Lab Code: 200167-0

FCC PART 22H, 24E

TEST AND MEASUREMENT REPORT

For

ADC Telecommunications Inc.

P.O. Box 1101, Minneapolis, Minnesota 55440, USA

FCC ID: NOO-S2790-011

Report Type:	**Product Type:**
Original Report	In Building Wireless Network System

Test Engineer:	Dennis Huang
Report Number:	R1001123-2224
Report Date:	2010-01-07
Reviewed By:	Boni Baniqued EMC/RF Supervisor
Prepared By: (84)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1001123-2224	Original Report	2010-01-07

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *ADC Telecommunications, Inc.* FCC ID: *NOO-S2790-011*, Model: *SPT- M1-8519-1 850/1900 Master RAU* or the "EUT" as referred to in this report is a wireless network systems operate for Cellular/PCS Bands. It is a flexible multi-operator/multi-protocol single platform system supporting up to 8 Radio Frequency (RF) bands. The Master RAU communicates with a Host Unit, an Expansion Unit (comprised of a DART Remote Module (DRU), IF Expansion Module (IFEU), and Power Supply. The RAU is intended to be installed above a false ceiling in an environmentally controlled office.

1.2 Mechanical Description of EUT

The EUT measures approximately 211 mm **(L)** x 272 mm **(W)** x 76 mm **(H)**, and weighs approximately 3.4 kg.

**The test data gathered are from production sample, serial number: RAU 13 (MRAU) provided by the manufacturer.*

1.3 EUT Photo

Master RAU
Please see additional photos in Exhibit C

1.4 Objective

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

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

1.5 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: R-2463 and C-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

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 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Agilent	MXG Vector Signal Generator	-	MY47420502
Agilent	Signal Generator	8648C	4108A05591
URH	Host	-	MDF3018A
DRH	DART Remote Unit	-	7109A00S
IFEU	IF Expansion Module	-	S/N7
SRAU	Slave RAU	-	Unit6 DL B2

2.5 Interface Ports and Cables

Cable Description	Length (m)	To	From
Shielded Cable (Duplex Fiber Optic)	3	Host Unit	DRU (Dart Remote Unit)
75 Ohm Coax Cable	3	IF Expansion Unit (IFEU)	SRAU
75 Ohm Coax Cable	100	IF Expansion Unit (IFEU)	MRAU
50 ohm CATV cable	< 1	DRU	IF Expansion Unit
RF Cable	< 1	Main Hub/RAU	Spectrum Analyzer
RF Cable	< 1	Main Hub/RAU	Signal Generator

2.6 Internal Configurations of EUT

Manufacturer	Description	Model	Serial Number
ADC Telecommunication	MRAU RF Cell PCB Board	712750-0 REV2.3	R0931G0014NC
ADC Telecommunication	MRAU RF PCS PCB Board	712755-0 REV4	R0929G0015NC
ADC Telecommunication	MRAU IF PCB Board	712750-1 REV4	R0933G0005NC

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	Compliant
§2.1091	RF Exposure	Compliant

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

4.1 Applicable Standard

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

4.2 Test Procedure

Conducted:

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

4.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	41-43 %
ATM Pressure:	101-102kPa

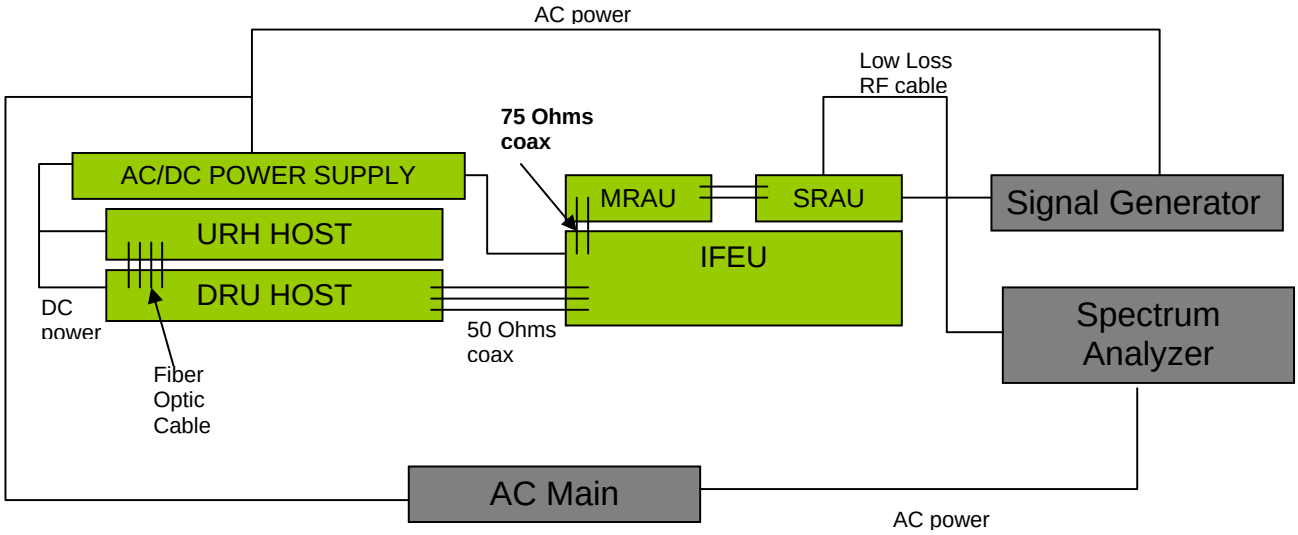
** The testing was performed by Dennis Huang from 2009-12-11 to 2009-12-15 in RF Site.*

4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	MXG Vector Signal Generator	-	MY47420502	2009-09-18

*** 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 Test Results

Maximum Output Power – Modulated Signal

Forward (Downlink)

Radio Mode	Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
CDMA	Cellular 850 MHz	Low	869.80	14.85	30.549
		Middle	881.52	15.00	31.623
		High	893.20	14.98	31.477
	PCS 1900 MHz	Low	1930.8	14.98	31.477
		Middle	1960.0	14.99	31.550
		High	1989.2	14.87	30.690
WCDMA	Cellular 850 MHz	Low	871.4	15.00	31.623
		Middle	881.4	14.99	31.550
		High	891.6	14.85	30.549
	PCS 1900 MHz	Low	1932.4	14.63	29.040
		Middle	1960.0	14.95	31.261
		High	1987.6	14.78	30.061

5 FCC §2.1047 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC § 2.1047(d), Part 22H and Part 24E, 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 22.917and 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 to at least 1% of the BW (Cellular/PCS) and the 26 dB & 99% bandwidth was recorded.

6.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	41-43 %
ATM Pressure:	101-102kPa

** The testing was performed by Dennis Huang from 2009-12-11 to 2009-12-15 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	MXG Vector Signal Generator	-	MY47420502	2009-09-18

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

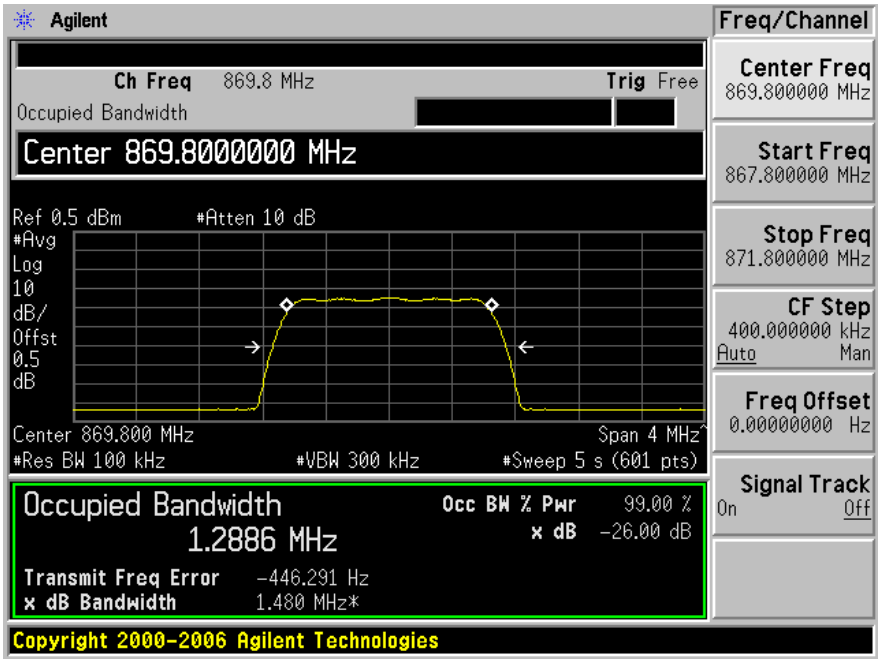
6.5 Summary of Test Results

Radio Mode	Band	Channel	Frequency (MHz)	Emission Bandwidth	
				Input (MHz)	Output (MHz)
CDMA	Cellular 850 MHz	Low	869.80	1.480	1.479
		Middle	881.52	1.480	1.482
		High	893.20	1.482	1.478
	PCS 1900 MHz	Low	1930.8	1.480	1.483
		Middle	1960.0	1.481	1.481
		High	1989.2	1.483	1.484
WCDMA	Cellular 850 MHz	Low	871.4	4.729	4.715
		Middle	881.4	4.730	4.727
		High	891.6	4.729	4.721
	PCS 1900 MHz	Low	1932.4	4.729	4.720
		Middle	1960.0	4.729	4.726
		High	1987.6	4.729	4.723

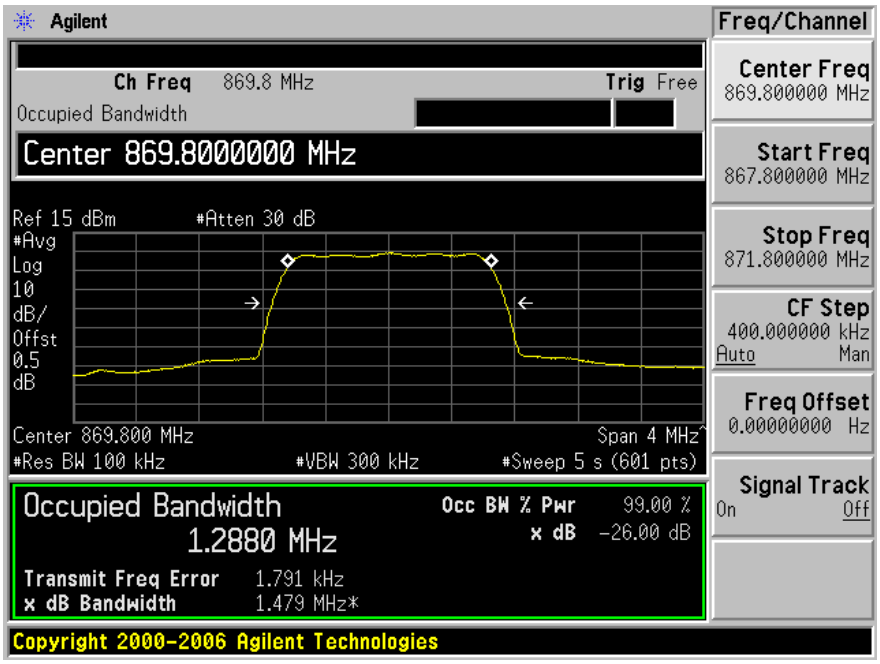
Please refer to the following plots.

CDMA Cellular Band Downlink

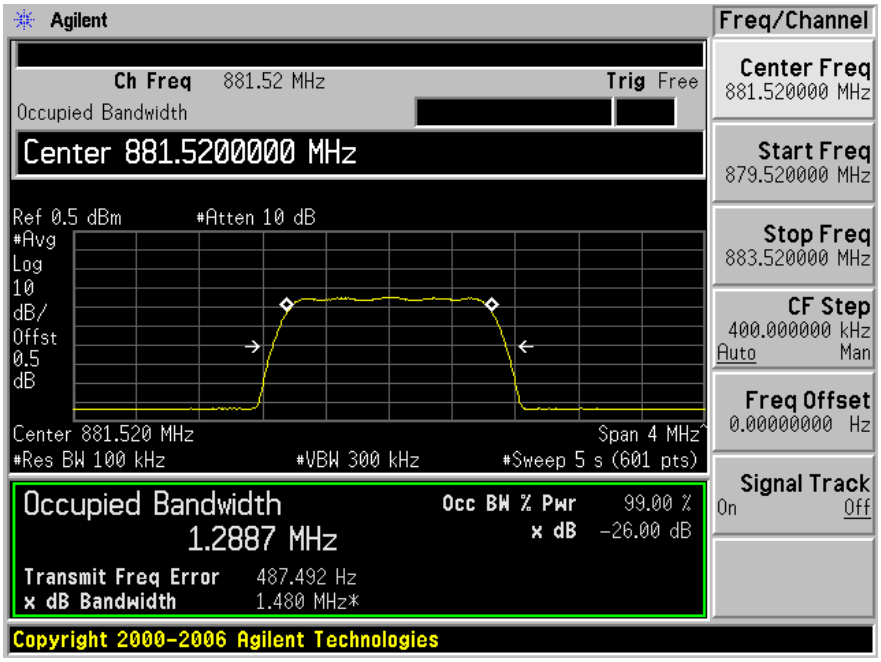
Low Channel: 869.8 MHz, Input



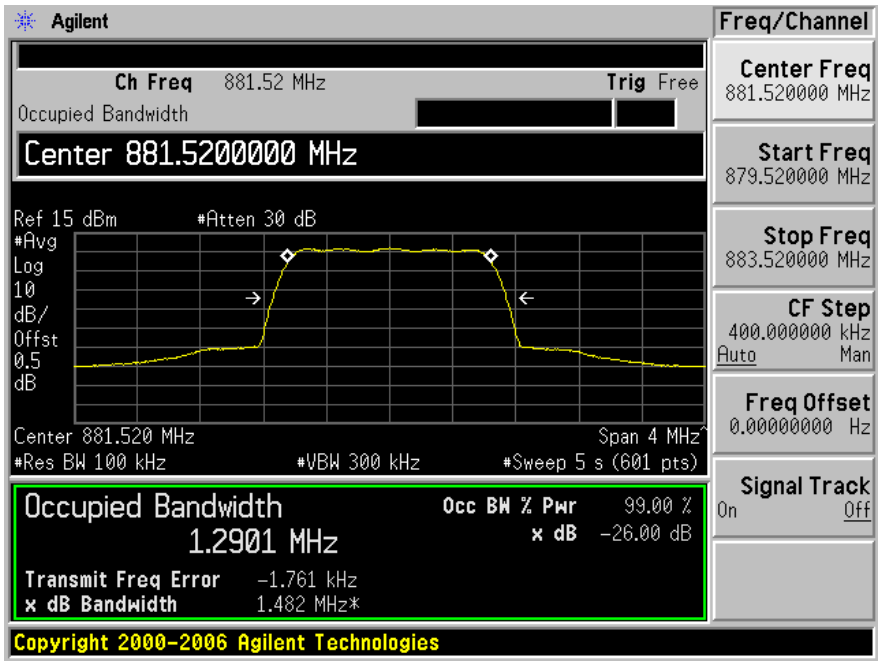
Output



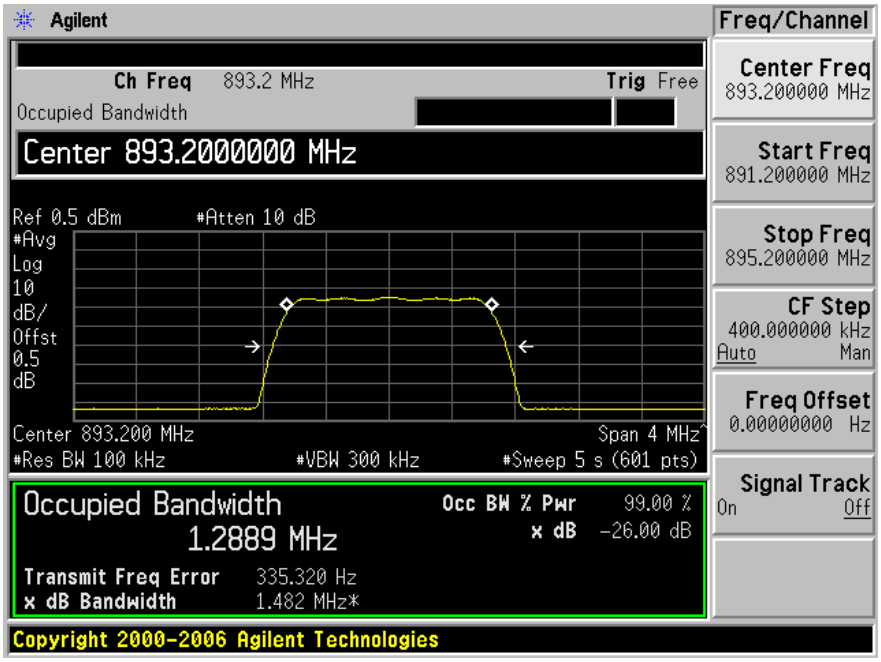
Middle Channel: 881.52 MHz, Input



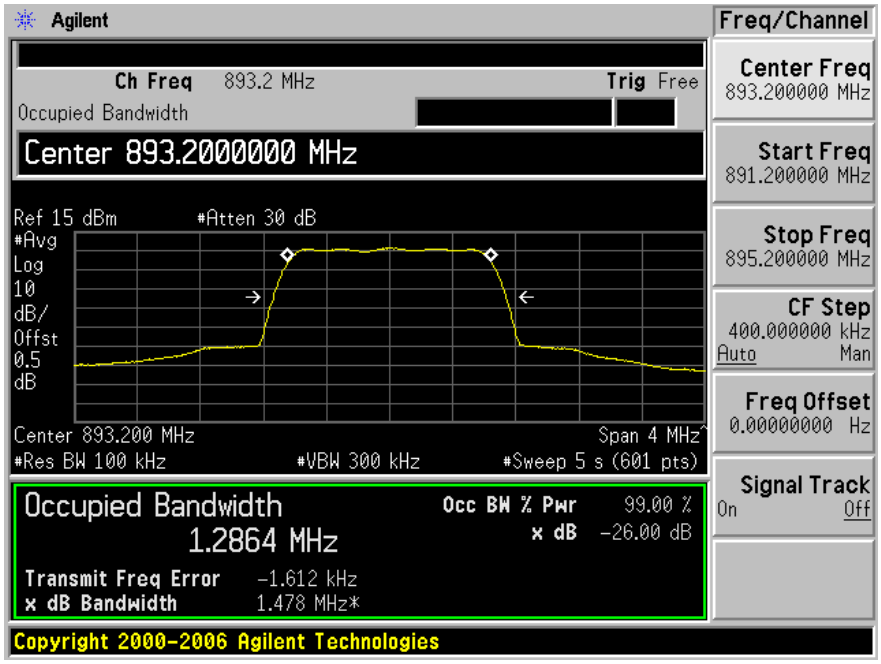
Output



High Channel: 893.2 MHz, Input

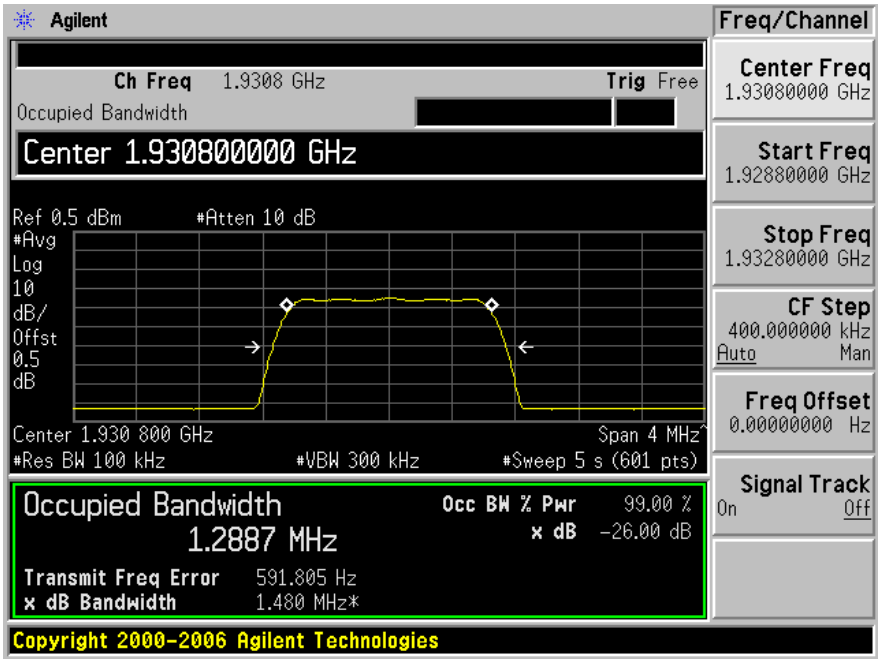


Output

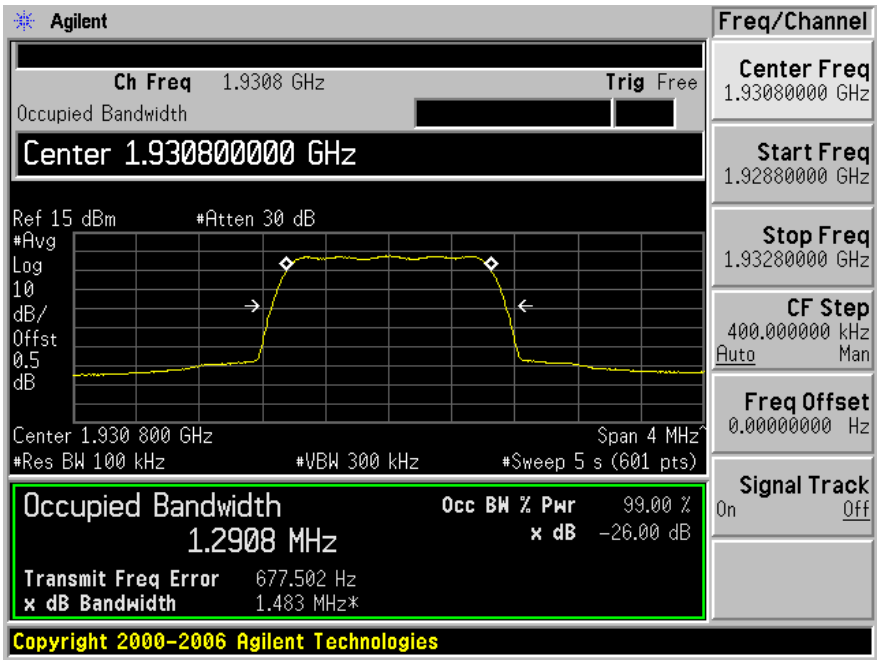


CDMA PCS Band Downlink

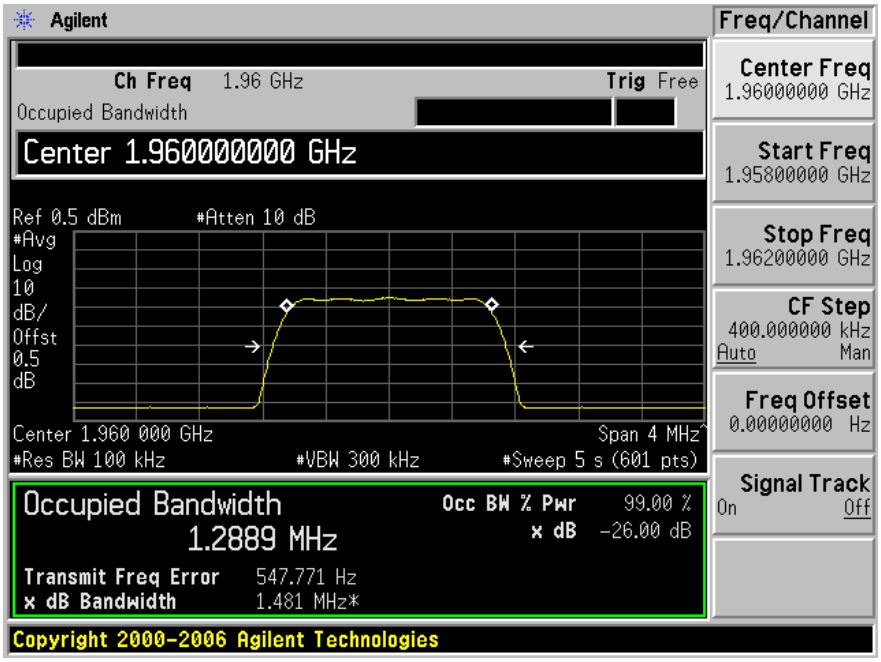
Low Channel: 1930.8 MHz, Input



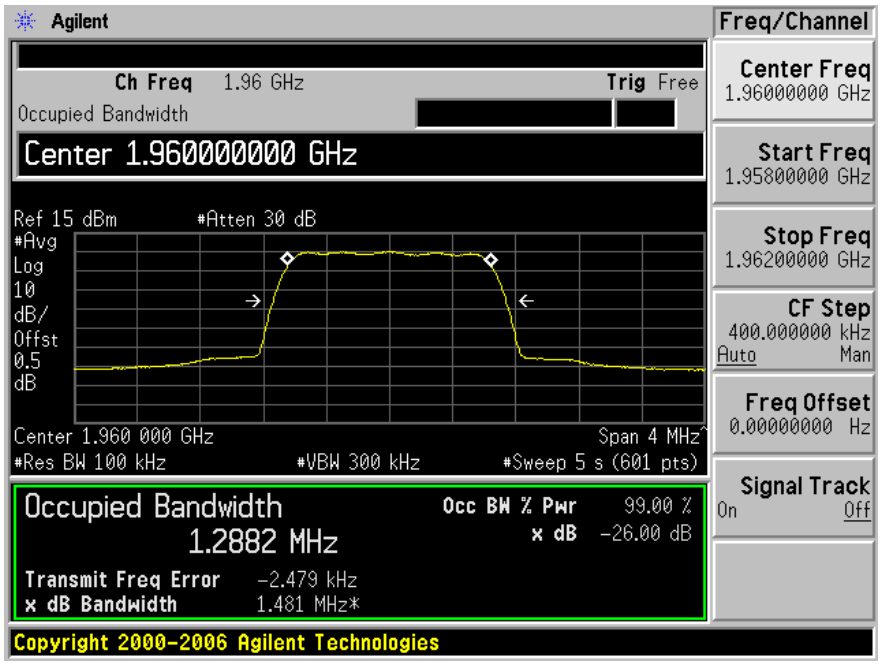
Output



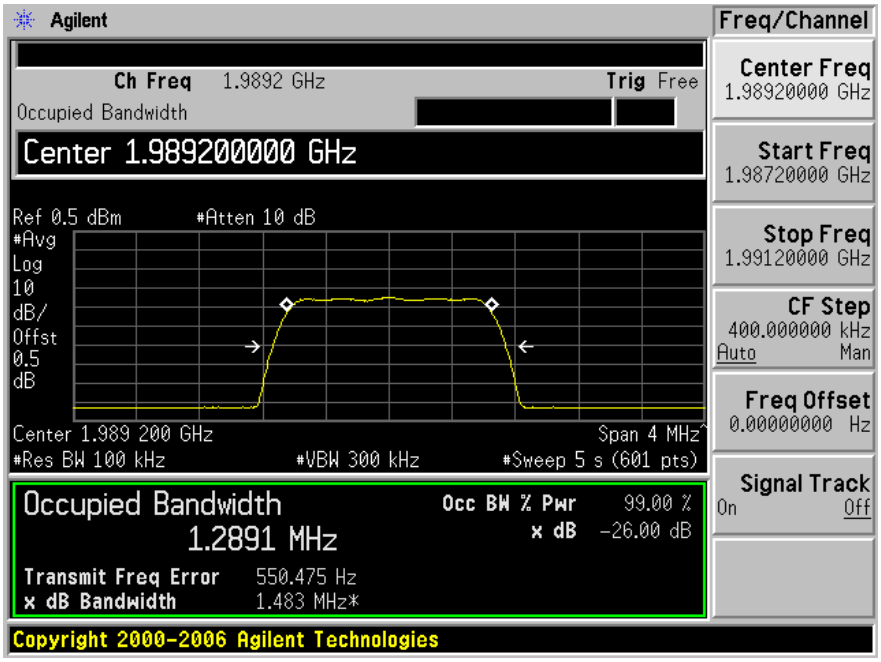
Middle Channel: 1960 MHz, Input



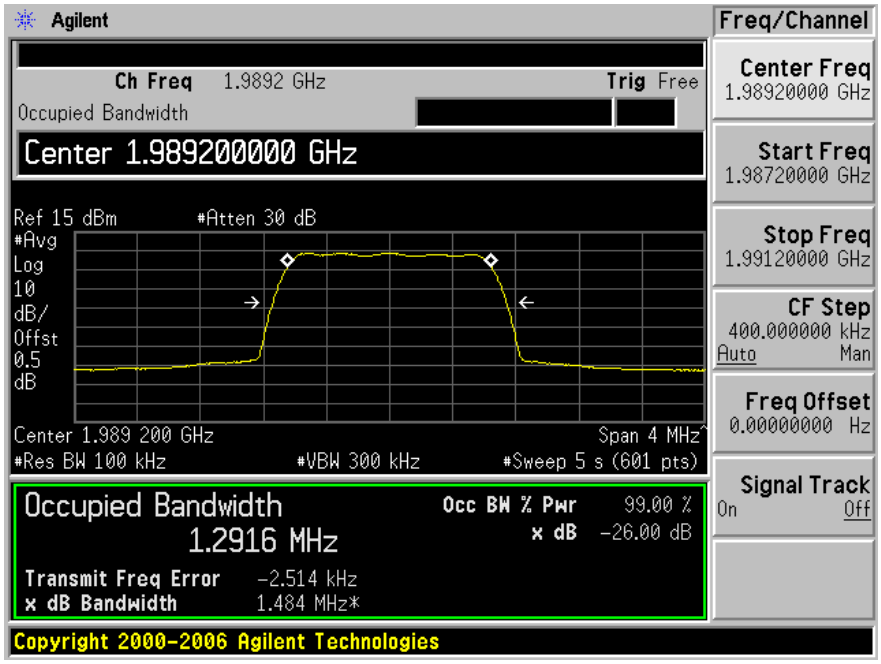
Output



High Channel: 1989.2 MHz, Input

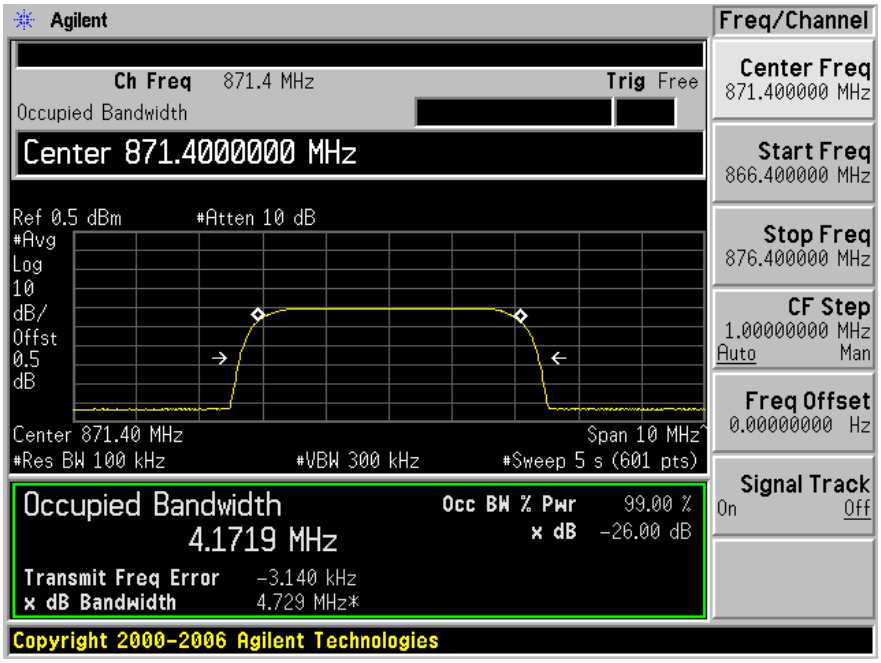


Output

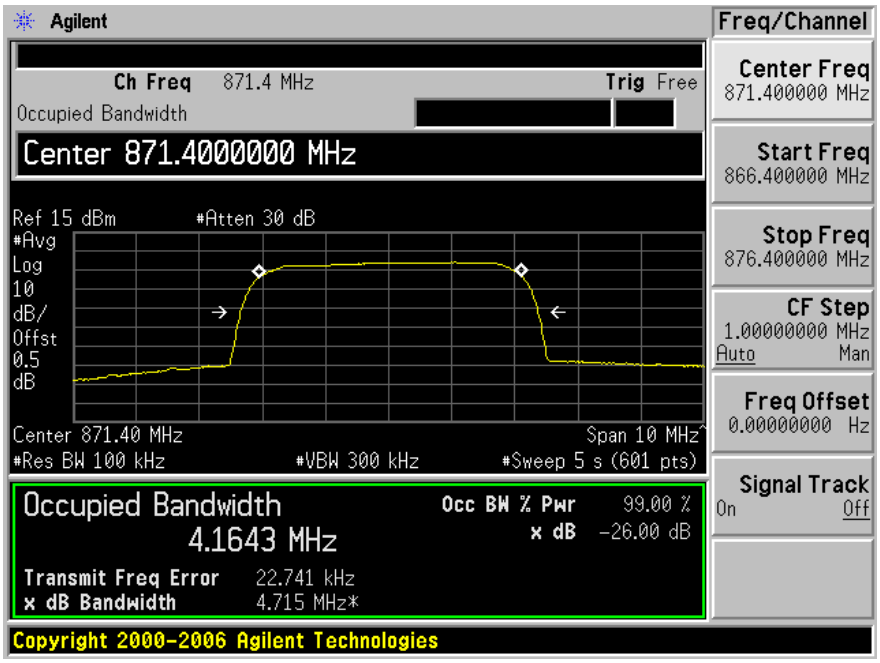


WCDMA Cellular Band Downlink

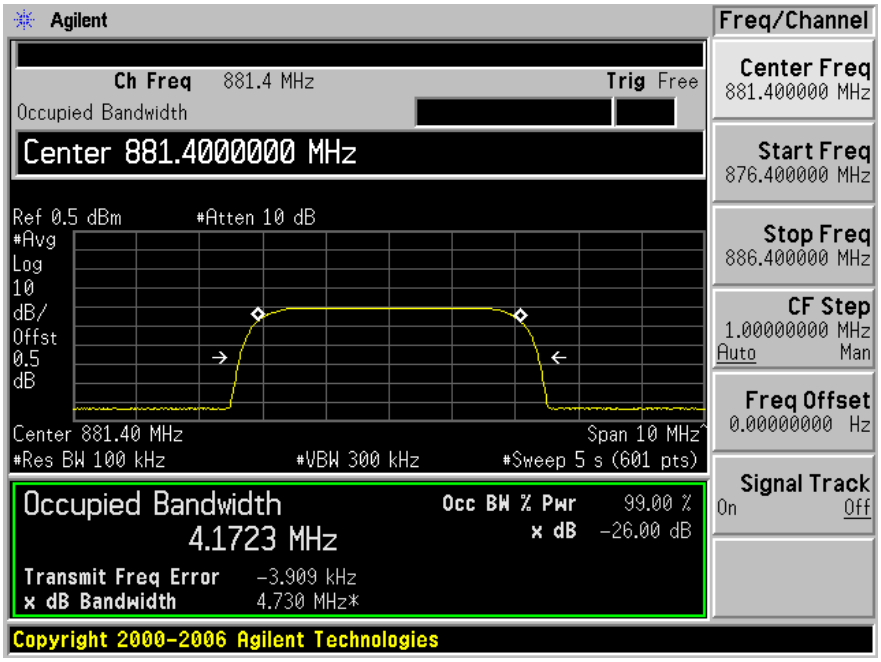
Low Channel: 871.4 MHz, Input



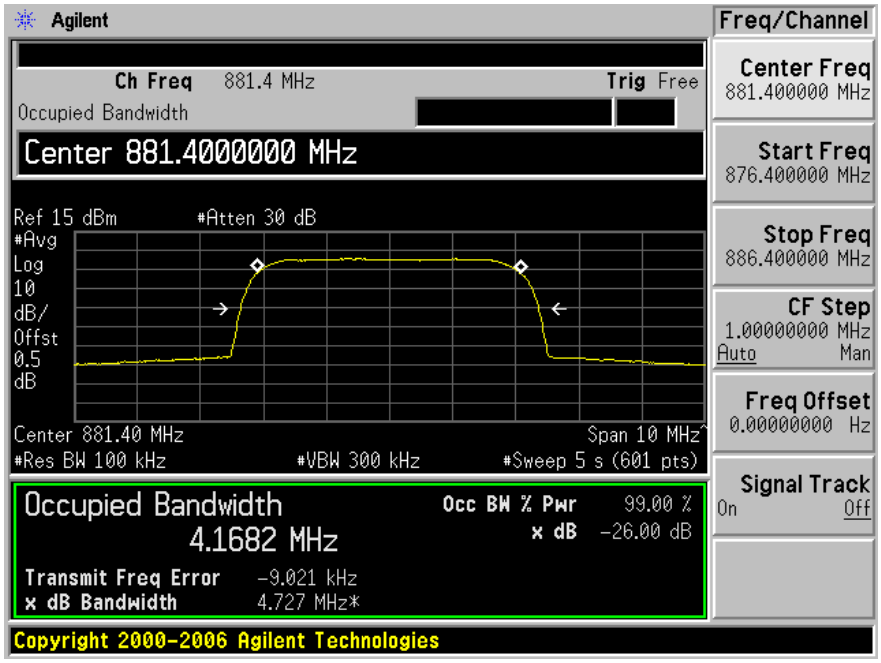
Output



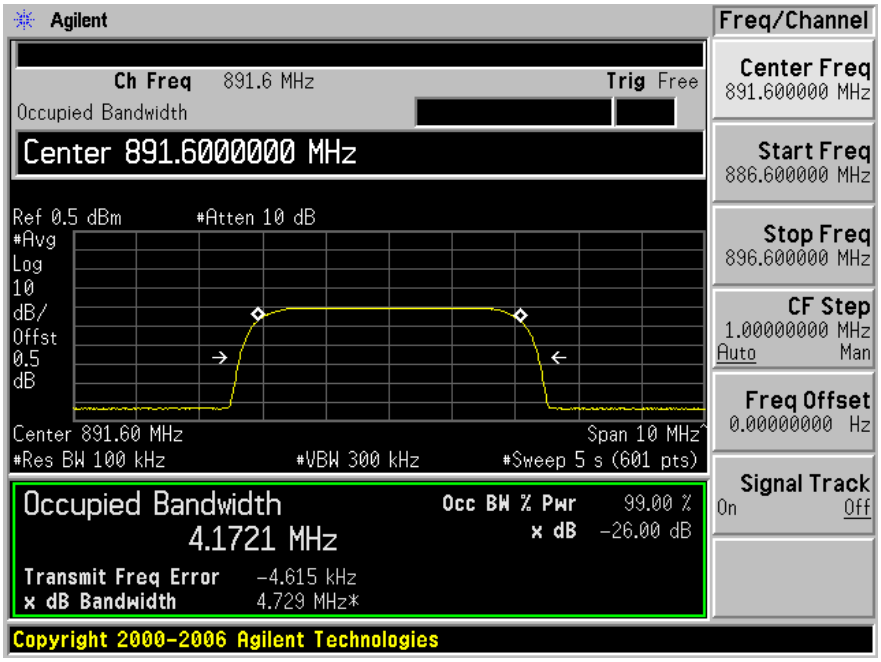
Middle Channel: 881.4 MHz, Input



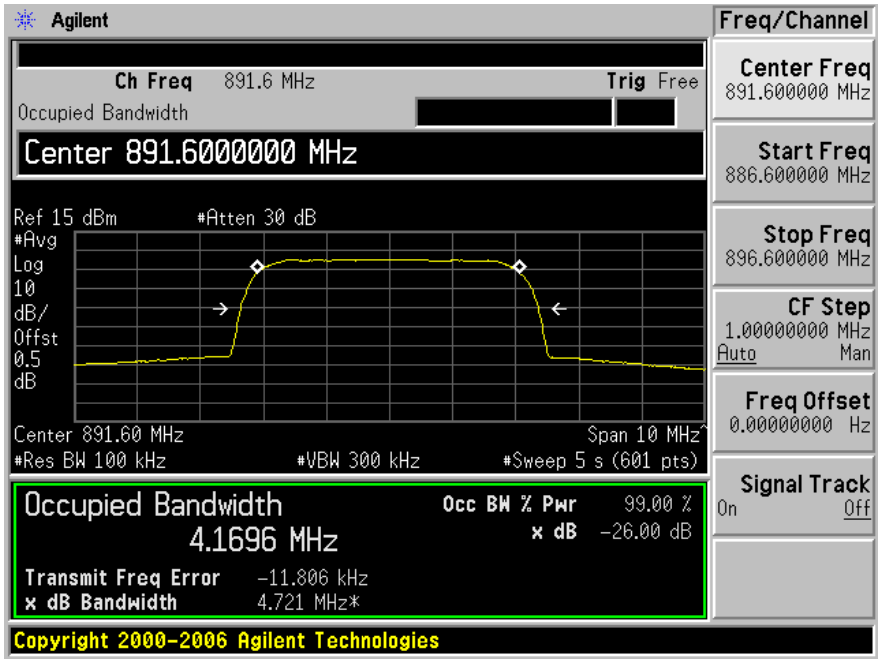
Output



High Channel: 891.6 MHz, Input

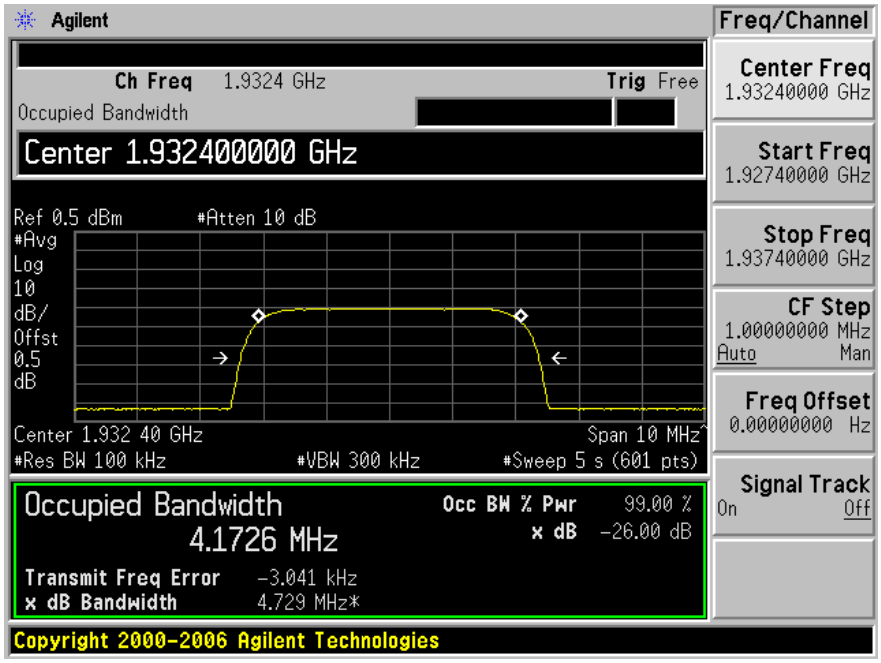


Output

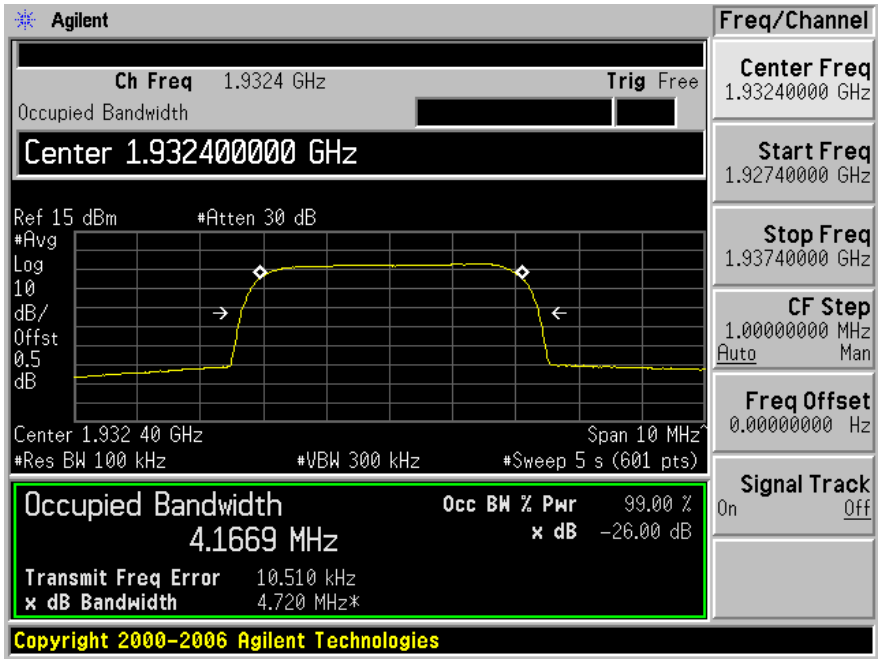


WCDMA PCS Band Downlink

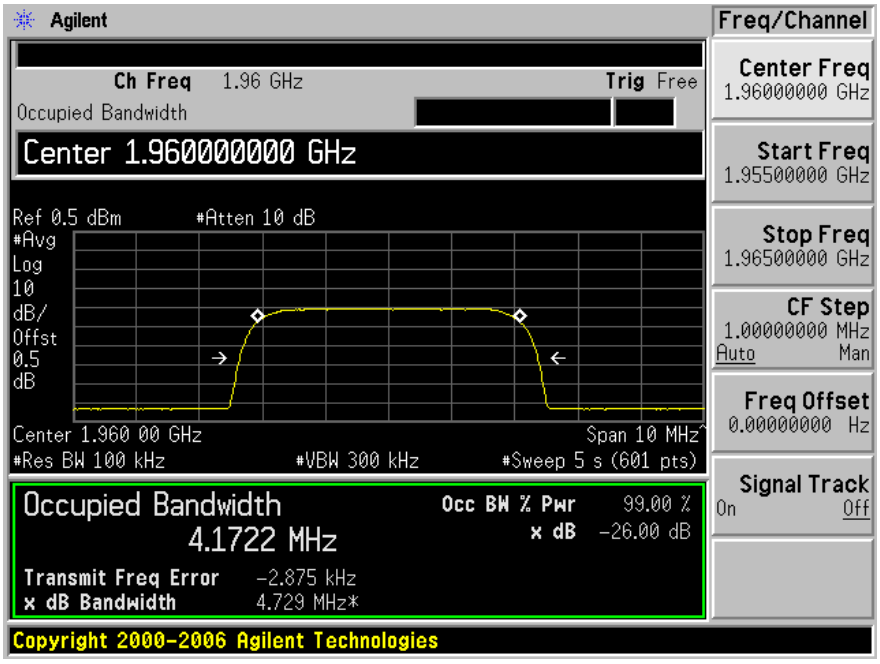
Low Channel: 1932.4 MHz, Input



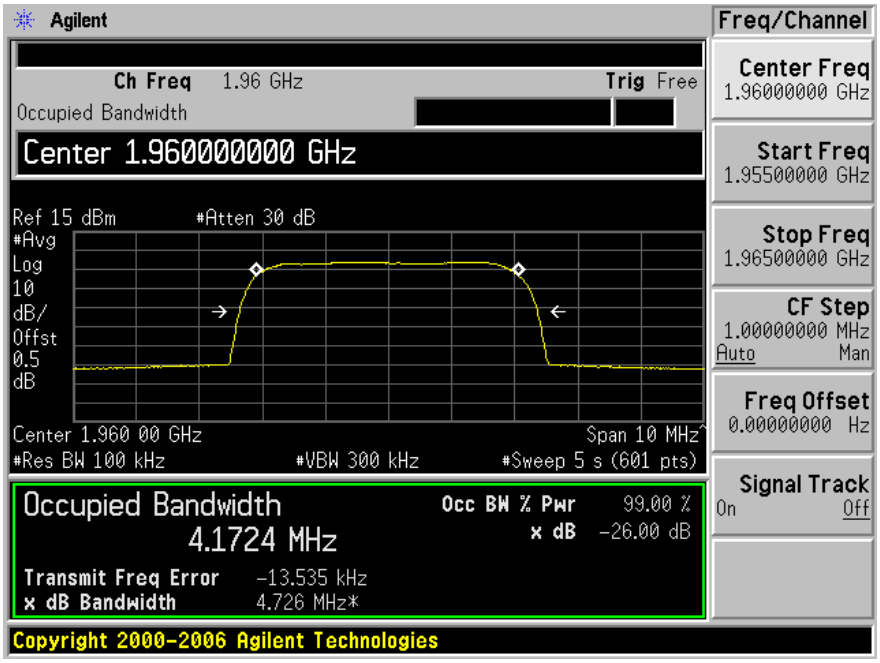
Output



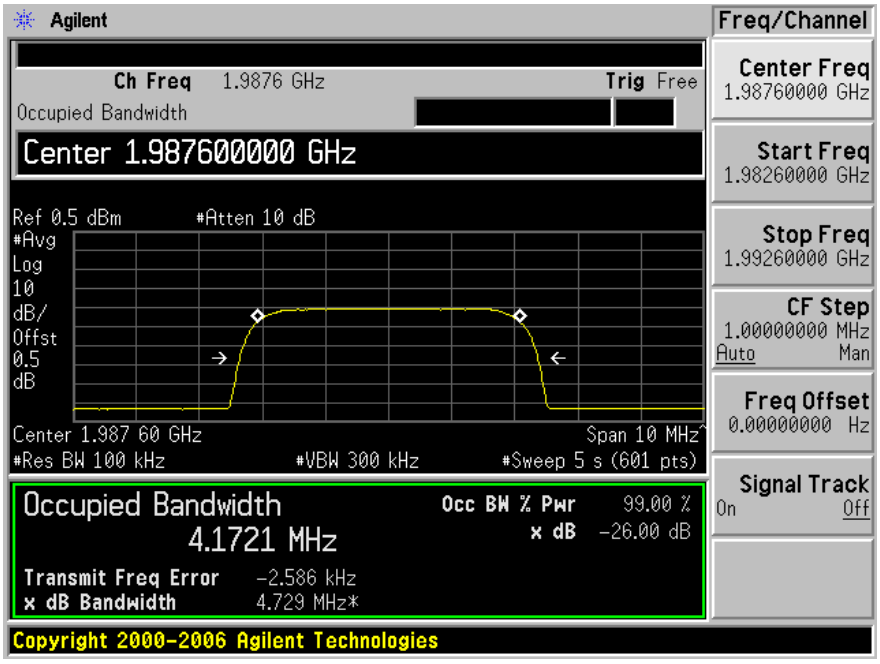
Middle Channel: 1960 MHz, Input



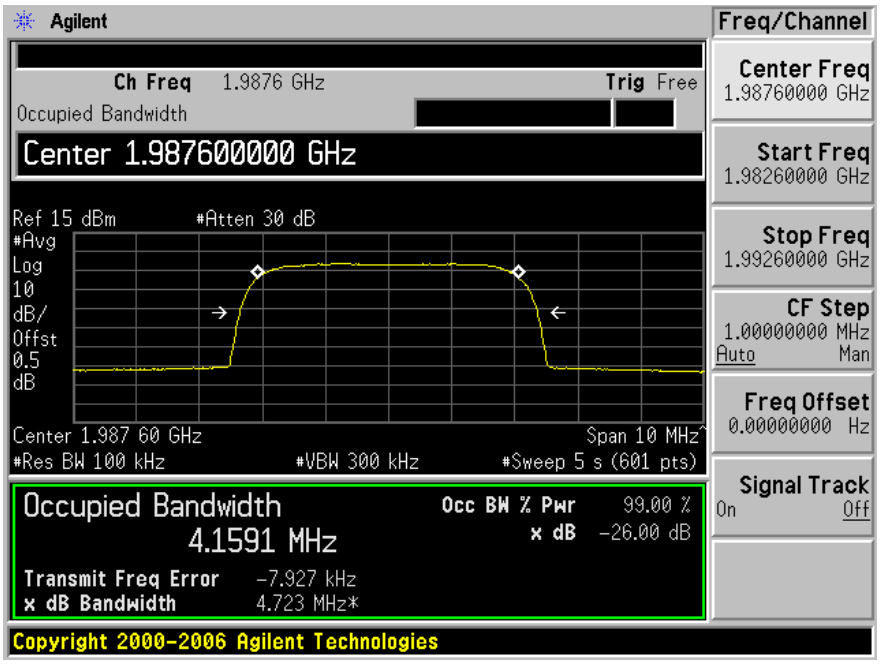
Output



High Channel: 1987.6 MHz, Input



Output



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

7.1 Applicable Standard

Requirements: CFR 47, § 2.1053, § 22.917 and § 22.238.

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.

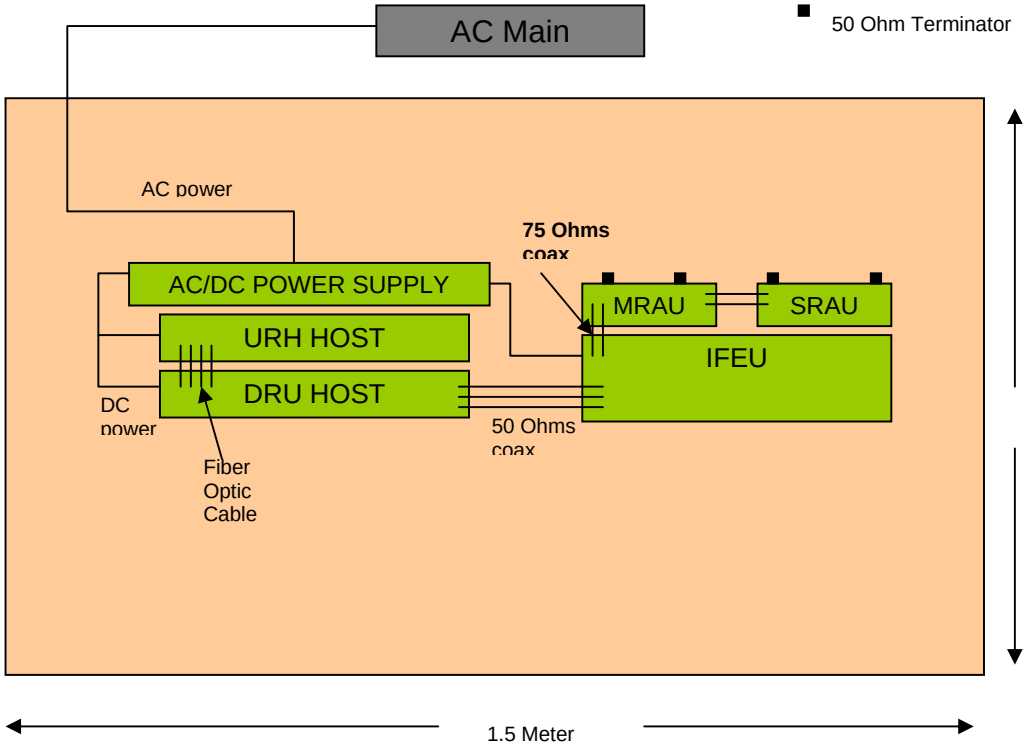
The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

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 Setup Block Diagram



7.4 Test Environmental Conditions

Temperature:	23.5 °C
Relative Humidity:	43 %
ATM Pressure:	101.7kPa

**The testing was performed by Dennis Huang on 2009-08-11 in 5 Meter Chamber #3.*

7.5 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Analyzer, Spectrum	E4446A	US44300386	2009-06-29
HP	Generator, Signal	83650B	3614A00276	2009-05-28
Ducommun Technologies	Amplifier, Pre	1-18GHz	9909297-01R	2009-03-04
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2009-09-23
A.R.A.	Antenna, Horn	DRG-118/A	1132	2009-07-28
Rohde & Schwarz	Signal Generator	SMIQ03	849192/0085	2009-12-03

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

7.6 Summary of Test Results

The worst case reading as follows:

CDMA

Band	Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Input Frequency
Cellular 850 MHz	-8.63	7545.85	Horizontal	881.52 MHz
PCS 1900 MHz	-8.43	7545.85	Horizontal	1960 MHz

WCDMA

Band	Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Input Frequency
Cellular 850 MHz	-8.63	7545.85	Horizontal	881.4 MHz
PCS 1900 MHz	-8.93	7545.85	Horizontal	1960 MHz

Please refer to the following plots for detailed results.

7.7 Test Results

CDMA:

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 Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
CDMA, Cellular Band, Input Frequency = 881.52 MHz											
1250	67.75	39	1.65	V	1250	-45.54	5.8	0.94	-40.68	-13	-27.68
1250	68.37	10	1.16	H	1250	-44.92	5.8	0.94	-40.06	-13	-27.06
1658	56.54	360	1.0	V	1658	-54.24	7.8	1.04	-47.48	-13	-34.48
1658	52.98	298	1.19	H	1658	-57.8	7.8	1.04	-51.04	-13	-38.04
3071.99	59.48	39	1.12	V	3071.99	-44.39	8.9	1.51	-37	-13	-24.00
3071.99	64.54	295	1.46	H	3071.99	-39.33	8.9	1.51	-31.94	-13	-18.94
7545.85	60	11	1.43	V	7545.85	-30.28	8.7	2.93	-24.51	-13	-11.51
7545.85	62.88	316	1.92	H	7545.85	-27.4	8.7	2.93	-21.63	-13	-8.63
CDMA, PCS Band, Input Frequency = 1960 MHz											
1250	68.37	20	1.69	V	1250	-44.92	5.8	0.94	-40.06	-13	-27.06
1250	65.17	35	1.0	H	1250	-48.12	5.8	0.94	-43.26	-13	-30.26
3071.99	59.59	39	1.0	V	3071.99	-44.28	8.9	1.51	-36.89	-13	-23.89
3071.99	64.75	300	1.42	H	3071.99	-39.12	8.9	1.51	-31.73	-13	-18.73
7545.85	60.31	12	1.41	V	7545.85	-29.97	8.7	2.93	-24.2	-13	-11.20
7545.85	63.08	314	1.92	H	7545.85	-27.2	8.7	2.93	-21.43	-13	-8.43

WCDMA:

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 Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
WCDMA, Cellular Band, Input Frequency = 881.4 MHz											
1250	68.63	20	175	V	1250	-44.66	5.8	0.94	-39.8	-13	-26.8
1250	65.06	34	1.13	H	1250	-48.23	5.8	0.94	-43.37	-13	-30.37
3071.99	59.48	39	1.12	V	3071.99	-44.39	8.9	1.51	-37	-13	-24.00
3071.99	64.54	295	1.46	H	3071.99	-39.33	8.9	1.51	-31.94	-13	-18.94
7545.85	60	11	1.43	V	7545.85	-30.28	8.7	2.93	-24.51	-13	-11.51
7545.85	62.88	316	1.92	H	7545.85	-27.4	8.7	2.93	-21.63	-13	-8.63
WCDMA, PCS Band, Input Frequency = 1960 MHz											
1250	68.55	20	1.75	V	1250	-44.74	5.8	0.94	-39.88	-13	-26.88
1250	65.27	34	1.16	H	1250	-48.02	5.8	0.94	-43.16	-13	-30.16
3071.99	59.78	39	1.12	V	3071.99	-44.09	8.9	1.51	-36.7	-13	-23.7
3071.99	64.74	295	1.45	H	3071.99	-39.13	8.9	1.51	-31.74	-13	-18.74
7545.85	60.02	11	1.45	V	7545.85	-30.26	8.7	2.93	-24.49	-13	-11.49
7545.85	62.58	316	1.92	H	7545.85	-27.7	8.7	2.93	-21.93	-13	-8.93

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 10^{th} harmonic.

8.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	41-43 %
ATM Pressure:	101-102kPa

** The testing was performed by Dennis Huang from 2009-12-11 to 2009-12-15 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	MXG Vector Signal Generator	-	MY47420502	2009-09-18

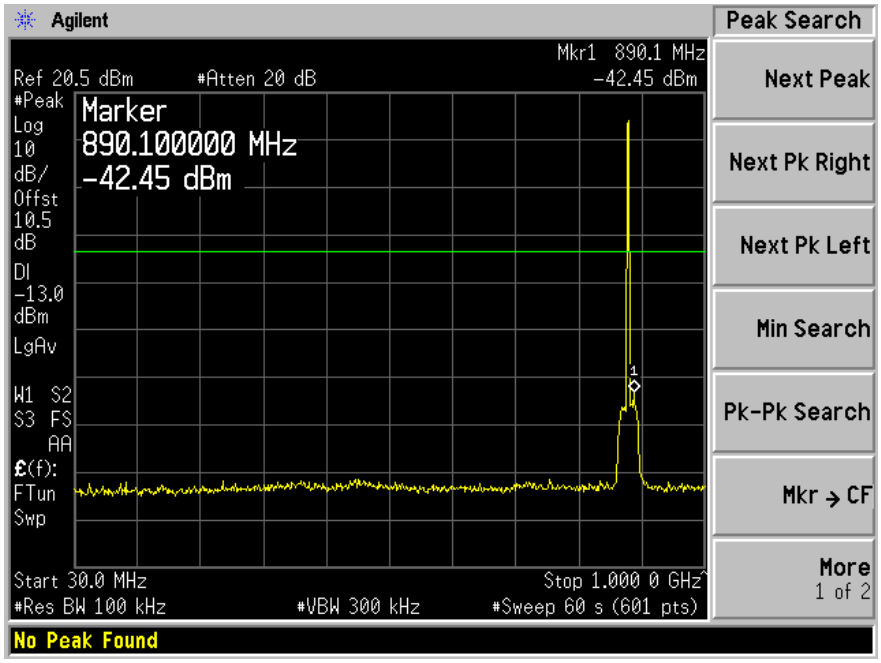
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.5 Test Results

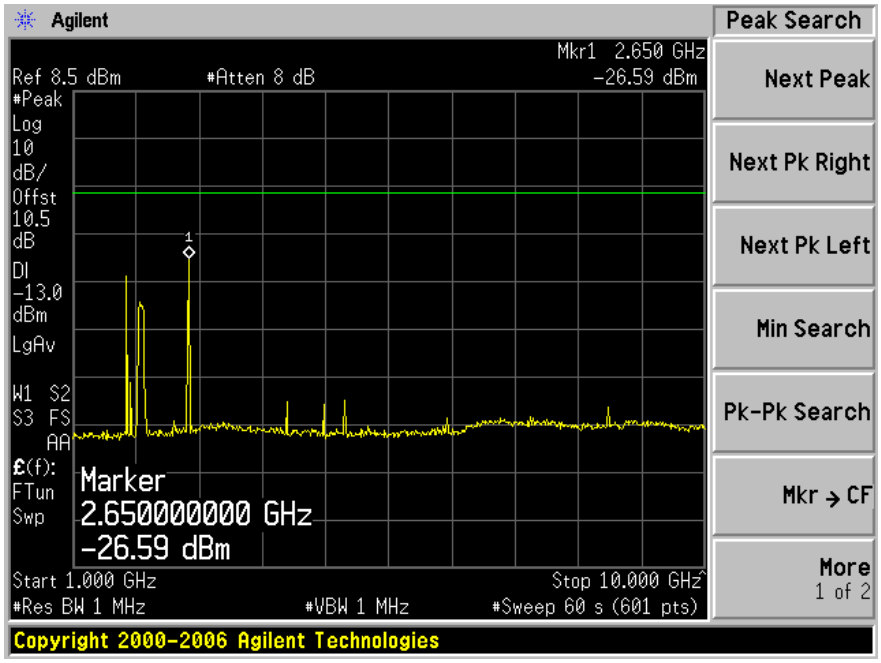
Please refer to the following plots.

CDMA Cellular Band Downlink, Middle Channel: 881.52 MHz

Plot 1: 30 MHz to 1 GHz

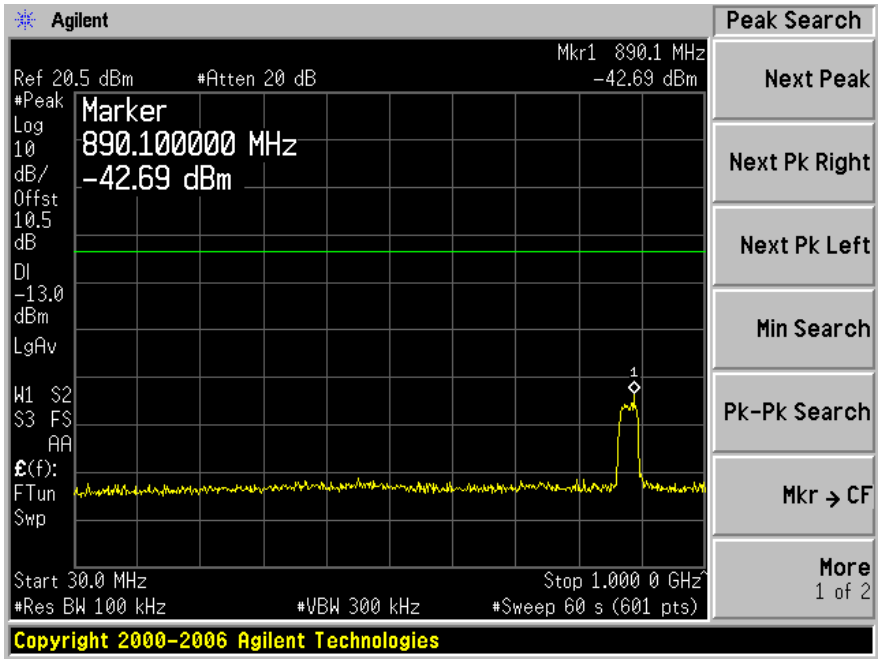


Plot 2: Above 1 GHz

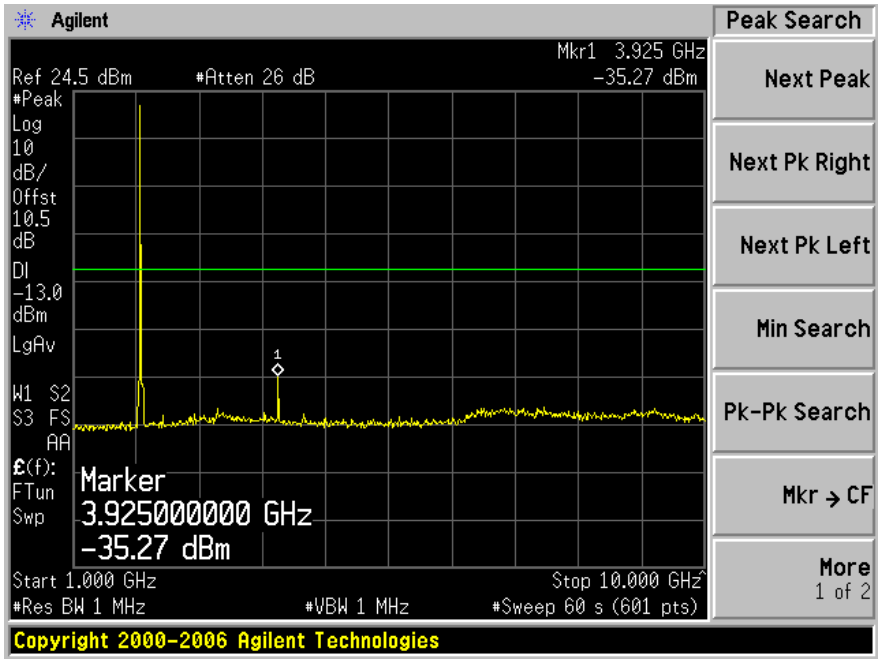


CDMA PCS Band Downlink, Middle Channel: 1960 MHz:

Plot 1: 30 MHz to 1 GHz

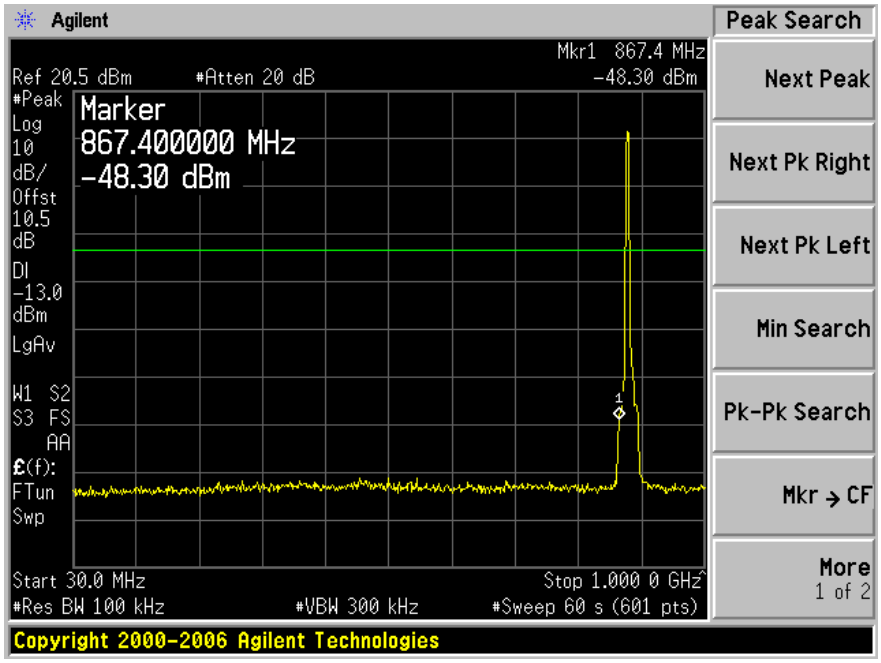


Plot 2: Above 1 GHz

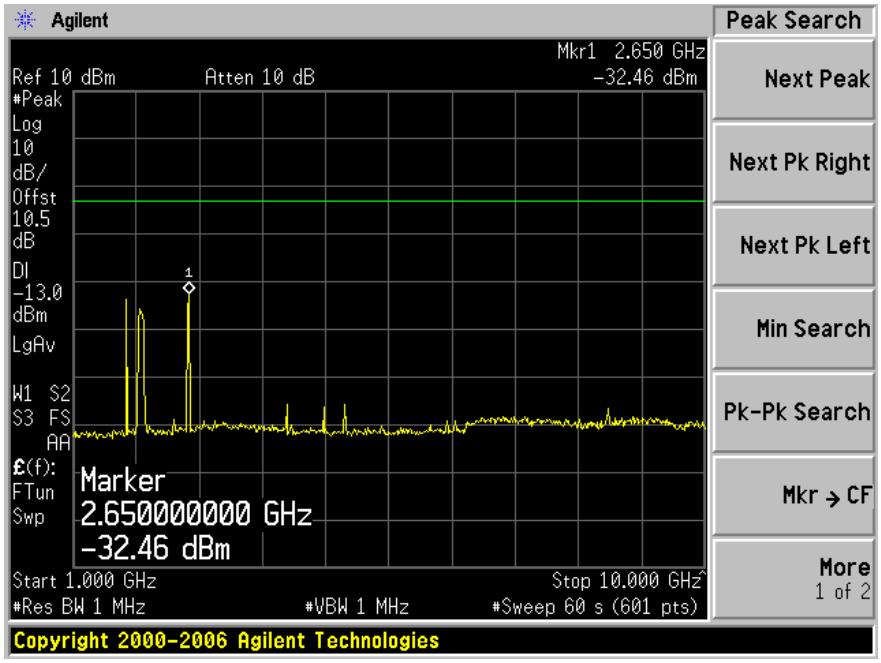


WCDMA Cellular Band Downlink, Middle Channel: 881.4 MHz:

Plot 1: 30 MHz to 1 GHz

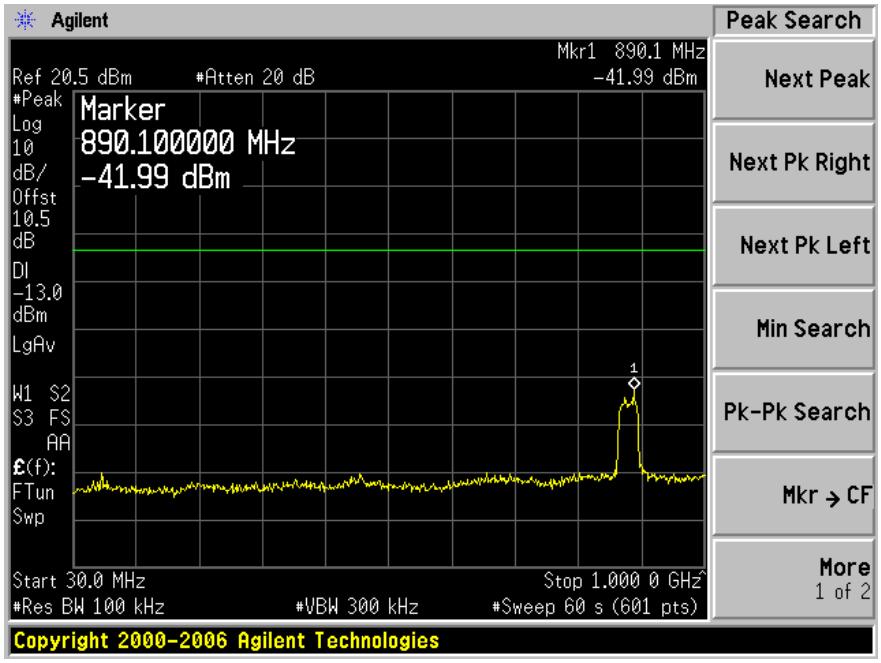


Plot 2: Above 1 GHz

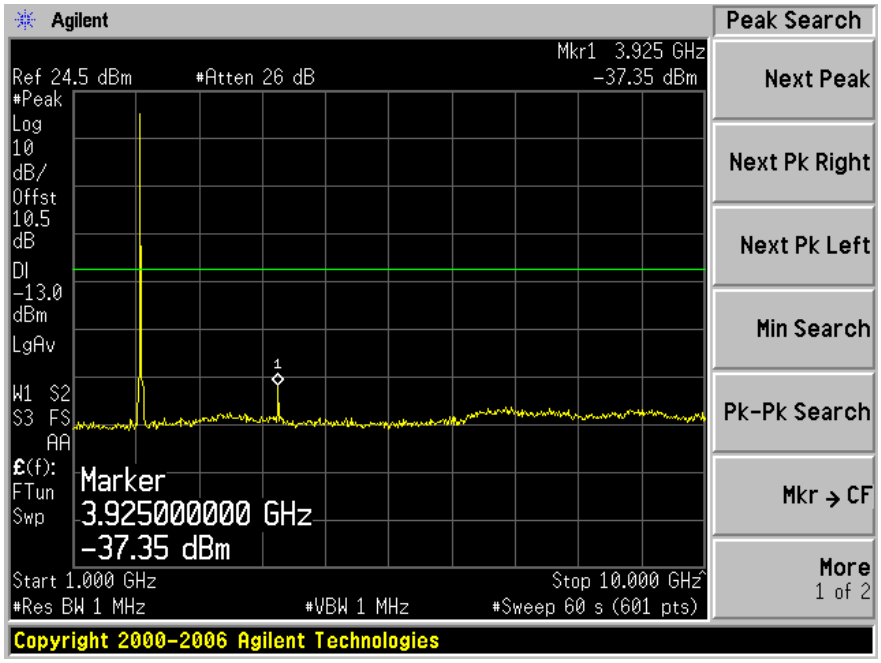


WCDMA PCS Band Downlink, Middle Channel: 1960 MHz:

Plot 1: 30 MHz to 1 GHz

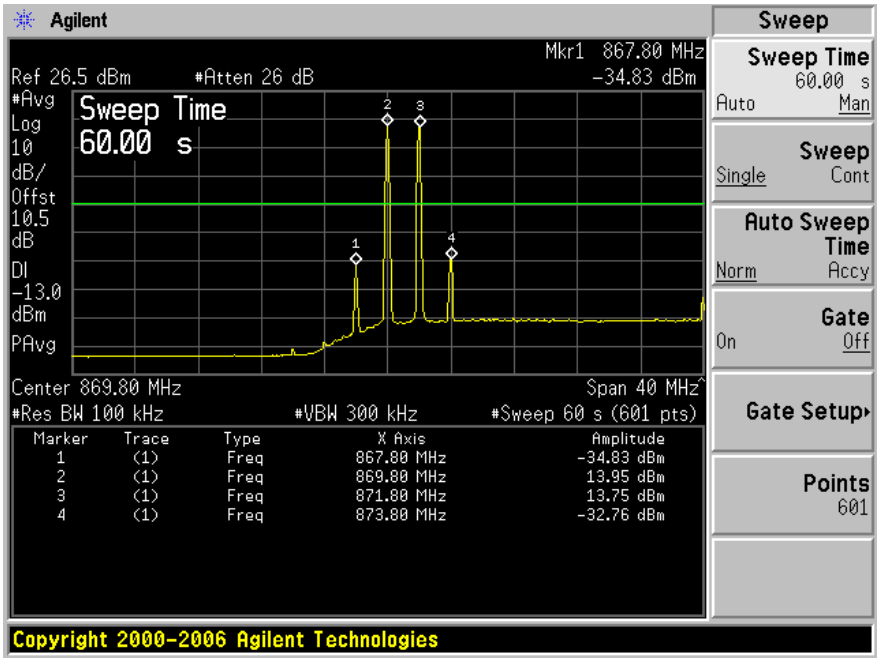


Plot 2: Above 1 GHz

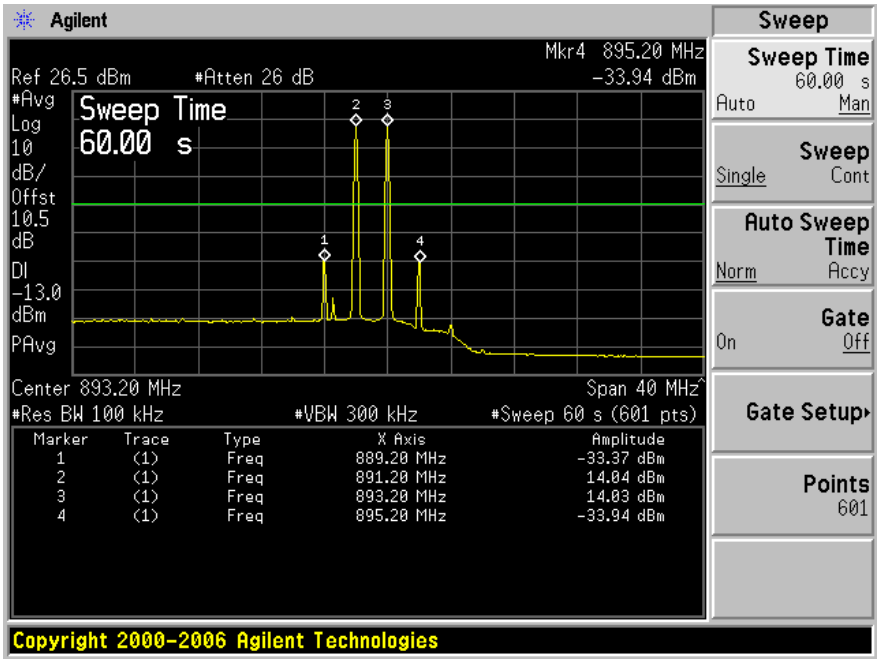


Inter-modulation:

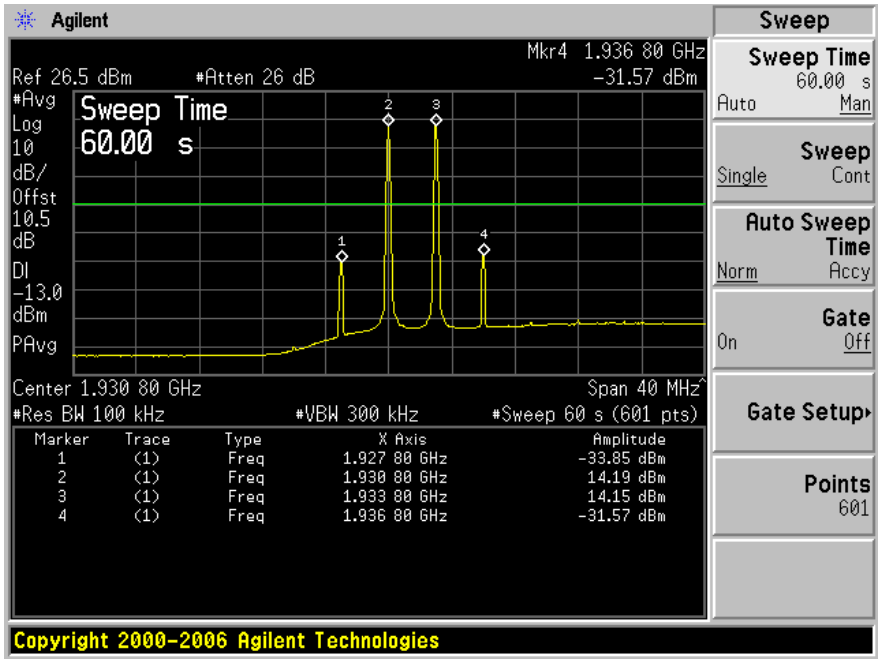
CDMA Cellular Band Downlink, Low Channel: 869.8 MHz:



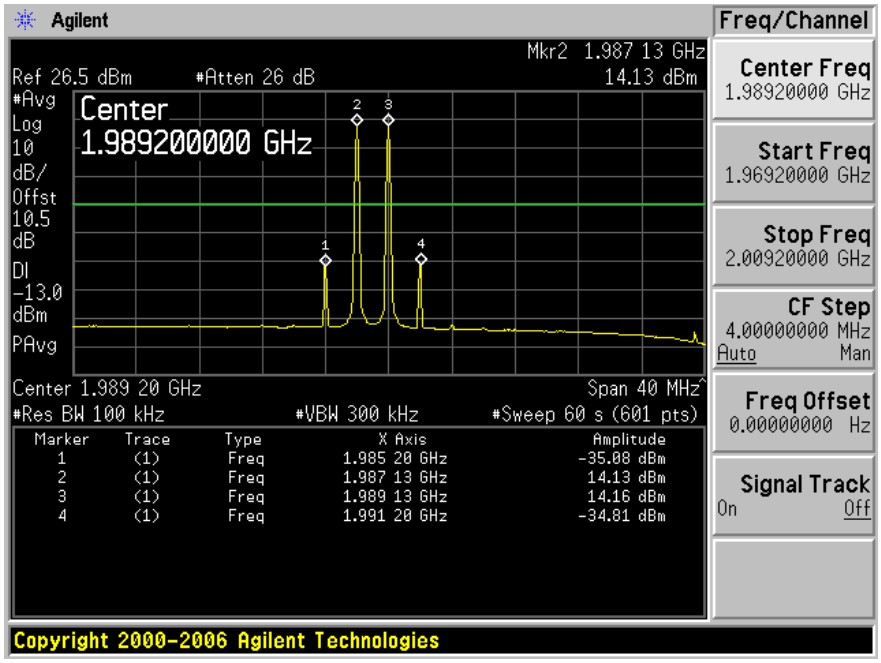
CDMA Cellular Band Downlink, High Channel: 893.2 MHz:



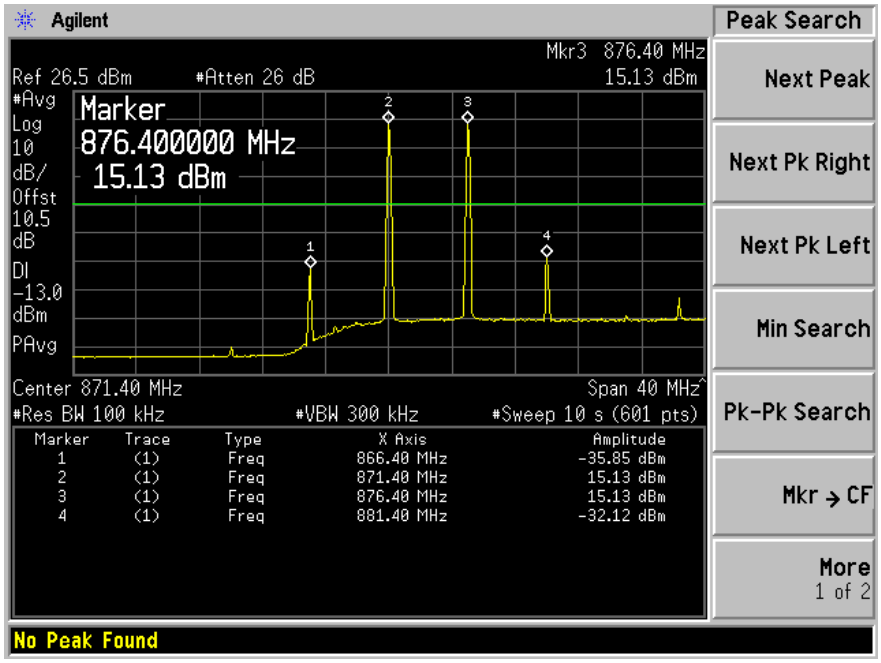
CDMA PCS Band Downlink, Low Channel: 1930.8 MHz:



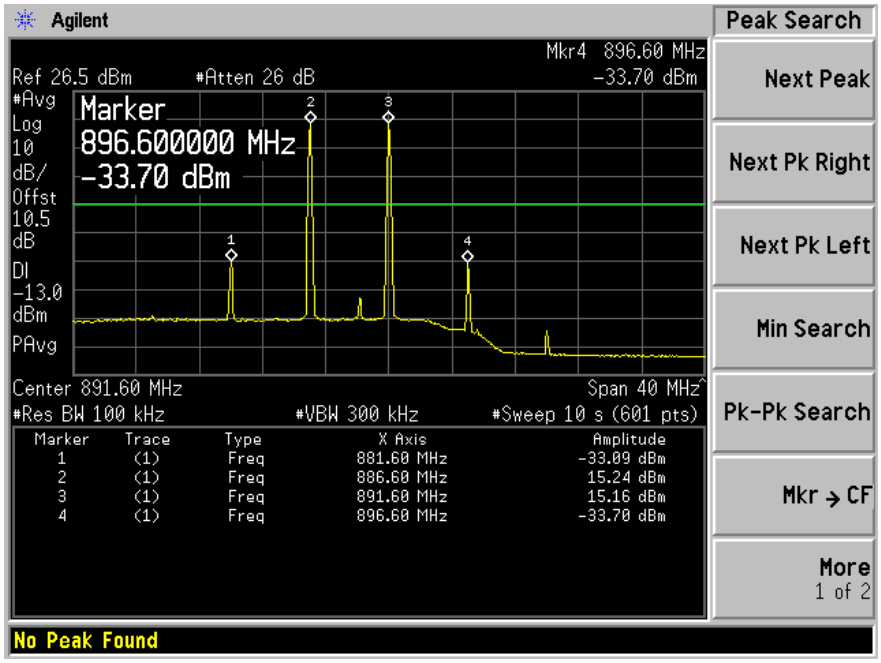
CDMA PCS Band Downlink, High Channel: 1989.2 MHz:



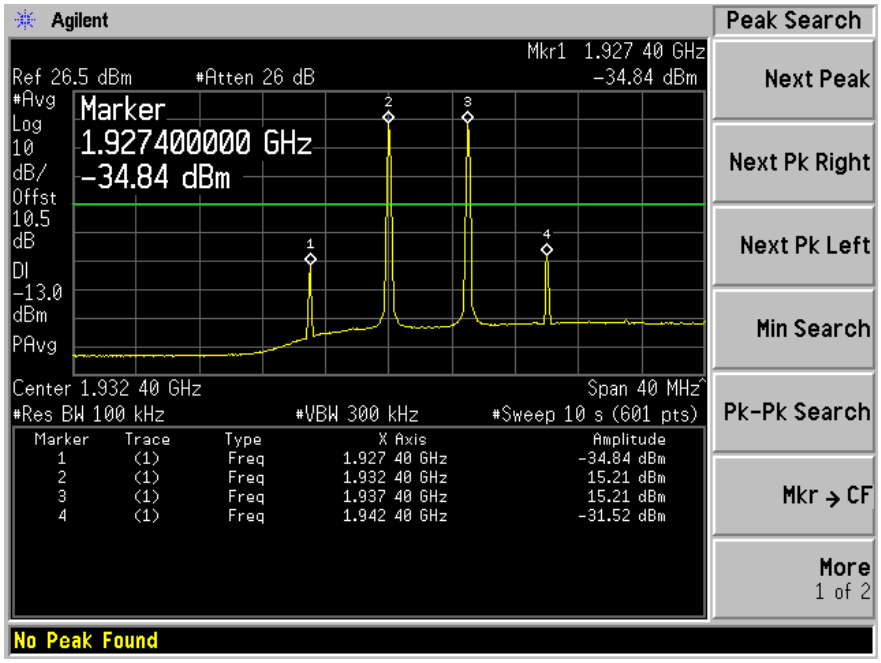
WCDMA Cellular Band Downlink, Low Channel: 871.4 MHz:



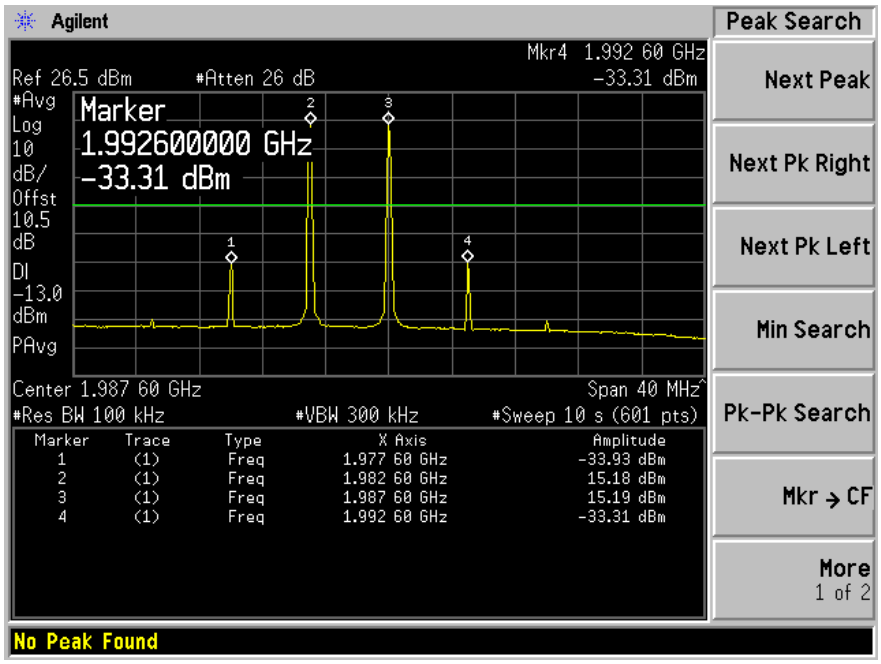
WCDMA Cellular Band Downlink, High Channel: 891.6 MHz:



WCDMA PCS Band Downlink, Low Channel: 1932.4 MHz:



WCDMA PCS Band Downlink, High Channel: 1987.2 MHz:



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:	22-24°C
Relative Humidity:	41-43 %
ATM Pressure:	101-102kPa

** The testing was performed by Dennis Huang from 2009-12-11 to 2009-12-15 in RF Site.*

9.4 Test Equipment List and Details

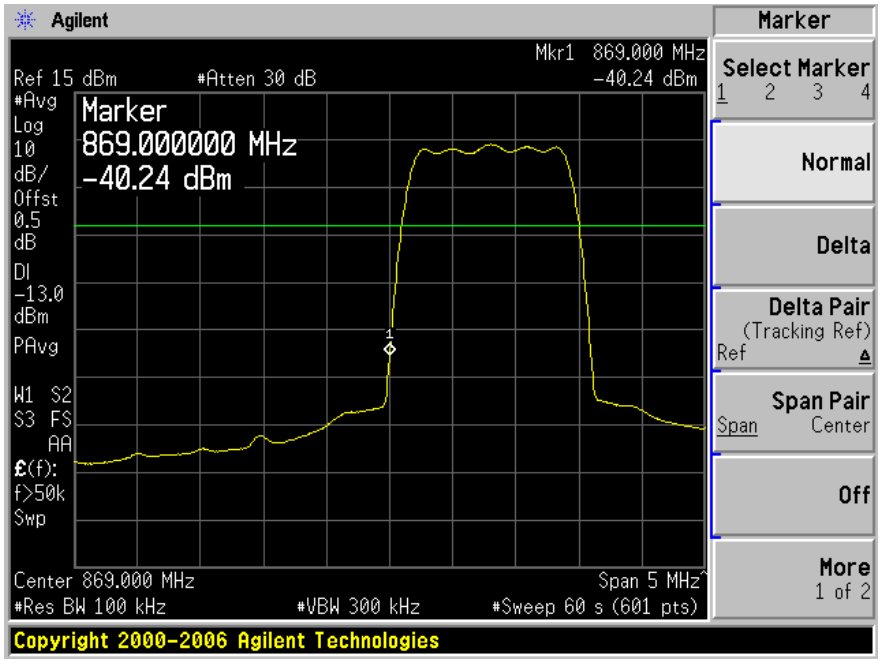
Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	MXG Vector Signal Generator	-	MY47420502	2009-09-18

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

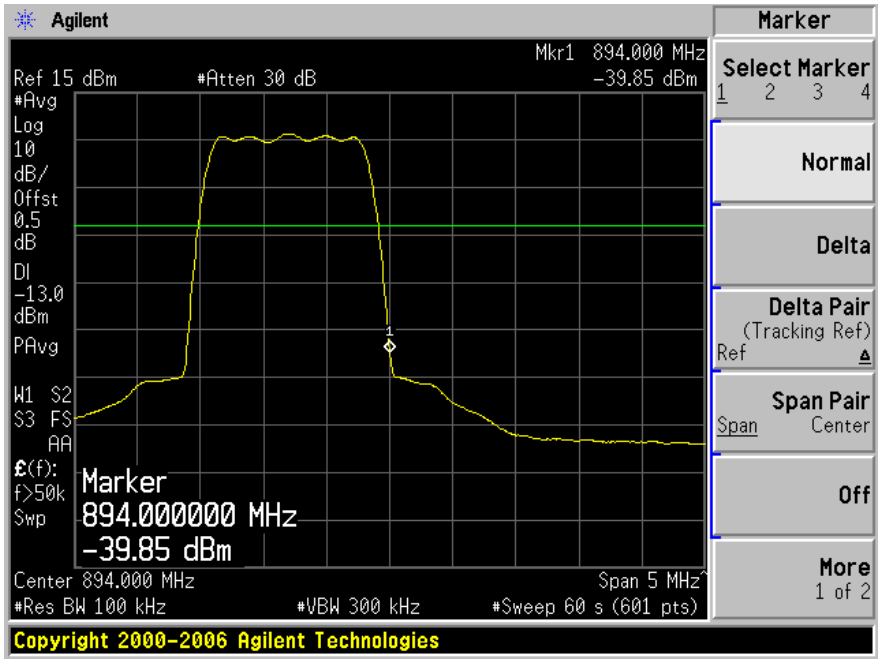
9.5 Test Results

Please refer to the following plots.

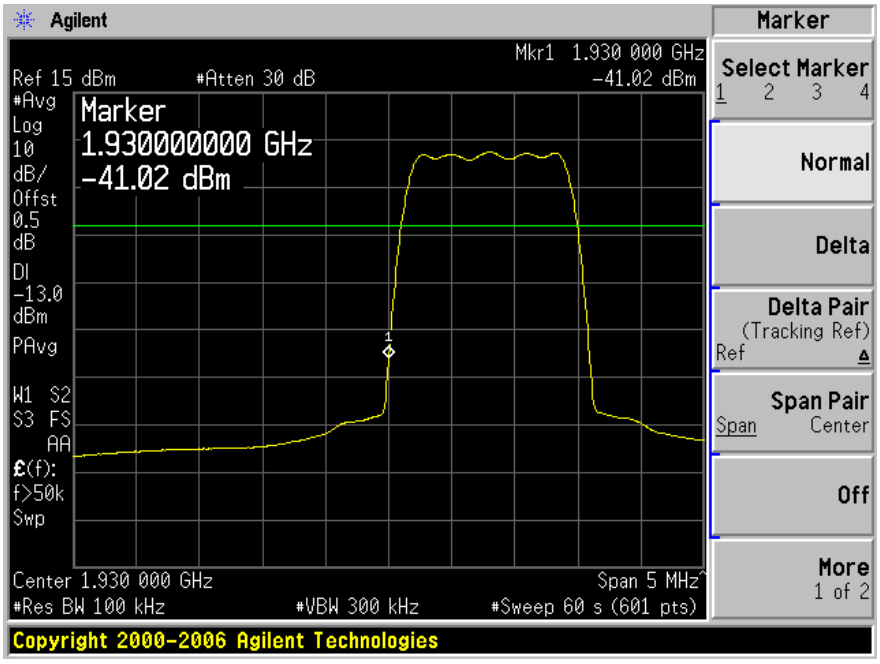
CDMA Cellular Band Downlink: Lowest Channel



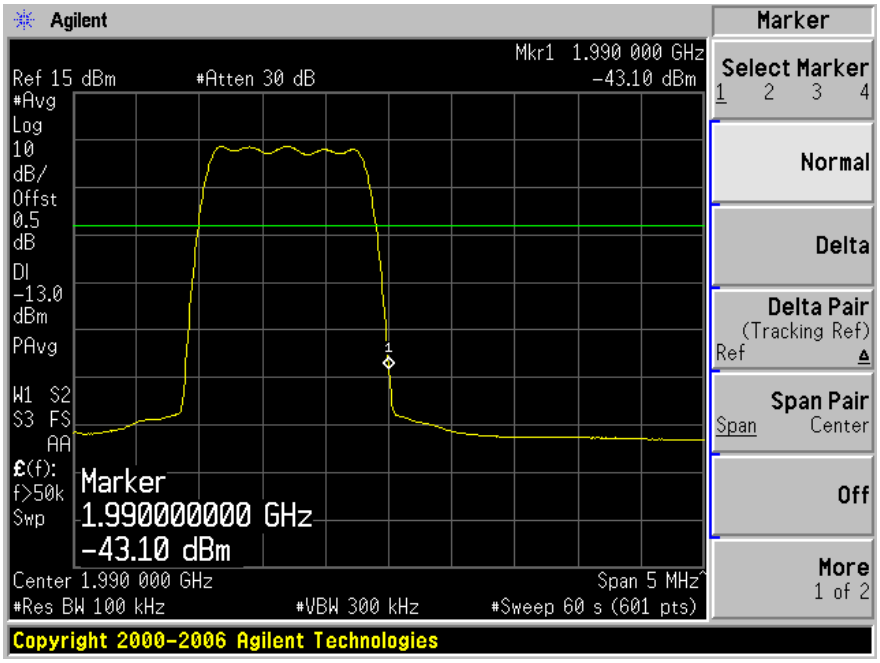
CDMA Cellular Band Downlink: Highest Channel



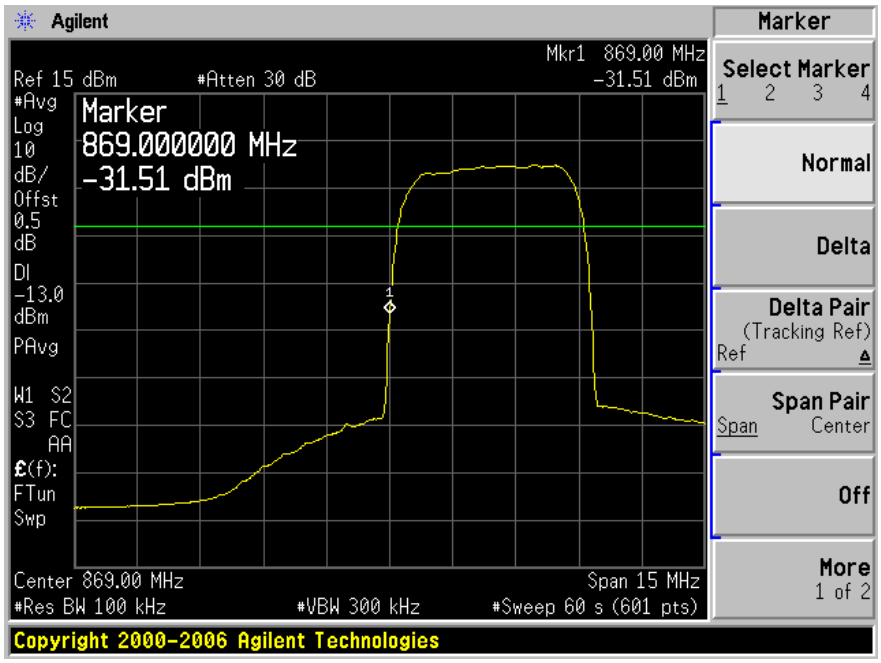
CDMA PCS Band Downlink: Lowest Channel



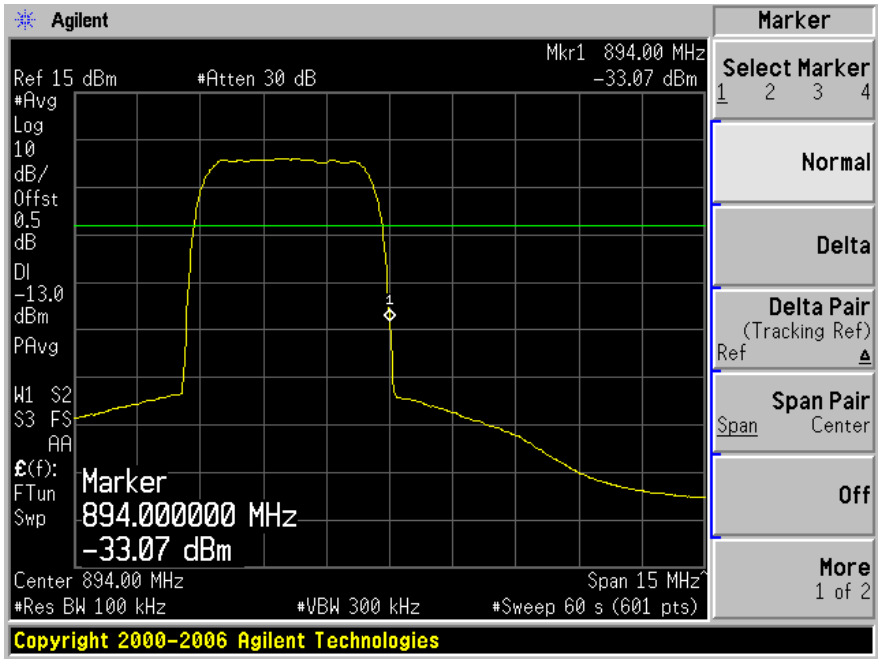
CDMA PCS Band Downlink: Highest Channel



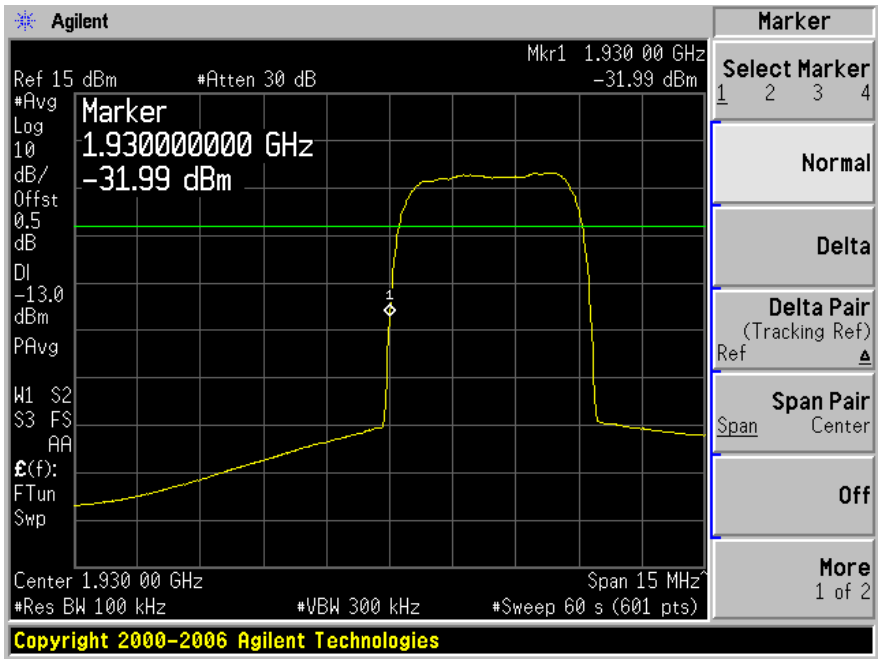
WCDMA Cellular Band Downlink: Lowest Channel



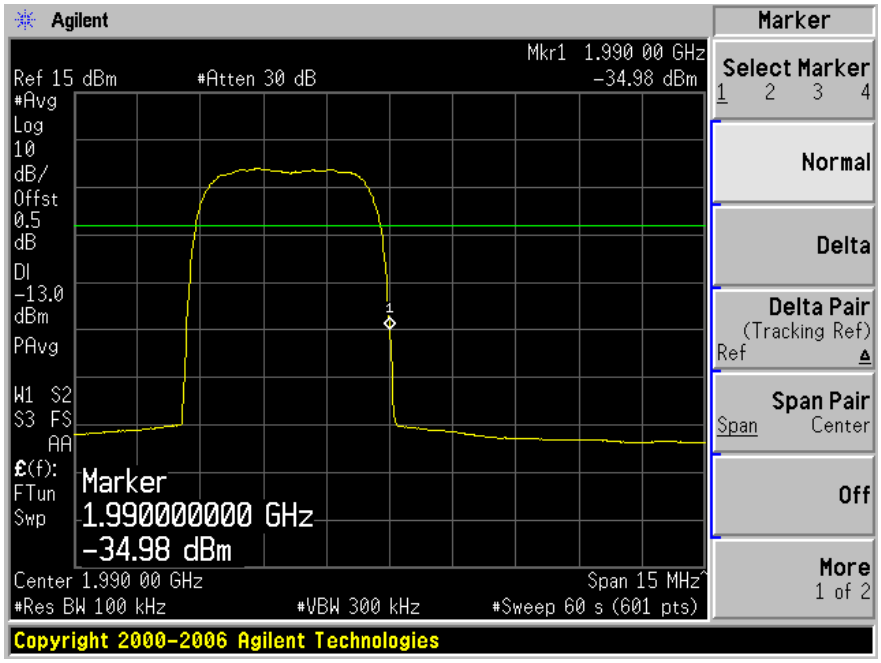
WCDMA Cellular Band Downlink: Highest Channel



WCDMA PCS Band Downlink: Lowest Channel



WCDMA PCS Band Downlink: Highest Channel



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 Procedure

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ± 0.000 25 %(± 2.5 ppm) of the center frequency.

CW was tested as worst case.

10.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	41-43 %
ATM Pressure:	101-102kPa

** The testing was performed by Dennis Huang on 2009-12-05 in RF Site.*

10.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
Agilent	Signal Generator	E4438C	MY47271125	2009-04-13
Tenney	Temperature Oven	Versa Tenn	12.431-8	2008-12-20

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

10.5 Test Results

Cellular Band, Downlink

The EUT is tested at 881.52 MHz with CW

(Frequency Drift with Supply Voltage Variation)

Voltage (Vac)	Frequency Error (Hz)	Frequency Error (ppm)
102	-167	-0.189445503
120	-158	-0.179235865
138	-165	-0.187176695

(Frequency Drift with Supply Temperature Variation)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)
50	-130	-0.147472547
-20	-105	-0.119112442

PCS Band, Downlink

The EUT is tested at 1960 MHz with CW

(Frequency Drift with Supply Voltage Variation)

Voltage (Vac)	Frequency Error (Hz)	Frequency Error (ppm)
102	-320	-0.163265306
120	-320	-0.163265306
138	-325	-0.165816327

(Frequency Drift with Supply Temperature Variation)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)
50	-260	-0.132653061
-20	-220	-0.112244898

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

Note: 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

Test Result

Please see the following MPE calculation for details.

Cellular 850 MHz Band:

CDMA:

Maximum peak output power at antenna input terminal (dBm):	15.00
Maximum peak output power at antenna input terminal (mW):	31.62
Prediction distance (cm):	20
Prediction frequency (MHz):	881.52
Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.310
Power density at predication frequency and distance (mW/cm^2):	0.0397
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5876

WCDMA:

Maximum peak output power at antenna input terminal (dBm):	15.00
Maximum peak output power at antenna input terminal (mW):	31.62
Prediction distance (cm):	20
Prediction frequency (MHz):	881.4
Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.310
Power density at predication frequency and distance (mW/cm^2):	0.0397
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.5876

PCS 1900 MHz Band:

CDMA:

Maximum peak output power at antenna input terminal (dBm):	14.99
Maximum peak output power at antenna input terminal (mW):	31.62
Prediction distance (cm):	20
Prediction frequency (MHz):	1960
Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.310
Power density at predication frequency and distance (mW/cm^2):	0.0397
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

WCDMA:

Maximum peak output power at antenna input terminal (dBm):	14.95
Maximum peak output power at antenna input terminal (mW):	31.26
Prediction distance (cm):	20
Prediction frequency (MHz):	1960
Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.310
Power density at predication frequency and distance (mW/cm^2):	0.03924
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

Test Result

For Downlink, the highest power density level at 20 cm is 0.0397mW/cm², which is below the uncontrolled exposure limit.

Note:
Antenna gain is restricted to 1.5 Watt ERP (2.49 Watt EIRP) in order to satisfy RF exposure compliance requirements. If higher than 1.5 Watt ERP, routine MPE evaluation is needed. The antennas should be installed to provide at least 20 cm from all persons to satisfy MPE requirements of FCC Part 2, 2.1091.