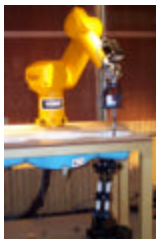
# PCTEST Engineering Laboratory, Inc.


*6660-B Dobbin Road · Columbia, MD 21045 · U.S.A.*
*TEL (410) 290-6652 · FAX (410) 290-6654*
*http://www.pctestlab.com*

## CERTIFICATE OF COMPLIANCE
## FCC Part 24 & 22 Certification

**LG ELECTRONICS, INC.**
**2000 Milbrook Drive**
**Lincolnshire, IL 60069**

**Dates of Tests: February 2-5, 2004**
**Test Report S/N: 22/24.240202051.BEJ**
**Test Site: PCTEST Lab, Columbia MD**

| | |
|---|---|
| **FCC ID** | **BEJL1200** |
| **APPLICANT** | **LG ELECTRONICS, INC.** |

| | |
|---|---|
| **Classification:** | **Licensed Portable Transmitter Held to Ear (PCE)** |
| **FCC Rule Part(s):** | **§24(E), §22H; §2** |
| **EUT Type:** | **Dual-Band GSM Phone** |
| **Model:** | ***L1200*** |
| **Tx Frequency Range:** | **824.20 – 848.80MHz (GSM850) / 1850.20MHz – 1909.80MHz (GSM1900)** |
| **Rx Frequency Range:** | **869.20 – 893.80MHz (GSM850) / 1930.20MHz – 1989.80MHz (GSM1900)** |
| **Max. RF Output Power:** | **1.34 W ERP GSM (31.273 dBm) / 1.99 W EIRP PCS GSM (32.981 dBm)** |
| **Max. SAR Measurement:** | **1.21 W/kg GSM Head SAR; 1.21 W/kg GSM Body SAR;** |
| | **1.23 W/kg PCS GSM Head SAR; 0.845 W/kg PCS GSM Body SAR** |
| **Emission Designator(s):** | **300KGXW (GSM)** |
| **Test Device Serial No.** | **Identical Prototype [S/N: #1]** |

**This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.**

**I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.**

Grant Conditions: Output power listed is ERP for Part 22 and EIRP for Part 24. SAR compliance for body-worn operating configuration is based on a separation distance of 1.5 cm between the back of the unit and the body of the user. End-users must be informed of the body-worn operating configurations for satisfying RF exposure compliance. Belt-clips or holsters may not contain metallic components.

*PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.*

Alfred Cirwithian
Vice President Engineering



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# TABLE OF CONTENTS


ATTACHMENT A: COVER LETTER(S)

ATTACHMENT B: ATTESTATION STATEMENT(S)

ATTACHMENT C: TEST REPORT

| | |
|---|---|
| 1.1 SCOPE | 3 |
| 2.1 INTRODUCTION | 4 |
| 3.1 INSERTS | 5 |
| 4.1 DESCRIPTION OF TESTS | 6-9 |
| 5.1 EFFECTIVE RADIATED POWER OUTPUT | 10 |
| 6.1 EQUIVALENT ISOTROPIC RADIATED POWER | 11 |
| 7.1 RADIATED MEASUREMENTS | 12-17 |
| 8.1 FREQUENCY STABILITY | 18-21 |
| 9.1 PLOTS OF EMISSIONS | 22 |
| 10.1 LIST OF TEST EQUIPMENT | 23 |
| 11.1 SAMPLE CALCULATIONS | 24 |
| 12.1 CONCLUSION | 25 |

ATTACHMENT D: TEST PLOTS

ATTACHMENT E: FCC ID LABEL / LOCATION

ATTACHMENT F: TEST SETUP PHOTOGRAPHS

ATTACHMENT G: EXTERNAL PHOTOGRAPHS

ATTACHMENT H: INTERNAL PHOTOGRAPHS

ATTACHMENT I: BLOCK DIAGRAM(S)

ATTACHMENT J: SCHEMATIC DIAGRAM(S)

ATTACHMENT K: OPERATIONAL / CIRCUIT DESCRIPTION

ATTACHMENT L: PARTS LIST/TUNE UP PROCEDURE

ATTACHMENT M: USER'S MANUAL

ATTACHMENT N: SAR MEASUREMENT REPORT

ATTACHMENT O: SAR TEST DATA

ATTACHMENT P: SAR TEST SETUP PHOTOGRAPHS

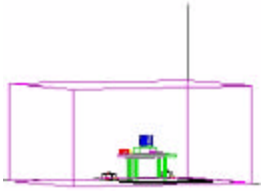
ATTACHMENT Q: DIPOLE VALIDATION

ATTACHMENT R: PROBE CALIBRATION




© 2003 PCTEST ENGINEERING LABORATORY, INC.

# MEASUREMENT REPORT



## 1.1 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 Name:** **LG ELECTRONICS, INC.**
**Address:** **2000 Milbrook Drive**
**Lincolnshire, IL 60069**

- FCC ID: **BEJL1200**
- Quantity: Quantity production is planned
- Emission Designators: 300KGXW (GSM)
- Tx Freq. Range: 824.20 – 848.80 MHz (GSM850)
  1850.20 – 1909.80 MHz (GSM1900)
- Rx Freq. Range: 869.20 – 893.80 MHz (GSM850)
  1930.20 – 1989.80 MHz (GSM1900)
- Max. Power Rating: 1.34 W ERP GSM (31.273 dBm)
  1.99 W EIRP PCS GSM (32.981 dBm)
- FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Dual-Band GSM Phone
- Modulation(s): GSM
- Frequency Tolerance: ± 0.00025% (2.5 ppm)
- FCC Rule Part(s): § 24(E), §22H
- Dates of Tests: February 2-5, 2004
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 22/24.240202051.BEJ



© 2003 PCTEST ENGINEERING LABORATORY, INC.

## 2.1 INTRODUCTION

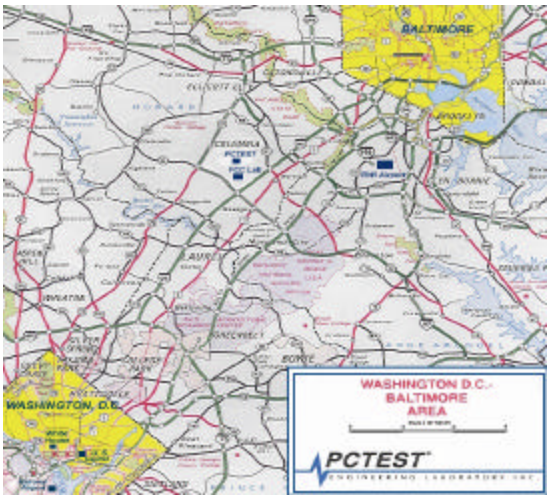



**Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.**

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

### Measurement Procedure

The radiated and spurious measurements were made outdoors at a 3-meter test range (see Figure2). 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 and the level of the signal generator was 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 antenna are taken into consideration.

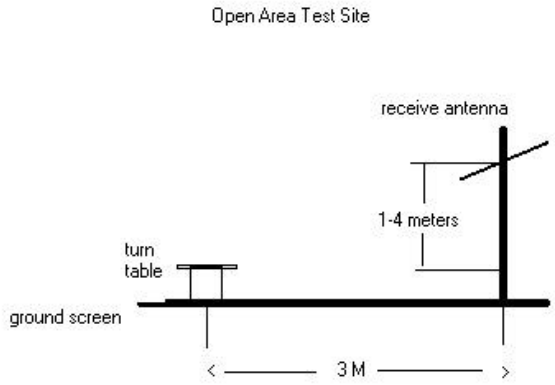



**Figure 2. Diagram of 3-meter outdoor test range**



© 2003 PCTEST ENGINEERING LABORATORY, INC.

## 3.1 INSERTS

### Function of Active Devices (Confidential)

The Function of active devices are shown in Attachment K.

### Block & Schematic Diagrams (Confidential)

The block diagrams are shown in Attachment I, and the schematic diagrams are shown in Attachment J.

### Operating Instructions

The instruction manual is shown in Attachment M.

### Parts List & Tune-Up Procedure (Confidential)

The parts list & tune-up procedure is shown in Attachment L.

### Description of Freq. Stabilization Circuit (Confidential)

The description of frequency stabilization circuit is shown in Attachment K.

### Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppresion Circuits (Confidential)

The description of suppression stabilization circuits is shown in Attachment K.


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 4.1 DESCRIPTION OF TESTS (CONTINUED)

## 4.2 Occupied Bandwidth Emission Limits

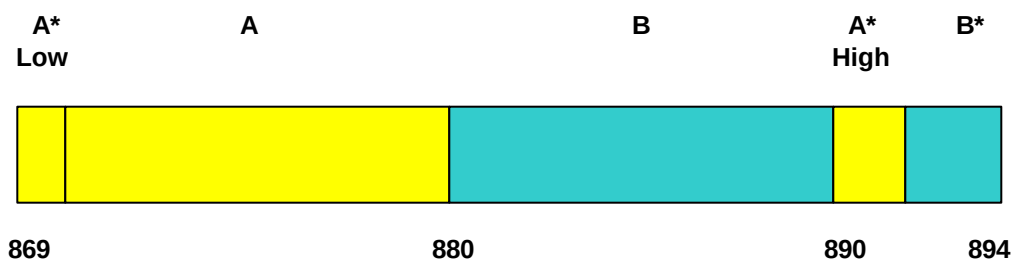
(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz 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 26 dB 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.

(d) 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.

## 4.3 Cellular - Base Frequency Blocks



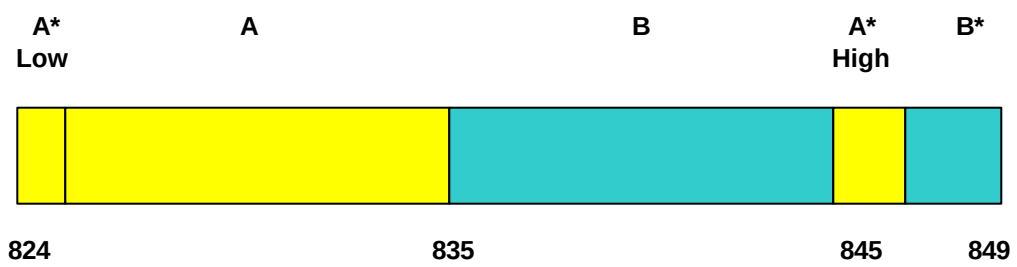

**BLOCK 1: 869 – 880 MHz (A* Low + A)**

**BLOCK 2: 880 – 890 MHz (B)**

**BLOCK 3: 890 – 891.5 MHz (A* High)**

**BLOCK 4: 891.5 – 894 MHz (B*)**

## 4.4 Cellular - Mobile Frequency Blocks




**BLOCK 1: 824 – 835 MHz (A* Low + A)**

**BLOCK 2: 835 – 845 MHz (B)**

**BLOCK 3: 845 – 846.5 MHz (A* High)**

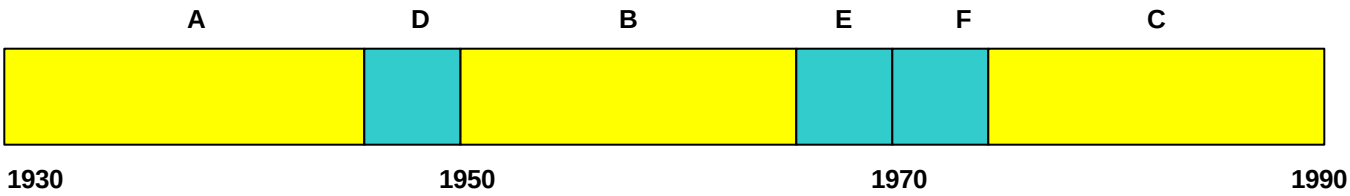
**BLOCK 4: 846.5 – 849 MHz (B*)**



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 4.1 DESCRIPTION OF TESTS (CONTINUED)

## 4.5 PCS - Base Frequency Blocks




BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 2: 1945 – 1950 MHz (D)

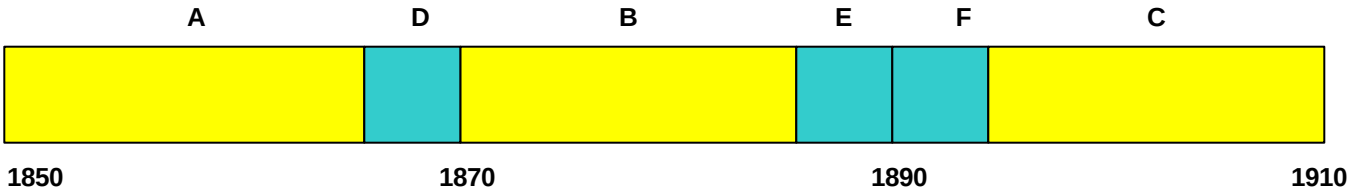
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 6: 1975 – 1990 MHz (C)

## 4.6 PCS - Mobile Frequency Blocks




BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 6: 1895 – 1910 MHz (C)



© 2003 PCTEST ENGINEERING LABORATORY, INC.

## 4.7 Spurious and Harmonic Emissions at Antenna Terminal

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 GHz. The transmitter is modulated with a 2500Hz tone at a level of 16dB greater than that required to provided 50% modulation.

At the input terminals of the spectrum analyzer, an isolator (RF circulator with on port terminated with 50 ohms) and an 870 MHz to 890 MHz bandpass filter is connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The rejection of the bandpass filter to signals in the 825 – 845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than –90dBm. Calibration of the test receiver is performed in the 870 – 890 MHz range to insure accuracy to allow variation in the bandpass filter insertion loss to be calibrated.

## 4.8 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and a high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter (signals below 1.6 GHz) is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

## 4.9 Radiation Spurious and Harmonic Emissions

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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 5.0 Frequency Stability/Temperature Variation.

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +60°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 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 (±2.5 ppm) of the center frequency.*

**Time Period and Procedure:**

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (22°C to 25°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 of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are 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 measurements are at 10 intervals 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 re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

**NOTE: The EUT is tested down to the battery endpoint.**


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 5.1 Test Data

## 5.2 Effective Radiated Power Output

A. POWER: **High (GSM 850 Mode)**

| Freq. Tuned (MHz) | REF. LEVEL (dBm) | POL (H/V) | ERP (W) | ERP (dBm) | BATTERY |
|---|---|---|---|---|---|
| 824.20 | -10.000 | H | 1.341 | 31.273 | Standard |
| 836.60 | -10.600 | H | 1.211 | 30.833 | Standard |
| 848.80 | -10.800 | H | 1.198 | 30.783 | Standard |

Note: Standard batteries are the only option for this phone

**NOTES:**

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 6.1 Test Data

## 6.2 Equivalent Isotropic Radiated Power (E.I.R.P.)

**Radiated measurements at 3 meters**

**Supply Voltage: 3.7 VDC**

**Modulation: GSM PCS**

| FREQ. (MHz) | REF. LEVEL (dBm) | POL (H/V) | Azimuth (o angle) | EIRP (dBm) | EIRP (W) | Battery |
|---|---|---|---|---|---|---|
| 1850.80 | -10.100 | H | 60 | 32.981 | 1.991 | Standard |
| 1880.00 | -10.700 | H | 60 | 32.551 | 1.804 | Standard |
| 1909.80 | -10.800 | H | 60 | 32.621 | 1.833 | Standard |

Note: Standard batteries are the only option for this phone

**NOTES:**

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.2 GSM 850 Mhz. Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.20 MHz
CHANNEL: 128 (Low)
MEASURED OUTPUT POWER: 31.273 dBm = 1.341 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 44.27 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1648.40 | -41.48 | 6.10 | -35.38 | H | 66.7 |
| 2472.60 | -54.28 | 6.70 | -47.58 | H | 78.9 |
| 3296.80 | -73.58 | 6.80 | -66.78 | H | 98.1 |
| 4121.00 | -77.68 | 6.50 | -71.18 | H | 102.5 |
| 4945.20 | -84.38 | 7.00 | -77.38 | H | 108.7 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.3 GSM 850 Mhz. Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.60 MHz
CHANNEL: 190 (Mid)
MEASURED OUTPUT POWER: 31.273 dBm = 1.341 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 44.27 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1673.20 | -42.68 | 6.10 | -36.58 | H | 67.9 |
| 2509.80 | -62.08 | 6.70 | -55.38 | H | 86.7 |
| 3346.40 | -76.48 | 6.80 | -69.68 | H | 101.0 |
| 4183.00 | -85.78 | 6.50 | -79.28 | H | 110.6 |
| 5019.60 | -83.78 | 7.00 | -76.78 | H | 108.1 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.4 GSM 850 Mhz. Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.80 MHz
CHANNEL: 251 (High)
MEASURED OUTPUT POWER: 31.273 dBm = 1.341 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 44.27 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 1697.60 | -48.98 | 6.10 | -42.88 | H | 74.2 |
| 2546.40 | -64.48 | 6.70 | -57.78 | H | 89.1 |
| 3395.20 | -76.08 | 6.80 | -69.28 | H | 100.6 |
| 4244.00 | -85.68 | 6.50 | -79.18 | H | 110.5 |
| 5092.80 | -83.98 | 7.00 | -76.98 | H | 108.3 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.5 GSM PCS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1850.20 MHz
CHANNEL: 512 (Low)
MEASURED OUTPUT POWER: 32.981 dBm = 1.991 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 45.99 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3700.40 | -37.83 | 8.70 | -29.13 | H | 62.1 |
| 5550.60 | -64.23 | 9.70 | -54.53 | H | 87.5 |
| 7400.80 | -66.43 | 9.90 | -56.53 | H | 89.5 |
| 9251.00 | -77.43 | 11.40 | -66.03 | H | 99.0 |
| 11101.20 | -77.33 | 12.10 | -65.23 | H | 98.2 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.6 GSM PCS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz
CHANNEL: 661 (Mid)
MEASURED OUTPUT POWER: 32.981 dBm = 1.991 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 45.99 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3760.00 | -44.63 | 8.70 | -35.93 | H | 68.9 |
| 5640.00 | -57.33 | 9.70 | -47.63 | H | 80.6 |
| 7520.00 | -68.73 | 9.90 | -58.83 | H | 91.8 |
| 9400.00 | -77.23 | 11.40 | -65.83 | H | 98.8 |
| 11280.00 | -77.13 | 12.10 | -65.03 | H | 98.0 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 7.1 Test Data (Continued)

## 7.7 GSM PCS Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1909.80 MHz
CHANNEL: 810 (High)
MEASURED OUTPUT POWER: 32.981 dBm = 1.991 W
MODULATION SIGNAL: GSM (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 45.99 dBc

| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|---|---|---|---|---|---|
| 3819.60 | -41.63 | 8.70 | -32.93 | H | 65.9 |
| 5729.40 | -53.13 | 9.70 | -43.43 | H | 76.4 |
| 7639.20 | -69.13 | 9.90 | -59.23 | H | 92.2 |
| 9549.00 | -76.93 | 11.40 | -65.53 | H | 98.5 |
| 11458.80 | -76.93 | 12.10 | -64.83 | H | 97.8 |

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

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. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. 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.


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 8.1 Test Data

## 8.2 FREQUENCY STABILITY (GSM 850 MHz)

OPERATING FREQUENCY: 836,520,002 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 3.7 VDC

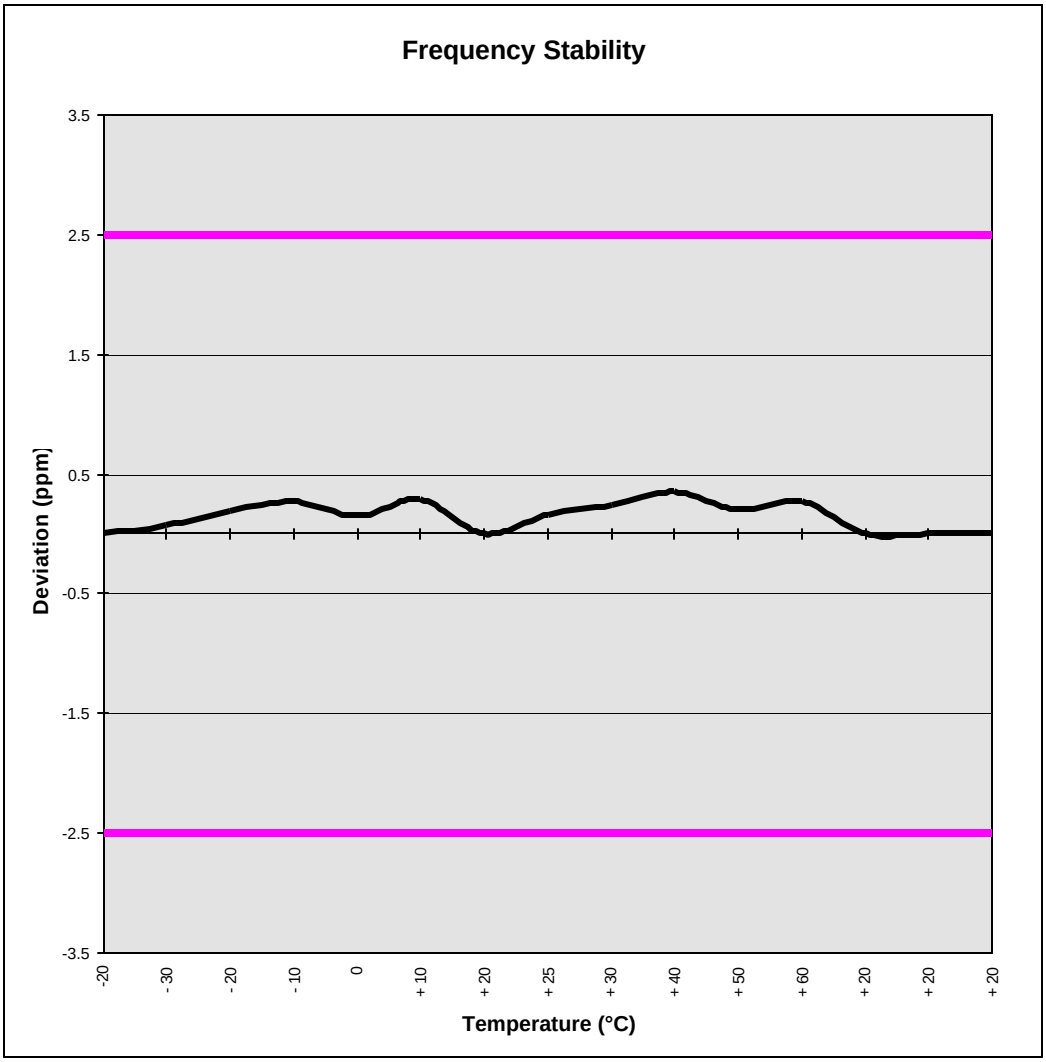
DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (ºC) | FREQ. (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100 % | 3.70 | + 20 (Ref) | 836,520,002 | 0.000000 |
| 100 % | | - 30 | 836,519,943 | 0.000007 |
| 100 % | | - 20 | 836,519,843 | 0.000019 |
| 100 % | | - 10 | 836,519,776 | 0.000027 |
| 100 % | | 0 | 836,519,877 | 0.000015 |
| 100 % | | + 10 | 836,519,759 | 0.000029 |
| 100 % | | + 20 | 836,520,002 | 0.000000 |
| 100 % | | + 25 | 836,519,868 | 0.000016 |
| 100 % | | + 30 | 836,519,801 | 0.000024 |
| 100 % | | + 40 | 836,519,709 | 0.000035 |
| 100 % | | + 50 | 836,519,835 | 0.000020 |
| 100 % | | + 60 | 836,519,776 | 0.000027 |
| 85 % | 3.15 | + 20 | 836,520,002 | 0.000000 |
| 115 % | 4.26 | + 20 | 836,520,002 | 0.000000 |
| BATT. ENDPOINT | 2.98 | + 20 | 836,520,002 | 0.000000 |


© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 8.1 Test Data (Continued)

## 8.3 FREQUENCY STABILITY (GSM 850 MHz)






© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 8.1 Test Data (Continued)

## 8.4 FREQUENCY STABILITY (GSM PCS)

OPERATING FREQUENCY: 1,880,000,003 Hz

CHANNEL: 661

REFERENCE VOLTAGE: 3.7 VAC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

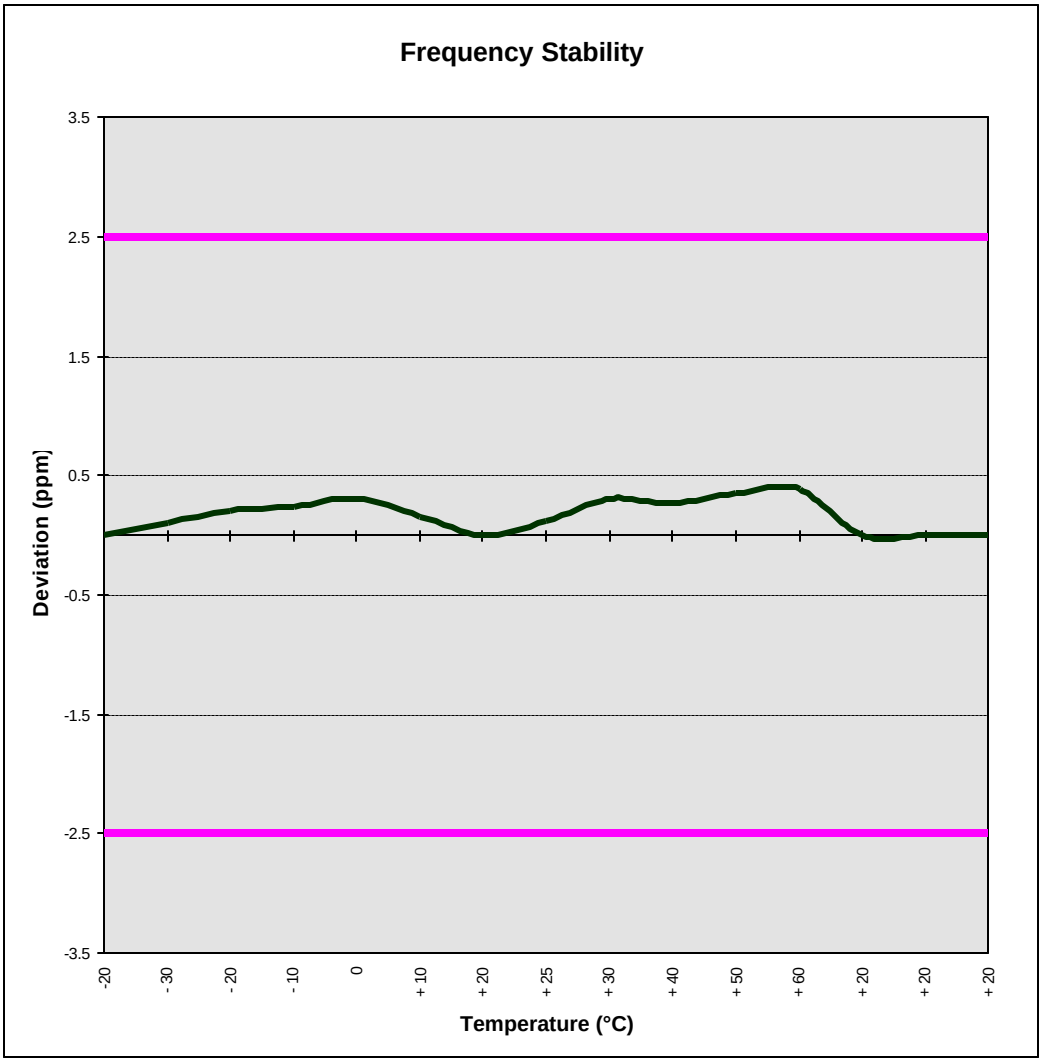
| VOLTAGE (%) | POWER (VDC) | TEMP (ºC) | FREQ. (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100 % | 3.70 | + 20 (Ref) | 1,880,000,003 | 0.000000 |
| 100 % | | - 30 | 1,879,999,796 | 0.000011 |
| 100 % | | - 20 | 1,879,999,608 | 0.000021 |
| 100 % | | - 10 | 1,879,999,552 | 0.000024 |
| 100 % | | 0 | 1,879,999,420 | 0.000031 |
| 100 % | | + 10 | 1,879,999,702 | 0.000016 |
| 100 % | | + 20 | 1,880,000,003 | 0.000000 |
| 100 % | | + 25 | 1,879,999,777 | 0.000012 |
| 100 % | | + 30 | 1,879,999,420 | 0.000031 |
| 100 % | | + 40 | 1,879,999,495 | 0.000027 |
| 100 % | | + 50 | 1,879,999,345 | 0.000035 |
| 100 % | | + 60 | 1,879,999,270 | 0.000039 |
| 85 % | 3.17 | + 20 | 1,880,000,003 | 0.000000 |
| 115 % | 4.26 | + 20 | 1,880,000,003 | 0.000000 |
| BATT. ENDPOINT | 2.95 | + 20 | 1,880,000,003 | 0.000000 |



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 8.1 Test Data (Continued)

## 8.5 FREQUENCY STABILITY (GSM PCS)






© 2003 PCTEST ENGINEERING LABORATORY, INC.

## 9.1 PLOT(S) OF EMISSIONS

**(SEE ATTACHMENT D)**



© 2003 PCTEST ENGINEERING LABORATORY, INC.

## 10.1 TEST EQUIPMENT

| Type | Model | Cal. Due Date | S/N |
|---|---|---|---|
| Microwave Spectrum Analyzer | 8566B (100Hz-22GHz) HP | 08/15/04 | 3638A08713 |
| Microwave Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 04/17/04 | 2542A11898 |
| Spectrum Analyzer/Tracking Gen. | HP 8591A (100Hz-1.8GHz) | 08/10/04 | 3144A02458 |
| Signal Generator* | HP 8640B (500Hz-1GHz) | 06/03/04 | 2232A19558 |
| Signal Generator* | HP 8640B (500Hz-1GHz) | 06/03/04 | 1851A09816 |
| Signal Generator* | Rohde & Schwarz (0.1-1000MHz) | 09/11/04 | 894215/012 |
| Ailtech/Eaton Receiver | NM 37/57A-SL (30-1000MHz) | 04/12/04 | 0792-032 |
| Ailtech/Eaton Receiver | NM 37/57A (30-1000MHz) | 03/11/04 | 0805-03334 |
| Ailtech/Eaton Receiver | NM 17/27A (0.1-32MHz) | 09/17/04 | 0608-03241 |
| Quasi-Peak Adapter | HP 85650A | 08/15/04 | 2043A00301 |
| Ailtech/Eaton Adapter | CCA-7 CISPR/ANSI QP Adapter | 03/11/04 | 0194-04082 |
| Gigatronics Universal Power Meter | 8657A | | 1835256 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | | 1833460 |
| Signal Generator | HP 8648D (9kHz-4GHz) | | 3613A00315 |
| Amplifier Research | 5S1G4 (5W, 800MHz-4.2GHz) | | 22322 |
| Network Analyzer | HP 8753E (30kHz-3GHz) | | JP38020182 |
| Audio Analyzer | HP 8903B | | 3011A09025 |
| Modulation Analyzer | HP 8901A | | 2432A03467 |
| Power Meter | HP 437B | | 3125U24437 |
| Power Sensor | HP 8482H (30µW-3W) | | 2237A02084 |
| Harmonic/Flicker | Test System HP 6841A (IEC 555-2/3) | | 3531A00115 |
| Broadband Amplifier (2) | HP 8447D | | 1145A00470, 1937A03348 |
| Broadband Amplifier | HP 8447F | | 2443A03784 |
| Horn Antenna | EMCO Model 3115 (1-18GHz) | | 9704-5182 |
| Horn Antenna | EMCO Model 3115 (1-18GHz) | | 9205-3874 |
| Horn Antenna | EMCO Model 3116 (18-40GHz) | | 9203-2178 |
| Biconical Antenna (4) | Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design | | 1295, 1332, 0355 |
| Log-Spiral Antenna (3) | Ailtech/Eaton 93490-1 | | 0608, 1103, 1104 |
| Roberts Dipoles | Compliance Design (1 set) | | |
| Ailtech Dipoles | DM-105A (1 set) | | 33448-111 |
| EMCO LISN (6) | 3816/2 | | 1079 |
| Microwave Preamplifier 40dB | Gain HP 83017A (0.5-26.5GHz) | | 3123A00181 |
| Microwave Cables | MicroCoax (1.0-26.5GHz) | | |
| Ailtech/Eaton Receiver | NM37/57A-SL | | 0792-03271 |
| Spectrum Analyzer | HP 8594A | | 3051A00187 |
| Spectrum Analyzer (2) | HP 8591A | | 3034A01395, 3108A02053 |
| Microwave Survey Meter | Holaday Model 1501 (2.450GHz) | | 80931 |
| Digital Thermometer | Extech Instruments 421305 | | 426966 |
| Attenuator | HP 8495A (0-70dB) DC-4GHz | | |
| Bi-Directional Coax Coupler | Narda 3020A (50-1000MHz) | | |
| Shielded Screen Room | RF Lindgren Model 26-2/2-0 | | 6710 (PCT270) |
| Shielded Semi-Anechoic Chamber | Ray Proof Model S81 | | R2437 (PCT278) |
| Enviromental Chamber | Associated Systems Model 1025 (Temperature/Humidity) | | PCT285 |

* Calibration traceable to the National Institute of Standards and Technology (NIST).



© 2003 PCTEST ENGINEERING LABORATORY, INC.

# 11.1 SAMPLE CALCULATIONS

## A. Emission Designator

**Emission Designator = 1M25F9W**

GSM BW = 1.25 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99.75% power bandwidth)

## B. Spurious Radiated Emission - PCS Band

**Example: Channel 25 PCS Mode 2nd Harmonic (3702.50 MHz)**

The receive analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3702.50 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80) = 50.3 dBc

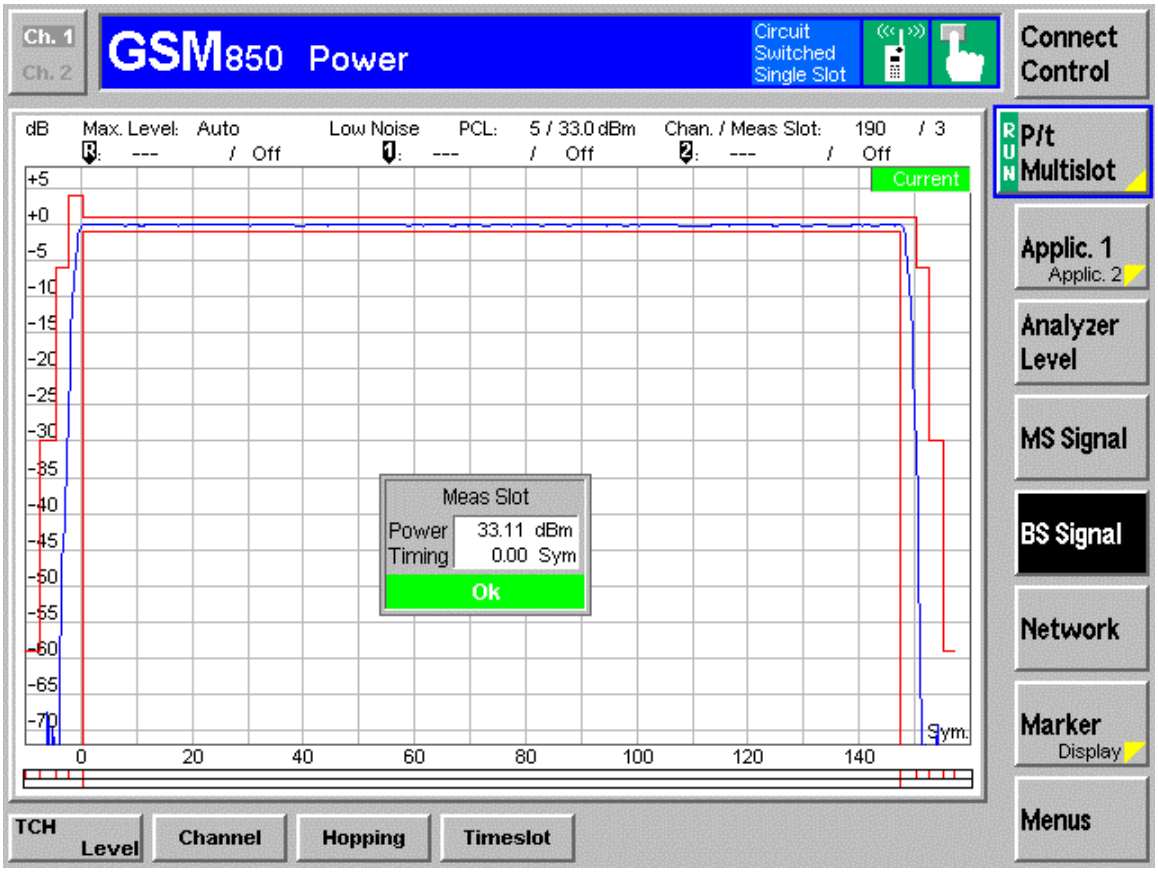

© 2003 PCTEST ENGINEERING LABORATORY, INC.

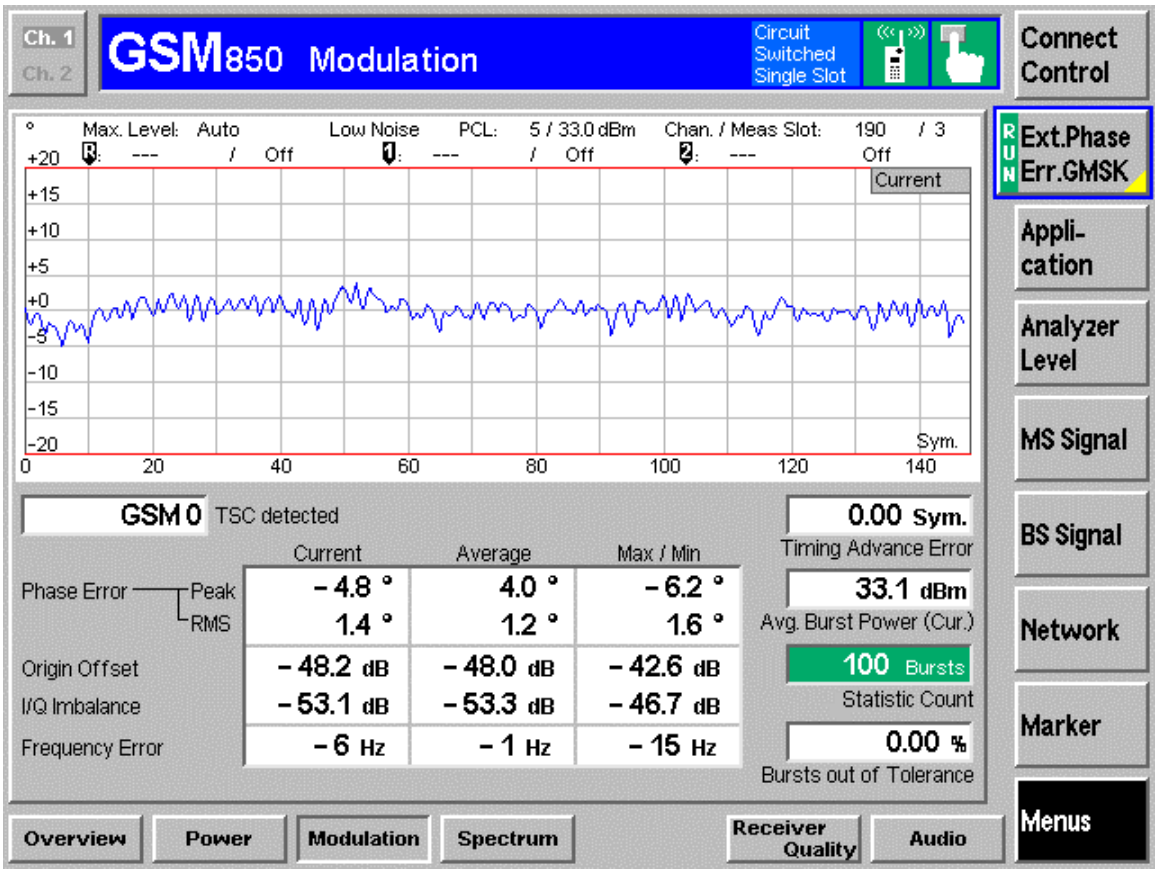
## 12.1 CONCLUSION

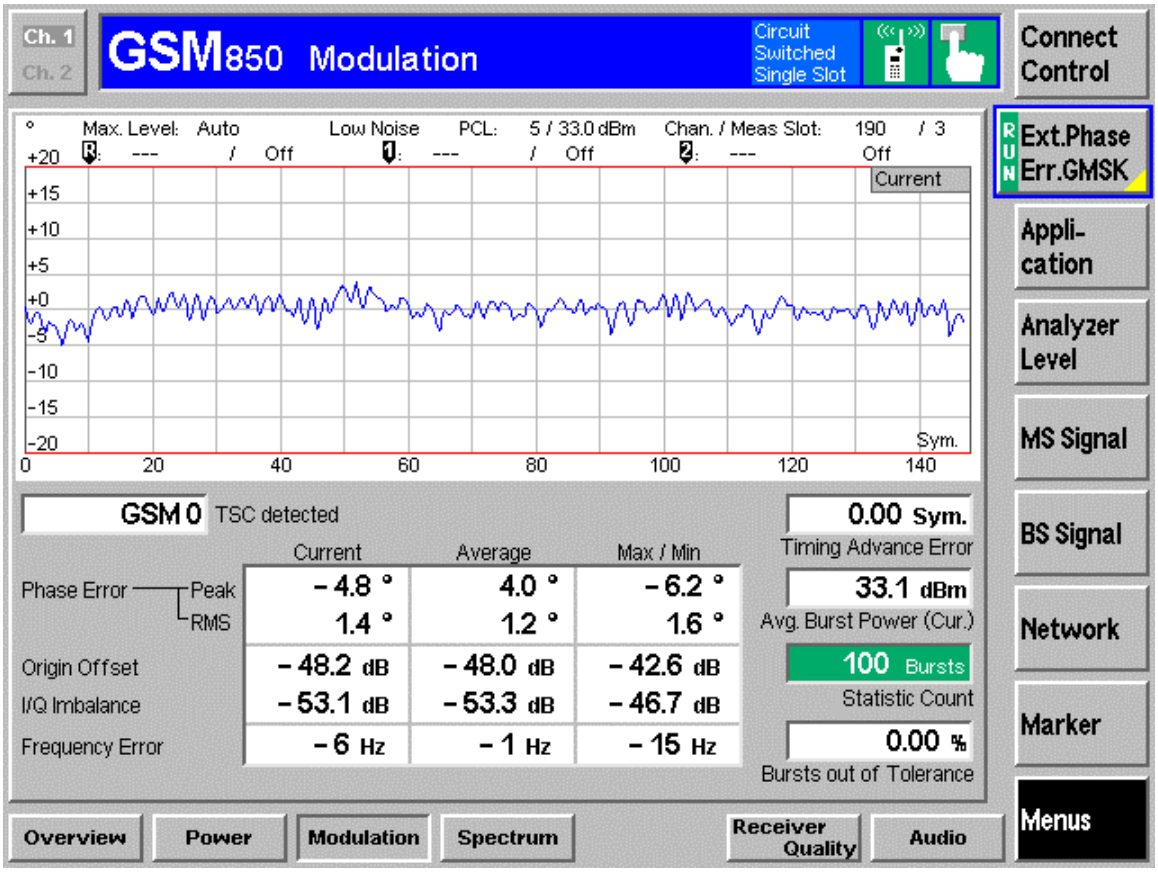
The data collected shows that the **LG ELECTRONICS Dual-Band GSM Phone FCC ID: BEJL1200** complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

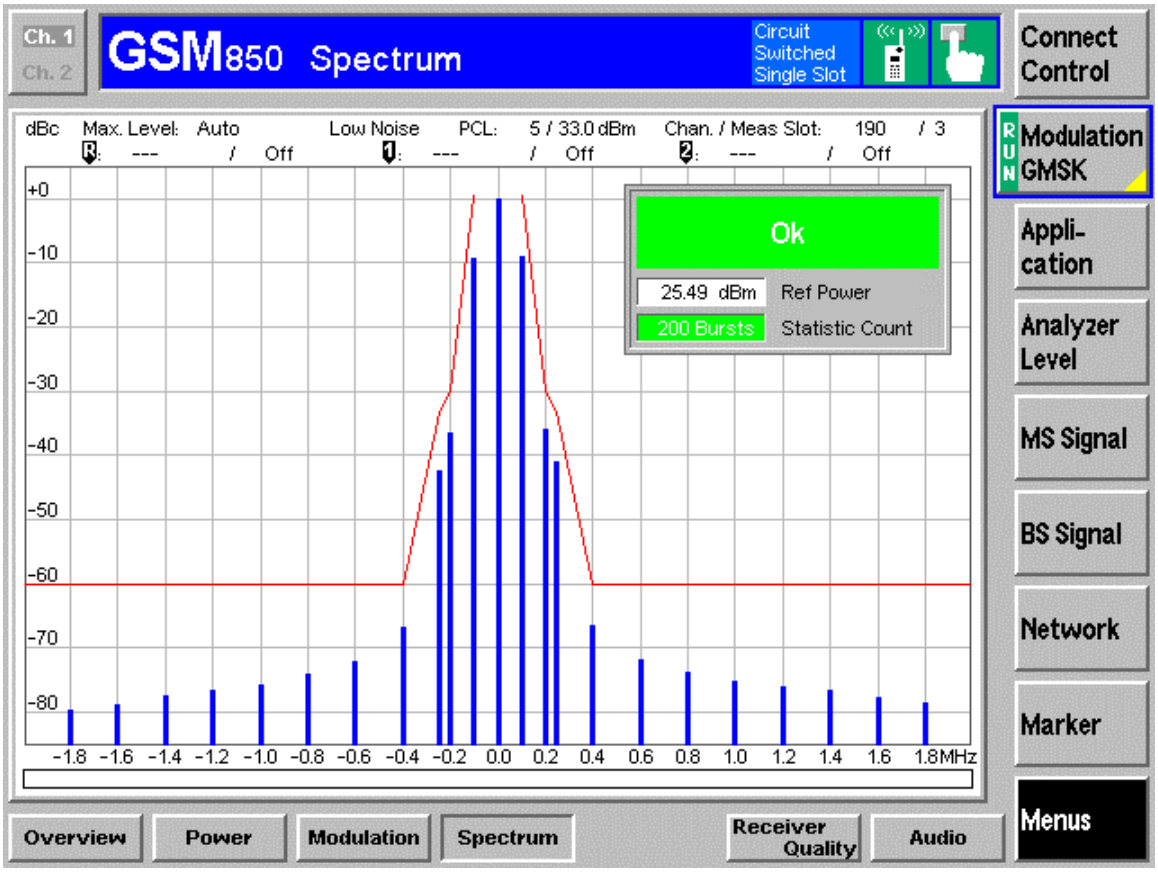

© 2003 PCTEST ENGINEERING LABORATORY, INC.

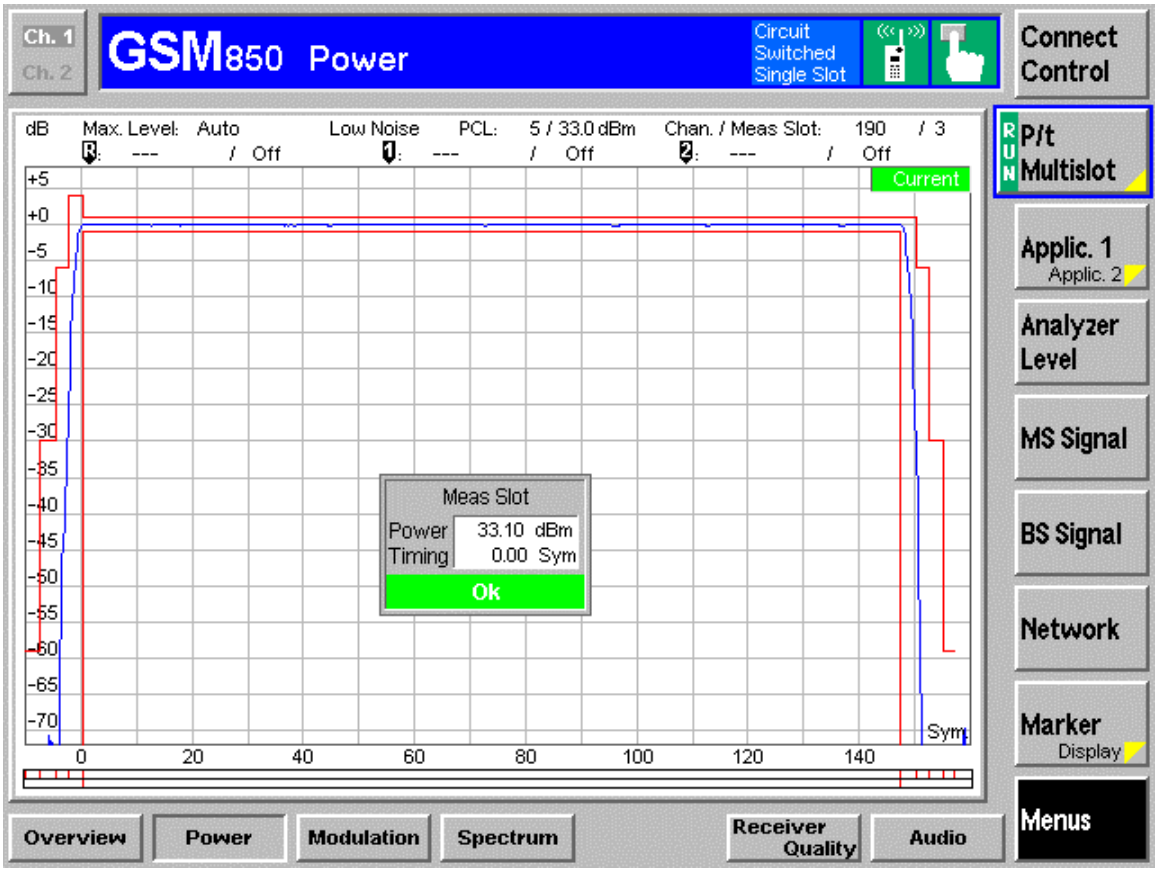
# APPENDIX A: TEST DATA

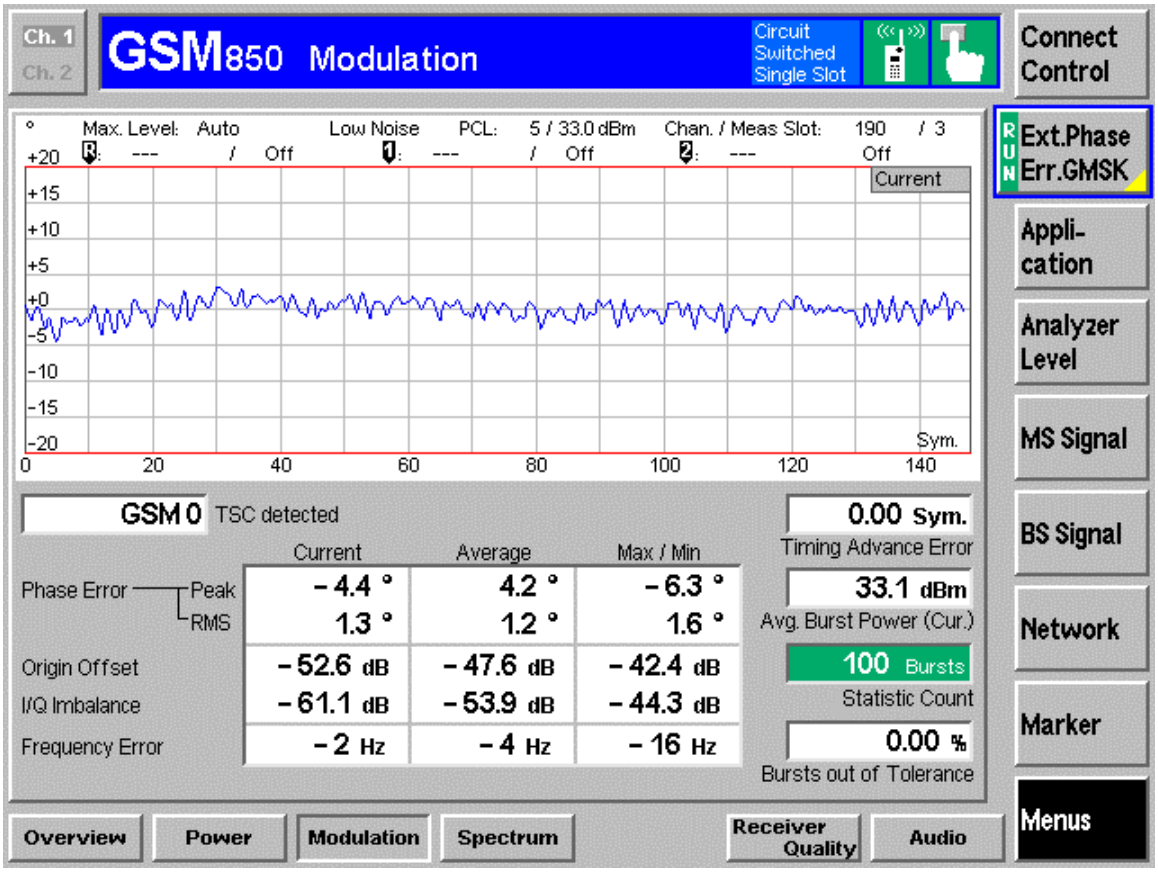

Ch. 1
Ch. 2
GSM850 Power
Circuit Switched Single Slot
Connect Control
dB
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 190 / 3
Off
Current
Meas Slot
Power 33.11 dBm
Timing 0.00 Sym
Ok
Sym.
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Marker
Display
Menus
TCH Level
Channel
Hopping
Timeslot

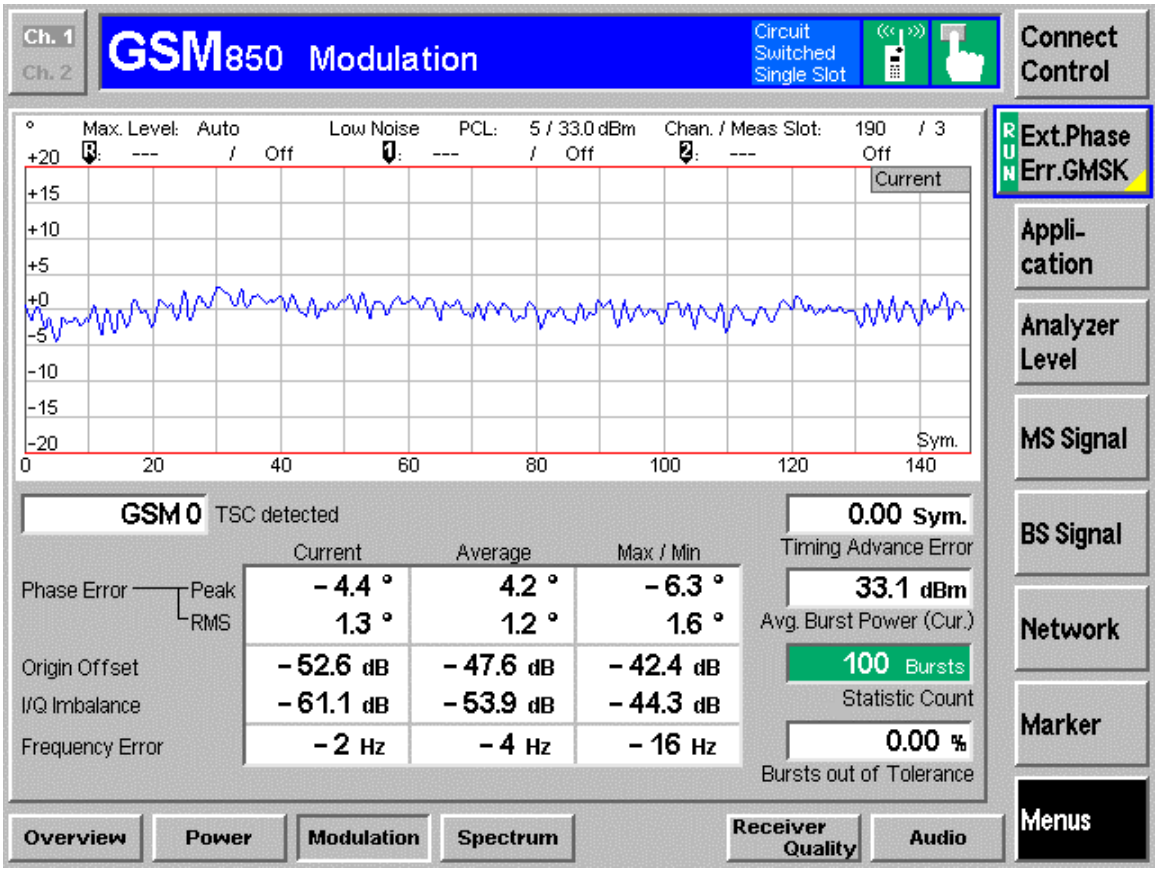

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 190 / 3
Off
Current
Sym.
GSM 0 TSC detected
Current Average Max / Min
Phase Error Peak -4.8 ° 4.0 ° -6.2 °
RMS 1.4 ° 1.2 ° 1.6 °
Origin Offset -48.2 dB -48.0 dB -42.6 dB
I/Q Imbalance -53.1 dB -53.3 dB -46.7 dB
Frequency Error -6 Hz -1 Hz -15 Hz
0.00 Sym.
Timing Advance Error
33.1 dBm
Avg. Burst Power (Cur.)
100 Bursts
Statistic Count
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

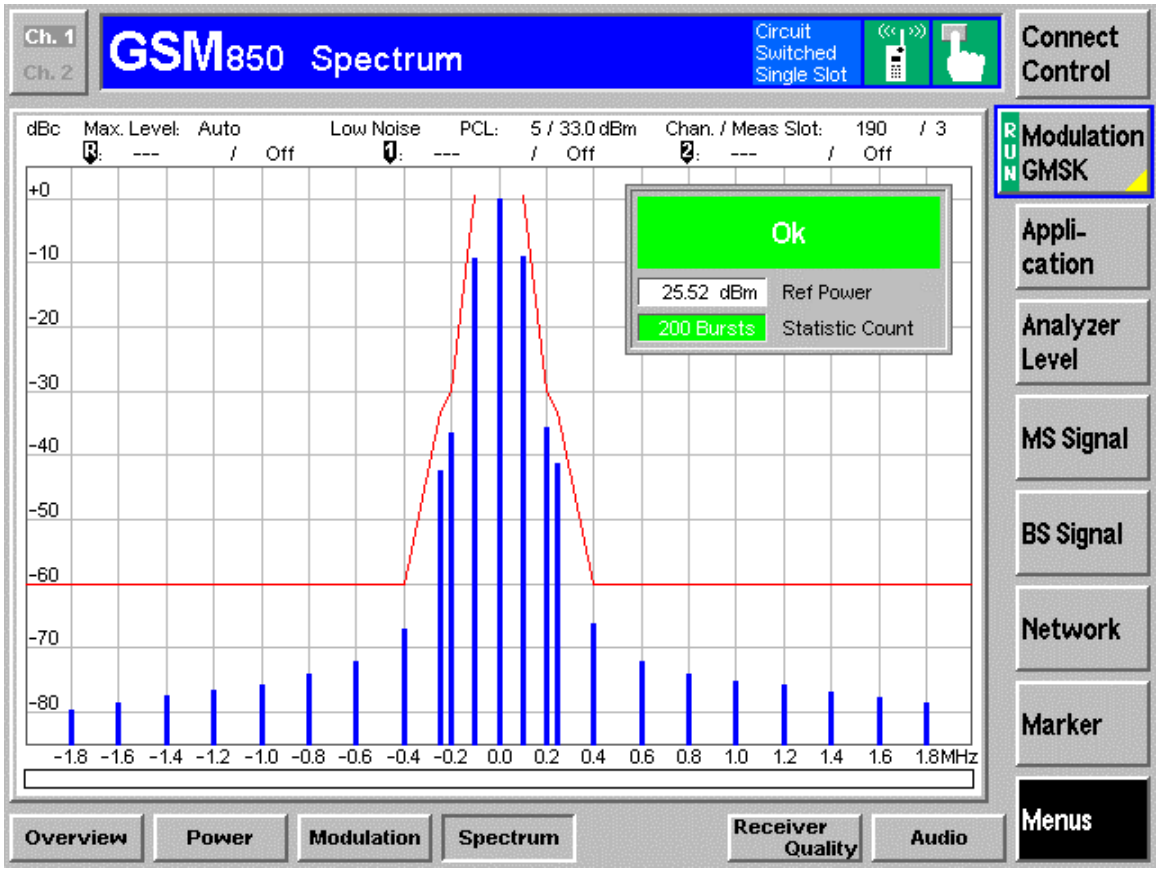

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 190 / 3
Off
Current
Sym.
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
GSM 0 TSC detected
Current
Average
Max / Min
Phase Error
Peak
RMS
-4.8 °
4.0 °
-6.2 °
1.4 °
1.2 °
1.6 °
Origin Offset
-48.2 dB
-48.0 dB
-42.6 dB
I/Q Imbalance
-53.1 dB
-53.3 dB
-46.7 dB
Frequency Error
-6 Hz
-1 Hz
-15 Hz
0.00 Sym.
Timing Advance Error
33.1 dBm
Avg. Burst Power (Cur.)
100 Bursts
Statistic Count
0.00 %
Bursts out of Tolerance
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

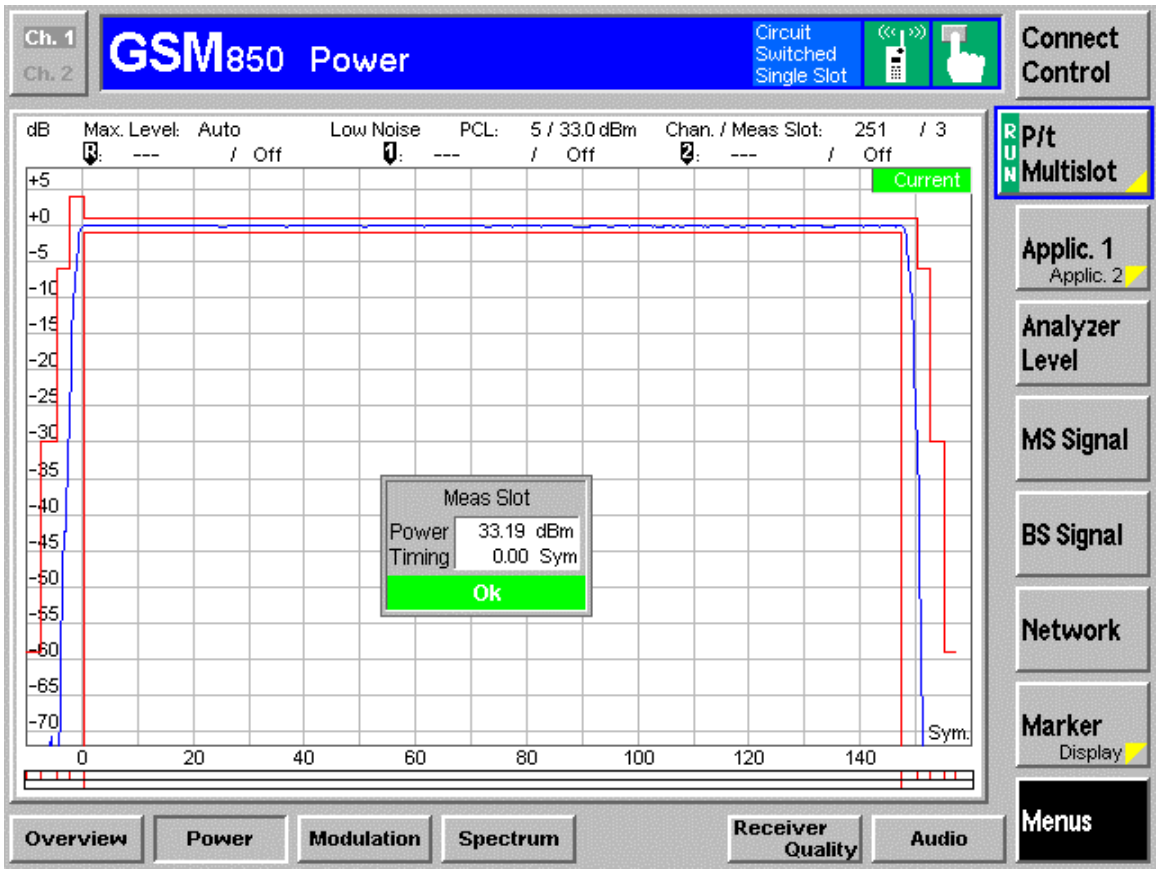

Ch. 1
Ch. 2
GSM850 Spectrum
Circuit Switched Single Slot
Connect Control
dBc Max. Level: Auto Low Noise PCL: 5 / 33.0 dBm Chan. / Meas Slot: 190 / 3
Ok
25.49 dBm Ref Power
200 Bursts Statistic Count
Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

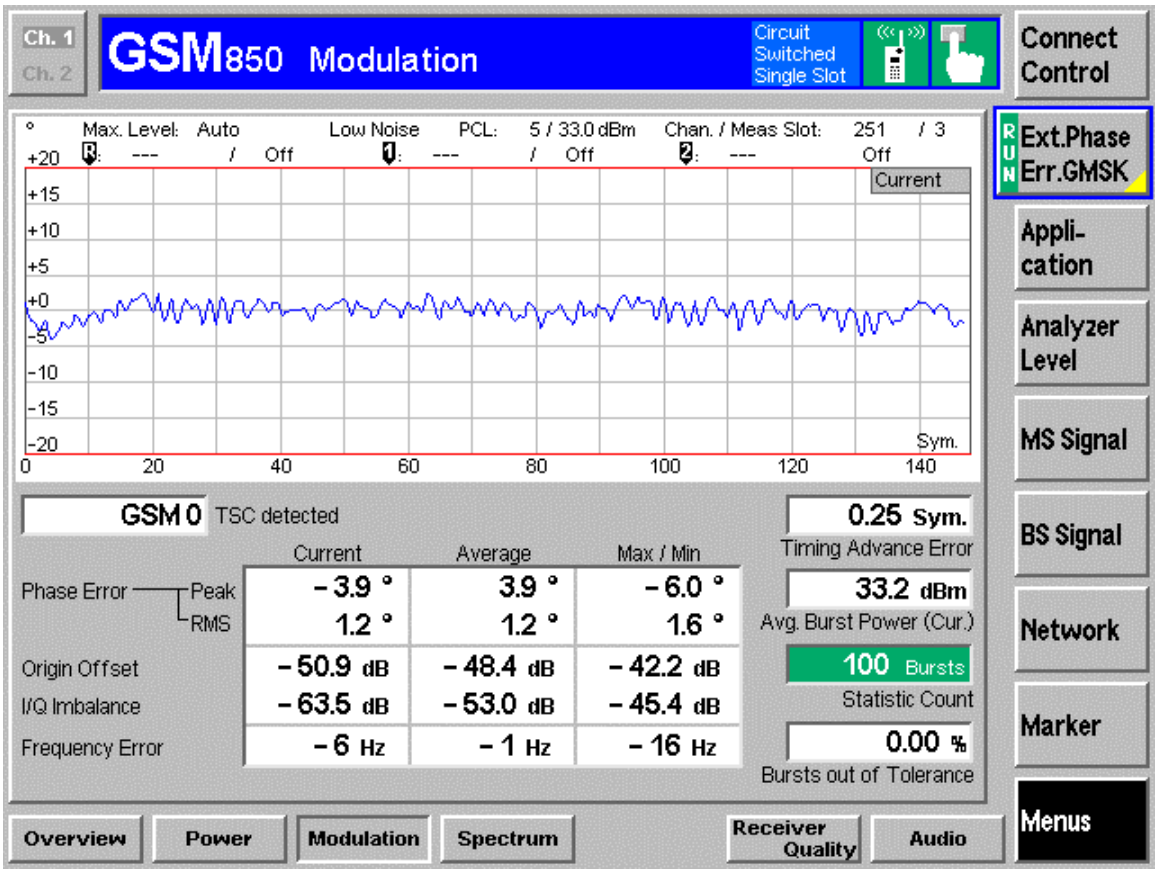

Ch. 1
Ch. 2
GSM850 Power
Circuit Switched Single Slot
Connect Control
dB Max. Level: Auto Low Noise PCL: 5 / 33.0 dBm Chan. / Meas Slot: 190 / 3
Current
Meas Slot
Power 33.10 dBm
Timing 0.00 Sym
Ok
Sym
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Marker Display
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

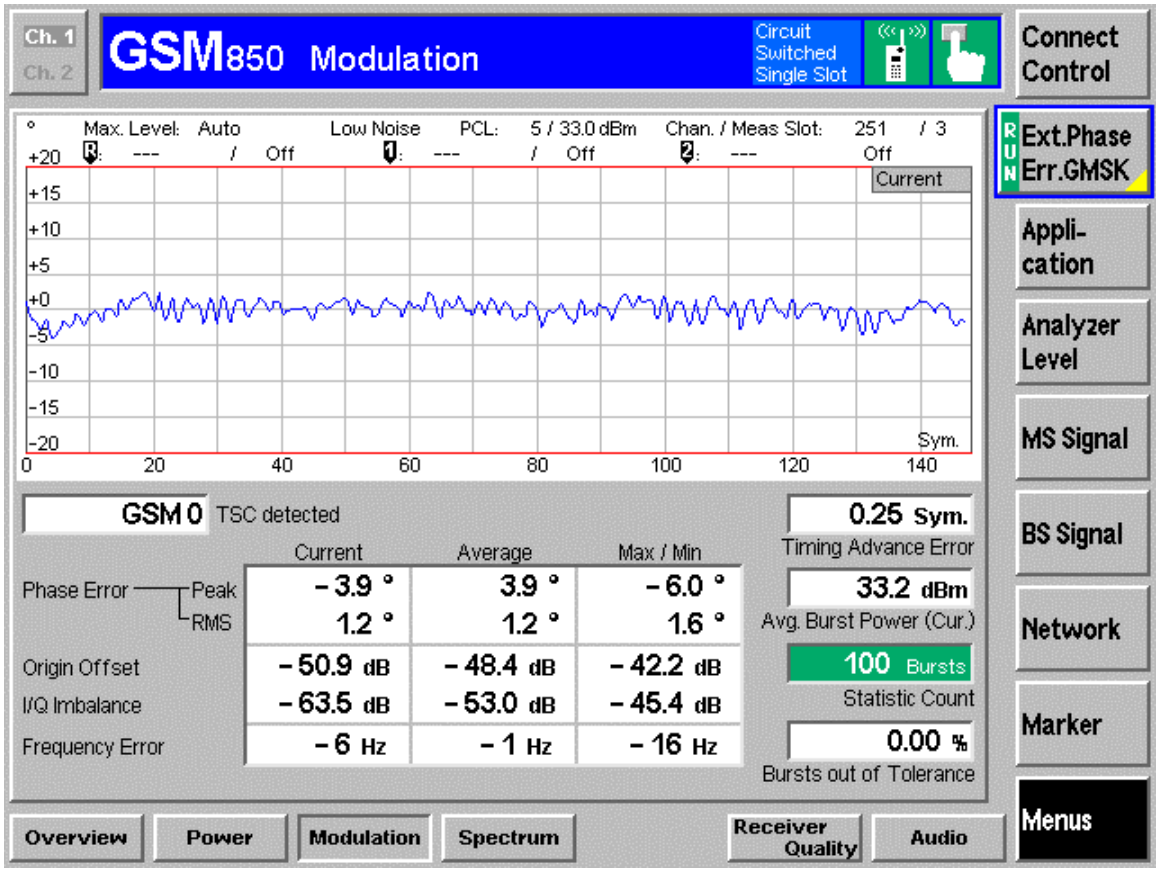

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 190 / 3
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current Average Max / Min
Phase Error Peak -4.4 ° 4.2 ° -6.3 °
RMS 1.3 ° 1.2 ° 1.6 °
33.1 dBm
Avg. Burst Power (Cur.)
Origin Offset -52.6 dB -47.6 dB -42.4 dB
I/Q Imbalance -61.1 dB -53.9 dB -44.3 dB
100 Bursts
Statistic Count
Frequency Error -2 Hz -4 Hz -16 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

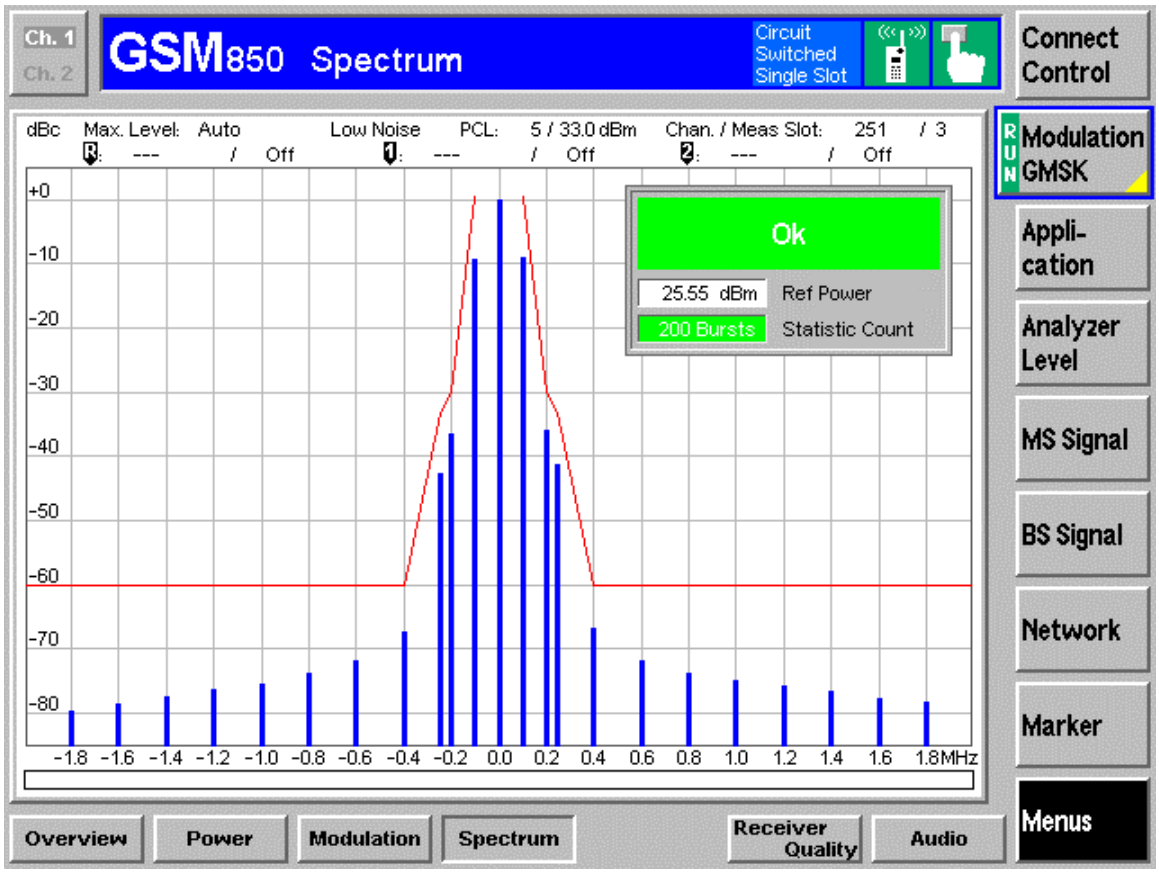

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 190 / 3
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current Average Max / Min
Phase Error Peak -4.4 ° 4.2 ° -6.3 °
RMS 1.3 ° 1.2 ° 1.6 °
33.1 dBm
Avg. Burst Power (Cur.)
Origin Offset -52.6 dB -47.6 dB -42.4 dB
I/Q Imbalance -61.1 dB -53.9 dB -44.3 dB
100 Bursts
Statistic Count
Frequency Error -2 Hz -4 Hz -16 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

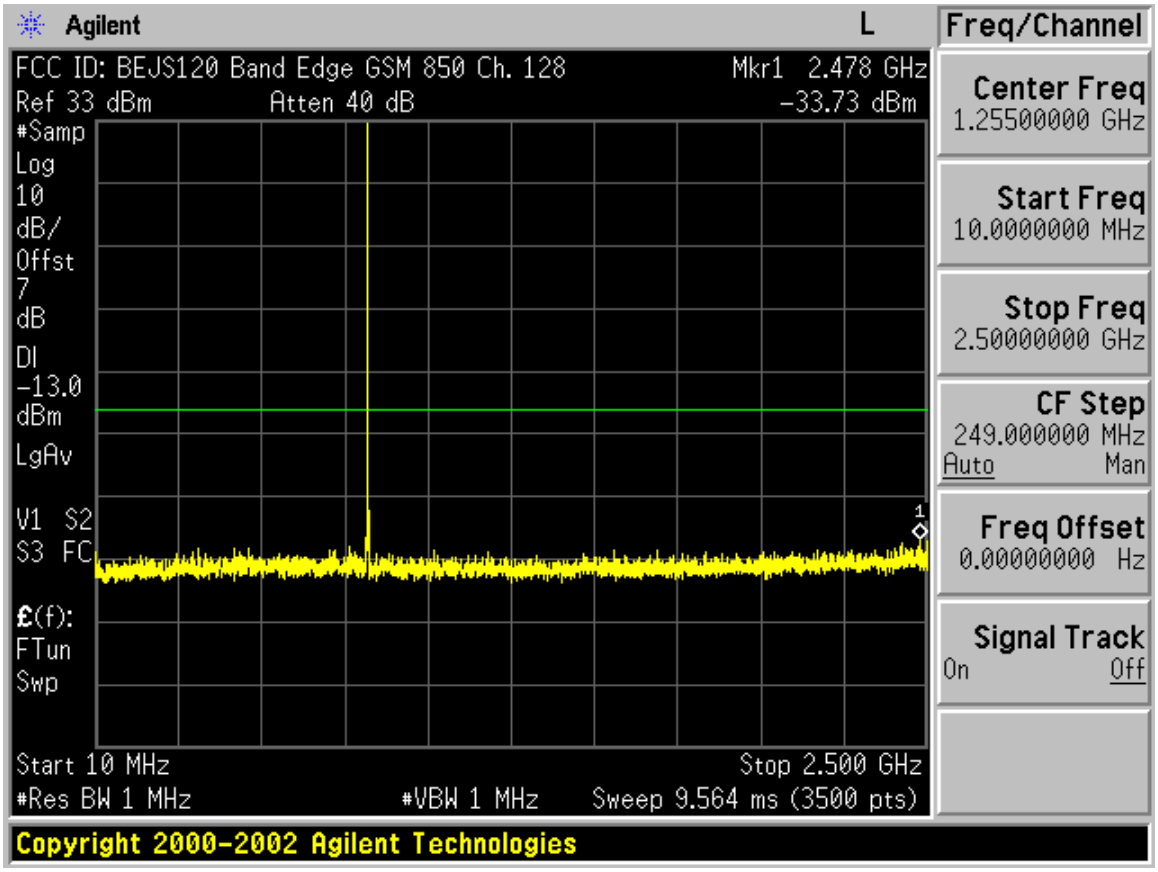

Ch. 1
Ch. 2
GSM850 Spectrum
Circuit Switched Single Slot
Connect Control
dBc Max. Level: Auto Low Noise PCL: 5 / 33.0 dBm Chan. / Meas Slot: 190 / 3
Ok
25.52 dBm Ref Power
200 Bursts Statistic Count
Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

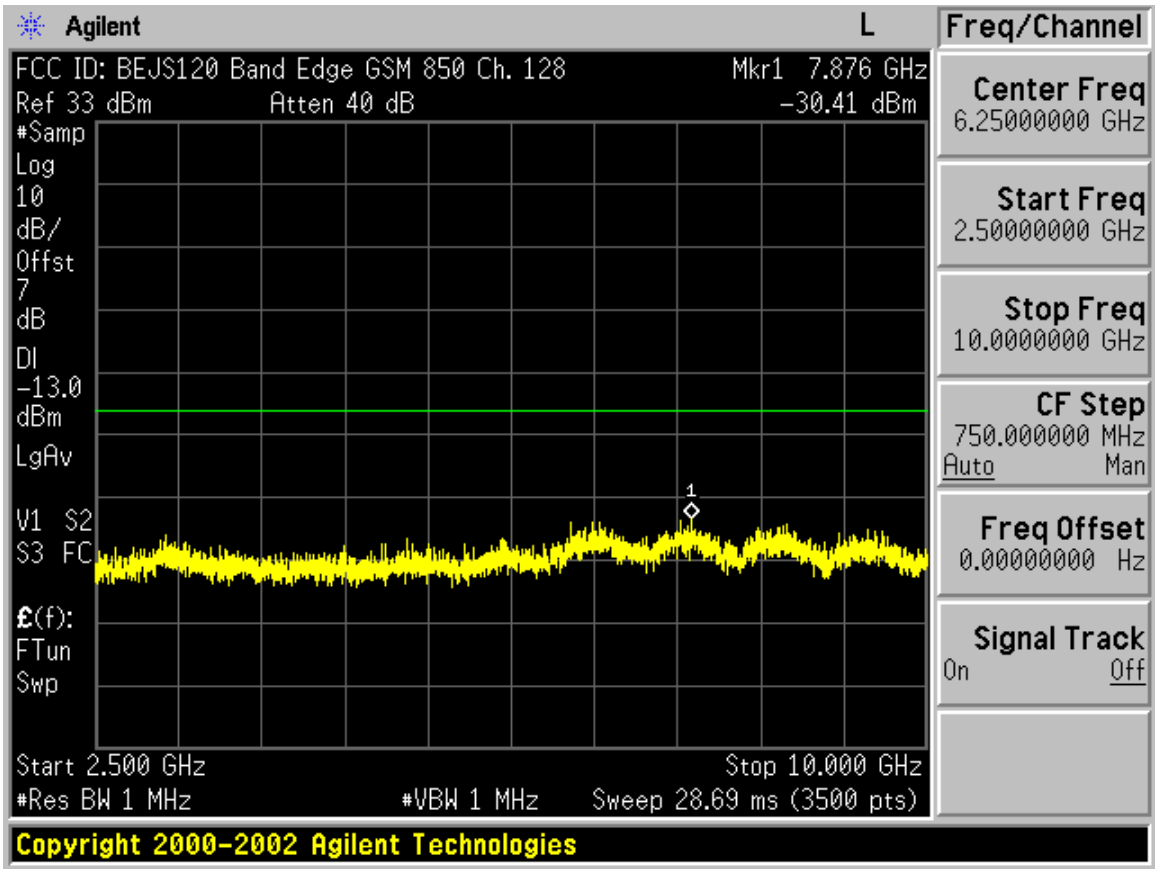

Ch. 1
Ch. 2
GSM850 Power
Circuit Switched Single Slot
Connect Control
dB Max. Level: Auto Low Noise PCL: 5 / 33.0 dBm Chan. / Meas Slot: 251 / 3
Current
Meas Slot
Power 33.19 dBm
Timing 0.00 Sym
Ok
Sym.
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Marker Display
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

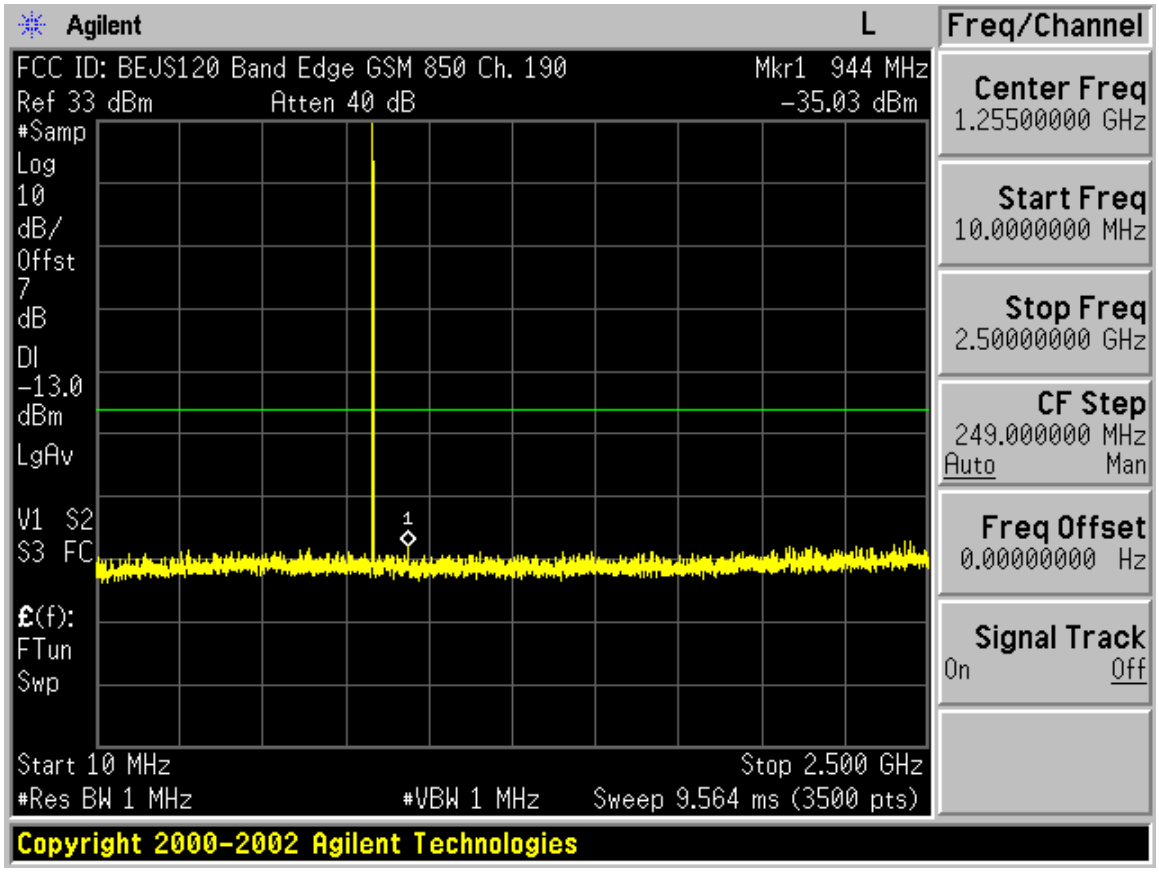

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 251 / 3
Current
Sym.
GSM 0 TSC detected
0.25 Sym.
Timing Advance Error
Current
Average
Max / Min
Phase Error
Peak
RMS
-3.9 °
3.9 °
-6.0 °
1.2 °
1.2 °
1.6 °
33.2 dBm
Avg. Burst Power (Cur.)
Origin Offset
-50.9 dB
-48.4 dB
-42.2 dB
100 Bursts
Statistic Count
I/Q Imbalance
-63.5 dB
-53.0 dB
-45.4 dB
Frequency Error
-6 Hz
-1 Hz
-16 Hz
0.00 %
Bursts out of Tolerance
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

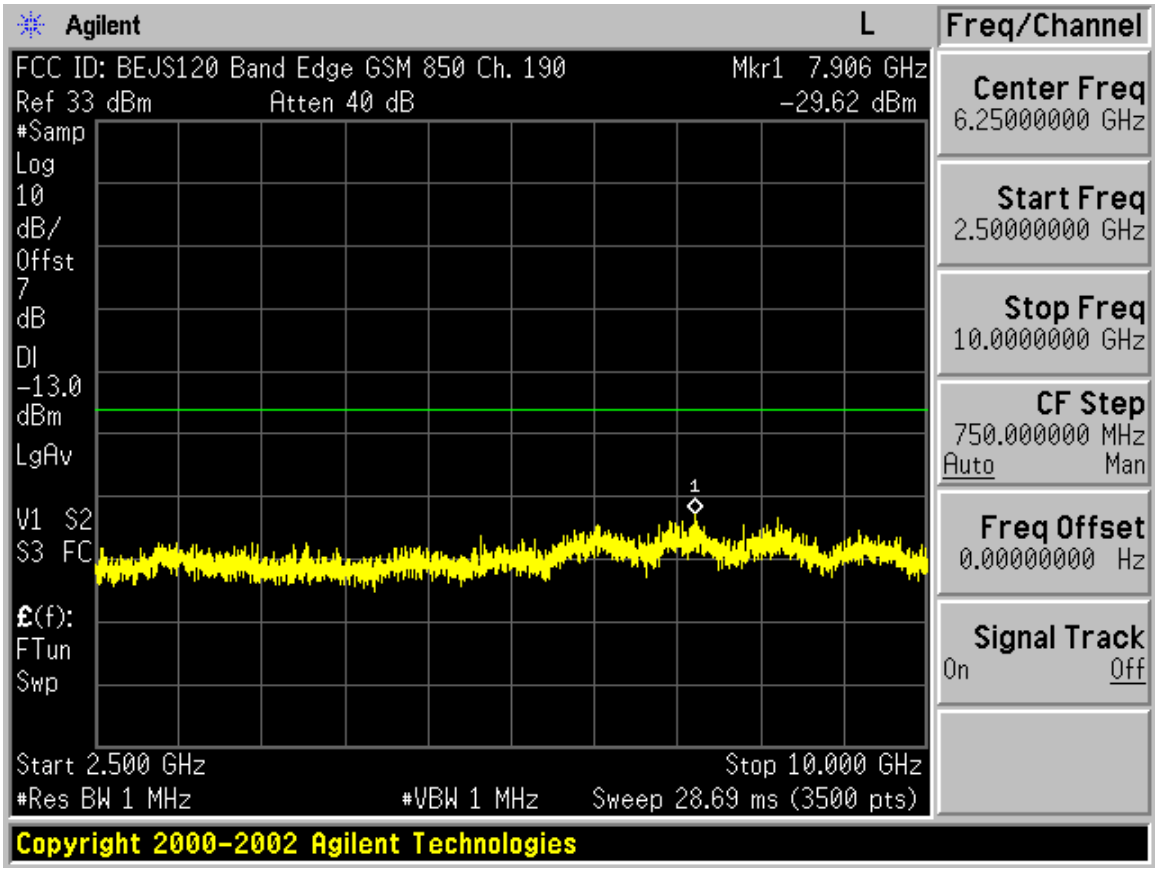

Ch. 1
Ch. 2
GSM850 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 251 / 3
Off
Current
Sym.
GSM 0 TSC detected
0.25 Sym.
Timing Advance Error
Current
Average
Max / Min
Phase Error
Peak
RMS
-3.9 °
3.9 °
-6.0 °
1.2 °
1.2 °
1.6 °
33.2 dBm
Avg. Burst Power (Cur.)
Origin Offset
-50.9 dB
-48.4 dB
-42.2 dB
I/Q Imbalance
-63.5 dB
-53.0 dB
-45.4 dB
100 Bursts
Statistic Count
Frequency Error
-6 Hz
-1 Hz
-16 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

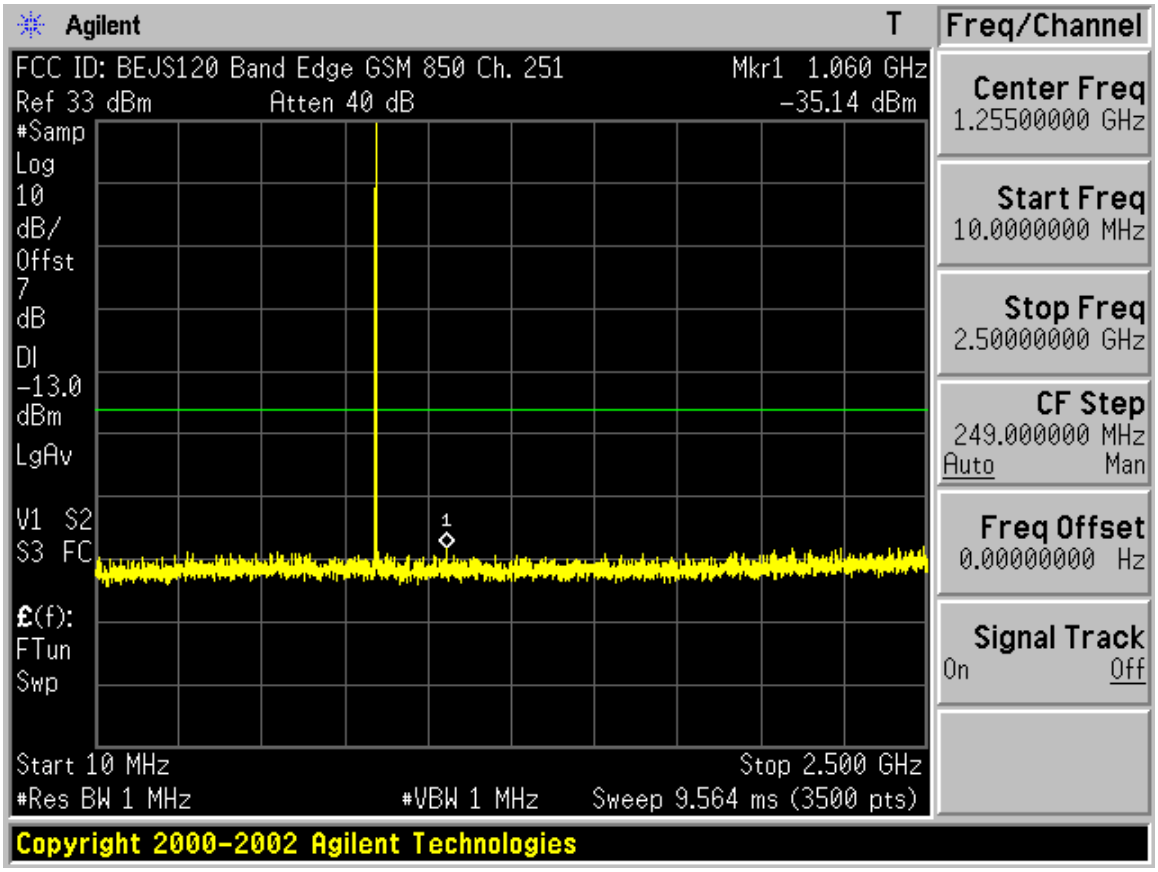

Ch. 1
Ch. 2
GSM850 Spectrum
Circuit Switched Single Slot
Connect Control
dBc
Max. Level: Auto
Low Noise
PCL: 5 / 33.0 dBm
Chan. / Meas Slot: 251 / 3
Off
Ok
25.55 dBm
Ref Power
200 Bursts
Statistic Count
-1.8 -1.6 -1.4 -1.2 -1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8MHz
Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

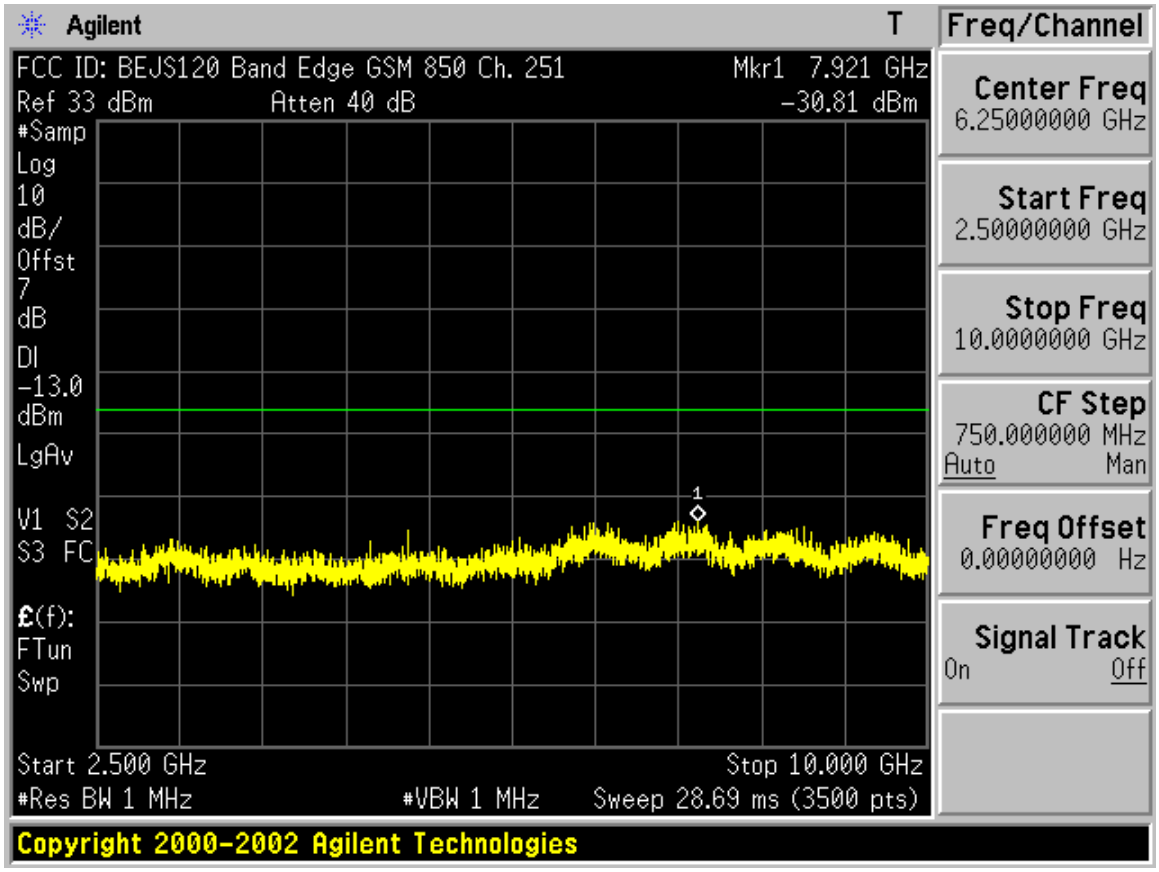

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 128
Mkr1 2.478 GHz
Ref 33 dBm
Atten 40 dB
-33.73 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

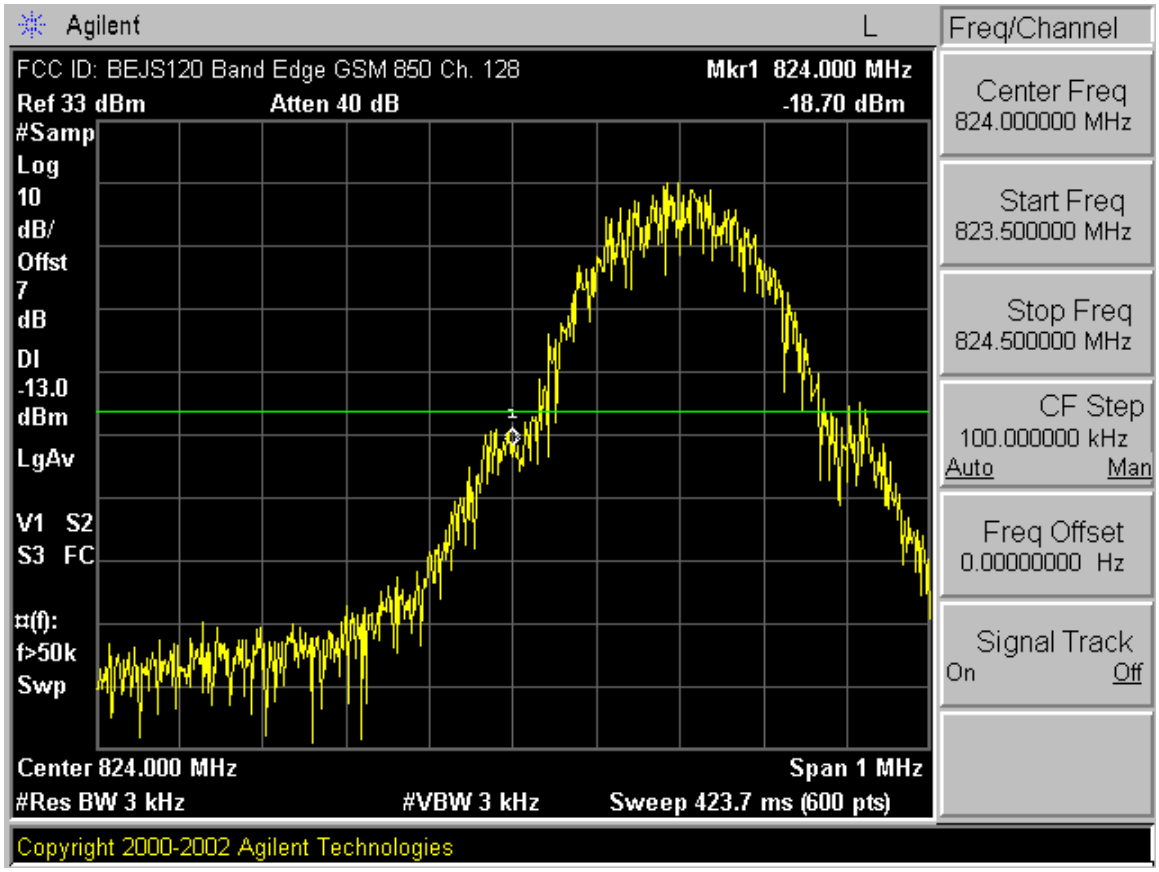

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 128
Mkr1 7.876 GHz
Ref 33 dBm
Atten 40 dB
-30.41 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
6.25000000 GHz
Start Freq
2.50000000 GHz
Stop Freq
10.0000000 GHz
CF Step
750.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 2.500 GHz
Stop 10.000 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 28.69 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

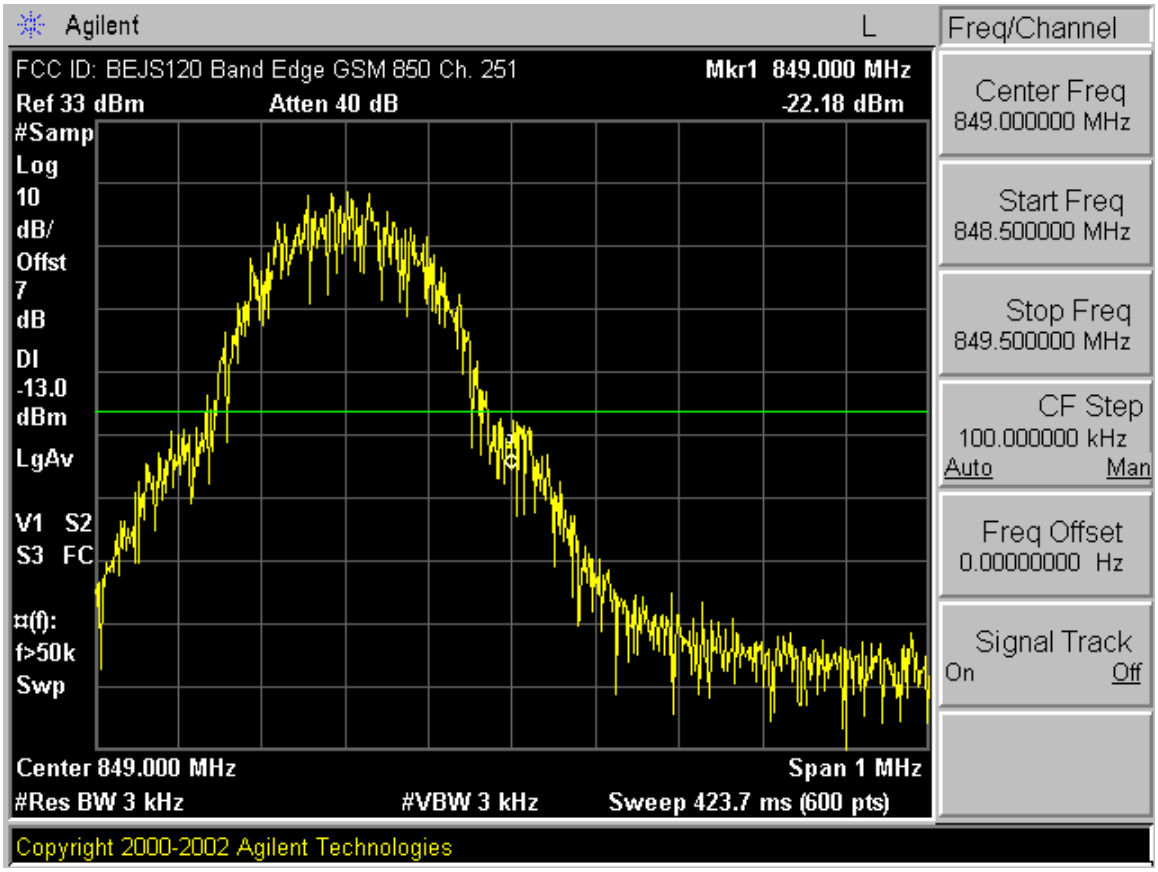

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 190
Mkr1 944 MHz
Ref 33 dBm
Atten 40 dB
-35.03 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

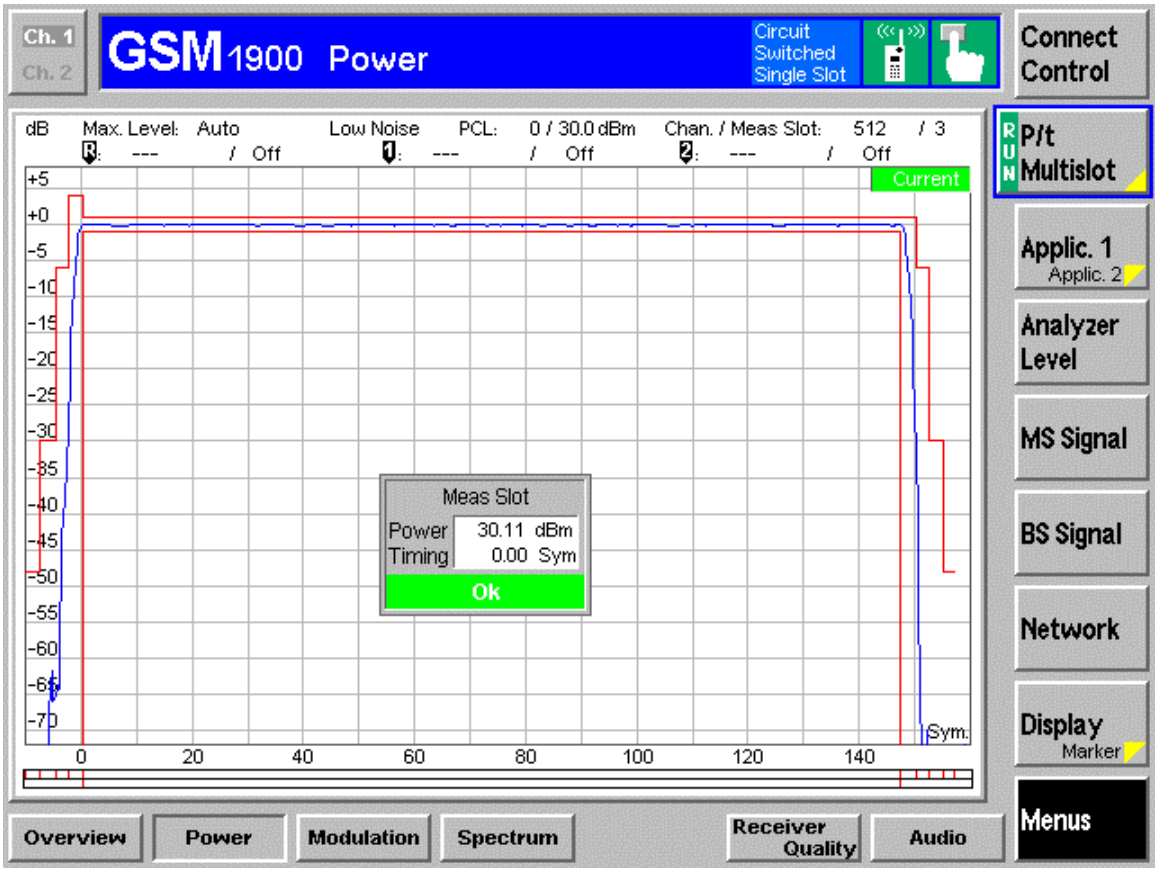

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 190
Mkr1 7.906 GHz
Ref 33 dBm
Atten 40 dB
-29.62 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
6.25000000 GHz
Start Freq
2.50000000 GHz
Stop Freq
10.0000000 GHz
CF Step
750.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 2.500 GHz
Stop 10.000 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 28.69 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

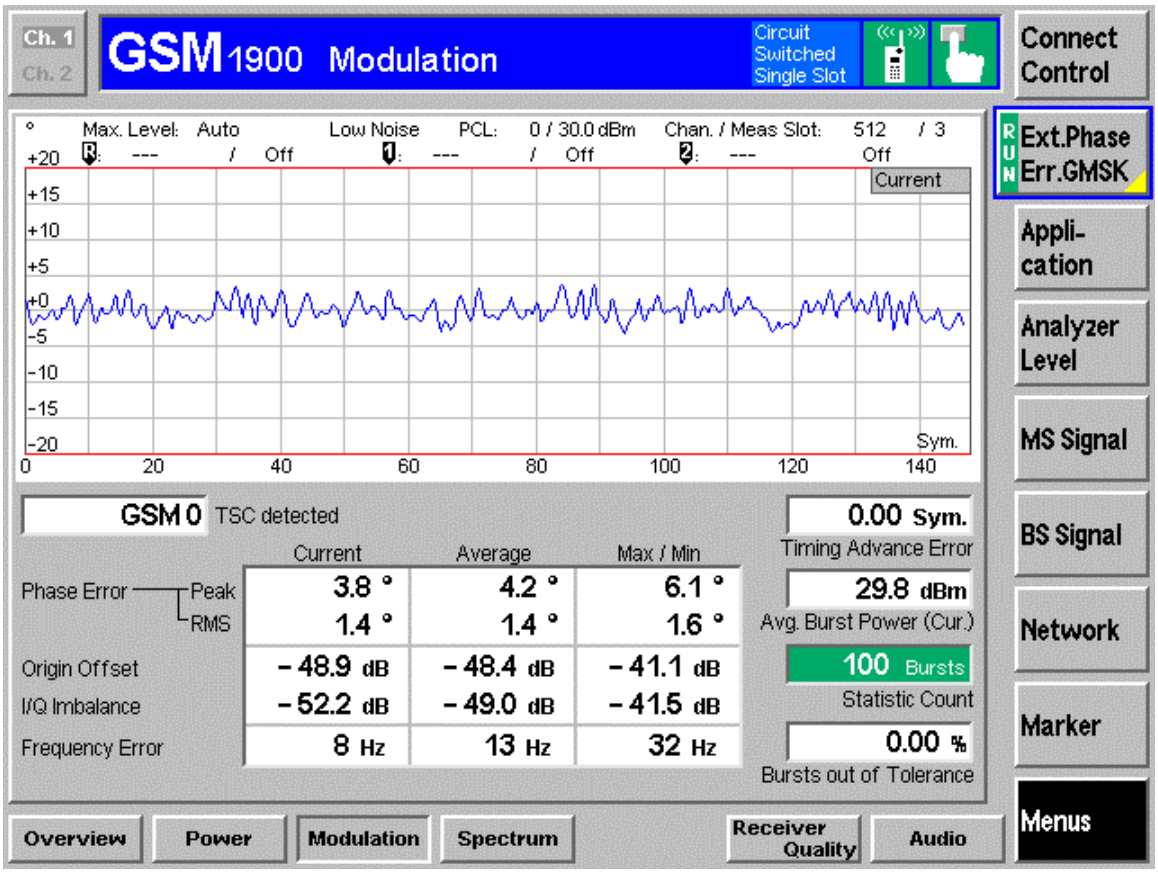

Agilent
T
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 251
Mkr1 1.060 GHz
Ref 33 dBm
Atten 40 dB
-35.14 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

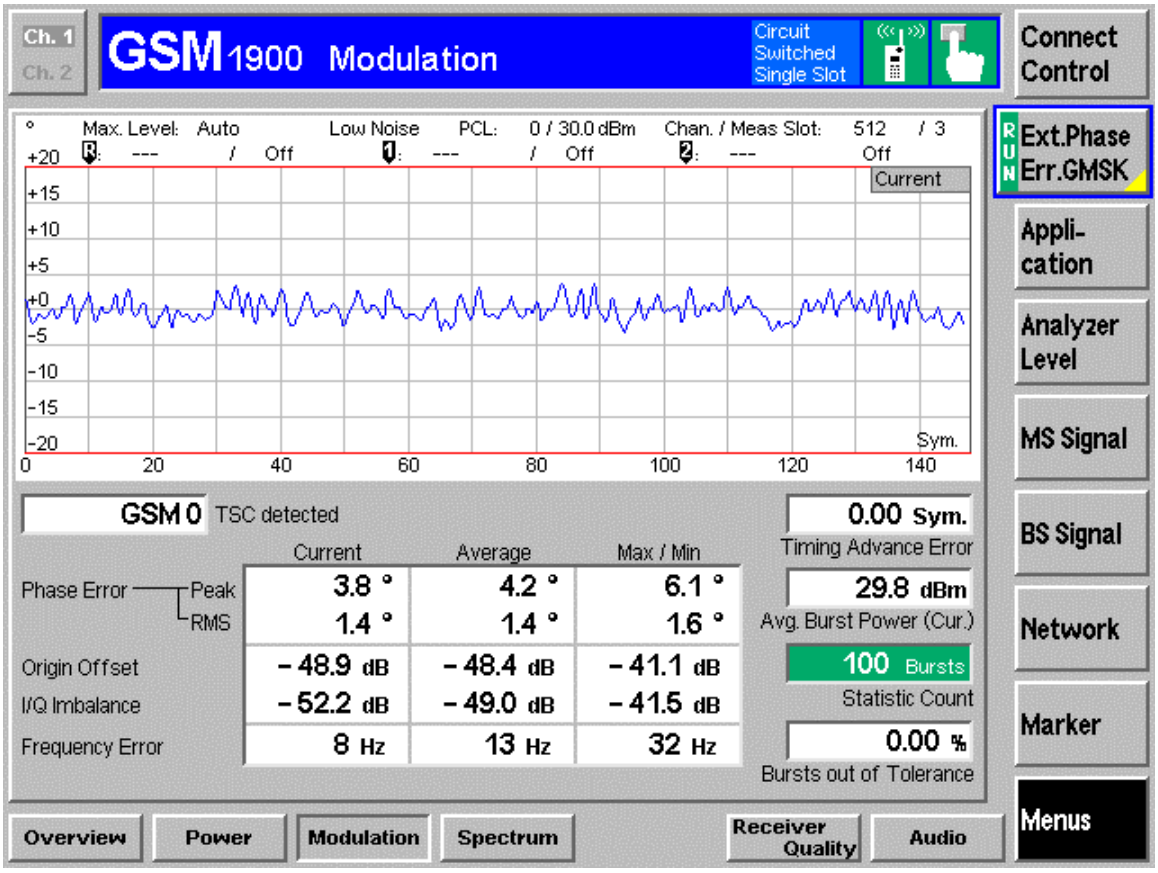

Agilent
T
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 251
Mkr1 7.921 GHz
Ref 33 dBm
Atten 40 dB
-30.81 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
6.25000000 GHz
Start Freq
2.50000000 GHz
Stop Freq
10.0000000 GHz
CF Step
750.000000 MHz
Auto Man
Freq Offset
0.000000000 Hz
Signal Track
On Off
Start 2.500 GHz
Stop 10.000 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 28.69 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

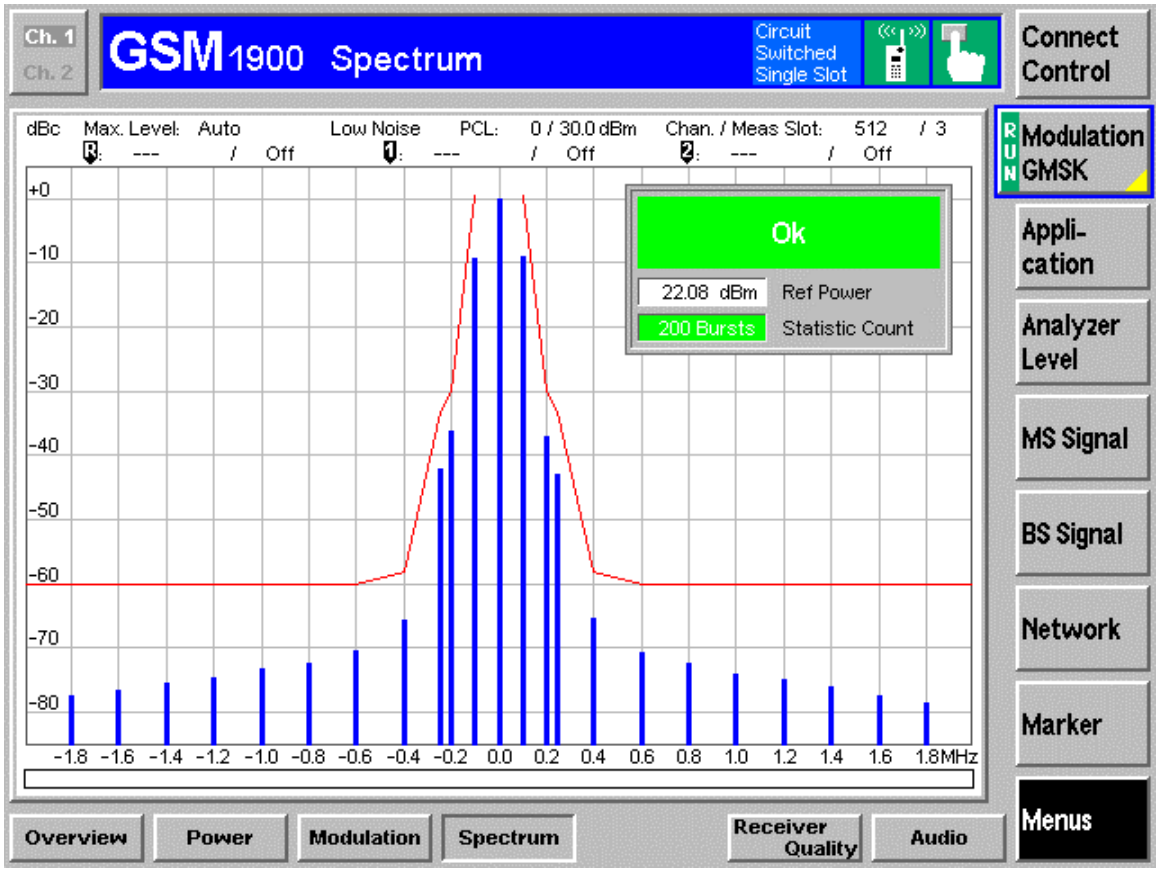

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 128
Mkr1 824.000 MHz
Ref 33 dBm
Atten 40 dB
-18.70 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
¤(f):
f>50k
Swp
Center Freq
824.000000 MHz
Start Freq
823.500000 MHz
Stop Freq
824.500000 MHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Center 824.000 MHz
Span 1 MHz
#Res BW 3 kHz
#VBW 3 kHz
Sweep 423.7 ms (600 pts)
Copyright 2000-2002 Agilent Technologies

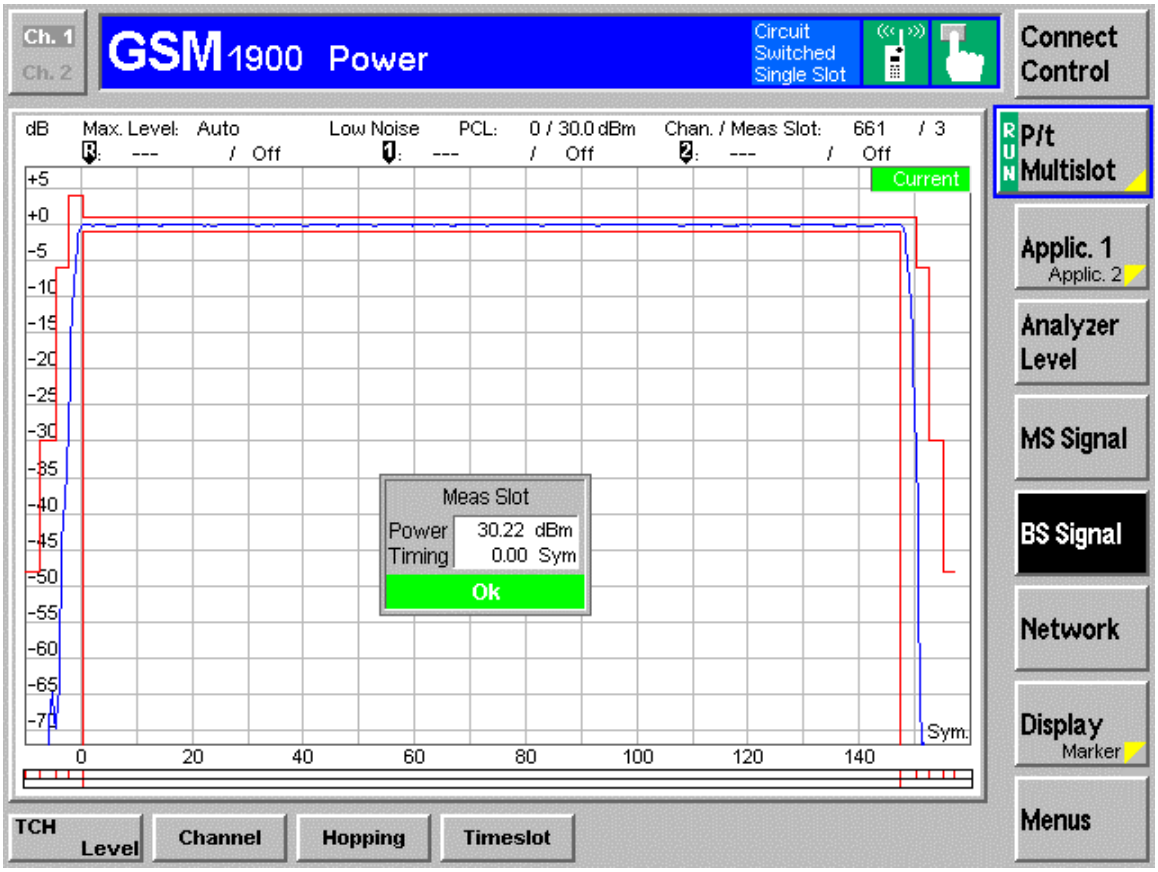

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM 850 Ch. 251
Mkr1 849.000 MHz
Ref 33 dBm
Atten 40 dB
-22.18 dBm
#Samp
Log
10
dB/
Offst
7
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
¤(f):
f>50k
Swp
Center 849.000 MHz
Span 1 MHz
#Res BW 3 kHz
#VBW 3 kHz
Sweep 423.7 ms (600 pts)
Center Freq
849.000000 MHz
Start Freq
848.500000 MHz
Stop Freq
849.500000 MHz
CF Step
100.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Copyright 2000-2002 Agilent Technologies

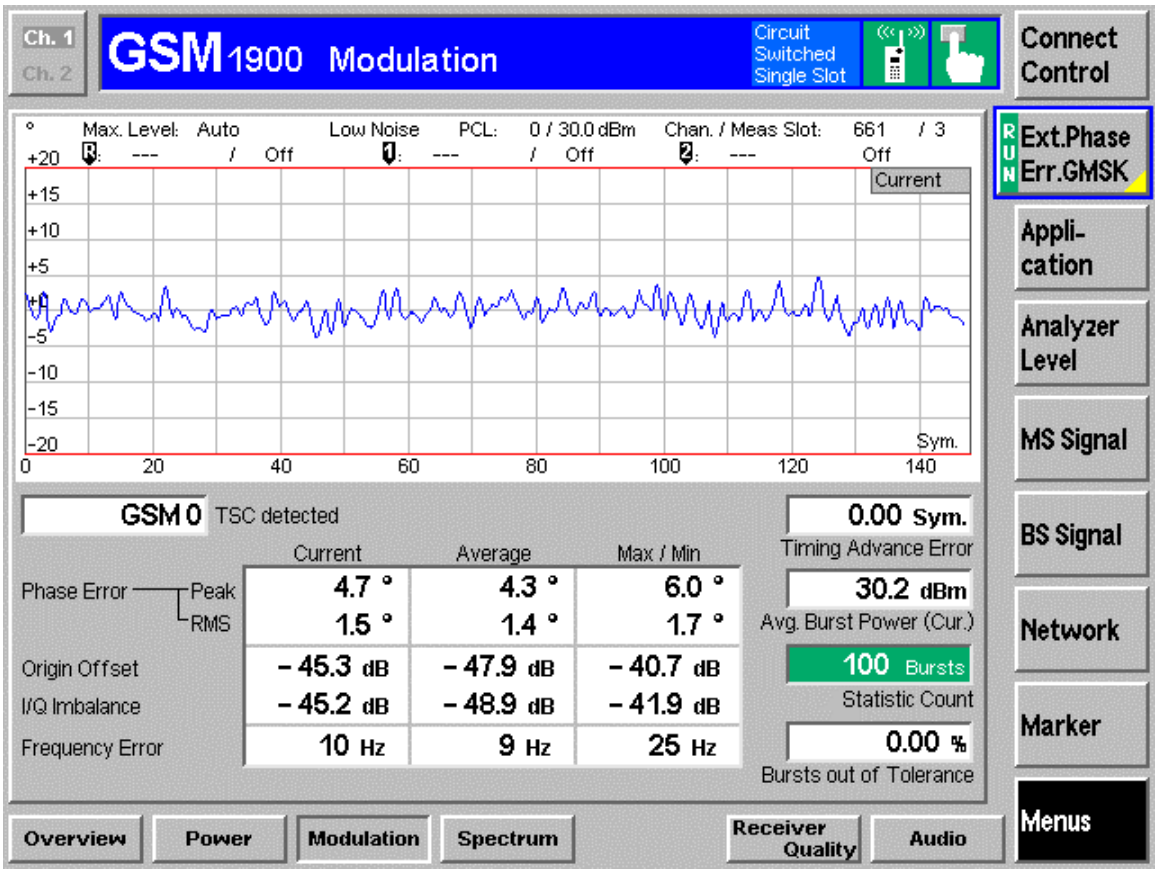

Ch. 1
Ch. 2
GSM 1900 Power
Circuit Switched Single Slot
Connect Control
dB
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 512 / 3
Off
Current
Meas Slot
Power 30.11 dBm
Timing 0.00 Sym
Ok
Sym.
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Display
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

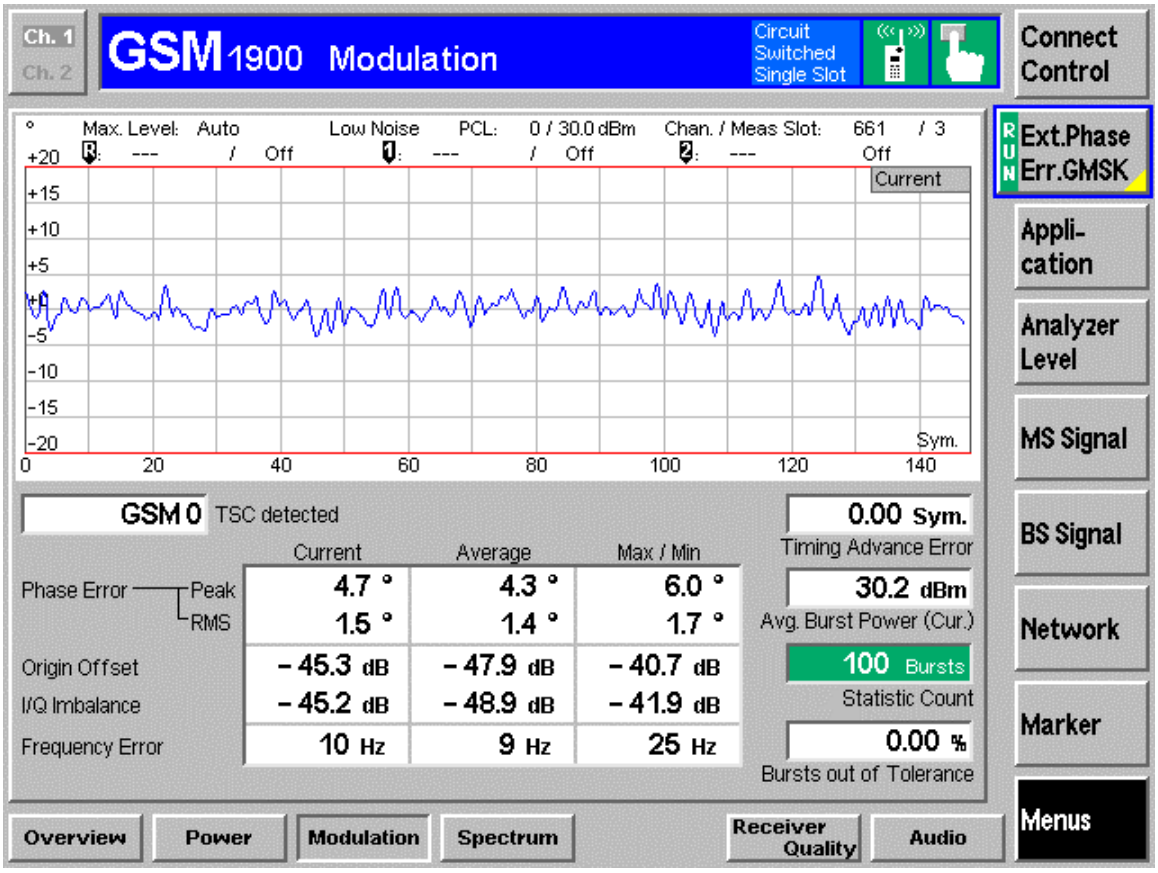

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 512 / 3
Off
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current Average Max / Min
Phase Error Peak 3.8 ° 4.2 ° 6.1 °
RMS 1.4 ° 1.4 ° 1.6 °
Origin Offset -48.9 dB -48.4 dB -41.1 dB
I/Q Imbalance -52.2 dB -49.0 dB -41.5 dB
Frequency Error 8 Hz 13 Hz 32 Hz
29.8 dBm
Avg. Burst Power (Cur.)
100 Bursts
Statistic Count
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

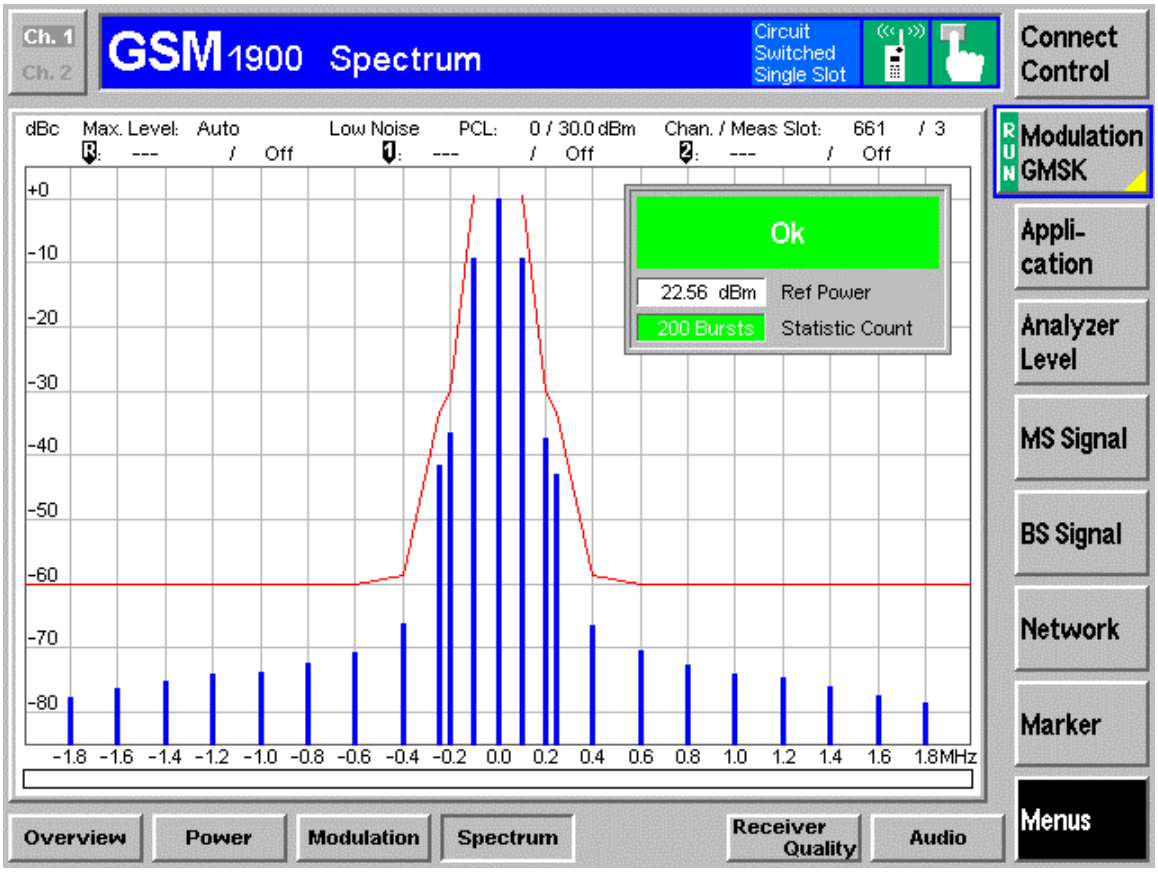

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 512 / 3
Off
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current
Average
Max / Min
Phase Error
Peak
RMS
3.8 °
4.2 °
6.1 °
1.4 °
1.4 °
1.6 °
29.8 dBm
Avg. Burst Power (Cur.)
Origin Offset
-48.9 dB
-48.4 dB
-41.1 dB
I/Q Imbalance
-52.2 dB
-49.0 dB
-41.5 dB
100 Bursts
Statistic Count
Frequency Error
8 Hz
13 Hz
32 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

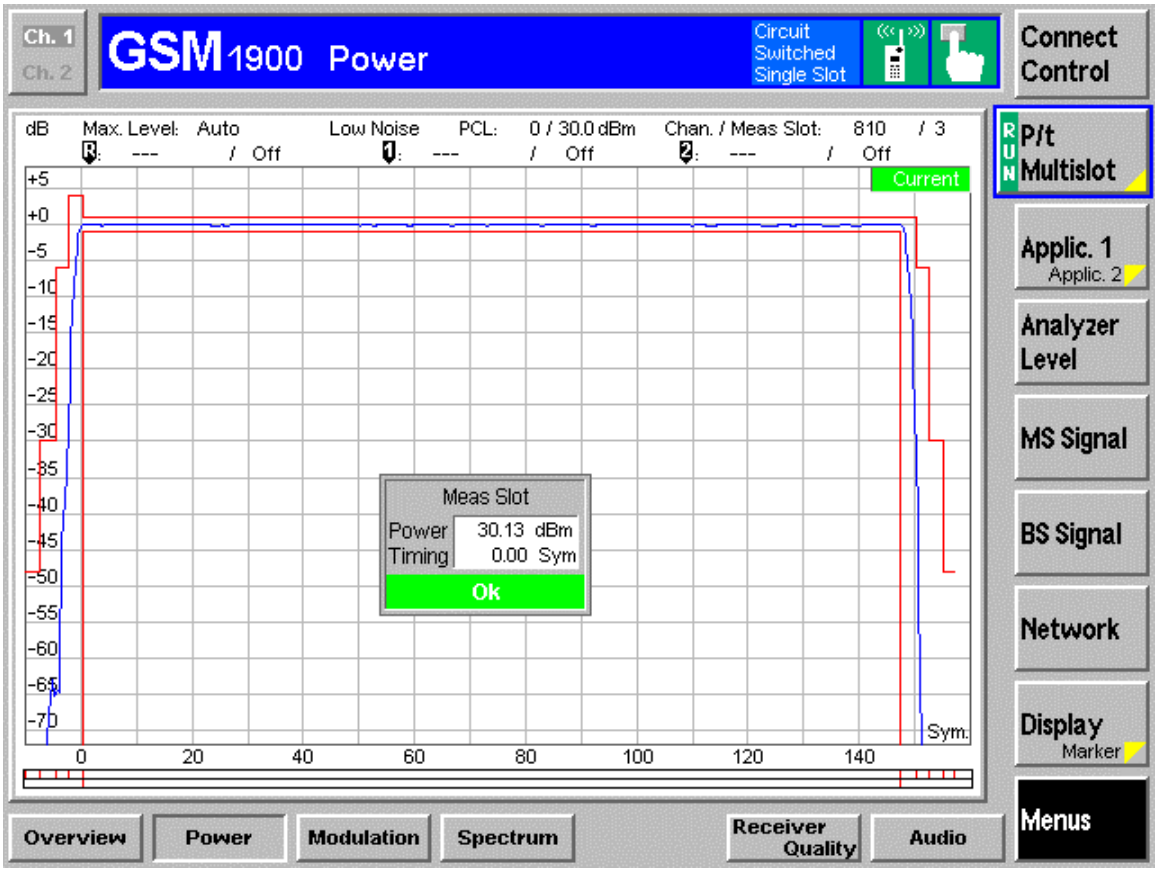

Ch. 1
Ch. 2
GSM 1900 Spectrum
Circuit Switched Single Slot
Connect Control
dBc Max. Level: Auto Low Noise PCL: 0 / 30.0 dBm Chan. / Meas Slot: 512 / 3
R: --- / Off 1: --- / Off 2: --- / Off
Ok
22.08 dBm Ref Power
200 Bursts Statistic Count
+0
-10
-20
-30
-40
-50
-60
-70
-80
-1.8 -1.6 -1.4 -1.2 -1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8MHz
RUN Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

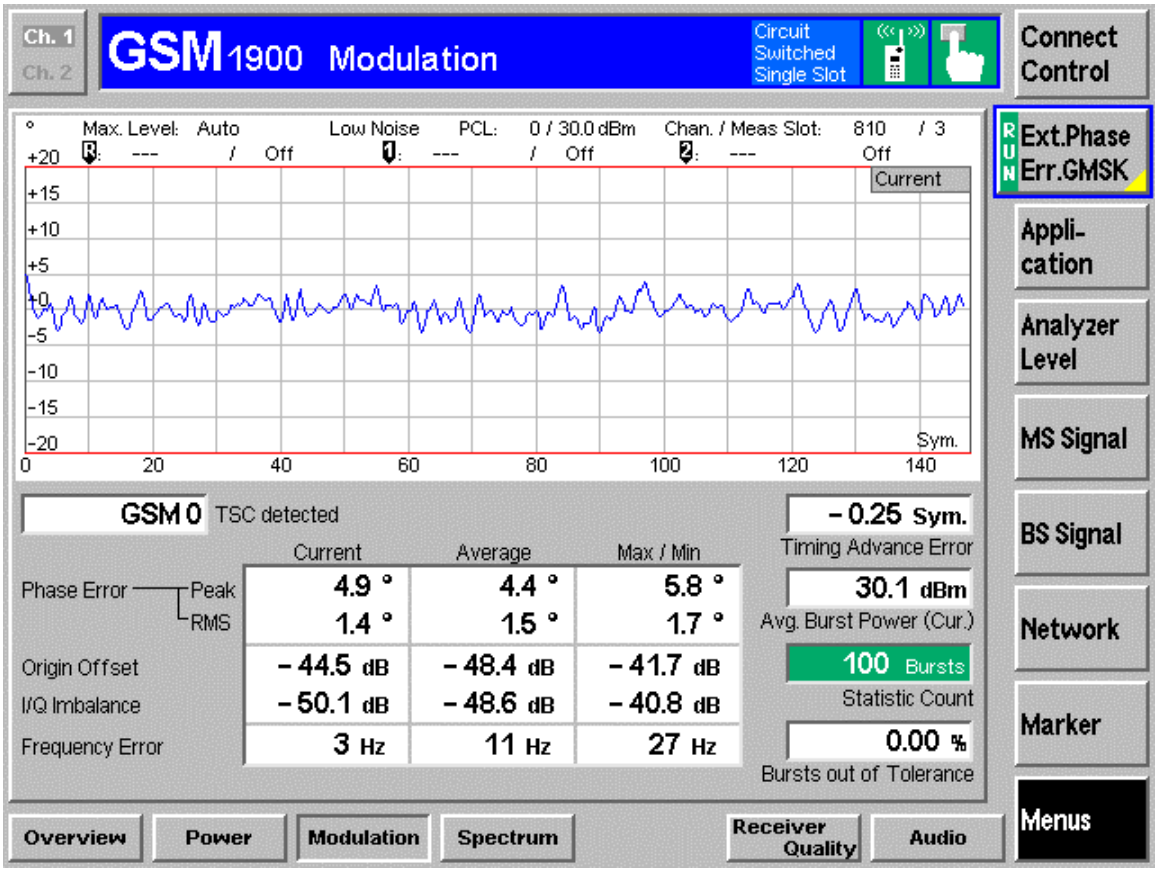

Ch. 1
Ch. 2
GSM 1900 Power
Circuit Switched Single Slot
Connect Control
dB
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 661 / 3
Off
Current
Meas Slot
Power 30.22 dBm
Timing 0.00 Sym
Ok
Sym.
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Display
Marker
Menus
TCH Level
Channel
Hopping
Timeslot

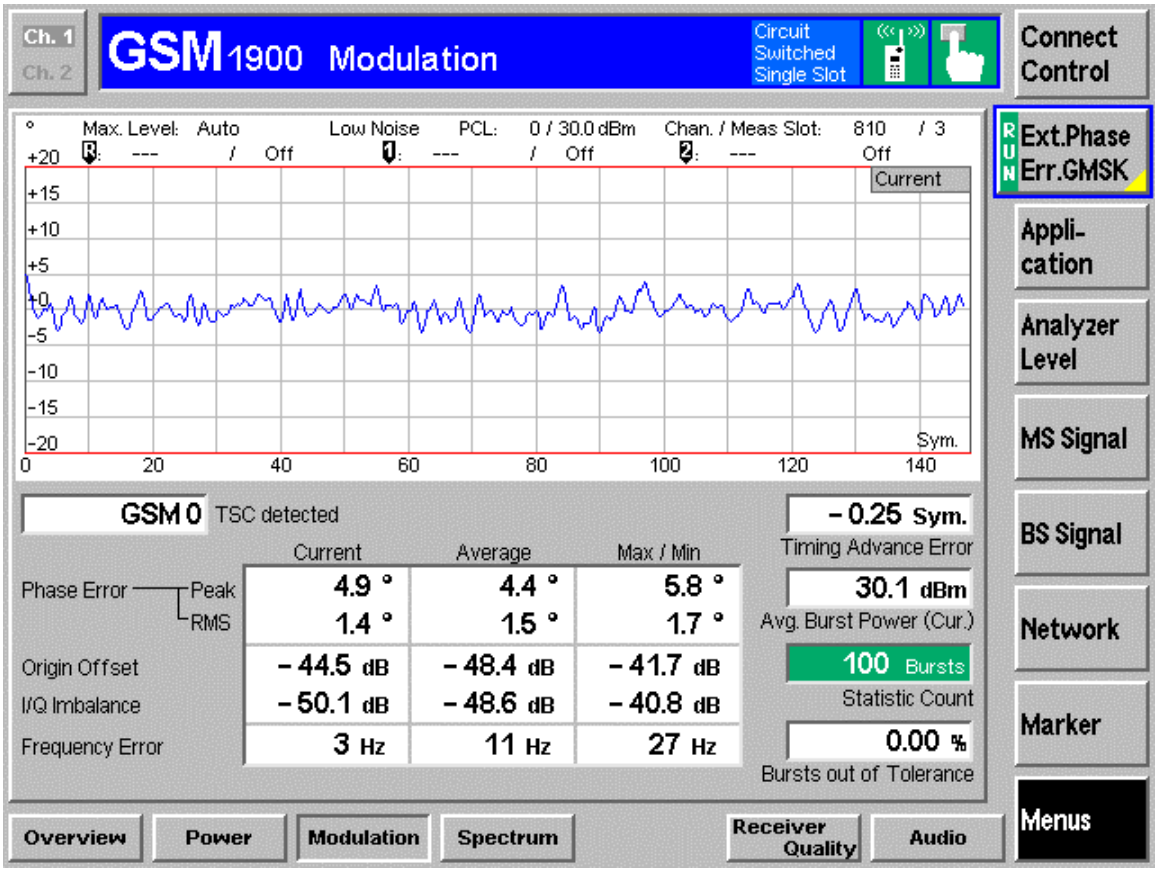

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 661 / 3
Off
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current Average Max / Min
Phase Error Peak 4.7 ° 4.3 ° 6.0 °
RMS 1.5 ° 1.4 ° 1.7 °
30.2 dBm
Avg. Burst Power (Cur.)
Origin Offset -45.3 dB -47.9 dB -40.7 dB
I/Q Imbalance -45.2 dB -48.9 dB -41.9 dB
100 Bursts
Statistic Count
Frequency Error 10 Hz 9 Hz 25 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

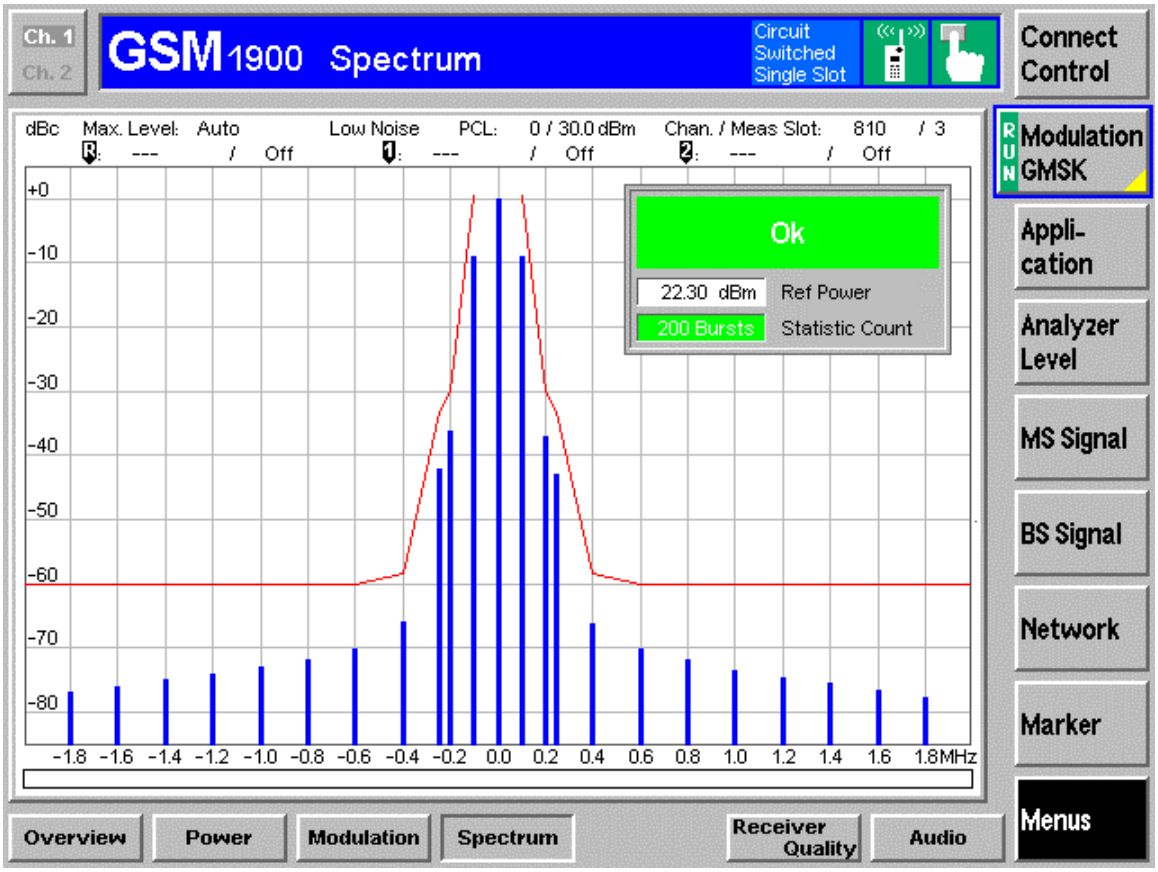

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 661 / 3
Off
Current
Sym.
GSM 0 TSC detected
0.00 Sym.
Timing Advance Error
Current
Average
Max / Min
Phase Error
Peak
RMS
4.7 °
4.3 °
6.0 °
1.5 °
1.4 °
1.7 °
30.2 dBm
Avg. Burst Power (Cur.)
Origin Offset
-45.3 dB
-47.9 dB
-40.7 dB
I/Q Imbalance
-45.2 dB
-48.9 dB
-41.9 dB
100 Bursts
Statistic Count
Frequency Error
10 Hz
9 Hz
25 Hz
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

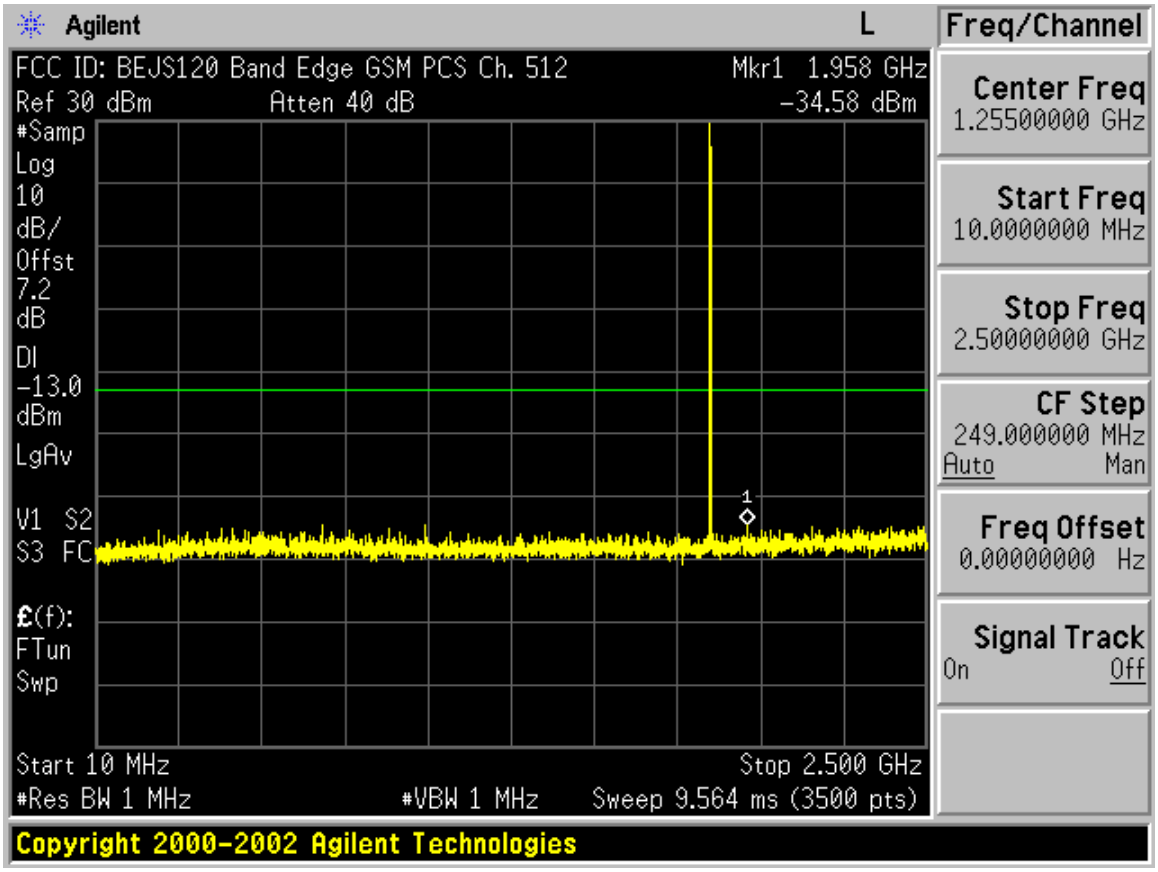

Ch. 1
Ch. 2
GSM 1900 Spectrum
Circuit Switched Single Slot
Connect Control
dBc Max. Level: Auto Low Noise PCL: 0 / 30.0 dBm Chan. / Meas Slot: 661 / 3
Ok
22.56 dBm Ref Power
200 Bursts Statistic Count
Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

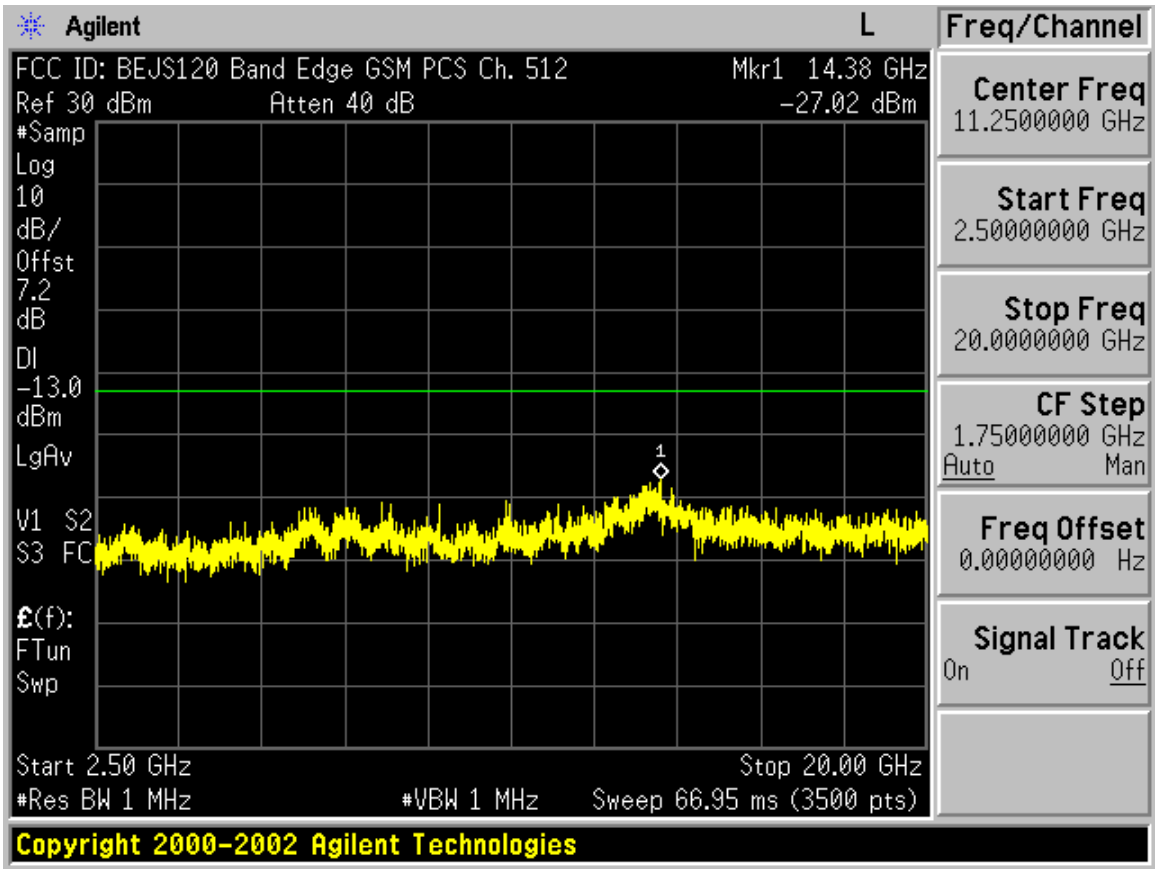

Ch. 1
Ch. 2
GSM 1900 Power
Circuit Switched Single Slot
Connect Control
dB Max. Level: Auto Low Noise PCL: 0 / 30.0 dBm Chan. / Meas Slot: 810 / 3
Current
Meas Slot
Power 30.13 dBm
Timing 0.00 Sym
Ok
Sym.
P/t Multislot
Applic. 1
Applic. 2
Analyzer Level
MS Signal
BS Signal
Network
Display
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

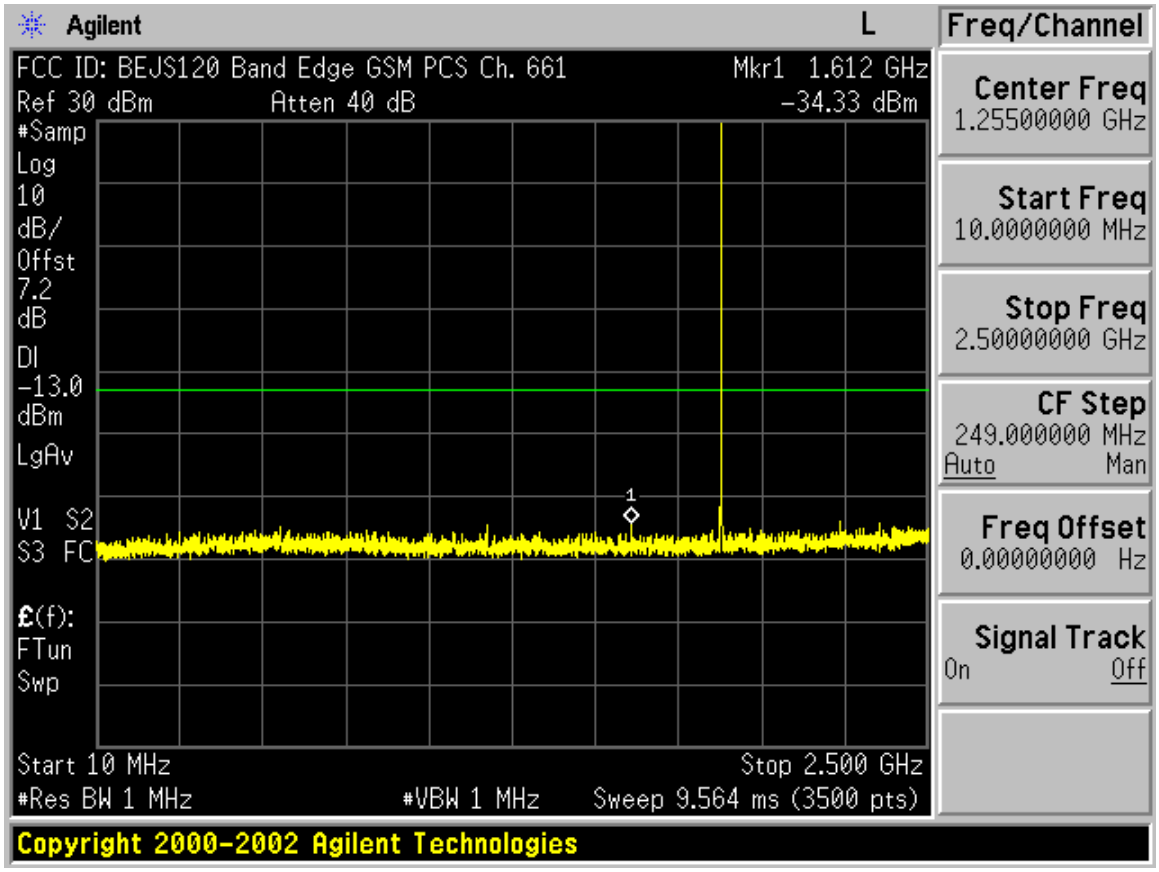

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 810 / 3
Off
Current
Sym.
GSM 0 TSC detected
Current
Average
Max / Min
Phase Error
Peak
RMS
4.9 °
4.4 °
5.8 °
1.4 °
1.5 °
1.7 °
Origin Offset
-44.5 dB
-48.4 dB
-41.7 dB
I/Q Imbalance
-50.1 dB
-48.6 dB
-40.8 dB
Frequency Error
3 Hz
11 Hz
27 Hz
-0.25 Sym.
Timing Advance Error
30.1 dBm
Avg. Burst Power (Cur.)
100 Bursts
Statistic Count
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

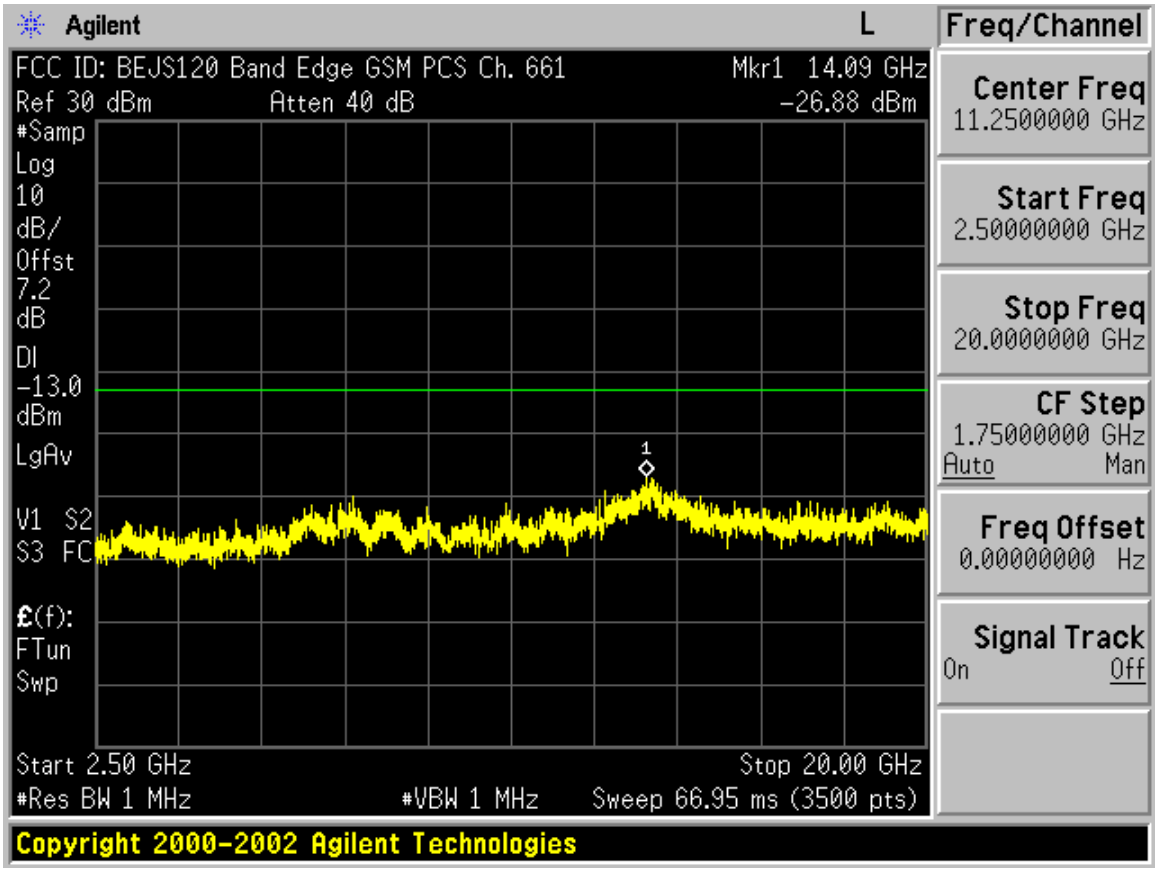

Ch. 1
Ch. 2
GSM 1900 Modulation
Circuit Switched Single Slot
Connect Control
Max. Level: Auto
Low Noise
PCL: 0 / 30.0 dBm
Chan. / Meas Slot: 810 / 3
Off
Current
Sym.
GSM 0 TSC detected
Current
Average
Max / Min
Phase Error
Peak
RMS
4.9 °
4.4 °
5.8 °
1.4 °
1.5 °
1.7 °
Origin Offset
-44.5 dB
-48.4 dB
-41.7 dB
I/Q Imbalance
-50.1 dB
-48.6 dB
-40.8 dB
Frequency Error
3 Hz
11 Hz
27 Hz
-0.25 Sym.
Timing Advance Error
30.1 dBm
Avg. Burst Power (Cur.)
100 Bursts
Statistic Count
0.00 %
Bursts out of Tolerance
Ext.Phase Err.GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

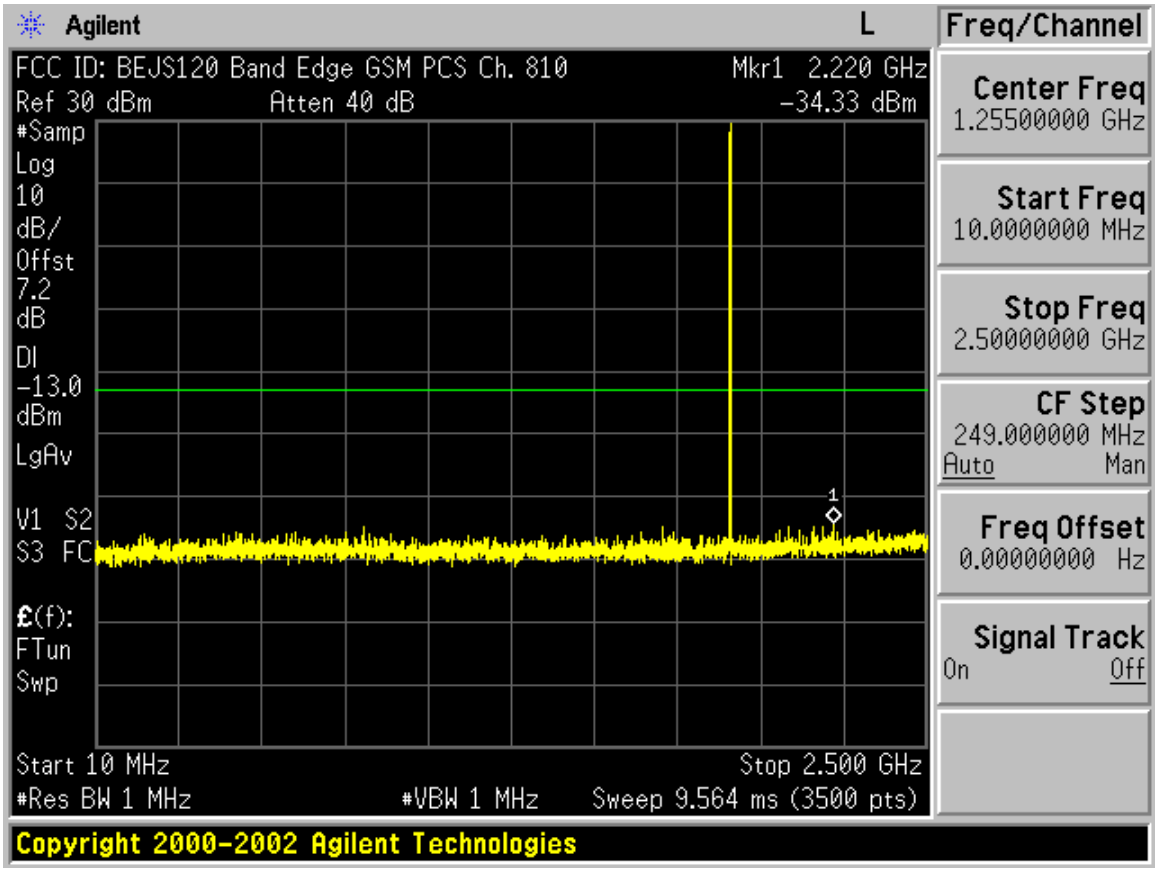

Ch. 1
Ch. 2
GSM 1900 Spectrum
Circuit Switched Single Slot
Connect Control
dBc Max. Level: Auto Low Noise PCL: 0 / 30.0 dBm Chan. / Meas Slot: 810 / 3
R: --- / Off 1: --- / Off 2: --- / Off
Ok
22.30 dBm Ref Power
200 Bursts Statistic Count
+0
-10
-20
-30
-40
-50
-60
-70
-80
-1.8 -1.6 -1.4 -1.2 -1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8MHz
RUN Modulation GMSK
Appli-cation
Analyzer Level
MS Signal
BS Signal
Network
Marker
Menus
Overview
Power
Modulation
Spectrum
Receiver Quality
Audio

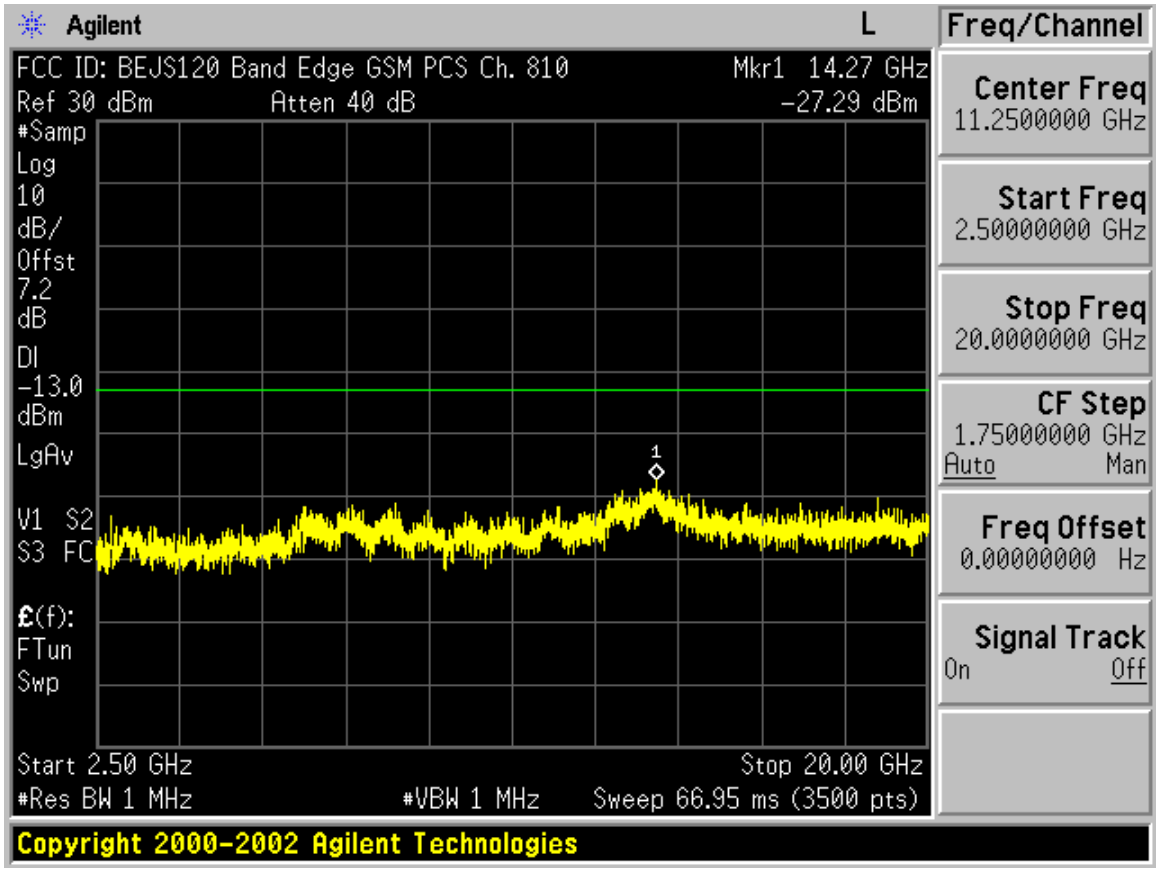

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 512
Mkr1 1.958 GHz
Ref 30 dBm
Atten 40 dB
-34.58 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

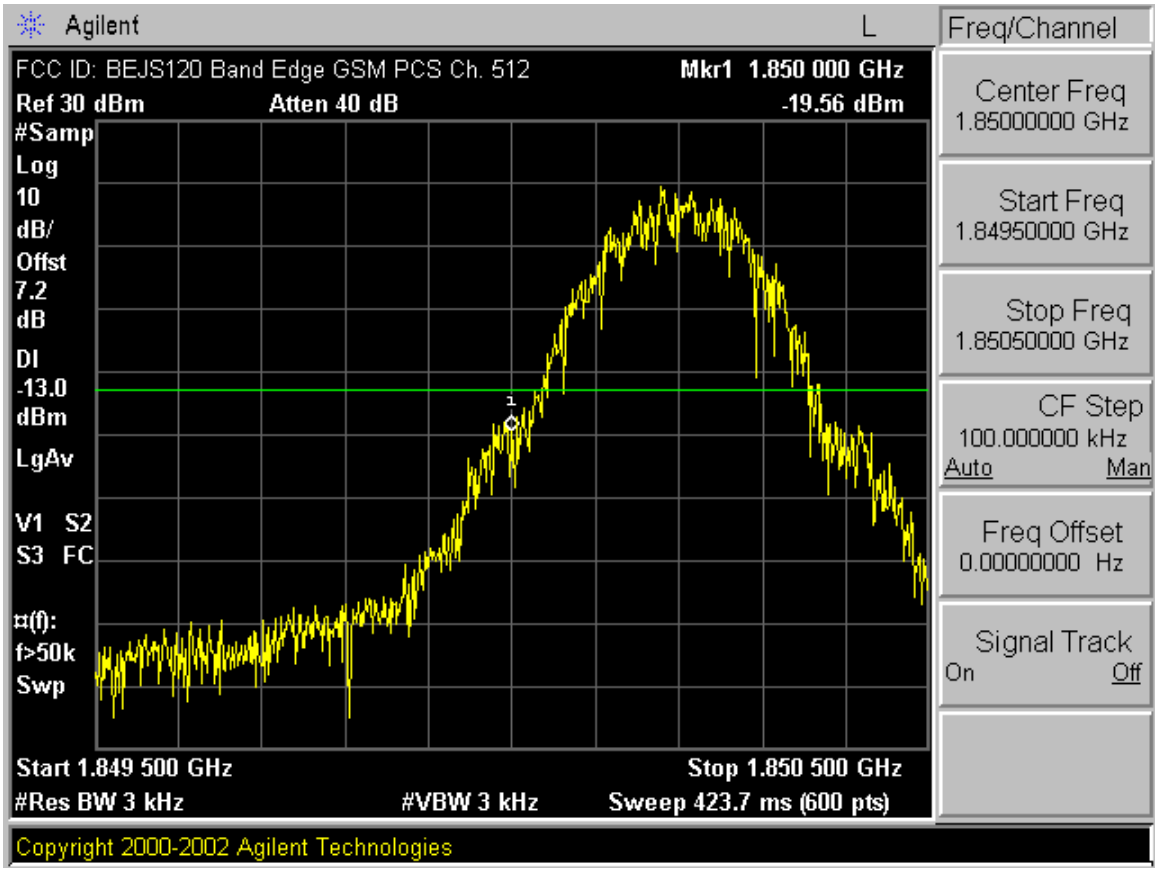

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 512
Mkr1 14.38 GHz
Ref 30 dBm
Atten 40 dB
-27.02 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 2.50 GHz
Stop 20.00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 66.95 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies

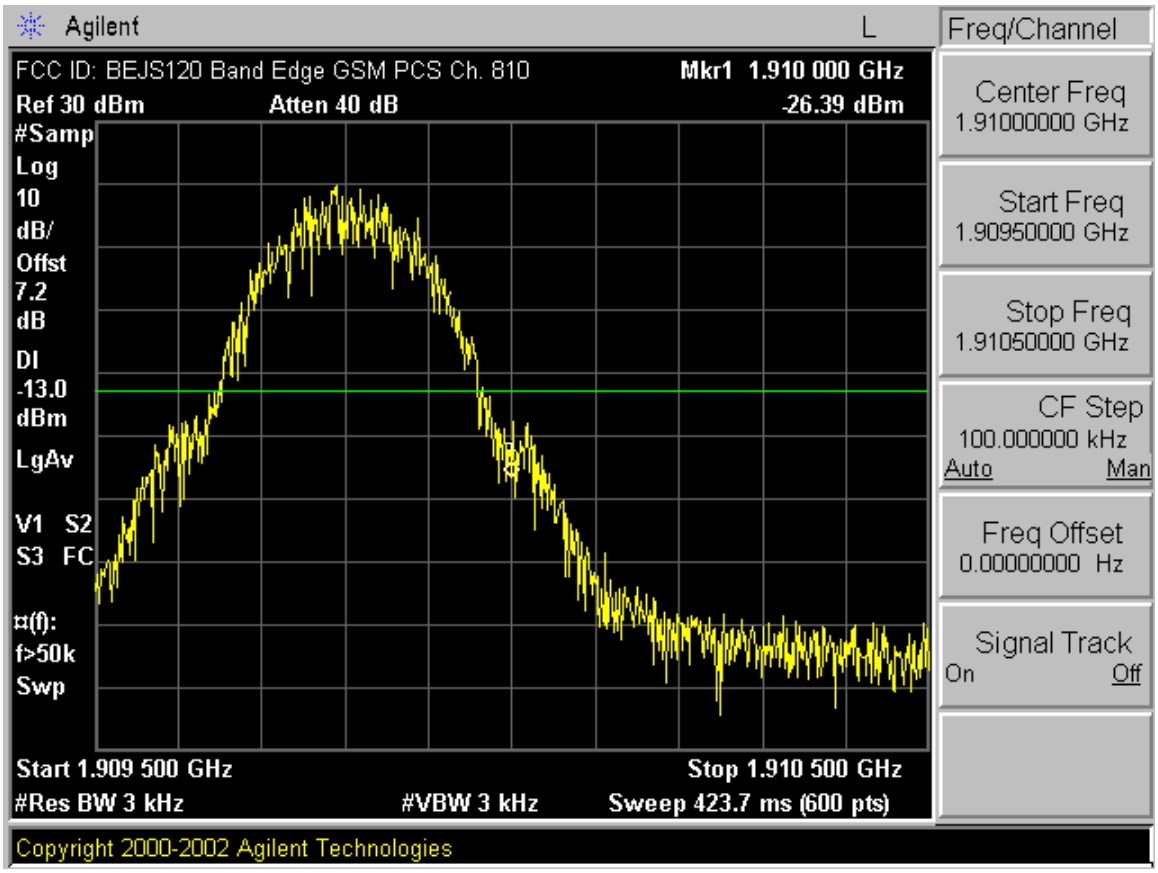

Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 661
Mkr1 1.612 GHz
Ref 30 dBm
Atten 40 dB
-34.33 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 661
Mkr1 14.09 GHz
Ref 30 dBm
Atten 40 dB
-26.88 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 2.50 GHz
Stop 20.00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 66.95 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 810
Mkr1 2.220 GHz
Ref 30 dBm
Atten 40 dB
-34.33 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
Center Freq
1.25500000 GHz
Start Freq
10.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
249.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Start 10 MHz
Stop 2.500 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 9.564 ms (3500 pts)
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 810
Mkr1 14.27 GHz
Ref 30 dBm
Atten 40 dB
-27.29 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
£(f):
FTun
Swp
1
Start 2.50 GHz
Stop 20.00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 66.95 ms (3500 pts)
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 512
Mkr1 1.850 000 GHz
Ref 30 dBm
Atten 40 dB
-19.56 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
¤(f):
f>50k
Swp
Start 1.849 500 GHz
Stop 1.850 500 GHz
#Res BW 3 kHz
#VBW 3 kHz
Sweep 423.7 ms (600 pts)
Center Freq
1.85000000 GHz
Start Freq
1.84950000 GHz
Stop Freq
1.85050000 GHz
CF Step
100.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: BEJS120 Band Edge GSM PCS Ch. 810
Mkr1 1.910 000 GHz
Ref 30 dBm
Atten 40 dB
-26.39 dBm
#Samp
Log
10
dB/
Offst
7.2
dB
Dl
-13.0
dBm
LgAv
V1 S2
S3 FC
¤(f):
f>50k
Swp
Start 1.909 500 GHz
Stop 1.910 500 GHz
#Res BW 3 kHz
#VBW 3 kHz
Sweep 423.7 ms (600 pts)
Center Freq
1.91000000 GHz
Start Freq
1.90950000 GHz
Stop Freq
1.91050000 GHz
CF Step
100.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Copyright 2000-2002 Agilent Technologies