



**FCC PART 22 & PART 24
TEST AND MEASUREMENT REPORT**

For

Beijing Telestone Technology Co., Ltd.

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FCC ID: U5TWFD5-RUA

Report Type: Original Report	Product Type: Remote Unit Wireless Network System
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*”

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R0908187-2224	Original Report	2009-09-24
1	R0908187-2224	Updated typo	2009-10-02

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *Beijing Telestone Technology Co., Ltd.* FCC ID: U5TWFDS-RUA, Model: WFDS-RUA or the “EUT” as referred to in this report is a Remote Unit for Wireless Fiber Distribution System. The RUA is a Dual system Remote Unit (850 MHz/1900 MHz) consists of optical transceiver, 850 MHz RF PCB, 1900 MHz RF PCB, splitter, combiner, monitor board and power panel. In WFDS system, on the down link, optical signals transmitted from MU/EU are converted to RF signals and simultaneously the power of RF signals are amplified; and on the up link, RF signals are converted to optical signals which will be transmitted to MU/EU.

1.2 Mechanical Description

Model: WFDS-RUA measures approximately 260 mm (L) x 245 mm (W) x 72 mm (H), and weighs approximately 2.72 kg.

**The test data gathered are from production sample, serial number: 09080700 provided by the manufacturer.*

1.3 EUT Photo



Please refer to Exhibit C for more EUT photographs.

1.4 Objective

This type approval report is prepared on behalf of Beijing Telestone Technology Co., Ltd. in accordance with Part 2, Subpart J, Part 22, Subpart H, Part 22, and 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 - Public Mobile Services

Part 24 Subpart E – PCS

Applicable Standards: TIA/EIA-603-C, ANSI C63.4-2003.

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

1.7 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 +2.0 dB for Conducted Emissions tests and +4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

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

1.8 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 EUT Exercise Software

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

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Support Equipment List

Manufacturer	Description	Model	Serial Number
Beijing Telestone Technology Co., Ltd.	Expansion Unit	WFDS-EU	09080629
Beijing Telestone Technology Co., Ltd.	Main Unit	WFDS-MU	09080123
Beijing Telestone Technology Co., Ltd.	850/1900 Dual Band Combiner	-	-

2.5 Local Support Equipment and Software List and Details

Manufacturer	Description	Model	Serial Number
Agilent	Signal Generator	E4438C	MY45094317
Agilent	Signal Studio for 3GPP WCDMA	N7600B	-

2.6 Internal Configurations of EUT

RUA:

Manufacturer	Description	Model	Serial Number
Beijing Telestone Technology Co., Ltd.	RF Board (1)	TS7.820.0410a	FC09-0683
Beijing Telestone Technology Co., Ltd.	RF Board (2)	TS7.820.0411a	FC09-4686
Beijing Telestone Technology Co., Ltd.	Dual RU Splitter	TS7.820.0413a	-
Beijing Telestone Technology Co., Ltd.	Power Board	TS7.820.0412a	-
Beijing Telestone Technology Co., Ltd.	RF-Optical Transceiver	CTR8270-12	0807023237

EU:

Manufacturer	Description	Model	Serial Number
Beijing Telestone Technology Co., Ltd.	RF Board (1)	TS7.820.0352b	-
Beijing Telestone Technology Co., Ltd.	RF Board (2)	TS7.820.0350c	-
Beijing Telestone Technology Co., Ltd.	LED Board	TS7.820.0344b	-
Beijing Telestone Technology Co., Ltd.	AC/DC Power Supply	RS-25-48	RA89244260
Beijing Telestone Technology Co., Ltd.	1in 8 out Splitter	SWBC-1x8-131	3080614043
Beijing Telestone Technology Co., Ltd.	RF-Optical Transceiver	CTR8270-12	0807023722

MU:

Manufacturer	Description	Model	Serial Number
Beijing Telestone Technology Co., Ltd.	RF Board (1)	TS7.820.0352b	-
Beijing Telestone Technology Co., Ltd.	RF Board (2)	TS7.820.0350c	-
Beijing Telestone Technology Co., Ltd.	LED Board	TS7.820.0344b	-
Beijing Telestone Technology Co., Ltd.	AC/DC Power Supply	RS-25-48	RA89244258
Beijing Telestone Technology Co., Ltd.	1in 8 out Splitter	SWBC-1x8-131	3080614144
Beijing Telestone Technology Co., Ltd.	RF-Optical Transceiver	CTR8270-12	0807013137

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
Shielded Cable (Fiber Optic)	1.5	MU	Expansion Hub
Shielded Cable (Fiber Optic)	1.5	EU	RUA
RF Cable	> 1	RUA	Combiner
RF Cable	< 1	Main Hub/Combiner	Spectrum Analyzer
RF Cable	< 1	Main Hub/RUA	Signal Generator

3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Tests	Results
§ 2.1046, § 22.913, § 24.232	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 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	Frequency Stability	N/A
§2.1091	RF Exposure	Compliant

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

4.1 Applicable Standard

According to §22.913 & §24.232, the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 700 Watts.

4.2 Test Procedure

Conducted:

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

4.3 Test Environmental Conditions

Temperature:	21-24°C
Relative Humidity:	40-43 %
ATM Pressure:	101-103 kPa

** The testing was performed by Victor Zhang on from 2009-09-08 to 2009-09-18 in RF Site.*

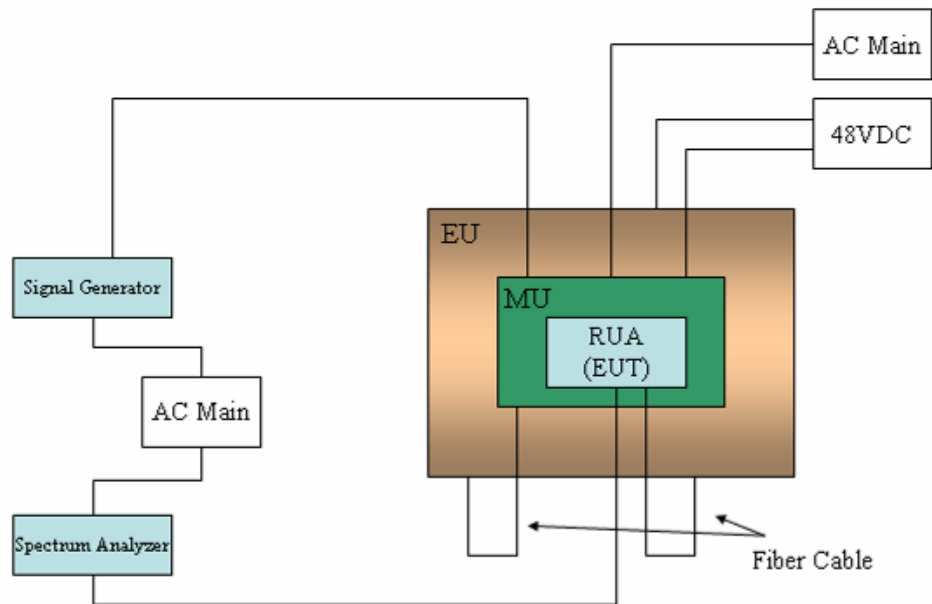
4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	Signal Generator	E4438C	MY45094317	2009-09-01

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

4.5 Test Setup Block Diagram

Bench Testing:



4.6 Summary of Test Results

Maximum Output Power – Cellular Band

GSM/GPRS/EDGE:

Channel	Frequency (MHz)	Output Power (dBm)	
		GSM/GPRS	EDGE
Low	869.2	19.25	21.84
Middle	881.6	20.66	23.21
High	893.8	20.26	22.77

CDMA2000 1x-EVDO Rev A:

Channel	Frequency (MHz)	Output Power (dBm)
Low	869.70	19.29
Middle	881.52	20.96
High	893.31	20.64

WCDMA:

Channel	Frequency (MHz)	Output Power (dBm)
Low	871.4	20.01
Middle	881.6	21.36
High	891.6	21.09

HSUPA:

Channel	Frequency (MHz)	Output Power (dBm)				
		Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
Low	871.4	19.33	19.12	19.20	19.33	19.24
Middle	881.6	20.71	20.31	20.44	20.47	20.46
High	891.6	20.48	20.22	20.32	20.39	20.39

HSDPA:

Channel	Frequency (MHz)	Output Power (dBm)				
		Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
Low	871.4	19.24	19.25	19.22	19.28	19.22
Middle	881.6	20.42	20.47	20.32	20.44	20.30
High	891.6	20.35	20.27	20.17	20.26	20.19

Maximum Output Power – PCS Band

GSM/GPRS/EDGE:

Channel	Frequency (MHz)	Output Power (dBm)	
		GSM/GPRS	EDGE
Low	1930.2	19.65	21.54
Middle	1960.0	20.39	22.26
High	1989.8	20.91	22.48

CDMA2000 1x-EVDO Rev A:

Channel	Frequency (MHz)	Output Power (dBm)
Low	1930.8	19.85
Middle	1960.0	20.03
High	1989.2	21.15

WCDMA:

Channel	Frequency (MHz)	Output Power (dBm)
Low	1932.4	19.41
Middle	1960.0	20.40
High	1987.6	21.03

HSUPA:

Channel	Frequency (MHz)	Output Power (dBm)				
		Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
Low	1932.4	19.03	18.96	19.32	19.25	19.17
Middle	1960.0	19.79	19.77	20.21	20.11	20.13
High	1987.6	19.70	19.73	20.33	20.27	20.18

HSDPA:

Channel	Frequency (MHz)	Output Power (dBm)				
		Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
Low	1932.4	19.22	19.11	19.19	19.06	19.08
Middle	1960.0	20.20	20.16	20.21	20.06	20.07
High	1987.6	20.22	20.07	20.08	20.02	20.01

5 FCC §2.1047 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC § 2.1047(d) and part 25, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

5.2 Test Result

N/A

6 FCC §2.1049, §22.917 & §24.238 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

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

6.2 Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 100 kHz and the 26 dB & 99% bandwidth was recorded.

6.3 Test Environmental Conditions

Temperature:	21-24°C
Relative Humidity:	40-43 %
ATM Pressure:	101-103 kPa

** The testing was performed by Victor Zhang on from 2009-09-08 to 2009-09-18 in RF Site.*

6.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	Signal Generator	E4438C	MY45094317	2009-09-01

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

6.5 Summary of Test Results

Occupied Bandwidth – Cellular Band

GSM/GPRS:

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	881.6	249.9423	323.520

EDGE:

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	881.6	246.9617	315.644

CDMA2000 1x-EVDO Rev A:

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	881.52	1270.2	1448

WCDMA Rel 99 (Worst Case for WCDMA/HSUPA/HSDPA):

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	881.6	4169.5	4729

Occupied Bandwidth – PCS Band

GSM/GPRS:

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	1960	250.1724	322.676

EDGE:

Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	1960	246.4082	318.314

CDMA2000 1x-EVDO Rev A:

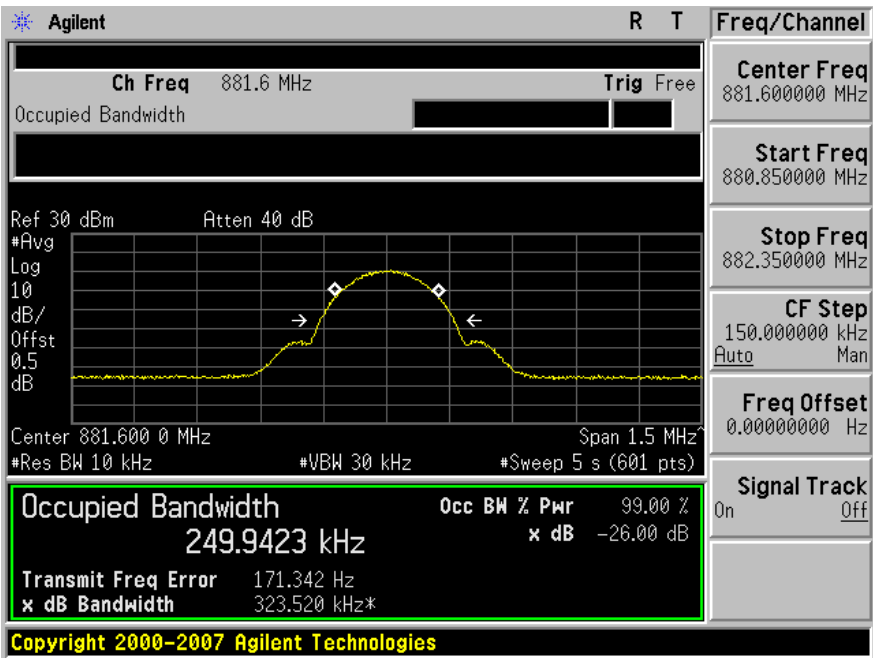
Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	1960	1271.8	1449

WCDMA Rel 99 (Worst Case for WCDMA/HSUPA/HSDPA):

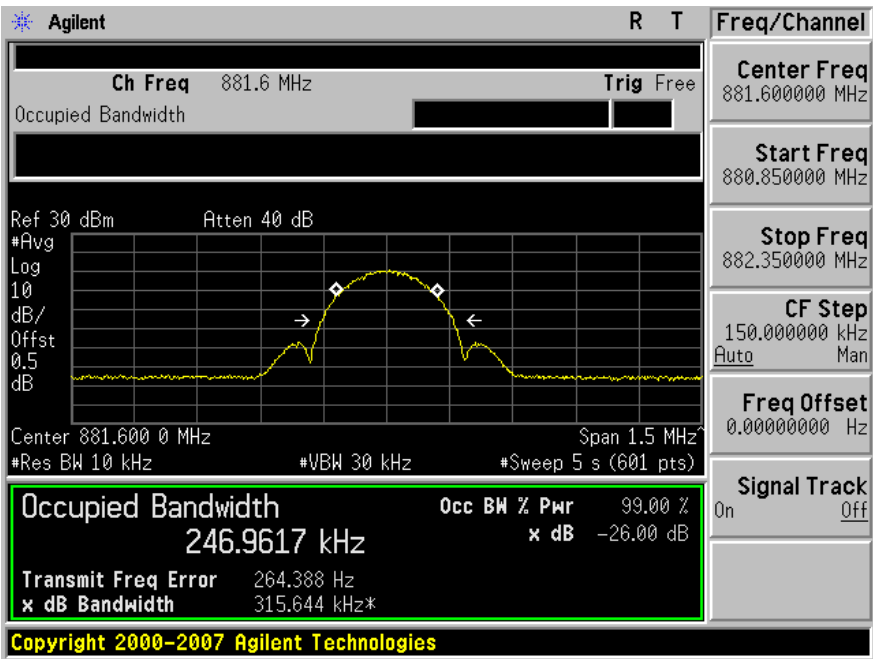
Channel	Frequency (MHz)	99% Bandwidth (kHz)	26 dB Bandwidth (kHz)
Middle	1960	4170.1	4733

Occupied Bandwidth:

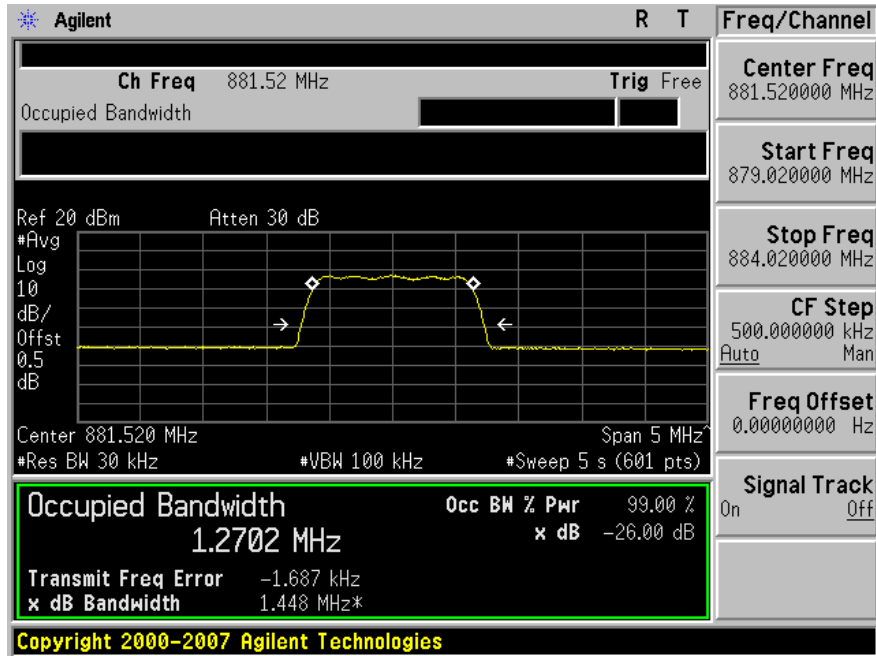
Cellular Band – GSM/GPRS



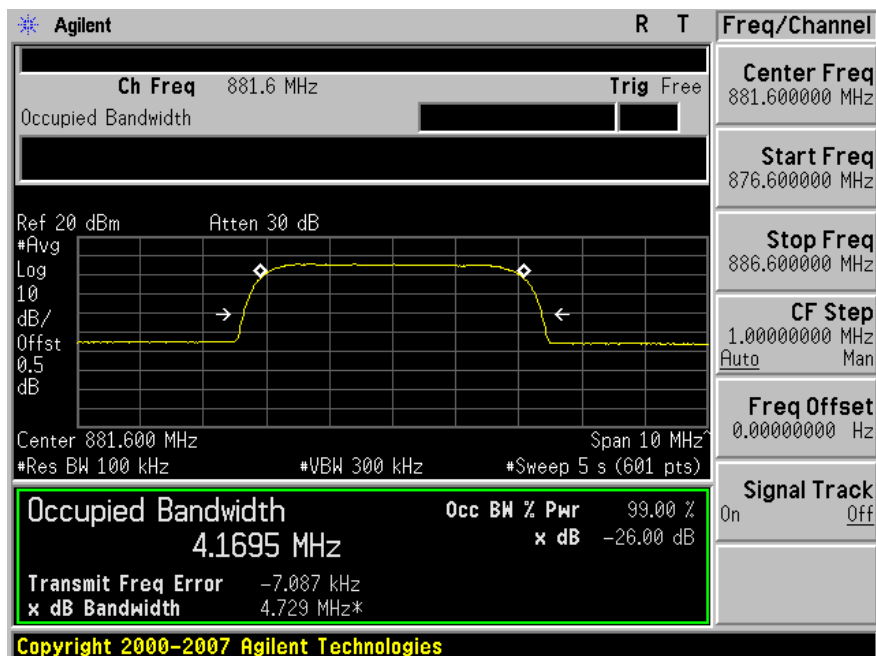
Cellular Band – EDGE



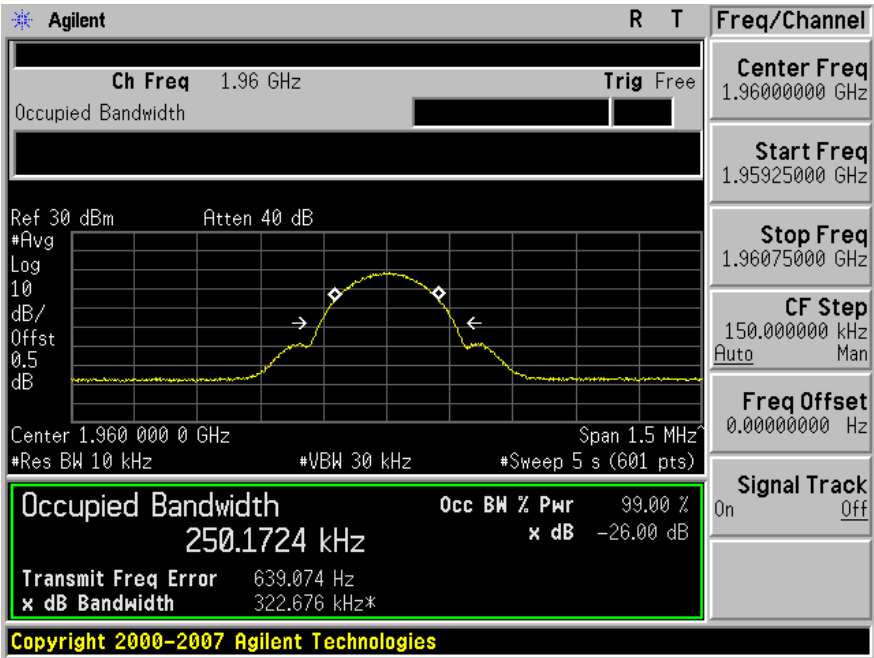
Cellular Band – CDMA2000 1x-EVDO Rev A



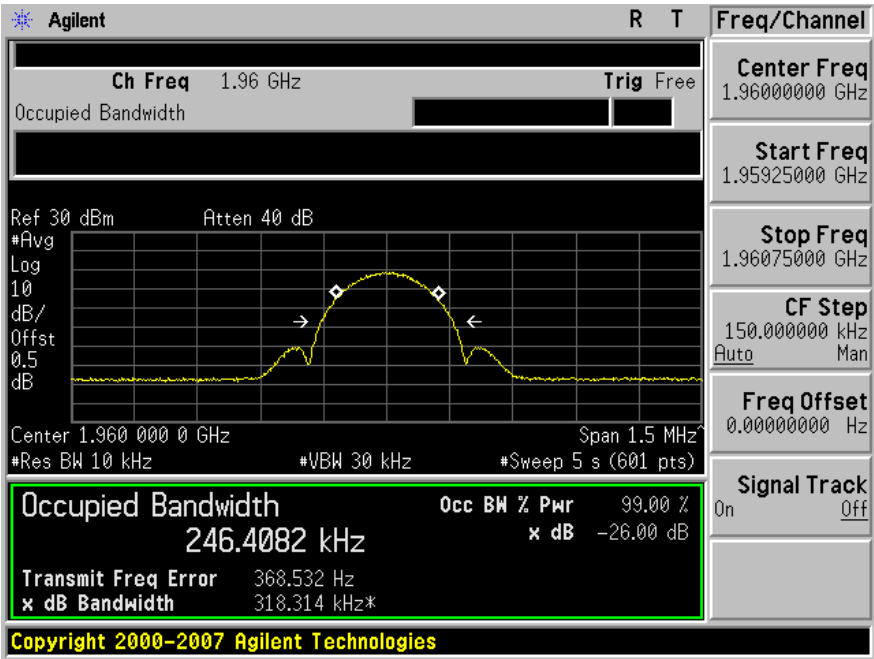
Cellular Band – WCDMA



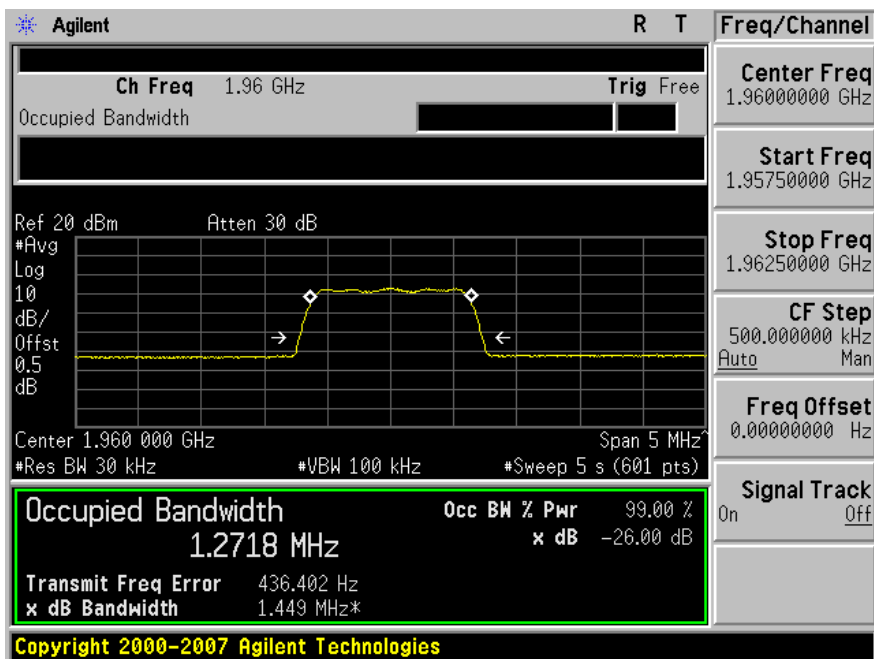
PCS Band – GSM/GPRS



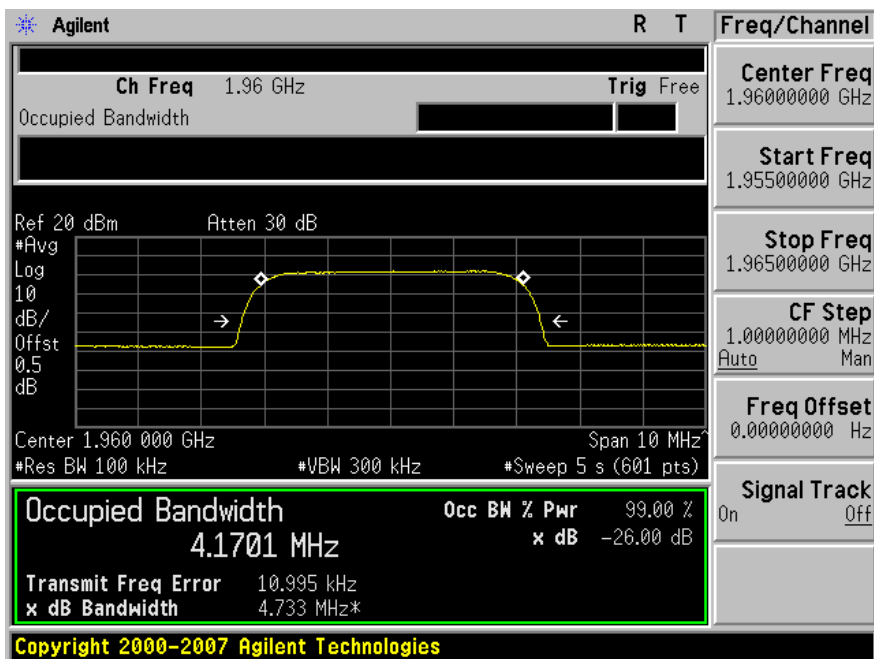
PCS Band – EDGE



PCS Band – CDMA2000 1x-EVDO Rev A



PCS Band – WCDMA



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

7.1 Applicable Standard

Requirements: CFR 47, § 2.1053, § 22.917 and § 24.238.

7.2 Test Procedure

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

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

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

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

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

7.3 Test Environmental Conditions

Temperature:	21-24 °C
Relative Humidity:	42-44 %
ATM Pressure:	101-103 kPa

** The testing was performed by Victor Zhang from 2009-09-14 to 2009-09-16 in 5 Meter Chamber #3.*

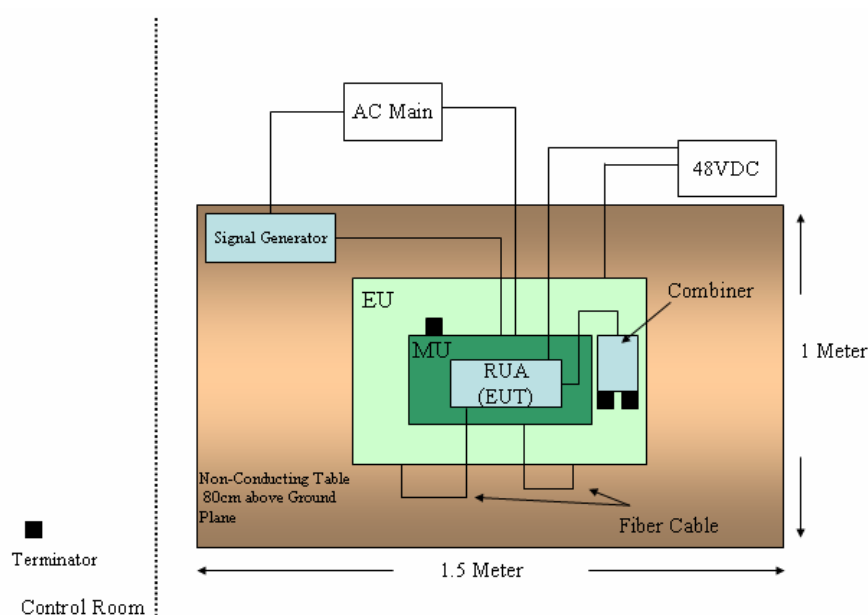
7.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
Agilent	Spectrum Analyzer	E4440A	US45303156	2009-07-23
Sunol Sciences	Antenna	JB1	A020106-1	2009-04-17
A.R.A	Horn Antenna	DRG-118/A	1132	2009-07-28
Agilent	Signal Generator	E4438C	MY45094317	2009-09-01
Ducommun	Amplifier	ALN-09173030-01	988251-03R	2009-03-04
HP	Pre-Amplifier	8447D	2944A06639	2009-06-05

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

7.5 Test Setup Block Diagram

Radiated Emission



7.6 Summary of Test Results

The worst case reading as follows:

Cellular Band

Mode: GSM/GPRS Frequency: 881.6 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-24.02	1957	Vertical	30 MHz – 10 GHz

Mode: EDGE Frequency: 881.6 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-25.17	1957	Vertical	30 MHz – 10 GHz

Mode: CDMA2000 1x-EVDO Rev A Frequency: 881.52 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-24.66	1957	Vertical	30 MHz – 10 GHz

Mode: WCDMA Rel 99 Frequency: 881.6 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-24.35	1957	Vertical	30 MHz – 10 GHz

PCS Band:

Mode: GSM/GPRS Frequency: 1960 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-20.92	3920	Vertical	30 MHz – 25 GHz

Mode: EDGE Frequency: 1960 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-14.88	3920	Vertical	30 MHz – 25 GHz

Mode: CDMA2000 1x-EVDO Rev A Frequency: 1960 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-18.88	3920	Vertical	30 MHz – 25 GHz

Mode: WCDMA Rel 99 Frequency: 1960 MHz			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Frequency Range
-22.14	3920	Vertical	30 MHz – 25 GHz

7.7 Test Results

Cellular Band:

Modulation: GSM/GPRS – 881.6 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1957.00	64.65	183	1.64	V	1957.00	-44.83	8.20	0.39	-37.02	-13.00	-24.02
1957.00	59.15	210	1.27	H	1957.00	-50.33	8.20	0.39	-42.52	-13.00	-29.52
1763.20	47.44	243	1.15	H	1763.20	-63.39	9.50	0.37	-54.26	-13.00	-41.26
1763.20	46.55	80	1.20	V	1763.20	-64.28	9.50	0.37	-55.15	-13.00	-42.15

Modulation: EDGE – 881.6 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1957.00	63.50	180	1.58	V	1957.00	-45.98	8.20	0.39	-38.17	-13.00	-25.17
1957.00	59.10	221	1.31	H	1957.00	-50.38	8.20	0.39	-42.57	-13.00	-29.57
1763.20	52.44	152	1.65	V	1763.20	-58.39	9.50	0.37	-49.26	-13.00	-36.26
1763.20	51.08	156	1.26	H	1763.20	-59.75	9.50	0.37	-50.62	-13.00	-37.62

Modulation: CDMA2000 1x-EVDO Rev A – 881.52 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1957.00	64.01	183	1.50	V	1957.00	-45.47	8.20	0.39	-37.66	-13.00	-24.66
1957.00	59.12	220	1.29	H	1957.00	-50.36	8.20	0.39	-42.55	-13.00	-29.55
1763.04	47.01	223	1.20	H	1763.04	-63.82	9.50	0.37	-54.69	-13.00	-41.69
1763.04	45.77	137	1.23	V	1763.04	-65.06	9.50	0.37	-55.93	-13.00	-42.93

Modulation: WCDMA – 881.6 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1957.00	64.32	183	1.64	V	1957.00	-45.16	8.20	0.39	-37.35	-13.00	-24.35
1957.00	59.02	210	1.27	H	1957.00	-50.46	8.20	0.39	-42.65	-13.00	-29.65
1763.20	45.73	189	1.20	H	1763.20	-65.10	9.50	0.37	-55.97	-13.00	-42.97
1763.20	42.91	77	1.15	V	1763.20	-67.92	9.50	0.37	-58.79	-13.00	-45.79

PCS Band:

Modulation: GSM/GPRS – 1960 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3920.00	62.79	172	1.14	V	3920.00	-44.02	10.80	0.60	-33.82	-13.00	-20.82
3920.00	53.67	232	1.60	H	3920.00	-53.14	10.80	0.60	-42.94	-13.00	-29.94
881.000	53.67	180	1.25	H	881.000	-58.35	0.00	0.23	-58.58	-13.00	-45.58
881.000	52.62	182	1.24	V	881.000	-59.40	0.00	0.23	-59.63	-13.00	-46.63

Modulation: EDGE – 1960 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3920.00	68.73	183	1.69	V	3920.00	-38.08	10.80	0.60	-27.88	-13.00	-14.88
3920.00	60.59	213	1.54	H	3920.00	-46.22	10.80	0.60	-36.02	-13.00	-23.02
881.000	53.88	144	1.23	V	881.000	-58.14	0.00	0.23	-58.37	-13.00	-45.37
881.000	53.30	170	1.21	H	881.000	-58.72	0.00	0.23	-58.95	-13.00	-45.95

Modulation: CDMA2000 1x-EVDO Rev A – 1960 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3920.00	64.73	179	1.20	V	3920.00	-42.08	10.80	0.60	-31.88	-13.00	-18.88
3920.00	55.42	187	1.53	H	3920.00	-51.39	10.80	0.60	-41.19	-13.00	-28.19
881.000	53.37	180	1.20	H	881.000	-58.65	0.00	0.23	-58.88	-13.00	-45.88
881.000	52.60	180	1.21	V	881.000	-59.42	0.00	0.23	-59.65	-13.00	-46.65

Modulation: WCDMA – 1960 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
3920.00	61.47	173	1.27	V	3920.00	-45.34	10.80	0.60	-35.14	-13.00	-22.14
3920.00	53.21	242	1.55	H	3920.00	-53.60	10.80	0.60	-43.40	-13.00	-30.40
881.000	53.33	180	1.23	H	881.000	-58.69	0.00	0.23	-58.92	-13.00	-45.92
881.000	51.37	180	1.19	V	881.000	-60.65	0.00	0.23	-60.88	-13.00	-47.88

8 FCC §2.1051, §22.917 & §24.238 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

8.1 Applicable Standard

Requirements: CFR 47, § 2.1051, § 22.917, § 24.238.

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

§ 22.917 and § 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 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.

8.3 Test Environmental Conditions

Temperature:	21-24°C
Relative Humidity:	40-43 %
ATM Pressure:	101-103 kPa

* The testing was performed by Victor Zhang on from 2009-09-08 to 2009-09-18 in RF Site.

8.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	Signal Generator	E4438C	MY45094317	2009-09-01

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

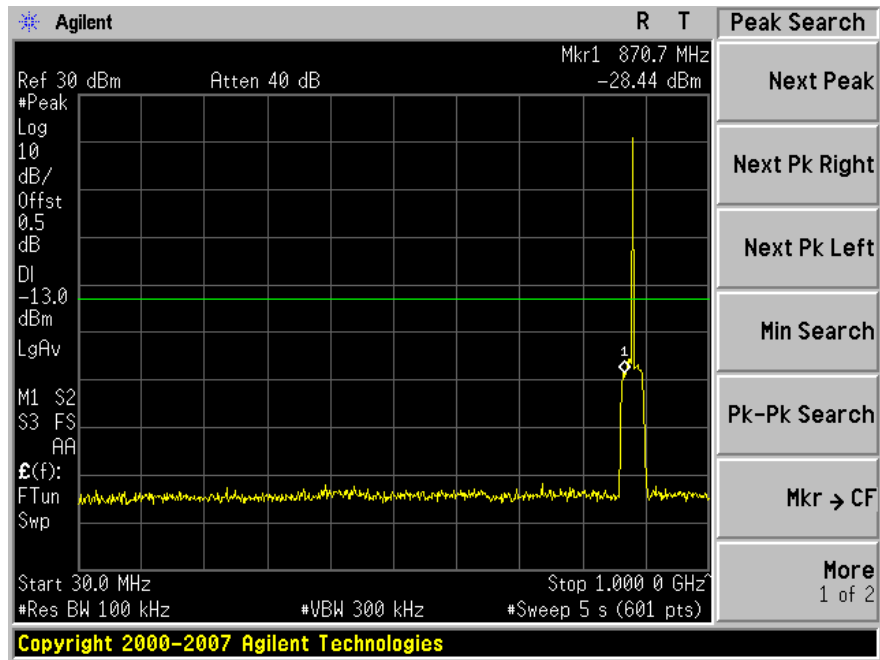
8.5 Test Results

Please refer to the following plots.

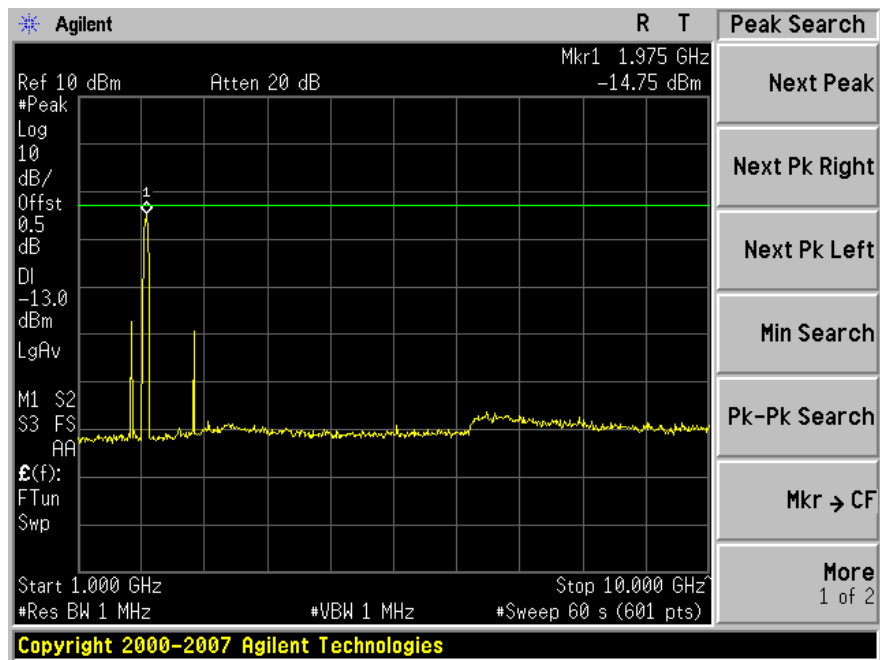
Cellular Band:

Modulation: GSM/GPRS Middle Channel

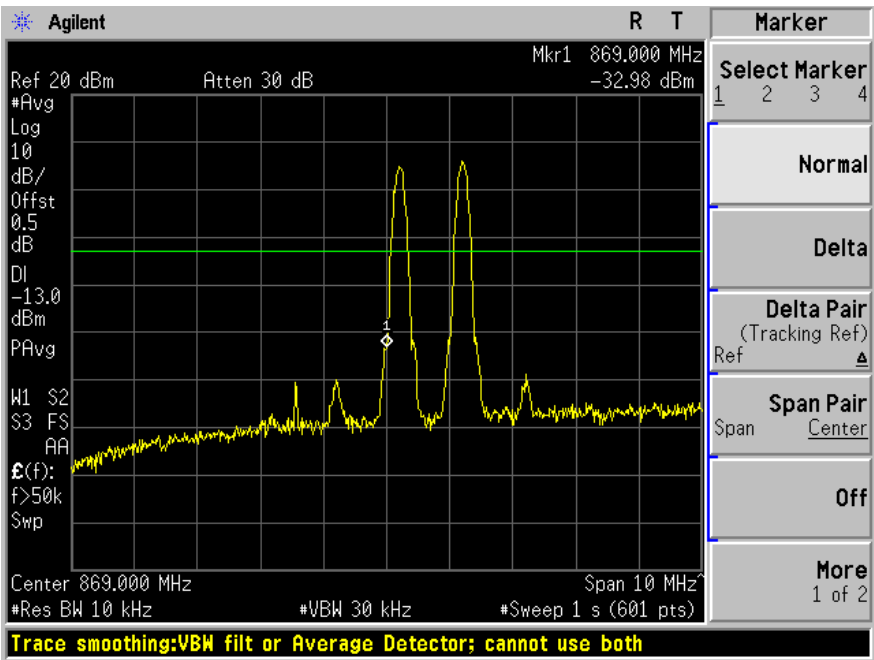
Plot 1: 30 MHz to 1 GHz



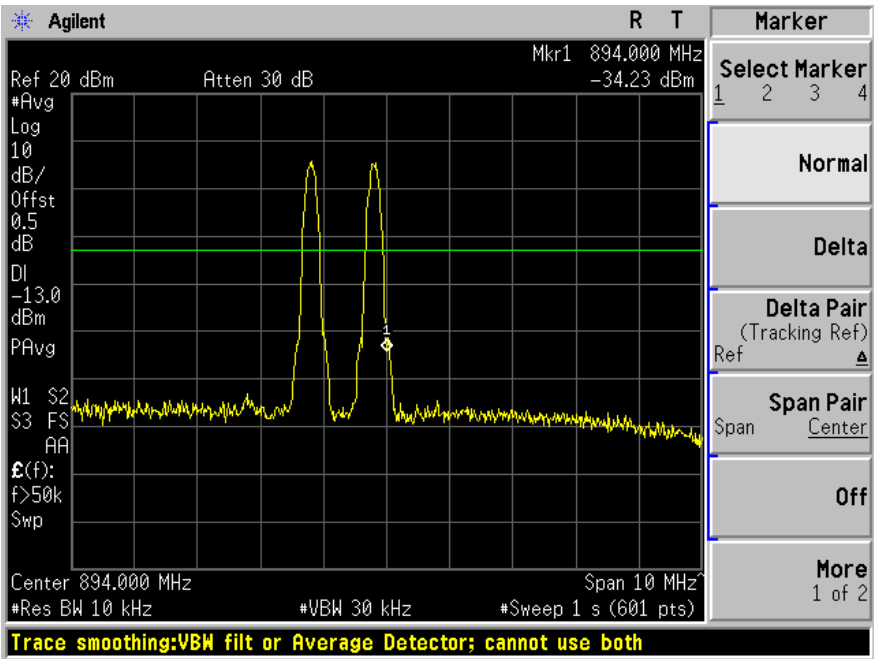
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



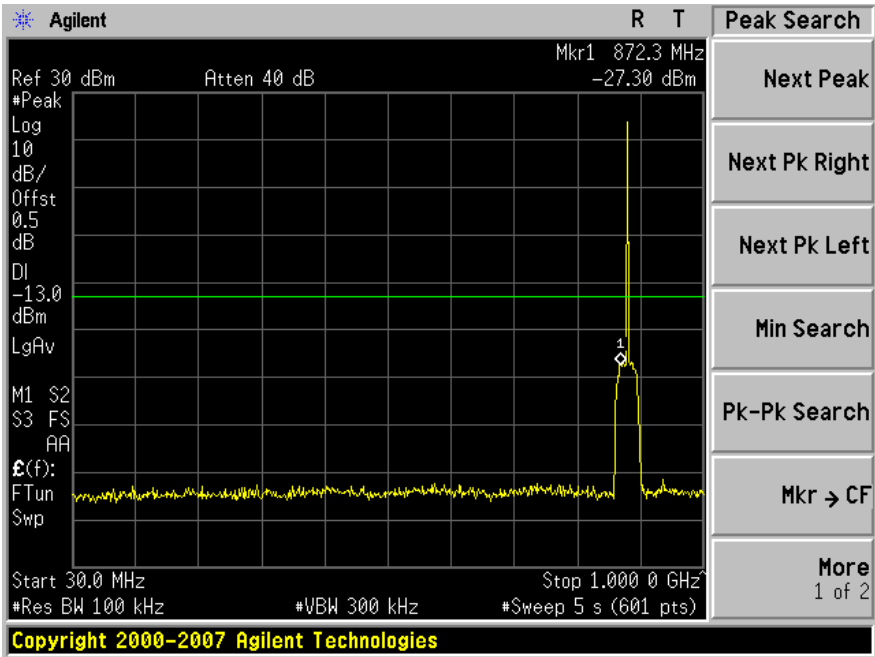
Inter-Modulation: Highest Channel:



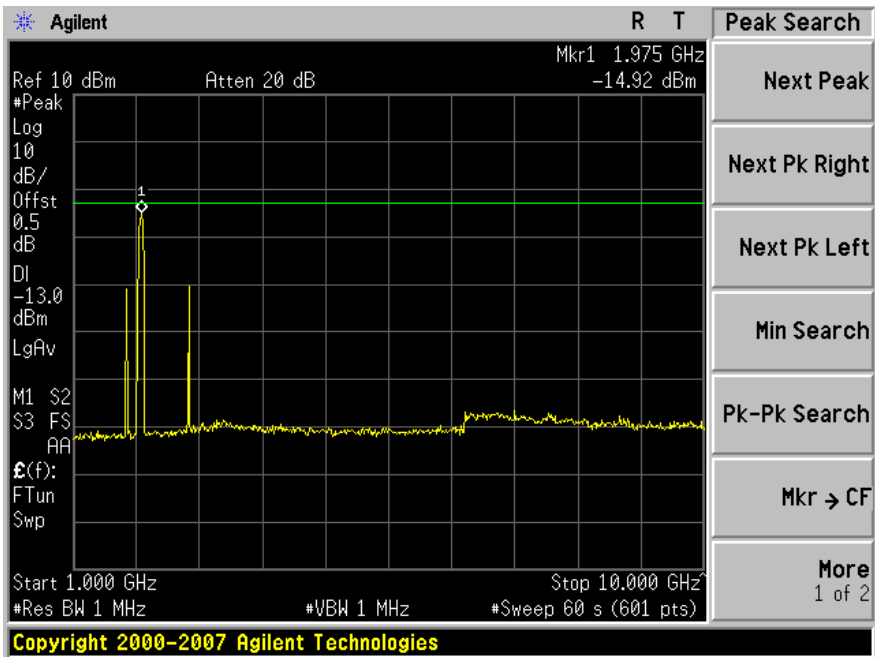
Cellular Band:

Modulation: EDGE Middle Channel

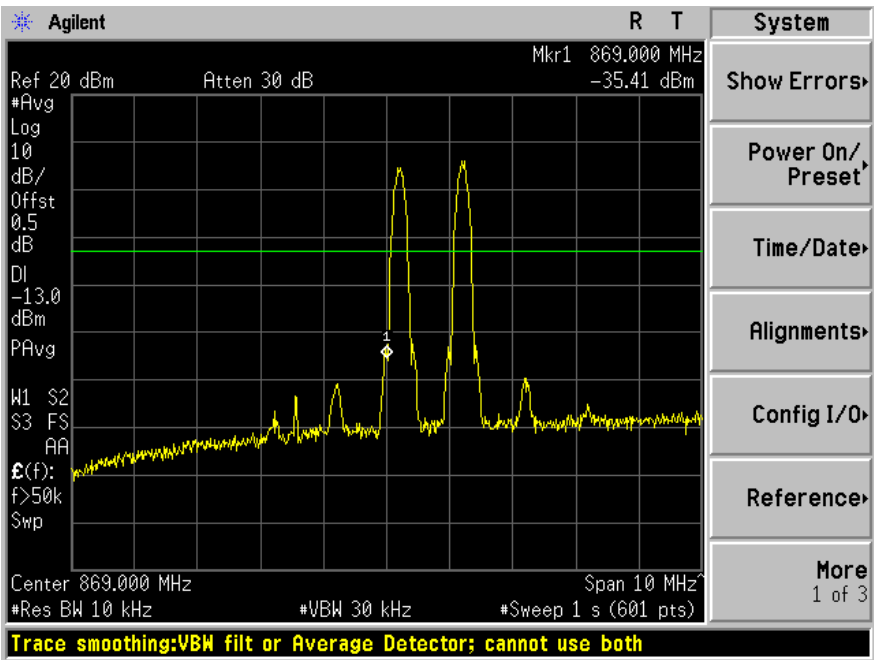
Plot 1: 30 MHz to 1 GHz



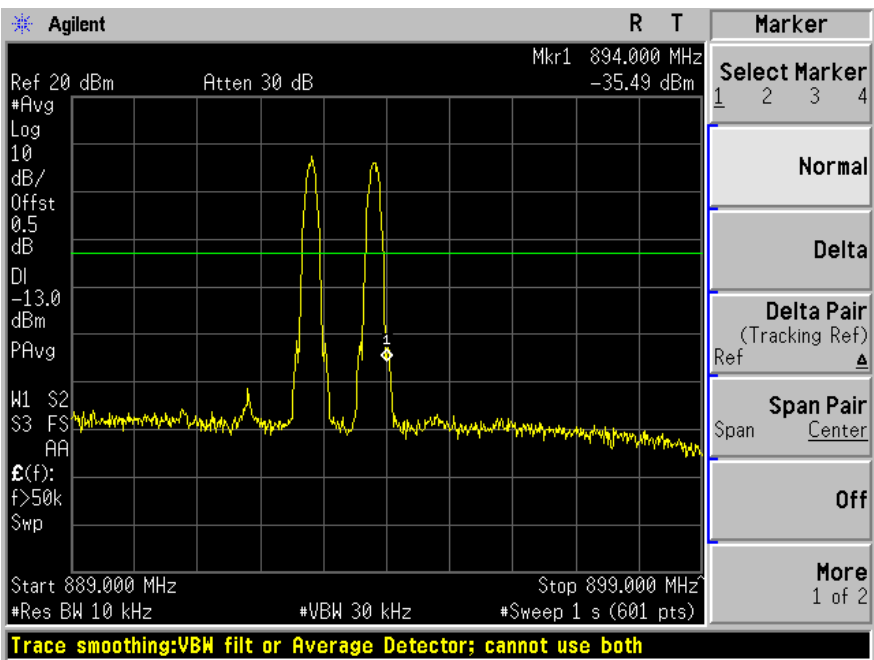
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



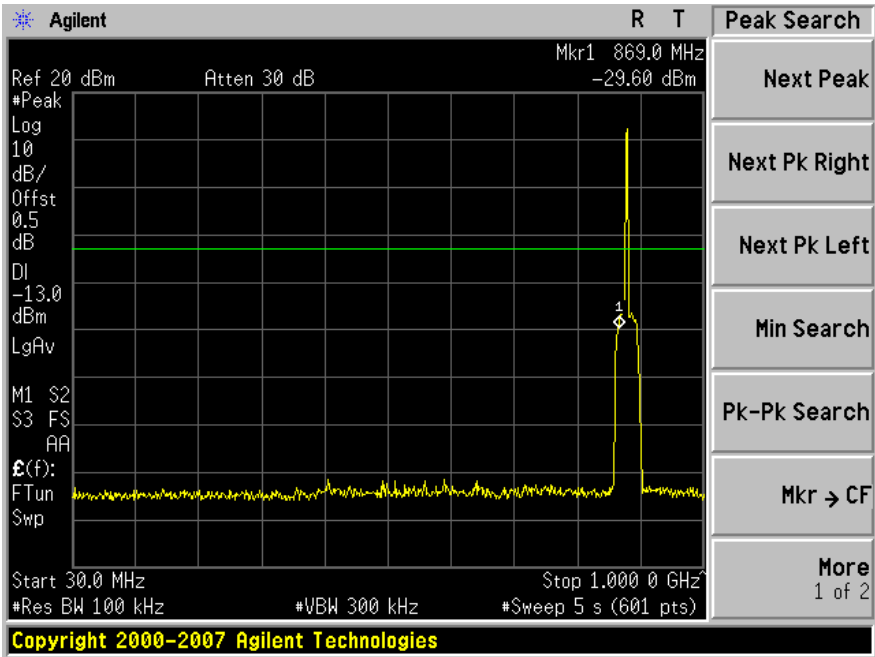
Inter-Modulation: Highest Channel:



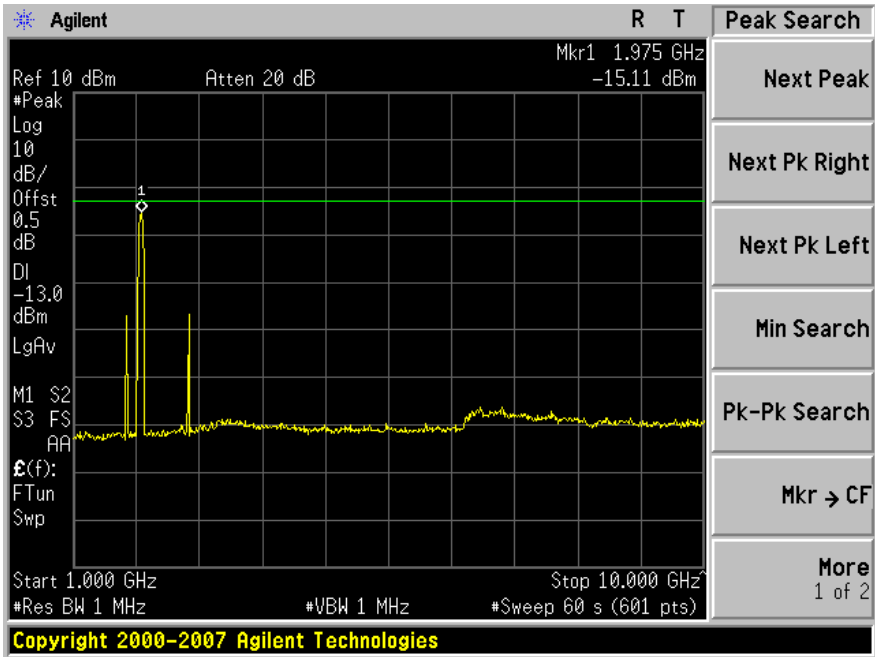
Cellular Band:

Modulation: CDMA2000 1x-EVDO Rev A Middle Channel

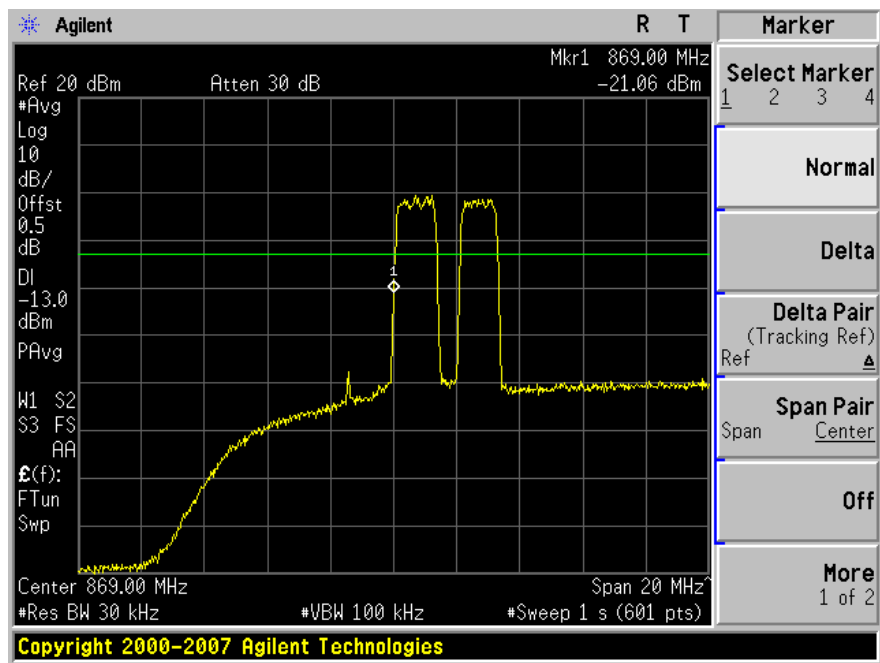
Plot 1: 30 MHz to 1 GHz



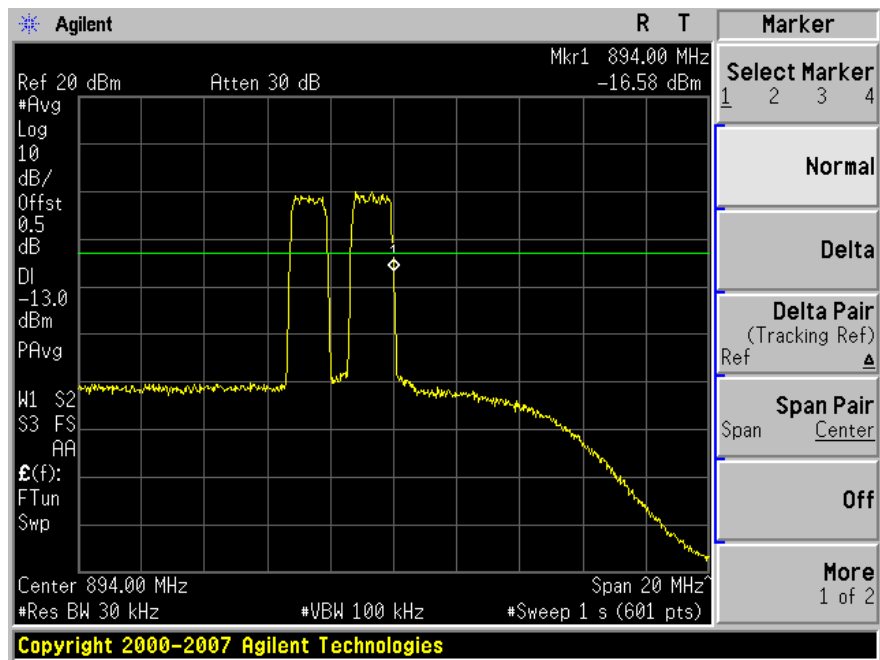
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



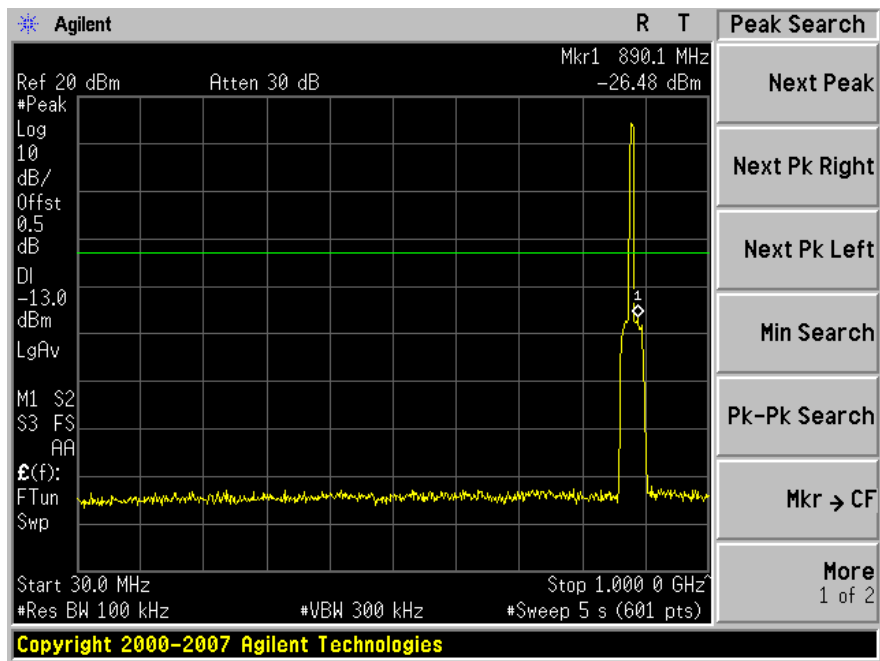
Inter-Modulation: Highest Channel:



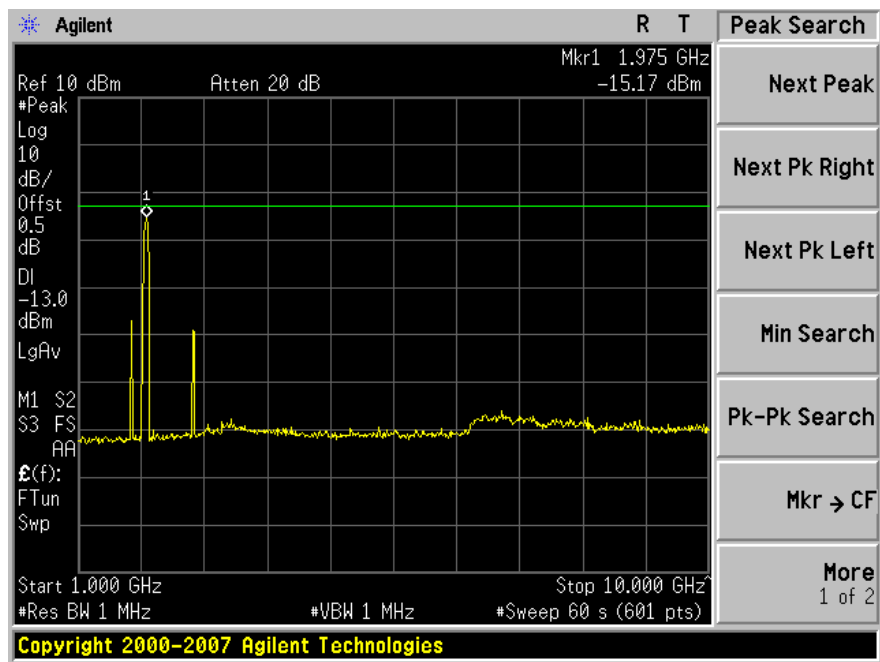
Cellular Band:

Modulation: WCDMA Middle Channel

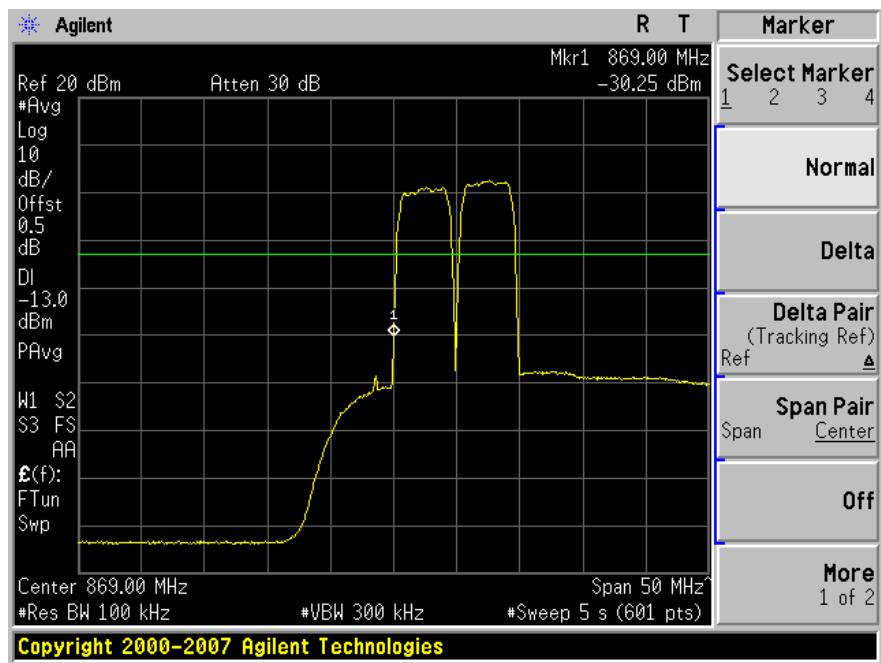
Plot 1: 30 MHz to 1 GHz



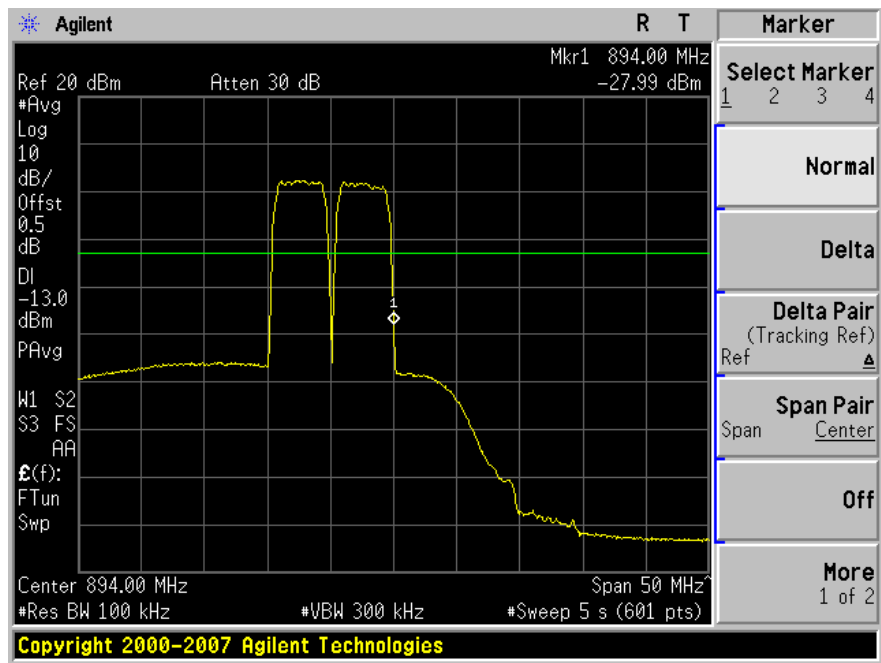
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



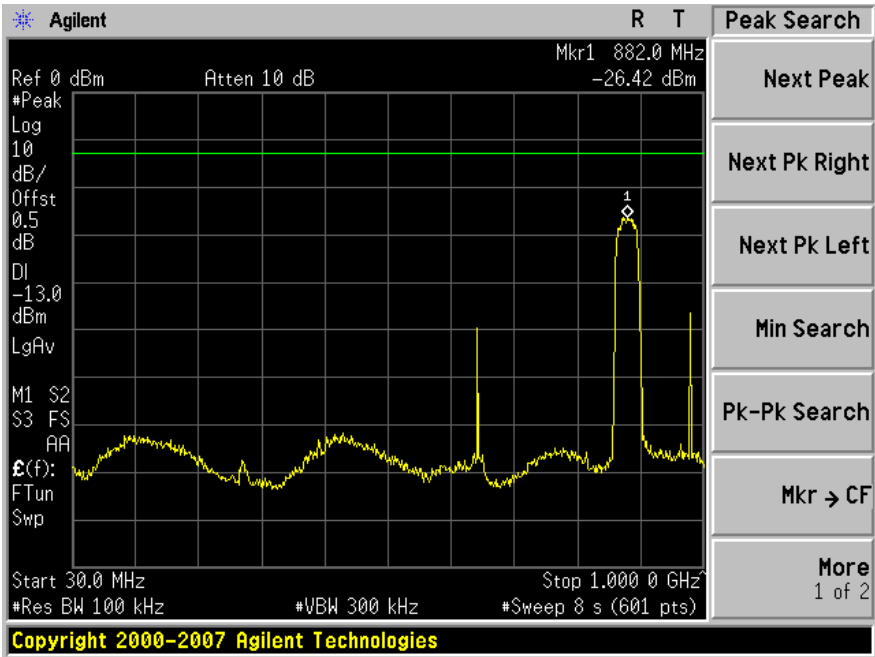
Inter-Modulation: Highest Channel:



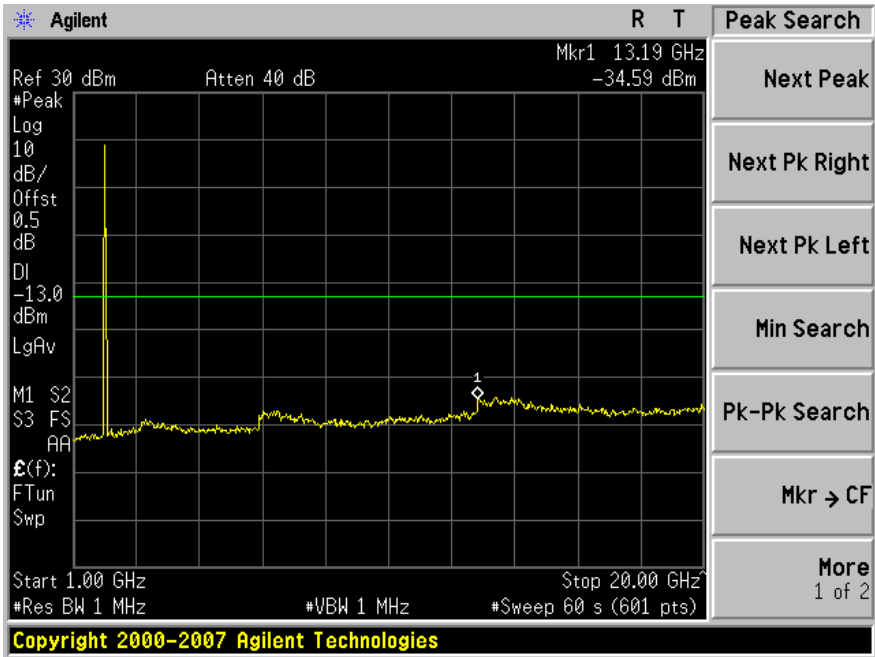
PCS Band:

Modulation: GSM/GPRS Middle Channel

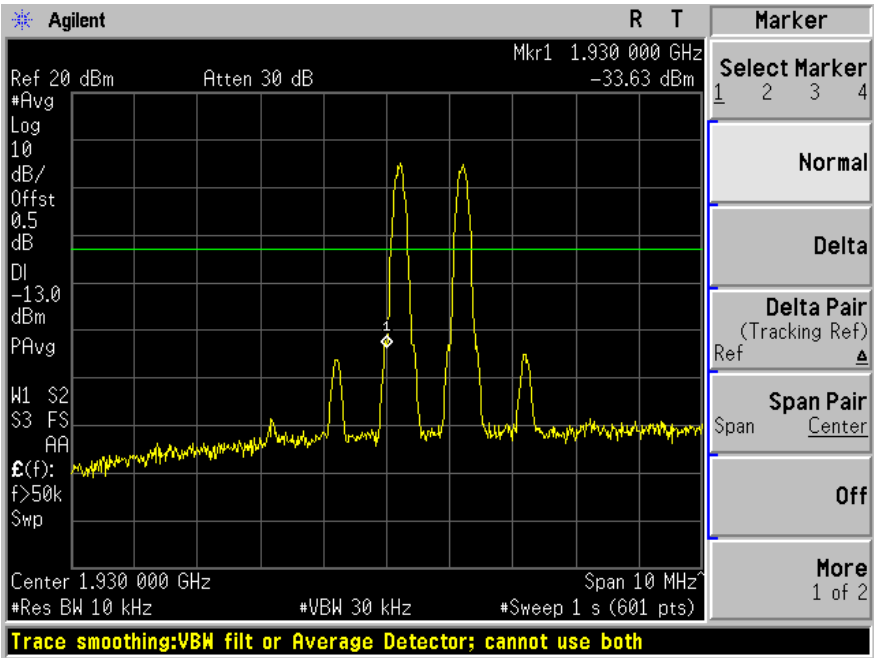
Plot 1: 30 MHz to 1 GHz



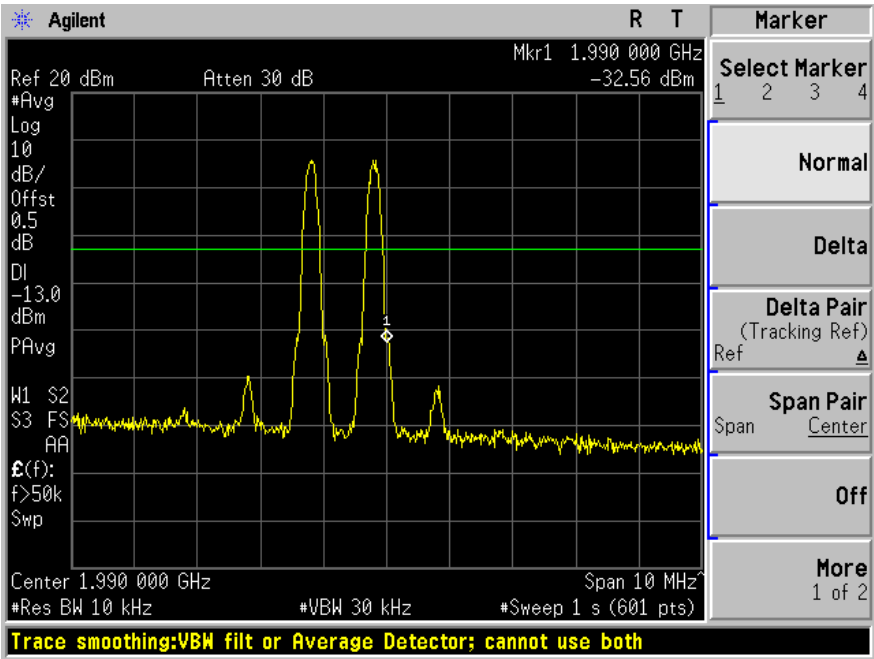
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



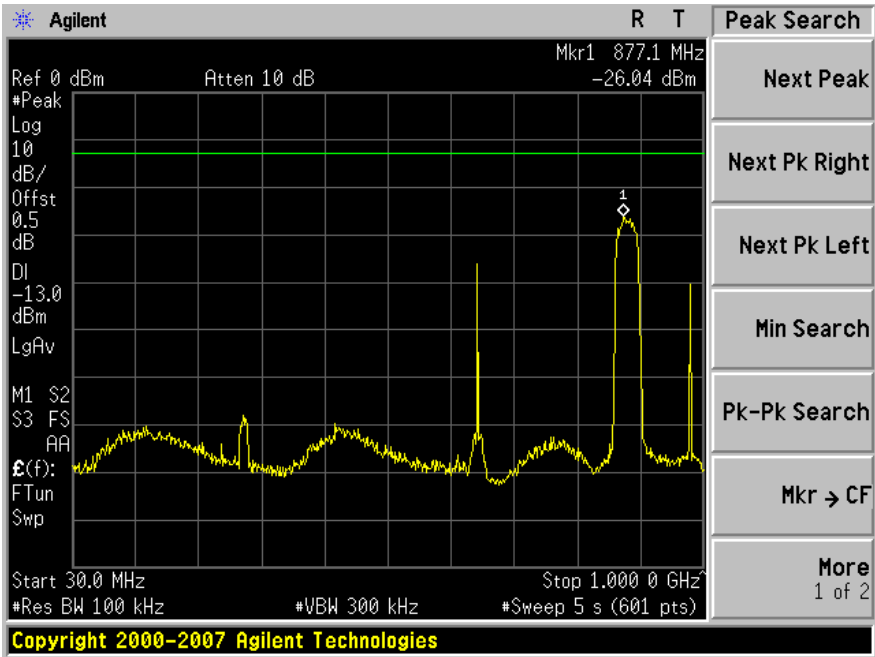
Inter-Modulation: Highest Channel:



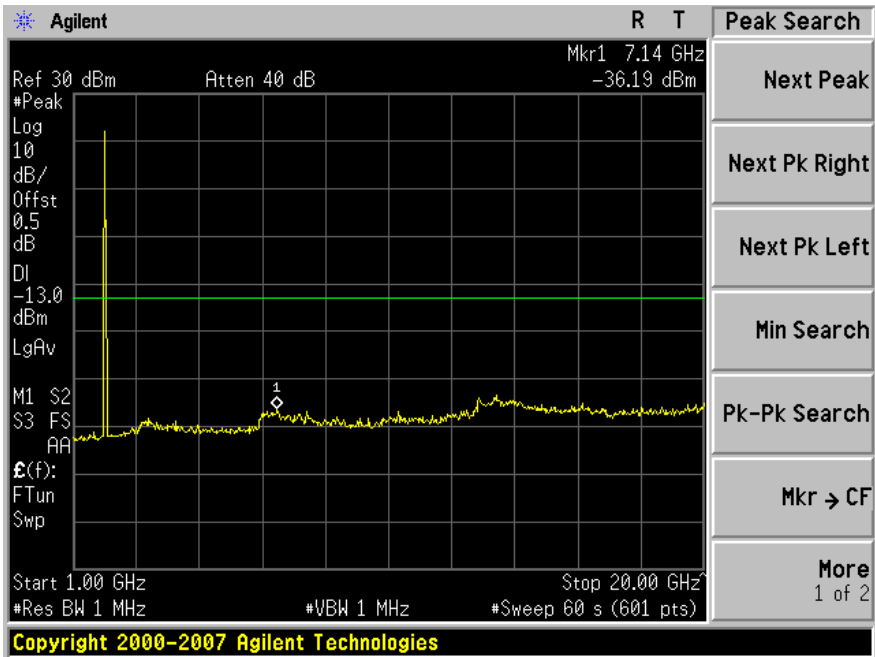
PCS Band:

Modulation: EDGE Middle Channel

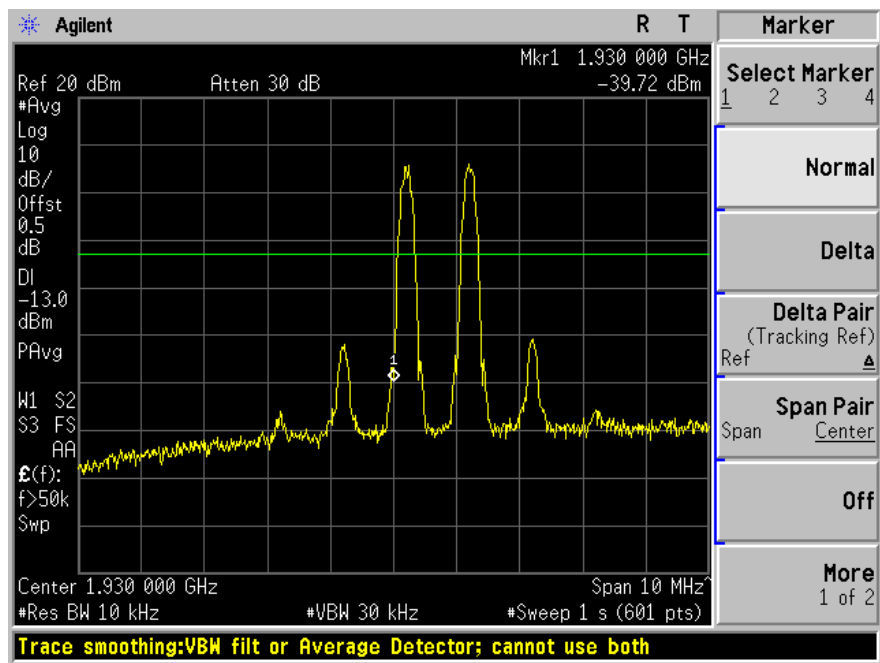
Plot 1: 30 MHz to 1 GHz



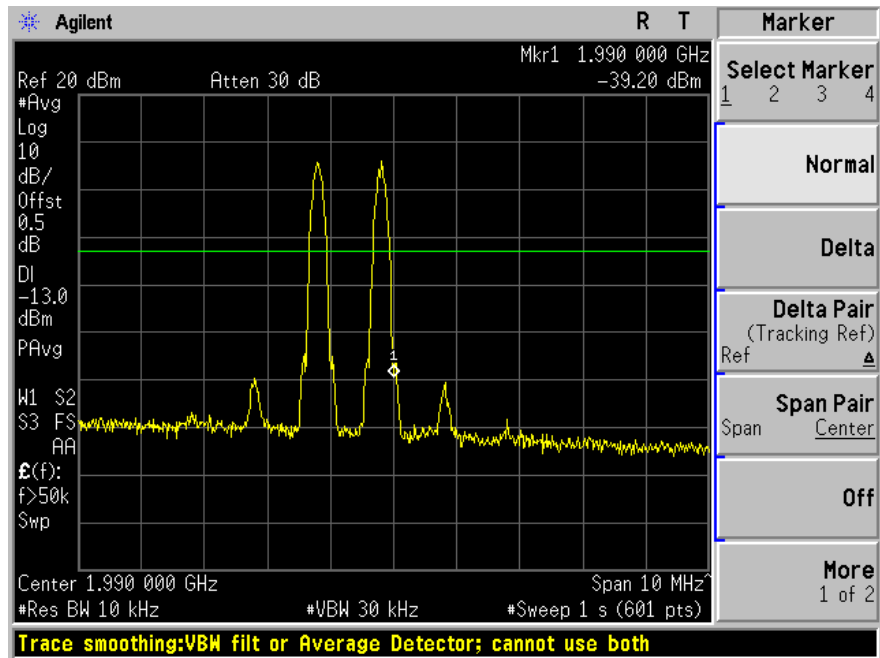
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



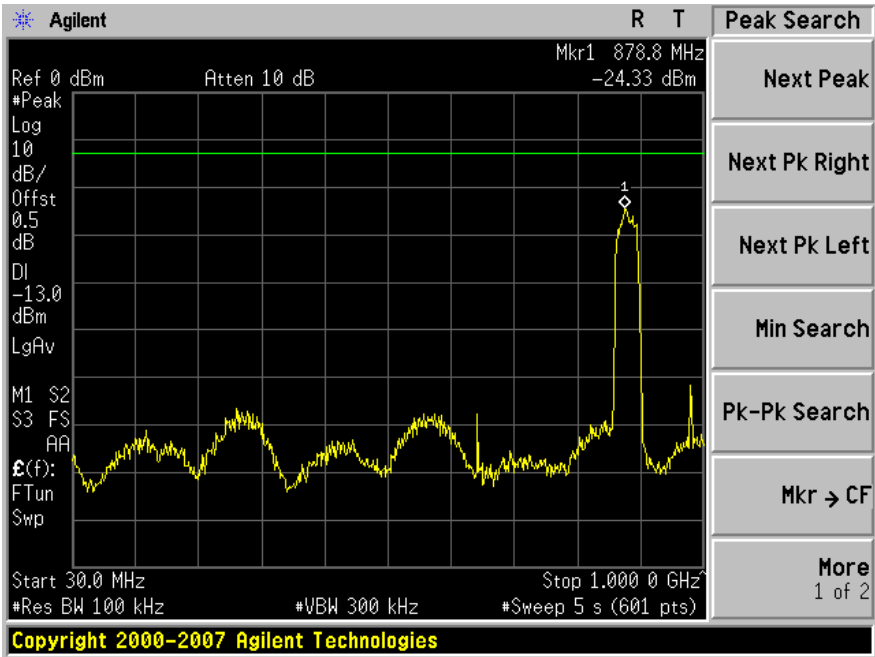
Inter-Modulation: Highest Channel:



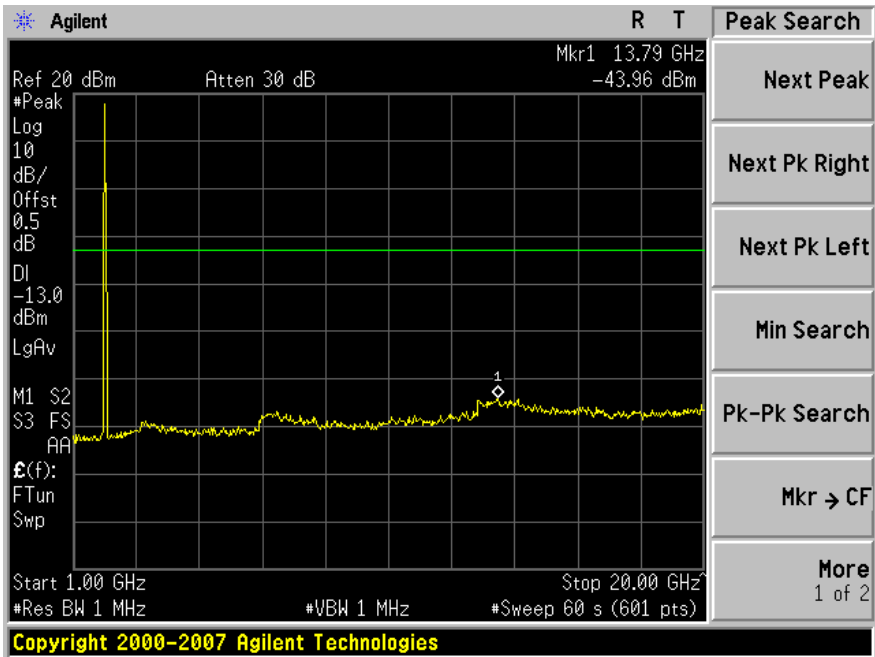
PCS Band:

Modulation: CDMA2000 1x-EVDO Rev A Middle Channel

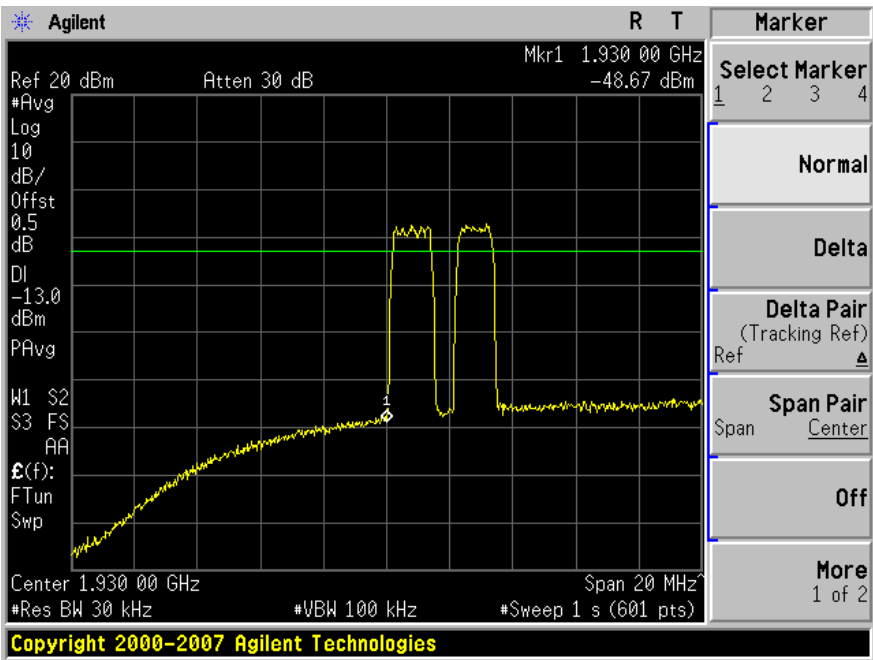
Plot 1: 30 MHz to 1 GHz



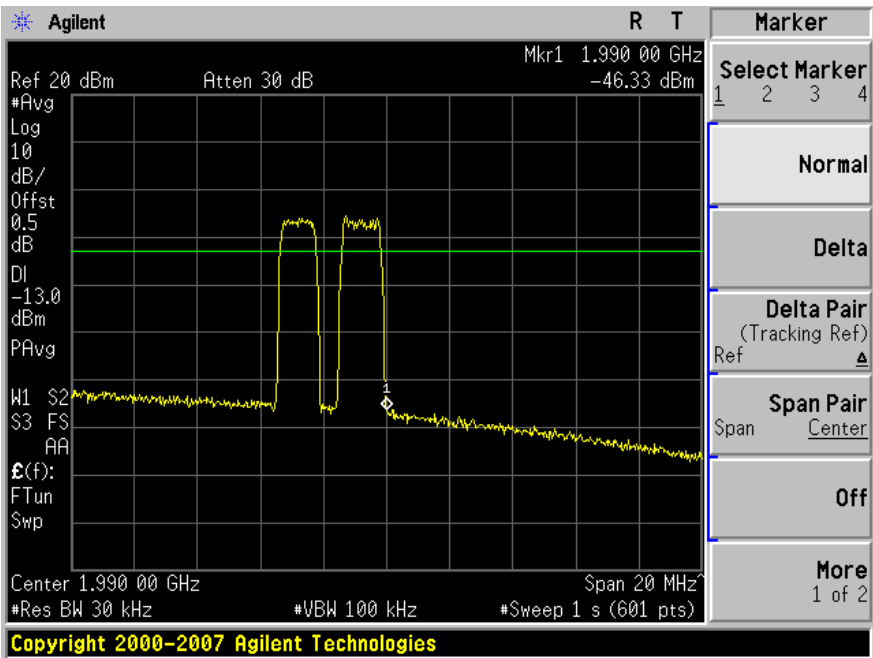
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



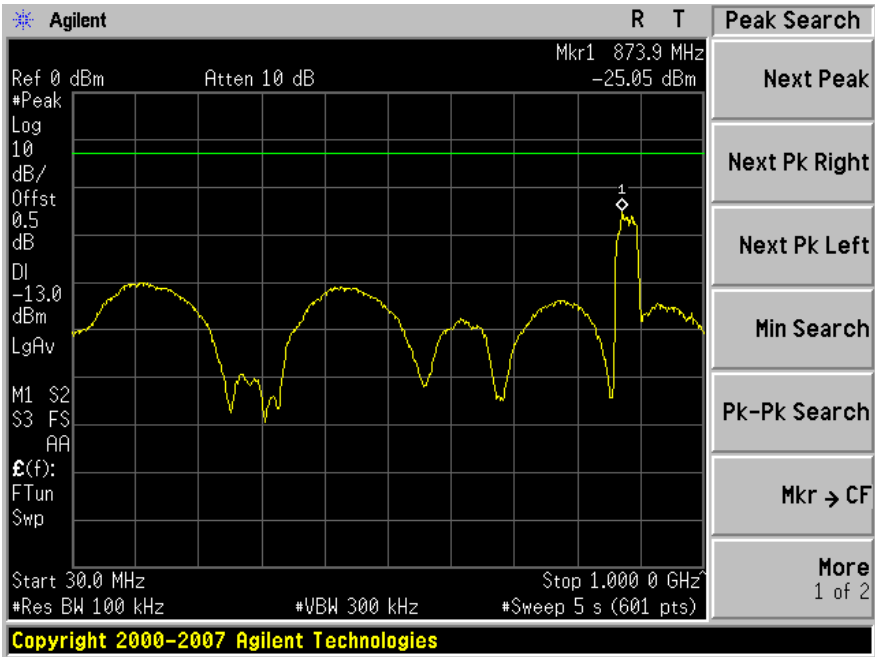
Inter-Modulation: Highest Channel:



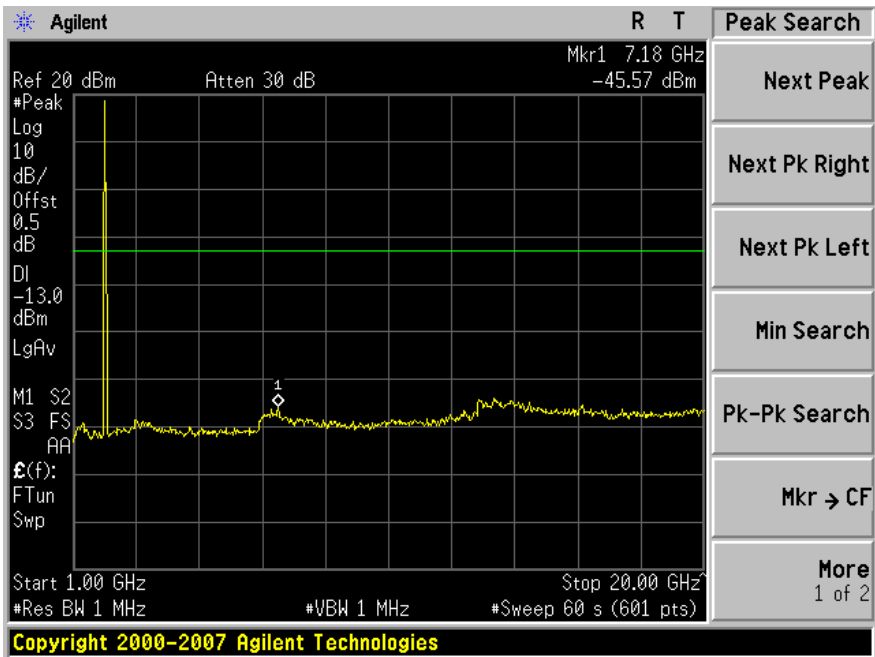
PCS Band:

Modulation: WCDMA Middle Channel

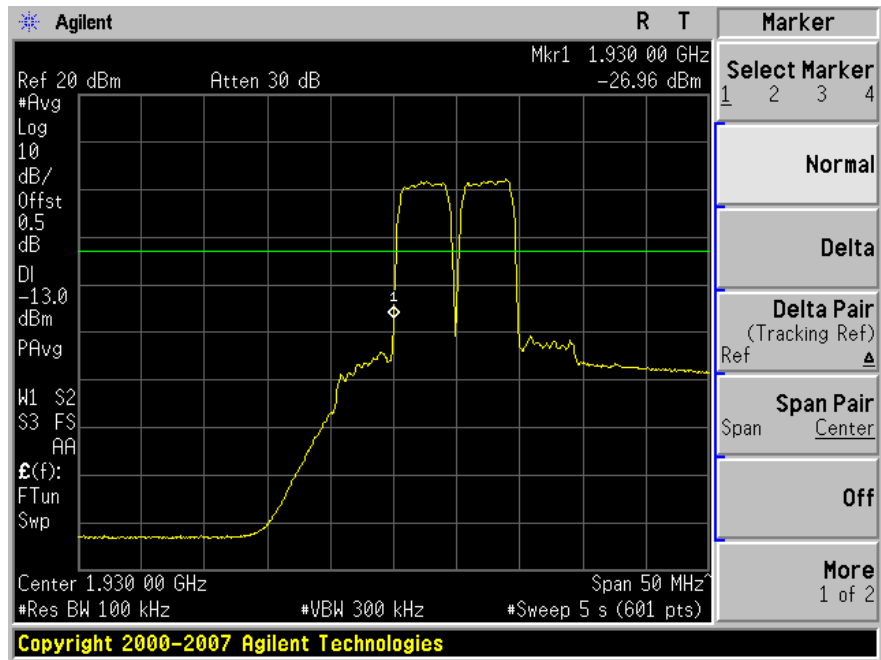
Plot 1: 30 MHz to 1 GHz



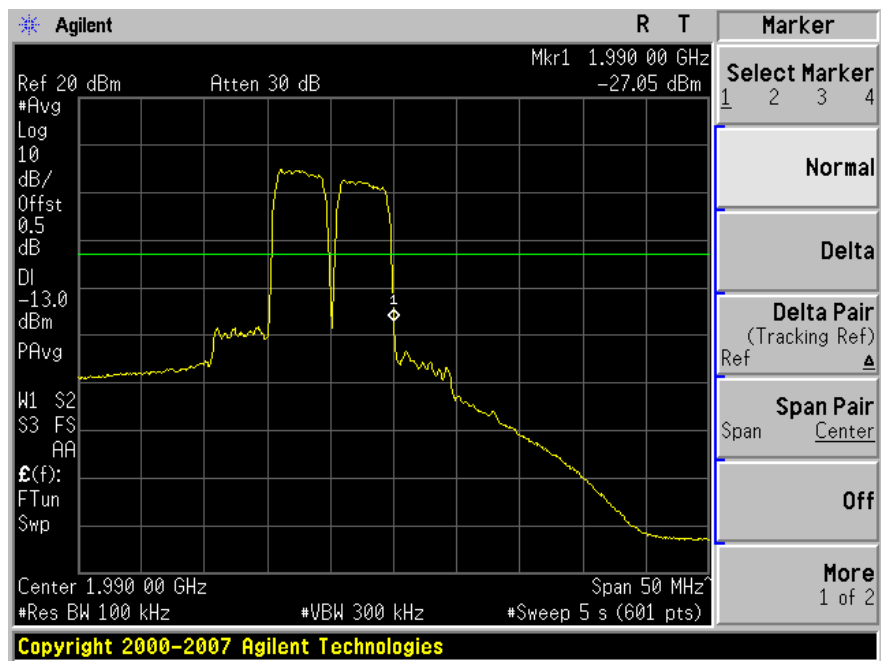
Plot 2: Above 1 GHz



Inter-Modulation: Lowest Channel:



Inter-Modulation: Highest Channel:



9 FCC §22.917 & §24.238 – BAND EDGE

9.1 Applicable Standard

According to § 22.917 and § 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.

9.2 Test Procedure

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

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

9.3 Test Environmental Conditions

Temperature:	21-24°C
Relative Humidity:	40-43 %
ATM Pressure:	101-103 kPa

** The testing was performed by Victor Zhang on from 2009-09-08 to 2009-09-18 in RF Site.*

9.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	Signal Generator	E4438C	MY45094317	2009-09-01

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

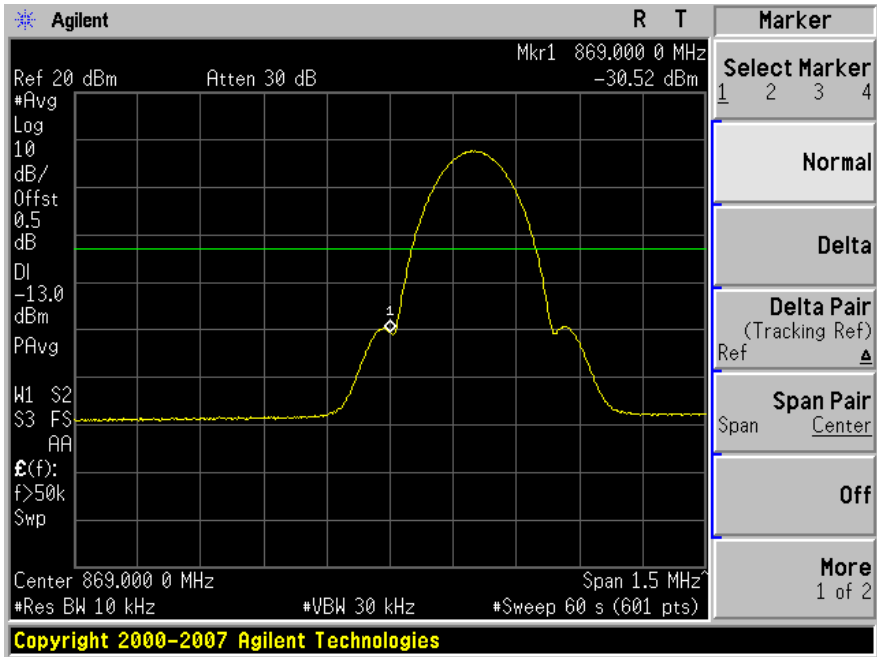
9.5 Test Results

Please refer to the following plots.

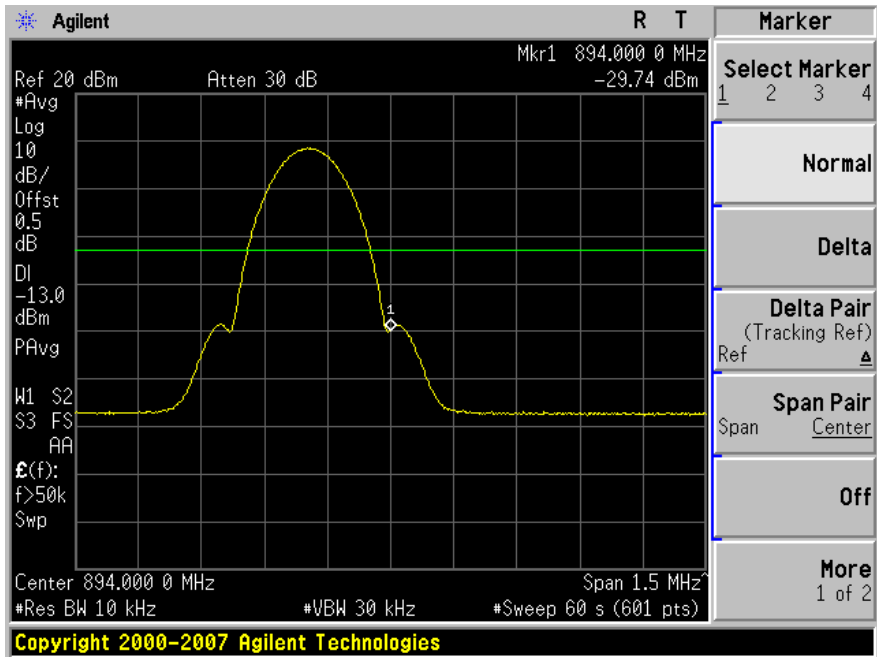
Cellular Band:

Modulation: GSM/GPRS

Plot 1: Lowest Edge



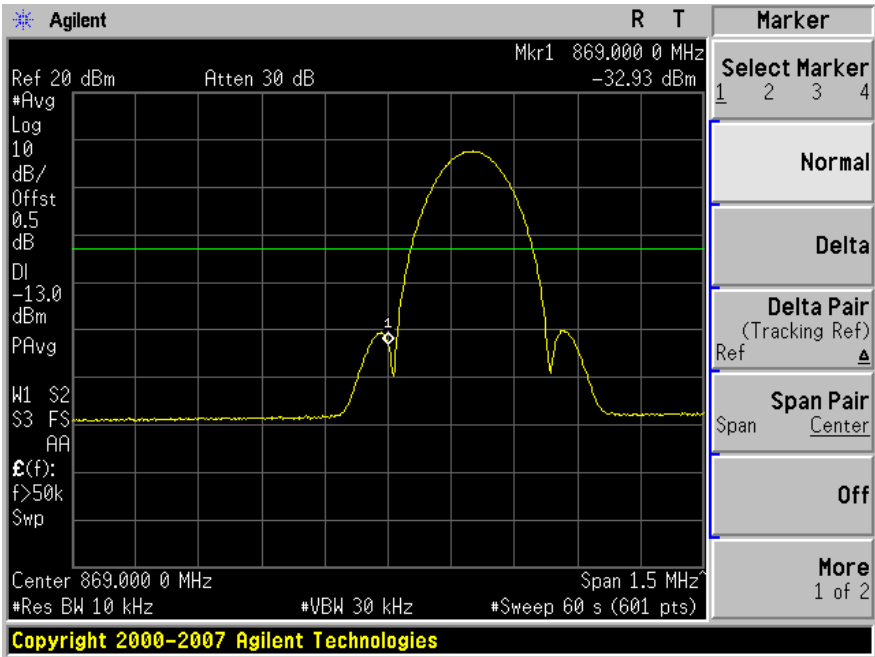
Plot 2: Highest Edge



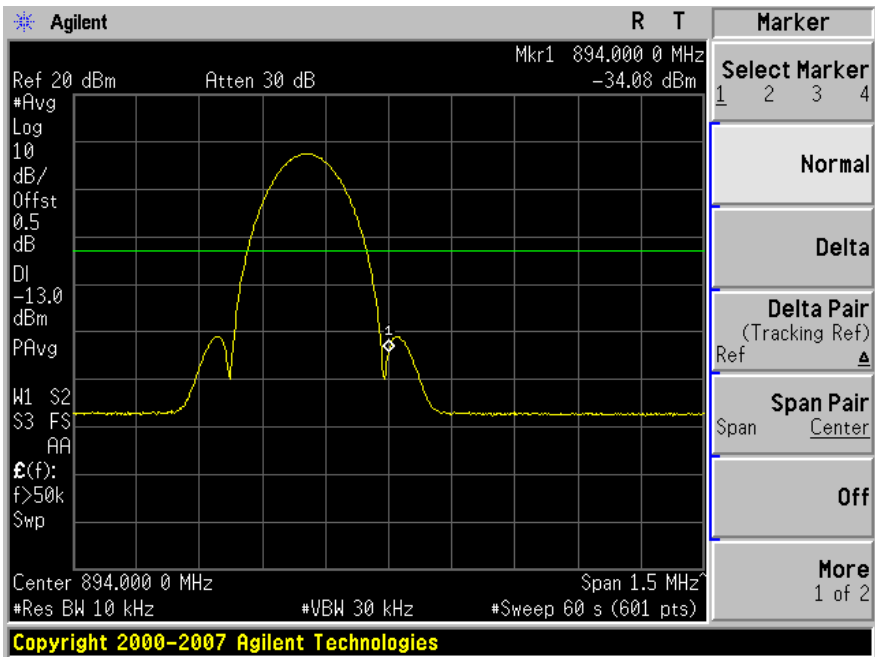
Cellular Band:

Modulation: EDGE

Plot 1: Lowest Edge



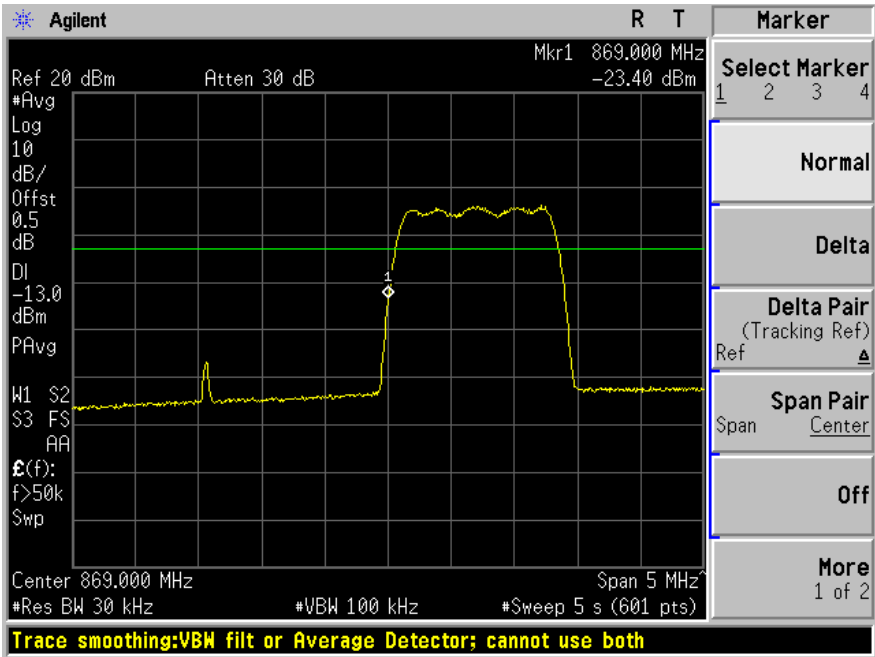
Plot 2: Highest Edge



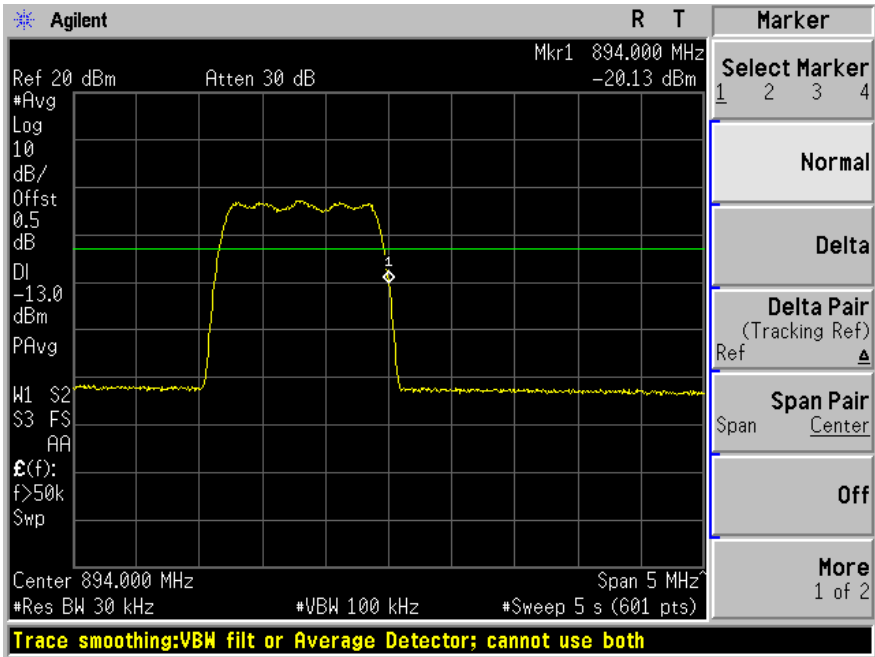
Cellular Band:

Modulation: CDMA2000 1x-EVDO Rev A

Plot 1: Lowest Edge



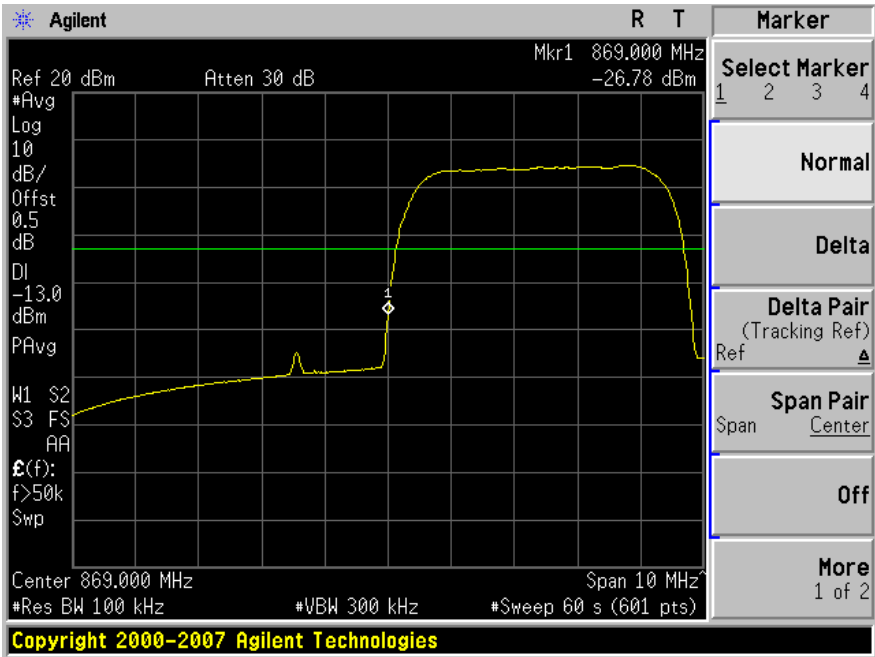
Plot 2: Highest Edge



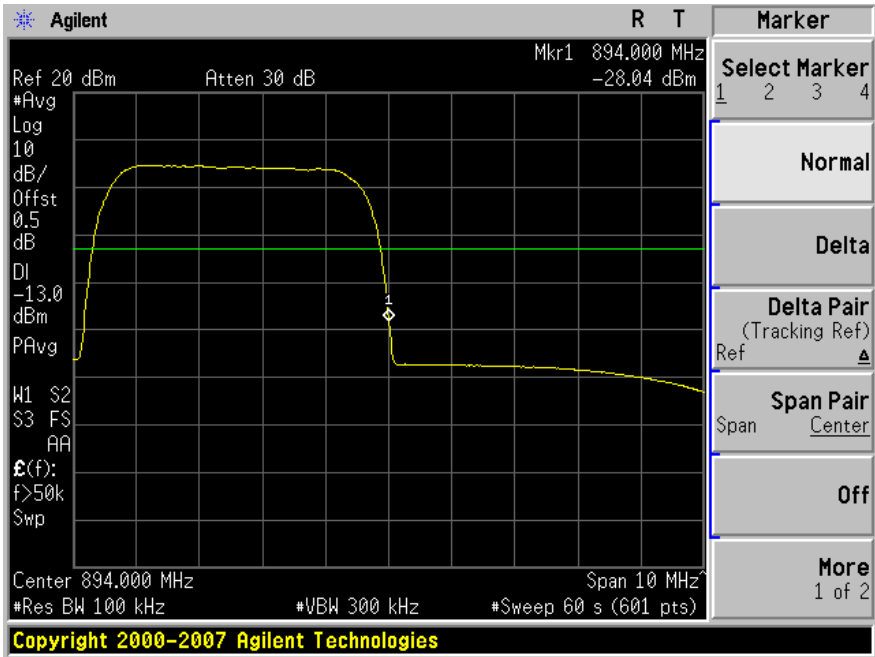
Cellular Band:

Modulation: WCDMA

Plot 1: Lowest Edge



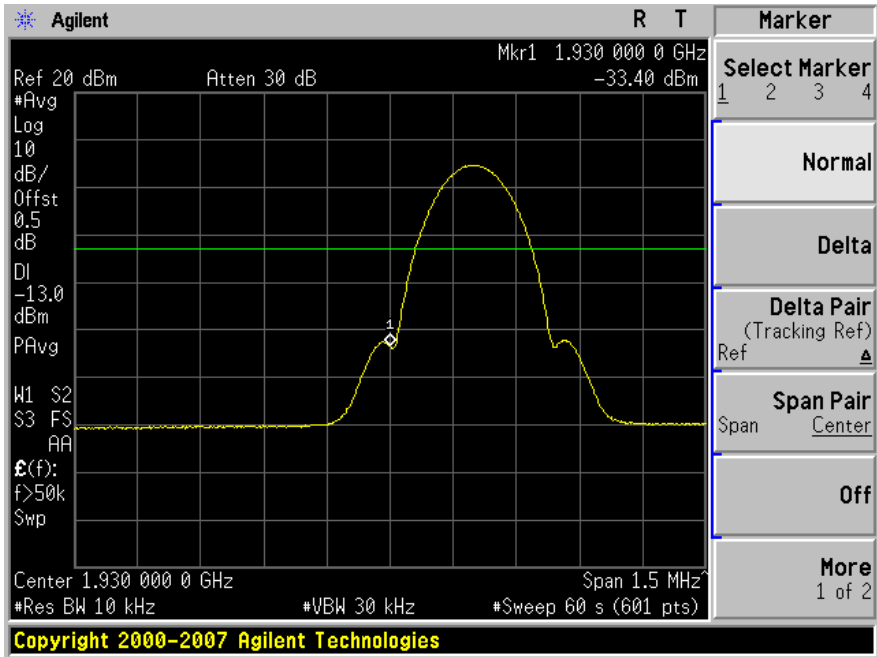
Plot 2: Highest Edge



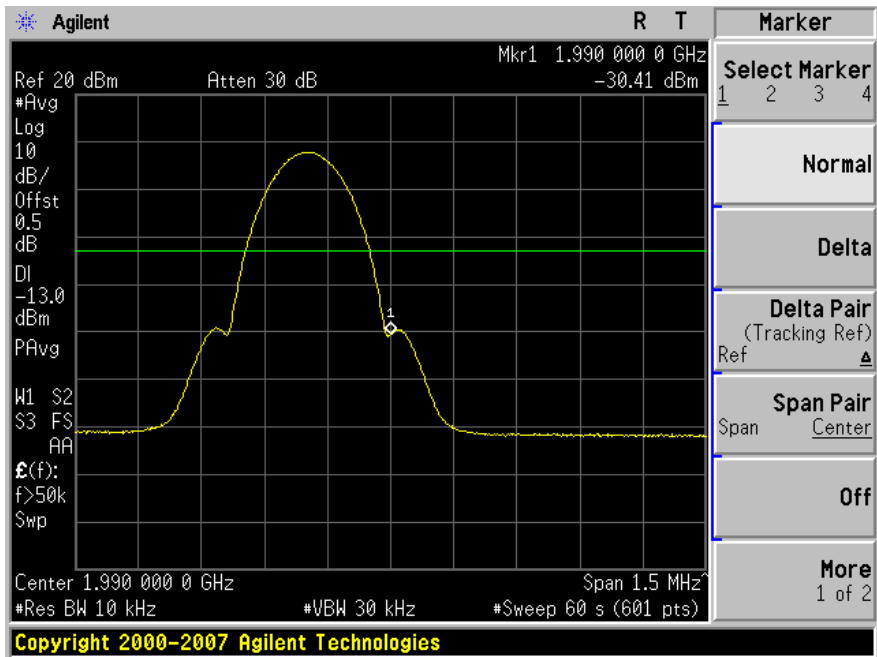
PCS Band:

Modulation: GSM/GPRS

Plot 1: Lowest Edge



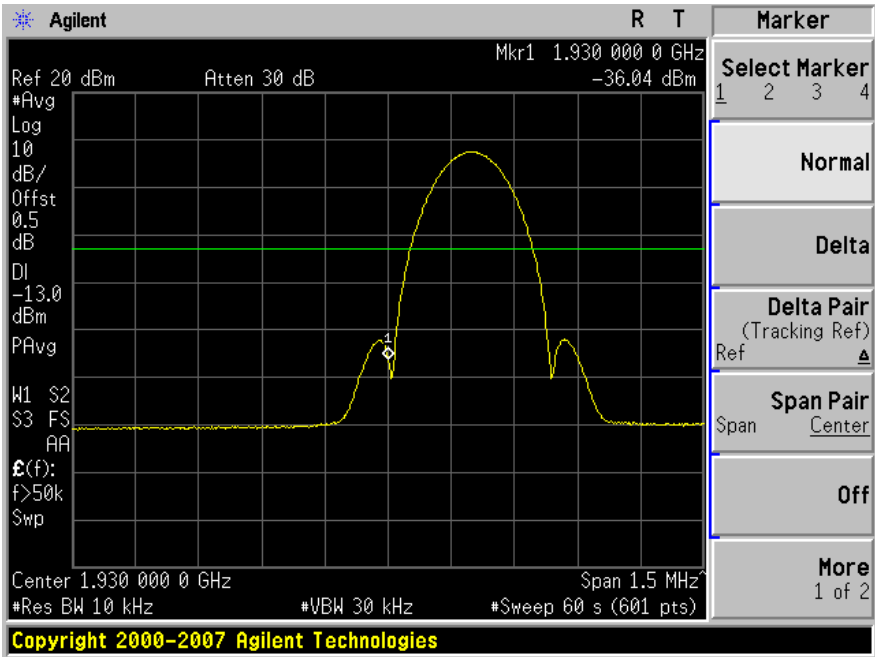
Plot 2: Highest Edge



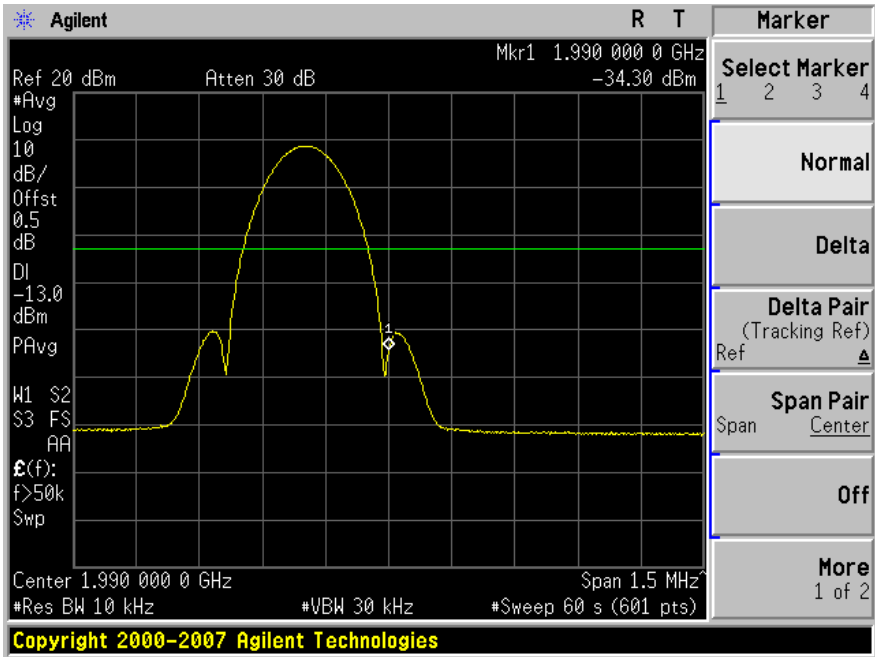
PCS Band:

Modulation: EDGE

Plot 1: Lowest Edge



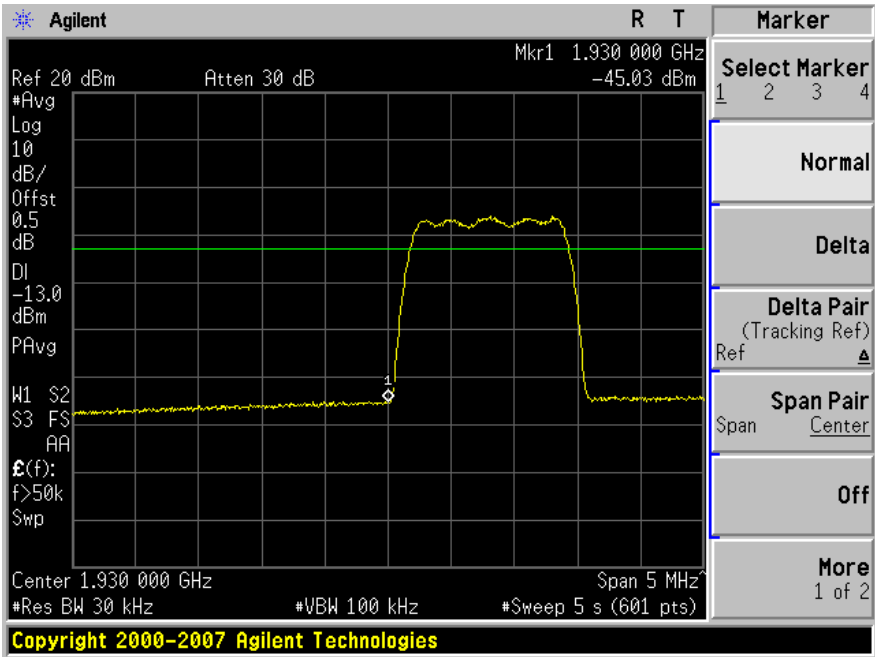
Plot 2: Highest Edge



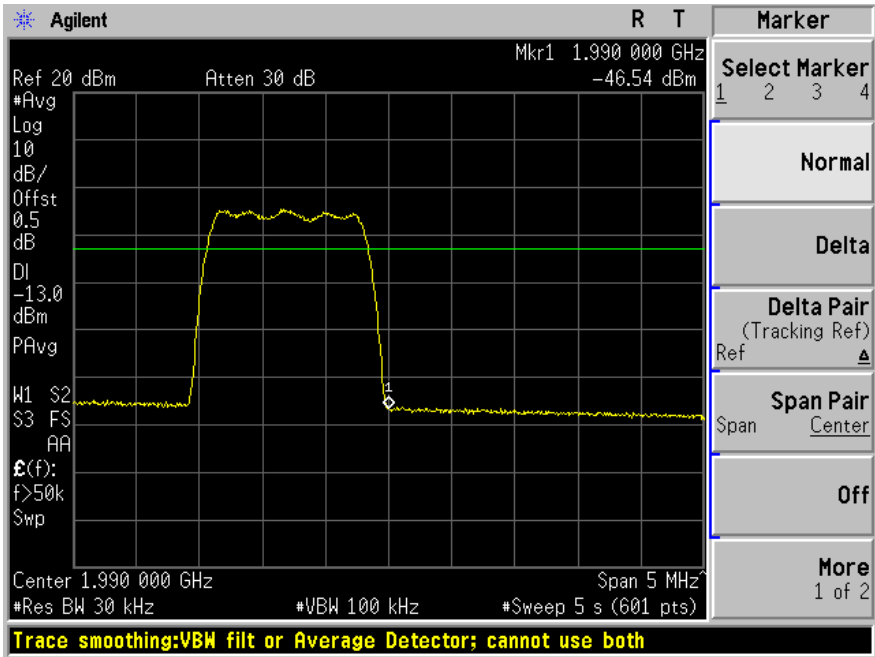
PCS Band:

Modulation: CDMA2000 1x-EVDO Rev A

Plot 1: Lowest Edge



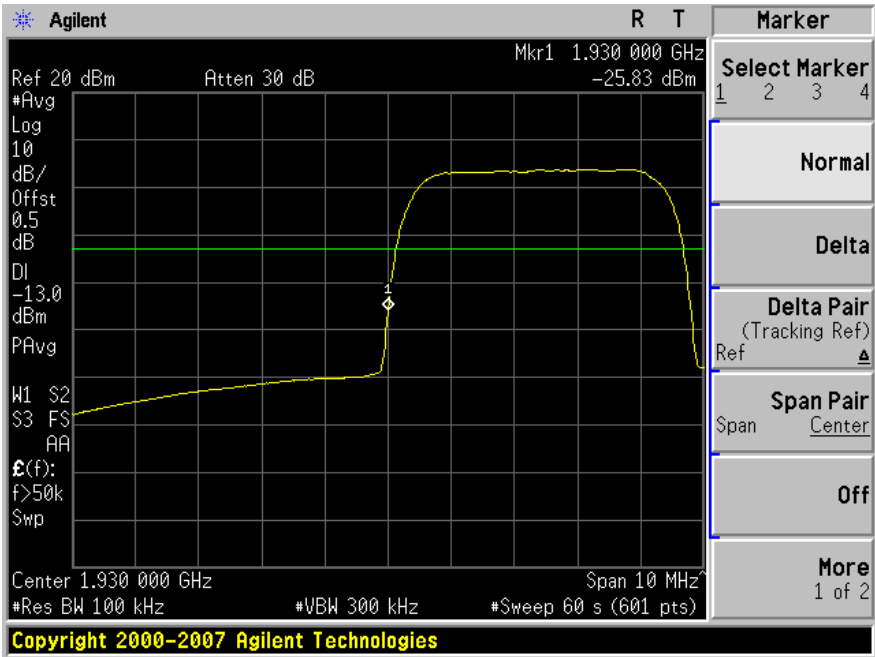
Plot 2: Highest Edge



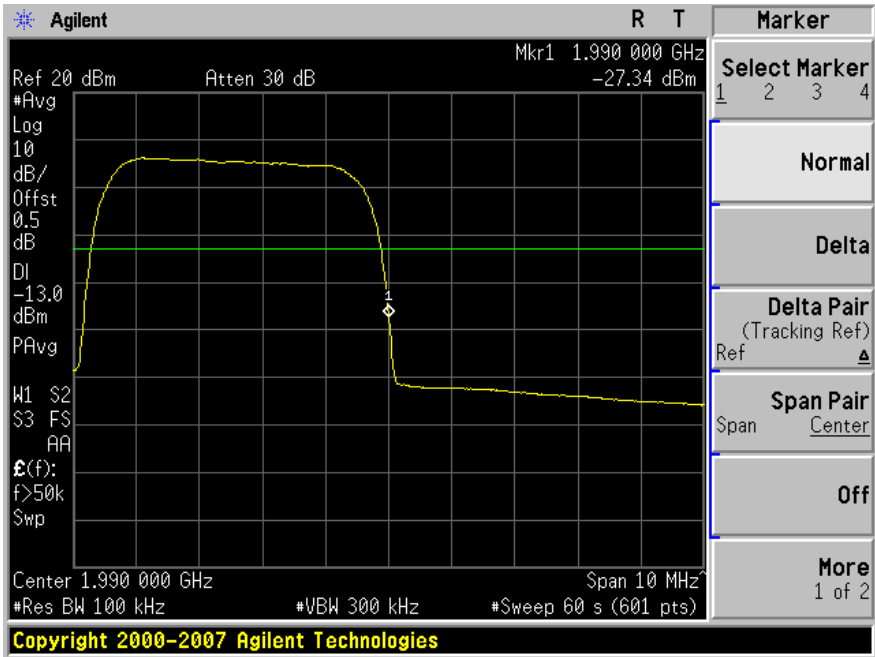
PCS Band:

Modulation: WCDMA

Plot 1: Lowest Edge



Plot 2: Highest Edge



10 FCC §2.1055 – Frequency Stability

10.1 Applicable Standard

According to § 2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

10.2 Test Result

N/A

11 FCC §1.1307(b) (1) & §2.1091 - RF EXPOSURE

11.1 Applicable Standard

According to §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

f = frequency in MHz

* = Plane-wave equivalent power density

11.2 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:

Worst Case: EDGE Middle Channel 881.6 MHz

Maximum peak output power at antenna input terminal (dBm): 23.21

Maximum peak output power at antenna input terminal (mW): 209.41

Prediction distance (cm): 30

Prediction frequency (MHz): 881.6

Antenna Gain, typical (dBi): 5

Maximum Antenna Gain (numeric): 3.16

Power density at predication frequency and distance (mW/cm²): 0.0585

MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 0.5877

PCS Band:**Worst Case: EDGE Middle Channel 1960 MHz**

Maximum peak output power at antenna input terminal (dBm):	<u>22.26</u>
Maximum peak output power at antenna input terminal (mW):	<u>168.27</u>
Prediction distance (cm):	<u>30</u>
Prediction frequency (MHz):	<u>1960</u>
Antenna Gain, typical (dBi):	<u>5</u>
Maximum Antenna Gain (numeric):	<u>3.16</u>
Power density at predication frequency and distance (mW/cm ²):	<u>0.0470</u>
MPE limit for uncontrolled exposure at predication frequency (mW/cm ²):	<u>1.0</u>

Test Result

For Cellular Band, the highest power density level at 30 cm is 0.0585 mW/cm², which is below the uncontrolled exposure limit of 0.5877 mW/cm² at 881.6 MHz.

For PCS Band, the highest power density level at 30 cm is 0.0470 mW/cm², which is below the uncontrolled exposure limit of 1 mW/cm² at 1960 MHz.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 30 cm between the radiation and your body.