Lab Code: 200167-0

FCC PART 22 AND 24
MEASUREMENT AND TEST REPORT

For

Telular Corp.

580 Old Willets Path
Hauppauge, NY 11788

FCC ID: MTFSX7HSDPA07

Report Type:	Product Type:
☒ Original Report	Cellular and PCS Wireless Terminal

Test Engineer:	Oscar Au
Report Number:	R0702142-2224
Report Date:	2007-06-18
Reviewed By:	Hans Mellberg: VP of Engineering
Prepared By: (00)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *Telular Corp.'s* product, FCC ID: MTFSX7HSDPA07 model: SX7T HSDPA or the "EUT" as referred to in this report is Wireless CDMA Access Point marketed as a "Fixed Cellular Terminal." The EUT is intended for deployment in an office or home office environment and is designed to allow cellular or PCS wireless devices to connect to either LAN or telephony networks. The EUT operates on both 824-849 MHz (cellular) and 1859-1910 MHz (PCS) bands and utilizes Edge, GSM, HSDPA, and W-CDMA modulation techniques. It is powered by either AC/ 12 VDC adapter or by 4.8 V rechargeable battery pack.

1.2 Mechanical Description

The EUT is of metallic construction and measures approximately 203 mm (L) x 140 mm (W) x 45 mm (H) and weighs approximately 1 *kg.*

** The test data gathered are from typical production sample, serial number: SX7T2142, provided by the manufacturer.*

1.3 EUT Photo

Please see additional photos in Exhibit C

1.4 Objective

This type approval report is prepared on behalf of *Telular Corp.* 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.

1.5 Related Submittal(s)/Grant(s)

No Related Submittals

1.6 Test Methodology

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

Part 22 Subpart H - Cellular Radiotelephone Service
Part 24 Subpart E - PCS

Applicable Standards: TIA EIA 98-C, TIA/EIA603-C, ANSI C63.4-2003.

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

1.7 Measurement Uncertainty

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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.8 Test Facility

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

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

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

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

2.2 Equipment Modifications

No modifications were made to the EUT.

2.3 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
ELPAC Power systems	AC-DC adaptor	FW1812	062770
Telular	4.8 V Rechargeable Battery Pack*	73001501	2006-12-12

**Battery pack was freshly and completely charged before the start of testing*

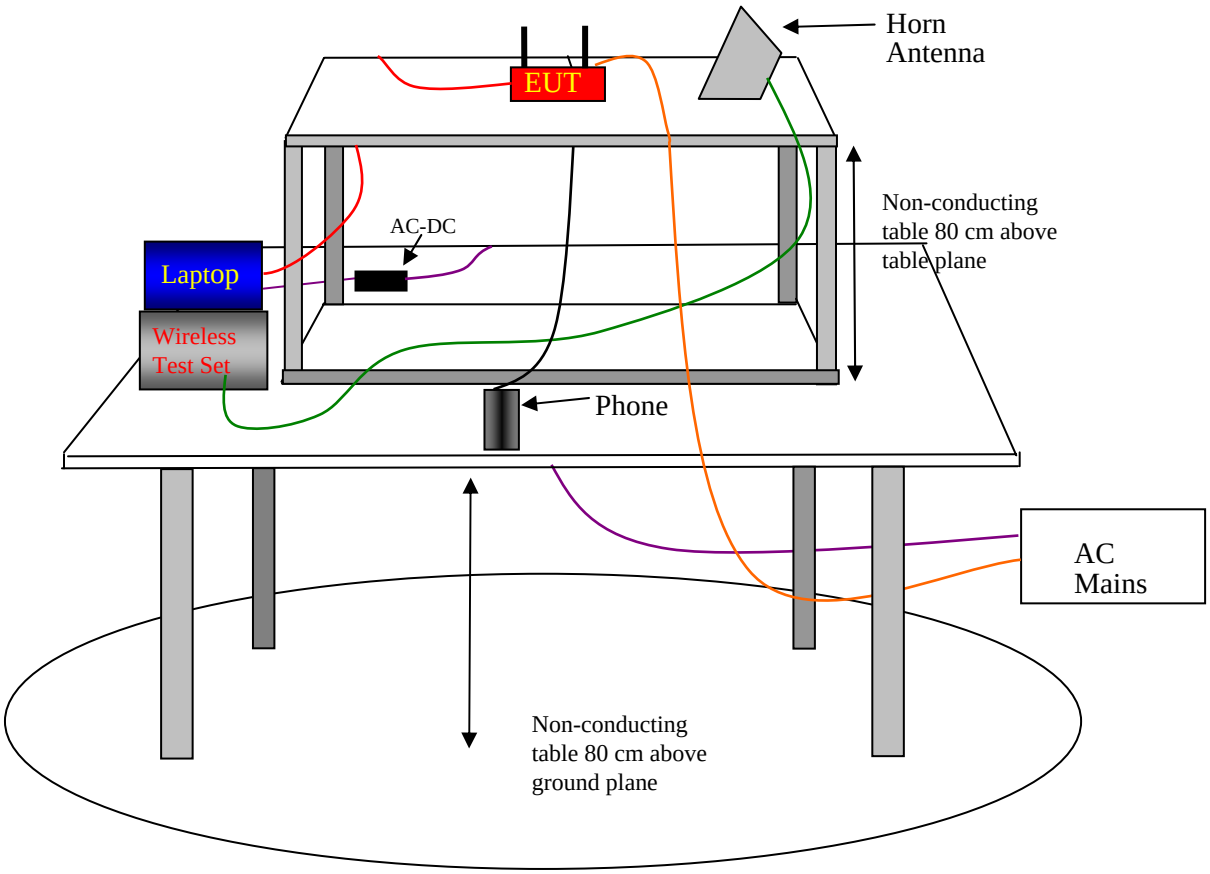
2.4 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Agilent	Wireless Communications Test Set	8960 Series 10 E5515C	GB44051221
Mini-Circuits	Splitter	ZFRSC-42	SF874700404
Midwest Microwave	10dB attenuator pad	ATT-0263-10-000-02	N/A
Inmet Corp.	DC Block	8055	N/A

2.5 Interface Ports and Cabling

Cable Description	Length (M)	From	To
RF cable	0.2	Communications test set	Splitter
RF cable	0.2	Antenna port on EUT	Splitter

2.6 Test setup Block Diagram for radiated emissions tests



3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 2.1047	Modulation Characteristics	N/A
§ 2.1053	Field Strength of Spurious Radiation	Compliant
§2.1091	RF Exposure	Compliant
§ 2.1046, § 22.912 (d) § 24.232	RF Output Power	Compliant
§ 2.1049 § 22.917 § 22.905 § 24.238	Out of Band Emissions, Occupied Bandwidth	Compliant
§ 2.1051, § 22.917 § 24.238(a)	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1055 (a) § 2.1055 (d) § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917 §24.238	Band Edge	Compliant

4 §2.1047 - MODULATION CHARACTERISTIC

4.1 Applicable Standard

According to FCC § 2.1047(d), part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

5 §1.1307(b) (1) & §2.1091 - RF EXPOSURE

5.1 Applicable Standard

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

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

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

5.2 MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Cellular band

Maximum peak output power at antenna input terminal:	32.30(dBm)
Maximum peak output power at antenna input terminal:	1698.24(mW)
Prediction distance:	25 (cm)
Predication frequency:	848.8(MHz)
Antenna Gain (typical):	3 (dBi)
Antenna gain:	1.995(numeric)
Power density at predication frequency at 25 cm:	0.4314(mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 0.5659(mW/cm^2)

PCS band

Maximum peak output power at antenna input terminal:	29.95(dBm)
Maximum peak output power at antenna input terminal:	988.55(mW)
Prediction distance:	20 (cm)
Predication frequency:	1909.8(MHz)
Antenna Gain (typical):	3 (dBi)
Antenna gain:	1.995(numeric)
Power density at predication frequency at 20 cm:	0.3923(mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1(mW/cm^2)

5.3 Test Result

The EUT is a mobile device. The power density level at 25 cm is 0.4314 mW/cm^2, which is below the uncontrolled exposure limit of 0.5659 mW/cm^2 at 848.8 MHz for Cellular band. The power density level at 20 cm is 0.3923 mW/cm^2, which is below the uncontrolled exposure limit of 1mW/cm^2 at 1909.8 MHz for PCS band. Thus, this device has overall minimum operating distance of 25 cm.

6 §2.1053 - SPURIOUS RADIATED EMISSIONS

6.1 Applicable Standard

Requirements: CFR 47, § 2.1053, § 22.917, § 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 lg (TXpwr in Watts/0.001) – the absolute level

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

6.2.1 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	45 %
ATM Pressure:	101.2 kPa

** The testing was performed by Oscar Au on 2007-05-11 to 2007-05-15.*

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06
HP	Amplifier, Pre	8447D	2944A10198	2007-01-08
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2006-08-21
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2007-04-20
HP	Generator, Signal	83650B	3614A00276	2007-05-10
A.R.A.	Antenna, Horn	DRG-118/A	1132	2006-08-17

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

6.4 Summary of Test Results

Worst case reading as follows:

Cellular band

Mode: Edge		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-29.52	1673.2	V

Mode: GSM		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-24.32	1673.2	V

Mode: HSDPA		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-33.92	1672.8	V

Mode: W-CDMA		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-32.62	1672.8	V

PCS band

Mode: Edge		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-27.02	3760	V

Mode: GSM		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-28.12	3760	V

Mode: HSDPA		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-29.92	3760	V

Mode: W-CDMA		
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**
-30.12	3760	V

6.5 Test Data

6.5.1 Edge

Run # 1: 30MHz -10GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
1673.2	59.6	180	1.8	V	1673.2	-50.4	9.27	1.3881	-42.5181	-13	-29.5181
1673.2	55.4	120	1.7	H	1673.2	-54.3	9.27	1.3881	-46.4181	-13	-33.4181
2509.8	51.3	90	1.6	V	2509.8	-58.5	9.25	1.5363	-50.7863	-13	-37.7863
2509.8	47.6	160	1.5	H	2509.8	-61.3	9.25	1.5363	-53.5863	-13	-40.5863
4183	43.5	120	1.4	V	4183	-63.9	10.7	2.2573	-55.4573	-13	-42.4573
4183	42.1	80	1.3	H	4183	-64.8	10.7	2.2573	-56.3573	-13	-43.3573

Run # 2: 30MHz -20GHz Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
3760	60.1	40	1.8	V	3760	-49.5	11.44	1.9599	-40.0199	-13	-27.0199
3760	55.3	60	1.3	H	3760	-54.3	11.44	1.9599	-44.8199	-13	-31.8199
5640	50.2	150	1.6	V	5640	-59.5	11.22	2.5625	-50.8425	-13	-37.8425
5640	48.7	160	1.5	H	5640	-61.1	11.22	2.5625	-52.4425	-13	-39.4425

6.5.2 GSM

Run # 1: 30MHz -10GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
2509.8	56.5	80	1.5	V	2509.8	-43.6	9.25	1.5363	-35.8863	-13	-22.8863
1673.2	64.1	0	1.9	V	1673.2	-45.2	9.27	1.3881	-37.3181	-13	-24.3181
2509.8	50.2	120	1.5	H	2509.8	-49.5	9.25	1.5363	-41.7863	-13	-28.7863
1673.2	58.6	20	1.3	H	1673.2	-51.4	9.27	1.3881	-43.5181	-13	-30.5181
4183	44.7	60	1.4	V	4183	-55.3	10.7	2.2573	-46.8573	-13	-33.8573
4183	40.2	60	1.6	H	4183	-59.1	10.7	2.2573	-50.6573	-13	-37.6573

Run # 2: 30MHz -20GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
3760	59.5	40	1.8	V	3760	-50.6	11.44	1.9599	-41.1199	-13	-28.1199
3760	54.6	60	1.3	H	3760	-55.4	11.44	1.9599	-45.9199	-13	-32.9199
5640	48.5	150	1.6	V	5640	-61.1	11.22	2.5625	-52.4425	-13	-39.4425
5640	46.8	160	1.5	H	5640	-62.7	11.22	2.5625	-54.0425	-13	-41.0425

6.5.3 HSDPA

Run # 1: 30MHz -10GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
1672.8	55.3	180	1.7	V	1672.8	-54.8	9.27	1.3881	-46.9181	-13	-33.9181
1672.8	53.1	150	1.5	H	1672.8	-56.7	9.27	1.3881	-48.8181	-13	-35.8181
2509.2	48.7	100	1.6	V	2509.2	-60.9	9.25	1.5363	-53.1863	-13	-40.1863
2509.2	46.3	220	1.3	H	2509.2	-61.2	9.25	1.5363	-53.4863	-13	-40.4863
4182	44.3	160	1.5	V	4182	-63.5	10.7	2.2573	-55.0573	-13	-42.0573
4182	43.1	120	1.4	H	4182	-64.4	10.7	2.2573	-55.9573	-13	-42.9573

Run # 2: 30MHz -20GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
3760	56.4	40	1.8	V	3760	-52.4	11.44	1.9599	-42.9199	-13	-29.9199
3760	53.6	60	1.3	H	3760	-55.6	11.44	1.9599	-46.1199	-13	-33.1199
5640	46.5	150	1.6	V	5640	-62.6	11.22	2.5625	-53.9425	-13	-40.9425
5640	45.1	160	1.5	H	5640	-63.3	11.22	2.5625	-54.6425	-13	-41.6425

6.5.4 W-CDMA

Run # 1: 30MHz -10GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
1672.8	56.8	200	1.7	V	1672.8	-53.5	9.27	1.3881	-45.6181	-13	-32.6181
1672.8	54.2	250	1.5	H	1672.8	-55.3	9.27	1.3881	-47.4181	-13	-34.4181
2509.2	49.7	100	1.6	V	2509.2	-60.6	9.25	1.5363	-52.8863	-13	-39.8863
2509.2	48.6	120	1.6	H	2509.2	-61.5	9.25	1.5363	-53.7863	-13	-40.7863
4182	44.5	200	1.5	V	4182	-63.4	10.7	2.2573	-54.9573	-13	-41.9573
4182	42.9	150	1.4	H	4182	-65.1	10.7	2.2573	-56.6573	-13	-43.6573

Run # 2: 30MHz -20GHz Middle Channel

Indicated		Azimuth	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)	Degrees	Height (m)	Polar H/V	Frequency (MHz)	Level dBm	Antenna Gain Correction	Cable Loss (dB)			
3760	56.9	40	1.8	V	3760	-52.6	11.44	1.9599	-43.1199	-13	-30.1199
3760	54.1	60	1.3	H	3760	-55.3	11.44	1.9599	-45.8199	-13	-32.8199
5640	47.2	150	1.6	V	5640	-62.5	11.22	2.5625	-53.8425	-13	-40.8425
5640	45.6	160	1.5	H	5640	-63.6	11.22	2.5625	-54.9425	-13	-41.9425

7 §2.1046, §22.913(a), & §24.232 – RF OUTPUT POWER

7.1 Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watt.

7.2 Test Procedure

Conducted:

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

7.2.1 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	58 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-05-11 to 2007-05-15.*

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

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

7.4 Summary of Test Results

7.4.1 Cellular band FCC Part 22

Edge

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	824.2	31.47	1402.81	3.00	34.47	38.45
MIDDLE	836.6	31.80	1513.56	3.00	34.80	38.45
HIGH	848.8	32.22	1667.25	3.00	35.22	38.45

GSM

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	824.2	31.58	1438.80	3.00	34.58	38.45
MIDDLE	836.6	31.96	1570.36	3.00	34.96	38.45
HIGH	848.8	32.30	1698.24	3.00	35.30	38.45

HSDPA

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	826.4	22.60	181.97	3.00	25.60	38.45
MIDDLE	836.4	22.75	188.36	3.00	25.75	38.45
HIGH	846.6	22.70	186.21	3.00	25.70	38.45

W-CDMA

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	826.4	22.19	165.58	3.00	25.19	38.45
MIDDLE	836.4	22.80	190.55	3.00	25.80	38.45
HIGH	846.6	22.55	179.89	3.00	25.55	38.45

7.4.2 PCS band FCC Part 24:

Edge

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	1850.20	25.25	334.97	3.00	28.25	33.00
MIDDLE	1880	29.50	891.25	3.00	32.50	33.00
HIGH	1909.8	29.30	851.14	3.00	32.30	33.00

GSM

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	1850.20	25.24	334.20	3.00	28.24	33.00
MIDDLE	1880	29.49	889.20	3.00	32.49	33.00
HIGH	1909.8	29.95	988.55	3.00	32.95	33.00

HSDPA

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	1852.4	21.92	155.60	3.00	24.92	33.00
MIDDLE	1880	22.76	188.80	3.00	25.76	33.00
HIGH	1907.5	22.30	169.82	3.00	25.30	33.00

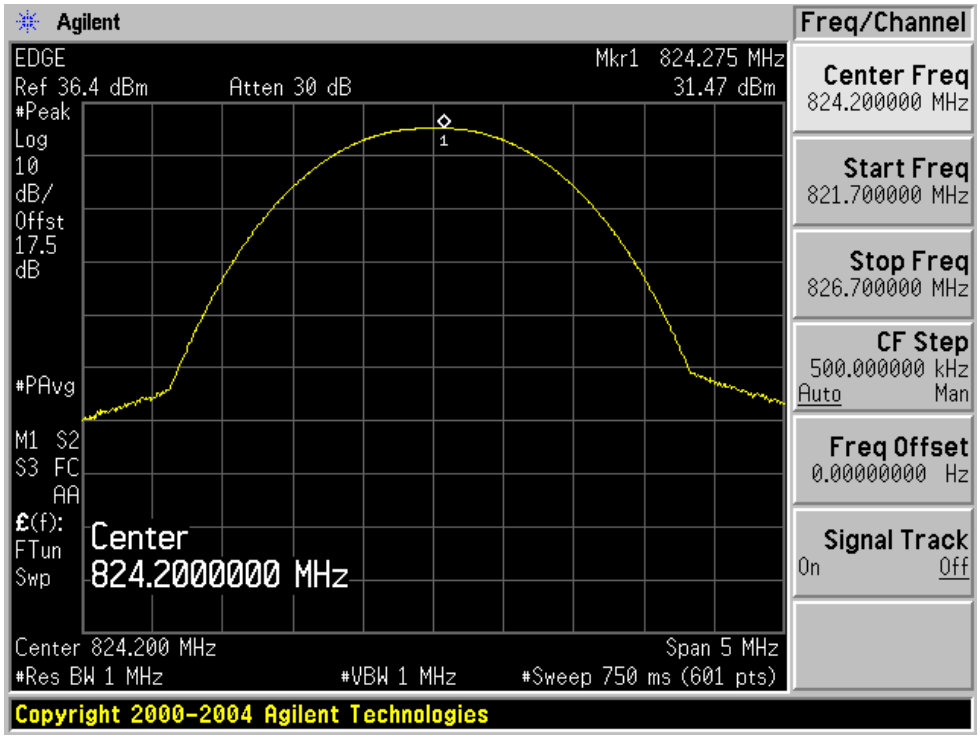
W-CDMA

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna (dBi)	ERP (dBm)	Limit (dBm)
LOW	1852.4	19.44	87.90	3.00	22.44	33.00
MIDDLE	1880	23.29	213.30	3.00	26.29	33.00
HIGH	1907.5	23.45	221.31	3.00	26.45	33.00

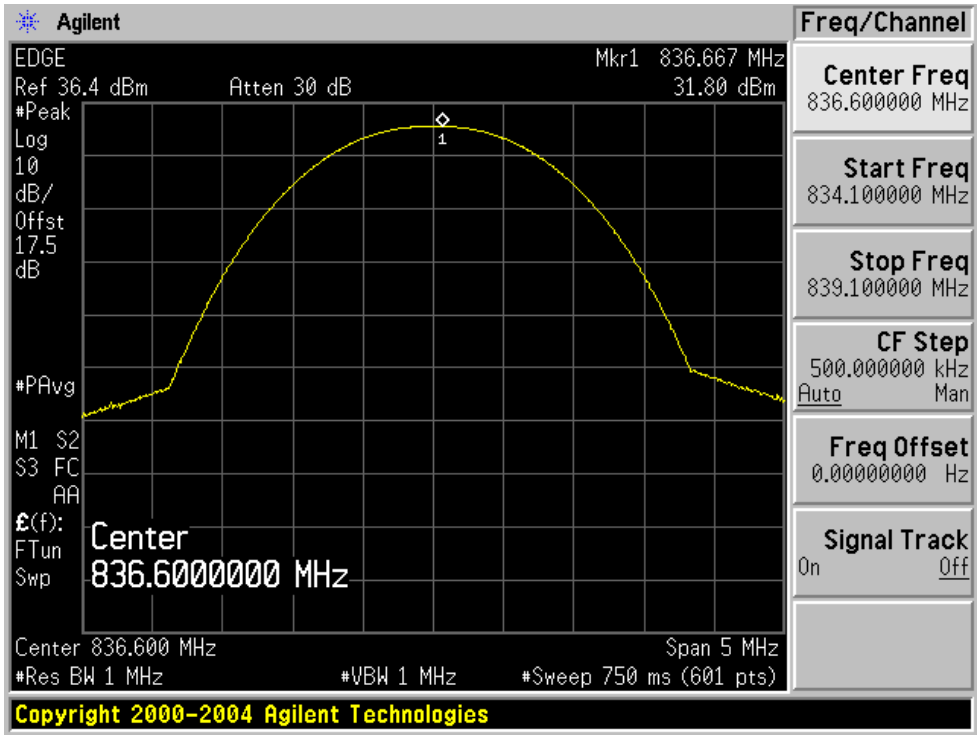
7.5 Test Data

7.5.1 Plots of Conducted Output Power for FCC Part 22 (Cellular Band)

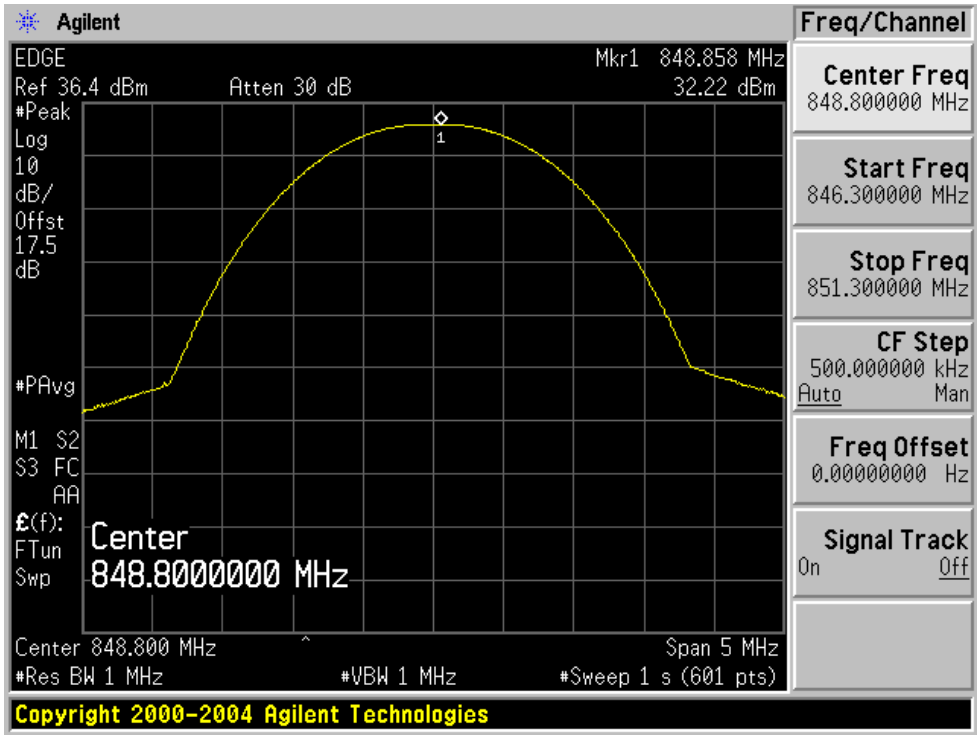
Edge Low Channel



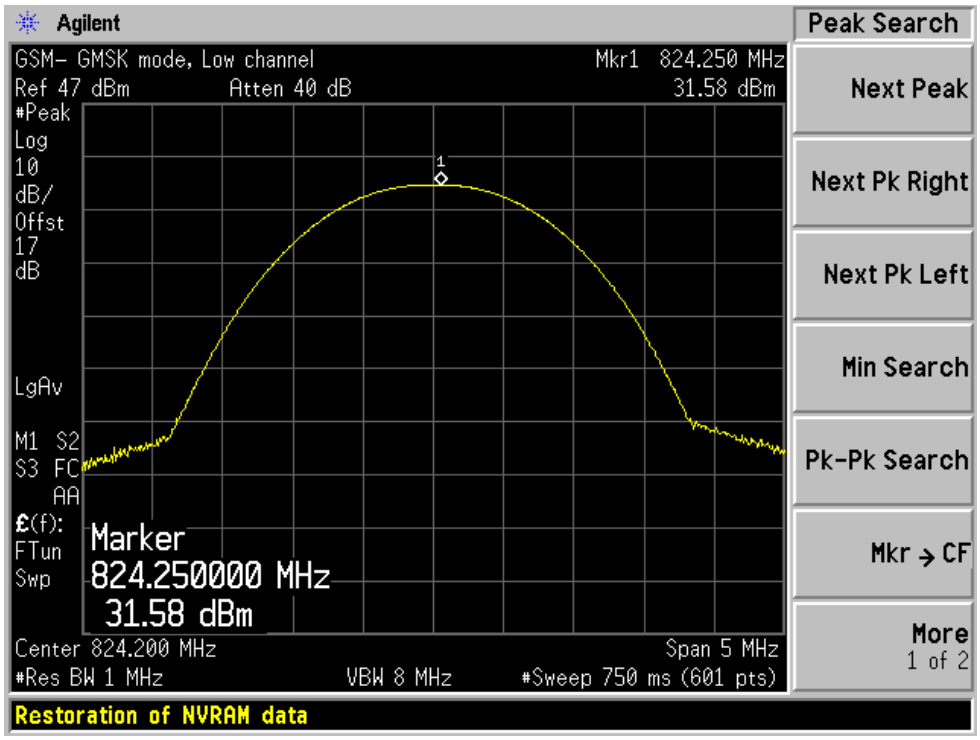
Edge Middle Channel



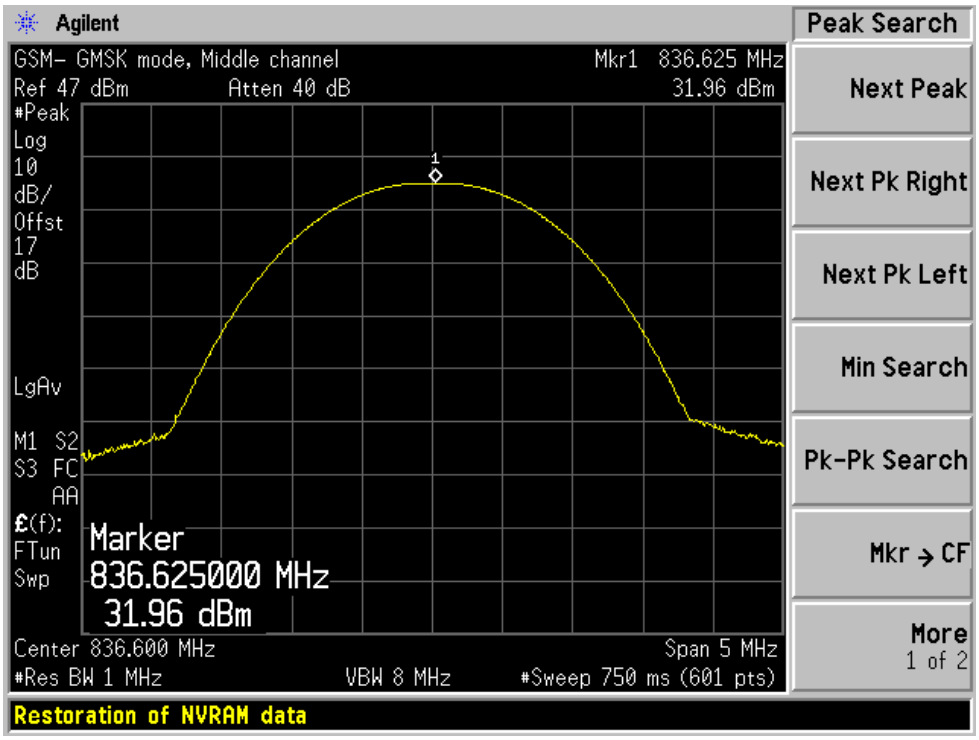
Edge High Channel



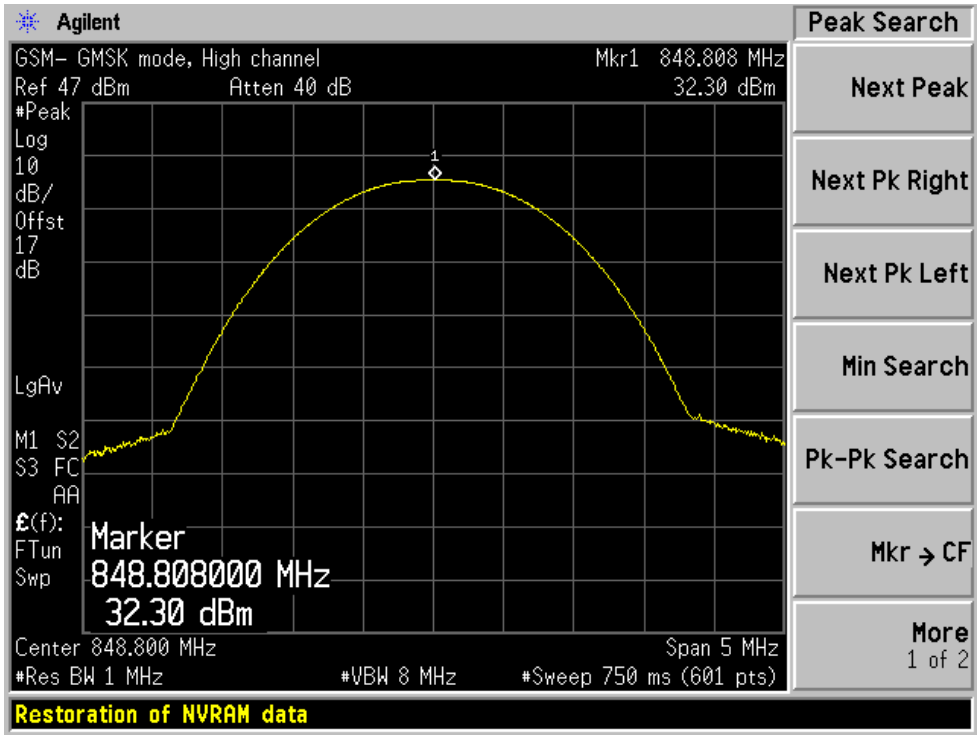
GSM Low Channel



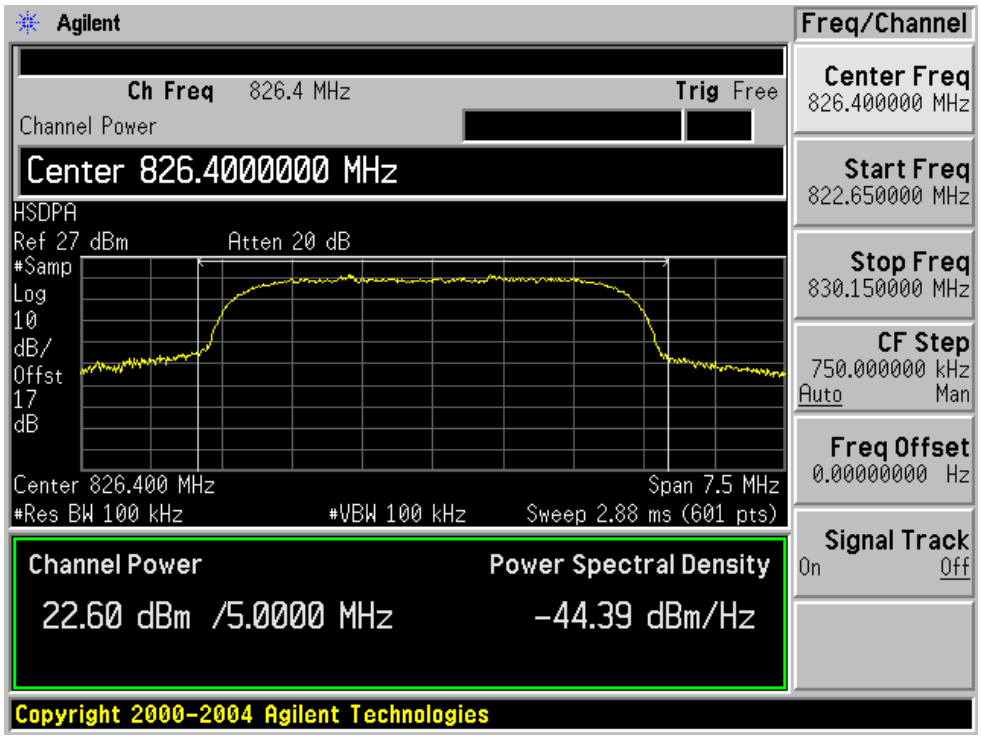
GSM Middle Channel



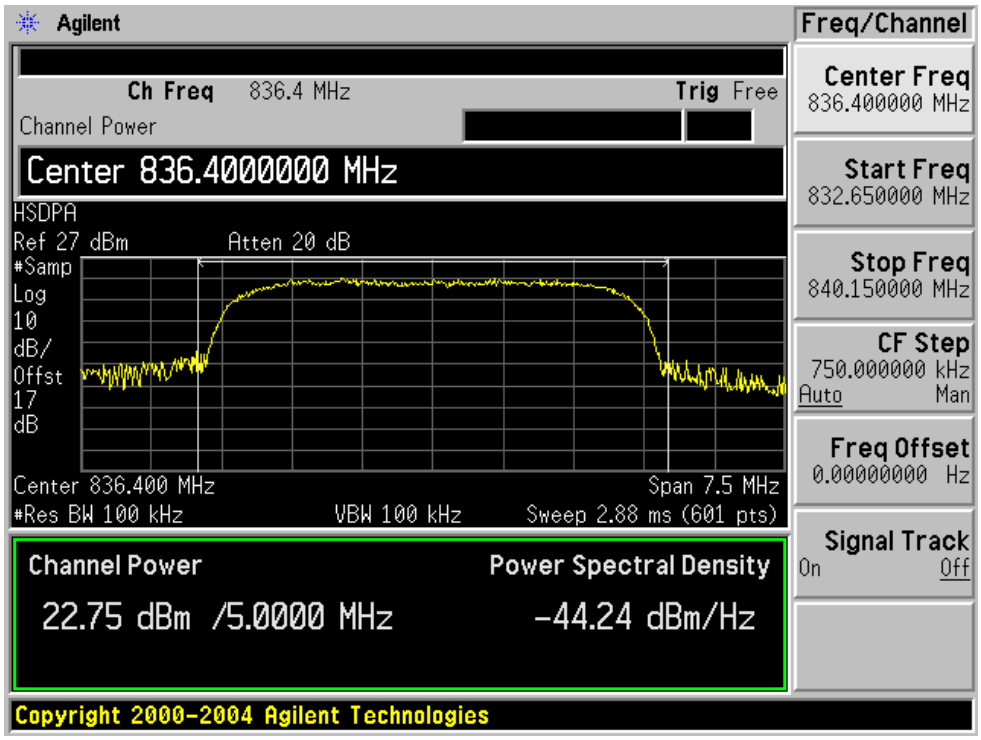
GSM High Channel



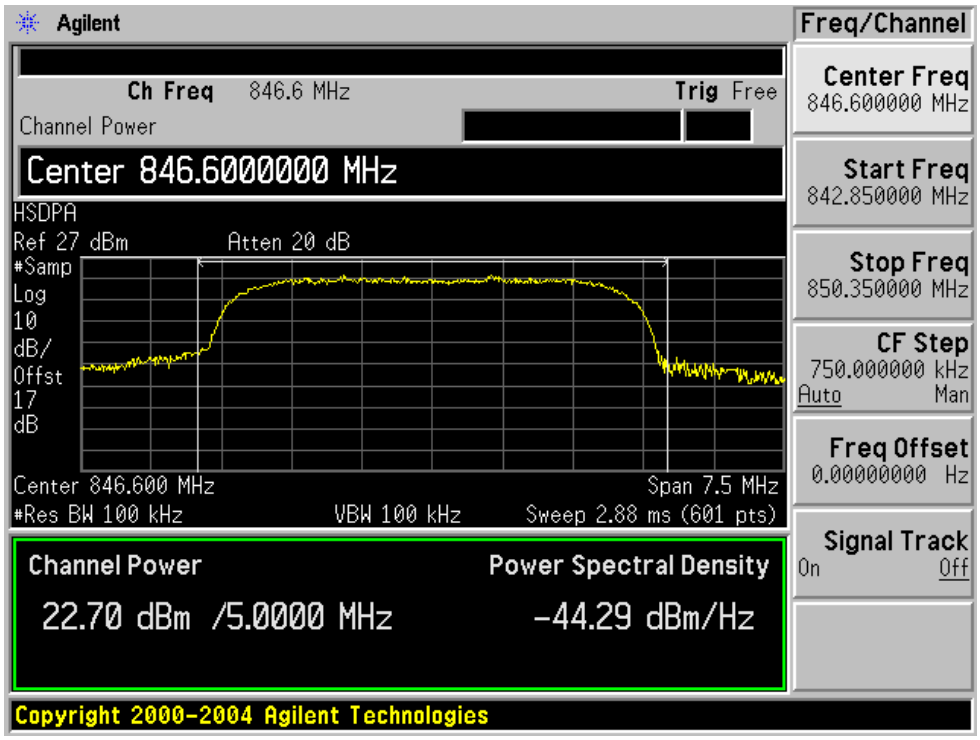
HSDPA Low Channel



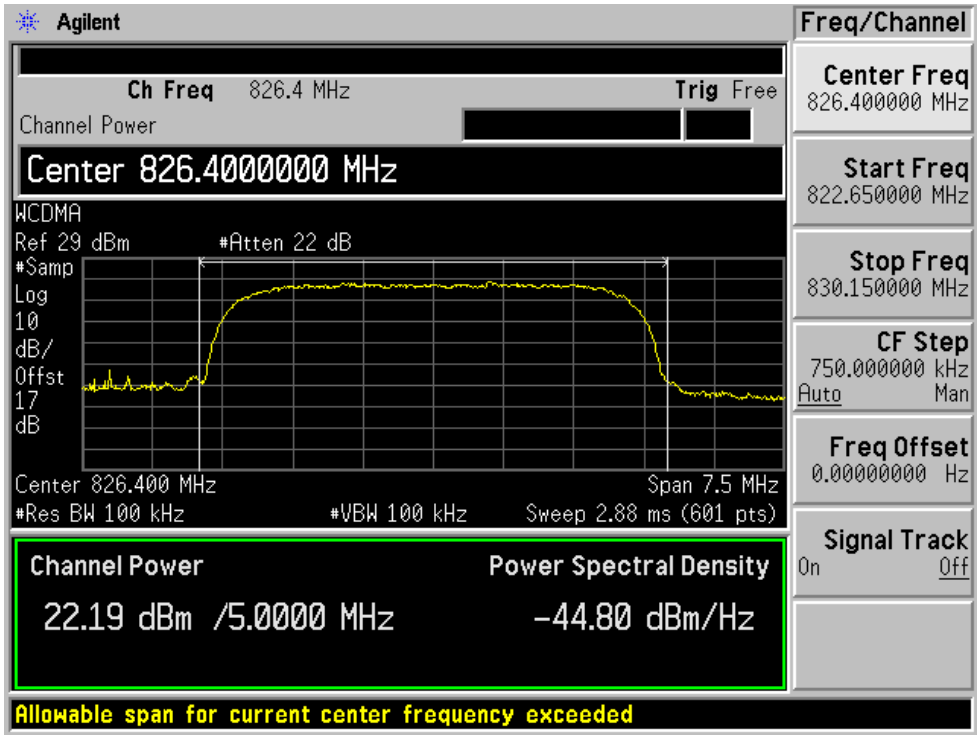
HSDPA Middle Channel



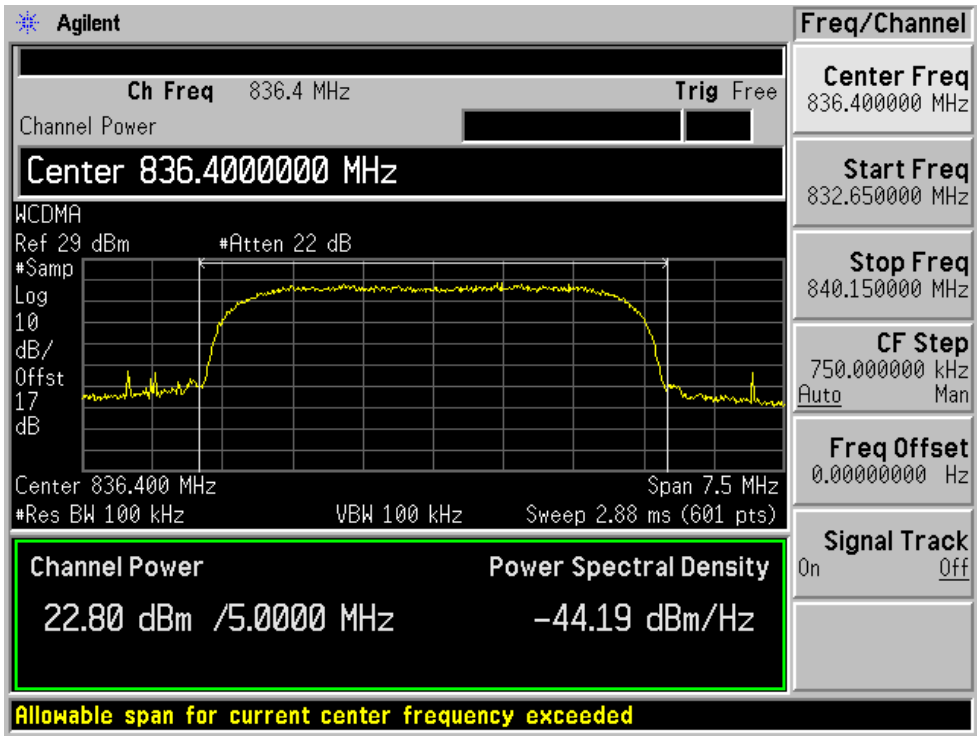
HSDPA High Channel



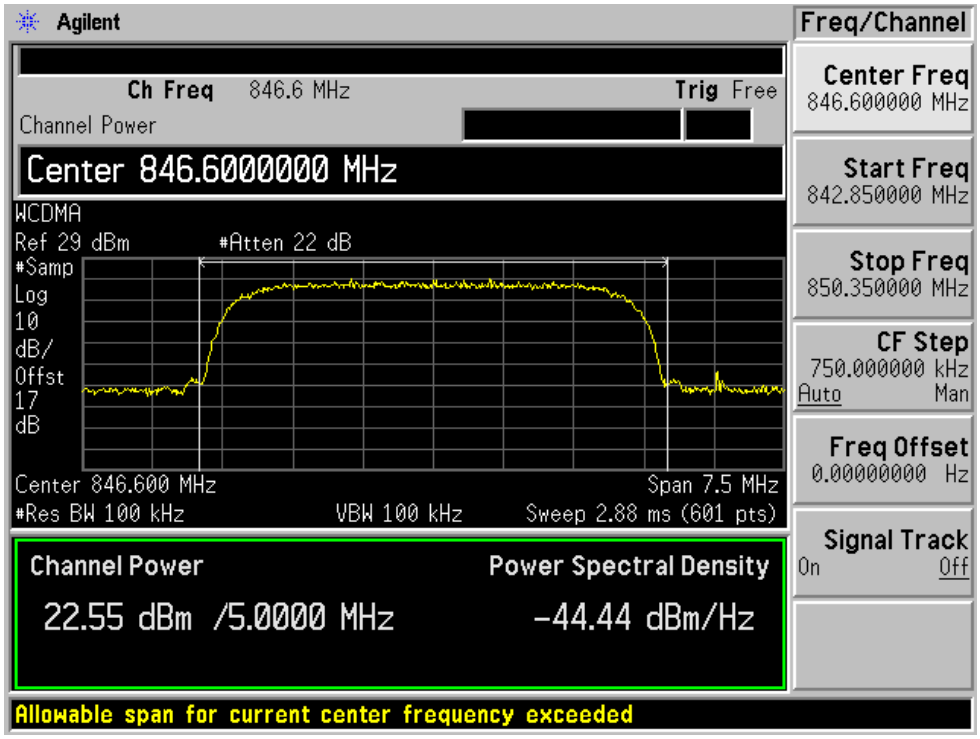
W-CDMA Low Channel



W-CDMA Middle Channel

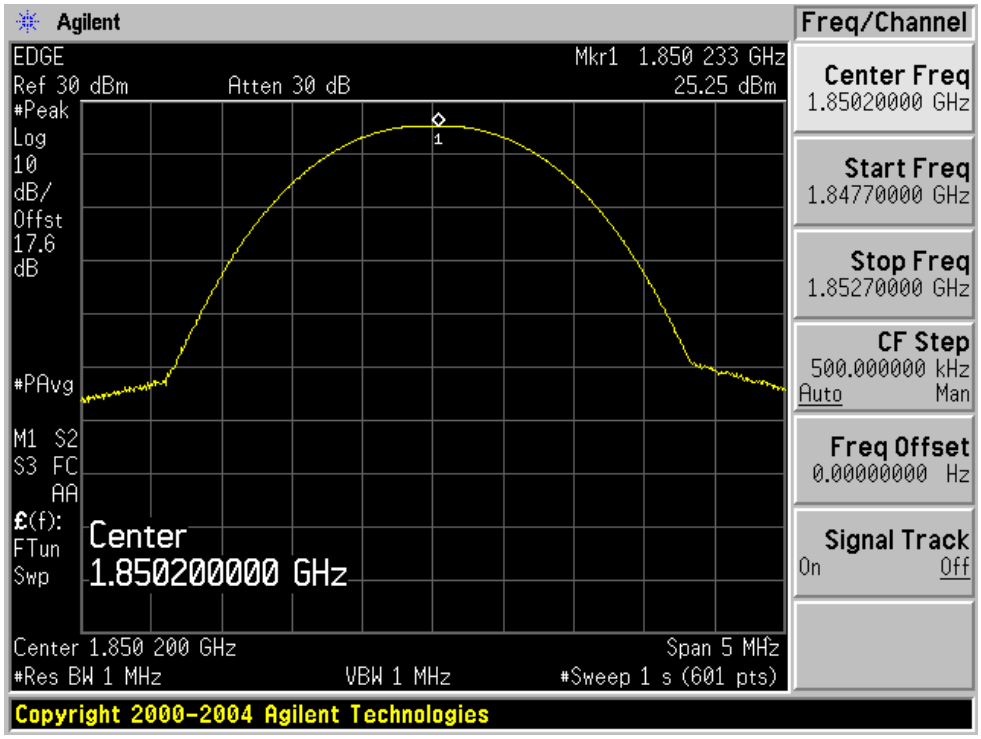


W-CDMA High Channel

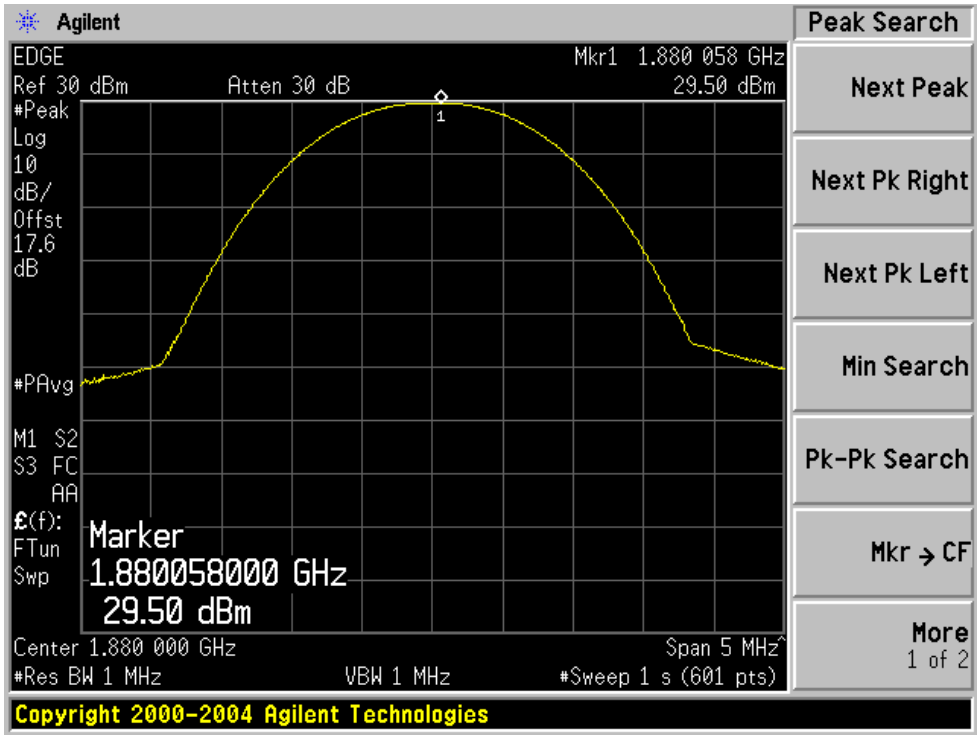


7.5.2 Plots of Conducted Output Power for FCC Part 24 (PCS Band)

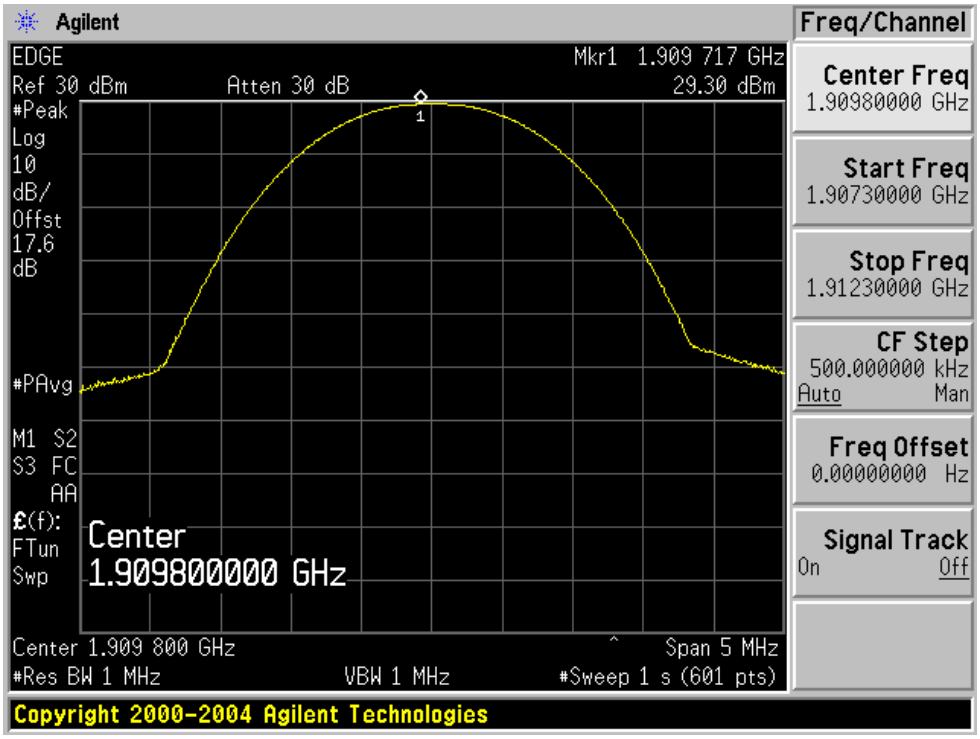
Edge Low Channel



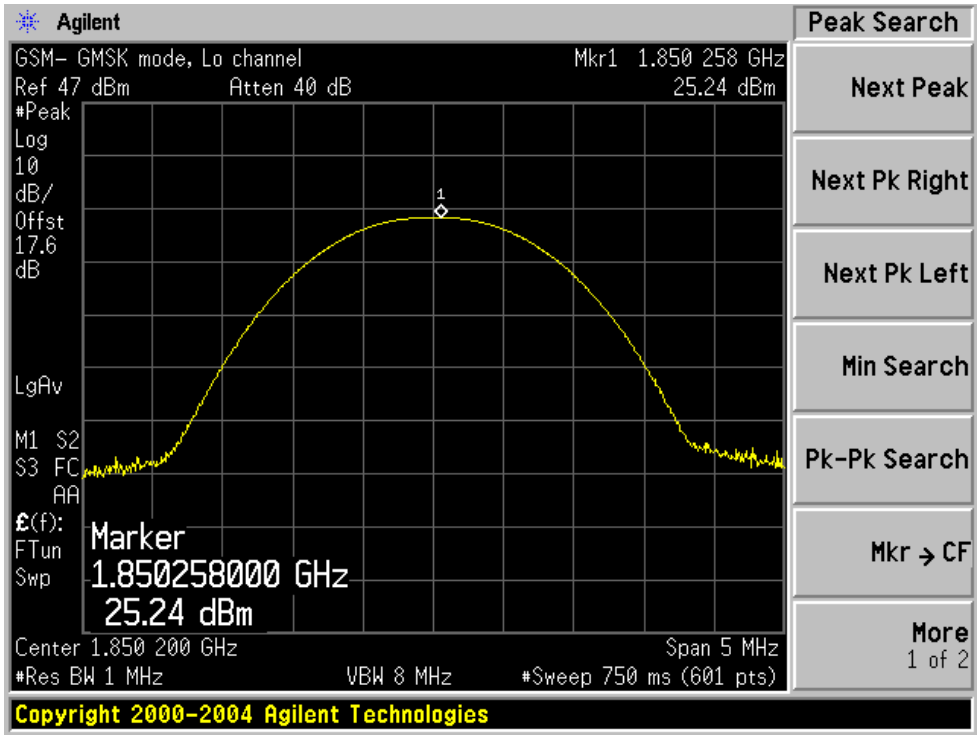
Edge Middle Channel



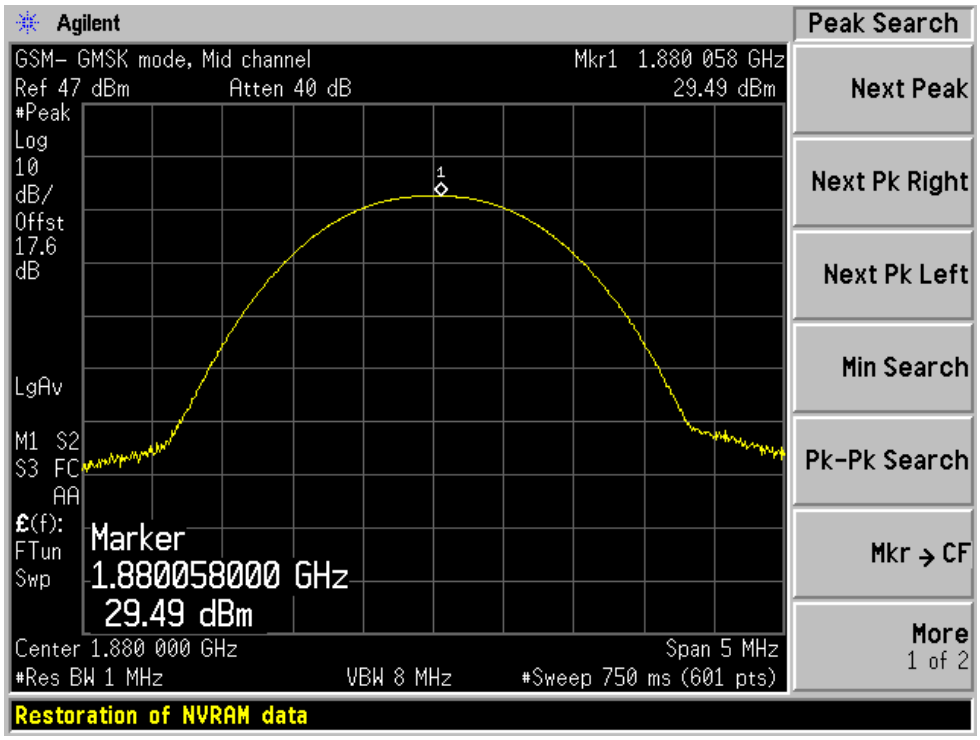
Edge High Channel



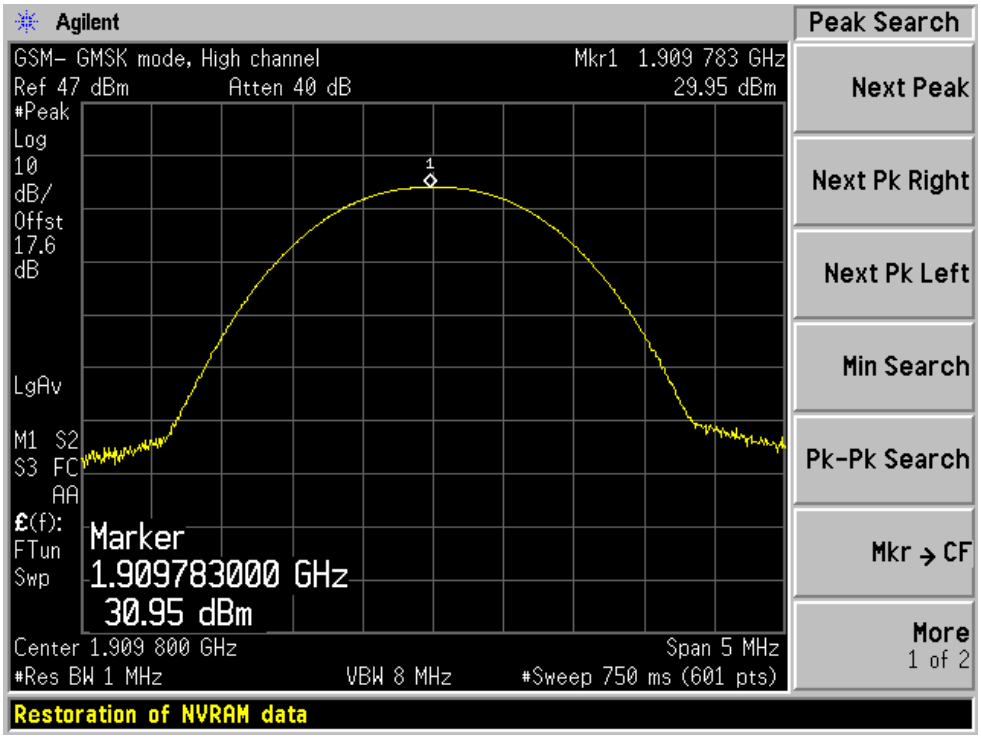
GSM Low Channel



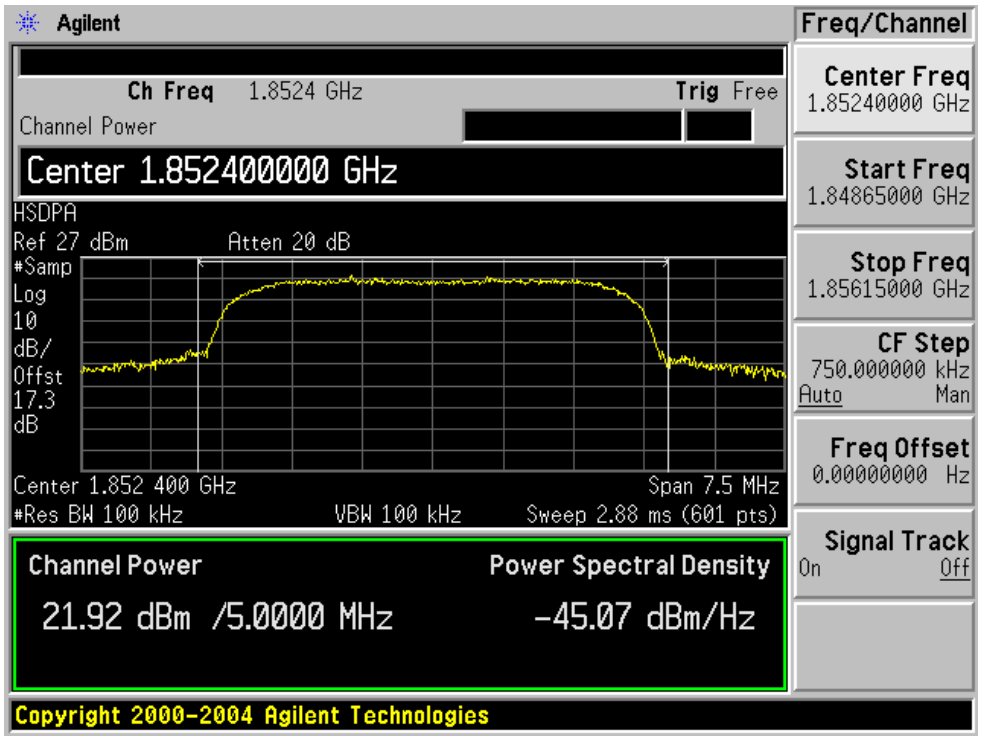
GSM Middle Channel



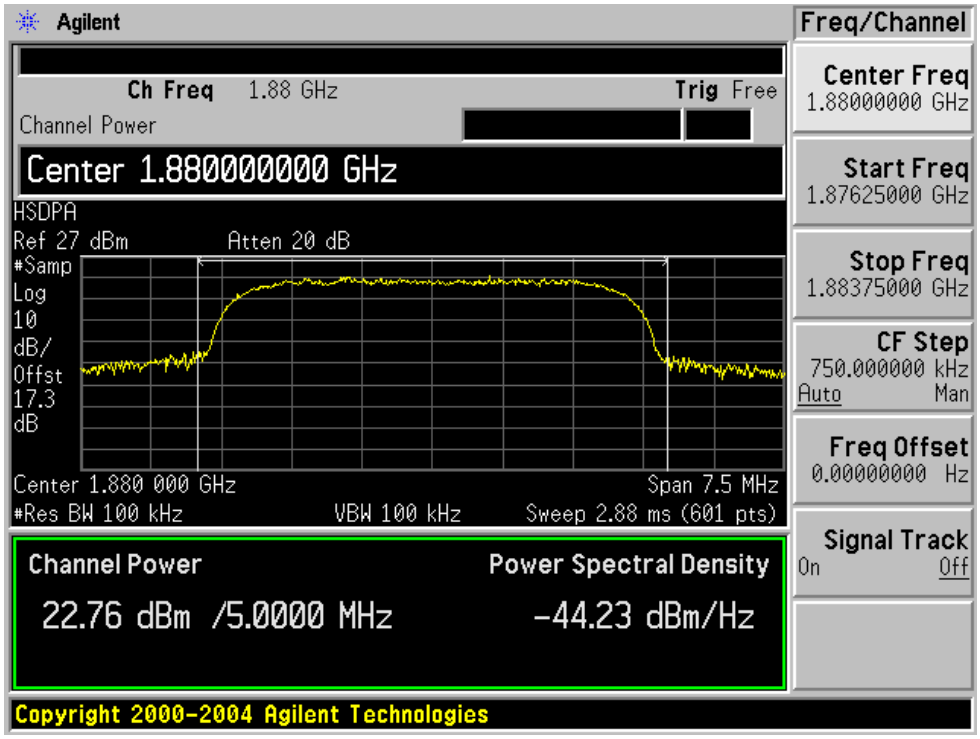
GSM High Channel



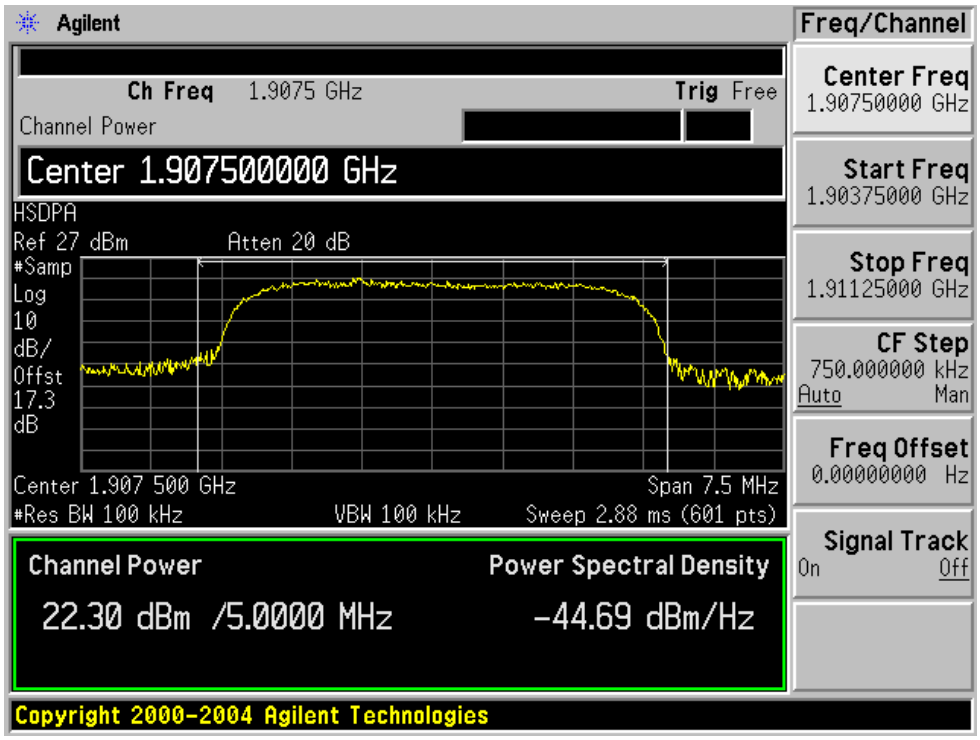
HSDPA Low Channel



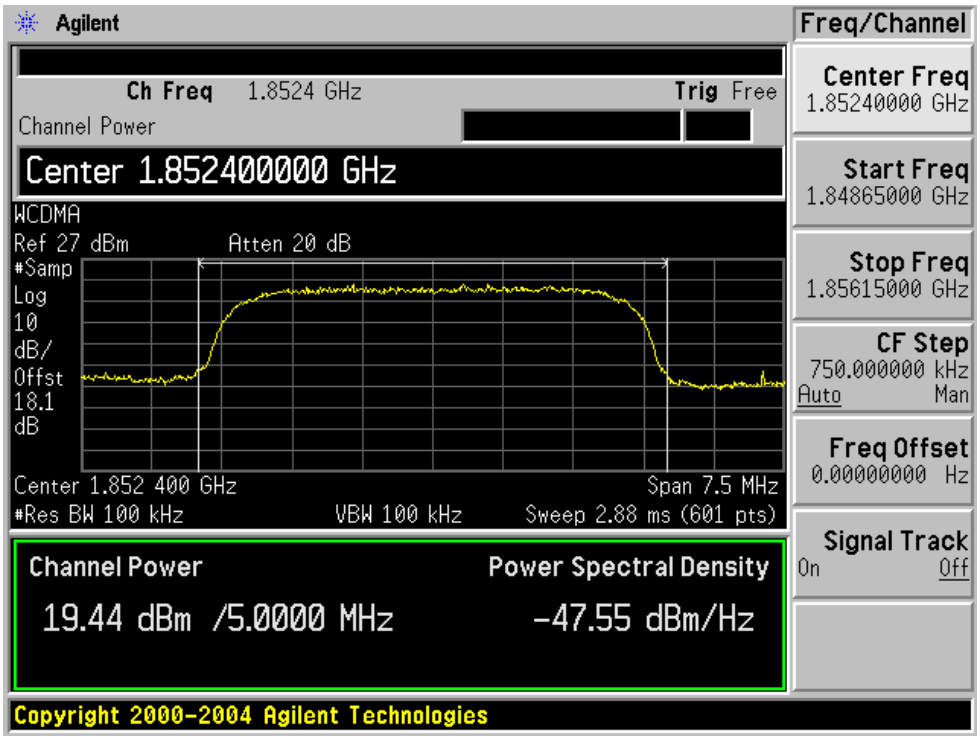
HSDPA Middle Channel



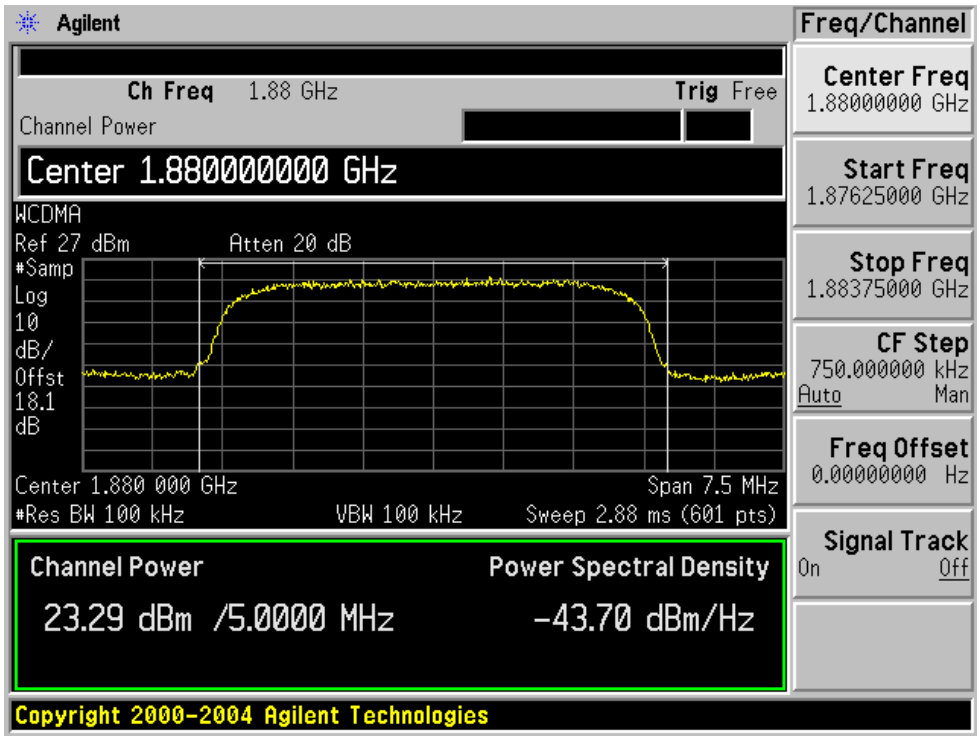
HSDPA High Channel



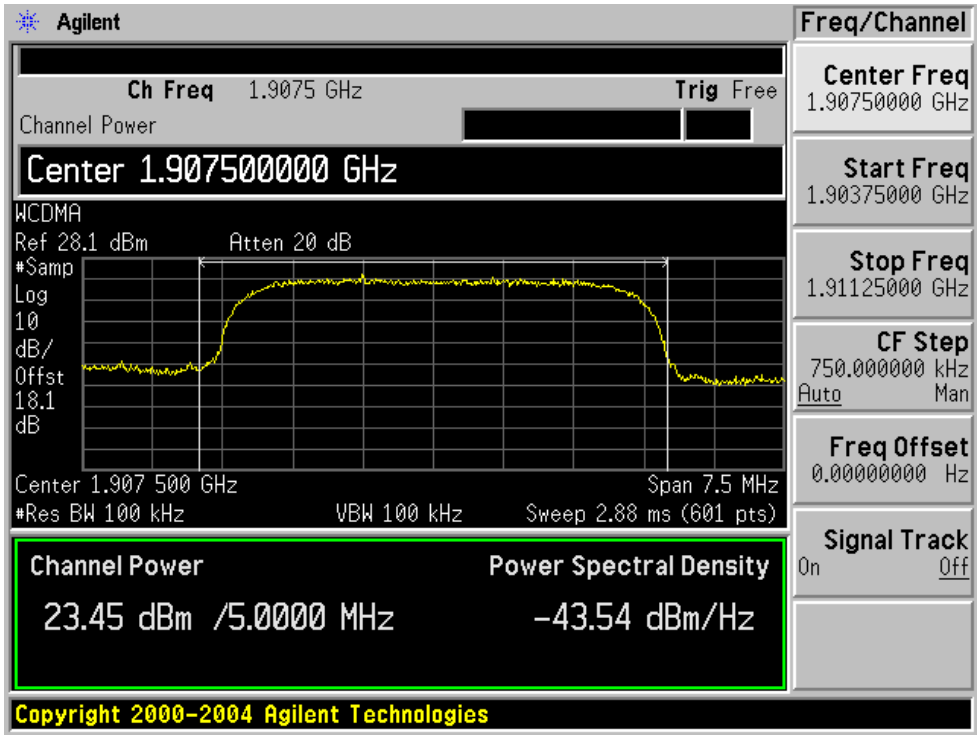
W-CDMA Low Channel



W-CDMA Middle Channel



W-CDMA High Channel



8 §2.1049, §22.917, §22.905, & §24.238 - OCCUPIED BANDWIDTH

8.1 Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 22.901, Section 22.917 and Section 24.238.

8.2 Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 30 kHz(Cellular /PCS) and the -26 dB bandwidth was recorded.

8.2.1 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	58 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-05-11 to 2007-05-15.*

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

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

8.4 Summary of Test Results

8.4.1 Cellular Band:

Edge

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	824.2	0.3138
MIDDLE	836.6	0.3092
HIGH	848.8	0.3112

GSM

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	824.2	0.3091
MIDDLE	836.6	0.3101
HIGH	848.8	0.3092

HSDPA

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	826.4	4.620
MIDDLE	836.4	4.619
HIGH	846.6	4.621

W-CDMA

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	826.4	4.607
MIDDLE	836.4	4.640
HIGH	846.6	4.628

8.4.2 PCS Band:

Edge

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	1850.20	0.3097
MIDDLE	1880	0.3118
HIGH	1909.8	0.3162

GSM

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	1850.20	0.3094
MIDDLE	1880	0.3144
HIGH	1909.8	0.3140

HSDPA

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	1852.4	4.619
MIDDLE	1880	4.622
HIGH	1907.5	4.615

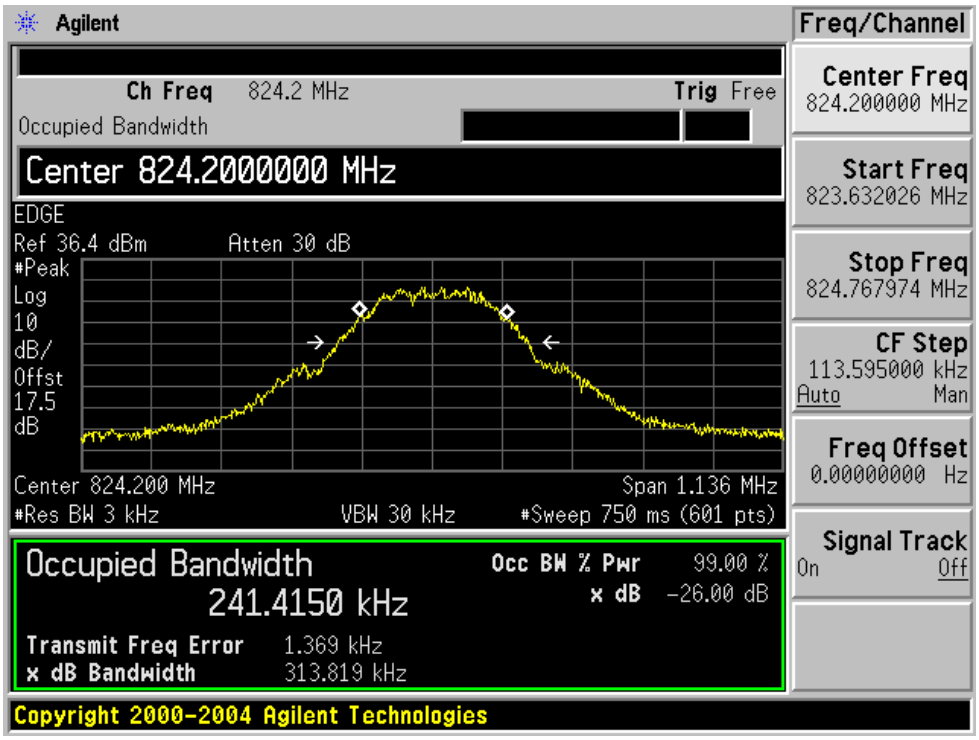
W-CDMA

Channel	Frequency (MHz)	Occupied Bandwidth (MHZ)
LOW	1852.4	4.615
MIDDLE	1880	4.619
HIGH	1907.5	4.626

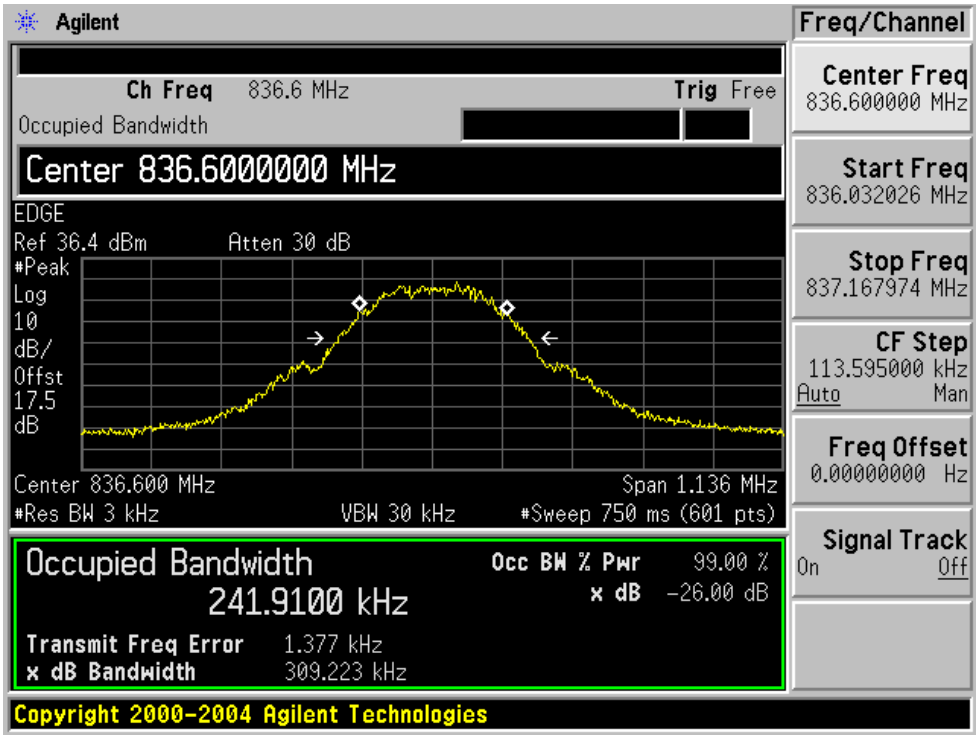
8.5 Test Data

8.5.1 Plots of Occupied Bandwidth for FCC Part 22 (Cellular Band)

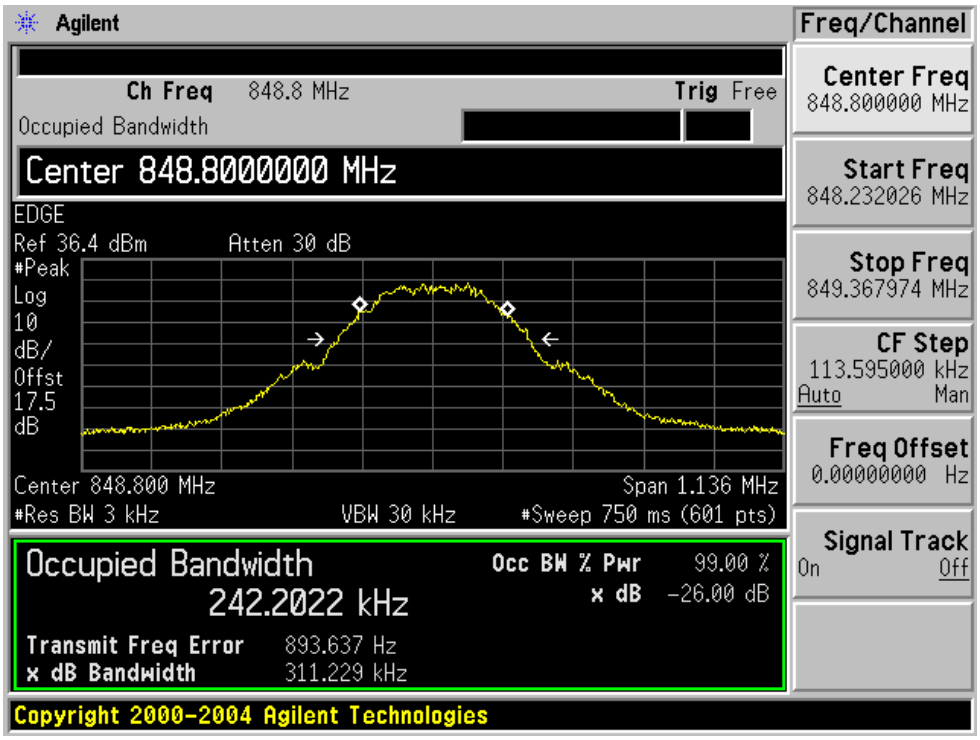
Edge Low Channel



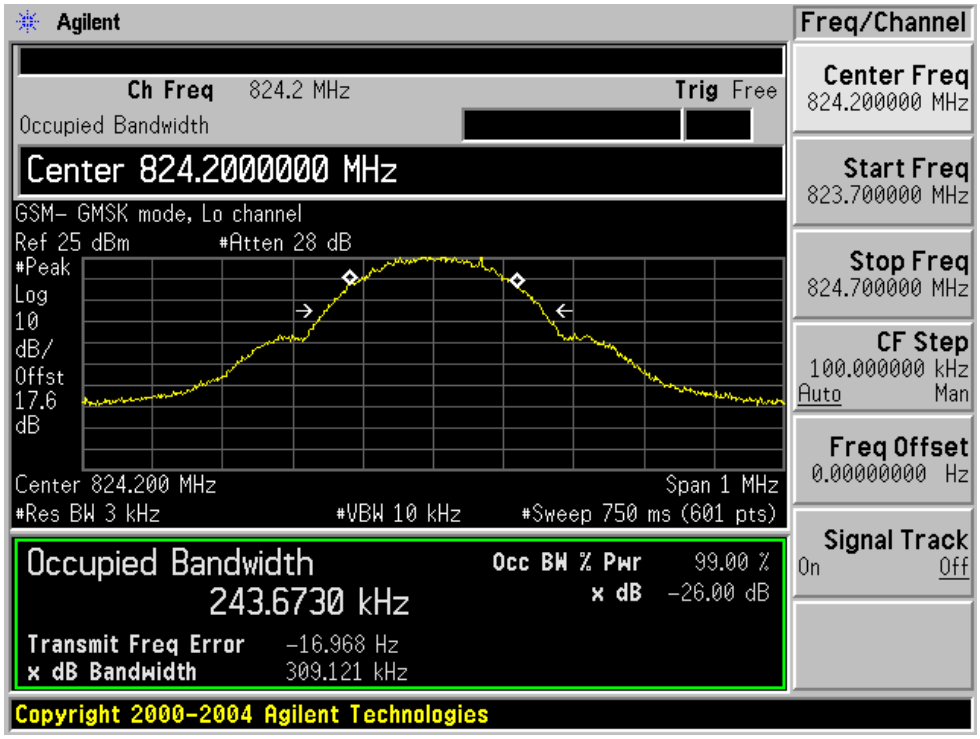
Edge Middle Channel



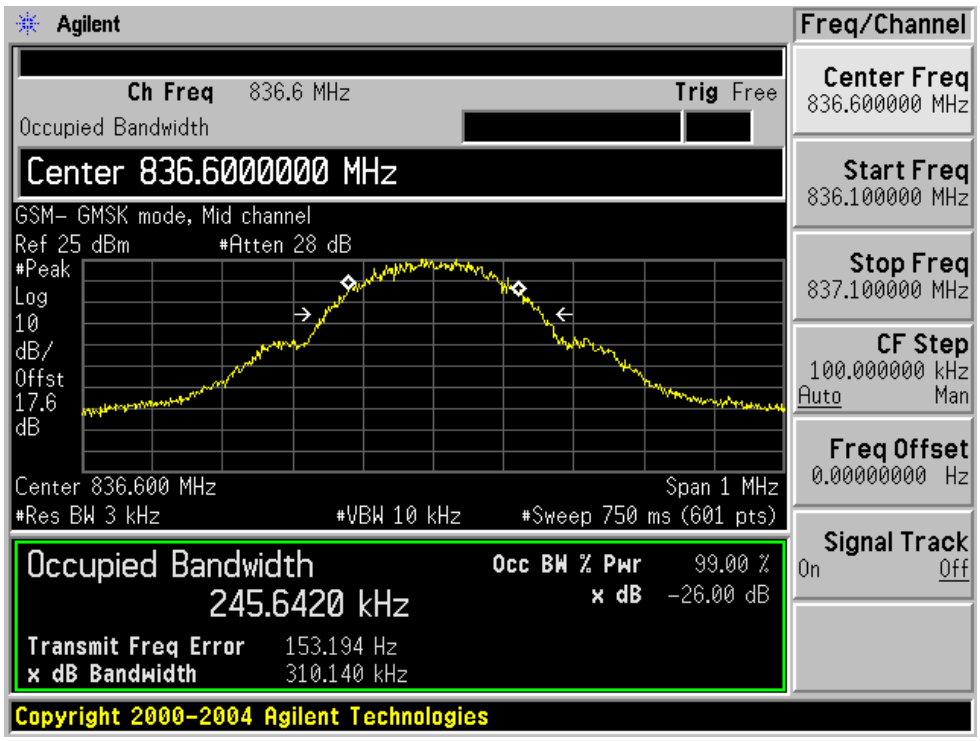
Edge High Channel



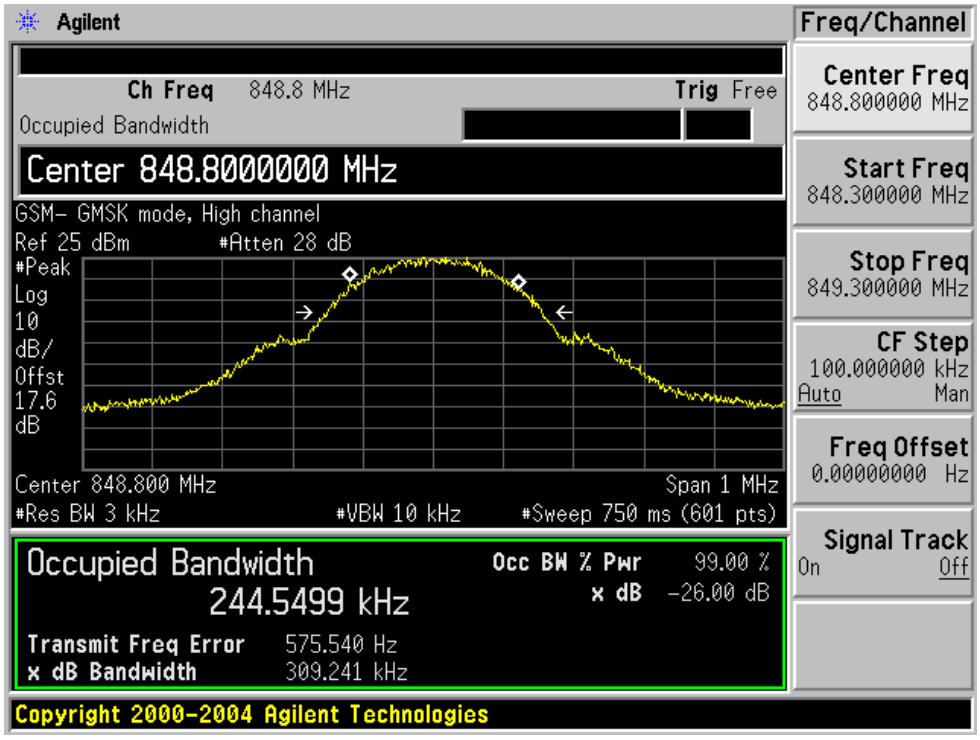
GSM Low Channel



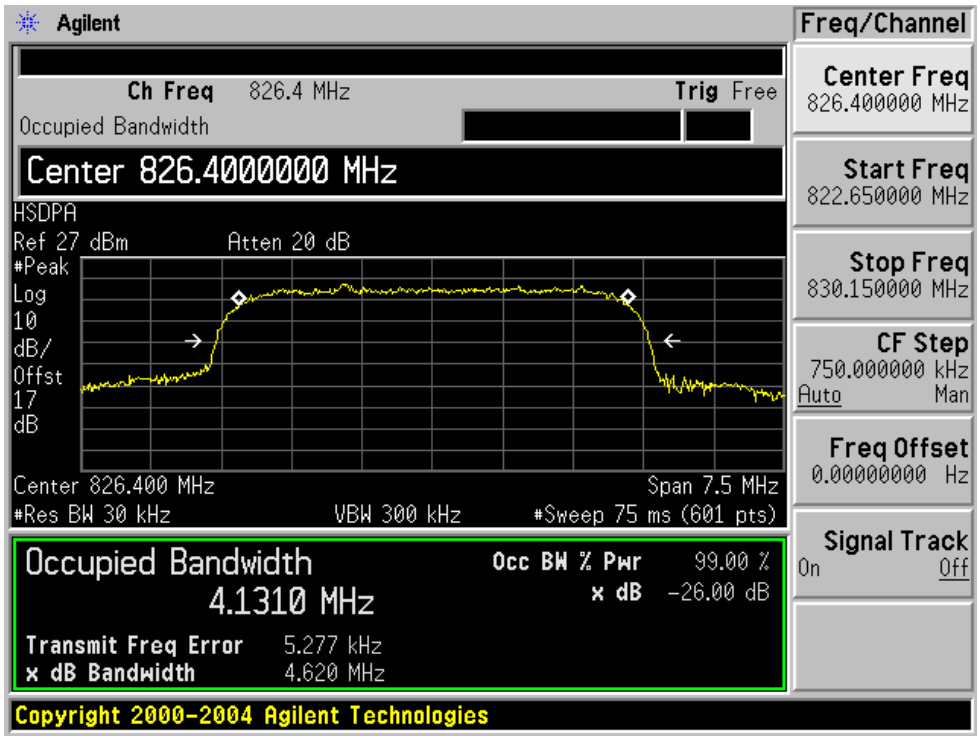
GSM Middle Channel



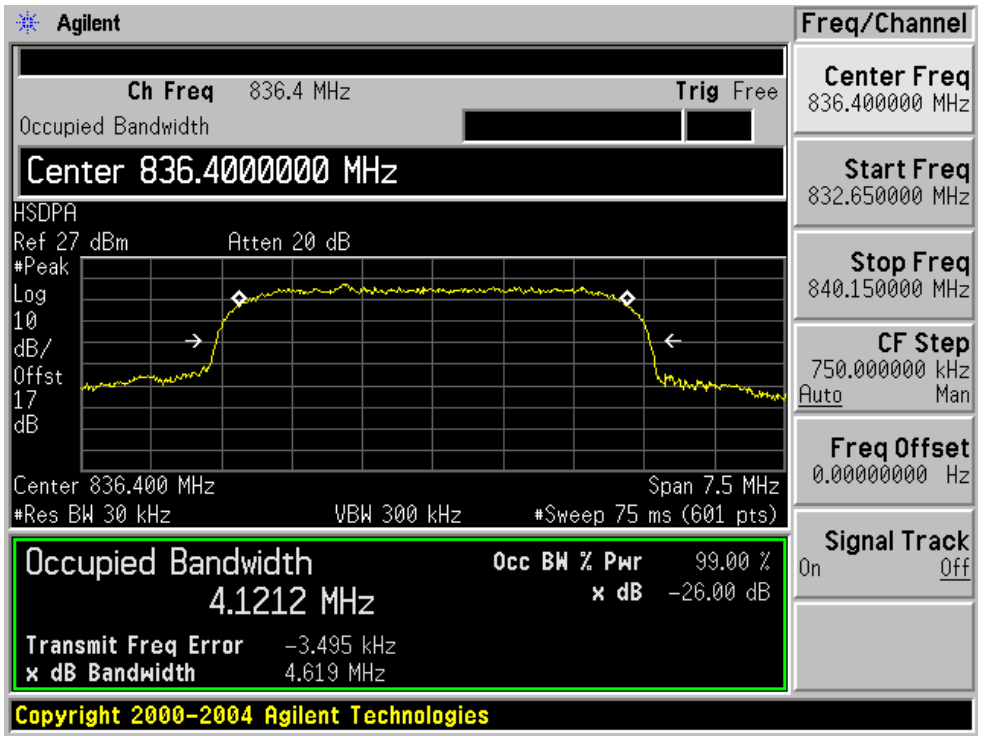
GSM High Channel



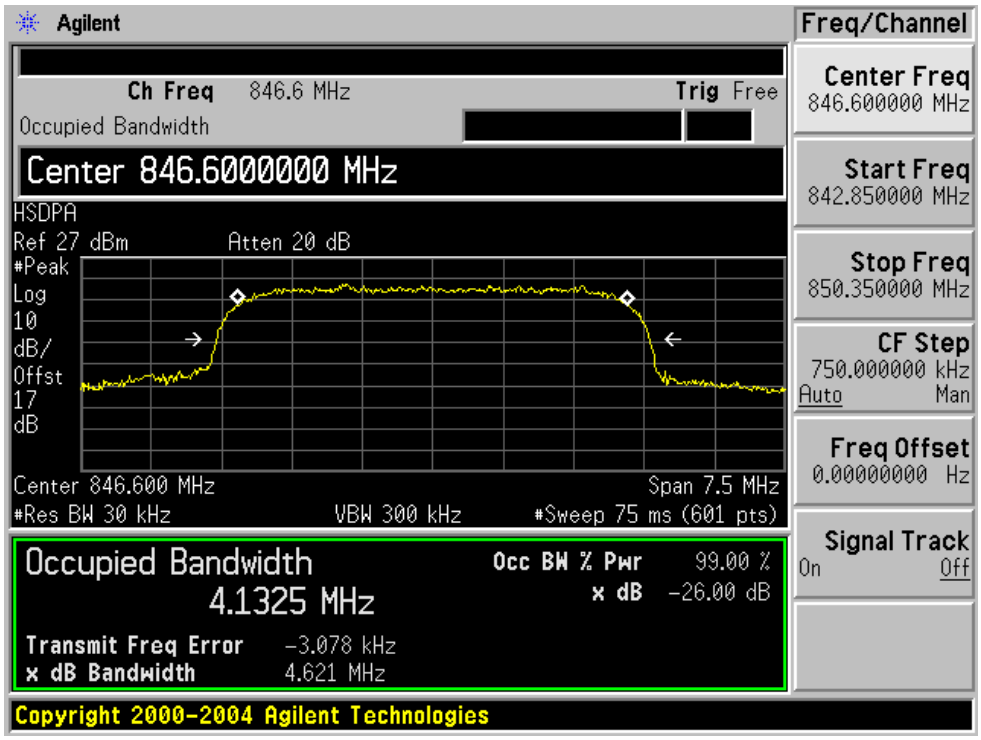
HSDPA Low Channel



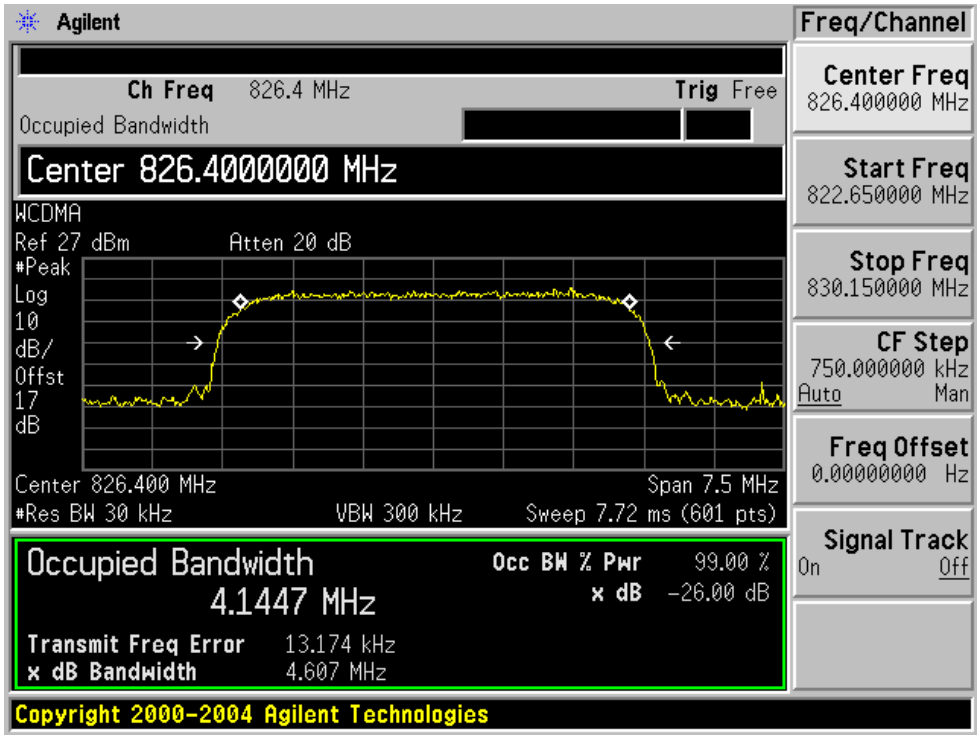
HSDPA Middle Channel



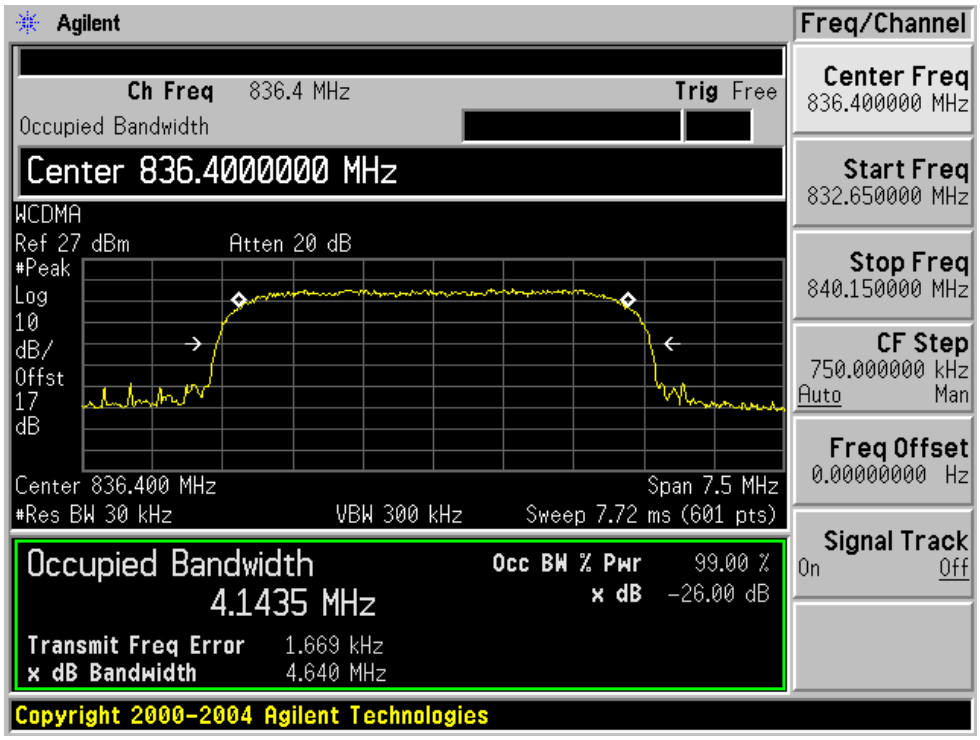
HSDPA High Channel



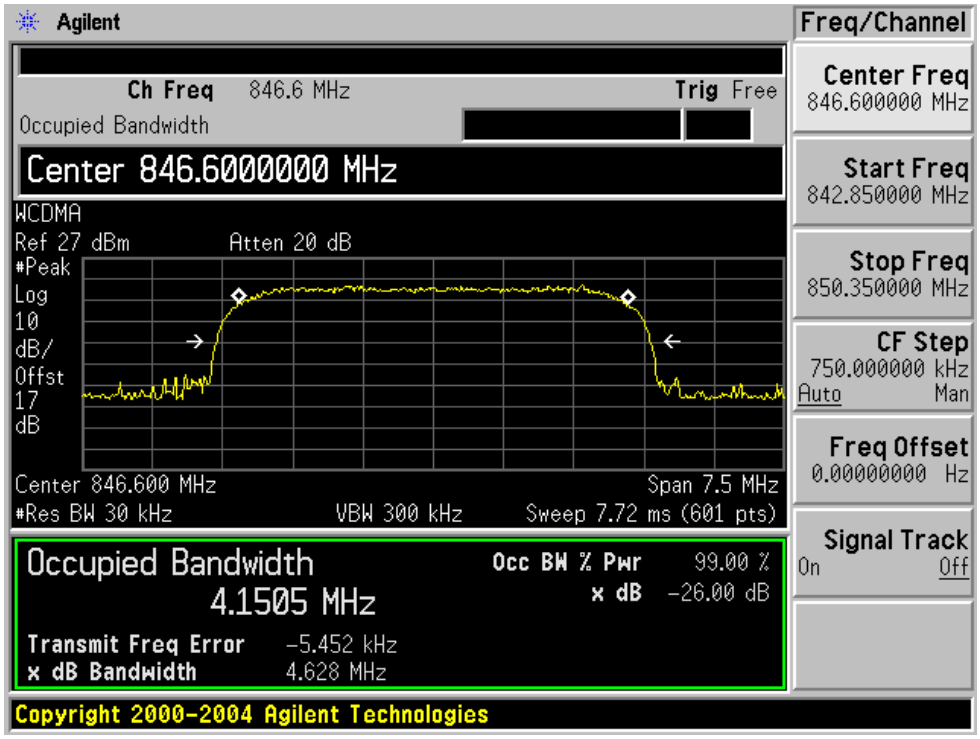
W-CDMA Low Channel



W-CDMA Middle Channel

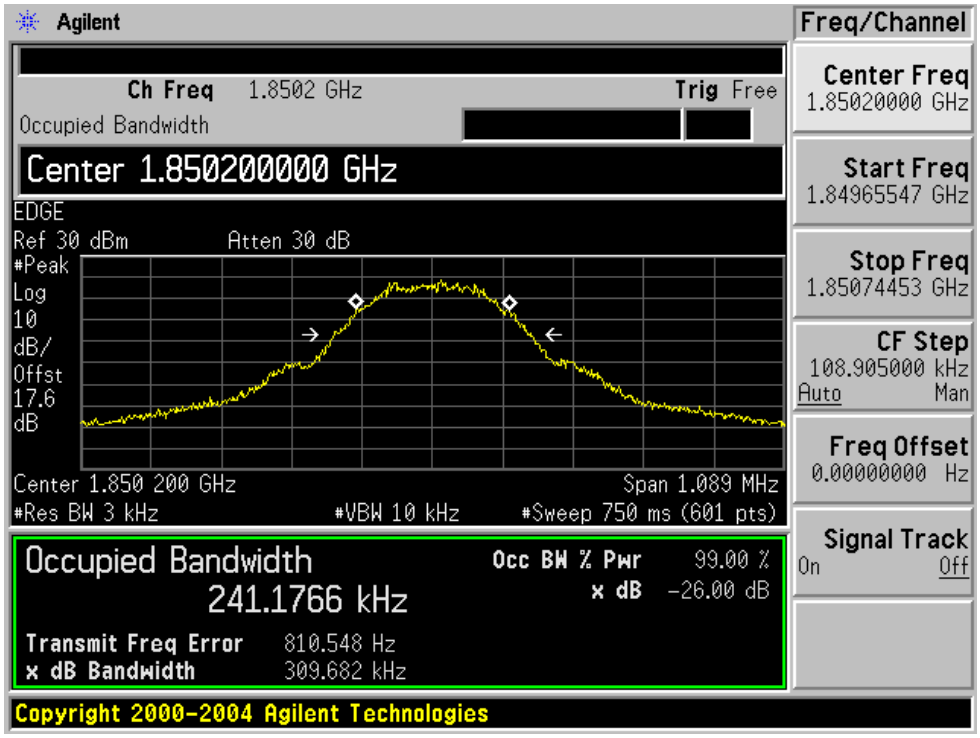


W-CDMA High Channel

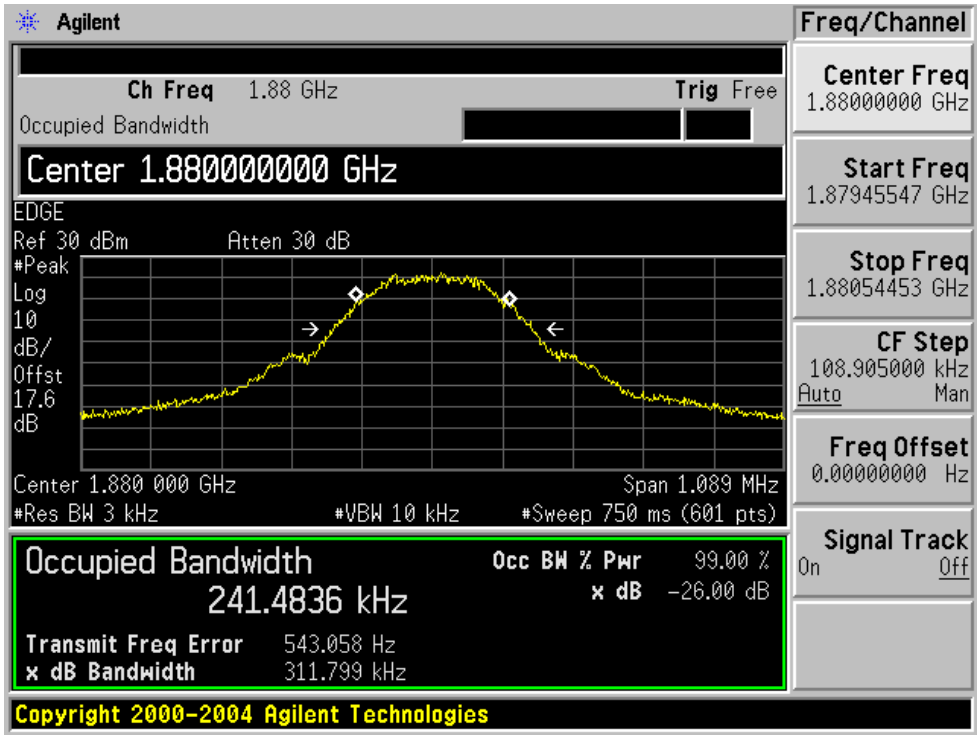


8.5.2 Plots of Occupied Bandwidth for FCC Part 24 (PCS Band)

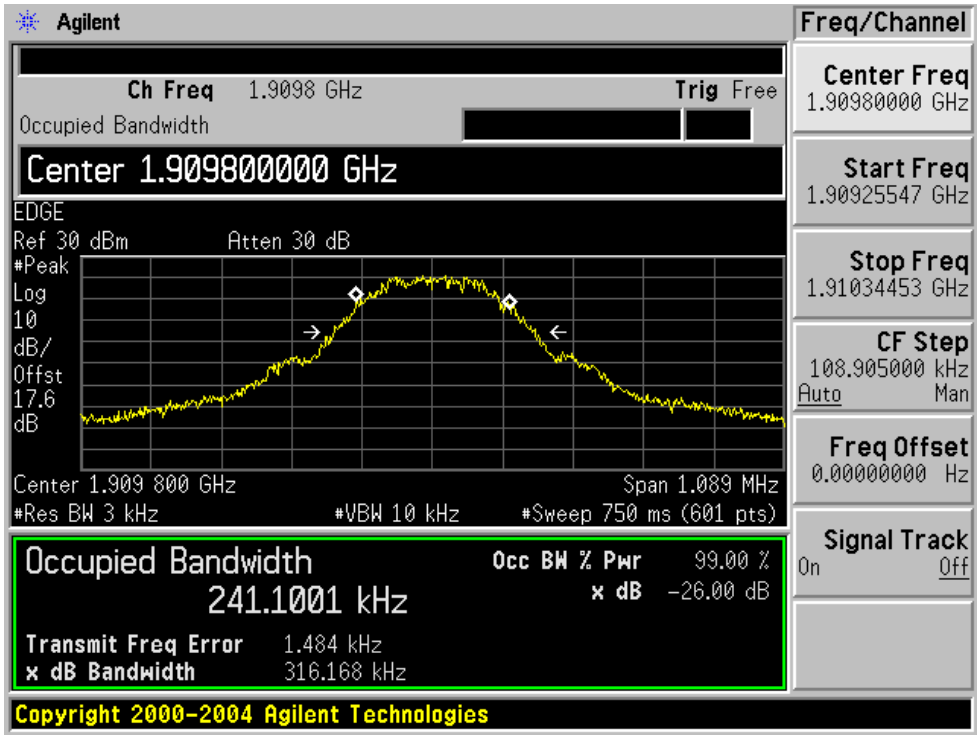
Edge Low Channel



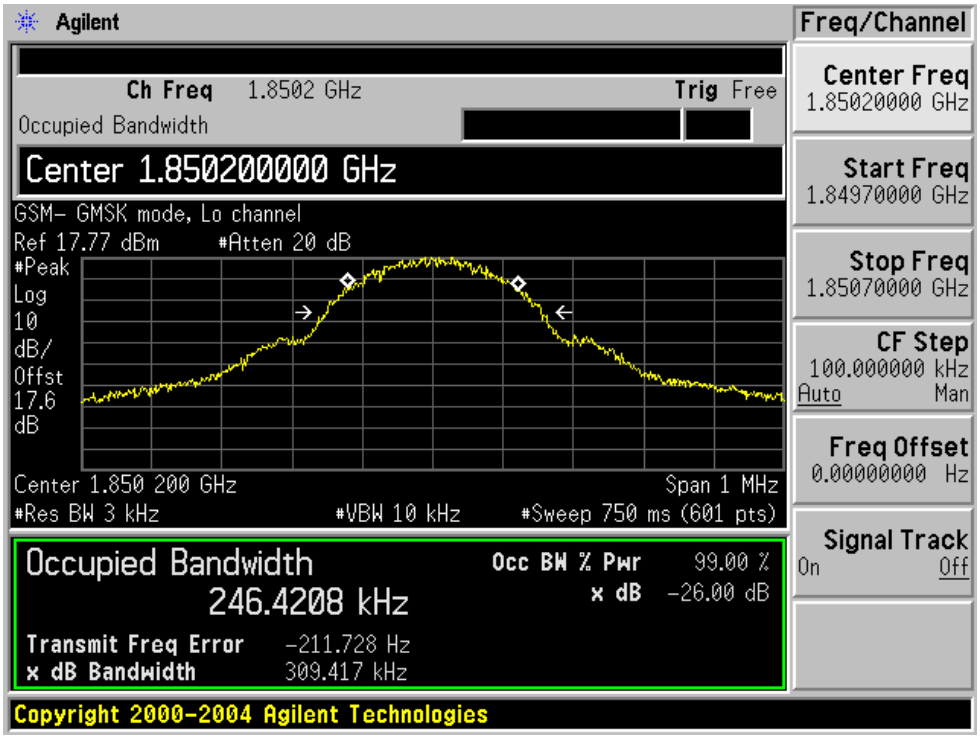
Edge Middle Channel



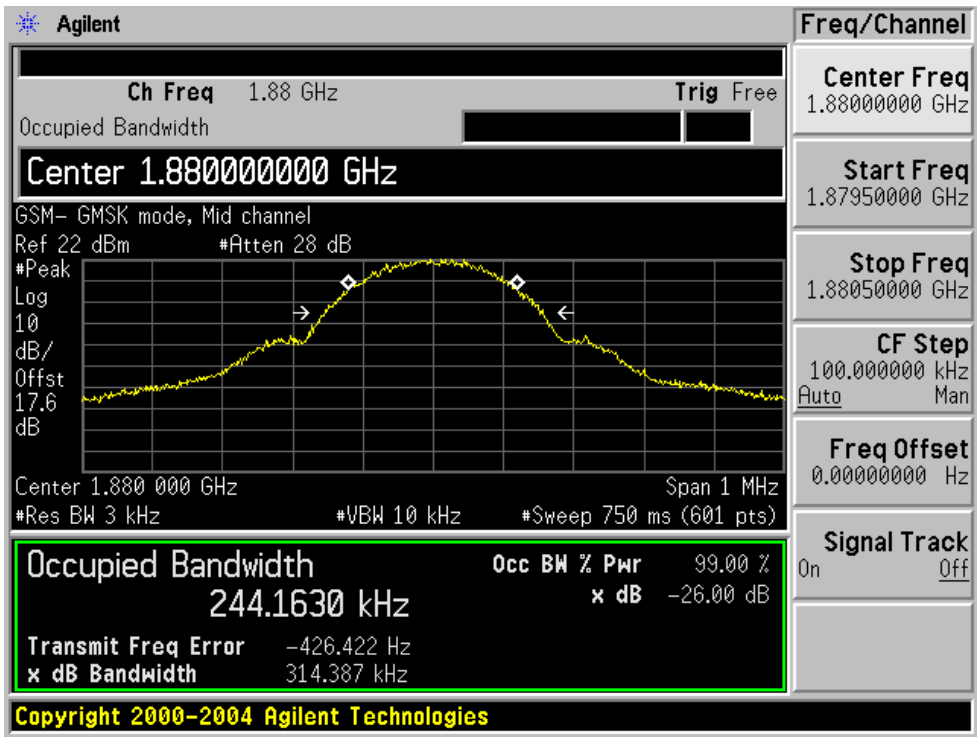
Edge High Channel



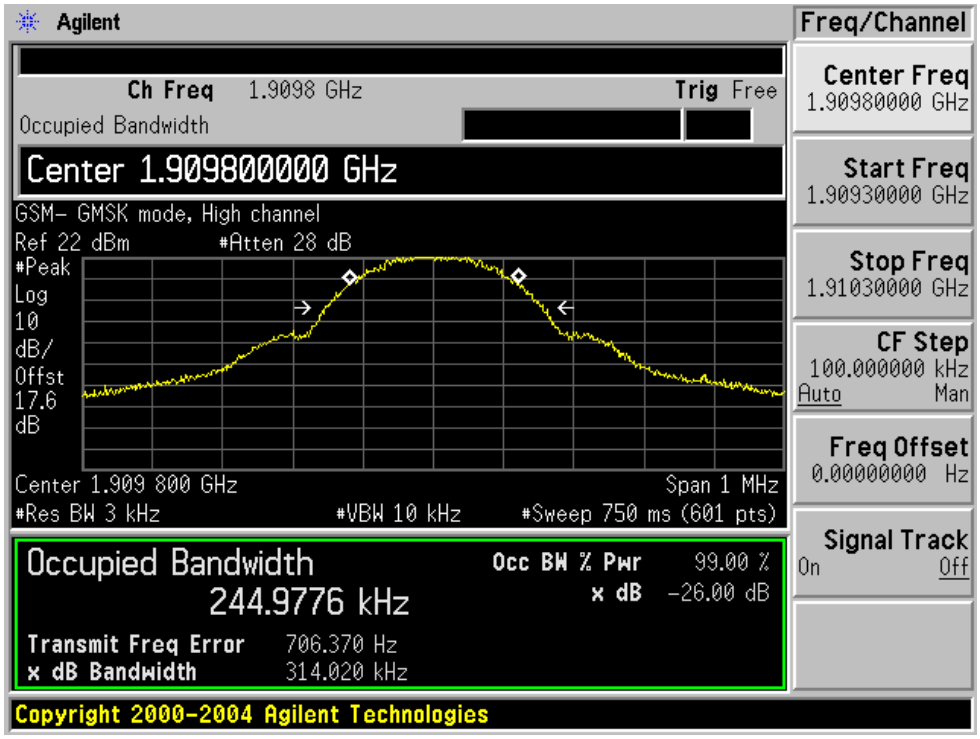
GSM Low Channel



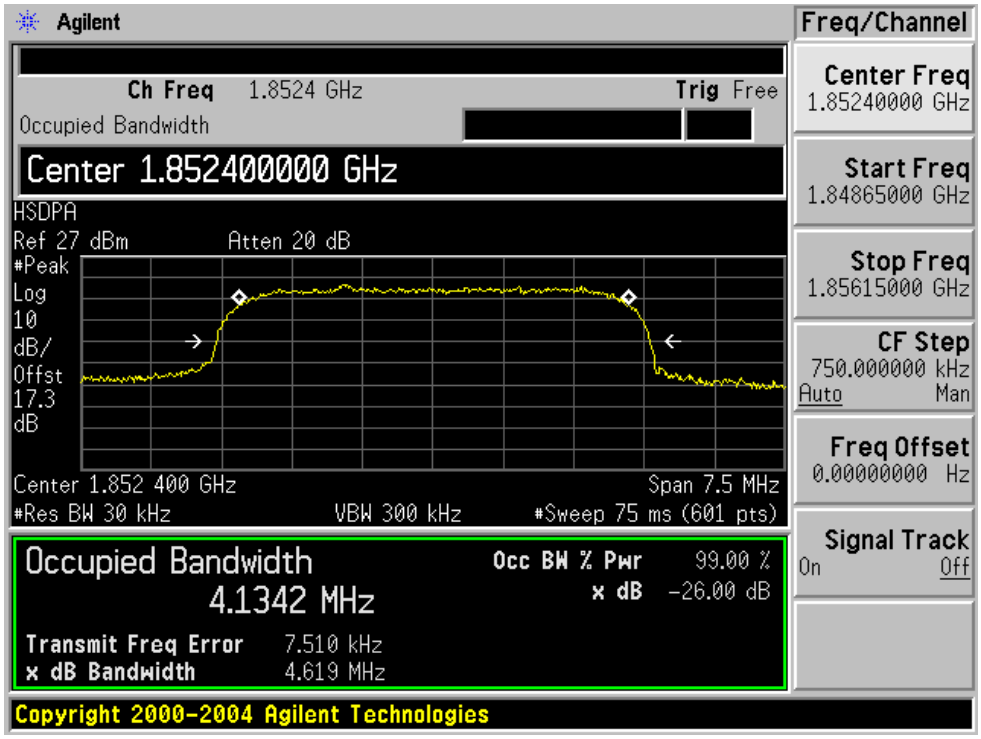
GSM Middle Channel



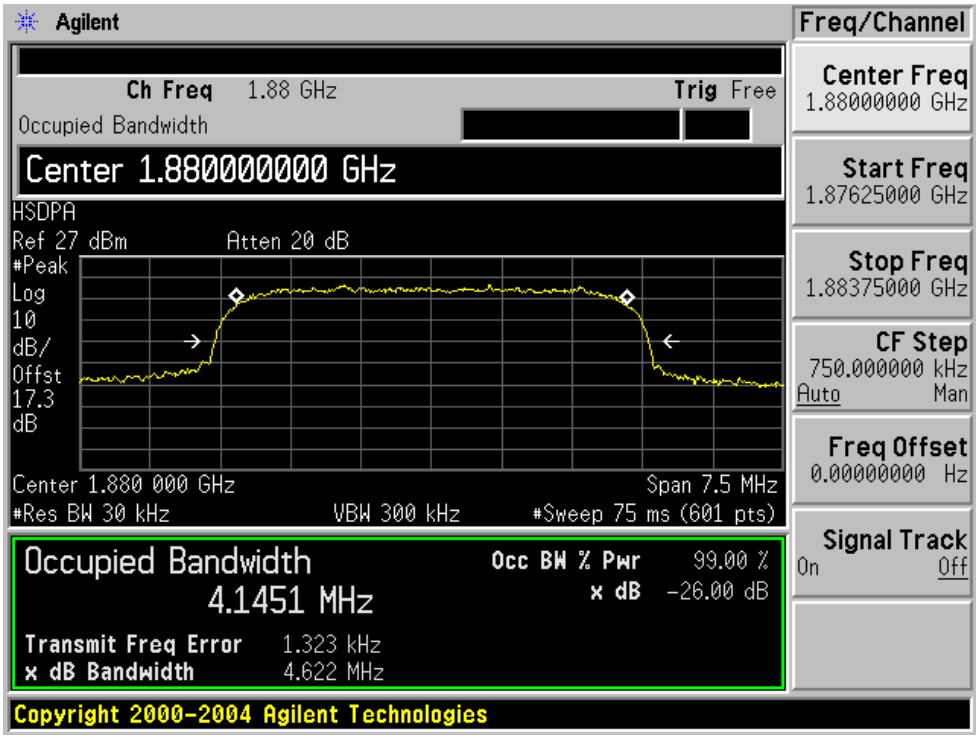
GSM High Channel



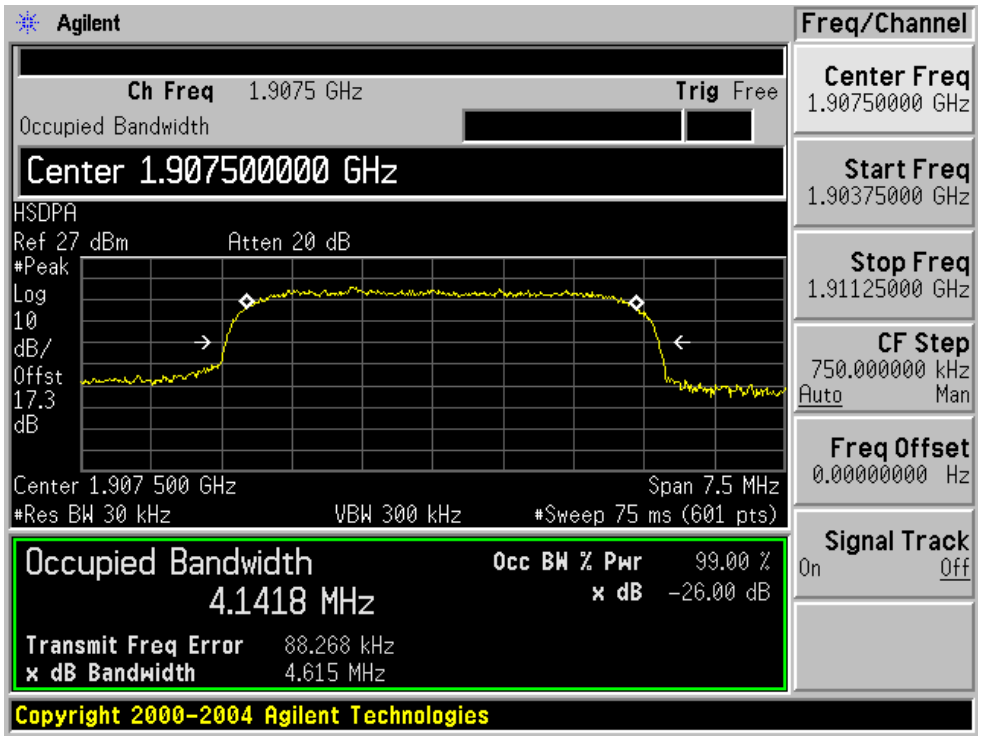
HSDPA Low Channel



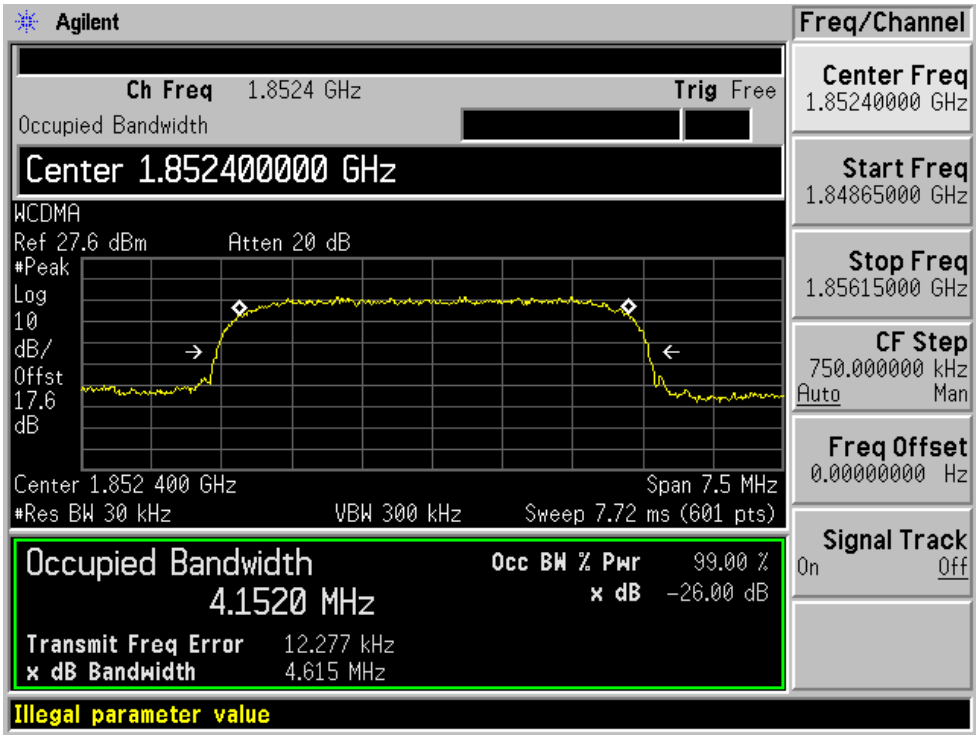
HSDPA Middle Channel



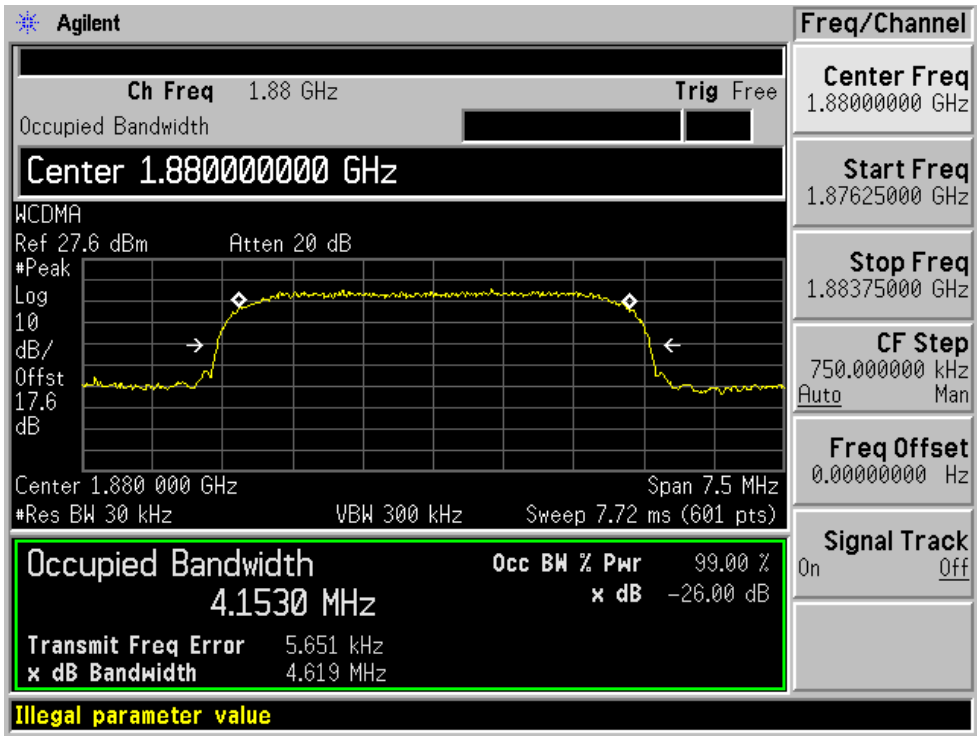
HSDPA High Channel



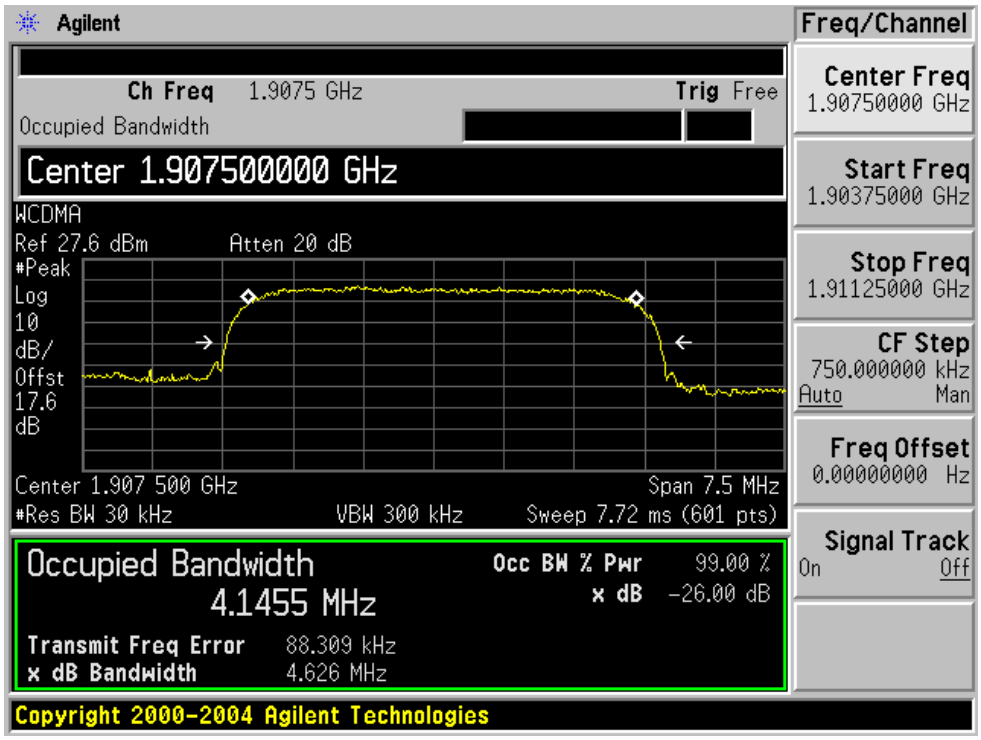
W-CDMA Low Channel



W-CDMA Middle Channel



W-CDMA High Channel



9 §2.1051, §22.917, & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

9.1 Applicable Standard

Requirements: CFR 47, § 2.1051. § 22.917 & §24.238(a).

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

9.2 Test Procedure

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

9.2.1 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	58 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-05-11 to 2007-05-15.*

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

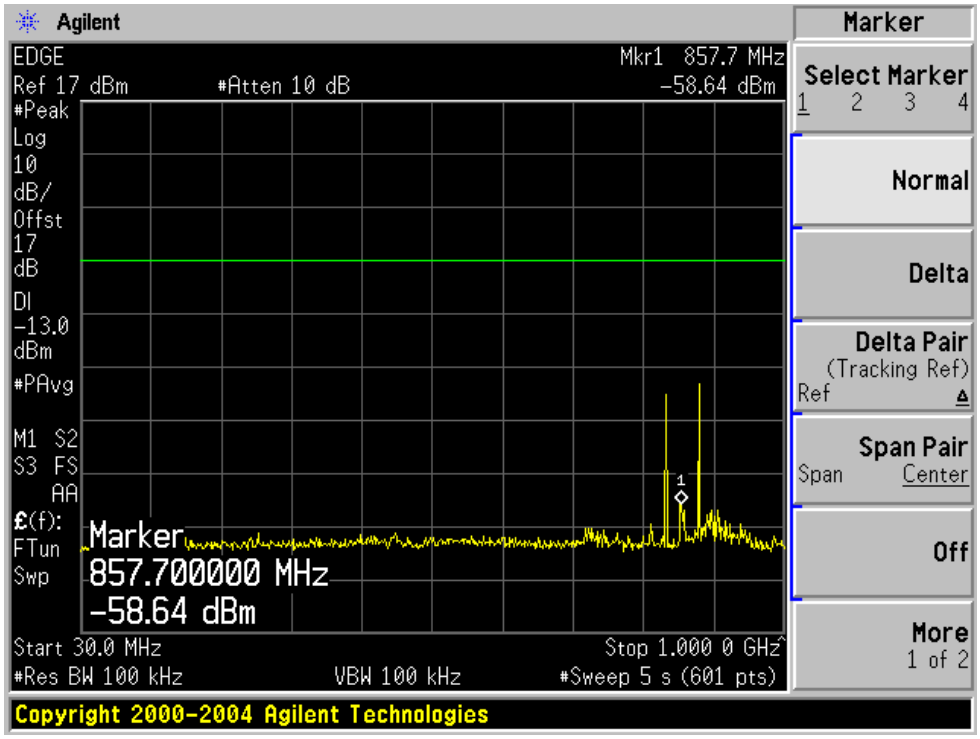
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

9.4 Test Results

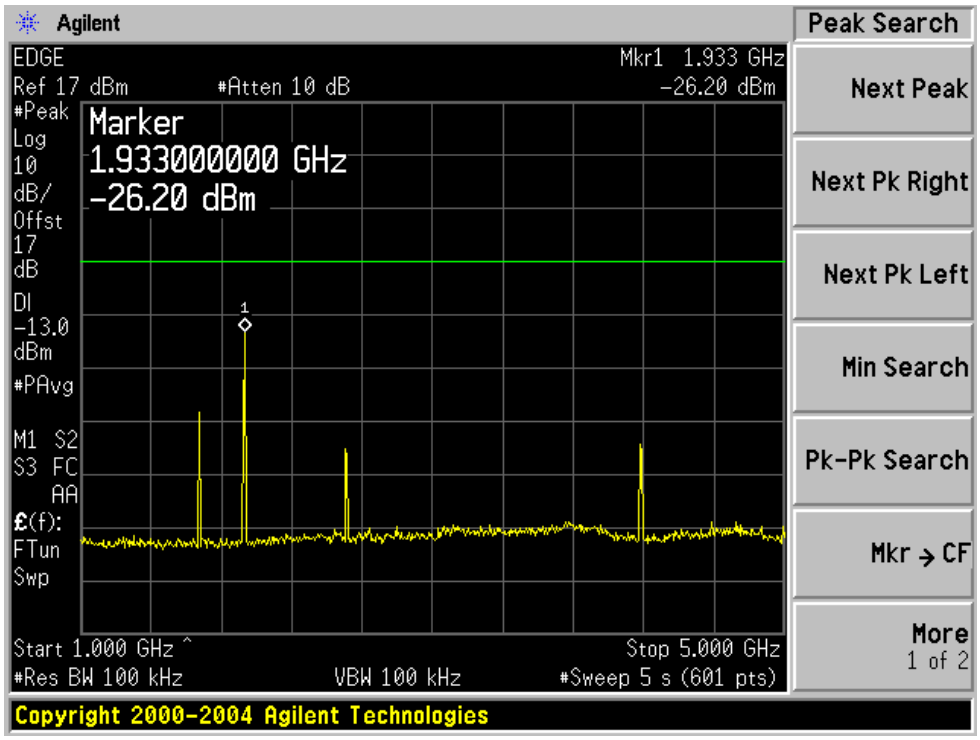
Please refer to the plots featured hereinafter

9.4.1 Plots of Spurious Emissions for FCC Part 22 (Cellular Band)

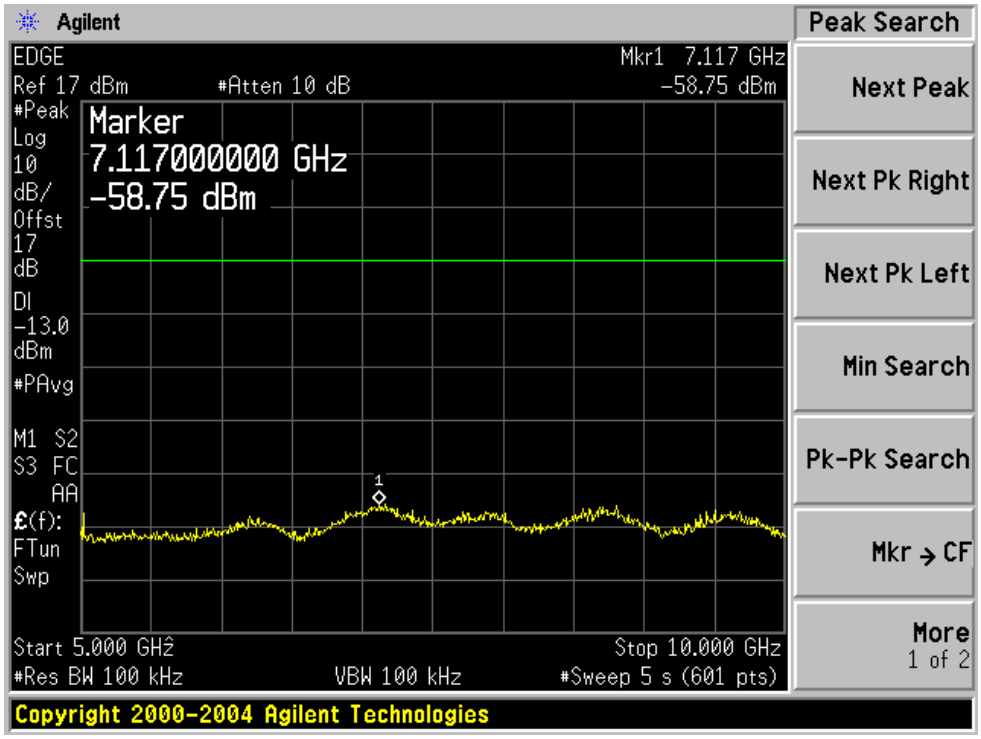
Edge (30 – 1000 MHz)



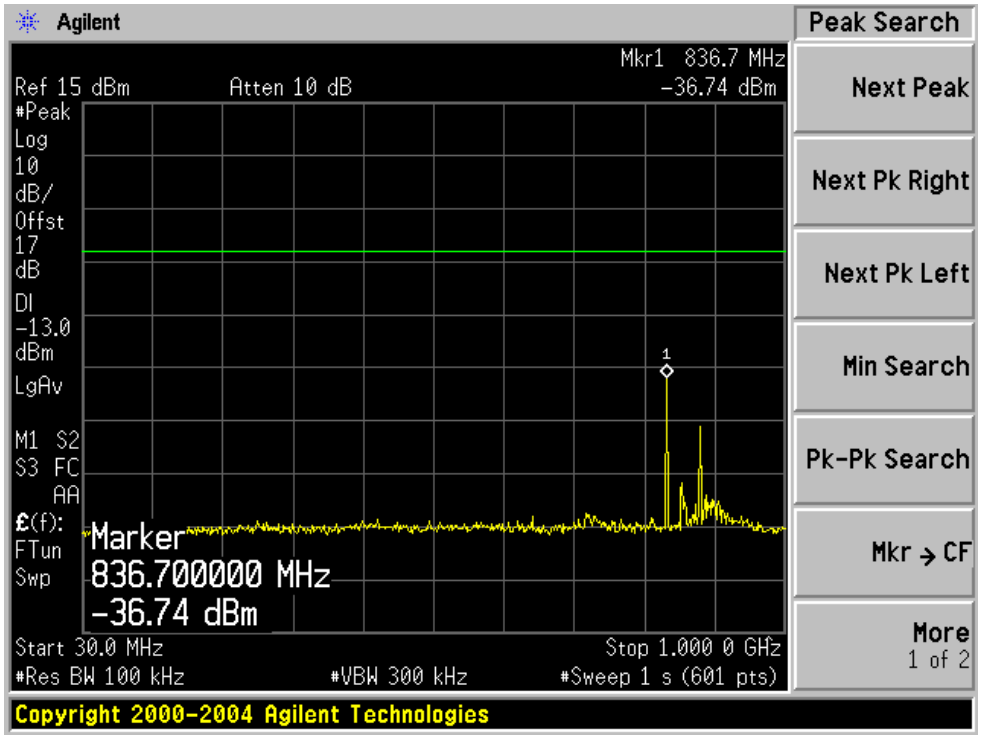
Edge (1 – 5 GHz)



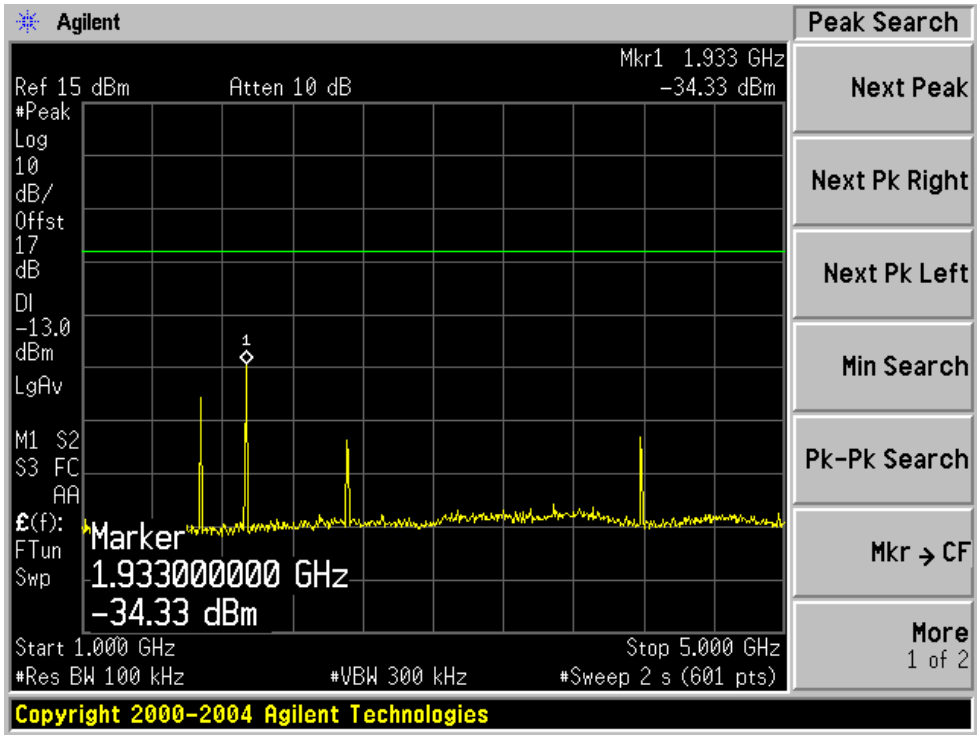
Edge (5 – 10 GHz)



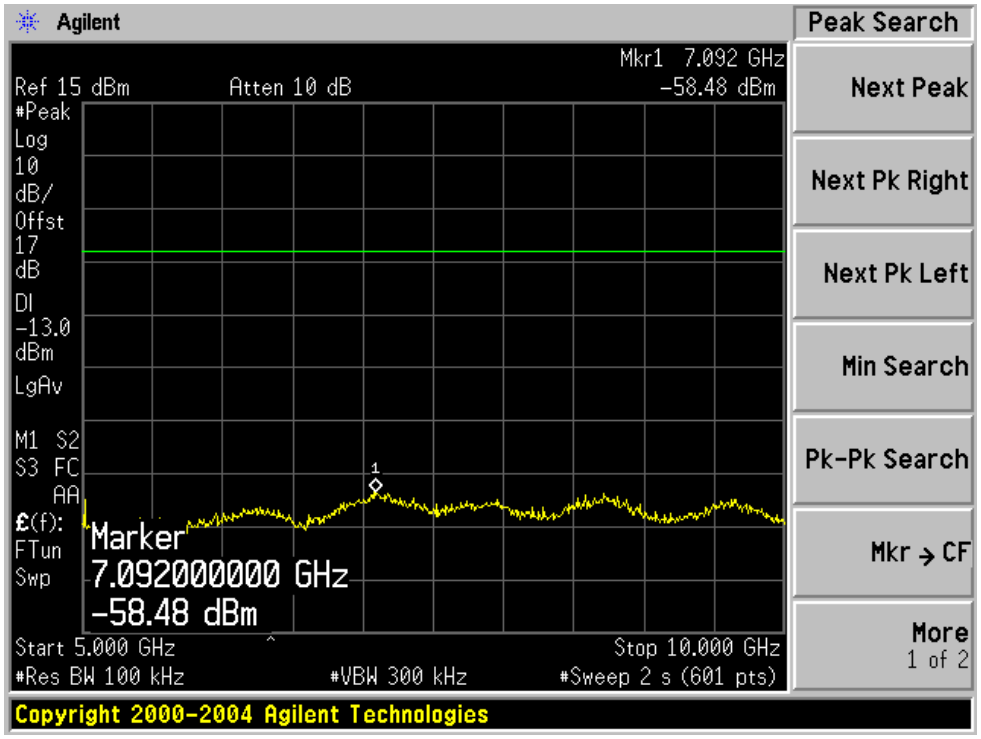
GSM (30 – 1000 MHz)



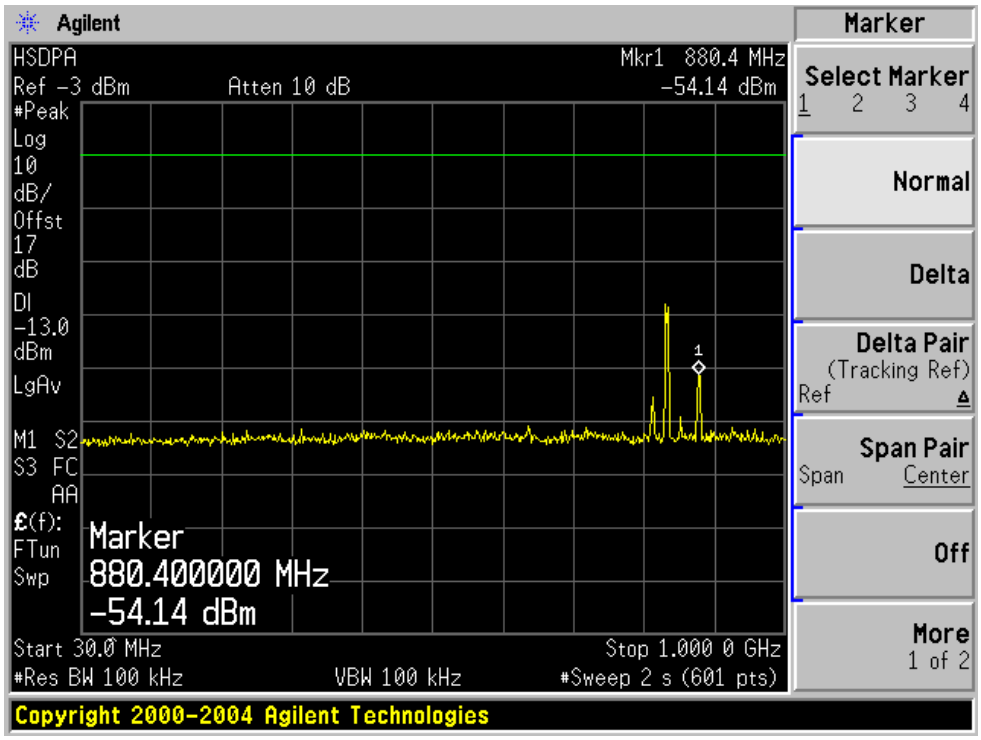
GSM (1 – 5 GHz)



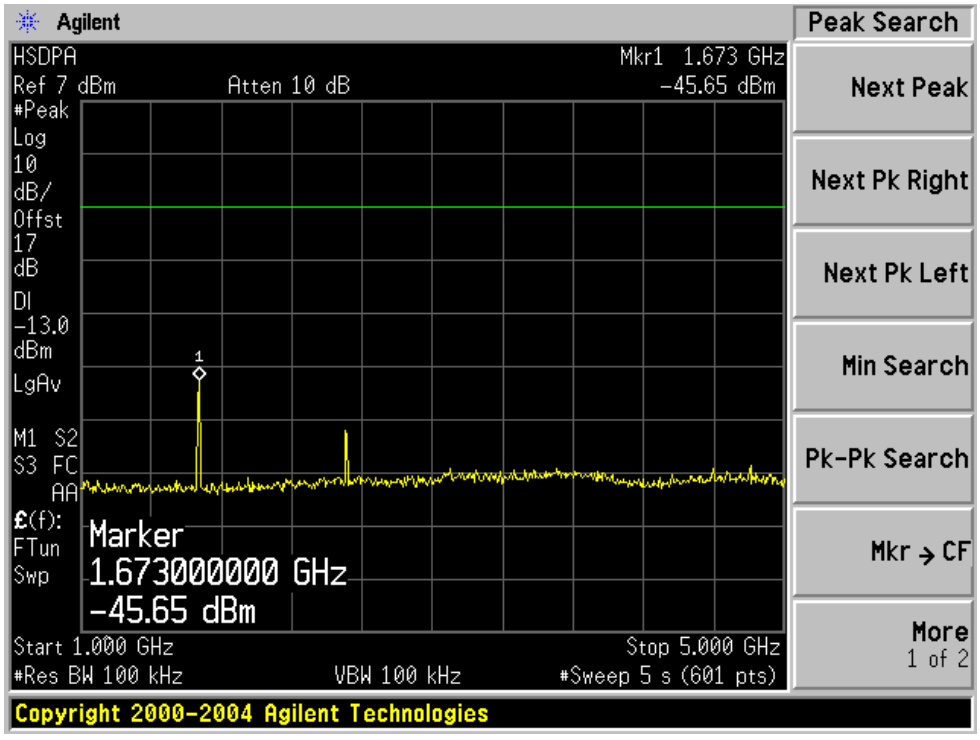
GSM (5 – 10 GHz)



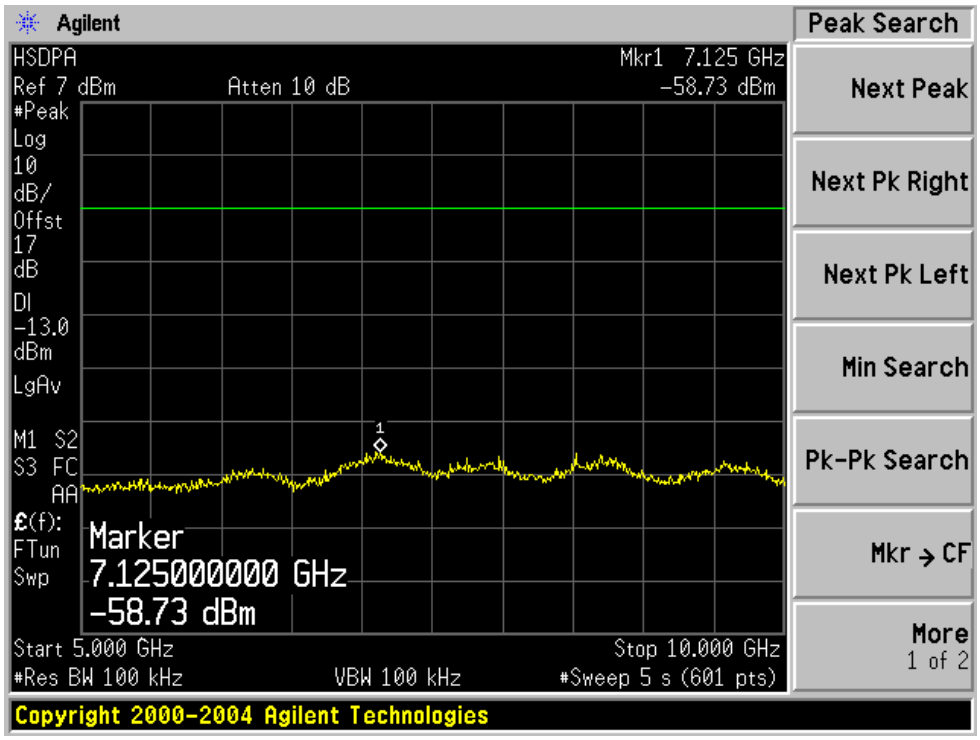
HSDPA (30 – 1000 MHz)



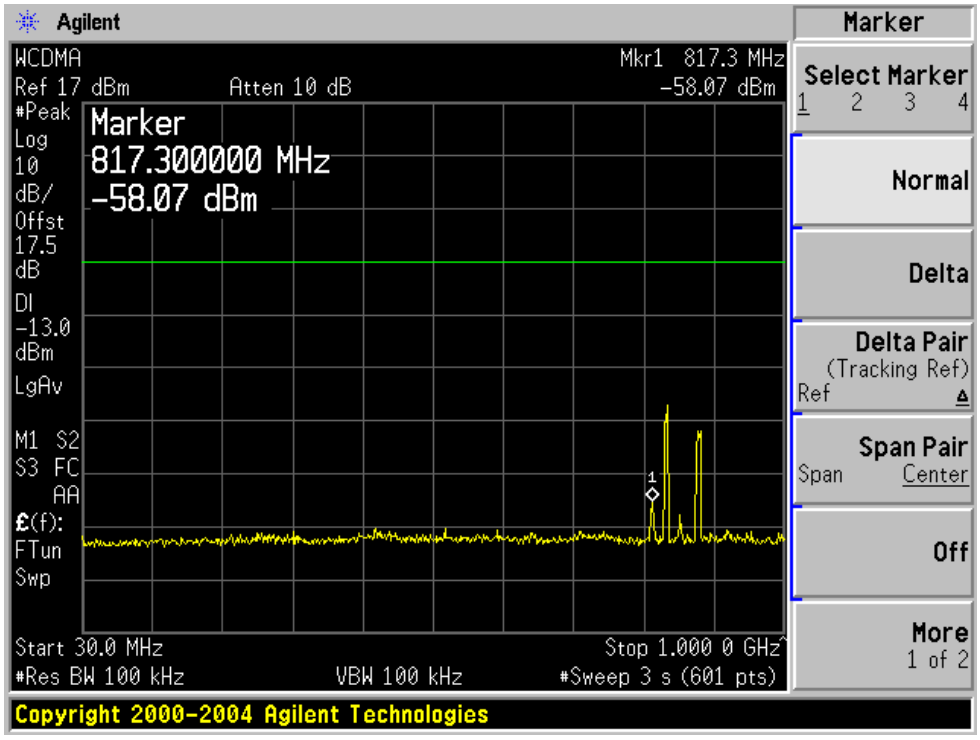
HSDPA (1 – 5 GHz)



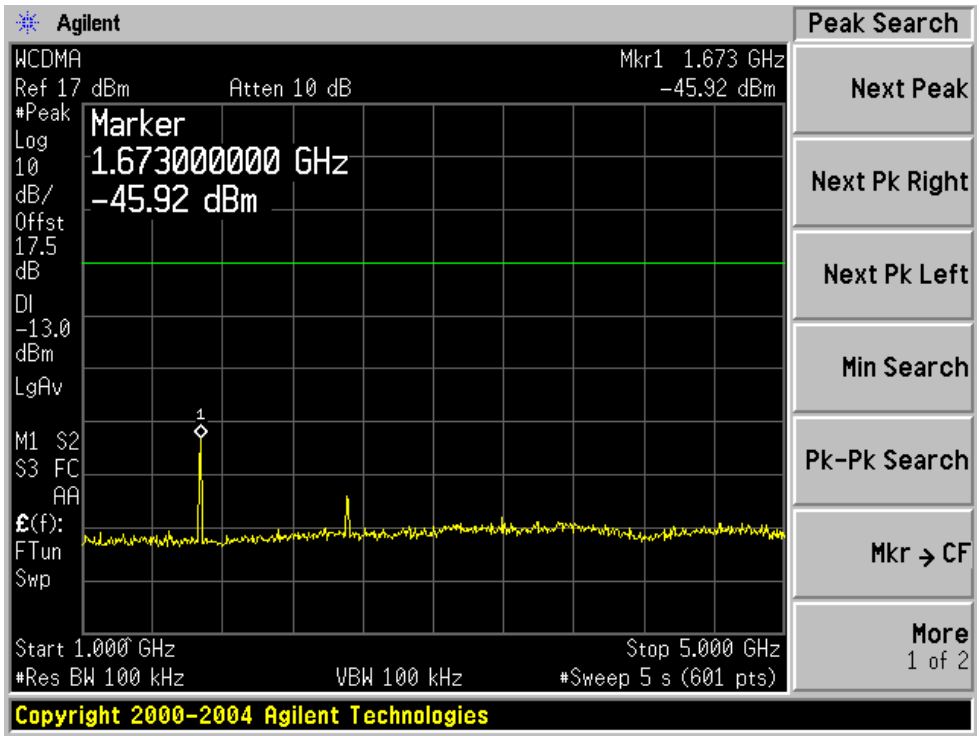
HSDPA (5 – 10 GHz)



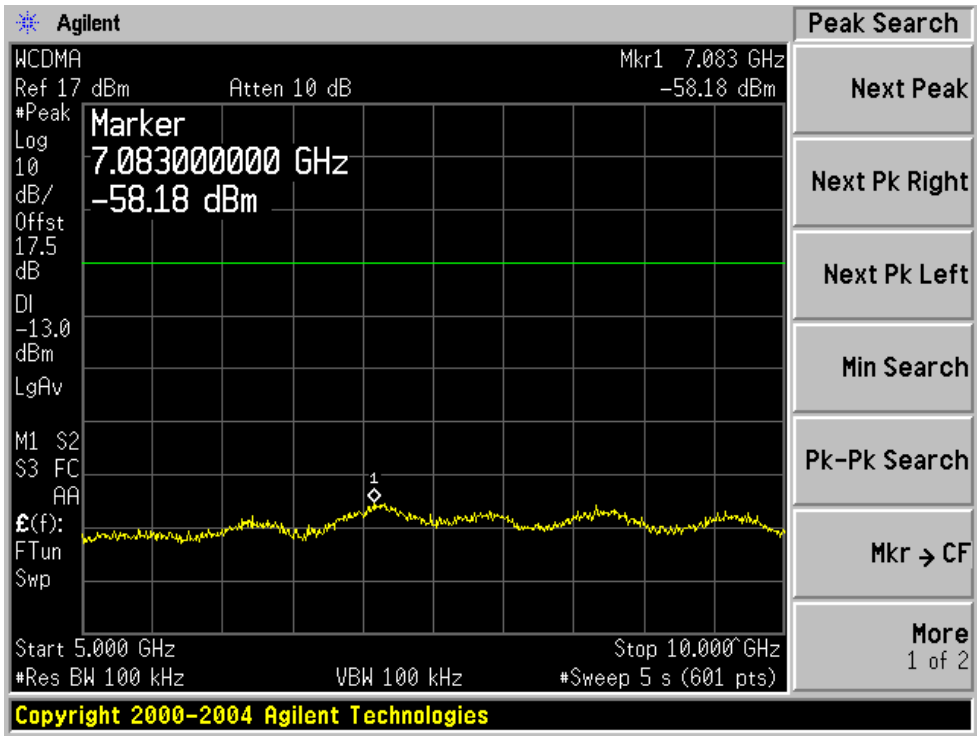
W-CDMA (30 – 1000 MHz)



W-CDMA (1 – 5 GHz)

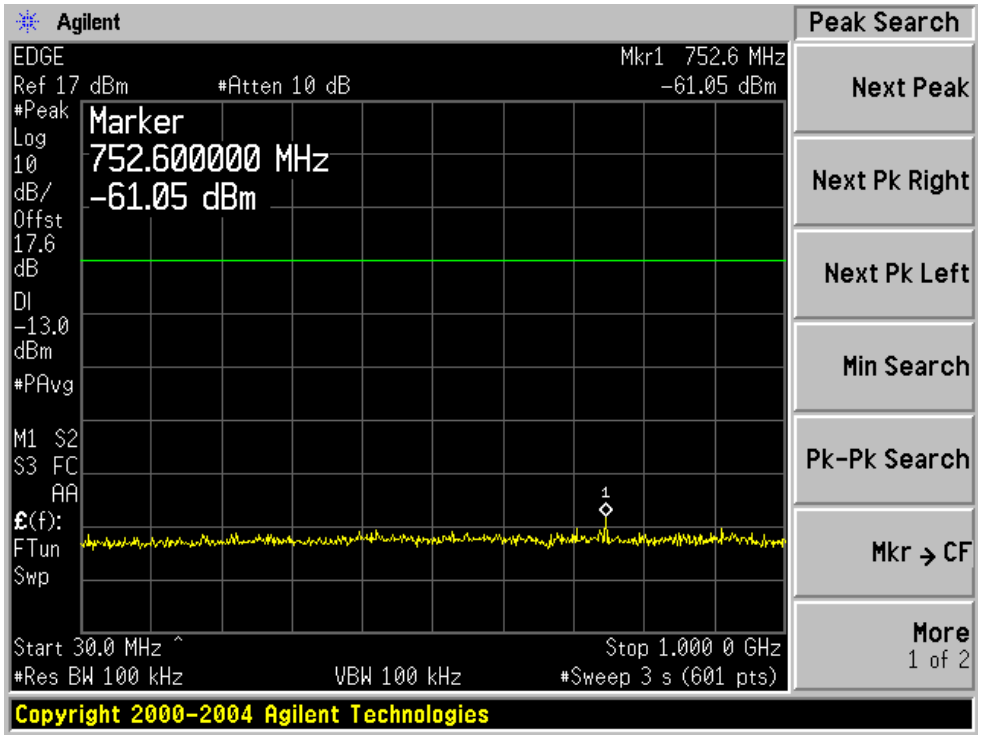


W-CDMA (5 – 10 GHz)

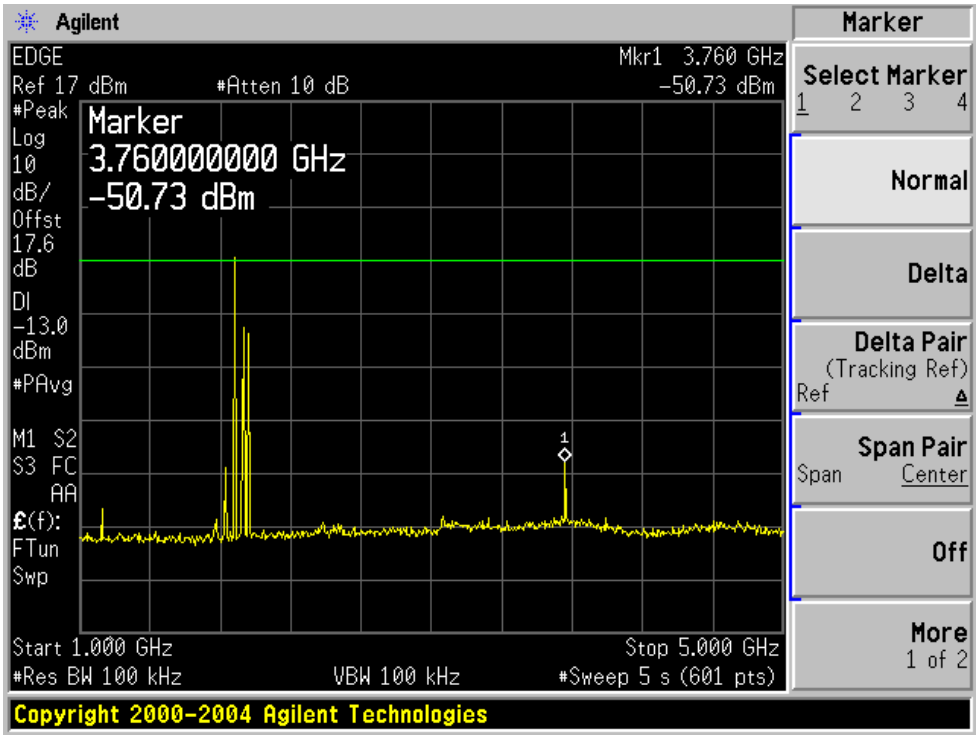


9.4.2 Plots of Spurious Emissions for FCC Part 24 (PCS Band)

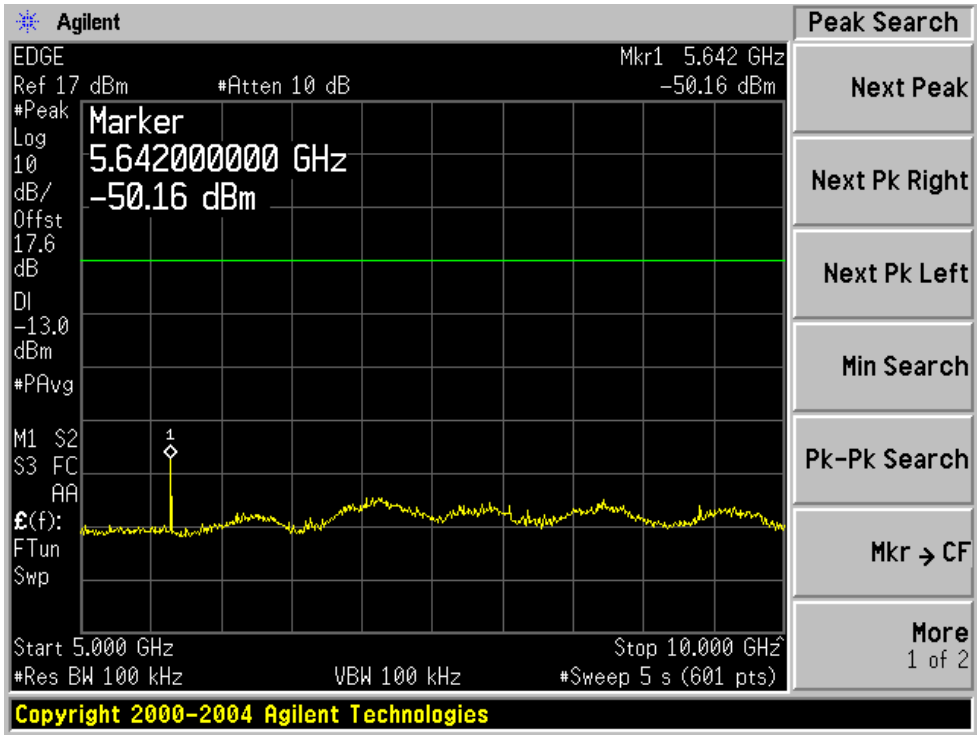
Edge (30 – 1000 MHz)



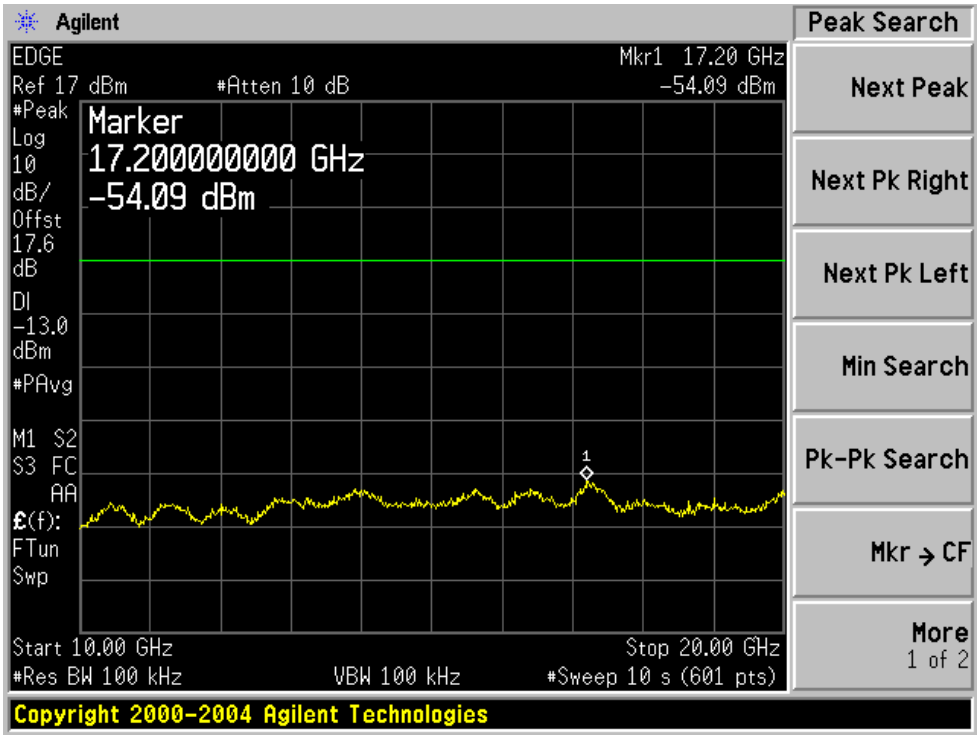
Edge (1 – 5 GHz)



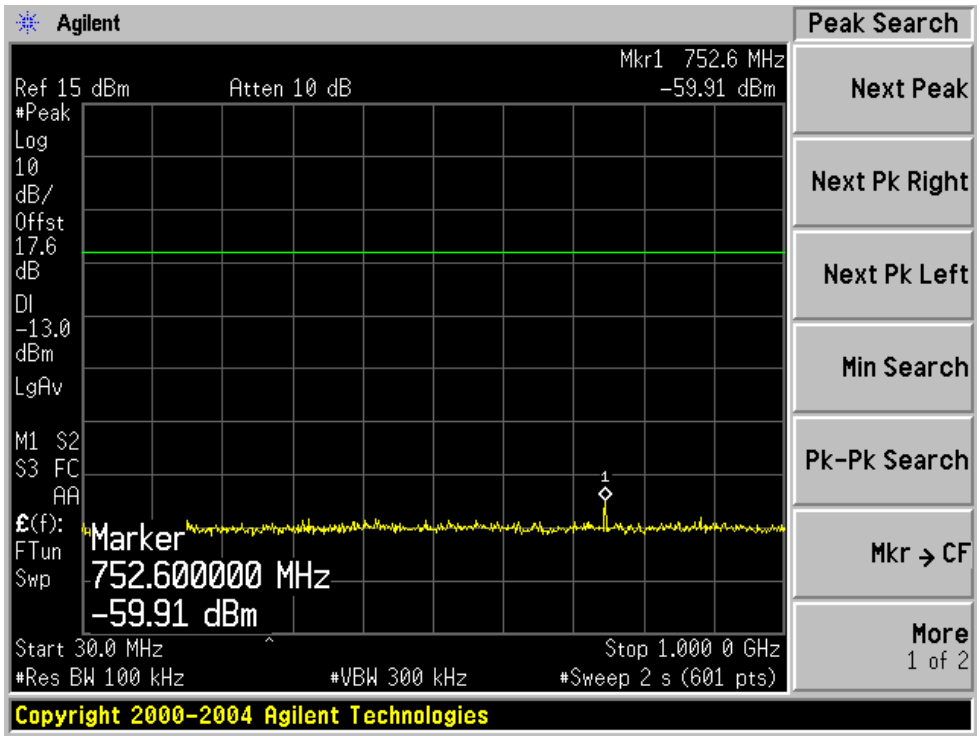
Edge (5 – 10 GHz)



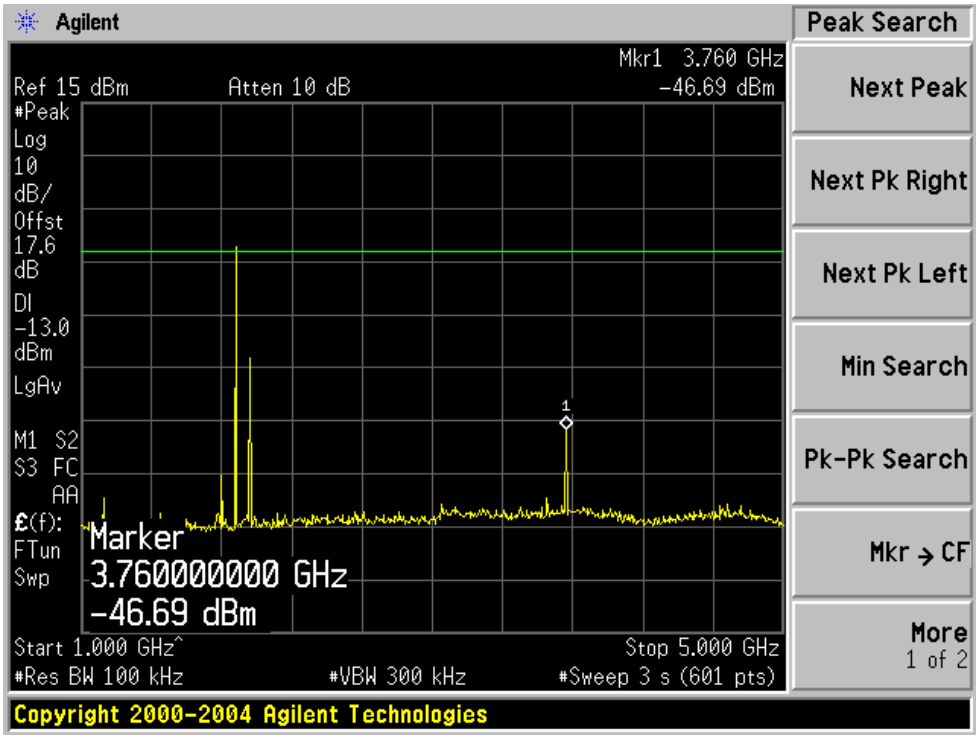
Edge (10 – 20 GHz)



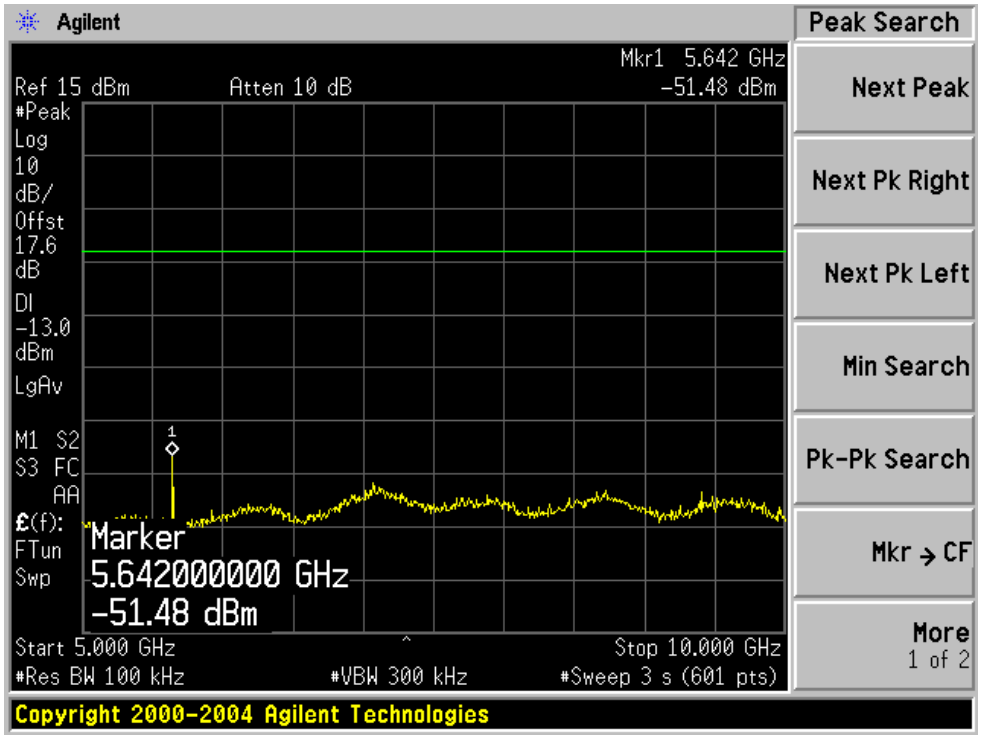
GSM (30 – 1000 MHz)



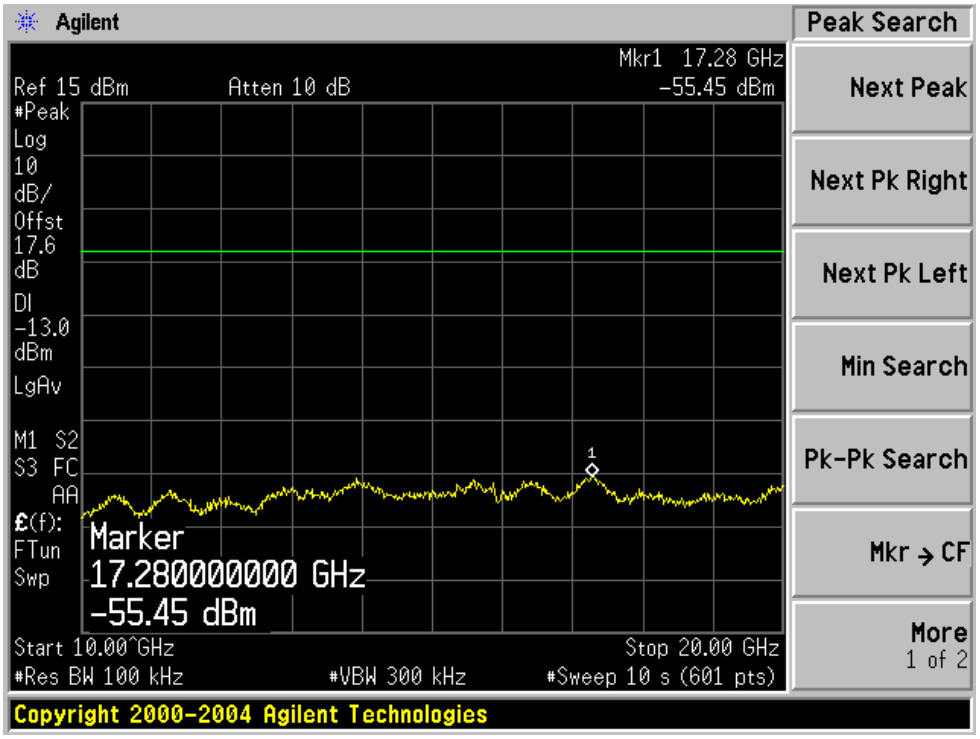
GSM (1 – 5 GHz)



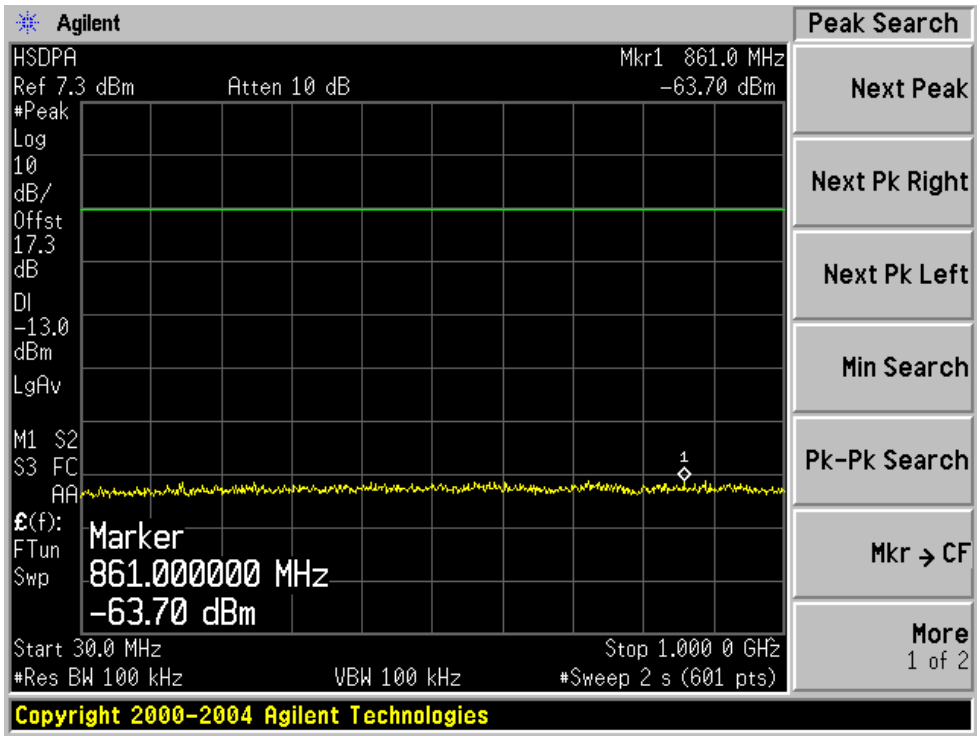
GSM (5 – 10 GHz)



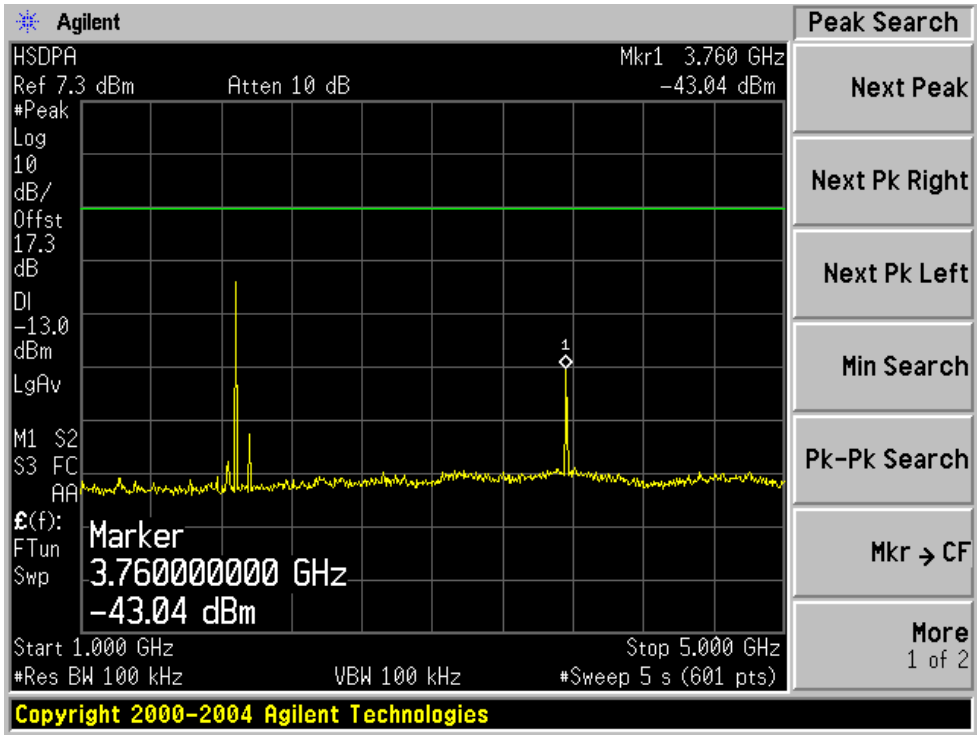
GSM (10 – 20 GHz)



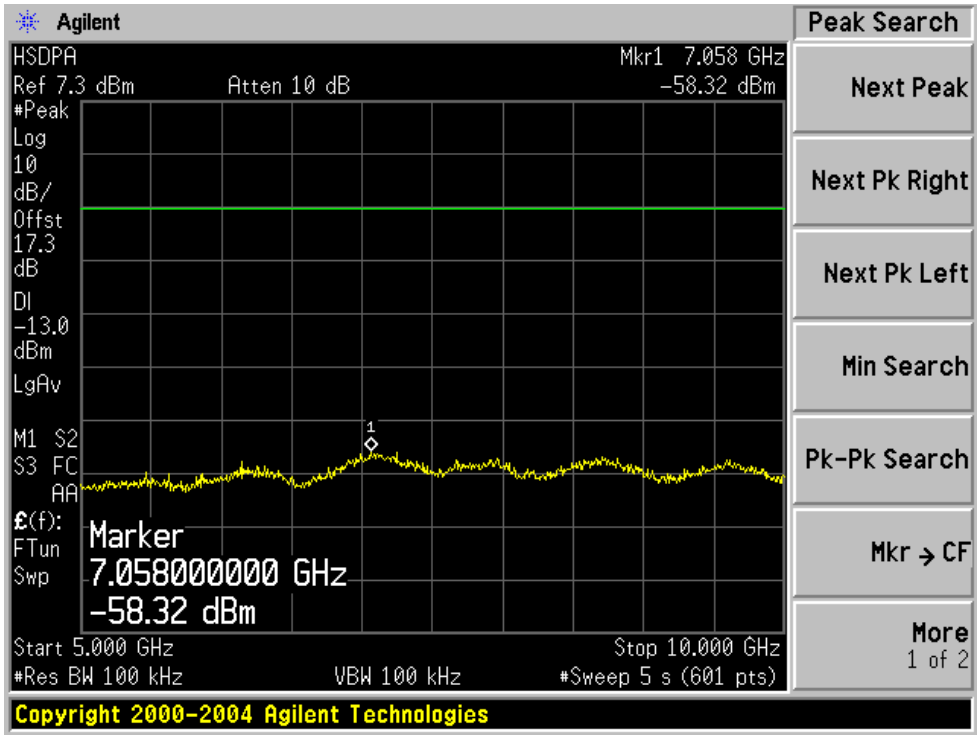
HSDPA (30 – 1000 MHz)



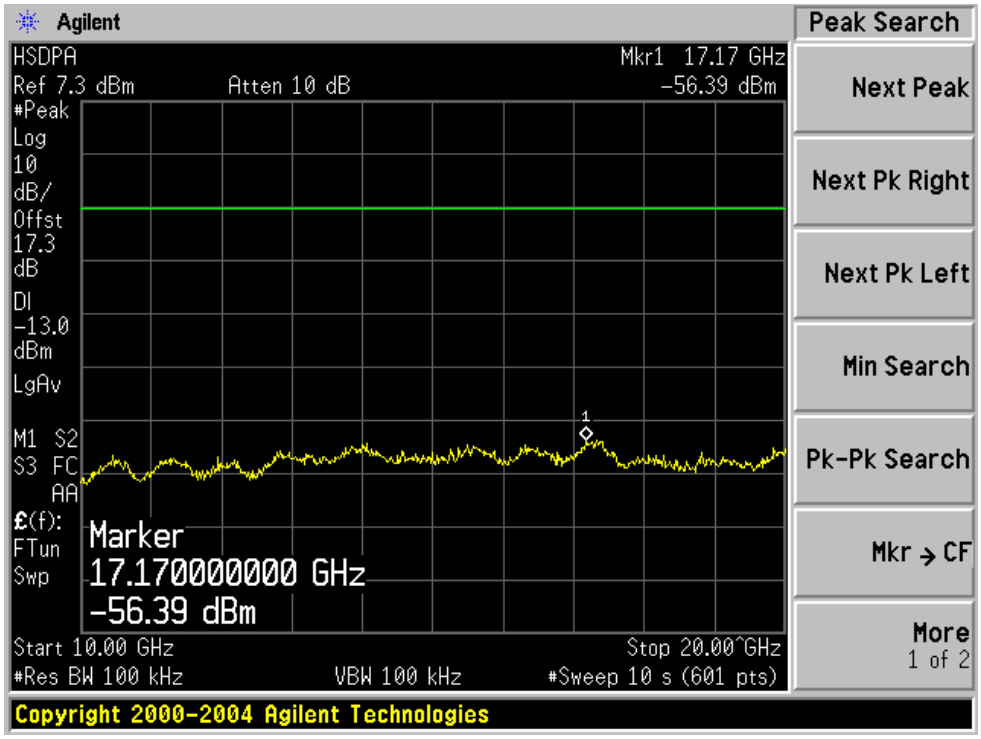
HSDPA (1 – 5 GHz)



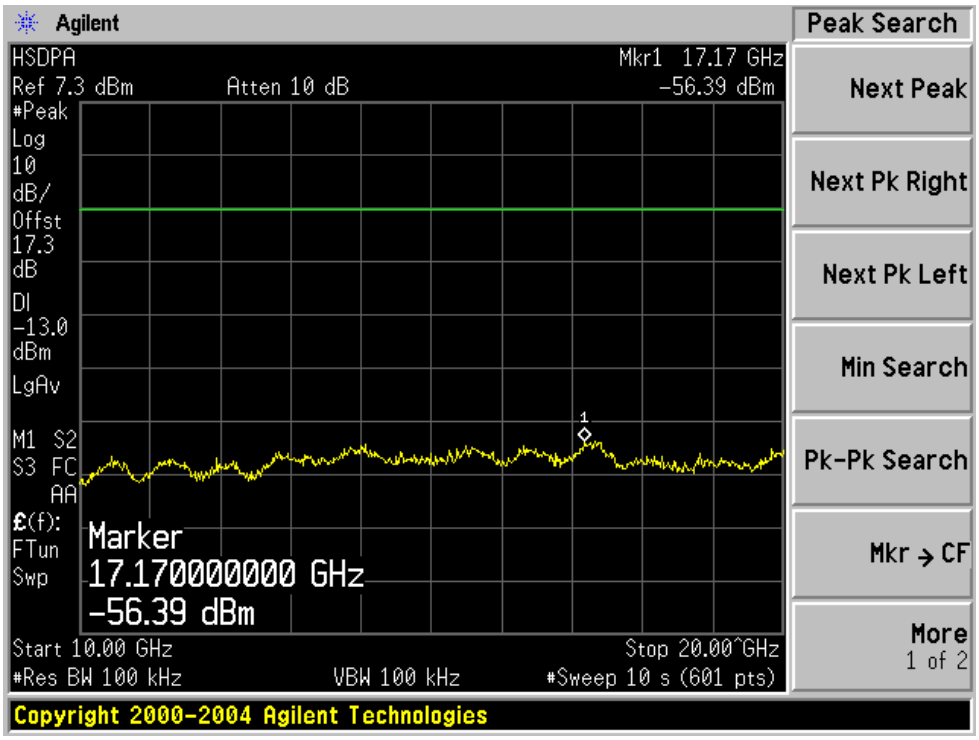
HSDPA (5 – 10 GHz)



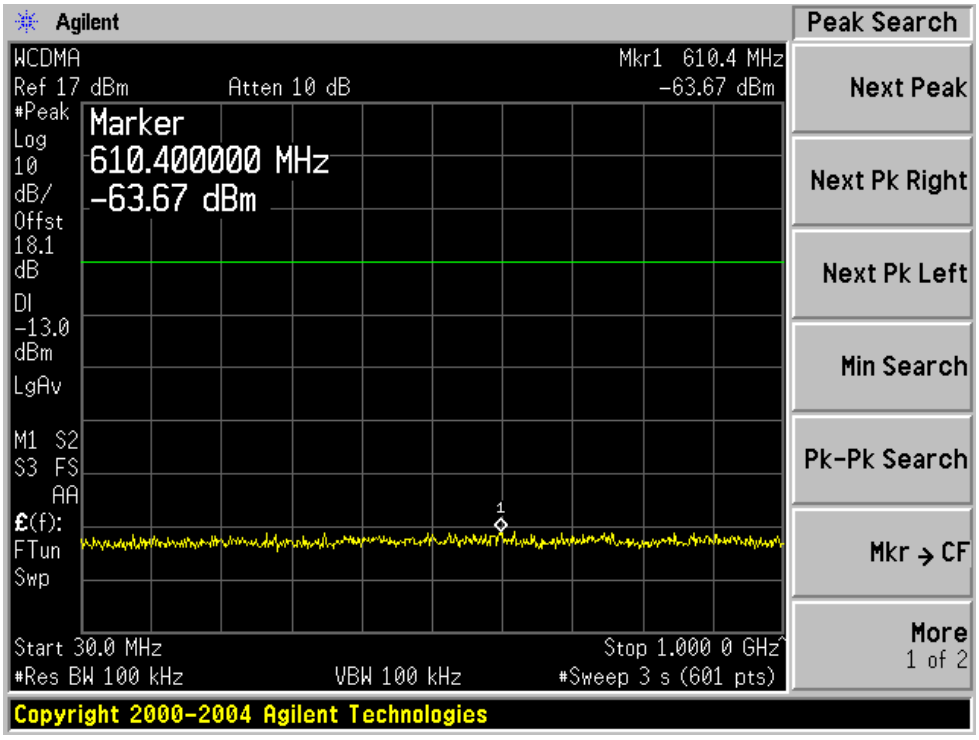
W-CDMA (30 – 1000 MHz)



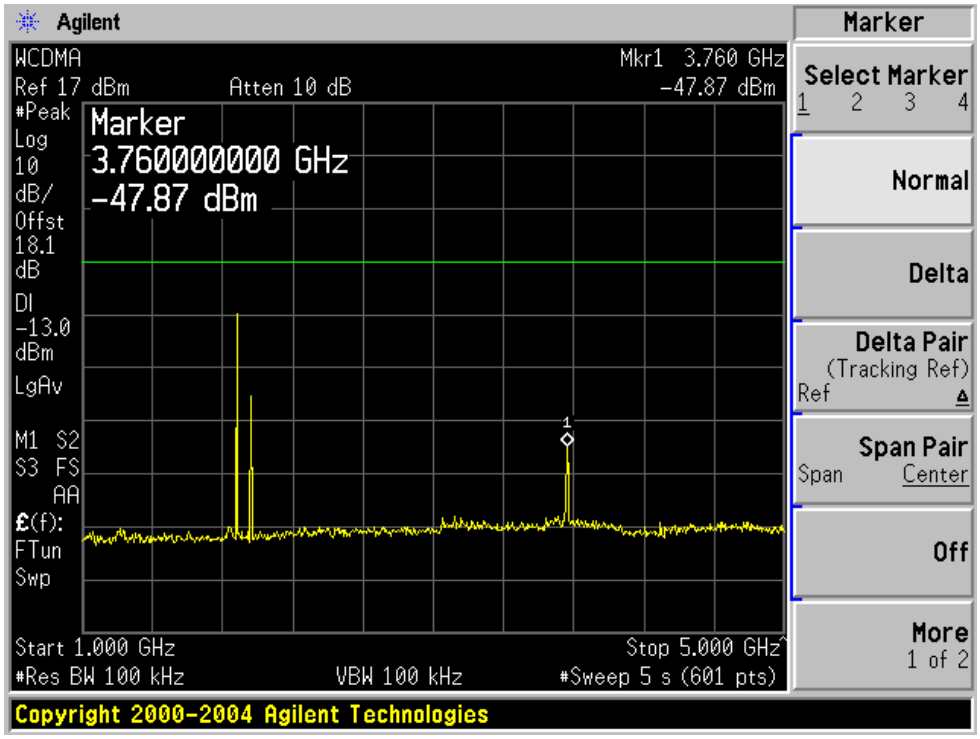
HSDPA (10 – 20 GHz)



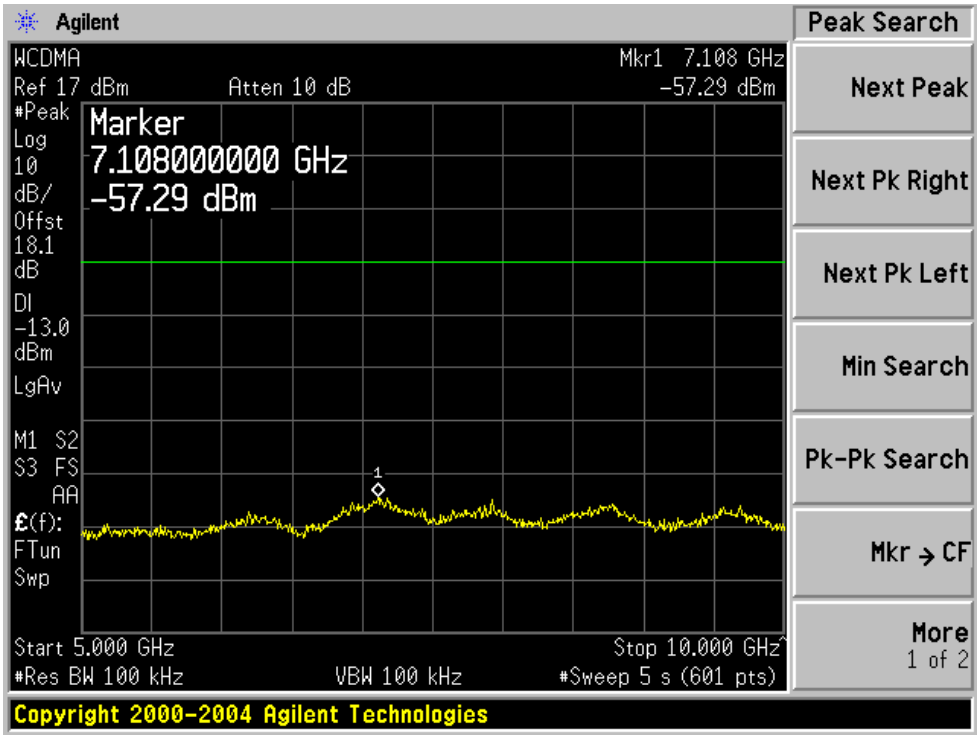
W-CDMA (30 – 1000 MHz)



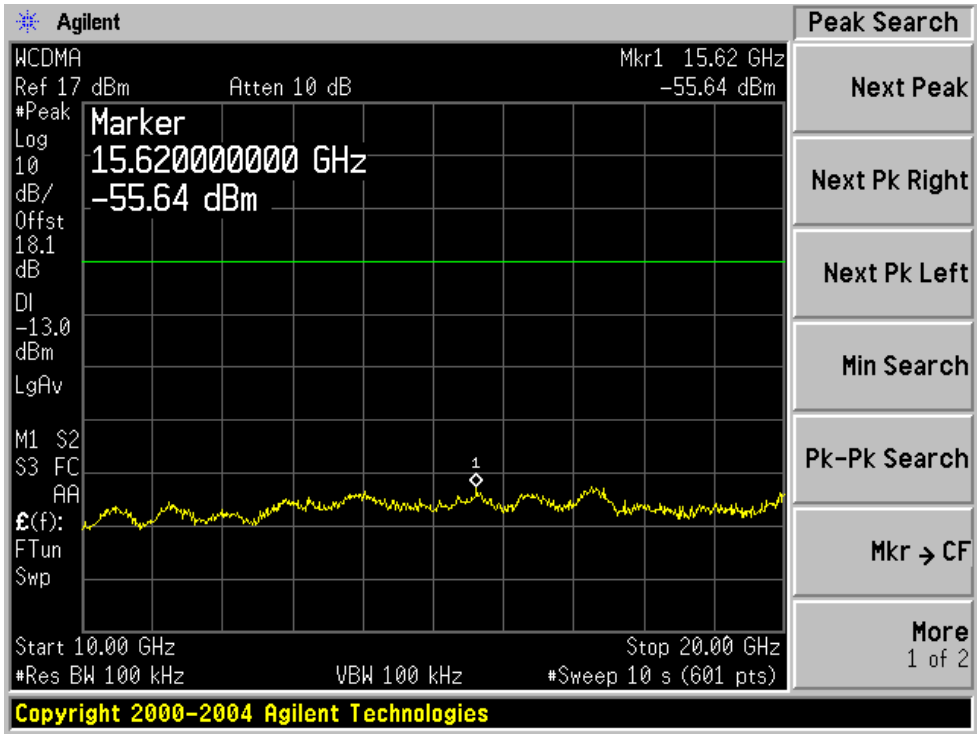
W-CDMA (1 – 5 GHz)



W-CDMA (5 – 10 GHz)



W-CDMA (10 – 20 GHz)



10 §2.1055 (a), §2.1055 (d), §22.355, & §24.235 - FREQUENCY STABILITY

10.1 Applicable Standard

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1_Frequency Tolerance for Transmitters in the Public Mobile Services

Table C-1_Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile [le]3 watts (ppm)	Mobile [le]3 watts (ppm)
25 to 50.....	20.0	20.0	50.0
50 to 450.....	5.0	5.0	50.0
450 to 512.....	2.5	5.0	5.0
821 to 896.....	1.5	2.5	2.5
928 to 929.....	5.0	n/a	n/a
929 to 960.....	1.5	n/a	n/a
2110 to 2220.....	10.0	n/a	n/a

According to §24.235, The frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

10.2.1 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	58 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-03-03.*

10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Frequency Counter	5342A	2232A06380	2006-12-12
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2007-01-24
ESPEC	Temp/ Humidity chamber	ESL-4CA	018010	2006-11-15

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

10.4 Test Results

Cellular Band FCC Part 22:

Frequency Stability versus Temperature (with AC-DC adaptor)

Reference Frequency: 836. 6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Error (ppm)
50	120	836.590011	0.012235
40	120	836.590009	0.010878
30	120	836.590004	0.005259
20	120	836.590003	0.003944
10	120	836.590005	0.005857
0	120	836.590006	0.006694
-10	120	836.590007	0.008128
-20	120	836.590005	0.006335
-30	120	836.590005	0.006216

Frequency Stability versus Voltage (with AC-DC adaptor)

Reference Frequency: 836.6 MHz, Limit: 2.5ppm			
Power Supplied (VAC)	**Environment Temperature (°C)**	**Measured Frequency (MHz)**	**Error (ppm)**
108	20	836.590013	0.014464
132	20	836.590011	0.013269

Frequency Stability versus Temperature (battery operated mode)

Reference Frequency: 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	**Power Supplied (DC)**	**Frequency Measure with Time Elapsed**	
		Measured Frequency (MHz)	**PPM Error**
50	4.8	836.590011	0.012598
40	4.8	836.590009	0.010878
30	4.8	836.590004	0.005259
20	4.8	836.590003	0.003944
10	4.8	836.590005	0.005857
0	4.8	836.590006	0.006694
-10	4.8	836.590007	0.008128
-20	4.8	836.590005	0.006335
-30	4.8	836.590005	0.006216

Frequency Stability versus Voltage (battery operated mode)

Reference Frequency: 836.6 MHz, Limit: 2.5ppm			
Power Supplied (DC)	**Environment Temperature (°C)**	**Measured Frequency (MHz)**	**Error (ppm)**
4.4	20	836.590012	0.014345
5.3	20	836.590009	0.010400

10.4.1 PCS Band FCC Part 24:

Frequency Stability versus Temperature (with AC-DC adaptor)

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Error (ppm)
50	120	1880.000013	0.007127
40	120	1880.000023	0.012808
30	120	1880.000010	0.005531
20	120	1880.000002	0.001063
10	120	1880.000008	0.004042
0	120	1880.000008	0.004255
-10	120	1880.000010	0.005265
-20	120	1880.000008	0.004468
-30	120	1880.000011	0.005691

Frequency Stability versus Voltage (with AC-DC adaptor)

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	Environment Temperature (°C)	Measured Frequency (MHz)	Error (ppm)
102	20	1880.0010	0.005531
132	20	1880.0008	0.004042

Frequency Stability versus Temperature (battery operated mode)

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	**Power Supplied (VDC)**	**Frequency Measure with Time Elapsed**	
		Measured Frequency (MHz)	**Error (ppm)**
50	4.8	1880.000013	0.007127
40	4.8	1880.000022	0.011808
30	4.8	1880.000010	0.005531
20	4.8	1880.000002	0.001063
10	4.8	1880.000008	0.004042
0	4.8	1880.000008	0.004255
-10	4.8	1880.000010	0.005265
-20	4.8	1880.000008	0.004468
-30	4.8	1880.000011	0.005691

Frequency Stability versus Voltage (battery operated mode)

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	**Environment Temperature (°C)**	**Measured Frequency (MHz)**	**Error (ppm)**
4.4	20	1880.0010	0.005531
5.3	20	1880.0015	0.008297

11 §22.917 & §24.238 – BAND EDGE

11.1 Applicable Standard

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

11.2 Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.

11.2.1 Environmental Conditions

Temperature:	19 °C
Relative Humidity:	51 %
ATM Pressure:	101.8 kPa

** The testing was performed by Oscar Au on 2007-05-11 to 2007-05-15.*

11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2007-01-24

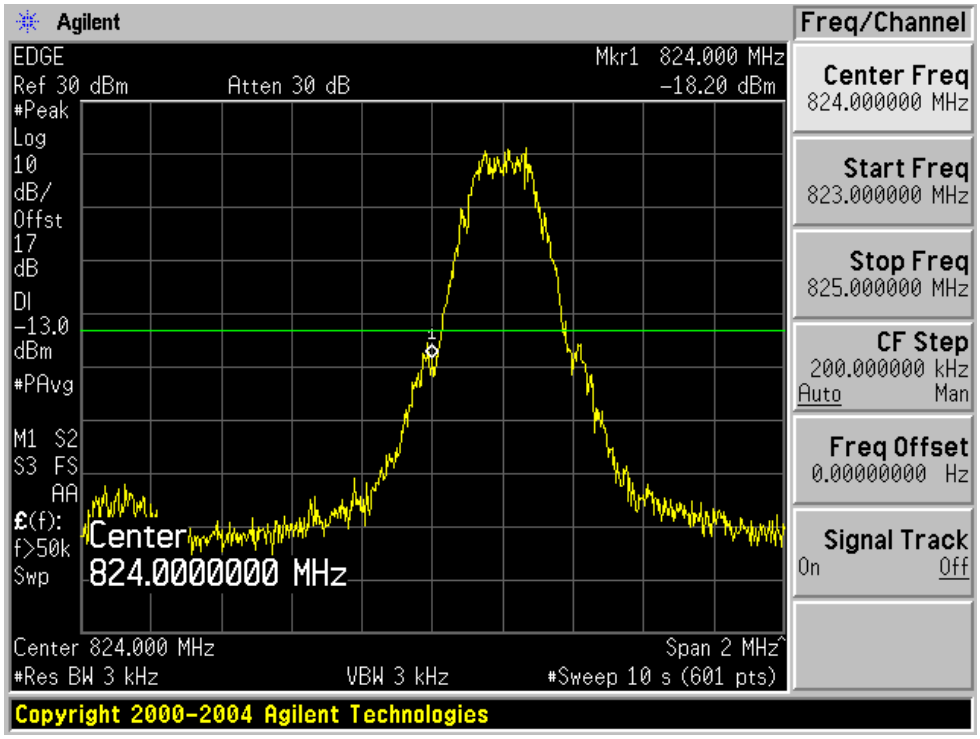
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

11.4 Test Results

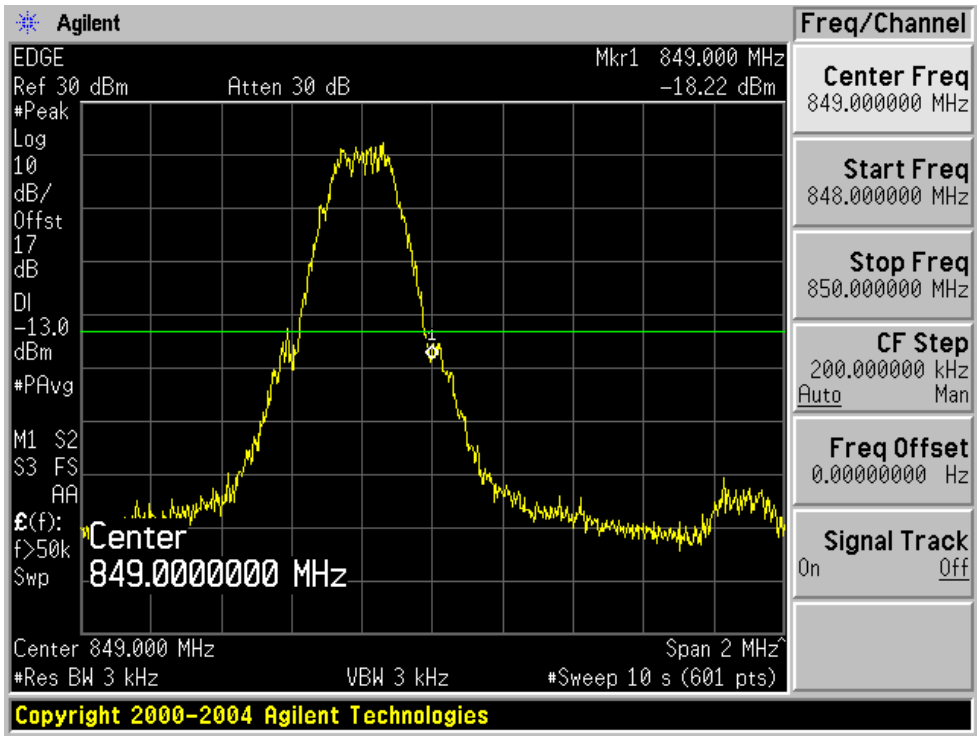
Please refer to the following plots.

11.4.1 Plots of Band Edge for Part 22 (Cellular Band)

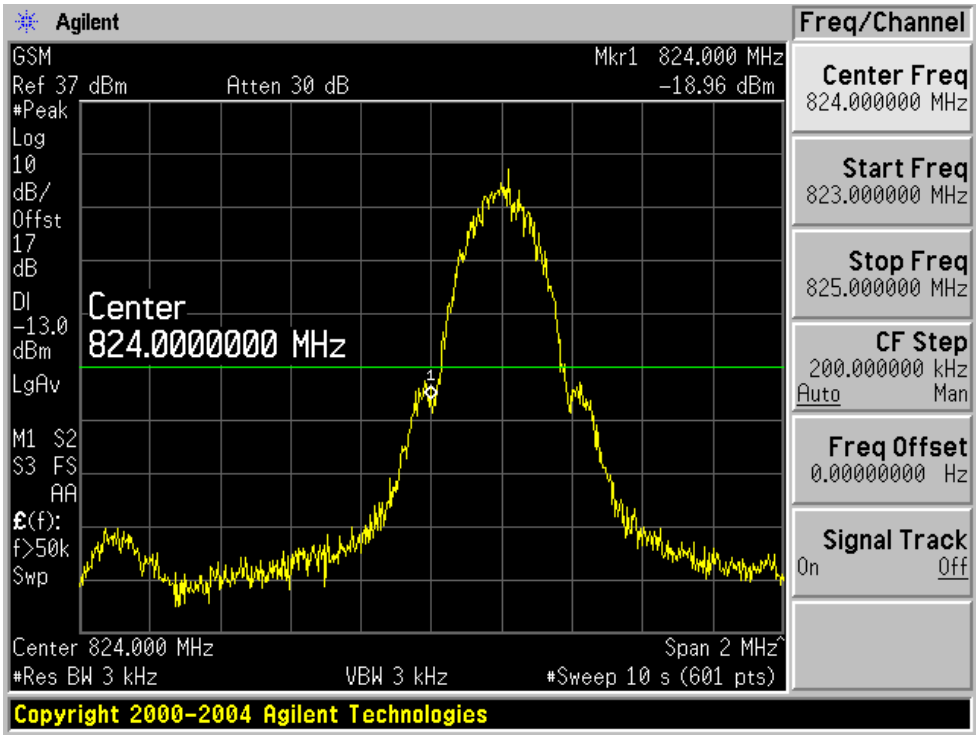
Edge Low Channel



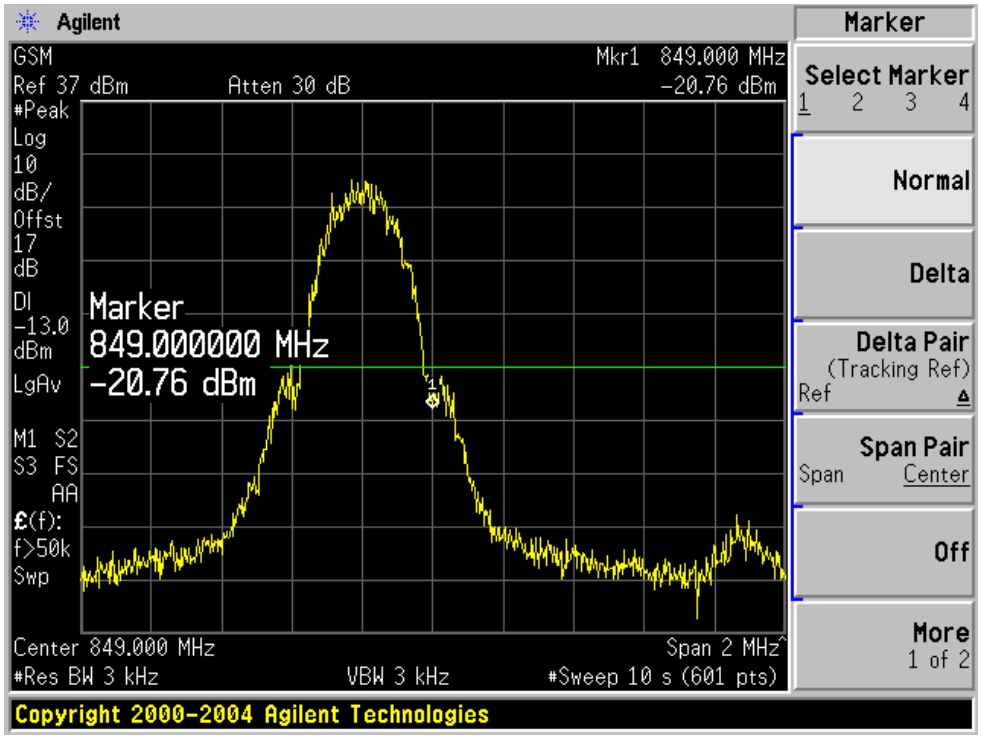
Edge High Channel



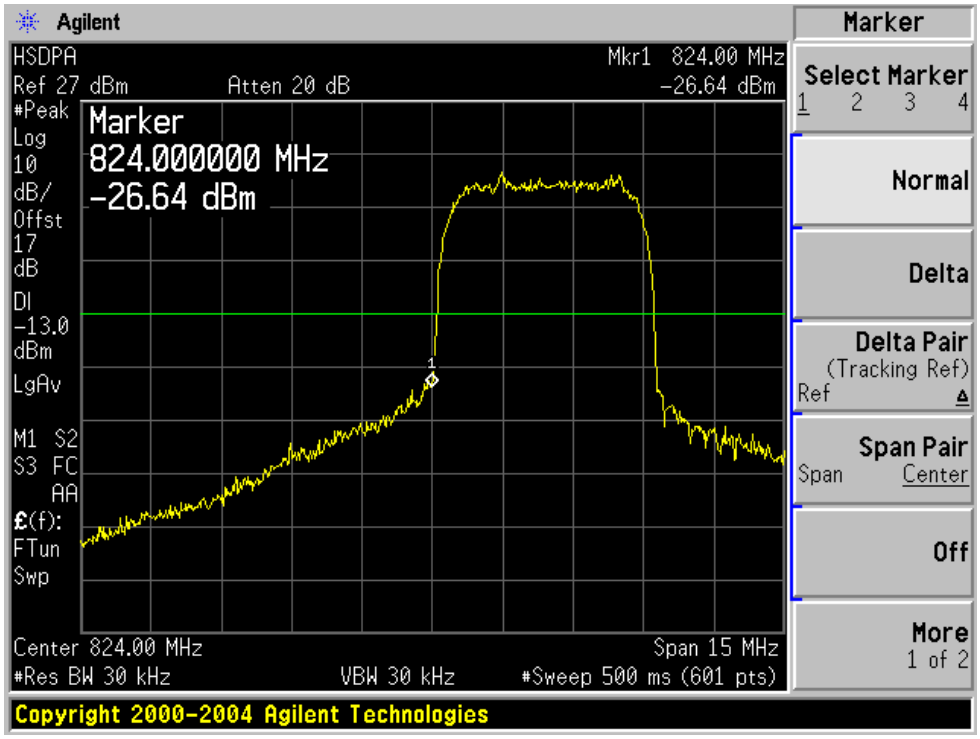
GSM Low Channel



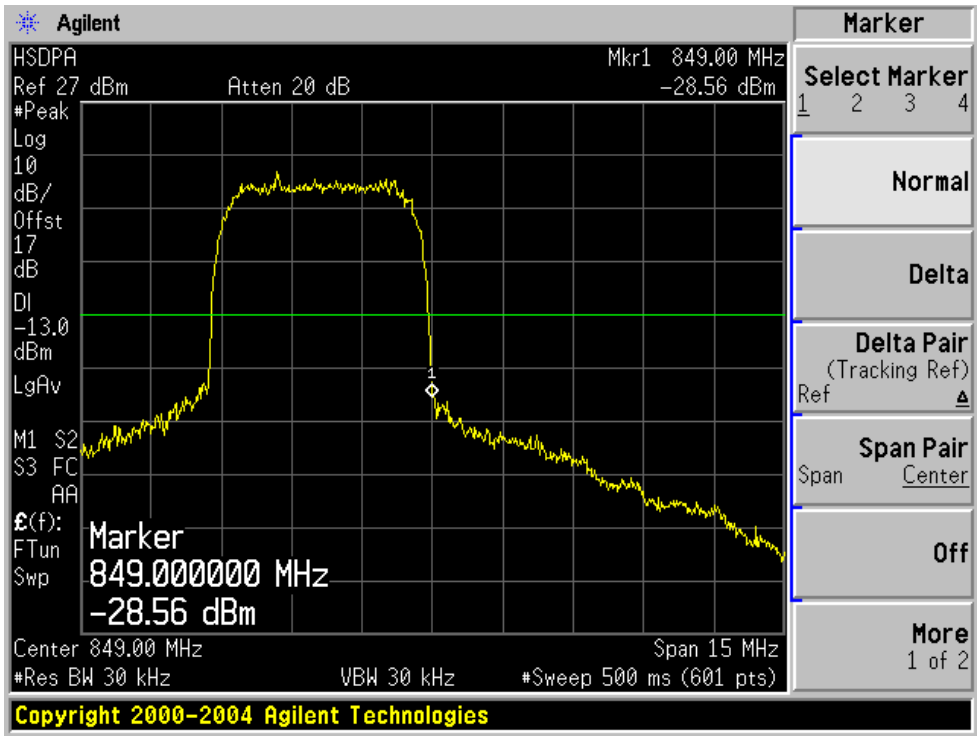
GSM High Channel



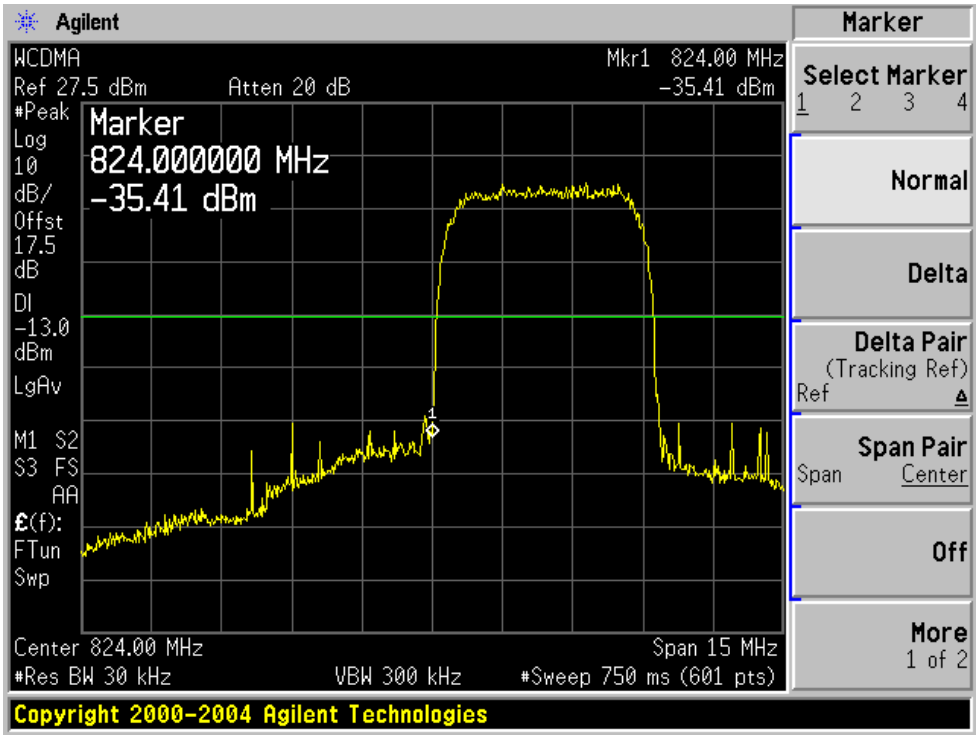
HSDPA Low Channel



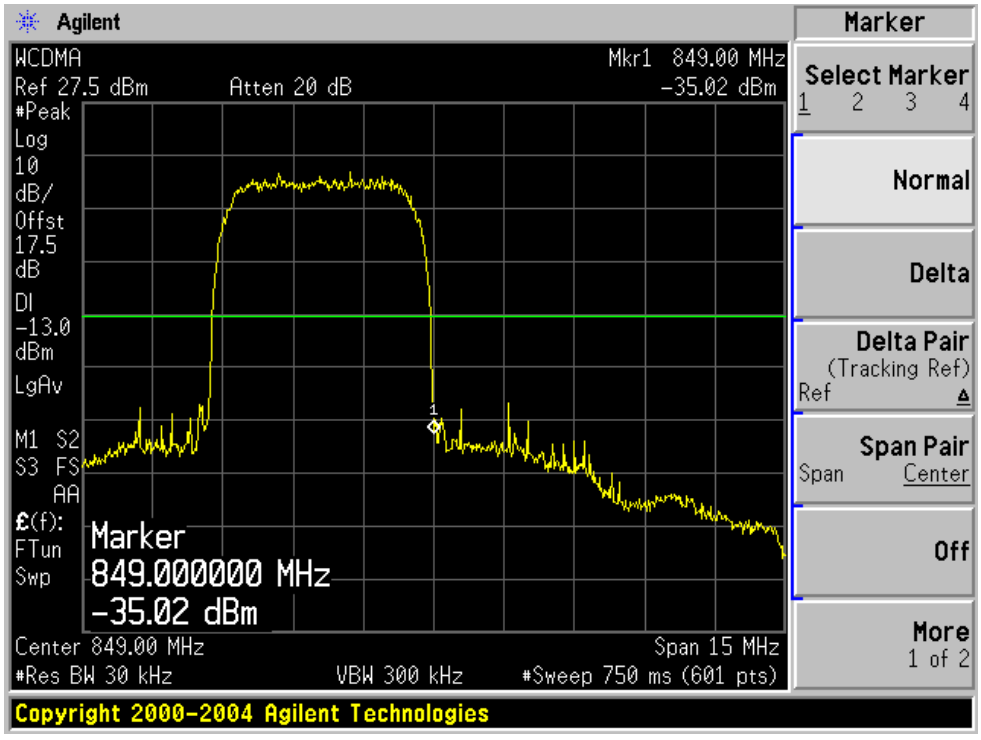
HSDPA High Channel



W-CDMA Low Channel

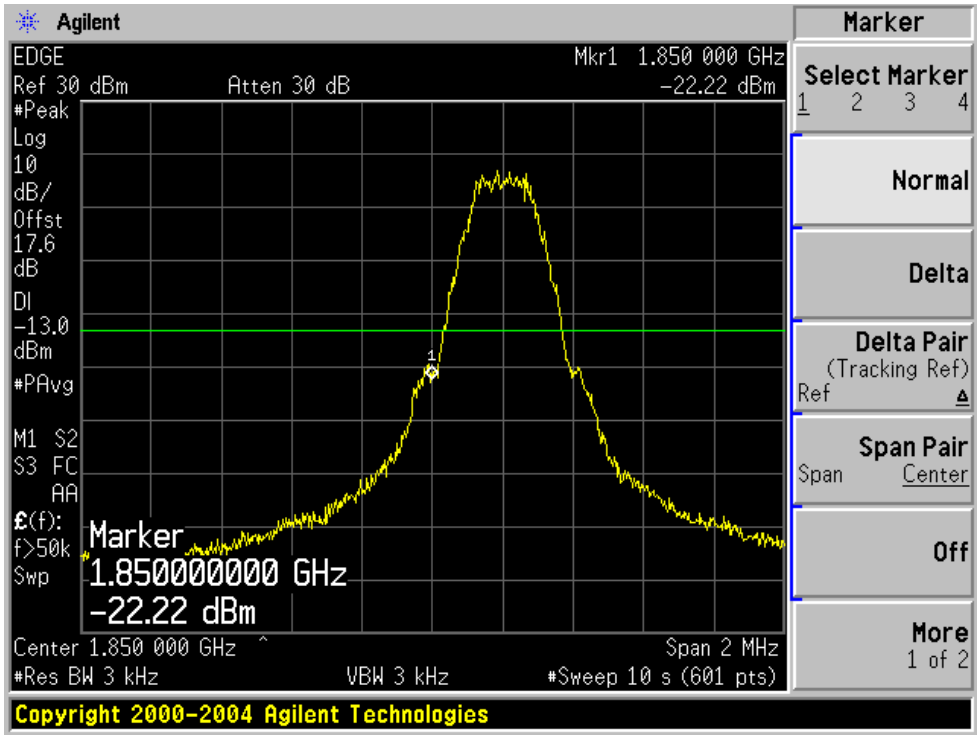


W-CDMA High Channel

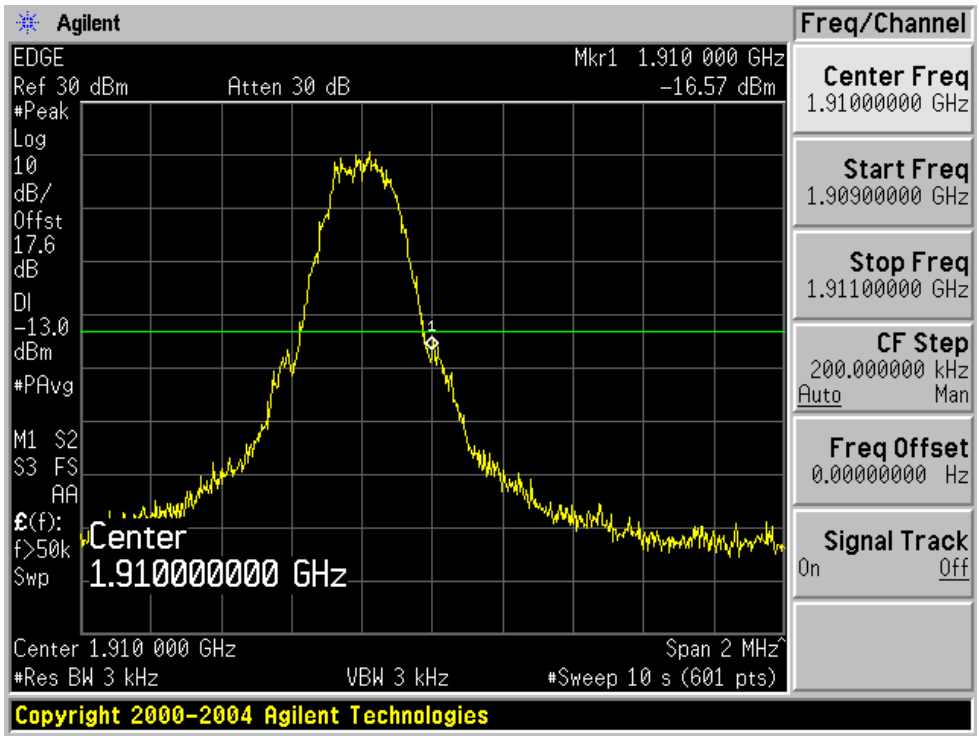


11.4.2 Plots of Band Edge for Part 24 (PCS Band)

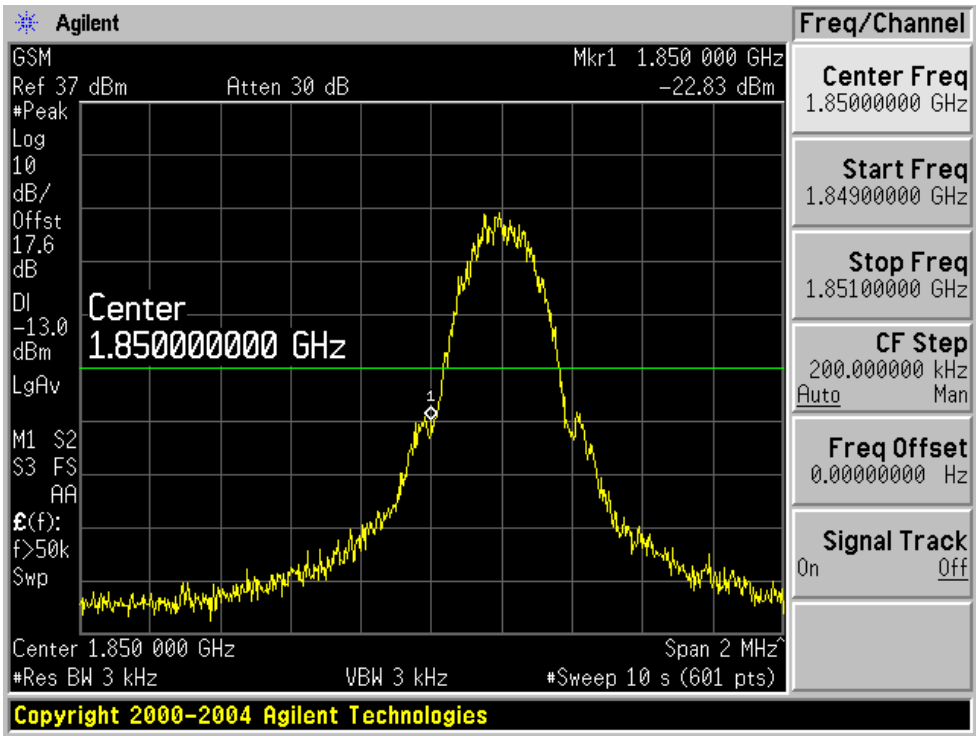
Edge Low Channel



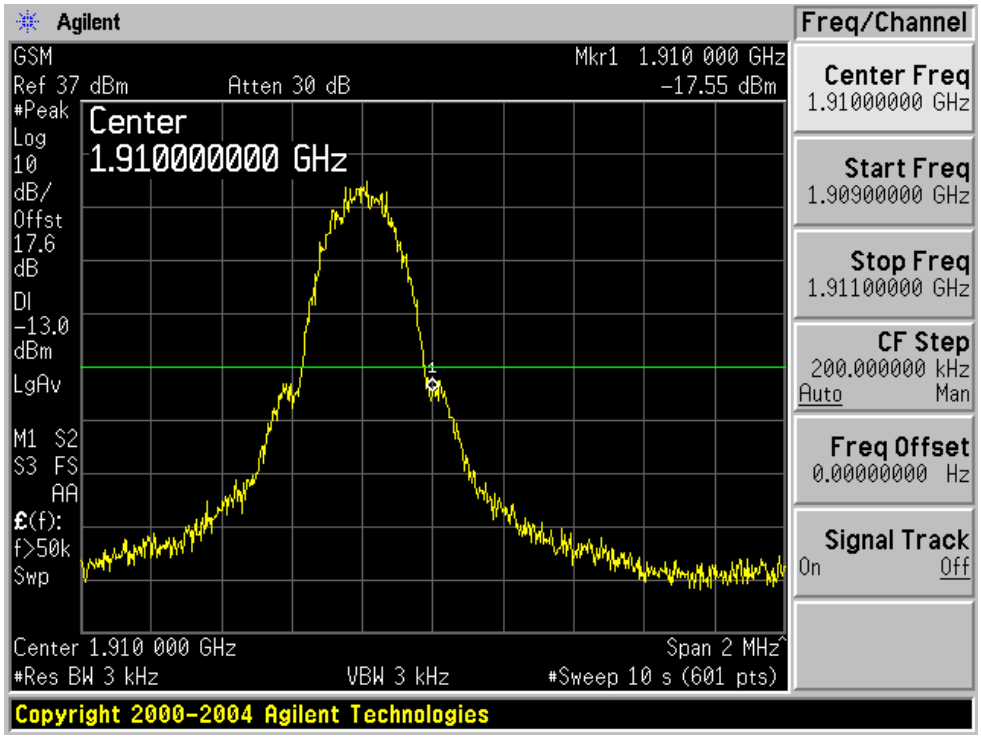
Edge High Channel



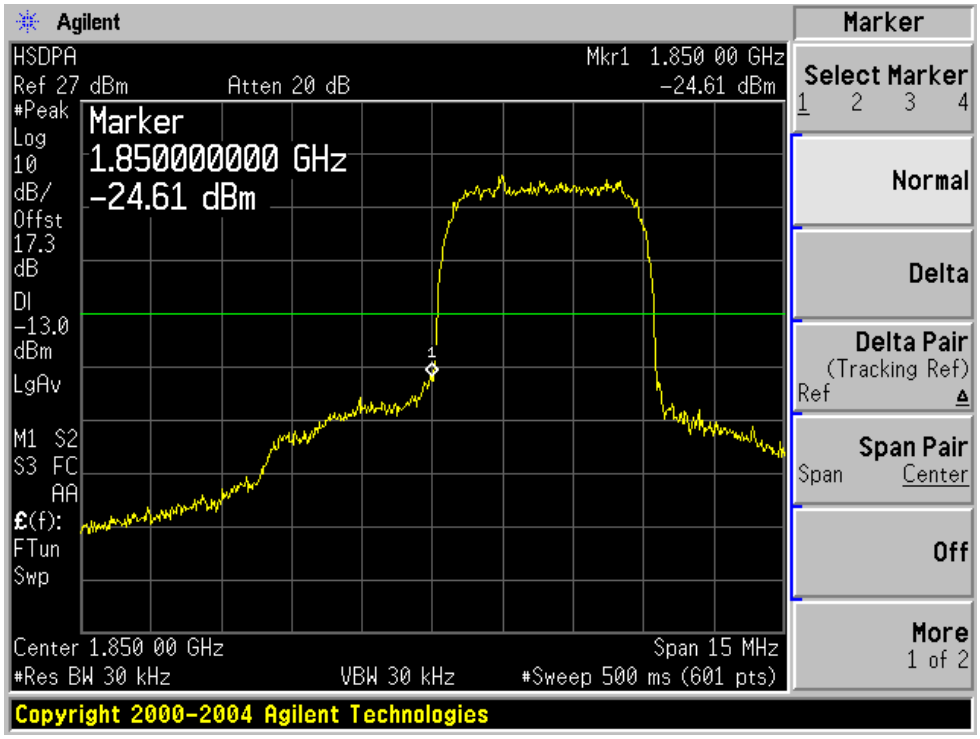
GSM Low Channel



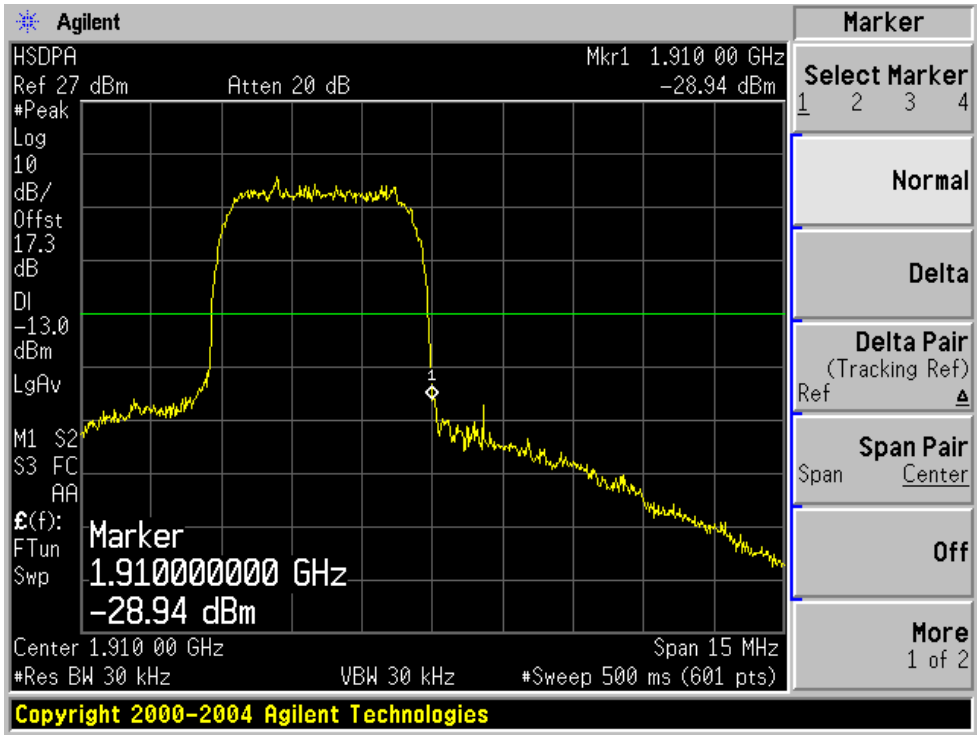
GSM High Channel



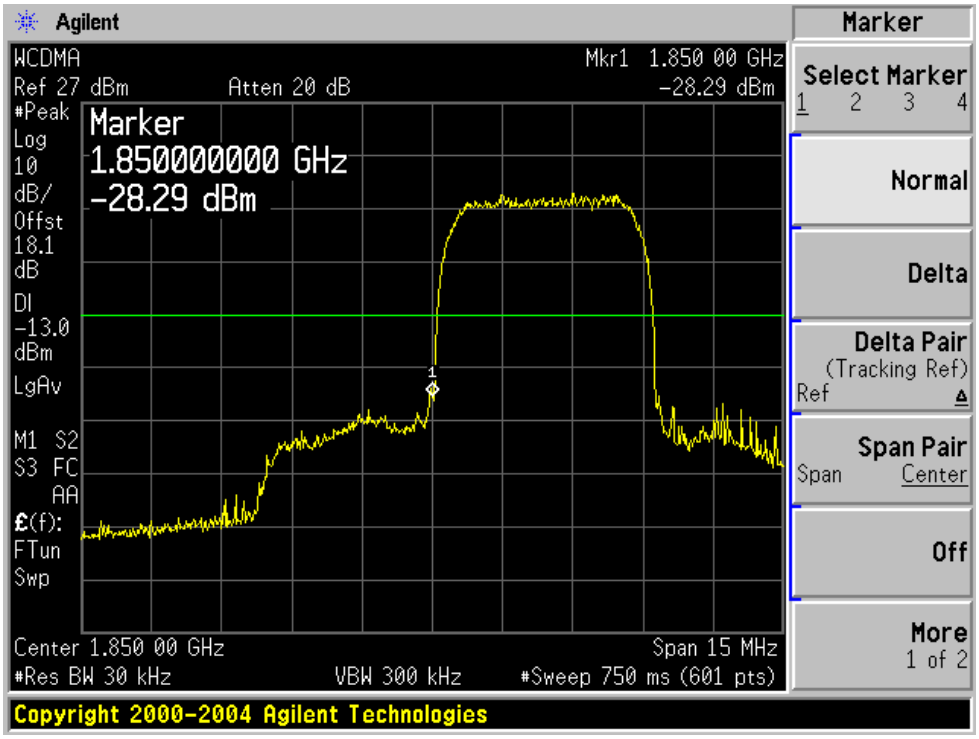
HSDPA Low Channel



HSDPA High Channel



W-CDMA Low Channel



W-CDMA High Channel