HCT CO.,LTD

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Class II Permissive Change

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.

Address:
10101 Old Grove Road, San Diego, CA 92131

Date of Issue:
February 08, 2012

Location:
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea

Test Report No.: HCTR1201FR27-1

HCT FRN: 0005866421

FCC ID:	**ZNFLS696**
APPLICANT:	**LG Electronics MobileComm U.S.A., Inc.**

FCC Model(s):	LS696
Additional FCC Model(s):	LG-LS696
EUT Type:	Cellular/PCS CDMA/EVDO Phone with Bluetooth & WLAN
Tx Frequency:	817.9 — 823.1 MHz (CDMA)
Max. RF Output Power:	0.234 W ERP CDMA (23.69 dBm)
Emission Designator(s):	1M27F9W (CDMA)/ 1M27F9W (CDMA EVDO)
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§90.691

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Hyo Sun Kwak
Report prepared by
: Hyo Sun Kwak
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1201FR27	January 27, 2012	- First Approval Report
HCTR1201FR27-1	February 08, 2012	- Revise the 23 Page ~ 30 Page

Table of Contents

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics MobileComm U.S.A., Inc.
Address:	10101 Old Grove Road, San Diego, CA 92131
FCC ID:	ZNFLS696
Application Type:	FCC Class II Permissive Change
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§90.691
EUT Type:	Cellular/PCS CDMA/EVDO & LTE Phone with Bluetooth & WLAN
FCC Model(s):	LS696
Additional FCC Model(s):	LG-LS696
Tx Frequency:	817.9 — 823.1 MHz (CDMA)
Max. RF Output Power:	0.234 W ERP CDMA (23.69 dBm)
Emission Designator(s):	1M27F9W (CDMA)/ 1M27F9W (CDMA EVDO)
Antenna Specification	Manufacturer: LS Mtron Co.Ltd. Antenna type: PIFA Antenna Peak Gain: -5.30 dBi
Date(s) of Tests:	January 12, 2012 ~ January 27, 2012

2. INTRODUCTION

2.1. EUT DESCRIPTION

The LS696 Cellular/PCS CDMA/EVDO Phone with Bluetooth & WLAN consists of Cellular CDMA, PCS CDMA, 1xRTT and EVDO Rev.A.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

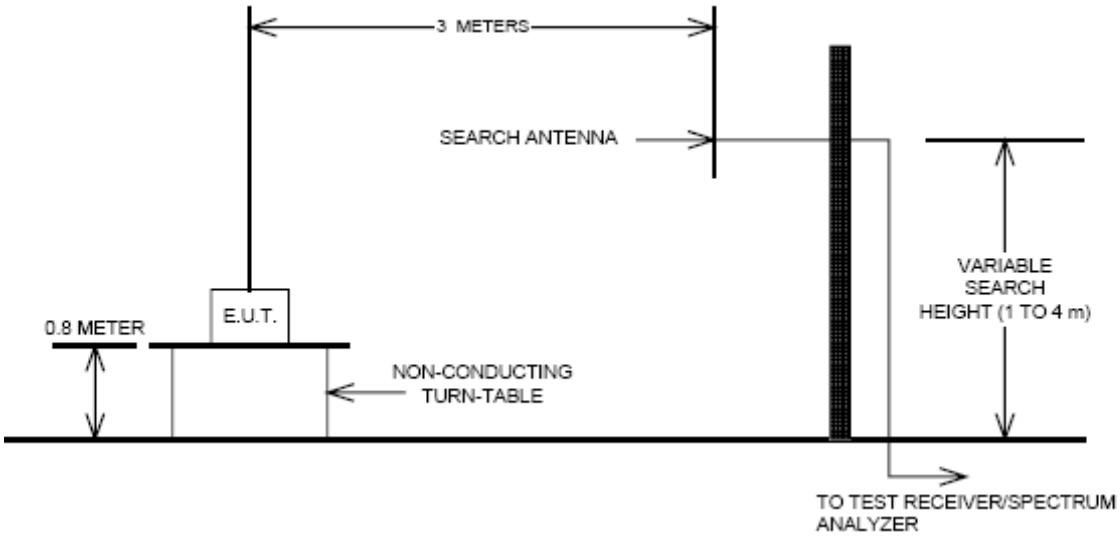
2.3. TEST FACILITY

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

3. DESCRIPTION OF TESTS

3.1 EFFECTIVE RADIATED POWER/EQUIVALENT ISOTROPIC RADIATED POWER

Test Set-up



Test Procedure

Radiated emission measurements were performed at an SAC(Semi-Anechoic Chamber)
The equipment under test is placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. A styrofoam turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.
The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with 'All Up' power control bits.

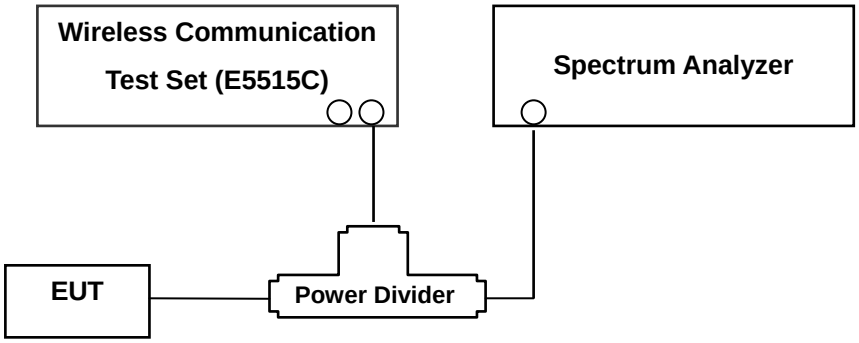
3.2 PEAK- TO- AVERAGE RATIO

A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. Plots of the EUT's Peak- to- Average Ratio are shown herein.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with 'All Up' power control bits.

3.3 OCCUPIED BANDWIDTH.

Test set-up



(Configuration of conducted Emission measurement)
Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with 'All Up' power control bits.

3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

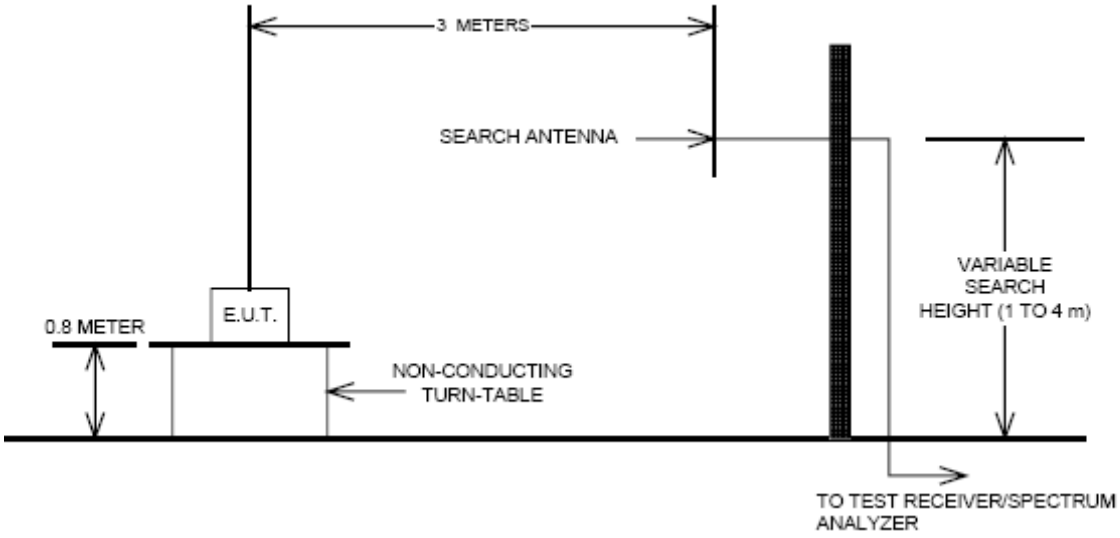
The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 30 MHz to 10 GHz. (PCS CDMA Mode: 30 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

- Band Edge Requirement : In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with 'All Up' power control bits.

3.5 RADIATED SPURIOUS AND HARMOMIC EMISSIONS

Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The SAC(Semi-Anechoic Chamber) meets requirements in ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable styrofoam platform mounted at three from the antenna mast.

1) The unit mounted on a styrofoam turntable 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
4) The spectrum shall be scanned up to the 10th harmonic of the fundamental frequency.

Test Procedure

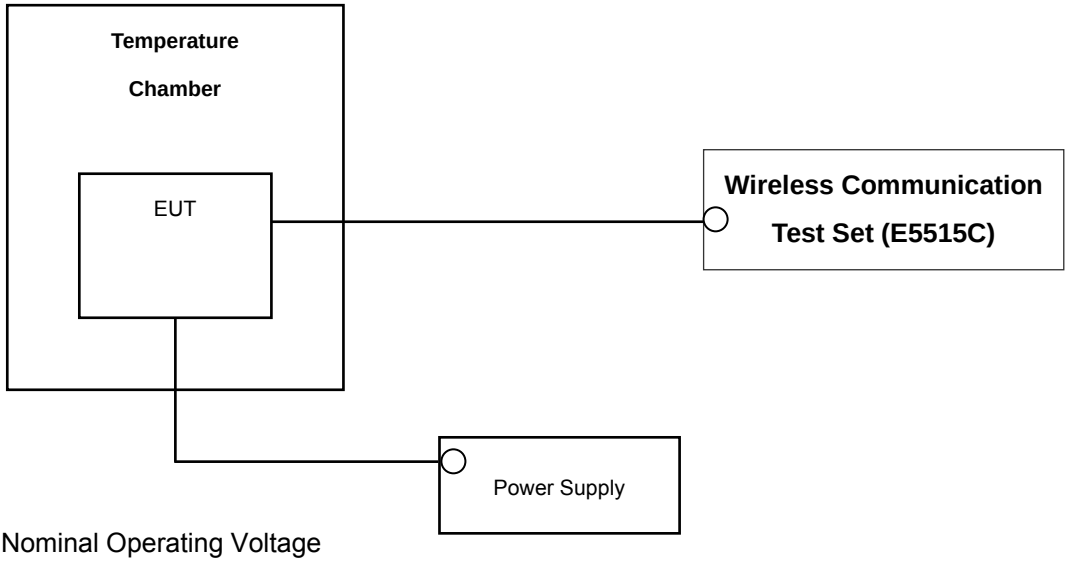
The equipment under test is placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. A styrofoam turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with 'All Up' power control bits.

3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



* Nominal Operating Voltage

Test Procedure

The frequency stability of the transmitter is measured by:
a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.000 25 %(± 2.5 ppm) of the center frequency.

Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
1. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.
NOTE: The EUT is tested down to the battery endpoint.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC1/SO2(CDMA) with ‘All Up’ power control bits.

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	N9020A	MY51110020	Annual	09/23/2012
Agilent	E9327A/ Power Sensor	MY4442009	Annual	05/02/2012
R&S	CMW500/ Base Station	1201.0002K50_10395	Annual	04/20/2012
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/24/2012
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	05/02/2012
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	05/02/2012
Agilent	11636B/ Power Divider	11377	Annual	11/07/2012
Digital	EP-3010/ Power Supply	3110117	Annual	11/07/2012
Schwarzbeck	UHAP/ Dipole Antenna	949	Biennial	03/18/2012
Schwarzbeck	UHAP/ Dipole Antenna	950	Biennial	03/18/2012
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	Annual	11/07/2012
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	04/13/2012
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	05/02/2012
WEINSCHEL	ATTENUATOR	BR0592	Annual	11/07/2012
REOHDE&SCHWARZ	FSP30/Spectrum Analyzer	839117/011	Annual	03/23/2012
Agilent	8960 (E5515C)/ Base Station	GB44400269	Annual	02/10/2012

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	**Test Limit**	**Test Condition**	**Test Result**
2.1051, 90.691	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 90.691	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	< 50 + 10log$_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5Khz of Block Edge		PASS
2.1046	Conducted Output Power	N/A		PASS
2.1055, 90.213	Frequency stability / variation of ambient temperature	< 2.5 ppm		PASS
90.635	Effective Radiated Power	< 100 Watts max. ERP	RADIATED	PASS
2.1053, 90.691	Radiated Spurious and Harmonic Emissions	< 43 + 10log$_{10}$ (P[Watts]) for all out-of band emissions		PASS

6. SAMPLE CALCULATION

A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL(dBm)	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
CDMA	564	820.10	-10.96	24.81	2.50	1.19	H	0.41	26.12

ERP = SubstitudeLEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (**ERP**).

B. Emission Designator

CDMA Emission Designator

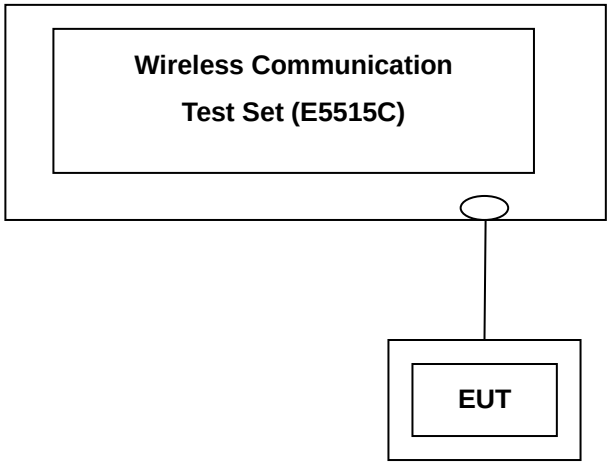
Emission Designator = 1M27F9W

CDMA BW = 1.27 MHz (Measured at the 99% power bandwidth)
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with The EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



Band	Channel	SO2	SO2	SO55	SO55	TDSO SO32	1xEvDO Rev.O	1xEvDO Rev.O	1xEvDO Rev.1	1xEvDO Rev.1
		RC1/1 (dBm)	RC3/3 (dBm)	RC1/1 (dBm)	RC3/3 (dBm)	RC3/3 (dBm)	(FTAP)	(RTAP)	(FETAP)	(RETAP)
CDMA	476	24.75	24.58	24.70	24.55	24.46	24.73	24.75	24.53	24.58
	564	24.77	24.58	24.71	24.58	24.52	24.78	24.77	24.63	24.66
	684	24.69	24.52	24.72	24.54	24.55	24.76	24.80	24.68	24.60

(Maximum Conducted Output Powers)

Note : Detecting mode is average.

7.2 OCCUPIED BANDWIDTH

Band	Channel	Frequency(MHz)	Data (MHz)
CDMA	476	817.90	1.2709
	564	820.10	1.2708
	684	823.10	1.2704
CDMA EVDO	476	817.90	1.2731

- Plots of the EUT's Occupied Bandwidth are shown Page 21 ~ 22.

7.3 CONDUCTED SPURIOUS EMISSIONS

Band	Channel	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
CDMA	476	7.2880	-41.55
	564	1.6400	-41.81
	684	1.6480	-38.22

- Plots of the EUT's Conducted Spurious Emissions are shown Page 31 ~ 33.

7.3.1 Band Edge

- Plots of the EUT's Band Edge are shown Page 23 ~ 30.

7.4 EFFECTIVE RADIATED POWER OUTPUT

(CDMA Mode)

Mode	Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL (dBm)	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
CDMA	476	817.90	-12.81	35.88	-10.56	1.63	H	0.234	23.69
	564	820.10	-13.10	35.59	-10.56	1.63	H	0.219	23.40
	684	823.10	-13.32	35.62	-10.55	1.61	H	0.222	23.46

Note: Standard batteries are the only options for this phone

NOTES:

Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive styrofoam resin table table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and the highest power is reported. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is in y plane in CDMA mode. Also worst case of detecting Antenna is in vertical polarization in CDMA mode.

7.5 RADIATED SPURIOUS EMISSIONS

7.5.1 RADIATED SPURIOUS EMISSIONS(CDMA Mode)

▣ MEASURED OUTPUT POWER: 23.69 dBm = 0.234 W

▣ MODULATION SIGNAL: CDMA

▣ DISTANCE: 3 meters

▣ LIMIT: - (43 + 10 log10 (W)) = -36.99 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
476	1,635.80	-50.63	9.60	-55.08	2.75	V	-48.23	-71.92
	2,453.70	-45.29	10.78	-48.15	3.52	H	-40.89	-64.58
	3,271.60	-	-	-	-	-	-	-
564	1,640.20	-49.99	9.60	-54.44	2.75	H	-47.59	-71.28
	2,460.30	-46.38	10.78	-49.29	3.47	H	-41.98	-65.67
	3,280.40	-	-	-	-	-	-	-
684	1,646.20	-47.96	9.66	-52.59	2.63	H	-45.56	-69.25
	2,469.30	-50.10	10.79	-52.94	3.55	H	-45.70	-69.39
	3,292.40	-	-	-	-	-	-	-

NOTES: 1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.

3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

7.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.6.1 FREQUENCY STABILITY (CDMA)

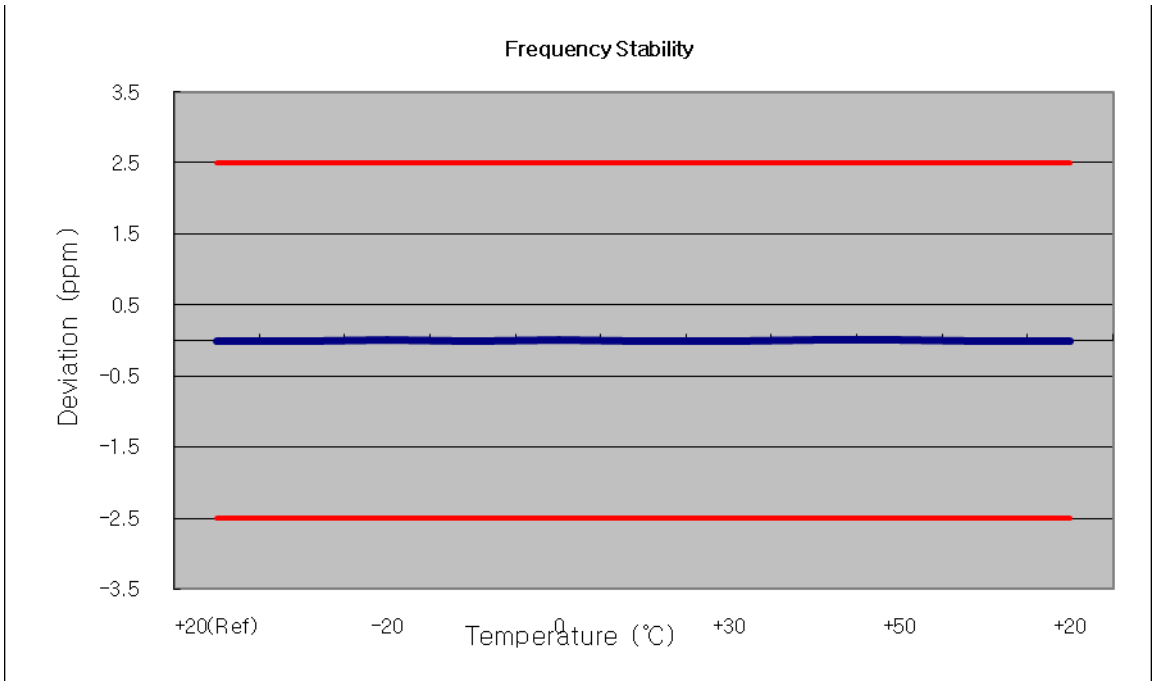
OPERATING FREQUENCY: 820.100.000 Hz

CHANNEL: 564

REFERENCE VOLTAGE: 3.7 VDC

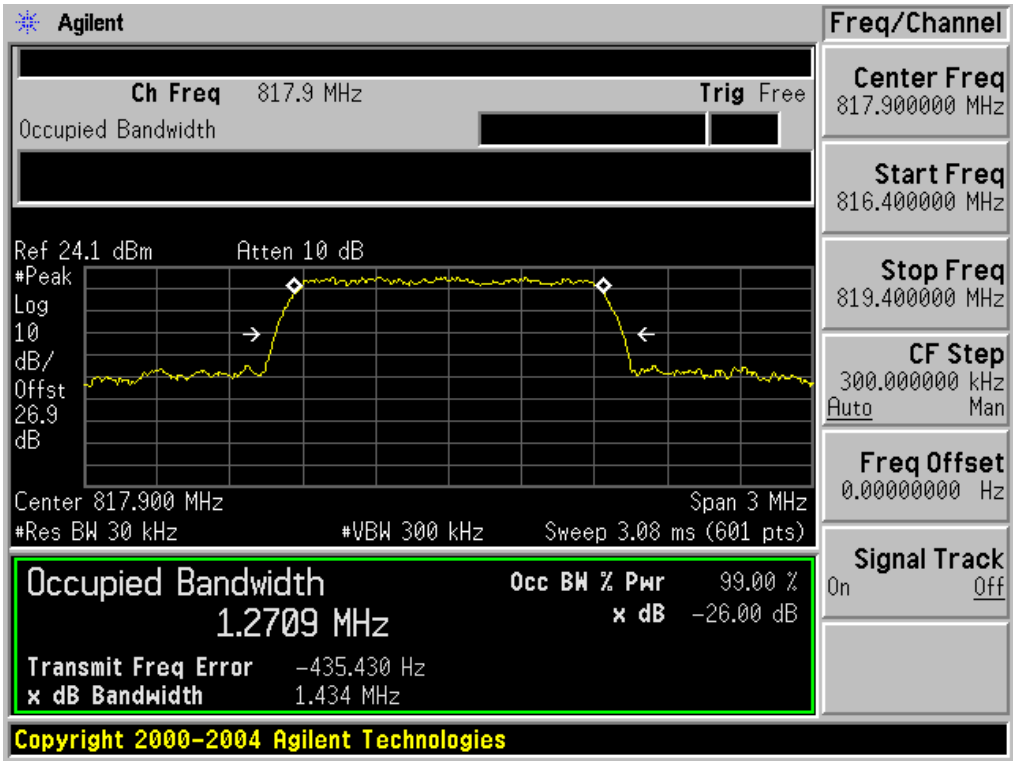
DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	820 099 997	0	0.000 000	0.000
100%		-30	820 099 990	-6.24	-0.000 001	-0.008
100%		-20	820 100 001	4.06	0.000 000	0.005
100%		-10	820 099 991	-5.25	-0.000 001	-0.006
100%		0	820 100 001	4.26	0.000 001	0.005
100%		+10	820 099 992	-4.89	-0.000 001	-0.006
100%		+30	820 099 991	-6.11	-0.000 001	-0.007
100%		+40	820 100 002	5.56	0.000 001	0.007
100%		+50	820 100 000	3.29	0.000 000	0.004
115%	4.255	+20	820 099 991	-5.31	-0.000 001	-0.006
Batt. Endpoint	3.400	+20	820 099 993	-4.01	0.000 000	-0.005

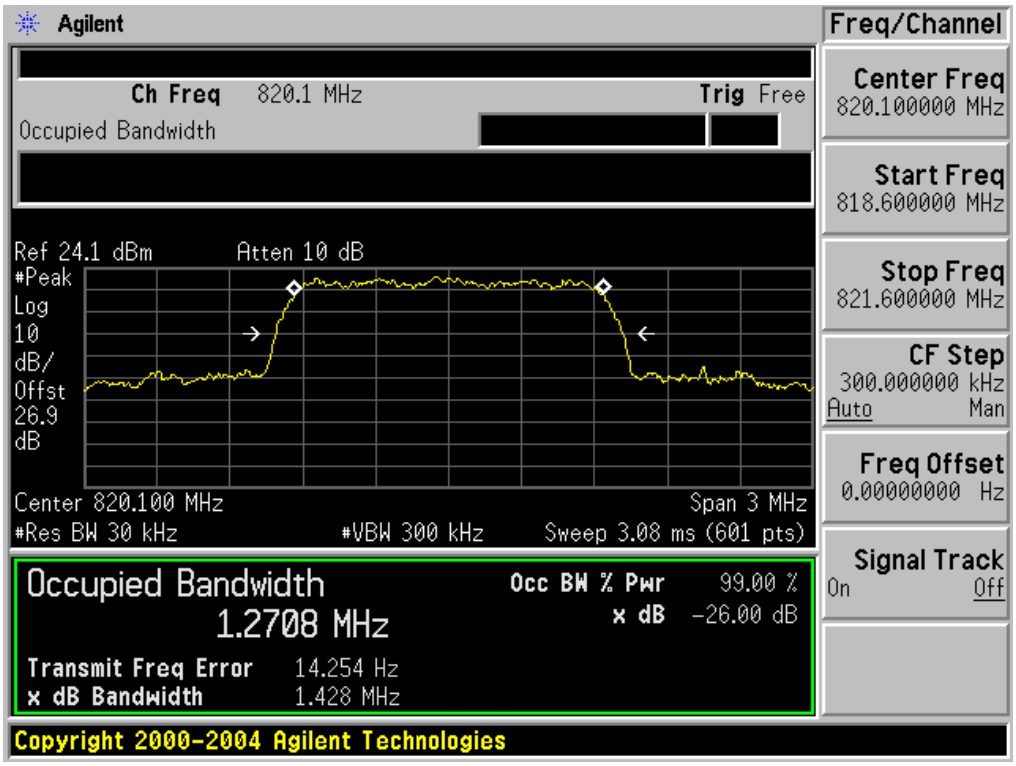


8. TEST PLOTS

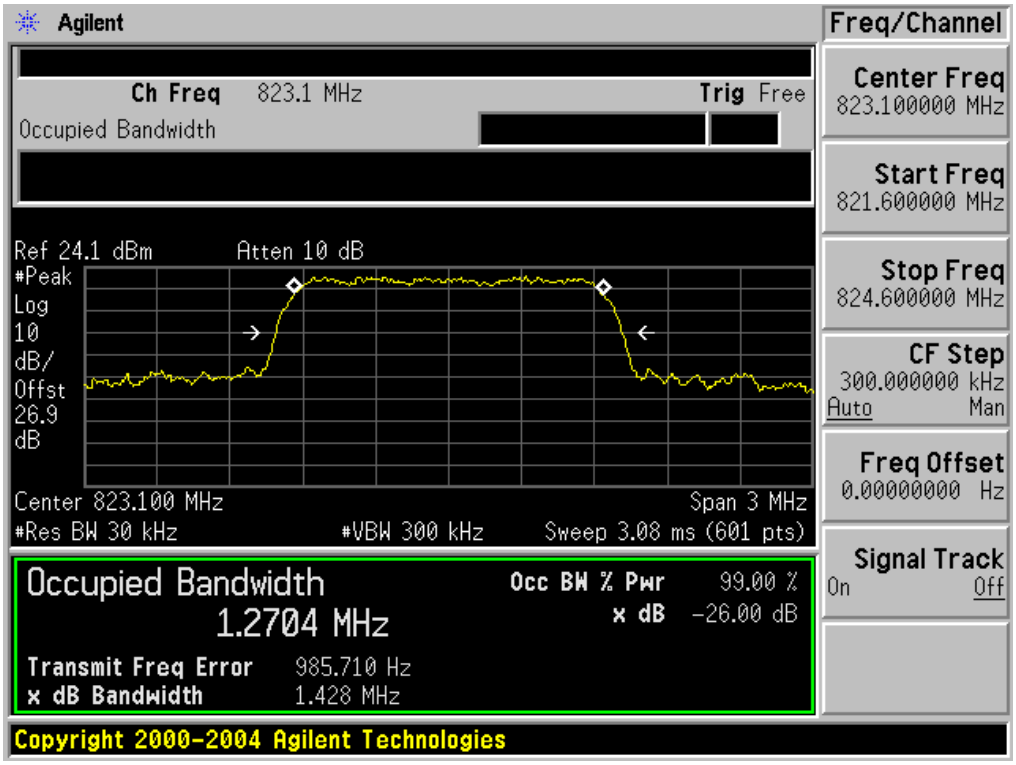
■ Secondary MODE (476 CH.) Occupied Bandwidth



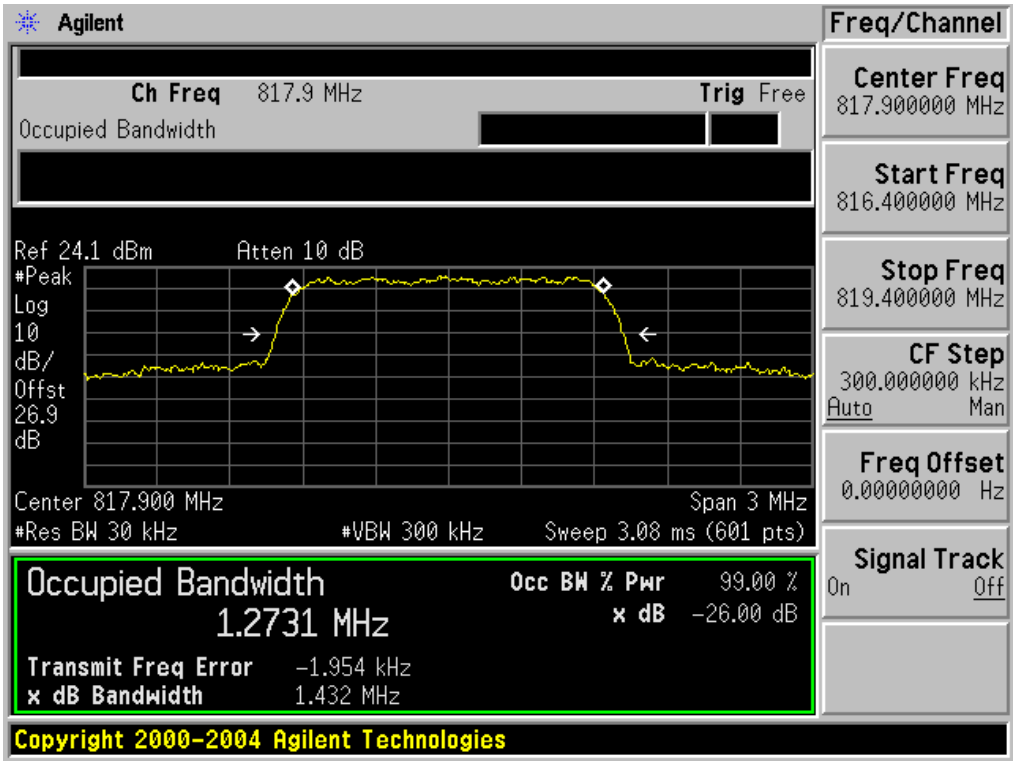
■ Secondary MODE (564 CH.) Occupied Bandwidth



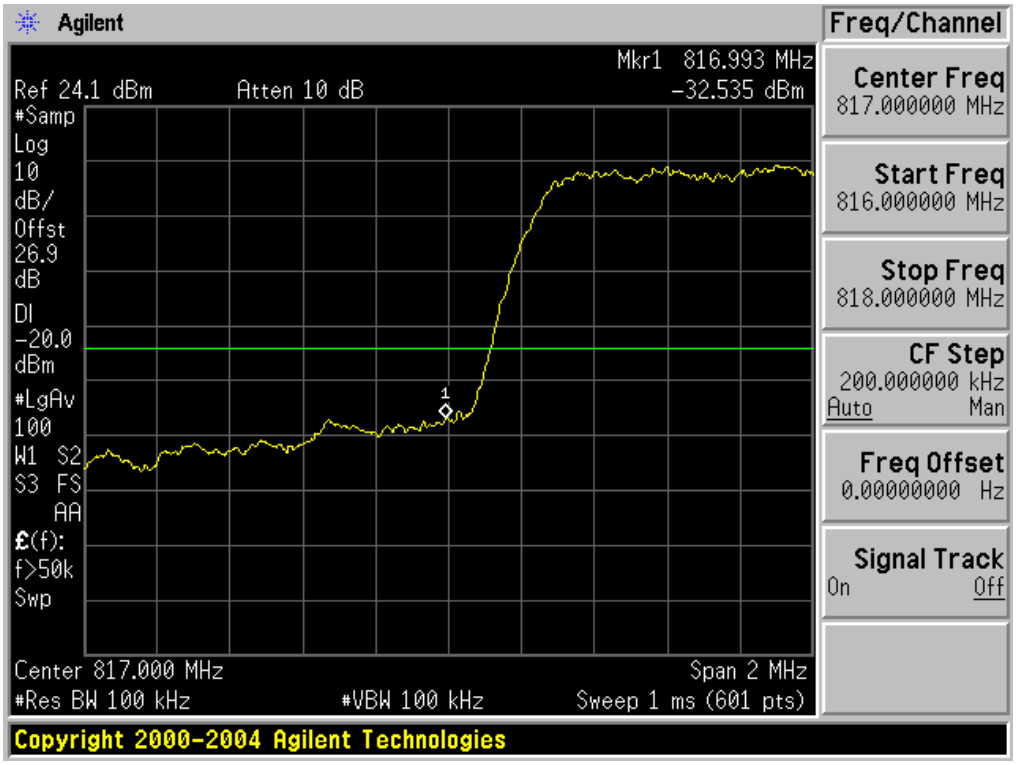
■ Secondary MODE (684 CH.) Occupied Bandwidth



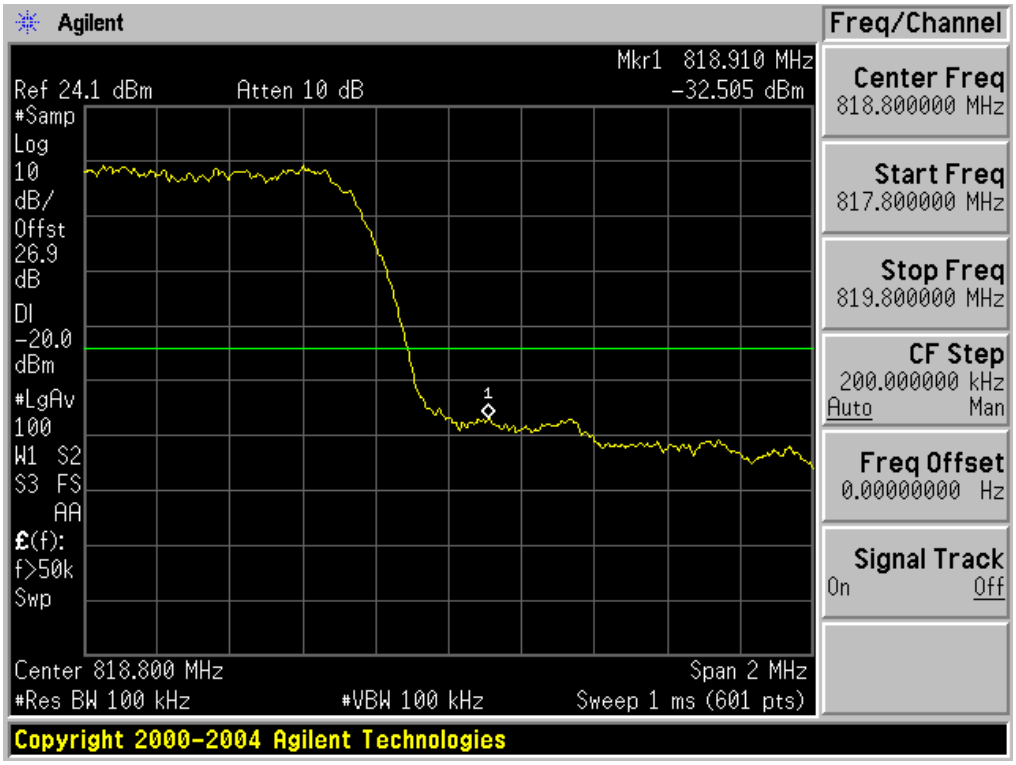
■ Secondary EVDO MODE (476 CH.) Occupied Bandwidth



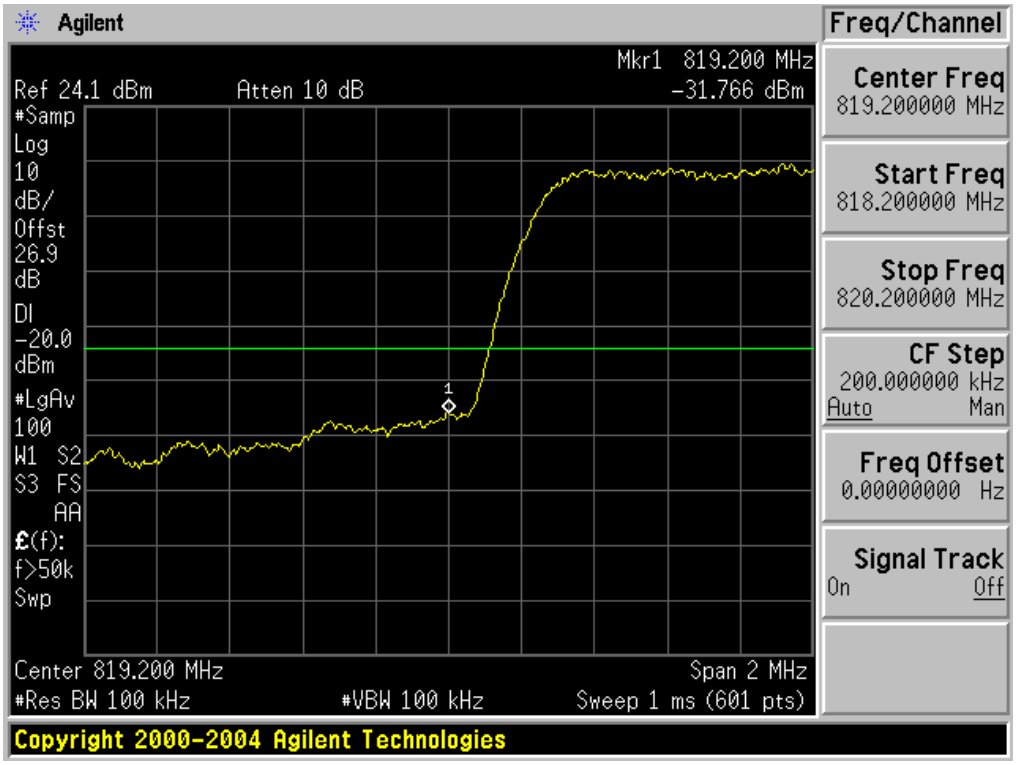
■ Secondary MODE (476 CH.) Block Edge-1



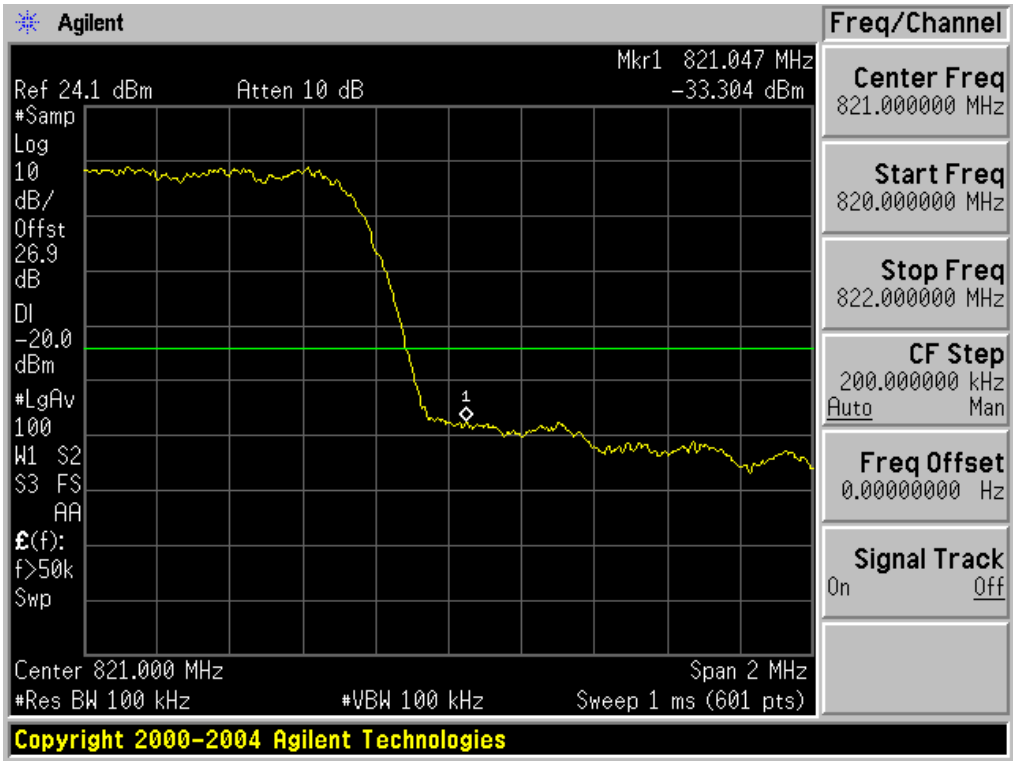
■ Secondary MODE (476 CH.) Block Edge-2



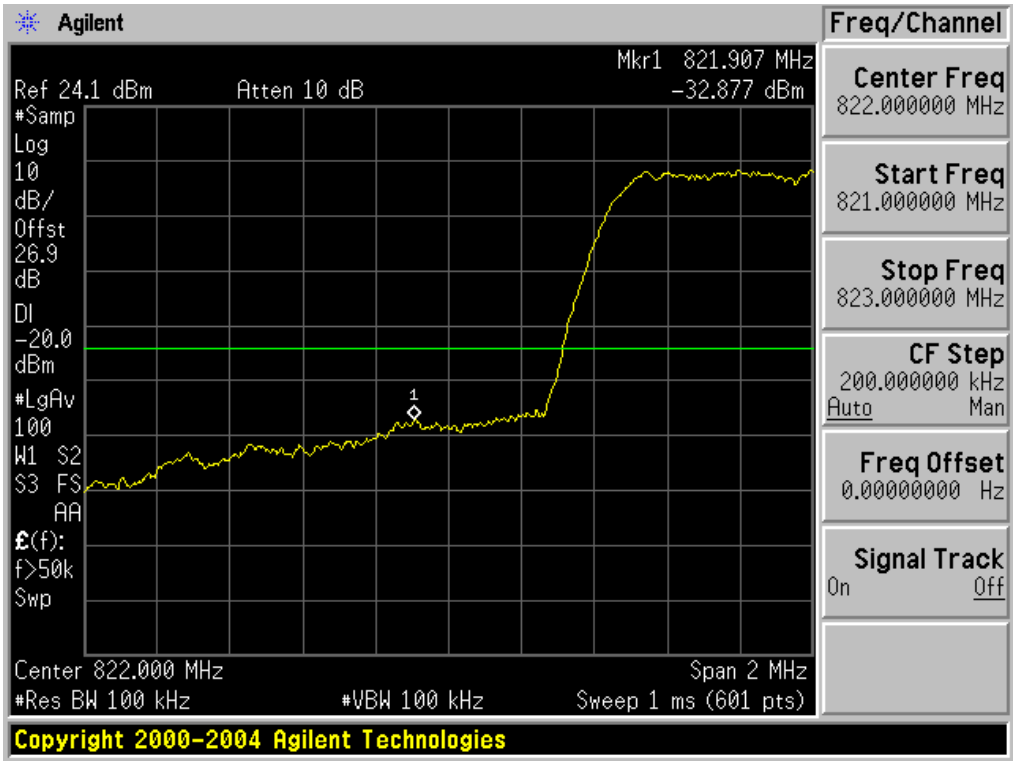
■ Secondary MODE (564 CH.) Block Edge-1



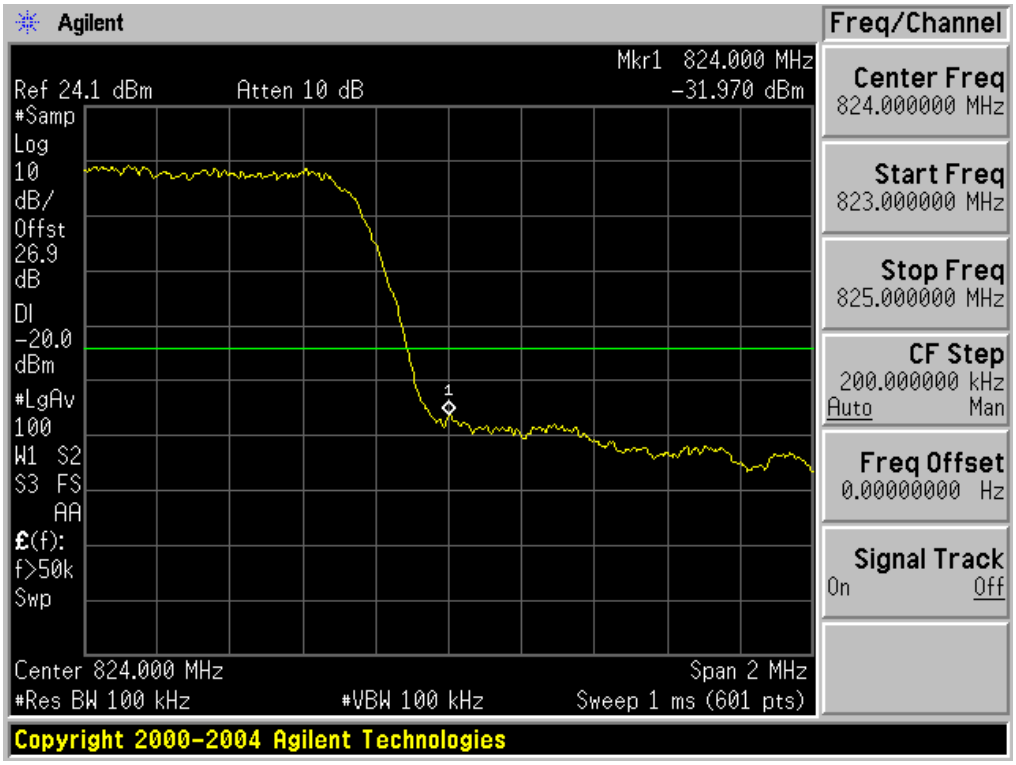
■ Secondary MODE (564 CH.) Block Edge-2



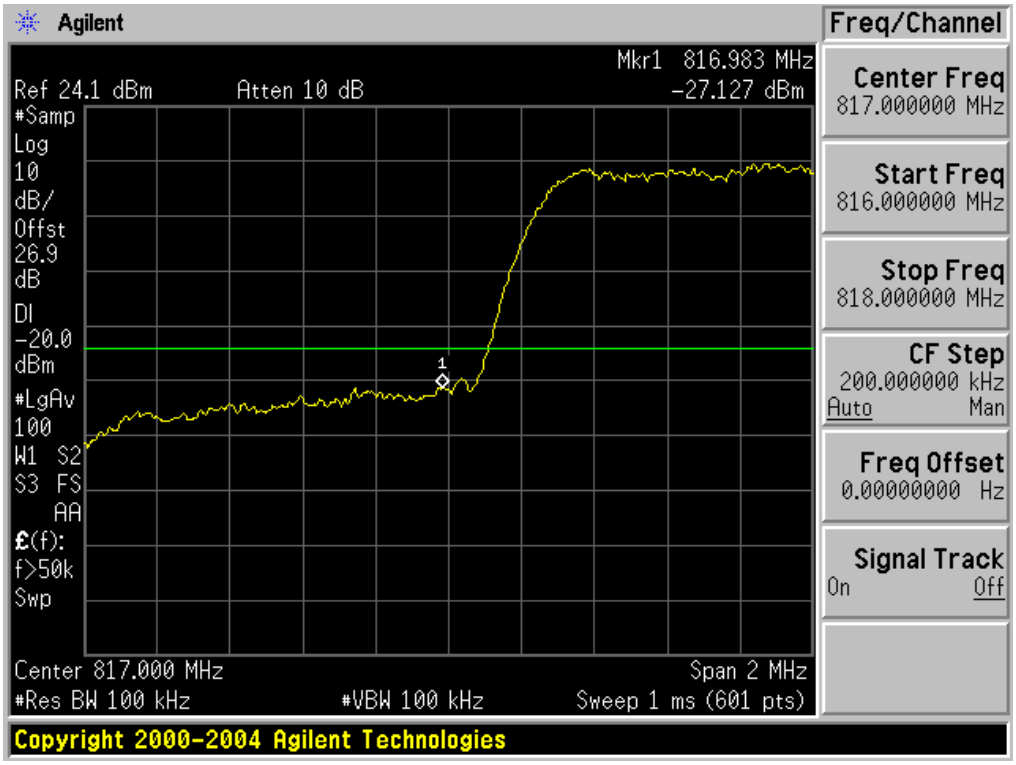
■ Secondary MODE (684 CH.) Block Edge-1



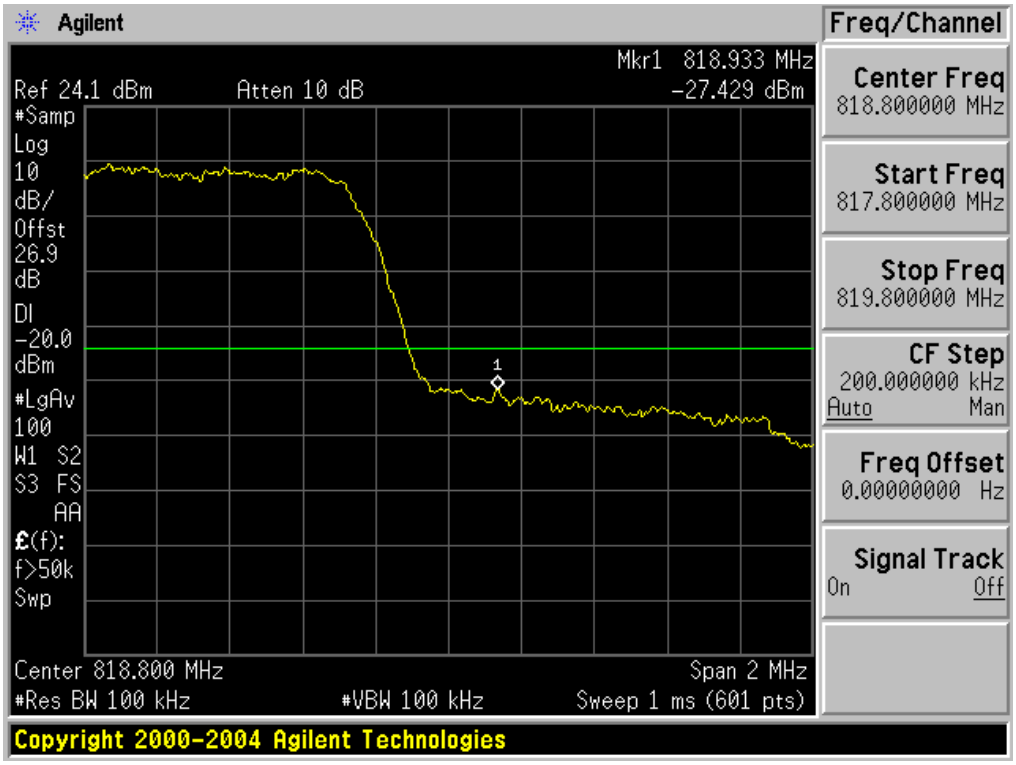
■ Secondary MODE (684 CH.) Block Edge-2



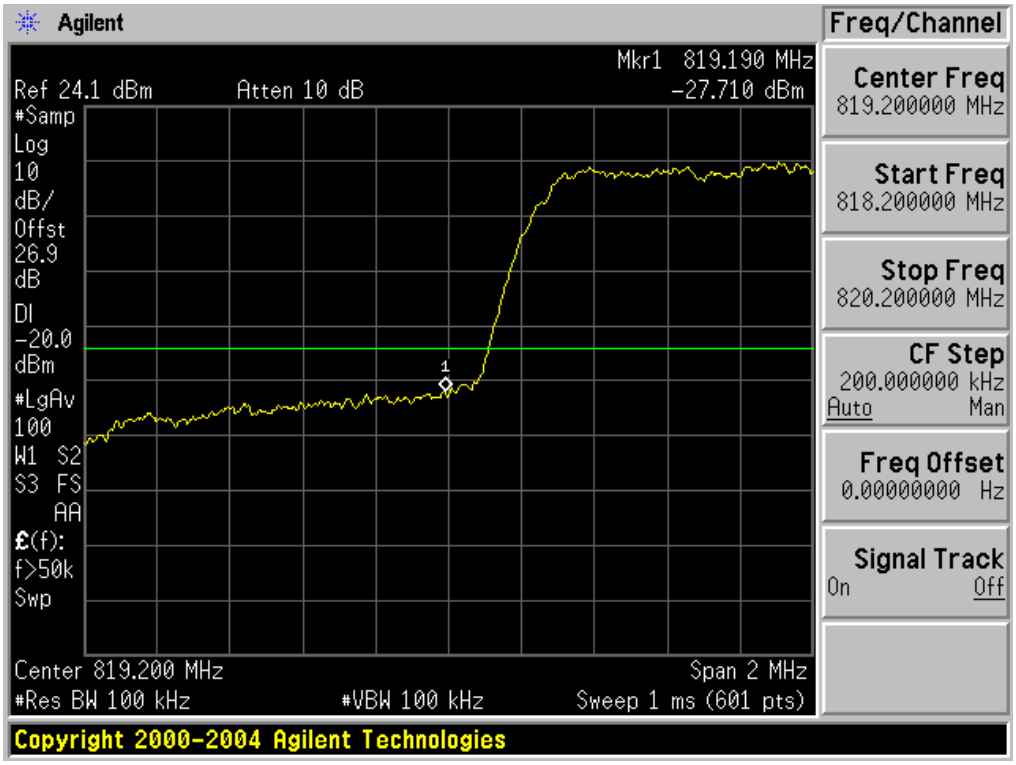
■ Secondary EVDO MODE (476 CH.) Block Edge-1



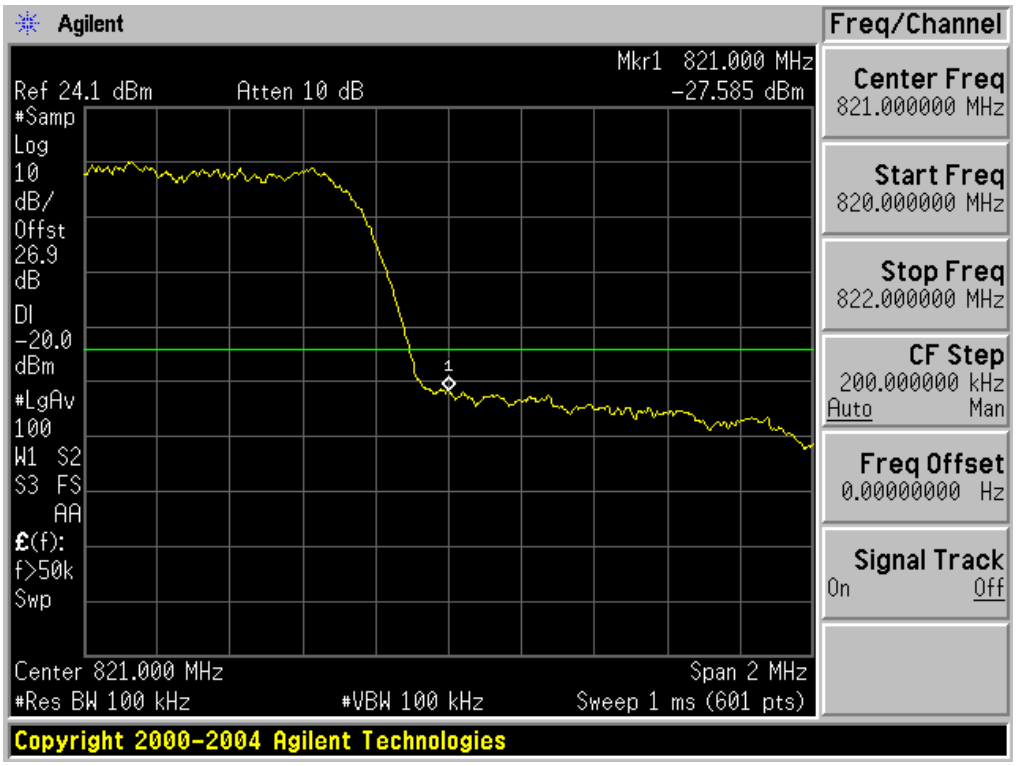
■ Secondary EVDO MODE (476 CH.) Block Edge-2



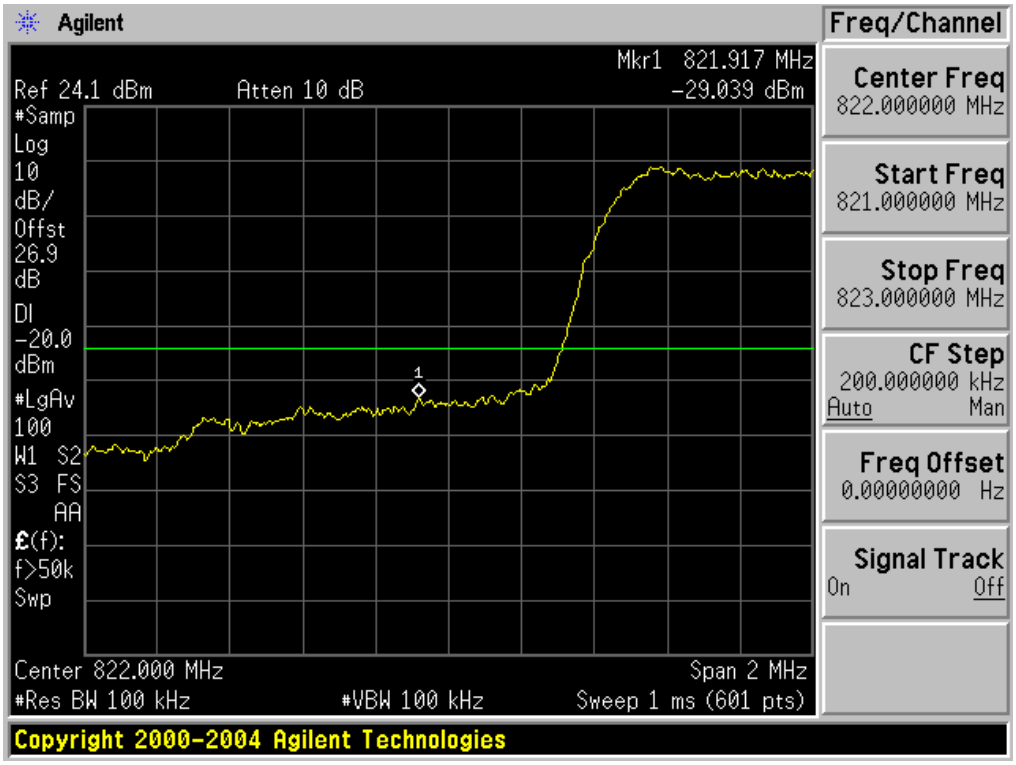
■ Secondary EVDO MODE (564 CH.) Block Edge-1



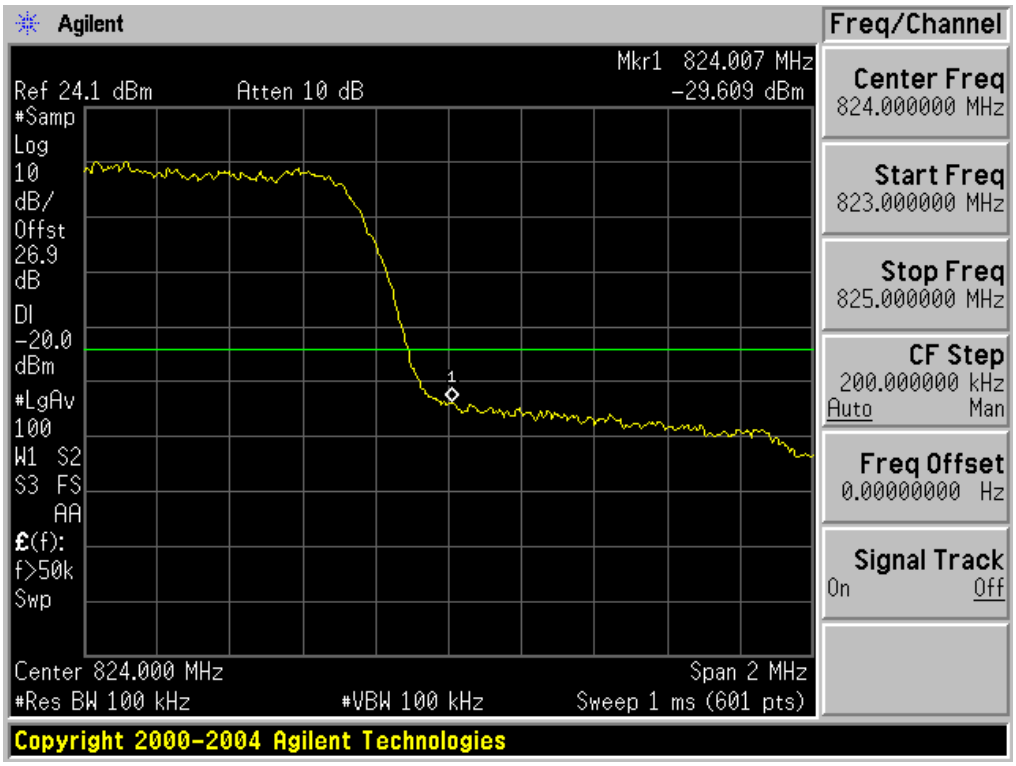
■ Secondary EVDO MODE (564 CH.) Block Edge-2



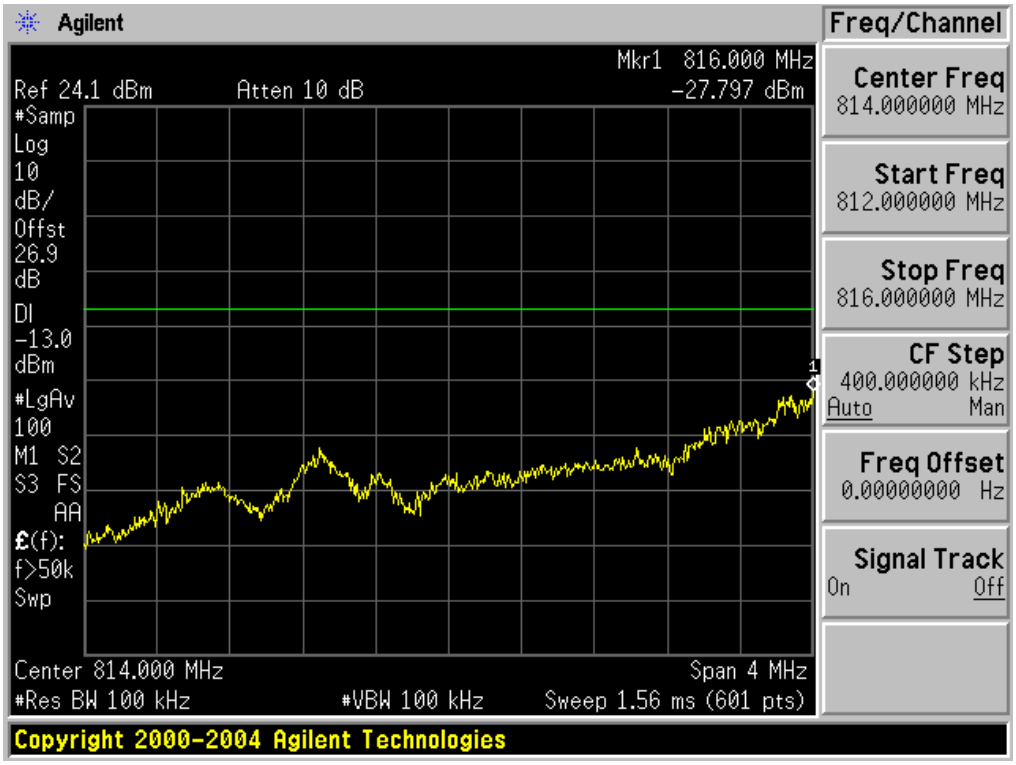
■ Secondary EVDO MODE (684 CH.) Block Edge-1



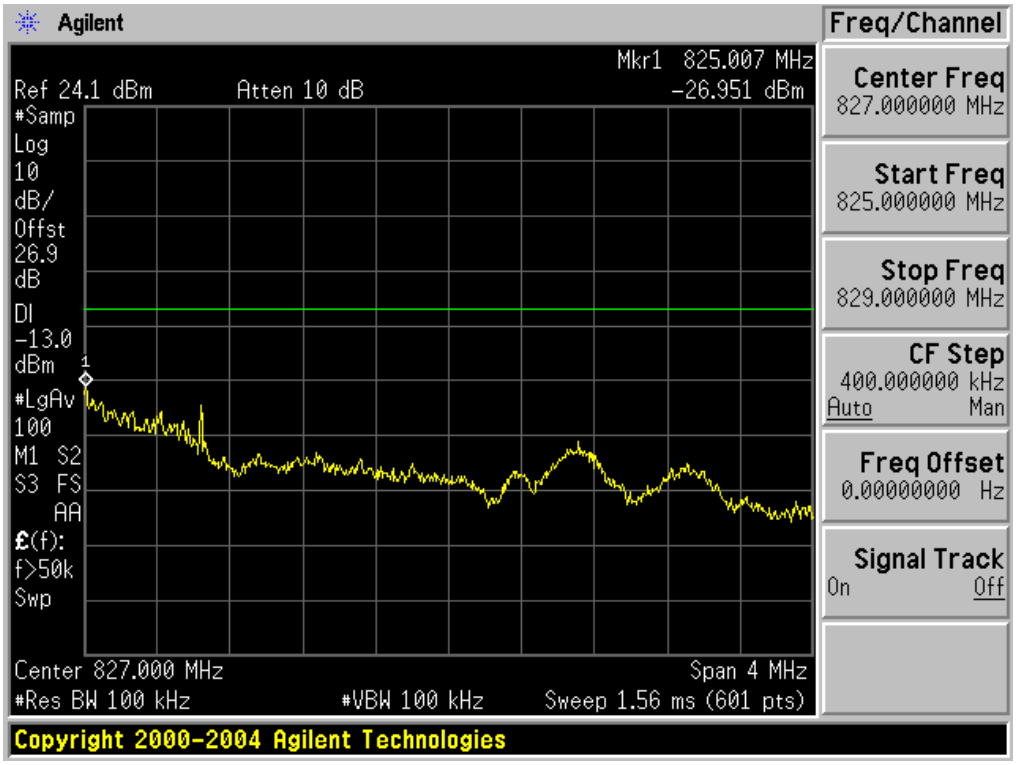
■ Secondary EVDO MODE (684 CH.) Block Edge-2



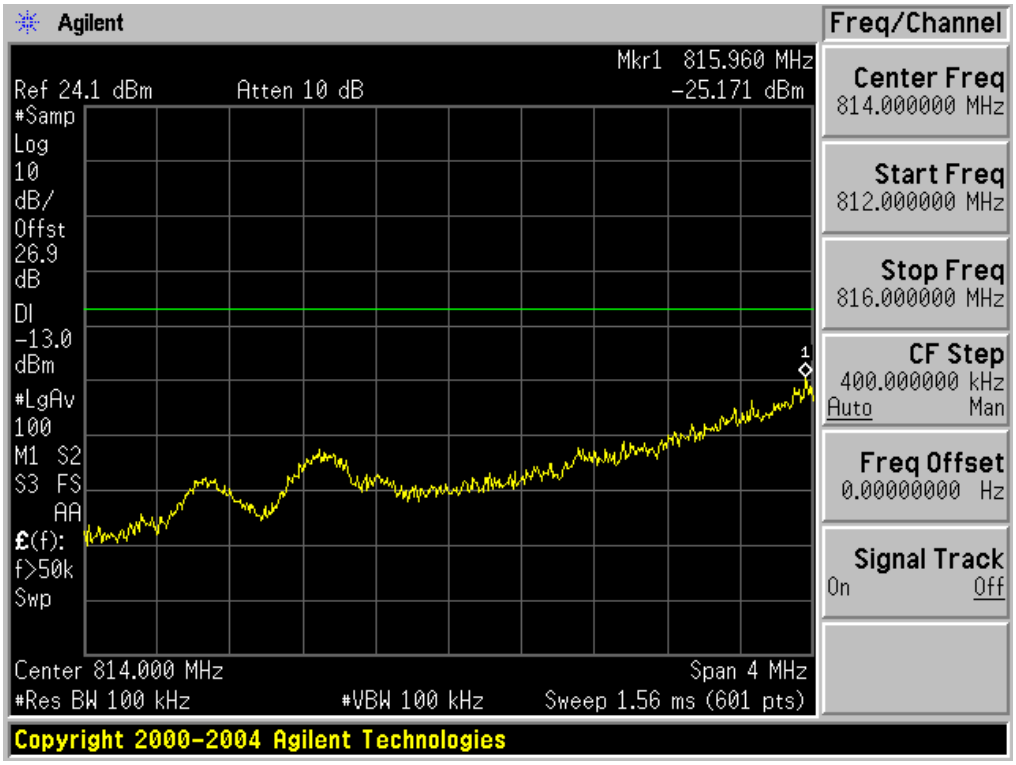
■ Secondary MODE (476 CH.) 4 MHz Span



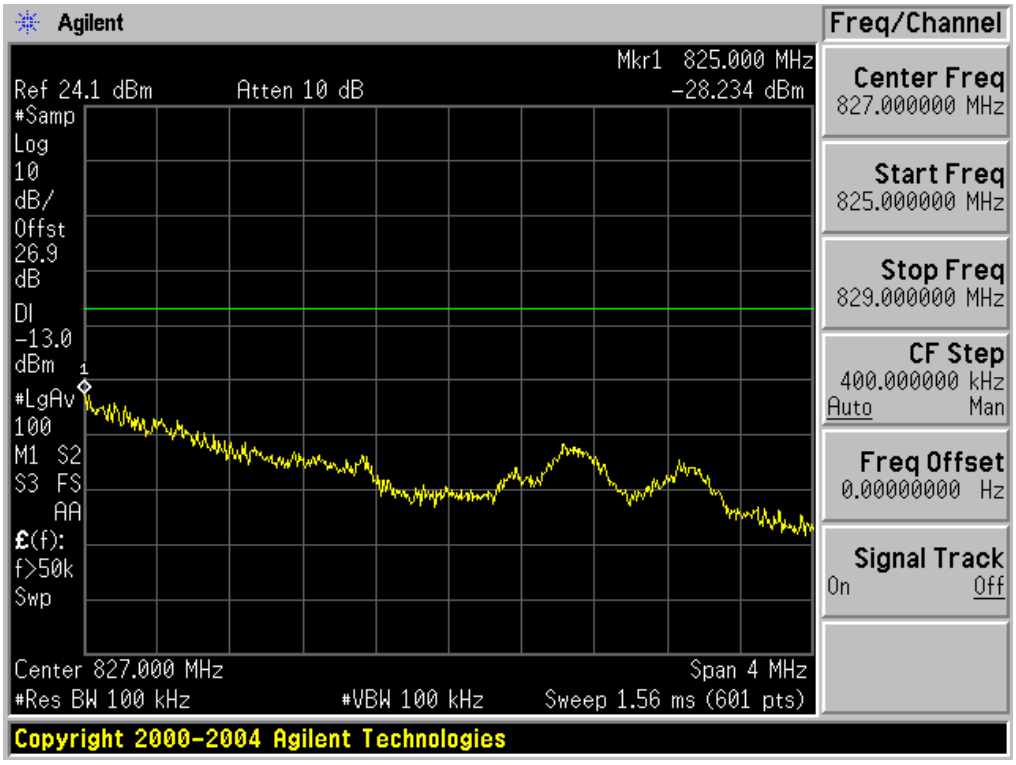
■ Secondary MODE (684 CH.) 4 MHz Span



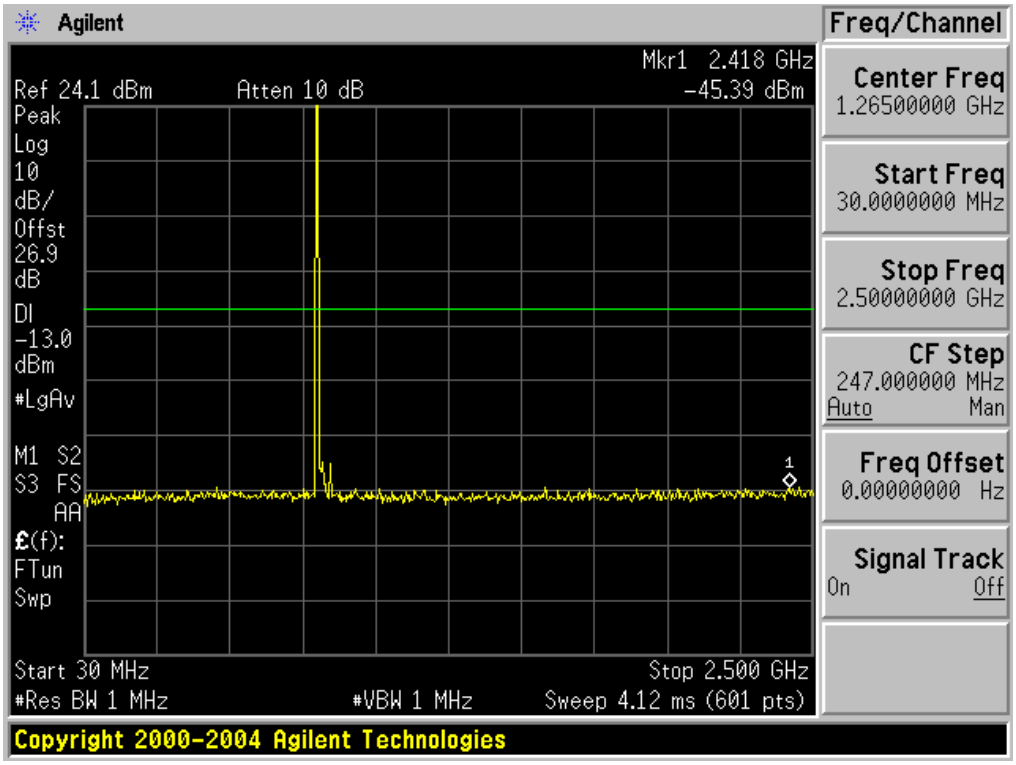
■ Secondary EVDO MODE (476 CH.) 4 MHz Span



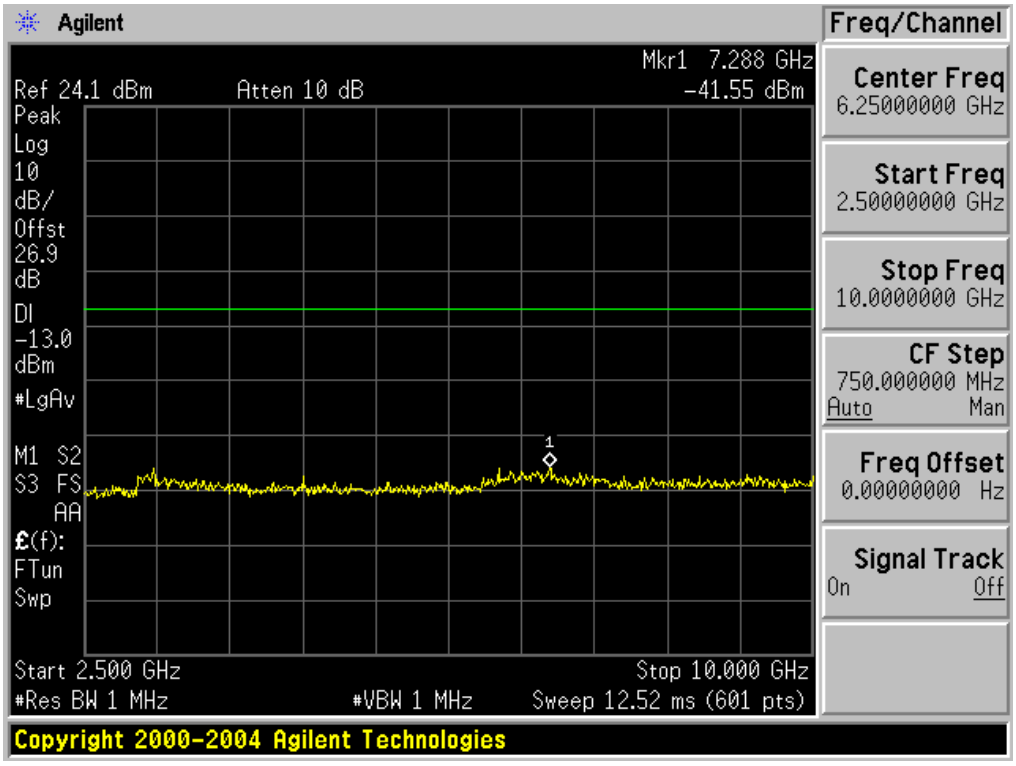
■ Secondary EVDO MODE (684 CH.) 4 MHz Span



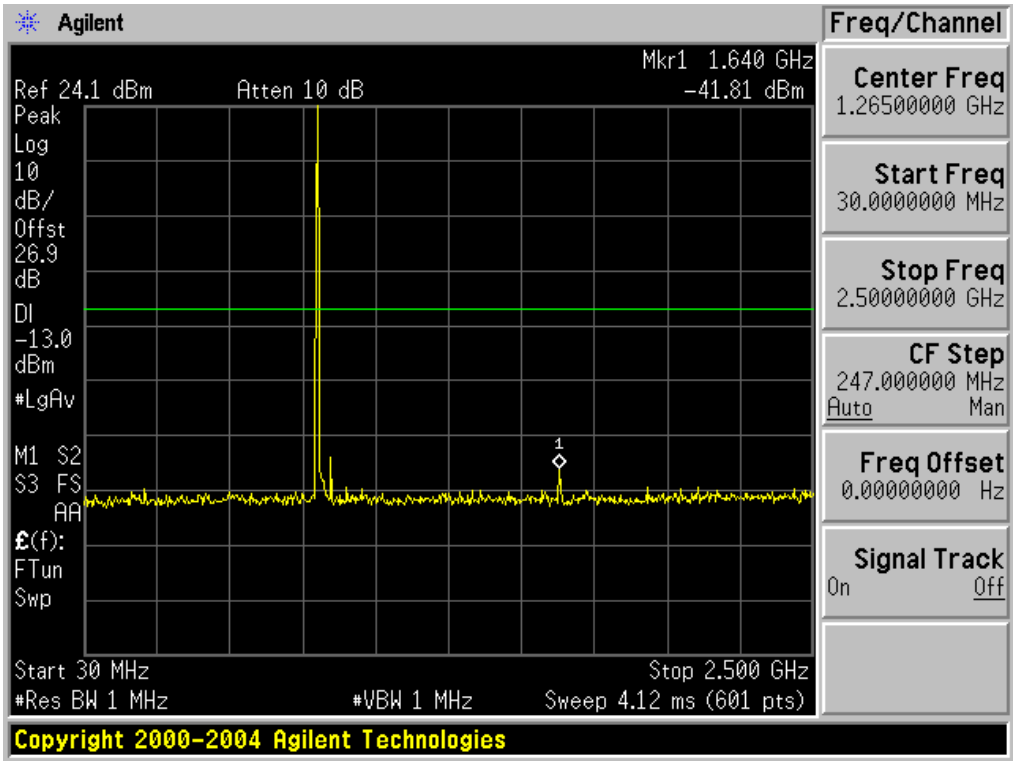
■ Secondary MODE (476 CH.) Conducted Spurious Emissions - 1



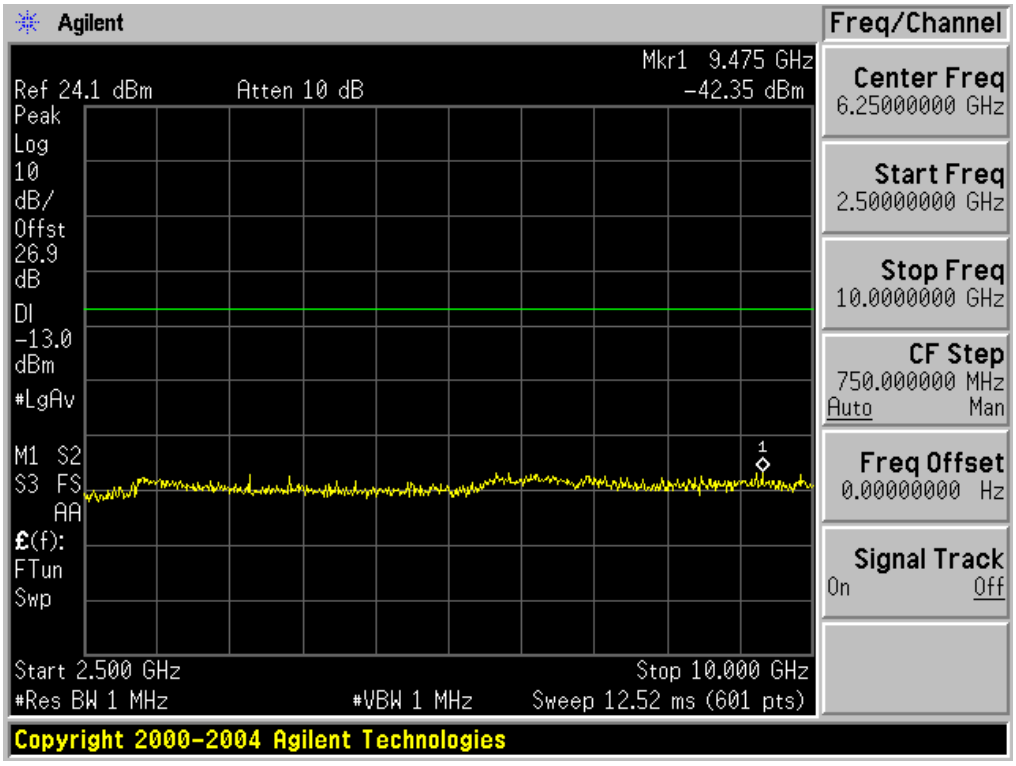
■ Secondary MODE (476 CH.) Conducted Spurious Emissions - 2



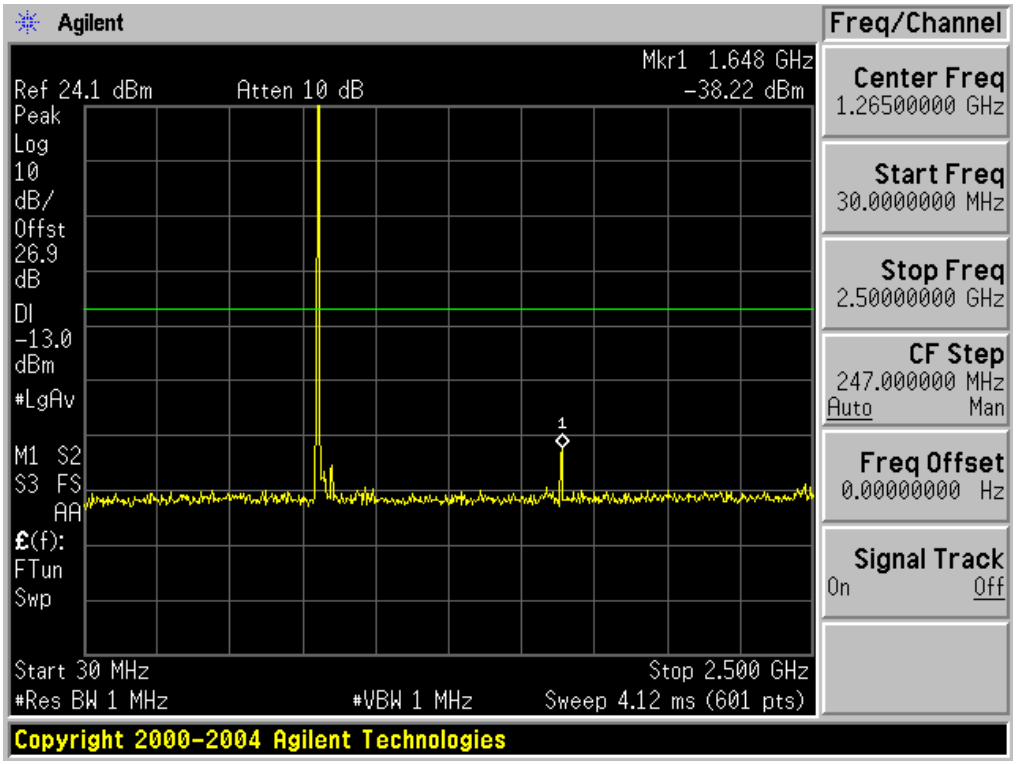
■ Secondary MODE (564 CH.) Conducted Spurious Emissions - 1



■ Secondary MODE (564 CH.) Conducted Spurious Emissions - 2



■ Secondary MODE (684 CH.) Conducted Spurious Emissions - 1



■ Secondary MODE (684 CH.) Conducted Spurious Emissions - 2