FCC PART 22H, 24E

TEST AND MEASUREMENT REPORT

For

Wilson Electronics, Inc.

3301 East Deseret Drive,

St. George, Utah 84790, USA

FCC ID: PWO2B1216
Model: 2B1216

Report Type:	**Product Type:**
Original Report	Dual Band Signal Booster

Test Engineer: Lionel Lara

Report Number: R1110063-2224

Report Date: 2012-06-27

Victor Zhang

Reviewed By: RF/EMC Engineer, Lead

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	R1110063-2224	Original Report	2012-06-27

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *Wilson Electronics, Inc.* product model: *2B1216*, FCC ID: PWO2B1216 or the "EUT" as referred to in this report, is a Signal Booster operating in the cellular and PCS bands.

General Specifications:

- Operating Frequency: *Downlink:* 869-894 MHz and 1930-1990 MHz
  Uplink: 824-849 MHz and 1850-1910 MHz
- Emission Designator: F9W, GXW, G7W
- Modulation: GSM, EDGE, CDMA, WCDMA, HSPA and EVDO.

1.2 Mechanical Description

The EUT dimension is approximately 15.24 cm (L) x 9.53 cm (W) x 5.08 cm (H) and weighs approximately 740 g.

The test data gathered are from production sample, serial number: 81121699991695372, provided by the manufacturer.

1.3 Objective

This type approval report is prepared on behalf of Wilson Electronics, 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 characteristic, 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 603-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 site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have 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 test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to TIA 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 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
BK Precision	DC Power Supply	1740	26502000233

2.5 EUT Internal Configuration

Manufacturer	Description	Model	Serial Number
Wilson Electronic	Main Board	811216 Rev. C	-

2.6 Local Support Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers
Agilent	Signal Generator	8648C	3847M00143
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309
Mini-Circuits	Amplifier	ZHL-42-SMA	D072204-36

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
RF cable	< 1m	Signal Generator	Amplifier
RF cable	< 1m	Output/ EUT	Spectrum analyzer
RF cable	< 1m	Amplifier	Input/EUT
Power supply cable	2 m	DC Power Supply	EUT

3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Tests	Results
§2.1046 §22.913(a), §24.232	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A[1]
§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 §22.355, §24.235	Frequency Stability	N/A[2]

Note: [1]According to FCC §2.1047(d) and part 22H, 24E, there is no specific requirement for digital modulation and no oscillator circuit, therefore modulation characteristic is not presented.
[2] There is no oscillator circuit in the EUT, therefore there is no frequency stability measurement required.

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

4.1 Applicable Standard

According to FCC §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

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:	20-25 °C
Relative Humidity:	35-40 %
ATM Pressure:	101.2 kPa

The testing was performed by Lionel Lara from 2011-11-22 to 2011-11-28 at RF Site.

4.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309	2011-04-28
Agilent	Analyzer, Spectrum	E4440A	US45303156	2010-08-09[1]

Note [1]: Two year calibration cycle.
Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

4.5 Test Results

Maximum Output Power – Modulated Signal

Mode		Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mw)
GSM	850 MHz Uplink	Low	824.2	35.34	3419.79
		Middle	836.6	35.80	3801.89
		High	848.8	34.41	2760.58
	850 MHz Downlink	Low	869.2	10.46	11.12
		Middle	881.6	10.61	11.51
		High	893.8	10.28	10.67
	1900 MHz Uplink	Low	1850.2	34.05	2540.97
		Middle	1880.0	34.35	2722.70
		High	1909.8	31.11	1291.22
	1900 MHz Downlink	Low	1930.2	10.66	11.64
		Middle	1960.0	10.51	11.25
		High	1989.8	12.22	16.67

Mode		Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mw)
EDGE	850 MHz Uplink	Low	824.2	35.60	3630.78
		Middle	836.6	36.20	4168.69
		High	848.8	35.48	3531.83
	850 MHz Downlink	Low	869.2	10.32	10.76
		Middle	881.6	11.48	14.06
		High	893.8	10.32	10.76
	1900 MHz Uplink	Low	1850.2	34.78	3006.08
		Middle	1880.0	35.01	3169.57
		High	1909.8	31.50	1412.54
	1900 MHz Downlink	Low	1930.2	10.79	11.99
		Middle	1960.0	10.54	11.32
		High	1989.8	12.26	16.83

Mode		Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mw)
CDMA	850 MHz Uplink	Low	824.80	34.59	2877.40
		Middle	836.52	34.68	2937.65
		High	848.20	33.62	2301.44
	850 MHz Downlink	Low	869.80	10.50	11.22
		Middle	881.52	11.41	13.84
		High	893.20	10.85	12.16
	1900 MHz Uplink	Low	1850.8	33.64	2312.06
		Middle	1880.0	33.82	2409.90
		High	1909.2	30.78	1196.74
	1900 MHz Downlink	Low	1930.8	10.08	10.19
		Middle	1960.0	10.68	11.69
		High	1989.2	12.21	16.63

Mode		Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mw)
WCDMA	850 MHz Uplink	Low	826.4	35.05	3198.90
		Middle	836.4	35.03	3184.20
		High	846.6	34.14	2594.18
	850 MHz Downlink	Low	871.4	10.95	12.45
		Middle	881.4	11.22	13.24
		High	891.6	10.30	10.72
	1900 MHz Uplink	Low	1852.4	33.16	2070.14
		Middle	1880.0	33.70	2344.23
		High	1907.6	31.38	1374.04
	1900 MHz Downlink	Low	1932.4	10.12	10.28
		Middle	1960.0	10.67	11.67
		High	1987.6	12.38	17.30

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 and no oscillator circuit, 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 at 30 kHz (Cellular/PCS) and the 26 dB & 99% bandwidth was recorded.

6.3 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	35-40 %
ATM Pressure:	101.2 kPa

The testing was performed by Lionel Lara from 2011-11-22 to 2011-11-28 at RF Site.

6.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309	2011-04-28
Agilent	Analyzer, Spectrum	E4440A	US45303156	2010-08-09[1]

Note [1]: Two year calibration cycle.
Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

6.5 Test Results

Mode		Channel	Frequency (MHz)	Emission Bandwidth 26 dB (kHz)	Emission Bandwidth 99% (kHz)
GSM	850 MHz Uplink	Middle	836.6	320.93	246.68
	850 MHz Downlink	Middle	881.6	324.85	253.45
	1900 MHz Uplink	Middle	1880.0	323.64	247.89
	1900 MHz Downlink	Middle	1960.0	340.51	257.60

Mode		Channel	Frequency (MHz)	Emission Bandwidth 26 dB (kHz)	Emission Bandwidth 99% (kHz)
EDGE	850 MHz Uplink	Middle	836.6	326.50	251.25
	850 MHz Downlink	Middle	881.6	336.02	255.57
	1900 MHz Uplink	Middle	1880.0	324.85	247.53
	1900 MHz Downlink	Middle	1960.0	349.74	257.97

Mode		Channel	Frequency (MHz)	Emission Bandwidth 26 dB (kHz)	Emission Bandwidth 99% (kHz)
CDMA	850 MHz Uplink	Middle	836.52	1449.00	1265.40
	850 MHz Downlink	Middle	881.52	1467.00	1271.20
	1900 MHz Uplink	Middle	1880.0	1471.00	1274.30
	1900 MHz Downlink	Middle	1960.0	1457.00	1266.10

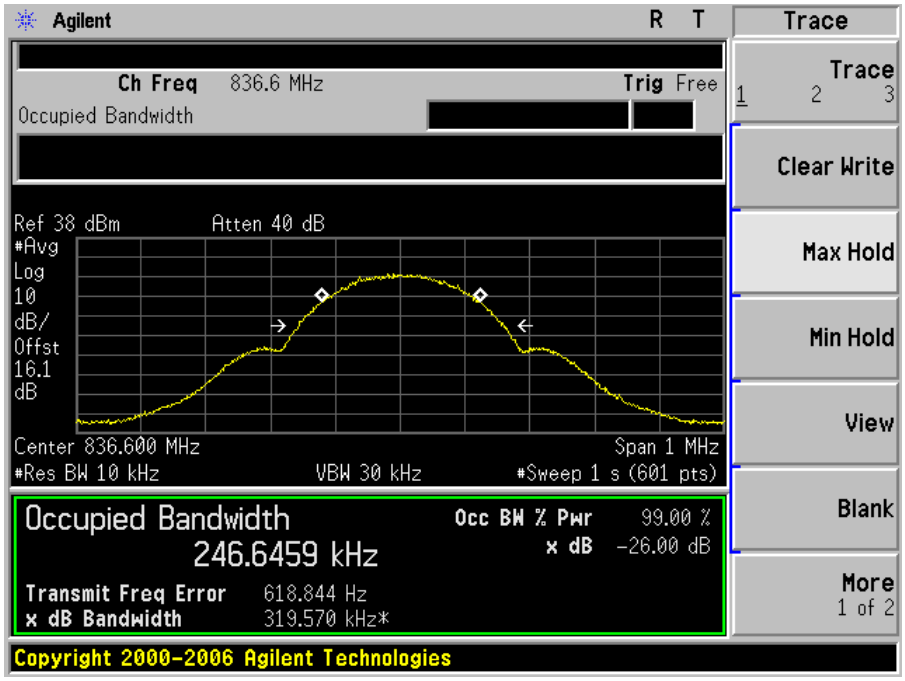
Mode		Channel	Frequency (MHz)	Emission Bandwidth 26 dB (kHz)	Emission Bandwidth 99% (kHz)
WCDMA	850 MHz Uplink	Middle	836.4	4749.00	4183.90
	850 MHz Downlink	Middle	881.4	4789.00	4197.80
	1900 MHz Uplink	Middle	1880.0	4789.00	4193.00
	1900 MHz Downlink	Middle	1960.0	4746.00	4179.70

Please refer to the following plots.

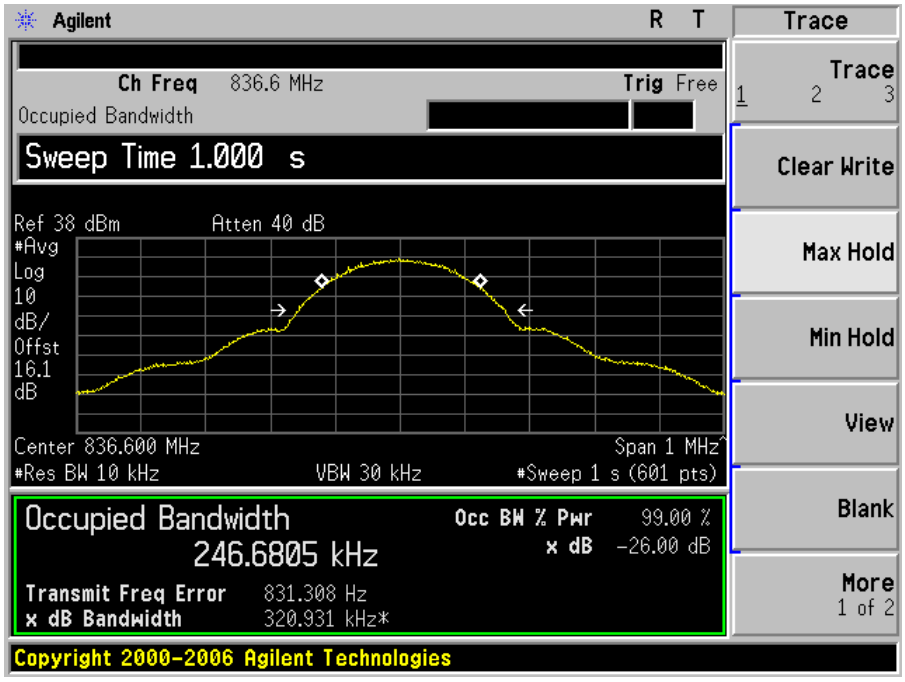
GSM 850 MHz Band (Uplink)

Middle Channel (836.6 MHz)

Input



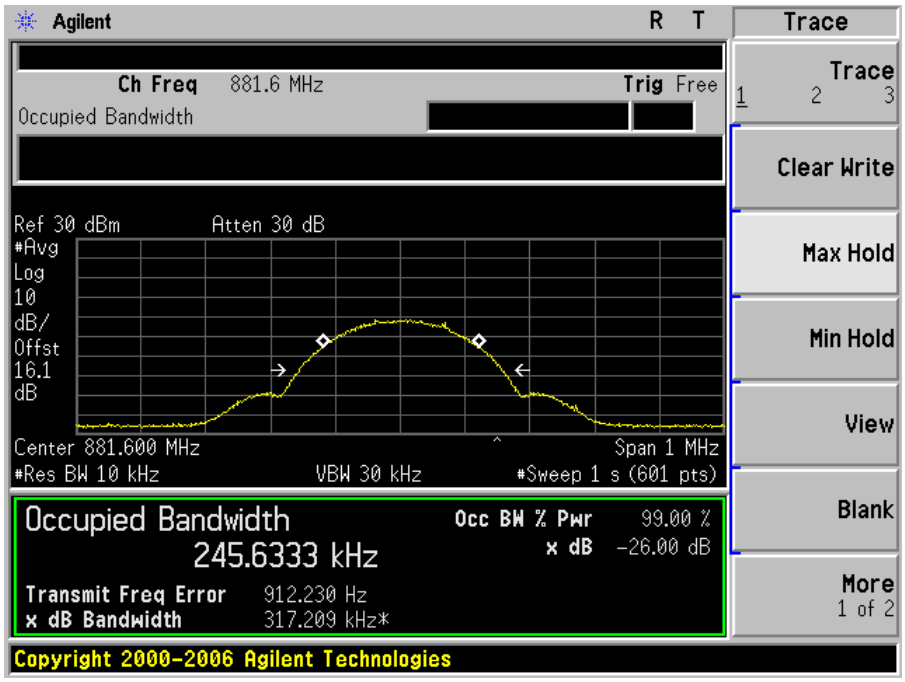
Output



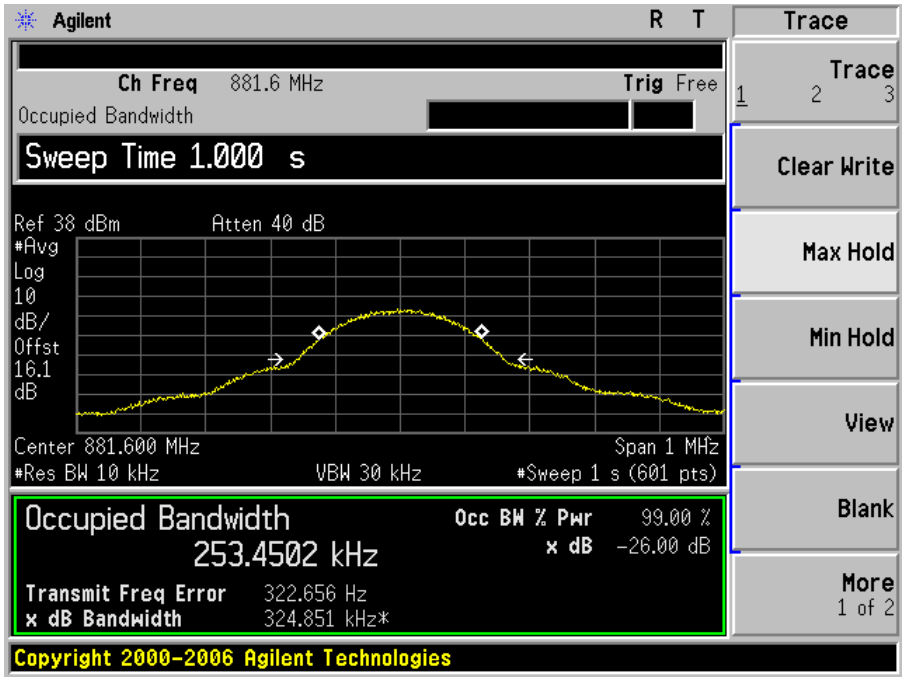
GSM 850 MHz Band (Downlink)

Middle Channel (881.6 MHz)

Input



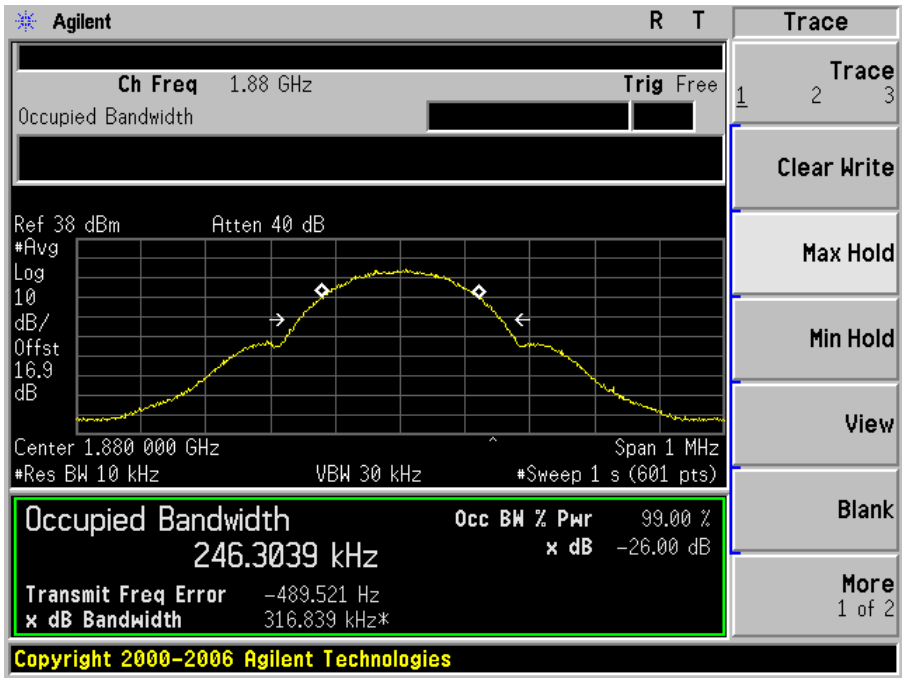
Output



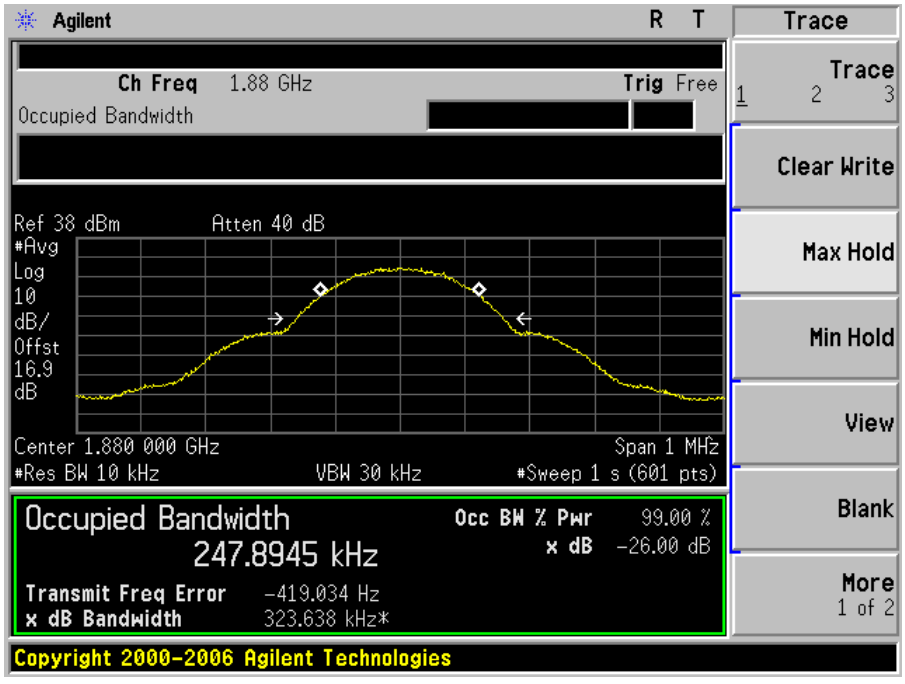
GSM 1900 MHz Band (Uplink)

Middle Channel (1880.0 MHz)

Input



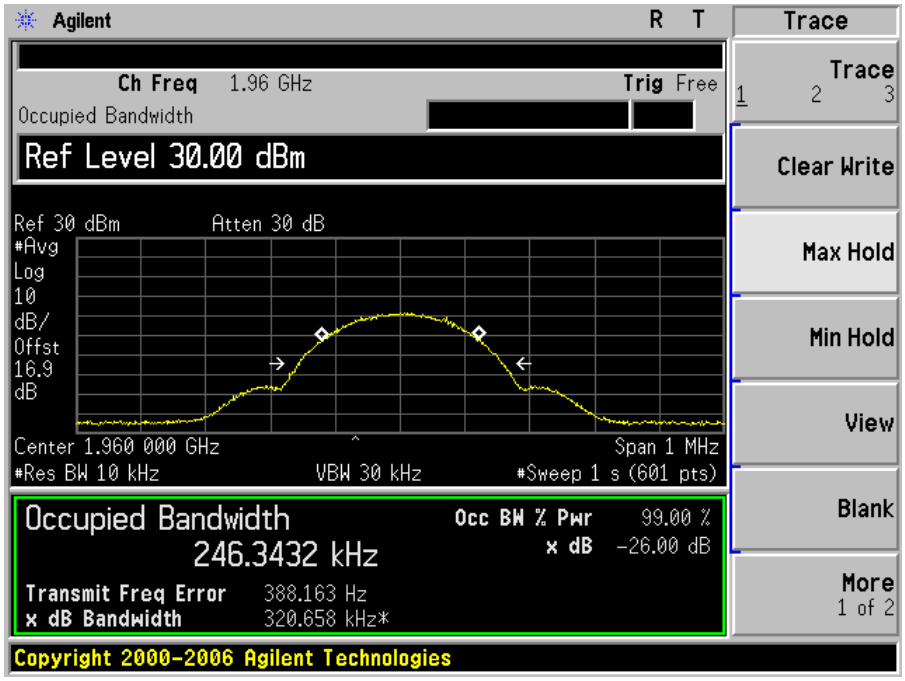
Output



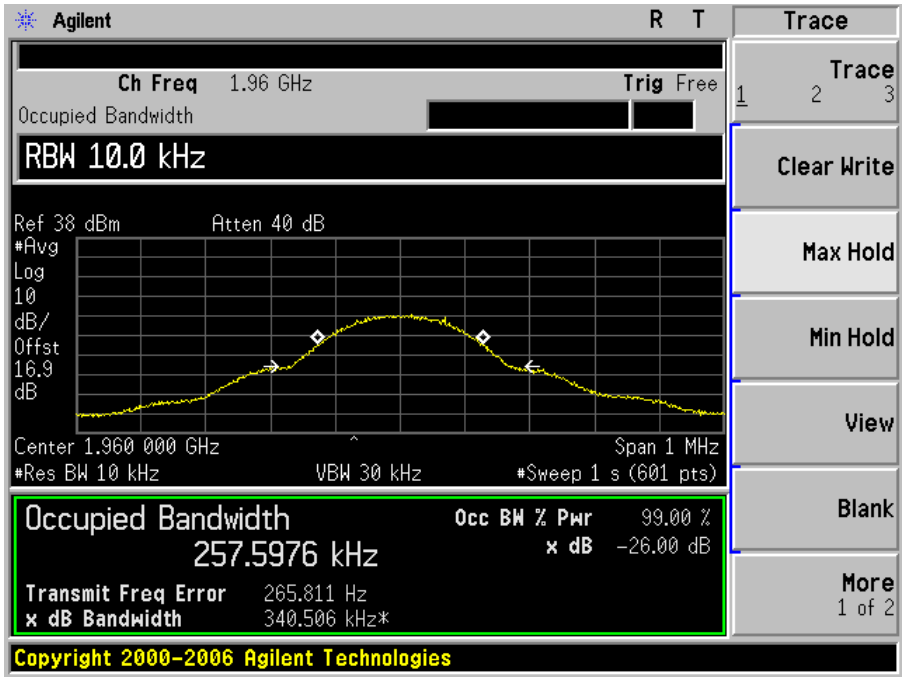
GSM 1900 MHz Band (Downlink)

Middle Channel (1960.0 MHz)

Input



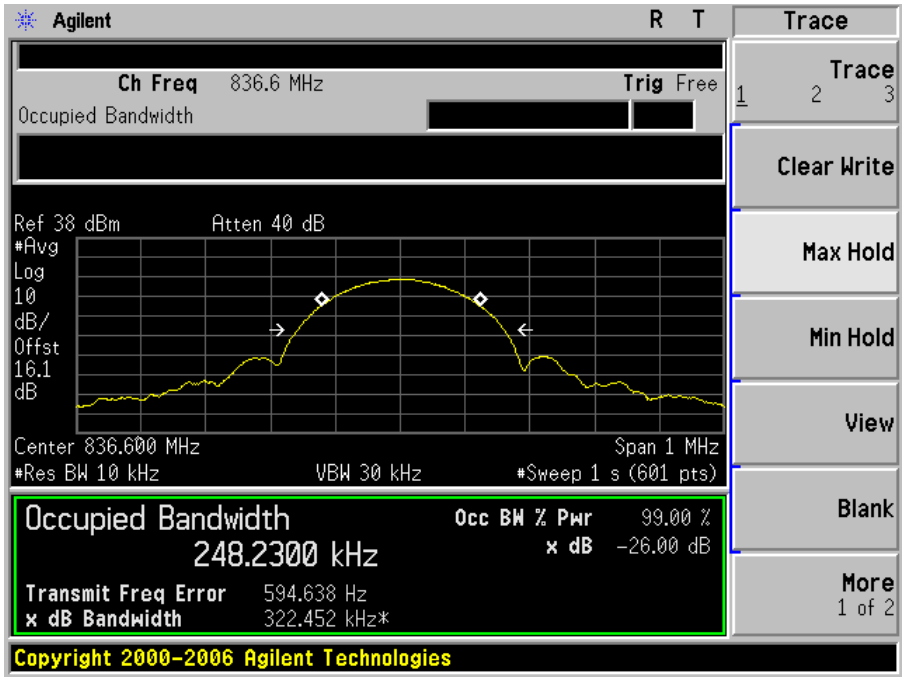
Output



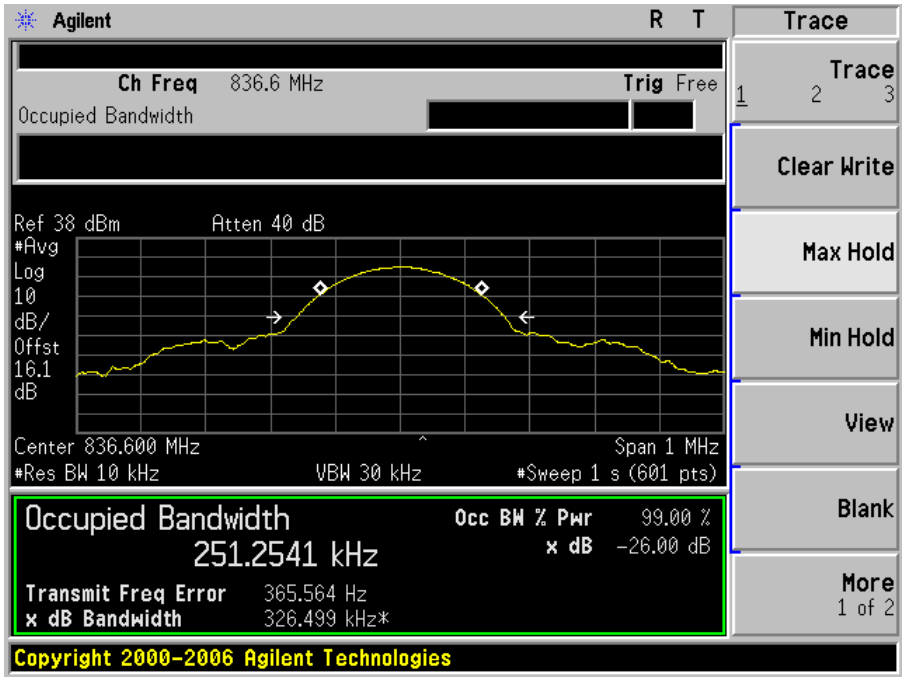
EDGE 850 MHz Band (Uplink)

Middle Channel (836.6 MHz)

Input



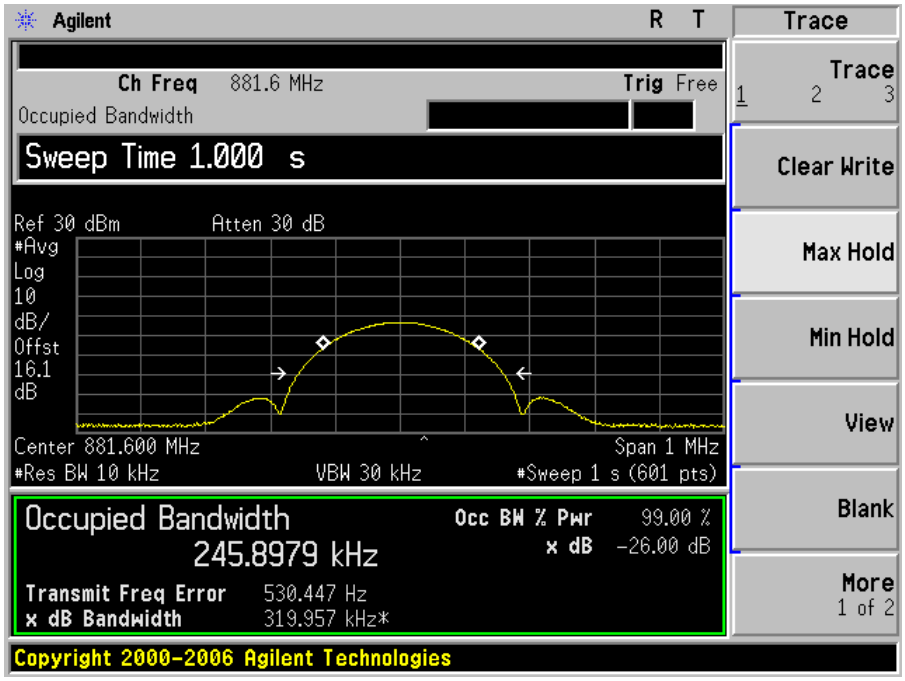
Output



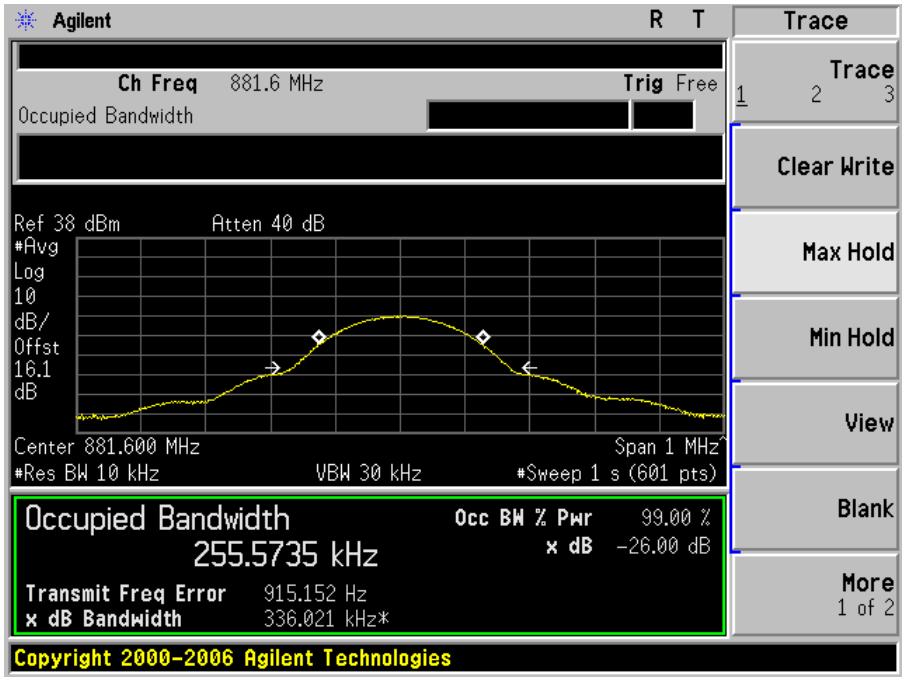
EDGE 850 MHz Band (Downlink)

Middle Channel (881.6 MHz)

Input



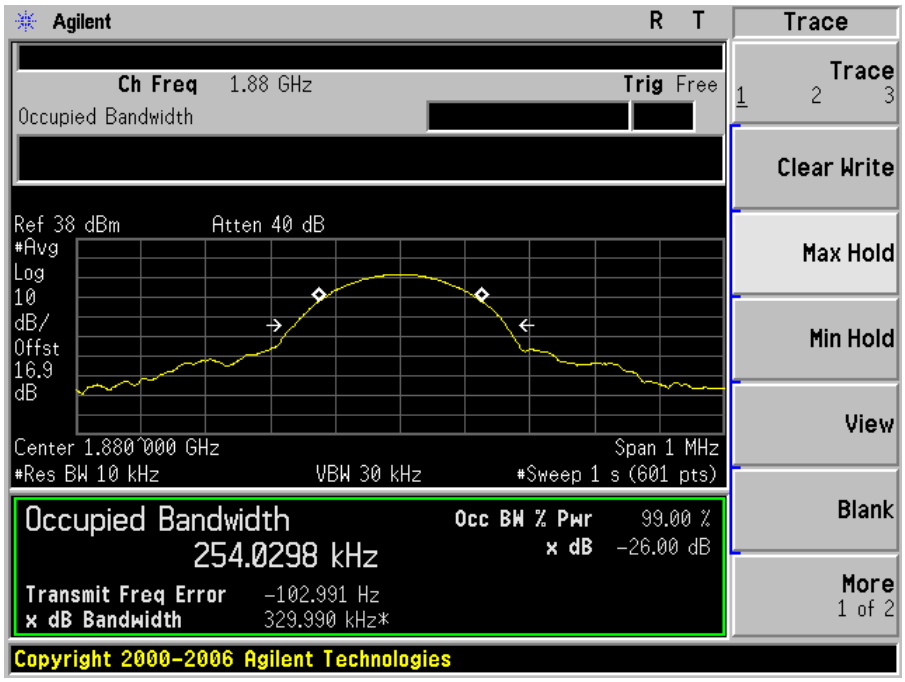
Output



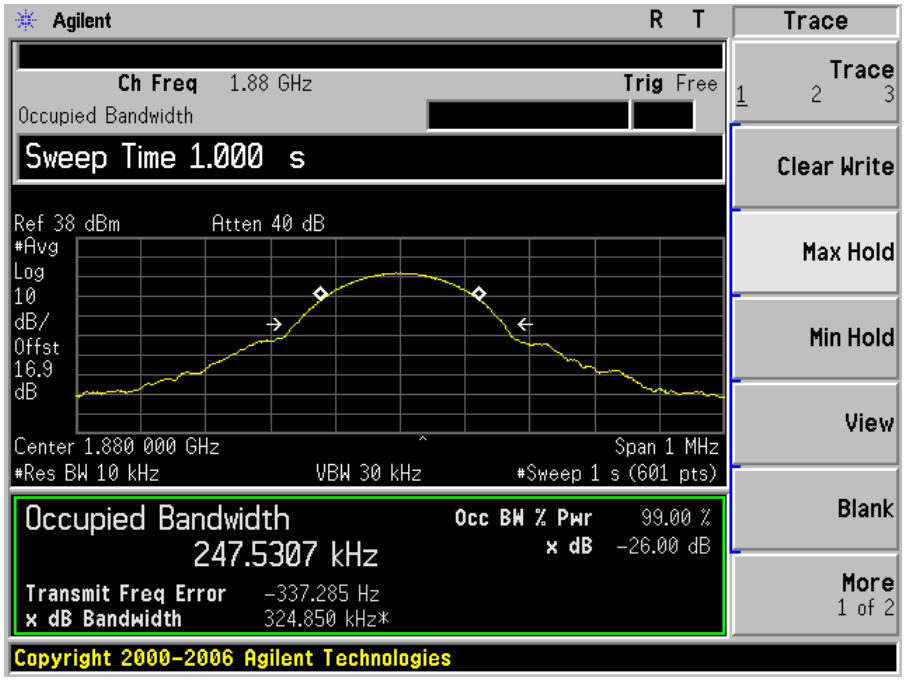
EDGE 1900 MHz Band (Uplink)

Middle Channel (1880.0 MHz)

Input



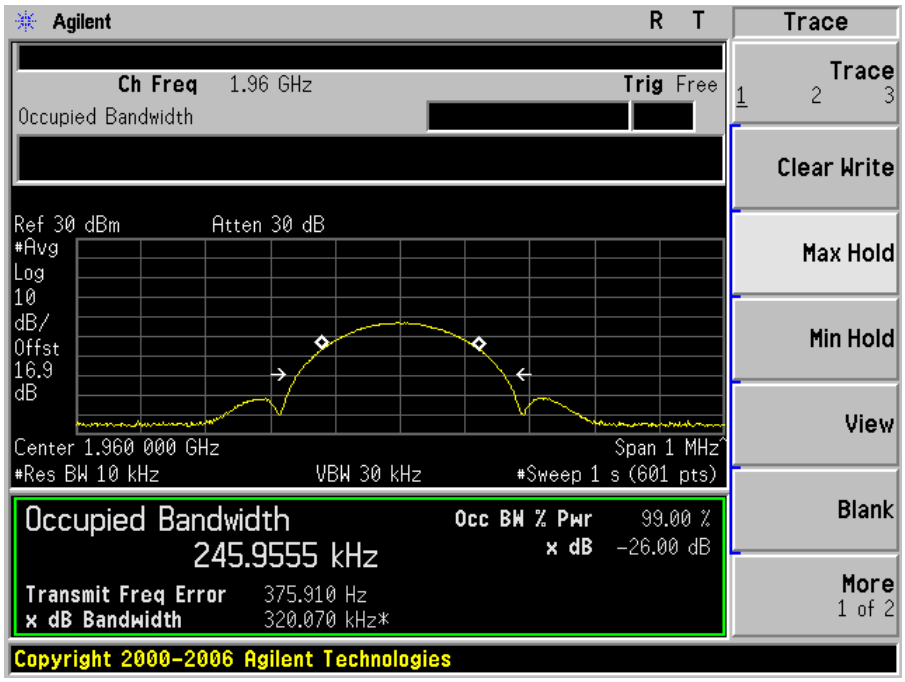
Output



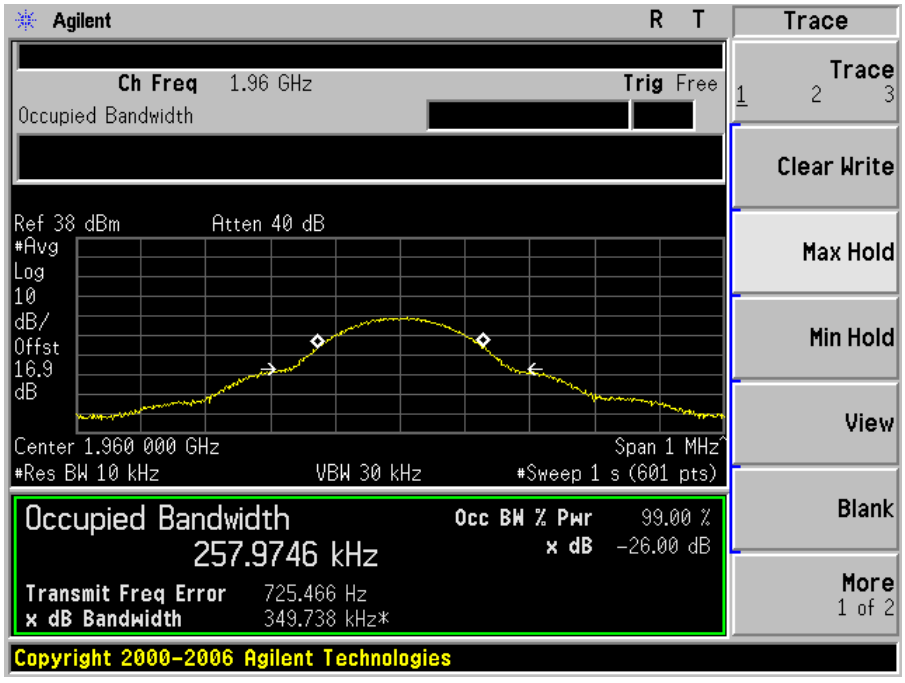
EDGE 1900 MHz Band (Downlink)

Middle Channel (1960.0 MHz)

Input



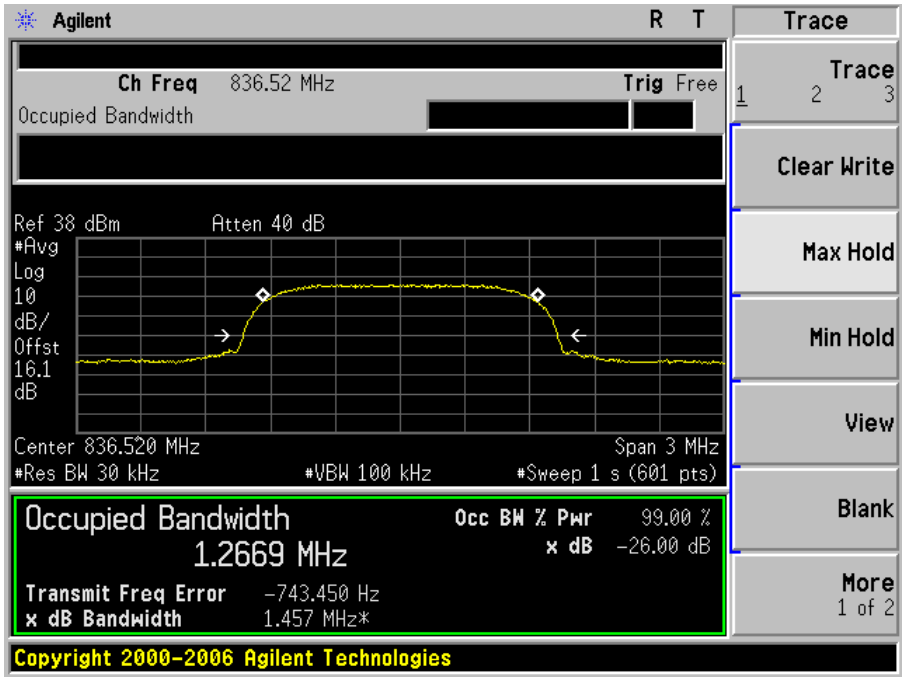
Output



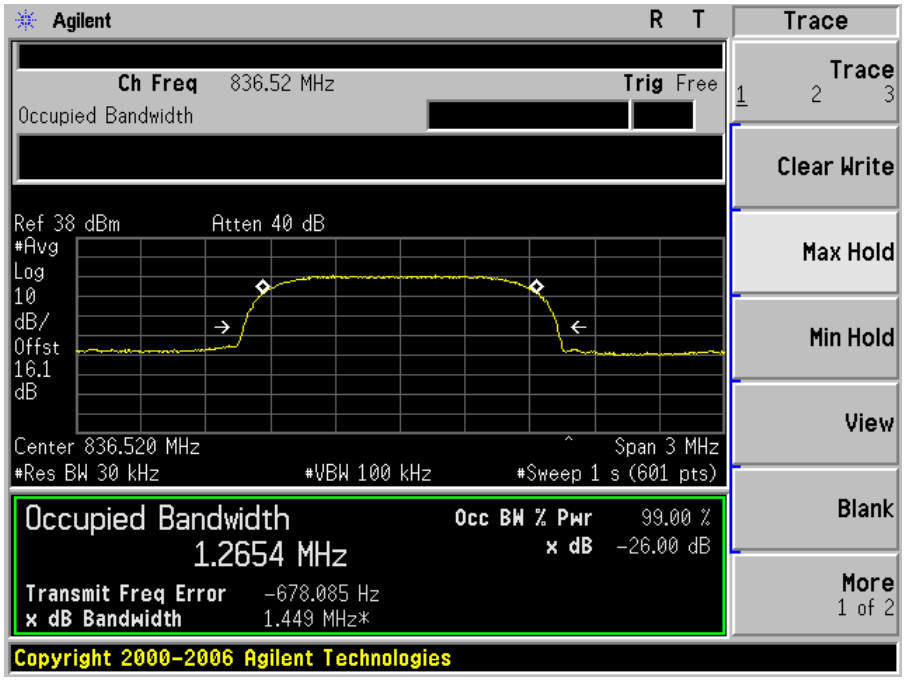
CDMA 850 MHz Band (Uplink)

Middle Channel (836.52 MHz)

Input



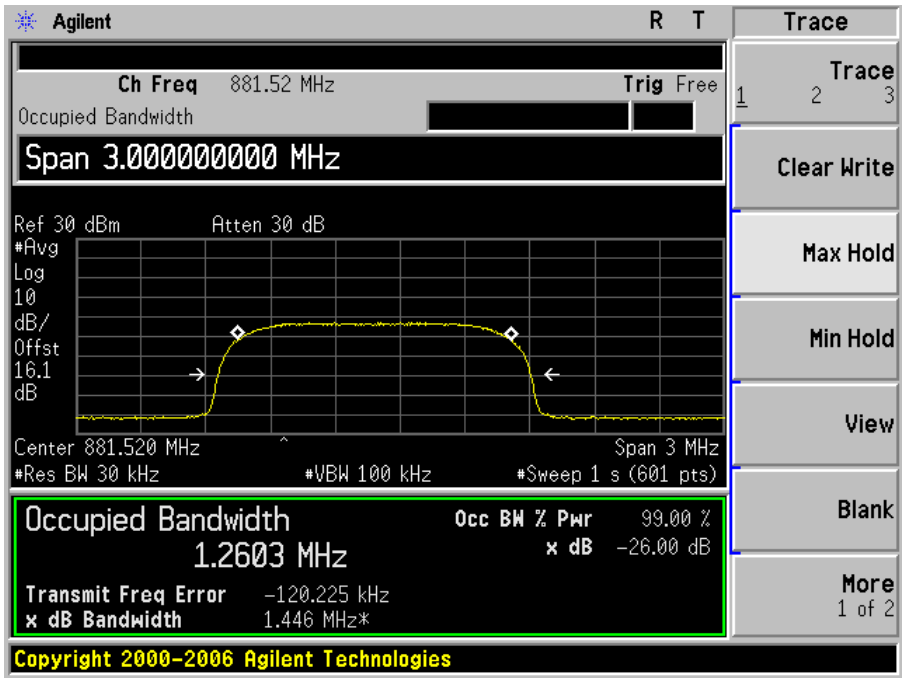
Output



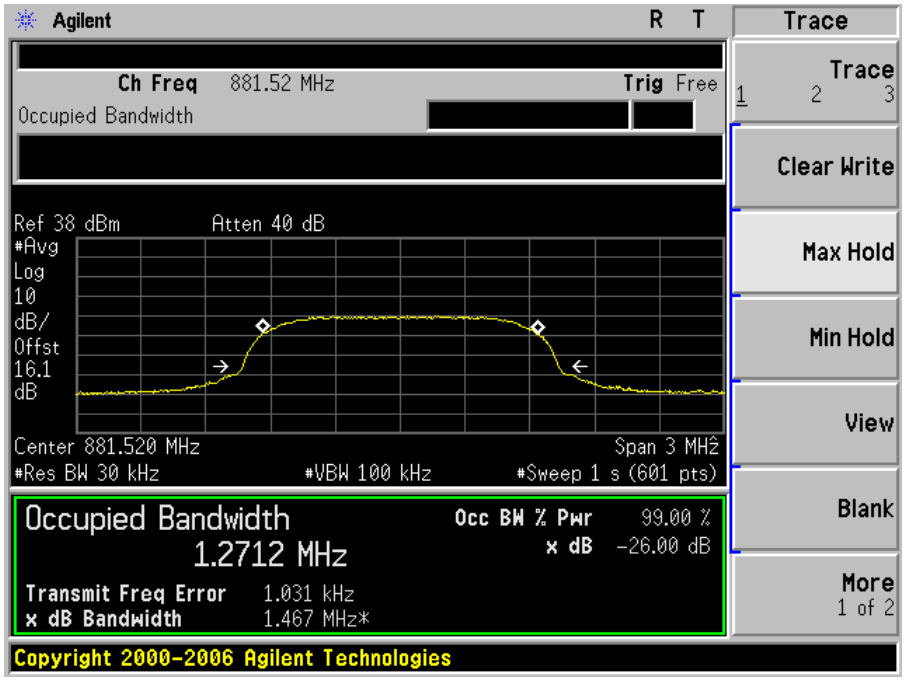
CDMA 850 MHz band (Downlink)

Middle Channel (881.52 MHz)

Input



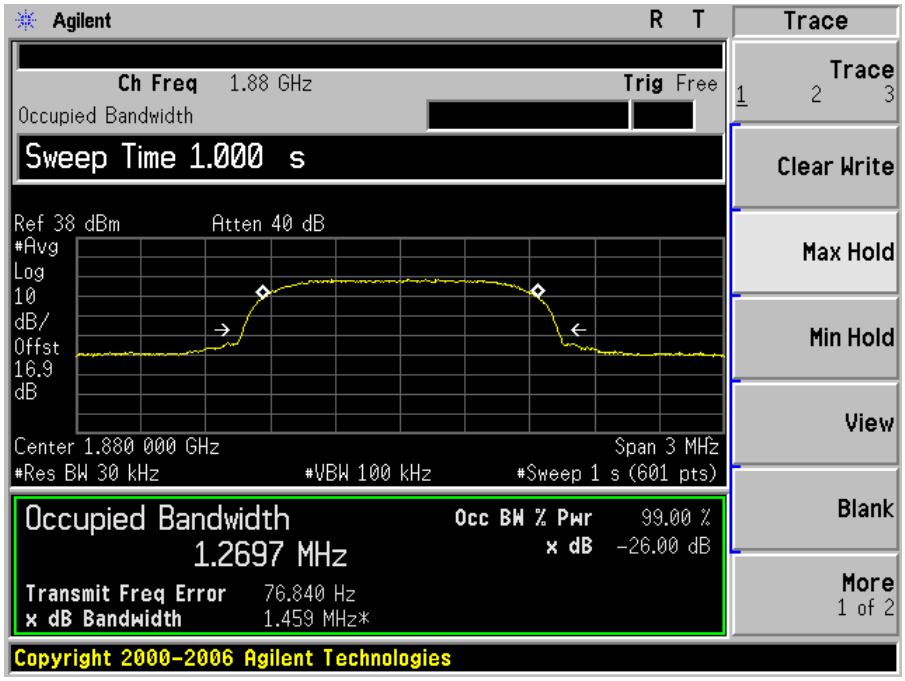
Output



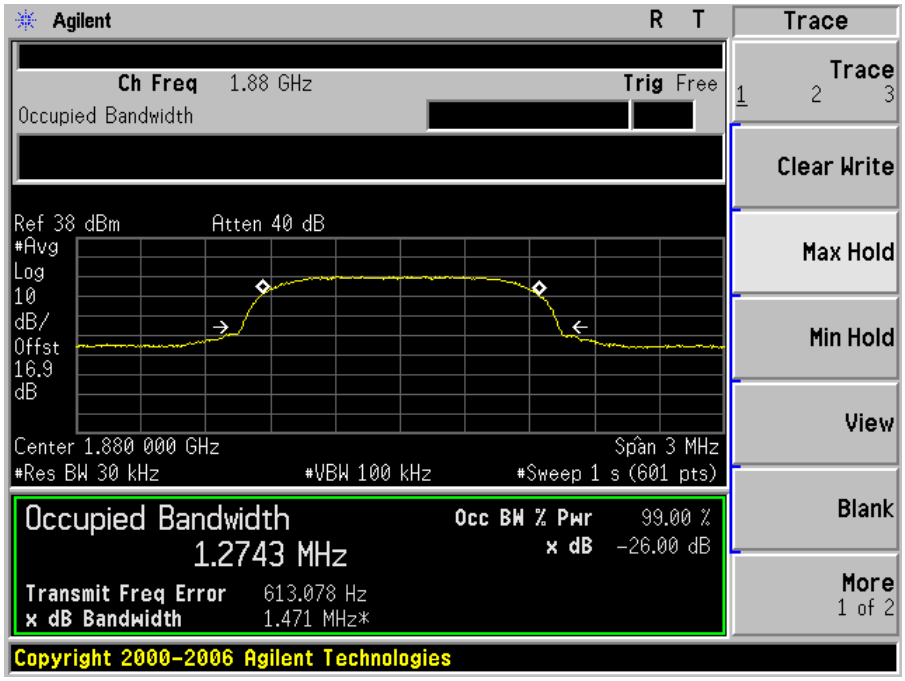
CDMA 1900 MHz Band (Uplink)

Middle Channel (1880.0 MHz)

Input



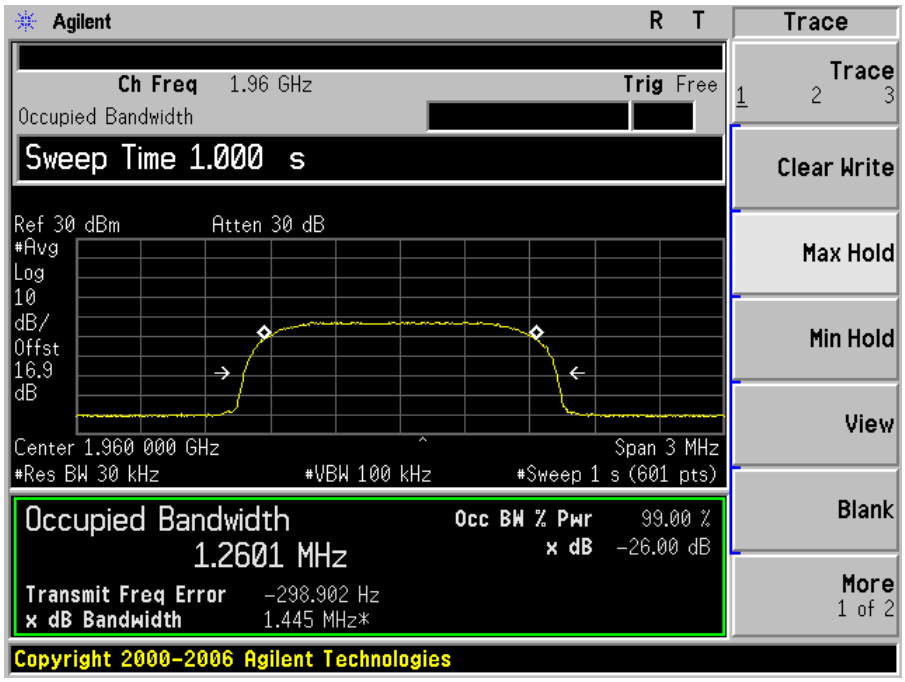
Output



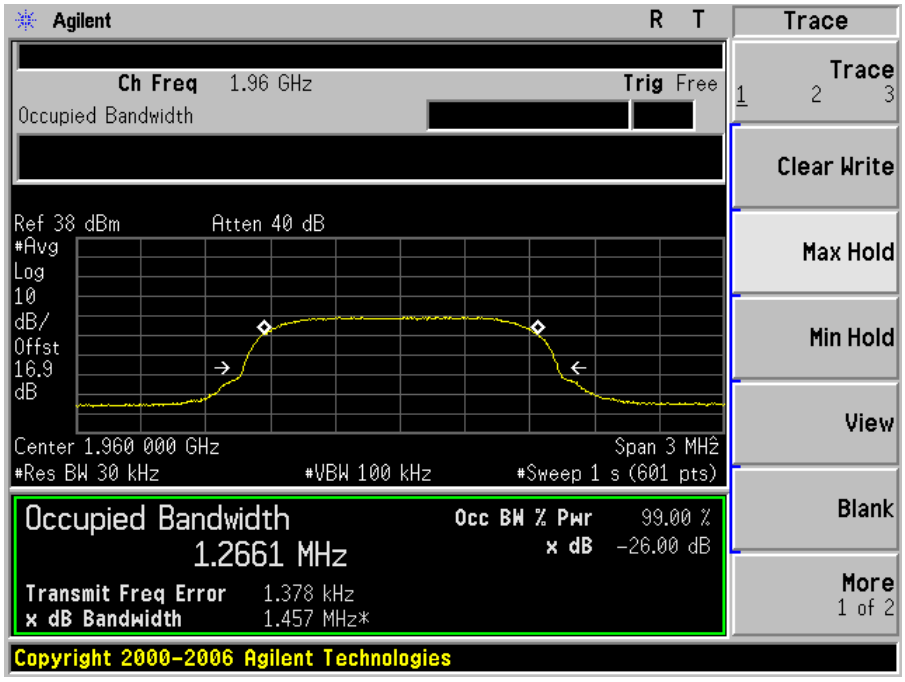
CDMA 1900 MHz Band (Downlink)

Middle Channel (1960.0 MHz)

Input



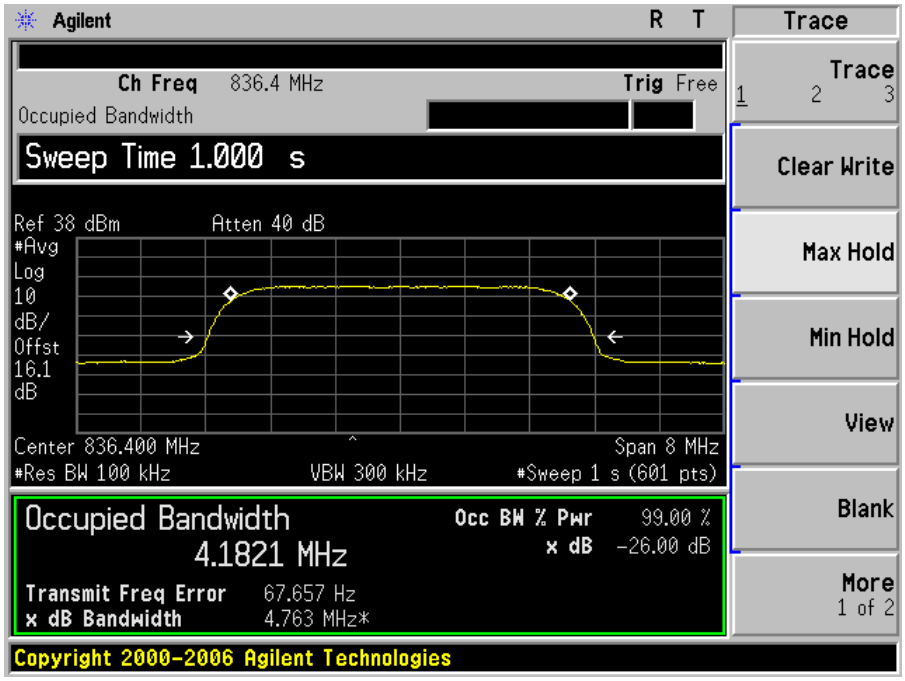
Output



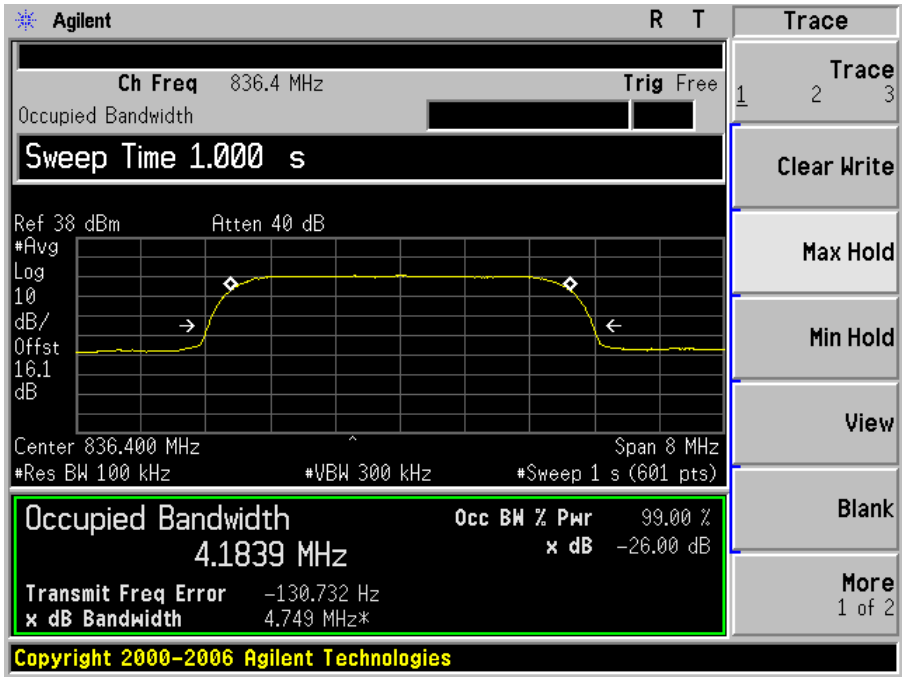
WCDMA 850 MHz Band (Uplink)

Middle Channel (836.4 MHz)

Input



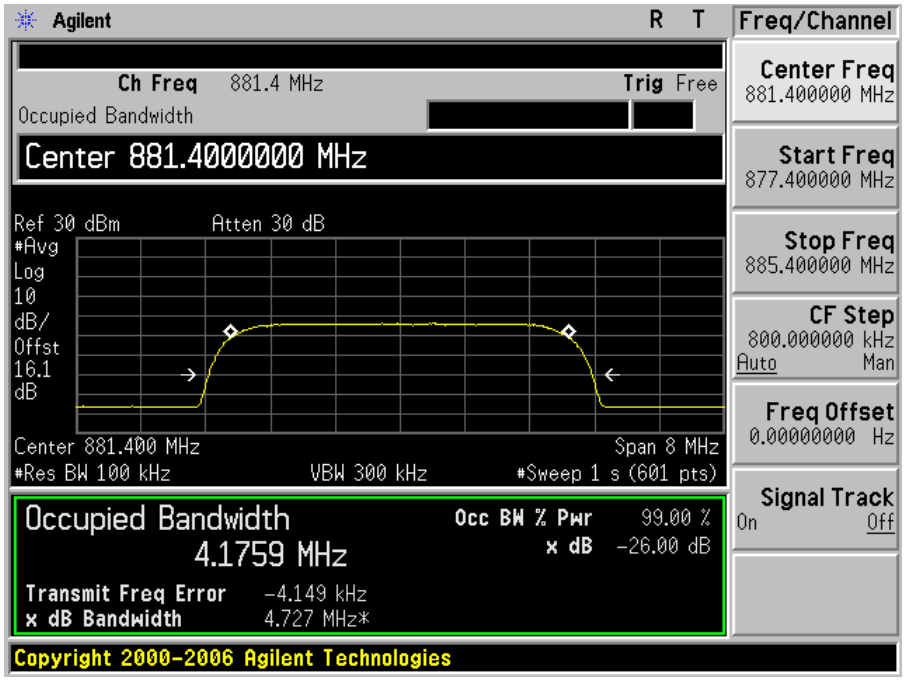
Output



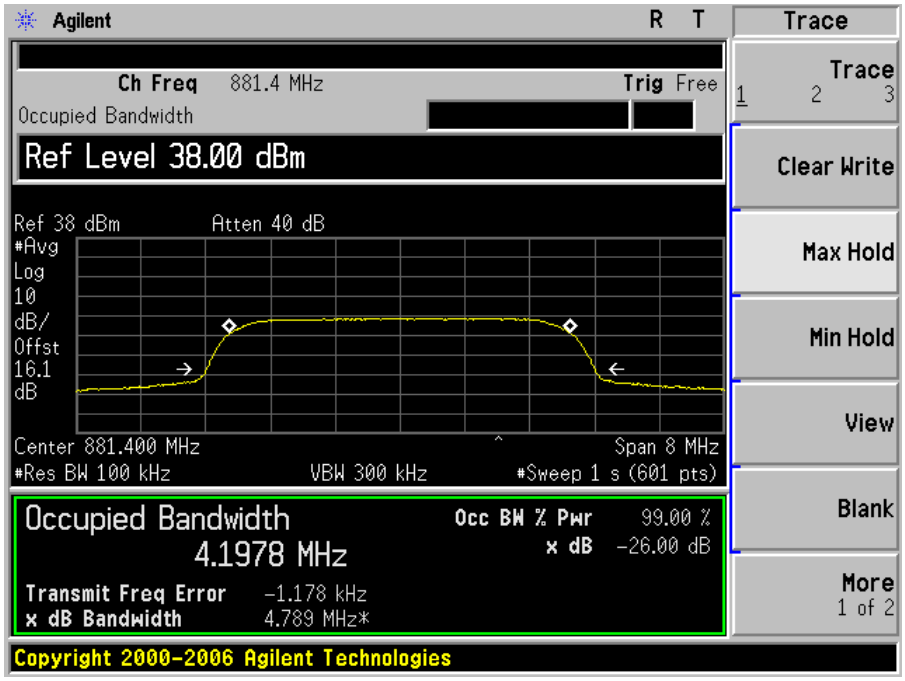
WCDMA 850 MHz band (Downlink)

Middle Channel (881.4 MHz)

Input



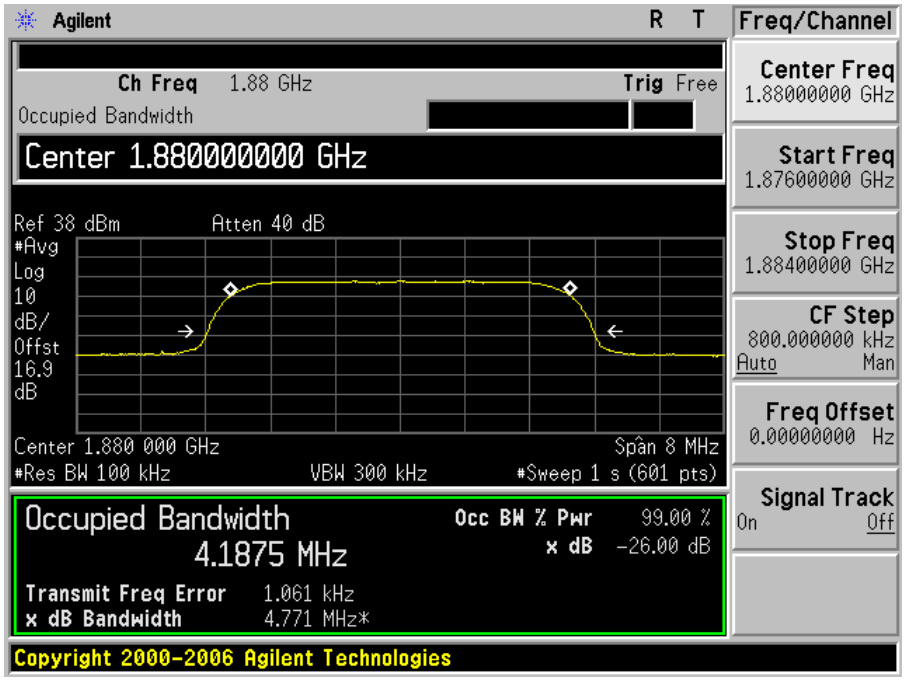
Output



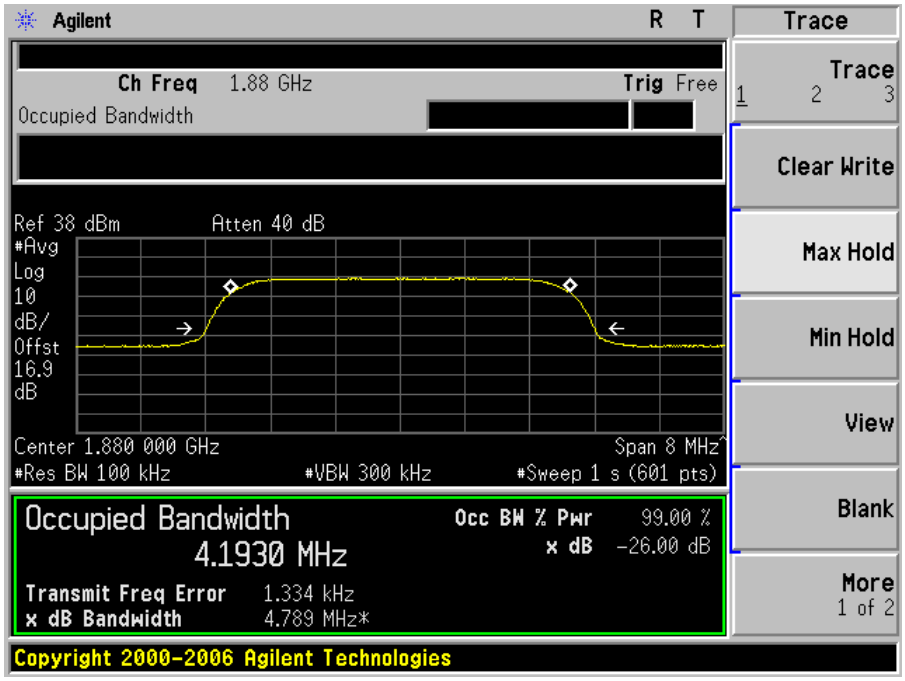
WCDMA 1900 MHz Band (Uplink)

Middle Channel (1880.0 MHz)

Input



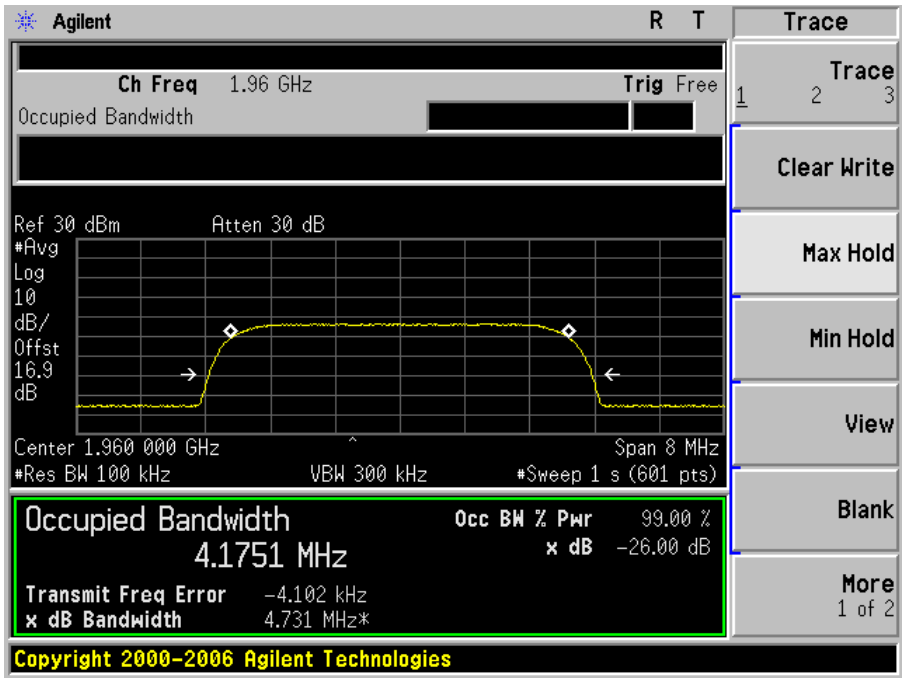
Output



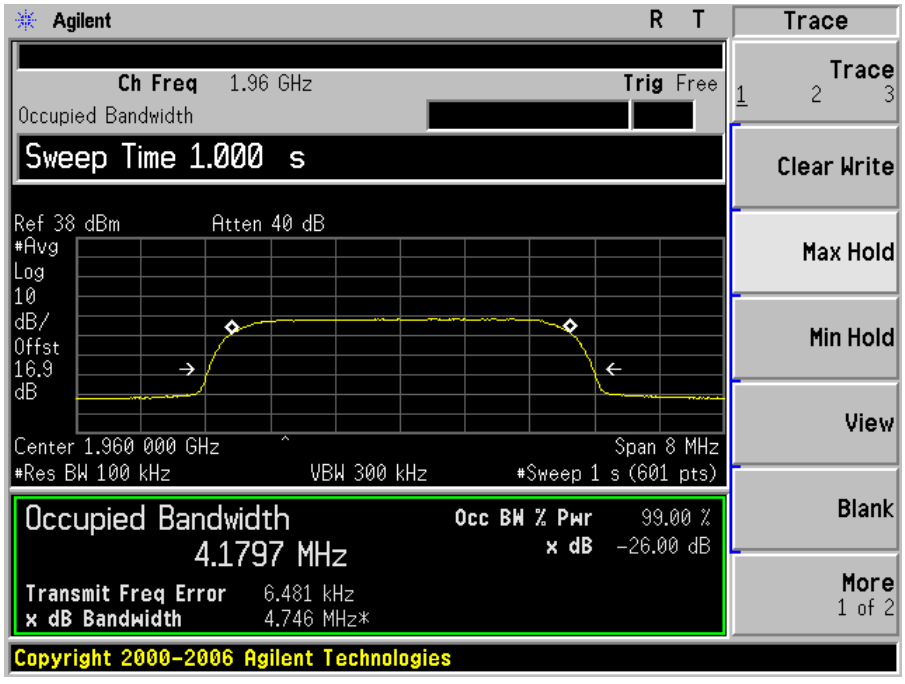
WCDMA 1900 MHz Band (Downlink)

Middle Channel (1960.0 MHz)

Input



Output



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

7.1 Applicable Standard

Requirements: FCC §2.1053, §22.917 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 Log10 (power out in Watts)

7.3 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	35-40 %
ATM Pressure:	101.2 kPa

The testing was performed by Lionel Lara from 2011-11-22 to 2011-11-28 at Chamber2.

7.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2011-03-08
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2011-05-09
Sunol Science Corp	System Controller	SC99V	011003-1	N/R
Sunol Sciences	Combination Antenna	JB1	A020106-1	2011-05-17
EMCO	Horn antenna	3115	9511-4627	2011-10-03
Sunol Sciences	Horn Antenna	DRH-118	A052704	2011-02-23
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309	2011-04-28
Agilent	Analyzer, Spectrum	E4440A	US45303156	2010-08-09[1]

Note 1: Two year calibration cycle.
Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

7.5 Summary of Test Results

Worst case reading as follows:

Mode: 850 MHz Downlink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency (MHz)**
-[1]	-	-	-

Note [1]: Spurious emissions at or below noise floor level.

Mode: 850 MHz Uplink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency (MHz)**
-8.48	2510	Horizontal	836.6

Mode: 1900 MHz Downlink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency (MHz)**
-19.55	39.79	Horizontal	1960.0

Mode: 1900 MHz Uplink			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency (MHz)**
-6.98	5640	Horizontal	1989.8

7.6 Test Results

850 MHz band 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. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
-[1]	-	-	-	-	-	-	-	-	-	-	-
-[1]	-	-	-	-	-	-	-	-	-	-	-

Note [1]: Spurious emissions at or below noise floor level.

850 MHz band 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. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1673	65.40	192	133	H	1673	-37.86	8.53	1.30	-30.63	-13	-17.63
1673	64.81	109	140	V	1673	-38.45	8.44	1.30	-31.31	-13	-18.31
2510	70.31	290	148	H	2510	-29.08	9.20	1.60	-21.48	-13	-8.48
2510	65.91	224	159	V	2510	-33.48	9.27	1.60	-25.81	-13	-12.81

1900 MHz band Downlink

Input frequency =1960.0 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. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3979	50.77	54	116	H	3979	-43.86	9.31	-2	-32.55	-13	-19.55
3979	46.08	232	148	V	3979	-48.55	9.38	-2	-37.17	-13	-24.17

1900 MHz band Uplink

Input frequency = 1989.8 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. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3760	58.83	219	149	H	3760	-37.35	8.88	1.6	-30.07	-13	-17.07
3760	51.95	213	148	V	3760	-44.23	9.03	1.6	-36.80	-13	-23.80
5640	62.59	215	147	H	5640	-28.74	11.06	2.3	-19.98	-13	-6.98
5640	57.11	290	148	V	5640	-34.22	10.90	2.3	-25.62	-13	-12.62

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.

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

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 10^{th} harmonic.

8.3 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	35-40 %
ATM Pressure:	101.2 kPa

The testing was performed by Lionel Lara on 2011-11-22 to 2011-11-28 in RF site.

8.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Generator, Signal	8648C	3847M00143	2010-11-22[1]
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309	2011-04-28
Agilent	Analyzer, Spectrum	E4440A	US45303156	2010-08-09[1]

Note [1]: Two year calibration cycle.
Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

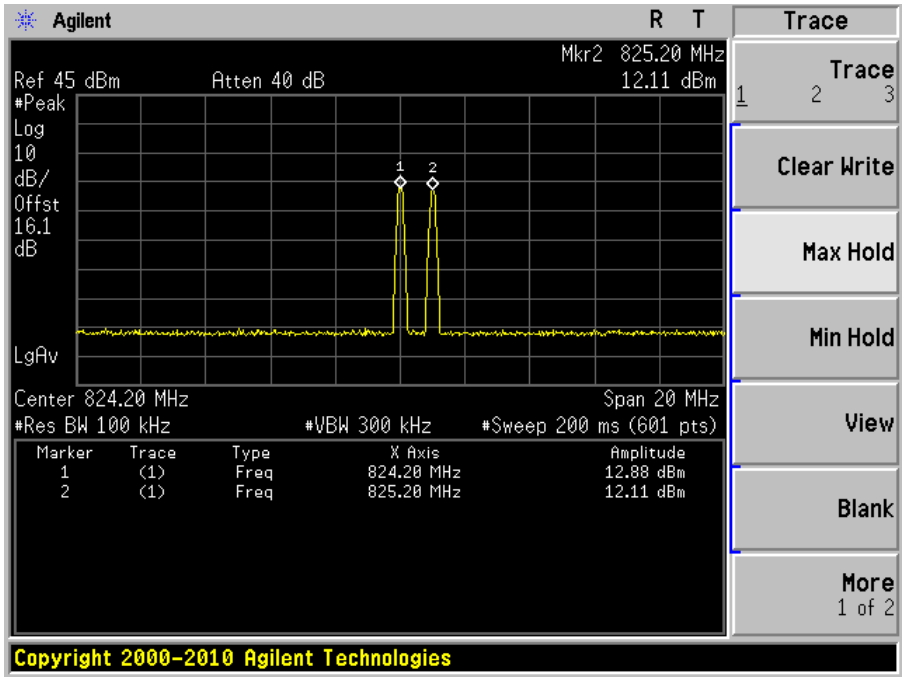
8.5 Test Results

Please refer to the following plots.

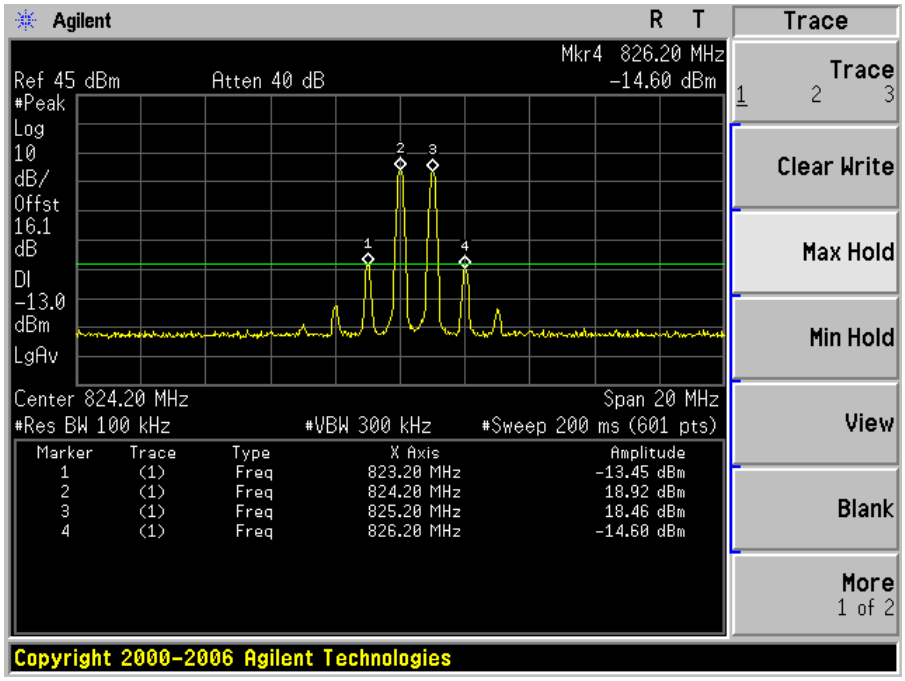
Inter-modulation:

GSM/EDGE 850 MHz band Low channel Uplink

Input

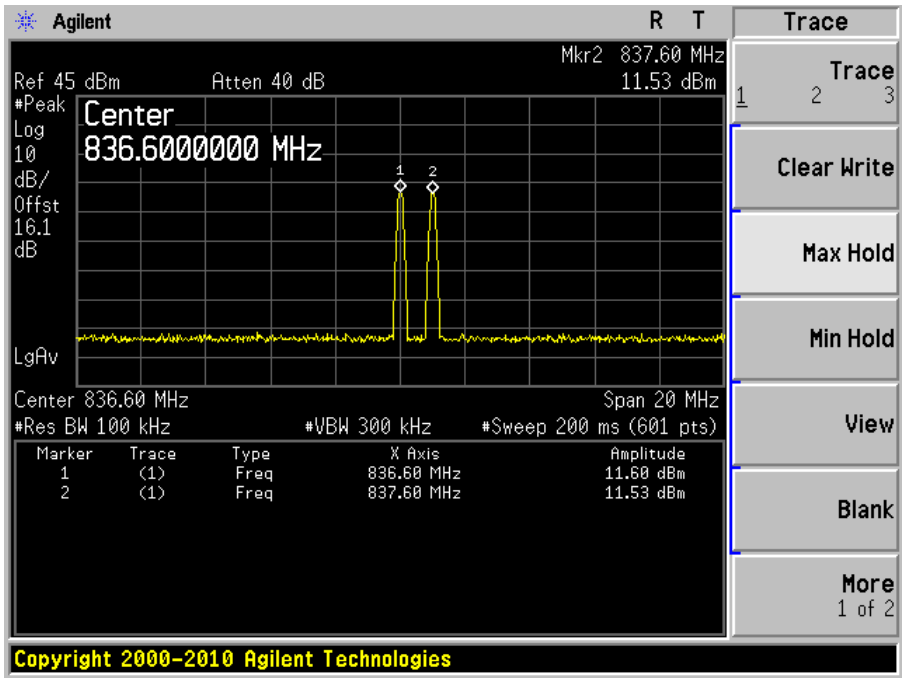


Output

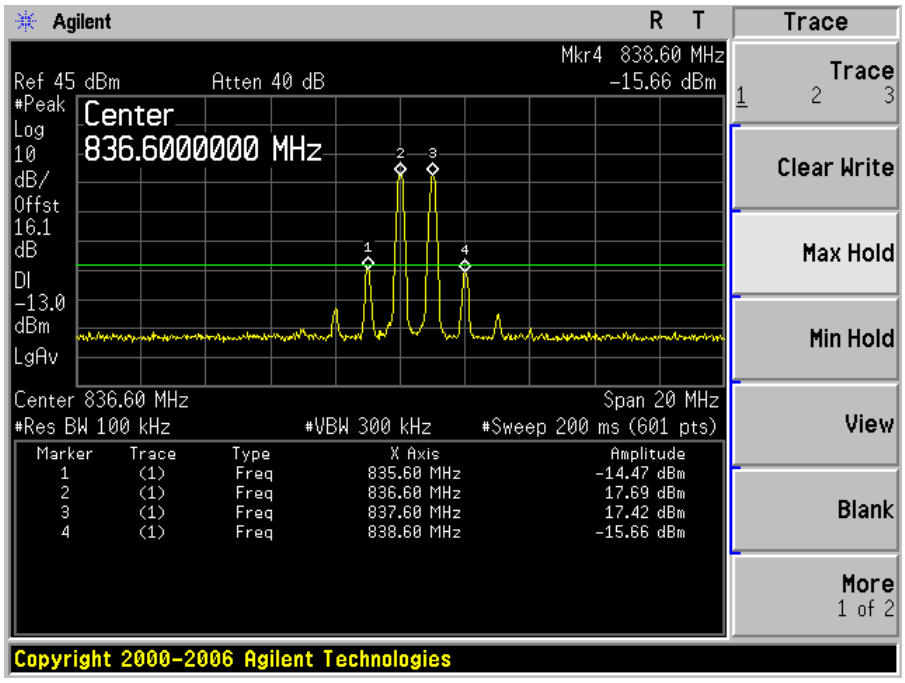


GSM/EDGE 850 MHz band Middle channel Uplink

Input

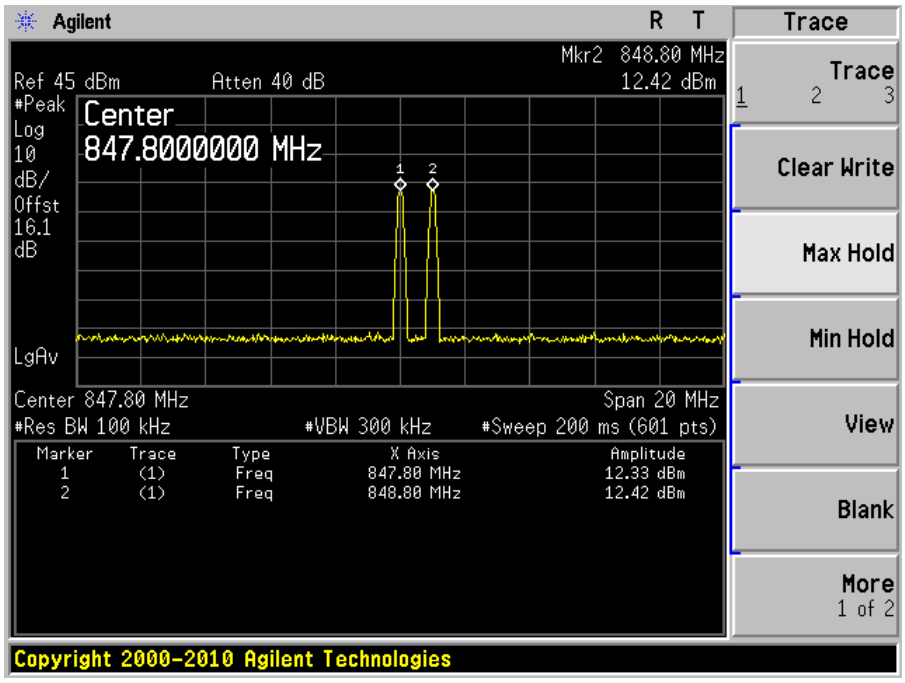


Output

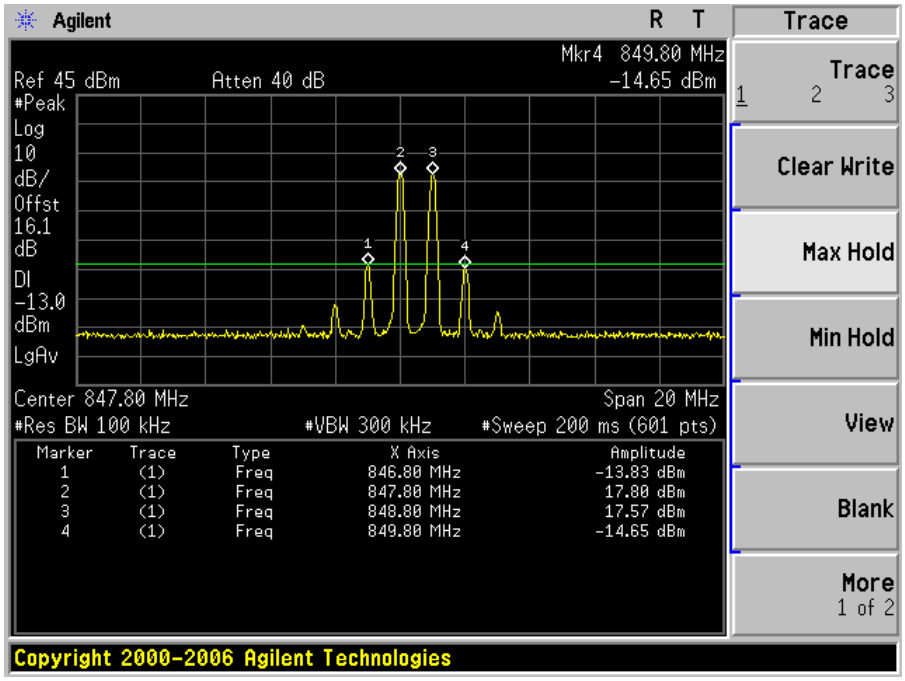


GSM/EDGE 850 MHz band High channel Uplink

Input

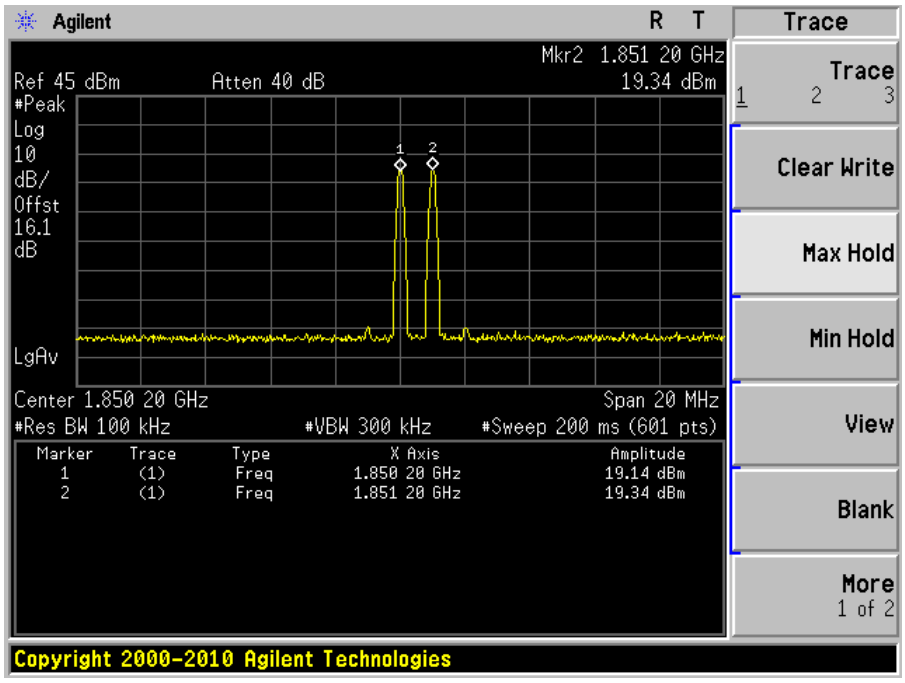


Output

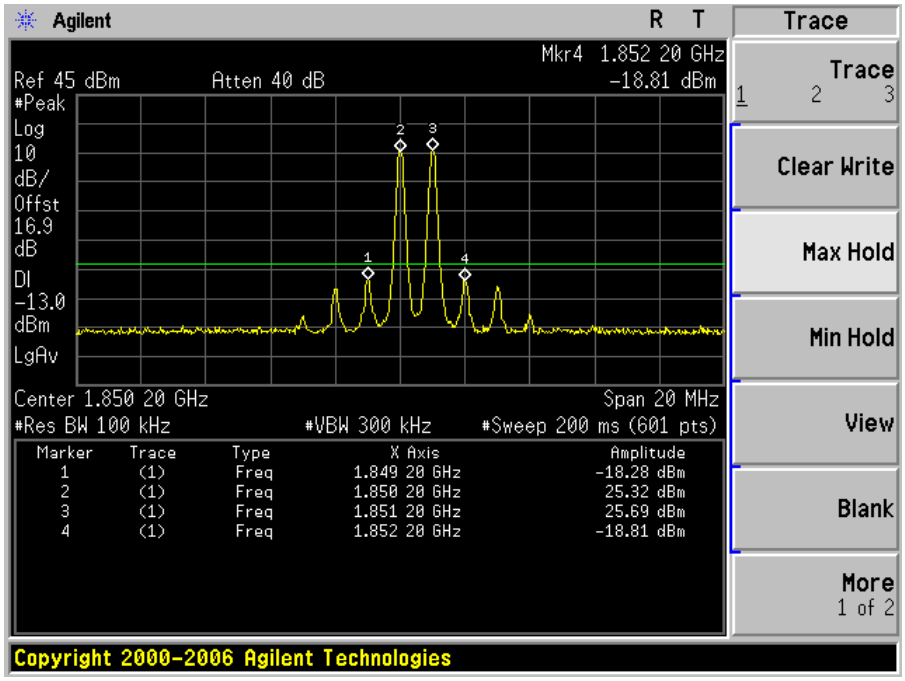


GSM/EDGE 1900 MHz band Low channel Uplink

Input

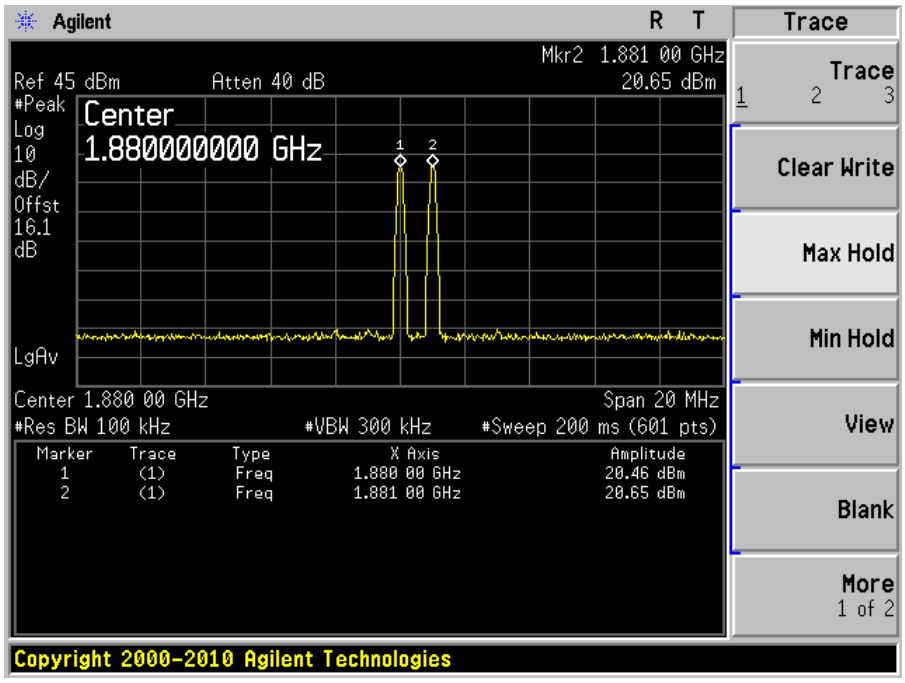


Output

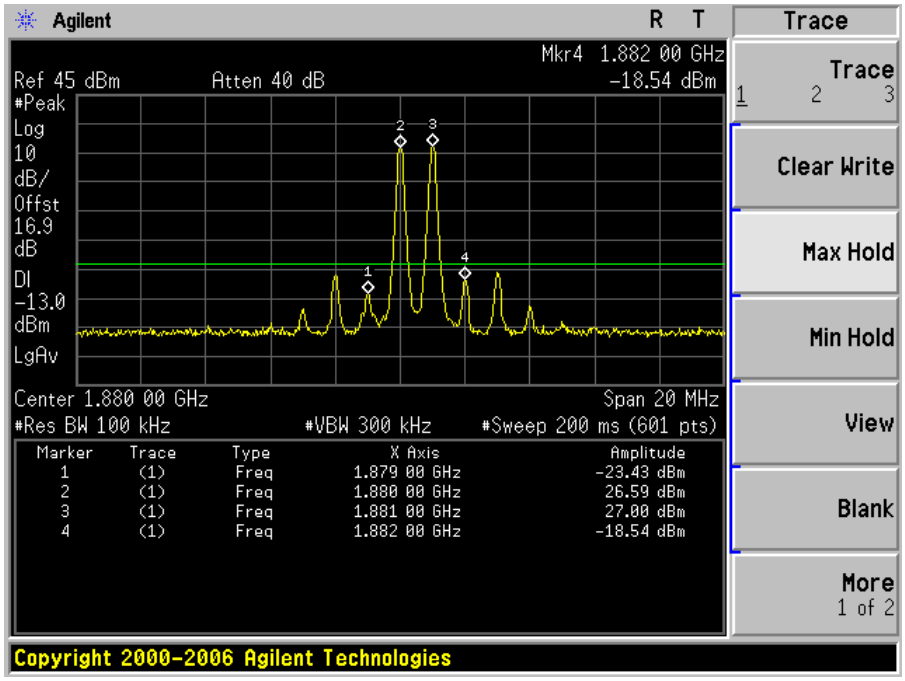


GSM/EDGE 1900 MHz band Middle channel Uplink

Input

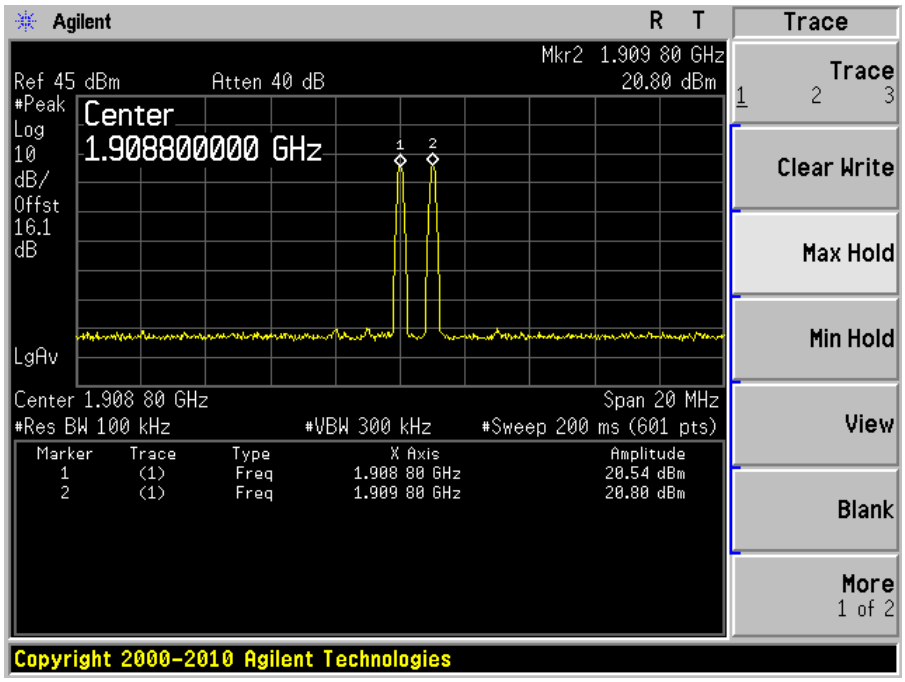


Output

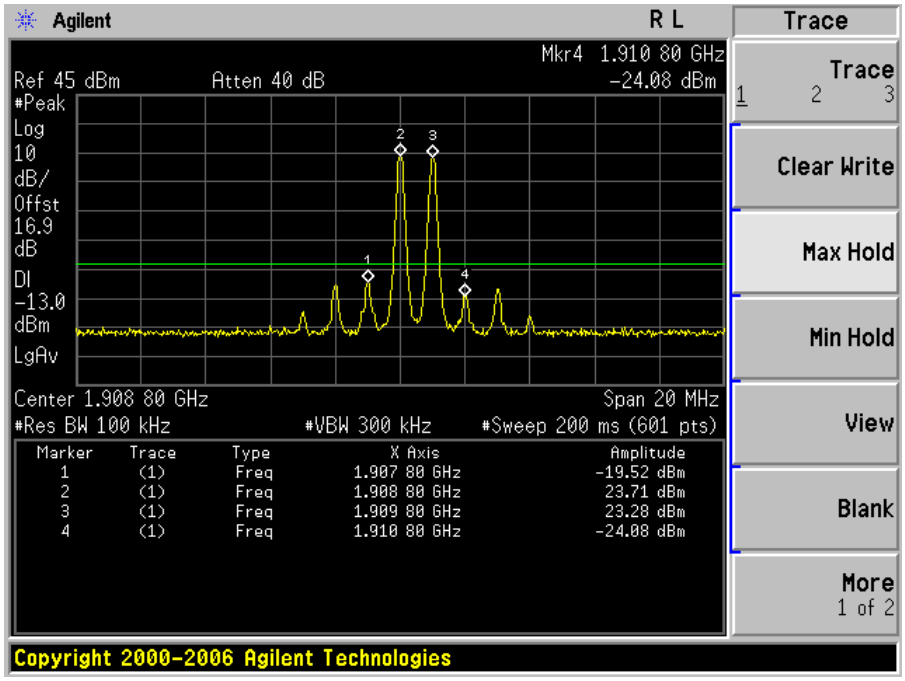


GSM/EDGE 1900 MHz band High channel Uplink

Input

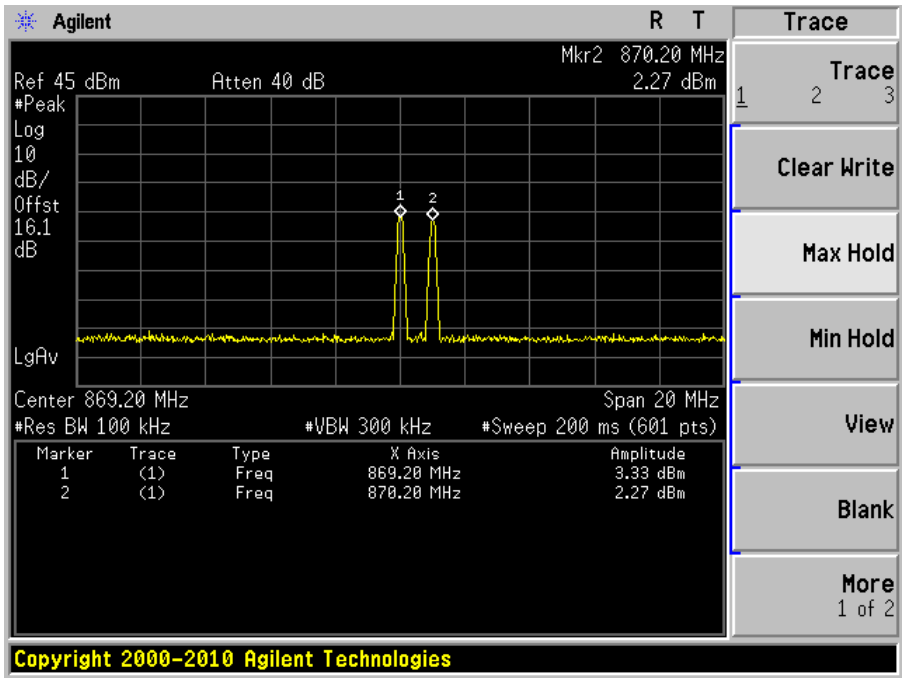


Output

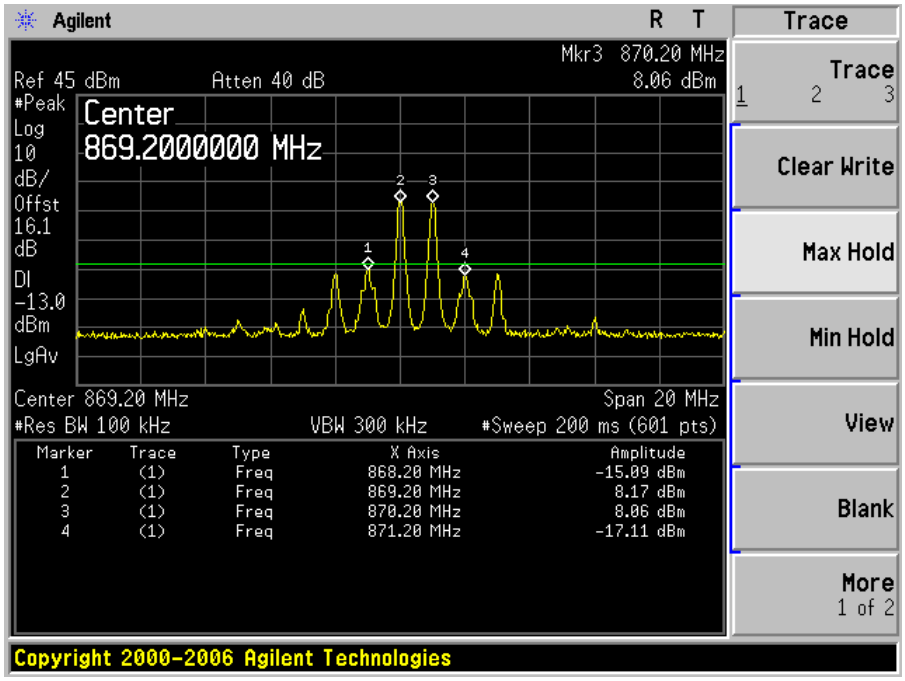


GSM/EDGE 850 MHz band Low channel Downlink

Input

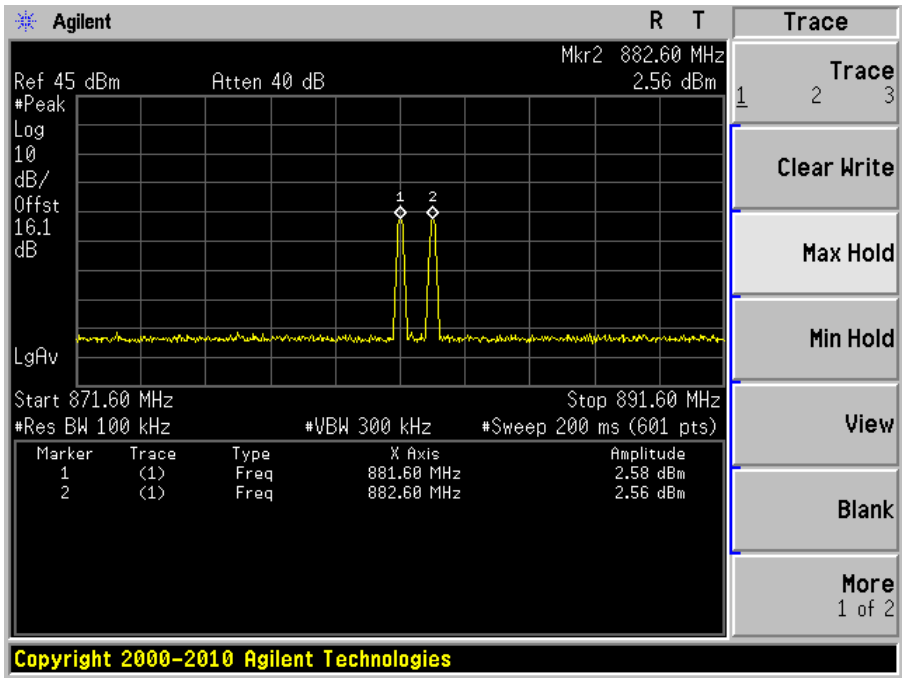


Output

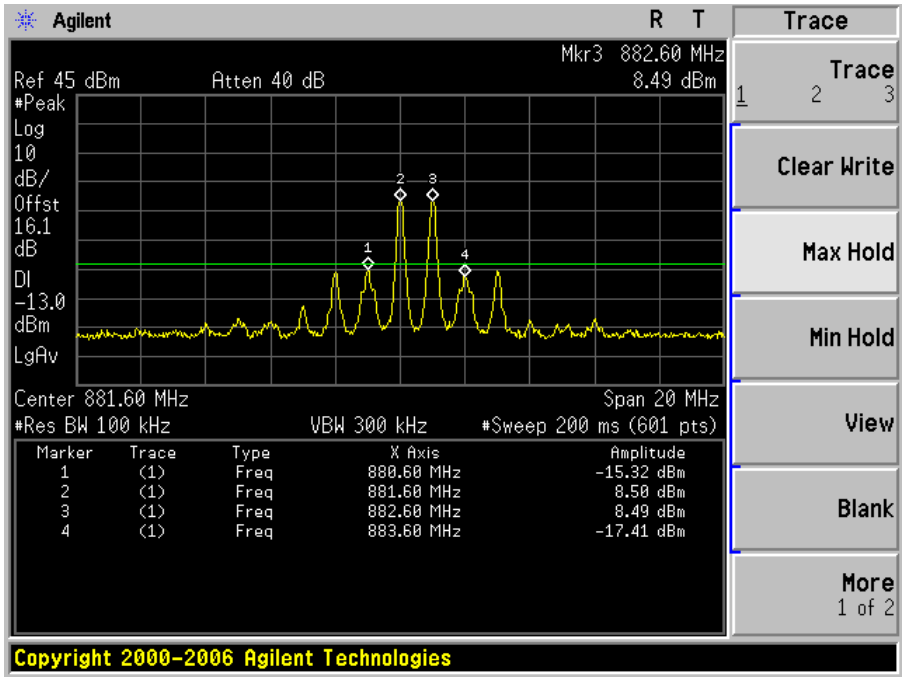


GSM/EDGE 850 MHz band Middle channel Downlink

Input

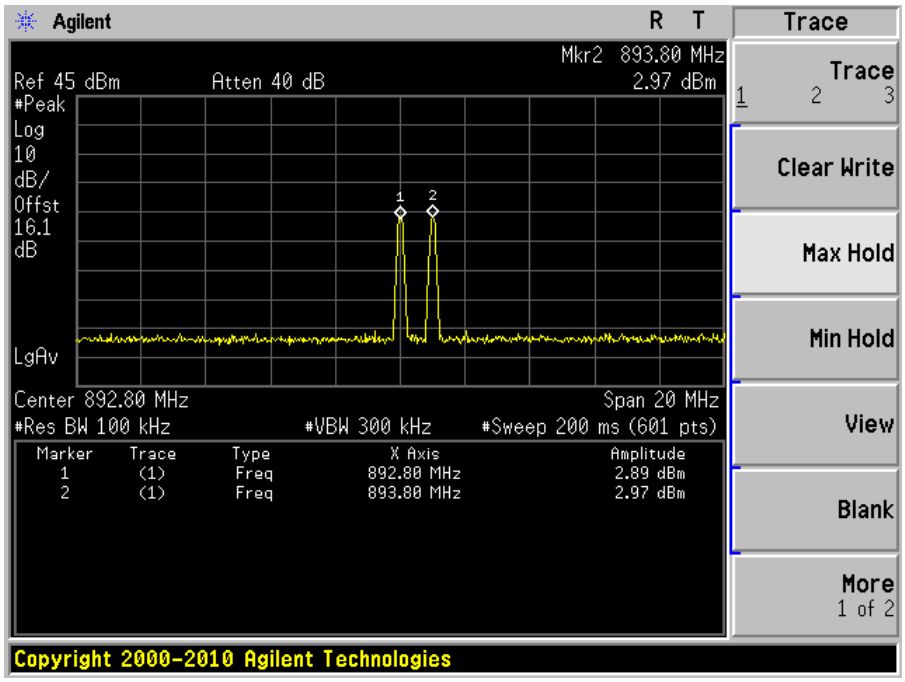


Output

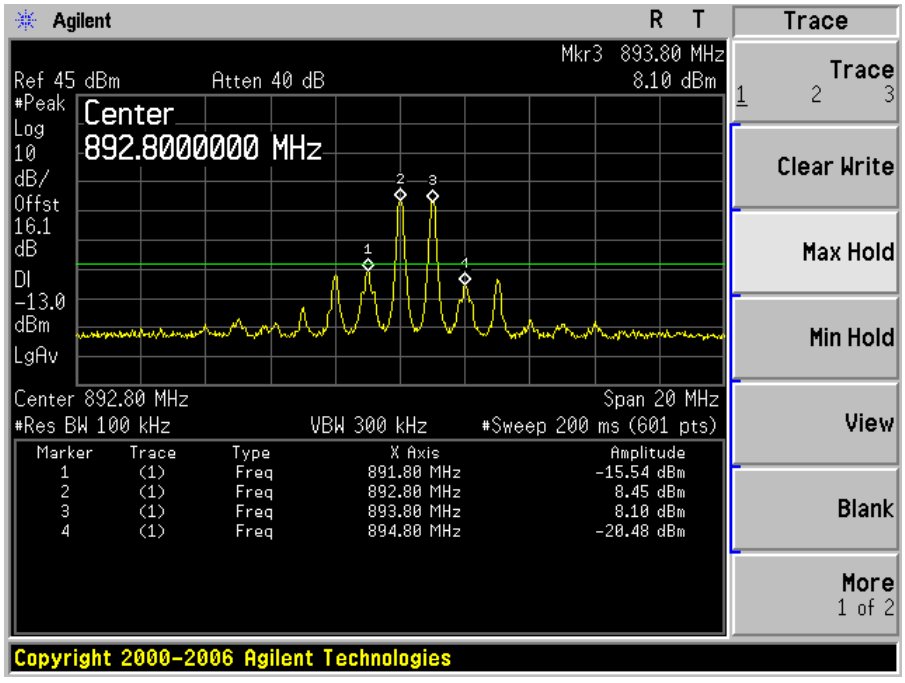


GSM/EDGE 850 MHz band High channel Downlink

Input

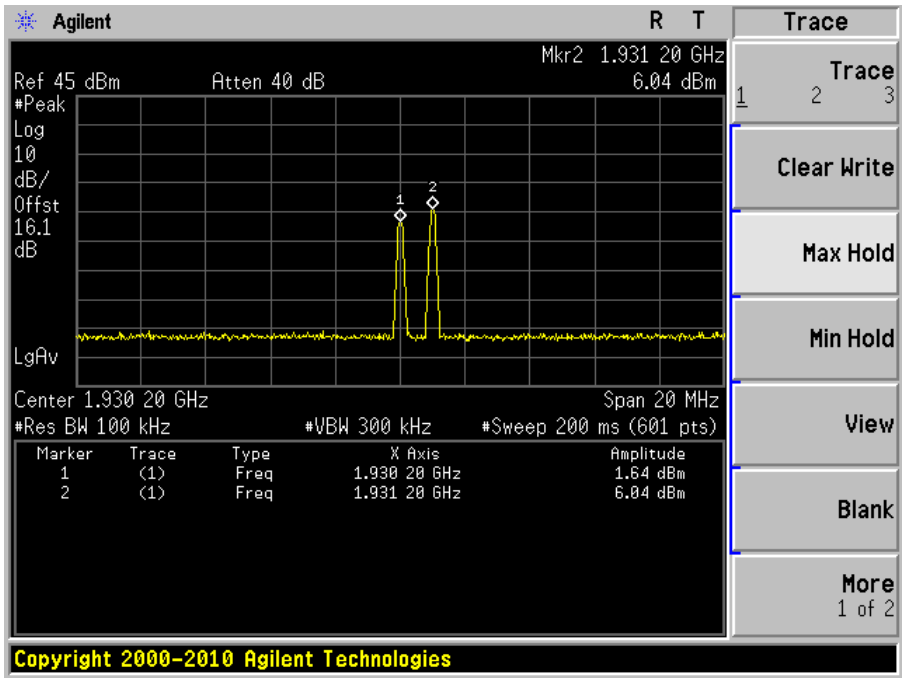


Output

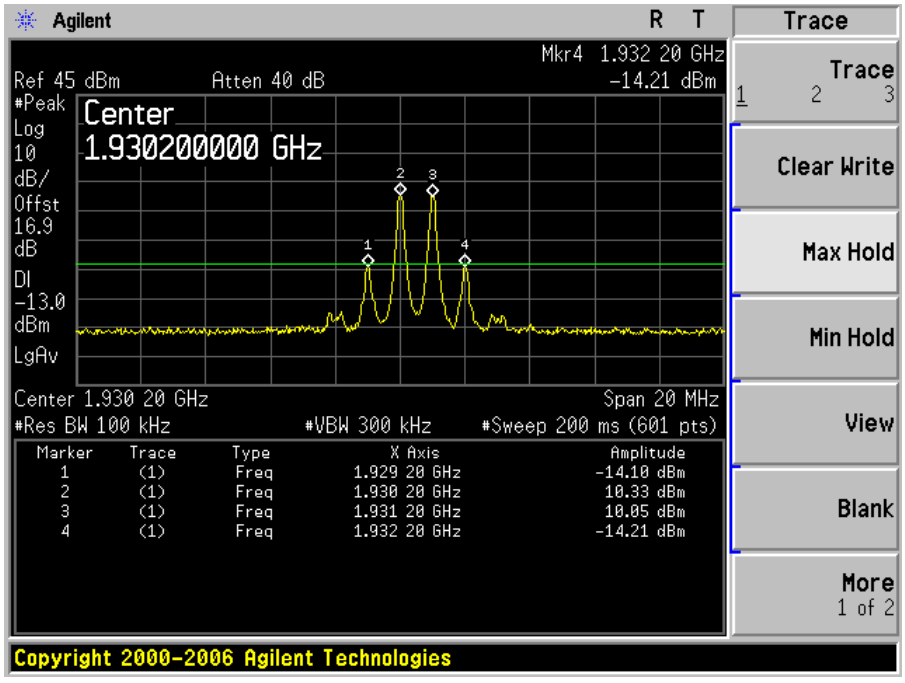


GSM/EDGE 1900 MHz band Low channel Downlink

Input

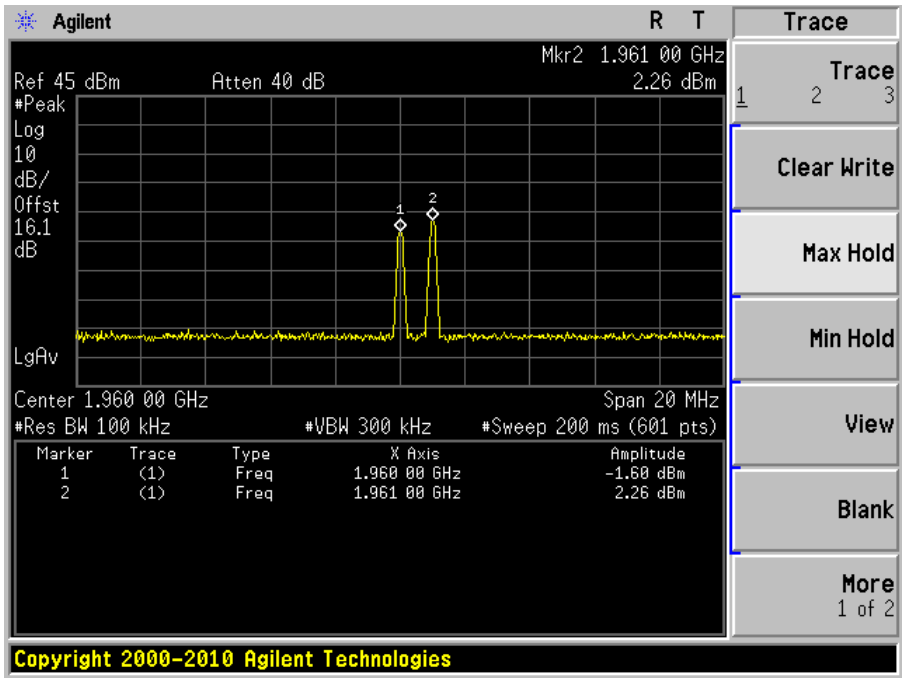


Output

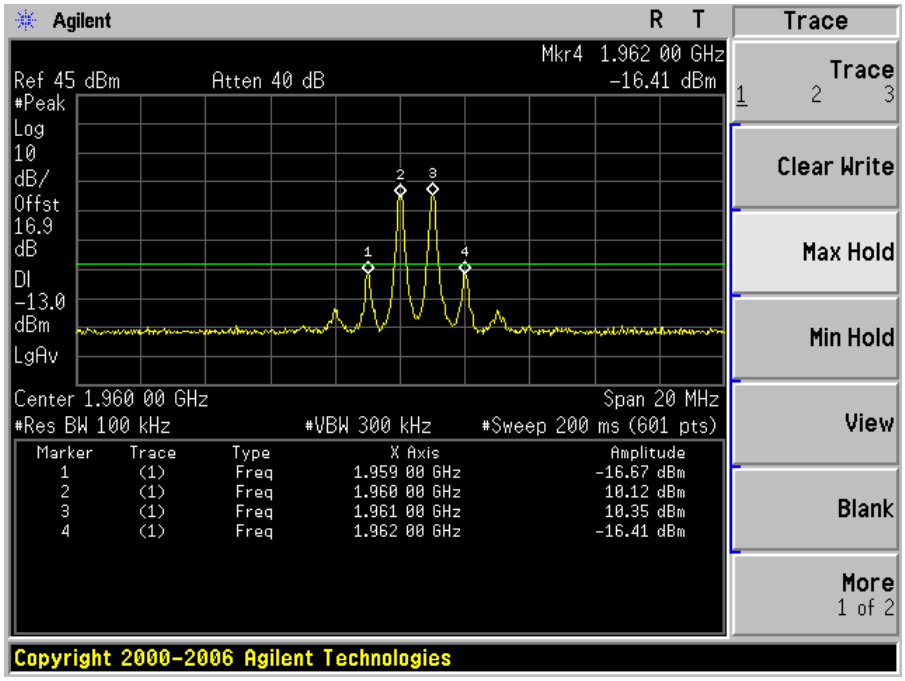


GSM/EDGE 1900 MHz band Middle channel Downlink

Input

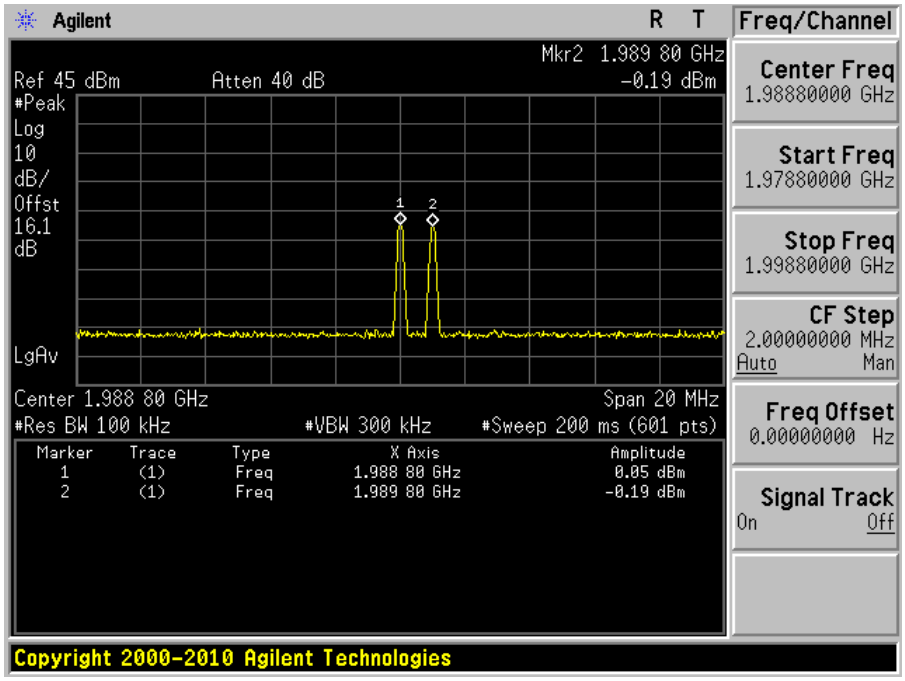


Output

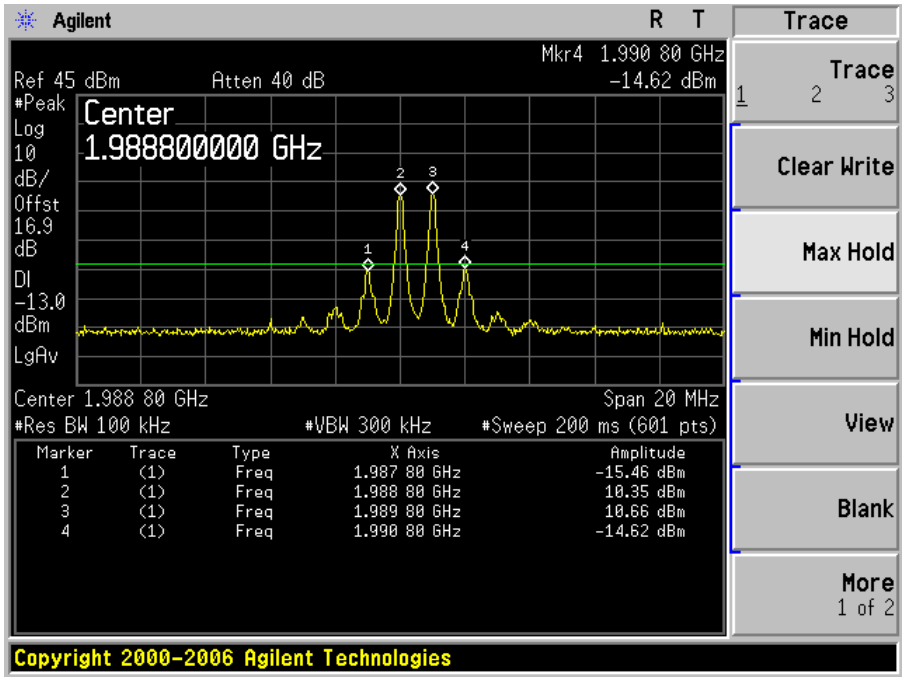


GSM/EDGE 1900 MHz band High channel Downlink

Input

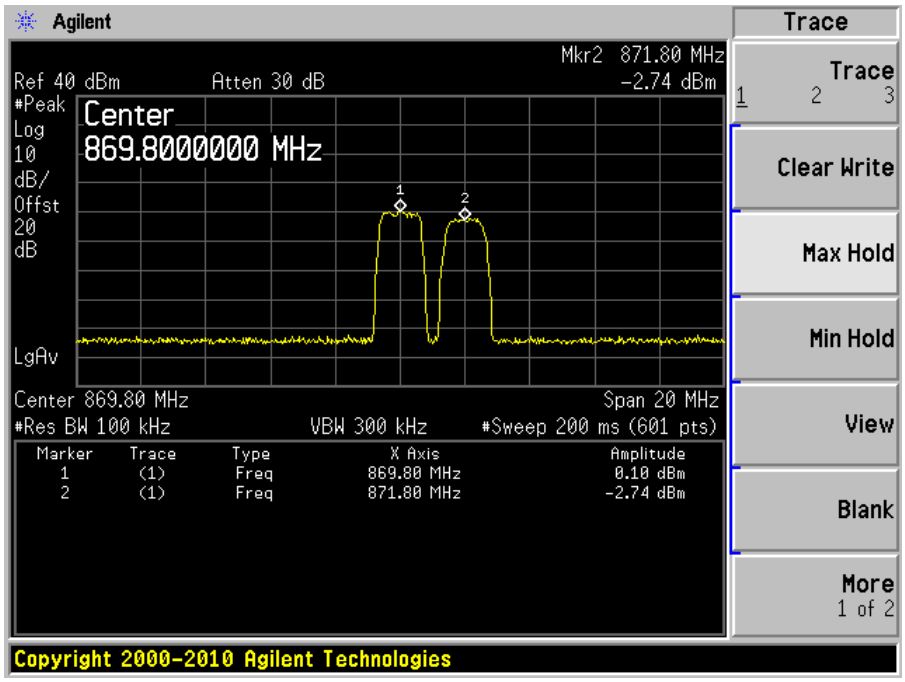


Output

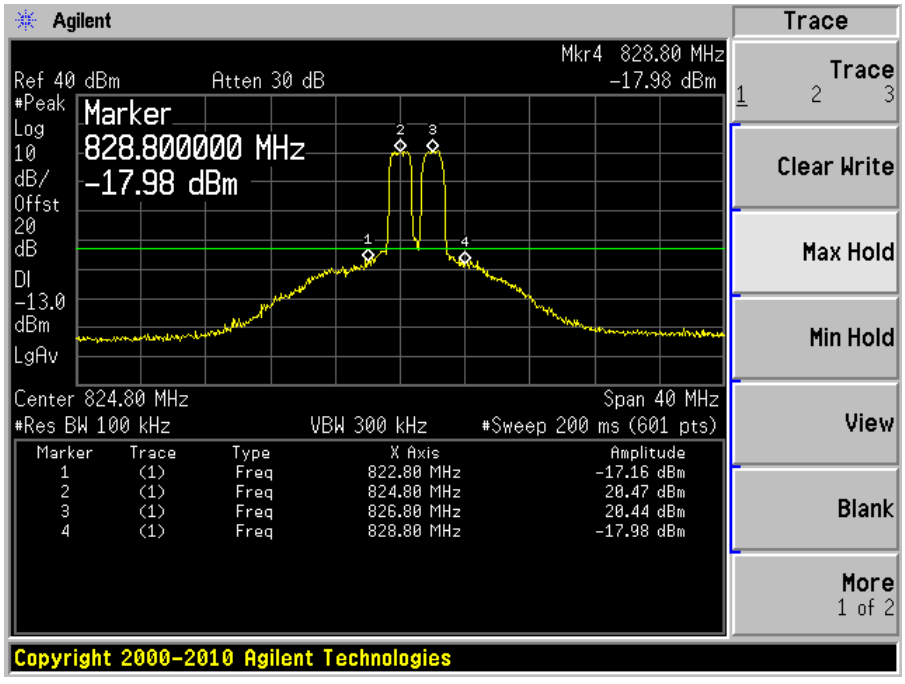


CDMA 850 MHz band Low channel Uplink

Input

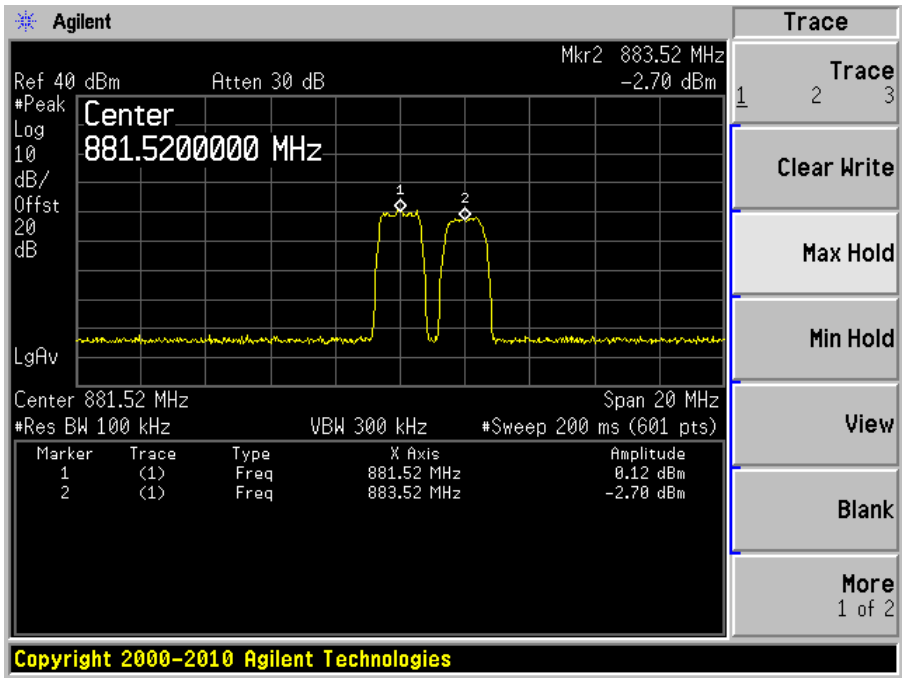


Output

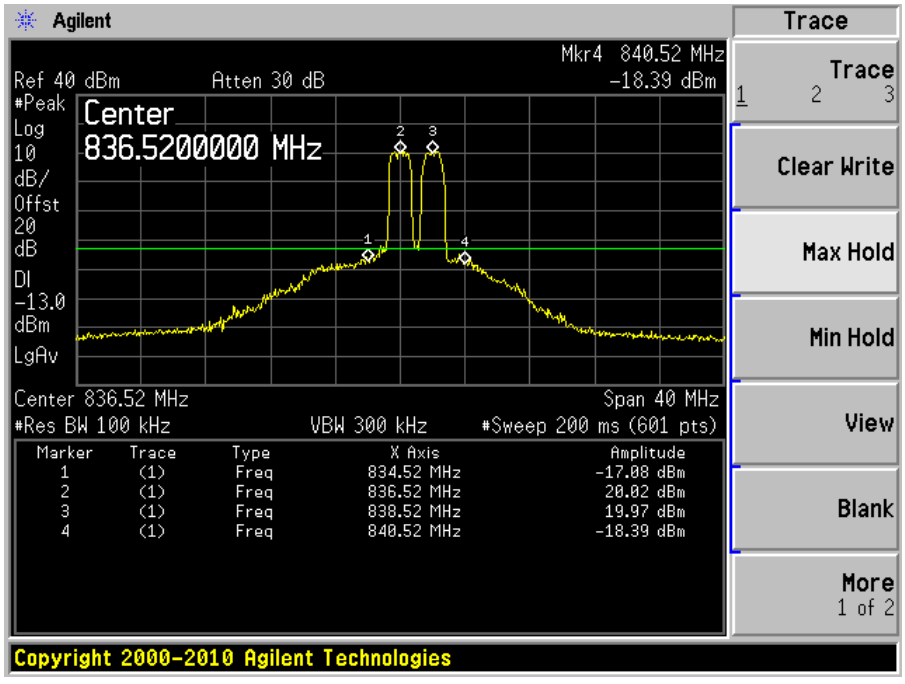


CDMA 850 MHz band Middle channel Uplink

Input

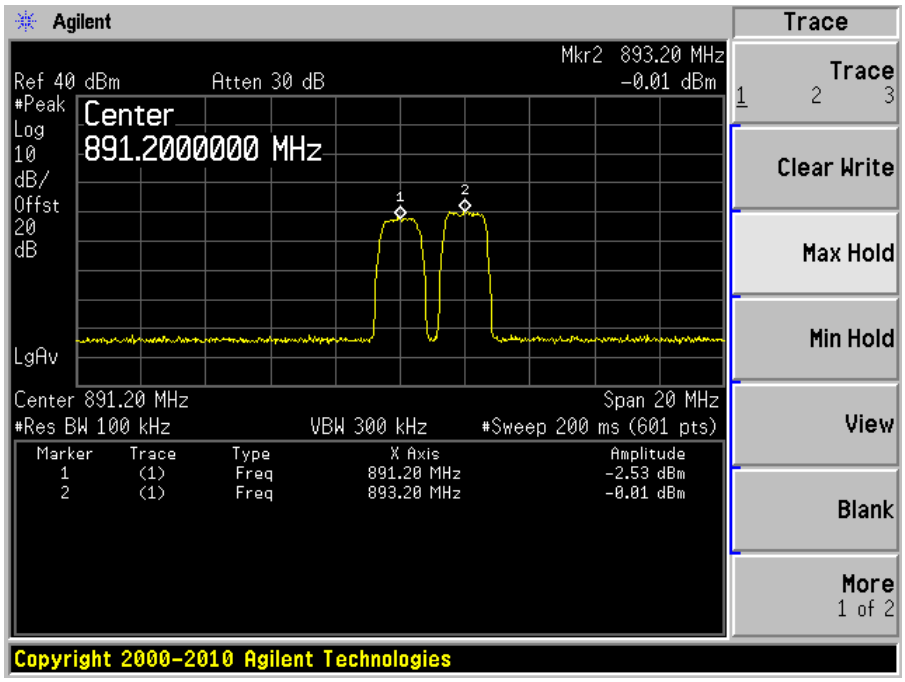


Output

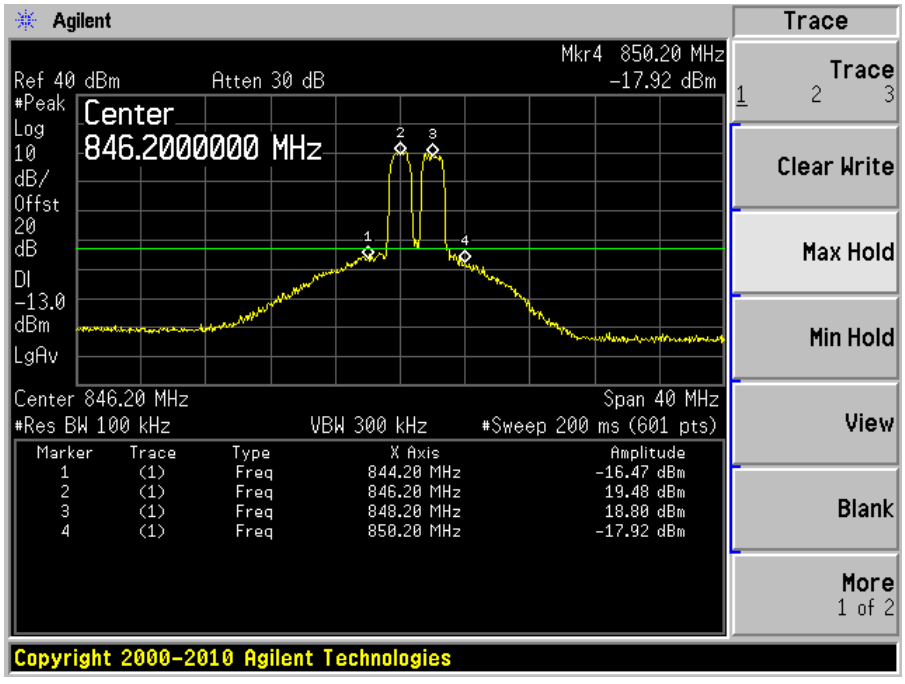


CDMA 850 MHz band High channel Uplink

Input

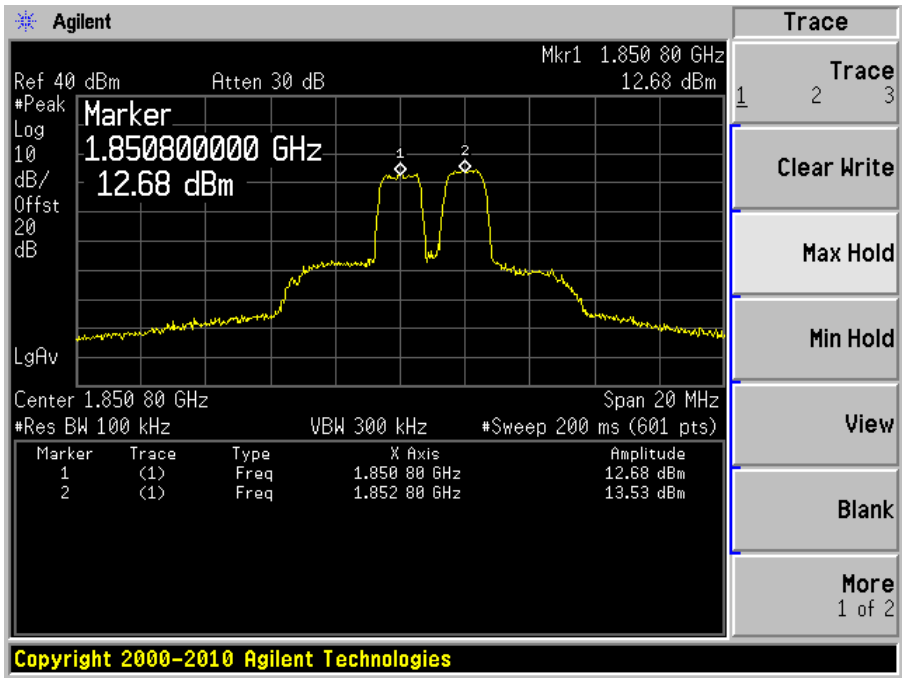


Output

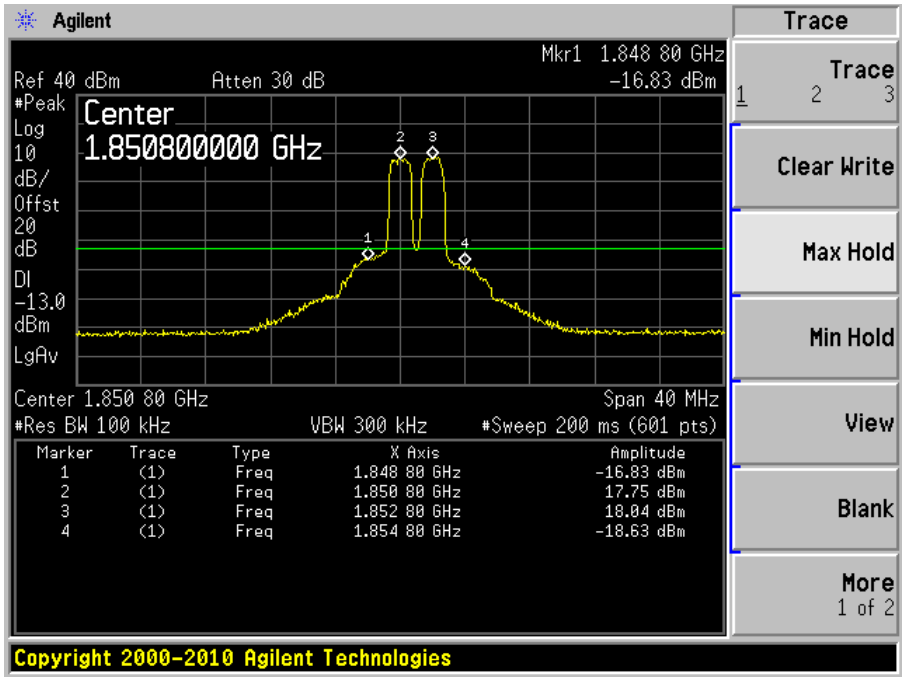


CDMA 1900 MHz band Low channel Uplink

Input

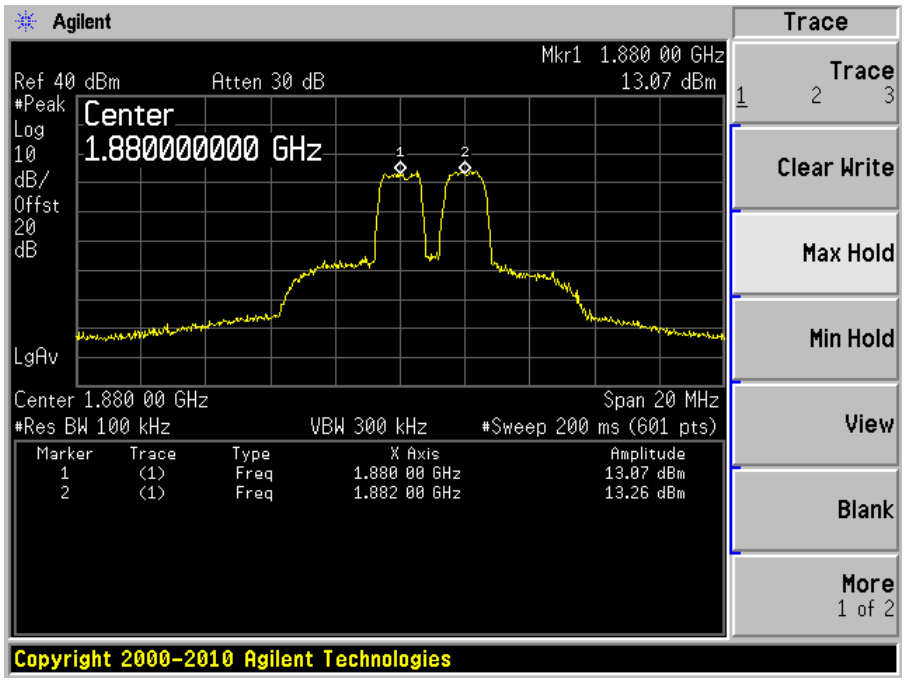


Output

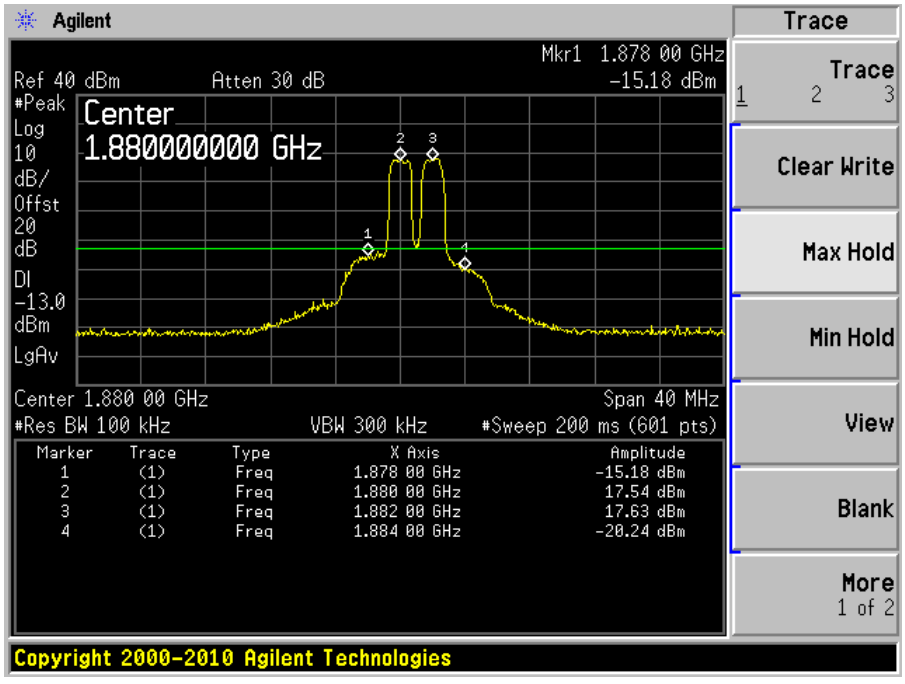


CDMA 1900 MHz band Middle channel Uplink

Input

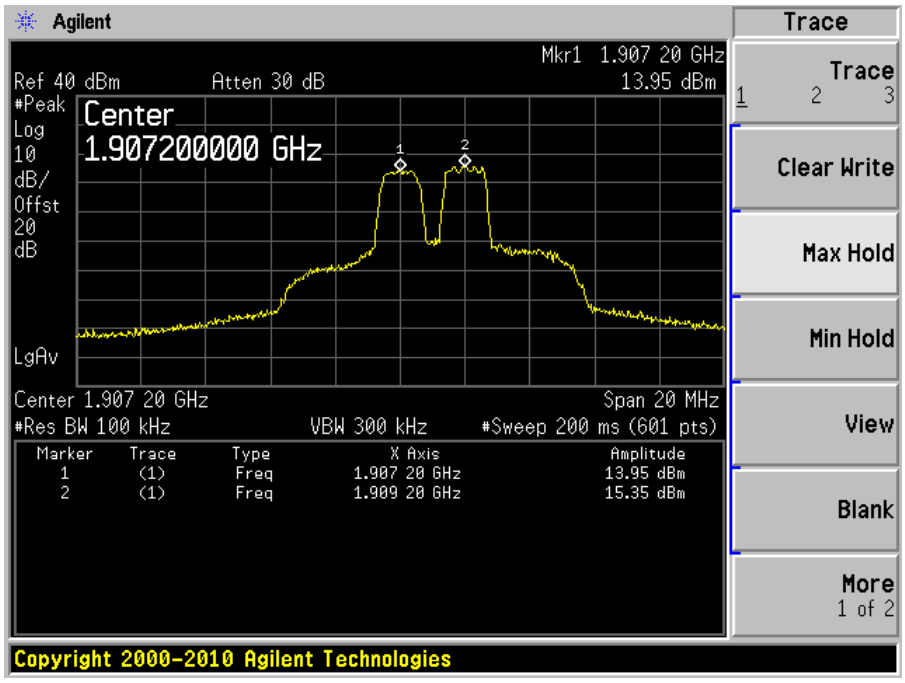


Output

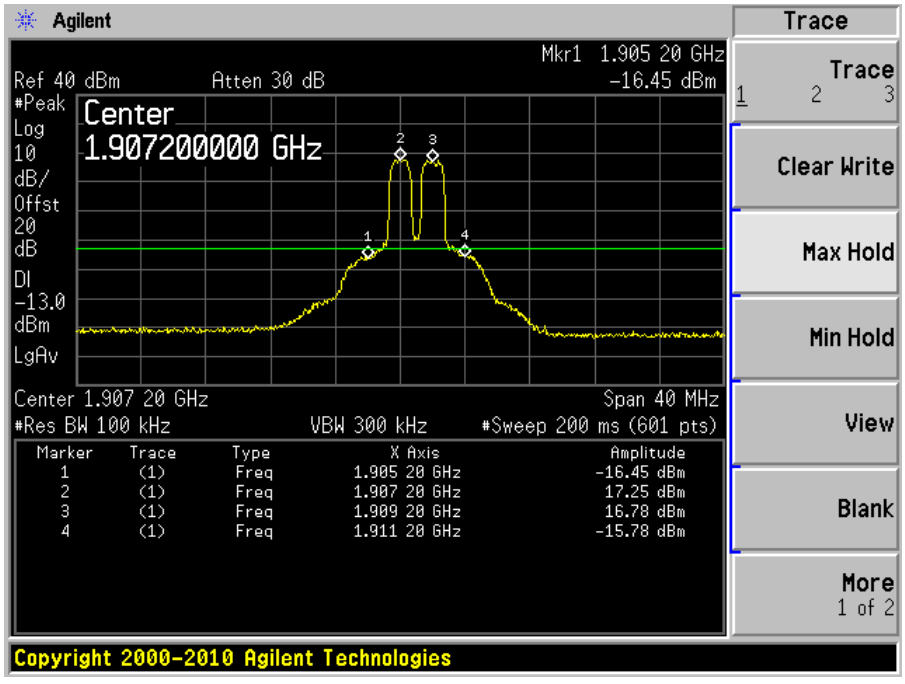


CDMA 1900 MHz band High channel Uplink

Input

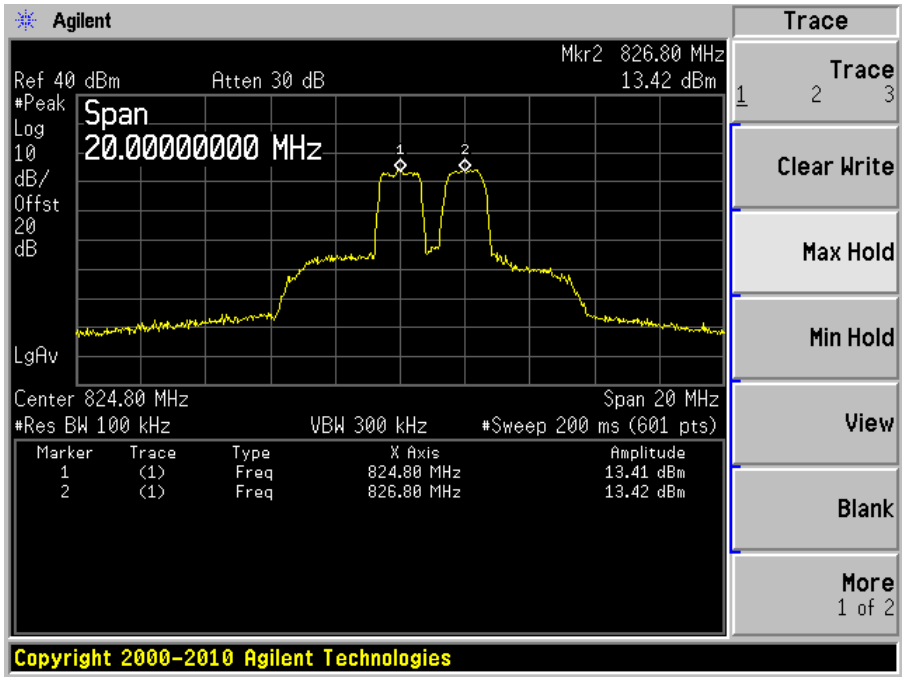


Output

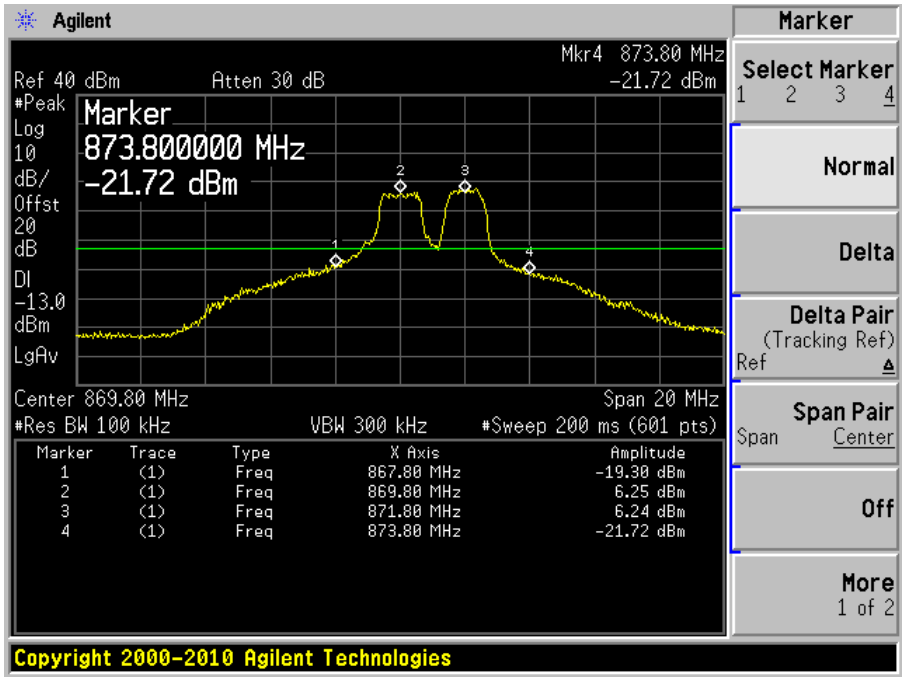


CDMA 850 MHz band Low channel Downlink

Input

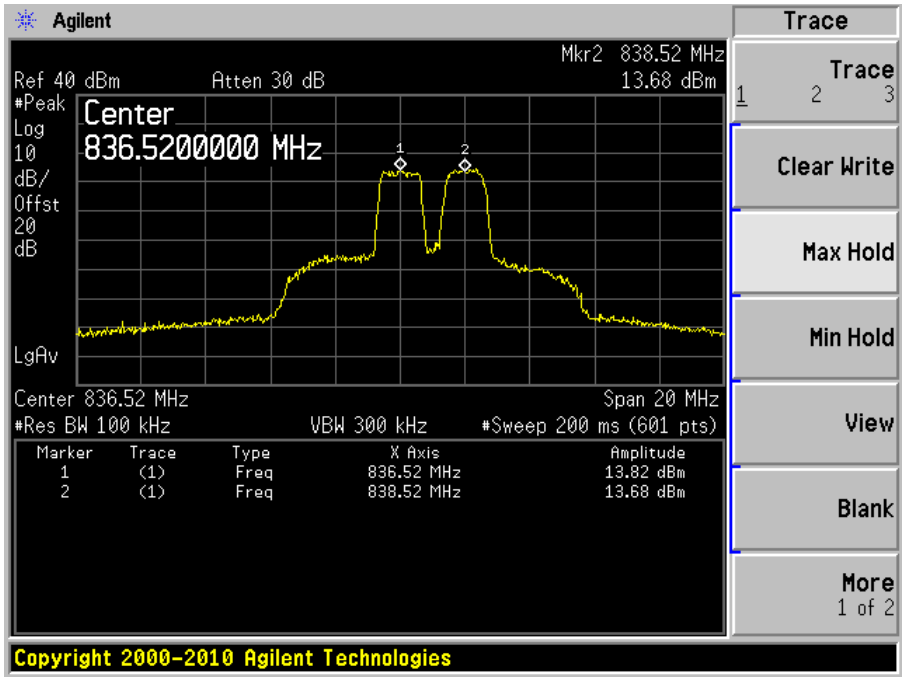


Output

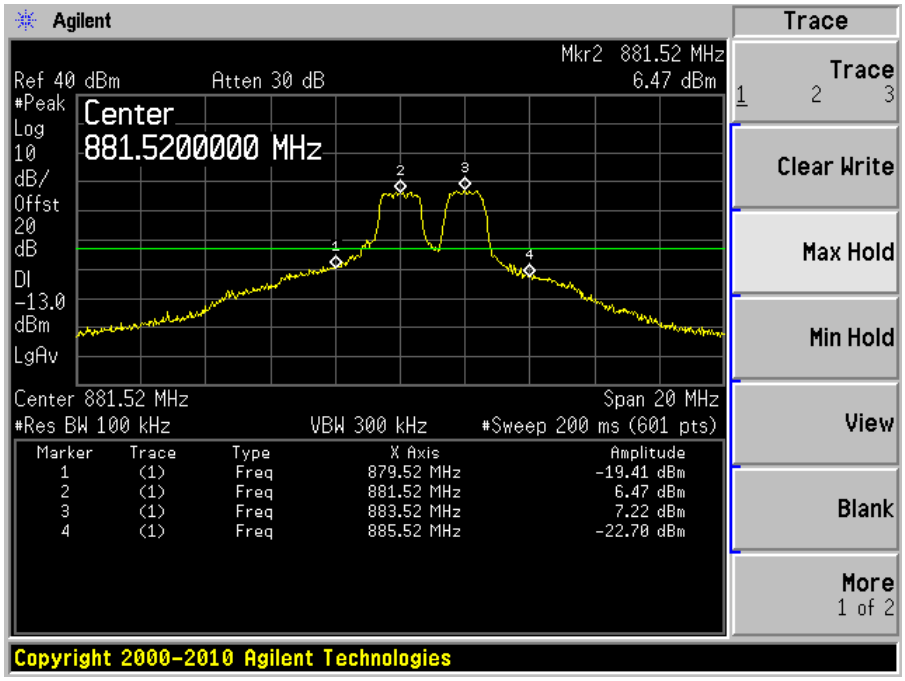


CDMA 850 MHz band Middle channel Downlink

Input

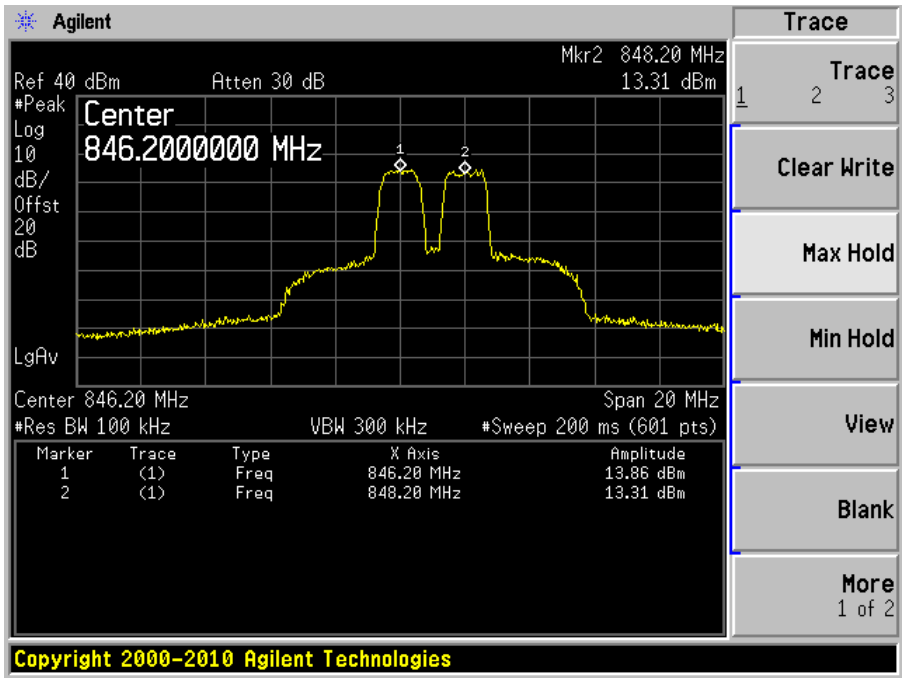


Output

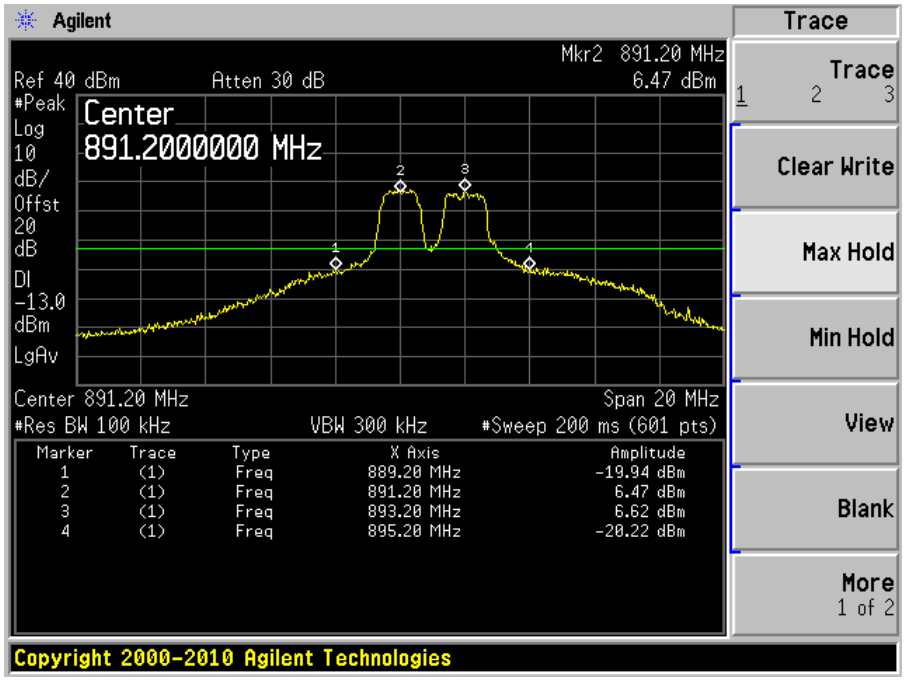


CDMA 850 MHz band High channel Downlink

Input

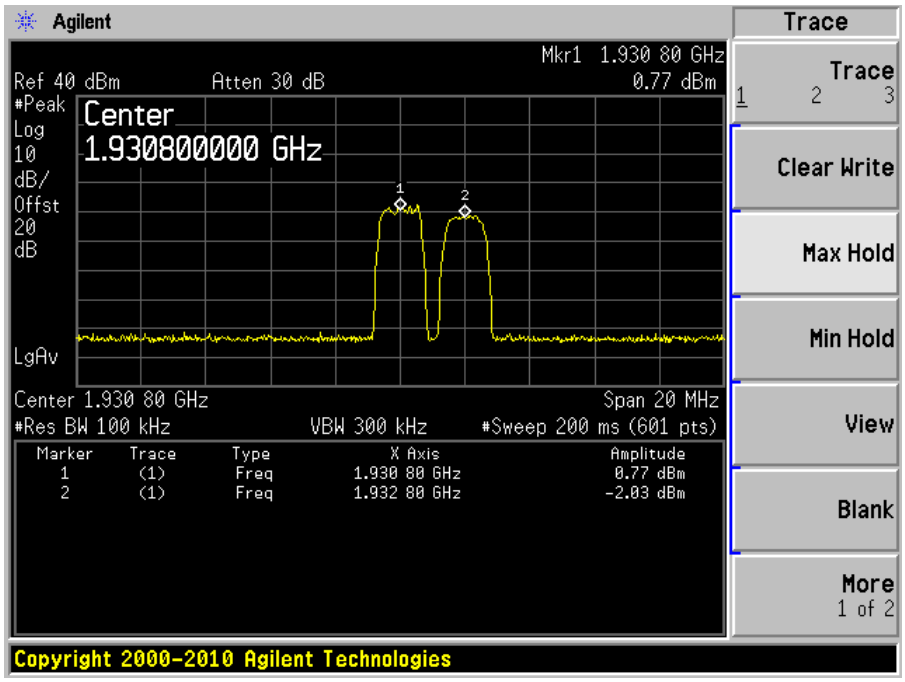


Output

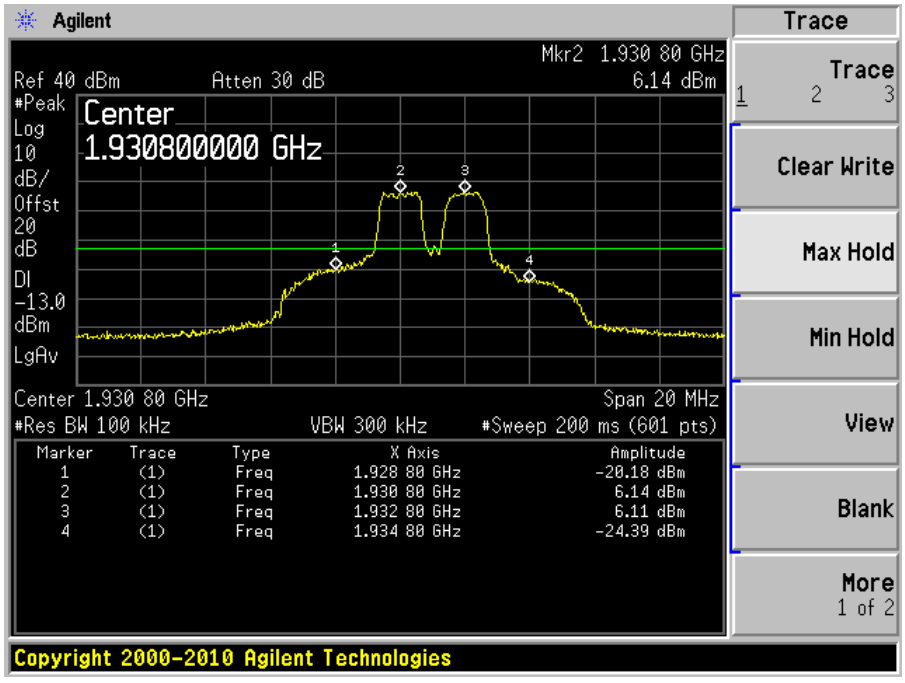


CDMA 1900 MHz band Low channel Downlink

Input

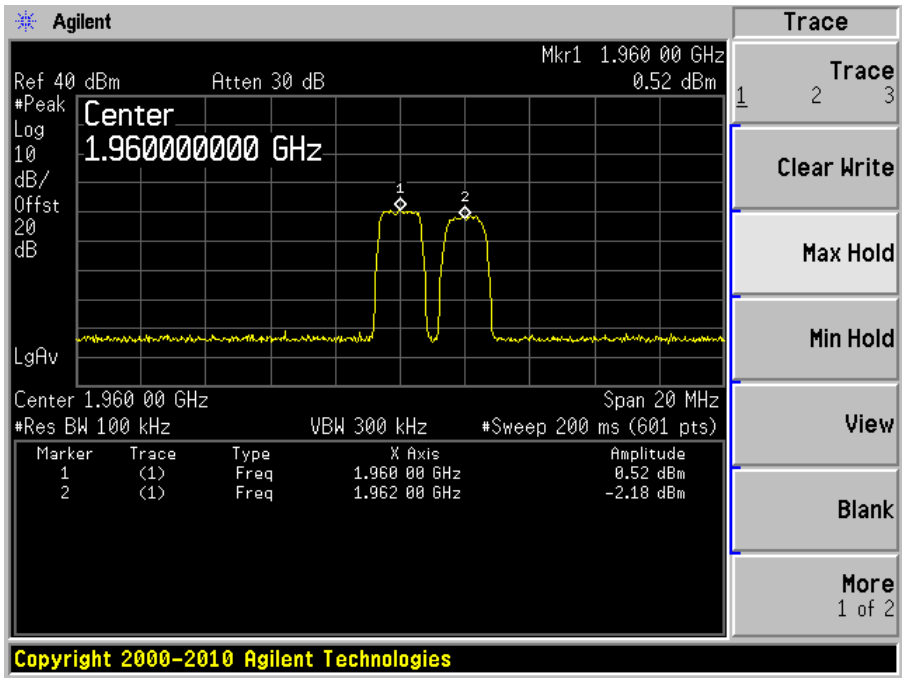


Output

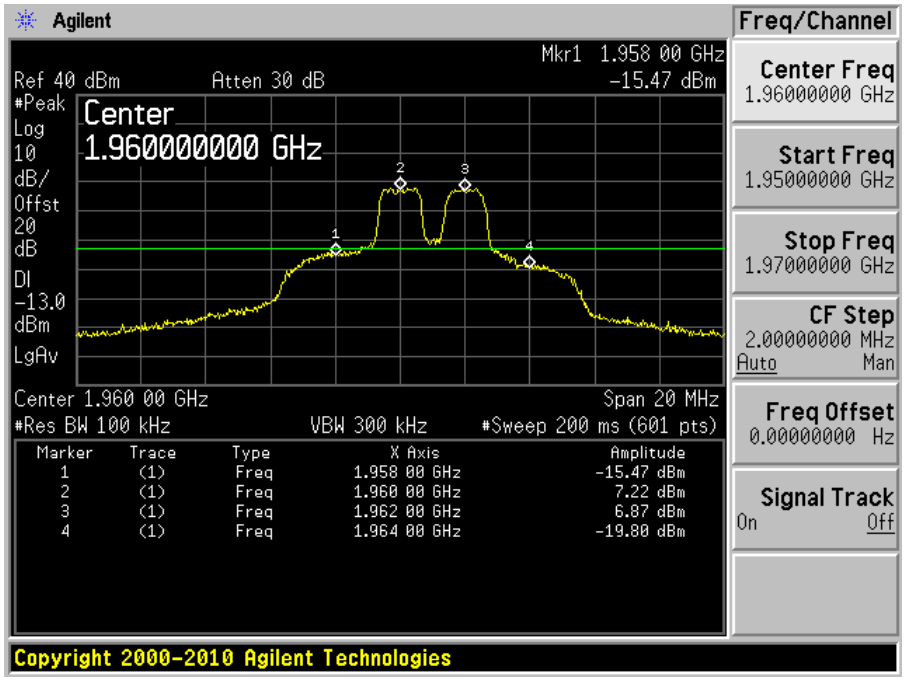


CDMA 1900 MHz band Middle channel Downlink

Input

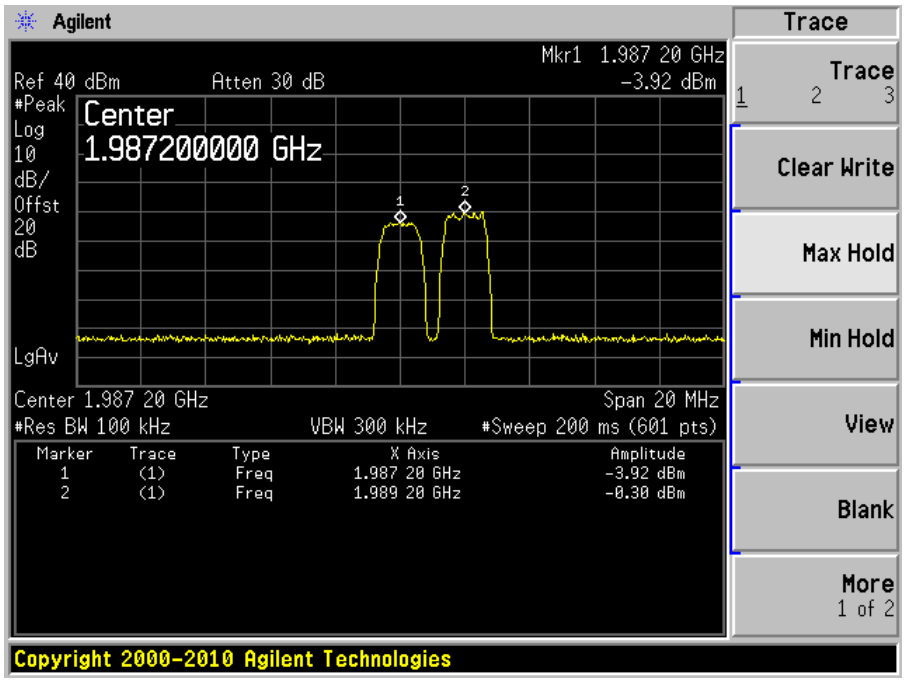


Output

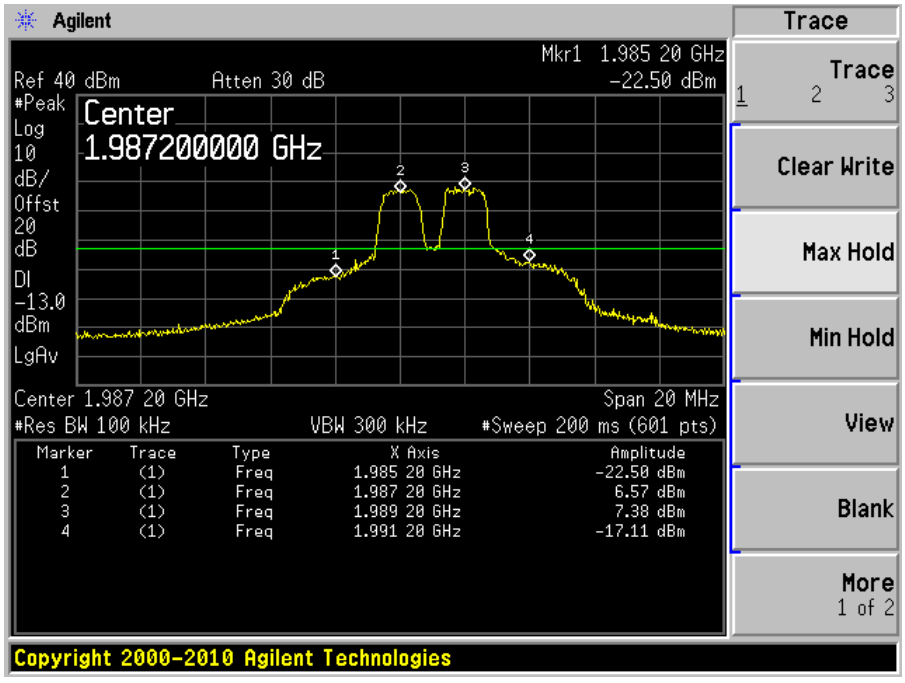


CDMA 1900 MHz band High channel Downlink

Input

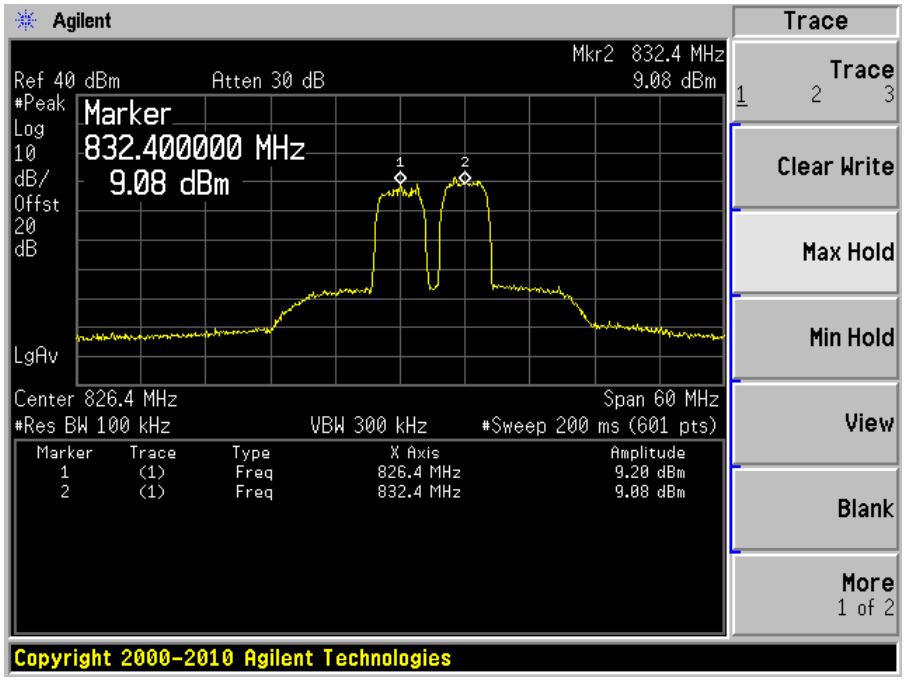


Output

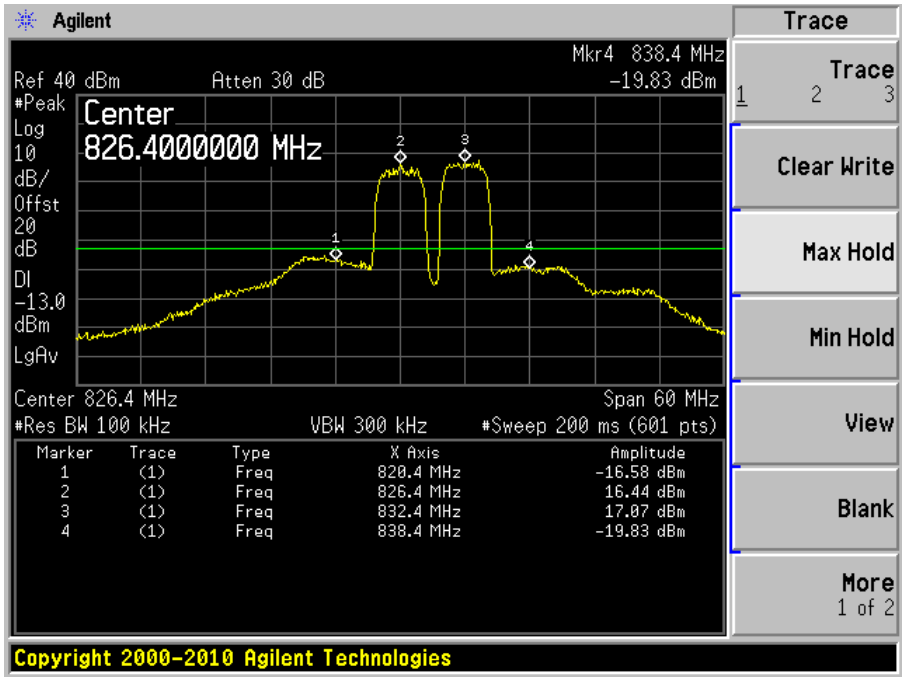


WCDMA 850 MHz band Low channel Uplink

Input

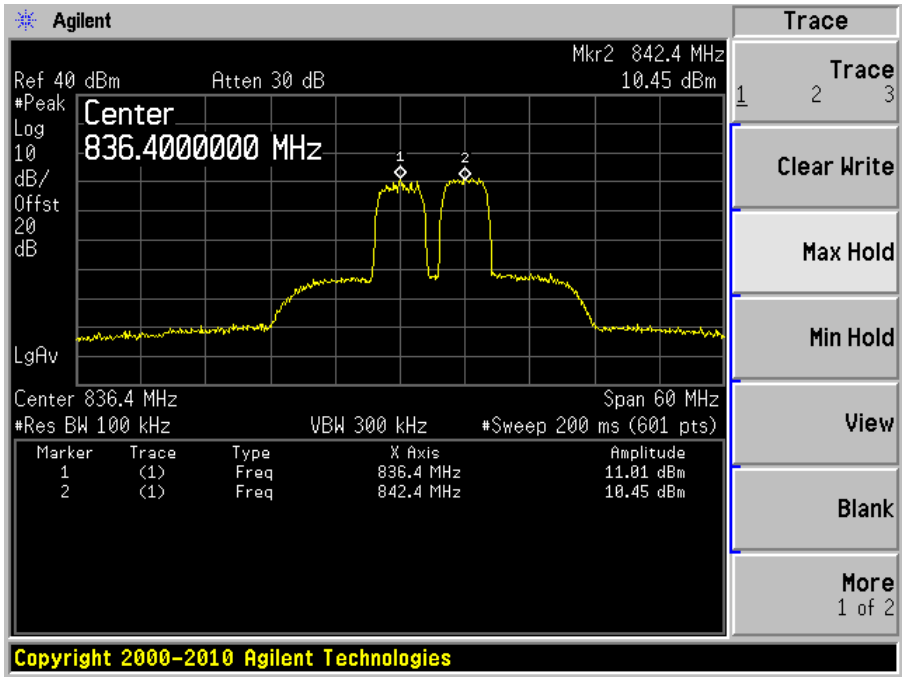


Output

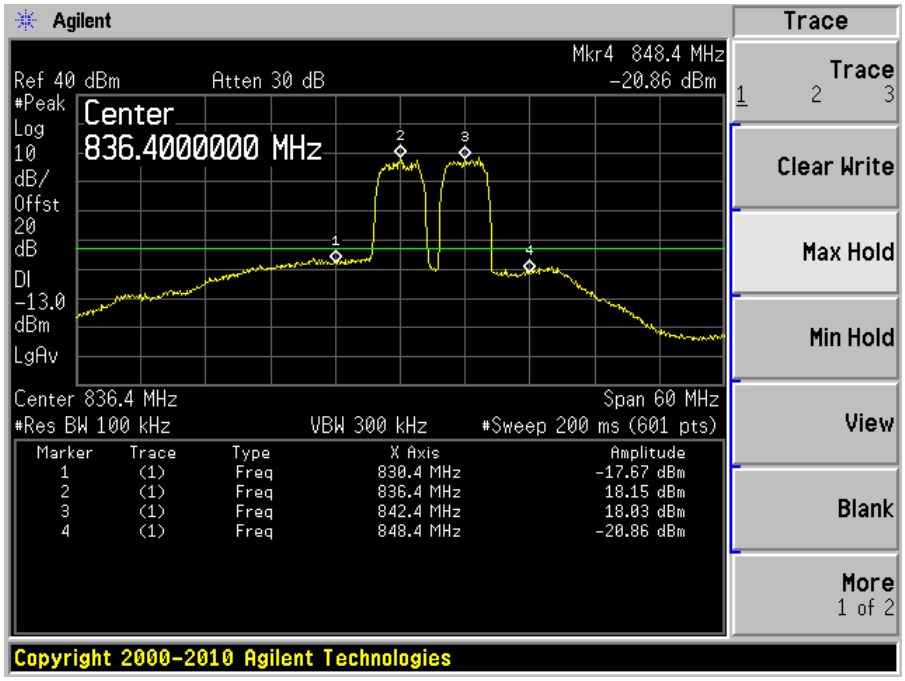


WCDMA 850 MHz band Middle channel Uplink

Input

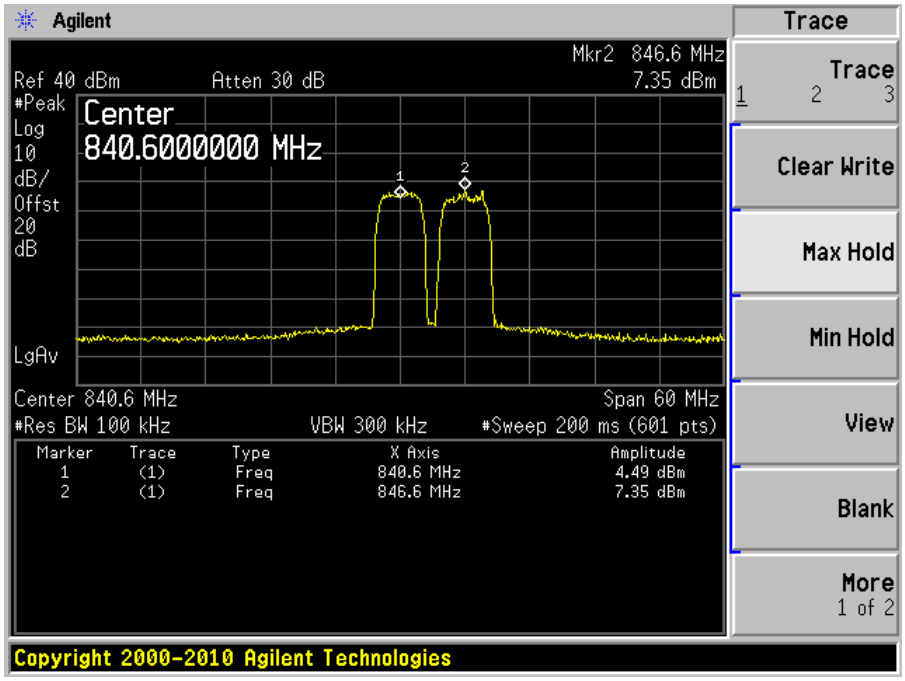


Output

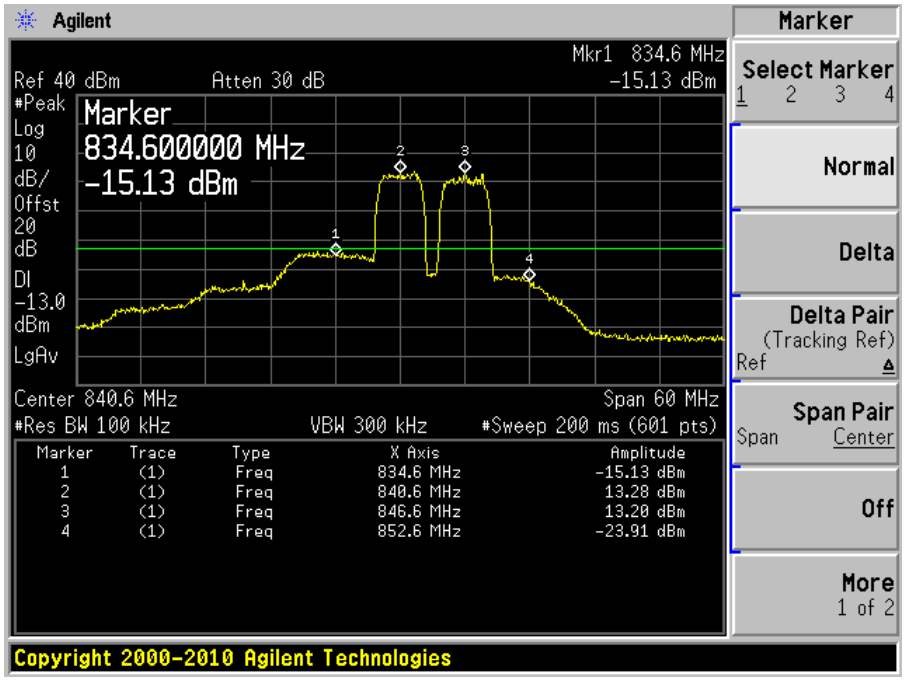


WCDMA 850 MHz band High channel Uplink

Input

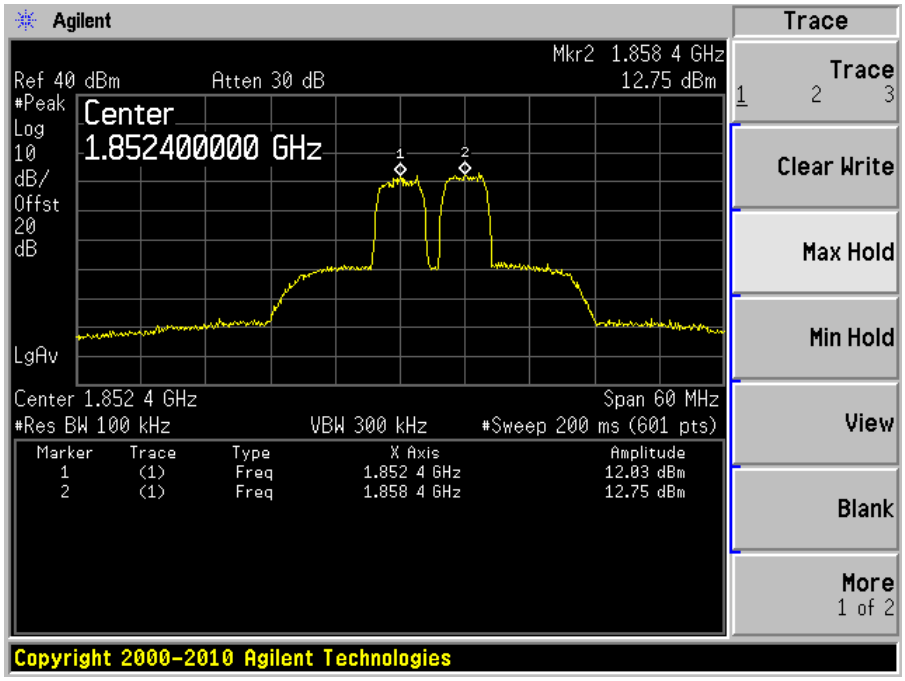


Output

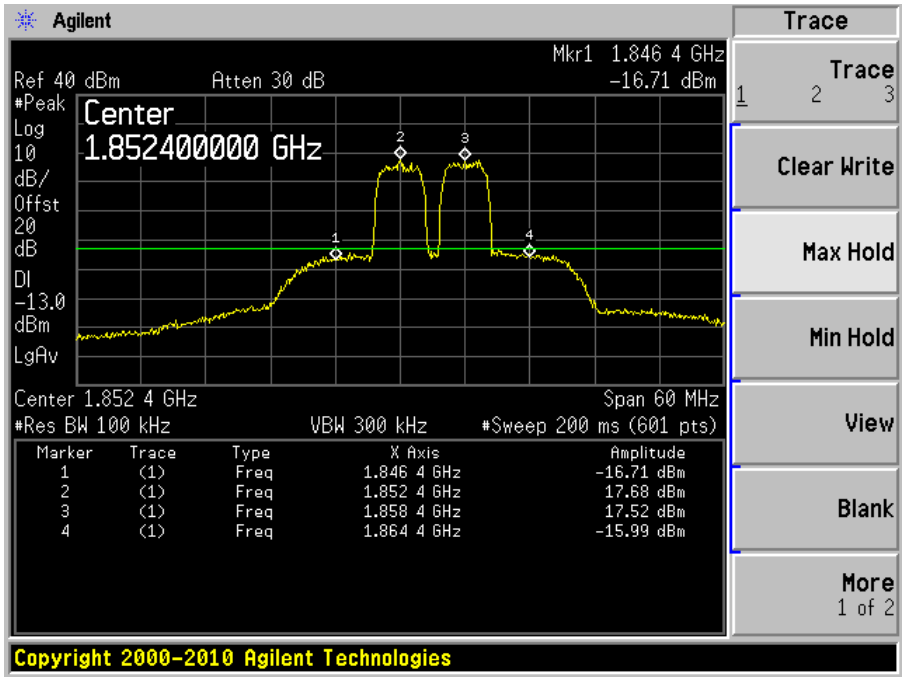


WCDMA 1900 MHz band Low channel Uplink

Input

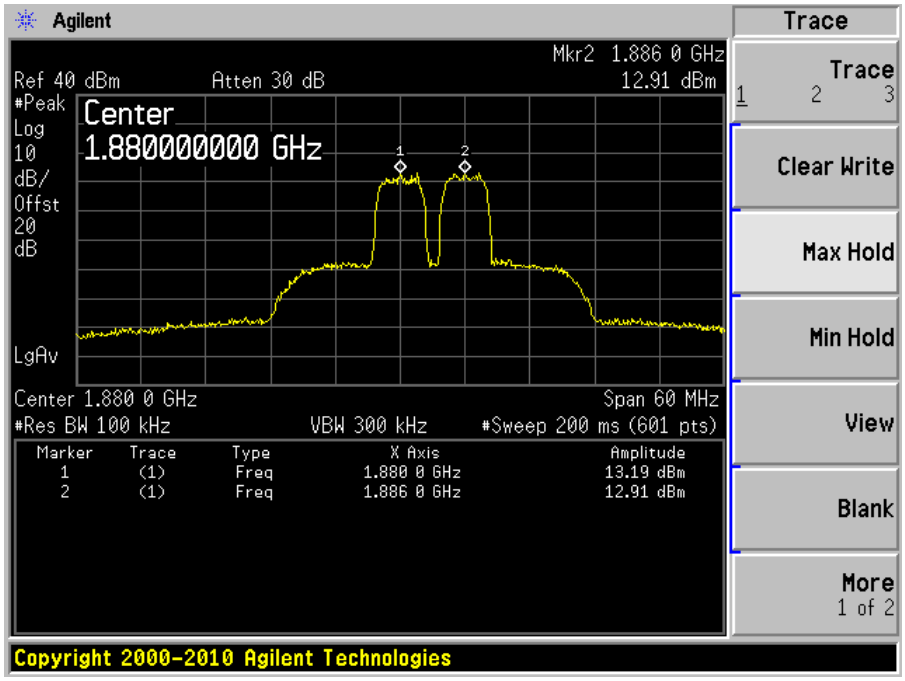


Output

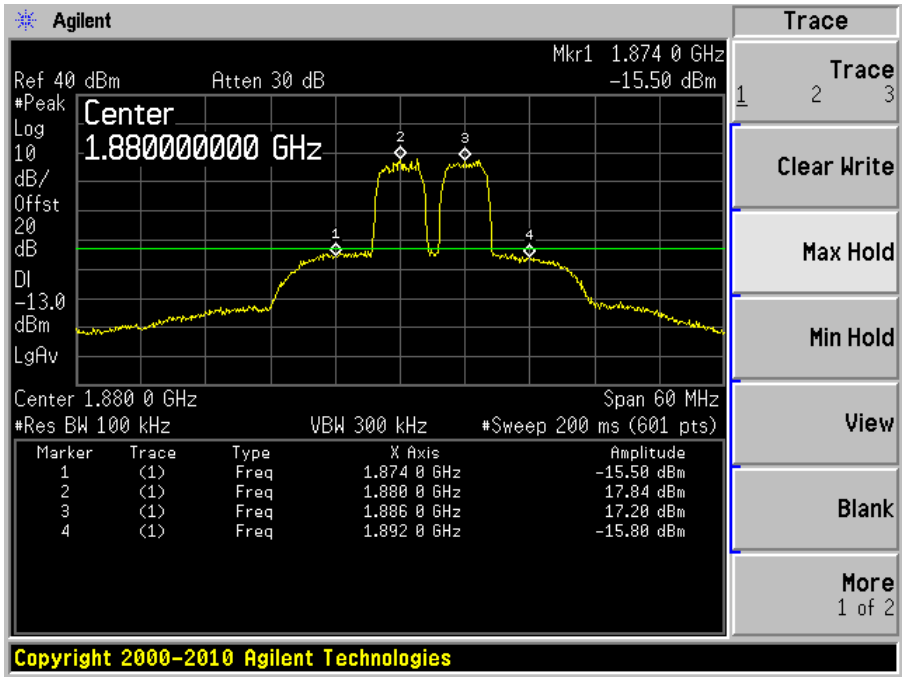


WCDMA 1900 MHz band Middle channel Uplink

Input

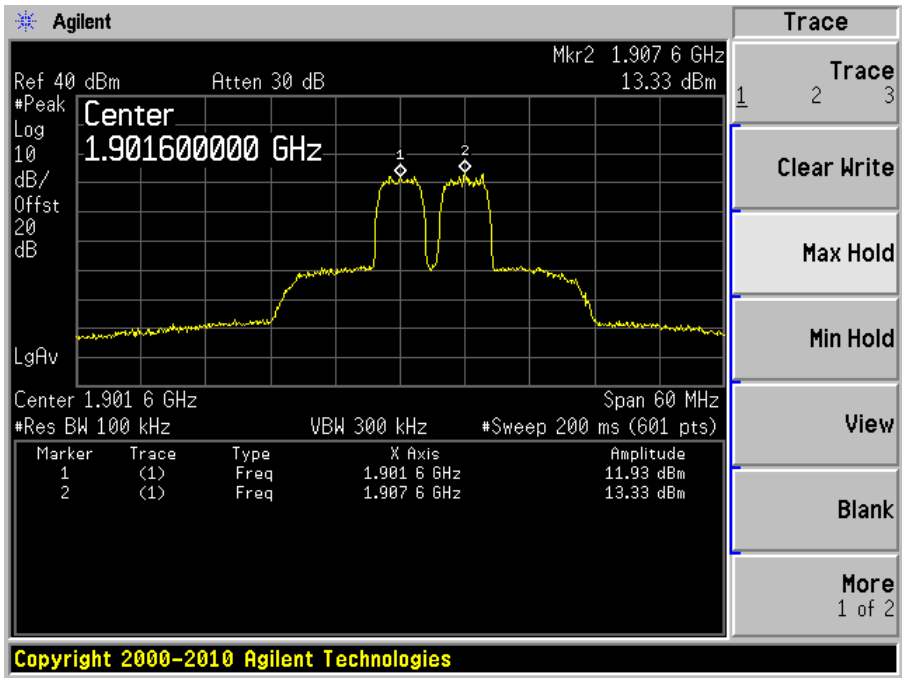


Output

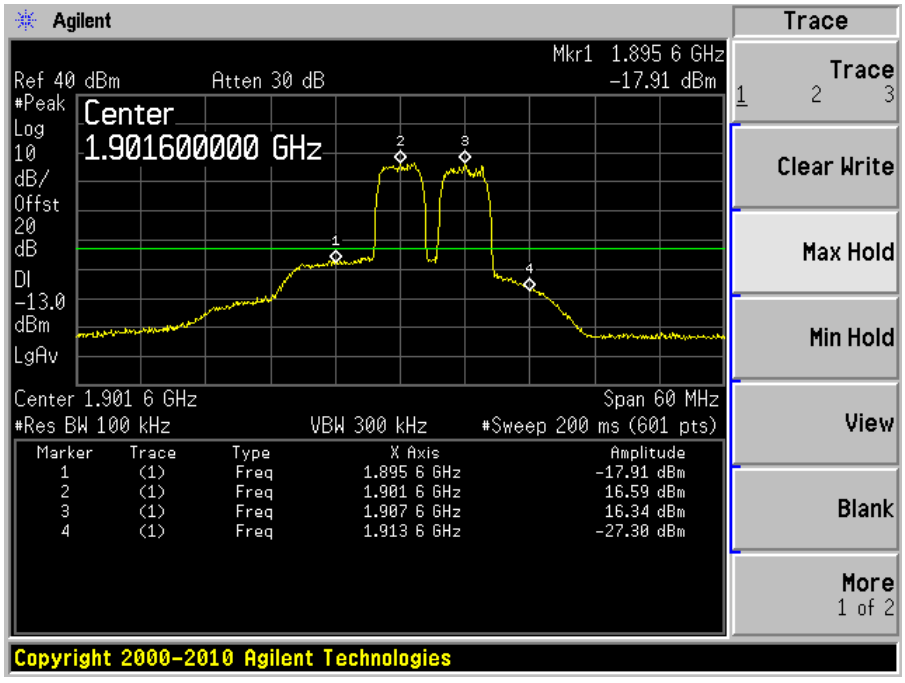


WCDMA 1900 MHz band High channel Uplink

Input

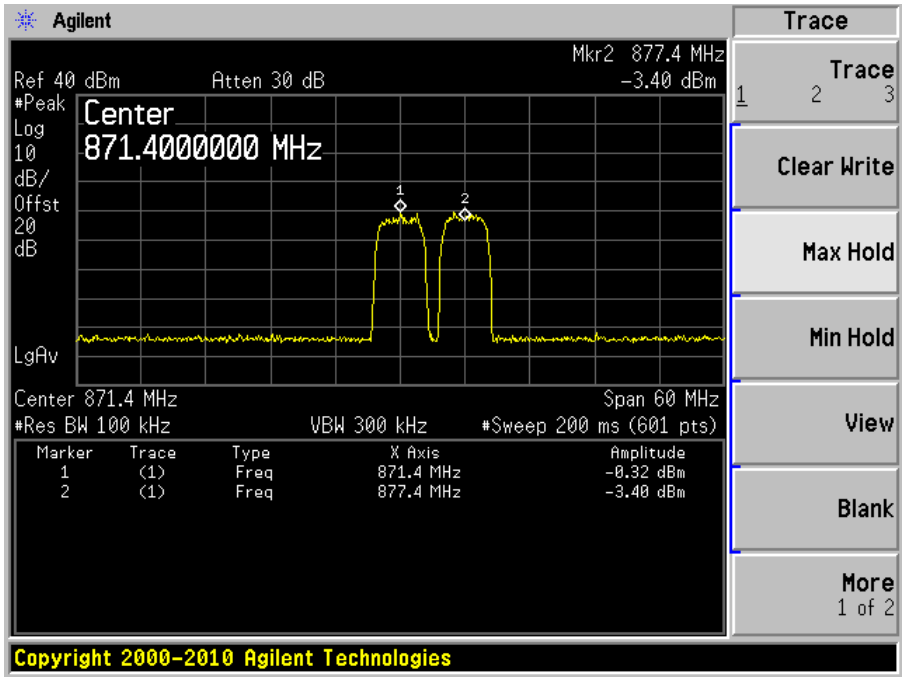


Output

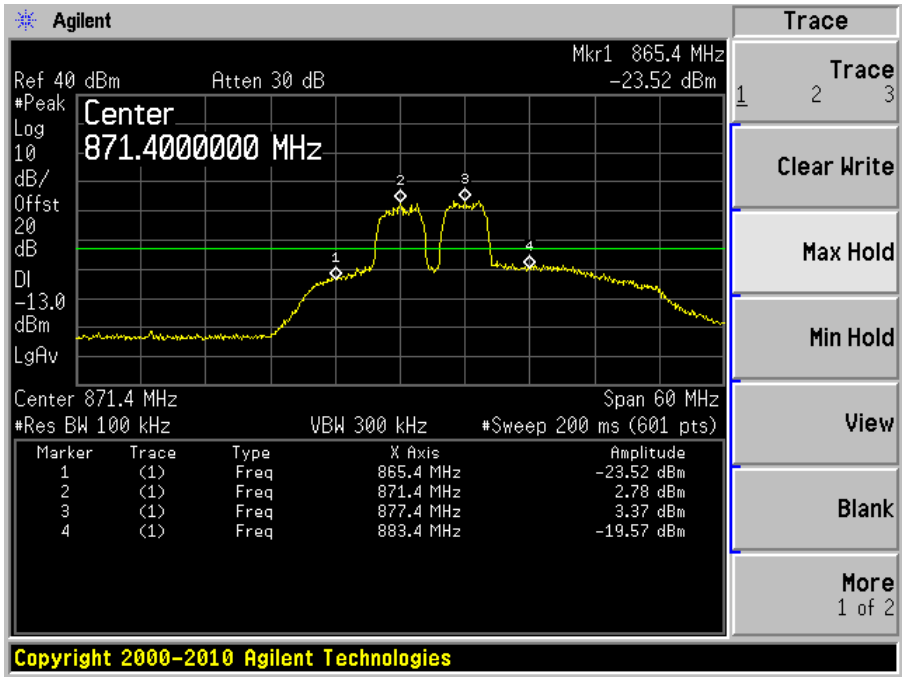


WCDMA 850 MHz band Low channel Downlink

Input

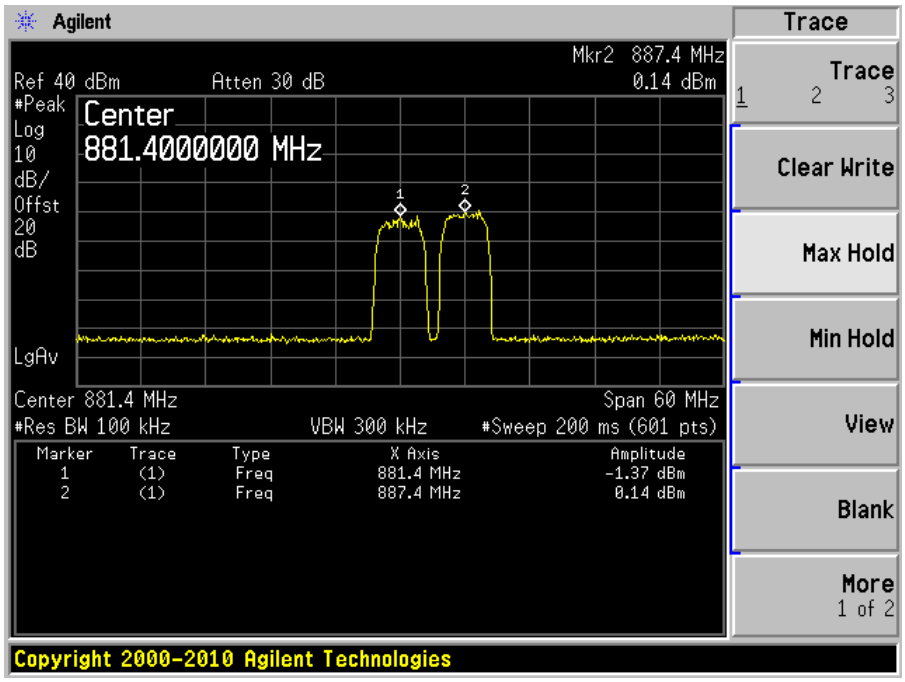


Output

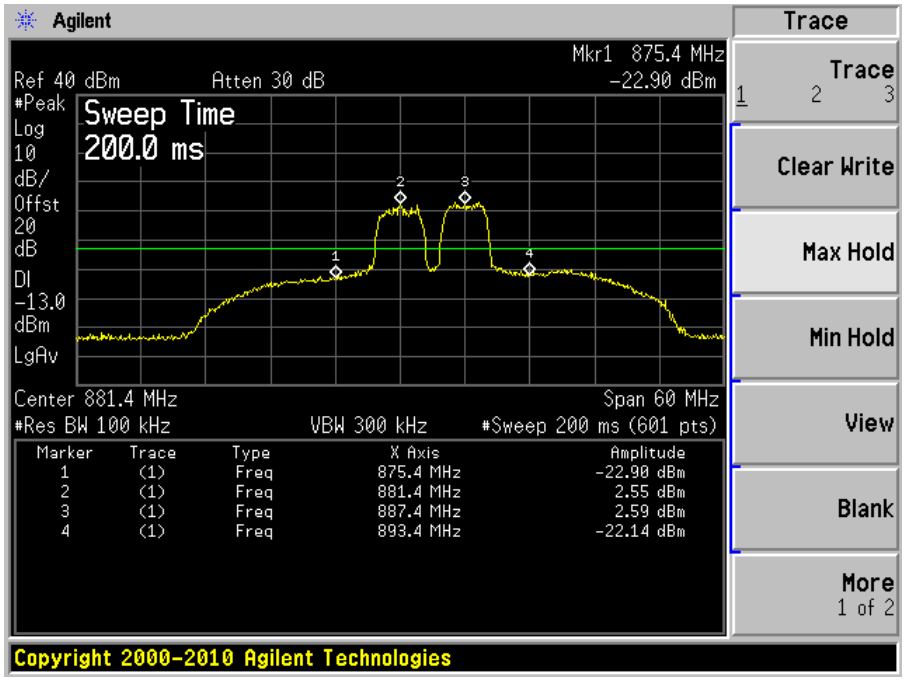


WCDMA 850 MHz band Middle channel Downlink

Input

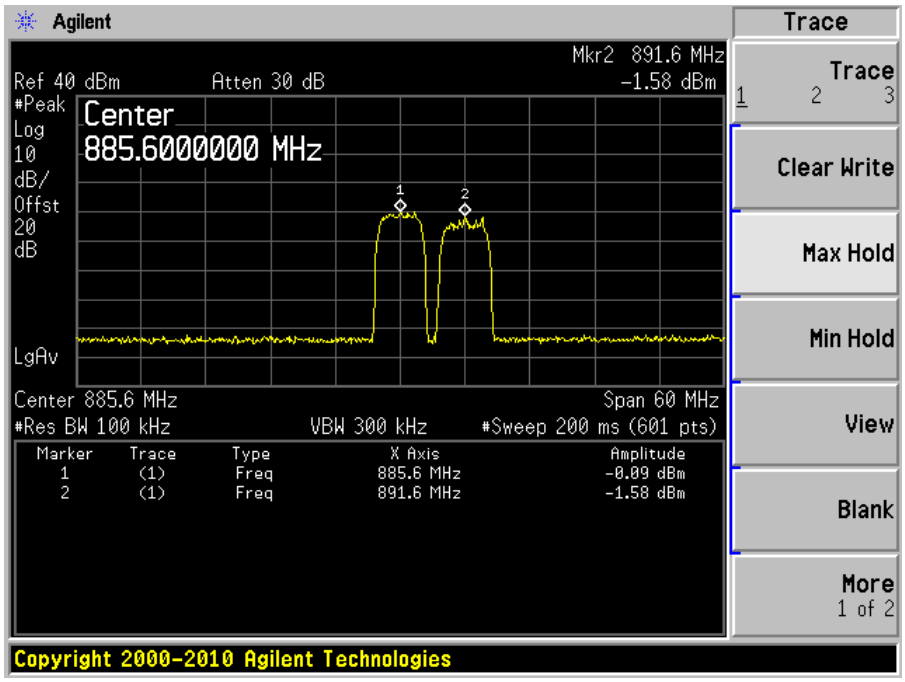


Output

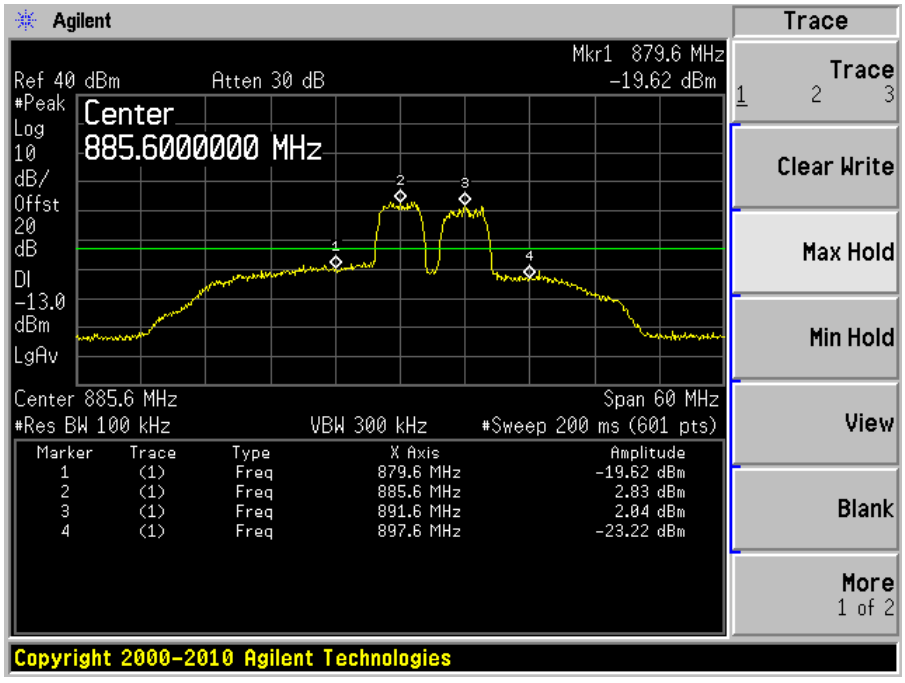


WCDMA 850 MHz band High channel Downlink

Input

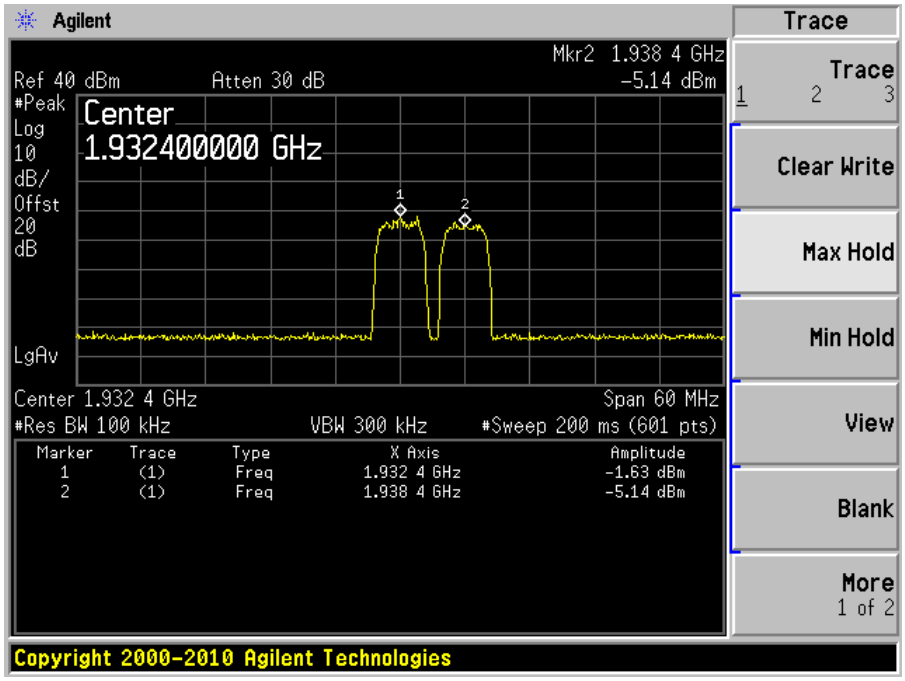


Output

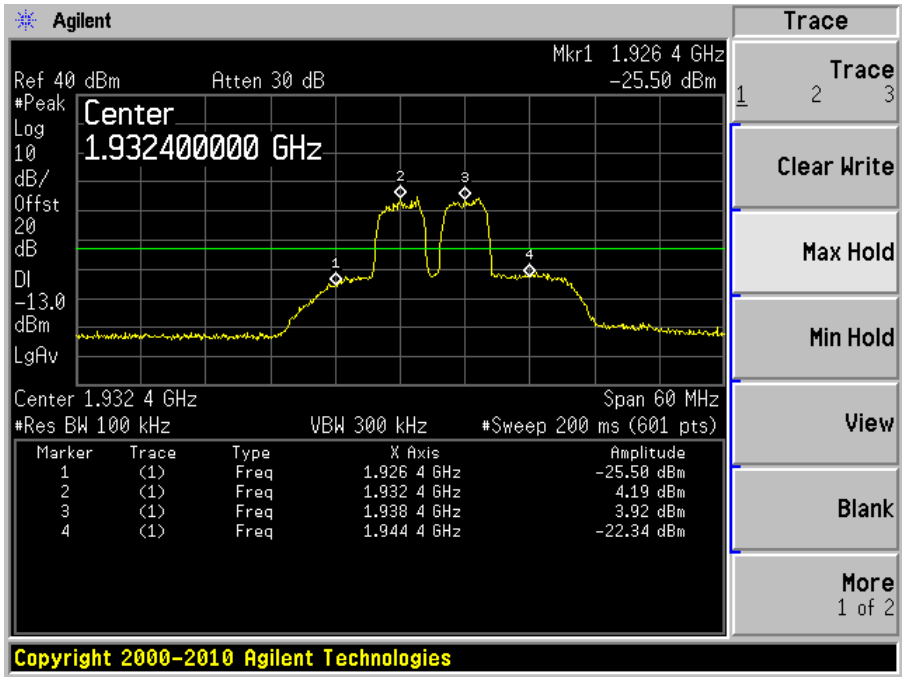


WCDMA 1900 MHz band Low channel Downlink

Input

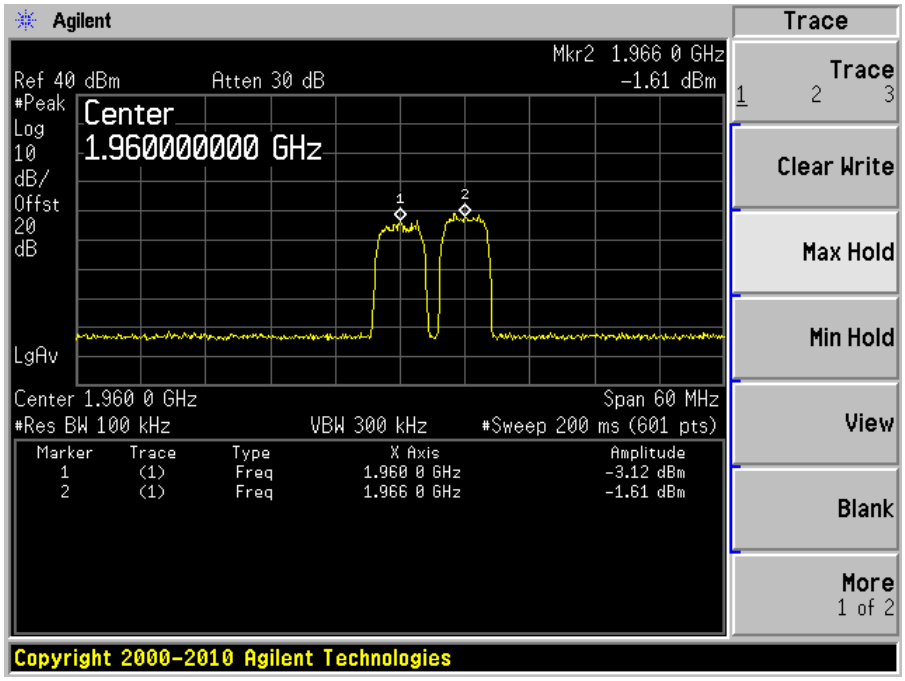


Output

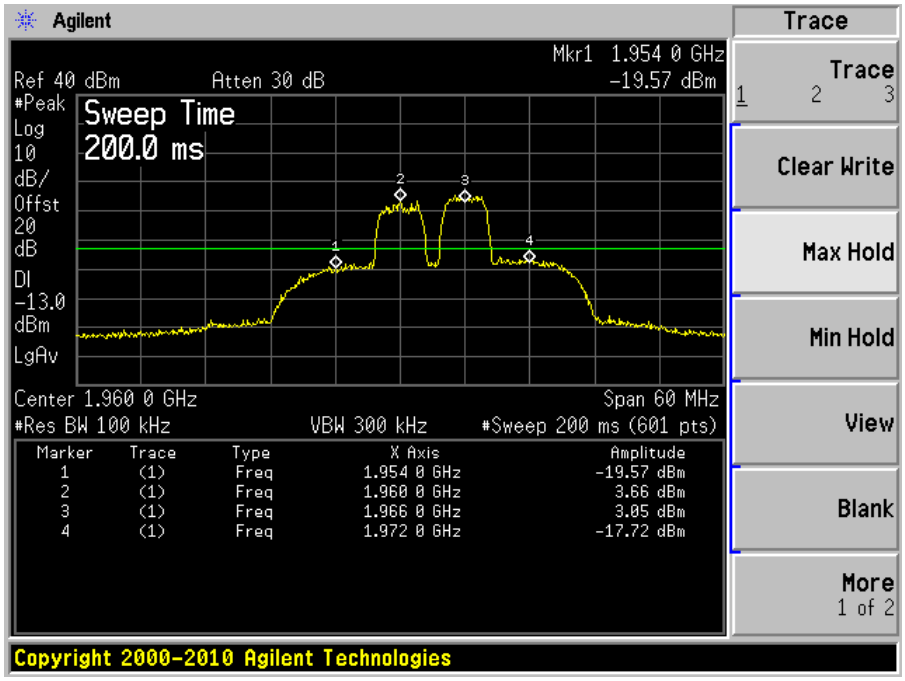


WCDMA 1900 MHz band Middle channel Downlink

Input

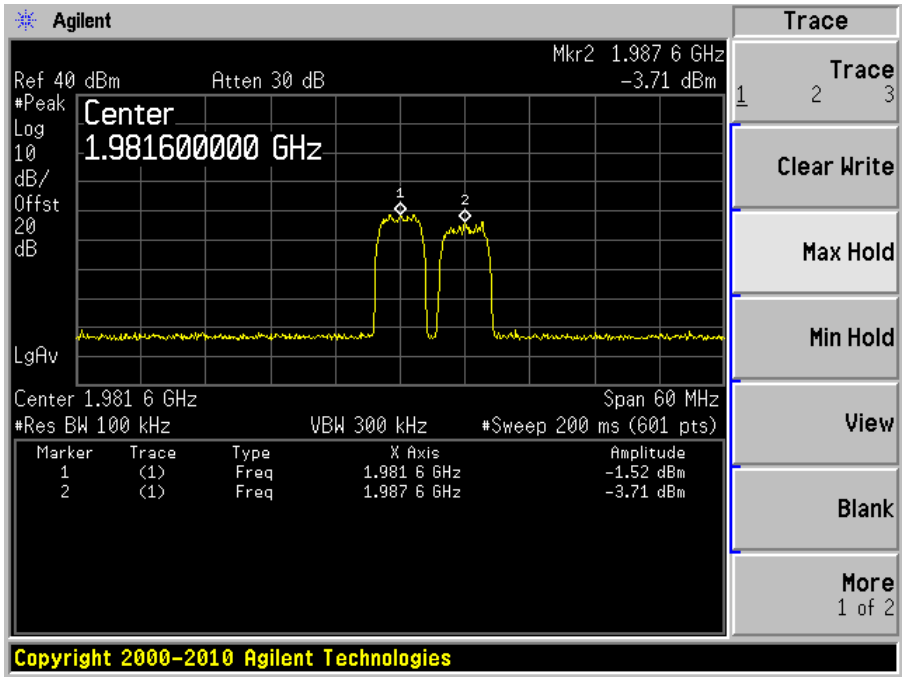


Output

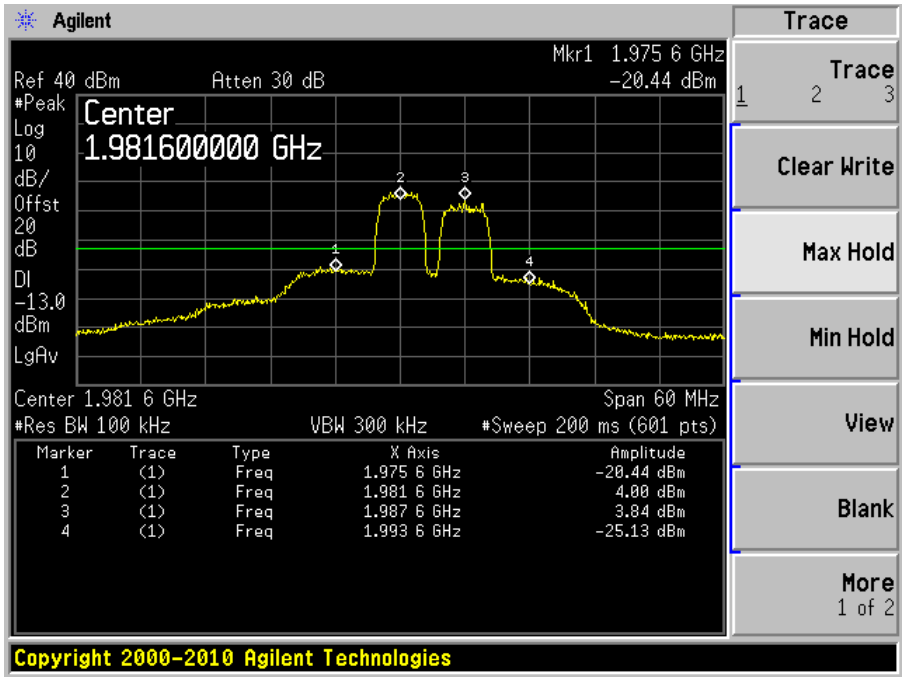


WCDMA 1900 MHz band High channel Downlink

Input

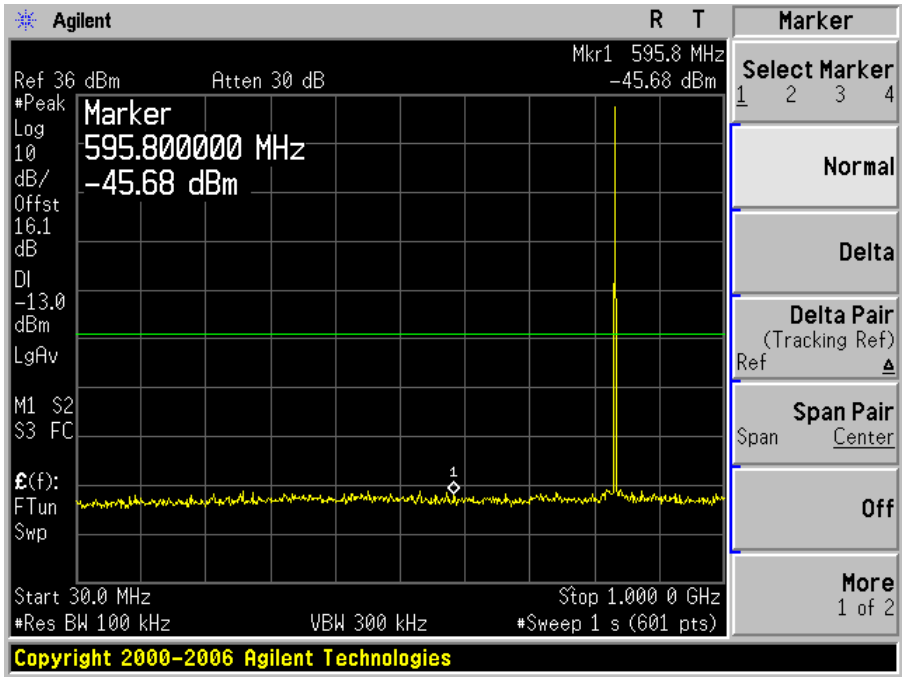


Output

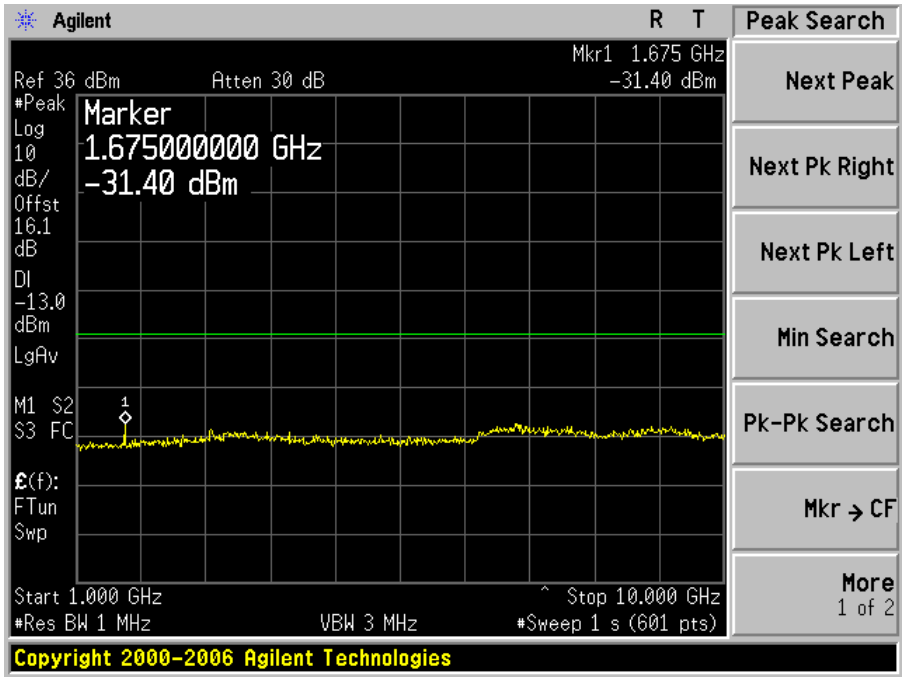


Spurious Emission at antenna terminal:

850 MHz band Uplink: Worst Channel

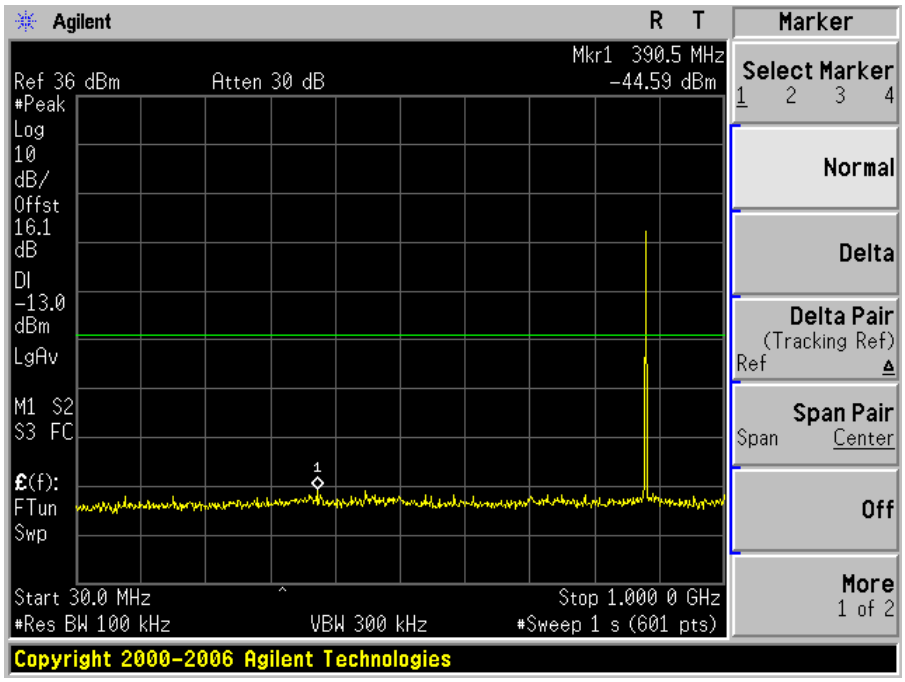


30 MHz to 1 GHz

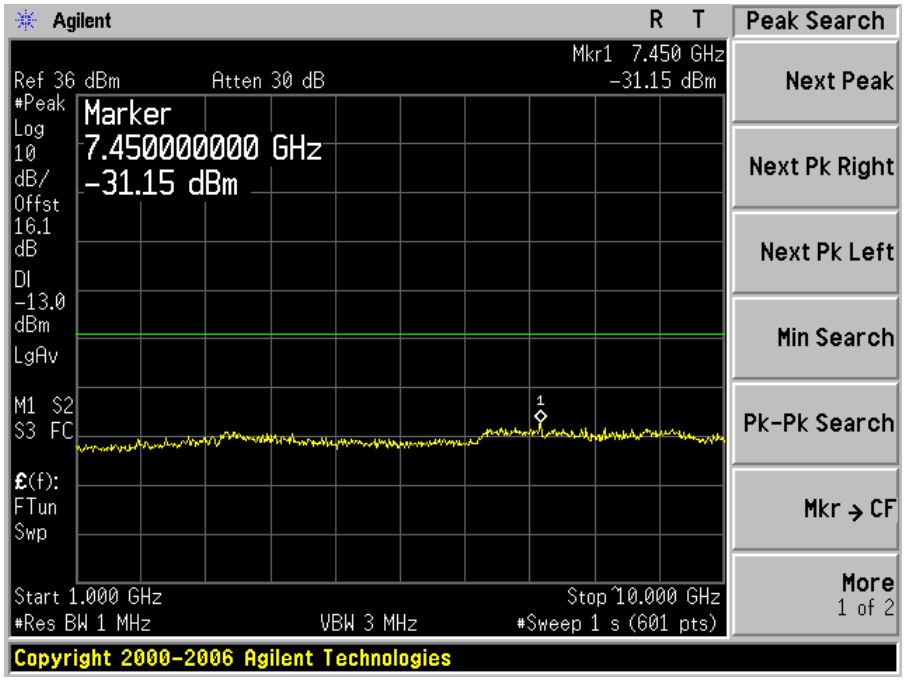


1 GHz to 10 GHz

850 MHz band Downlink: Worst Channel

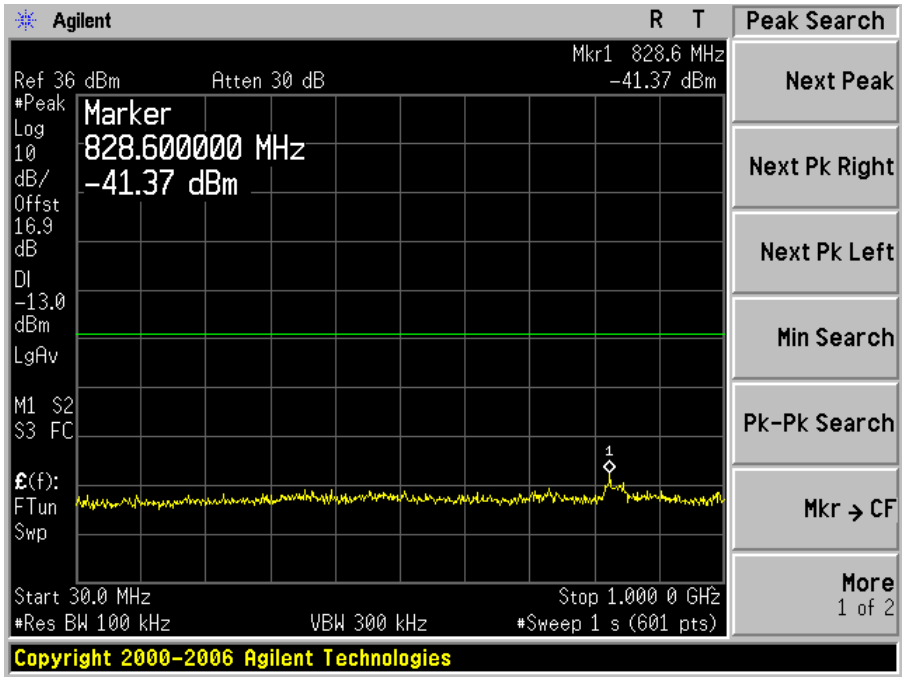


30 MHz to 1 GHz

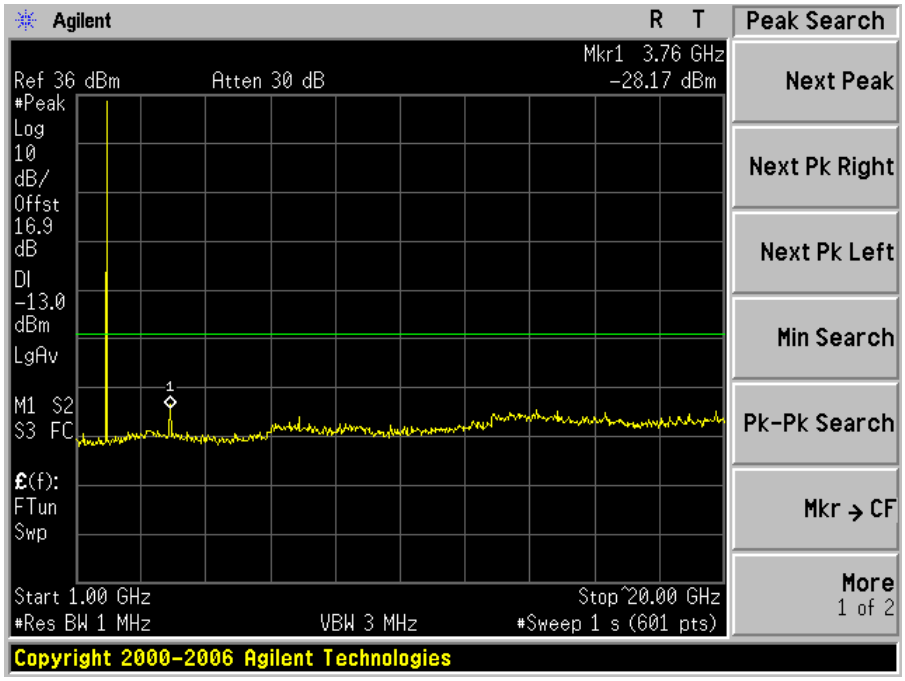


1 GHz to 10 GHz

1900 MHz band Uplink: Worst Channel

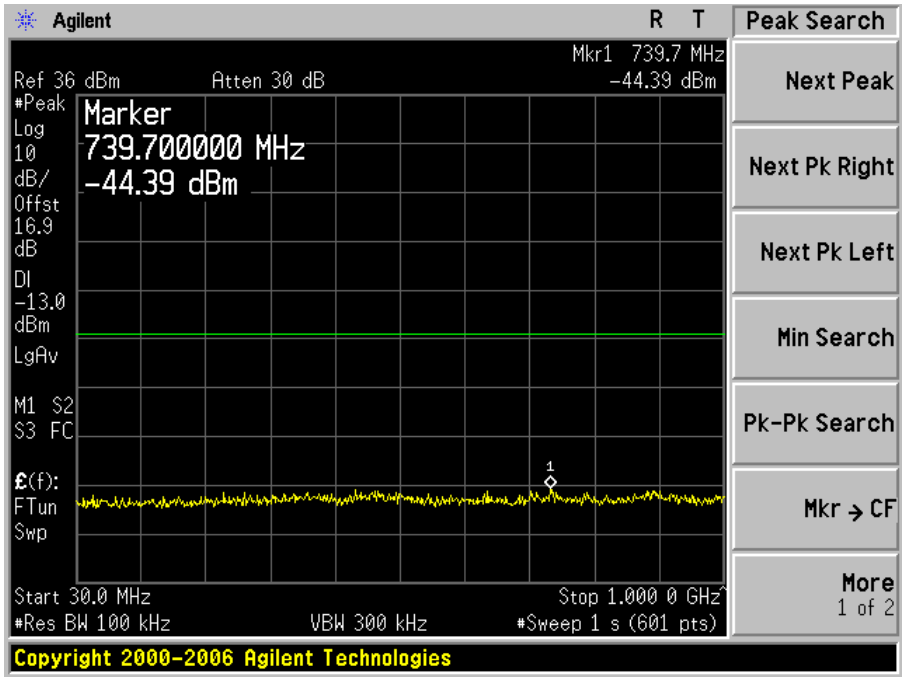


30 MHz to 1 GHz

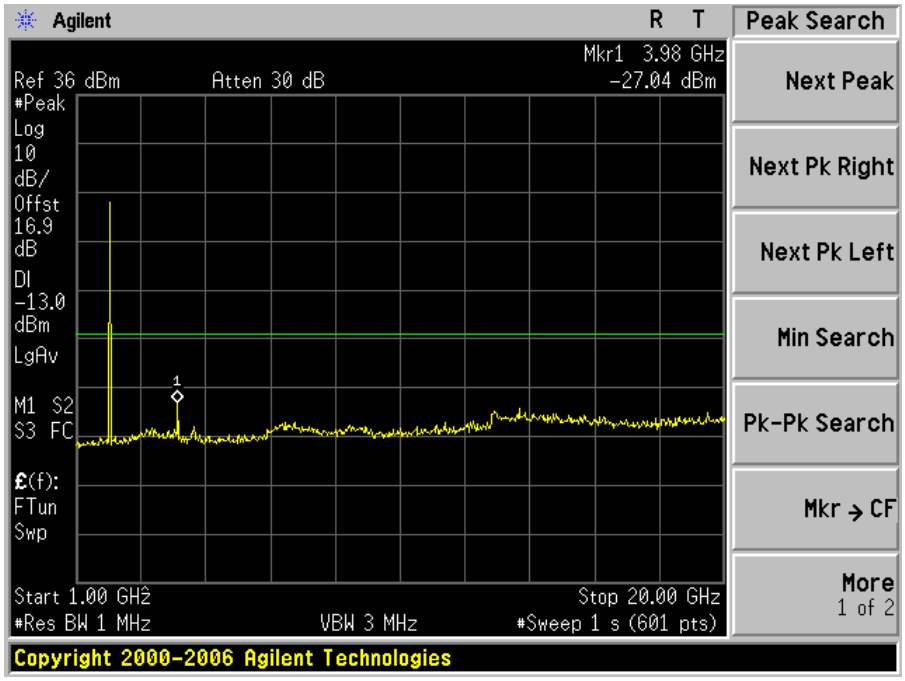


1 GHz to 20 GHz

1900 MHz band Downlink: Worst Channel



30 MHz to 1 GHz



1 GHz to 20 GHz

9 FCC §22.917 & §24.238– BAND EDGE

9.1 Applicable Standard

According to FCC §22.917, 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.

According to FCC §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.

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:	20-25 °C
Relative Humidity:	35-40%
ATM Pressure:	101.2 kPa

The testing was performed by Lionel Lara from 2011-11-22 to 2011-11-28 at RF Site.

9.4 Test Equipment List and Details

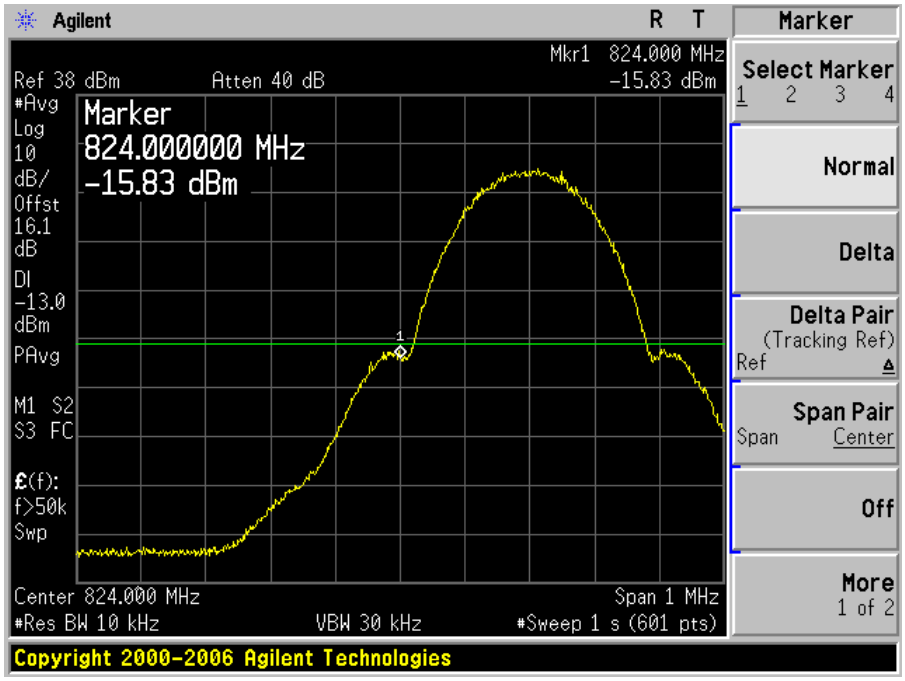
Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	ESG-D Series Signal Generator	E4438C	MY45091309	2011-04-28
Agilent	Analyzer, Spectrum	E4440A	US45303156	2010-08-09[1]

Note [1]: Two year calibration cycle.
Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

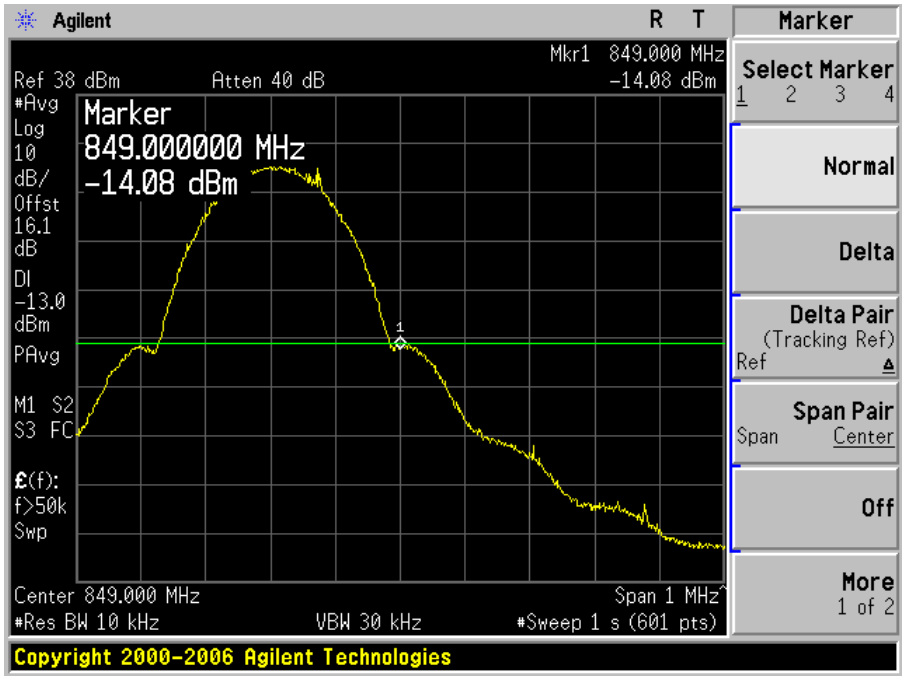
9.5 Test Results

Please refer to the following plots.

GSM 850 MHz band Uplink Band Edge

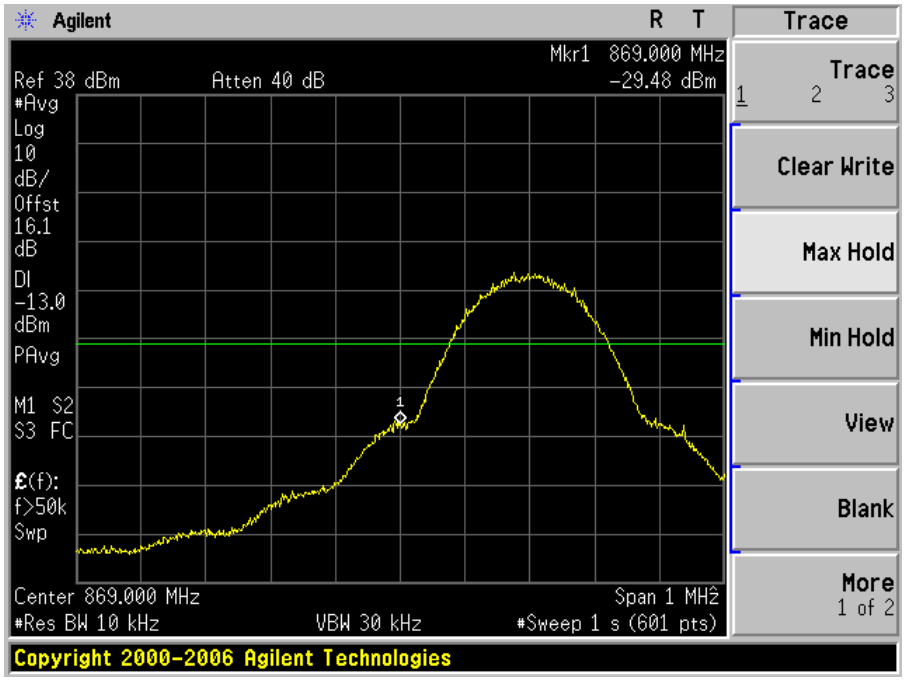


Low Channel

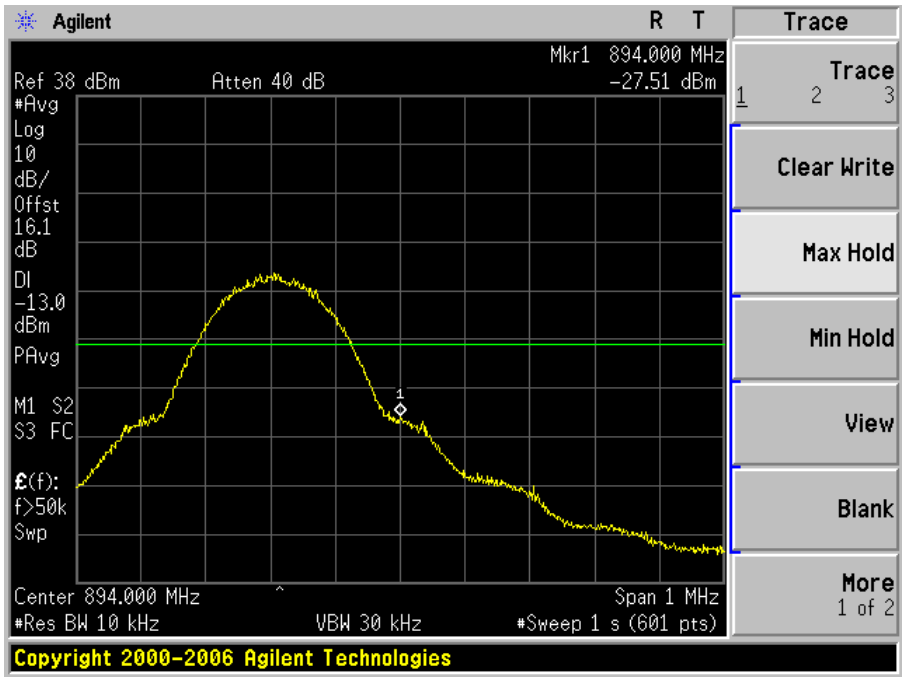


High Channel

GSM 850 MHz band Downlink Band Edge

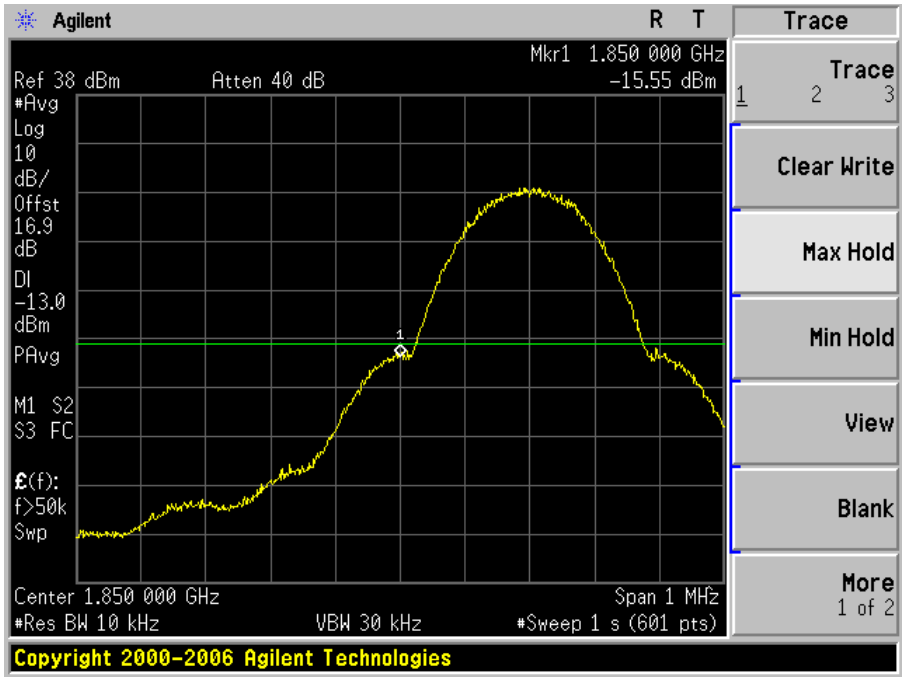


Low Channel

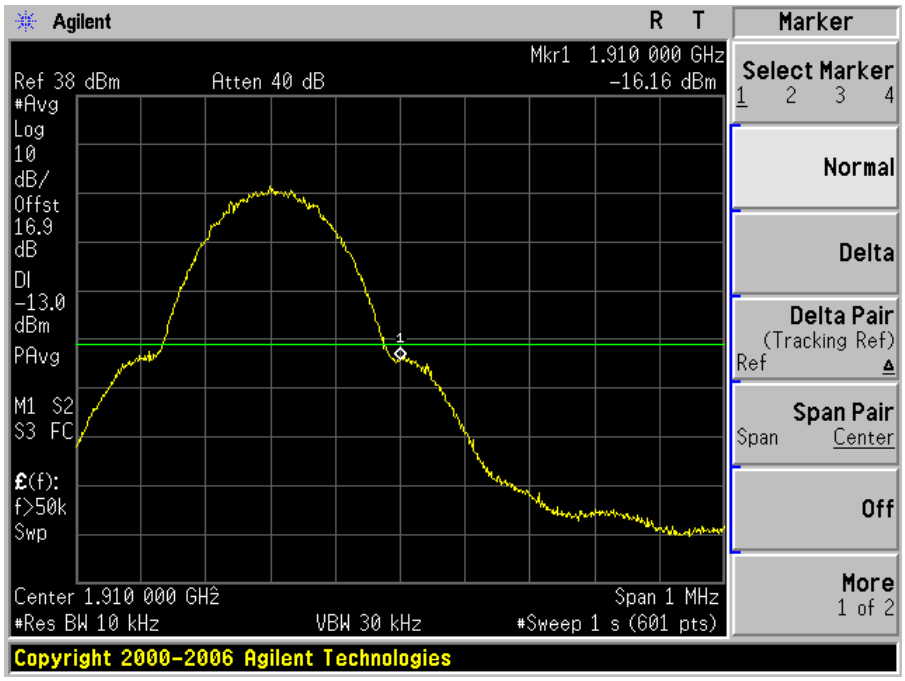


High Channel

GSM 1900 MHz band Uplink Band Edge

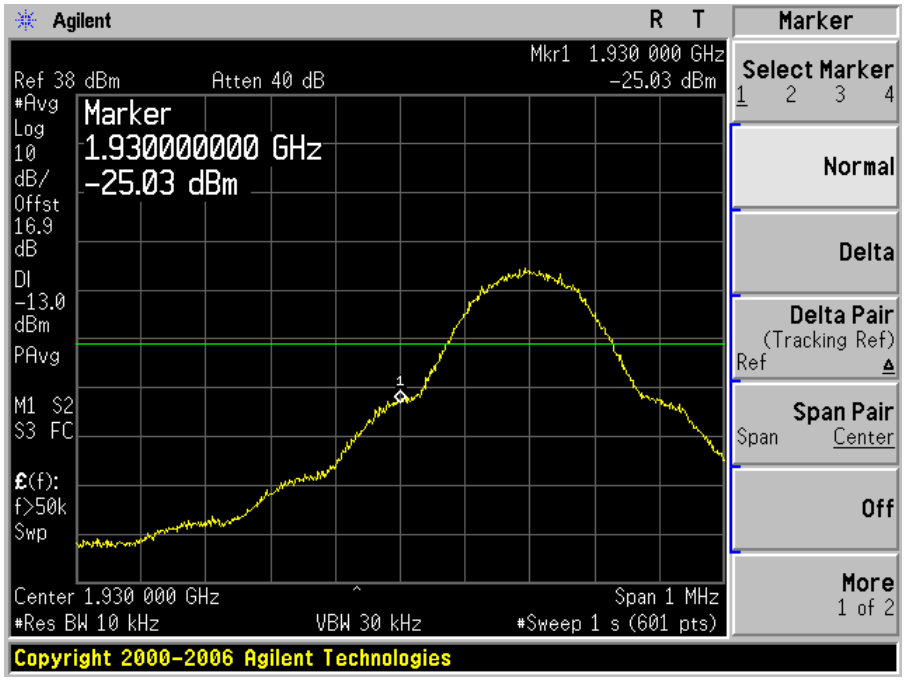


Low Channel

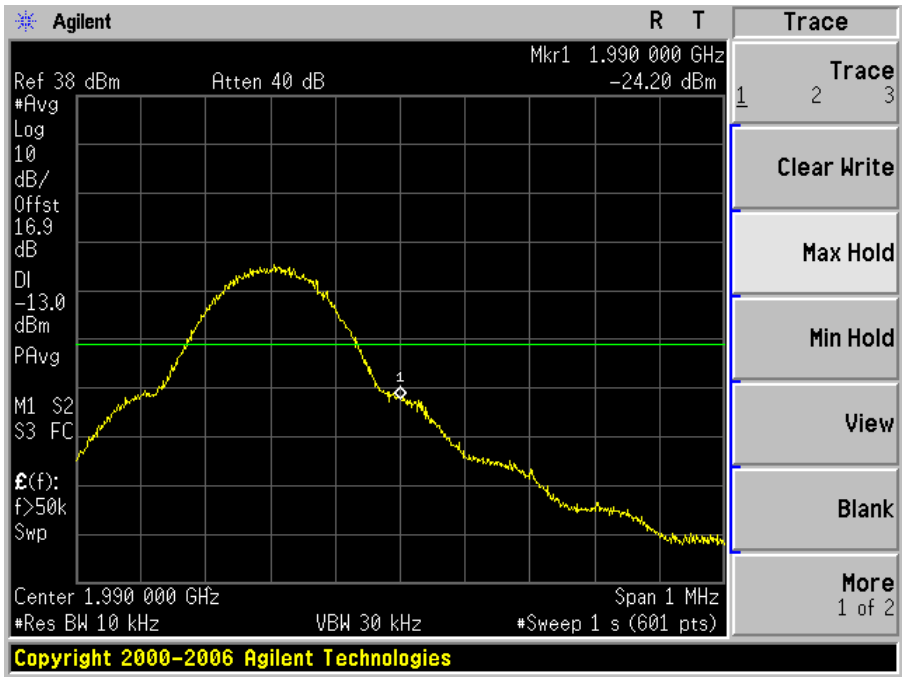


High Channel

GSM 1900 MHz band Downlink Band Edge

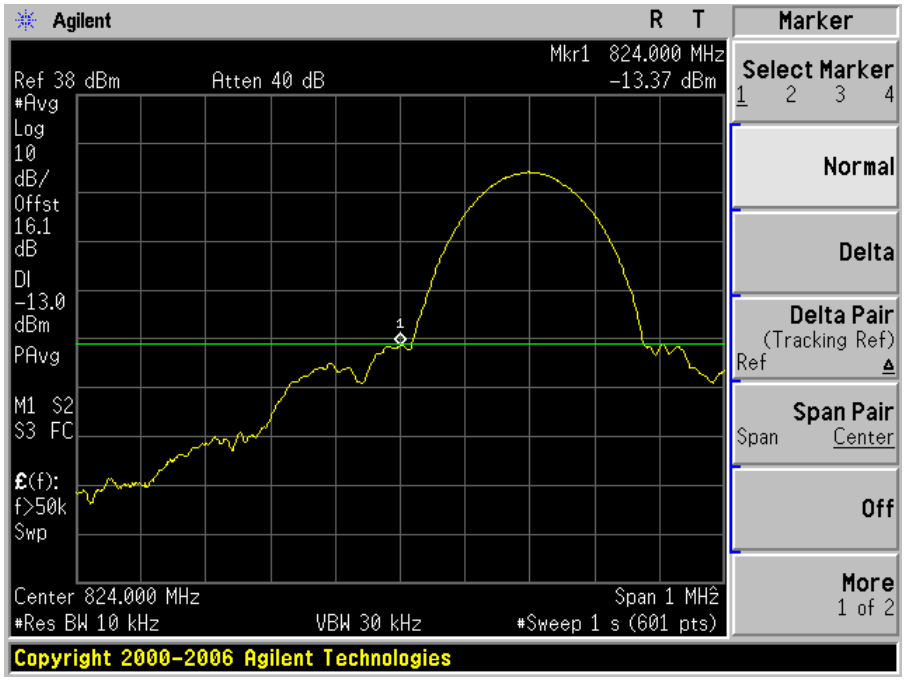


Low Channel

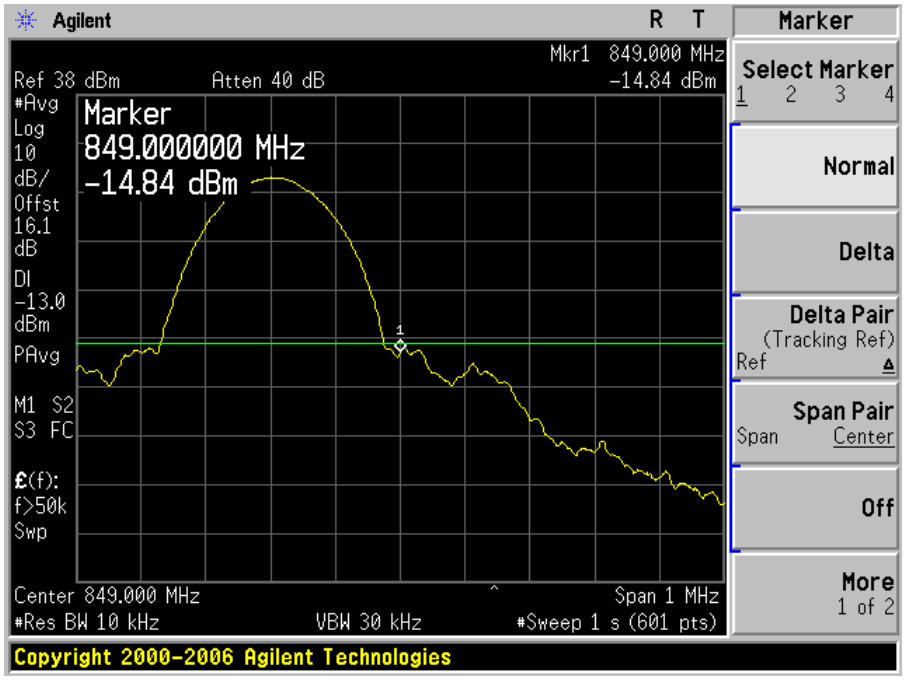


High Channel

EDGE 850 MHz band Uplink Band Edge

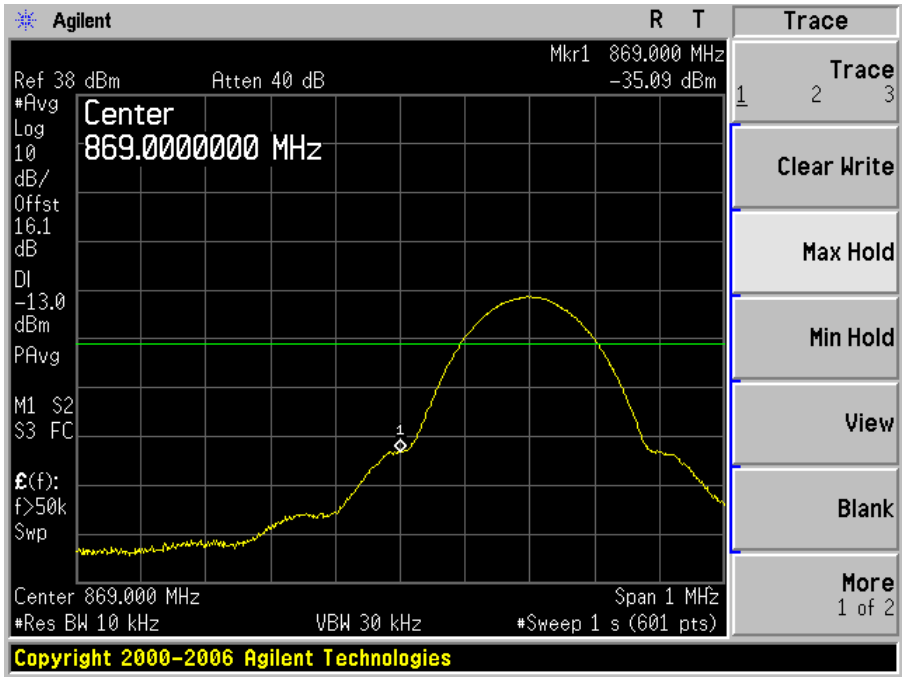


Low Channel

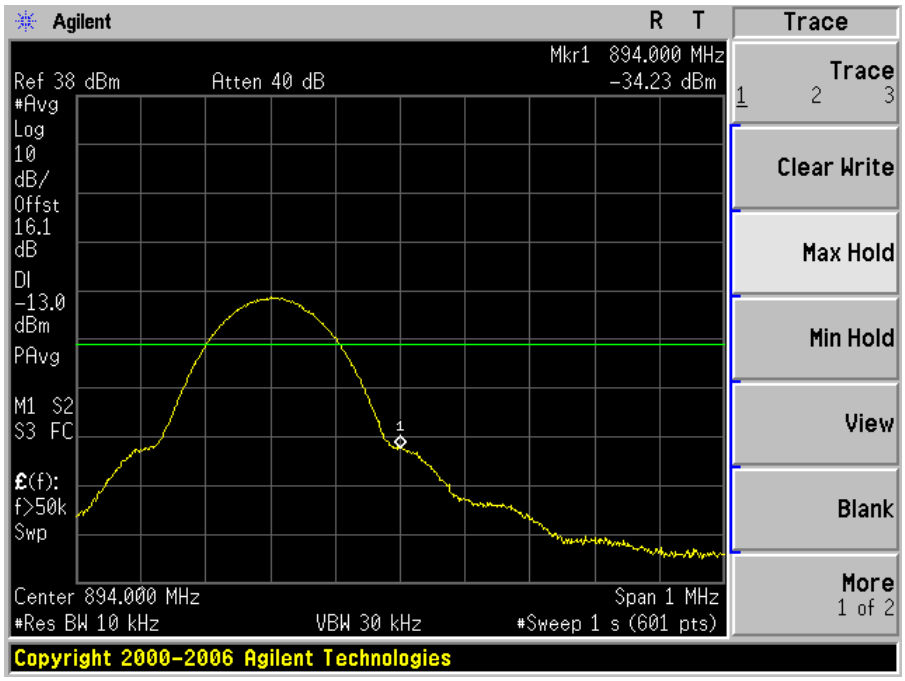


High Channel

EDGE 850 MHz band Downlink Band Edge

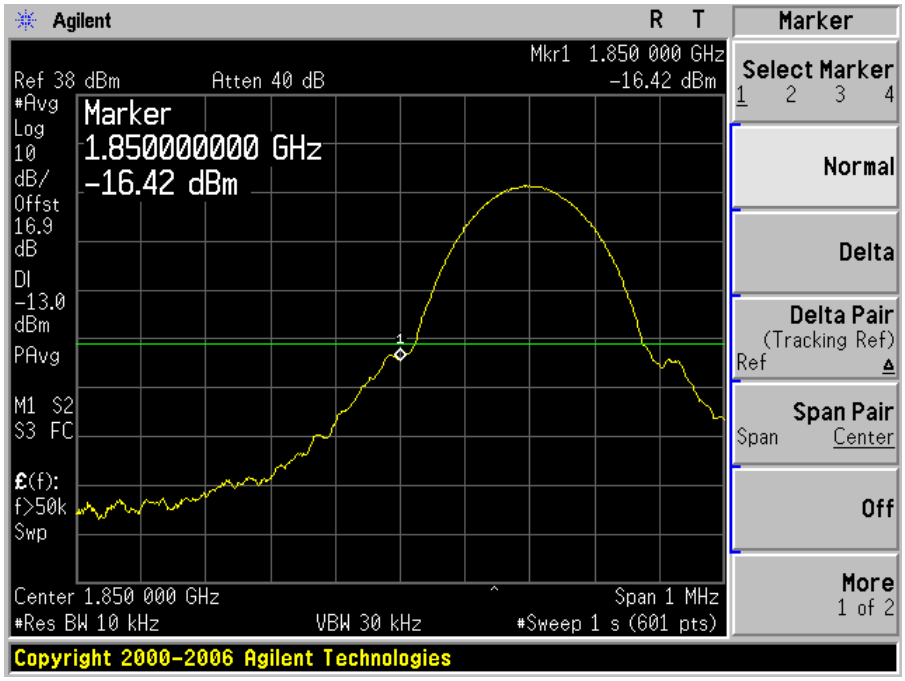


Low Channel

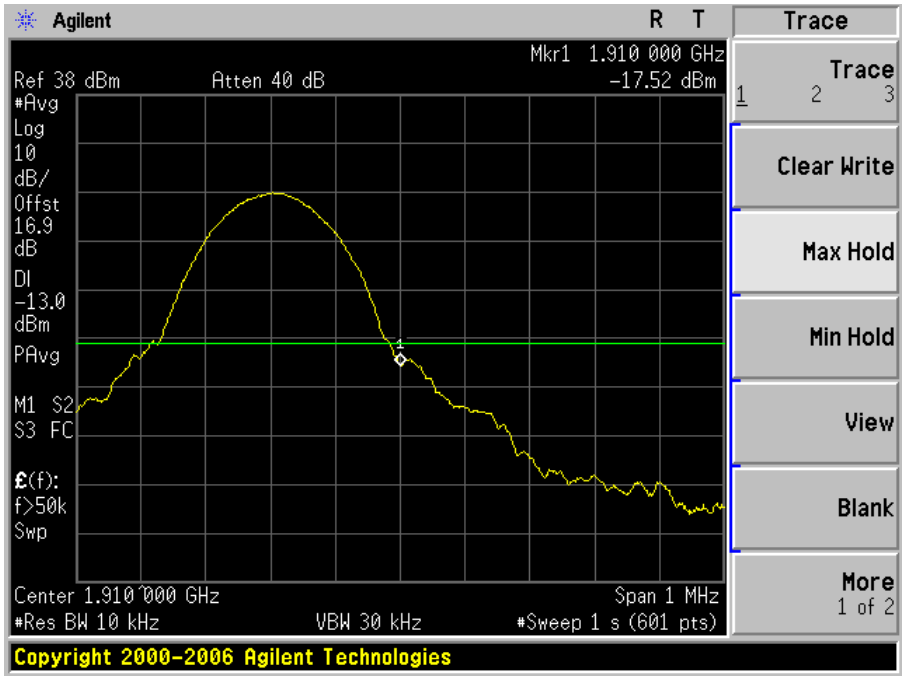


High Channel

EDGE 1900 MHz band Uplink Band Edge

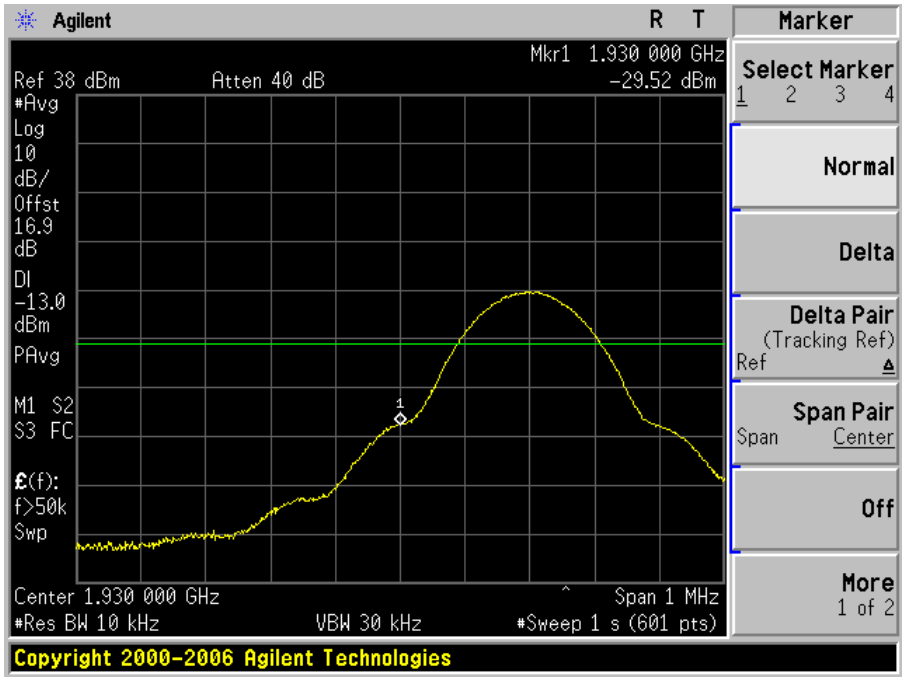


Low Channel

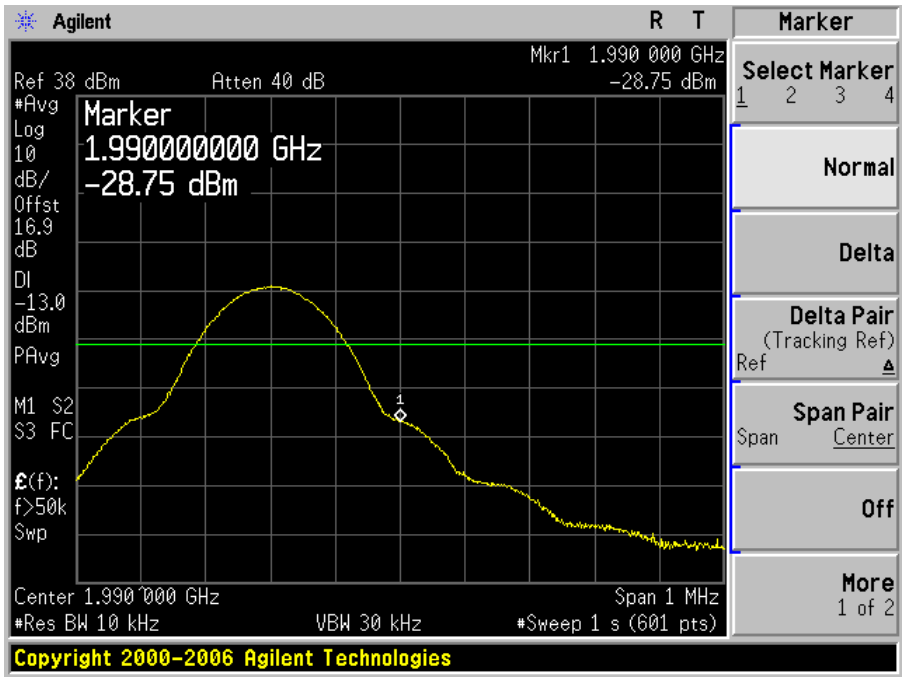


High Channel

EDGE 1900 MHz band Downlink Band Edge

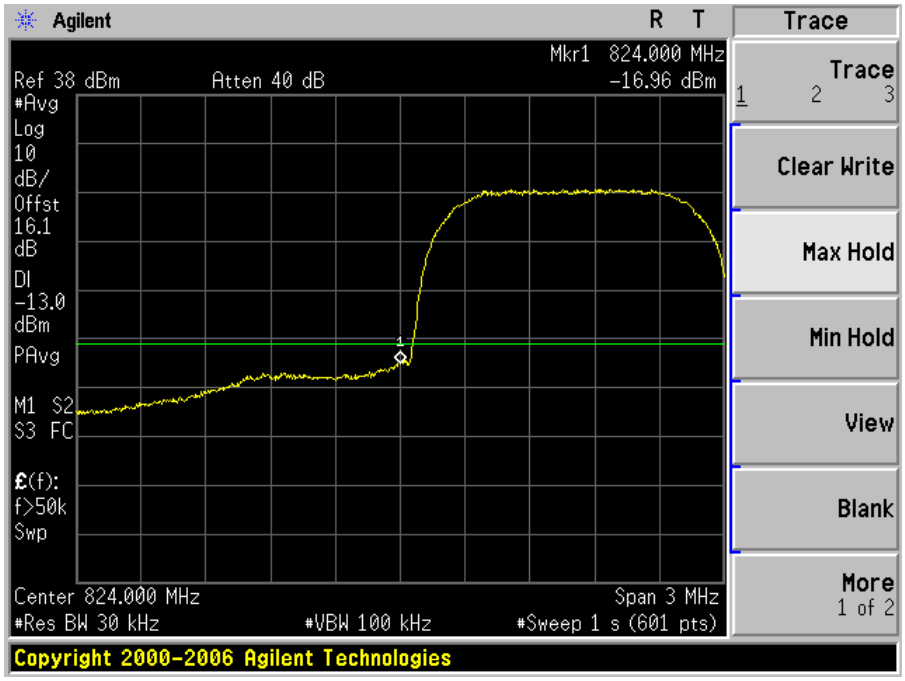


Low Channel

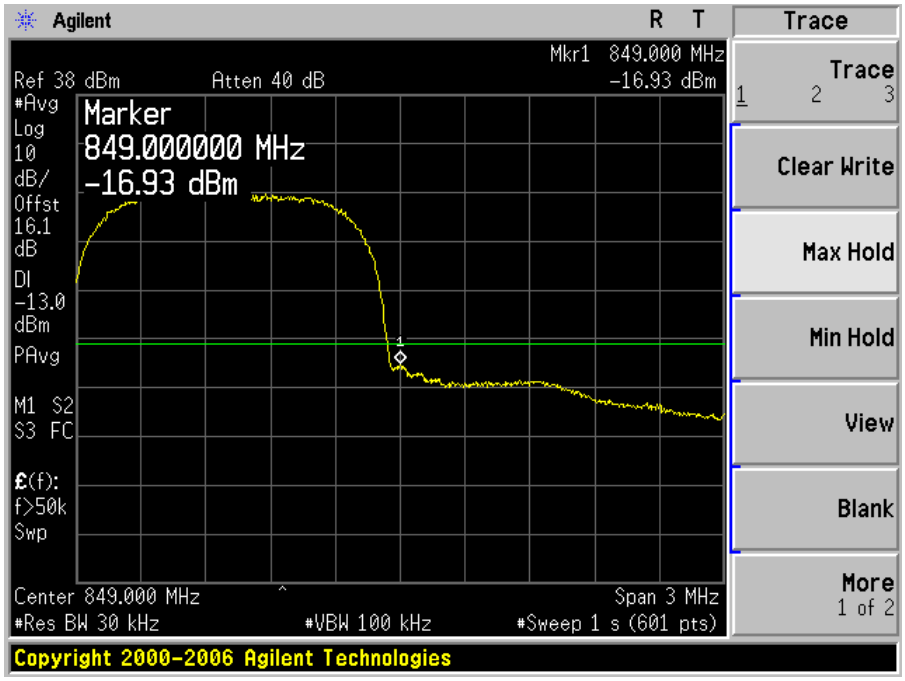


High Channel

CDMA 850 MHz band Uplink Band Edge

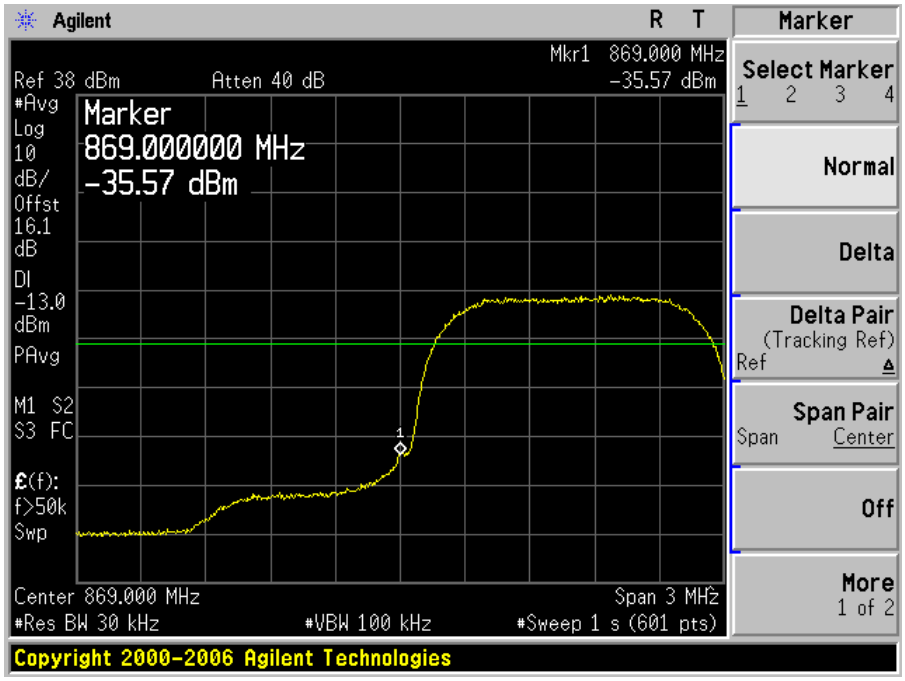


Low Channel

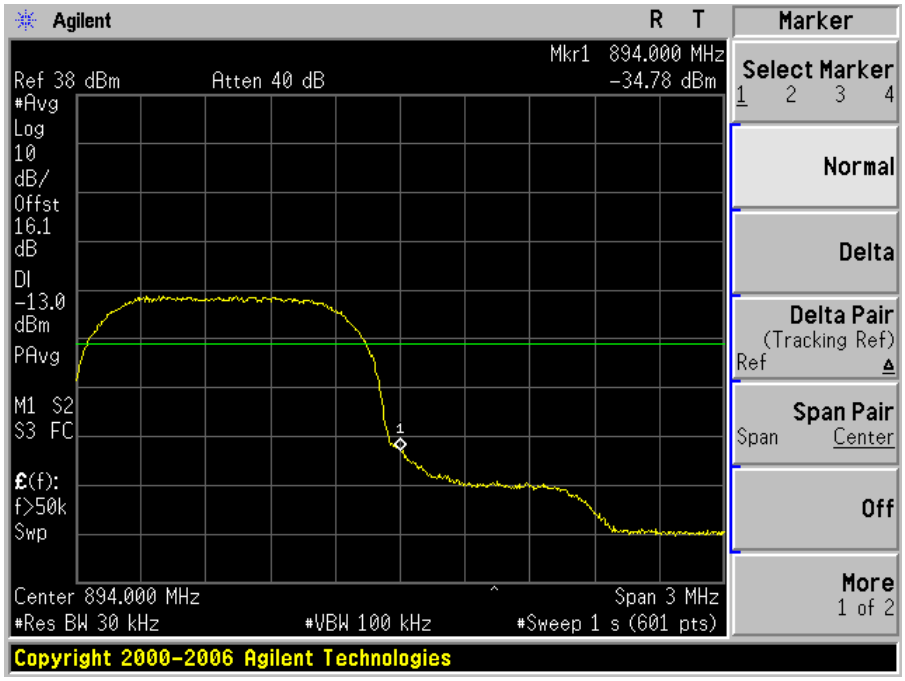


High Channel

CDMA 850 MHz band Downlink Band Edge

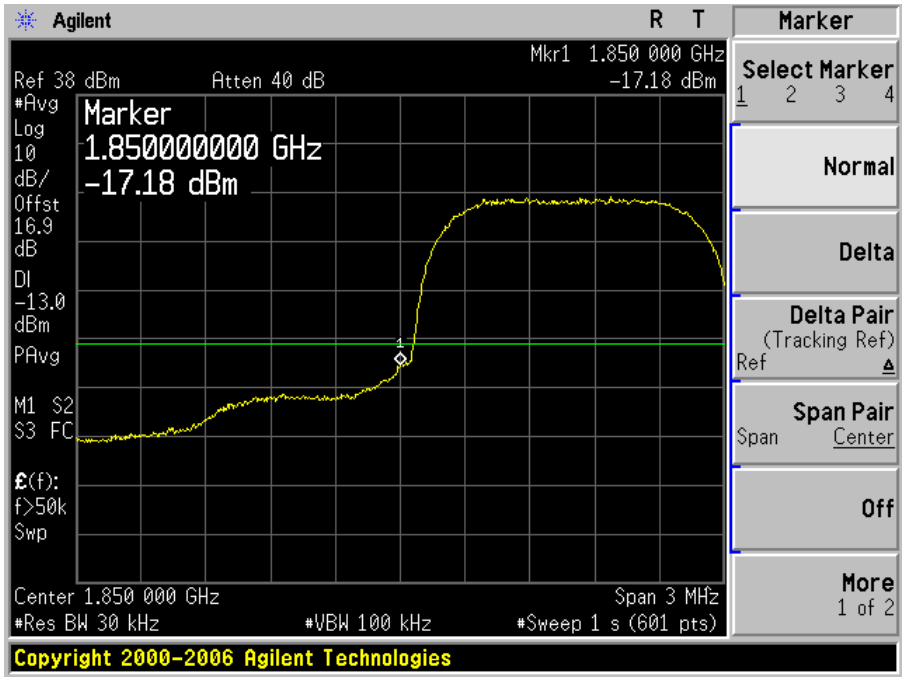


Low Channel

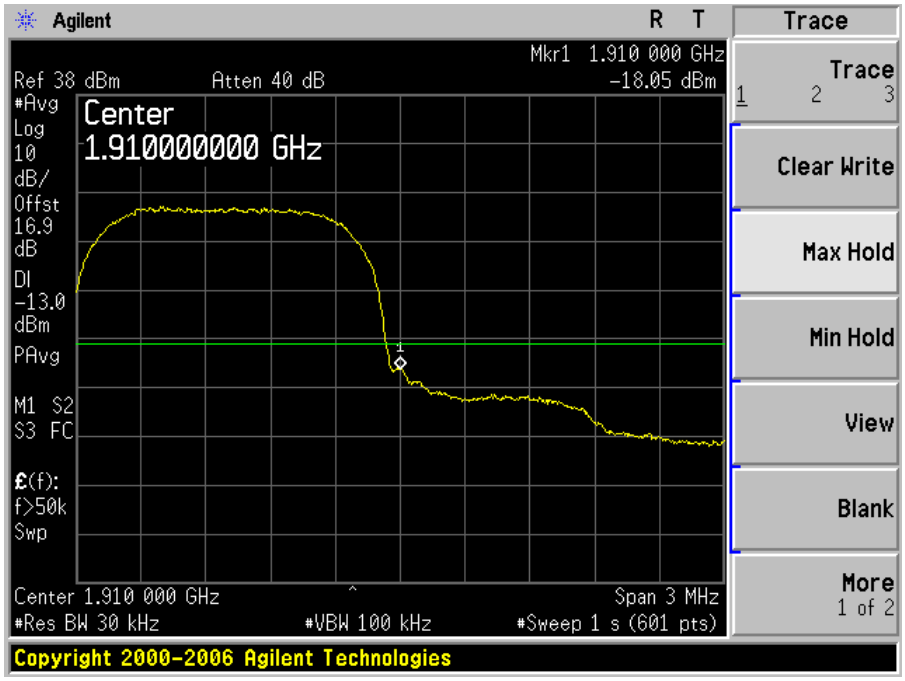


High Channel

CDMA 1900 MHz band Uplink Band Edge

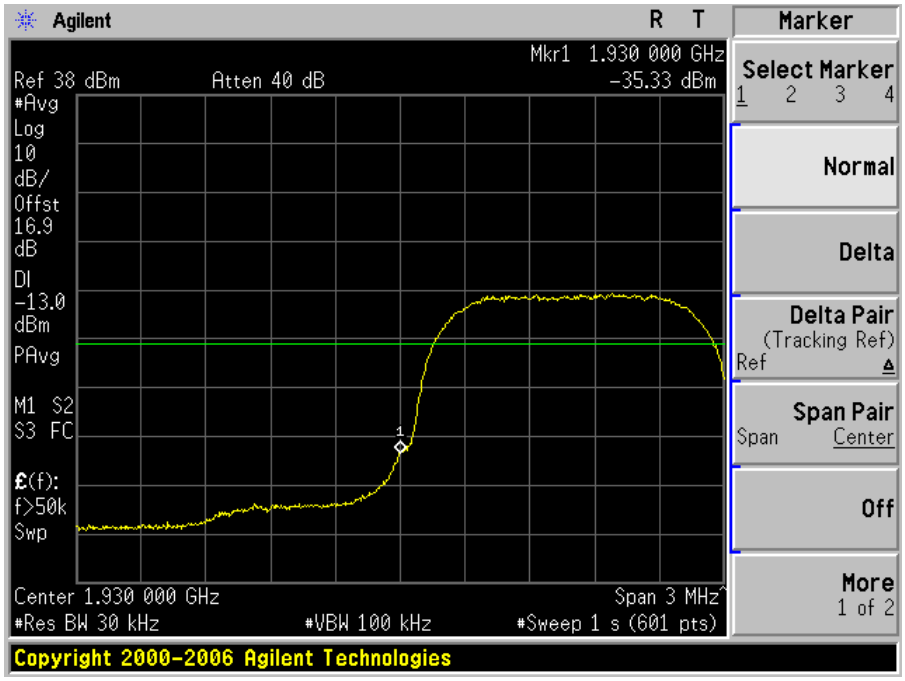


Low Channel

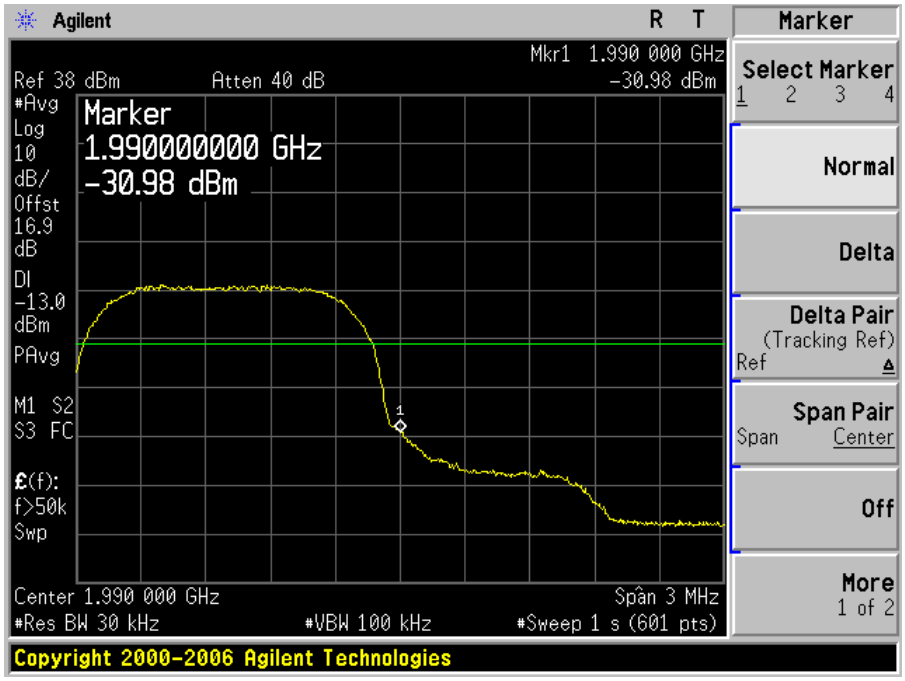


High Channel

CDMA 1900 MHz band Downlink Band Edge

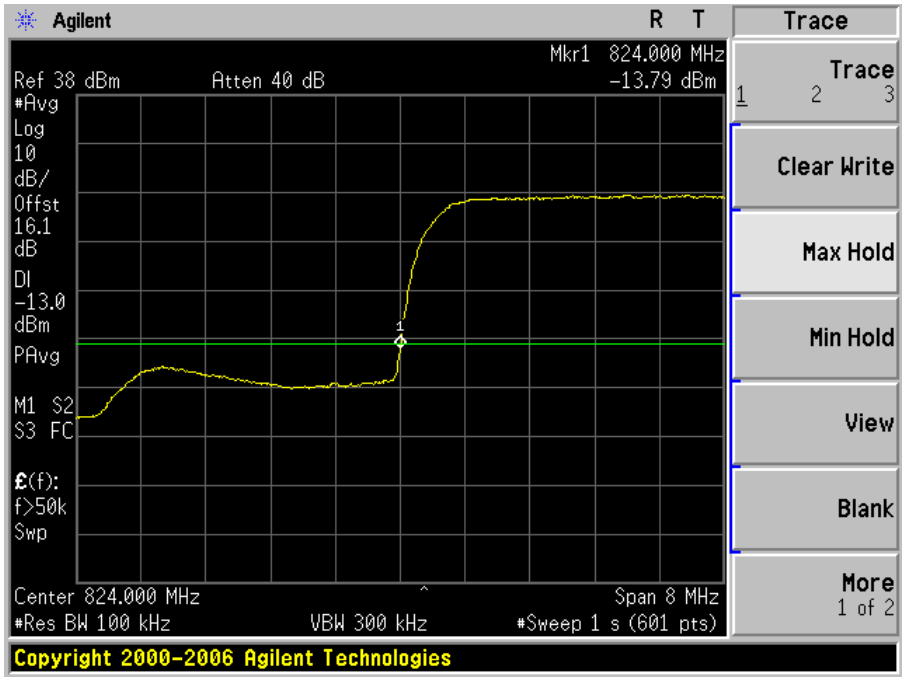


Low Channel

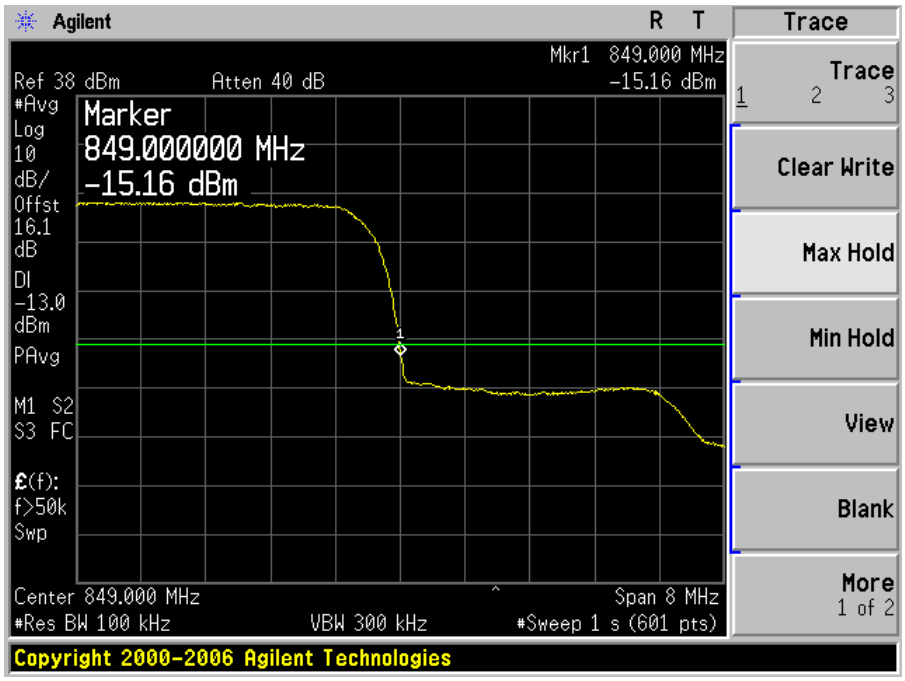


High Channel

WCDMA 850 MHz band Uplink Band Edge

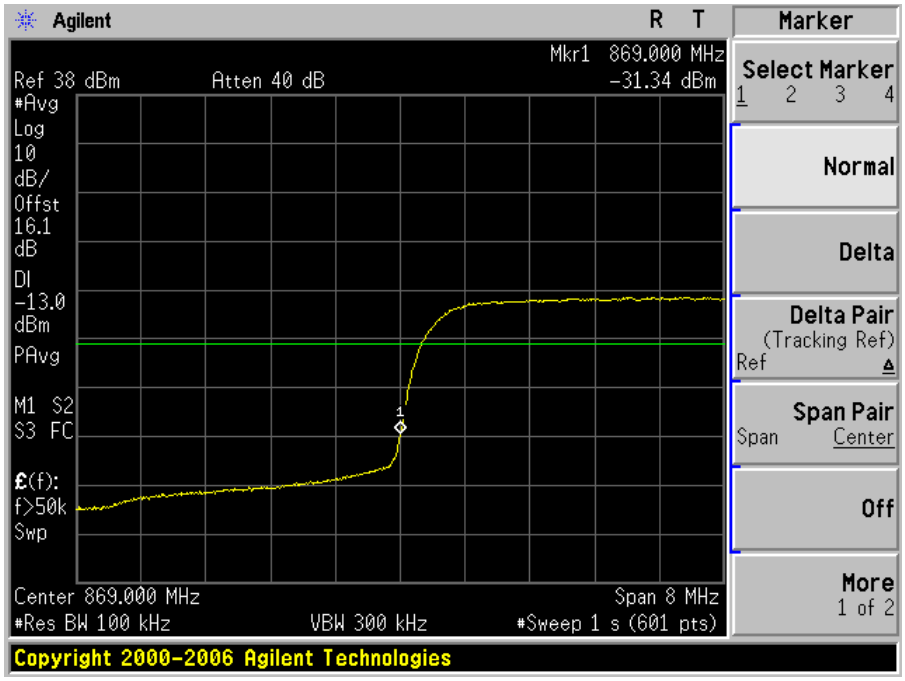


Low Channel

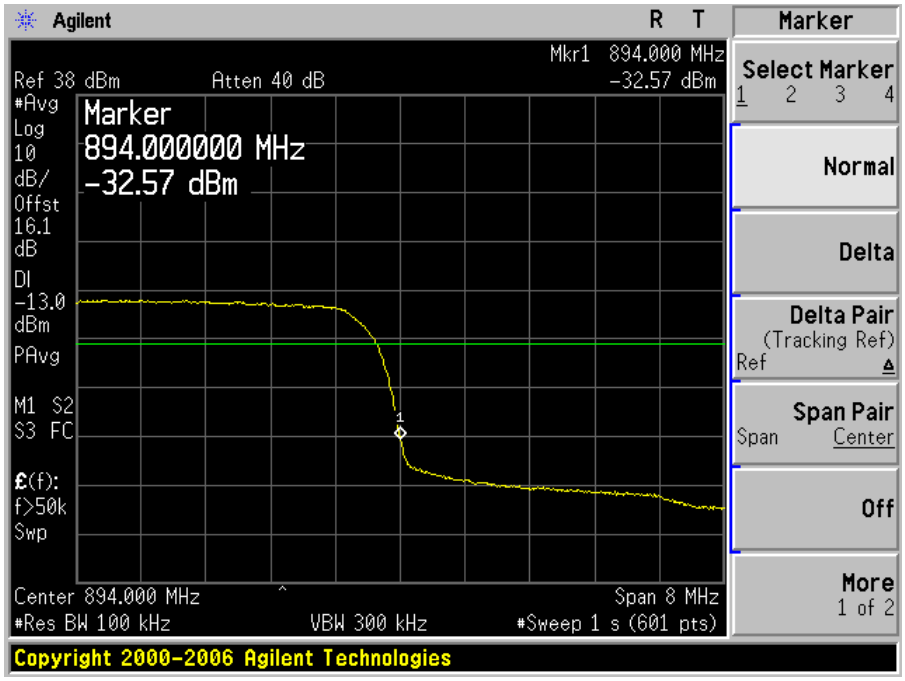


High Channel

WCDMA 850 MHz band Downlink Band Edge

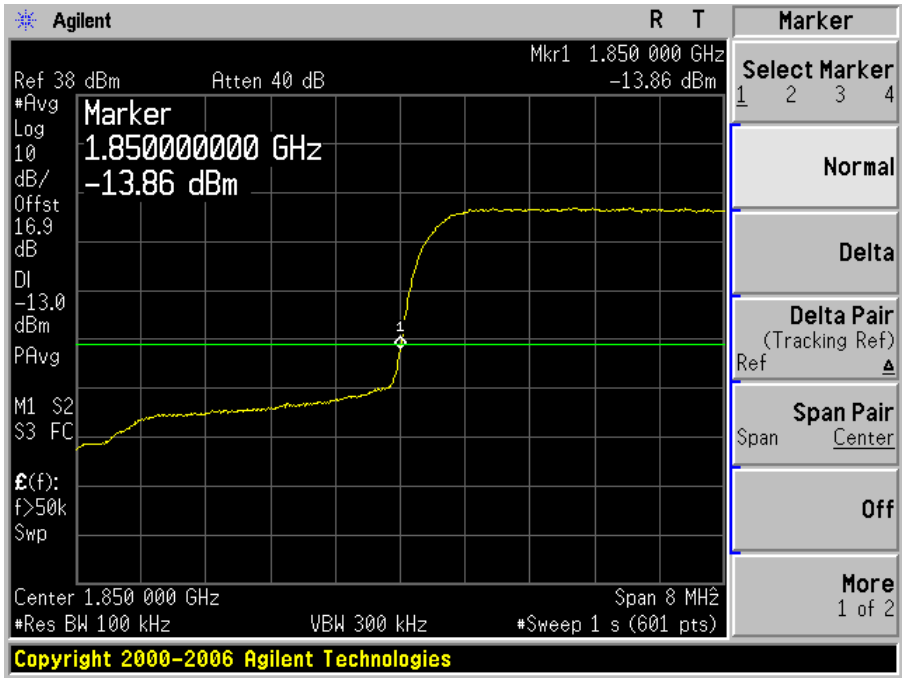


Low Channel

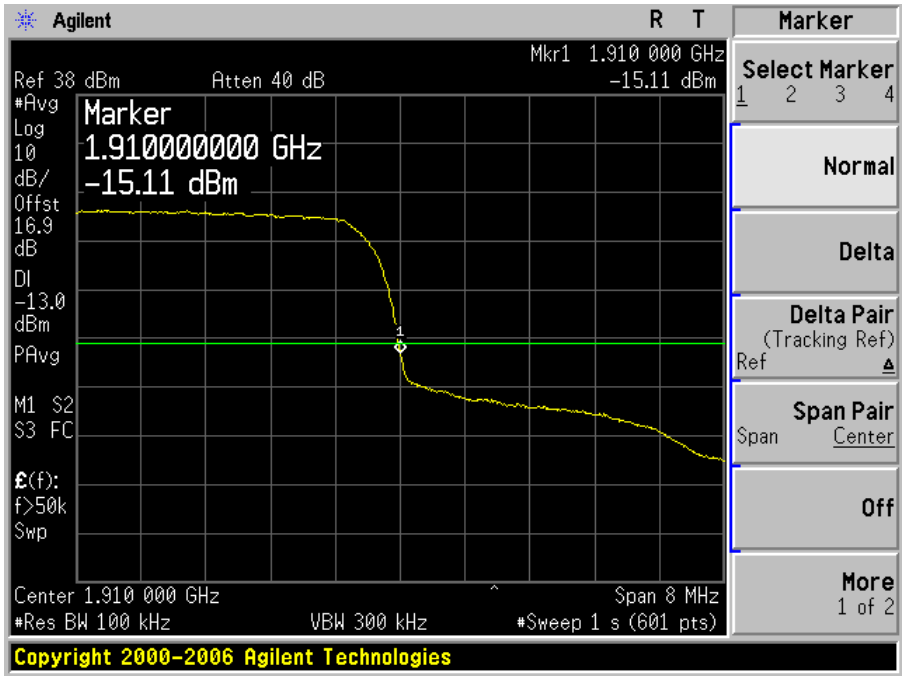


High Channel

WCDMA 1900 MHz band Uplink Band Edge

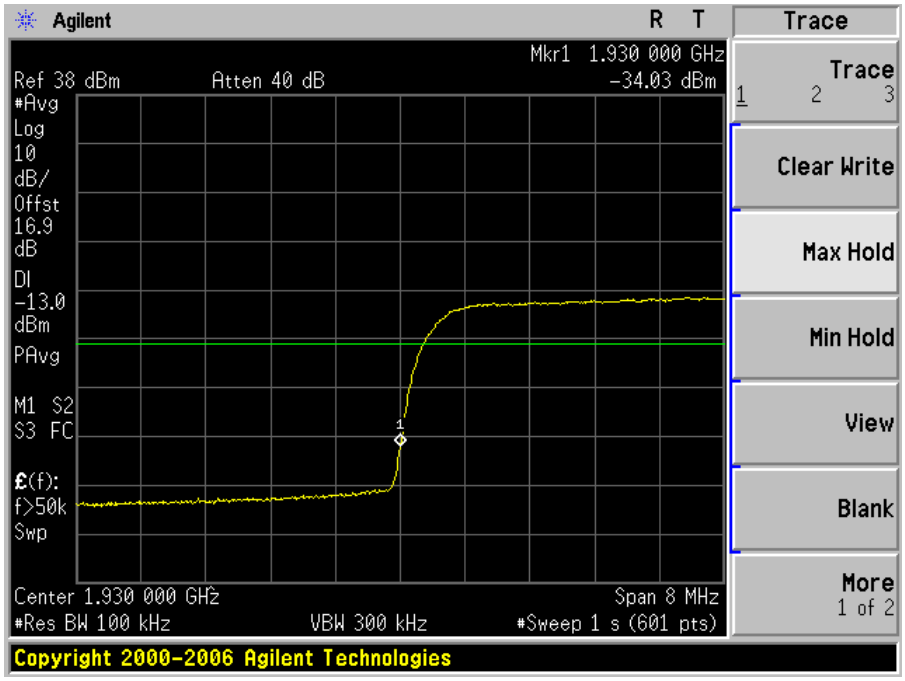


Low Channel

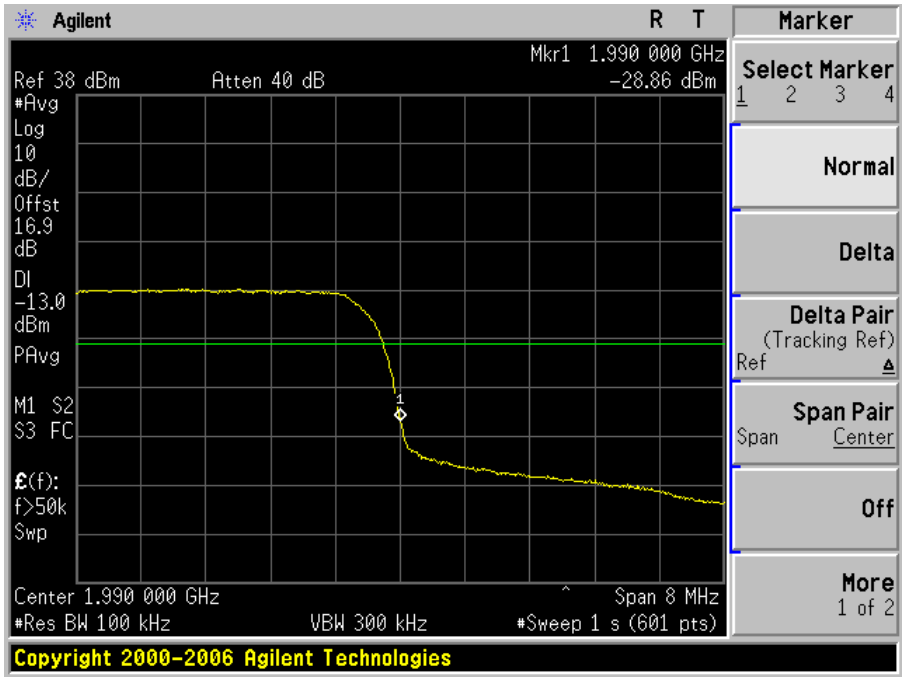


High Channel

WCDMA 1900 MHz band Downlink Band Edge



Low Channel



High Channel

10 FCC §2.1055, §22.355 & §24.235 – 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