Lab Code: 200167-0

FCC PART 22H, 24E

TEST AND MEASUREMENT REPORT

For

Cellphone-Mate, Inc

48820 Kato Rd. Suite 300B,
Fremont, CA 94538, USA

FCC ID: RSNMINI-40UNDER

Report Type:	**Product Type:**
Original Report	Bi-Directional Amplifier

Test Engineer:	Lionel Lara
Report Number:	R1202064-2224
Report Date:	2012-03-08
Reviewed By:	Victor Zhang EMC/RF Lead
Prepared By: **(SP)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1202064-2224	Original Report	2012-03-08

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Cellphone-Mate, Inc.* and their product *FCC ID: RSNMINI-40UNDER*, model: CM-MINI or the "EUT" as referred to in this report. The EUT is a wireless, mobile and fixed (in-building), dual-band bi-directional amplifier for enhancing the range of cell phones. A 50 Ω SMA connector is used for connecting both outside and inside antenna to the amplifier. The uplink frequency bands are: 824~849 MHz and 1850~1910 MHz. The downlink frequency bands are 869~894 MHz and 1930~1990 MHz. Modulation types are GSM, EDGE, CDMA, EVDO and HSPA. The amplifier is contained in a metal case.

1.2 Mechanical Description

The EUT Approximate measurement is: 120 mm (L) x 69 mm (W) x 25 mm (H). Weight: 260g.

The test data gathered are from typical production sample, serial number: QFNM1Q assigned by BACL.

1.3 Objective

This type approval report is prepared on behalf of *Cellphone-Mate, Inc.* in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristics, occupied bandwidth, spurious emissions at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E – PCS

Applicable Standards: TIA/EIA603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from +2.0 dB for Conducted Emissions tests and +4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and

December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

NA, signal was sent through EUT using a signal generator, device was set to normal operating mode.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 EUT Internal Configuration

Manufacturer	Description	Model	Serial Number
Cellphone-Mate, Inc.	PCB Board	CM2000-19dB V1.0	-

2.5 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Everfine	DC Power Supply	WY305	809024

2.6 Interface Ports and Cabling

Cable Description	Length (m)	From	To
RF cable	< 1	Signal Generator	Input/ EUT
RF cable	< 1	Output/ EUT	Spectrum Analyzer

3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Tests	Results
§2.1046, §22.913, §24.232	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A
§2.1049, §22.917, §24.238	Occupied Bandwidth / Out of Band Emissions	Compliant
§2.1053, §22.917, §24.238	Spurious Radiated Emissions	Compliant
§2.1051, §22.917, §24.238	Spurious Emissions at Antenna Terminals	Compliant
§22.917, §24.238	Band Edge	Compliant
§2.1055	Frequency Stability	N/A
§2.1091	RF Exposure	Compliant

4 FCC §2.1046, §22.913 & §24.232 – RF OUTPUT POWER

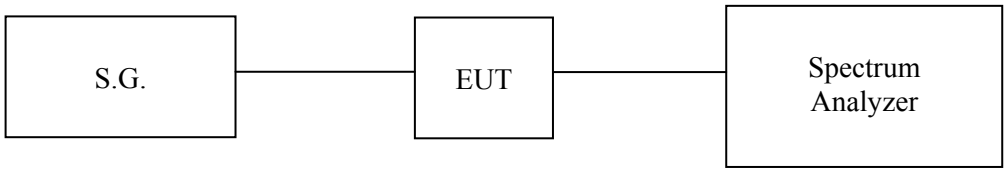
4.1 Applicable Standard

FCC §22.913(a) and §24.232.

4.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the signal generator and the spectrum analyzer through sufficient attenuation.



4.3 Test Environmental Conditions

Temperature:	21-22 °C
Relative Humidity:	45-55 %
ATM Pressure:	100-102kPa

The testing was performed by Lionel Lara from 2012-02-20 to 2012-02-26 in RF Site.

4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
HP	Signal Generator	8648C	3426A00417	2011-08-18
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

4.5 Test Results

Maximum Output Power – Modulated Signal

GSM/GPRS

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
GSM/GPRS	850 MHz Uplink	Low	824.2	0	28.50
		Middle	836.6	0	29.56
		High	848.8	0	28.52
	850 MHz Downlink	Low	869.2	-19	8.12
		Middle	881.6	-20	8.21
		High	893.8	-20	6.83
	1900 MHz Uplink	Low	1850.2	0	28.88
		Middle	1880.0	0	28.00
		High	1909.8	-1	26.15
	1900 MHz Downlink	Low	1930.2	-20	9.30
		Middle	1960.0	-18	11.04
		High	1989.8	-18	8.10

EDGE

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
EDGE	850 MHz Uplink	Low	824.2	0	29.56
		Middle	836.6	0	30.56
		High	848.8	0	29.76
	850 MHz Downlink	Low	869.2	-20	9.51
		Middle	881.6	-22	9.27
		High	893.8	-20	8.17
	1900 MHz Uplink	Low	1850.2	0	29.96
		Middle	1880.0	-5	28.11
		High	1909.8	-3	27.00
	1900 MHz Downlink	Low	1930.2	-20	10.36
		Middle	1960.0	-20	11.34
		High	1989.8	-19	9.02

CDMA/EVDO

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
CDMA/EVDO	850 MHz Uplink	Low	824.80	0	27.88
		Middle	836.52	0	28.85
		High	848.20	0	28.11
	850 MHz Downlink	Low	869.80	-21	7.36
		Middle	881.52	-21	7.32
		High	893.20	-19	7.13
	1900 MHz Uplink	Low	1850.8	0	28.24
		Middle	1880.0	-2	27.10
		High	1909.2	-1	25.90
	1900 MHz Downlink	Low	1930.8	-20	8.98
		Middle	1960.0	-21	10.02
		High	1989.2	-19	7.43

WCDMA/HSPA

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
WCDMA/HSPA	850 MHz Uplink	Low	826.4	0	28.41
		Middle	836.4	0	29.03
		High	846.6	0	28.47
	850 MHz Downlink	Low	871.4	-20	8.46
		Middle	881.4	-21	7.34
		High	891.6	-19	8.21
	1900 MHz Uplink	Low	1852.4	1	28.84
		Middle	1880.0	-2	27.45
		High	1907.6	-1	26.59
	1900 MHz Downlink	Low	1932.4	-20	9.16
		Middle	1960.0	-21	10.06
		High	1987.6	-19	7.92

5 FCC §2.1047 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC §2.1047(d), Part 22H and Part 24E, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

5.2 Test Result

N/A

6 FCC §2.1049, §22.917 & §24.238 - OCCUPIED BANDWIDTH

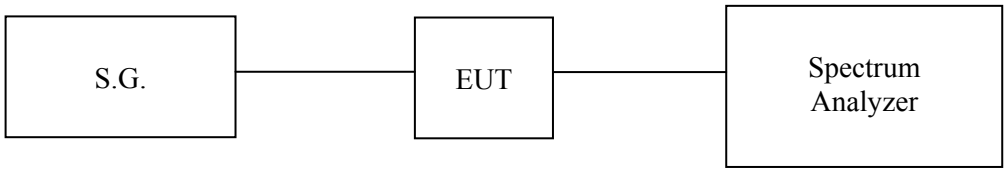
6.1 Applicable Standard

Requirements: FCC §2.1049, §22.917 and §24.238.

6.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set to at least 1% of the BW (Cellular/PCS) and the 26 dB & 99% bandwidth was recorded.



6.3 Test Environmental Conditions

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Relative Humidity:	45-55 %
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Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

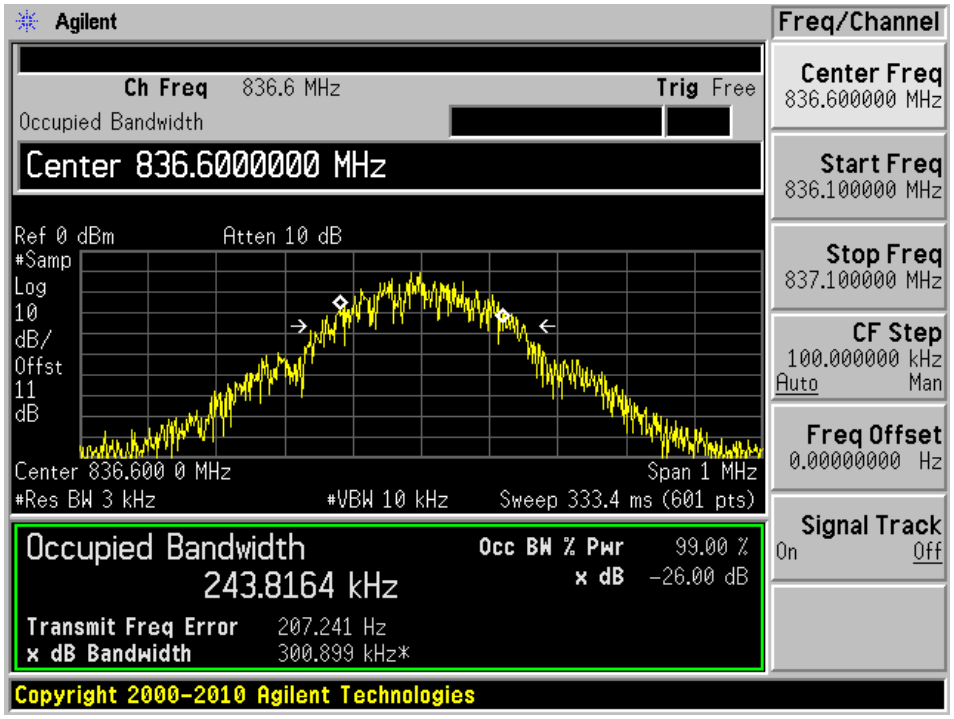
6.5 Test Results

Mode		Modulation	Frequency (MHz)	Emission Bandwidth	
				Input (kHz)	Output (kHz)
Cellular	Uplink	GSM/GPRS	836.6	243.8164	249.4868
		EDGE	836.6	246.7424	247.0271
		CDMA/EVDO	836.52	1229.5	1266.8
		WCDMA/HSPA	836.4	4185.3	4231.5
	Downlink	GSM/GPRS	881.6	236.4346	240.8034
		EDGE	881.6	235.7145	249.5848
		CDMA/EVDO	881.52	1270.8	1276.5
		WCDMA/HSPA	881.4	4198.7	4249.0
PCS	Uplink	GSM/GPRS	1880	248.8062	237.3921
		EDGE	1880	240.1717	260.3290
		CDMA/EVDO	1880	1246.1	1275.1
		WCDMA/HSPA	1880	4214.0	4212.2
	Downlink	GSM/GPRS	1960	243.8549	246.5825
		EDGE	1960	249.5300	265.6382
		CDMA/EVDO	1960	1265.5	1286.5
		WCDMA/HSPA	1960	4149.7	4246.5

Please refer to the following plots.

GSM/GPRS Cellular Band Uplink

Input



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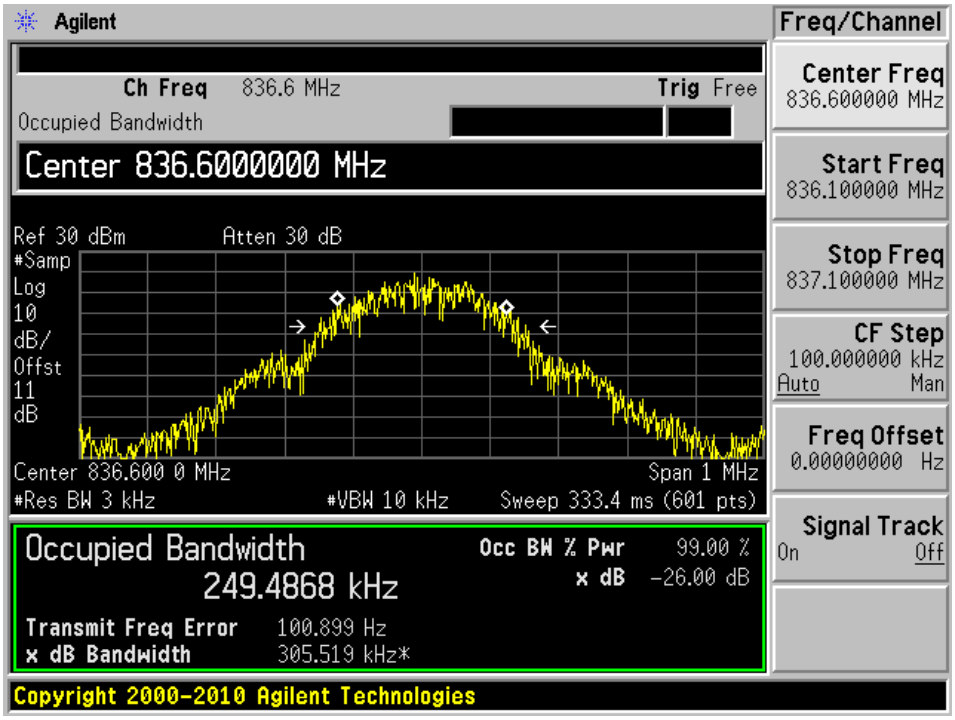
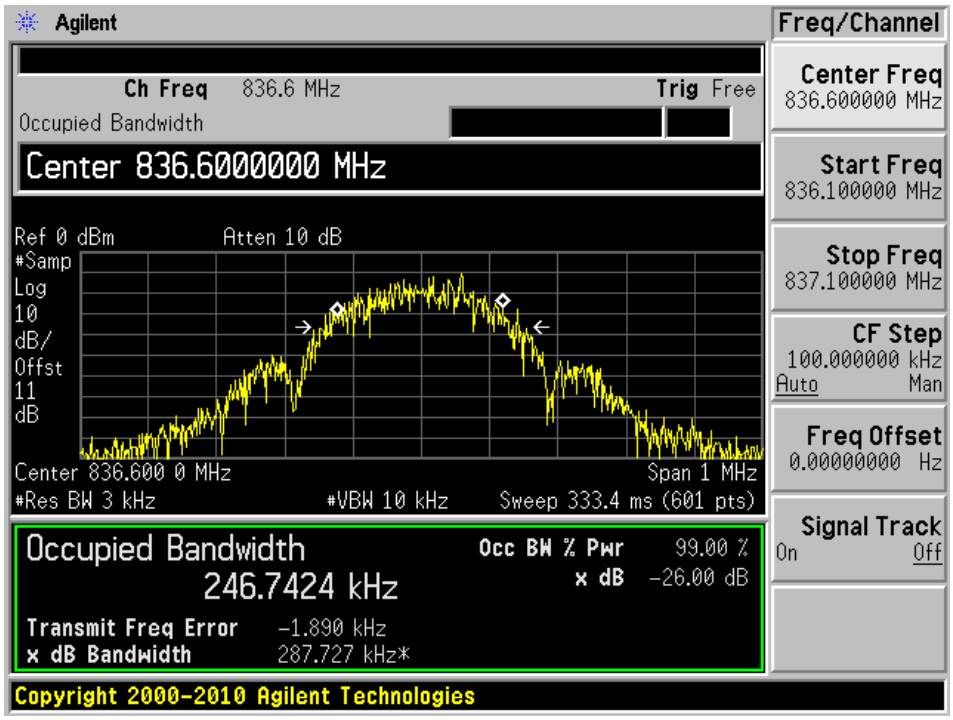


EDGE Cellular Band Uplink

Input



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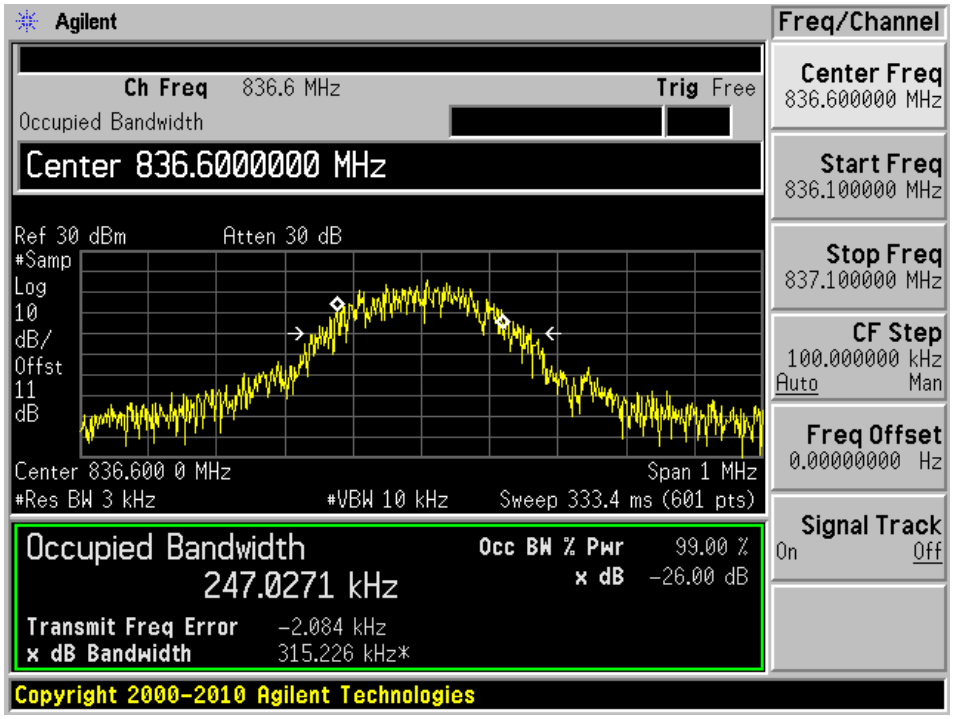
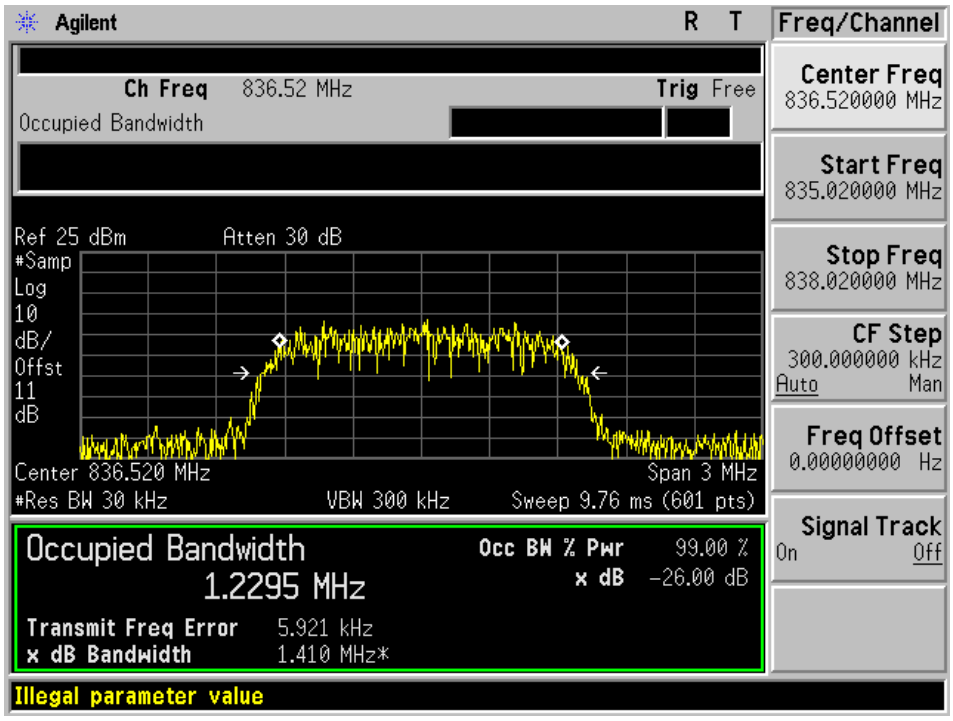


CDMA/EVDO Cellular Band Uplink

Input



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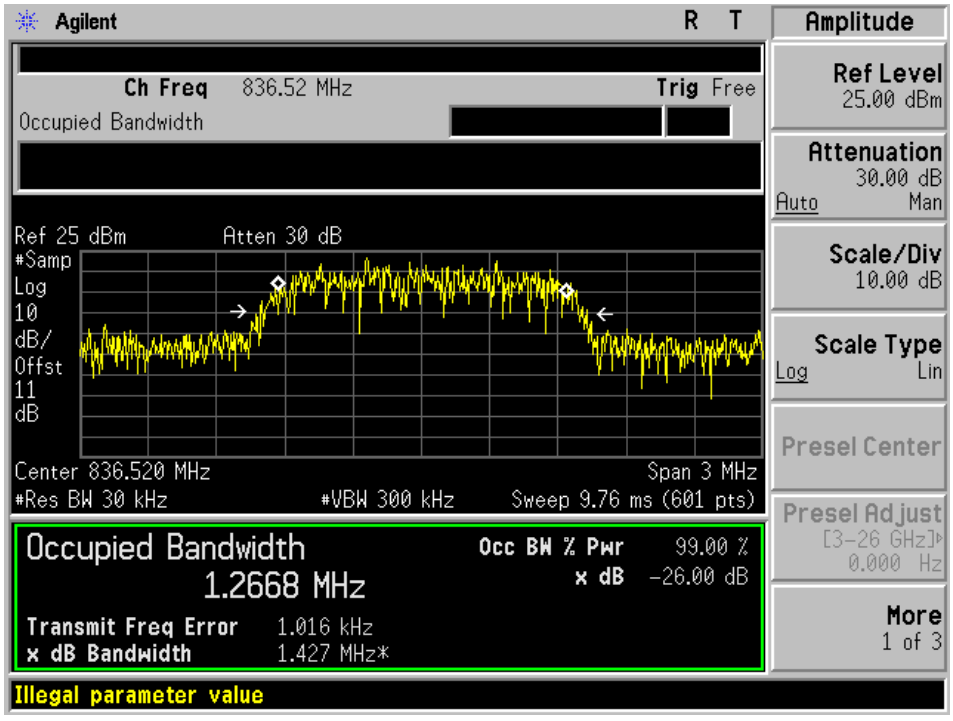
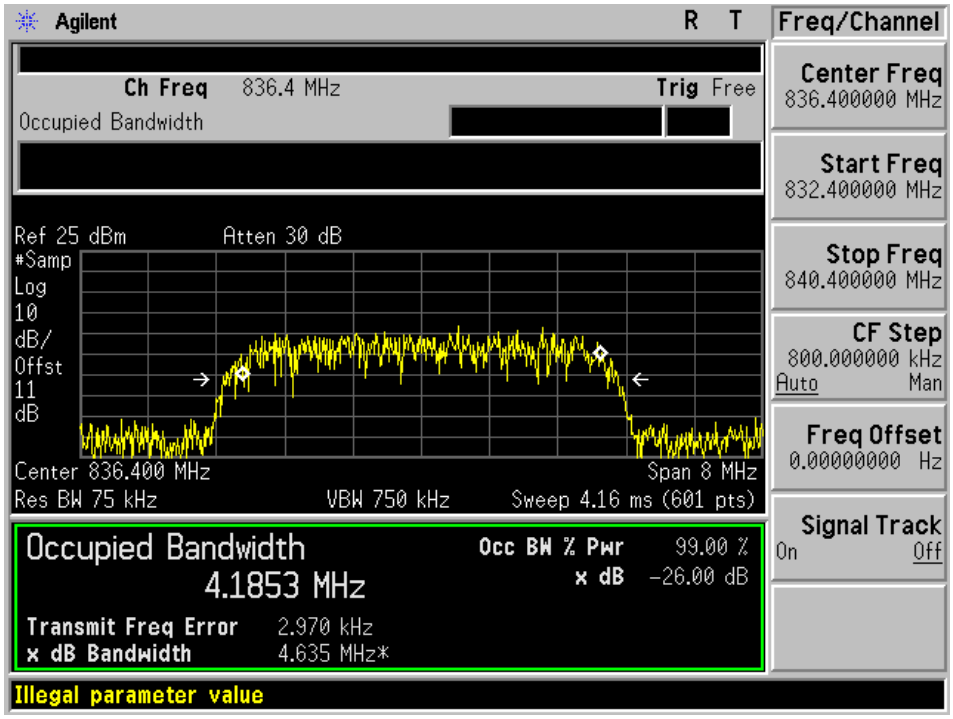


WCDMA/HSPA Cellular Band Uplink

Input



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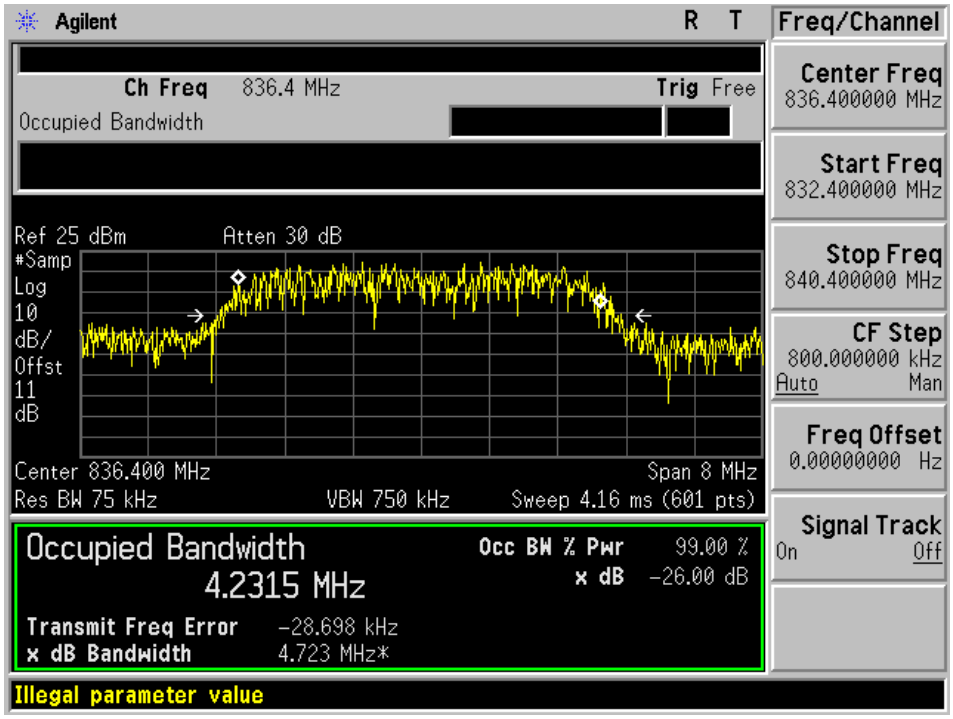

GSM/GPRS Cellular Band Downlink

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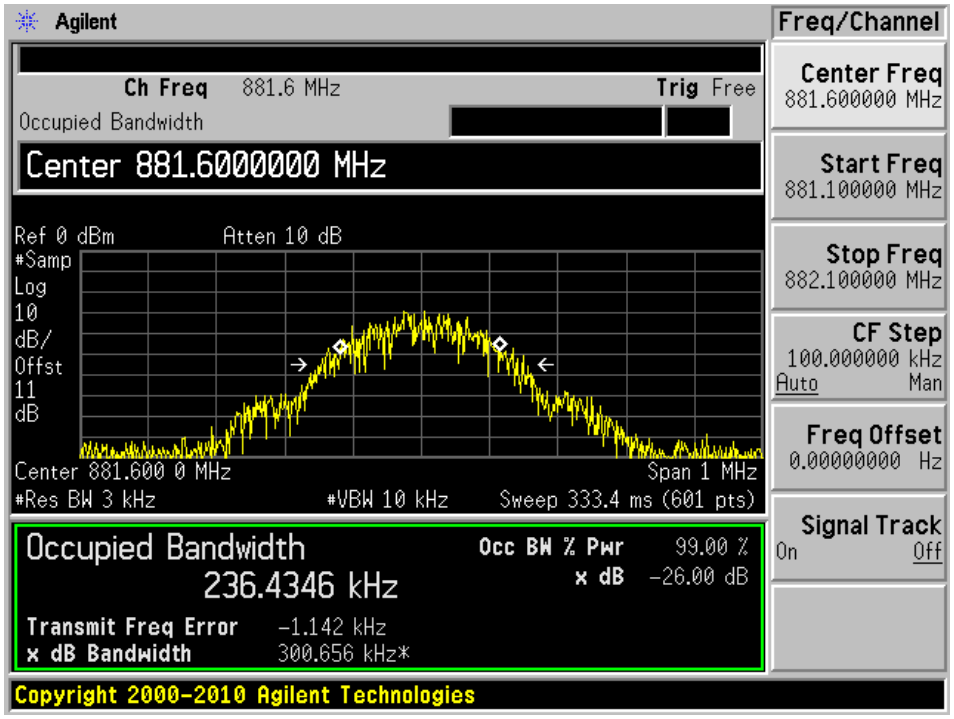

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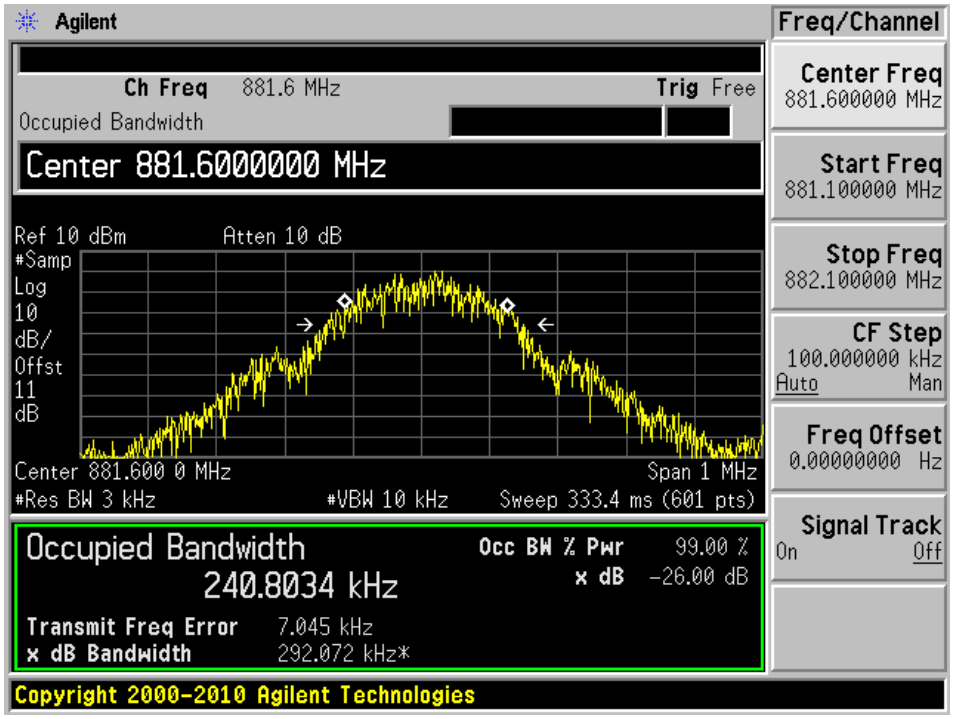

EDGE Cellular Band Downlink

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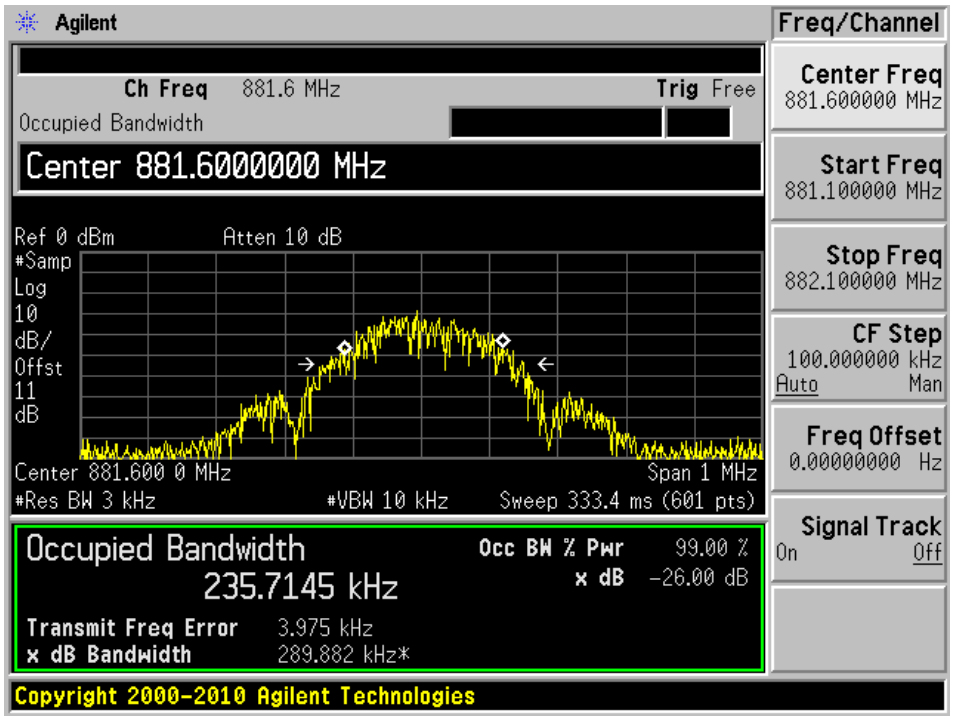

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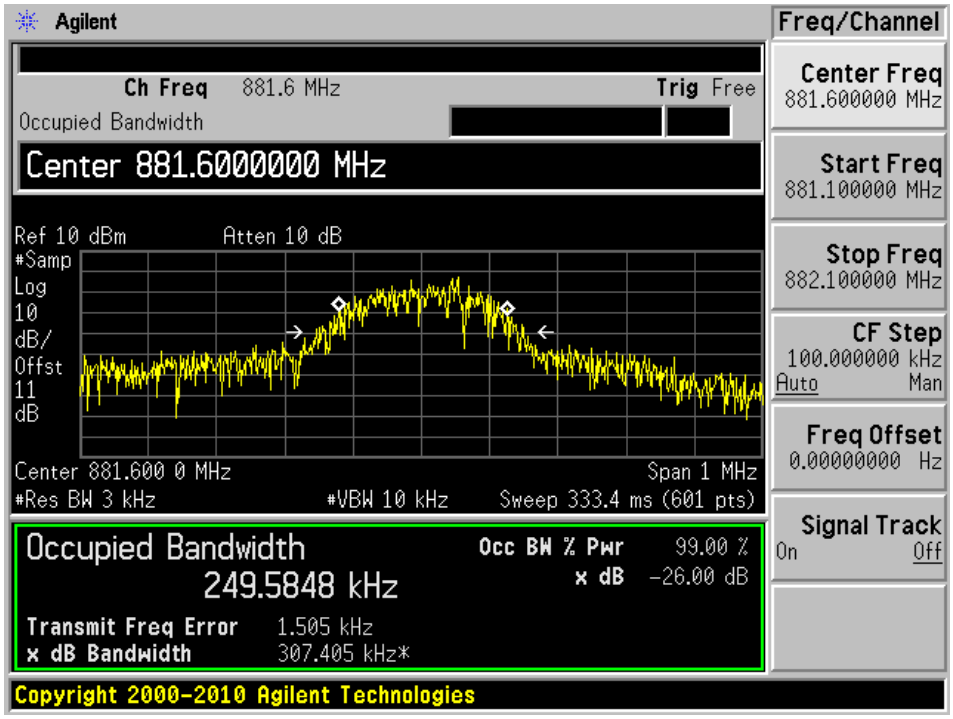

CDMA/EVDO Cellular Band Downlink

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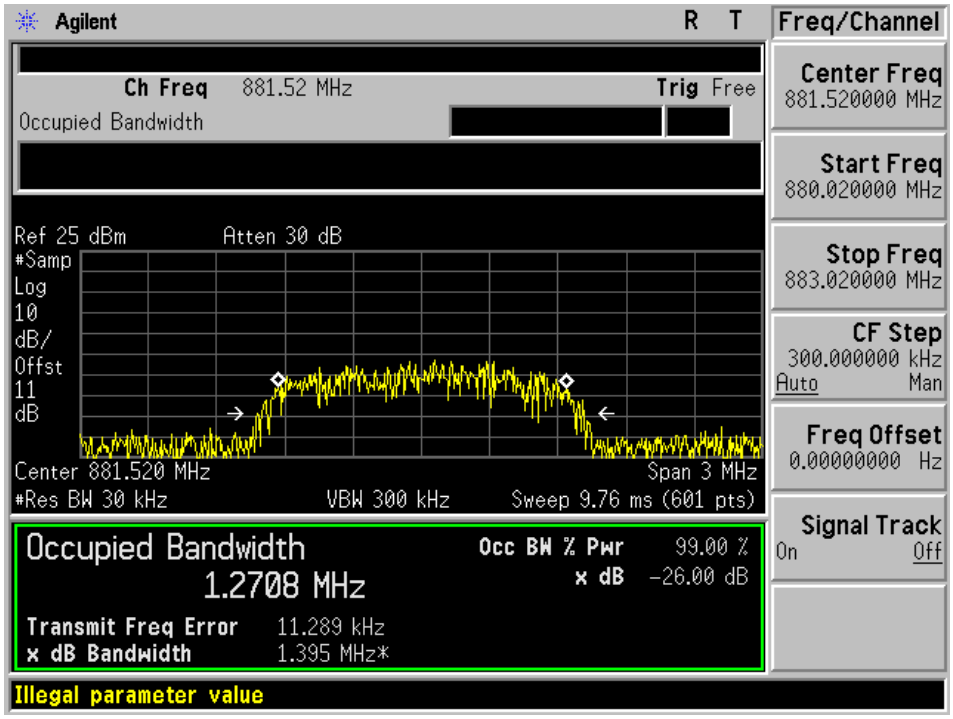

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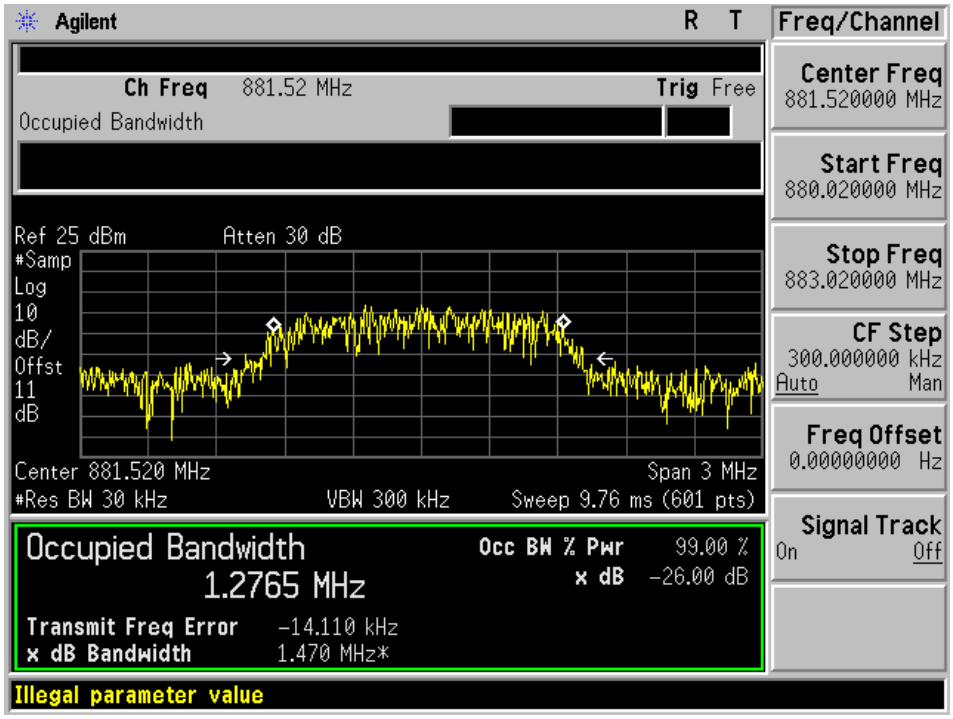
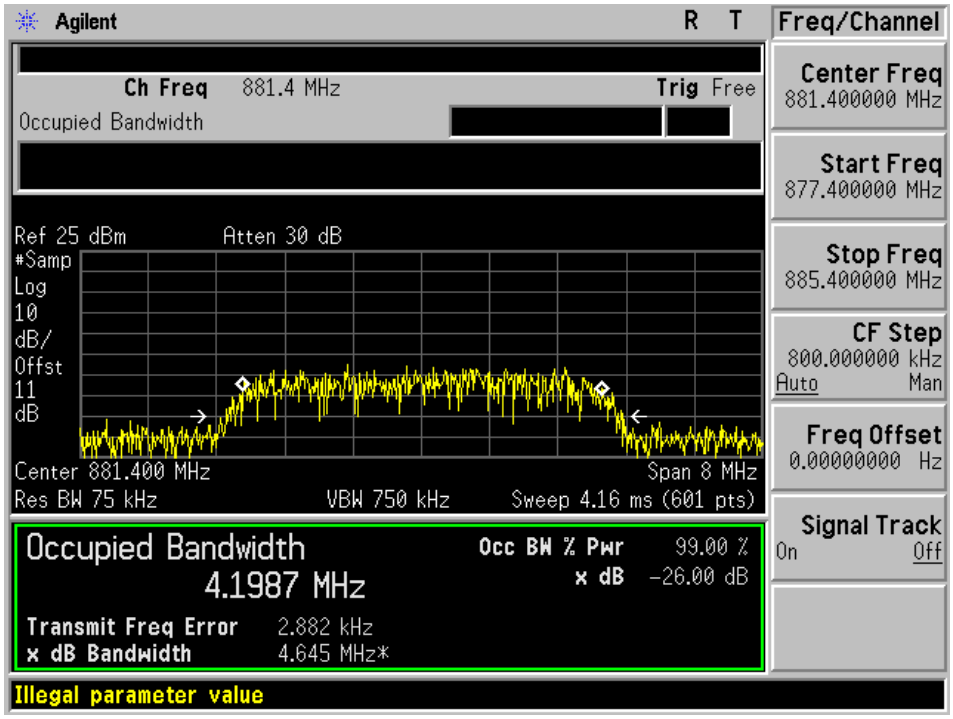


WCDMA/HSPA Cellular Band Downlink

Input



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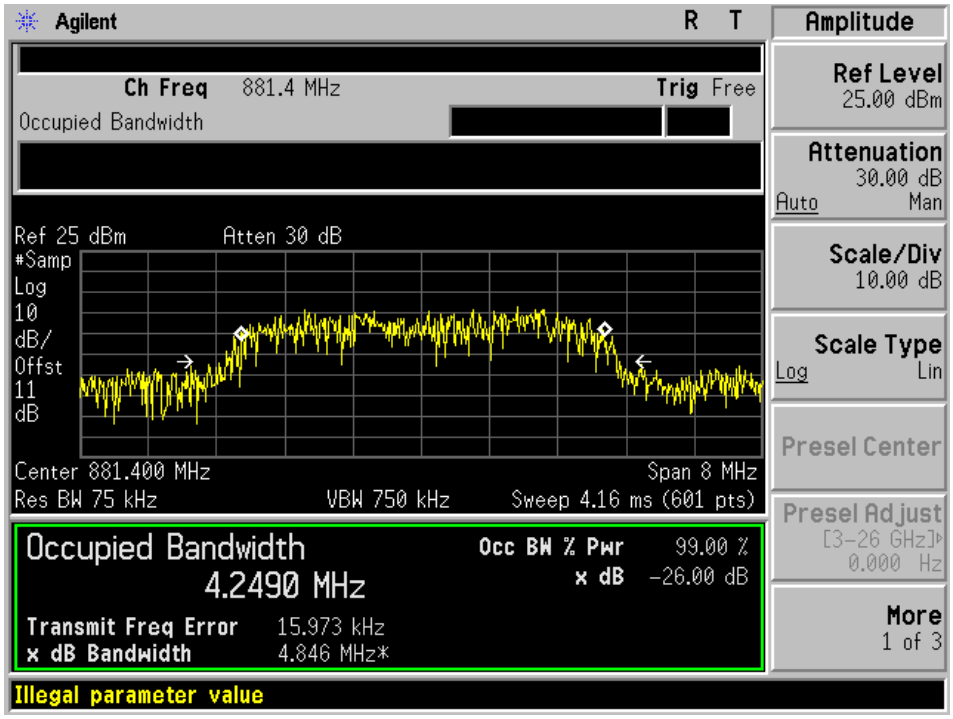
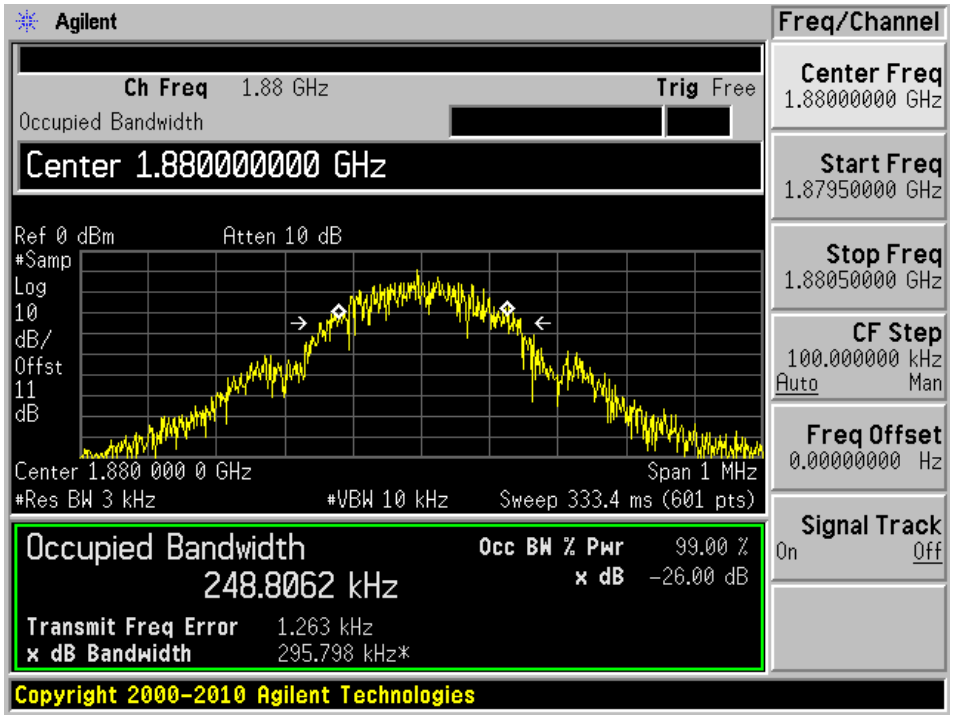


GSM/GPRS PCS Band Uplink

Input



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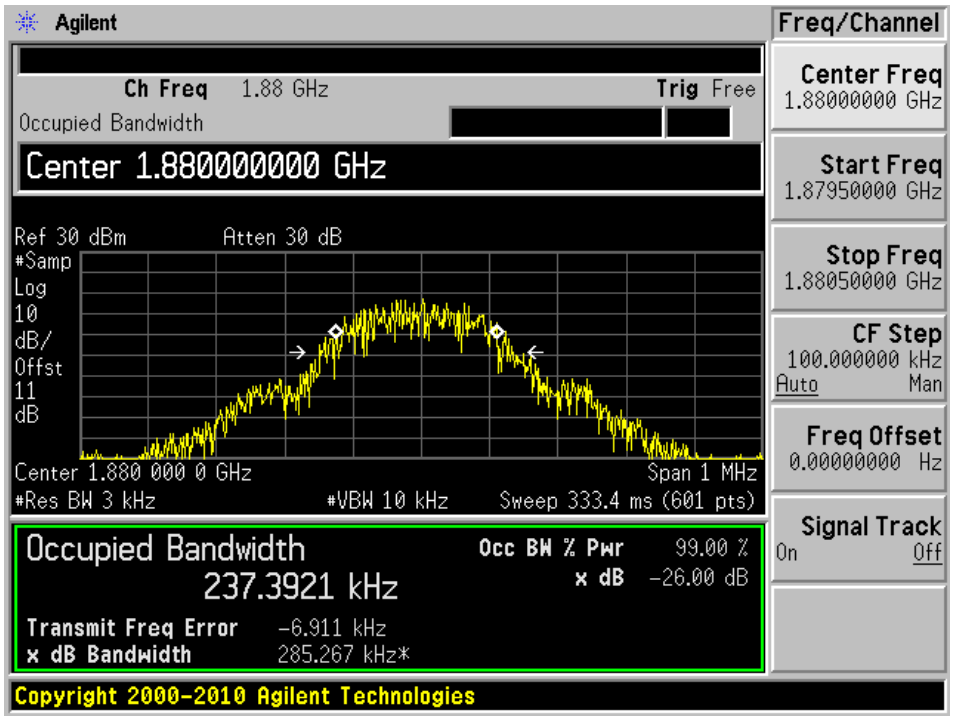
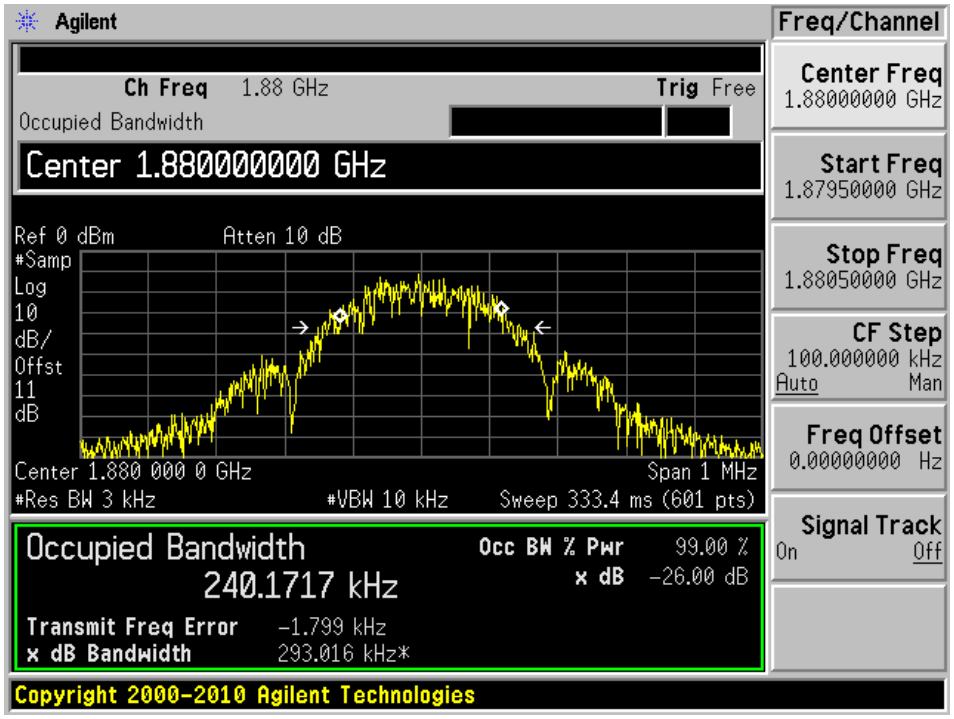


EDGE PCS Band Uplink

Input



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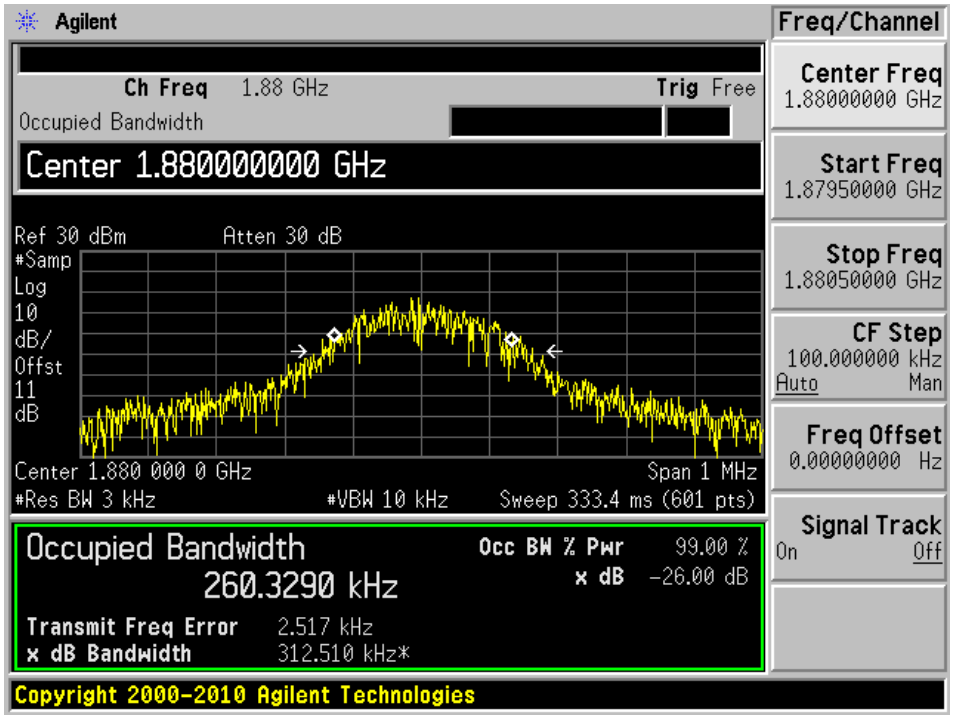

CDMA/EVDO PCS Band Uplink

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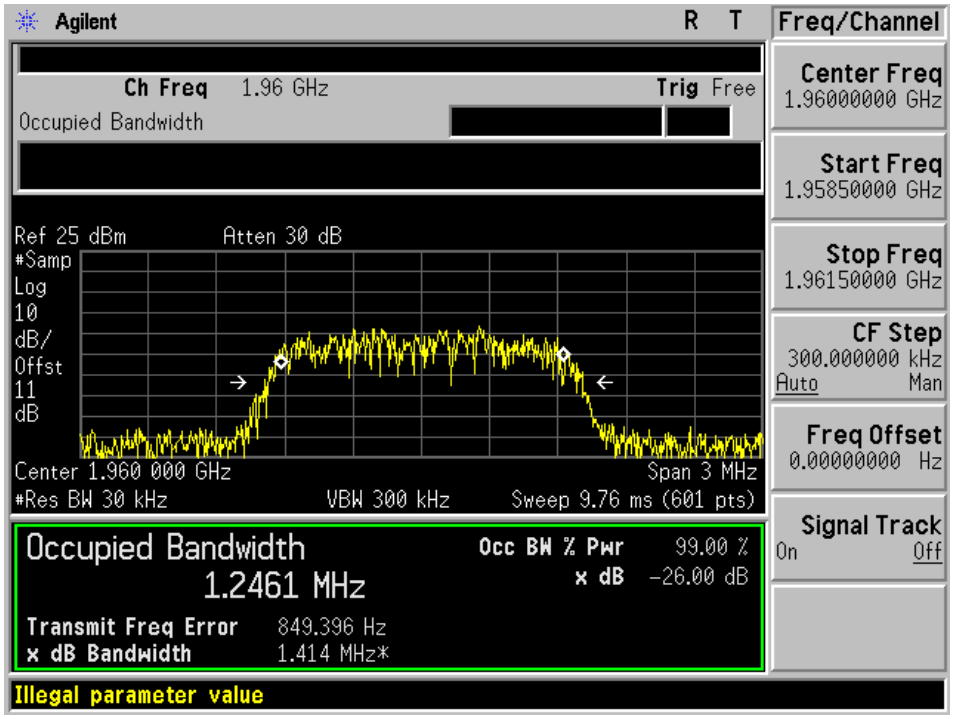

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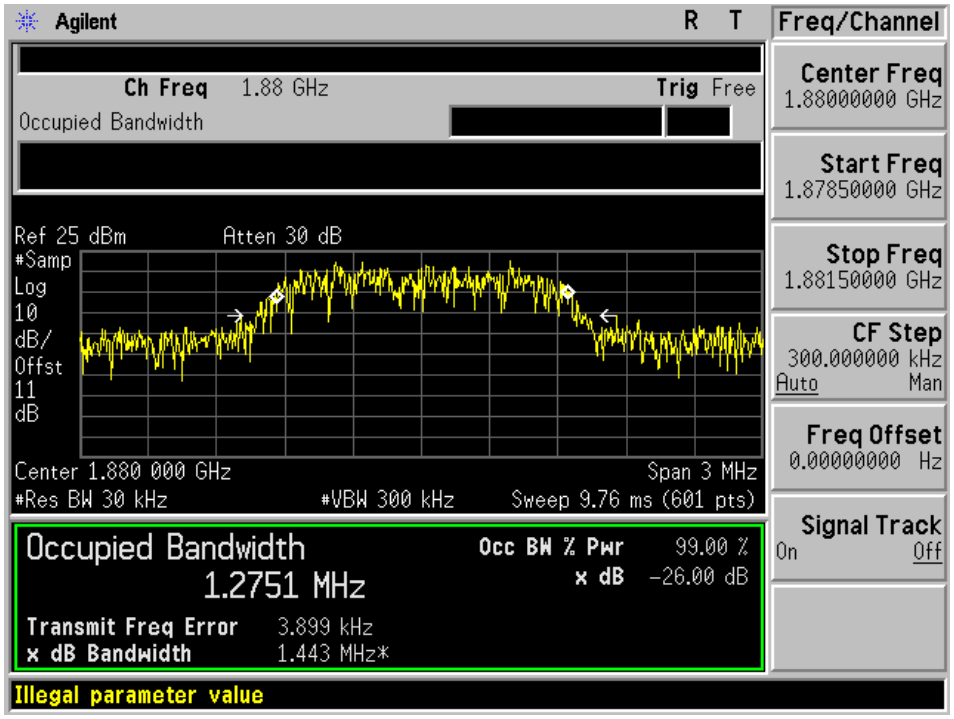

WCDMA/HSPA PCS Band Uplink

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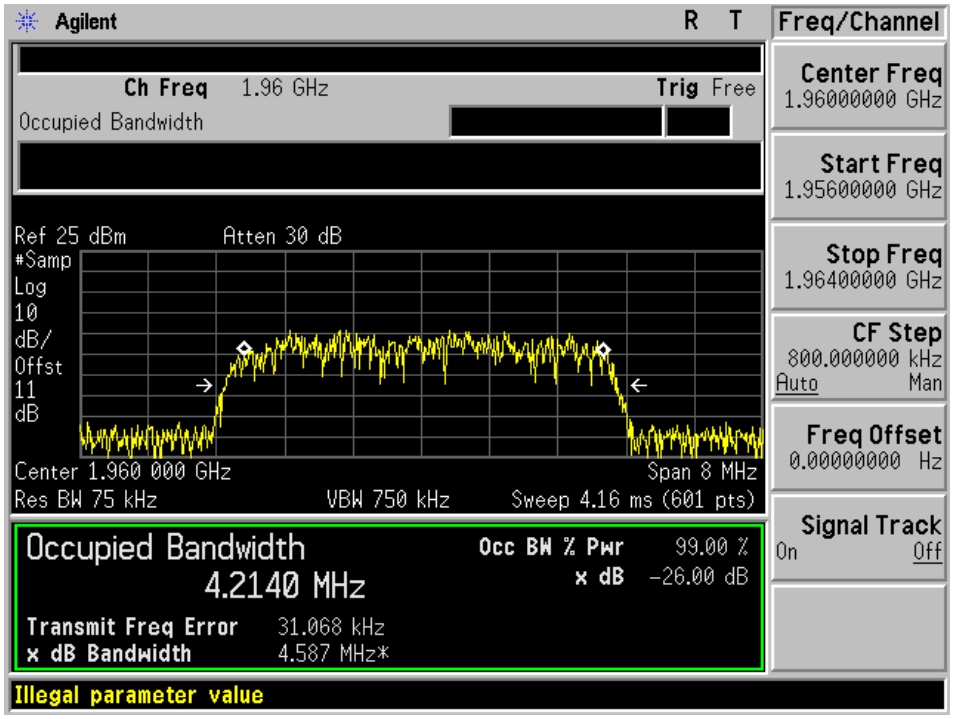

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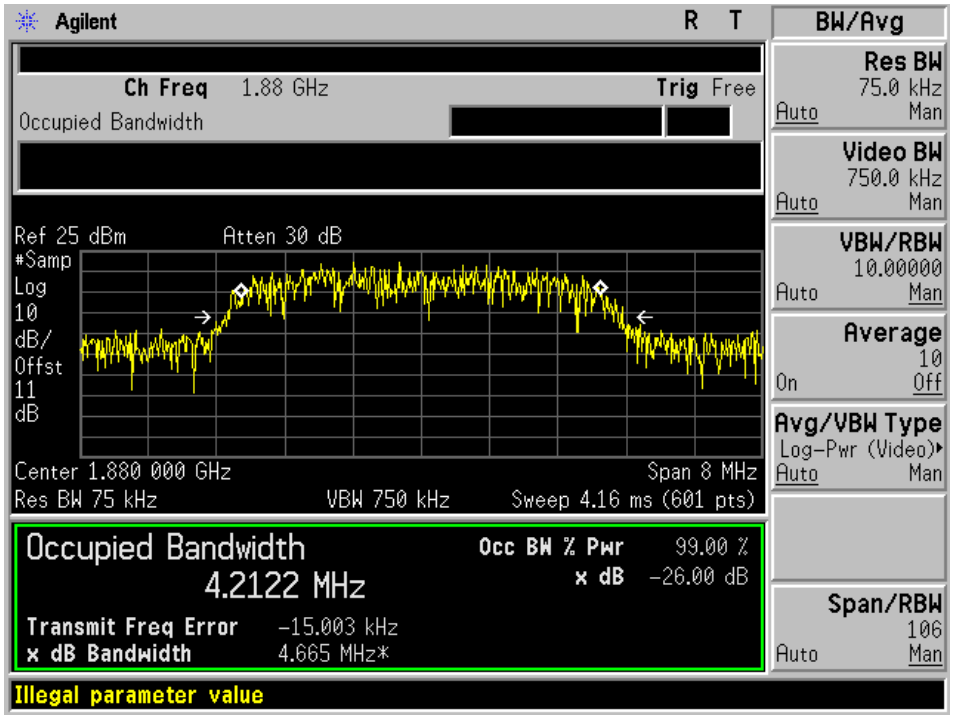

GSM/GPRS PCS Band Downlink

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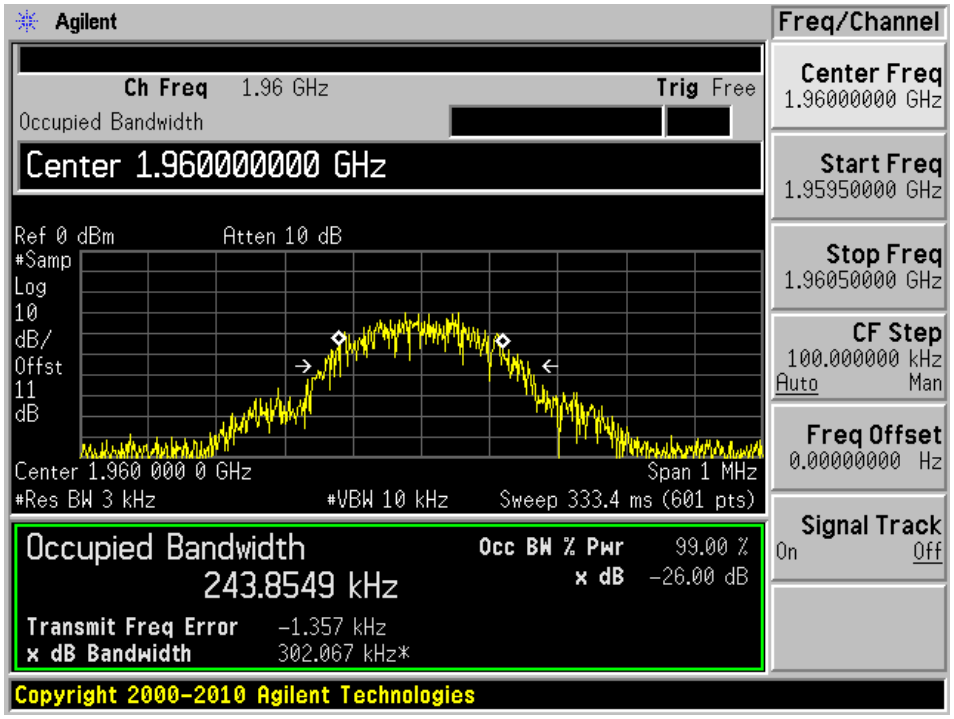

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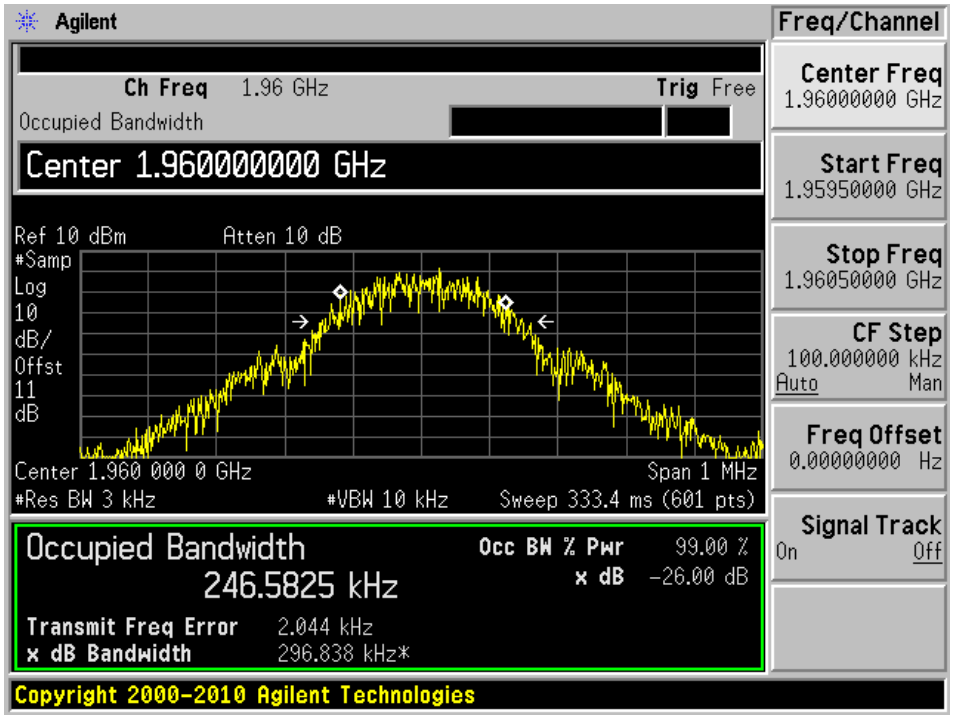
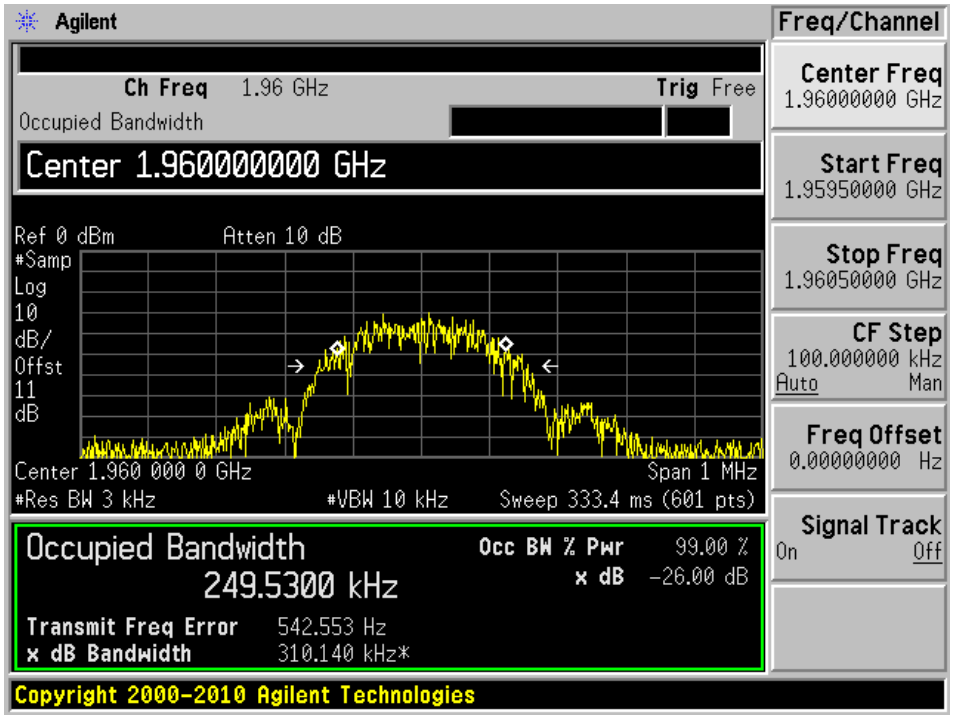


EDGE PCS Band Downlink

Input



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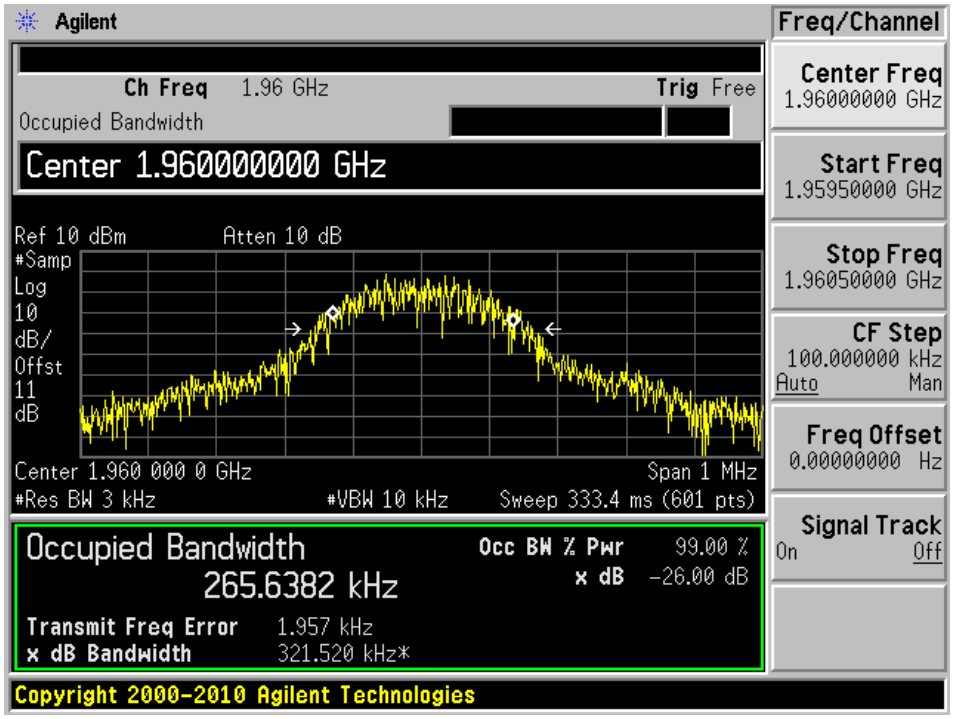
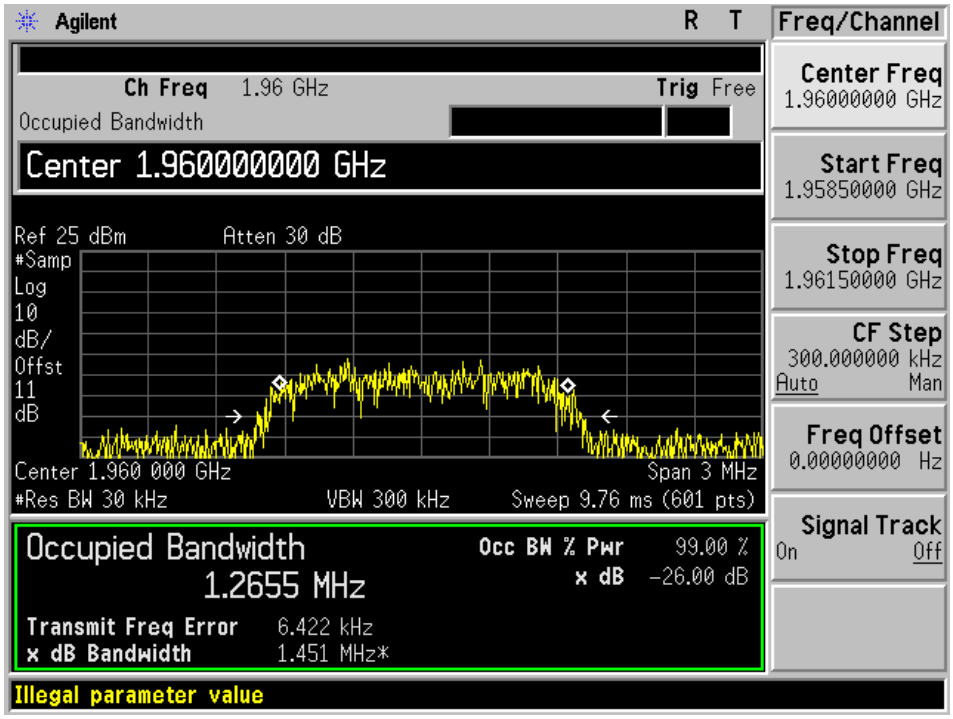
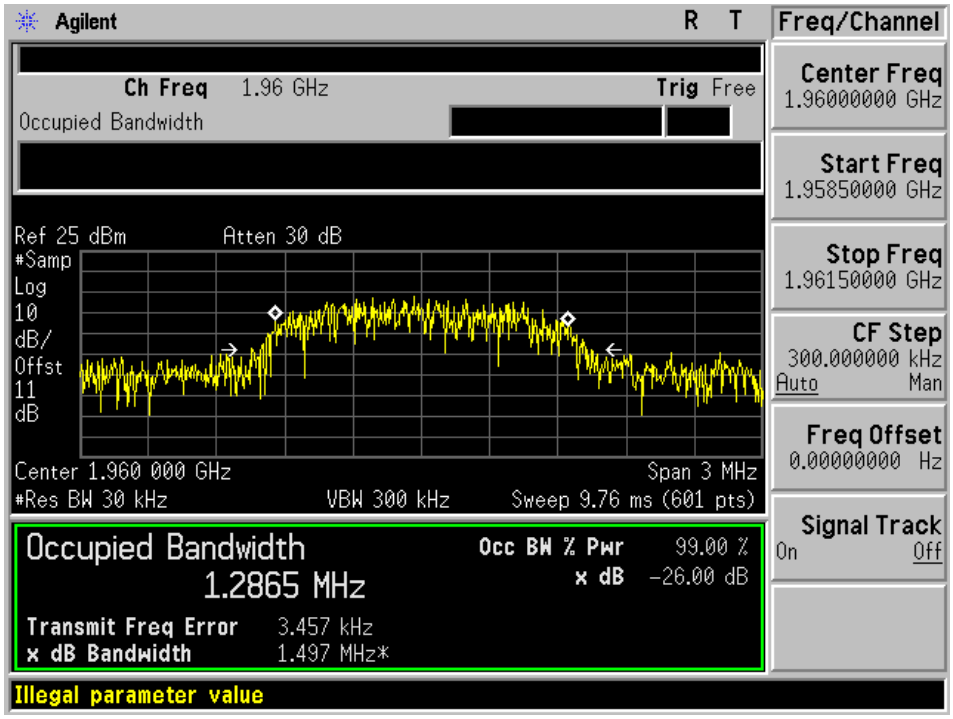


CDMA/EVDO PCS Band Downlink

Input

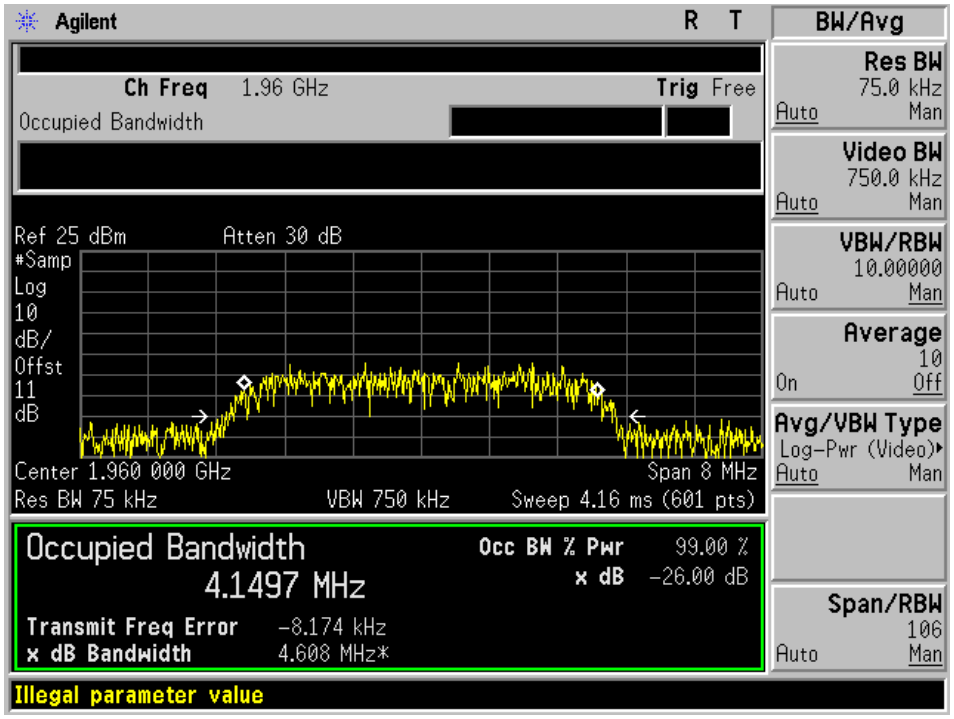


Output

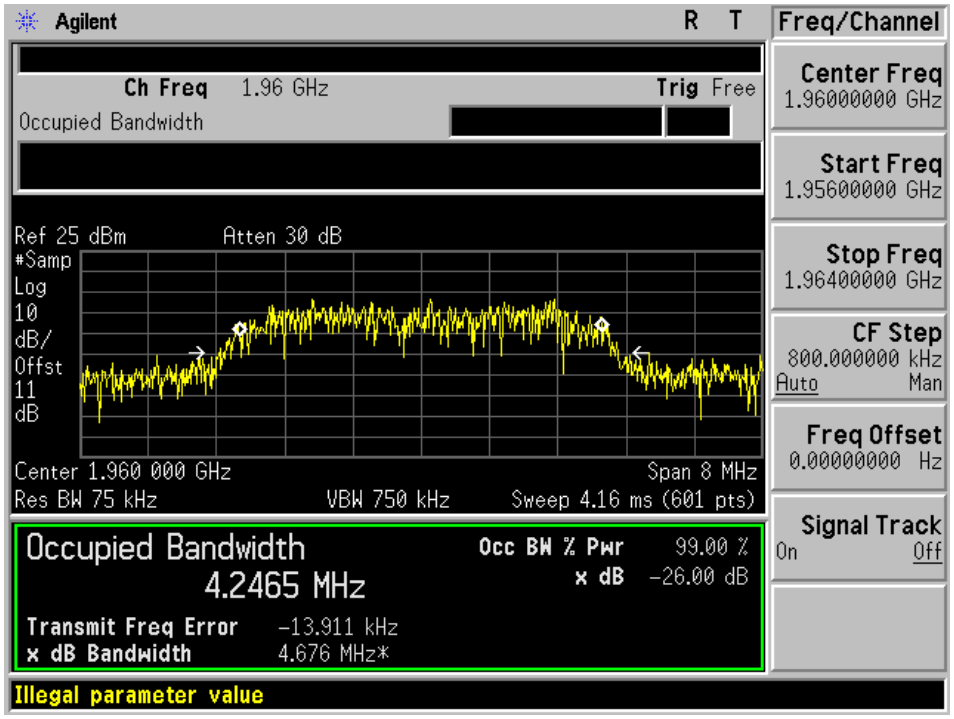


WCDMA/HSPA PCS Band Downlink

Input



Output



7 FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

7.1 Applicable Standard

Requirements: FCC §2.1053, §2.917 and §24.238.

7.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level
Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

7.3 Test Environmental Conditions

Temperature:	21-22 °C
Relative Humidity:	45-55 %
ATM Pressure:	100-102kPa

The testing was performed by Lionel Lara from 2012-02-20 to 2012-02-26 in 5 Meter Chamber #3.

7.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-06-29
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2011-06-09
A.R.A	Horn antenna	DEG-118/A	1132	2012-01-04
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2011-05-09
HP	Signal Generator	8648C	3426A00417	2011-08-18
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

7.5 Test Results

Uplink (Input frequency = 836.6 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1673.2	39.97	166	138	V	1673	-67.21	7.8	1.34	-60.75	-13	-47.75
1673.2	39.44	46	186	H	1673	-67.74	7.8	1.34	-61.28	-13	-48.28

Downlink (Input frequency = 881.6 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
-	-	-	-	H	-	-	-	-	-	-13	Note
-	-	-	-	V	-	-	-	-	-	-13	Note

Note: All emissions are on/under noise floor level.

Uplink (Input frequency = 1880 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3760	41.84	176	106	V	3760	-61.6	9.5	1.68	-53.78	-13	-40.78
3760	44.43	169	122	H	3760	-59.01	9.5	1.68	-51.19	-13	-38.19

Downlink (Input frequency = 1960 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
-	-	-	-	H	-	-	-	-	-	-13	Note
-	-	-	-	V	-	-	-	-	-	-13	Note

Note: All emissions are on/under noise floor level.

8 FCC §2.1051, §22.917 & §24.238 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

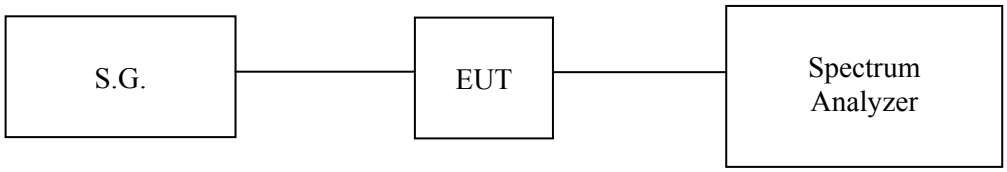
8.1 Applicable Standard

Requirements: FCC §2.1051, §22.917 and §24.238.

As per FCC §22.917 and §24.238, 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

8.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



8.3 Test Environmental Conditions

Temperature:	21-22 °C
Relative Humidity:	45-55 %
ATM Pressure:	100-102kPa

The testing was performed by Lionel Lara from 2012-02-20 to 2012-02-26 in RF Site.

8.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
HP	Signal Generator	8648C	3426A00417	2011-08-18
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

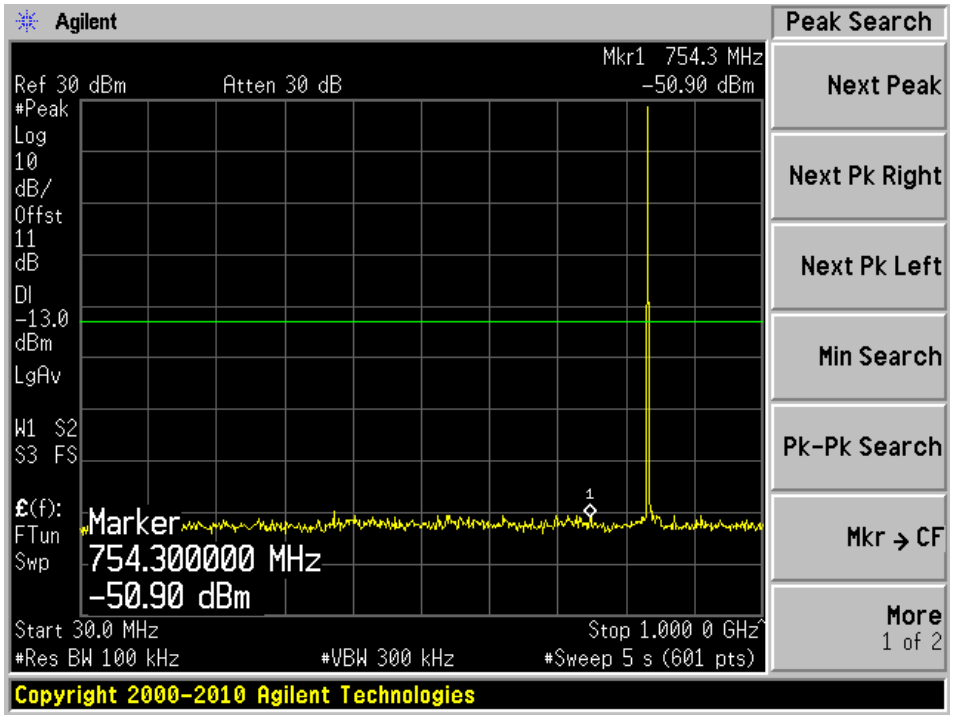
Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.5 Test Results

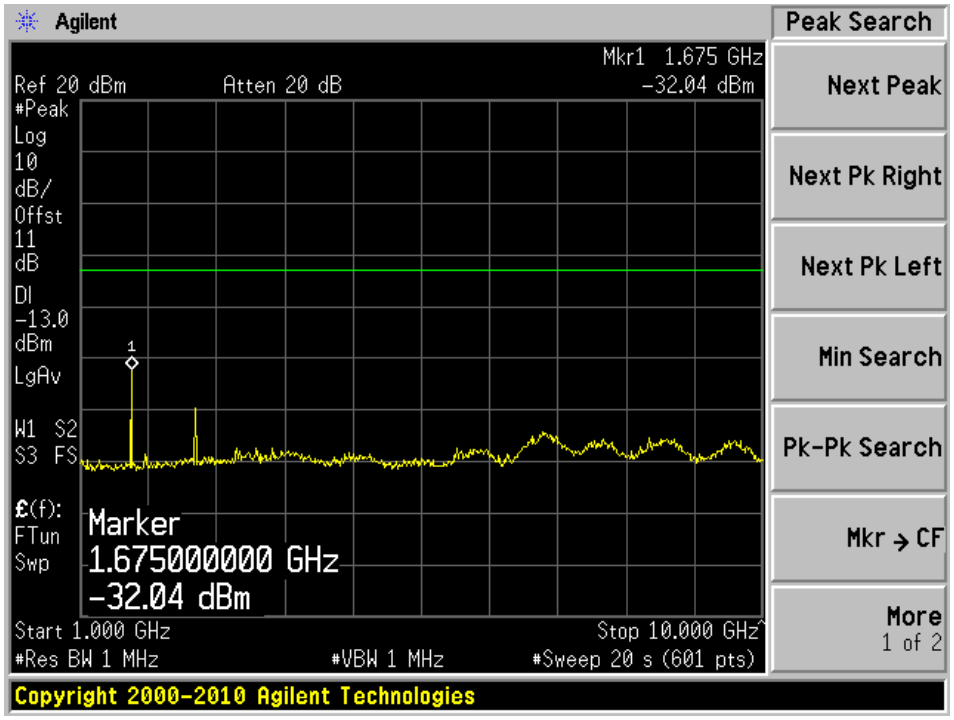
Please refer to the following plots.

Cellular Band Uplink, Middle Channel: 836.6 MHz

Plot 1: 30 MHz to 1 GHz

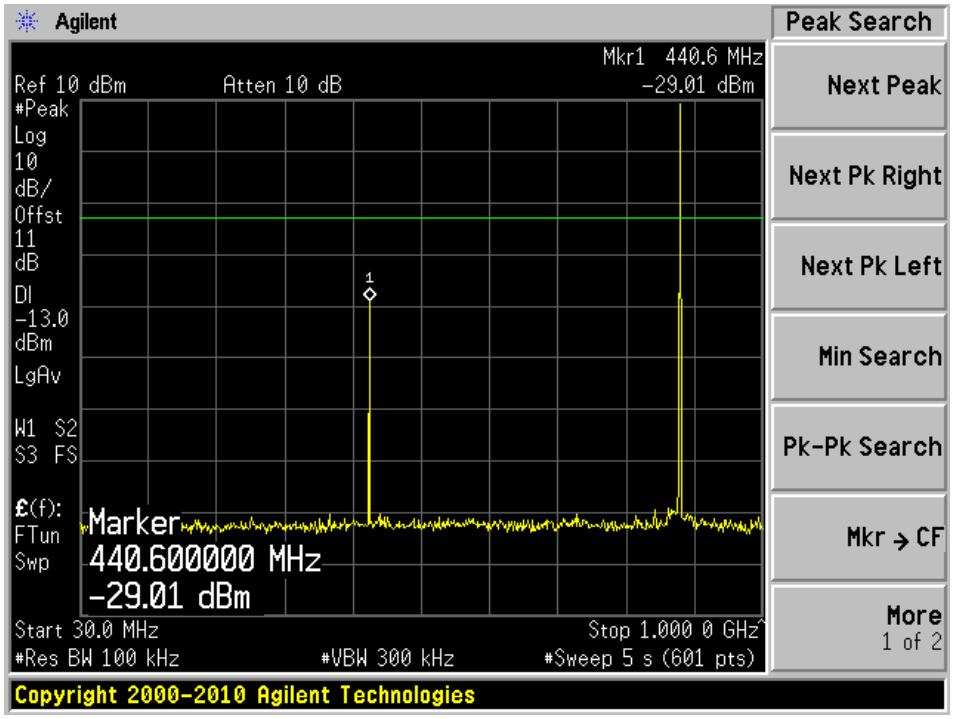


Plot 2: Above 1 GHz

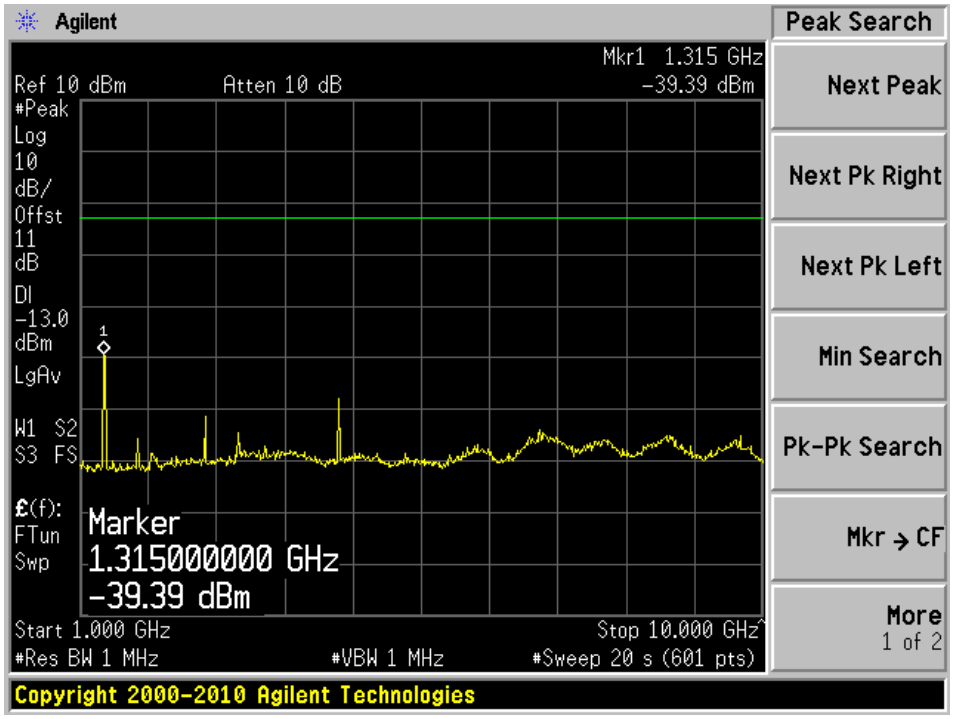


Cellular Band Downlink, Middle Channel: 881.6 MHz

Plot 1: 30 MHz to 1 GHz

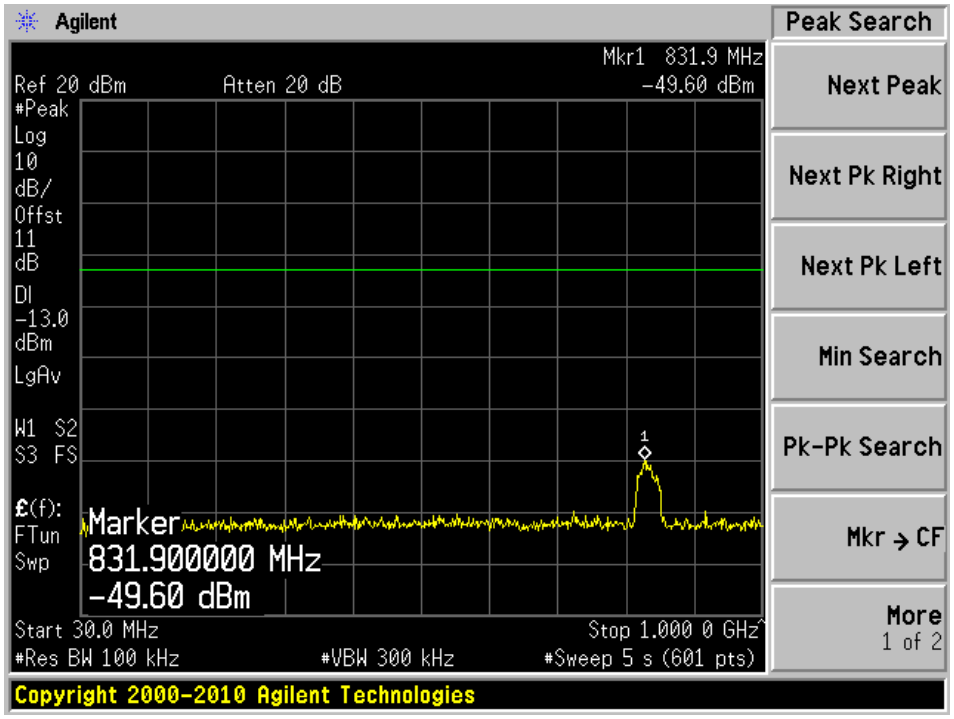


Plot 2: Above 1 GHz

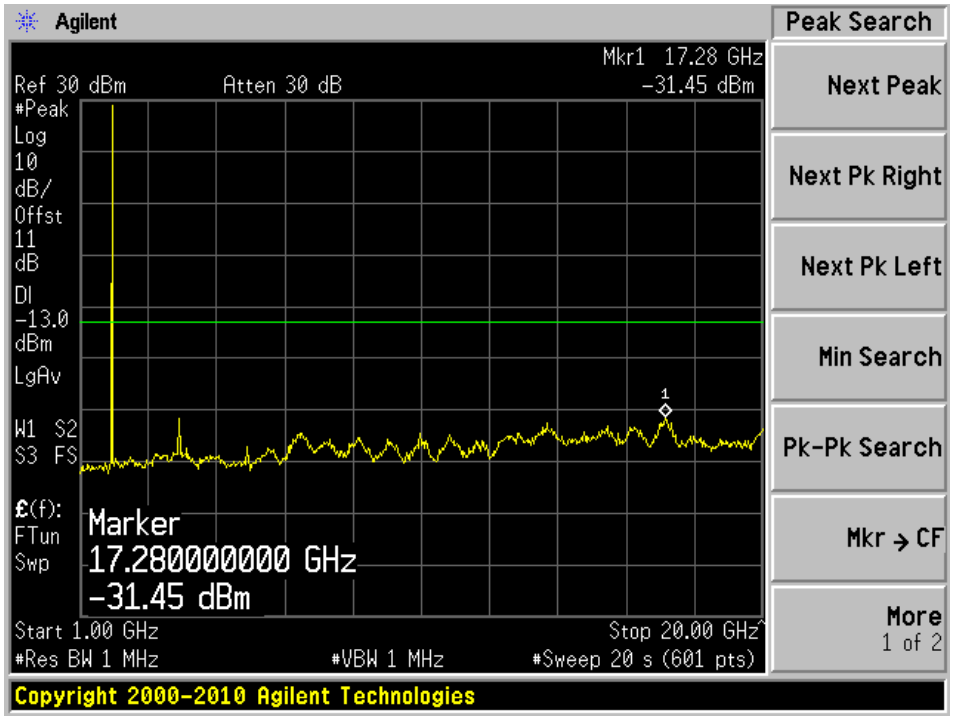


PCS Band Uplink, Middle Channel: 1880 MHz

Plot 1: 30 MHz to 1 GHz

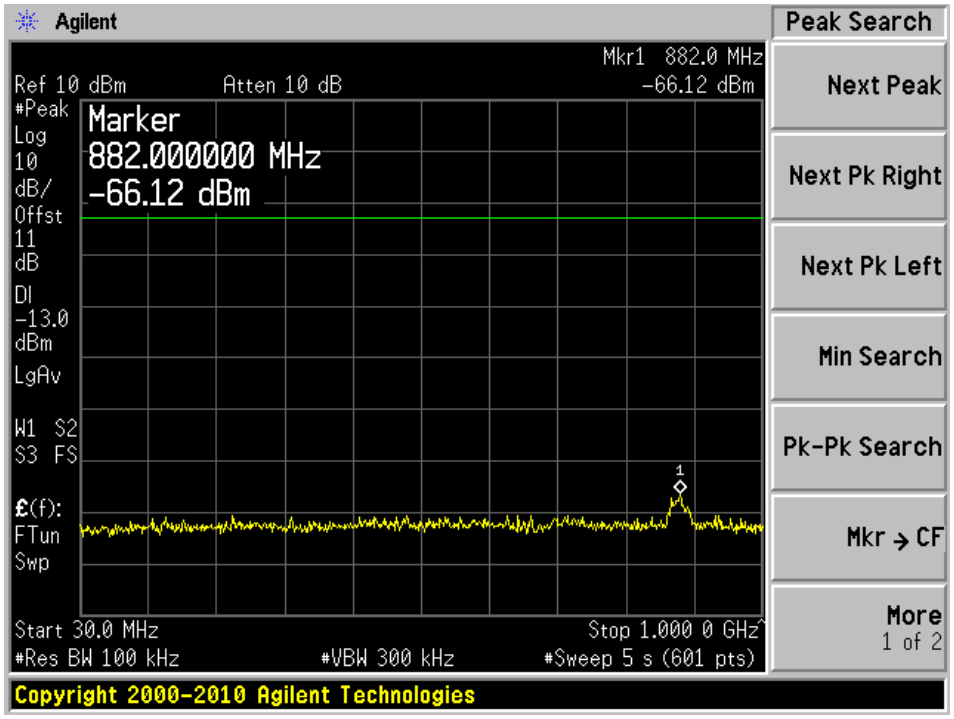


Plot 2: Above 1 GHz

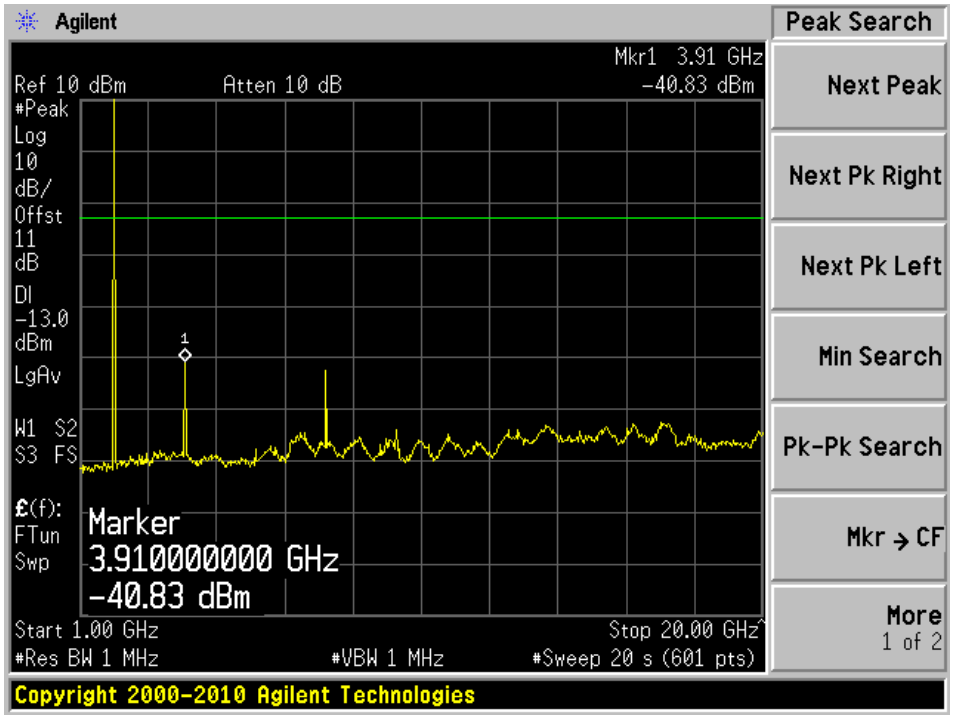


PCS Band Downlink, Middle Channel: 1960 MHz

Plot 1: 30 MHz to 1 GHz

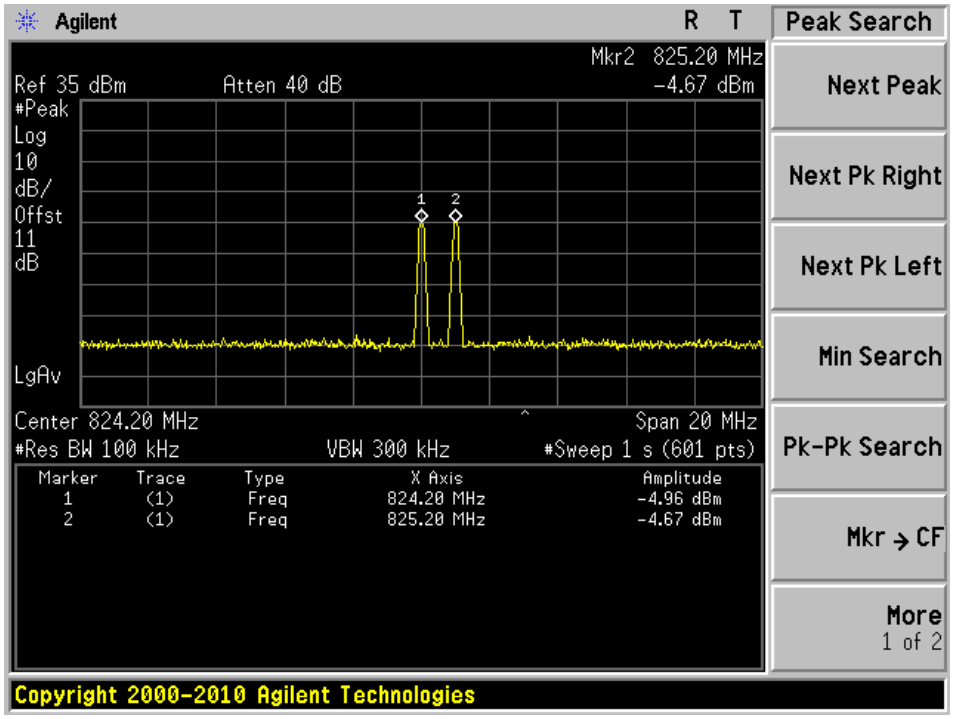


Plot 2: Above 1 GHz

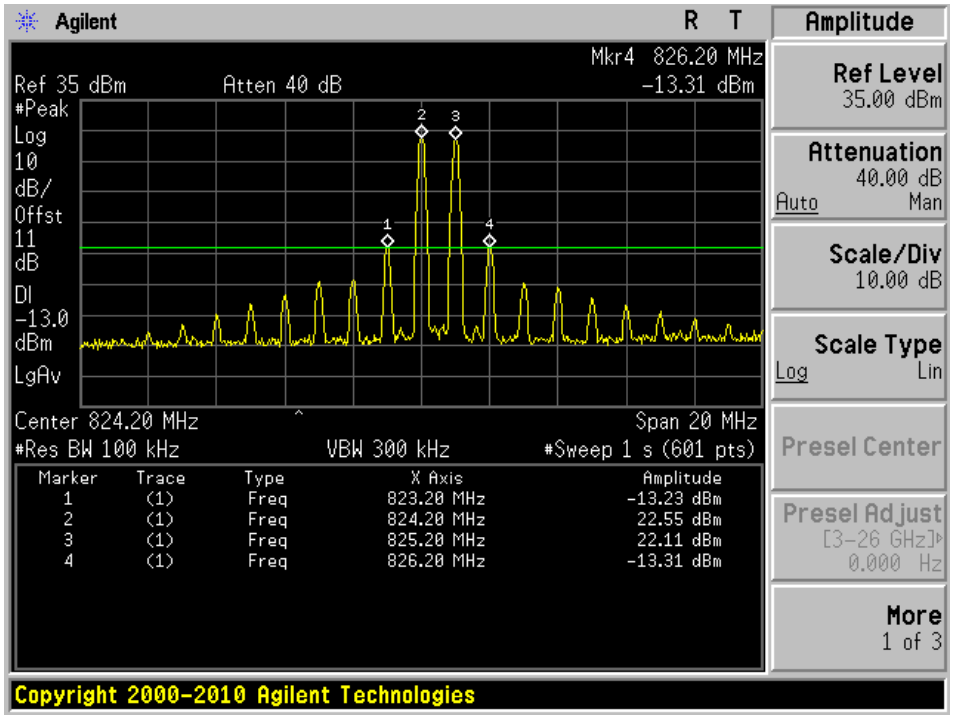


Inter-modulation

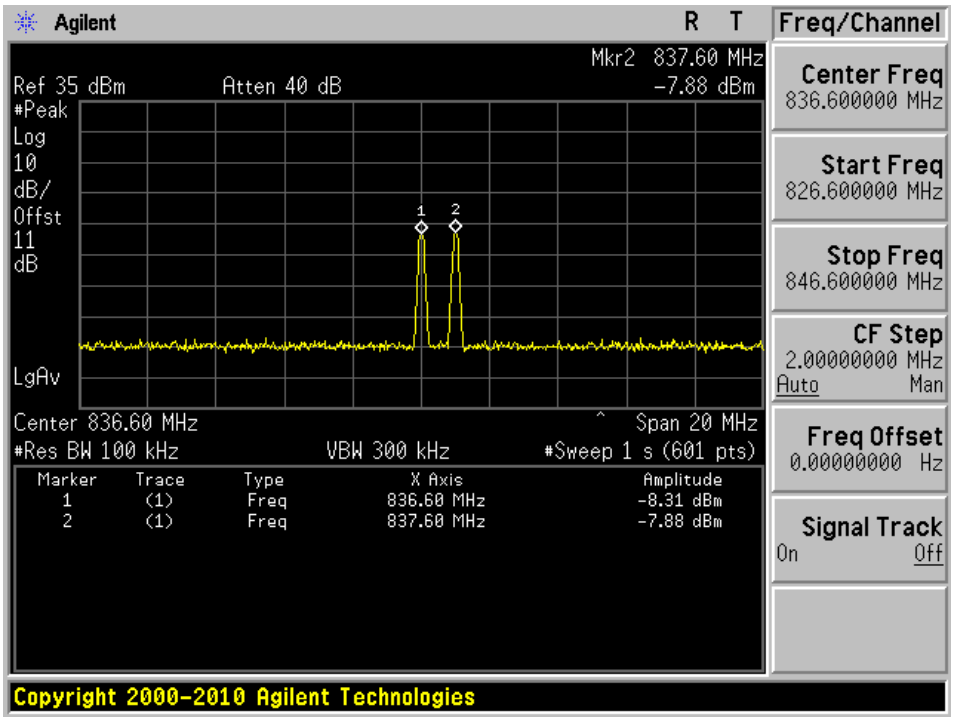
Cellular Band Uplink Low Channel, Input



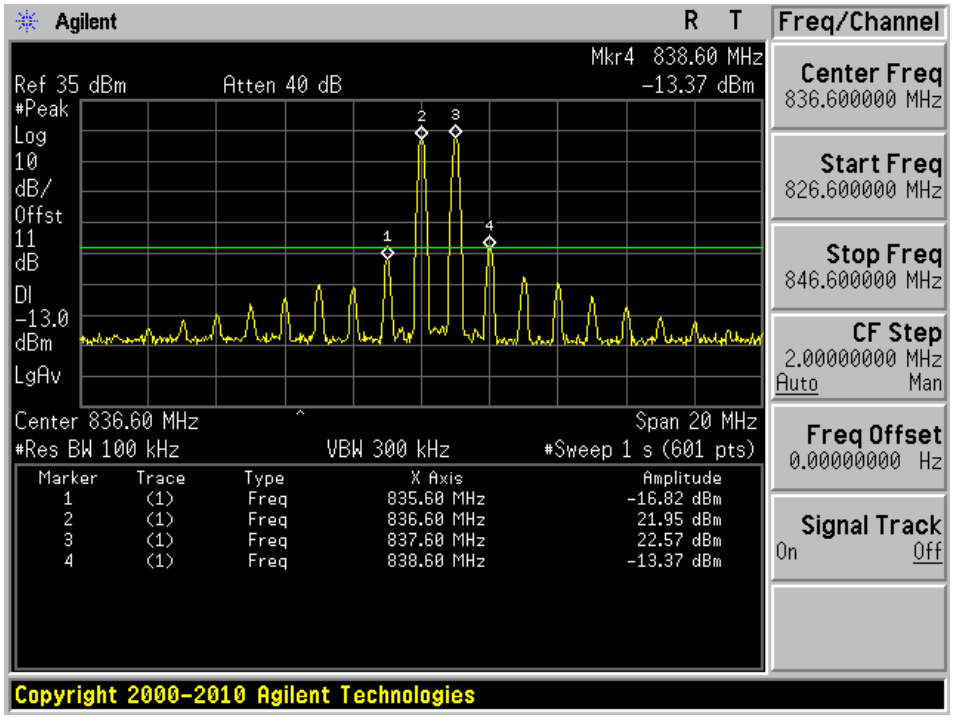
Cellular Band Uplink Low Channel, Output



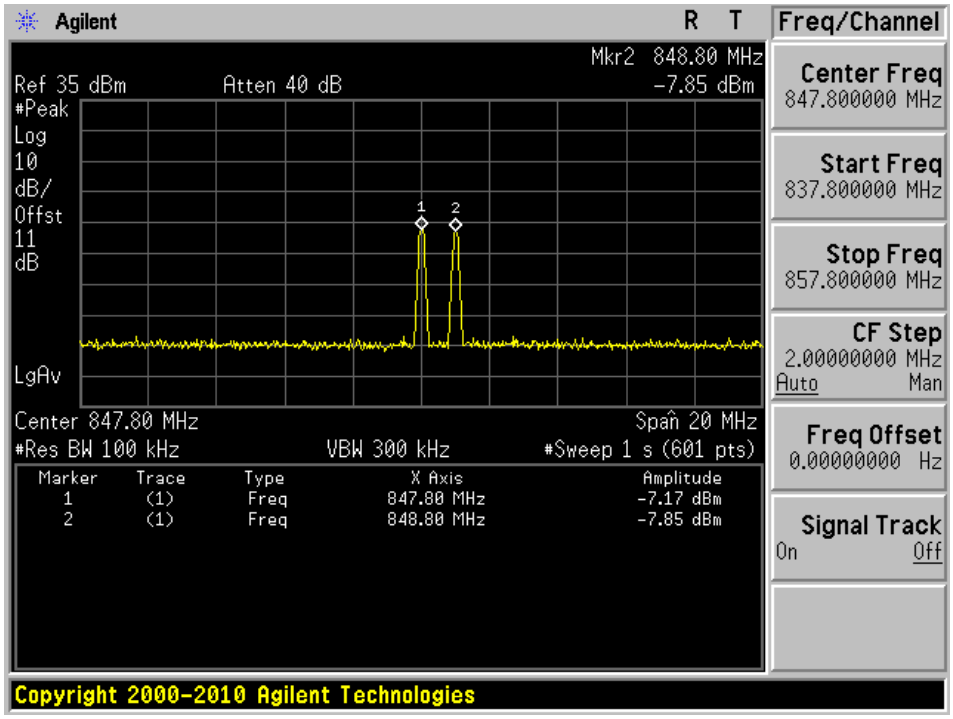
Cellular Band Uplink Middle Channel, Input



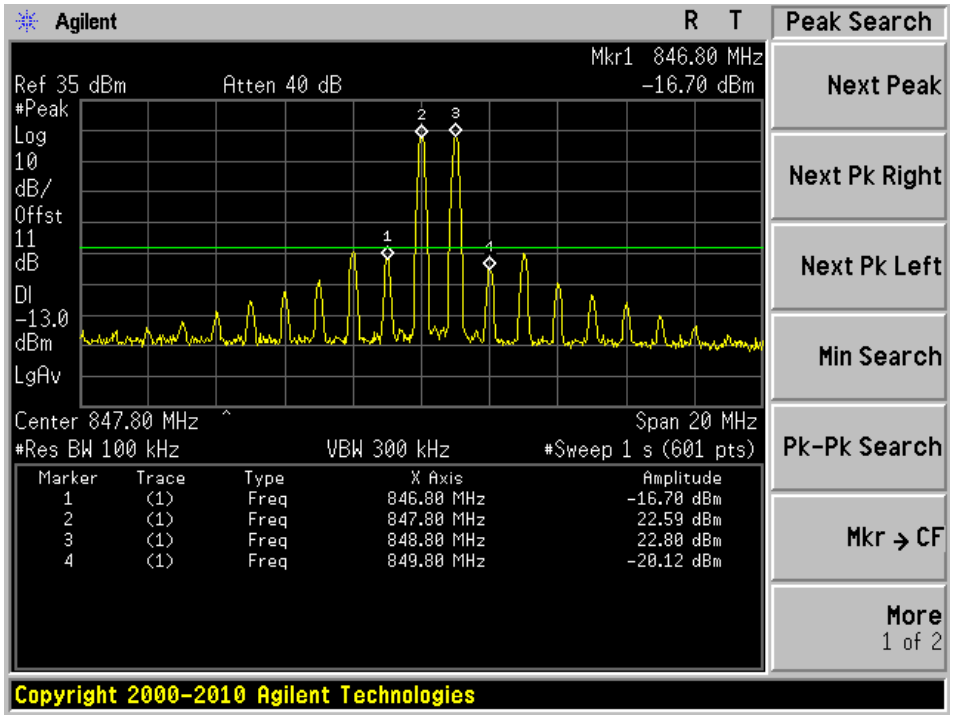
Cellular Band Uplink Middle Channel, Output



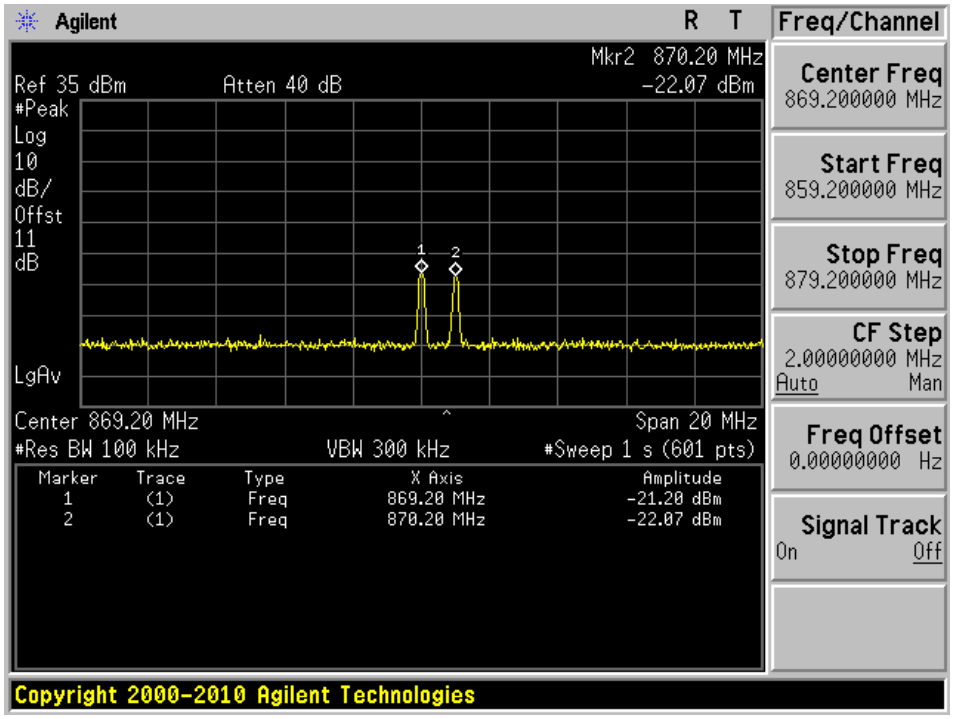
Cellular Band Uplink High Channel, Input



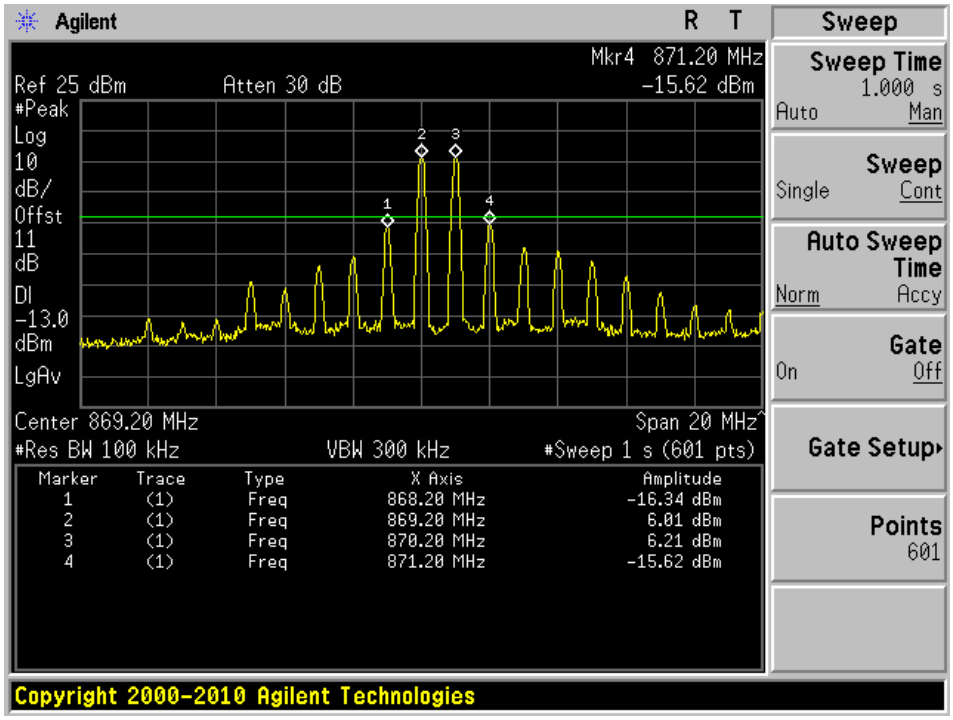
Cellular Band Uplink High Channel, Output



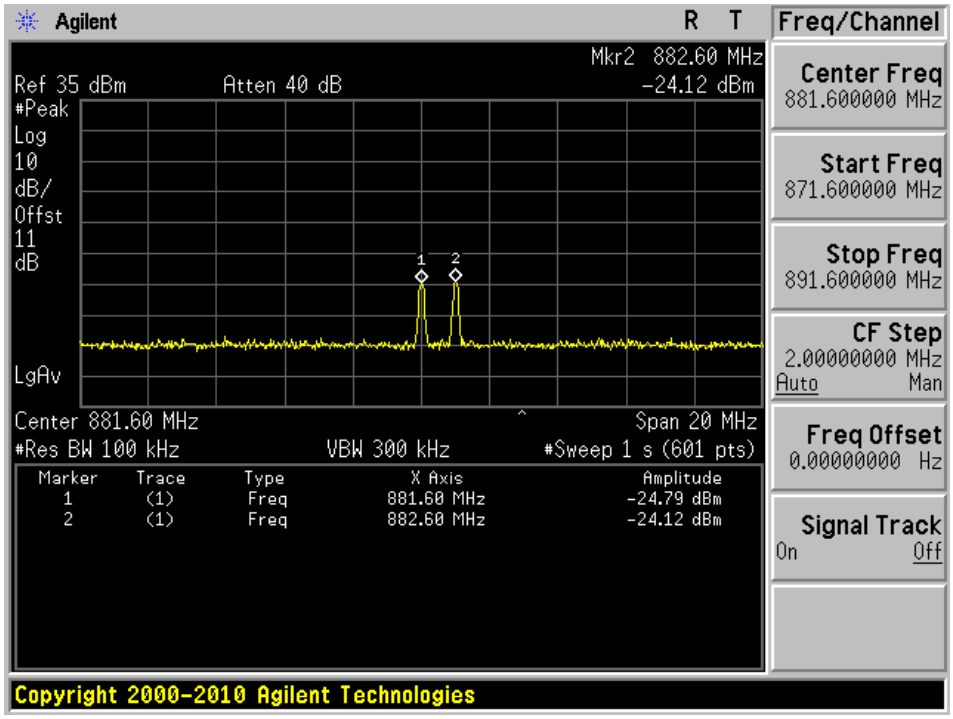
Cellular Band Downlink Low Channel, Input



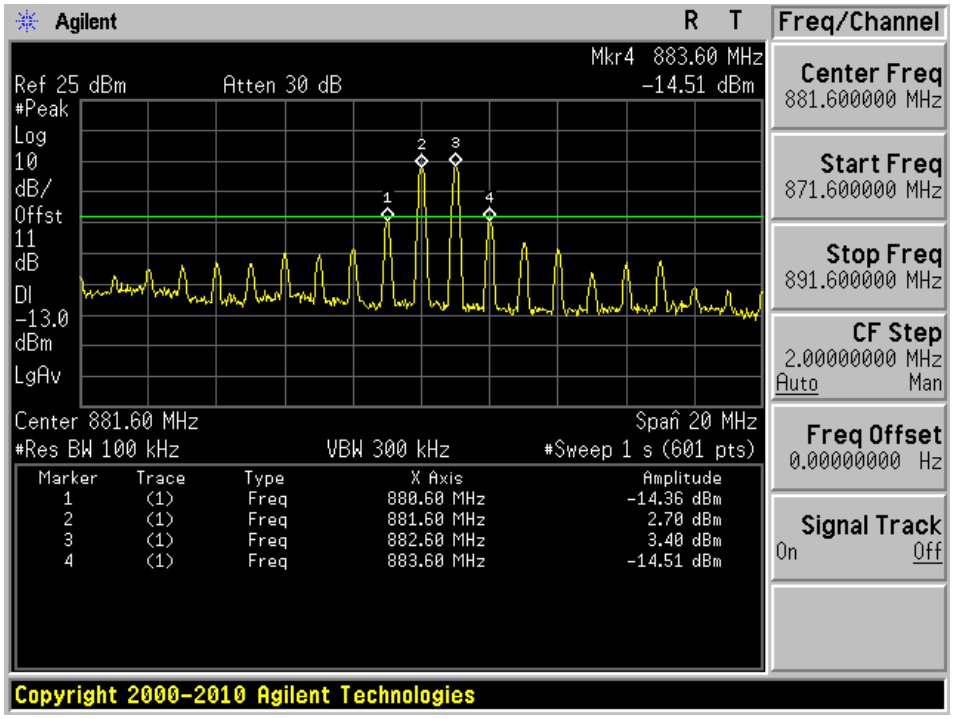
Cellular Band Downlink Low Channel, Output



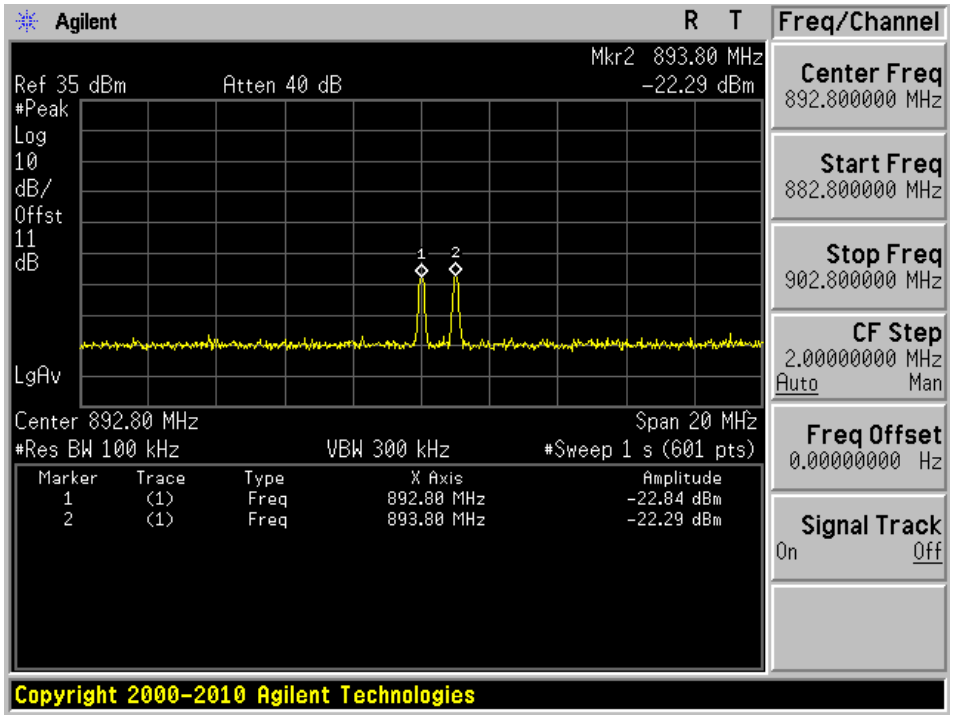
Cellular Band Downlink Middle Channel, Input



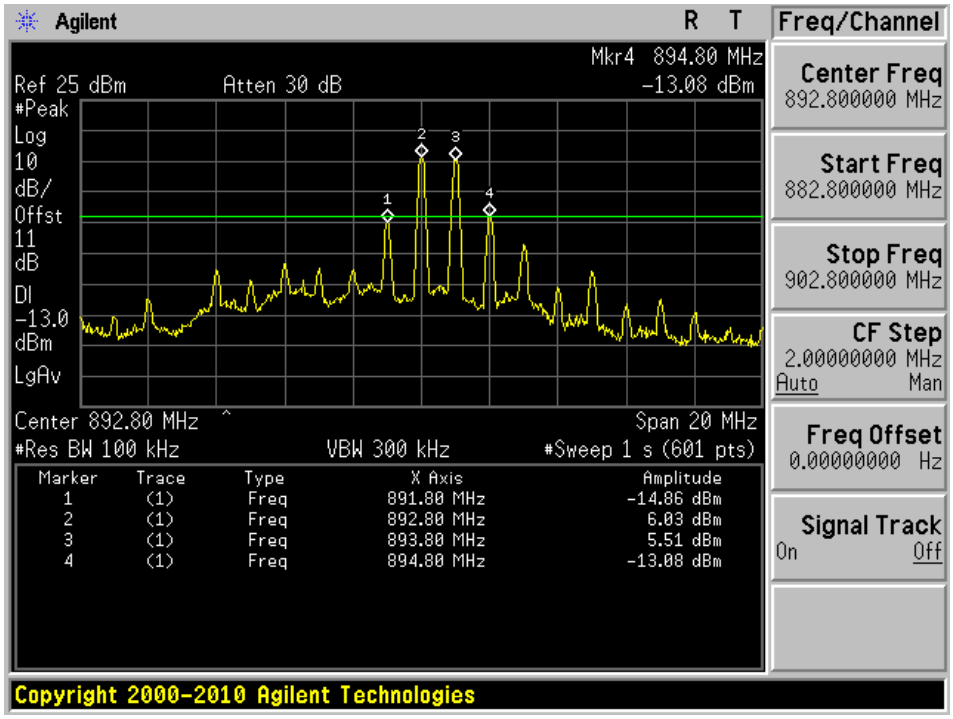
Cellular Band Downlink Middle Channel, Output



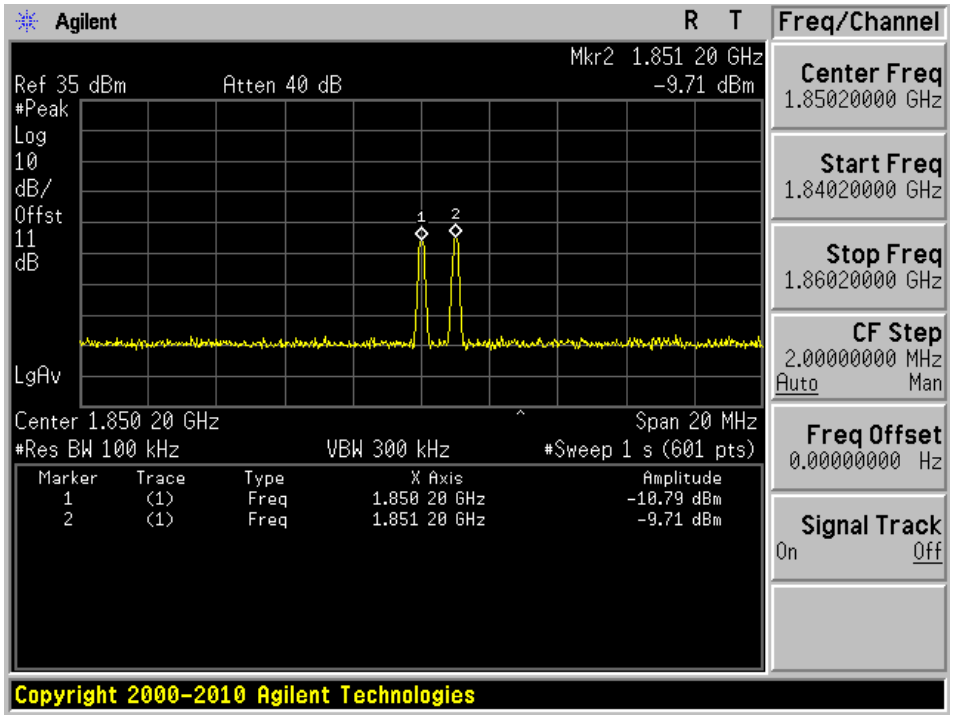
Cellular Band Downlink High Channel, Input



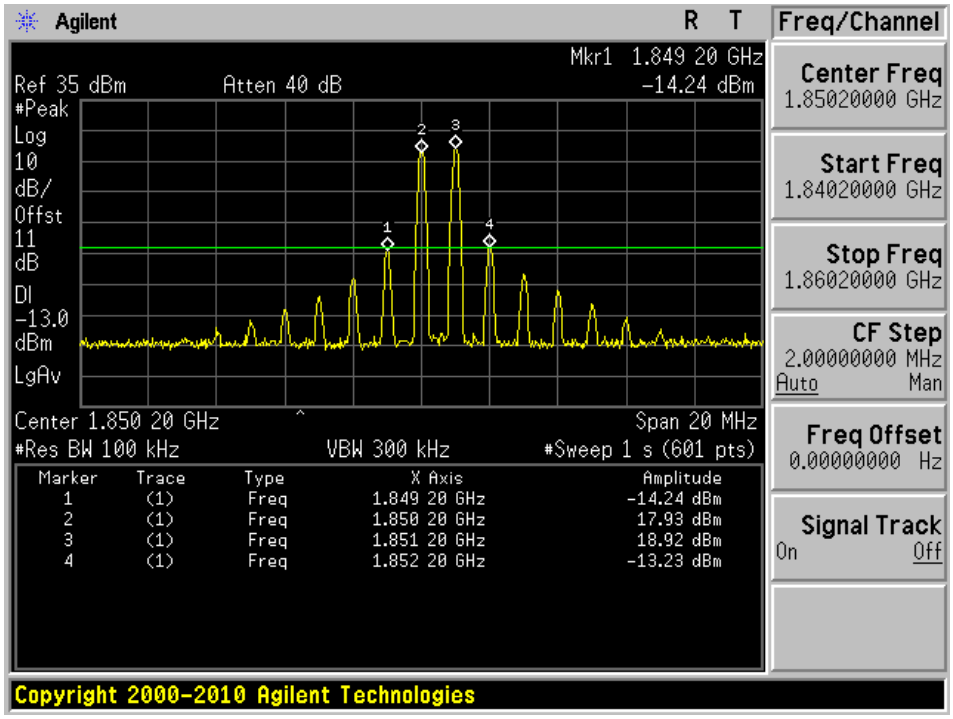
Cellular Band Downlink High Channel, Output



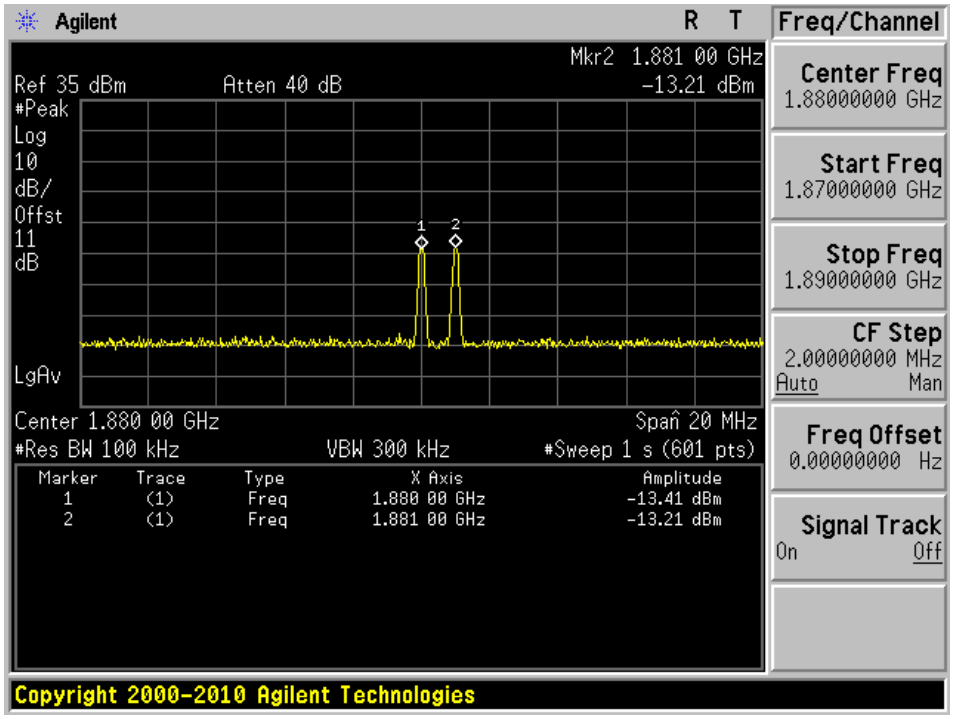
PCS Band Uplink Low Channel, Input



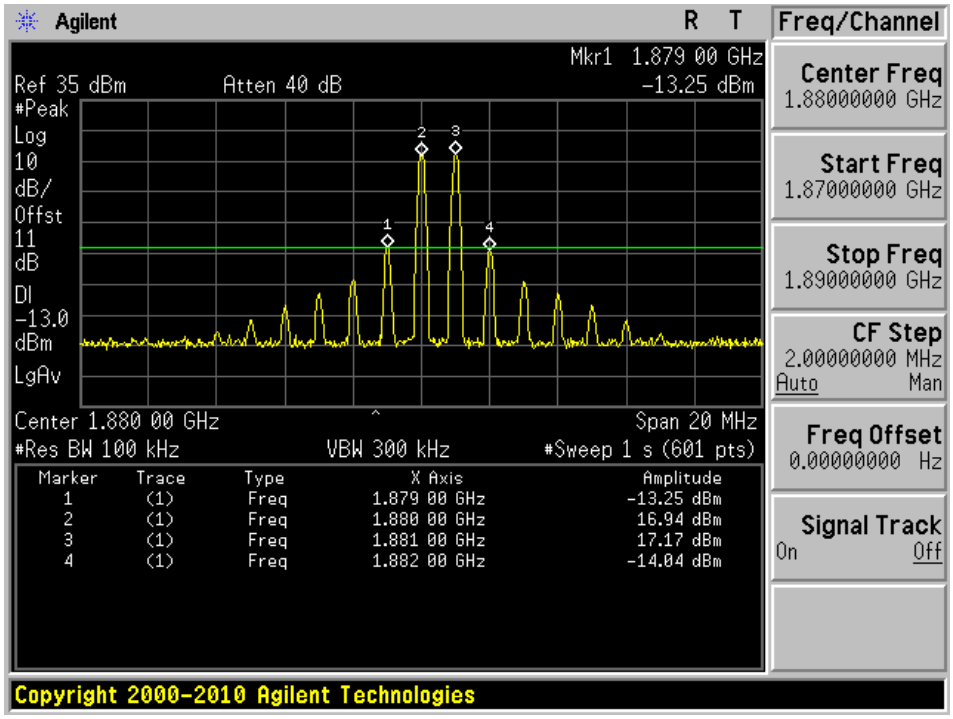
PCS Band Uplink Low Channel, Output



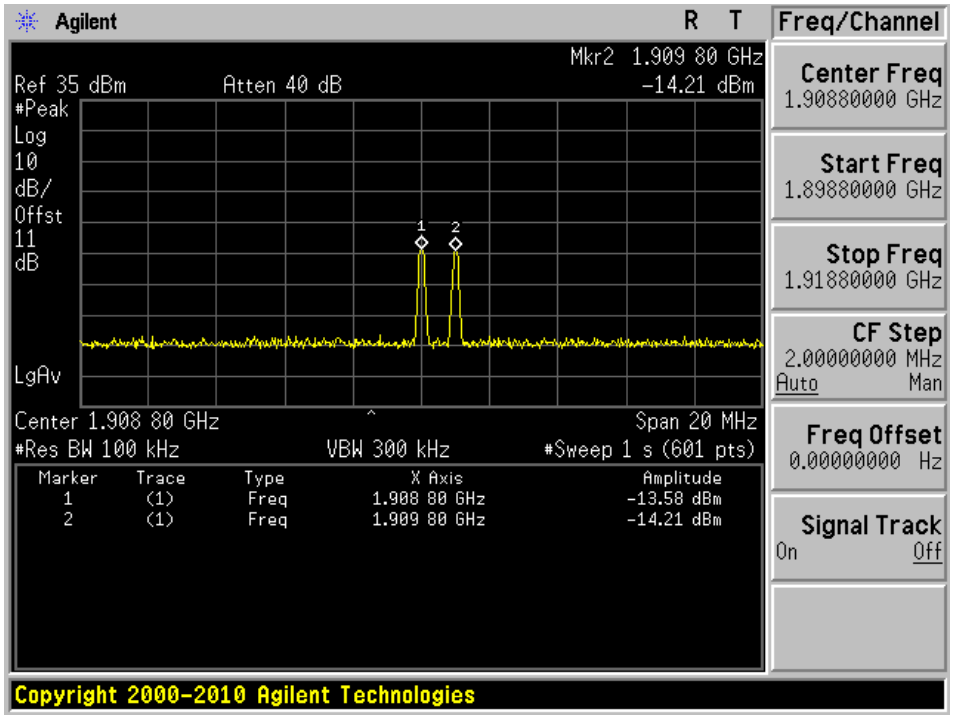
PCS Band Uplink Middle Channel, Input



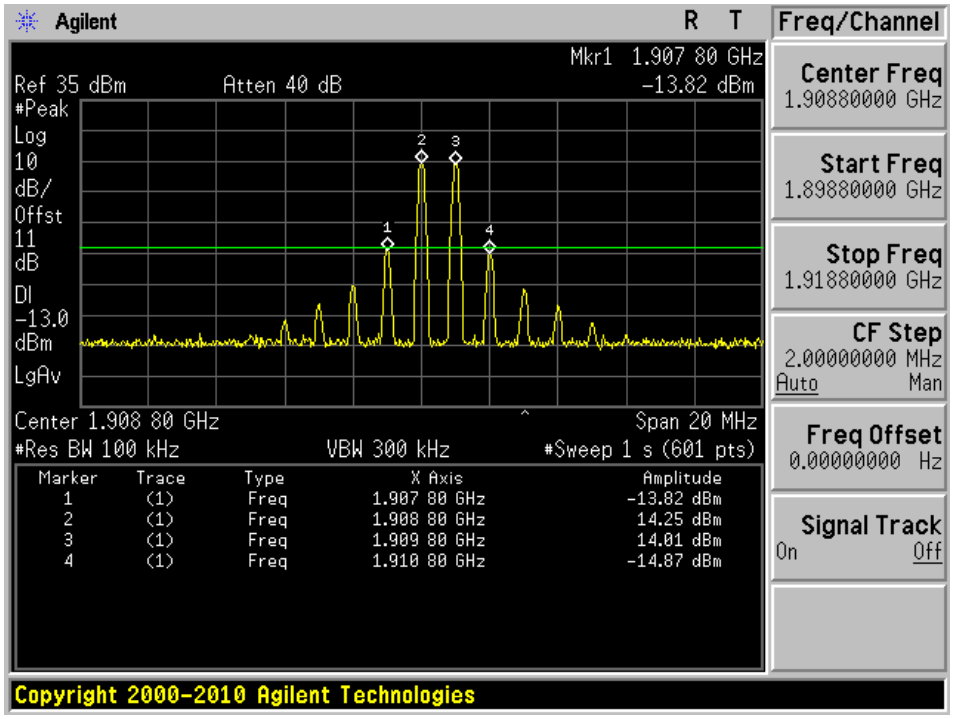
PCS Band Uplink Middle Channel, Output



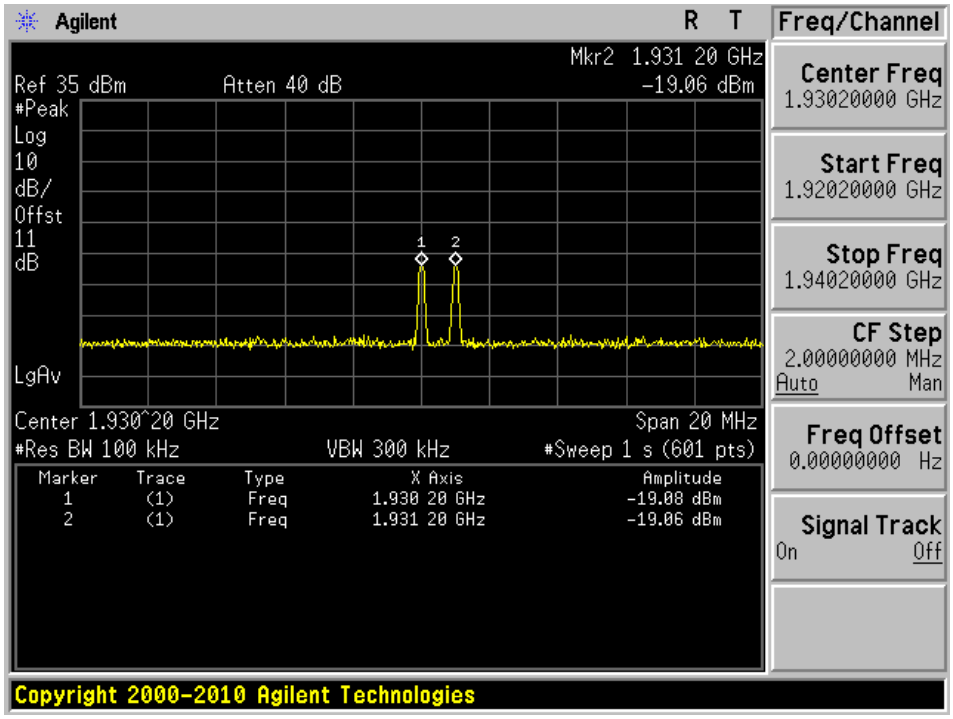
PCS Band Uplink High Channel, Input



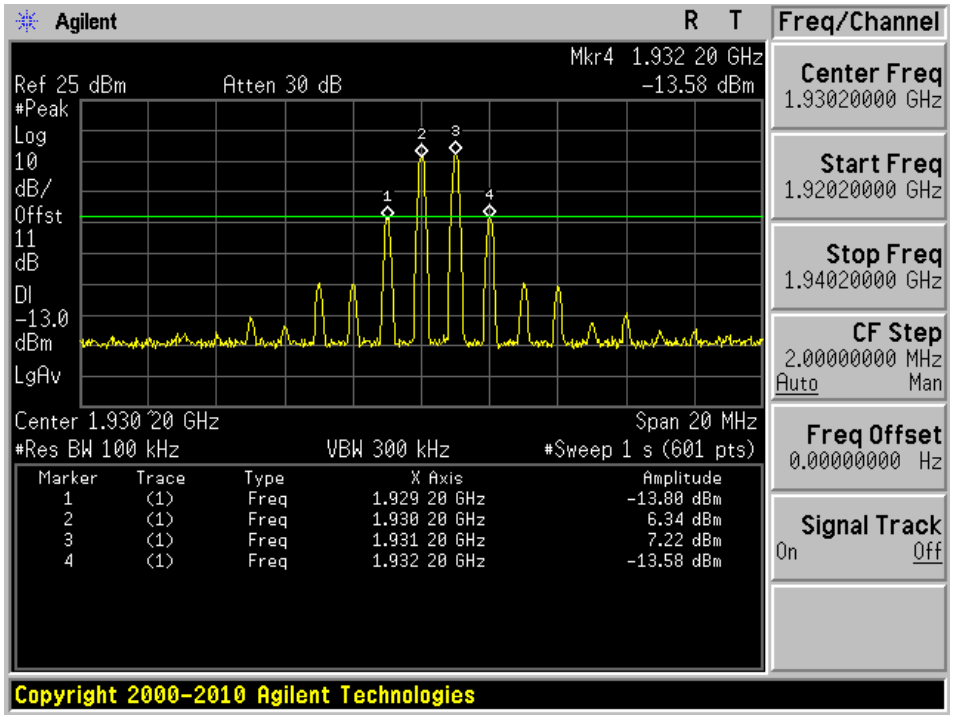
PCS Band Uplink High Channel, Output



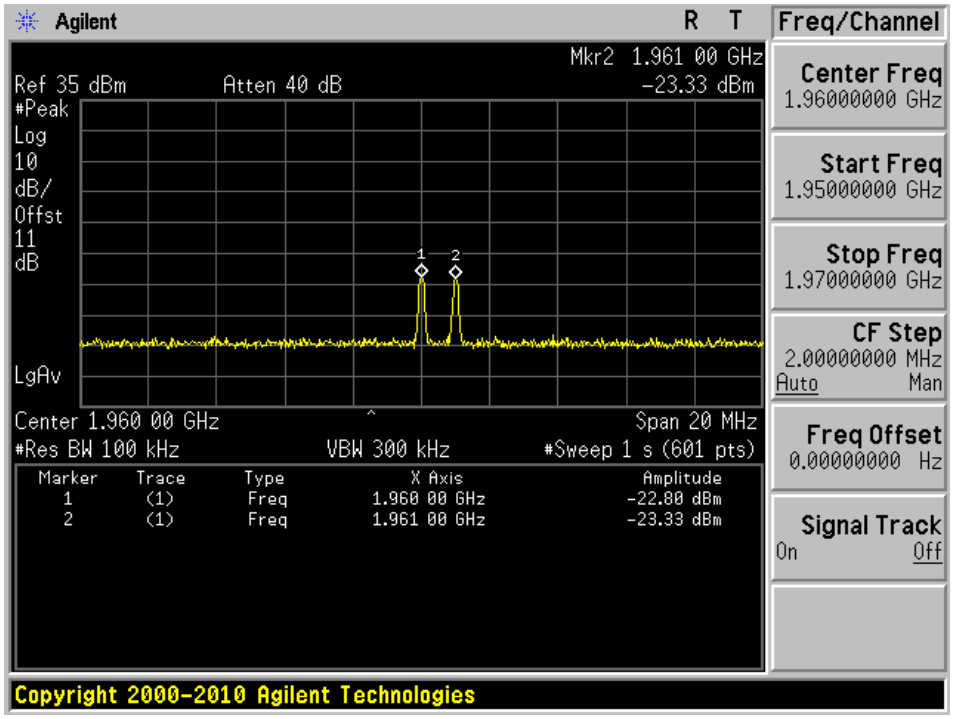
PCS Band Downlink Low Channel, Input



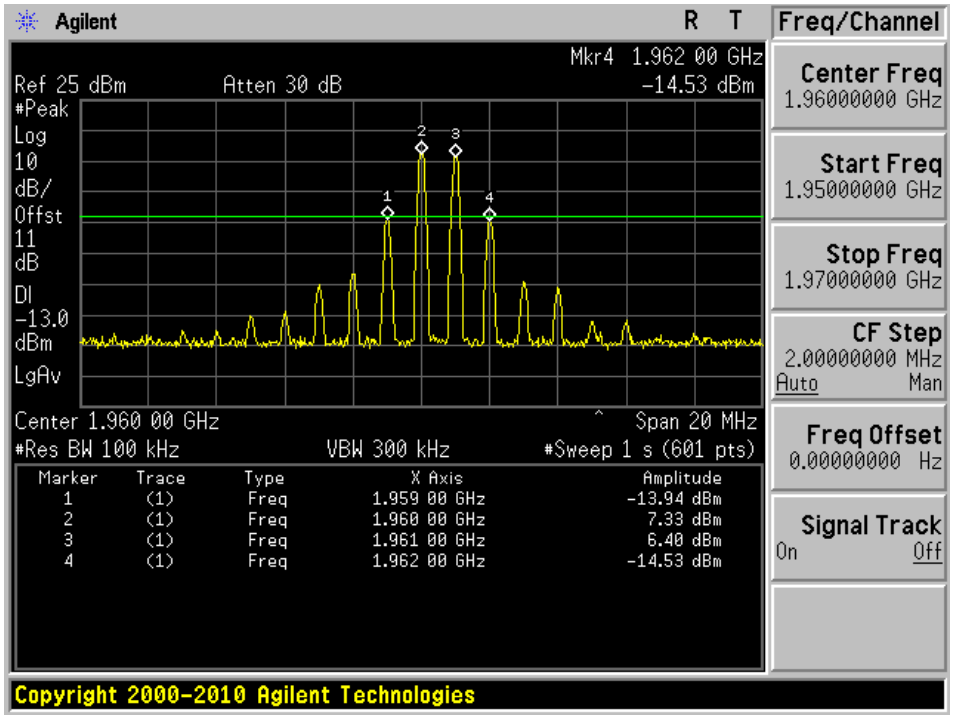
PCS Band Downlink Low Channel, Output



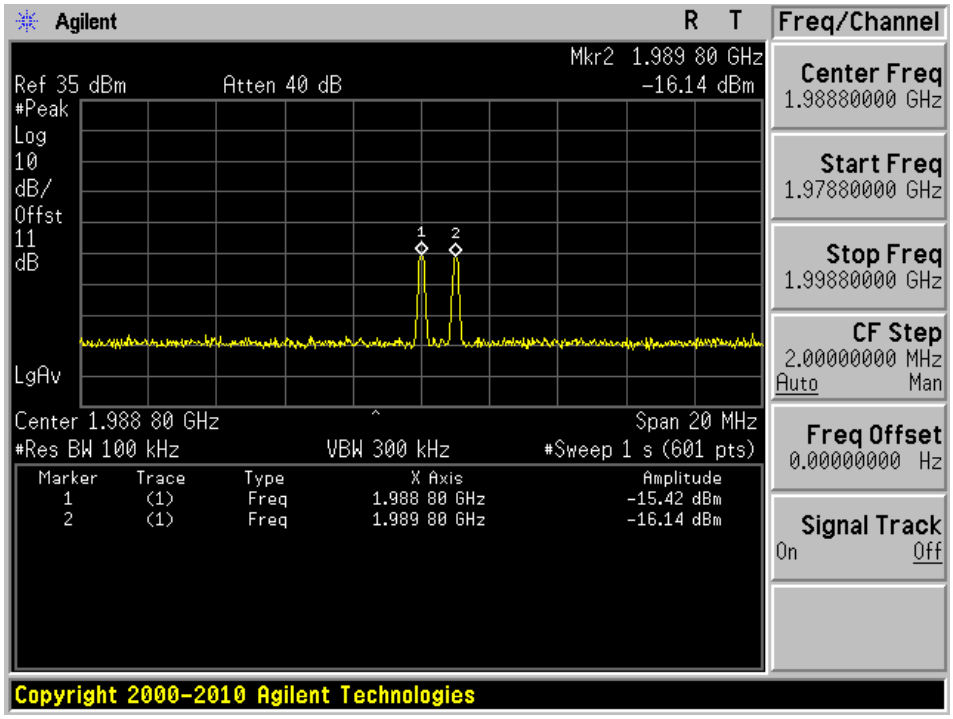
PCS Band Downlink Middle Channel, Input



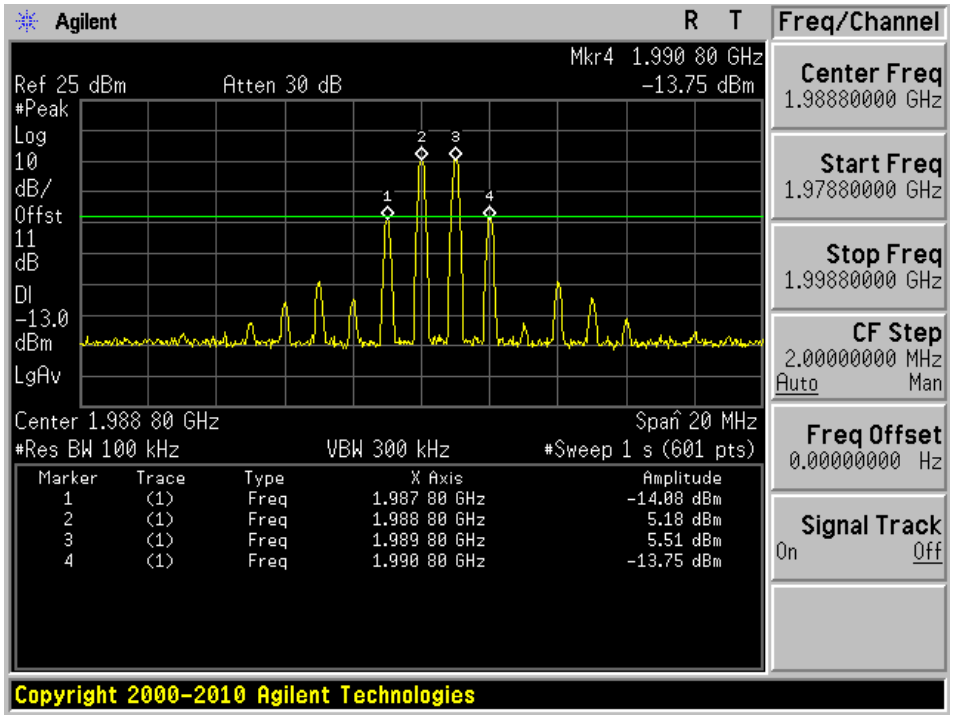
PCS Band Downlink Middle Channel, Output



PCS Band Downlink High Channel, Input



PCS Band Downlink High Channel, Output



9 FCC §22.917 & §24.238 – BAND EDGE

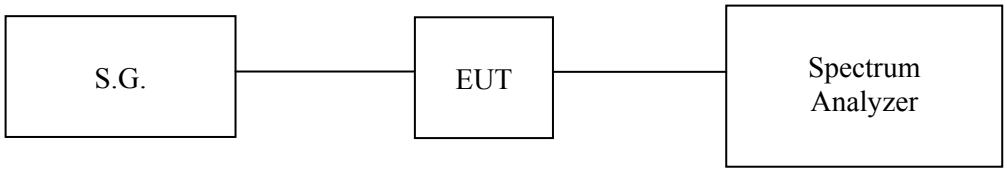
9.1 Applicable Standard

According to FCC §22.917 and §24.238, the power of any emissions 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.

9.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.



9.3 Test Environmental Conditions

Temperature:	21-22 °C
Relative Humidity:	45-55 %
ATM Pressure:	100-102kPa

The testing was performed by Lionel Lara from 2012-02-20 to 2012-02-26 in RF Site.

9.4 Test Equipment List and Details

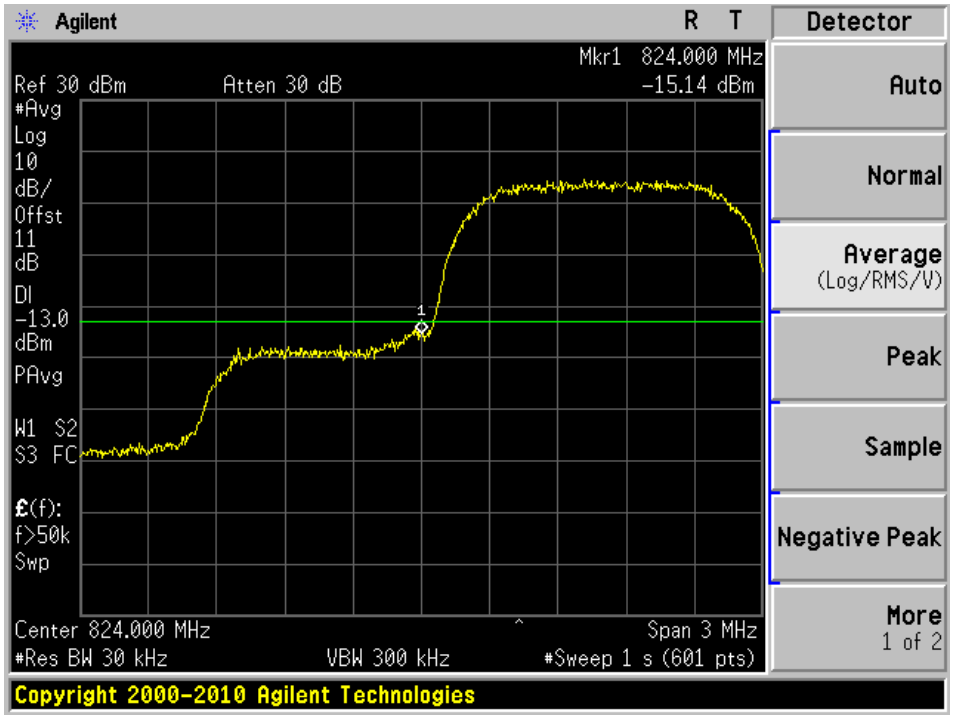
Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
HP	Signal Generator	8648C	3426A00417	2011-08-18
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

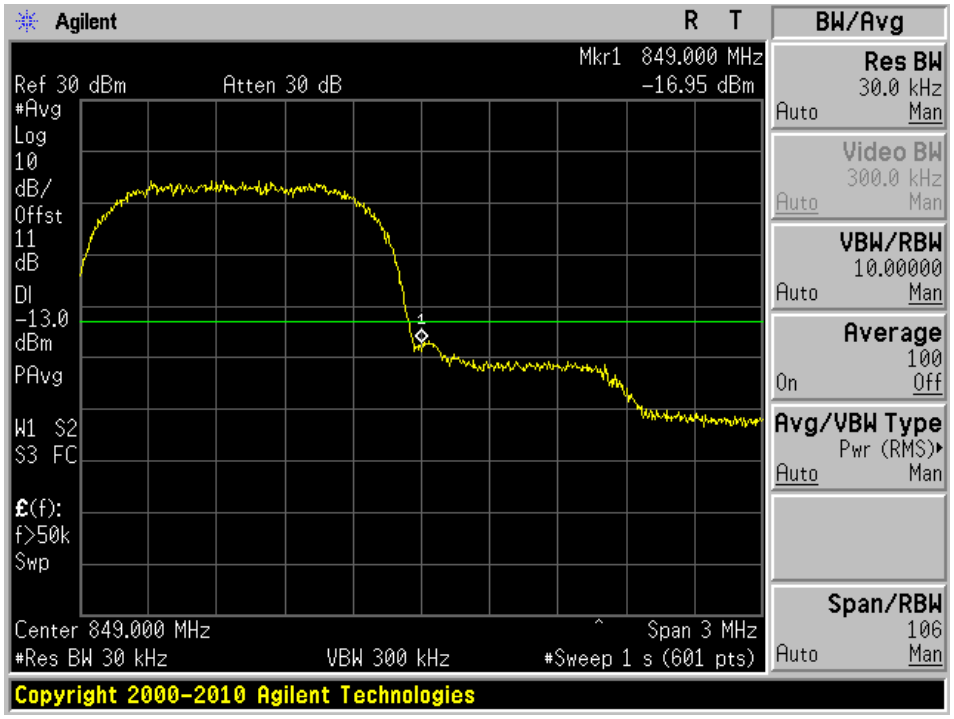
9.5 Test Results

Please refer to the following plots.

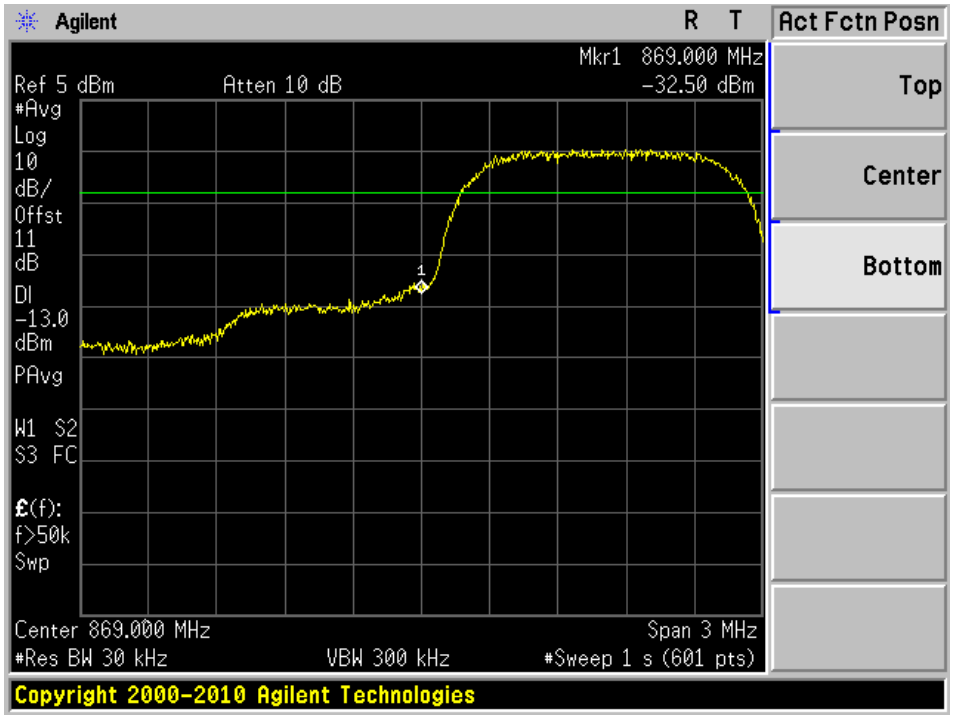
CDMA/EVDO Cellular Band Uplink: Lowest Channel



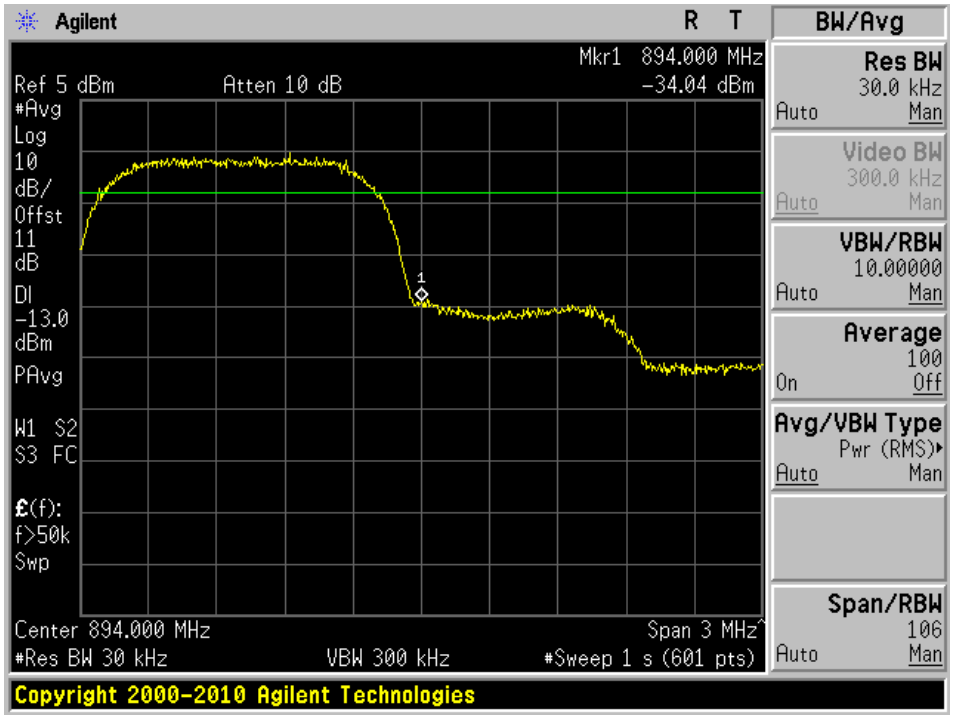
CDMA/EVDO Cellular Band Uplink: Highest Channel



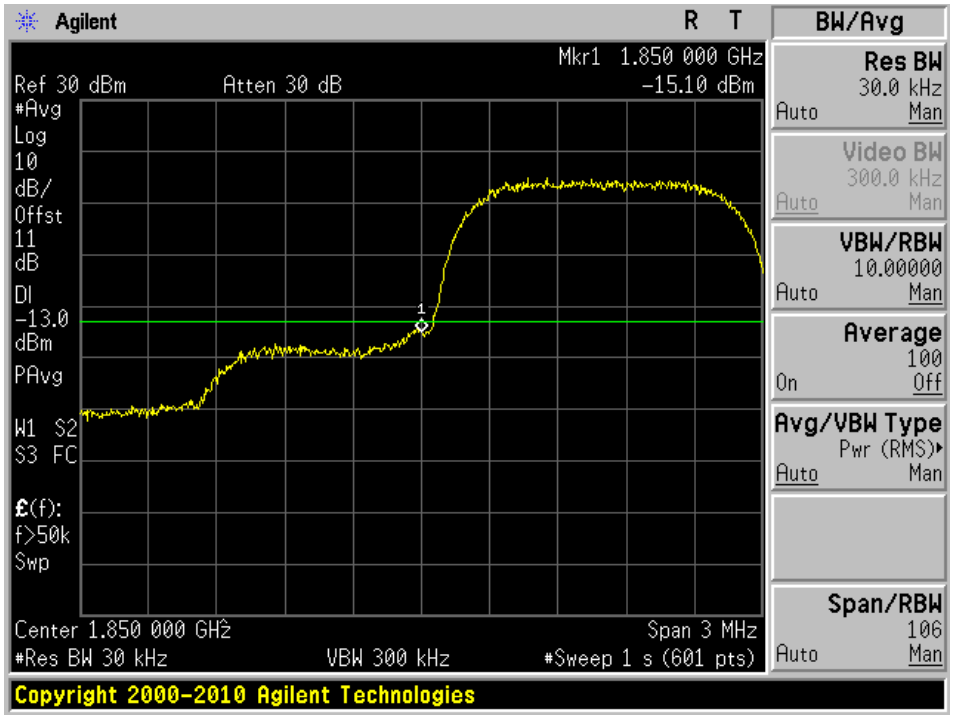
CDMA/EVDO Cellular Band Downlink: Lowest Channel



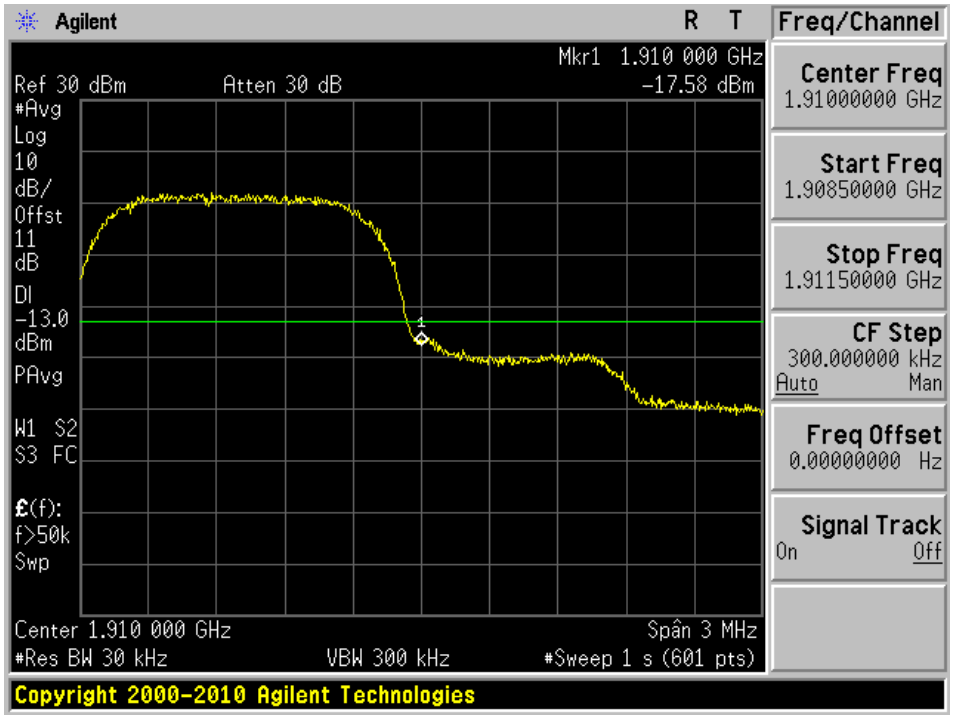
CDMA/EVDO Cellular Band Downlink: Highest Channel



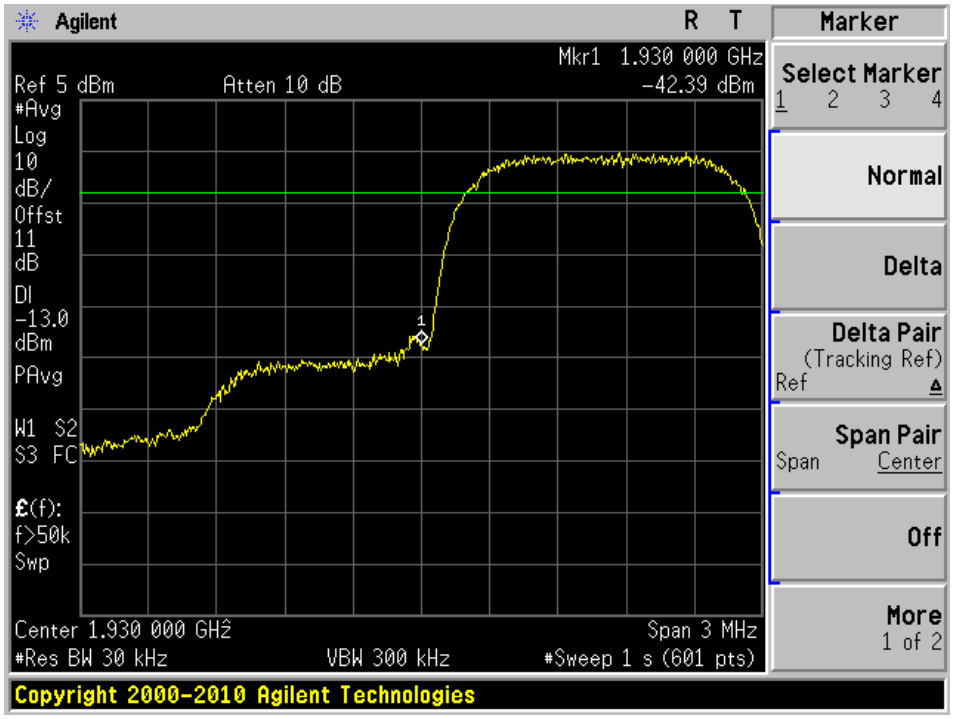
CDMA/EVDO PCS Band Uplink: Lowest Channel



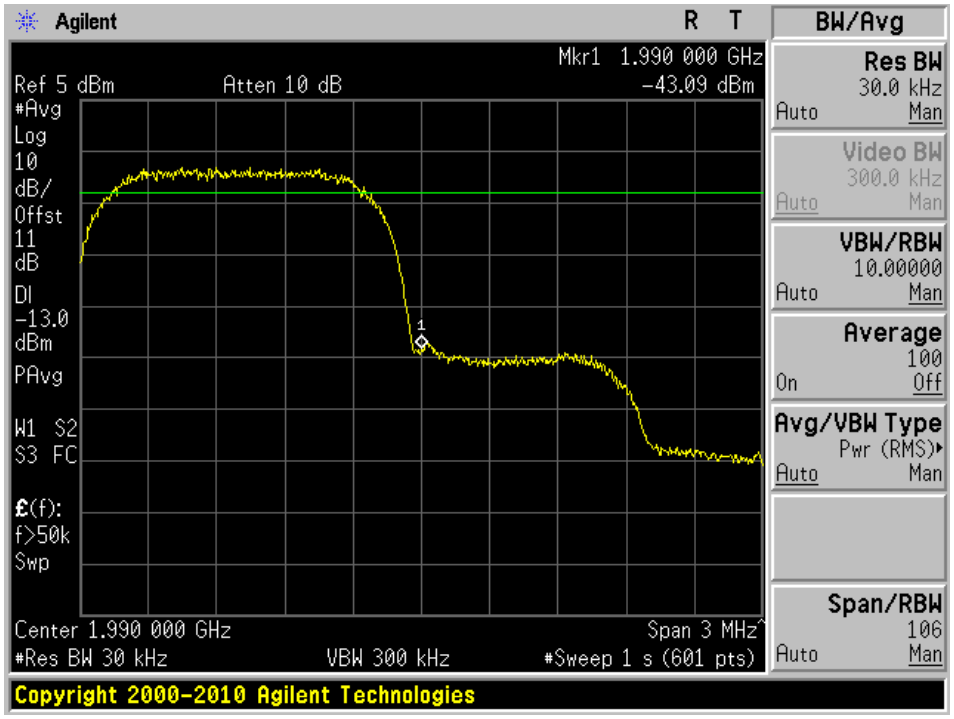
CDMA/EVDO PCS Band Uplink: Highest Channel



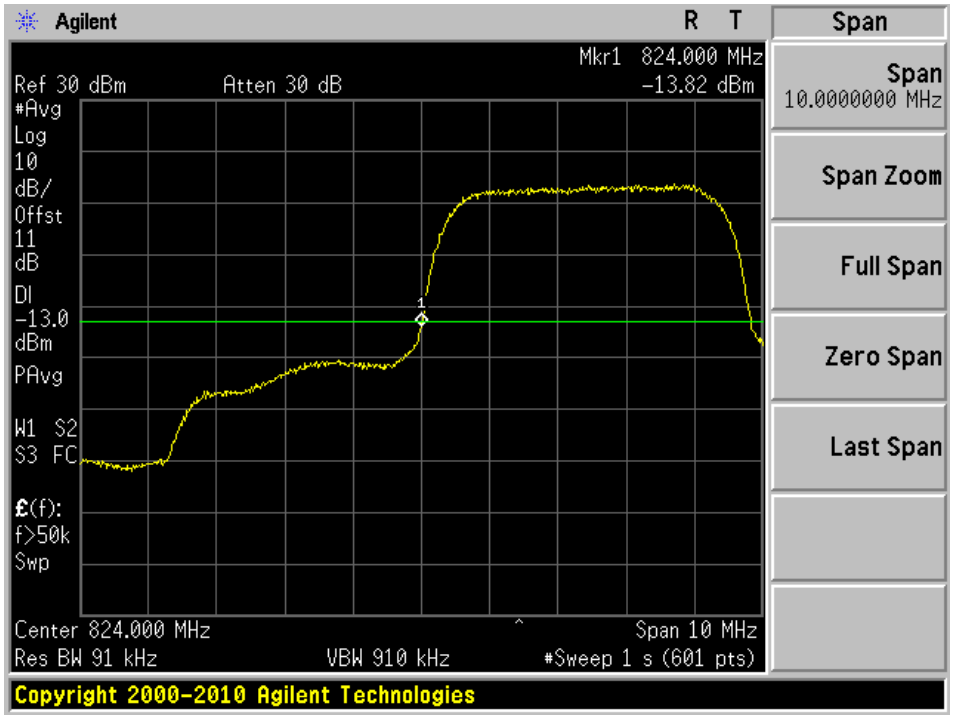
CDMA/EVDO PCS Band Downlink: Lowest Channel



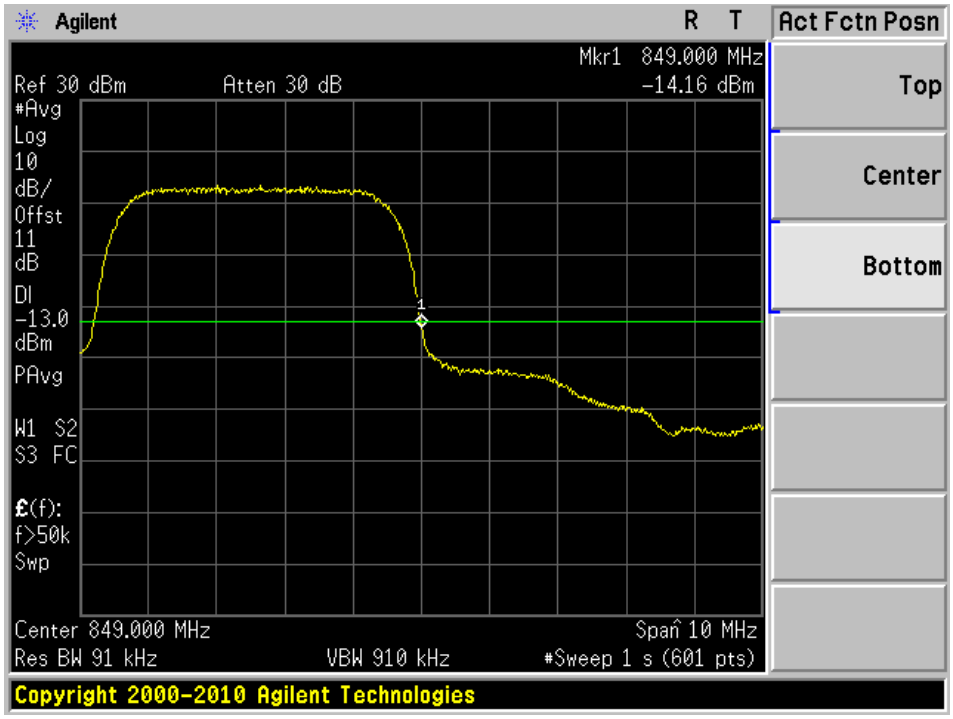
CDMA/EVDO PCS Band Downlink: Highest Channel



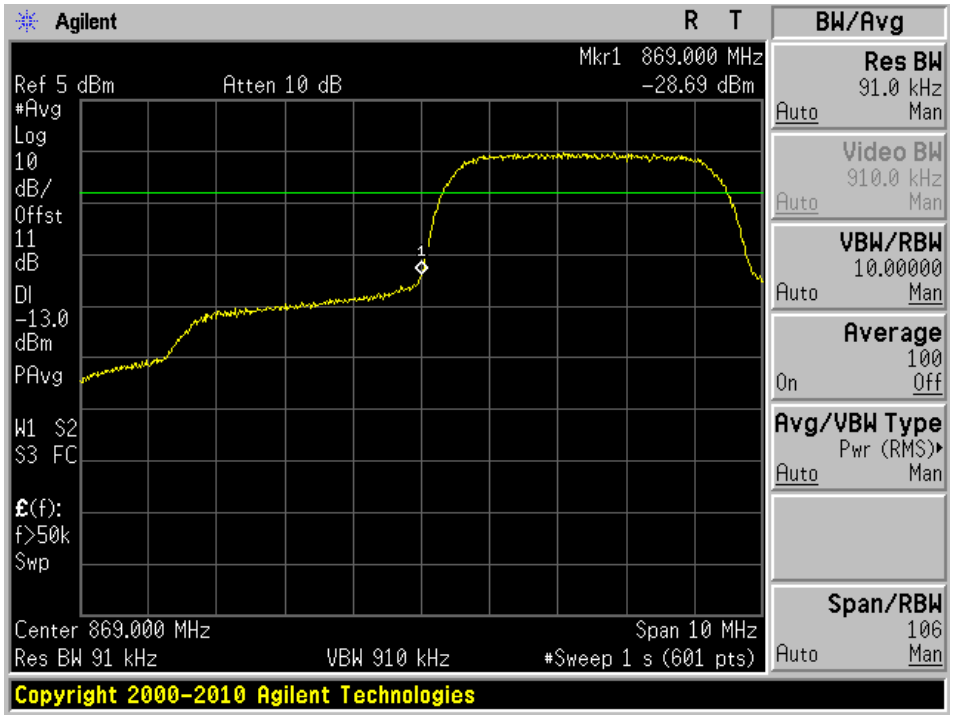
WCDMA/HSPA Cellular Band Uplink: Lowest Channel



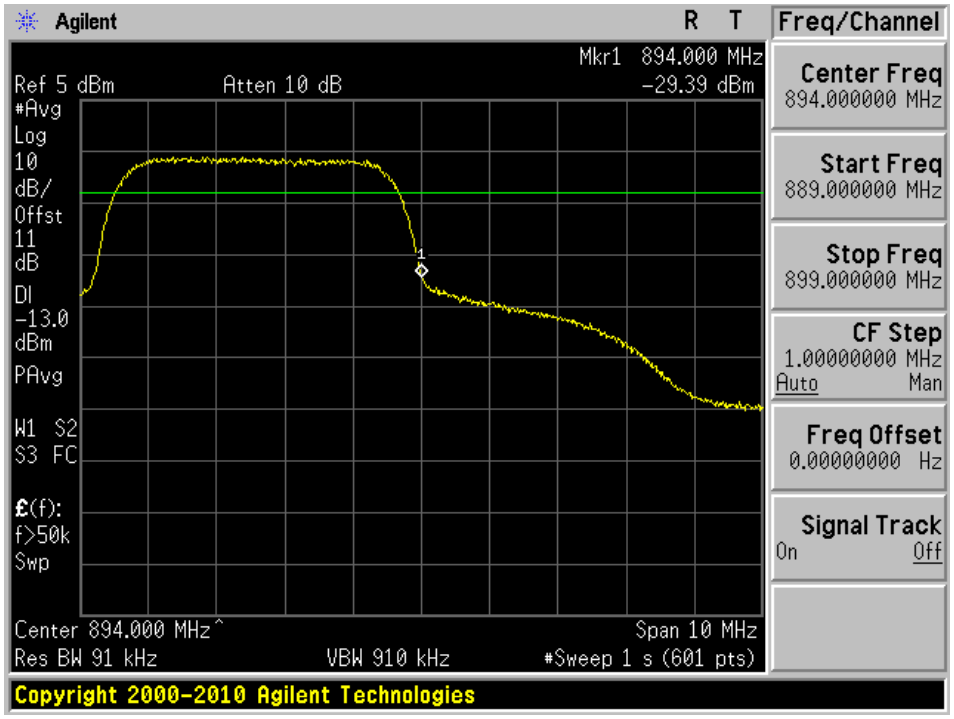
WCDMA/HSPA Cellular Band Uplink: Highest Channel



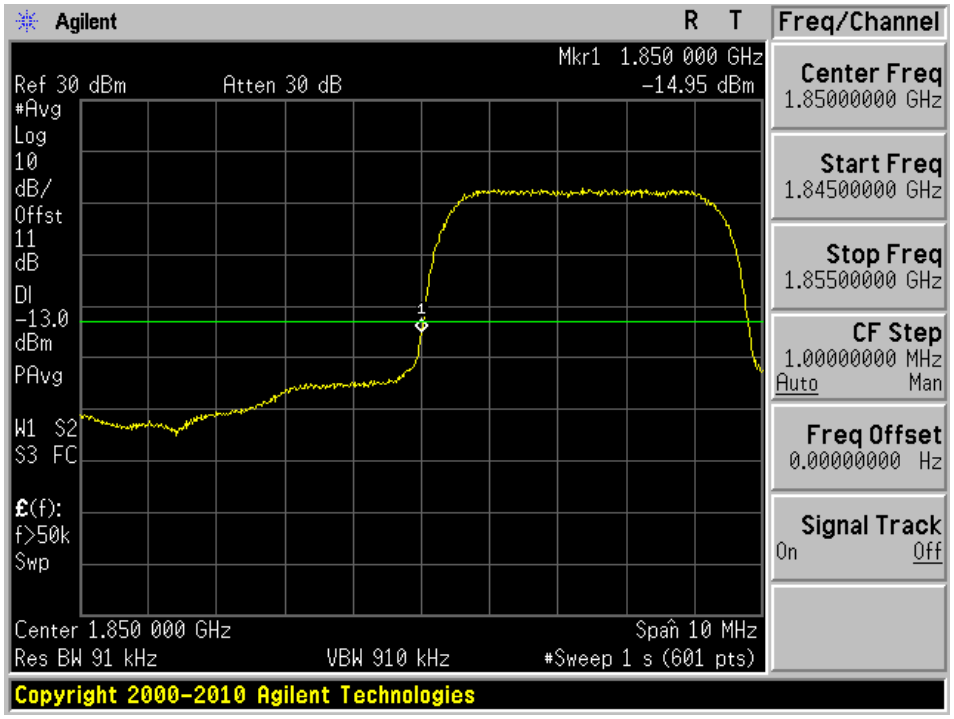
WCDMA/HSPA Cellular Band Downlink: Lowest Channel



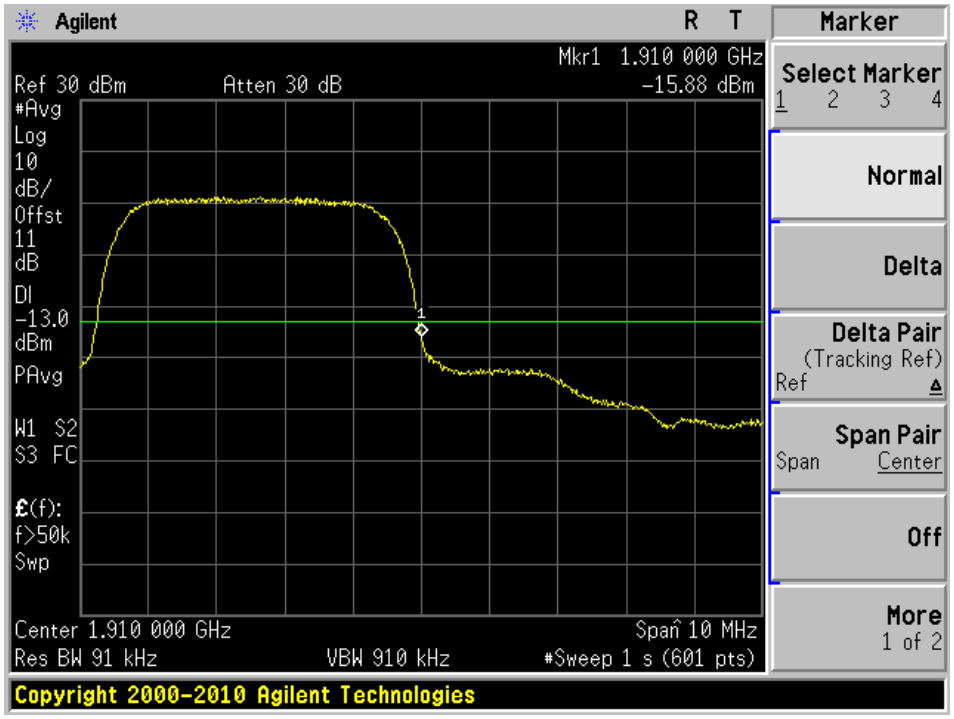
WCDMA/HSPA Cellular Band Downlink: Highest Channel



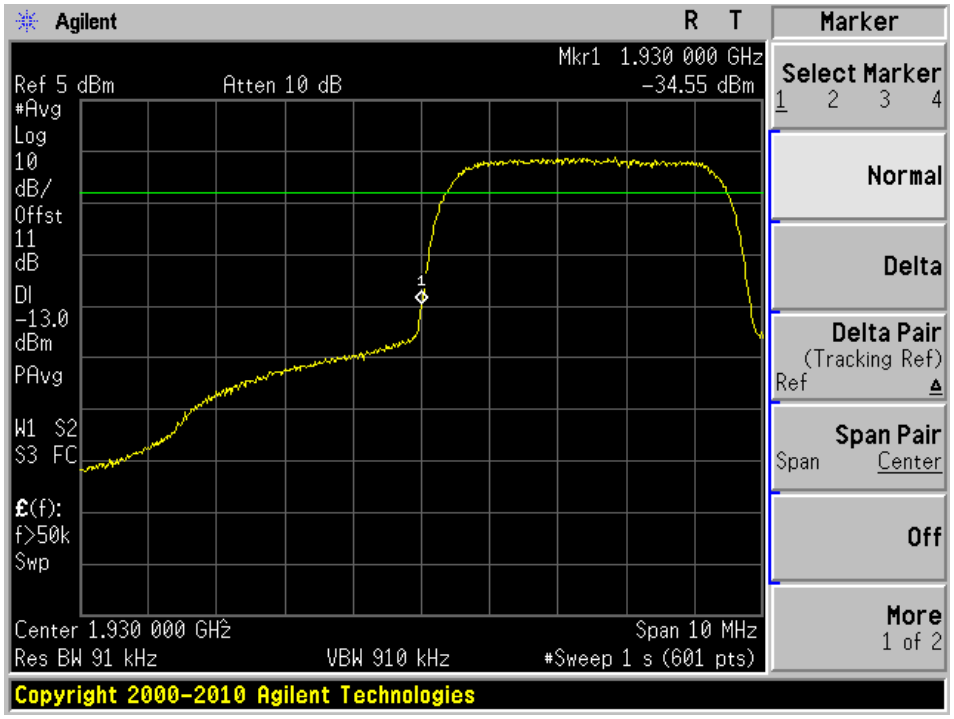
WCDMA/HSPA PCS Band Uplink: Lowest Channel



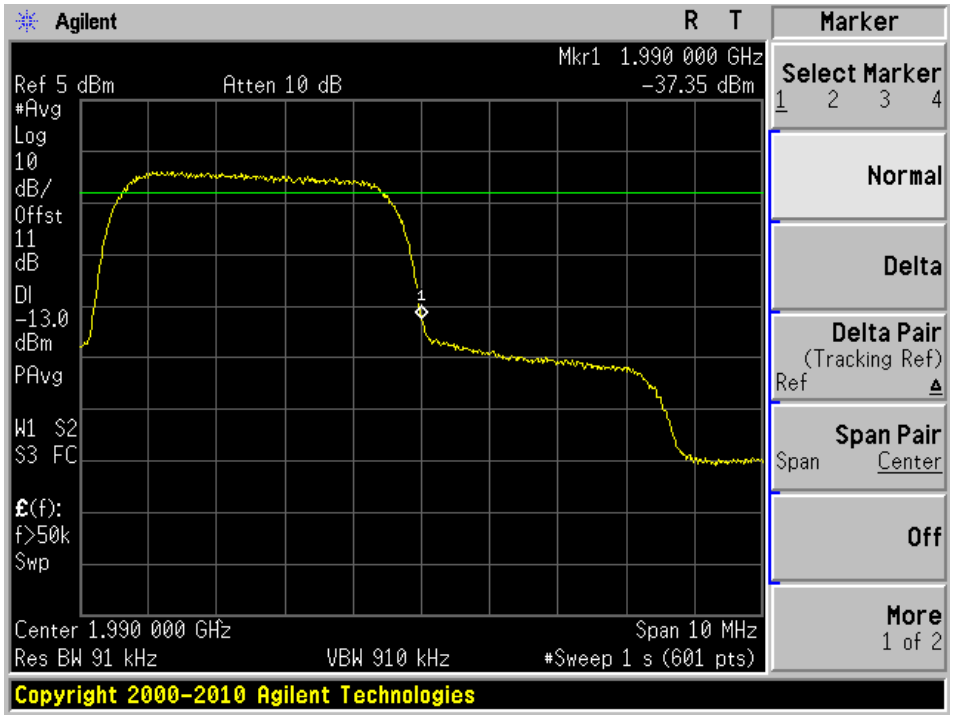
WCDMA/HSPA PCS Band Uplink: Highest Channel



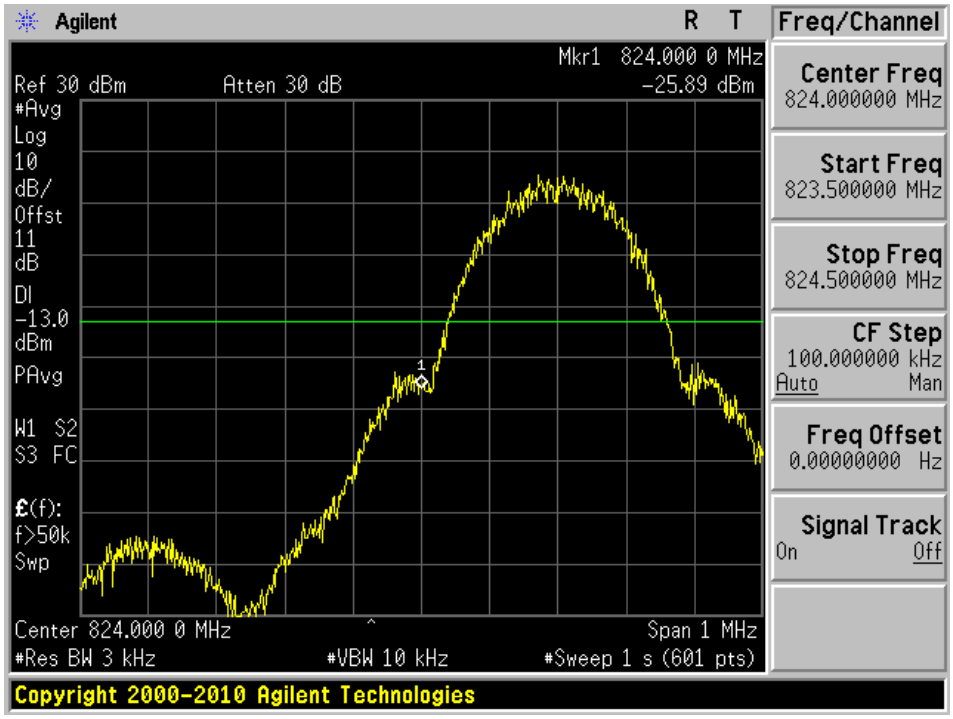
WCDMA/HSPA PCS Band Downlink: Lowest Channel



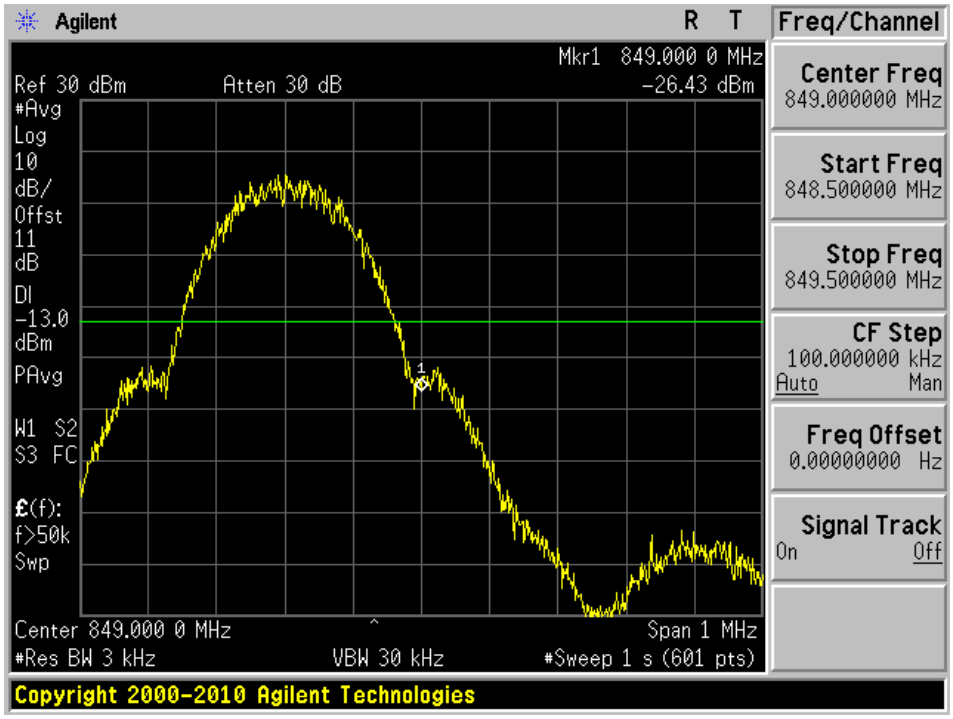
WCDMA/HSPA PCS Band Downlink: Highest Channel



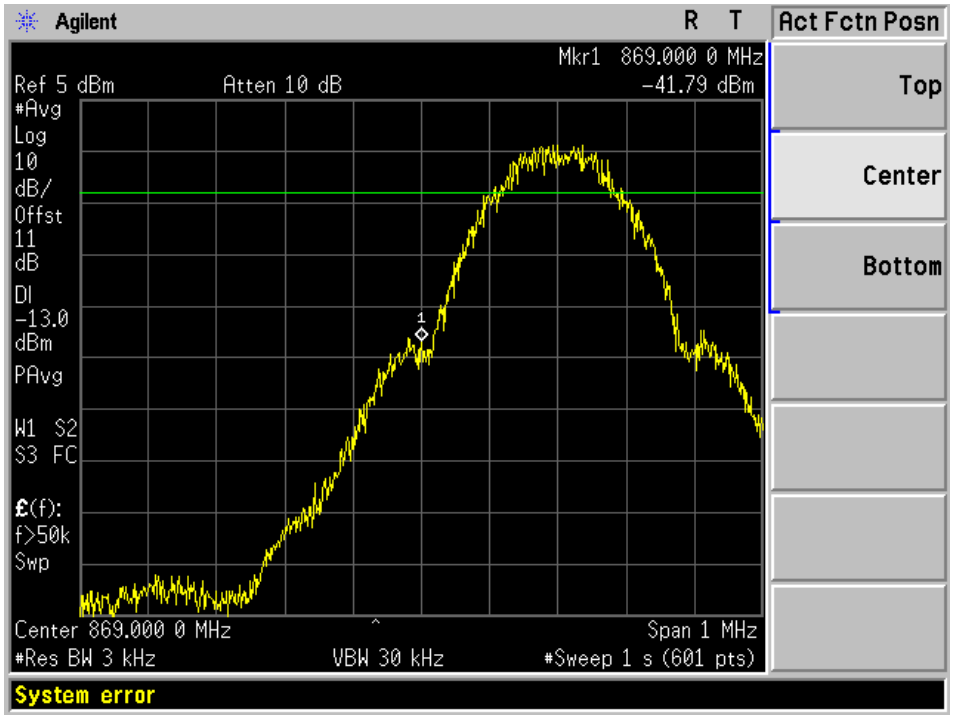
GSM Cellular Band Uplink: Lowest Channel



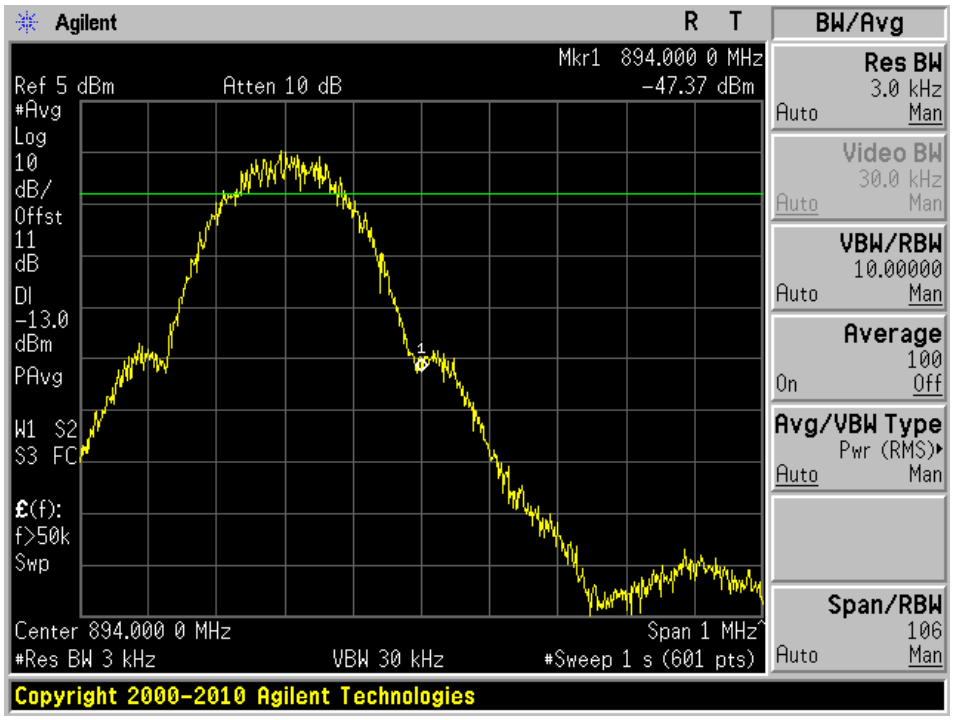
GSM Cellular Band Uplink: Highest Channel



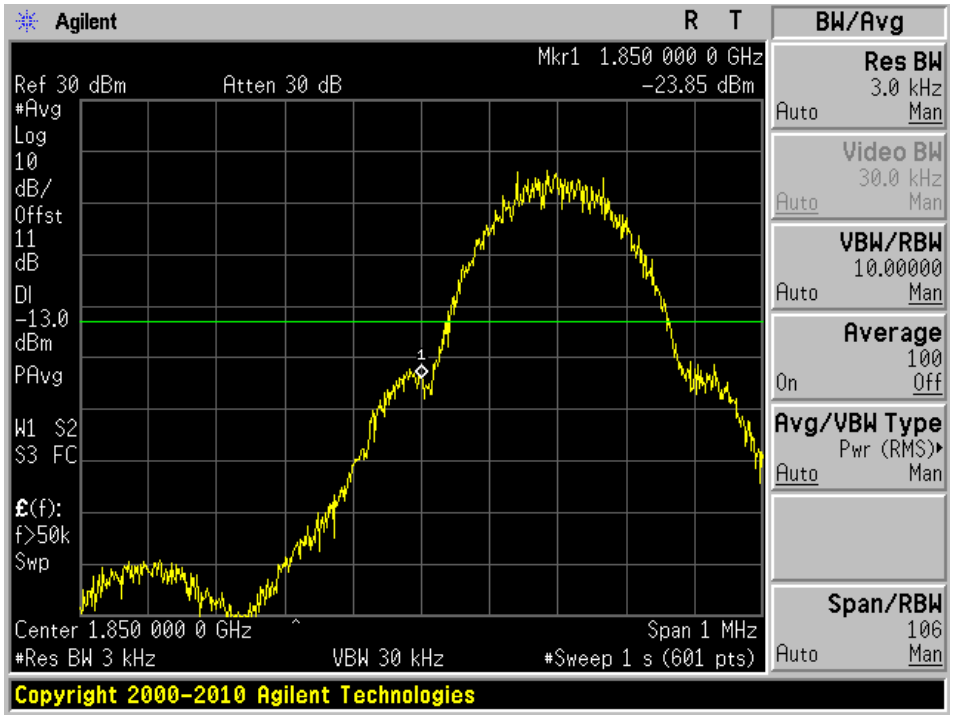
GSM Cellular Band Downlink: Lowest Channel



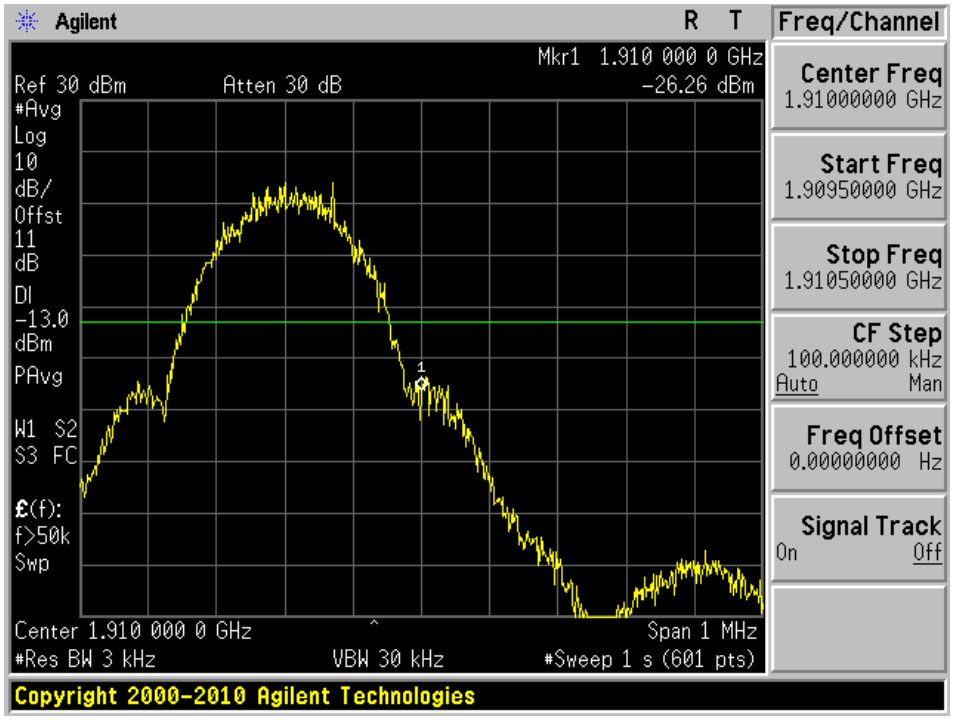
GSM Cellular Band Downlink: Highest Channel



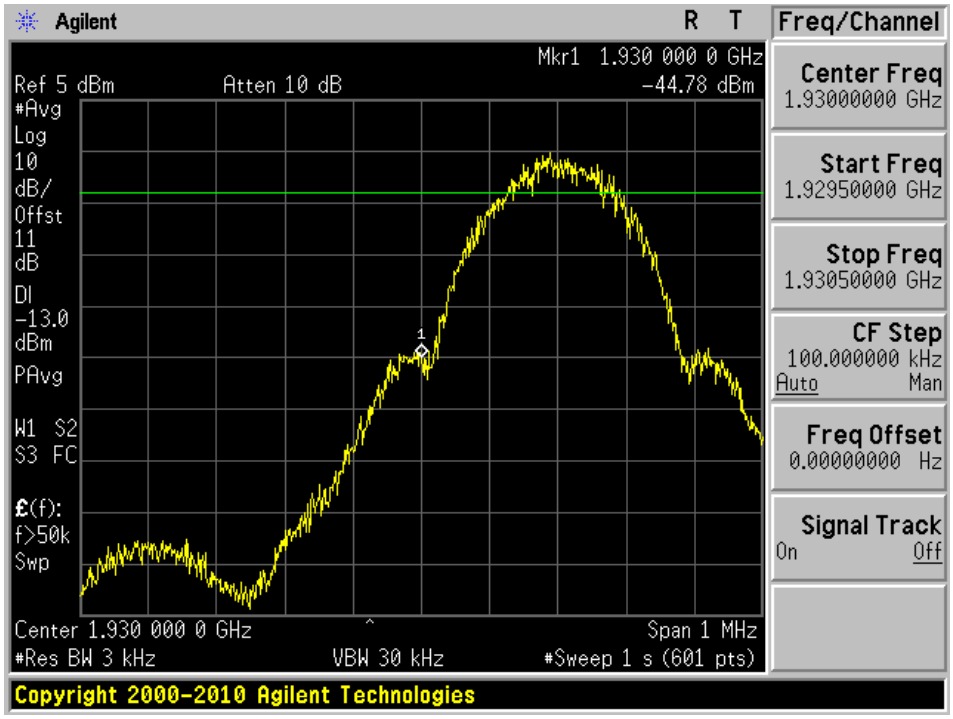
GSM PCS Band Uplink: Lowest Channel



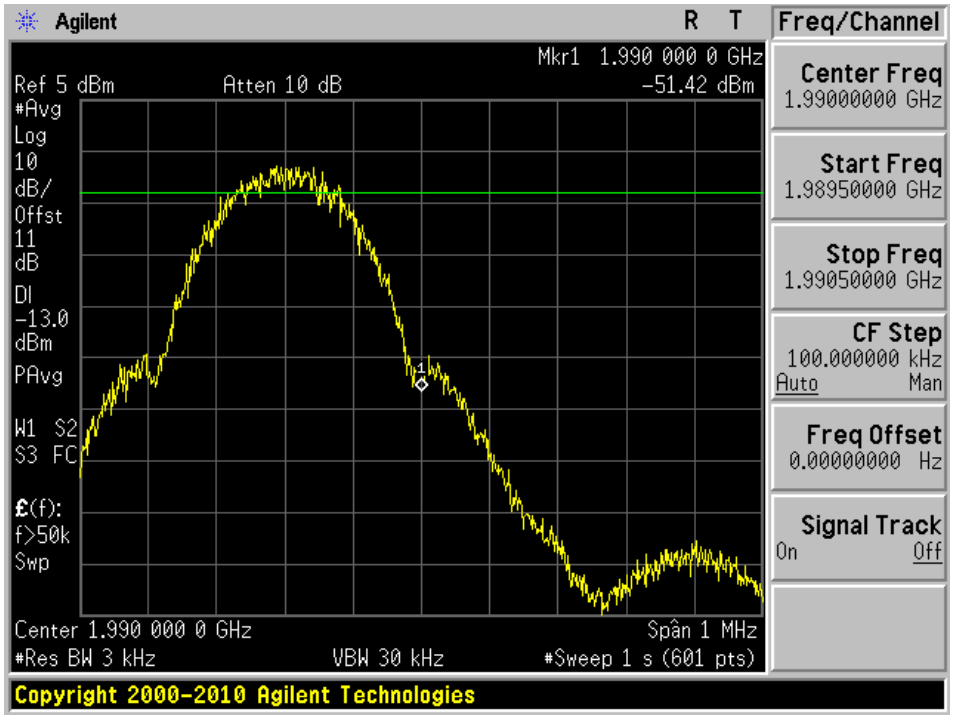
GSM PCS Band Uplink: Highest Channel



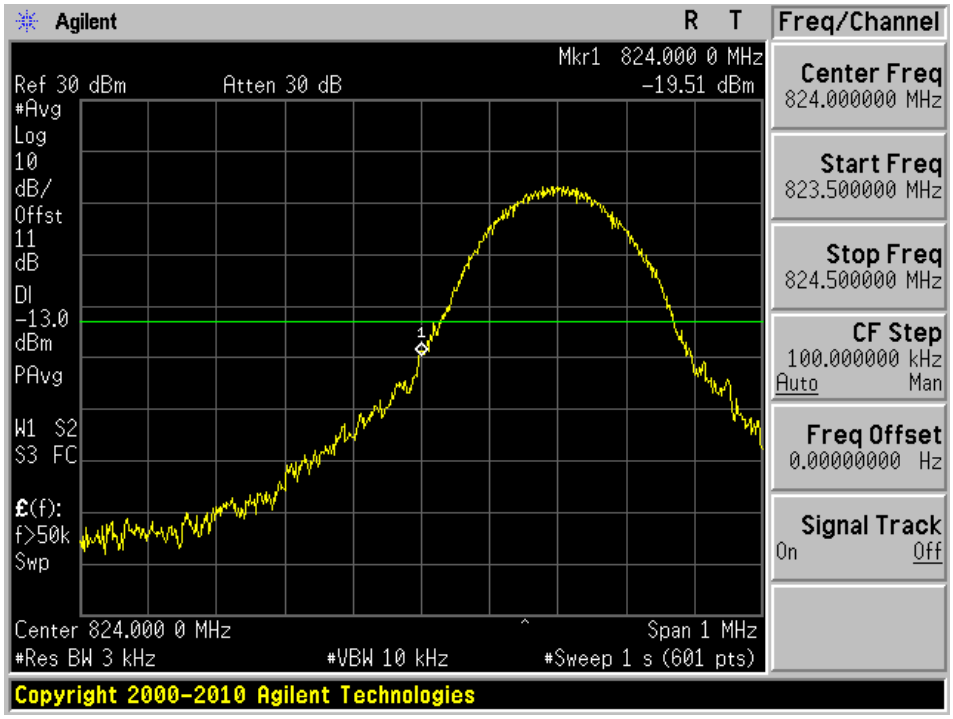
GSM PCS Band Downlink: Lowest Channel



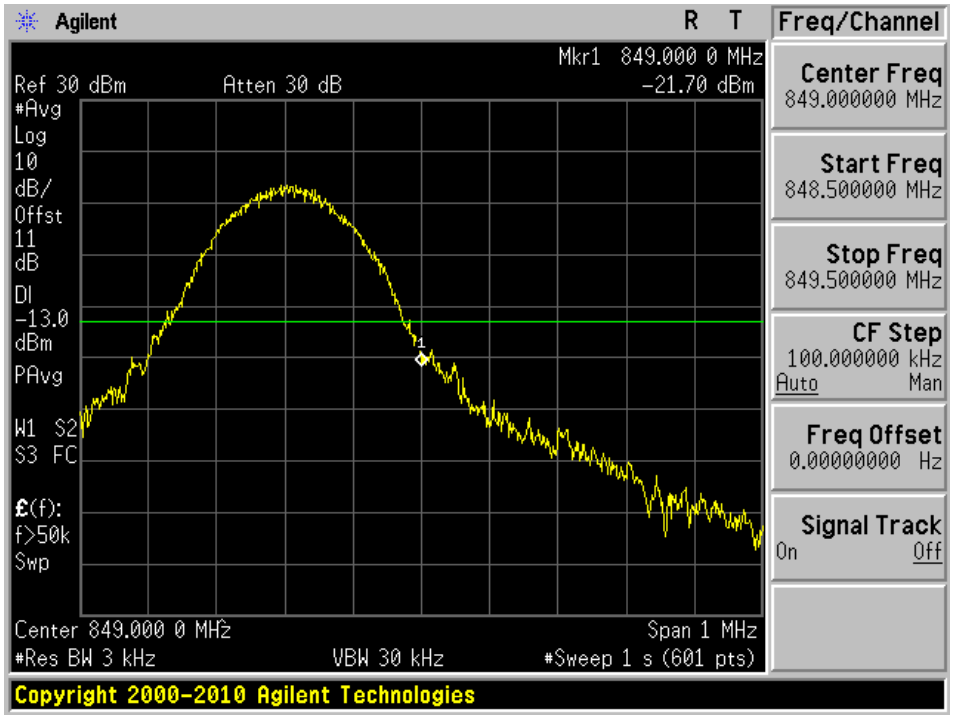
GSM PCS Band Downlink: Highest Channel



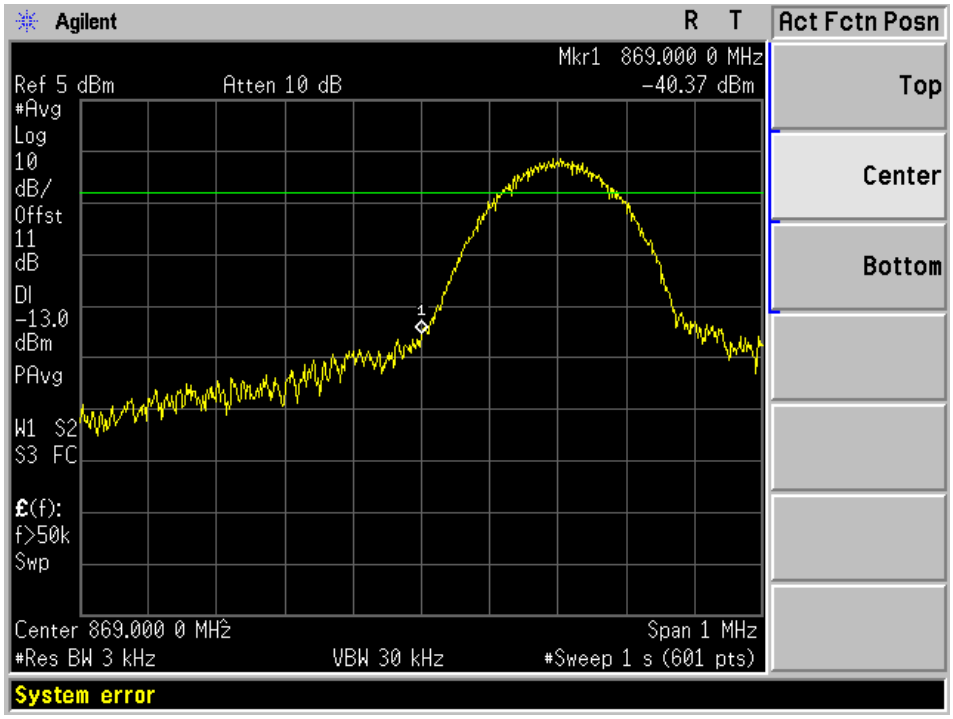
EDGE Cellular Band Uplink: Lowest Channel



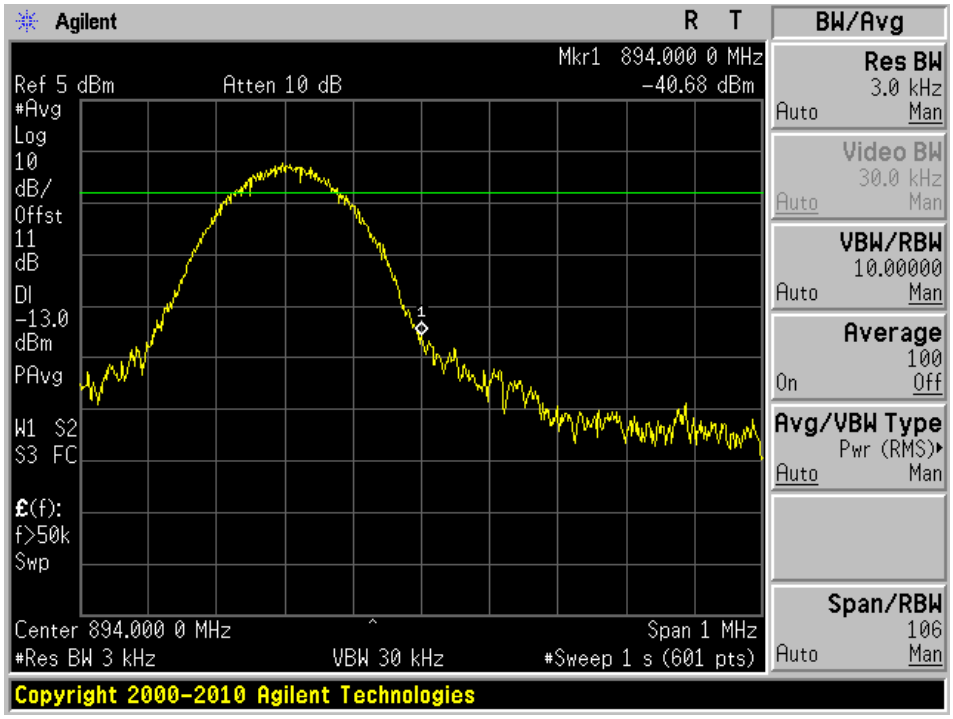
EDGE Cellular Band Uplink: Highest Channel



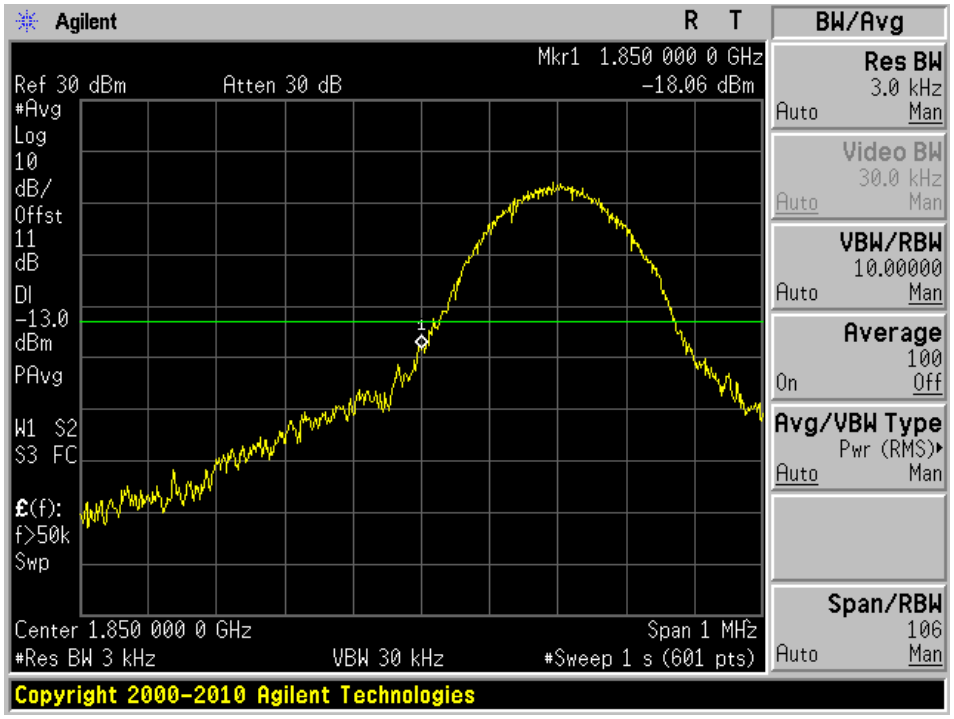
EDGE Cellular Band Downlink: Lowest Channel



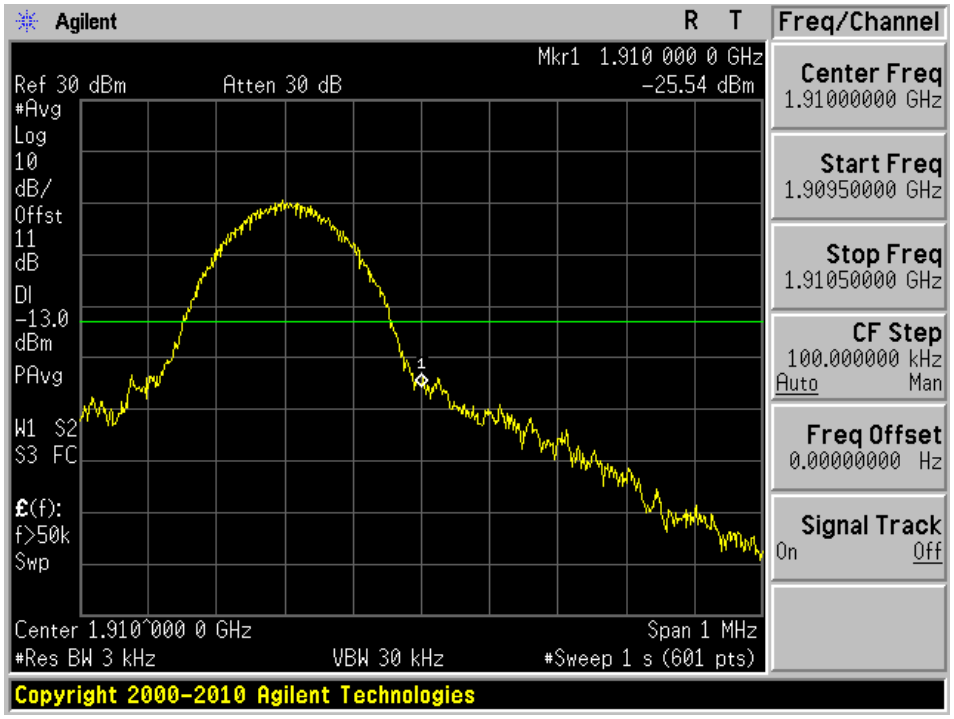
EDGE Cellular Band Downlink: Highest Channel



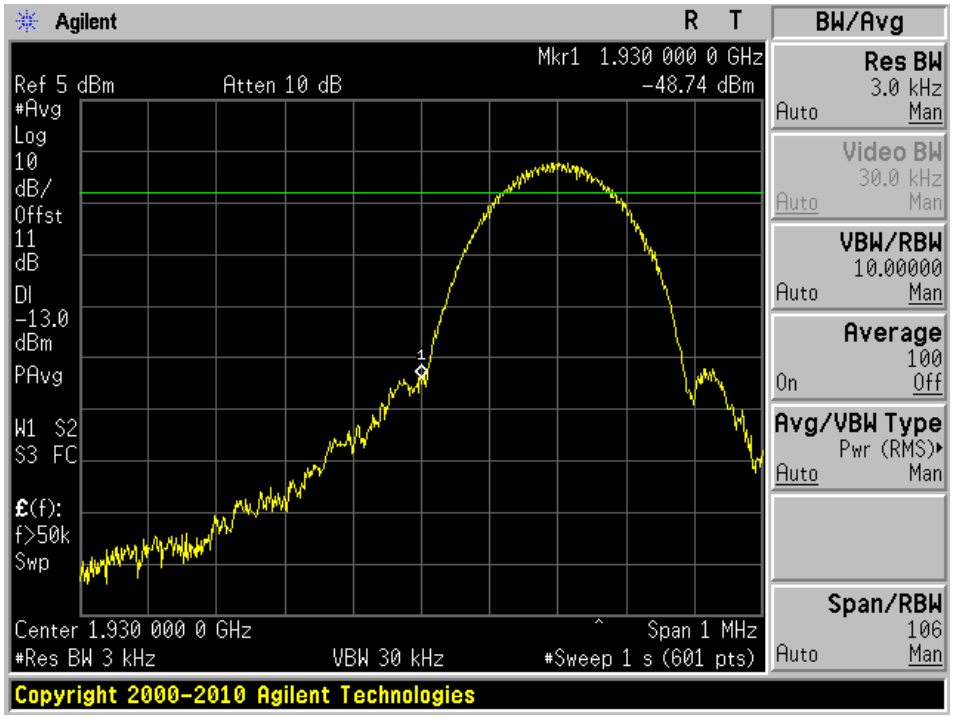
EDGE PCS Band Uplink: Lowest Channel



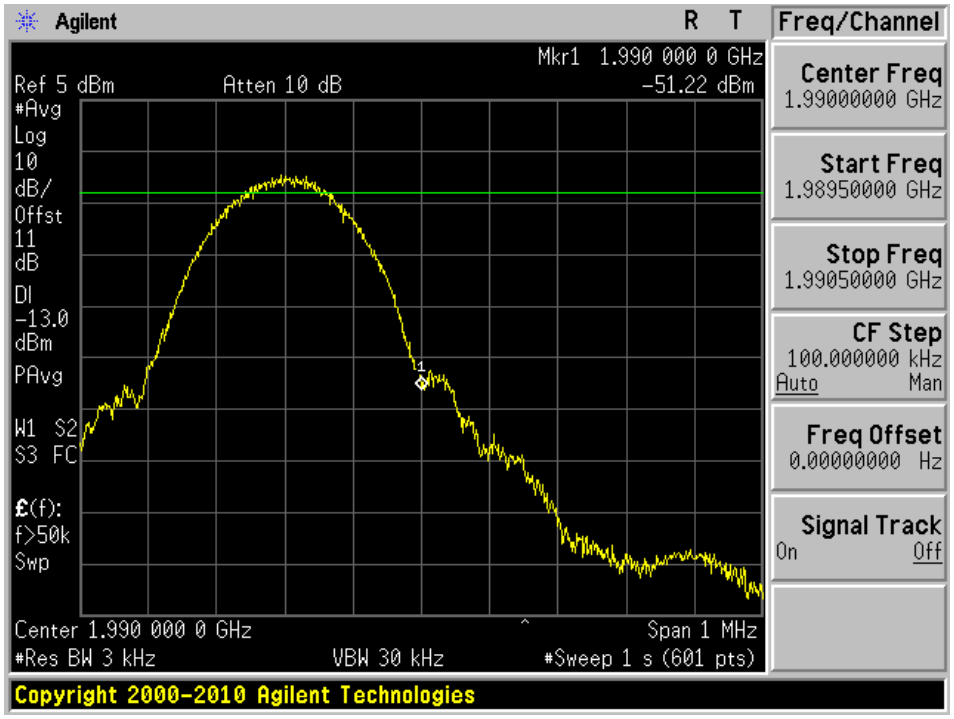
EDGE PCS Band Uplink: Highest Channel



EDGE PCS Band Downlink: Lowest Channel



EDGE PCS Band Downlink: Highest Channel



10 FCC §2.1055 – FREQUENCY STABILITY

This EUT is an amplifier, not a transmitter. There is no oscillator circuit in the EUT, therefore there is no frequency stability measurement required.

10.1 Test Result

N/A

11 FCC §1.1307(b)(1) & §2.1091 - RF EXPOSURE

11.1 Applicable Standard

According to §1.1310 and §2.1091 (Mobile Devices) RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note: f = frequency in MHz
* = Plane-wave equivalent power density

11.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

11.3 Test Result

Cellular Band UL:

Maximum peak output power at antenna input terminal (dBm):	30.56
Maximum peak output power at antenna input terminal (mW):	1137.63
Prediction distance (cm):	20.00
Prediction frequency (MHz):	824.20
Antenna Gain, typical (dBi):	5.00
Cable Loss (dB)	2.00
Maximum Antenna Gain+ Cable Loss (numeric):	2.00
Power density at predication frequency and distance (mW/cm^2):	0.4516
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5495

Cellular Band DL:

Maximum peak output power at antenna input terminal (dBm):	9.51
Maximum peak output power at antenna input terminal (mW):	8.93
Prediction distance (cm):	20.00
Prediction frequency (MHz):	869.20
Antenna Gain, typical (dBi):	5.00
Cable Loss (dB)	2.00
Maximum Antenna Gain+ Cable Loss (numeric):	2.00
Power density at predication frequency and distance (mW/cm^2):	0.0035
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5795

PCS Band UL:

Maximum peak output power at antenna input terminal (dBm):	29.96
Maximum peak output power at antenna input terminal (mW):	990.83
Prediction distance (cm):	20.00
Prediction frequency (MHz):	1850.20
Antenna Gain, typical (dBi):	5.00
Cable Loss (dB)	2.00
Maximum Antenna Gain+ Cable Loss (numeric):	2.00
Power density at predication frequency and distance (mW/cm^2):	0.3933
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

PCS Band DL:

Maximum peak output power at antenna input terminal (dBm):	11.34
Maximum peak output power at antenna input terminal (mW):	13.61
Prediction distance (cm):	20.00
Prediction frequency (MHz):	1930.20
Antenna Gain, typical (dBi):	5.00
Cable Loss (dB)	2.00
Maximum Antenna Gain+ Cable Loss (numeric):	2.00
Power density at predication frequency and distance (mW/cm^2):	0.0054
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

(Note: The MPE was calculated with the cable loss between EUT and the antenna was 2 dB.)