Lab Code: 200167-0

FCC PART 22H, 24E, & 27

TEST AND MEASUREMENT REPORT

For

Cellphone-Mate, Inc

48820 Kato Rd. Suite 300B
Fremont, CA 94538

FCC ID: RSNCM5000

Report Type:	**Product Type:**
Original Report	In-building Amplifier

Test Engineer:	Lionel Lara
Report Number:	R1203141-222427
Report Date:	2012-04-24
Reviewed By:	Victor Zhang EMC/RF Lead
Prepared By: (84)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1203141-222427	Original Report	2012-04-18

1 General Information

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Cellphone-Mate, Inc.* and their product *FCC ID: RSNCM5000*, model: *CM5000* or the "EUT" as referred to in this report. The EUT is a wireless, mobile and fixed (in-building), five-band bi-directional amplifier for enhancing the range of cell phones. A 50 Ω n-type connector is used for connecting both outside and inside antenna to the amplifier. The uplink frequency bands are: 824-849 MHz, 1850-1910 MHz, 698-716 MHz, 776-787 MHz and 1710-1755 MHz. The downlink frequency bands are 869-894 MHz, 1930-1990 MHz, 728-746 MHz, 746-757 MHz, and 2110-2155 MHz. Modulation types are CDMA/EVDO, GSM, EDGE, WCDMA/HSPA, QPSK, 16QAM and 64QAM. The amplifier is contained in a metal case.

1.2 Mechanical Description

The EUT Approximate measurement is: 355 mm (L) x 279 mm (W) x 63 mm (H). Weight: 7250g.

The test data gathered are from typical production sample, serial number: JSEKMH.

1.3 Objective

This type approval report is prepared on behalf of *Cellphone-Mate, Inc.* in accordance with Part 2, Subpart J, Part 22 Subpart H, Part 24 Subpart E and Part 27 of the Federal Communication Commissions rules.

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

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

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

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E – PCS
Part 27 - Miscellaneous Wireless Communications Services

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

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

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2003, 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.

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.: R-3729, C-4176, G-469, and T-1206. 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 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/Standards/scopes/2001670.htm

2 System Test Configuration

2.1 Justification

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

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

2.2 EUT Exercise Software

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

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 EUT Internal Configuration

Manufacturer	Description	Model	Serial Number
Cellphone-Mate, Inc	PCB Board	2Bands Amplifier V1.0	-
Cellphone-Mate, Inc.	PCB Board	3Bands Amplifier V1.0	-
Dongwan Boyang Electronic Inc.	18V 5A Power Supply	STD-1805	-
Cellphone-Mate, Inc.	External Antenna	CM288W	-

2.5 Local Support Equipment List and Details

NA

2.6 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Adapter Tech.	AC Adapter	STD-1805	1205

2.7 Interface Ports and Cabling

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

3 Summary Of Test Results

FCC Rules	Description of Tests	Results
§2.1046, §22.913, §24.232, §27.50	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A
§2.1049, §22.917, §24.238, §27.53	Occupied Bandwidth	Compliant
§2.1053, §22.917, §24.238, §27.53	Spurious Radiated Emissions	Compliant
§2.1051, §22.917, §24.238, §27.53	Spurious Emissions at Antenna Terminals	Compliant
§22.917, §24.238, §27.53	Band Edge	Compliant
§2.1055	Frequency Stability	N/A
§2.1091	RF Exposure	Compliant

Note: NA, the unit is amplifier only device.

4 FCC §2.1046, §22.913, §24.232 & §27.50 – 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.

According to FCC §24.232 , Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

According to FCC §27.50, the maximum effective radiated power (ERP) of fixed and base station must not exceed 1000 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 Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09[1]
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Note 1: Based on a two year calibration cycle.

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

4.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	57 %
ATM Pressure:	101.4kPa

The testing was performed by Lionel Lara on 2012-03-28 in the RF Site.

4.5 Test Results

Maximum Output Power – Modulated Signal

GSM/GPRS

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
GSM/GPRS	850 MHz Uplink	Low	824.2	-51	25.66
		Middle	836.6	-54	26.5
		High	848.8	-50	24.31
	850 MHz Downlink	Low	869.2	-55	24.4
		Middle	881.6	-57	24.84
		High	893.8	-54	24.63
	1900 MHz Uplink	Low	1850.2	-47	25.68
		Middle	1880.0	-48	26.38
		High	1909.8	-43	23.36
	1900 MHz Downlink	Low	1930.2	-49	23.4
		Middle	1960.0	-53	26.04
		High	1989.8	-55	23.82

EDGE

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
EDGE	850 MHz Uplink	Low	824.2	-52	27.05
		Middle	836.6	-55	28.19
		High	848.8	-52	25.42
	850 MHz Downlink	Low	869.2	-56	26.1
		Middle	881.6	-58	26.6
		High	893.8	-55	26.05
	1900 MHz Uplink	Low	1850.2	-50	25.71
		Middle	1880.0	-51	26.31
		High	1909.8	-46	23.34
	1900 MHz Downlink	Low	1930.2	-50	24.9
		Middle	1960.0	-54	26.89
		High	1989.8	-56	25.62

CDMA/EVDO

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
CDMA/EVDO	850 MHz Uplink	Low	824.80	-50	25.94
		Middle	836.52	-53	26.04
		High	848.20	-51	23.36
	850 MHz Downlink	Low	869.80	-56	23.19
		Middle	881.52	-58	23.69
		High	893.20	-56	23.52
	1900 MHz Uplink	Low	1850.8	-48	24.93
		Middle	1880.0	-48	25.8
		High	1909.2	-45	22.2
	1900 MHz Downlink	Low	1930.8	-52	21.81
		Middle	1960.0	-54	24.91
		High	1989.2	-55	23.4

WCDMA/HSPA

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
WCDMA/HSPA	850 MHz Uplink	Low	826.4	-50	26.01
		Middle	836.4	-53	26.04
		High	846.6	-51	23.58
	850 MHz Downlink	Low	871.4	-56	23.08
		Middle	881.4	-58	23.77
		High	891.6	-59	22.89
	1900 MHz Uplink	Low	1852.4	-49	25.29
		Middle	1880.0	-49	25.33
		High	1907.6	-46	23.31
	1900 MHz Downlink	Low	1932.4	-56	21.69
		Middle	1960.0	-54	24.93
		High	1987.6	-53	24.6

Lower LTE Band – Downlink

Mode	Modulation	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
Downlink 728-746 MHz	QPSK (1.4 MHz)	729	-62	13.27
	QPSK (1.4 MHz)	737	-68	16.27
	QPSK (1.4 MHz)	745	-59	24.1
	16QAM (1.4 MHz)	729	-62	13.29
	16QAM (1.4 MHz)	737	-67	17.34
	16QAM (1.4 MHz)	745	-59	24.11
	64QAM (1.4 MHz)	729	-62	13.29
	64QAM (1.4 MHz)	737	-67	17.26
	64QAM (1.4 MHz)	745	-59	24.07
	QPSK (3 MHz)	730	-62	14.69
	QPSK (3 MHz)	737	-67	17.28
	QPSK (3 MHz)	744	-59	24.19
	16QAM (3 MHz)	730	-63	13.62
	16QAM (3 MHz)	737	-67	17.3
	16QAM (3 MHz)	744	-59	24.18
	64QAM (3 MHz)	730	-63	13.62
	64QAM (3 MHz)	737	-67	17.29
	64QAM (3 MHz)	744	-59	24.18
	QPSK (5 MHz)	731	-62	15.95
	QPSK (5 MHz)	737	-66	18.17
	QPSK (5 MHz)	743	-59	24.16
	16QAM (5 MHz)	731	-63	14.85
	16QAM (5 MHz)	737	-67	17.14
	16QAM (5 MHz)	743	-59	24.16
	64QAM (5 MHz)	731	-63	14.85
	64QAM (5 MHz)	737	-67	17.17
	64QAM (5 MHz)	743	-60	23.69
	QPSK (10 MHz)	733	-65	16.11
	QPSK (10 MHz)	741	-65	19.25
	16QAM (10 MHz)	733	-66	15.1
	16QAM (10 MHz)	741	-65	19.24
	64QAM (10 MHz)	733	-66	15.09
	64QAM (10 MHz)	741	-65	19.24

Lower LTE Band – Uplink

Mode	Modulation	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
Uplink 698-716 MHz	QPSK (1.4 MHz)	699	-54	22.76
	QPSK (1.4 MHz)	709	-53	22.65
	QPSK (1.4 MHz)	715	-53	21.21
	16QAM (1.4 MHz)	699	-55	21.83
	16QAM (1.4 MHz)	709	-53	22.5
	16QAM (1.4 MHz)	715	-53	21.22
	64QAM (1.4 MHz)	699	-55	21.86
	64QAM (1.4 MHz)	709	-53	22.48
	64QAM (1.4 MHz)	715	-53	21.13
	QPSK (3 MHz)	700	-54	22.71
	QPSK (3 MHz)	709	-53	22.84
	QPSK (3 MHz)	714	-53	22.78
	16QAM (3 MHz)	700	-54	22.62
	16QAM (3 MHz)	709	-53	22.64
	16QAM (3 MHz)	714	-54	21.88
	64QAM (3 MHz)	700	-54	22.65
	64QAM (3 MHz)	709	-53	22.62
	64QAM (3 MHz)	714	-54	21.84
	QPSK (5 MHz)	701	-53	23.85
	QPSK (5 MHz)	709	-53	22.96
	QPSK (5 MHz)	713	-53	23.29
	16QAM (5 MHz)	701	-54	23
	16QAM (5 MHz)	709	-53	22.82
	16QAM (5 MHz)	713	-53	23.04
	64QAM (5 MHz)	701	-54	22.98
	64QAM (5 MHz)	709	-53	22.79
	64QAM (5 MHz)	713	-54	22.23
	QPSK (10 MHz)	703	-54	23.35
	QPSK (10 MHz)	711	-54	22.23
	16QAM (10 MHz)	703	-54	23.2
	16QAM (10 MHz)	711	-54	22.15
	64QAM (10 MHz)	703	-54	23.14
	64QAM (10 MHz)	711	-54	22.12

Upper LTE Band – Downlink

Mode	Modulation	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
Downlink 746-757 MHz	QPSK (1.4 MHz)	747	-59	24
	QPSK (1.4 MHz)	752	-58	23.11
	QPSK (1.4 MHz)	756	-58	20.36
	16QAM (1.4 MHz)	747	-58	24.32
	16QAM (1.4 MHz)	752	-58	23.1
	16QAM (1.4 MHz)	756	-58	20.37
	64QAM (1.4 MHz)	747	-59	23.99
	64QAM (1.4 MHz)	752	-58	23.1
	64QAM (1.4 MHz)	756	-58	20.37
	QPSK (3 MHz)	748	-58	24.08
	QPSK (3 MHz)	752	-58	23.12
	QPSK (3 MHz)	755	-59	21.16
	16QAM (3 MHz)	748	-58	24.09
	16QAM (3 MHz)	752	-58	23.11
	16QAM (3 MHz)	755	-58	22.12
	64QAM (3 MHz)	748	-59	23.83
	64QAM (3 MHz)	752	-58	23.09
	64QAM (3 MHz)	755	-58	22.13
	QPSK (5 MHz)	749	-59	23.62
	QPSK (5 MHz)	754	-57	23.09
	16QAM (5 MHz)	749	-59	23.62
	16QAM (5 MHz)	754	-57	23.1
	64QAM (5 MHz)	749	-59	23.63
	64QAM (5 MHz)	754	-57	23.09
	QPSK (10 MHz)	752	-62	20.77
	16QAM (10 MHz)	752	-63	19.71
	64QAM (10 MHz)	752	-62	20.79

Upper LTE Band – Uplink

Mode	Modulation	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
Uplink 776-787 MHz	QPSK (1.4 MHz)	777	-54	22.22
	QPSK (1.4 MHz)	782	-53	23.96
	QPSK (1.4 MHz)	786	-55	21.69
	16QAM (1.4 MHz)	777	-53	22.5
	16QAM (1.4 MHz)	782	-53	23.73
	16QAM (1.4 MHz)	786	-55	21.4
	64QAM (1.4 MHz)	777	-53	22.34
	64QAM (1.4 MHz)	782	-54	23.01
	64QAM (1.4 MHz)	786	-55	21.31
	QPSK (3 MHz)	778	-52	23.41
	QPSK (3 MHz)	782	-53	23.67
	QPSK (3 MHz)	785	-54	22.31
	16QAM (3 MHz)	778	-53	22.68
	16QAM (3 MHz)	782	-53	23.48
	16QAM (3 MHz)	785	-54	22.14
	64QAM (3 MHz)	778	-53	22.58
	64QAM (3 MHz)	782	-53	23.38
	64QAM (3 MHz)	785	-54	22.05
	QPSK (5 MHz)	779	-53	23.08
	QPSK (5 MHz)	784	-53	23.04
	16QAM (5 MHz)	779	-52	23.43
	16QAM (5 MHz)	784	-53	22.87
	64QAM (5 MHz)	779	-52	23.37
	64QAM (5 MHz)	784	-53	22.83
	QPSK (10 MHz)	782	-52	23.59
	16QAM (10 MHz)	782	-52	23.42
	64QAM (10 MHz)	782	-52	23.4

AWS Band

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)
WCDMA/HSPA	1710-1755 MHz Uplink	Low	1712.4	-51	23.9
		Middle	1732.4	-52	24.53
		High	1752.6	-49	23.41
	2110-2155 MHz Downlink	Low	2112.4	-57	24.49
		Middle	2132.4	-57	24.24
		High	2152.6	-59	22.49

5 FCC §2.1049, §22.917, §24.238 & §27.53 - Occupied Bandwidth

5.1 Applicable Standard

Requirements: FCC §2.1049, §22.917, §24.238 and §27.53.

5.2 Test Procedure

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

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

5.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09[1]
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Note 1: Based on a two year calibration cycle.

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

5.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	54 %
ATM Pressure:	101.4kPa

The testing was performed by Lionel Lara on 2012-04-03 in the RF Site.

5.5 Test Results

Mode		Channel	Frequency (MHz)	Emission Bandwidth Input (kHz)	Emission Bandwidth Output (kHz)
GSM	850 MHz Uplink	Middle	836.6	243.95	244.63
	850 MHz Downlink	Middle	881.6	242.79	245.44
	1900 MHz Uplink	Middle	1880.0	245.00	244.07
	1900 MHz Downlink	Middle	1960.0	243.98	245.45

Mode		Channel	Frequency (MHz)	Emission Bandwidth Input (kHz)	Emission Bandwidth Output (kHz)
EDGE	850 MHz Uplink	Middle	836.6	245.36	248.21
	850 MHz Downlink	Middle	881.6	246.42	248.00
	1900 MHz Uplink	Middle	1880.0	245.59	249.04
	1900 MHz Downlink	Middle	1960.0	245.93	254.50

Mode		Channel	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
CDMA	850 MHz Uplink	Middle	836.52	1.2582	1.2639
	850 MHz Downlink	Middle	881.52	1.2658	1.2647
	1900 MHz Uplink	Middle	1880.0	1.2548	1.2683
	1900 MHz Downlink	Middle	1960.0	1.2585	1.2775

Mode		Channel	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
WCDMA	850 MHz Uplink	Middle	836.4	4.1600	4.1407
	850 MHz Downlink	Middle	881.4	4.1887	4.1755
	1900 MHz Uplink	Middle	1880.0	4.1553	4.1868
	1900 MHz Downlink	Middle	1960.0	4.1759	4.1991

Lower LTE Band – Downlink

Mode	Modulation	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
Downlink 728-746 MHz	QPSK (1.4 MHz)	737	1.1003	1.0985
	16QAM (1.4 MHz)	737	1.1014	1.0991
	64QAM (1.4 MHz)	737	1.0986	1.0986
	QPSK (3 MHz)	737	2.7011	2.6938
	16QAM (3 MHz)	737	2.7016	2.7044
	64QAM (3 MHz)	737	2.7046	2.6966
	QPSK (5 MHz)	737	4.4984	4.4771
	16QAM (5 MHz)	737	4.4946	4.4772
	64QAM (5 MHz)	737	4.4916	4.4783
	QPSK (10 MHz)	733	8.9640	8.8377
	16QAM (10 MHz)	733	8.9707	8.8439
	64QAM (10 MHz)	733	8.9627	8.8280

Lower LTE Band – Uplink

Mode	Modulation	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
Uplink 698-716 MHz	QPSK (1.4 MHz)	709	1.0795	1.0812
	16QAM (1.4 MHz)	709	1.0780	1.0822
	64QAM (1.4 MHz)	709	1.0774	1.0836
	QPSK (3 MHz)	709	2.6904	2.6944
	16QAM (3 MHz)	709	2.6903	2.6913
	64QAM (3 MHz)	709	2.6897	2.6857
	QPSK (5 MHz)	709	4.4704	4.4850
	16QAM (5 MHz)	709	4.4694	4.4830
	64QAM (5 MHz)	709	4.4713	4.4851
	QPSK (10 MHz)	703	8.9428	8.9306
	16QAM (10 MHz)	703	8.9403	8.9526
	64QAM (10 MHz)	703	8.9443	8.9296

Upper LTE Band – Downlink

Mode	Modulation	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
Downlink 746-757 MHz	QPSK (1.4 MHz)	752	1.1000	1.1034
	16QAM (1.4 MHz)	752	1.0956	1.1022
	64QAM (1.4 MHz)	752	1.0969	1.1023
	QPSK (3 MHz)	752	2.7008	2.7056
	16QAM (3 MHz)	752	2.7110	2.7047
	64QAM (3 MHz)	752	2.7016	2.7029
	QPSK (5 MHz)	749	4.4966	4.4904
	16QAM (5 MHz)	749	4.4984	4.4948
	64QAM (5 MHz)	749	4.4939	4.4910
	QPSK (10 MHz)	752	8.9728	8.8649
	16QAM (10 MHz)	752	8.9633	8.8754
	64QAM (10 MHz)	752	8.9622	8.8522

Upper LTE Band – Uplink

Mode	Modulation	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
Uplink 776-787 MHz	QPSK (1.4 MHz)	782	1.0744	1.0836
	16QAM (1.4 MHz)	782	1.0785	1.0816
	64QAM (1.4 MHz)	782	1.0784	1.0824
	QPSK (3 MHz)	782	2.6903	2.6895
	16QAM (3 MHz)	782	2.6867	2.6896
	64QAM (3 MHz)	782	2.6863	2.6841
	QPSK (5 MHz)	779	4.4714	4.4686
	16QAM (5 MHz)	779	4.4729	4.4772
	64QAM (5 MHz)	779	4.4772	4.4741
	QPSK (10 MHz)	782	8.9362	8.9228
	16QAM (10 MHz)	782	8.9557	8.9395
	64QAM (10 MHz)	782	8.9420	8.9370

AWS Band

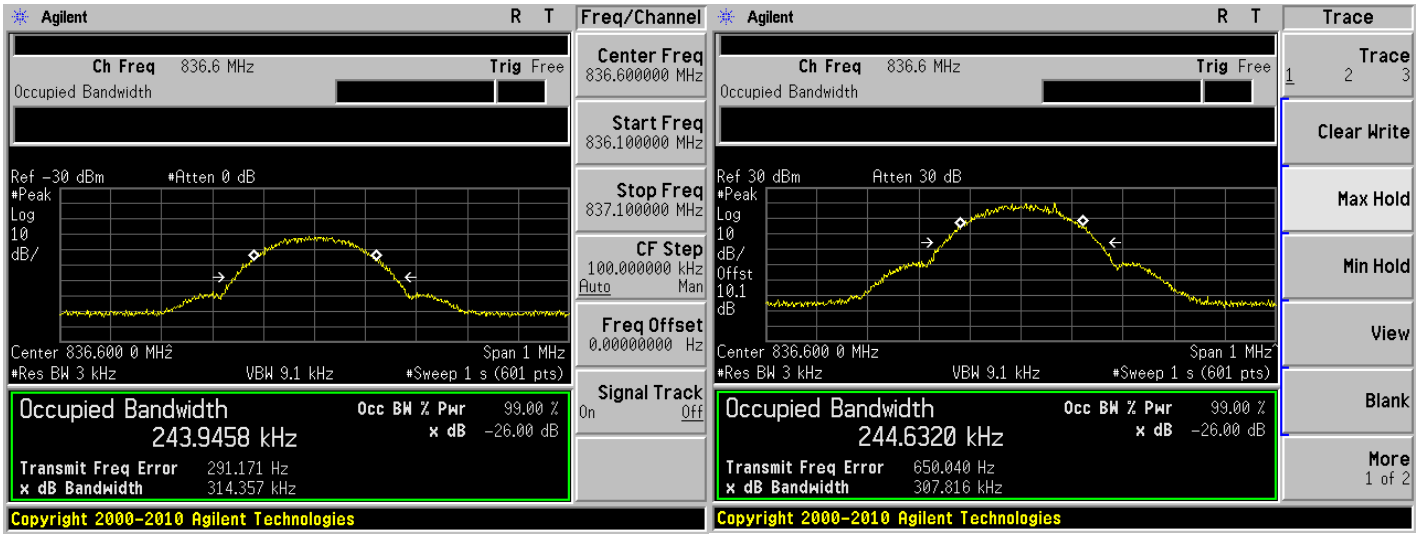
Mode		Channel	Frequency (MHz)	Emission Bandwidth Input (MHz)	Emission Bandwidth Output (MHz)
WCDMA	1710-1755 MHz Uplink	Middle	1732.4	4.1640	4.1702
	2110-2155 MHz Downlink	Middle	2132.4	4.1955	4.1808

Please refer to the following plots.

Cell Band, Uplink:

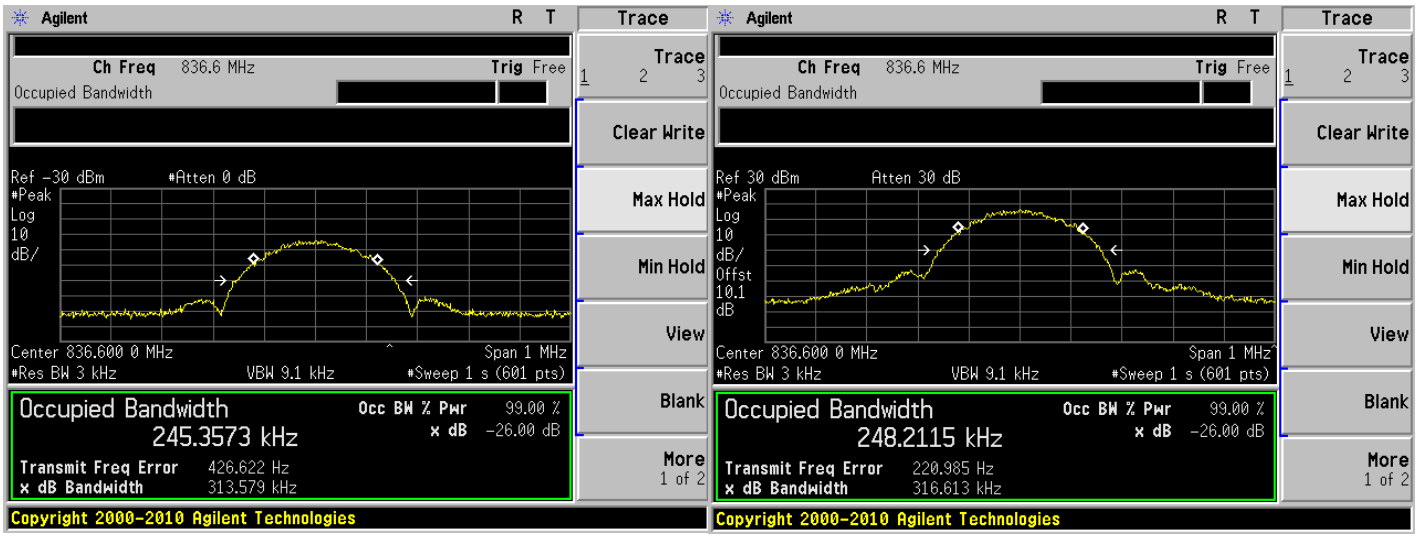
GSM/GPRS (Middle Channel)

Input Output



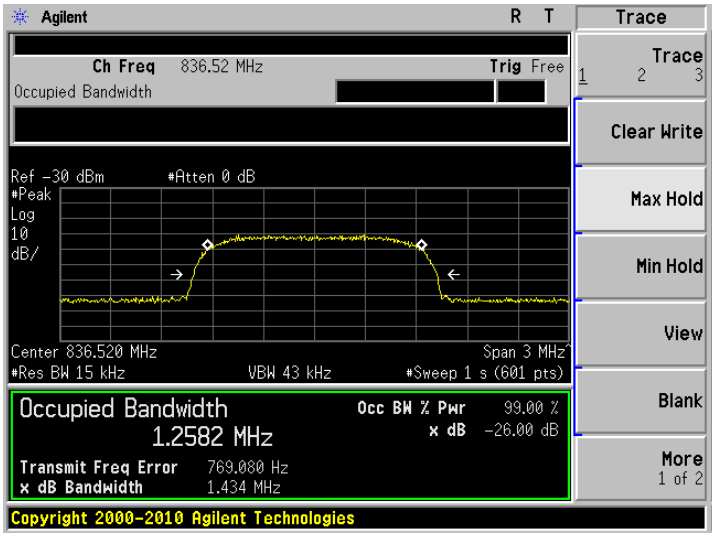
EDGE (Middle Channel)

Input Output

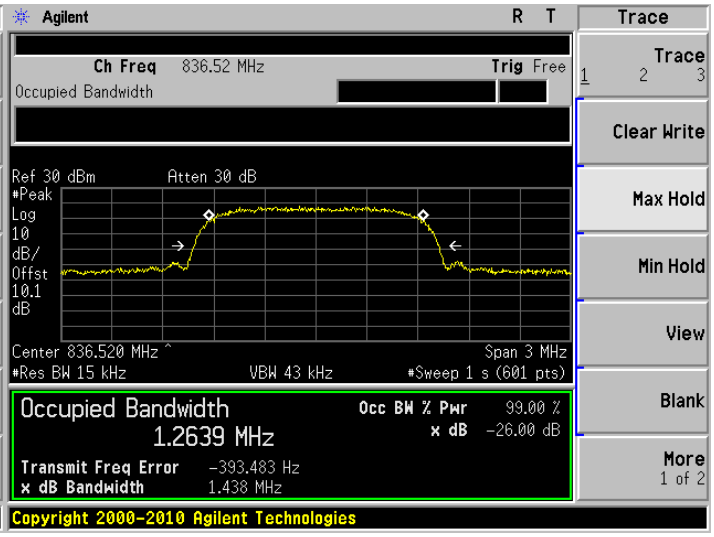


CDMA/EVDO (Middle Channel)

Input

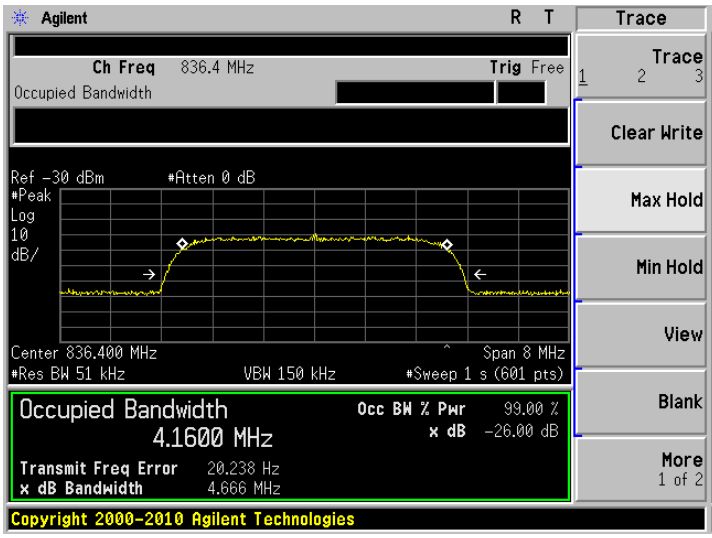


Output

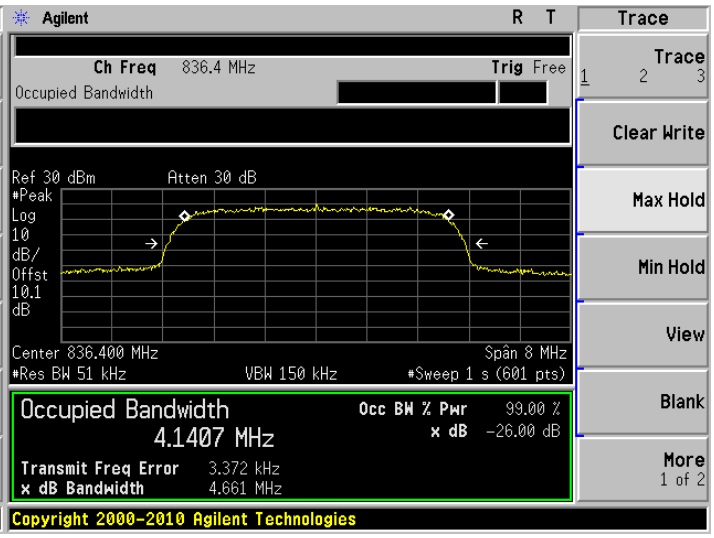


WCDMA/HSPA (Middle Channel)

Input



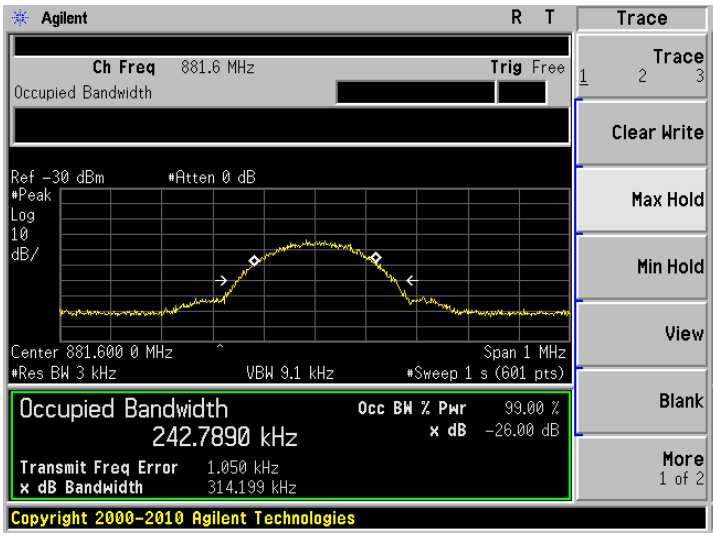
Output



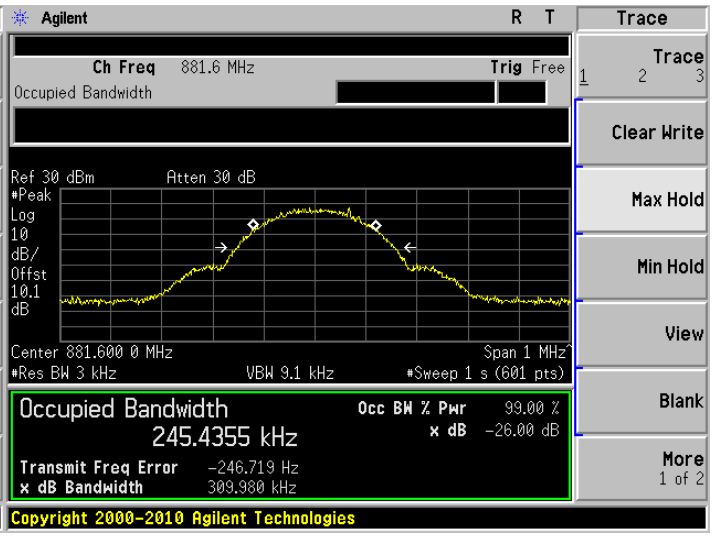
Cell Band, Downlink:

GSM/GPRS (Middle Channel)

Input

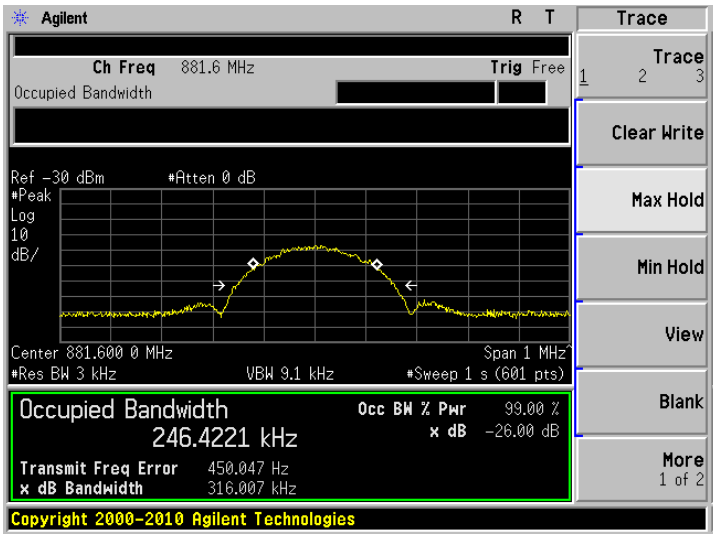


Output

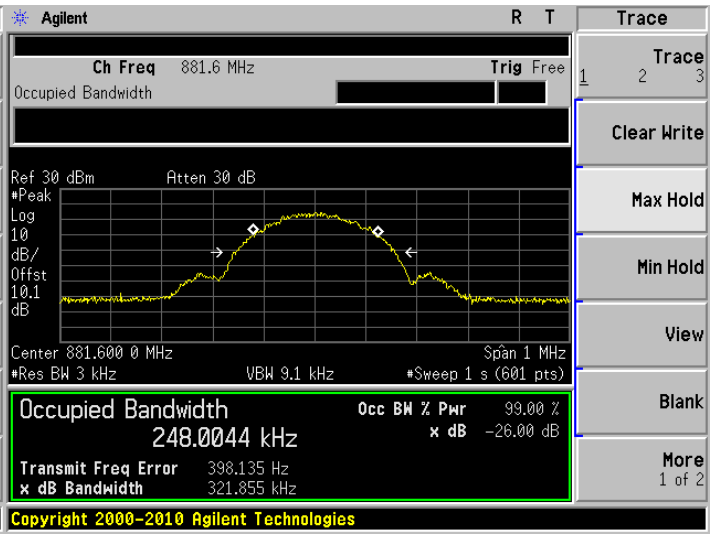


EDGE (Middle Channel)

Input

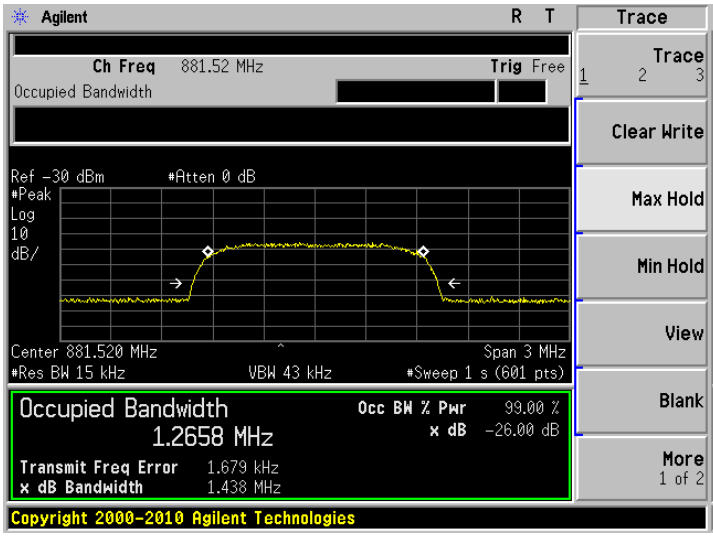


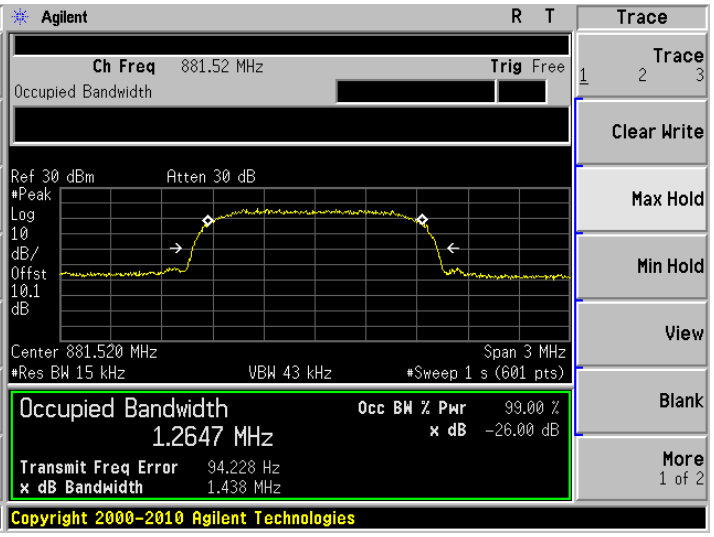
Output



CDMA/EVDO (Middle Channel)

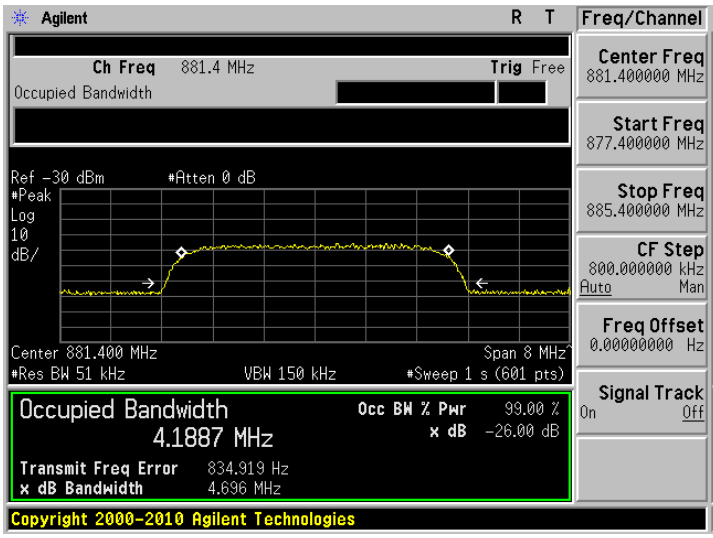
Input Output

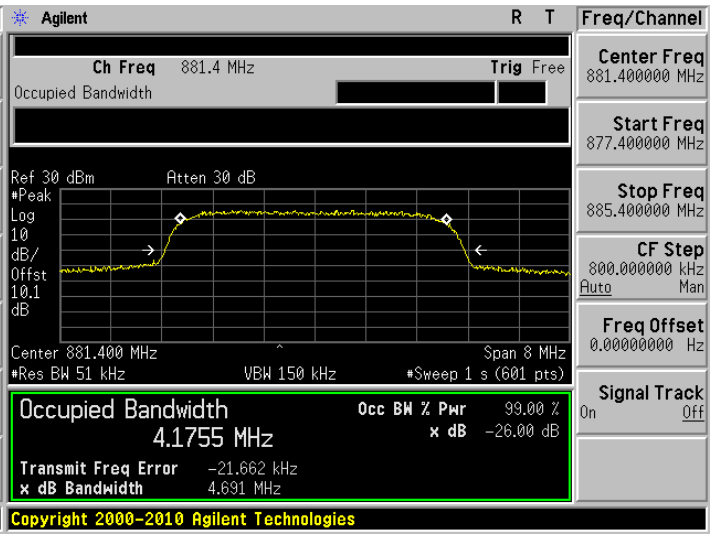




WCDMA/HSPA (Middle Channel)

Input Output





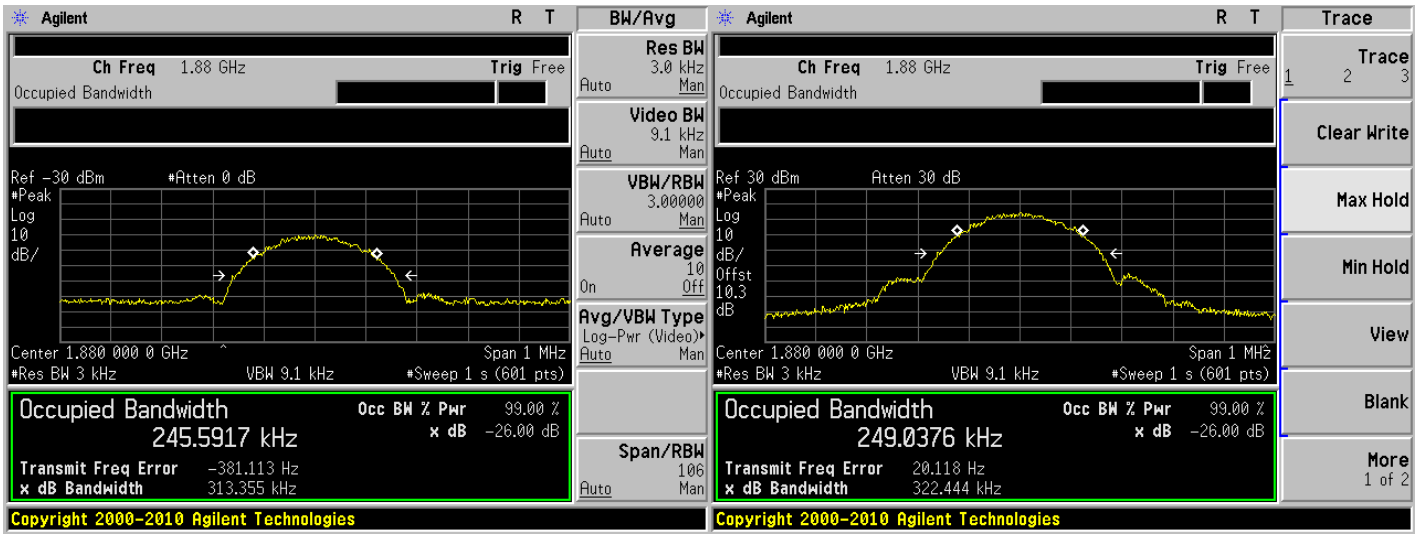
PCS Band, Uplink:

GSM/GPRS (Middle Channel)

Input Output

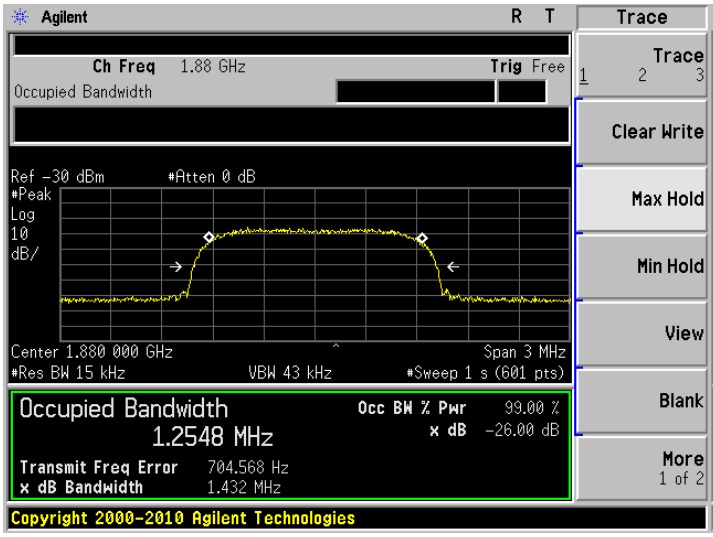
EDGE (Middle Channel)

Input Output

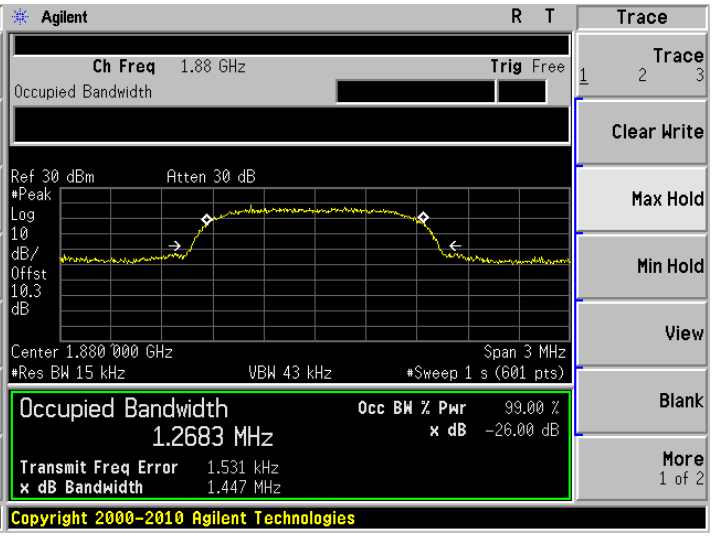


CDMA/EVDO (Middle Channel)

Input

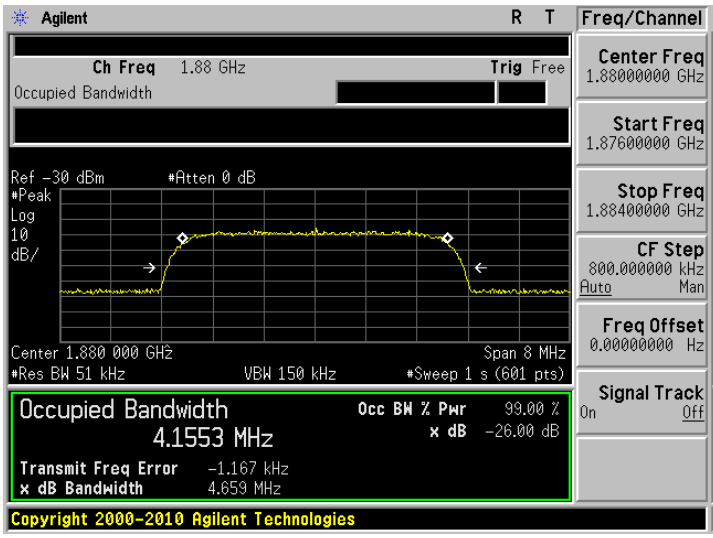


Output

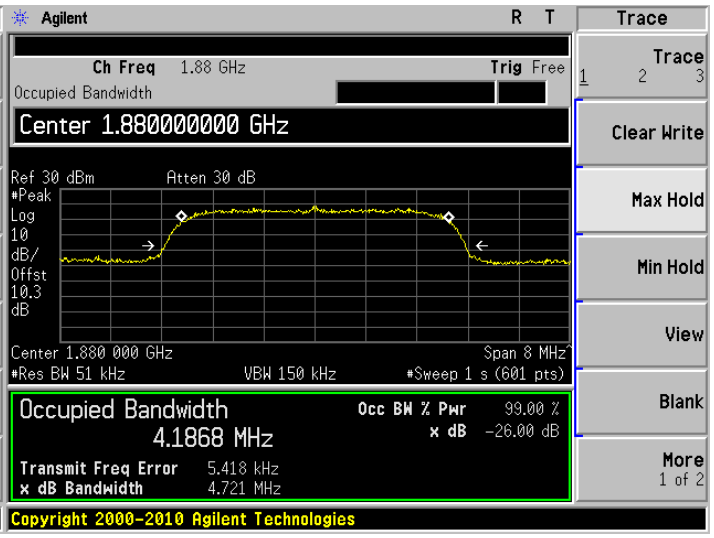


WCDMA/HSPA (Middle Channel)

Input



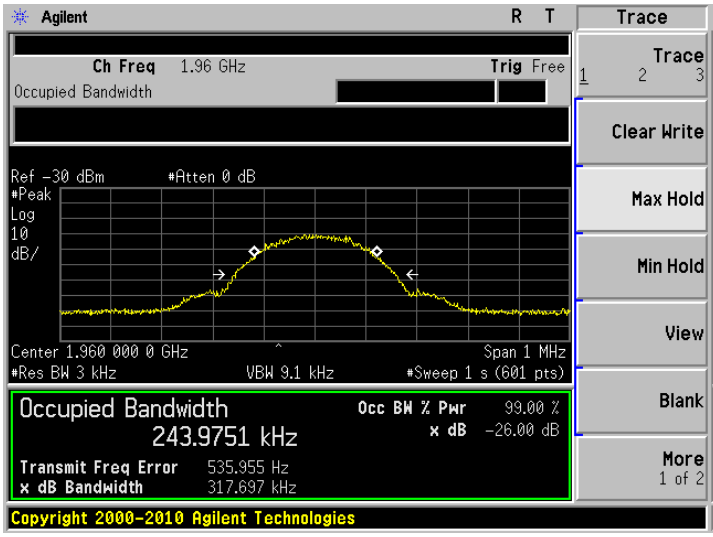
Output



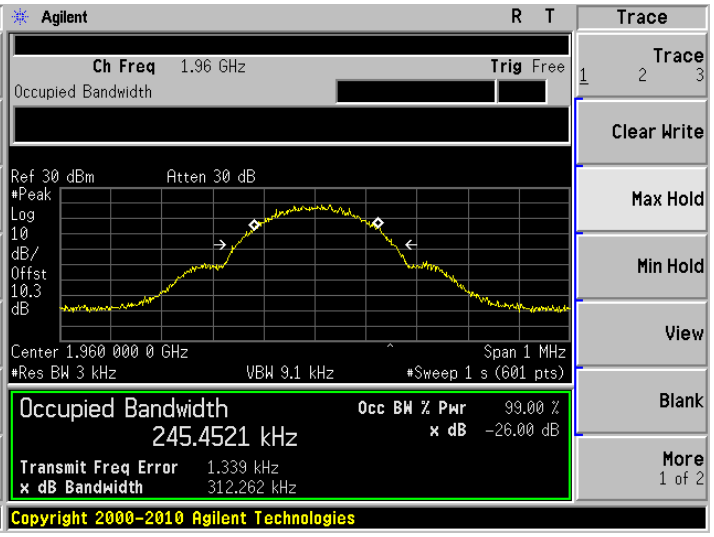
PCS Band, Downlink:

GSM/GPRS (Middle Channel)

Input

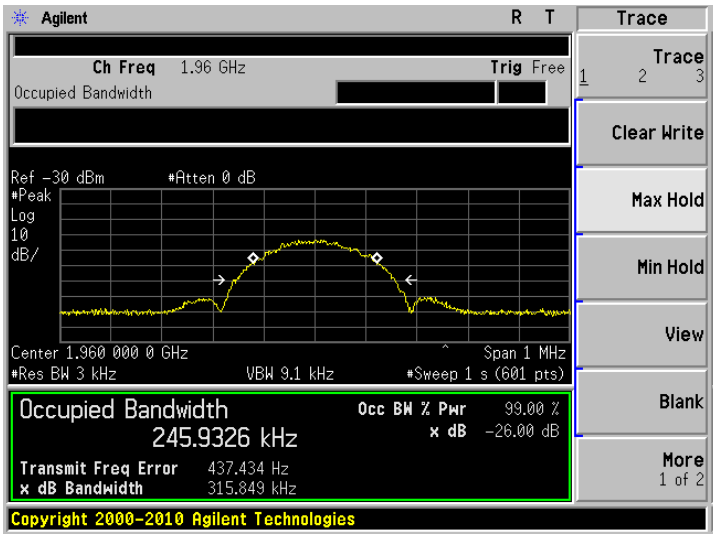


Output

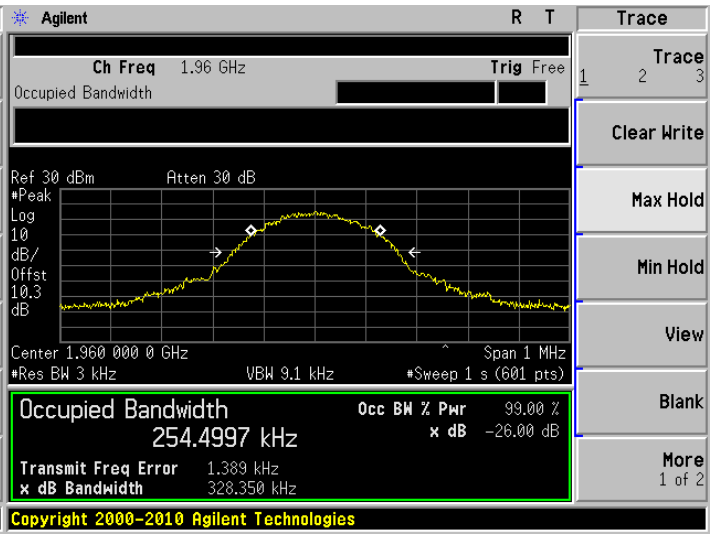


EDGE (Middle Channel)

Input

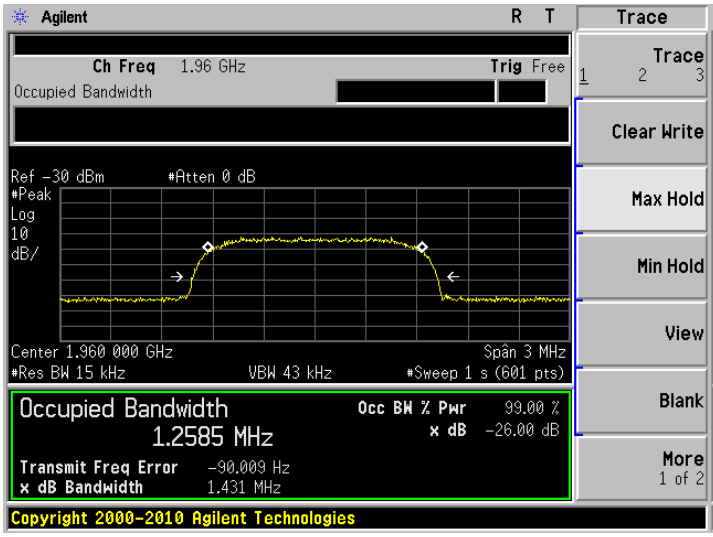


Output

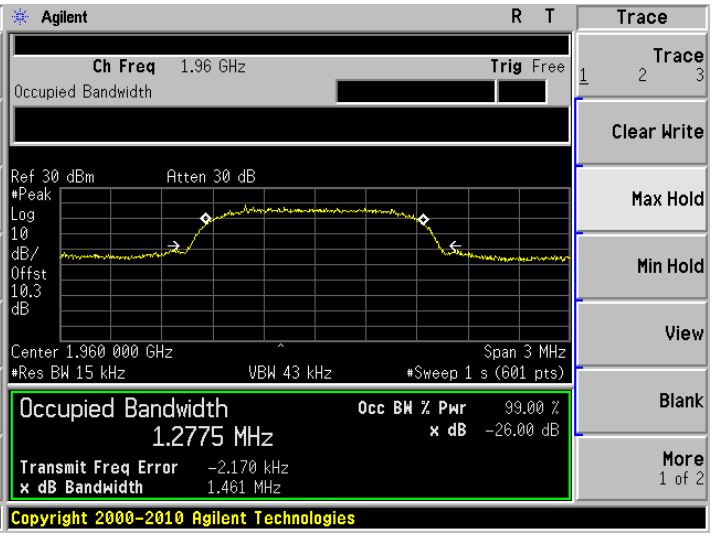


CDMA/EVDO (Middle Channel)

Input

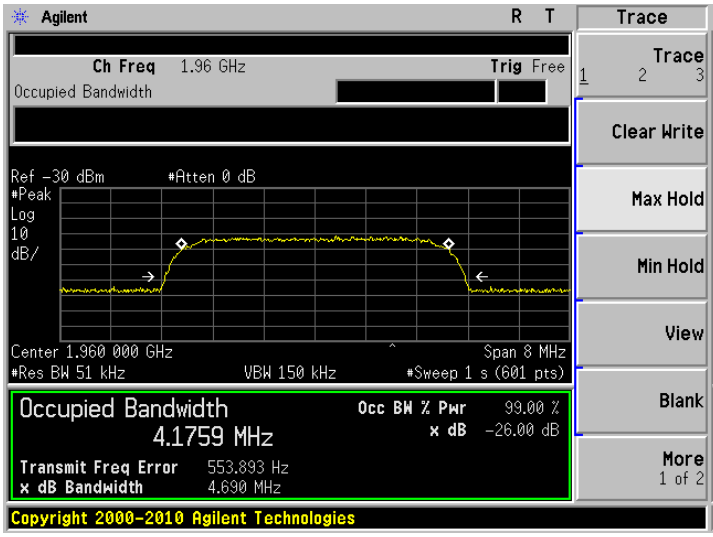


Output

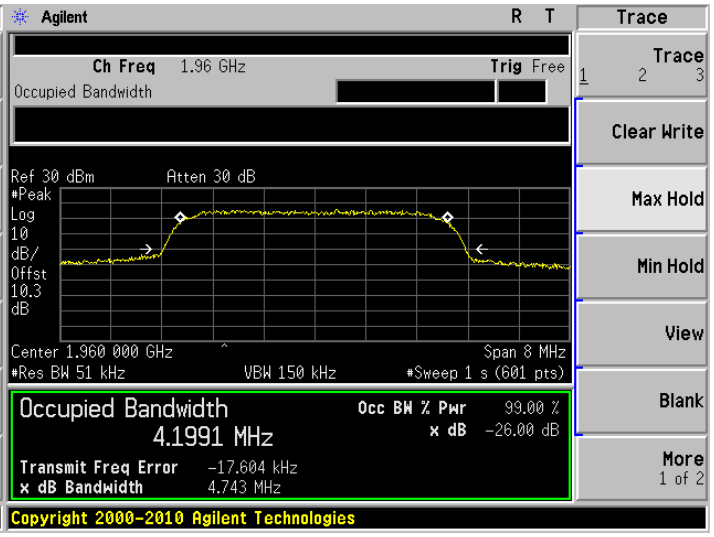


WCDMA/HSPA (Middle Channel)

Input



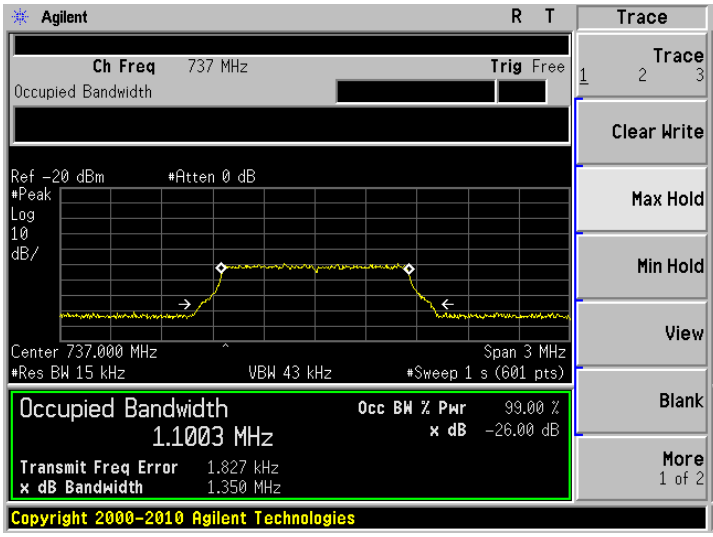
Output



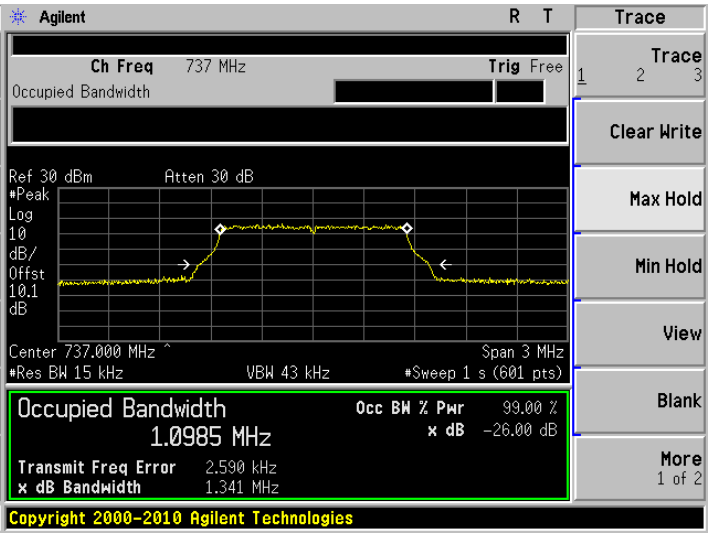
Lower LTE Band; DL: 728-746 MHz

QPSK (1.4 MHz), (Middle Channel)

Input

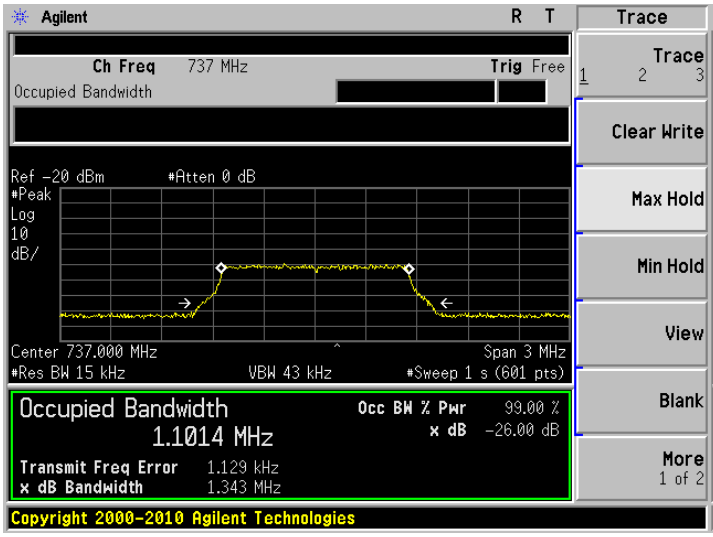


Output

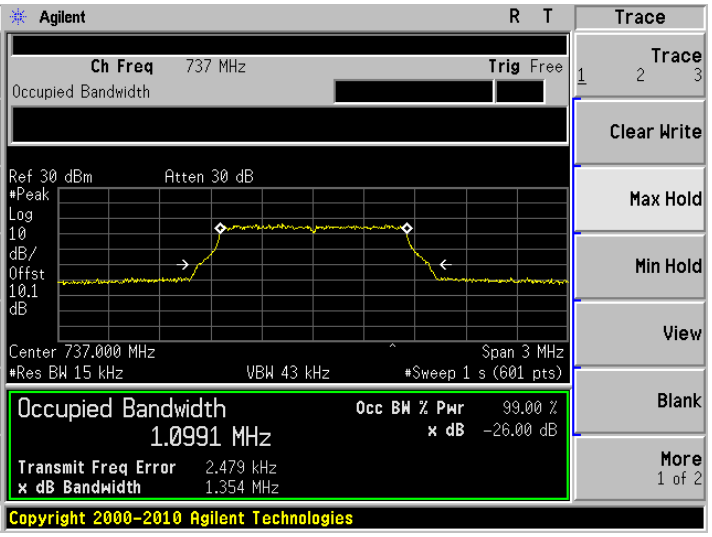


16QAM (1.4 MHz), (Middle Channel)

Input

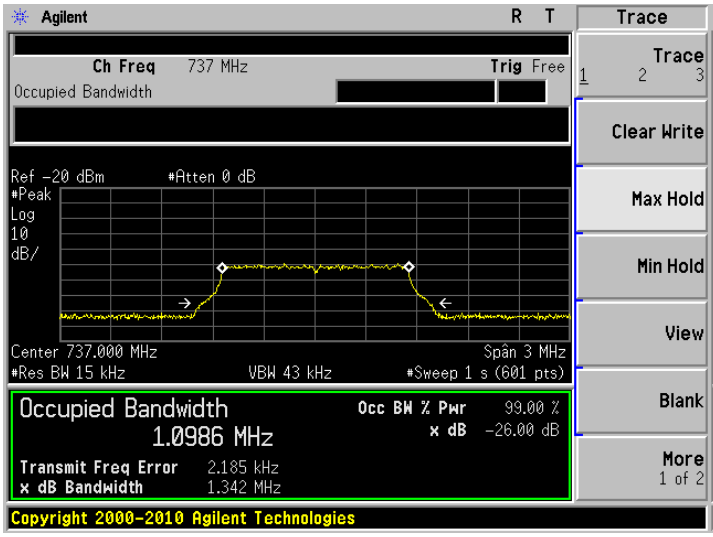


Output

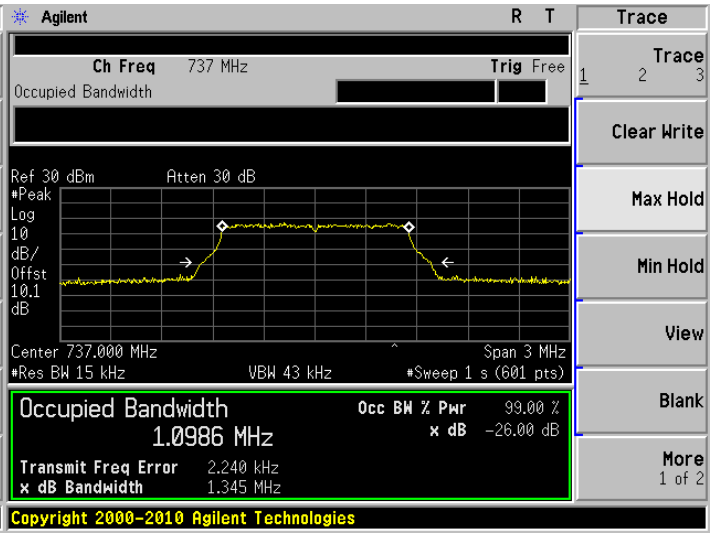


64QAM (1.4 MHz), (Middle Channel)

Input

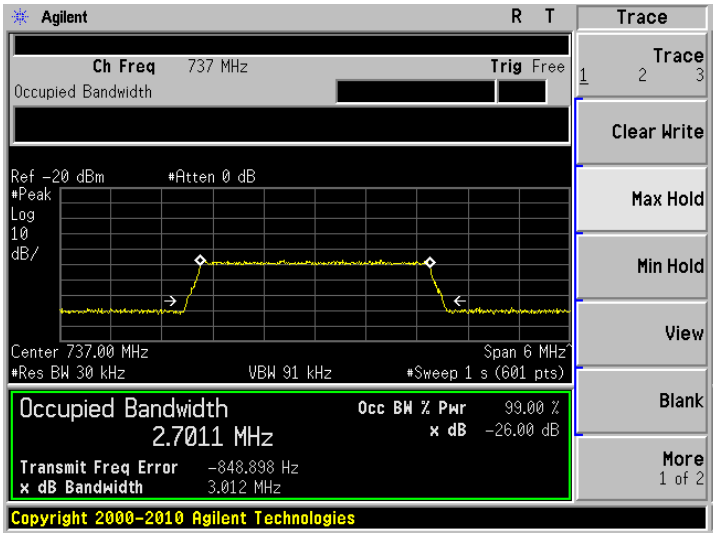


Output

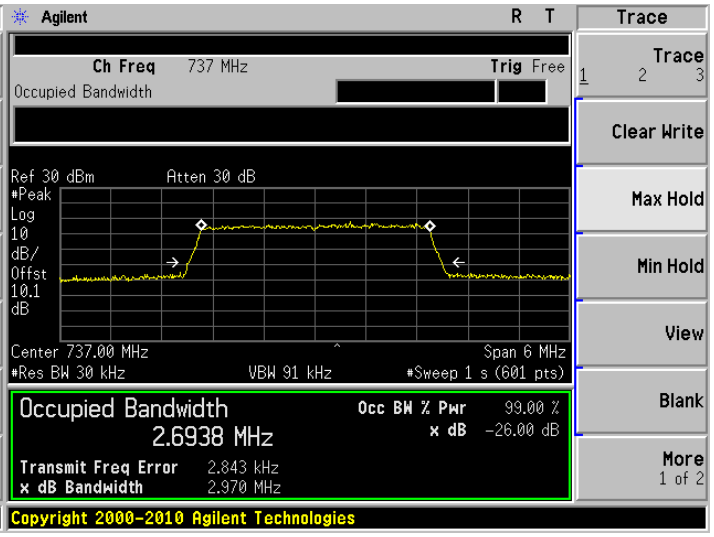


QPSK (3 MHz), (Middle Channel)

Input

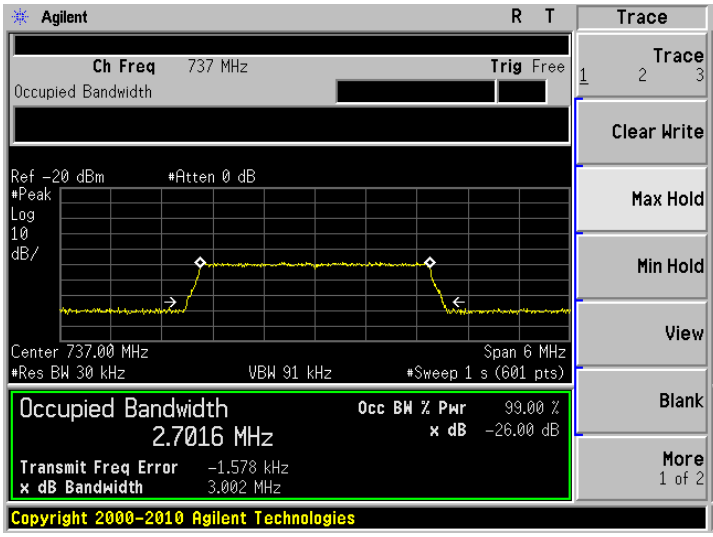


Output

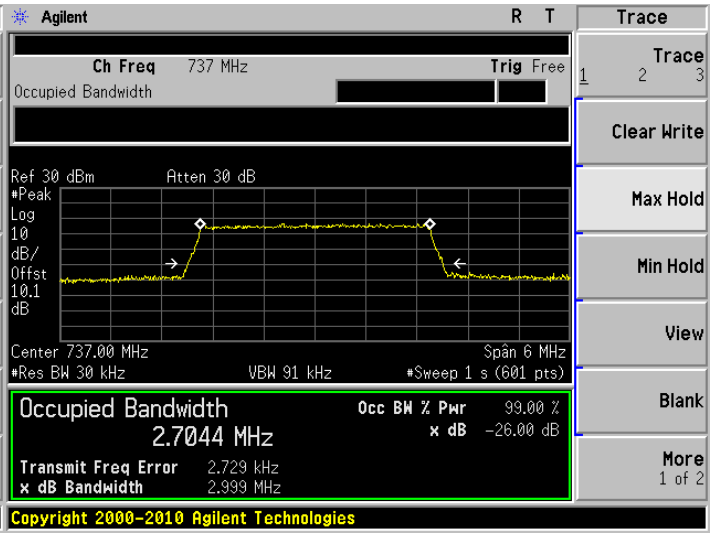


16QAM (3 MHz), (Middle Channel)

Input

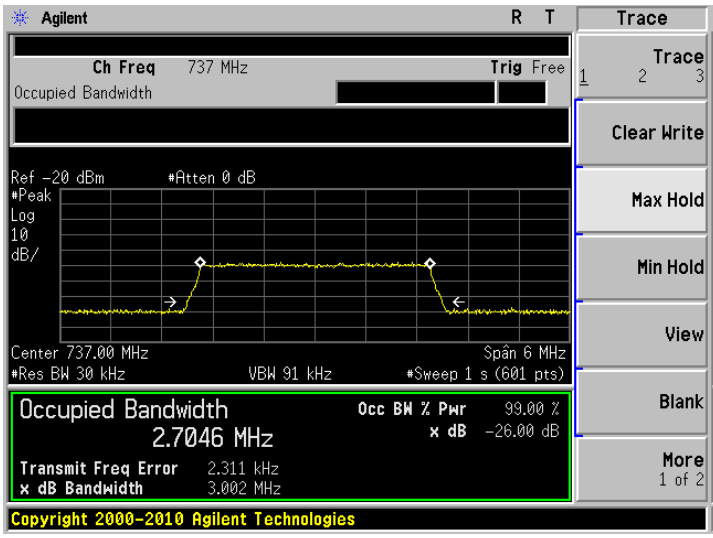


Output

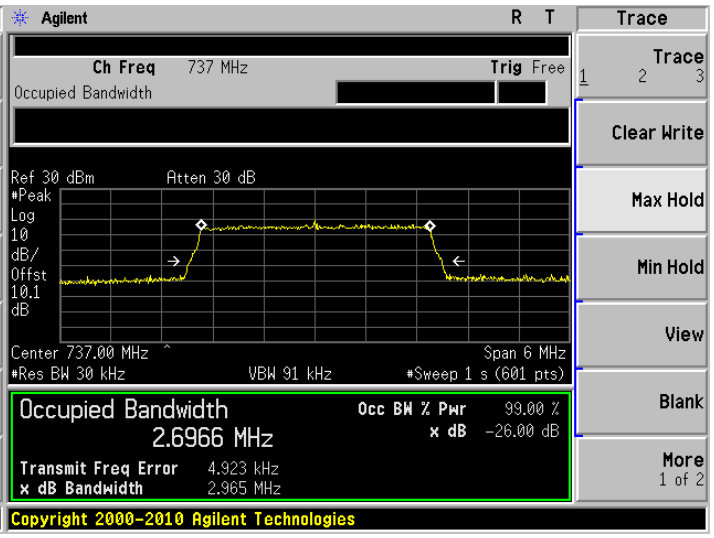


64QAM (3 MHz), (Middle Channel)

Input

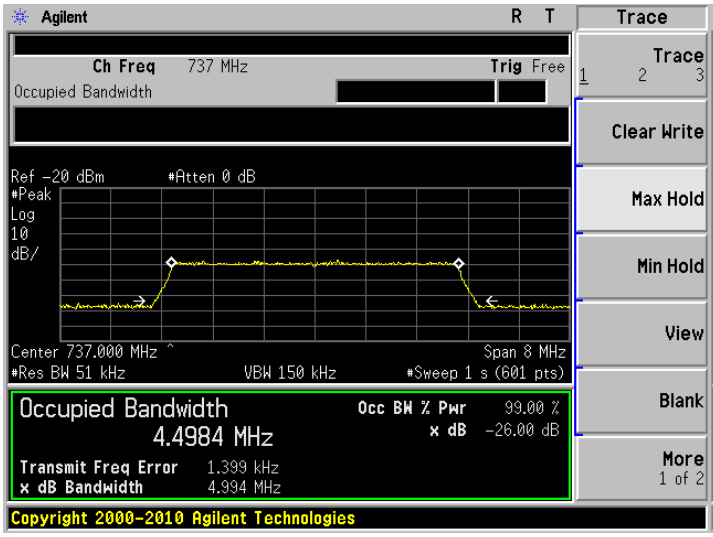


Output

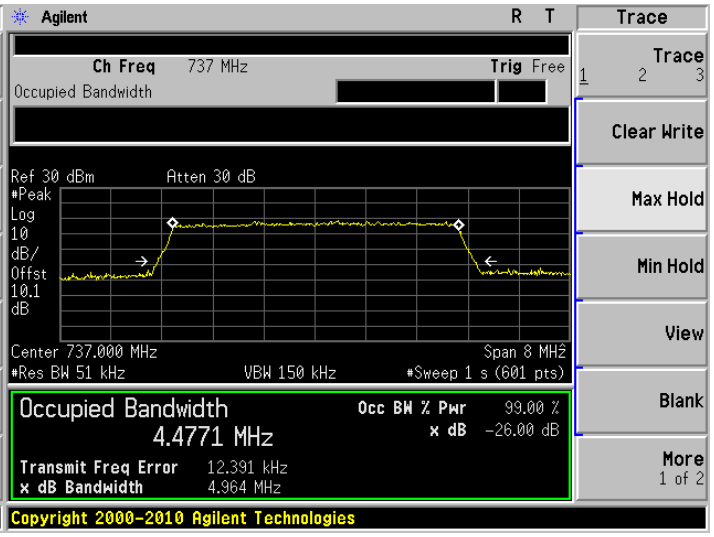


QPSK (5 MHz), (Middle Channel)

Input

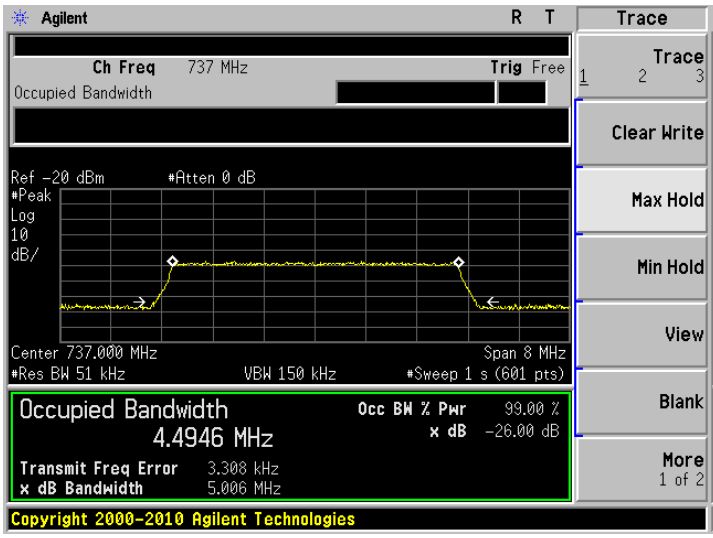


Output

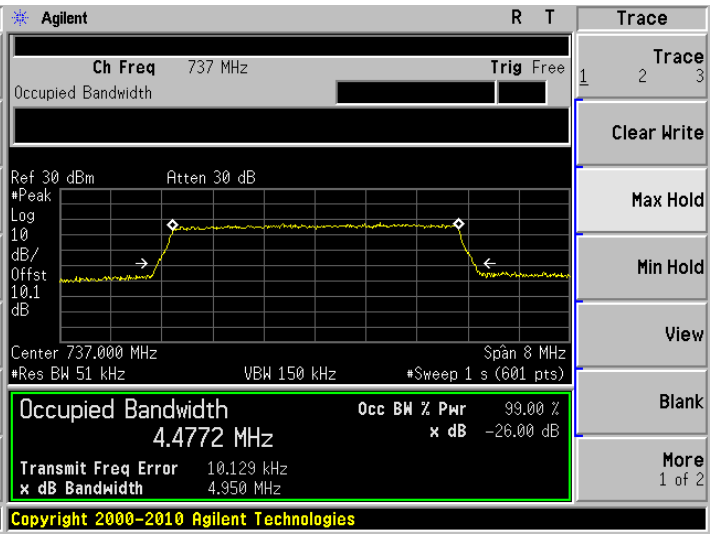


16QAM (5 MHz), (Middle Channel)

Input

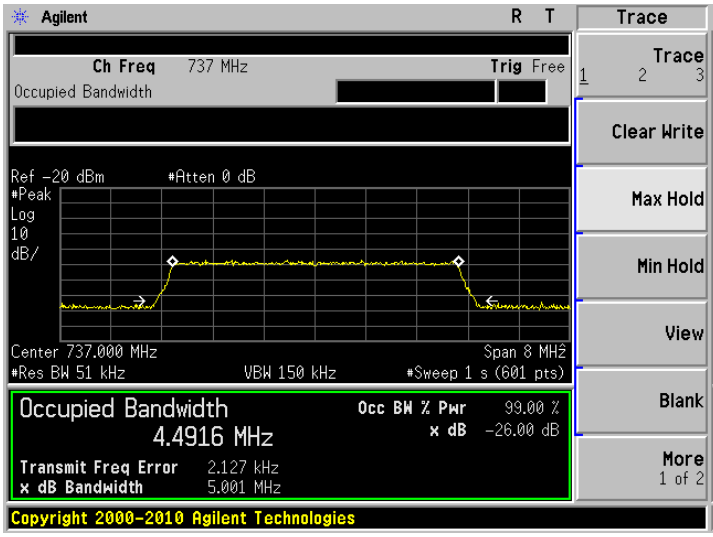


Output

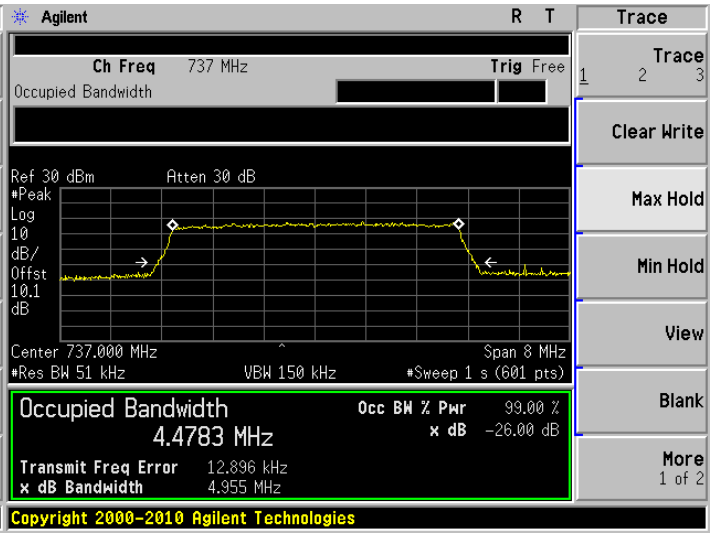


64QAM (5 MHz), (Middle Channel)

Input

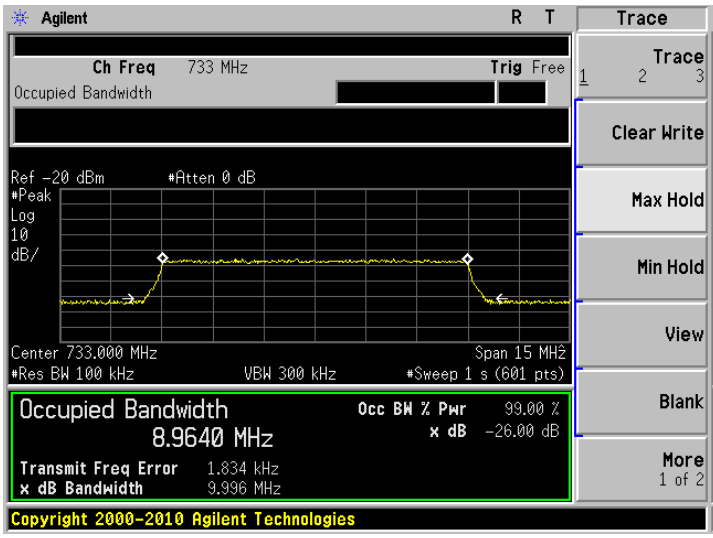


Output

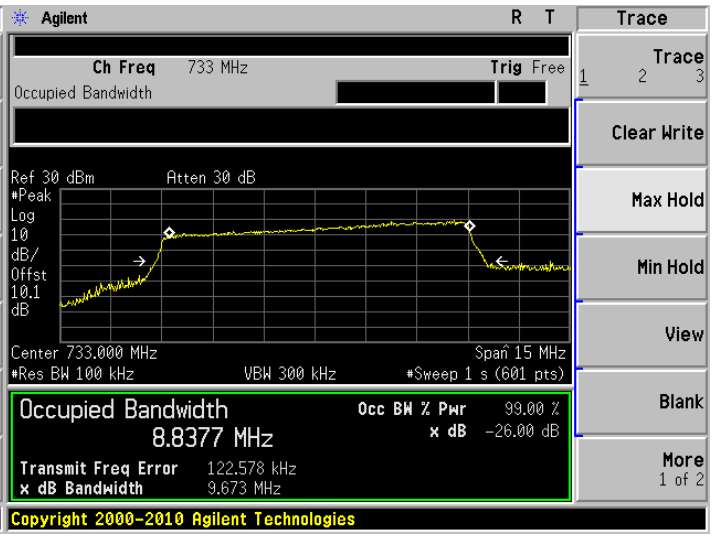


QPSK (10 MHz), (Low Channel)

Input

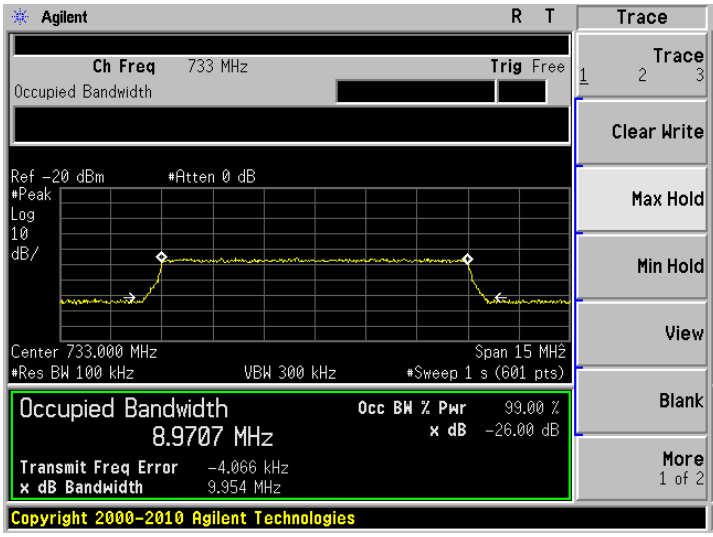


Output

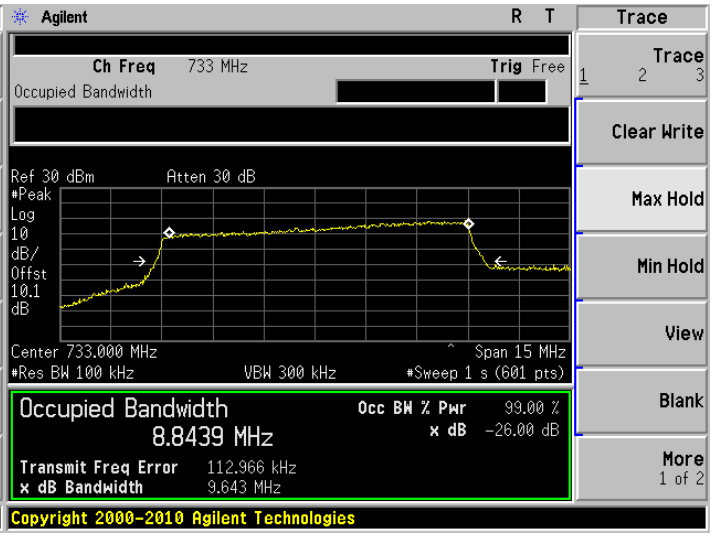


16QAM (10 MHz), (Low Channel)

Input

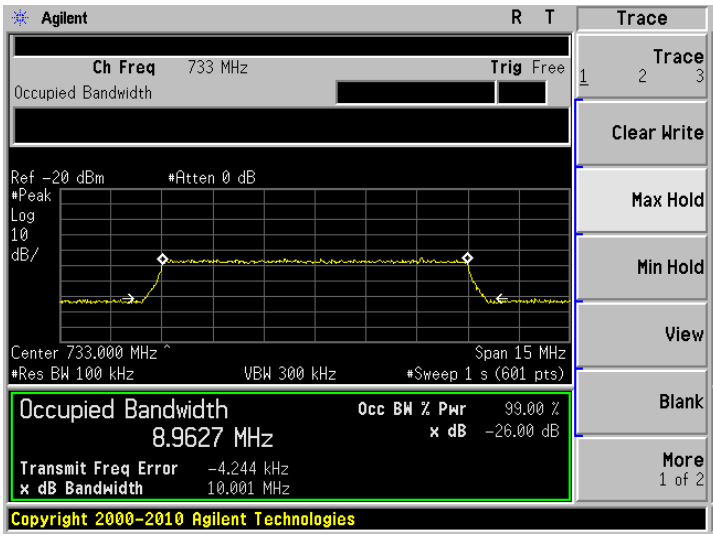


Output

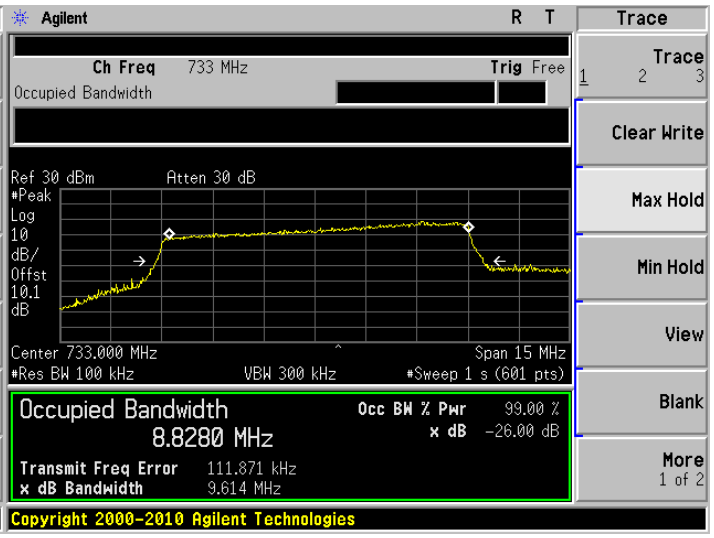


64QAM (10 MHz), (Low Channel)

Input



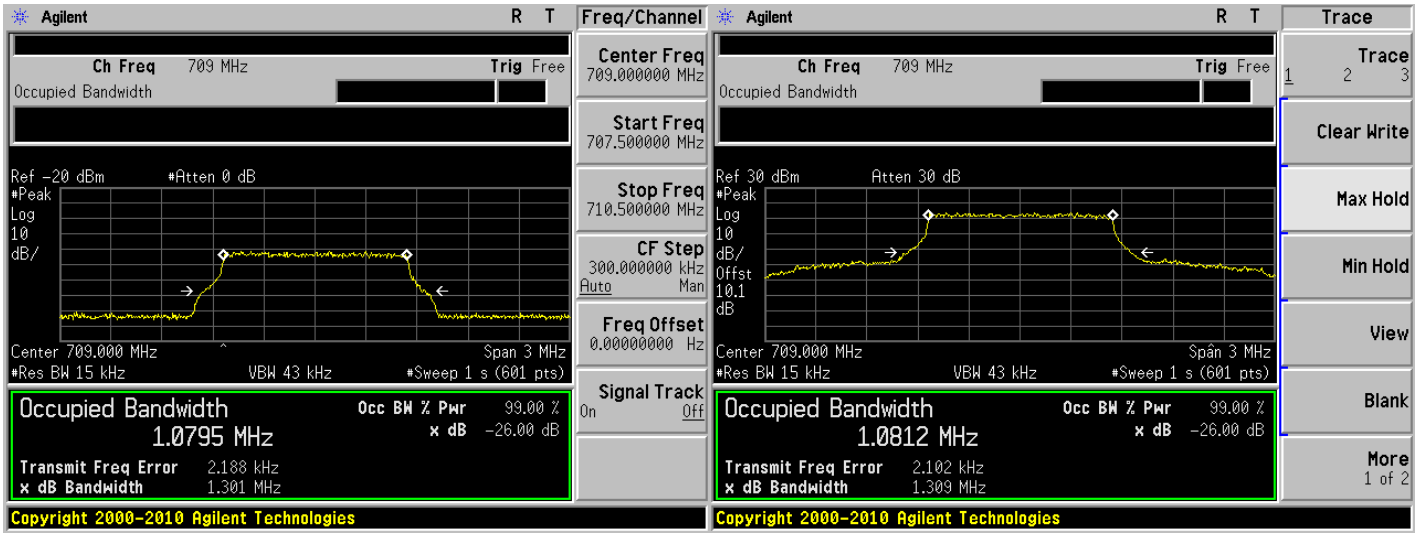
Output



Lower LTE Band; UL: 698-716 MHz

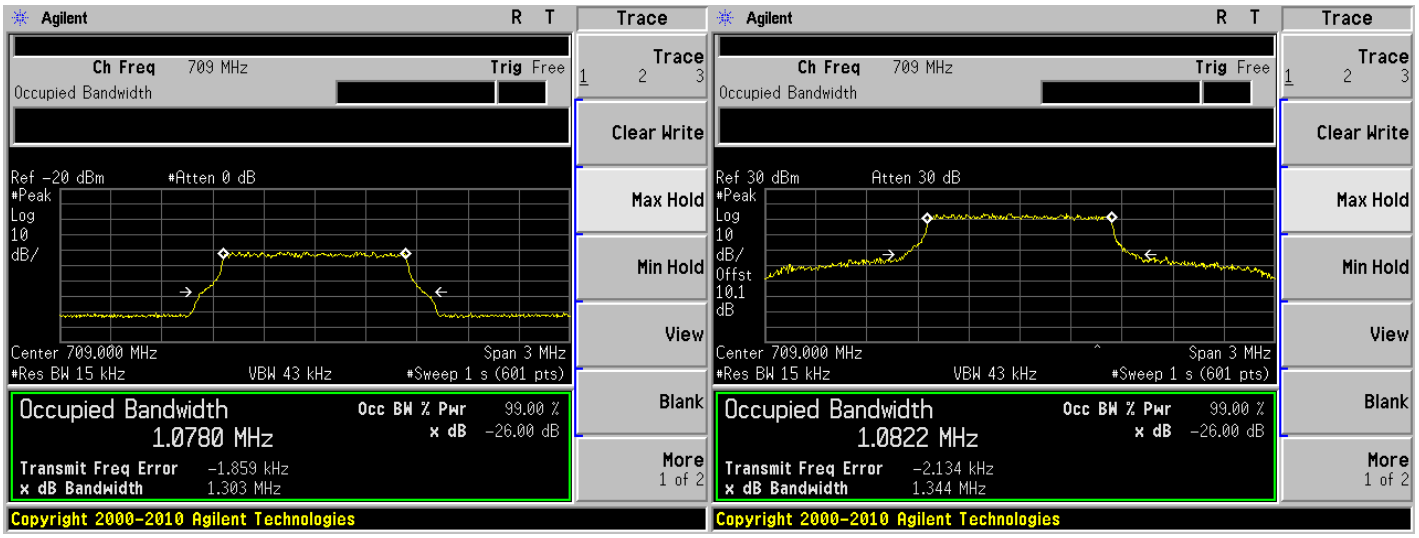
QPSK (1.4 MHz), (Middle Channel)

Input Output



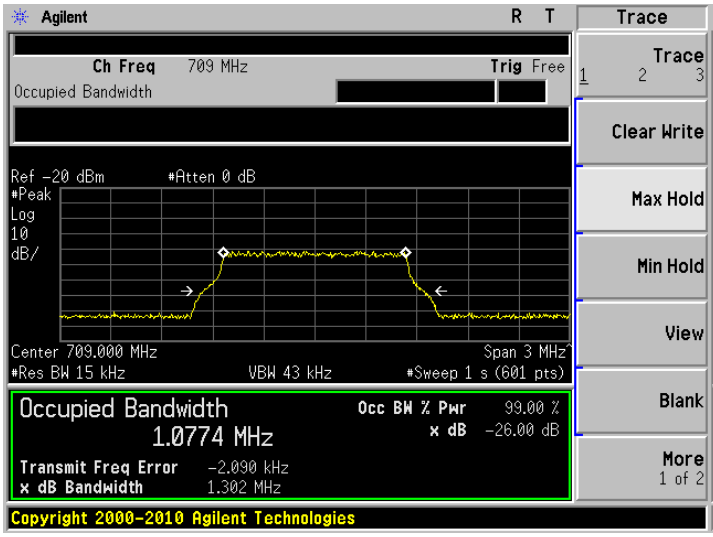
16QAM (1.4 MHz), (Middle Channel)

Input Output

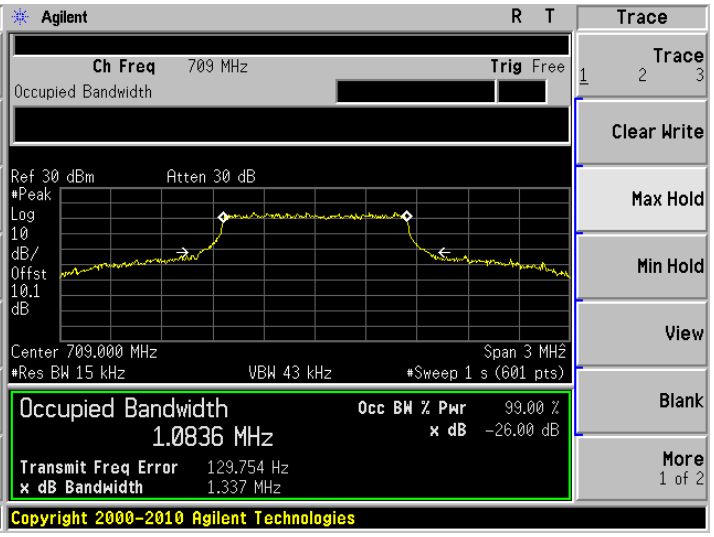


64QAM (1.4 MHz), (Middle Channel)

Input

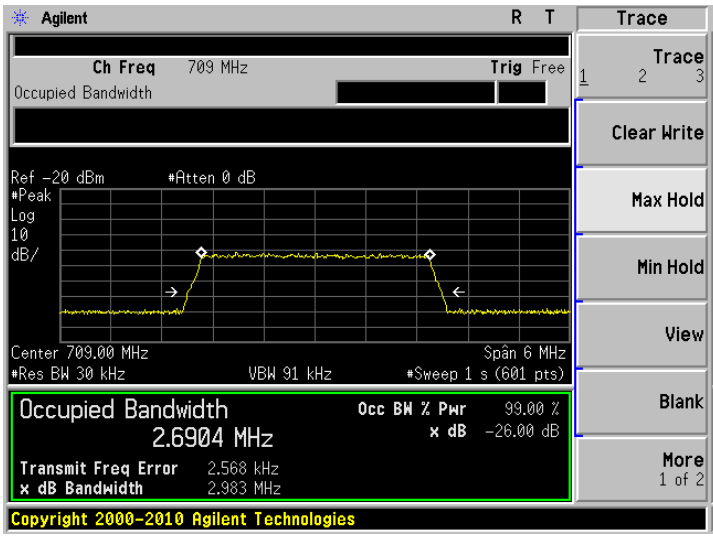


Output

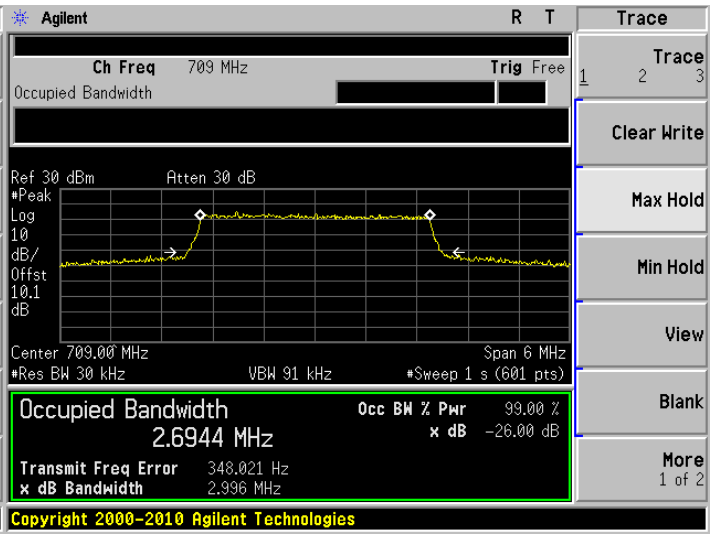


QPSK (3 MHz), (Middle Channel)

Input

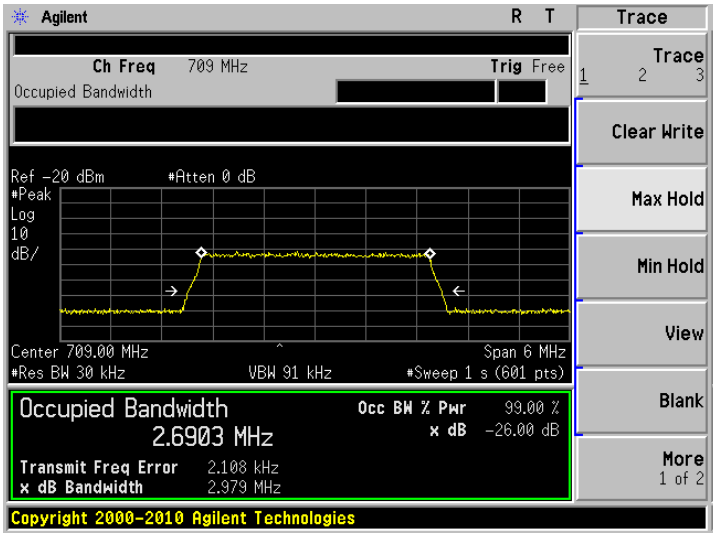


Output

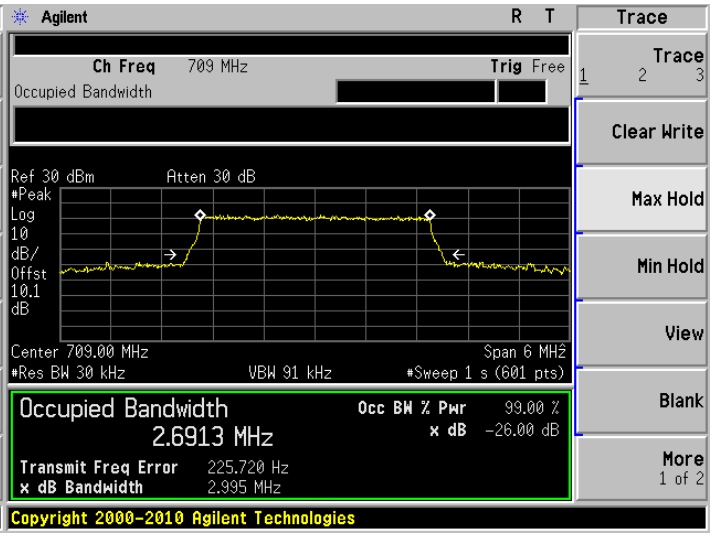


16QAM (3 MHz), (Middle Channel)

Input

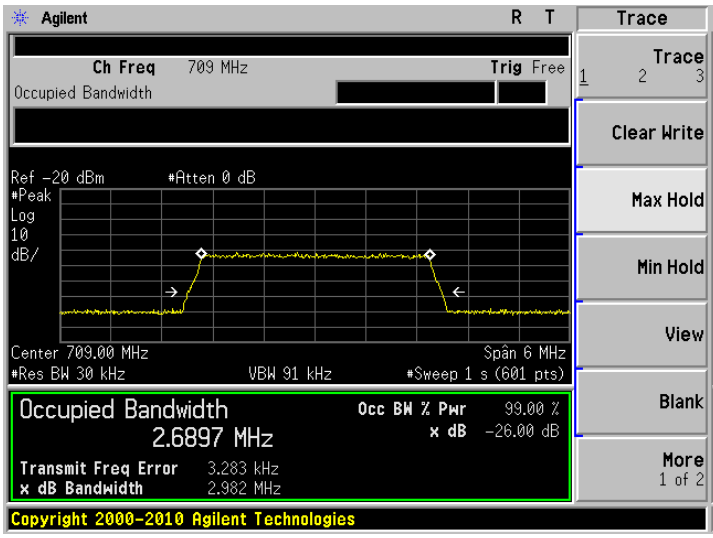


Output

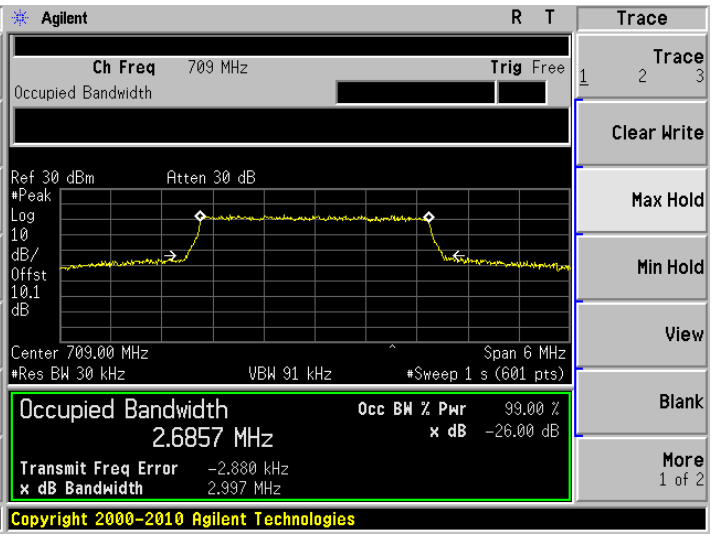


64QAM (3 MHz), (Middle Channel)

Input

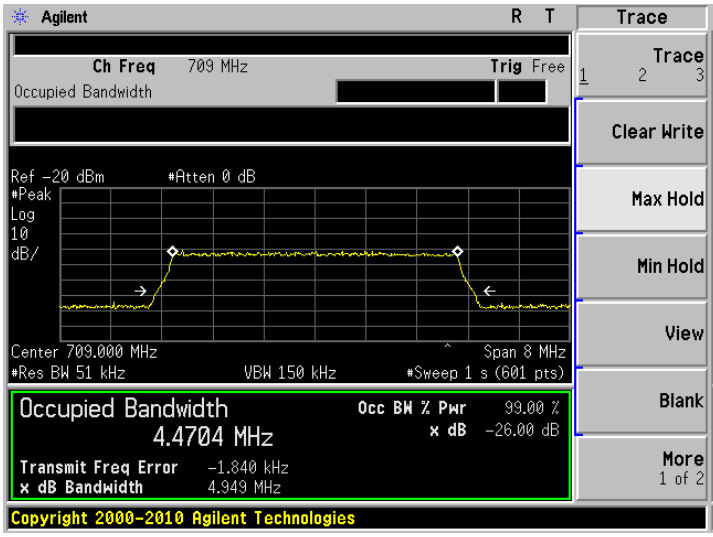


Output

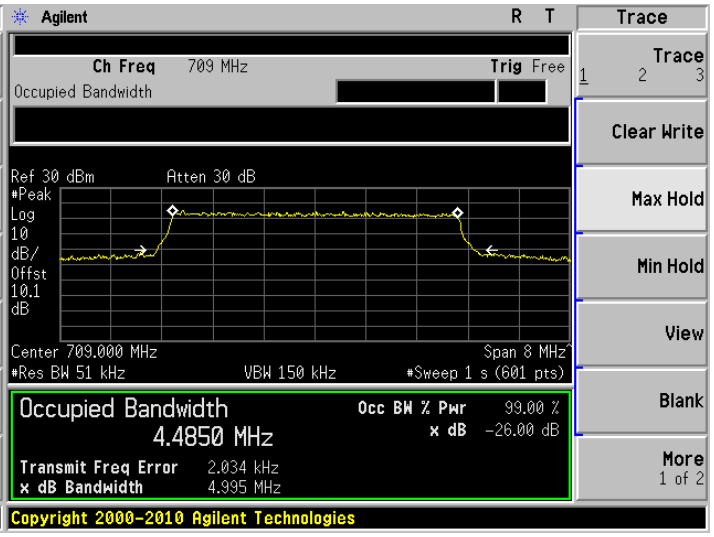


QPSK (5 MHz), (Middle Channel)

Input

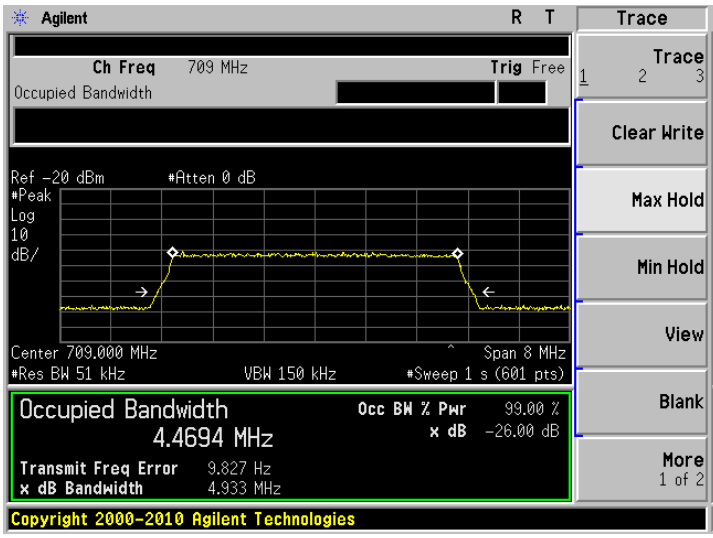


Output

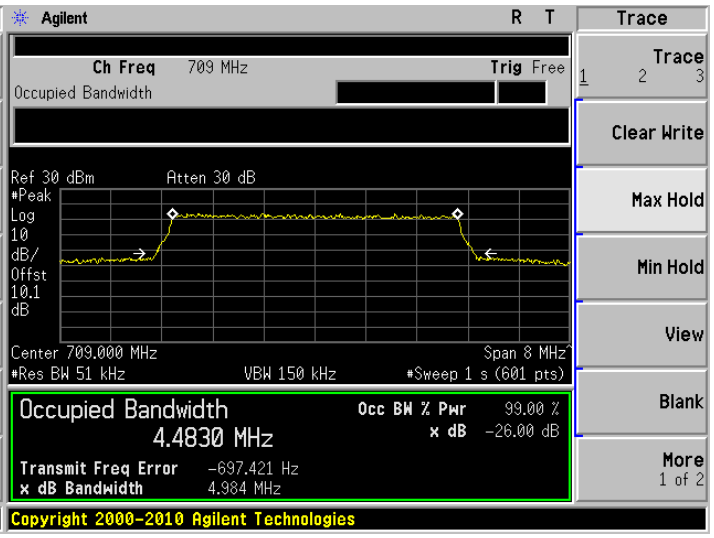


16QAM (5 MHz), (Middle Channel)

Input

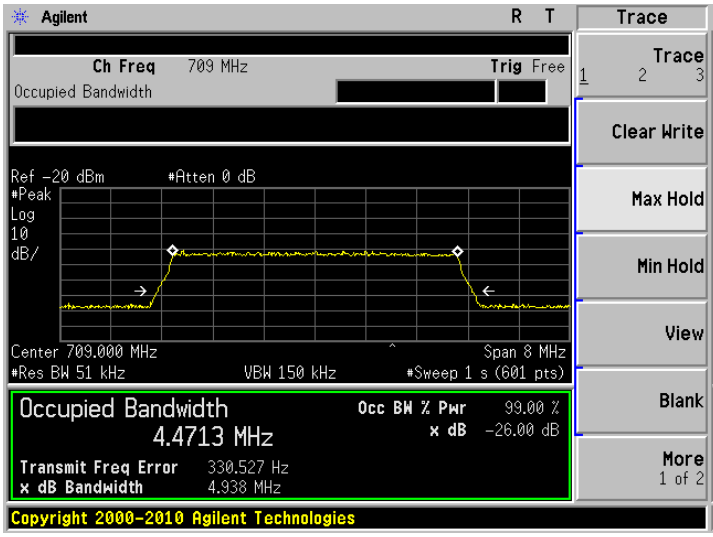


Output

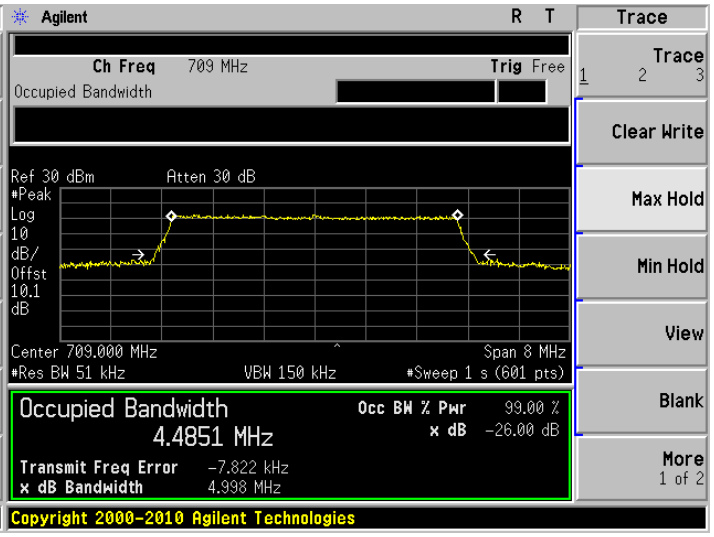


64QAM (5 MHz), (Middle Channel)

Input

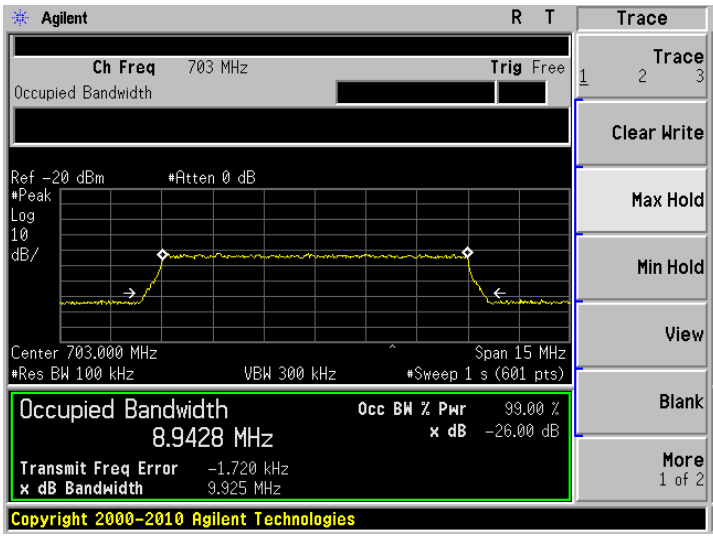


Output

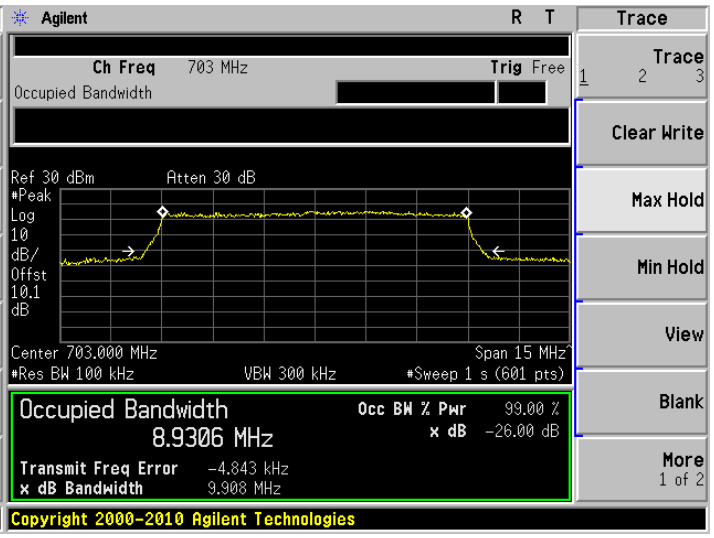


QPSK (10 MHz), (Low Channel)

Input

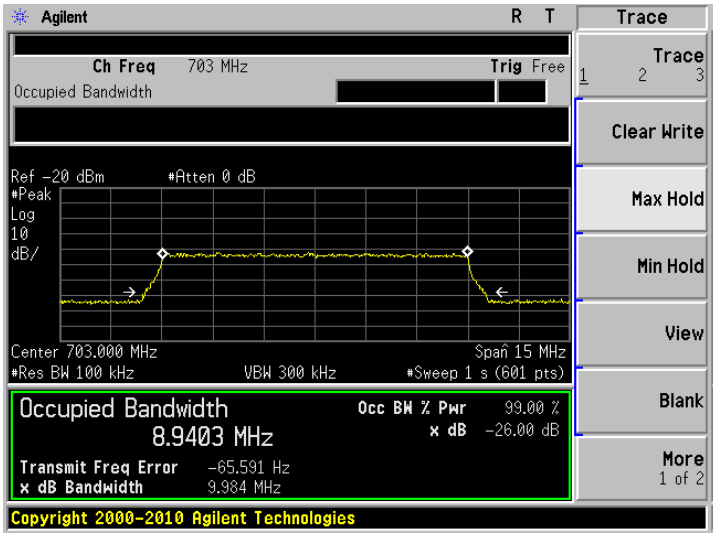


Output

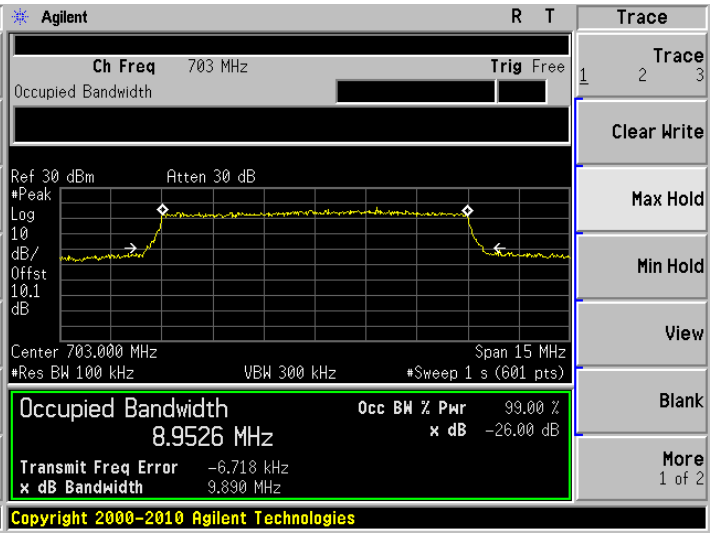


16QAM (10 MHz), (Low Channel)

Input

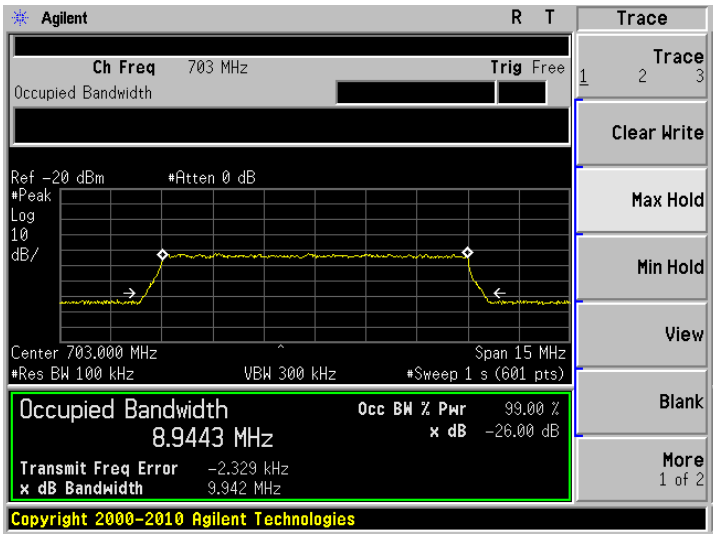


Output

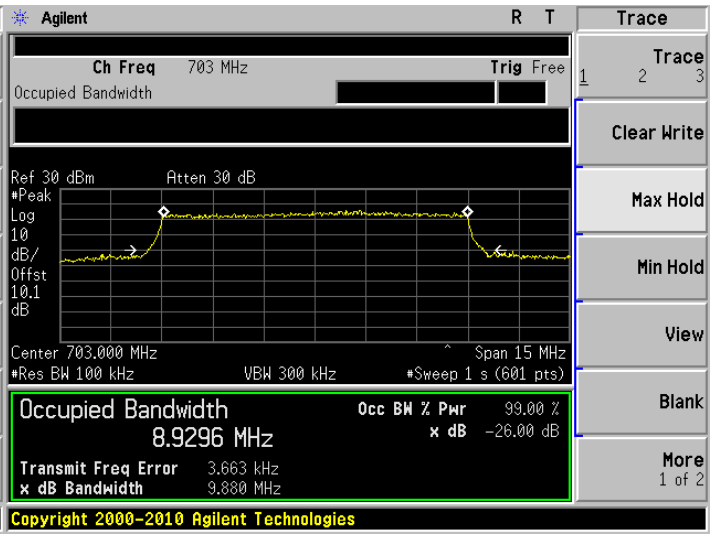


64QAM (10 MHz), (Low Channel)

Input



Output



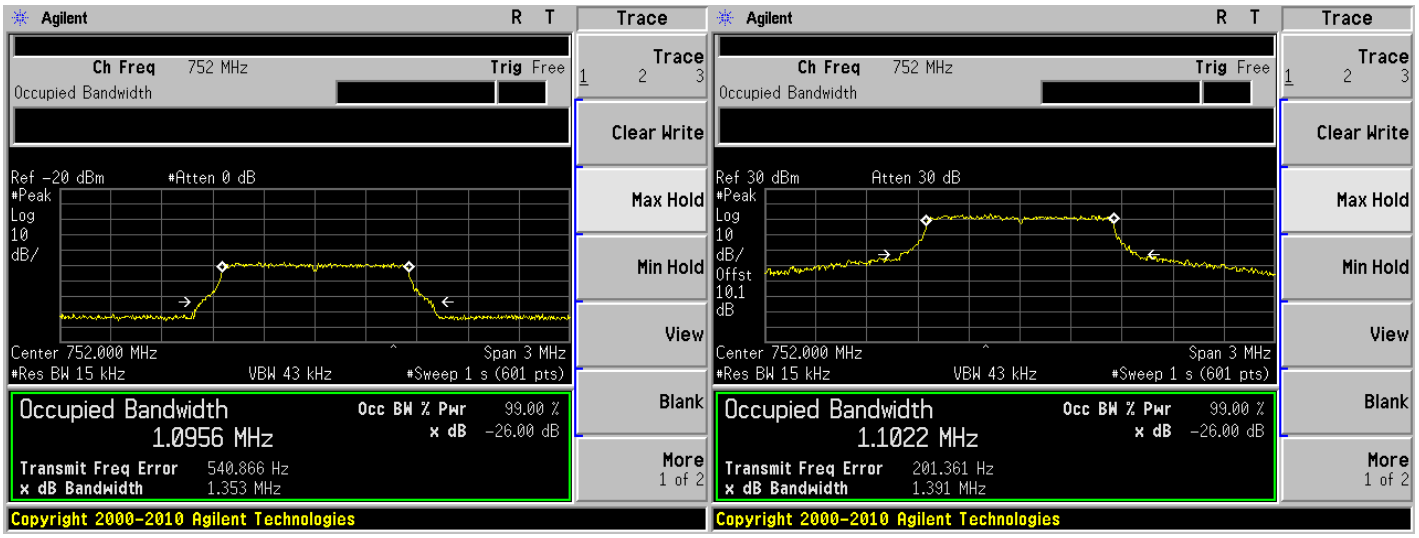
Upper LTE Band; DL: 746-757 MHz

QPSK (1.4 MHz), (Middle Channel)

Input Output

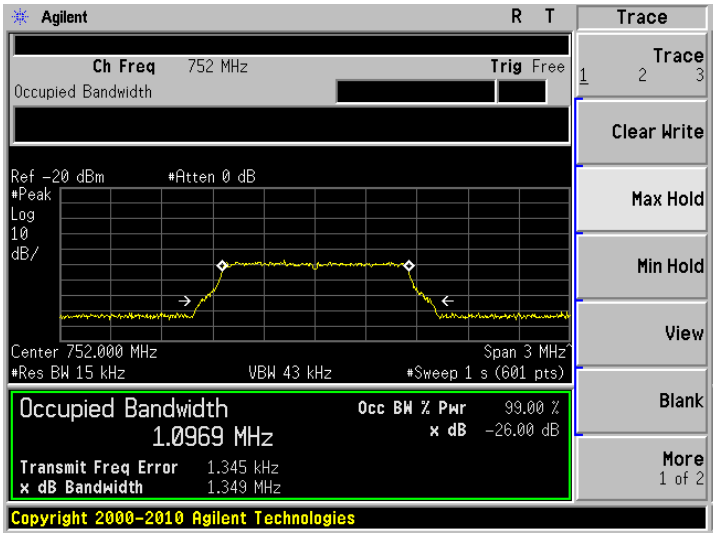
16QAM (1.4 MHz), (Middle Channel)

Input Output

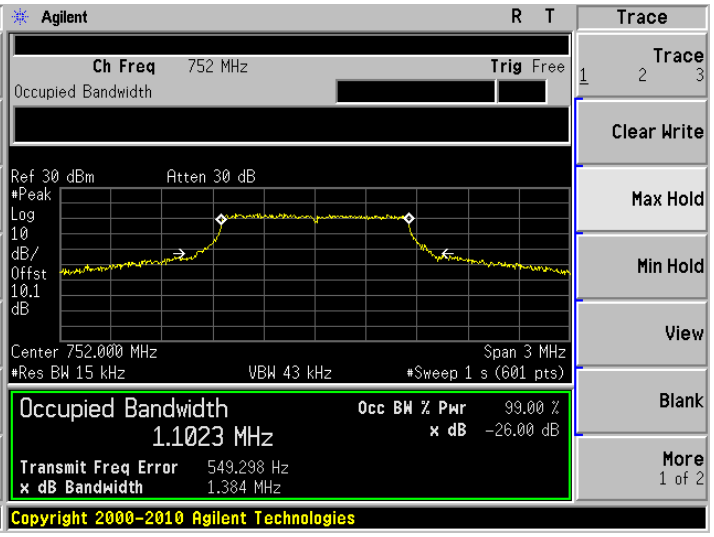


64QAM (1.4 MHz), (Middle Channel)

Input

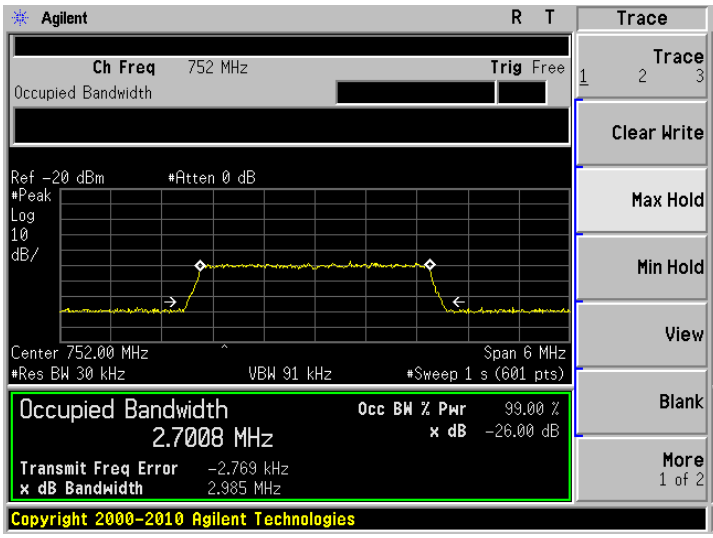


Output

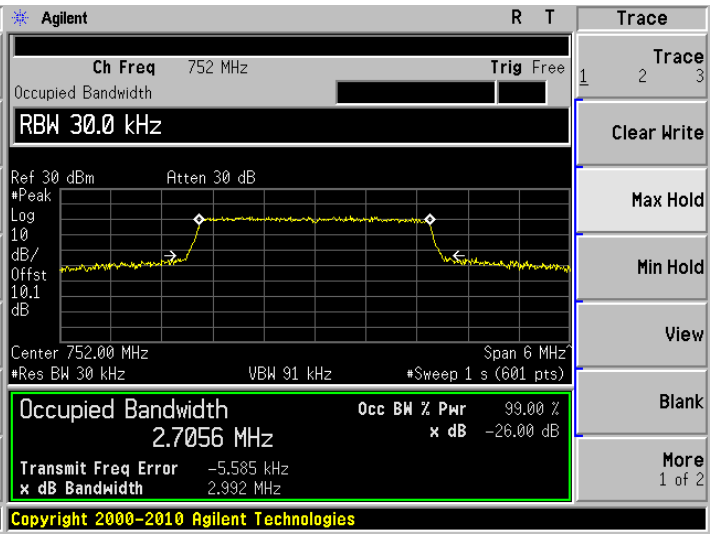


QPSK (3 MHz), (Middle Channel)

Input

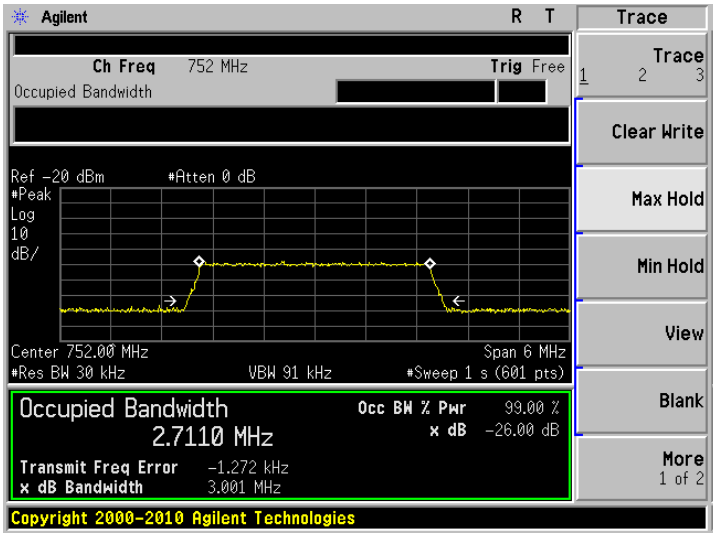


Output

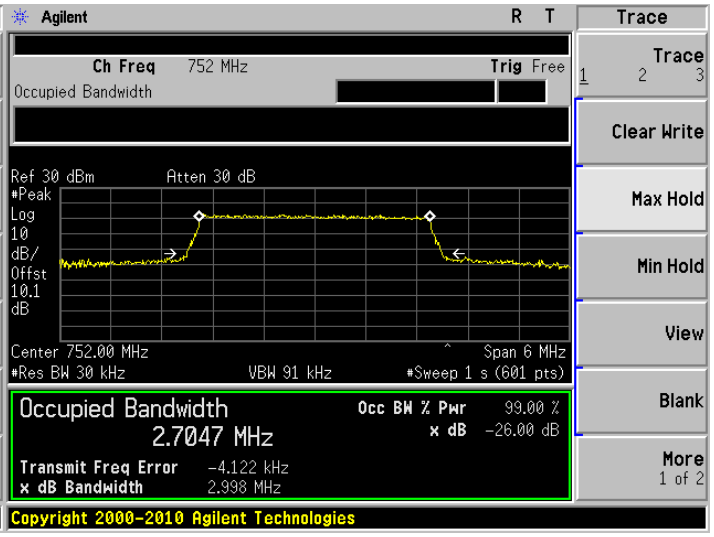


16QAM (3 MHz), (Middle Channel)

Input

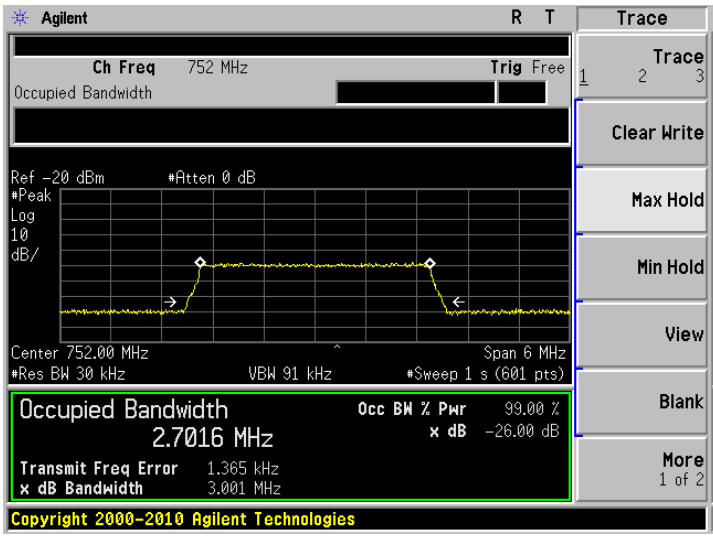


Output

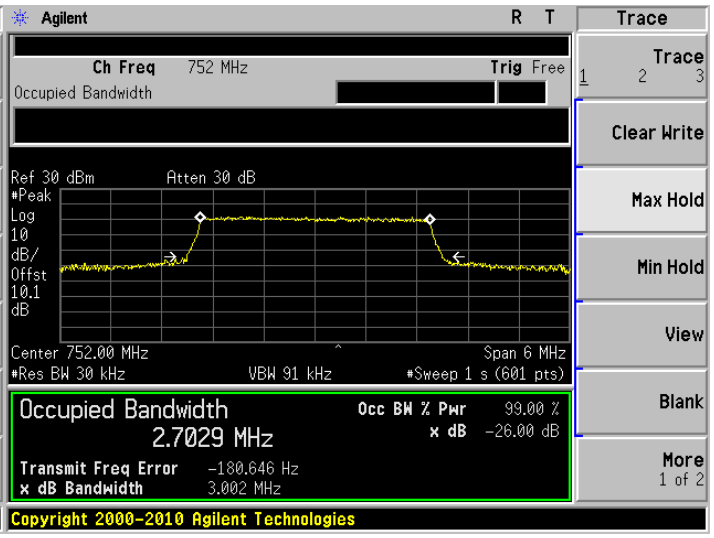


64QAM (3 MHz), (Middle Channel)

Input

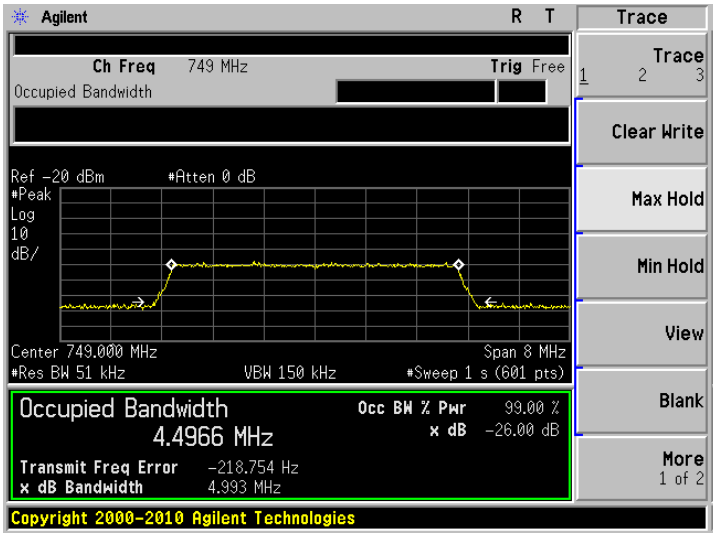


Output

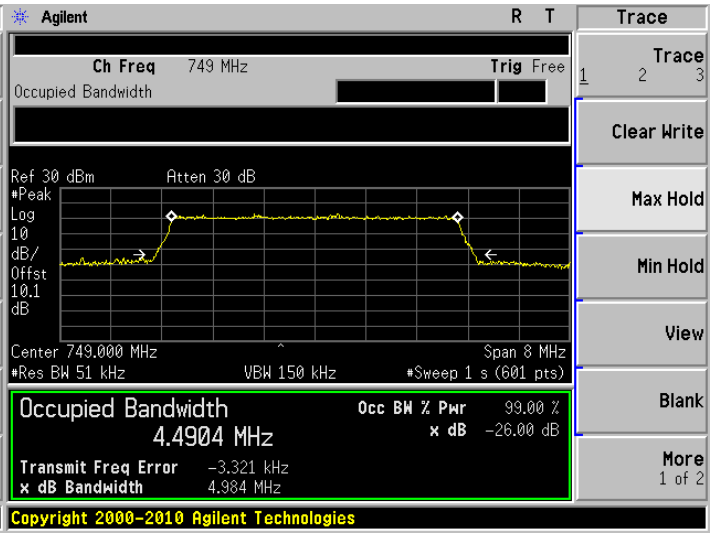


QPSK (5 MHz), (Low Channel)

Input

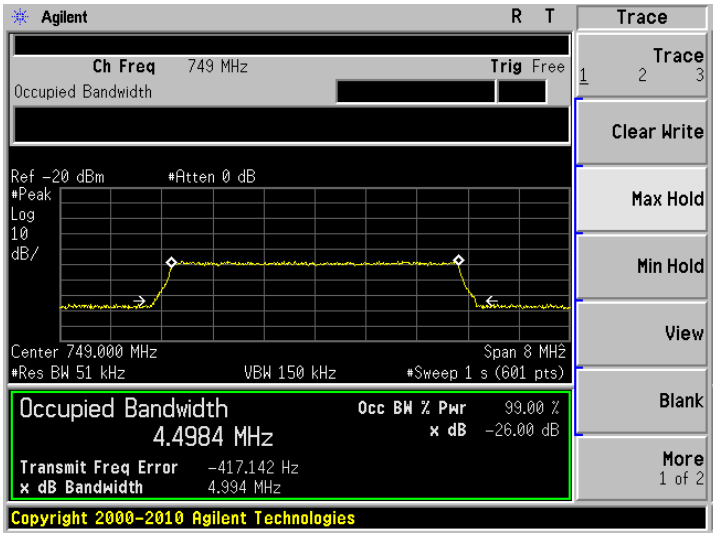


Output

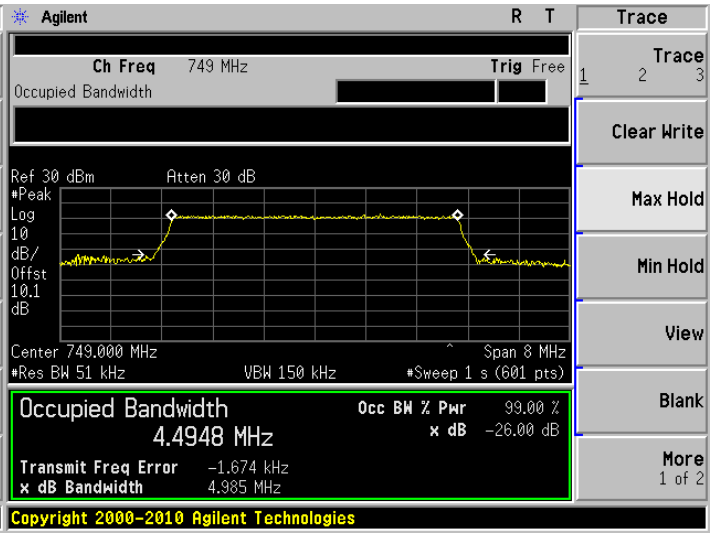


16QAM (5 MHz), (Low Channel)

Input

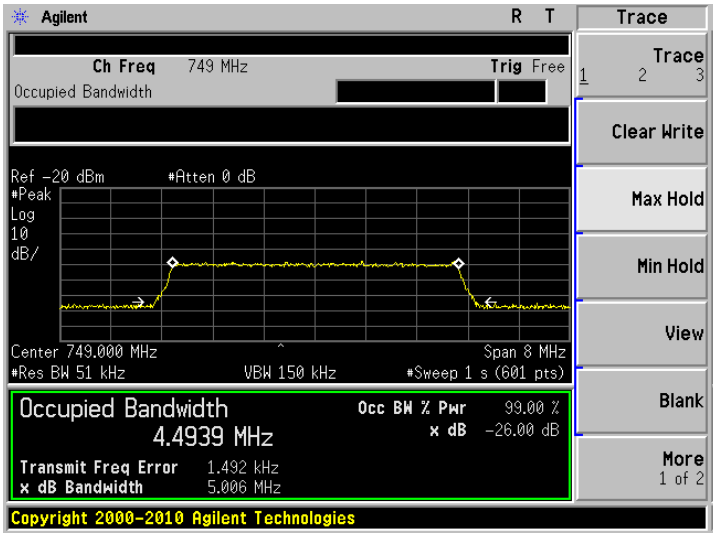


Output

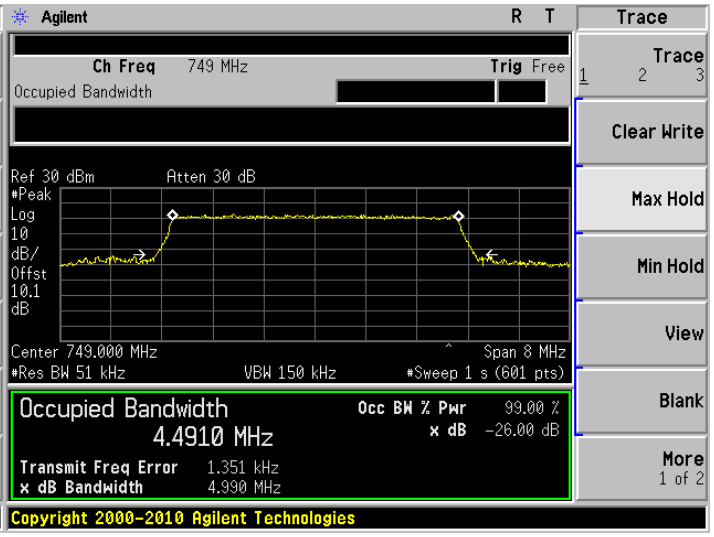


64QAM (5 MHz), (Low Channel)

Input

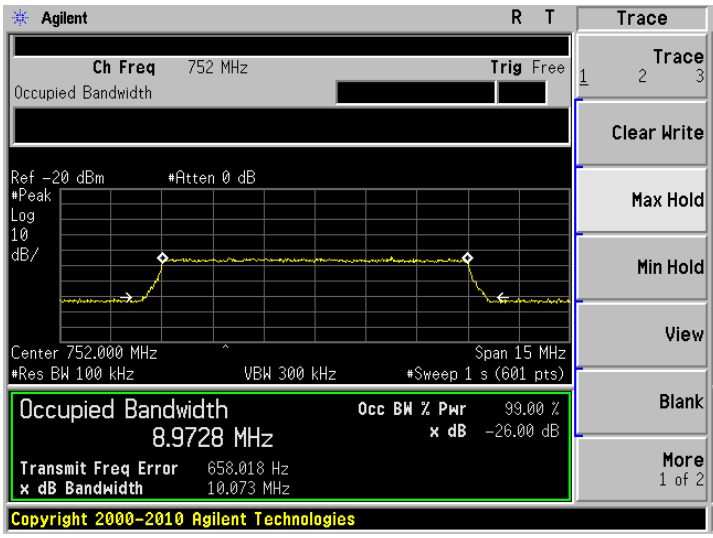


Output

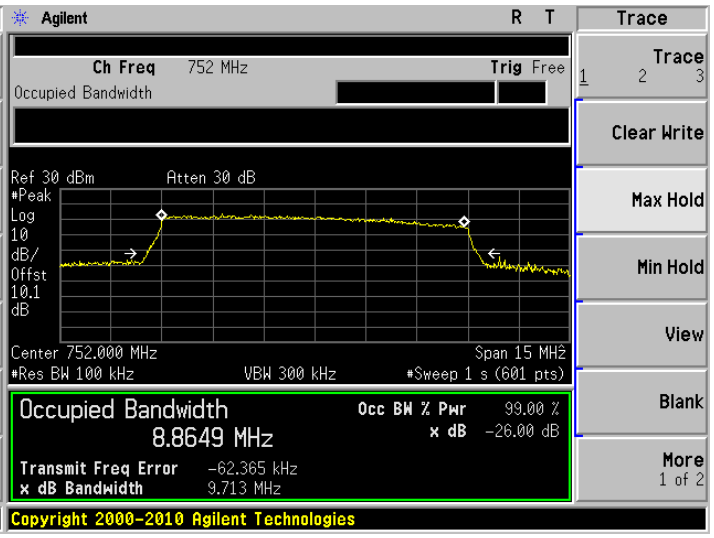


QPSK (10 MHz), (Middle Channel)

Input

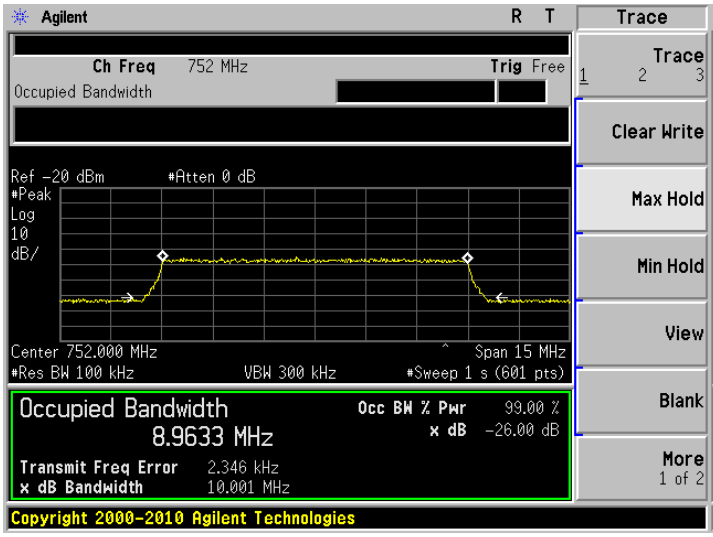


Output

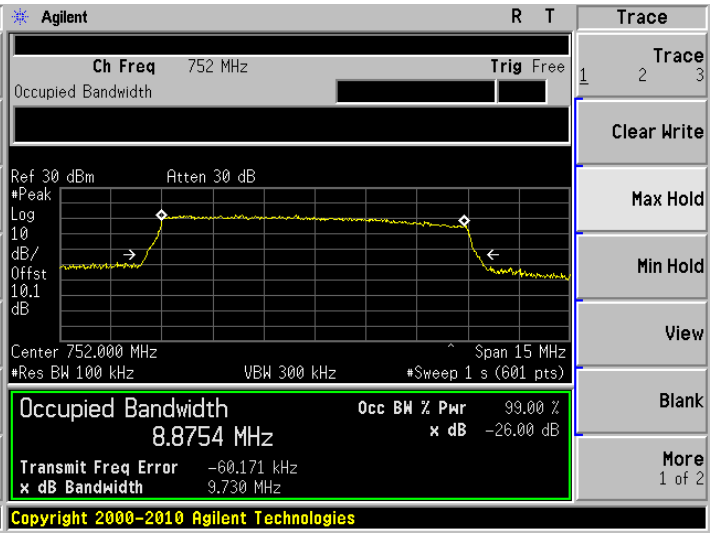


16QAM (10 MHz), (Middle Channel)

Input

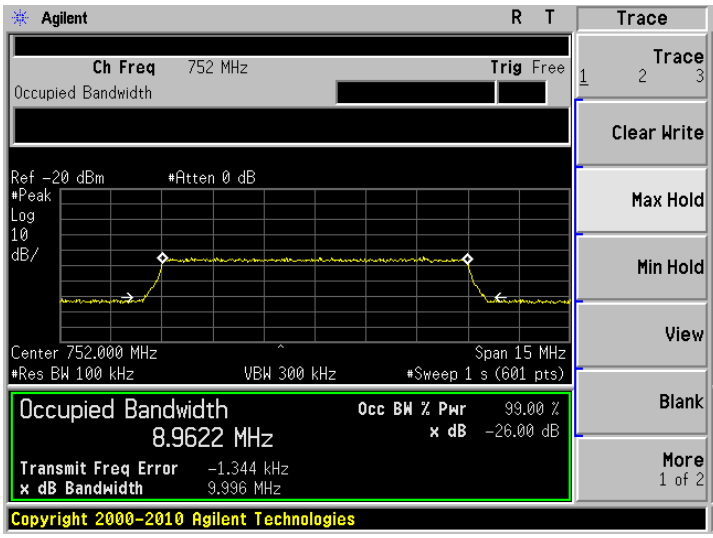


Output

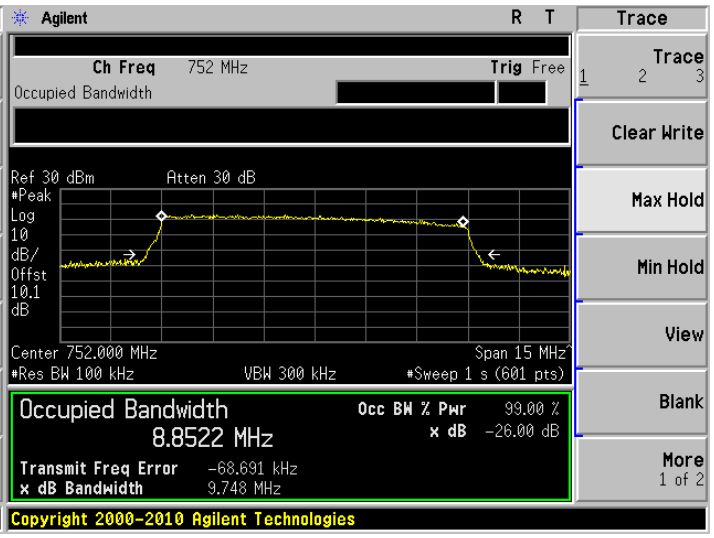


64QAM (10 MHz), (Middle Channel)

Input



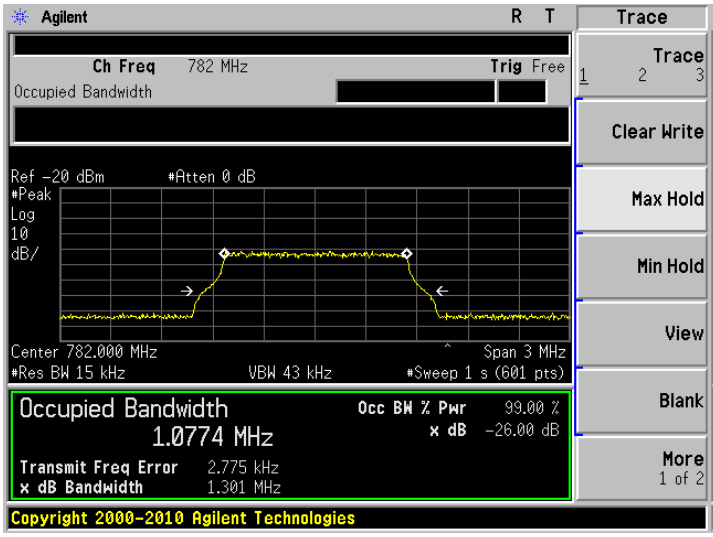
Output



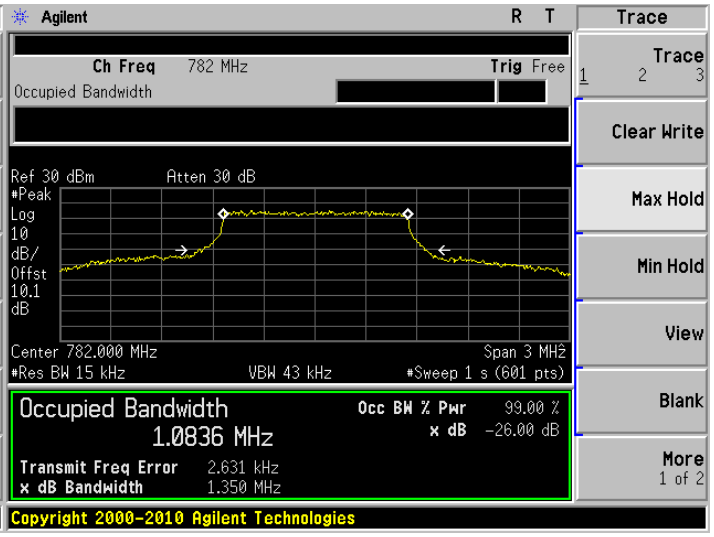
Upper LTE Band; UL: 776-787 MHz

QPSK (1.4 MHz), (Middle Channel)

Input

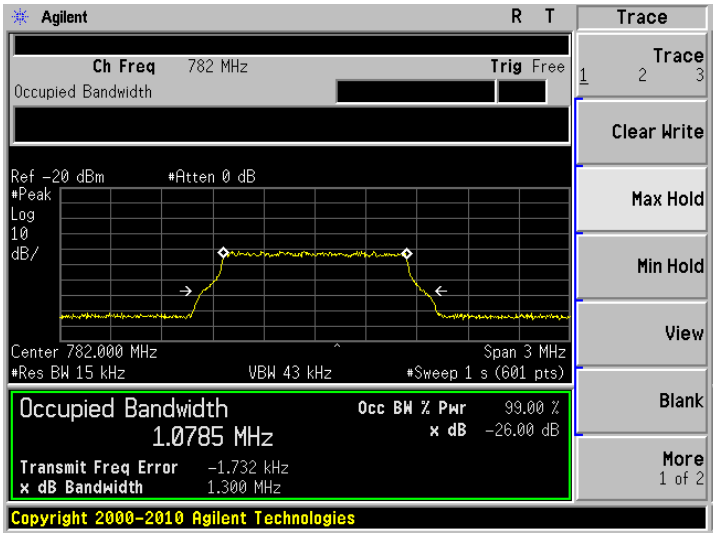


Output

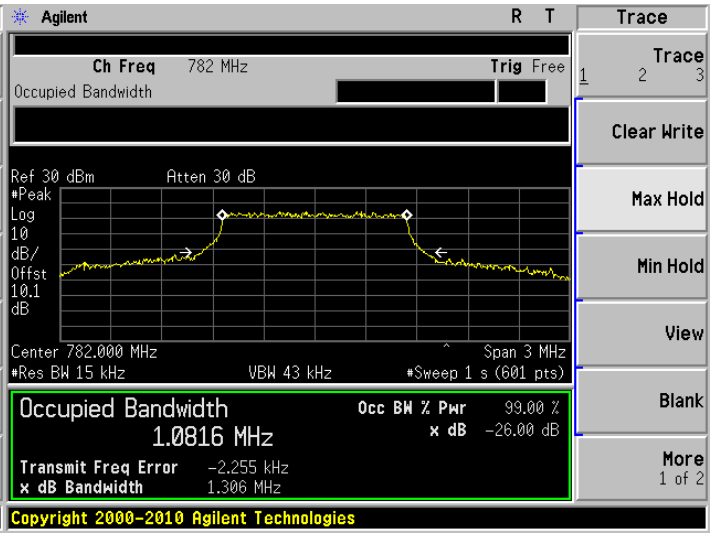


16QAM (1.4 MHz), (Middle Channel)

Input

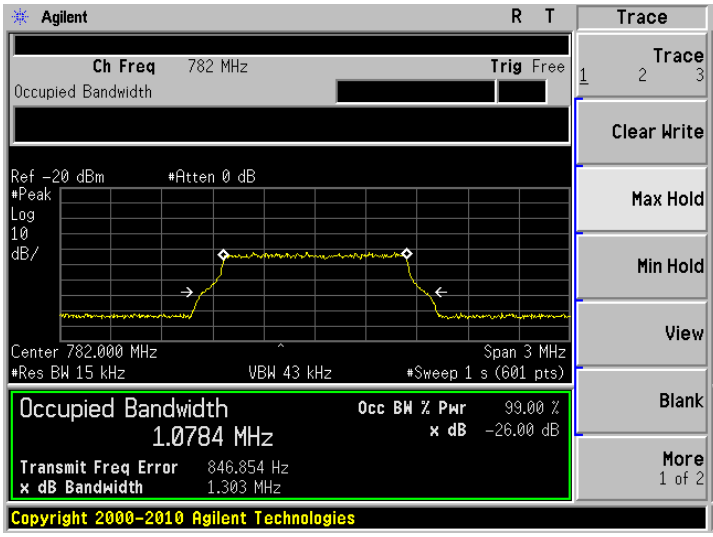


Output

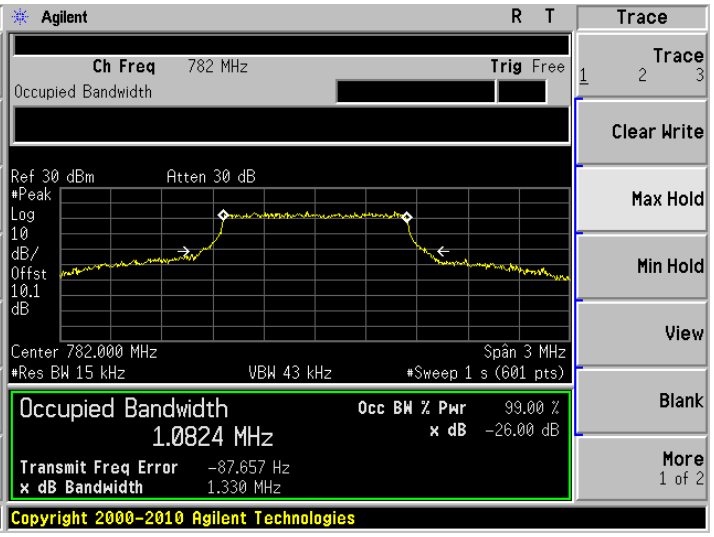


64QAM (1.4 MHz), (Middle Channel)

Input

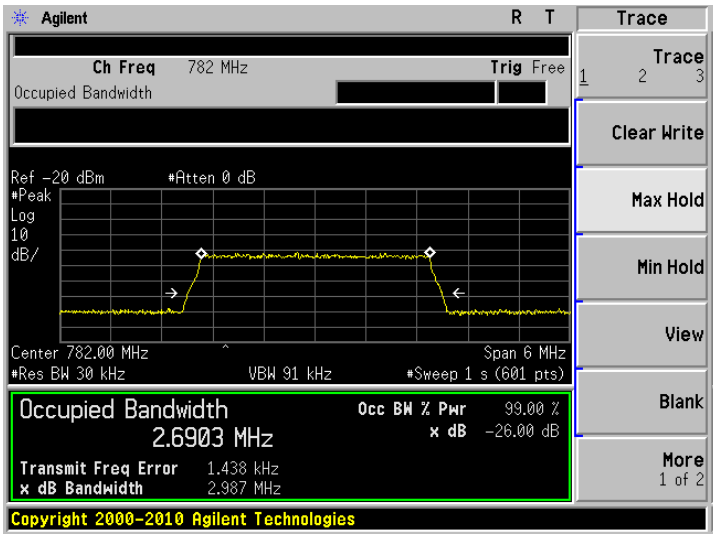


Output

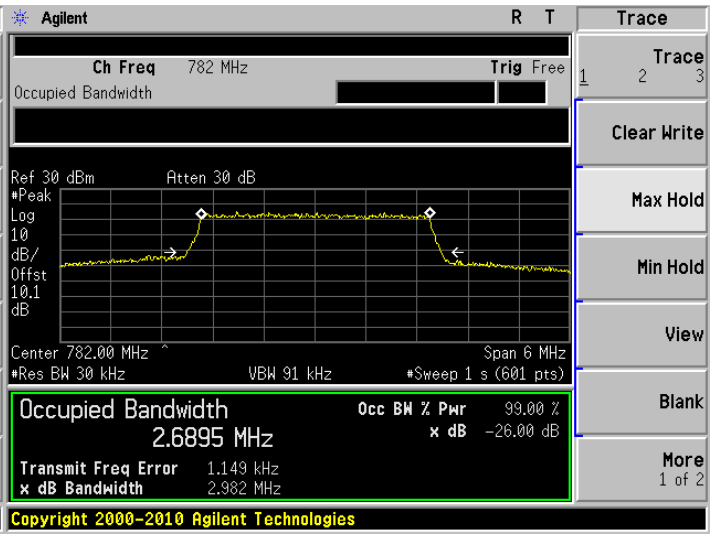


QPSK (3 MHz), (Middle Channel)

Input

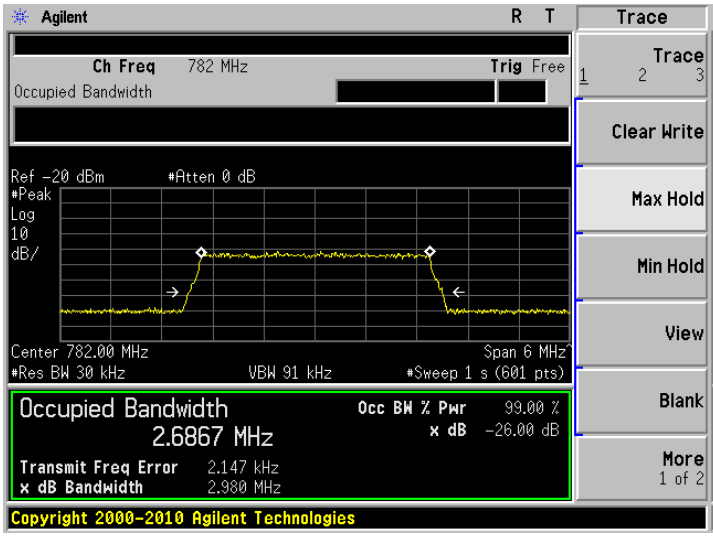


Output

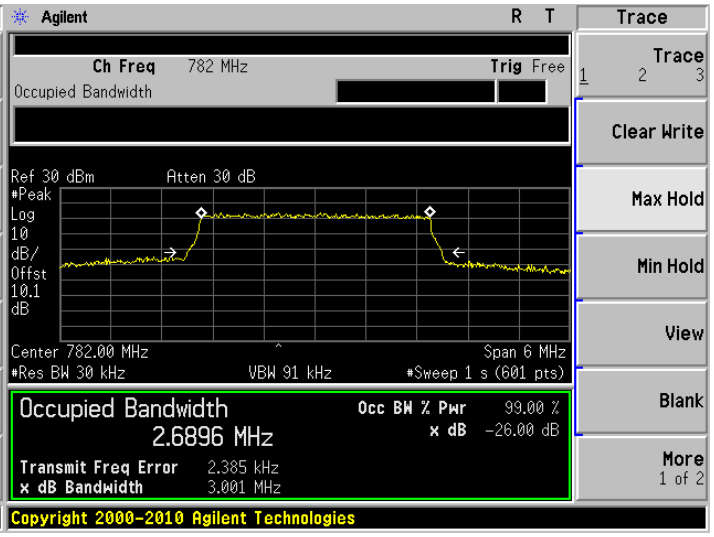


16QAM (3 MHz), (Middle Channel)

Input

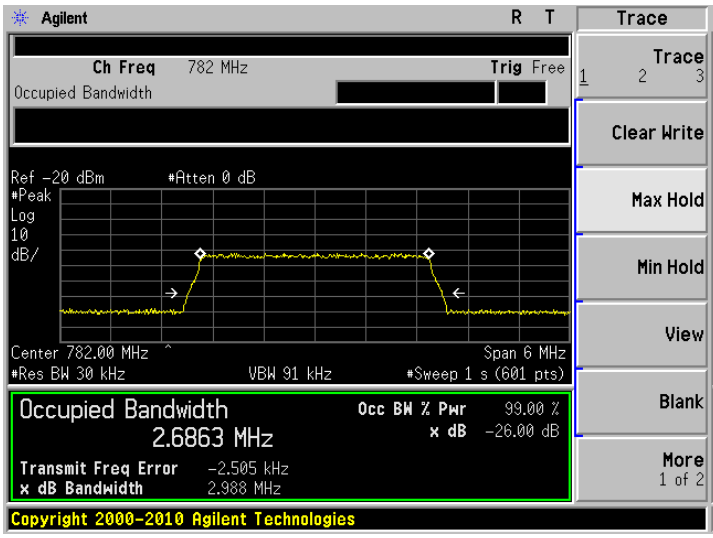


Output

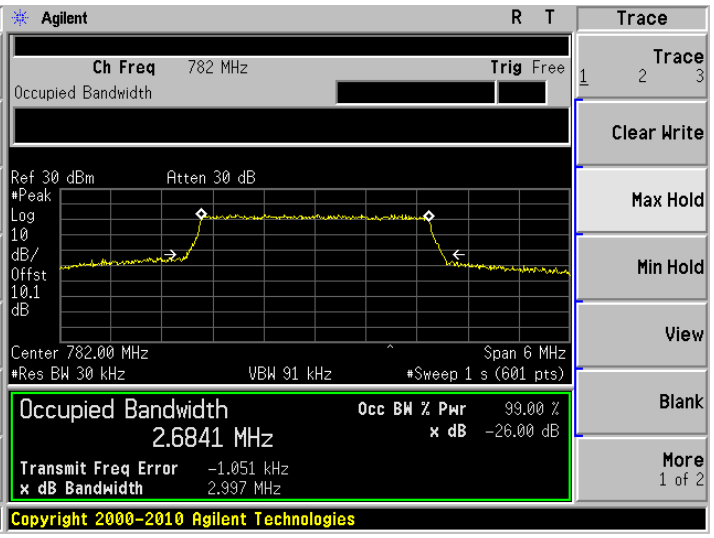


64QAM (3 MHz), (Middle Channel)

Input

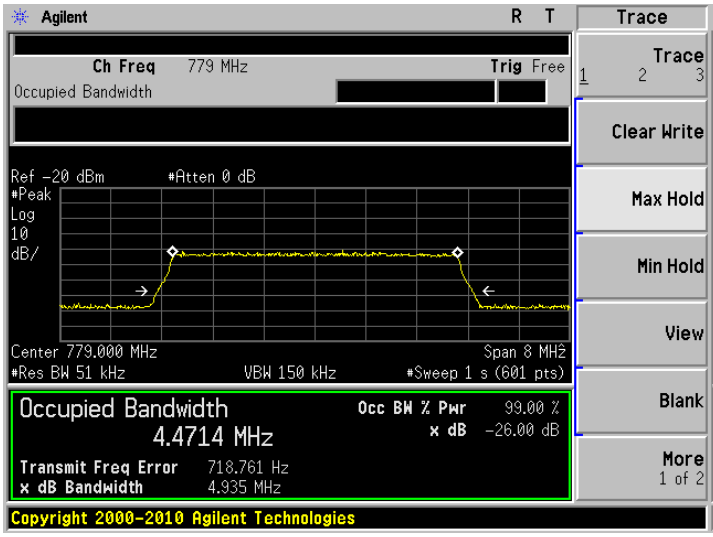


Output

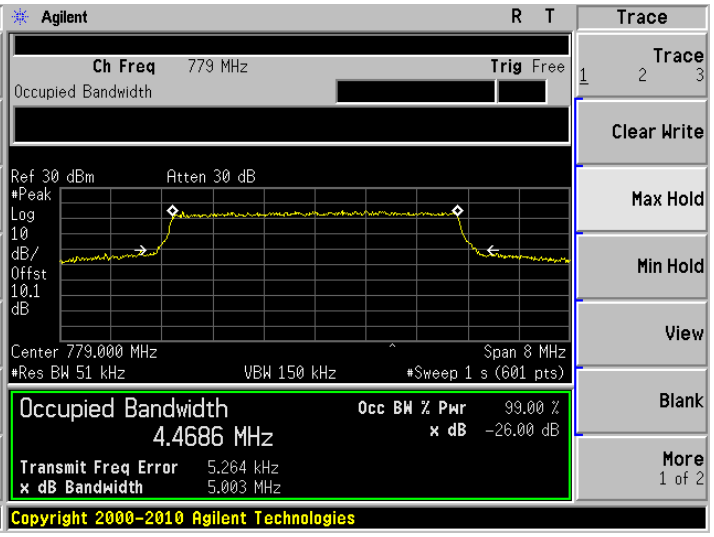


QPSK (5 MHz), (Low Channel)

Input

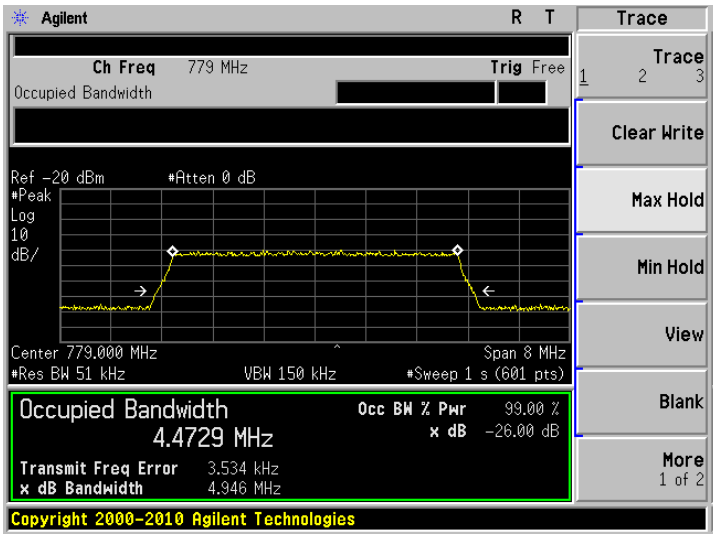


Output

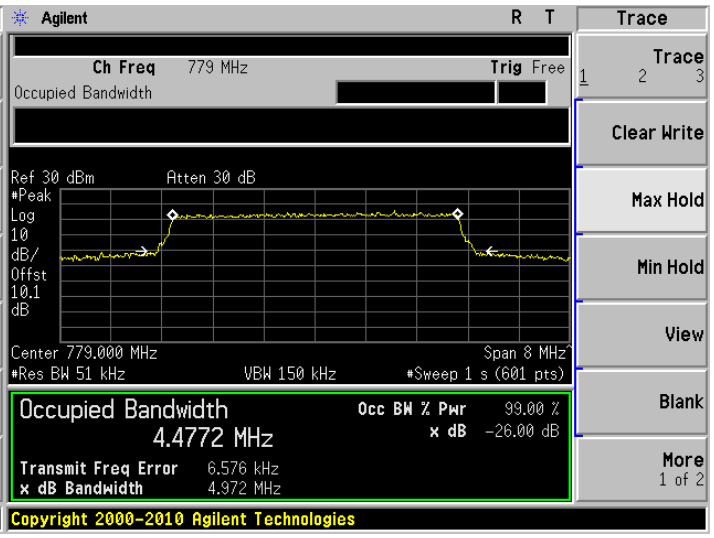


16QAM (5 MHz), (Low Channel)

Input

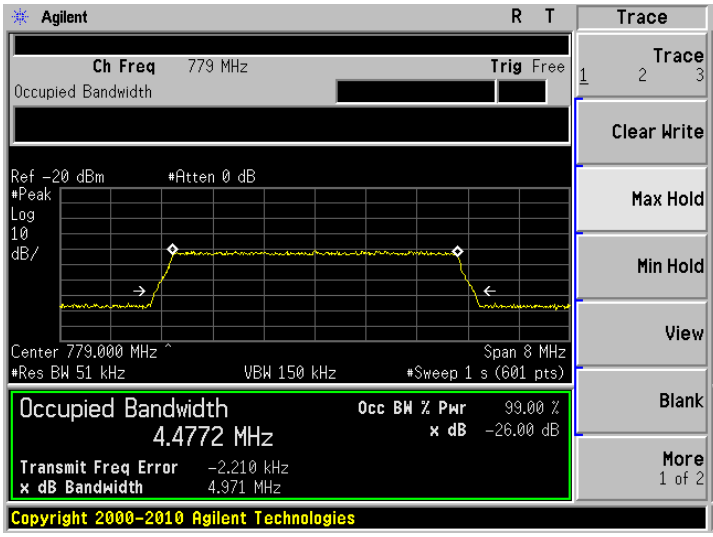


Output

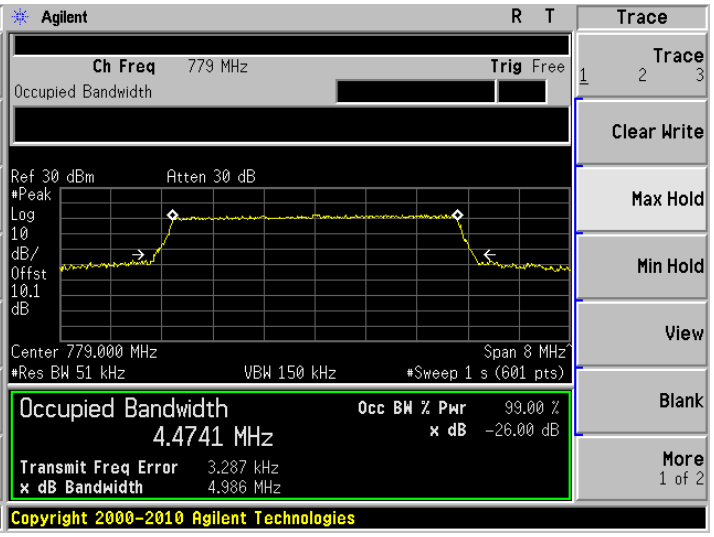


64QAM (5 MHz), (Low Channel)

Input

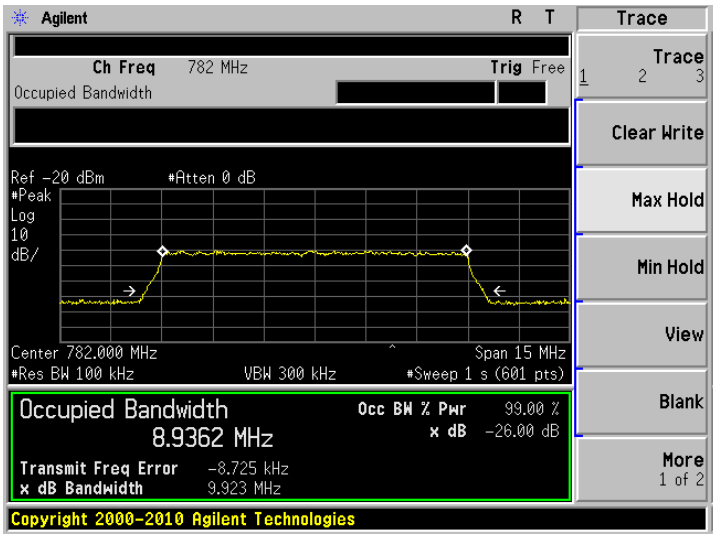


Output

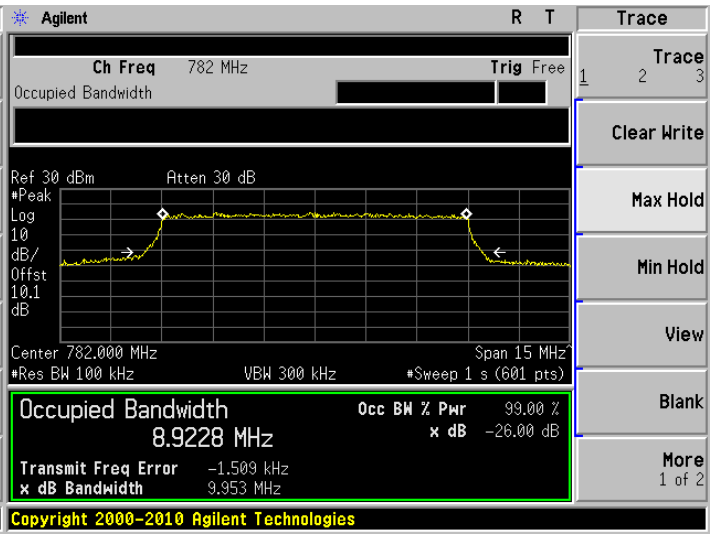


QPSK (10 MHz), (Middle Channel)

Input

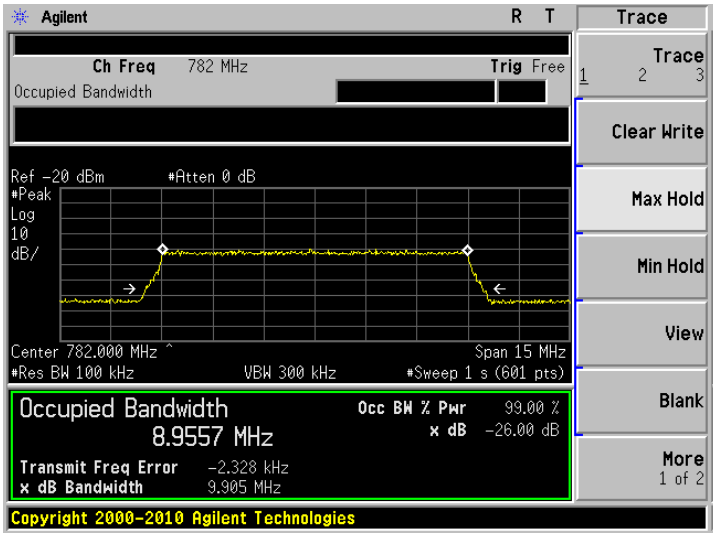


Output

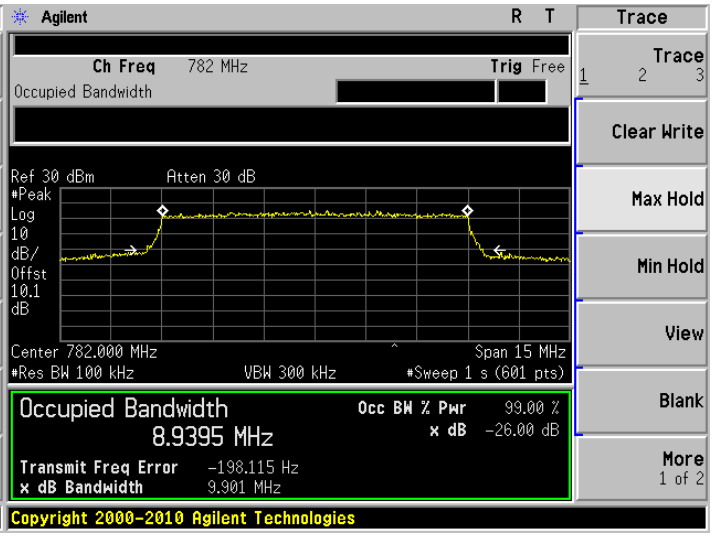


16QAM (10 MHz), (Middle Channel)

Input

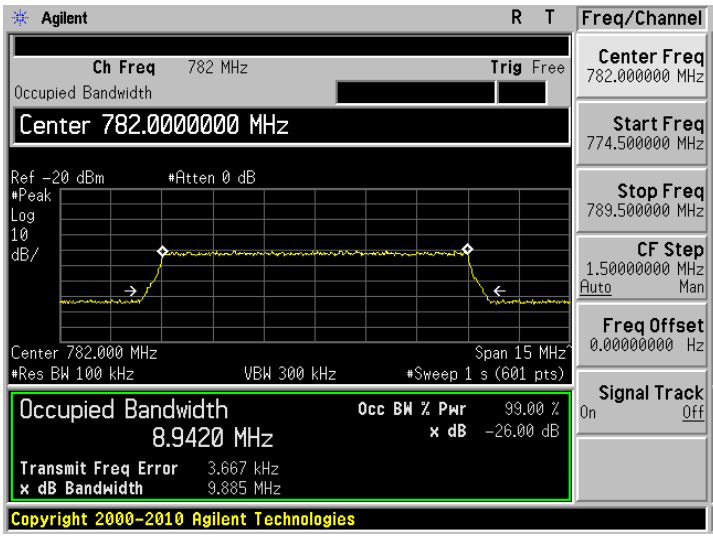


Output

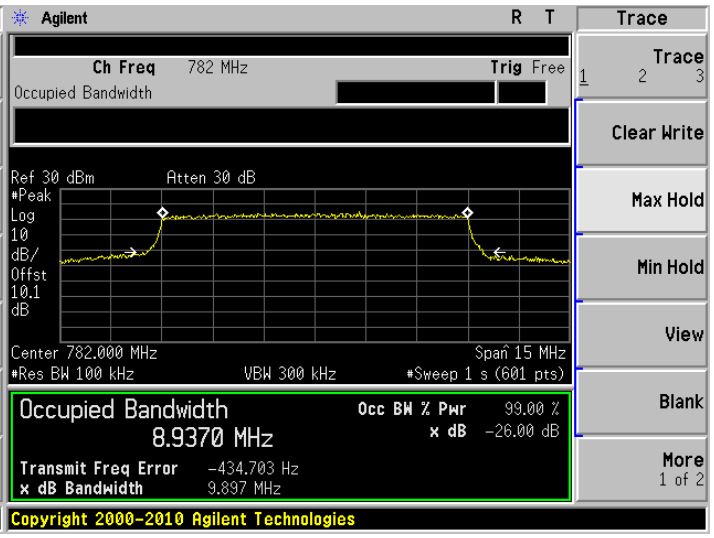


64QAM (10 MHz), (Middle Channel)

Input



Output



AWS Band, Uplink:

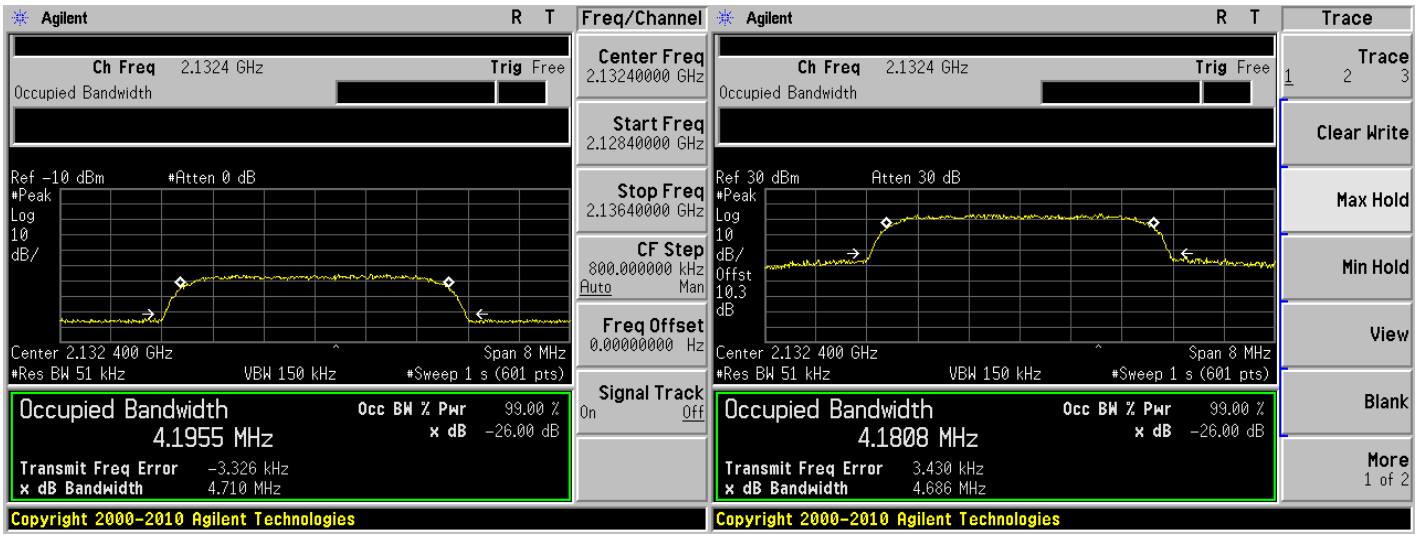
WCDMA/HSPA (Middle Channel)

Input Output

AWS Band, Downlink:

WCDMA/HSPA (Middle Channel)

Input Output



6 FCC §2.1053, §22.917, §24.238 & §27.53 - Spurious Radiated Emissions

6.1 Applicable Standard

According to FCC §22.917, §24.238 and §27.53, 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.

6.2 Test Procedure

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

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

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

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

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

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09[1]
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10
Hewlett Packard	Pre amplifier	8447D	2944A06639	2011-06-09
Eaton	Horn antenna	96001	Mar-07	2011-10-03
A.H. Systems	Horn antenna	SAS-200/571	261	2012-01-18
Mini-Circuits	Pre Amplifier	ZVA-183-S	667400960	2011-05-08
HP	Signal Generator	8648C	3426A00417	2011-08-18

Note 1: Based on a two year calibration cycle.

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

6.4 Test Environmental Conditions

Temperature:	20-21 °C
Relative Humidity:	47-49 %
ATM Pressure:	101.4-101.6kPa

The testing was performed by Lionel Lara from 2012-04-09 to 2012-04-10 in 5 Meter Chamber 3.

6.5 Test Results

Cell 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. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
337.5	46.99	218	162	H	337.5	-60.1	0	0.6	-60.7	-13	-47.7
337.5	41.37	112	150	V	337.5	-65.72	0	0.6	-66.32	-13	-53.32
6578	45.08	253	235	H	6578	-46.5	11.83	2.32	-36.99	-13	-23.99
6578	51.12	218	162	V	6578	-40.46	11.79	2.32	-30.99	-13	-17.99

Downlink (Input frequency = 881.6 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
340.85	45.88	104	150	H	340.85	-61.21	0	0.6	-61.81	-13	-48.81
340.85	39.96	285	175	V	340.85	-67.13	0	0.6	-67.73	-13	-54.73
6579	44.82	68	207	H	6579	-46.76	11.83	2.32	-37.25	-13	-24.25
6579	50.8	43	156	V	6579	-40.78	11.79	2.32	-31.31	-13	-18.31

PCS Band:

Uplink (Input frequency = 1880 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
337.2	46.78	220	161	H	337.2	-60.31	0	0.6	-60.91	-13	-47.91
337.2	41.63	112	148	V	337.2	-65.46	0	0.6	-66.06	-13	-53.06
6577	46.32	240	233	H	6577	-45.26	11.83	2.32	-35.75	-13	-22.75
6577	51.36	220	188	V	6577	-40.22	11.79	2.32	-30.75	-13	-17.75

Downlink (Input frequency = 1960 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
340.69	45.72	105	150	H	340.69	-61.37	0	0.6	-61.97	-13	-48.97
340.69	39.65	286	174	V	340.69	-67.44	0	0.6	-68.04	-13	-55.04
6577	44.75	81	217	H	6577	-46.83	11.83	2.32	-37.32	-13	-24.32
6577	50.35	45	150	V	6577	-41.23	11.79	2.32	-31.76	-13	-18.76

Lower LTE Band:

Uplink (Input frequency = 699 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
336.4	46.23	221	161	H	336.4	-60.86	0	0.6	-61.46	-13	-48.46
336.4	40.99	114	151	V	336.4	-66.1	0	0.6	-66.7	-13	-53.7
6577	44.89	253	229	H	6577	-46.69	11.83	2.32	-37.18	-13	-24.18
6577	50.5	211	167	V	6577	-41.08	11.79	2.32	-31.61	-13	-18.61

Downlink (Input frequency = 745 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
340.1	45.79	104	150	H	340.1	-61.3	0	0.6	-61.9	-13	-48.9
340.1	39.52	285	174	V	340.1	-67.57	0	0.6	-68.17	-13	-55.17
6578	44.62	82	226	H	6578	-46.96	11.83	2.32	-37.45	-13	-24.45
6578	50.64	49	150	V	6578	-40.94	11.79	2.32	-31.47	-13	-18.47

Upper LTE Band:

Uplink (Input frequency = 782 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
338.8	46.28	218	159	H	338.8	-60.81	0	0.6	-61.41	-13	-48.41
338.8	40.87	110	154	V	338.8	-66.22	0	0.6	-66.82	-13	-53.82
6578	45.05	253	230	H	6578	-46.53	11.83	2.32	-37.02	-13	-24.02
6578	51.57	218	168	V	6578	-40.01	11.79	2.32	-30.54	-13	-17.54

Downlink (Input frequency = 747 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
340.77	45.24	108	152	H	340.77	-61.85	0	0.6	-62.45	-13	-49.45
340.77	39.8	282	175	V	340.77	-67.29	0	0.6	-67.89	-13	-54.89
6577	43.4	81	224	H	6577	-48.18	11.83	2.32	-38.67	-13	-25.67
6577	49.63	40	150	V	6577	-41.95	11.79	2.32	-32.48	-13	-19.48

AWS Band:

Uplink (Input frequency = 1732.4 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
336.8	46.03	218	161	H	336.8	-61.06	0	0.6	-61.66	-13	-48.66
336.8	40.52	112	150	V	336.8	-66.57	0	0.6	-67.17	-13	-54.17
6578	46.39	232	240	H	6578	-45.19	11.83	2.32	-35.68	-13	-22.68
6578	51.57	221	175	V	6578	-40.01	11.79	2.32	-30.54	-13	-17.54

Downlink (Input frequency = 2112.4 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
341.85	45.12	104	148	H	341.85	-61.97	0	0.6	-62.57	-13	-49.57
341.85	39.79	288	178	V	341.85	-67.3	0	0.6	-67.9	-13	-54.9
6580	45.16	83	218	H	6580	-46.42	11.83	2.32	-36.91	-13	-23.91
6580	51.11	48	150	V	6580	-40.47	11.79	2.32	-31	-13	-18

7 FCC §2.1051, §22.917, §24.238 & §27.53 - Spurious Emissions At Antenna Terminals

7.1 Applicable Standard

According to FCC §22.917, §24.238 and §27.53 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.

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.

7.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09[1]
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Note 1:Based on a two year calibration cycle.

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

7.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	46 %
ATM Pressure:	101.3kPa

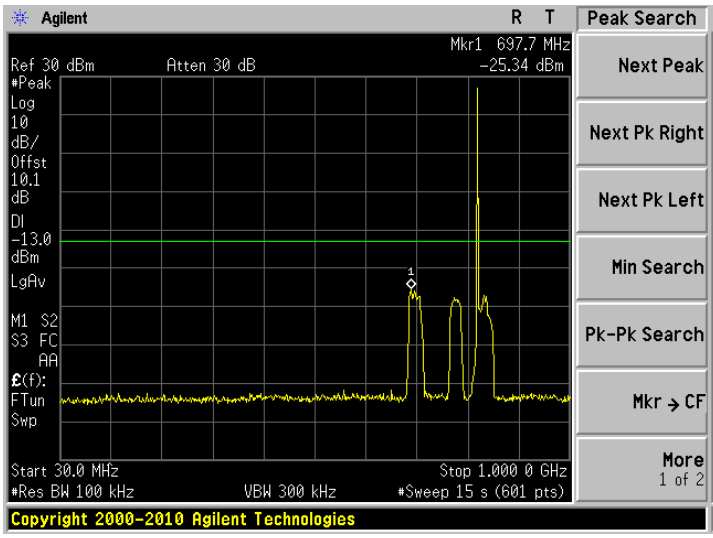
The testing was performed by Lionel Lara on 2012-04-06 in the RF Site.

7.5 Test Results

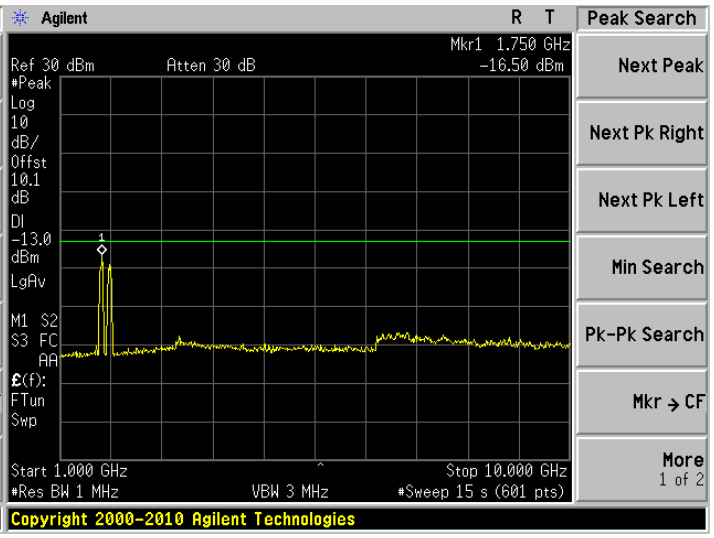
Please refer to the following plots.

Cellular Band Uplink, Middle Channel: 836.6 MHz:

Plot 1: 30 MHz to 1 GHz

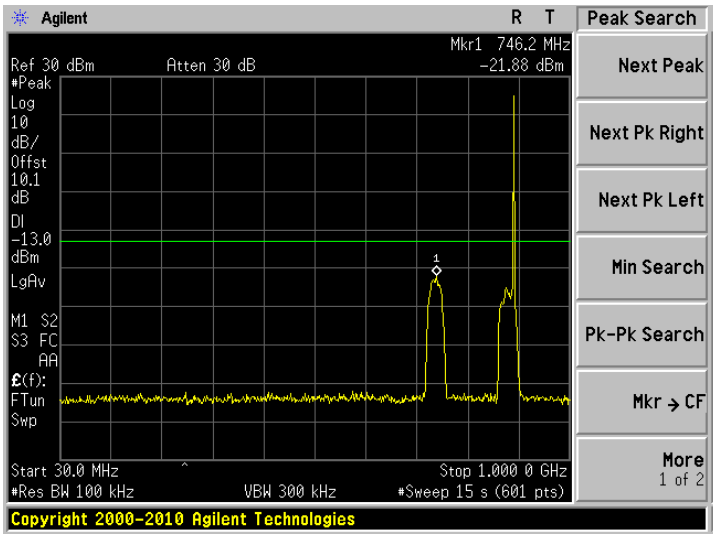


Plot 2: Above 1 GHz

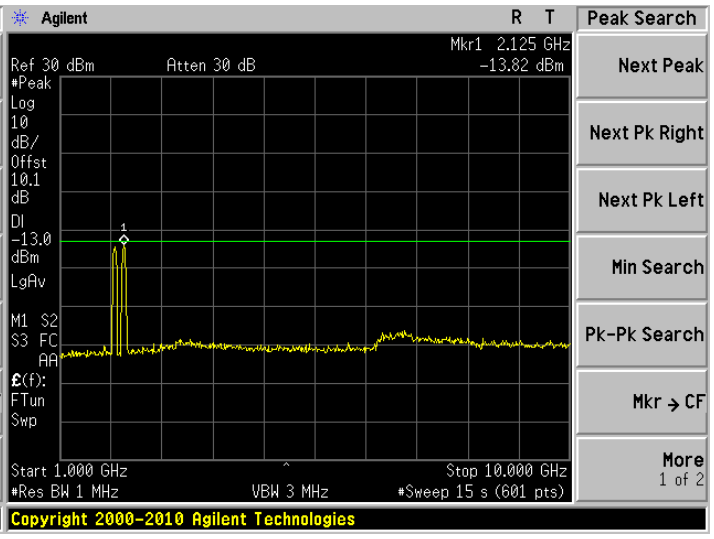


Cellular Band Downlink, Middle Channel: 881.6 MHz:

Plot 1: 30 MHz to 1 GHz

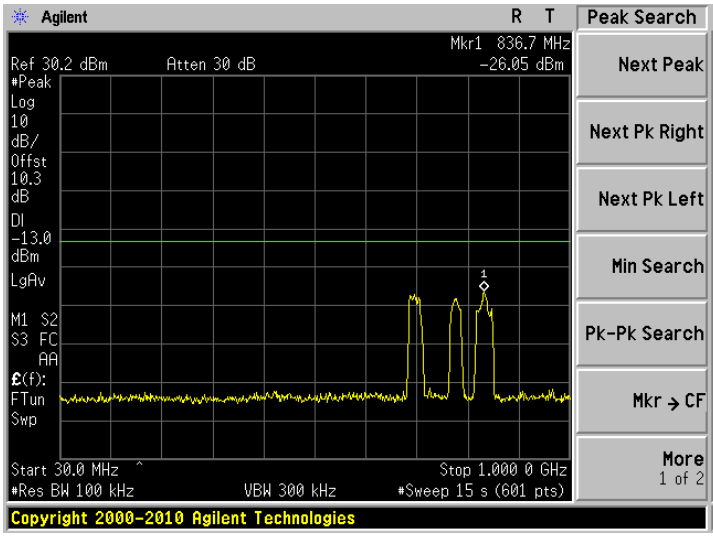


Plot 2: Above 1 GHz

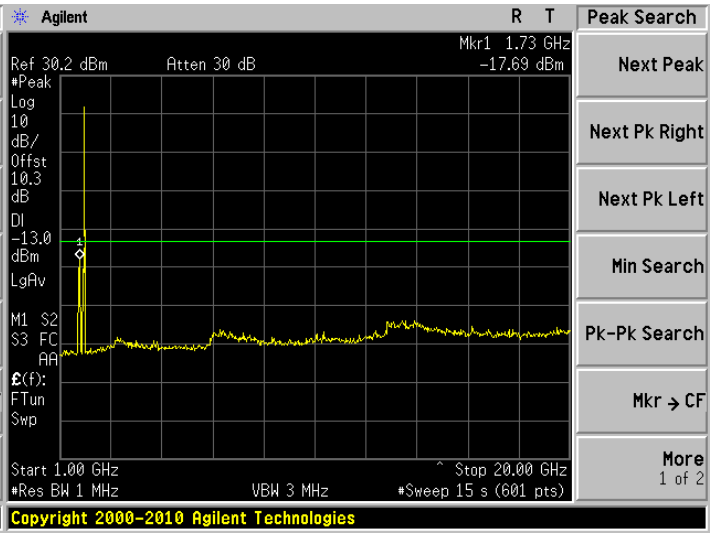


PCS Band Uplink, Middle Channel: 1880 MHz:

Plot 1: 30 MHz to 1 GHz

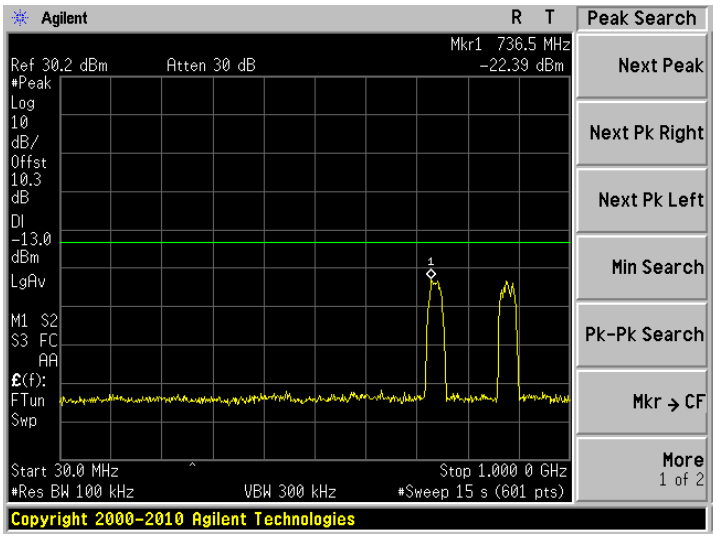


Plot 2: Above 1 GHz

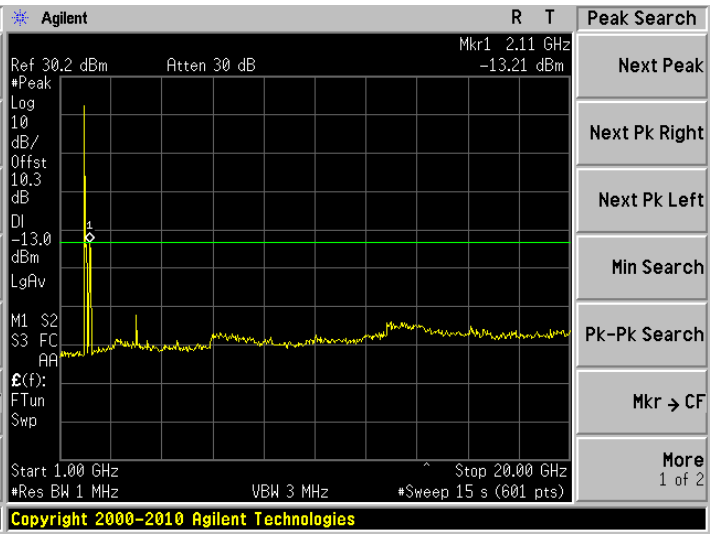


PCS Band Downlink, Middle Channel: 1960 MHz:

Plot 1: 30 MHz to 1 GHz

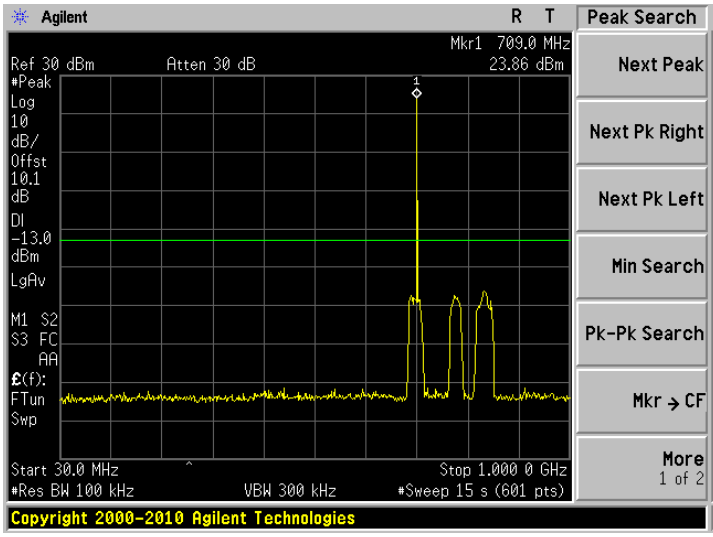


Plot 2: Above 1 GHz

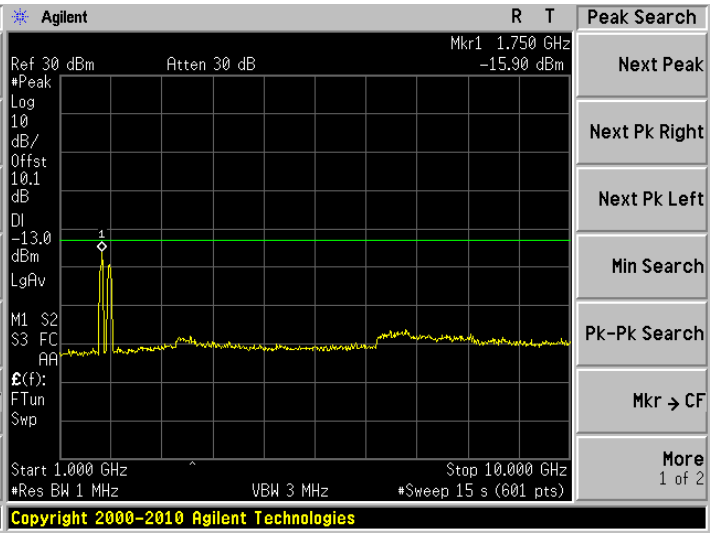


Lower LTE Band Uplink, Middle Channel: 709 MHz:

Plot 1: 30 MHz to 1 GHz

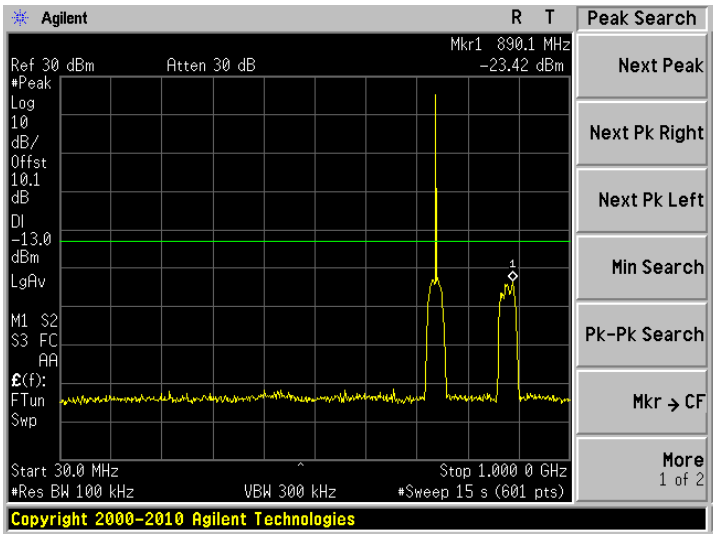


Plot 2: Above 1 GHz

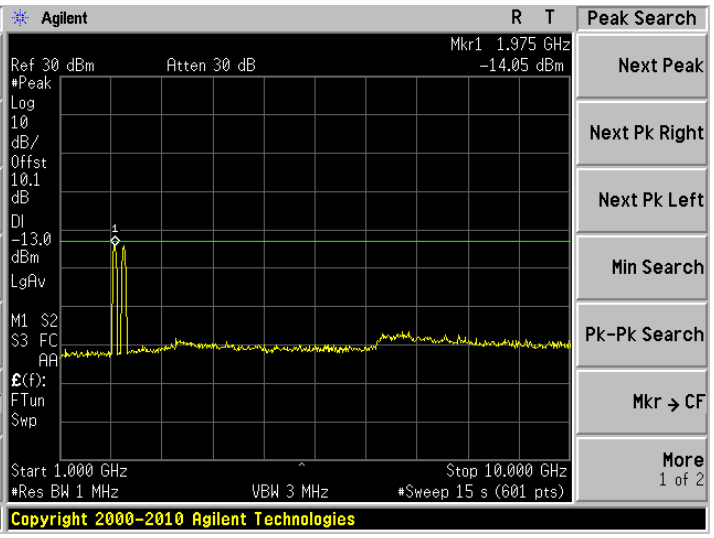


Lower LTE Band Downlink, Middle Channel: 737 MHz:

Plot 1: 30 MHz to 1 GHz

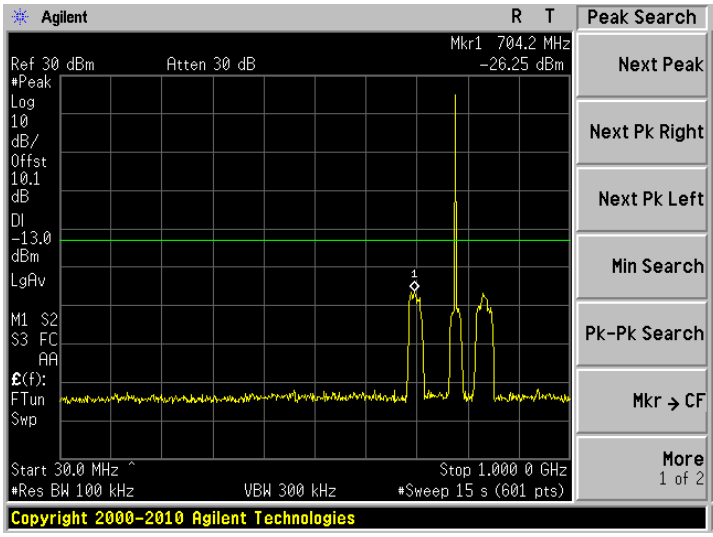


Plot 2: Above 1 GHz

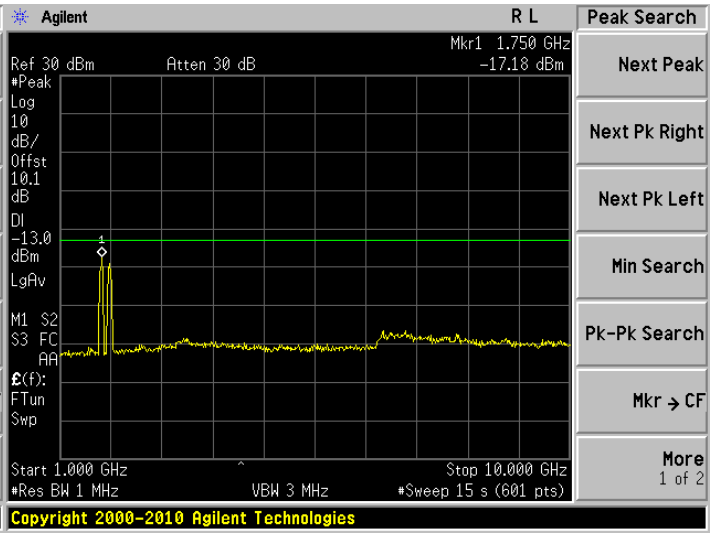


Upper LTE Band Uplink, Middle Channel: 782 MHz:

Plot 1: 30 MHz to 1 GHz

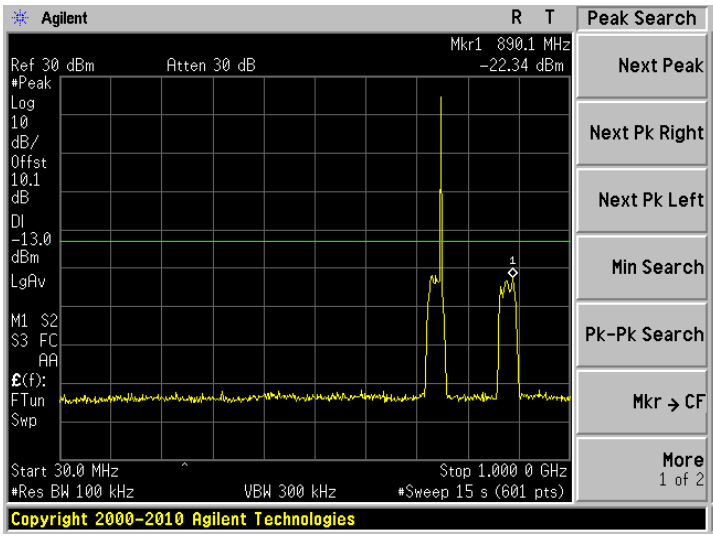


Plot 2: Above 1 GHz

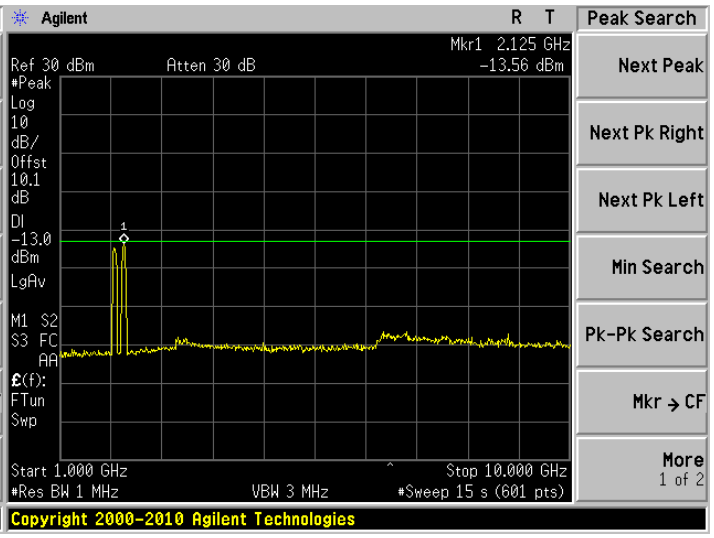


Upper LTE Band Downlink, Middle Channel: 752 MHz:

Plot 1: 30 MHz to 1 GHz

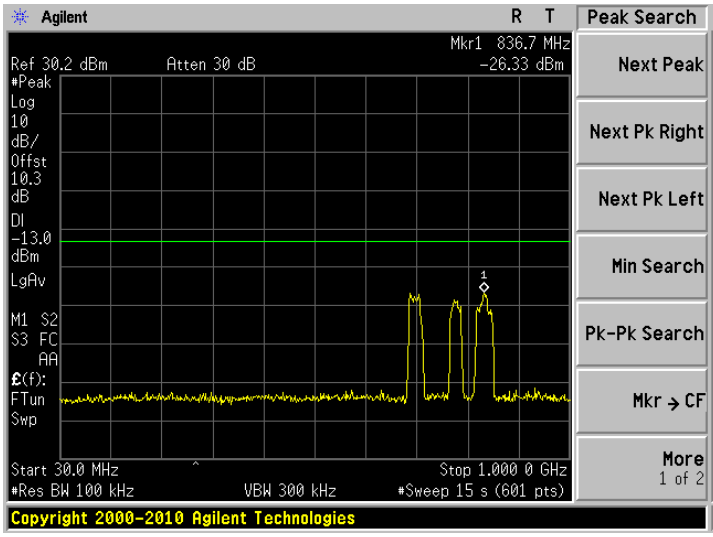


Plot 2: Above 1 GHz

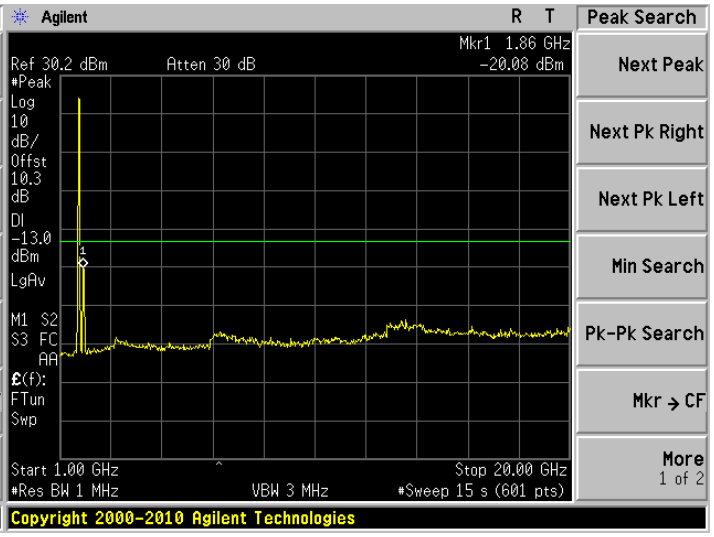


AWS Band Uplink, Middle Channel: 1732.4 MHz:

Plot 1: 30 MHz to 1 GHz

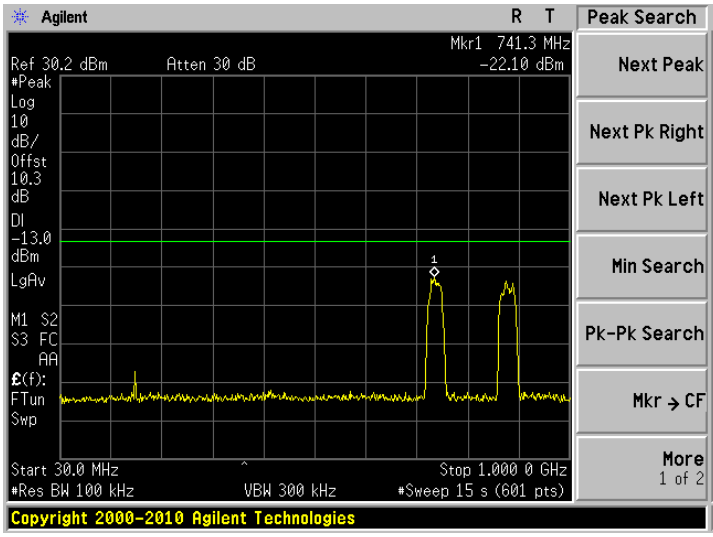


Plot 2: Above 1 GHz

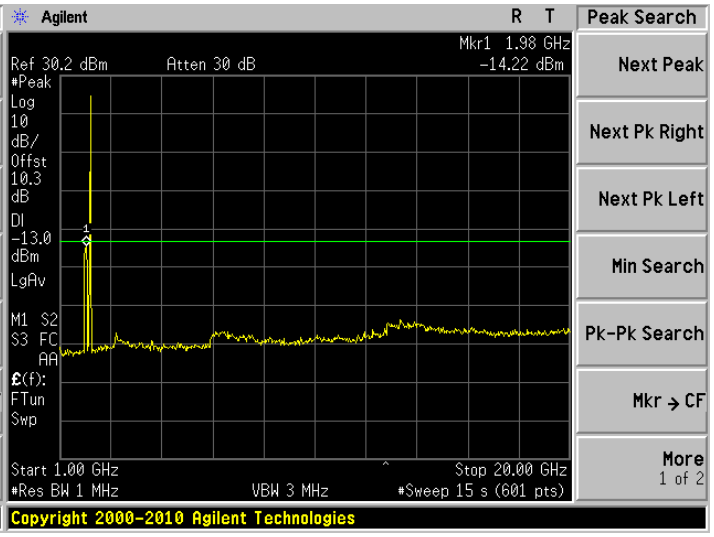


AWS LTE Band Downlink, Middle Channel: 2132.4 MHz:

Plot 1: 30 MHz to 1 GHz



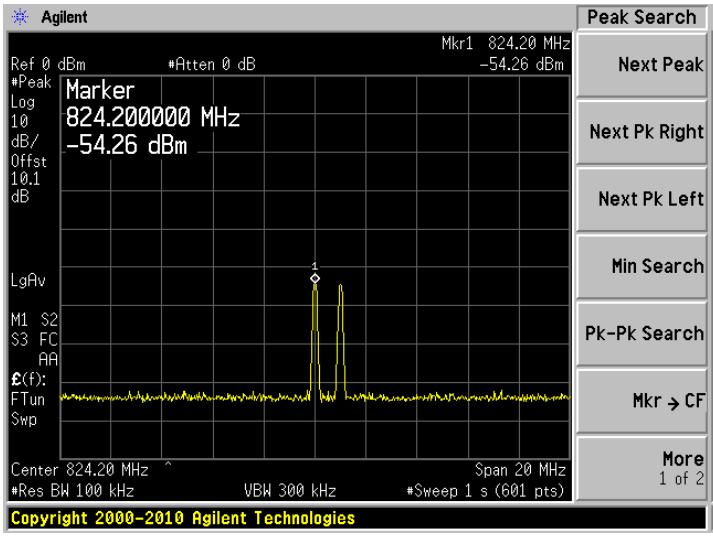
Plot 2: Above 1 GHz



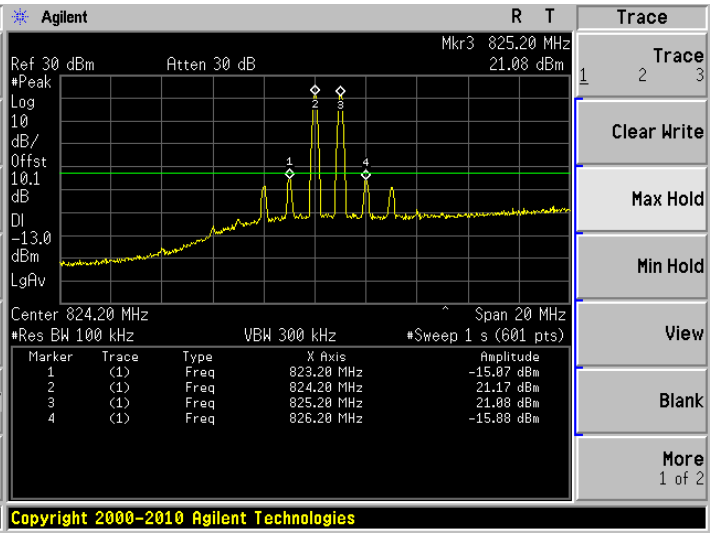
Inter-modulation

Cellular Band Uplink:

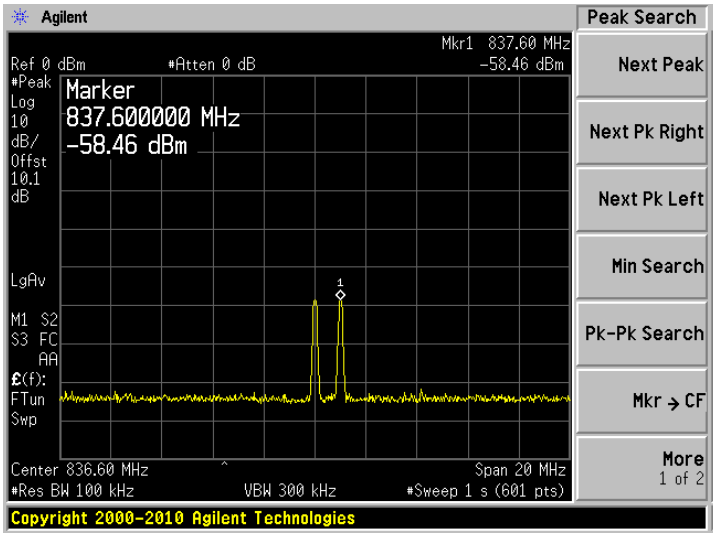
Low Channel, Input



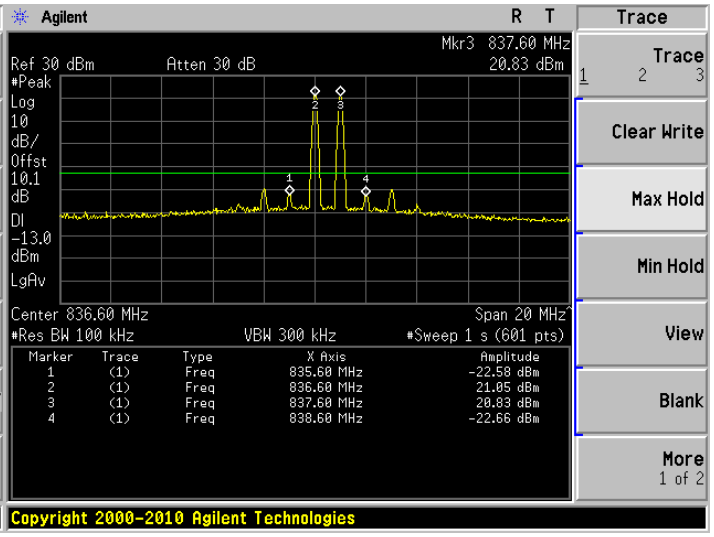
Low Channel, Output:



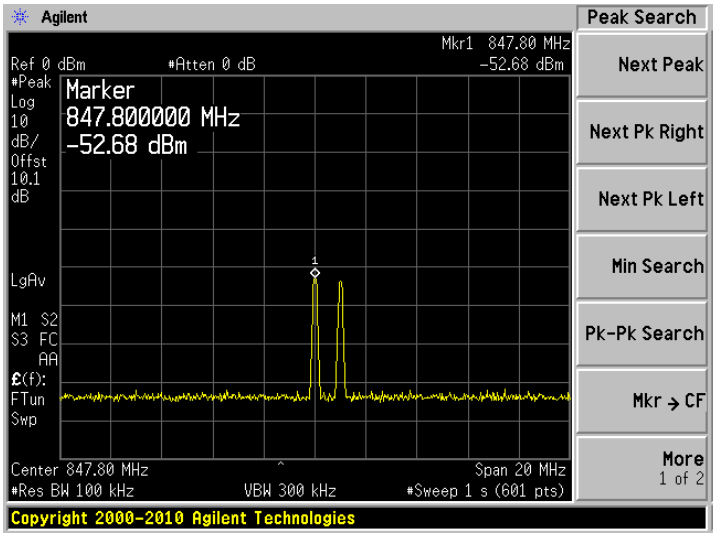
Middle Channel, Input



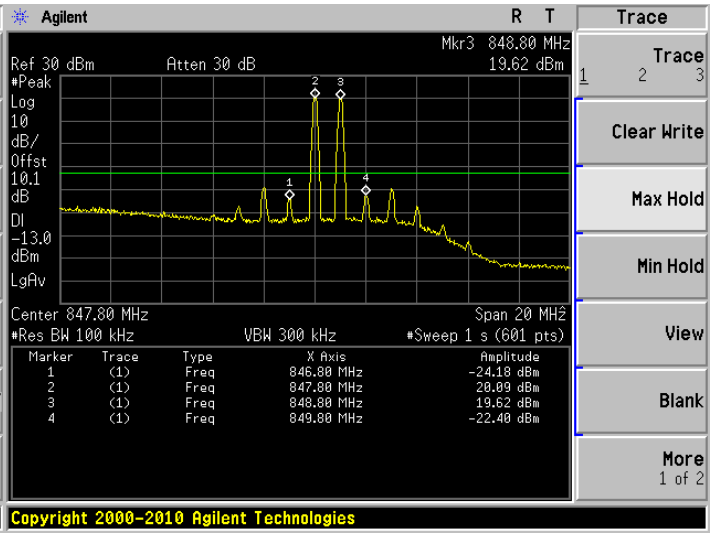
Middle Channel, Output



High Channel, Input

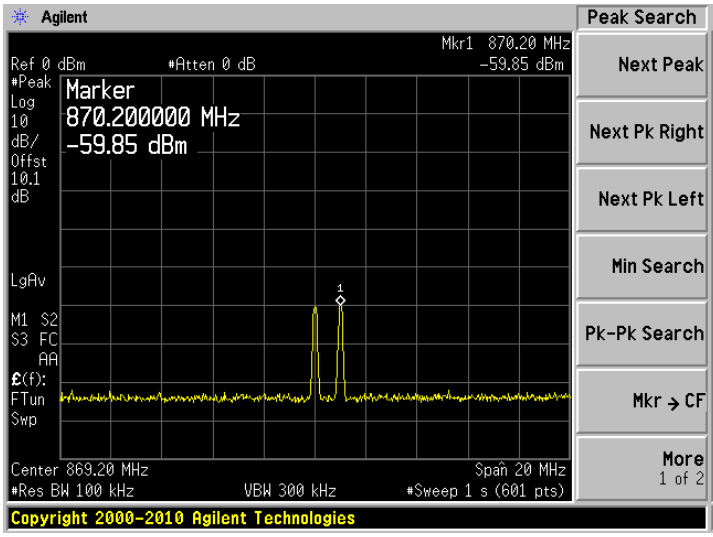


High Channel, Output

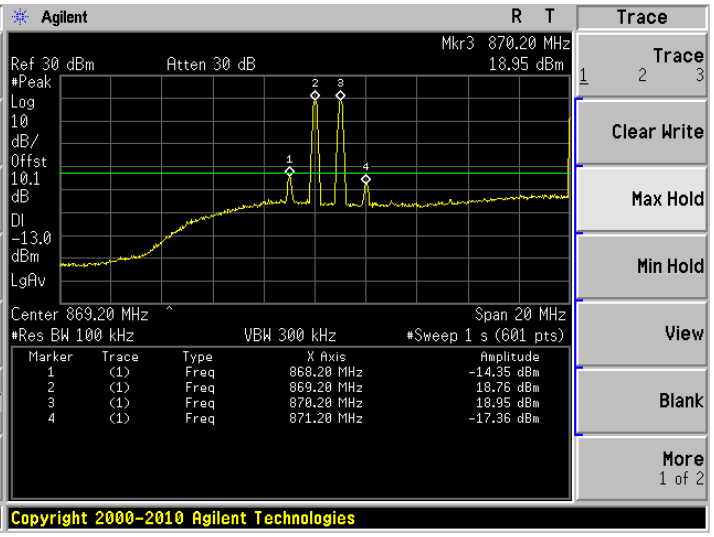


Cellular Band Downlink:

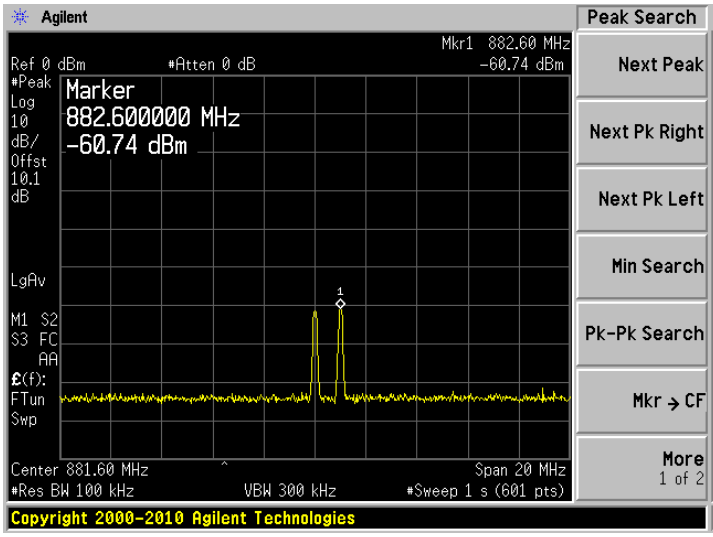
Low Channel, Input



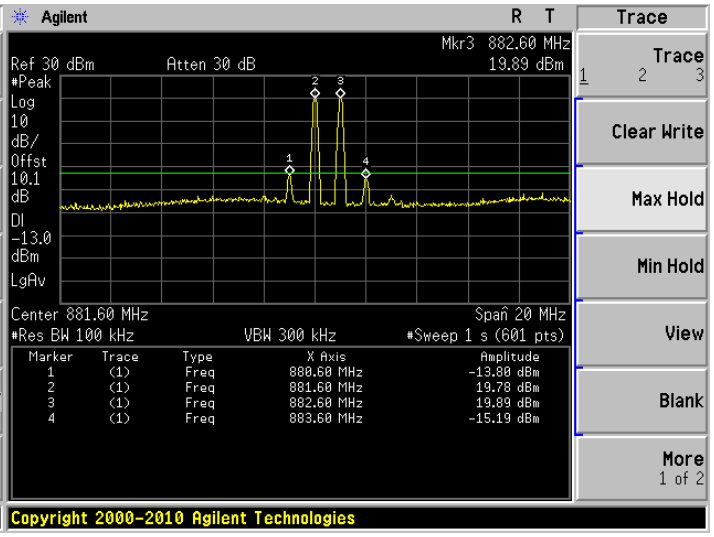
Low Channel, Output



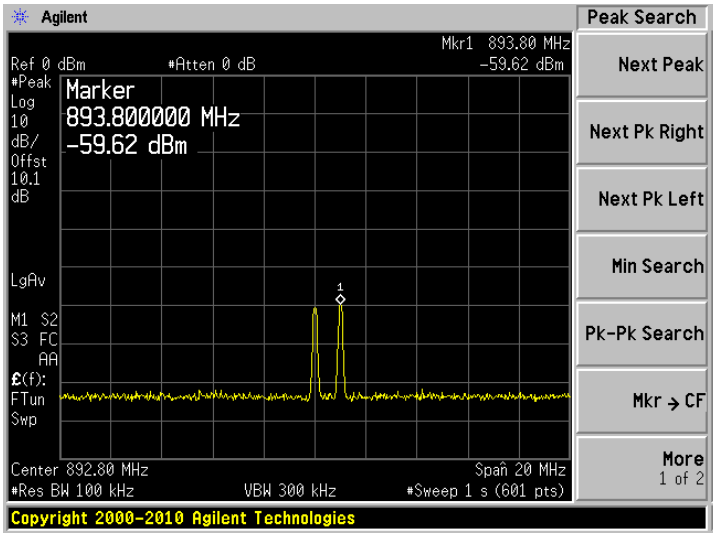
Middle Channel, Input



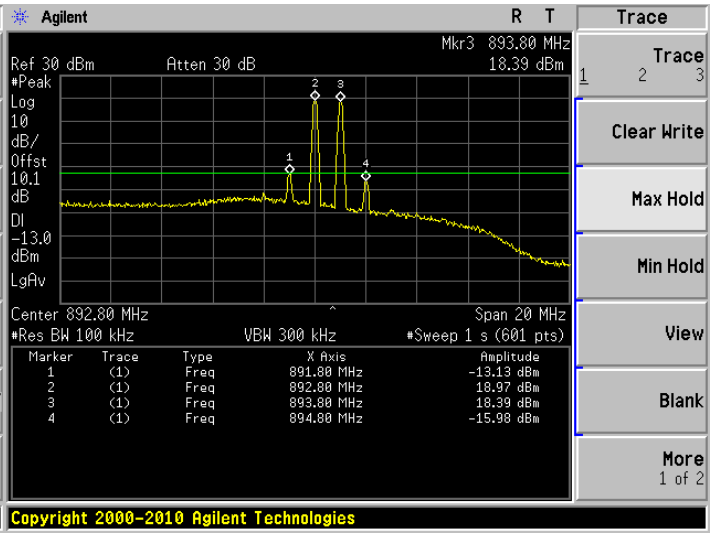
Middle Channel, Output



High Channel, Input

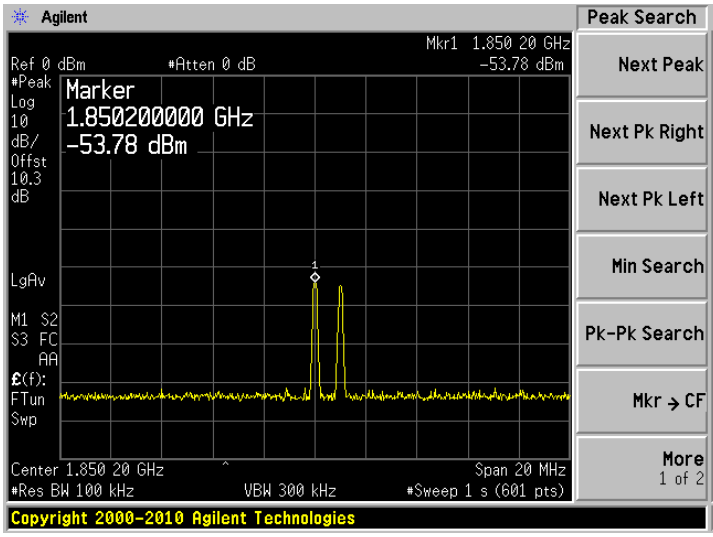


High Channel, Output

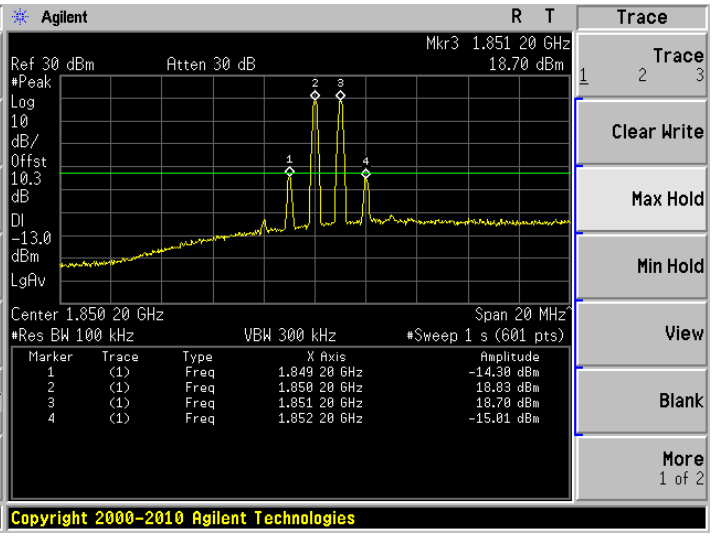


PCS Band Uplink:

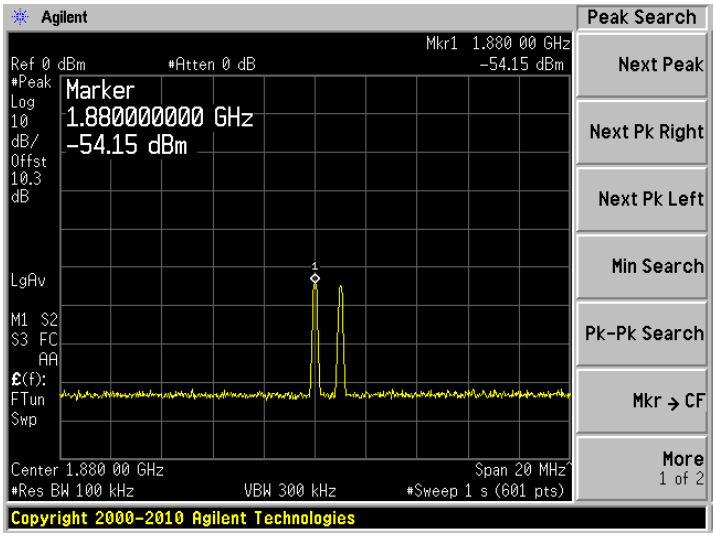
Low Channel, Input



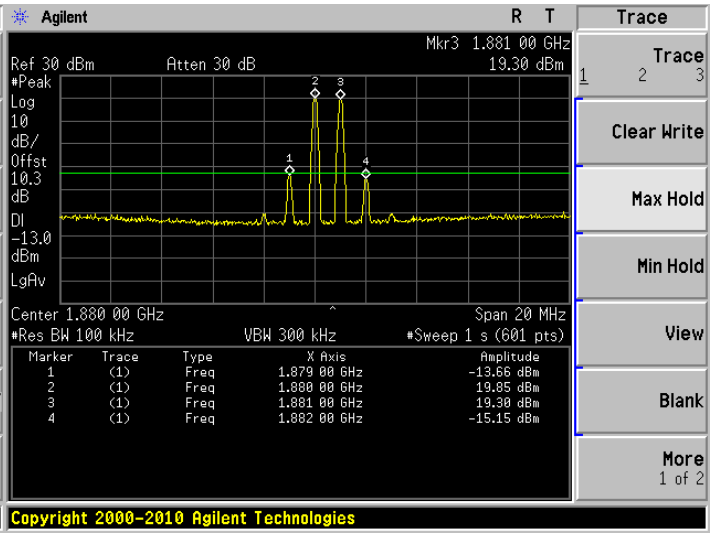
Low Channel, Output



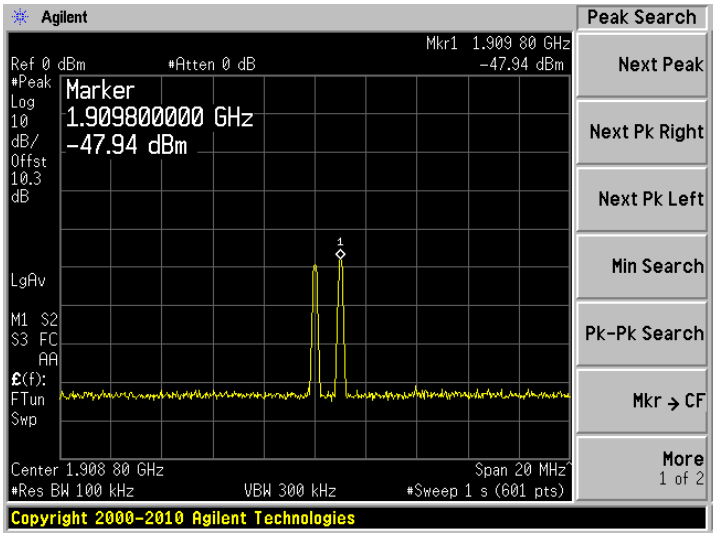
Middle Channel, Input



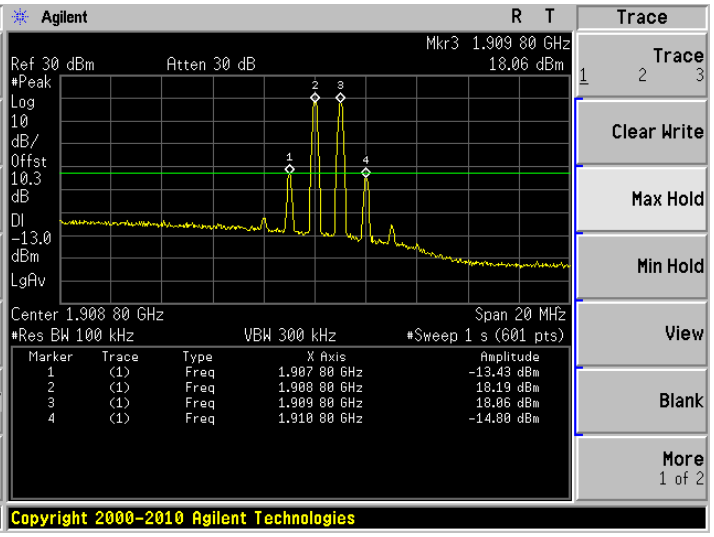
Middle Channel, Output



High Channel, Input

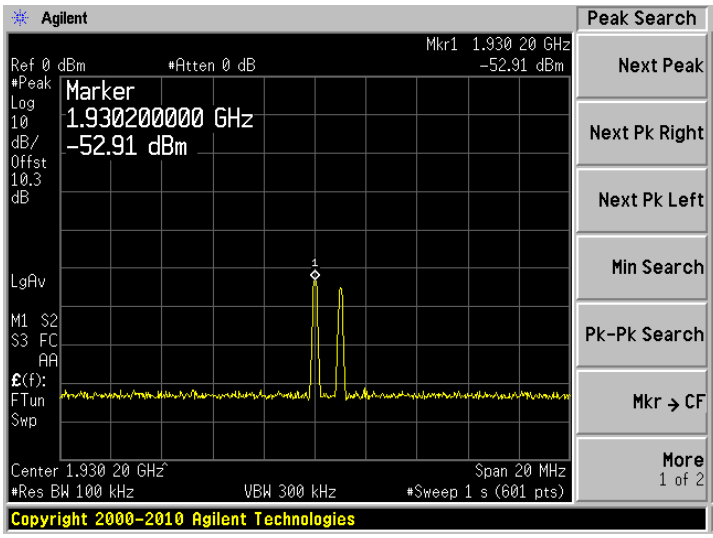


High Channel, Output

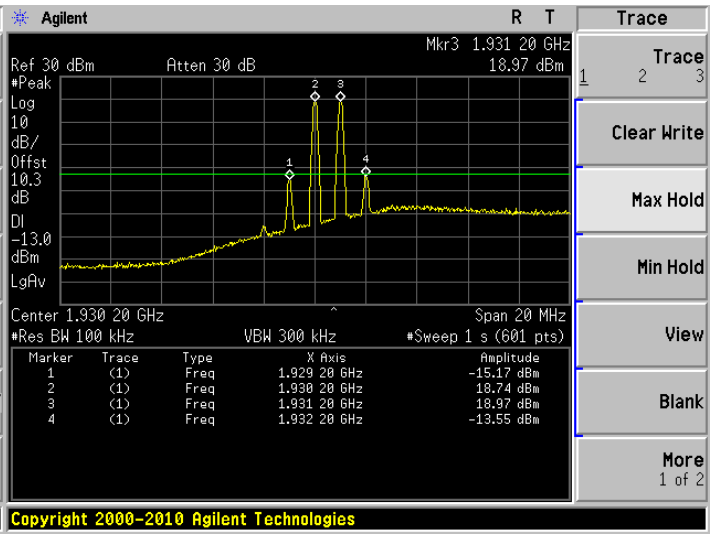


PCS Band Downlink:

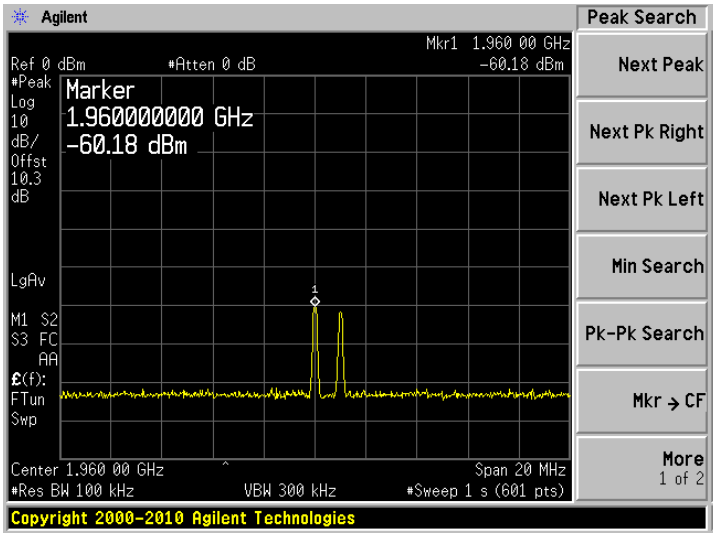
Low Channel, Input



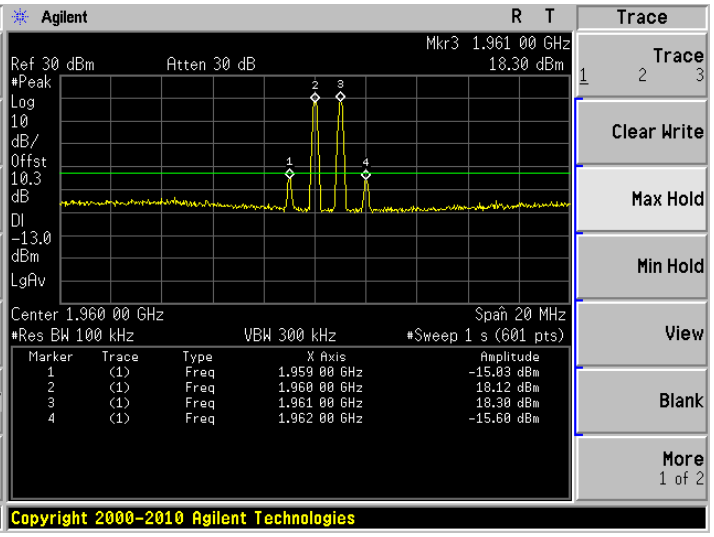
Low Channel, Output



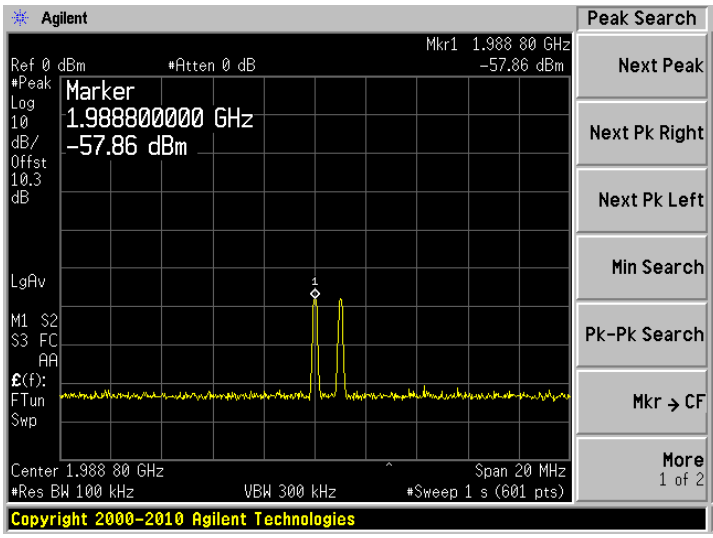
Middle Channel, Input



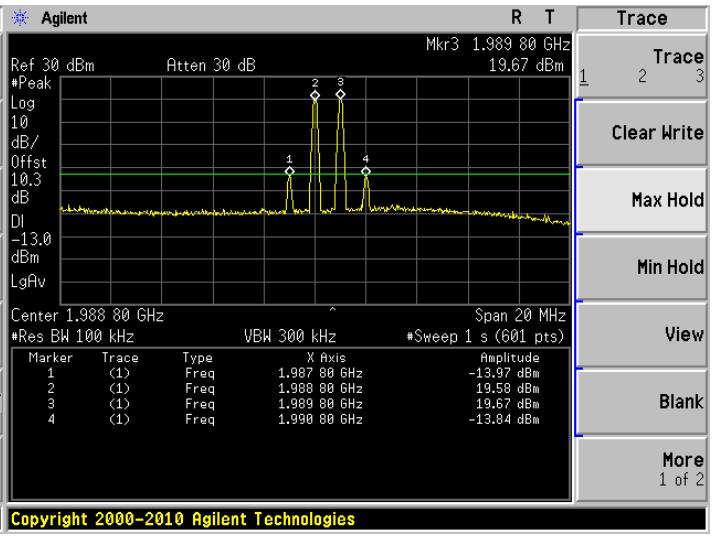
Middle Channel, Output



High Channel, Input

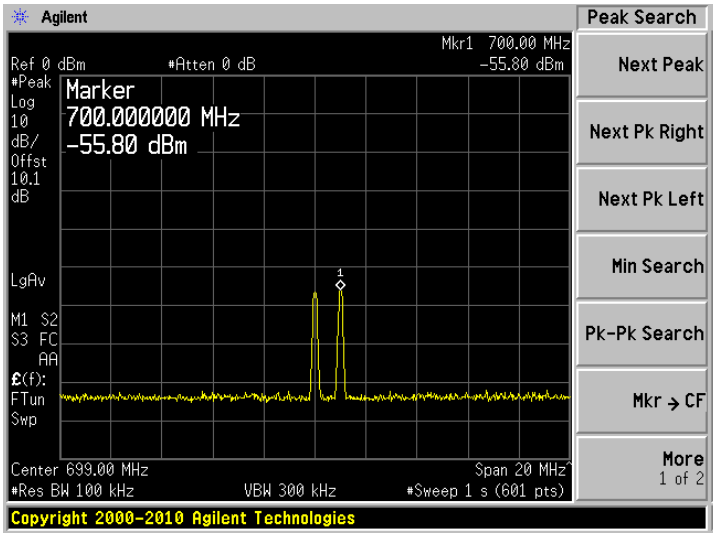


High Channel, Output

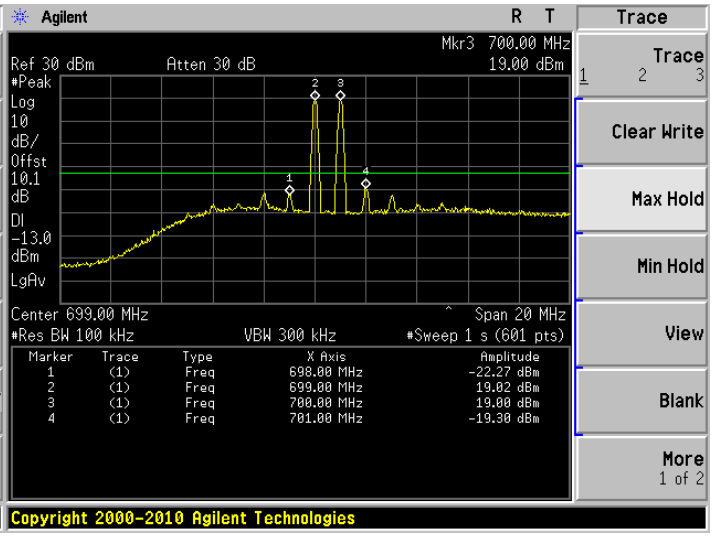


Lower LTE Band Uplink:

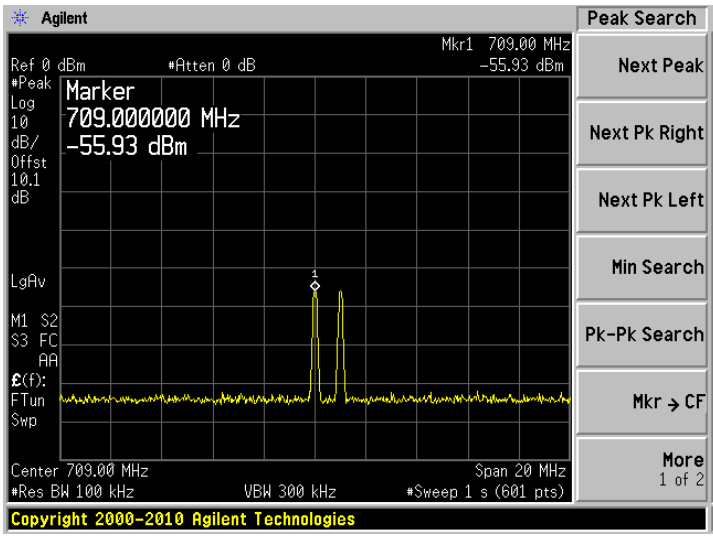
Low Channel, Input



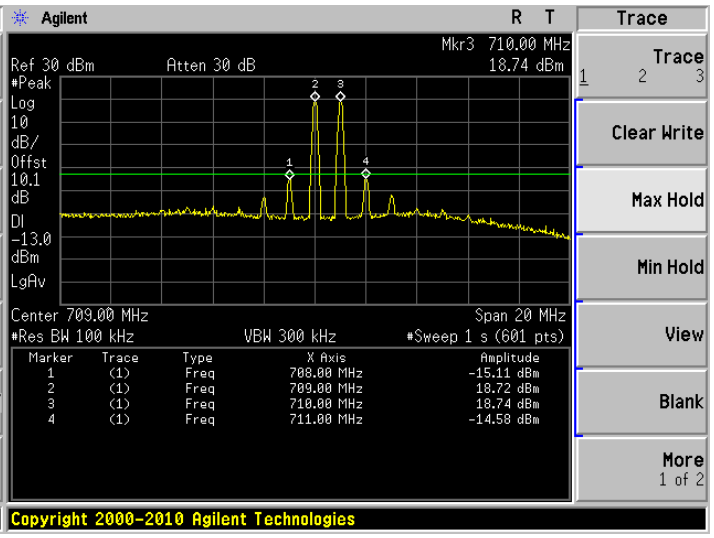
Low Channel, Output



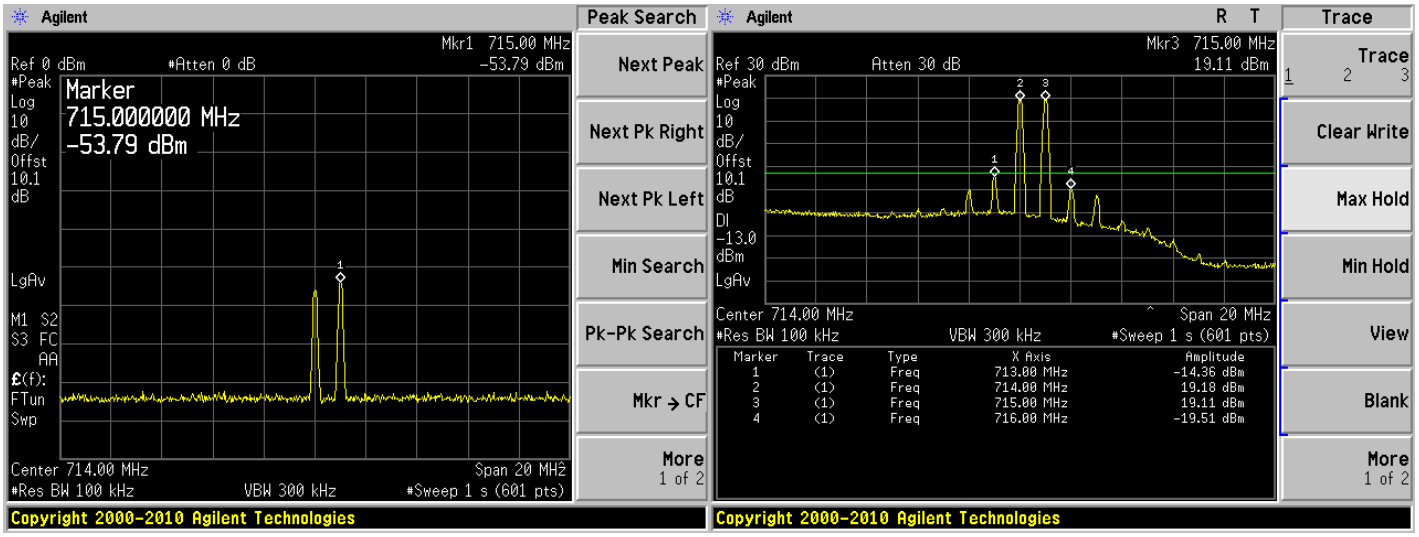
Middle Channel, Input



Middle Channel, Output

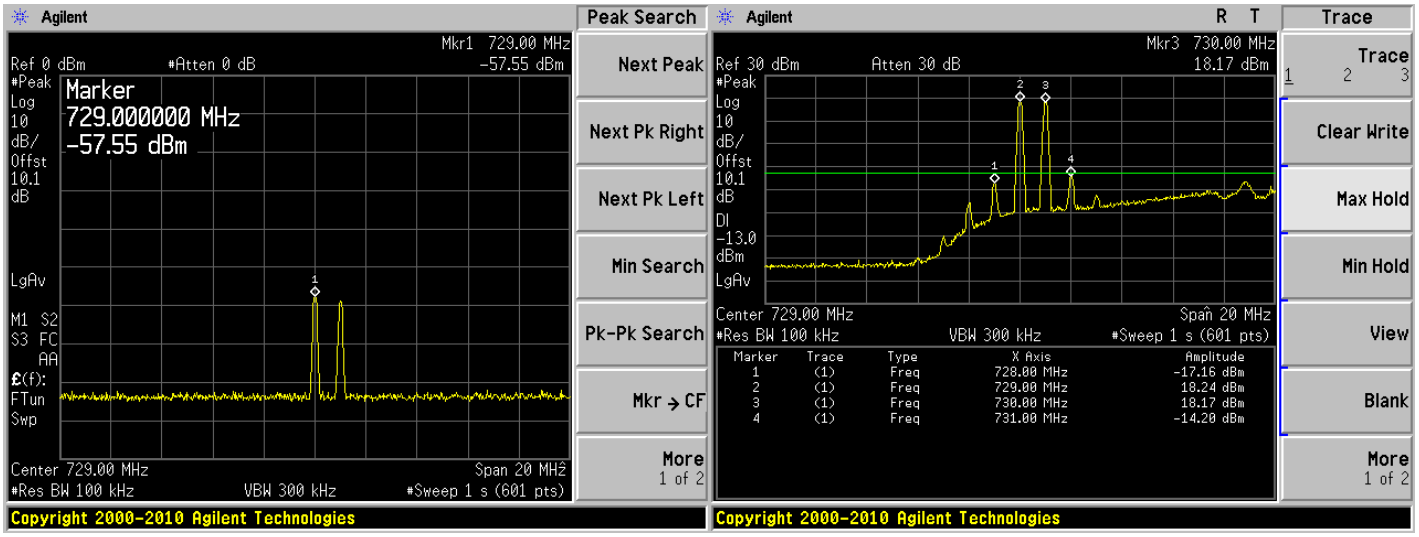


High Channel, Input High Channel, Output

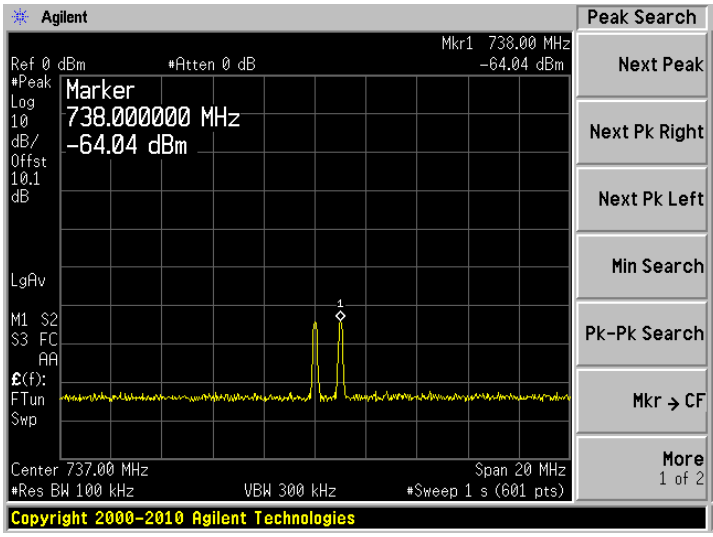


Lower LTE Band Downlink:

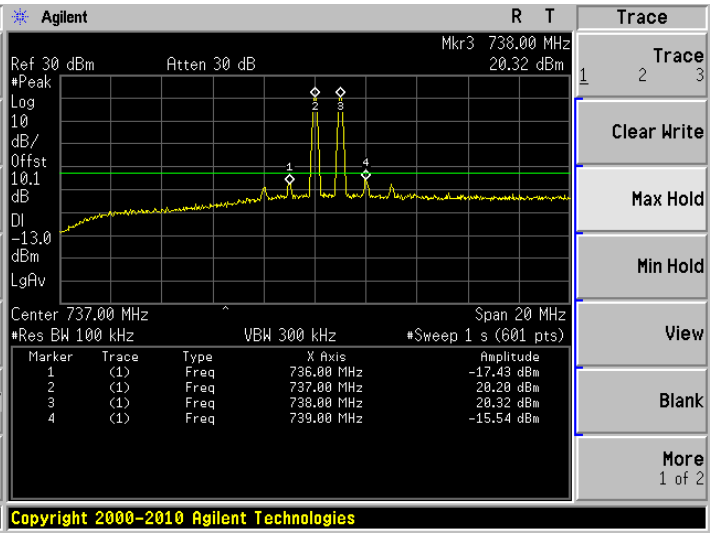
Low Channel, Input Low Channel, Output



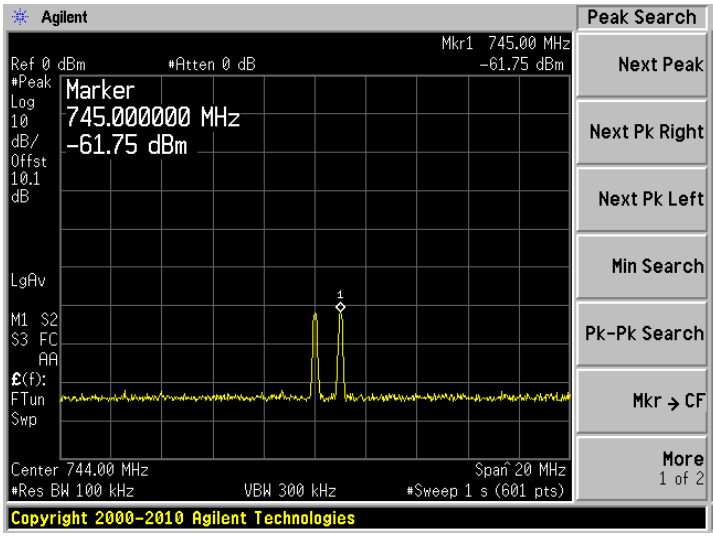
Middle Channel, Input



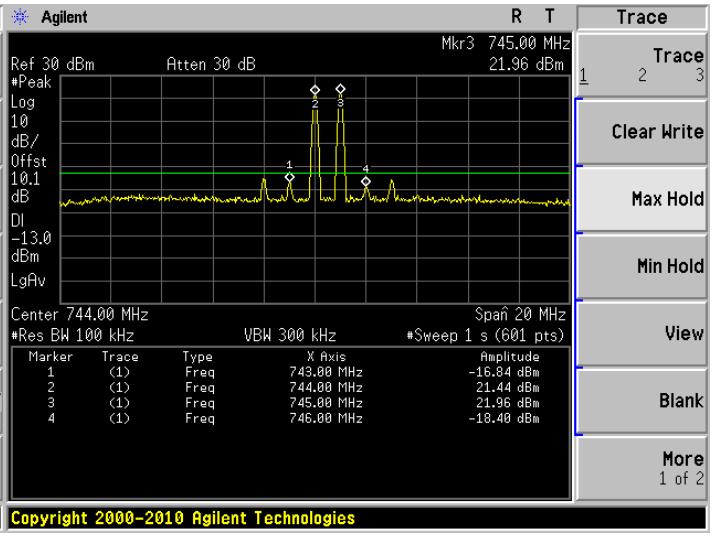
Middle Channel, Output



High Channel, Input

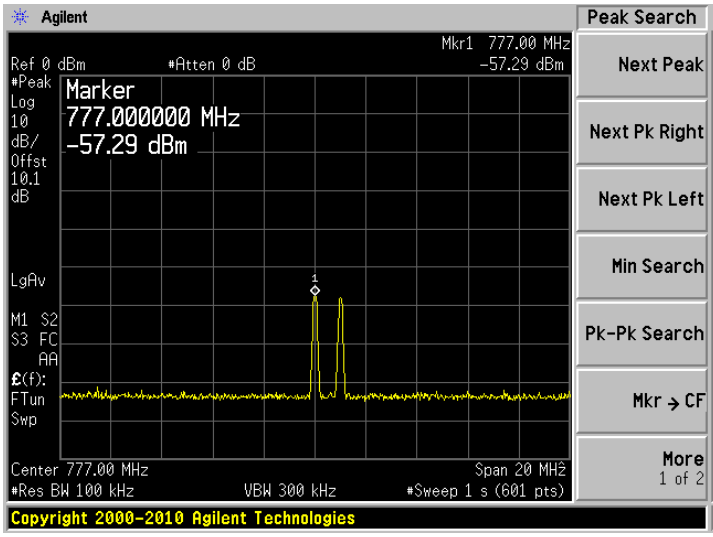


High Channel, Output

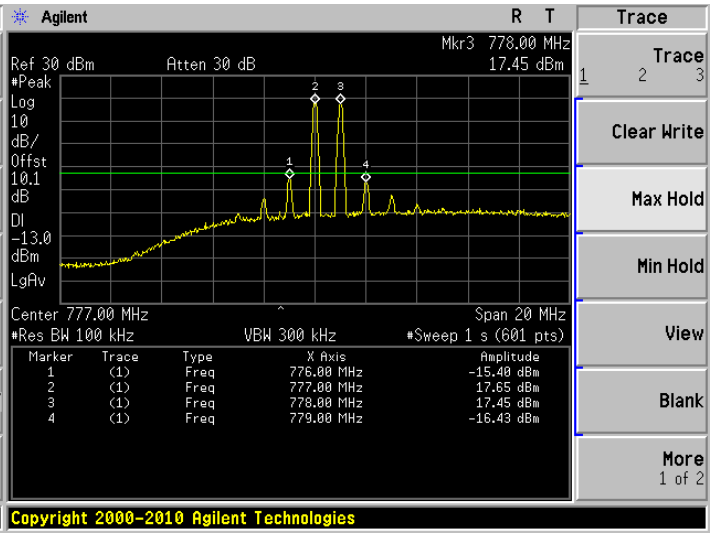


Upper LTE Band Uplink:

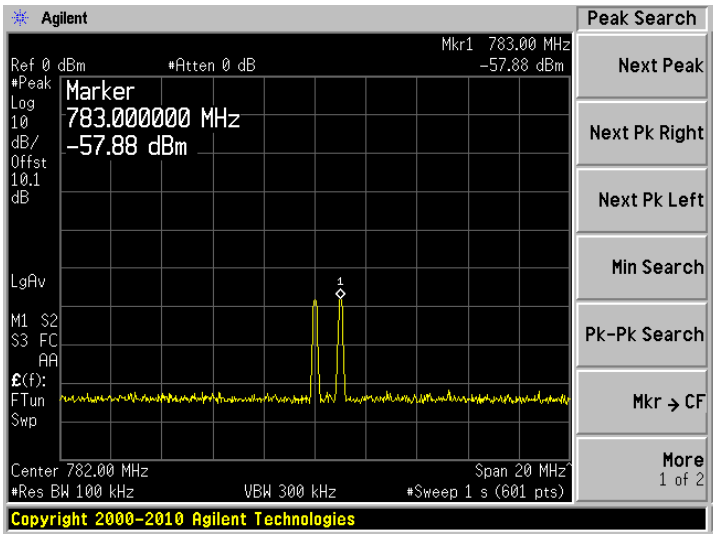
Low Channel, Input



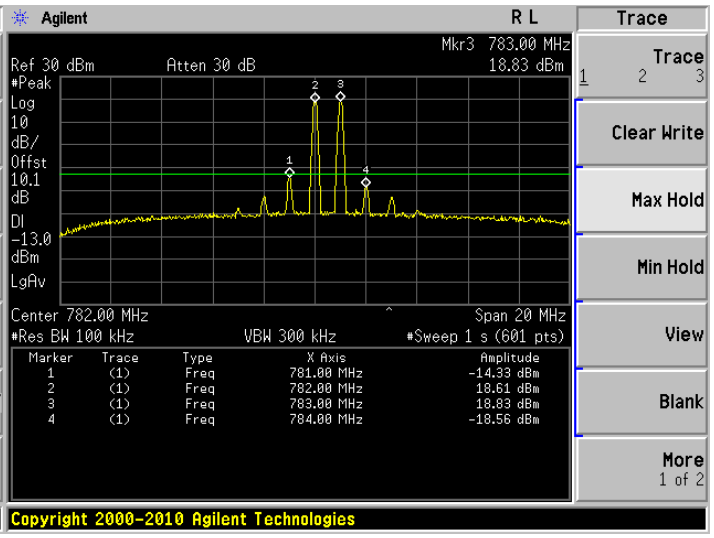
Low Channel, Output



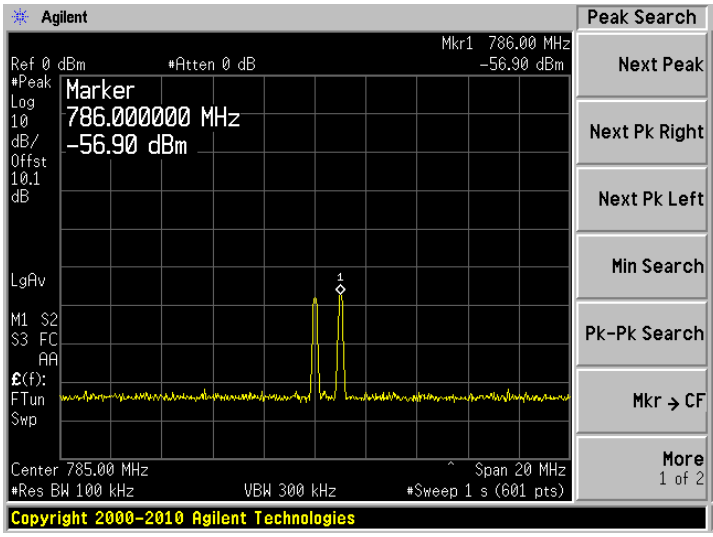
Middle Channel, Input



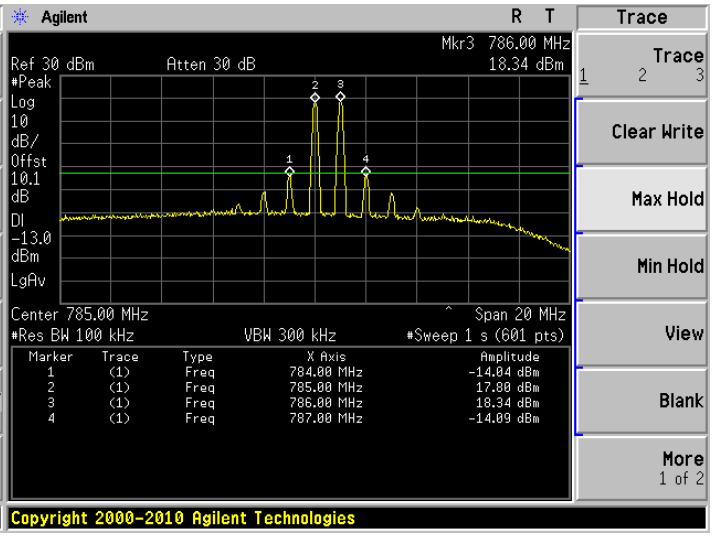
Middle Channel, Output



High Channel, Input

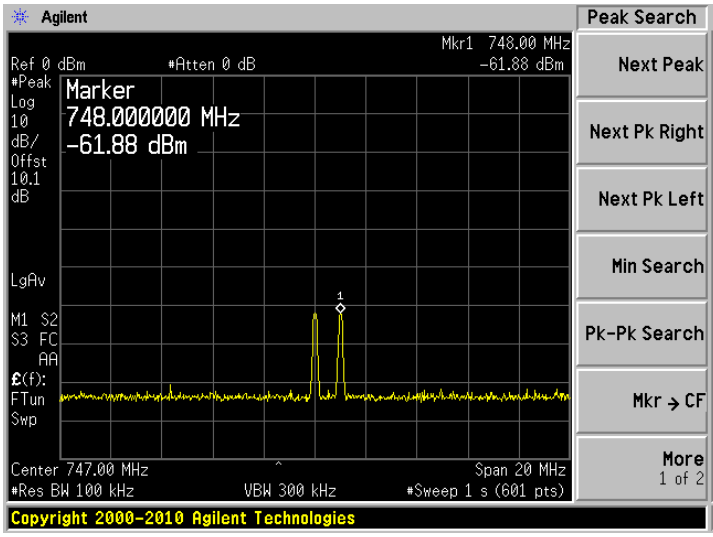


High Channel, Output

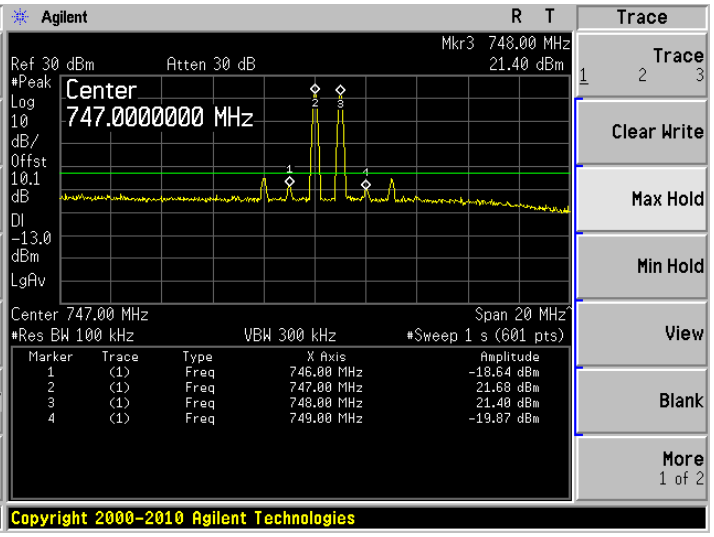


Upper LTE Band Downlink:

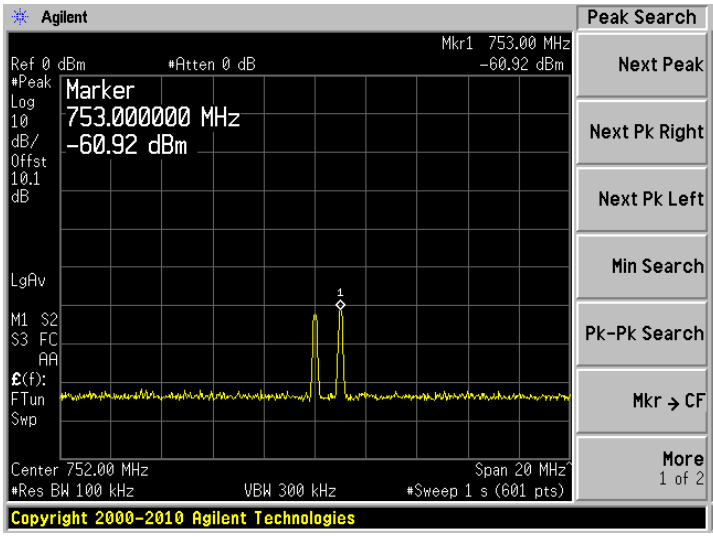
Low Channel, Input



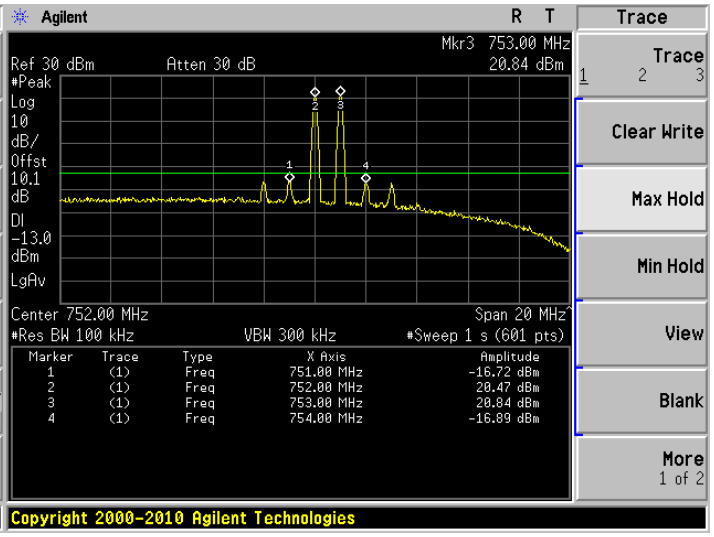
Low Channel, Output



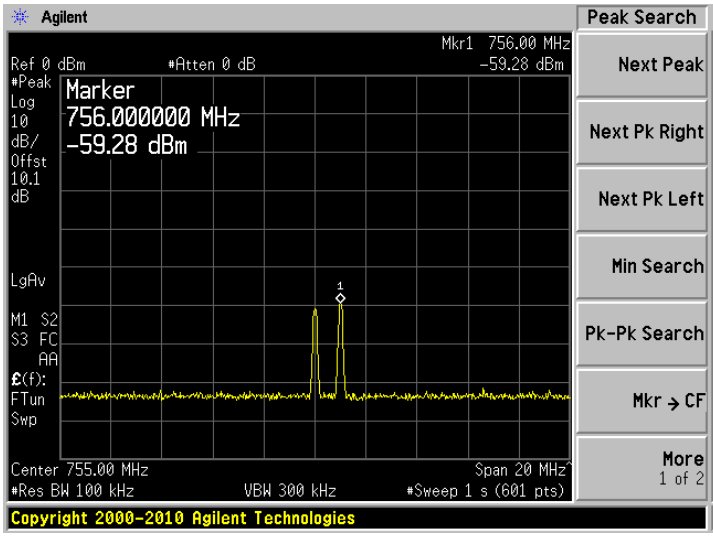
Middle Channel, Input



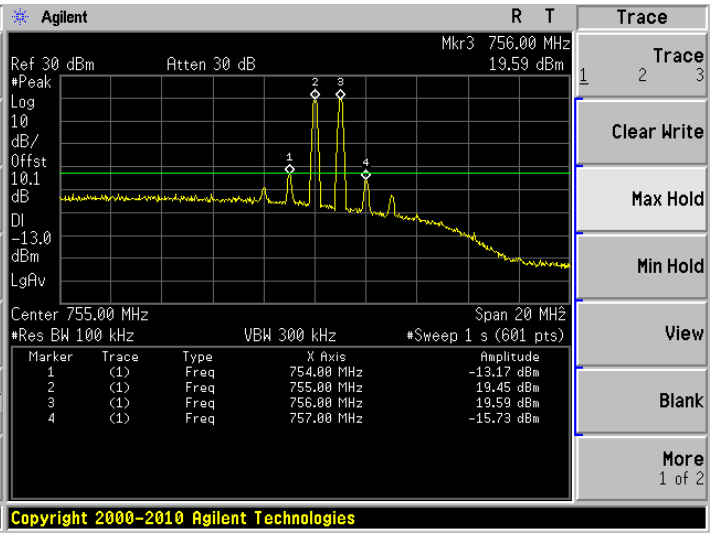
Middle Channel, Output



High Channel, Input

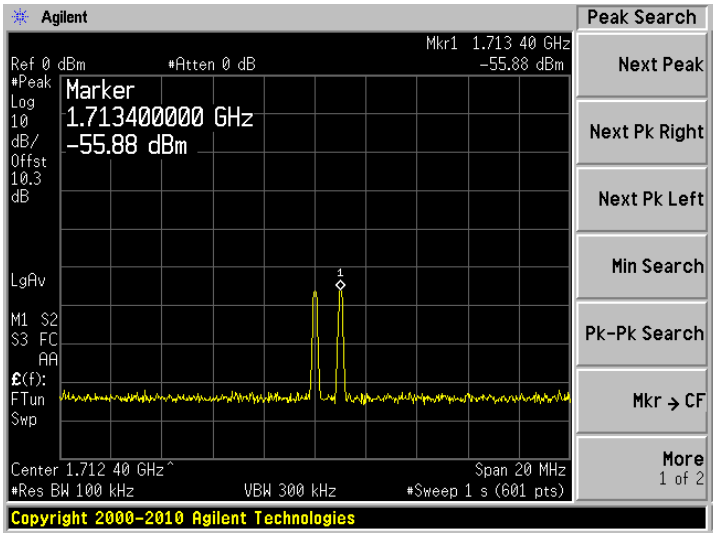


High Channel, Output

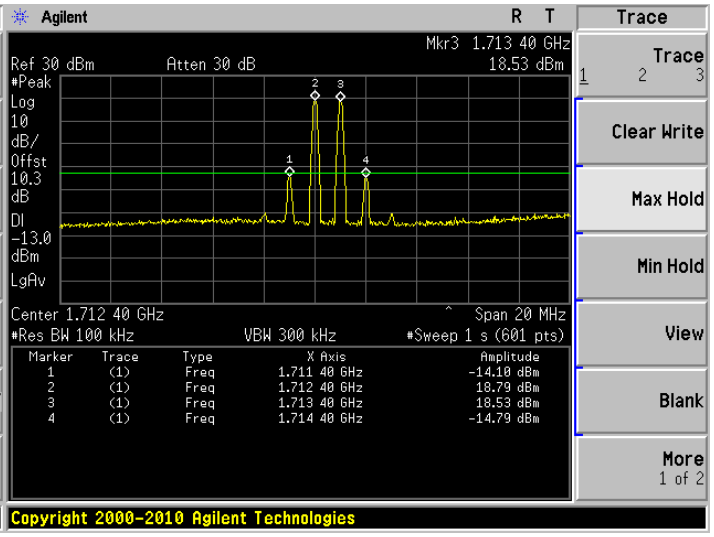


AWS Band Uplink:

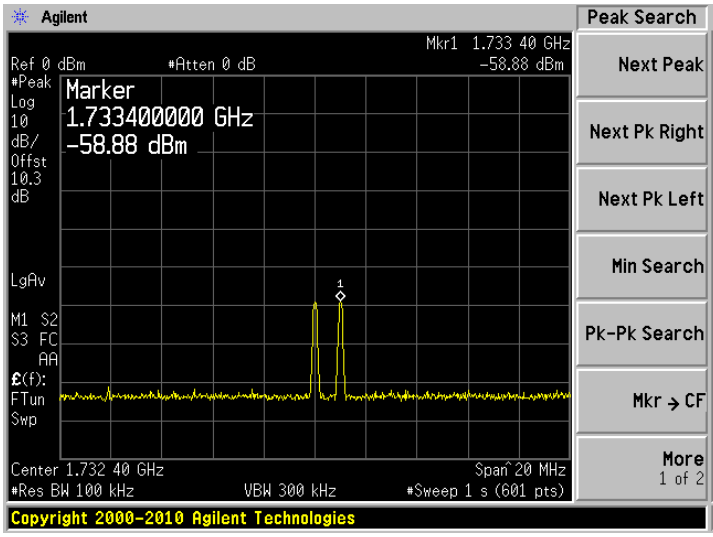
Low Channel, Input



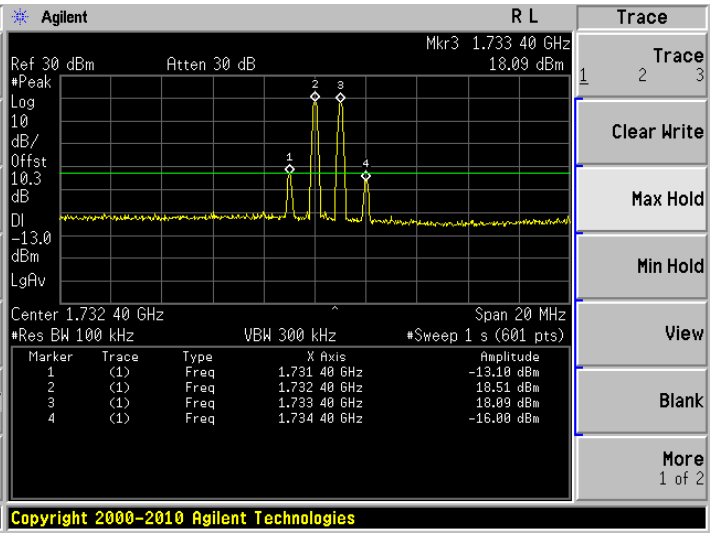
Low Channel, Output



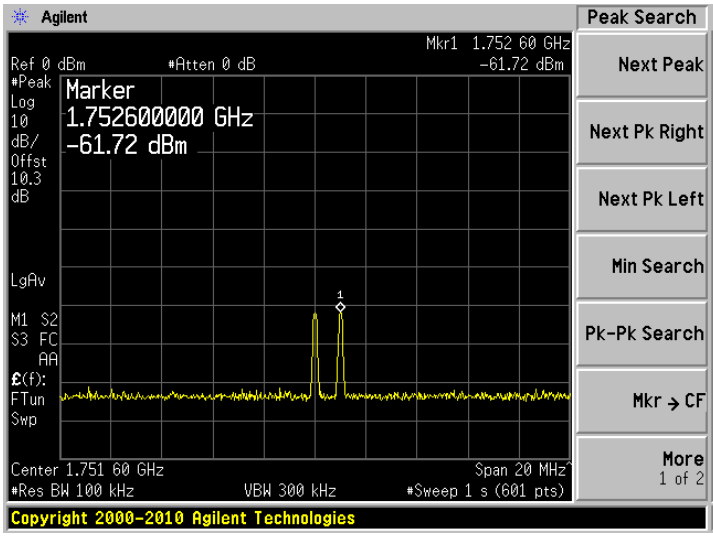
Middle Channel, Input



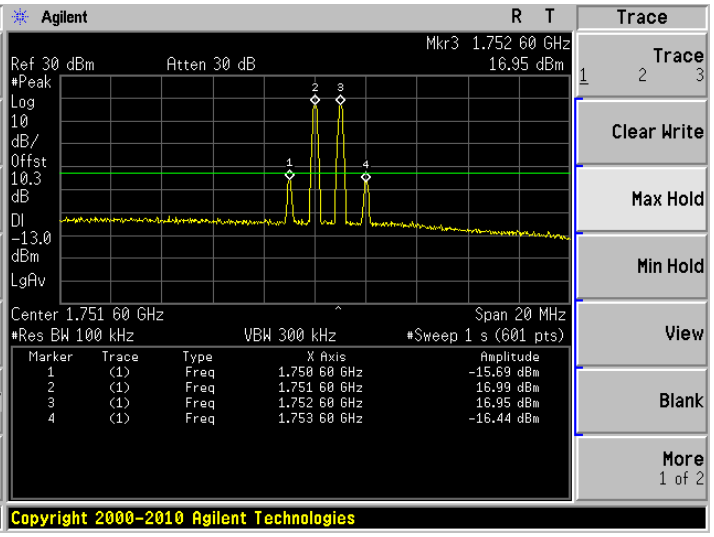
Middle Channel, Output



High Channel, Input

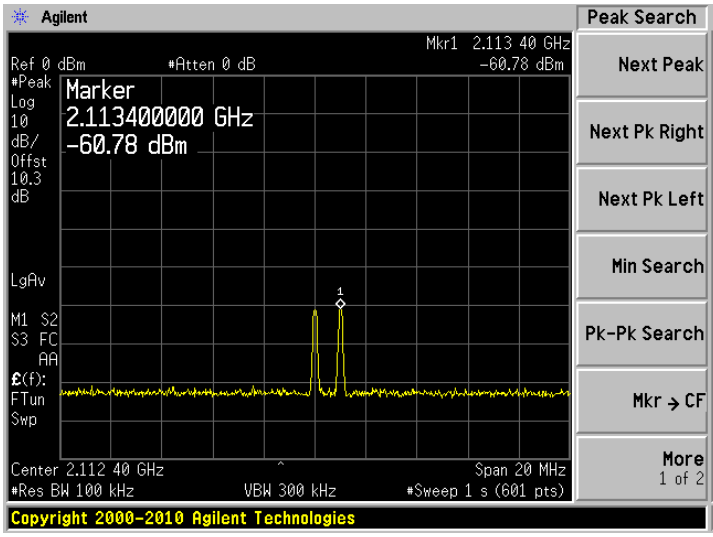


High Channel, Output

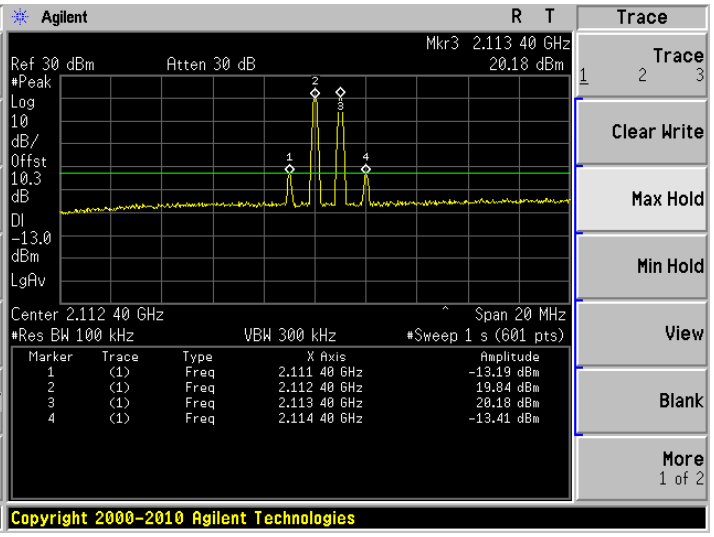


AWS Band Downlink:

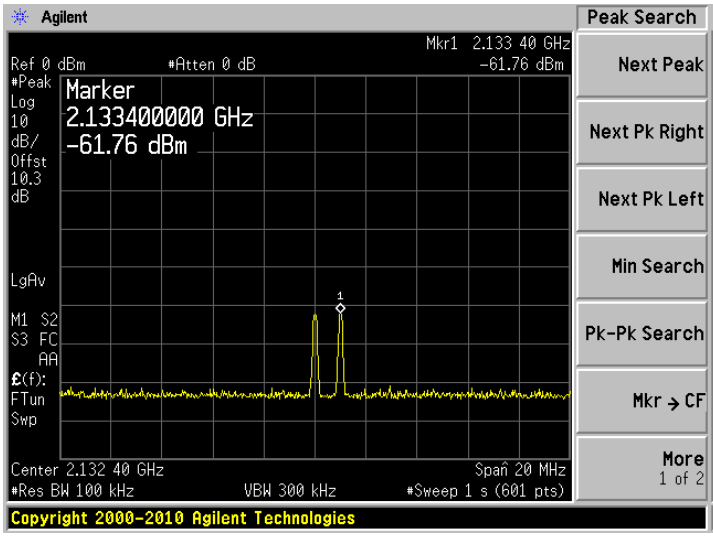
Low Channel, Input



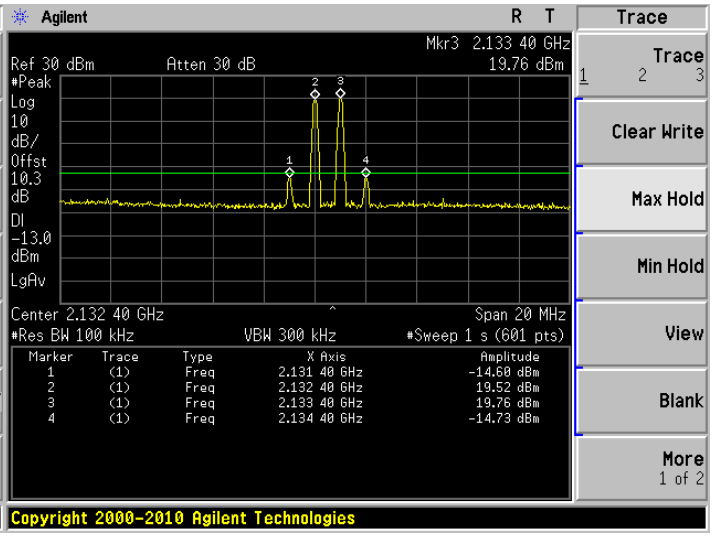
Low Channel, Output



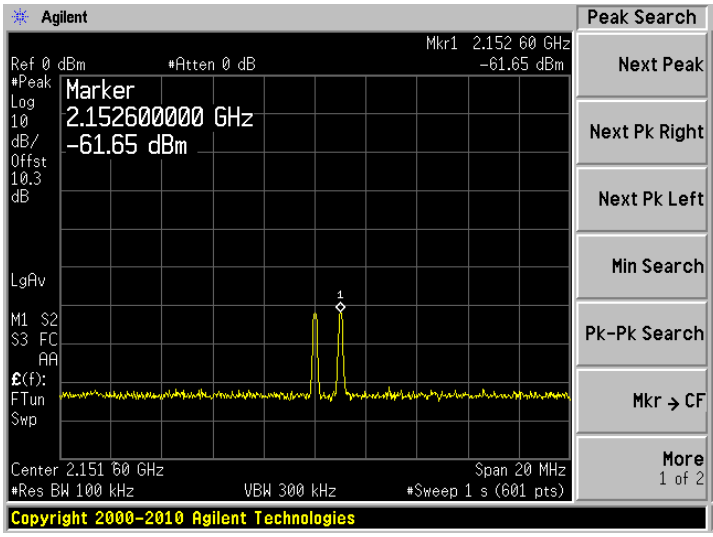
Middle Channel, Input



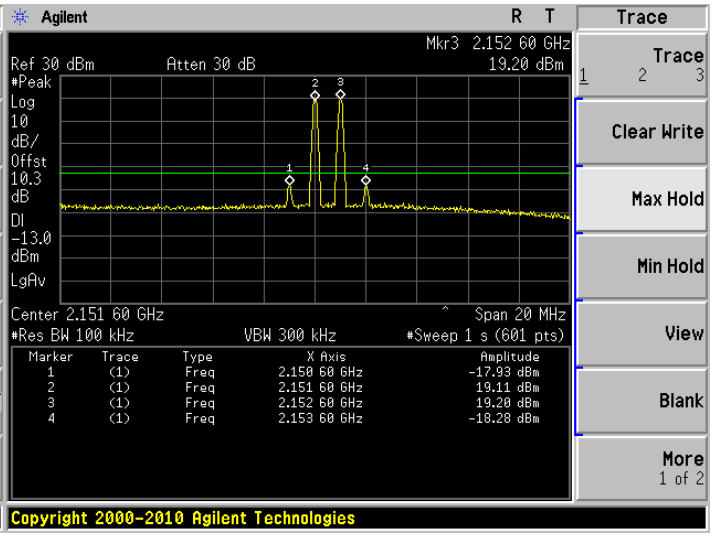
Middle Channel, Output



High Channel, Input



High Channel, Output



8 FCC §22.917 & §24.238, & §27.53 – Band Edge

8.1 Applicable Standard

According to FCC §22.917, §24.238, and §27.53, 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.

8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09[1]
Agilent	Signal Generator	E4438C	MY45091309	2011-04-28

Note 1: Based on a two year calibration cycle.

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

8.4 Test Environmental Conditions

Temperature:	20 °C
Relative Humidity:	48 %
ATM Pressure:	101.2kPa

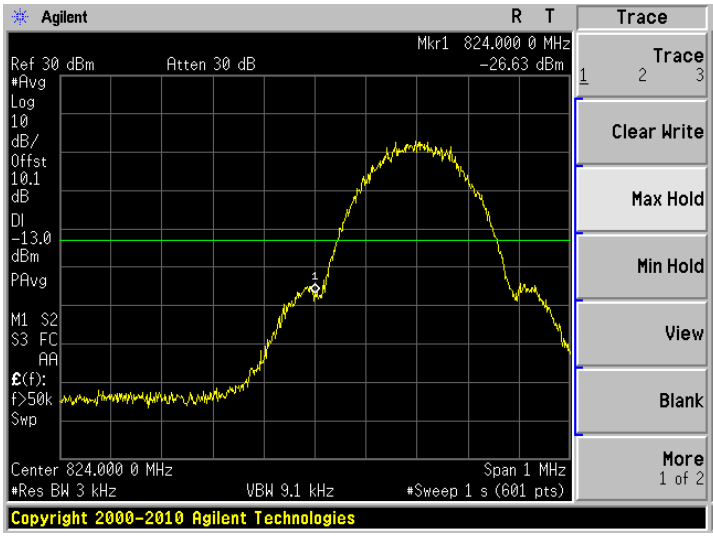
The testing was performed by Lionel Lara on 2012-04-06 in the RF Site.

8.5 Test Results

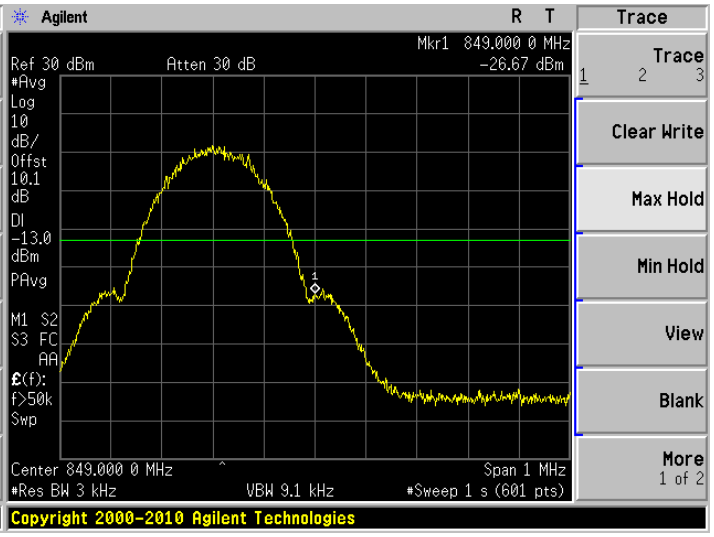
Please refer to the following plots.

Cell Band Uplink:

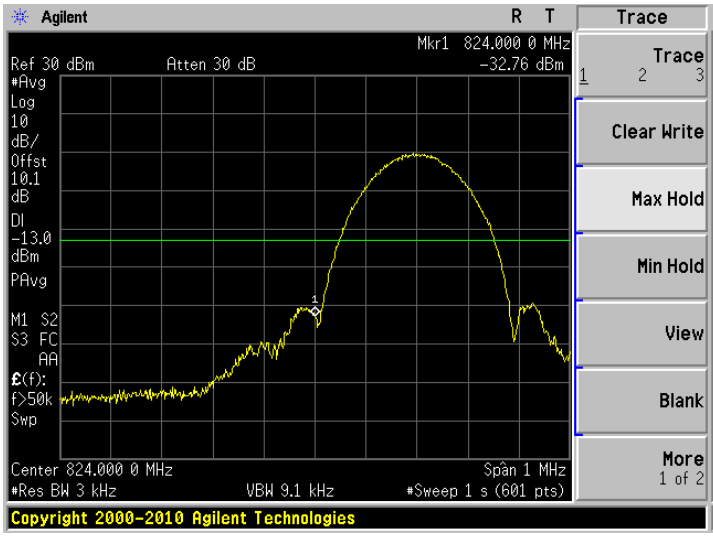
GSM - Low Channel



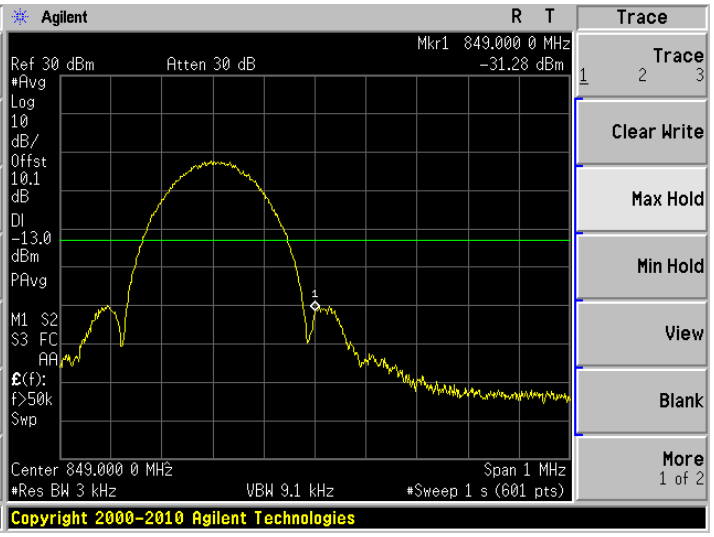
GSM - High Channel



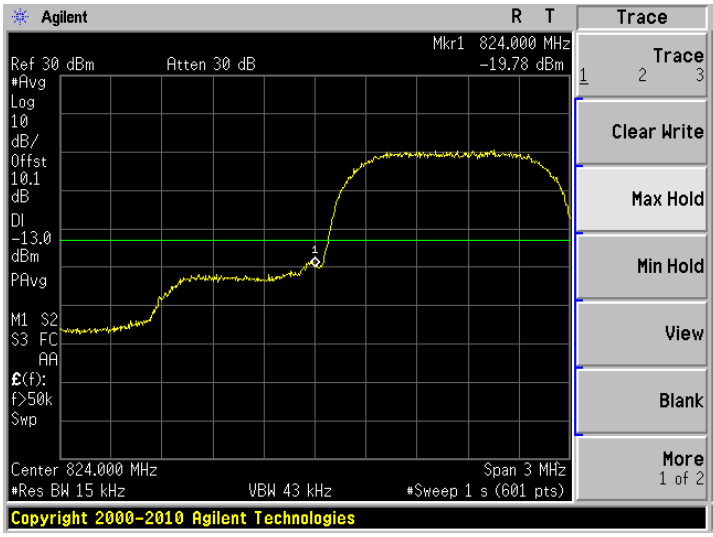
EDGE - Low Channel



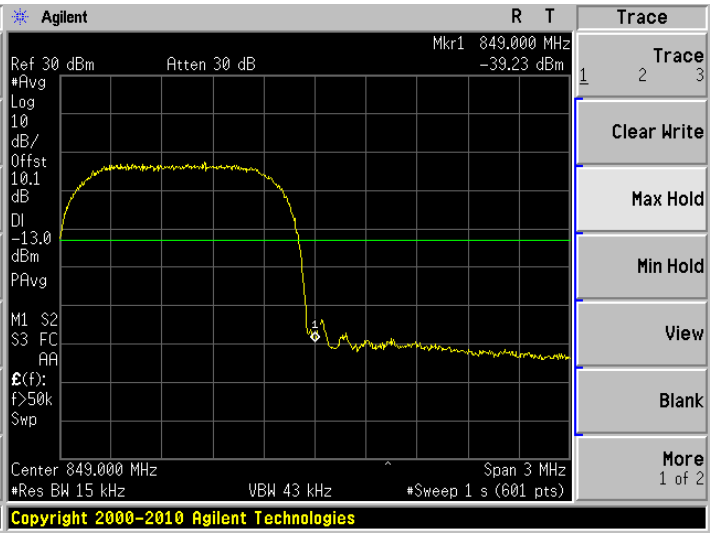
EDGE - High Channel



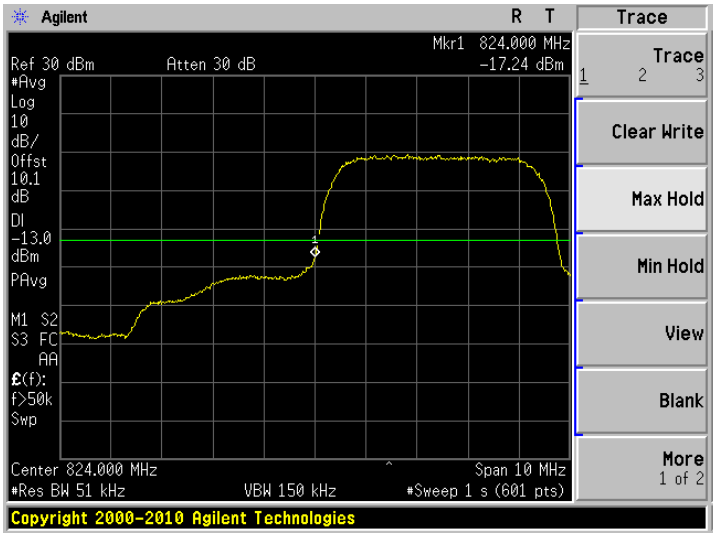
CDMA - Low Channel



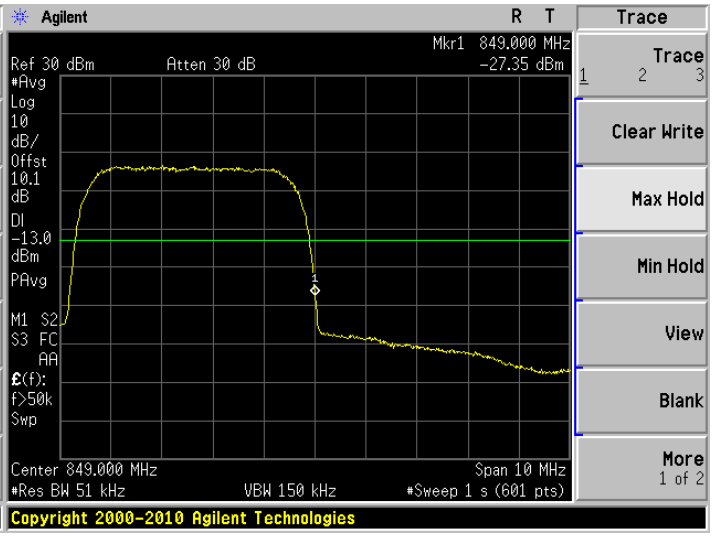
CDMA - High Channel



WCDMA - Low Channel

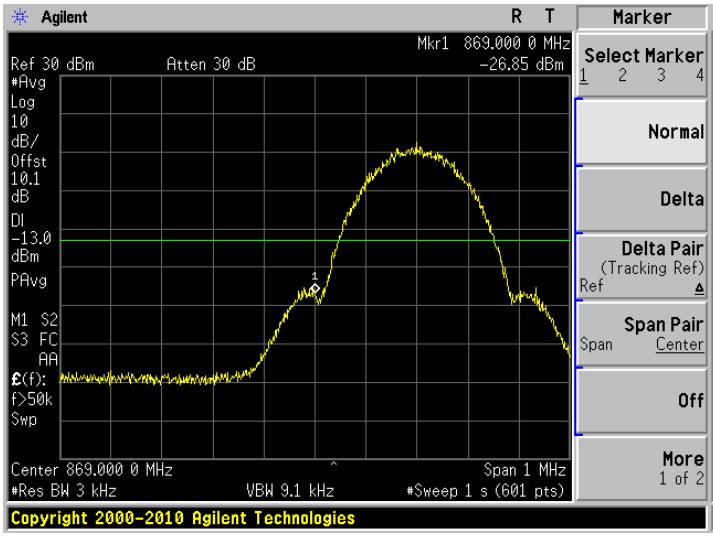


WCDMA - High Channel

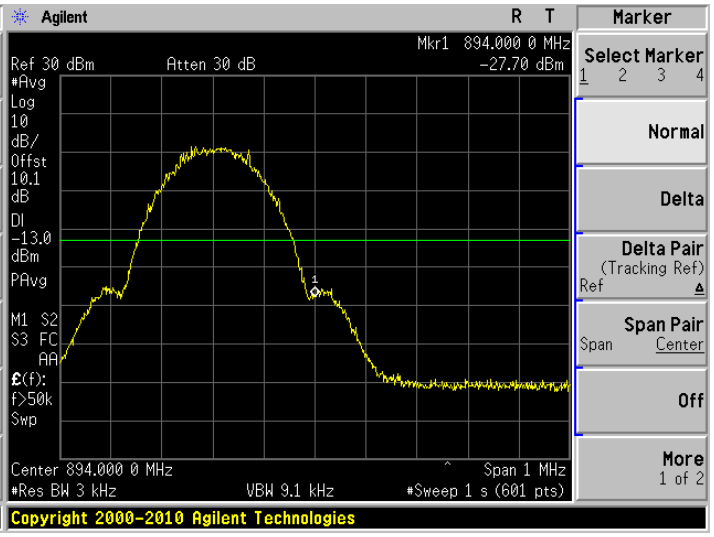


Cell Band Downlink:

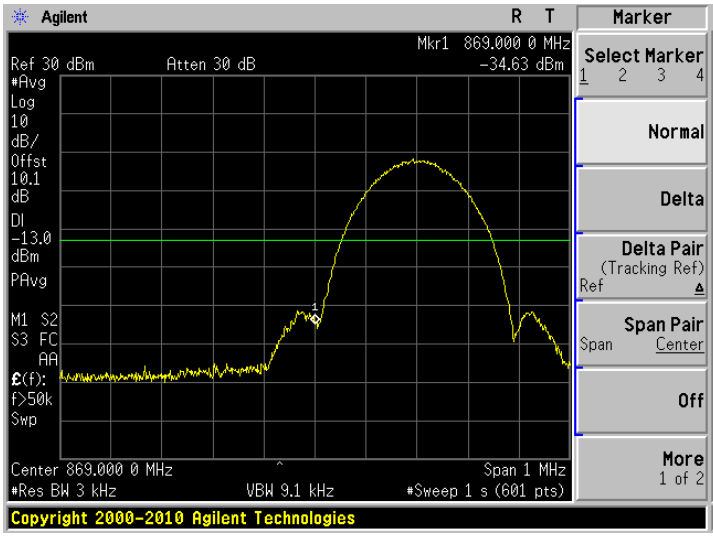
GSM - Low Channel



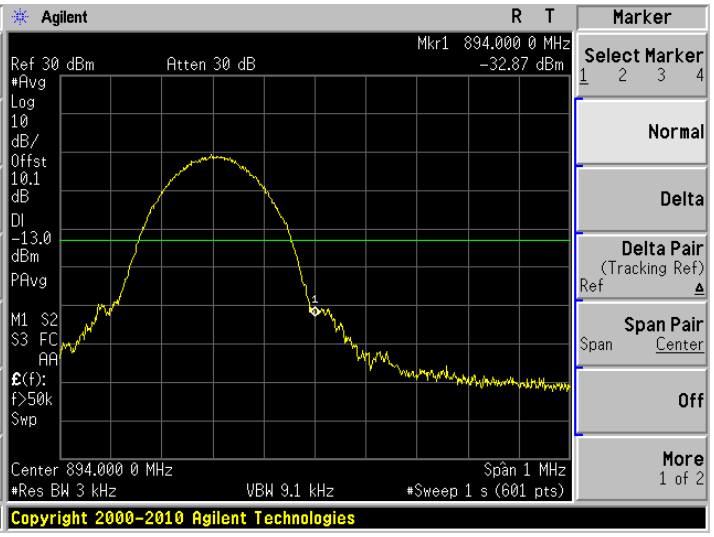
GSM - High Channel



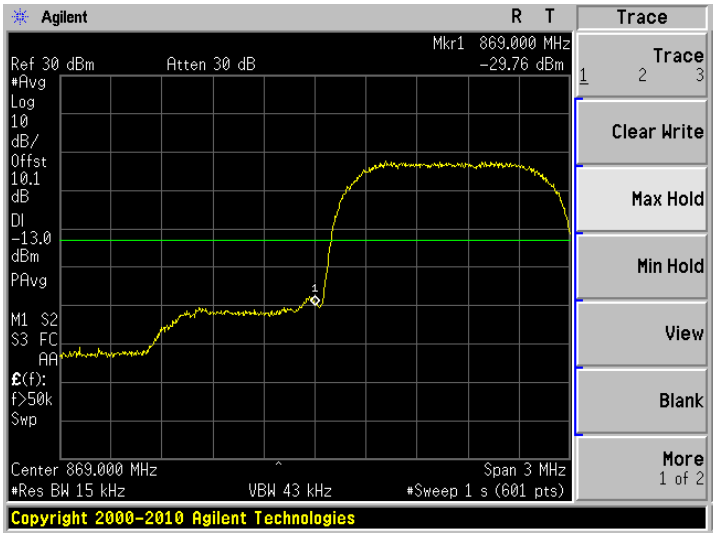
EDGE - Low Channel



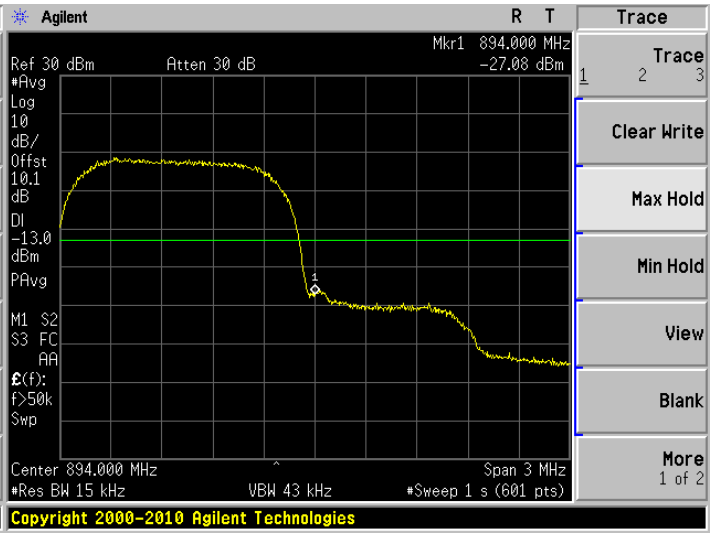
EDGE - High Channel



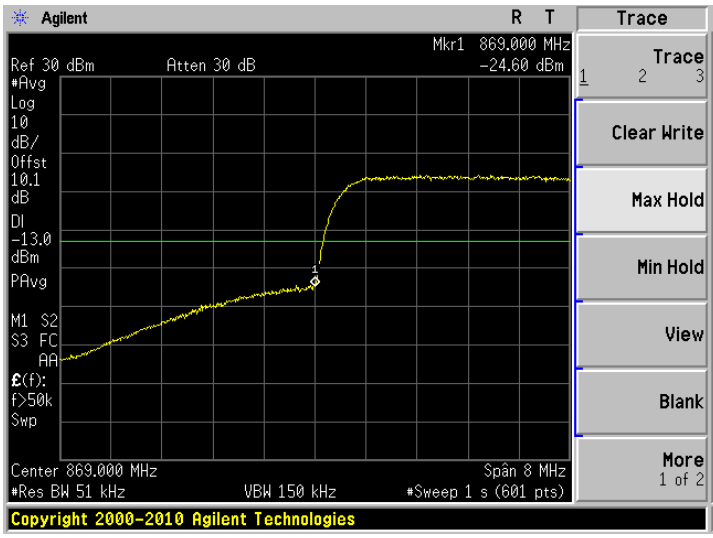
CDMA - Low Channel



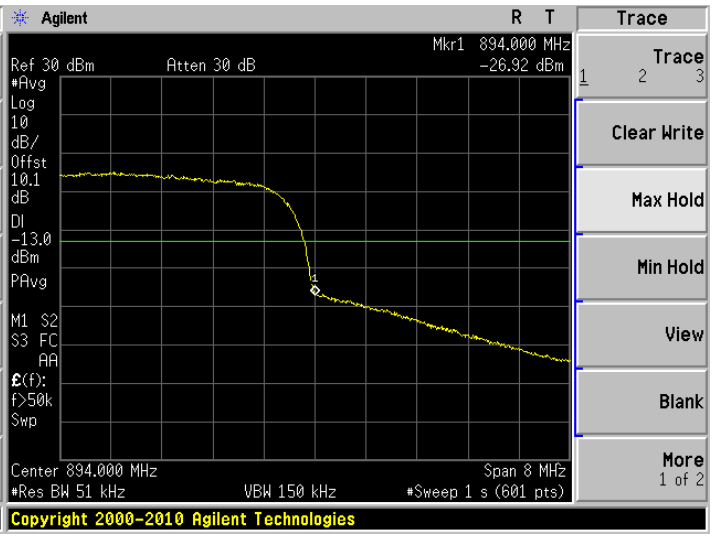
CDMA - High Channel



WCDMA - Low Channel

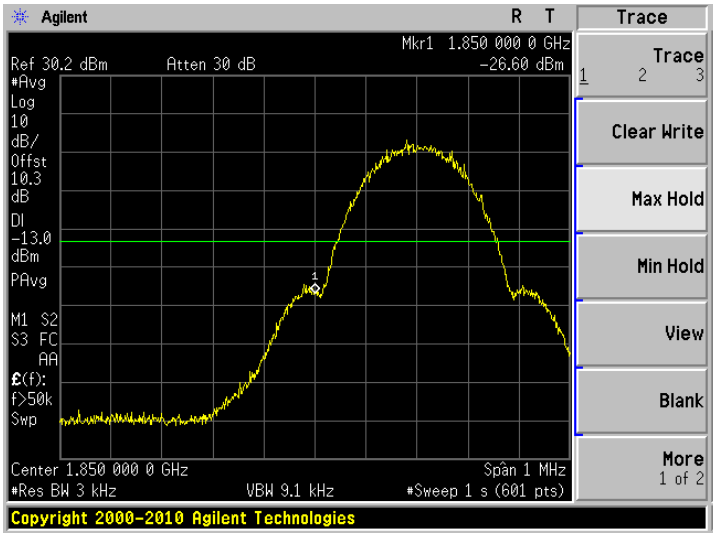


WCDMA - High Channel

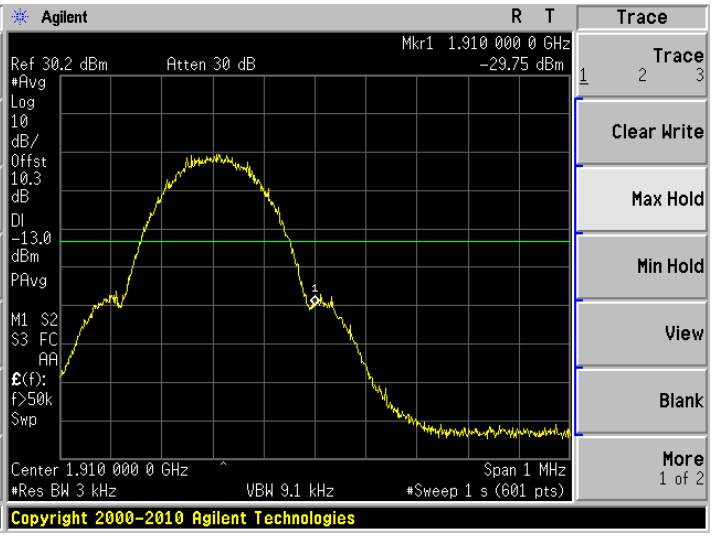


PCS Band Uplink:

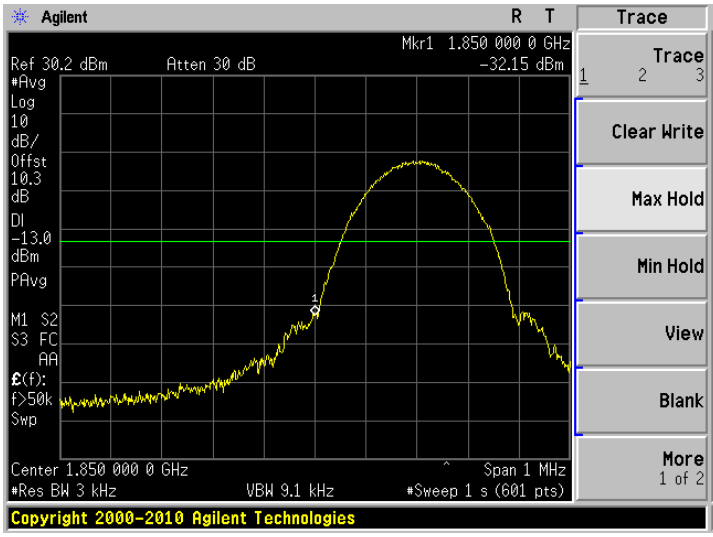
GSM - Low Channel



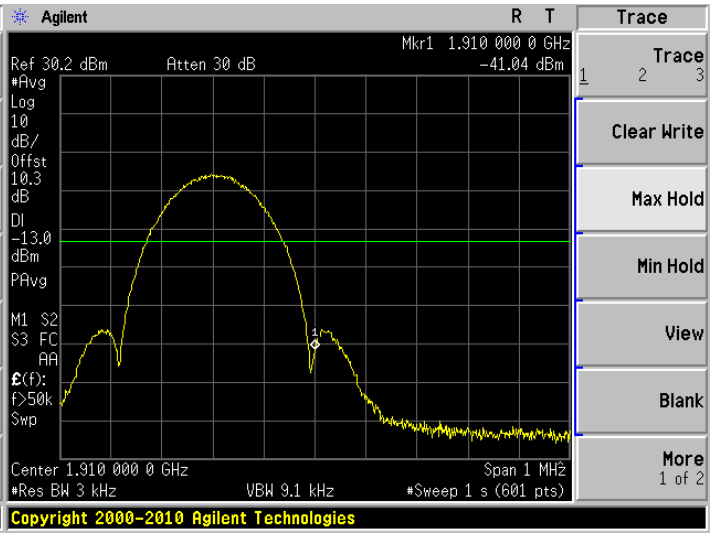
GSM - High Channel



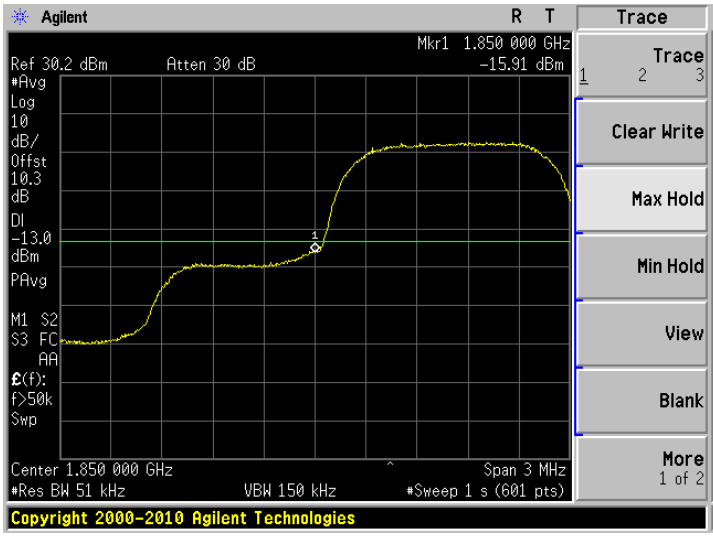
EDGE - Low Channel



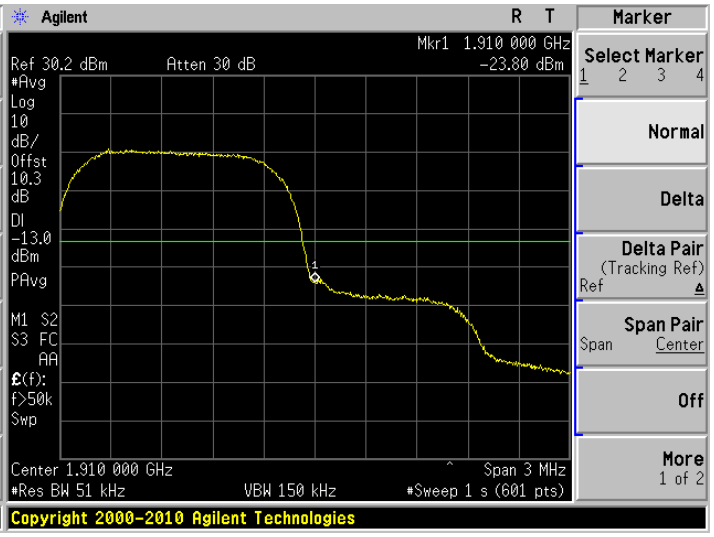
EDGE - High Channel



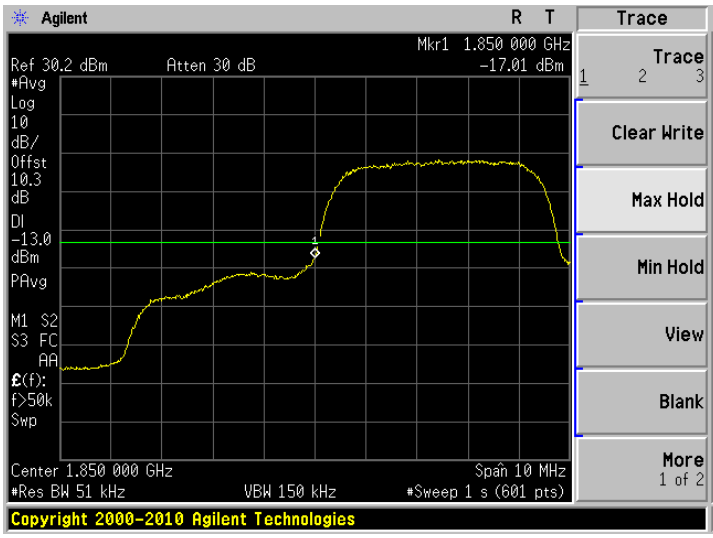
CDMA - Low Channel



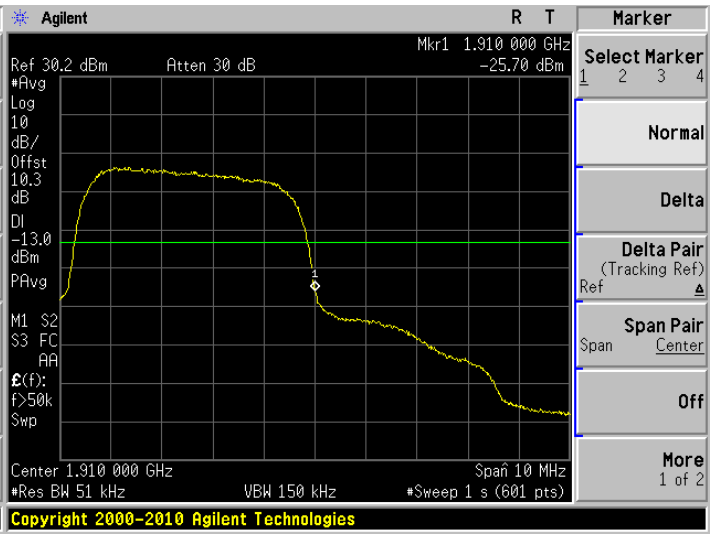
CDMA - High Channel



WCDMA - Low Channel

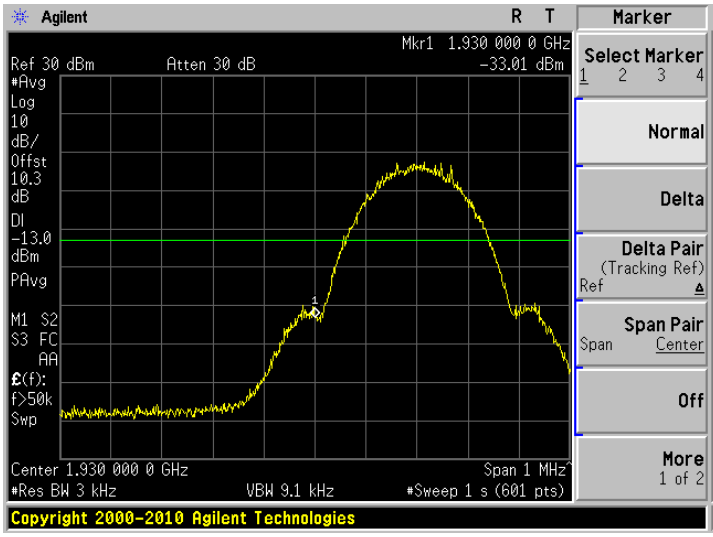


WCDMA - High Channel

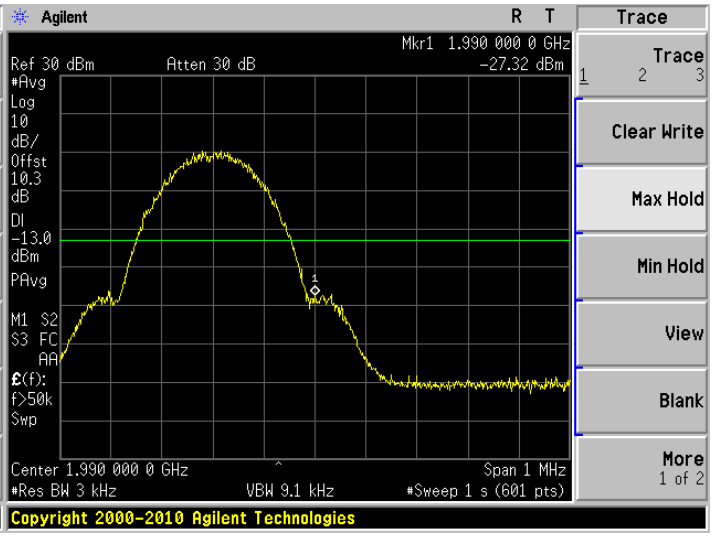


PCS Band Downlink:

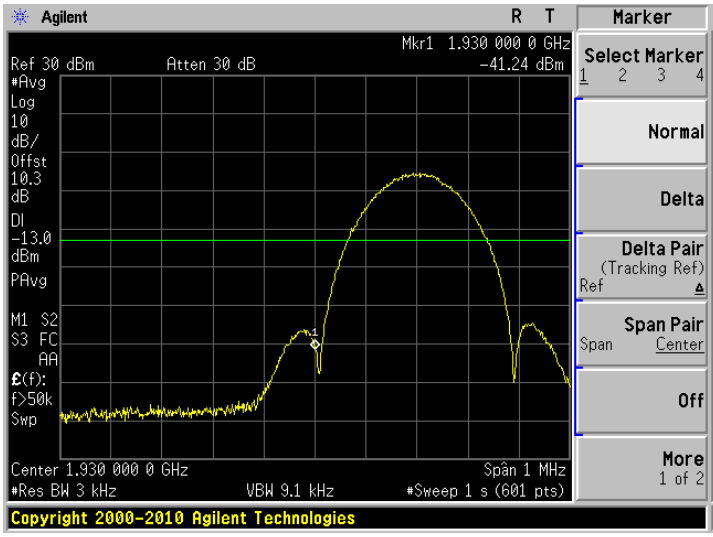
GSM - Low Channel



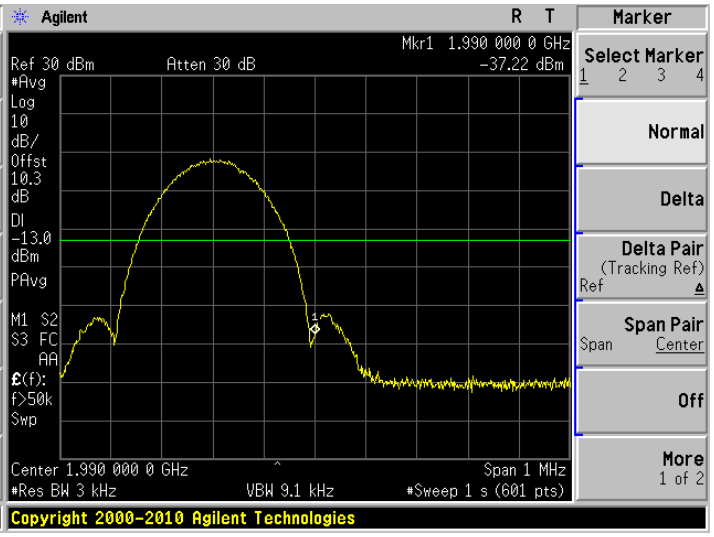
GSM - High Channel



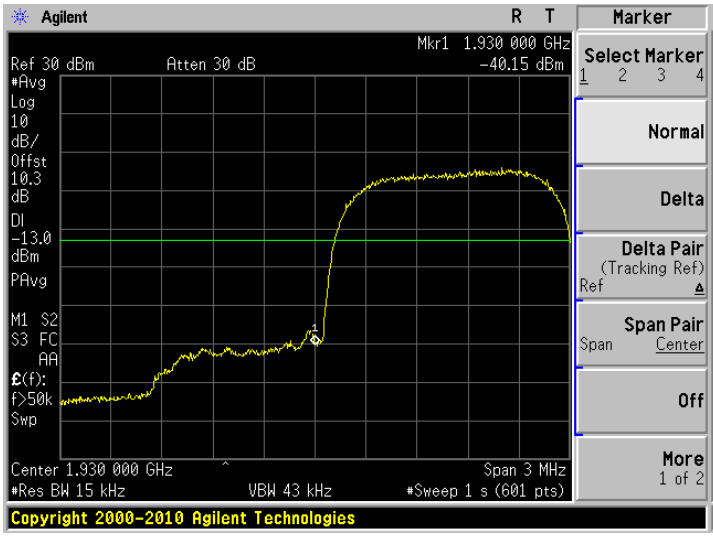
EDGE - Low Channel



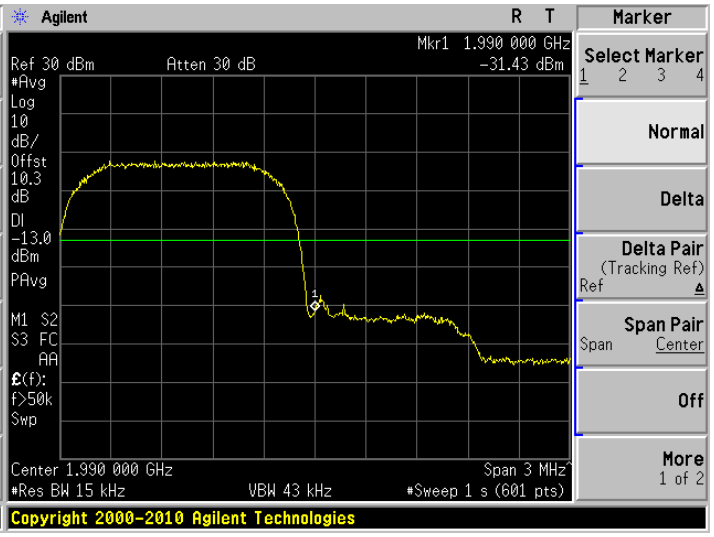
EDGE - High Channel



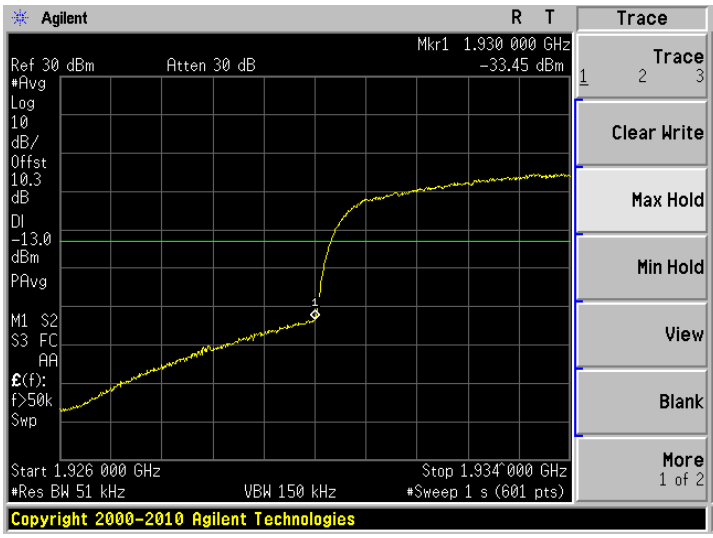
CDMA - Low Channel



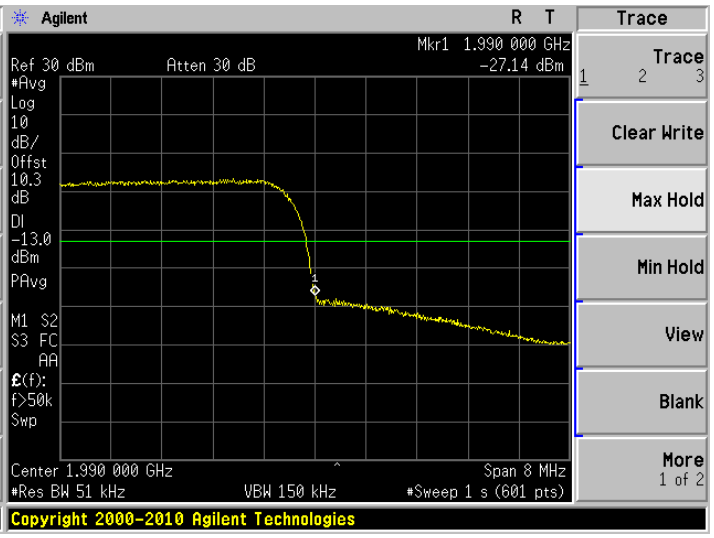
CDMA - High Channel



WCDMA - Low Channel

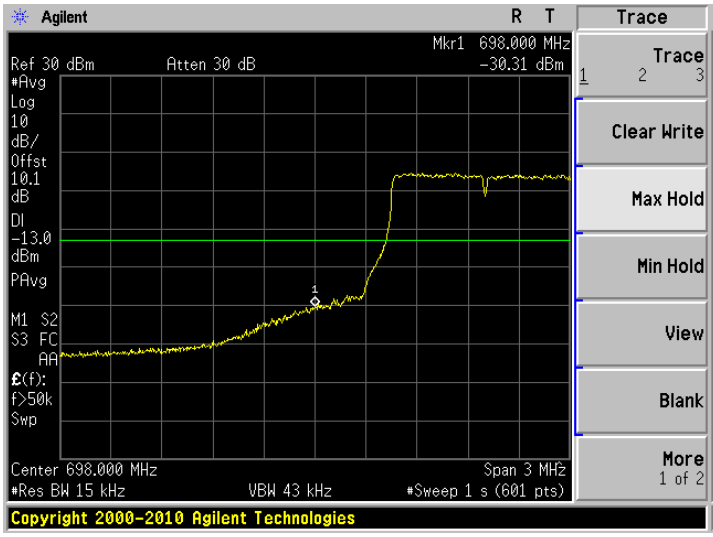


WCDMA - High Channel

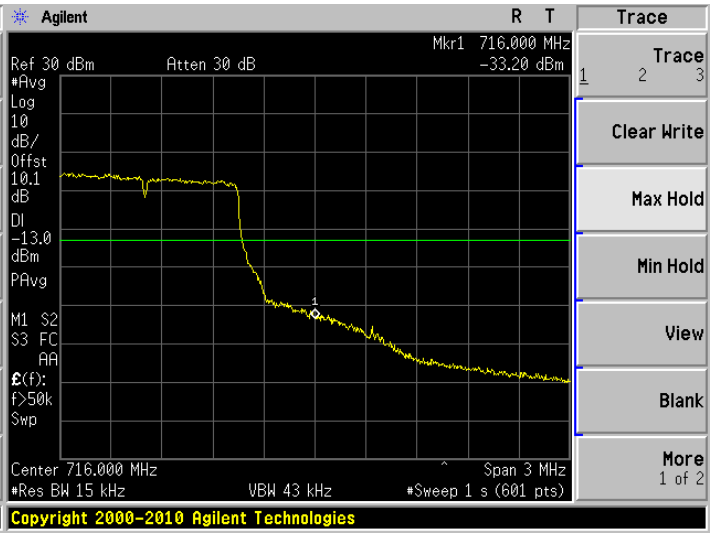


Lower LTE Band Uplink:

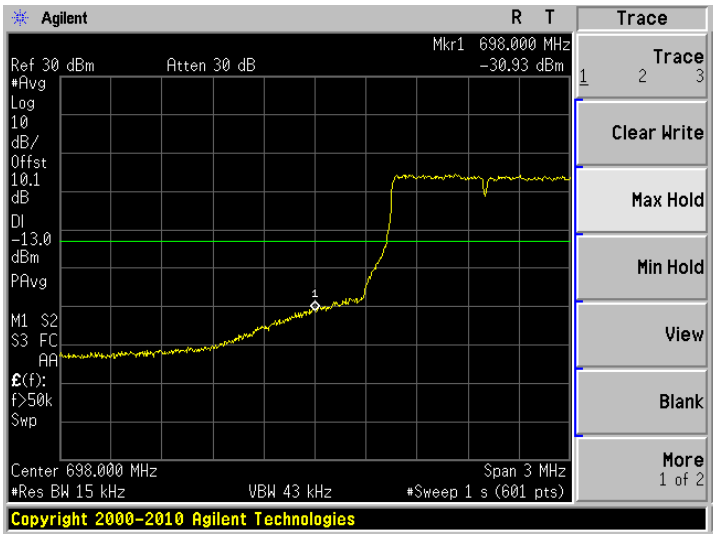
QPSK (1.4 MHz) - Low Channel



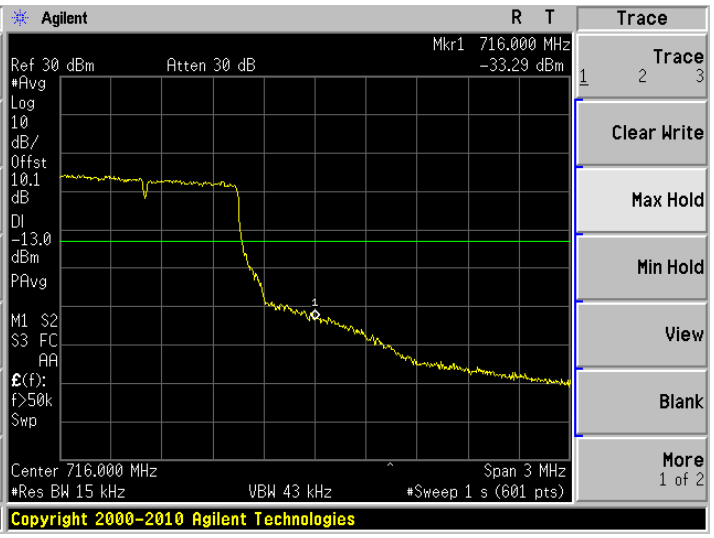
QPSK (1.4 MHz) - High Channel



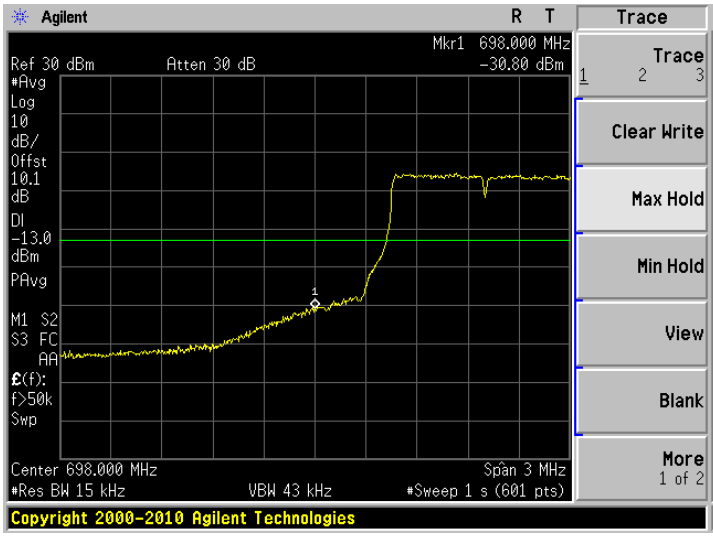
16QAM (1.4 MHz) - Low Channel



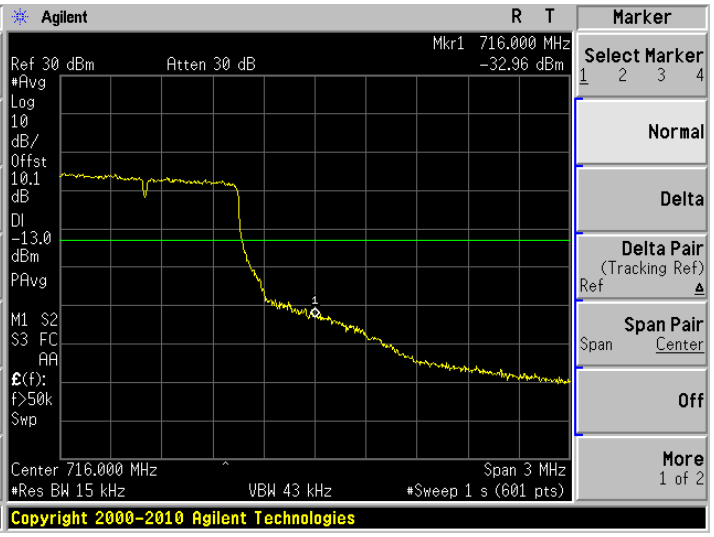
16QAM (1.4 MHz) - High Channel



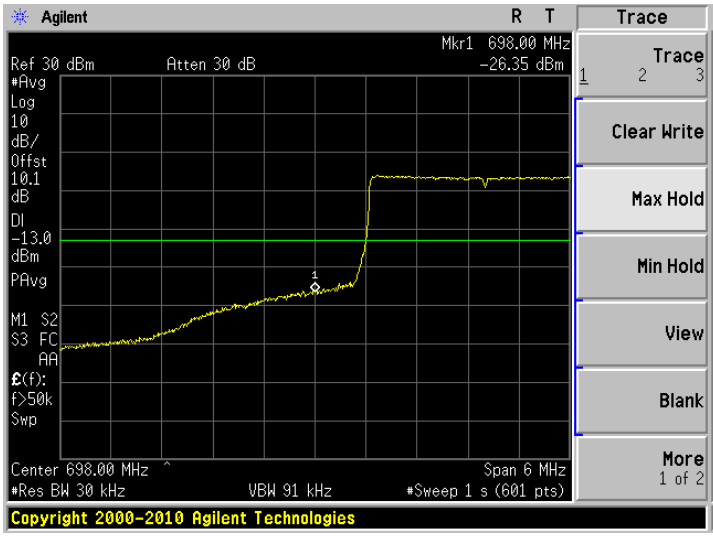
64QAM (1.4 MHz) - Low Channel



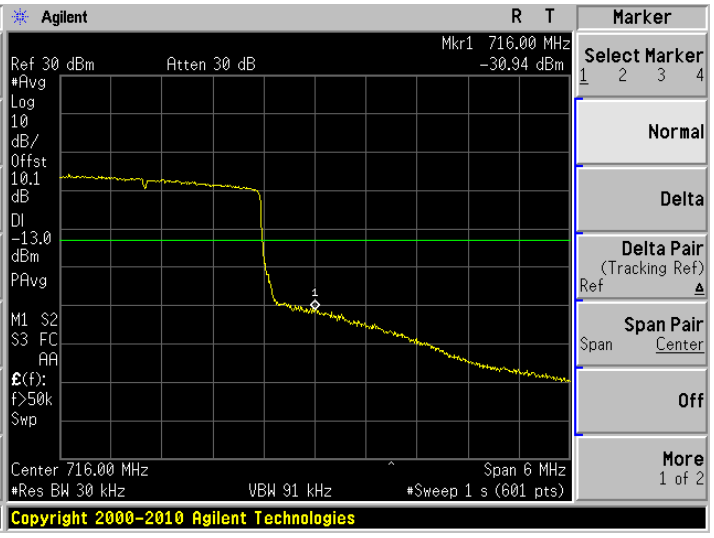
64QAM (1.4 MHz) - High Channel



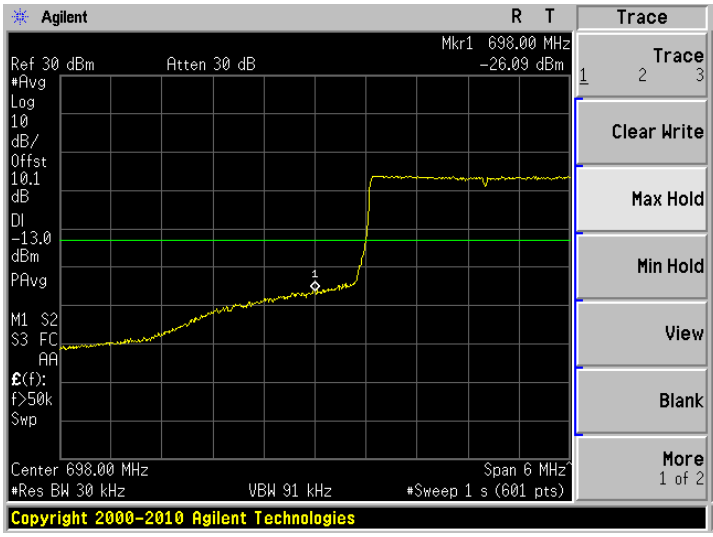
QPSK (3 MHz) - Low Channel



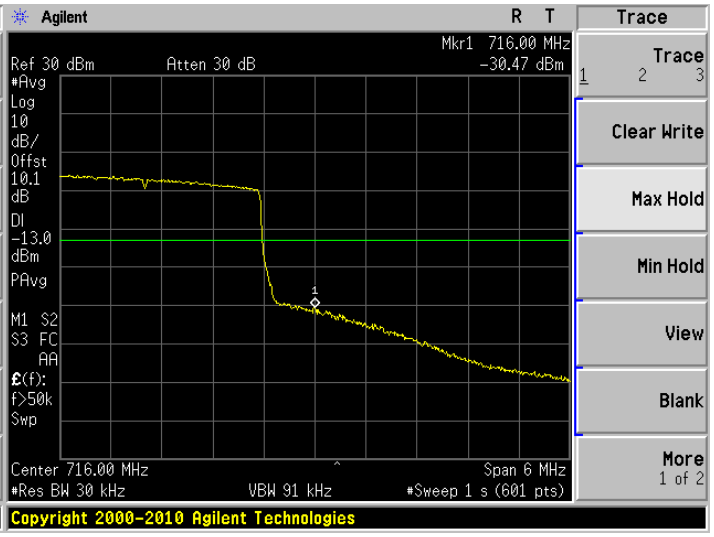
QPSK (3 MHz) - High Channel



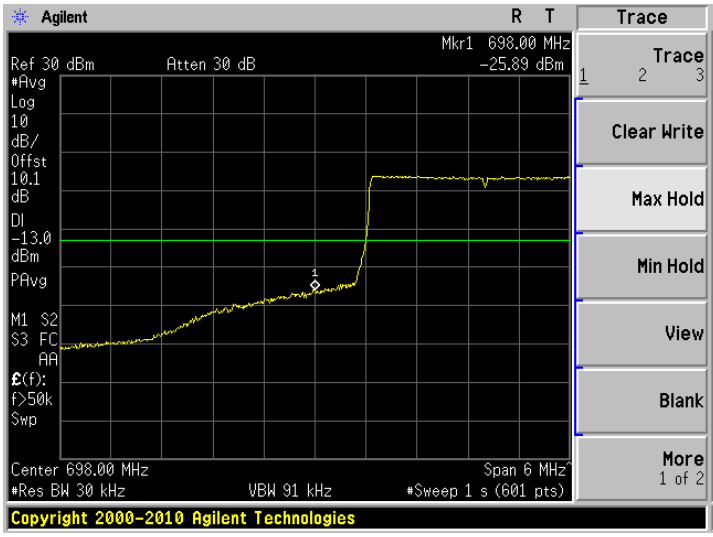
16QAM (3 MHz) - Low Channel



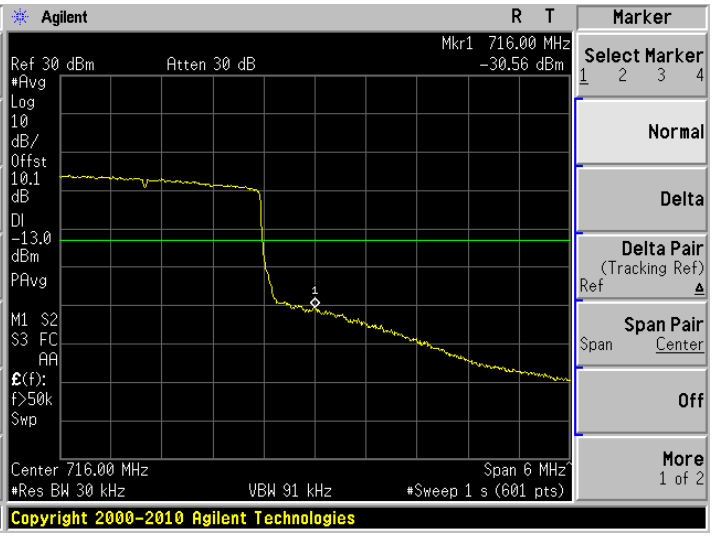
16QAM (3 MHz) - High Channel



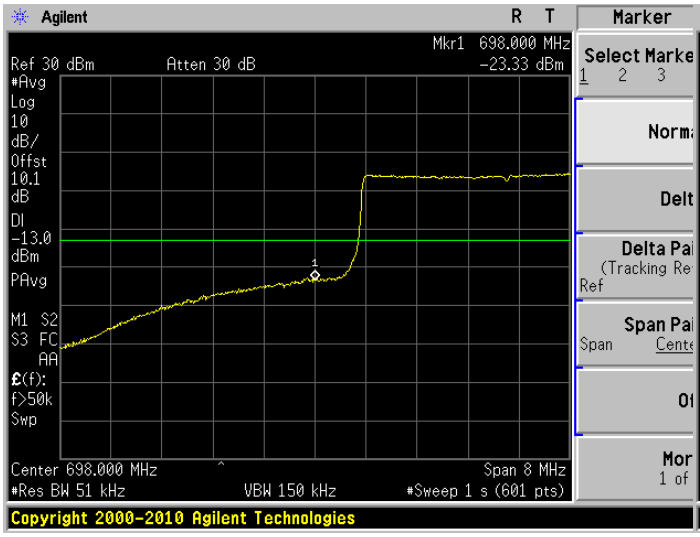
64QAM (3 MHz) - Low Channel



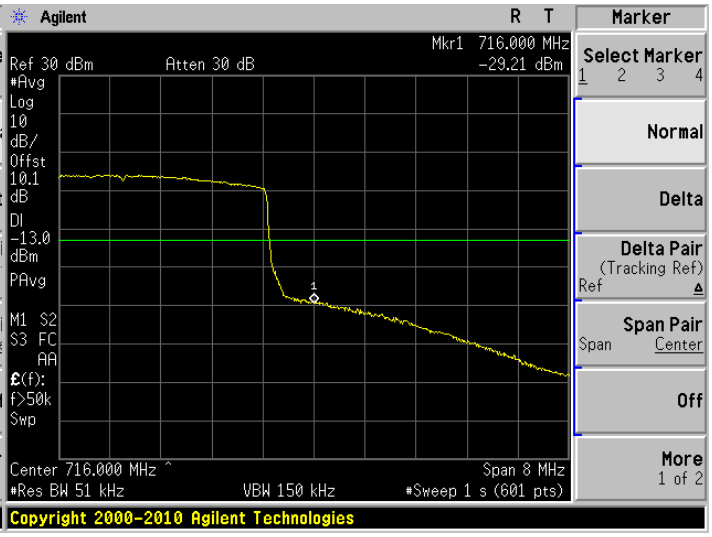
64QAM (3 MHz) - High Channel



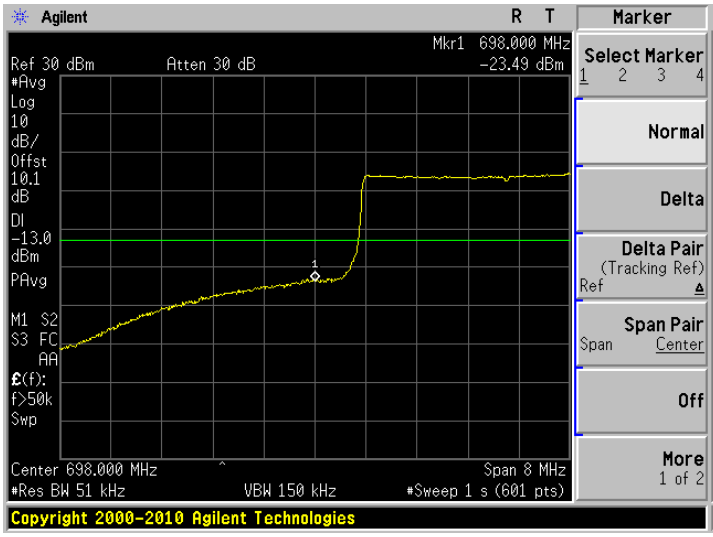
QPSK (5 MHz) - Low Channel



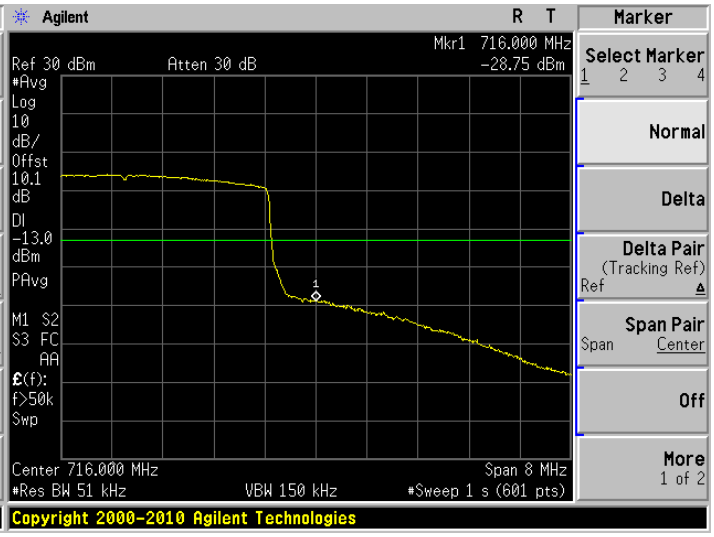
QPSK (5 MHz) - High Channel



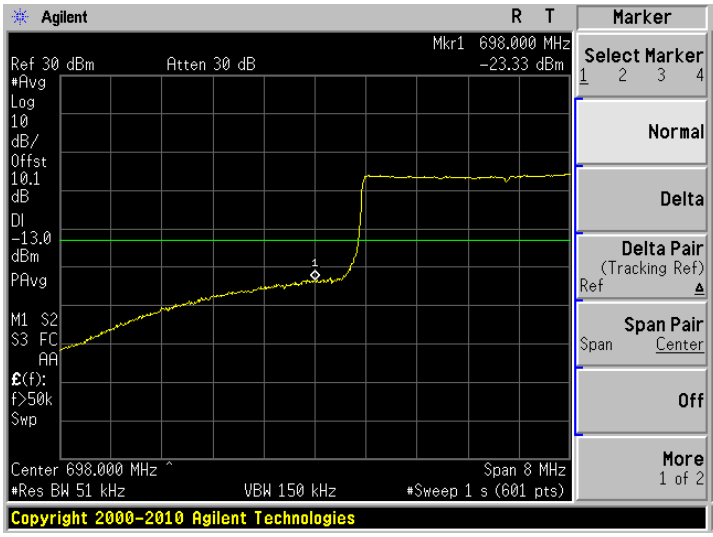
16QAM (5 MHz) - Low Channel



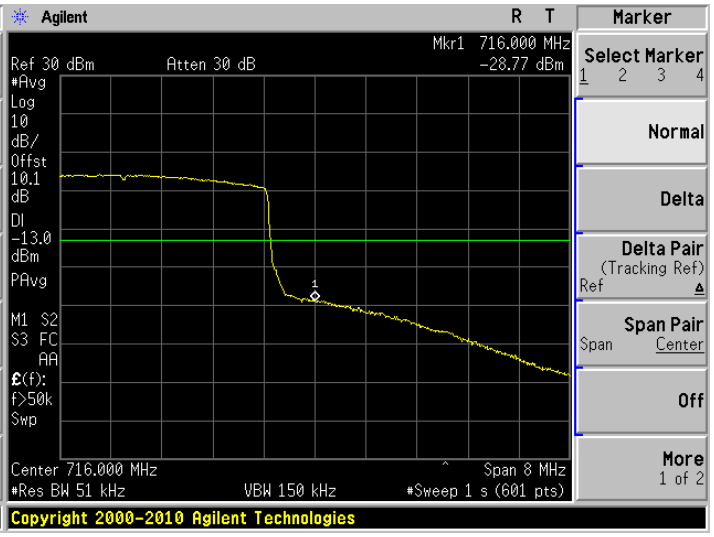
16QAM (5 MHz) - High Channel



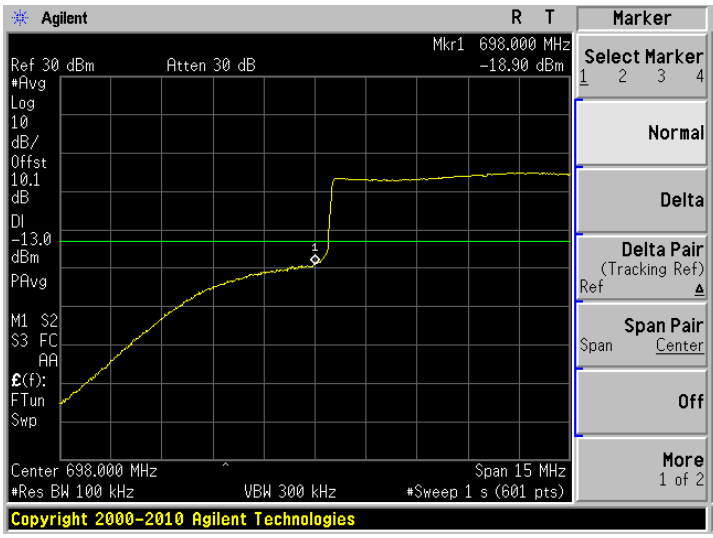
64QAM (5 MHz) - Low Channel



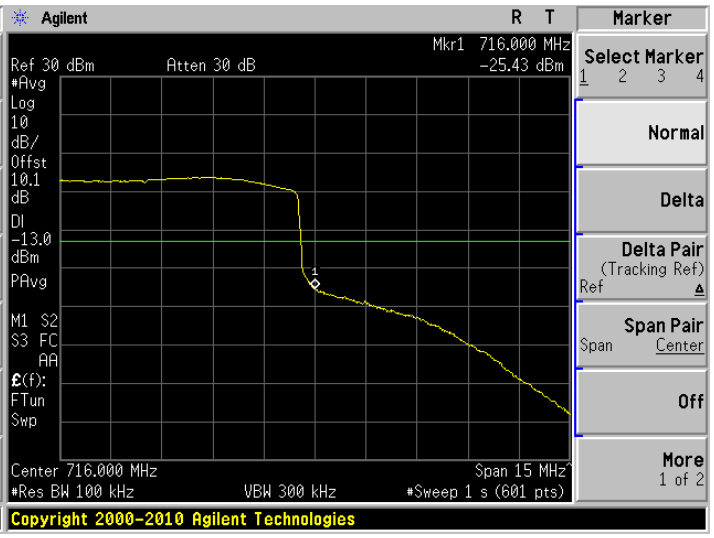
64QAM (5 MHz) - High Channel



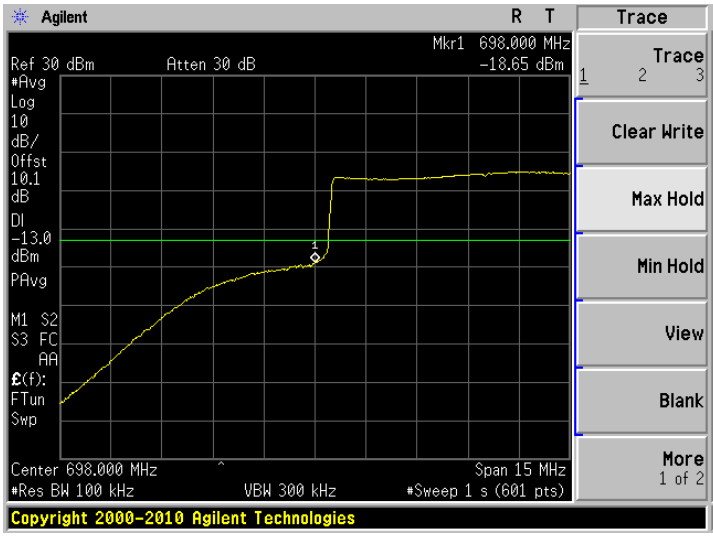
QPSK (10 MHz) - Low Channel



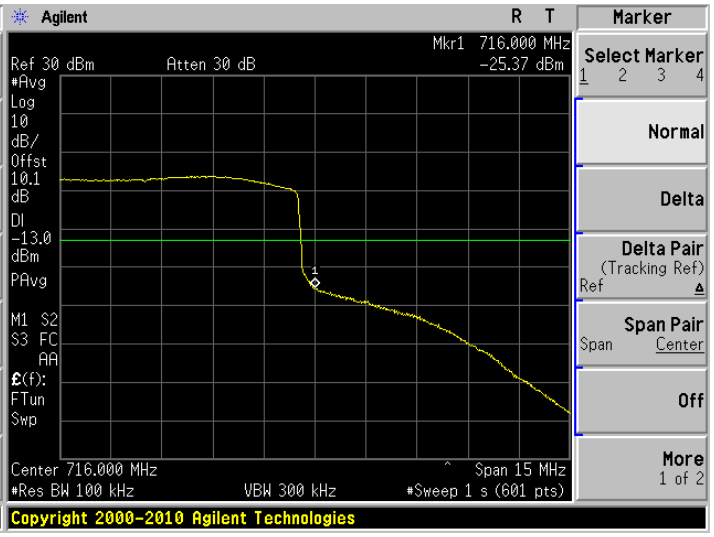
QPSK (10 MHz) - High Channel



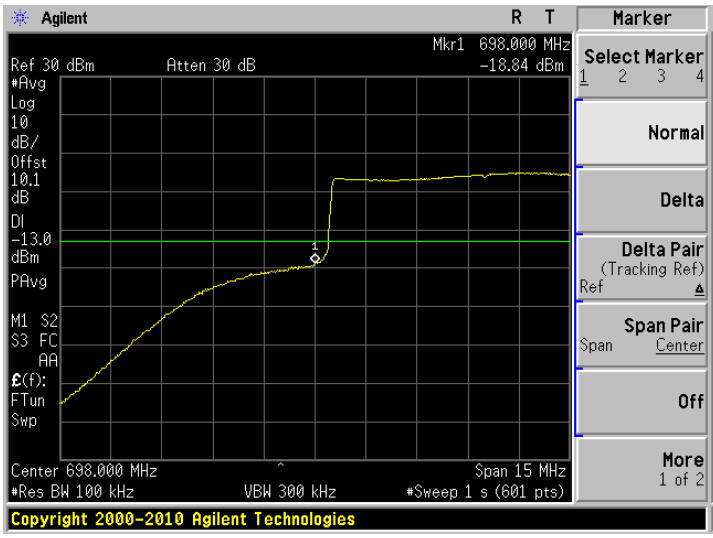
16QAM (10 MHz) - Low Channel



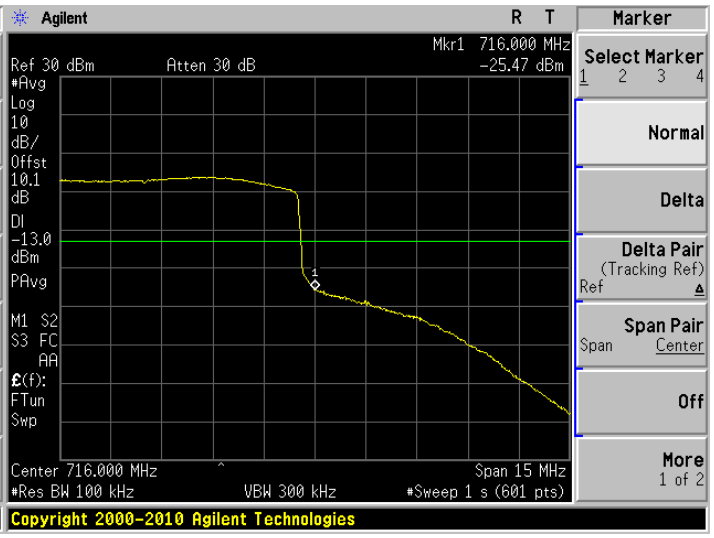
16QAM (10 MHz) - High Channel



64QAM (10 MHz) - Low Channel

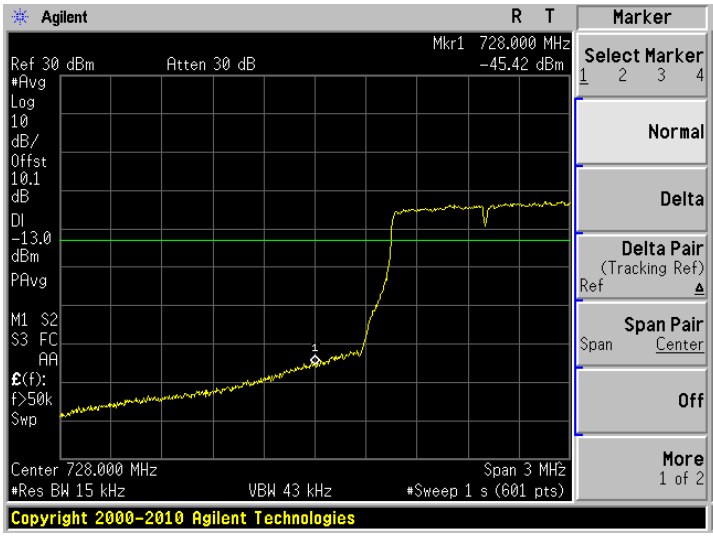


64QAM (10 MHz) - High Channel

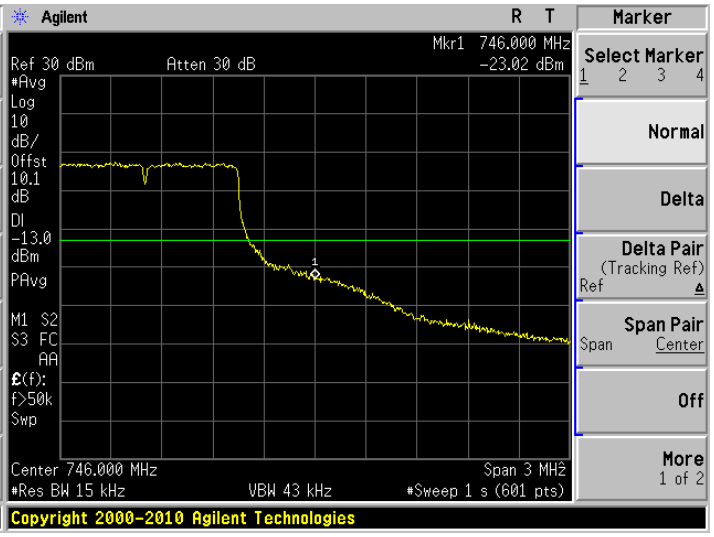


Lower LTE Band Downlink:

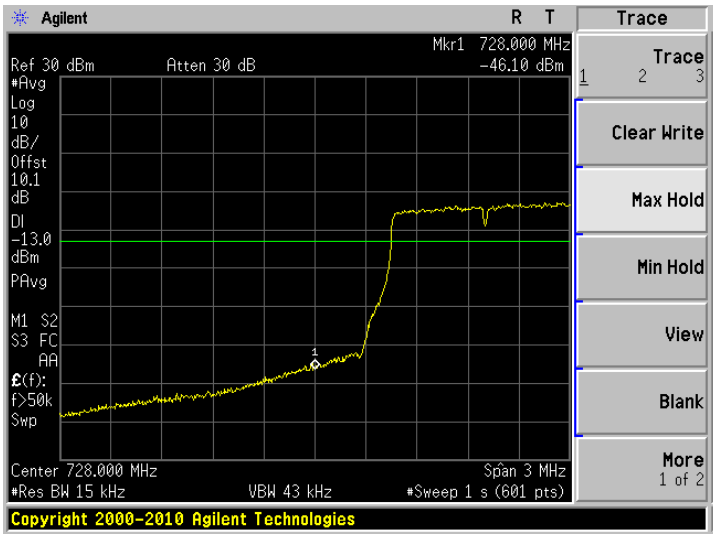
QPSK (1.4 MHz) - Low Channel



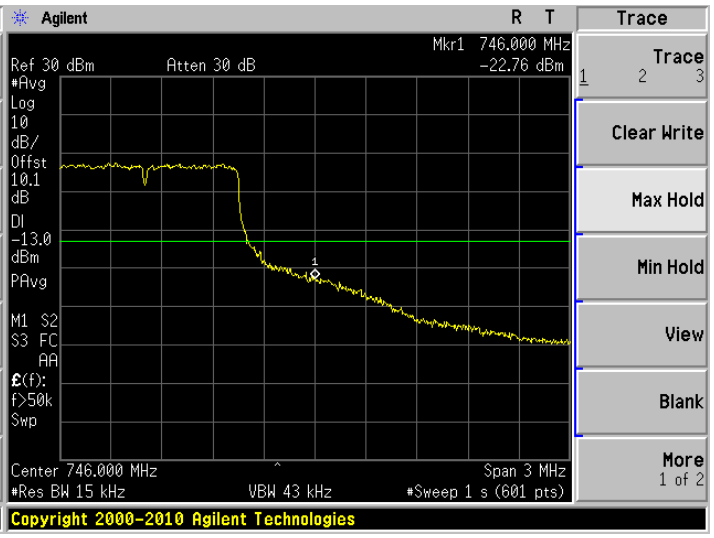
QPSK (1.4 MHz) - High Channel



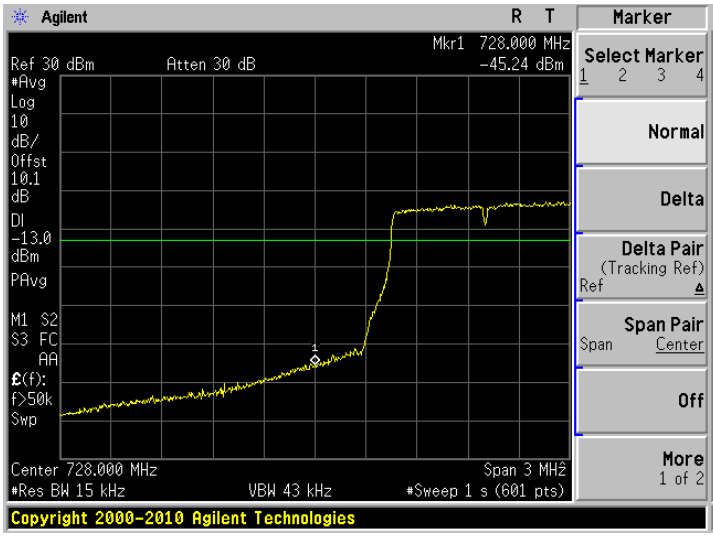
16QAM (1.4 MHz) - Low Channel



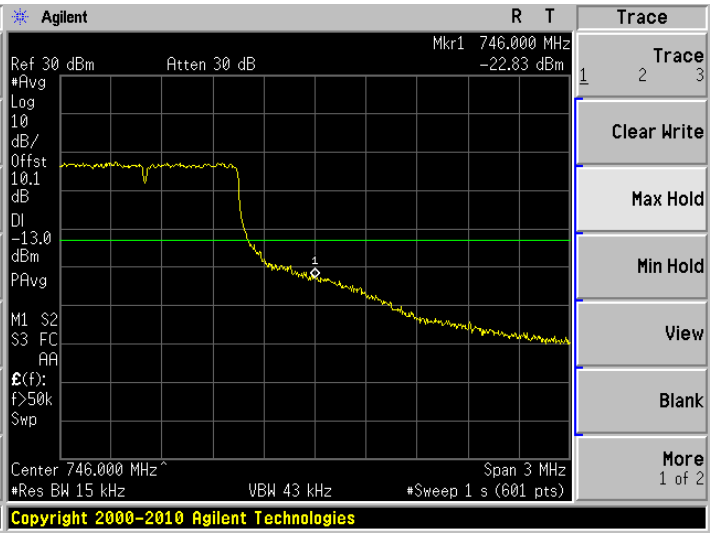
16QAM (1.4 MHz) - High Channel



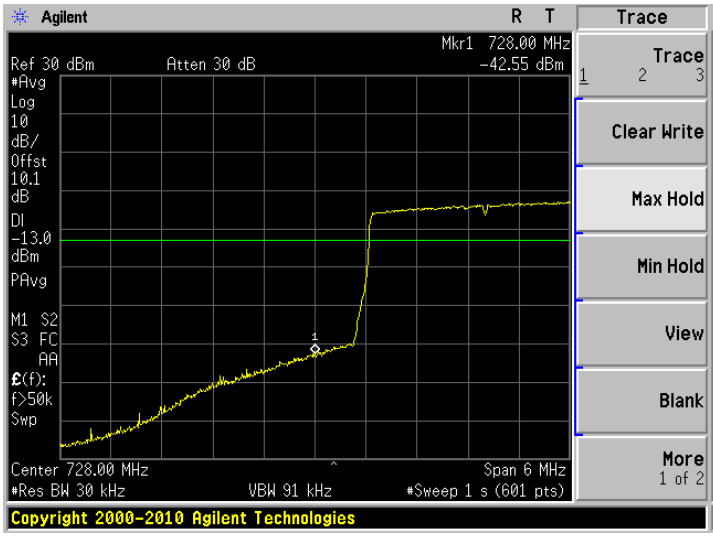
64QAM (1.4 MHz) - Low Channel



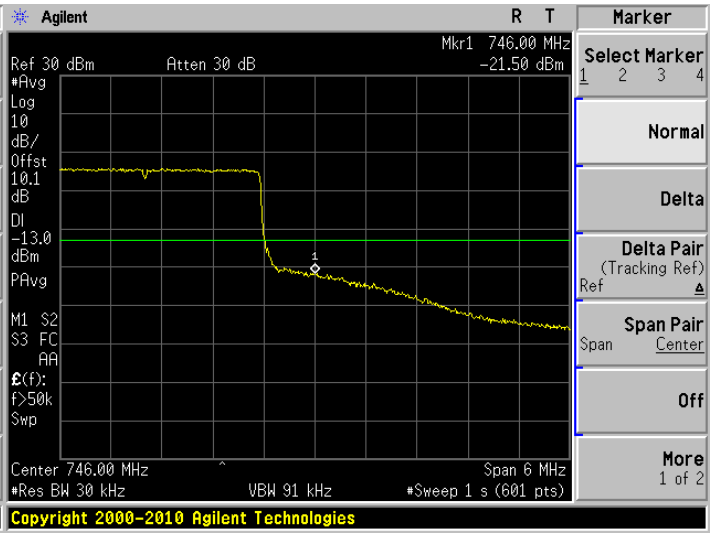
64QAM (1.4 MHz) - High Channel



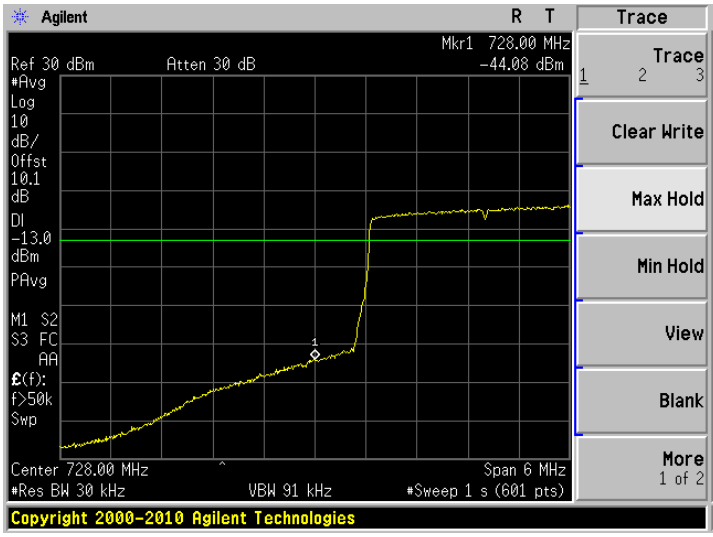
QPSK (3 MHz) - Low Channel



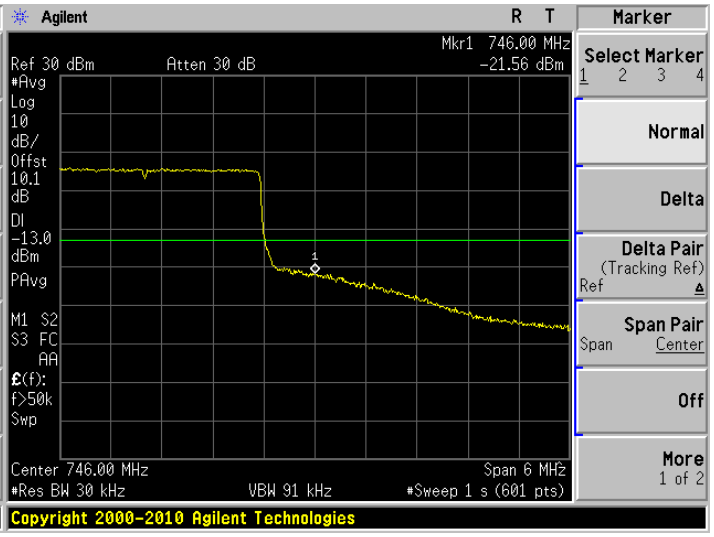
QPSK (3 MHz) - High Channel



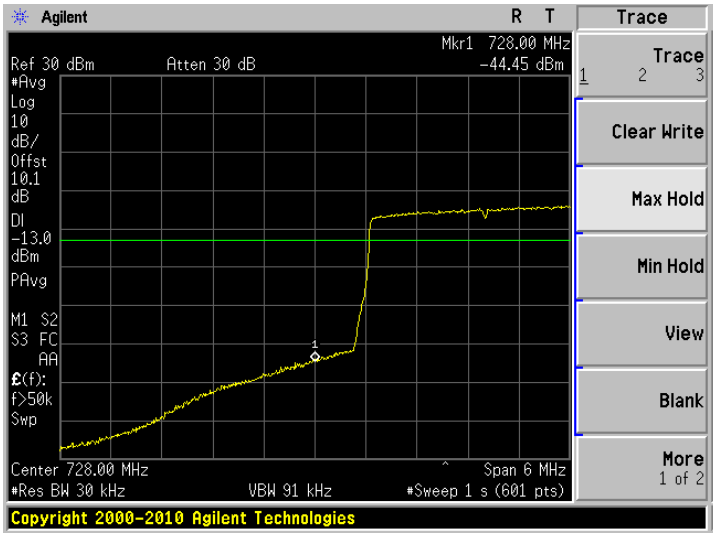
16QAM (3 MHz) - Low Channel



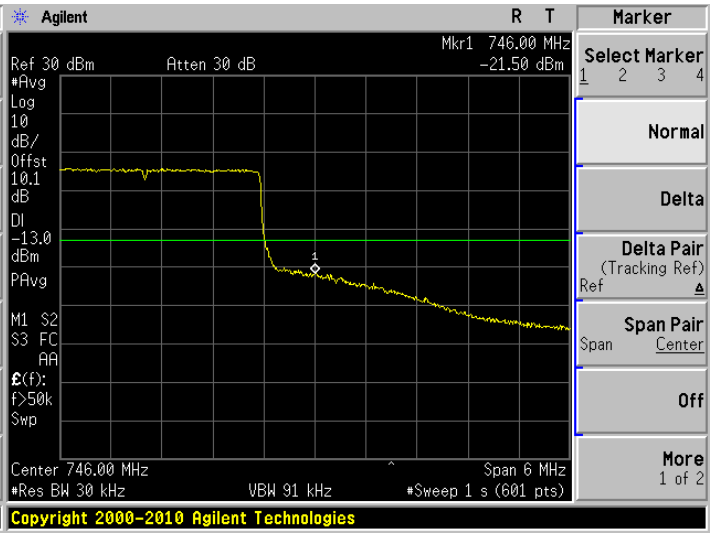
16QAM (3 MHz) - High Channel



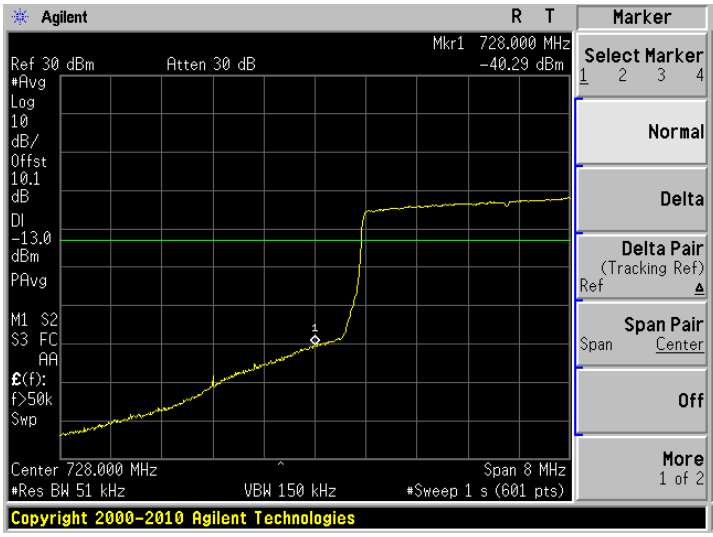
64QAM (3 MHz) - Low Channel



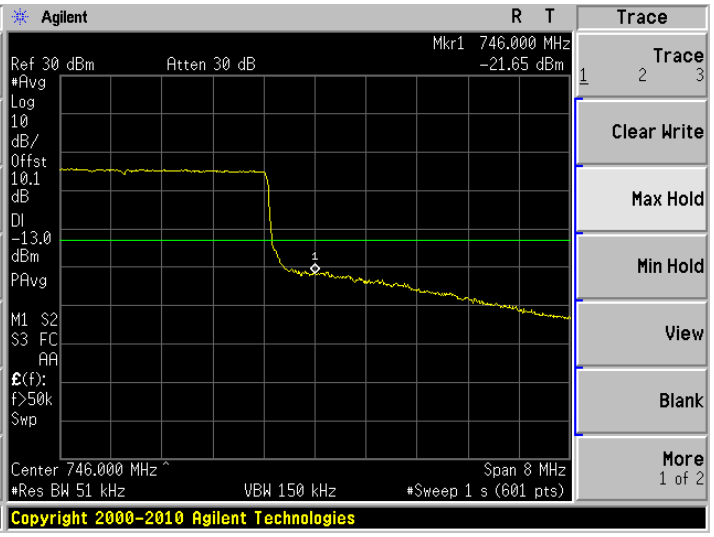
64QAM (3 MHz) - High Channel



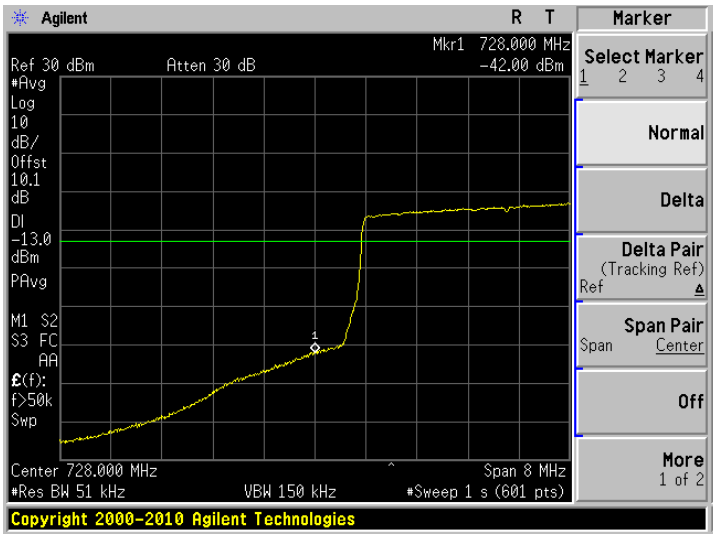
QPSK (5 MHz) - Low Channel



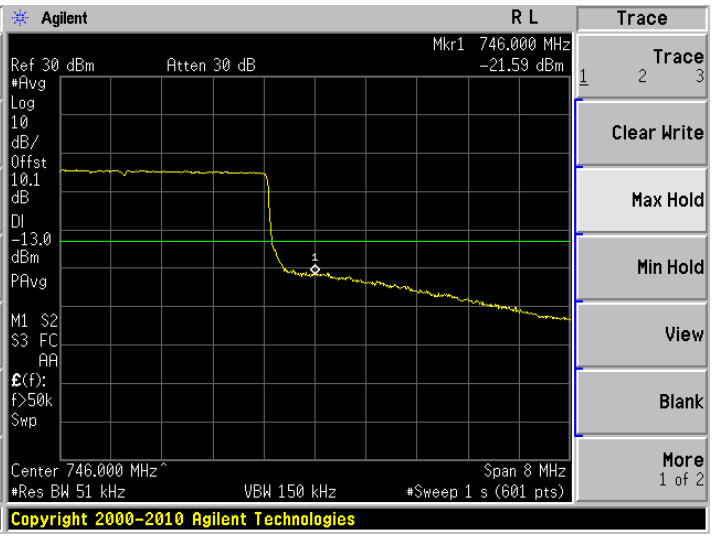
QPSK (5 MHz) - High Channel



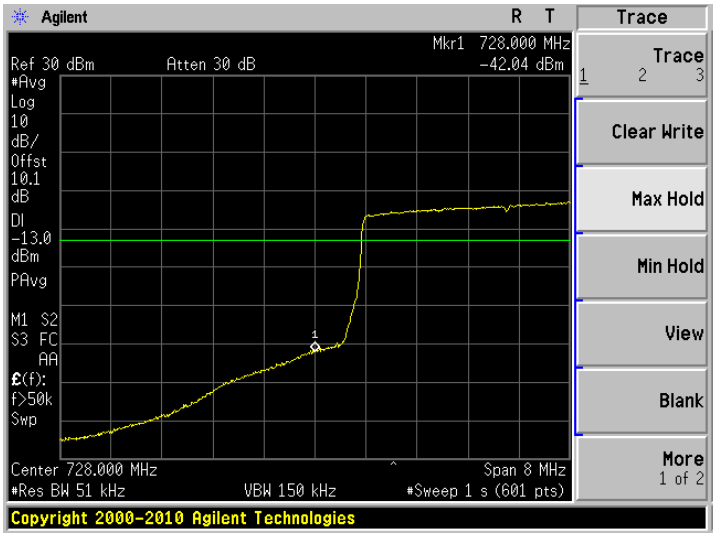
16QAM (5 MHz) - Low Channel



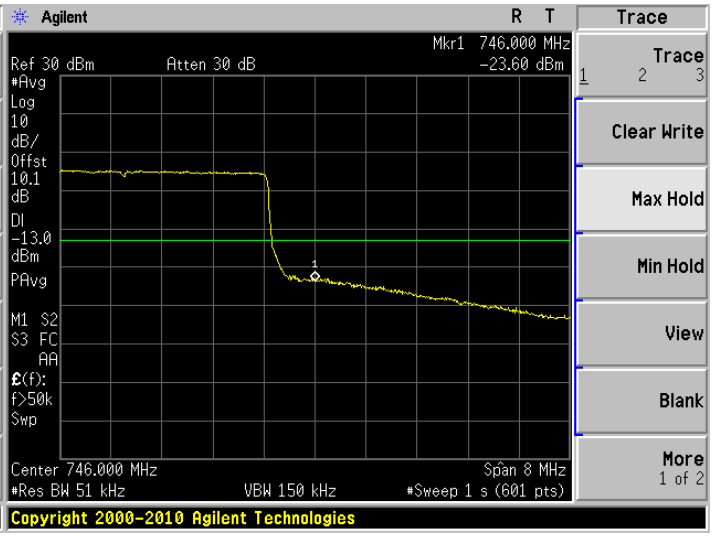
16QAM (5 MHz) - High Channel



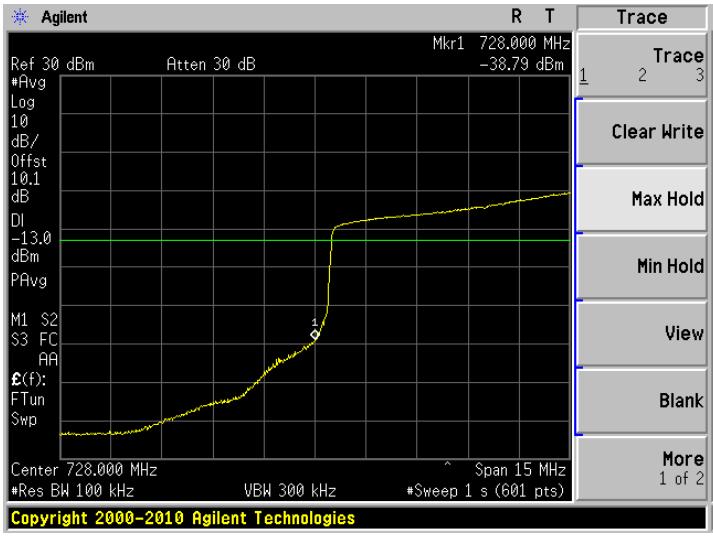
64QAM (5 MHz) - Low Channel



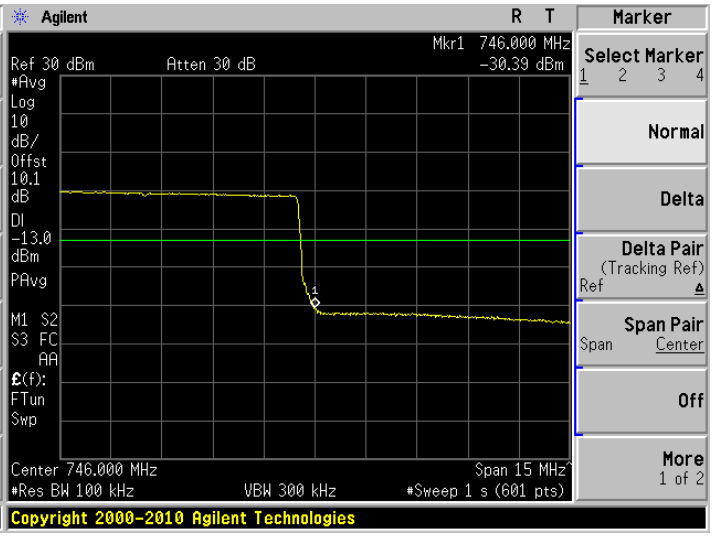
64QAM (5 MHz) - High Channel



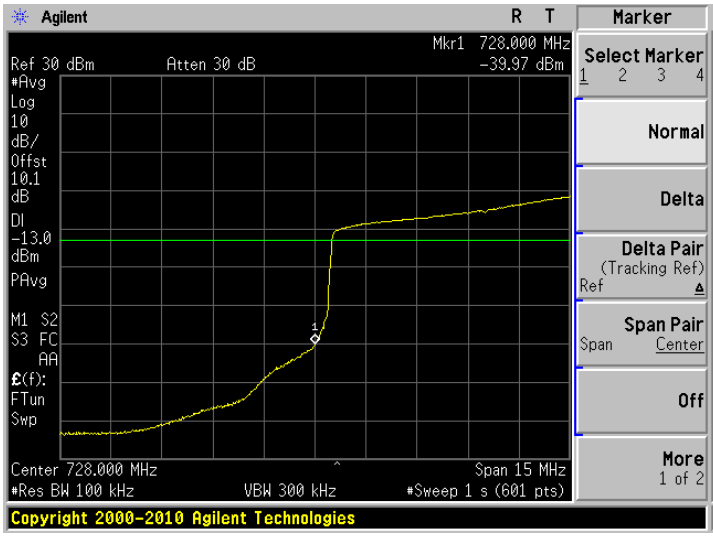
QPSK (10 MHz) - Low Channel



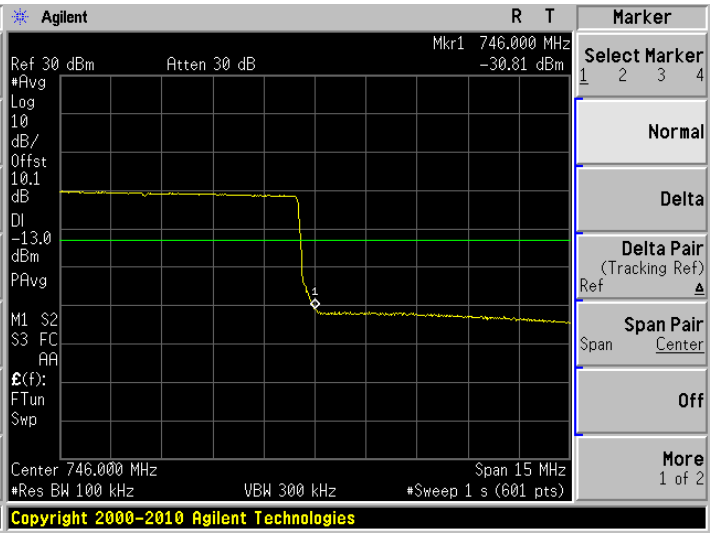
QPSK (10 MHz) - High Channel



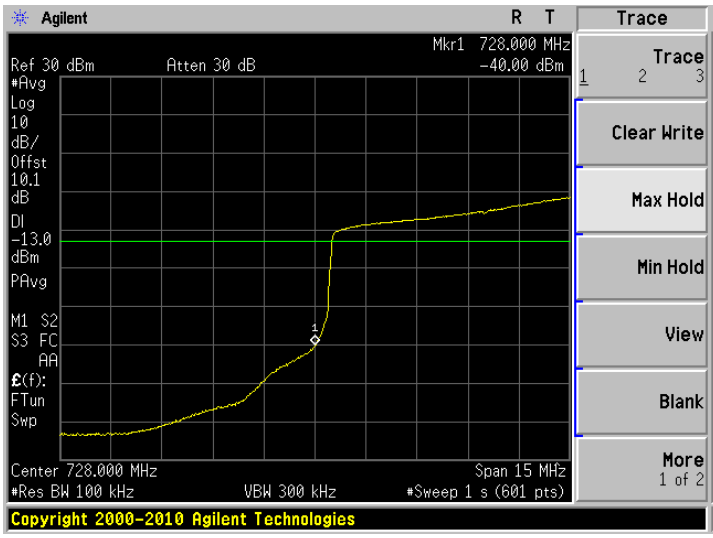
16QAM (10 MHz) - Low Channel



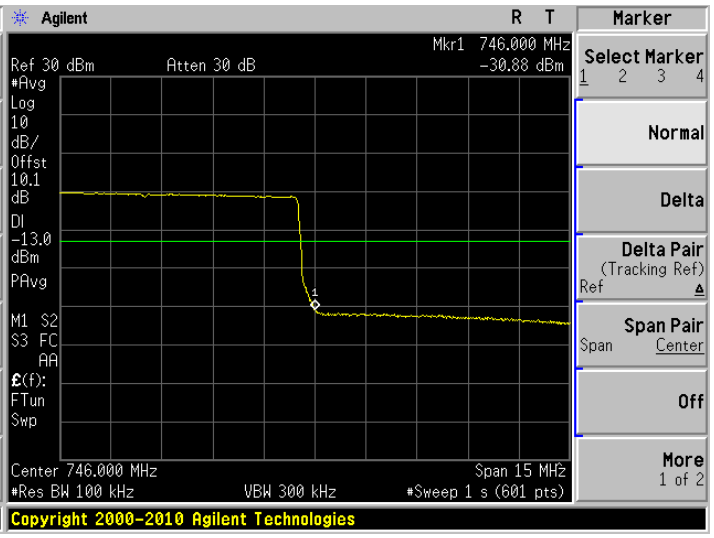
16QAM (10 MHz) - High Channel



64QAM (10 MHz) - Low Channel

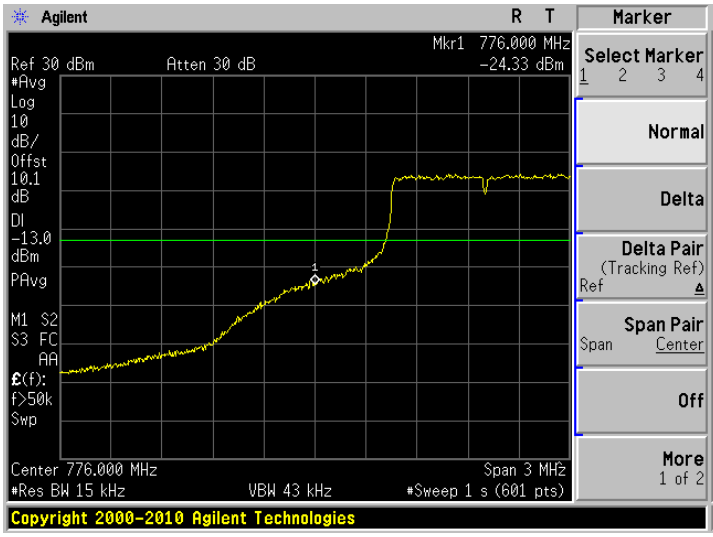


64QAM (10 MHz) - High Channel

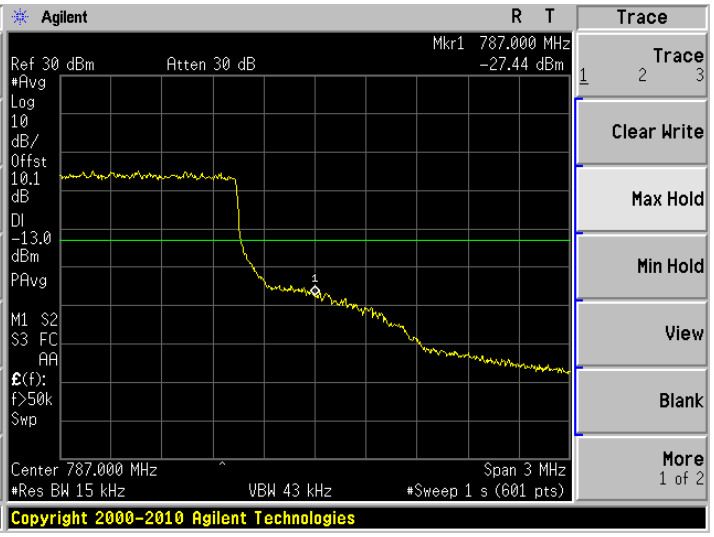


Upper LTE Band Uplink:

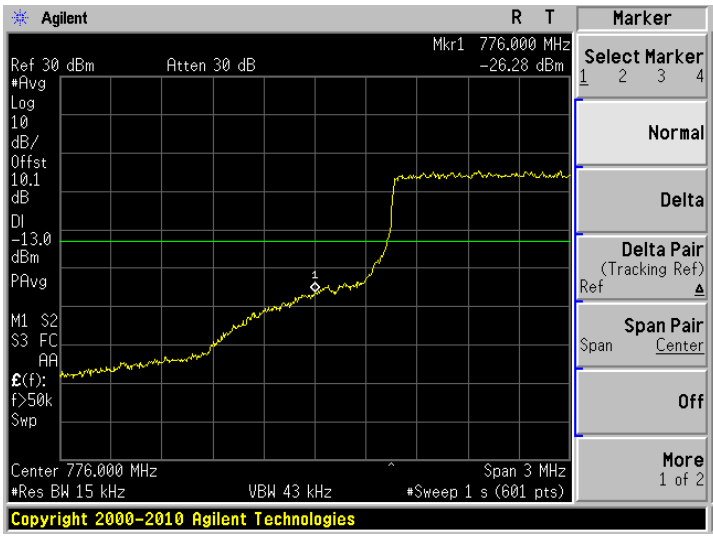
QPSK (1.4 MHz) - Low Channel



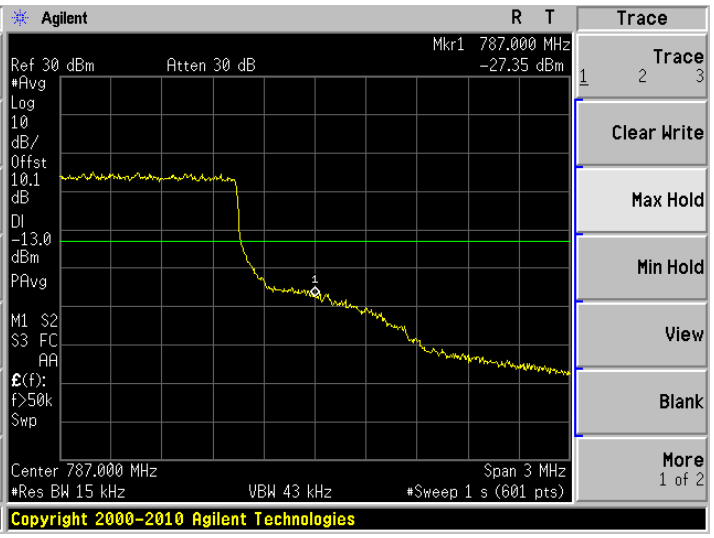
QPSK (1.4 MHz) - High Channel



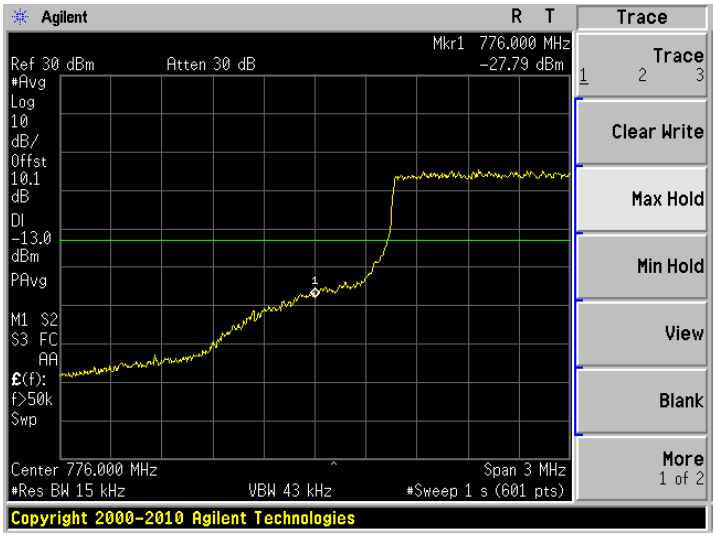
16QAM (1.4 MHz) - Low Channel



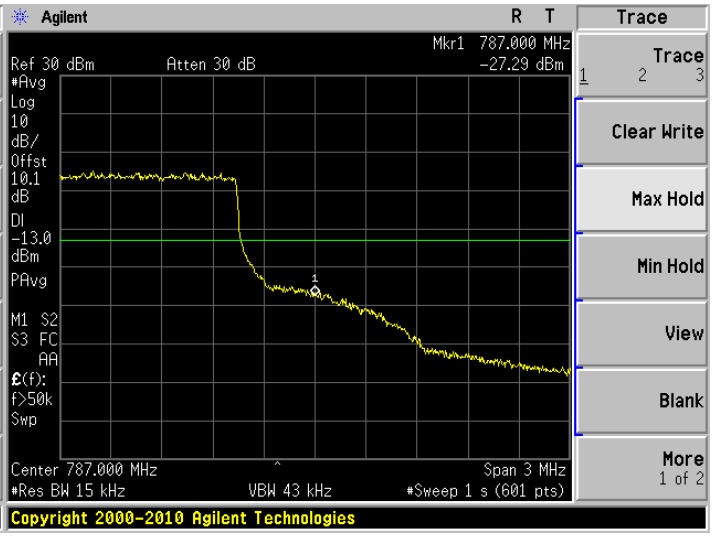
16QAM (1.4 MHz) - High Channel



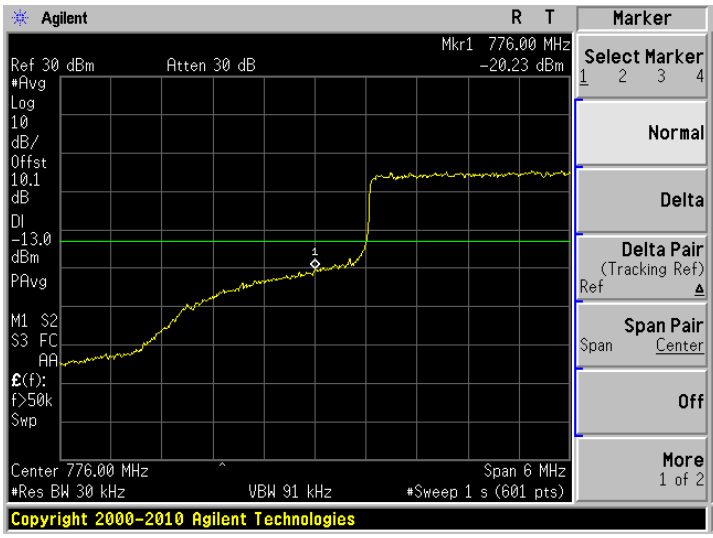
64QAM (1.4 MHz) - Low Channel



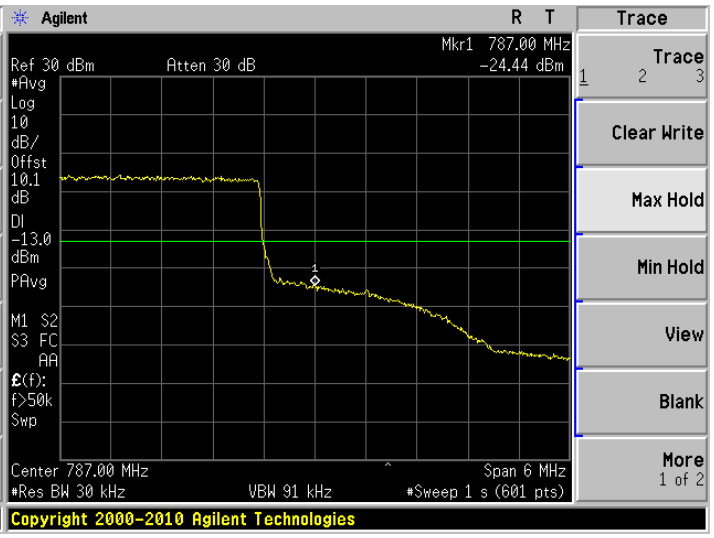
64QAM (1.4 MHz) - High Channel



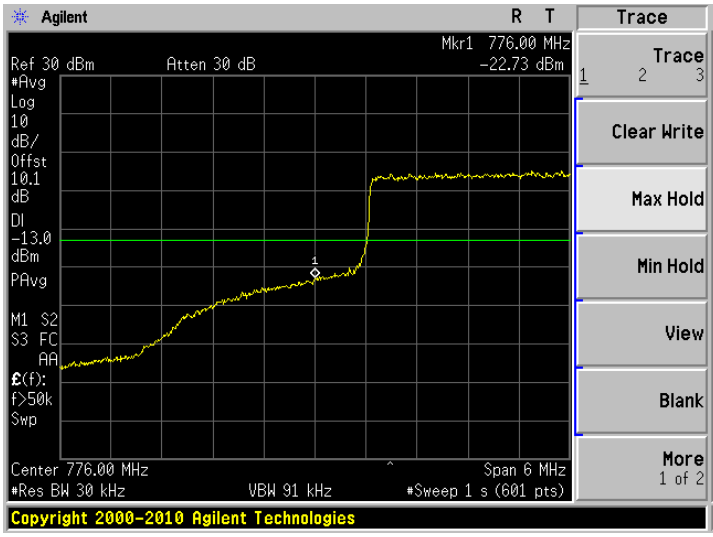
QPSK (3 MHz) - Low Channel



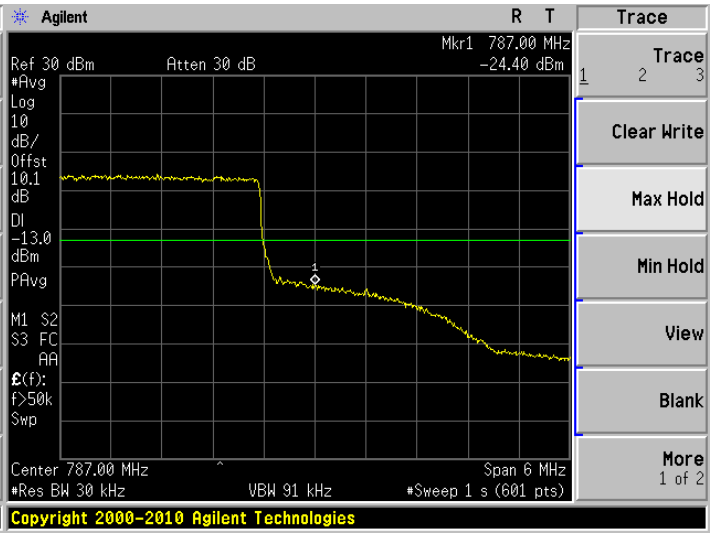
QPSK (3 MHz) - High Channel



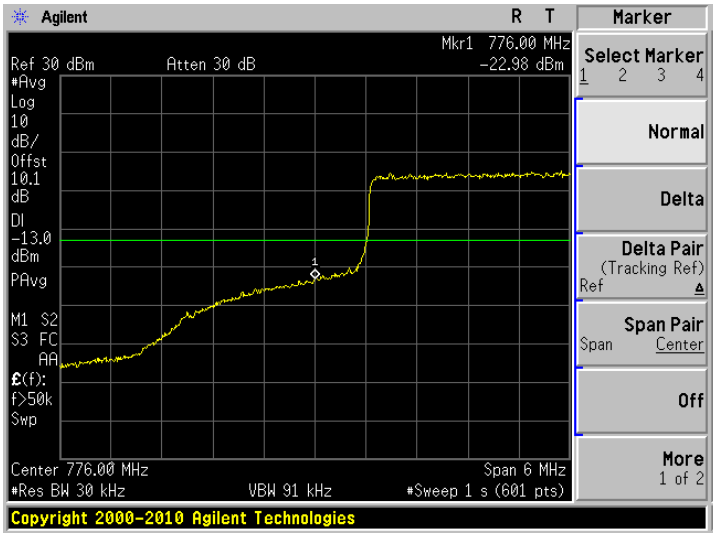
16QAM (3 MHz) - Low Channel



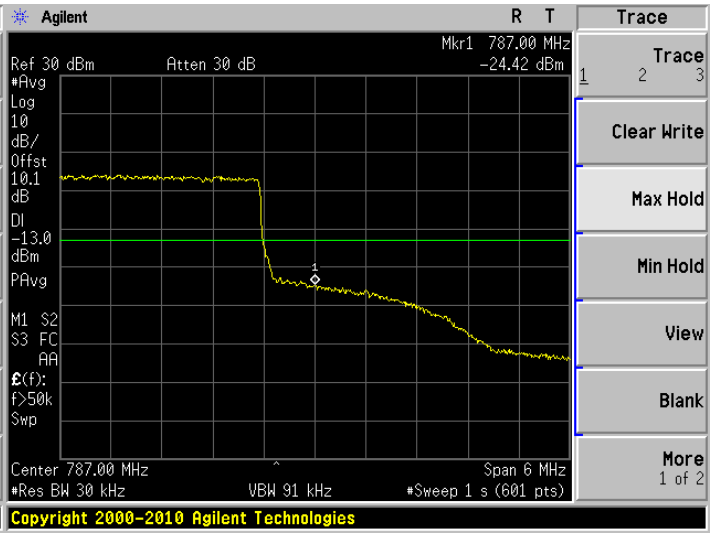
16QAM (3 MHz) - High Channel



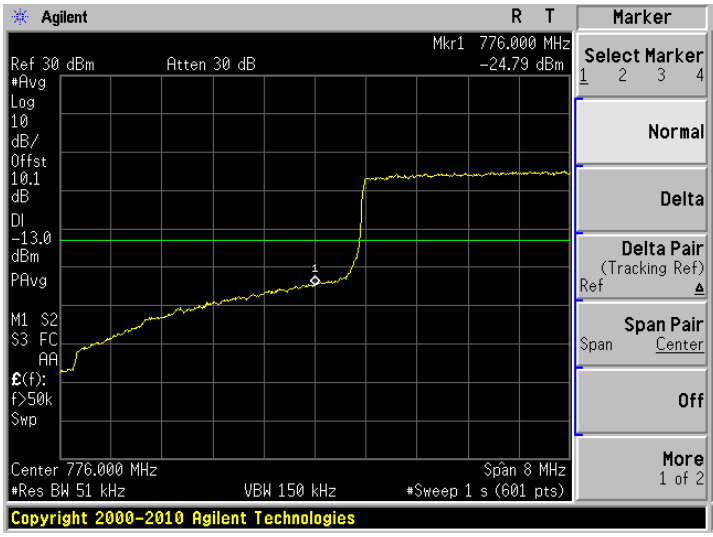
64QAM (3 MHz) - Low Channel



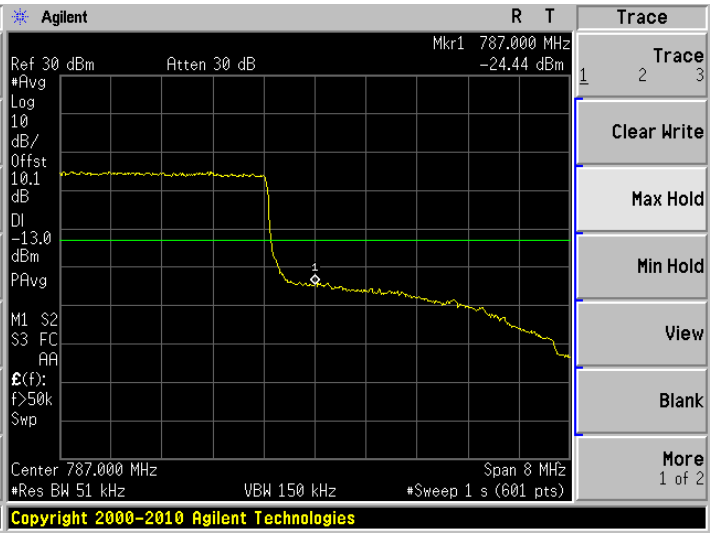
64QAM (3 MHz) - High Channel



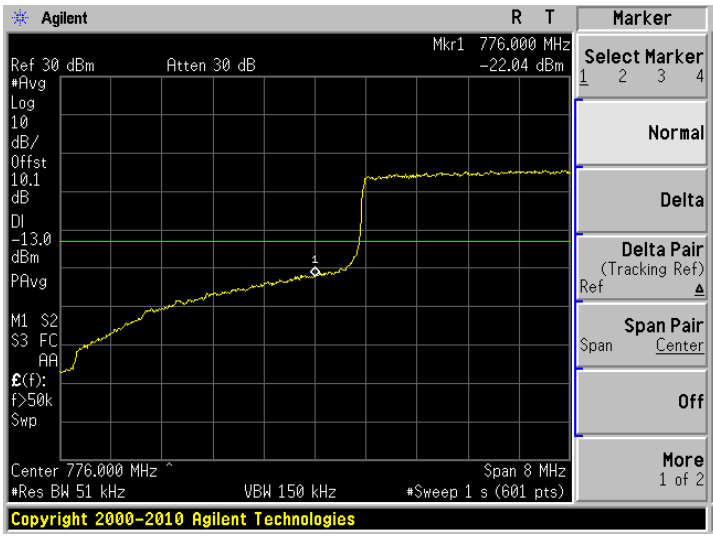
QPSK (5 MHz) - Low Channel



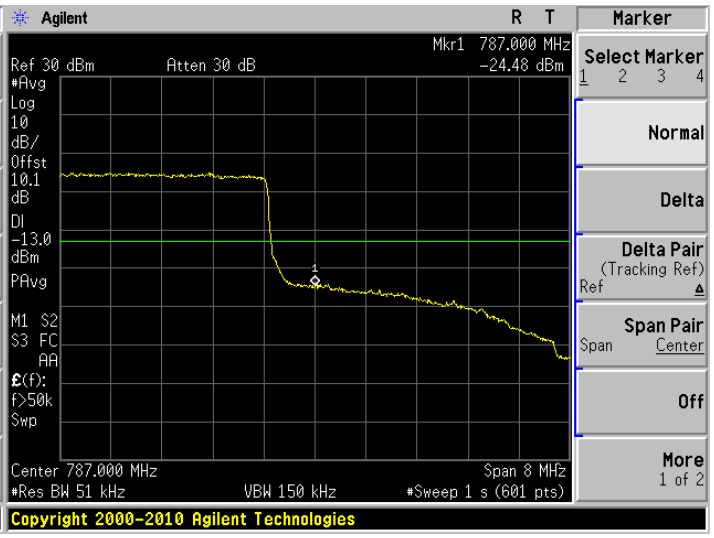
QPSK (5 MHz) - High Channel



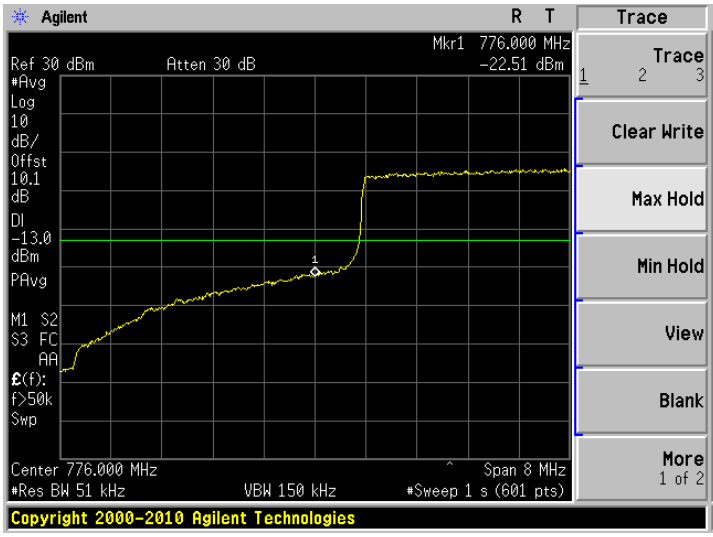
16QAM (5 MHz) - Low Channel



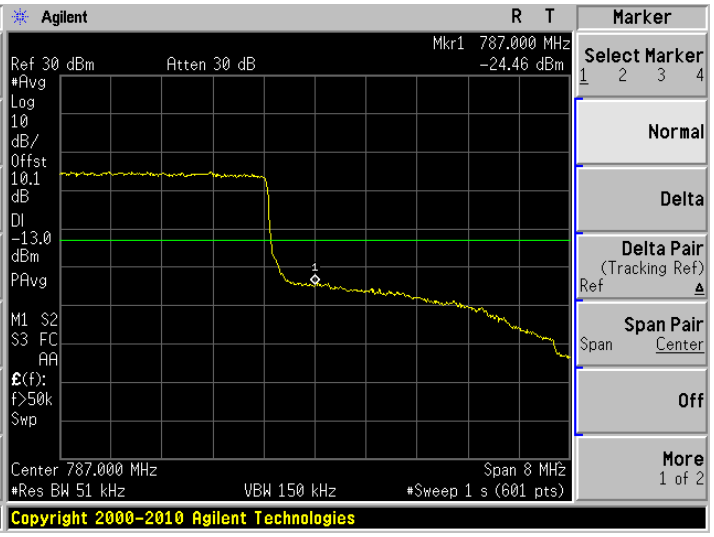
16QAM (5 MHz) - High Channel



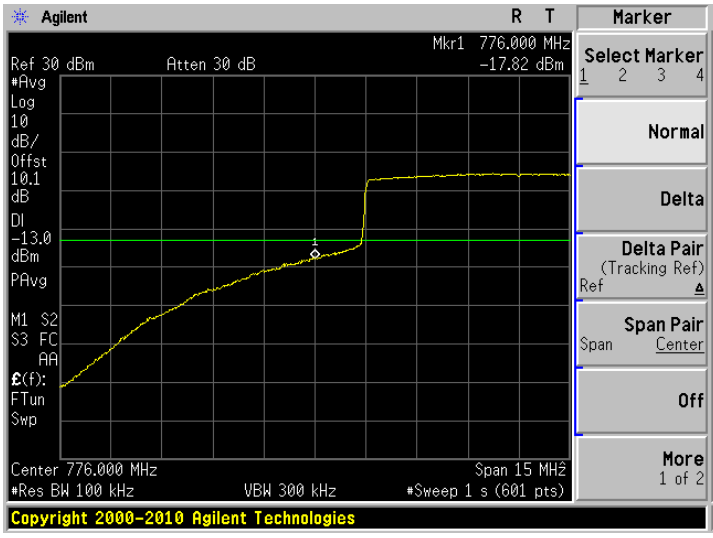
64QAM (5 MHz) - Low Channel



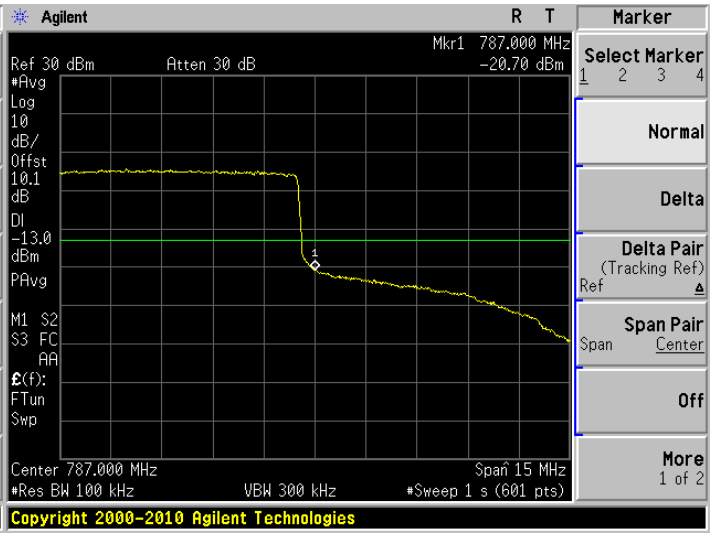
64QAM (5 MHz) - High Channel



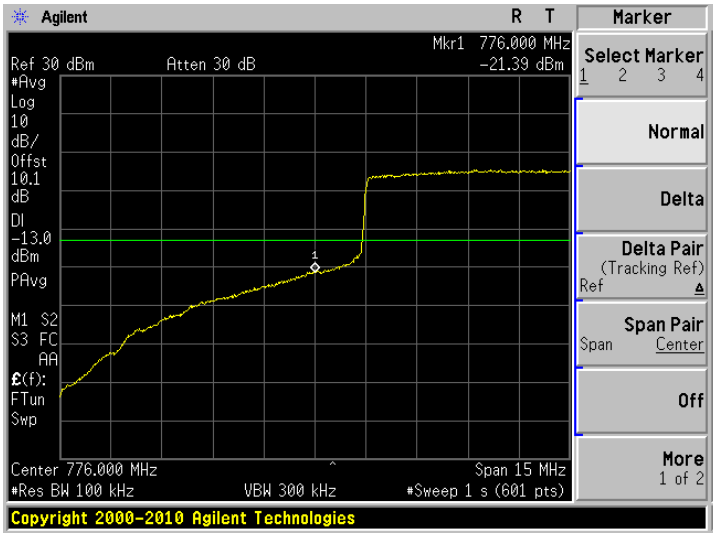
QPSK (10 MHz) - Low Channel



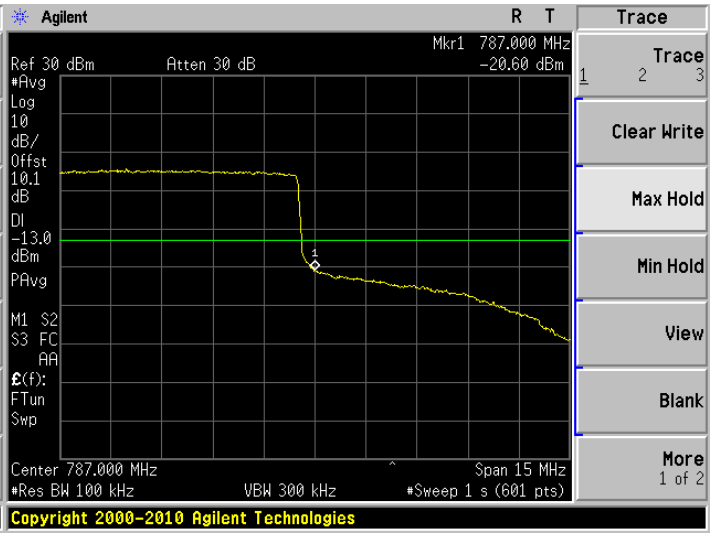
QPSK (10 MHz) - High Channel



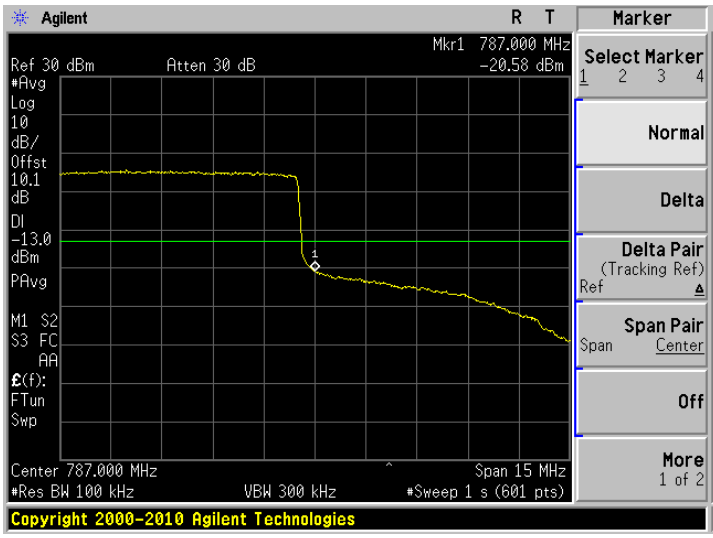
16QAM (10 MHz) - Low Channel



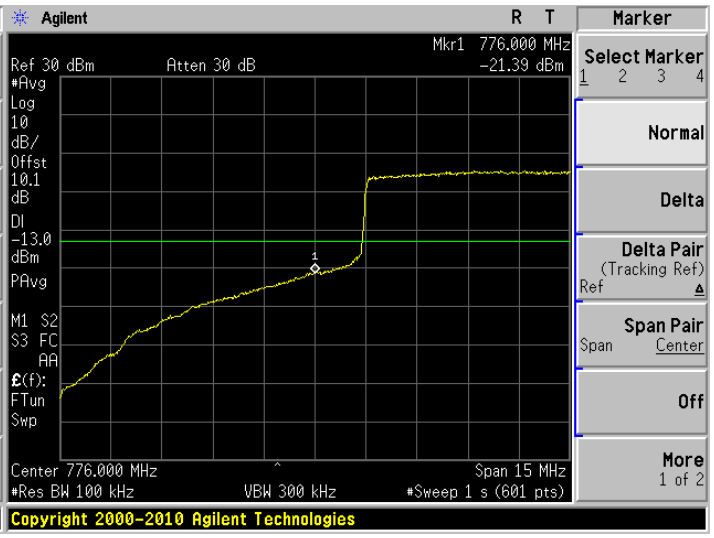
16QAM (10 MHz) - High Channel



64QAM (10 MHz) - Low Channel

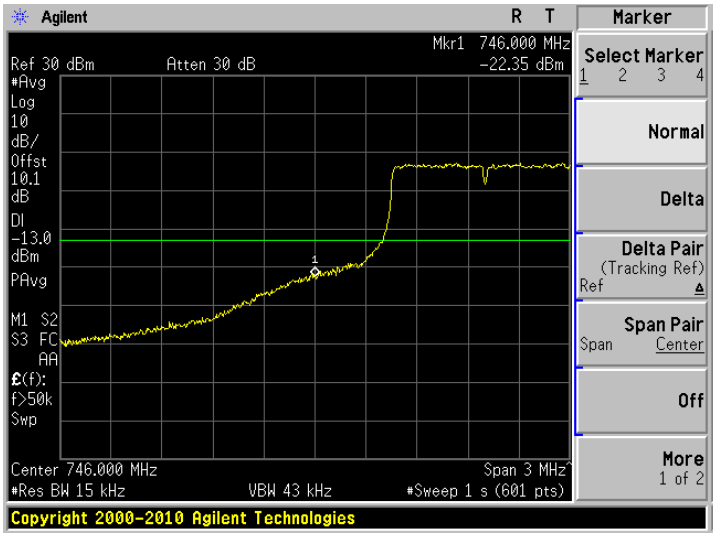


64QAM (10 MHz) - High Channel

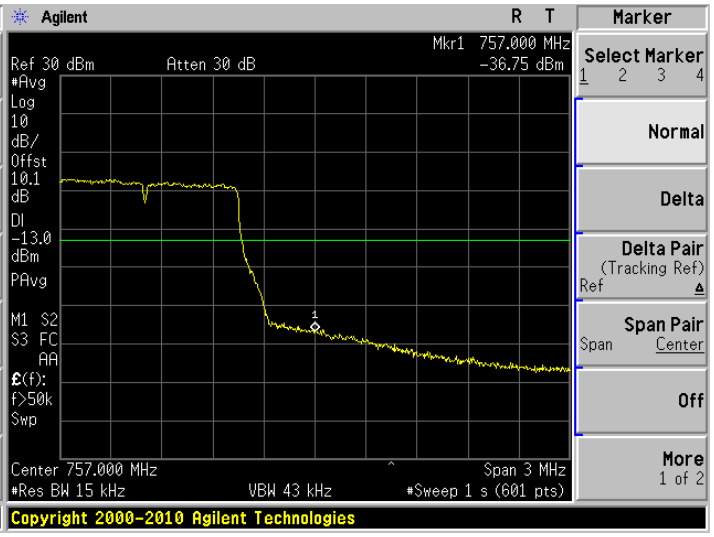


Upper LTE Band Downlink:

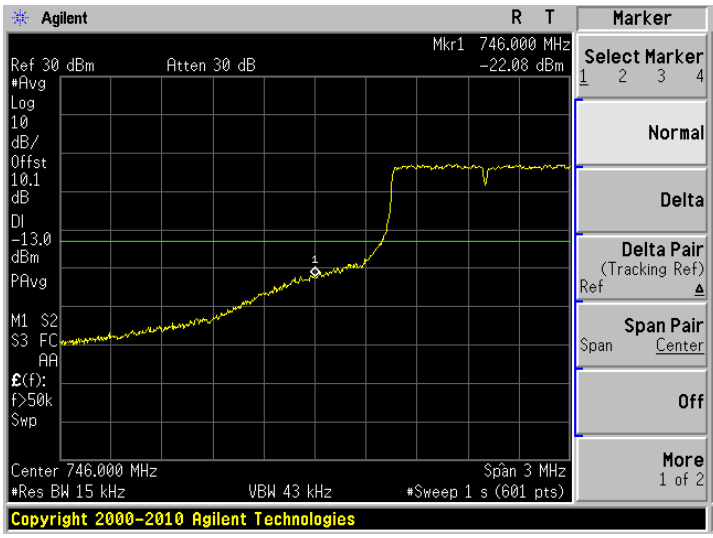
QPSK (1.4 MHz) - Low Channel



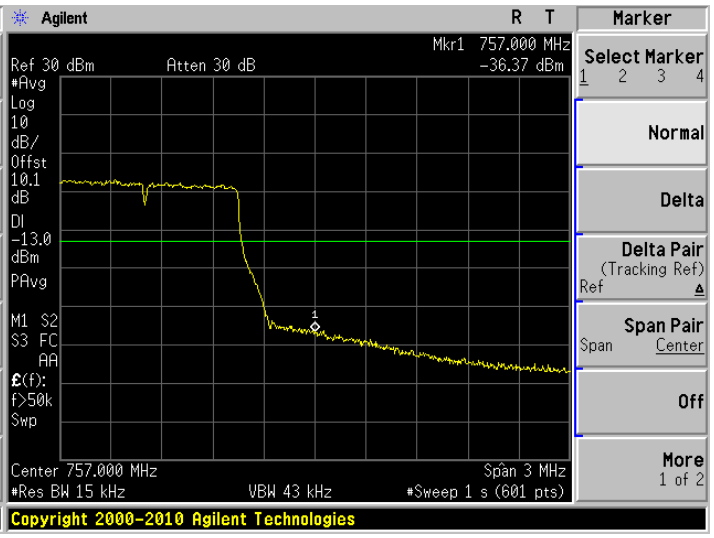
QPSK (1.4 MHz) - High Channel



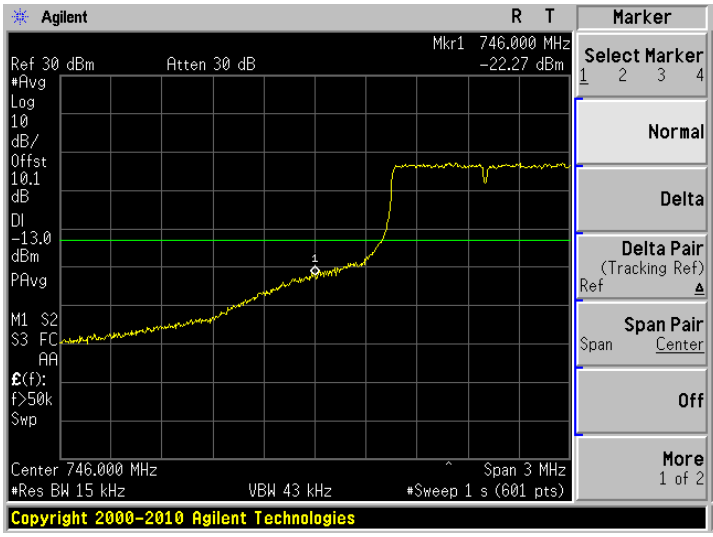
16QAM (1.4 MHz) - Low Channel



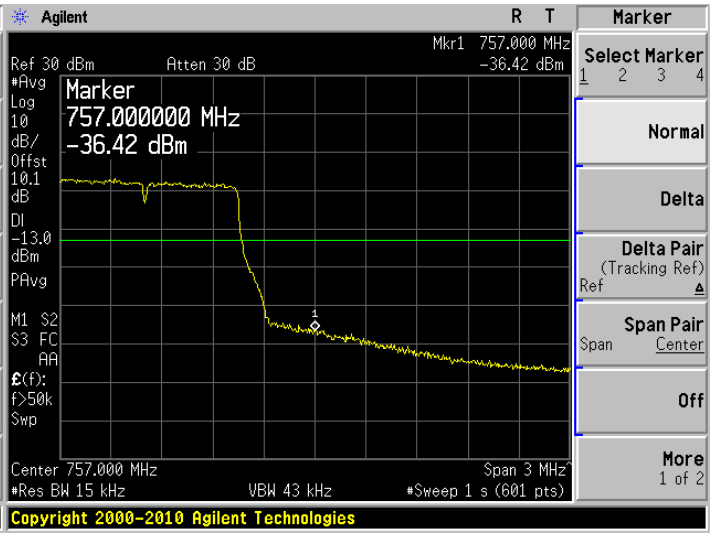
16QAM (1.4 MHz) - High Channel



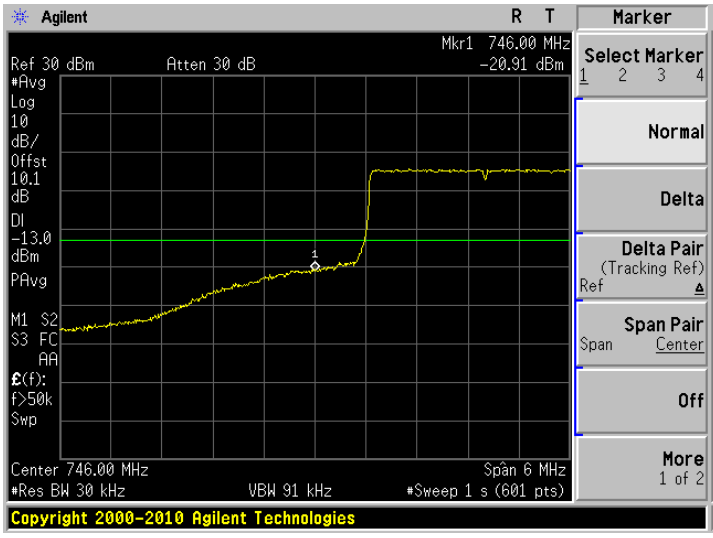
64QAM (1.4 MHz) - Low Channel



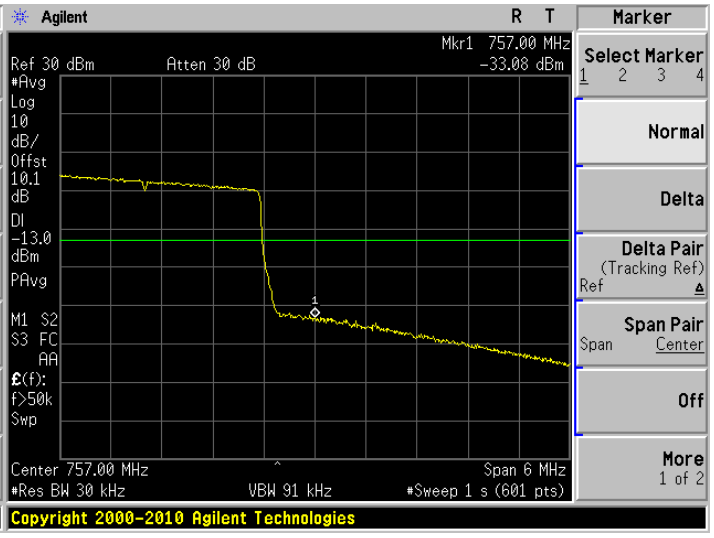
64QAM (1.4 MHz) - High Channel



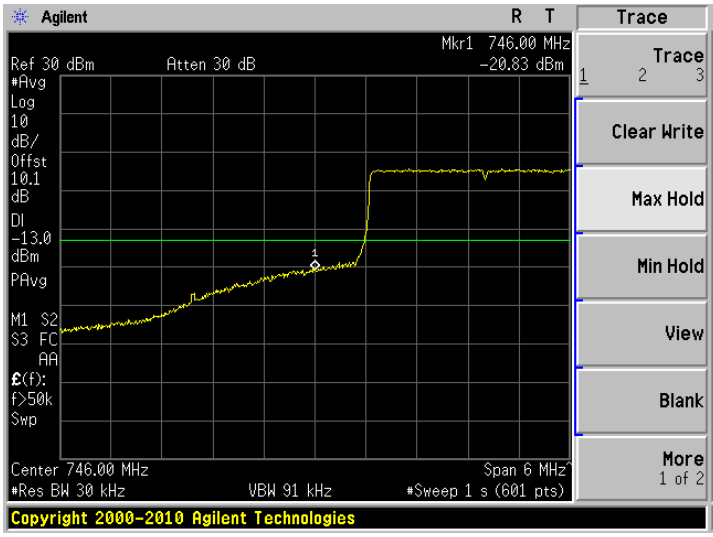
QPSK (3 MHz) - Low Channel



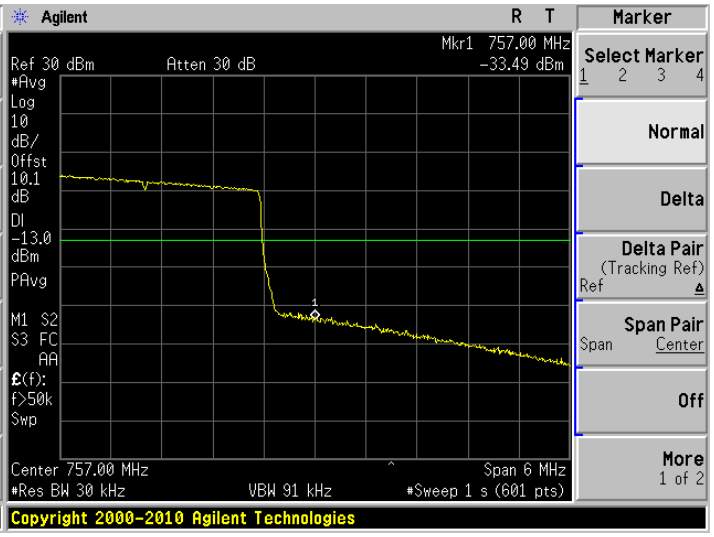
QPSK (3 MHz) - High Channel



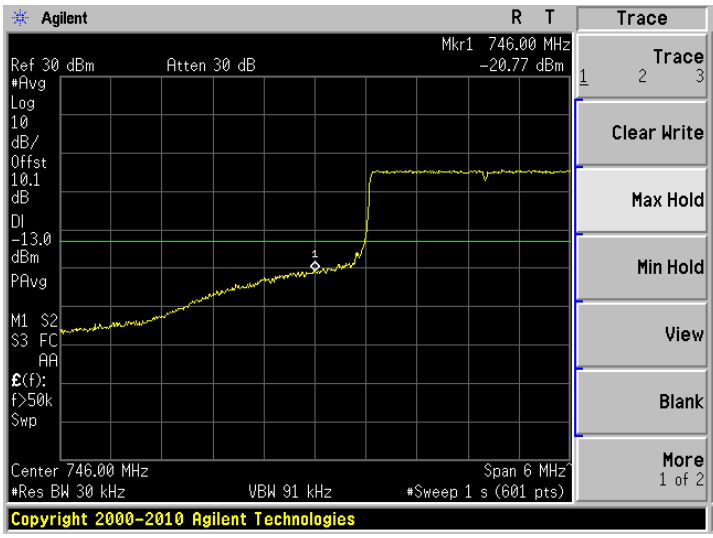
16QAM (3 MHz) - Low Channel



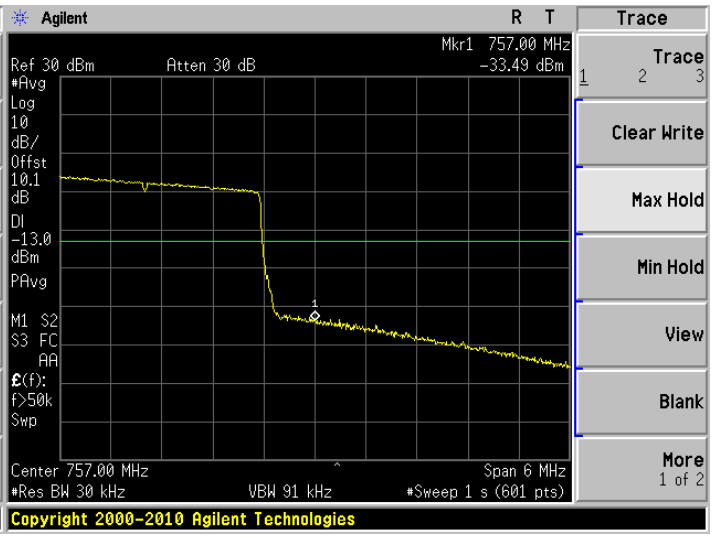
16QAM (3 MHz) - High Channel



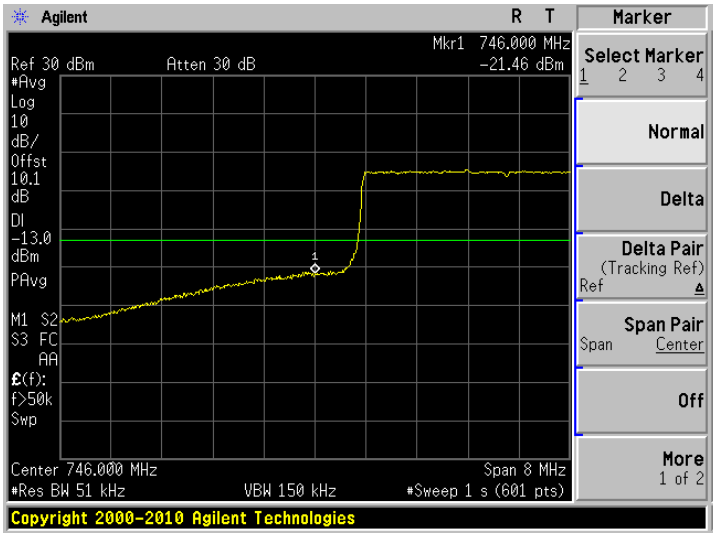
64QAM (3 MHz) - Low Channel



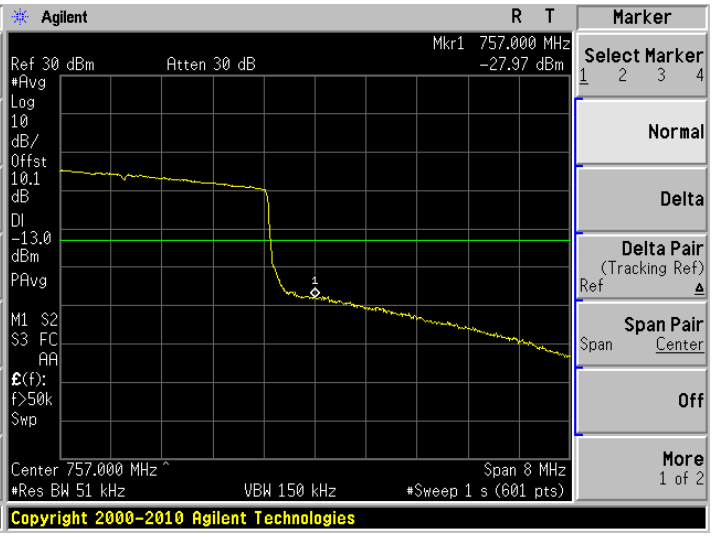
64QAM (3 MHz) - High Channel



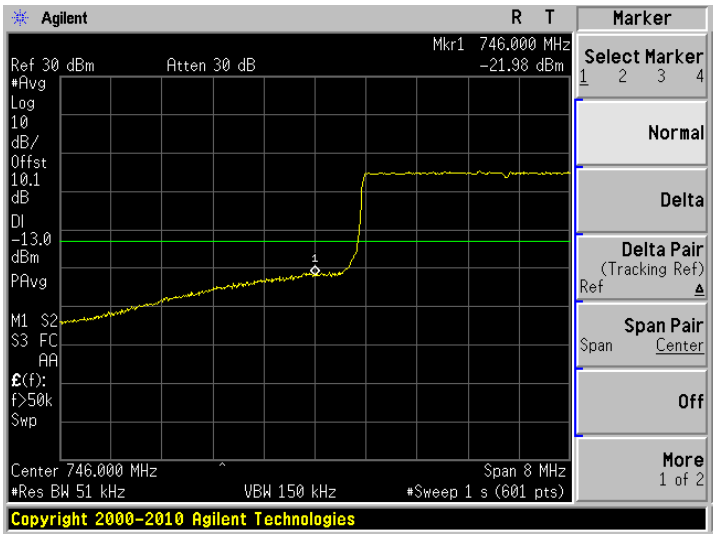
QPSK (5 MHz) - Low Channel



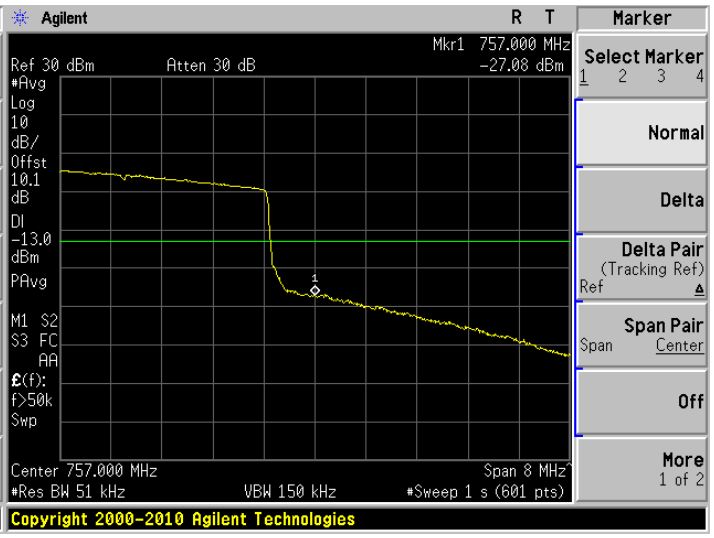
QPSK (5 MHz) - High Channel



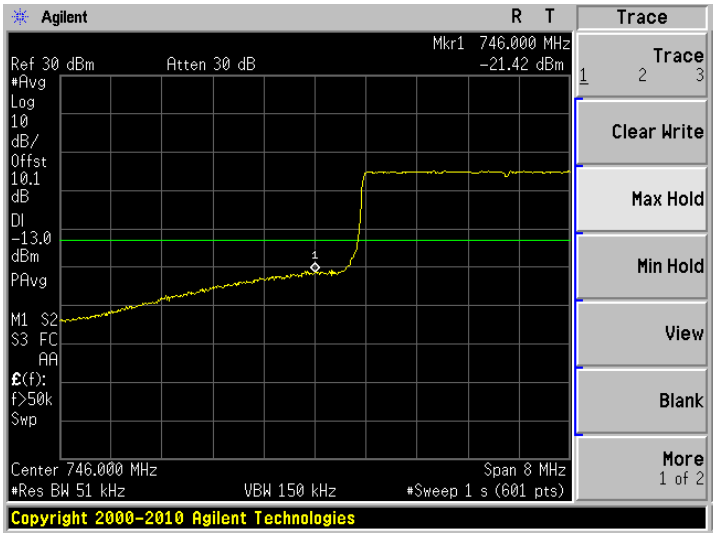
16QAM (5 MHz) - Low Channel



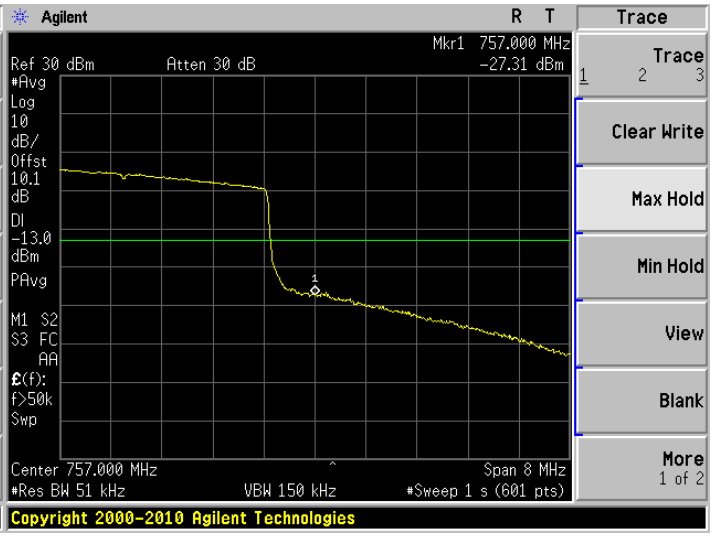
16QAM (5 MHz) - High Channel



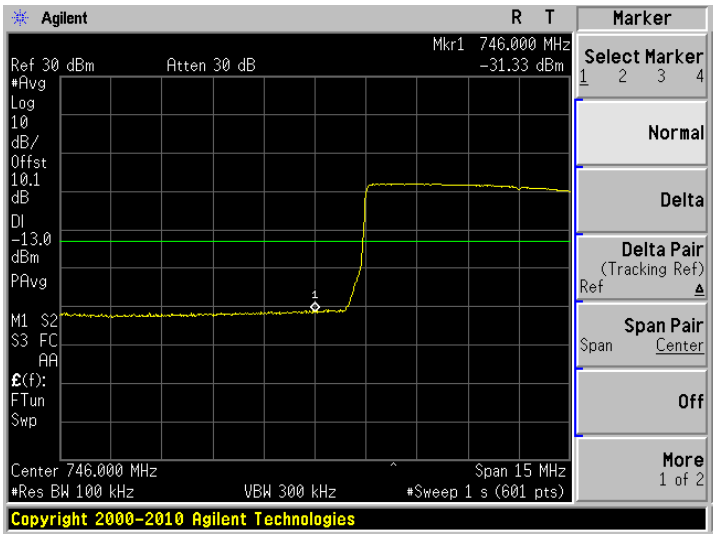
64QAM (5 MHz) - Low Channel



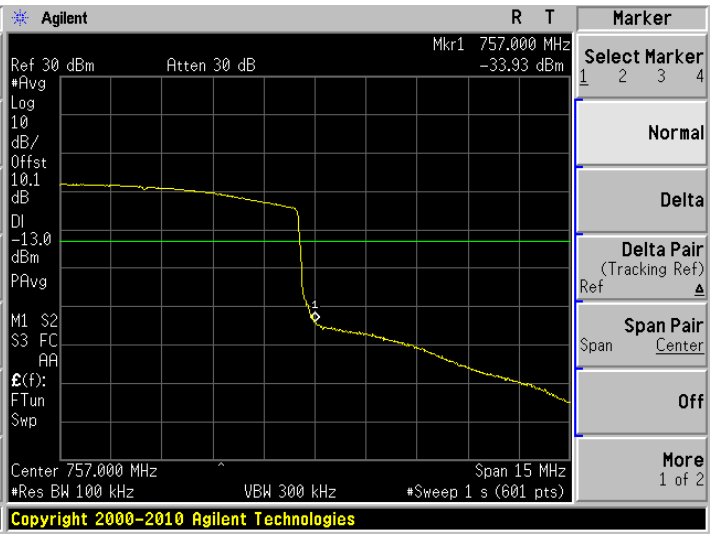
64QAM (5 MHz) - High Channel



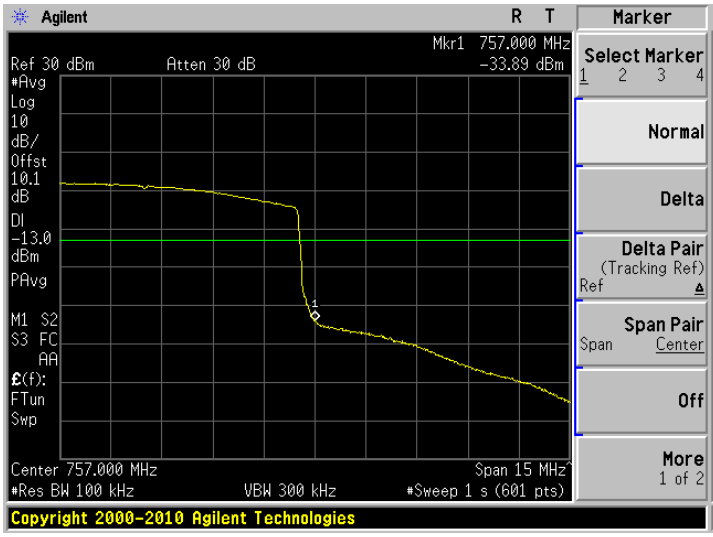
QPSK (10 MHz) - Low Channel



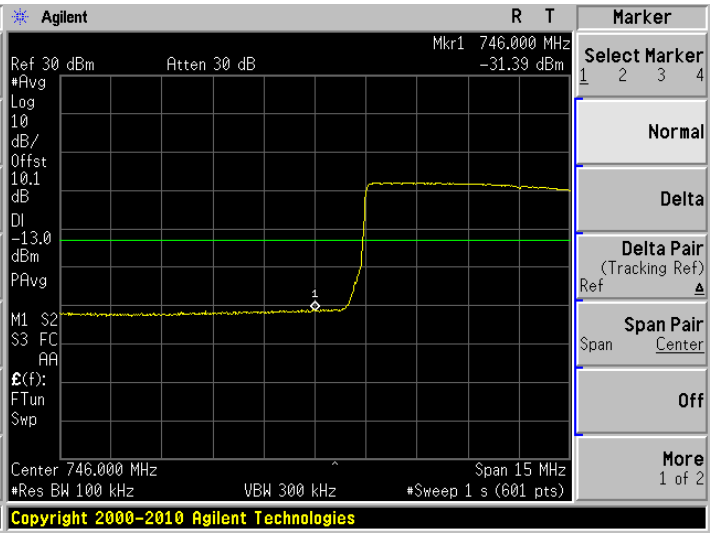
QPSK (10 MHz) - High Channel



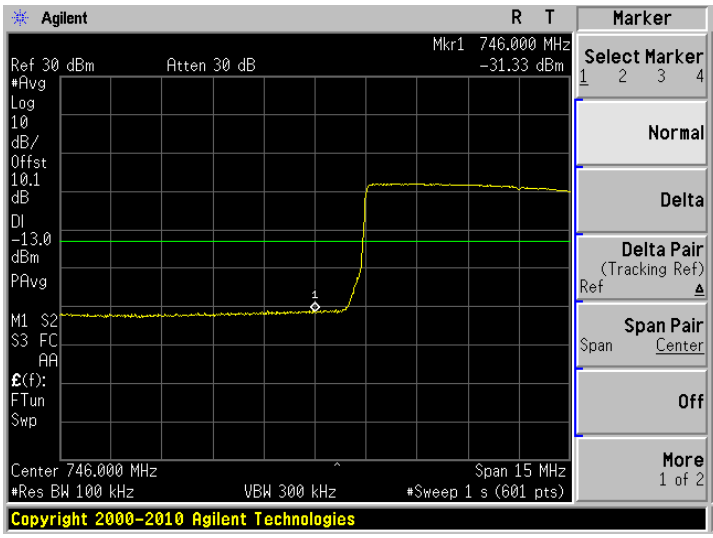
16QAM (10 MHz) - Low Channel



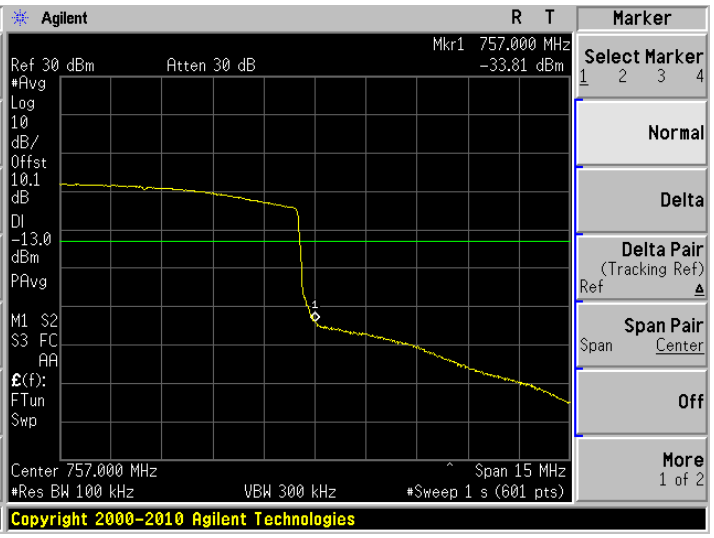
16QAM (10 MHz) - High Channel



64QAM (10 MHz) - Low Channel

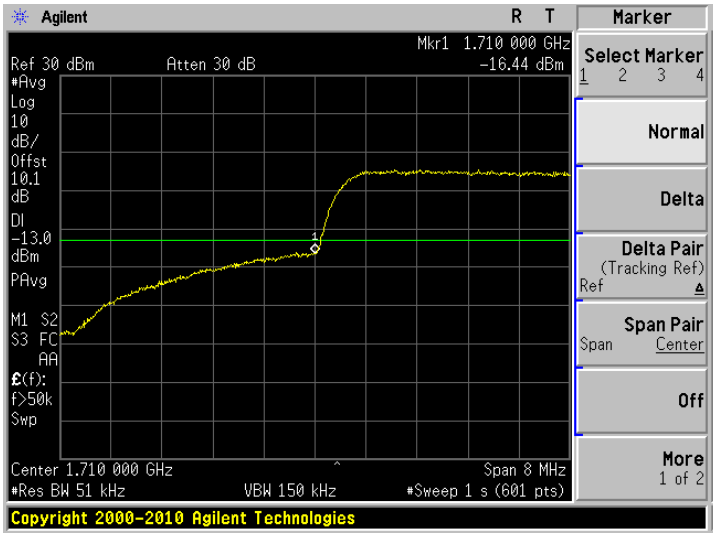


64QAM (10 MHz) - High Channel

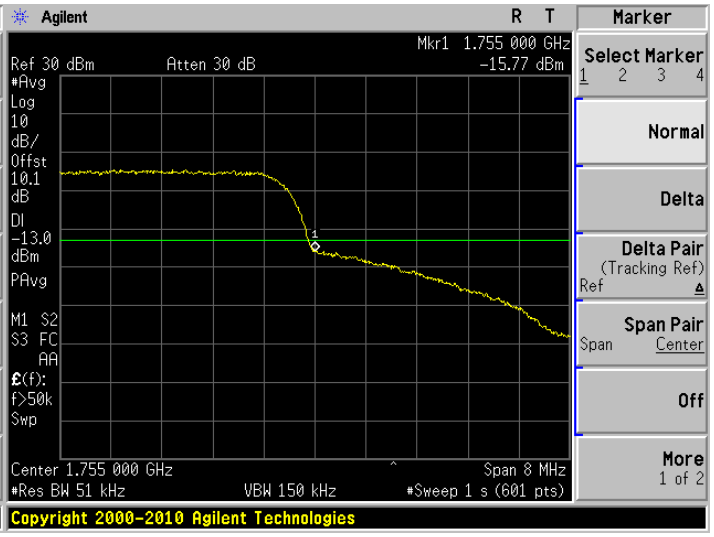


AWS Band Uplink:

WCDMA – Low Channel

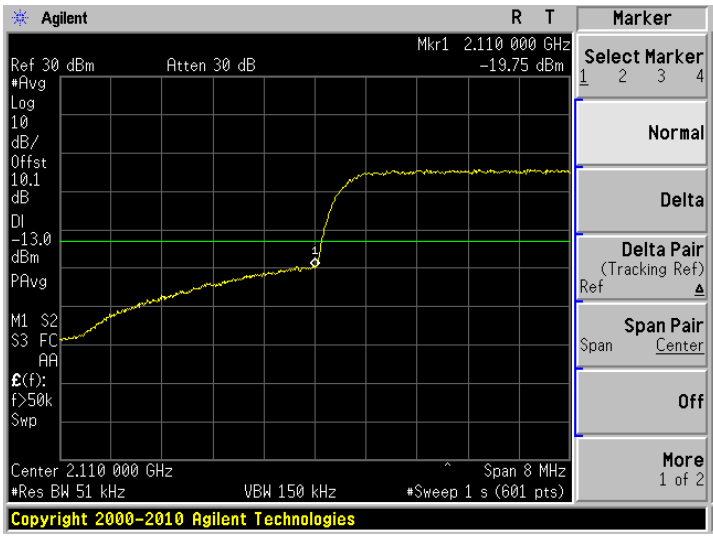


WCDMA – High Channel



AWS Band Downlink:

WCDMA – Low Channel



WCDMA – High Channel