



**FCC CFR47 PART 22H AND 24E  
&  
INDUSTRY CANADA RSS-132 AND RSS-133  
CERTIFICATION TEST REPORT**

**FOR**

**WIRELESS USB MODEM**

**MODEL NUMBER: USB 598**

**FCC ID: N7NU598**

**IC: 2417C-U598**

**REPORT NUMBER: 08U11927-1, Revision B**

**ISSUE DATE: JULY 24, 2008**

*Prepared for*

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

*Prepared by*

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
---	07/23/08	Initial Issue	T. Chan
B	07/24/08	Revised Section 5.2 & Removed MPE Section	T. Chan

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# 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** SIERRA WIRELESS  
2290 COSMOS CT.  
CARLSBAD, CA, 92010 U.S.A.

**EUT DESCRIPTION:** WIRELESS USB MODEM

**SERIAL NUMBER:** FCC2-F2B

**MODEL NAMES:** USB 598

**DATE TESTED:** JULY 15 –19, 2008

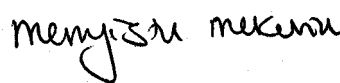
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 24E	PASS
IC RSS-132 ISSUE 2 and RSS-133 ISSUE 4	PASS

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All expressions of Pass/Fail in this report are opinions expressed by CCS based on interpretations of the test results. 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:



THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

MENGISTU MEKURIA  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with RSS-GEN, RSS132, RSS133, ANSI C63.4-2003, and TIA/EIA 603C (2004).

## 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
Radiated Emission, Above 2000 MHz	+/- 4.3 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 multi-bands (850MHz and 1900MHz) wireless USB modem operating on CDMA, 1xRTT, 1xEVDO, Rev.0, and Rev.A. networks. The EUT manufactured by Sierra Wireless Inc.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum radiated and conducted peak output powers as follows:

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low CH - 824.70	EV-DO, Rev A	28.14	651.63	29.80	954.99
Mid CH - 836.52		28.26	669.88	29.20	831.76
High CH - 848.31		28.07	641.21	28.90	776.25

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low CH - 1851.25	EV-DO, Rev A	28.69	739.61	28.40	691.83
Mid CH - 1880.00		29.19	829.85	27.60	575.44
High CH - 1908.75		28.31	677.64	27.30	537.03

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an encapsulating monopole, slot antenna with a maximum gain of 2.4dBi for Cellular and 2.0dBi for PCS bands.

### 5.4. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent Communication Test Set.

## 5.5. WORST-CASE CONFIGURATION AND MODE

Preliminary measurements take place for different Radio configurations (RC) and Service Options (SO) at mid channel to identify the worst-case scenario.

### 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.

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

#### EVDO Release A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- 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)

#### EVDO Release A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > **FETAP**
- **F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)**
- 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)

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

Output Power Measurement Results @ Low/Middle/High channel

Channel	f (MHz)	FETAP-Traffic Format	RETAP-Data Payload Size	Conducted power (dBm)	
				Average	
1013	824.70	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	23.70	
384	836.52			<b>23.95</b>	
777	848.31			23.85	

PCS Band (Sample #: FCC2-F2B)

Channel	f (MHz)	FETAP-Traffic Format	RETAP-Data Payload Size	Conducted power (dBm)	
				Average	
25	1851.25	307.2k, QPSK/ ACK channel is transmitted at all the slots)	4096	23.92	
600	1880.00			<b>24.00</b>	
1175	1908.75			23.85	



### 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

#### EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

#### EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

**3G-CDMA2000 1xEV-DO Revision 0 (Rev 0)**

Output Power Measurement Results @ Low/Middle/High channel

Channel	f (MHz)	FTAP Rate	RTAP Rate	Conducted power (dBm)
				Average
1013	824.70	307.2 kbps (2 slot, QPSK)	153.6 kbps	23.82
384	836.52			<b>24.04</b>
777	848.31			24.03

PCS Band (Sample #: FCC2-F2B)

Channel	f (MHz)	FTAP Rate	RTAP Rate	Conducted power (dBm)
				Average
25	1851.25	307.2 kbps (2 slot, QPSK)	153.6 kbps	24.00
600	1880.00			<b>24.08</b>
1175	1908.75			23.95

**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.13.08, L

1xRTT

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 8  
    > Network ID (NID) > 65535
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- 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
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

**3G-CDMA2000 1xRTT**

Output Power Measurement Results @ Low/Middle/High channel

<b>1xRTT - Cell Band (Sample #: FCC2-F2B)</b>				
<b>Radio Configuration (RC)</b>	<b>Service Option (SO)</b>	<b>Conducted Output power (dBm)</b>		
		<b>Ch. 1013</b>	<b>Ch. 384</b>	<b>Ch. 777</b>
RC1 (Fwd1, Rvs1)	2 (Loopback)	23.83	23.92	23.91
	55 (Loopback)	23.87	23.93	23.94
RC2 (Fwd2, Rvs2)	9 (Loopback)	23.85	23.93	23.97
	55 (Loopback)	23.87	23.95	23.96
RC3 (Fwd3, Rvs3)	2 (Loopback)	23.87	23.95	23.94
	55 (Loopback)	23.86	23.94	23.92
	32 (+ F-SCH)	23.89	23.92	23.91
	32 (+ SCH)	23.86	23.92	23.90
RC4 (Fwd4, Rvs3)	2 (Loopback)	23.79	23.92	23.96
	55 (Loopback)	23.81	23.93	23.95
	32 (+ F-SCH)	23.80	23.93	23.92
	32 (+ SCH)	23.83	23.91	23.90
RC5 (Fwd5, Rvs4)	9 (Loopback)	23.79	23.97	23.97
	55 (Loopback)	23.78	23.95	23.96
<b>1xRTT - PCS Band (Sample #: FCC2-F2B)</b>				
<b>Radio Configuration (RC)</b>	<b>Service Option (SO)</b>	<b>Conducted Output power (dBm)</b>		
		<b>Ch. 25</b>	<b>Ch. 600</b>	<b>Ch. 1175</b>
RC1 (Fwd1, Rvs1)	2 (Loopback)	23.92	24.00	23.96
	55 (Loopback)	23.91	23.96	23.97
RC2 (Fwd2, Rvs2)	9 (Loopback)	23.91	23.97	23.96
	55 (Loopback)	23.93	23.96	23.98
RC3 (Fwd3, Rvs3)	2 (Loopback)	23.87	23.98	23.93
	55 (Loopback)	23.88	23.97	23.91
	32 (+ F-SCH)	23.87	23.94	23.86
	32 (+ SCH)	23.89	23.95	23.85
RC4 (Fwd4, Rvs3)	2 (Loopback)	23.87	23.95	23.92
	55 (Loopback)	23.90	23.92	23.84
	32 (+ F-SCH)	23.86	23.96	23.90
	32 (+ SCH)	23.93	23.97	23.92
RC5 (Fwd5, Rvs4)	9 (Loopback)	23.89	23.95	23.91
	55 (Loopback)	23.86	23.94	23.93

**ENGINEERING RATIONAL IN DETERMING Worst Case Data**

Based upon engineering evaluation result performed previously, the peak-to-average ratio for Rev.0 is about 3.64 - 3.99 dB and the peak-to-average ratio for Rev.A is about 3.9 - 4.33 dB. Based on the above average power results from the different modulations, EV-DO REV.0 has highest average output power but EV-DO, REV A Protocol RETAP has highest peak output power due to higher peak-to-average ratio. All test items were performed with EV-DO Rev. A mode of operation.

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

Cellular Band – FETAP (307.2k, QPSK/ ACK channel is transmitted at all the slots)				PCS Band – FETAP(307.2k, QPSK/ ACK channel is transmitted at all the slots)			
Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)	Channel	f (MHz)	R-Data Pkt Size	Conducted power (dBm)
			Peak				Peak
1013	824.70	4096	28.14	25	1851.25	4096	28.69
384	836.52		28.26	600	1880.00		29.19
777	848.31		28.07	1175	1908.75		28.31

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	LATITUDE D620	(01)07898349890528	DoC
Laptop AC Adapter	Dell	LA65NS0-00	CN-0DF263-71615-66C-2E23	DoC
Communications Test Set	Agilent	E5515C	GB46160222	DoC
Power Splitter	Pasternack	PE2028	2662	N/A

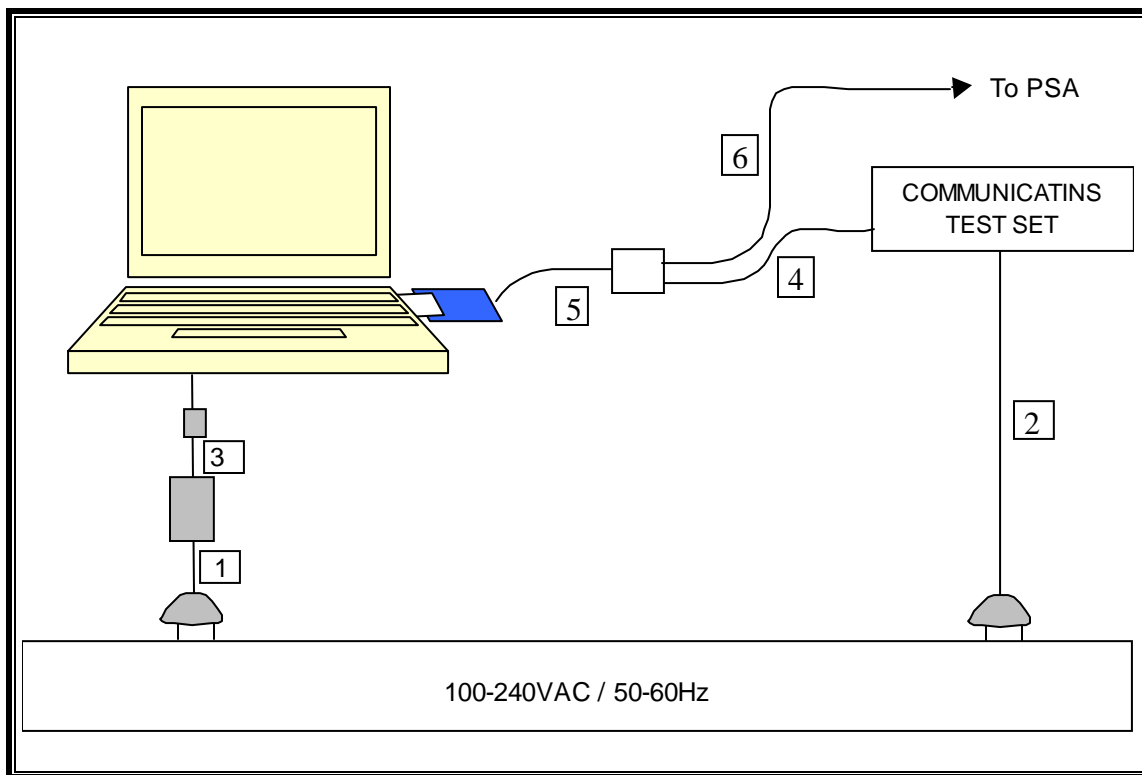
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC Input	1	2-Prong	Un-Shielded	2.0 m	N/A
2	AC Input	1	3-Prong	Un-Shielded	2.0 m	N/A
3	DC Input	1	Mini-Jack	Un-Shielded	2.0 m	Ferrites on Cradle and PC Ends
4	RF In/Out	1	SMA	Shielded	1.0 m	N/A
5	RF In/Out	1	SMA	Shielded	0.2 m	N/A
6	RF In/Out	1	SMA	Shielded	1.0 m	N/A

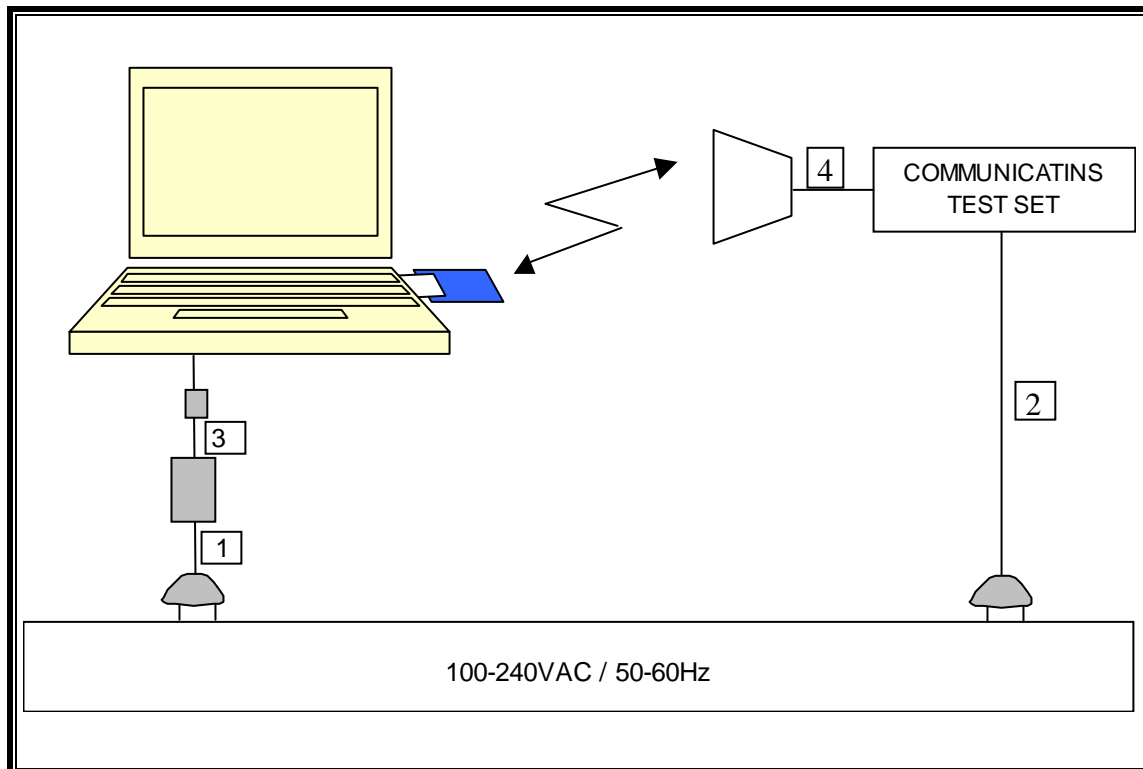
### TEST SETUP

The EUT directly plugged into the laptop during the tests. The Wireless Communication test set exercised the EUT.

**SETUP DIAGRAM FOR CONDUCTED TESTS**



**SETUP DIAGRAM FOR RADIATED 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
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/08
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/25/08
Preamp 30-1000MHz	Sonoma Instrument	310N	185623	03/31/09
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	10/25/08
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	03/03/09
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	04/22/09
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/22/09
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00369	09/27/08
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	29800	05/13/09
Wireless Communications Test Set	Agilent	E5515C	10092	06/16/09
2.7GHz HPF	MicroTronic	HPM13194	2	CNR
1.5GHz HPF	MicroTronic	HPM13195	1	CNR
Signal Generator 2 -40 GHz	R & S	SMP04	DE 34210	02/16/09
Signal Generator 1024 MHz	R & S	SMY01	DE 12311	05/28/09
Dipole	ETS	3121C-DB2	22435	06/08/09

## 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 99% bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% and -26 dB bandwidths function are utilized.

#### RESULTS

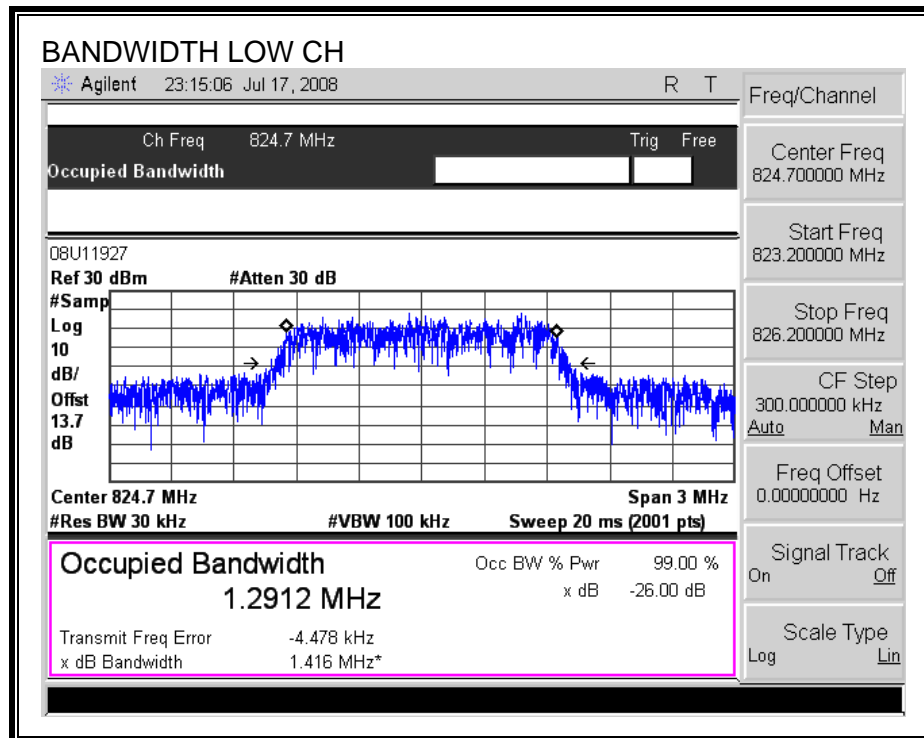
##### CELL, EV-DO REV A, CDMA Modulation

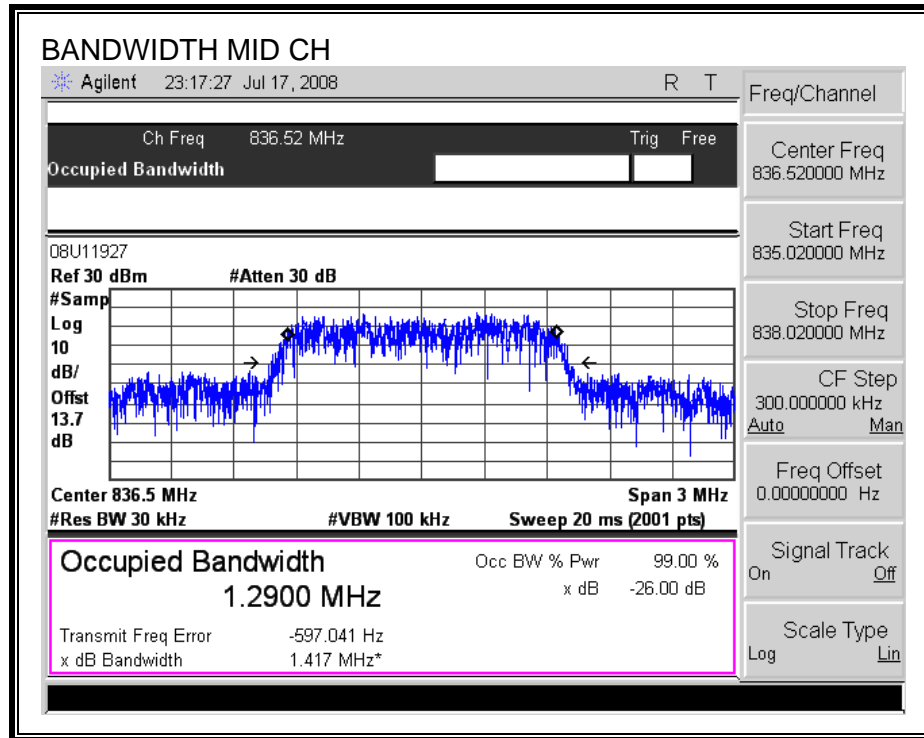
Channel	Frequency (MHz)	99% BW (MHz)	-26dB BW (MHz)
Low	824.70	1.291	1.416
Middle	836.52	1.290	1.417
High	848.31	1.294	1.421

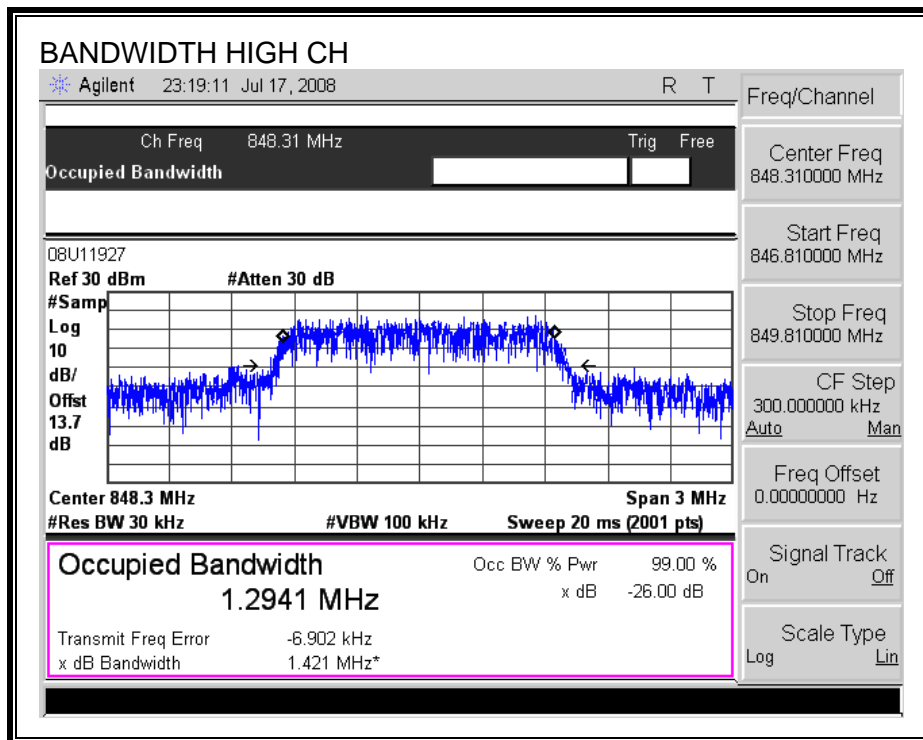
##### PCS, EV-DO REV A, CDMA Modulation

Channel	Frequency (MHz)	99% BW (MHz)	-26dB BW (MHz)
Low	1851.25	1.289	1.418
Middle	1880.00	1.290	1.417
High	1908.75	1.288	1.417

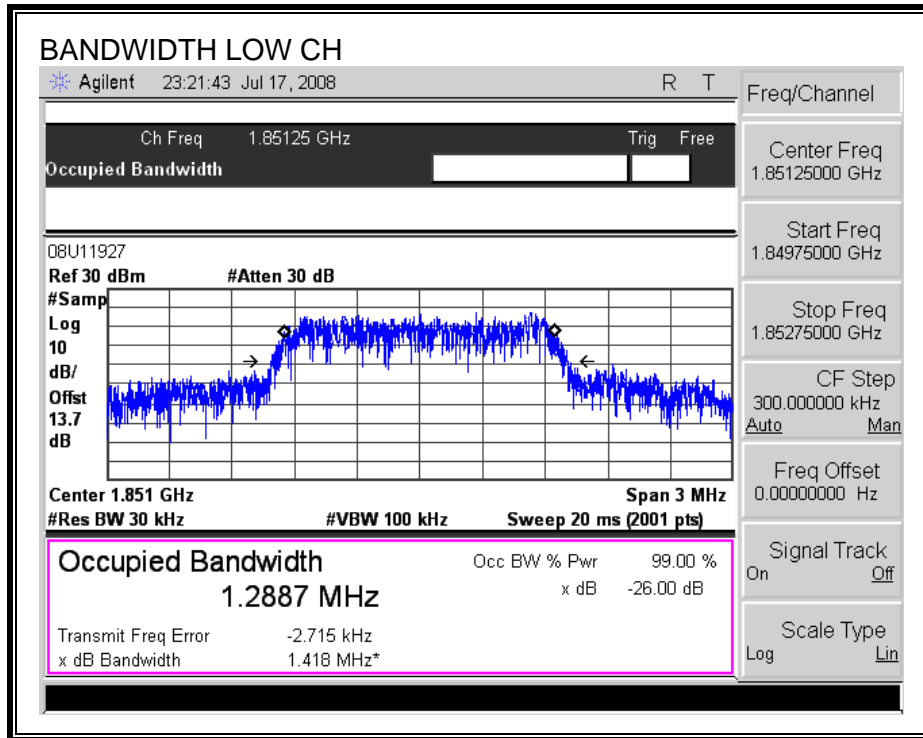
**CELL, EV-DO Rev A, CDMA BANDWIDTH**

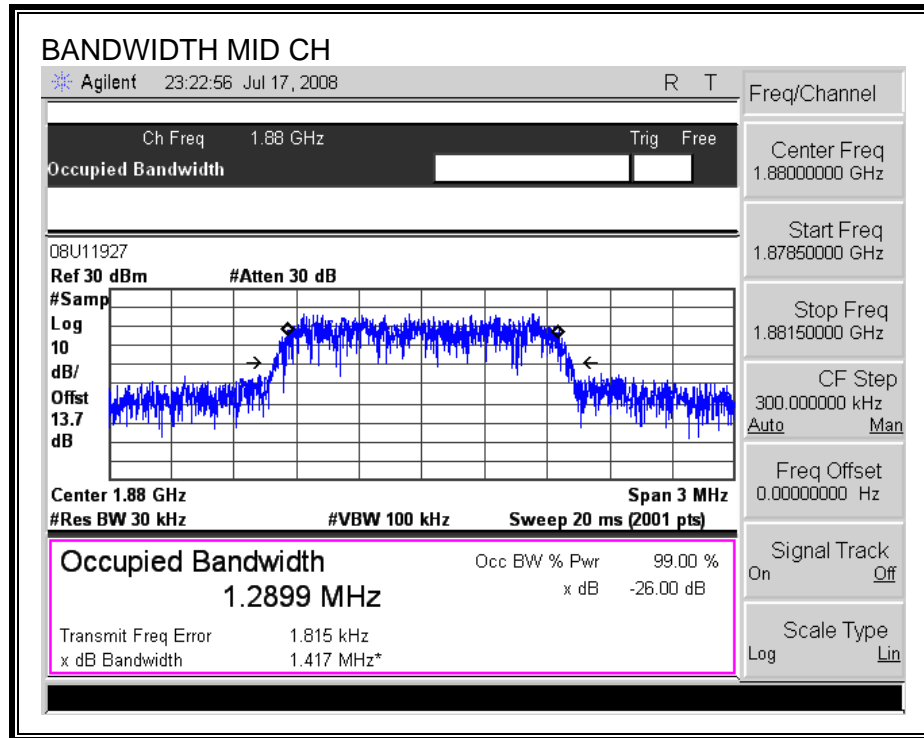


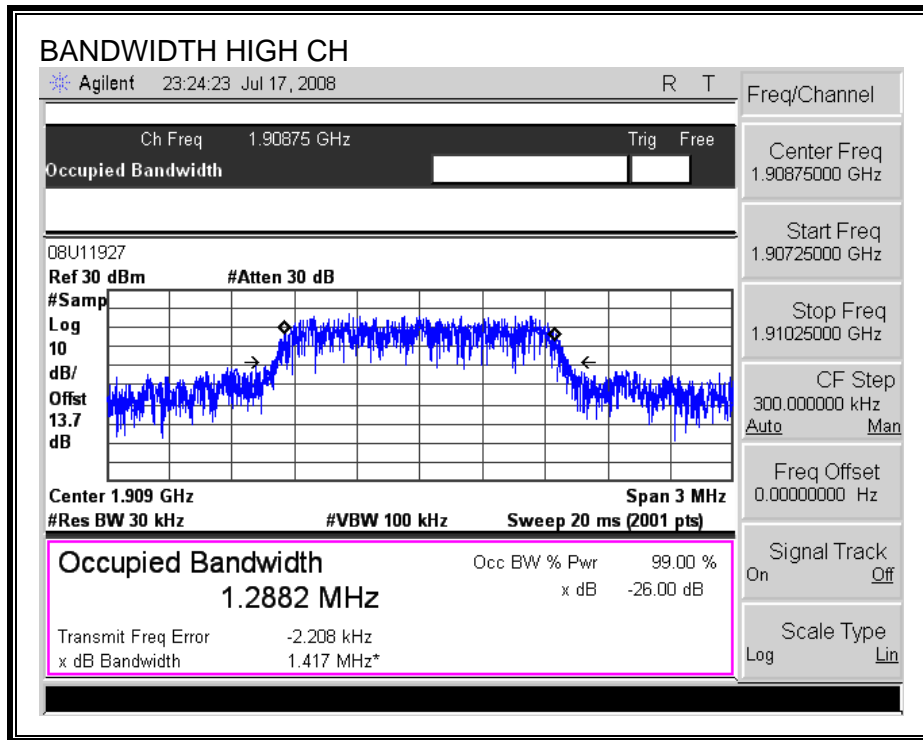




**PCS, EV-DO Rev A, CDMA BANDWIDTH**









## 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) & 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

#### CELL, EV-DO Rev A, CDMA Modulation

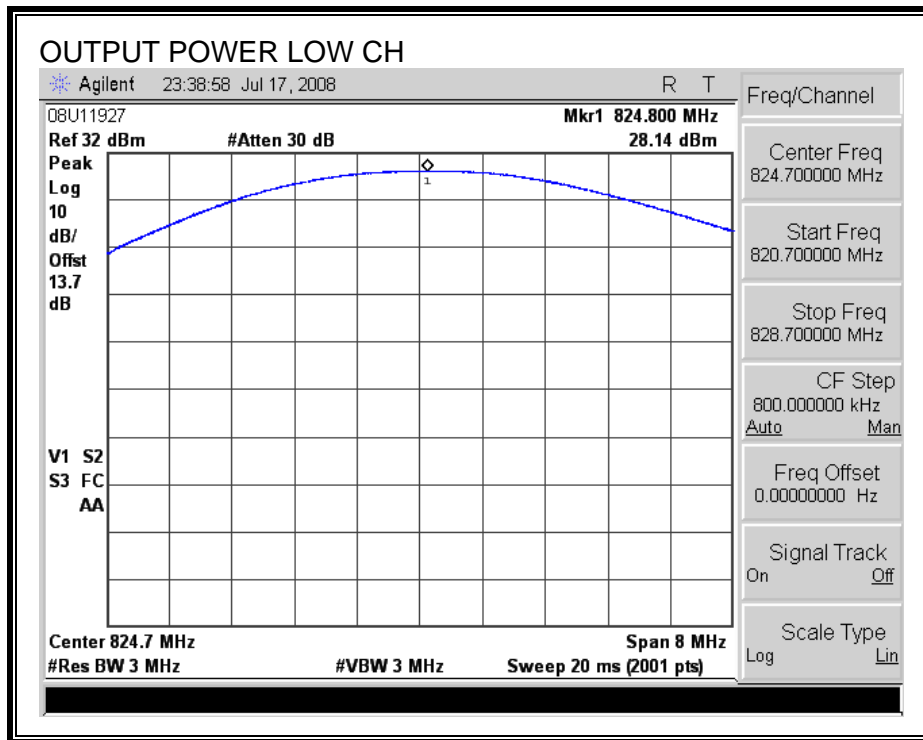
Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low	824.7	28.14	651.63	29.80	954.99
Middle	836.5	28.26	669.88	29.20	831.76
High	848.3	28.07	641.21	28.90	776.25

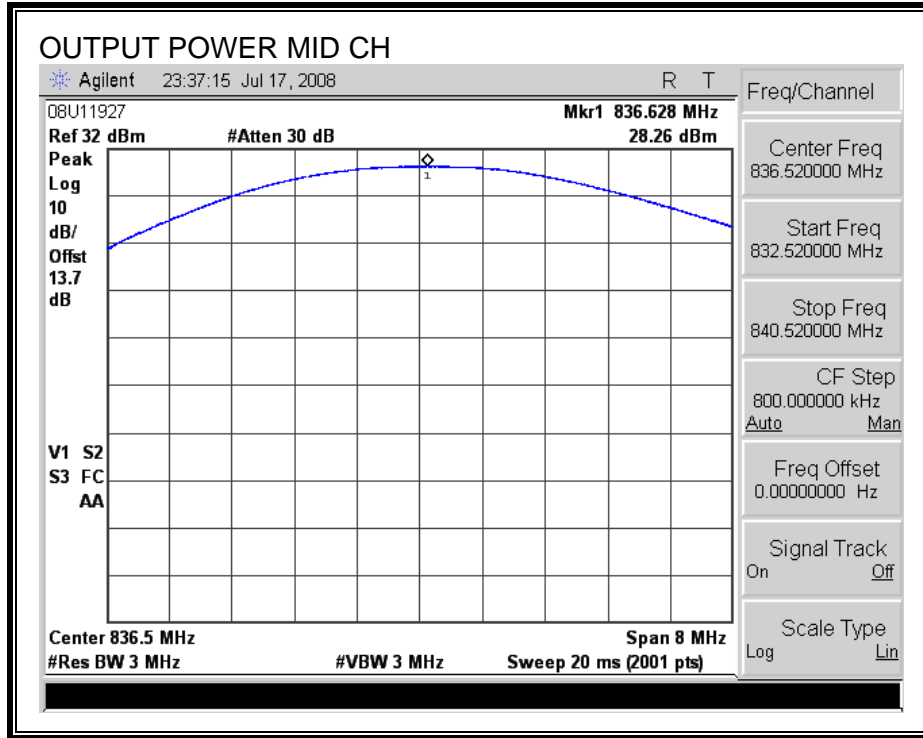
#### PCS, EV-DO Rev A, CDMA Modulation

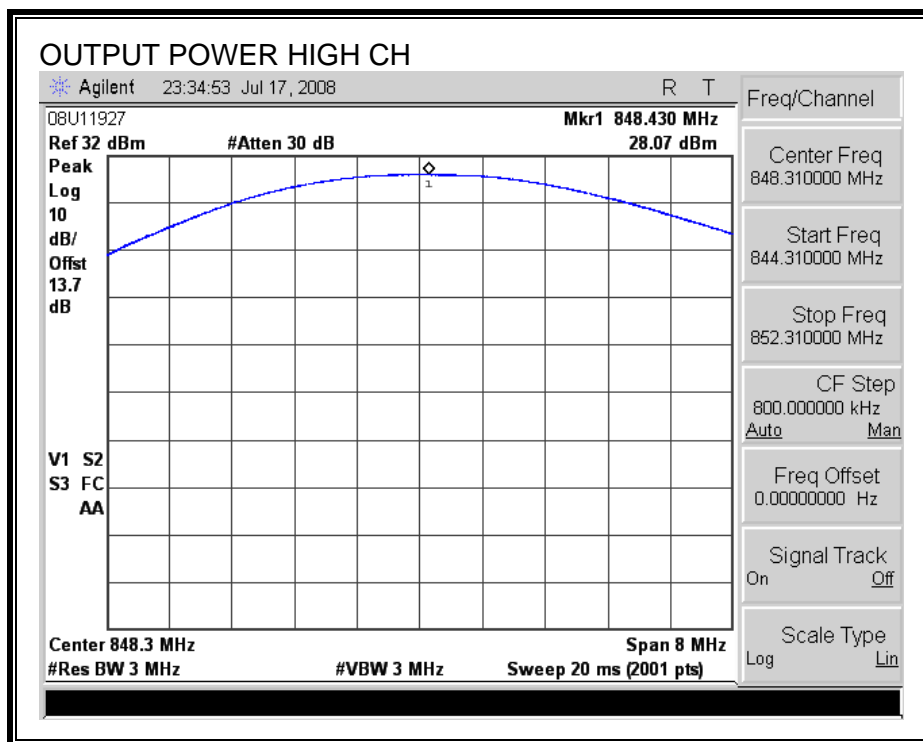
Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low	1851.25	28.69	739.61	28.40	691.83
Middle	1880.00	29.19	829.85	27.60	575.44
High	1908.75	28.31	677.64	27.30	537.03

NOTE: RBW=VBW=3MHz

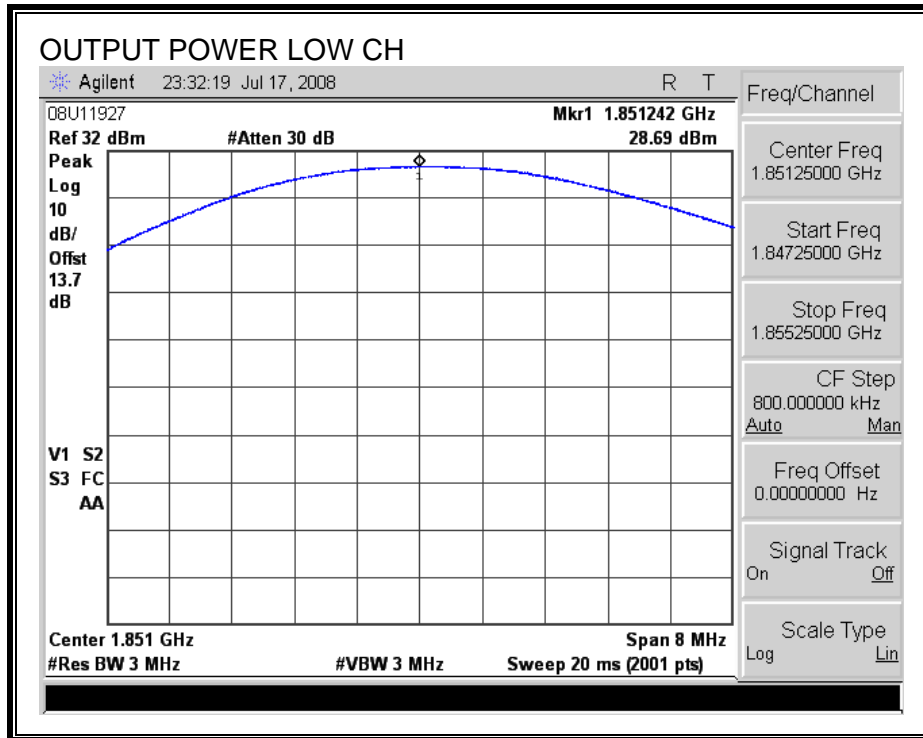
**CELL, EV-DO Rev A, CDMA RF CONDUCTED OUTPUT POWER**

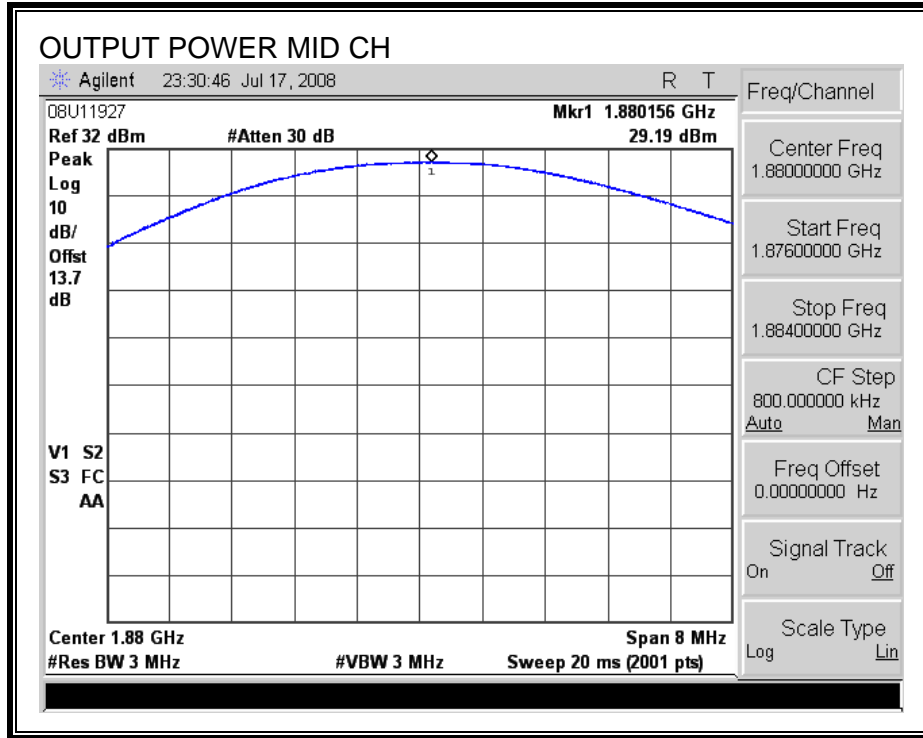


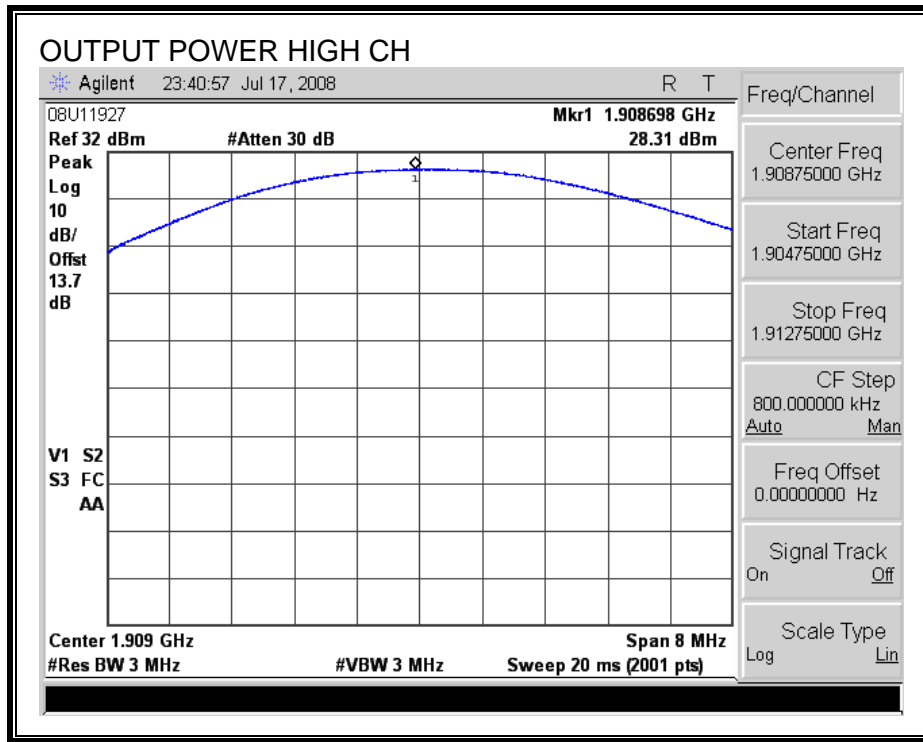




**PCS, EV-DO Rev A, CDMA RF CONDUCTED OUTPUT POWER**







**CELL, EV-DO Rev A, CDMA OUTPUT POWER (ERP)**

High Frequency Fundamental Measurement Compliance Certification Services, Fremont 5m Chamber B									
<b>Company:</b>		SIERRA WIRELESS INC.							
<b>Project #:</b>		08U11927							
<b>Date:</b>		7/16/2008							
<b>Test Engineer:</b>		MENGI STU MEKRIA							
<b>Configuration:</b>		EUT WITH SUPPORT LAPTOP							
<b>Mode:</b>		TX, EV-DO Rev A, CDMA CELL BAND							
<b>Test Equipment:</b>									
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, Thanh cable									
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	99.6	V	24.0	0.5	0.0	23.5	38.5	-14.9	
824.70	104.8	H	30.3	0.5	0.0	29.8	38.5	-8.6	
<b>Mid Ch</b>									
836.52	99.3	V	23.7	0.6	0.0	23.1	38.5	-15.3	
836.52	104.9	H	29.8	0.6	0.0	29.2	38.5	-9.2	
<b>High Ch</b>									
848.31	98.6	V	23.4	0.7	0.0	22.7	38.5	-15.7	
848.31	105.6	H	29.6	0.7	0.0	28.9	38.5	-9.5	
Rev. 1.24.7									



**PCS, EV-DO Rev A, CDMA OUTPUT POWER (EIRP)**

High Frequency Fundamental Measurement									
Compliance Certification Services, Fremont 5m Chamber B									
Company:		SIERRA WIRELESS INC.							
Project #:		08U11927							
Date:		7/16/2008							
Test Engineer:		MENGISTU MEKRIA							
Configuration:		EUT WITH SUPPORT LAPTOP							
Mode:		TX, EV-DO Rev A, CDMA PCS BAND							
<b>Test Equipment:</b>									
Receiving: Horn T73, and 12ft S/N: 197209005 (Setup this one for testing EUT) Thanh Cable									
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse S/N: 177081002, Thanh cable									
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	97.8	V	21.0	0.9	8.3	28.4	33.0	-4.6	
1.851	93.3	H	15.8	0.9	8.3	23.2	33.0	-9.8	
<b>Mid Ch</b>									
1.880	96.8	V	20.1	0.9	8.3	27.6	33.0	-5.5	
1.880	92.2	H	14.6	0.9	8.3	22.1	33.0	-11.0	
<b>High Ch</b>									
1.909	96.5	V	19.8	0.9	8.4	27.3	33.0	-5.7	
1.909	91.3	H	13.9	0.9	8.4	21.4	33.0	-11.6	
Rev. 1.24.7									

### **7.3. SPURIOUS EMISSION AT ANTENNA TERMINAL**

#### **LIMIT**

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

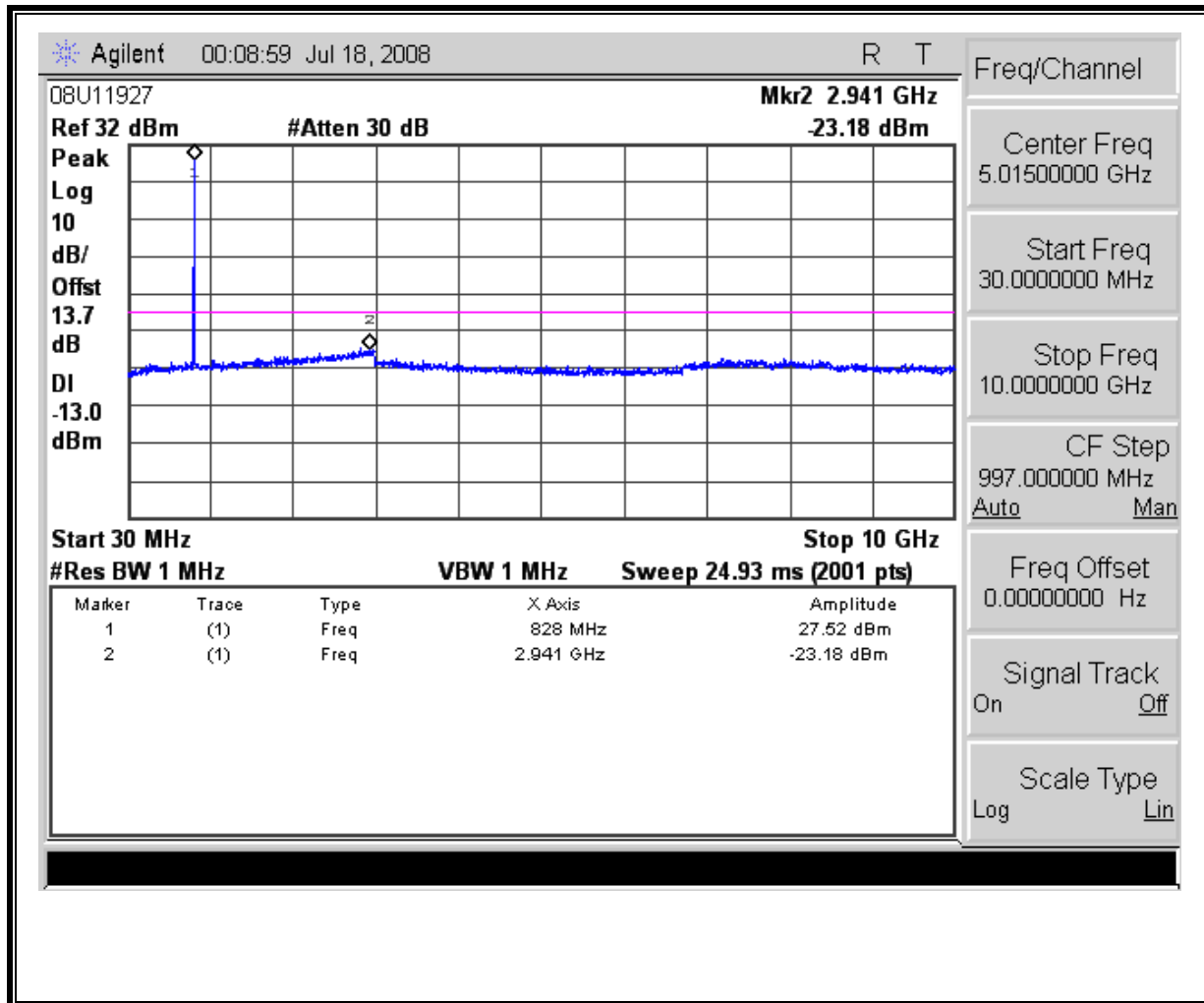
ANSI / TIA / EIA 603C Clause 2.2.12, FCC 22.917 (h), FCC 24.238 (b), RSS-132, & RSS-133

#### **RESULTS**

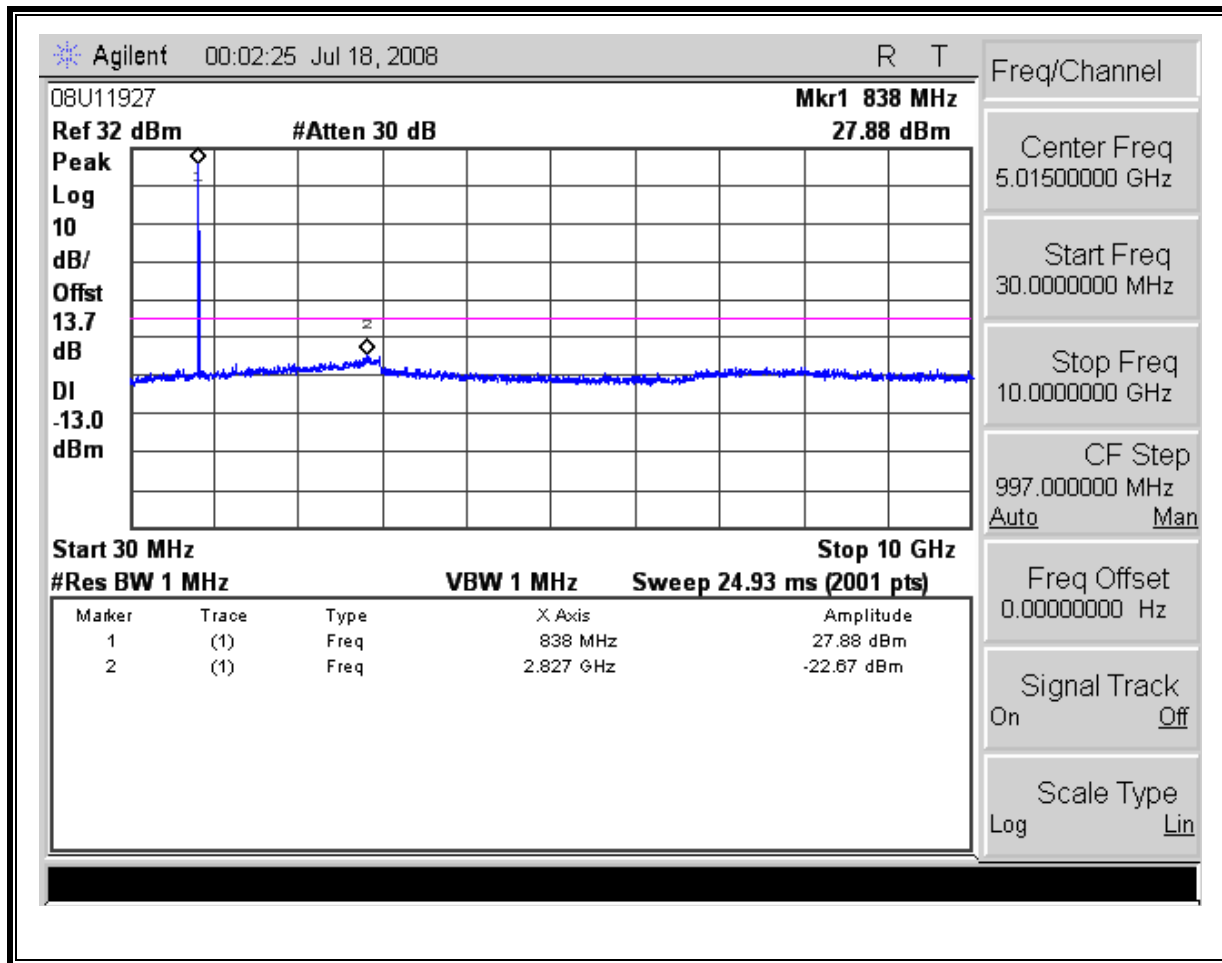
**RF CONDUCTED PORT:**

**CELL, EV-DO Rev A, CDMA MODULATION:**

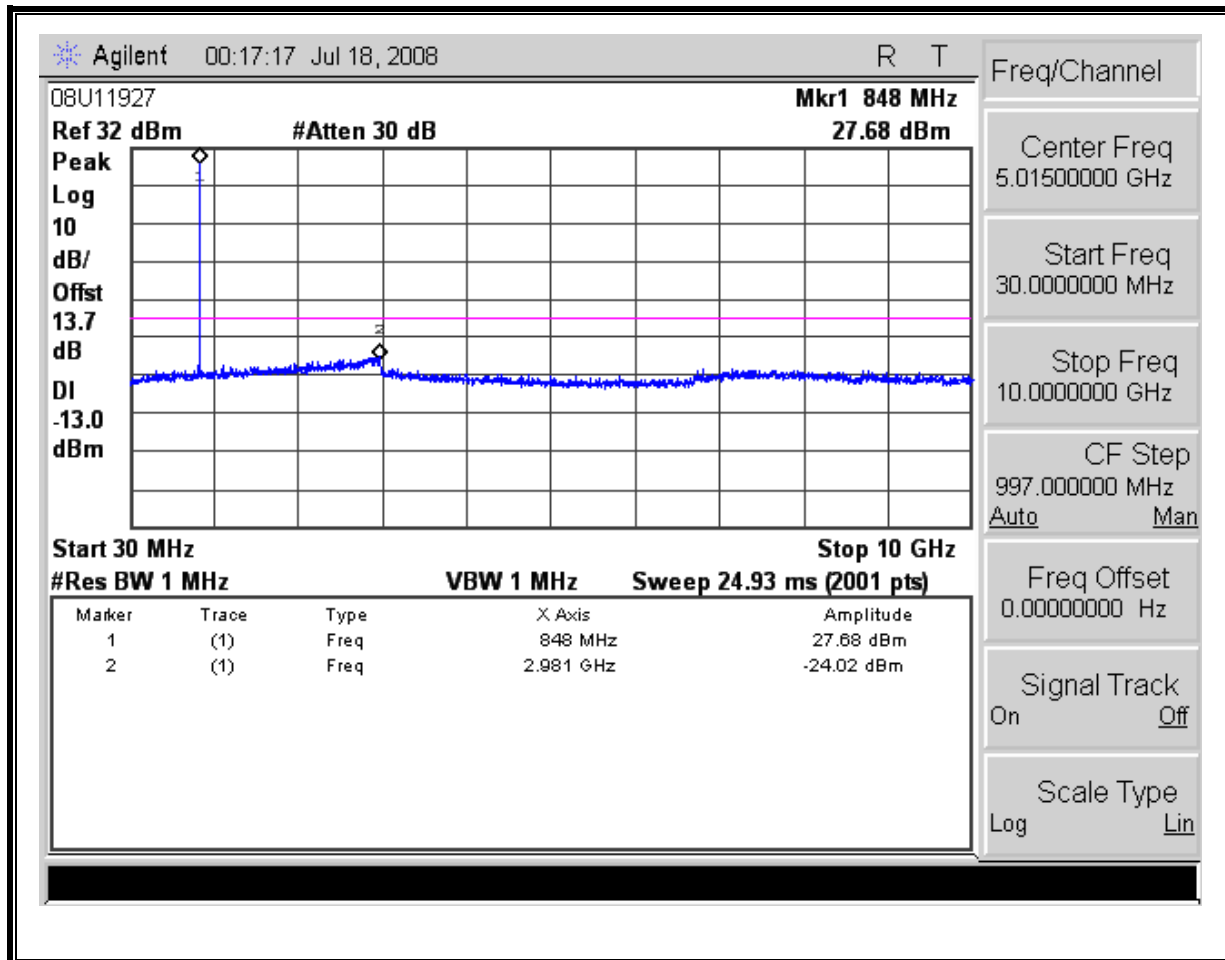
**Low Channel, Out-Of-Band Emissions**



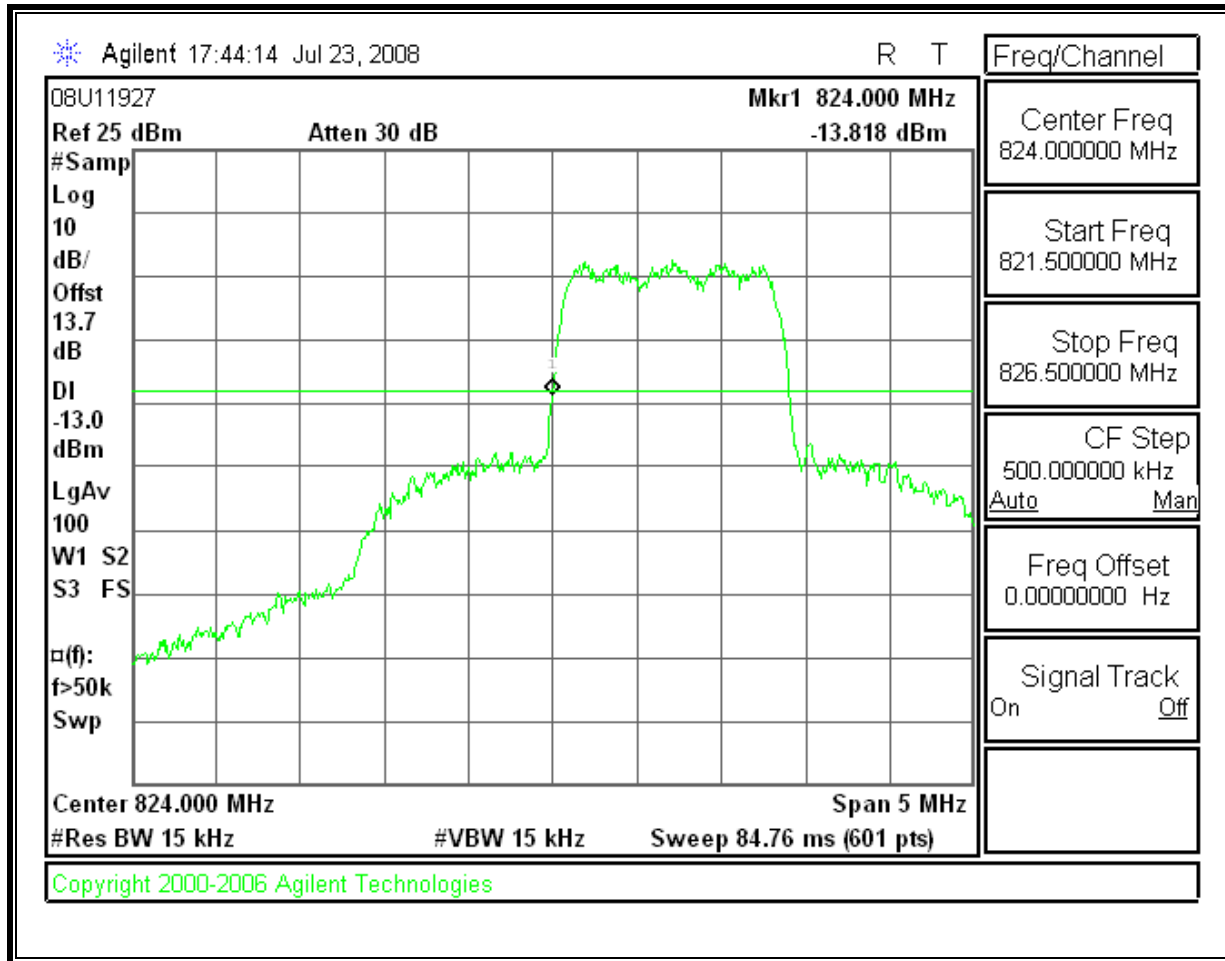
**Mid Channel, Out-Of-Band Emissions**



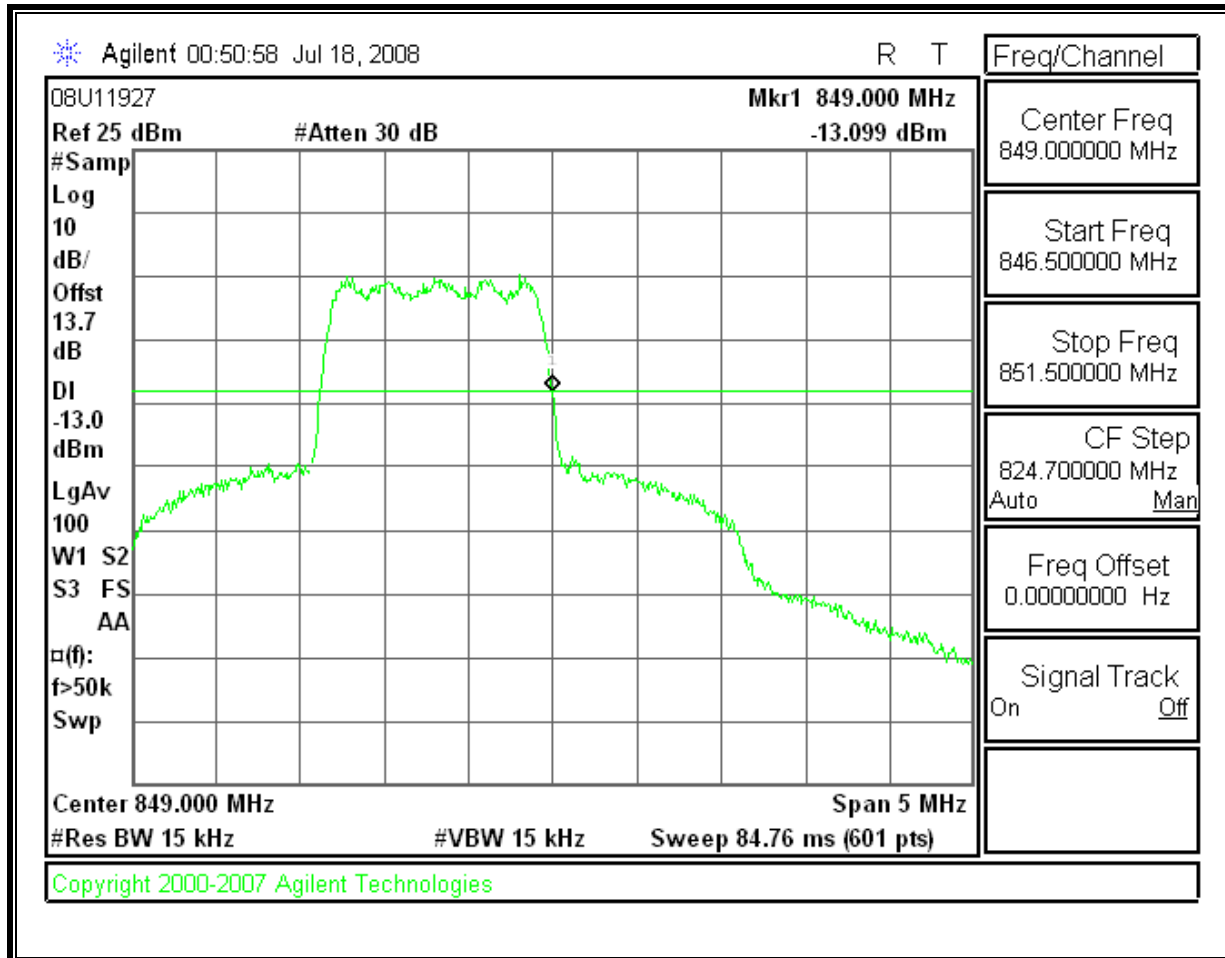
**High Channel, Out-Of-Band Emissions**



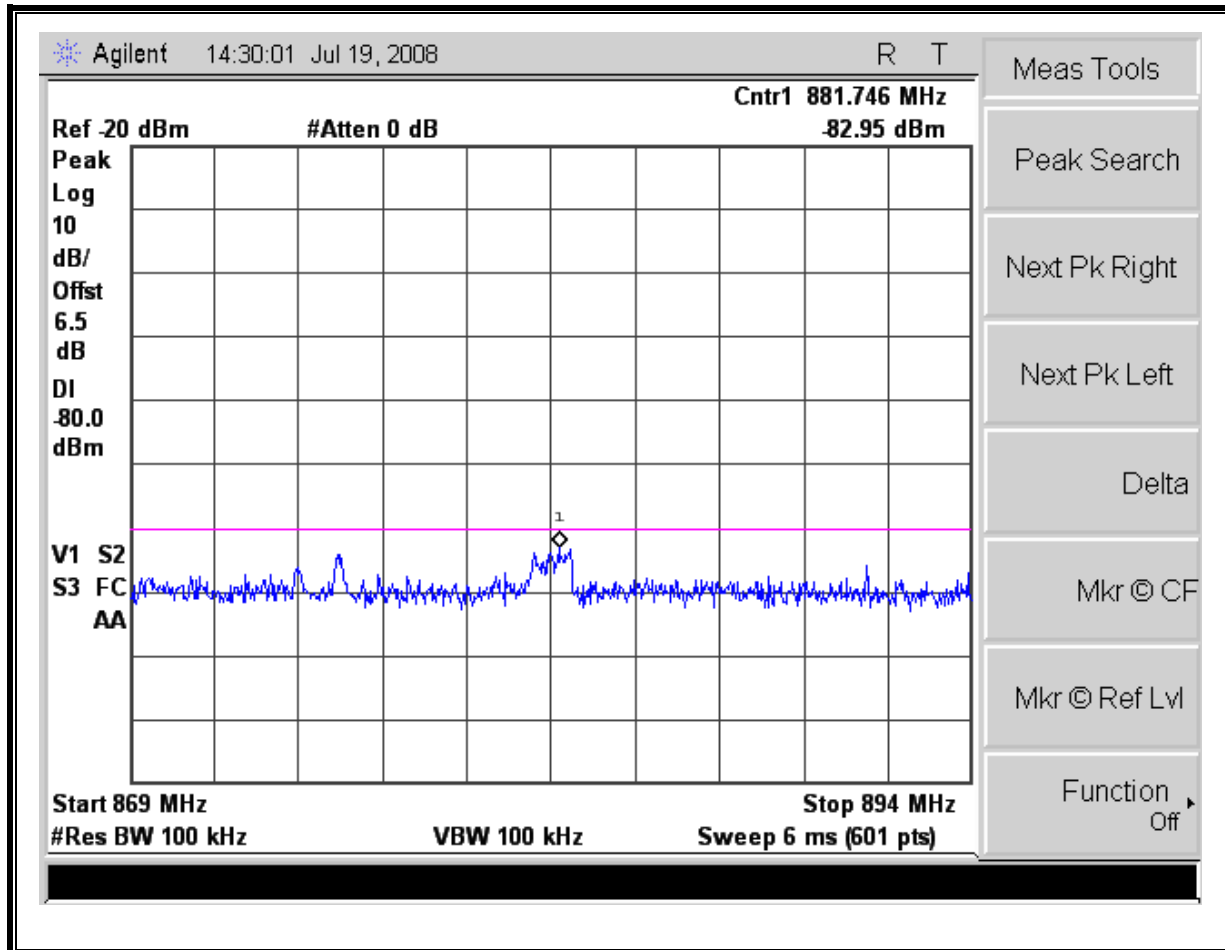
**Low Channel Band Edge**



**High Channel Band Edge**



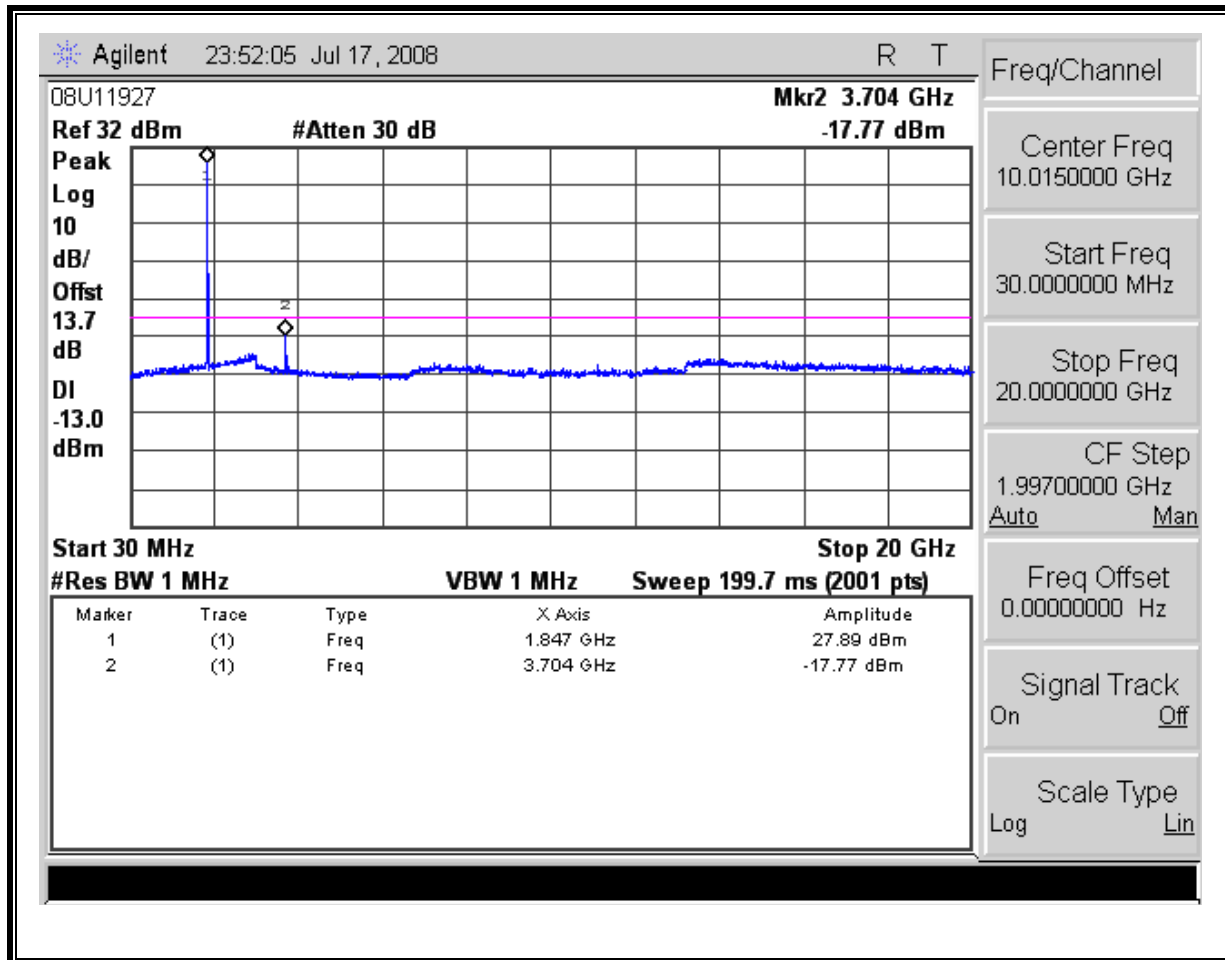
**Mobile Emissions in Base Frequency Range**



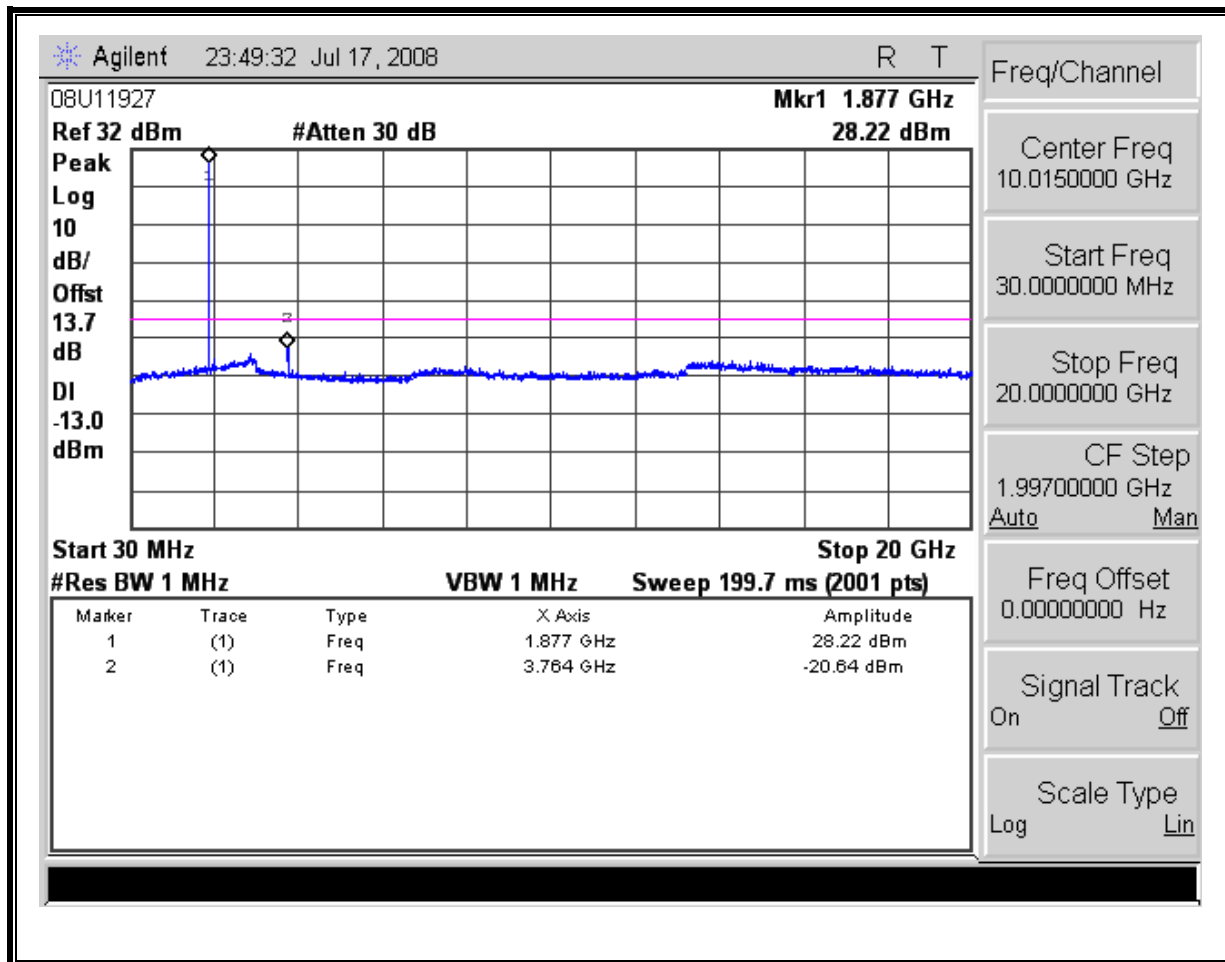


**PCS, EV-DO Rev A, CDMA MODULATION::**

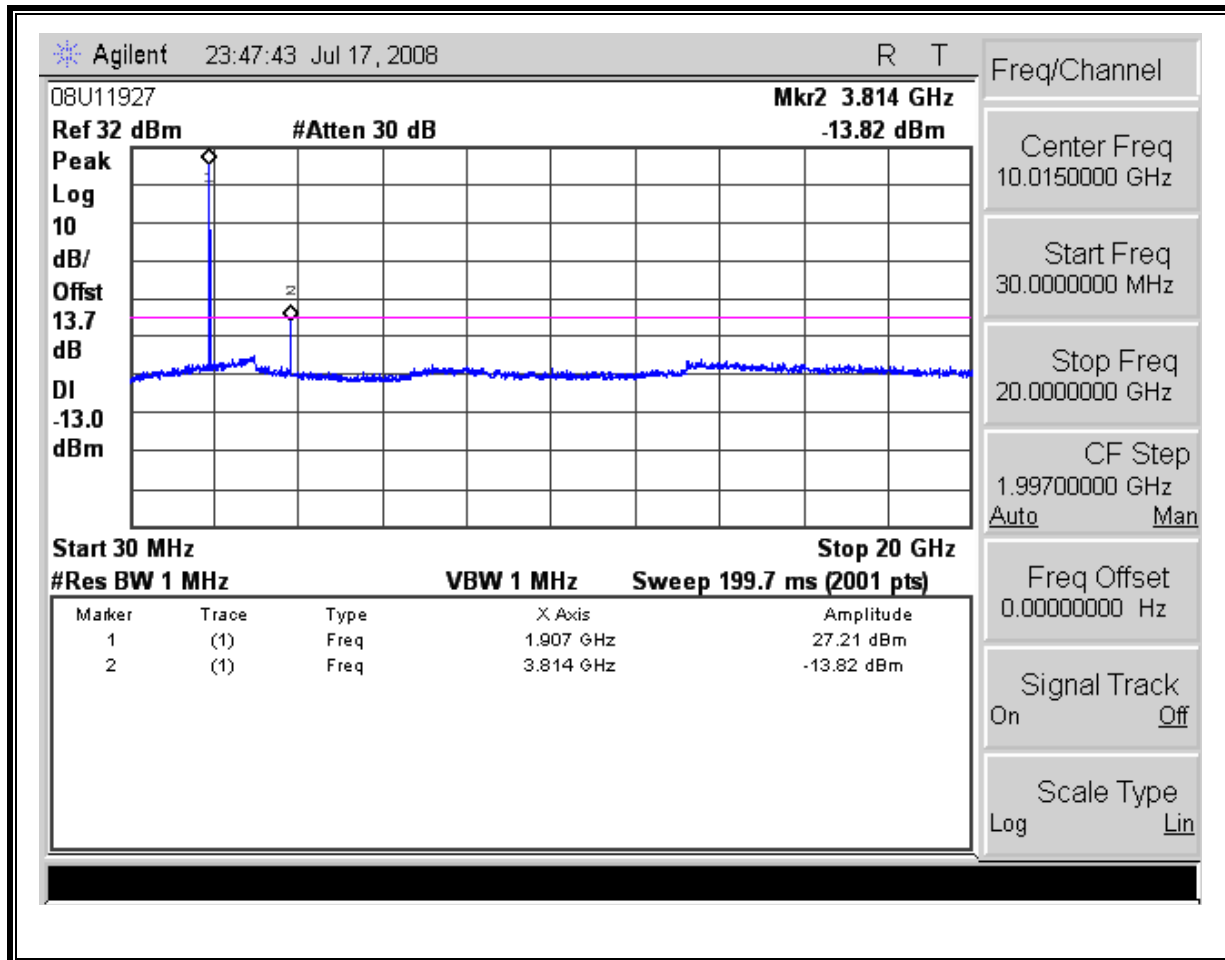
**Low Channel, Out-Of-Band Emissions**



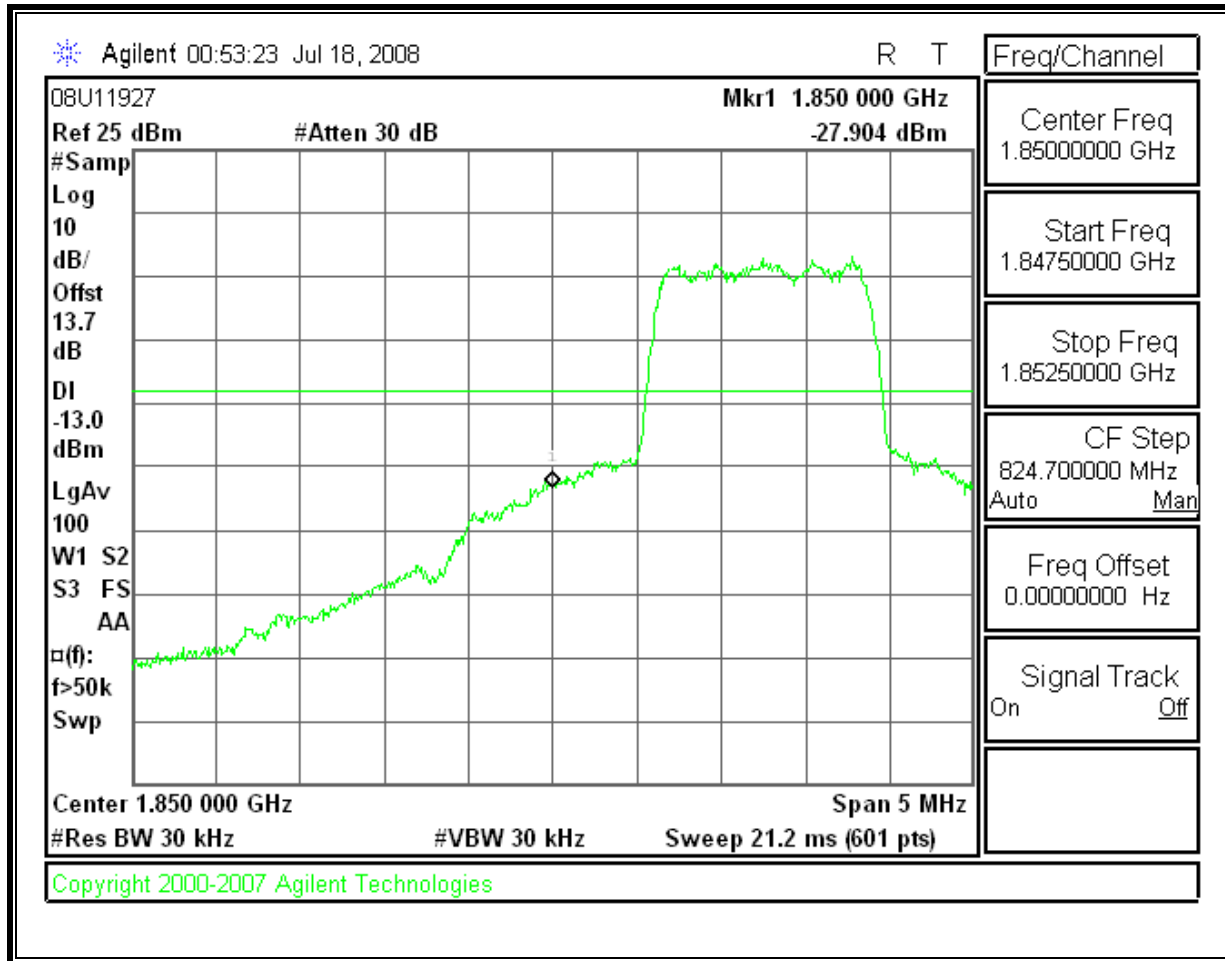
**Mid Channel, Out-Of-Band Emissions**



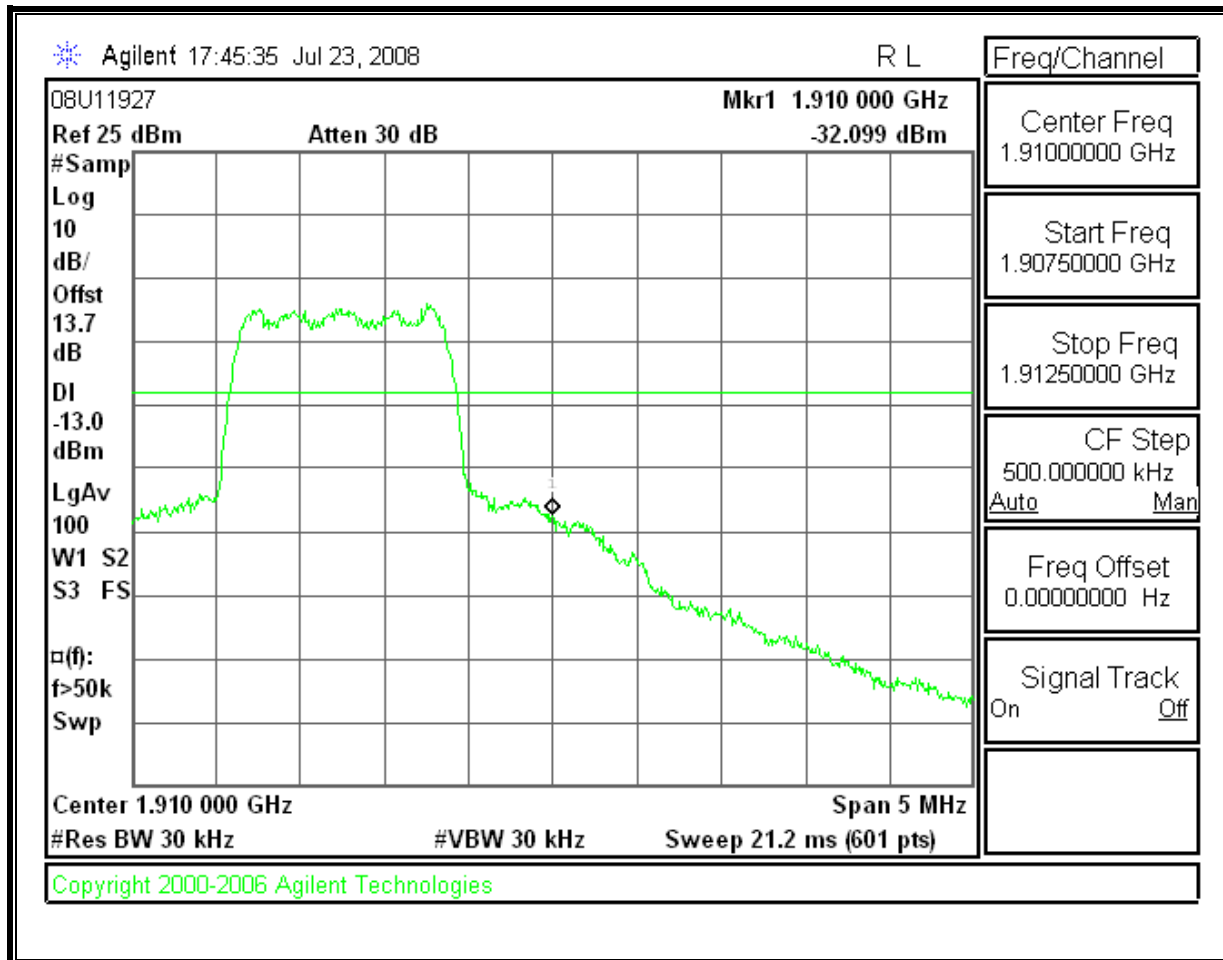
**High Channel, Out-Of-Band Emissions**



**Low Channel Band Edge**



**High Channel Band Edge**



**FIELD STRENGTH OF SPURIOUS RADIATION:**

**CELL, EV-DO Rev A, CDMA MODULATION SPURIOUS & HARMONIC (ERP)**

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
<b>High Frequency Substitution Measurement</b>										
Compliance Certification Services, Fremont 5m B-Chamber										
Company: SIERRA WIRELESS INC.										
Project #: 08U11927										
Date: 7/17/2008										
Test Engineer: MENGISTU MEKRIA										
Configuration: EUT WITH SUPPORT LAPTOP										
Mode: TX, EV-DO Rev A, CDMA CELL BAND										
Test Equipment:										
<div style="display: flex; justify-content: space-between;"> <div>EMCO Horn 1-18GHz T73; S/N: 6717 @3m</div> <div>Horn &gt; 18GHz</div> <div>Limit FCC 22</div> <div><input checked="" type="checkbox"/> High Pass Filter</div> </div>										
<div style="display: flex; justify-content: space-between;"> <div>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)                 </div> <div>Pre-amplifier 1-26GHz T145 Agilent 3008A</div> <div>Pre-amplifier 26-40GHz</div> </div>										
<b>LOW CH. (824.70 MHz)</b>										
1.695	51.0	V	-54.8	3.9	8.1	5.9	-52.7	-13.0	-39.7	
2.474	52.6	V	-49.9	4.9	9.5	7.4	-47.4	-13.0	-34.4	
1.695	50.4	H	-54.7	3.9	8.1	5.9	-52.7	-13.0	-39.7	
2.474	55.5	H	-46.8	4.9	9.5	7.4	-44.3	-13.0	-31.3	
<b>MID CH. (836.52 MHz)</b>										
1.673	55.4	V	-50.5	3.9	8.0	5.9	-48.5	-13.0	-35.5	
2.510	52.6	V	-49.7	4.9	9.6	7.4	-47.2	-13.0	-34.2	
1.673	54.8	H	-50.4	3.9	8.0	5.9	-48.4	-13.0	-35.4	
2.510	58.7	H	-43.5	4.9	9.6	7.4	-41.0	-13.0	-28.0	
<b>HI CH. (848.31 MHz)</b>										
1.697	51.6	V	-54.2	3.9	8.1	5.9	-52.2	-13.0	-39.2	
2.545	50.5	V	-51.6	4.9	9.6	7.4	-49.2	-13.0	-36.2	
1.697	54.6	H	-50.4	3.9	8.1	5.9	-48.4	-13.0	-35.4	
2.545	55.3	H	-46.7	4.9	9.6	7.4	-44.2	-13.0	-31.2	
Rev. 4.12.7										

**PCS, EV-DO Rev A, CDMA MODULATION SPURIOUS & HARMONIC (EIRP)**

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

Company: SIERRA WIRELESS INC.  
 Project #: 08U11927  
 Date: 7/17/2008  
 Test Engineer: MENGISTU MEKRIA  
 Configuration: EUT WITH SUPPORT LAPTOP  
 Mode: TX, EV-DO Rev A, CDMA PCS BAND

**Test Equipment:**

EMCO Horn 1-18GHz  
T73; S/N: 6717 @3m

Horn > 18GHz

Limit  
FCC 24

High Pass Filter

Hi Frequency Cables

(2 ft)
  (2~3 ft)
  (4~6 ft)
  (12 ft)

Pre-amplifier 1-26GHz  
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. (1851.25 MHz)</b>										
3.721	55.8	V	-41.2	6.0	9.7	7.6	-37.4	-13.0	-24.4	
5.538	60.7	V	-31.7	7.4	11.3	9.1	-27.9	-13.0	-14.9	
3.721	56.7	H	-40.2	6.0	9.7	7.6	-36.4	-13.0	-23.4	
5.538	57.9	H	-33.5	7.4	11.3	9.1	-29.6	-13.0	-16.6	
<b>MID CH. (1800.00 MHz)</b>										
3.760	56.1	V	-40.7	6.0	9.7	7.6	-37.0	-13.0	-24.0	
5.640	55.0	V	-37.7	7.4	11.5	9.3	-33.6	-13.0	-20.6	
3.760	57.5	H	-39.2	6.0	9.7	7.6	-35.4	-13.0	-22.4	
5.640	53.8	H	-37.9	7.4	11.5	9.3	-33.9	-13.0	-20.9	
<b>HI CH. (1908.75 MHz)</b>										
3.818	64.5	V	-32.0	6.0	9.7	7.5	-28.3	-13.0	-15.3	
5.726	57.8	V	-35.1	7.5	11.6	9.5	-30.9	-13.0	-17.9	
3.818	64.2	H	-32.1	6.0	9.7	7.5	-28.5	-13.0	-15.5	
5.726	56.9	H	-35.0	7.5	11.6	9.5	-30.9	-13.0	-17.9	

Rev. 4.12.7

## **7.4. FREQUENCY STABILITIES**

### **LIMIT**

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations. 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**



**CELL, CDMA MODULATION – MID CHANNEL**

Reference Frequency: Cellular Mid Channel 835.81666MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2089.542 Hz				
DC Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	835.816678	-0.014	2.5
115.00	40	835.816674	-0.010	2.5
115.00	30	835.816636	0.036	2.5
<b>115.00</b>	<b>20</b>	<b>835.816666</b>	<b>0</b>	2.5
115.00	10	835.816681	-0.018	2.5
115.00	0	835.816685	-0.023	2.5
115.00	-10	835.816676	-0.012	2.5
115.00	-20	835.816690	-0.029	2.5
115.00	-30	835.816692	-0.031	2.5

Reference Frequency: Cellular Mid Channel 835.81666MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2089.542 Hz				
DC Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>100%</b>	<b>20</b>	<b>835.816666</b>	<b>0</b>	<b>2.5</b>
85%	20	835.816658	0.010	2.5
115%	20	835.816656	0.012	2.5

**PCS, CDMA MODULATION – MID CHANNEL**

Reference Frequency: PCS Mid Channel 1879.25005MHz @ 20°C				
Limit: within the authorized block or +- 2.5 ppm = 4698.125 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	1879.250320	-0.144	2.5
115.00	40	1879.250230	-0.096	2.5
115.00	30	1879.250180	-0.069	2.5
<b>115.00</b>	<b>20</b>	<b>1879.25005</b>	<b>0</b>	<b>2.5</b>
115.00	10	1879.249900	0.080	2.5
115.00	0	1879.249830	0.117	2.5
115.00	-10	1879.249790	0.138	2.5
115.00	-20	1879.249880	0.090	2.5
115.00	-30	1879.249730	0.170	2.5

Reference Frequency: PCS Mid Channel 1879.25005MHz @ 20 C				
Limit: within the authorized block or +- 2.5 ppm = 4698.125 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>100%</b>	<b>20</b>	<b>1879.250050</b>	<b>0</b>	<b>2.5</b>
85%	20	1879.250330	-0.149	2.5
115%	20	1879.250420	-0.197	2.5

## 7.5. 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

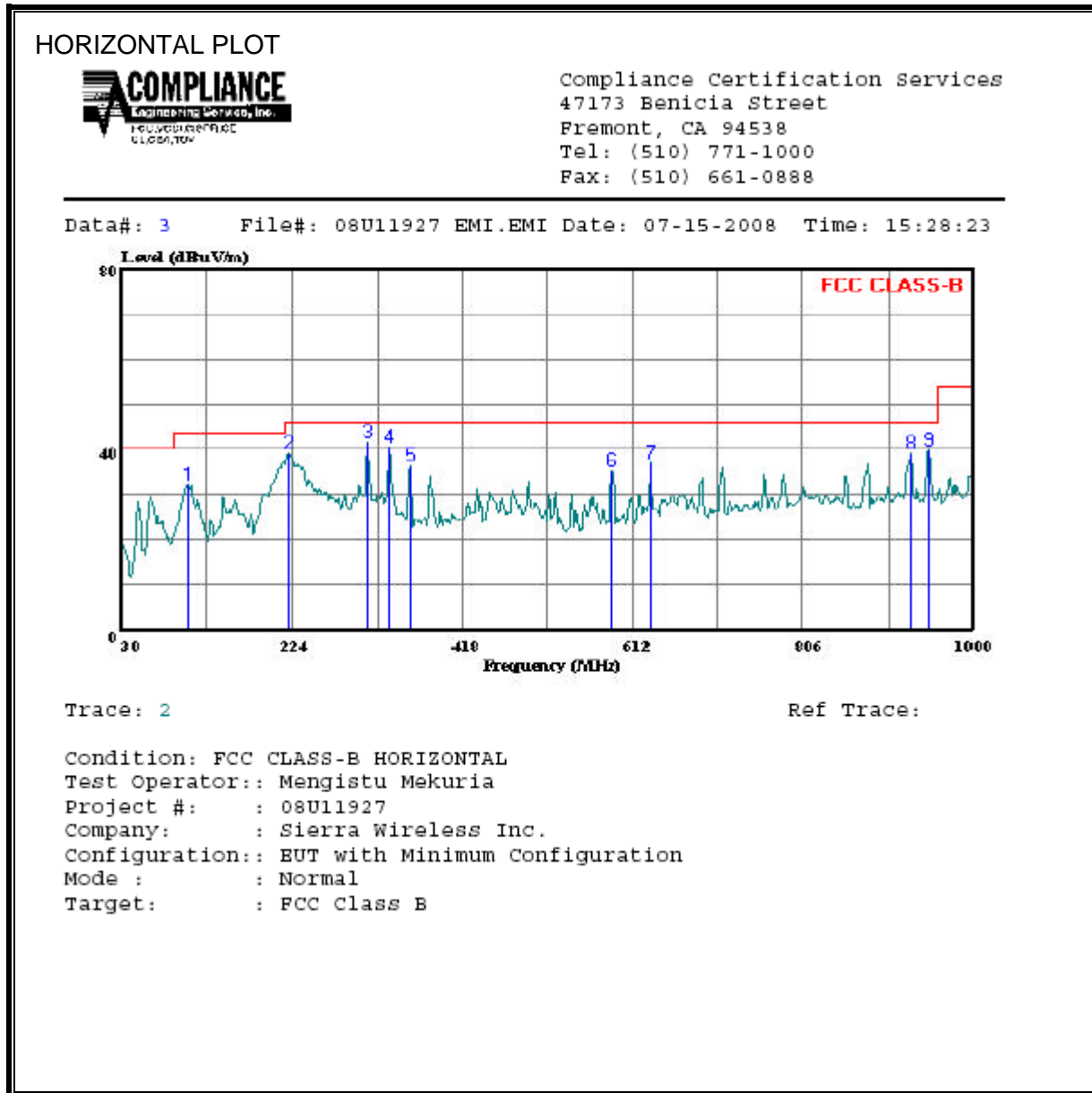
### TEST PROCEDURE

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:

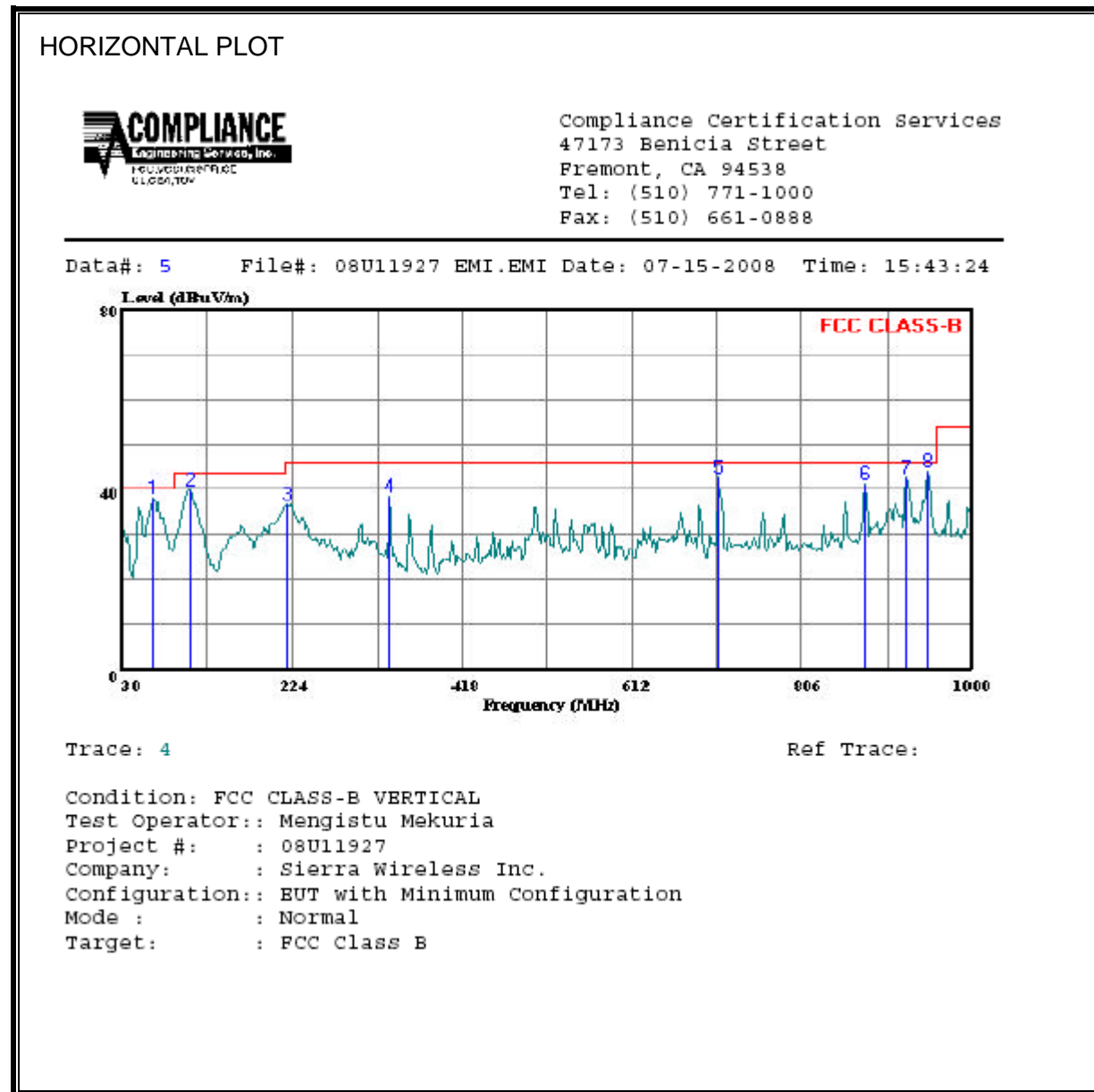
**RECEIVER SPURIOUS EMISSIONS FOR 30 TO 1000 MHz, HORIZONTAL**



HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	104.690	52.10	-19.85	32.25	43.50	-11.25	Peak
2	221.090	56.64	-17.51	39.13	46.00	-6.87	Peak
3	310.330	56.75	-15.25	41.50	46.00	-4.50	Peak
4	334.580	55.02	-14.56	40.46	46.00	-5.54	Peak
5	358.830	50.20	-13.83	36.37	46.00	-9.63	Peak
6	586.780	44.03	-8.71	35.32	46.00	-10.68	Peak
7	633.340	44.77	-7.82	36.95	46.00	-9.05	Peak
8	929.190	40.66	-1.64	39.02	46.00	-6.98	Peak
9	950.530	41.07	-1.30	39.77	46.00	-6.23	Peak

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



VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	65.890	61.76	-23.70	38.06	40.00	-1.94	Peak
2	106.630	59.43	-19.49	39.94	43.50	-3.56	Peak
3	218.180	54.28	-17.51	36.77	46.00	-9.23	Peak
4	334.580	52.92	-14.56	38.36	46.00	-7.64	Peak
5	710.940	48.69	-6.12	42.57	46.00	-3.43	Peak
6	877.780	43.95	-2.81	41.14	46.00	-4.86	Peak
7	924.340	44.24	-1.72	42.52	46.00	-3.48	Peak
8	950.530	45.37	-1.30	44.07	46.00	-1.93	Peak

**RECEIVER SPURIOUS EMISSIONS FOR ABOVE 1GHz**

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



## 7.6. POWER LINE CONDUCTED EMISSION

### 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

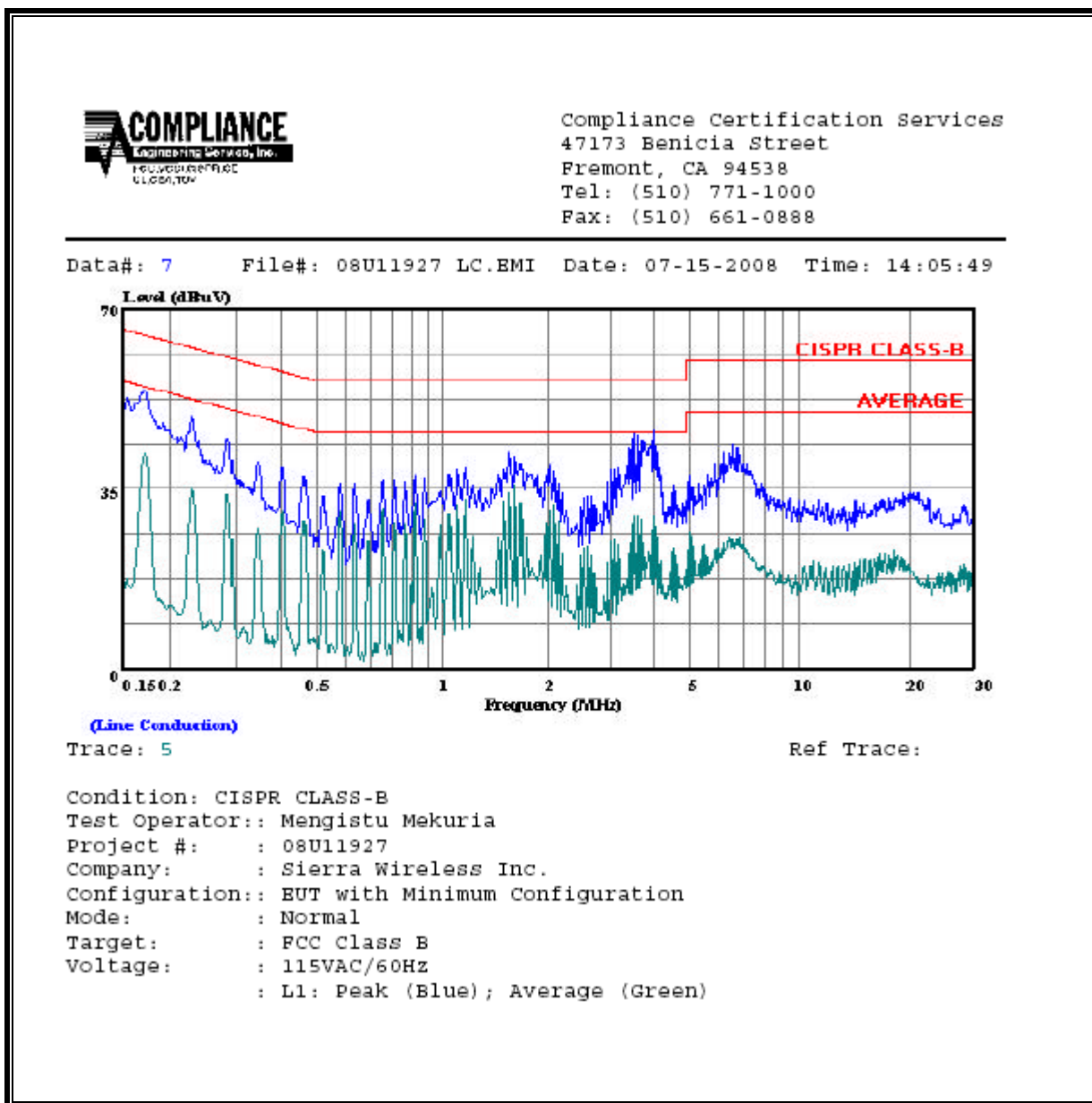
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### RESULTS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.17	54.07	--	41.85	0.00	64.91	54.91	-10.84	-13.06	L1
1.66	42.15	--	35.80	0.00	56.00	46.00	-13.85	-10.20	L1
3.62	45.65	--	29.83	0.00	56.00	46.00	-10.35	-16.17	L1
0.18	52.18	--	42.60	0.00	64.67	54.67	-12.49	-12.07	L2
1.61	41.07	--	35.10	0.00	56.00	46.00	-14.93	-10.90	L2
3.90	45.79	--	30.90	0.00	56.00	46.00	-10.21	-15.10	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

