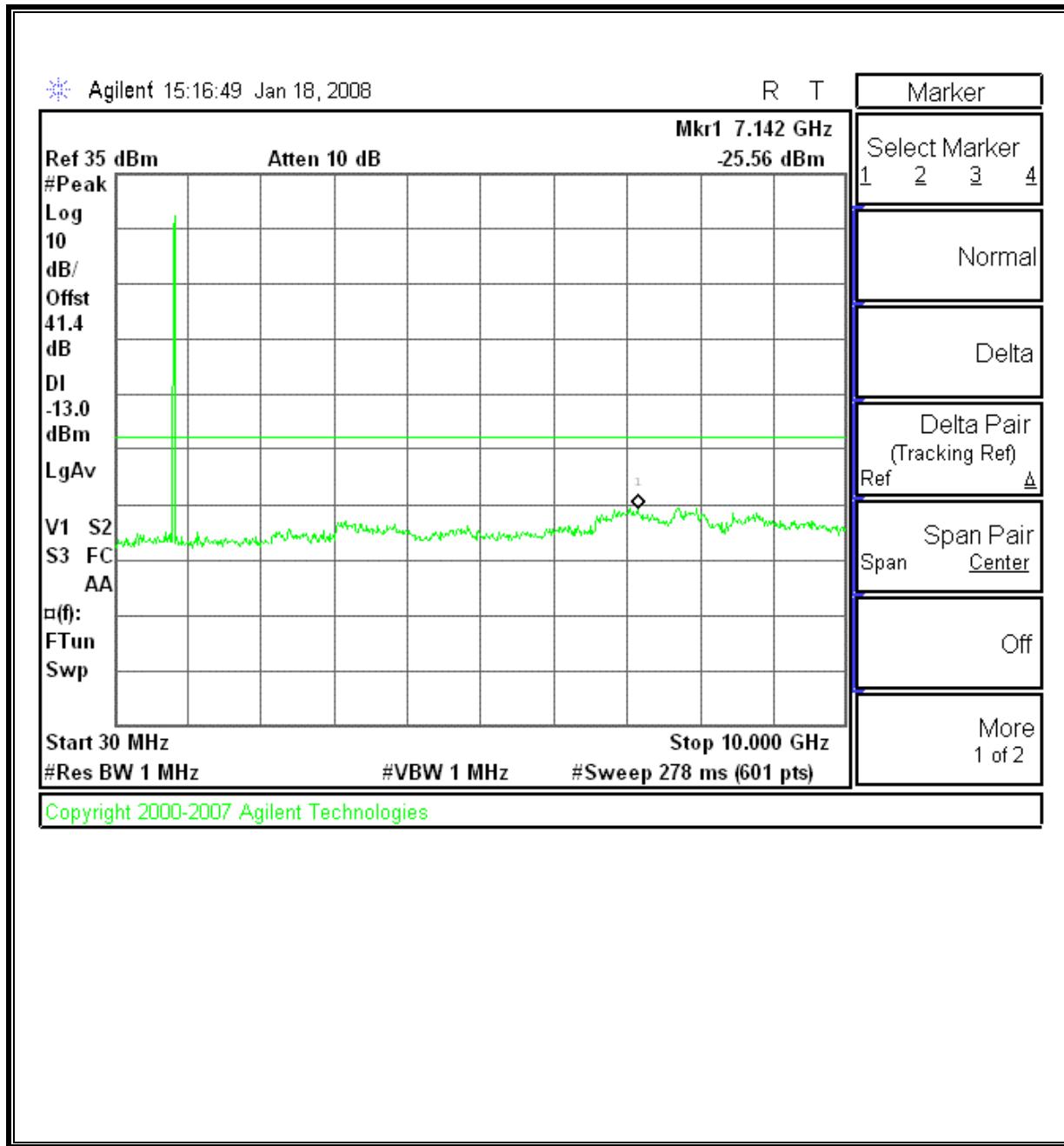
**L704 and C705 changed to improve Antenna Matching:**

**800MHz CELLULAR**

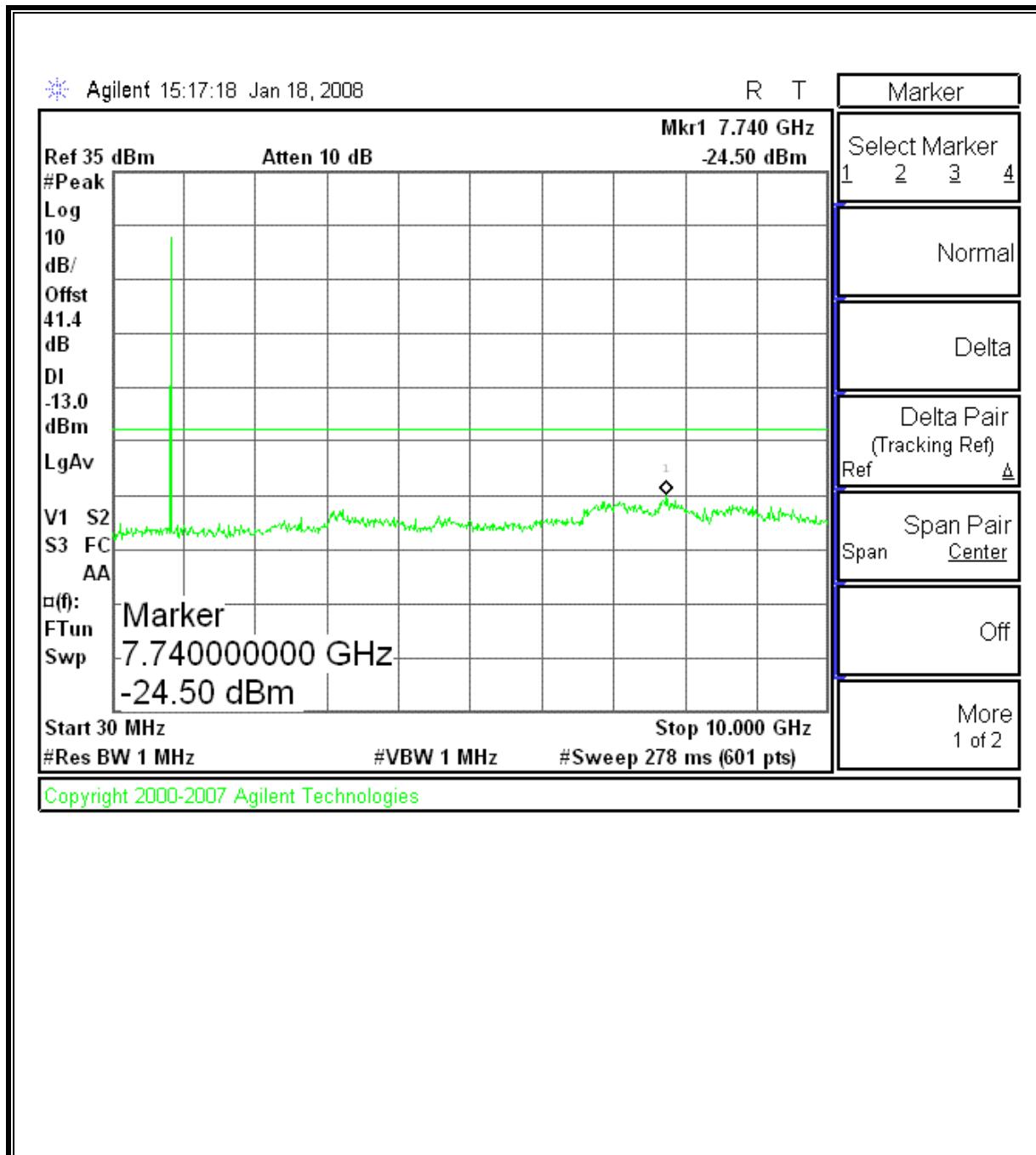
**EVDO REV A Modulation: Low Channel Out-Of-Band Emissions**



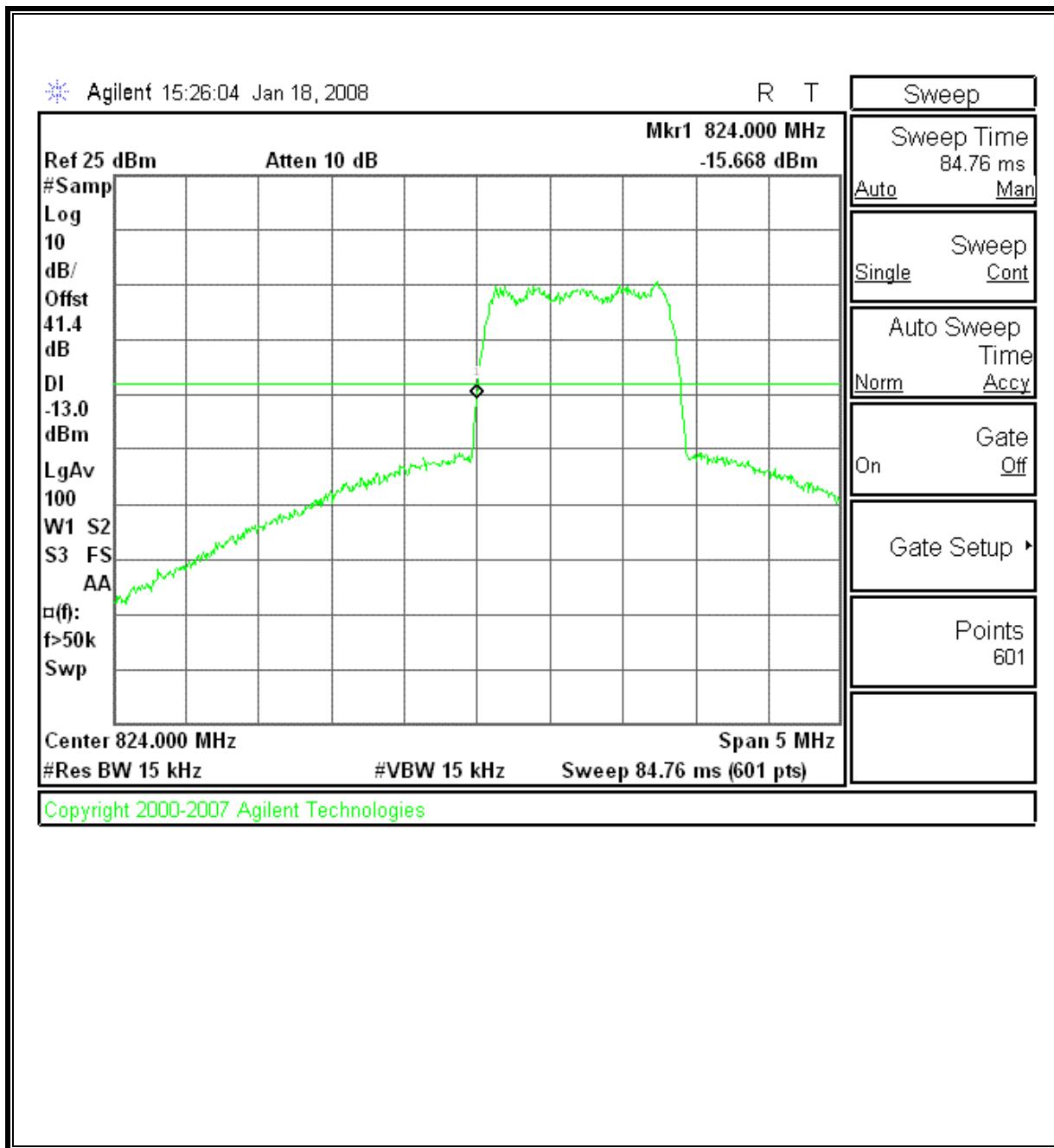
**EVD0 REV A Modulation: Mid Channel Out-Of-Band Emissions**



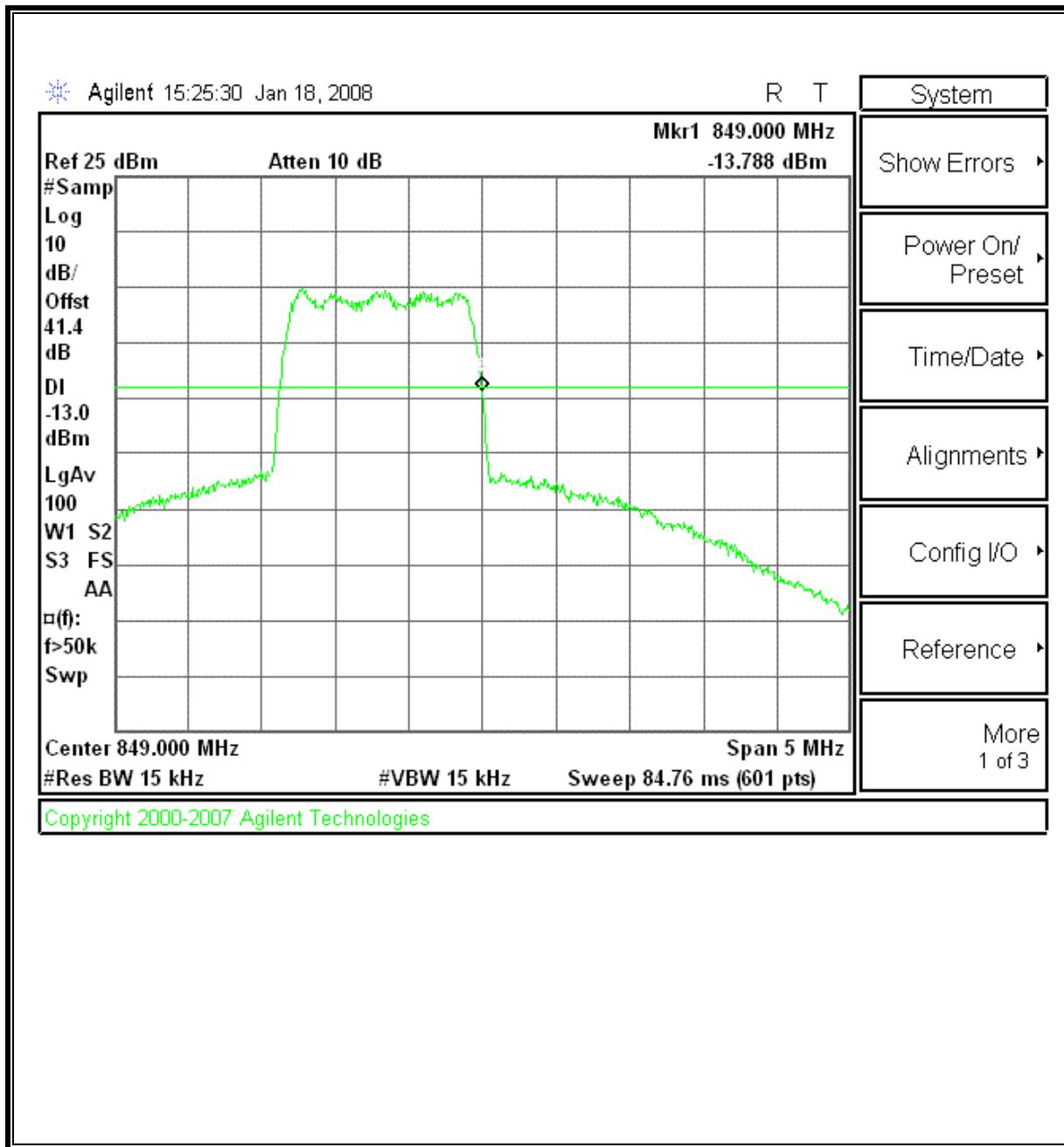
**EVD0 REV A Modulation: High Channel Out-Of-Band Emissions**



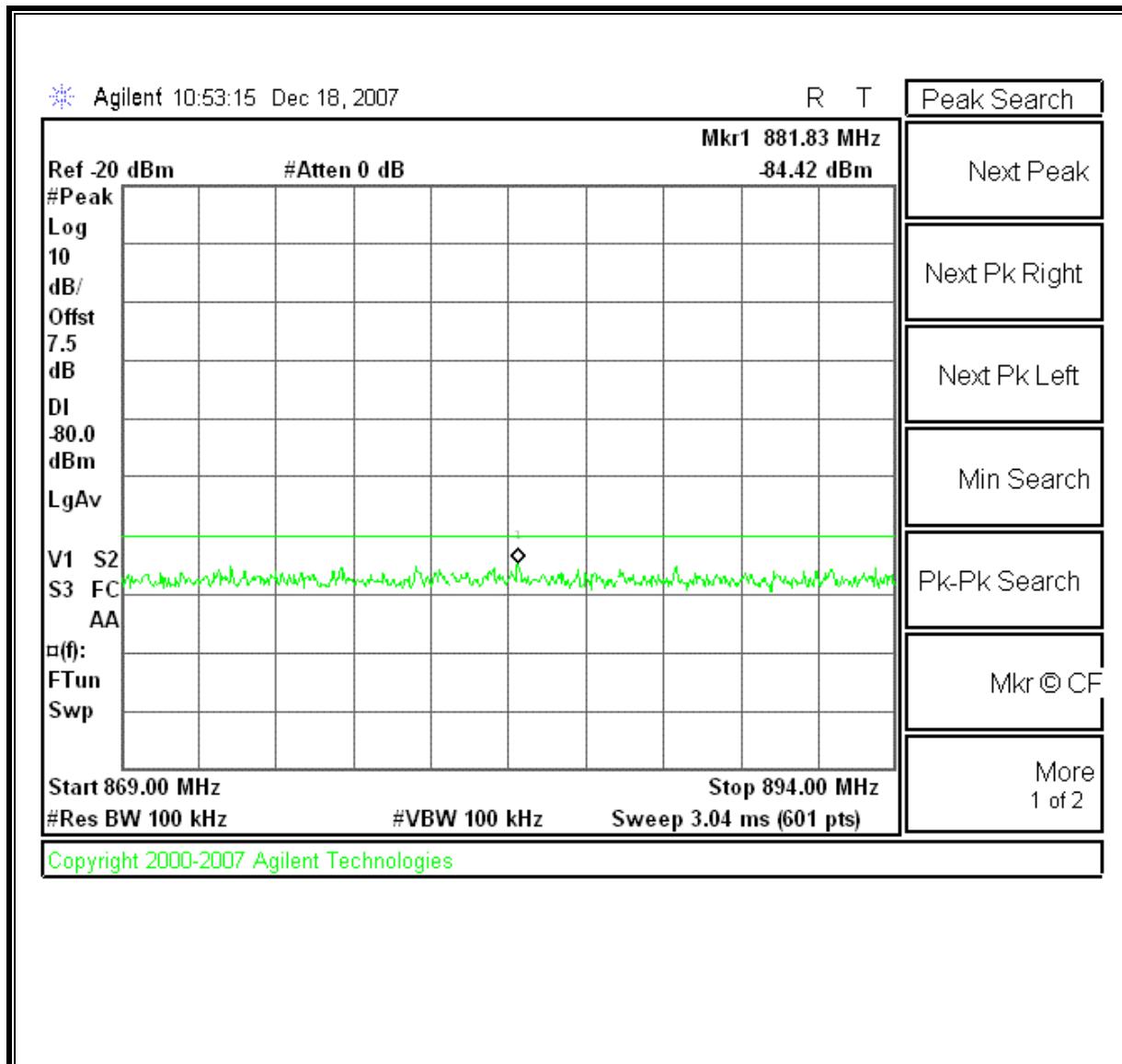
**EVD0 REV A Modulation: Low Channel Band Edge**



**EVDO REV A Modulation: High Channel Band Edge**

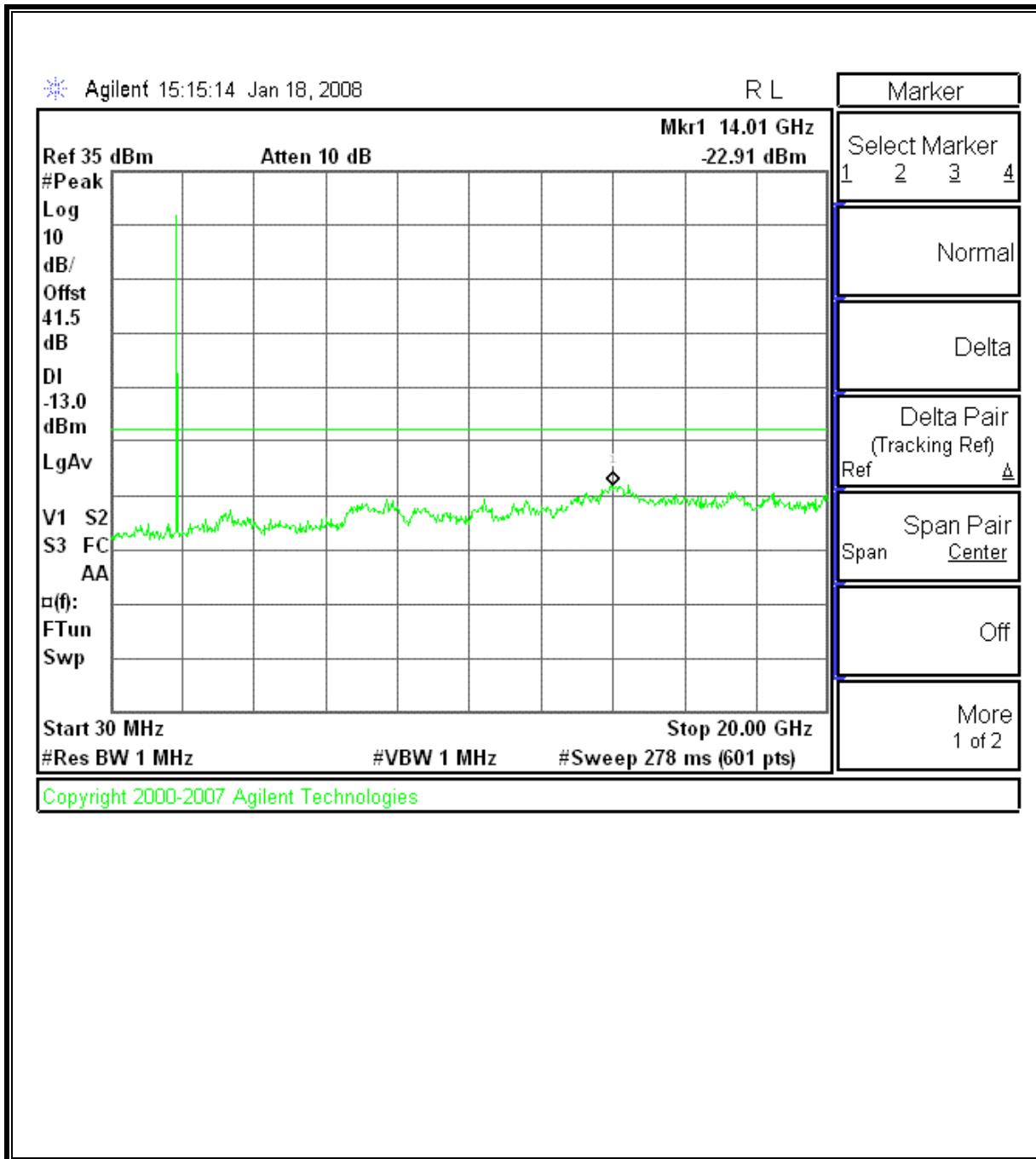


**EVDO REV A Modulation Mobile Emissions in Base Frequency Range**

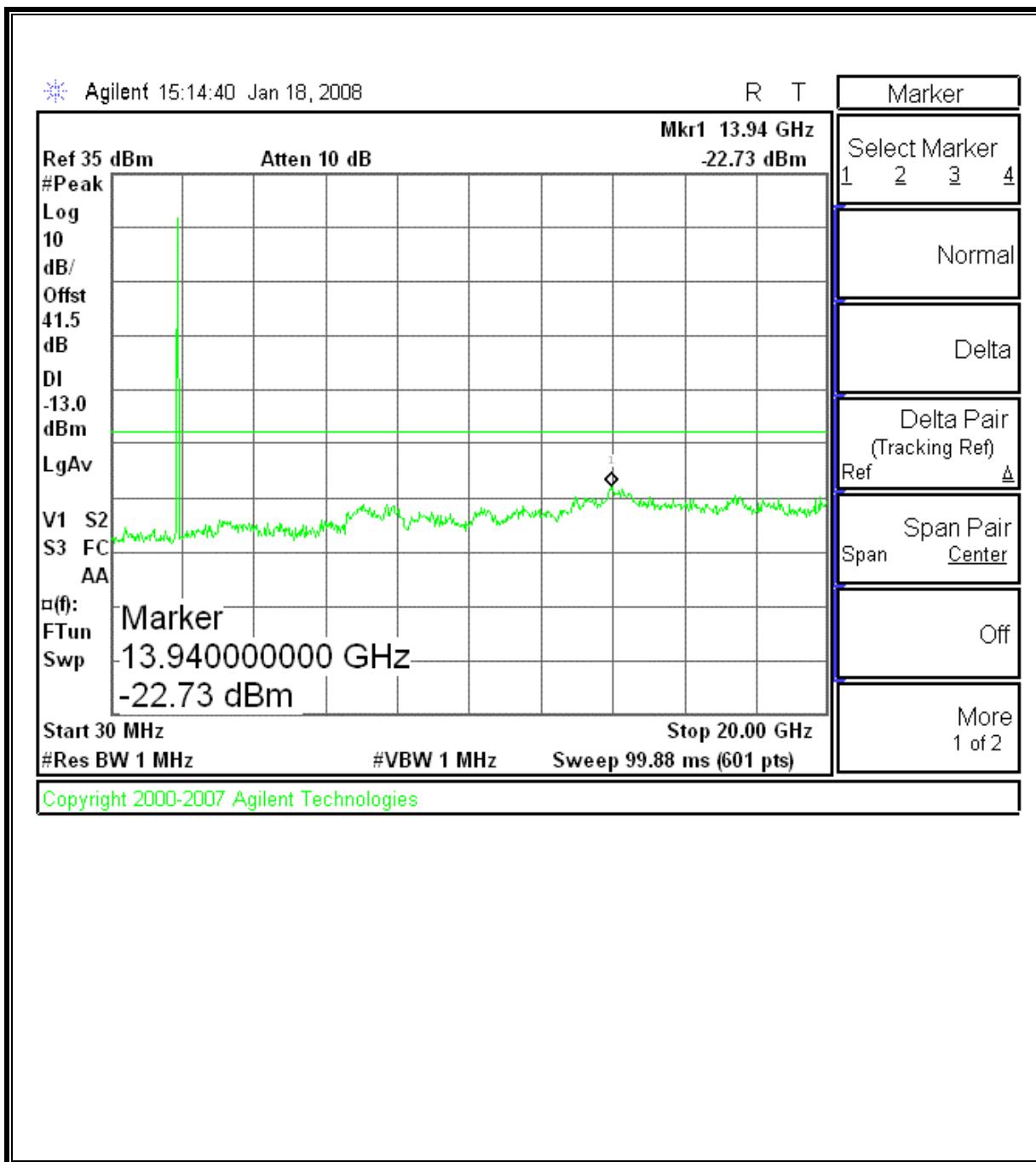


## 1900MHz PCS MODULATION RESULTS

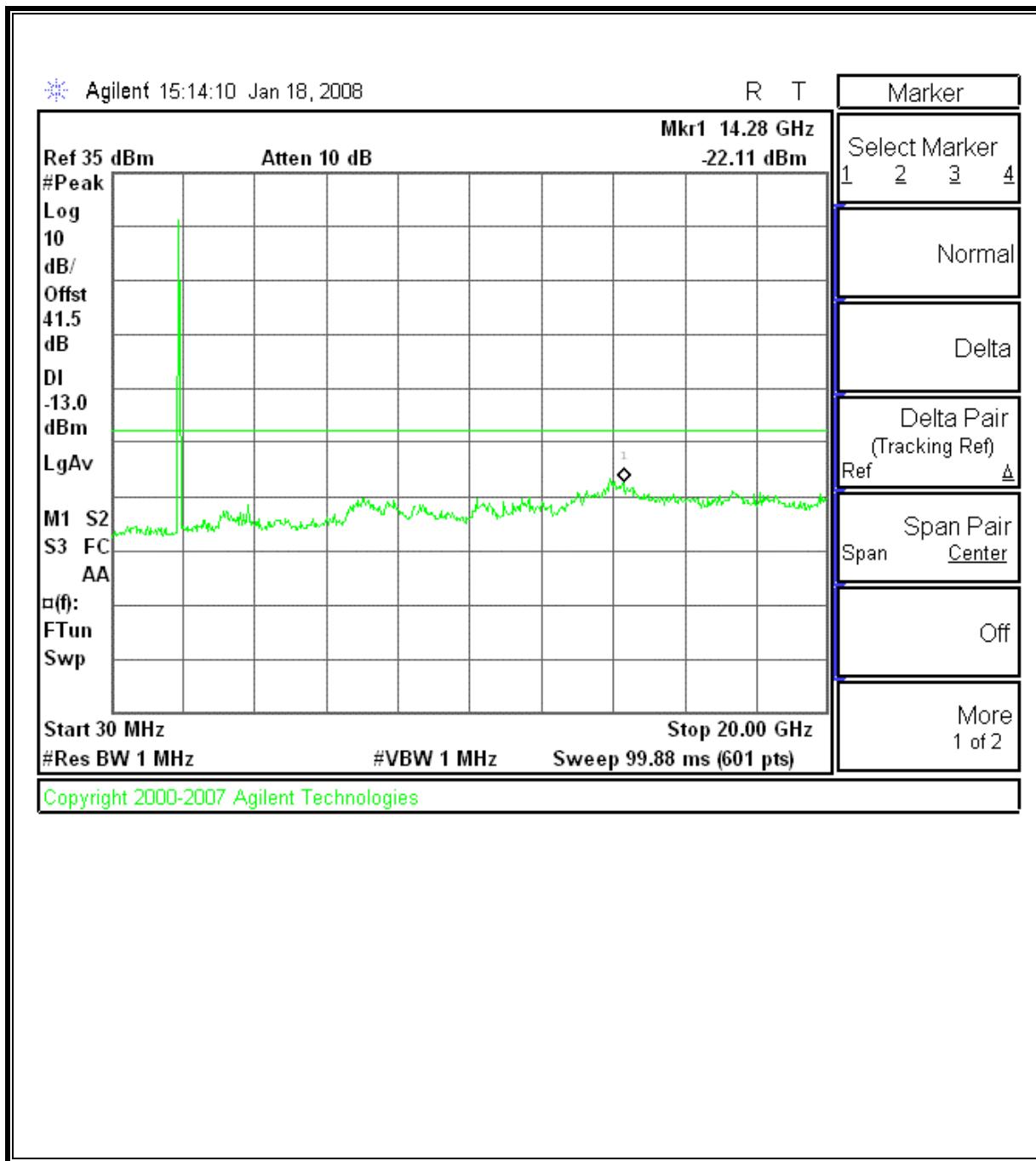
### Low Channel, Out-Of-Band Emissions



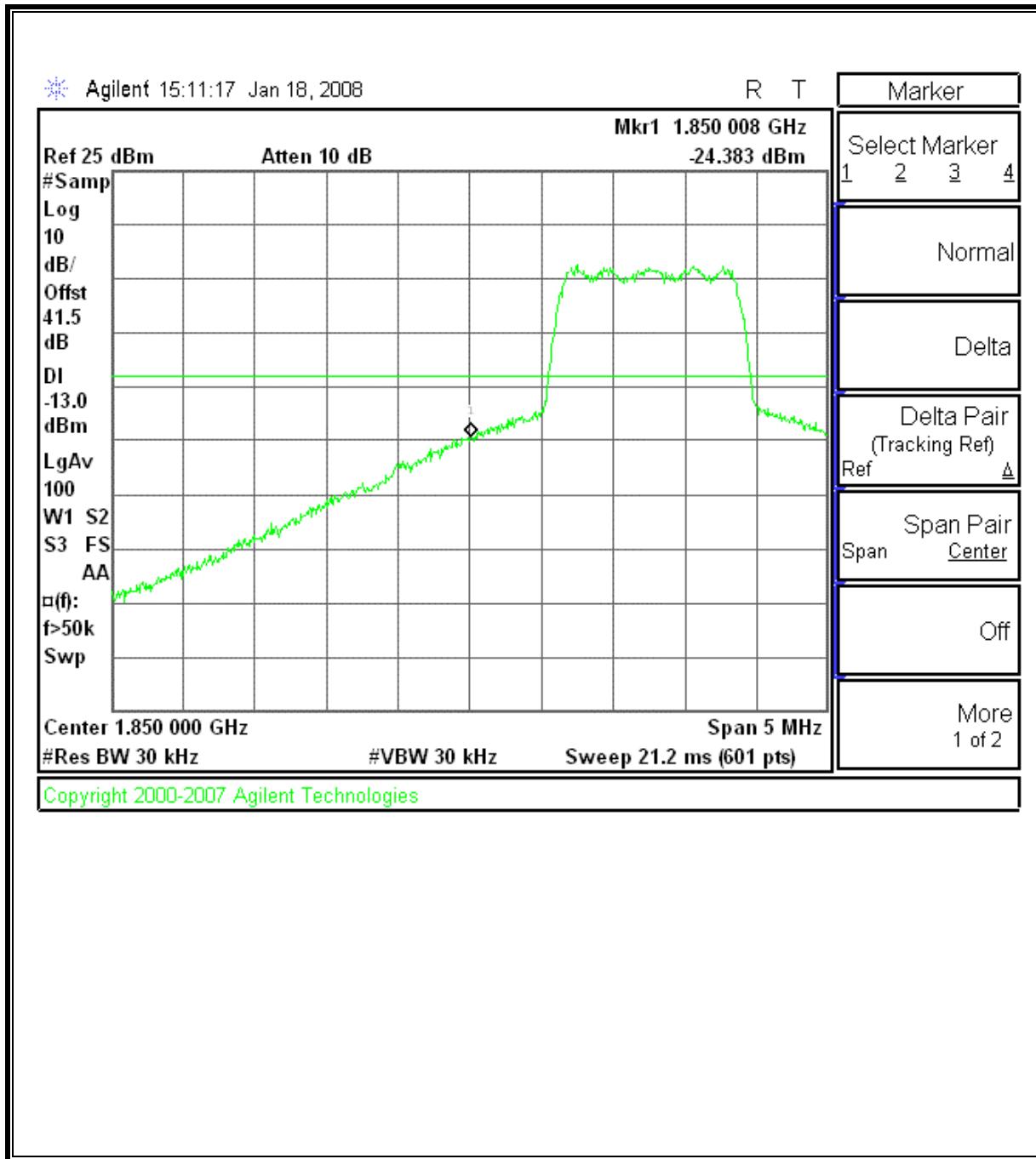
Mid Channel, Out-Of-Band Emissions



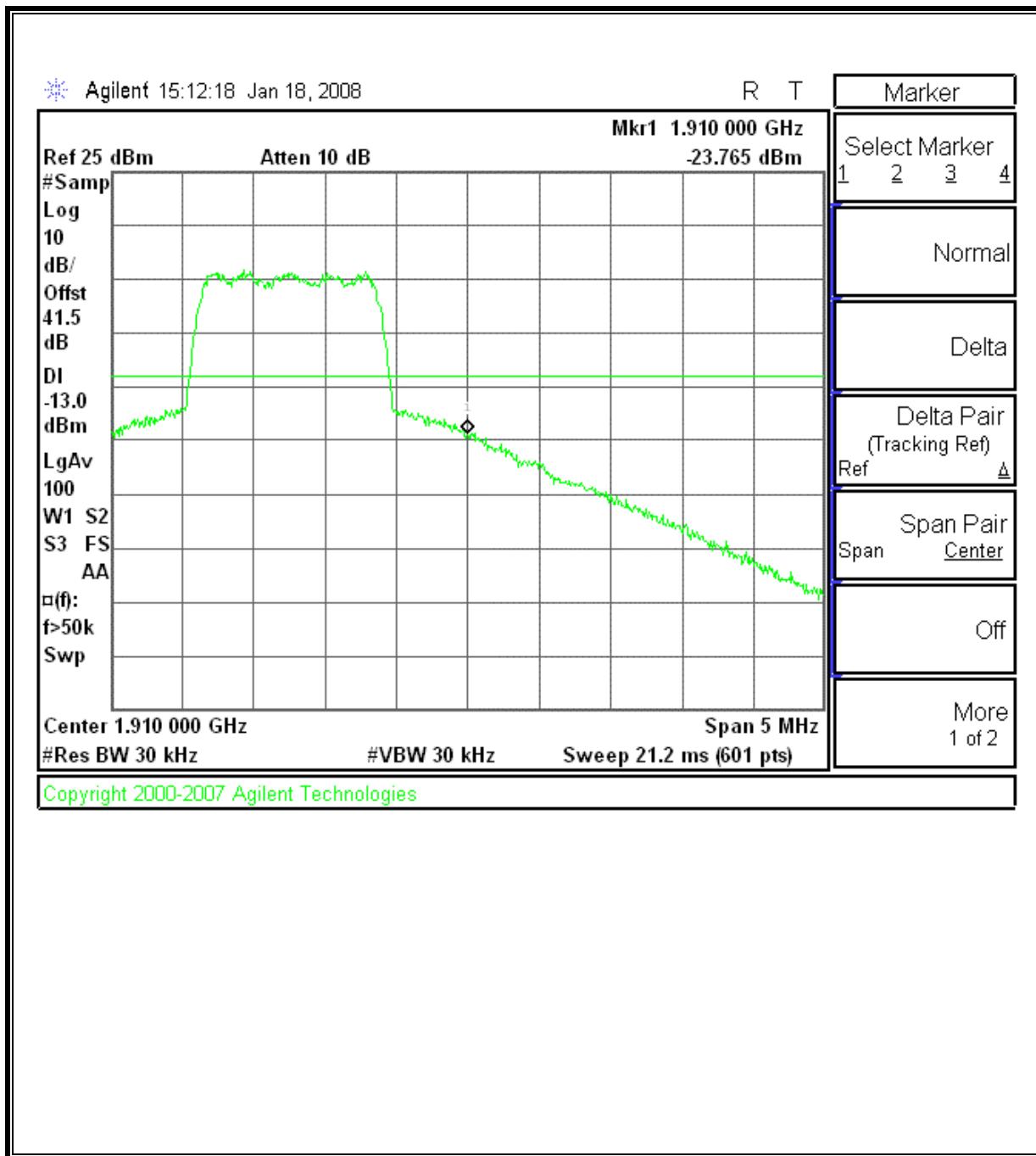
**High Channel, Out-Of-Band Emissions**



Low Channel Band Edge



High Channel Band Edge



## 6.4. FREQUENCY STABILITY

### LIMIT

§22.355, §24.235, RSS132 § 4.3, & RSS133 § 6.3 Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

For Mobile devices operating in the 824 to 849 MHz band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### TEST PROCEDURE

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.3.1 and 2.3.2

### RESULTS

No non-compliance noted.

**800MHz CELLULAR – MID CHANNEL**

Reference Frequency: CELL Mid Channel 835.83140MHz @ 25°C				
Limit: ± 2.5 ppm = 2089.579 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	835.83130	0.120	± 2.5
115.00	40	835.83135	0.060	± 2.5
115.00	30	835.83137	0.036	± 2.5
<b>3.70</b>	<b>25</b>	<b>835.83140</b>	<b>0.000</b>	<b>± 2.5</b>
115.00	20	835.83142	-0.024	± 2.5
115.00	10	835.83143	-0.041	± 2.5
115.00	0	835.83144	-0.048	± 2.5
115.00	-10	835.83146	-0.072	± 2.5
115.00	-20	835.83149	-0.108	± 2.5
115.00	-30	835.83152	-0.144	± 2.5
85%	25	835.83143	-0.036	± 2.5
115%	25	835.83146	-0.072	± 2.5

**1900MHz PCS – MID CHANNEL**

Reference Frequency: PCS Mid Channel 1879.3073MHz @ 25°C				
Limit: to stay within the authorized block				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.30678	0.277	± 2.5
115.00	40	1879.30675	0.293	± 2.5
115.00	30	1879.30705	0.133	± 2.5
<b>115.00</b>	<b>25</b>	<b>1879.30730</b>	<b>0.000</b>	<b>± 2.5</b>
115.00	20	1879.30688	0.223	± 2.5
115.00	10	1879.30721	0.048	± 2.5
115.00	0	1879.30728	0.011	± 2.5
115.00	-10	1879.30738	-0.043	± 2.5
115.00	-20	1879.30742	-0.064	± 2.5
115.00	-30	1879.30756	-0.138	± 2.5
85%	25	1879.30736	-0.032	± 2.5
115%	25	1879.30733	-0.016	± 2.5

## 6.5. FIELD STRENGTH OF SPURIOUS RADIATION

### LIMIT

§22.917 (e), §24.238 (a), RSS-132 § 4.5.1, & RSS-133 § 6.5.1 (a) (i) & (b) 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

RSS-132, RSS-133, & ANSI / TIA / EIA 603C Clause 2.2.12, FCC 22.917 (h), & FCC 24.238 (b)

### RESULTS

No non-compliance noted.

**CELL, CDMA Spurious & Harmonic (ERP)**

High Frequency Substitution Measurement Compliance Certification Services, Fremont 5m B-Chamber										
Company: Siera Wireless Project #: 07U11455 Date: 12/20/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: TX, CELL EVDO REV A										
<u>Test Equipment:</u>										
EMCO Horn 1-18GHz			Horn > 18GHz			Limit		High Pass Filter		
T73; S/N: 6717 @3m						FCC 22		<input checked="" type="checkbox"/> High Pass Filter		
Hi Frequency Cables										
<input 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				
			T145 Agilent 3008A							
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										
1.649	45.6	H	-59.7	3.8	8.0	5.8	-57.7	-13.0	-44.7	
2.474	42.5	H	-59.7	4.9	9.5	7.4	-57.2	-13.0	-44.2	
3.299	42.0	H	-56.9	5.6	9.8	7.6	-54.9	-13.0	-41.9	
1.649	44.7	V	-61.3	3.8	8.0	5.8	-59.3	-13.0	-46.3	
2.474	43.4	V	-59.0	4.9	9.5	7.4	-56.5	-13.0	-43.5	
3.299	42.3	V	-56.7	5.6	9.8	7.6	-54.7	-13.0	-41.7	
Mid Ch										
1.673	46.3	H	-58.9	3.9	8.0	5.9	-56.9	-13.0	-43.9	
2.510	45.8	H	-56.3	4.9	9.6	7.4	-53.8	-13.0	-40.8	
3.346	43.2	H	-55.5	5.6	9.8	7.6	-53.5	-13.0	-40.5	
1.673	46.5	V	-59.4	3.9	8.0	5.9	-57.4	-13.0	-44.4	
2.510	44.6	V	-57.7	4.9	9.6	7.4	-55.2	-13.0	-42.2	
3.346	43.5	V	-55.3	5.6	9.8	7.6	-53.3	-13.0	-40.3	
High Ch										
1.697	45.3	H	-59.8	3.9	8.1	5.9	-57.7	-13.0	-44.7	
2.545	43.8	H	-58.2	4.9	9.6	7.4	-55.7	-13.0	-42.7	
3.393	42.6	H	-55.8	5.7	9.7	7.6	-53.9	-13.0	-40.9	
1.697	45.0	V	-60.8	3.9	8.1	5.9	-58.7	-13.0	-45.7	
2.545	43.0	V	-59.2	4.9	9.6	7.4	-56.7	-13.0	-43.7	
3.393	42.5	V	-56.0	5.7	9.7	7.6	-54.1	-13.0	-41.1	
Rev. 4.12.7										
Note: No other emissions were detected above the system noise floor.										

**PCS Spurious & Harmonic (EIRP)**

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

Company: Siera Wireless  
Project #: 07U11455  
Date: 12/20/2007  
Test Engineer: Chin Pang  
Configuration: EUT/Laptop  
Mode: TX, 1900MHz EVDO REV A

**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 type="checkbox"/> (2~3 ft) <input type="checkbox"/> (4~6 ft) <input checked="" type="checkbox"/> (12 ft)		Pre-amplifier 1-26GHz T145 Agilent 3008A	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</b>										
3.703	45.6	H	-51.4	5.9	9.7	7.6	-47.6	-13.0	-34.6	
5.554	43.8	H	-47.7	7.4	11.3	9.1	-43.8	-13.0	-30.8	
7.405	43.4	H	-46.1	8.3	12.6	10.4	-41.8	-13.0	-28.8	
3.703	44.5	V	-52.6	5.9	9.7	7.6	-48.8	-13.0	-35.8	
5.554	42.3	V	-50.2	7.4	11.3	9.1	-46.3	-13.0	-33.3	
7.405	42.8	V	-47.5	8.3	12.6	10.4	-43.2	-13.0	-30.2	
<b>Mid Ch</b>										
3.760	45.8	H	-50.9	6.0	9.7	7.6	-47.2	-13.0	-34.2	
5.640	43.5	H	-48.2	7.4	11.5	9.3	-44.1	-13.0	-31.1	
7.520	43.8	H	-45.6	8.3	12.6	10.5	-41.3	-13.0	-28.3	
3.760	45.0	V	-51.8	6.0	9.7	7.6	-48.1	-13.0	-35.1	
5.640	42.6	V	-50.1	7.4	11.5	9.3	-46.0	-13.0	-33.0	
7.520	43.6	V	-46.6	8.3	12.6	10.5	-42.3	-13.0	-29.3	
<b>High Ch</b>										
3.817	43.8	H	-52.6	6.0	9.7	7.5	-48.9	-13.0	-35.9	
5.726	42.5	H	-49.4	7.5	11.6	9.5	-45.2	-13.0	-32.2	
7.635	42.8	H	-46.4	8.4	12.7	10.5	-42.1	-13.0	-29.1	
3.817	45.0	V	-51.5	6.0	9.7	7.5	-47.8	-13.0	-34.8	
5.726	43.0	V	-49.9	7.5	11.6	9.5	-45.7	-13.0	-32.7	
7.635	43.5	V	-46.5	8.4	12.7	10.5	-42.2	-13.0	-29.2	

Rev. 4.12.7  
Note: No other emissions were detected above the system noise floor.

**With Metal-Plated Decorative Rings and L704 and C705 changed to improve Antenna Matching:**

**CELL, EVDO REV A SPURIOUS & HARMONIC (ERP)**

High Frequency Substitution Measurement Compliance Certification Services, Fremont 5m B-Chamber										
Company: Siera Wireless Project #:07U11455 Date:02/14/2008 Test Engineer: Tom Chen Configuration: EUT/Laptop Mode:TX, CELL EVDO REV A										
<u>Test Equipment:</u>										
EMCO Horn 1-18GHz T73; S/N: 6717 @3m			Horn > 18GHz			Limit			<input checked="" type="checkbox"/> High Pass Filter	
						FCC 22				
Hi Frequency Cables <input 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 T145 Agilent 3008A			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										
1.649	57.1	H	-48.2	3.8	8.0	5.8	-46.2	-13.0	-33.2	
2.474	54.0	H	-48.2	4.9	9.5	7.4	-45.7	-13.0	-32.7	
3.299	53.5	H	-45.4	5.6	9.8	7.6	-43.4	-13.0	-30.4	
1.649	56.2	V	-49.8	3.8	8.0	5.8	-47.8	-13.0	-34.8	
2.474	54.9	V	-47.5	4.9	9.5	7.4	-45.0	-13.0	-32.0	
3.299	53.8	V	-45.2	5.6	9.8	7.6	-43.2	-13.0	-30.2	
Mid Ch										
1.673	57.8	H	-47.4	3.9	8.0	5.9	-45.4	-13.0	-32.4	
2.510	57.3	H	-44.8	4.9	9.6	7.4	-42.3	-13.0	-29.3	
3.346	54.7	H	-44.0	5.6	9.8	7.6	-42.0	-13.0	-29.0	
1.673	58.0	V	-47.9	3.9	8.0	5.9	-45.9	-13.0	-32.9	
2.510	56.1	V	-46.2	4.9	9.6	7.4	-43.7	-13.0	-30.7	
3.346	55.0	V	-43.8	5.6	9.8	7.6	-41.8	-13.0	-28.8	
High Ch										
1.697	56.8	H	-48.3	3.9	8.1	5.9	-46.2	-13.0	-33.2	
2.545	55.3	H	-46.7	4.9	9.6	7.4	-44.2	-13.0	-31.2	
3.393	54.1	H	-44.3	5.7	9.7	7.6	-42.4	-13.0	-29.4	
1.697	56.5	V	-49.3	3.9	8.1	5.9	-47.2	-13.0	-34.2	
2.545	54.5	V	-47.7	4.9	9.6	7.4	-45.2	-13.0	-32.2	
3.393	54.0	V	-44.5	5.7	9.7	7.6	-42.6	-13.0	-29.6	
Rev. 4.12.7										
Note: No other emissions were detected above the system noise floor.										

**PCS, EVDO REV A SPURIOUS & HARMONIC (EIRP)**

High Frequency Substitution Measurement Compliance Certification Services, Fremont 5m B-Chamber											
Company: Siera Wireless Project #: 07U11455 Date: 02/14/2008 Test Engineer: Tom Chen Configuration: EUT/Laptop Mode: TX, 1900MHz EVDO REV A											
Test Equipment:											
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 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	
						T145 Agilent 3008A					
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											
3.703	54.4	H	-42.6	5.9	9.7	7.6	-38.8	-13.0	-25.8		
5.554	51.7	H	-39.8	7.4	11.3	9.1	-35.9	-13.0	-22.9		
7.405	56.5	H	-33.0	8.3	12.6	10.4	-28.7	-13.0	-15.7		
3.703	54.7	V	-42.4	5.9	9.7	7.6	-38.6	-13.0	-25.6		
5.554	52.9	V	-39.6	7.4	11.3	9.1	-35.7	-13.0	-22.7		
7.405	54.3	V	-36.0	8.3	12.6	10.4	-31.7	-13.0	-18.7		
Mid Ch											
3.760	54.2	H	-42.5	6.0	9.7	7.6	-38.8	-13.0	-25.8		
5.640	51.7	H	-40.0	7.4	11.5	9.3	-35.9	-13.0	-22.9		
7.520	56.5	H	-32.9	8.3	12.6	10.5	-28.6	-13.0	-15.6		
3.760	55.1	V	-41.7	6.0	9.7	7.6	-38.0	-13.0	-25.0		
5.640	52.9	V	-39.8	7.4	11.5	9.3	-35.7	-13.0	-22.7		
7.520	54.5	V	-35.7	8.3	12.6	10.5	-31.4	-13.0	-18.4		
High Ch											
3.817	54.7	H	-41.7	6.0	9.7	7.5	-38.0	-13.0	-25.0		
5.726	51.7	H	-40.2	7.5	11.6	9.5	-36.0	-13.0	-23.0		
7.635	56.5	H	-32.7	8.4	12.7	10.5	-28.4	-13.0	-15.4		
3.817	55.0	V	-41.5	6.0	9.7	7.5	-37.8	-13.0	-24.8		
5.726	52.9	V	-40.0	7.5	11.6	9.5	-35.8	-13.0	-22.8		
7.635	54.9	V	-35.1	8.4	12.7	10.5	-30.8	-13.0	-17.8		
Rev. 4.12.7											
Note: No other emissions were detected above the system noise floor.											

## 6.6. 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 mW/cm<sup>2</sup>

**RESULTS**

No non-compliance noted:

Mode	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )
800MHz Cellar	20.0	28.59	1.30	0.19
1900 MHz PCS	20.0	27.91	2.70	0.23

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.

## 6.7. RECEIVER SPURIOUS EMISSIONS

### LIMIT

Spurious Emission Limits for Receivers:

Spurious Frequency (MHz)	Field Strength (microvolts/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

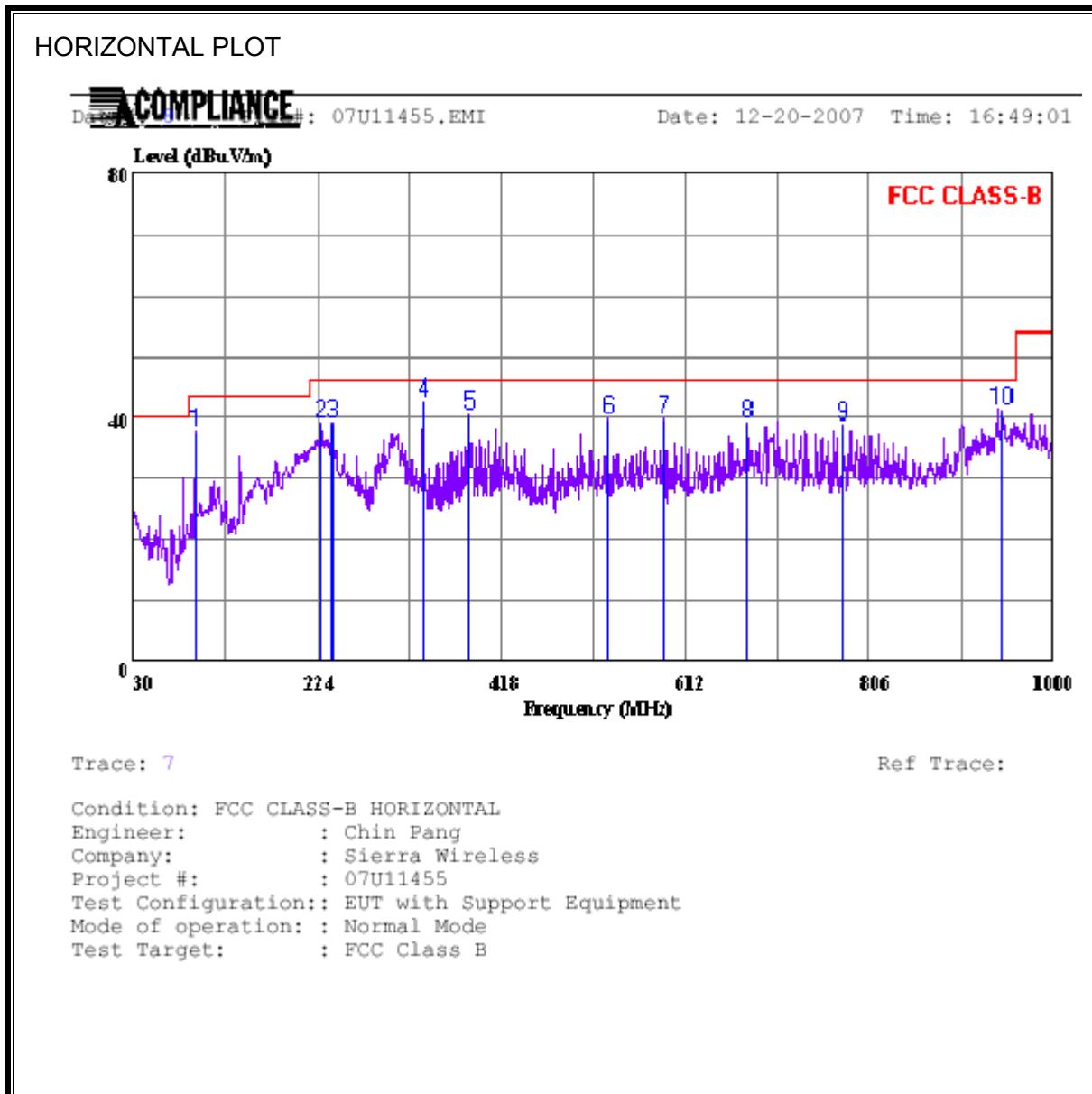
### TEST PROCEDURE

The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (local oscillator frequency, intermediate frequency or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable and local oscillator frequencies.

### RESULTS

No non-compliance noted.

**RECEIVER SPURIOUS EMISSIONS FOR 30 TO 1000 MHz, HORIZONTAL**

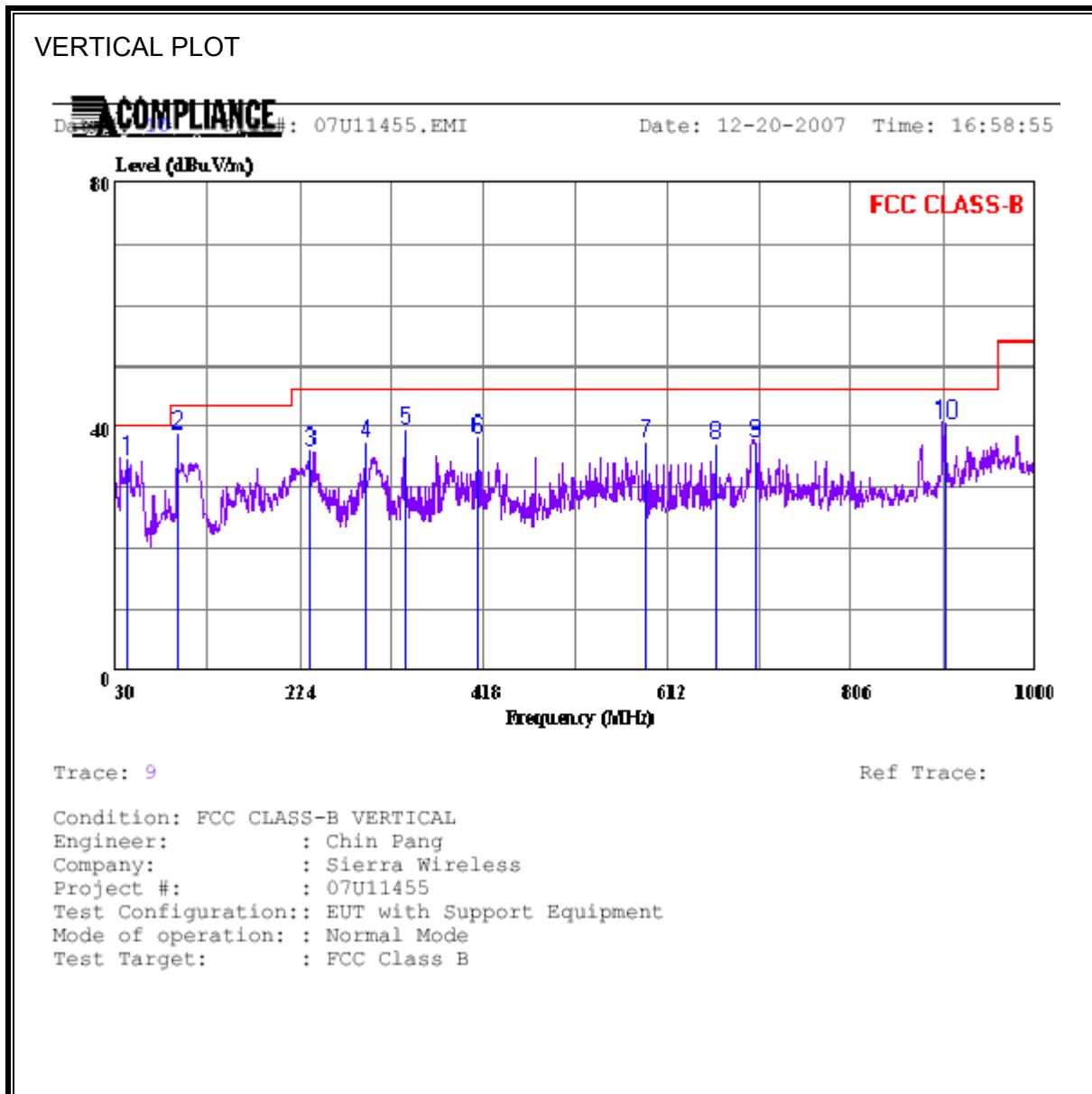


HORIZONTAL DATA

Page: 1

Freq	Read		Level	Limit	Over	Limit	Remark
	Level	Factor					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	94.990	56.20	-18.29	37.91	43.50	-5.59	Peak
2	227.880	54.10	-14.93	39.17	46.00	-6.83	Peak
3	239.520	53.60	-14.53	39.07	46.00	-6.93	Peak
4	335.550	53.80	-11.37	42.43	46.00	-3.57	Peak
5	383.080	50.60	-10.25	40.35	46.00	-5.65	Peak
6	530.520	46.60	-6.76	39.84	46.00	-6.16	Peak
7	589.690	45.30	-5.60	39.70	46.00	-6.30	Peak
8	677.960	43.00	-3.88	39.12	46.00	-6.88	Peak
9	777.870	41.00	-2.39	38.62	46.00	-7.38	Peak
10	945.680	42.10	-0.86	41.24	46.00	-4.76	Peak

**RECEIVER SPURIOUS EMISSIONS FOR 30 TO 1000 MHz, VERTICAL**



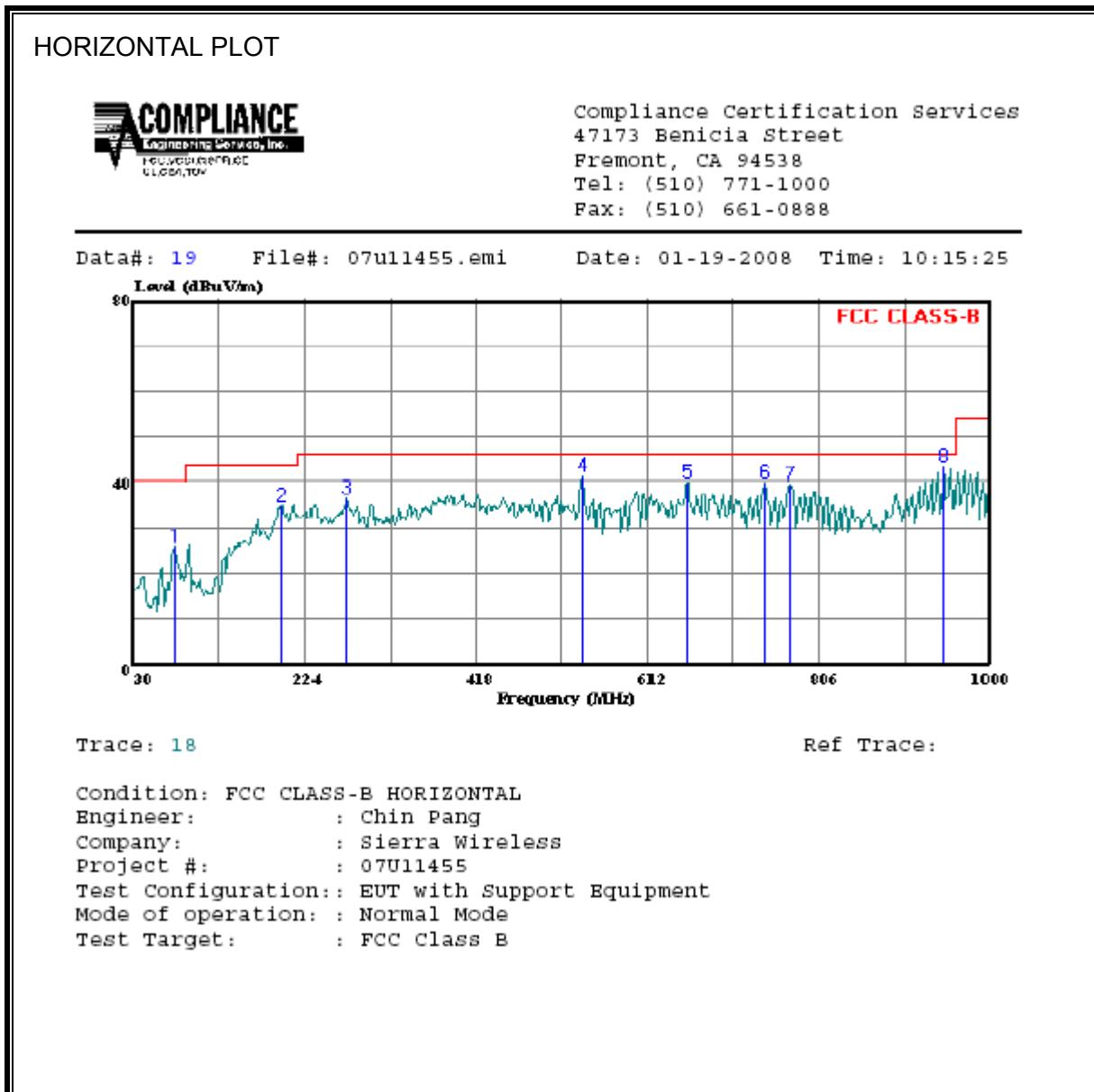
VERTICAL DATA

Page: 1

Freq	Read		Level	Limit	Over	Limit	Remark
	Level	Factor					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	42.610	48.90	-14.27	34.63	40.00	-5.37	Peak
2	94.990	57.10	-18.29	38.81	43.50	-4.69	Peak
3	234.670	50.60	-14.69	35.91	46.00	-10.09	Peak
4	293.840	49.90	-12.48	37.42	46.00	-8.58	Peak
5	335.550	51.00	-11.37	39.63	46.00	-6.37	Peak
6	412.180	47.60	-9.55	38.05	46.00	-7.95	Peak
7	589.690	43.00	-5.60	37.40	46.00	-8.60	Peak
8	662.440	41.40	-4.21	37.19	46.00	-8.81	Peak
9	704.150	40.90	-3.40	37.50	46.00	-8.50	Peak
10	904.940	41.60	-1.04	40.56	46.00	-5.44	Peak

## **L704 and C705 changed to improve Antenna Matching:**

## EMISSIONS FOR 30 TO 1000 MHz, HORIZONTAL



HORIZONTAL DATA

Page: 1

		Read		Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	75.590	48.60	-22.64	25.96	40.00	-14.05 Peak
2	197.810	52.22	-17.31	34.91	43.50	-8.59 Peak
3	271.530	53.65	-17.09	36.56	46.00	-9.44 Peak
4	538.280	51.94	-10.77	41.17	46.00	-4.83 Peak
5	656.620	48.87	-9.21	39.66	46.00	-6.34 Peak
6	744.890	47.99	-8.02	39.97	46.00	-6.03 Peak
7	773.990	46.96	-7.41	39.55	46.00	-6.45 Peak
8	948.590	47.46	-4.20	43.26	46.00	-2.74 Peak

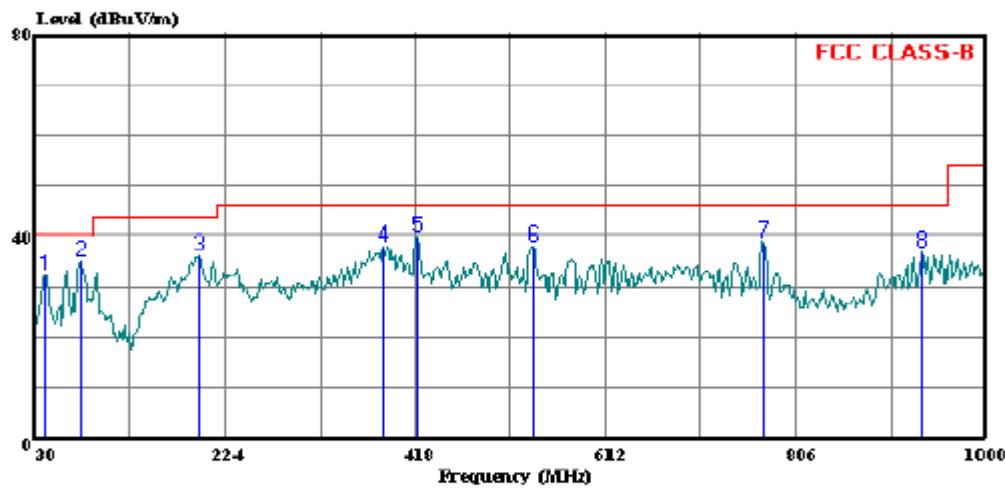
**RECEIVER SPURIOUS EMISSIONS FOR 30 TO 1000 MHz, VERTICAL**

**VERTICAL PLOT**



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 21 File#: 07U11455.emi Date: 01-19-2008 Time: 10:23:32



Trace: 20

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Engineer: : Chin Pang  
Company: : Sierra Wireless  
Project #: : 07U11455  
Test Configuration: EUT with Support Equipment  
Mode of operation: : Normal Mode  
Test Target: : FCC Class B

VERTICAL DATA

Page: 1

		Read		Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	40.670	48.07	-15.49	32.58	40.00	-7.42 Peak
2	75.590	57.80	-22.64	35.16	40.00	-4.84 Peak
3	196.840	53.75	-17.53	36.22	43.50	-7.28 Peak
4	385.990	51.80	-13.84	37.96	46.00	-8.04 Peak
5	419.940	52.82	-13.06	39.76	46.00	-6.24 Peak
6	539.250	48.71	-10.78	37.93	46.00	-8.07 Peak
7	773.990	46.27	-7.41	38.86	46.00	-7.14 Peak
8	935.980	41.56	-4.56	37.00	46.00	-9.00 Peak

**RECEIVER SPURIOUS EMISSIONS FOR ABOVE 1GHz**

Note: No emissions were found within above 1GHz of 20dB below the system noise.

## 6.8. AC MAINS LINE CONDUCTED EMISSIONS

### LIMIT

RSS-Gen 7.2.2

Except when the requirements applicable to a given device state otherwise, for any licence-exempt radio communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 2. The tighter limit applies at the frequency range boundaries.

Table 2 – AC Power Lines Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency.

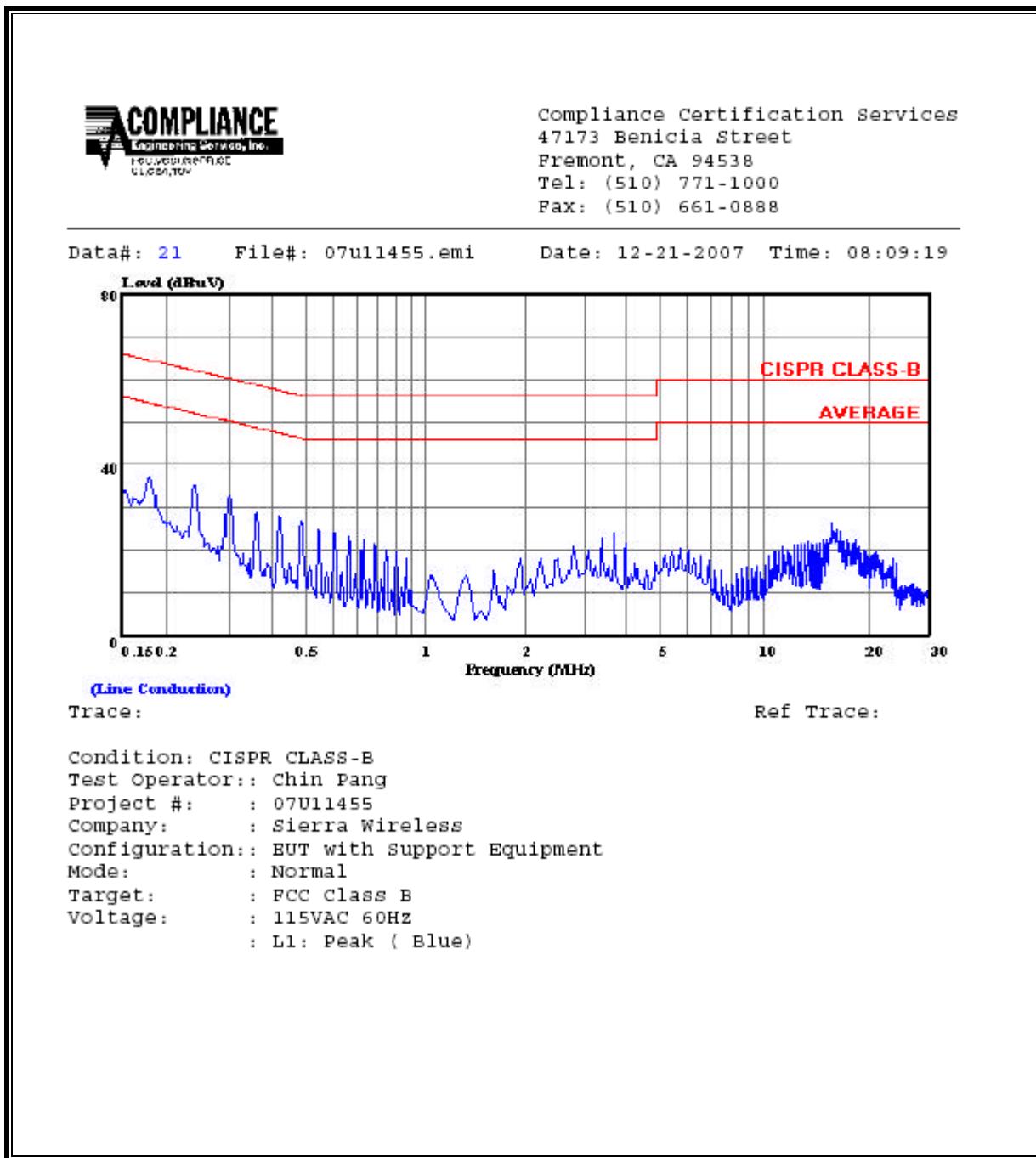
### RESULTS

No non-compliance noted.

## **6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Closs (dB)	Limit QP	EN B AV	Margin		Remark
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.18	36.68	--	--	0.00	64.44	54.44	-27.76	-17.76	L1
0.24	35.31	--	--	0.00	62.10	52.10	-26.79	-16.79	L1
15.80	26.28	--	--	0.00	60.00	50.00	-33.72	-23.72	L1
0.18	36.18	--	--	0.00	64.49	54.49	-28.31	-18.31	L2
0.24	33.31	--	--	0.00	62.10	52.10	-28.79	-18.79	L2
3.53	25.00	--	--	0.00	56.00	46.00	-31.00	-21.00	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

