



TESTING LABORATORY
CERTIFICATE NUMBER: 3297.02



FCC PART 22H

TEST AND MEASUREMENT REPORT

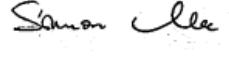
For

Whoop Wireless, Inc.

5913 NW 31st Ave., Fort Lauderdale,

Germantown, FL 33309, USA

FCC ID: 2AEQJ-CP4-001

Report Type: Original Report	Product Type: Industrial Booster
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Report Number: <u>R1506022-22 Rev B</u>	
Report Date: <u>2015-07-30</u>	
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk

“*”

(Rev. 2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1506022-22	Original Report	2015-07-09
1	R1506022-22 Rev A	Updated test data	2015-07-27
2	R1506022-22 Rev B	Updated test data	2015-07-30

1 General Information

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Whoop Wireless, Inc.* and their product model: CP4-001, FCC ID: 2AEQJ-CP4-001 which will henceforth be referred to as the EUT (Equipment under Test). The EUT is a cellular band amplifier for both downlink and uplink. The EUT operates in the frequency band of 800 MHz for GSM, CDMA, WCDMA and LTE for uplink and downlink.

1.2 Mechanical Description

The EUT measures approximately 17cm (L) x 13cm (W) x 3cm (H) and weighs 1kg.

The test data gathered are from typical production sample, serial number: R1506022-1, assigned by BACL.

1.3 Objective

This type approval report is prepared on behalf of *Whoop Wireless, Inc.* in accordance with Part 2, Subpart J, Part 20.21, Part 22 Subpart H, of the Federal Communication Commission's rules.

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

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 20.21 – Signal Boosters

Part 22 Subpart H - Public Mobile Services

Applicable Standards: TIA/EIA603-D, ANSI C63.4-2014, FCC KDB 935210.

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 CISPR16-4-2:2011, 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

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65:1996** by **A2LA** to certify:

- 1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

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 C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

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

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

2 System Test Configuration

2.1 Justification

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

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

2.2 EUT Exercise Software

N/A: signal was sent through EUT using a signal generator. The 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
Zore Access Tech	30-00010-PCB	CP4-002 REV A	-

2.5 Local Support Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers
Dell	Laptop	Latitude D600	CN-0X2034-48643-3A6-8307
Agilent	Signal Generator	E4438C	MY45091309
Agilent	Signal Studio for WCDMA/LTE	N7600B	-

2.6 Power Supply and Line Filters

Manufacturers	Descriptions	Models	Serial Numbers
Switching Adapter	AC Adapter	GQ15-050250-CU	-

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(a)	RF Output Power	Compliant
§2.1049	Occupied Bandwidth	Compliant
§2.1053, §22.917(a)	Spurious Radiated Emissions	Compliant
§2.1053, §22.917(a)	Spurious Emissions at Antenna Terminals	Compliant
§2.1053, §22.917(b)	Band Edge	Compliant
§2.1055, §22.355	Frequency Stability	N/A ¹
§20.21	Out of Band Rejection	Compliant
§2.1091	RF Exposure	Compliant

N/A¹ The unit is a signal booster.

4 FCC §2.1046 & §22.913(a) – RF Output Power

4.1 Applicable Standards

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

4.2 Test Procedure

Conducted:

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω - 75Ω matching pad.



4.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

4.4 Test Environmental Conditions

Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

The testing was performed by Ronak Patel 2015-06-08 to 2015-06-29 in the RF Site.

4.5 Test Results

ALC OFF

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Gain (dB)
GSM/GPRS	850 MHz Downlink	Low	869.2	-44.85	13.31	58.16
		Middle	881.6	-46.85	14.07	60.92
		High	893.8	-44.85	13.13	57.98
	850 MHz Uplink	Low	824.2	-40	12.42	52.42
		Middle	836.6	-43	13.52	56.52
		High	848.8	-40	12.12	52.12
CDMA/EVDO	850 MHz Downlink	Low	869.31	-46.85	15.30	62.15
		Middle	881.6	-48.85	15.09	63.94
		High	893.2	-45.85	15.01	60.86
	850 MHz Uplink	Low	824.7	-42	13.74	55.74
		Middle	836.6	-44	15.59	59.59
		High	848.2	-40	13.45	53.45
WCDMA	850 MHz Downlink	Low	871.4	-48.85	15.90	64.75
		Middle	881.6	-50.85	15.76	66.61
		High	891.6	-48.85	15.14	63.99
	850 MHz Uplink	Low	826.4	-40	13.36	53.36
		Middle	836.4	-41	14.86	55.86
		High	846.6	-40	12.40	52.4

LTE Band 5 DL

Modulation Type	Channel Bandwidth (MHz)	Channel Frequency (MHz)	Input Power (dBm)	Output Power Measurement (dBm)	Gain (dB)
QPSK	1.4	869.7	-53.85	15.78	69.63
		881.5	-55.85	15.85	71.7
		893.3	-52.85	15.77	68.62
	3	870.2	-51.85	15.29	67.14
		881.5	-53.85	15.04	68.89
		892.5	-50.85	15.13	65.98
	5	871.5	-48.85	15.64	64.49
		881.5	-50.85	15.67	66.52
		891.5	-48.85	15.20	64.05
	10	874	-47.85	15.23	63.08
		881.5	-47.85	15.46	63.31
		889	-46.85	15.90	62.75
16-QAM	1.4	869.7	-53.85	15.44	69.29
		881.5	-55.85	15.48	71.33
		893.3	-52.85	15.56	68.41
	3	870.5	-51.85	15.21	67.06
		881.5	-52.85	15.98	68.83
		892.5	-50.85	15.07	65.92
	5	871.5	-49.85	15.02	64.87
		881.5	-51.85	15.03	66.88
		891.5	-48.85	15.27	64.12
	10	874	-46.85	15.21	62.06
		881.5	-47.85	15.38	63.23
		889	-46.85	15.20	62.05
64-QAM	1.4	869.7	-53.85	15.55	69.4
		881.5	-55.85	15.60	71.45
		893.3	-52.85	15.55	68.4
	3	870.5	-52.85	15.69	68.54
		892.5	-54.85	15.52	70.37
		893.8	-51.85	15.66	67.51
	5	871.5	-49.85	15.43	65.28
		881.5	-51.85	15.51	67.36
		891.5	-48.85	15.59	64.44
	10	874	-46.85	15.50	62.35
		881.5	-48.85	15.17	64.02
		889	-46.85	15.77	62.62

LTE Band 5 UL

Modulation Type	Channel Bandwidth (MHz)	Channel Frequency (MHz)	Input Power (dBm)	Output Power Measurement (dBm)	Gain (dB)
QPSK	1.4	824.7	-44	15.76	59.76
		836.5	-48	15.34	63.34
		848.3	-42	15.63	57.63
	3	824.2	-40	14.18	54.18
		836.6	-44	15.75	59.75
		848.8	-39	14.10	53.1
	5	826.5	-40	14.08	54.08
		836.5	-43	15.06	58.06
		846.5	-39	13.08	52.08
	10	829	-37	13.52	50.52
		836.5	-39	13.88	52.88
		844	-40	13.48	53.48
16-QAM	1.4	824.7	-45	15.15	60.15
		836.5	-48	15.78	63.78
		848.3	-43	15.05	58.05
	3	824.2	-43	14.80	57.8
		836.6	-44	15.85	59.85
		848.8	-39	14.17	53.17
	5	826.5	-41	14.08	55.08
		836.5	-41	15.12	56.12
		846.5	-38	13.83	51.83
	10	829	-39	14	53
		836.5	-42	14.57	56.57
		844	-41	14.01	55.01
64-QAM	1.4	824.7	-45	15.42	60.42
		836.5	-48	15.88	63.88
		848.3	-43	15.09	58.09
	3	824.2	-43	15.36	58.36
		836.5	-45	15.52	60.52
		848.8	-40	14.67	54.67
	5	826.5	-41	14.77	55.77
		836.5	-44	15.56	59.56
		846.5	-39	14.06	53.06
	10	829	-38	14.13	52.13
		836.5	-42	14.68	56.68
		844	-41	15.22	56.22

ALC ON

Mode		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Gain (dB)
GSM/GPRS	850 MHz Downlink	Low	869.2	-41.85	15.22	57.07
		Middle	881.6	-43.85	14.76	58.61
		High	893.8	-41.85	15.10	56.95
	850 MHz Uplink	Low	824.2	-37	12.15	49.15
		Middle	836.6	-40	13.44	53.44
		High	848.8	-37	12.57	49.57
CDMA/EVDO	850 MHz Downlink	Low	869.31	-43.85	15.89	59.74
		Middle	881.5	-45.85	15.06	60.91
		High	893.2	-42.85	15.62	58.47
	850 MHz Uplink	Low	824.7	-39	13.32	52.32
		Middle	836.5	-41	15.50	56.5
		High	848.2	-37	13.73	50.73
WCDMA	850 MHz Downlink	Low	871.4	-45.85	16.07	61.92
		Middle	881.6	-47.85	16.05	63.9
		High	891.6	-45.85	16.33	62.18
	850 MHz Uplink	Low	826.4	-37	13.21	50.21
		Middle	836.4	-38	14.94	52.94
		High	846.6	-37	12.53	49.53

LTE Band 5 DL

Modulation Type	Channel Bandwidth (MHz)	Channel Frequency (MHz)	Input Power (dBm)	Output Power Measurement (dBm)	Gain (dB)
QPSK	1.4	869.7	-50.85	16.41	67.26
		881.5	-52.85	16.18	69.03
		893.3	-49.85	16.41	66.26
	3	870.2	-48.85	14.68	63.53
		881.5	-50.85	15.97	66.82
		892.5	-47.85	15.48	63.33
	5	871.5	-45.85	15.66	61.51
		881.5	-47.85	16.03	63.88
		891.5	-45.85	15.38	61.23
	10	874	-44.85	15.86	60.71
		881.5	-44.85	15.79	60.64
		889	-43.85	16.54	60.39
16-QAM	1.4	869.7	-50.85	16.17	67.02
		881.5	-52.85	16.02	68.87
		893.3	-49.85	15.87	65.72
	3	870.5	-48.85	15.20	64.05
		881.5	-49.85	15.57	65.42
		892.5	-47.85	15.67	63.52
	5	871.5	-46.85	15.04	61.89
		881.5	-48.85	15.39	64.24
		891.5	-45.85	15.45	61.3
	10	874	-43.85	15.84	59.69
		881.5	-44.85	15.71	60.56
		889	-43.85	15.84	59.69
64-QAM	1.4	869.7	-50.85	15.76	66.61
		881.5	-52.85	16.10	68.95
		893.3	-49.85	15.74	65.59
	3	870.5	-49.85	15.79	65.64
		892.5	-51.85	16.85	68.7
		893.8	-48.85	15.94	64.79
	5	871.5	-46.85	16.07	62.92
		881.5	-48.85	16.24	65.09
		891.5	-45.85	16.13	61.98
	10	874	-43.85	15.81	59.66
		881.5	-45.85	15.16	61.01
		889	-43.85	15.36	59.21

LTE Band 5 UL

Modulation Type	Channel Bandwidth (MHz)	Channel Frequency (MHz)	Input Power (dBm)	Output Power Measurement (dBm)	Gain (dB)
QPSK	1.4	824.7	-41	16.07	57.07
		836.5	-45	15.96	60.96
		848.3	-39	15.66	54.66
	3	824.2	-37	15.06	52.06
		836.6	-41	16.50	57.5
		848.8	-36	14.23	50.23
	5	826.5	-37	14.3	51.3
		836.5	-40	15.16	55.16
		846.5	-36	13.75	49.75
	10	829	-34	14.07	48.07
		836.5	-36	14.52	50.52
		844	-37	13.44	50.44
16-QAM	1.4	824.7	-42	15.37	57.37
		836.5	-45	15.99	60.99
		848.3	-40	15.46	55.46
	3	824.2	-40	15.00	55
		836.6	-41	15.78	56.78
		848.8	-36	14.32	50.32
	5	826.5	-38	14.96	52.96
		836.5	-38	15.71	53.71
		846.5	-35	14.61	49.61
	10	829	-36	14.00	50
		836.5	-39	15.74	54.74
		844	-38	14.51	52.51
64-QAM	1.4	824.7	-42	15.64	57.64
		836.5	-45	16.80	61.8
		848.3	-40	15.69	55.69
	3	824.2	-40	15.63	55.63
		836.5	-42	16.25	58.25
		848.8	-37	15	52
	5	826.5	-38	14.57	52.57
		836.5	-41	15.66	56.66
		846.5	-36	14.2	50.2
	10	829	-35	15.31	50.31
		836.5	-39	15.26	54.26
		844	-38	15.6	53.6

5 FCC §2.1049 & §22.917 - Occupied Bandwidth

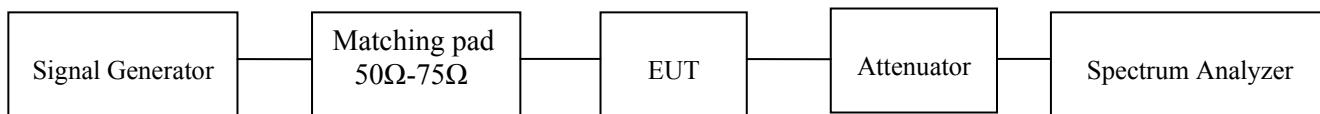
5.1 Applicable Standards

Requirements: FCC §2.1049, §22.917

5.2 Test Procedure

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω-75Ω matching pad.

The resolution bandwidth of the spectrum analyzer was set to at least 1 to 5% of the OBW and the 26 dB & 99% bandwidth was recorded.



5.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

5.4 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

5.5 Test Results

Please refer to the following tables and plots.

ALC OFF

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	
				Input	Output
GSM/GPRS	850 MHz Downlink	Low	869.2	304.8	320.312
		Middle	881.6	301.884	313.945
		High	893.8	305.110	317.605
	850 MHz Uplink	Low	824.2	314.945	310.774
		Middle	836.6	312.254	317.055
		High	848.8	303.957	316.683
CDMA/EVDO	850 MHz Downlink	Low	869.8	1.451	1.463
		Middle	881.5	1.473	1.454
		High	893.2	1.472	1.479
	850 MHz Uplink	Low	824.8	1.495	1.461
		Middle	836.5	1.460	1.465
		High	848.2	1.458	1.460
WCDMA	850 MHz Downlink	Low	871.4	4.826	4.824
		Middle	881.6	4.878	4.854
		High	891.6	4.885	4.835
	850 MHz Uplink	Low	826.4	4.881	4.829
		Middle	836.4	4.903	4.853
		High	846.6	4.829	4.913

LTE QPSK Band 5

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.391	1.433
		Middle	881.5	1.341	1.425
		High	893.3	1.348	1.437
	850 MHz Uplink	Low	824.7	1.382	1.396
		Middle	836.5	1.351	1.362
		High	848.3	1.362	1.388
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.000	3.294
		Middle	881.5	3.017	3.302
		High	892.5	3.003	3.306
	850 MHz Uplink	Low	825.5	3.087	3.312
		Middle	836.5	3.115	3.103
		High	847.5	3.087	3.140
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.187	5.245
		Middle	881.5	5.112	5.261
		High	891.5	5.204	5.285
	850 MHz Uplink	Low	826.5	5.513	5.196
		Middle	836.5	5.179	5.205
		High	846.5	5.099	5.206
LTE 10 MHz	850 MHz Downlink	Low	874	10.397	10.482
		Middle	881.5	10.337	10.493
		High	889	10.372	10.294
	850 MHz Uplink	Low	821.5	10.254	9.544
		Middle	836.5	10.549	10.395
		High	844	10.459	10.227

LTE 16QAM Band 5

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.358	1.329
		Middle	881.5	1.340	1.320
		High	893.3	1.346	1.300
	850 MHz Uplink	Low	824.7	1.322	1.371
		Middle	836.5	1.356	1.366
		High	848.3	1.377	1.362
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.111	3.270
		Middle	881.5	3.066	3.271
		High	892.5	3.116	3.295
	850 MHz Uplink	Low	825.5	3.145	3.084
		Middle	836.5	3.093	3.124
		High	847.5	3.133	3.077
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.179	4.947
		Middle	881.5	5.182	5.037
		High	891.5	5.179	4.917
	850 MHz Uplink	Low	826.5	5.164	5.165
		Middle	836.5	5.177	5.173
		High	846.5	5.115	5.185
LTE 10 MHz	850 MHz Downlink	Low	874	10.368	9.784
		Middle	881.5	10.307	9.994
		High	889	10.455	9.894
	850 MHz Uplink	Low	821.5	10.338	9.629
		Middle	836.5	10.430	10.252
		High	844	10.218	10.317

LTE 64QAM Band 5

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.387	1.369
		Middle	881.5	1.350	1.347
		High	893.3	1.356	1.385
	850 MHz Uplink	Low	824.7	1.404	1.362
		Middle	836.5	1.373	1.345
		High	848.3	1.378	1.353
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.098	3.279
		Middle	881.5	3.123	3.277
		High	892.5	3.062	3.309
	850 MHz Uplink	Low	825.5	3.102	3.102
		Middle	836.5	3.065	3.121
		High	847.5	3.097	3.090
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.176	5.167
		Middle	881.5	5.198	5.164
		High	891.5	5.236	5.146
	850 MHz Uplink	Low	826.5	5.137	5.135
		Middle	836.5	5.103	5.164
		High	846.5	5.180	5.135
LTE 10 MHz	850 MHz Downlink	Low	874	10.193	10.276
		Middle	881.5	10.336	10.387
		High	889	10.362	10.275
	850 MHz Uplink	Low	821.5	10.519	9.569
		Middle	836.5	10.495	10.192
		High	844	10.300	10.338

ALC ON

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	
				Input	Output
GSM/GPRS	850 MHz Downlink	Low	869.2	304.8	316.128
		Middle	881.6	301.884	316.521
		High	893.8	305.110	305.816
	850 MHz Uplink	Low	824.2	314.945	312.703
		Middle	836.6	312.254	312.386
		High	848.8	303.957	317.605
CDMA/EVDO	850 MHz Downlink	Low	869.8	1451	1432
		Middle	881.5	1473	1433
		High	893.2	1472	1433
	850 MHz Uplink	Low	824.8	1495	1432
		Middle	836.5	1460	1434
		High	848.2	1458	1434
WCDMA	850 MHz Downlink	Low	871.4	4826	4689
		Middle	881.6	4878	4683
		High	891.6	4.885	4698
	850 MHz Uplink	Low	826.4	4881	4697
		Middle	836.4	4903	4688
		High	846.6	4829	4707

LTE QPSK Band 5

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.391	1.299
		Middle	881.5	1.341	1.292
		High	893.3	1.348	1.287
	850 MHz Uplink	Low	824.7	1.382	1.325
		Middle	836.5	1.351	1.320
		High	848.3	1.362	1.334
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.000	2.986
		Middle	881.5	3.017	2.953
		High	892.5	3.003	2.975
	850 MHz Uplink	Low	825.5	3.087	2.992
		Middle	836.5	3.115	2.986
		High	847.5	3.087	2.984
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.187	4.947
		Middle	881.5	5.112	4.906
		High	891.5	5.204	4.894
	850 MHz Uplink	Low	826.5	5.513	4.941
		Middle	836.5	5.179	4.935
		High	846.5	5.099	4.939
LTE 10 MHz	850 MHz Downlink	Low	874	10.397	9.797
		Middle	881.5	10.337	9.869
		High	889	10.372	9.781
	850 MHz Uplink	Low	821.5	10.254	9.8
		Middle	836.5	10.549	9.709
		High	844	10.459	9.754

LTE 16QAM Band 5

Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.358	1.278
		Middle	881.5	1.340	1.286
		High	893.3	1.346	1.286
	850 MHz Uplink	Low	824.7	1.322	1.305
		Middle	836.5	1.356	1.295
		High	848.3	1.377	1.306
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.111	2.972
		Middle	881.5	3.066	2.987
		High	892.5	3.116	2.964
	850 MHz Uplink	Low	825.5	3.145	2.979
		Middle	836.5	3.093	2.973
		High	847.5	3.133	2.989
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.179	4.936
		Middle	881.5	5.182	4.961
		High	891.5	5.179	4.914
	850 MHz Uplink	Low	826.5	5.164	4.923
		Middle	836.5	5.177	4.933
		High	846.5	5.115	4.977
LTE 10 MHz	850 MHz Downlink	Low	874	10.368	9.847
		Middle	881.5	10.307	9.821
		High	889	10.455	9.814
	850 MHz Uplink	Low	821.5	10.338	9.746
		Middle	836.5	10.430	9.820
		High	844	10.218	9.867

LTE 64QAM Band 5

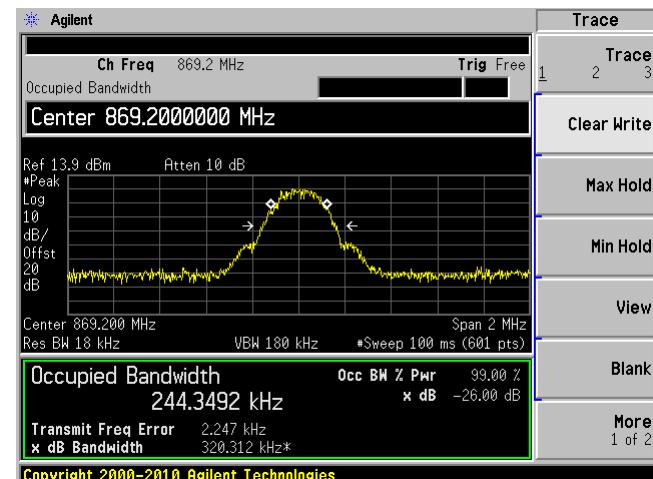
Mode		Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
				Input	Output
LTE 1.4 MHz	850 MHz Downlink	Low	869.7	1.387	1.293
		Middle	881.5	1.350	1.282
		High	893.3	1.356	1.312
	850 MHz Uplink	Low	824.7	1.404	1.295
		Middle	836.5	1.373	1.285
		High	848.3	1.378	1.287
LTE 3 MHz	850 MHz Downlink	Low	870.5	3.098	2.973
		Middle	881.5	3.123	2.974
		High	892.5	3.062	2.973
	850 MHz Uplink	Low	825.5	3.102	2.988
		Middle	836.5	3.065	2.978
		High	847.5	3.097	3.000
LTE 5 MHz	850 MHz Downlink	Low	871.5	5.176	4.953
		Middle	881.5	5.198	4.986
		High	891.5	5.236	4.937
	850 MHz Uplink	Low	826.5	5.137	4.965
		Middle	836.5	5.103	4.968
		High	846.5	5.180	4.970
LTE 10 MHz	850 MHz Downlink	Low	874	10.193	9.789
		Middle	881.5	10.336	9.756
		High	889	10.362	9.831
	850 MHz Uplink	Low	821.5	10.519	9.735
		Middle	836.5	10.495	9.678
		High	844	10.300	9.646

Cellular Band ALC OFF

GSM/GPRS Downlink

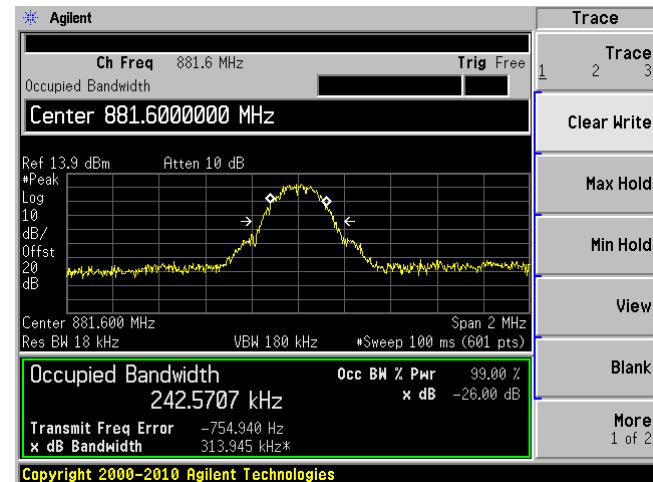
Low Input

Low Output



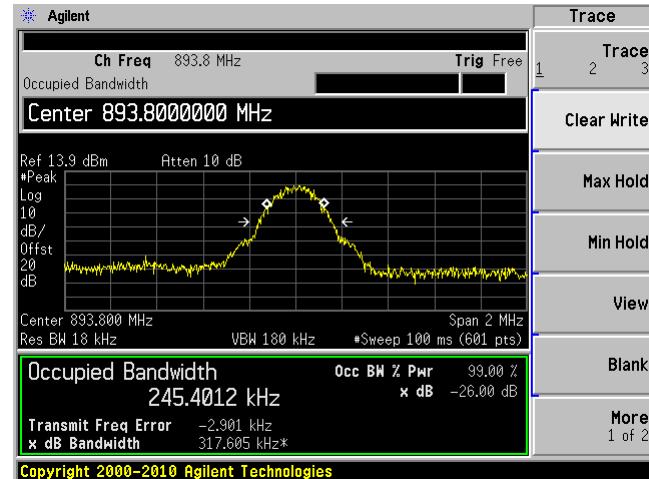
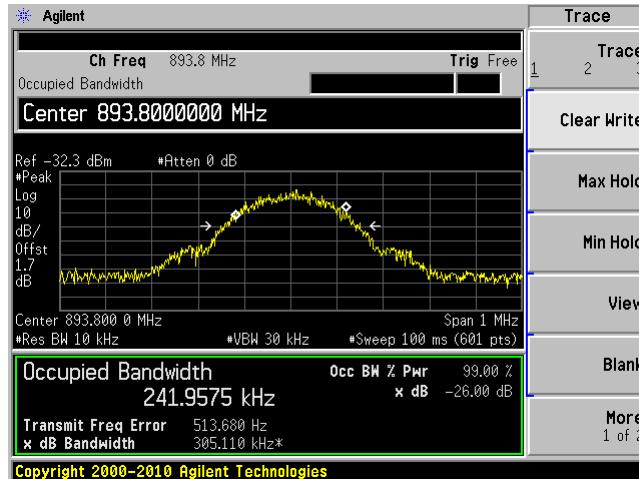
Middle Input

Middle Output



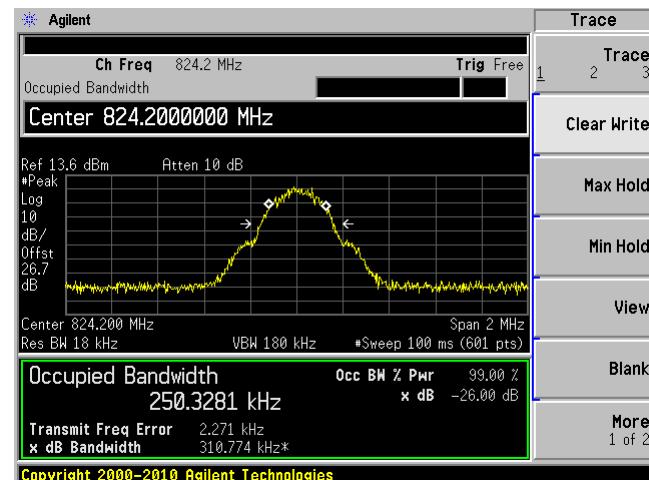
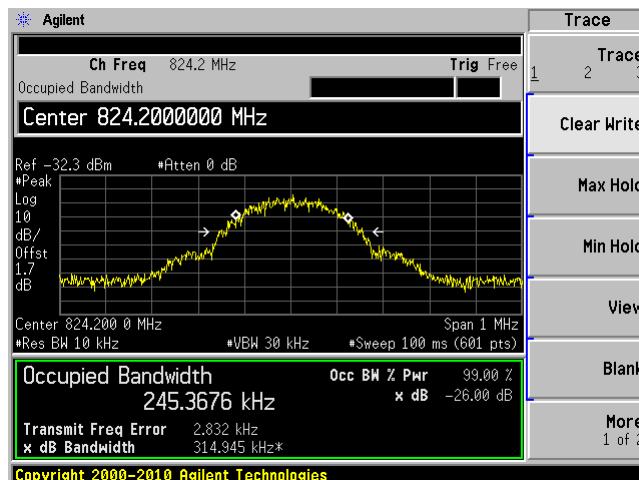
High Input

High Output

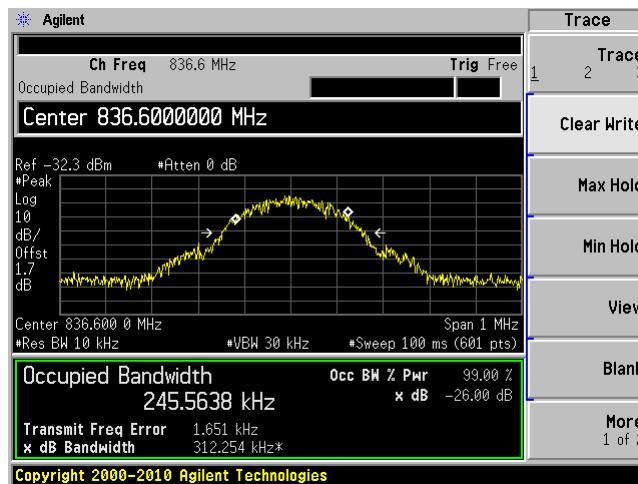
**GSM/GPRS Uplink**

Low Input

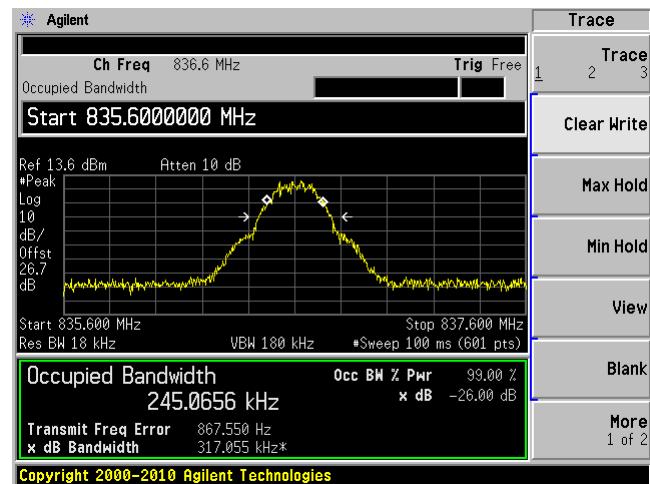
Low Output



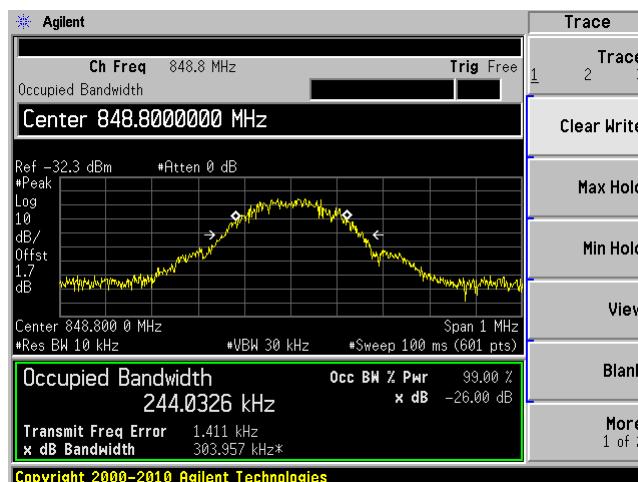
Middle Input



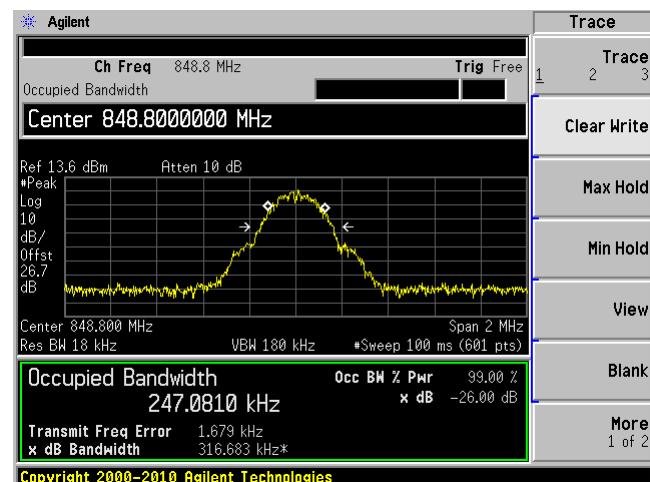
Middle Output



High Input

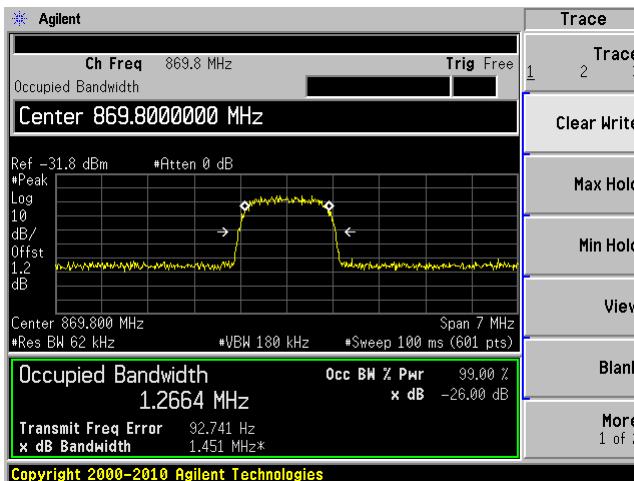


High Output

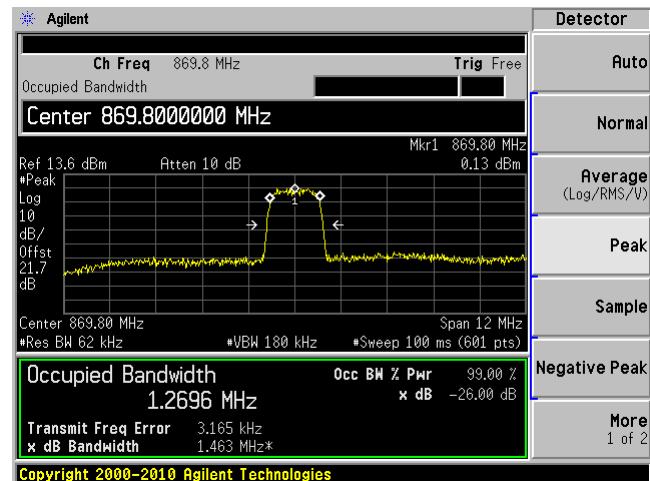


CDMA Downlink

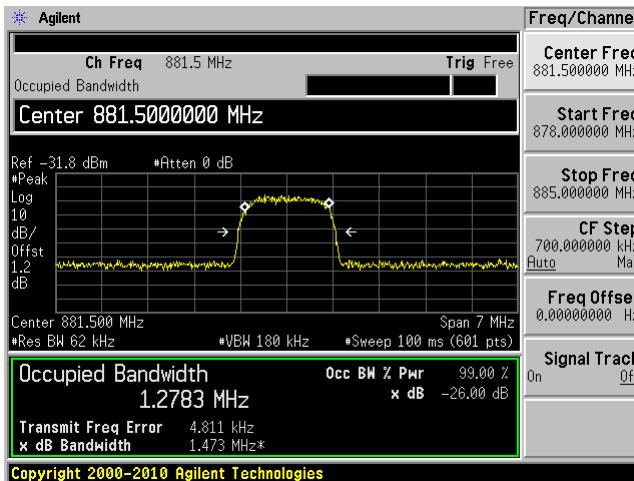
Low Input



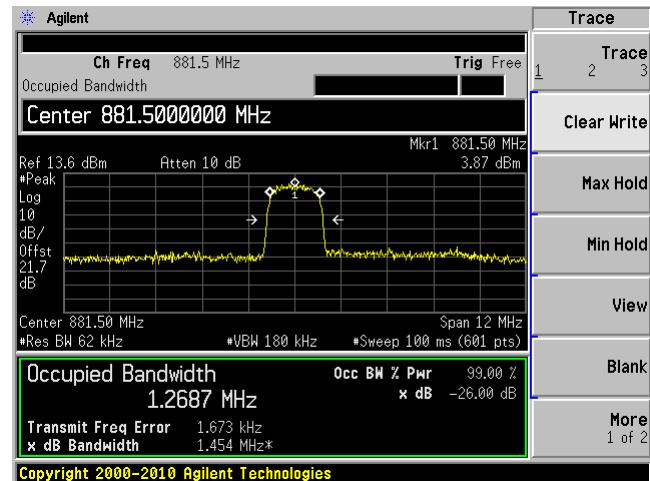
Low Output



Middle Input

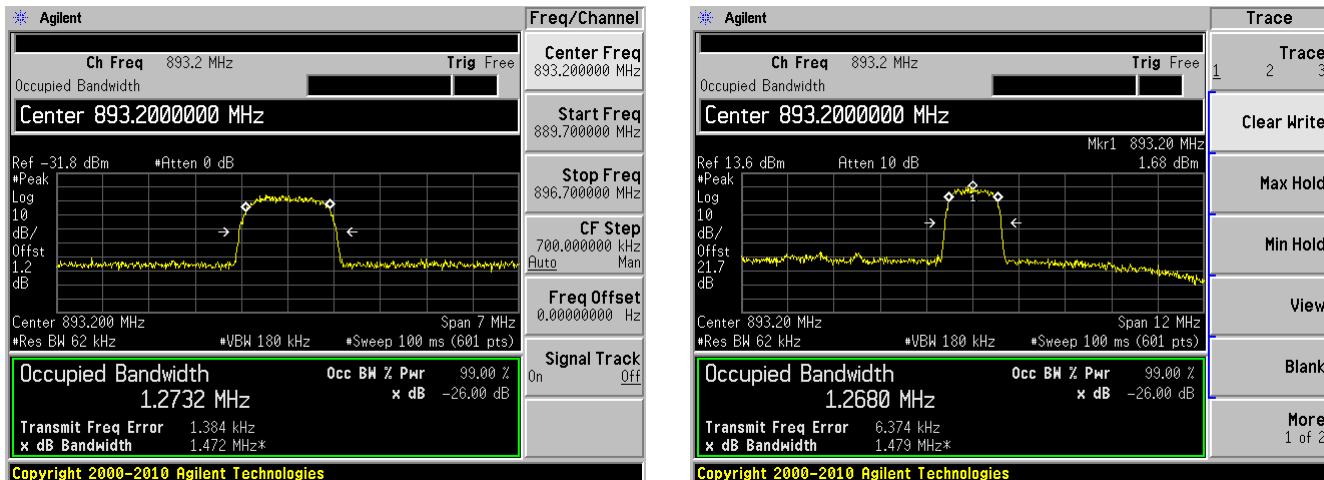


Middle Output



High Input

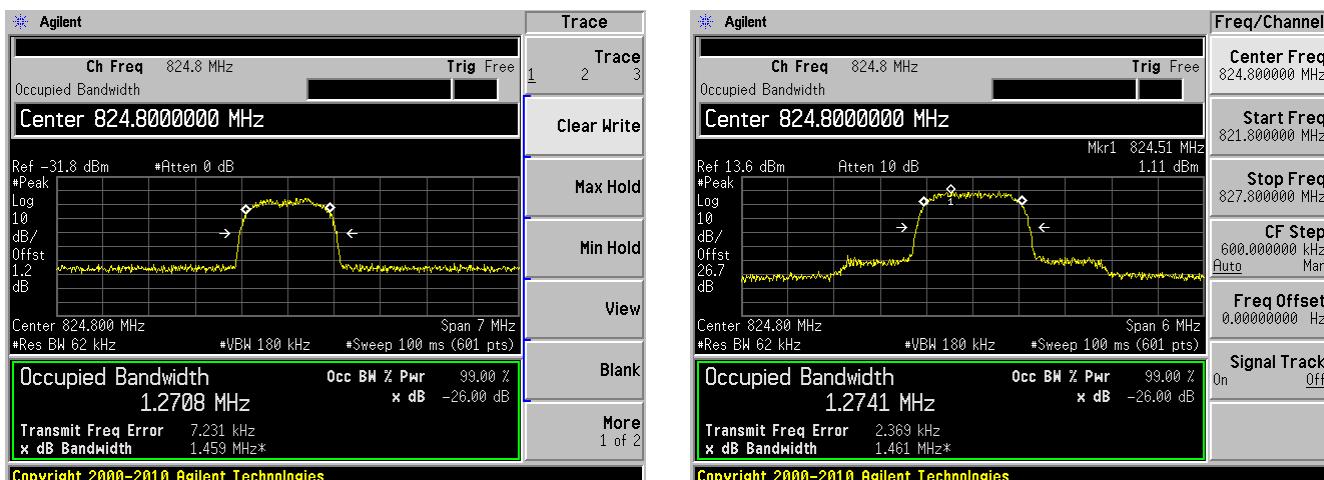
High Output



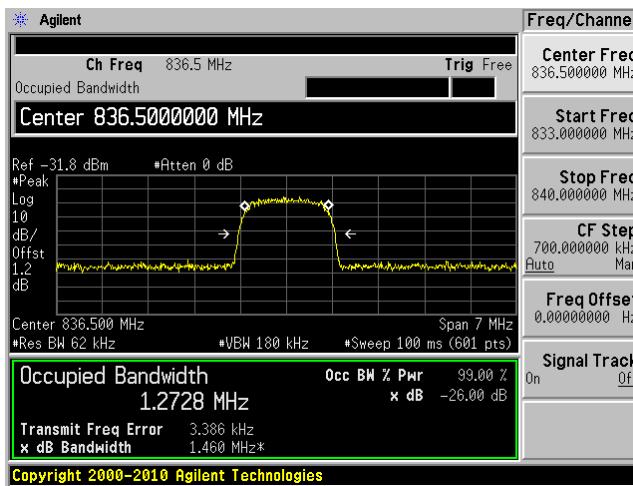
CDMA Uplink

Low Input

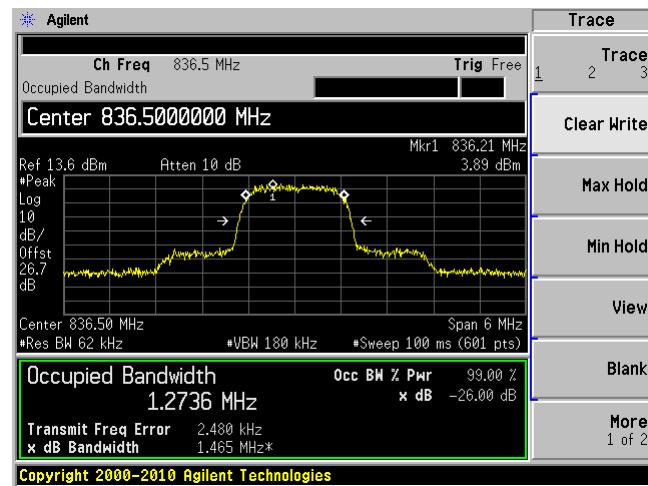
Low Output



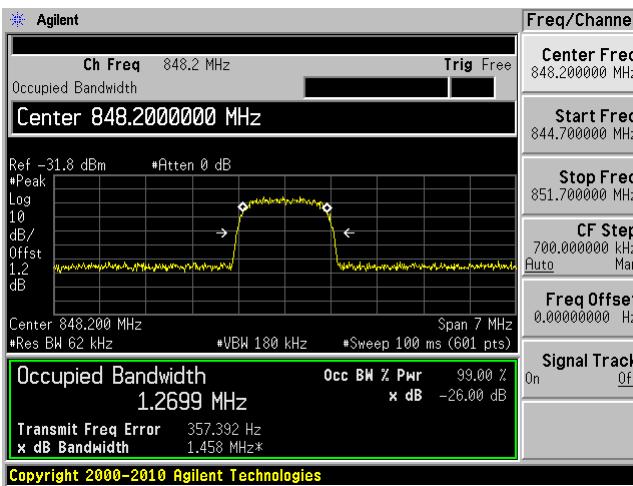
Middle Input



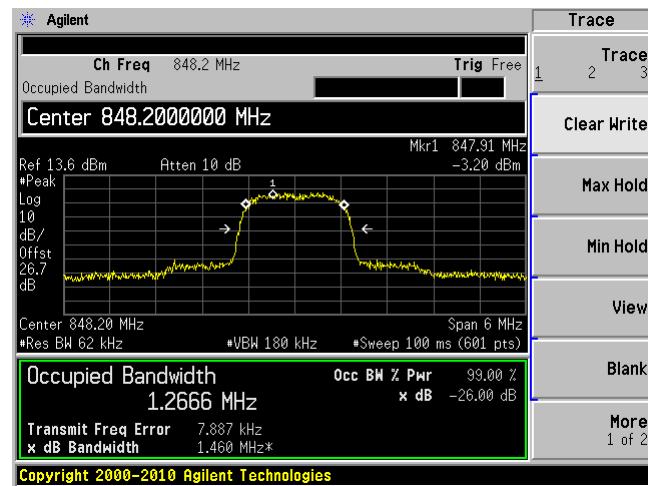
Middle Output



High Input

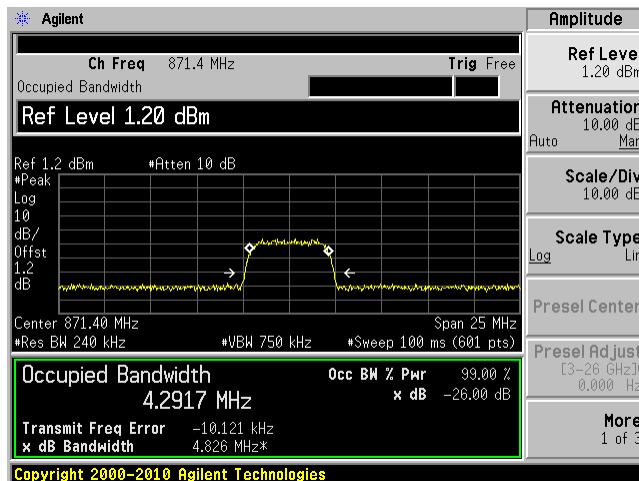


High Output

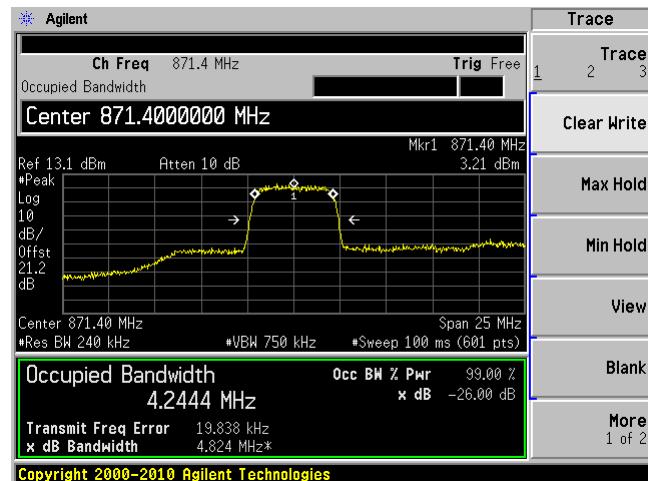


WCDMA Downlink

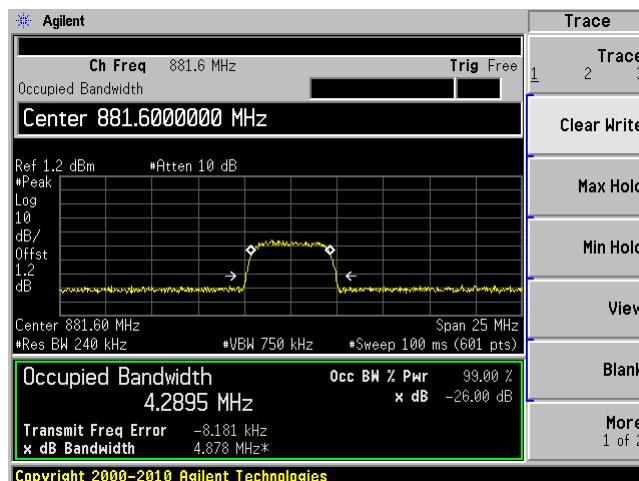
Low Input



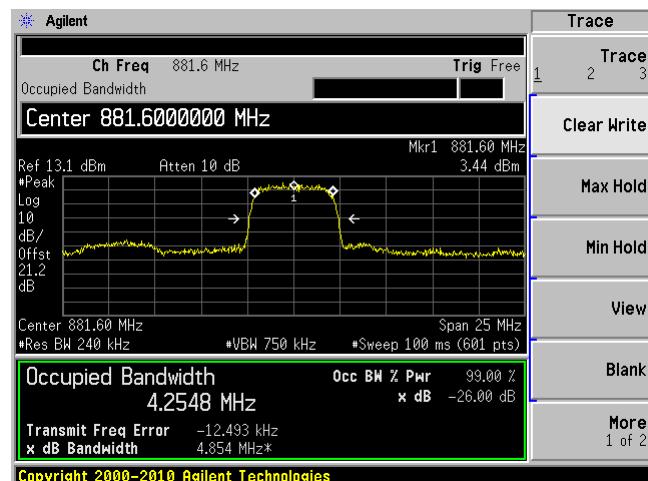
Low Output



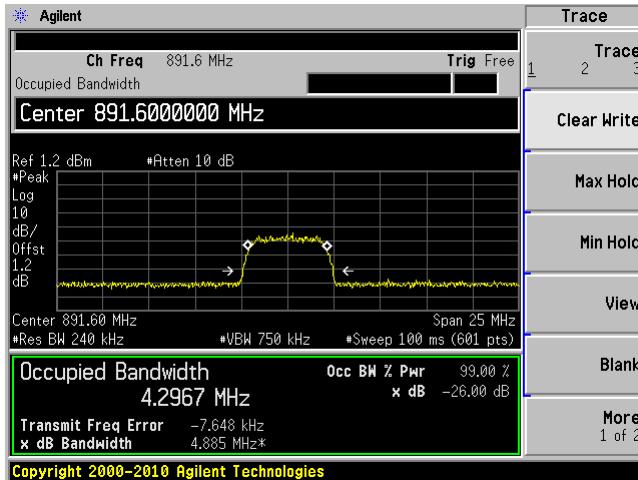
Middle Input



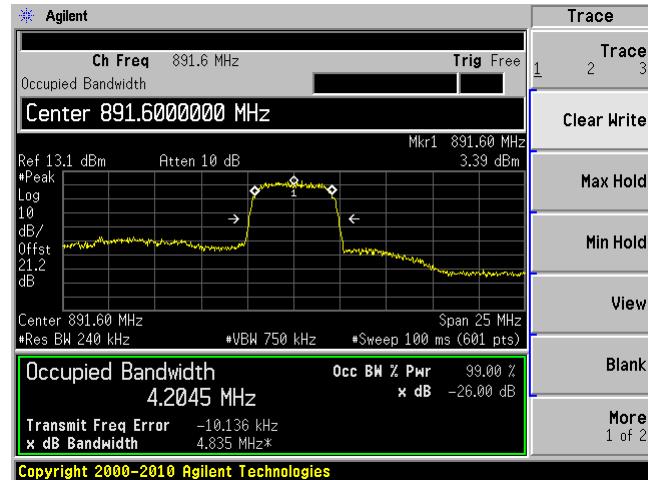
Middle Output



High Input

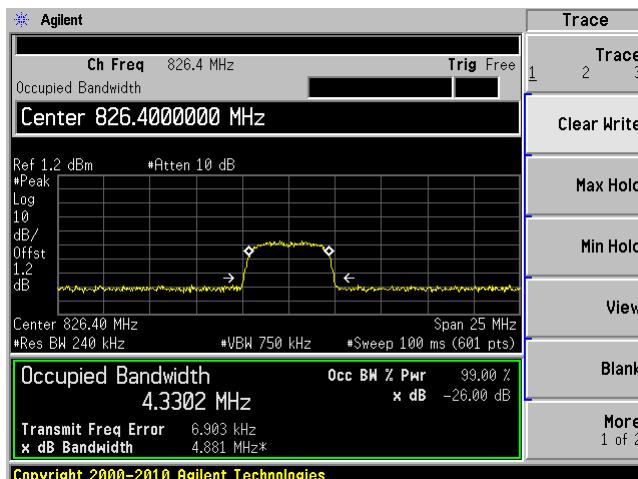


High Output

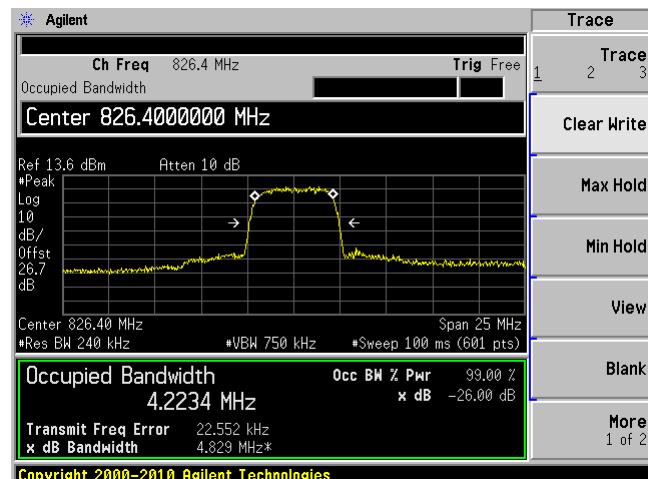


WCDMA Uplink

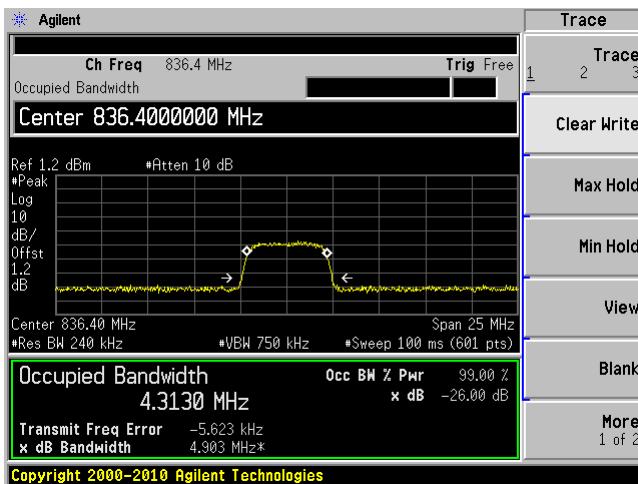
Low Input



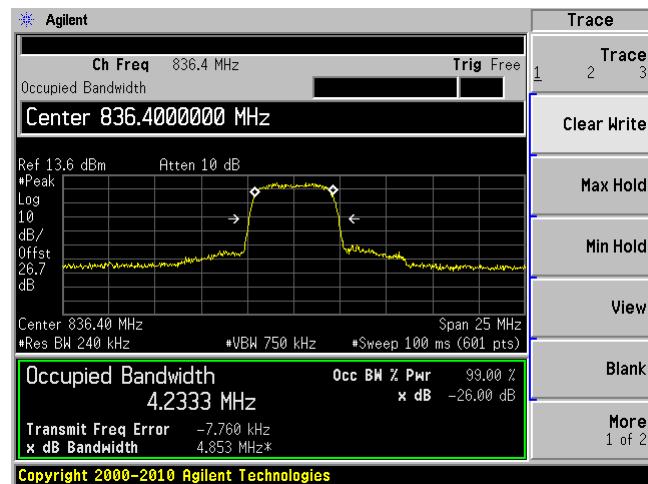
Low Output



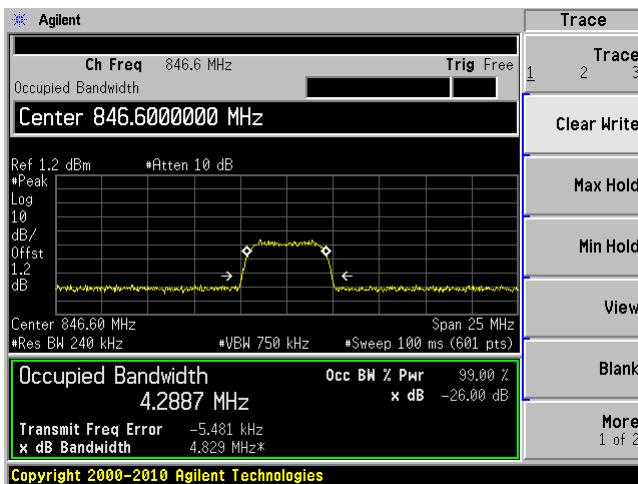
Middle Input



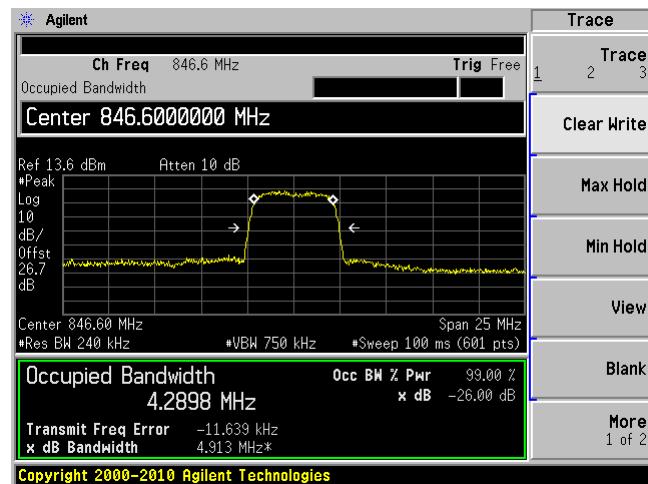
Middle Output



High Input



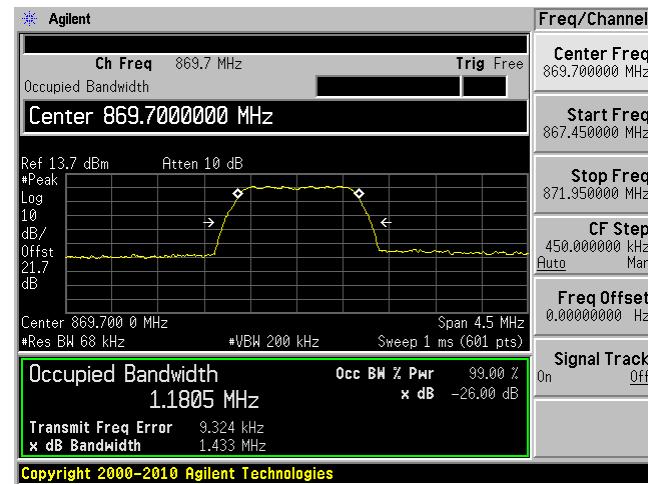
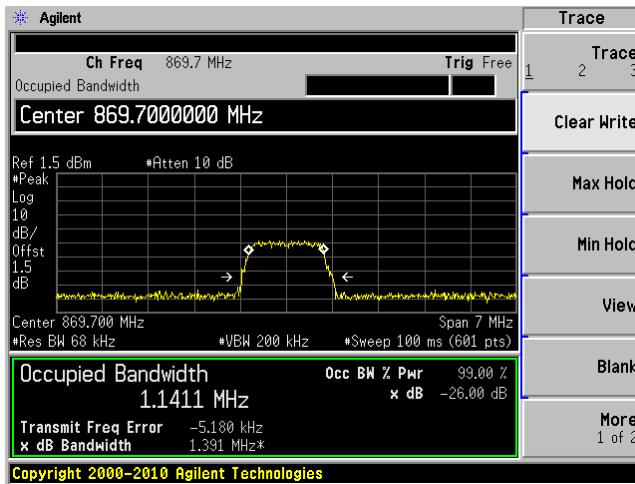
High Output



LTE 1.4MHz QPSK Downlink

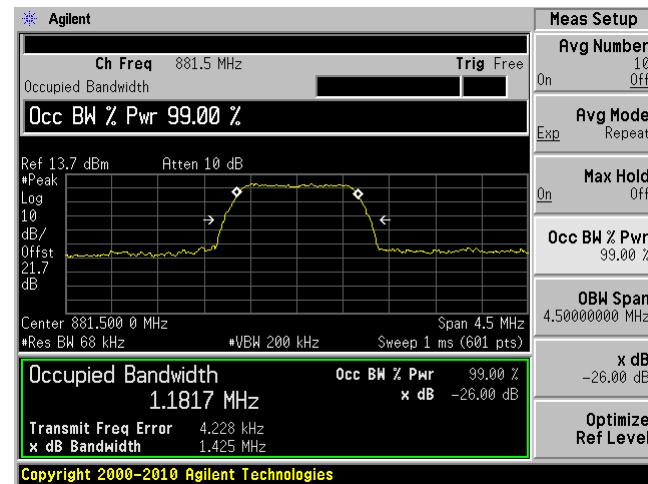
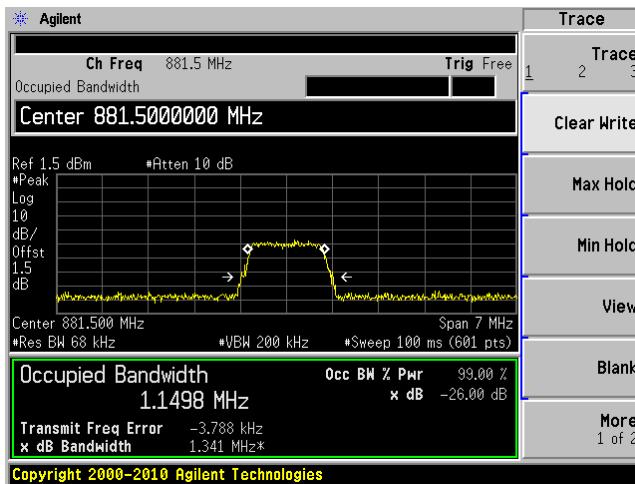
Low Input

Low Output

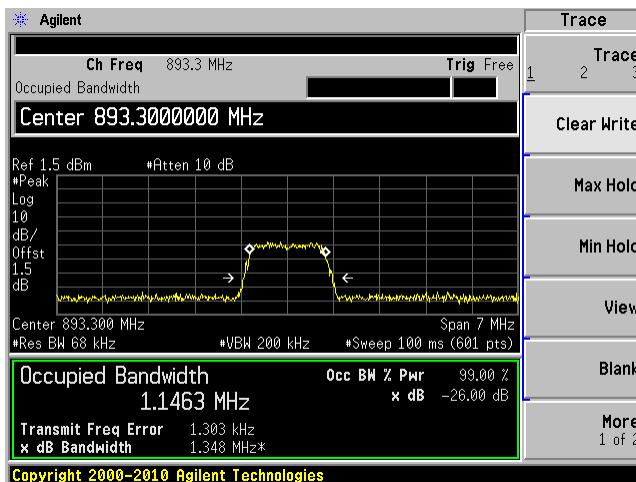


Middle Input

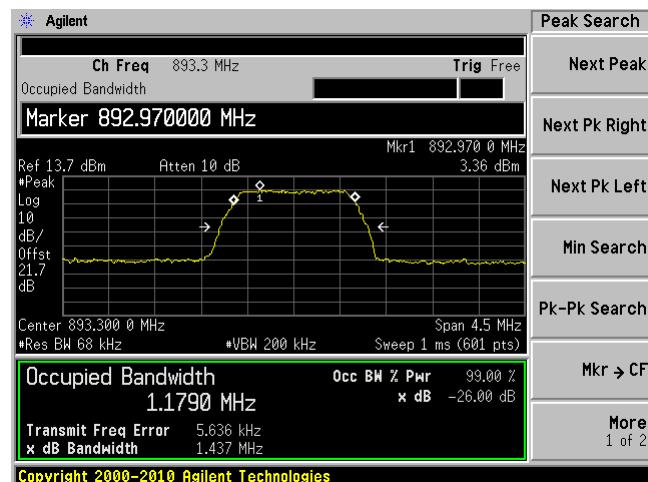
Middle Output



High Input

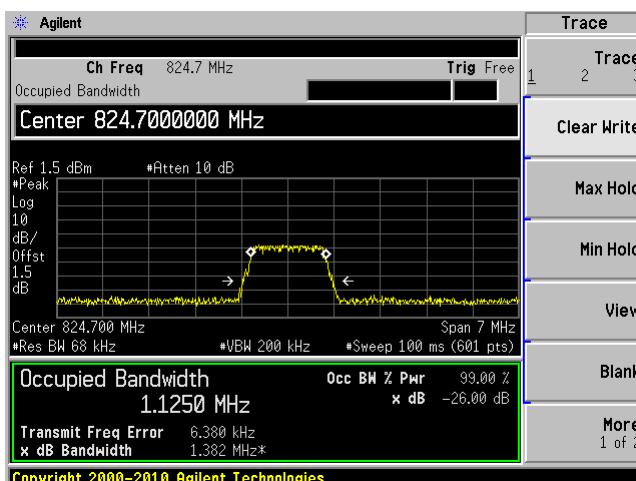


High Output

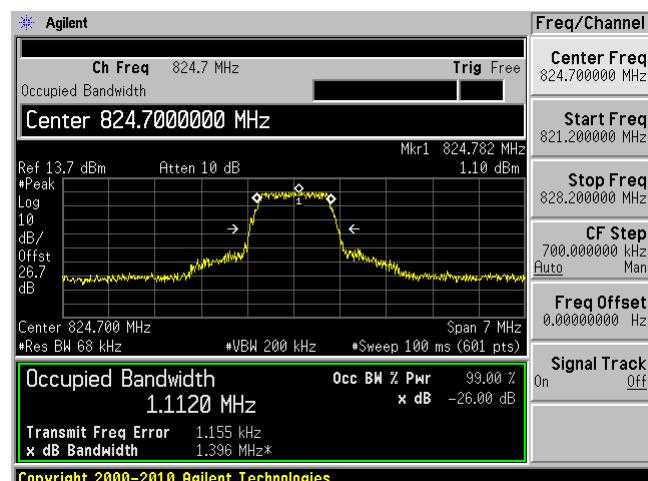


LTE 1.4MHz QPSK Uplink

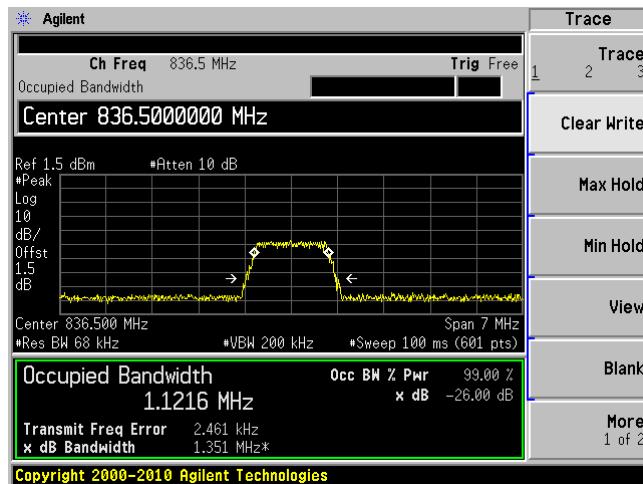
Low Input



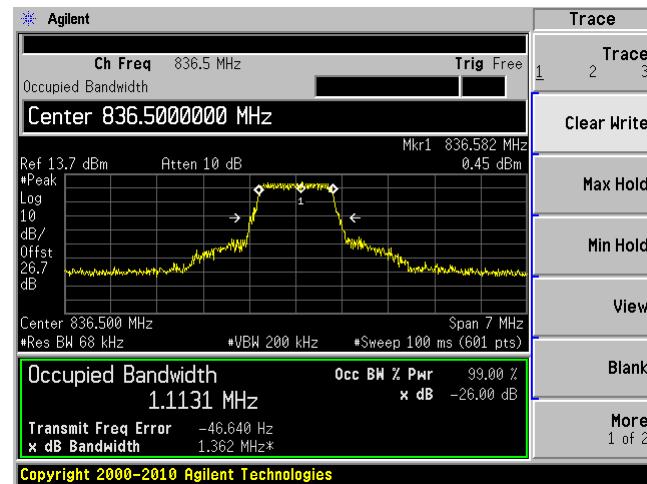
Low Output



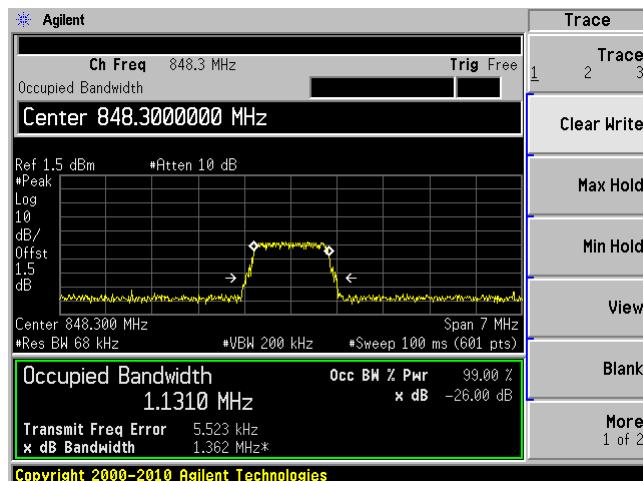
Middle Input



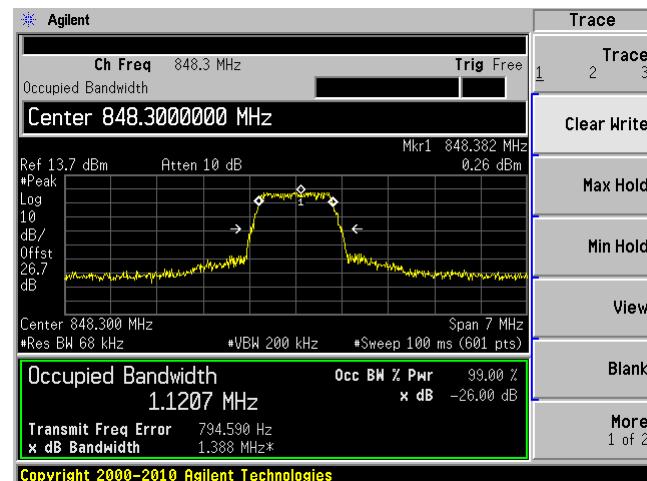
Middle Output



High Input

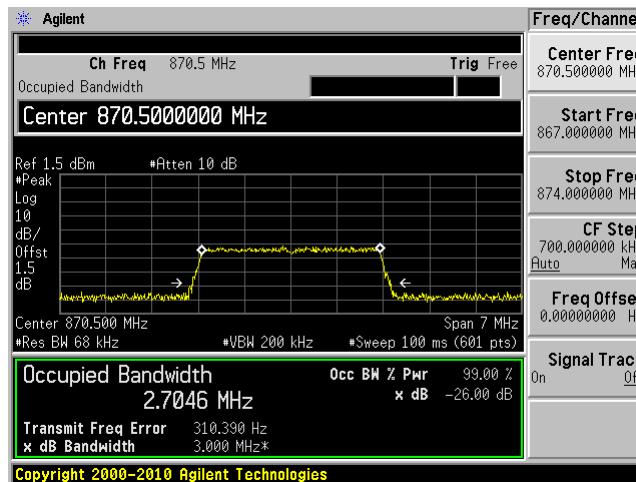


High Output

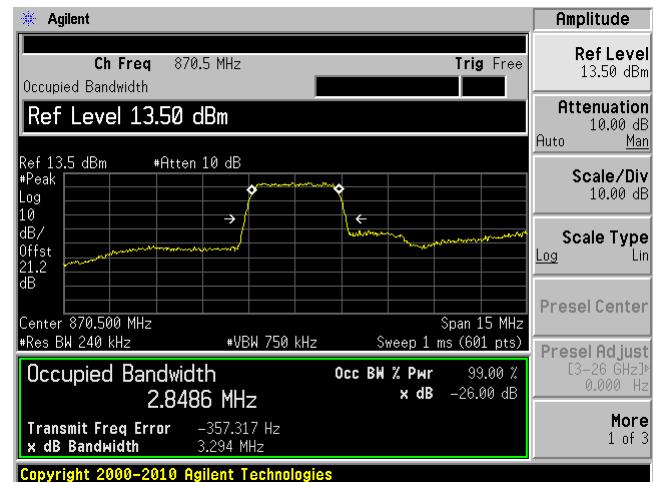


LTE 3MHz QPSK Downlink

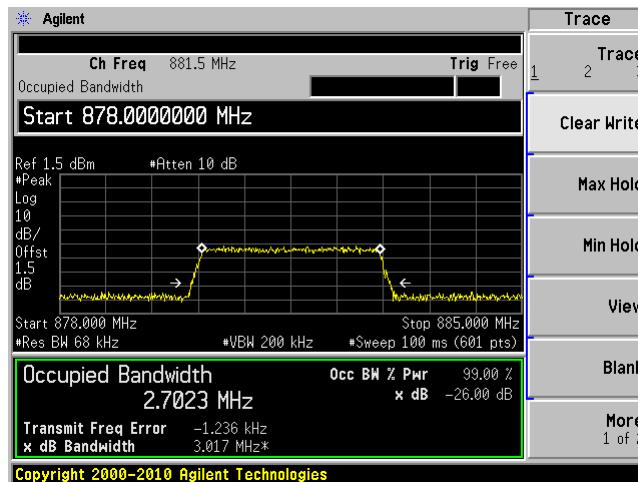
Low Input



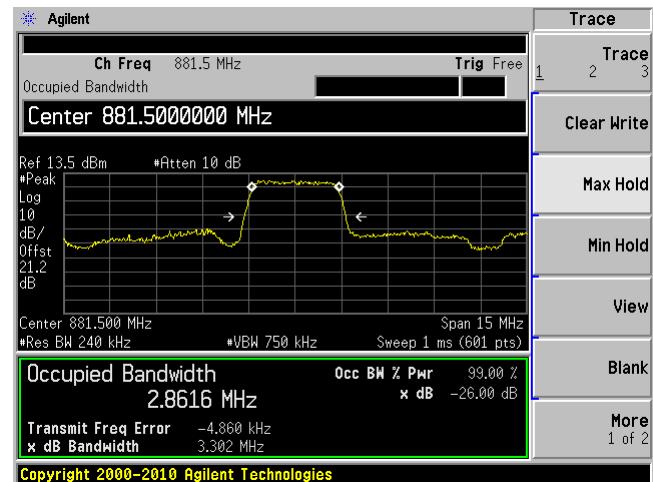
Low Output



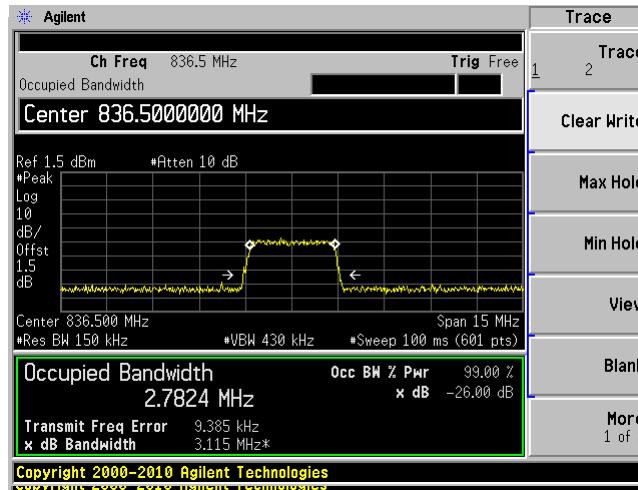
Middle Input



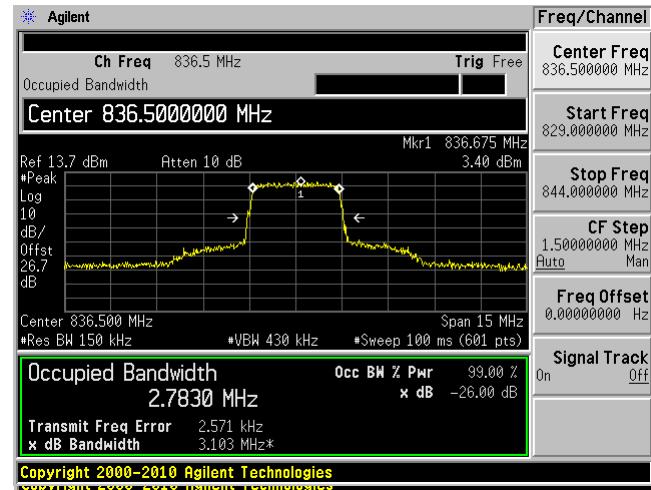
Middle Output



High Input

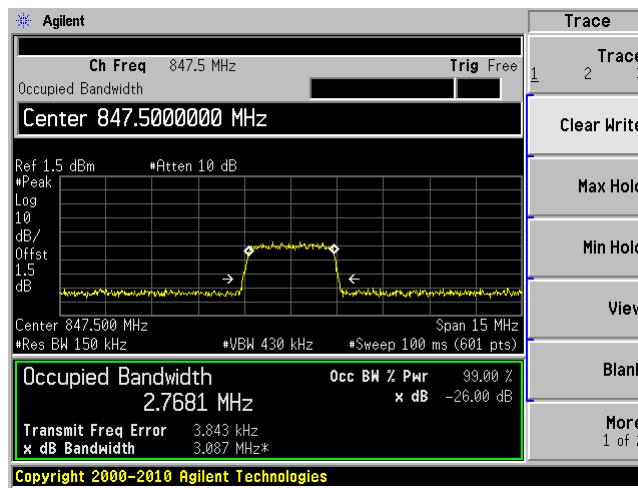


High Output

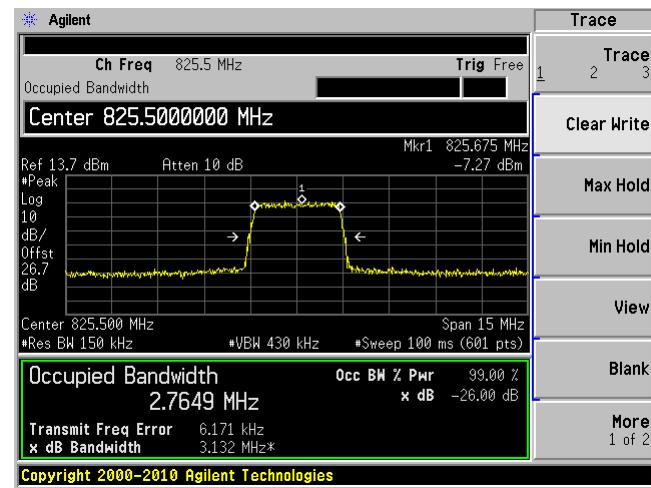


LTE 3MHz QPSK Uplink

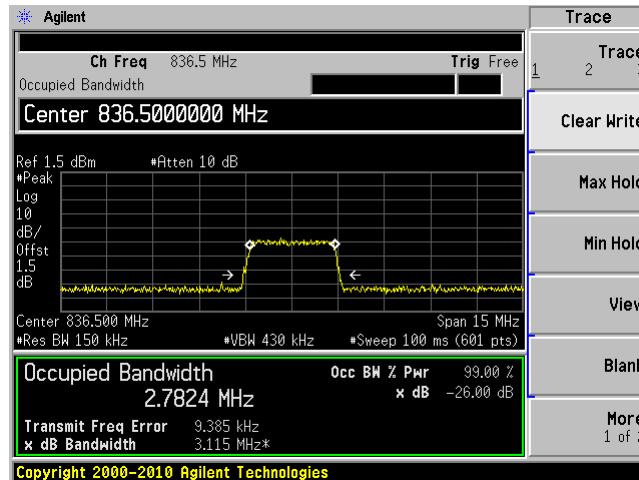
Low Input



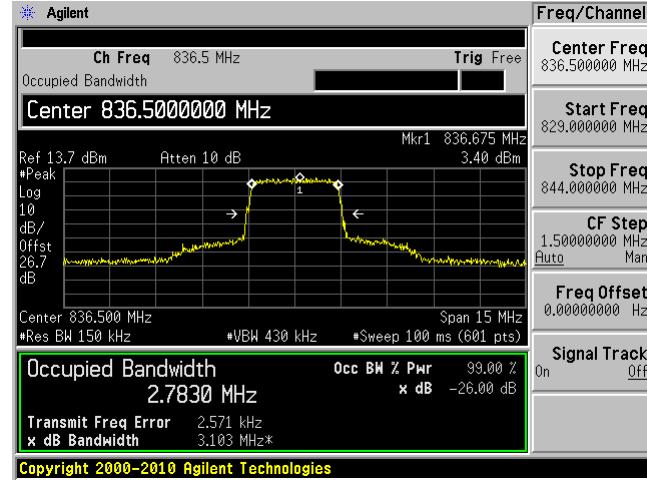
Low Output



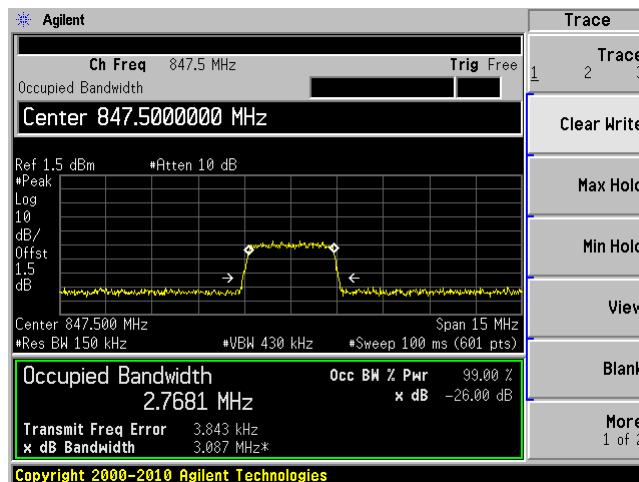
Middle Input



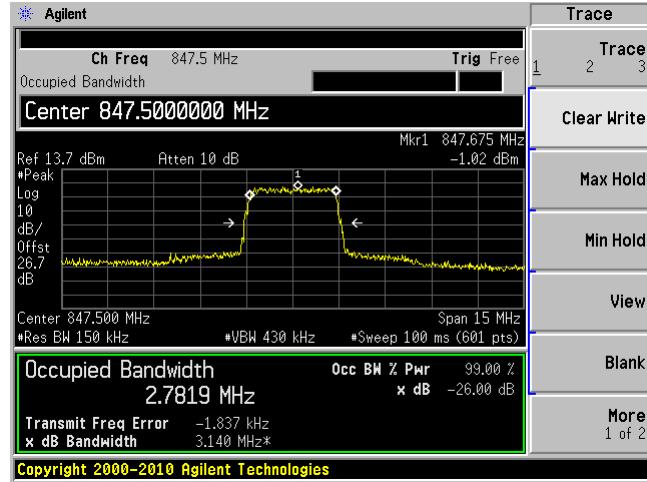
Middle Output



High Input



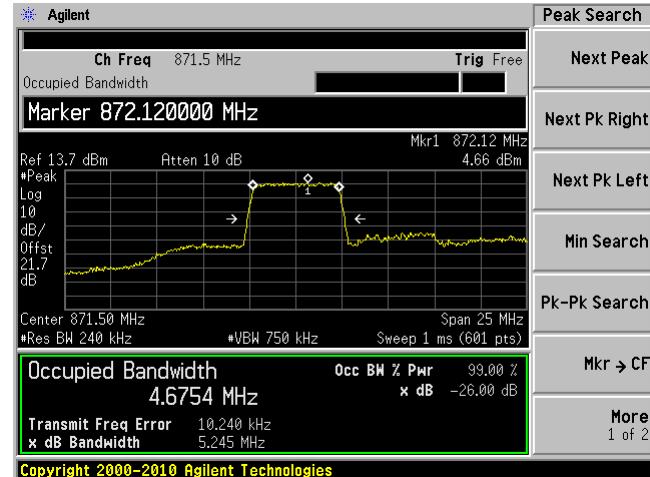
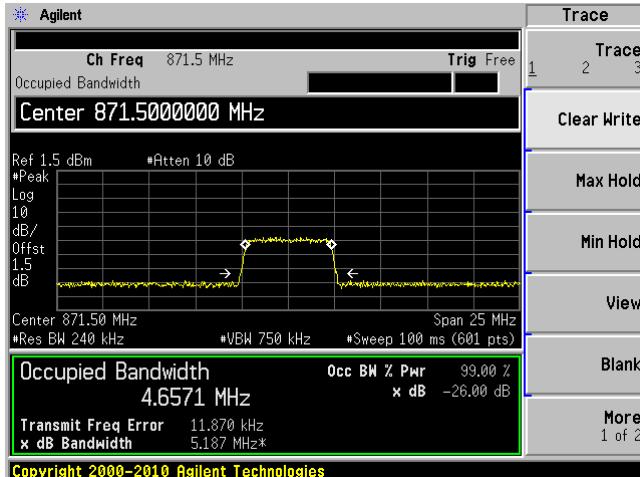
High Output



LTE 5MHz QPSK Downlink

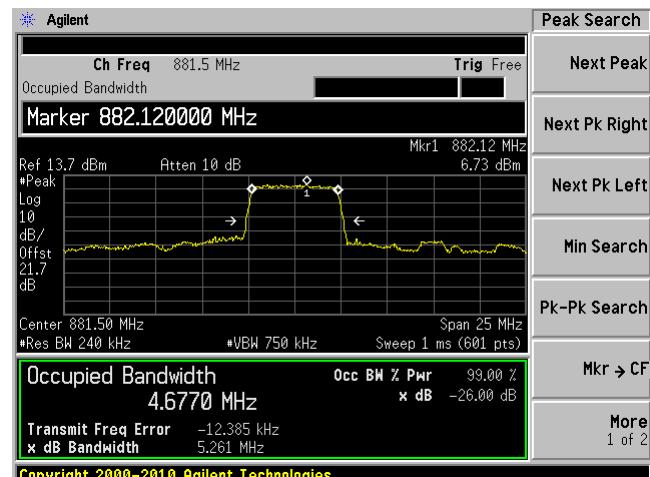
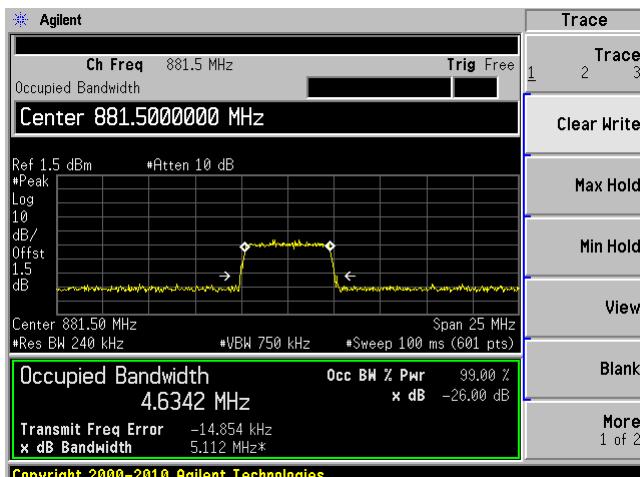
Low Input

Low Output

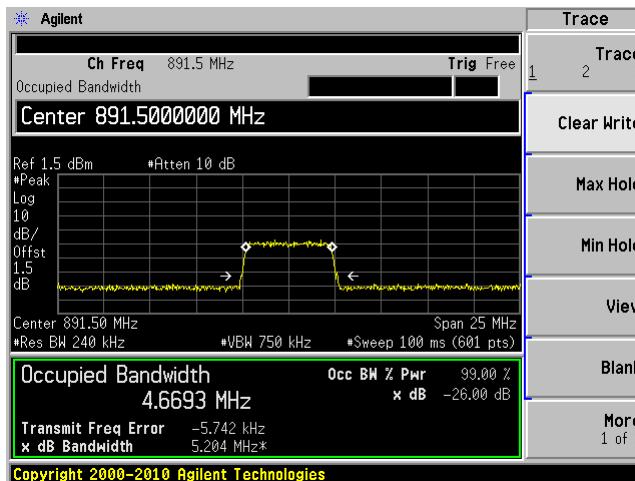


Middle Input

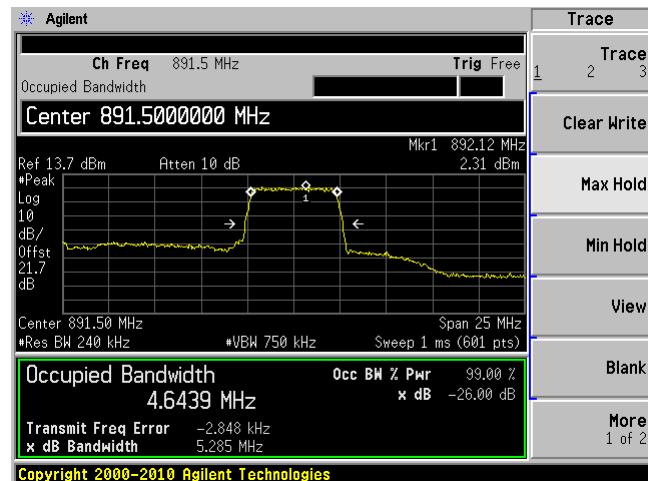
Middle Output



High Input

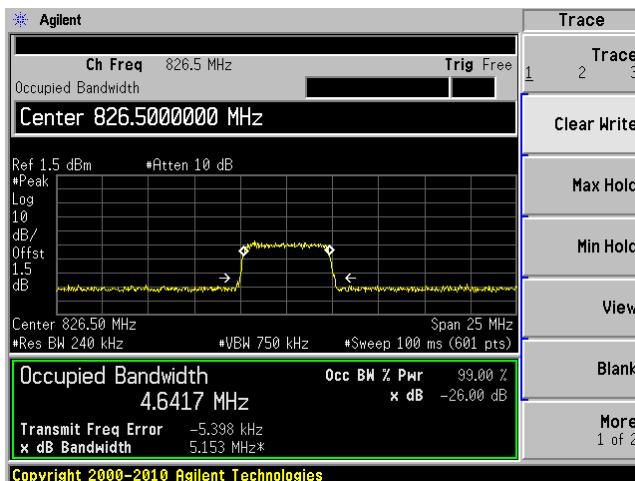


High Output

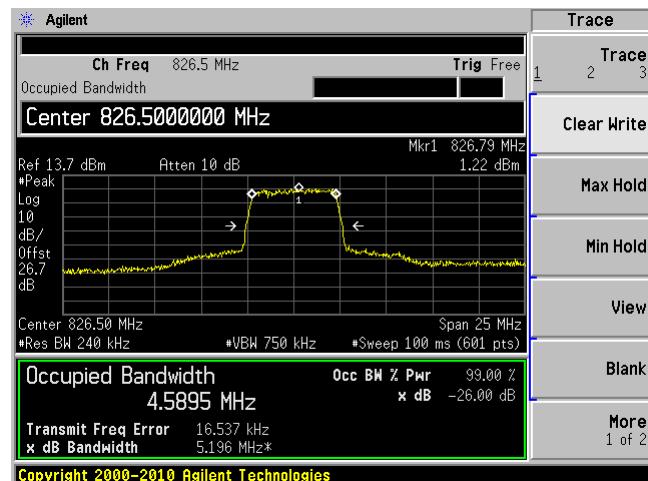


LTE 5MHz QPSK Uplink

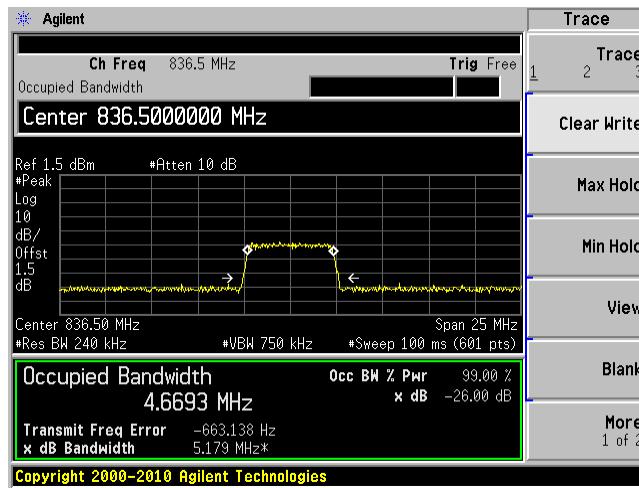
Low Input



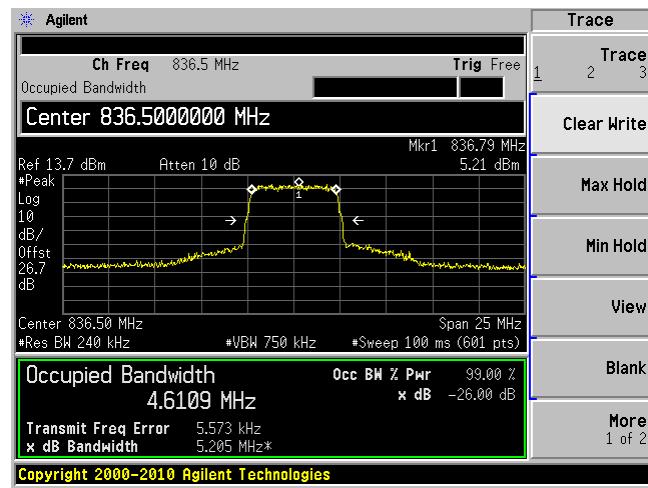
Low Output



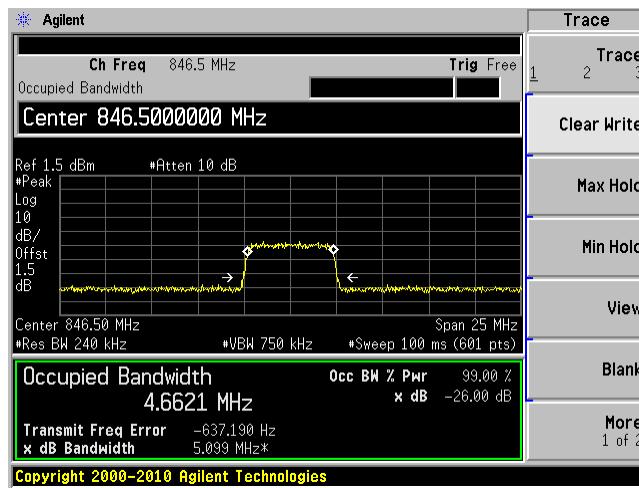
Middle Input



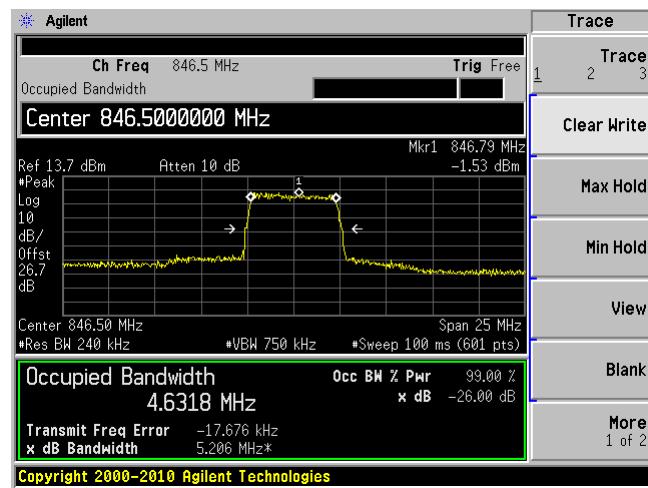
Middle Output



High Input

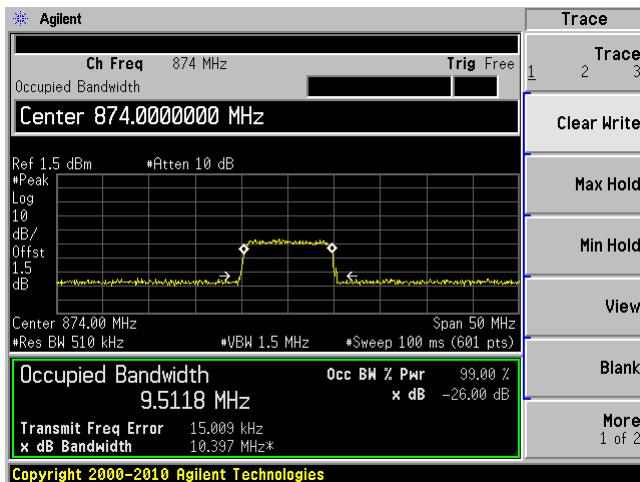


High Output

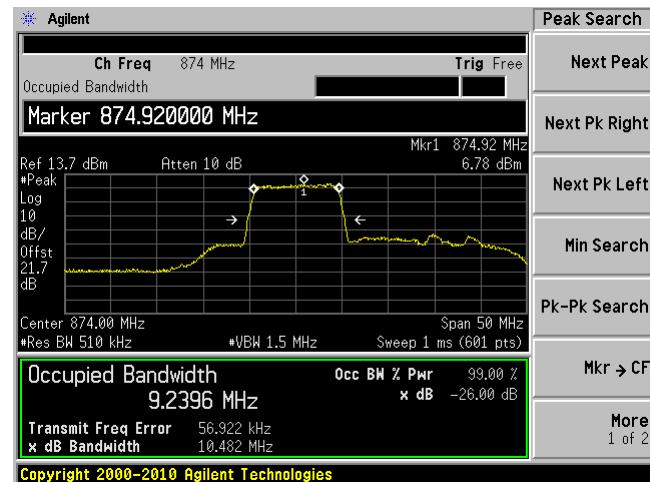


LTE 10MHZ QPSK Downlink

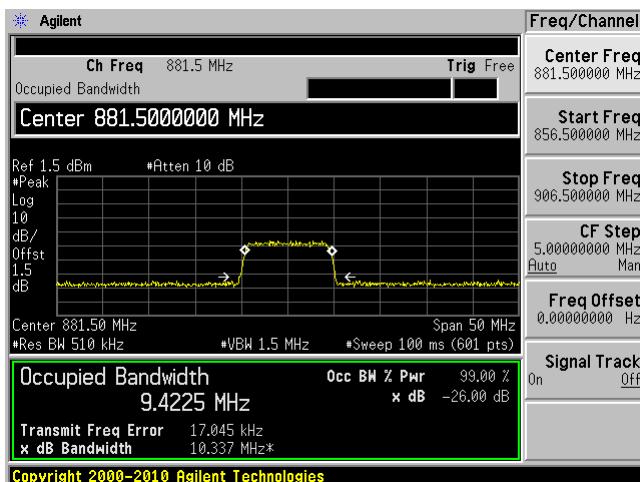
Low Input



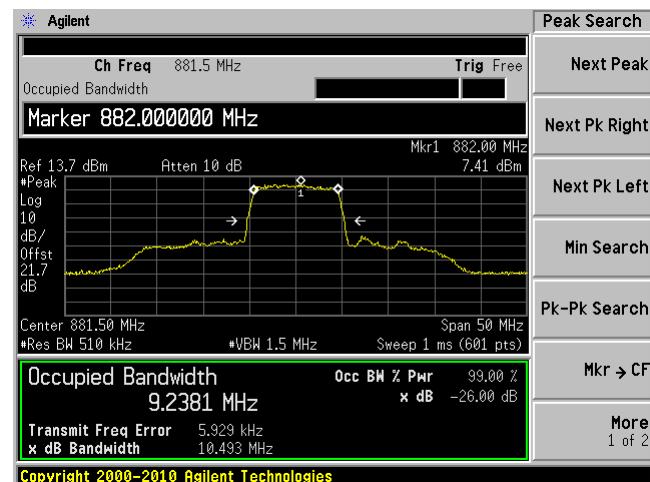
Low Output



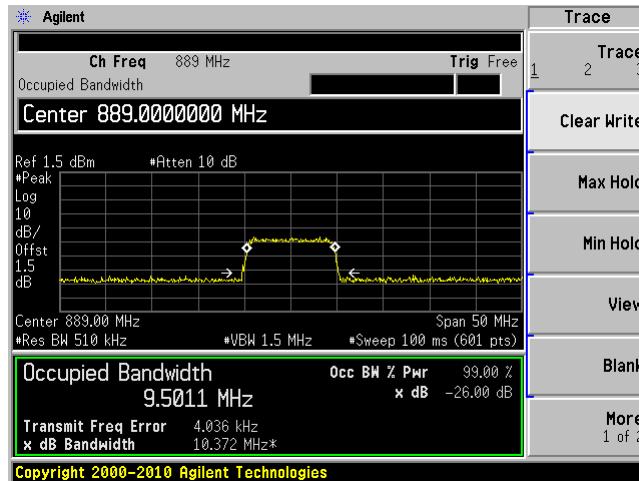
Middle Input



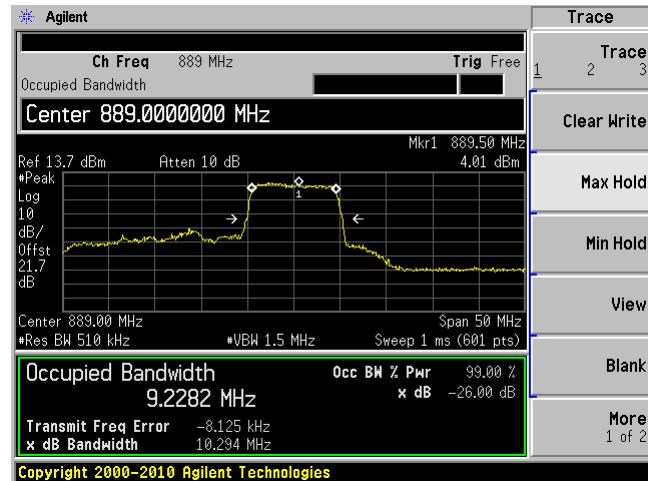
Middle Output



High Input

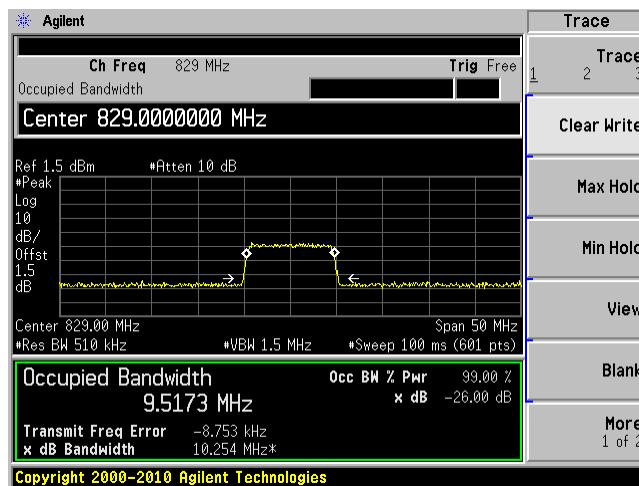


High Output

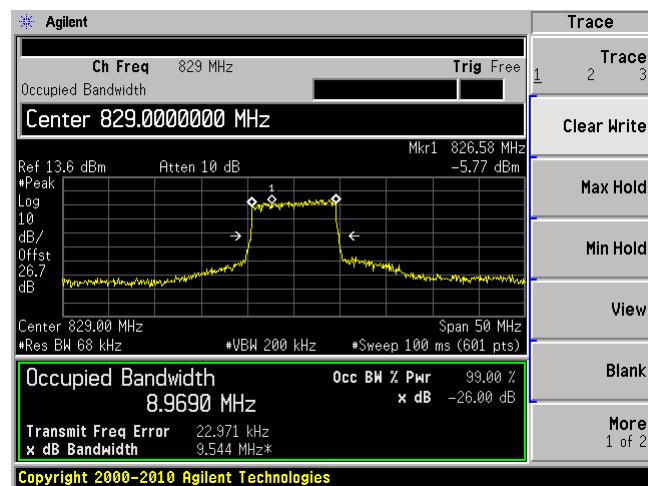


LTE 10MHz QPSK Uplink

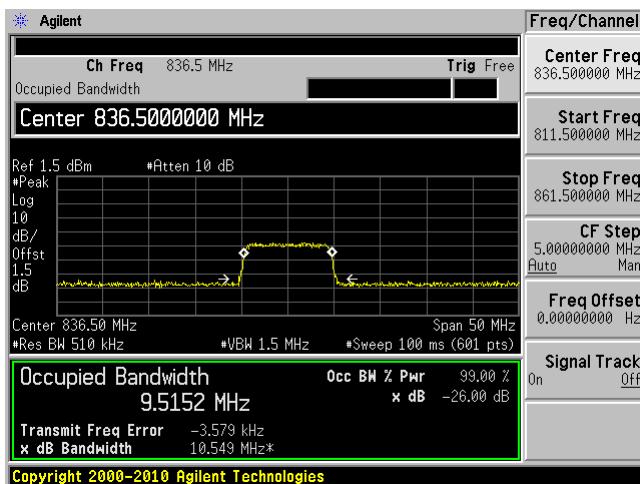
Low Input



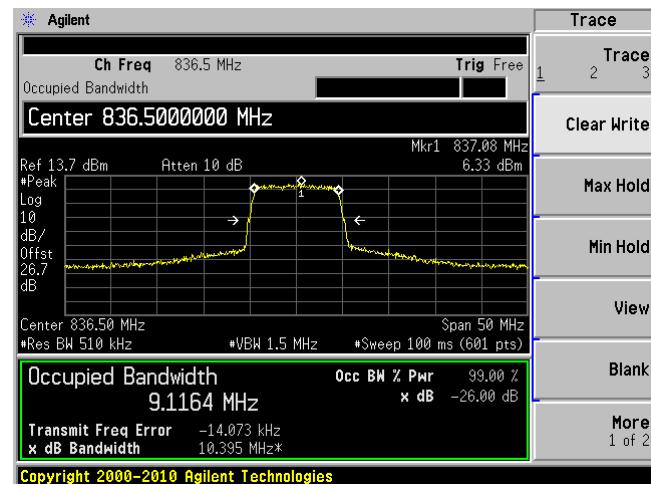
Low Output



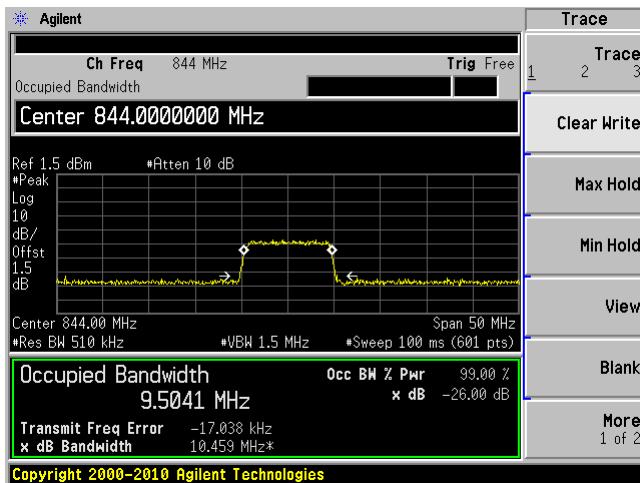
Middle Input



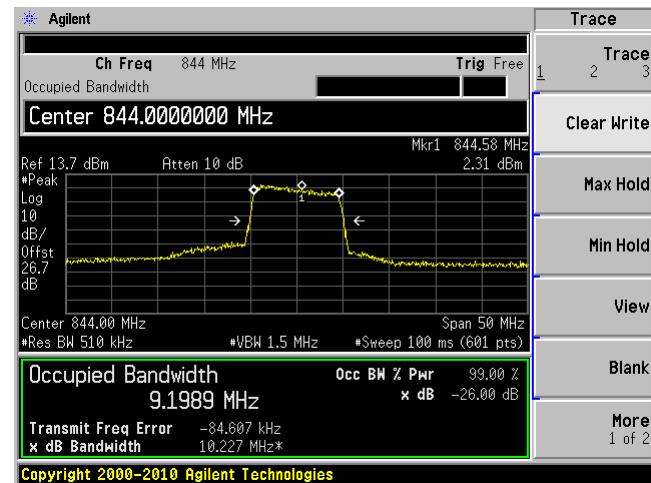
Middle Output



High Input

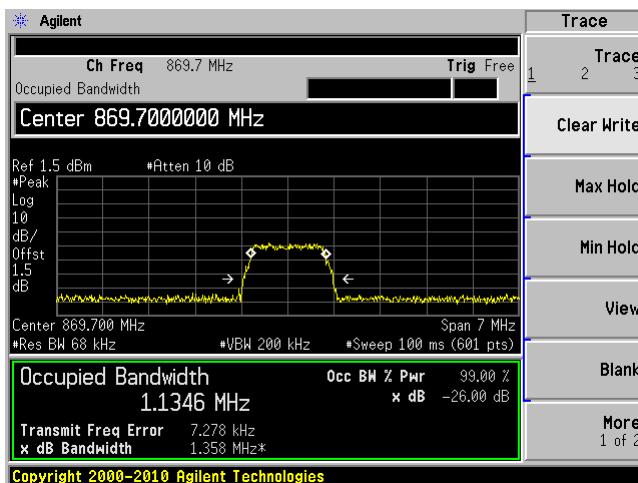


High Output

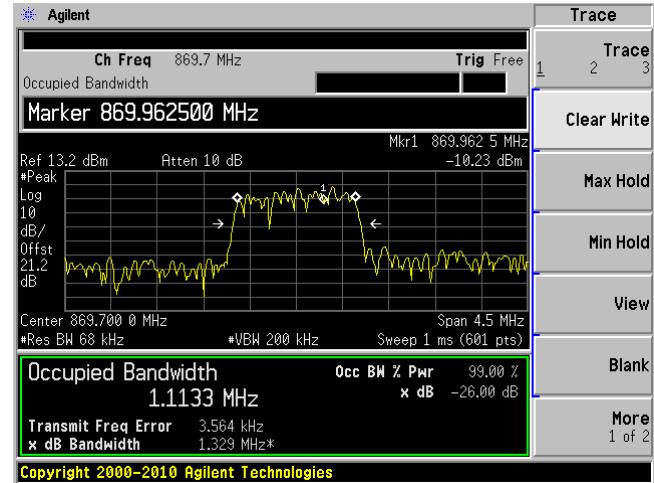


LTE 1.4MHz 16QAM Downlink

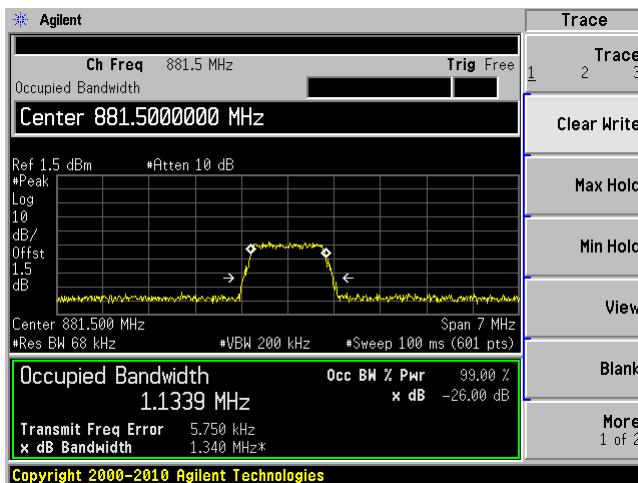
Low Input



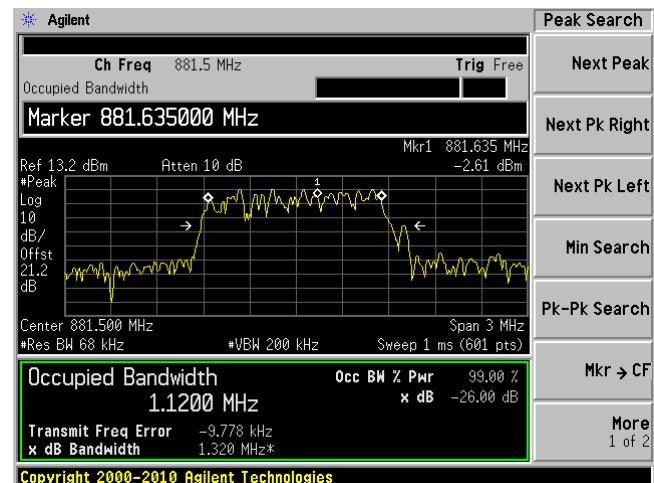
Low Output



Middle Input

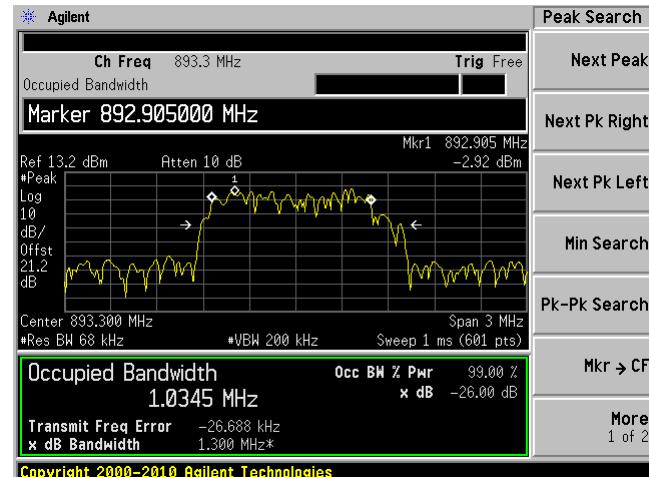
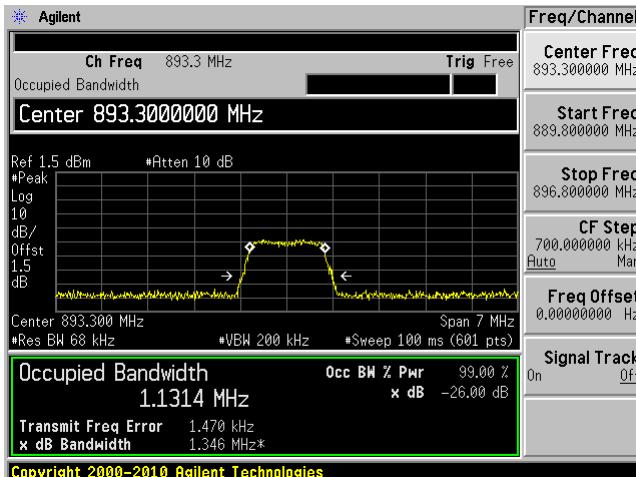


Middle Output



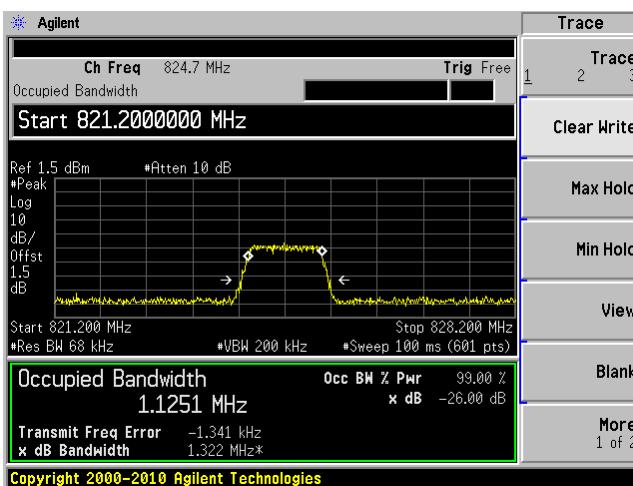
High Input

High Output

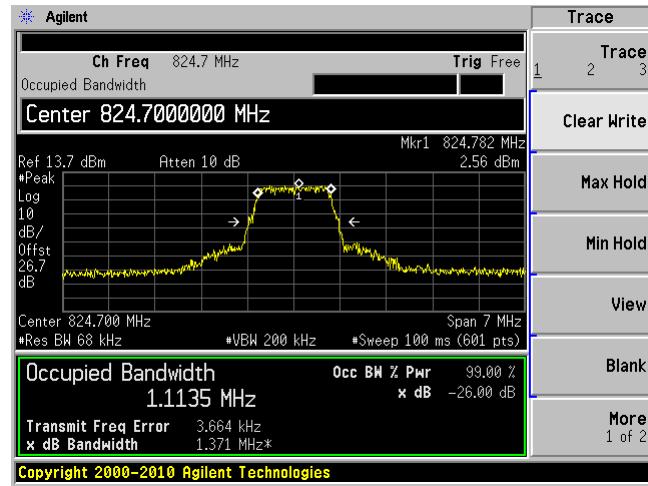


LTE 1.4MHz 16QAM Uplink

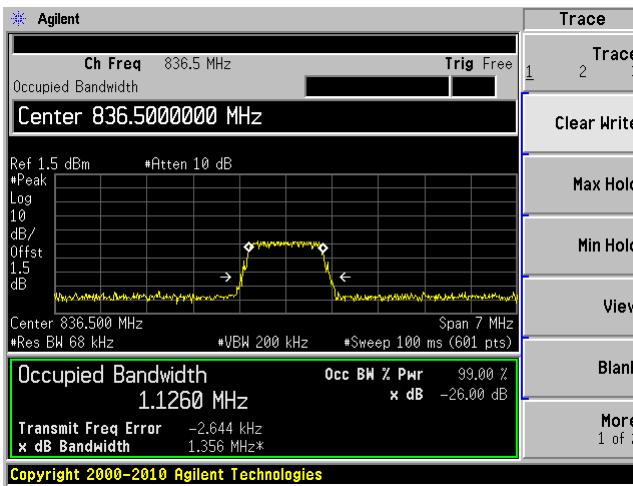
Low Input



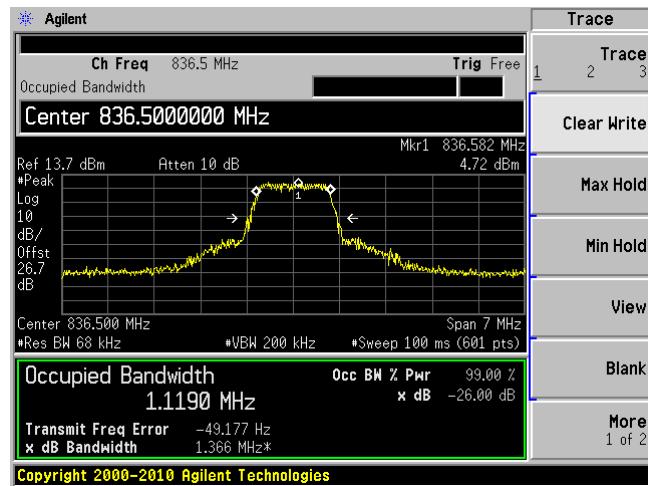
Low Output



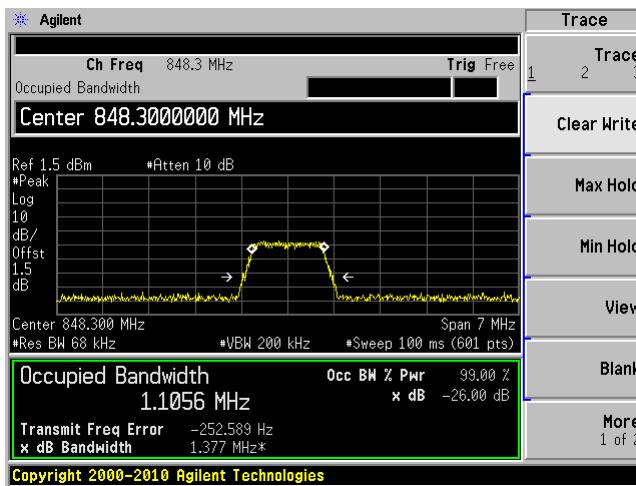
Middle Input



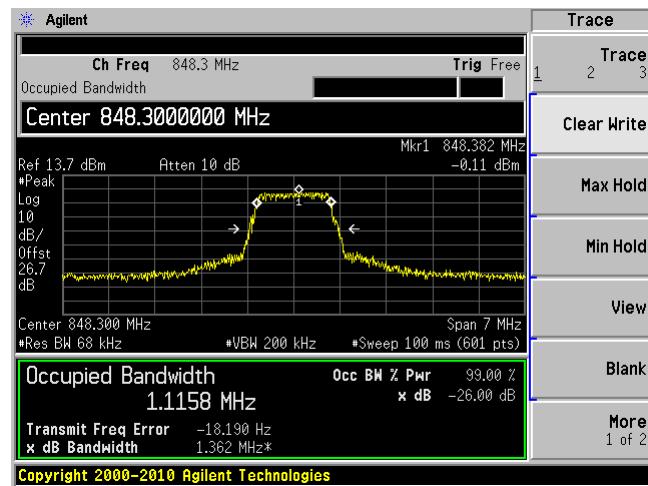
Middle Output



High Input

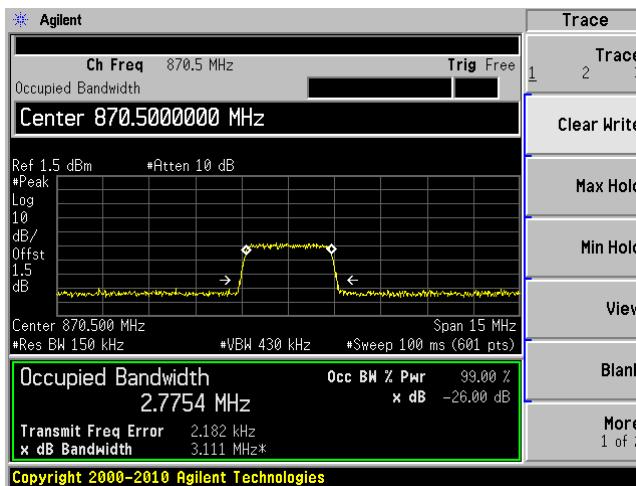


High Output

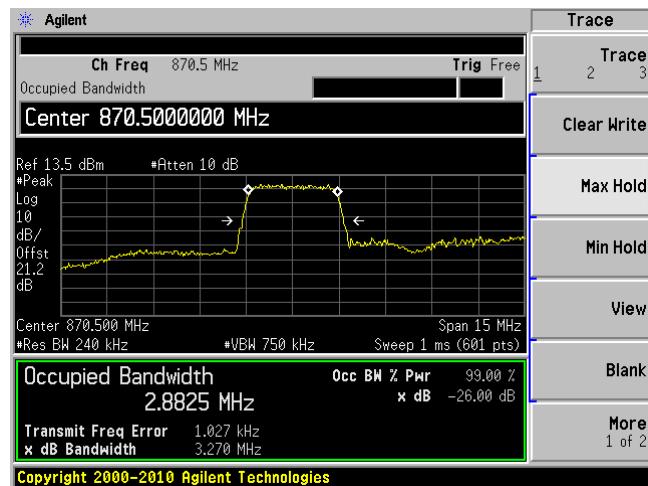


LTE 3MHz 16QAM Downlink

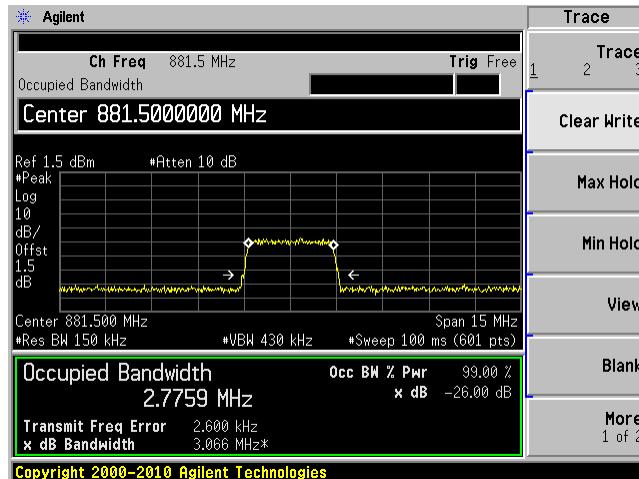
Low Input



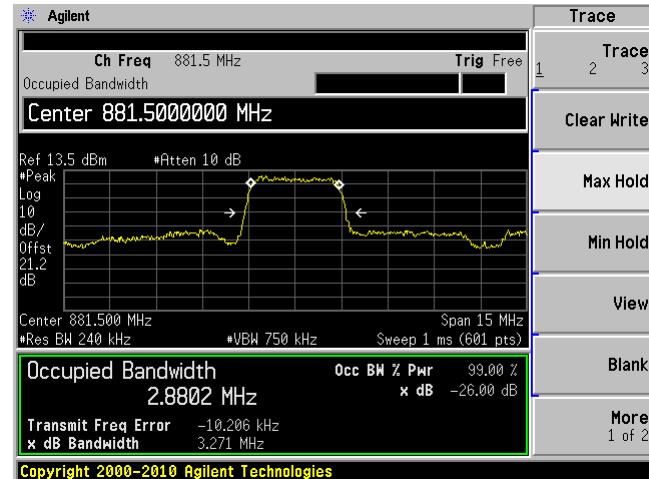
Low Output



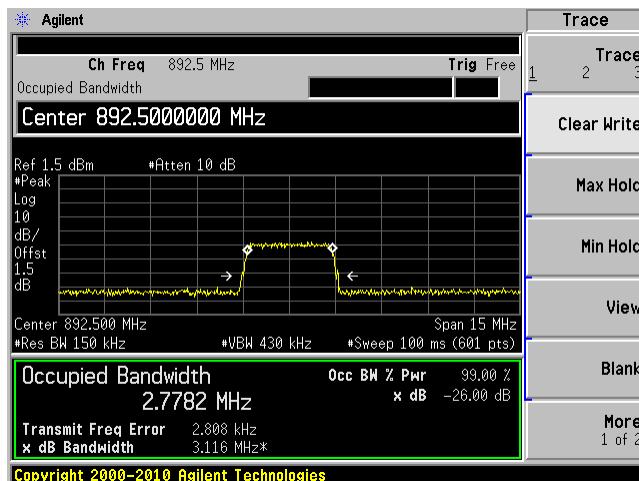
Middle Input



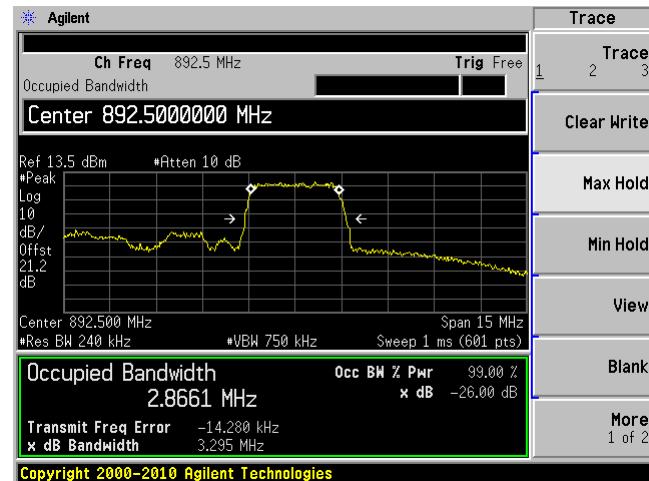
Middle Output



High Input

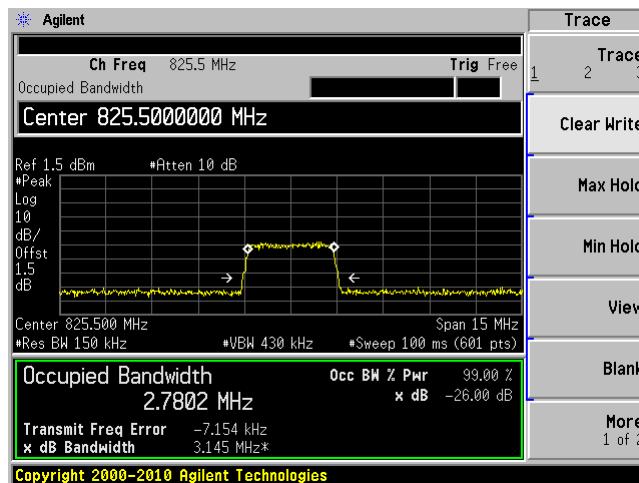


High Output

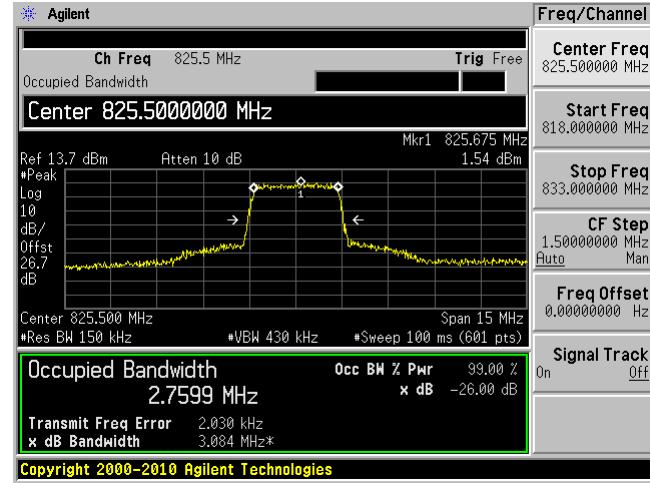


LTE 3MHz 16QAM Uplink

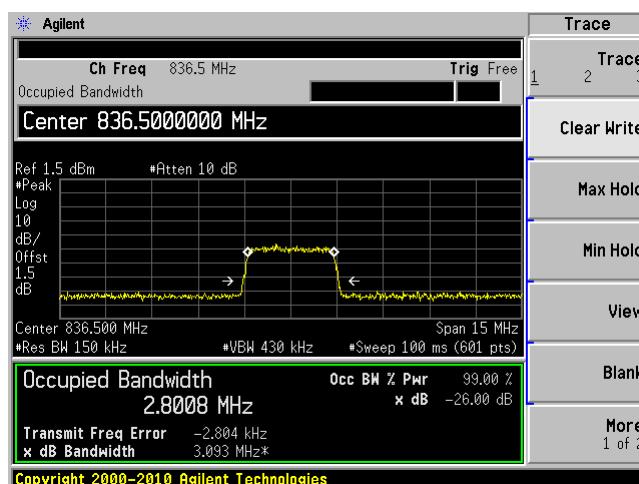
Low Input



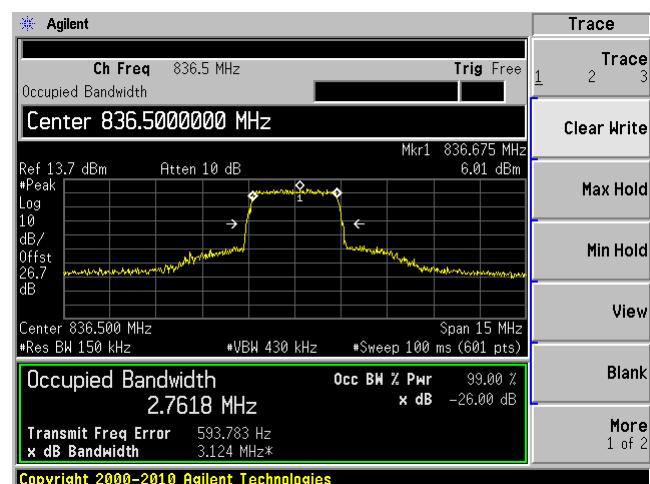
Low Output



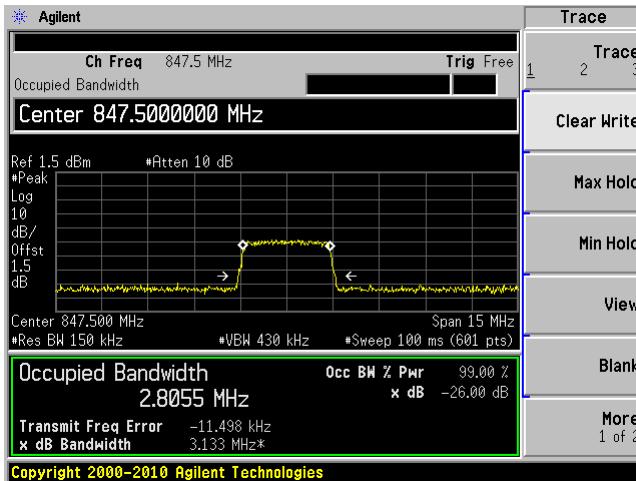
Middle Input



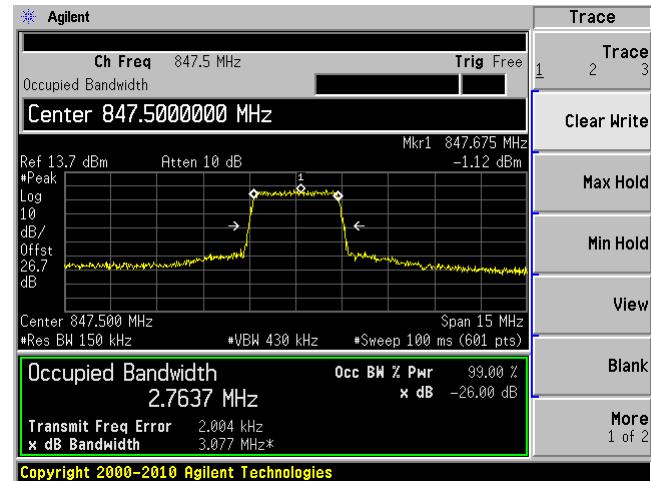
Middle Output



High Input

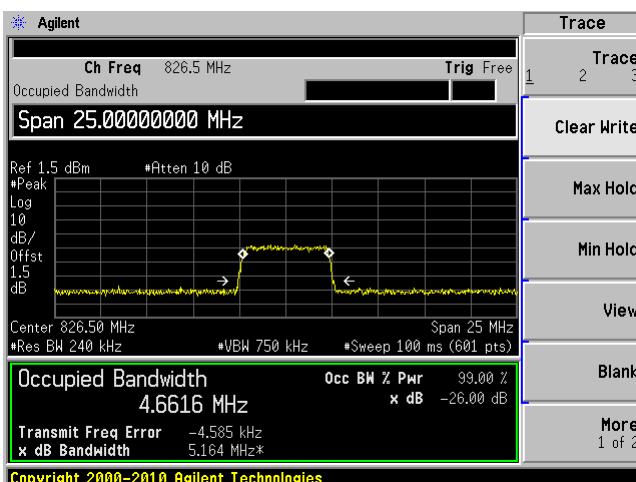


High Output

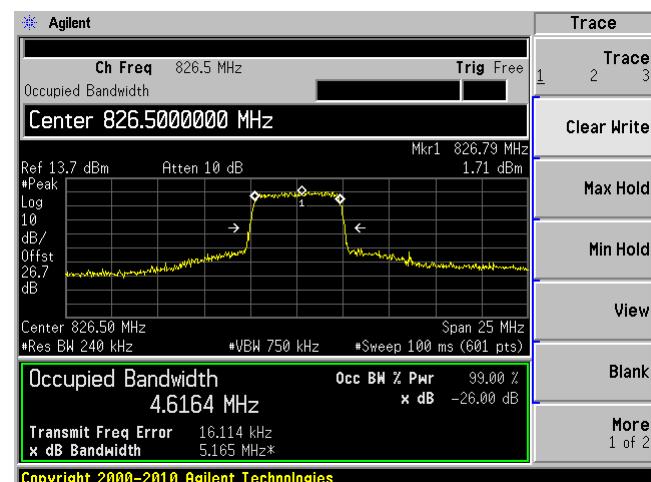


LTE 5MHz 16QAM Uplink

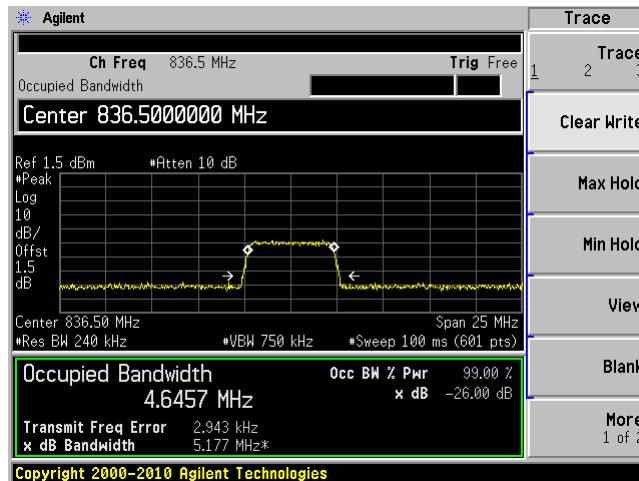
Low Input



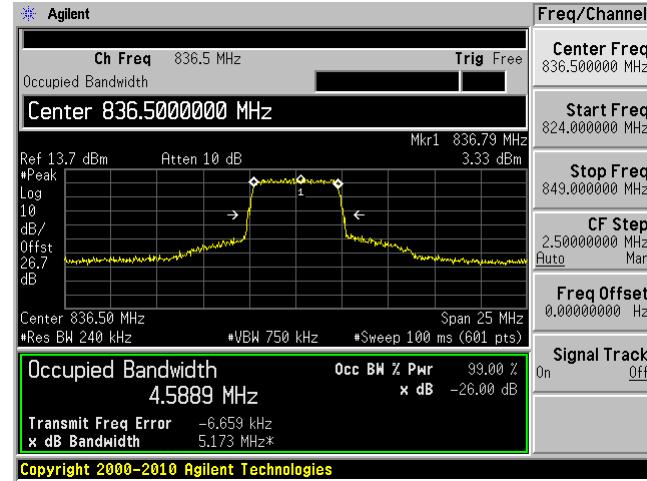
Low Output



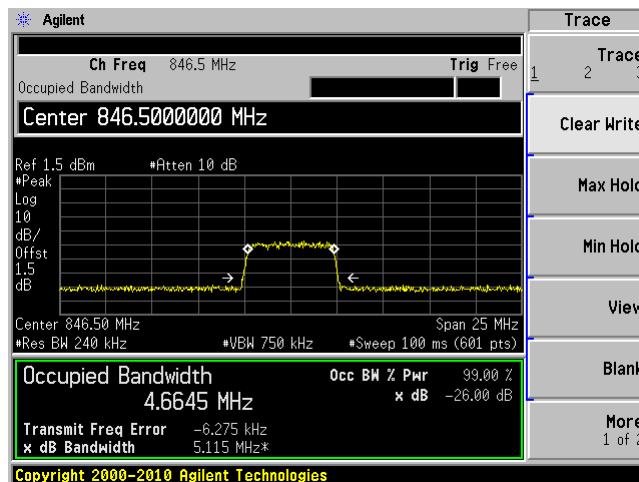
Middle Input



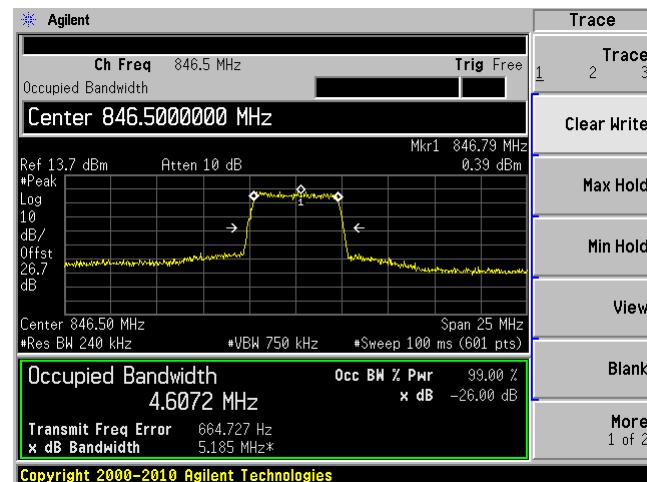
Middle Output



High Input

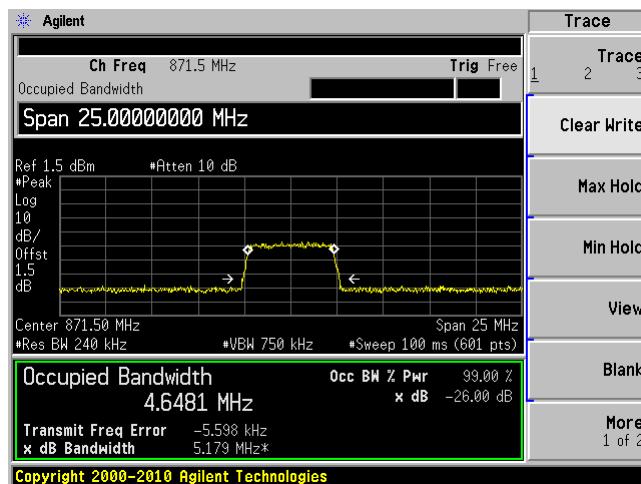


High Output

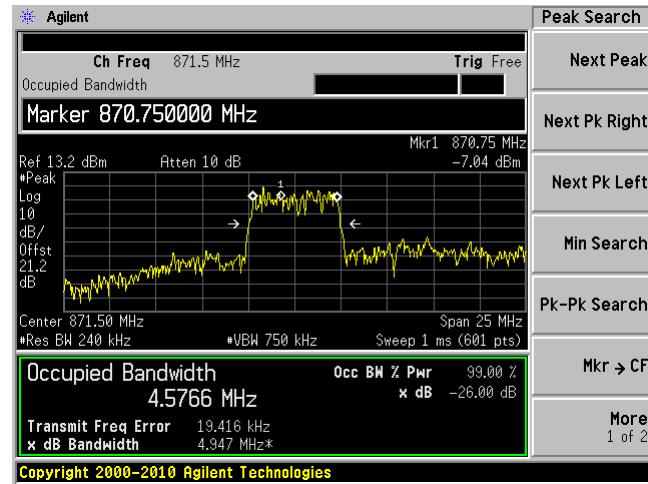


LTE 5MHz 16QAM Downlink

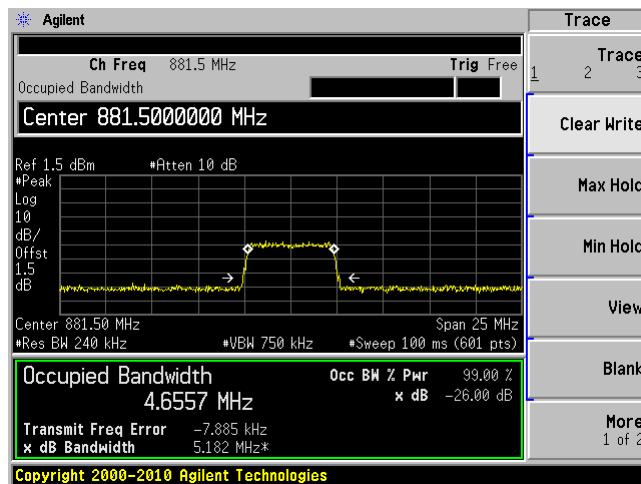
Low Input



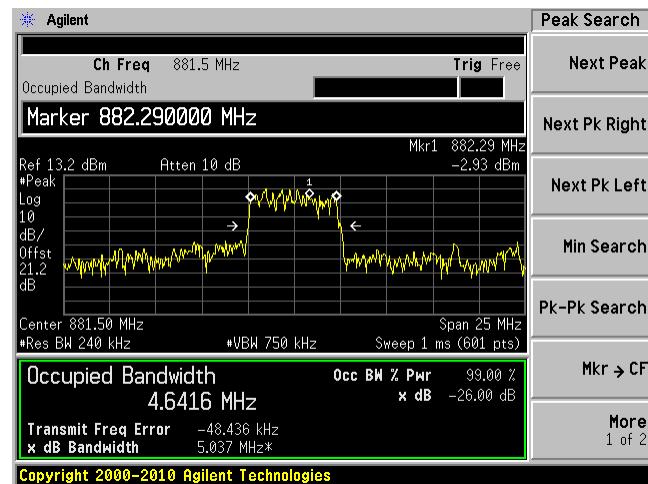
Low Output



Middle Input

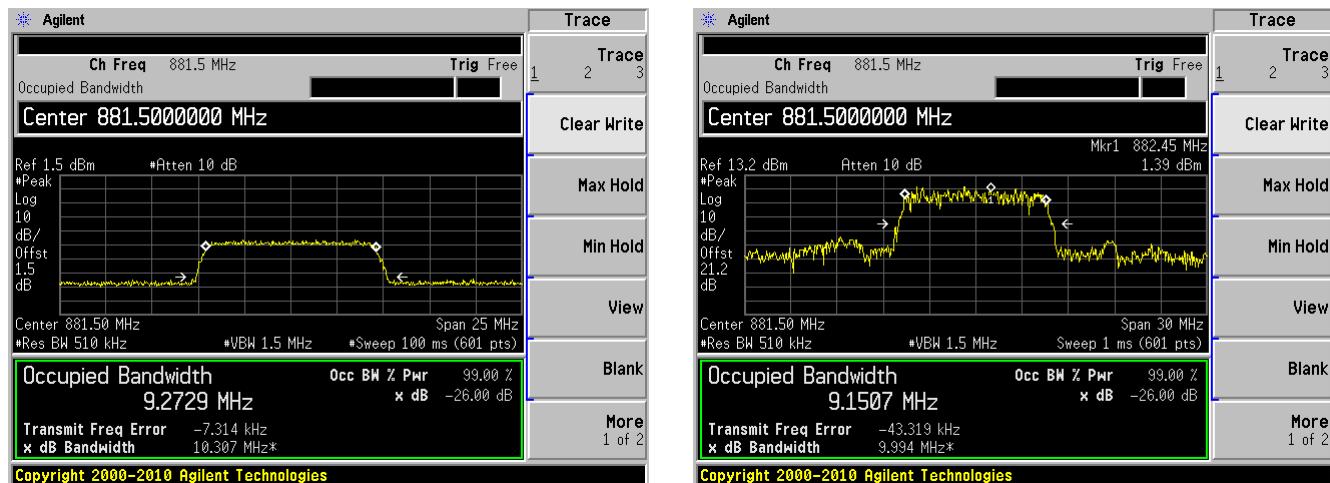


Middle Output



High Input

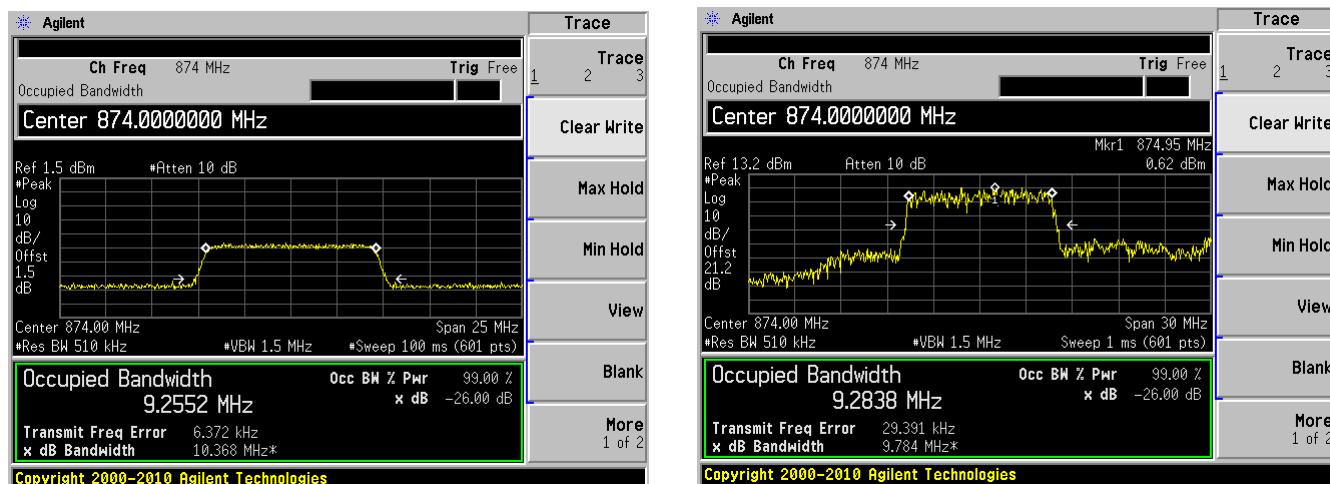
High Output



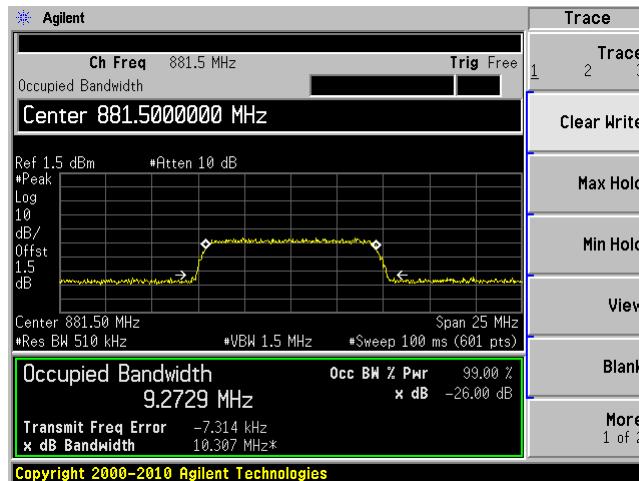
LTE 10MHz 16QAM Downlink

Low Input

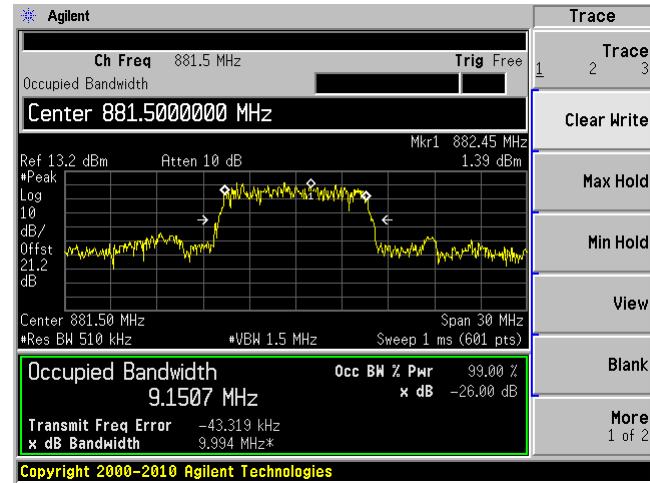
Low Output



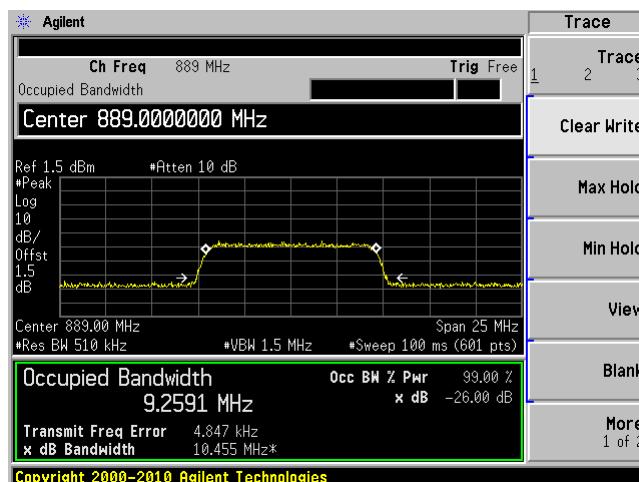
Middle Input



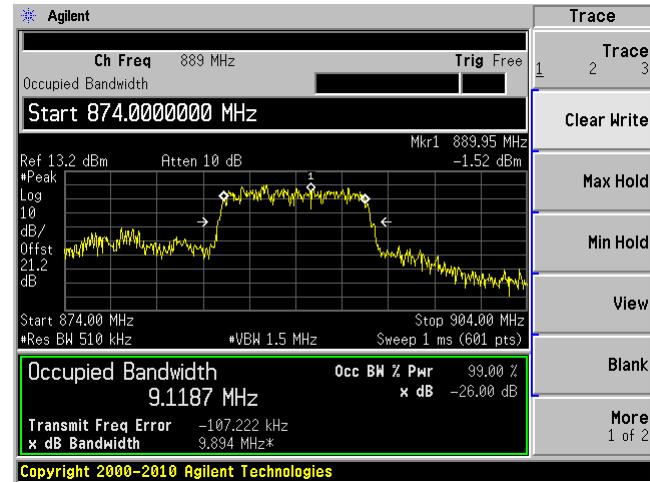
Middle Output



High Input

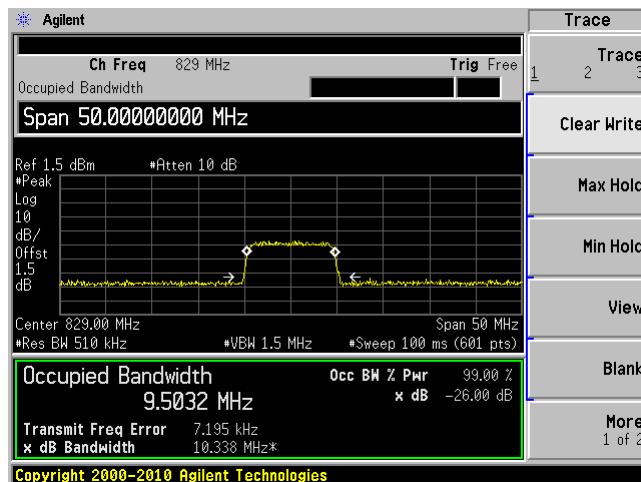


High Output

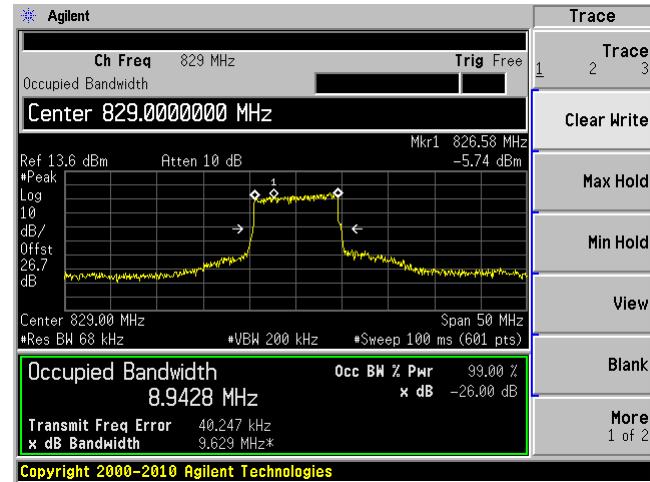


LTE 10MHz 16QAM Uplink

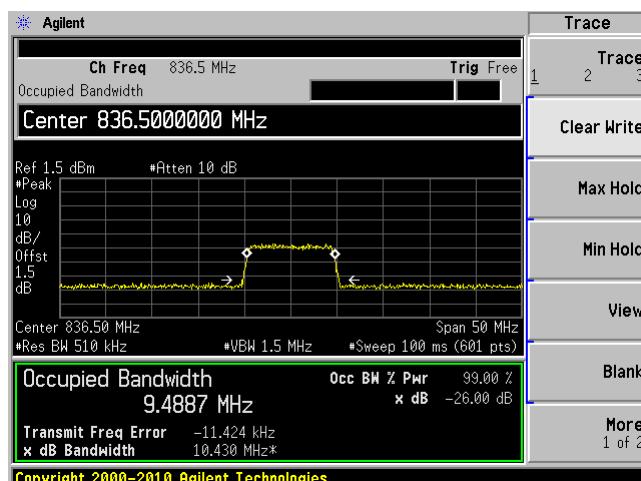
Low Input



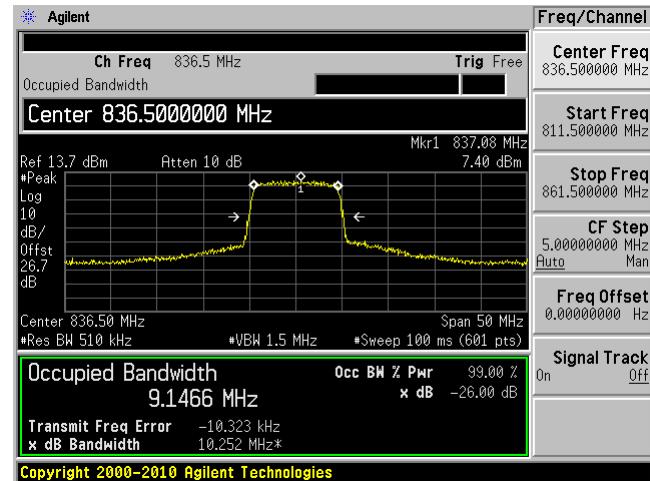
Low Output



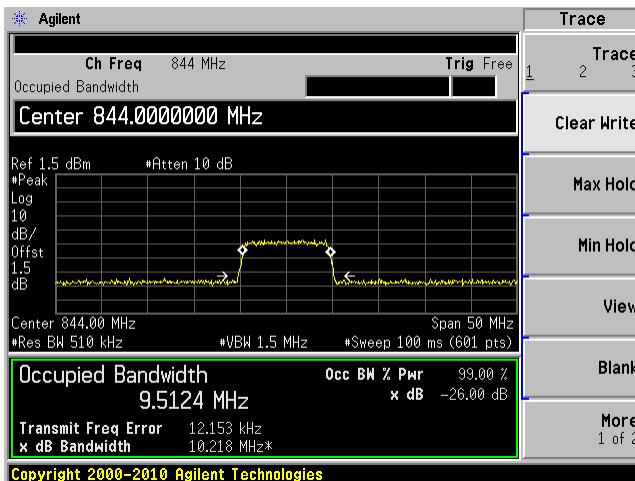
Middle Input



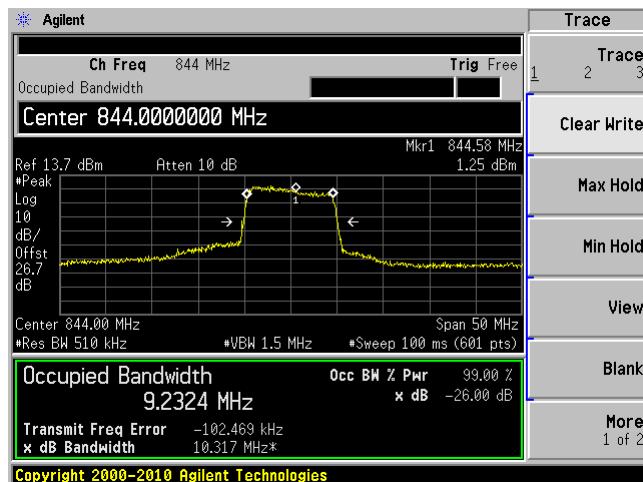
Middle Output



High Input

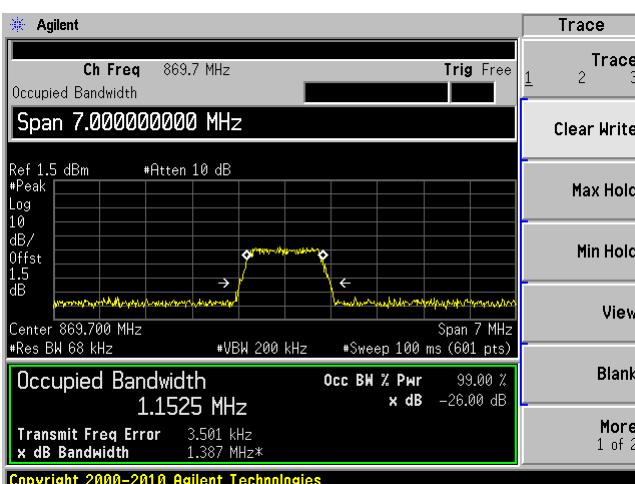


High Output

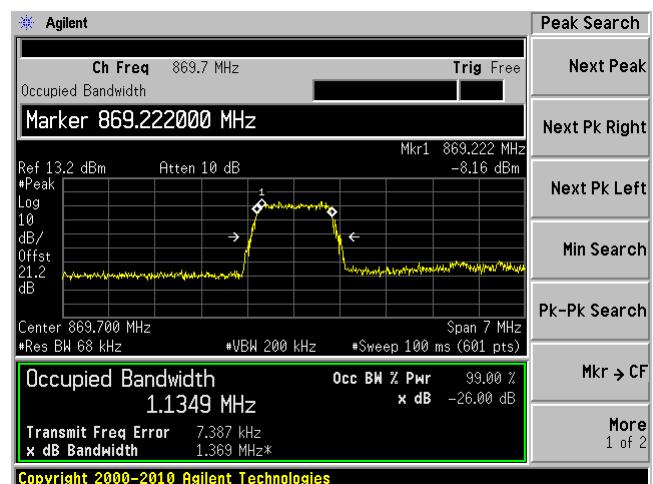


LTE 1.4MHz 64QAM Downlink

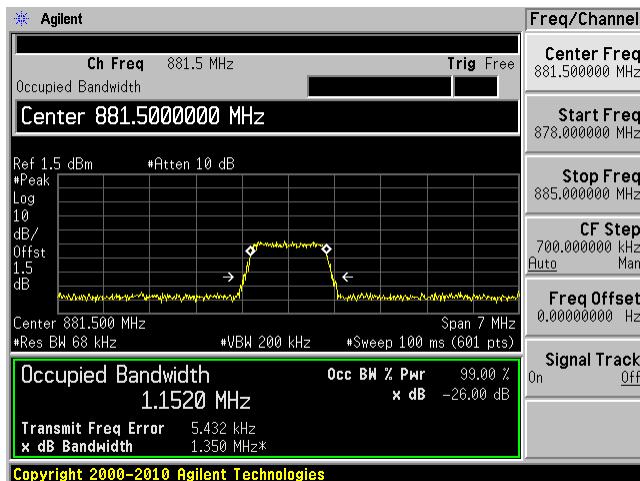
Low Input



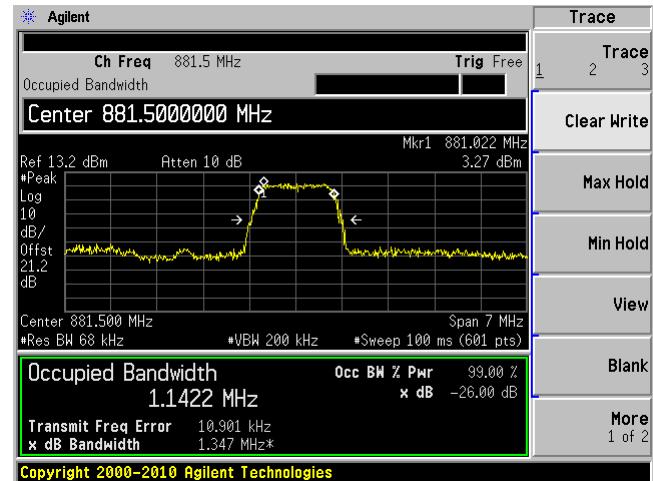
Low Output



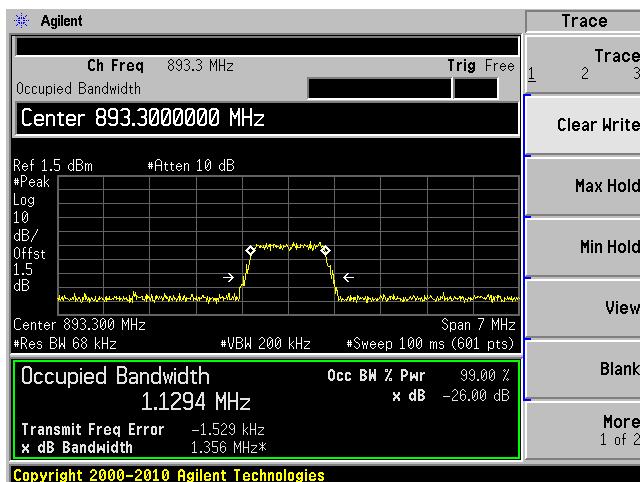
Middle Input



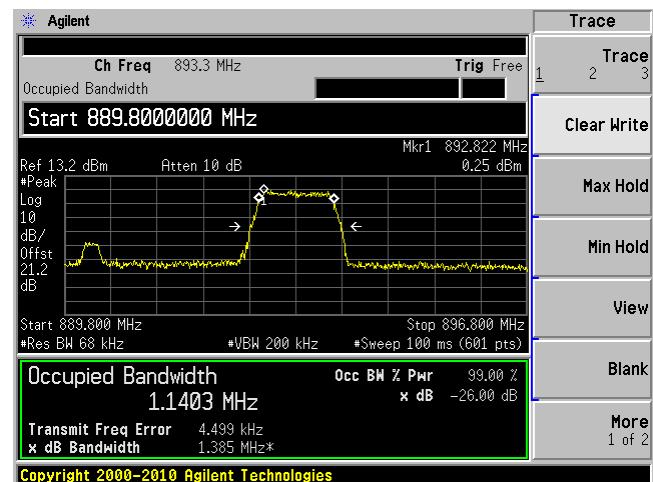
Middle Output



High Input

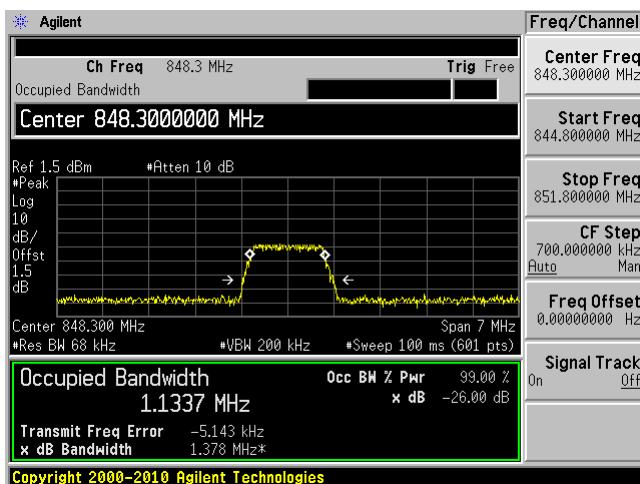


High Output

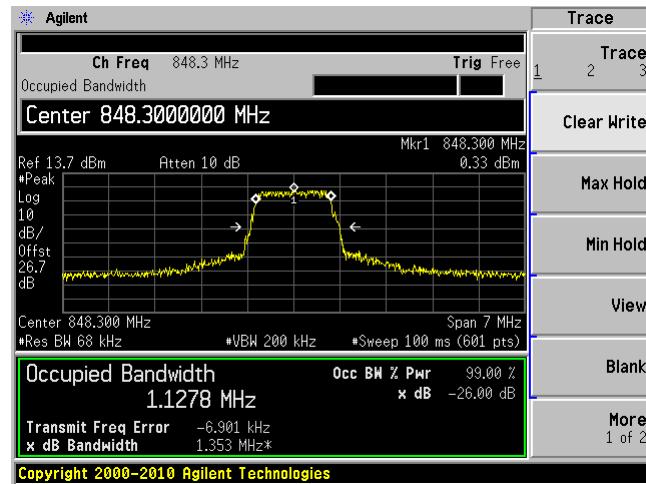


LTE 1.4MHz 64QAM Uplink

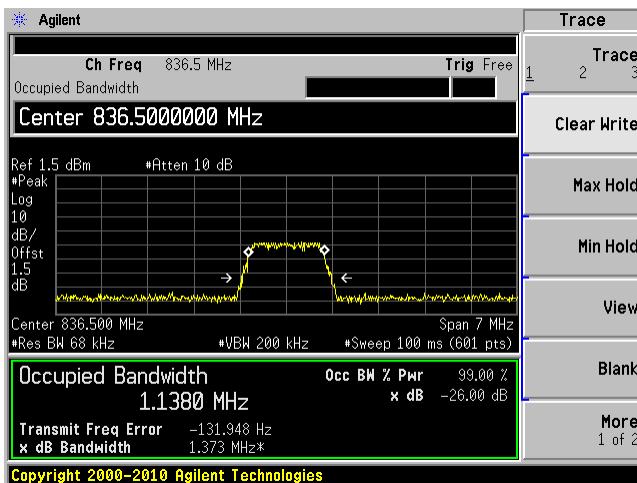
Low Input



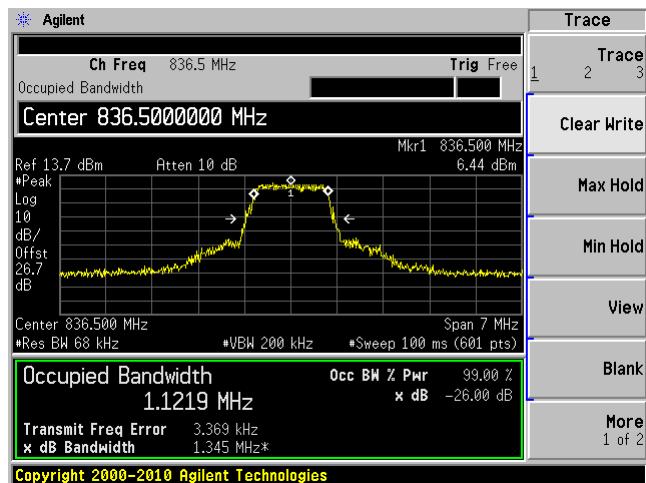
Low Output



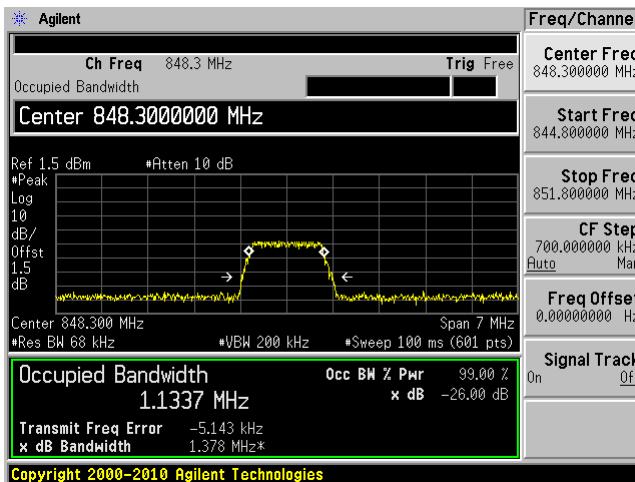
Middle Input



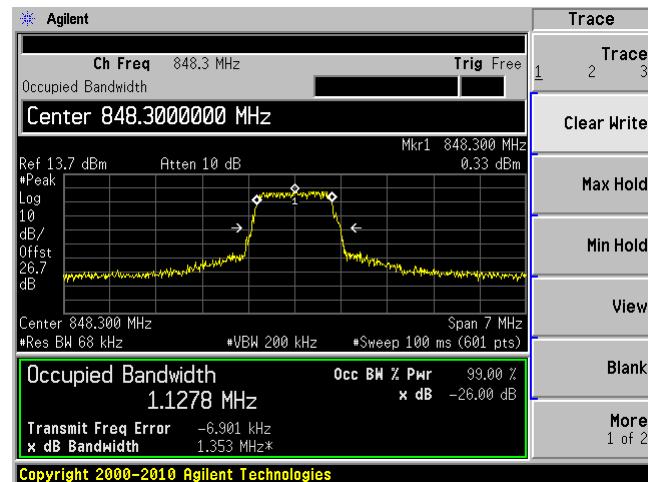
Middle Output



High Input

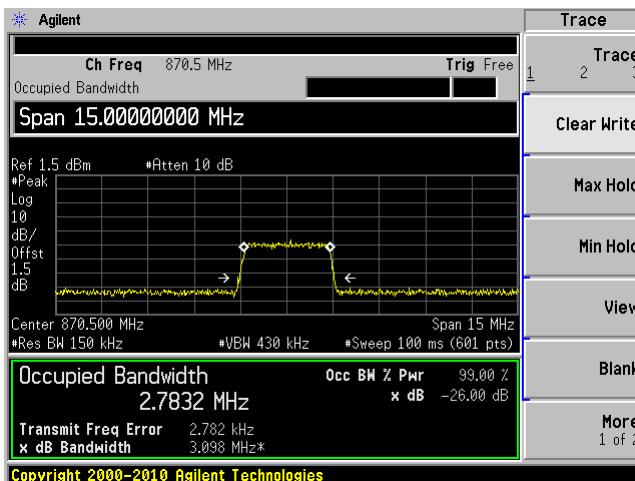


High Output

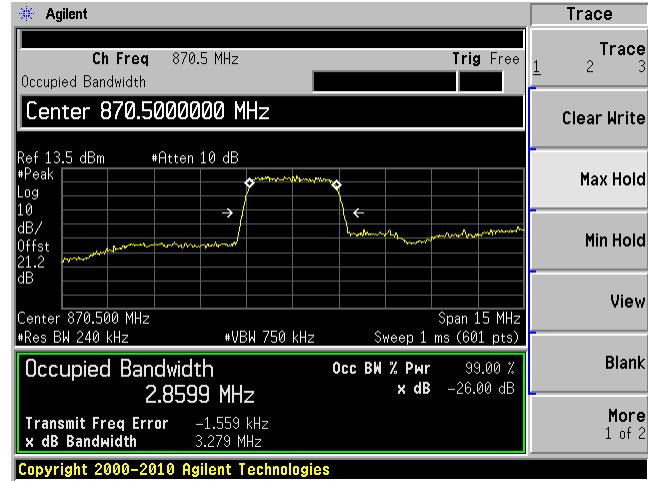


LTE 3MHz 64QAM Downlink

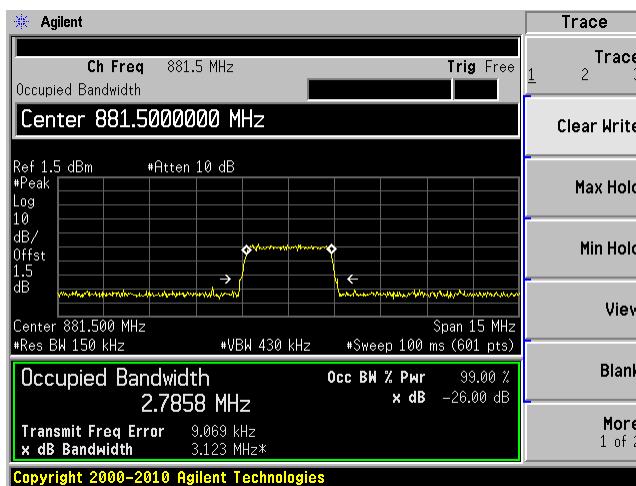
Low Input



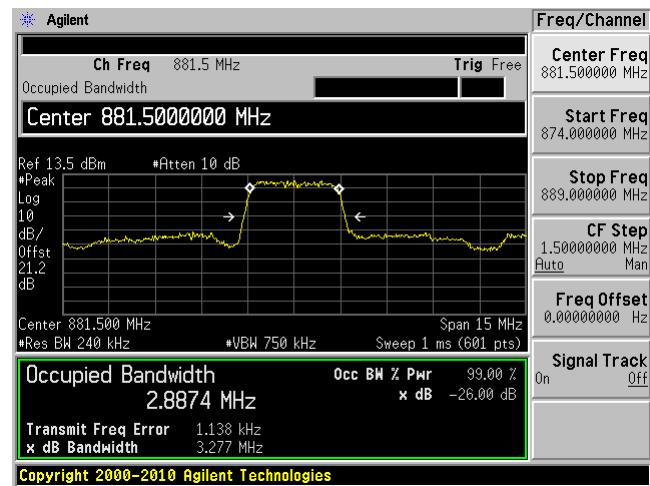
Low Output



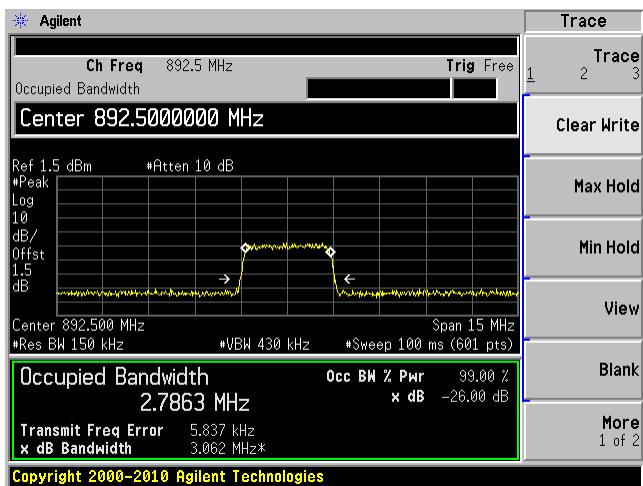
Middle Input



Middle Output



High Input

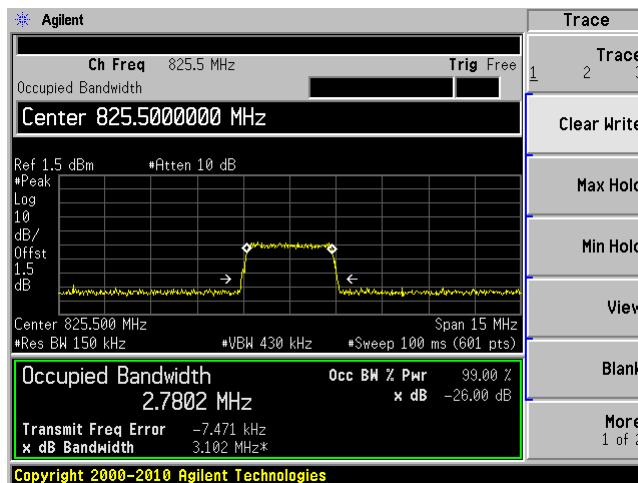


High Output

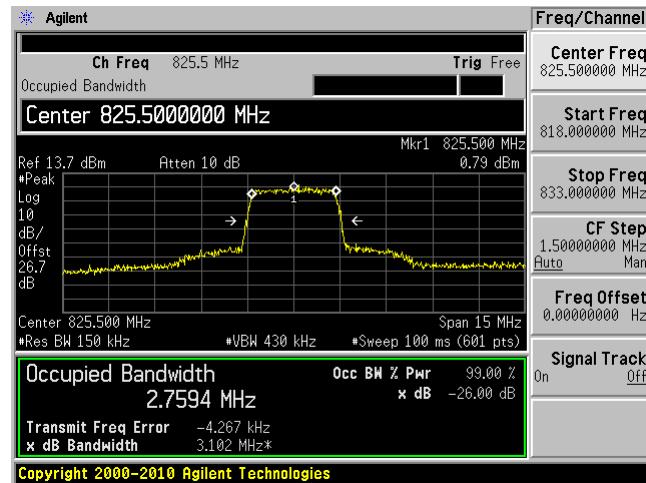


LTE 3MHz 64QAM Uplink

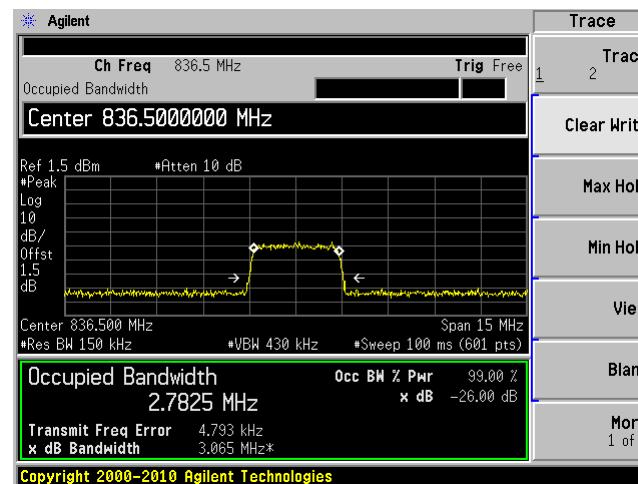
Low Input



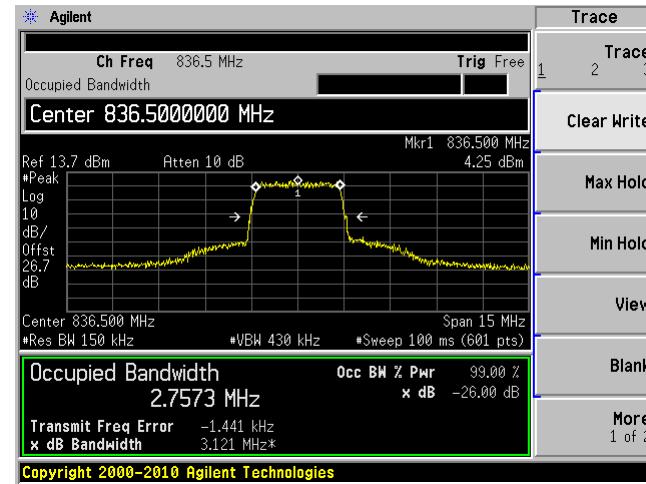
Low Output



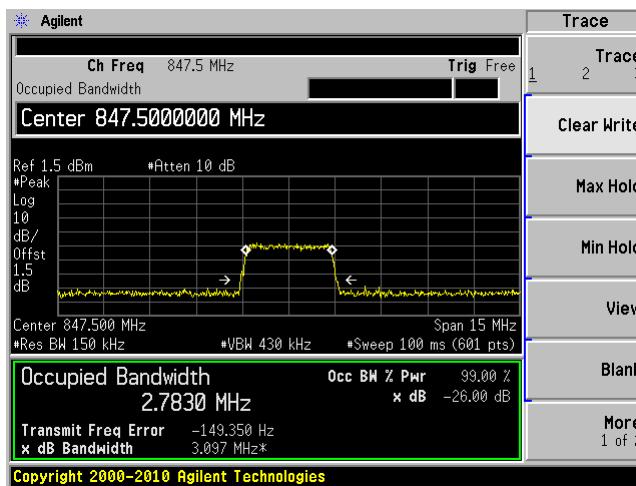
Middle Input



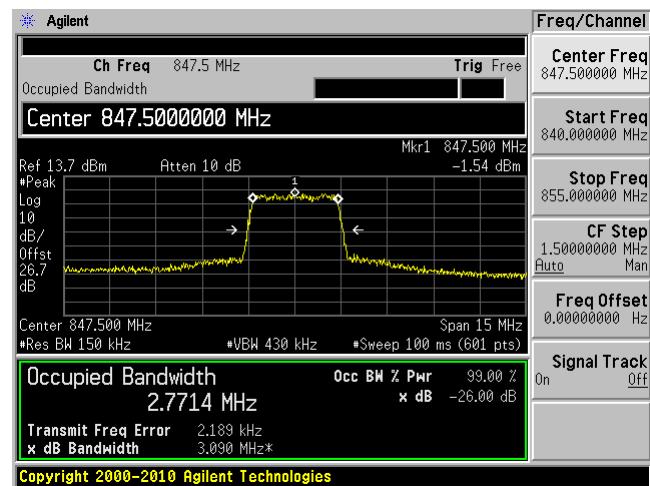
Middle Output



High Input

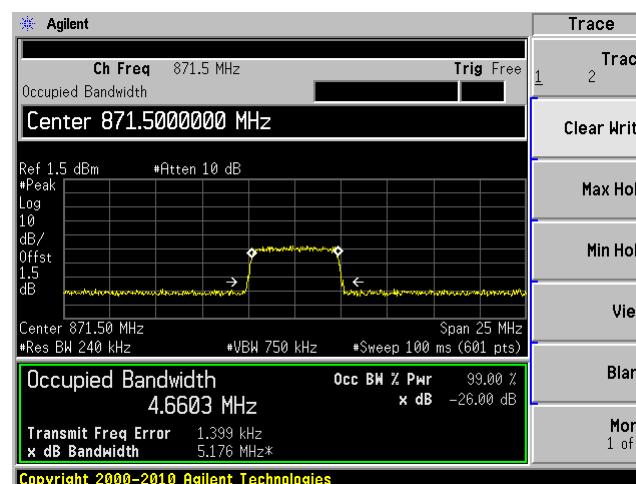


High Output

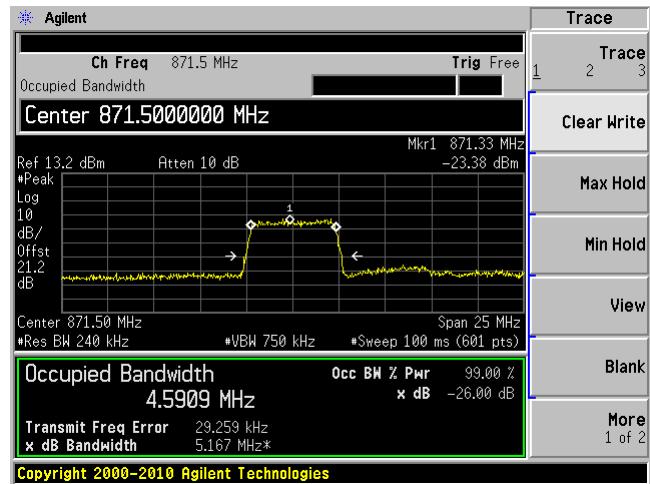


LTE 5MHz 64QAM Downlink

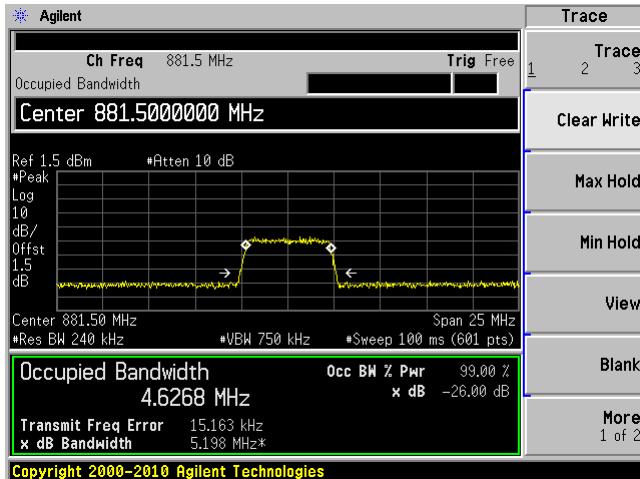
Low Input



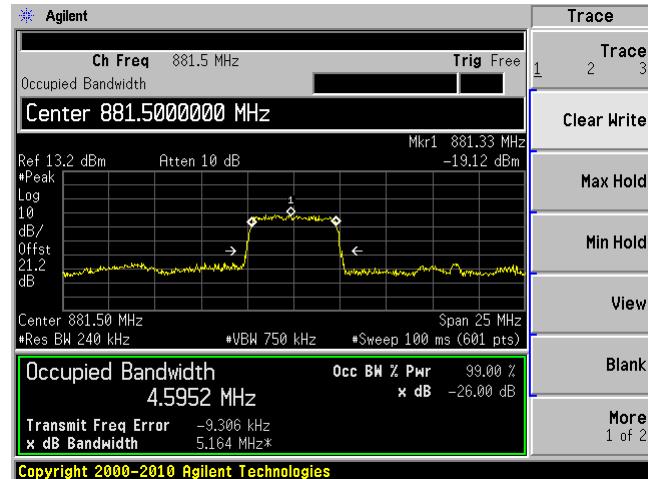
Low Output



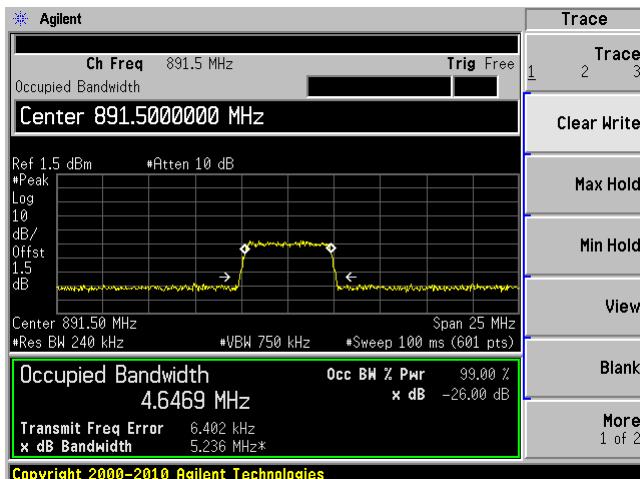
Middle Input



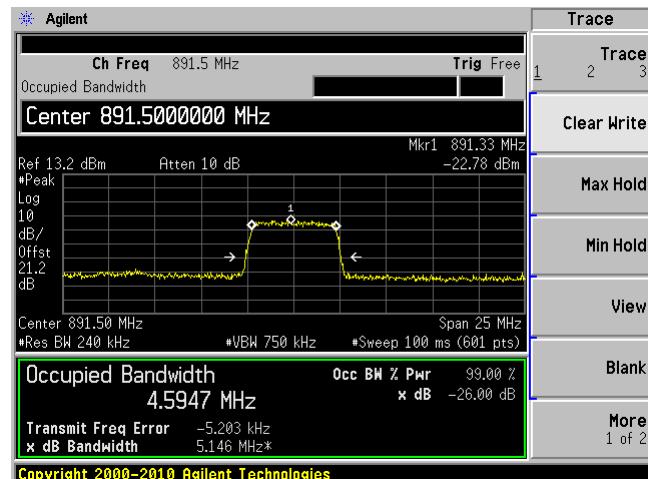
Middle Output



High Input

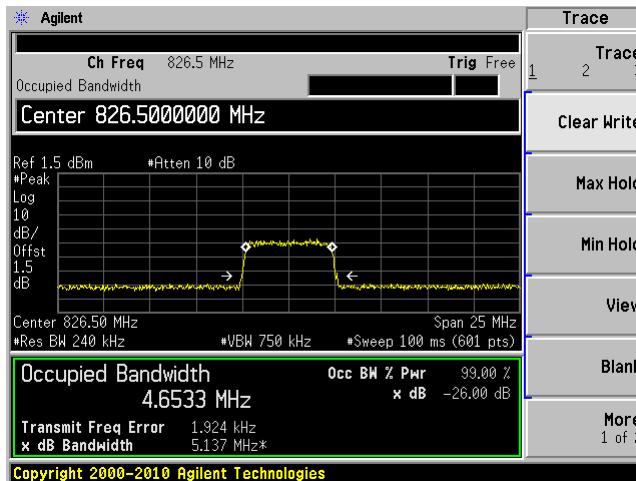


High Output

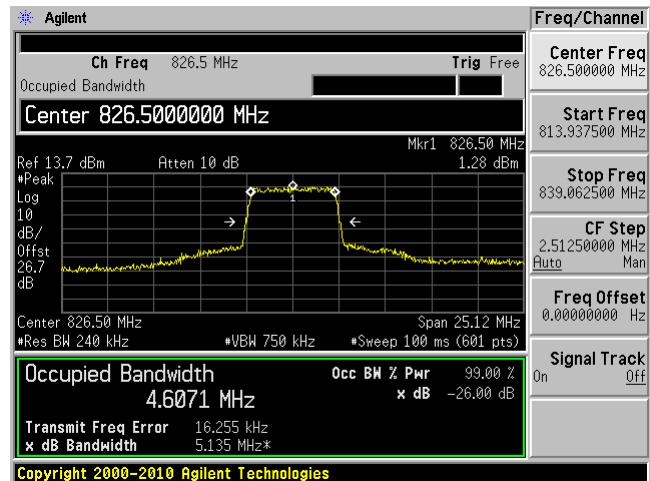


LTE 5MHz 64QAM Uplink

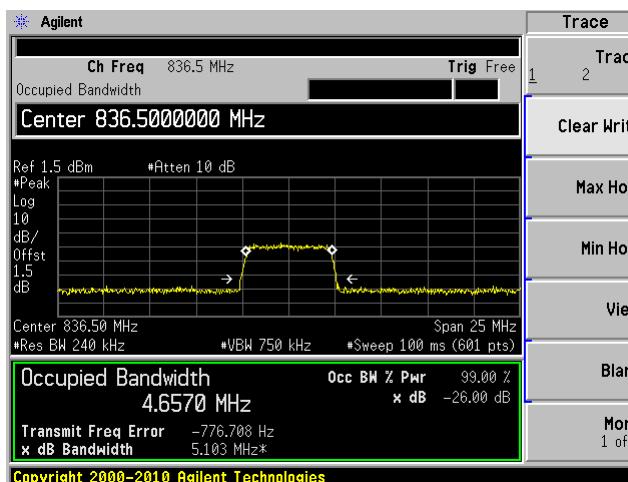
Low Input



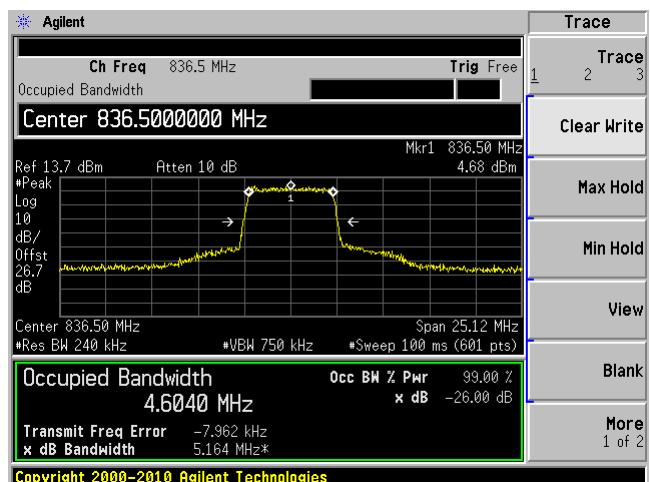
Low Output



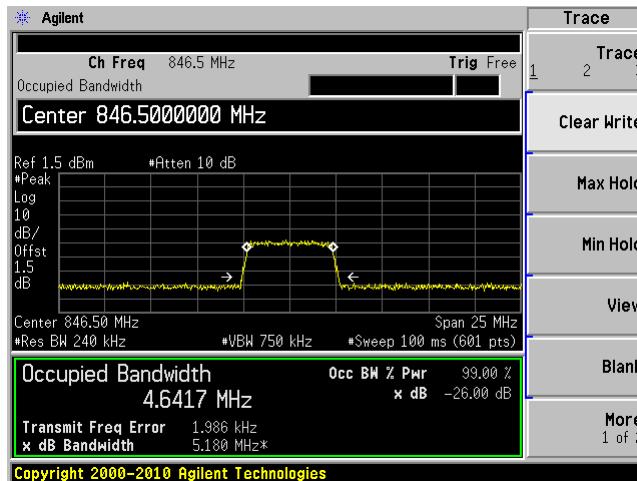
Middle Input



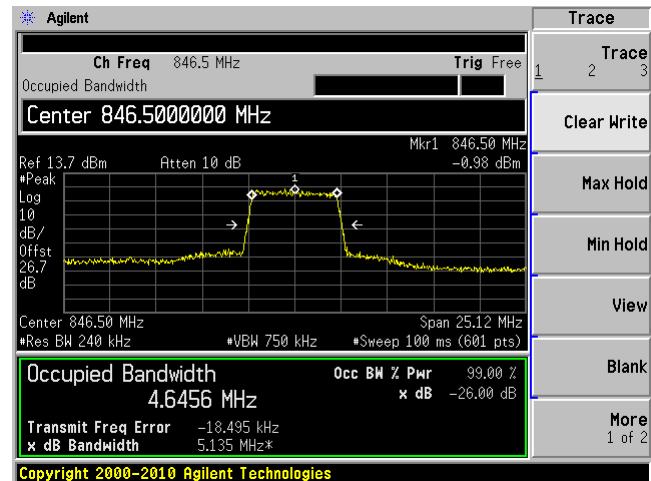
Middle Output



High Input

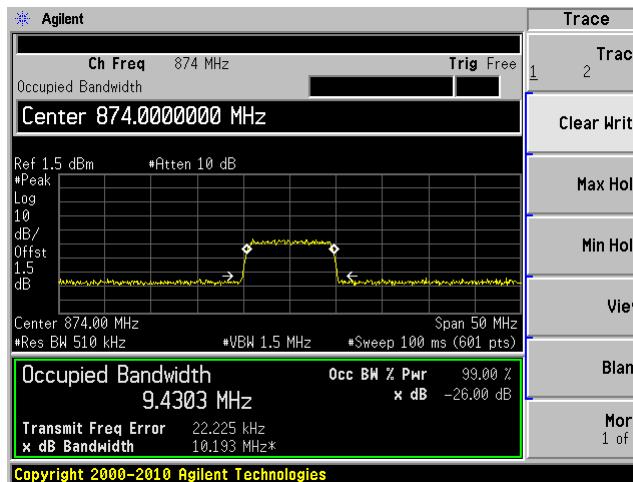


High Output

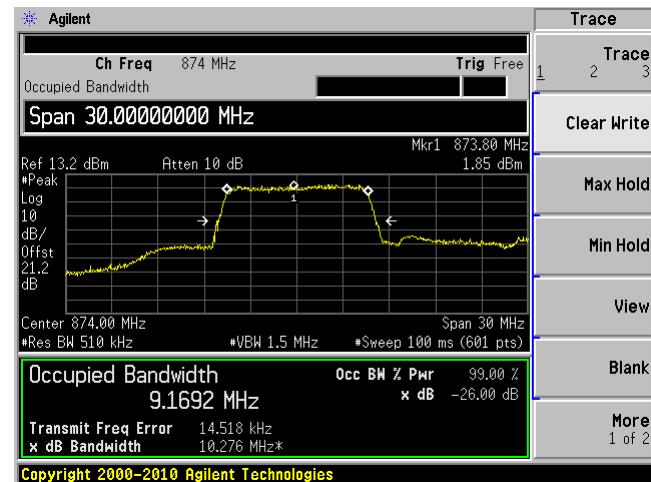


LTE 10MHz 64QAM Downlink

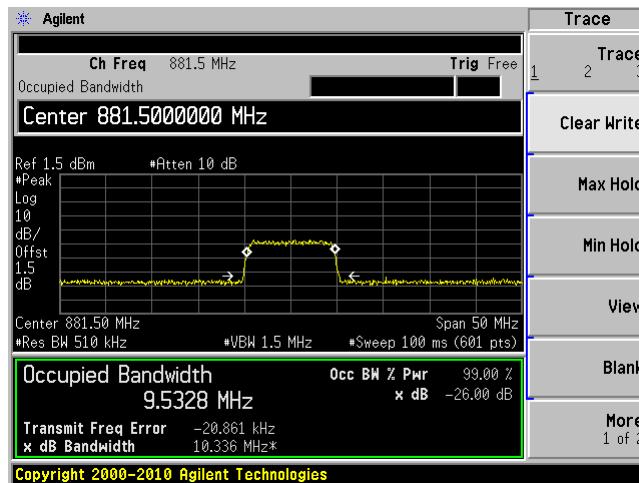
Low Input



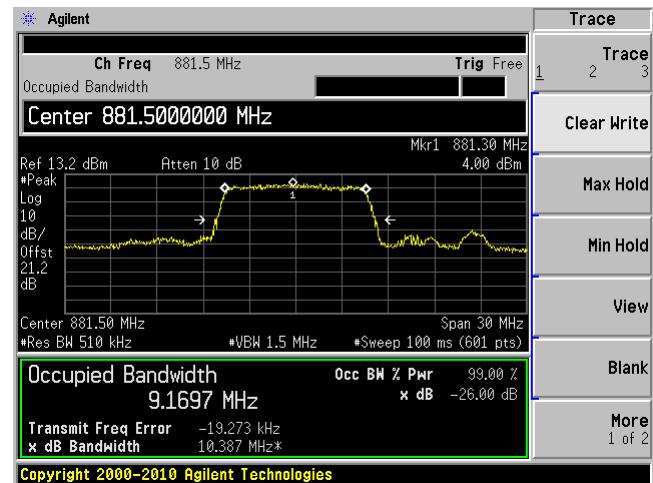
Low Output



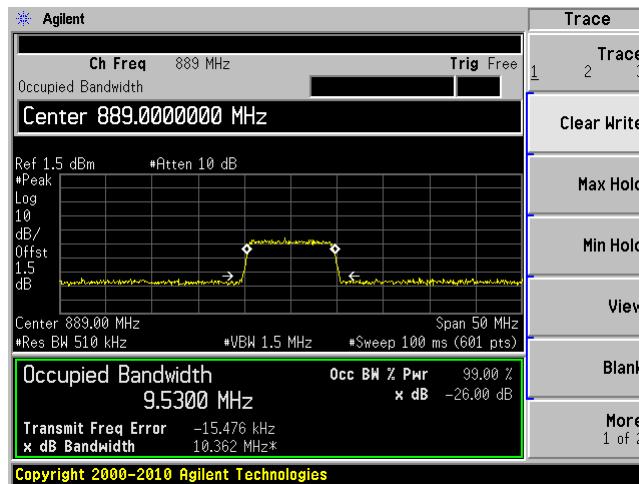
Middle Input



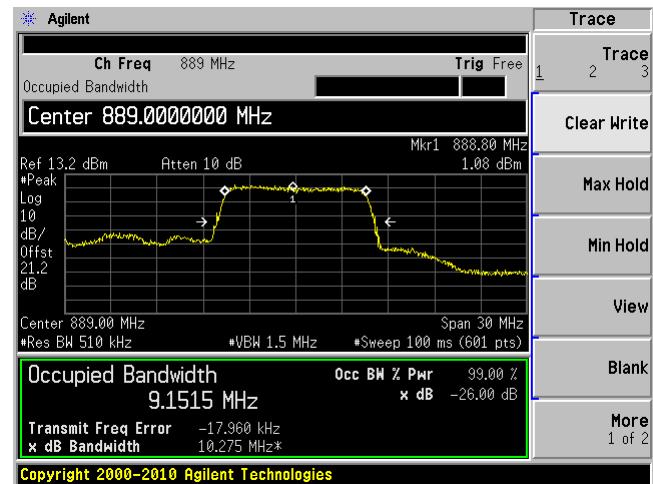
Middle Output



High Input

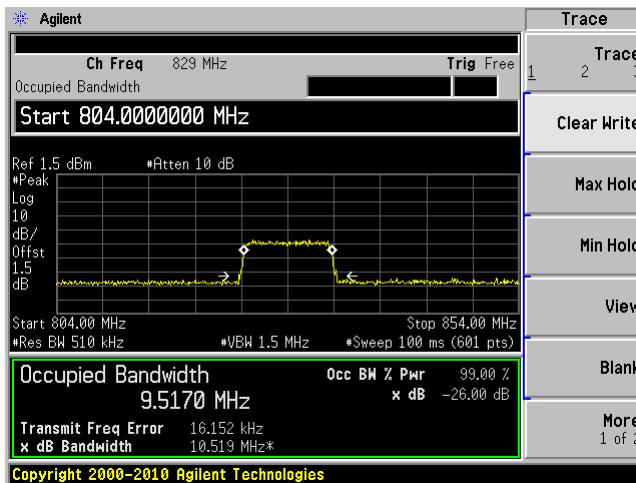


High Output

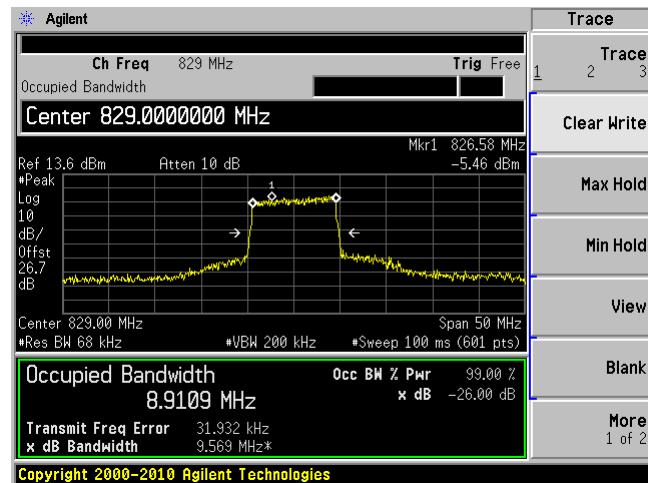


LTE 10MHz 64QAM Uplink

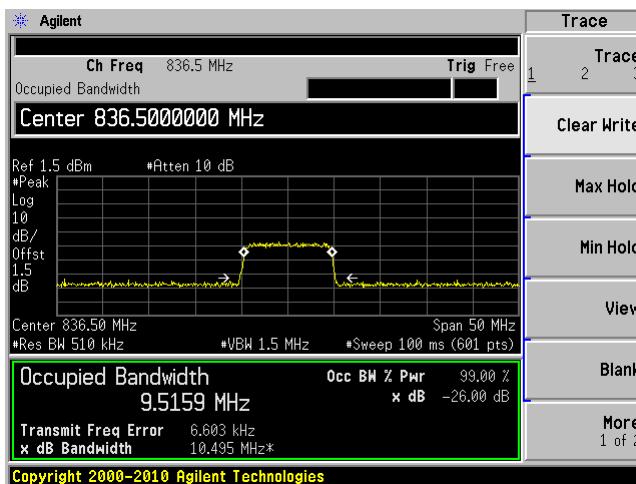
Low Input



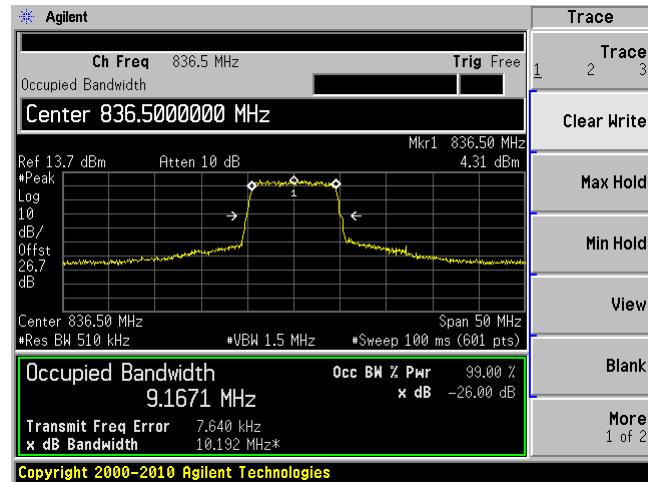
Low Output



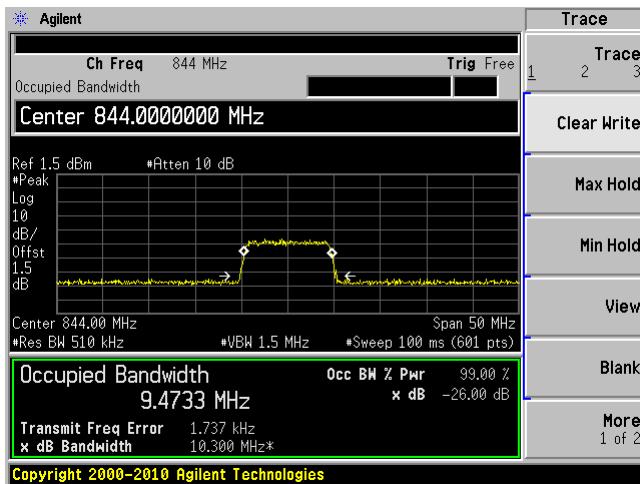
Middle Input



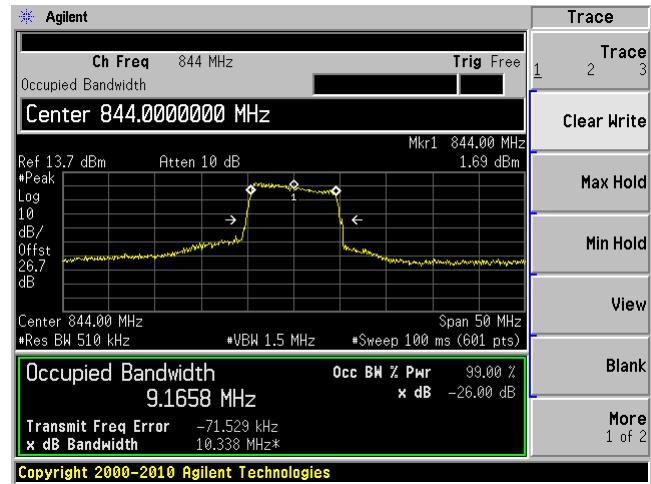
Middle Output



High Input

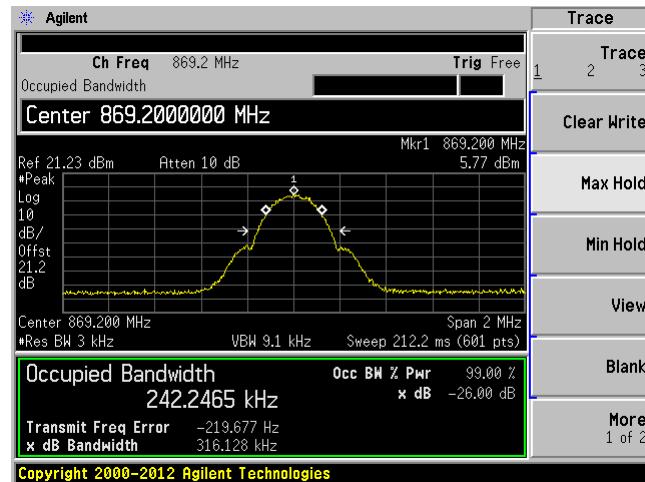
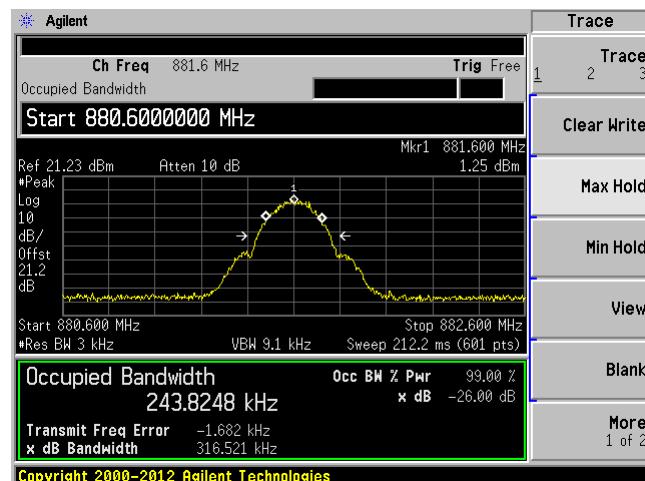


High Output

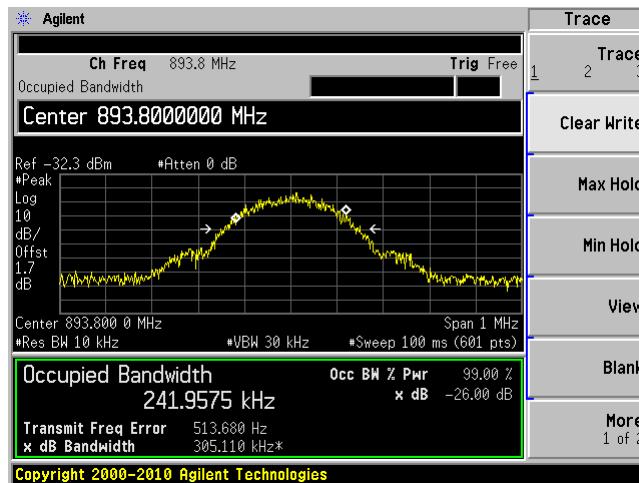


Cellular Band ALC ON

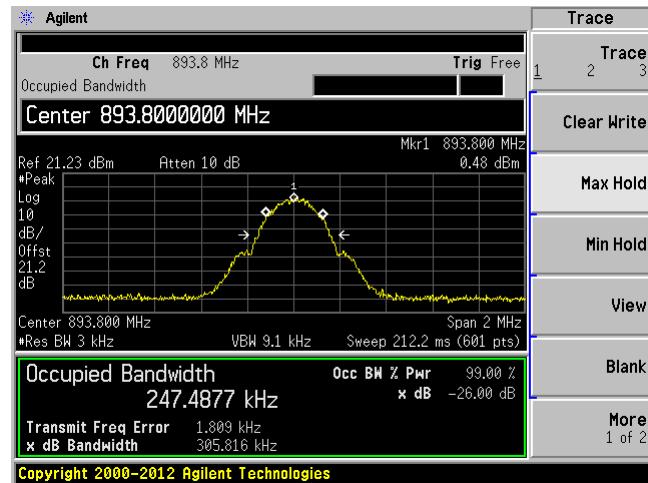
GSM/GPRS Downlink

Low Input**Low Output****Middle Input****Middle Output**

High Input

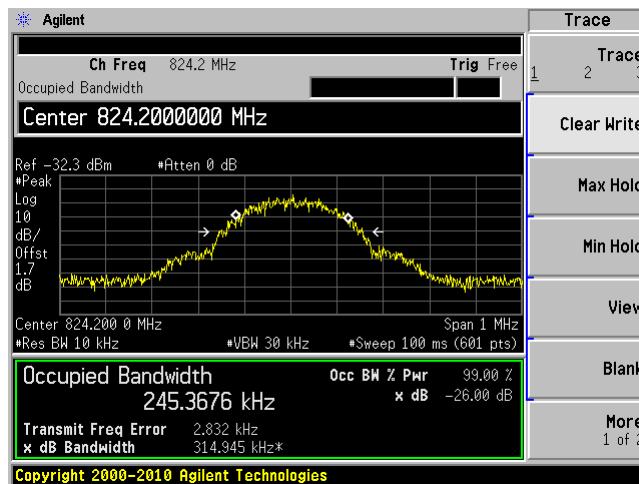


High Output

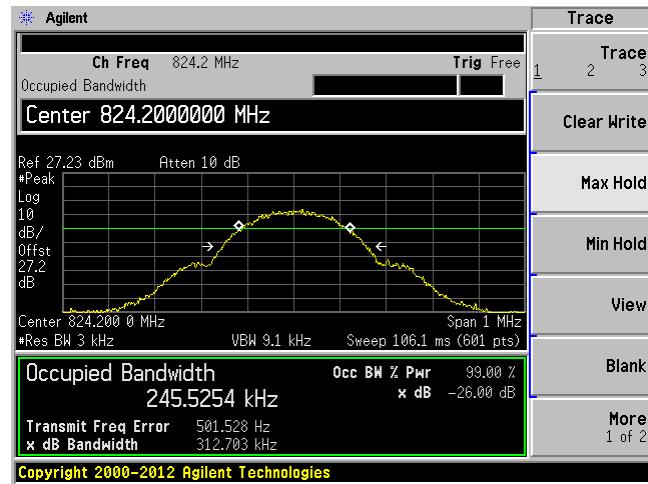


GSM/GPRS Uplink

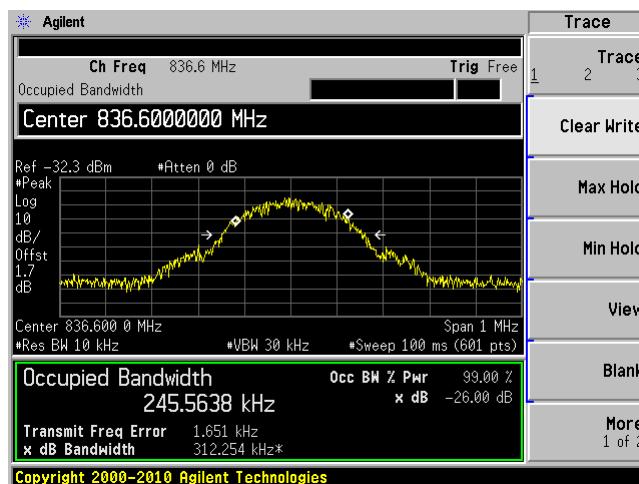
Low Input



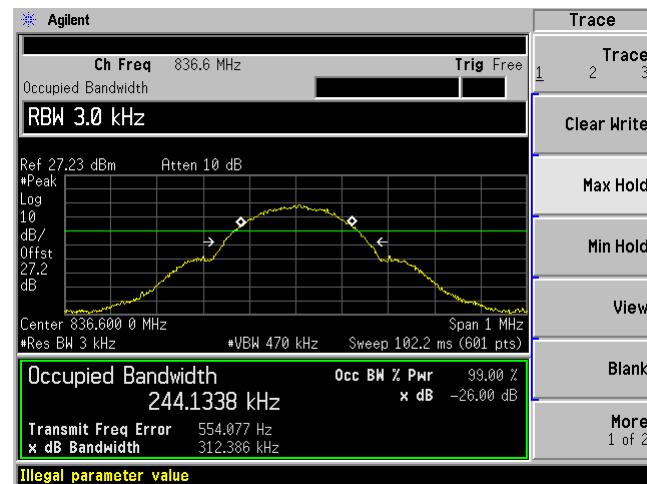
Low Output



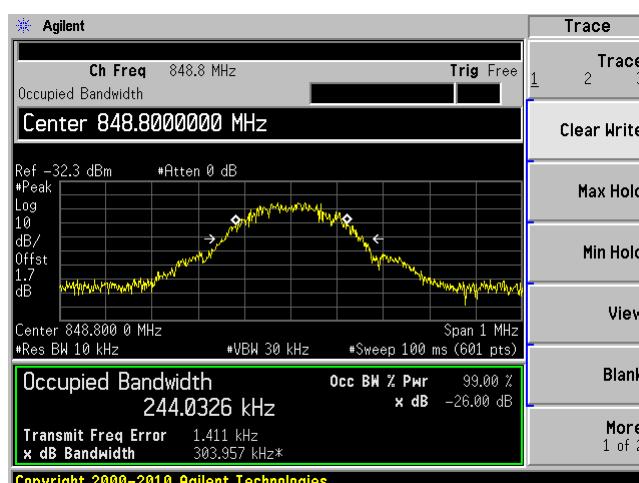
Middle Input



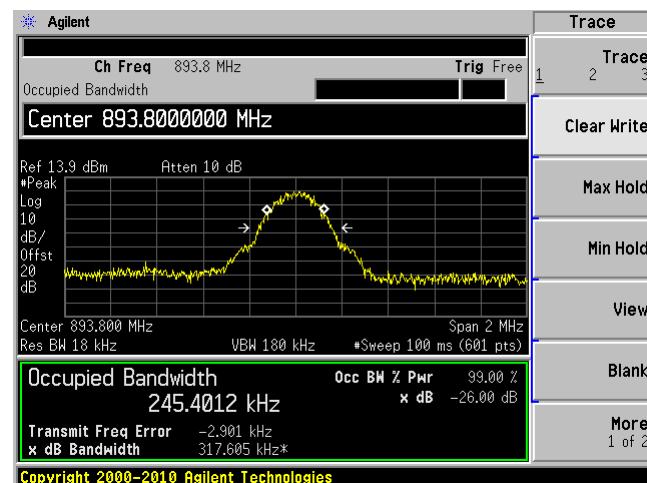
Middle Output



High Input

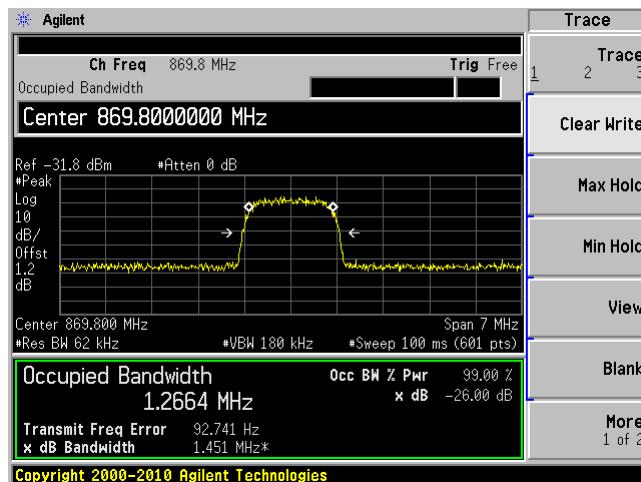


High Output

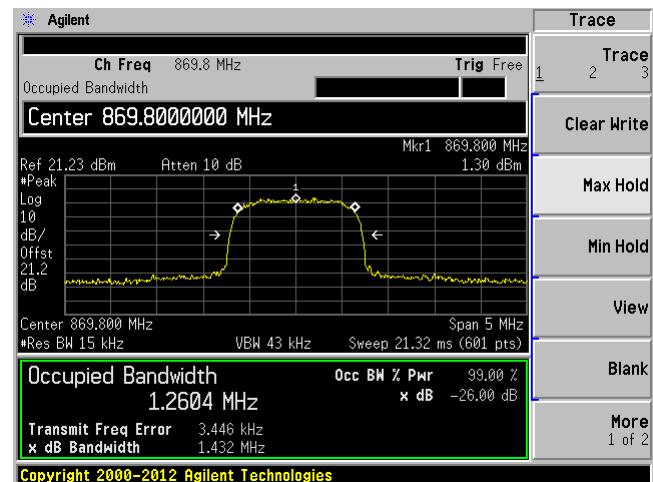


CDMA Downlink

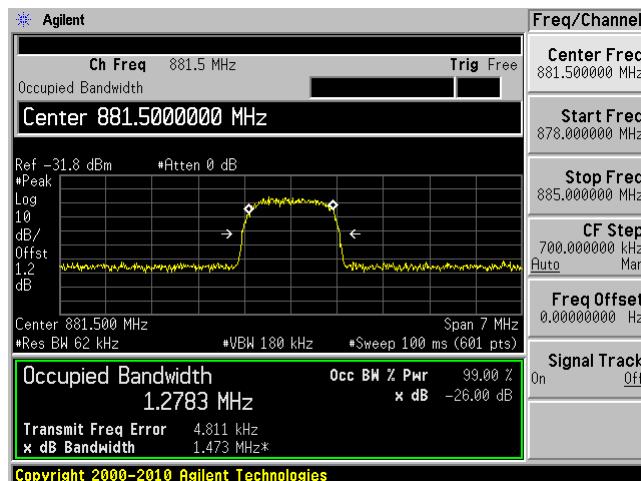
Low Input



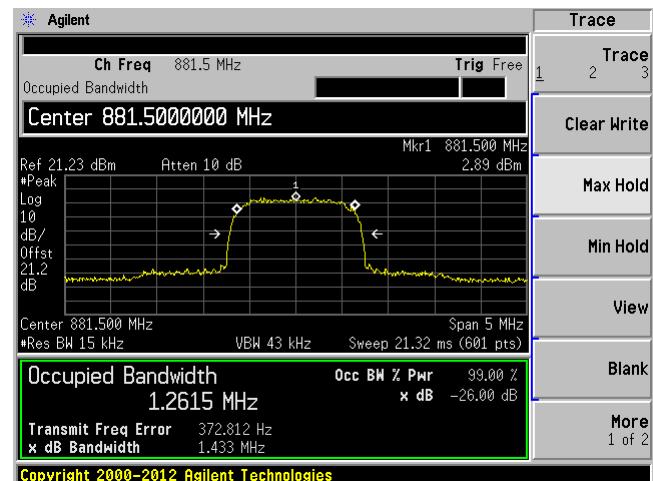
Low Output



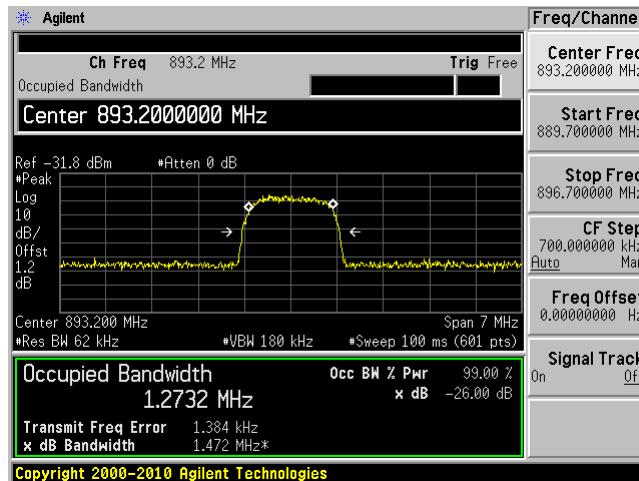
Middle Input



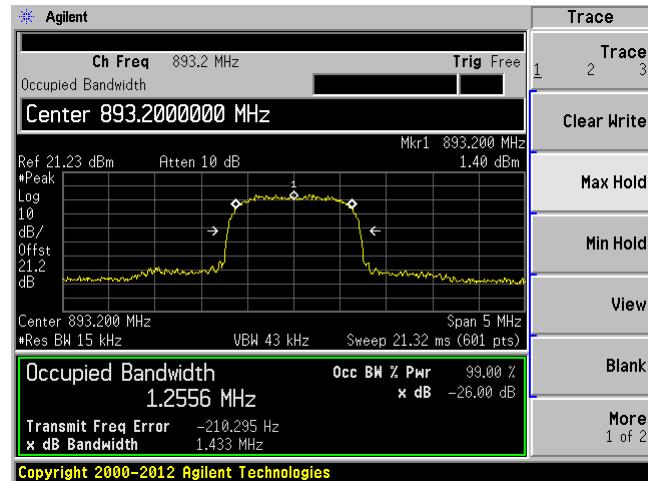
Middle Output



High Input

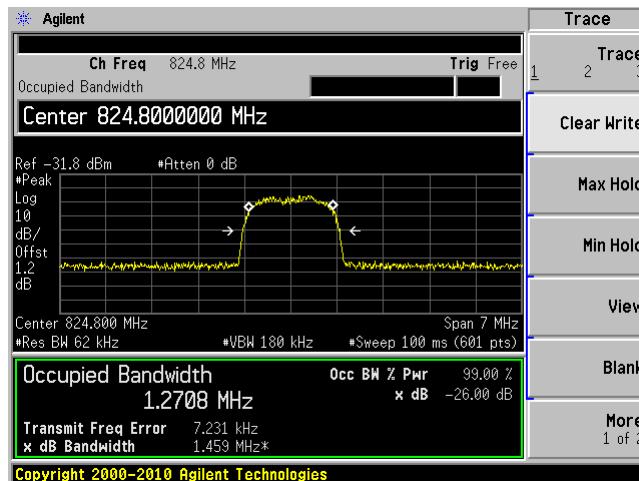


High Output

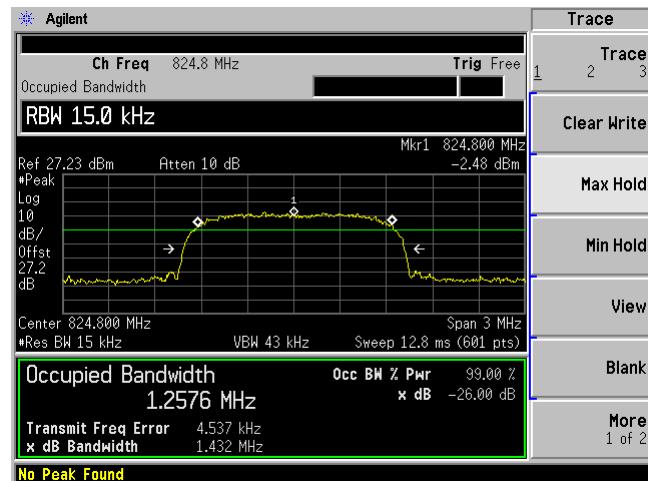


CDMA Uplink

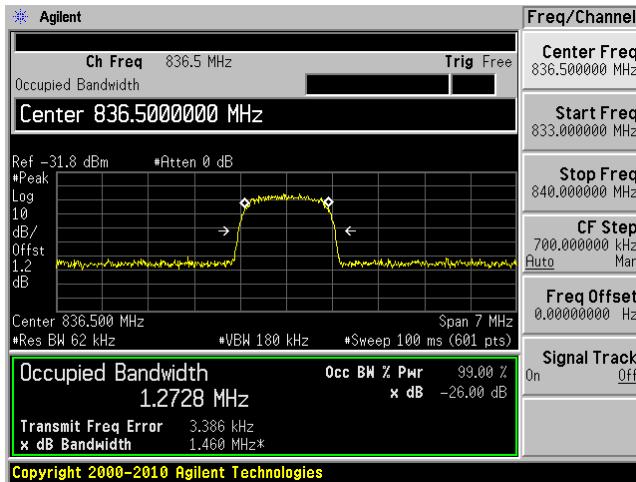
Low Input



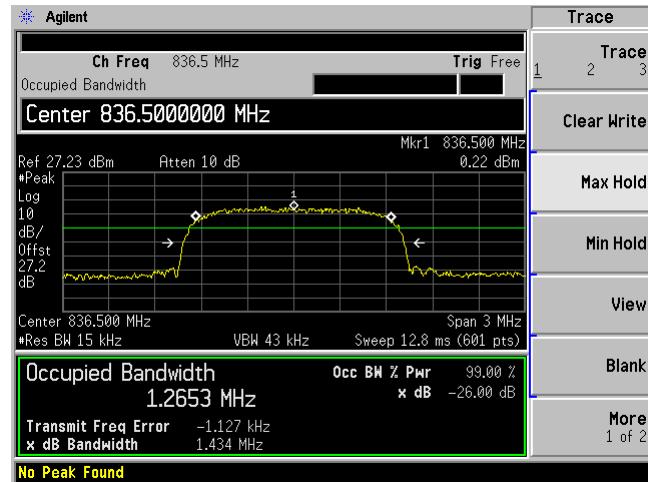
Low Output



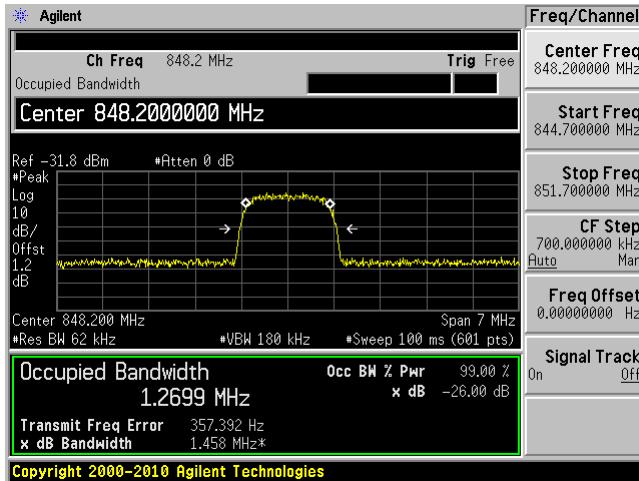
Middle Input



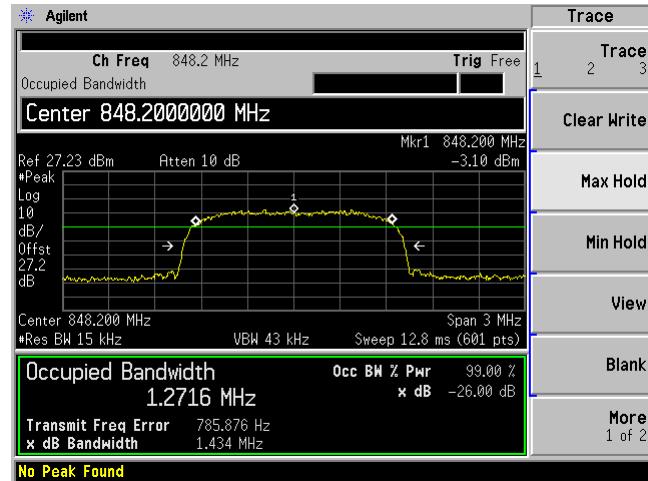
Middle Output



High Input

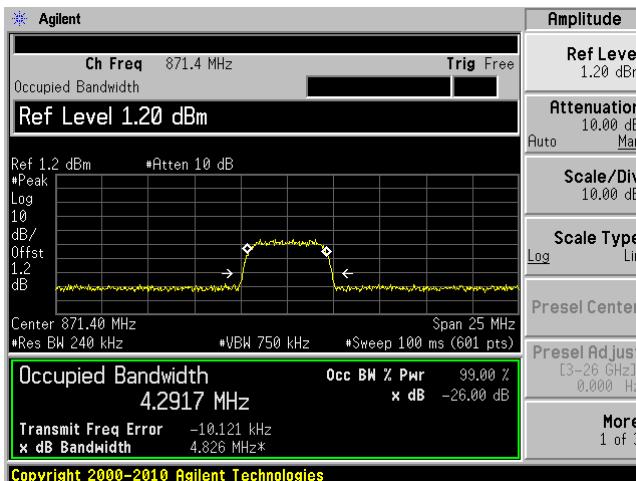


High Output

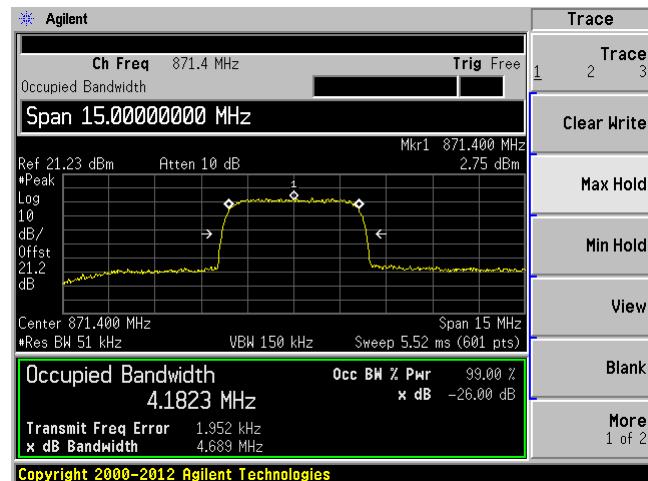


WCDMA Downlink

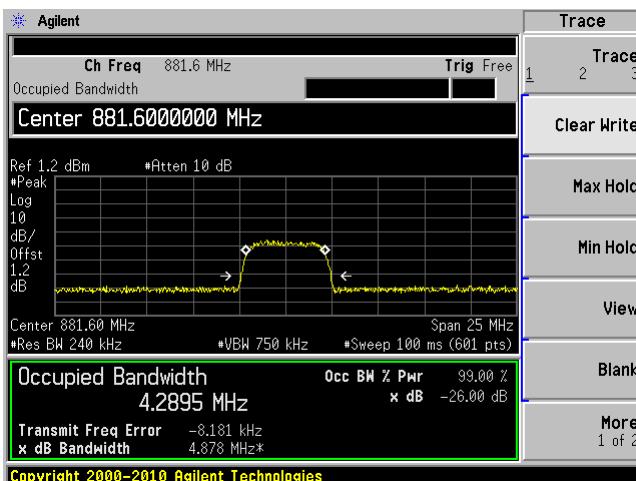
Low Input



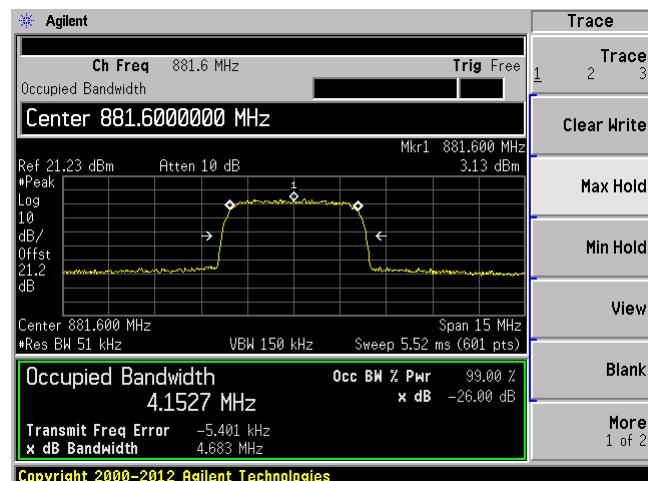
Low Output



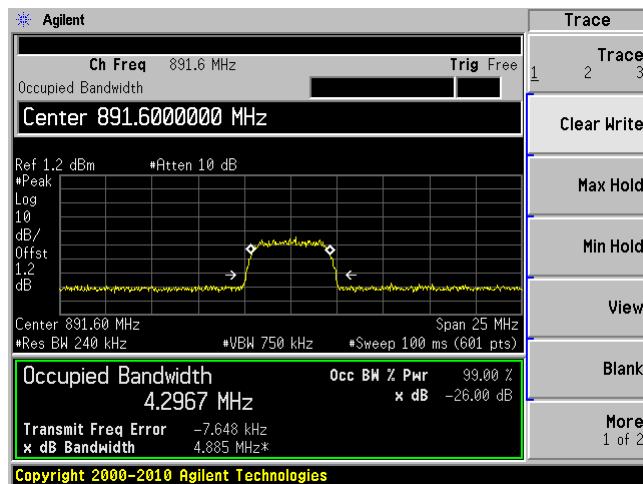
Middle Input



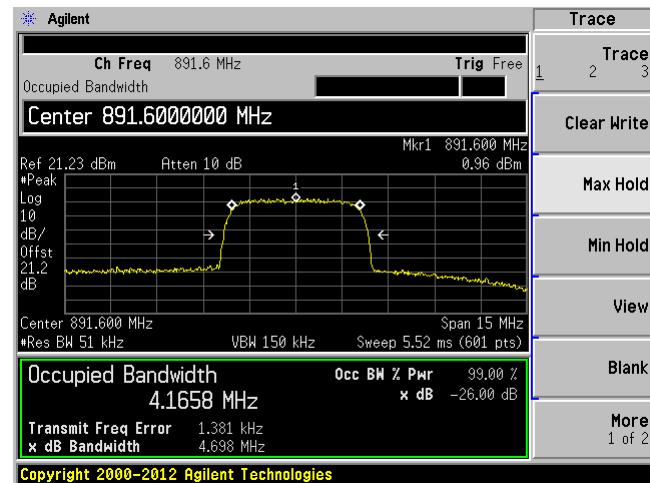
Middle Output



High Input

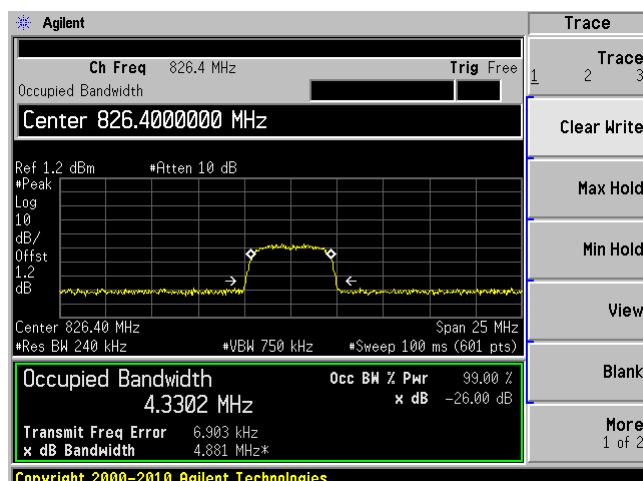


High Output

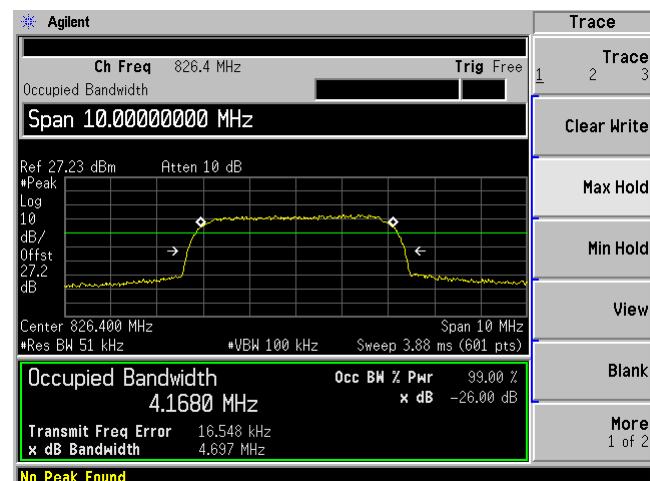


WCDMA Uplink

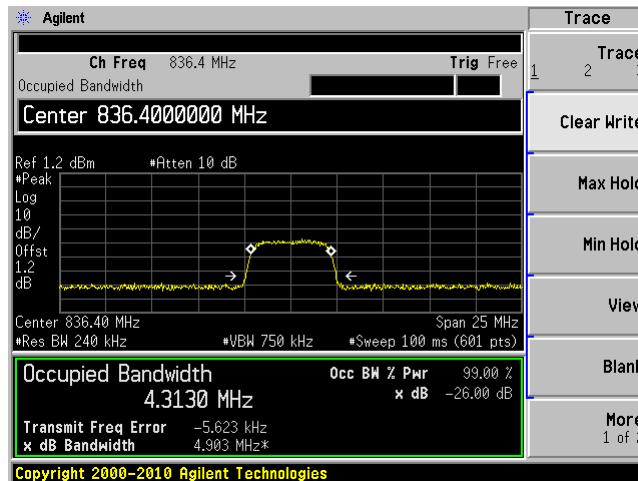
Low Input



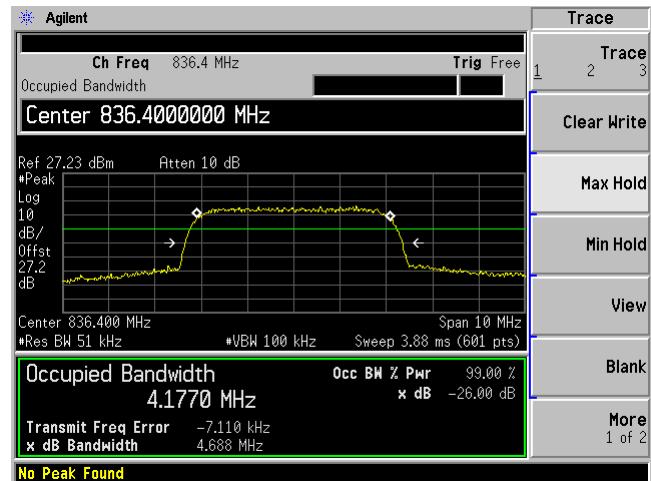
Low Output



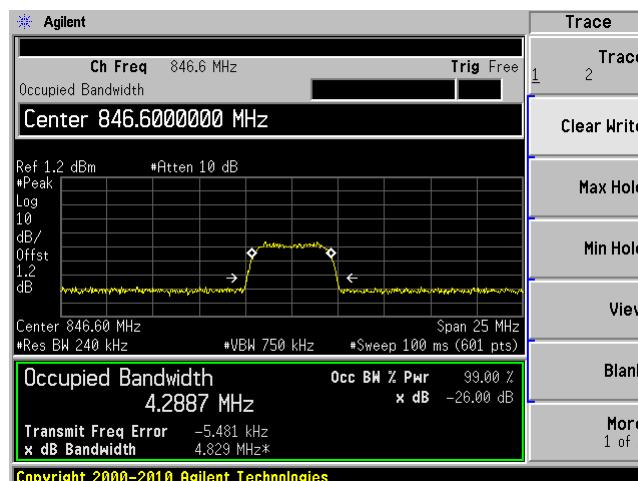
Middle Input



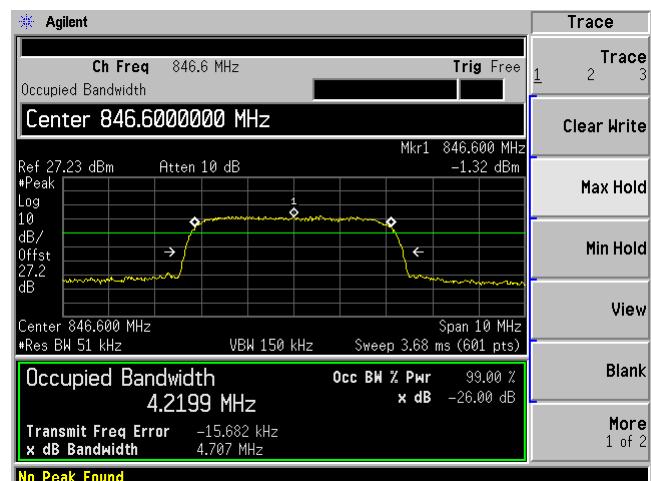
Middle Output



High Input

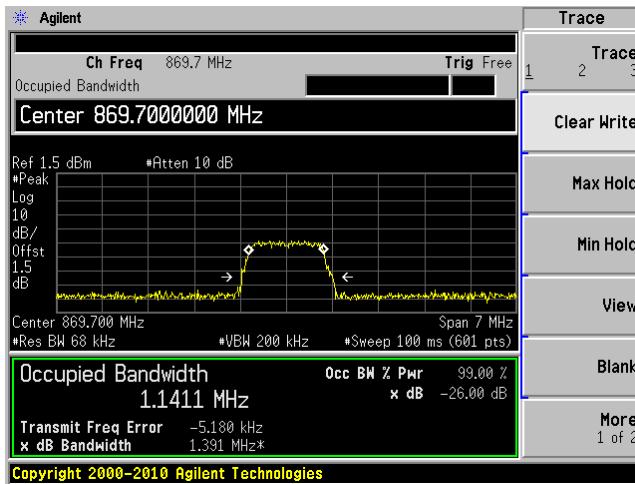


High Output

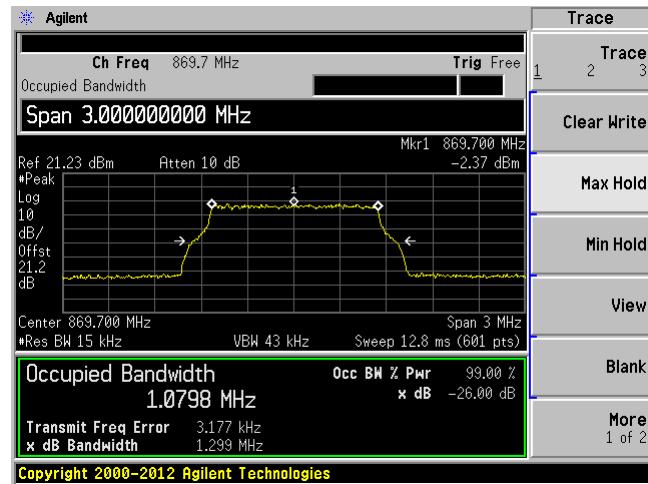


LTE 1.4MHz QPSK Downlink

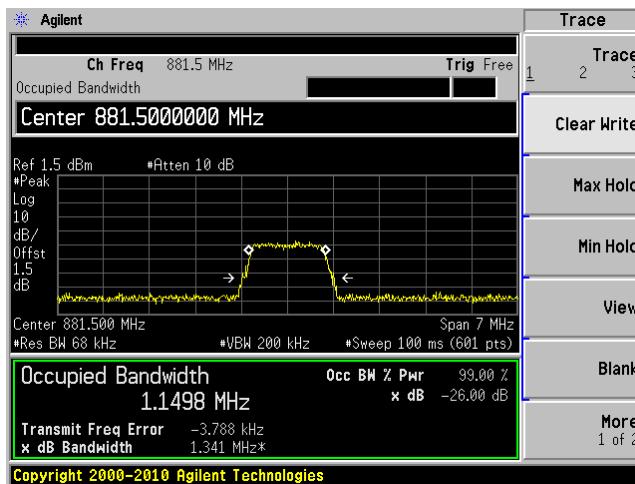
Low Input



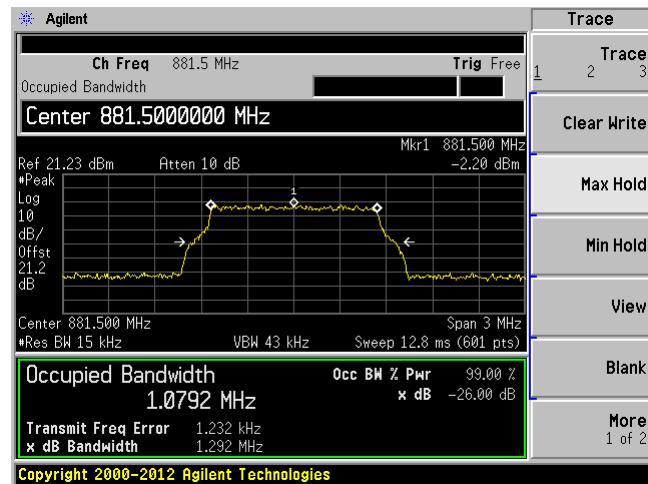
Low Output



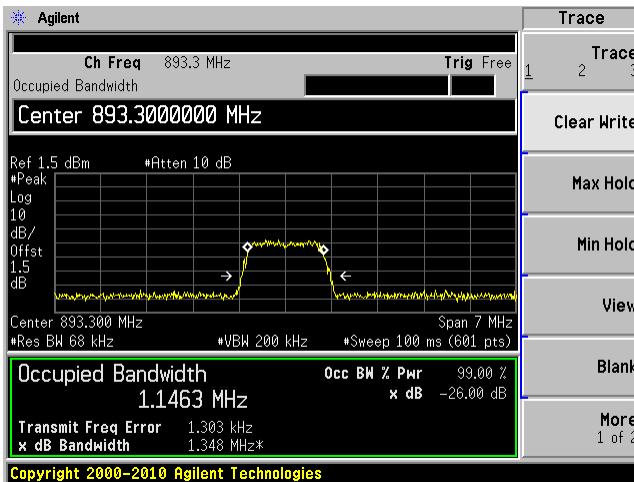
Middle Input



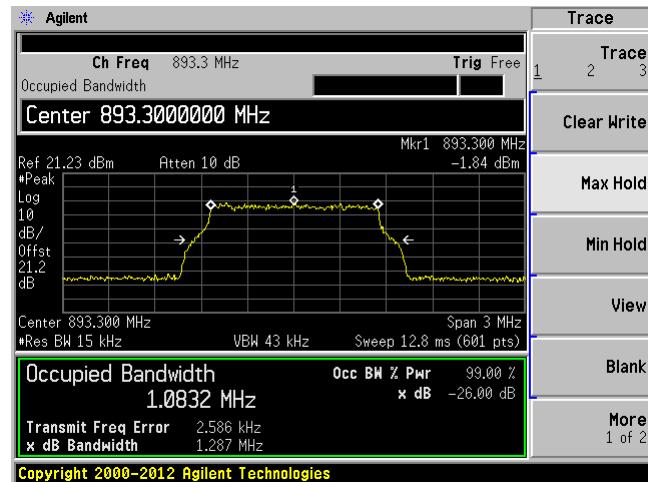
Middle Output



High Input

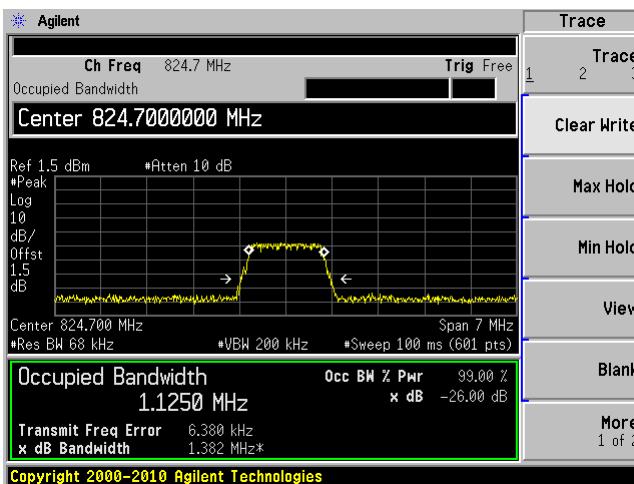


High Output

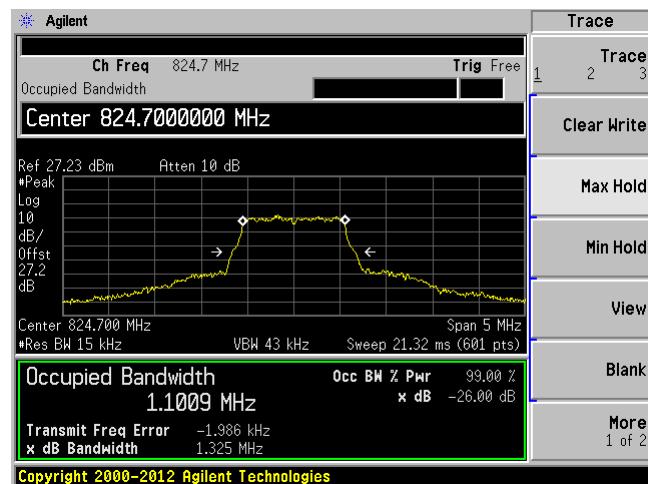


LTE 1.4MHz QPSK Uplink

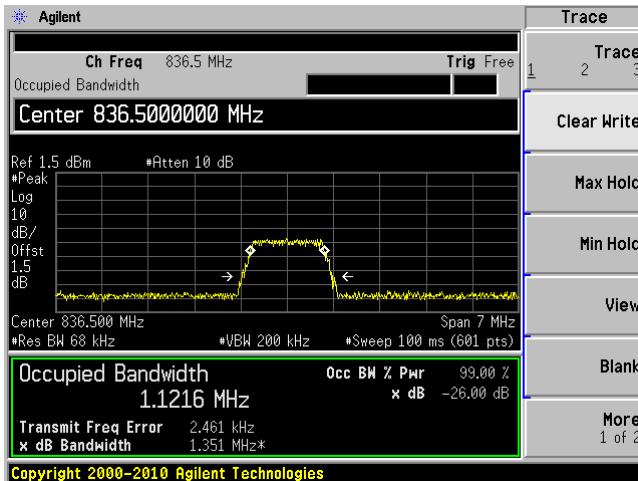
Low Input



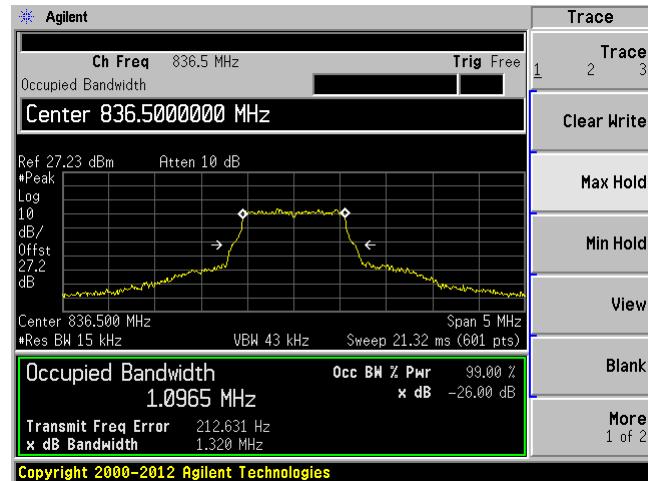
Low Output



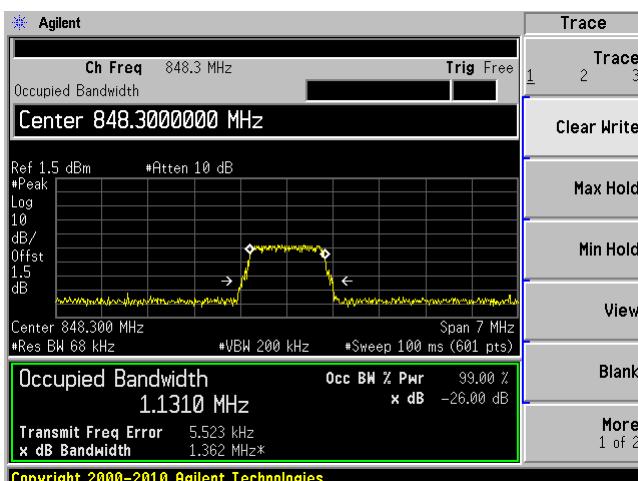
Middle Input



Middle Output



High Input

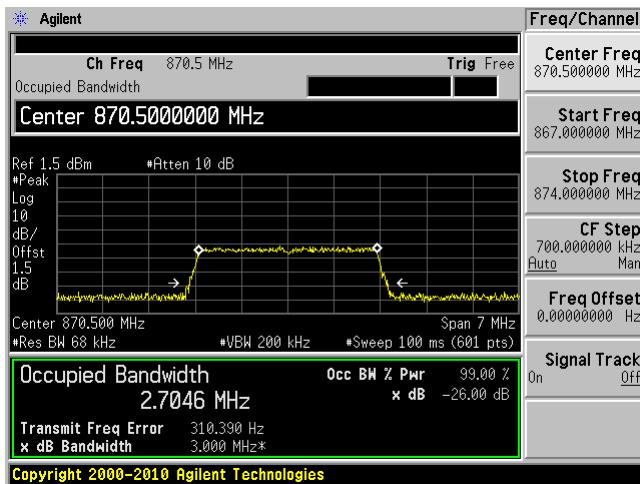


High Output

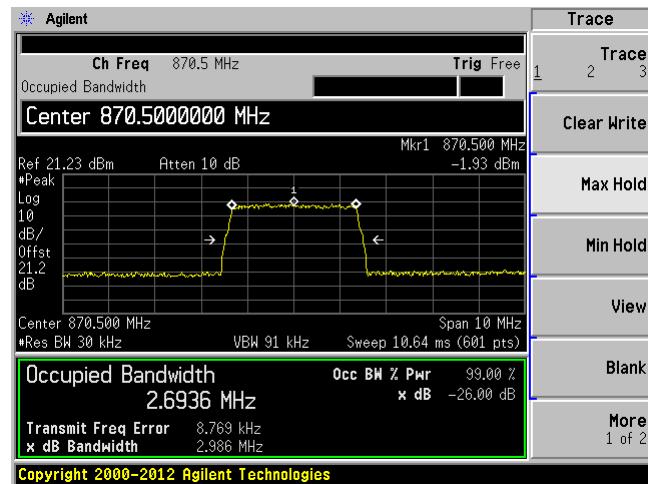


LTE 3MHz QPSK Downlink

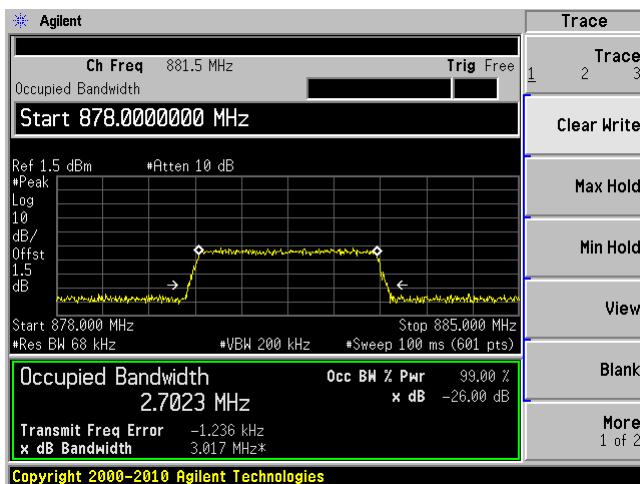
Low Input



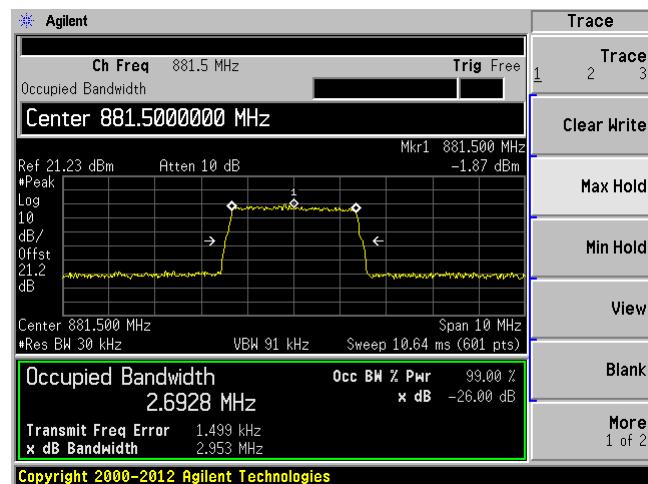
Low Output



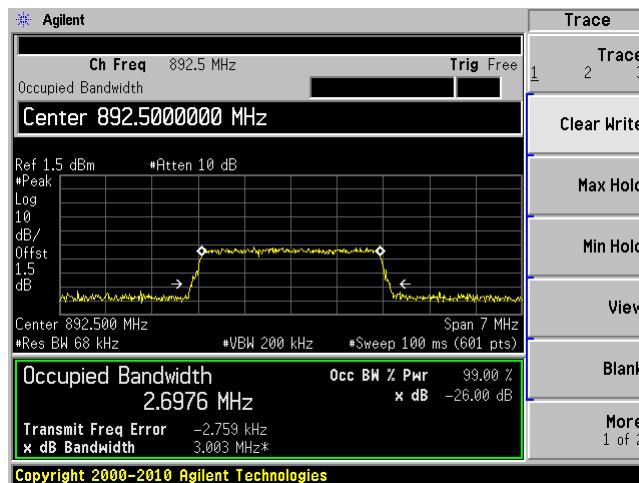
Middle Input



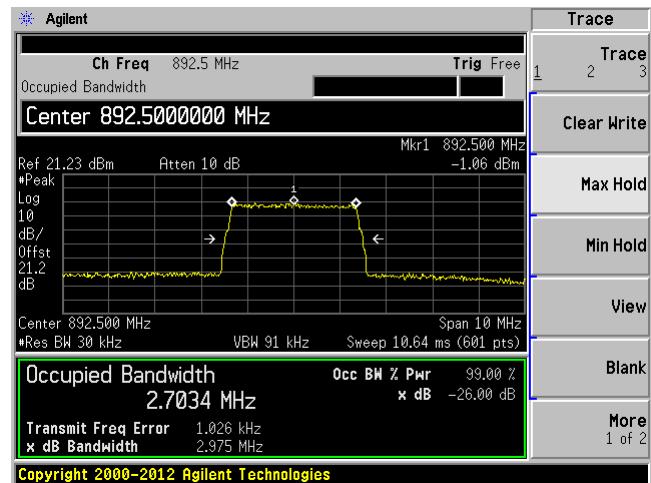
Middle Output



High Input

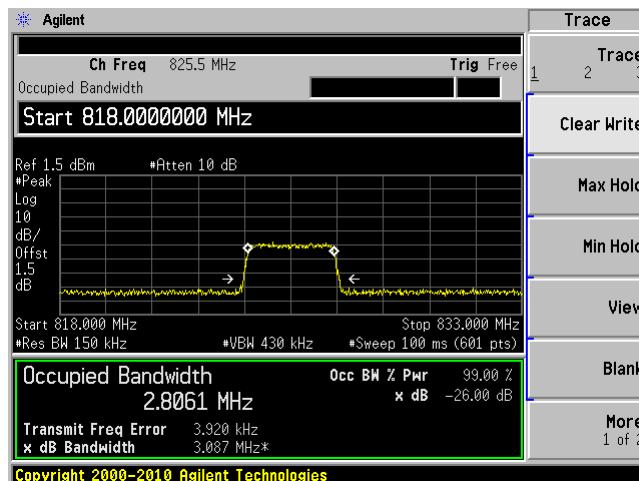


High Output

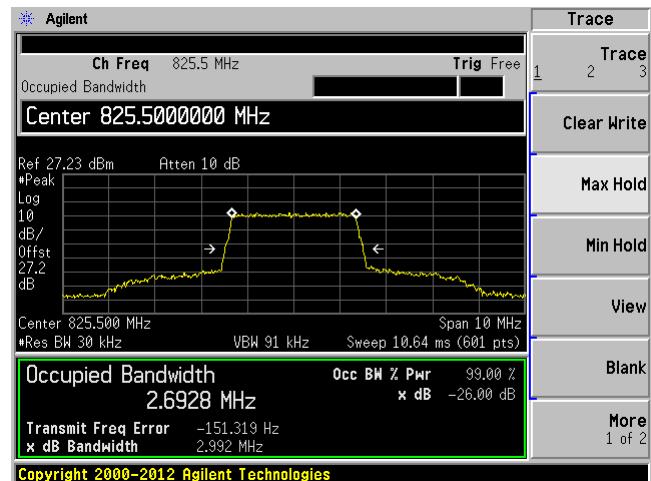


LTE 3MHz QPSK Uplink

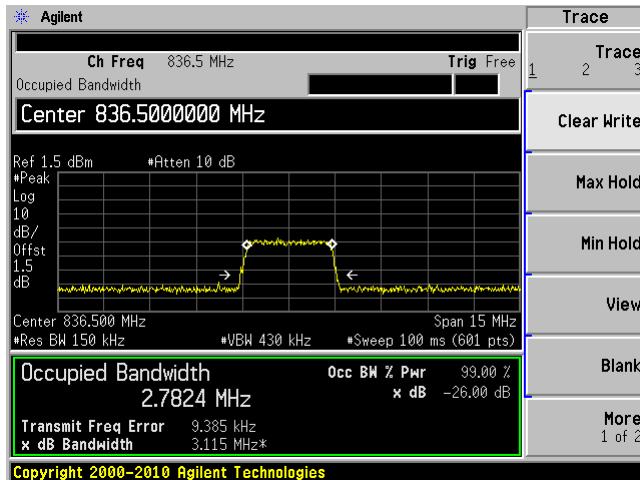
Low Input



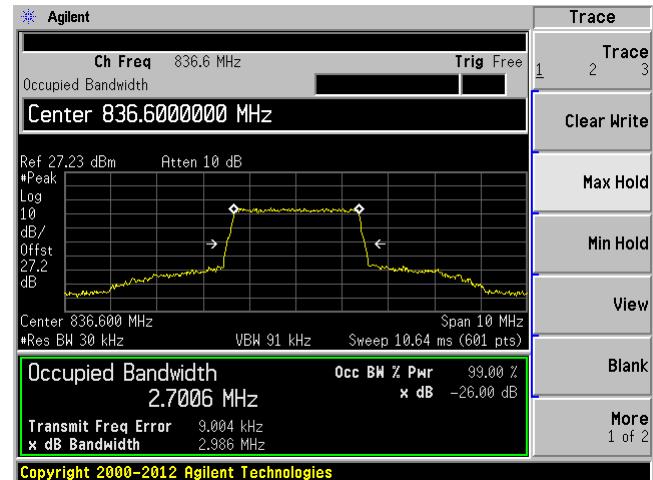
Low Output



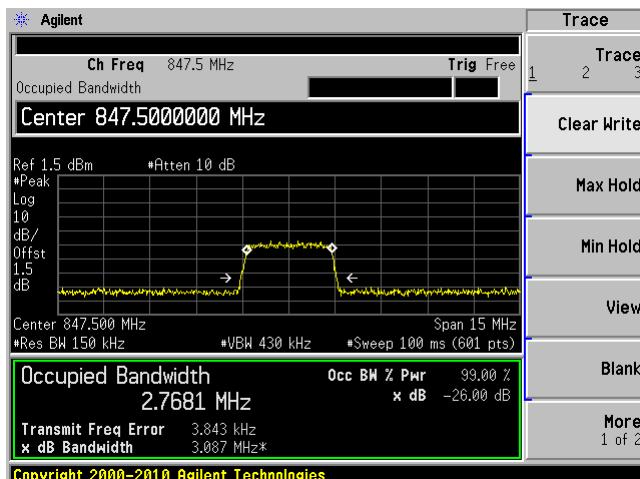
Middle Input



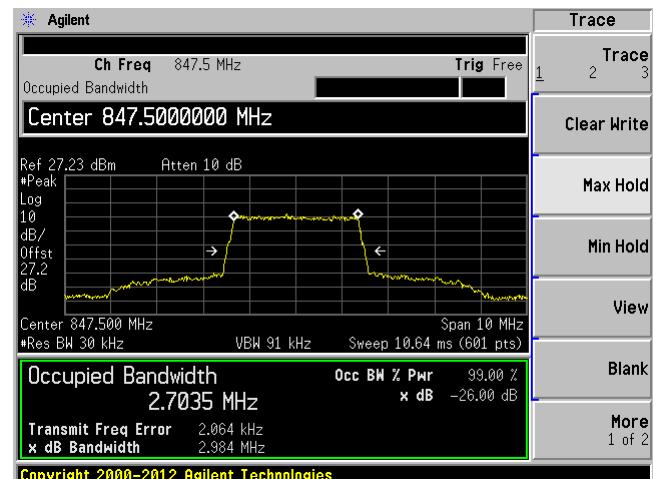
Middle Output



High Input

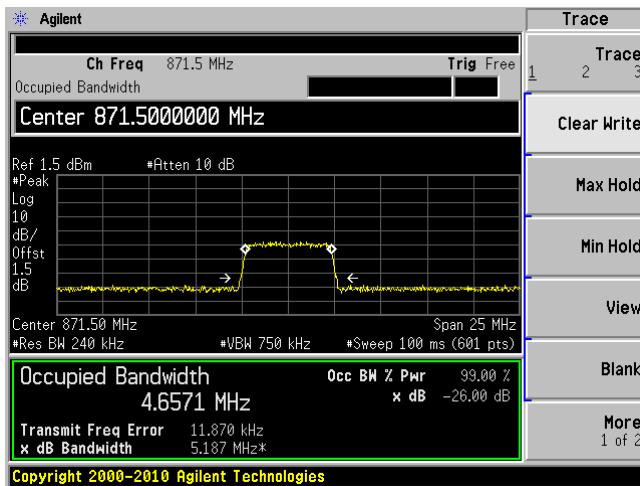


High Output

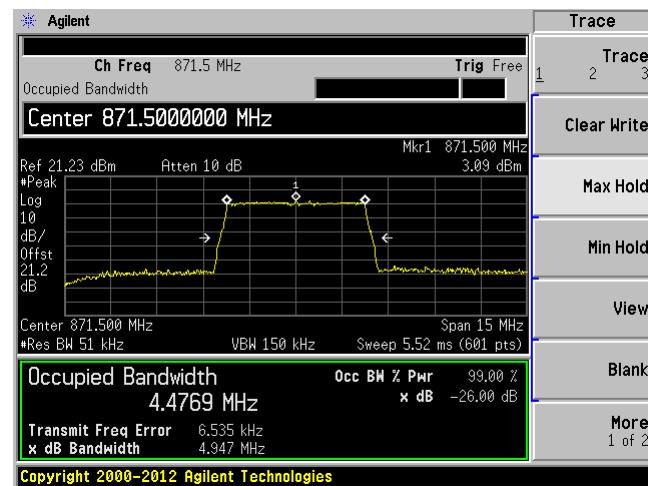


LTE 5MHz QPSK Downlink

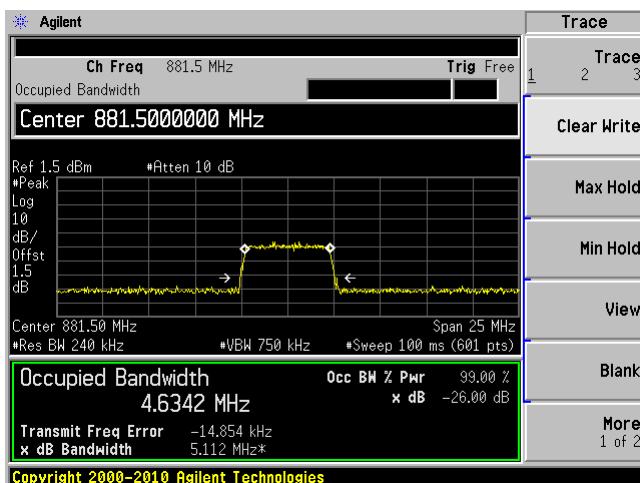
Low Input



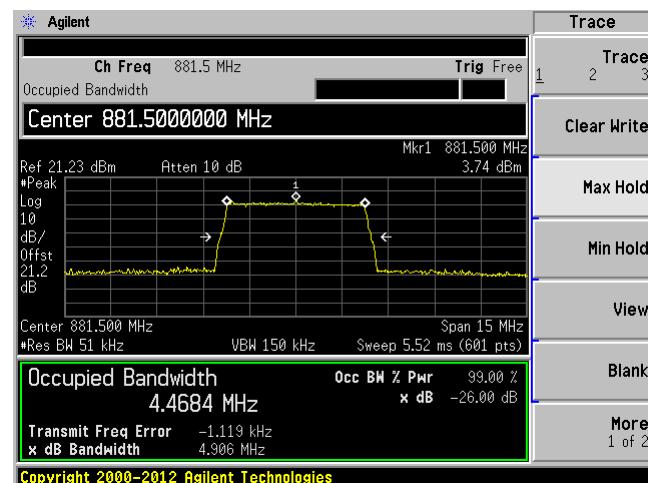
Low Output



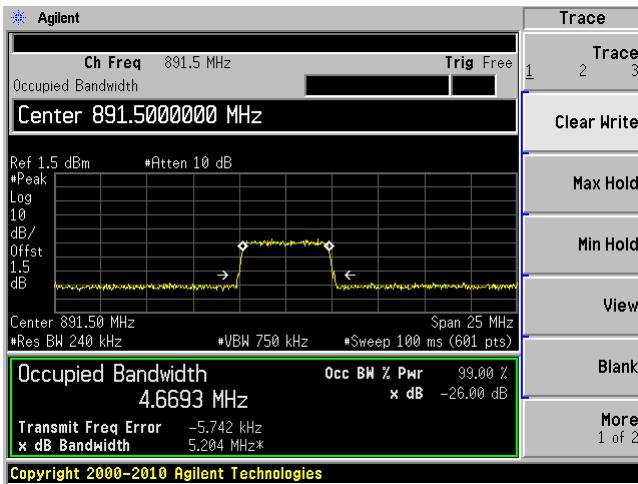
Middle Input



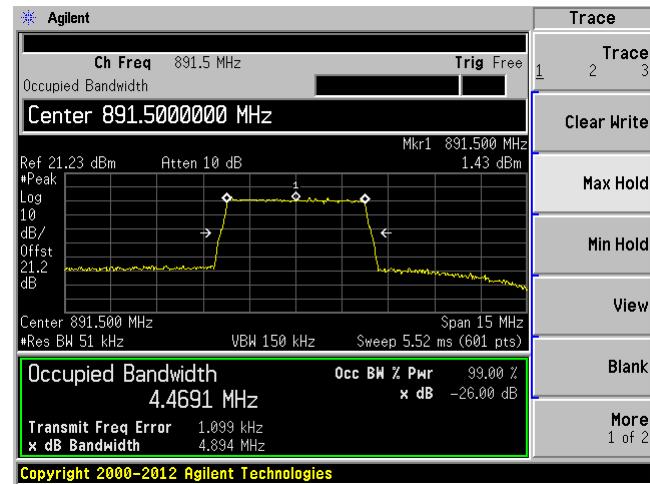
Middle Output



High Input

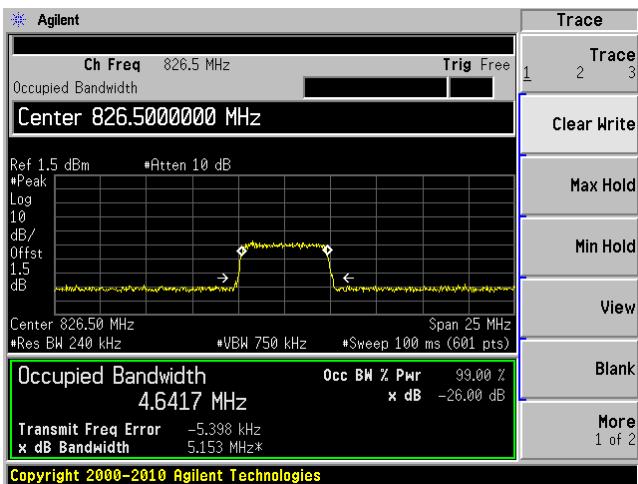


High Output

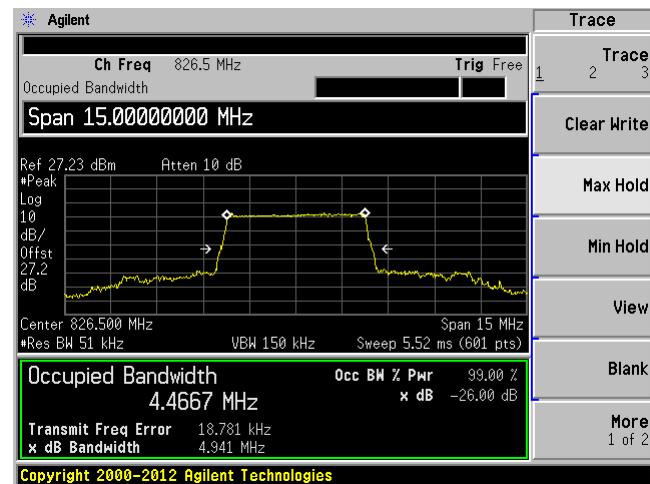


LTE 5MHz QPSK Uplink

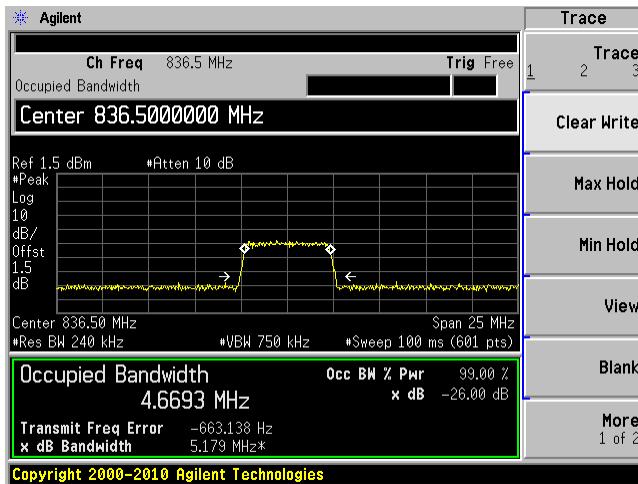
Low Input



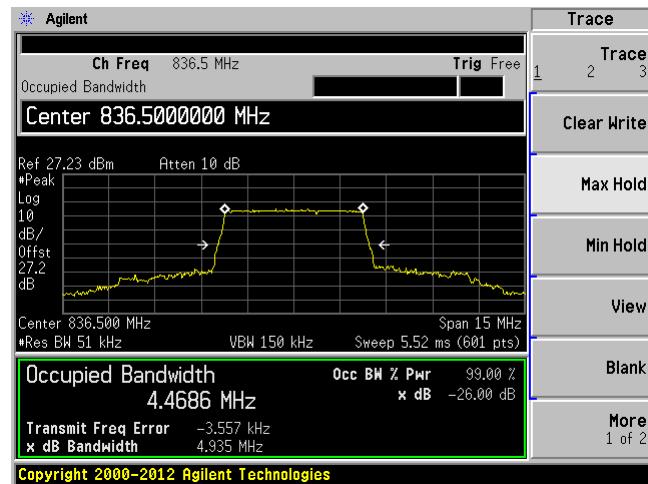
Low Output



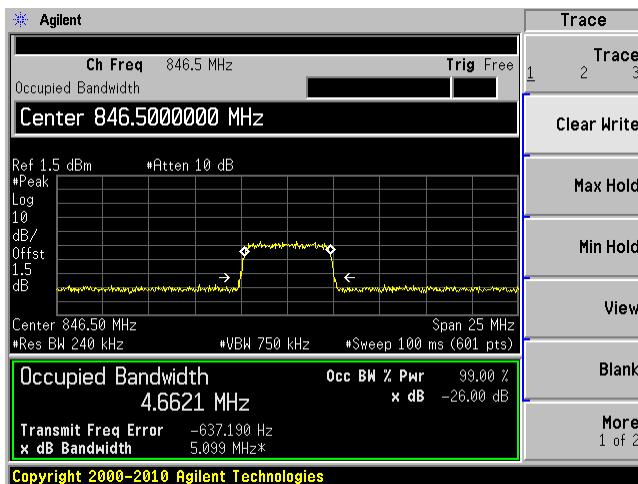
Middle Input



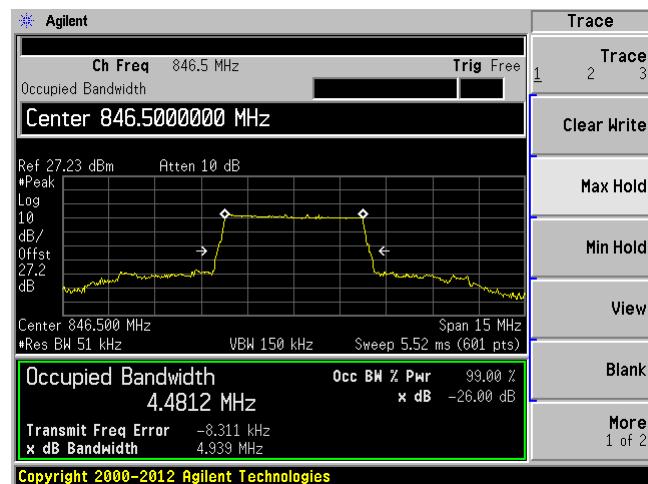
Middle Output



High Input

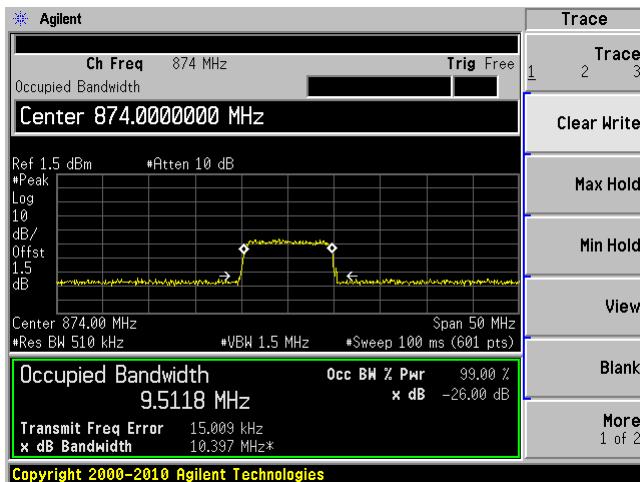


High Output

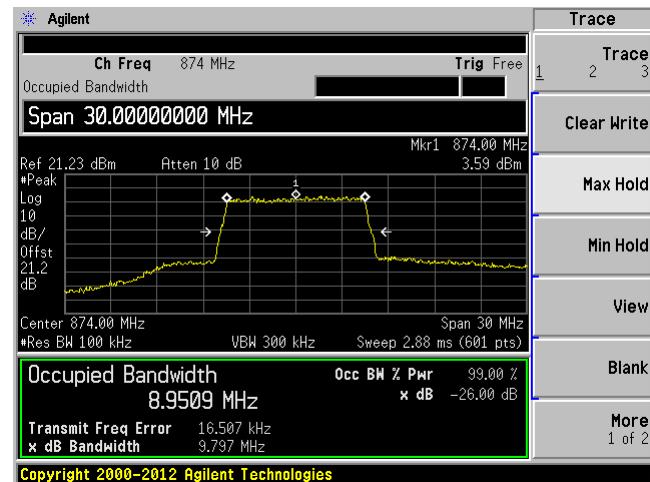


LTE 10MHZ QPSK Downlink

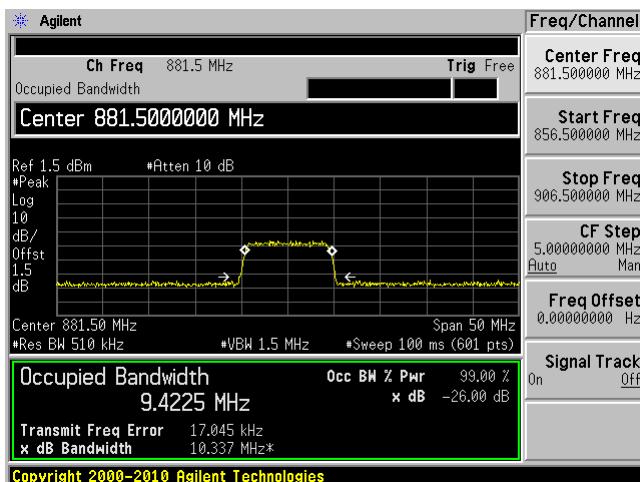
Low Input



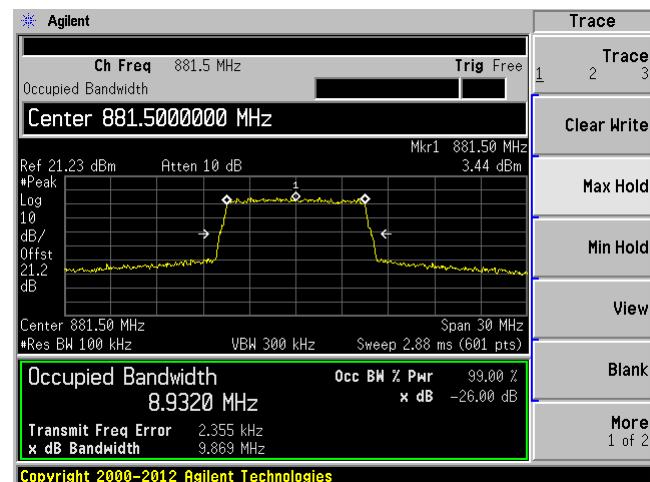
Low Output



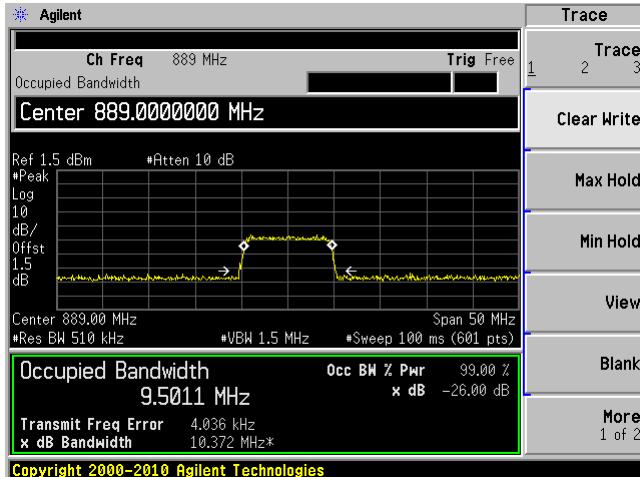
Middle Input



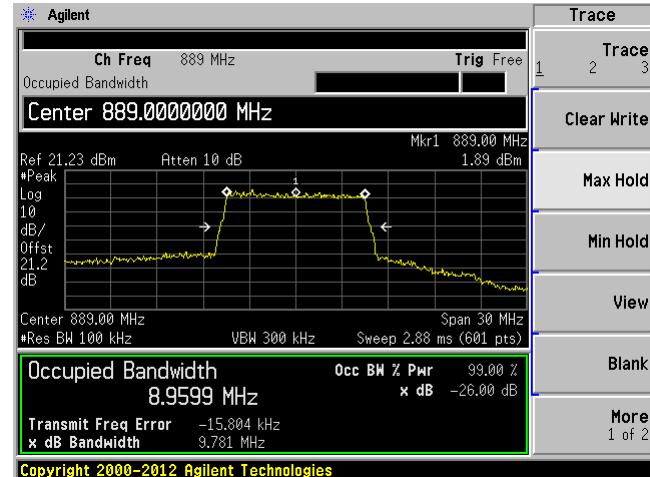
Middle Output



High Input

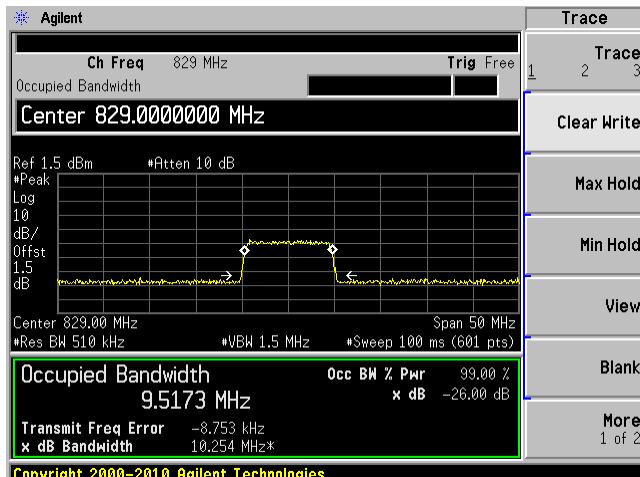


High Output

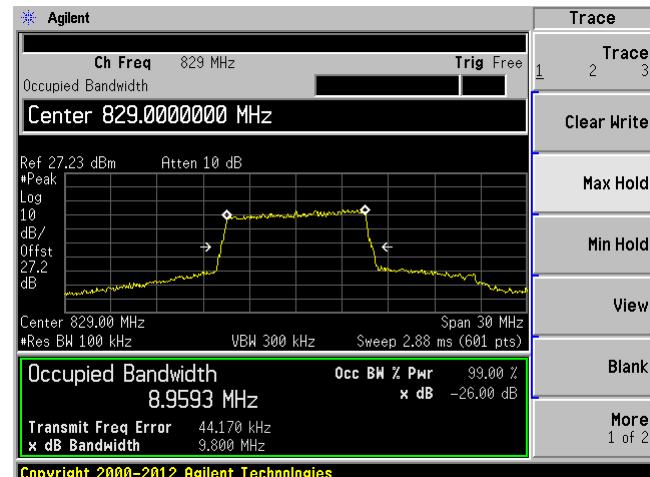


LTE 10MHZ QPSK Uplink

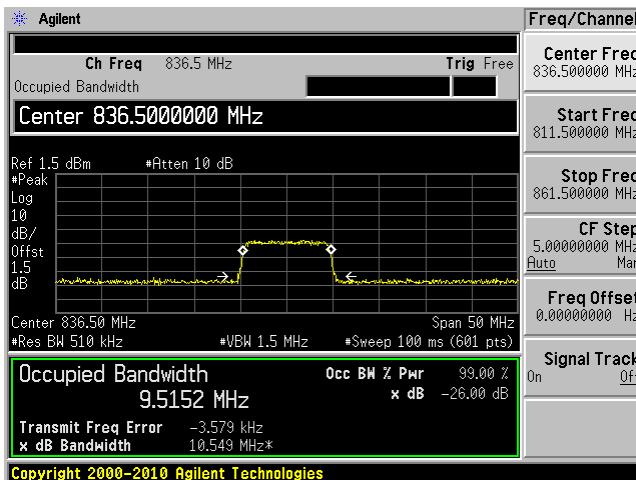
Low Input



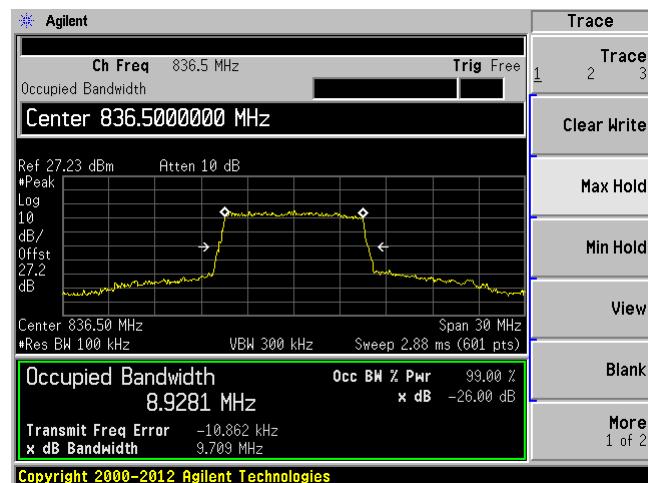
Low Output



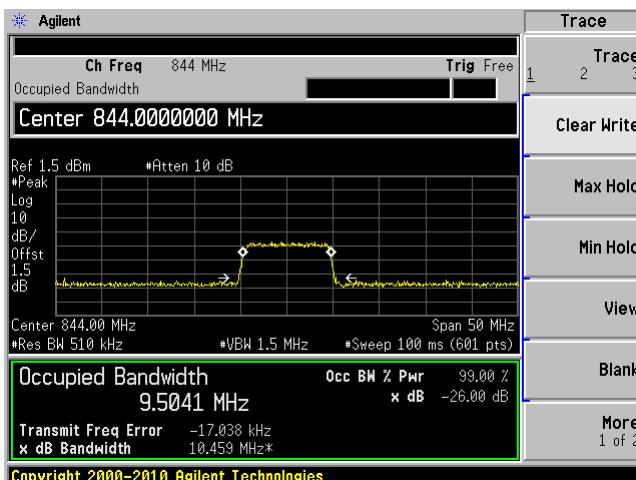
Middle Input



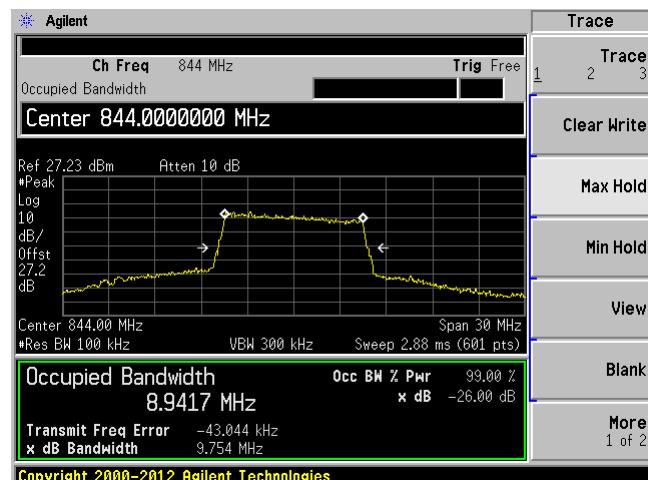
Middle Output



High Input

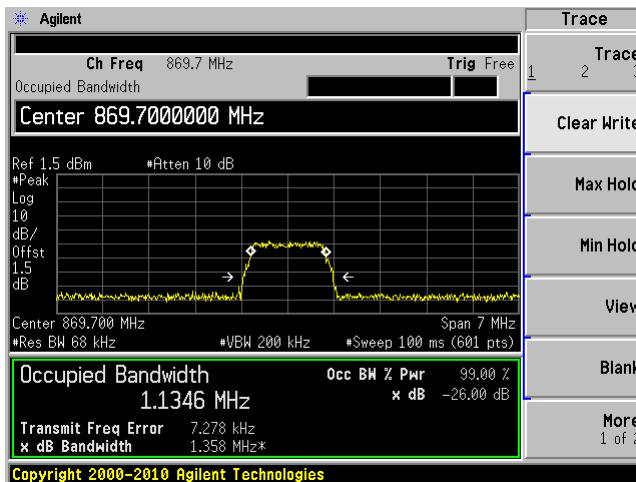


High Output

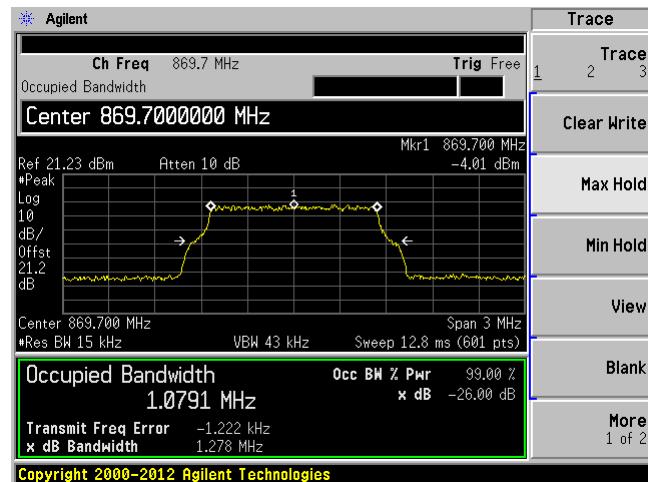


LTE 1.4MHz 16QAM Downlink

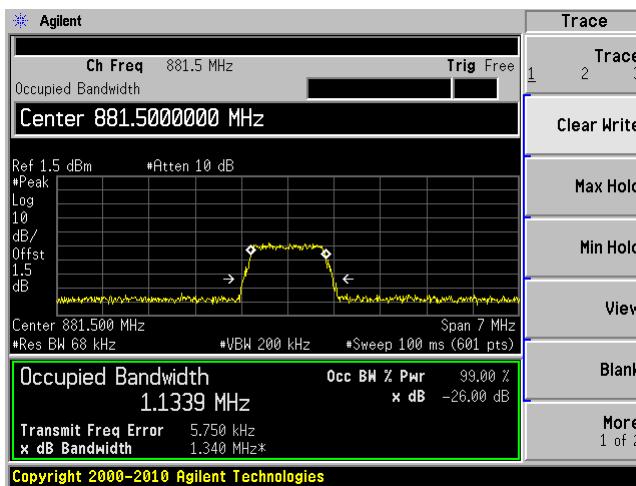
Low Input



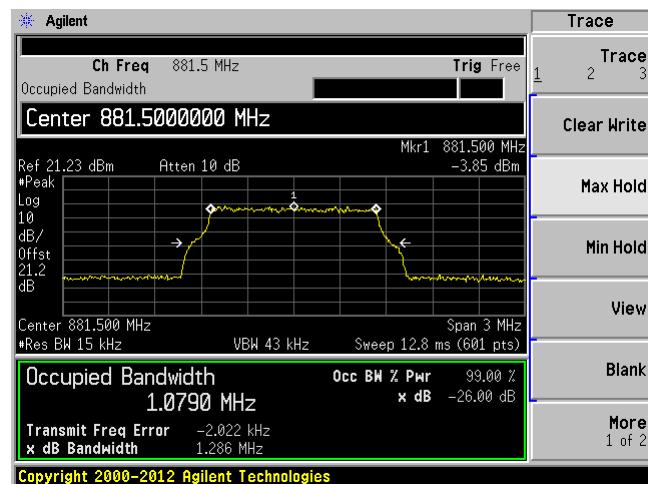
Low Output



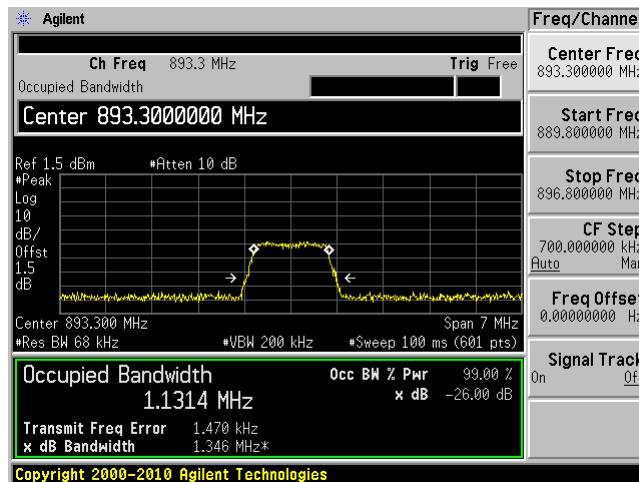
Middle Input



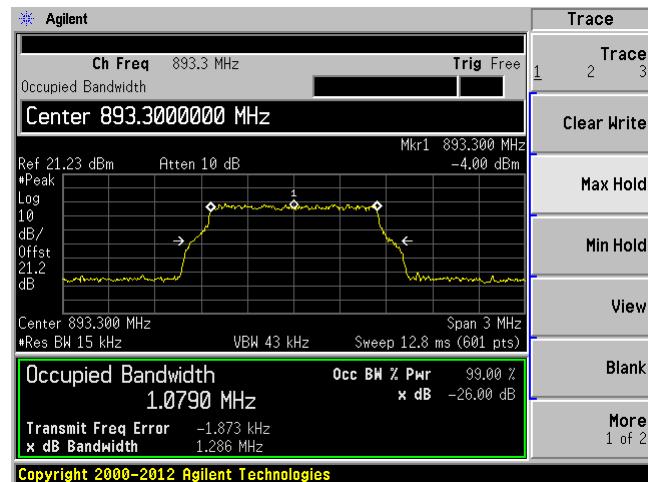
Middle Output



High Input

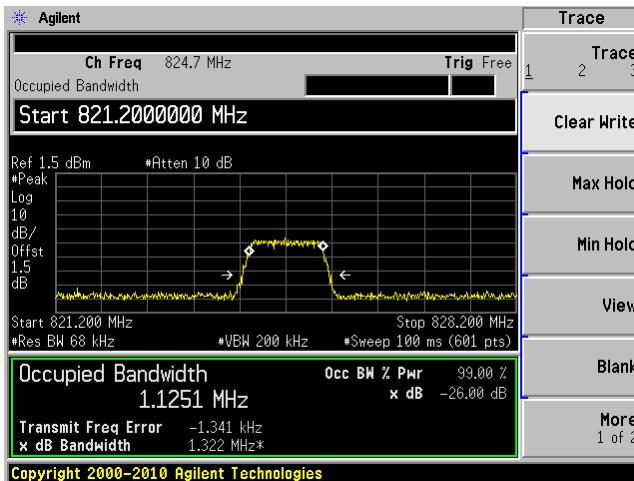


High Output

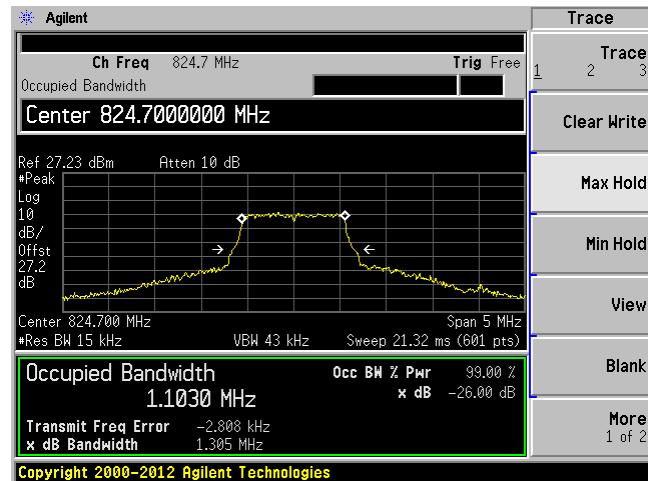


LTE 1.4MHz 16QAM Uplink

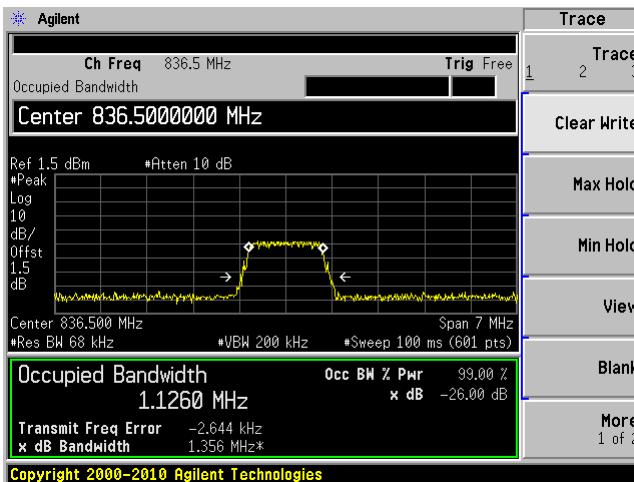
Low Input



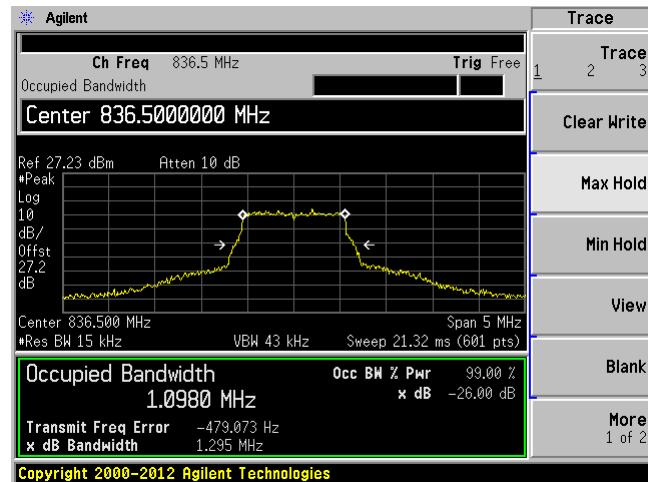
Low Output



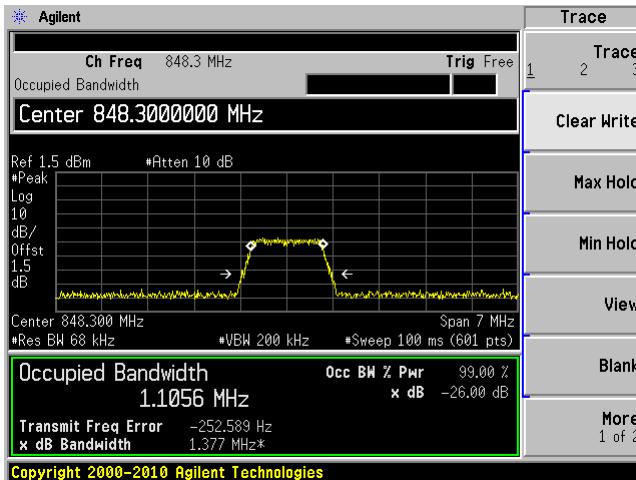
Middle Input



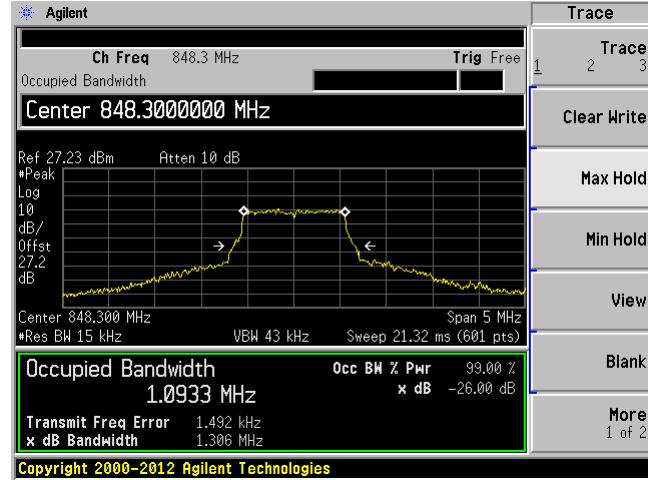
Middle Output



High Input

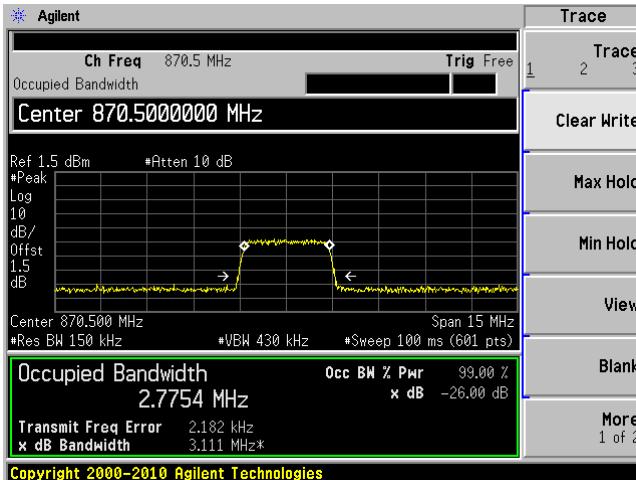


High Output

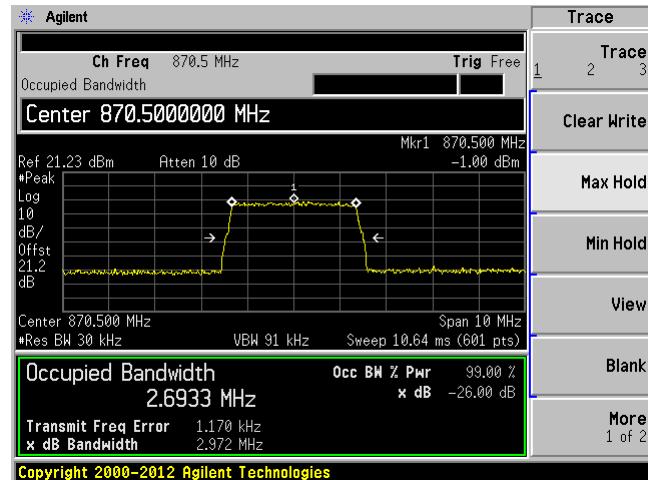


LTE 3MHz 16QAM Downlink

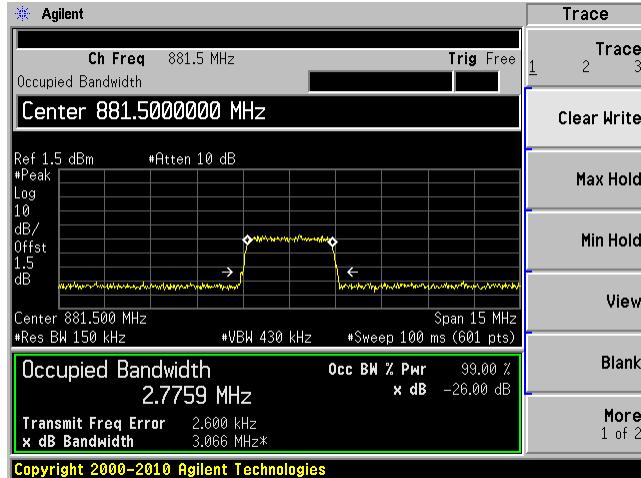
Low Input



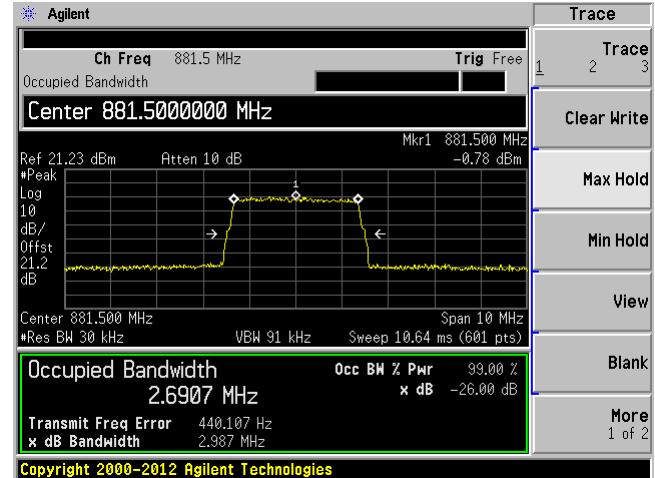
Low Output



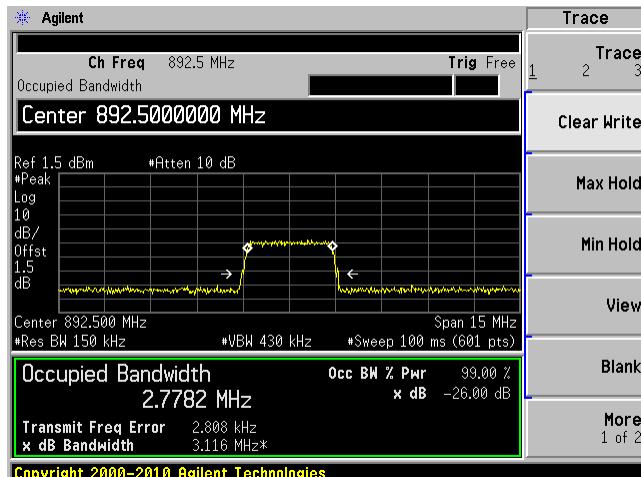
Middle Input



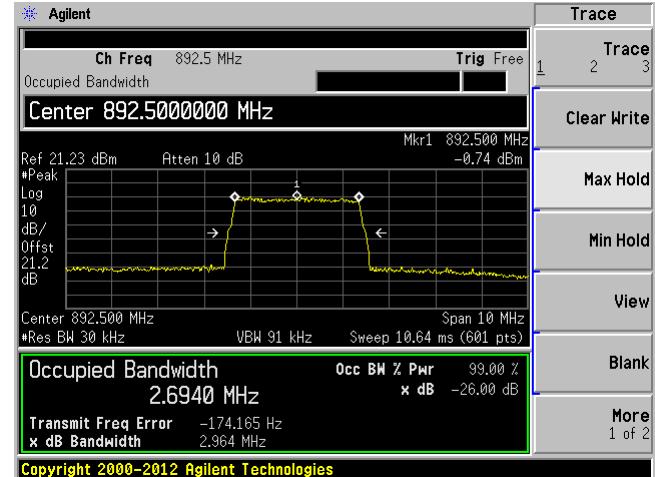
Middle Output



High Input

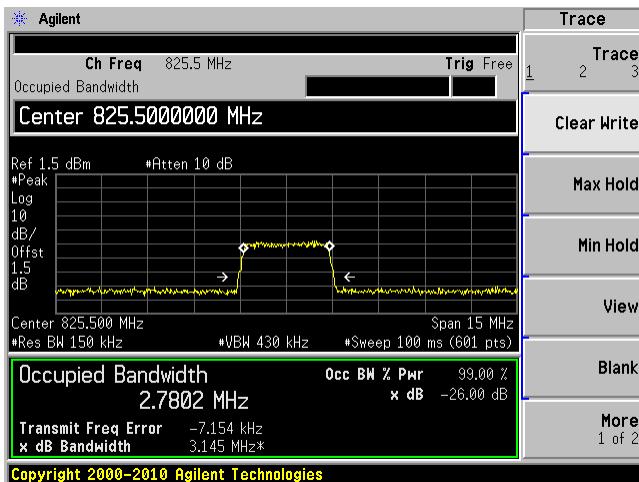


High Output

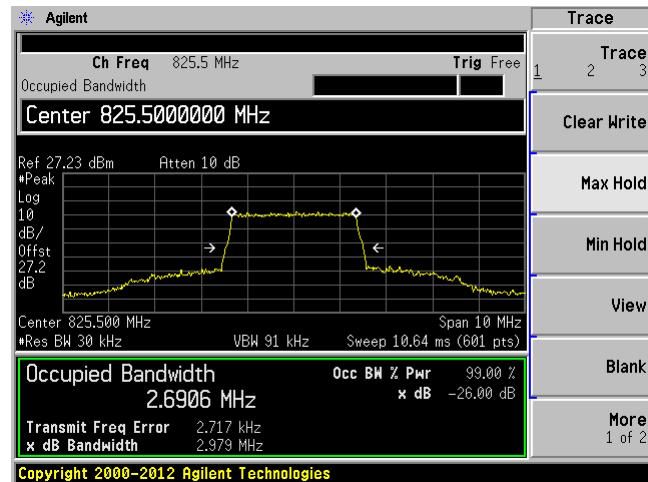


LTE 3MHz 16QAM Uplink

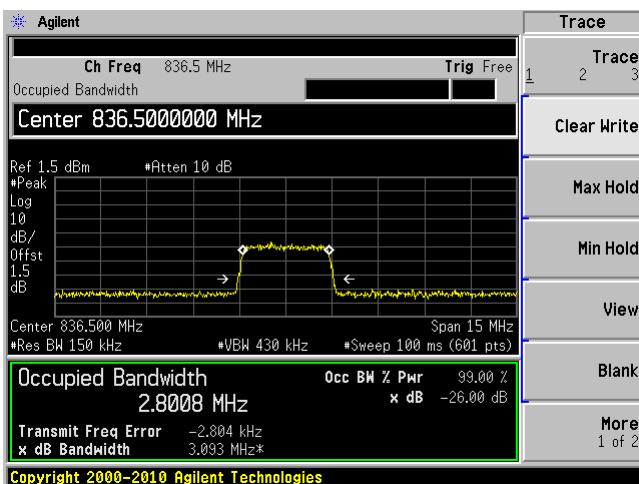
Low Input



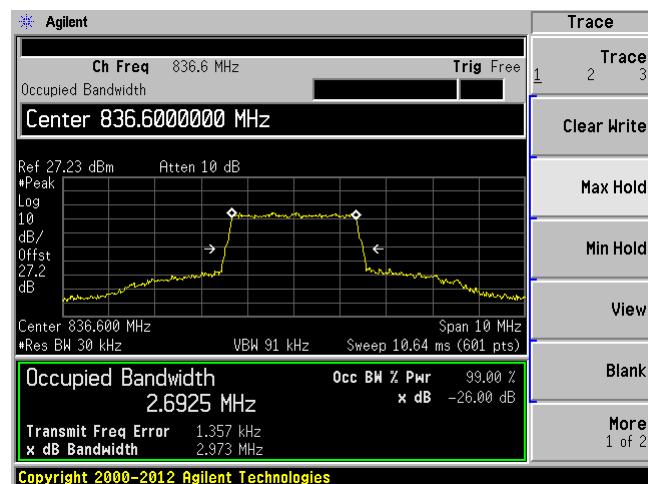
Low Output



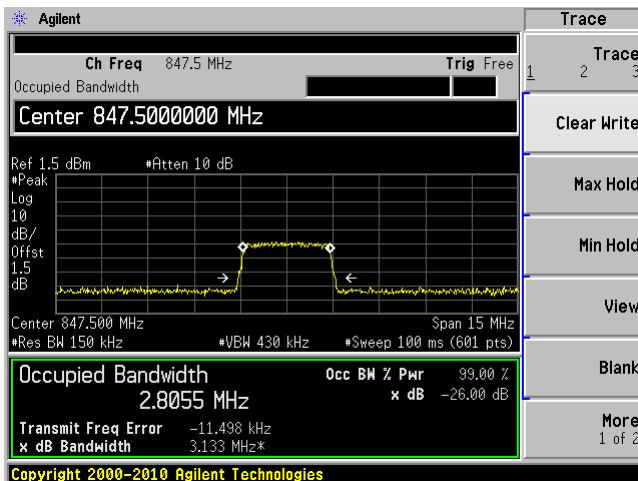
Middle Input



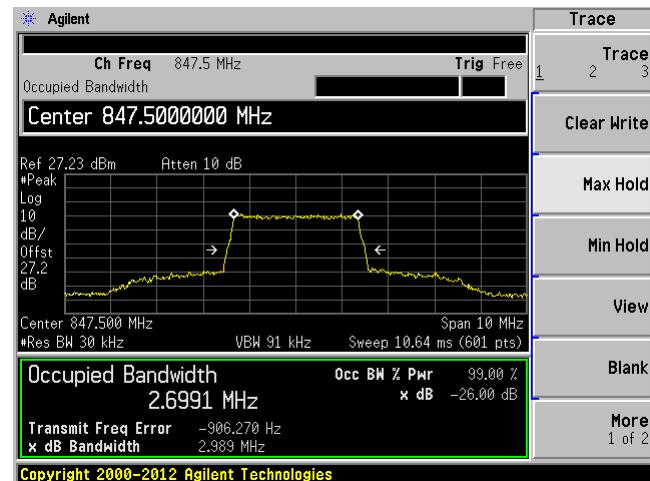
Middle Output



High Input

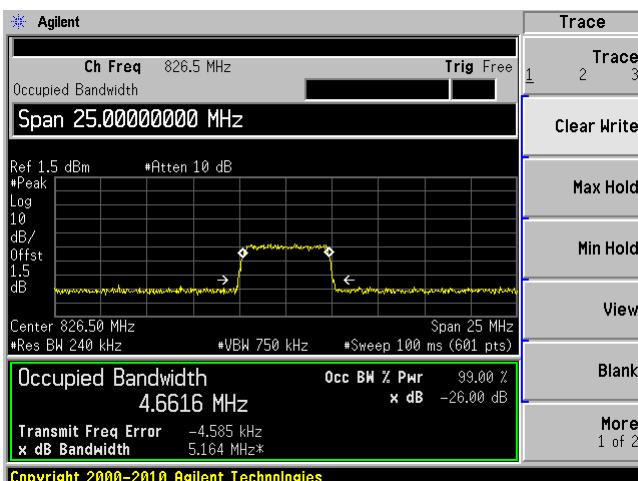


High Output

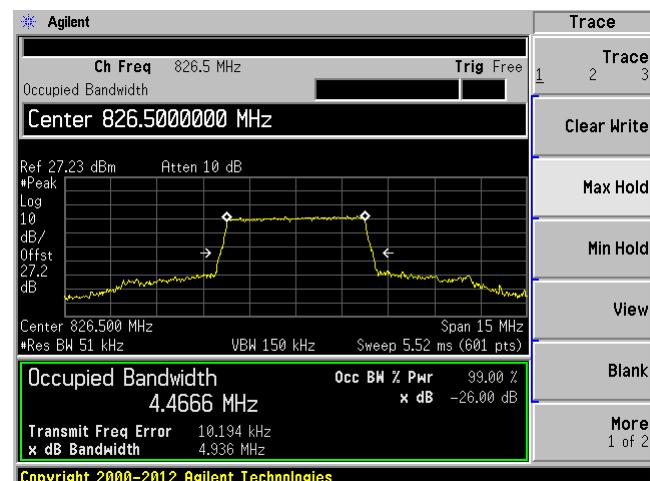


LTE 5MHz 16QAM Uplink

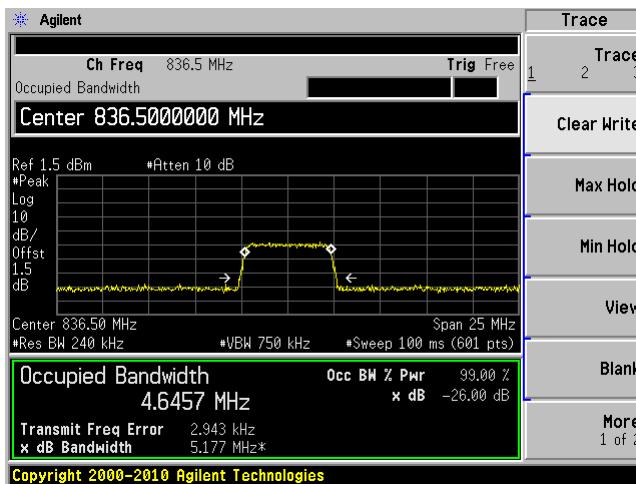
Low Input



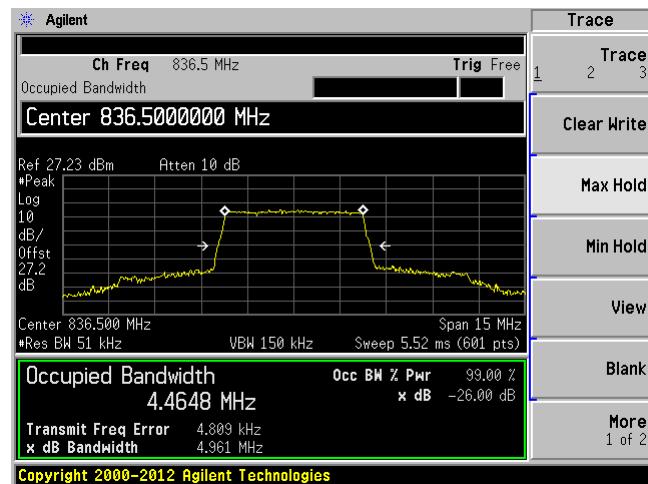
Low Output



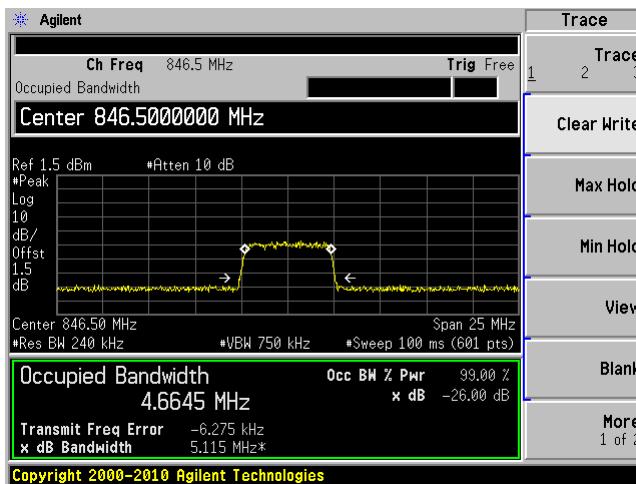
Middle Input



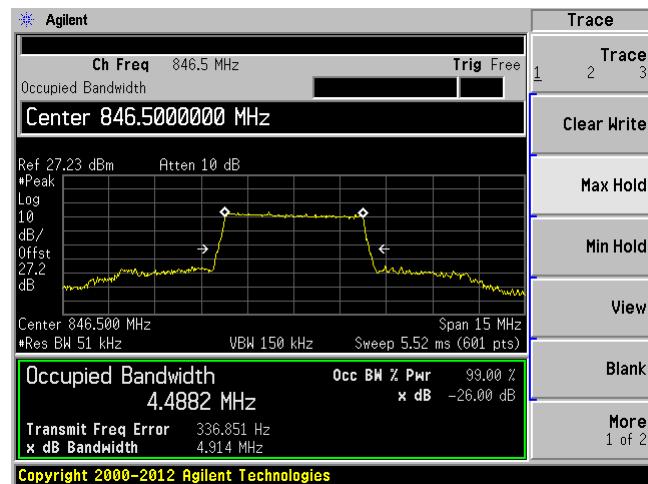
Middle Output



High Input

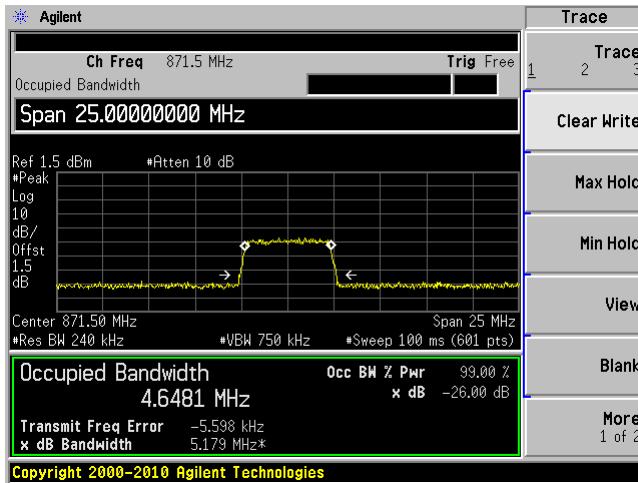


High Output

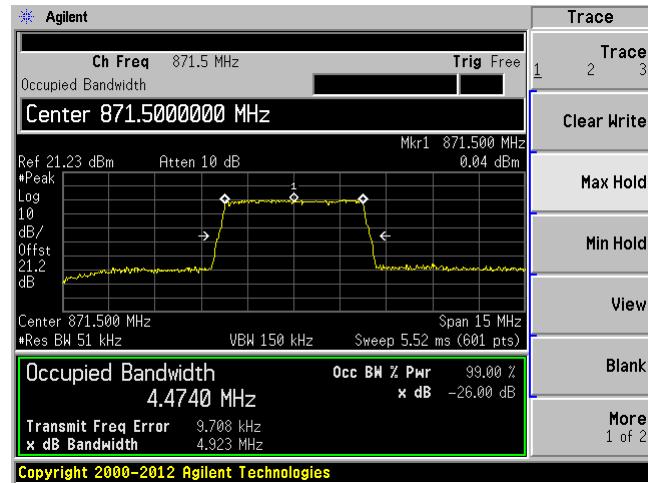


LTE 5MHz 16QAM Downlink

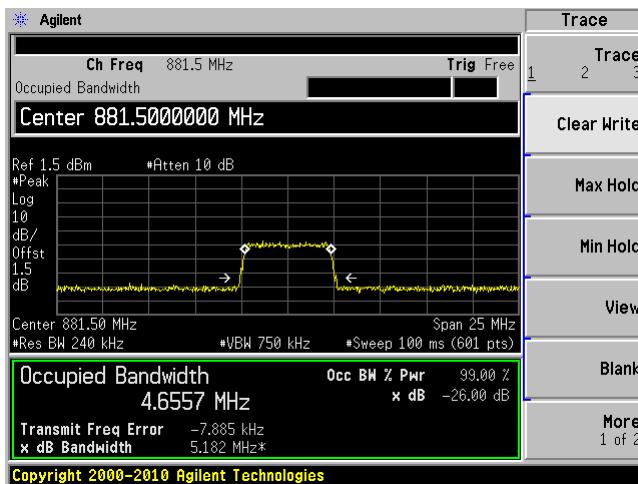
Low Input



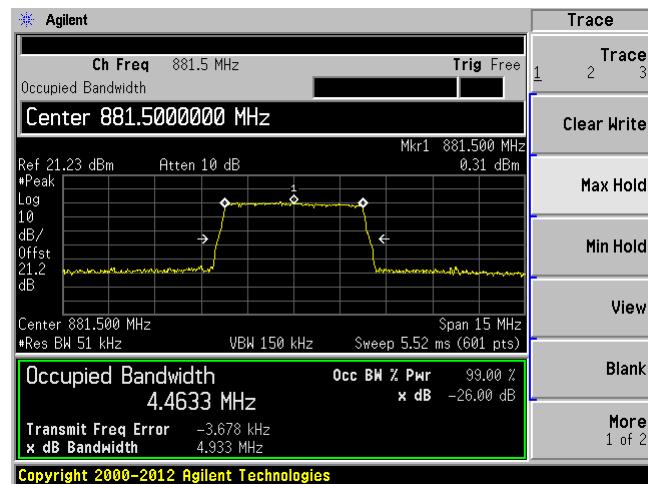
Low Output



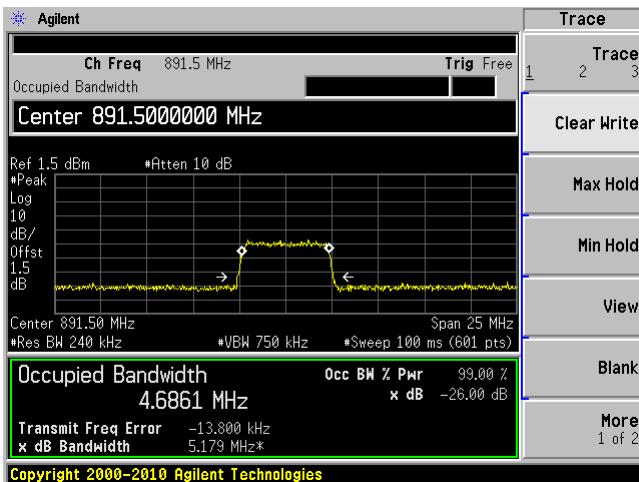
Middle Input



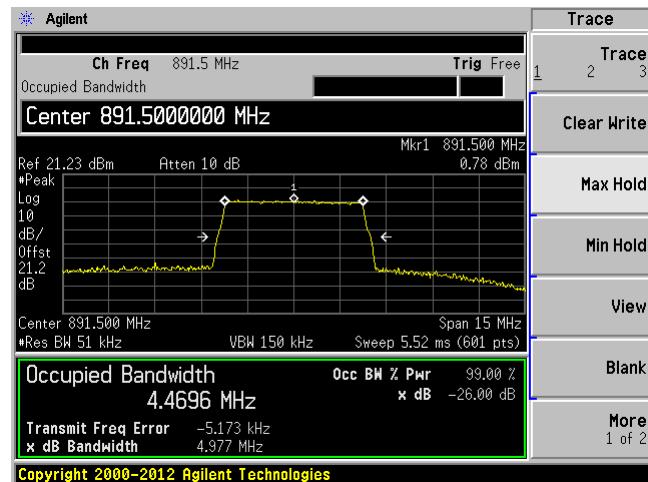
Middle Output



High INPUT

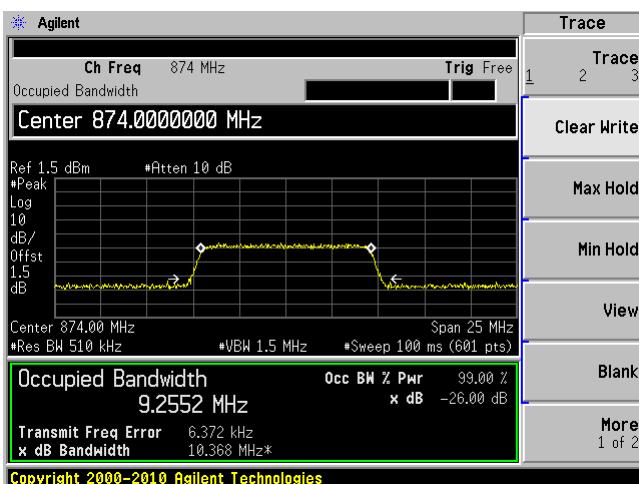


High O/P

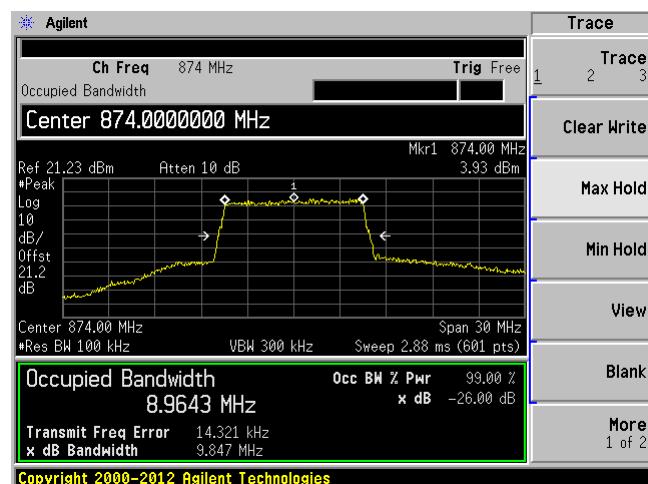


LTE 10MHz 16QAM Downlink

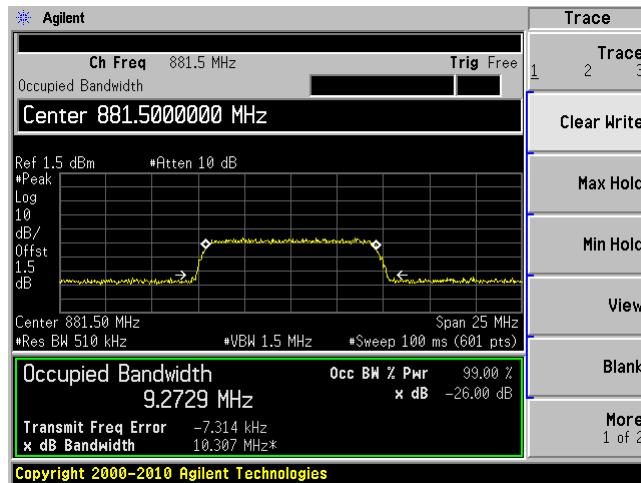
Low Input



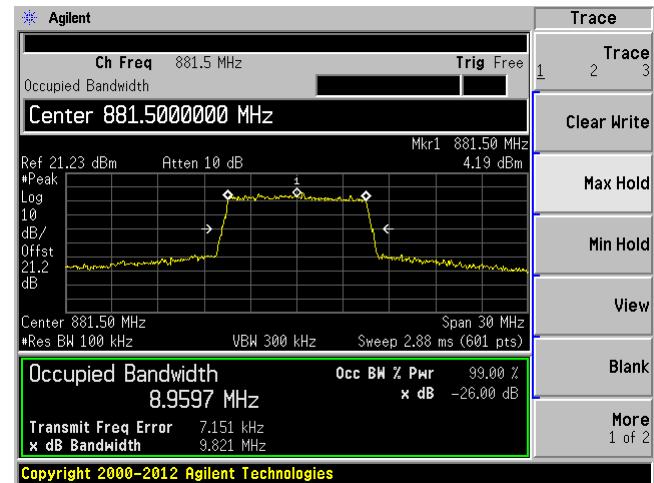
Low Output



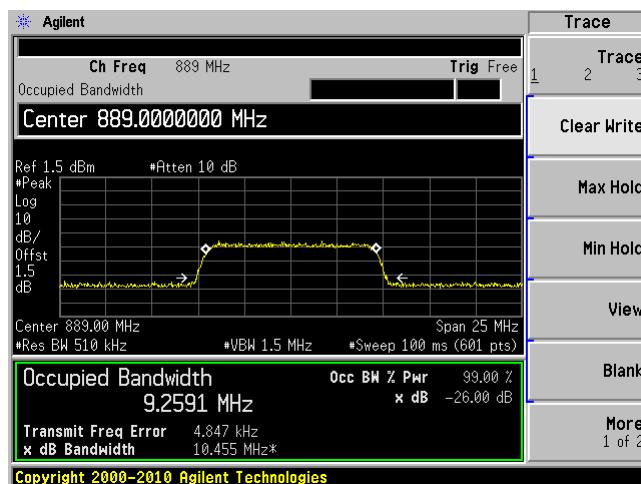
Middle Input



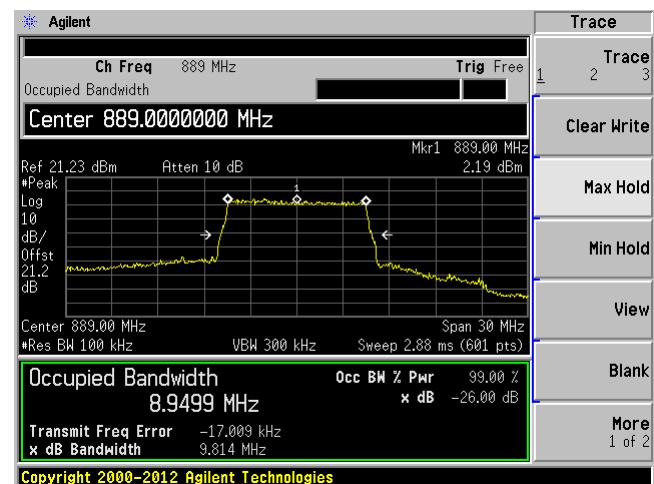
Middle Output



High Input



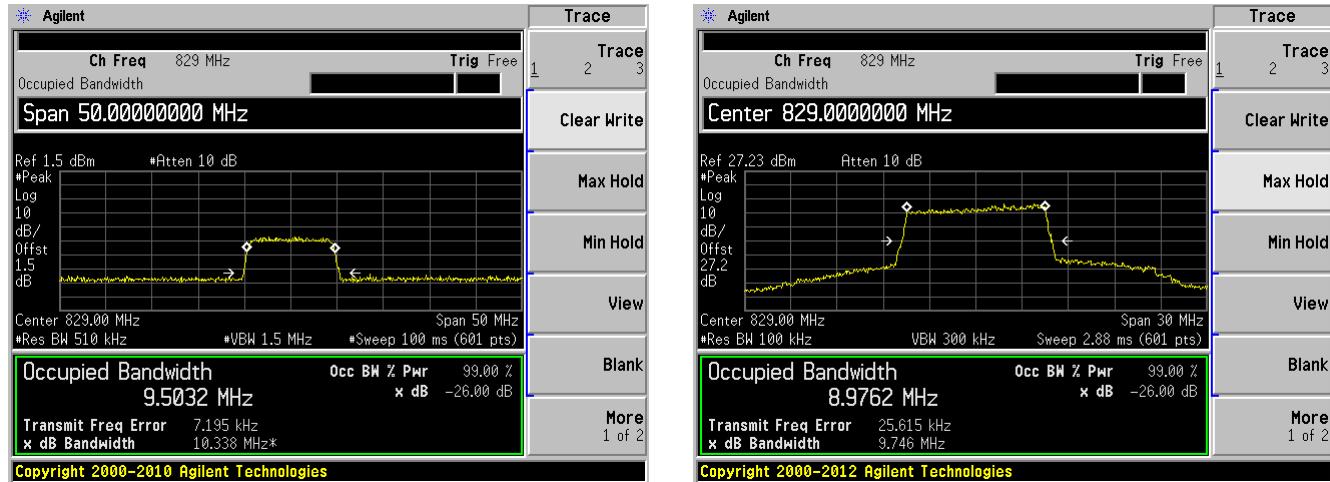
High Output



LTE 10MHz 16QAM Uplink

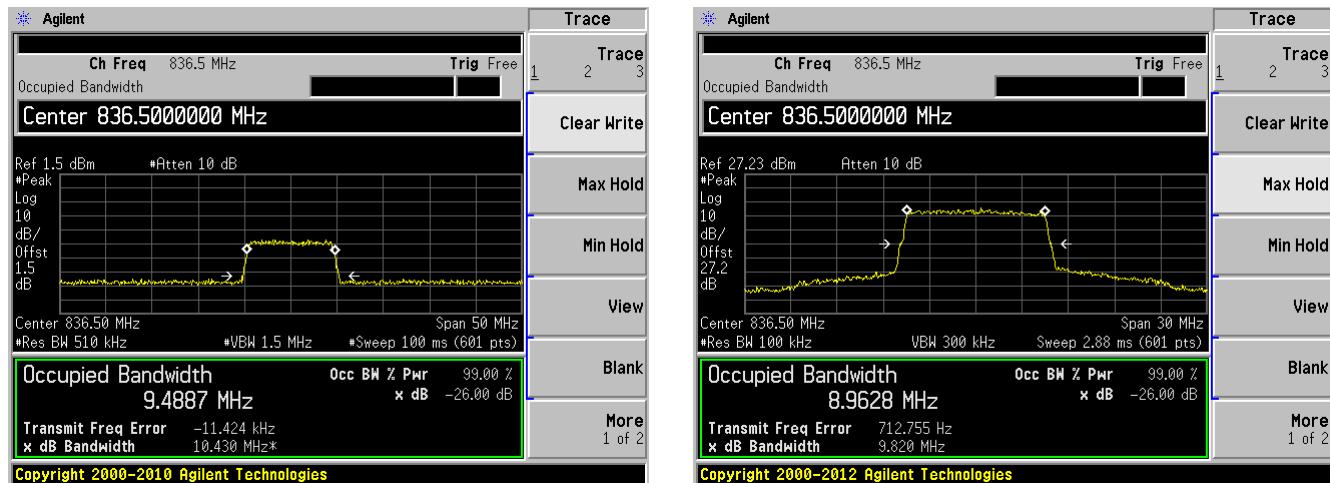
Low Input

Low Output

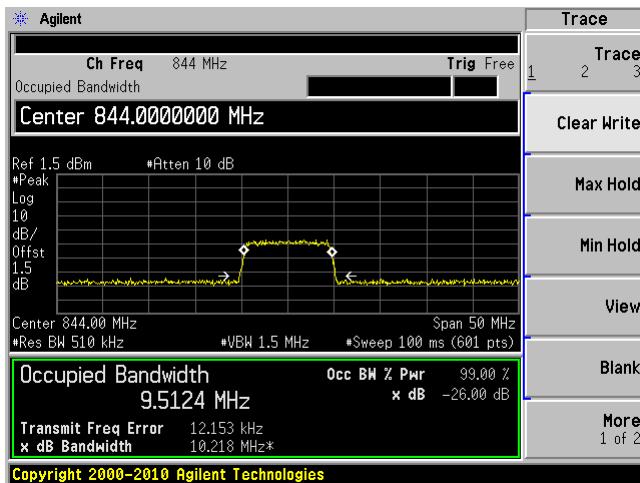


Middle Input

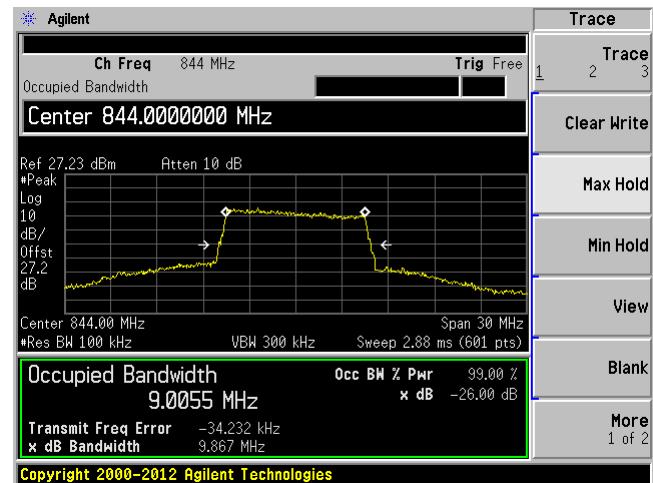
Middle Output



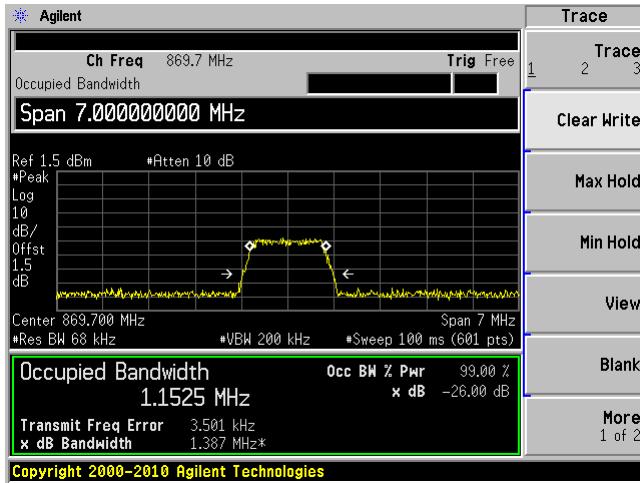
High Input



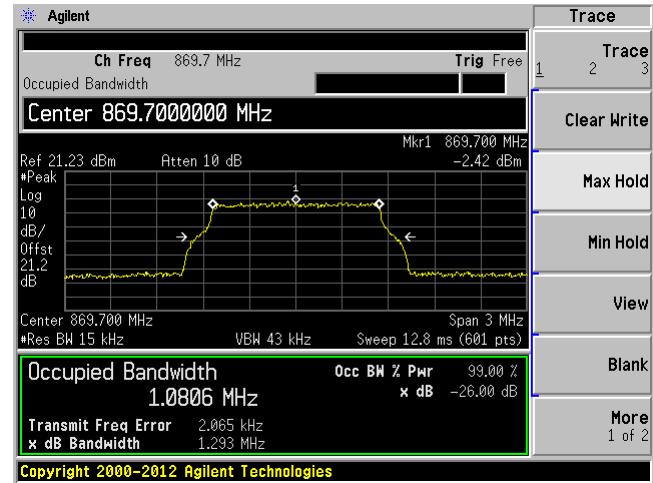
High Output

**LTE 1.4MHz 64QAM Downlink**

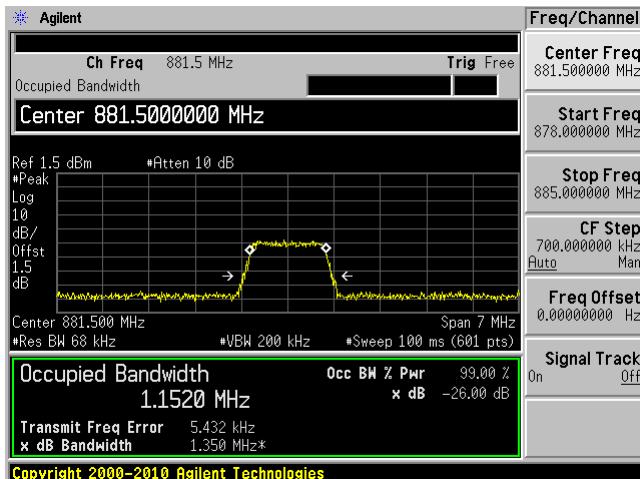
Low Input



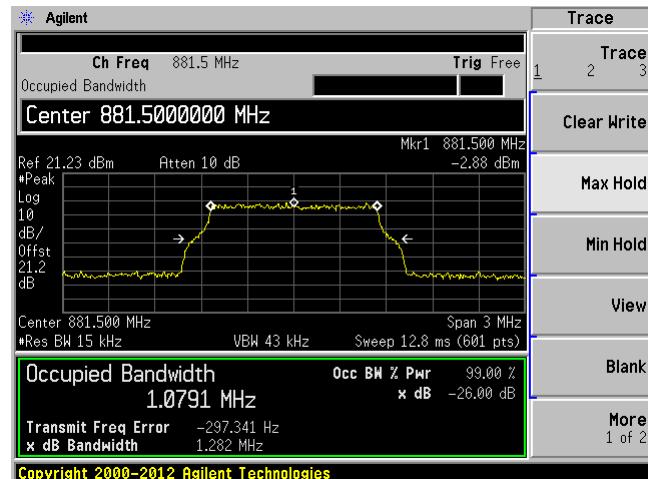
Low Output



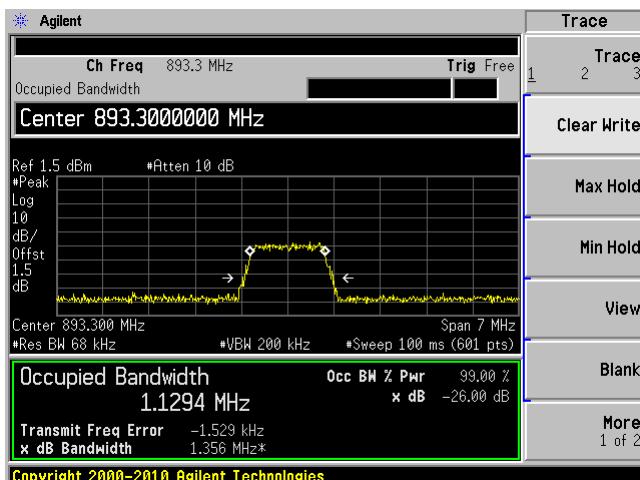
Middle Input



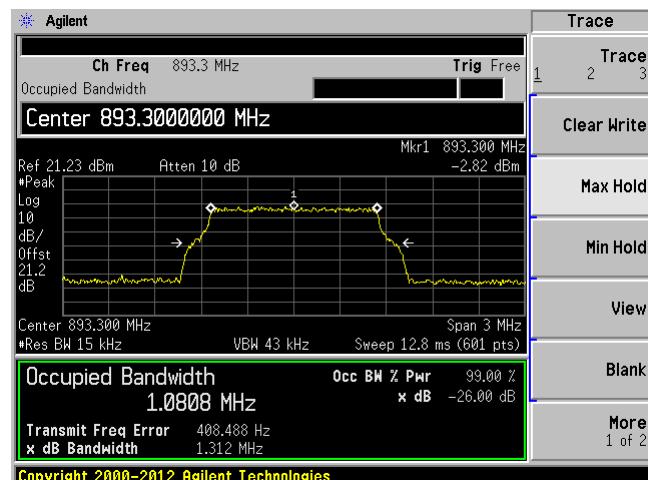
Middle Output



High Input

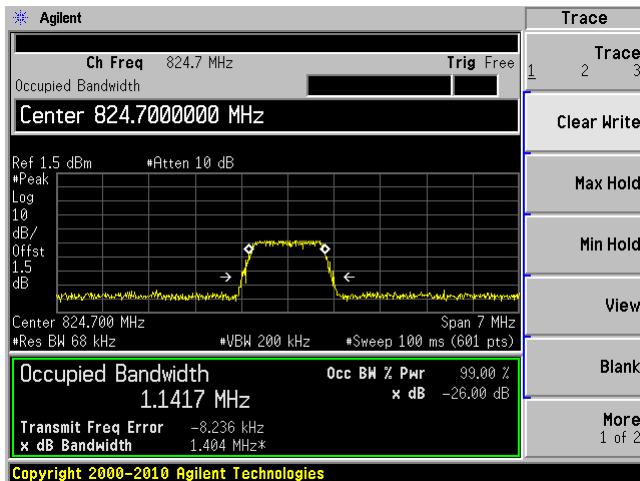


High Output

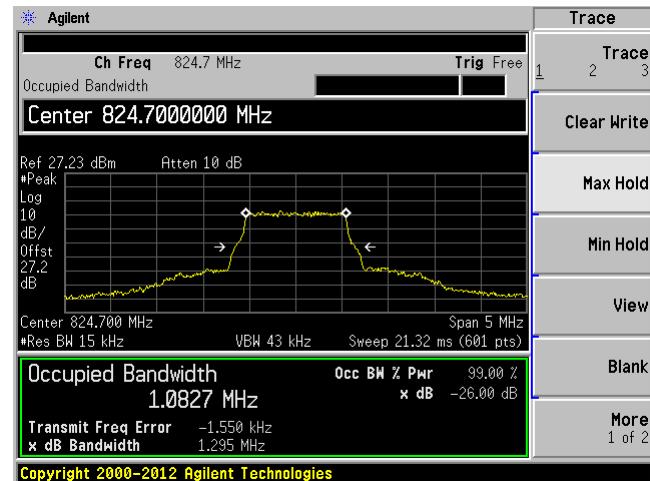


LTE 1.4MHz 64QAM Uplink

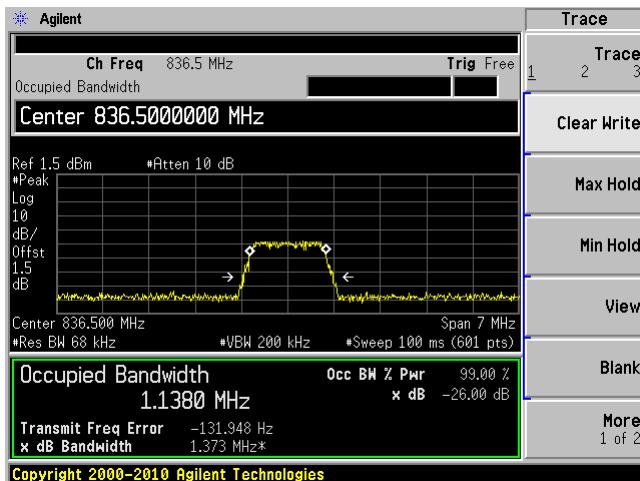
Low Input



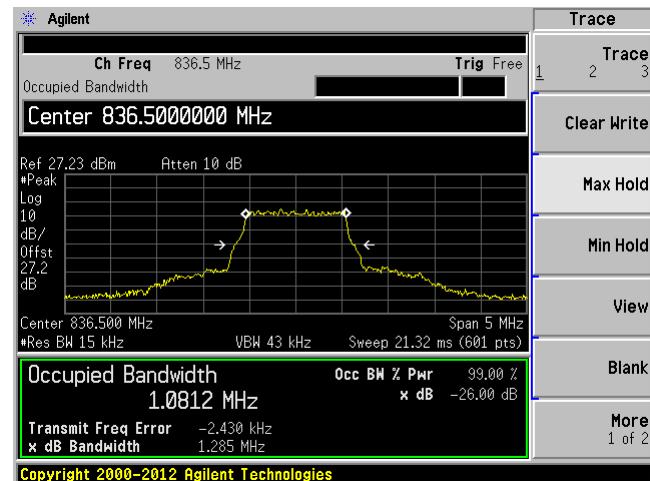
Low Output



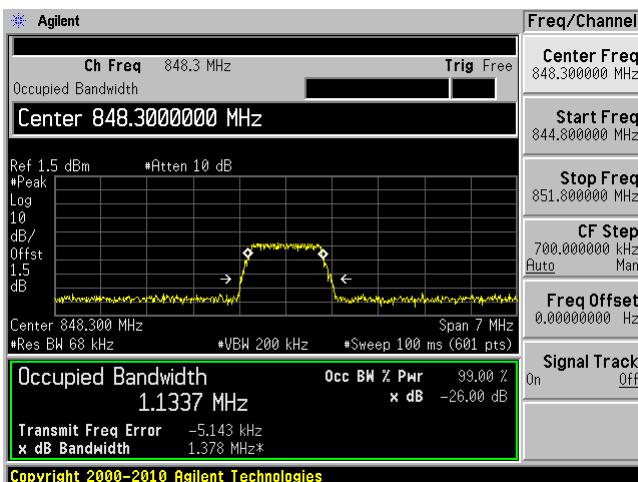
Middle Input



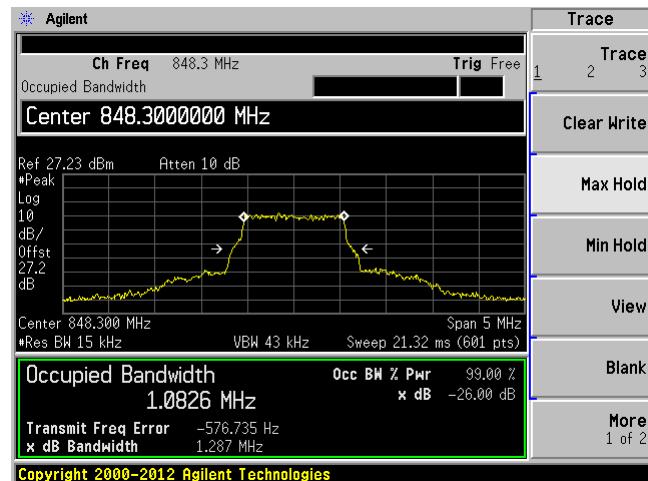
Middle Output



High Input

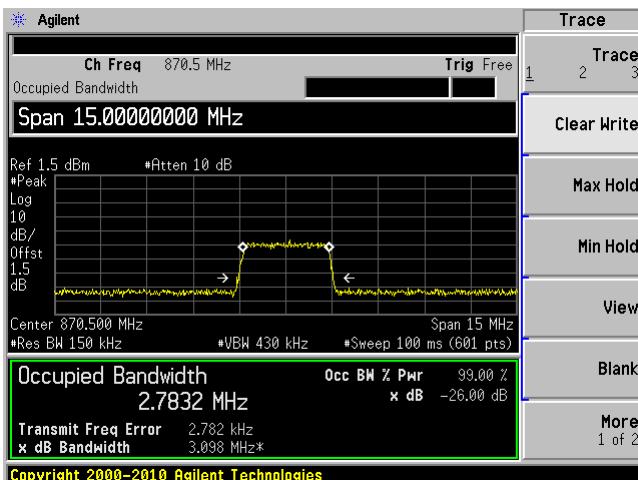


High Output

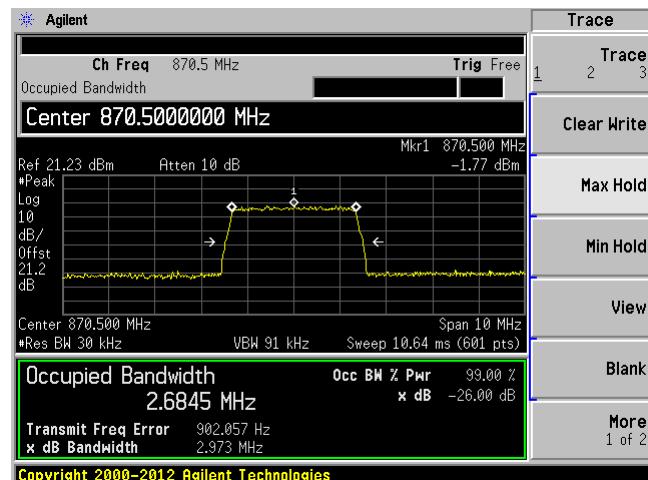


LTE 3MHz 64QAM Downlink

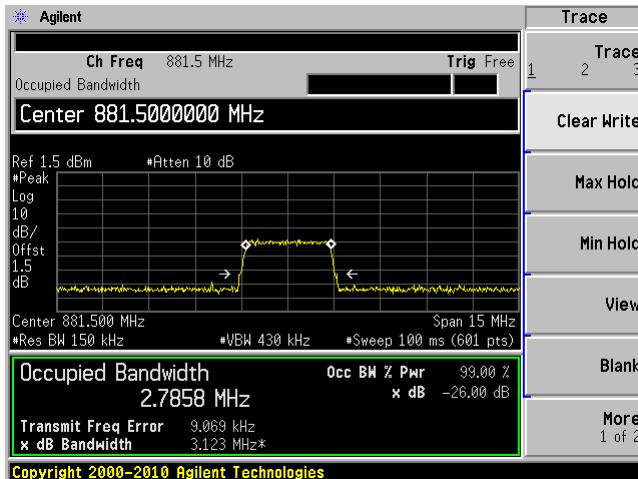
Low Input



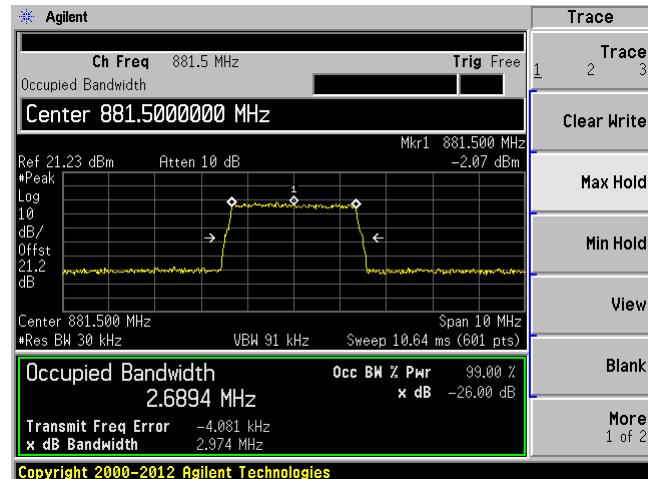
Low Output



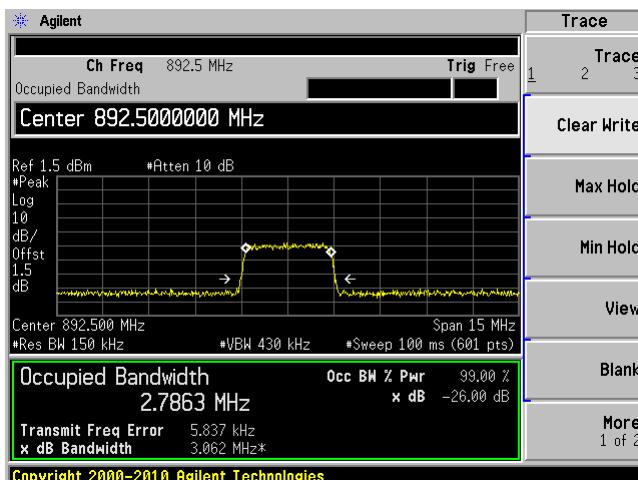
Middle Input



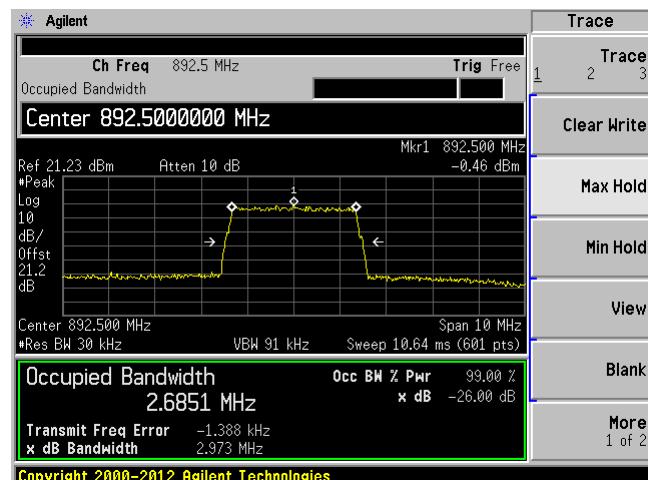
Middle Output



High Input

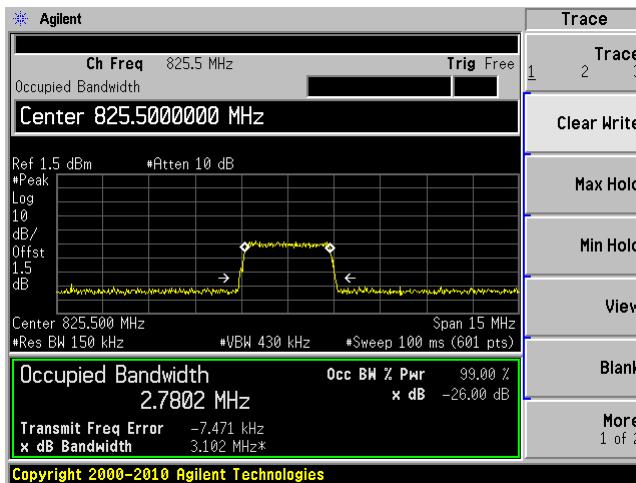


High Output

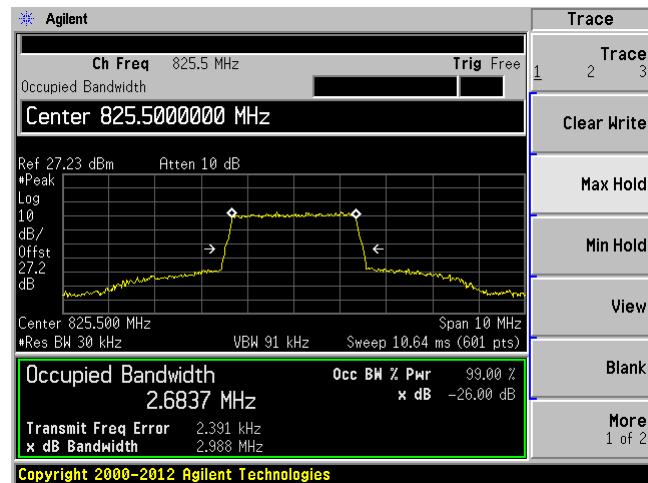


LTE 3MHz 64QAM Uplink

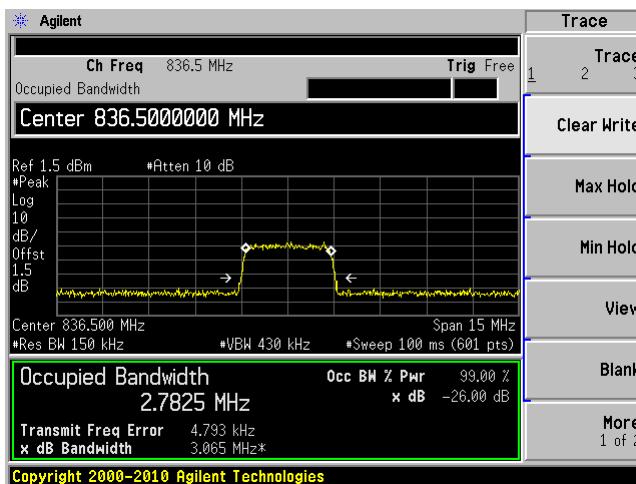
Low Input



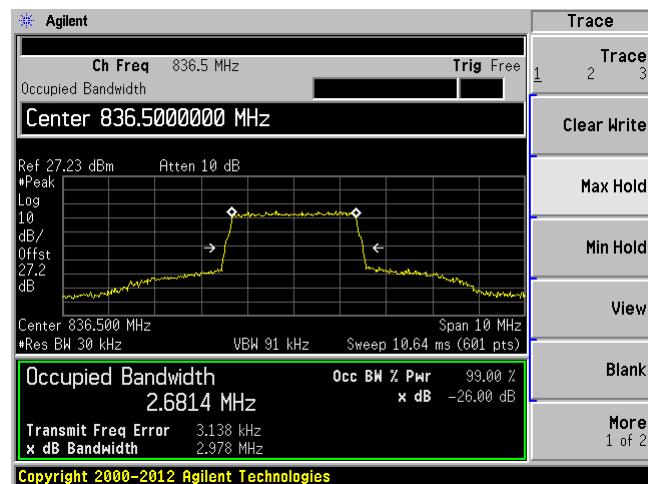
Low Output



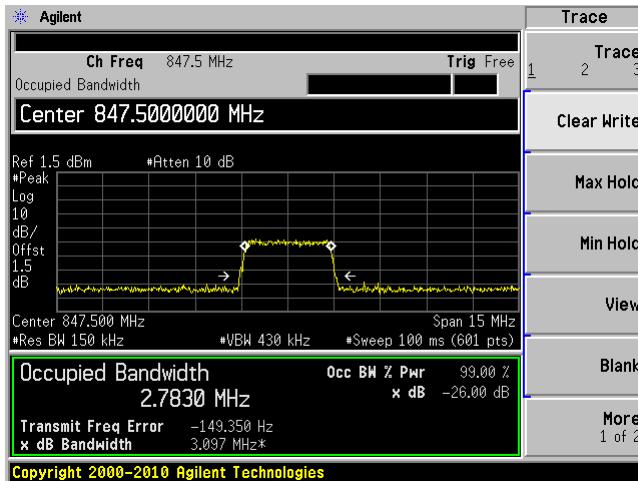
Middle Input



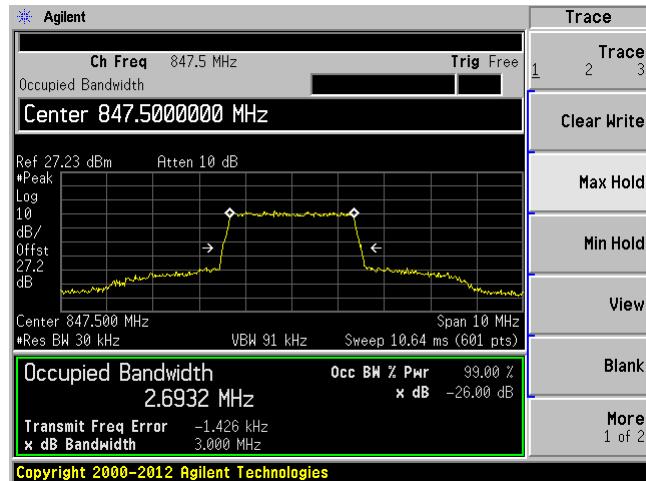
Middle Output



High Input

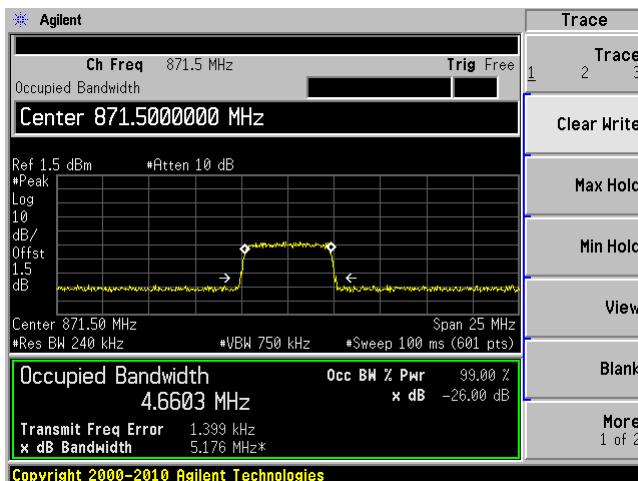


High Output

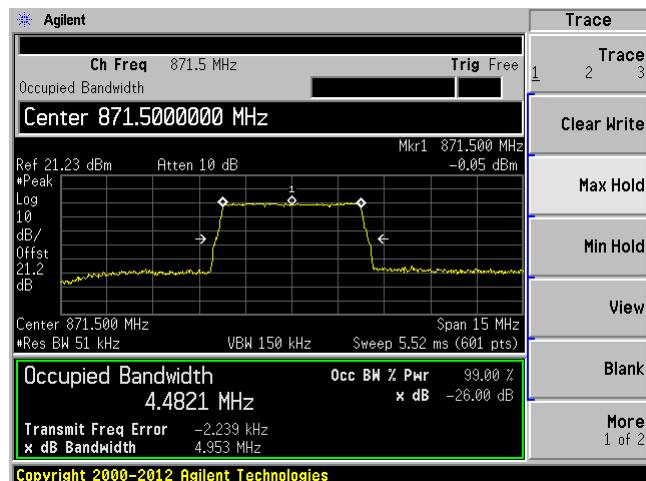


LTE 5MHz 64QAM Downlink

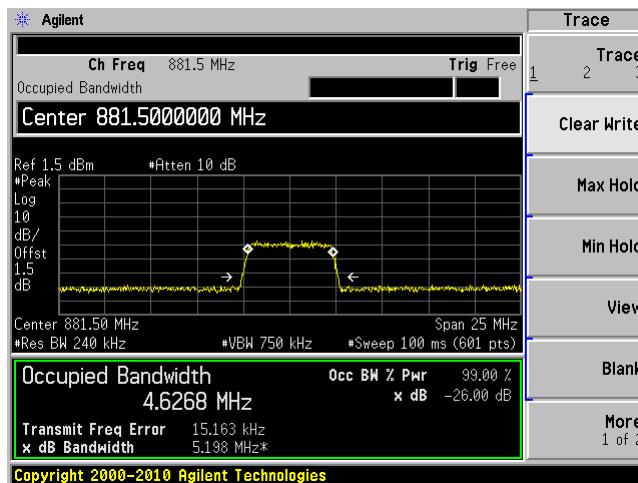
Low Input



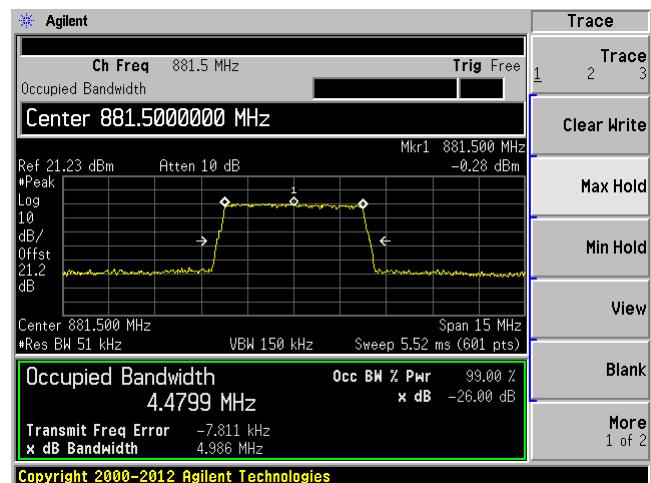
Low Output



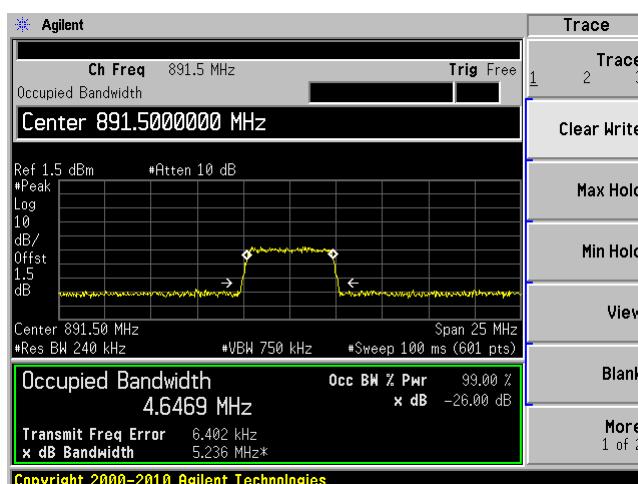
Middle Input



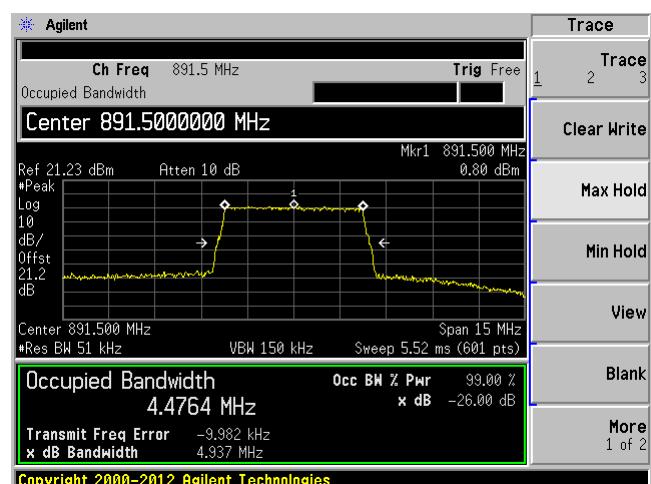
Middle Output



High Input

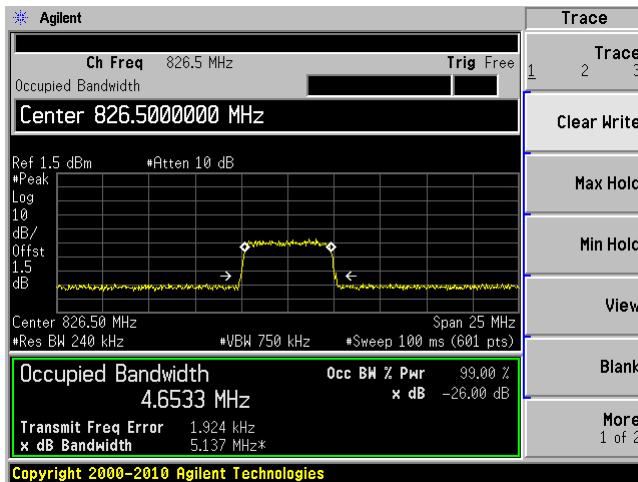


High Output

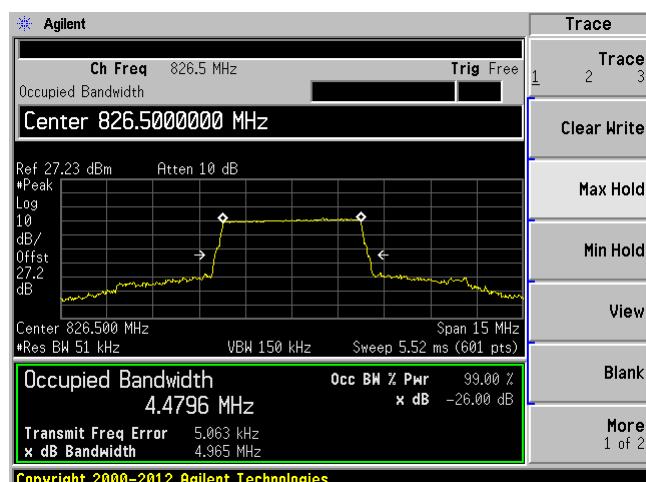


LTE 5MHz 64QAM Uplink

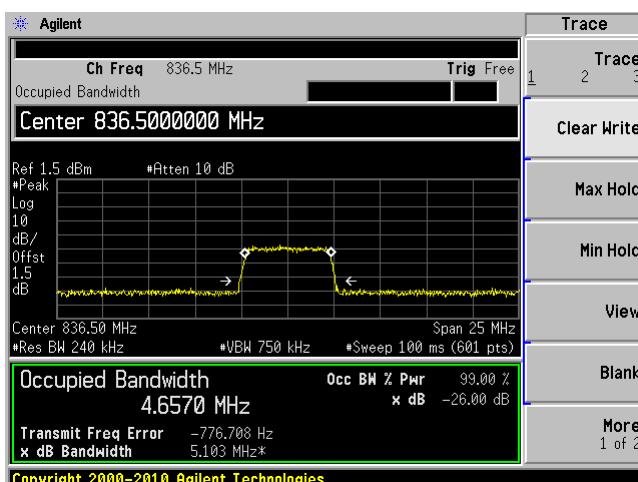
Low Input



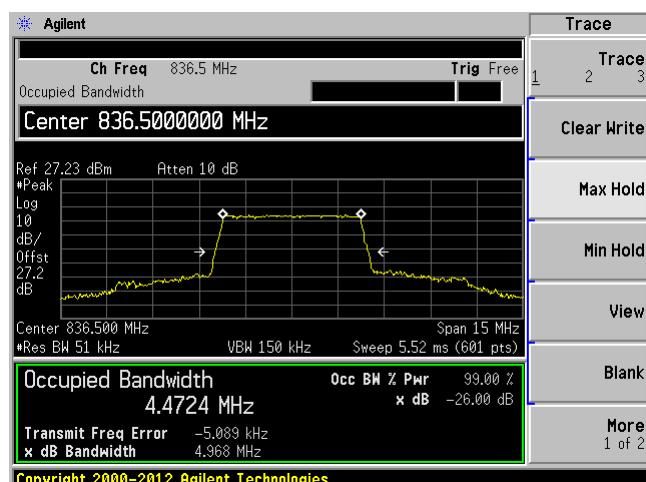
Low Output



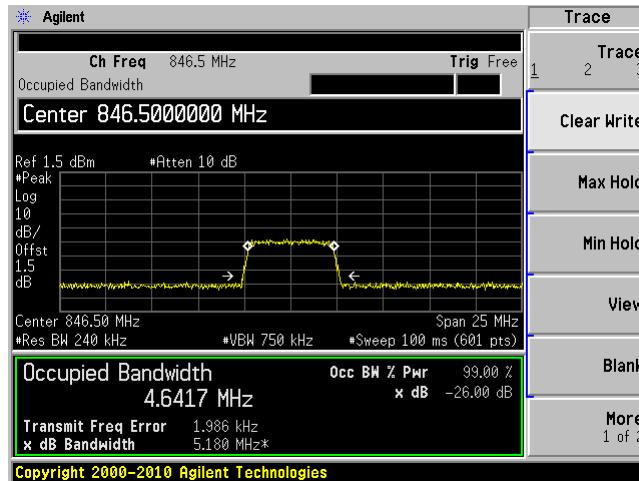
Middle Input



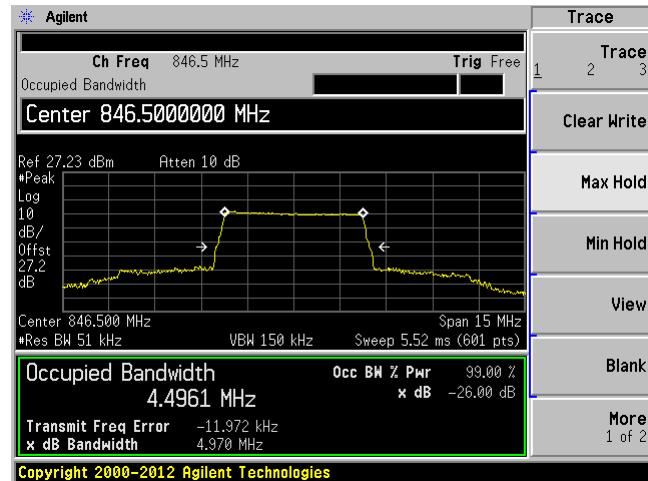
Middle Output



High Input

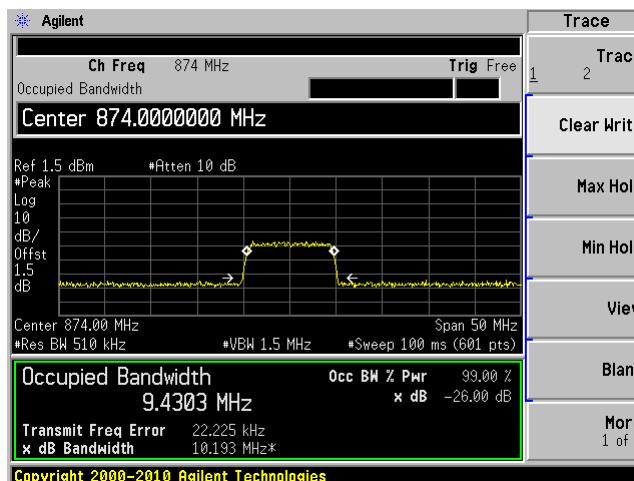


High Output

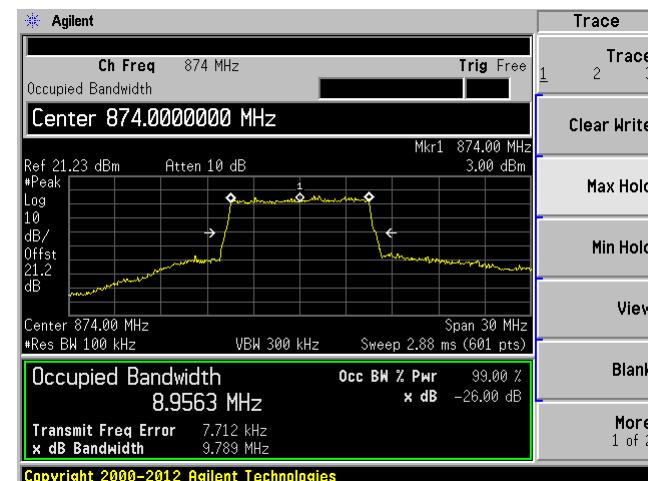


LTE 10MHz 64QAM Downlink

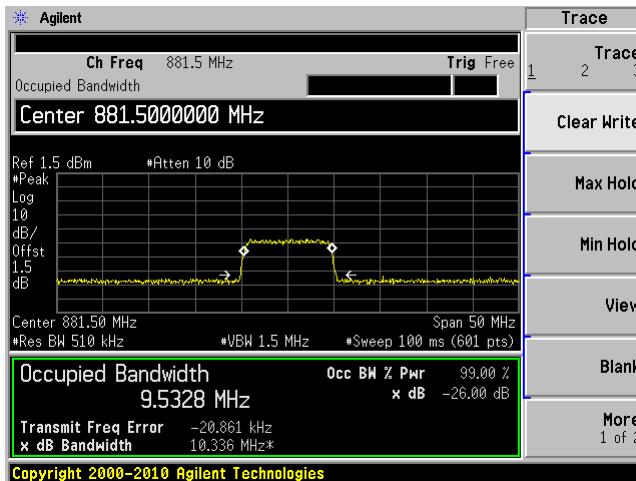
Low Input



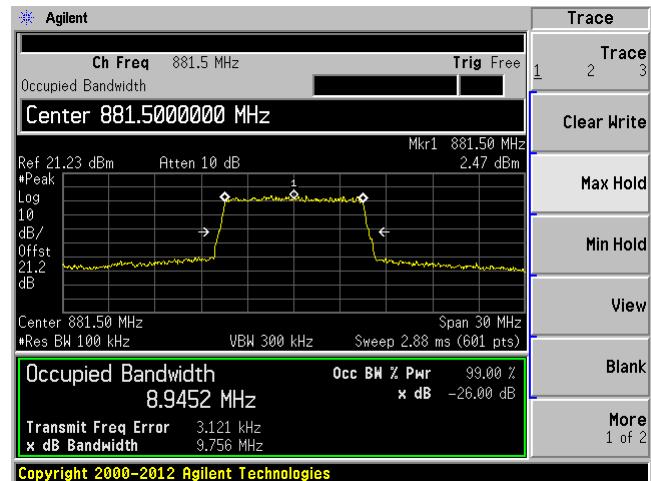
Low Output



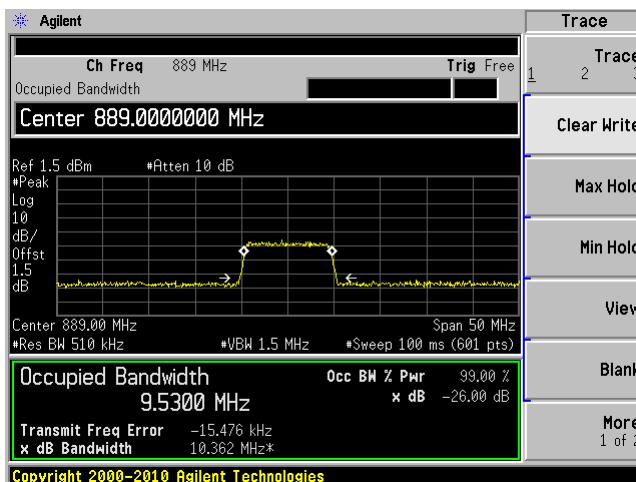
Middle Input



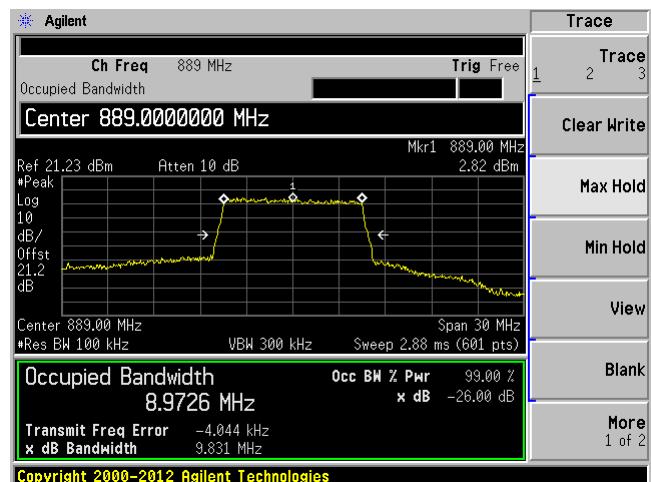
Middle Output



High Input

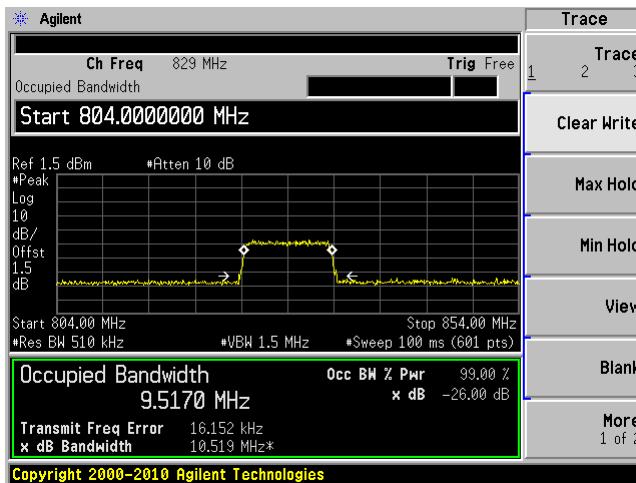


High Output

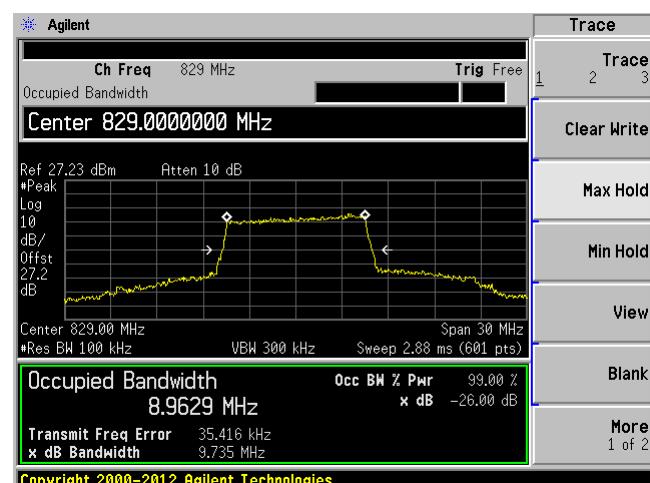


LTE 10MHz 64QAM Uplink

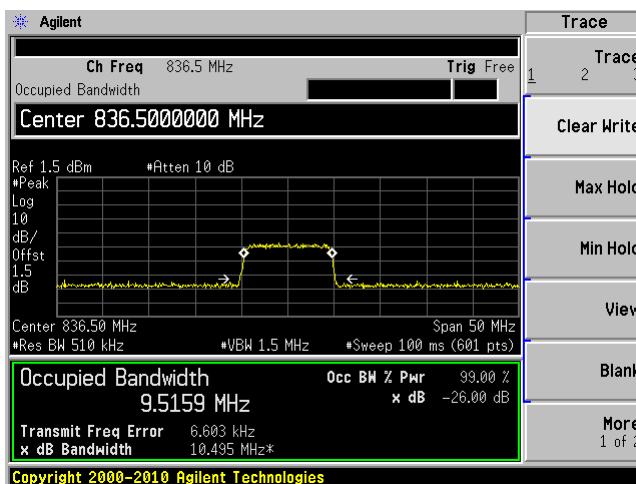
Low Input



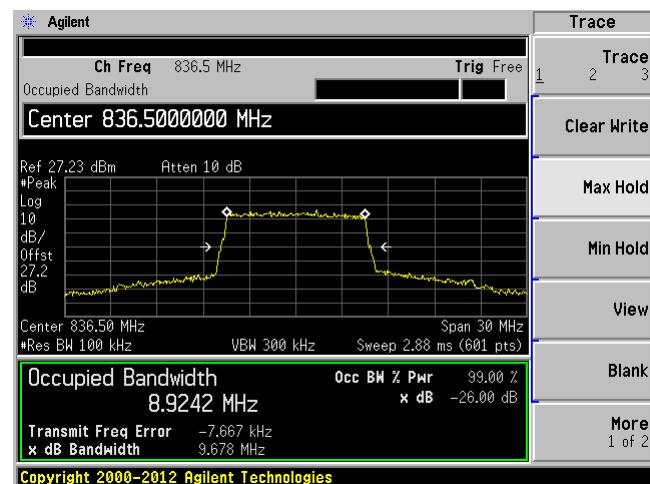
Low Output



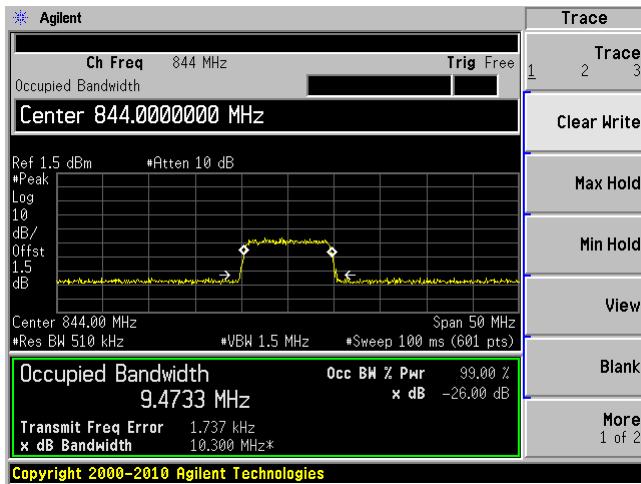
Middle Input



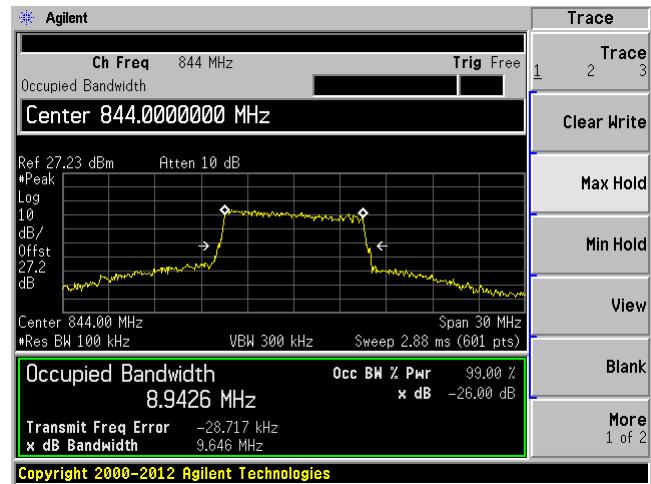
Middle Output



High Input



High Output



6 FCC §2.1053 & §22.917- Spurious Radiated Emissions

6.1 Applicable Standards

According to FCC §22.917 the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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 = $10 \log (\text{TX Power in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

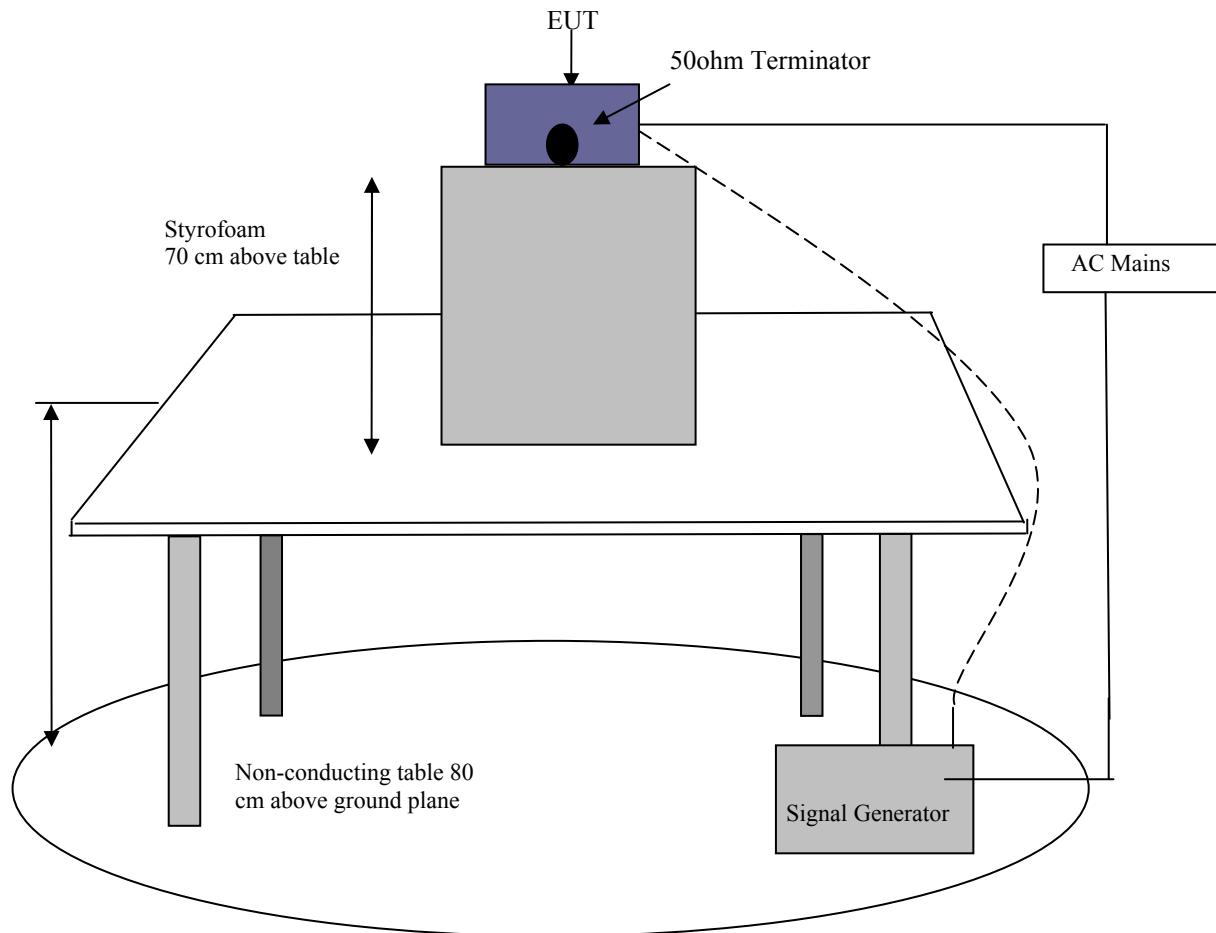
6.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/A	N/A
Sunol Sciences	Antenna, Biconi-Log	JB3	A020106-2	2014-09-17	1 year
COM-POWER	Antenna, Dipole	AD-100	721033DB1 ,2, 721033DB3, 4	2014-11-03	2 year
Hewlett Packard	Pre-amplifier 1GHz-26.5GHz	8447D	2944A06639	2015-05-08	1 year
HP/Agilent	Pre Amplifier	8449B OPT HO2	3008A0113	2015-05-19	1 year
Agilent	Analyzer, Spectrum	E4440A	MY44303352	2014-11-13	1 year
Eaton	Antenna, Horn	96001	2617	2014-11-18	1 year
EMCO	Antenna, Horn	3115	9511-4627	2015-01-15	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

6.4 Test Setup Block Diagram

Radiated Emissions Testing



6.5 Test Environmental Conditions

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

The testing was performed by Ronak Patel on 2014-04-18 in 5 Meter Chamber 3.

6.6 Test Results

Carrier Wave Signal

Downlink (Channel frequency = 869 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
2615	55.54	54	100	V	2615	-41.48	8.702	1.08	-33.858	-13	-20.858
2615	49.19	0	100	H	2615	-46.45	9.125	1.08	-38.405	-13	-25.405
1737	42.89	0	100	V	1737	-57.62	8.098	0.88	-50.402	-13	-37.402
1737	43.23	0	100	H	1737	-56.32	8.308	0.88	-48.892	-13	-35.892

Downlink (Channel frequency = 881.5 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
2643	55.7	40	100	V	2643	-41.32	8.702	1.08	-33.698	-13	-20.698
2643	48.62	78	100	H	2643	-47.02	9.125	1.08	-38.975	-13	-25.975
1227	45.37	0	100	V	1227	-58.33	7.008	0.7	-52.022	-13	-39.022
3522	40.48	0	100	H	3522	-54.78	9.673	1.03	-46.137	-13	-33.137

Downlink (Channel frequency = 894 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
2672	57.03	58	100	V	2672	-39.99	9.411	1.08	-31.659	-13	-18.659
2672	49.86	89	100	H	2672	-45.78	9.75	1.08	-37.11	-13	-24.11
3578	42.46	0	100	V	3578	-51.94	9.35	1.03	-43.62	-13	-30.62
1963	40.43	0	100	H	1963	-59.79	8.983	0.92	-51.727	-13	-38.727

Uplink (Channel frequency = 829 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1658	58.07	140	160	V	1658	-43.56	8.795	0.62	-35.385	-13	-22.385
1658	56.55	5	100	H	1658	-47.6	8.98	0.62	-39.24	-13	-26.24
2486	53.85	133	151	V	2486	-42.82	9.395	0.8	-34.225	-13	-21.225
2487	53.73	132	163	H	2487	-43.96	9.373	0.8	-35.387	-13	-22.387

Uplink (Channel frequency = 836.5 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1672	56.19	139	160	V	1672	-45.44	9.086	0.62	-36.974	-13	-23.974
1672	54.93	7	100	H	1672	-49.22	8.98	0.62	-40.86	-13	-27.86
2509	52.55	132	154	V	2509	-44.12	9.395	0.8	-35.525	-13	-22.525
2509	52.54	51	100	H	2509	-45.15	9.373	0.8	-36.577	-13	-23.577

Uplink (Channel frequency = 844 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)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1688	56.29	138	162	V	1688	-45.34	9.086	0.62	-36.874	-13	-23.874
1687	54.81	7	100	H	1687	-49.34	8.98	0.62	-40.98	-13	-27.98
2532	53.06	67	197	V	2532	-43.61	9.395	0.8	-35.015	-13	-22.015
2532	53.06	52	100	H	2532	-44.63	9.373	0.8	-36.057	-13	-23.057

7 FCC §2.1051 & §22.917- Spurious Emissions at Antenna Terminals

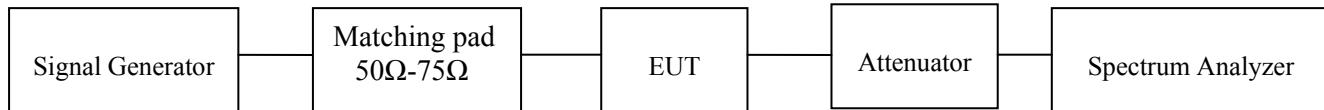
7.1 Applicable Standards

According to FCC §22.917 the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

7.2 Test Procedure

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω - 75Ω matching pad

The resolution bandwidth of the spectrum analyzer was set 100 KHz for frequency band of 800. 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	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

7.4 Test Environmental Conditions

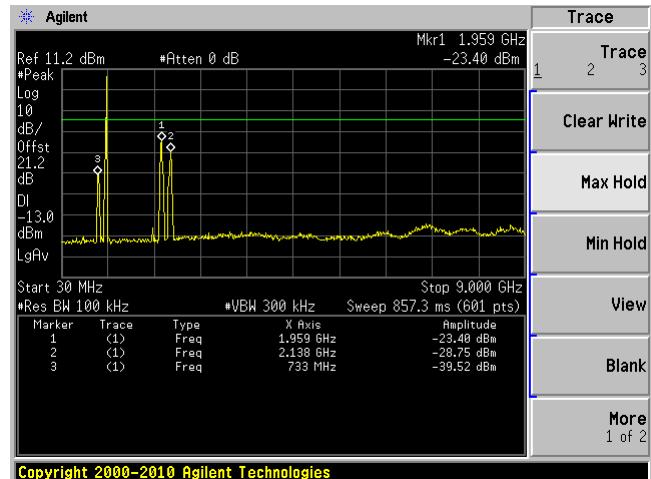
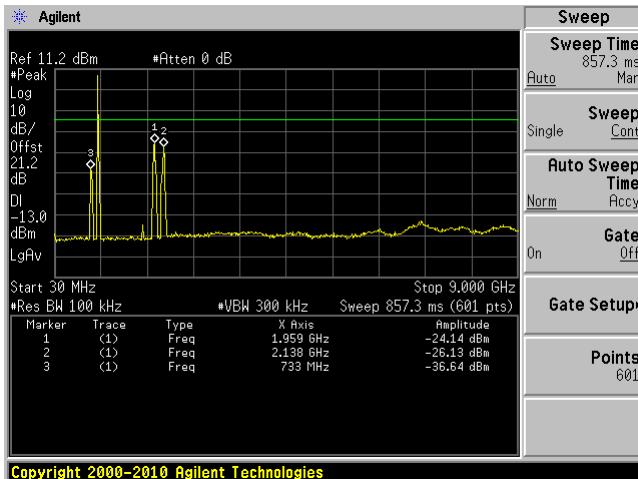
Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

The testing was performed by Ronak Patel 2015-06-08 to 2015-06-29 in the RF Site.

GSM

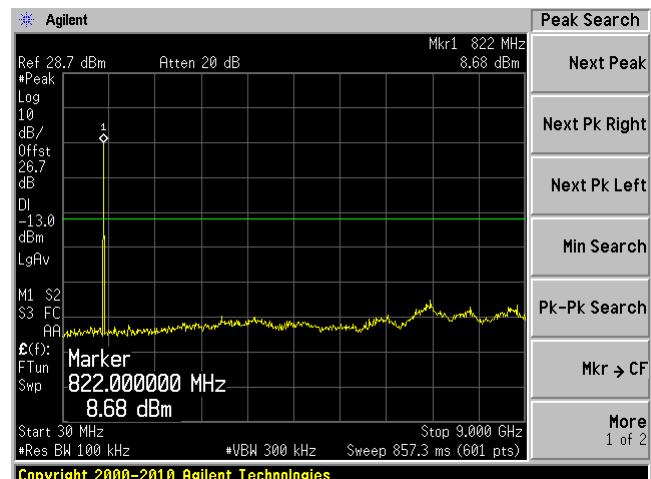
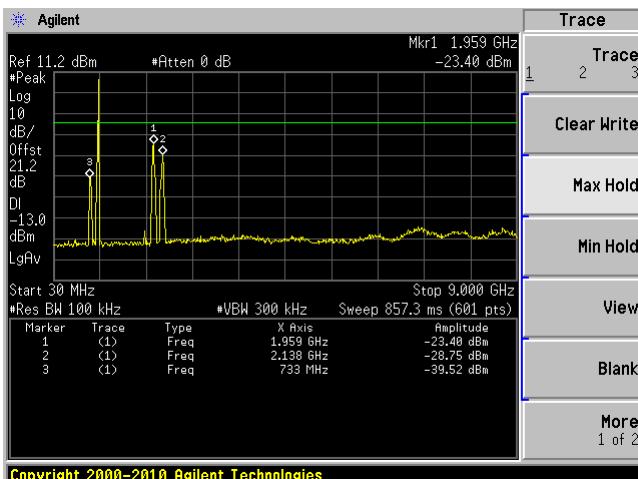
DL Low 30MHz-9GHz

DL Middle 30MHz-9GHz

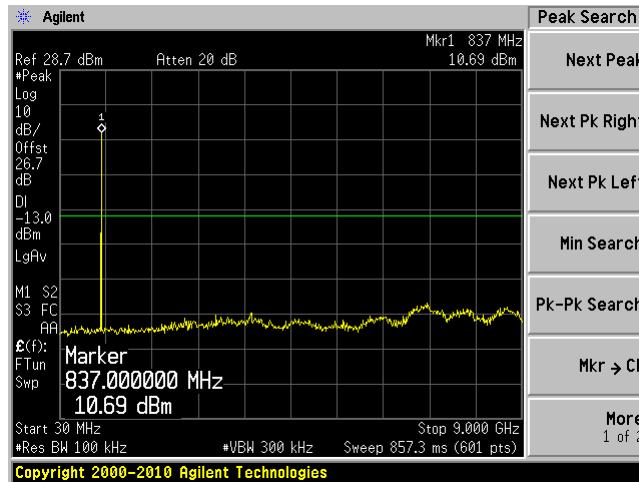


DL High 30MHz-9GHz

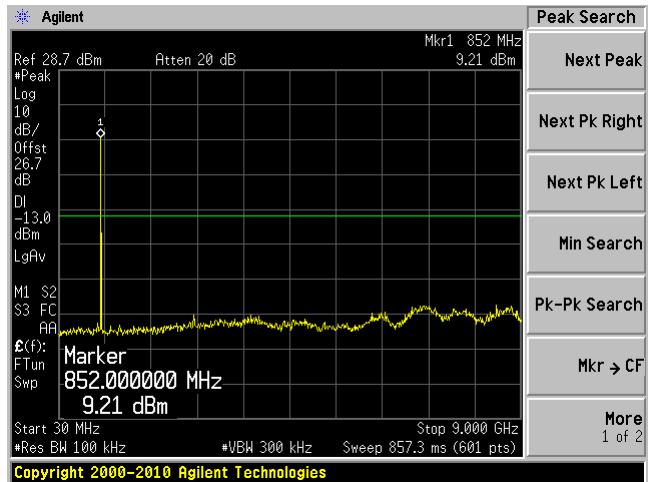
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

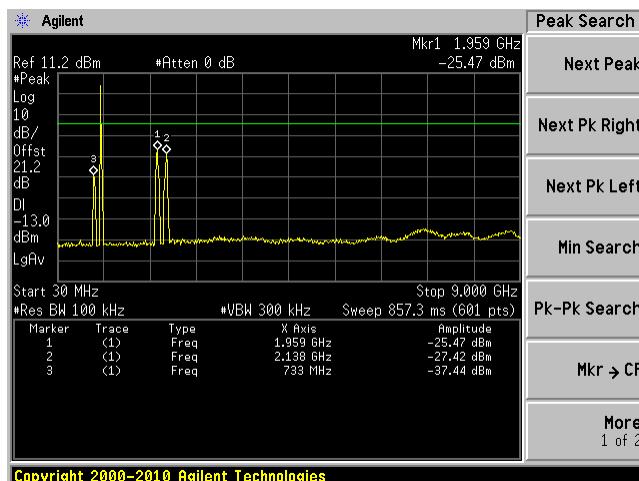


UL High 30MHz-9GHz

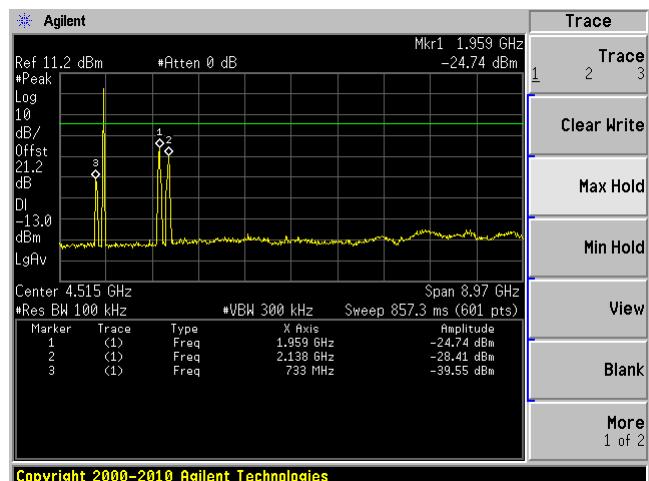


CDMA

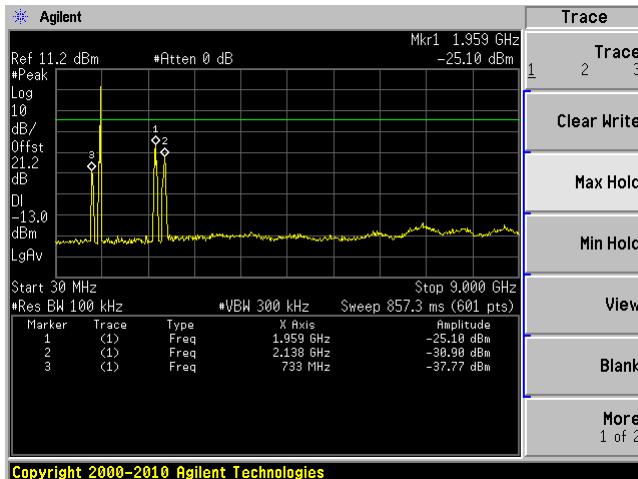
DL Low 30MHz-9GHz



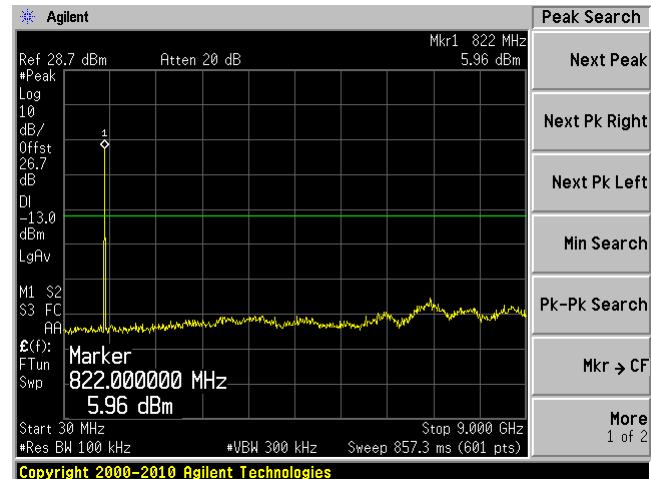
DL Middle 30MHz-9GHz



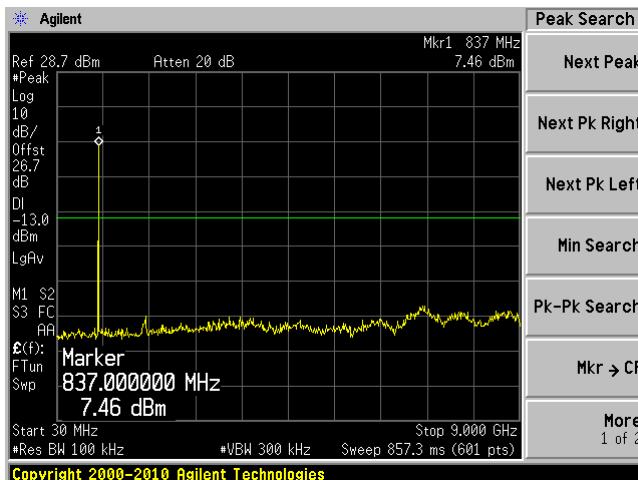
DL High 30MHz-9GHz



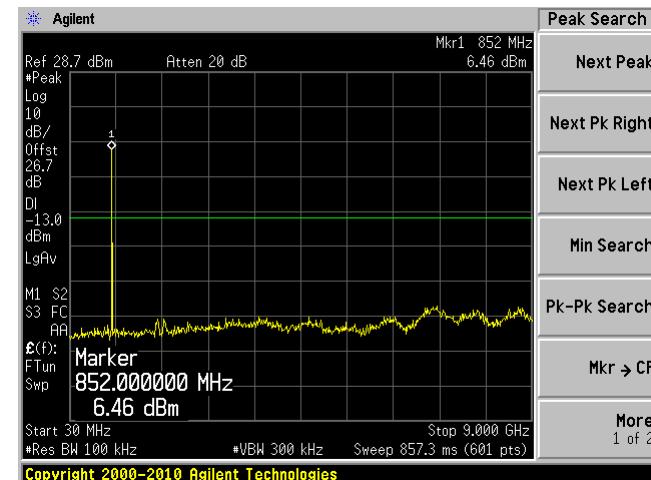
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

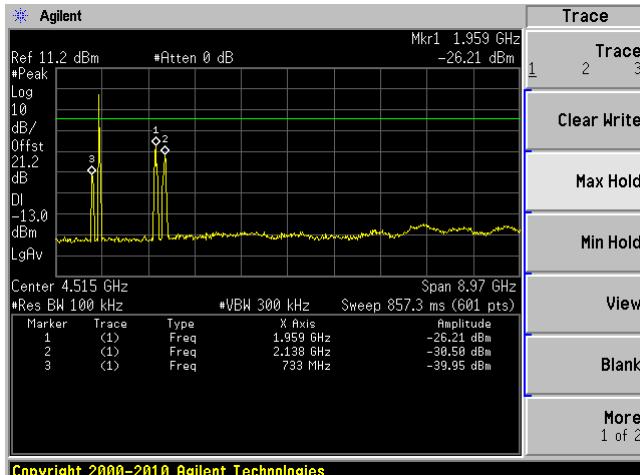


UL High 30MHz-9GHz

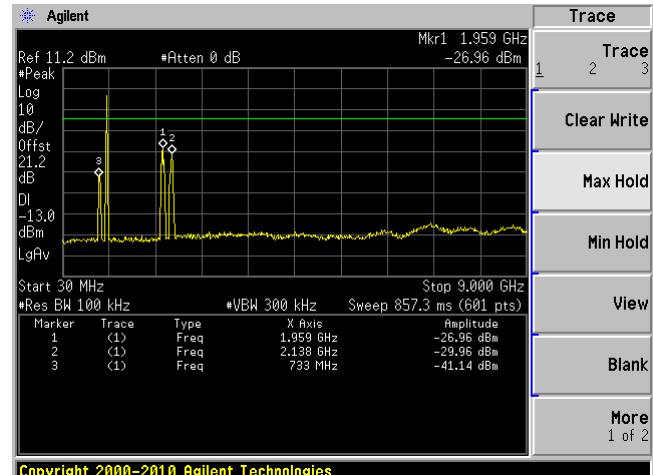


WCDMA

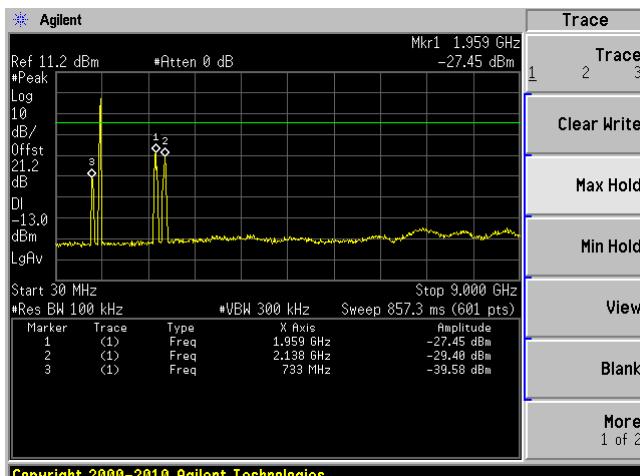
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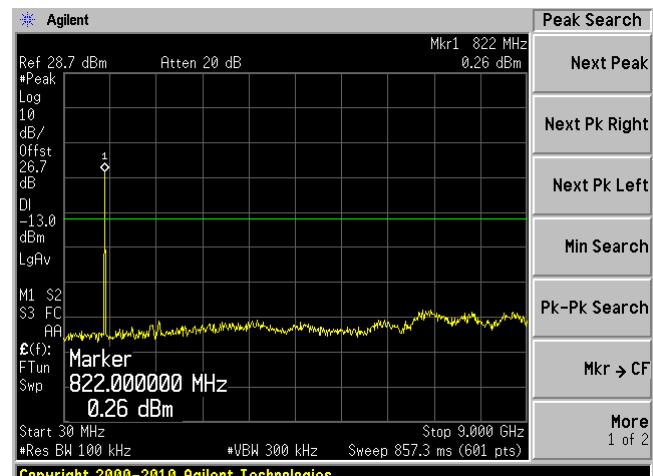
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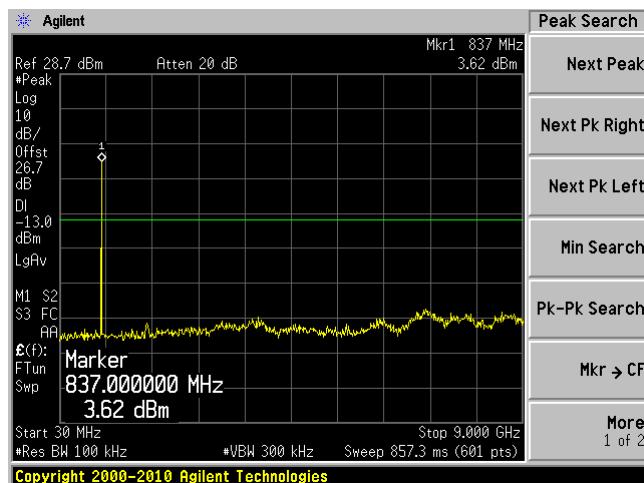
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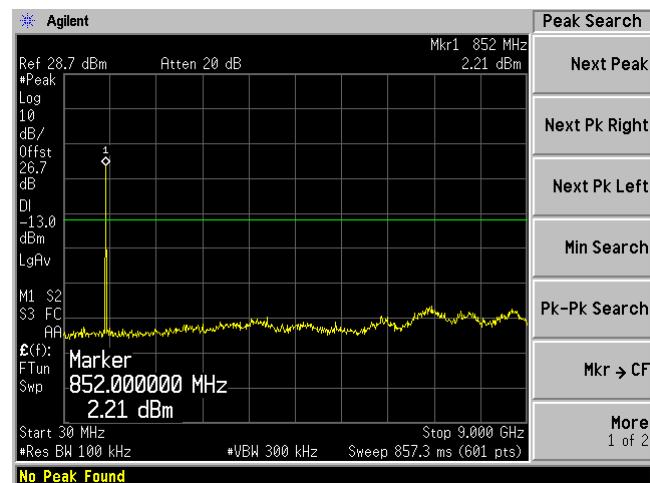
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

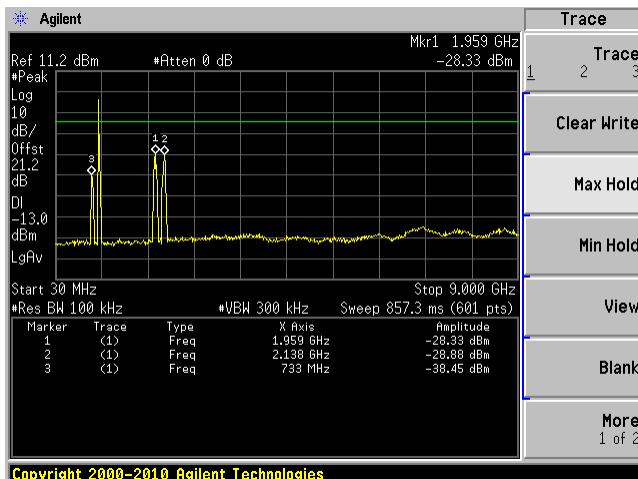


UL High 30MHz-9GHz

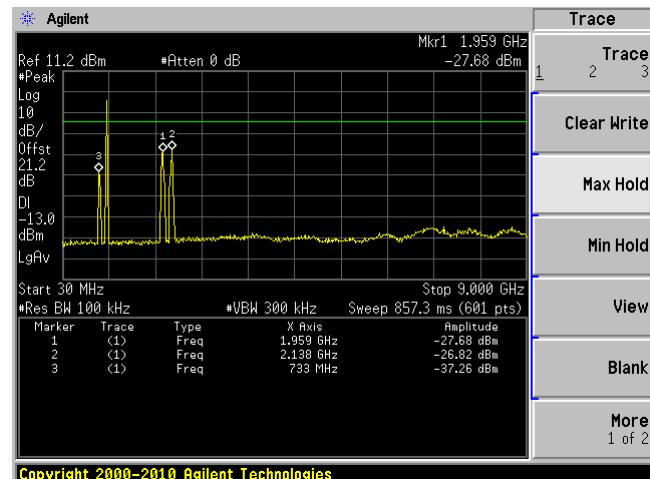


LTE 1.4MHz QPSK

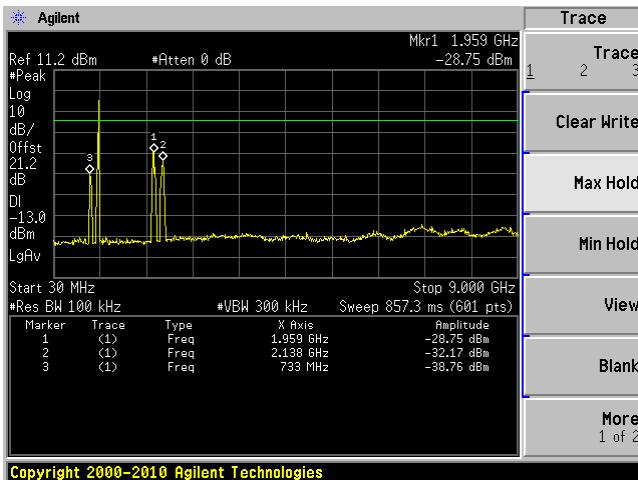
DL Low 30MHz-9GHz



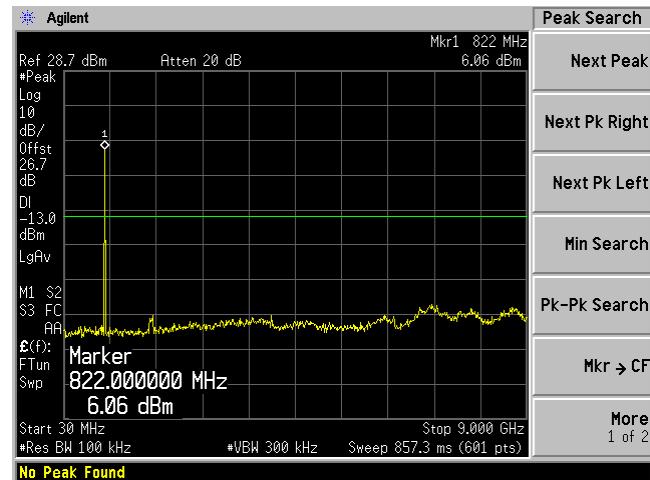
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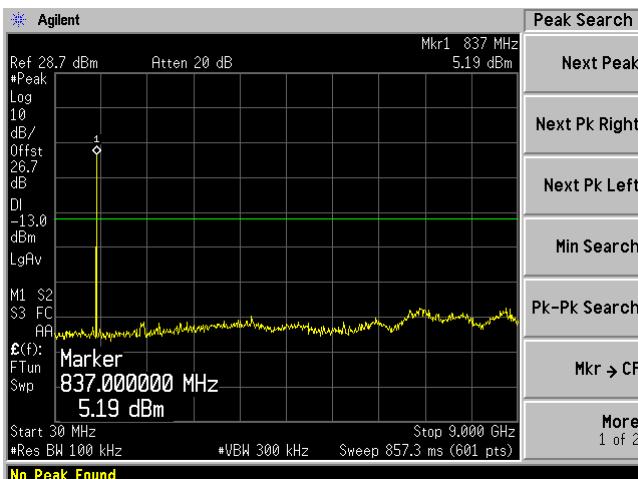
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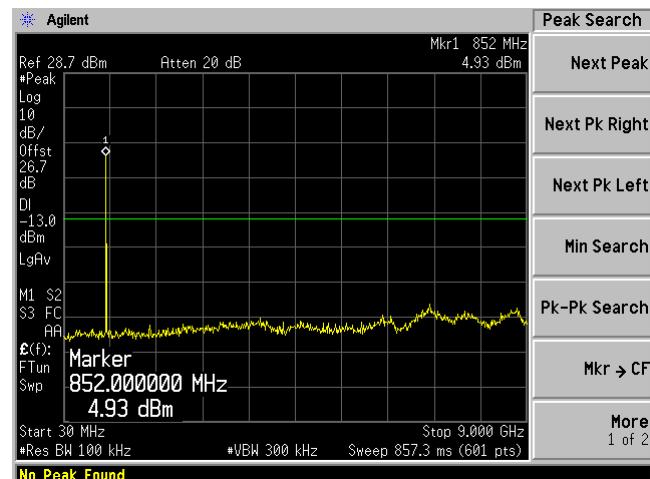
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

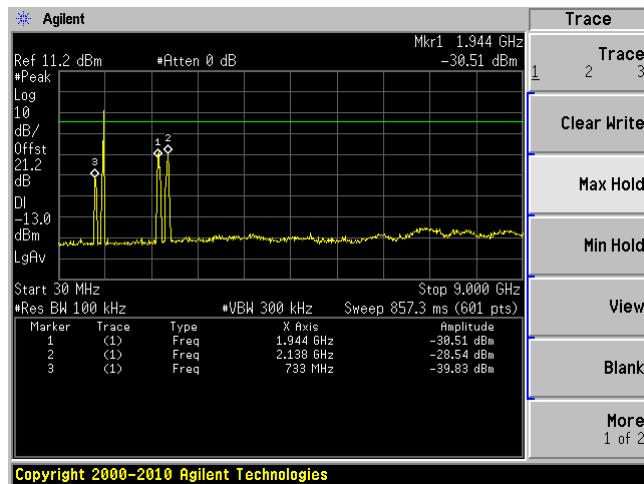


UL High 30MHz-9GHz

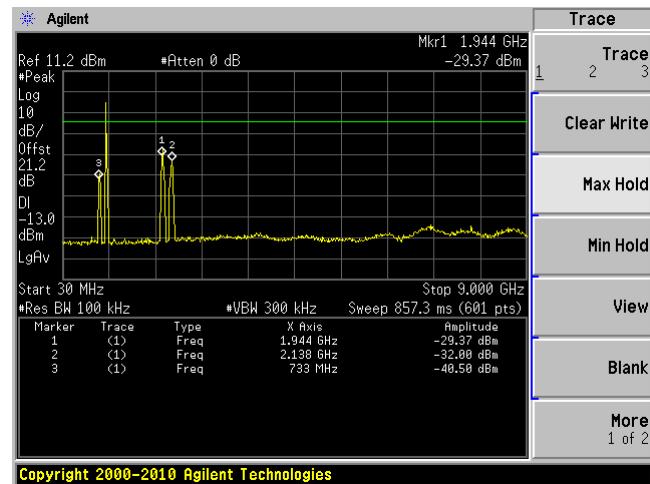


LTE 3MHz QPSK

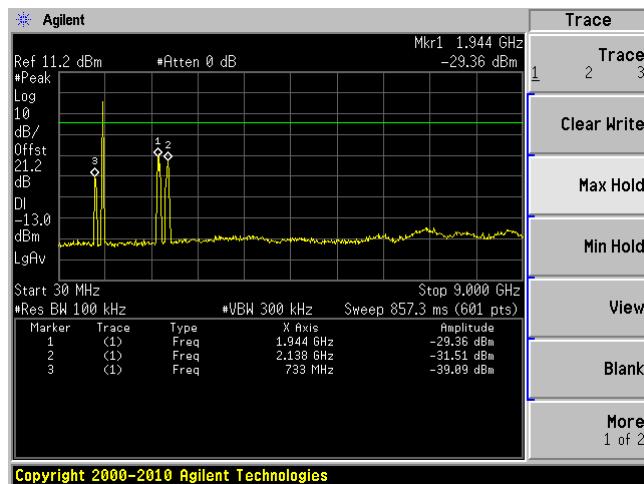
DL Low 30MHz-9GHz



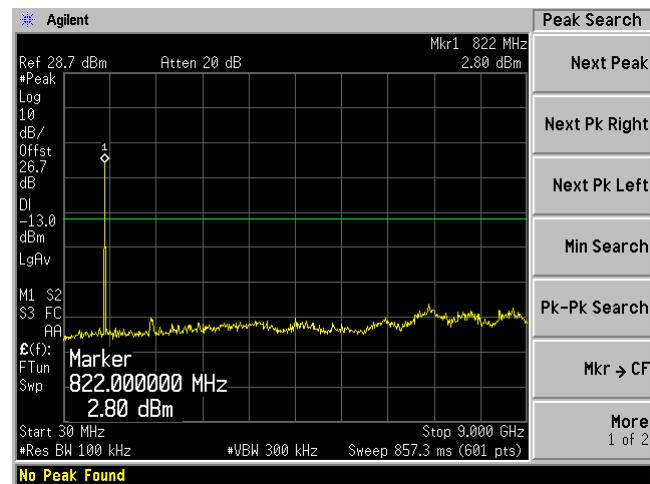
DL Middle 30MHz-9GHz



DL High 30MHz-9GHz

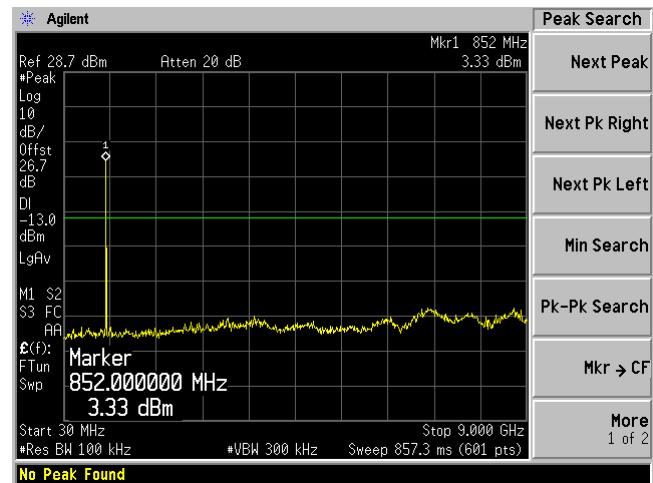
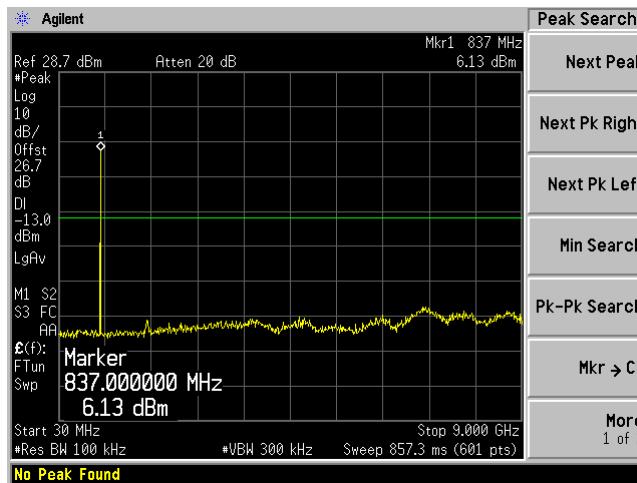


UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

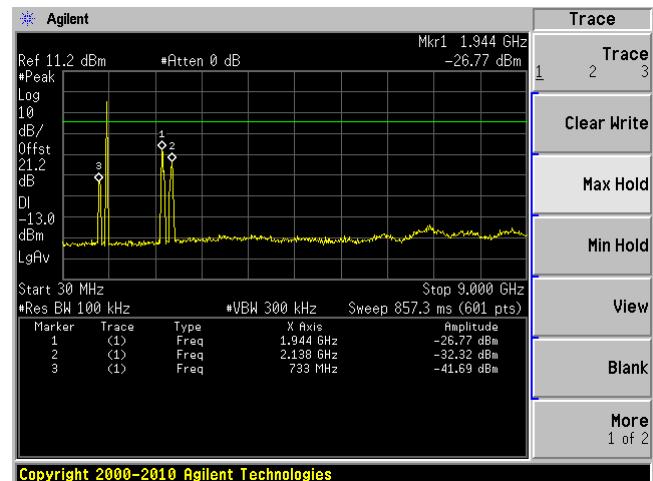
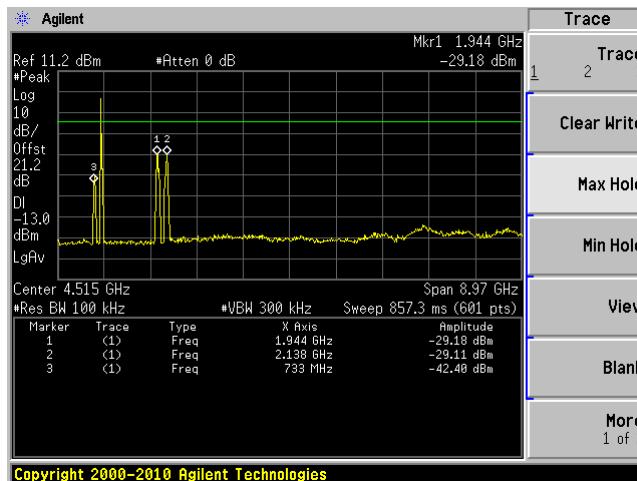
UL High 30MHz-9GHz



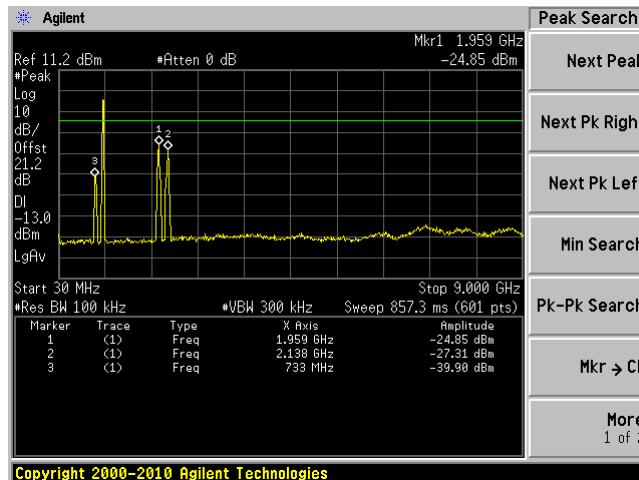
LTE 5MHz QPSK

DL Low 30MHz-9GHz

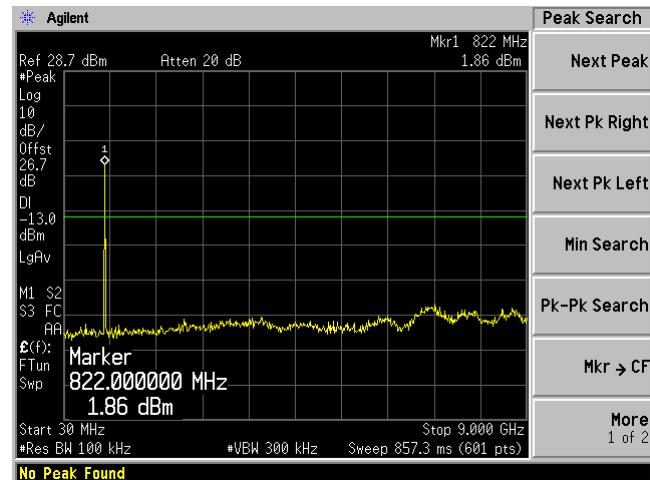
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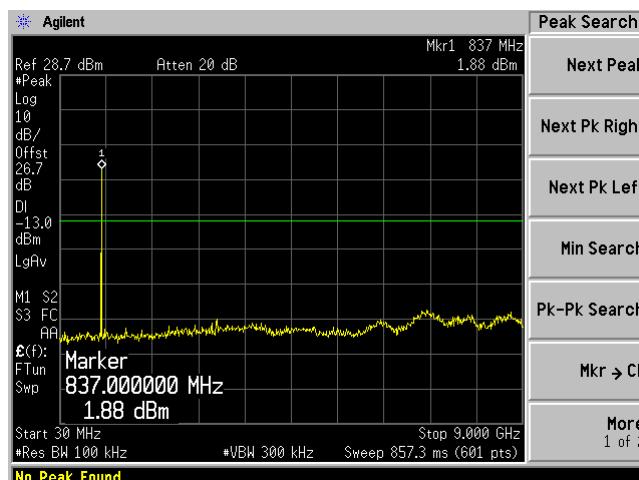
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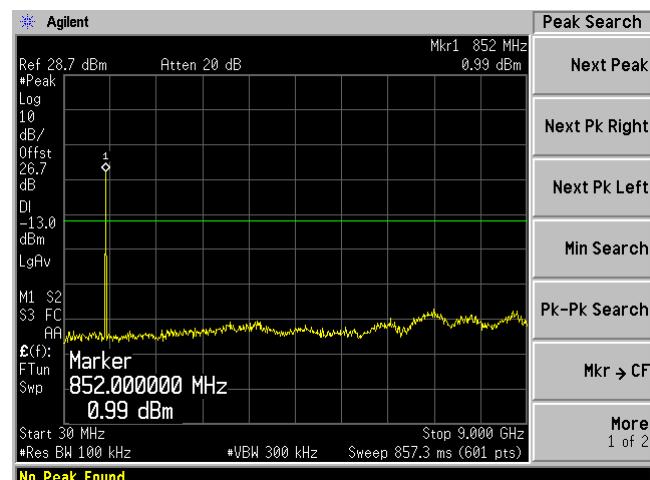
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

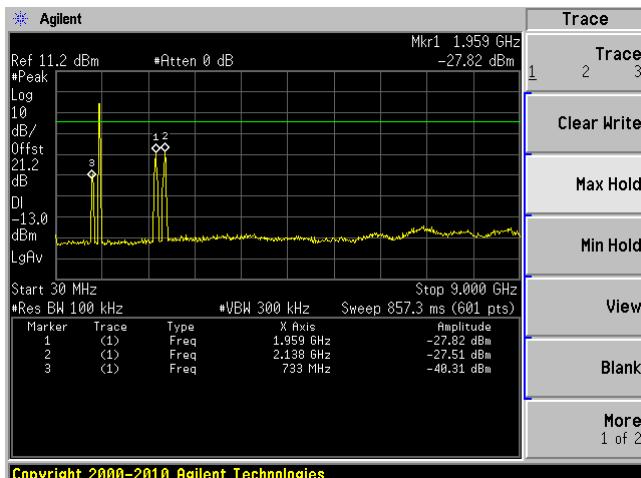


UL High 30MHz-9GHz

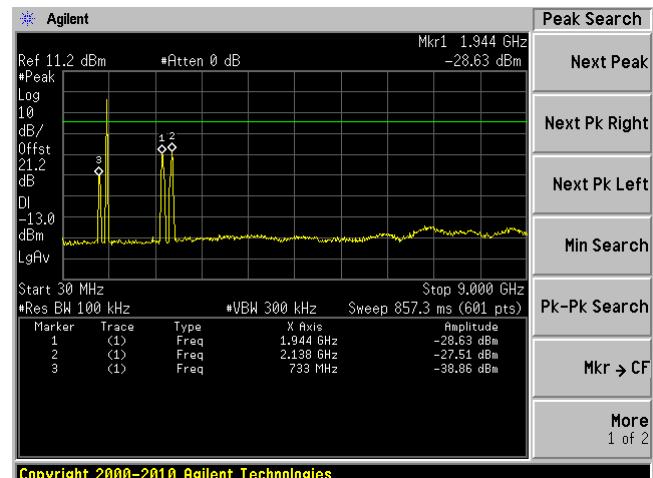


LTE 10MHz QPSK

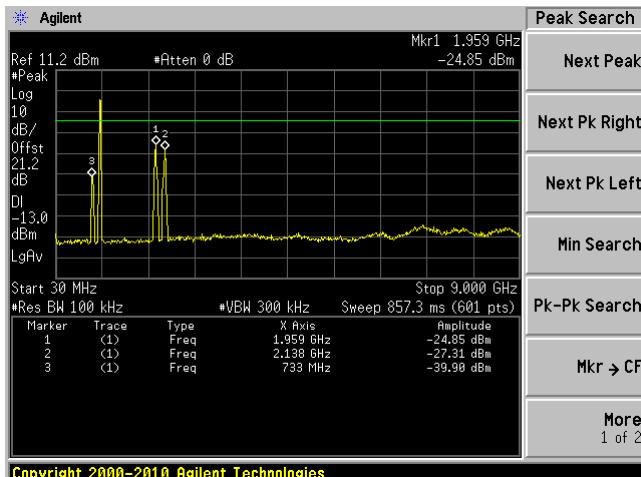
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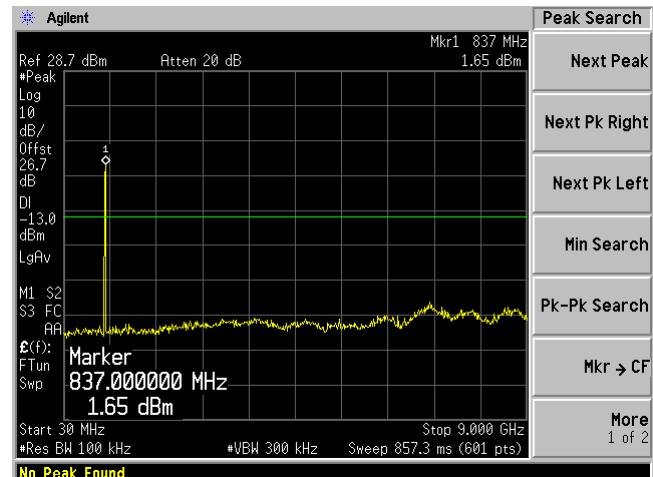
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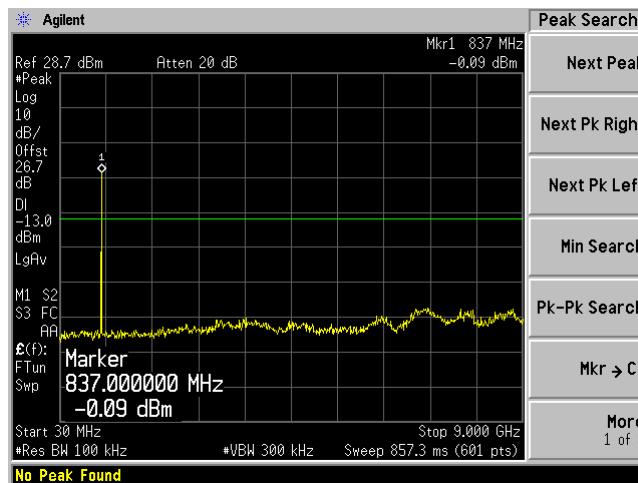
DL High 30MHz-9GHz



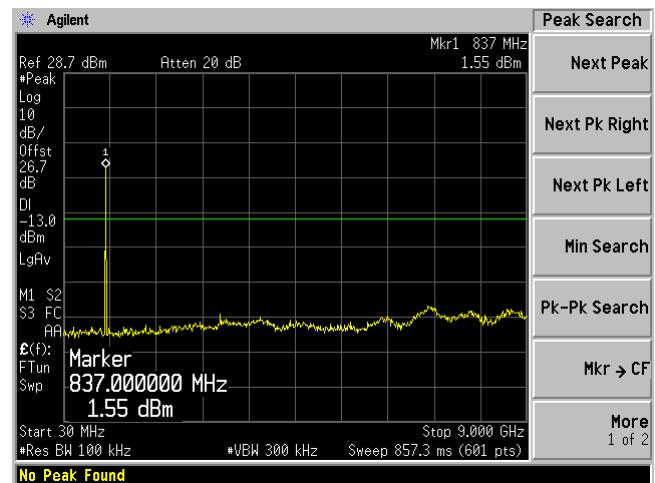
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

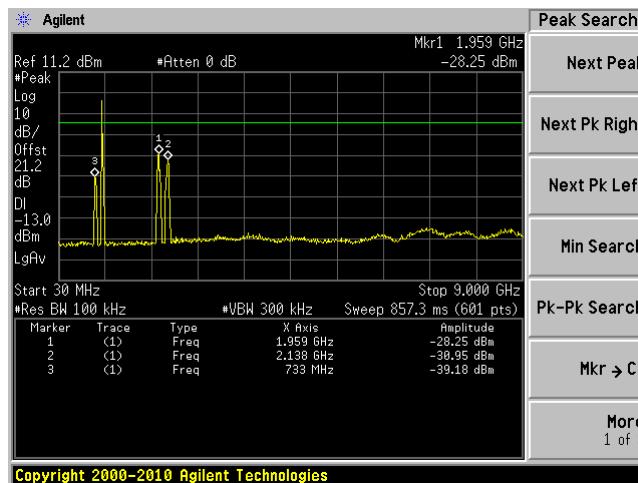


UL High 30MHz-9GHz

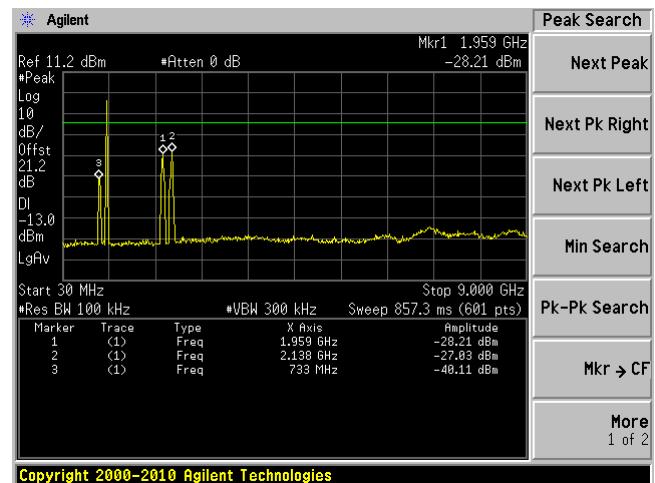


LTE 1.4MHz 16QAM

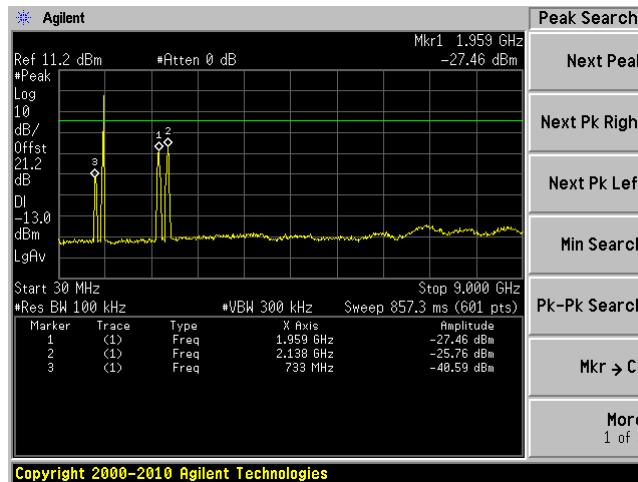
DL Low 30MHz-9GHz



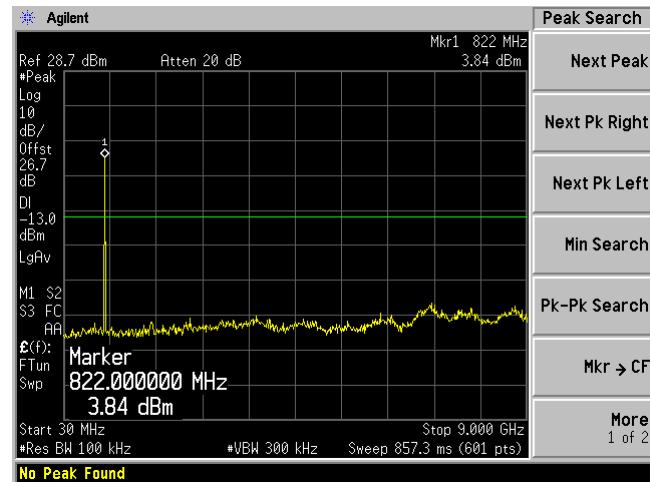
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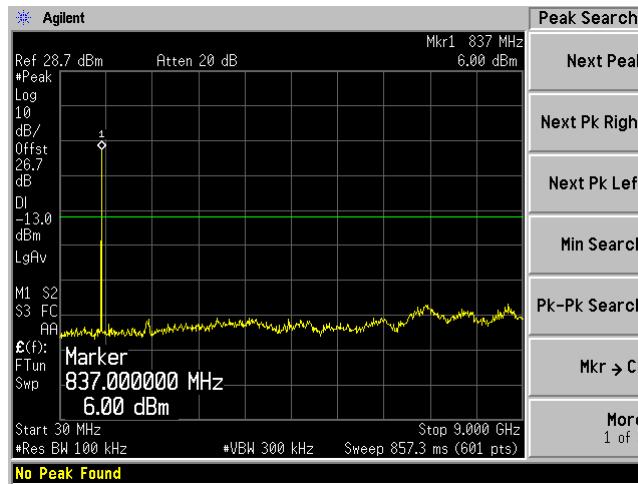
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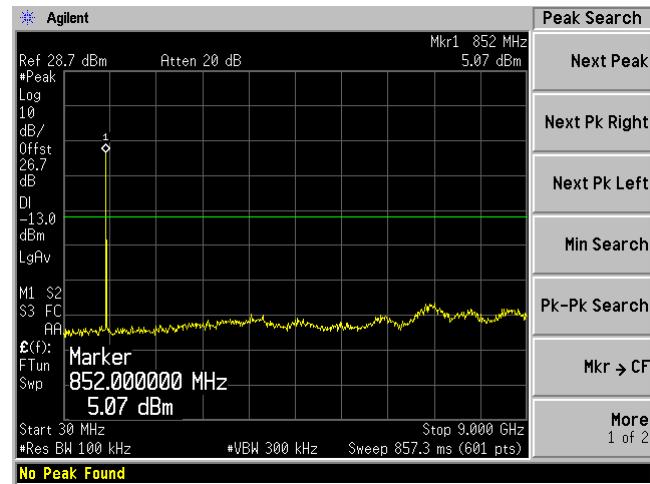
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

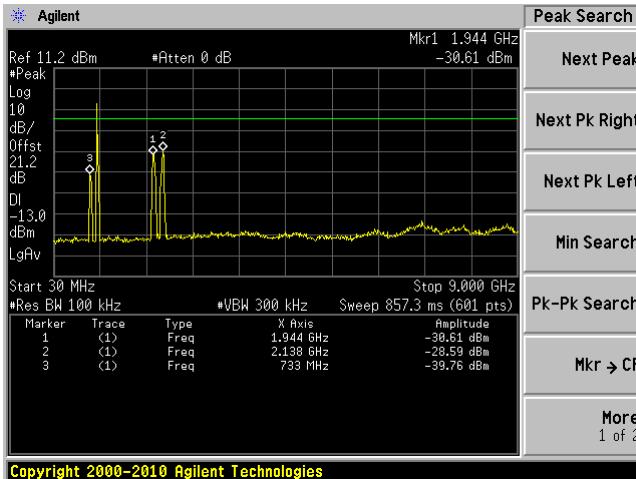


UL High 30MHz-9GHz

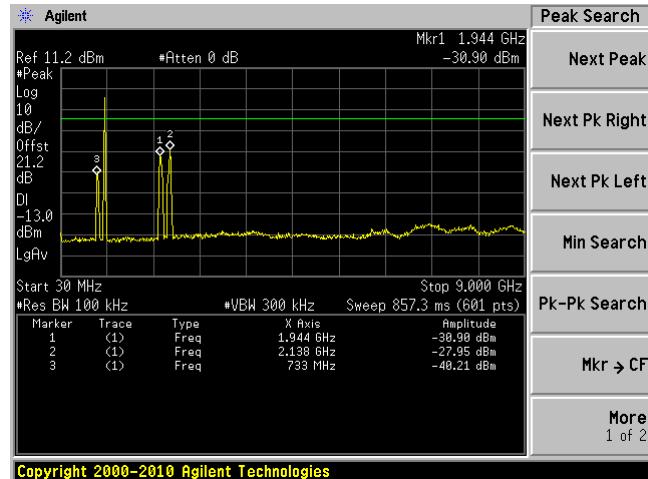


LTE 3MHz 16QAM

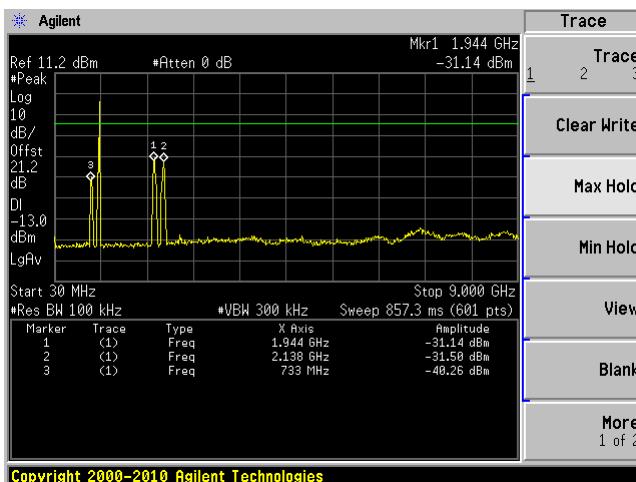
DL Low 30MHz-9GHz



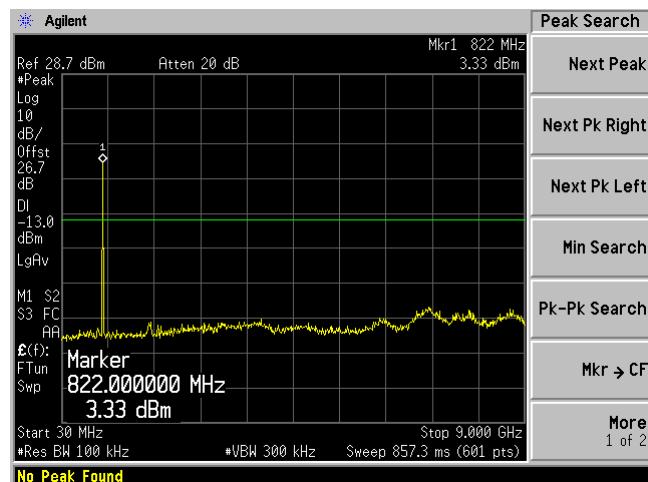
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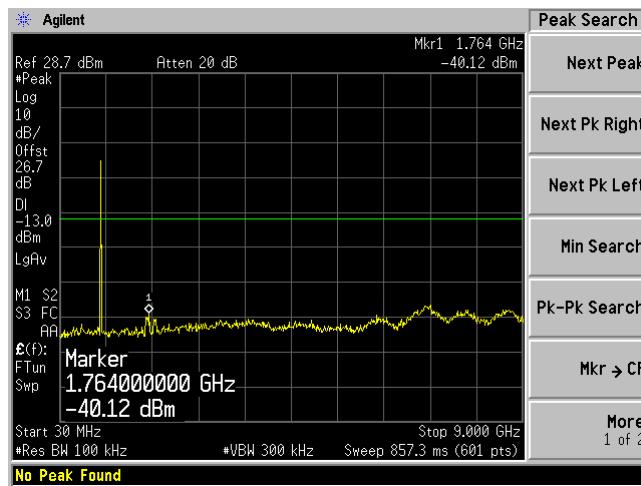
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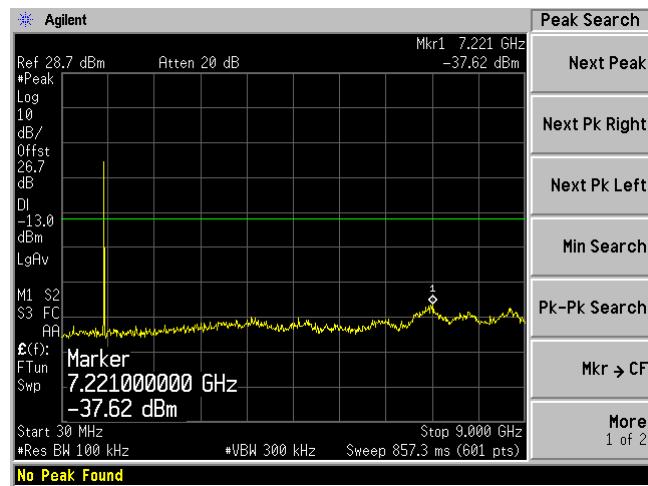
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

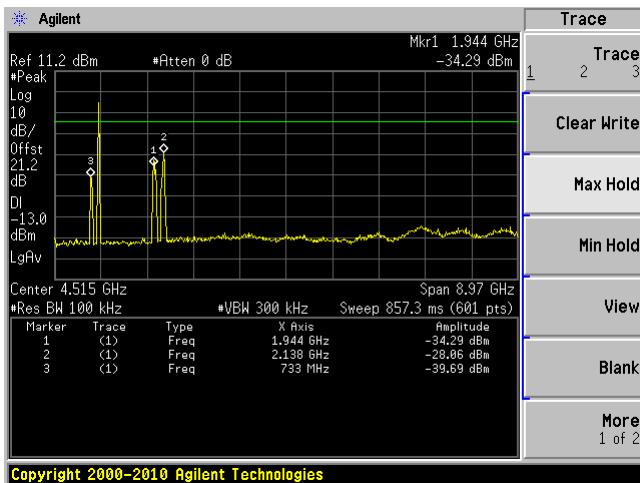


UL High 30MHz-9GHz

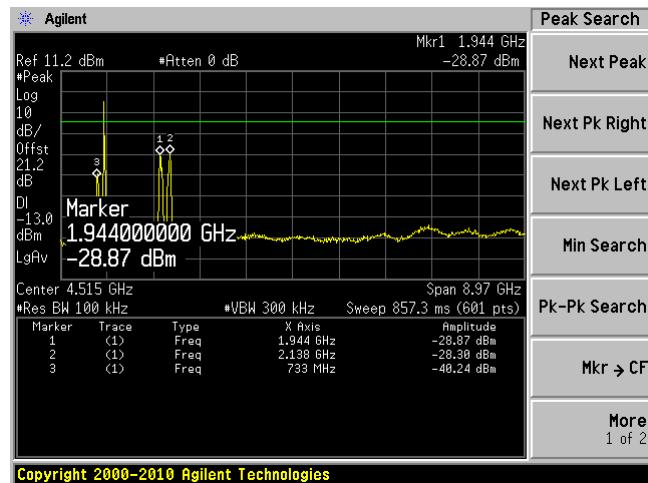


LTE 5MHz 16QAM

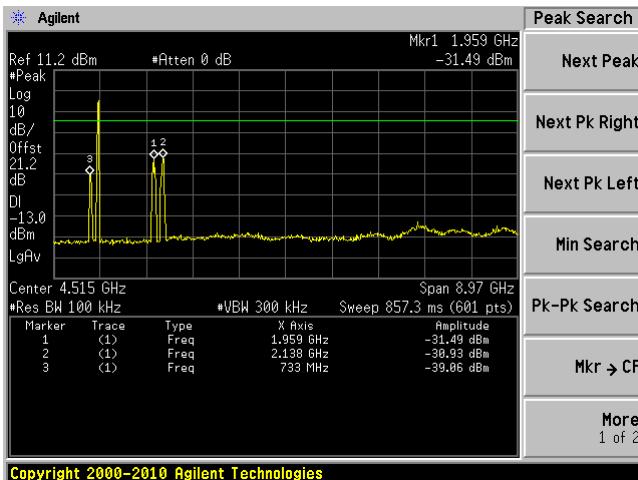
DL Low 30MHz-9GHz



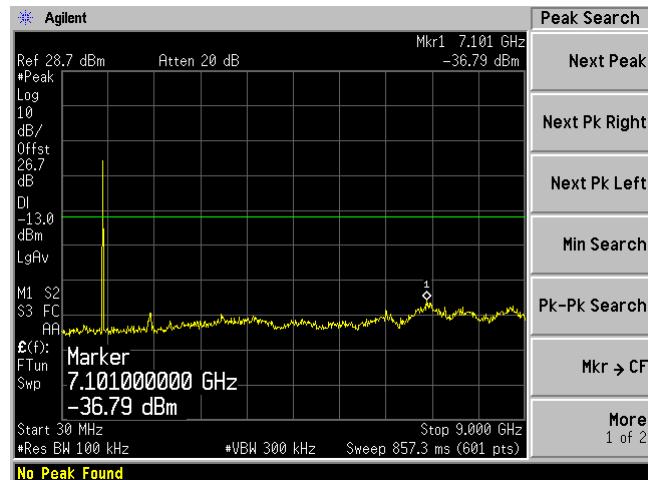
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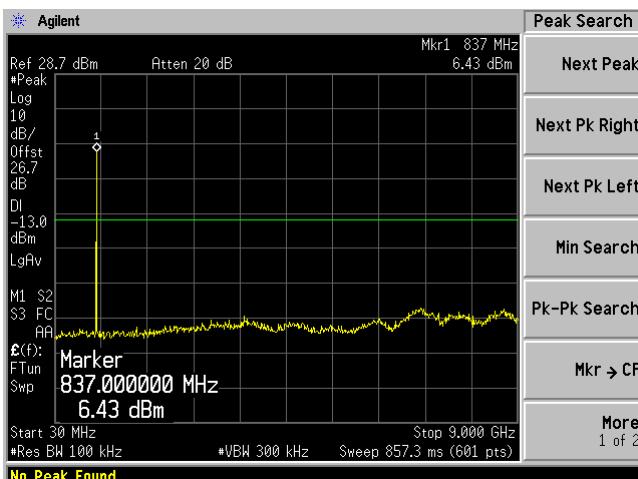
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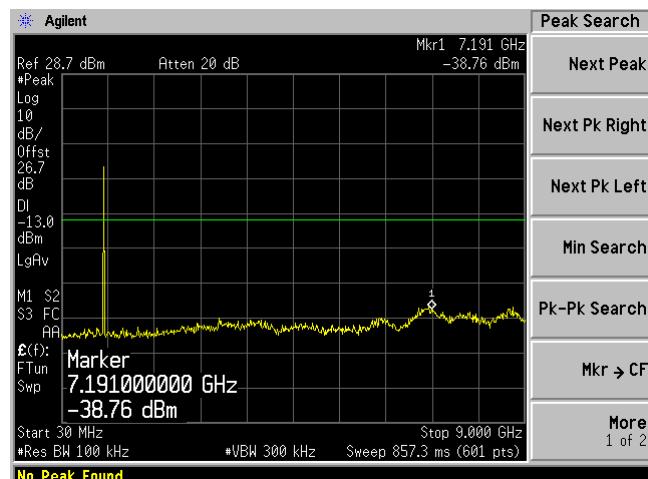
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

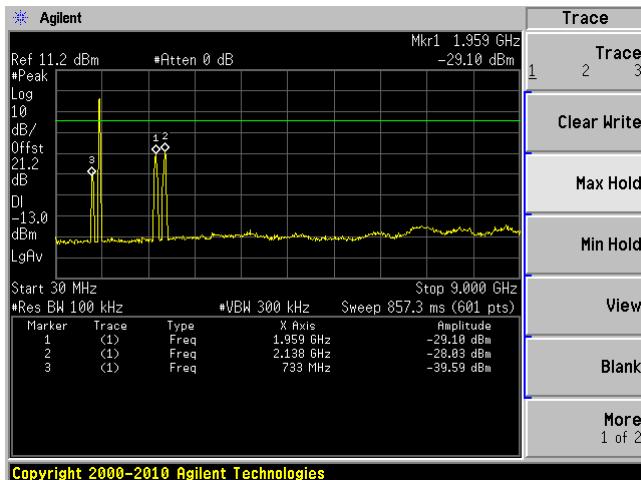


UL High 30MHz-9GHz

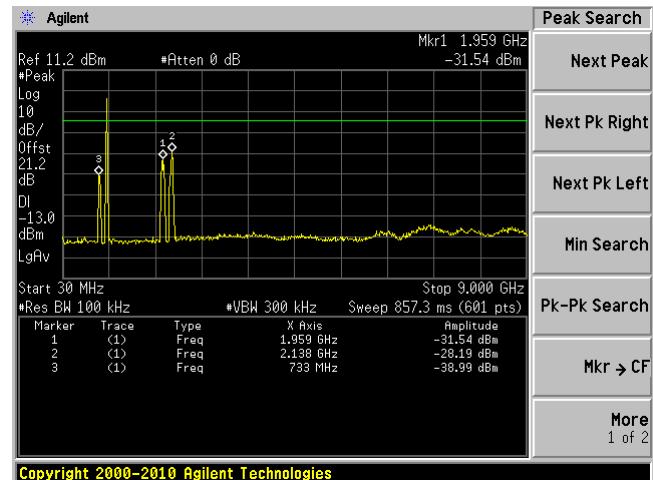


LTE 10MHz 16QAM

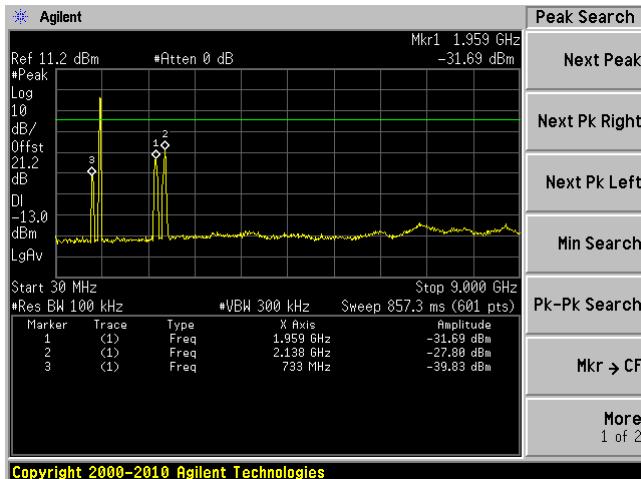
DL Low 30MHz-9GHz



DL Middle 30MHz-9GHz



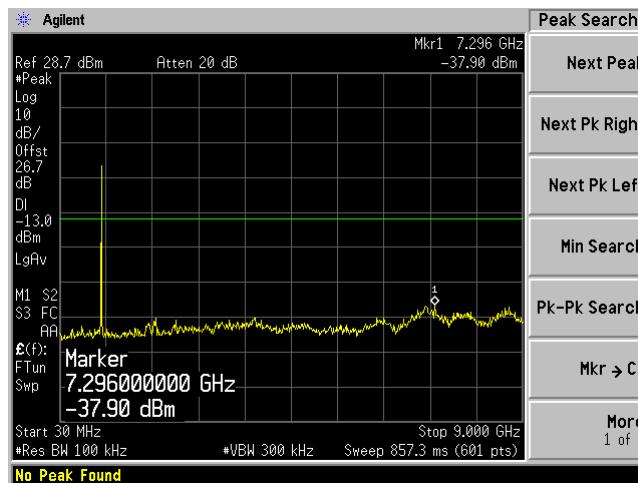
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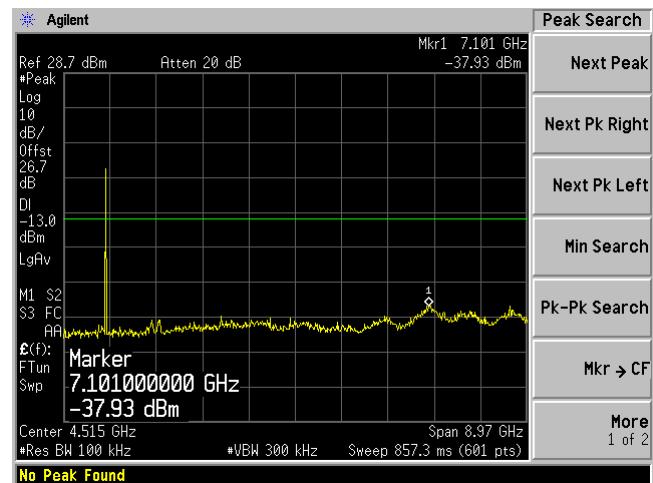
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

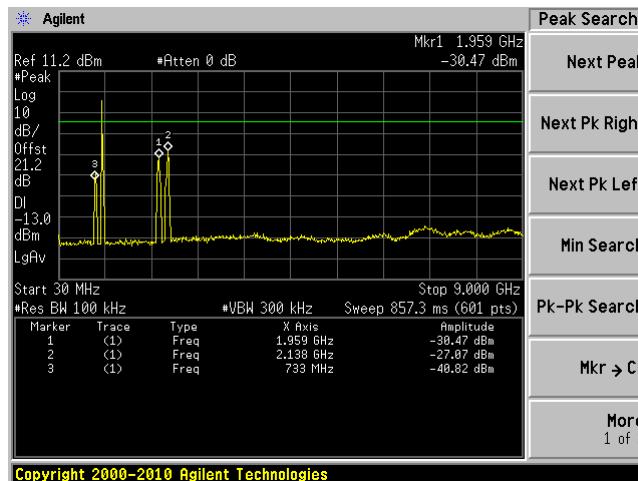


UL High 30MHz-9GHz

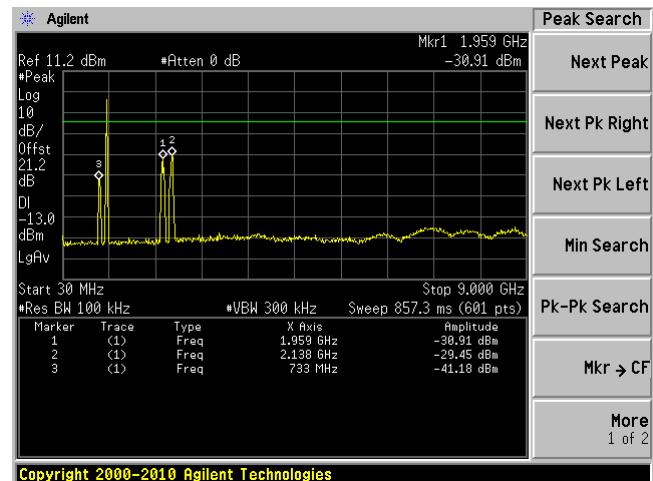


LTE 1.4MHz 64QAM

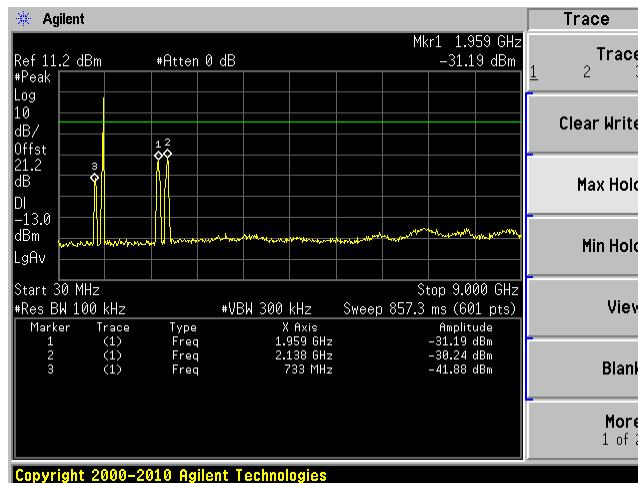
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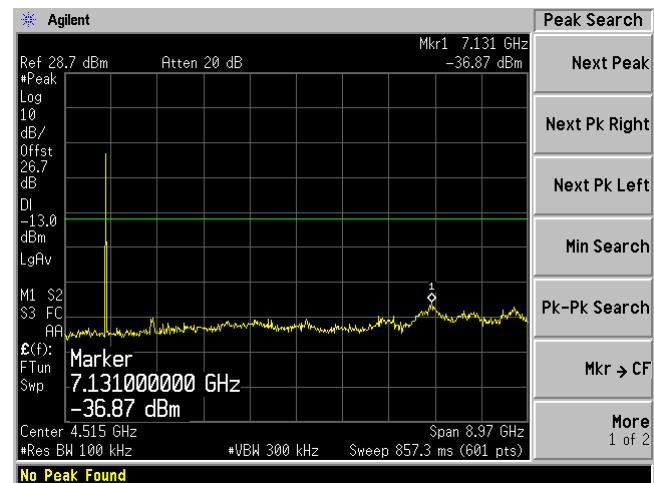
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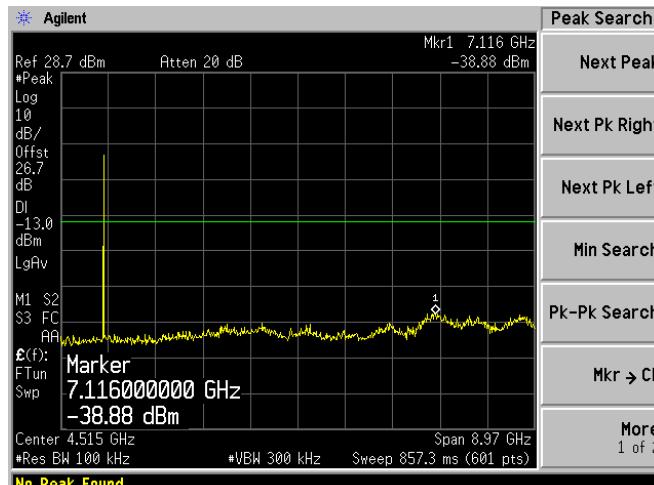
DL High 30MHz-9GHz



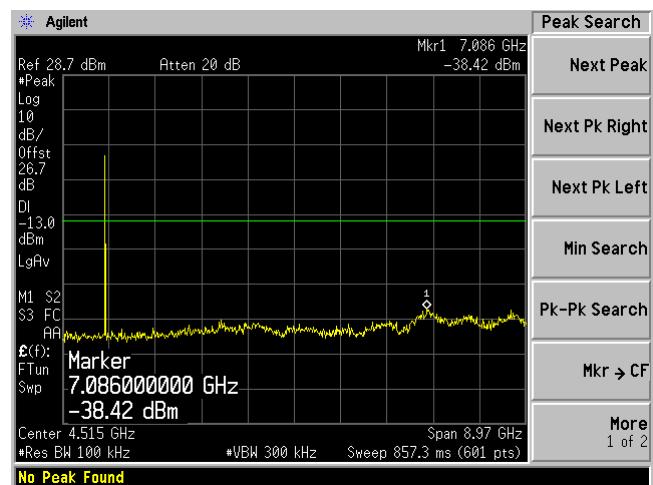
UL Low 30MHz-9GHz



UL High 30MHz-9GHz



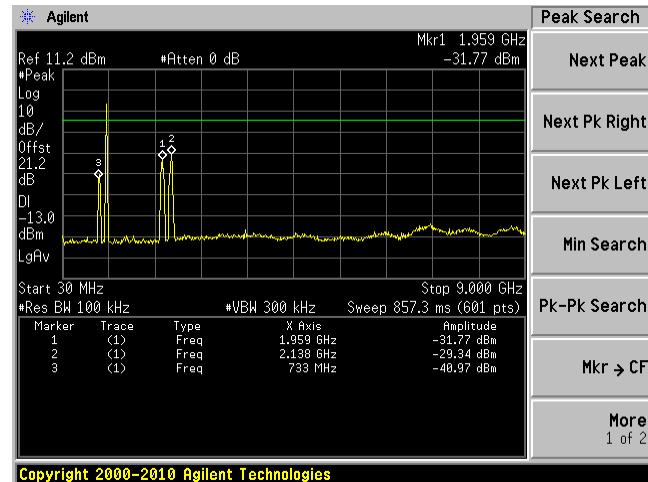
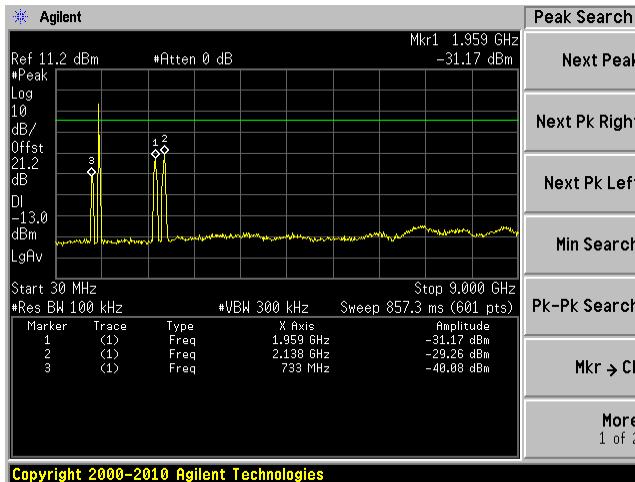
UL Middle 30MHz-9GHz



LTE 3MHz QPSK

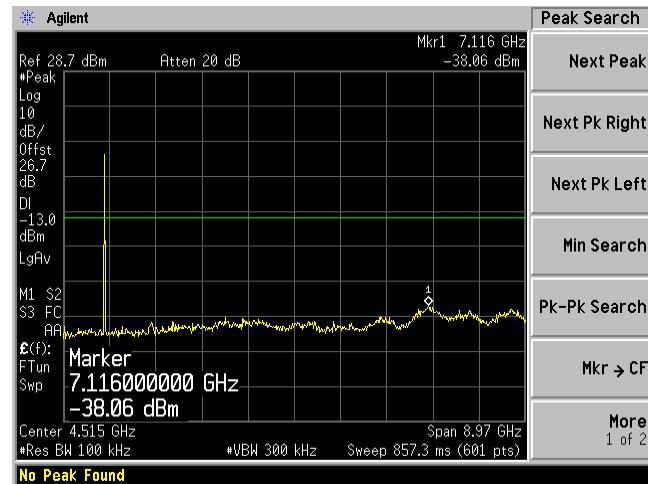
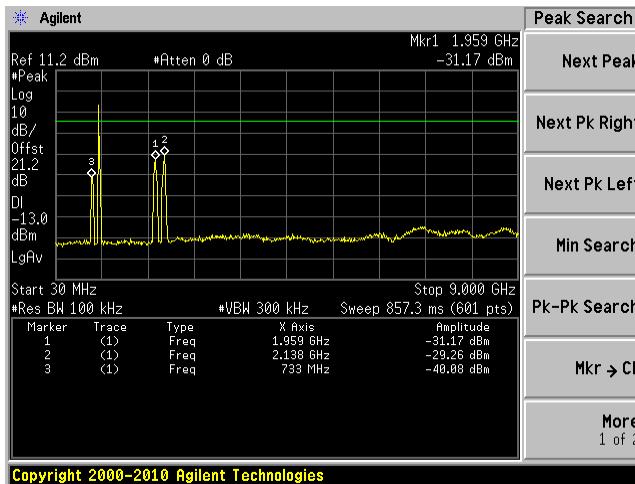
DL Low 30MHz-9GHz

DL Middle 30MHz-9GHz

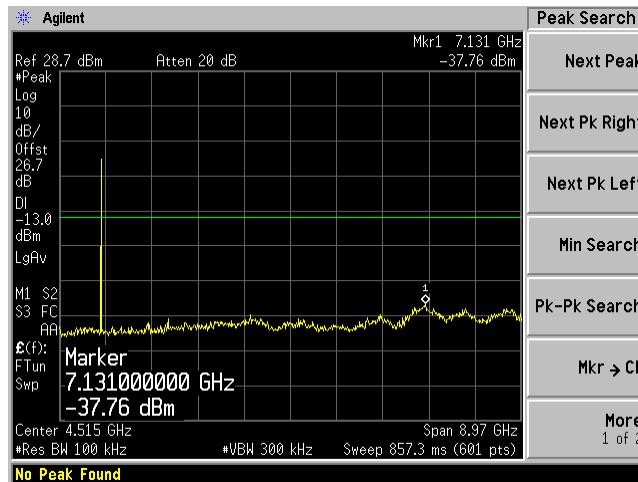


DL High 30MHz-9GHz

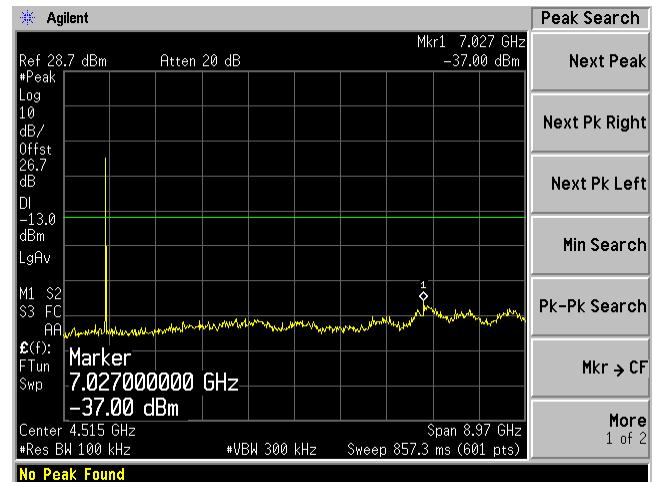
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz



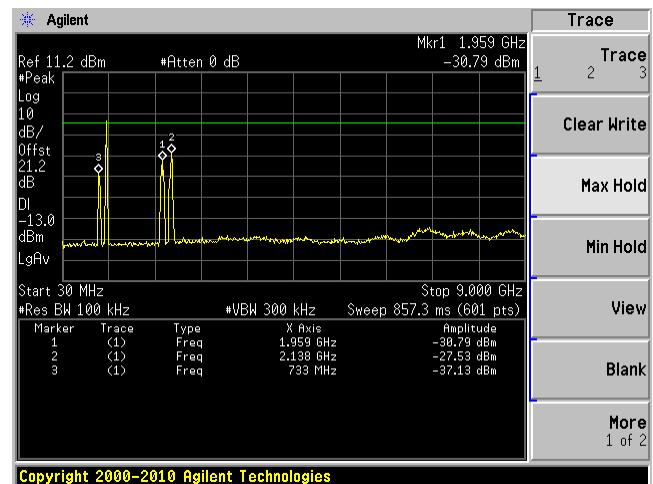
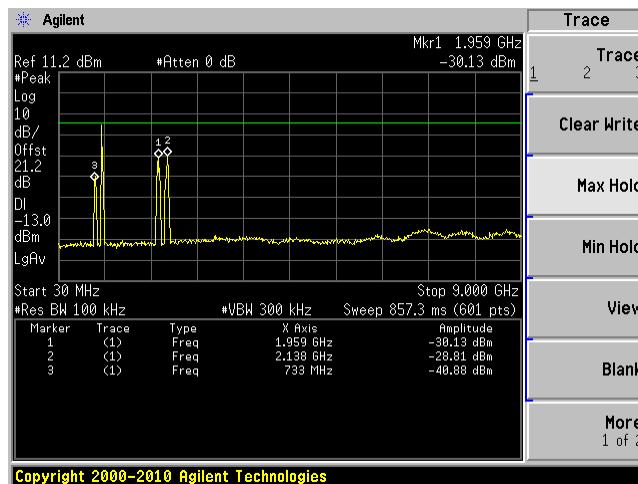
UL High 30MHz-9GHz



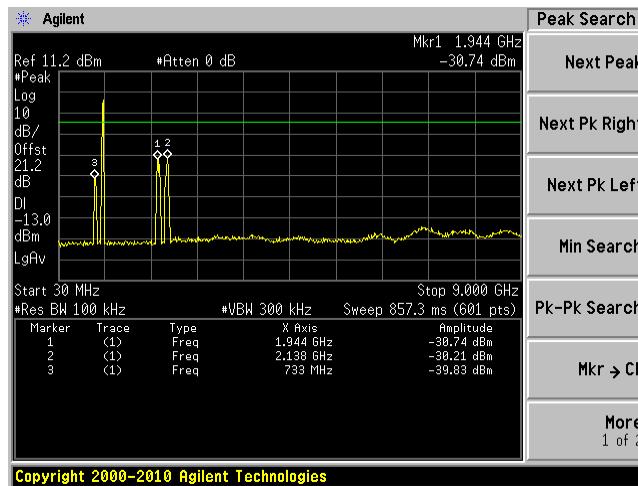
LTE 5MHz 64QAM

DL Low 30MHz-9GHz

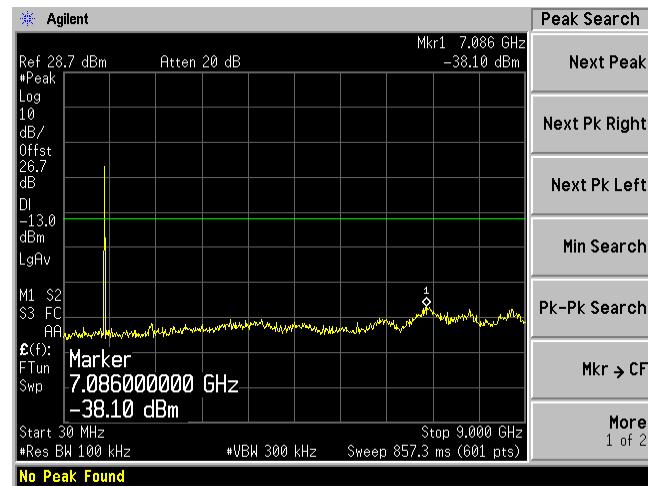
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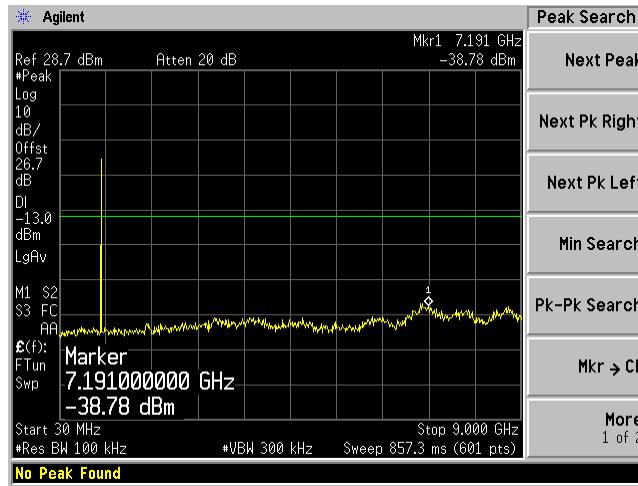
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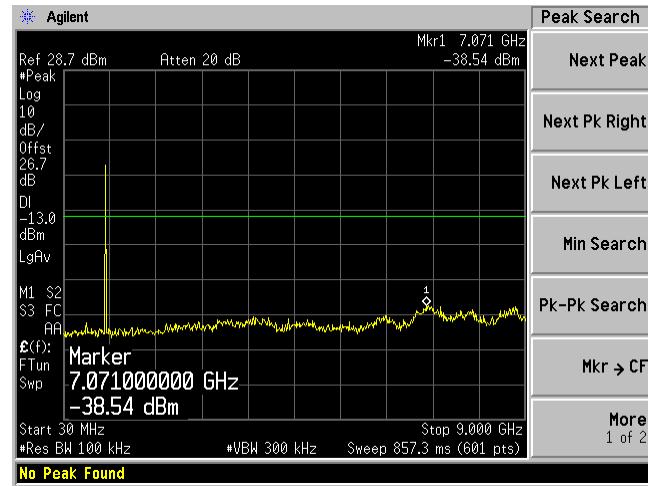
UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

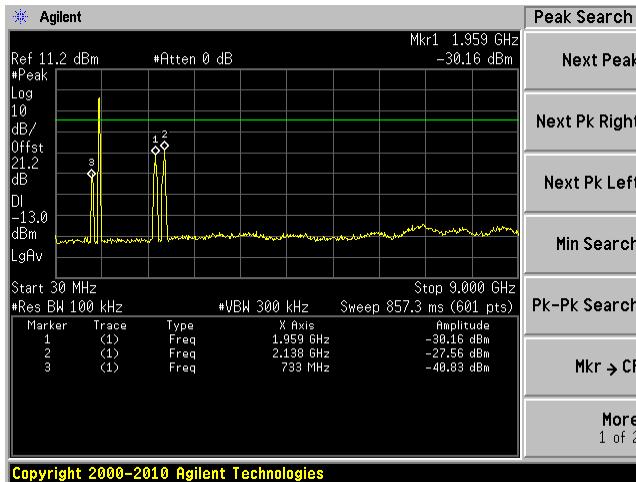


UL High 30MHz-9GHz

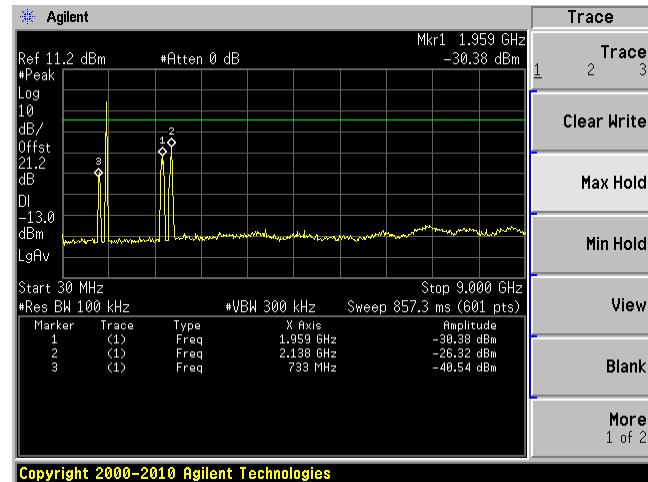


LTE 10MHz 64QAM

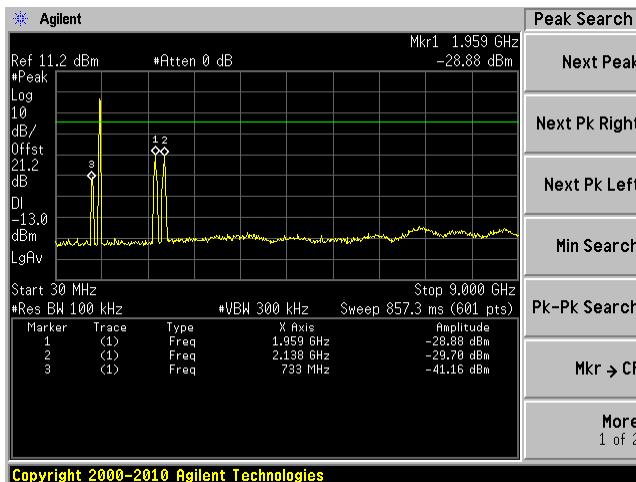
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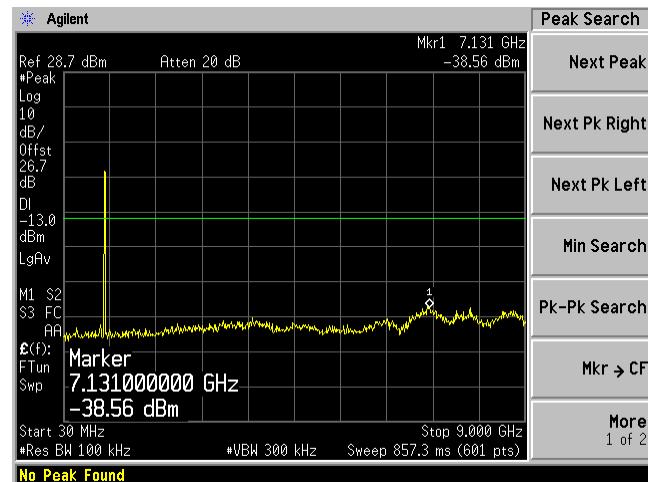
DL Middle 30MHz-9GHz



DL High 30MHz-9GHz

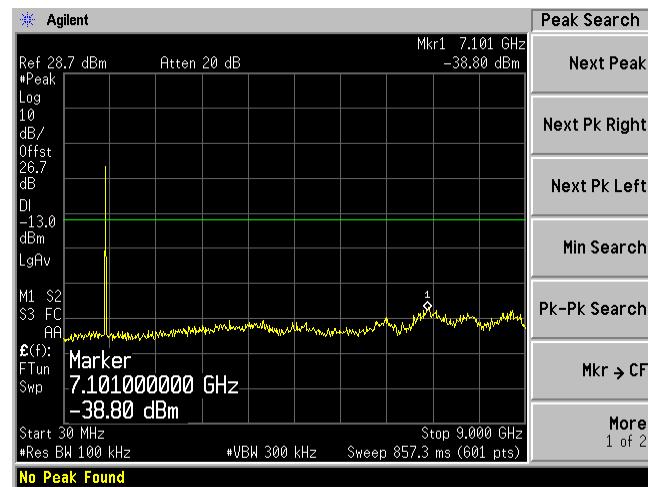
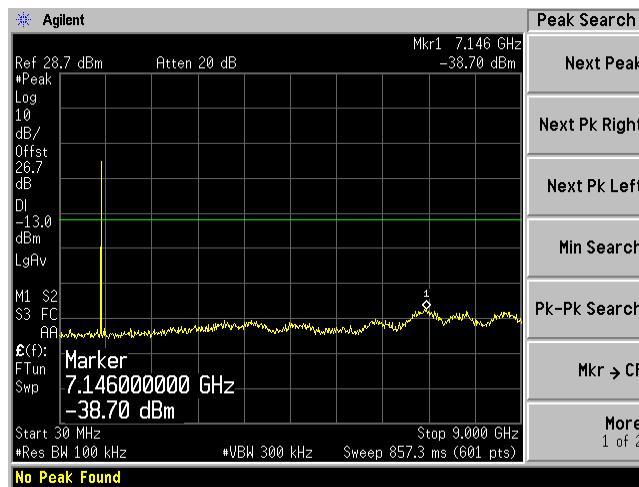


UL Low 30MHz-9GHz



UL Middle 30MHz-9GHz

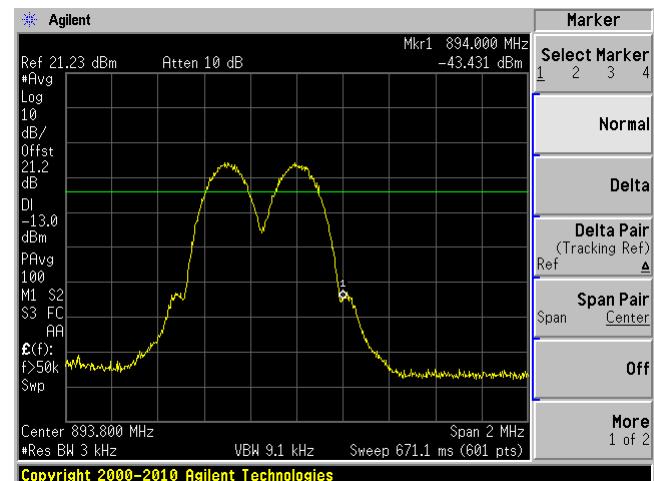
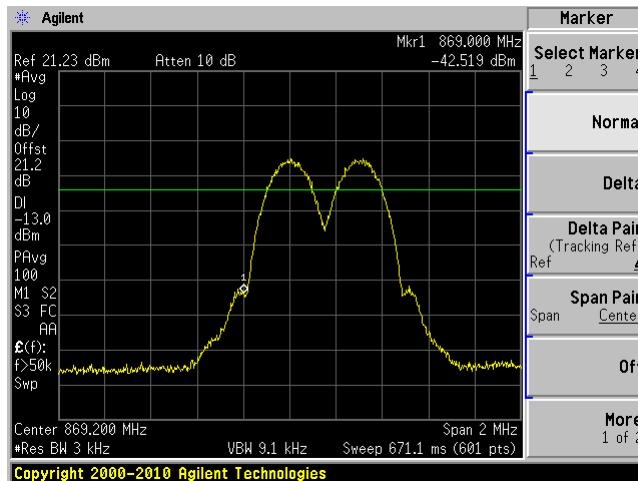
UL High 30MHz-9GHz



Intermodulation

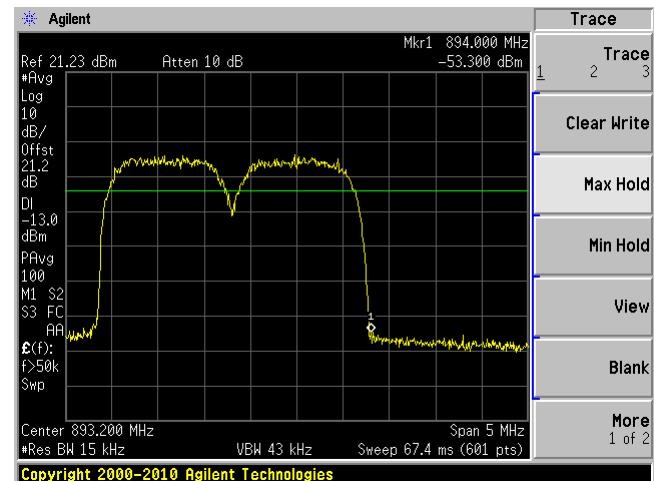
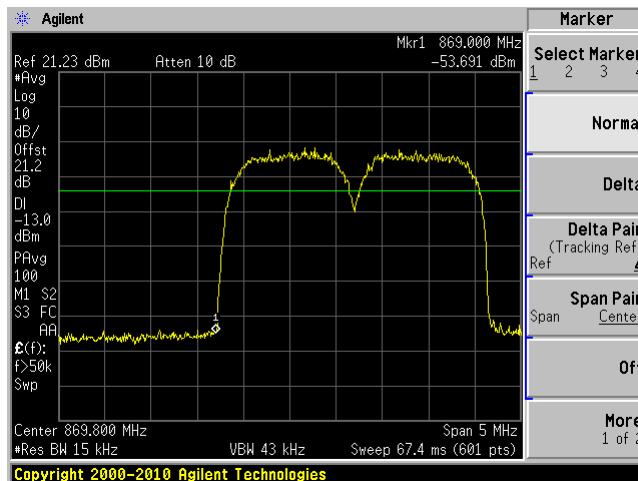
Downlink (ALC off)

GSM
Low Channel High Channel



CDMA

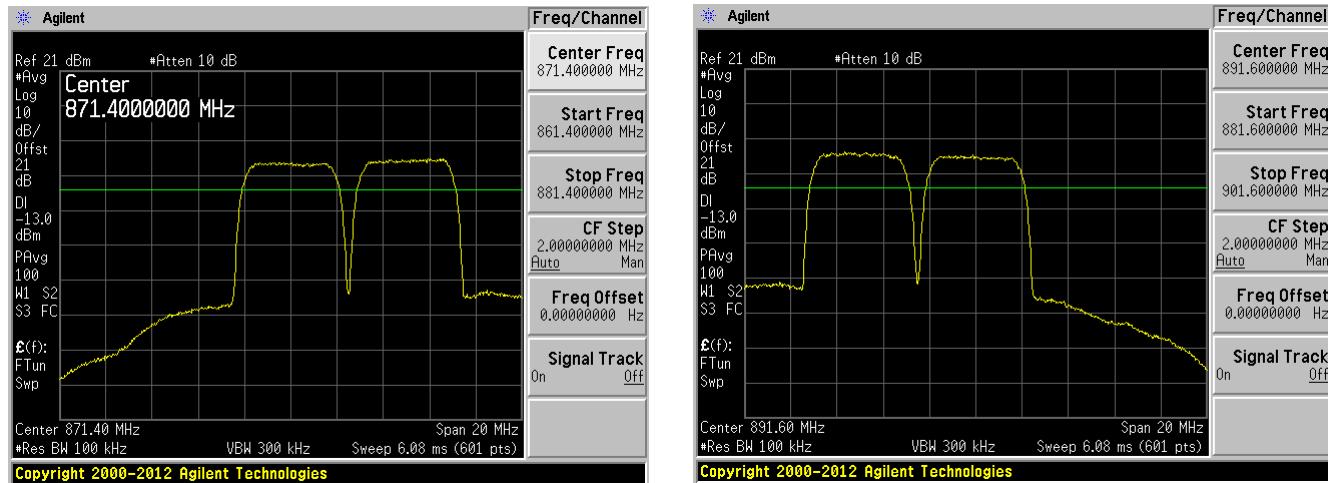
Low Channel High Channel



WCDMA

Low Channel

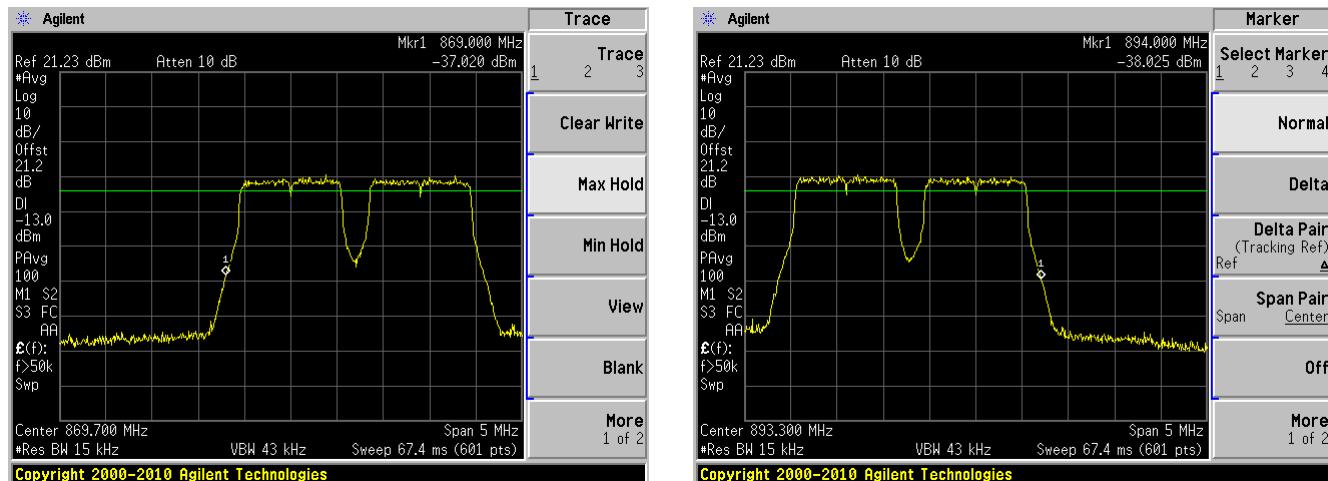
High Channel



LTE-QPSK 1.4 MHz

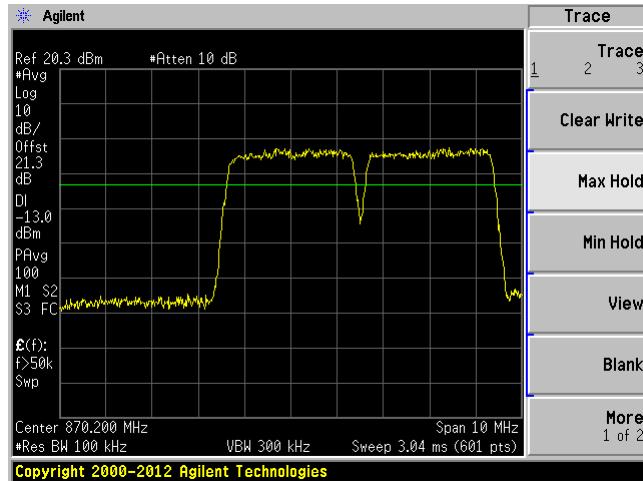
Low Channel

High Channel

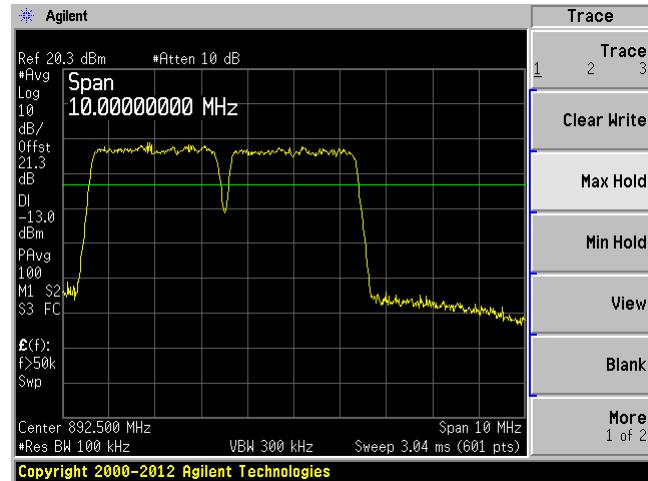


LTE-QPSK 3 MHz

Low Channel

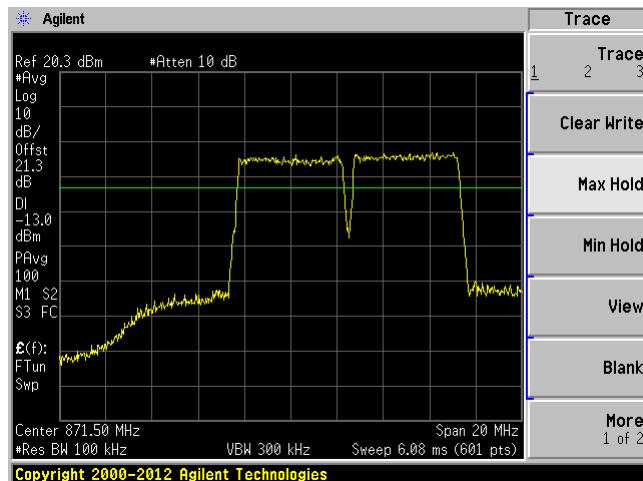


High Channel

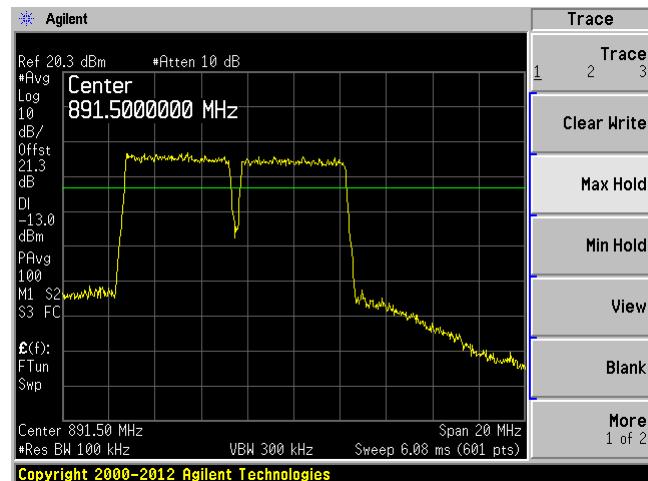


LTE-QPSK 5 MHz

Low Channel

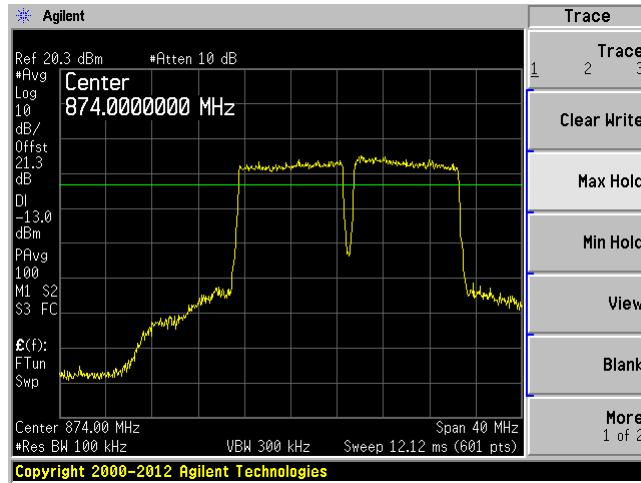


High Channel

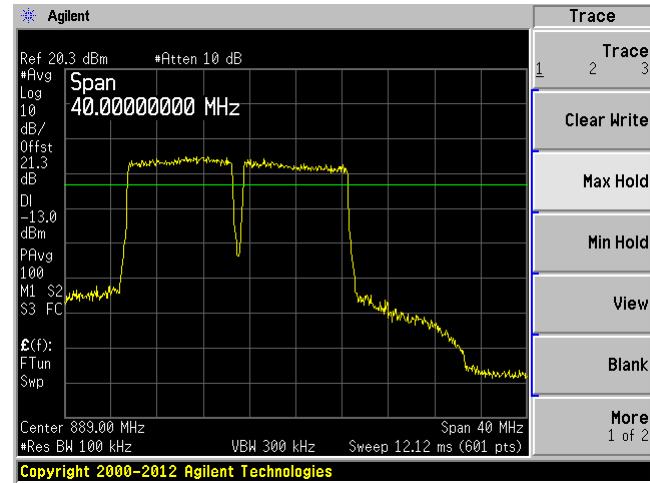


LTE-QPSK 10 MHz

Low Channel

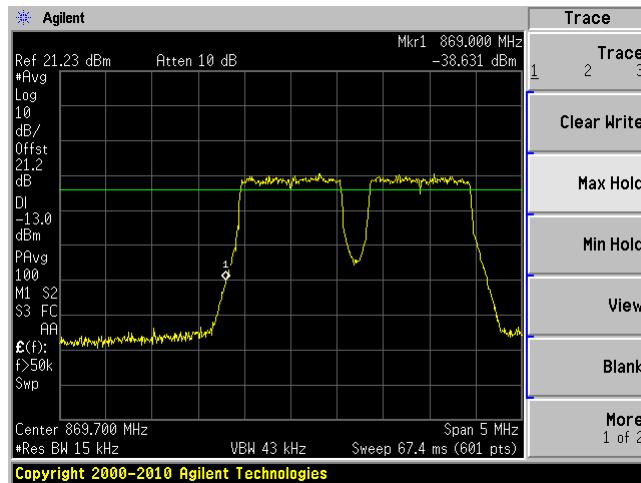


High Channel

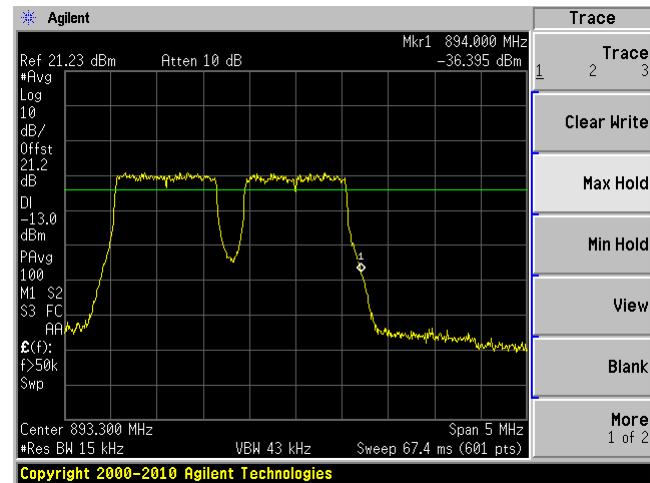


LTE-16QAM 1.4 MHz

Low Channel

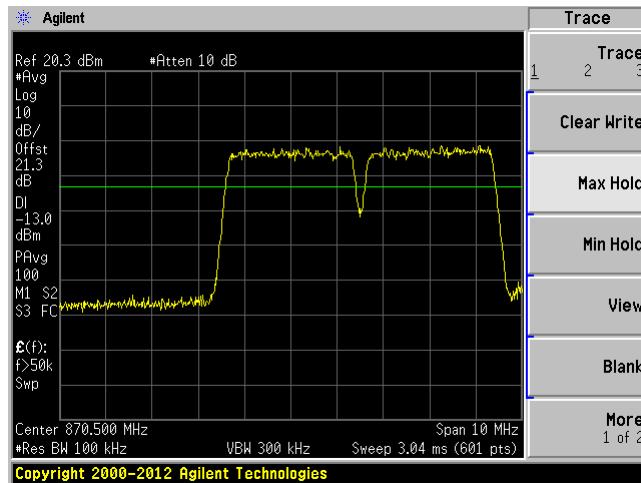


High Channel

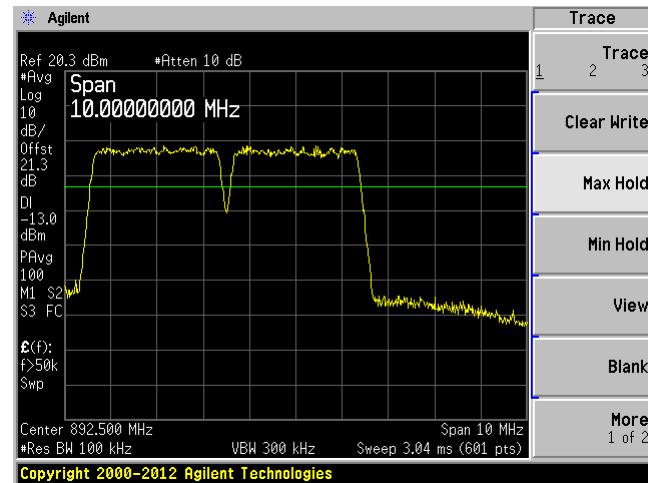


LTE-16QAM 3 MHz

Low Channel

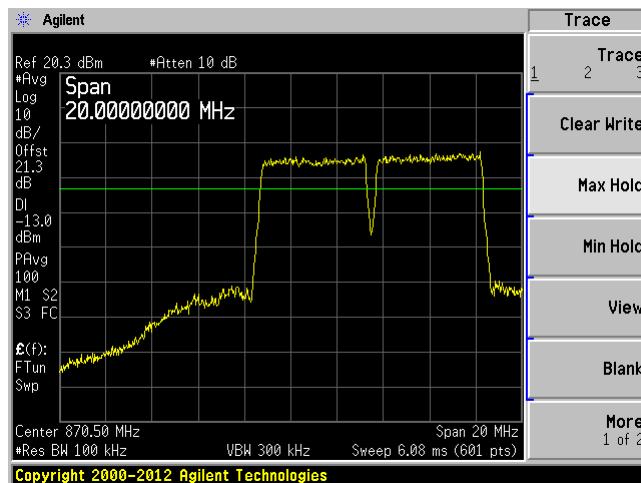


High Channel

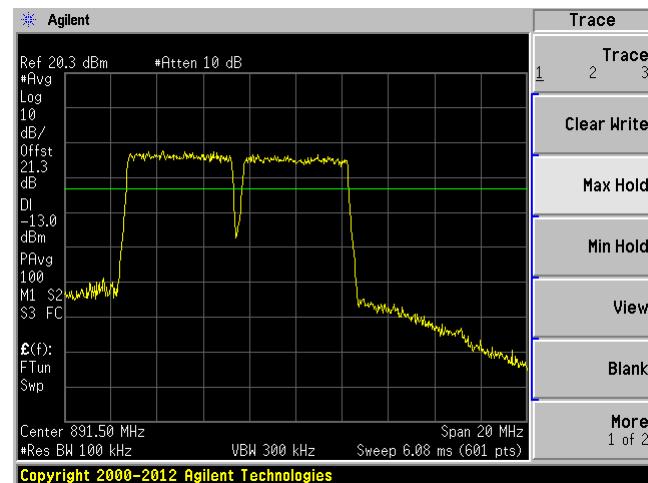


LTE-16QAM 5 MHz

Low Channel

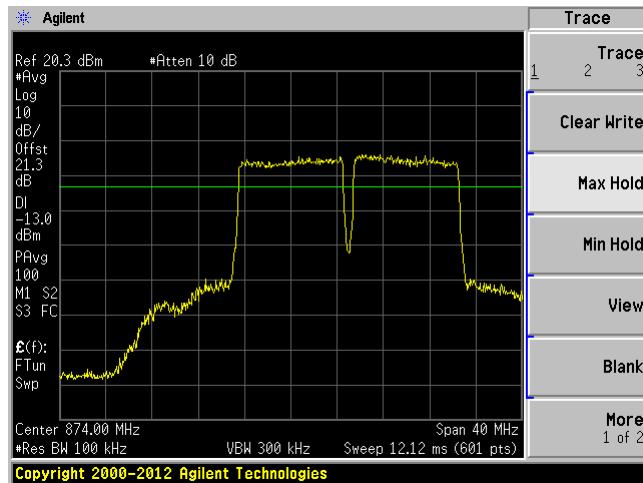


High Channel

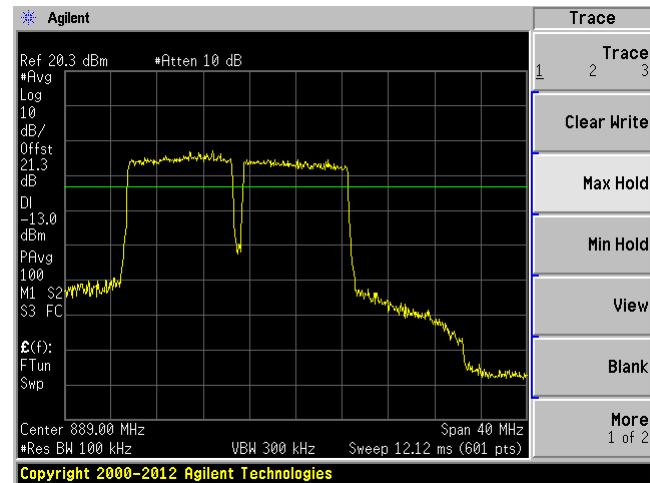


LTE-16QAM 10 MHz

Low Channel

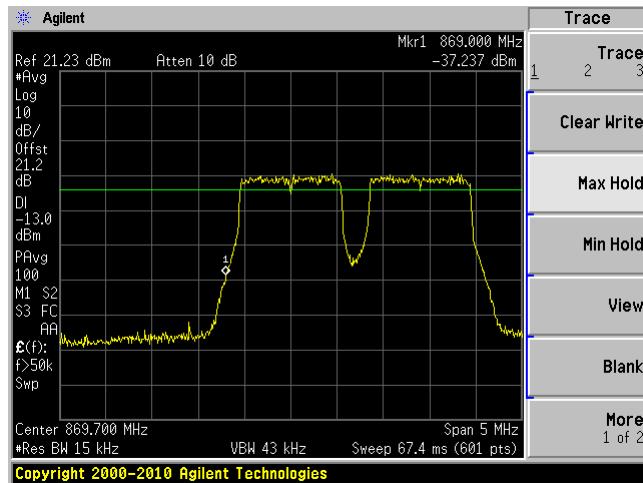


High Channel

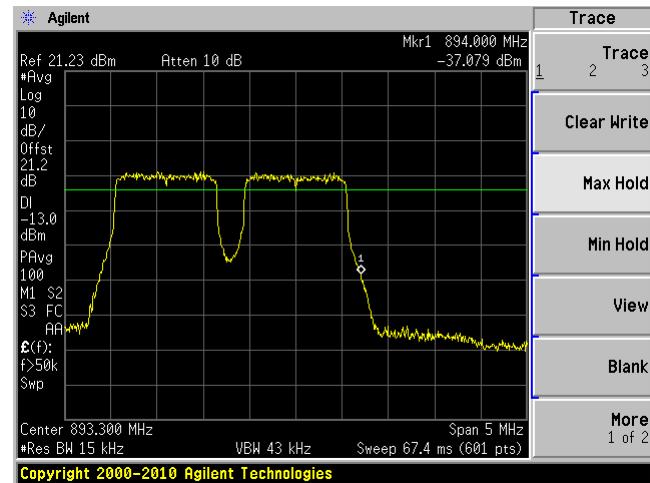


LTE-64QAM 1.4 MHz

Low Channel

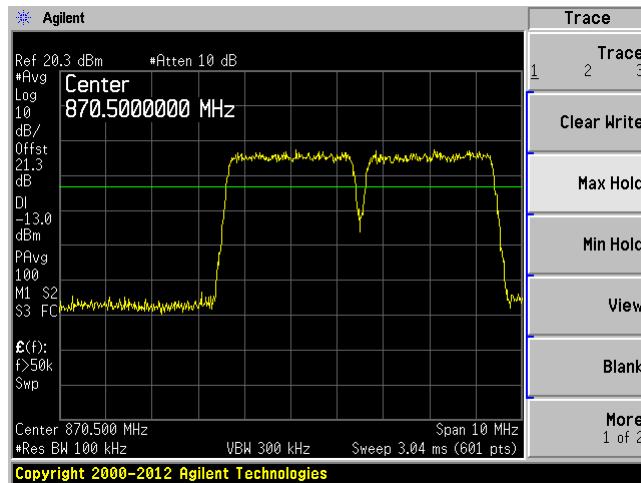


High Channel

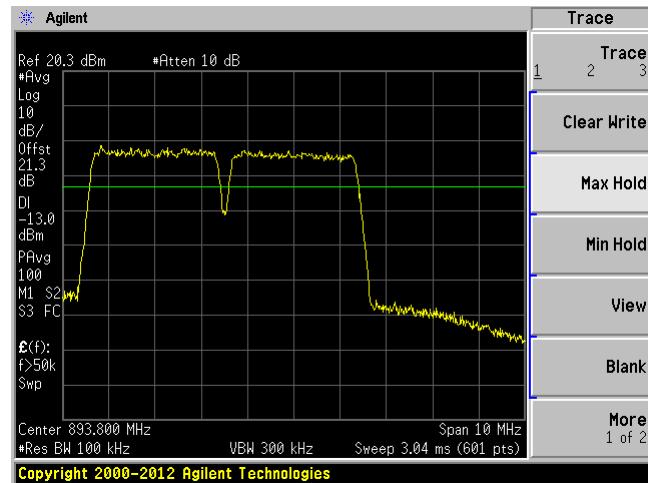


LTE-64QAM 3 MHz

Low Channel

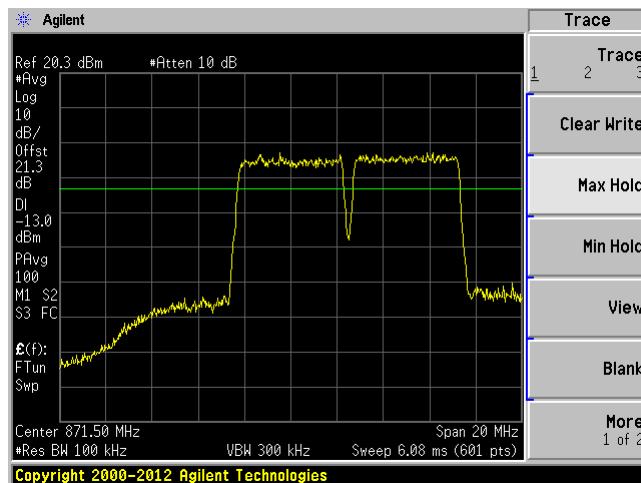


High Channel

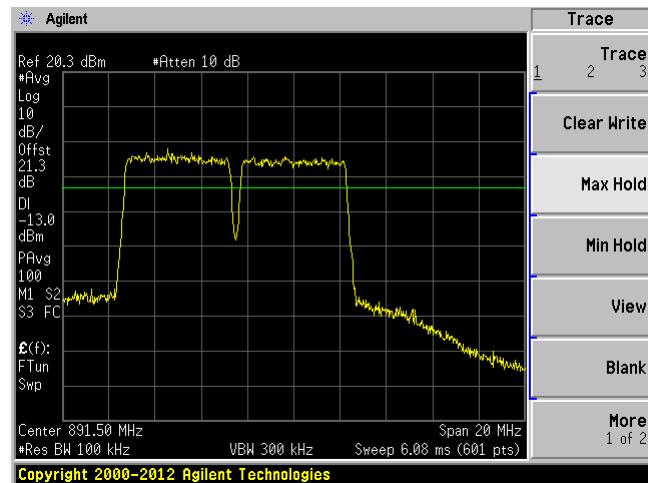


LTE-64QAM 5 MHz

Low Channel

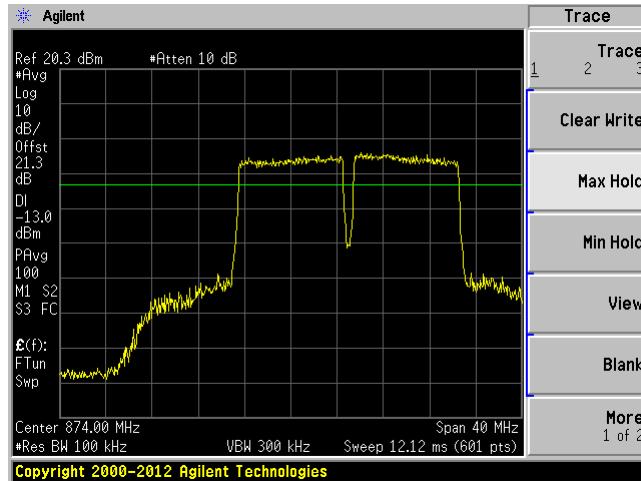


High Channel

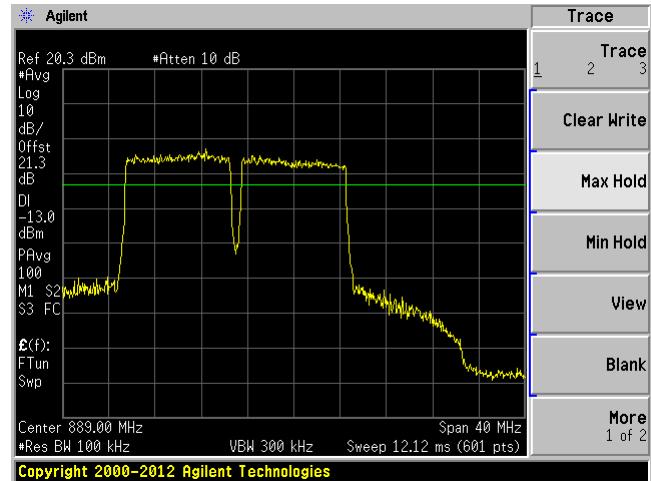


LTE-64QAM 10 MHz

Low Channel



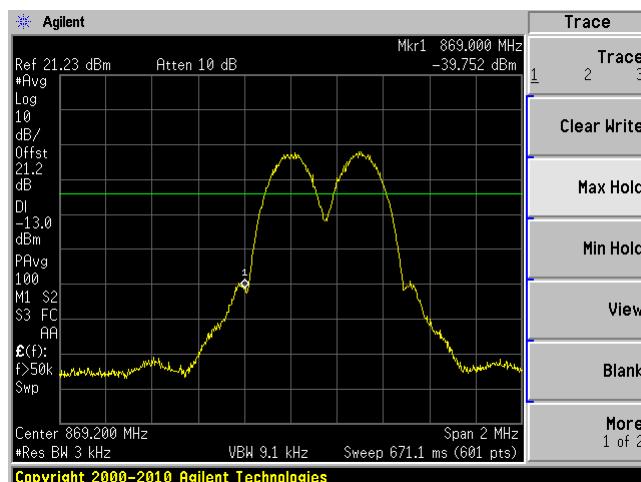
High Channel



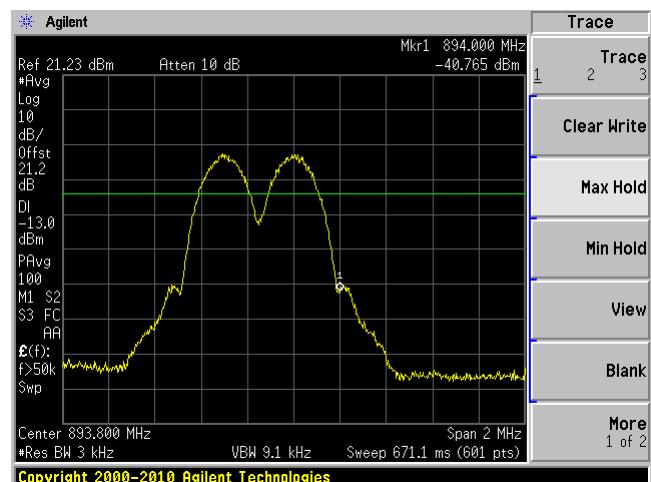
Downlink (ALC on)

GSM

Low Channel

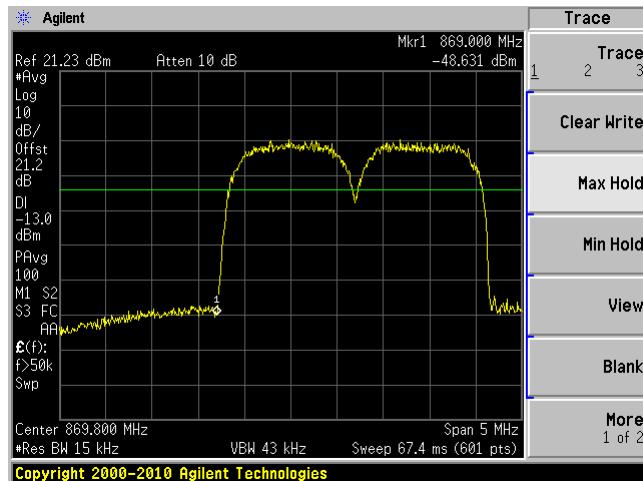


High Channel

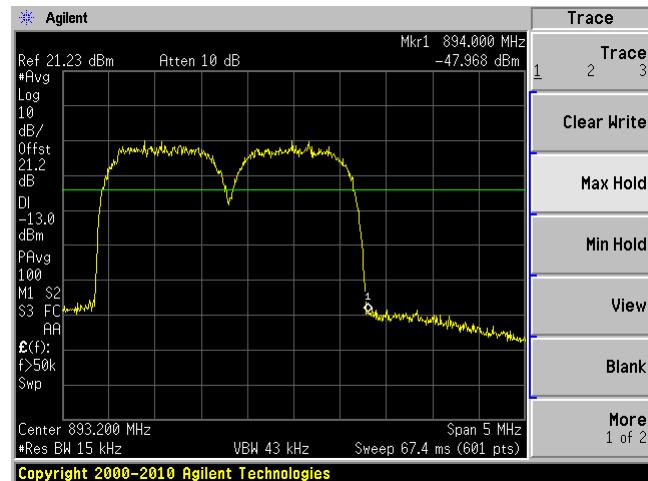


CDMA

Low Channel

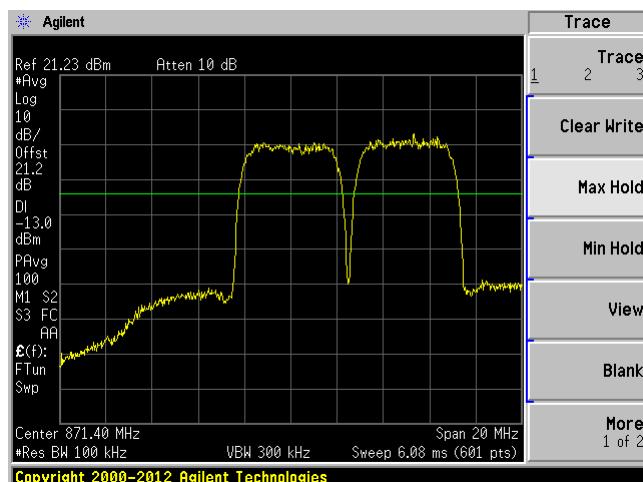


High Channel

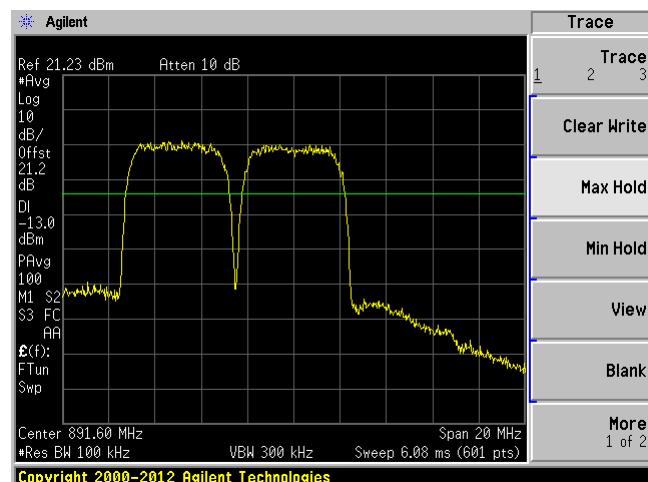


WCDMA

Low Channel

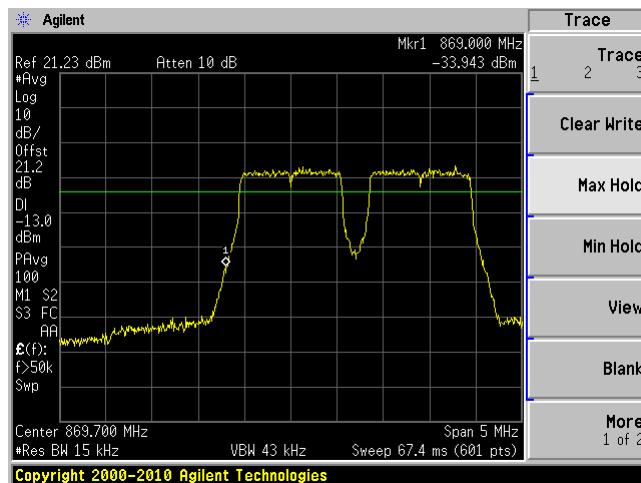


High Channel

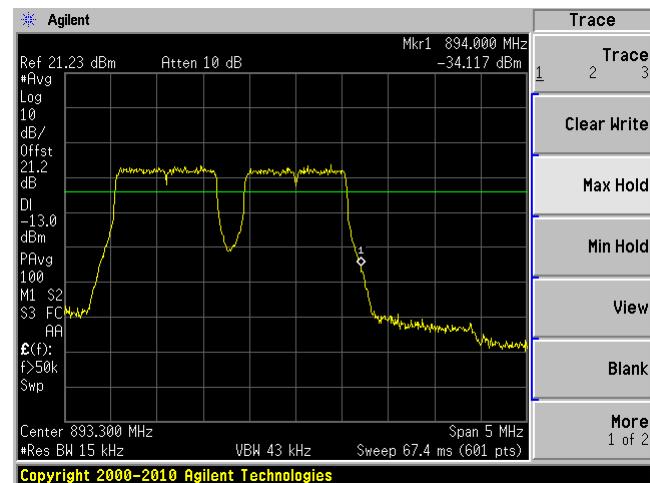


LTE-QPSK 1.4 MHz

Low Channel

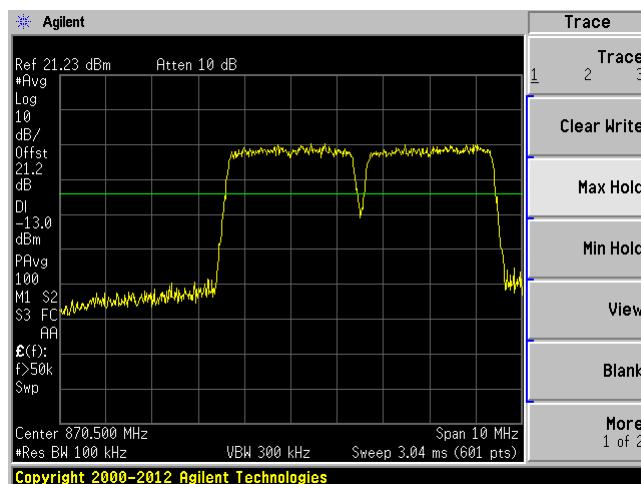


High Channel

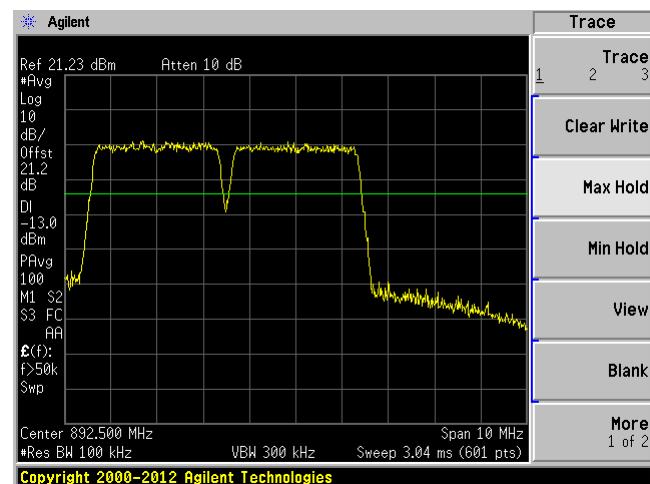


LTE-QPSK 3 MHz

Low Channel

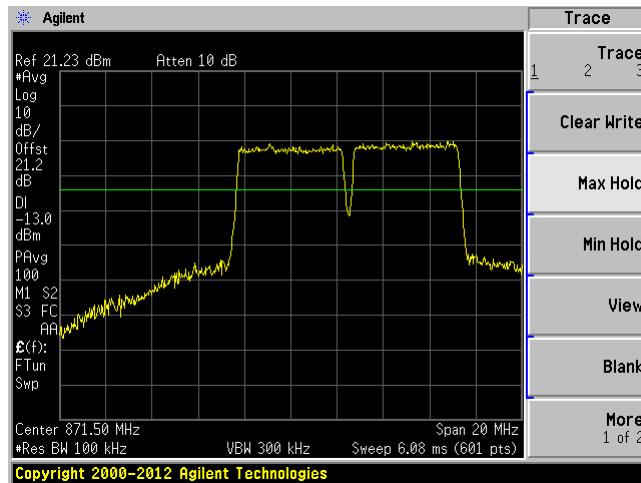


High Channel

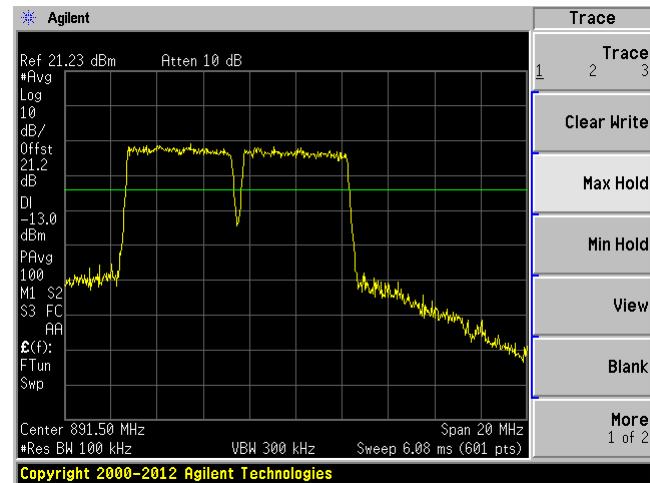


LTE-QPSK 5 MHz

Low Channel

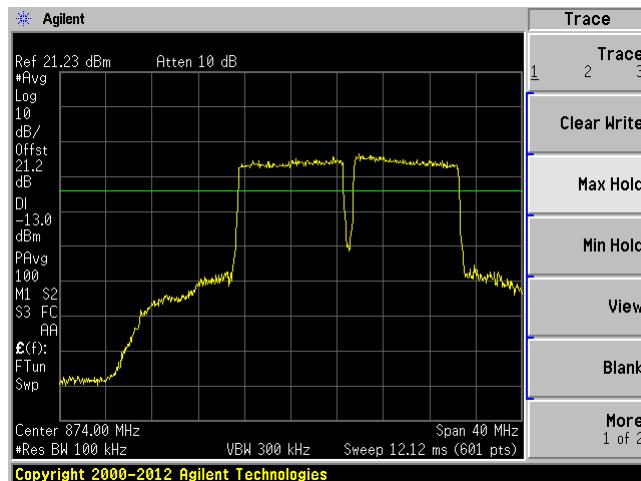


High Channel

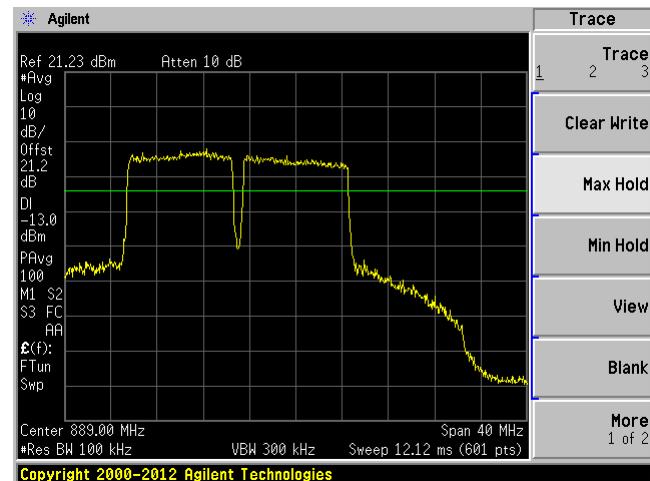


LTE-QPSK 10 MHz

Low Channel

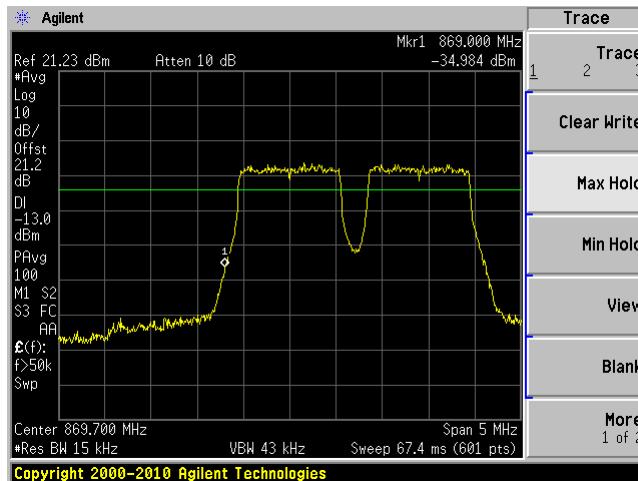


High Channel

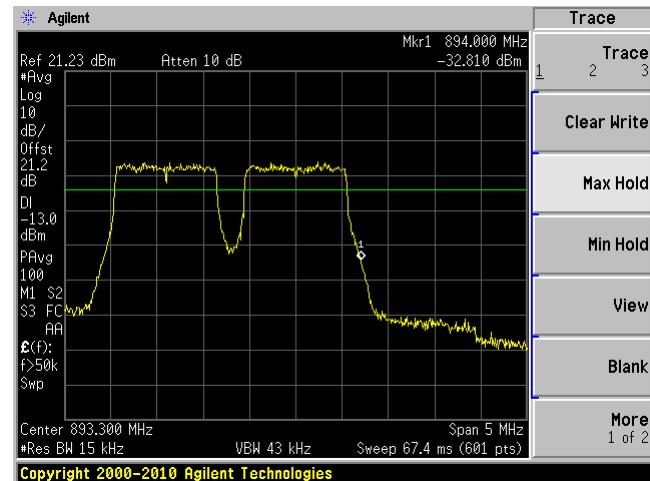


LTE-16QAM 1.4 MHz

Low Channel

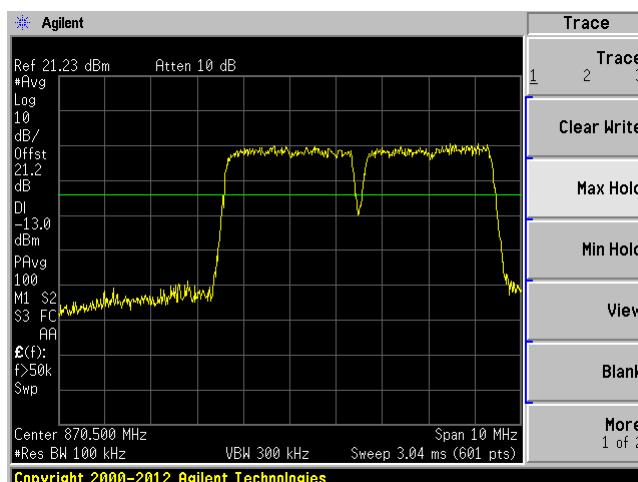


High Channel

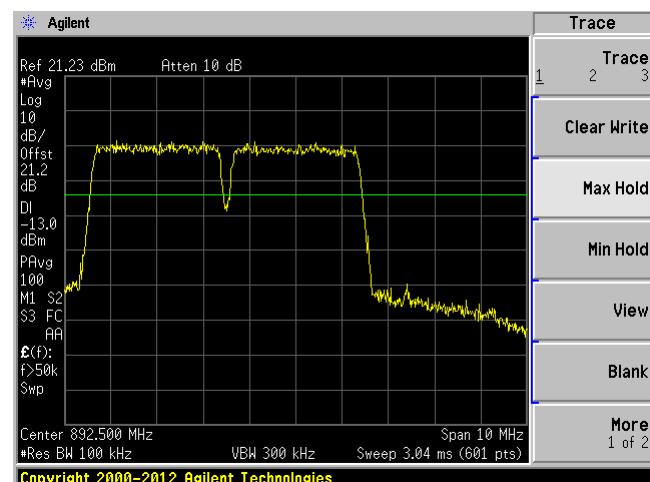


LTE-16QAM 3 MHz

Low Channel

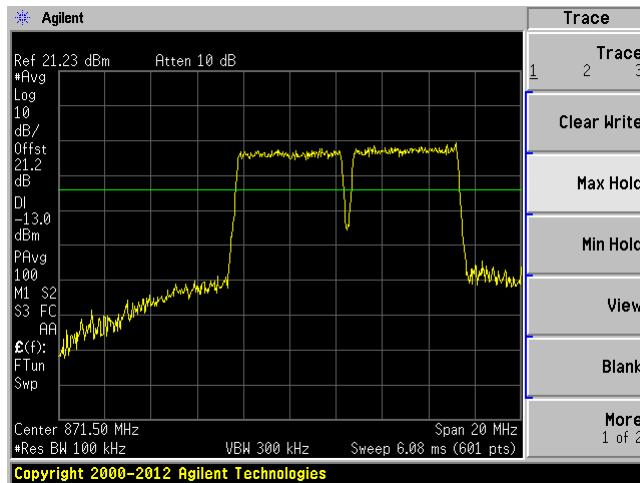


High Channel

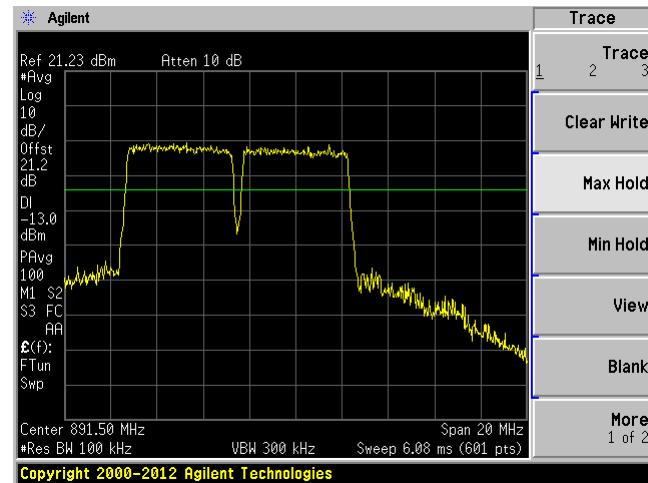


LTE-16QAM 5 MHz

Low Channel

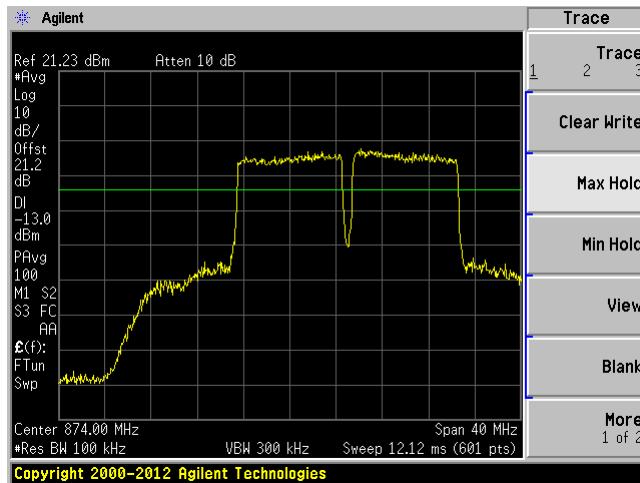


High Channel

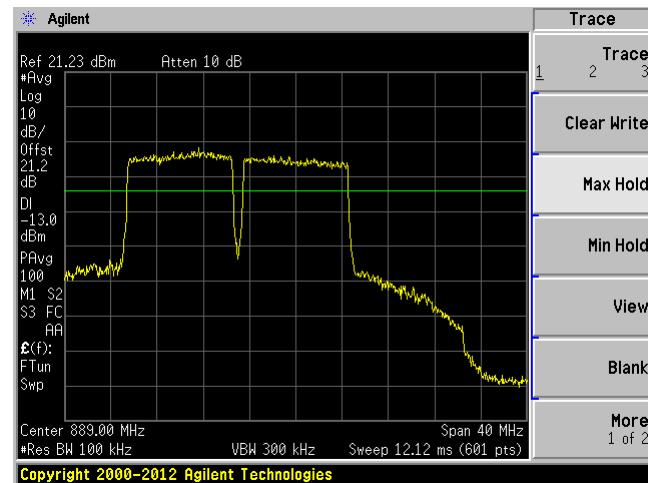


LTE-16QAM 10 MHz

Low Channel

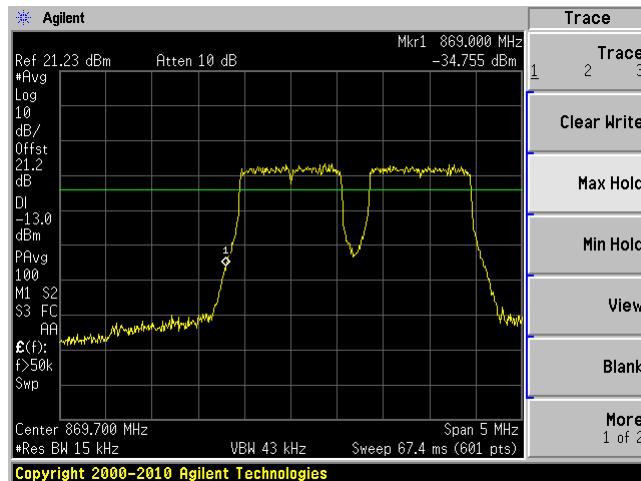


High Channel

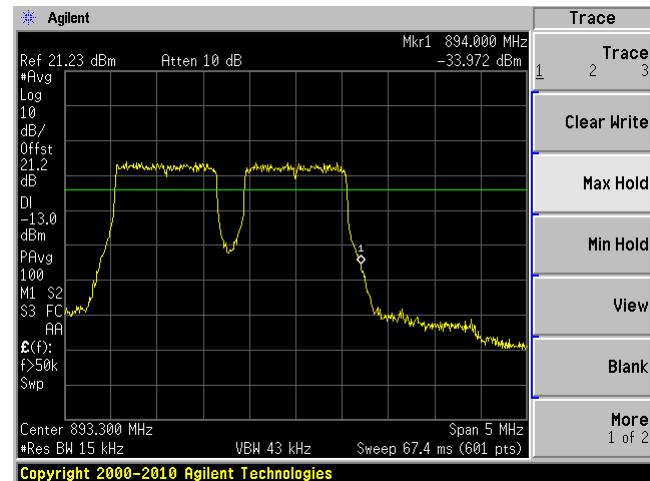


LTE-64QAM 1.4 MHz

Low Channel

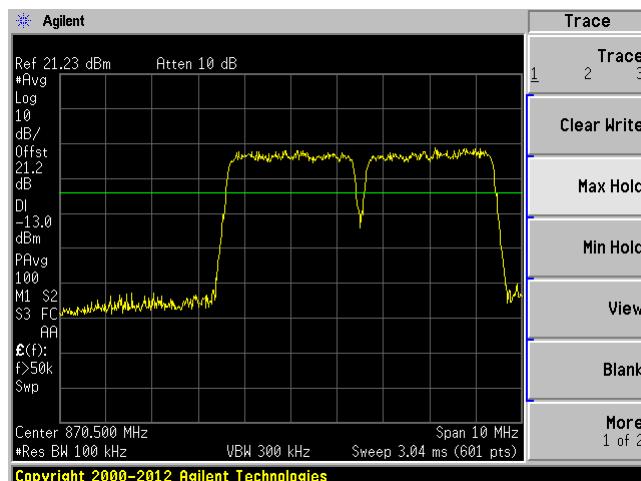


High Channel

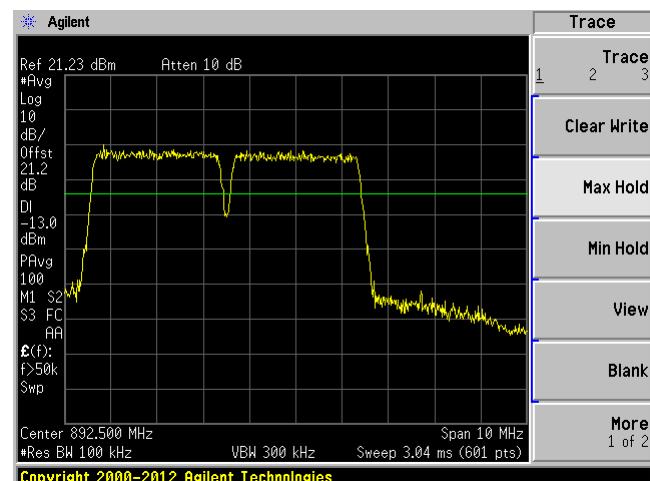


LTE-64QAM 3 MHz

Low Channel

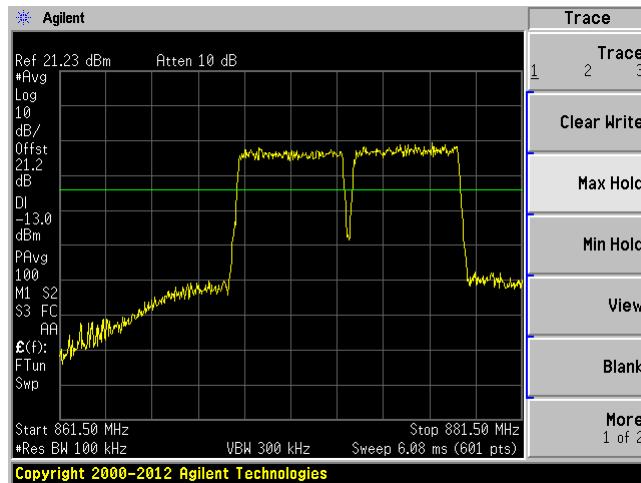


High Channel

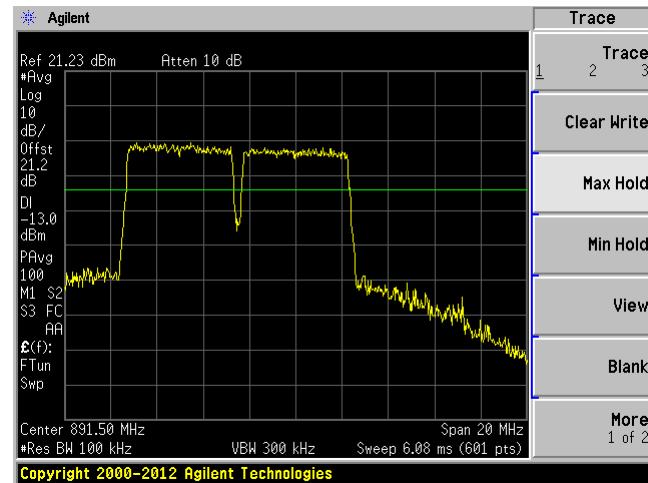


LTE-64QAM 5 MHz

Low Channel

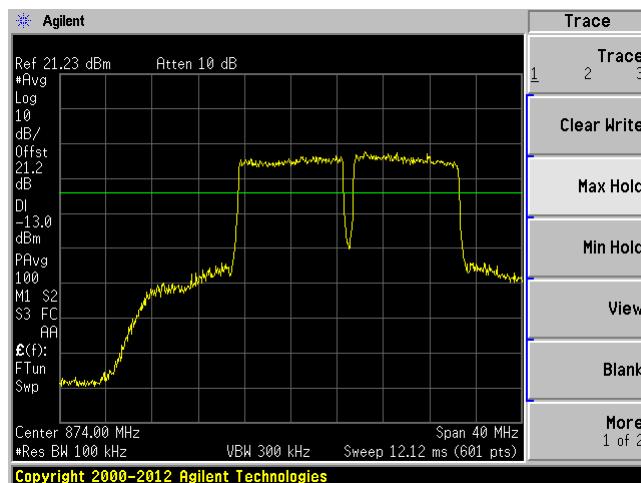


High Channel

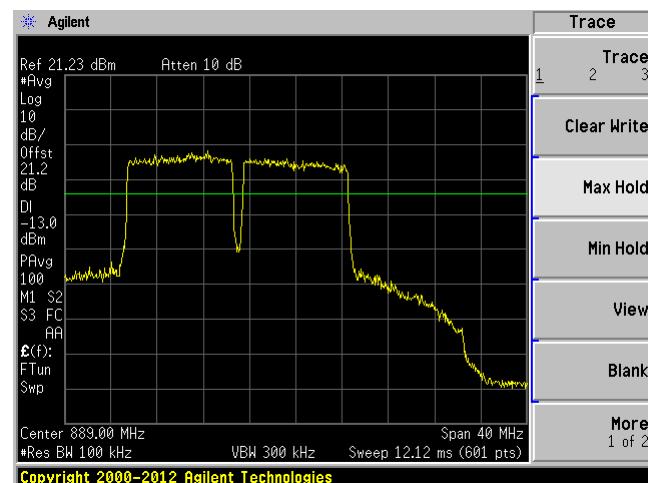


LTE-64QAM 10 MHz

Low Channel



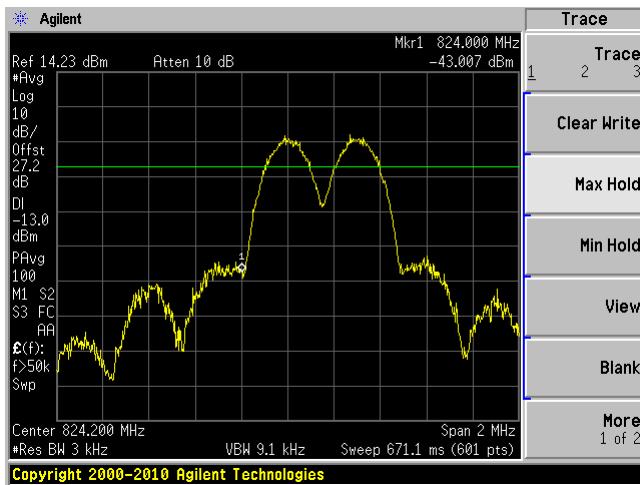
High Channel



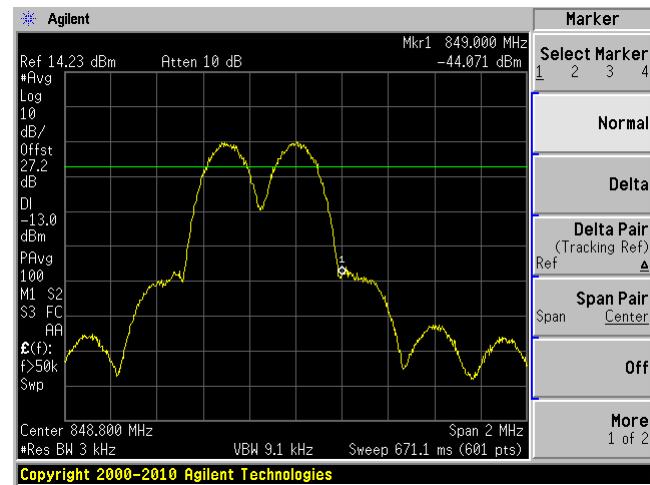
Uplink (ALC off)

GSM

Low Channel

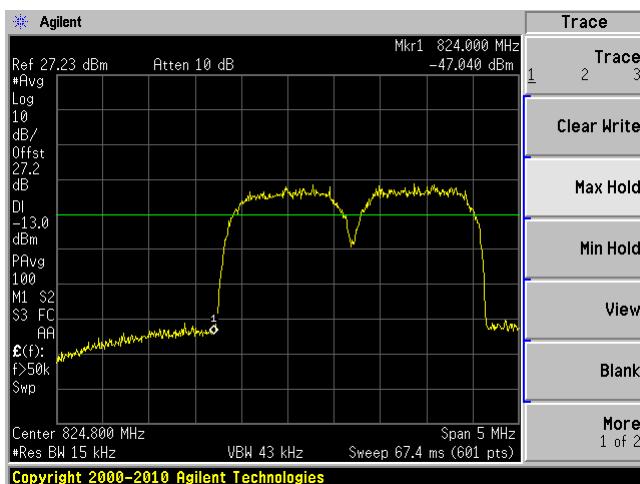


High Channel

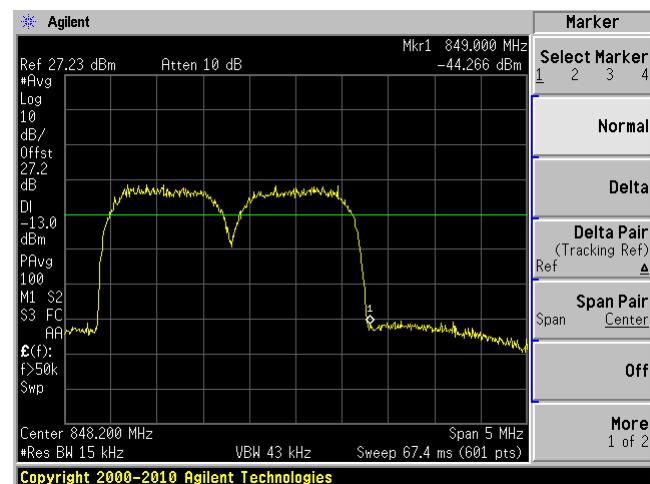


CDMA

Low Channel

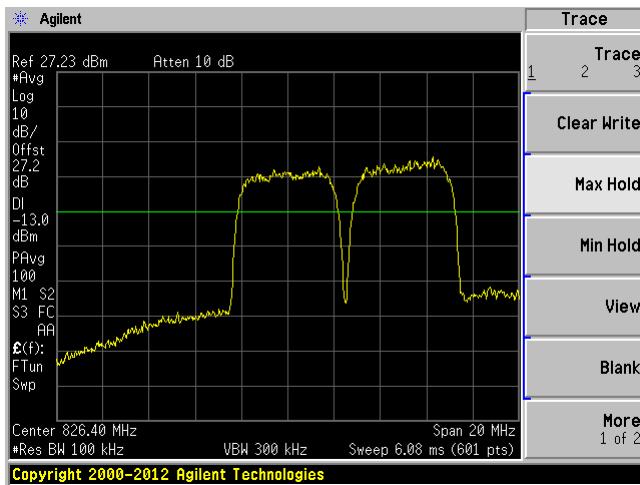


High Channel

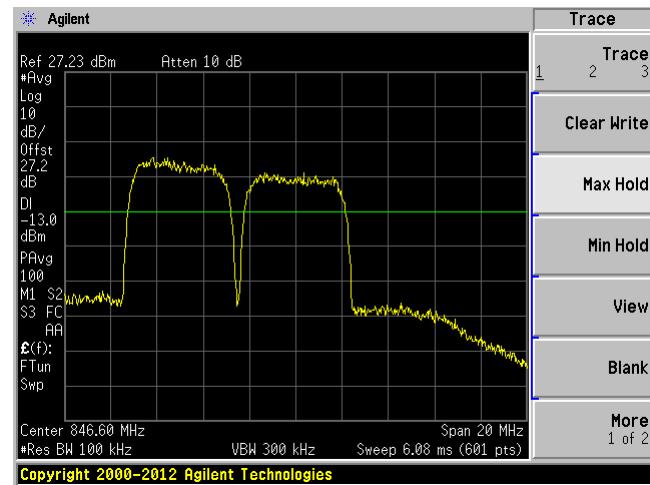


WCDMA

Low Channel

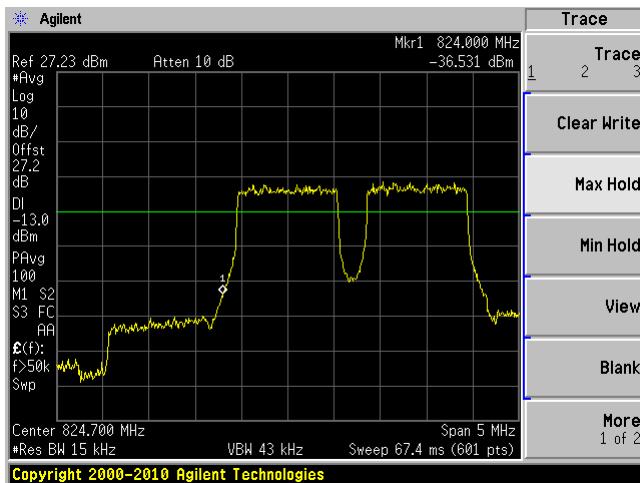


High Channel

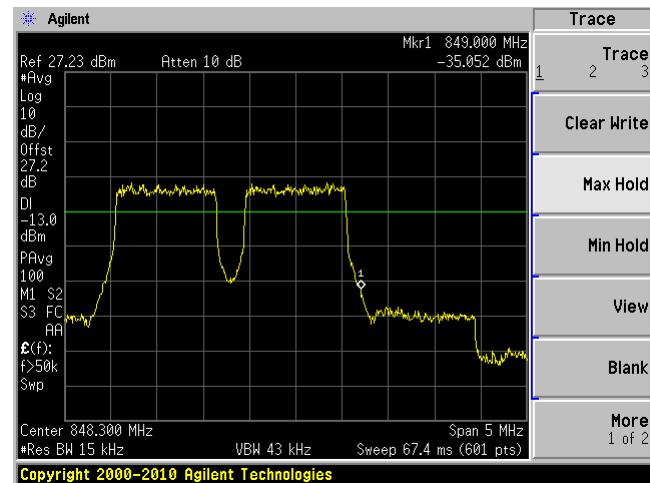


LTE-QPSK 1.4 MHz

Low Channel

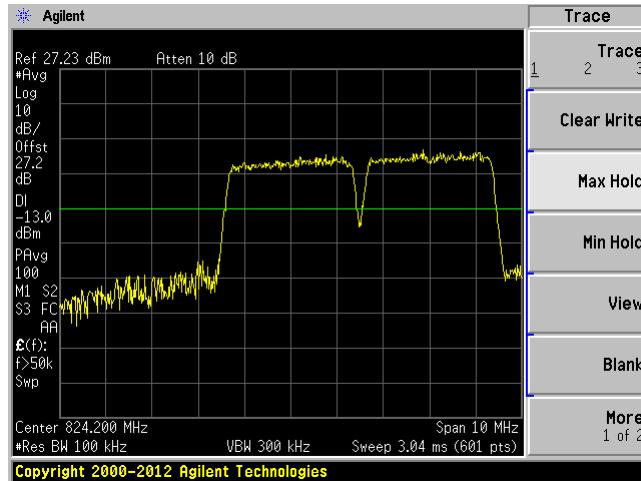


High Channel

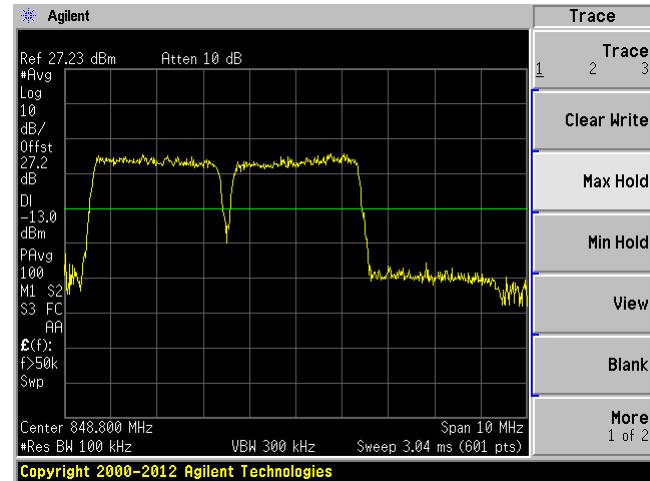


LTE-QPSK 3 MHz

Low Channel

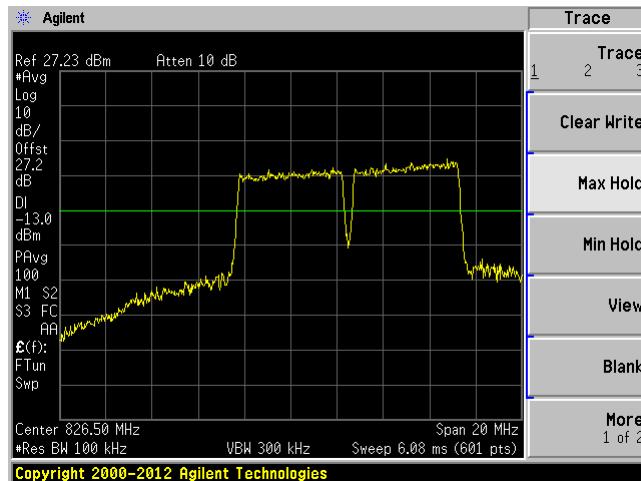


High Channel

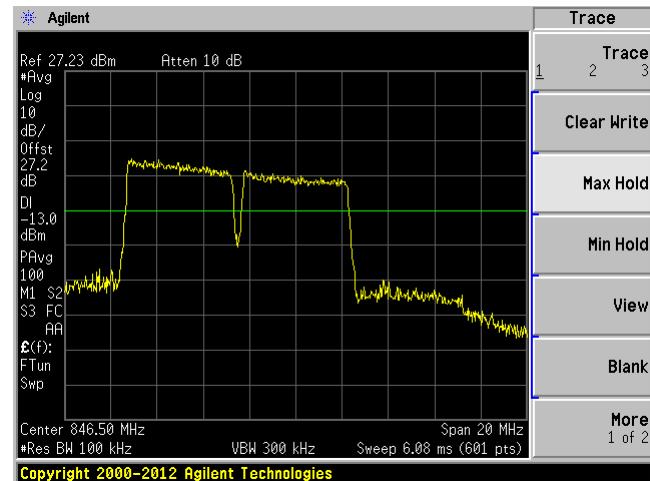


LTE-QPSK 5 MHz

Low Channel

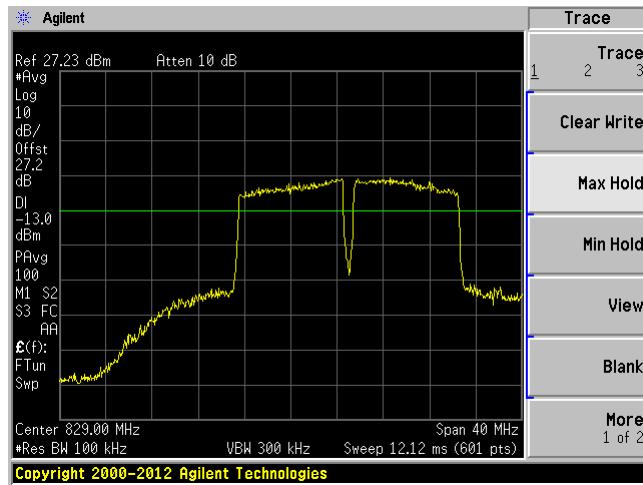


High Channel

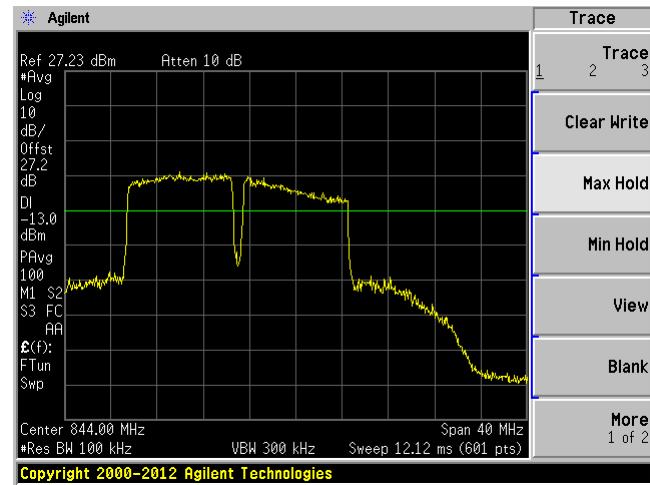


LTE-QPSK 10 MHz

Low Channel

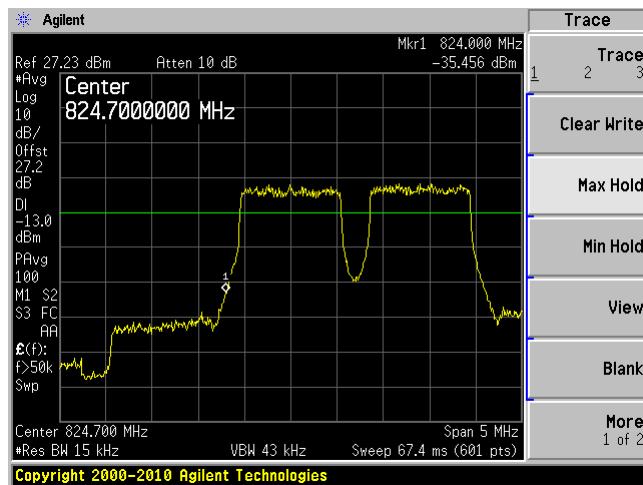


High Channel

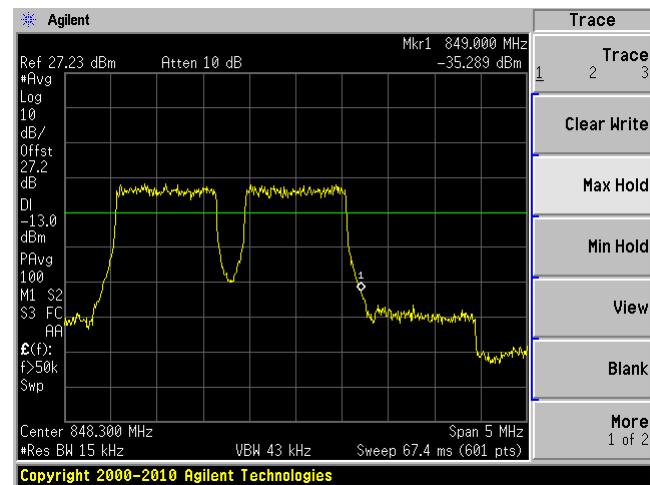


LTE-16QAM 1.4 MHz

Low Channel

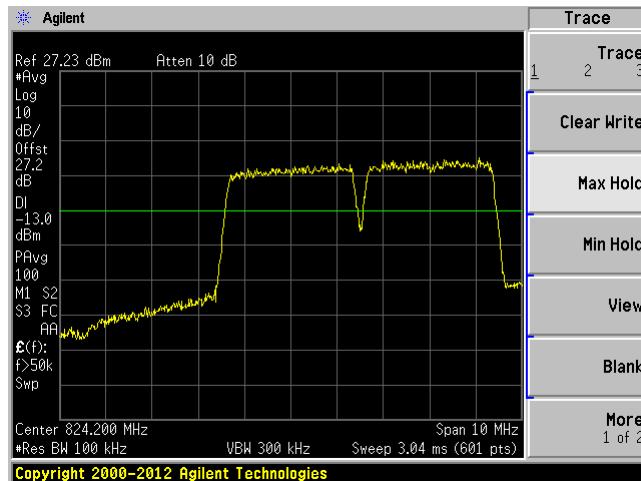


High Channel

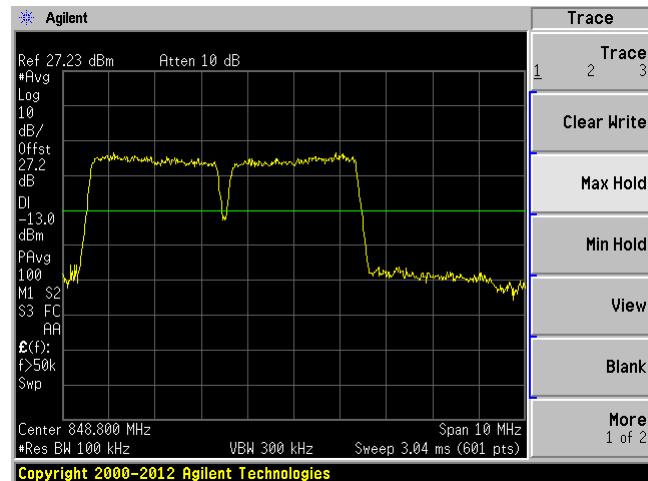


LTE-16QAM 3 MHz

Low Channel

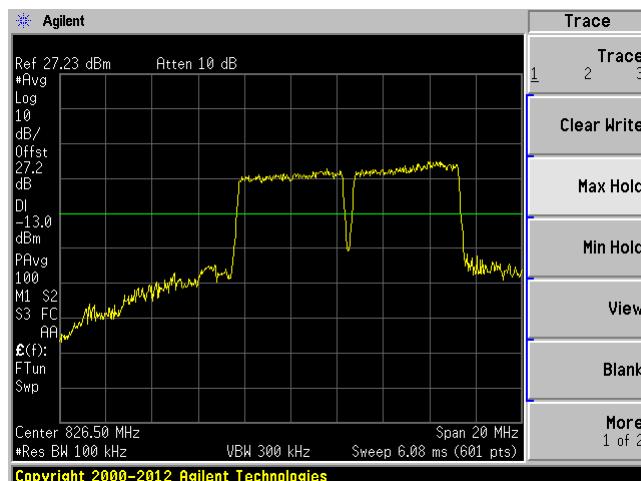


High Channel

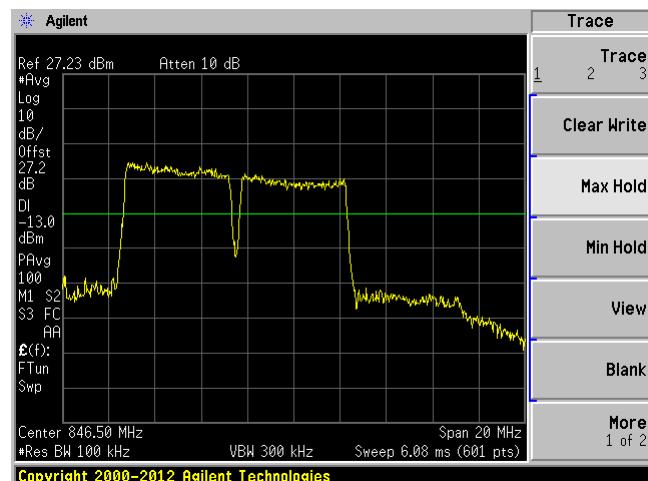


LTE-16QAM 5 MHz

Low Channel

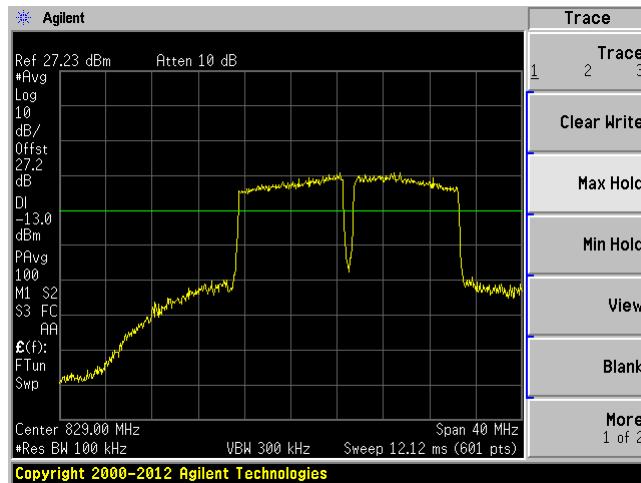


High Channel

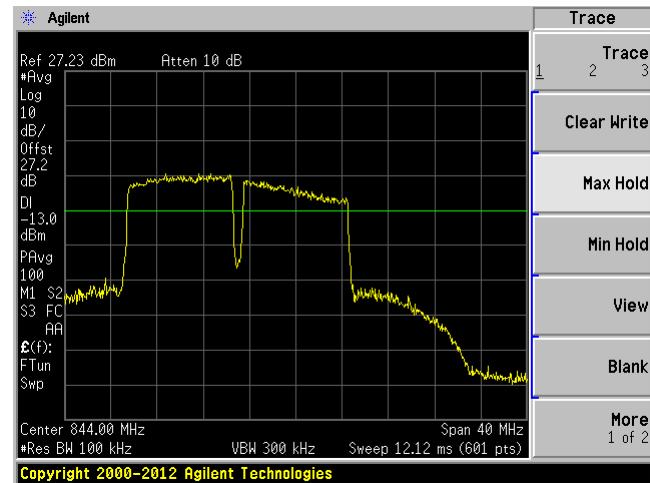


LTE-16QAM 10 MHz

Low Channel

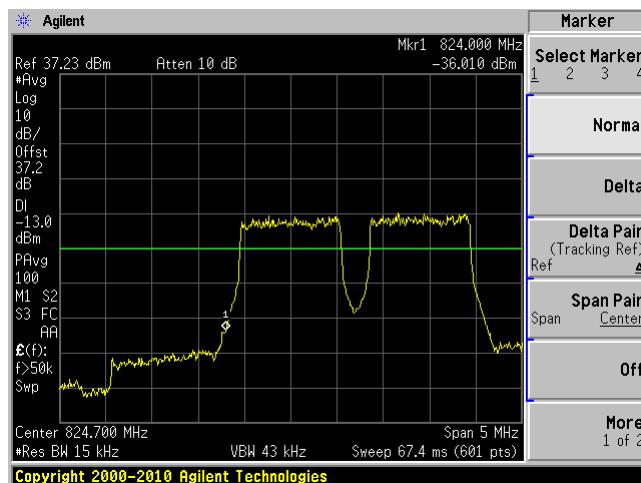


High Channel

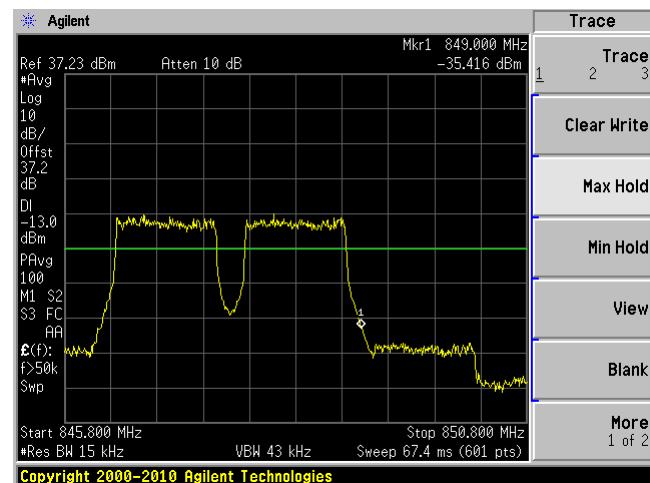


LTE-64QAM 1.4 MHz

Low Channel

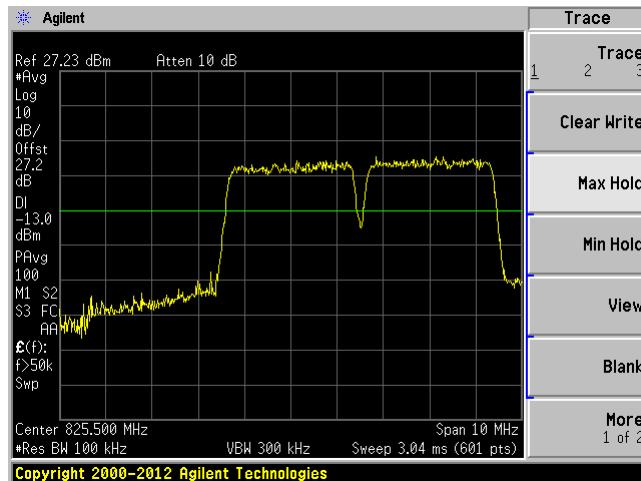


High Channel

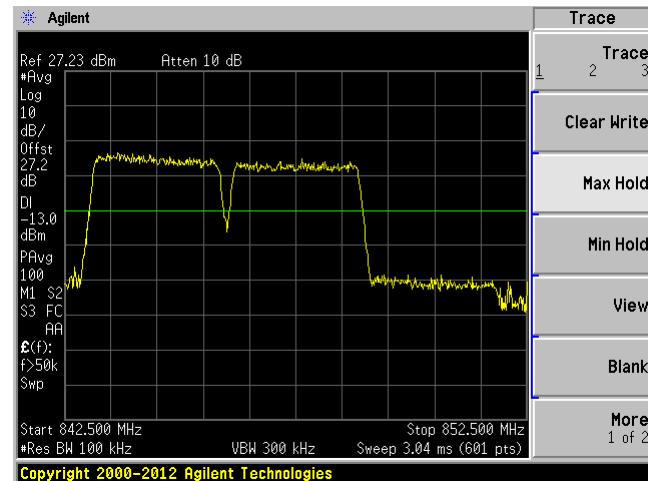


LTE-64QAM 3 MHz

Low Channel

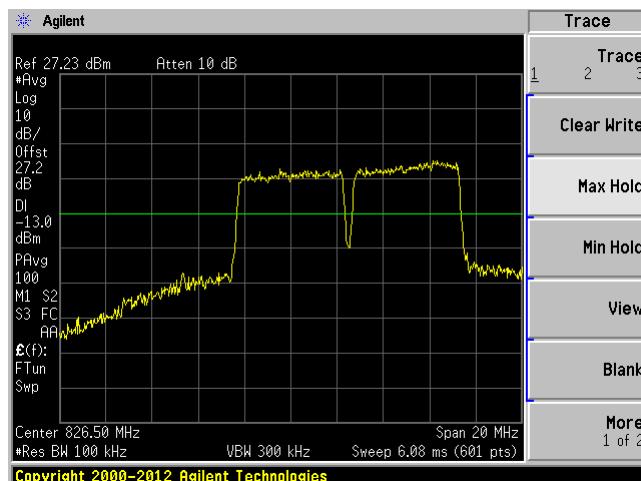


High Channel

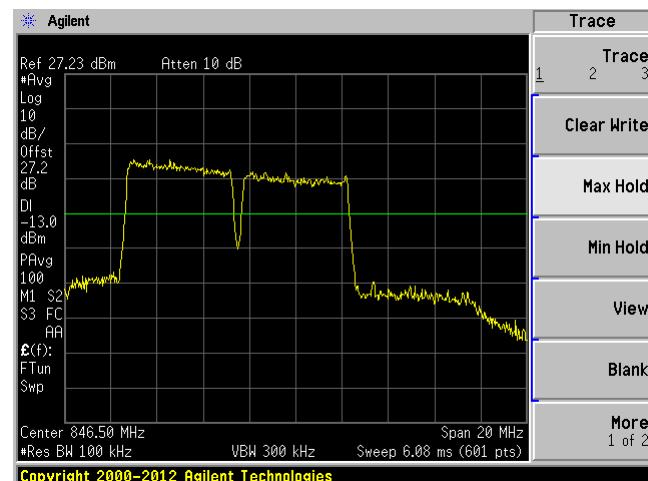


LTE-64QAM 5 MHz

Low Channel

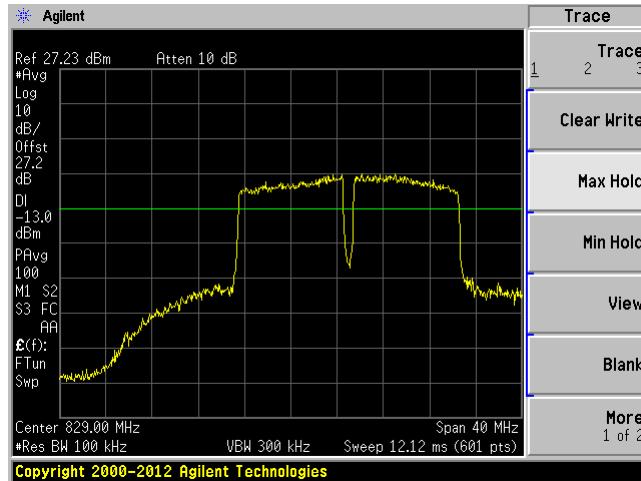


High Channel

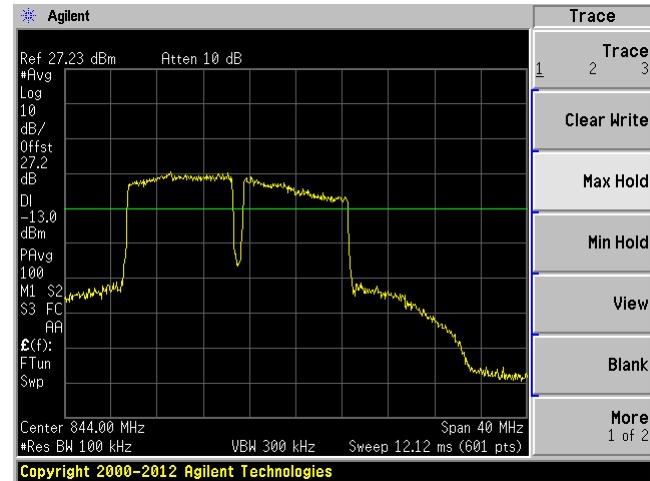


LTE-64QAM 10 MHz

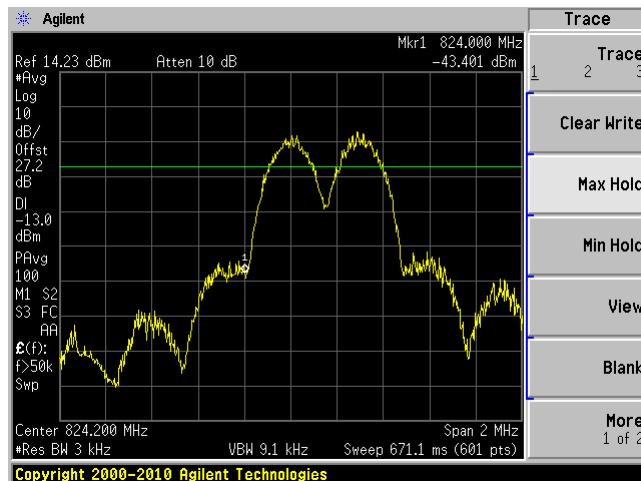
Low Channel



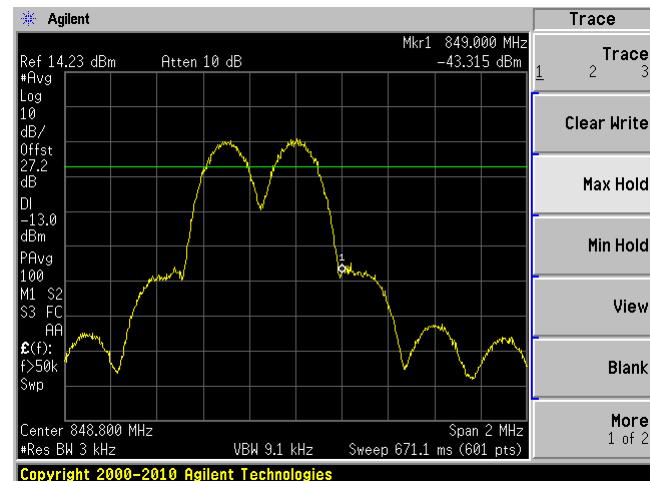
High Channel

Uplink (ALC on)
GSM

Low Channel

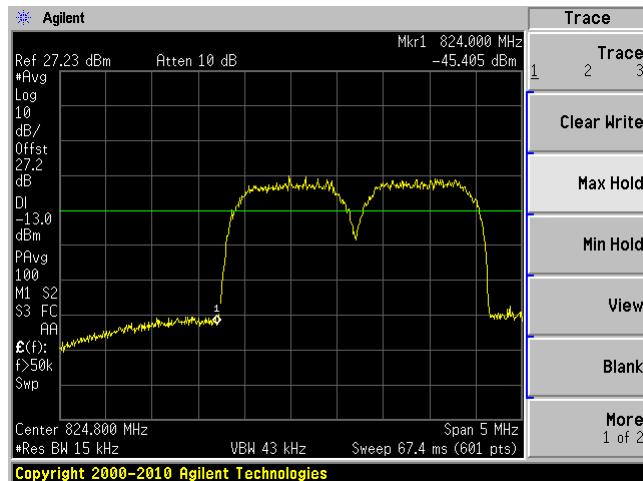


High Channel

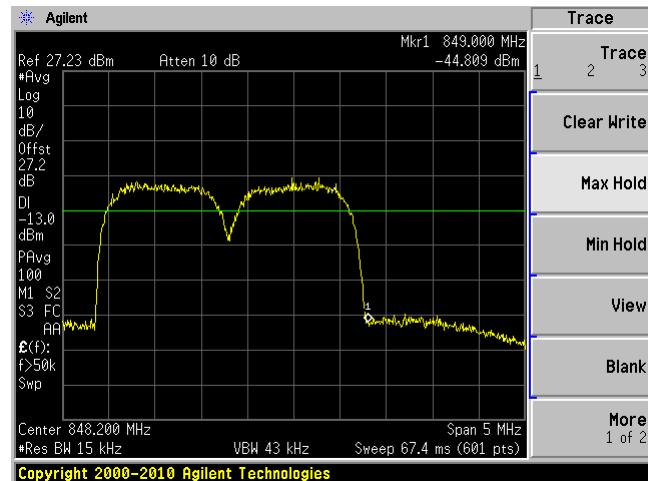


CDMA

Low Channel

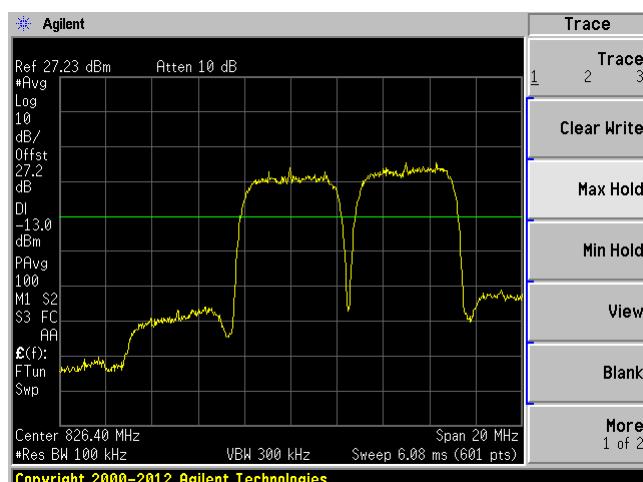


High Channel

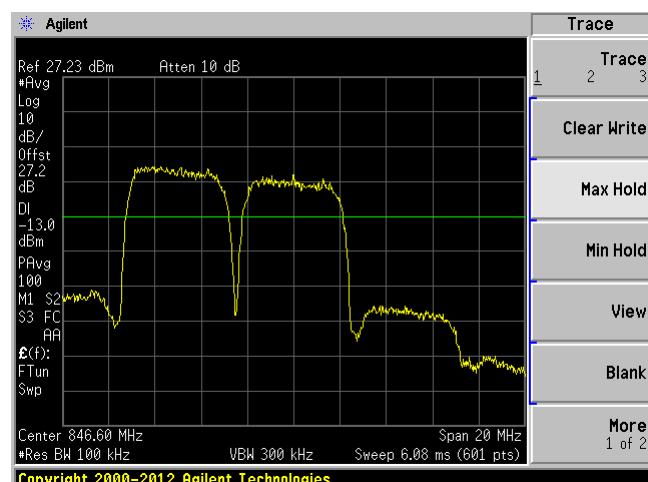


WCDMA

Low Channel

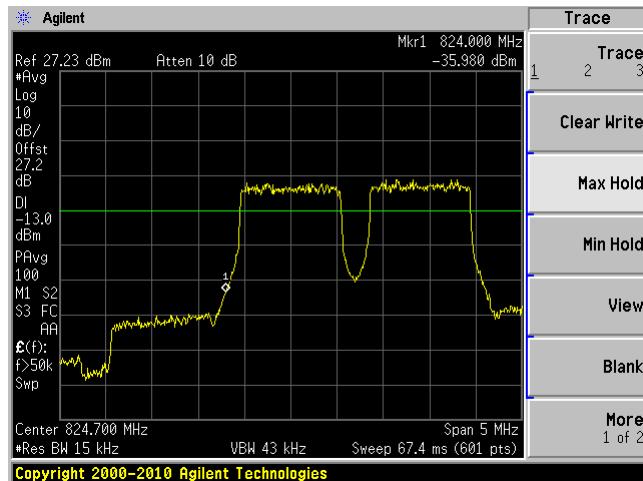


High Channel

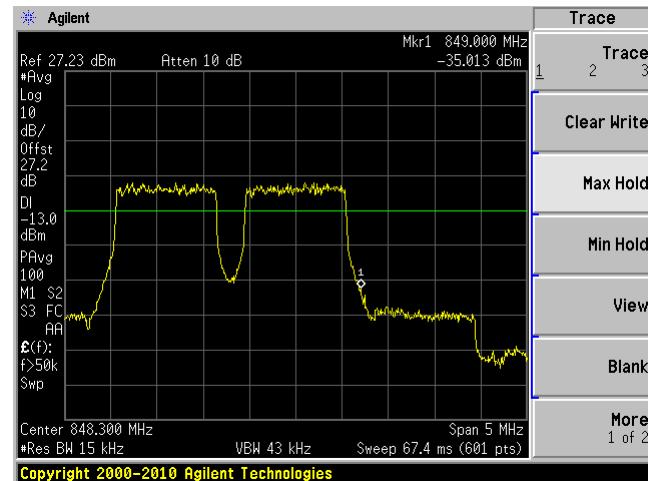


LTE-QPSK 1.4 MHz

Low Channel

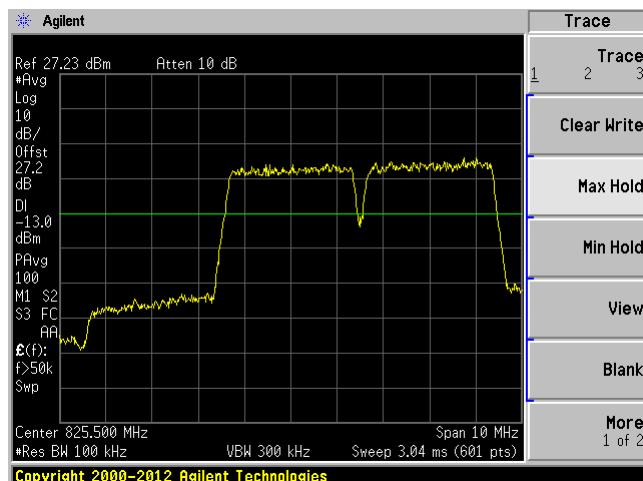


High Channel



LTE-QPSK 3 MHz

Low Channel

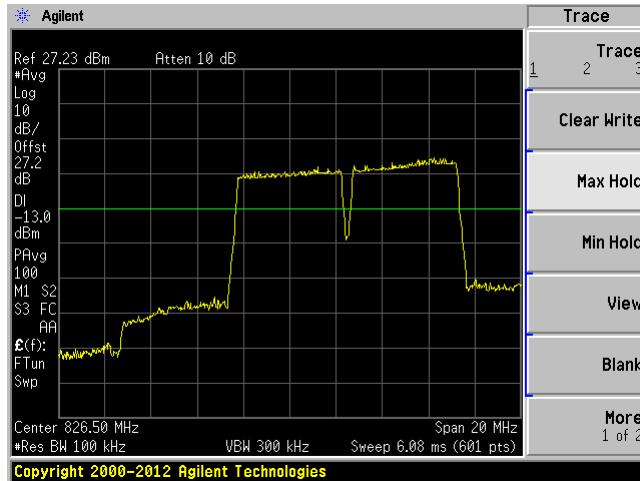


High Channel

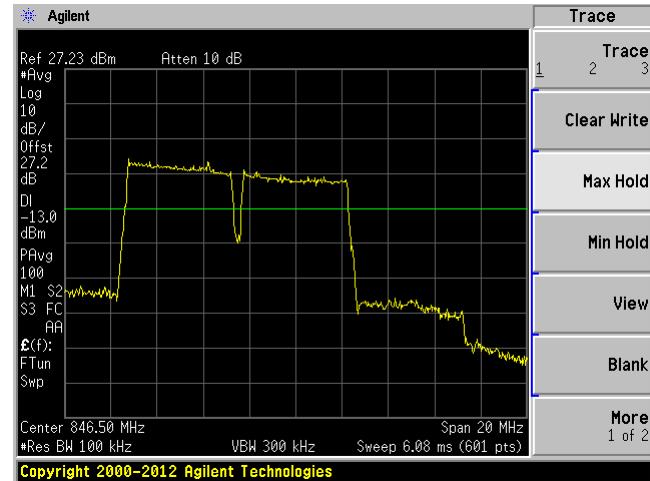


LTE-QPSK 5 MHz

Low Channel

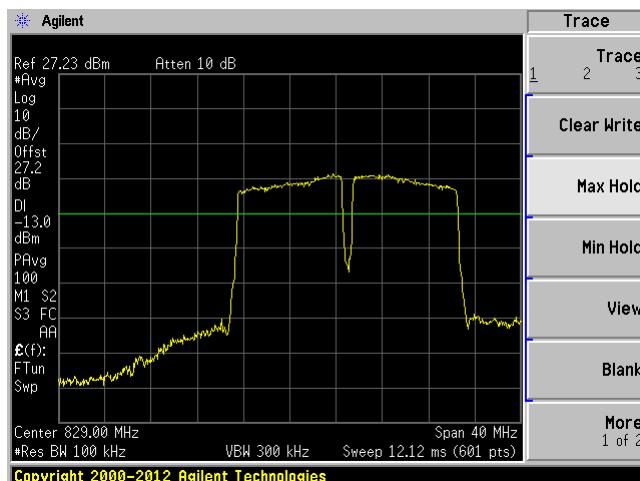


High Channel

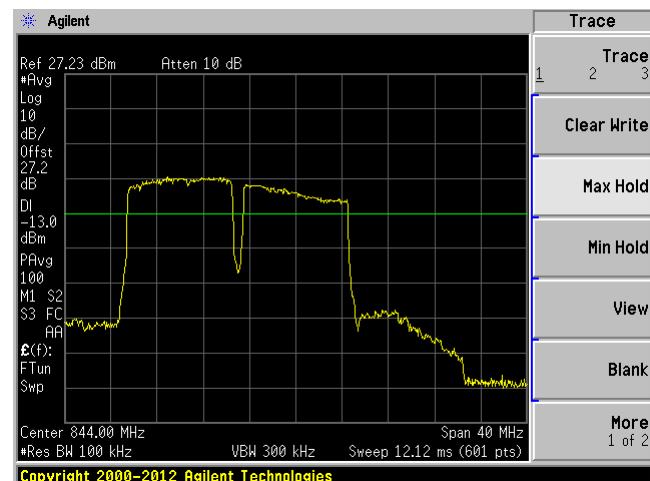


LTE-QPSK 10 MHz

Low Channel

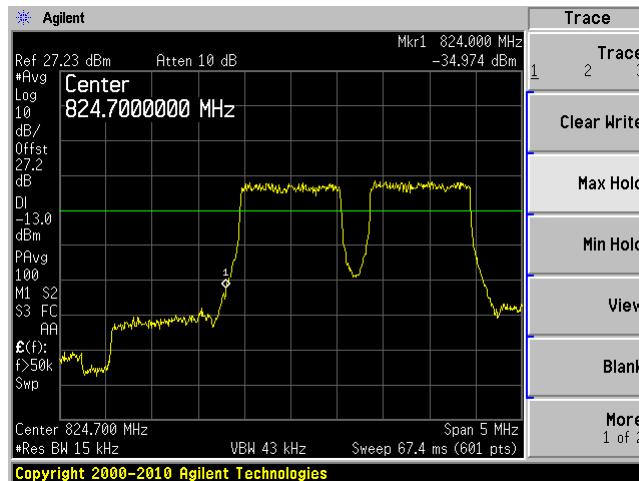


High Channel

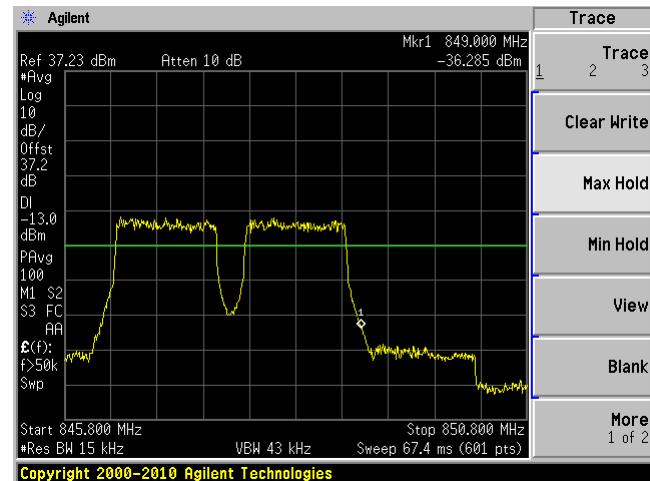


LTE-16QAM 1.4 MHz

Low Channel

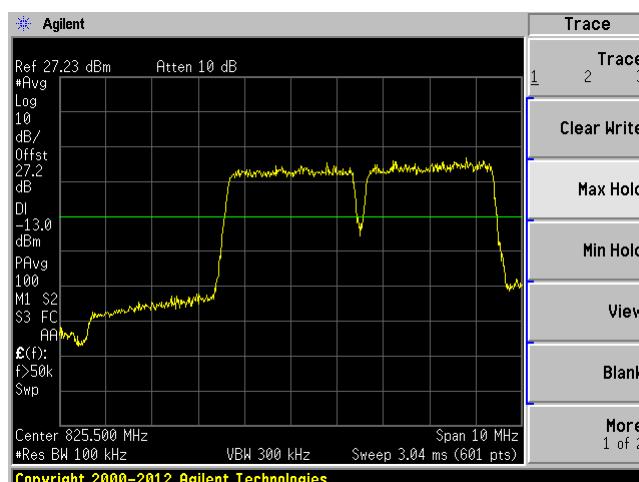


High Channel

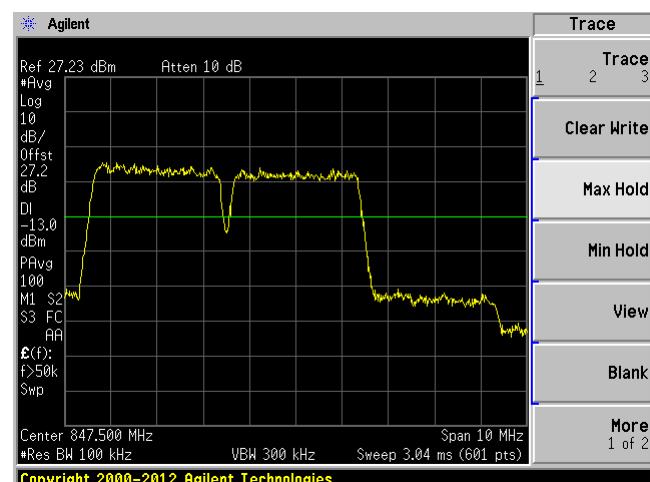


LTE-16QAM 3 MHz

Low Channel

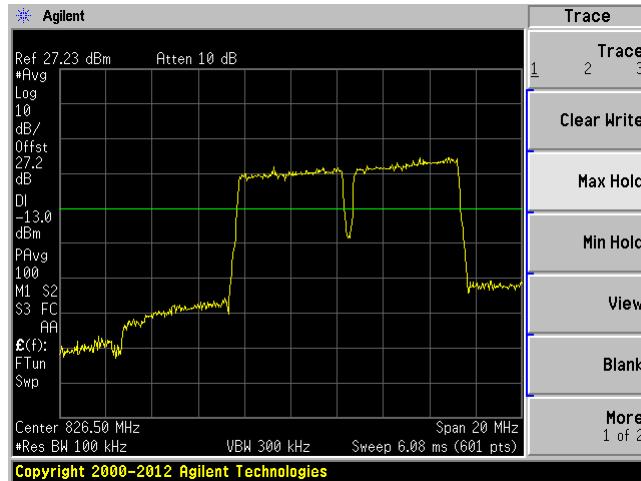


High Channel

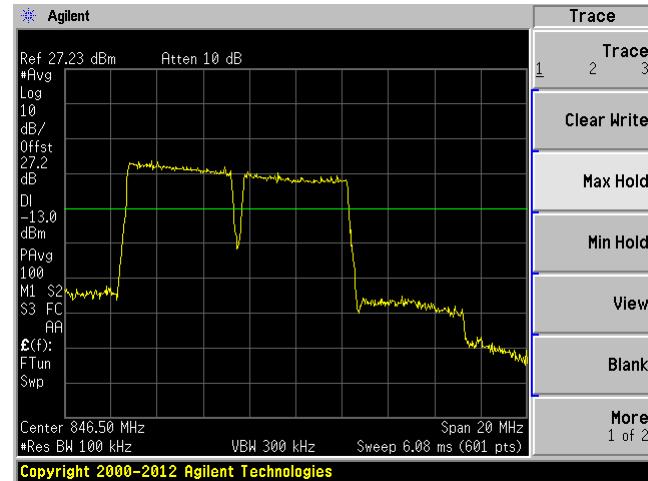


LTE-16QAM 5 MHz

Low Channel

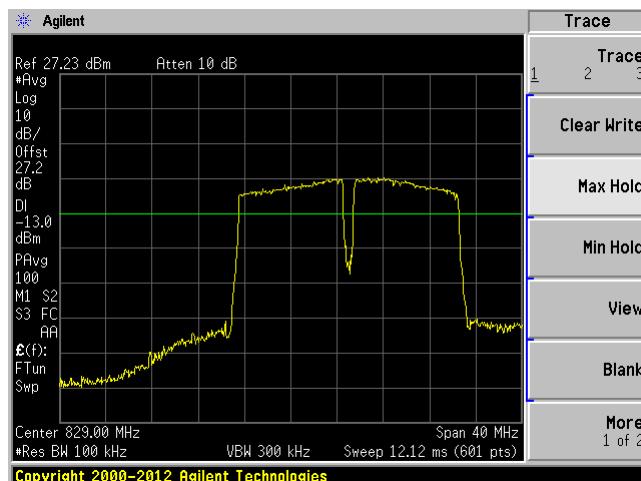


High Channel



LTE-16QAM 10 MHz

Low Channel

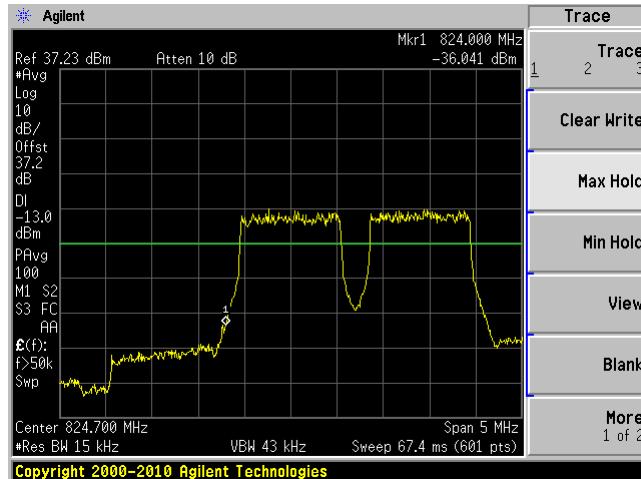


High Channel

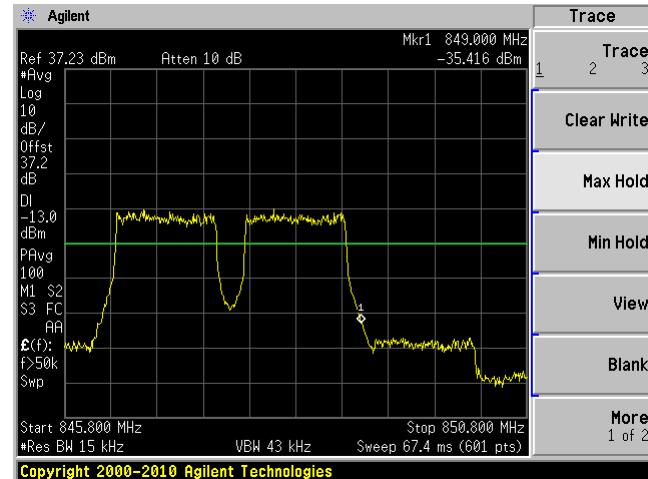


LTE-64QAM 1.4 MHz

Low Channel

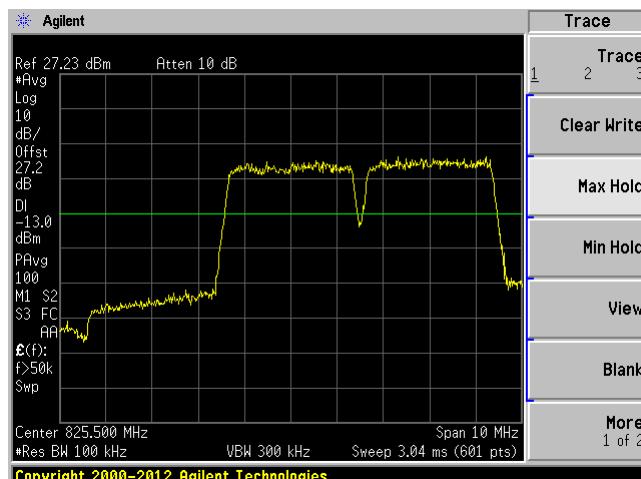


High Channel

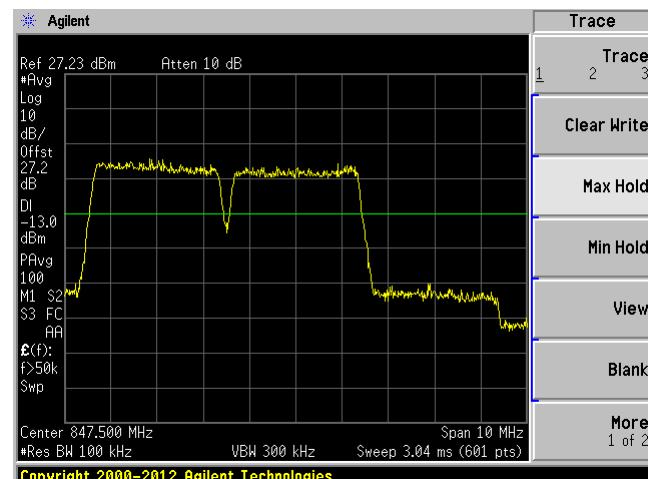


LTE-64QAM 3 MHz

Low Channel

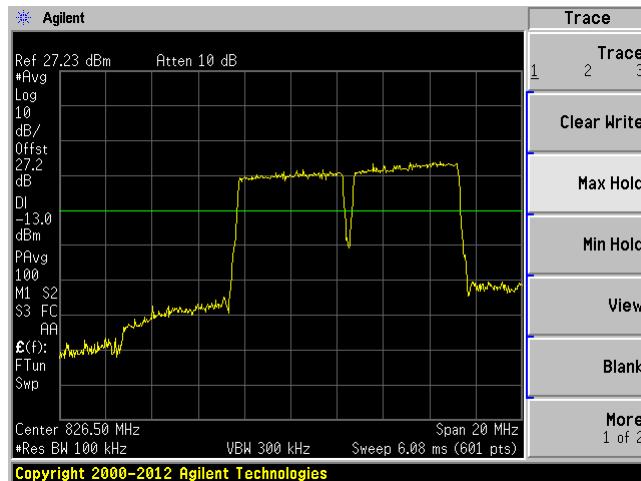


High Channel

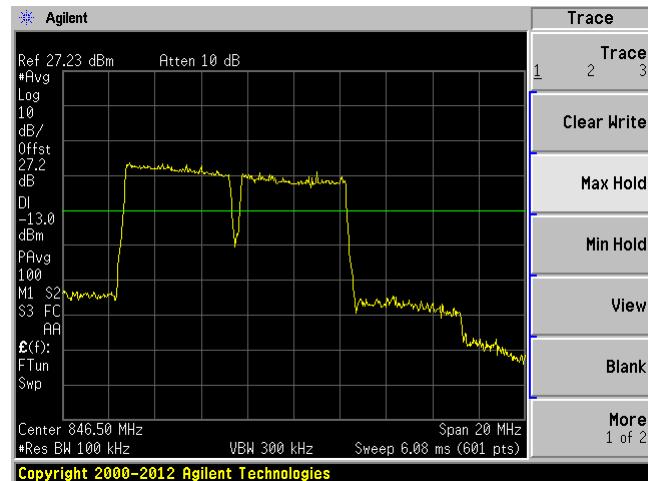


LTE-64QAM 5 MHz

Low Channel

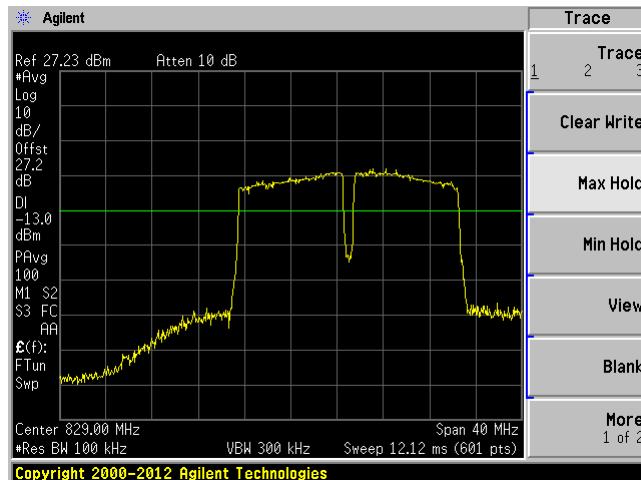


High Channel

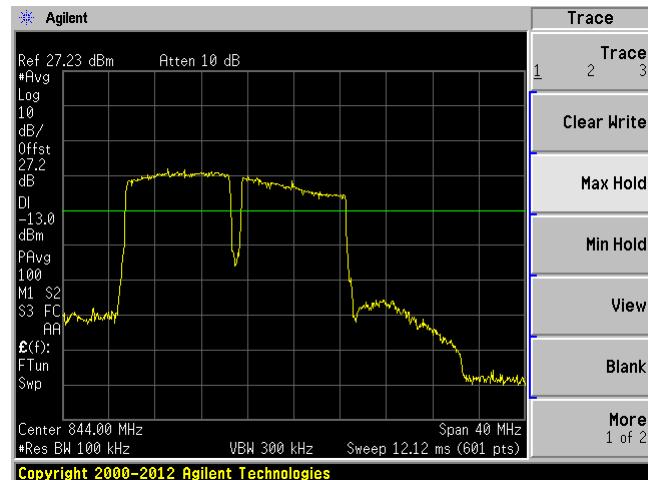


LTE-64QAM 10 MHz

Low Channel



High Channel



8 FCC §22.917 - Band Edge

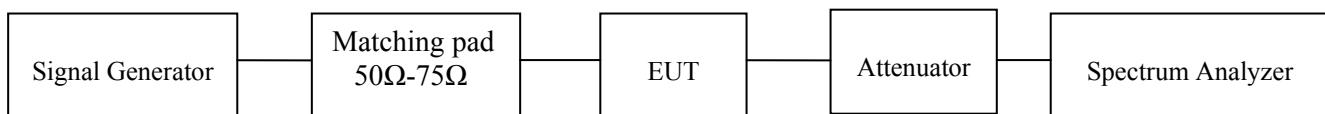
8.1 Applicable Standards

According to FCC §22.917 the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

8.2 Test Procedure

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω - 75Ω matching pad.

The center frequency of the spectrum analyzer was set according to center frequency of the EUT to be transmitted. The RBW was set to greater than 1% of emission bandwidth for all uplink and downlink frequencies.



8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

8.4 Test Environmental Conditions

Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

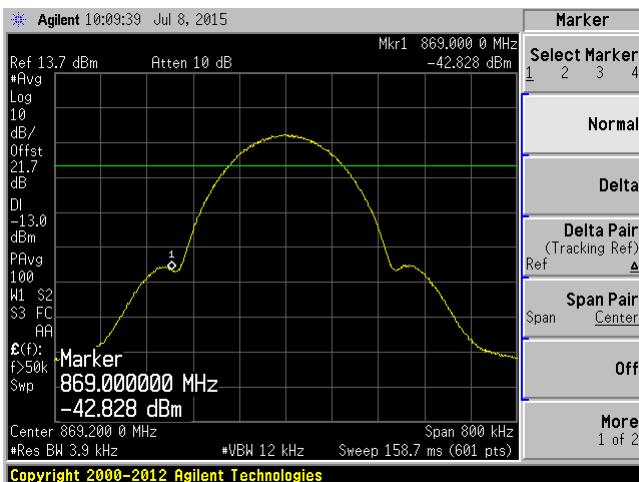
The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

8.5 Test Results

Please refer to the following plots.

GSM/GPRS DL

Low DL

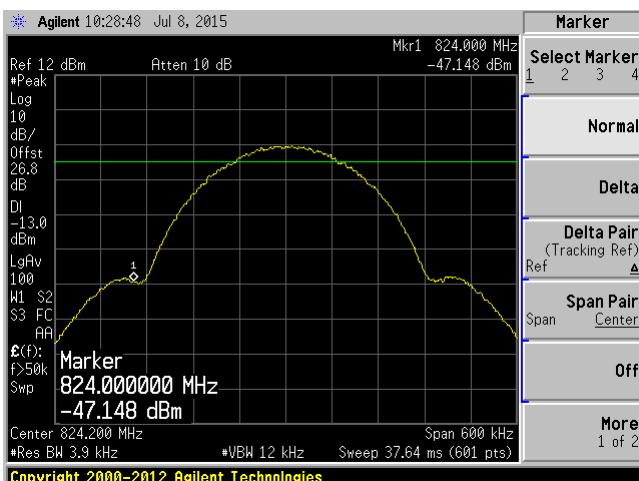


High DL

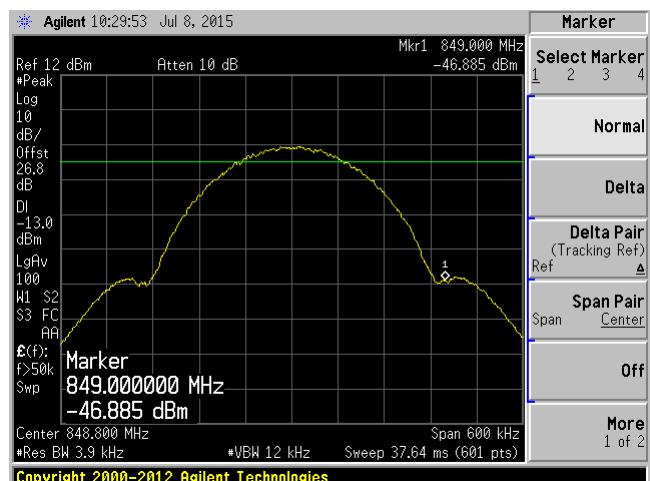


GSM/GPRS UL

Low UL

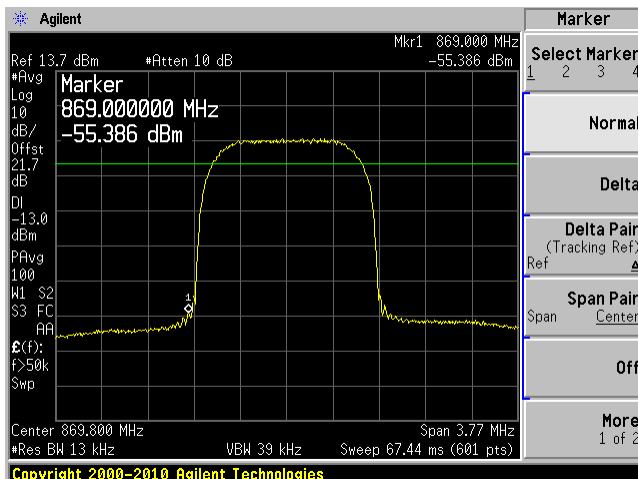


High UL

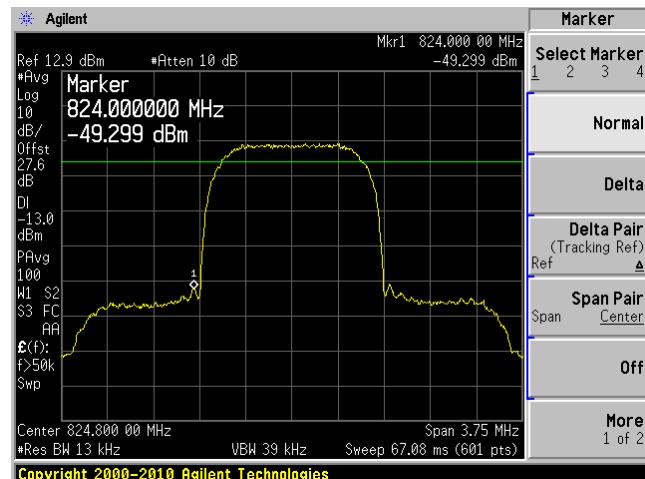


CDMA

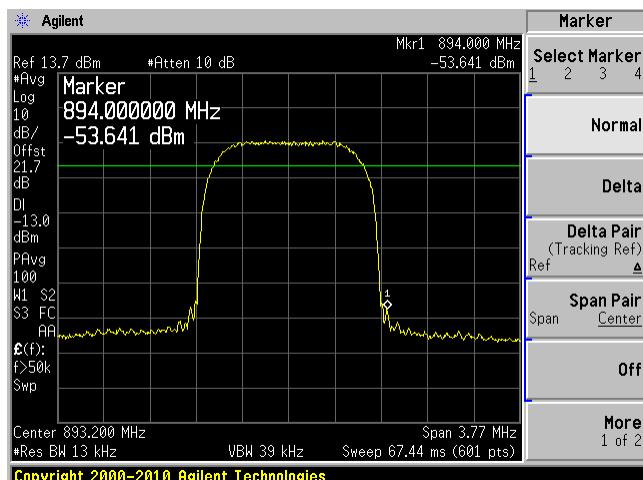
Low DL



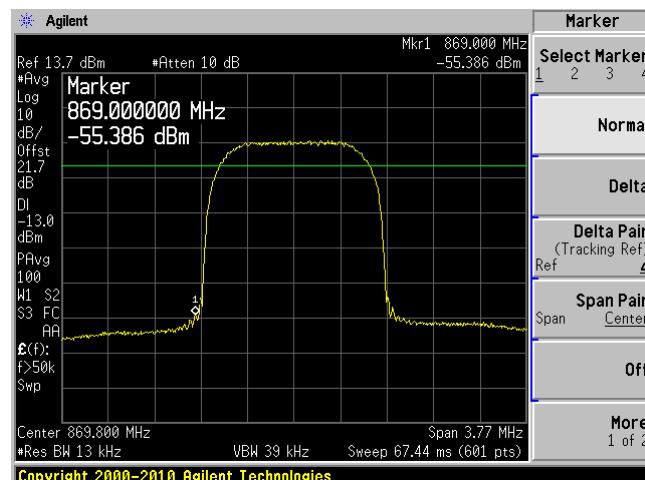
Low UL



High DL

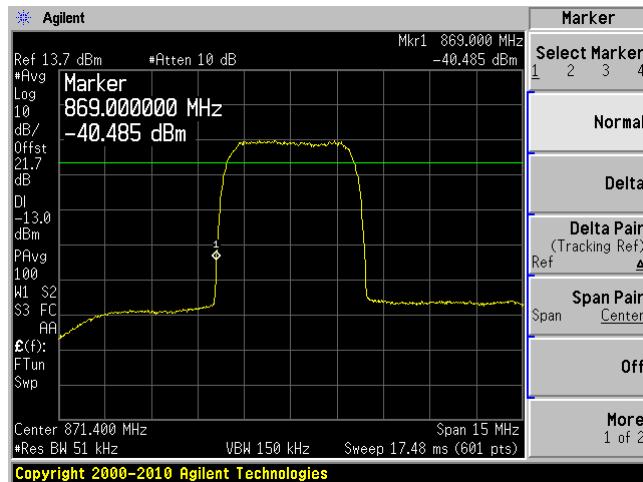


High UL

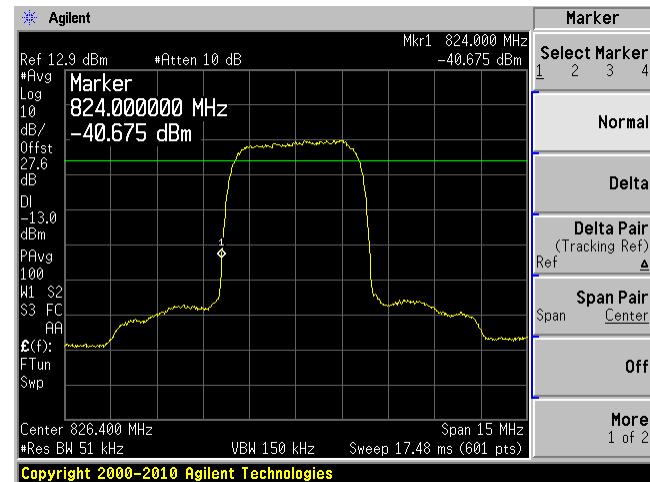


WCDMA

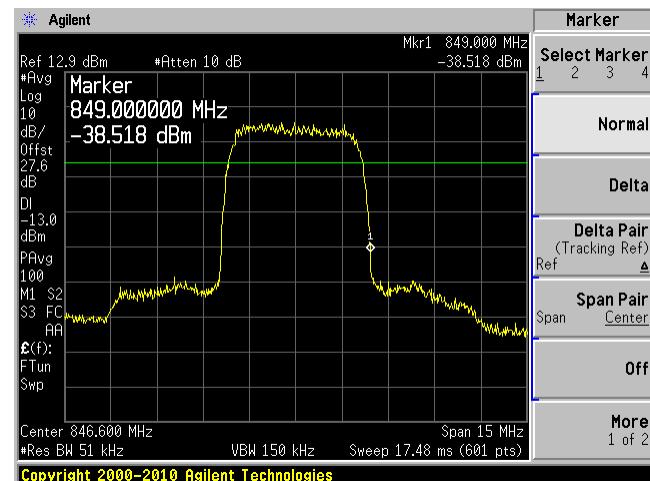
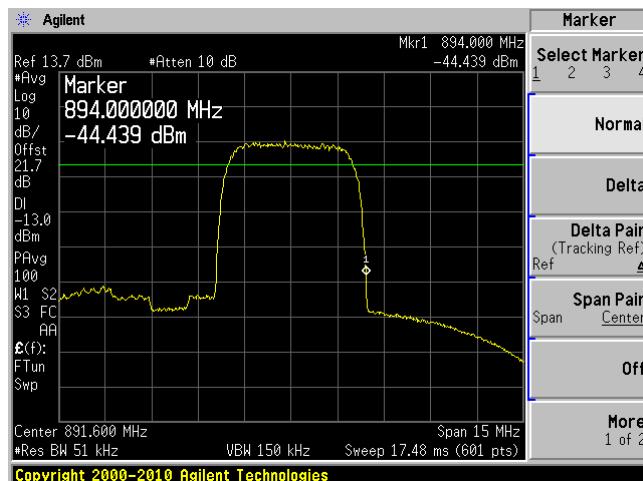
Low DL



Low UL

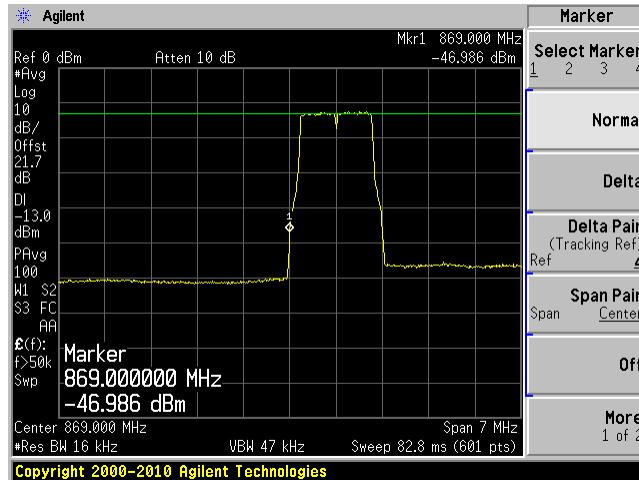


High DL

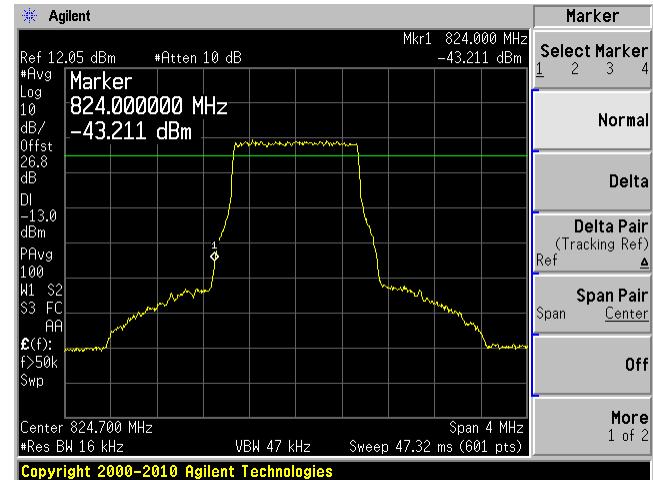


LTE 1.4MHZ QPSK

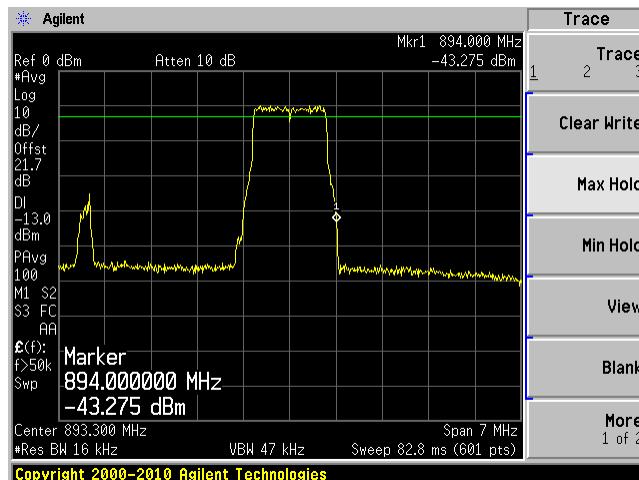
Low DL



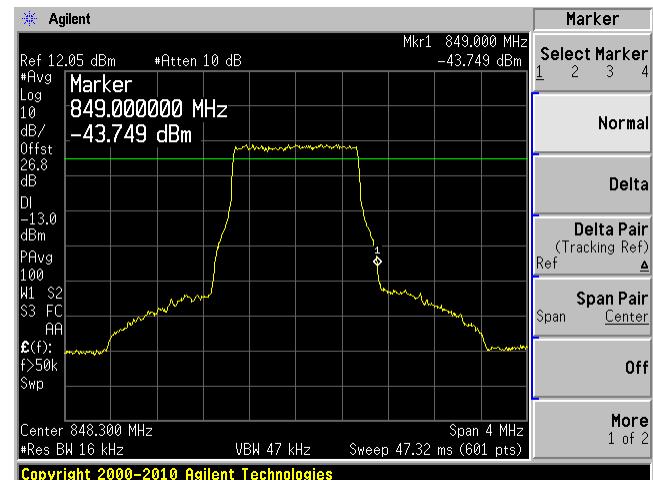
Low UL



High DL

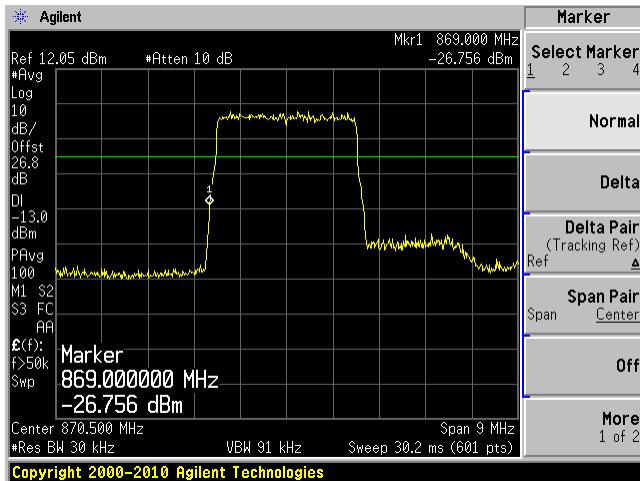


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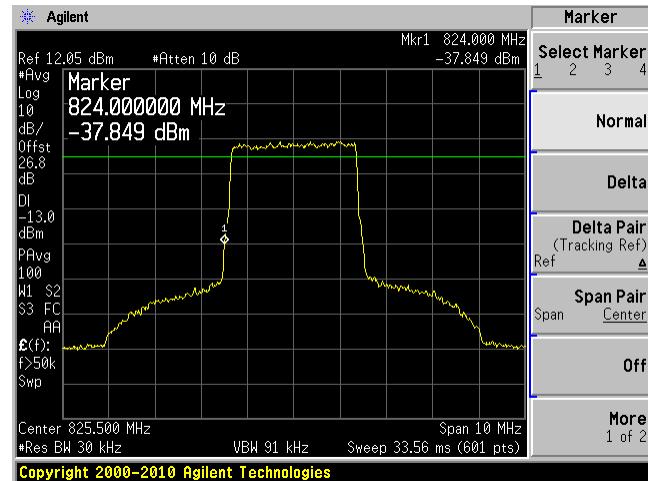


LTE 3MHZ QPSK

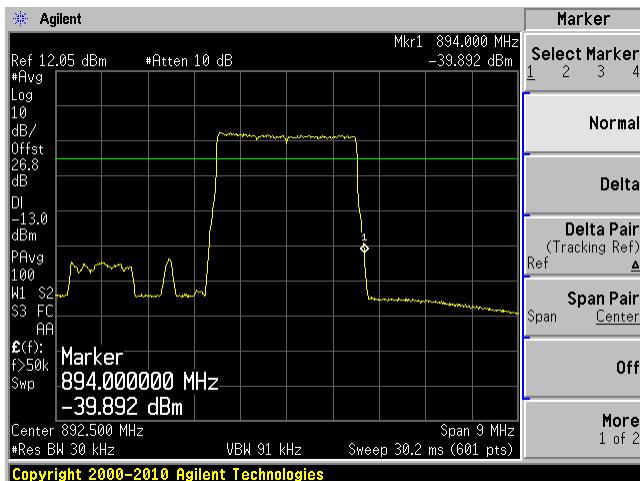
Low DL



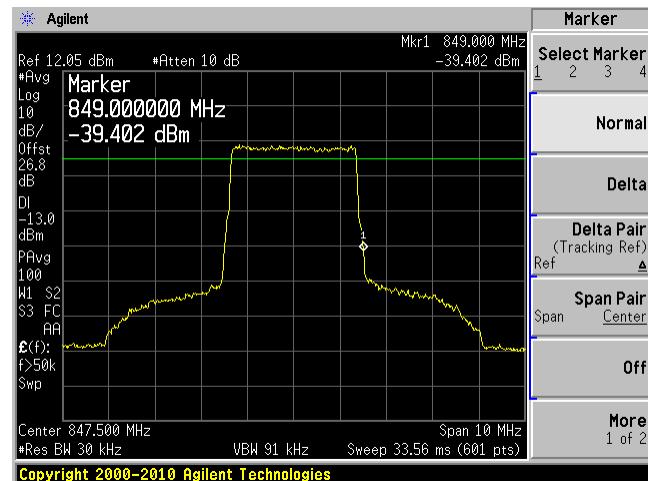
Low UL



High DL

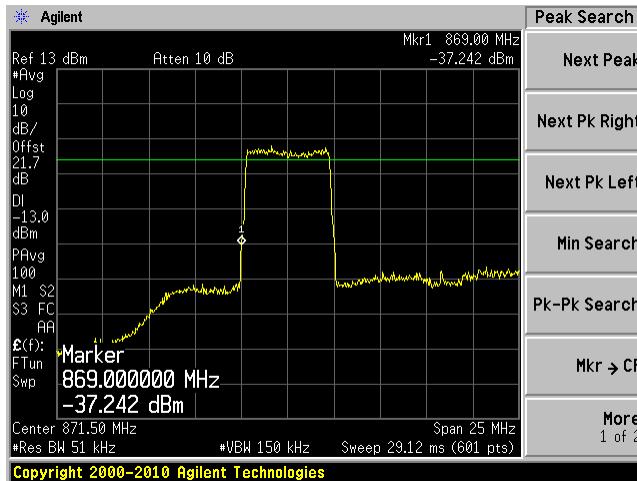


High UL

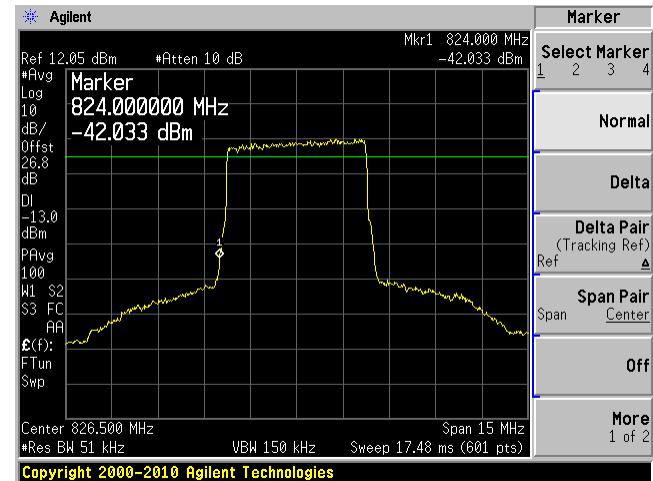


LTE 5MHZ QPSK

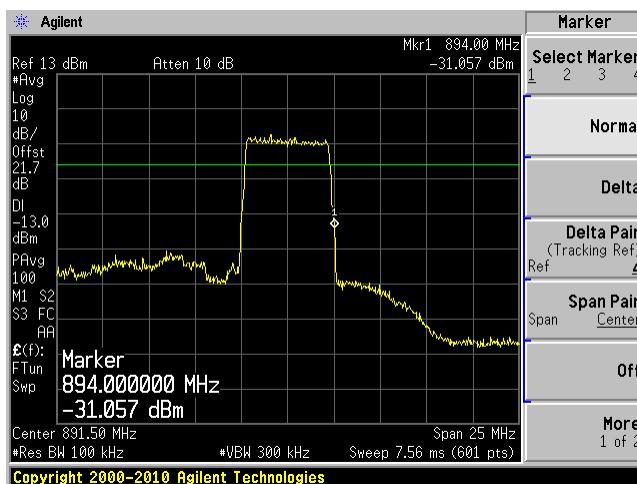
Low DL



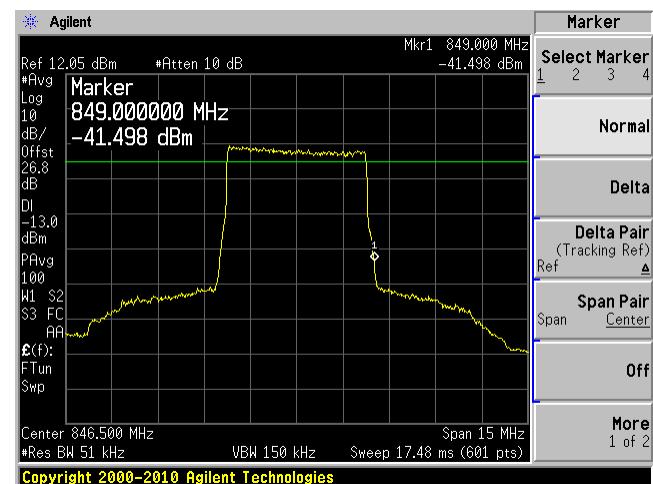
Low UL



High DL

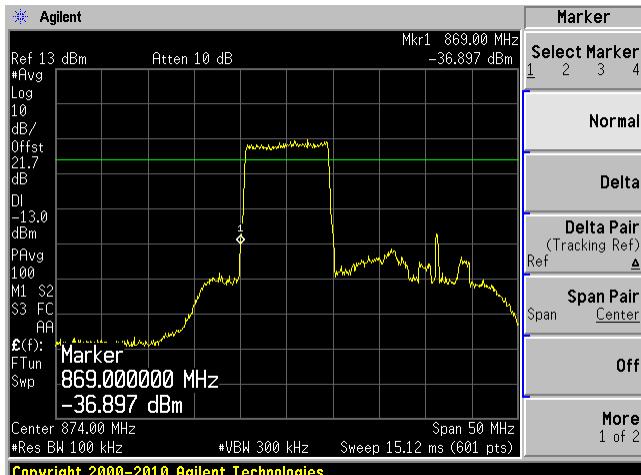


High UL

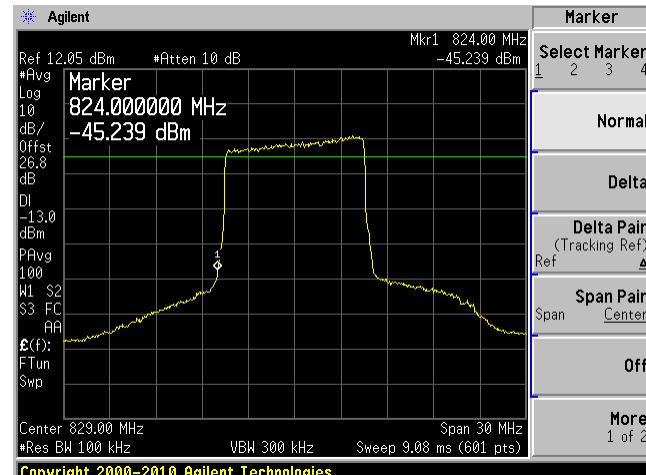


LTE 10MHZ QPSK

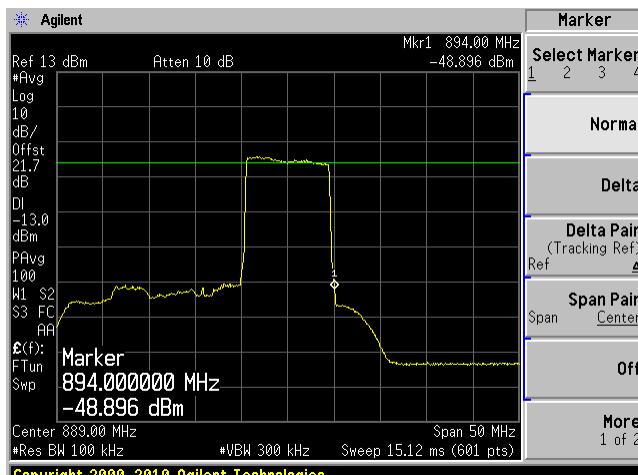
Low DL



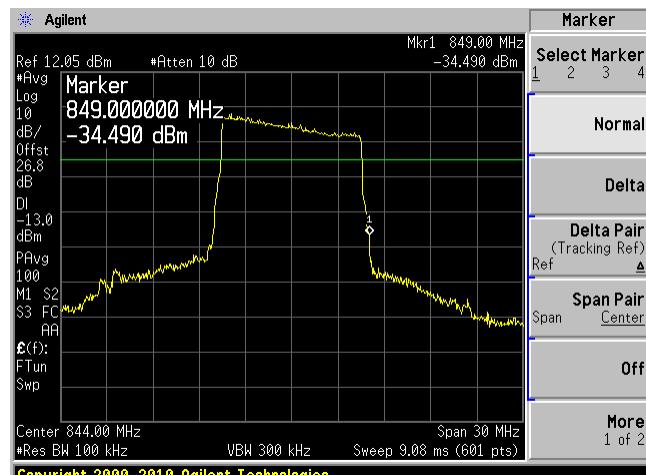
Low UL



High DL

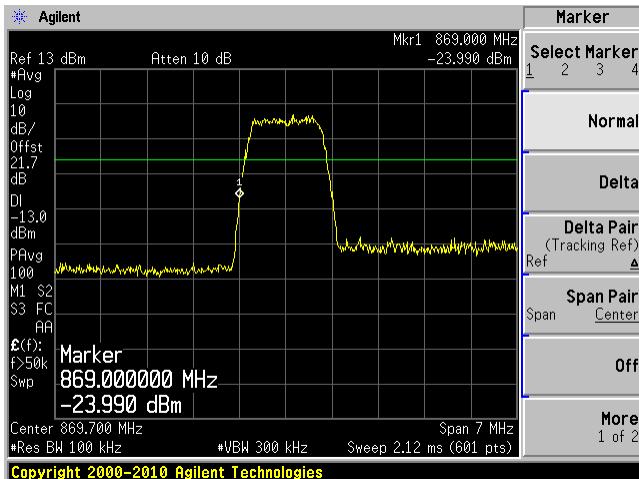


High UL

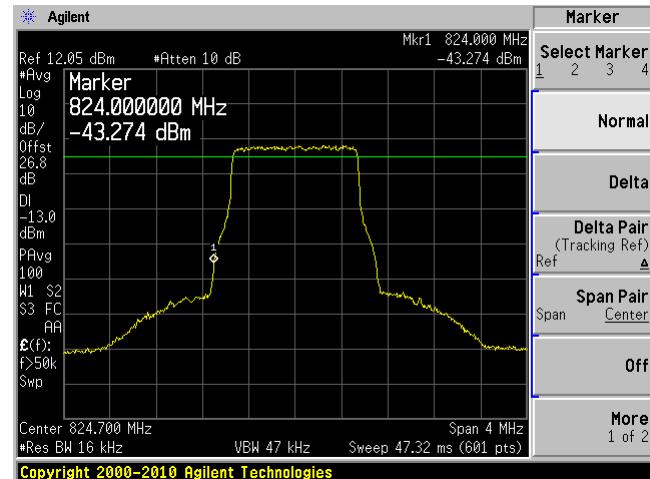


LTE 1.4 MHZ 16QAM

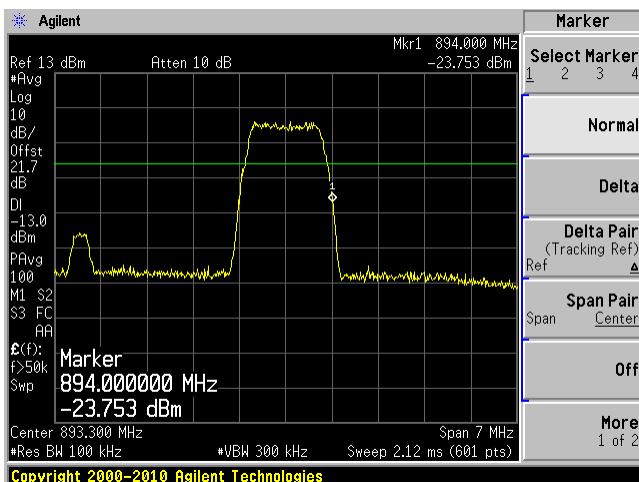
Low DL



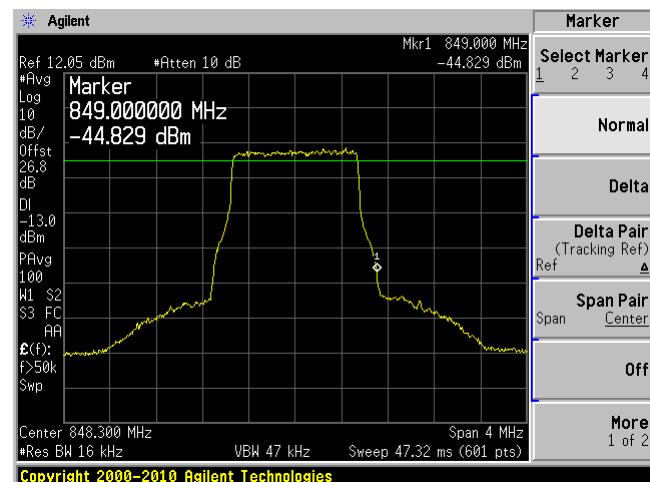
Low UL



High DL

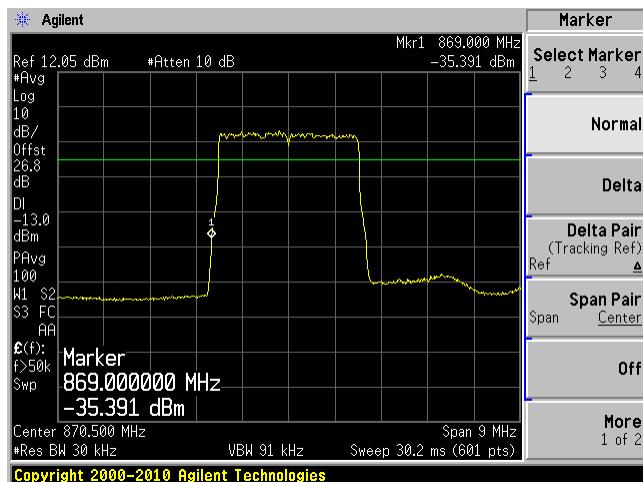


High UL

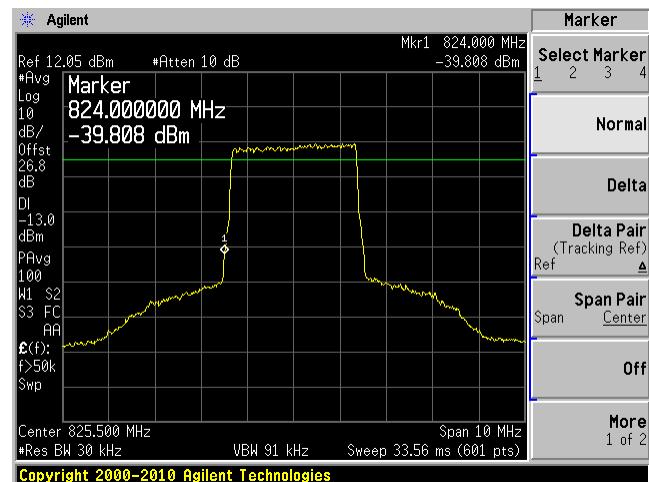


LTE 3MHZ 16QAM

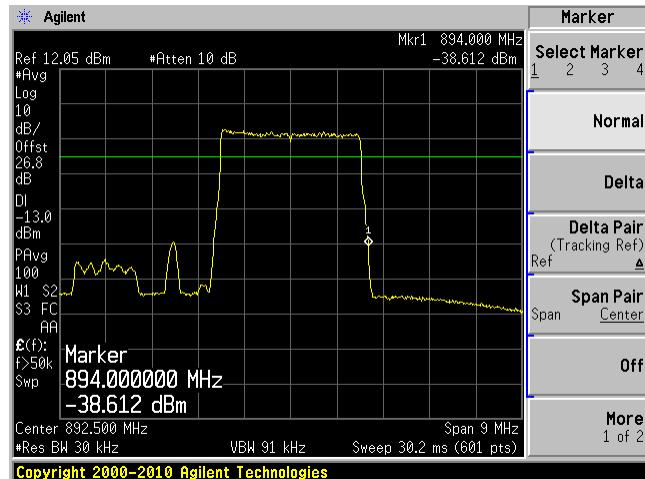
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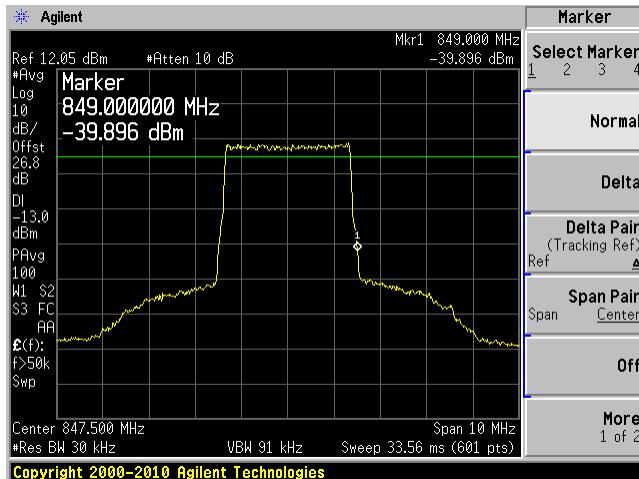
Low UL



High DL

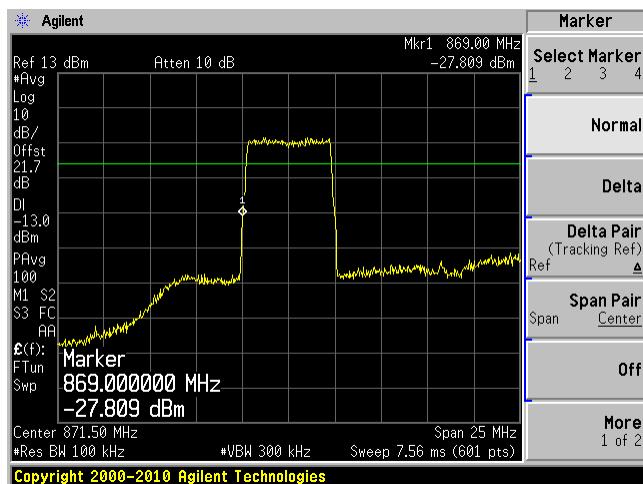


High UL

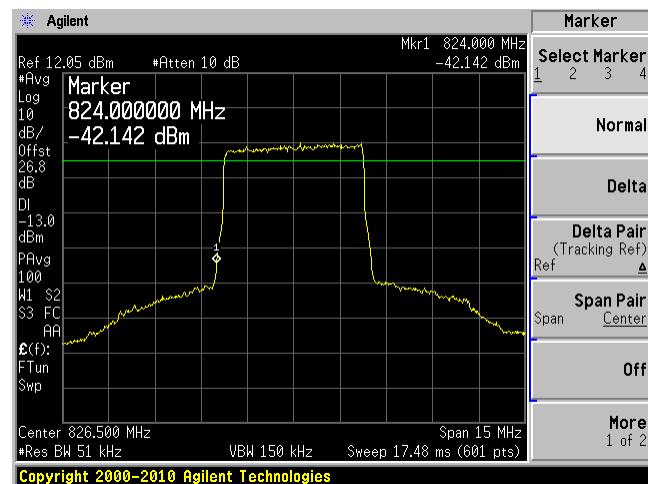


LTE 5MHZ 16QAM

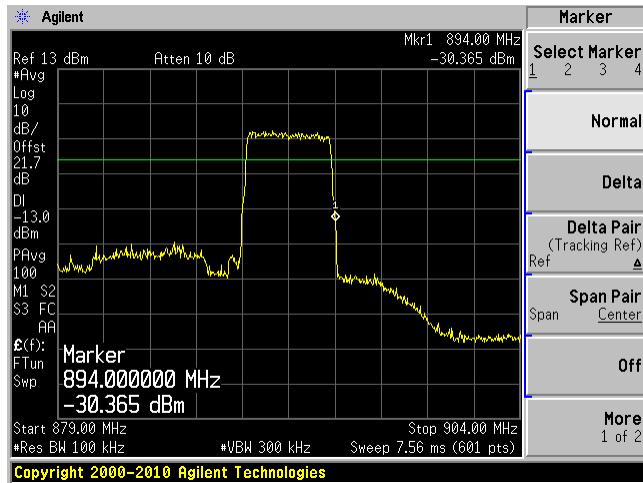
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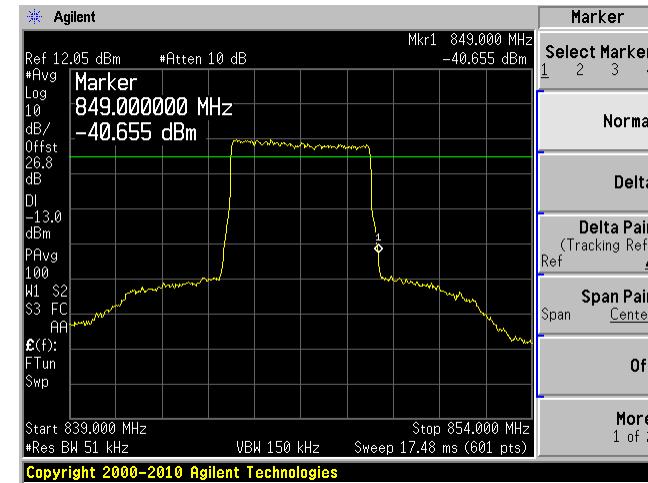
Low UL



High DL

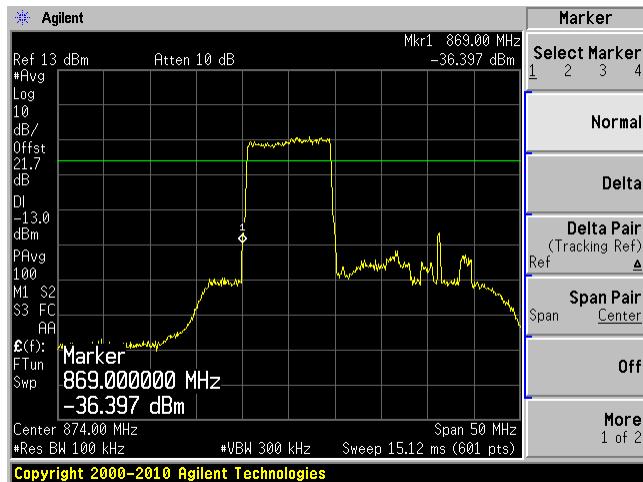


High UL

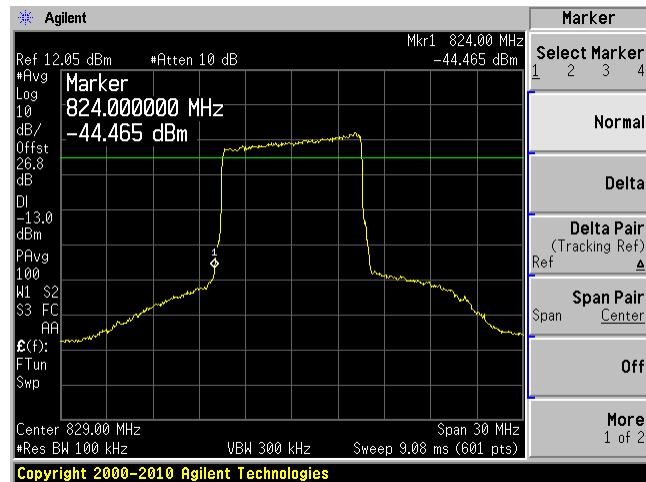


LTE 10MHZ 16QAM

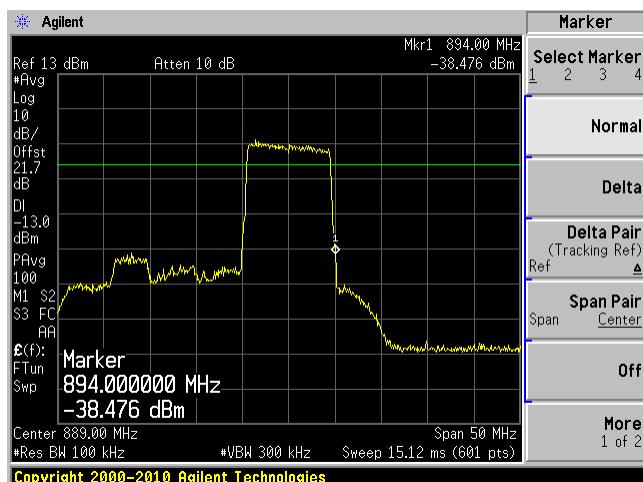
Low DL



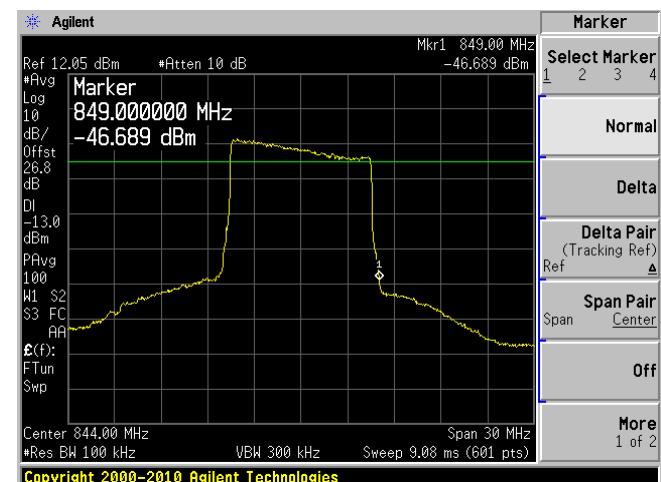
Low UL



High DL

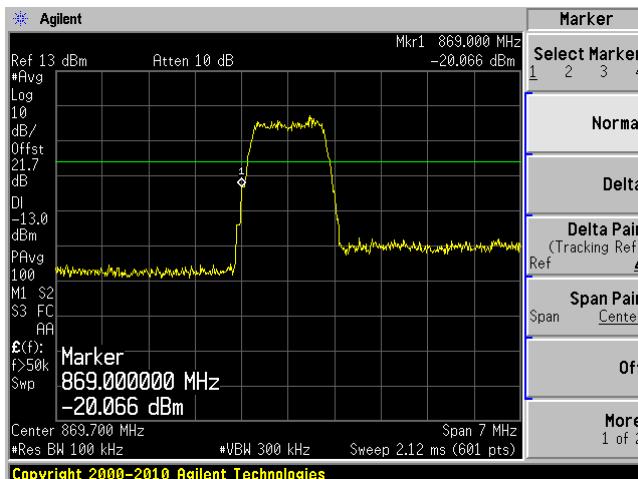


High UL

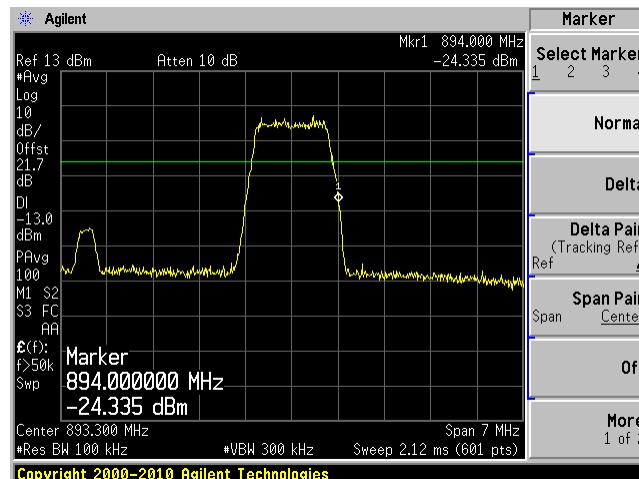


LTE 1.4MHZ 64QAM

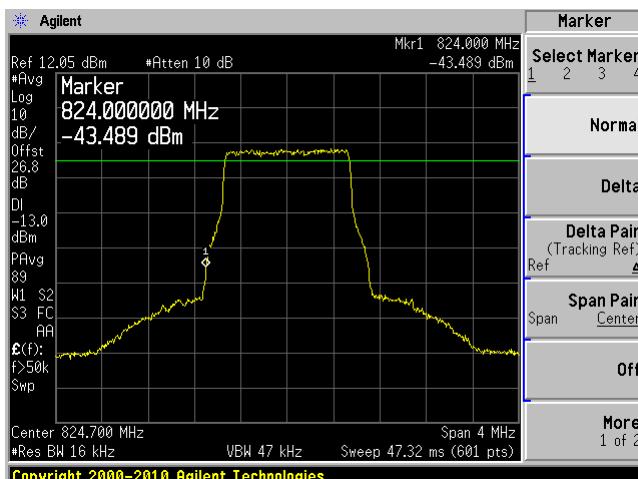
Low DL



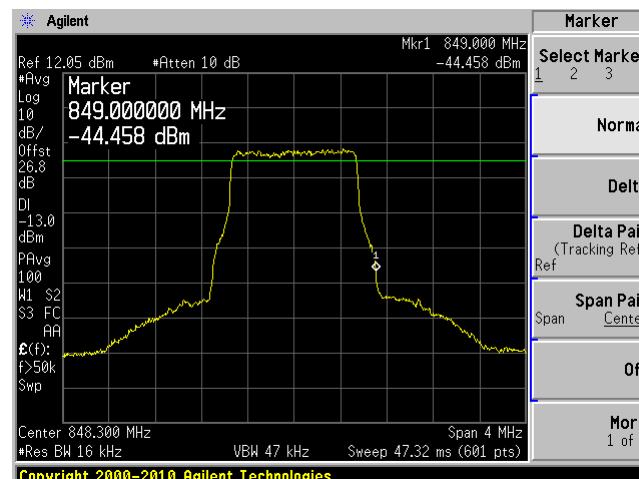
High DL



Low UL

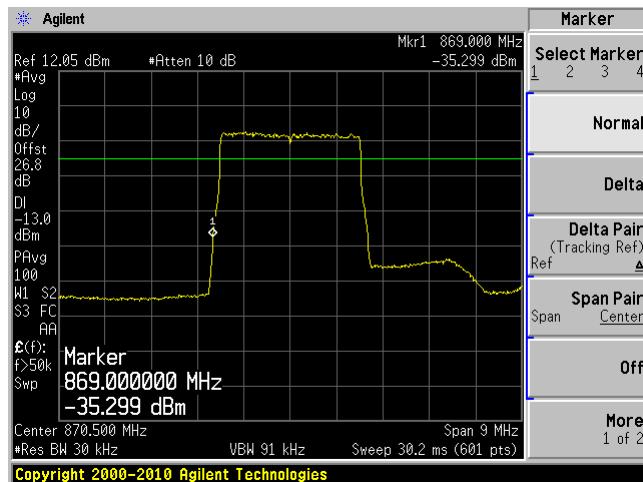


High UL

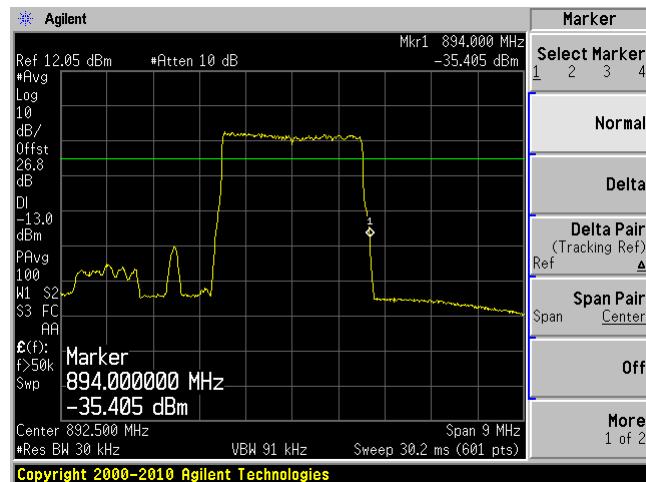


LTE 3MHZ 64QAM

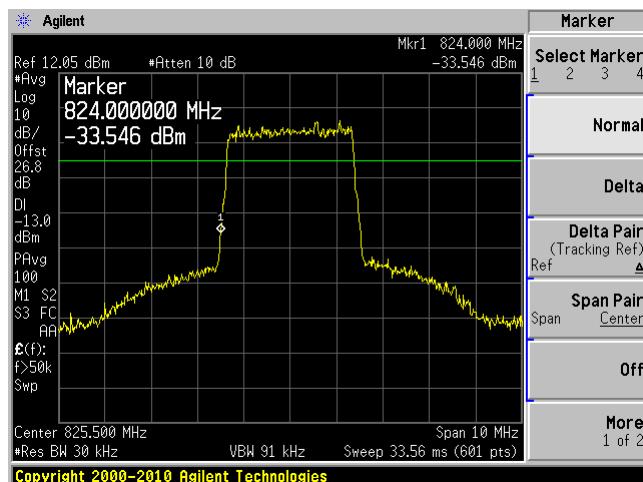
Low DL



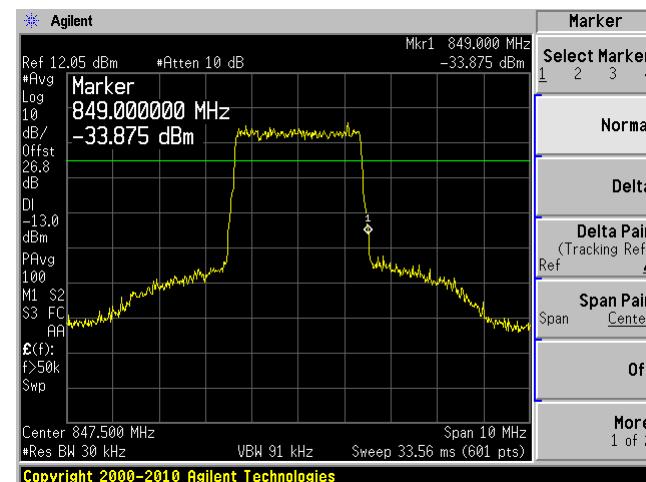
High DL



Low UL

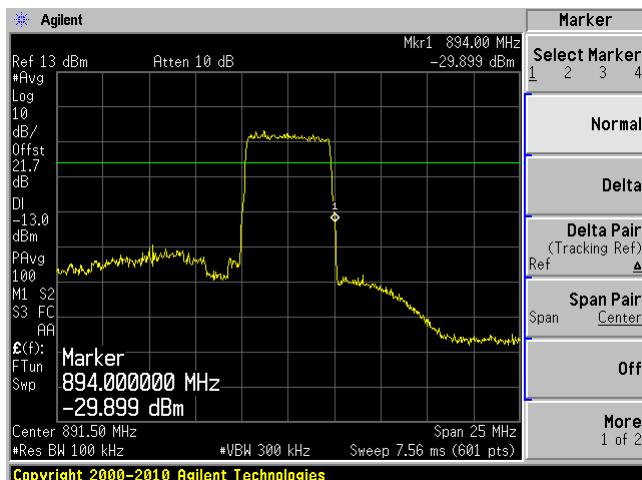


High UL

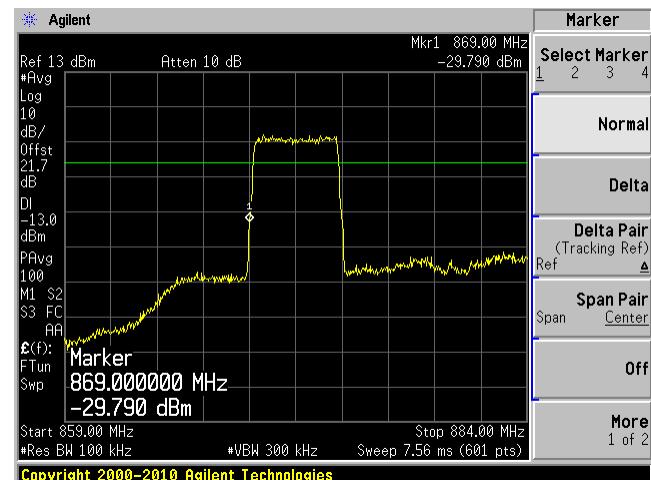


LTE 5MHZ 64QAM

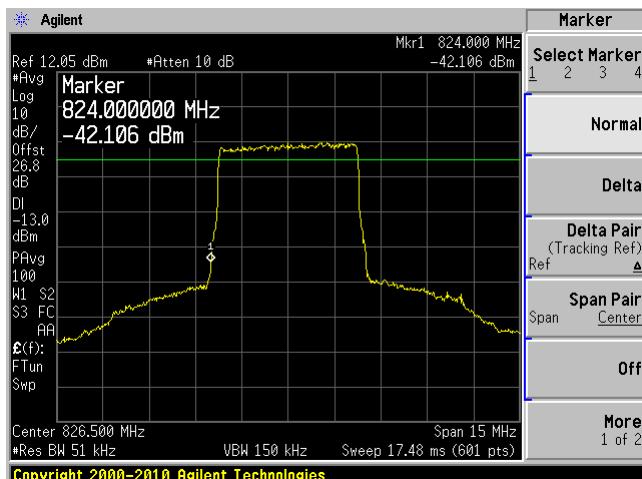
Low DL



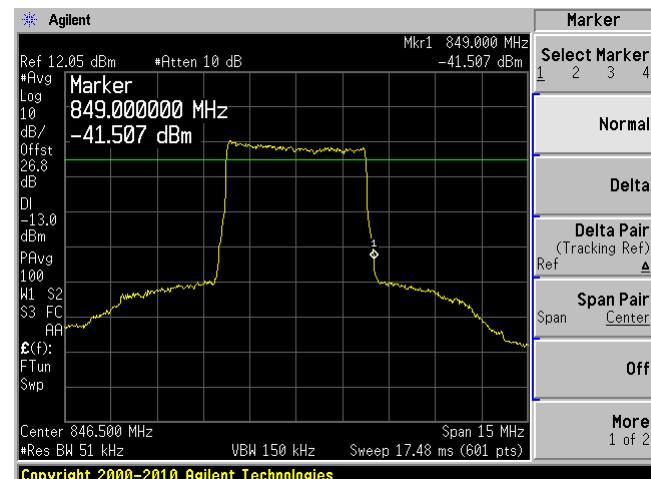
High DL



Low UL

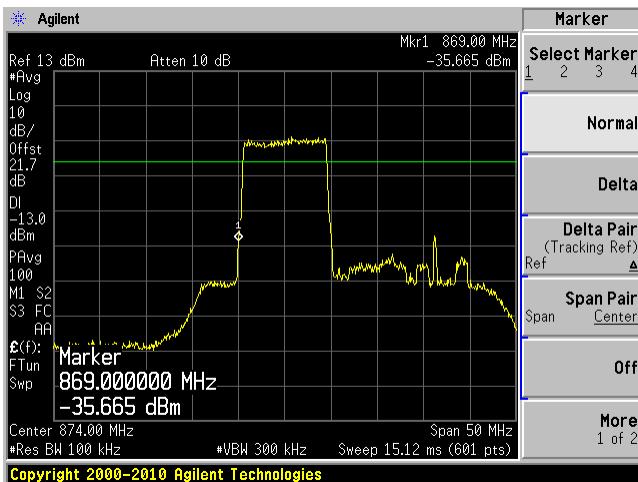


High UL

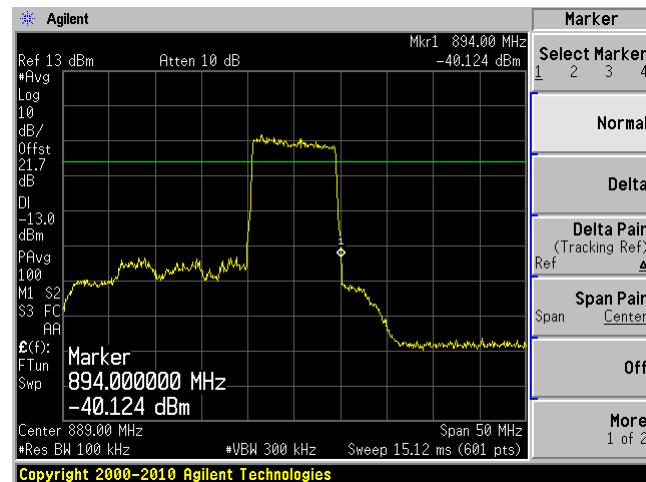


LTE 10MHZ 64QAM

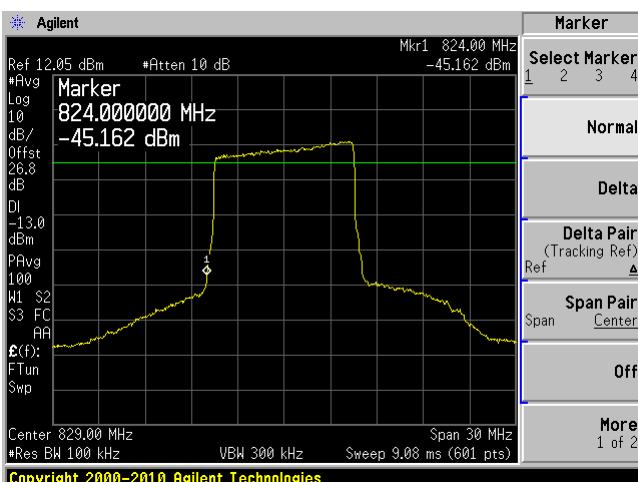
Low DL



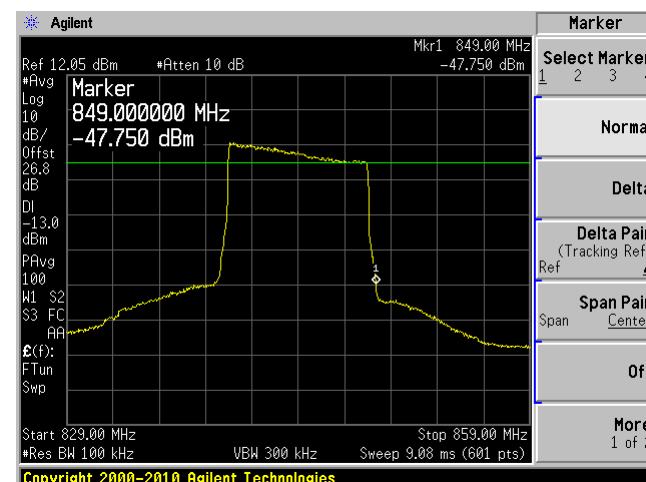
High DL



Low UL



High UL



9 FCC §20.21 – Out of Band Rejection

9.1 Applicable Standard

According to FCC Part 20.21, a frequency selective booster shall have -20 dB at the band edge referenced to the gain in the center of the pass band of the booster, where band edge is the end of the licensee's allocated spectrum.

9.2 Test Procedure

KDB 935210 D05, Section 3.3.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The span of the spectrum analyzer was set to be wide enough in order to capture the spectrum of entire operating band.

9.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

9.4 Test Environmental Conditions

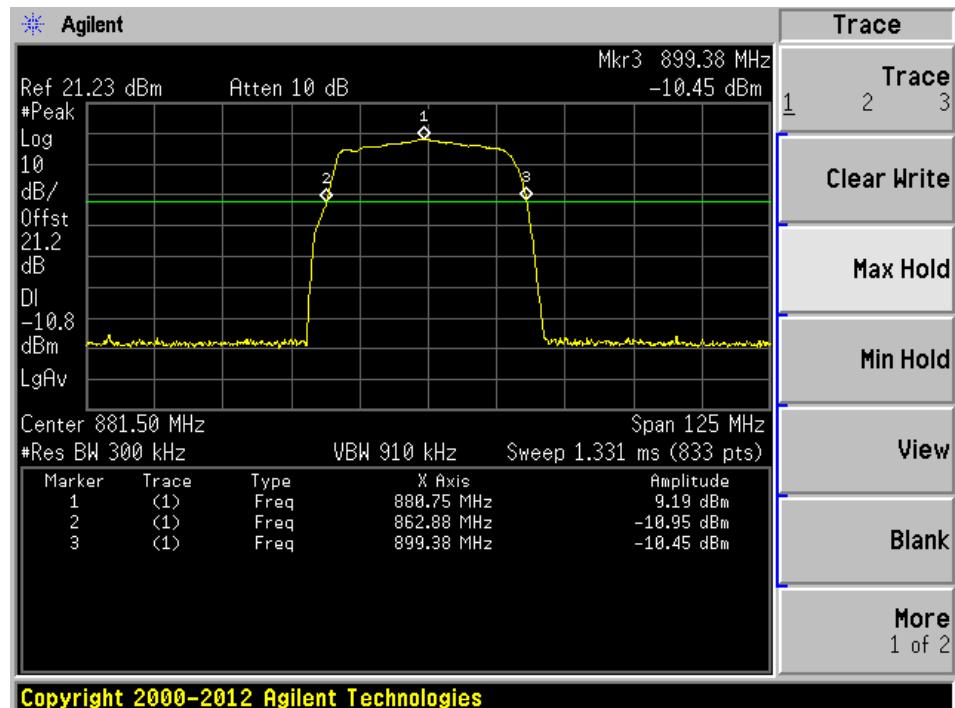
Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

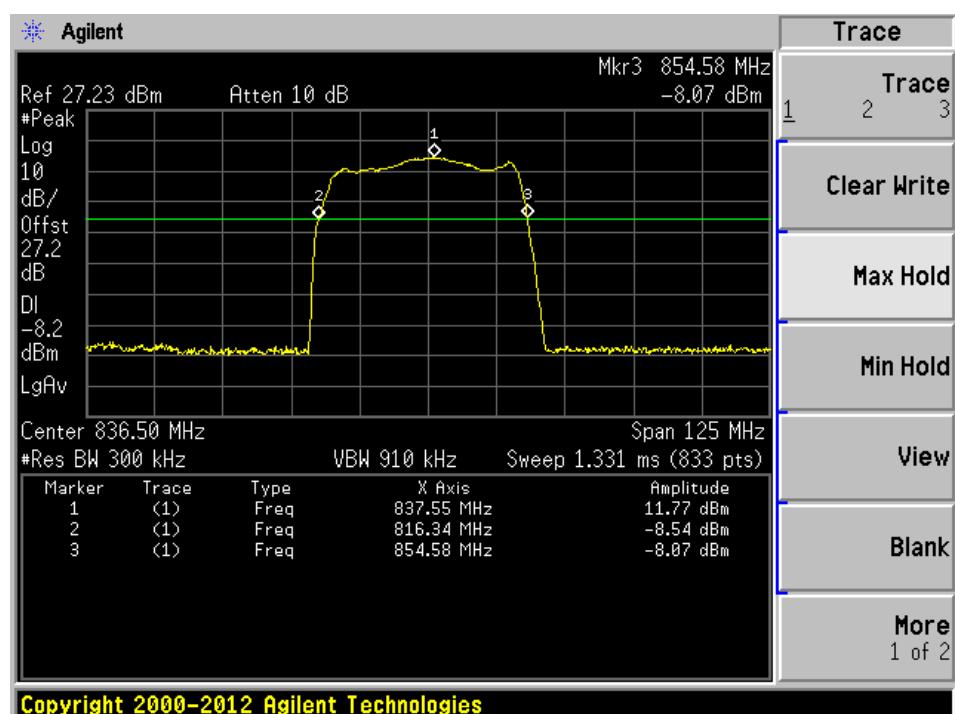
9.5 Test Results

Please refer to the following plot,

Downlink, 869 – 894 MHz



Uplink, 824 – 849 MHz



10 FCC §2.1091 - RF Exposure

10.1 Applicable Standards

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

Limits for General Population/Uncontrolled Exposure

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

Note: f = frequency in MHz

* = Plane-wave equivalent power density

10.2 MPE Prediction

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

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

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

10.3 Test Results

Downlink (Directional Antenna)

Maximum peak output power at antenna input terminal (dBm): 15.98

Maximum peak output power at antenna input terminal (mW): 39.627

Prediction distance (cm): 30

Prediction frequency (MHz): 881.5

Antenna Gain, typical (dBi): 8.5

Maximum Antenna Gain (numeric): 7.0795

Power density at predication frequency and distance (mW/cm²): 0.025

MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 0.588

Downlink (Omni Directional Antenna)

Maximum peak output power at antenna input terminal (dBm): 15.98
Maximum peak output power at antenna input terminal (mW): 39.627
 Prediction distance (cm): 30
 Prediction frequency (MHz): 881.5
 Antenna Gain, typical (dBi): 3.5
 Maximum Antenna Gain (numeric): 2.239
Power density at predication frequency and distance (mW/cm²): 0.0079
MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 0.588

Uplink

Maximum peak output power at antenna input terminal (dBm): 15.88
Maximum peak output power at antenna input terminal (mW): 38.726
 Prediction distance (cm): 30
 Prediction frequency (MHz): 836.5
 Antenna Gain, typical (dBi): 8.5
 Maximum Antenna Gain (numeric): 7.0795
Power density at predication frequency and distance (mW/cm²): 0.0243
MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 0.558

Results

For uplink and downlink, the highest power density levels at **30 cm** are below the MPE uncontrolled exposure limit.