

RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model No. : LG-E400, E400, LGE400
Order No. : 1111-01610
Date of receipt : 2011-11-28
Test duration : 2011-12-12 ~ 2011-12-21
Date of issue : 2011-12-21
Use of report : Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
10101 Old Grove Road., San Diego, CA 92131

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification : §22(H), §24(E)
Test environment : See appended test report
Test result : Pass Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:



Engineer
S.K. Ryu

Witnessed by:

N/A

Reviewed by:



Technical Director
Harvey Sung

Test Report Version

| Test Report No. | Date | Description |
|-----------------|-------------------|----------------------------|
| DRTFCC1112-0489 | December 21, 2011 | Final version for approval |
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1. GENERAL INFORMATION

Applicant Name: LG Electronics MobileComm U.S.A., Inc.

Address: 10101 Old Grove Road., San Diego, CA 92131

FCC ID : ZNFE400

FCC Classification : Licensed Portable Transmitter Held to Ear (PCE)

EUT Type : Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN

Model Name : LG-E400

Add Model Name : E400, LGE400
※ Three models are same mechanical, electrical and functional.
※ The only difference is the model name, which are changed for marketing purpose.

Supplying power : Standard Battery
- Type: Li-Ion Battery
- M/N: BL-44JN
- Rating: DC 3.7V & 1540mAh 5.7Wh

Antenna Information : Internal Antenna
- Type: Built-In type

Tx Frequency : GSM850: 824.2 ~ 848.8 MHz
GSM1900: 1850.2 ~ 1909.8 MHz

Rx Frequency : GSM850: 869.2 ~ 893.8 MHz
GSM1900: 1930.2 ~ 1989.8 MHz

Max. RF Output Power : GSM850: 0.944W ERP(29.75dBm)
GSM1900: 1.089W EIRP(30.37dBm)

Emission Designator(s) : GSM850: 244KGXW
GSM1900: 247KGXW

2. INTRODUCTION

2.1. EUT DESCRIPTION

The Equipment Under Test(EUT) supports a dual band(Cellular/PCS) with Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The 10m Chamber and conducted measurement facility used to collect the radiated data are located at the 683-3, Yubang-Dong, Yongin-Si, Gyunggi-Do, 449-080, South Korea. The site is constructed in conformance with the requirements.

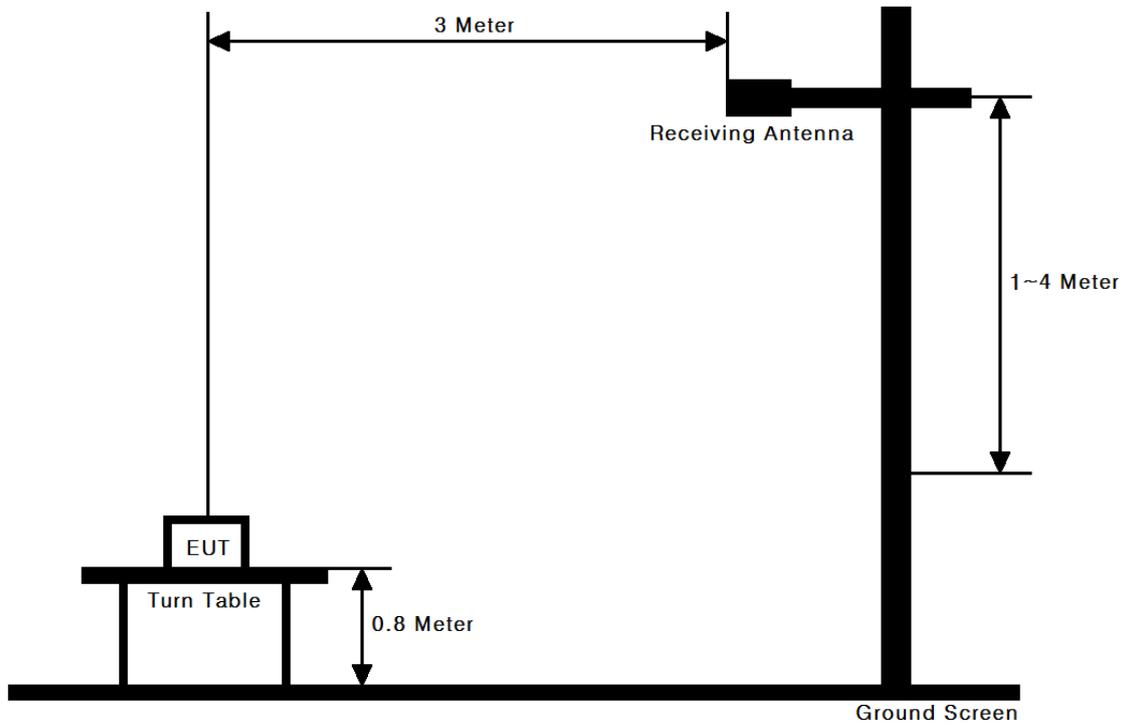
- 10m Chamber registration Number: 678747

3. DESCRIPTION OF TESTS

3.1 ERP & EIRP

(Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up



Test Procedure

These measurements were performed outdoors at 3meter test range. The equipment under test is placed on a wooden turntable 0.8-meters above the ground plane and 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.

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.

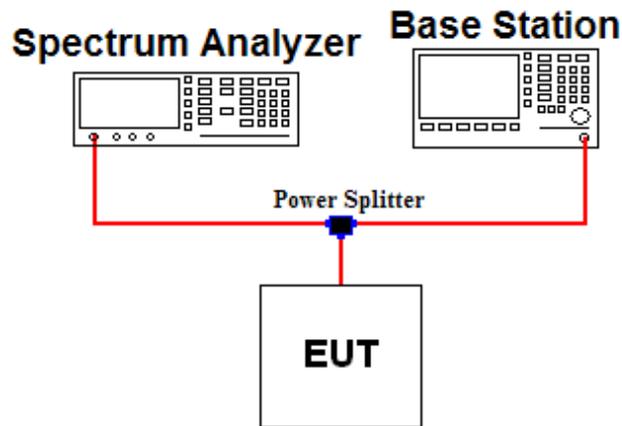
3.2 PEAK TO AVERAGE RATIO

A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. Plots of the EUT's Peak- to- Average Ratio are shown herein.

3.3 OCCUPIED BANDWIDTH.

Test set-up

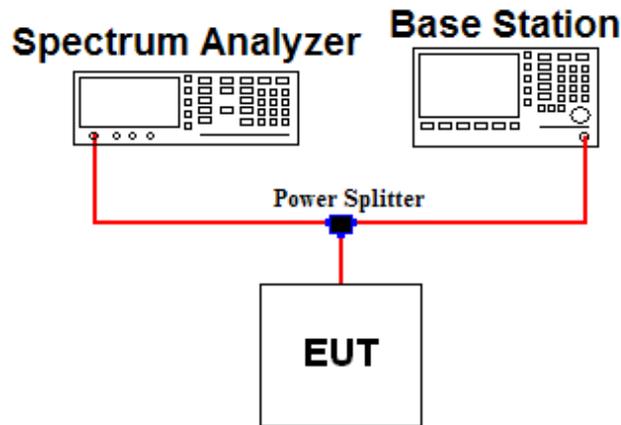


Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test set-up



Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with -13dBm limit $[43+10\log(P)]$, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block.

A display line was placed at -13dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

Band Edge Requirement

In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

3.5 RADIATED SPURIOUS EMISSIONS

Test Set-up



Test Procedure

This measurement was performed outdoors at 3meter test range. The equipment under test is placed on a wooden turntable 0.8-meters above the ground plane and 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

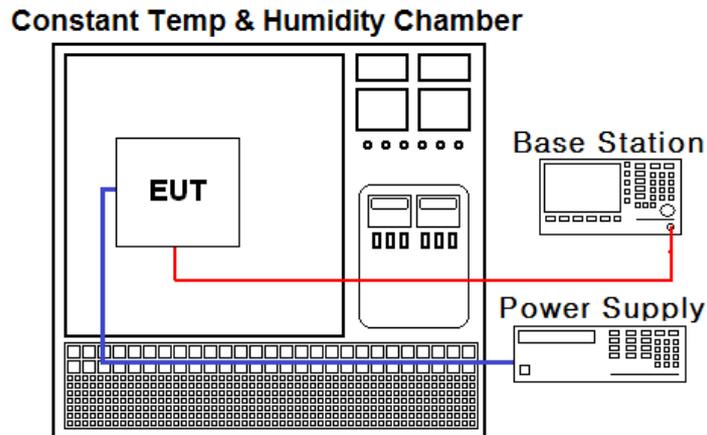
For radiated power measurements below 1GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1GHz, 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 spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



Test Procedure

The frequency stability of the transmitter is measured by:

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

Specification - the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature. (25°C to provide a reference).

1. 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 is made within one minute after applying power to the transmitter.
2. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

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

4. LIST OF TEST EQUIPMENT

| Type | Manufacturer | Model | Cal.Date (yy/mm/dd) | Next.Cal.Date (yy/mm/dd) | S/N |
|---|---------------|---------------------------------|------------------------|-----------------------------|------------------------|
| Spectrum Analyzer | Agilent | E4440A | 11/09/30 | 12/09/30 | MY45304199 |
| Spectrum Analyzer | Agilent | N9020A | 11/01/07 | 12/01/07 | MY49100833 |
| Power Splitter | Anritsu | K241B | 11/09/30 | 12/09/30 | 020611 |
| TEMP & HUMIDITY Chamber | JISCO | KR-100/J-RHC2 | 11/09/30 | 12/09/30 | 30604493/021031 |
| Digital Multimeter | H.P | 34401A | 11/03/07 | 12/03/07 | 3146A13475, US36122178 |
| Signal Generator | Rohde Schwarz | SMR20 | 11/03/08 | 12/03/08 | 101251 |
| Vector Signal Generator | Rohde Schwarz | SMJ100A | 11/01/11 | 12/01/11 | 100148 |
| 8960 Series 10 Wireless Comms. Test Set | Agilent | E5515C | 11/03/07 | 12/03/07 | GB43461134 |
| Thermo hygrometer | BODYCOM | BJ5478 | 11/01/13 | 12/01/13 | 090205-2 |
| DC Power Supply | HP | 6622A | 11/03/07 | 12/03/07 | 3448A03760 |
| High-pass filter | Wainwright | WHNX2.1 | 11/09/30 | 12/09/30 | 1 |
| High-Pass Filter | Wainwright | D82346 | 11/09/30 | 12/09/30 | 9 |
| Tunable Notch Filter | Wainwright | WRCT800.0 /960.0-0.2/40-8SSK | N/A | N/A | 32 |
| Tunable Notch Filter | Wainwright | WRCD1700.0 /2000.0-0.2/40-10SSK | N/A | N/A | 53 |
| HORN ANT | ETS | 3115 | 11/09/06 | 12/09/06 | 21097 |
| HORN ANT | ETS | 3115 | 11/03/22 | 12/03/22 | 6419 |
| HORN ANT | Schwarzbeck | BBHA9120A | 10/04/13 | 12/04/13 | 322 |
| HORN ANT | A.H.Systems | SAS-574 | 11/03/25 | 13/03/25 | 154 |
| HORN ANT | A.H.Systems | SAS-574 | 11/03/25 | 13/03/25 | 155 |
| Dipole Antenna | Schwarzbeck | VHA9103 | 11/11/22 | 12/11/22 | 2116 |
| Dipole Antenna | Schwarzbeck | VHA9103 | 11/11/22 | 12/11/22 | 2117 |
| Dipole Antenna | Schwarzbeck | UHA9105 | 11/11/22 | 12/11/22 | 2261 |
| Dipole Antenna | Schwarzbeck | UHA9105 | 11/11/22 | 12/11/22 | 2262 |
| Attenuator (3dB) | WEINSCHL | 56-3 | 11/09/30 | 12/09/30 | Y2342 |
| Attenuator (10dB) | WEINSCHL | 23-10-34 | 11/09/30 | 12/09/30 | BP4386 |
| Attenuator (10dB) | WEINSCHL | 31696 | 11/09/30 | 12/09/30 | 446 |
| Amplifier (30dB) | Agilent | 8449B | 11/03/07 | 12/03/07 | 3008A01590 |
| Amplifier | EMPOWER | BBS3Q7ELU | 11/09/30 | 12/09/30 | 1020 |
| BICONICAL ANT. | Schwarzbeck | VHA 9103 | 10/12/21 | 12/12/21 | 91031946 |
| LOG-PERIODIC ANT. | Schwarzbeck | UHALP9108A | 10/07/07 | 12/07/07 | 590 |
| Amplifier (25dB) | Agilent | 8447D | 11/03/07 | 12/03/07 | 2944A10144 |

5. SUMMARY OF TEST RESULTS

| FCC Part Section(s) | Parameter | Status Note 1 |
|--|--|-------------------------|
| 2.1046 | Conducted Output Power | C |
| 22.913(a) 24.232(c) | Effective Radiated Power Equivalent Isotropic Radiated Power | C |
| 22.917(a) 24.238(a) 2.1049 | Occupied Bandwidth | C |
| 22.917(a) 24.238(a) 2.1051 | Band Edge Spurious and Harmonic Emissions at Antenna Terminal | C |
| 24.232(d) | Peak to Average Ratio | C |
| 22.917(a) 24.238(a) 2.1053 | Radiated Spurious and Harmonic Emissions | C |
| 22.355 24.235 2.1055 | Frequency Stability | C |
| <p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> | | |

The sample was tested according to the following specification:
ANSI C-63.4-2003, ANSI/TIA/EIA-603-C-2004

6. SAMPLE CALCULATION

A. Emission Designator

GSM850 Emission Designator

Emission Designator = **244KGXW**

GSM OBW = 244.31 kHz

(Measured at the 99.75% power bandwidth)

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

GSM1900 Emission Designator

Emission Designator = **247KGXW**

GSM BW = 247.39 kHz

(Measured at the 99.75% power bandwidth)

G = Phase Modulation

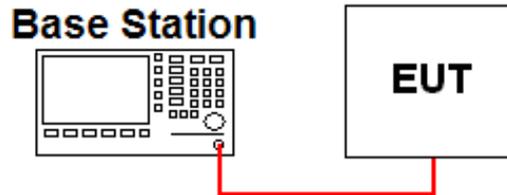
X = Cases not otherwise covered

W = Combination (Audio/Data)

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



▪ GSM / GPRS / EDGE

| Band | Channel | Test Result(dBm) | | | | | | | | |
|----------|---------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | GSM | GPRS 1 TX Slot | GPRS 2 TX Slot | GPRS 3 TX Slot | GPRS 4 TX Slot | EDGE 1 TX Slot | EDGE 2 TX Slot | EDGE 3 TX Slot | EDGE 4 TX Slot |
| Cellular | 128 | 33.20 | 33.20 | 32.05 | 29.62 | 28.61 | N/A | N/A | N/A | N/A |
| | 190 | 33.20 | 33.20 | 32.04 | 29.62 | 28.62 | N/A | N/A | N/A | N/A |
| | 251 | 33.20 | 33.19 | 32.01 | 29.58 | 28.60 | N/A | N/A | N/A | N/A |
| PCS | 512 | 30.20 | 30.20 | 28.79 | 27.28 | 25.81 | N/A | N/A | N/A | N/A |
| | 661 | 30.20 | 30.20 | 28.81 | 27.27 | 25.83 | N/A | N/A | N/A | N/A |
| | 810 | 30.20 | 30.20 | 28.94 | 27.45 | 25.98 | N/A | N/A | N/A | N/A |

The power was measured E5515C

7.2 PEAK TO AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.1

7.3 OCCUPIED BANDWIDTH

| Band | Channel | Test Result(KHz) |
|---------|---------|------------------|
| GSM850 | 128 | 244.31 |
| | 190 | 243.13 |
| | 251 | 242.58 |
| GSM1900 | 512 | 243.11 |
| | 661 | 246.71 |
| | 810 | 247.39 |

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.2

7.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

- Plots of the EUT's Conducted Spurious Emissions are shown in Clause 8.3

7.5 BAND EDGE

- Plots of the EUT's Band Edge are shown in Clause 8.4

7.6 EFFECTIVE RADIATED POWER(GSM850)**- GSM850 data**

| Channel | EUT Position | TEST CONDITIONS | | | Power Step: 5 | | |
|------------|--------------|------------------|------------|--------------|---------------|----------------|------------|
| | | Ref. level (dBm) | Pol. (H/V) | ERP (dBm) | ERP (W) | Power Supply | Note. |
| 128 | Y | -6.47 | V | 28.96 | 0.787 | DC 3.7V | GSM |
| 190 | X | -5.03 | H | 28.97 | 0.789 | DC 3.7V | GSM |
| 251 | X | -3.85 | H | 29.75 | 0.944 | DC 3.7V | GSM |

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT is placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation is adjusted for the highest reading on the receive spectrum analyzer.

For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz.

A half-wave dipole is substituted in place of the EUT. This dipole antenna is driven by a signal generator and the level of the signal generator is adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and the highest power is reported in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.7 EQUIVALENT ISOTROPIC RADIATED POWER(GSM1900)**- GSM1900 data**

| Channel | EUT Position | TEST CONDITIONS Power Step: 0 | | | | | | Note |
|------------|--------------|-------------------------------|------------|----------------|--------------|--------------|----------------|------------|
| | | Ref. level (dBm) | Pol. (H/V) | Ant Gain (dBi) | EIRP (dBm) | EIRP (W) | Power Supply | |
| 512 | Y | -9.37 | V | 8.59 | 28.93 | 0.782 | DC 3.7V | GSM |
| 661 | Z | -8.81 | V | 8.68 | 29.97 | 0.993 | DC 3.7V | GSM |
| 810 | Z | -8.05 | V | 8.77 | 30.37 | 1.089 | DC 3.7V | GSM |

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT is placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation is adjusted for the highest reading on the receive spectrum analyzer.

For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz.

A half-wave dipole is substituted in place of the EUT. This dipole antenna is driven by a signal generator and the level of the signal generator is adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and the highest power is reported in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8 RADIATED SPURIOUS EMISSIONS

7.8.1 RADIATED SPURIOUS EMISSIONS(GSM850)

| Channel (ERP) | Freq. (MHz) | EUT Position | POL (H/V) | LEVEL@ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | (dBc) | Limit (dBc) |
|-----------------|-------------|--------------|-----------|--------------------------------|-------------------------------|-------------------------------|-------|-------------|
| 128 (0.787W) | 1648.47 | X | H | -43.30 | 5.83 | -37.47 | 66.43 | 41.96 |
| | 2473.30 | X | H | -52.58 | 7.16 | -45.42 | 74.37 | |
| | 3296.80 | Y | V | -42.36 | 7.49 | -34.87 | 63.83 | |
| 190 (0.789W) | 1673.05 | X | H | -48.07 | 5.90 | -42.17 | 71.14 | 41.97 |
| | 3346.18 | Y | V | -48.42 | 7.09 | -41.33 | 70.30 | |
| | 4183.39 | Y | V | -47.31 | 7.48 | -39.83 | 68.81 | |
| 251 (0.944W) | 1697.66 | X | H | -48.74 | 5.98 | -42.76 | 72.52 | 42.75 |
| | 3395.35 | X | H | -49.25 | 7.12 | -42.13 | 71.88 | |
| | 4243.36 | X | H | -46.91 | 7.48 | -39.43 | 69.18 | |

- Limit Calculation = $43 + 10 \log_{10} (\text{ERP [W]})$ [dBc]

- Emissions were not reported greater than below 35dB of the Limit.

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT is placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation is 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.

This device was tested under all configurations and the highest power is reported in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.2 RADIATED SPURIOUS EMISSIONS(GSM1900)

| Channel (EIRP) | Freq. (MHz) | EUT Position | POL (H/V) | LEVEL@ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | (dBc) | Limit (dBc) |
|-----------------|-------------|--------------|-----------|--------------------------------|-------------------------------|-------------------------------|-------|-------------|
| 512 (0.782W) | 5550.39 | Z | V | -49.98 | 11.11 | -38.87 | 67.80 | 41.93 |
| | 7400.71 | Z | V | -33.64 | 11.53 | -22.11 | 51.04 | |
| | 9250.94 | Z | V | -37.43 | 11.44 | -25.99 | 54.92 | |
| 661 (0.993W) | 5640.22 | Z | V | -48.94 | 11.16 | -37.78 | 67.75 | 42.97 |
| | 7520.23 | Z | V | -40.15 | 11.51 | -28.64 | 58.61 | |
| | 9377.57 | Z | V | -35.38 | 11.58 | -23.79 | 53.76 | |
| 810 (1.089W) | 5729.41 | Z | V | -48.11 | 11.21 | -36.90 | 67.27 | 43.37 |
| | 7639.60 | Y | V | -42.36 | 11.48 | -30.88 | 61.25 | |
| | 9549.05 | Y | V | -37.77 | 11.78 | -25.99 | 56.36 | |

- Limit Calculation = $43 + 10 \log_{10} (\text{EIRP [W]})$ [dBc]
- Emissions were not reported greater than below 30dB of the Limit.

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT is placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation is 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.

This device was tested under all configurations and the highest power is reported in GSM mode and using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.

This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

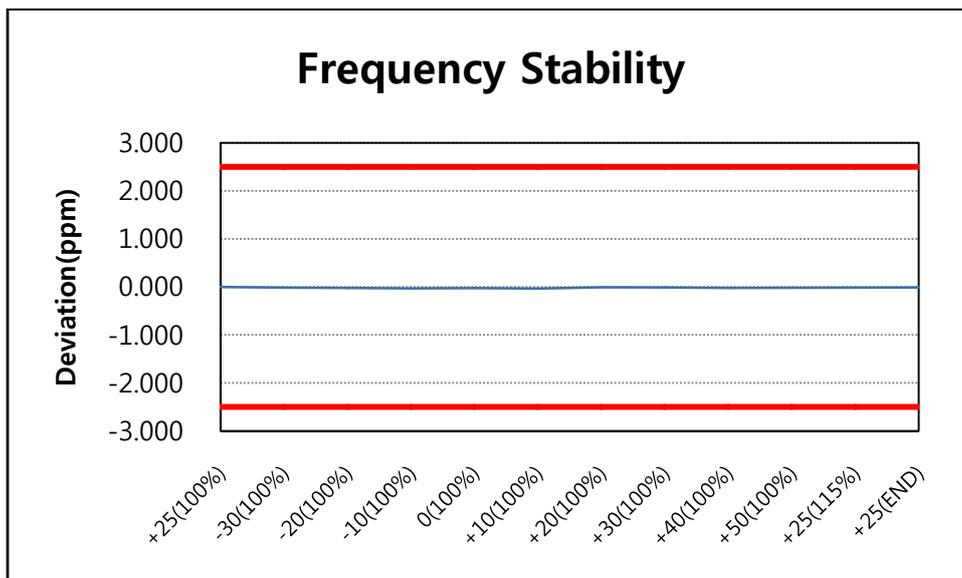
The worst case data is reported.

7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.9.1 FREQUENCY STABILITY (GSM850)

OPERATING FREQUENCY : 836,600,023 Hz
 CHANNEL : 190(Mid)
 REFERENCE VOLTAGE : 3.70 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

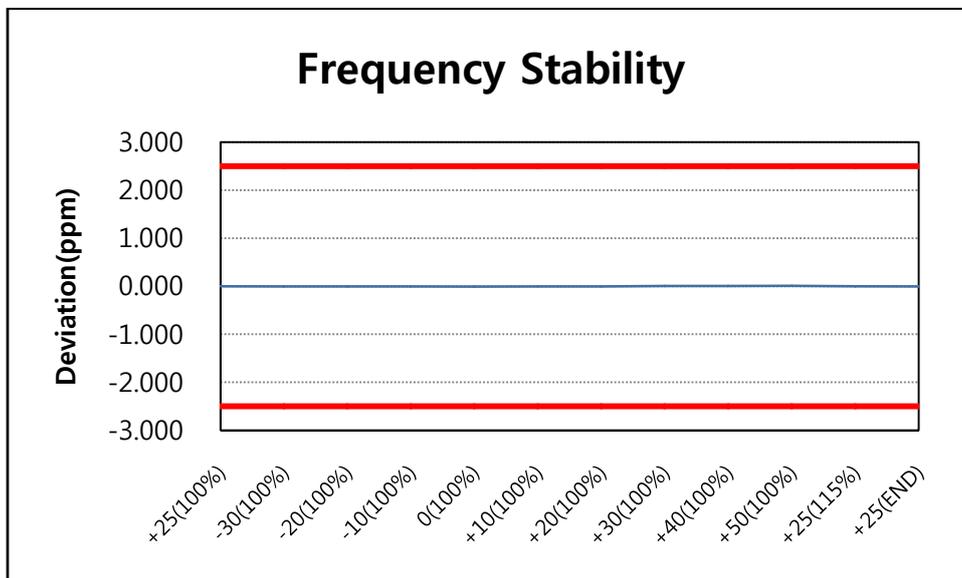
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|-------------|-----------|-------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | +25(Ref) | 836,600,023 | 0.000 | 0.00000000 |
| 100% | | -30 | 836,600,012 | -0.013 | -0.00000131 |
| 100% | | -20 | 836,600,006 | -0.020 | -0.00000203 |
| 100% | | -10 | 836,599,997 | -0.031 | -0.00000311 |
| 100% | | 0 | 836,600,002 | -0.025 | -0.00000251 |
| 100% | | +10 | 836,599,994 | -0.035 | -0.00000347 |
| 100% | | +20 | 836,600,017 | -0.007 | -0.00000072 |
| 100% | | +30 | 836,600,013 | -0.012 | -0.00000120 |
| 100% | | +40 | 836,600,006 | -0.020 | -0.00000203 |
| 100% | | +50 | 836,600,009 | -0.017 | -0.00000167 |
| 115% | 4.255 | +25 | 836,600,011 | -0.014 | -0.00000143 |
| BATT.ENDPOINT | 3.145 | +25 | 836,600,013 | -0.012 | -0.00000120 |



7.9.2 FREQUENCY STABILITY (GSM1900)

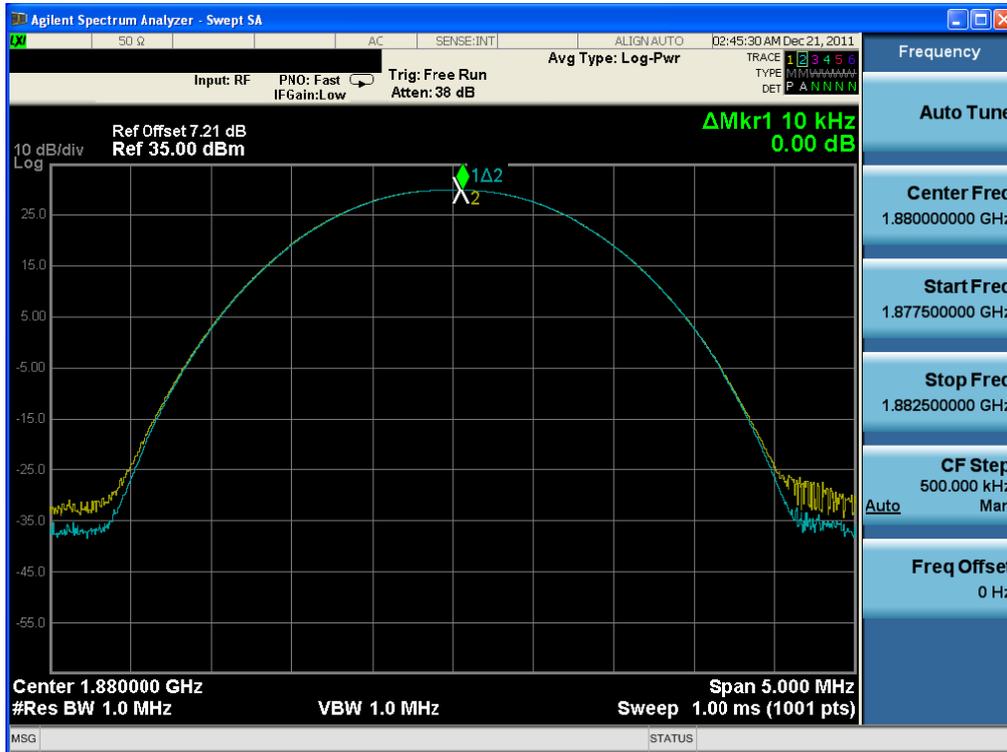
OPERATING FREQUENCY : 1,8879,999,997 Hz
 CHANNEL : 661(Mid)
 REFERENCE VOLTAGE : 3.70 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|---------------|-----------|-------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | +25(Ref) | 1,879,999,997 | 0.000 | 0.00000000 |
| 100% | | -30 | 1,879,999,990 | -0.004 | -0.00000037 |
| 100% | | -20 | 1,879,999,987 | -0.005 | -0.00000053 |
| 100% | | -10 | 1,879,999,988 | -0.005 | -0.00000048 |
| 100% | | 0 | 1,879,999,984 | -0.007 | -0.00000069 |
| 100% | | +10 | 1,879,999,989 | -0.004 | -0.00000043 |
| 100% | | +20 | 1,879,999,993 | -0.002 | -0.00000021 |
| 100% | | +30 | 1,880,000,006 | 0.005 | 0.00000048 |
| 100% | | +40 | 1,880,000,010 | 0.007 | 0.00000069 |
| 100% | | +50 | 1,880,000,012 | 0.008 | 0.00000080 |
| 115% | 4.255 | +25 | 1,879,999,994 | -0.002 | -0.00000016 |
| BATT.ENDPOINT | 3.145 | +25 | 1,879,999,988 | -0.005 | -0.00000048 |

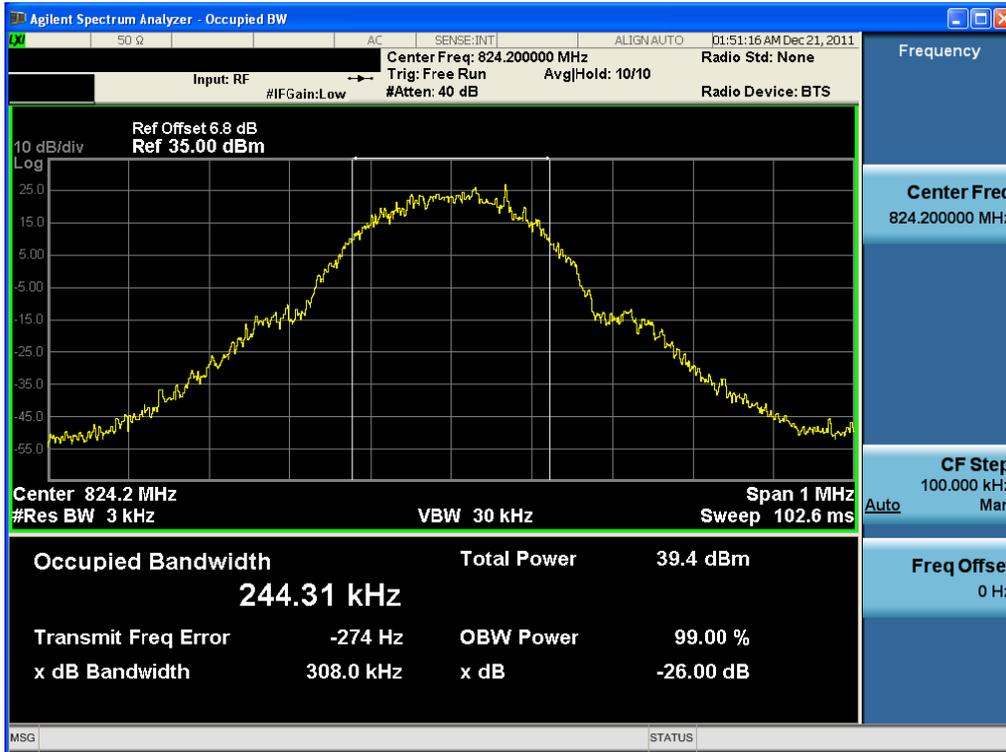


8. TEST PLOTS

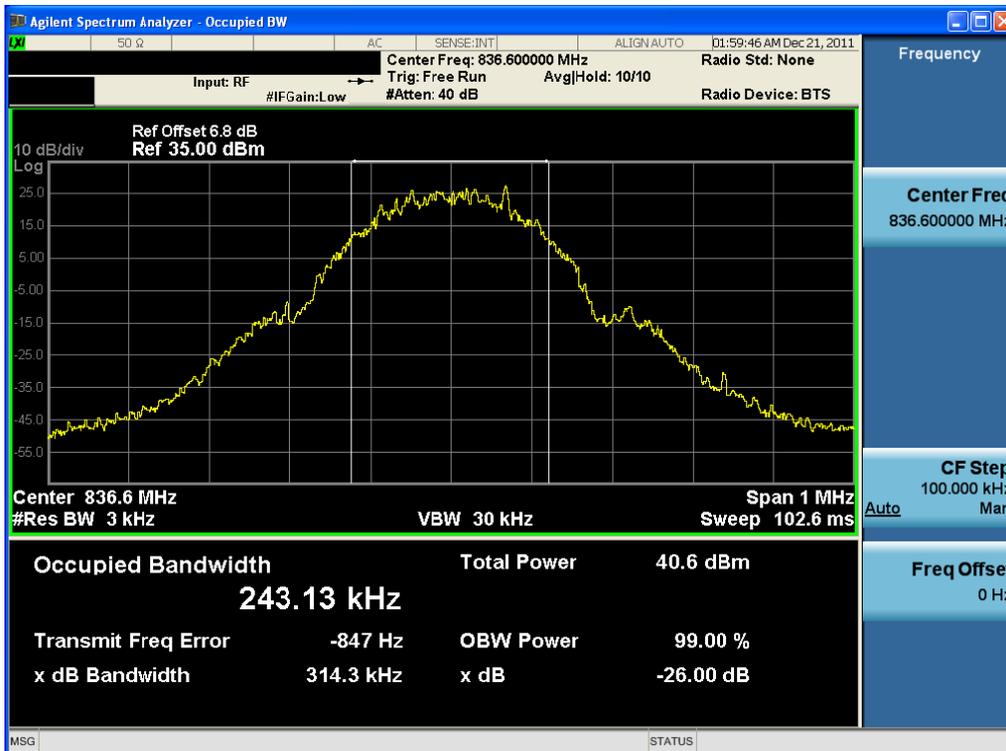
8.1 Peak to Average Ratio GSM1900 & Channel: 661



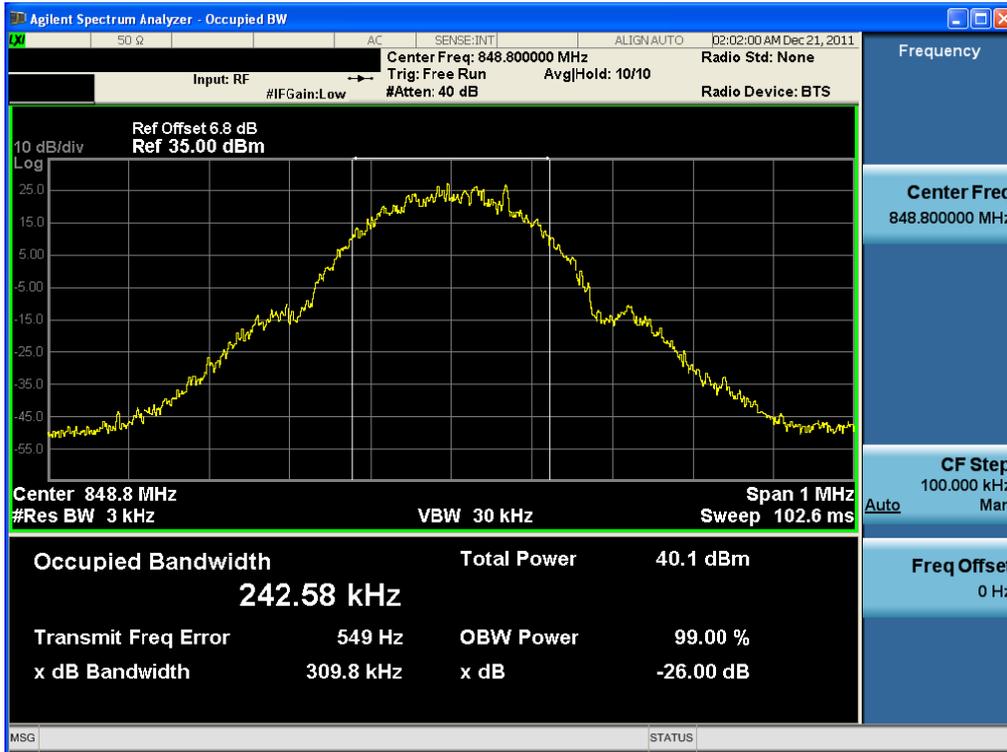
8.2 Occupied Bandwidth 99 % Bandwidth GSM850 & Channel: 128



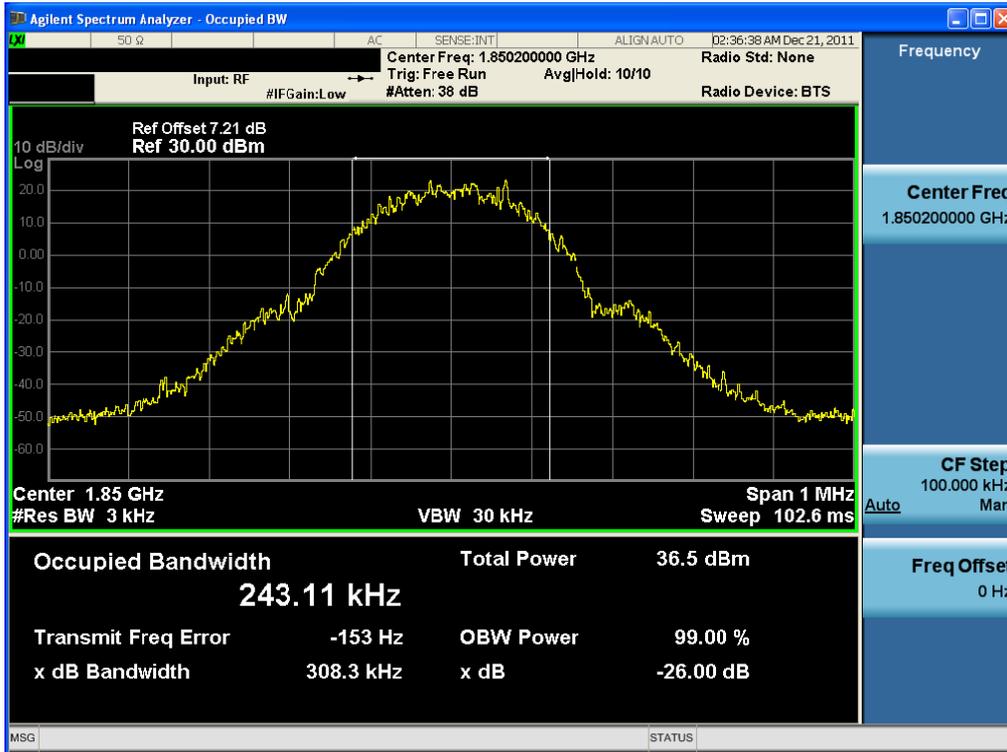
GSM850 & Channel: 190



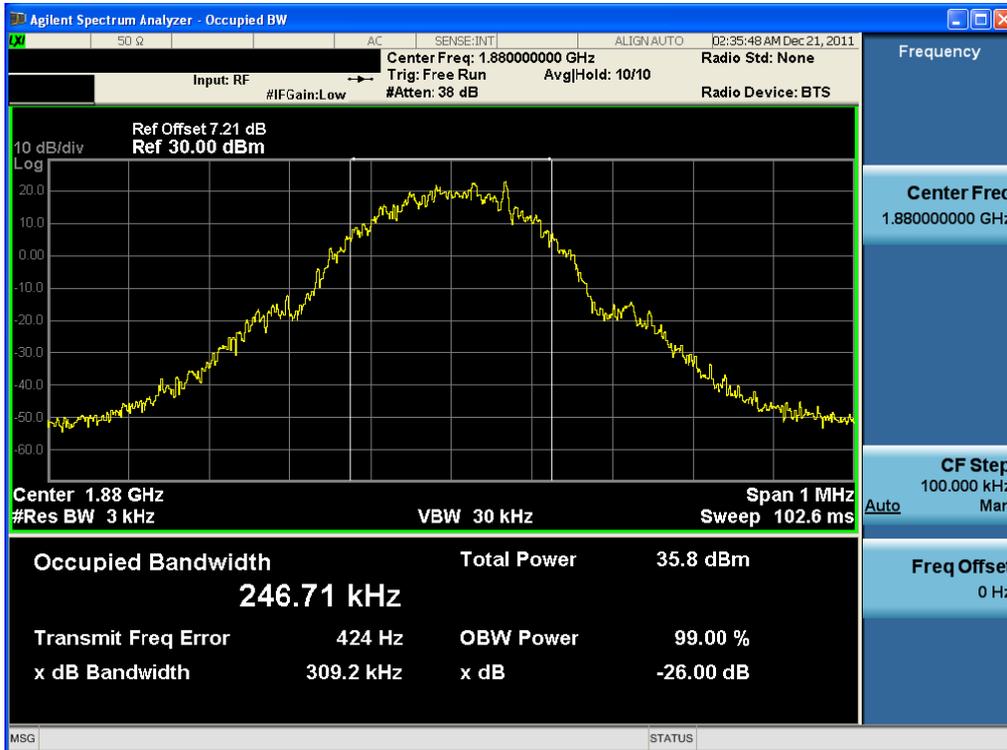
GSM850 & Channel: 251



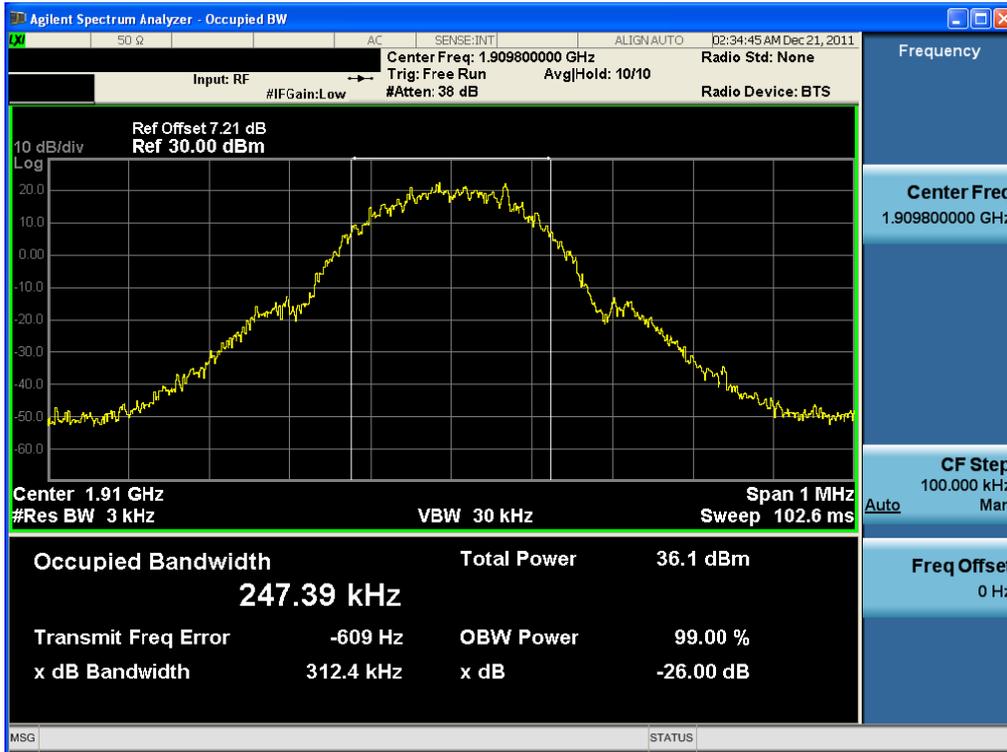
GSM 1900 & Channel: 512



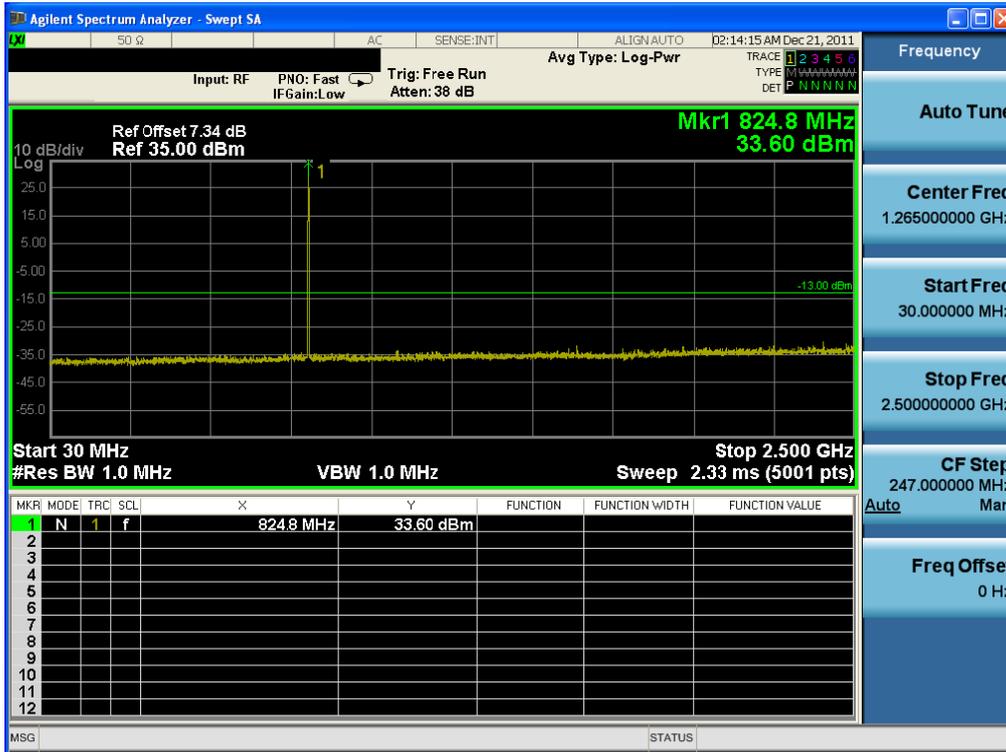
GSM 1900 & Channel: 661



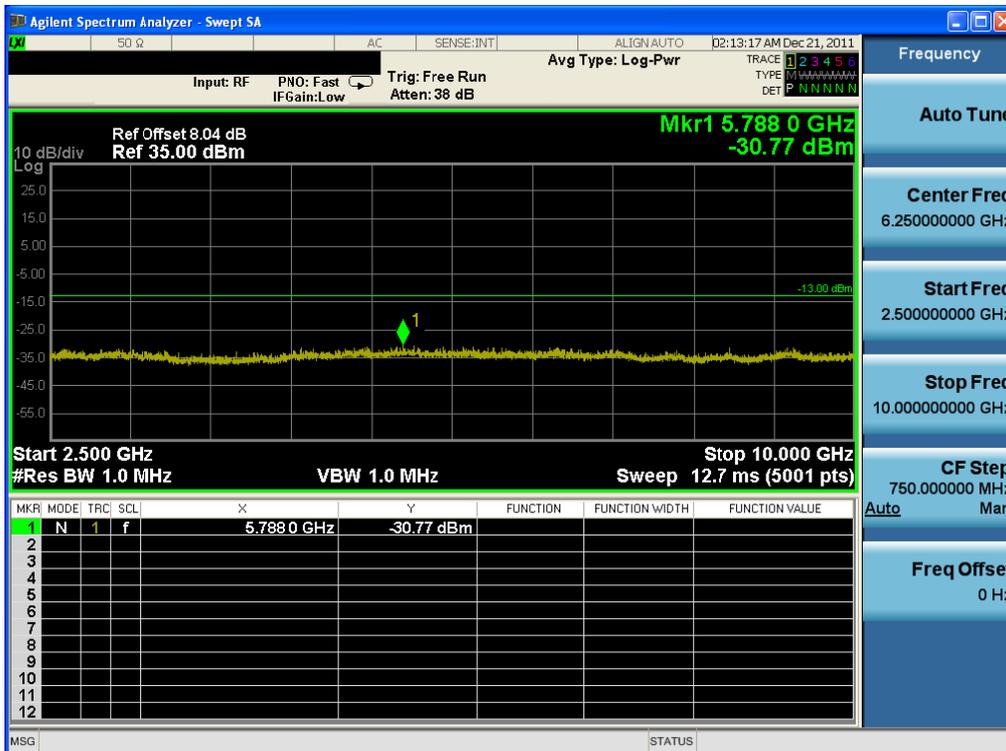
GSM 1900 & Channel: 810



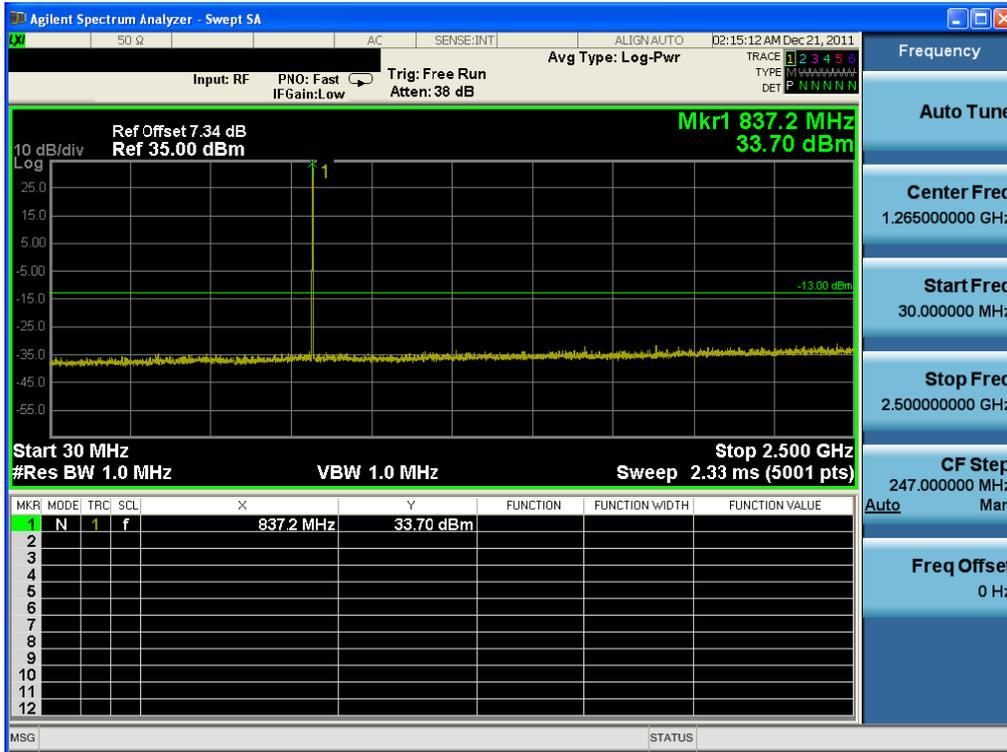
8.3 Spurious Emissions at Antenna Terminal GSM850 & Channel: 128



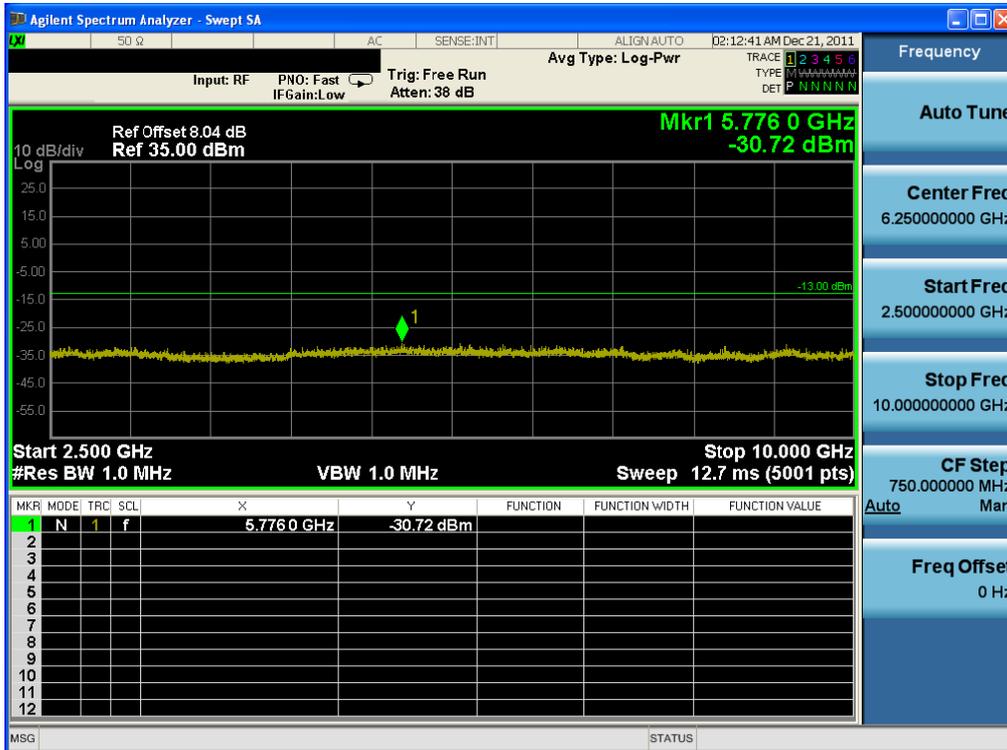
GSM850 & Channel: 128



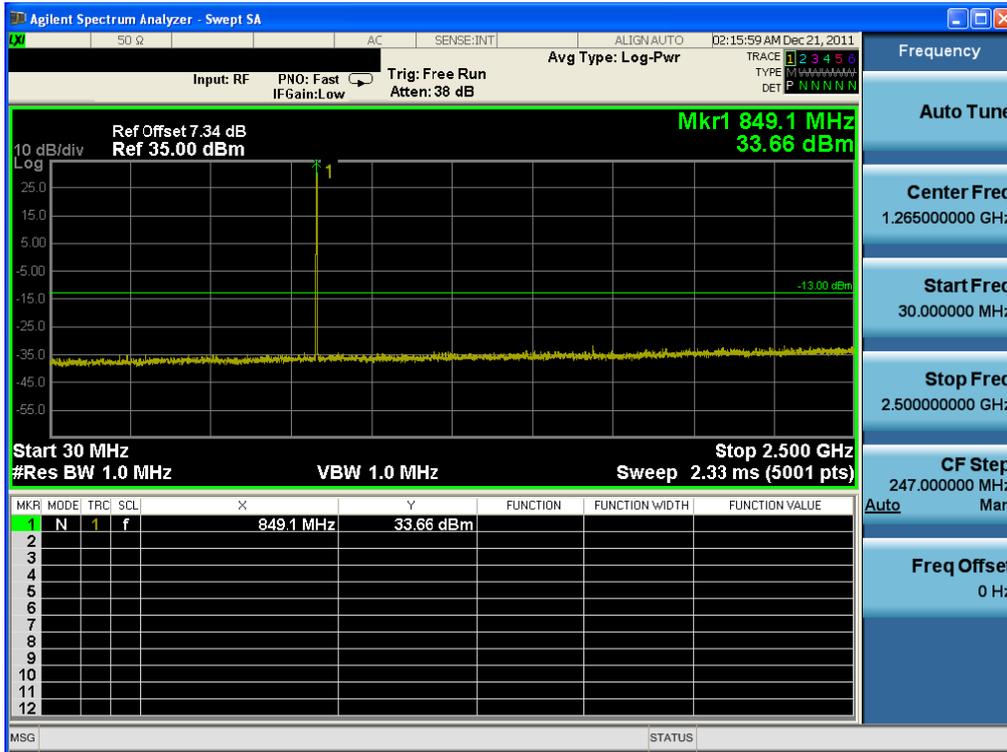
GSM850 & Channel: 190



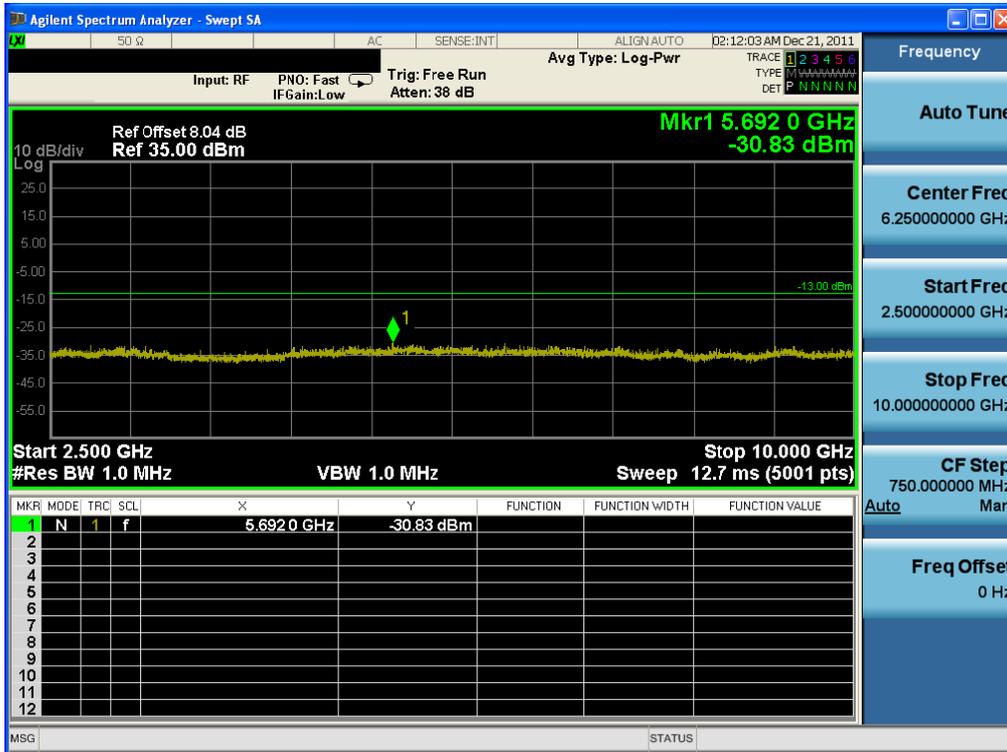
GSM850 & Channel: 190



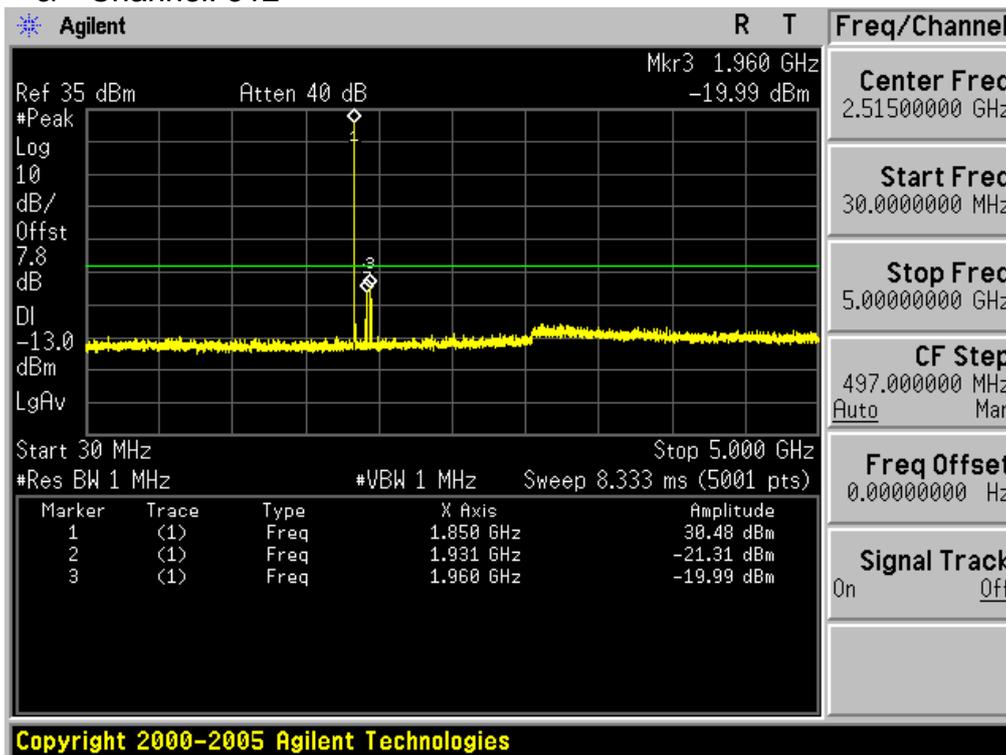
GSM850 & Channel: 251



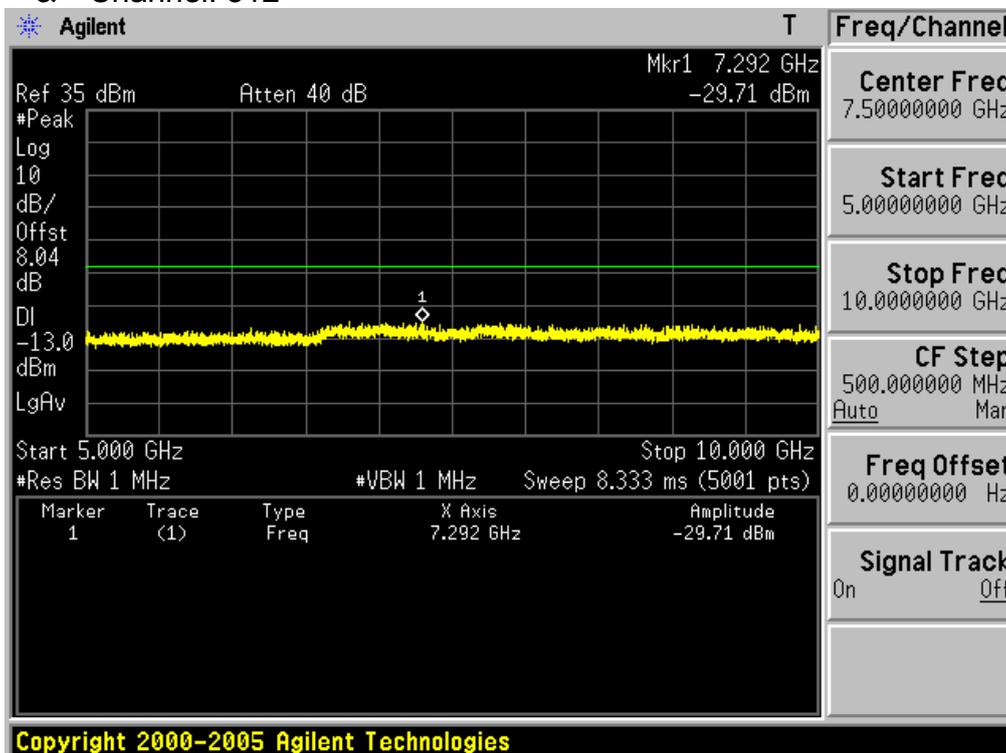
GSM850 & Channel: 251



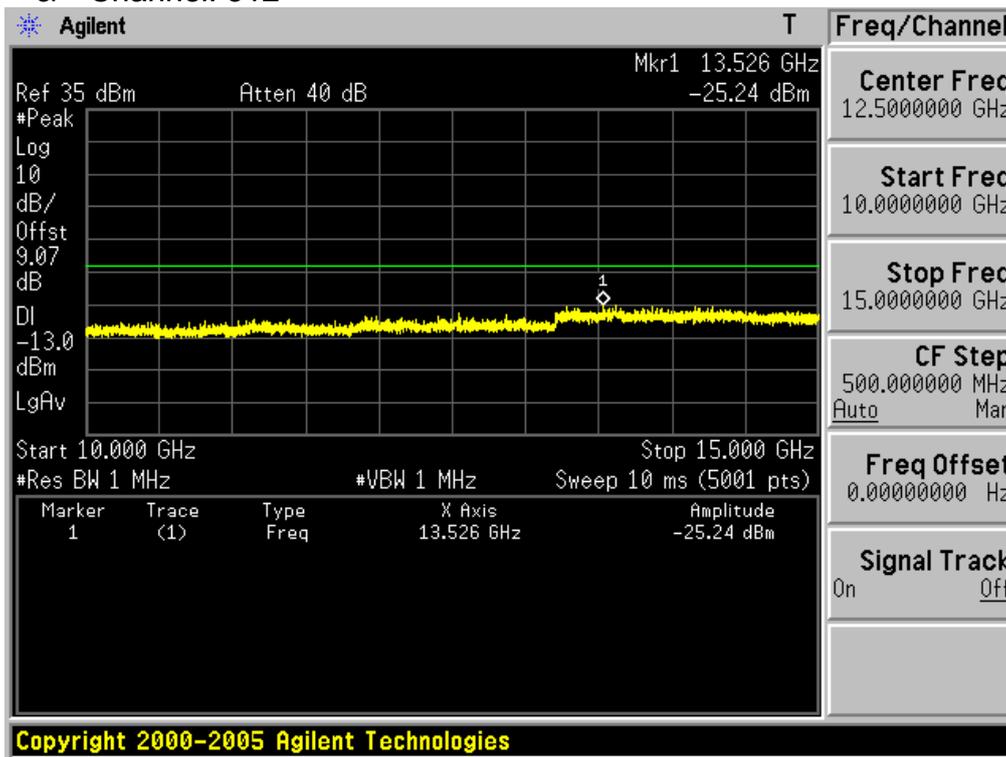
PCS1900 & Channel: 512



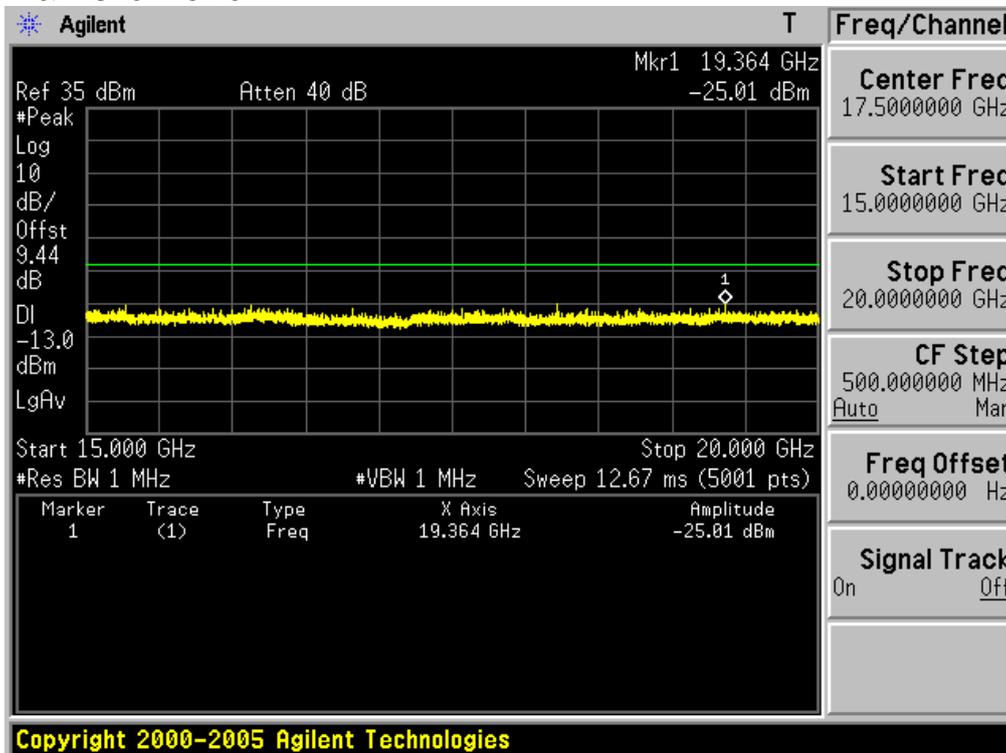
PCS1900 & Channel: 512



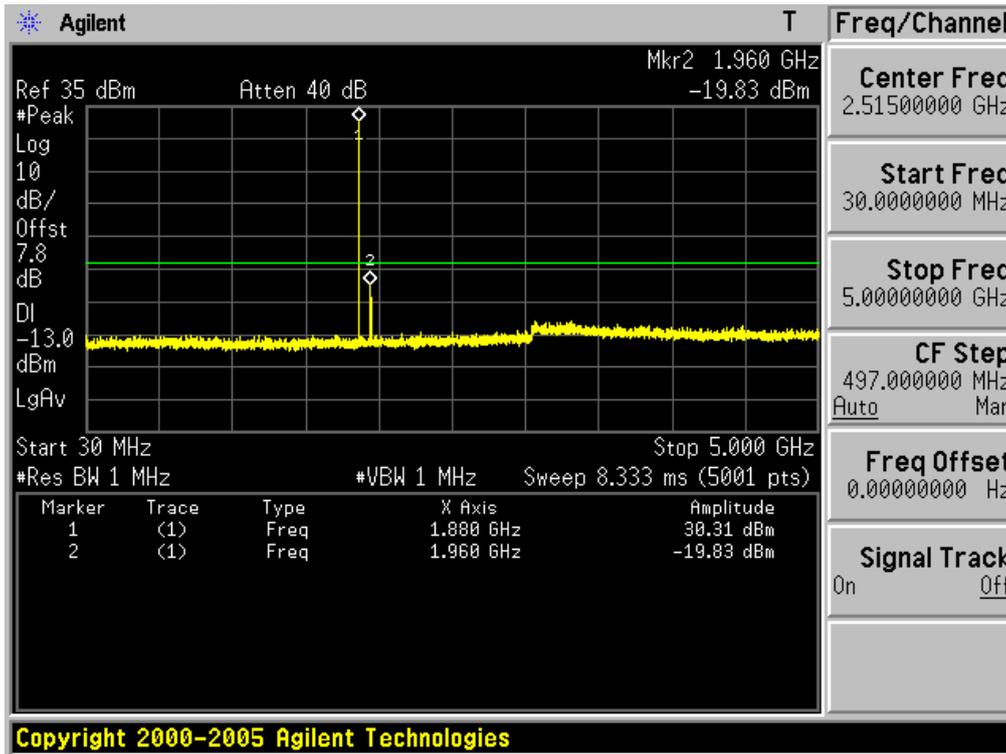
PCS1900 & Channel: 512



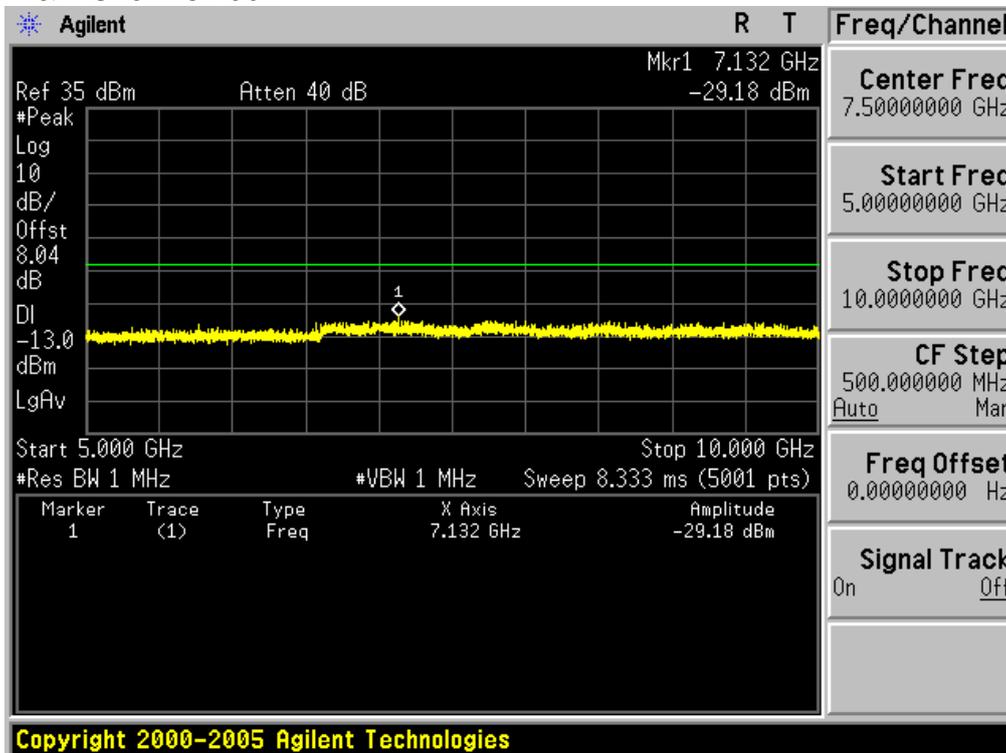
PCS1900 & Channel: 512



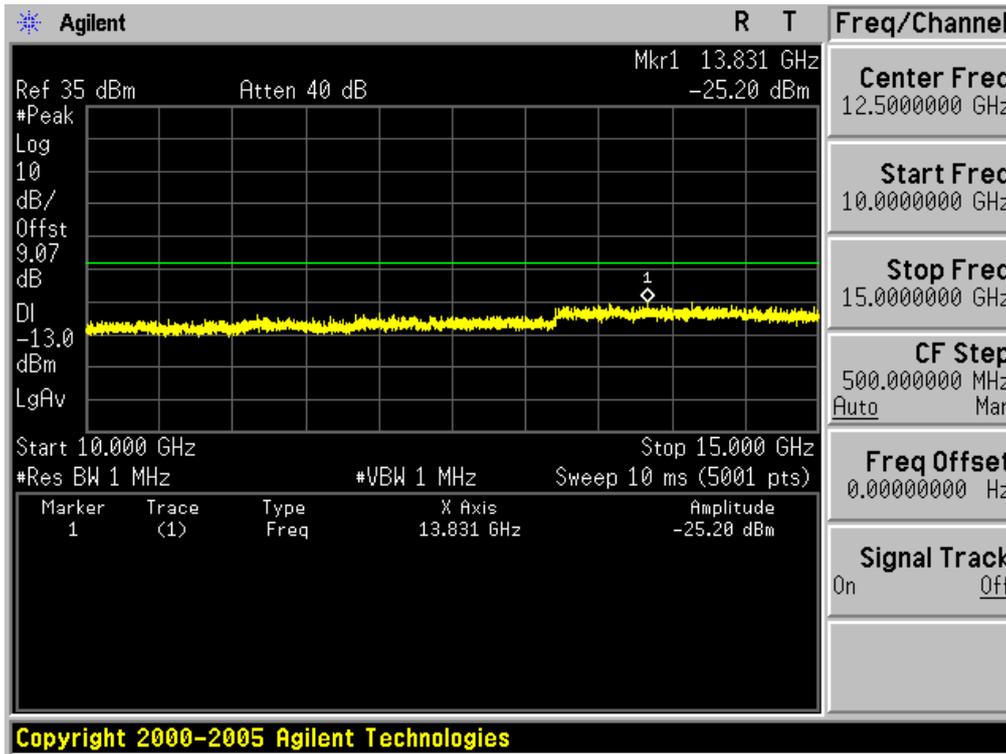
PCS1900 & Channel: 661



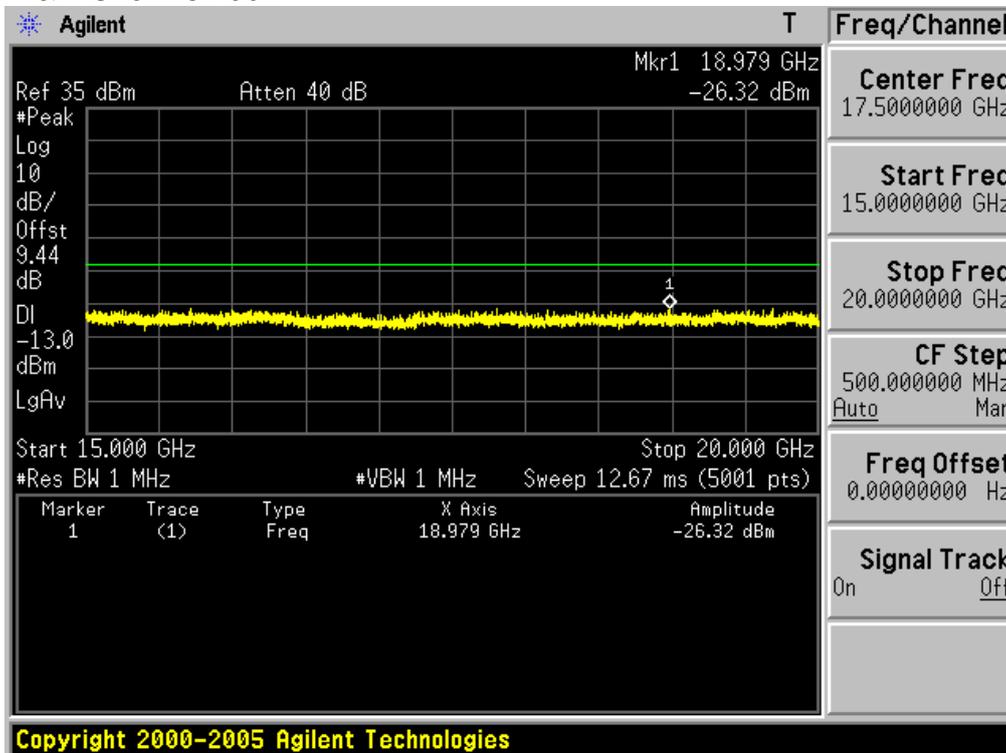
PCS1900 & Channel: 661



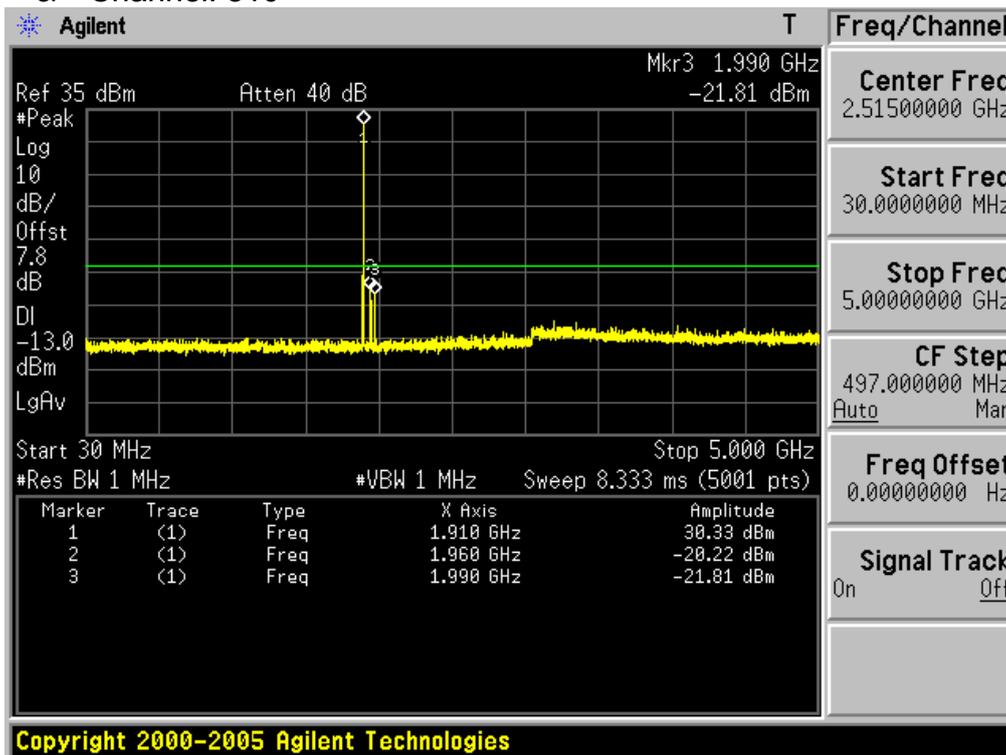
PCS1900 & Channel: 661



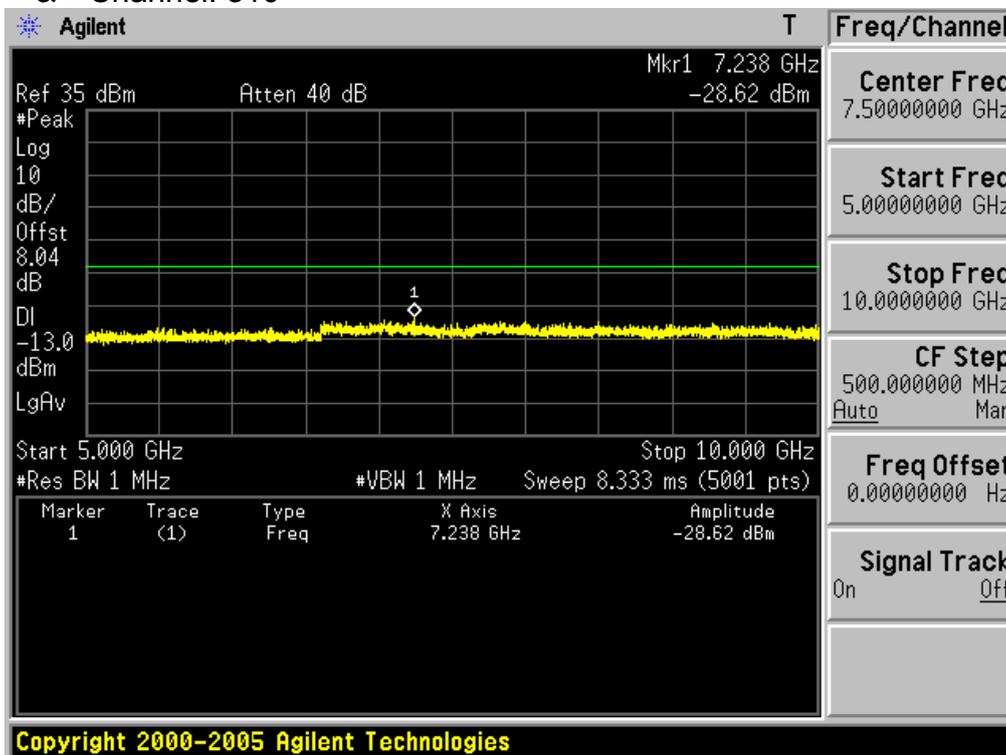
PCS1900 & Channel: 661



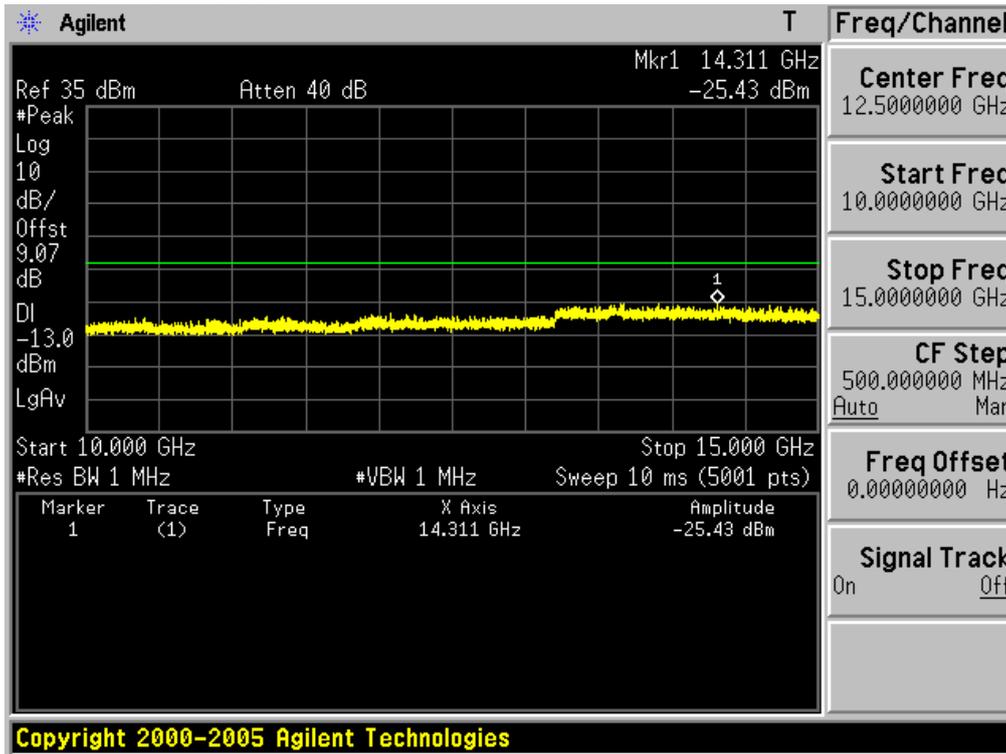
PCS1900 & Channel: 810



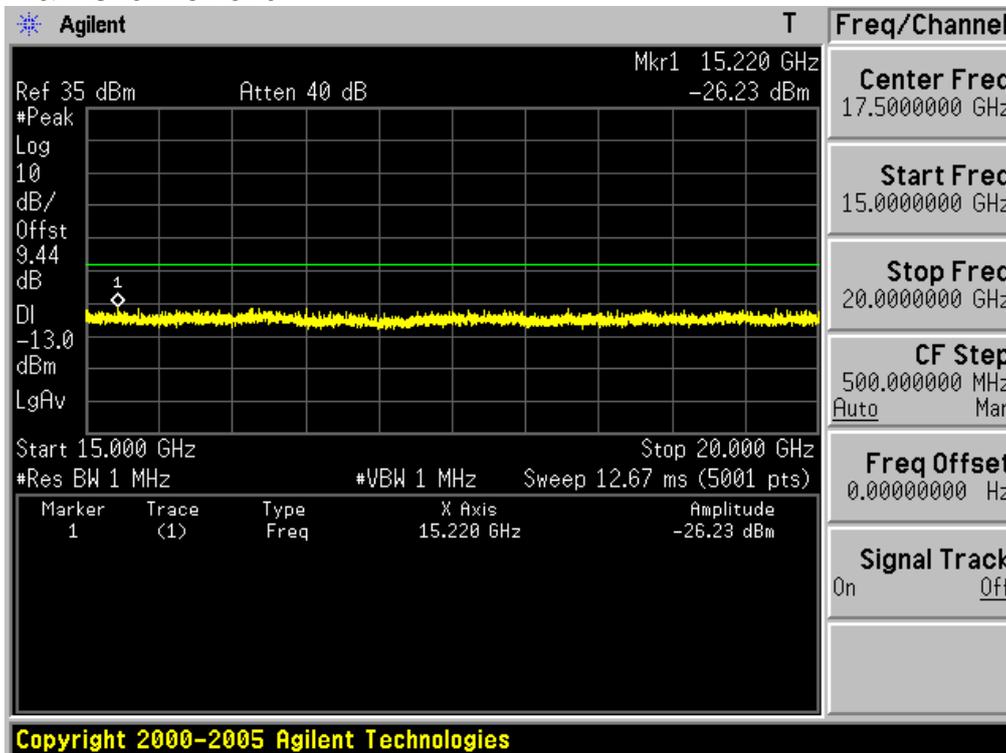
PCS1900 & Channel: 810



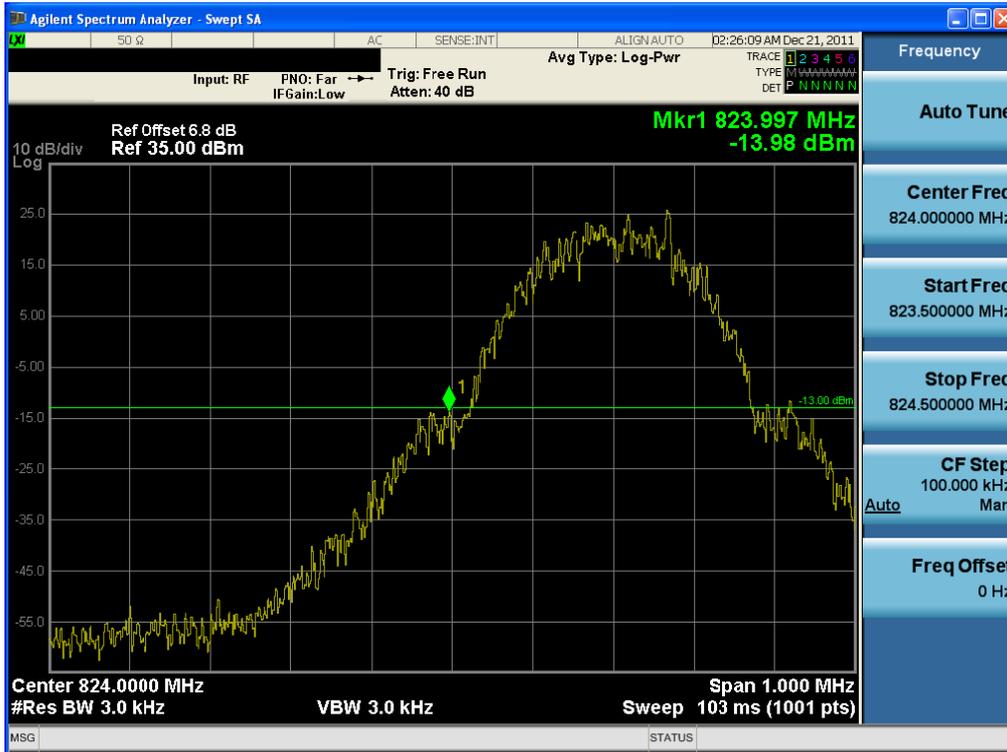
PCS1900 & Channel: 810



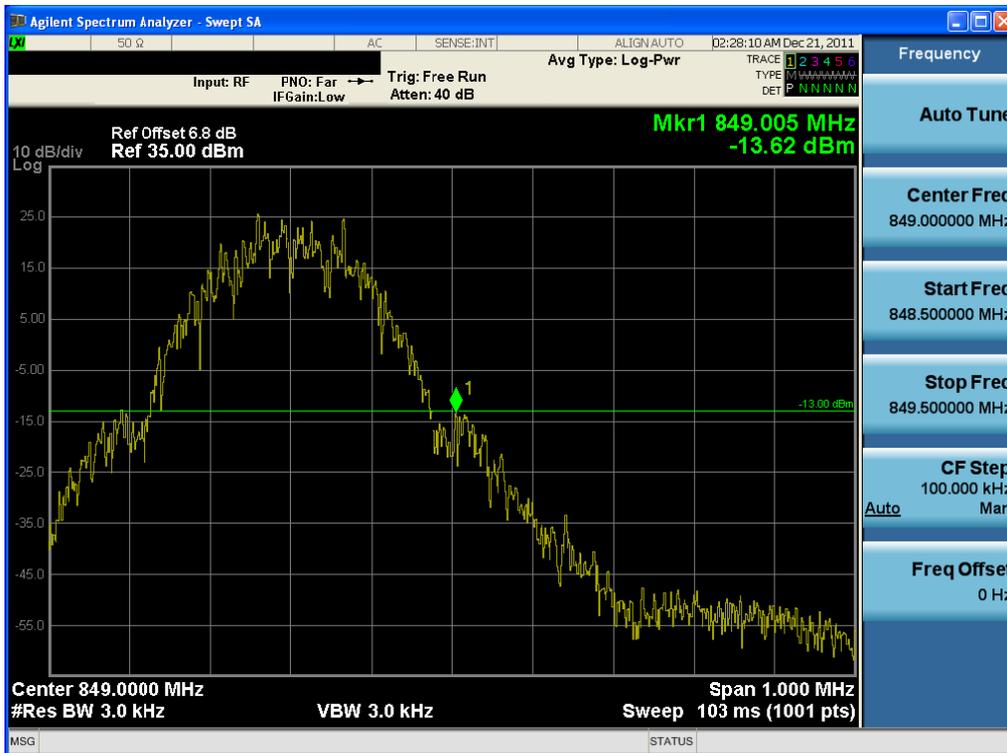
PCS1900 & Channel: 810



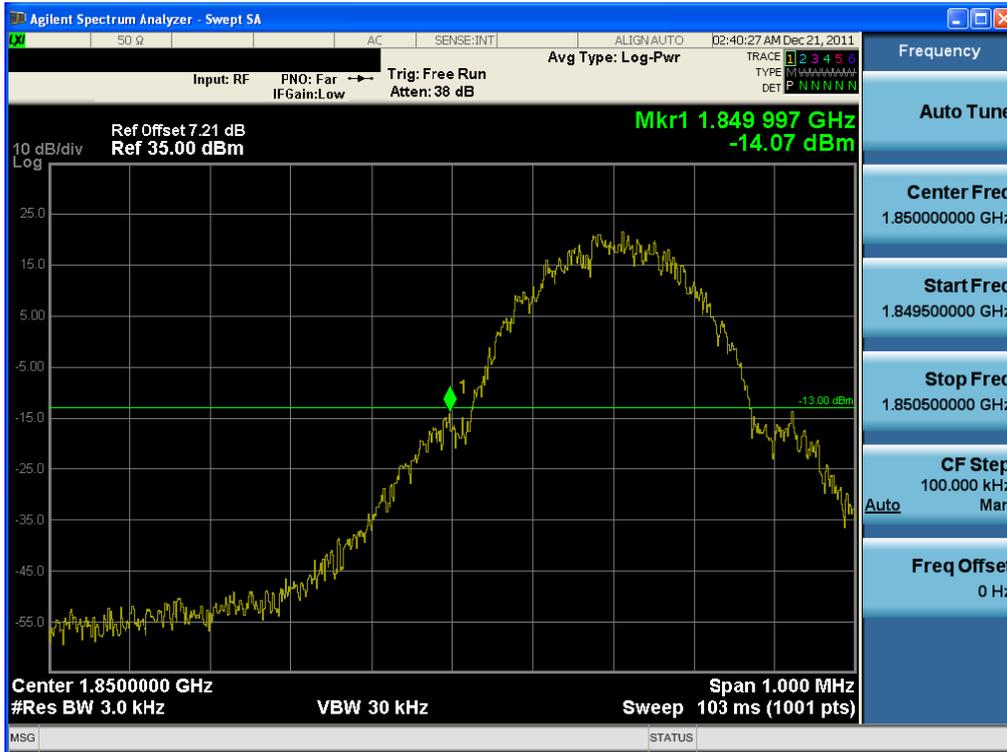
8.4 Band Edge GSM850 & Channel: 128



GSM850 & Channel: 251



PCS1900 & Channel: 512



PCS1900 & Channel: 810

