683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
Tel: +82-31-321-2664 Fax: +82-31-321-1664
http://www.digitalemc.com

# CERTIFICATE OF COMPLIANCE
# FCC Part 22 & 24 Certification

Dates of Tests: September 12 ~ 19, 2008
Test Report S/N:DR50110809X
Test Site : DIGITAL EMC CO., LTD.

FCC ID. **WRLWINDDUO2100**

APPLICANT **WND TELECOM OFFSHOE S.A.L**

| | | |
|---|---|---|
| **Classification** | : | **Licensed Portable Transmitter Held to Ear (PCE)** |
| **FCC Rule Part(s)** | : | **§22(H), §24(E), §2** |
| **EUT Type** | : | **Dual Face GSM/GPRS Mobile Phone with Bluetooth** |
| **Model name** | : | **WIND DUO 2100** |
| **Serial number** | : | **Identical prototype** |
| **TX Frequency Range** | : | **824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)** |
| **RX Frequency Range** | : | **869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)** |
| **Max. RF Output Power** | : | **0.392 W ERP GSM850 (Black face)** |
| | | **0.202 W ERP GSM850 (Silver face)** |
| | : | **0.292 W EIRP PCS1900 (Black face)** |
| | | **0.337 W EIRP PCS1900 (Silver face)** |
| **Max. SAR Measurement** | : | **0.250 mW/g GSM850 Head SAR // 0.143 mW/g GSM850 GPRS Body SAR** |
| | : | **1.460 mW/g PCS1900 Head SAR // 0.273 mW/g PCS1900 GPRS Body SAR** |
| **Date of Issue** | : | **September 25, 2008** |

 

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# MEASUREMENT REPORT

## 1. Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

## §2.1033 General Information

**Applicant: WND TELECOM OFFSHORE S.A.L**

**Address: EMILE EDDEH ST. TOUR DE LYON 9TH FL. SNOUBRA, 2033 7001. BEIRUT, LEBANON**

**Attention: TAE SOO LEE (Principal Research Engineer)**

- FCC ID: **WRLWINDDUO2100**
- Quantity: The mass product
- Tx Freq. Range: 824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)
- Rx Freq. Range: 869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)
- Max. Power Rating: 0.392 W ERP GSM850 (Black face)
  0.202 W ERP GSM850 (Silver face)
  0.292 W EIRP PCS1900 (Black face)
  0.337 W EIRP PCS1900 (Silver face)
- FCC Classification(s): Licensed Portable Transmitter Held to Ear (PCE)
- Equipment (EUT) Type: Dual Face GSM/GPRS Mobile Phone with Bluetooth
- Brief Description of EUT: This device has two independent GSM modules and it's antennas and a Bluetooth module and it's antenna.
- Modulation(s): GMSK
- Frequency Tolerance: ± 0.00025 % (2.5ppm)
- FCC Rule Part(s): §22(H), §24(E), §2
- Dates of Tests: September 12 ~ 19, 2008
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110809X

## 2. General Information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.
Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
http://www.digitalemc.com E-mail : demc@unitel.co.kr
Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".
This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

**Test operator: Test Engineer**

| Data | Name | Signature |
|---|---|---|
| September 25, 2008 | D.C. Cha | |

**Report Reviewed By: Technical Manager**

| Data | Name | Signature |
|---|---|---|
| September 25, 2008 | Harvey Sung | |

Ordering party:

| | | |
|---|---|---|
| Company name | : | WND TELECOM OFFSHORE S.A.L |
| Address | : | EMILE EDDEH ST. TOUR DE LYON 9TH FL. SNOUBRA, 2033 7001 |
| City/town | : | BEIRUT |
| Country | : | LEBANON |
| Date of order | : | August 13, 2008 |

# 3. Test Report

## 3.1 Summary of test

| FCC Part Section(s) | Parameter | Status (note 1) |
|---|---|---|
| | | |
| 22.913(a) / 24.232(b), 2.1046 | Power Output | C |
| 22.917 / 24.238, 2.1049(h)(i) | Occupied Bandwidth | C |
| 22.917(b) / 24.238(b) | Emission Bandwidth | C |
| 22.917 / 24.238 2.1051 | Emission Limits Transmitter | C |
| 2.1053 (a) | Field Strength of Spurious Radiation | C |
| 2.1055 | Frequency Stability | C |

**Note 1: C= Complies NC=Not Complies NT=Not Tested NA=Not Applicable**

**Note 2: This device has two independent GSM modules ( Each one module on the black face and the silver face). So all test items were repeated for each GSM module on black face and silver face of the device.**

The sample was tested according to the following specification:

FCC Parts §22(H), §24(E), §2; ANSI/TIA/EIA-603-C 2004

## 3.2 Power Output

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 2.1046 (a) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850<br>1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |

**Measurement Procedure:**

- During the process of testing, the EUT was controlled via Radio Communication Tester to ensure max. power transmission and proper modulation.
- Power output was measured at the RF output terminals when the transmitter is adjusted in accordance with communication tester (or the tune-up procedure).

**Measurement Data:**

**GSM850 (Black face)**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 5 |
|---|---|---|
| | | (dBm) |
| 128 | 824.2 | **31.63** |
| 190 | 836.6 | **31.86** |
| 251 | 848.8 | **31.79** |

**PCS1900 (Black face)**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 0 |
|---|---|---|
| | | (dBm) |
| 512 | 1850.2 | **28.65** |
| 661 | 1880.0 | **28.40** |
| 810 | 1909.8 | **28.43** |

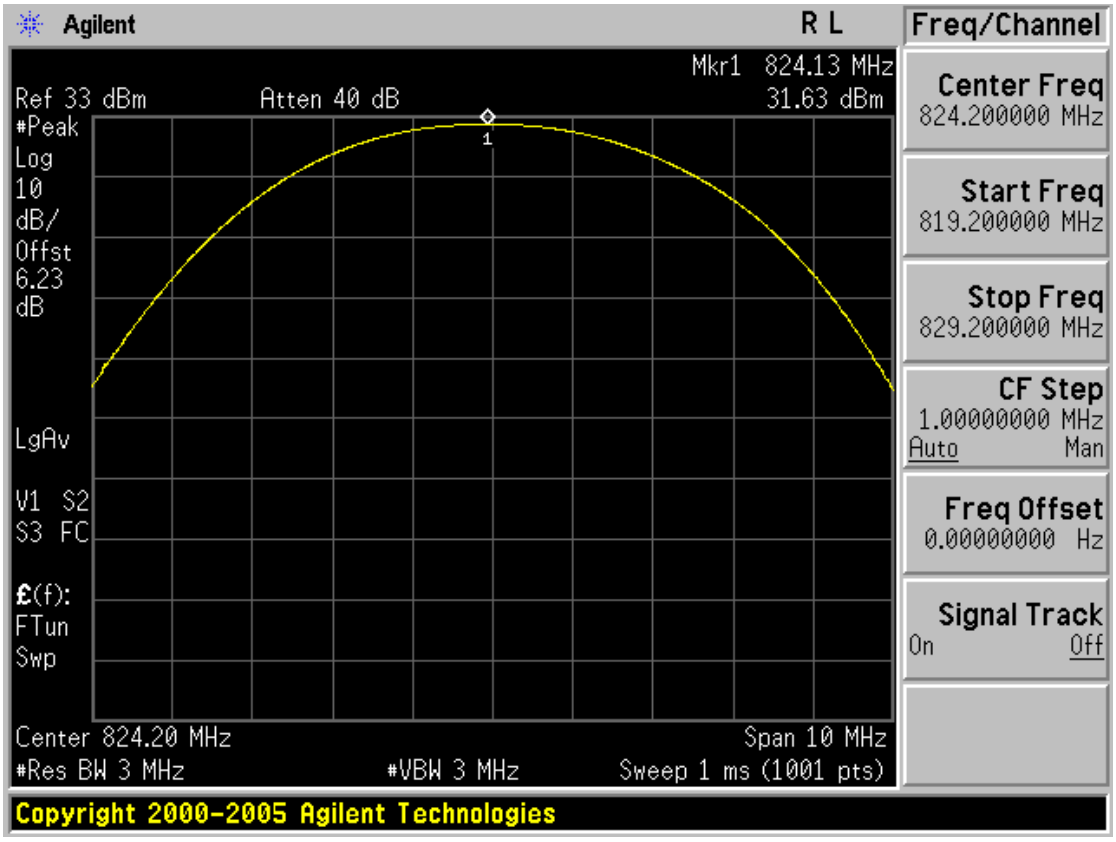
**GSM850 (Silver face)**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 5 |
|---|---|---|
| | | (dBm) |
| 128 | 824.2 | **31.63** |
| 190 | 836.6 | **31.84** |
| 251 | 848.8 | **31.64** |

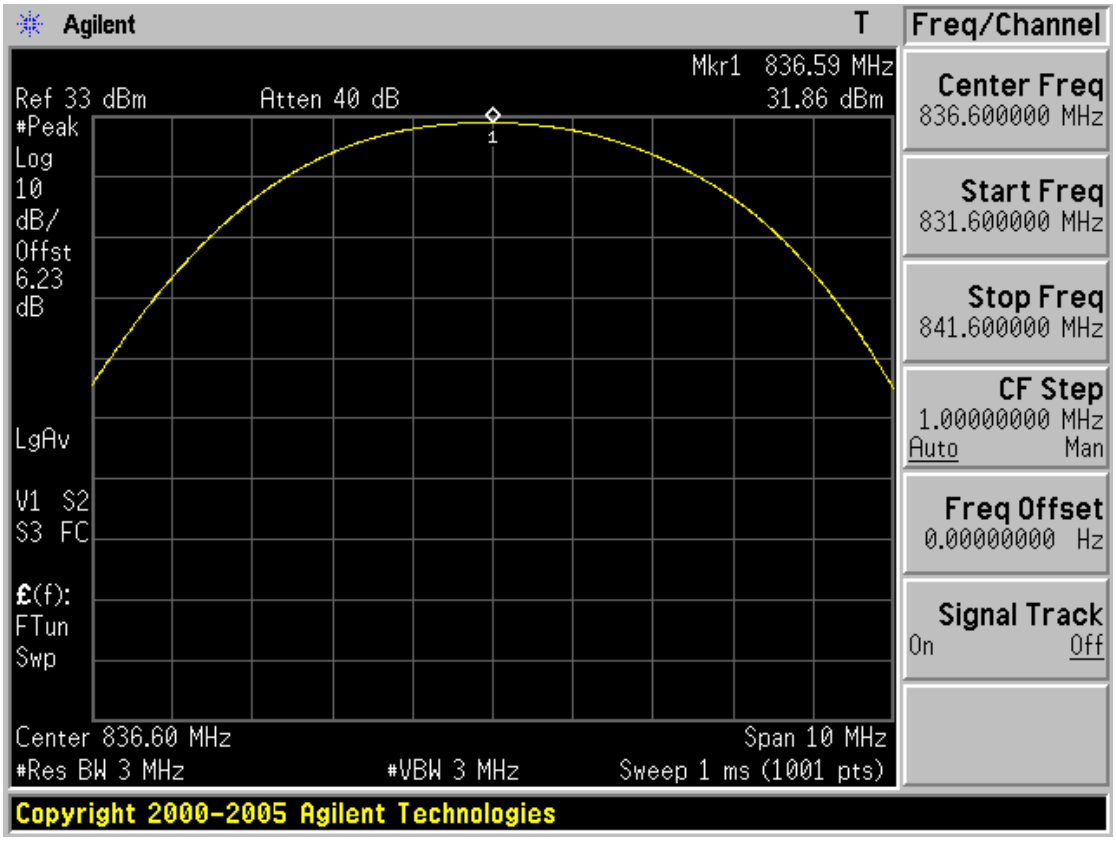
**PCS1900 (Silver face)**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 0 |
|---|---|---|
| | | (dBm) |
| 512 | 1850.2 | **28.51** |
| 661 | 1880.0 | **28.38** |
| 810 | 1909.8 | **28.46** |

**POWER OUT. GSM850 Ch.128 (Black face)**

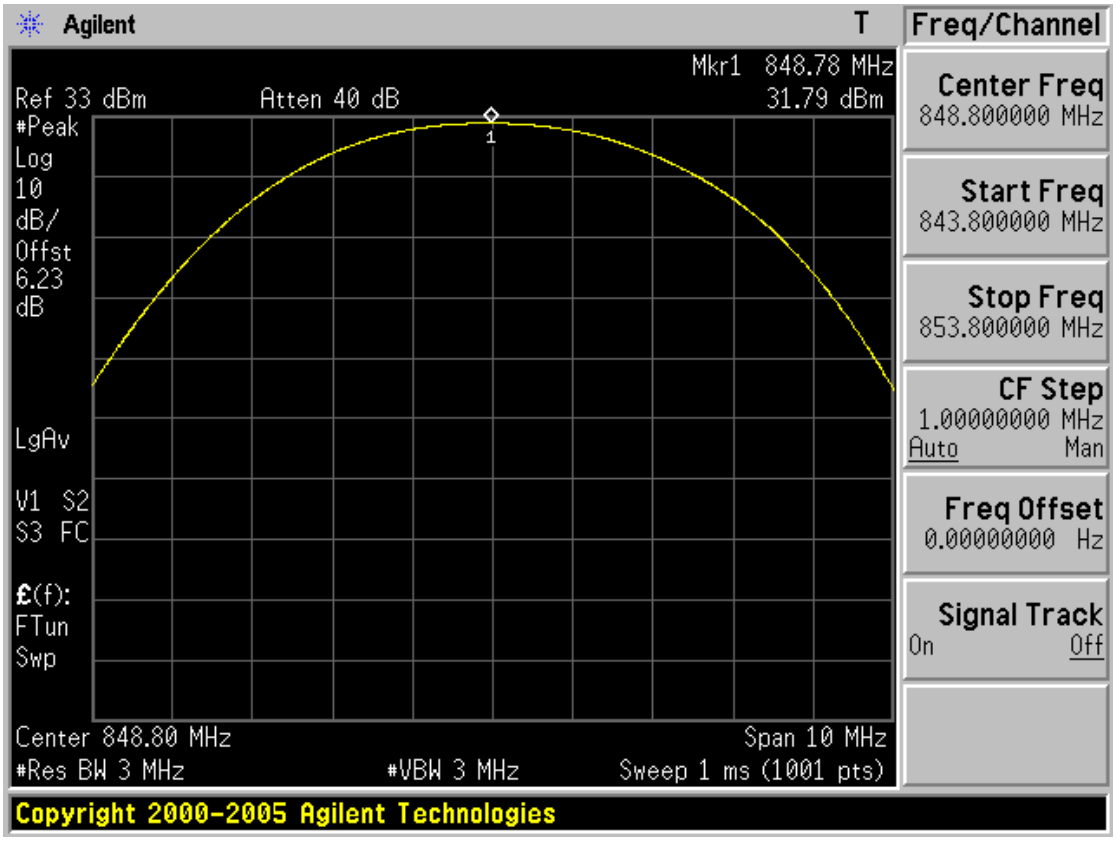



**POWER OUT. GSM850 Ch.190 (Black face)**

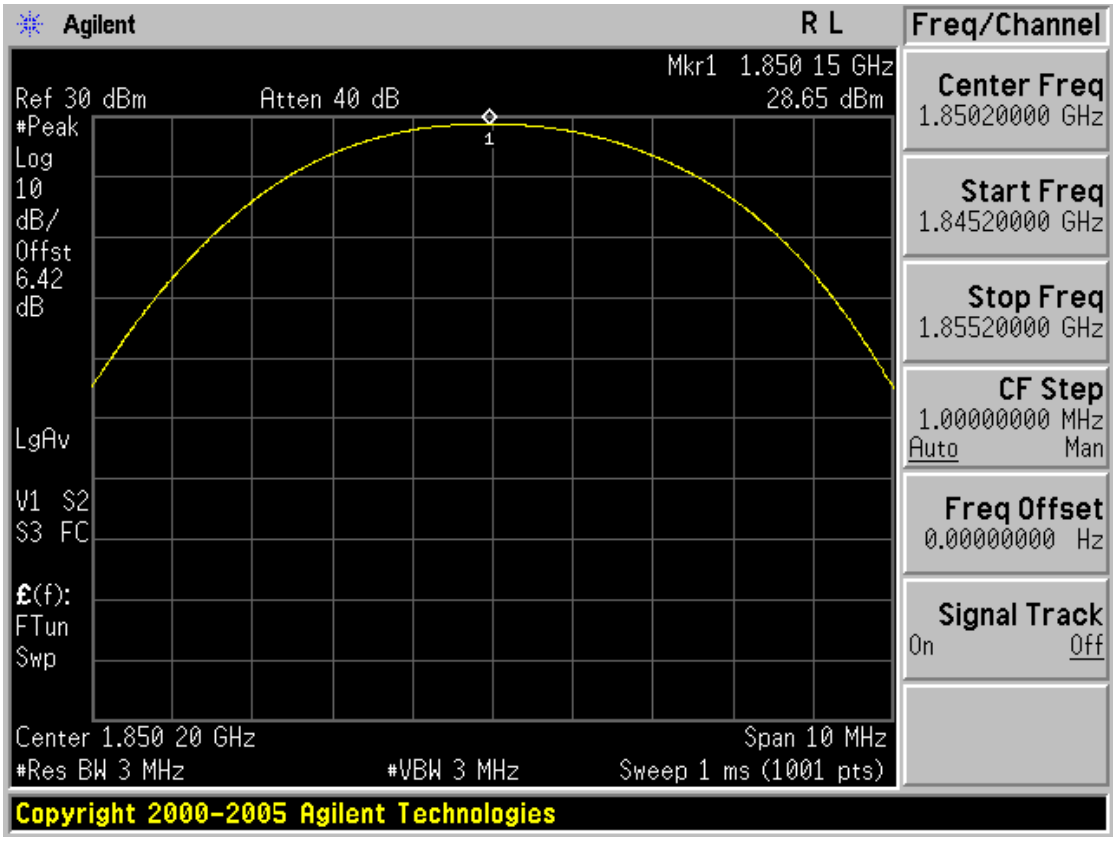


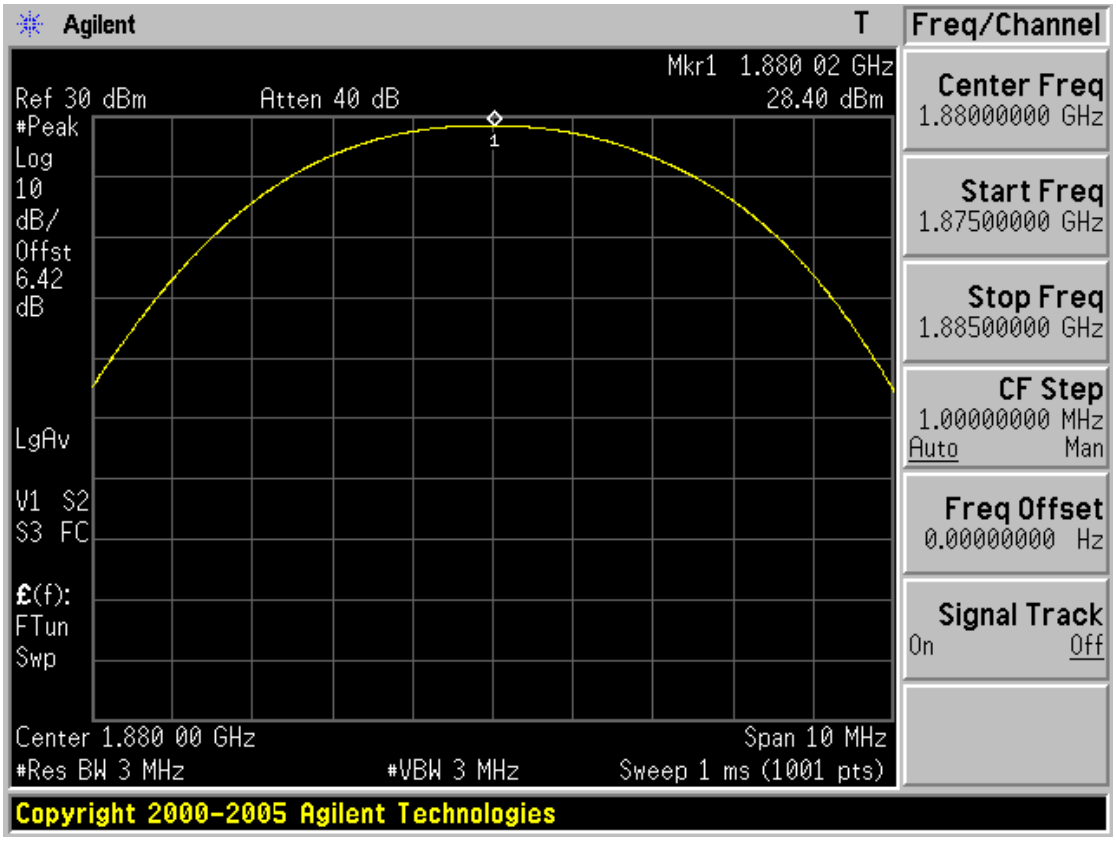
**POWER OUT. GSM850 Ch.251 (Black face)**



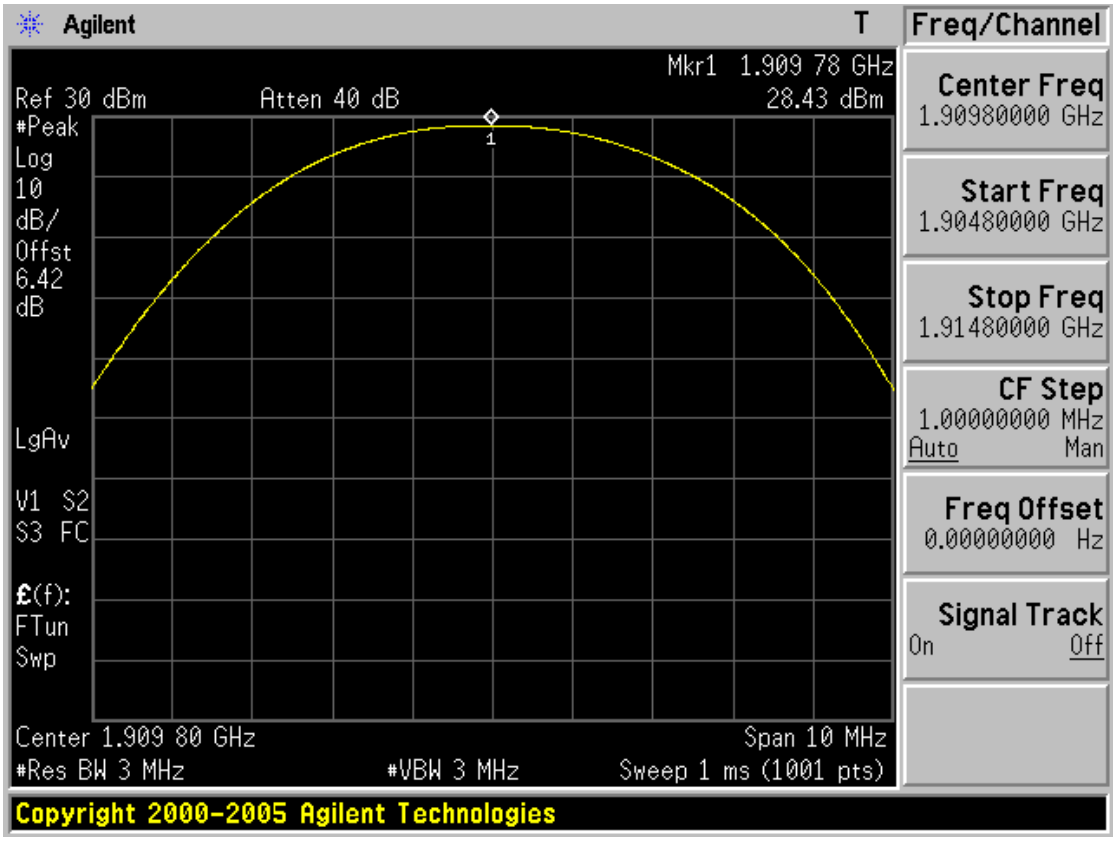
**POWER OUT. PCS1900 Ch.512 (Black face)**



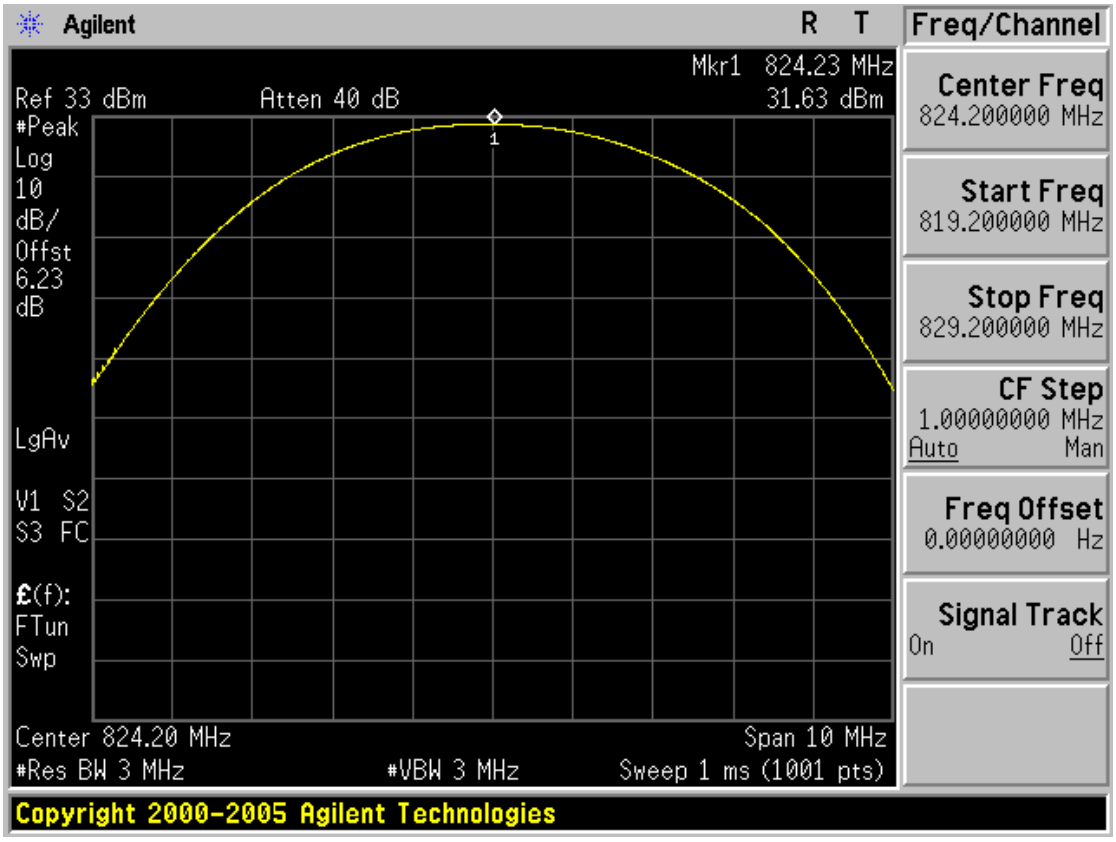

**POWER OUT. PCS1900 Ch.661 (Black face)**



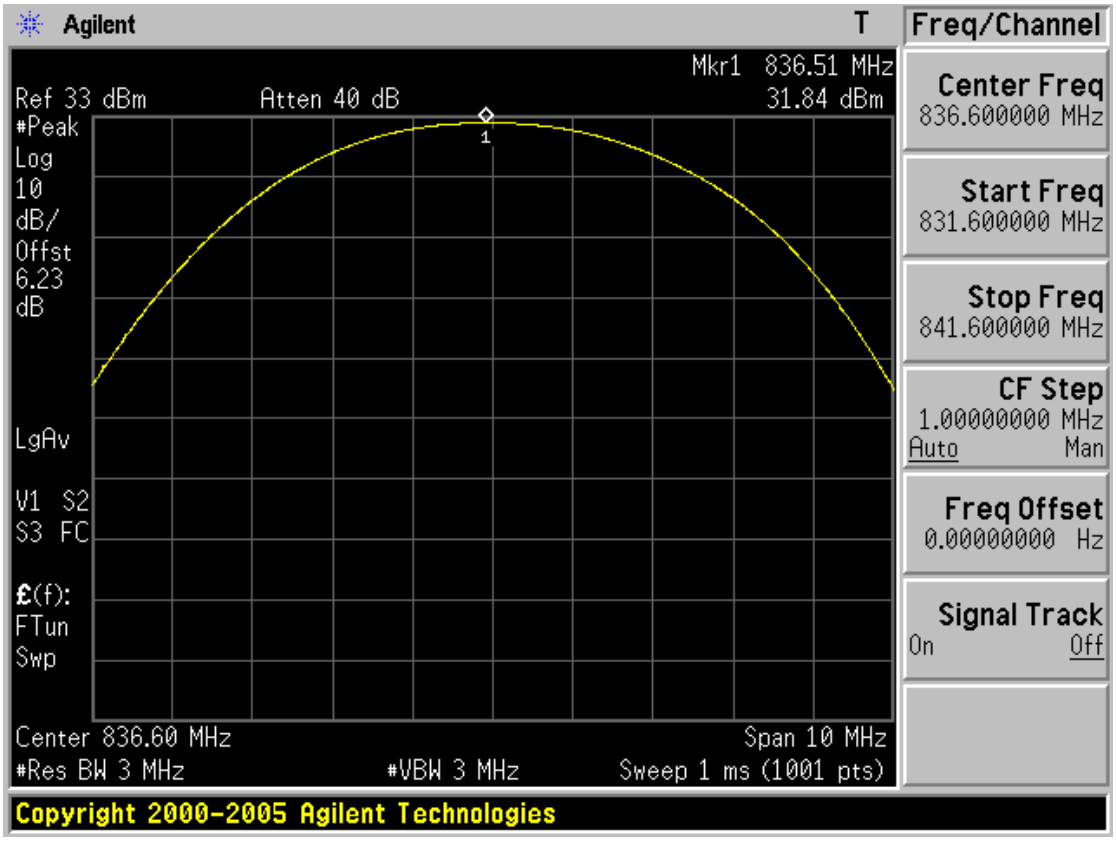
**POWER OUT. PCS1900 Ch.810 (Black face)**



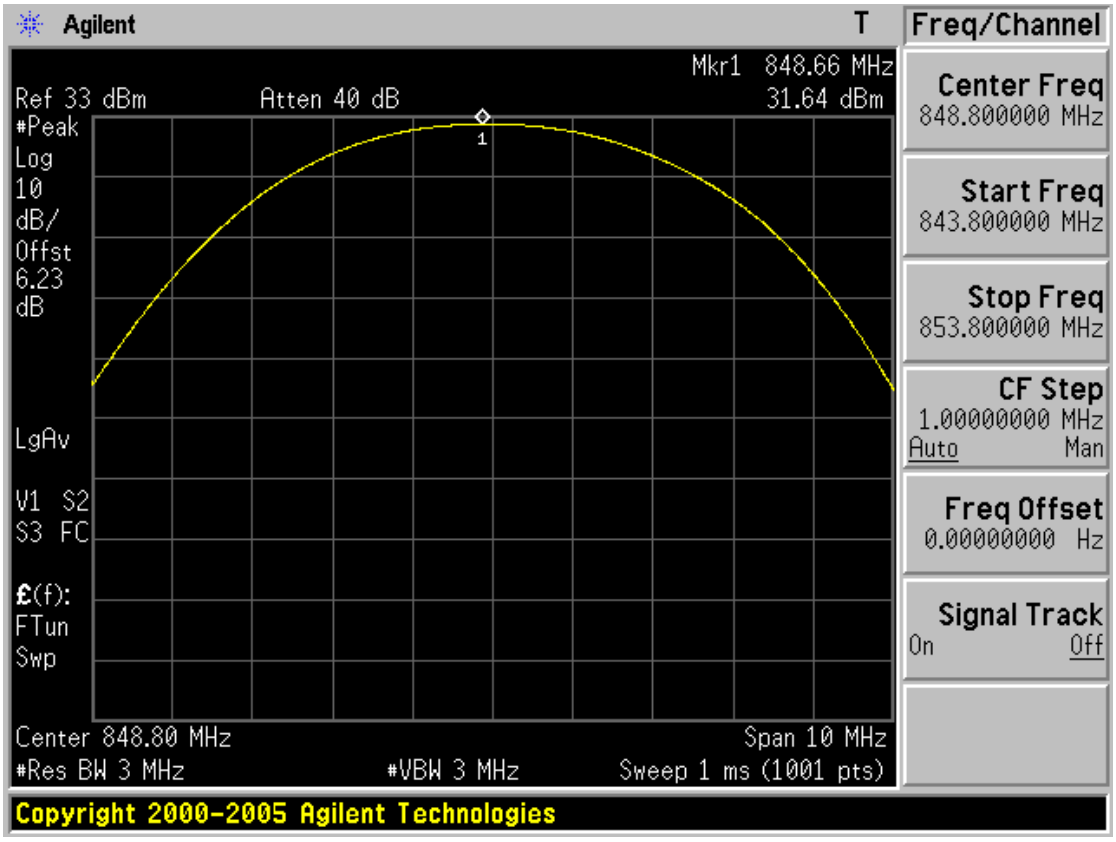
**POWER OUT. GSM850 Ch.128 (Silver face)**



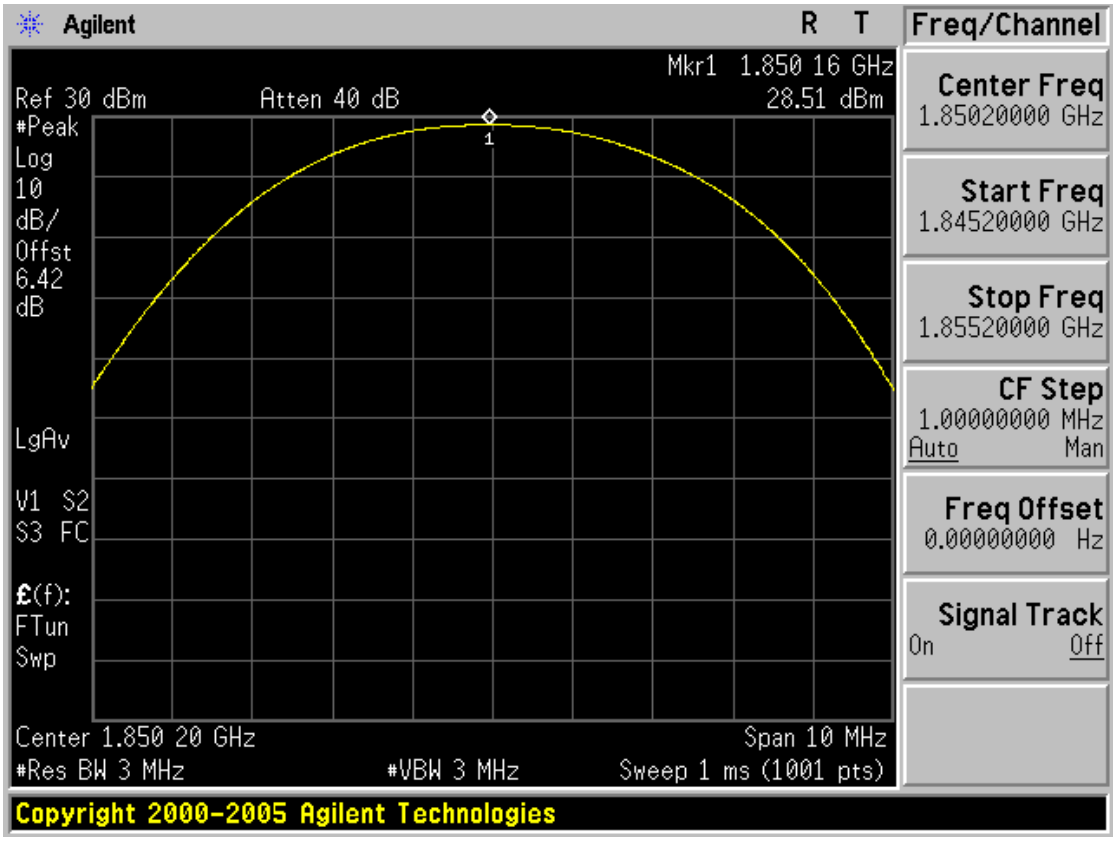

**POWER OUT. GSM850 Ch.190 (Silver face)**



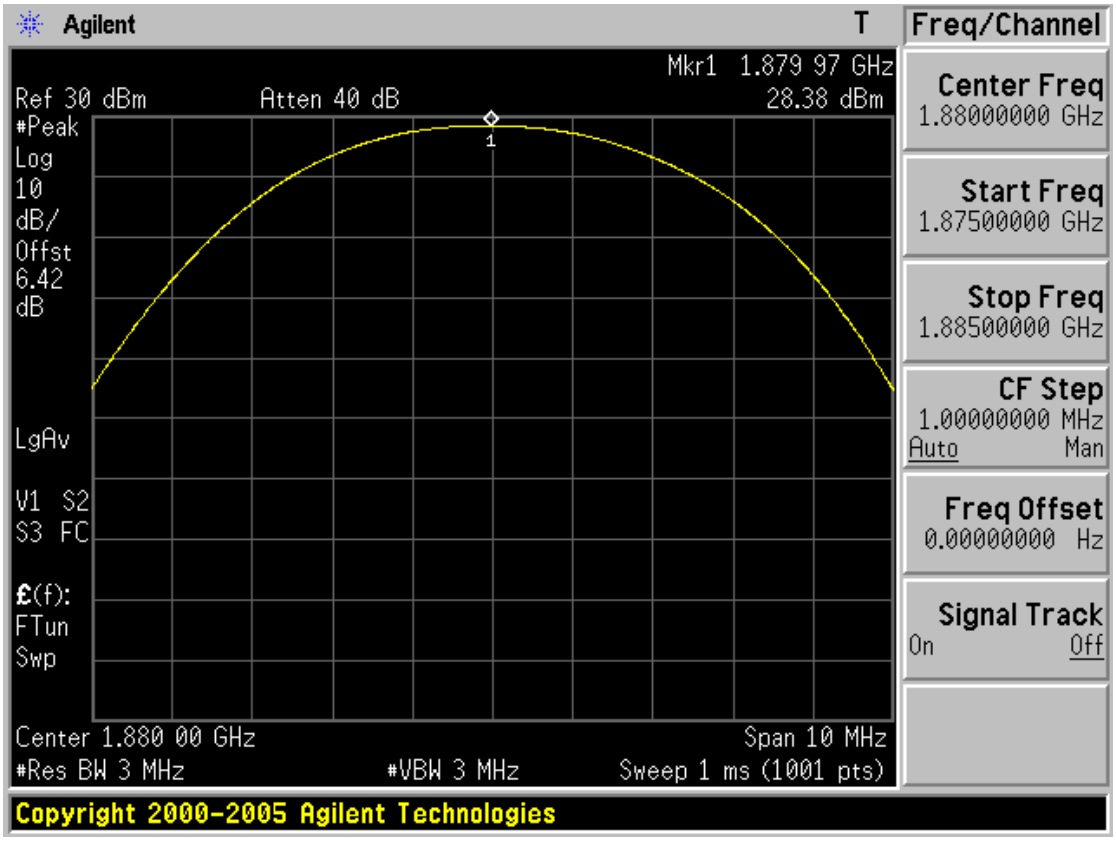
**POWER OUT. GSM850 Ch.251 (Silver face)**



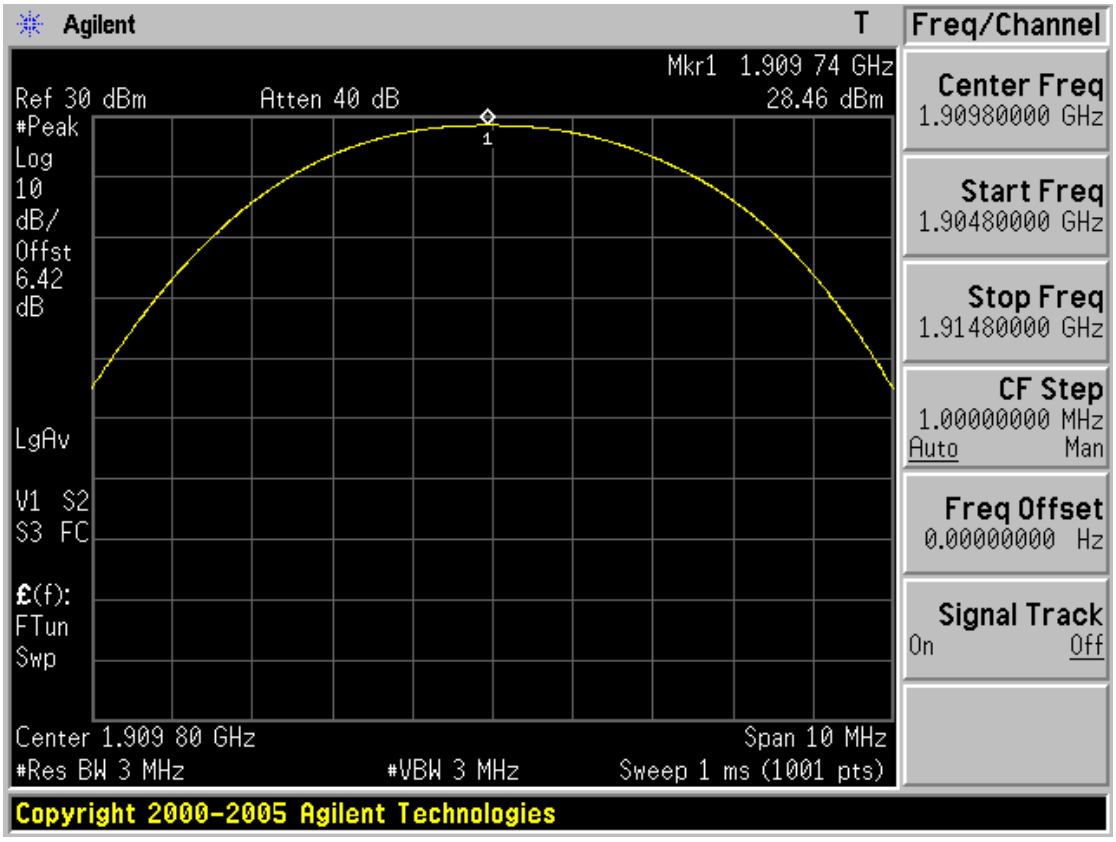
**POWER OUT. PCS1900 Ch.512 (Silver face)**




**POWER OUT. PCS1900 Ch.661 (Silver face)**



**POWER OUT. PCS1900 Ch.810 (Silver face)**



## ERP (GSM850)

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 22.913(a) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850 |
| RBW=VBW | : | 3MHz |

**Measurement Procedure:**

Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C 2004

The EUT was placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

**Measurement Data:**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 5 | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ref. level (dBm) | Pol. (H/V) | ERP (dBm) | ERP (W) | Battery | Note. |
| 128 | 824.2 | -14.58 | H | 24.02 | 0.253 | Battery | Black Face |
| 190 | 836.6 | -14.68 | H | 24.55 | 0.285 | Battery | Black Face |
| **251** | **848.8** | **-13.41** | **H** | **25.93** | **0.392** | **Battery** | **Black Face** |
| **128** | **824.2** | **-13.91** | **H** | **23.05** | **0.202** | **Battery** | **Silver Face** |
| 190 | 836.6 | -14.34 | H | 21.53 | 0.142 | Battery | Silver Face |
| 251 | 848.8 | -13.67 | H | 21.89 | 0.155 | Battery | Silver Face |
| **251(Black)/251(Silver)** | 848.8 | -14.10 | H | 21.46 | 0.140 | Battery | Simultaneous mode |

**Note : The ERP test for simultaneous operation mode was repeated at the same channel which is the worst case channel of black face and silver face.**

## EIRP (PCS1900)

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 24.232(b) |
| Tested Frequency | : | 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |
| RBW=VBW | : | 3MHz |

**Measurement Procedure:**

Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C 2004

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

**Measurement Data:**

| Channel | Frequency (MHz) | TEST CONDITIONS Power Step: 0 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Ref. level (dBm) | Pol. (H/V) | ANT GAIN | EIRP (dBm) | EIRP (W) | Battery | Note. |
| 512 | 1850.20 | -16.86 | H | 8.55 | 22.58 | 0.181 | Battery | Black Face |
| **661** | **1880.00** | **-15.56** | **H** | **8.39** | **24.65** | **0.292** | **Battery** | **Black Face** |
| 810 | 1909.80 | -15.81 | H | 8.37 | 24.03 | 0.253 | Battery | Black Face |
| 512 | 1850.20 | -15.67 | H | 8.55 | 23.77 | 0.238 | Battery | Silver Face |
| **661** | **1880.00** | **-14.93** | **H** | **8.39** | **25.28** | **0.337** | **Battery** | **Silver Face** |
| 810 | 1909.80 | -16.20 | H | 8.37 | 23.64 | 0.231 | Battery | Silver Face |
| **661(Black)/661(Silver)** | **1880.00** | **-13.58** | **H** | **8.39** | **26.63** | **0.460** | **Battery** | **Simultaneous mode** |

**Note : The EIRP test for simultaneous operation mode was repeated at the same channel which is the worst case channel of black face and silver face.**

## 3.3 Occupied Bandwidth

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 2.1049 (h)(i) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850<br>1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |

**Measurement Procedure:**

- The 99% power bandwidth was measured with a calibrated spectrum analyzer.
- Spectrum analyzer plots are included on the following pages.

**Measurement Data:**

**GSM850 (Black face)**

| Channel | Frequency (MHz) | 99% Bandwidth (kHz) |
|---|---|---|
| 128 | 824.2 | **242.8999** |
| 190 | 836.6 | **248.6458** |
| 251 | 848.8 | **242.3537** |

**PCS1900 (Black face)**

| Channel | Frequency (MHz) | 99% Bandwidth (kHz) |
|---|---|---|
| 512 | 1850.2 | **248.0033** |
| 661 | 1880.0 | **233.1220** |
| 810 | 1909.8 | **243.7615** |

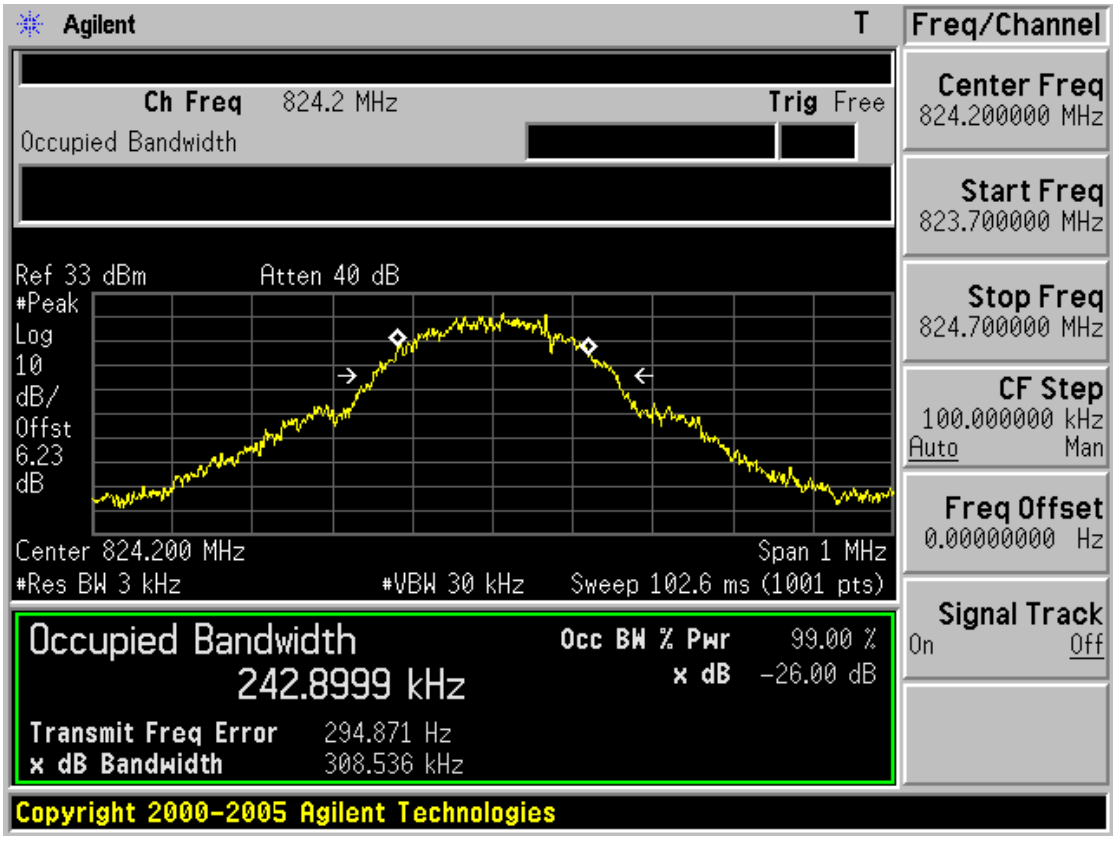
**GSM850 (Silver face)**

| Channel | Frequency (MHz) | 99% Bandwidth (kHz) |
|---|---|---|
| 128 | 824.2 | **245.4415** |
| 190 | 836.6 | **245.1189** |
| 251 | 848.8 | **246.0588** |

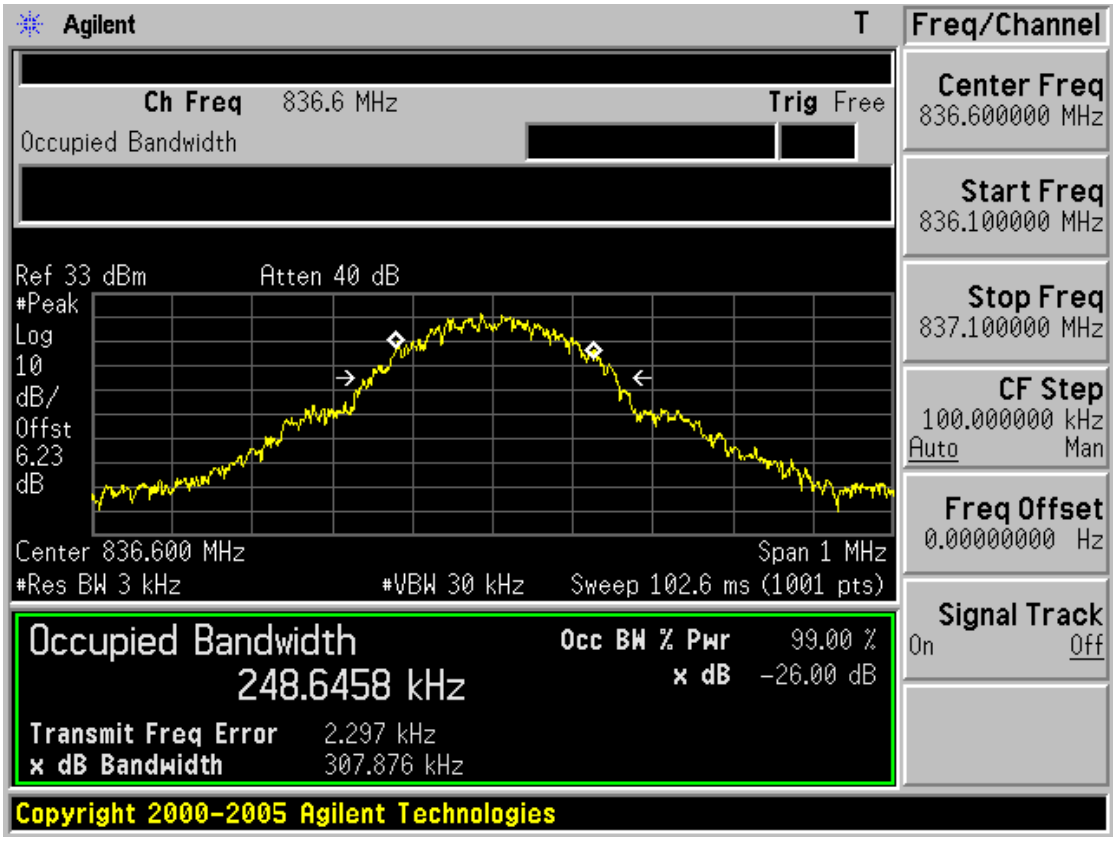
**PCS1900 (Silver face)**

| Channel | Frequency (MHz) | 99% Bandwidth (kHz) |
|---|---|---|
| 512 | 1850.2 | **244.4350** |
| 661 | 1880.0 | **243.2601** |
| 810 | 1909.8 | **244.4562** |

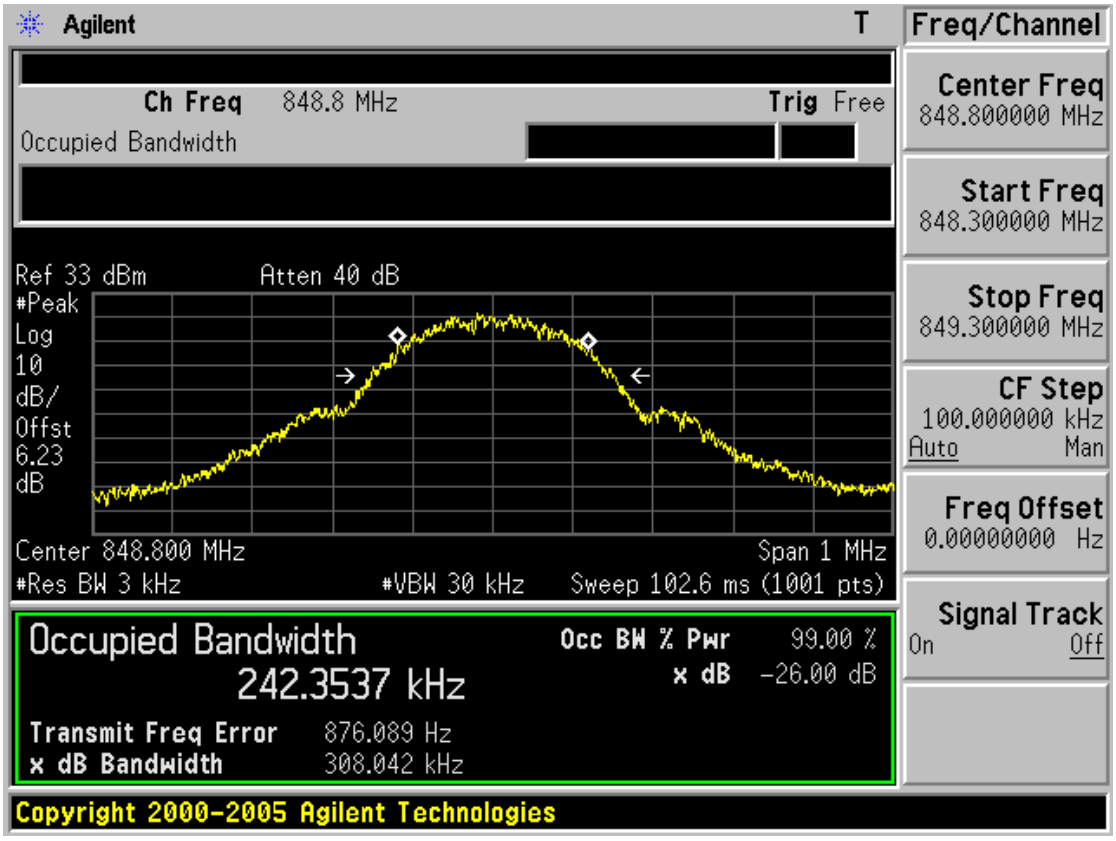
**GSM850** **99 % Bandwidth Ch. 128 (Black face)**



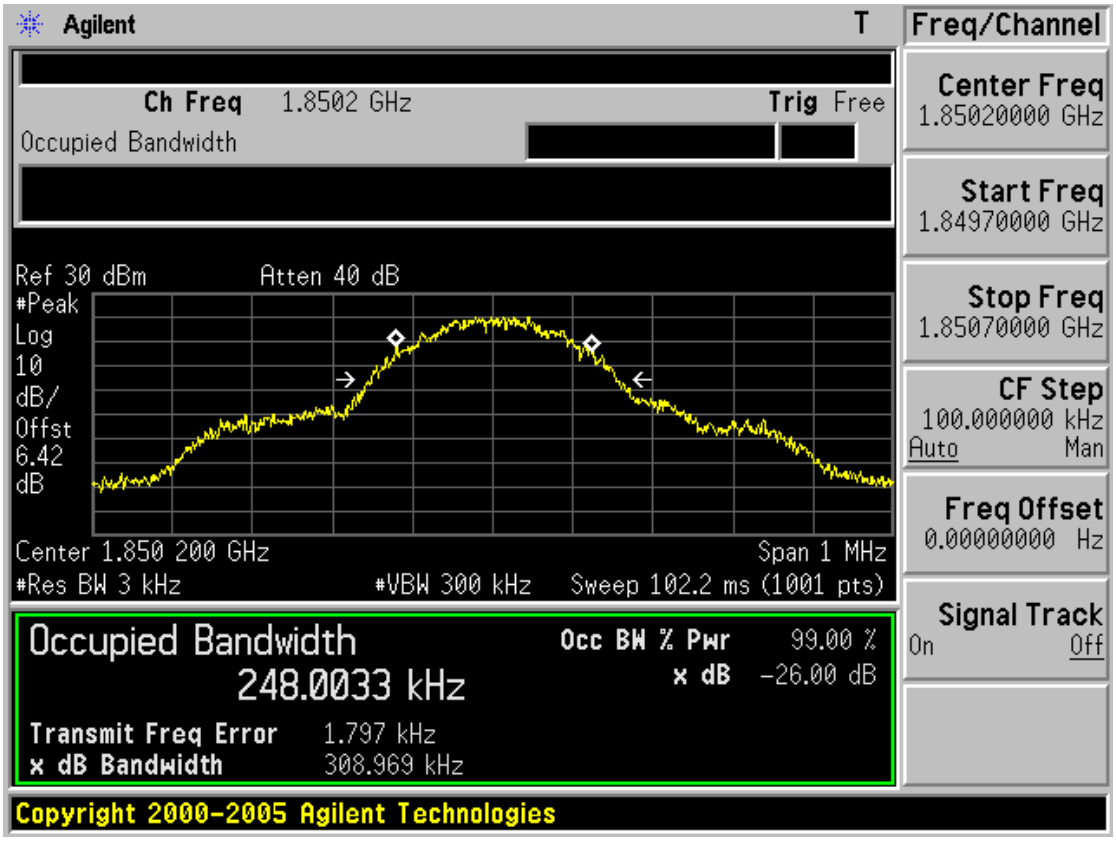

**GSM850** **99 % Bandwidth Ch. 190 (Black face)**



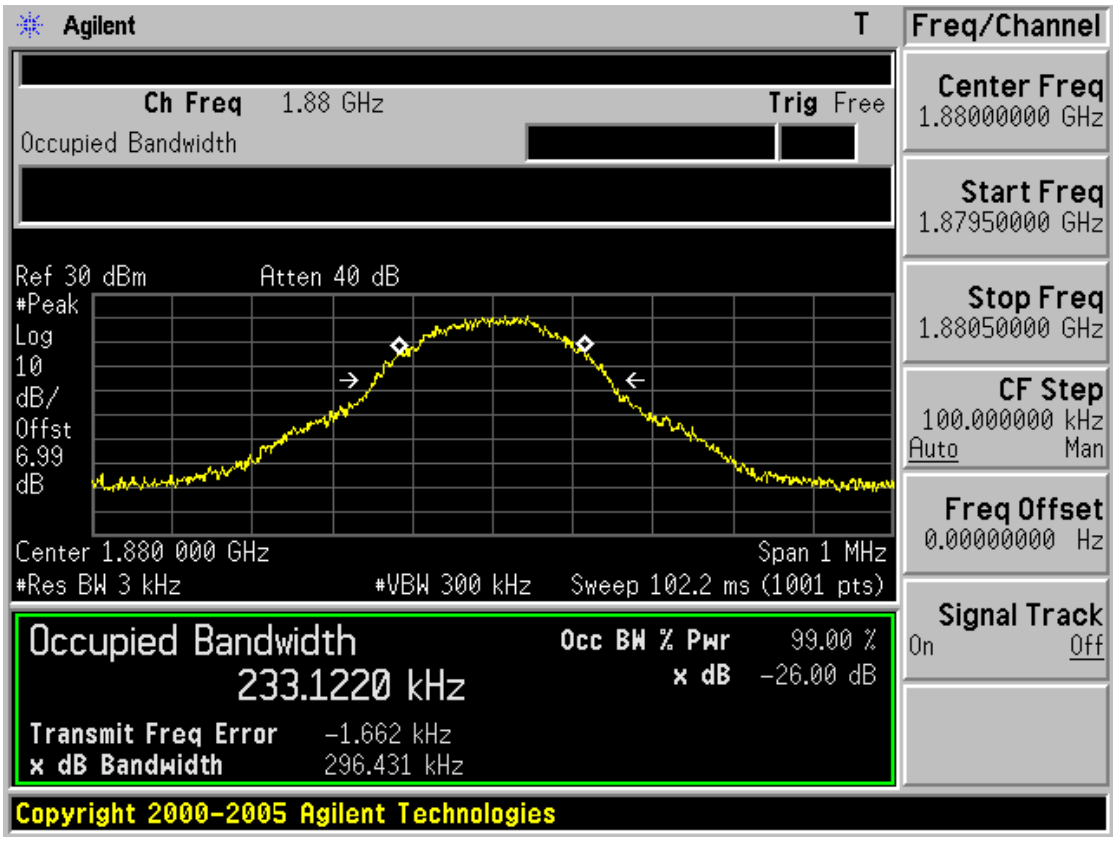
**GSM850** **99 % Bandwidth Ch. 251 (Black face)**



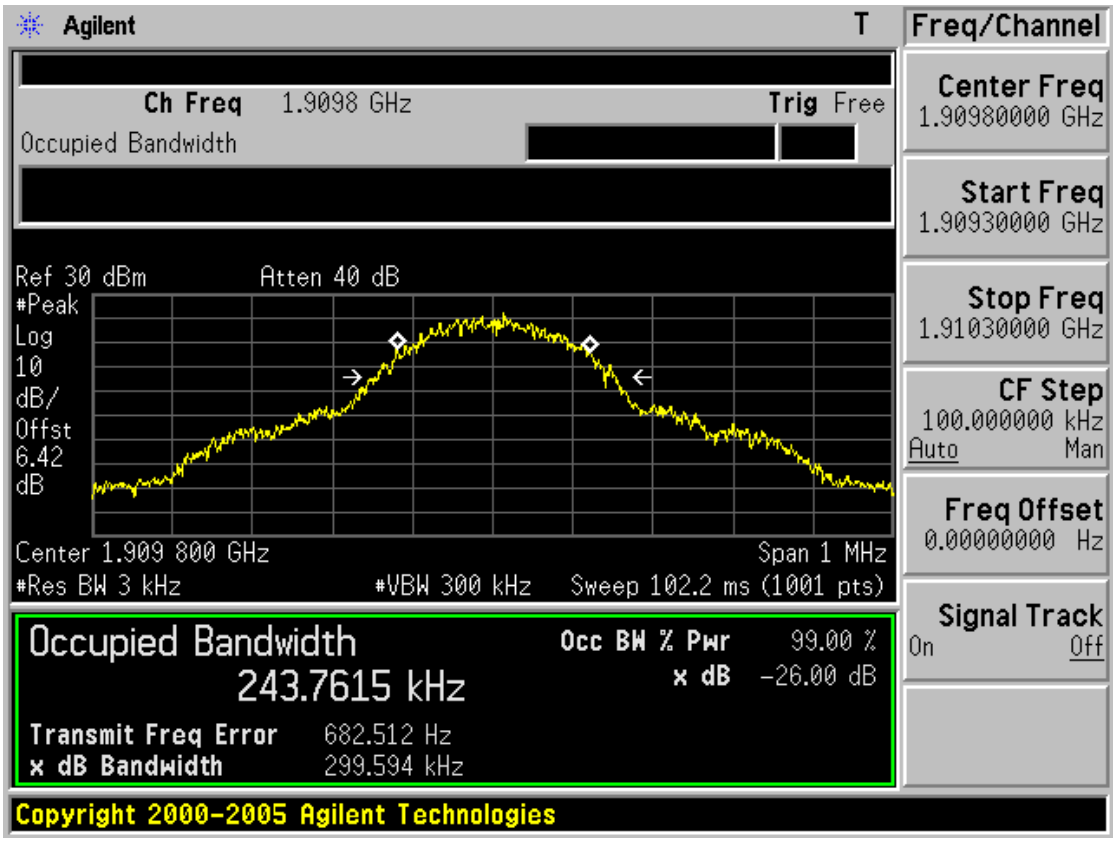

**GSM1900** **99 % Bandwidth Ch. 512 (Black face)**



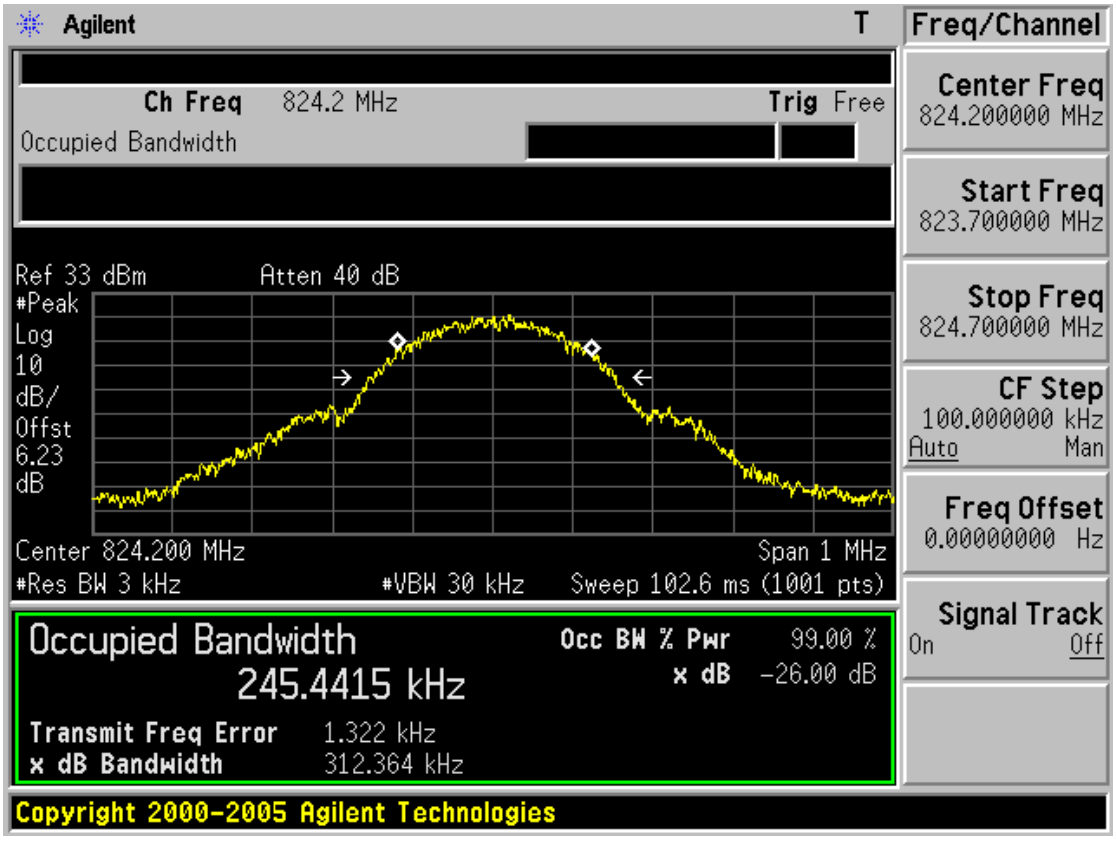
**GSM1900** **99 % Bandwidth Ch. 661 (Black face)**



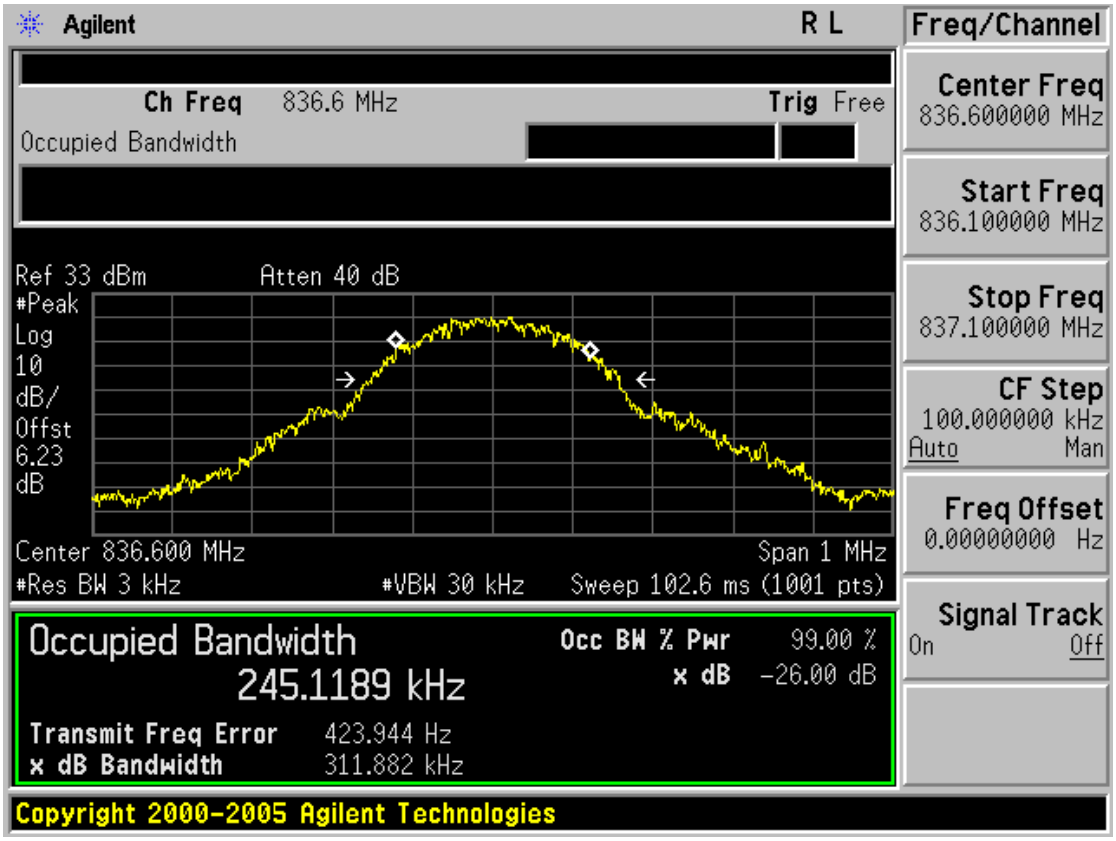

**GSM1900** **99 % Bandwidth Ch. 810 (Black face)**



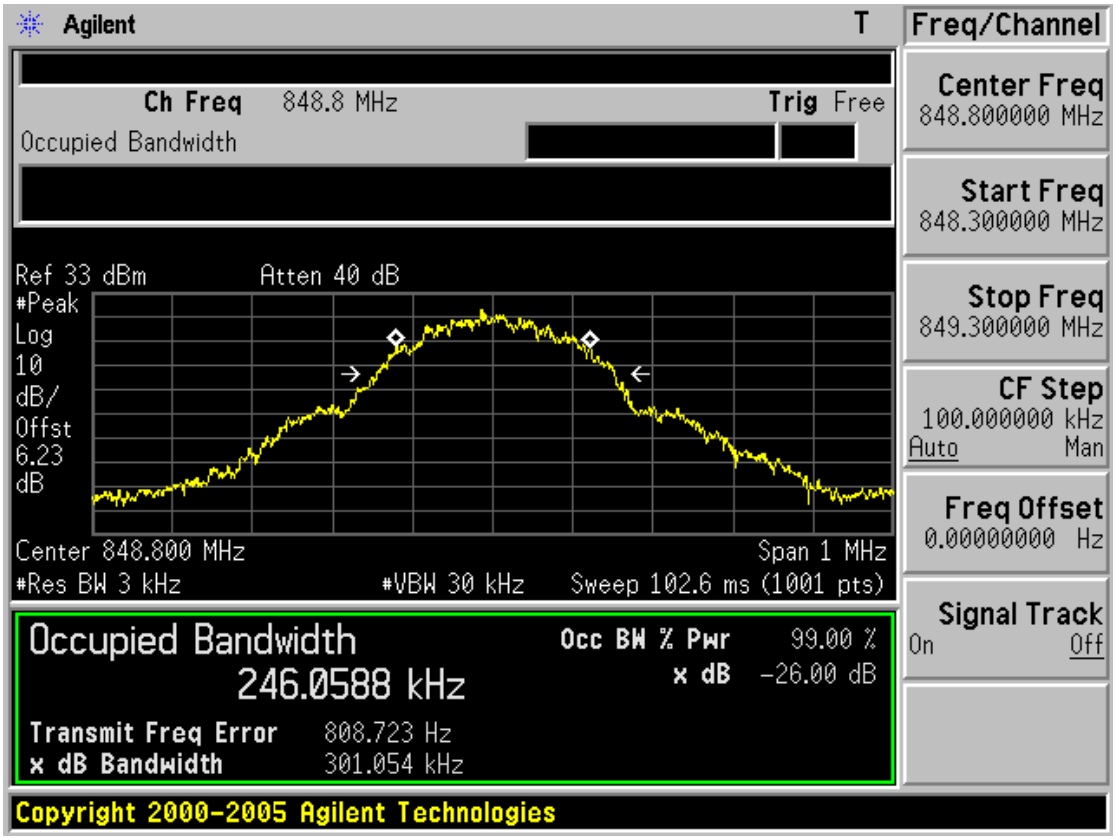
**GSM850** **99 % Bandwidth Ch. 128 (Silver face)**



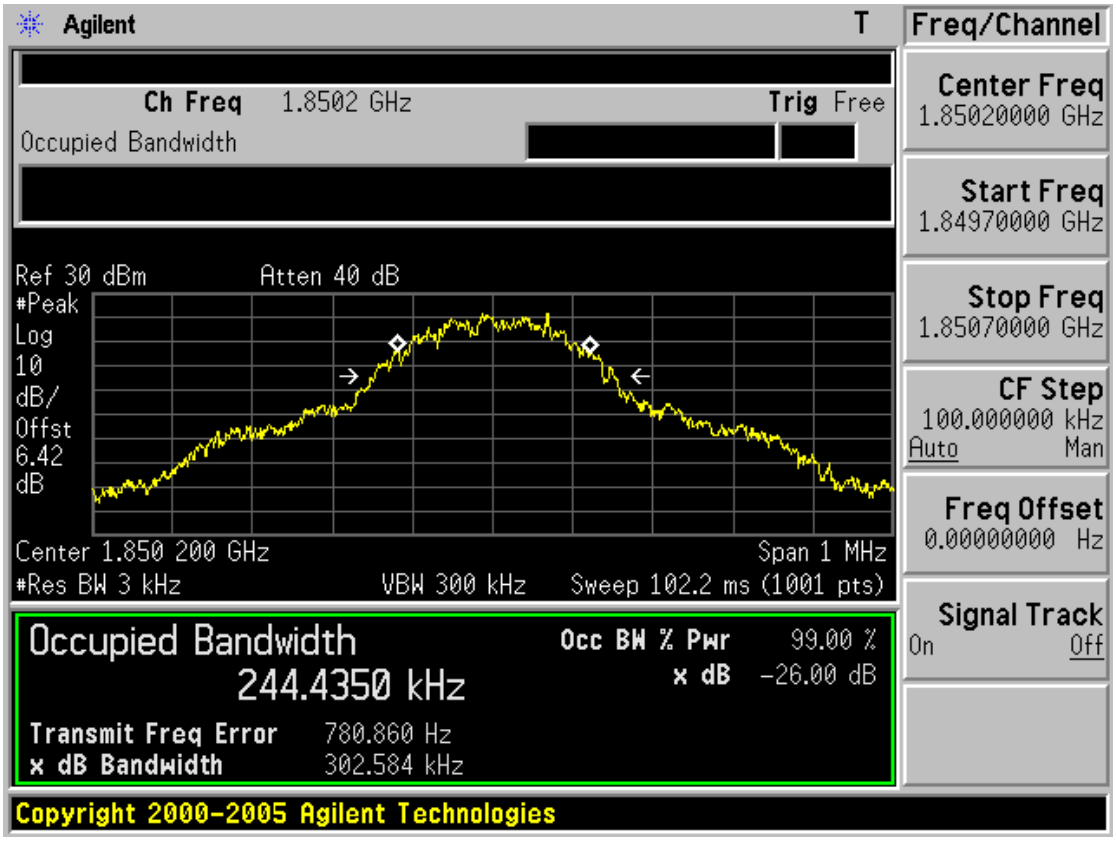

**GSM850** **99 % Bandwidth Ch. 190 (Silver face)**



**GSM850** **99 % Bandwidth Ch. 251 (Silver face)**

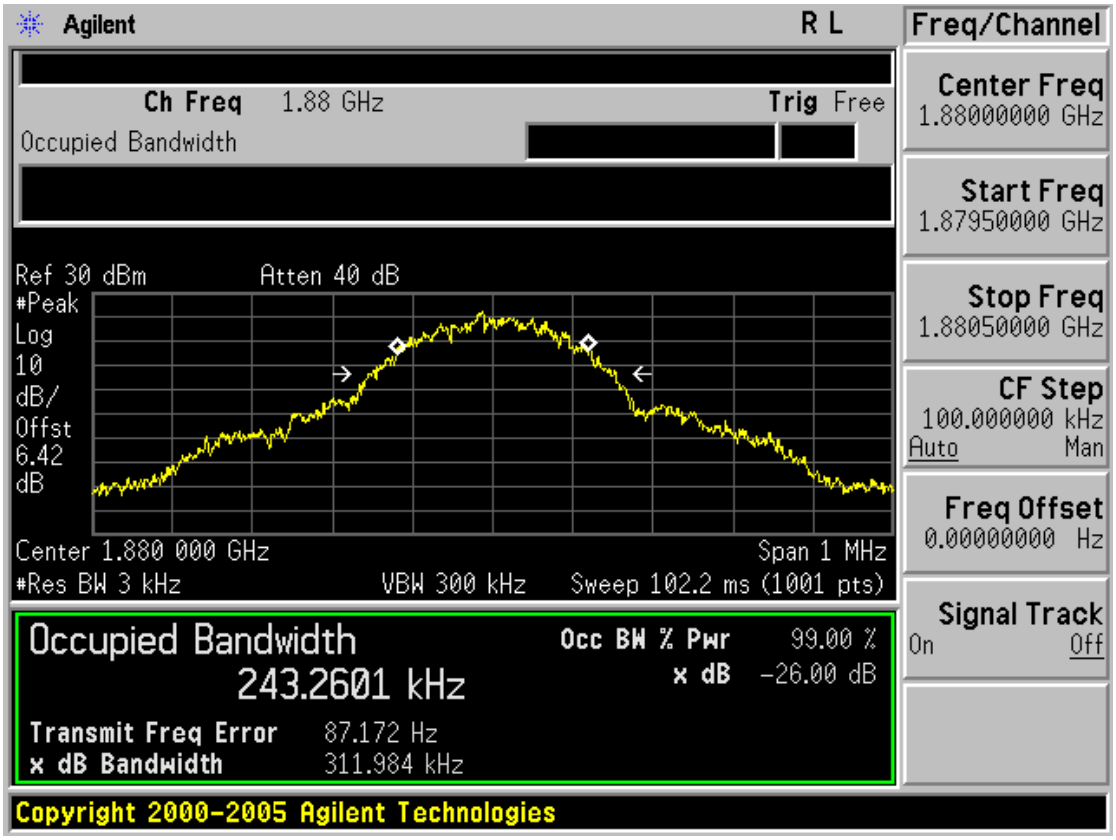



**GSM1900** **99 % Bandwidth Ch. 512 (Silver face)**

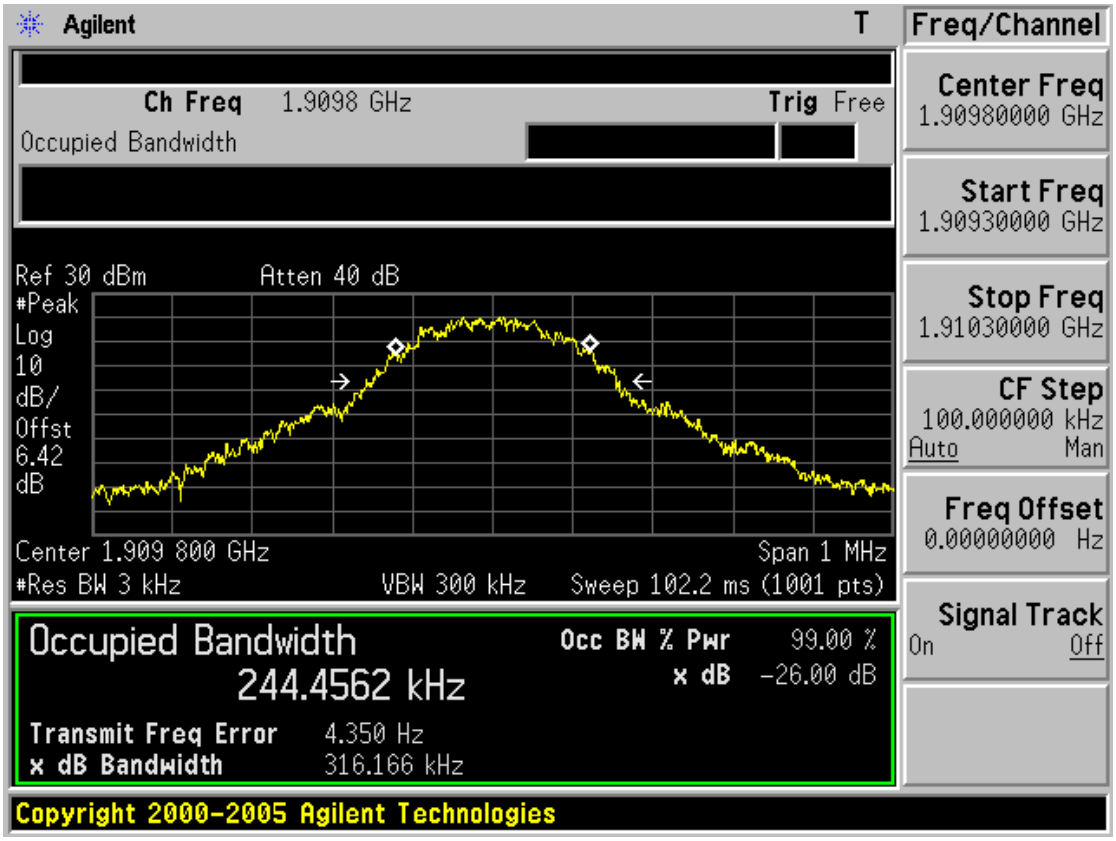


**GSM1900** **99 % Bandwidth Ch. 661 (Silver face)**




**GSM1900** **99 % Bandwidth Ch. 810 (Silver face)**



## 3.4 Occupied Bandwidth Emission Limit

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 24.238(b) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850<br>1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |

**Measurement Procedure:**

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43+10log(P) dB.

  (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1㎒ or greater. However, in the 1㎒ bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26dB below the transmitter power.

  (c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

- The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
- Spectrum analyzer plots are included on the following pages.

**Measurement Data:**

- Refer to the next page.

**GSM850 (Black face)**

| Channel | Frequency (MHz) | -26dBc Bandwidth (kHz) |
|---|---|---|
| 128 | 824.2 | **314** |
| 190 | 836.6 | **314** |
| 251 | 848.8 | **311** |

**PCS1900 (Black face)**

| Channel | Frequency (MHz) | -26dBc Bandwidth (kHz) |
|---|---|---|
| 512 | 1850.2 | **309** |
| 661 | 1880.0 | **314** |
| 810 | 1909.8 | **313** |

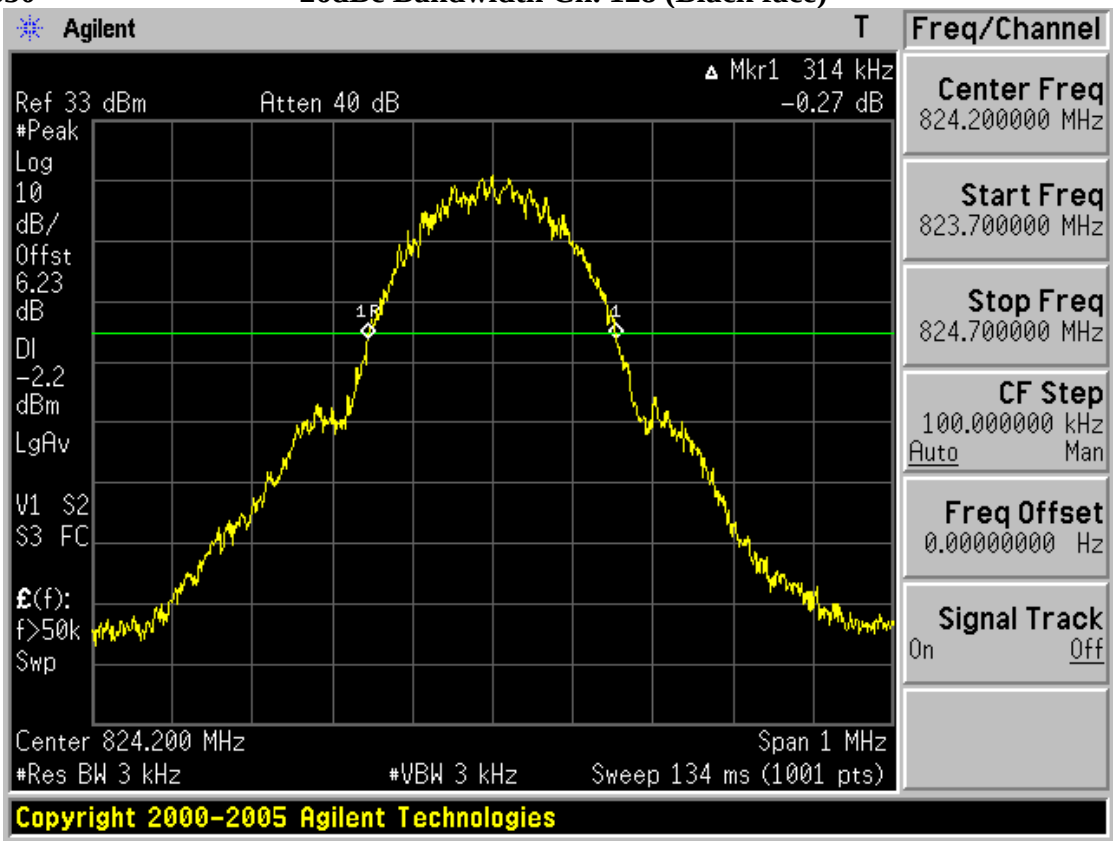
**GSM850 (Silver face)**

| Channel | Frequency (MHz) | -26dBc Bandwidth (kHz) |
|---|---|---|
| 128 | 824.2 | **309** |
| 190 | 836.6 | **310** |
| 251 | 848.8 | **312** |

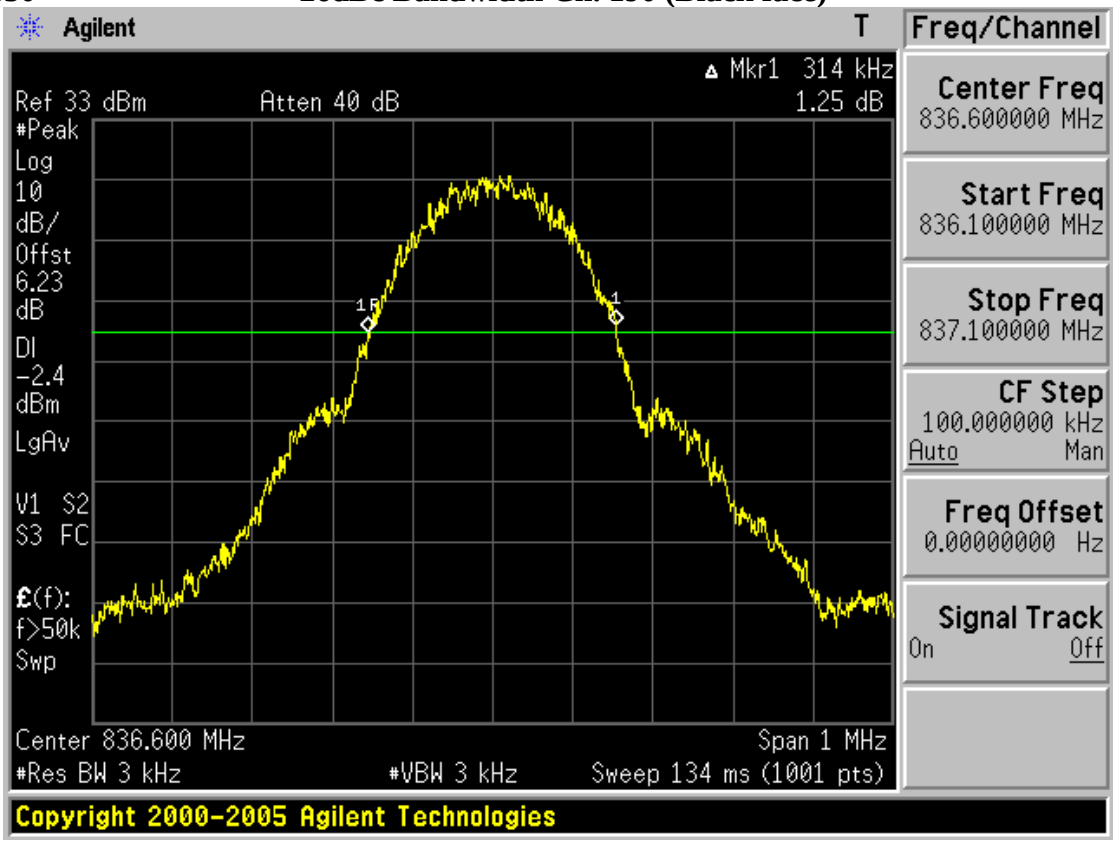
**PCS1900 (Silver face)**

| Channel | Frequency (MHz) | -26dBc Bandwidth (kHz) |
|---|---|---|
| 512 | 1850.2 | **309** |
| 661 | 1880.0 | **313** |
| 810 | 1909.8 | **312** |

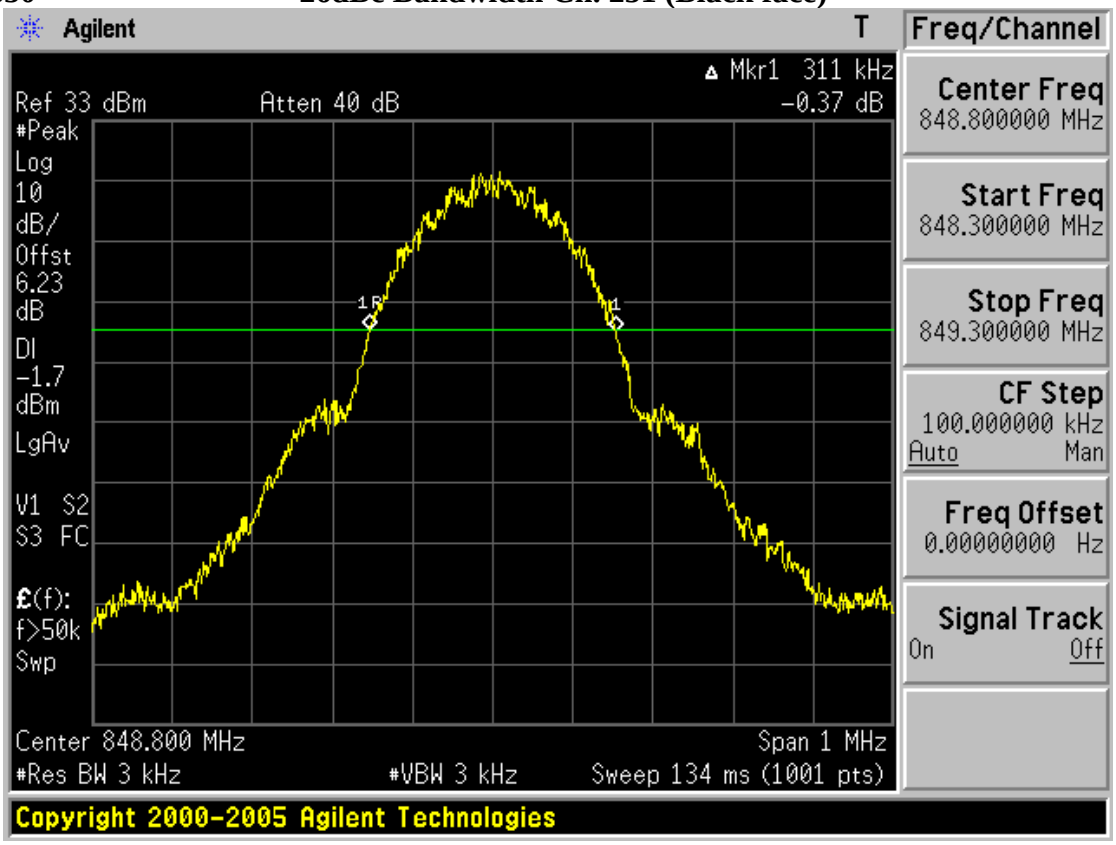
**GSM850** **-26dBc Bandwidth Ch. 128 (Black face)**



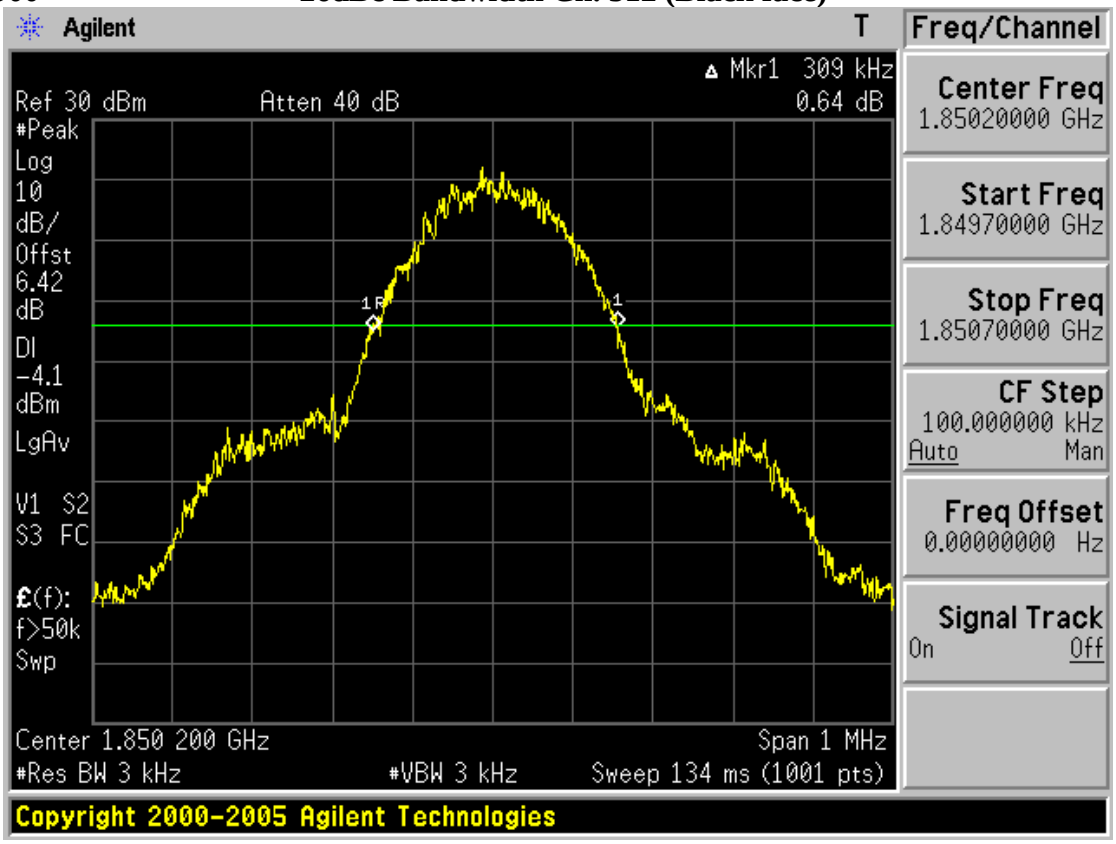

**GSM850** **-26dBc Bandwidth Ch. 190 (Black face)**



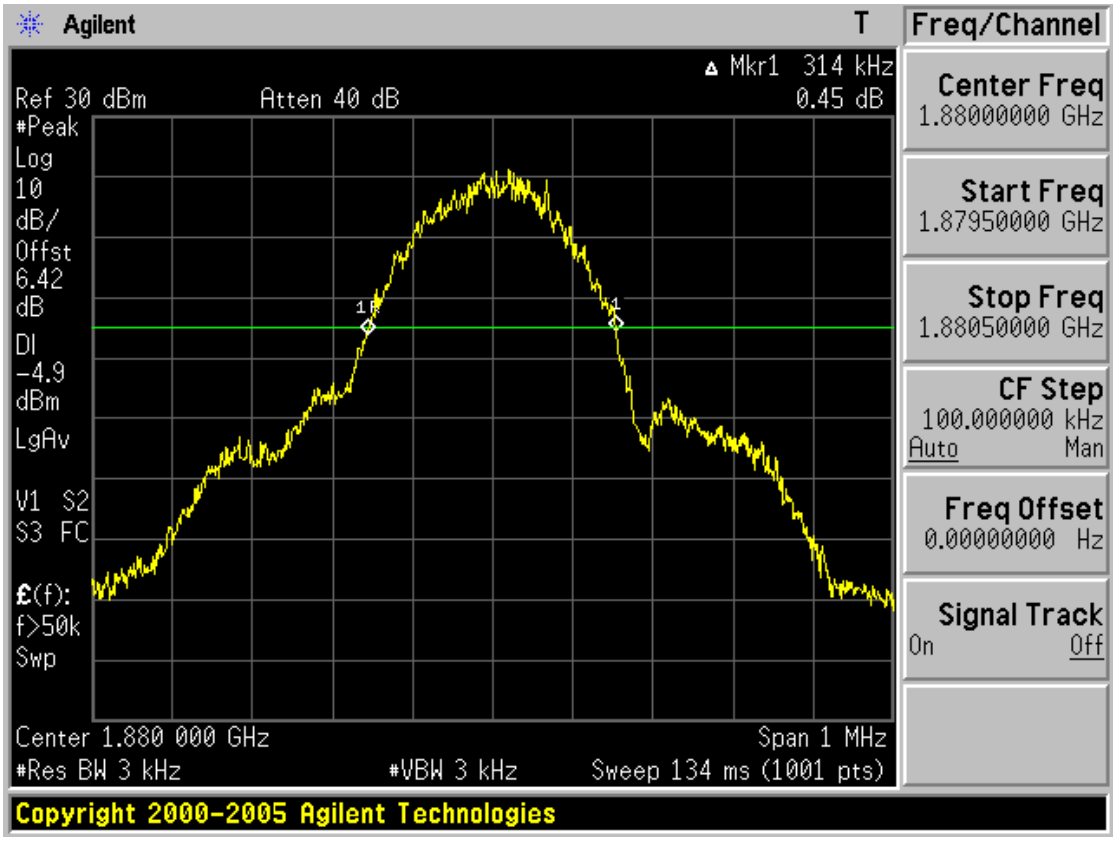
**GSM850** **-26dBc Bandwidth Ch. 251 (Black face)**



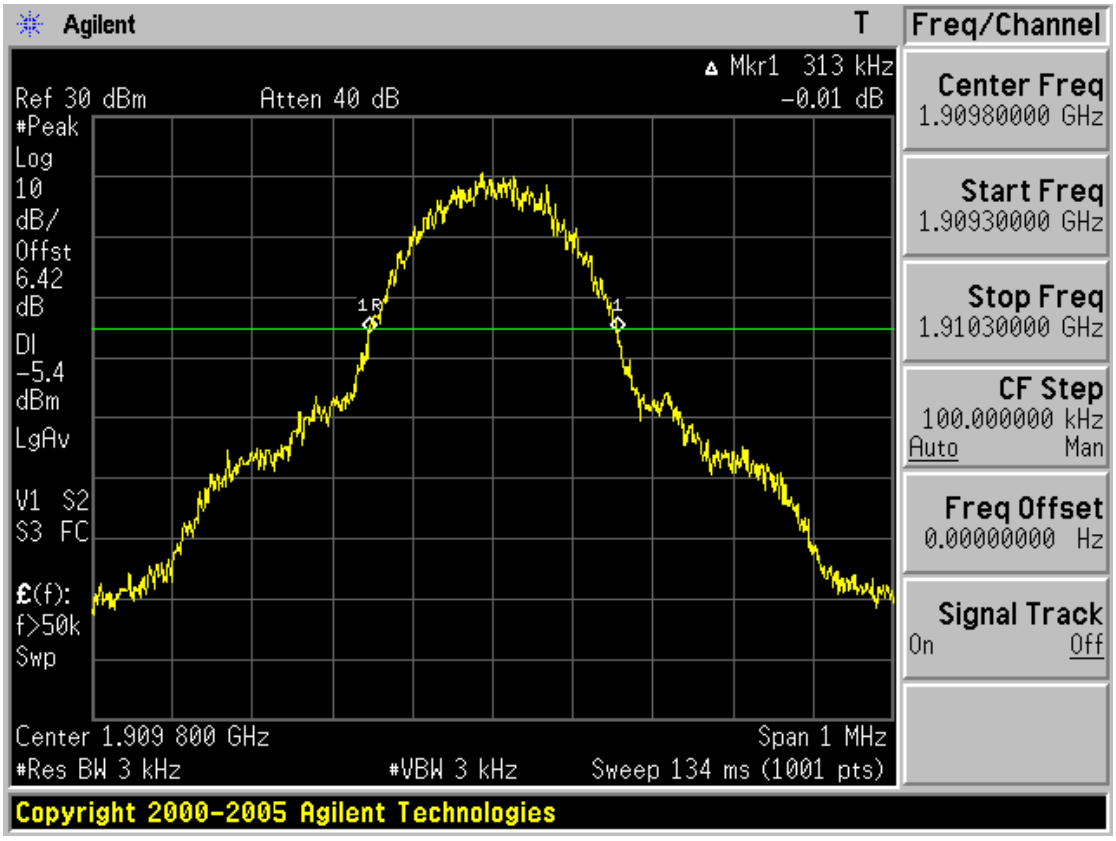

**PCS1900** **-26dBc Bandwidth Ch. 512 (Black face)**



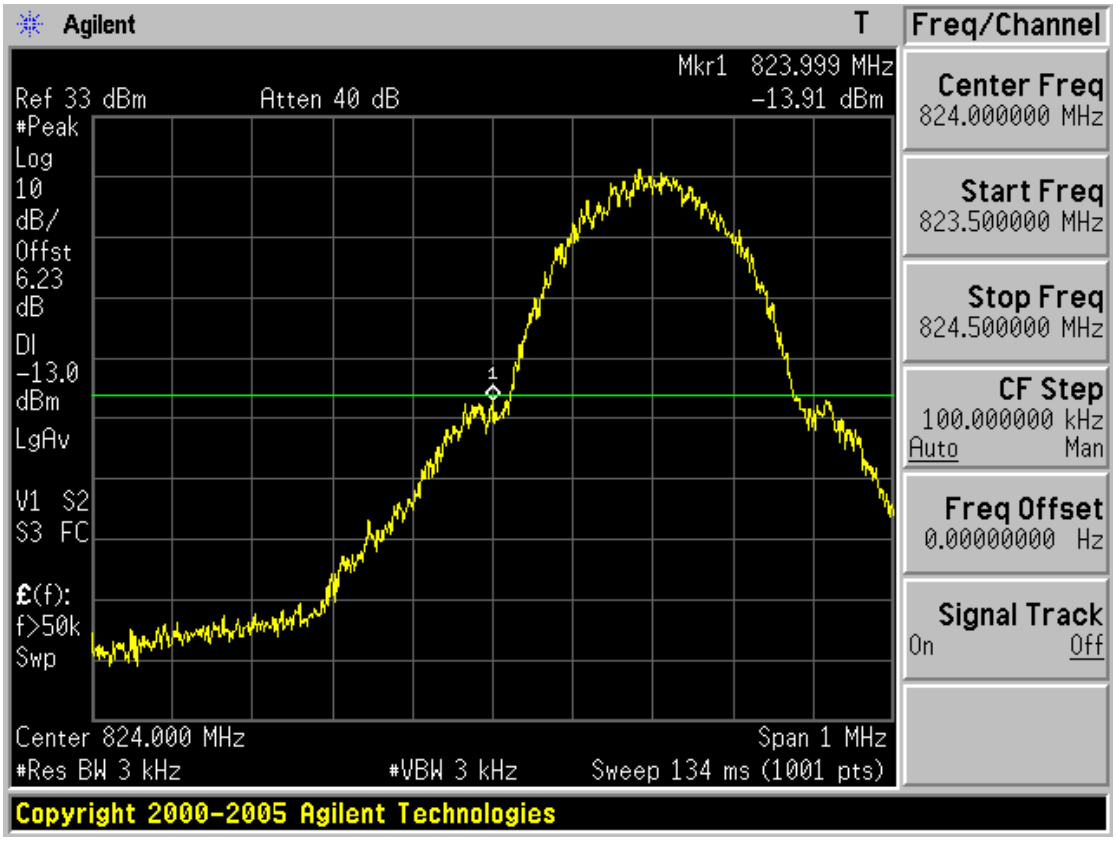
**PCS1900** **-26dBc Bandwidth Ch. 661 (Black face)**



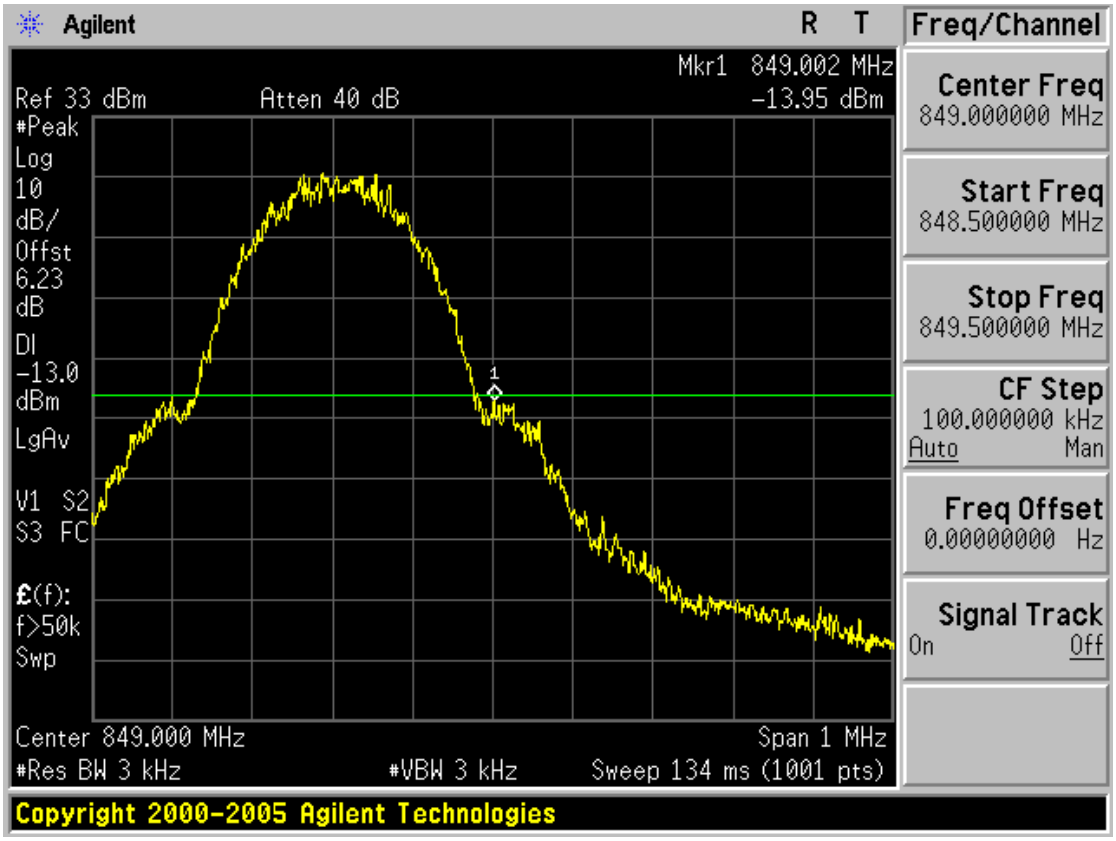

**PCS1900** **-26dBc Bandwidth Ch. 810 (Black face)**



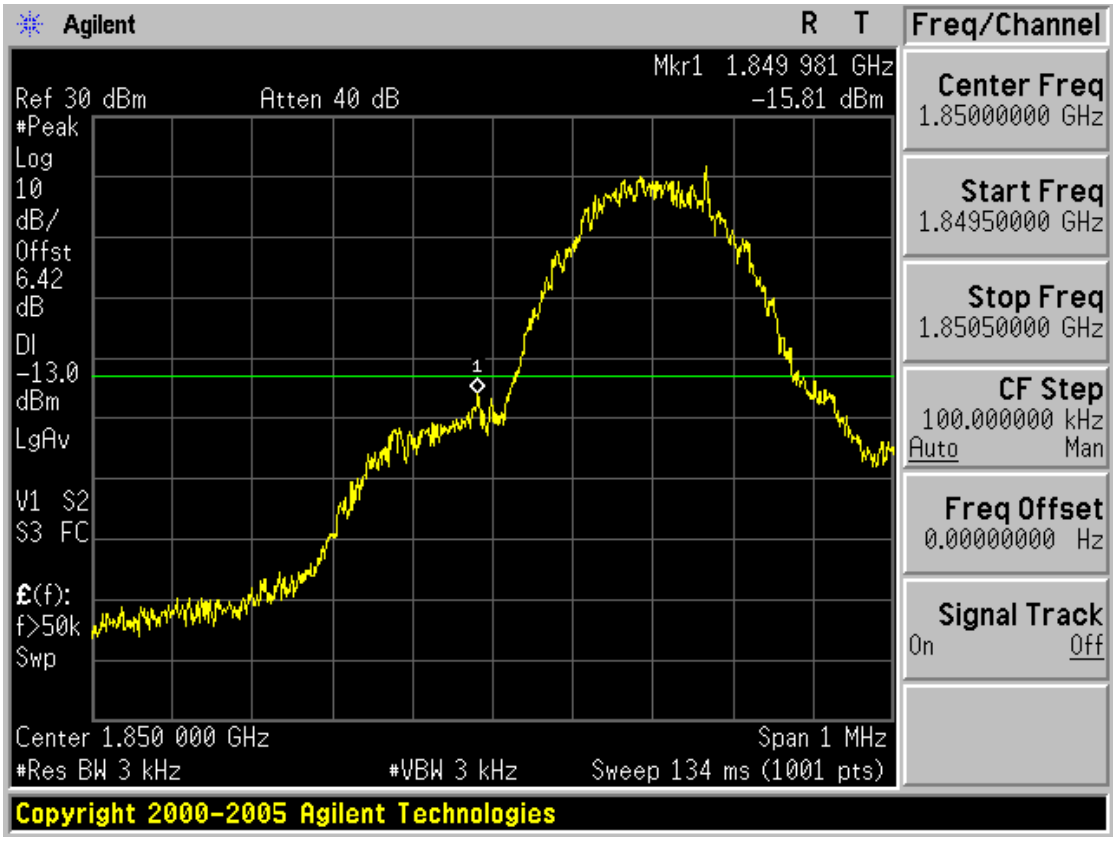
**GSM850** **Band Edge Ch. 128 (Black face)**



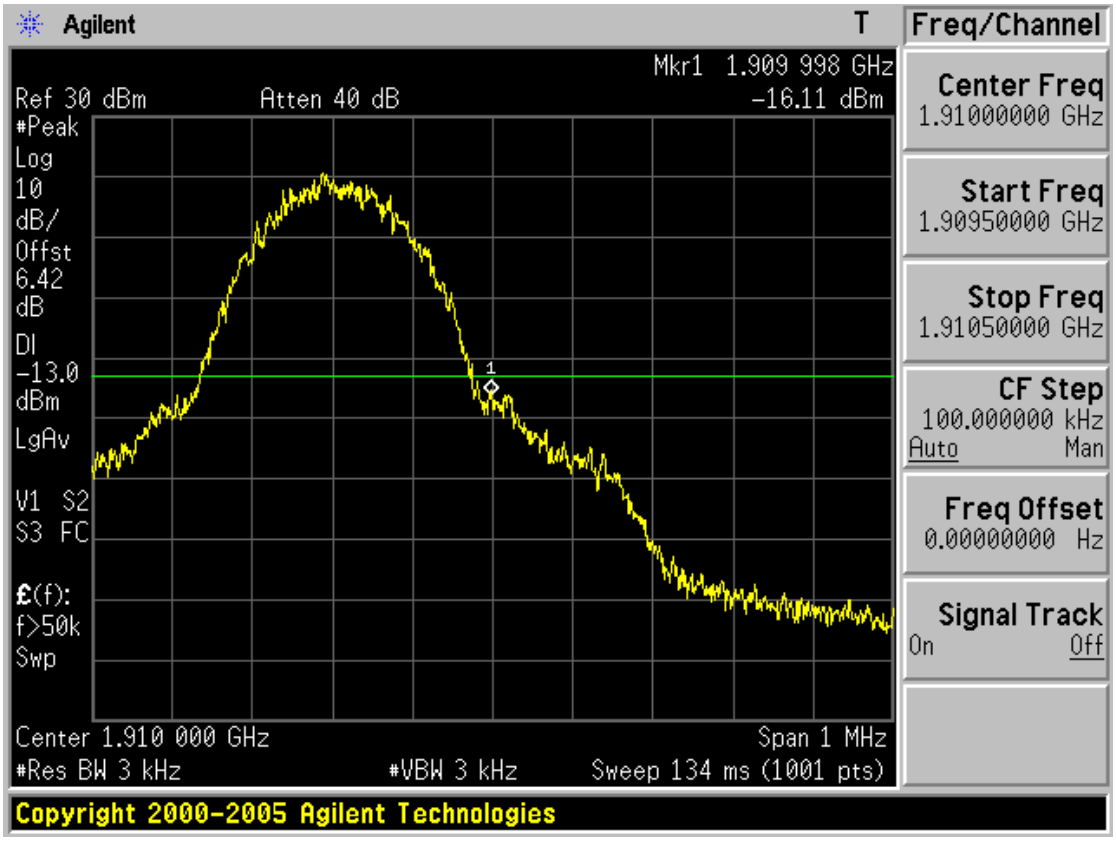

**GSM850** **Band Edge Ch. 251 (Black face)**



**PCS1900** **Band Edge Ch. 512 (Black face)**

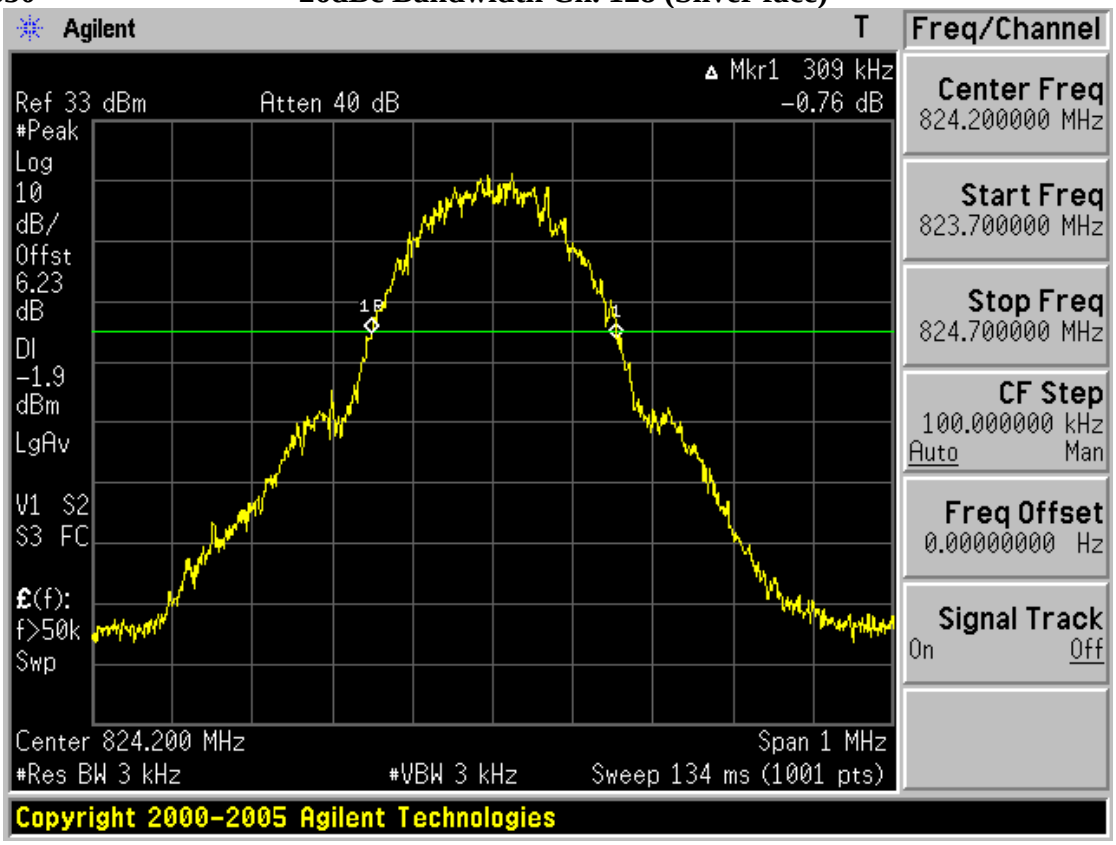



**PCS1900** **Band Edge Ch. 810 (Black face)**

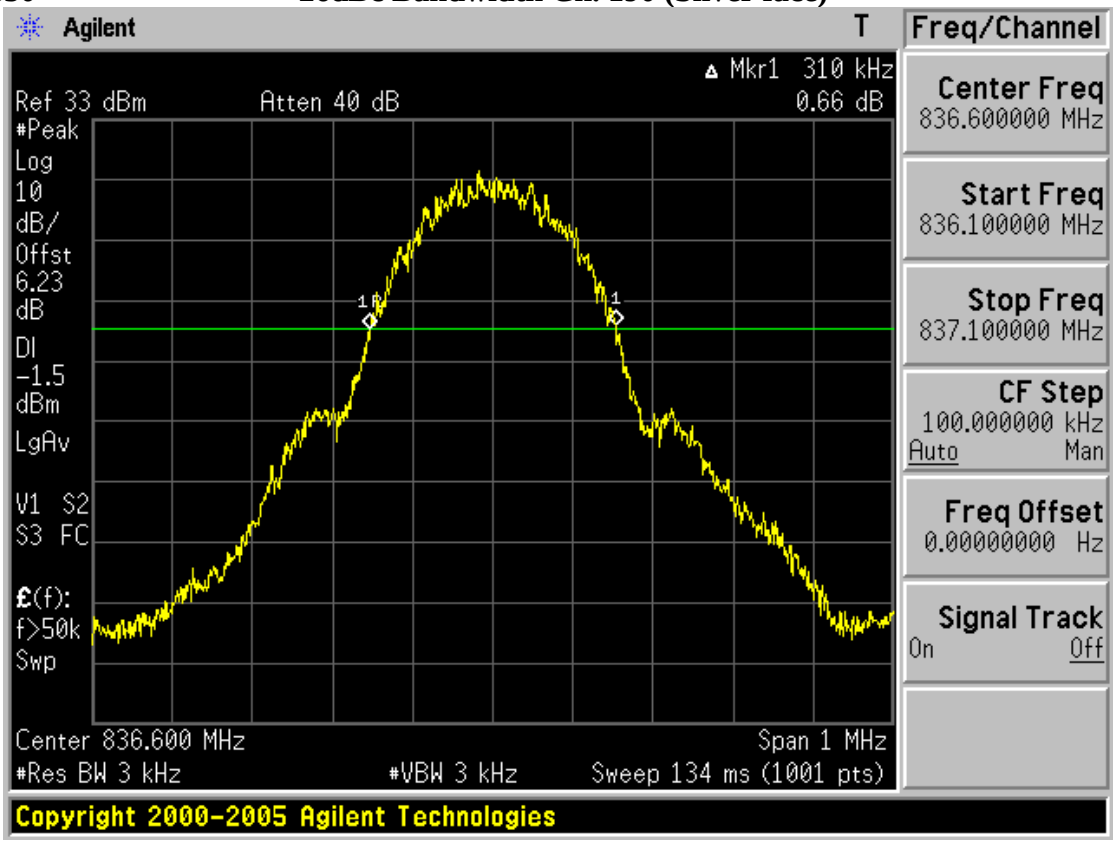


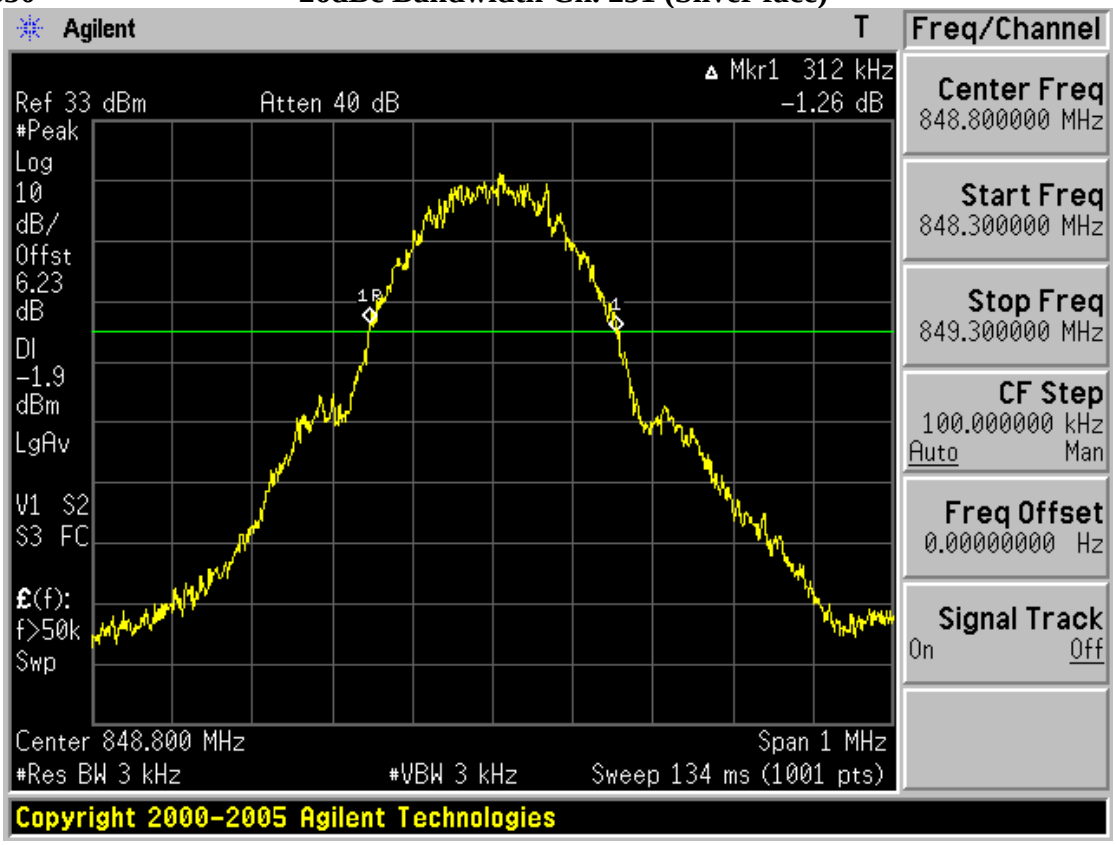
**GSM850 -26dBc Bandwidth Ch. 128 (Silver face)**



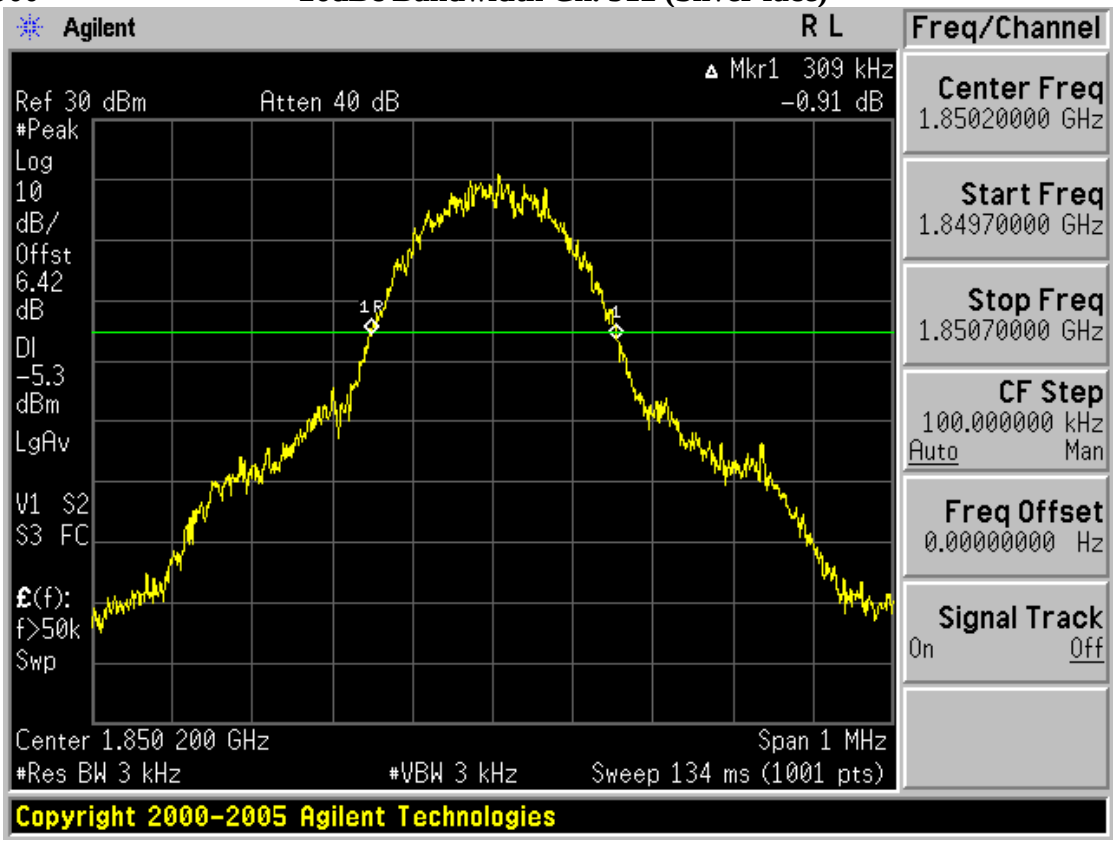

**GSM850 -26dBc Bandwidth Ch. 190 (Silver face)**



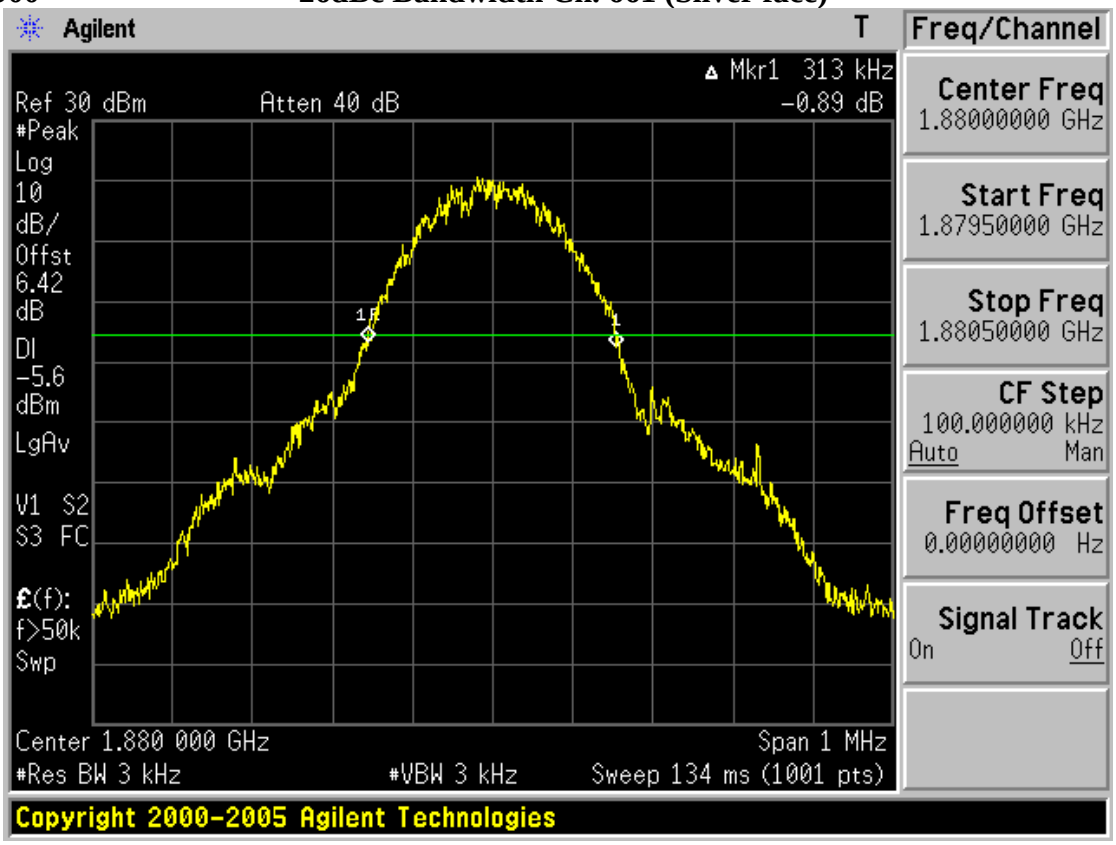
**GSM850** **-26dBc Bandwidth Ch. 251 (Silver face)**



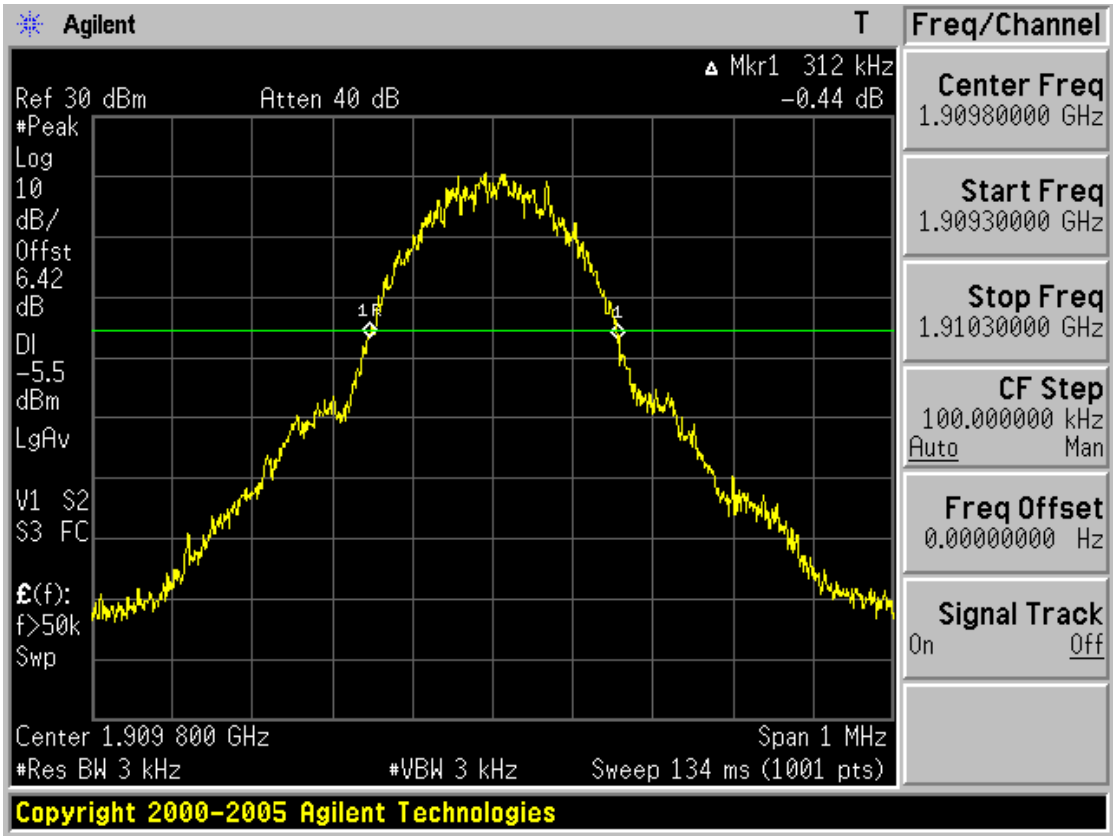

**PCS1900** **-26dBc Bandwidth Ch. 512 (Silver face)**



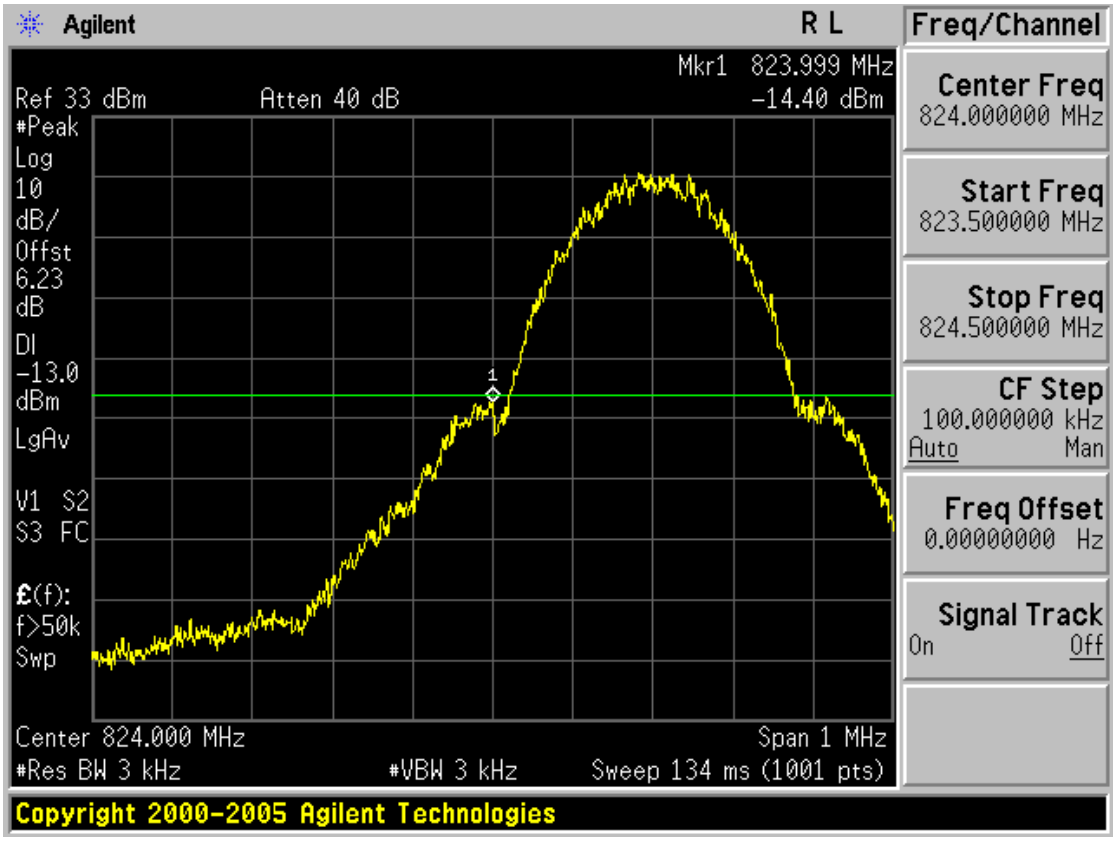
**PCS1900 -26dBc Bandwidth Ch. 661 (Silver face)**



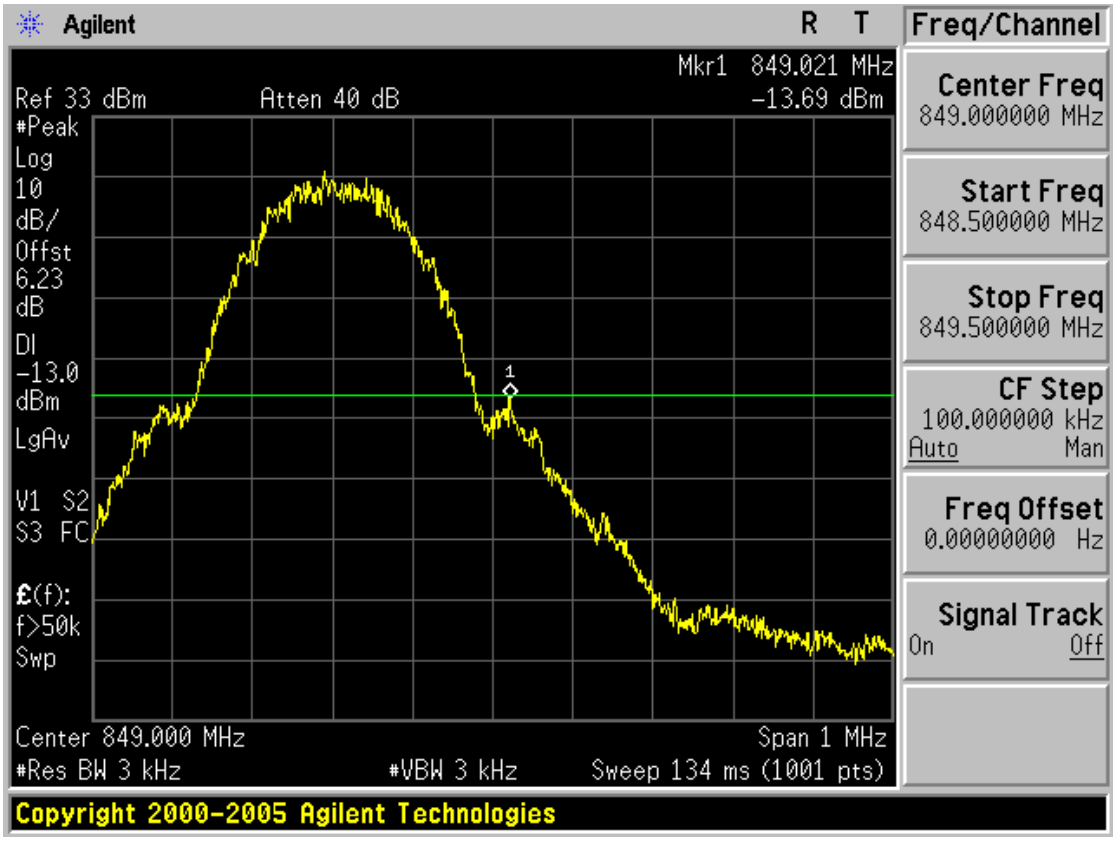

**PCS1900 -26dBc Bandwidth Ch. 810 (Silver face)**



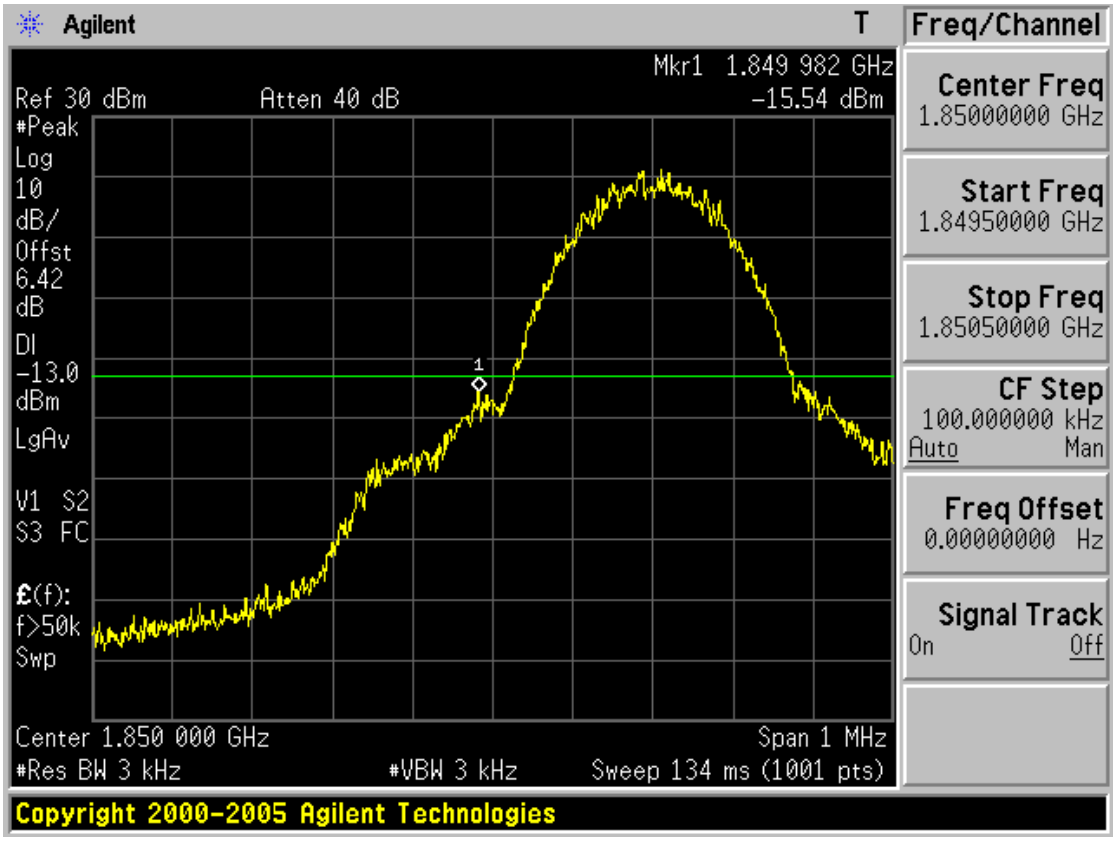
**GSM850** **Band Edge Ch. 128 (Silver face)**



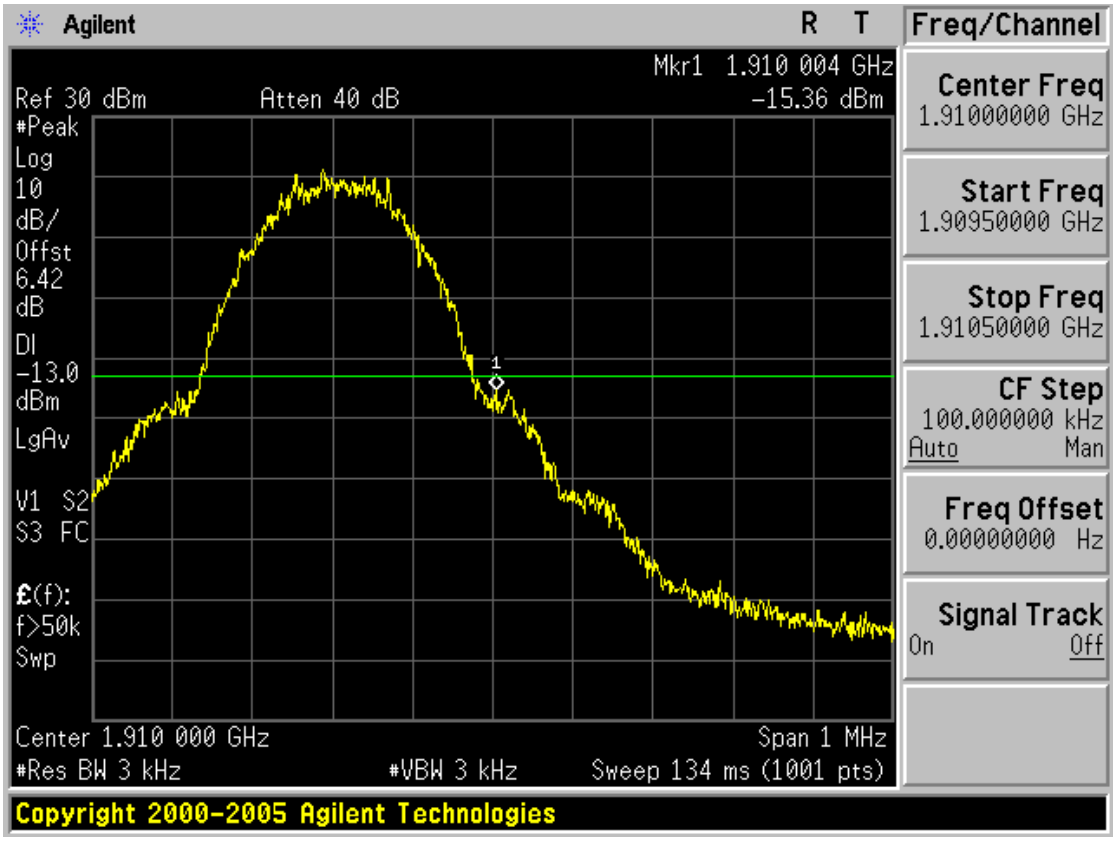

**GSM850** **Band Edge Ch. 251 (Silver face)**



**PCS1900** **Band Edge Ch. 512 (Silver face)**




**PCS1900** **Band Edge Ch. 810 (Silver face)**



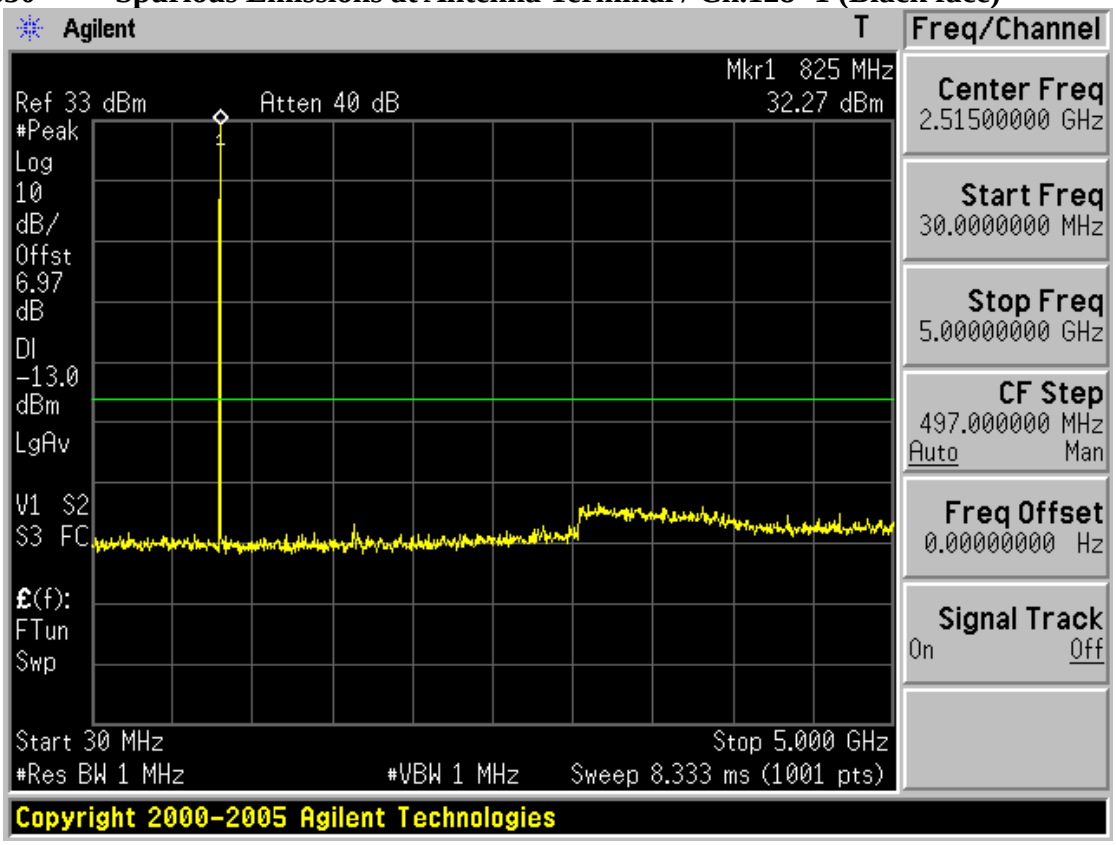
## 3.5 Spurious and Harmonic Emissions at Antenna Terminal

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 2.1051, 24.238(a) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850<br>1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |

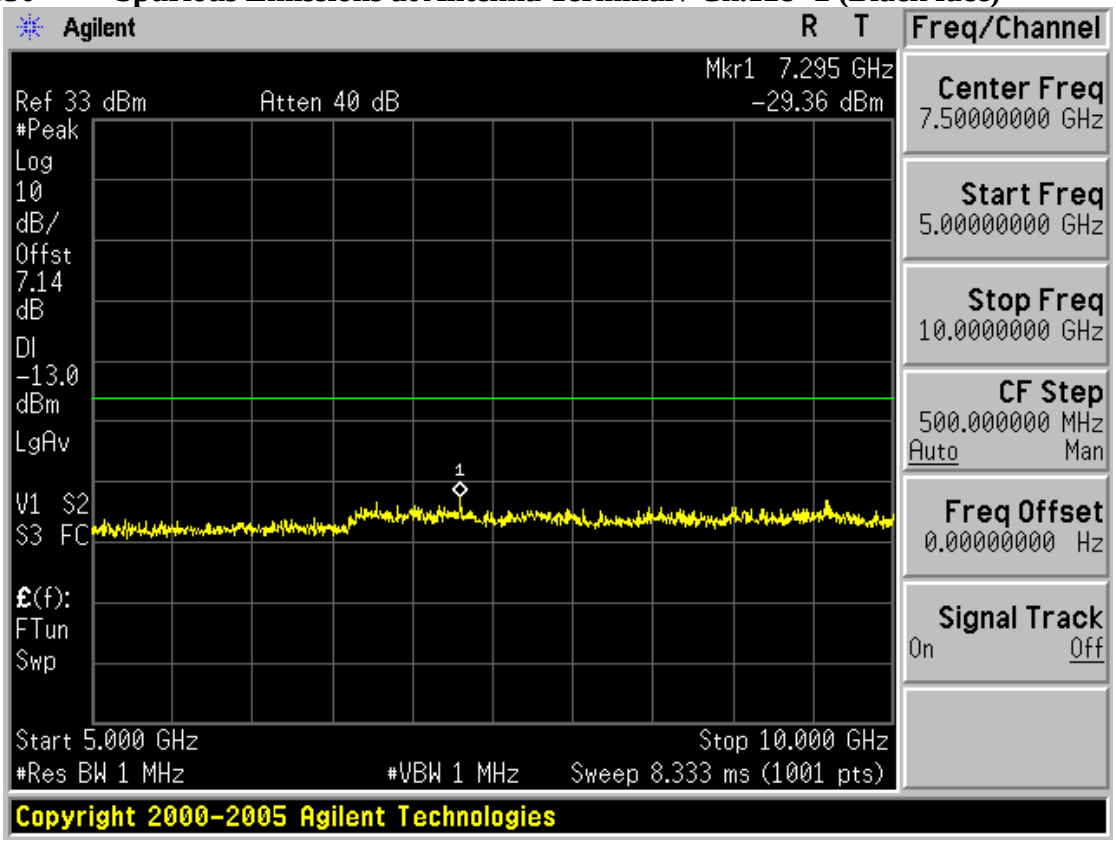
**Measurement Procedure:**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.
The spectrum is scanned from the lowest frequency generated in the equipment up to 10'th harmonics of the highest frequency.
Spectrum analyzer plots are included on the following pages.

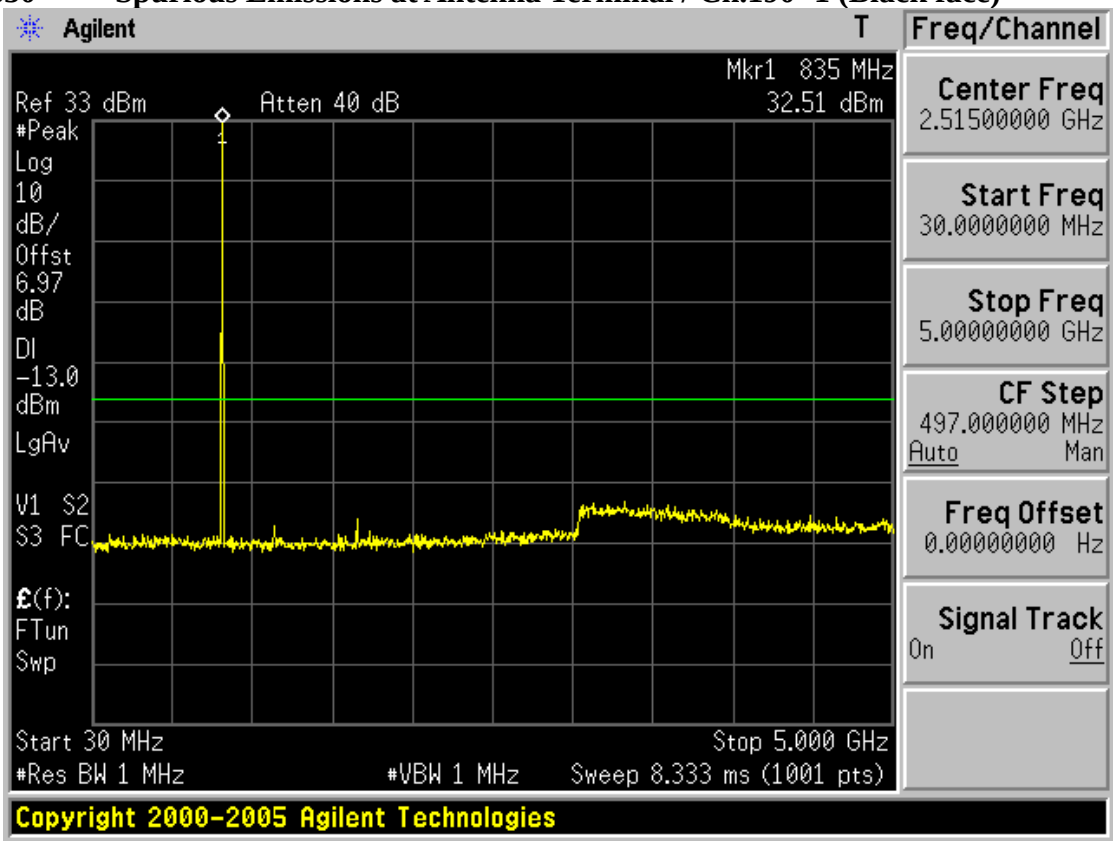
**GSM850 Spurious Emissions at Antenna Terminal / Ch.128 -1 (Black face)**



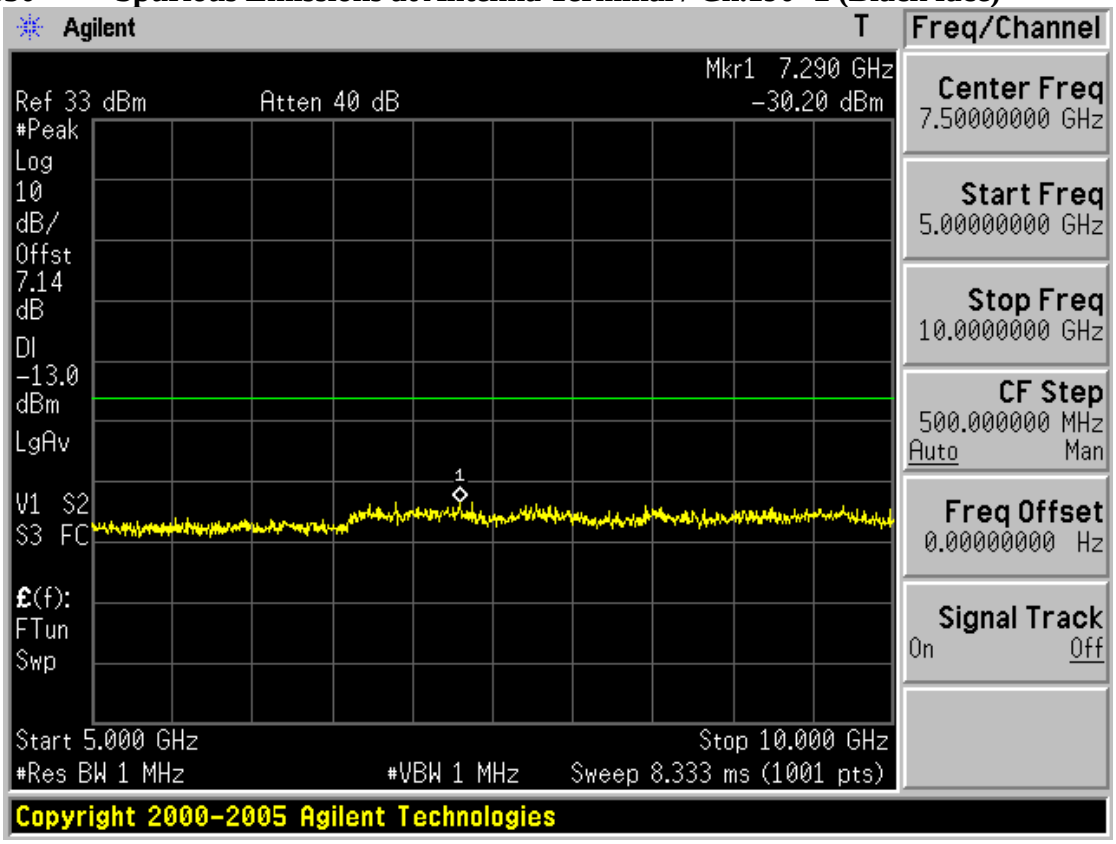

**GSM850 Spurious Emissions at Antenna Terminal / Ch.128 -2 (Black face)**



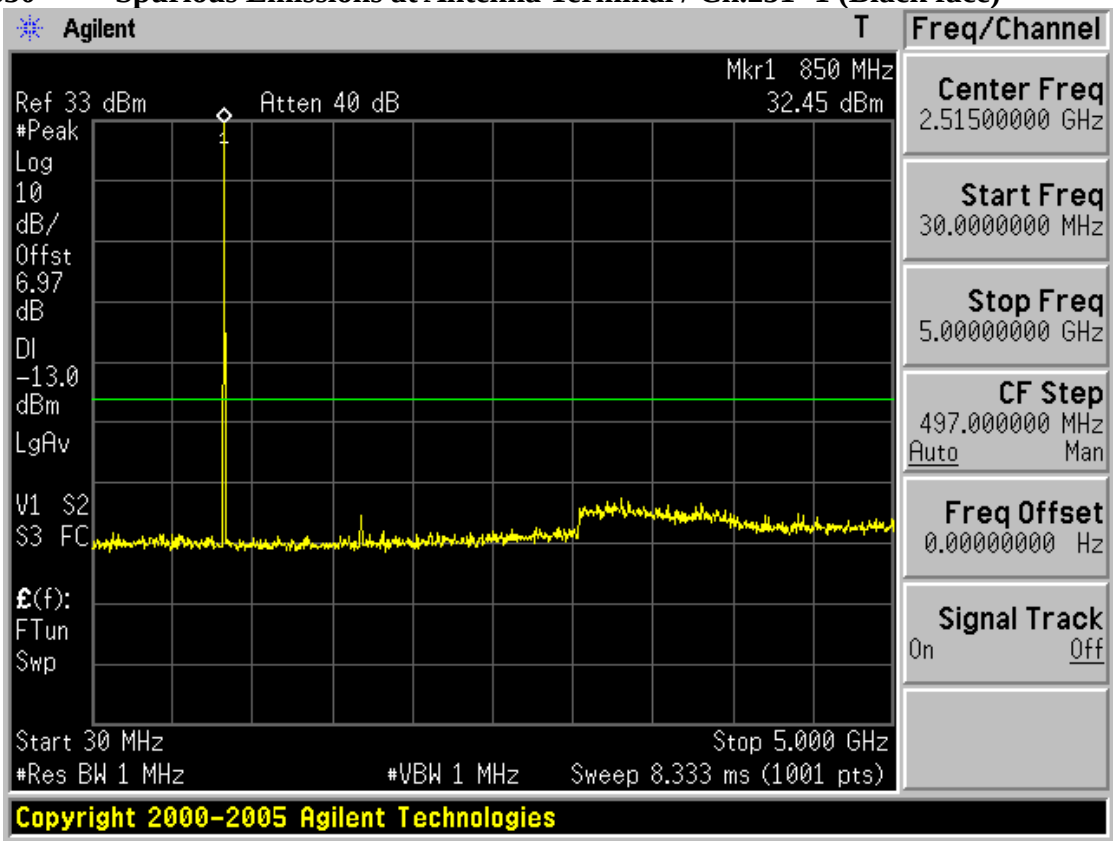
**GSM850 Spurious Emissions at Antenna Terminal / Ch.190 -1 (Black face)**



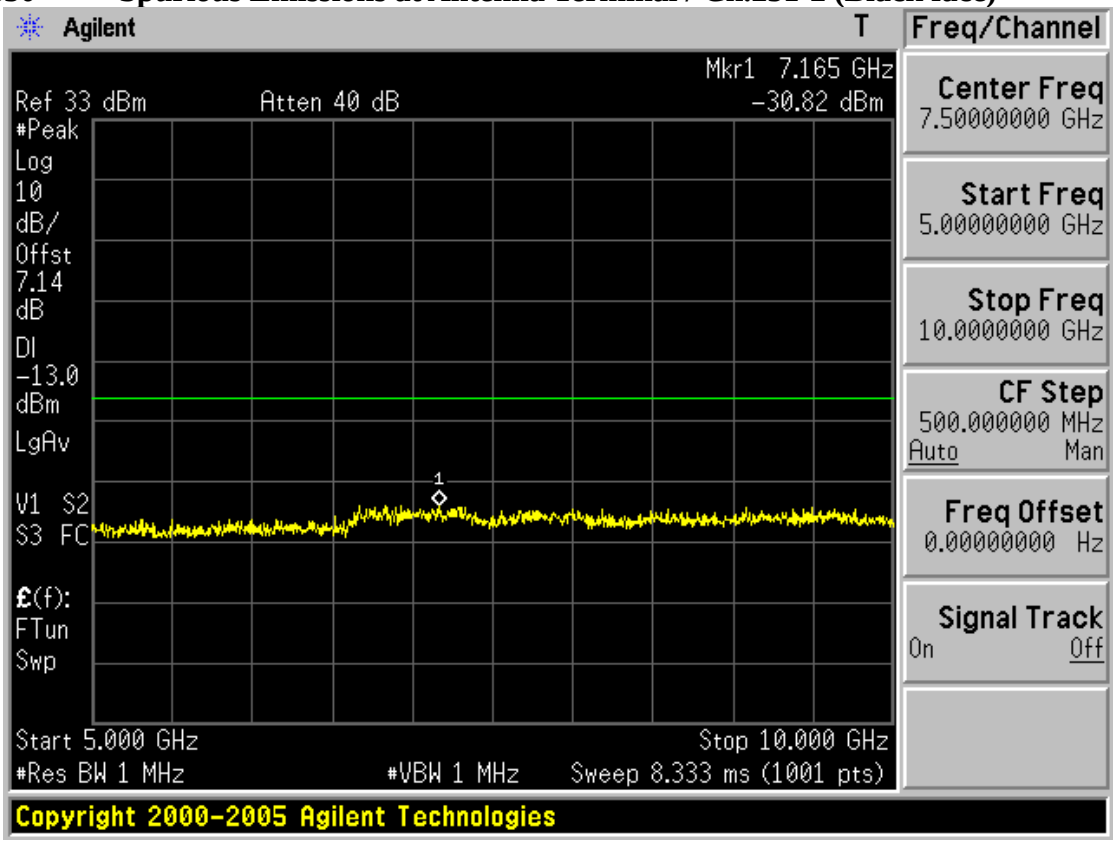

**GSM850 Spurious Emissions at Antenna Terminal / Ch.190 -2 (Black face)**



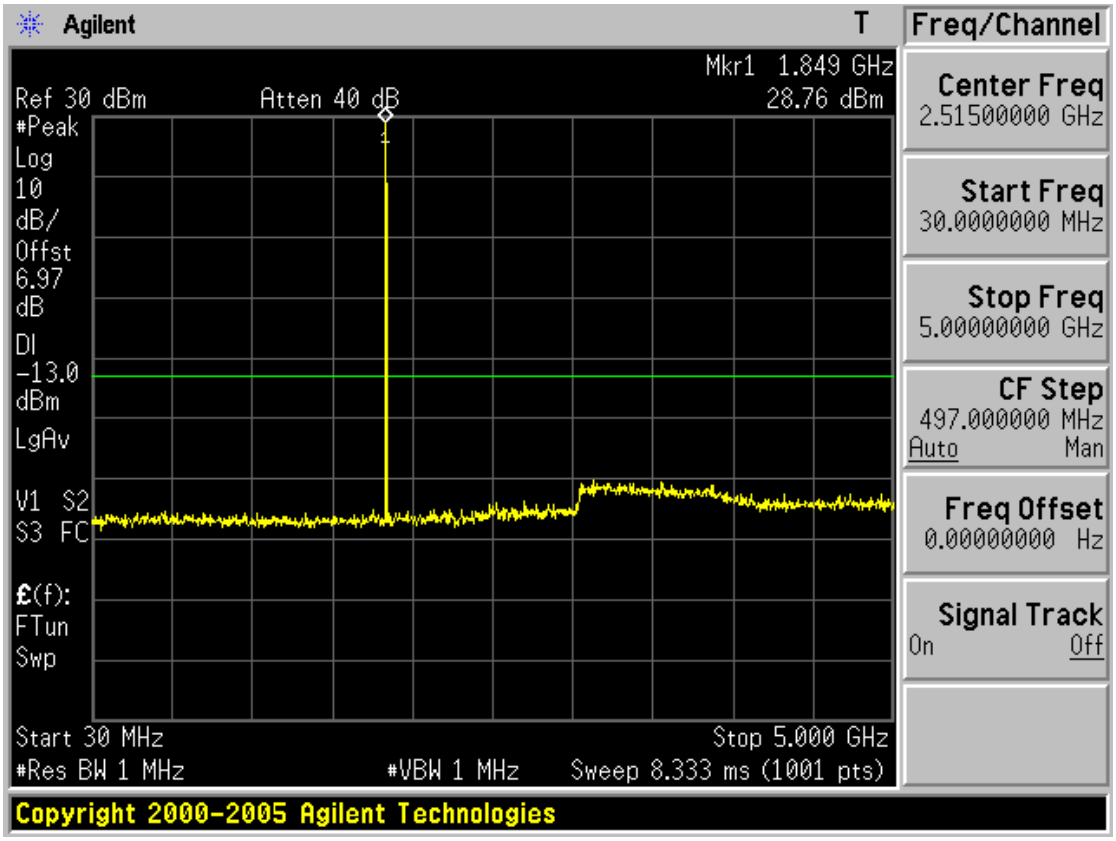
**GSM850 Spurious Emissions at Antenna Terminal / Ch.251 -1 (Black face)**



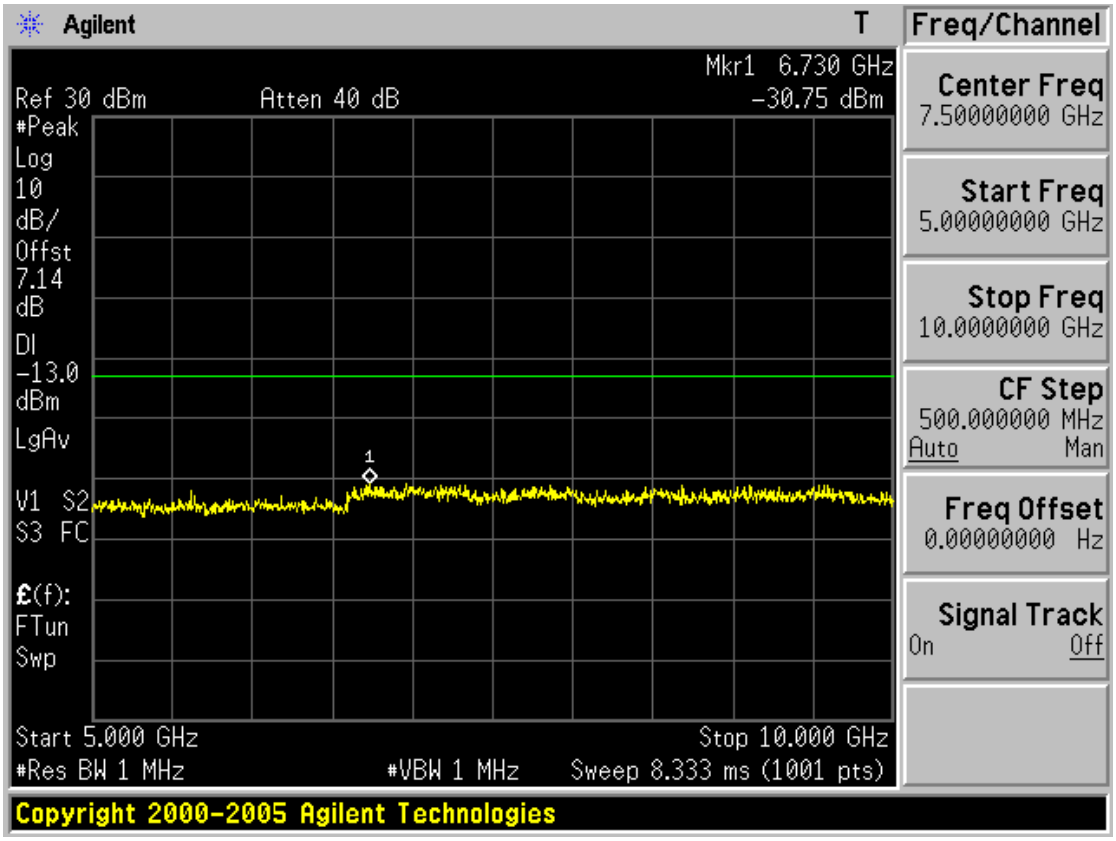

**GSM850 Spurious Emissions at Antenna Terminal / Ch.251-2 (Black face)**



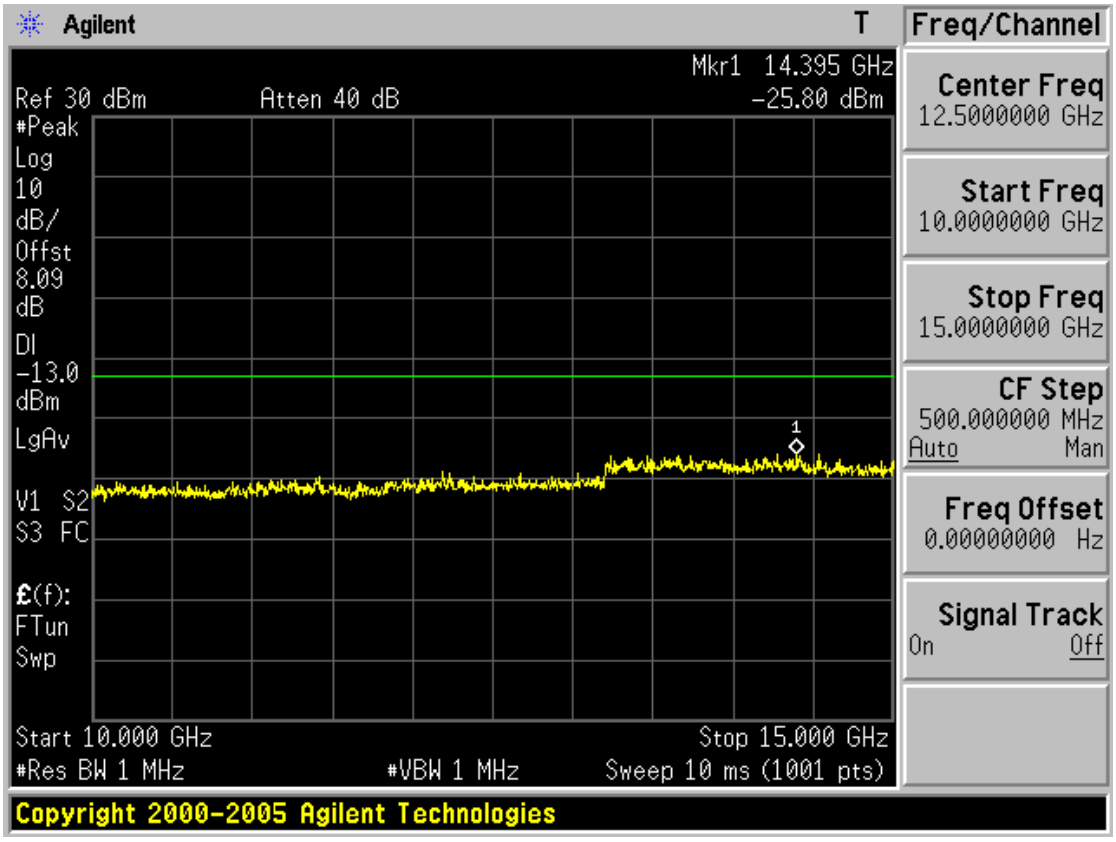
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -1 (Black face)**



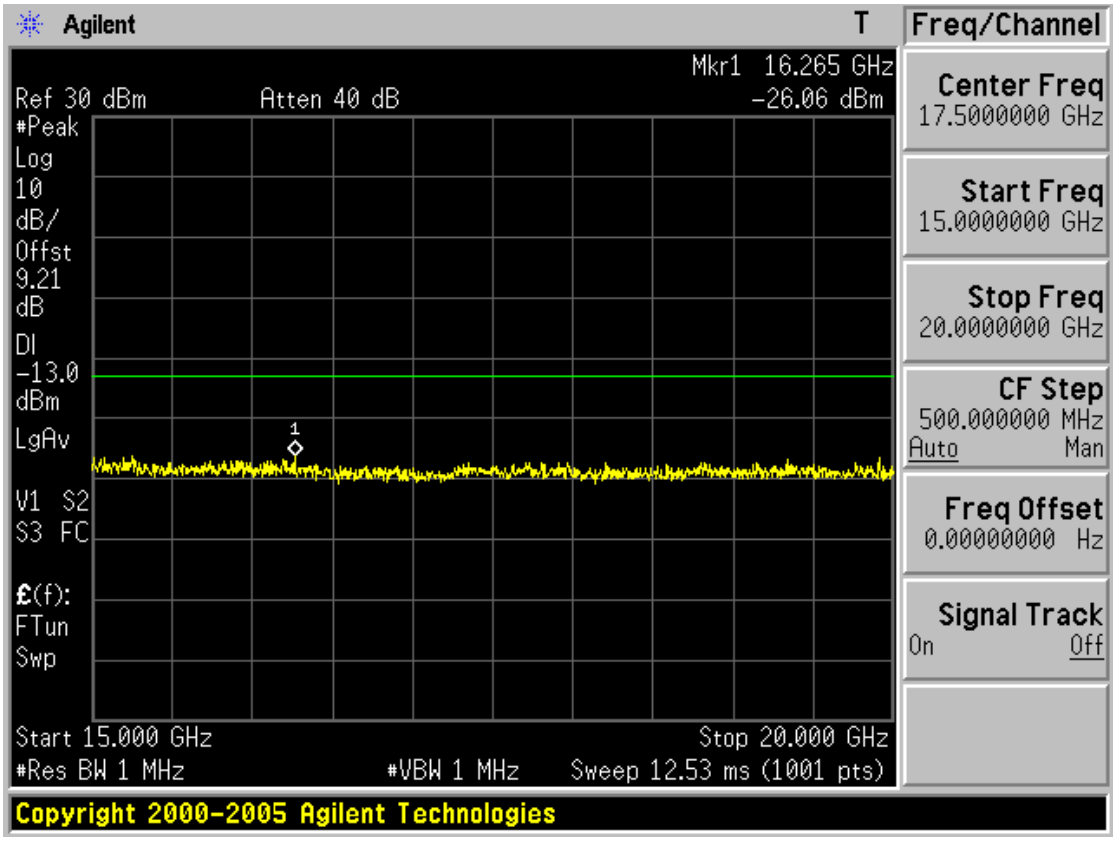

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -2 (Black face)**



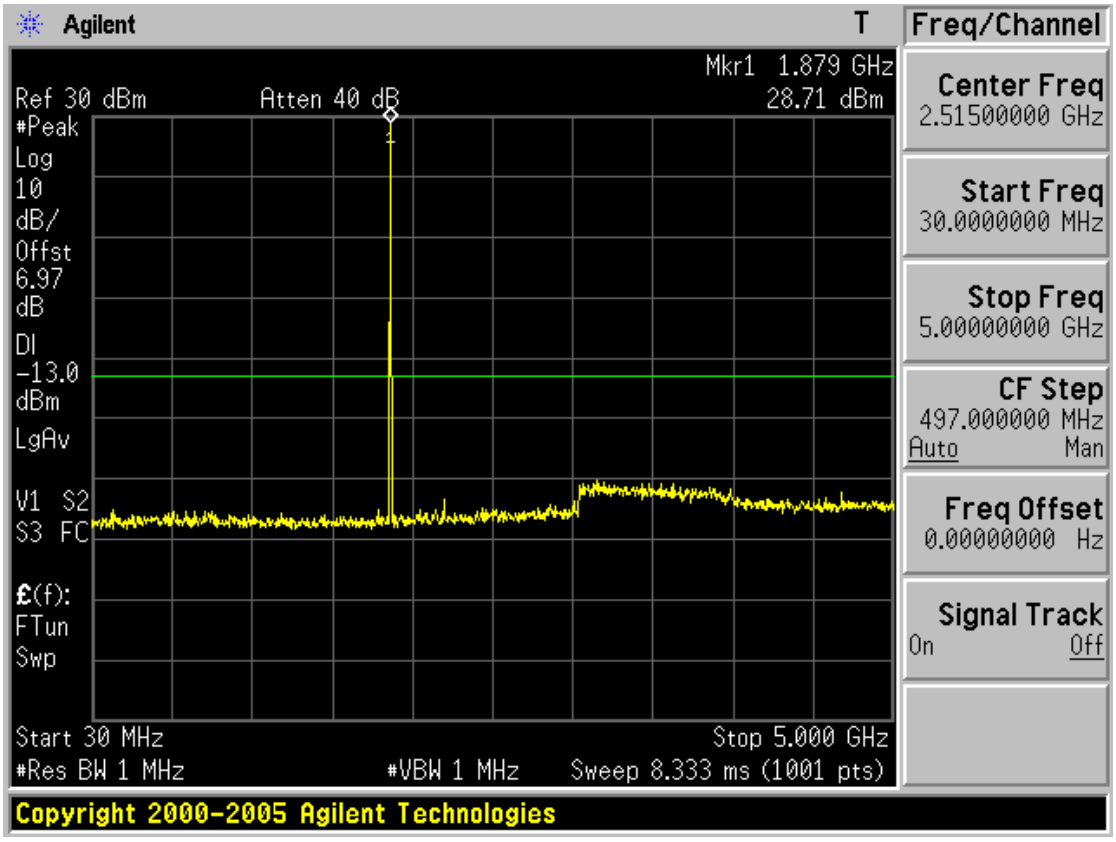
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -3 (Black face)**



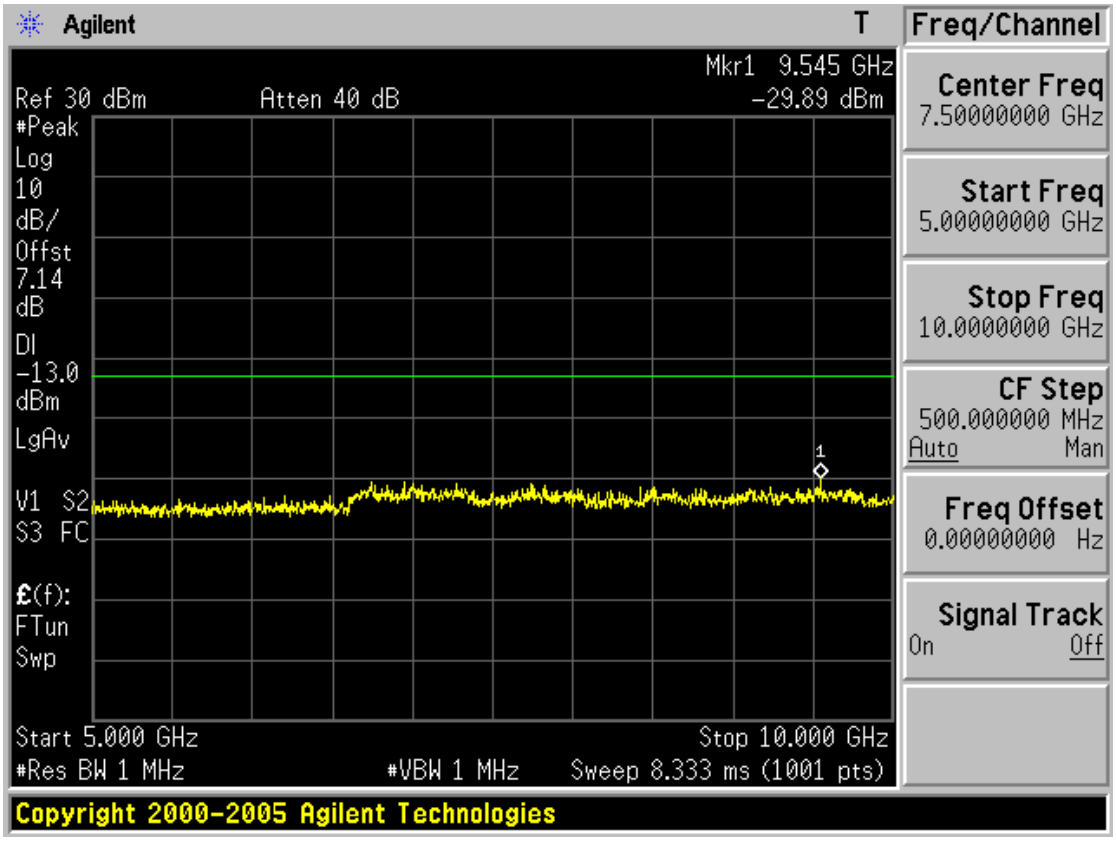

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -4 (Black face)**



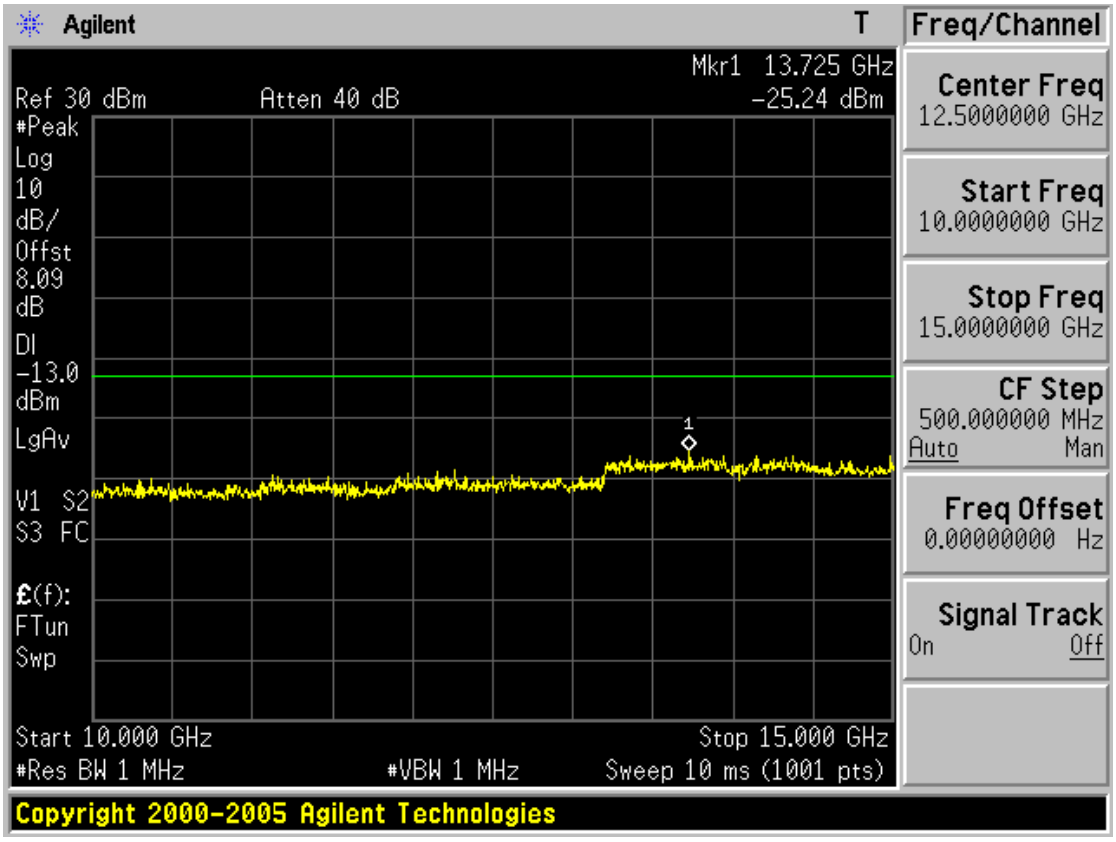
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -1 (Black face)**



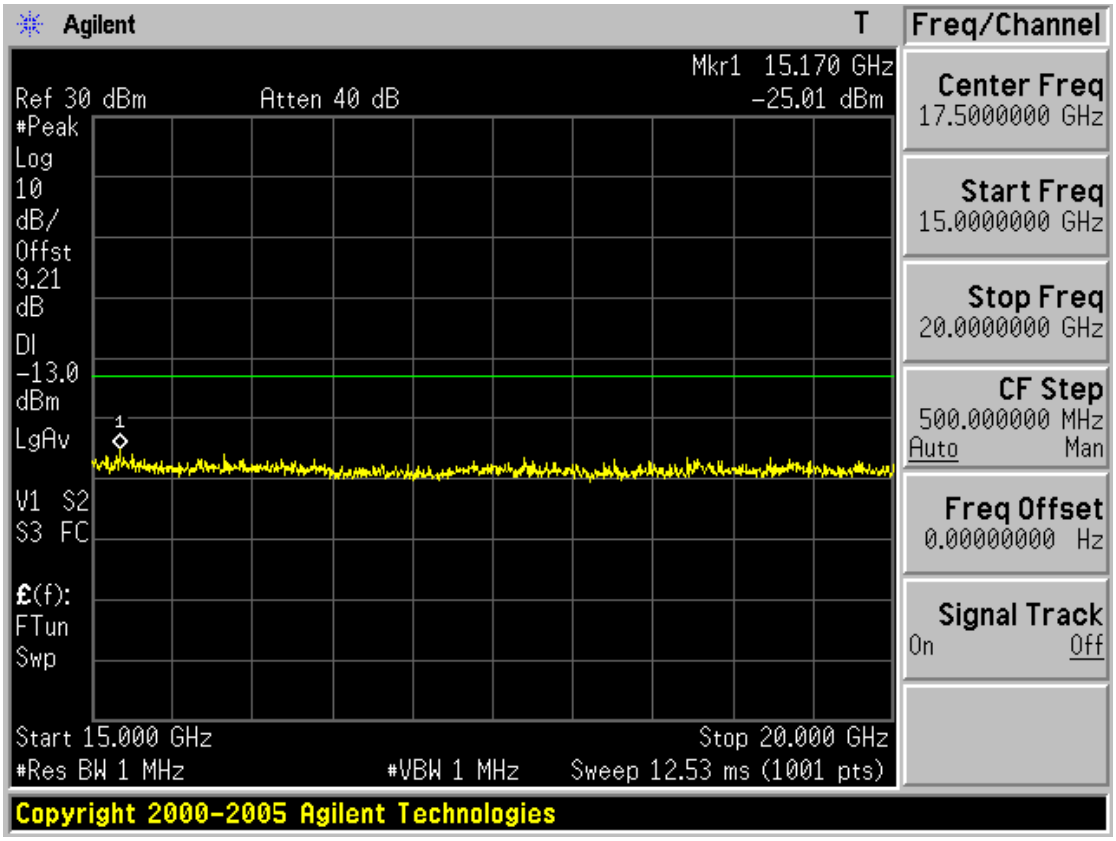

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -2 (Black face)**



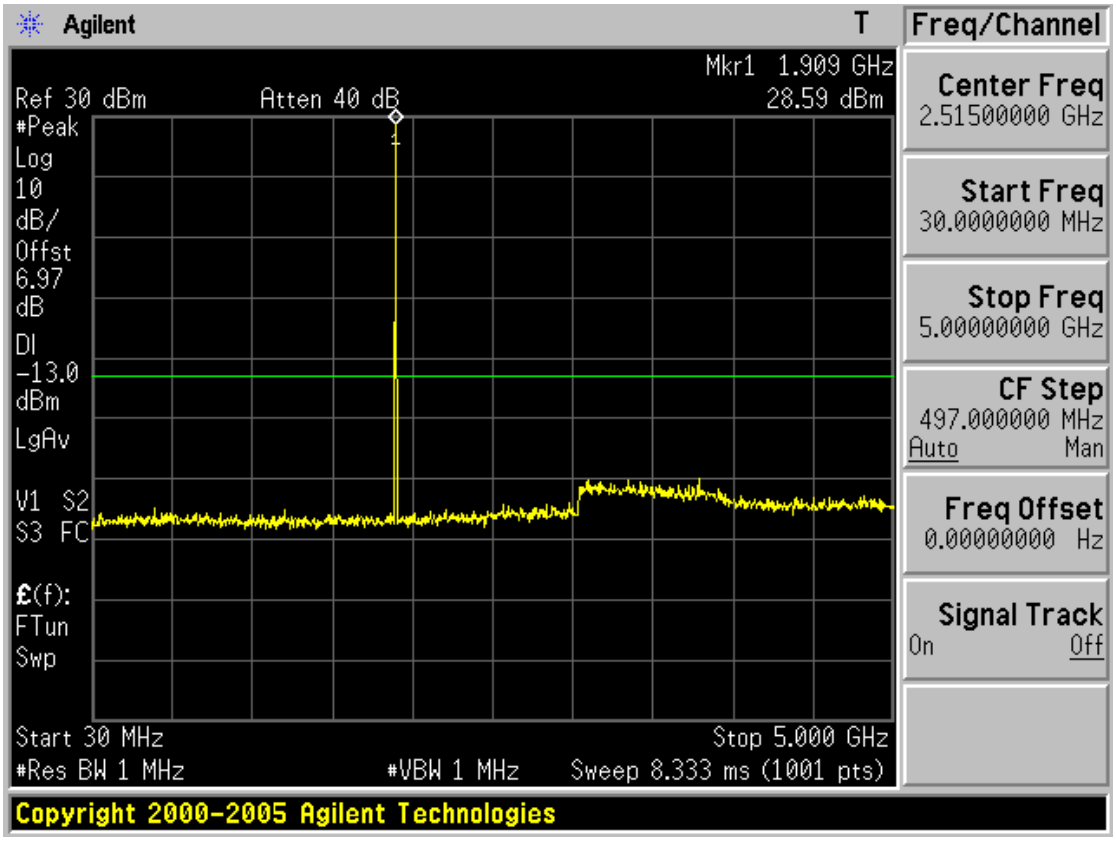
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -3 (Black face)**



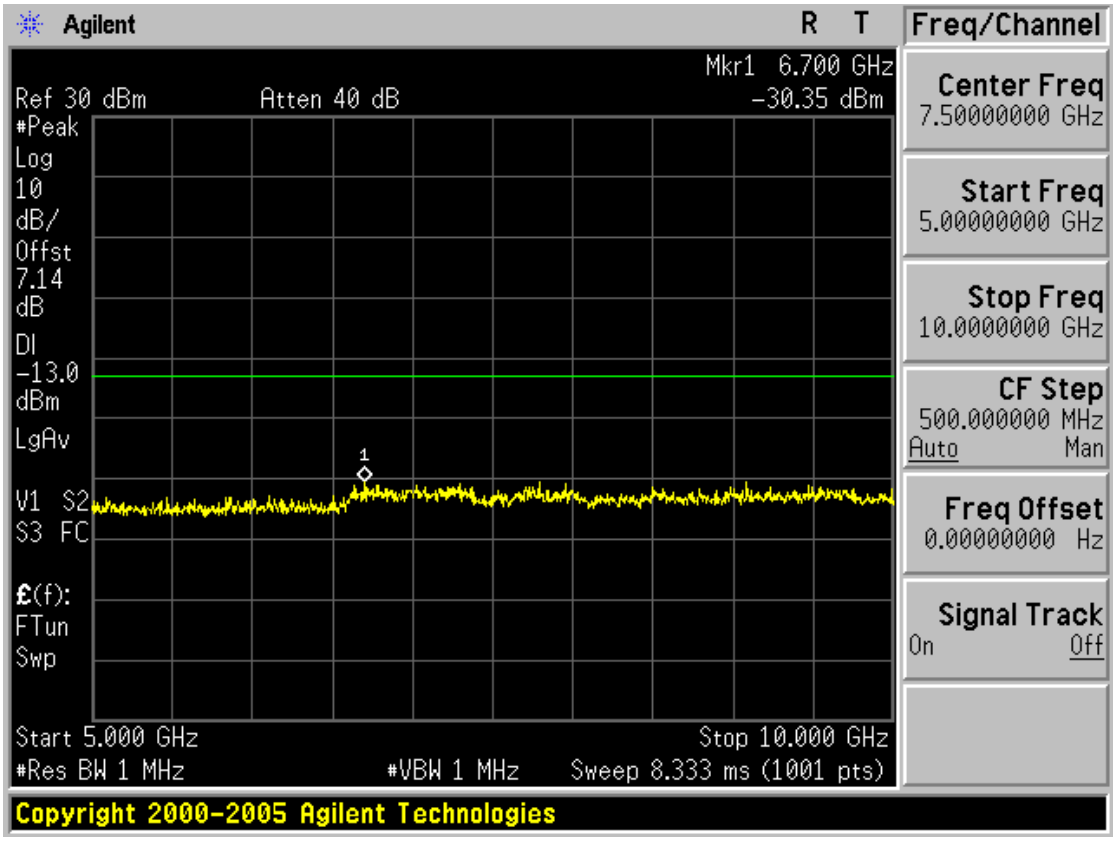

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -4 (Black face)**



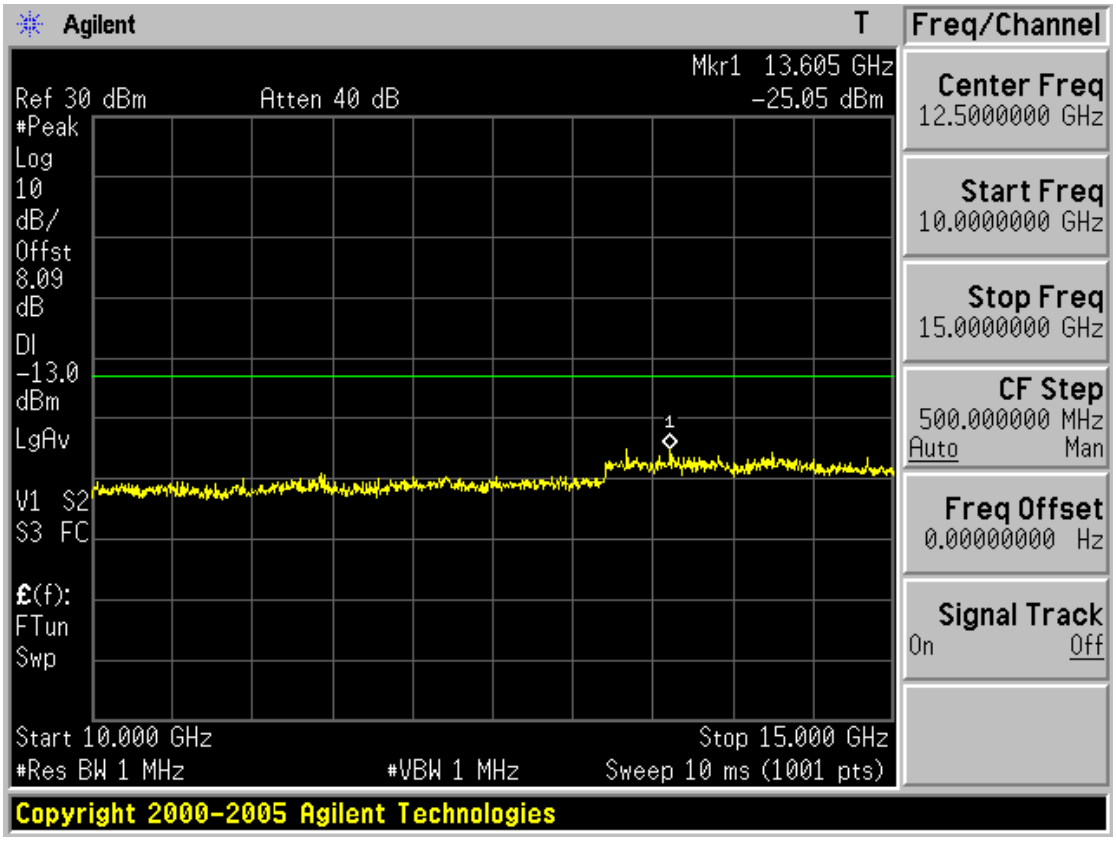
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -1 (Black face)**



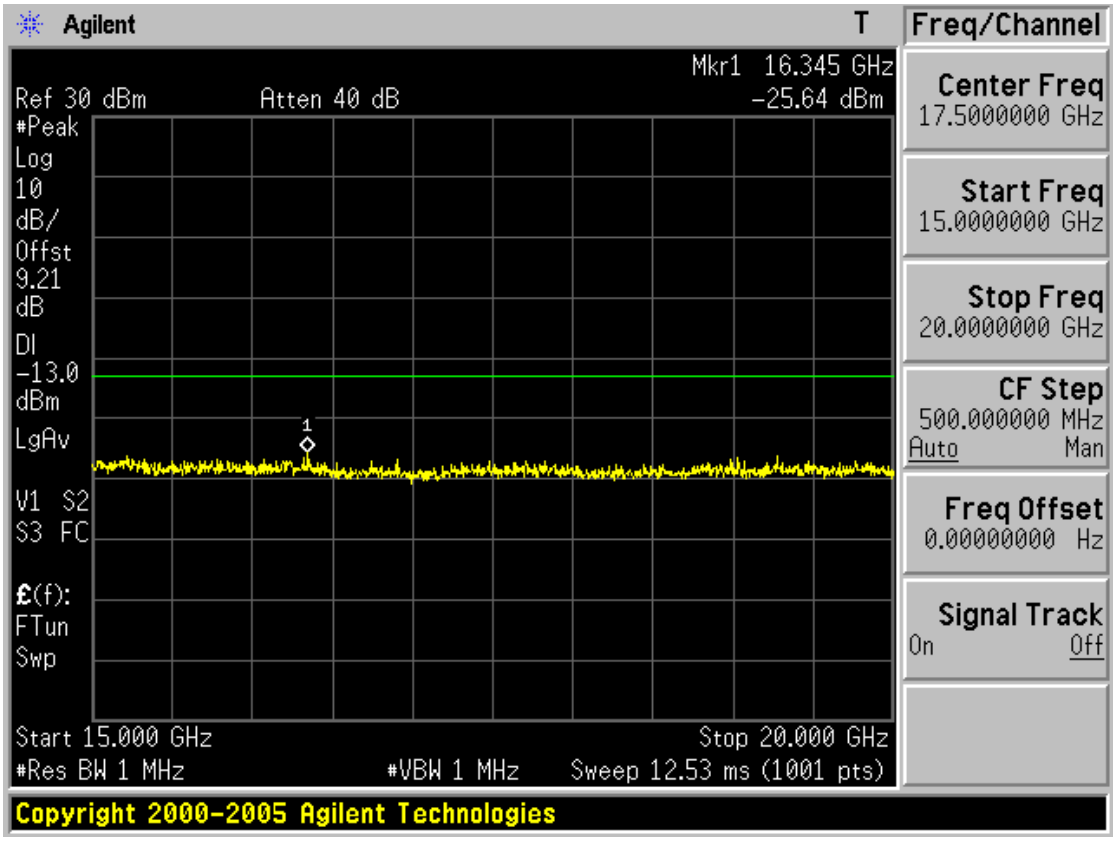

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -2 (Black face)**



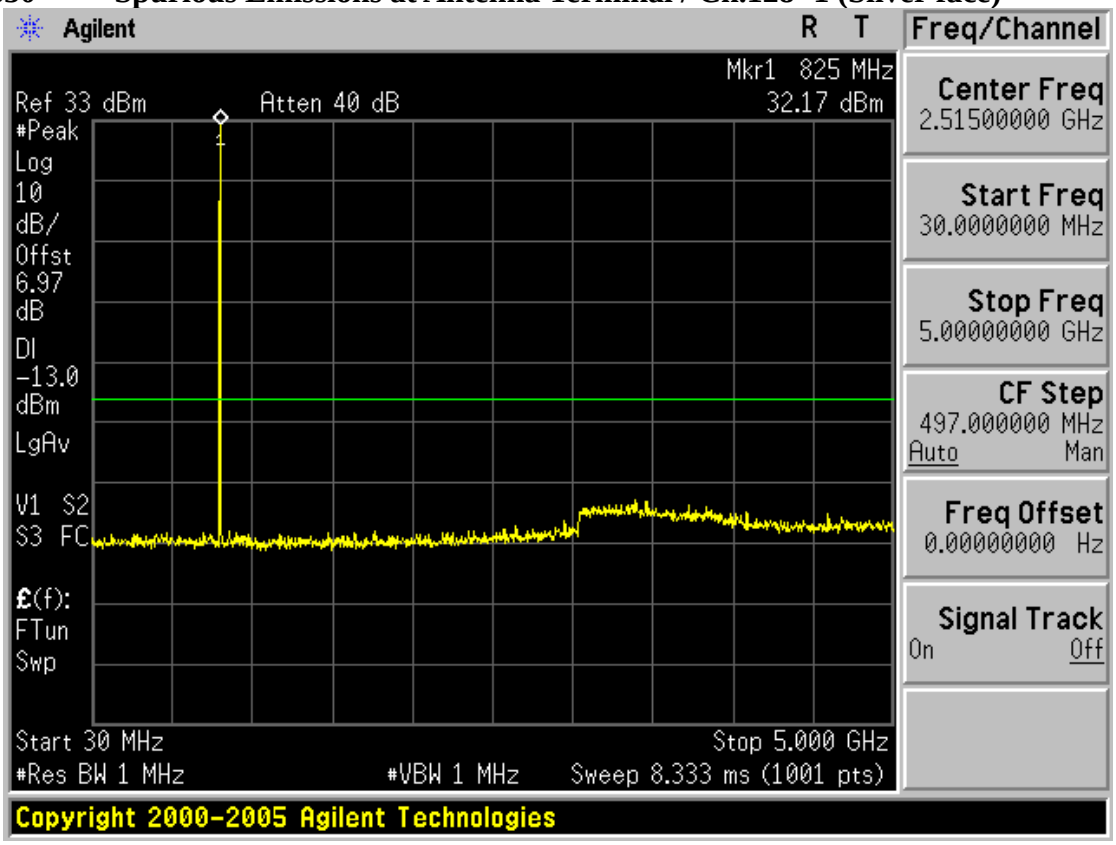
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -3 (Black face)**



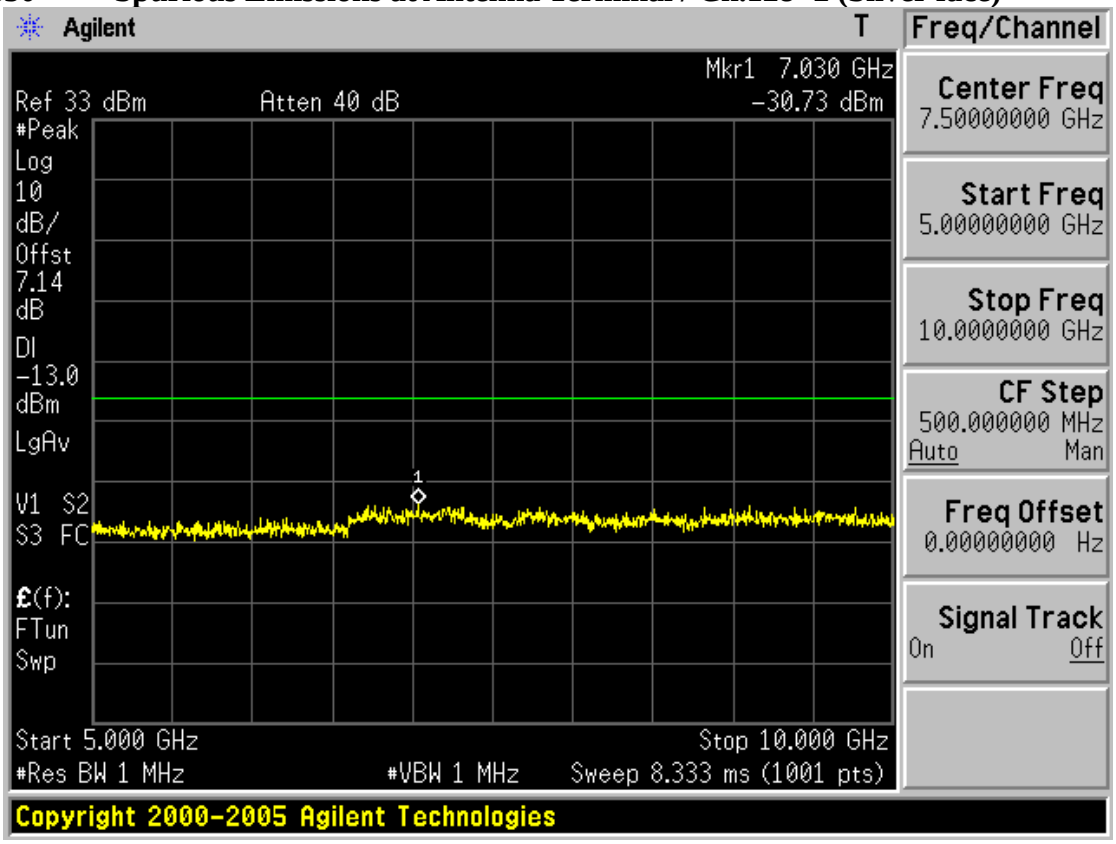

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -4 (Black face)**



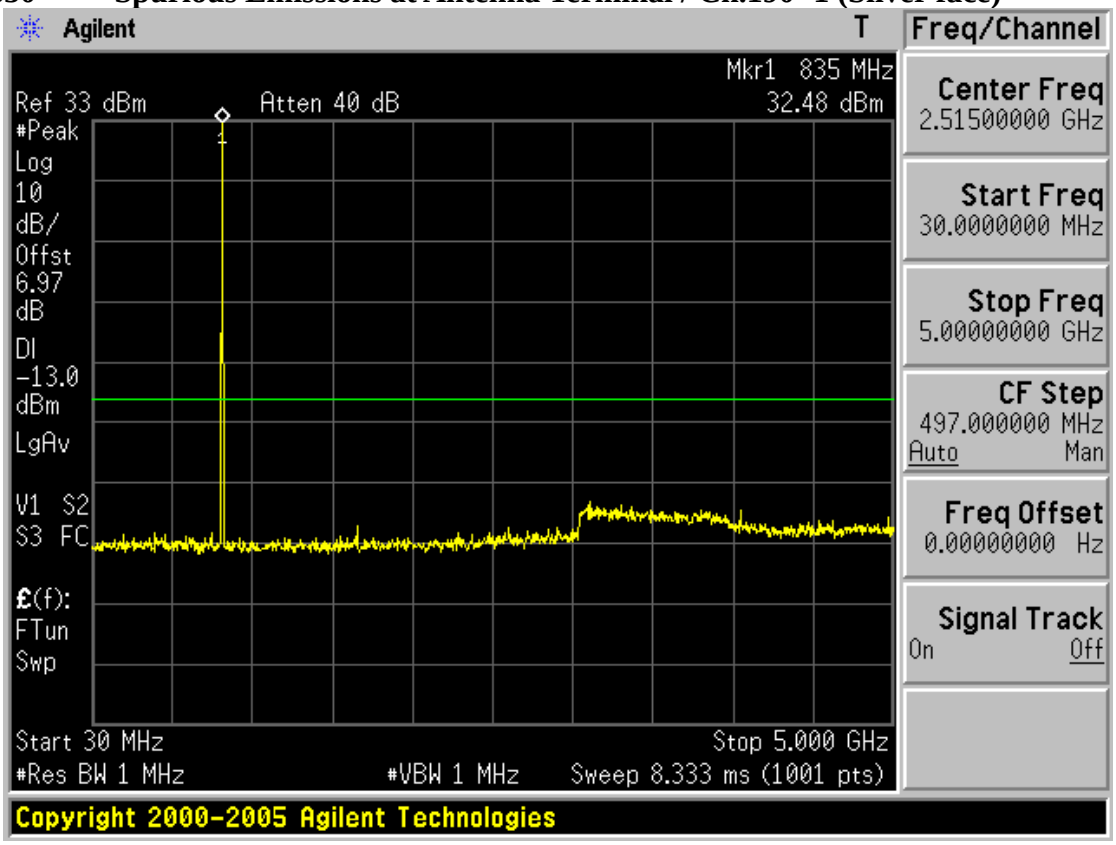
**GSM850 Spurious Emissions at Antenna Terminal / Ch.128 -1 (Silver face)**



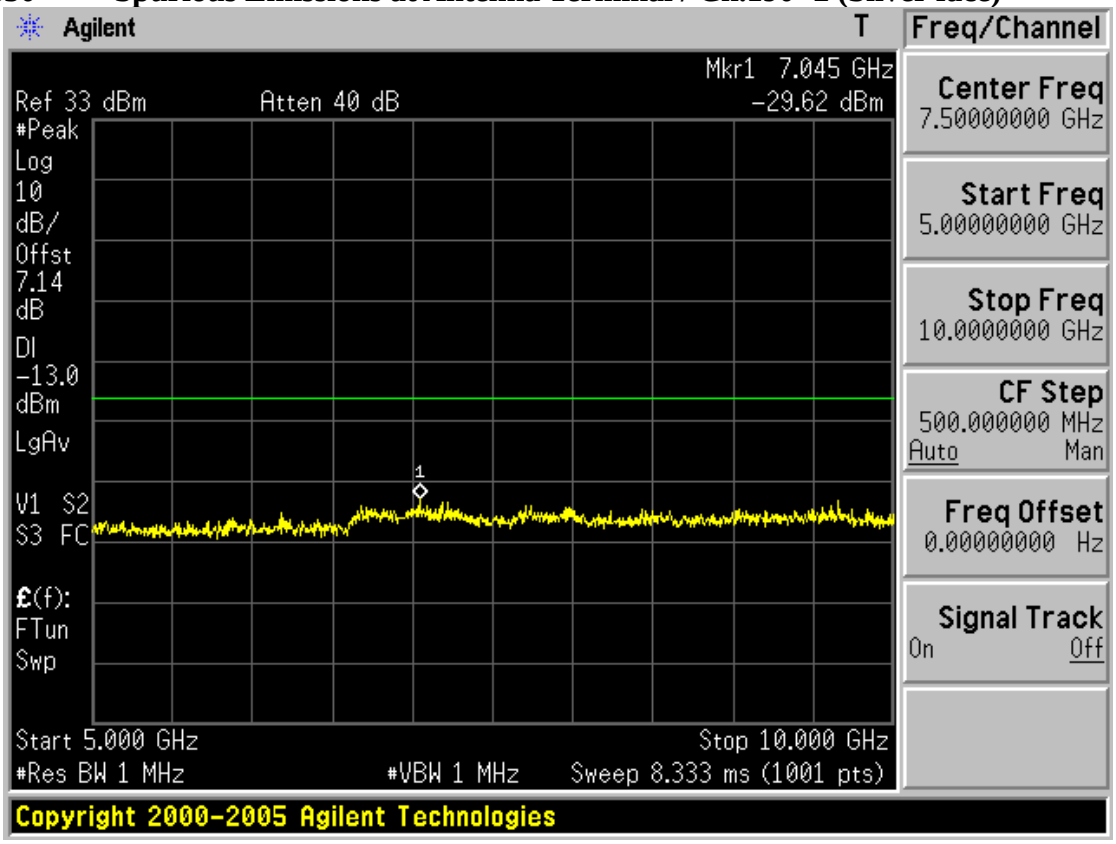

**GSM850 Spurious Emissions at Antenna Terminal / Ch.128 -2 (Silver face)**



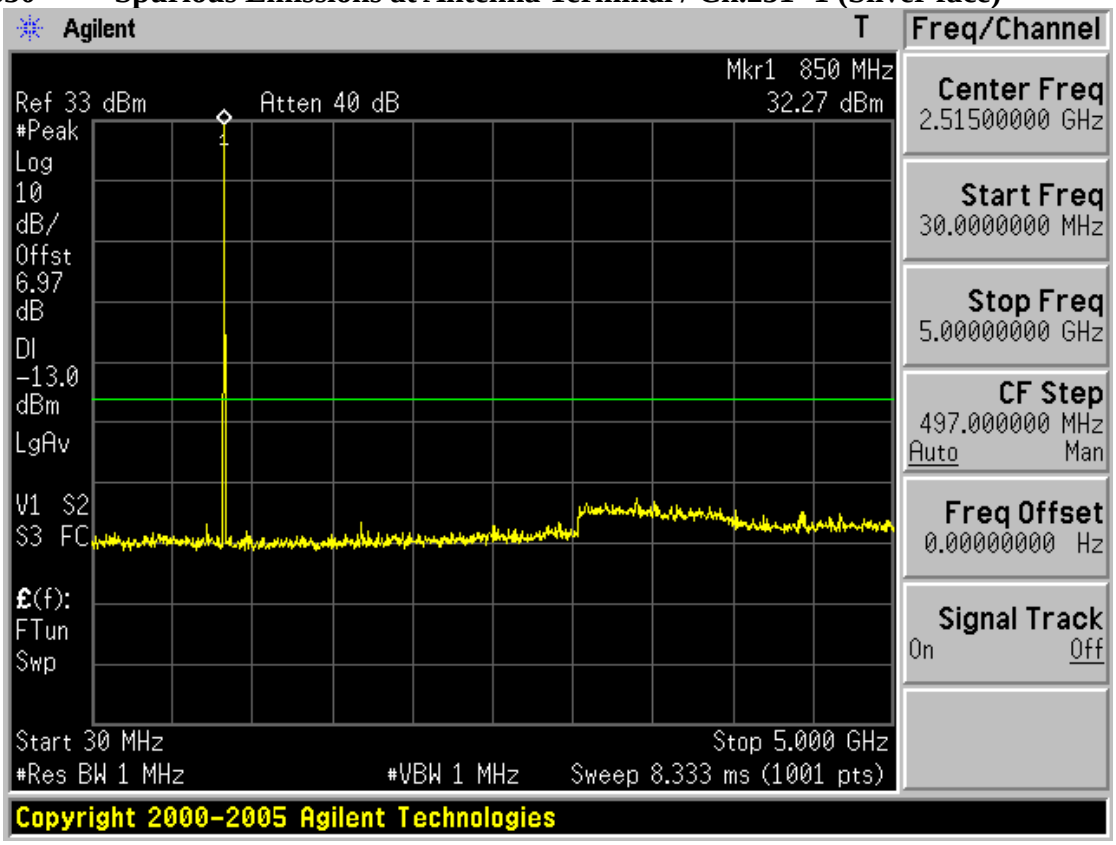
**GSM850 Spurious Emissions at Antenna Terminal / Ch.190 -1 (Silver face)**



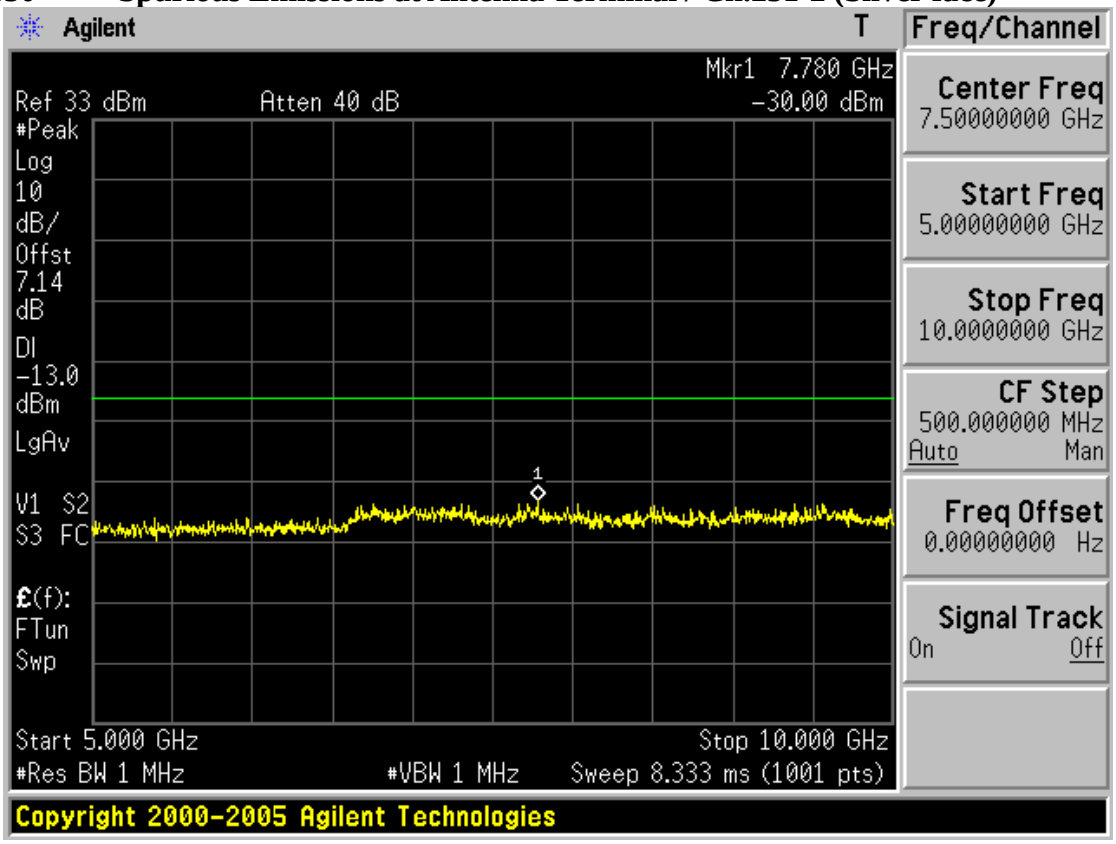

**GSM850 Spurious Emissions at Antenna Terminal / Ch.190 -2 (Silver face)**



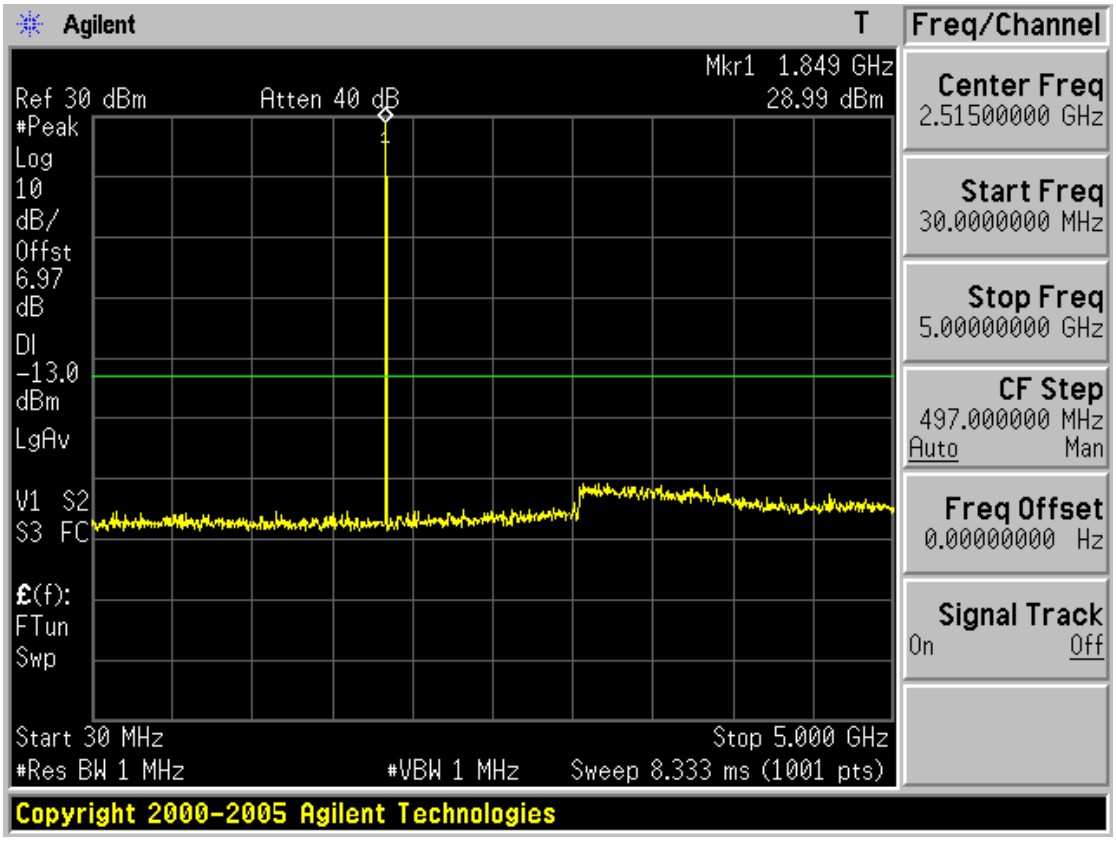
**GSM850 Spurious Emissions at Antenna Terminal / Ch.251 -1 (Silver face)**



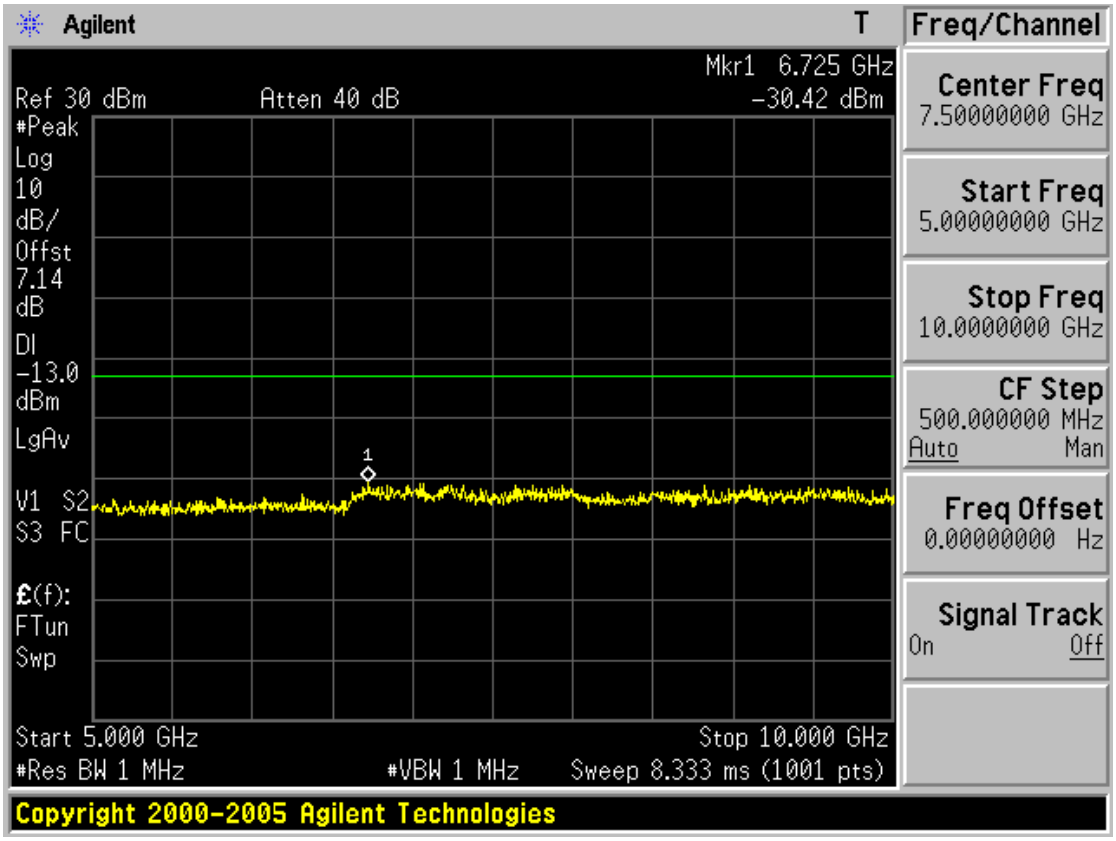

**GSM850 Spurious Emissions at Antenna Terminal / Ch.251-2 (Silver face)**



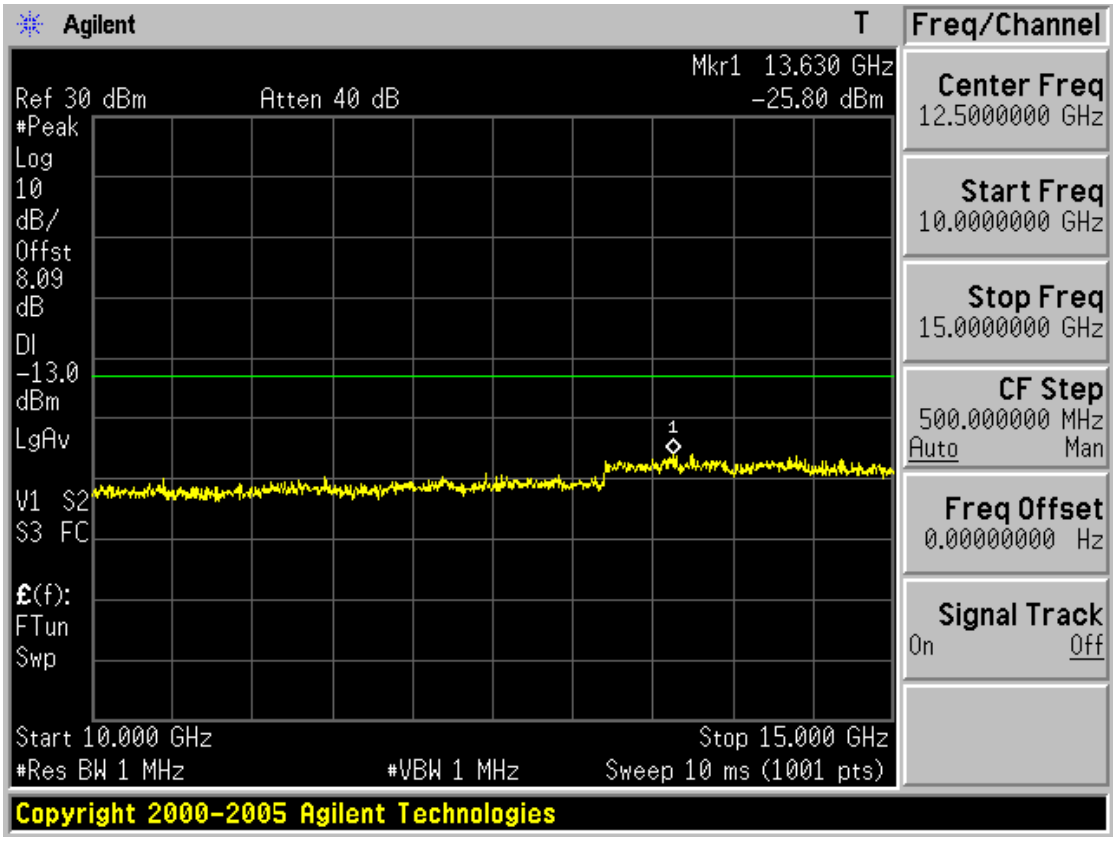
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -1 (Silver face)**



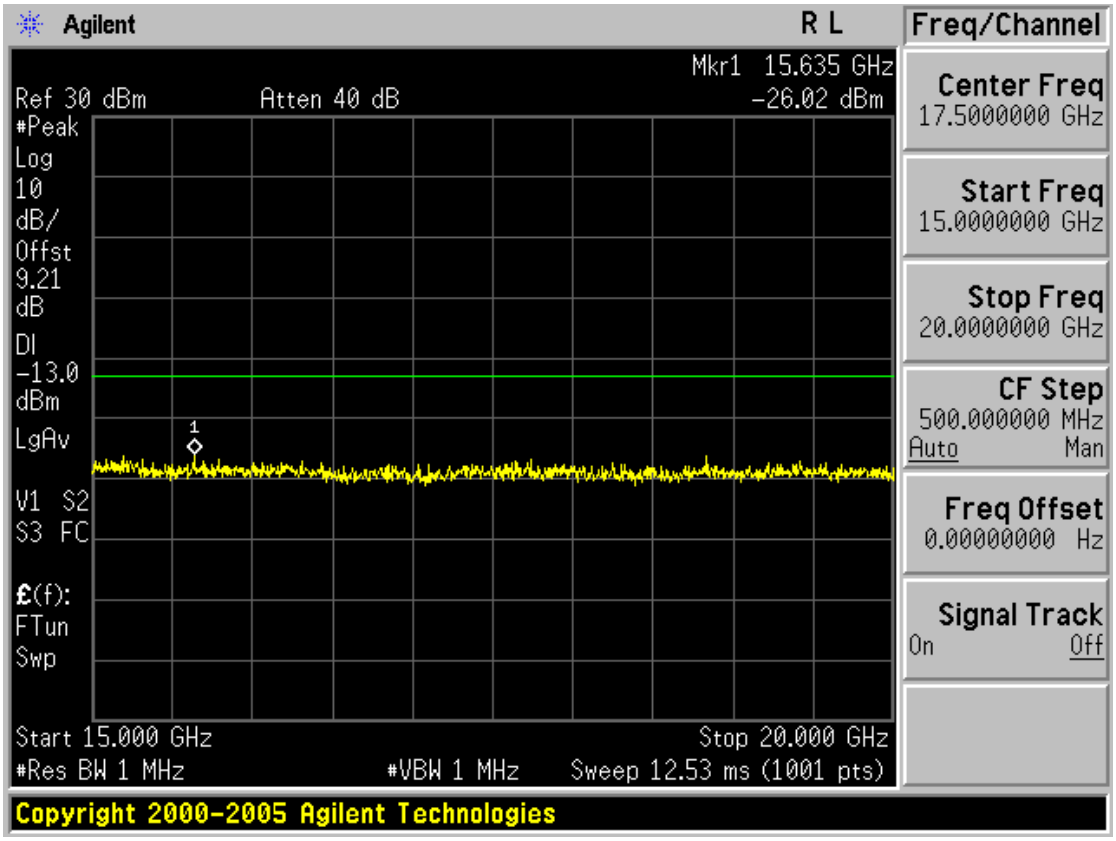

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -2 (Silver face)**



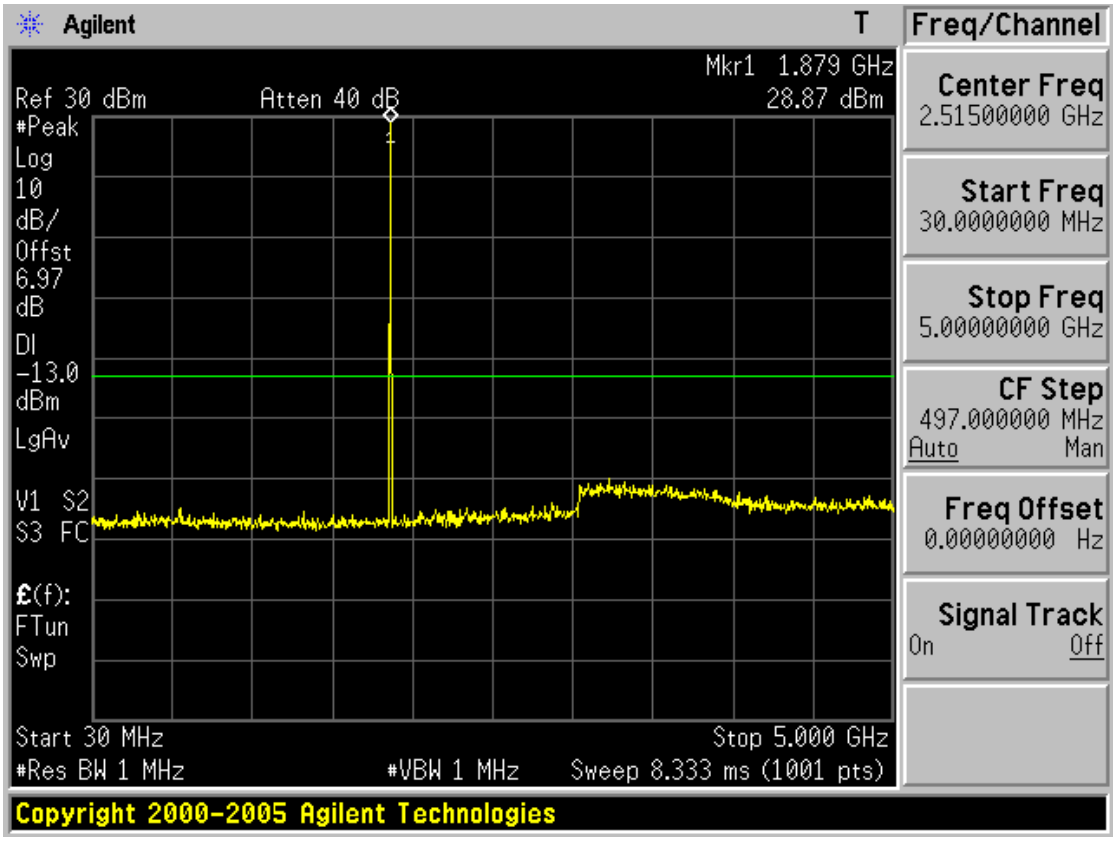
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -3 (Silver face)**



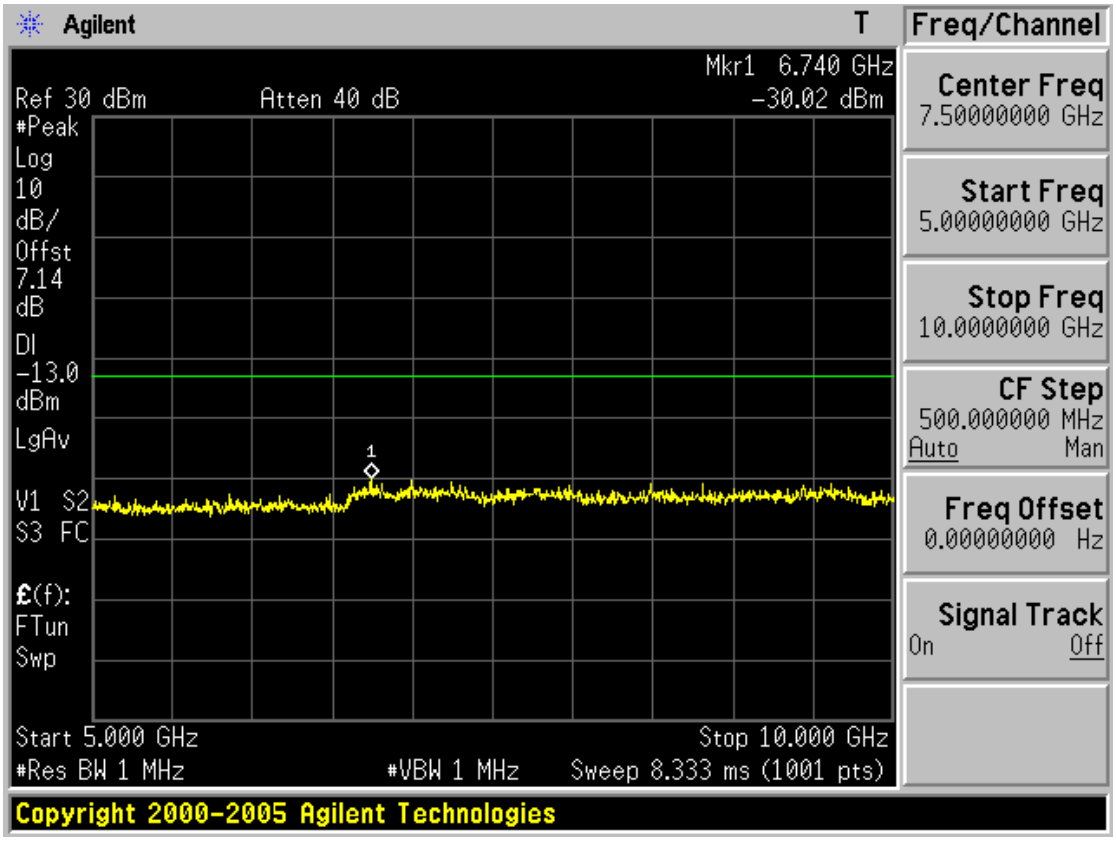

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.512 -4 (Silver face)**



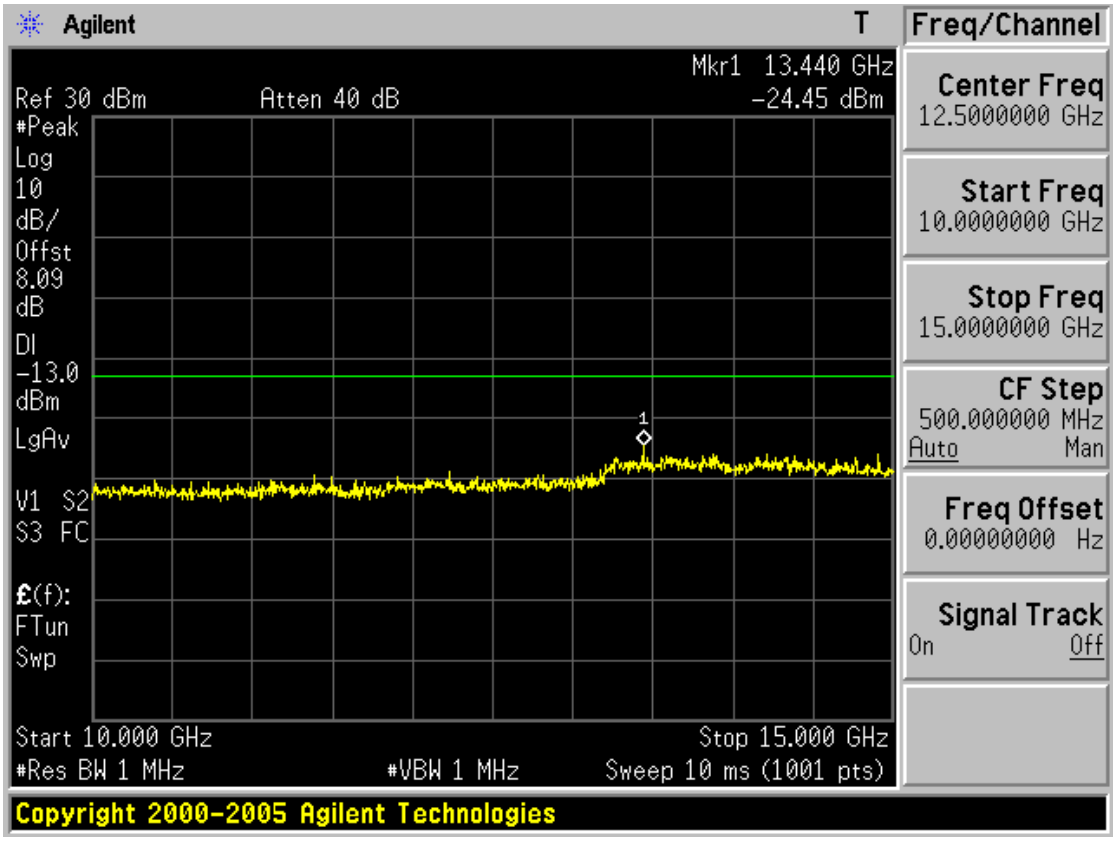
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -1 (Silver face)**



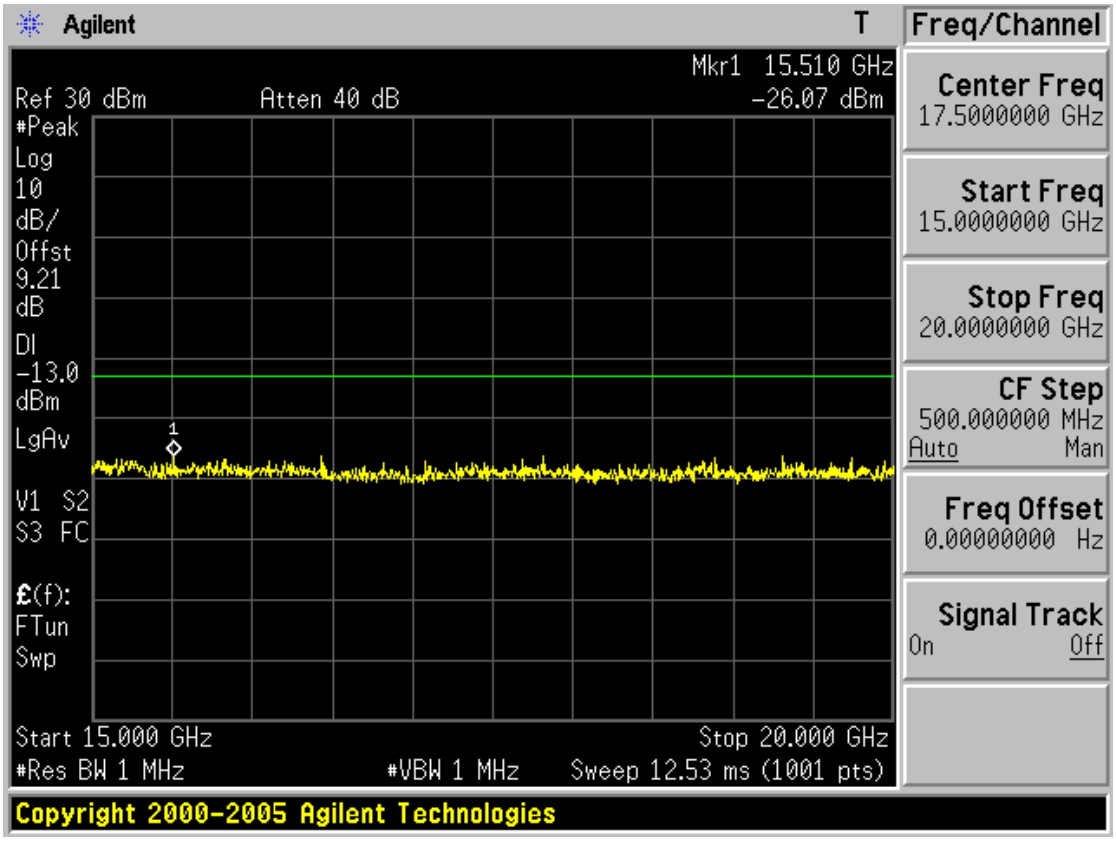

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -2 (Silver face)**



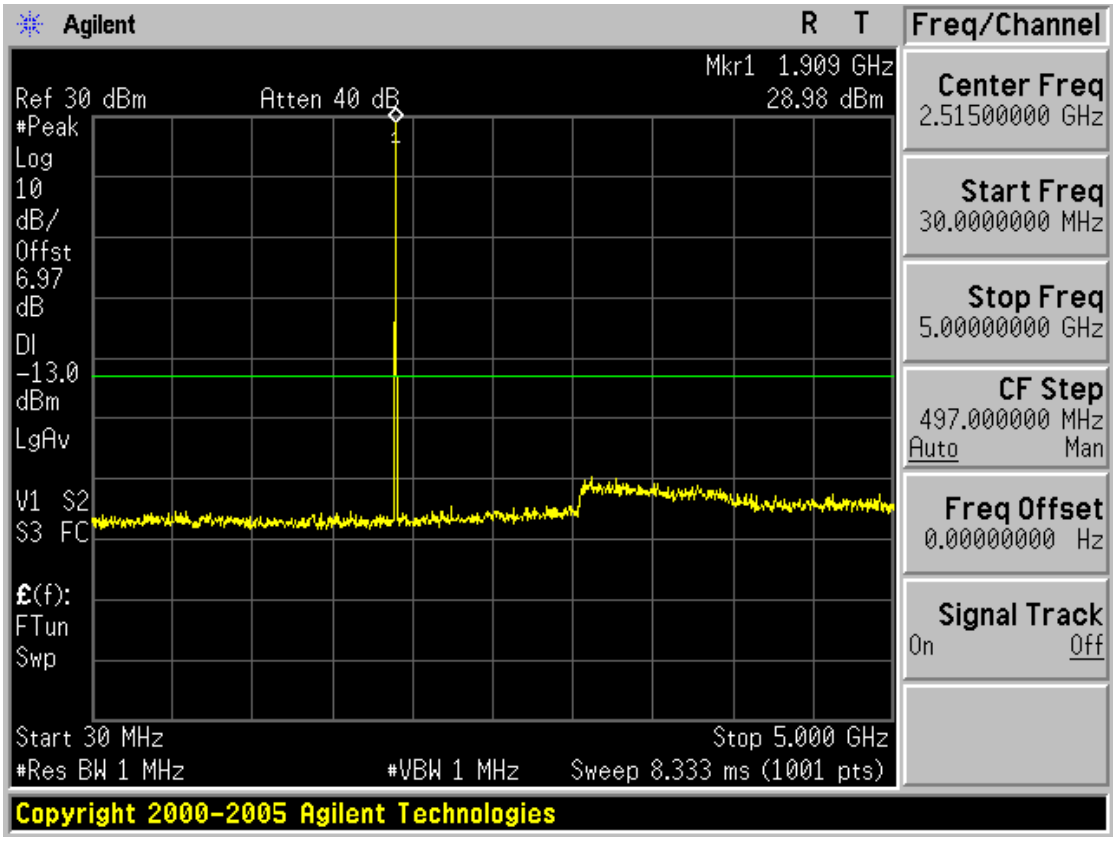
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -3 (Silver face)**



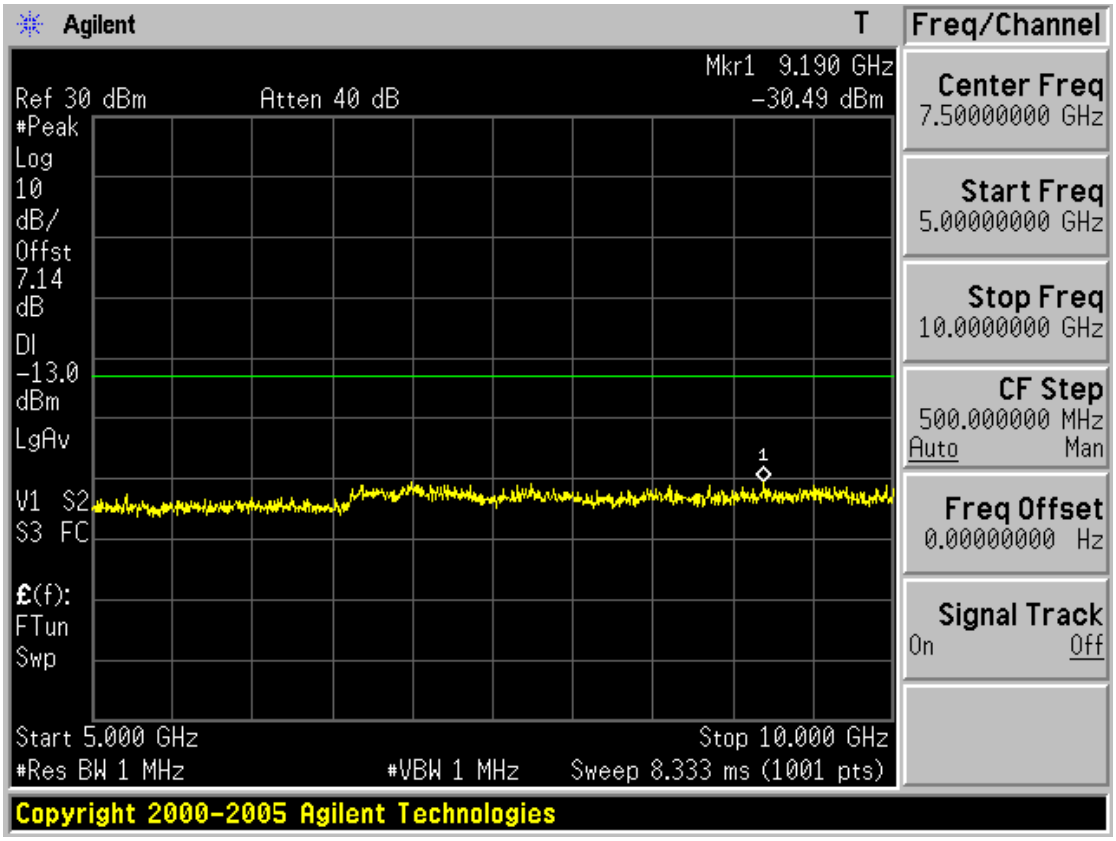

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.661 -4 (Silver face)**



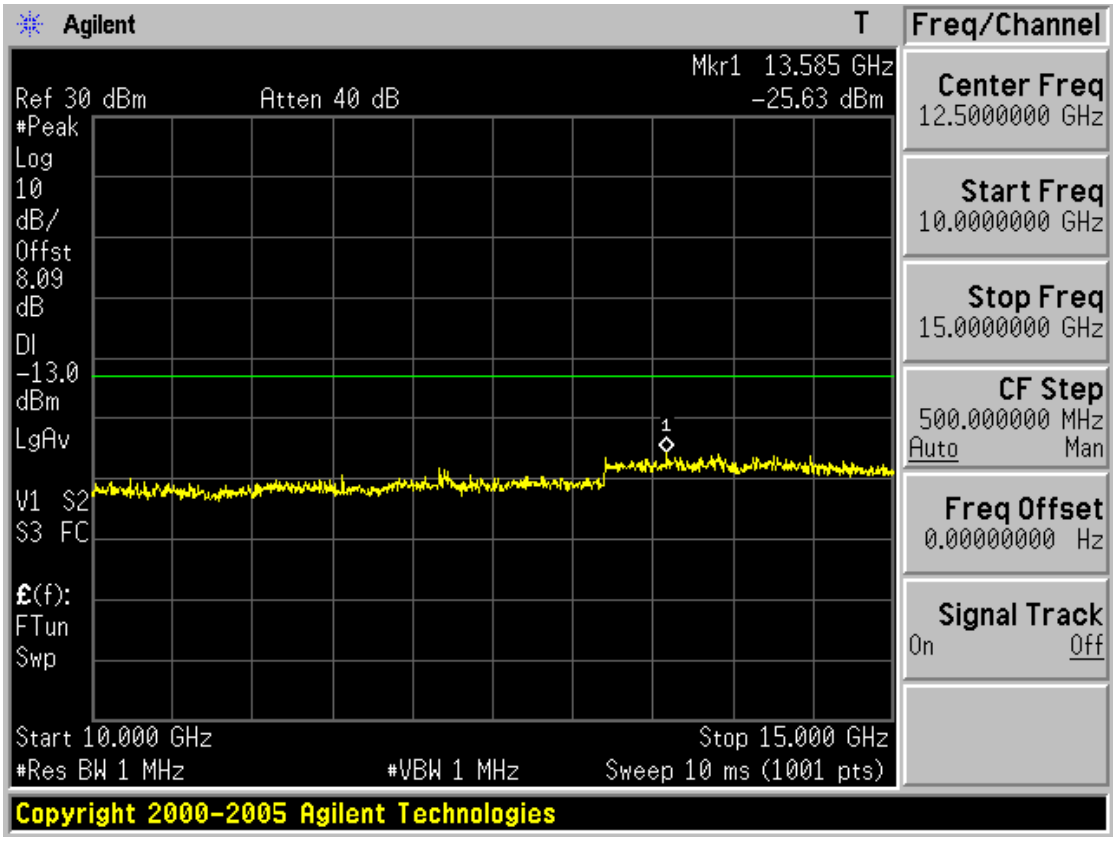
**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -1 (Silver face)**



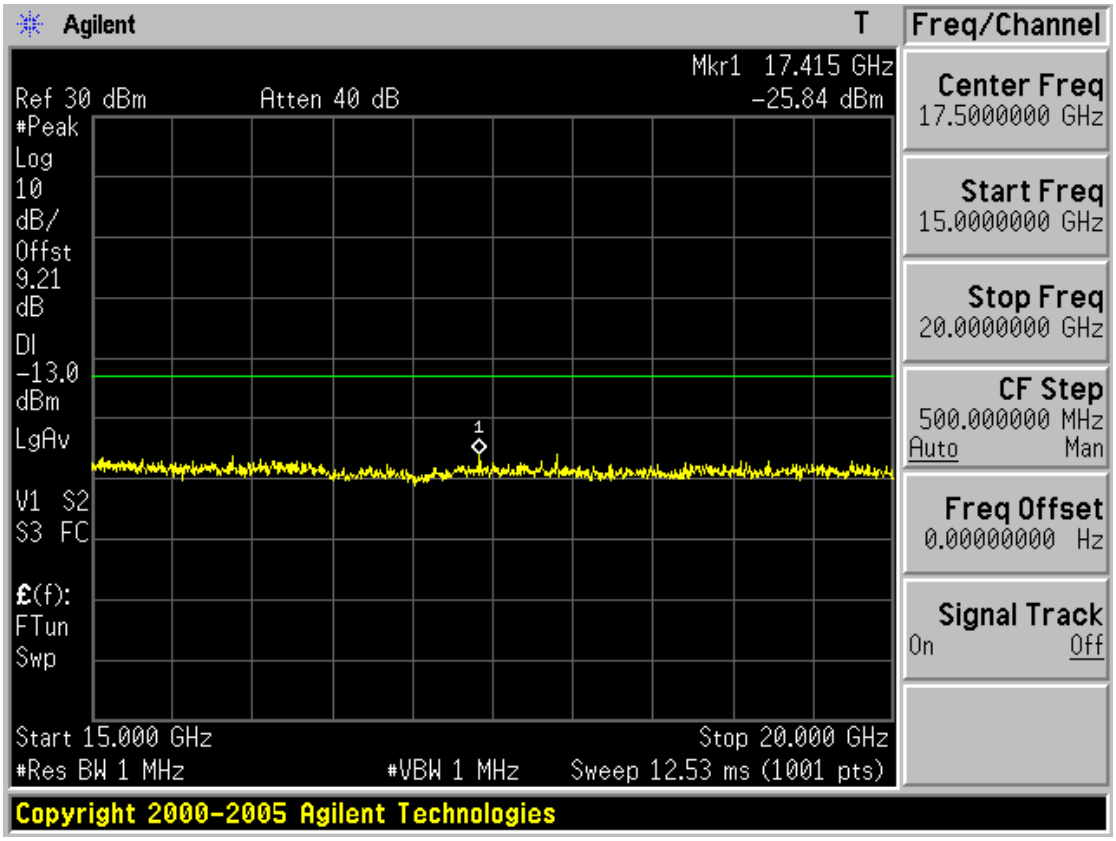

**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -2 (Silver face)**



**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -3 (Silver face)**




**PCS1900 Spurious Emissions at Antenna Terminal / Ch.810 -4 (Silver face)**



## 3.6 Field Strength of Spurious Radiation

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 2.1053(a) |
| Tested Frequency | : | 824.2MHz, 836.6MHz and 848.8MHz for GSM850<br>1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900 |

**Measurement Procedure:**

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Black face)

OPERATING FREQUENCY : 824.2 MHz

CHANNEL : 128(Low)

MEASURED OUTPUT POWER : 24.02 dBm = 0.253 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : $43 + 10 \log_{10} (W)$ = 37.02 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1648.4 | -47.11 | 6.31 | -40.80 | V | 64.82 |
| 1648.4 | -48.05 | 6.31 | -41.74 | H | 65.76 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Black face)

OPERATING FREQUENCY : 836.6 MHz

CHANNEL : 190(Mid)

MEASURED OUTPUT POWER : 24.55 dBm = 0.285 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : $43 + 10 \log_{10} (W)$ = 37.55 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1673.2 | -50.37 | 6.36 | -44.01 | V | 68.56 |
| 1673.2 | -51.68 | 6.36 | -45.32 | H | 69.87 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Black face)

OPERATING FREQUENCY : 848.8 MHz

CHANNEL : 251(High)

MEASURED OUTPUT POWER : 25.93 dBm = 0.392 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 38.93 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1697.6 | -47.82 | 6.41 | -41.41 | V | 67.34 |
| 1697.6 | -45.47 | 6.41 | -39.06 | H | 64.99 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 824.2 MHz

CHANNEL : 128(Low)

MEASURED OUTPUT POWER : 23.05 dBm = 0.202 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 36.05 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1648.4 | -43.13 | 6.31 | -36.82 | V | 59.87 |
| 1648.4 | -43.66 | 6.31 | -37.35 | H | 60.40 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 836.6 MHz

CHANNEL : 190(Mid)

MEASURED OUTPUT POWER : 21.53 dBm = 0.142 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 34.53 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1673.2 | -50.87 | 6.36 | -44.51 | V | 66.04 |
| 1673.2 | -49.20 | 6.36 | -42.84 | H | 64.37 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 848.8 MHz

CHANNEL : 251(High)

MEASURED OUTPUT POWER : 21.89 dBm = 0.155 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 34.89 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1697.6 | -48.10 | 6.41 | -41.69 | V | 63.58 |
| 1697.6 | -47.19 | 6.41 | -40.78 | H | 62.67 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM850 Field Strength of SPURIOUS Radiation (Simultaneous mode)

OPERATING FREQUENCY : 848.8 MHz

CHANNEL : 251(High)

MEASURED OUTPUT POWER : 21.46 dBm = 0.140 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : $43 + 10 \log_{10} (W)$ = 34.46 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBd) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1697.6 | -51.77 | 6.41 | -45.36 | V | 66.82 |
| 1697.6 | -45.92 | 6.41 | -39.51 | H | 60.97 |
| - | - | - | - | - | - |

**Note : This simultaneous operation mode test was repeated at the same channel which is the worst case channel of black face and silver face.**

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Black Face)

OPERATING FREQUENCY : 1850.2 MHz

CHANNEL : 512(Low)

MEASURED OUTPUT POWER : 22.58 dBm = 0.181 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : $43 + 10 \log_{10} (W)$ = 35.58 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3700.4 | -48.55 | 9.60 | -38.95 | V | 61.53 |
| 3700.4 | -48.03 | 9.60 | -38.43 | H | 61.01 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Black Face)

OPERATING FREQUENCY : 1880.0 MHz

CHANNEL : 661(Mid)

MEASURED OUTPUT POWER : 24.65 dBm = 0.292 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : $43 + 10 \log_{10} (W)$ = 37.65 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3760 | -47.21 | 9.59 | -37.62 | V | 62.27 |
| 3760 | -47.21 | 9.59 | -37.62 | H | 62.27 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Black Face)

OPERATING FREQUENCY : 1909.8 MHz

CHANNEL : 810(High)

MEASURED OUTPUT POWER : 24.03 dBm = 0.253 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 37.03 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3819.6 | -46.46 | 9.58 | -36.88 | V | 60.91 |
| 3819.6 | -47.76 | 9.58 | -38.18 | H | 62.21 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 1850.2 MHz

CHANNEL : 512(Low)

MEASURED OUTPUT POWER : 23.77 dBm = 0.238 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 36.77 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3700.4 | -45.98 | 9.60 | -36.38 | V | 60.15 |
| 3700.4 | -47.17 | 9.60 | -37.57 | H | 61.34 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 1880.0 MHz

CHANNEL : 661(Mid)

MEASURED OUTPUT POWER : 25.28 dBm = 0.337 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 38.28 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3760 | -47.46 | 9.59 | -37.87 | V | 63.15 |
| 3760 | -46.77 | 9.59 | -37.18 | H | 62.46 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Silver face)

OPERATING FREQUENCY : 1909.8 MHz

CHANNEL : 810(High)

MEASURED OUTPUT POWER : 23.64 dBm = 0.231 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 36.64 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3819.6 | -46.76 | 9.58 | -37.18 | V | 60.82 |
| 3819.6 | -47.48 | 9.58 | -37.90 | H | 61.54 |
| - | - | - | - | - | - |

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## GSM1900 Field Strength of SPURIOUS Radiation (Simultaneous mode)

OPERATING FREQUENCY : 1880.0 MHz

CHANNEL : 661(Mid)

MEASURED OUTPUT POWER : 26.63 dBm = 0.460 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 39.63 dBc

| **Freq.** (MHz) | **LEVEL@ ANTENNA TERMINALS** (dBm) | **SUBSTITUTE ANTENNA GAIN** (dBi) | **CORRECT GENERATOR LEVEL** (dBm) | **POL** (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3760.0 | -43.98 | 9.59 | -34.39 | V | 58.02 |
| 3760.0 | -47.87 | 9.59 | -38.28 | H | 61.91 |
| - | - | - | - | - | - |

**Note : This simultaneous operation mode test was repeated at the same channel which is the worst case channel of black face and silver face.**

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

## 3.7 Frequency Stability/Temperature Variation.

| | | |
|---|---|---|
| FCC ID | : | **WRLWINDDUO2100** |
| Specification | : | 47 CFR 2.1055 |
| Tested Frequency | : | 836.6MHz for GSM850<br>1880.0MHz for PCS1900 |

**Measurement 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 85% 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 minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

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 ±0.00025(±2.5ppm) of the center frequency.

**Time Period and Procedure:**

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight ”soak” at -30°C(usually 14-16 hours),the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10intervals starting at -30°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

## Frequency Stability (GSM850) (Black face)

OPERATING FREQUENCY : 836,599,960 Hz

CHANNEL : 190(Mid)

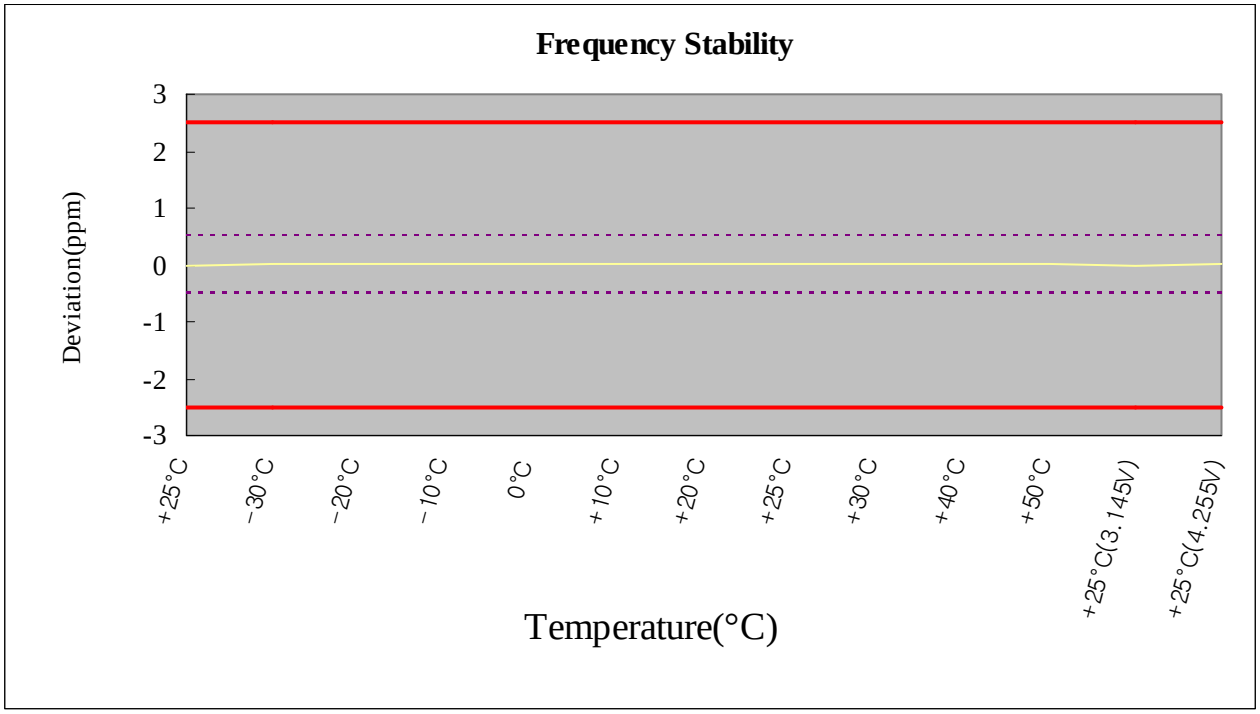
REFERENCE VOLTAGE : 3.7 VDC

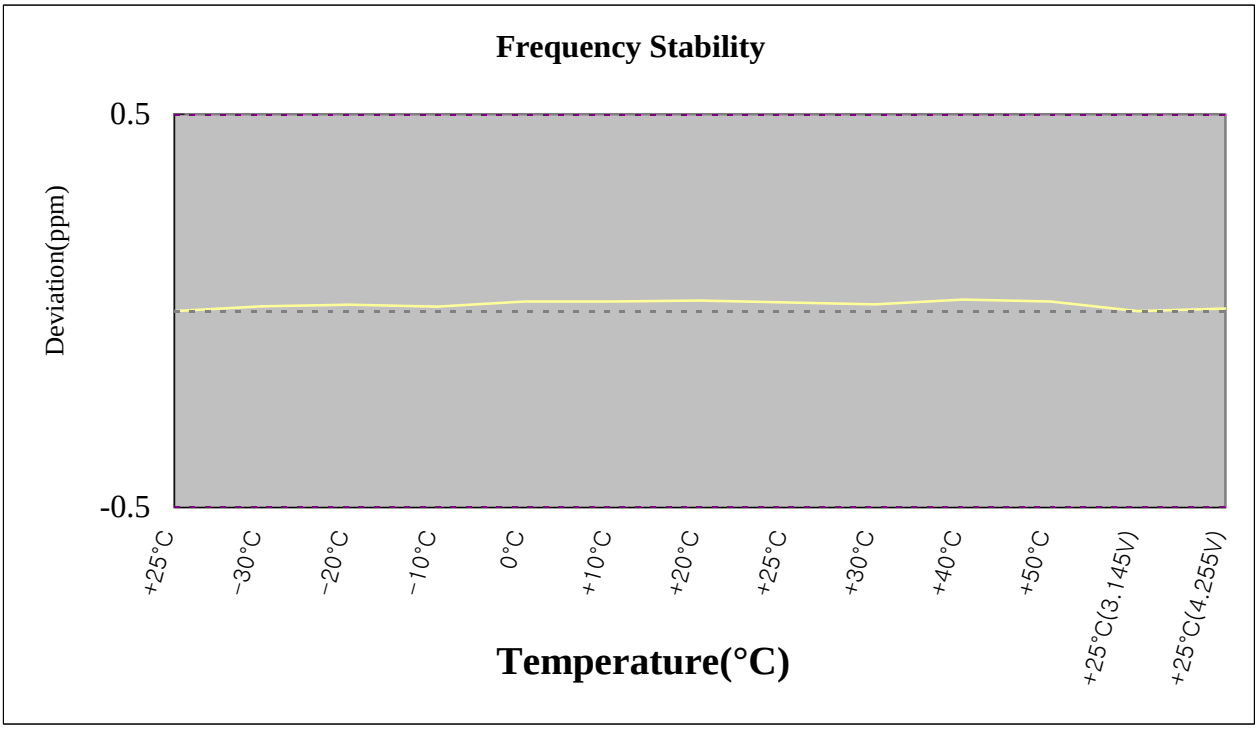
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100% | 3.7 | +25(Ref) | 836,599,960 | 0.000000 |
| 100% | | -30 | 836,599,970 | 0.000001 |
| 100% | | -20 | 836,599,973 | 0.000002 |
| 100% | | -10 | 836,599,969 | 0.000001 |
| 100% | | 0 | 836,599,980 | 0.000002 |
| 100% | | +10 | 836,599,980 | 0.000002 |
| 100% | | +20 | 836,599,982 | 0.000003 |
| 100% | | +25 | 836,599,978 | 0.000002 |
| 100% | | +30 | 836,599,974 | 0.000002 |
| 100% | | +40 | 836,599,984 | 0.000003 |
| 100% | | +50 | 836,599,980 | 0.000002 |
| 85% | 3.145 | +25 | - | - |
| 115% | 4.255 | +25 | 836,599,965 | 0.000001 |
| BAT. END Point | 3.400 | +25 | 836,599,971 | 0.01 |

**This device is not operated at 3.145 V (85%).**

**Frequency Stability(GSM850)** **(Continued…)**



## Frequency Stability (PCS1900) (Black face)

OPERATING FREQUENCY : 1,879,999,968 Hz

CHANNEL : 0661(Mid)

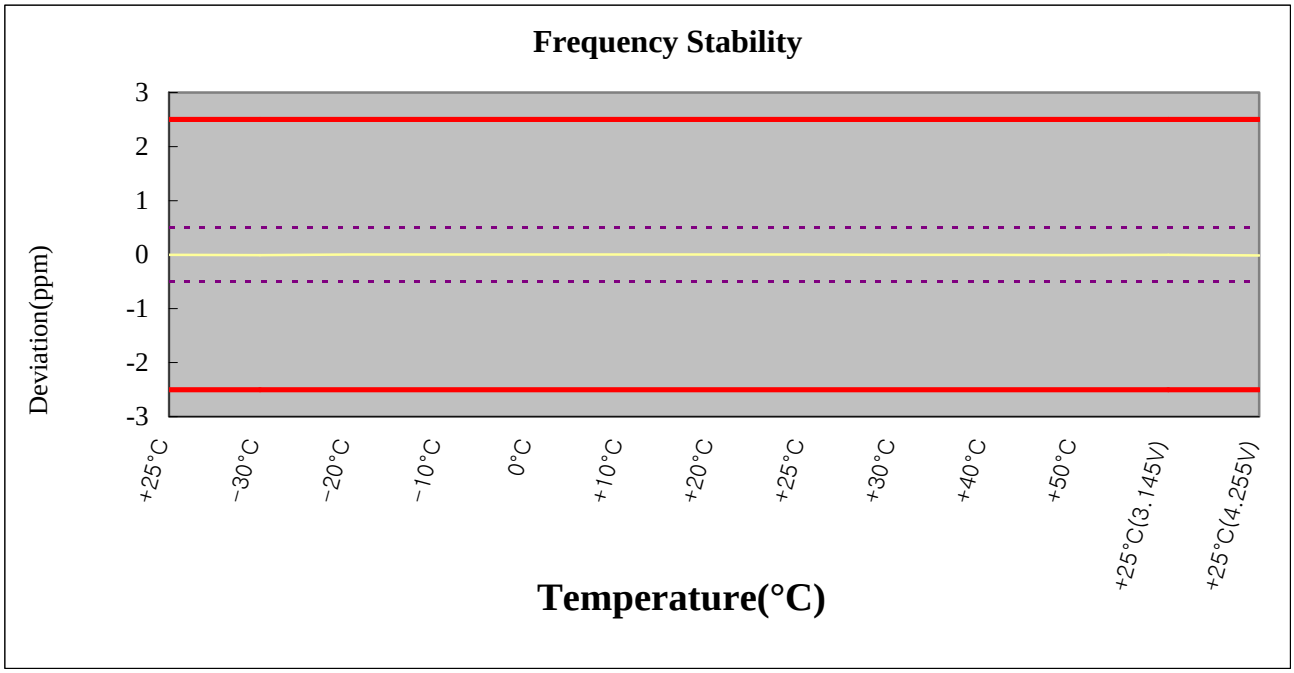
REFERENCE VOLTAGE : 3.7 VDC

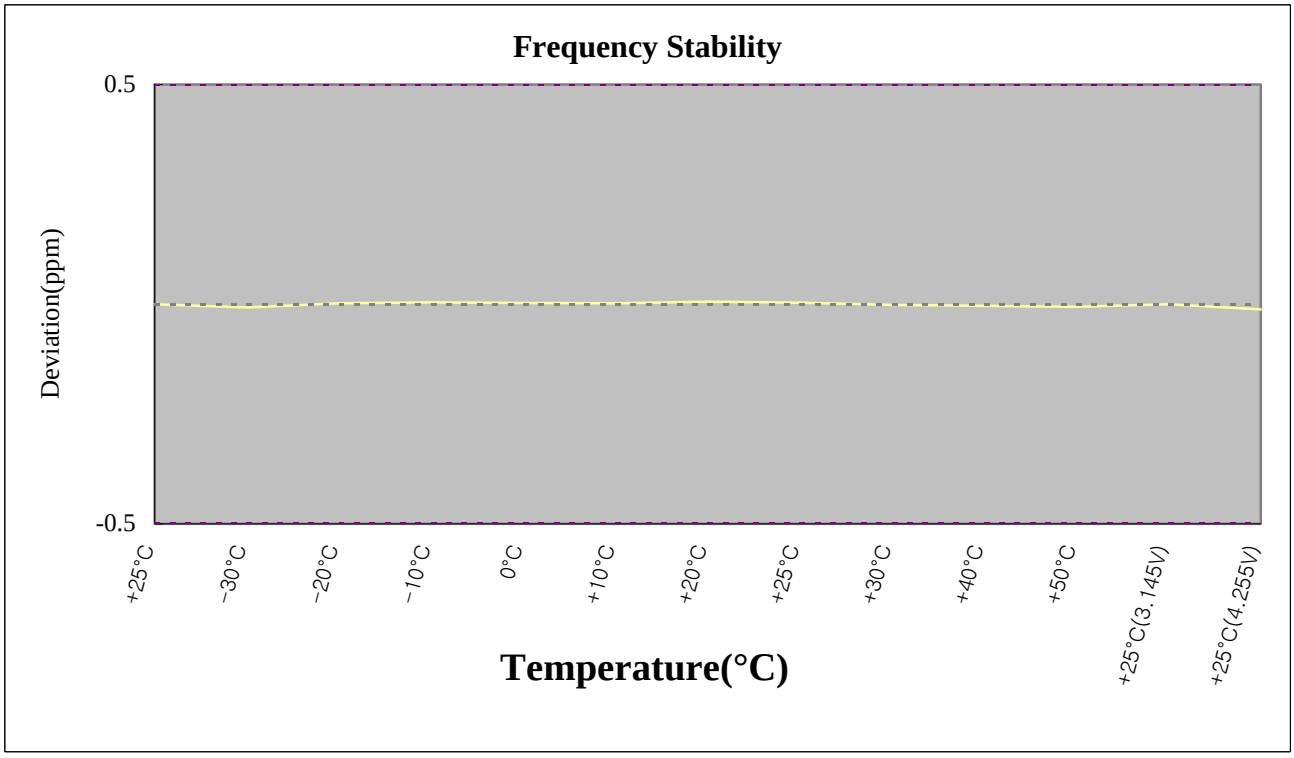
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100% | 3.7 | +25(Ref) | 1,879,999,968 | 0.000000 |
| 100% | | -30 | 1,879,999,953 | -0.000001 |
| 100% | | -20 | 1,879,999,972 | 0.000000 |
| 100% | | -10 | 1,879,999,975 | 0.000000 |
| 100% | | 0 | 1,879,999,973 | 0.000000 |
| 100% | | +10 | 1,879,999,971 | 0.000000 |
| 100% | | +20 | 1,879,999,978 | 0.000001 |
| 100% | | +25 | 1,879,999,974 | 0.000000 |
| 100% | | +30 | 1,879,999,965 | 0.000000 |
| 100% | | +40 | 1,879,999,961 | 0.000000 |
| 100% | | +50 | 1,879,999,956 | -0.000001 |
| 85% | 3.145 | +25 | - | - |
| 115% | 4.255 | +25 | 1,879,999,945 | -0.000001 |
| BATT.ENDPOINT | 3.400 | +25 | 1,879,999,965 | 0.000000 |

**This device is not operated at 3.145 V (85%).**

## Frequency Stability (PCS1900) (continued…)



## Frequency Stability (GSM850) (Silver face)

OPERATING FREQUENCY : 836,599,953 Hz

CHANNEL : 190(Mid)

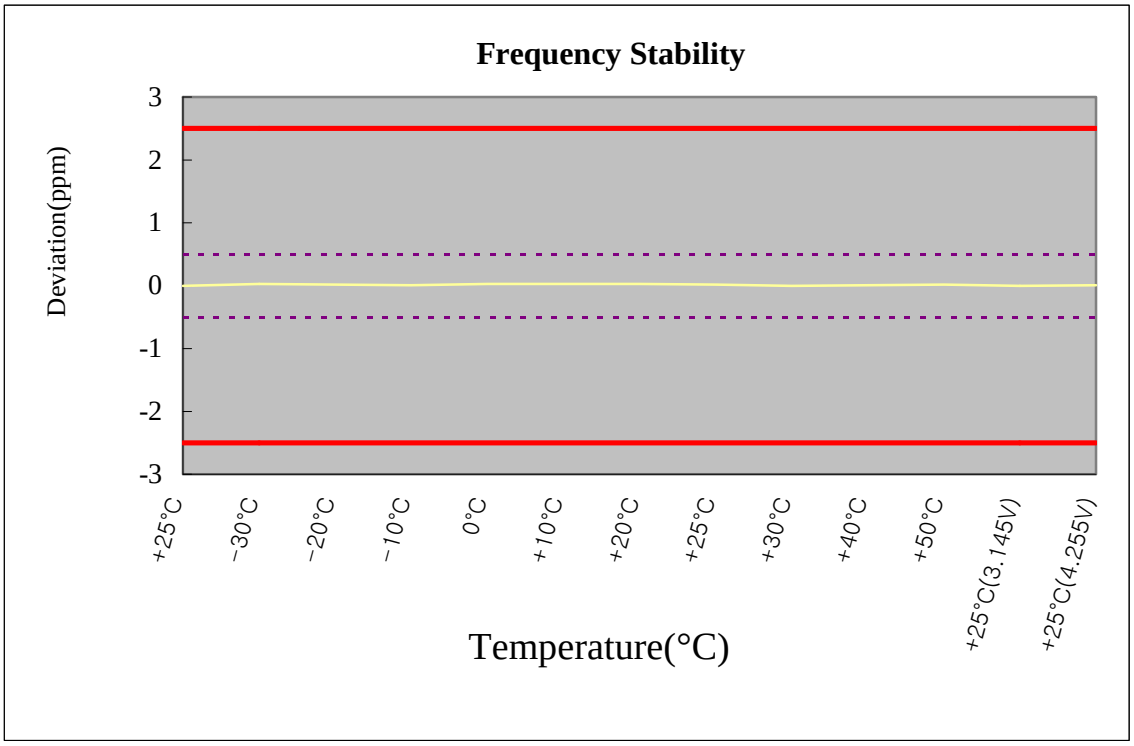
REFERENCE VOLTAGE : 3.7 VDC

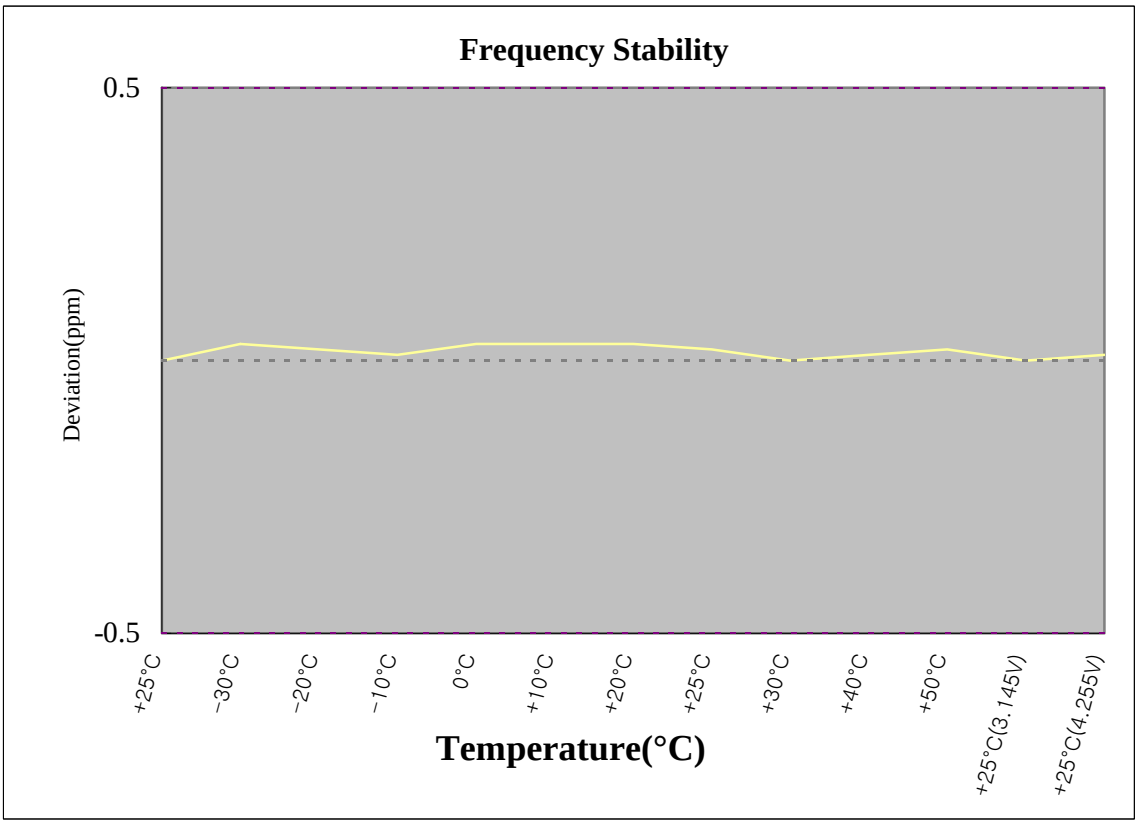
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100% | 3.7 | +25(Ref) | 836,599,953 | 0.000000 |
| 100% | | -30 | 836,599,975 | 0.000003 |
| 100% | | -20 | 836,599,967 | 0.000002 |
| 100% | | -10 | 836,599,965 | 0.000001 |
| 100% | | 0 | 836,599,978 | 0.000003 |
| 100% | | +10 | 836,599,974 | 0.000003 |
| 100% | | +20 | 836,599,980 | 0.000003 |
| 100% | | +25 | 836,599,972 | 0.000002 |
| 100% | | +30 | 836,599,954 | 0.000000 |
| 100% | | +40 | 836,599,964 | 0.000001 |
| 100% | | +50 | 836,599,966 | 0.000002 |
| 85% | 3.145 | +25 | - | - |
| 115% | 4.255 | +25 | 836,599,960 | 0.000001 |
| BAT. END Point | 3.250 | +25 | 836,599,935 | -0.000002 |

**This device is not operated at 3.145 V (85%).**

**Frequency Stability(GSM850)** **(Continued…)**



## Frequency Stability (PCS1900) (Silver Face)

OPERATING FREQUENCY : 1,879,999,942 Hz

CHANNEL : 661(Mid)

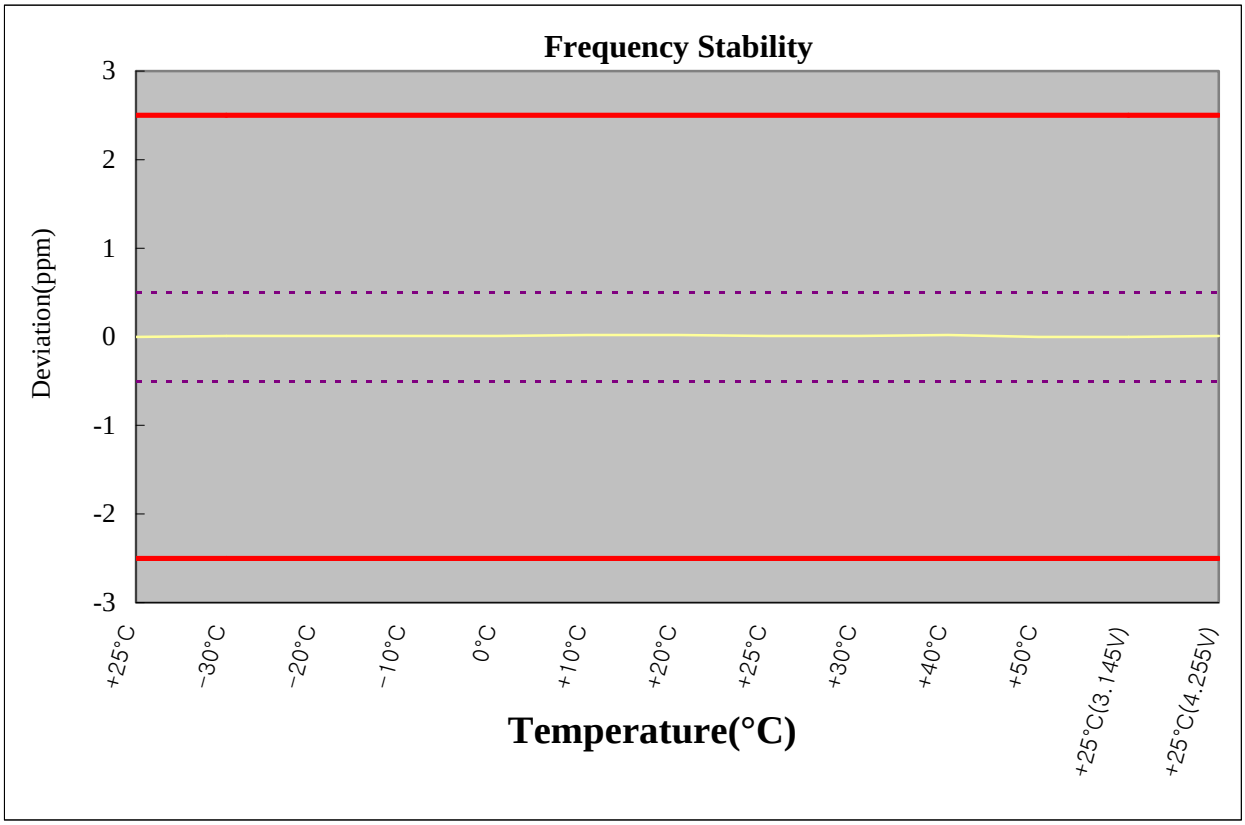
REFERENCE VOLTAGE : 3.7 VDC

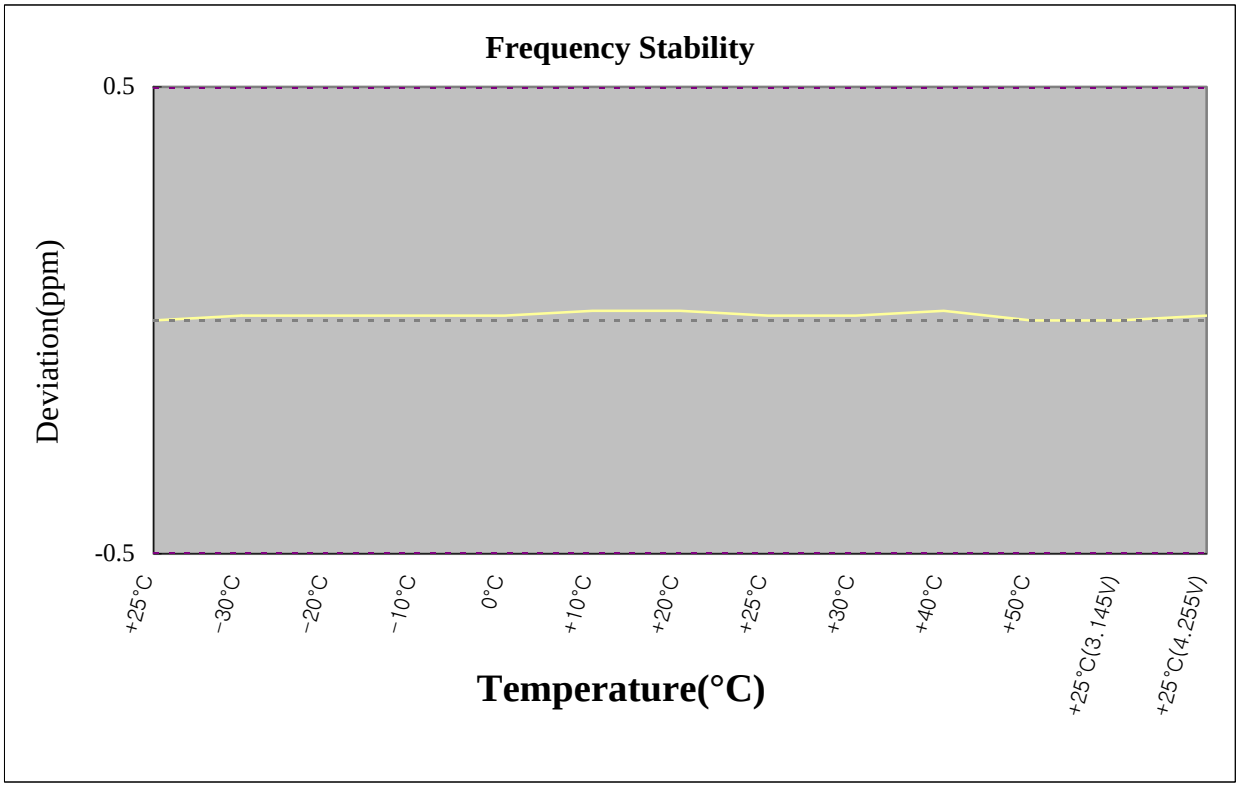
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100% | 3.7 | +25(Ref) | 1,879,999,942 | 0.000000 |
| 100% | | -30 | 1,879,999,954 | 0.000001 |
| 100% | | -20 | 1,879,999,964 | 0.000001 |
| 100% | | -10 | 1,879,999,970 | 0.000001 |
| 100% | | 0 | 1,879,999,965 | 0.000001 |
| 100% | | +10 | 1,879,999,971 | 0.000002 |
| 100% | | +20 | 1,879,999,971 | 0.000002 |
| 100% | | +25 | 1,879,999,960 | 0.000001 |
| 100% | | +30 | 1,879,999,970 | 0.000001 |
| 100% | | +40 | 1,879,999,975 | 0.000002 |
| 100% | | +50 | 1,879,999,945 | 0.000000 |
| 85% | 3.145 | +25 | - | - |
| 115% | 4.255 | +25 | 1,879,999,957 | 0.000001 |
| BATT.ENDPOINT | 3.250 | +25 | 1,879,999,935 | 0.000000 |

**This device is not operated at 3.145 V (85%).**

**Frequency Stability (PCS1900)** **(continued…)**



# 4. TEST EQUIPMENT

| | Type | Manufacturer | Model | Cal.Due.Date (dd/mm/yy) | Next.Due.Date (dd/mm/yy) | S/N |
|---|---|---|---|---|---|---|
| 01 | Spectrum Analyzer | Agilent | E4404B | 21/03/08 | 21/03/09 | US41061134 |
| 02 | Spectrum Analyzer | Agilent | E4440A | 06/11/08 | 06/11/09 | MY45304199 |
| 03 | Spectrum Analyzer | H.P | 8563E | 13/10/08 | 13/10/09 | 3551A04634 |
| 04 | Spectrum Analyzer | H.P | 8591E | 26/04/08 | 26/04/09 | 3649A05889 |
| 05 | Spectrum Analyzer | Rohde Schwarz | FSP | 09/09/08 | 09/09/09 | 100385 |
| 06 | EMI TEST RECEIVER | R&S | ESU | 11/01/08 | 11/01/09 | 100014 |
| 07 | EMI TEST RECEIVER | R&S | ESCI | 13/05/08 | 13/05/09 | 100364 |
| 08 | Power Meter | H.P | EMP-442A | 10/07/08 | 10/07/09 | GB37170413 |
| 09 | Power Sensor | H.P | 8481A | 11/03/08 | 11/03/09 | 3318A96566 |
| 10 | Power Divider | Agilent | 11636B | 17/12/07 | 17/12/08 | 56471 |
| 11 | Signal Generator | Rohde Schwarz | SMR20 | 02/04/08 | 02/04/09 | 101251 |
| 12 | Signal Generator | H.P | ESG-3000A | 09/07/08 | 09/07/09 | US37230529 |
| 13 | Vector Signal Generator | Rohde Schwarz | SMJ100A | 17/01/08 | 17/01/09 | 100148 |
| 14 | Audio Analyzer | H.P | 8903B | 09/07/08 | 09/07/09 | 3011A09448 |
| 15 | Modulation Analyzer | H.P | 8901B | 18/07/08 | 18/07/09 | 3028A03029 |
| 16 | Oscilloscope | Tektronix | TDS3052 | 07/10/08 | 07/10/09 | B016821 |
| 17 | 8960 Series 10 Wireless Comms. Test Set | Agilent | E5515C | 31/07/08 | 31/07/09 | GB43461134 |
| 18 | Universal Radio communication Tester | Rohde Schwarz | CMU 200 | 02/04/08 | 02/04/09 | 107631 |
| 19 | Bluetooth Tester | TESCOM | TC-3000A | 01/08/08 | 01/08/09 | 3000A4A0121 |
| 20 | Power Splitter | WEINSCHEL | 1593 | 06/10/08 | 06/10/09 | 332 |
| 21 | Power Splitter | Anritsu | K241B | 14/10/08 | 14/10/09 | 020611 |
| 22 | BAND Reject Filter | Microwave Circuits | N0308372 | 06/10/08 | 06/10/09 | 3125-01DC0352 |
| 23 | BAND Reject Filter | Wainwright | WRCG1750 | 06/10/08 | 06/10/09 | 2 |
| 24 | AC Power supply | DAEKWANG | 5KVA | 20/03/08 | 20/03/09 | 20060321-1 |
| 25 | DC Power Supply | H.P | 6622A | 20/03/08 | 20/03/09 | 3448A03760 |
| 26 | DC Power Supply | HP | 6633A | 20/03/08 | 20/03/09 | 3524A06634 |
| 27 | HORN ANT | ETS | 3115 | 13/06/08 | 13/06/09 | 6419 |
| 28 | HORN ANT | ETS | 3115 | 10/09/08 | 10/09/09 | 21097 |
| 29 | HORN ANT | A.H.Systems | SAS-574 | 13/06/08 | 13/06/09 | 154 |
| 30 | HORN ANT | A.H.Systems | SAS-574 | 13/06/08 | 13/06/09 | 155 |
| 31 | Dipole Antenna | Schwarzbeck | VHA9103 | 19/12/07 | 19/12/08 | 2116 |

# 4. TEST EQUIPMENT (CONTINUED)

| | Type | Manufacturer | Model | Cal.Due.Date (dd/mm/yy) | Next.Due.Date (dd/mm/yy) | S/N |
|---|---|---|---|---|---|---|
| 32 | Dipole Antenna | Schwarzbeck | VHA9103 | 19/12/07 | 19/12/08 | 2117 |
| 33 | Dipole Antenna | Schwarzbeck | UHA9105 | 20/12/07 | 20/12/08 | 2261 |
| 34 | Dipole Antenna | Schwarzbeck | UHA9105 | 20/12/07 | 20/12/08 | 2262 |
| 35 | TEMP & HUMIDITY Chamber | JISCO | J-RHC2 | 10/10/08 | 10/10/09 | 021031 |
| 36 | Log Periodic Antenna | Schwarzbeck | UHALP9108A1 | 30/09/08 | 30/09/09 | 1098 |
| 37 | Biconical Antenna | Schwarzbeck | VHA9103 | 13/06/08 | 13/06/09 | 2233 |
| 38 | Digital Multimeter | H.P | 34401A | 20/03/08 | 20/03/09 | 3146A13475,US36122178 |
| 39 | Attenuator (10dB) | WEINSCHEL | 23-10-34 | 01/10/08 | 01/10/09 | BP4386 |
| 40 | Attenuator (10dB) | WEINSCHEL | 23-10-34 | 30/01/08 | 30/01/09 | BP4387 |
| 41 | High-Pass Filter | ANRITSU | MP526D | 06/10/08 | 06/10/09 | MP27756 |
| 42 | Attenuator (3dB) | Agilent | 8491B | 01/08/08 | 01/08/09 | MY39260700 |
| 43 | Attenuator (20dB) | Aeroflex/Weinschel | 86-20-11 | 06/10/08 | 06/10/09 | 432 |
| 44 | Attenuator (10dB) | Aeroflex/Weinschel | 86-10-11 | 06/10/08 | 06/10/09 | 446 |
| 45 | Attenuator (10dB) | Aeroflex/Weinschel | 86-10-11 | 06/10/08 | 06/10/09 | 408 |
| 46 | Type N Coaxial CIRCULATOR | NOVA MICROWAVE | 0088CAN | 11/07/08 | 11/07/09 | 788 |
| 47 | Type N Coaxial CIRCULATOR | NOVA MICROWAVE | 0185CAN | 11/07/08 | 11/07/09 | 790 |
| 48 | Type N Coaxial CIRCULATOR | NOVA MICROWAVE | 0215CAN | 11/07/08 | 11/07/09 | 112 |
| 49 | Amplifier (25dB) | Agilent | 8447D | 21/05/08 | 21/05/09 | 2944A10144 |
| 50 | Amplifier (30dB) | Agilent | 8449B | 13/10/08 | 13/10/09 | 3008A01590 |
| 51 | Amplifier (22dB) | H.P | 8447E | 27/02/08 | 27/02/09 | 2945A02865 |
| 52 | Position Controller | TOKIN | 5901T | N/A | N/A | 14173 |
| 53 | Driver | TOKIN | 5902T2 | N/A | N/A | 14174 |
| 54 | LISN | Kyorits | KNW-407 | 04/08/08 | 04/08/09 | 8-317-8 |
| 55 | LISN | Kyorits | KNW-242 | 13/10/08 | 13/10/09 | 8-654-15 |
| 56 | CVCF | NF Electronic | 4420 | 21/03/08 | 21/03/09 | 304935/337980 |
| 57 | Software | ToYo EMI | EP5/RE | N/A | N/A | Ver 2.0.800 |
| 58 | Software | ToYo EMI | EP5/CE | N/A | N/A | Ver 2.0.801 |
| 59 | Software | AUDIX | e3 | N/A | N/A | Ver 3.0 |
| 60 | Software | Agilent | Benchlink | N/A | N/A | A.01.09 021211 |
| 61 | RFI/FIELD Intensity Meter | Kyorits | KNW-2402 | 11/09/08 | 11/09/09 | 4N-170-3 |

# 5. EMISSION DESIGNATOR

**GSM850 (Black Face)**

Emission Designator = 249KGXW

GSM BW = 248.6458 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

**PCS1900 (Black Face)**

Emission Designator = 248KGXW

GSM BW = 248.0033 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

**GSM850 (Silver Face)**

Emission Designator = 246KGXW

GSM BW = 246.0588 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

**PCS1900 (Silver Face)**

Emission Designator = 244KGXW

GSM BW = 244.4562 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

# 6. CONCLUSION

The data collected shows that the **WND TELECOM OFFSHORE S.A.L** Dual band GSM phone **FCC ID: WRLWINDDUO2100** complies with all the requirements of Parts 2.22 and 24 of the FCC rules.