

# FCC PART 22H/24E TEST AND MEASUREMENT REPORT



For

**Beyond E-Tech Inc**

3005 West Loop South STE.100

Houston, TX 77027, USA

**FCC ID: WTID916**  
**Model: D916**

<b>Report Type:</b> Original Report	<b>Product Type:</b> GSM &GPRS Dual Standby Mobile Phone
<b>Test Engineer:</b> Jack Liu	
<b>Report Number:</b> R0810015-2224	
<b>Report Date:</b> 2008-10-22	
<b>Reviewed By:</b> Boni Baniqued Sr. RF Engineer	
<b>Prepared By:</b> (63)	Bay Area Compliance Laboratories Corp. (BACL) 1274 Anvilwood, Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164

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

\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev.2)

## TABLE OF CONTENTS

<b>1</b>	<b>GENERAL INFORMATION .....</b>	<b>4</b>
1.1	PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	4
1.2	EUT PHOTO .....	4
1.3	MECHANICAL DESCRIPTION .....	4
1.4	OBJECTIVE .....	4
1.5	RELATED SUBMITTAL(S)/GRANT(S) .....	5
1.6	TEST METHODOLOGY .....	5
1.7	MEASUREMENT UNCERTAINTY .....	5
1.8	TEST FACILITY .....	5
<b>2</b>	<b>SYSTEM TEST CONFIGURATION .....</b>	<b>7</b>
2.1	JUSTIFICATION .....	7
2.2	EUT EXERCISE SOFTWARE .....	7
2.3	SPECIAL ACCESSORIES .....	7
2.4	EQUIPMENT MODIFICATIONS .....	7
2.5	REMOTE SUPPORT EQUIPMENT .....	7
2.6	LOCAL SUPPORT EQUIPMENT .....	7
2.7	POWER SUPPLY AND LINE FILTERS .....	7
2.8	INTERFACE PORTS AND CABLING .....	7
2.9	TEST SETUP BLOCK DIAGRAM FOR RADIATED EMISSIONS TESTS .....	8
<b>3</b>	<b>SUMMARY OF TEST RESULTS .....</b>	<b>9</b>
<b>4</b>	<b>§2.1047 - MODULATION CHARACTERISTIC .....</b>	<b>10</b>
4.1	APPLICABLE STANDARD .....	10
<b>5</b>	<b>§1.1307(B) (1) &amp; §2.1093 - RF EXPOSURE .....</b>	<b>11</b>
5.1	APPLICABLE STANDARD .....	11
5.2	TEST RESULT .....	11
<b>6</b>	<b>§2.1053 - SPURIOUS RADIATED EMISSIONS .....</b>	<b>12</b>
6.1	APPLICABLE STANDARD .....	12
6.2	TEST PROCEDURE .....	12
6.3	TEST EQUIPMENT LIST AND DETAILS .....	12
6.4	SUMMARY OF TEST RESULTS .....	13
<b>7</b>	<b>§2.1046, §22.913(A), &amp; §24.232 – RF OUTPUT POWER .....</b>	<b>15</b>
7.1	APPLICABLE STANDARD .....	15
7.2	TEST PROCEDURE .....	15
7.3	TEST EQUIPMENT LIST AND DETAILS .....	15
7.4	SUMMARY OF TEST RESULTS .....	16
<b>8</b>	<b>§2.1049, §22.917, §22.905, &amp; §24.238 - OCCUPIED BANDWIDTH .....</b>	<b>21</b>
8.1	APPLICABLE STANDARD .....	21
8.2	TEST PROCEDURE .....	21
8.3	TEST EQUIPMENT LIST AND DETAILS .....	21
8.4	SUMMARY OF TEST RESULTS .....	21
8.5	TEST DATA & PLOTS .....	22
<b>9</b>	<b>§2.1051, §22.917, &amp; §24.238(A) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....</b>	<b>26</b>

9.1	APPLICABLE STANDARD .....	26
9.2	TEST PROCEDURE .....	26
9.3	TEST EQUIPMENT LIST AND DETAILS.....	26
9.4	TEST RESULTS .....	26
<b>10</b>	<b>§2.1055 (A), §2.1055 (D), §22.355, &amp; §24.235 - FREQUENCY STABILITY .....</b>	<b>31</b>
10.1	APPLICABLE STANDARD .....	31
10.2	TEST PROCEDURE .....	31
10.3	TEST EQUIPMENT LIST AND DETAILS.....	32
10.4	TEST RESULTS .....	32
<b>11</b>	<b>§22.917 &amp; §24.238 – BAND EDGE .....</b>	<b>34</b>
11.1	APPLICABLE STANDARD .....	34
11.2	TEST PROCEDURE .....	34
11.3	TEST EQUIPMENT LIST AND DETAILS.....	34
11.4	TEST RESULTS .....	34
<b>12</b>	<b>EXHIBIT A - FCC ID LABELING AND WARNING STATEMENT.....</b>	<b>37</b>
12.1	APPLICABLE STANDARD .....	37
12.2	PROPOSED FCC ID LABEL .....	37
12.3	PROPOSED LABEL LOCATION ON EUT .....	38
<b>13</b>	<b>EXHIBIT B - TEST SETUP PHOTOGRAPHS .....</b>	<b>39</b>
13.1	RADIATED EMISSIONS BELOW 1GHz- FRONT VIEW .....	39
13.2	RADIATED EMISSIONS ABOVE 1GHz- FRONT VIEW .....	39
13.3	RADIATED EMISSIONS BELOW 1GHz- REAR VIEW.....	40
13.4	RADIATED EMISSIONS ABOVE 1GHz- REAR VIEW .....	40
<b>14</b>	<b>EXHIBIT C - EUT PHOTOGRAPHS.....</b>	<b>41</b>
14.1	EUT- FRONT SIDE VIEW .....	41
14.2	EUT- BACK SIDE VIEW .....	41
14.3	EUT – BOTTOM/ INTERFACE PORT VIEW .....	42
14.4	EUT – TOP VIEW .....	42
14.5	EUT – RIGHT SIDE VIEW .....	43
14.6	EUT – LEFT SIDE VIEW .....	43
14.7	EUT BATTERY .....	44
14.8	EUT AC/DC POWER ADAPTER .....	44
14.9	EUT – COVER OFF VIEW.....	45
14.10	EUT – MAIN BOARD ASSEMBLY (WITH ANTENNA AND RF SHEILDING) BOTTOM VIEW.....	45
14.11	EUT – MAIN BOARD ASSEMBLY (WITHOUT ANTENNA AND RF SHEILDING) BOTTOM VIEW .....	46
14.12	EUT – MAIN BOARD ASSEMBLY (WITH LCD AND KEYBOARD) TOP VIEW.....	46
14.13	EUT – MAIN BOARD ASSEMBLY (WITH LCD FLIP OFF) TOP VIEW.....	47
14.14	EUT – MAIN BOARD ASSEMBLY (WITHOUT KEYBOARD) TOP VIEW 1.....	47
14.15	EUT – MAIN BOARD ASSEMBLY (WITHOUT KEYBOARD) TOP VIEW 2.....	48
14.16	EUT –KEYBOARD TOP VIEW .....	48
14.17	EUT – KEYBOARD BOTTOM VIEW .....	49

## 1 GENERAL INFORMATION

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

This measurement and test report has been compiled on behalf of *Beyond E-Tech Inc* and their product model: *D916*, *FCC ID: WTID916* which is a GSM 850/1900 Dual Standby Mobile Phone.

Frequency band: GSM850: 824-849 MHz (Tx); 869-894 MHz (Rx)

PCS1900: 1850-1910 MHz (Tx); 1930-1990 MHz (Rx)

Bluetooth: 2402-2480 MHz (Tx/Rx)

### 1.2 EUT Photo



*Additional Photos in Exhibit C*

### 1.3 Mechanical Description

The *Beyond E-Tech Inc* product model: *D916*, *FCC ID: WTID916* or the "EUT" as referred to in this report is a mobile phone. The EUT measures approximately 114mm (L) x 53 mm (W) x 17mm (H), and weighs approximately 112 g (with 1800mAh battery).

*\* The test data gathered are from typical production sample, serial number: B1993 Sample ID: T2165 provided by the BACL.*

### 1.4 Objective

This type approval report is prepared on behalf of *Beyond E-Tech 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.

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

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

FCC Part15.247 submission with FCC ID: WTID916.

## **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/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

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

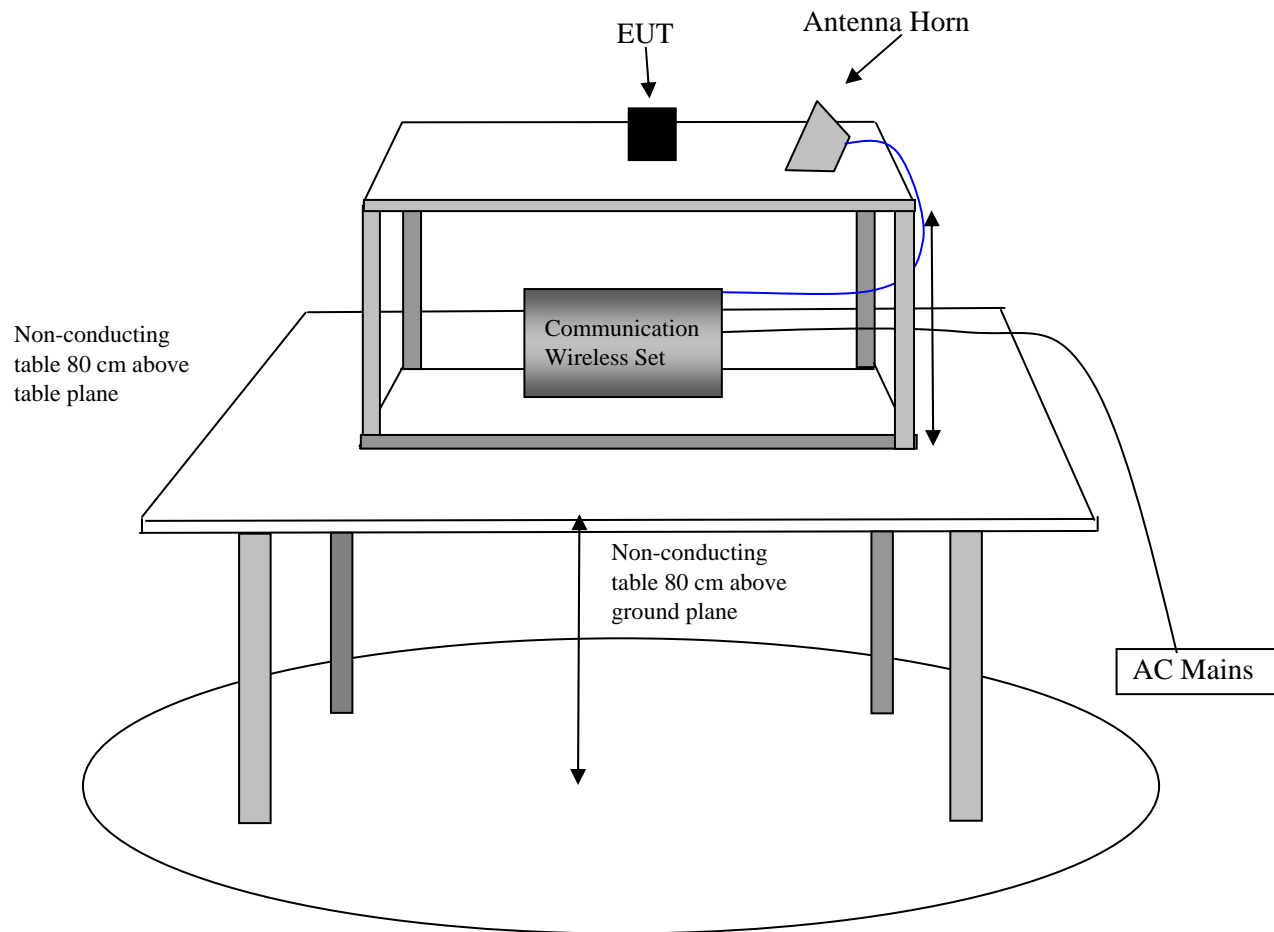
### 2.7 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
AC/DC Adapter	USB version AC/DC Adapter	ZT-688	B1994

### 2.8 Interface Ports and Cabling

Cable Description	From	To
USB cable	EUT	AC/DC Adapter

## 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
§2.1093	RF Exposure	Compliant Please See SAR report R0810015-SAR
§ 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

---

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

---

### **4.1 Applicable Standard**

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

---

## **5 §1.1307(b) (1) & §2.1093 - RF EXPOSURE**

---

### **5.1 Applicable Standard**

According to §1.1310 and §2.1093 RF exposure is calculated.

### **5.2 Test Result**

**Compliant:** The EUT is a hand portable device and thus requires SAR evaluation, please see BACL SAR Report R0810015-SAR for measurement and testing details.

## 6 §2.1053 - SPURIOUS RADIATED EMISSIONS

### 6.1 Applicable Standard

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

### 6.2 Test Procedure

TIA/EIA-603-C Section 2.2.12 – Unwanted Emission: Radiated Spurious

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 =  $10 \log (\text{TX Power in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \log_{10} (\text{power out in Watts})$

### 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

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

## 6.4 Summary of Test Results

### 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 2008-10-8 to 2008-10-21

Worst case reading as follows:

Mode: Transmitting		
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)
-0.45	2509.8	Vertical

### 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)
Freq. (MHz)	Amp. (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
2509.8	80.71	209	100	V	2509.8	-20.98	8.9	1.37	-13.45	-13	-0.45
4183	71.29	333	150	V	4183	-25.06	11	2	-16.06	-13	-3.06
2509.8	78.87	200	250	H	2509.8	-25.6	8.9	1.37	-18.07	-13	-5.07
1673.2	79.14	233	100	V	1673.2	-27.54	8.8	1.05	-19.79	-13	-6.79
1673.2	75.89	221	100	H	1673.2	-28.57	8.8	1.05	-20.82	-13	-7.82
4183	63.35	99	100	H	4183	-35.03	11	2	-26.03	-13	-13.03

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

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level dBm	Antenna Gain (dBi)	Cable Loss (dB)			
5640	53.43	0	100	V	5640	-40.71	11.1	2.53	-32.14	-13	-19.14
3760	53.78	190	250	H	3760	-45.35	11.2	1.8	-35.95	-13	-22.95
5640	47.66	182	100	H	5640	-45.65	11.1	2.53	-37.08	-13	-24.08
3760	49.32	219	100	V	3760	-47.07	11.2	1.8	-37.67	-13	-24.67

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

### 7.1 Applicable Standard

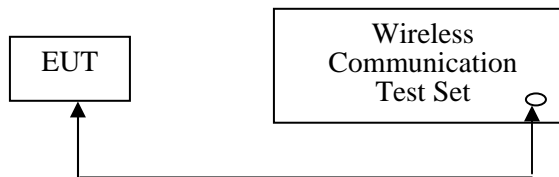
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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

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

## 7.4 Summary of Test Results

### 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 2008-10-8 to 2008-10-21

### Conducted Power

Cellular Band Part 22H:

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (dBm)
Low	824.2	31.79	1510	38.45
Middle	836.6	31.93	1559	38.45
High	848.8	32.03	1595.8	38.45

PCS Band Part 24E:

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (dBm)
Low	1850.2	29.08	809	33
Middle	1880.0	29.16	824	33
High	1909.8	29.61	914	33



**Radiated Power (ERP and EIRP)**

## Cellular Band Part 22H:

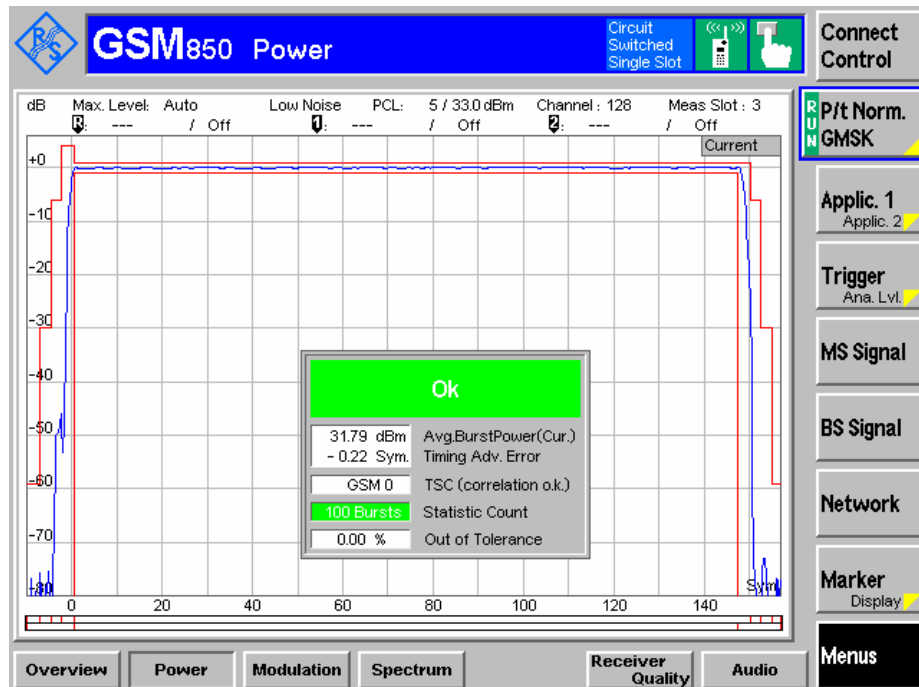
Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
824.2	106.32	173	114	V	824.2	32.61	0	0.65	31.96	38.45	-6.49
824.2	95.08	127	100	H	824.2	21.37	0	0.65	20.72	38.45	-17.73
836.6	106.15	173	114	V	836.6	32.44	0	0.65	31.79	38.45	-6.66
836.6	95.07	127	100	H	836.6	21.36	0	0.65	20.71	38.45	-17.74
848.8	105.7	173	114	V	848.8	31.99	0	0.65	31.34	38.45	-7.11
848.8	95.02	127	100	H	848.8	21.31	0	0.65	20.66	38.45	-17.79

## PCS Band Part 24E:

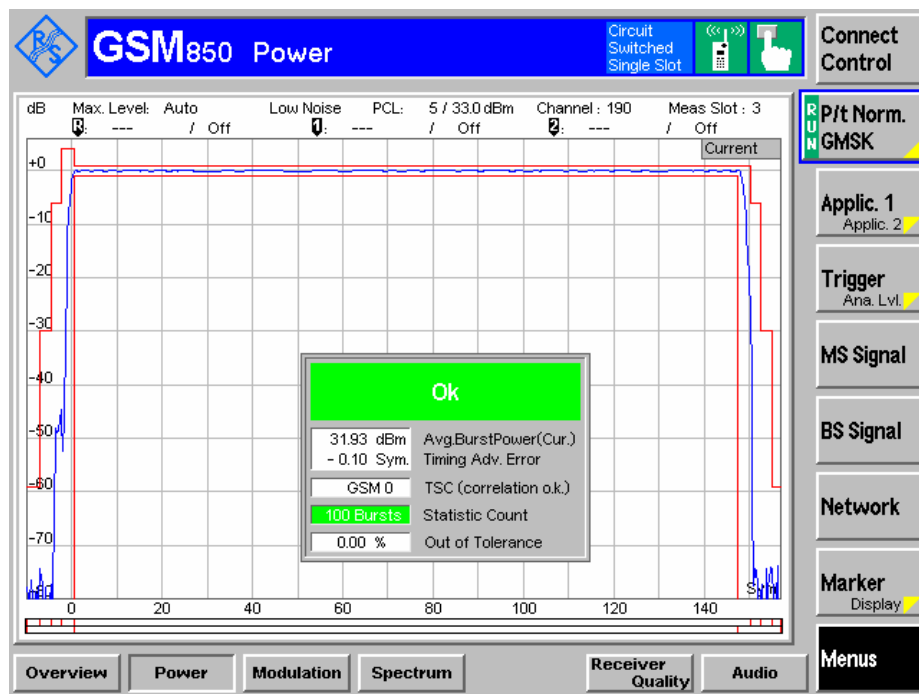
Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
1850.2	122.18	150	1.8	V	1850.2	19.67	9.5	1.09	28.08	33	-4.92
1850.2	122.24	201	1.7	H	1850.2	20.45	9.5	1.09	28.86	33	-4.14
1880	122.22	150	1.5	V	1880	19.91	9.0	1.14	27.77	33	-5.23
1880	122.09	215	1.75	H	1880	20.34	9.0	1.14	28.2	33	-4.8
1909.8	121.73	152	1.5	V	1909.8	19.57	9.0	1.14	27.43	33	-5.57
1909.8	121.86	212	1.5	H	1909.8	20.12	9.0	1.14	27.98	33	-5.02

## Plots of Conducted Output Power for Part 22H

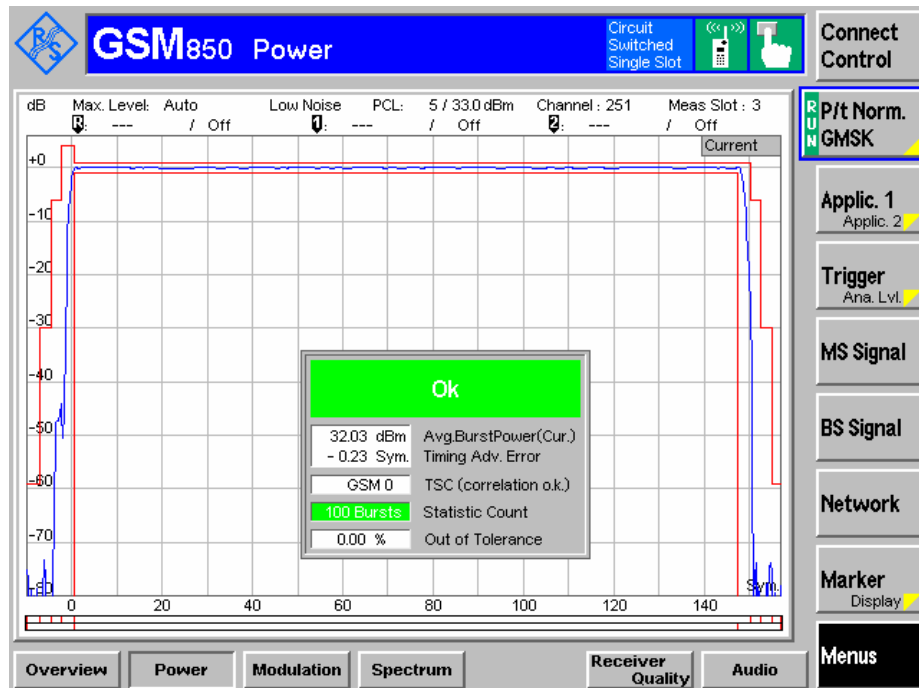
## Low Channel



## Middle Channel

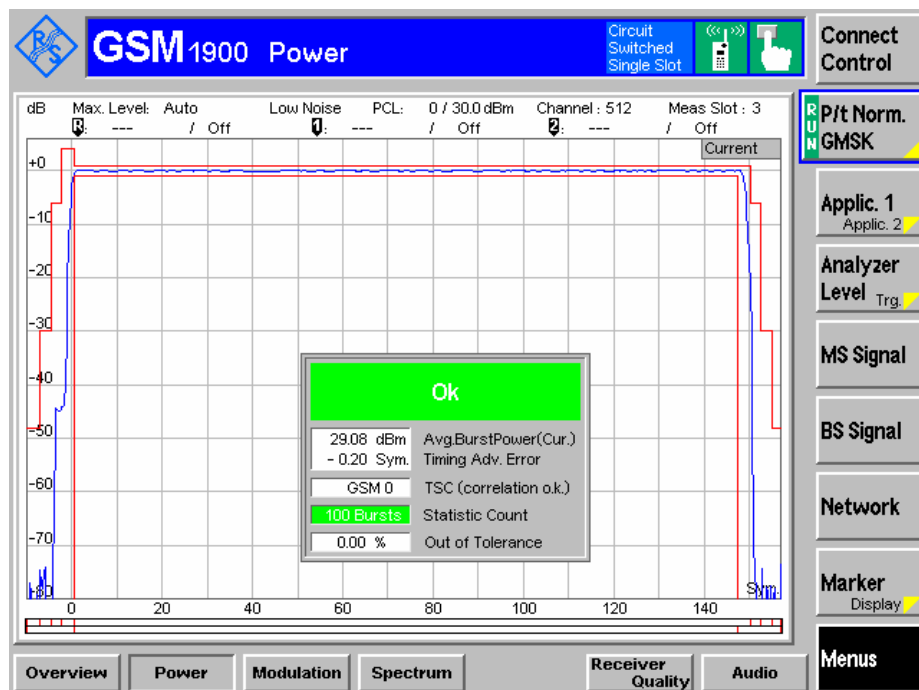


## High Channel

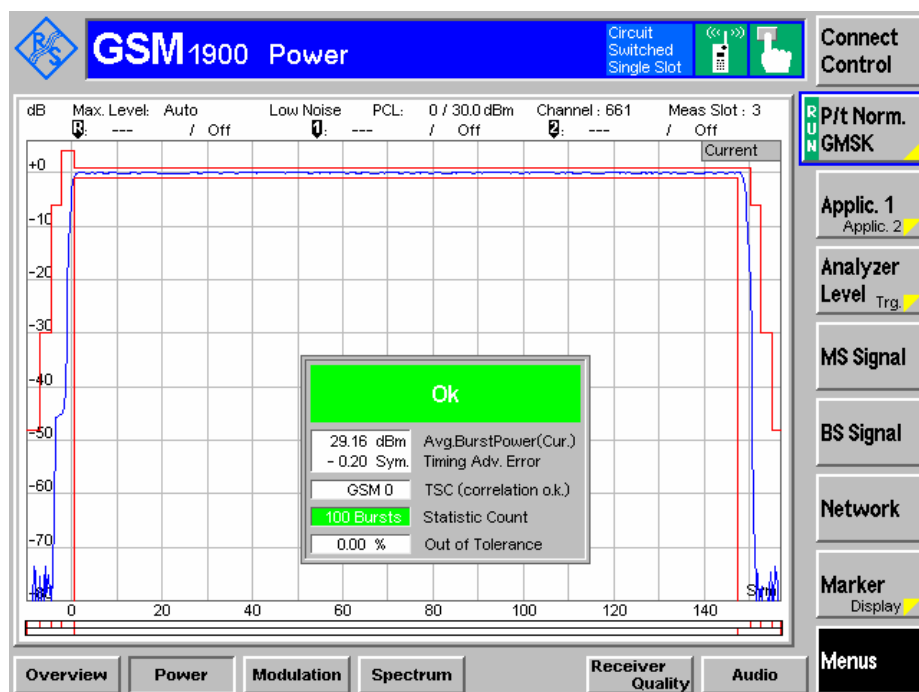


### Plots of Conducted Output Power for Part 24E

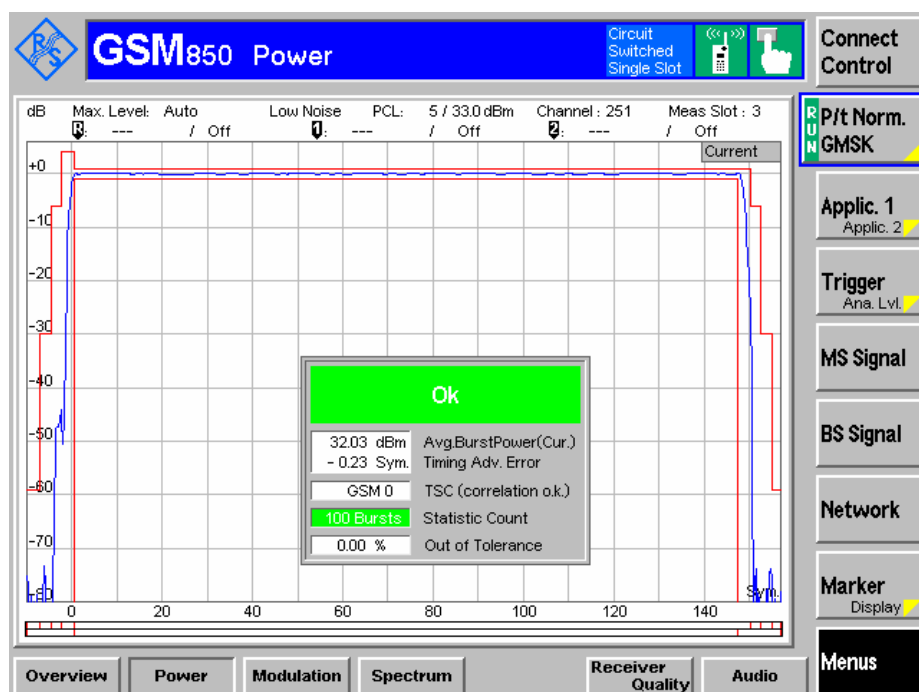
## Low Channel



## 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	Spectrum Analyzer	E4440A	MY44303352	2009-04-28

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

### 8.4 Summary of Test Results

#### Environmental Conditions

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

\* *Testing performed by Jack Liu on 2008-10-8 to 2008-10-21*

## Cellular Band Part 22H:

Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	824.2	315.353	243.7902
Middle	836.6	309.523	241.8843
High	848.8	314.181	247.3305

## PCS Band Part 24E:

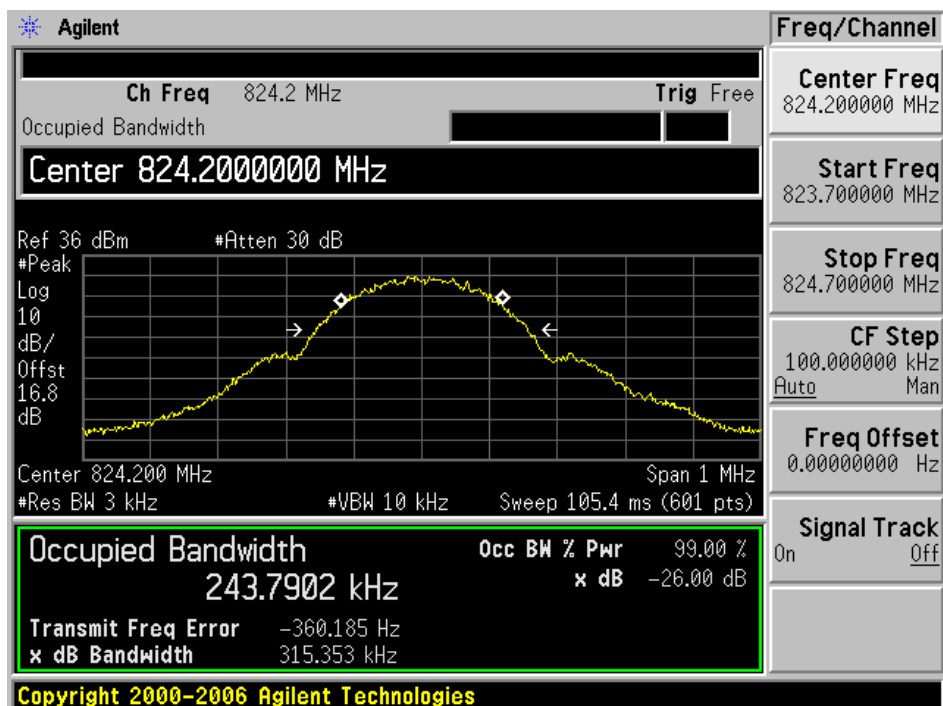
Channel	Frequency (MHz)	26 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	1850.2	310.244	245.4270
Middle	1880.0	312.855	242.2584
High	1909.8	309.821	245.1537

## 8.5 Test Data & Plots

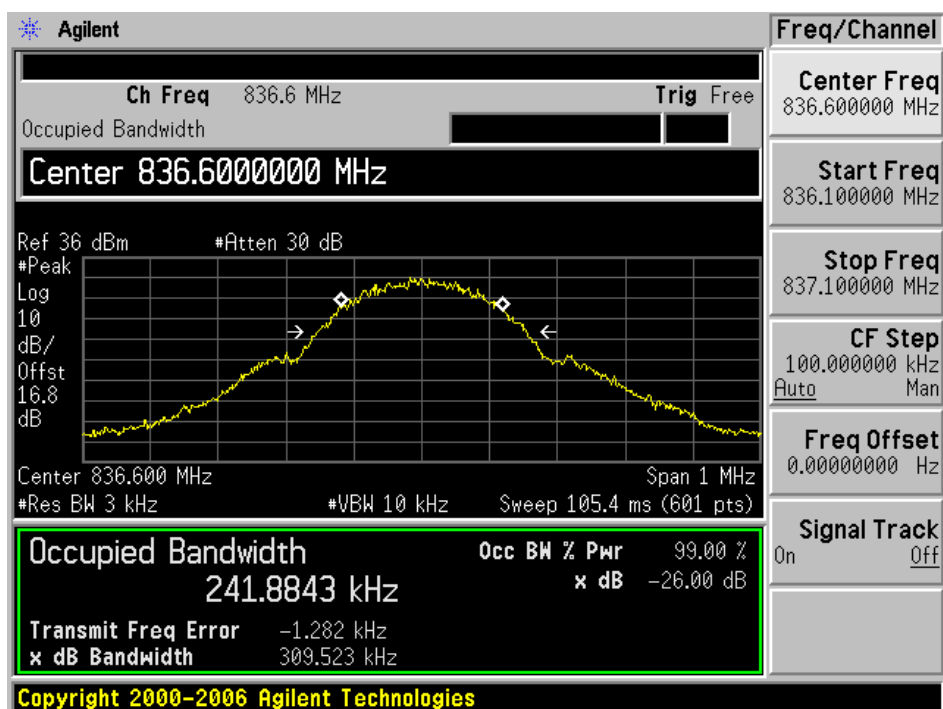
Please refer to the following plots.

## Plots of Occupied Bandwidth for Part 22H

## Low Channel



## Middle Channel

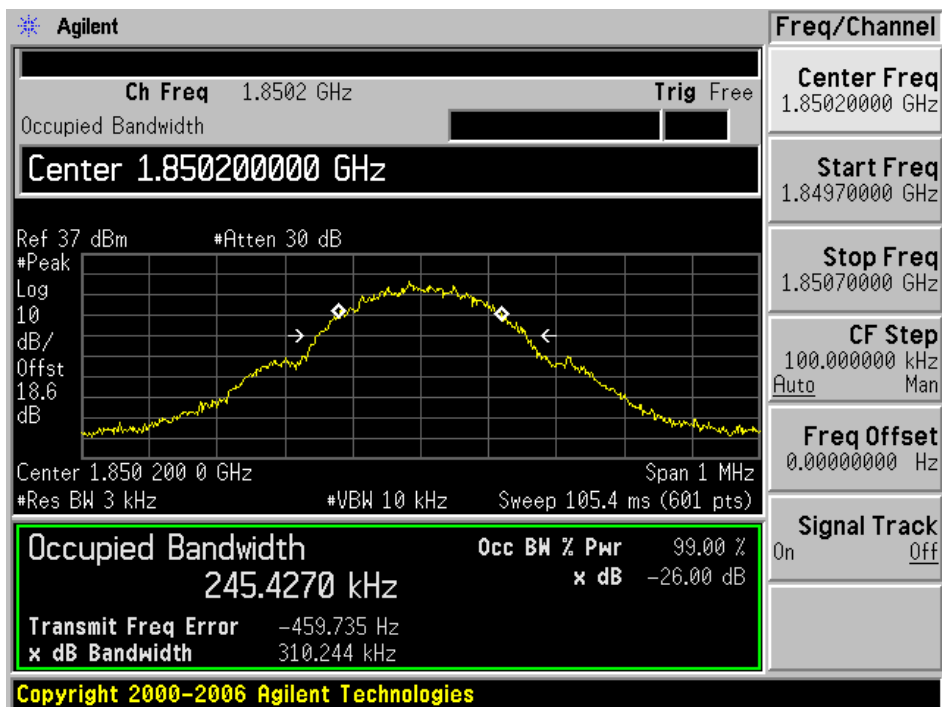


## High Channel



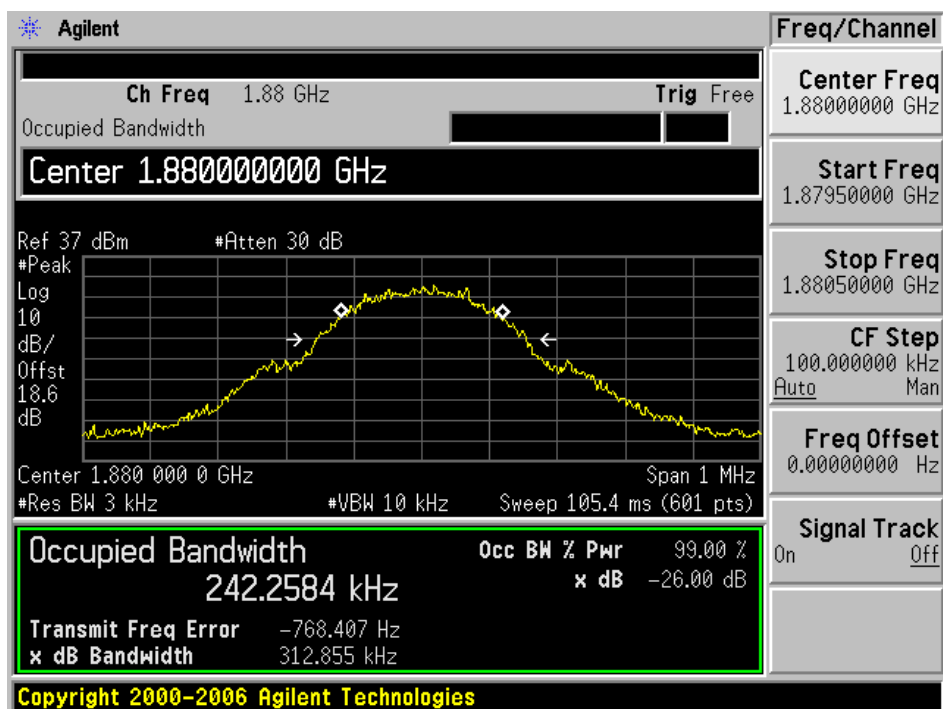
## Plots of Occupied Bandwidth for Part 24E

## Low Channel

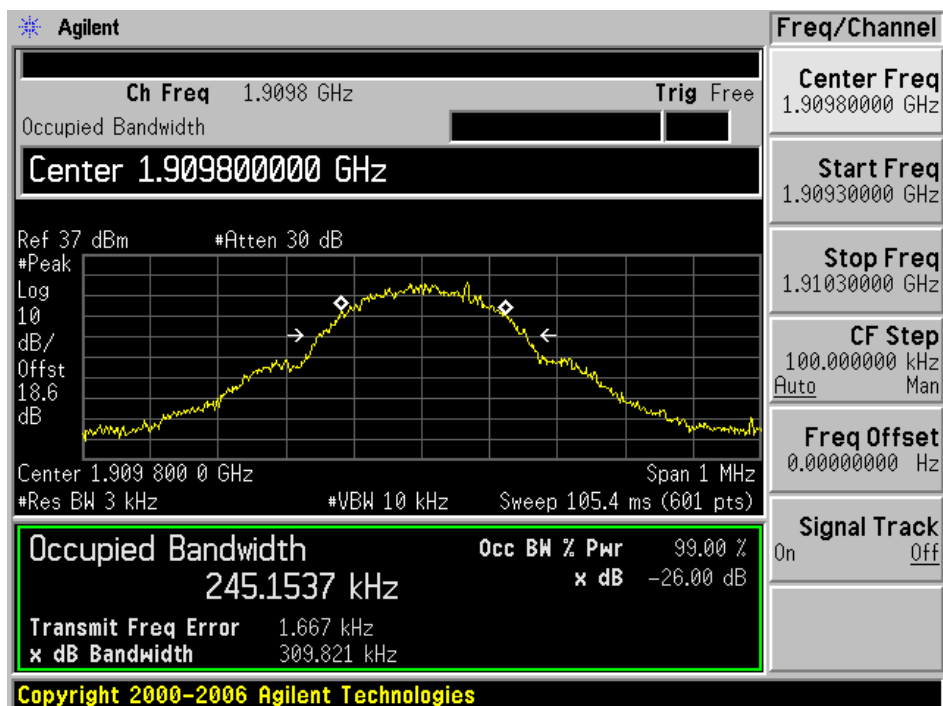




## Middle Channel



## 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	E4440A	MY44303352	2009-04-28

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

### 9.4 Test Results

#### Environmental Conditions

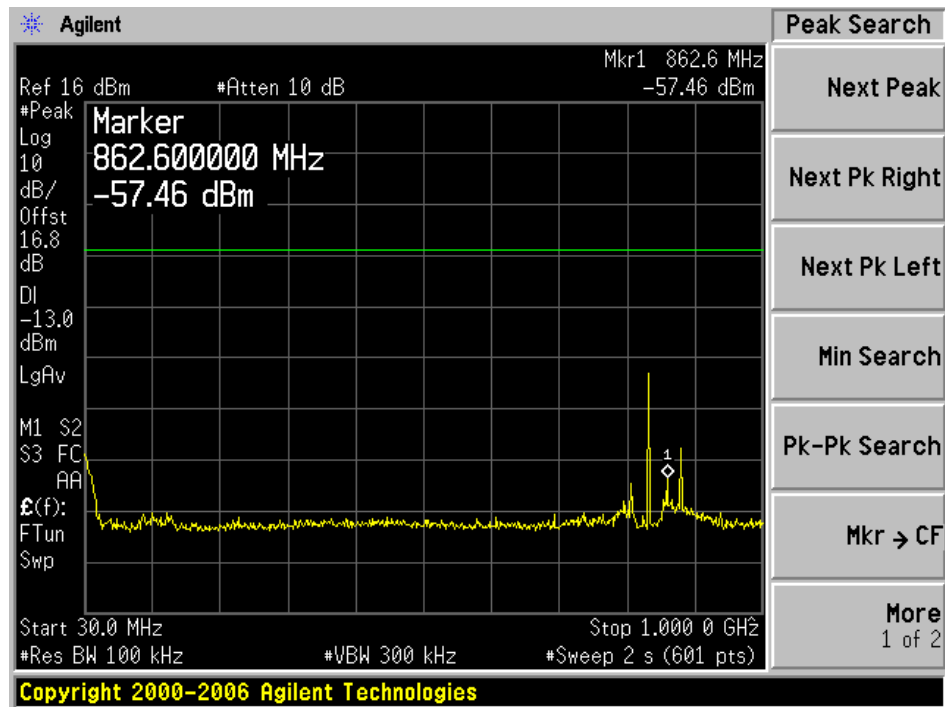
<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

\* *Testing performed by Jack Liu on 2008-10-8 to 2008-10-21*

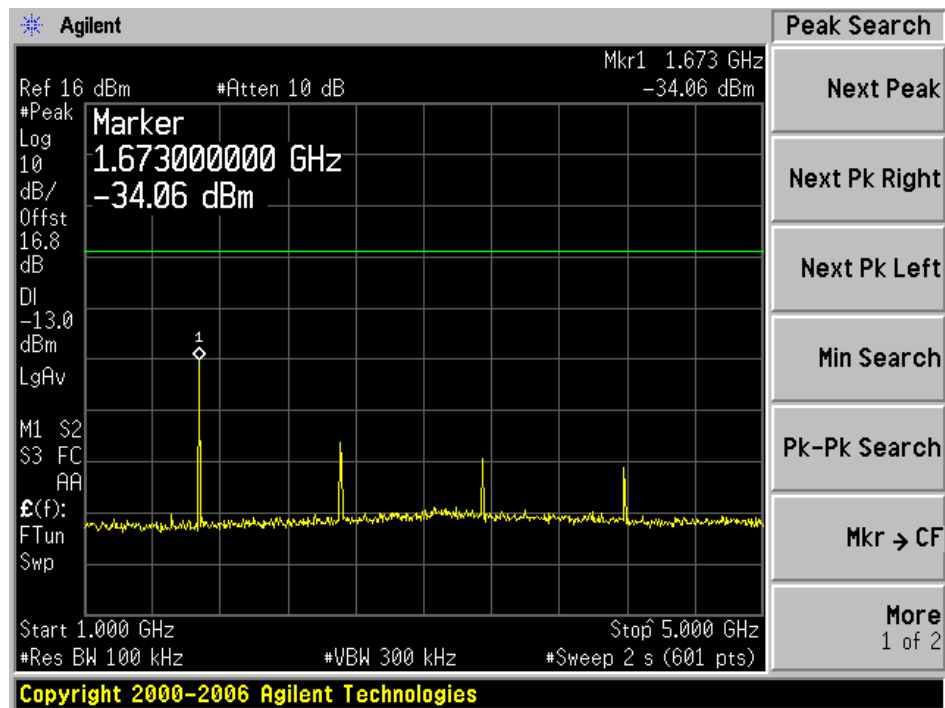
Please refer to the plots featured hereinafter

## Plots of Spurious Emissions for Part 22H

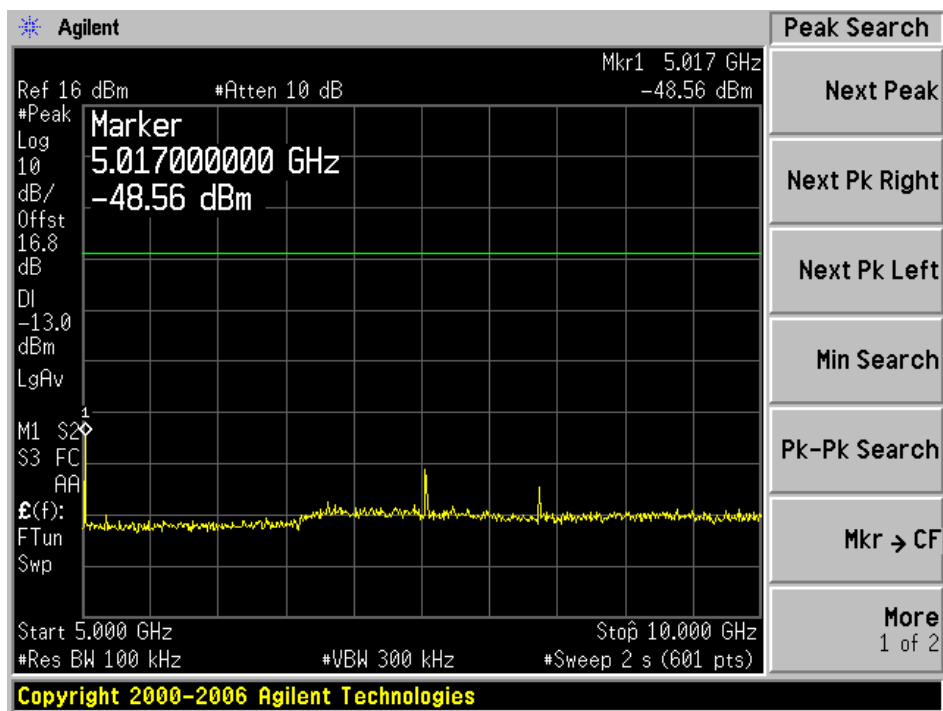
Middle Channel (f = 836.6 MHz)



Plot 1a: 30MHz – 1GHz



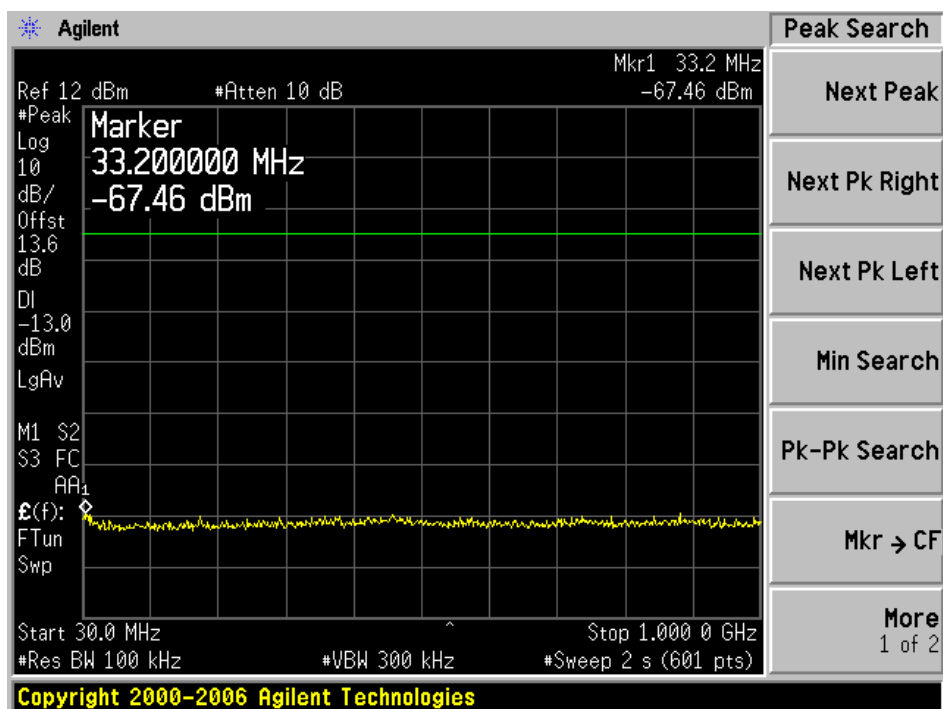
Plot 2a: 1GHz – 5GHz



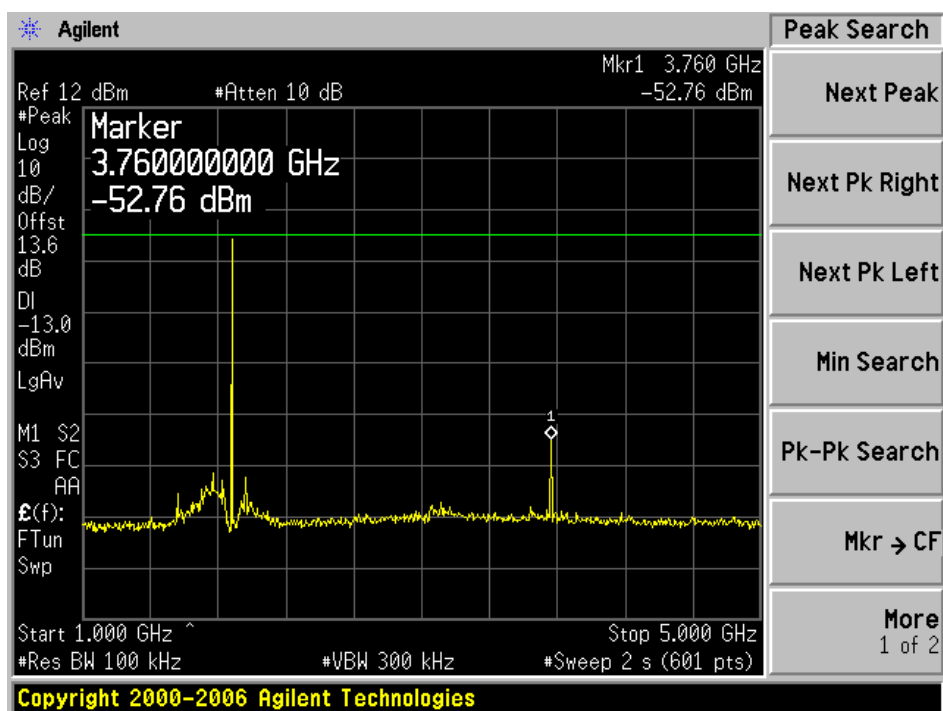
Plot 3a: 5GHz – 10GHz

### Plots of Spurious Emissions for Part 24E

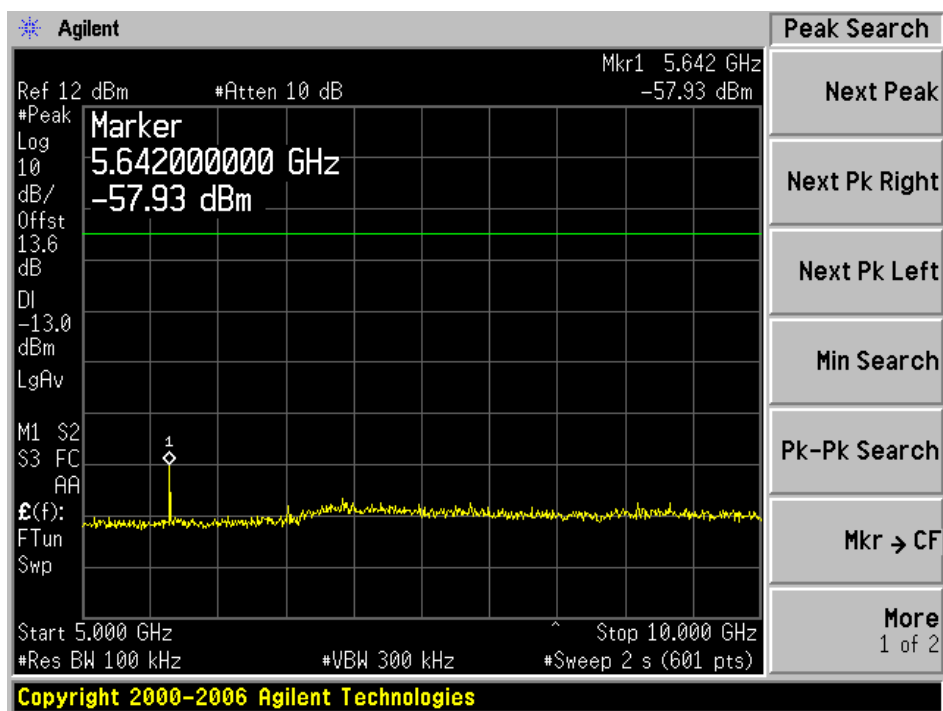
#### Middle Channel (f = 1880 MHz)



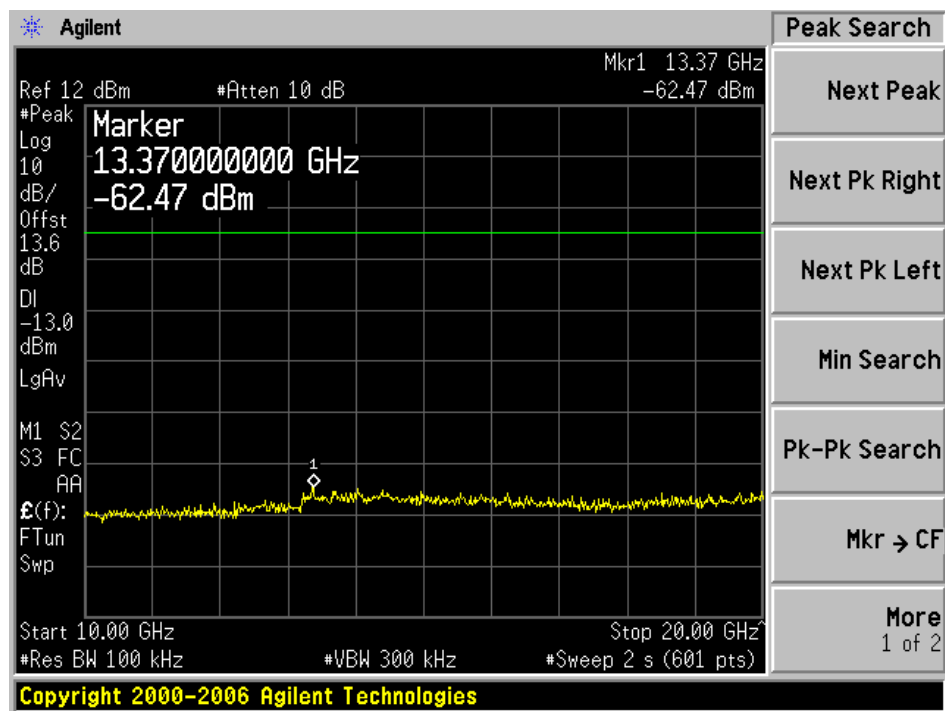
Plot 1b: 30MHz – 1GHz



Plot 2b: 1GHz – 5GHz



Plot 3b: 5GHz – 10GHz



Plot 4b: 10GHz – 20GHz

## 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.

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

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

### 10.4 Test Results

#### 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 2008-10-8 to 2008-10-21*

#### Cellular Band Part 22H:

*Frequency Stability versus Temperature (battery operated mode)*

Reference Frequency: 836.6 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed		
		Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
50	3.7	836599982	-18	-0.021515659
40	3.7	836599994	-6	-0.007171886
30	3.7	836599991	-9	-0.010757829
20	3.7	836599995	-5	-0.005976572
10	3.7	836599994	-6	-0.007171886
0	3.7	836599993	-7	-0.008367201
-10	3.7	836599987	-13	-0.015539087
-20	3.7	836599985	-15	-0.017929716
-30	3.7	836599990	-10	-0.011953144



*Frequency Stability versus Voltage (battery operated mode)*

Reference Frequency: 836.6 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
20	3.4	836599994	-6	-0.007171886
20	3.7	836599991	-9	-0.010757829

**PCS Band Part 24E:***Frequency Stability versus Temperature (battery operated mode)*

Reference Frequency: 1880.0 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed		
		Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
50	3.7	1880000080	80	0.042553191
40	3.7	1880000077	77	0.040957447
30	3.7	1880000075	75	0.039893617
20	3.7	1880000020	20	0.010638298
10	3.7	1880000023	23	0.012234043
0	3.7	1880000053	53	0.028191489
-10	3.7	1880000058	58	0.030851064
-20	3.7	1880000025	25	0.013297872
-30	3.7	1880000021	21	0.011170213

*Frequency Stability versus Voltage (battery operated mode)*

Reference Frequency: 1880.0 MHz, Limit: 2.5ppm				
Environment Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (Hz)	Frequency Error (Hz)	Error (ppm)
20	3.4	1880000015	15	0.007978723
20	3.7	1880000026	26	0.013829787

## 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	E4440A	MY44303352	2009-04-28

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

### 11.4 Test Results

#### Environmental Conditions

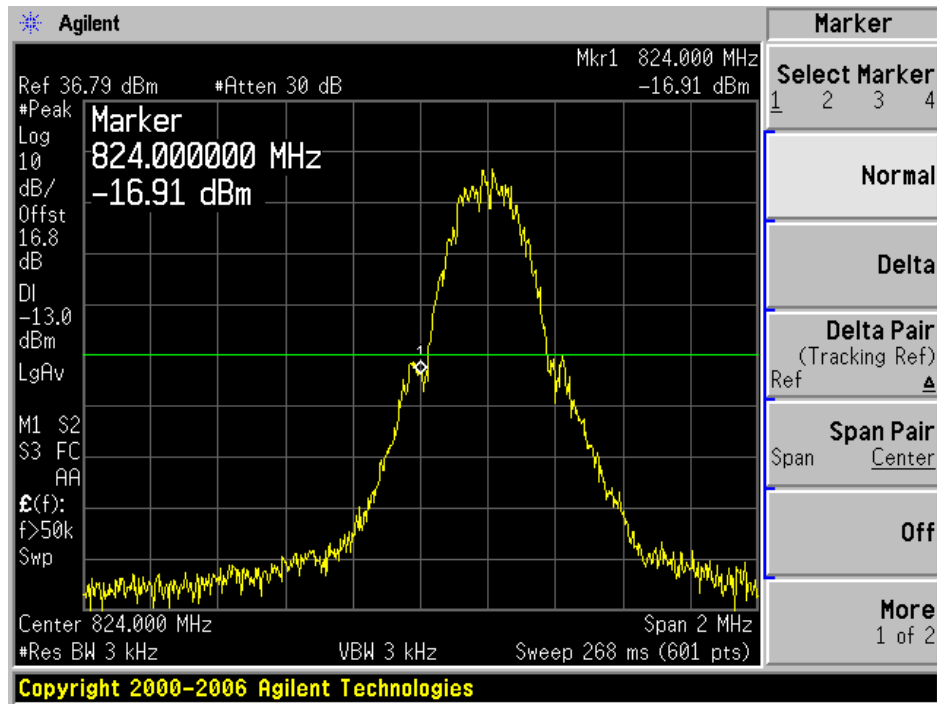
<b>Temperature:</b>	21 °C ~ 25 °C
<b>Relative Humidity:</b>	40 % ~ 60 %
<b>ATM Pressure:</b>	101.1 kPa ~ 101.6 kPa

\* *Testing performed by Jack Liu on 2008-10-8 to 2008-10-21*

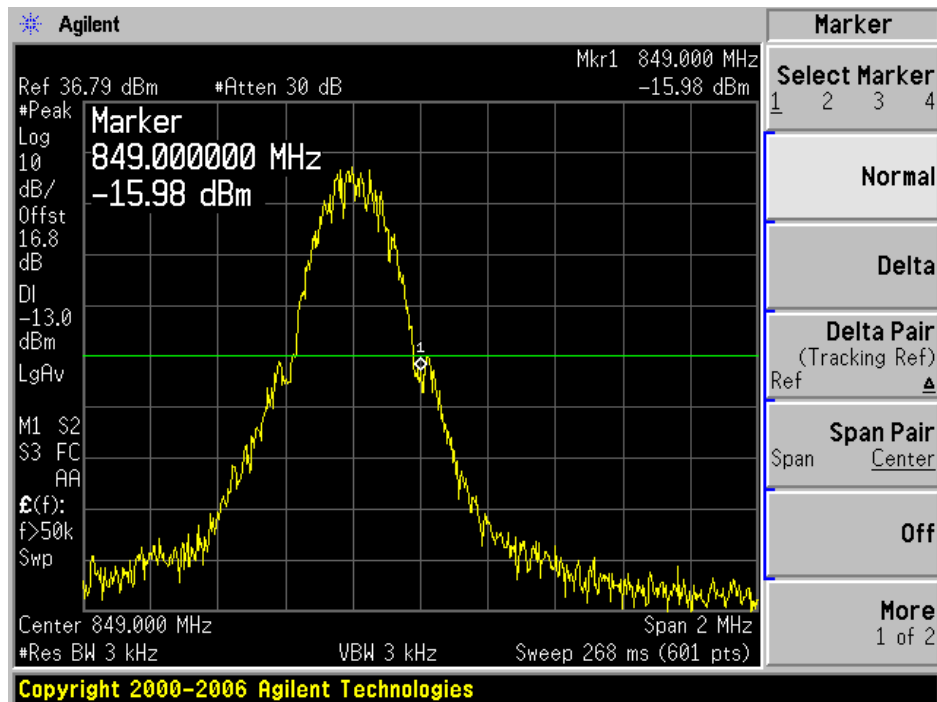
Please refer to the following plots.

## Plots of Band Edge for Part 22H

## Lowest Channel

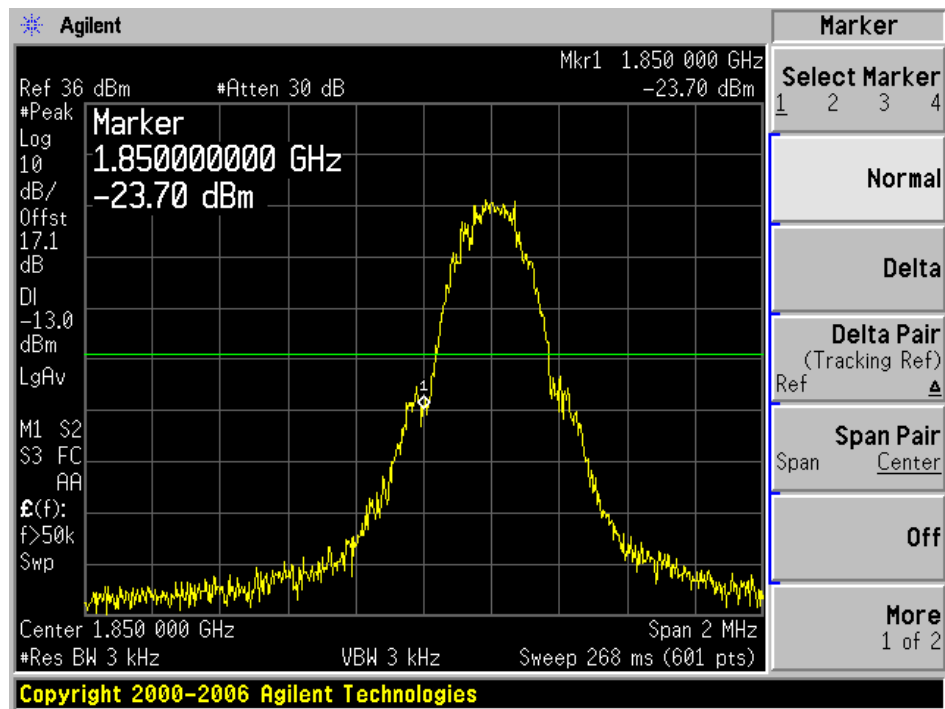


## Highest Channel



## Plots of Band Edge for Part 24E

## Lowest Channel



## High Channel

