Lab Code: 200167-0

FCC PART 24

MEASUREMENT AND TEST REPORT

For

Cellphone-Mate, Inc.

2140 Peralta Blvd, Suite 213-A
Fremont, CA 94536, U.S.A.

FCC ID: RSNCM1900-5560-65

Product Type: ☒ Original Report		**Product Type:** Bidirectional Amplifier
Test Engineer:	Oscar Au	
Report Number:	R0708033-24	
Report Date:	2007-08-06	
Reviewed By:	James Ma, Test Engineer	
Prepared By: (00)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164	

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TABLE OF CONTENTS

1 GENERAL INFORMATION 4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
1.2 MECHANICAL DESCRIPTION 4
1.3 EUT PHOTO 4
1.4 OBJECTIVE 4
1.5 RELATED SUBMITTAL(S)/GRANT(S) 5
1.6 TEST METHODOLOGY 5
1.7 MEASUREMENT UNCERTAINTY 5
1.8 TEST FACILITY 5
SYSTEM TEST CONFIGURATION 6
1.9 JUSTIFICATION 6
1.10 EUT EXERCISE SOFTWARE 6
1.11 EQUIPMENT MODIFICATIONS 6
1.12 POWER SUPPLY AND LINE FILTERS 6
1.13 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS 6
1.14 INTERFACE PORTS AND CABLING 6
2 SUMMARY OF TEST RESULTS 7
3 §2.1047 - MODULATION CHARACTERISTIC 8
3.1 APPLICABLE STANDARD 8
3.2 TEST RESULT 8
4 §1.1307(B)(1) & 2.1091 - RF EXPOSURE 9
4.1 APPLICABLE STANDARD 9
4.2 MPE PREDICTION 9
4.3 TEST RESULT 10
§2.1053, §24.238 - SPURIOUS RADIATED EMISSIONS 11
4.4 APPLICABLE STANDARD 11
4.5 TEST PROCEDURE 11
4.6 TEST EQUIPMENT LIST AND DETAILS 11
4.7 SUMMARY OF TEST RESULTS 11
4.8 TEST DATA 12
5 §2.1046, §24.232(A) – RF OUTPUT POWER 13
5.1 APPLICABLE STANDARD 13
5.2 TEST PROCEDURE 13
5.3 TEST EQUIPMENT LIST AND DETAILS 13
5.4 SUMMARY OF TEST RESULTS 14
5.5 TESTS DATA AND PLOTS 15
6 §2.1049, §24.238 - OCCUPIED BANDWIDTH 27
6.1 APPLICABLE STANDARD 27
6.2 TEST PROCEDURE 27
6.3 TEST EQUIPMENT LIST AND DETAILS 27
6.4 SUMMARY OF TEST RESULTS 28
6.5 TEST DATA AND PLOTS 29
7 §2.1051, §24.238(A) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS 41
7.1 APPLICABLE STANDARD 41
7.2 TEST PROCEDURE 41

7.3 TEST EQUIPMENT LIST AND DETAILS 41
7.4 TEST RESULTS 41

8 §24.238 – BAND EDGE 53

8.1 APPLICABLE STANDARD 53
8.2 TEST PROCEDURE 53
8.3 TEST EQUIPMENT LIST AND DETAILS 53
8.4 TEST RESULTS 53

9 EXHIBIT A - FCC ID LABELING AND WARNING STATEMENT 58

9.1 SUGGESTED FCC ID LABEL 58
9.2 PROPOSED LABEL LOCATION ON EUT 58
9.3 FCC WARNING STATEMENT 58

10 EXHIBIT B - TEST SETUP PHOTOGRAPHS 59

10.1 RADIATED EMISSIONS - FRONT VIEW 59
10.2 RADIATED EMISSIONS - REAR VIEW 59

11 EXHIBIT C - EUT PHOTOGRAPHS 60

11.1 FRONT VIEW 60
11.2 REAR VIEW 60
11.3 RIGHT SIDE VIEW 61
11.4 LEFT SIDE VIEW 61
11.5 OUTDOOR ANTENNA PORT VIEW 62
11.6 INDOOR ANTENNA PORT VIEW 62
11.7 CHASSIS OFF TOP VIEW 63
11.8 CHASSIS OFF BOTTOM SIDE VIEW 63
DOWNLINK BOARD COMPONENT SIDE VIEW 63
DOWNLINK BOARD COMPONENT SIDE VIEW 64
11.9 DOWNLINK BOARD SOLDER SIDE VIEW 64
11.10 UPLINK BOARD COMPONENT SIDE VIEW 65
11.11 UPLINK BOARD SOLDER SIDE VIEW 65
11.12 RF INPUT BOARD COMPONENT SIDE VIEW FOR DOWNLINK 66
11.13 RF INPUT BOARD SOLDER SIDE VIEW FOR DOWNLINK 66
11.14 RF INPUT BOARD COMPONENT SIDE VIEW FOR UPLINK 67
11.15 RF INPUT BOARD SOLDER SIDE VIEW FOR UPLINK 67
11.16 POWER SUPPLY VIEW 68

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The Cellphone-Mate, Inc. product, FCC ID: RSNCM1900-5560-65 or the "EUT" as referred to in this report is a dual-band cellular bidirectional amplifier that employs GSM and Code Division Multiple Access (CDMA) modulation to transmit at PCS service (1900 MHz).

1.2 Mechanical Description

The EUT Approximate measurement is: 160mm (L) x 98 mm (W) x 55 mm (H). It is of metallic construction.

** The test data gathered are from typical production sample, serial numbers: 01019, 01012, provided by the manufacturer.*

1.3 EUT Photo

Please see additional photos in Exhibit C

1.4 Objective

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

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

1.5 Related Submittal(s)/Grant(s)

No Related Submittals

1.6 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 24 Subpart E - PCS

Applicable Standards: TIA EIA 98-C, 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.

1.7 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.

1.8 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

SYSTEM TEST CONFIGURATION

1.9 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.

1.10 EUT Exercise Software

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

1.11 Equipment Modifications

No modifications were made to the EUT.

1.12 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Oriental Hero Ele. Fty.	AC-DC Adaptor	OH-1048A0904000U-U	0723

1.13 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Midwest Microwave	10dB attenuator pad	ATT-0263-10-000-02	N/A
Inmet Corp.	DC Block	8055	N/A

1.14 Interface Ports and Cabling

Cable Description	Length (M)	From	To
RF cable	0.2	Signal Generator	Input/ EUT
RF cable	0.2	Output/ EUT	Spectrum analyzer

2 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 2.1047	Modulation Characteristics	N/A
§2.1091	RF Exposure	Compliant
§ 2.1053, § 24.238	Field Strength of Spurious Radiation	Compliant
§ 2.1046, § 24.232	RF Output Power	Compliant
§ 2.1049, § 24.238	Occupied Bandwidth	Compliant
§ 2.1051, § 24.238	Spurious Emissions at Antenna Terminals & Two- Tone Test	Compliant
§ 24.238	Band Edge	Compliant

3 §2.1047 - MODULATION CHARACTERISTIC

3.1 Applicable Standard

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

3.2 Test Result

N/A

4 §1.1307(b) (1) & 2.1091 - RF EXPOSURE

4.1 Applicable Standard

According to §1.1307 & 2.1091 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

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

4.2 MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of 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

CDMA

Uplink:

Maximum peak output power at antenna input terminal (dBm):	19.66
Maximum peak output power at antenna input terminal (mW):	92.47
Prediction distance (cm):	25
Prediction frequency (MHz):	1880
Antenna Gain, typical (dBi):	9
Maximum Antenna Gain (numeric):	7.943
Power density at predication frequency and distance (mW/cm^2):	0.0935
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0000

Downlink:

Maximum peak output power at antenna input terminal (dBm):	19.50
Maximum peak output power at antenna input terminal (mW):	89.13
Prediction distance (cm):	25
Prediction frequency (MHz):	1960
Antenna Gain, typical (dBi):	9
Maximum Antenna Gain (numeric):	7.943
Power density at predication frequency and distance (mW/cm^2):	0.0901
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0000

GSM

Uplink:

Maximum peak output power at antenna input terminal (dBm):	26.90
Maximum peak output power at antenna input terminal (mW):	489.78
Prediction distance (cm):	25
Prediction frequency (MHz):	1880
Antenna Gain, typical (dBi):	9
Maximum Antenna Gain (numeric):	7.943
Power density at predication frequency and distance (mW/cm^2):	0.4953
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0000

Downlink:

Maximum peak output power at antenna input terminal (dBm):	26.79
Maximum peak output power at antenna input terminal (mW):	477.53
Prediction distance (cm):	25
Prediction frequency (MHz):	1960
Antenna Gain, typical (dBi):	9
Maximum Antenna Gain (numeric):	7.943
Power density at predication frequency and distance (mW/cm^2):	0.4829
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0000

4.3 Test Result

The device is compliant with the requirement MPE limit for uncontrolled exposure at predication frequency 1.0 mW/cm^2. The maximum power density at the distance of 25 cm was 0.4953mW/cm^2. Thus, the requirement of at least 25 cm required by the manufacturer is in compliance with the MPE requirement.

§2.1053, §24.238 - SPURIOUS RADIATED EMISSIONS

4.4 Applicable Standard

Requirements: CFR 47, § 2.1053, § 24.238.

4.5 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 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

4.5.1 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	58 %
ATM Pressure:	102.2 kPa

** The testing was performed by Oscar Au on 2007-08-09.*

4.6 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-04-26
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2006-08-21
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2007-04-20
HP	Generator, Signal	83650B	3614A00276	2006-10-10
A.R.A.	Antenna, Horn	DRG-118/A	1132	2006-08-17

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

4.7 Summary of Test Results

Worst case reading as follows:

Mode: Downlink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency**
-32.13	3920	Vertical	1960 MHz

Mode: Uplink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency**
-31.23	3760	Vertical	1880 MHz

4.8 Test Data

Downlink Input frequency = 1960 MHz

Indicated		Azimuth Degrees	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBuV)		Height (m)	Polar H/V	Frequency (MHz)	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
3920	53.73	180	1.5	V	3920	-53.2	10.37	2.3	-45.13	-13	-32.13
3920	51.4	240	1.2	H	3920	-55.6	10.37	2.3	-47.53	-13	-34.53
5880	45.6	250	1.6	V	5880	-60.1	11.42	3.5	-52.18	-13	-39.18
5880	44.7	210	1.8	H	5880	-61.3	11.42	3.5	-53.38	-13	-40.38
7840	45.2	175	1.3	H	7840	-60.4	11.02	4.6	-53.98	-13	-40.98
7840	44.6	80	2	V	7840	-61.5	11.02	4.6	-55.08	-13	-42.08

Uplink Input frequency = 1880 MHz

Indicated		Azimuth Degrees	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBuV)		Height (m)	Polar H/V	Frequency (MHz)	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)	Absolute Level (dBm)		
3760	53.17	243	1.3	V	3760	-52.6	10.67	2.3	-44.23	-13	-31.23
7520	51.7	100	1.2	V	7520	-52.9	11.14	4.6	-46.36	-13	-33.36
3760	47.8	145	1.6	H	3760	-57.3	10.67	2.3	-48.93	-13	-35.93
5640	47	100	1.2	H	5640	-58.4	11.22	3.5	-50.68	-13	-37.68
7520	47.6	340	1.2	H	7520	-58.2	11.14	4.6	-51.66	-13	-38.66
5640	43.2	217	1.3	V	5640	-62.7	11.22	3.5	-54.98	-13	-41.98

5 §2.1046, §24.232(a) – RF OUTPUT POWER

5.1 Applicable Standard

According to FCC §2.1046 and §24.232 (a), output power is limited to 2 watts (33 dBm) EIRP.

5.2 Test Procedure

Conducted:

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

5.2.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	59 %
ATM Pressure:	101.9 kPa

** The testing was performed by Oscar Au on 2007-08-09.*

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-04-26
R & S	Signal Generator	SMIQ03	849192	2006-10-08

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

5.4 Summary of Test Results

5.4.1 Conducted Power: CDMA

Forward (downlink)

Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dBi)	Cable loss (dB)	EIRP (dBm)	EIRP Limit (dBm)
Low	1931.25	-35.99	17.50	9	3	23.50	33.0
Middle	1960	-43.56	19.50	9	3	25.50	33.0
High	1988.75	-36.16	18.40	9	3	24.40	33.0

Reverse (uplink)

Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dBi)	Cable loss (dB)	EIRP (dBm)	EIRP Limit (dBm)
Low	1851.25	-35.66	17.80	9	3	23.80	33.0
Middle	1880	-37.41	19.66	9	3	25.66	33.0
High	1908.75	-31.55	17.88	9	3	23.88	33.0

5.4.2 Conducted Power: GSM

Forward (downlink)

Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dBi)	Cable loss (dB)	EIRP (dBm)	EIRP Limit (dBm)
Low	1930.20	-26.51	24.51	9	3	30.51	33.0
Middle	1960	-35.18	26.79	9	3	32.79	33.0
High	1989.80	-26.99	25.07	9	3	31.07	33.0

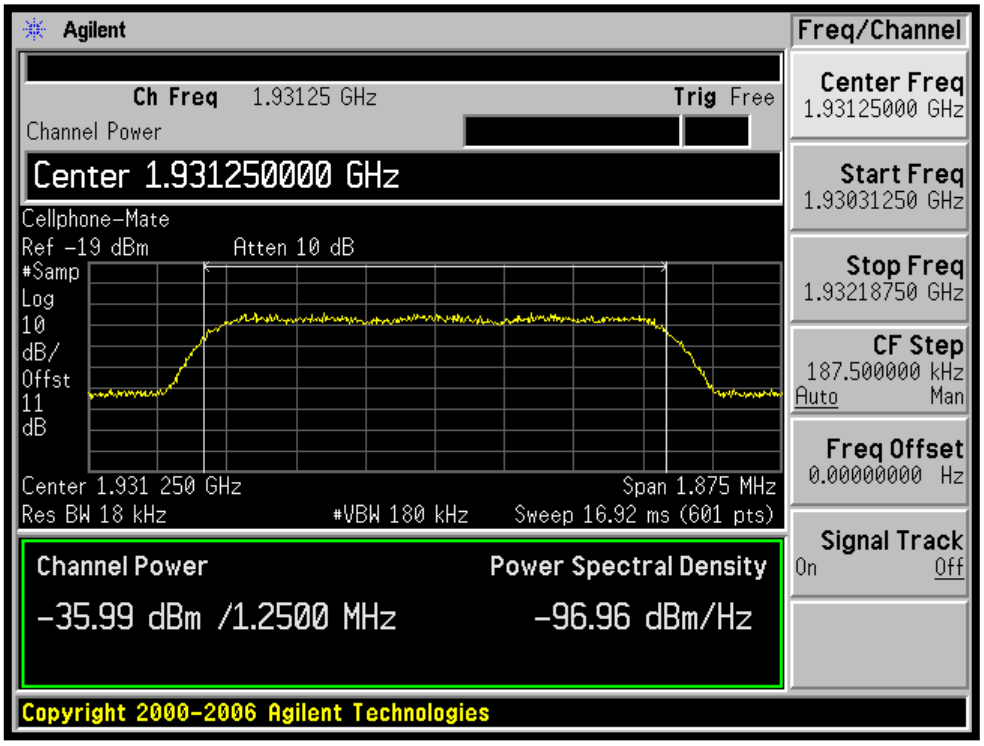
Reverse (uplink)

Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dBi)	Cable loss (dB)	EIRP (dBm)	EIRP Limit (dBm)
Low	1850.20	-23.91	24.81	9	3	30.81	33.0
Middle	1880	-27.82	26.90	9	3	32.90	33.0
High	1909.80	-18.99	25.36	9	3	31.36	33.0

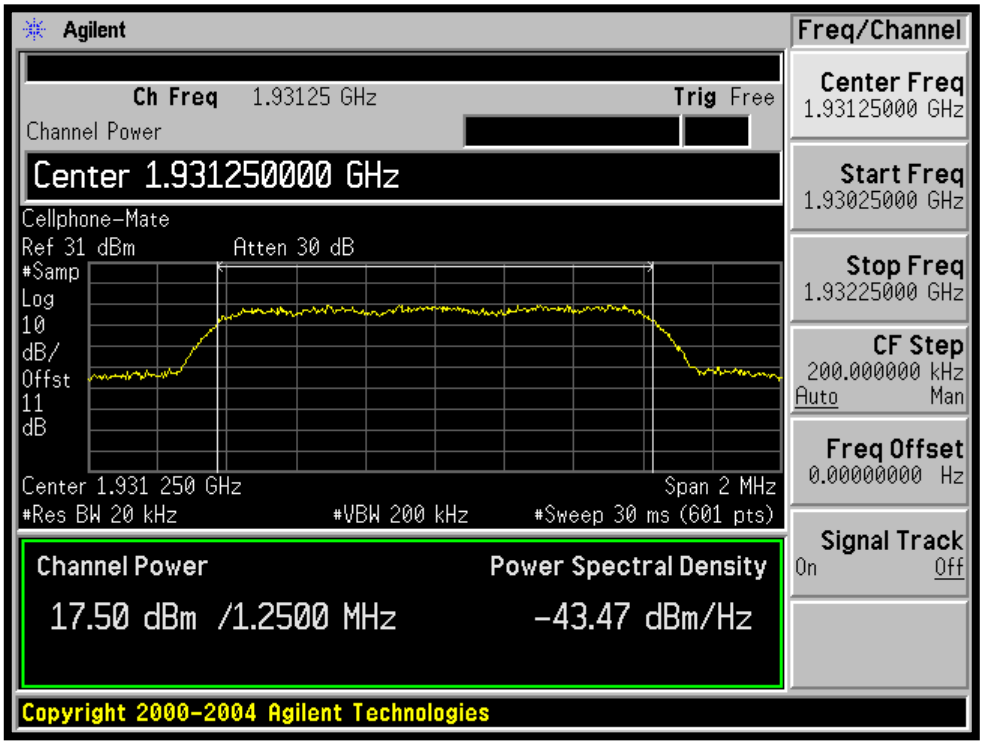
5.5 Tests data and plots

5.5.1 CDMA: Forward (downlink): Low Channel

Input

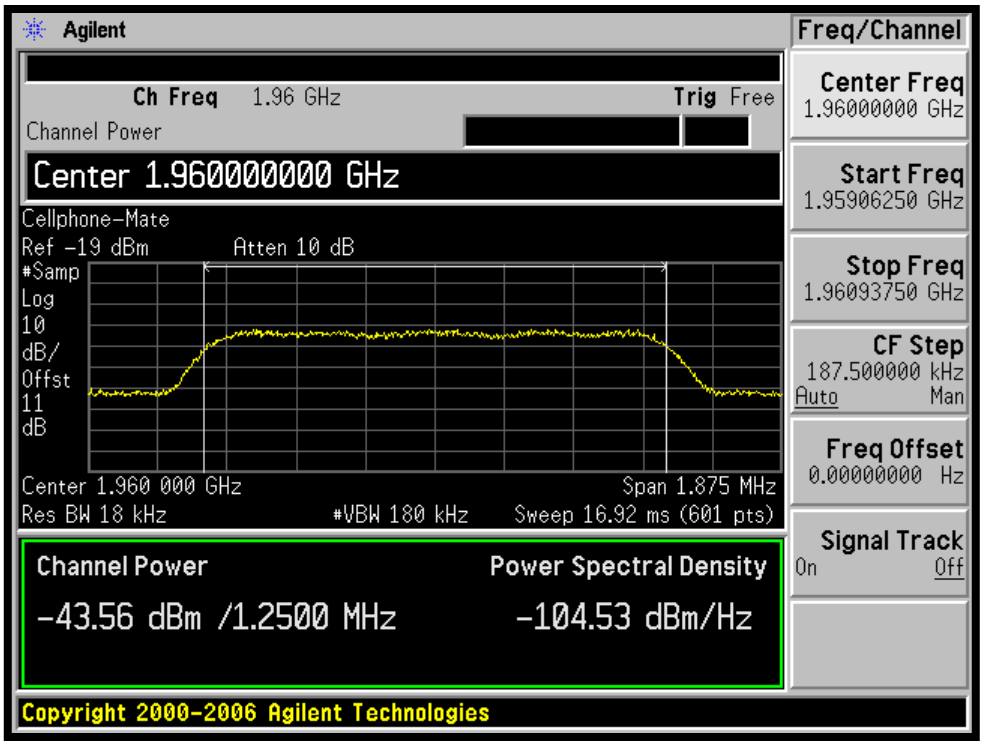


Output

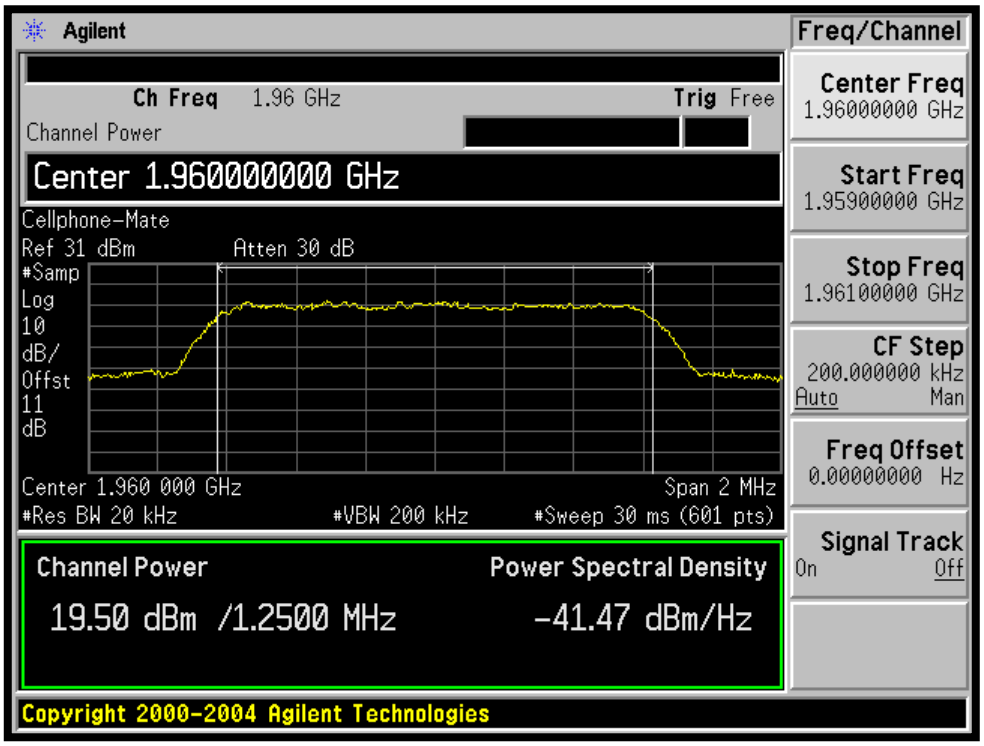


5.5.2 CDMA: Forward (downlink): Middle Channel

Input

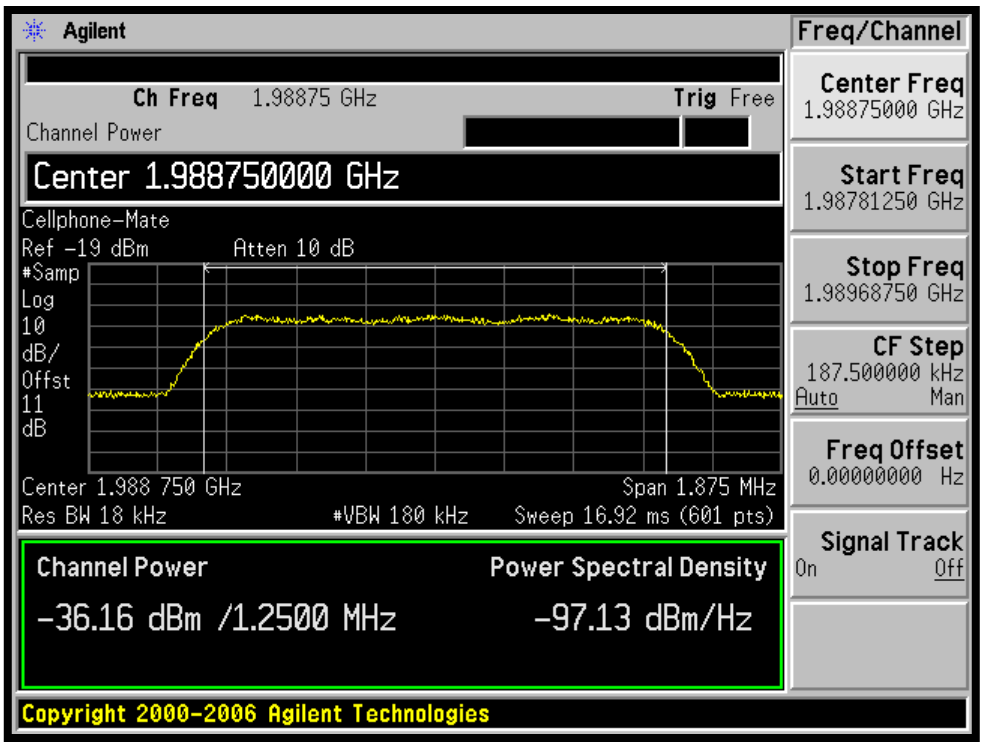


Output

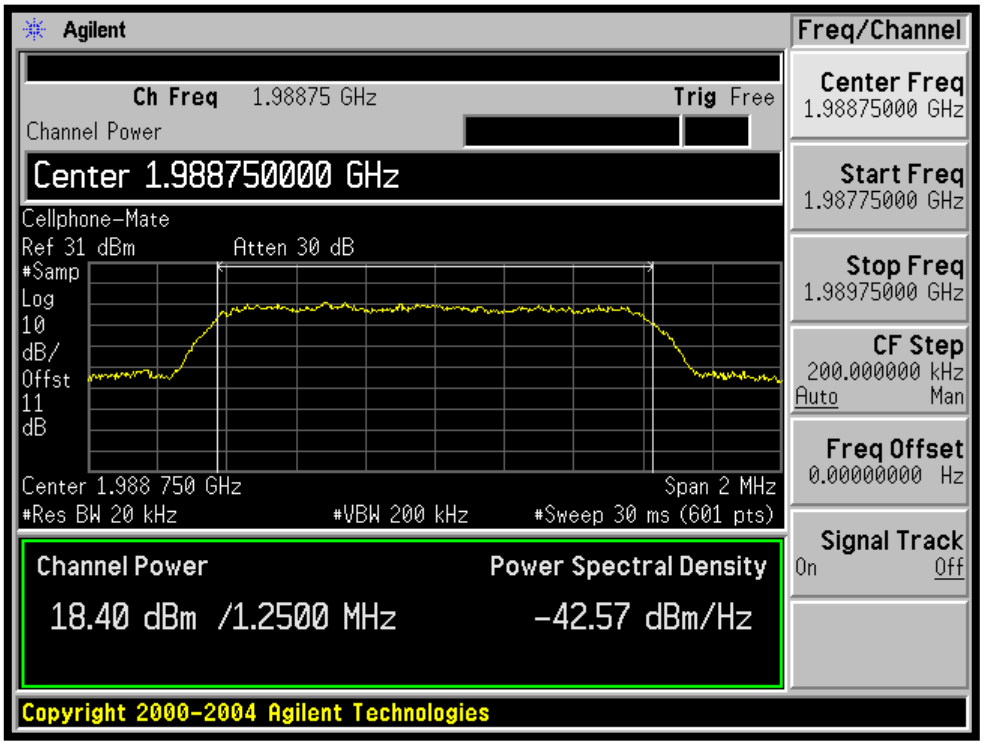


5.5.3 CDMA: Forward (downlink): High channel

Input

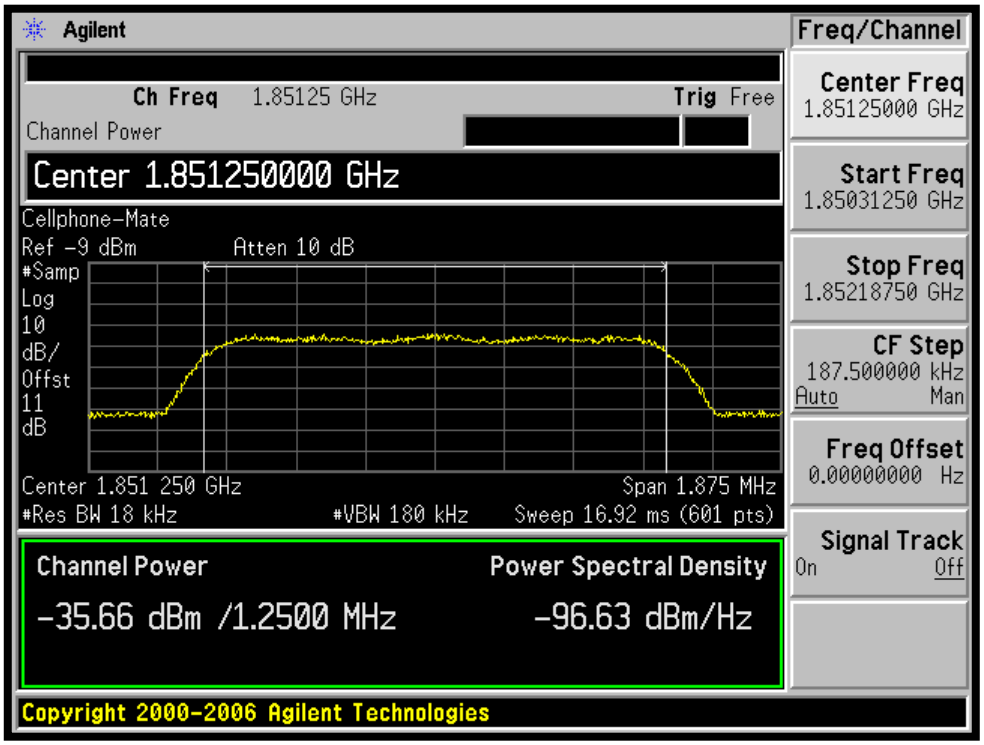


Output

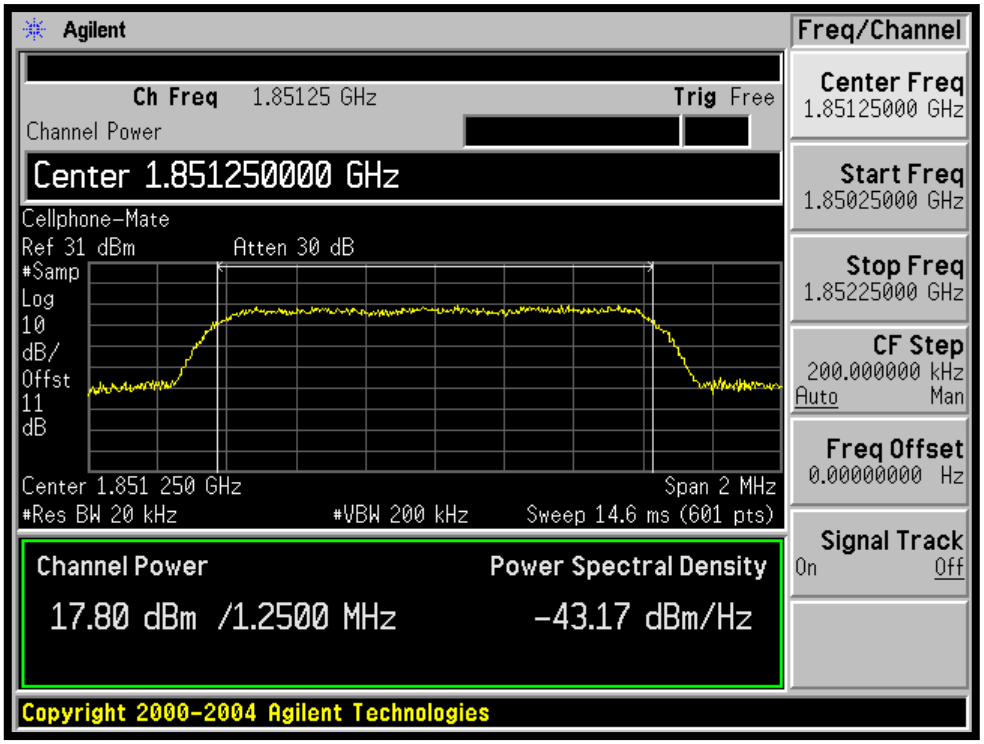


5.5.4 CDMA: Reverse (uplink): Low Channel

Input

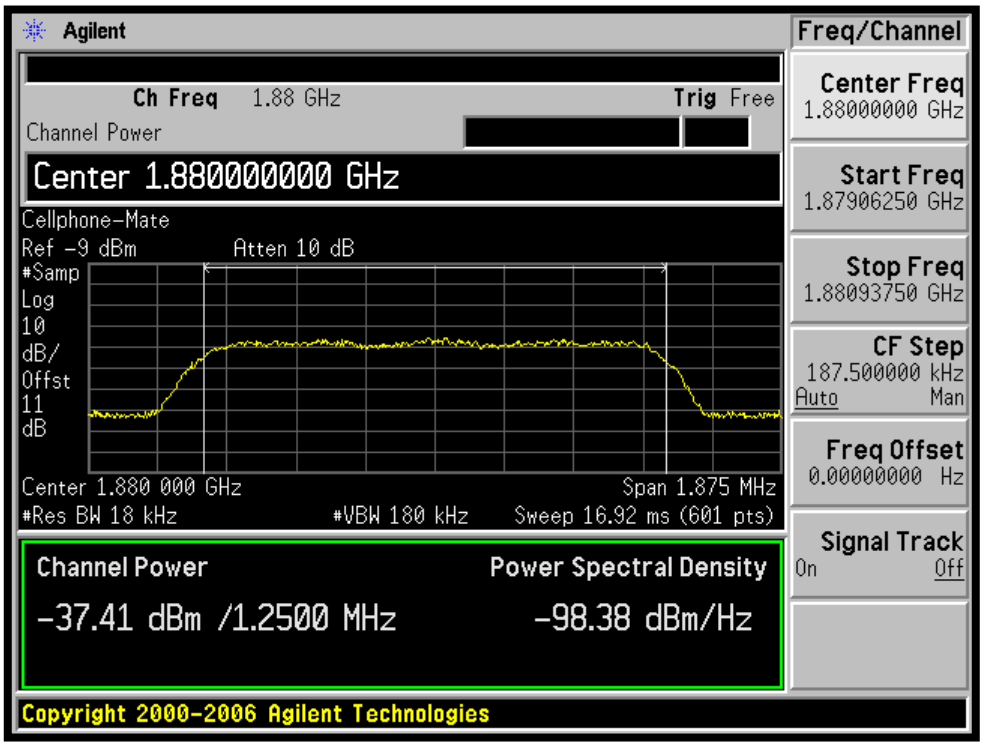


Output

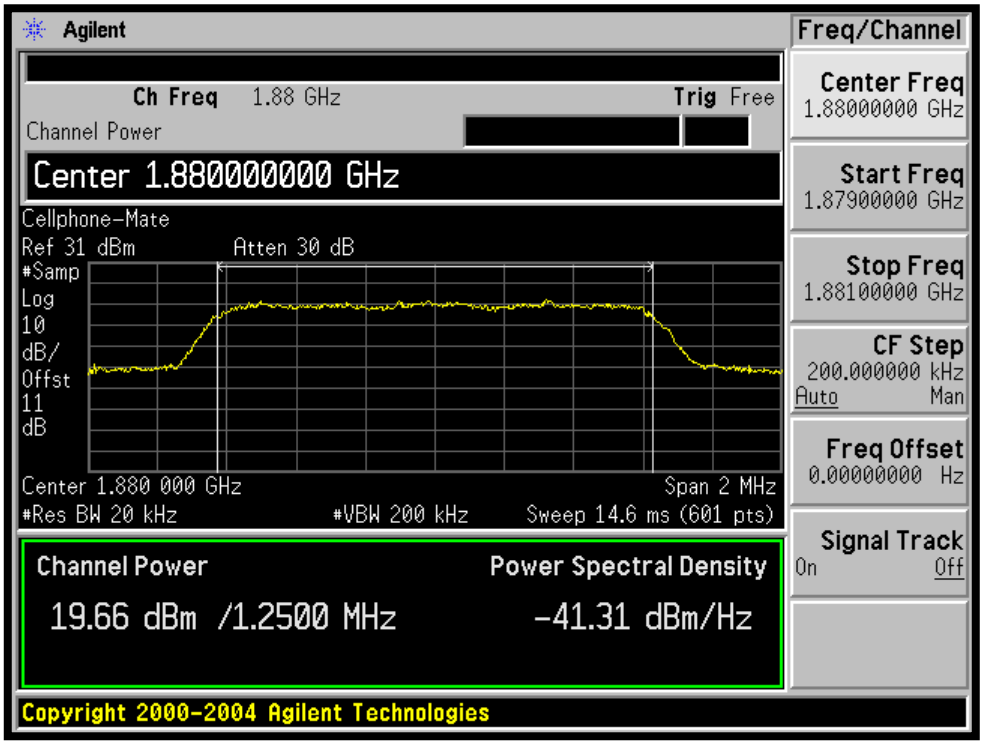


5.5.5 CDMA: Reverse (uplink): Middle Channel

Input

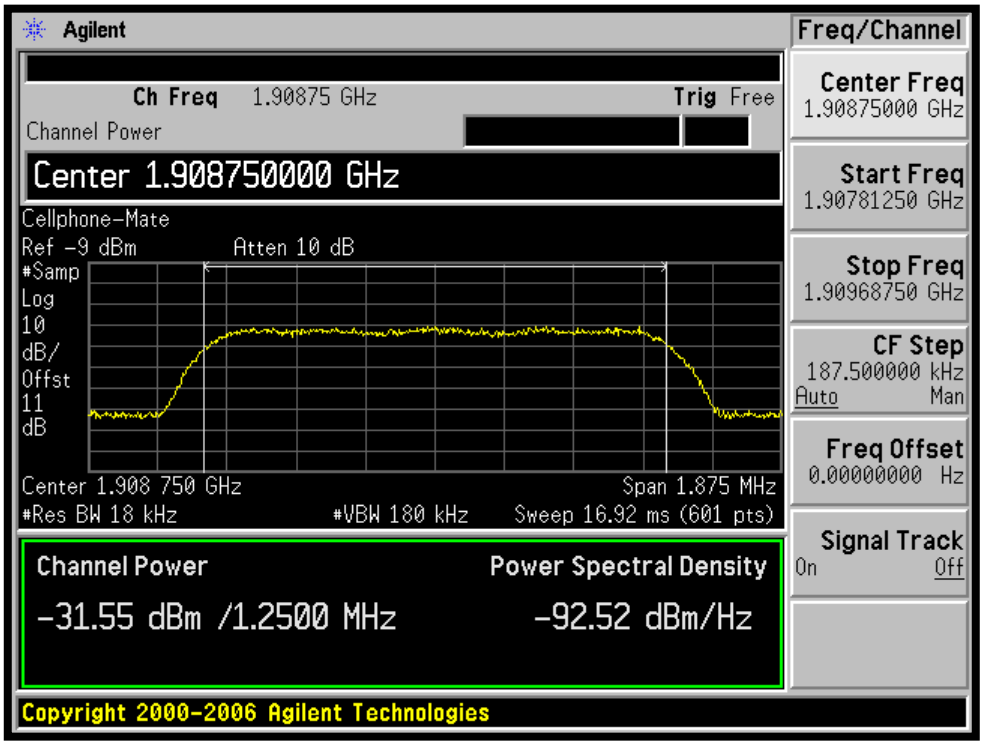


Output

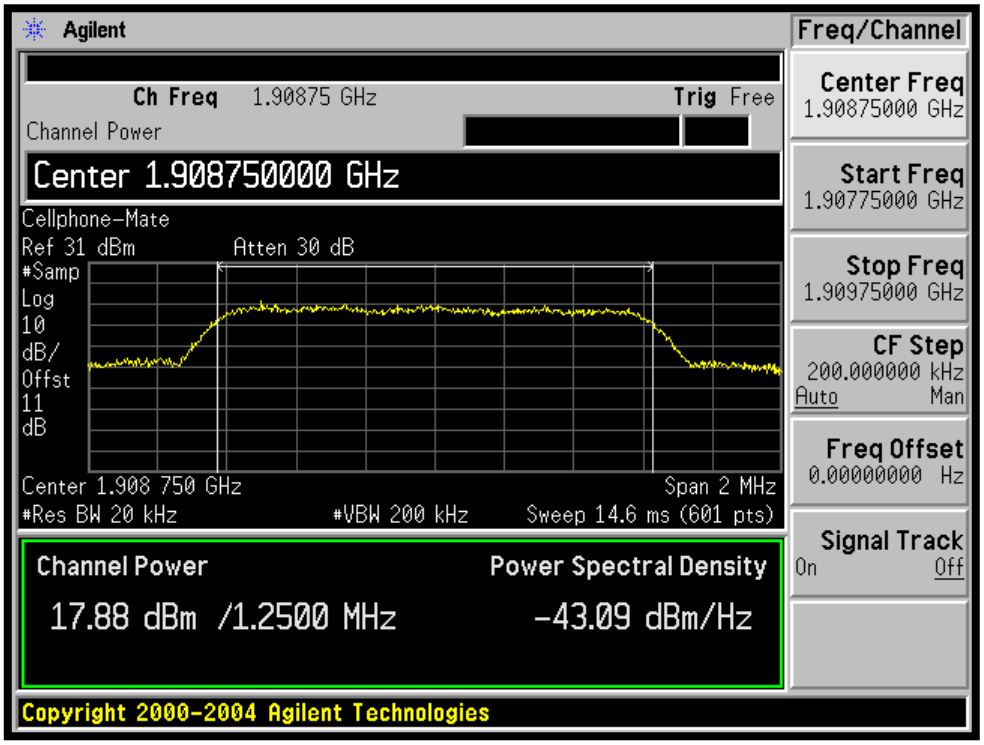


5.5.6 CDMA: Reverse (uplink): High Channel

Input

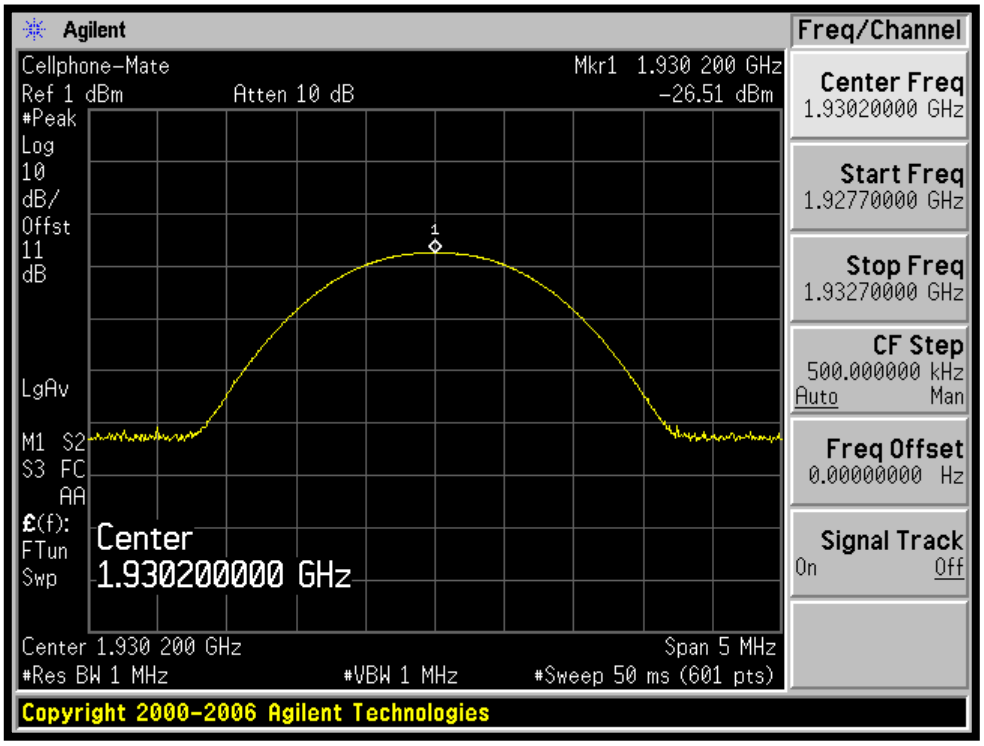


Output

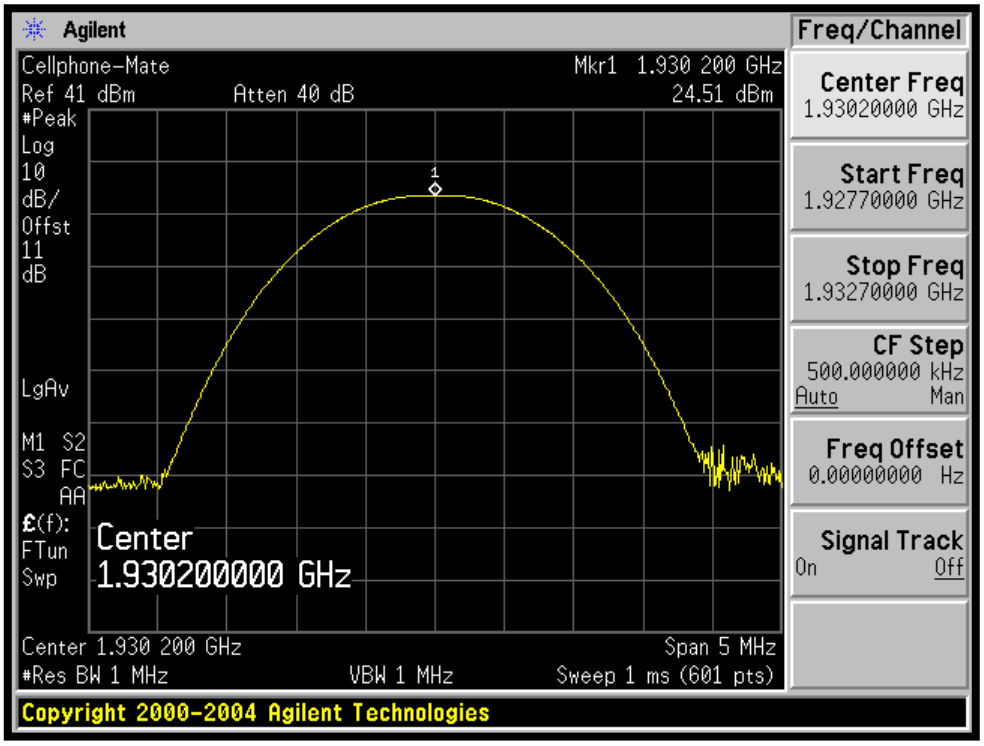


5.5.7 GSM: Forward (Downlink): Low Channel

Input

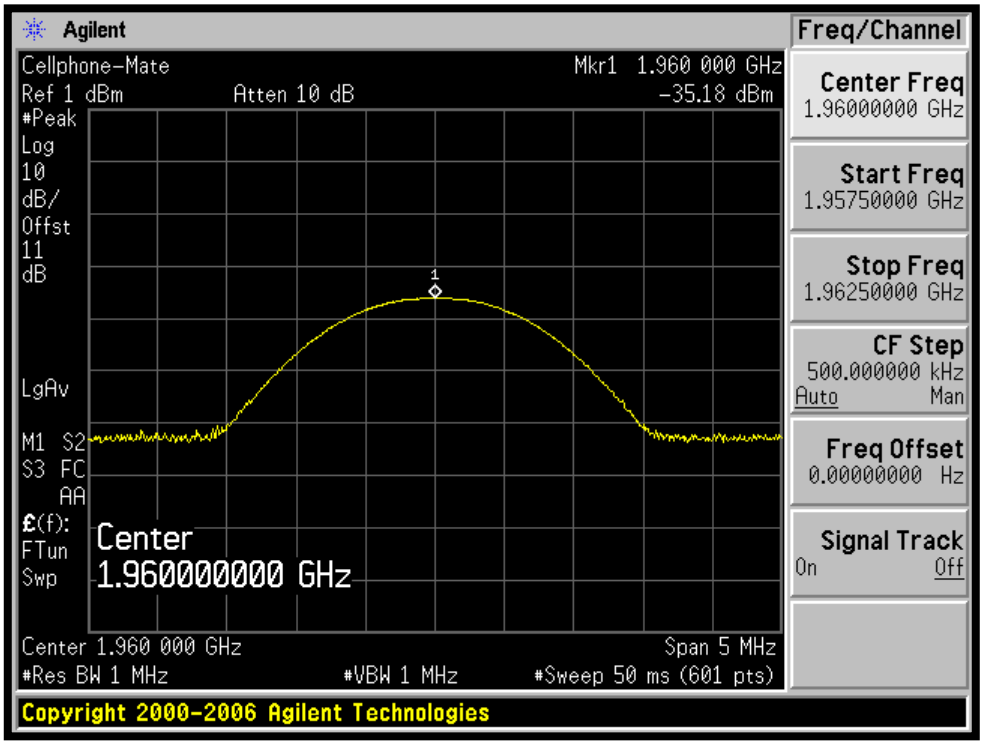


Output

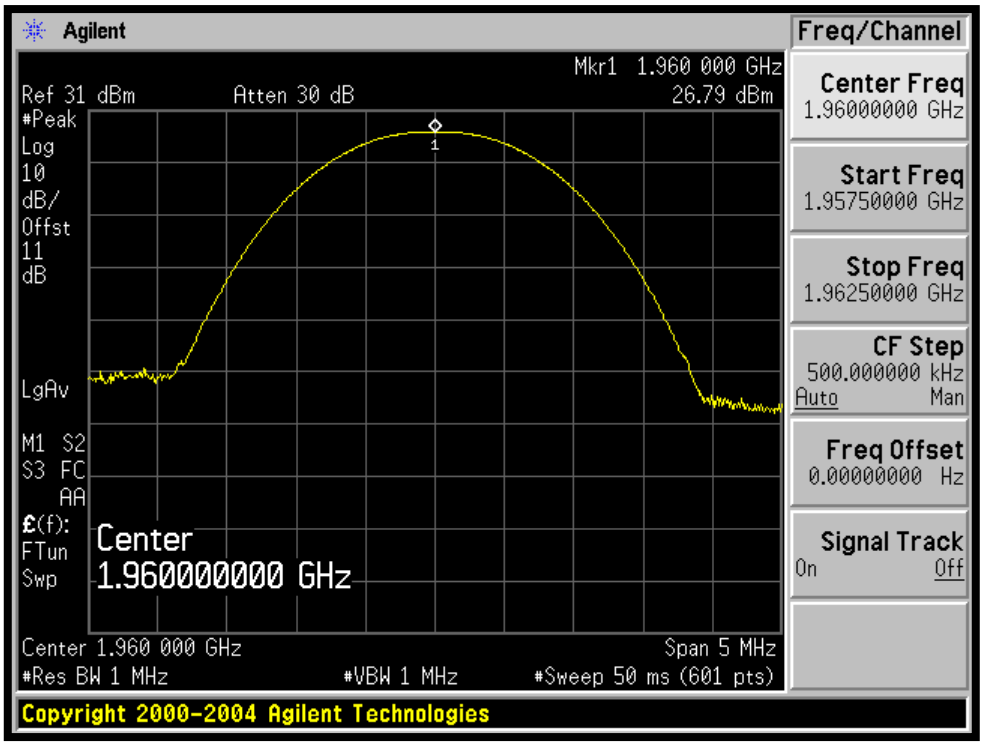


5.5.8 GSM: Forward (Downlink): Middle Channel

Input

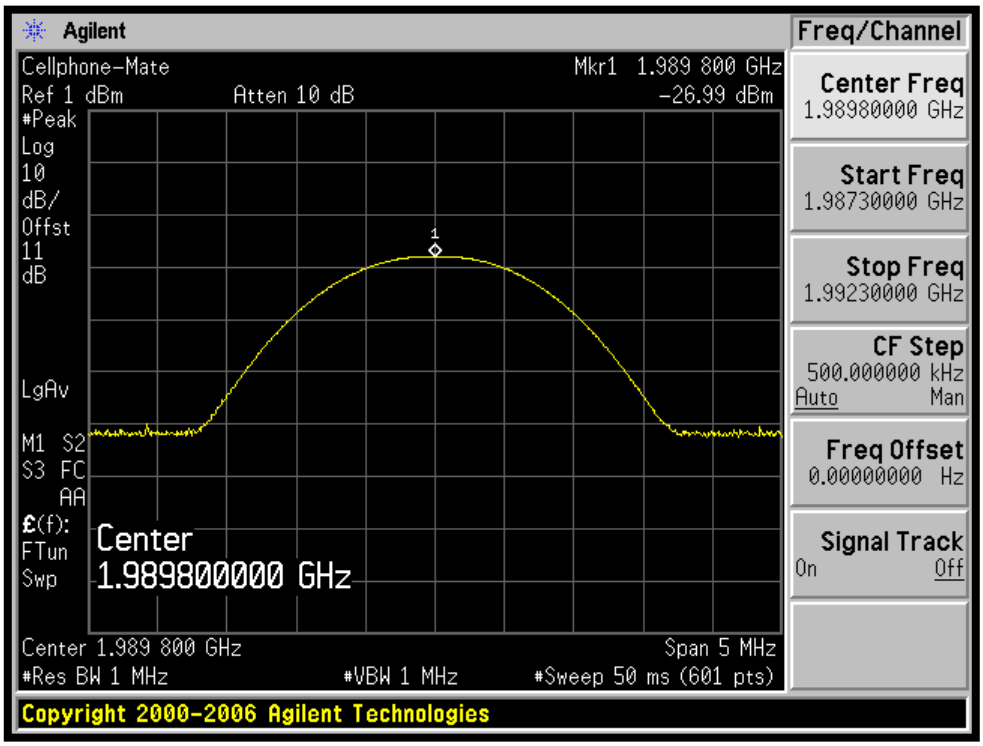


Output

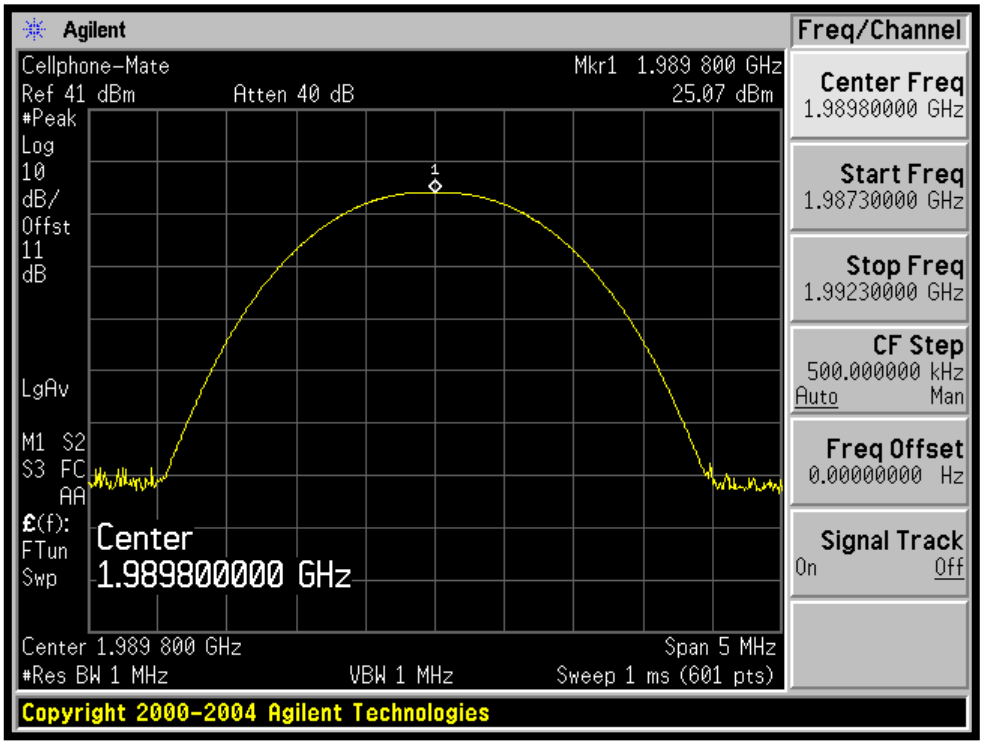


5.5.9 GSM: Forward (Downlink): High Channel

Input

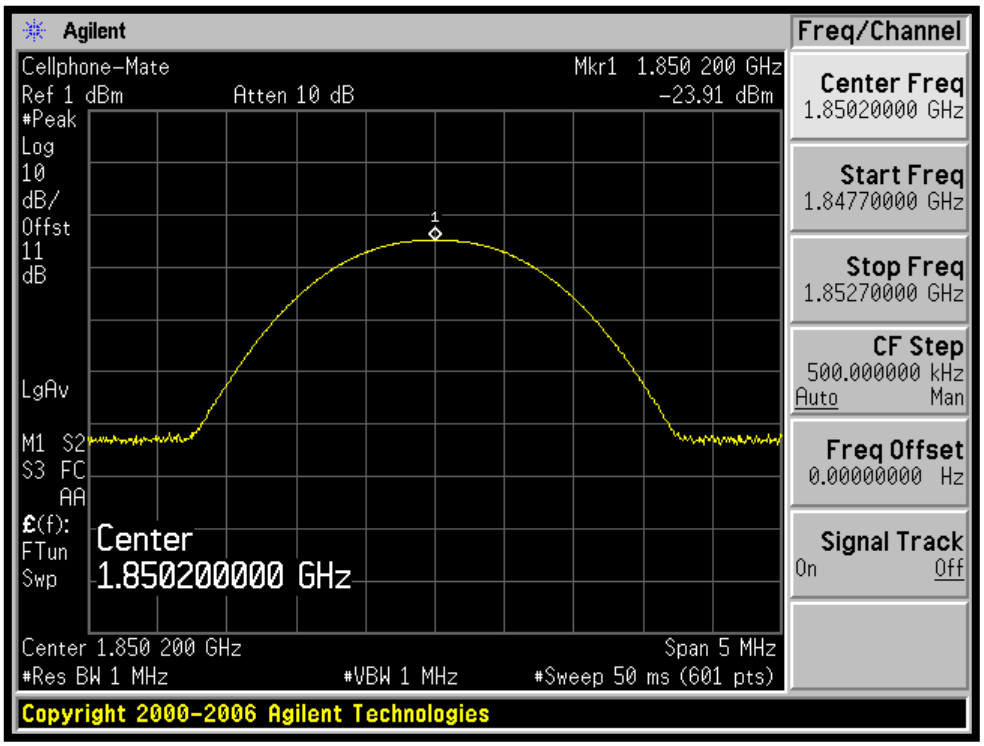


Output

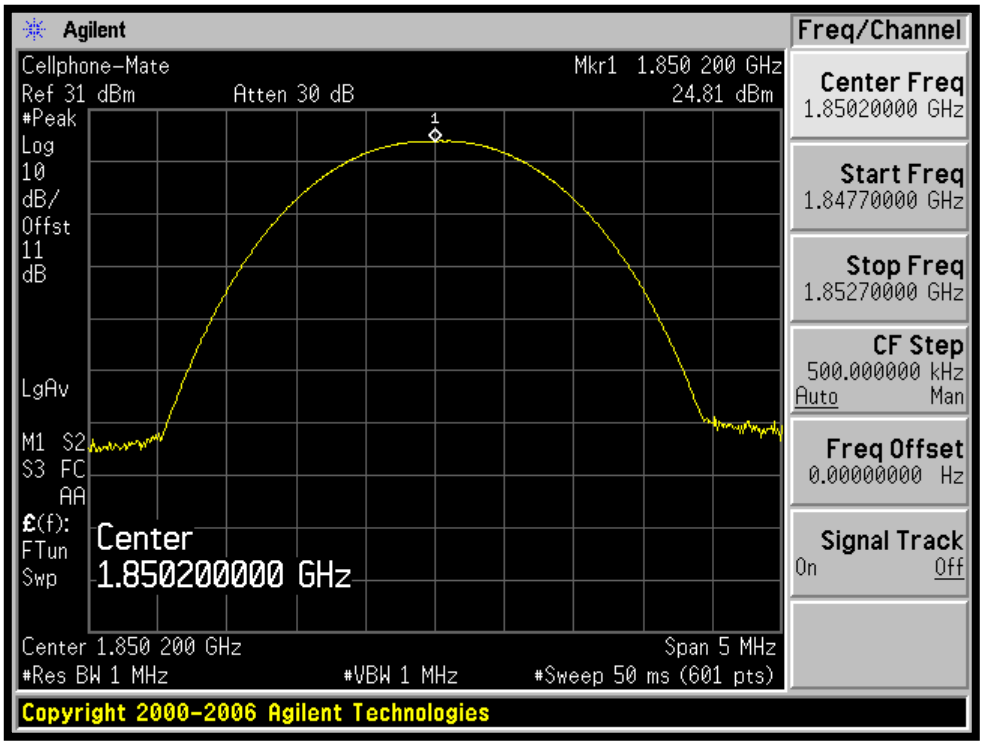


5.5.10 GSM: Reverse (Uplink): Low Channel

Input

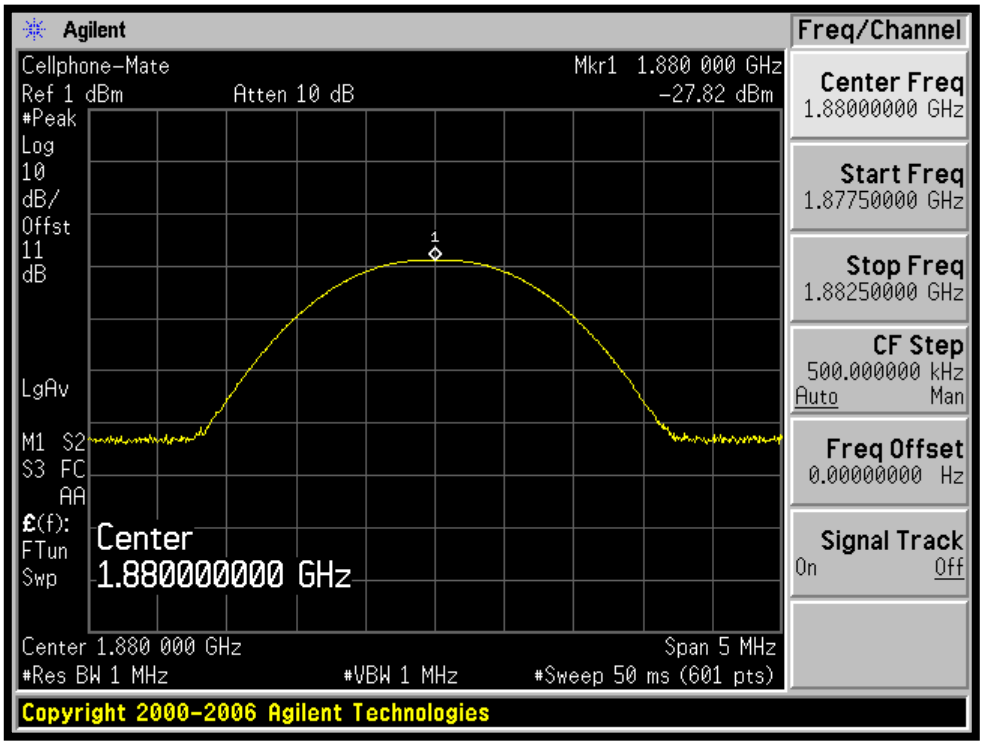


Output

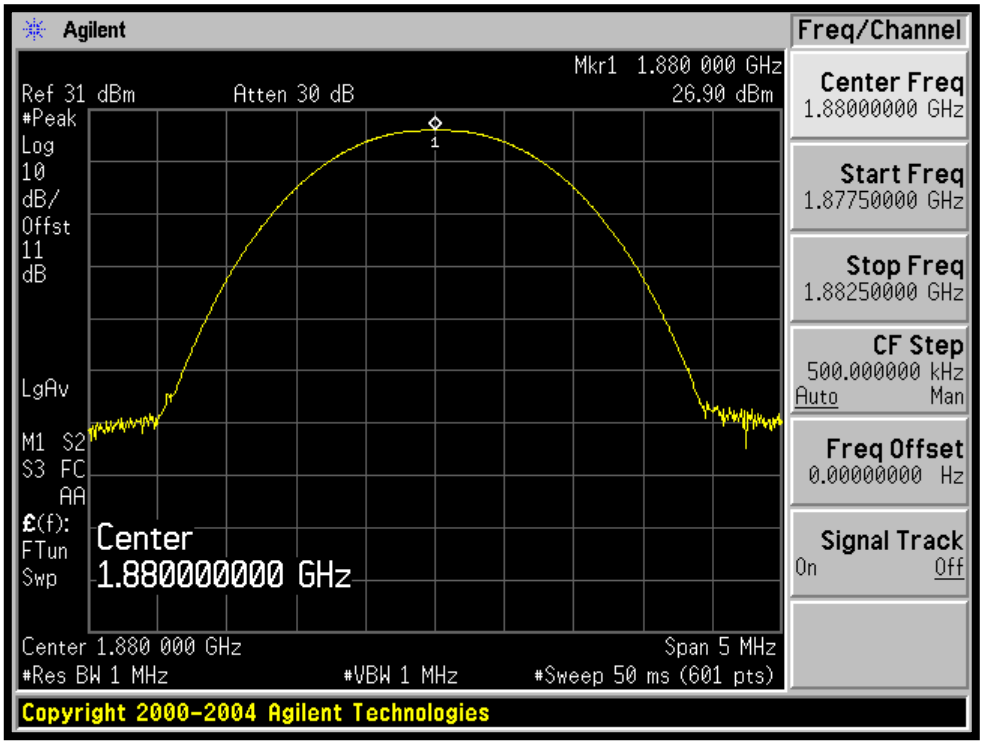


5.5.11 GSM: Reverse (Uplink): Middle Channel

Input

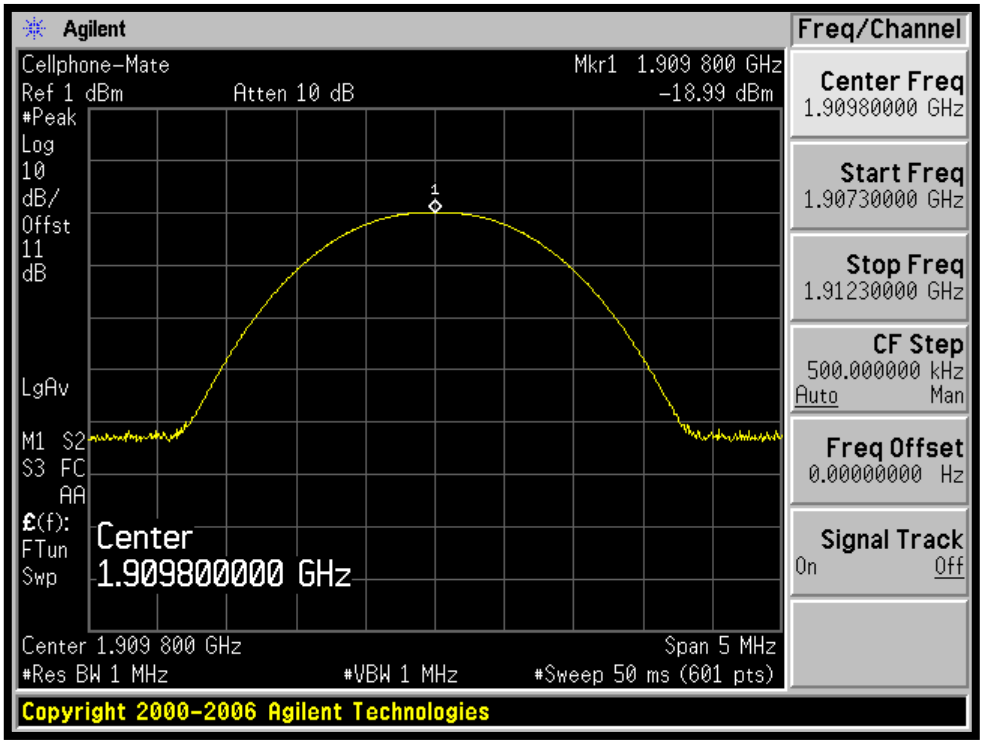


Output

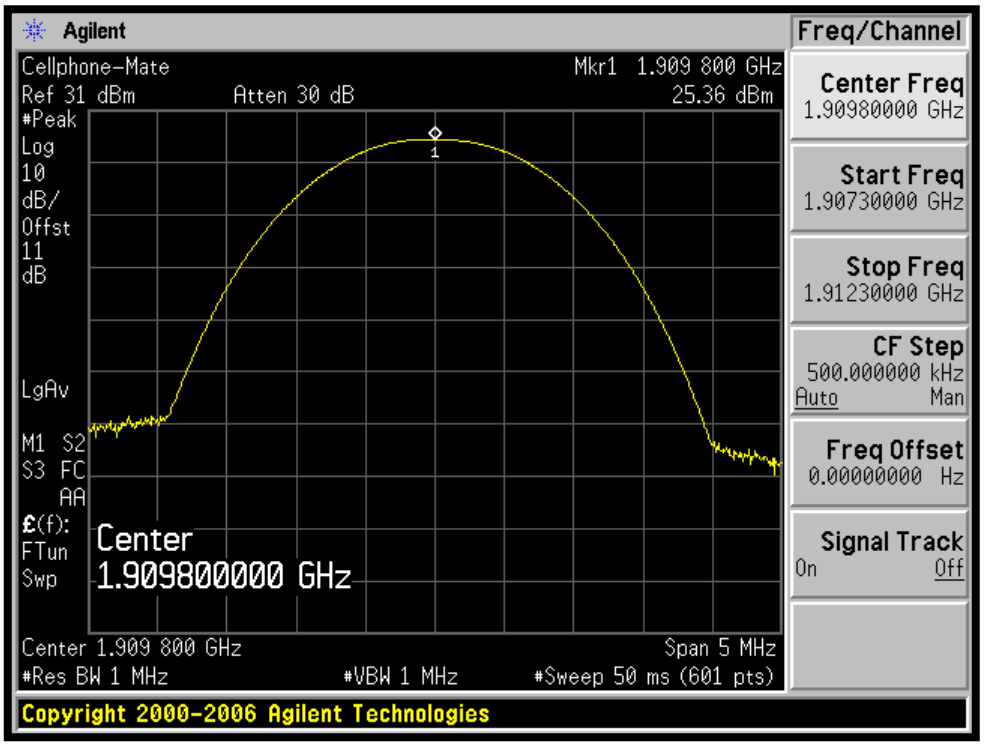


5.5.12 GSM: Reverse (Uplink): High Channel

Input



Output



6 §2.1049, §24.238 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 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 at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.

6.2.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	58 %
ATM Pressure:	101.7 kPa

** The testing was performed by Oscar Au on 2007-08-09.*

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-04-26
R & S	Signal Generator	SMIQ03	849192	2006-10-08

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

6.4 Summary of Test Results

6.4.1 CDMA:

Downlink

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
Low	1931.25	1.2666
Middle	1960	1.2683
High	1988.75	1.2677

Uplink

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
Low	1851.25	1.2699
Middle	1880	1.2673
High	1908.75	1.2699

6.4.2 GSM:

Downlink

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Low	1930.20	250.7443
Middle	1960	246.3525
High	1989.80	246.0655

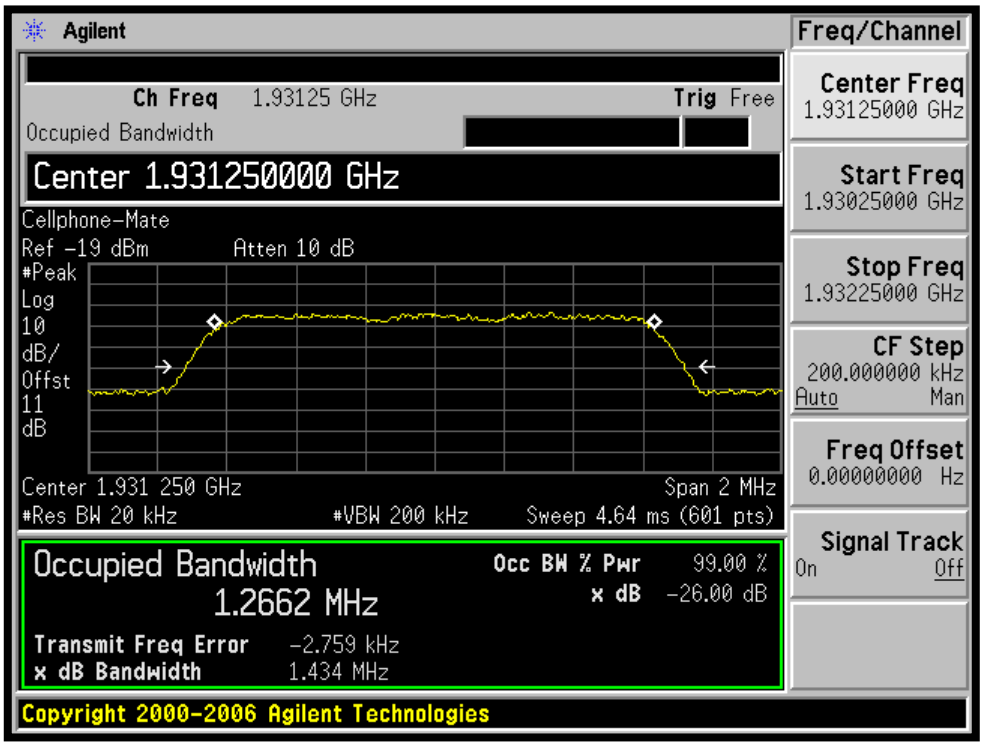
Uplink

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Low	1850.20	246.5000
Middle	1880	245.9956
High	1909.80	245.7453

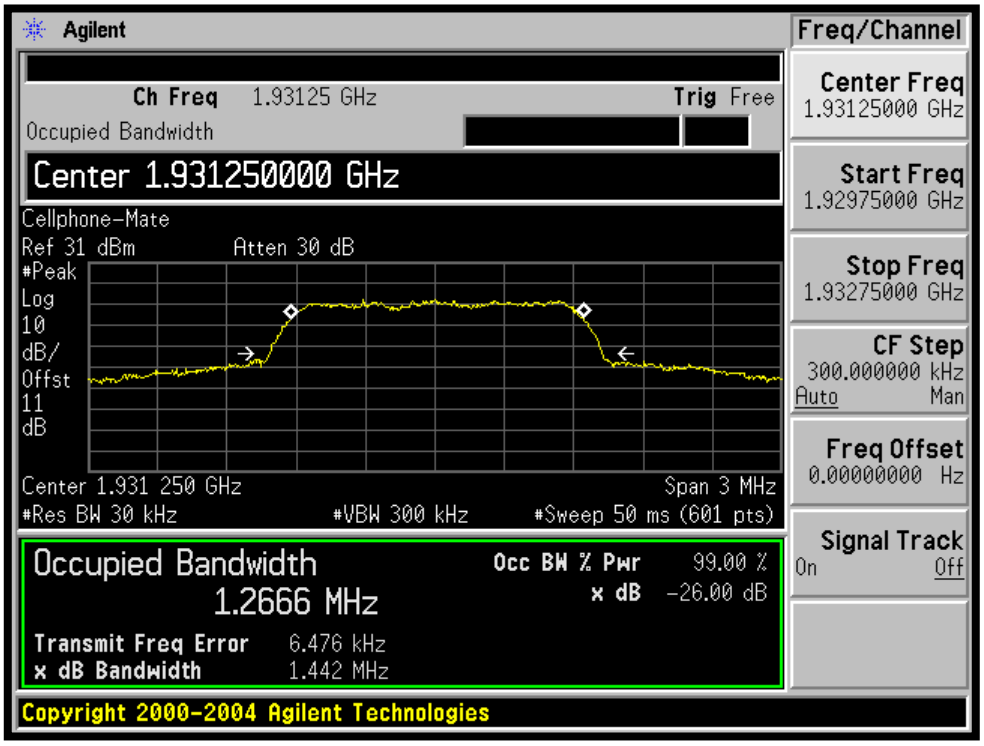
6.5 Test data and plots

6.5.1 CDMA: Forward (Downlink): Low Channel

Input

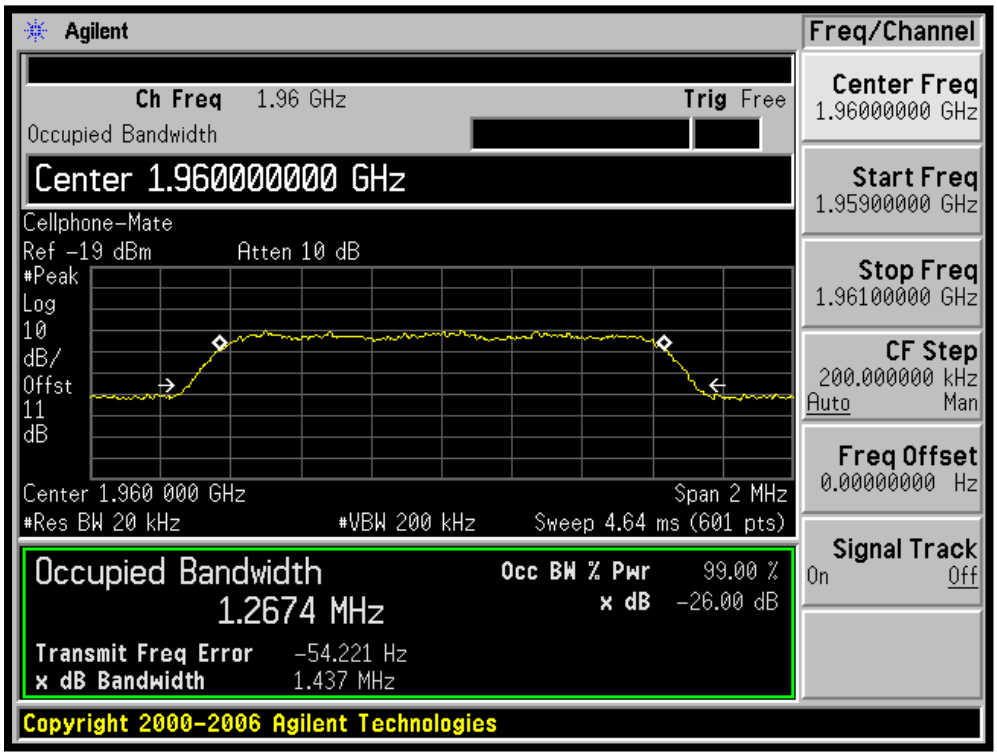


Output

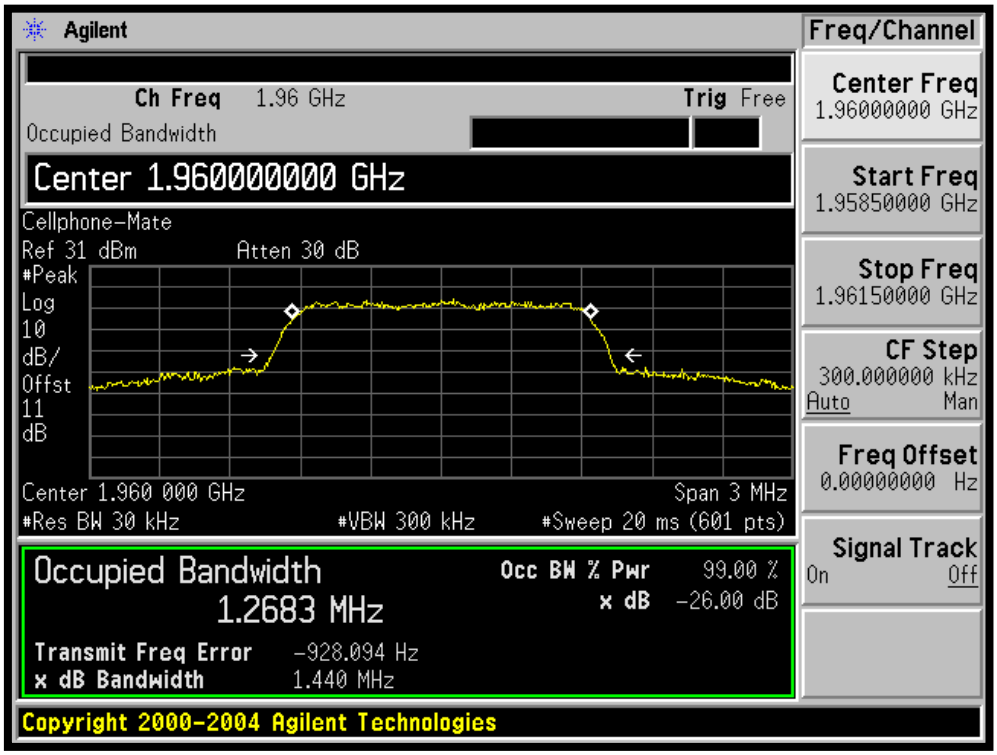


6.5.2 CDMA: Forward (Downlink): Middle Channel

Input

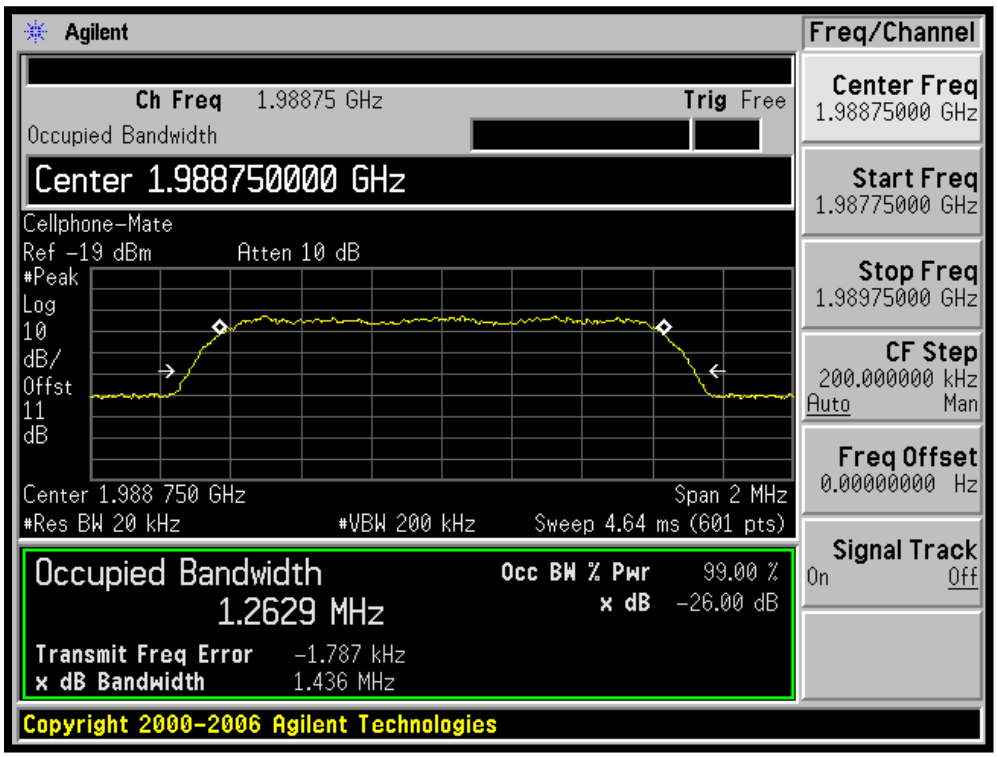


Output

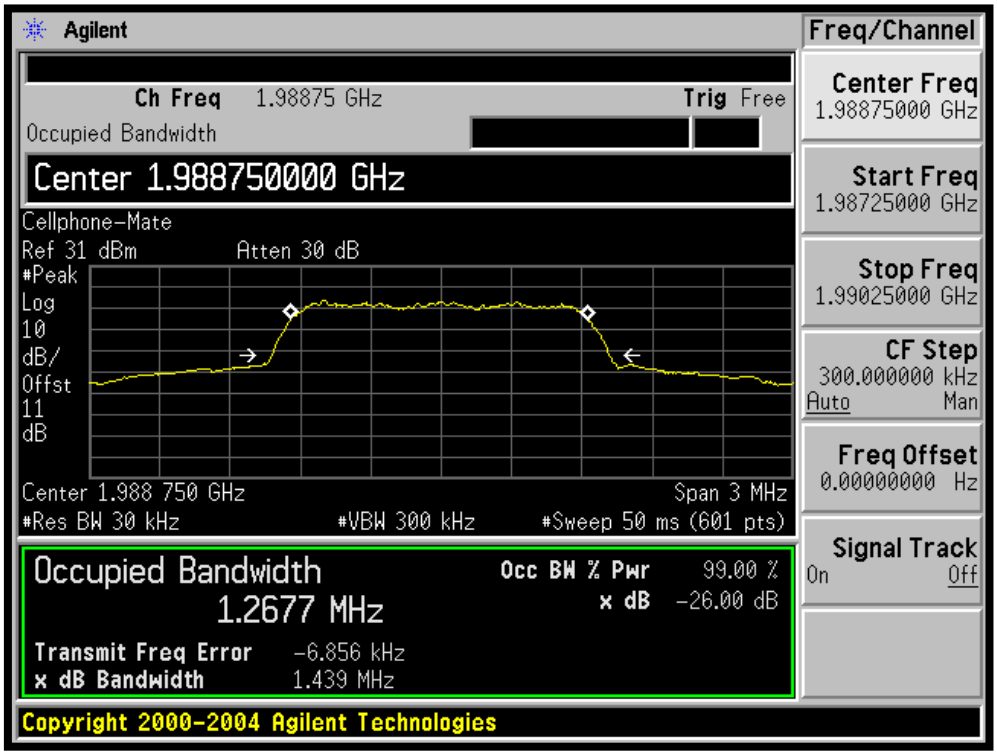


6.5.3 CDMA: Forward (Downlink): High Channel

Input

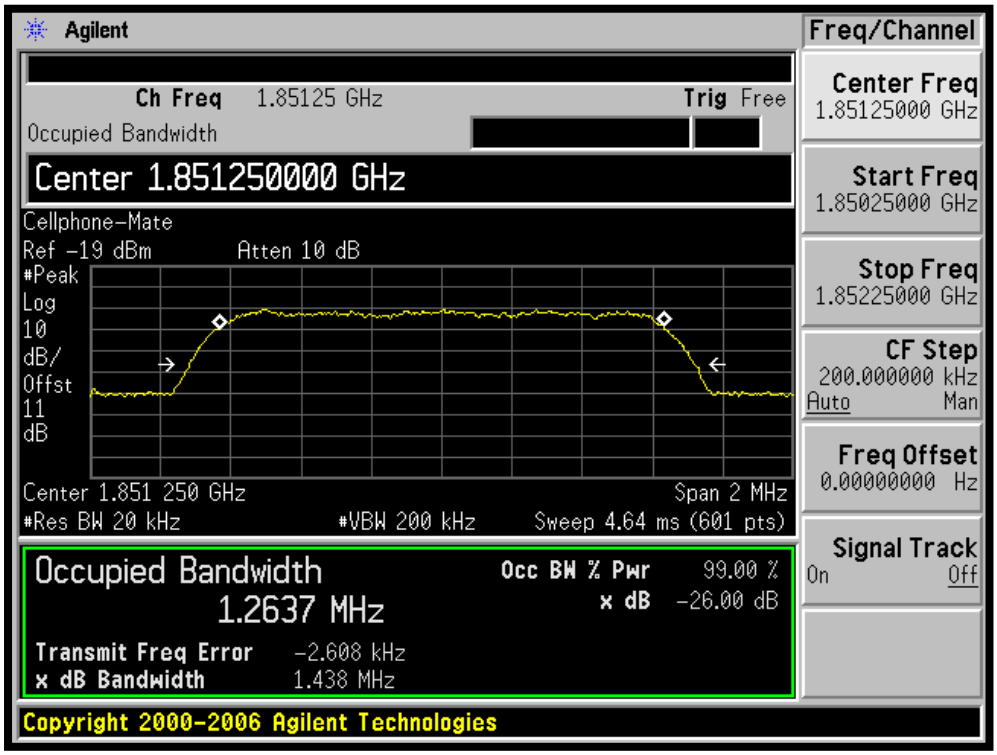


Output

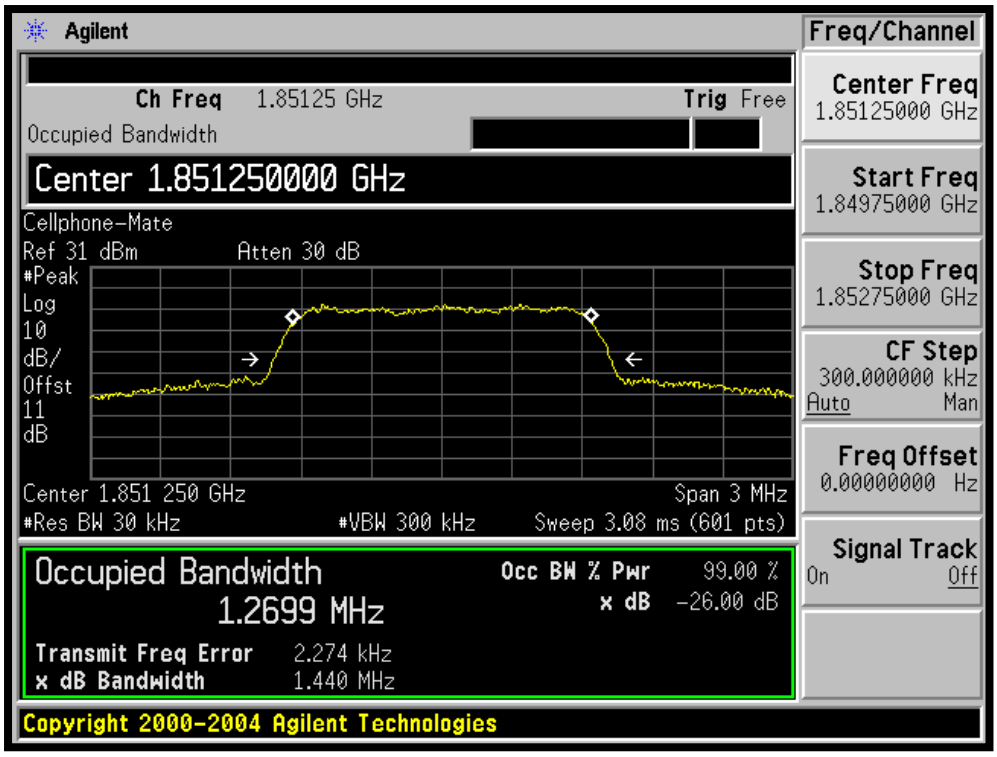


6.5.4 CDMA: Reverse (Uplink): Low Channel

Input

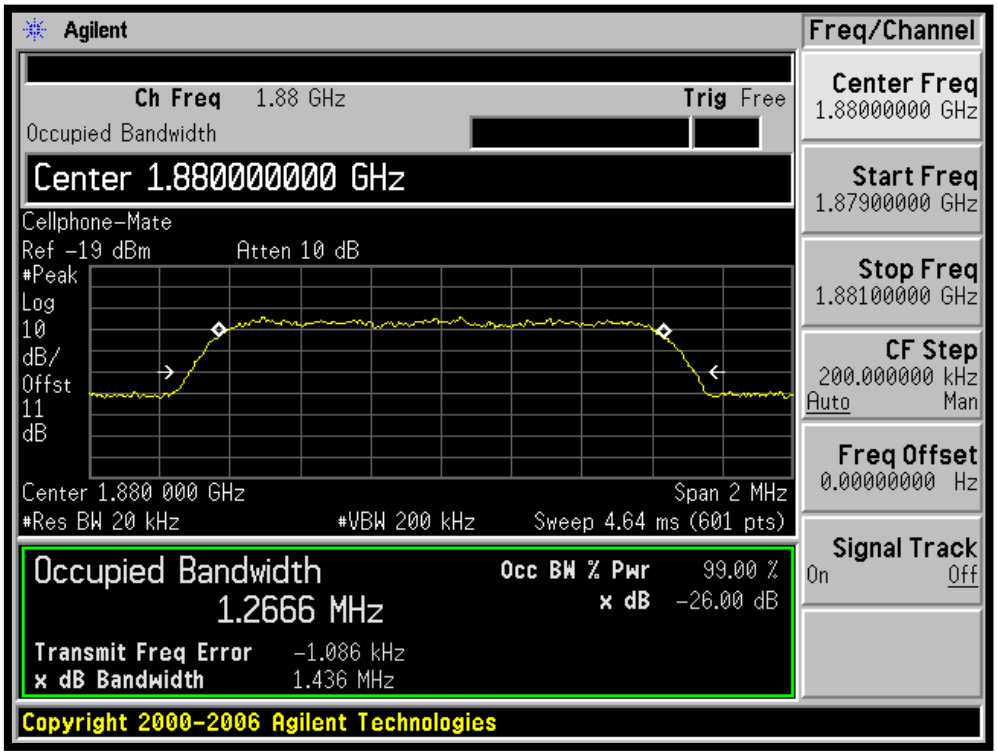


Output

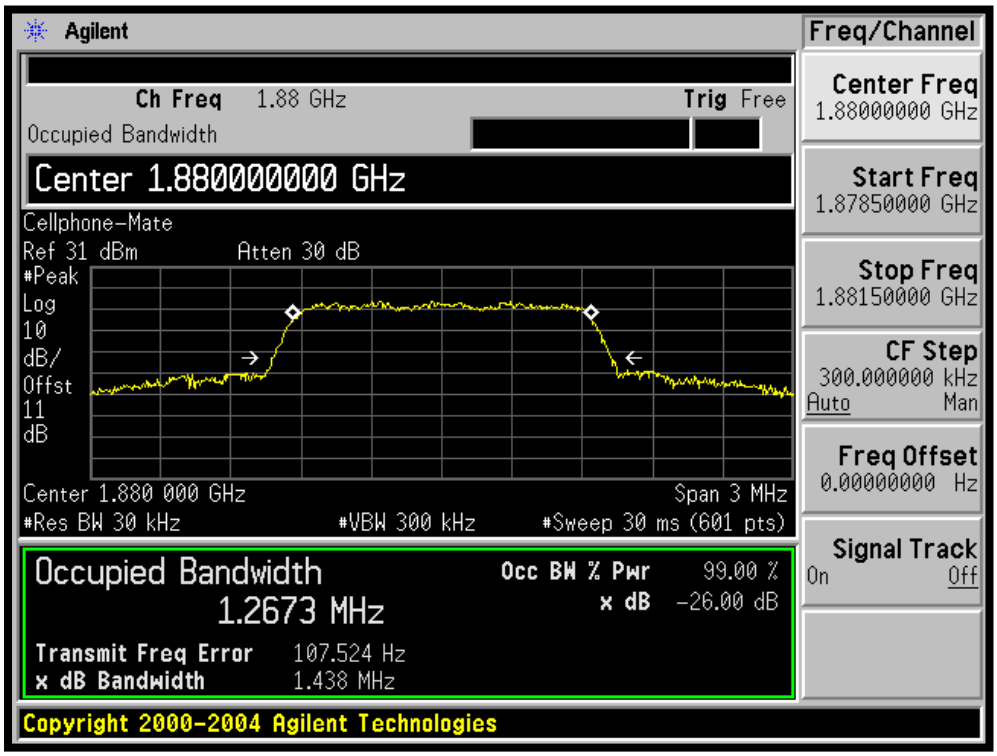


6.5.5 CDMA: Reverse (Uplink): Middle Channel

Input

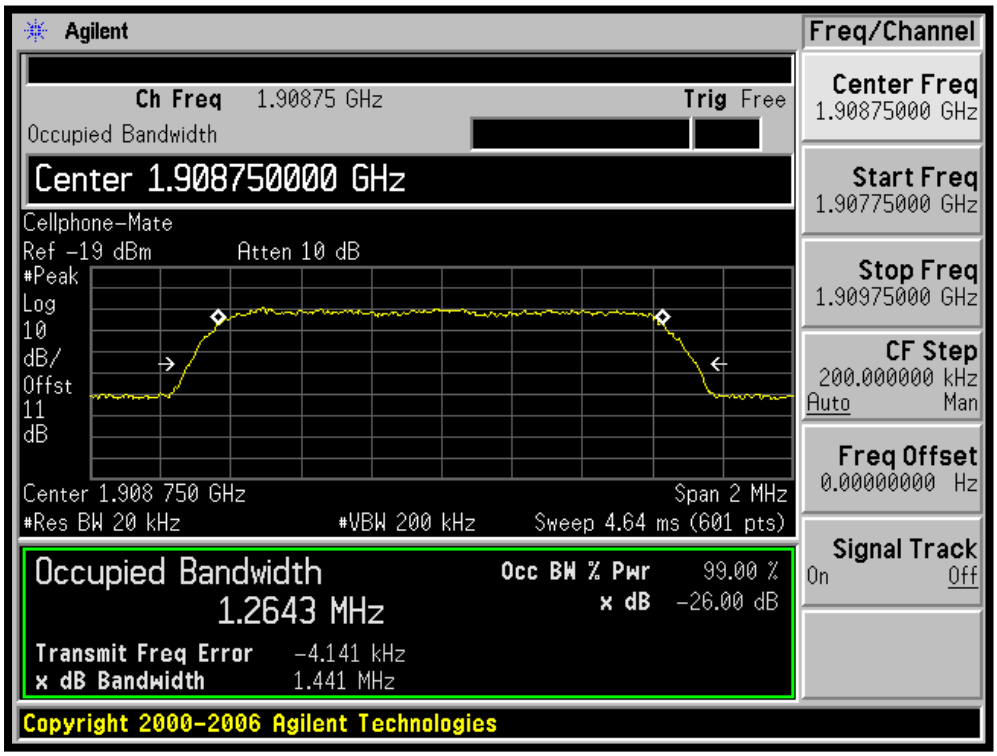


Output

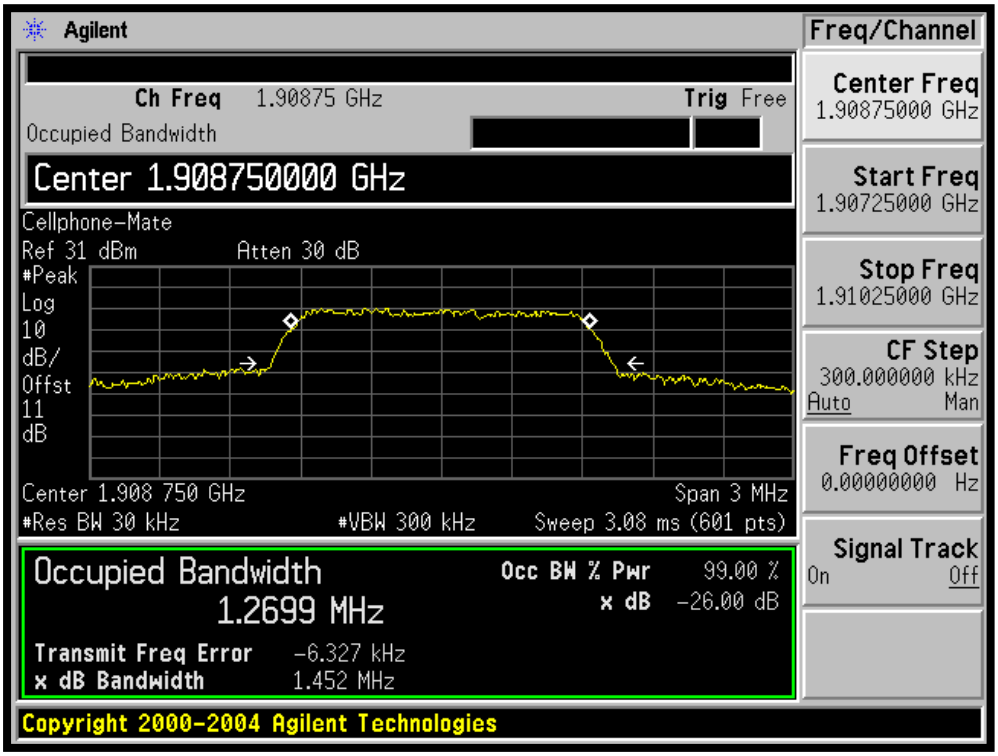


6.5.6 CDMA: Reverse (Uplink): High Channel

Input

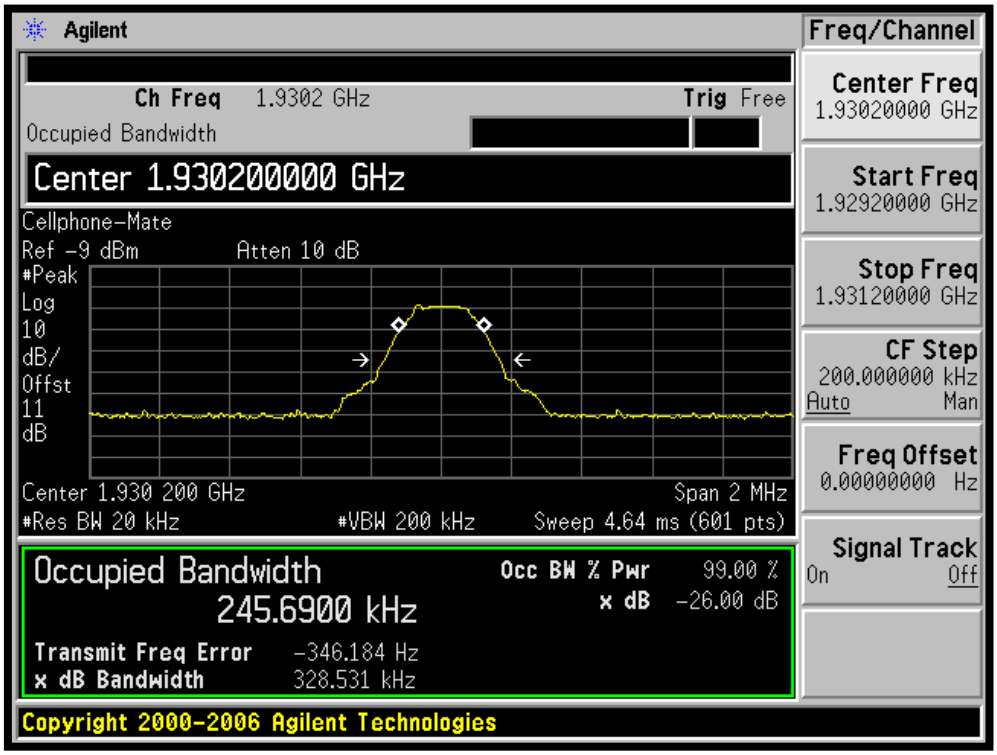


Output

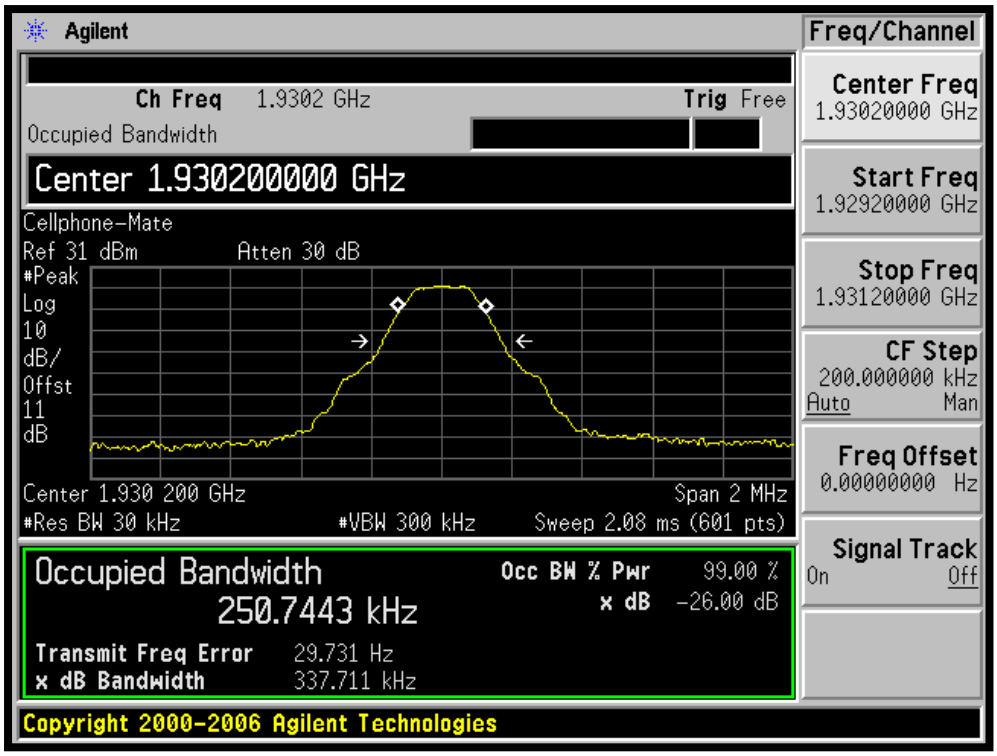


6.5.7 GSM: Forward (Downlink): Low Channel

Input

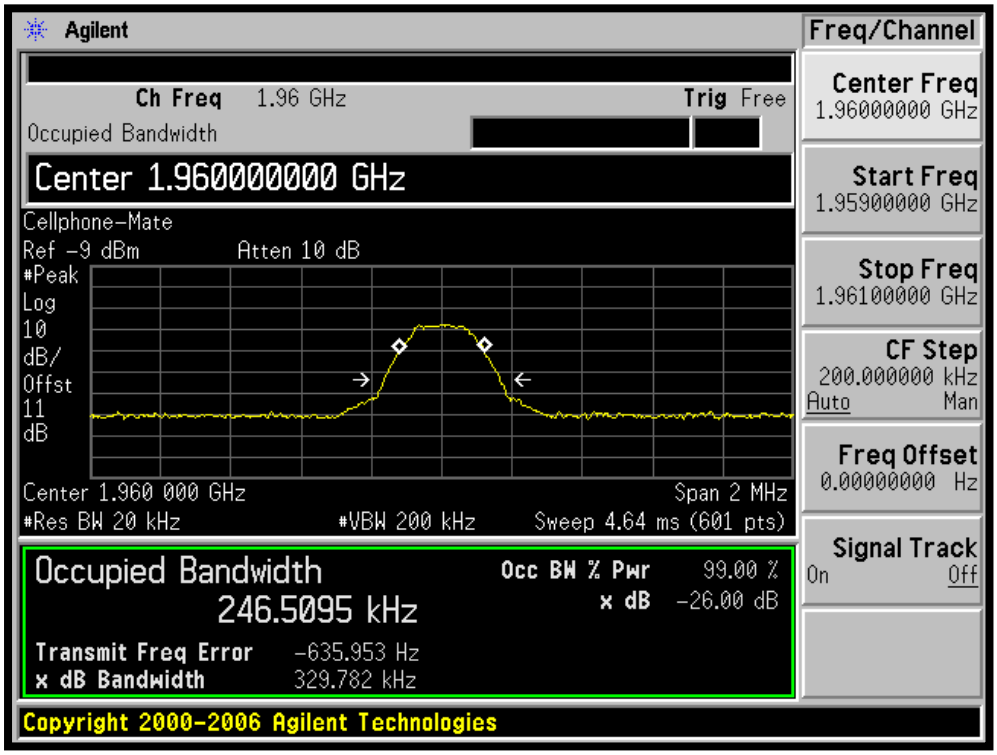


Output

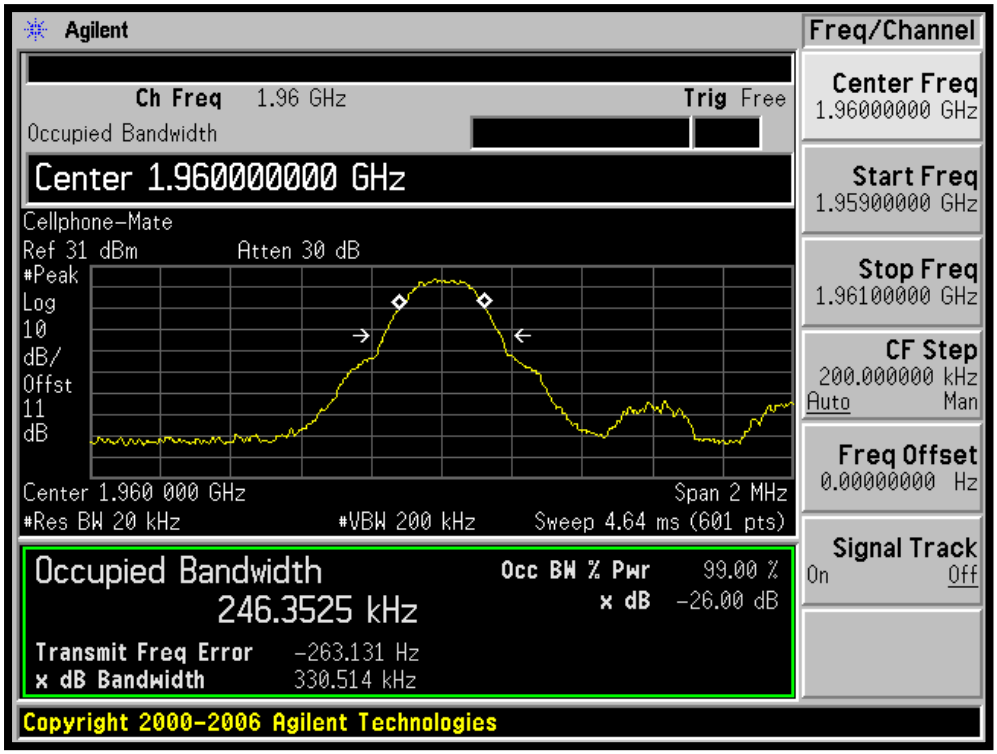


6.5.8 GSM: Forward (Downlink): Middle Channel

Input

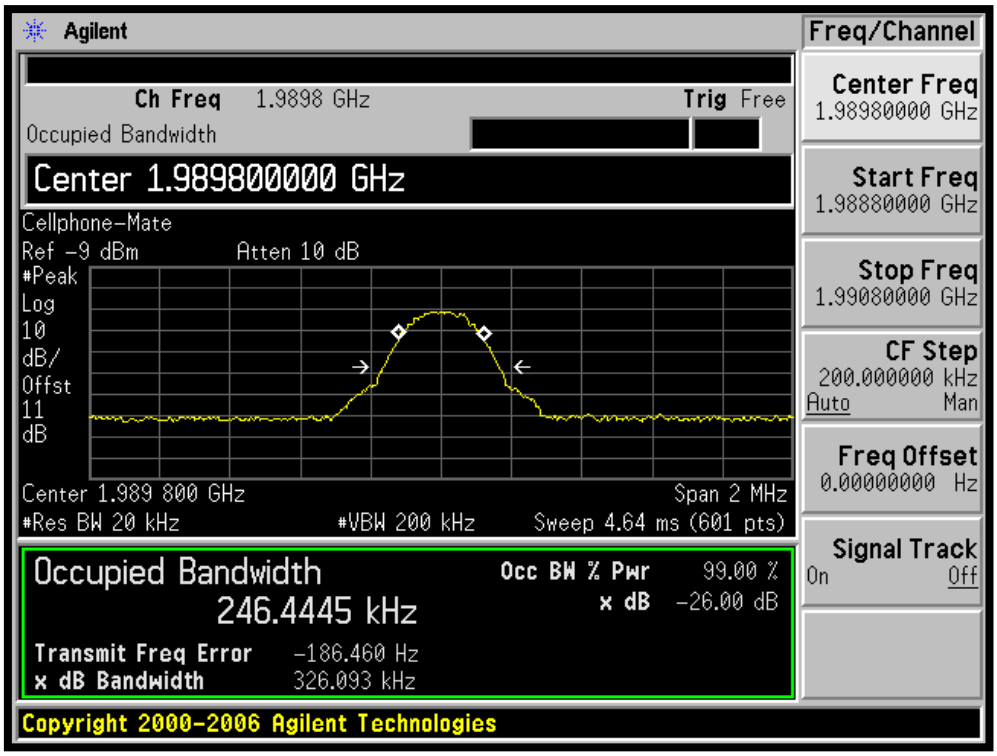


Output

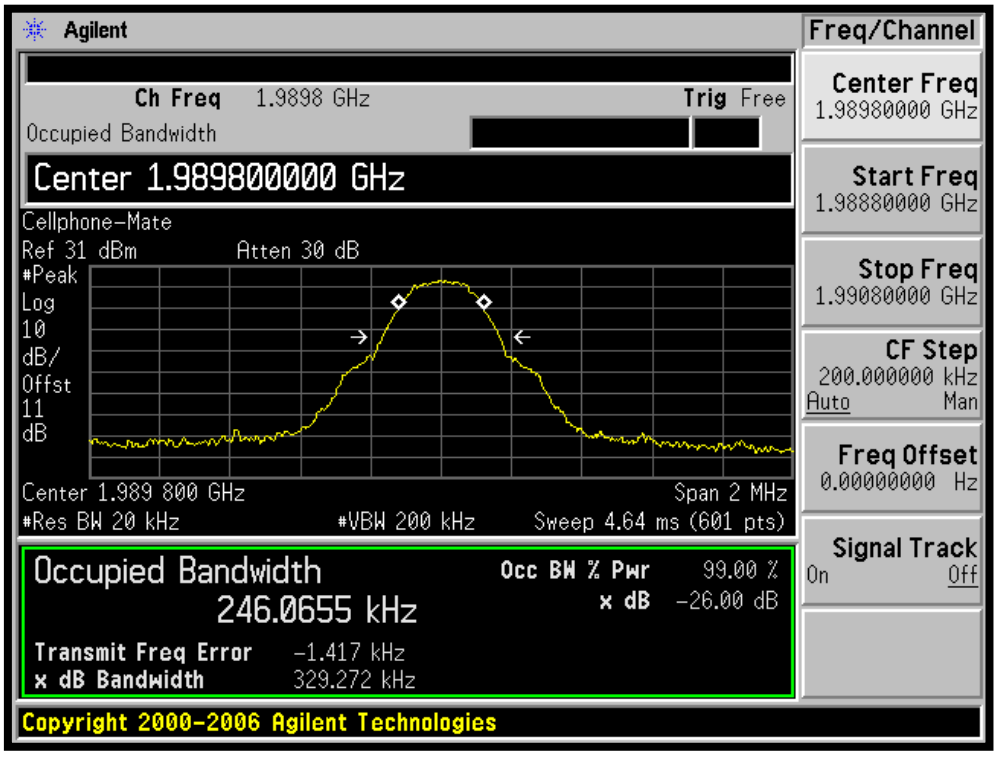


6.5.9 GSM: Forward (Downlink): High Channel

Input

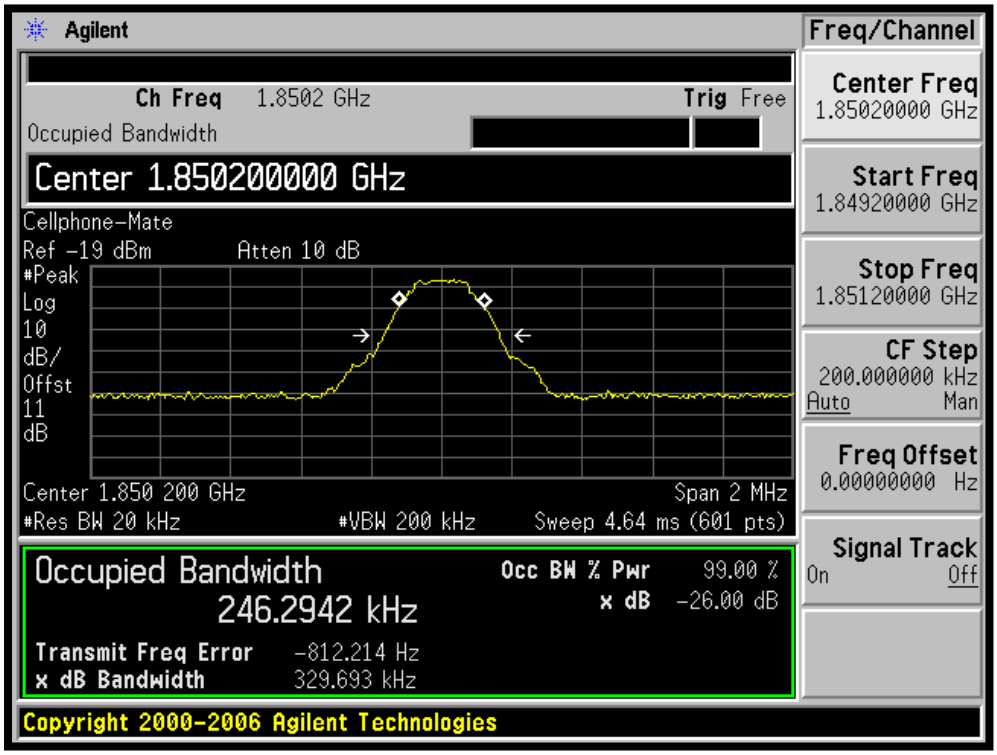


Output

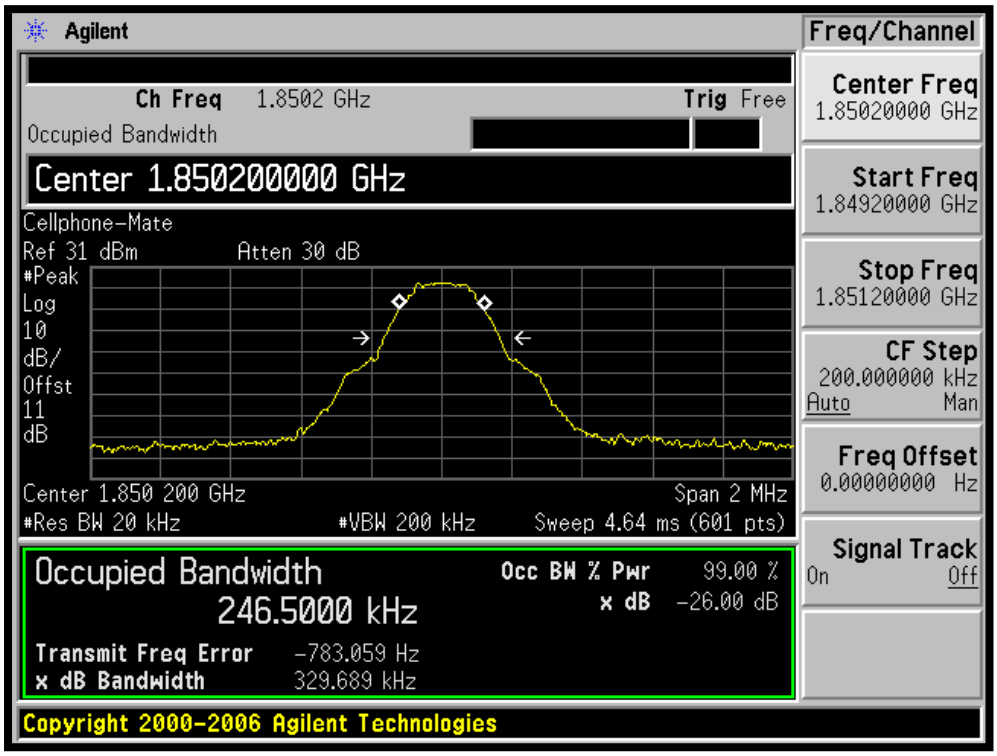


6.5.10 GSM: Reverse (Uplink): Low Channel

Input

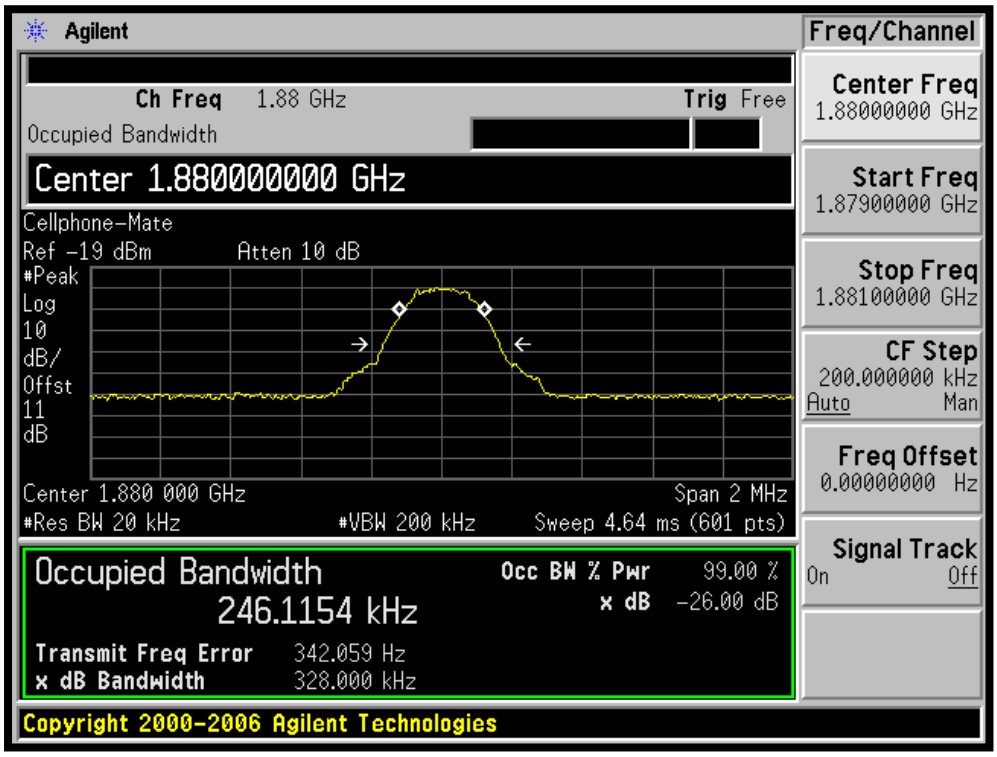


Output

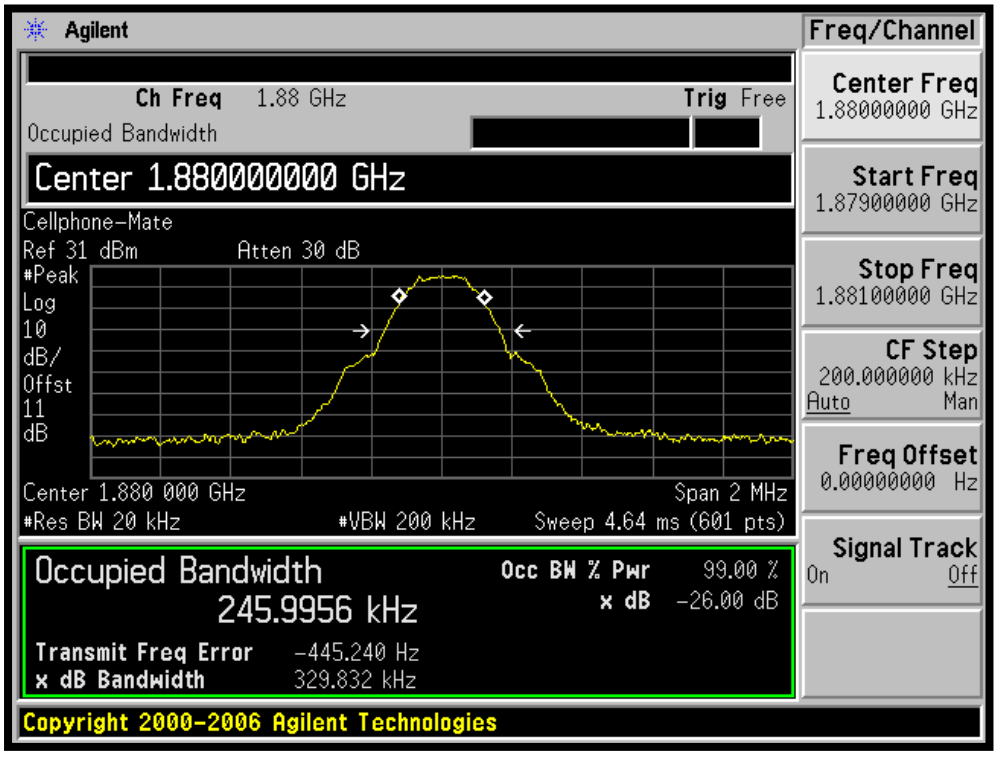


6.5.11 GSM: Reverse (Uplink): Middle Channel

Input

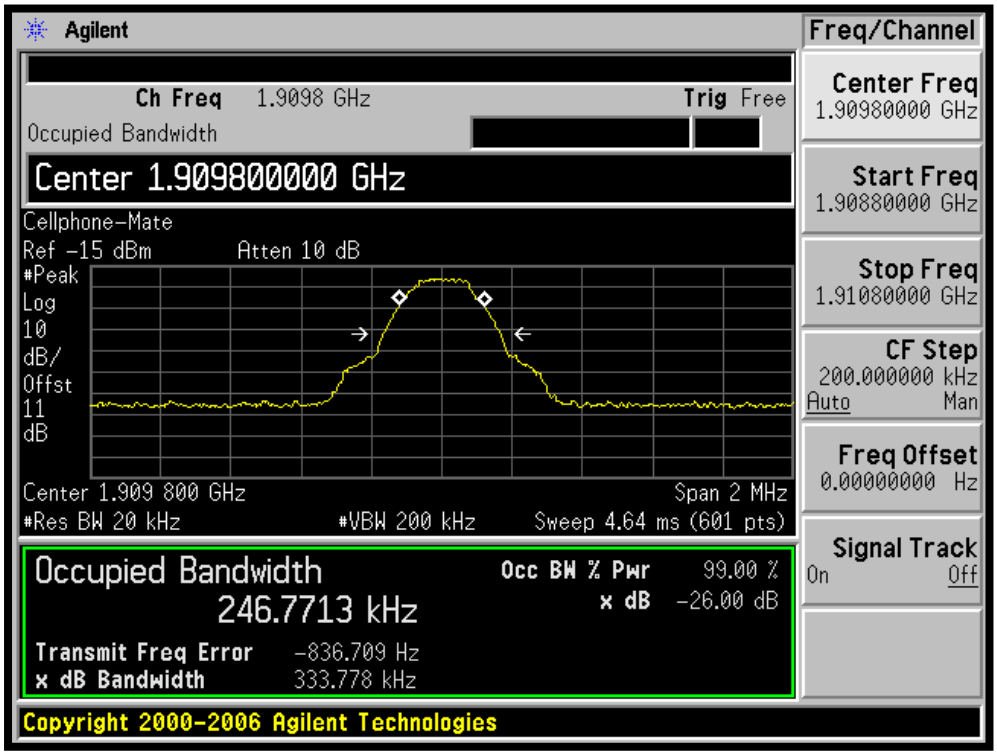


Output

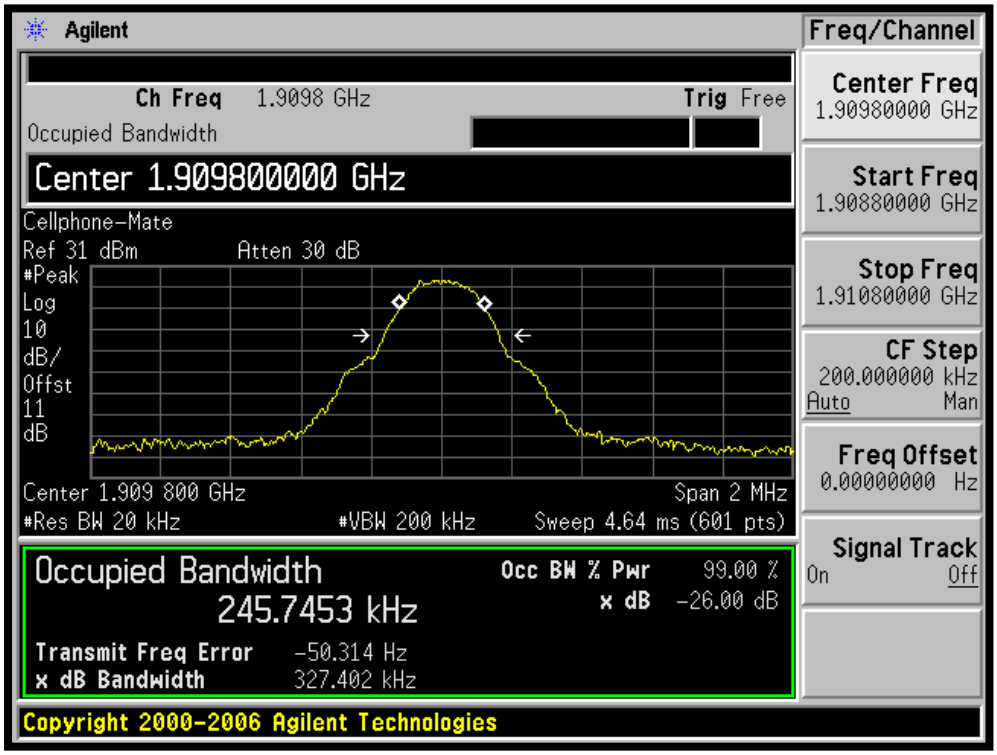


6.5.12 GSM: Reverse (Uplink): High Channel

Input



Output



7 §2.1051, §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

Requirements: CFR 47, § 2.1051. § 24.238(a)

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

7.2 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.

7.2.1 Environmental Conditions

Temperature:	22° C
Relative Humidity:	60 %
ATM Pressure:	102.1 kPa

** The testing was performed by Oscar Au on 2007-08-09.*

7.3 Test Equipment List and Details

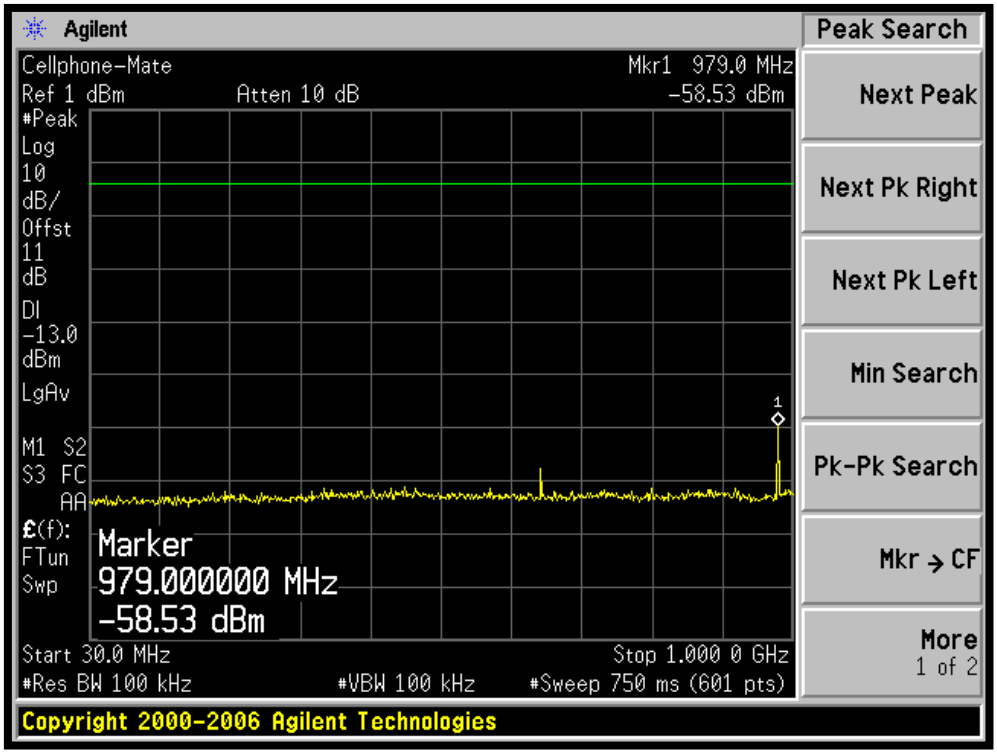
Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-04-26
R & S	Signal Generator	SMIQ03	849192	2006-10-08

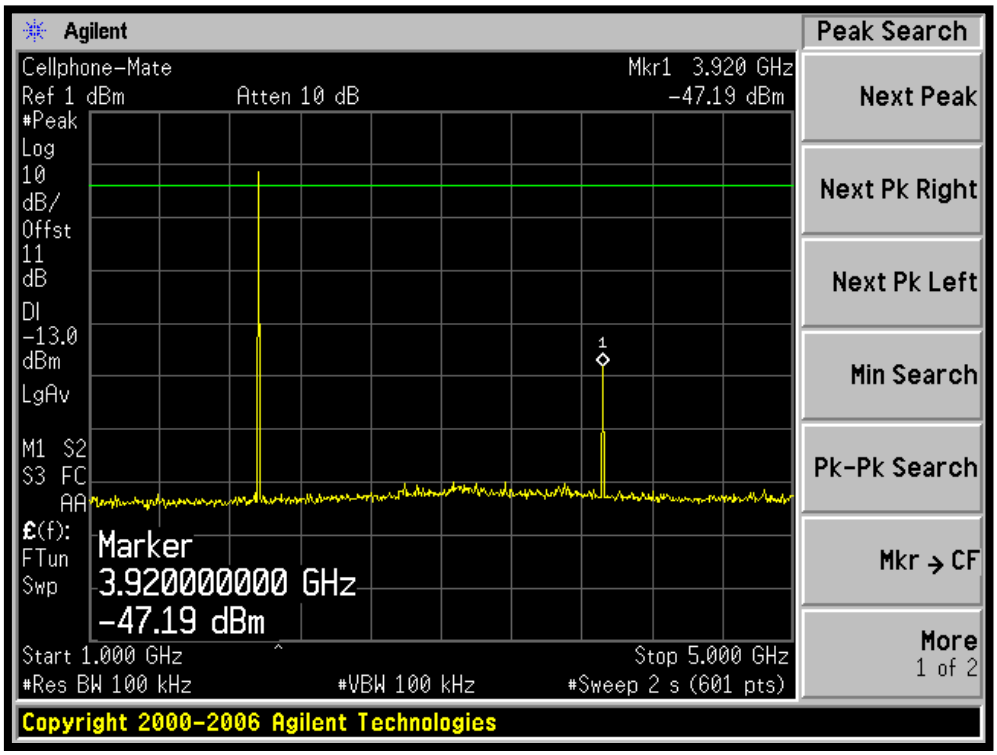
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

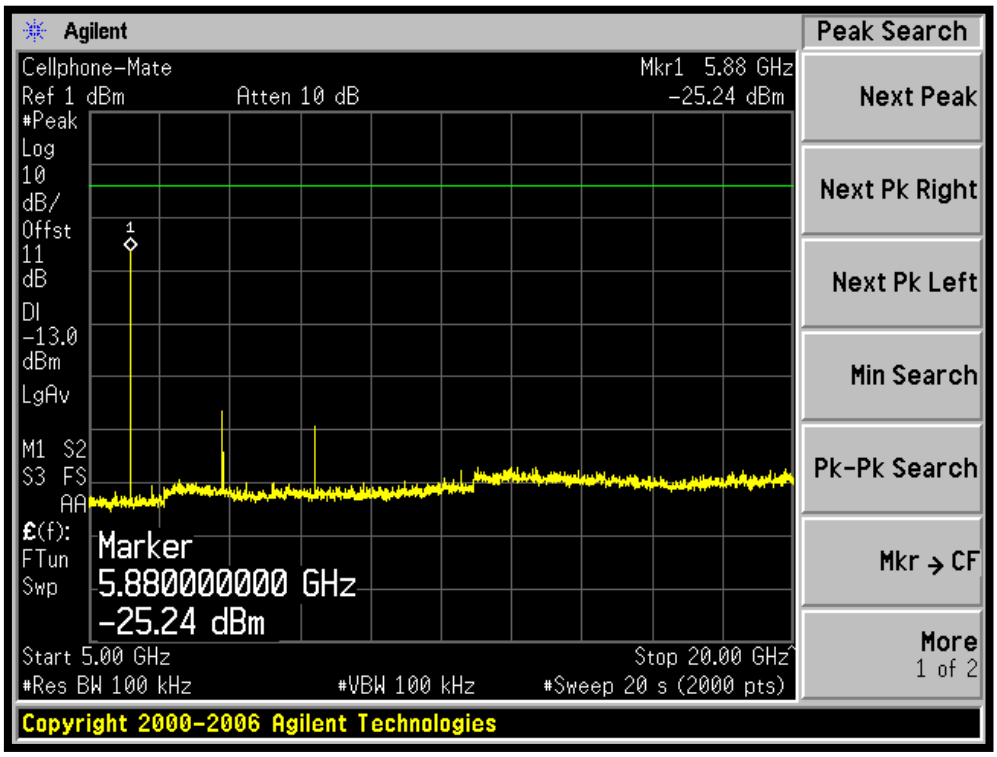
7.4 Test Results

Please refer to the hereinafter plots.

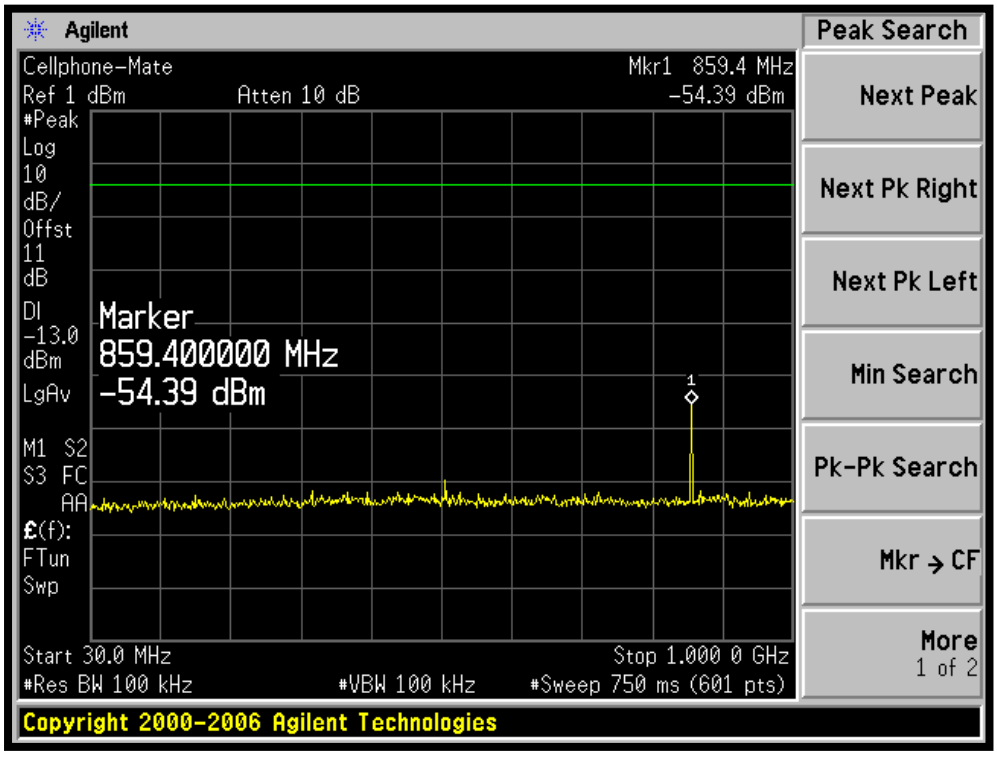
7.4.1 Forward (Downlink): Middle Channel

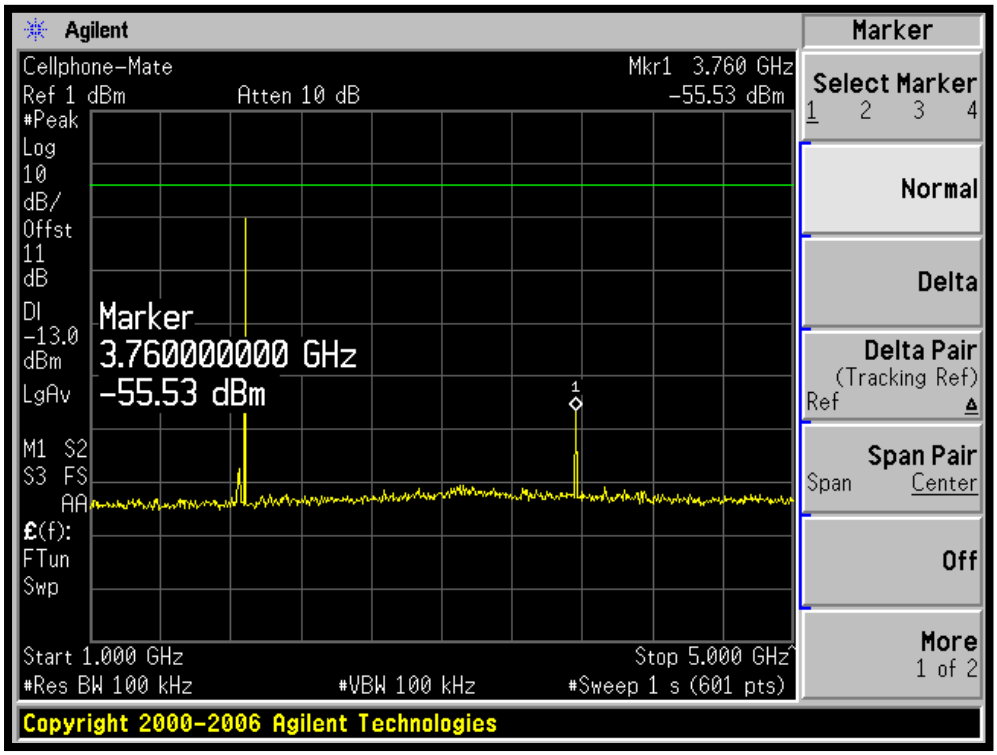


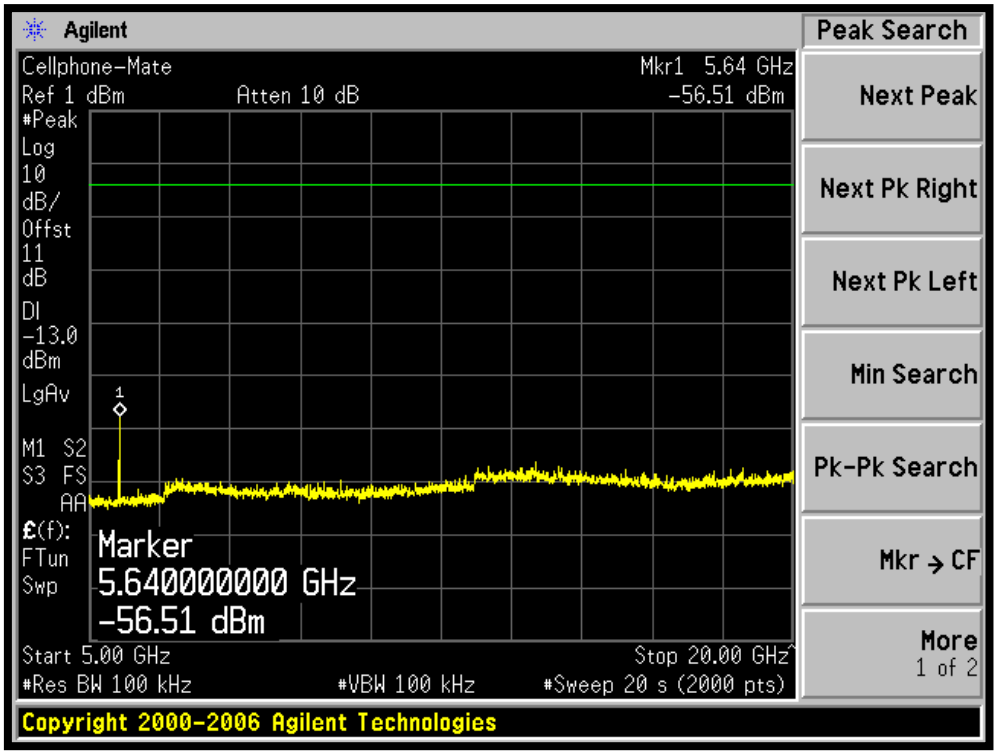




7.4.2 Reverse (Uplink): Middle Channel



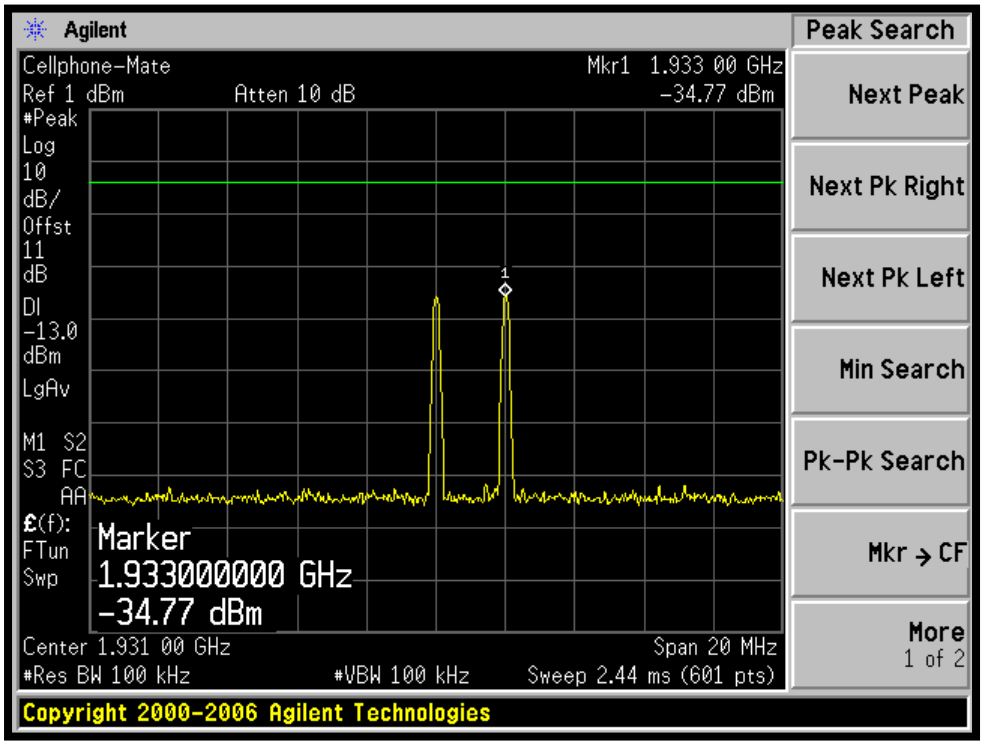

Agilent
Marker
Cellphone-Mate
Mkr1 3.760 GHz
Ref 1 dBm
Atten 10 dB
-55.53 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
3.760000000 GHz
-55.53 dBm
Start 1.000 GHz
Stop 5.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 1 s (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2006 Agilent Technologies


Agilent
Peak Search
Cellphone-Mate
Mkr1 5.64 GHz
Ref 1 dBm
Atten 10 dB
-56.51 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
5.640000000 GHz
-56.51 dBm
Start 5.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 20 s (2000 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

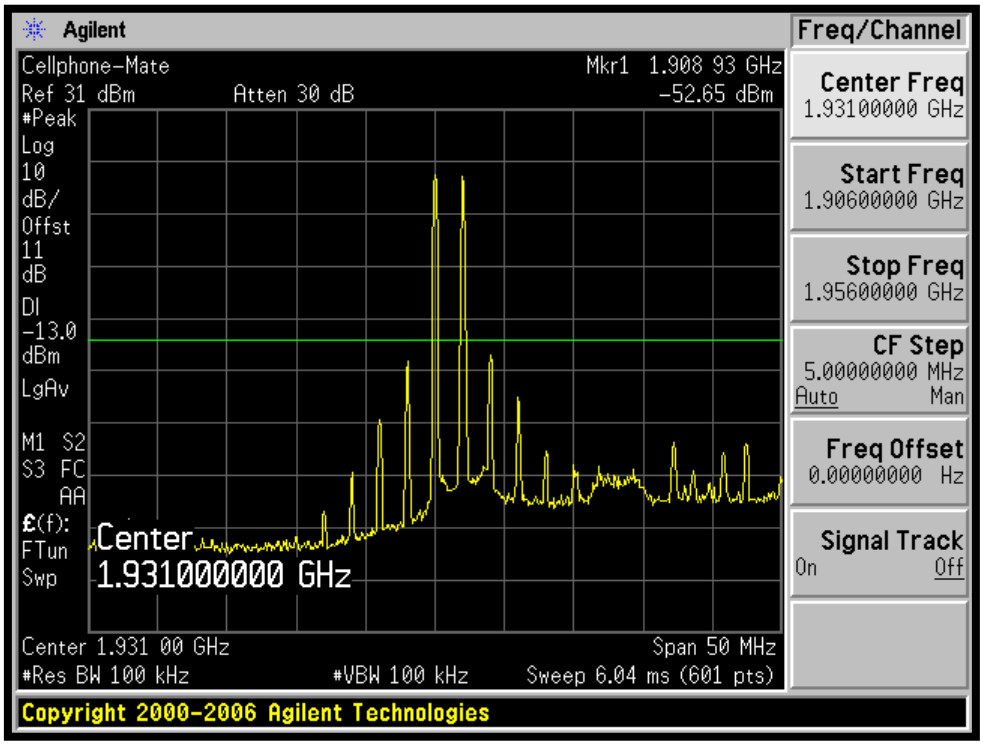
Intermodulation Testing

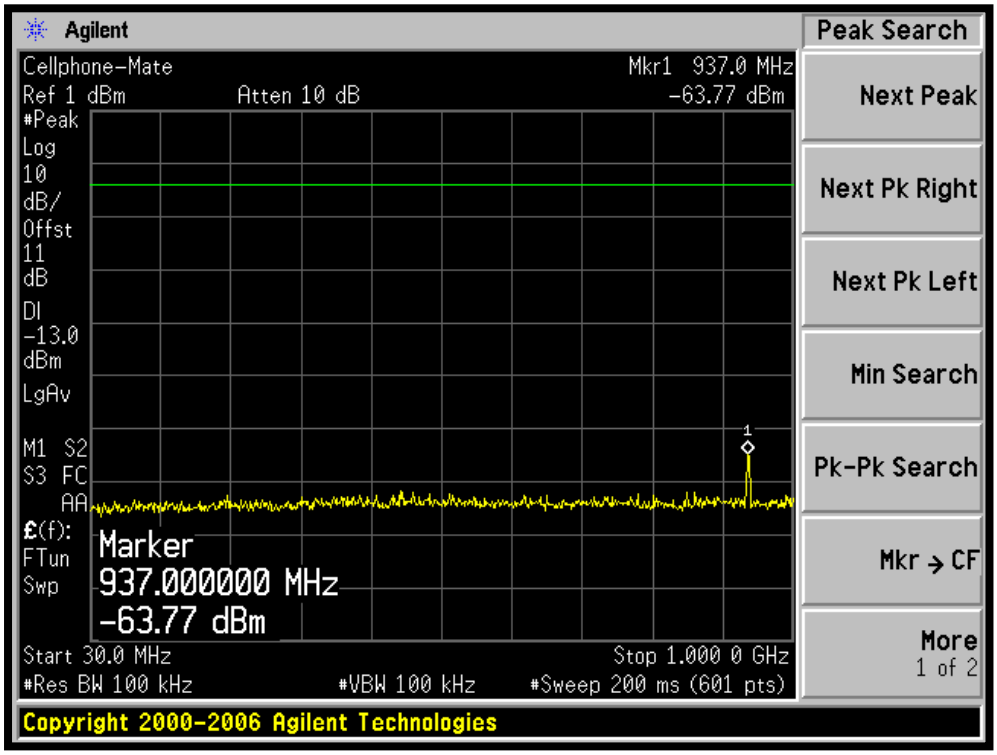
7.4.3 Forward (Downlink) Low channel

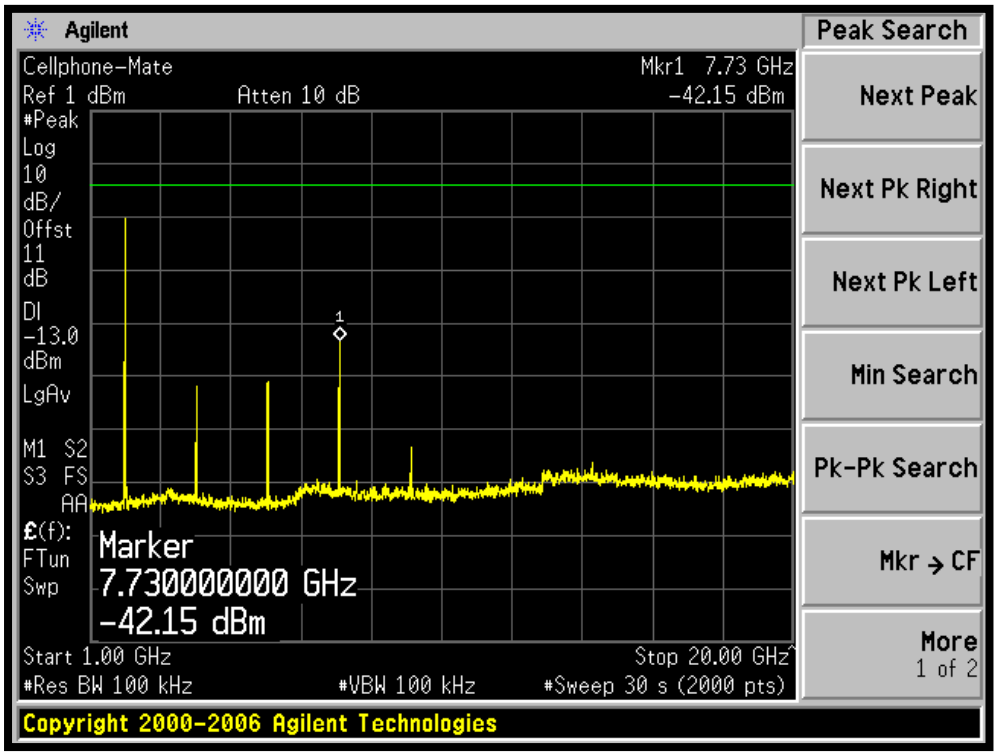
Input



Output

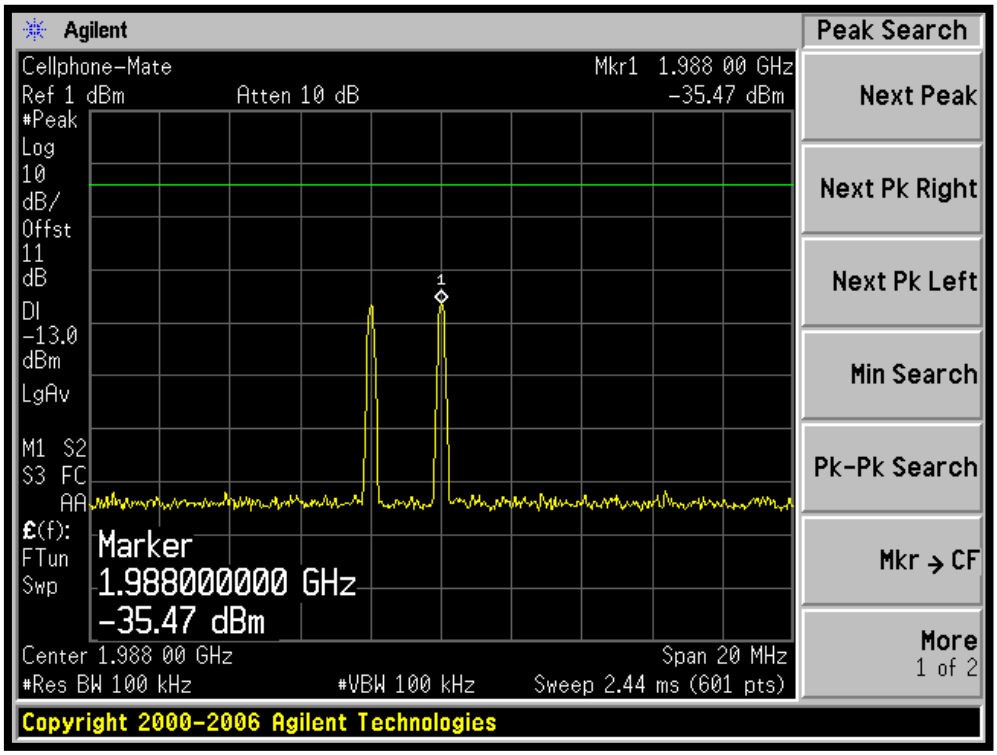



Agilent
Peak Search
Cellphone-Mate
Mkr1 937.0 MHz
Ref 1 dBm
Atten 10 dB
-63.77 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
937.000000 MHz
-63.77 dBm
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 200 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

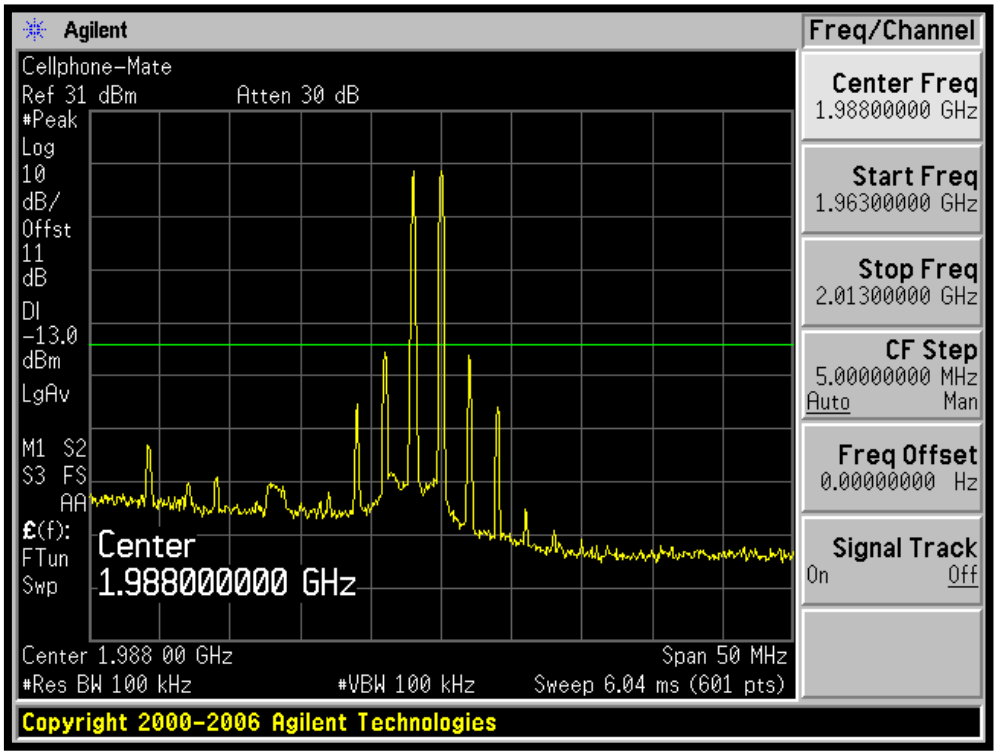

Agilent
Peak Search
Cellphone-Mate
Mkr1 7.73 GHz
Ref 1 dBm
Atten 10 dB
-42.15 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
7.730000000 GHz
-42.15 dBm
Start 1.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 30 s (2000 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

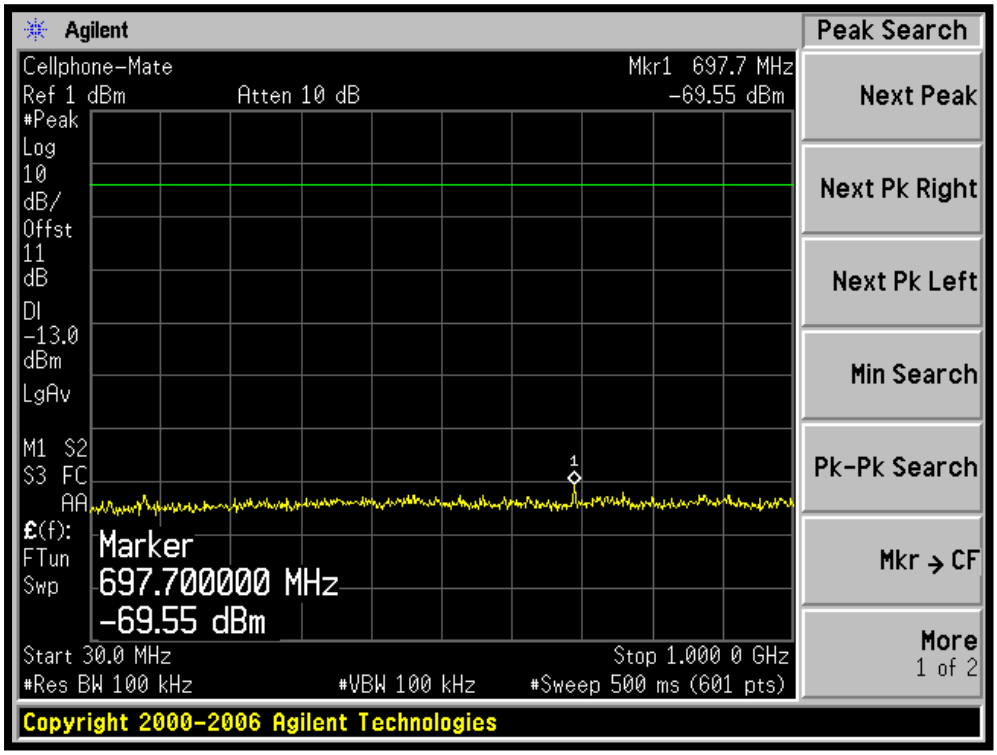
7.4.4 Forward (Downlink) High channel

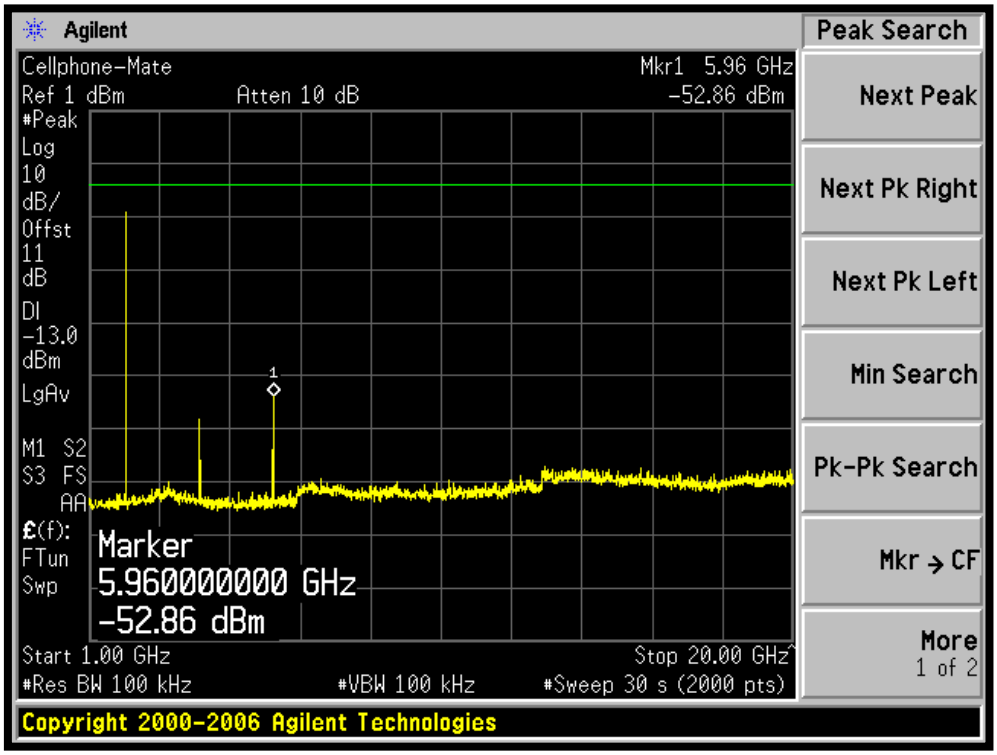
Input



Output

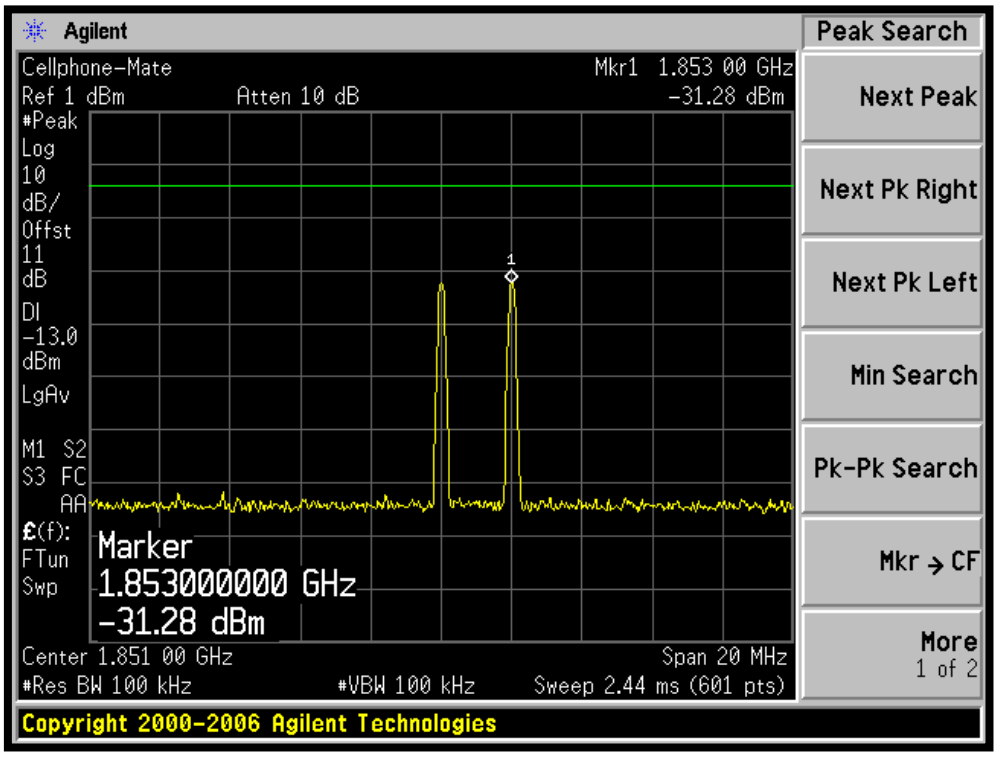



Agilent
Peak Search
Cellphone-Mate
Mkr1 697.7 MHz
Ref 1 dBm
Atten 10 dB
-69.55 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
697.700000 MHz
-69.55 dBm
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 500 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

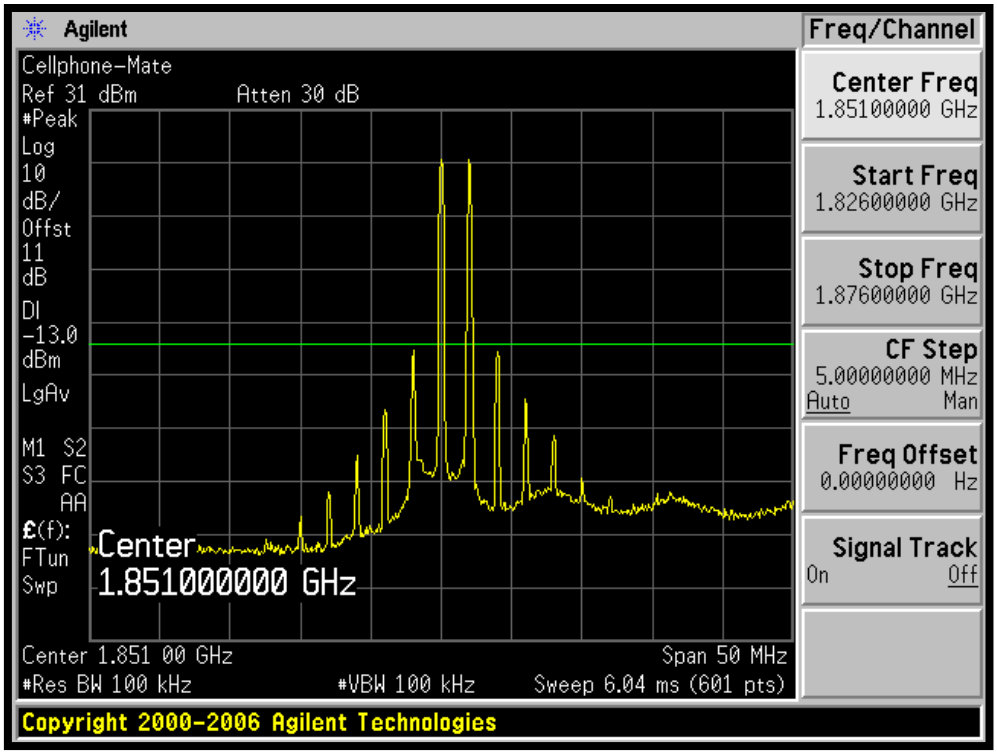

Agilent
Peak Search
Cellphone-Mate
Mkr1 5.96 GHz
Ref 1 dBm
Atten 10 dB
-52.86 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
5.960000000 GHz
-52.86 dBm
Start 1.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 30 s (2000 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

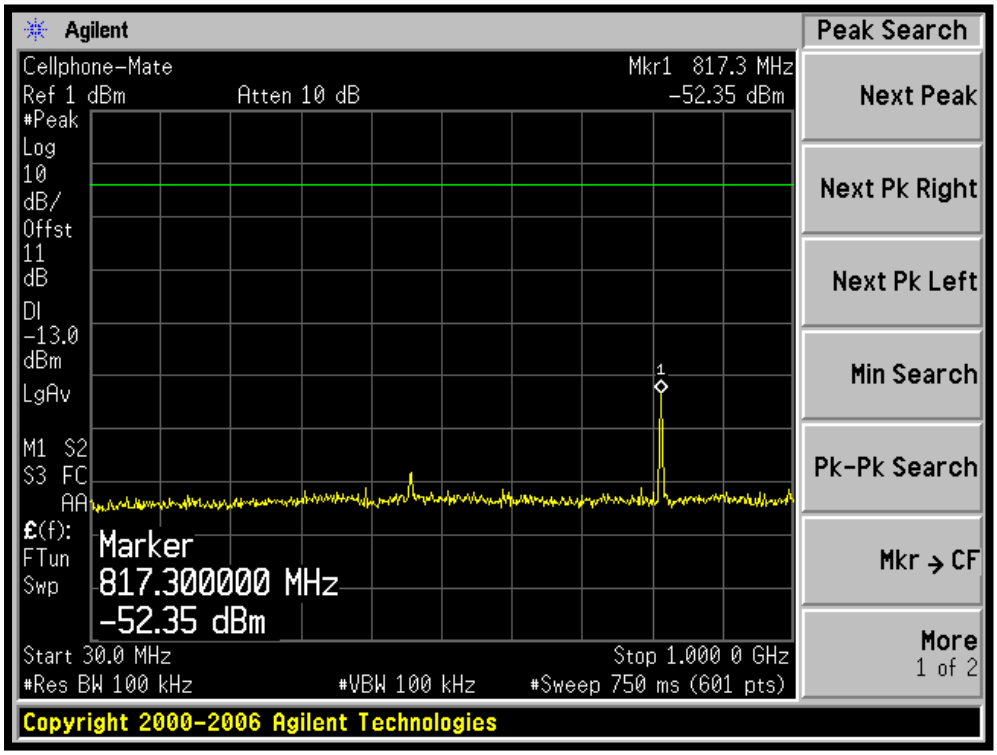
7.4.5 Reverse (Uplink) Low channel

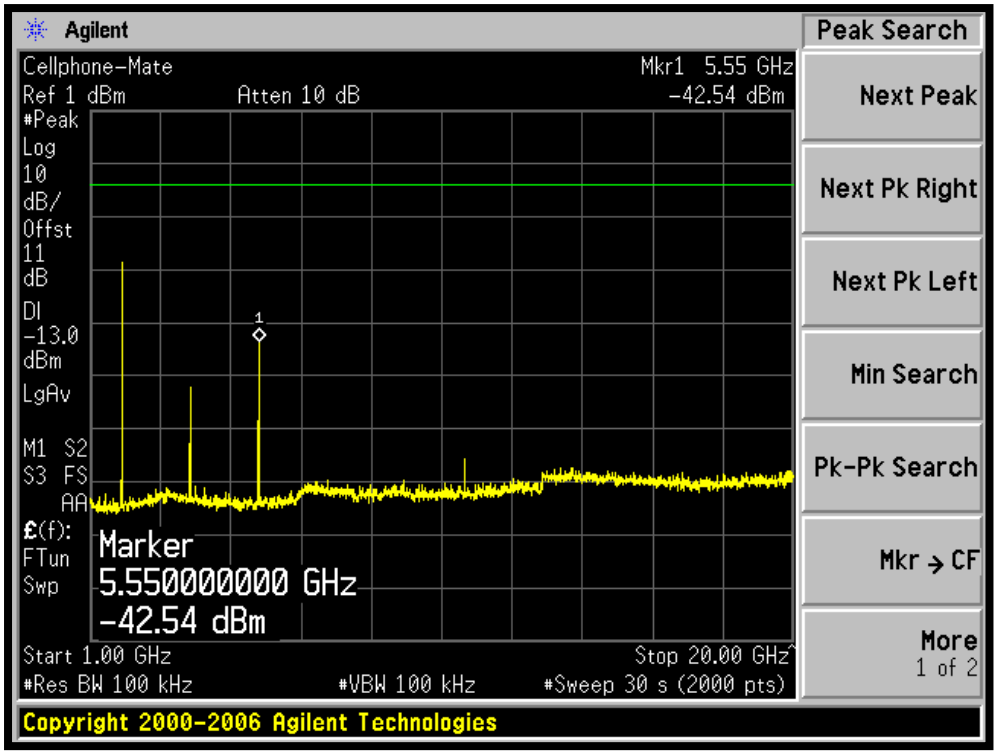
Input



Output

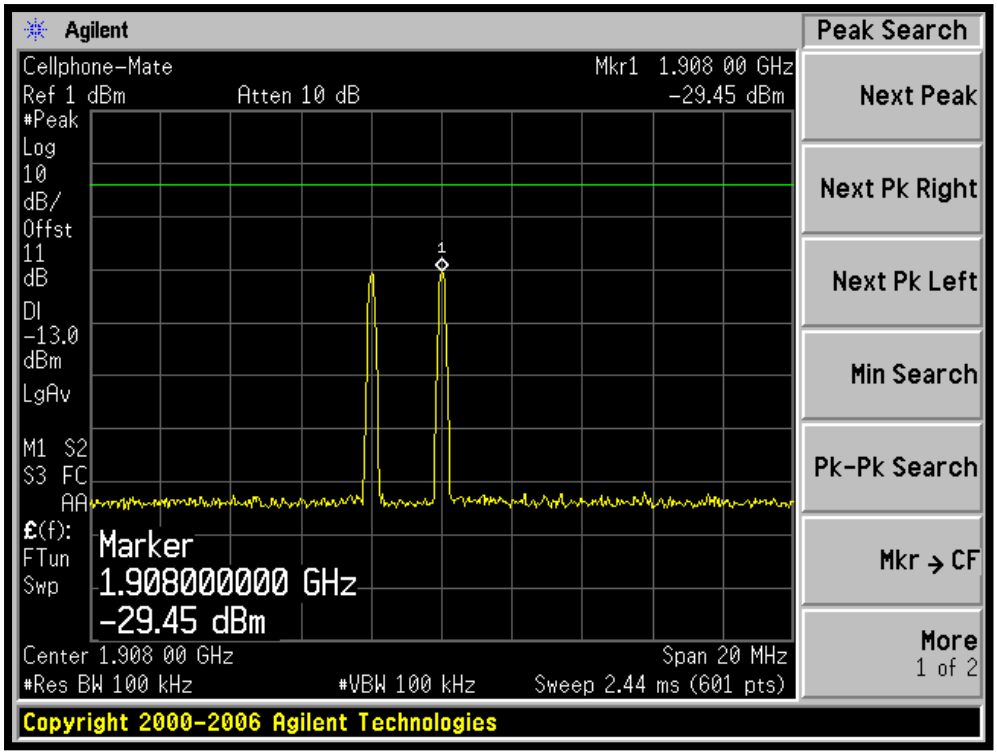



Agilent
Peak Search
Cellphone-Mate
Mkr1 817.3 MHz
Ref 1 dBm
Atten 10 dB
-52.35 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
817.300000 MHz
-52.35 dBm
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 750 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

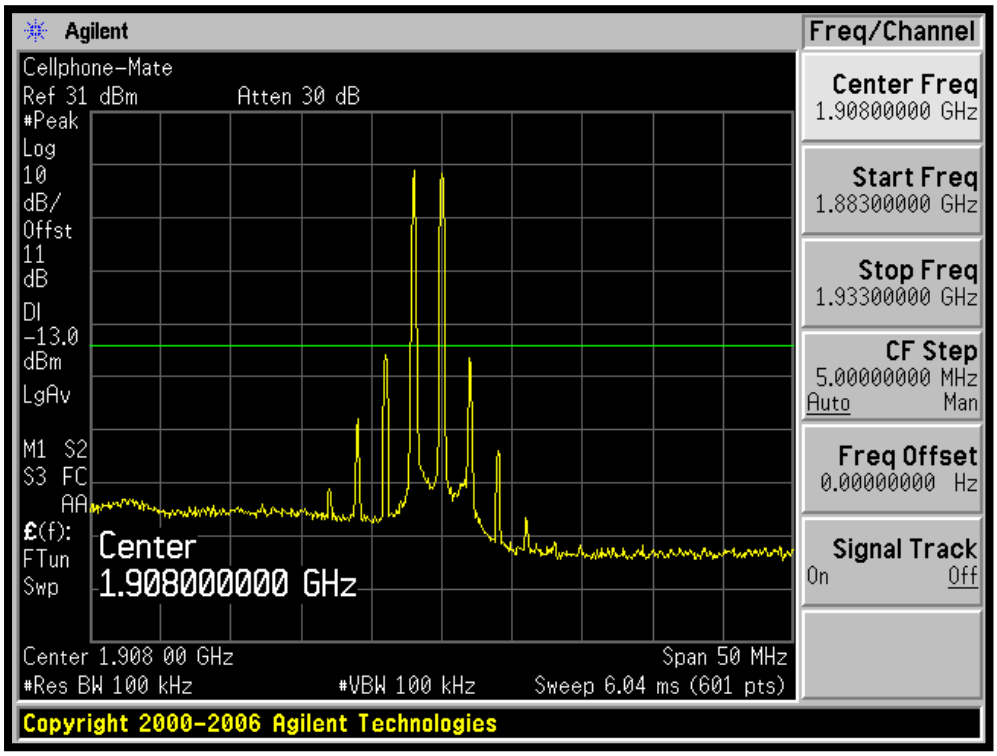

Agilent
Peak Search
Cellphone-Mate
Mkr1 5.55 GHz
Ref 1 dBm
Atten 10 dB
-42.54 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
5.550000000 GHz
-42.54 dBm
Start 1.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 30 s (2000 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

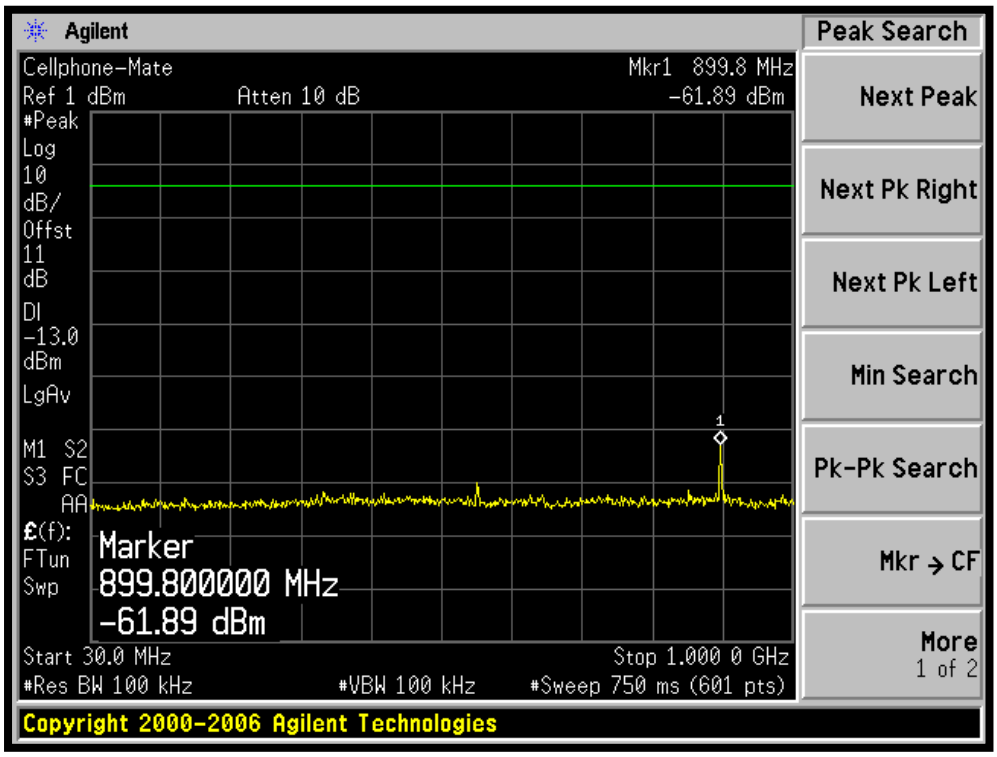
7.4.6 Reverse (Uplink) High channel

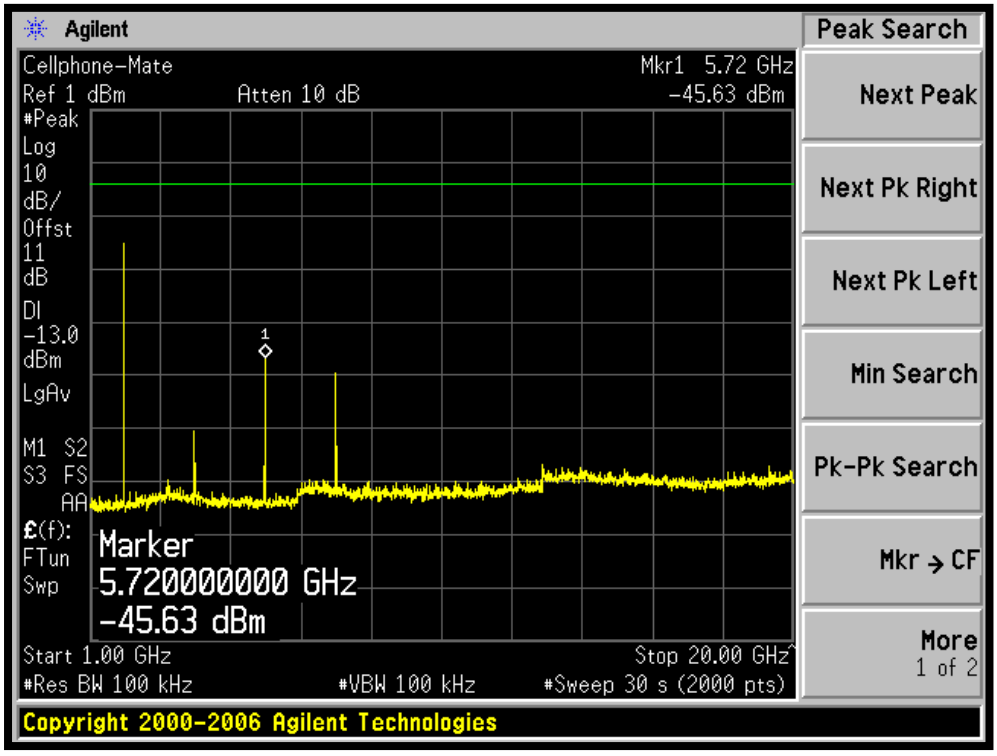
Input



Output




Agilent
Peak Search
Cellphone-Mate
Mkr1 899.8 MHz
Ref 1 dBm
Atten 10 dB
-61.89 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
899.800000 MHz
-61.89 dBm
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 750 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies


Agilent
Peak Search
Cellphone-Mate
Mkr1 5.72 GHz
Ref 1 dBm
Atten 10 dB
-45.63 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Marker
5.720000000 GHz
-45.63 dBm
Start 1.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
#Sweep 30 s (2000 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies

8 §24.238 – BAND EDGE

8.1 Applicable Standard

According to § 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.

8.2 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, RBW set to 10 kHz.

8.2.1 Environmental Conditions

Temperature:	21 °C
Relative Humidity:	57 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-08-09.*

8.3 Test Equipment List and Details

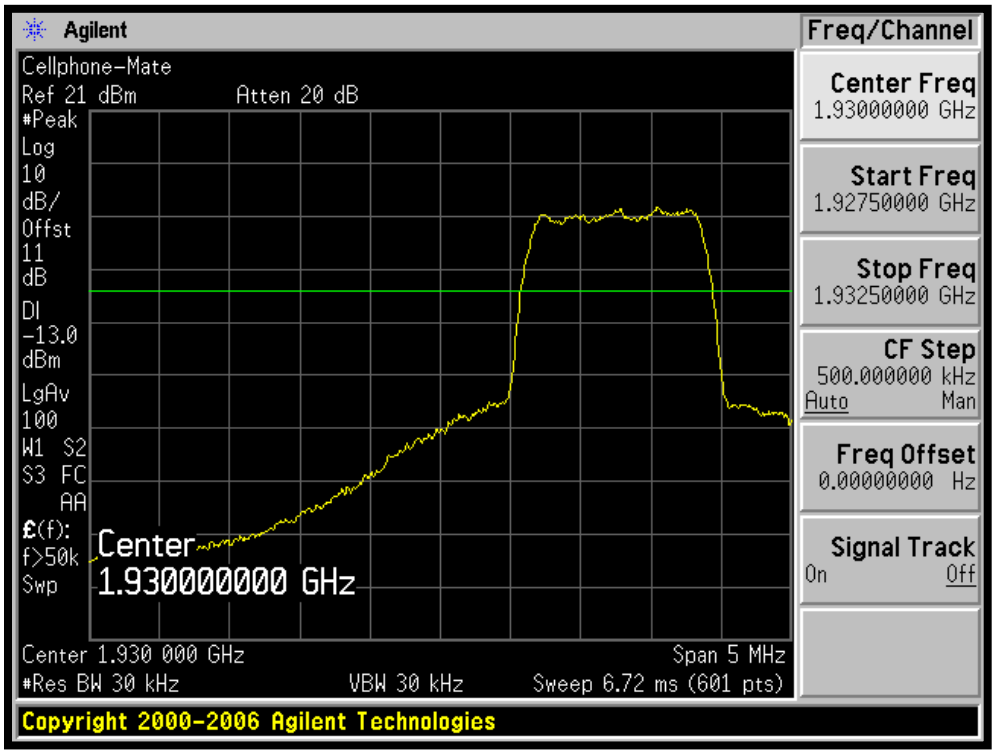
Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-04-26
R & S	Signal Generator	SMIQ03	849192	2006-10-08

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

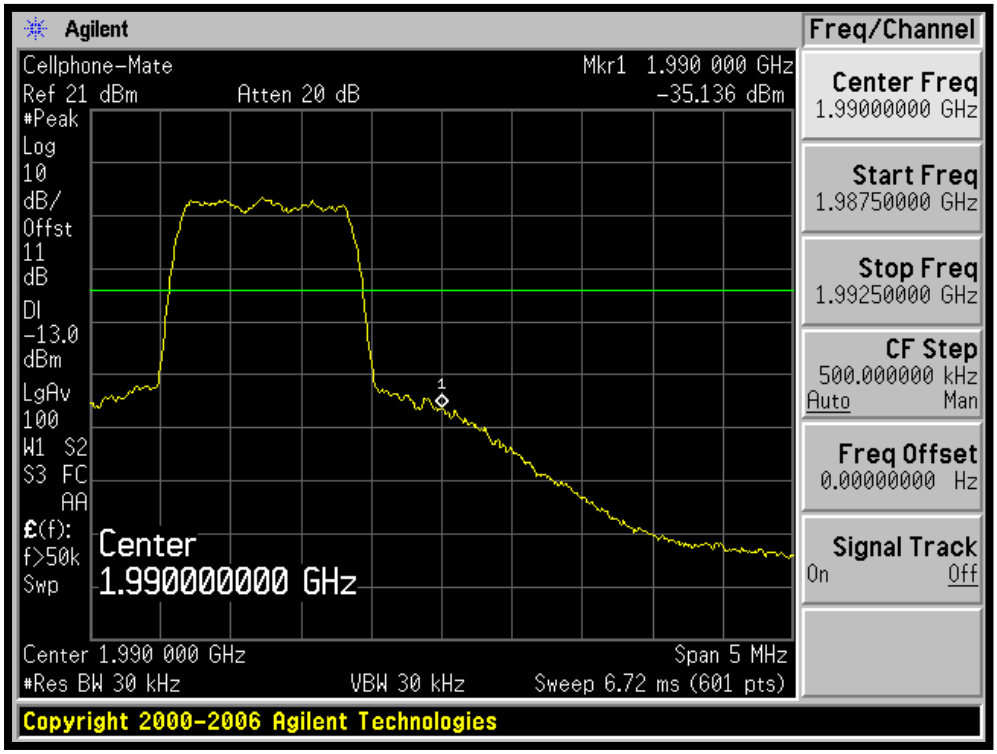
8.4 Test Results

Please refer to the following plots.

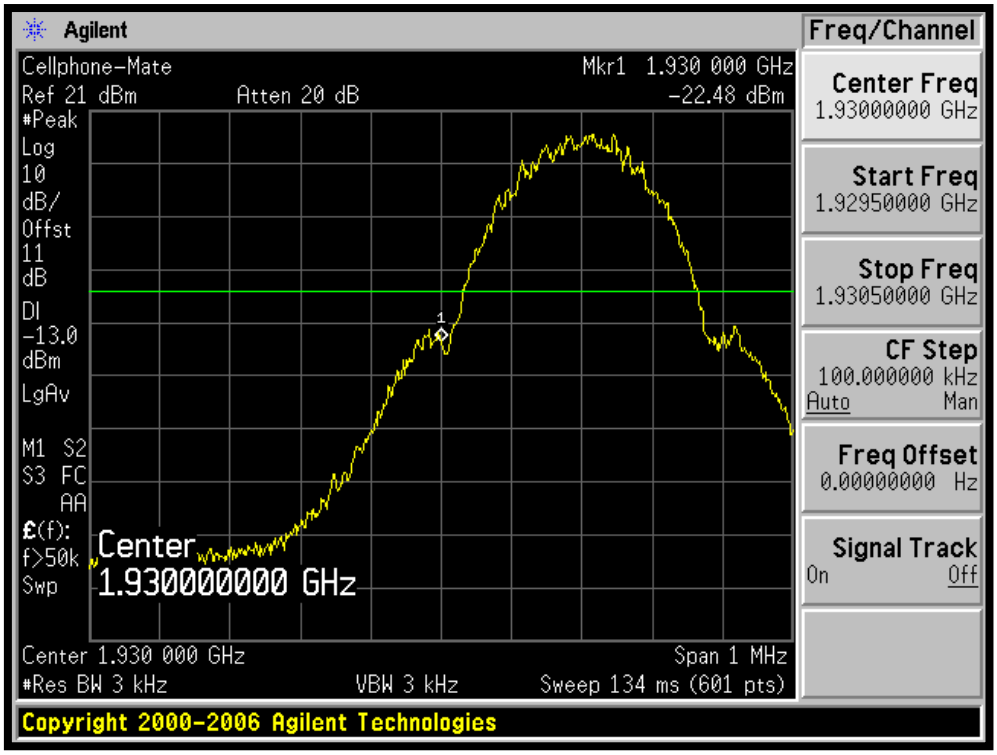
8.4.1 CDMA: Forward (Downlink): Lowest Channel



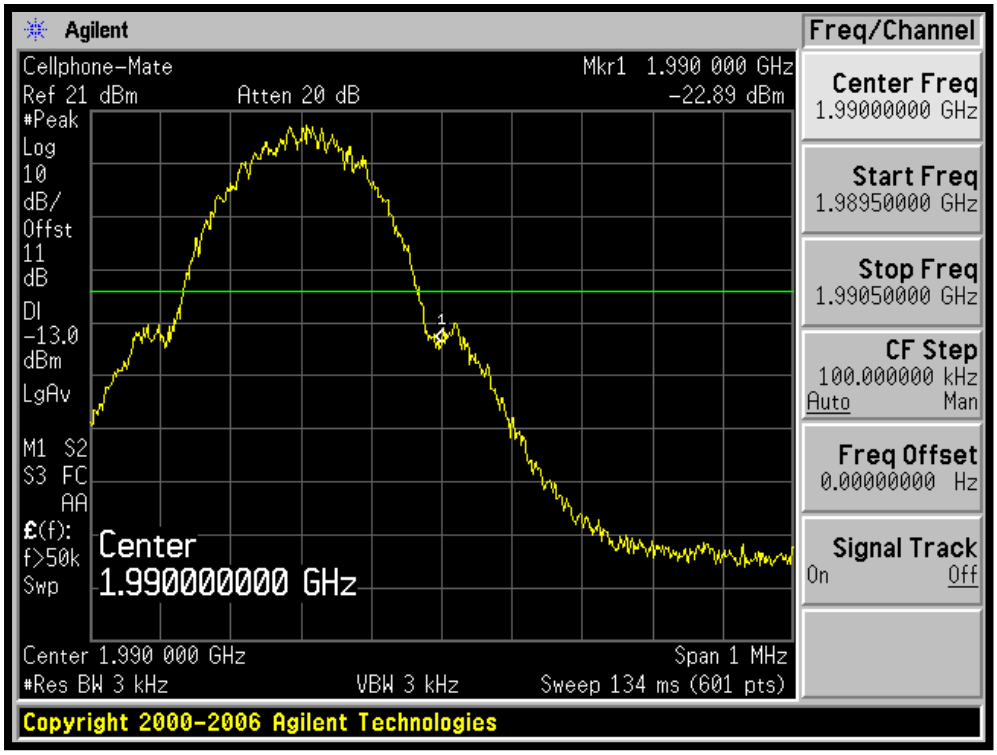
8.4.2 CDMA: Forward (Downlink): Highest Channel



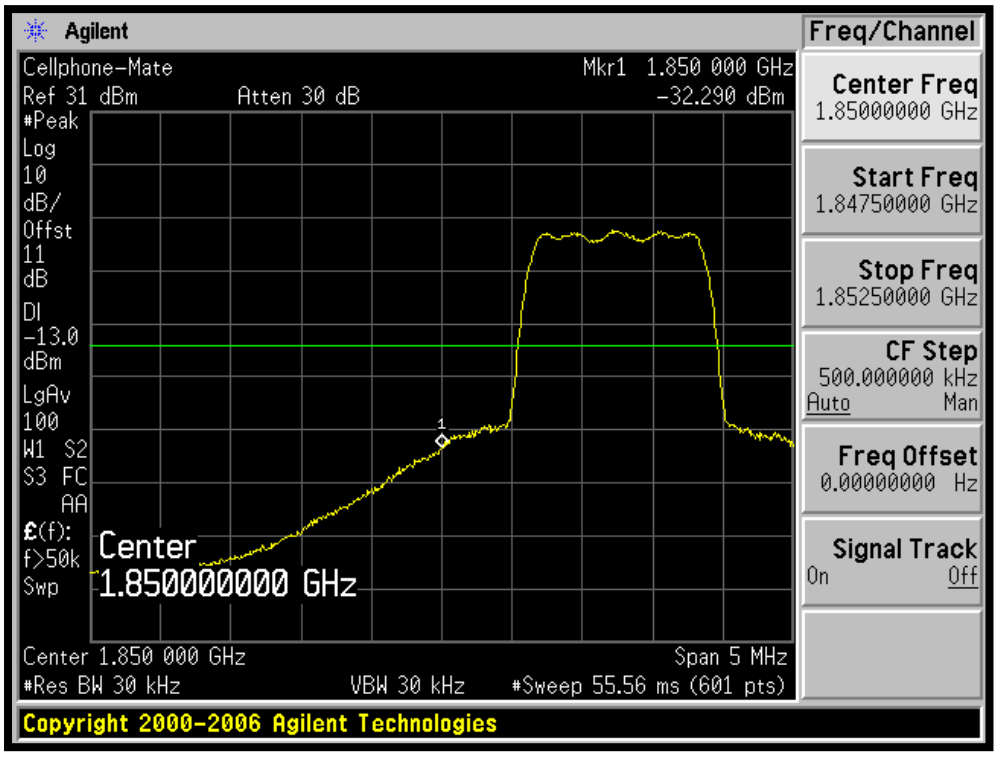
8.4.3 GSM: Forward (Downlink): Lowest Channel



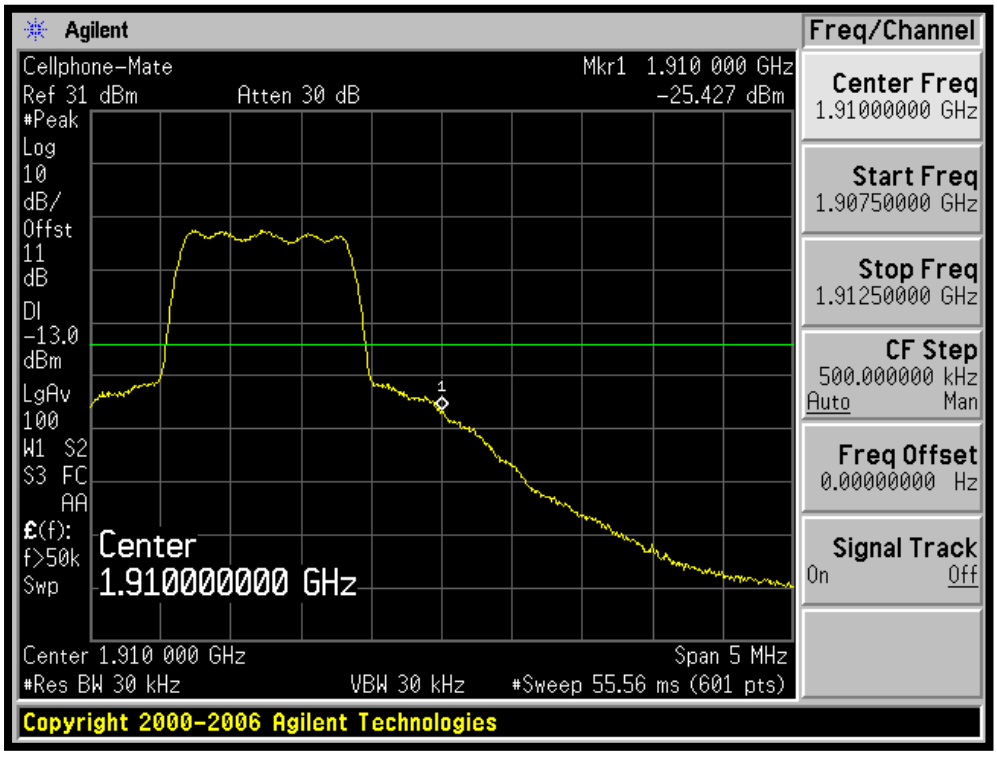
8.4.4 GSM: Forward (Downlink): Highest Channel



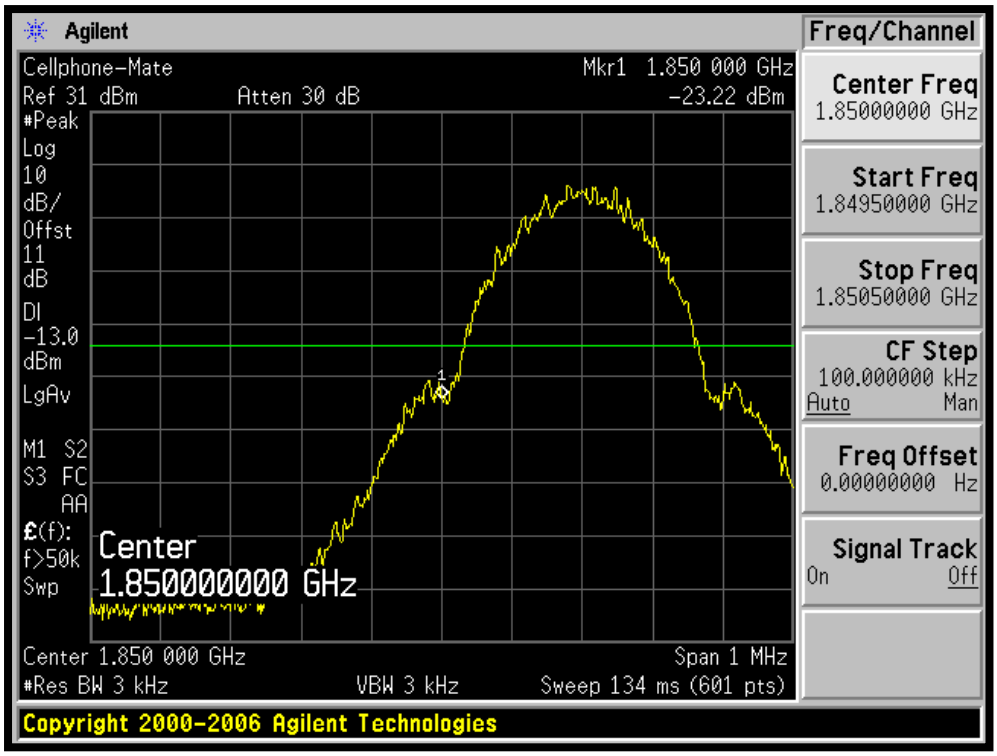
8.4.5 CDMA: Reverse (Uplink): Lowest Channel



8.4.6 CDMA: Reverse (Uplink): Highest Channel



8.4.7 GSM: Reverse (Uplink): Lowest Channel



8.4.8 GSM: Reverse (Uplink): Highest Channel