



FCC PART 22H, 24E  
TEST AND MEASUREMENT REPORT

For

**Brightstar Corporation**

9725 NW 117<sup>th</sup> Ave, Miami, FL, 33178

**FCC ID: WVB-GP855**

<b>Report Type:</b> Original Report	<b>Product Type:</b> GSM Fixed Wireless Phone
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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**

<b>Revision #</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	R0811145-2224	Original	2008-12-04

## 1 GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test (EUT)

This measurement and test report has been compiled on behalf of *Brightstar Corporation* and their product model: *GP885*, *FCC ID: WVB-GP855* which is a GSM Fixed Wireless Phone.

Frequency band: GSM850: 824-849 MHz (Tx); 869-894 MHz (Rx)  
PCS1900: 1850-1910 MHz (Tx); 1930-1990 MHz (Rx)

### 1.2 EUT Photo



*Additional Photos in Exhibit C*

### 1.3 Mechanical Description

The EUT measures approximately 200 mm (L) x 199.4mm (W) x 53.6 mm (H), and weighs approximately 730 g.

*\* The test data gathered are from typical production sample, serial number: B2032 Sample ID: 72203 provided by the BACL.*

### 1.4 Objective

This type approval report is prepared on behalf of *Brightstar Corporation* 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.

This measurement and test report only pertains to the GSM 850/1900 portion of the EUT.

### **1.5 Related Submittal(s)/Grant(s)**

N/A

### **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/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/hdocs/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

An RFID simulation program was provided by the customer.

### 2.3 Special Accessories

N/A

### 2.4 Equipment Modifications

No modifications were made to the EUT

### 2.5 Remote Support Equipment

N/A

### 2.6 Local Support Equipment

Manufacturer	Description	Model	Serial Number
HP	Laptop	T41	99-KHVP2

### 2.7 Power Supply and Line Filters

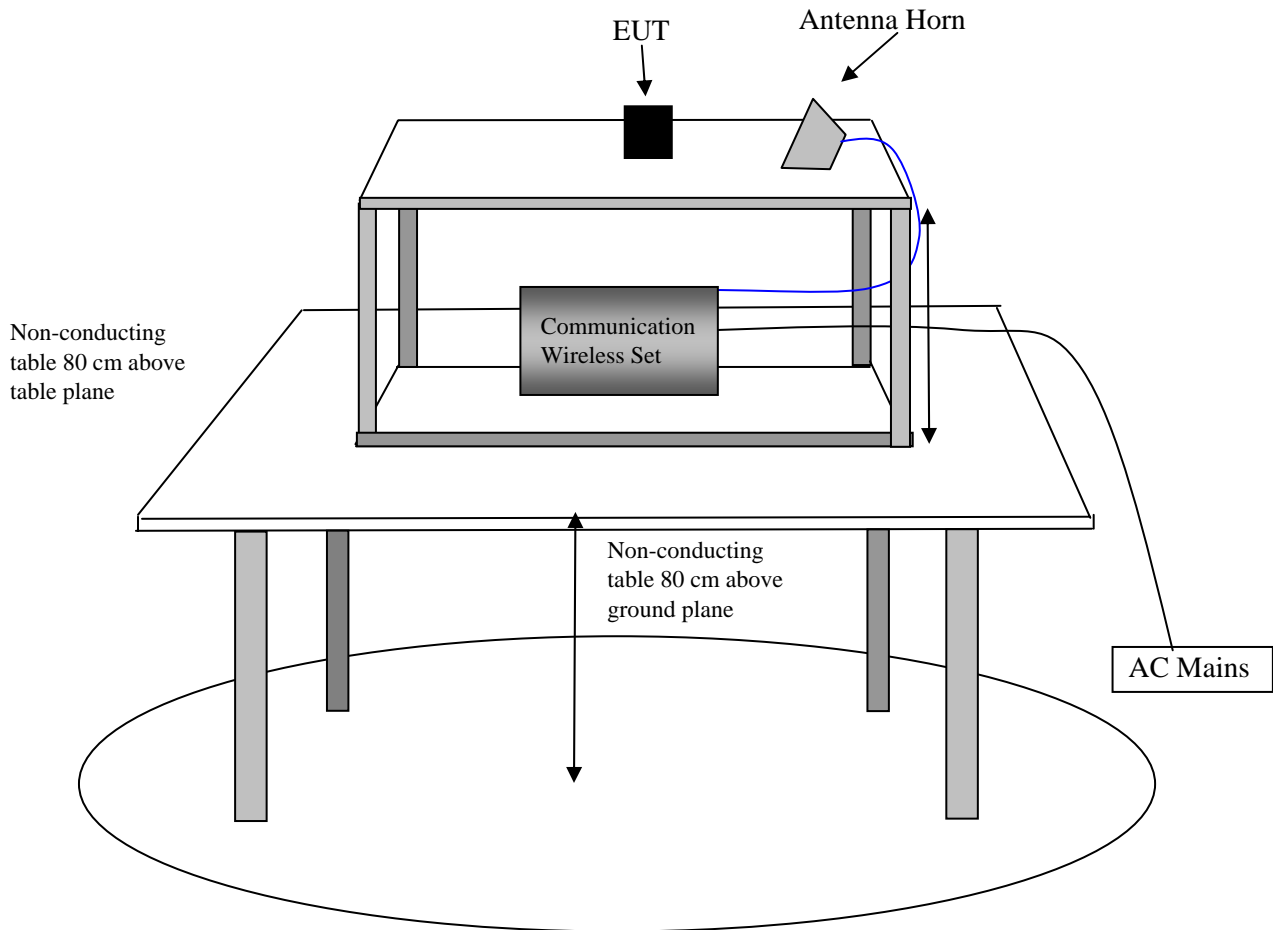
Manufacturer	Description	Model	Serial Number
Ruide Electronical Industrial Co., Ltd.	AC/DC Adapter	STC-A22O50C55-C	B2032

### 2.8 Interface Ports and Cabling

Cable Description	From	To
-	-	-



### 2.9 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 § 22.917(a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§2.1091	RF Exposure	Compliant
§ 2.1046 § 22.913 § 24.232	RF Output Power	Compliant
§ 2.1049 § 22.917 § 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

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## **4 §2.1047 - MODULATION CHARACTERISTIC**

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### **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 <sup>2</sup> )	Averaging Time (minute)
<b>Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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

Prediction 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 (dBm): 32.77

Maximum peak output power at antenna input terminal (mW): 1892.34

Prediction distance (cm): 25

Prediction frequency (MHz): 836.6

Antenna Gain, typical (dBi): 2.0

Maximum Antenna Gain (numeric): 1.585

Power density at predication frequency and distance (mW/cm<sup>2</sup>): 0.382

MPE limit for uncontrolled exposure at predication frequency (mW/cm<sup>2</sup>): 0.5577

**PCS Band**

Maximum peak output power at antenna input terminal (dBm):	29.37
Maximum peak output power at antenna input terminal (mW):	865
Prediction distance (cm):	25
Prediction frequency (MHz):	1880.0
Antenna Gain, typical (dBi):	2.0
Maximum Antenna Gain (numeric):	1.585
Power density at predication frequency and distance (mW/cm <sup>2</sup> ):	0.175
MPE limit for uncontrolled exposure at predication frequency (mW/cm <sup>2</sup> ):	1.0

**5.3 Test Result**

The device is compliant with the requirement MPE limit for uncontrolled. The maximum power density at the distance of 25 cm was 0.5577 mW/cm<sup>2</sup>. Thus, the requirement of at least 25 cm required by the manufacturer is in compliance with the MPE requirement. The distance has been addressed on the user manual.

## 6 §2.1053 - RADIATED SPURIOUS 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 log (TX power in Watts/0.001) – the absolute level  
 Spurious attenuation limit in dB = 43 + 10 Log<sub>10</sub> (power out in Watts)

### 6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24*
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-28
Sunol Sciences	Antenna	JB1	A103105-3	2009-03-25
A.R.A	Horn Antenna	DRG-118/A	1132	2009-07-28
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2009-07-01
HP	Pre-Amplifier	8449B	3008A01978	2008-11-02
HP	Pre-Amplifier	8447D	2944A06639	2008-12-19

\* 2-year calibration cycle

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

### 6.4 Environmental Conditions

Temperature:	22 °C ~ 24 °C
Relative Humidity:	40 % ~ 60 %
ATM Pressure:	101.1 kPa ~ 101.6 kPa

\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2

## 6.5 Summary of Test Results

Worst case reading as follows:

Mode: Transmitting		
Margin (dB)	Frequency (MHz)	Antenna Polarization (Horizontal/Vertical)
-11.96	1673.2	Horizontal

### Test Data

Run # 1: 30MHz -10GHz Cellular Band Middle Channel (836.6 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant Cord. (dBi)	Cable Loss (dB)			
1673.2	73.73	76	154	H	1673.2	-33.11	9.2	1.05	-24.96	-13	-11.96
1673.2	73.34	207	100	V	1673.2	-35.06	9.2	1.05	-26.91	-13	-13.91
2509.8	64.53	244	111	V	2509.8	-35.98	9.4	1.37	-27.95	-13	-14.95
2509.8	64.11	139	103	H	2509.8	-38.32	9.4	1.37	-30.29	-13	-17.29
914.3	66.86	338	100	V	914.3	-31.68	0	0.63	-32.31	-13	-19.31
914.3	69.2	33	173	H	914.3	-32.52	0	0.63	-33.15	-13	-20.15
758.6	65.65	39	100	H	758.6	-39.4	0	0.52	-39.92	-13	-26.92
758.6	58.61	19	249	V	758.6	-44.08	0	0.52	-44.6	-13	-31.60

Run # 2: 30MHz -20GHz PCS Band Middle Channel (1880 MHz)

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amplitude (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant Cord. (dBi)	Cable Loss (dB)			
3760	59.56	25	105	V	3760	-37.32	10.6	1.8	-28.52	-13	-15.52
3760	53.96	108	222	H	3760	-45.97	10.6	1.8	-37.17	-13	-24.17
162.49	60.94	223	138	H	162.49	-49.87	0	0.3	-50.17	-13	-37.17

## 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.

Radiated (ERP and EIRP):

TIA-603-C §2.2.17

### 7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24*
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-28
Sunol Sciences	Antenna	JB1	A103105-3	2009-03-25
A.R.A	Horn Antenna	DRG-118/A	1132	2009-07-28
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2009-07-01
HP	Pre-Amplifier	8449B	3008A01978	2008-11-02
HP	Pre-Amplifier	8447D	2944A06639	2008-12-19

\* 2-year calibration cycle

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

### 7.4 Environmental Conditions

<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2



## 7.5 Summary of Test Results

### Conducted Output Power

#### Cellular Band

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (dBm)
Low	824.2	32.52	1786	38.45
Middle	836.6	32.60	1820	38.45
High	848.8	32.77	1892	38.45

#### PCS Band

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (dBm)
Low	1850.2	29.31	853	33
Middle	1880.0	29.37	865	33
High	1909.8	29.30	851	33

### Radiated Power (ERP/EIRP)

#### Cellular Band

Indicated		Azimuth (degree)	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
Frequency (MHz)	Amplitude (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dBd)				Cable Loss (dB)
836.6	109.57	63	100	H	836.6	36.05	0	0.65	35.40	38.45	-3.05
824.2	109.71	63	100	H	824.2	35.76	0	0.65	35.11	38.45	-3.34
848.8	109.1	63	100	H	848.8	35.54	0	0.65	34.89	38.45	-3.56
848.8	105.52	50	100	V	848.8	32.94	0	0.65	32.29	38.45	-6.16
824.2	105.17	20	111	V	824.2	32.82	0	0.65	32.17	38.45	-6.28
836.6	105.06	20	100	V	836.6	32.41	0	0.65	31.76	38.45	-6.69

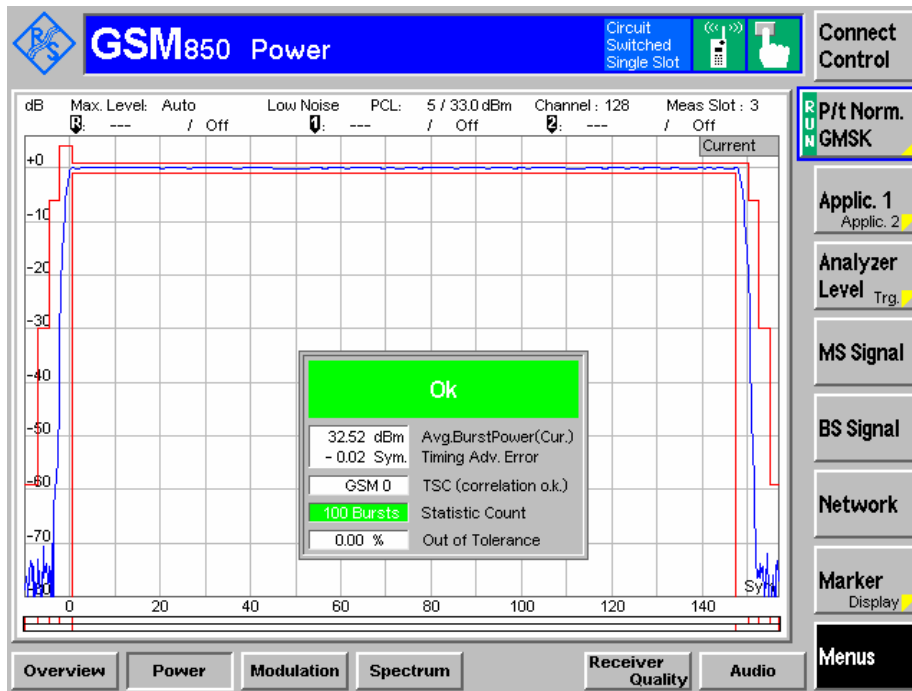
#### PCS Band

Indicated		Azimuth (degree)	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
Frequency (MHz)	Amplitude (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dBi)				Cable Loss (dB)
1880.0	92.49	247	220	V	1880	21.46	9	1.14	29.32	33	-3.68
1909.8	91.69	220	171	V	1909.8	21.03	9	1.14	28.89	33	-4.11
1850.2	91.98	247	220	V	1850.2	19.85	9.5	1.09	28.26	33	-4.74
1850.2	90.86	219	100	H	1850.2	19.67	9.5	1.09	28.08	33	-4.92
1880.0	90.27	219	100	H	1880	20.17	9	1.14	28.03	33	-4.97
1909.8	90.18	219	100	H	1909.8	19.69	9	1.14	27.55	33	-5.45

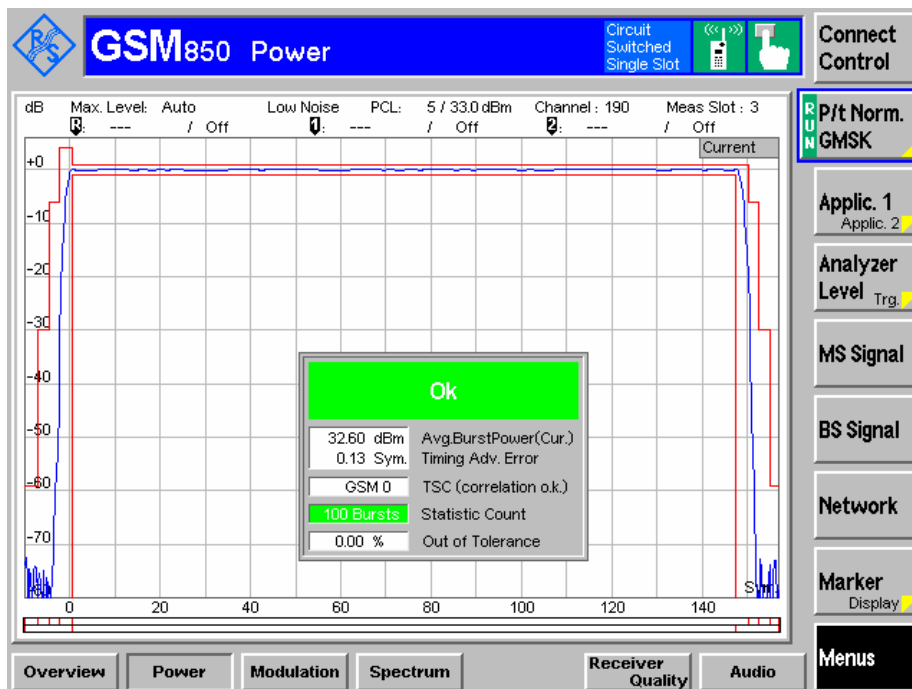
## 7.6 Test Plots

### Conducted Output Power of Cellular Band

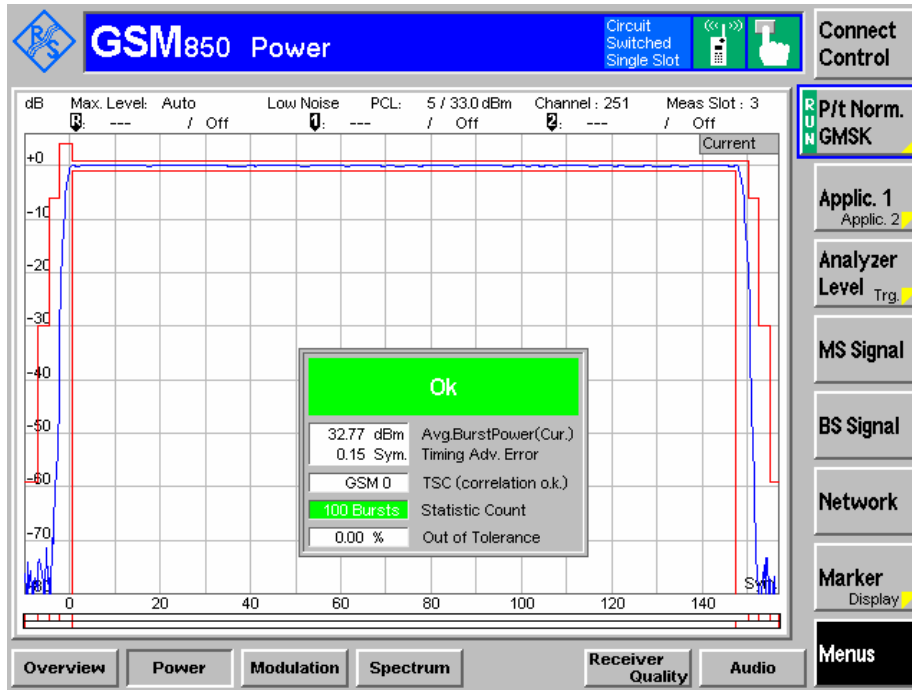
#### Low Channel



#### Middle Channel

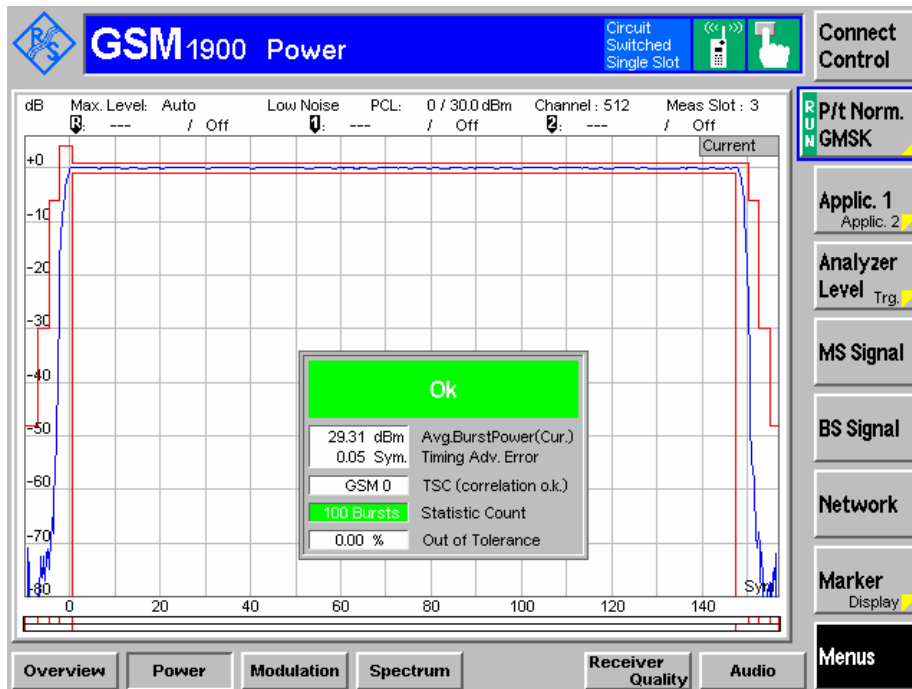


### High Channel

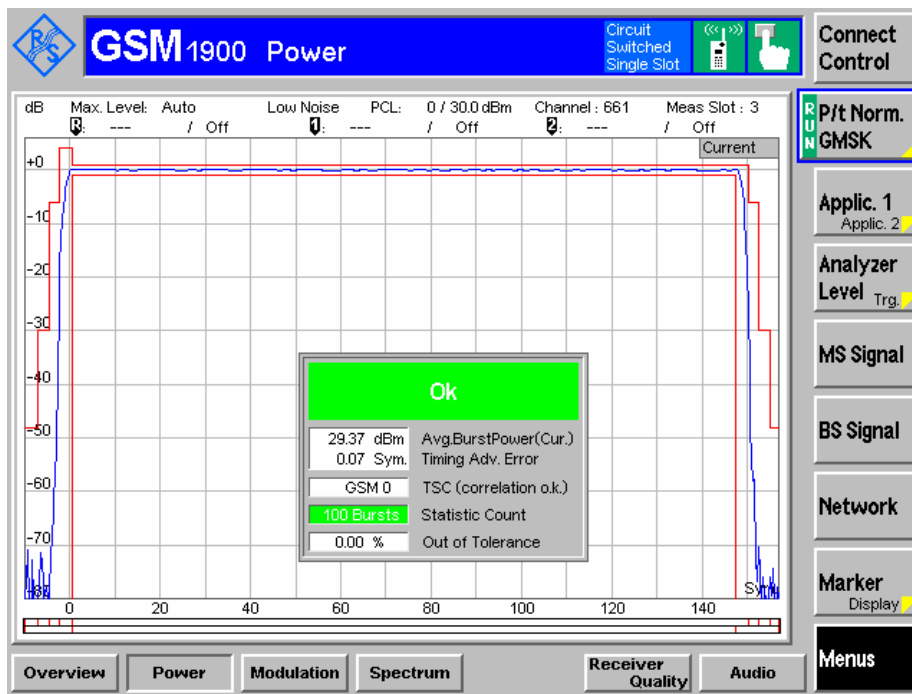


### Conducted Output Power of PCS Band

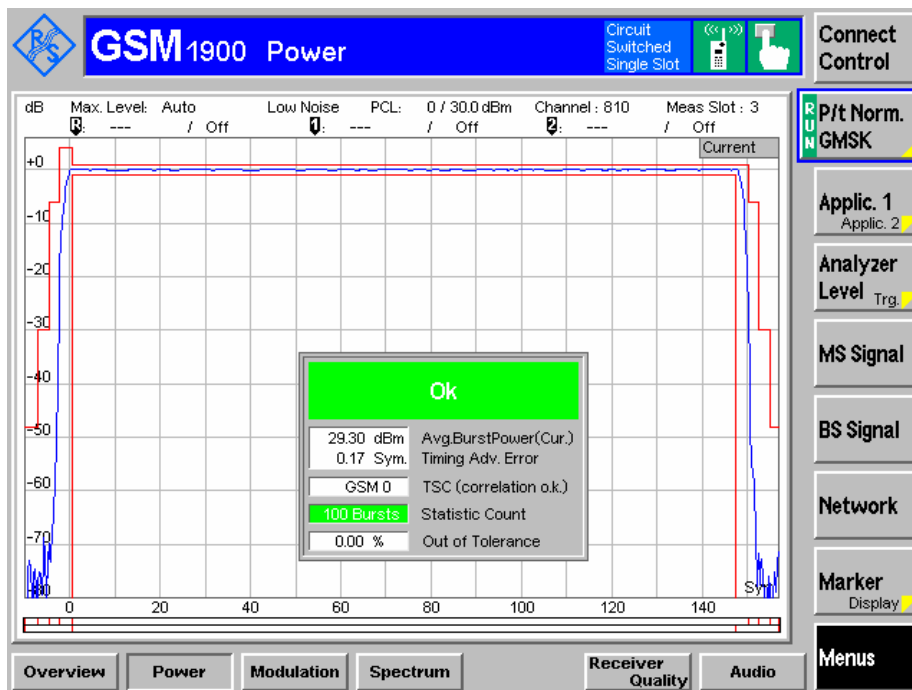
### Low Channel



### Middle Channel



### 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 3 kHz (Cellular /PCS) and the -26 dB bandwidth was recorded.

### 8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24*
Agilent	Communication, Radio Universal	E5155C	GB44051221	2009-08-08*
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-05-19

\* 2-year calibration cycle

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

### 8.4 Environmental Conditions

<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2

## 8.5 Test Data and Plots

Cellular Band:

Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	824.2	334.311	251.4870
Middle	836.6	328.644	248.4775
High	848.8	331.937	248.5635

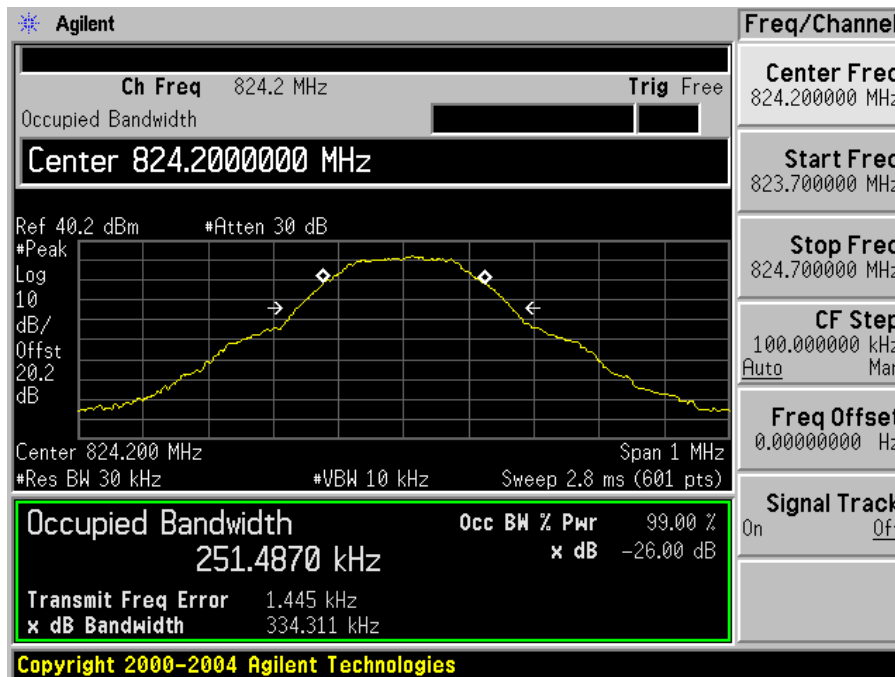
PCS Band:

Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	1850.2	336.007	251.5774
Middle	1880.0	331.415	251.0901
High	1909.8	333.068	249.4710

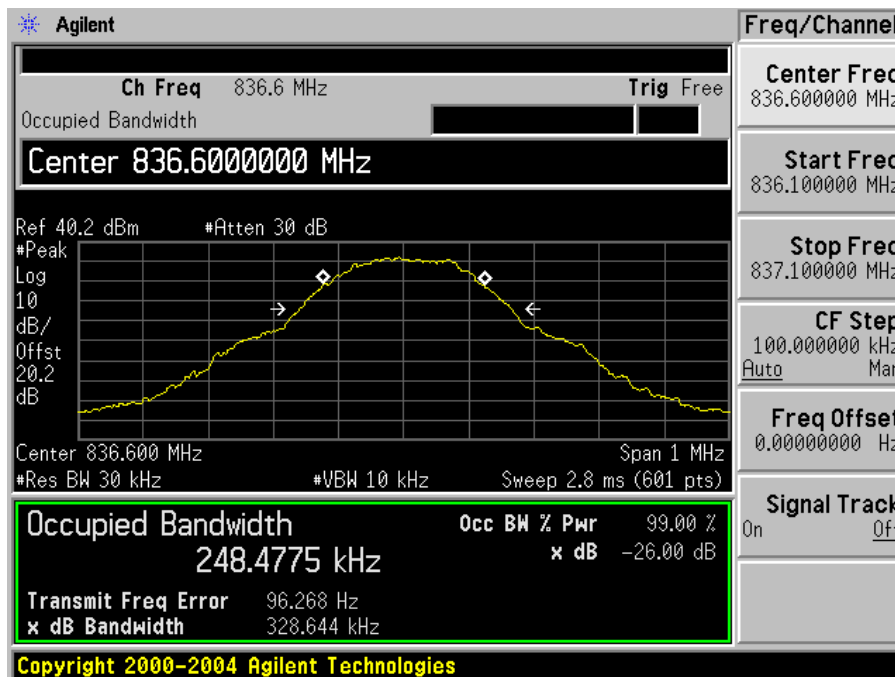
Please refer to the following plots.

Occupied Bandwidth of Cellular Band:

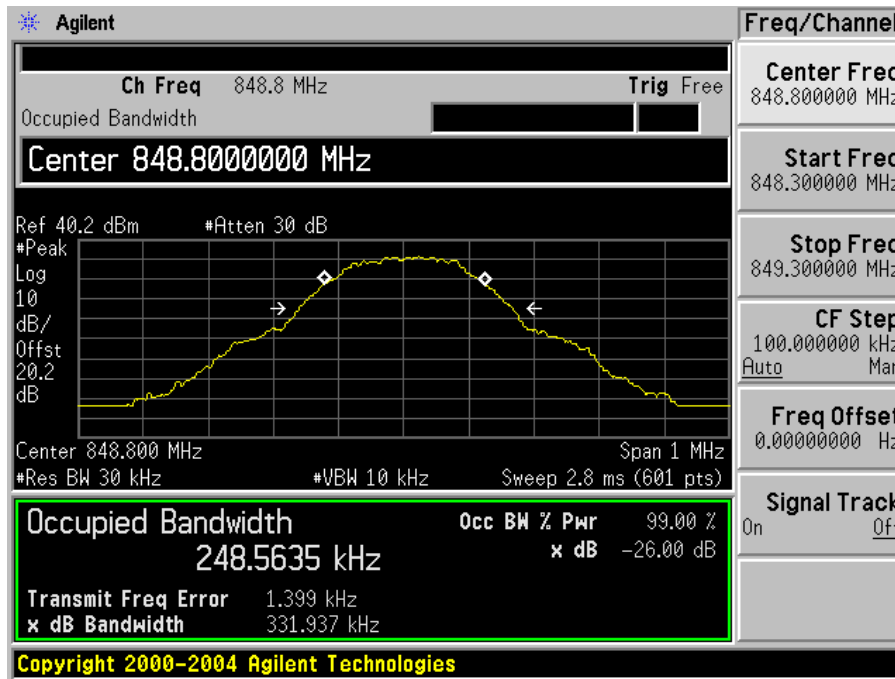
Low Channel



Middle Channel

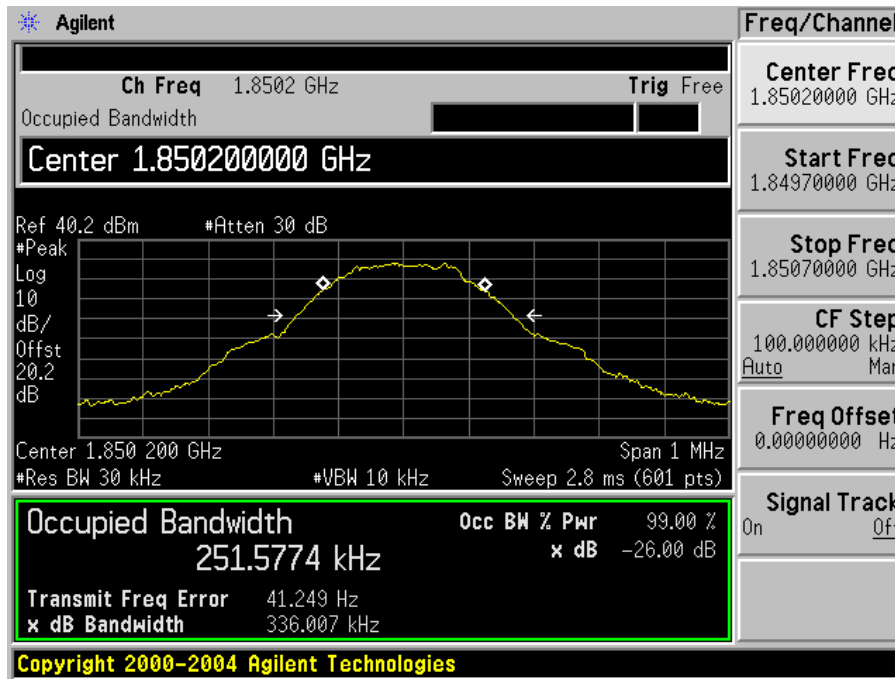


### High Channel



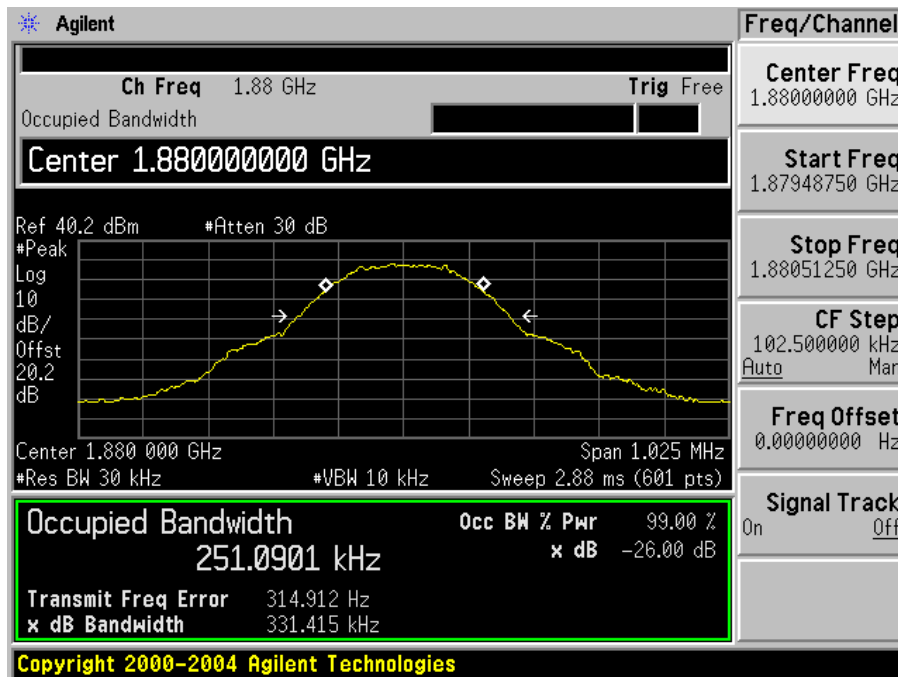
Occupied Bandwidth of PCS Band:

### Low Channel

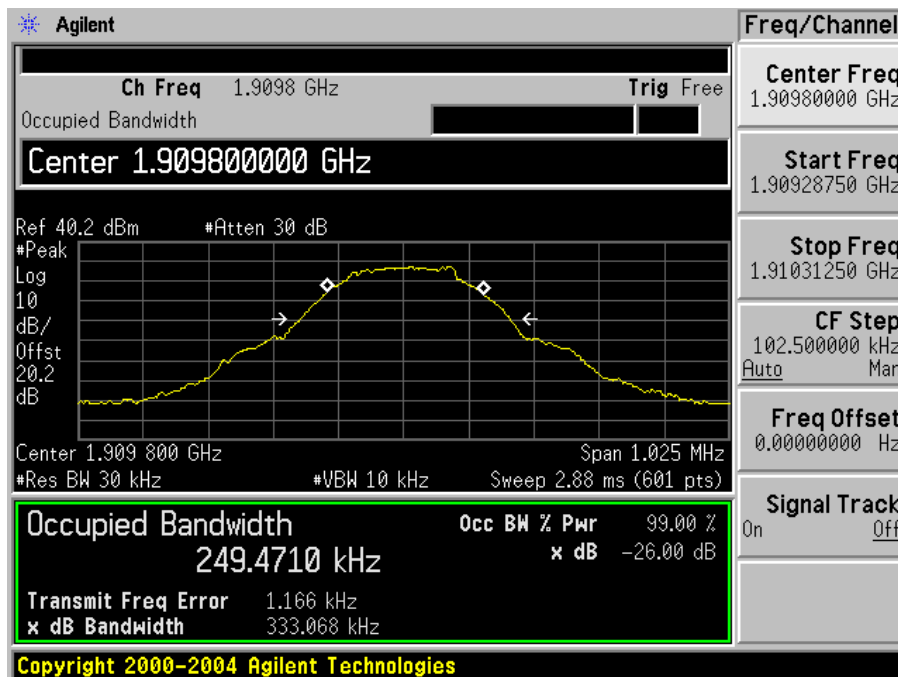




Middle Channel



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 10<sup>th</sup> harmonic.

### 9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24*
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-05-19

\* 2-year calibration cycle

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

### 9.4 Environmental Conditions

<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

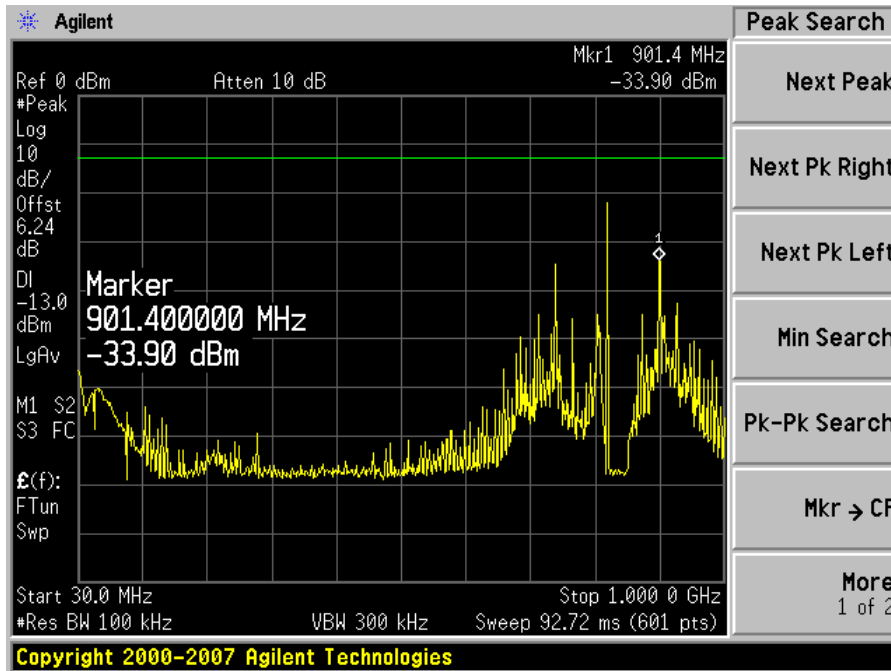
\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2

Please refer to the plots featured hereinafter

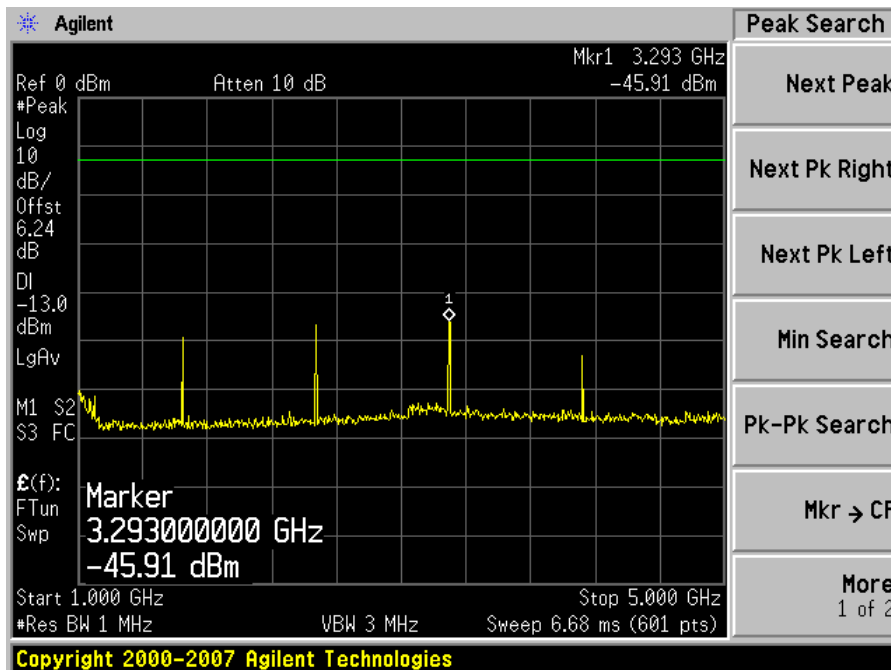
### 9.5 Test Data and Plots

Plots of Antenna Port Spurious Emissions for Cellular Band:

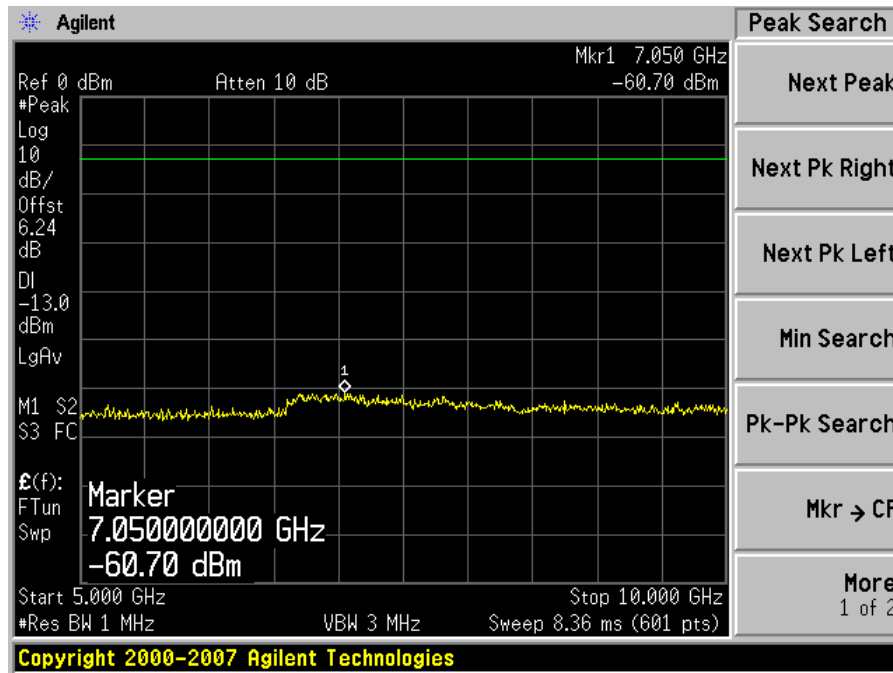
Low Channel (f = 824.2 MHz)



Plot 1a: 30 MHz – 1 GHz

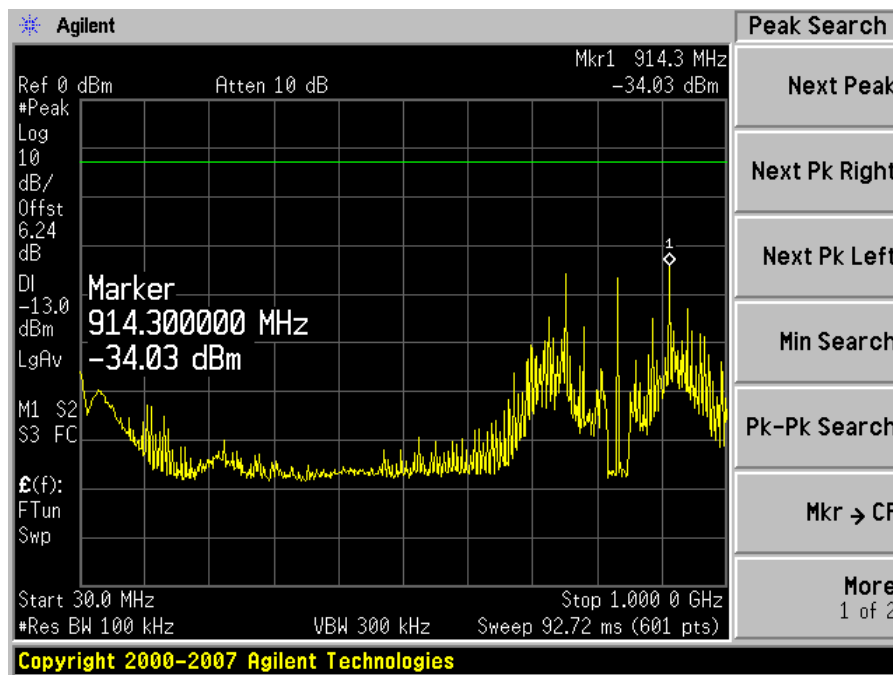


Plot 2a: 1 – 5 GHz

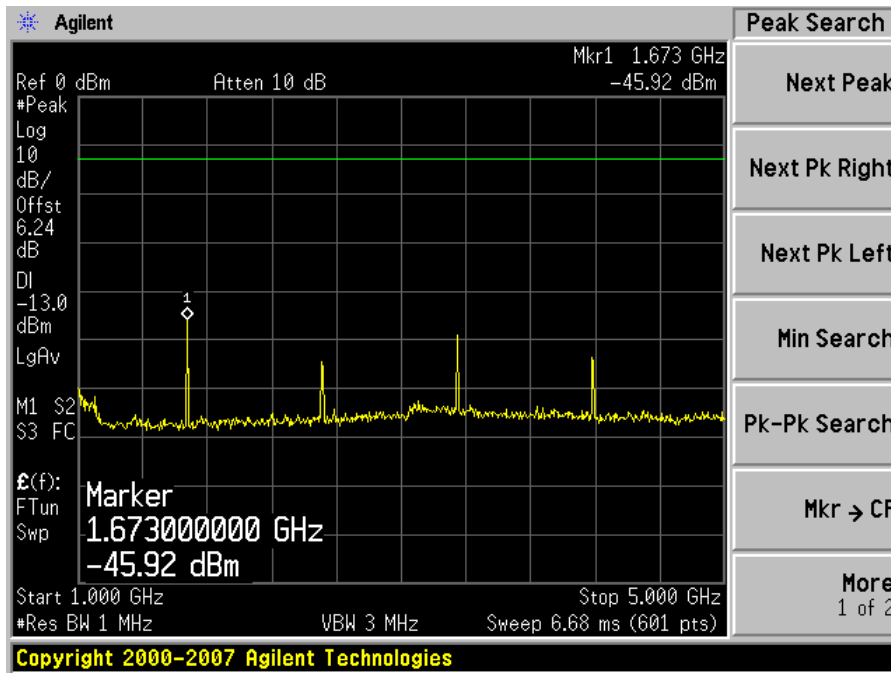


Plot 3a: 5 – 10 GHz

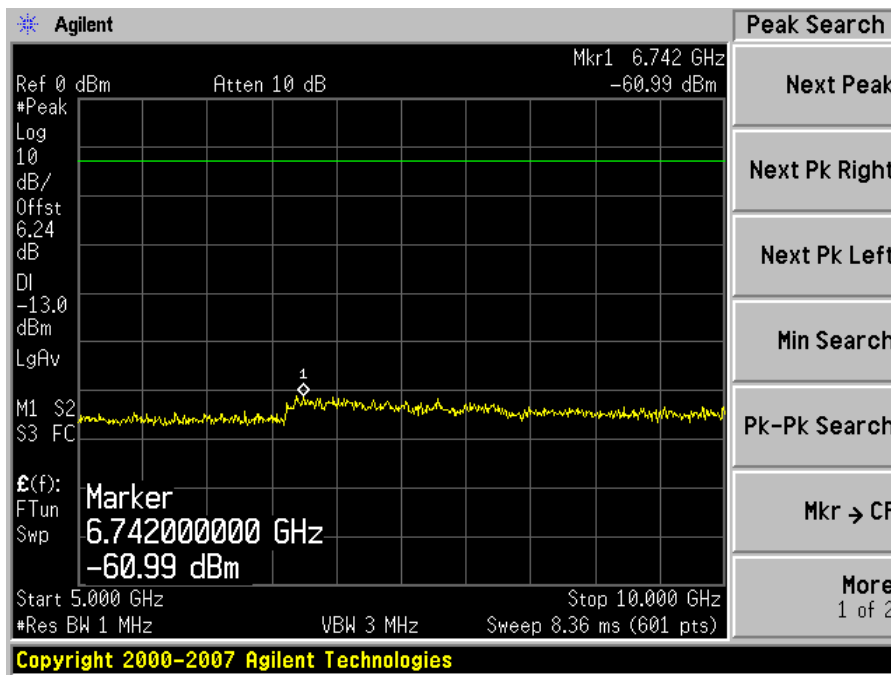
**Middle Channel (f = 836.6 MHz)**



Plot 1b: 30 MHz – 1 GHz

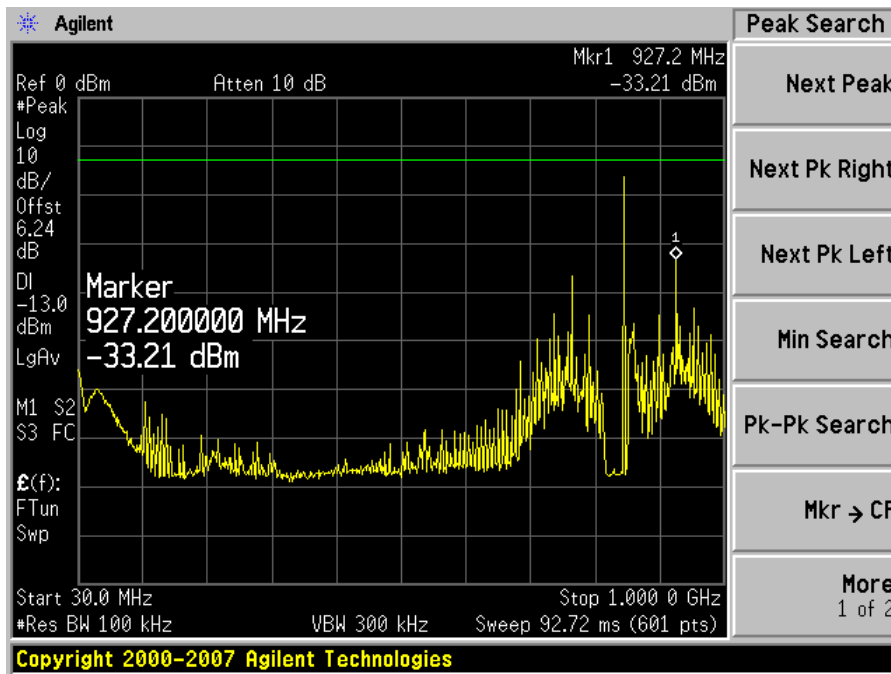


Plot 2b: 1 – 5 GHz

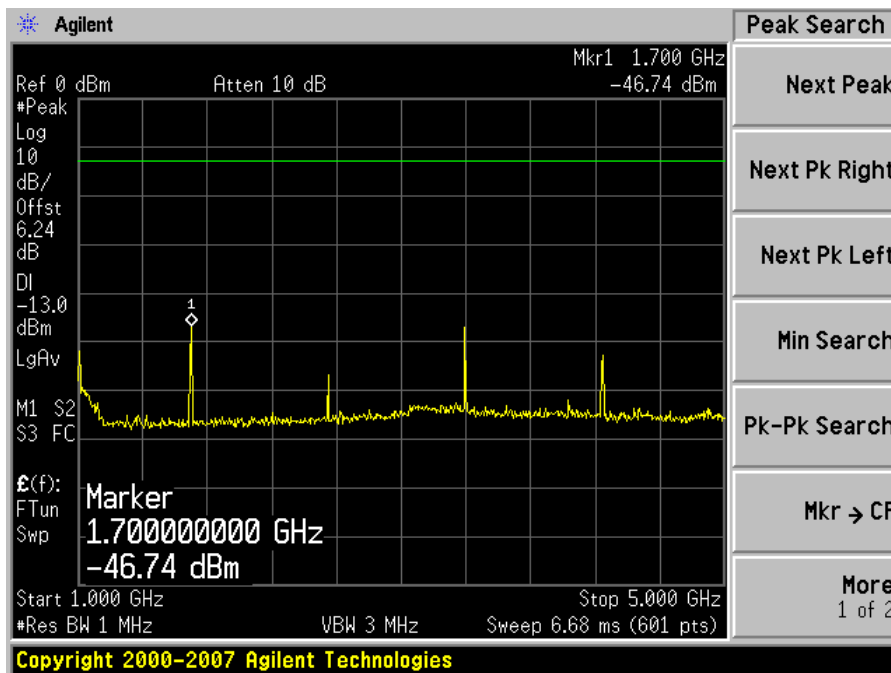


Plot 3b: 5 – 10 GHz

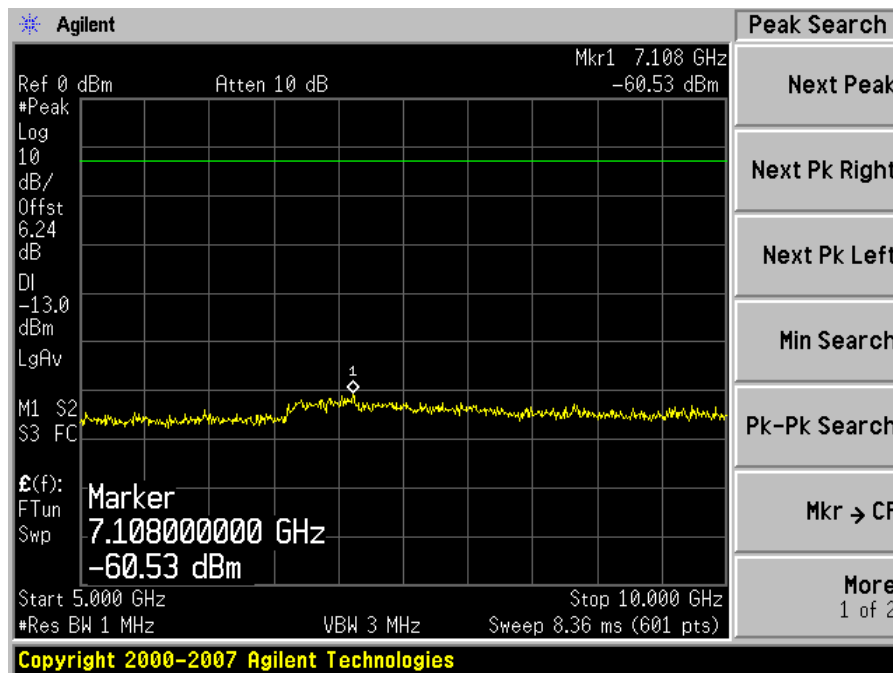
High Channel (f = 848.8 MHz)



Plot 1c: 30 MHz – 1 GHz



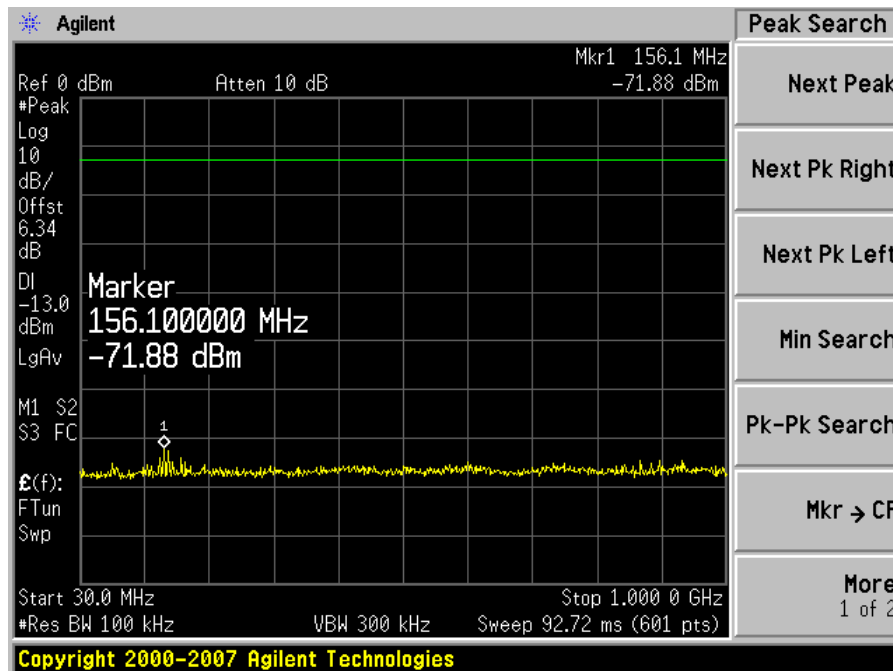
Plot 2c: 1 – 5 GHz



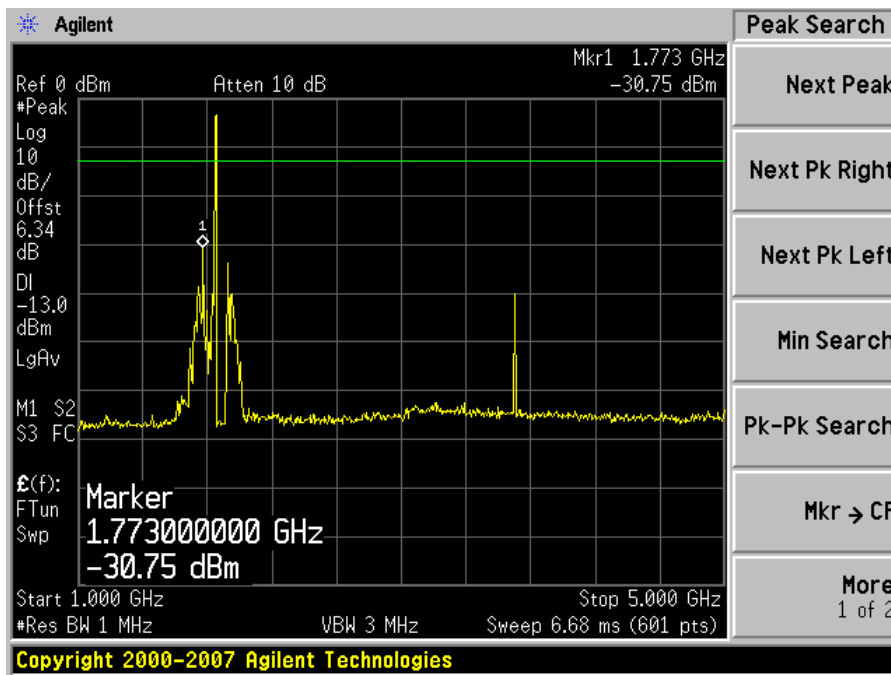
Plot 3c: 5 – 10 GHz

Plots of Antenna Port Spurious Emissions for PCS Band:

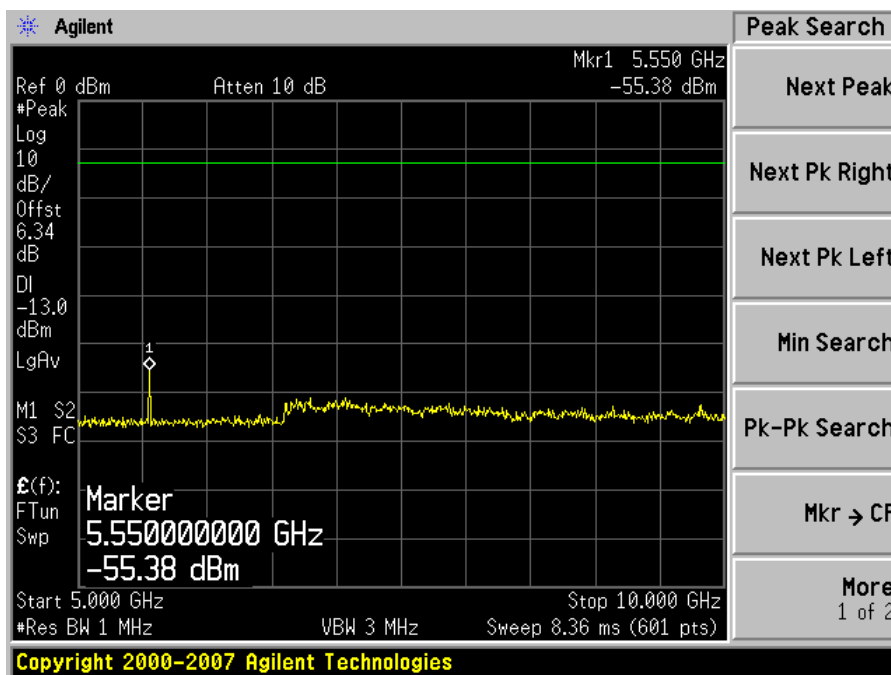
**Low Channel (f = 1850.2 MHz)**



Plot 1d: 30 – 1 GHz

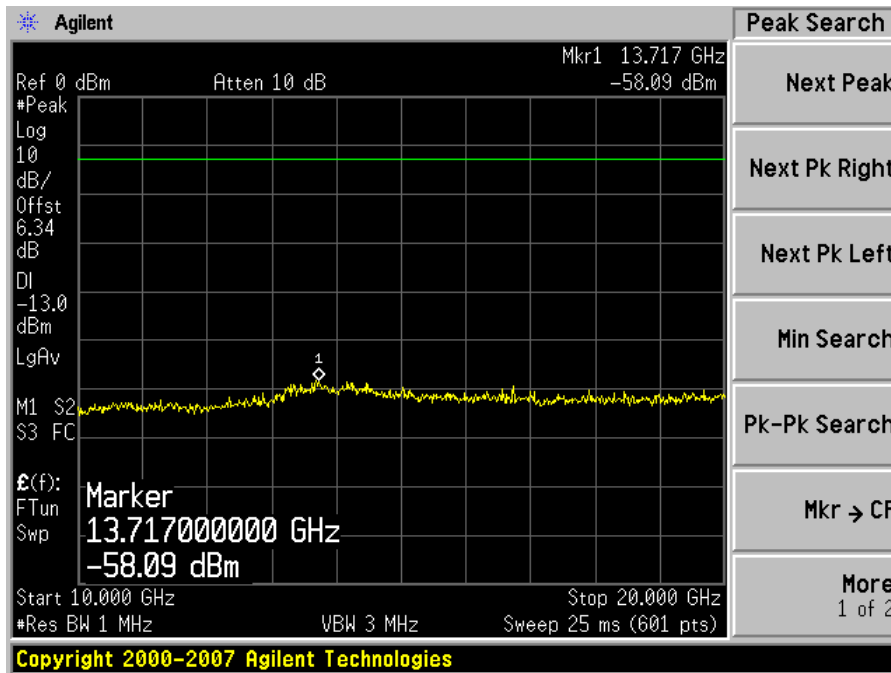


Plot 2d: 1 – 5 GHz



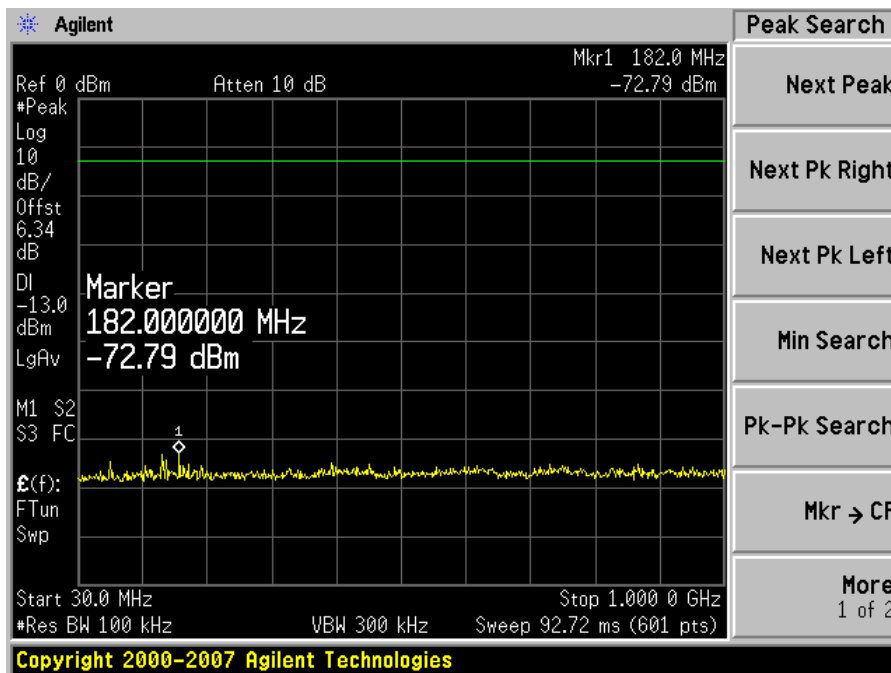
Plot 3d: 5 – 10 GHz



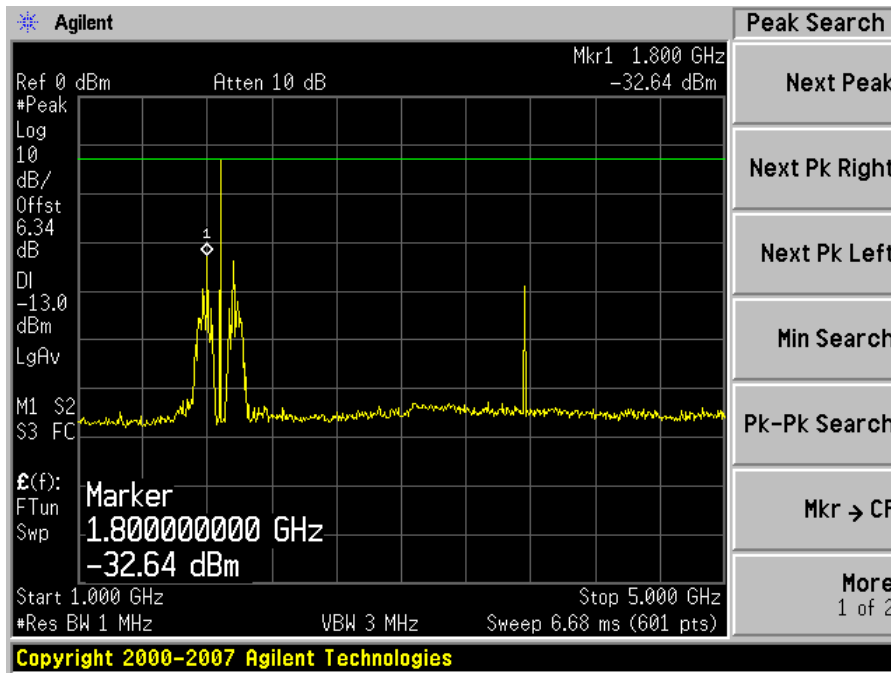


Plot 4d: 10 – 20 GHz

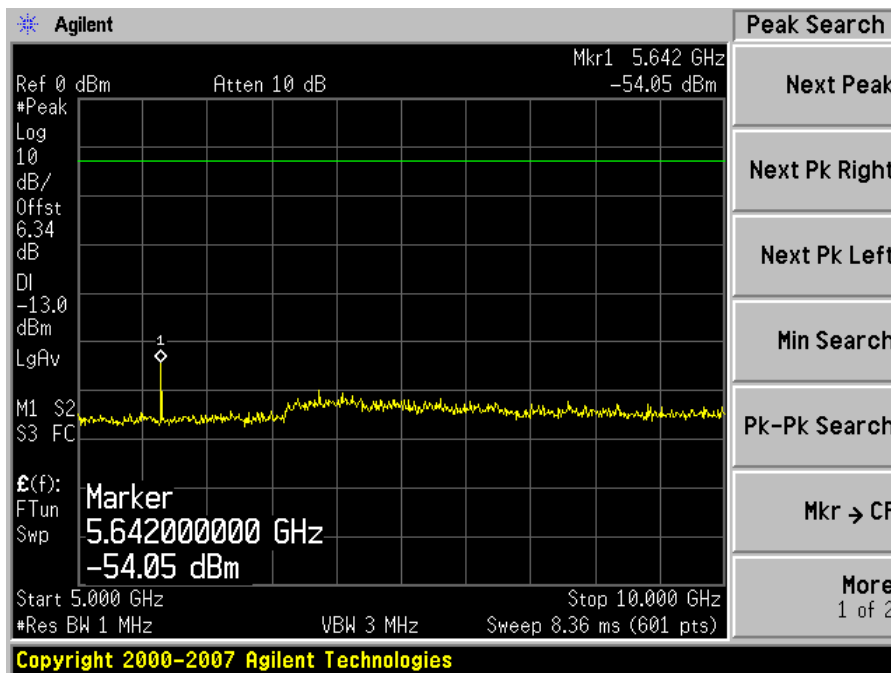
Middle Channel (f = 1880 MHz)



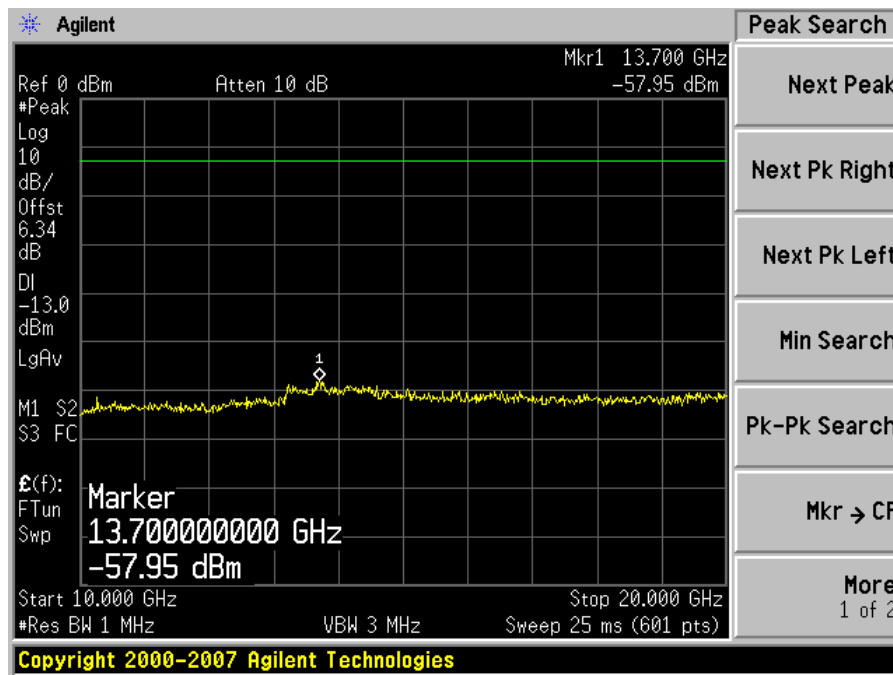
Plot 1e: 30 MHz – 1 GHz



Plot 2e: 1 – 5 GHz

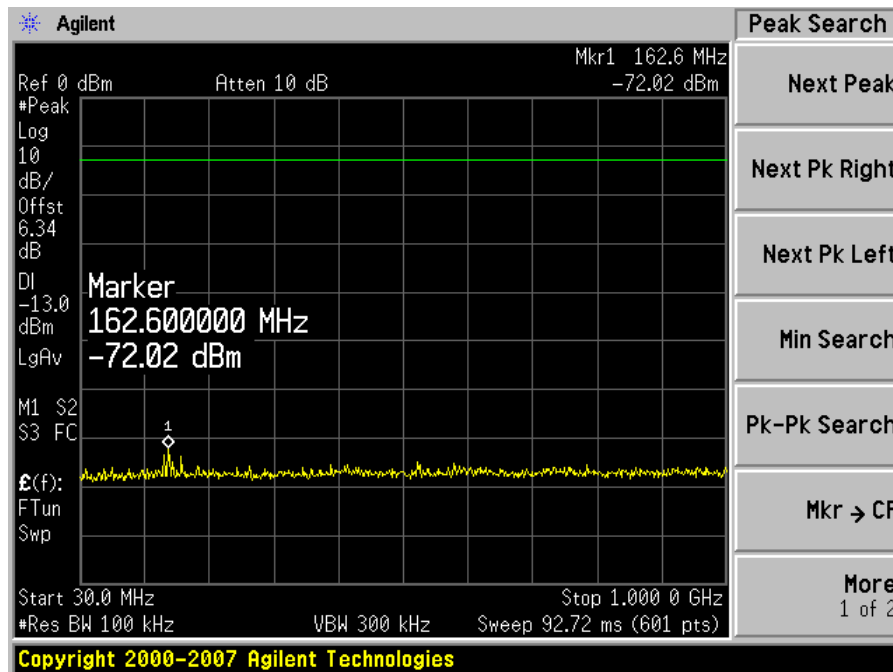


Plot 3e: 5 – 10 GHz

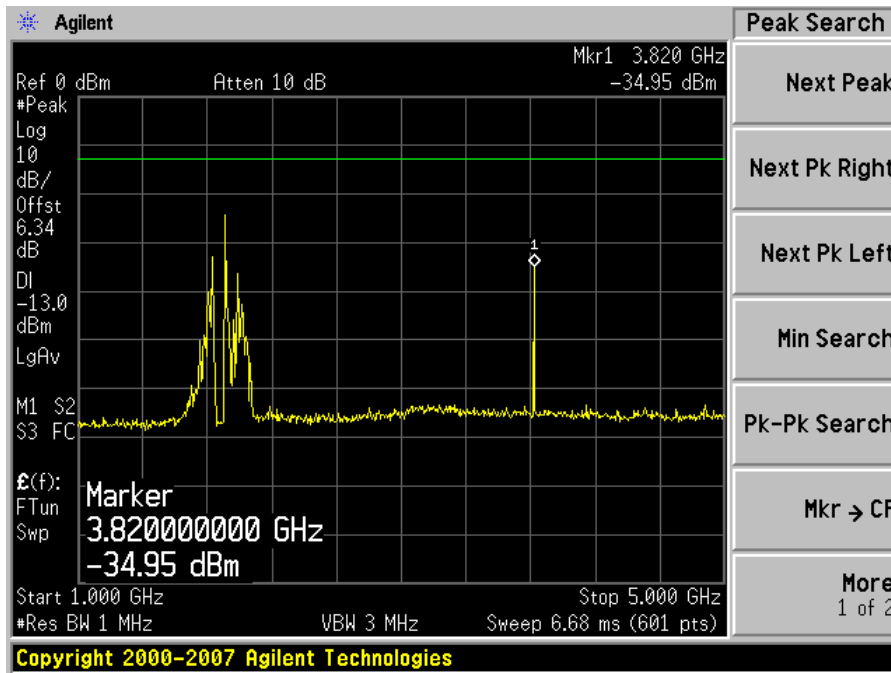


Plot 4e: 10 – 20 GHz

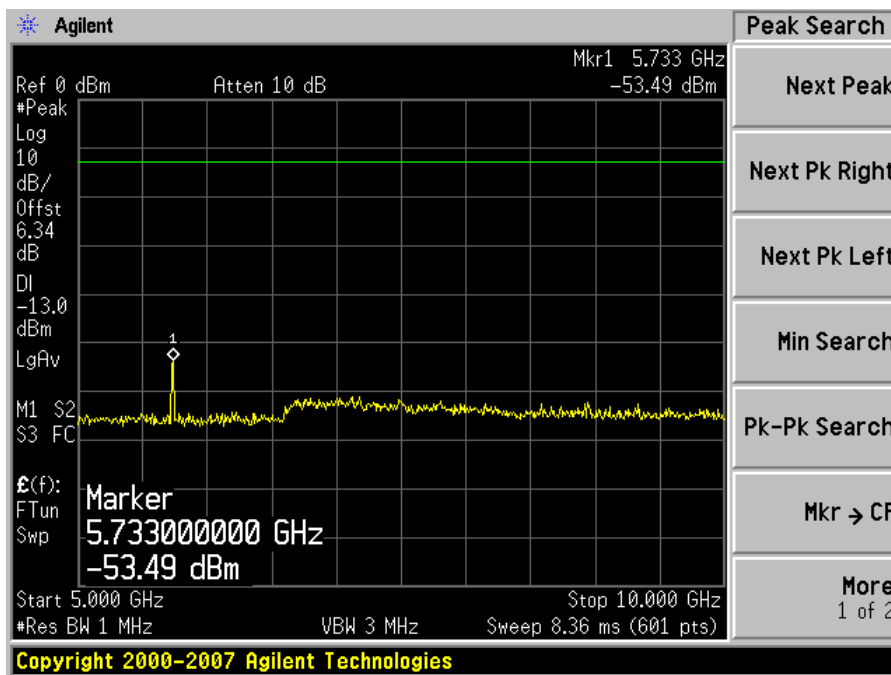
**High Channel (f = 1909.8 MHz)**



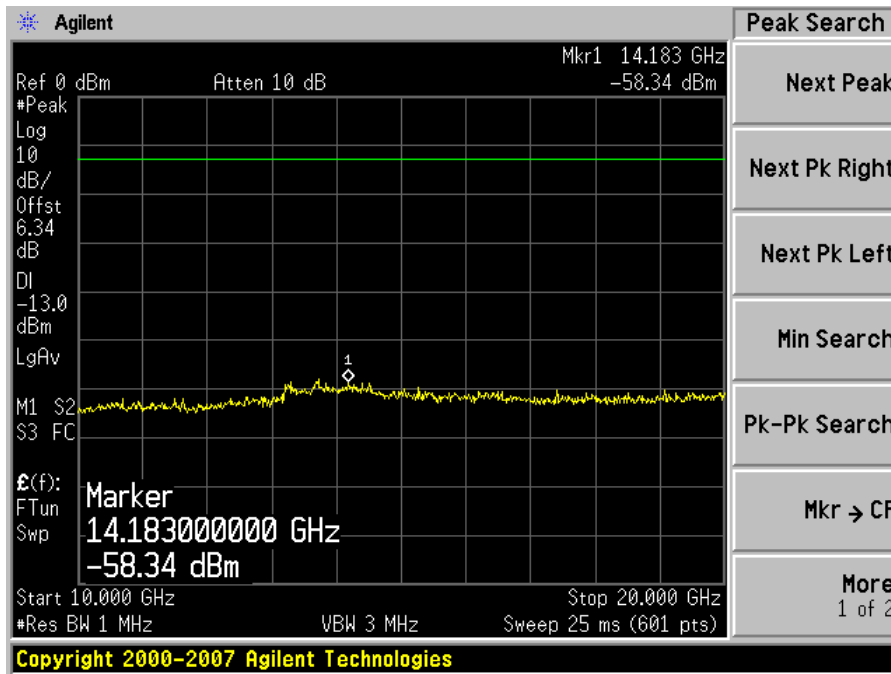
Plot 1f: 30 MHz – 1 GHz



Plot 2f: 1 – 5 GHz



Plot 3f: 5 – 10 GHz



Plot 4f: 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

Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤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.

### 10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
ESPEC	Temp/ Humidity chamber	ESL-4CA	018010	2008-12-12
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24 *
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-28

\* 2-year calibration cycle

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

## 10.4 Environmental Conditions

<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2

## 10.5 Test Results

### Cellular Band:

#### *Frequency Stability versus Temperature*

Reference Frequency: 836.6 MHz, Limit: 2.5ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
50	110	836599730	-270	-0.32273
40	110	836600005	5	0.005977
30	110	836600006	6	0.007172
20	110	836600008	8	0.009563
10	110	836600006	6	0.007172
0	110	836600006	6	0.007172
-10	110	836600007	7	0.008367
-20	110	836600008	8	0.009563
-30	110	836600009	9	0.010758

#### *Frequency Stability versus Voltage*

Reference Frequency: 836.6 MHz, Limit: 2.5ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
20	93.5	836600004	4	0.004781
20	126.5	836600005	5	0.005977

**PCS Band:***Frequency Stability versus Temperature*

Reference Frequency: 1880.0 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
50	110	1899999460.00	-540	-0.28723
40	110	190000028.00	28	0.014894
30	110	190000031.00	31	0.016489
20	110	190000030.00	30	0.015957
10	110	190000031.00	31	0.016489
0	110	190000033.00	33	0.017553
-10	110	190000032.00	32	0.017021
-20	110	190000036.00	36	0.019149
-30	110	190000039.00	39	0.020745

*Frequency Stability versus Voltage*

Reference Frequency: 1880.0 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
20	93.5	190000023.00	23	0.012234
20	126.5	190000025.00	25	0.013298



## 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.

### 11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Due Date
R & S	Communication, Radio Universal	CMU200	103492	2009-05-24*
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-05-19

\* 2-year calibration cycle

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

### 11.4 Environmental Conditions

<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

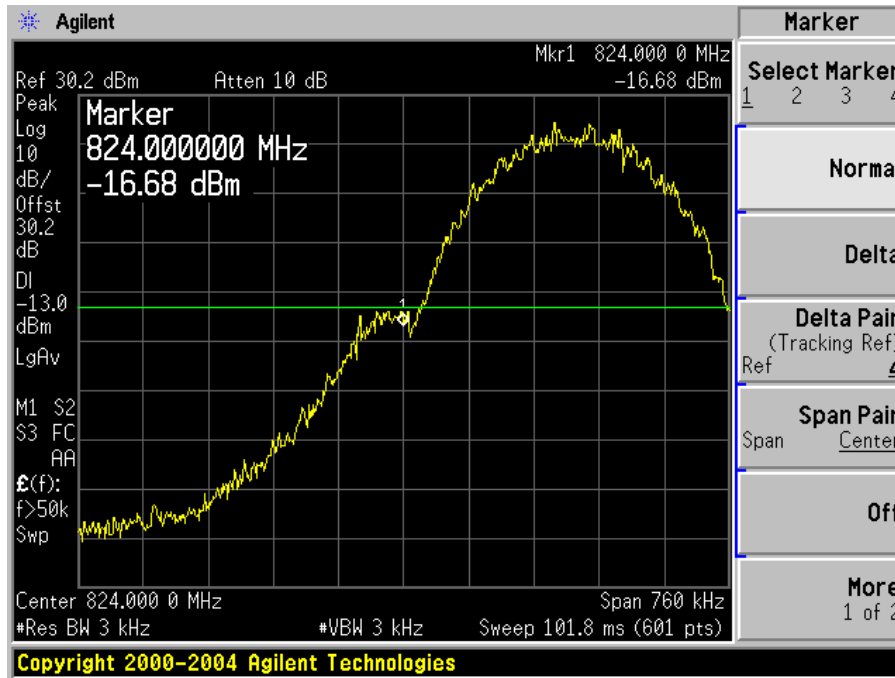
\* Testing performed by Jack Liu on 2008-11-21 to 2008-12-2

### 11.5 Test Data and Plots

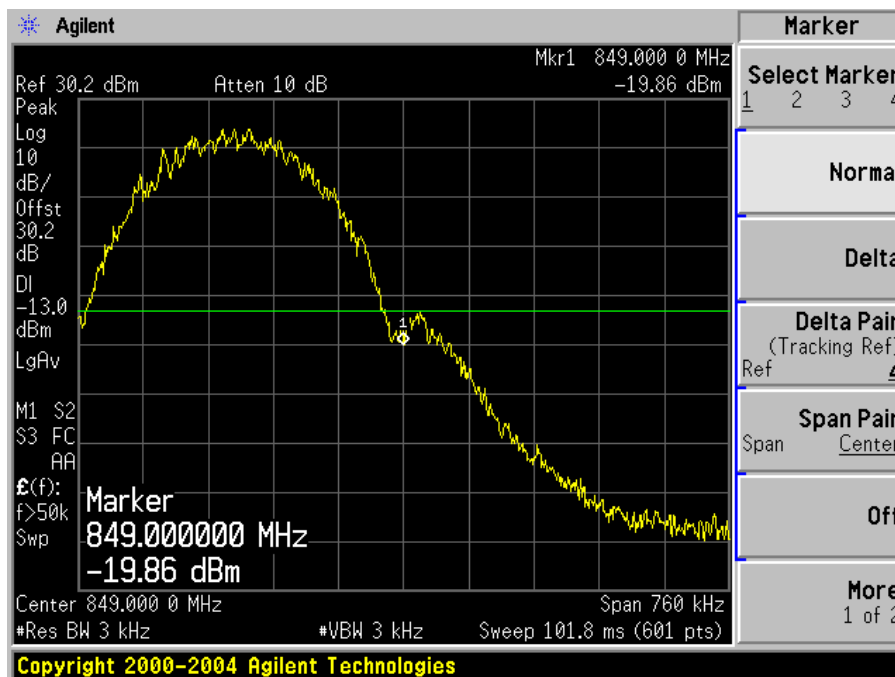
Please refer to the following plots.

Plots of Band Edge for Cellular Band:

Lowest Channel

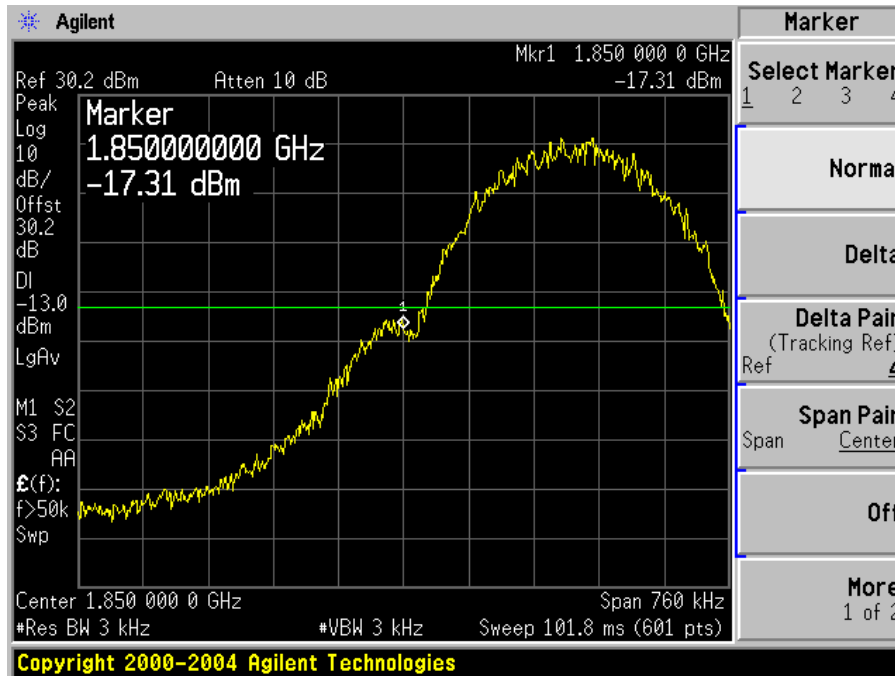


Highest Channel



Plots of Band Edge for PCS Band:

**Lowest Channel**



**Highest Channel**

