Lab Code: 200167-0

FCC PART 22H, 24E

TEST AND MEASUREMENT REPORT

For

Wireless Extenders, Inc.

One Meca Way,

Norcross, GA 30093 USA

FCC ID: SO4YX545-PCS-CEL2

Report Type:	**Product Type:**
Original Report	Cellular and PCS band Amplifier

Test Engineer: Ning Ma

Report Number: R1203211-2224

Report Date: 2012-05-18

Reviewed By: Victor Zhang
EMC/RF Lead

Prepared By: (SP)
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Fax: (408) 732 9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1203211-2224	Original Report	2012-05-18

1 General Description

1.1 Product Description for Equipment under Test (EUT)

The Wireless Extenders, Inc. product, model: *YX545*, FCC ID: SO4YX545-PCS-CEL2 or the "EUT" as referred to in this report, is a cellular band PCS band signal amplifier for both downlink (signals from the network to the subscriber's equipment) and uplink (signals from subscriber's equipment to the network).The YX545 SOHO model is designed for small office and home office environments.

1.2 Mechanical Description

The EUT dimension is approximately 17.8cm (L) x 12.7cm (W) x 3.2cm (H) and weighs approximately 255g

The test data gathered are from production sample. Serial number: R1203211-1assigned by BACL.

1.3 Objective

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

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

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

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

Part 22 Subpart H – Cellular Radiotelephone Service
Part 24 Subpart E – Broadband PCS

Applicable Standards: TIA EIA 98-C, TIA/EIA 603-C, ANSI C63.4-2009.

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

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from ±2.0 dB for Conducted Emissions tests and ±4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

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

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, 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.: R-3729, C-4176, G-469, and T-1206. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

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

2 EUT Test Configuration

2.1 Justification

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

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

2.2 EUT Exercise Software

Signal was sent through EUT using a signal generator; device was set to normal operating mode.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Equipment

No special equipment used during testing.

2.5 Power Supply List and Details

Manufacturer	Description	Model Number	Serial Number
I.T.E	Power Adapter	FY0502000	-

2.6 External I/O Cabling List and AC Cord

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

2.7 EUT Internal Configurations

Objects/Parts	Manufacturers	Model	Series Number
Main Board	Wireless Extenders, Inc.	E252691	-

3 Summary of Test Results

FCC Rules	Description of Tests	Results
§2.1046 §22.913(a), §24.232	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A [1]
§2.1049 §22.917, §24.238	Occupied Bandwidth / Out of Band Emissions	Compliant
§2.1053 §22.917, §24.238	Spurious Radiated Emissions	Compliant
§2.1051 §22.917, §24.238	Spurious Emissions at Antenna Terminals	Compliant
§22.917, §24.238	Band Edge	Compliant
§2.1055 §22.355, §24.235	Frequency Stability	N/A[1]
§2.1091	RF Exposure Information	Compliant

Note: [1] EUT is amplifier only, no oscillator circuit in the EUT, and there are no modulation characteristics

4 FCC §2.1046, §22.913(a) & §24.232 – RF Output Power

4.1 Applicable Standard

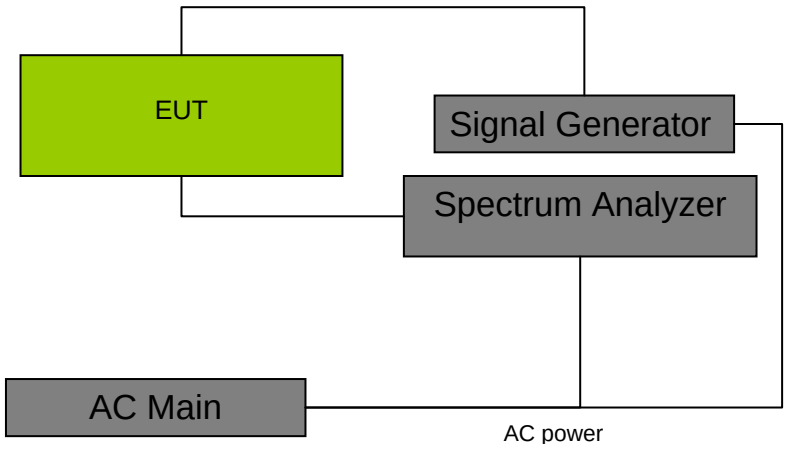
According to FCC §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

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

4.2 Test Setup Block Diagram and Procedure

Conducted:

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



4.3 Test Equipment List and Details

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

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

4.4 Test Environmental Conditions

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

The testing was performed by Ning Ma from 2012-03-29 to 2012-04-04 at RF Site.

4.5 Test Results

Maximum Output Power – Modulated Signal

GSM/GPRS

Mode/Frequency Band		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (mw)
GSM/GPRS	850 MHz Uplink	Low	824.2	-41	19.32	85.51
		Middle	836.6	-42	20.30	107.15
		High	848.8	-38	18.25	66.83
	850 MHz Downlink	Low	869.2	-47	13.55	22.65
		Middle	881.6	-49	13.09	20.37
		High	893.8	-45	13.13	20.56
	1900 MHz Uplink	Low	1850.2	-40	20.02	100.46
		Middle	1880.0	-43	19.93	98.40
		High	1909.8	-35	19.20	83.18
	1900 MHz Downlink	Low	1930.2	-44	12.51	17.82
		Middle	1960.0	-49	13.43	22.03
		High	1989.8	-46	13.06	20.23

EDGE

Mode/Frequency Band		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (mw)
EDGE	850 MHz Uplink	Low	824.2	-44	20.26	106.17
		Middle	836.6	-49	17.09	51.17
		High	848.8	-39	20.41	109.90
	850 MHz Downlink	Low	869.2	-50	13.45	22.13
		Middle	881.6	-52	13.13	20.56
		High	893.8	-48	13.21	20.94
	1900 MHz Uplink	Low	1850.2	-43	20.42	110.15
		Middle	1880.0	-46	20.06	101.39
		High	1909.8	-37	20.32	107.65
	1900 MHz Downlink	Low	1930.2	-46	13.61	22.96
		Middle	1960.0	-52	13.59	22.86
		High	1989.8	-48	13.98	25.00

CDMA/EVDO

Mode/Frequency Band		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (mw)
CDMA/EVDO	850 MHz Uplink	Low	824.80	-41	20.78	119.67
		Middle	836.52	-42	20.84	121.34
		High	848.20	-37	19.21	83.37
	850 MHz Downlink	Low	869.80	-48	13.05	20.18
		Middle	881.52	-49	13.16	20.70
		High	893.20	-45	13.19	20.84
	1900 MHz Uplink	Low	1850.8	-40	20.54	113.24
		Middle	1880.0	-42	20.98	125.31
		High	1909.2	-34	19.98	99.54
	1900 MHz Downlink	Low	1930.8	-44	13.01	20.00
		Middle	1960.0	-49	13.26	21.18
		High	1989.2	-46	13.06	20.23

WCDMA/HSPA

Mode/Frequency Band		Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (mw)
WCDMA/HSPA	850 MHz Uplink	Low	826.4	-41	20.12	102.80
		Middle	836.4	-42	20.28	106.66
		High	846.6	-37	19.02	79.80
	850 MHz Downlink	Low	871.4	-48	13.26	21.18
		Middle	881.4	-49	13.10	20.42
		High	891.6	-45	13.78	23.88
	1900 MHz Uplink	Low	1852.4	-41	19.06	80.54
		Middle	1880.0	-42	20.35	108.39
		High	1907.6	-35	18.21	66.22
	1900 MHz Downlink	Low	1932.4	-44	13.60	22.91
		Middle	1960.0	-49	13.32	21.48
		High	1987.6	-46	13.15	20.65

5 FCC §2.1049, §22.917 & §24.238 – Occupied Bandwidth

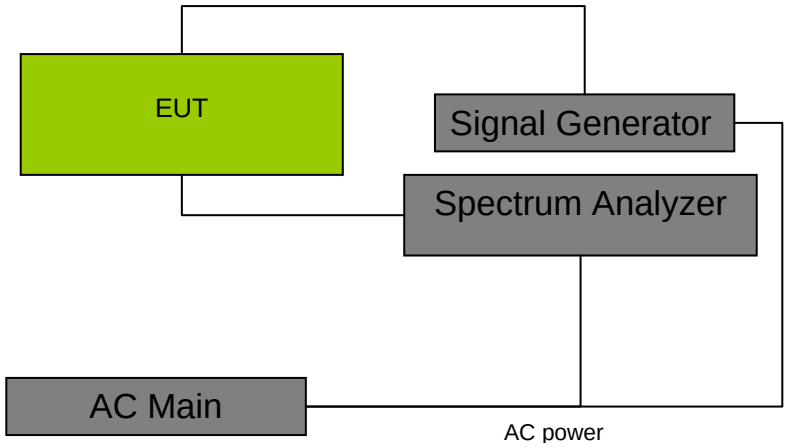
5.1 Applicable Standard

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

5.2 Test Block Diagram and Procedure

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

The 26 dB & 99% bandwidth was recorded.



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5.4 Test Environmental Conditions

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

The testing was performed by Ning Ma from 2012-03-29 to 2012-04-04 at RF Site.

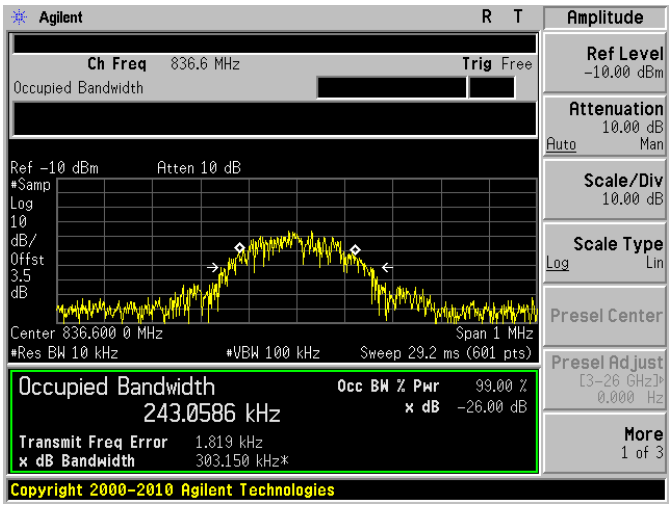
5.5 Test Results

Please refer to the following table and plots.

Frequency Band		Modulation	Frequency (MHz)	Emission Bandwidth	
				Input (kHz)	Output (kHz)
Cellular Band	Uplink	GSM/GPRS	836.6	243.0586	237.6354
		EDGE	836.6	248.0563	249.2575
		CDMA/EVDO	836.52	1269.7	1243.0
		WCDMA/HSPA	836.4	4236.1	4070.2
	Downlink	GSM/GPRS	881.6	238.0272	248.1779
		EDGE	881.6	241.6892	243.6953
		CDMA/EVDO	881.52	1258.2	1264.7
		WCDMA/HSPA	881.4	4198.7	4142.4
PCS Band	Uplink	GSM/GPRS	1880	237.1303	235.3035
		EDGE	1880	248.1931	245.2657
		CDMA/EVDO	1880	1265.5	1257.9
		WCDMA/HSPA	1880	4130.7	4116.8
	Downlink	GSM/GPRS	1960	245.7150	242.9078
		EDGE	1960	244.4469	235.9443
		CDMA/EVDO	1960	1266.5	1250.6
		WCDMA/HSPA	1960	4149.7	4089.4

GSM/GPRS Cellular Band Uplink

Input



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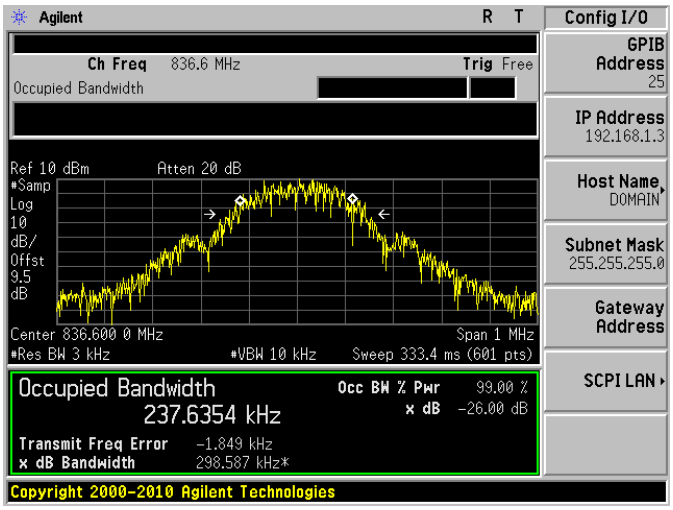
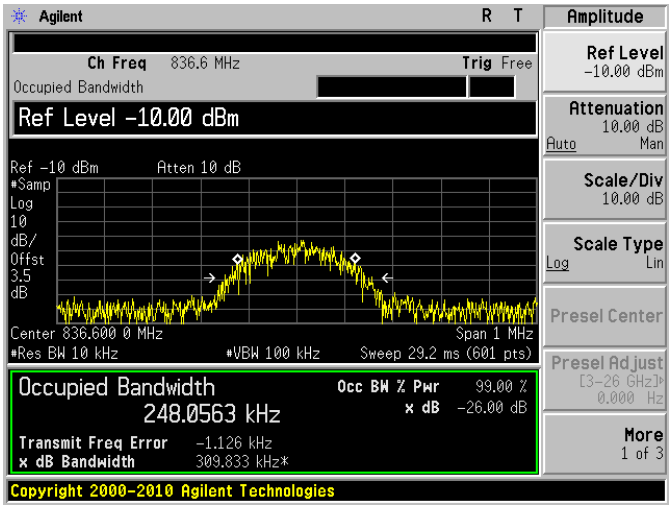


EDGE Cellular Band Uplink

Input



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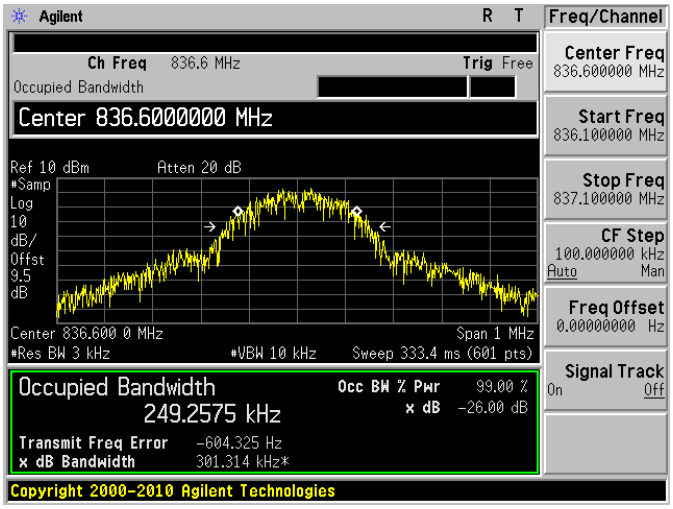
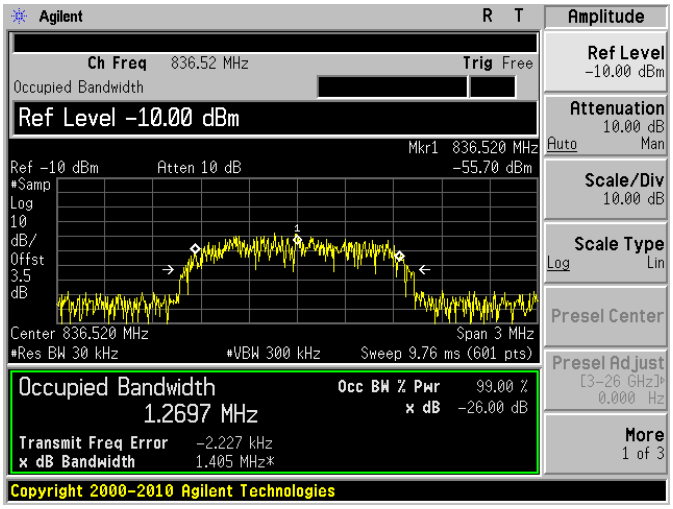


CDMA/EVDO Cellular Band Uplink

Input



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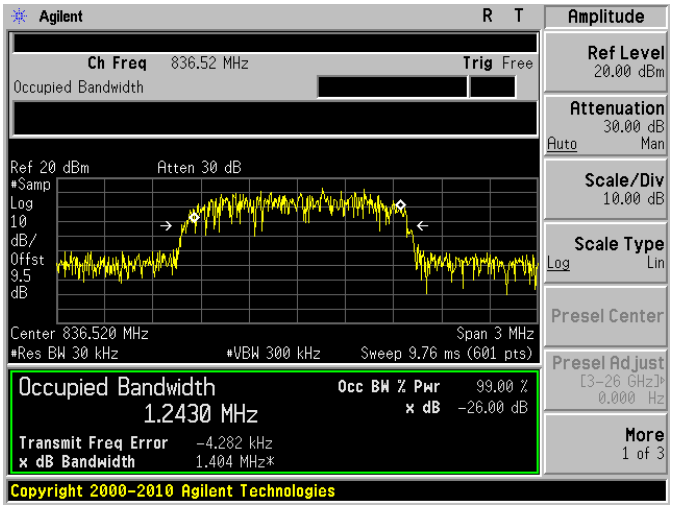

WCDMA/HSPA Cellular Band Uplink

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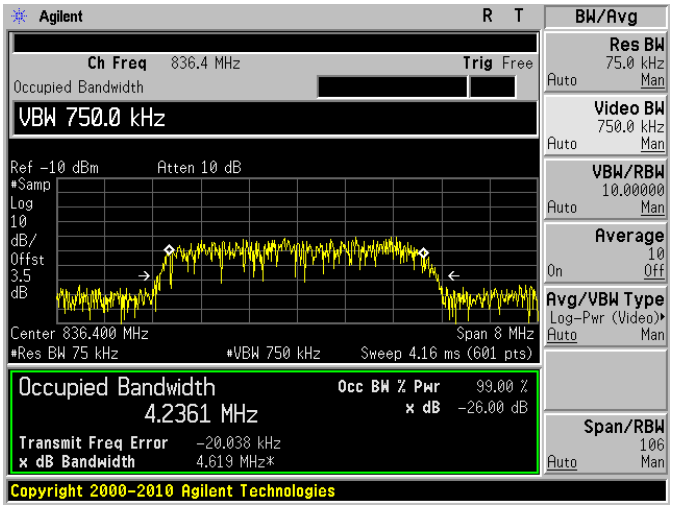

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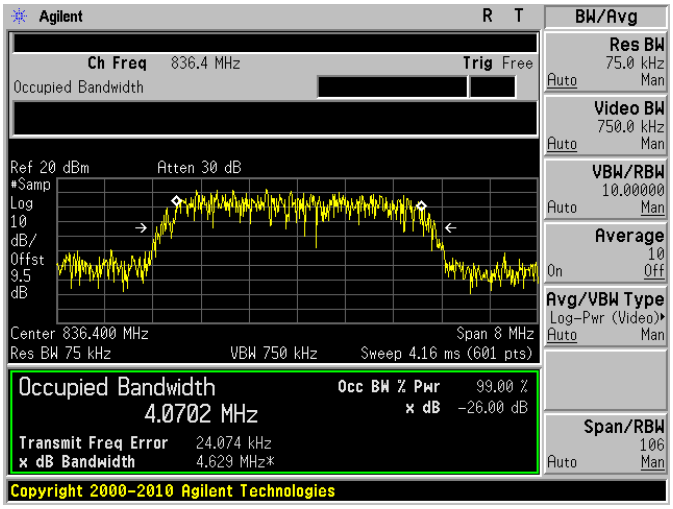

GSM/GPRS Cellular Band Downlink

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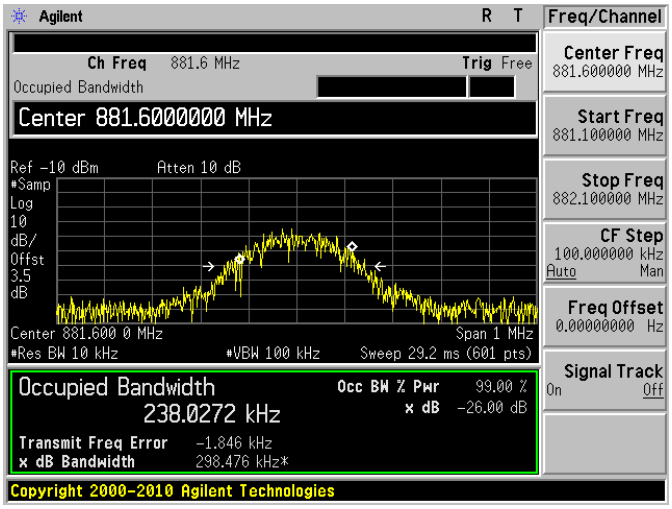

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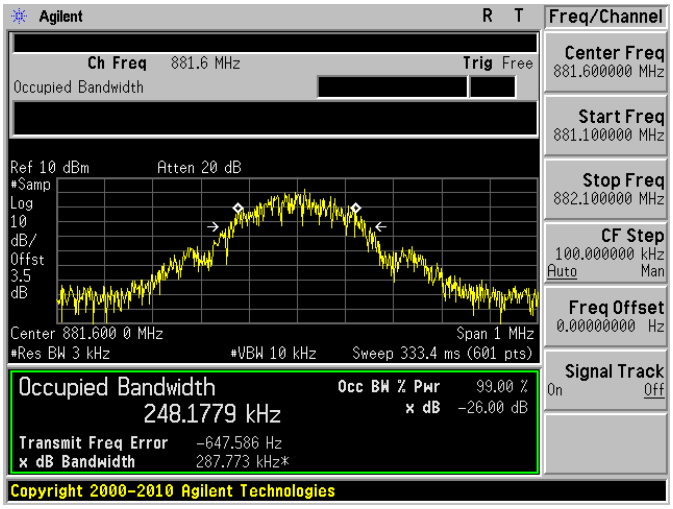

EDGE Cellular Band Downlink

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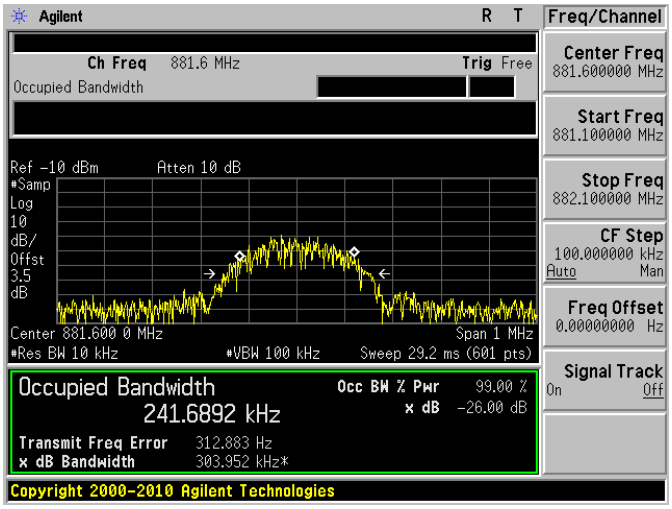

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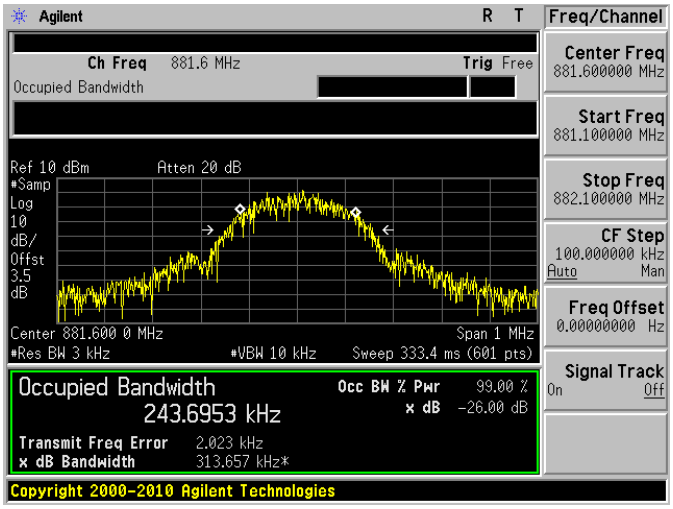

CDMA/EVDO Cellular Band Downlink

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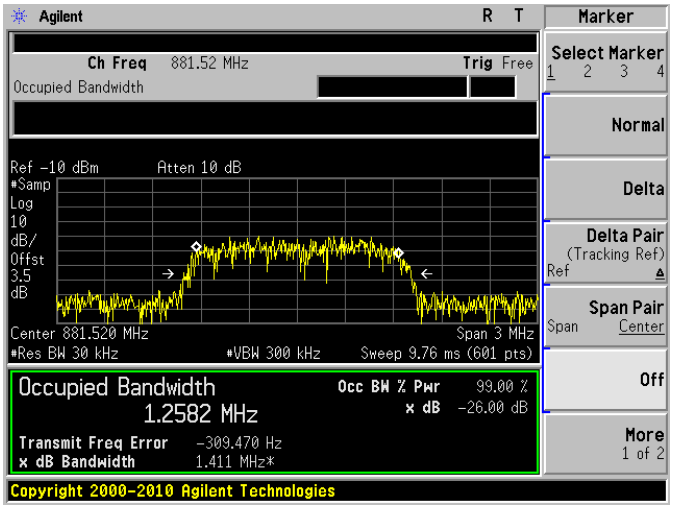

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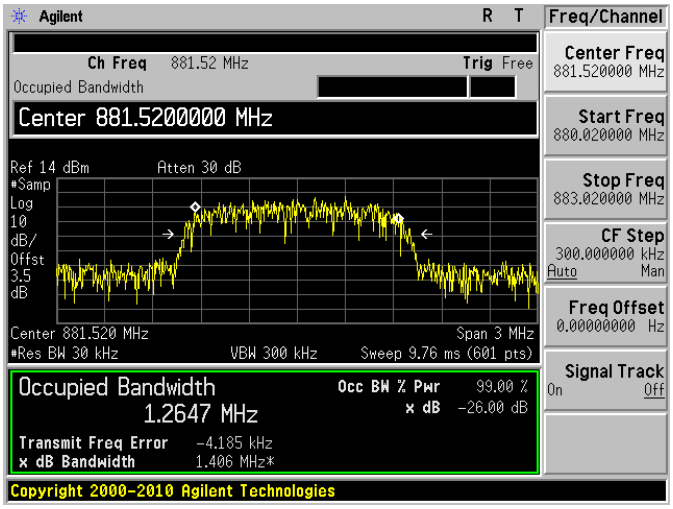
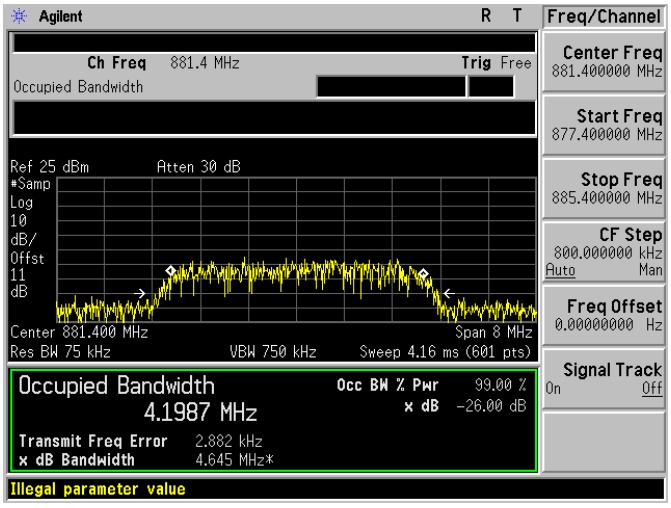


WCDMA/HSPA Cellular Band Downlink

Input



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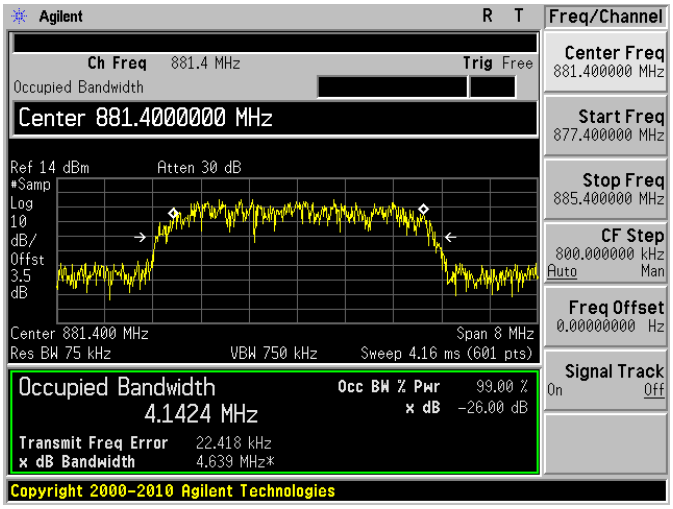
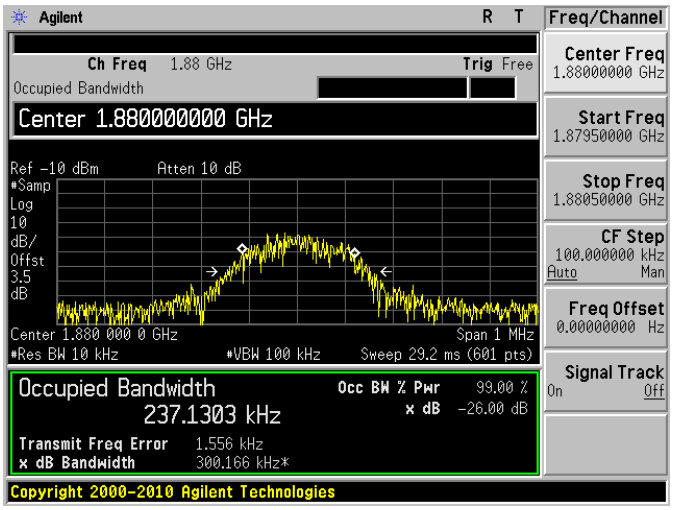


GSM/GPRS PCS Band Uplink

Input



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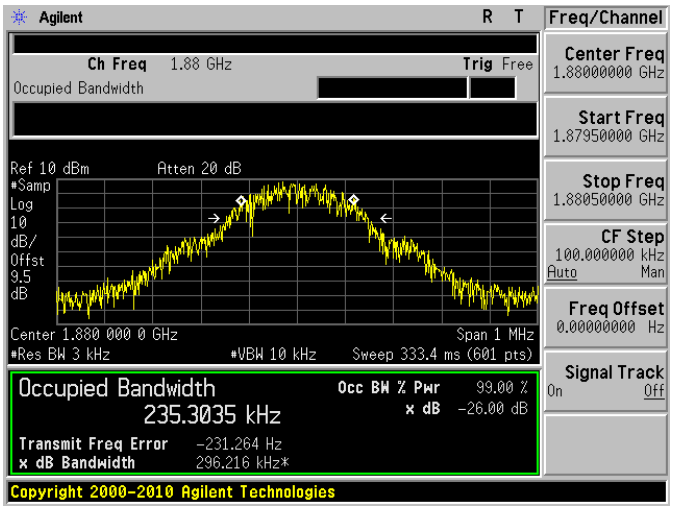
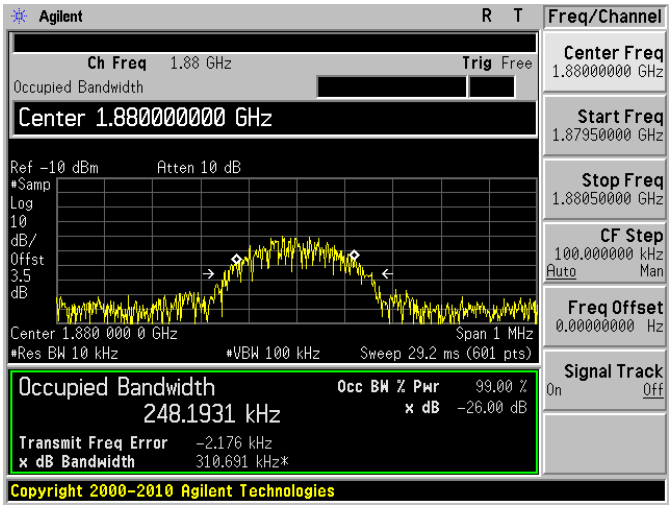


EDGE PCS Band Uplink

Input



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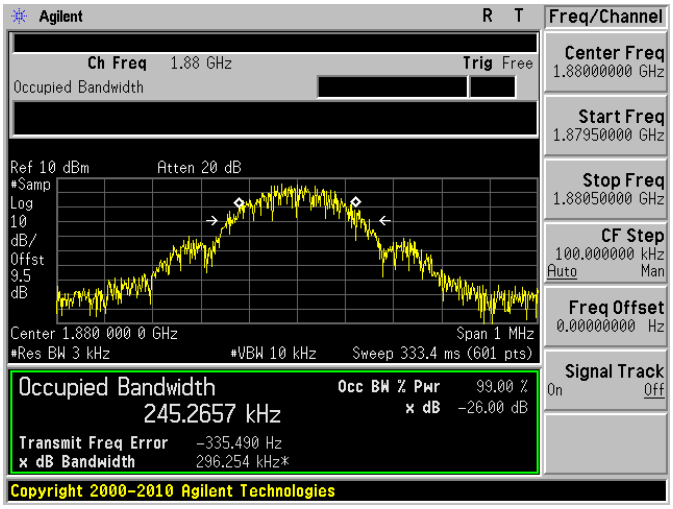

CDMA/EVDO PCS Band Uplink

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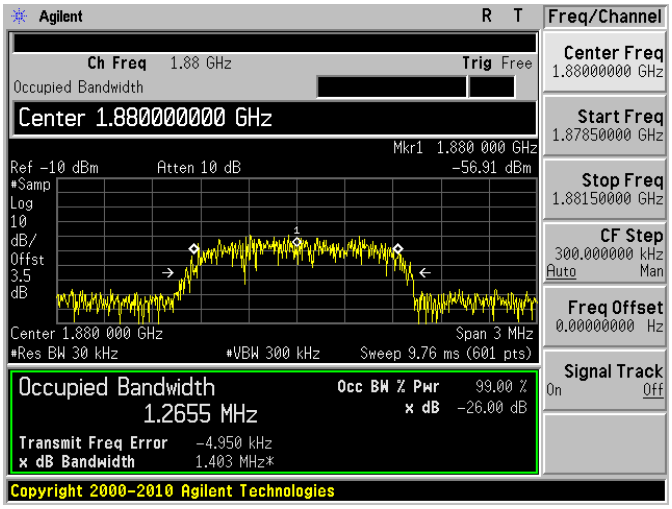

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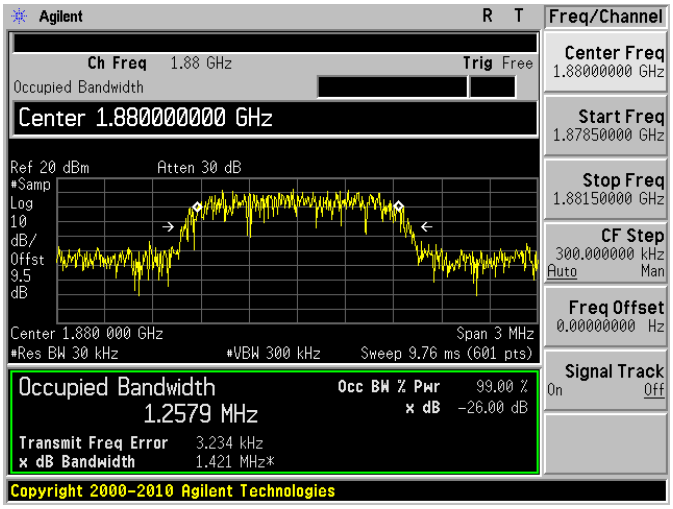
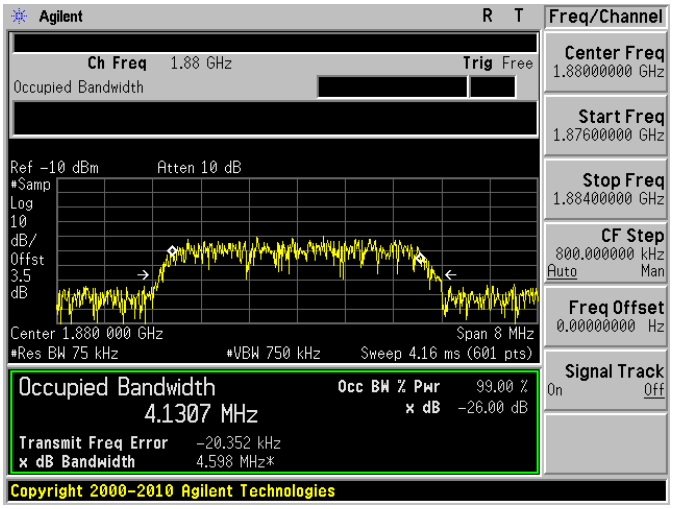


WCDMA/HSPA PCS Band Uplink

Input



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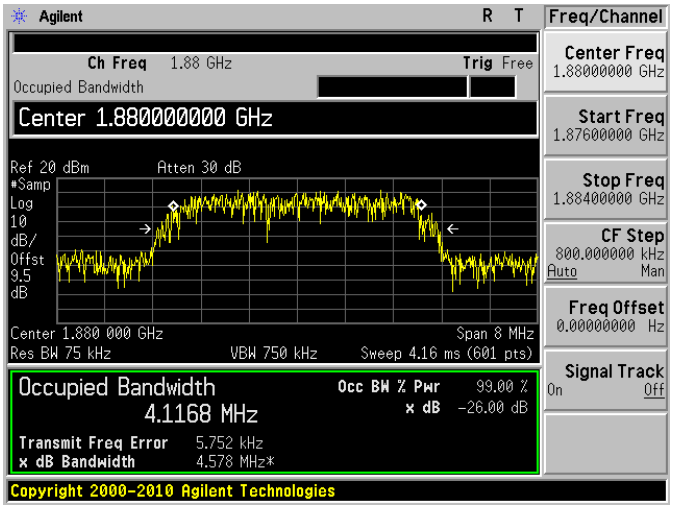

GSM/GPRS PCS Band Downlink

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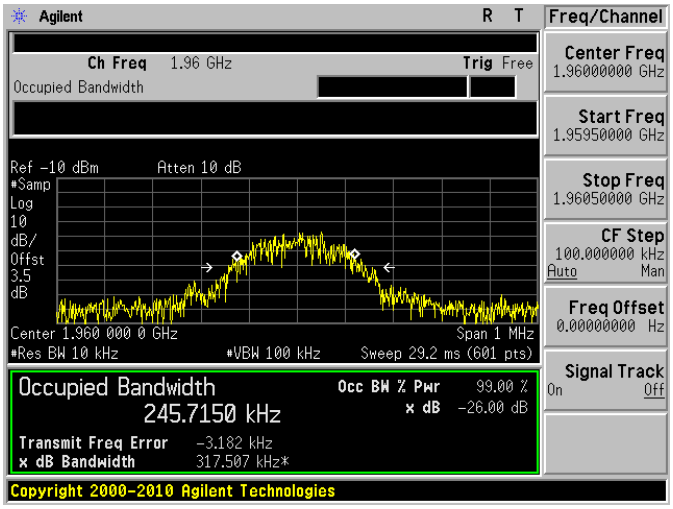

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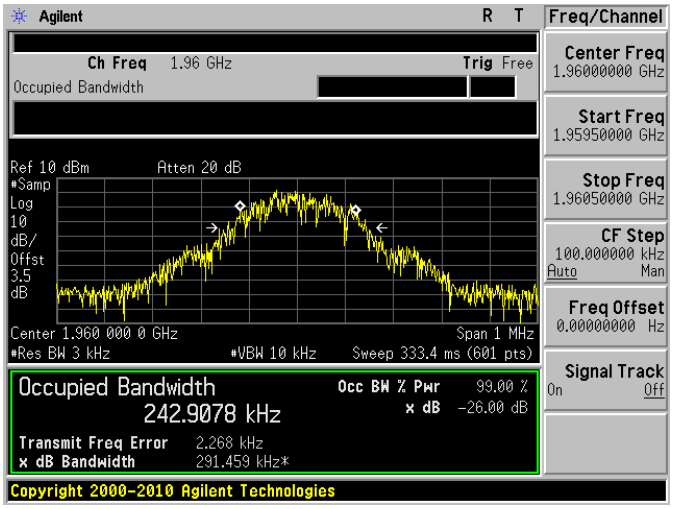

EDGE PCS Band Downlink

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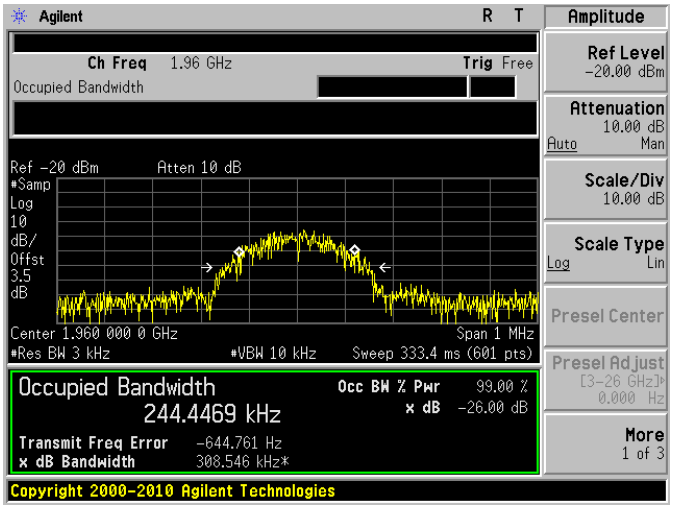
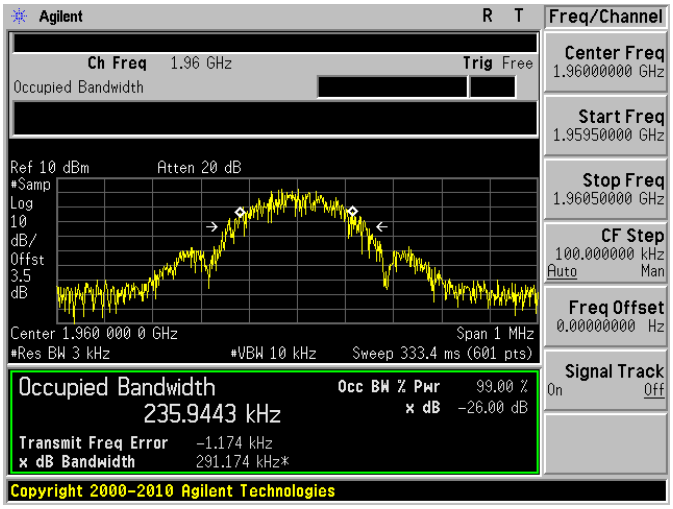
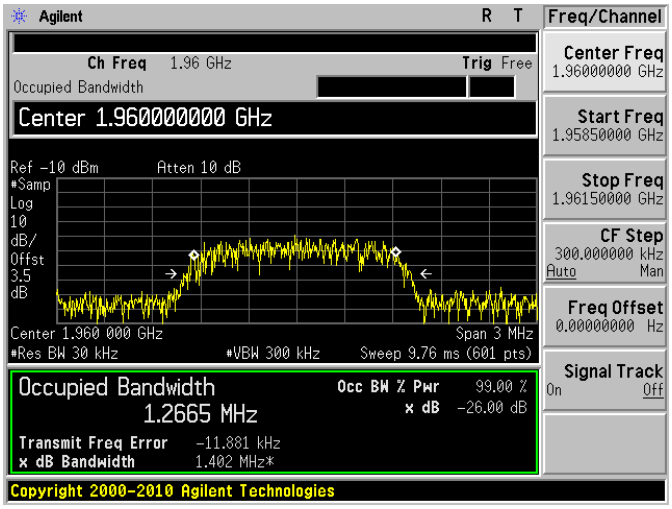


Output

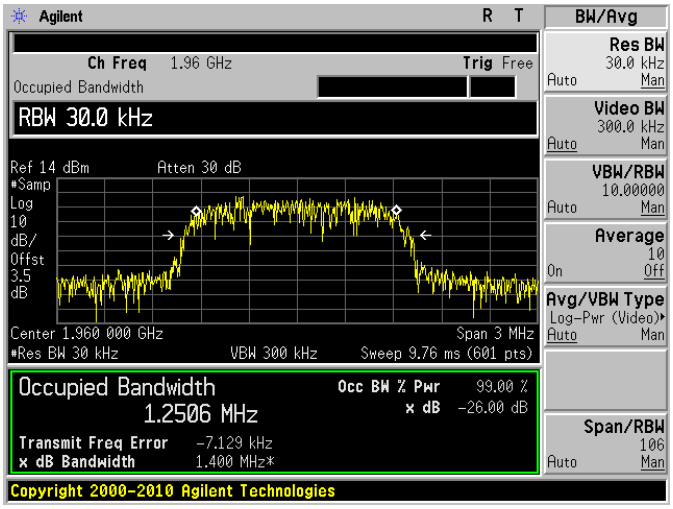


CDMA/EVDO PCS Band Downlink

Input

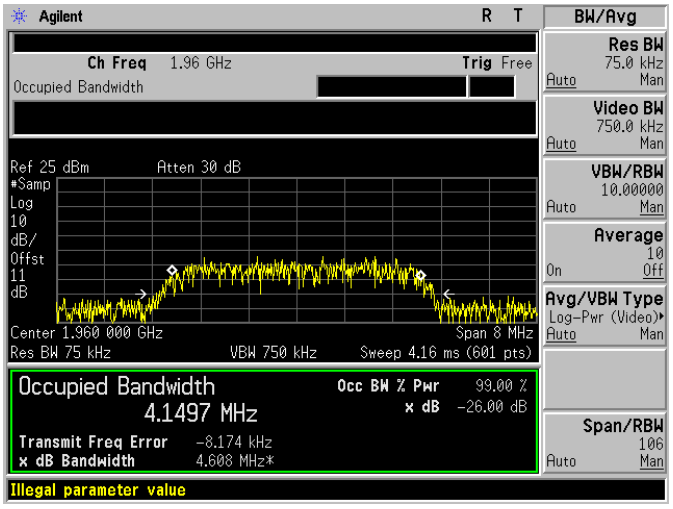


Output

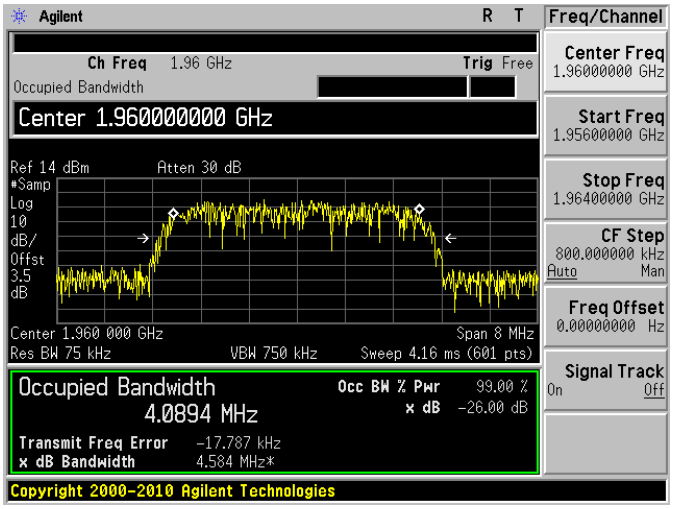


WCDMA/HSPA PCS Band Downlink

Input



Output



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

6.1 Applicable Standard

Requirements: FCC §2.1053, §22.917 and §24.238

6.2 Test Procedure

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

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

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

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

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level
Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)

6.3 Test Equipment List and Details

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

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

6.4 Test Environmental Conditions

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

The testing was performed by Ning Ma from 2012-03-29 to 2012-04-04 in 5 Meter Chamber #3.

6.5 Test Results

Uplink (Input frequency = 836.6 MHz) – CW Signal

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

Downlink (Input frequency = 881.6 MHz) – CW Signal

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

Uplink (Input frequency = 1880 MHz) – CW Signal

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

Downlink (Input frequency = 1960 MHz) – CW Signal

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

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

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

7.1 Applicable Standard

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

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

7.2 Test Procedure

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

7.3 Test Equipment List and Details

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

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

7.4 Test Environmental Conditions

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

The testing was performed by Ning Ma from 2012-03-29 to 2012-04-04 at RF Site.

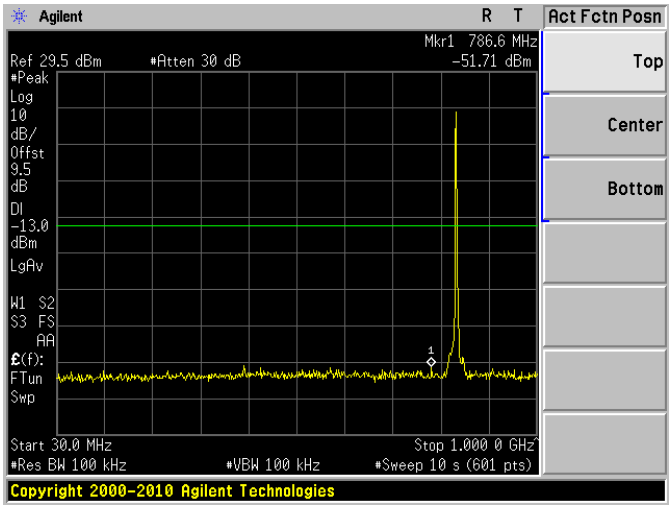
7.5 Test Results

Please refer to the following plots.

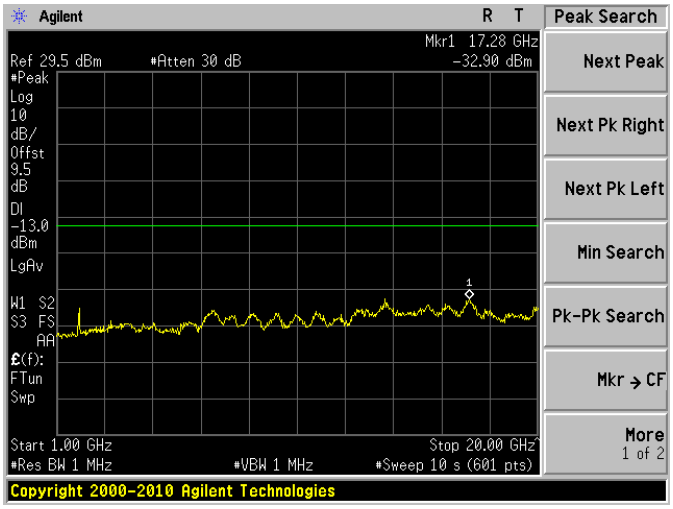
Cellular Band Uplink

Middle Channel: 836.6 MHz– CW Signal

30 MHz to 1 GHz



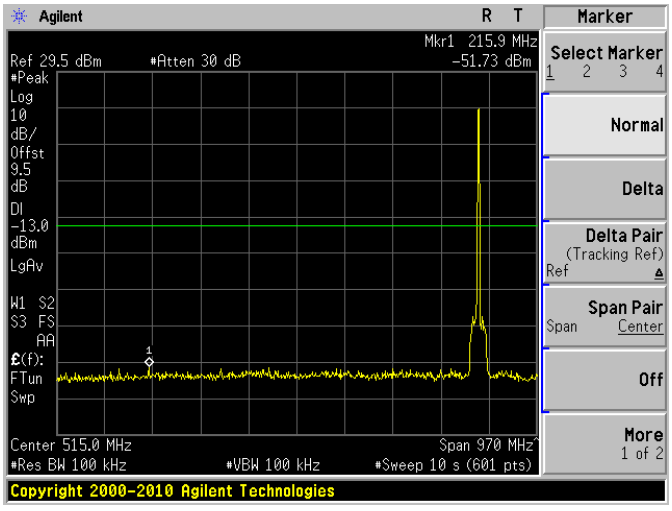
1 to 26 GHz



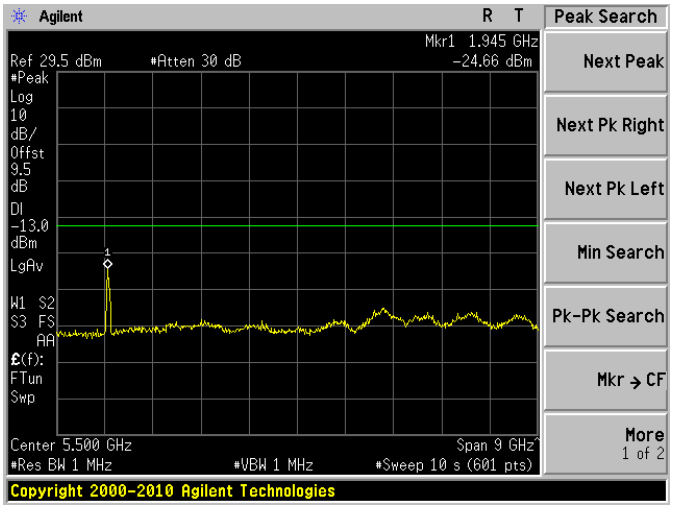
Cellular Band Downlink

Middle Channel: 881.6 MHz: – CW Signal

30 MHz to 1 GHz



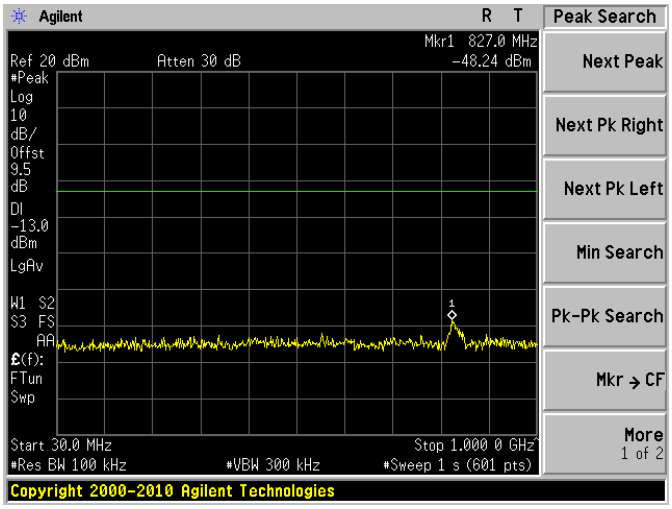
1 to 26 GHz



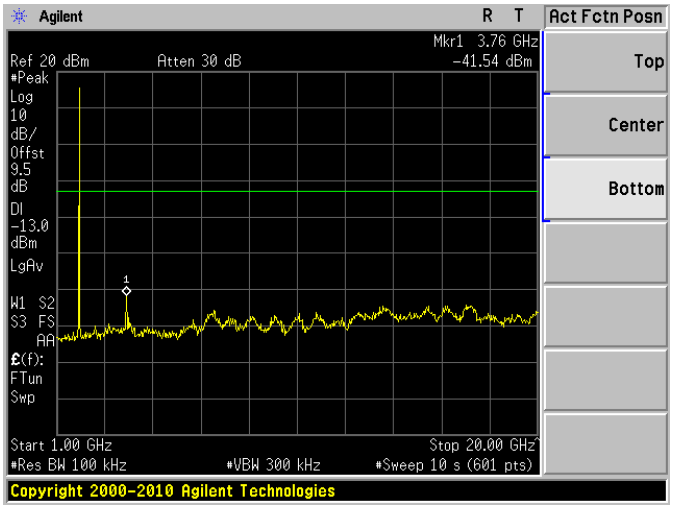
PCS Band Uplink

Middle Channel: 1880 MHz: – CW Signal

30 MHz to 1 GHz



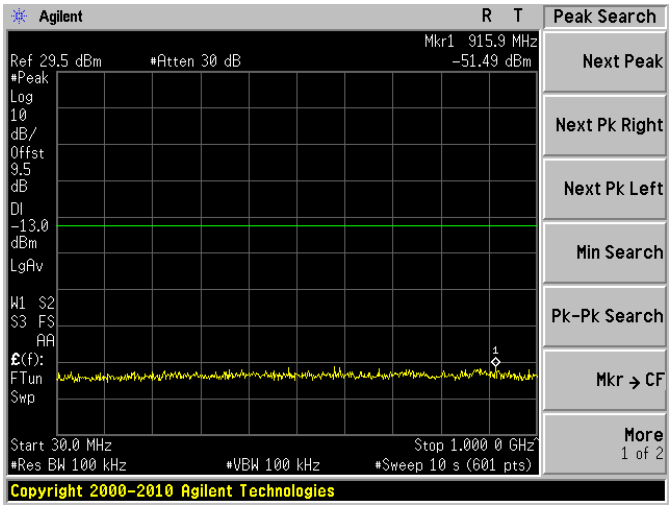
1 to 26 GHz



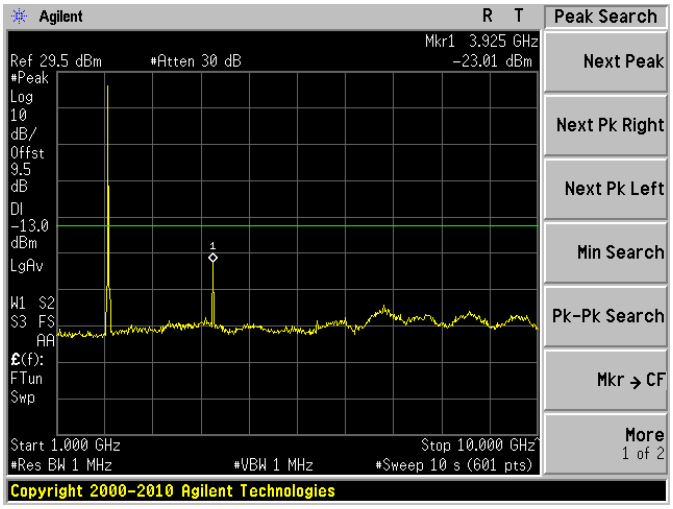
PCS Band Downlink

Middle Channel: 1960 MHz: – CW Signal

30 MHz to 1 GHz



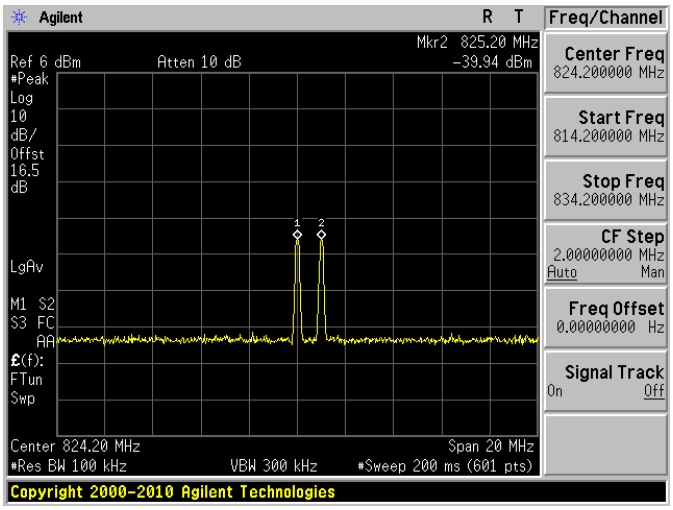
1 to 26 GHz



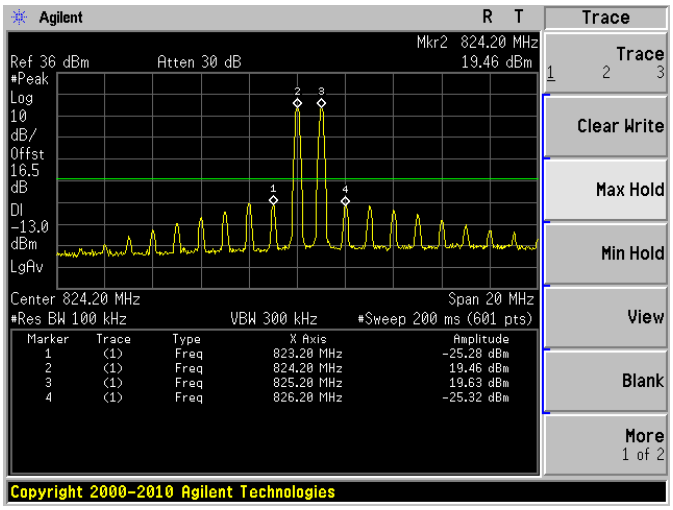
Inter-modulation

Cellular Band Uplink Low Channel

Input

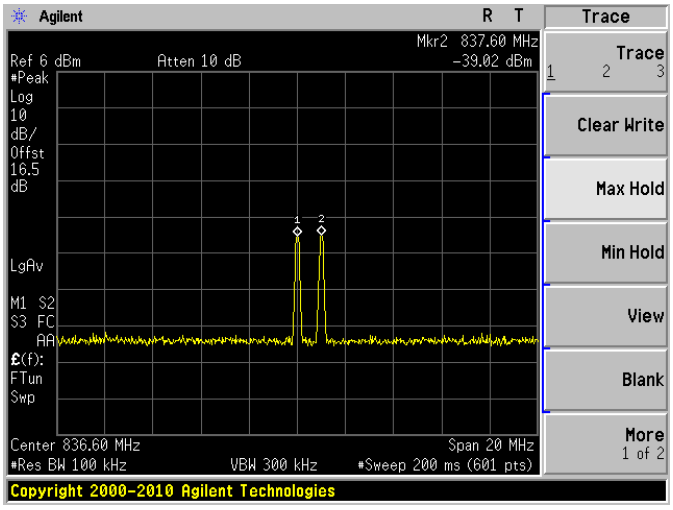


Output

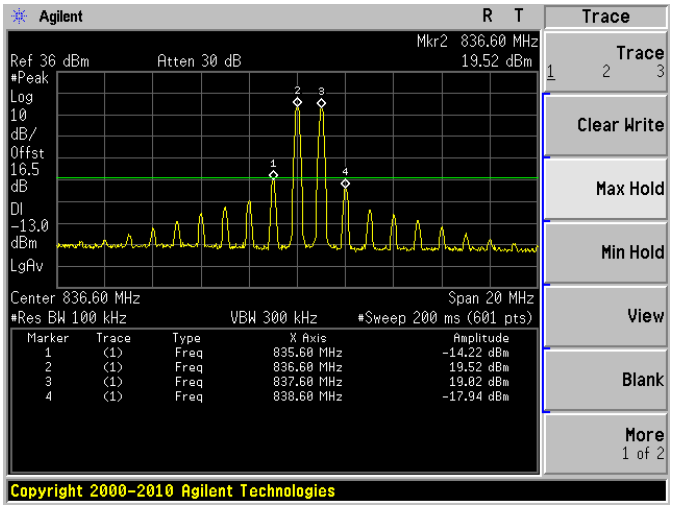


Cellular Band Uplink Middle Channel

Input

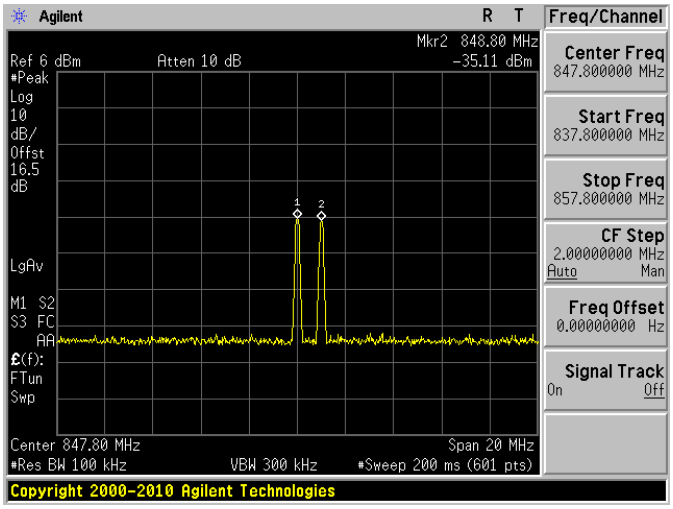


Output

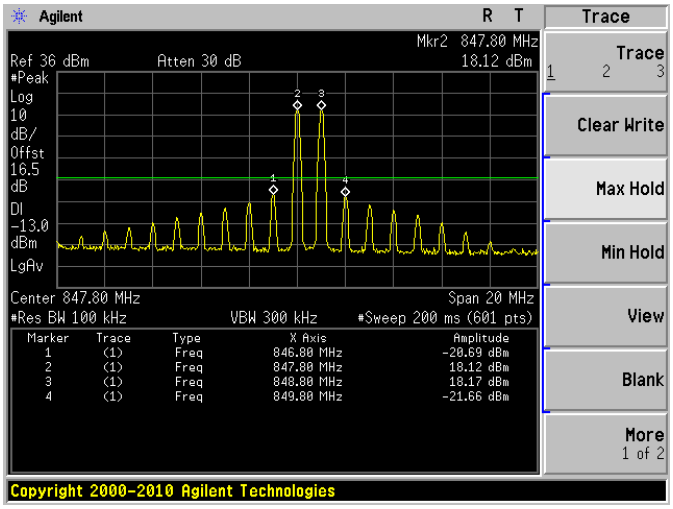


Cellular Band Uplink High Channel

Input

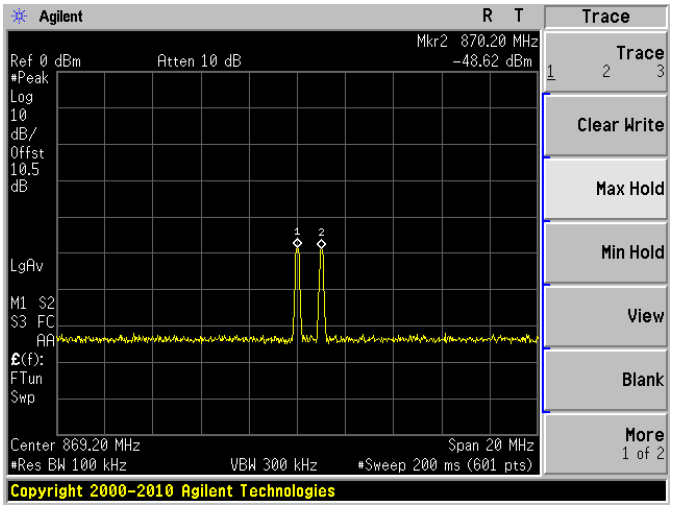


Output

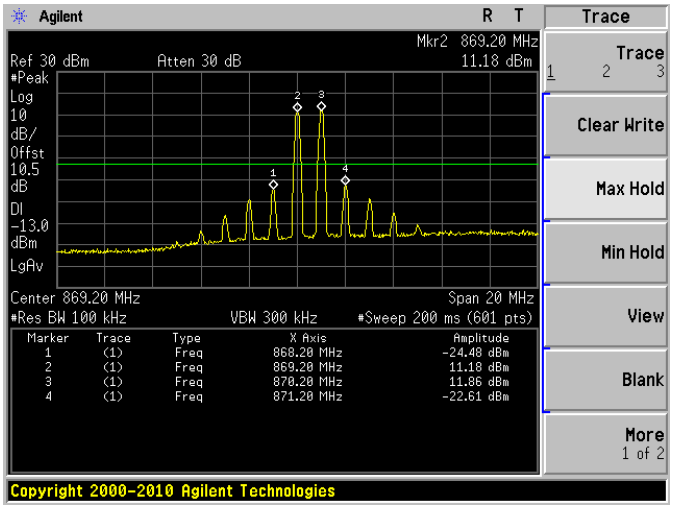


Cellular Band Downlink Low Channel

Input

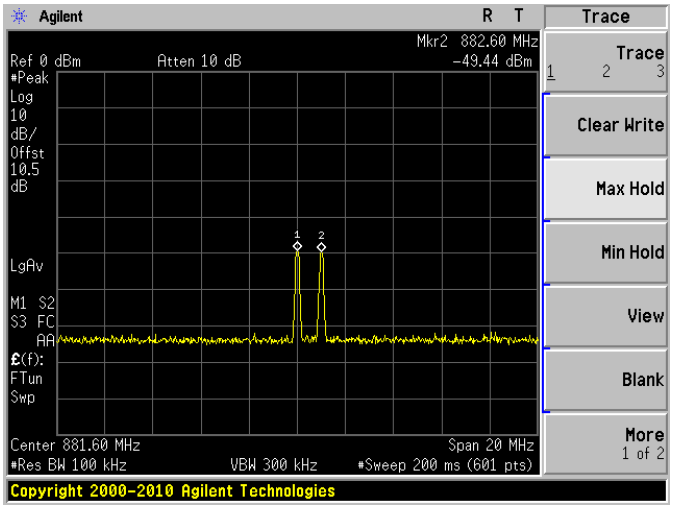


Output

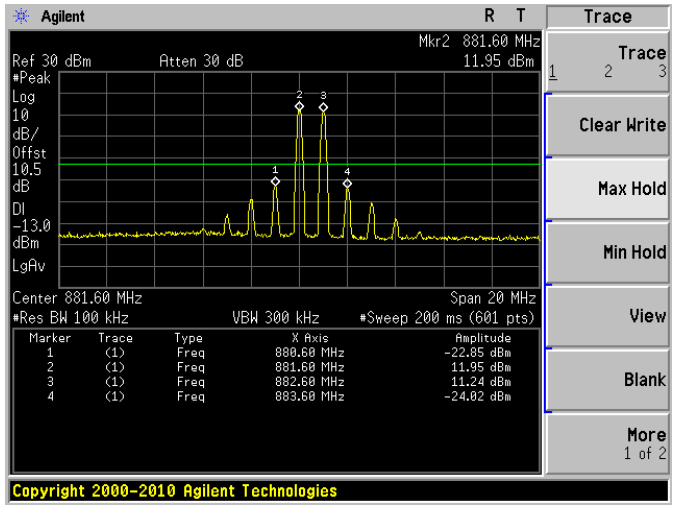


Cellular Band Downlink Middle Channel

Input

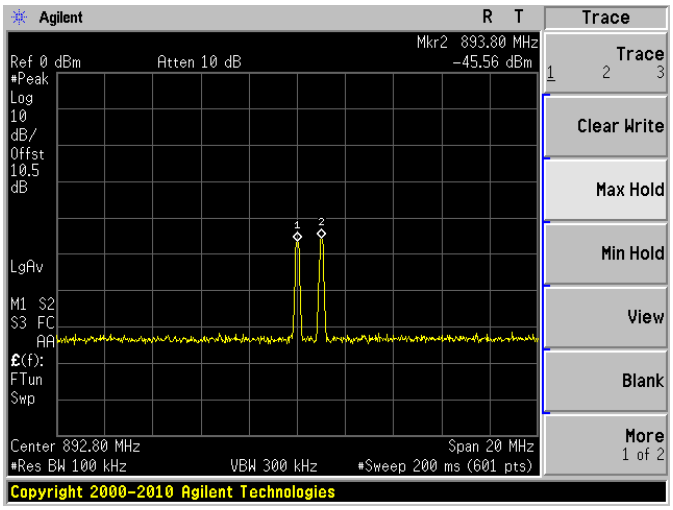


Output

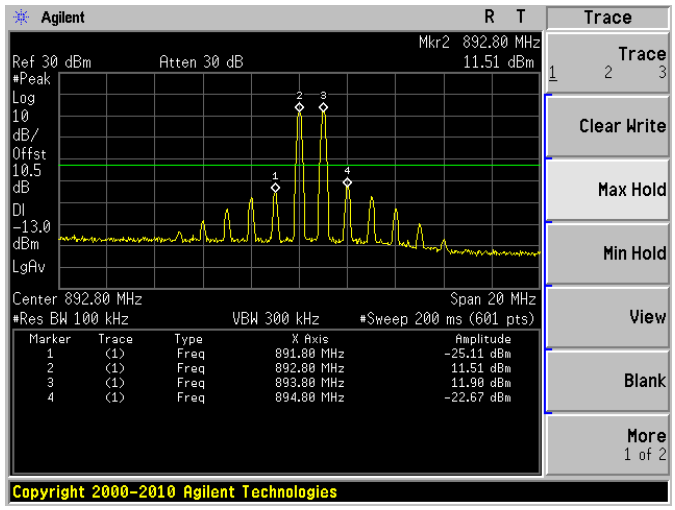


Cellular Band Downlink High Channel

Input

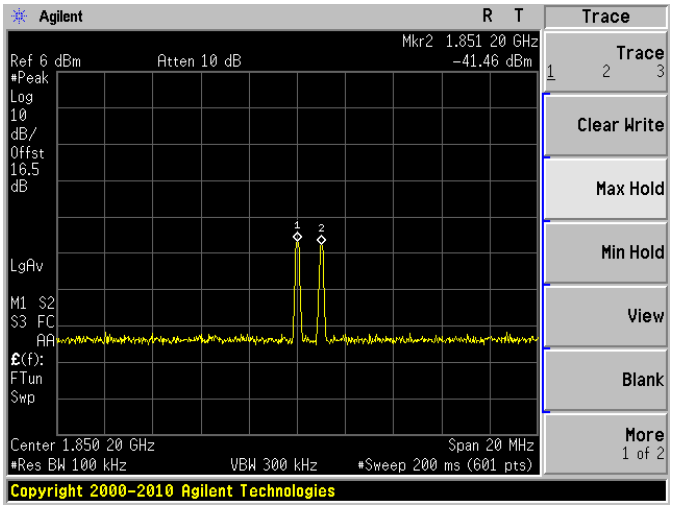


Output

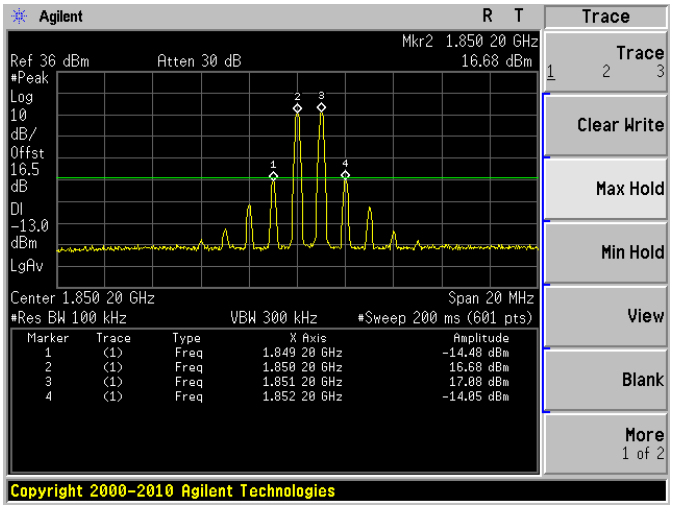


PCS Band Uplink Low Channel

Input

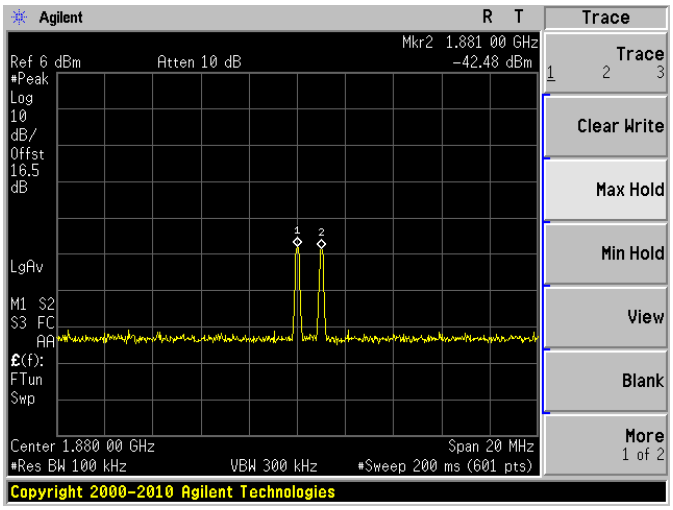


Output

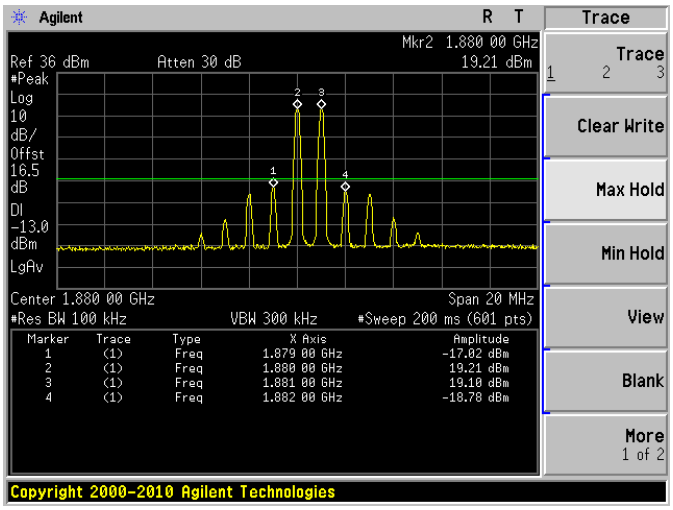


PCS Band Uplink Middle Channel

Input

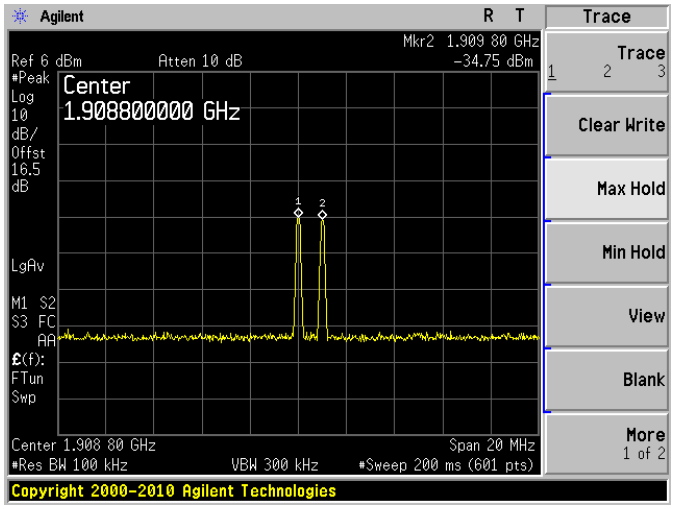


Output

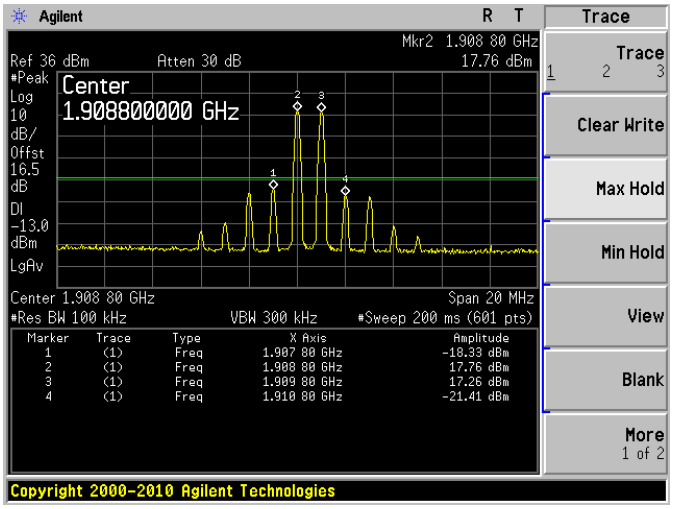


PCS Band Uplink High Channel

Input

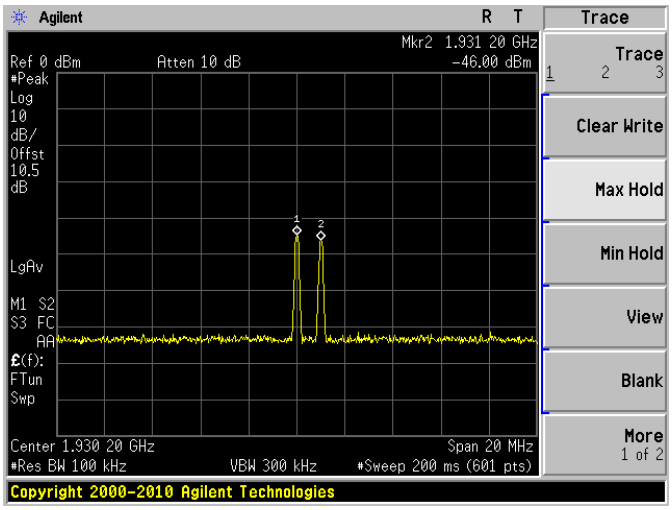


Output

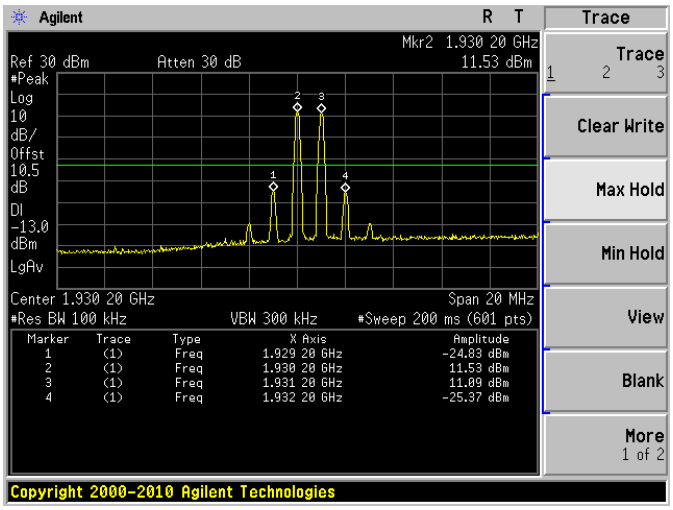


PCS Band Downlink Low Channel

Input

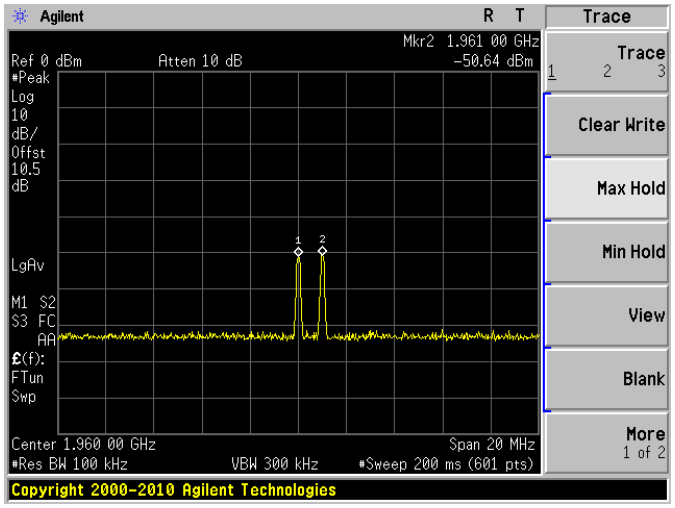


Output

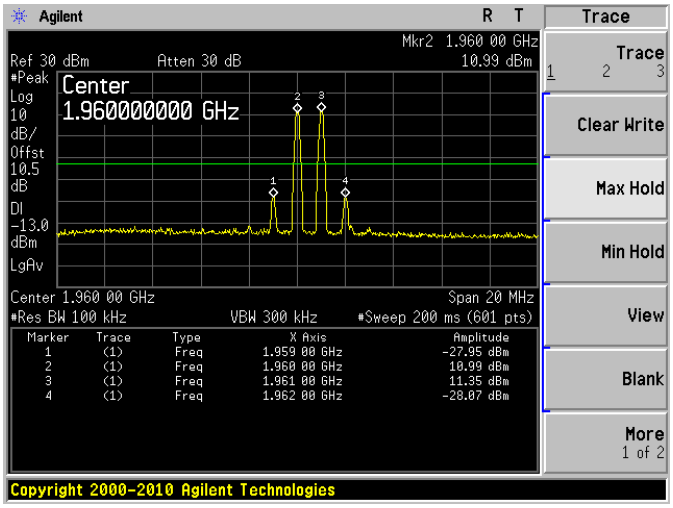


PCS Band Downlink Middle Channel

Input

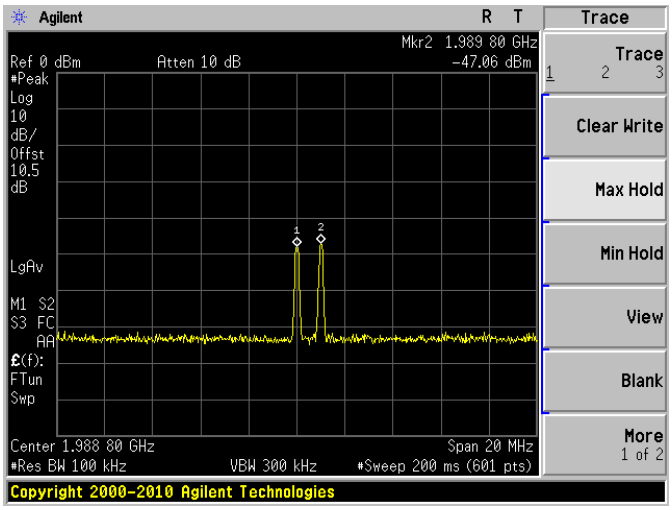


Output

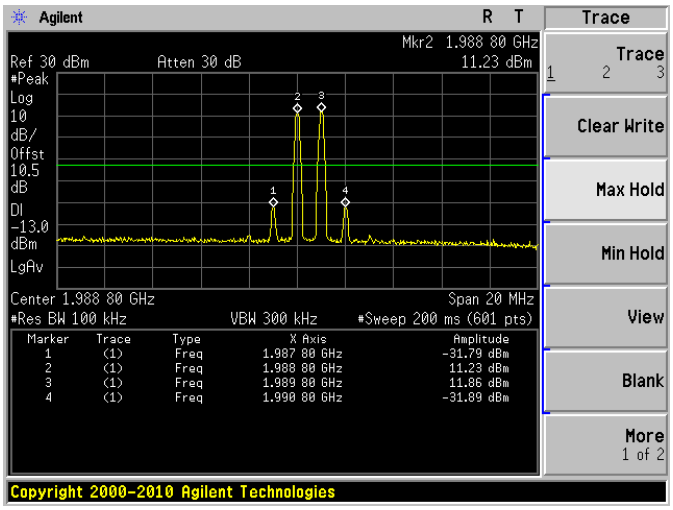


PCS Band Downlink High Channel

Input



Output



8 FCC §22.917 & §24.238 – Band Edge

8.1 Applicable Standard

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

According to FCC §24.238, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

8.2 Test Procedure

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

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

8.3 Test Equipment List and Details

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

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

8.4 Test Environmental Conditions

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

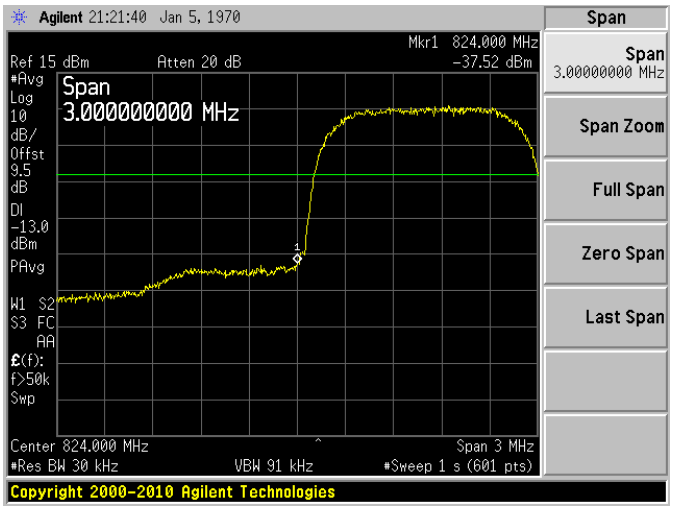
The testing was performed by Ning Ma from 2012-03-29 to 2012-04-04 at RF Site.

8.5 Test Results

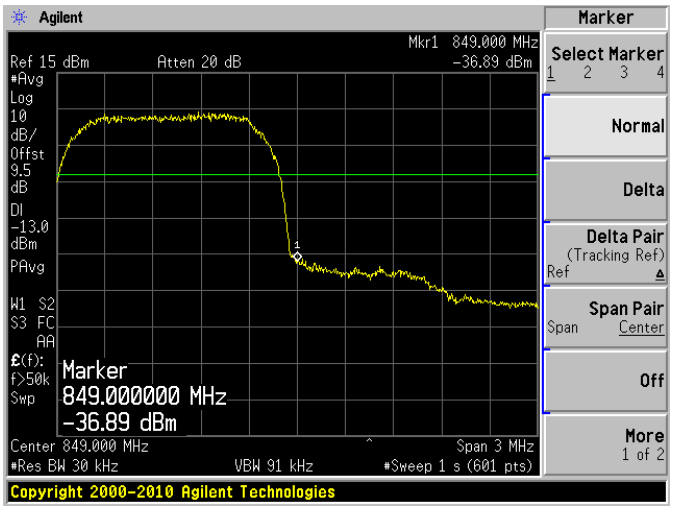
Please refer to the following plots.

CDMA/EVDO Cellular Band Uplink

Low Channel

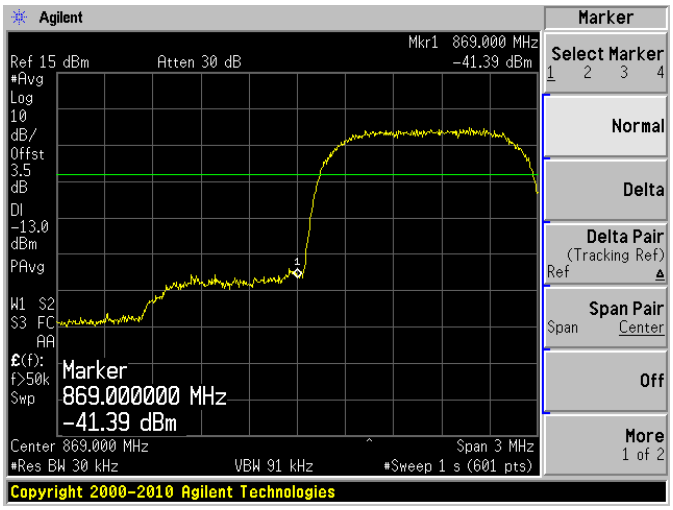


High Channel

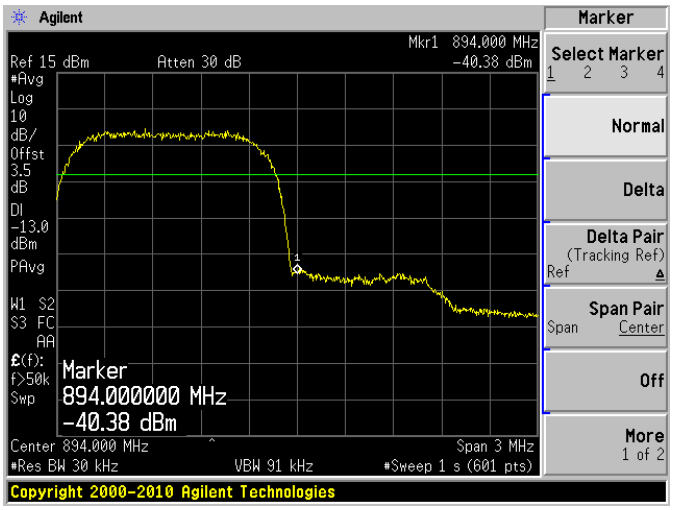


CDMA/EVDO Cellular Band Downlink

Low Channel

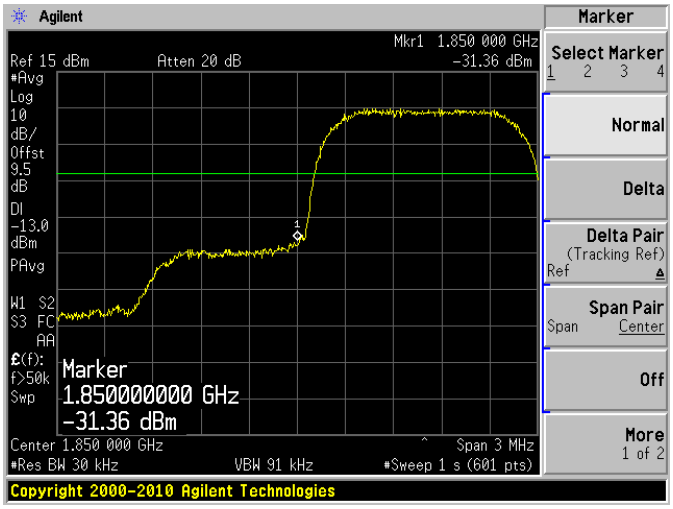


High Channel

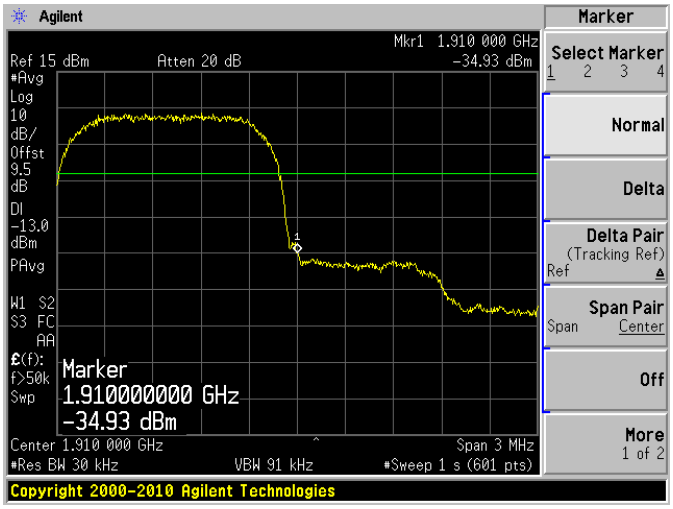


CDMA/EVDO PCS Band Uplink

Low Channel

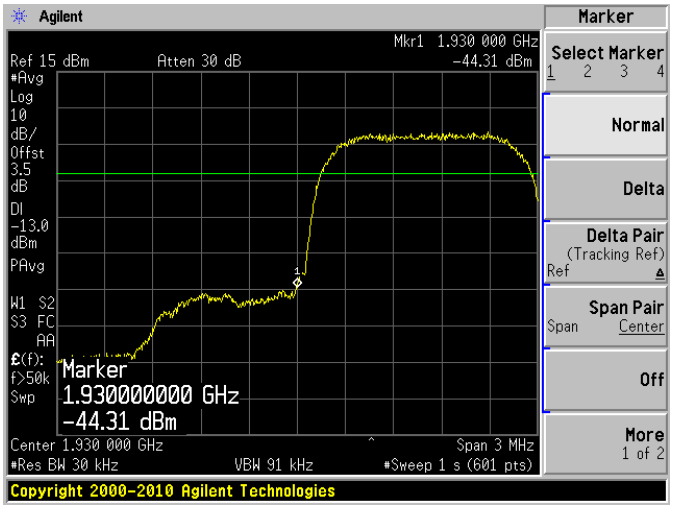


High Channel

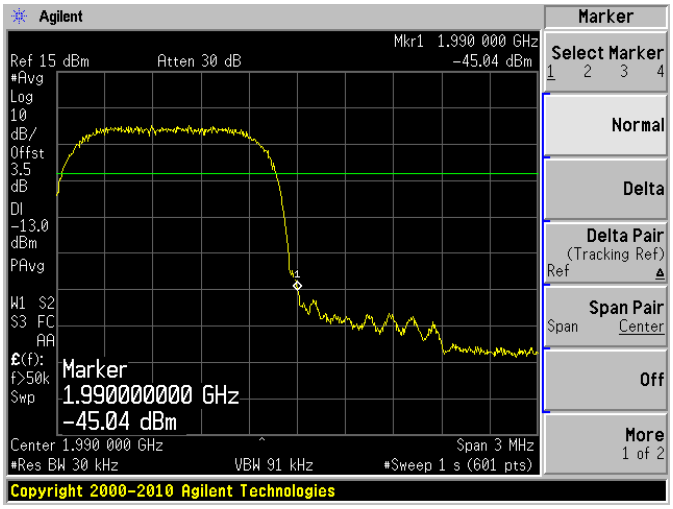


CDMA/EVDO PCS Band Downlink

Low Channel

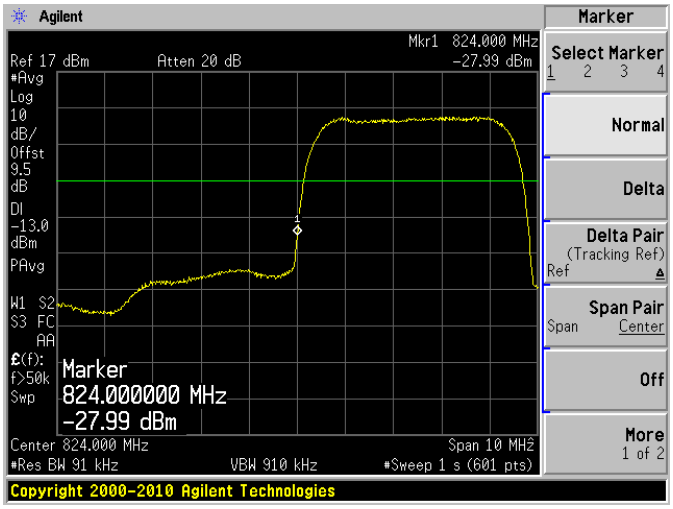


High Channel

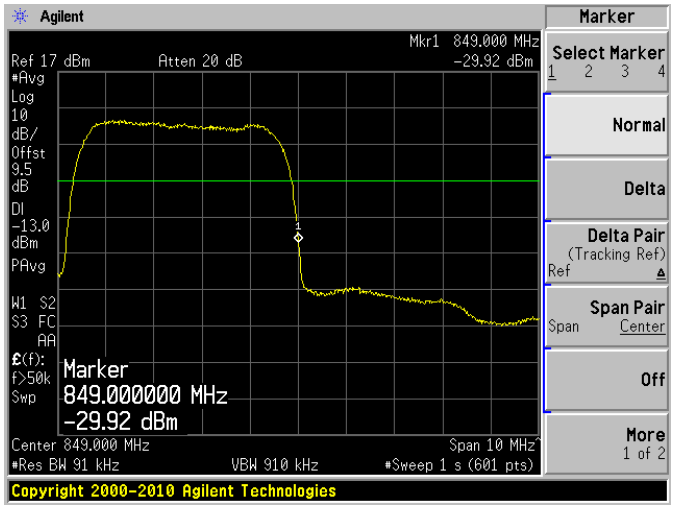


WCDMA/HSPA Cellular Band Uplink

Low Channel

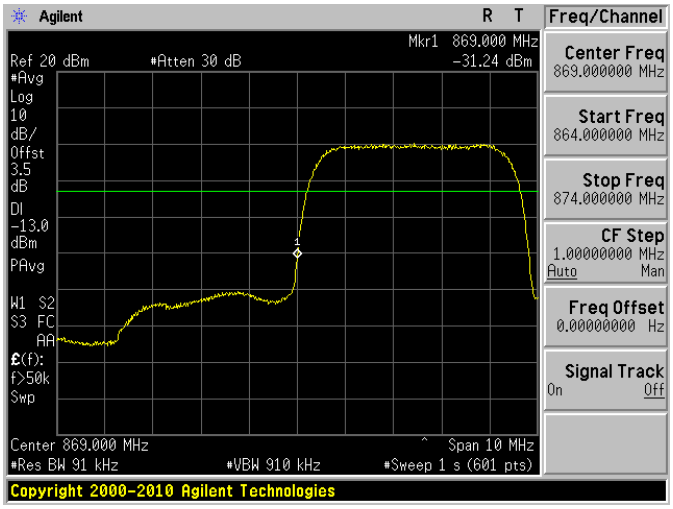


High Channel

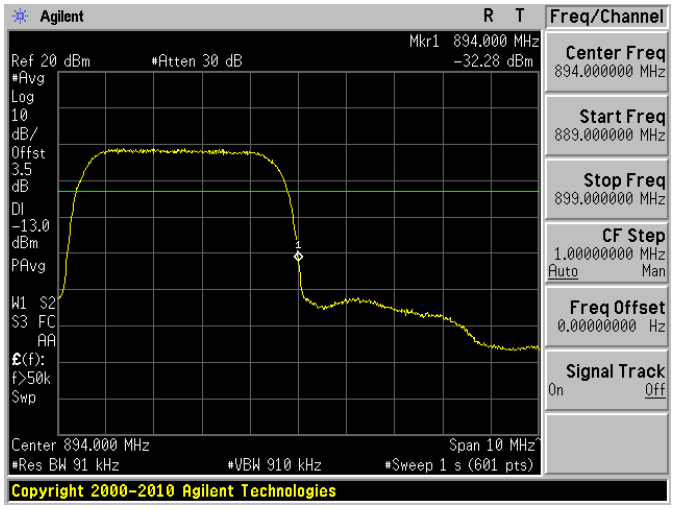


WCDMA/HSPA Cellular Band Downlink

Low Channel

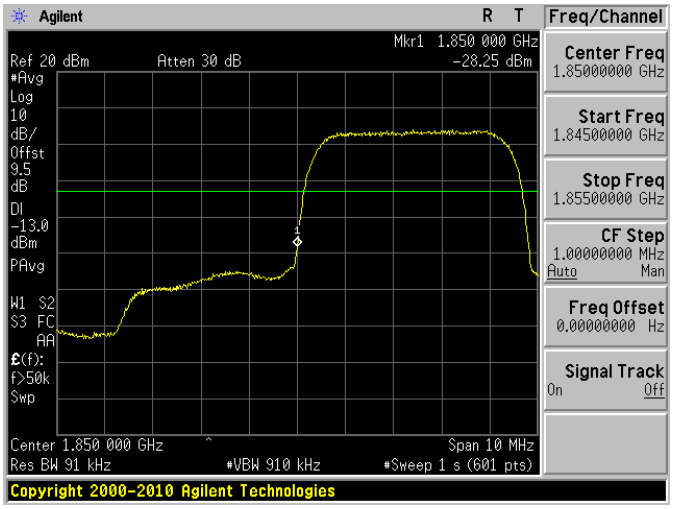


High Channel

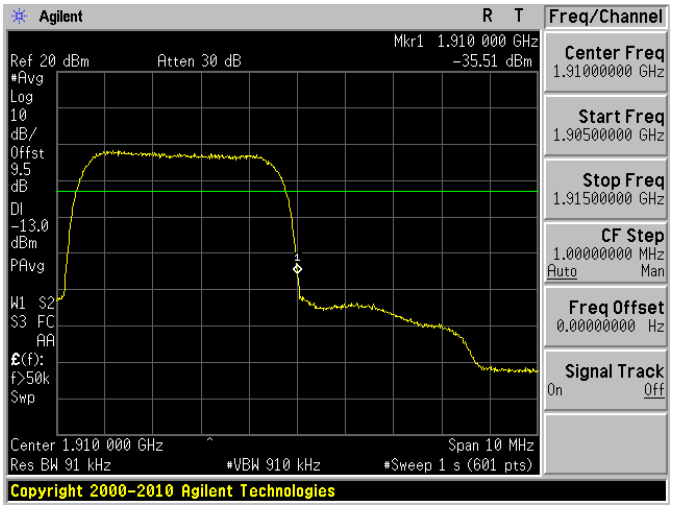


WCDMA/HSPA PCS Band Uplink

Low Channel

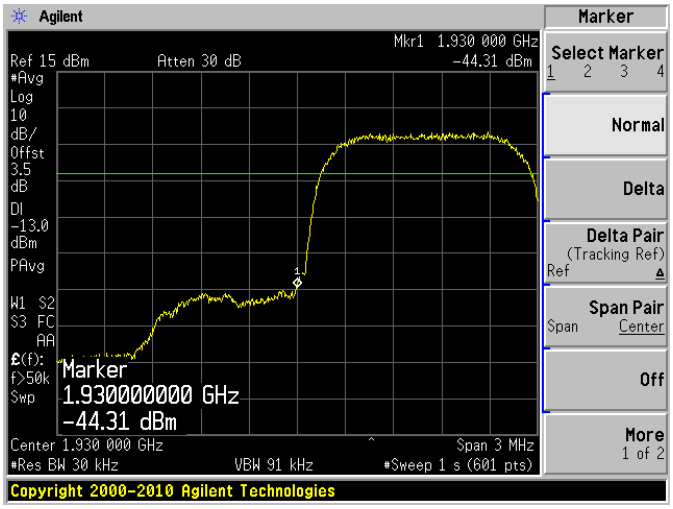


High Channel

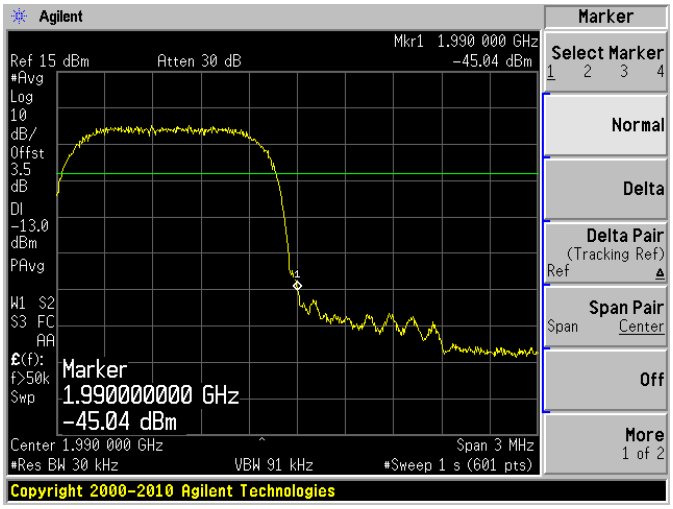


WCDMA/HSPA PCS Band Downlink

Low Channel

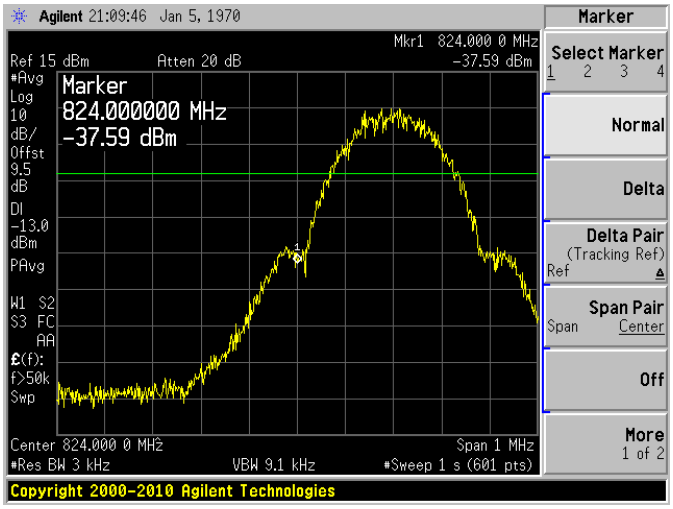


High Channel

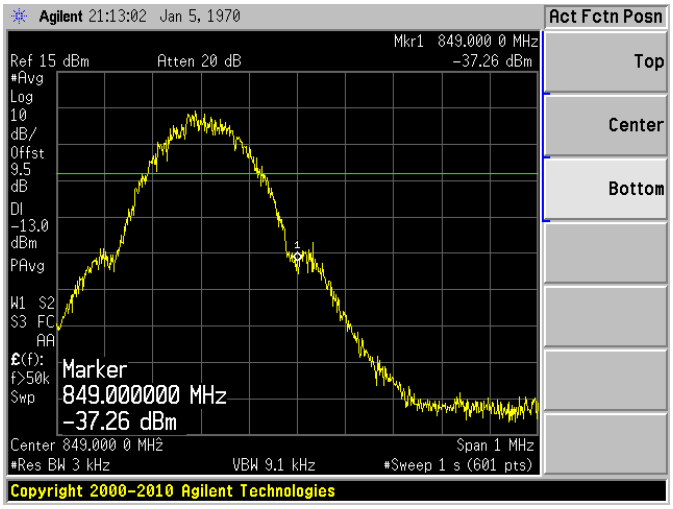


GSM Cellular Band Uplink

Low Channel

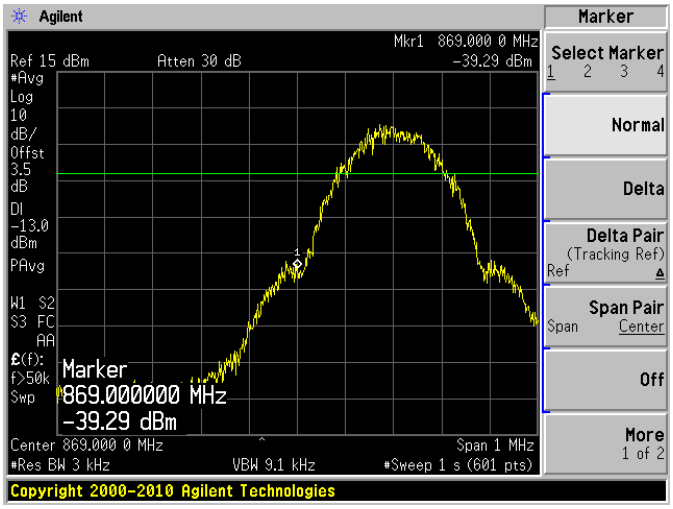


High Channel

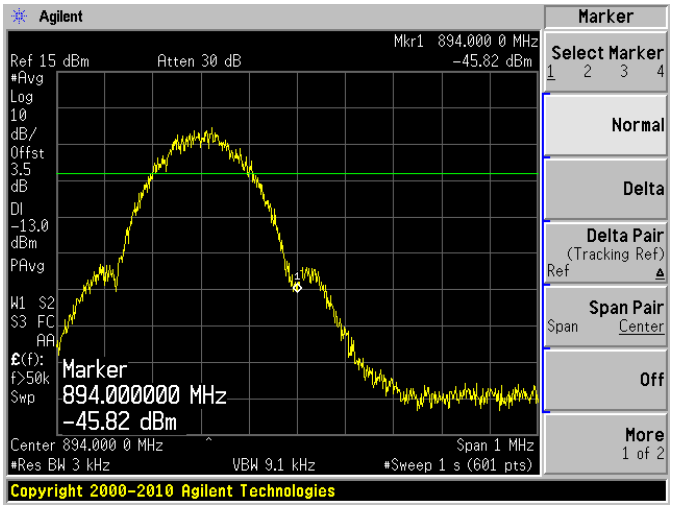


GSM Cellular Band Downlink

Low Channel

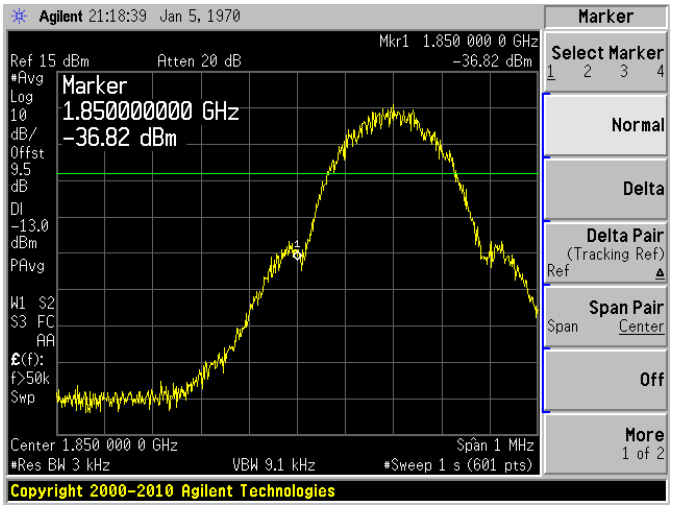


High Channel

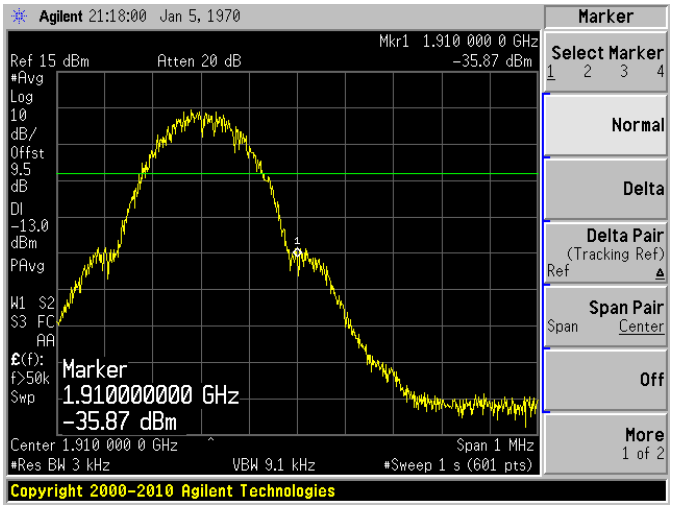


GSM PCS Band Uplink

Low Channel

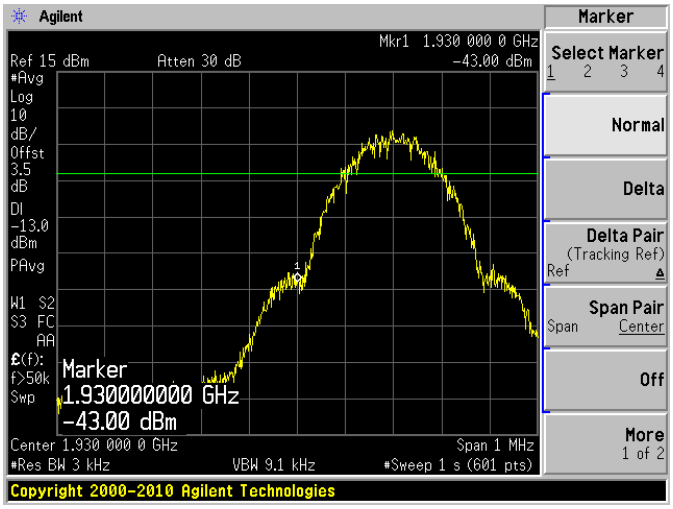


High Channel

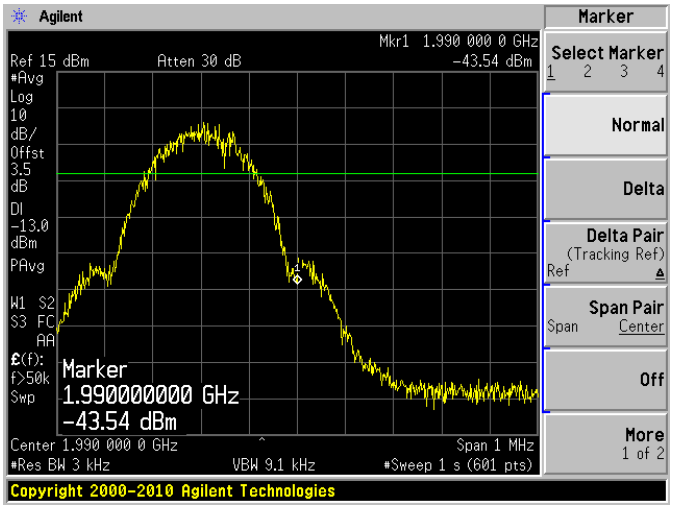


GSM PCS Band Downlink

Low Channel

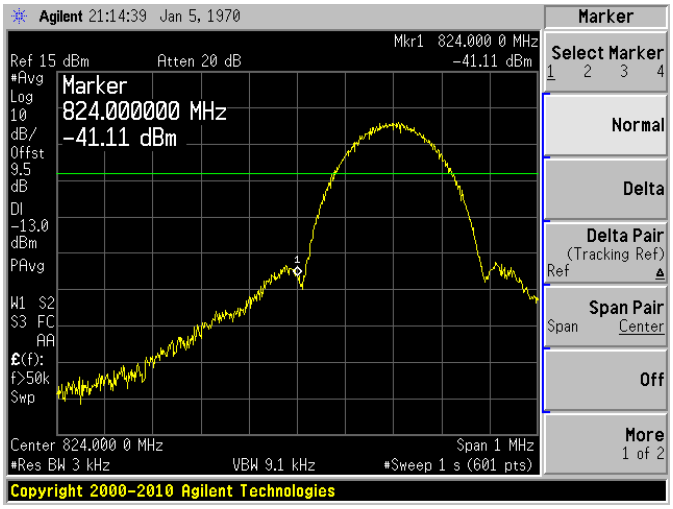


High Channel

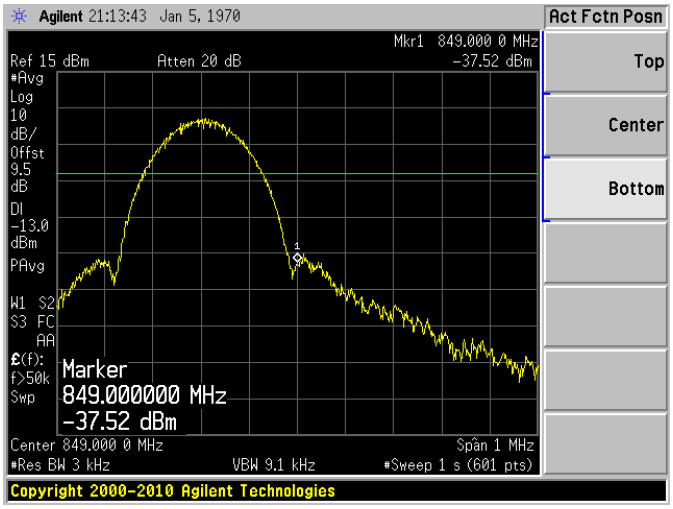


EDGE Cellular Band Uplink

Low Channel

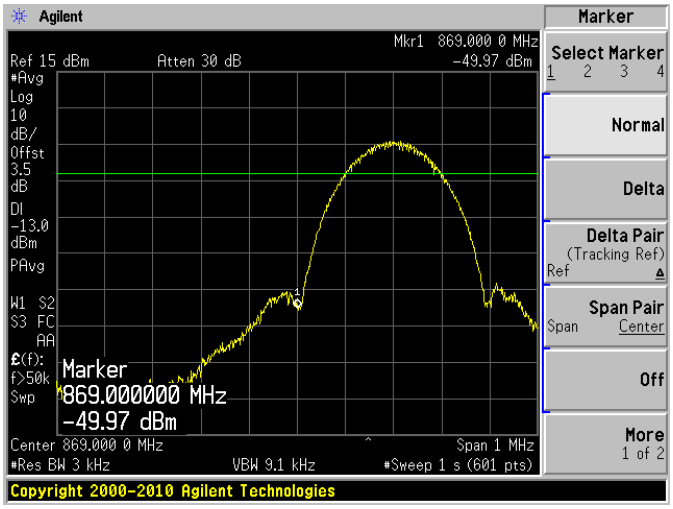


High Channel

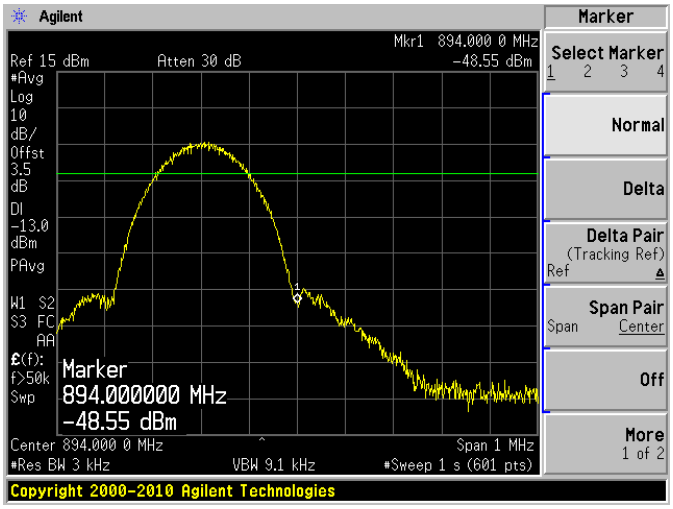


EDGE Cellular Band Downlink

Low Channel

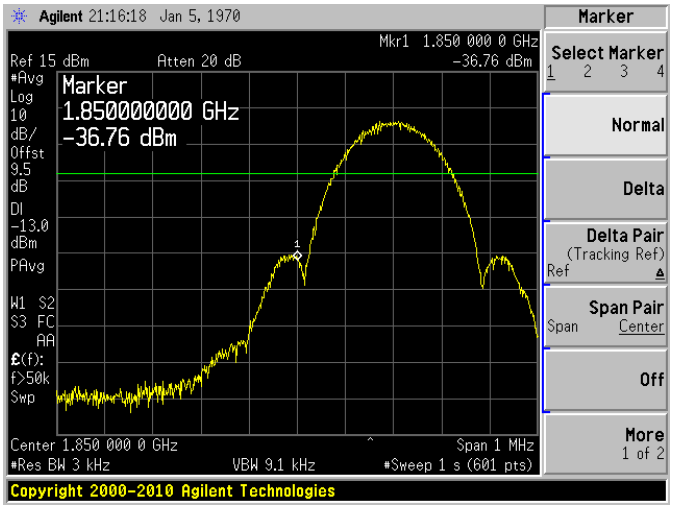


High Channel

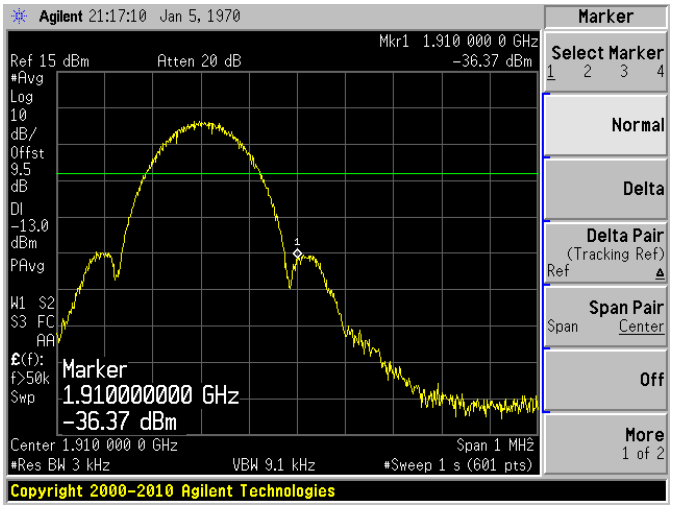


EDGE PCS Band Uplink

Low Channel

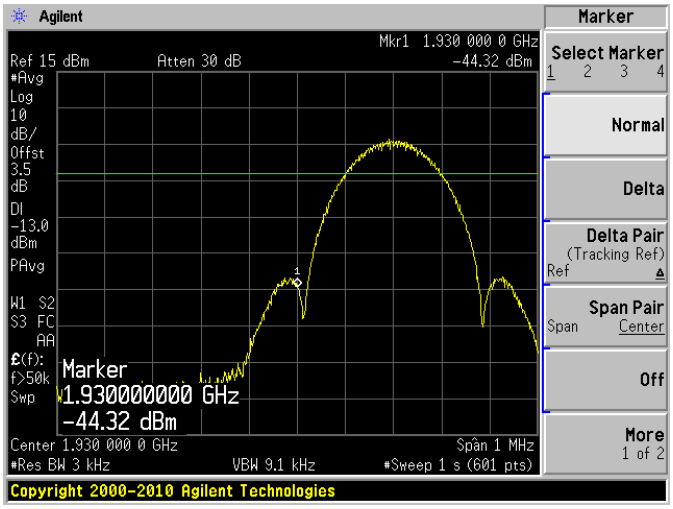


High Channel

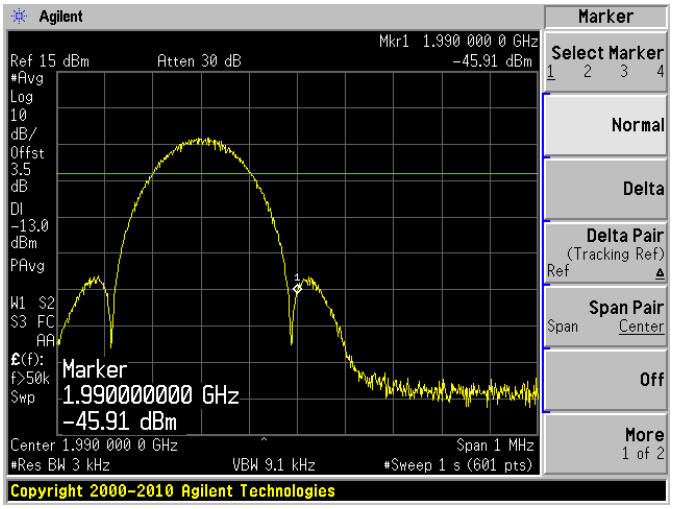


EDGE PCS Band Downlink

Low Channel



High Channel



9 FCC §1.1307(b)(1) & §2.1091 – RF Exposure Information

9.1 Applicable Standard

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

Limits for General Population/Uncontrolled Exposure

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

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

9.2 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

Cellular Band Uplink

Maximum peak output power at antenna input terminal (dBm):	20.84
Maximum peak output power at antenna input terminal (mW):	121.3389
Prediction distance (cm):	20
Prediction frequency (MHz):	836.52
Antenna Gain, typical (dBi):	3.0
Antenna Gain, typical (numeric):	2.0
Power density at predication frequency and distance (mW/cm^2):	0.0482
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5577

Cellular Band Downlink

Maximum peak output power at antenna input terminal (dBm):	13.78
Maximum peak output power at antenna input terminal (mW):	23.87811
Prediction distance (cm):	20
Prediction frequency (MHz):	891.6
Antenna Gain, typical (dBi):	3.0
Antenna Gain, typical (numeric):	2.0
Power density at predication frequency and distance (mW/cm^2):	0.0095
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5944

PCS Band Uplink

Maximum peak output power at antenna input terminal (dBm):	20.98
Maximum peak output power at antenna input terminal (mW):	125.3141
Prediction distance (cm):	20
Prediction frequency (MHz):	1880.0
Antenna Gain, typical (dBi):	5.0
Antenna Gain, typical (numeric):	3.2
Power density at predication frequency and distance (mW/cm^2):	0.0798
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

PCS Band Downlink

Maximum peak output power at antenna input terminal (dBm):	13.98
Maximum peak output power at antenna input terminal (mW):	25.00345
Prediction distance (cm):	20
Prediction frequency (MHz):	1989.8
Antenna Gain, typical (dBi):	5.0
Antenna Gain, typical (numeric):	3.2
Power density at predication frequency and distance (mW/cm^2):	0.0159
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

Results

For uplink and downlink, the highest power density levels at 20 cm are below the MPE uncontrolled exposure limit.