HCT.CO., LTD.
Product Compliance Division
TEL : +82 31 639 8518 FAX : +82 31 639 8525

CERTIFICATE OF COMPLIANCE

FCC Part 24 & 22 Certification

Applicant Name:
SODIFF BMT CO., LTD
Address:
678-7,ChangMan-Ri, GwangTan-Myun, Paju-City, Gyeonggi-Do, Korea

Date of Testing:
September 29, 2008
Test Site/Location:
HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si, Kyungki-do, Korea
Test Report No.: HCT-R08-176
HCT FRN: 0005866421

FCC ID : WJG-S11

APPLICANT : SODIFF BMT CO., LTD

Application Type:	Certification
FCC Classification:	Licensed Portable Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§22, §24, §2
EUT Type:	GSM Phone 850/1800/1900 & B/T
Model:	SGP400
Tx Frequency:	824.20 - 848.80 MHz (GSM850) 1 850.20 – 1 909.80 MHz (GSM1900)
Rx Frequency:	869.20 - 893.80 MHz (GSM850) 1 930.20 – 1 989.80 MHz (GSM1900)
Max. RF Output Power:	0.687 W ERP GSM850 (28.37 dBm) / 0.746 W EIRP GSM1900 (28.73 dBm)
Emission Designator(s):	246KGXW (GSM850), 246KGXW (GSM1900)

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT.CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Jong Seok Lee

Report prepared by
: Jong Seok Lee
Test engineer of RF Part

Sang Jun Lee

Approved by
: Sang Jun Lee
Manager of RF Part

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	**SODIFF BMT CO., LTD**
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Emission Designator(s):	246KGXW (GSM850), 246KGXW (GSM1900)
Antenna Specification	Manufacturer: RadiAnt Antenna type: Internal Antenna Peak Gain: -1.2 dBi
Date(s) of Tests:	September 29, 2008
Place of Tests:	HCT.CO., LTD. San 136-1 Ami-ri, Bubal-eup, Icheon-si,
Report Serial No	HCT-R08-176

2. INTRODUCTION

2.1. EUT DESCRIPTION

The SODIFF BMT CO., LTD, SGP400 consists of GSM850, GSM1900, GPRS Class12.

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.

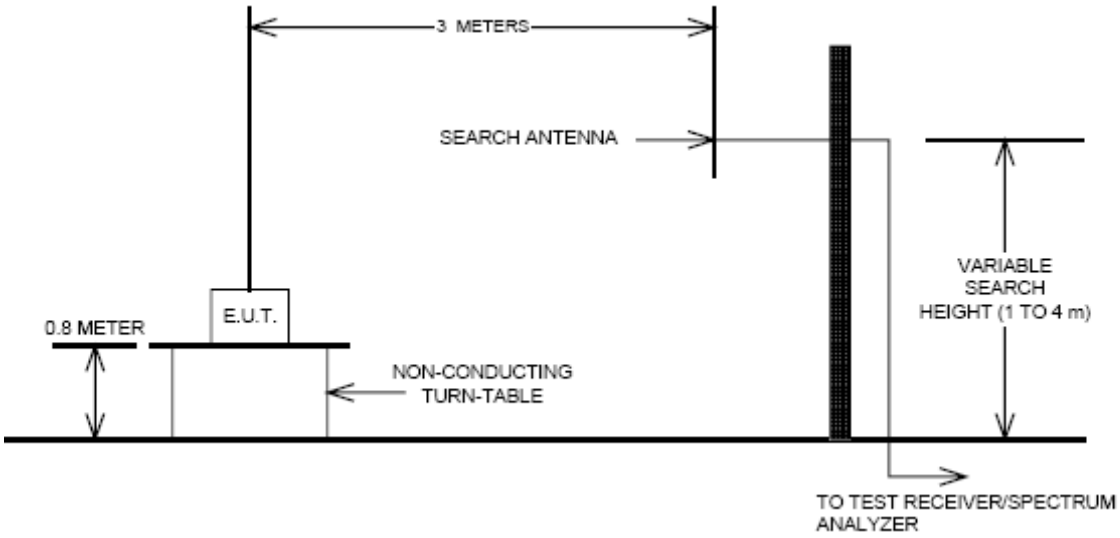
2.3. TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

3. DESCRIPTION OF TESTS

3.1 Effective Radiated Power/Equivalent Isotropic Radiated Power

Test Set-up



Test Procedure

Radiated emission measurements were performed at an open Site.

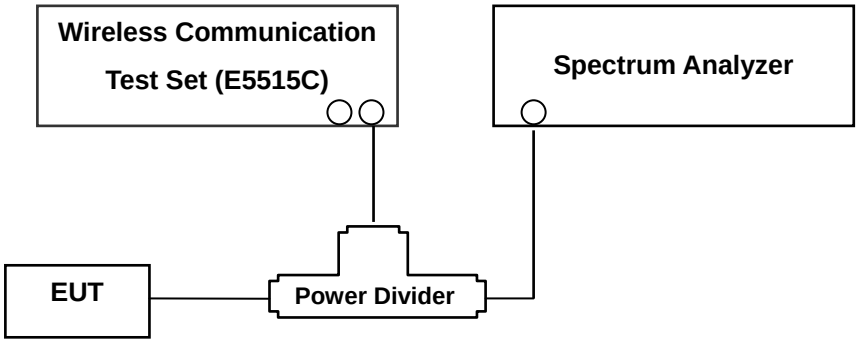
The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

A wooden turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. 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 Occupied bandwidth.

Test set-up



(Configuration of conducted Emission measurement)
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.

3.3 Spurious and Harmonic Emissions at Antenna Terminal.

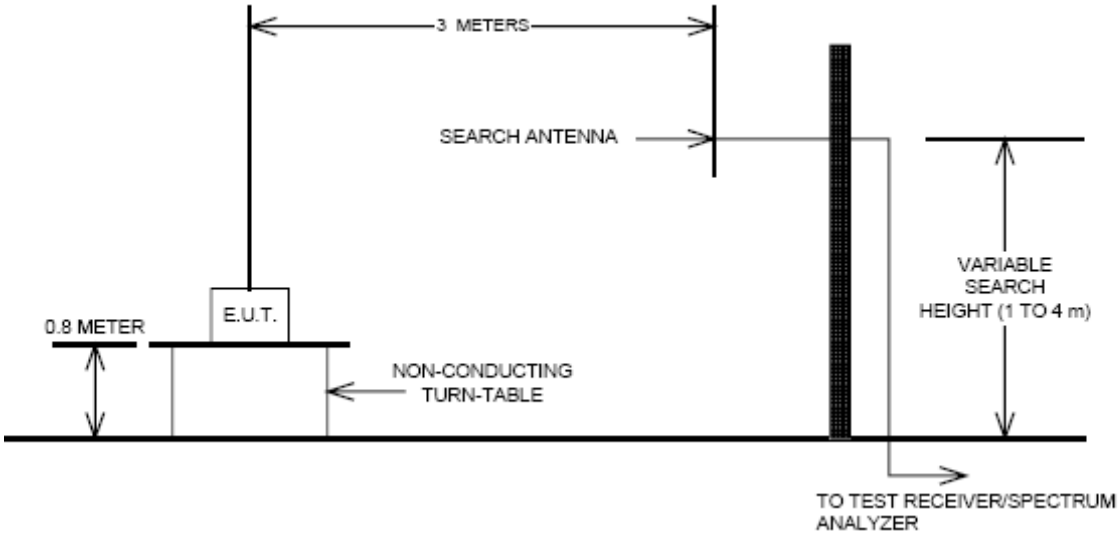
Test Procedure

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 Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz. (GSM1900 Mode: 10 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

3.4 Radiated Spurious and Harmonic Emissions

Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable wooden platform mounted at three from the antenna mast.

1) The unit mounted on a wooden table 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
4) The spectrum shall be scanned up to the 10th harmonic of the fundamental frequency.

Test Procedure

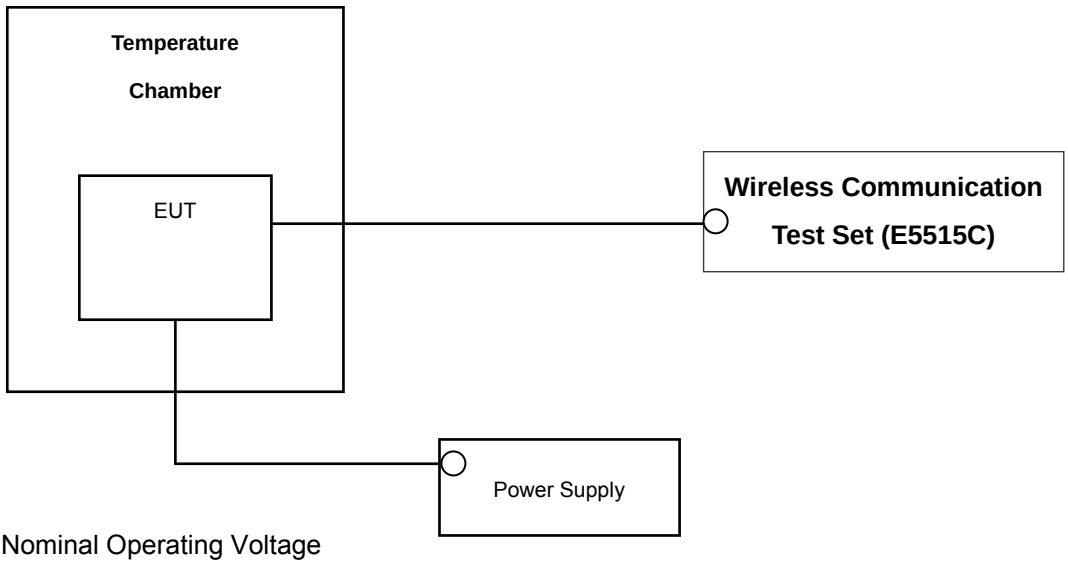
The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.

A wooden turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. 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.

3.5 Frequency stability / variation of ambient temperature

Test Set-up



* Nominal Operating Voltage

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 ± 0.000 25 %(± 2.5 ppm) of the center frequency.

Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°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

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	ESI40/ Spectrum Analyzer	831564/003	Annual	11/06/2008
Agilent	E4419B/ Power Meter	MY41291386	Annual	11/05/2008
Agilent	8481A/ Power Sensor	MY41090870	Annual	11/05/2008
R&S	CMU200/ Base Station	110740	Annual	08/26/2009
Agilent	8960 (E5515C)/ Base Station	GB444400269	Annual	02/11/2009
Tescom	TC-3000/ Bluetooth Simulator	3000A4900112	Annual	01/11/2009
MITEQ	AMF-60-0010 1800-35-20P / AMP	1200937	Annual	01/15/2009
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	06/28/2009
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	06/28/2009
Agilent	778D/ Dual Directional Coupler	16072	Annual	11/09/2008
Agilent	1506A/ Power Divider	99441	Annual	11/10/2008
Digital	EP-3010/ Power Supply	3110117	Annual	12/29/2008
Schwarzbeck	UHAP/ Dipole Antenna	630	Annual	11/13/2008
Schwarzbeck	UHAP/ Dipole Antenna	605	Annual	11/13/2008
R&S	HFH2-Z2/ Loop Antenna	881056/070	Annual	12/11/2008
Korea Engineering	KR-1005L / Chamber	KRAB07063-2CH	Annual	01/05/2009
Schwarzbeck	VULB9160/ TRILOG Antenna	3150	Biennial	04/20/2009
Schwarzbeck	VULB9160/ TRILOG Antenna	3125	Biennial	05/16/2009
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	03/26/2010
Schwarzbeck	BBHA 9120D/ Horn Antenna	1201	Biennial	05/02/2009
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	01/08/2009

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 22.917(a), 24.238(a)	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 22.917(a), 24.238(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	< 43 + $\log_{10}$ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS
2.1046	Conducted Output Power	N/A		PASS
2.1055, 22.355, 24.235	Frequency stability / variation of ambient temperature	< 2.5 ppm		PASS
22.913(a)(2) 24.232(c)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS
	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS
2.1053, 22.917(a), 24.238(a)	Radiated Spurious and Harmonic Emissions	< 43 + $\log_{10}$ (P[Watts]) for all out-of band emissions		PASS

6. SAMPLE CALCULATION

A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL(dBm)	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
GSM850	251	848.80	-7.58	28.59	2.83	1.20	H	1.05	30.22

ERP = SubstitudeLEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (**ERP**).

B. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

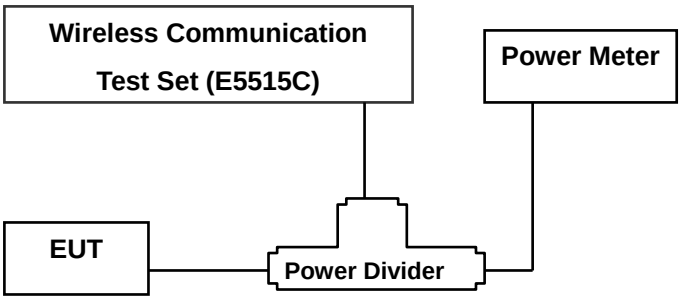
GSM BW = 249 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

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.



Band	Channel	Voice	GPRS Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)
GSM 850	128	32.13	32.12	32.11	32.09	32.05
	190	32.26	32.20	32.18	32.15	32.13
	251	32.36	32.31	32.29	32.26	32.22
GSM 1900	512	29.59	29.60	29.59	29.58	29.56
	661	29.54	29.52	29.52	29.51	29.50
	810	29.56	29.54	29.54	29.52	29.50

(GSM Conducted Output Powers)

7.2 Effective Radiated Power Output (E.R.P)(GSM850)

(GSM850 Mode)

Mode	Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL (dBm)	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
GSM850	128	824.20	-9.12	36.72	-8.32	1.17	H	0.53	27.23
	190	836.60	-9.27	37.22	-8.22	1.19	H	0.60	27.81
	251	848.80	-9.43	37.69	-8.12	1.20	H	0.69	28.37

Note: Standard batteries are the only options for this phone

NOTES:

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

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. 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 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.
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 unit was tested with its standard battery.

7.3 Equivalent Isotropic Radiated Power (E.I.R.P.) (GSM1900)

(GSM1900 Mode)

Mode	Ch./ Freq.		Measured Level(dBm)	Substitude LEVEL (dBm)	Ant. Gain	C.L	Pol.	EIRP	
	channel	Freq.(MHz)						W	dBm
GSM1900	512	1,850.20	-11.01	20.60	10.05	1.91	H	0.75	28.73
	661	1,880.00	-11.50	20.32	10.05	1.95	H	0.70	28.42
	810	1,909.80	-12.02	19.88	10.06	1.97	H	0.63	27.97

Note: Standard batteries are the only options for this phone

NOTES:

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

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

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 unit was tested with its standard battery.

7.4 Radiated Spurious Emissions(GSM850 Mode)

▣ MEASURED OUTPUT POWER: 28.37 dBm = 0.687 W

▣ MODULATION SIGNAL: GSM850

▣ DISTANCE: 3 meters

▣ LIMIT: - (43 + 10 lo_{g10} (W)) = - 41.37 dBc

dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
128	1,648.40	-33.82	7.09	-44.35	1.73	H	-38.99	-67.36
	2,472.60	-39.08	8.12	-46.19	2.28	H	-40.35	-68.72
	3,296.80	-49.16	9.72	-56.74	2.57	H	-49.59	-77.96
190	1,673.20	-32.37	7.23	-43.13	1.79	H	-37.69	-66.06
	2,509.80	-40.98	8.14	-48.11	2.33	H	-42.30	-70.67
	3,346.40	-46.75	9.99	-54.78	2.66	H	-47.45	-75.82
251	1,699.60	-31.00	7.41	-41.61	1.83	H	-36.03	-64.40
	2,549.40	-38.53	8.21	-45.81	2.34	H	-39.94	-68.31
	3,399.20	-46.96	9.91	-54.59	2.85	H	-47.53	-75.90

NOTES: Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

7.5 Radiated Spurious Emissions(GSM1900 Mode)

▣ MEASURED OUTPUT POWER: 28.73 dBm = 0.746 W

▣ MODULATION SIGNAL: GSM1900

▣ DISTANCE: 3 meters

▣ LIMIT: - (43 + 10 $\log_{10}$ (W)) = -41.73 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
512	3,700.40	-35.36	10.31	-41.63	2.73	H	-34.05	-62.78
	5,550.60	-41.87	10.55	-43.45	3.60	H	-36.50	-65.23
	7,400.80	-43.84	9.21	-34.96	3.88	H	-29.63	-58.36
661	3,760.00	-31.52	10.32	-37.49	2.73	H	-29.90	-58.63
	5,640.00	-41.80	10.60	-43.45	3.60	H	-36.45	-65.18
	7,520.00	-47.21	9.18	-38.11	3.88	H	-32.81	-61.54
810	3,819.60	-29.14	10.34	-35.02	2.73	H	-27.41	-56.14
	5,729.40	-44.38	10.65	-45.69	3.60	H	-38.64	-67.37
	7,639.20	-49.83	9.15	-40.50	3.88	H	-35.23	-63.96

NOTES: Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

7.6 Frequency stability / variation of ambient temperature

7.6.1 FREQUENCY STABILITY (GSM850)

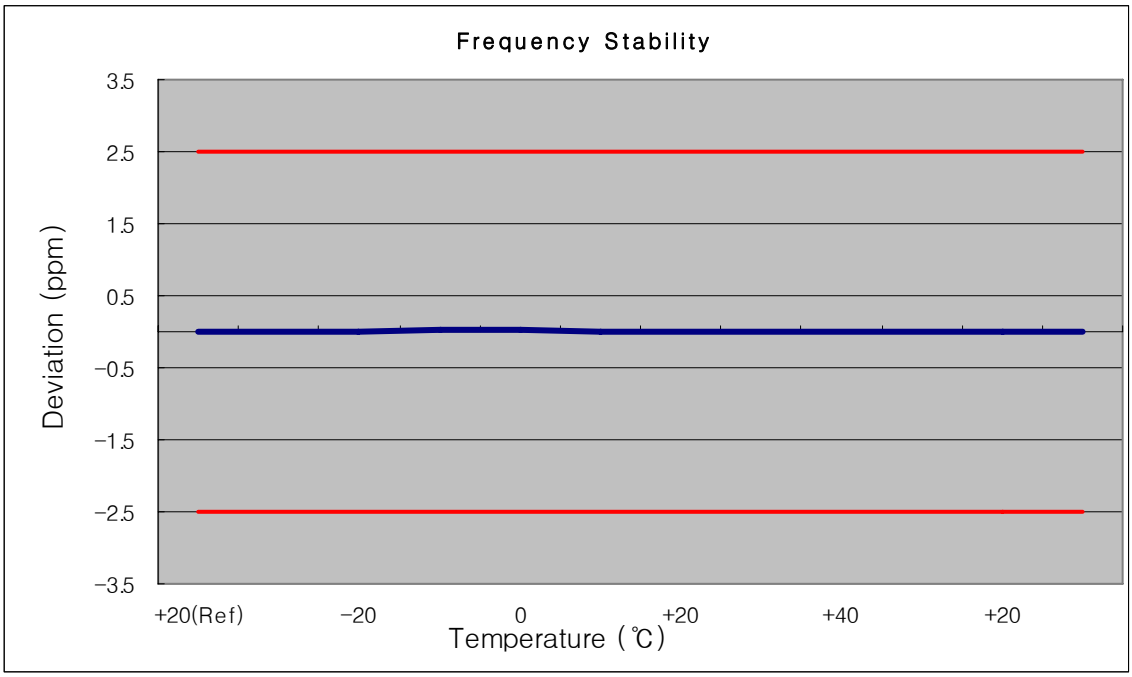
OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL: 190

REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	836 599 991	−8.91	−0.000 001	−0.011
100%		−30	836 600 011	10.59	0.000 001	0.013
100%		−20	836 600 008	8.23	0.000 001	0.010
100%		−10	836 600 015	14.93	0.000 002	0.018
100%		0	836 600 013	12.95	0.000 002	0.015
100%		+10	836 600 010	9.5	0.000 001	0.011
100%		+20	836 600 011	10.74	0.000 001	0.013
100%		+30	836 600 011	11.08	0.000 001	0.013
100%		+40	836 600 006	5.61	0.000 001	0.007
100%		+50	836 600 011	11.48	0.000 001	0.014
115%	4.255	+20	836 600 007	6.92	0.000 001	0.008
Batt. Endpoint	3.400	+20	836 600 011	11.02	0.000 001	0.013



7.6.2 FREQUENCY STABILITY (GSM1900)

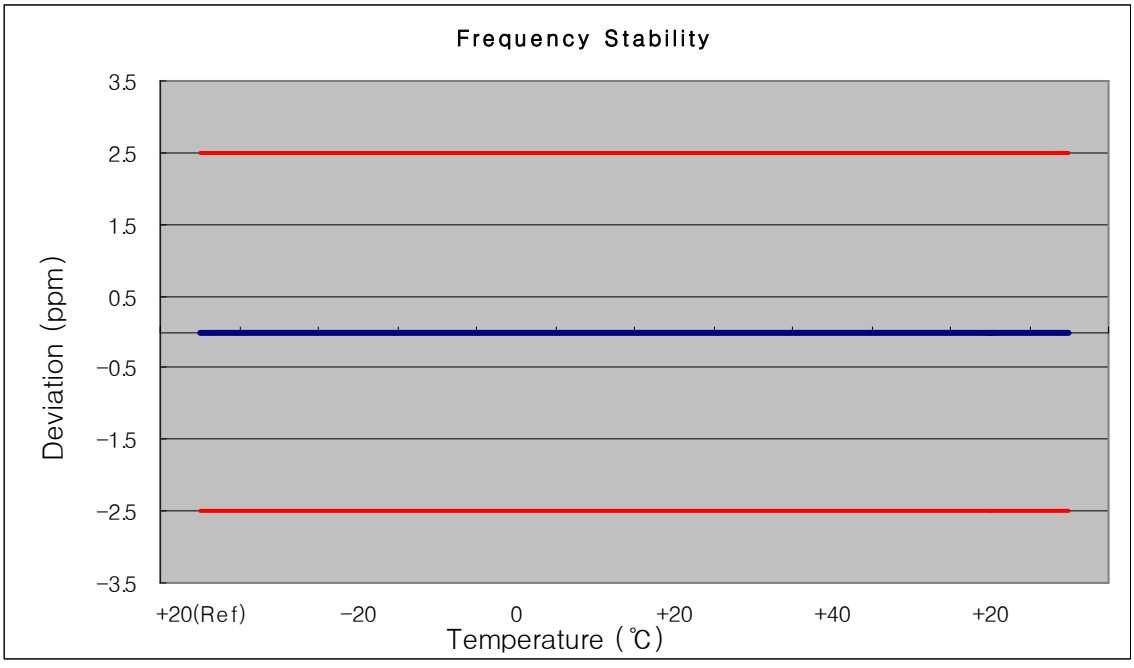
OPERATING FREQUENCY: 1880,000,000 Hz

CHANNEL: 661

REFERENCE VOLTAGE: 3.7 VDC

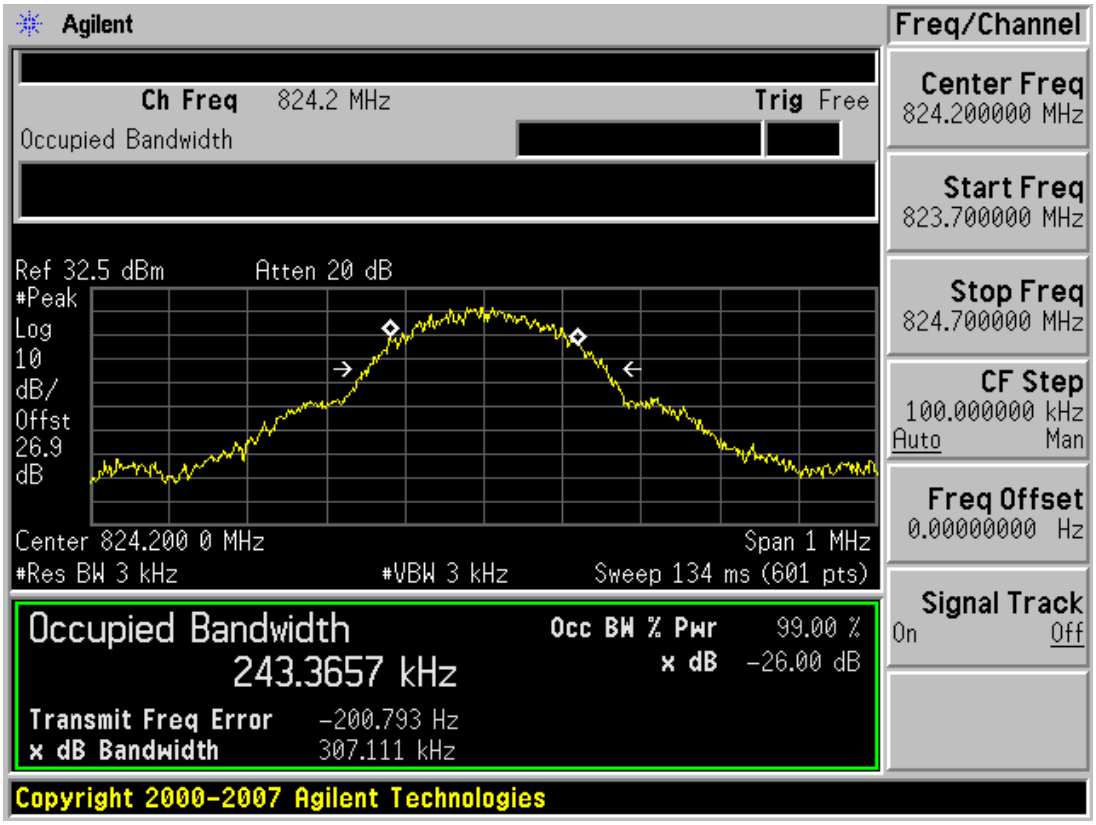
DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	1879 999 965	-35.34	-0.000 002	-0.019
100%		-30	1879 999 968	-31.53	-0.000 002	-0.017
100%		-20	1879 999 972	-28.43	-0.000 002	-0.015
100%		-10	1879 999 976	-23.85	-0.000 001	-0.013
100%		0	1879 999 968	-32.23	-0.000 002	-0.017
100%		+10	1879 999 975	-25.34	-0.000 001	-0.013
100%		+20	1879 999 970	-30.43	-0.000 002	-0.016
100%		+30	1879 999 973	-27.19	-0.000 001	-0.014
100%		+40	1879 999 972	-27.65	-0.000 001	-0.015
100%		+50	1879 999 971	-28.82	-0.000 002	-0.015
115%	4.255	+20	1879 999 974	-25.6	-0.000 001	-0.014
Batt. Endpoint	3.400	+20	1879 999 976	-23.9	-0.000 001	-0.013

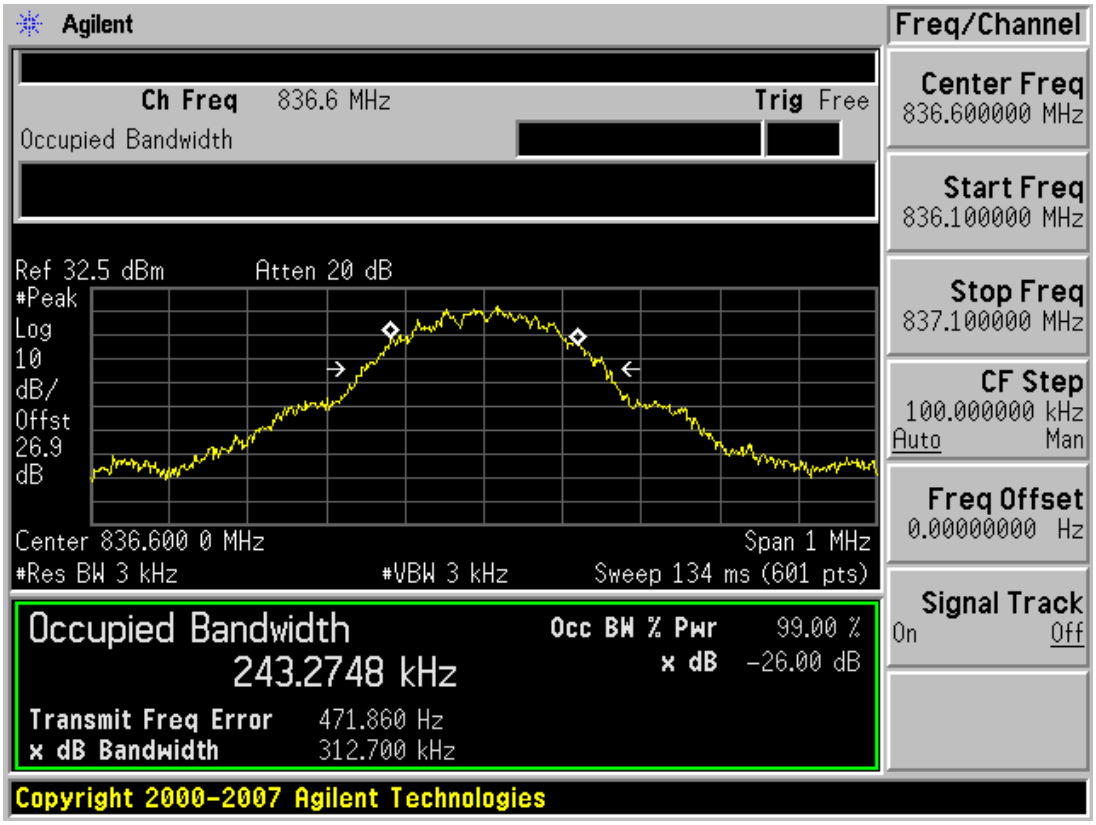


8. TEST PLOTS

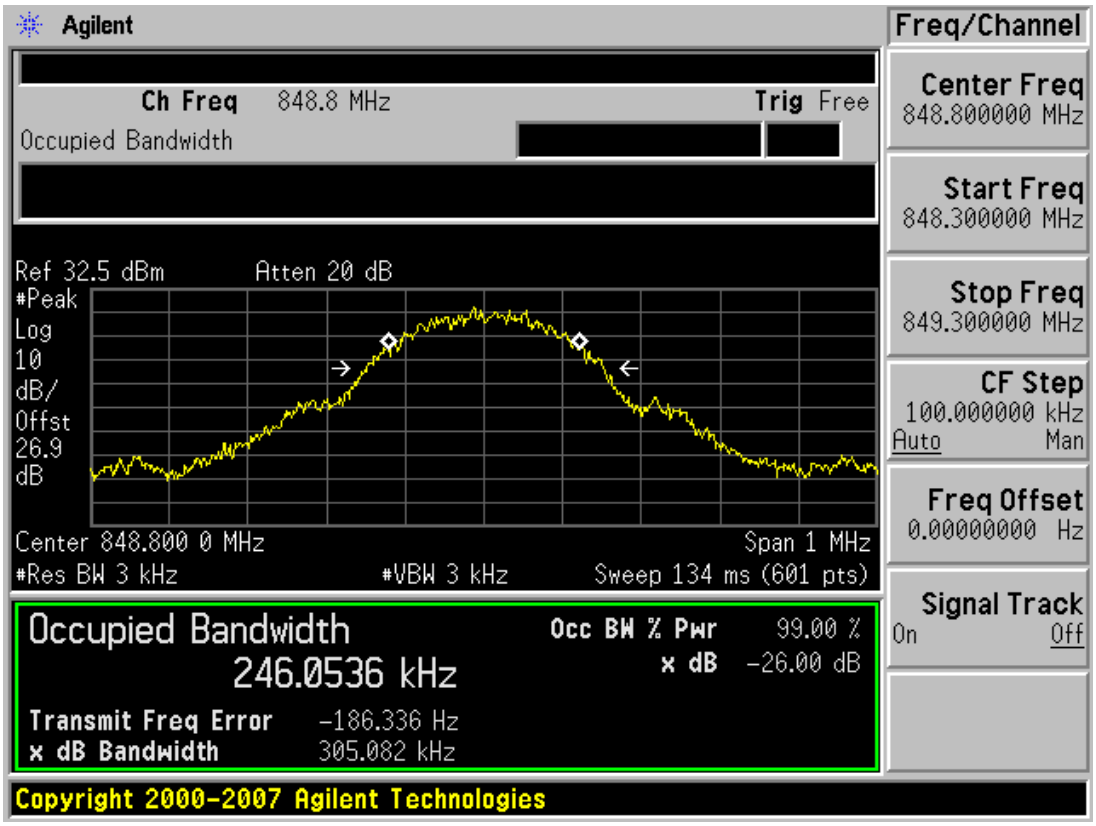
■ GSM850 MODE (128 CH.) Occupied Bandwidth



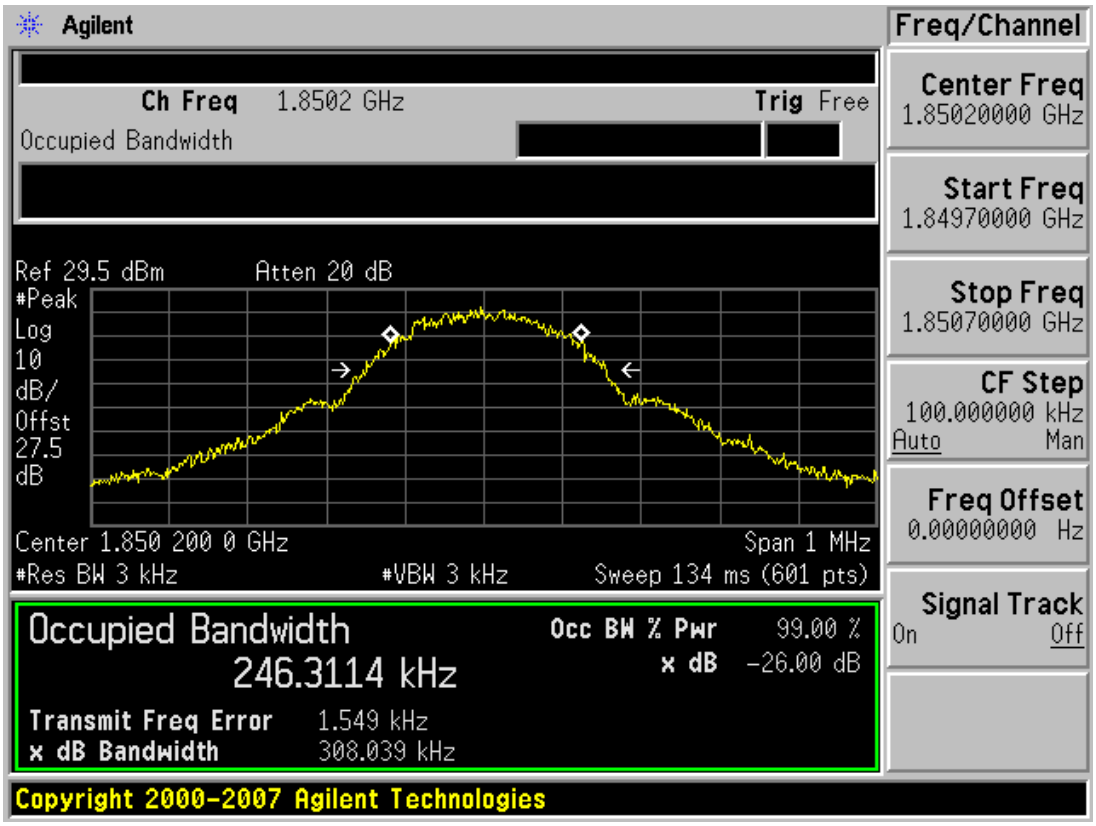
■ GSM850 MODE (190 CH.) Occupied Bandwidth



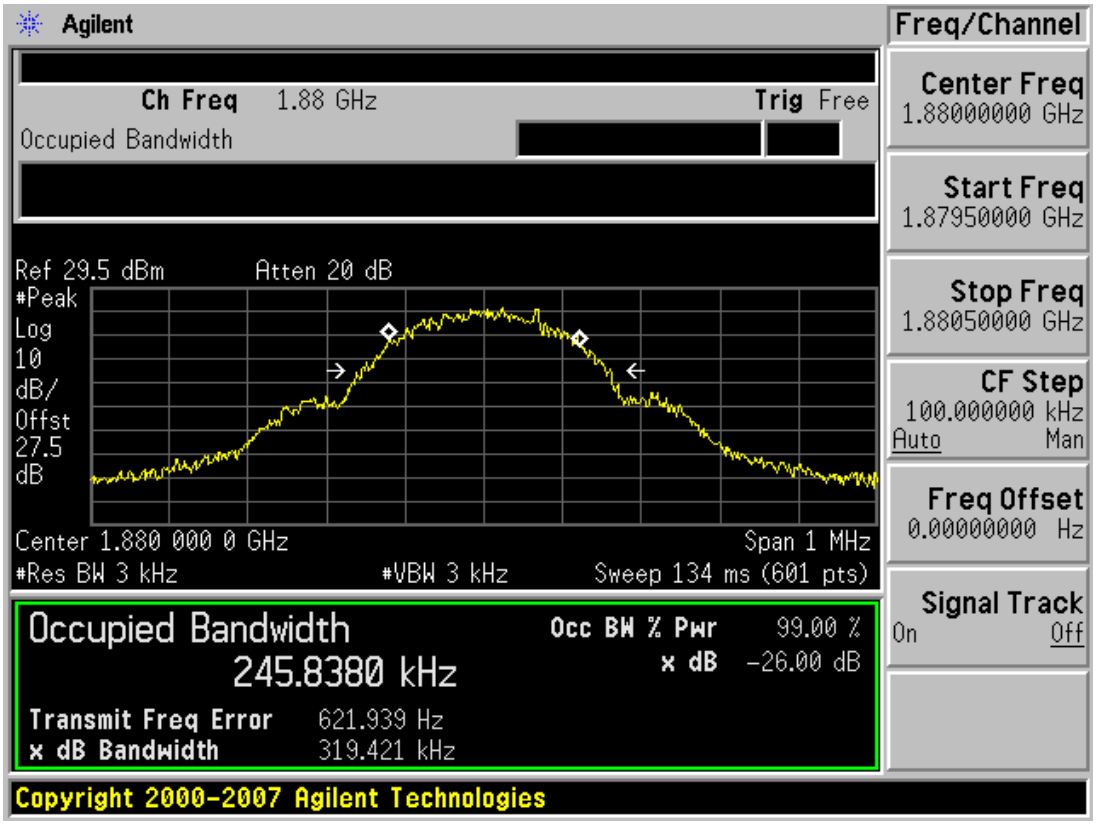
■ GSM850 MODE (251 CH.) Occupied Bandwidth



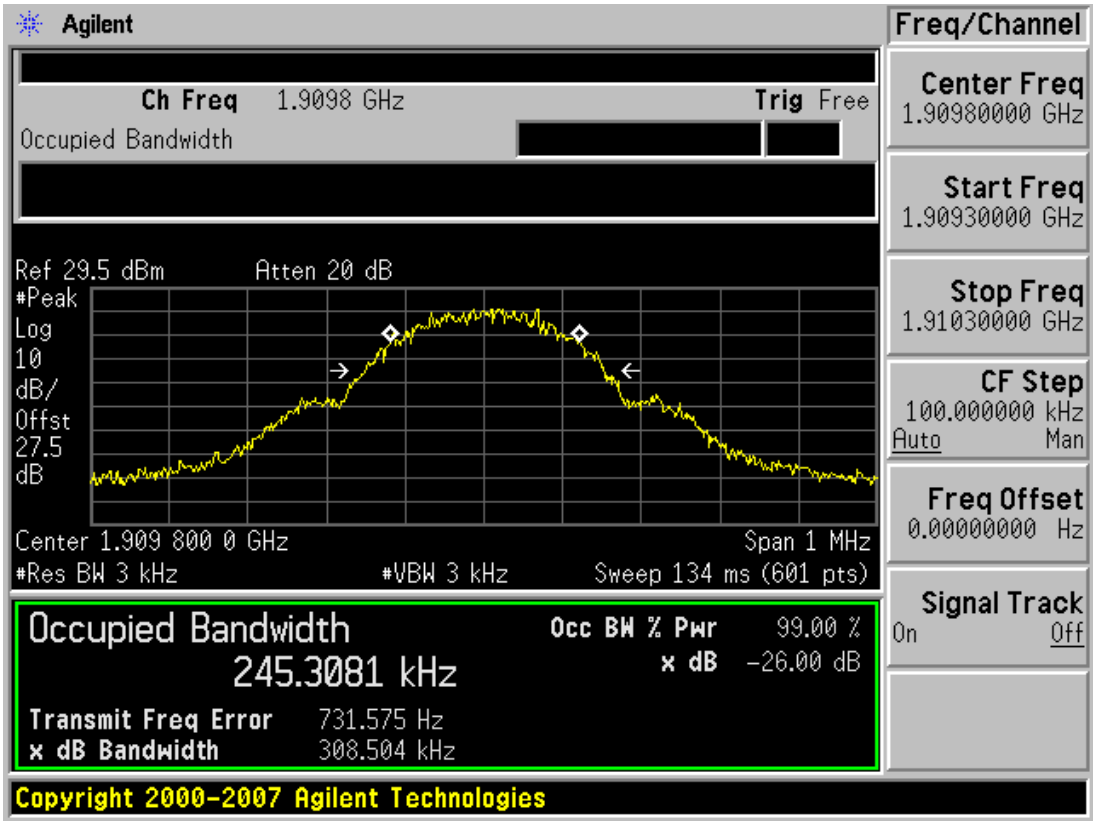
■ GSM1900 MODE (512 CH.) Occupied Bandwidth



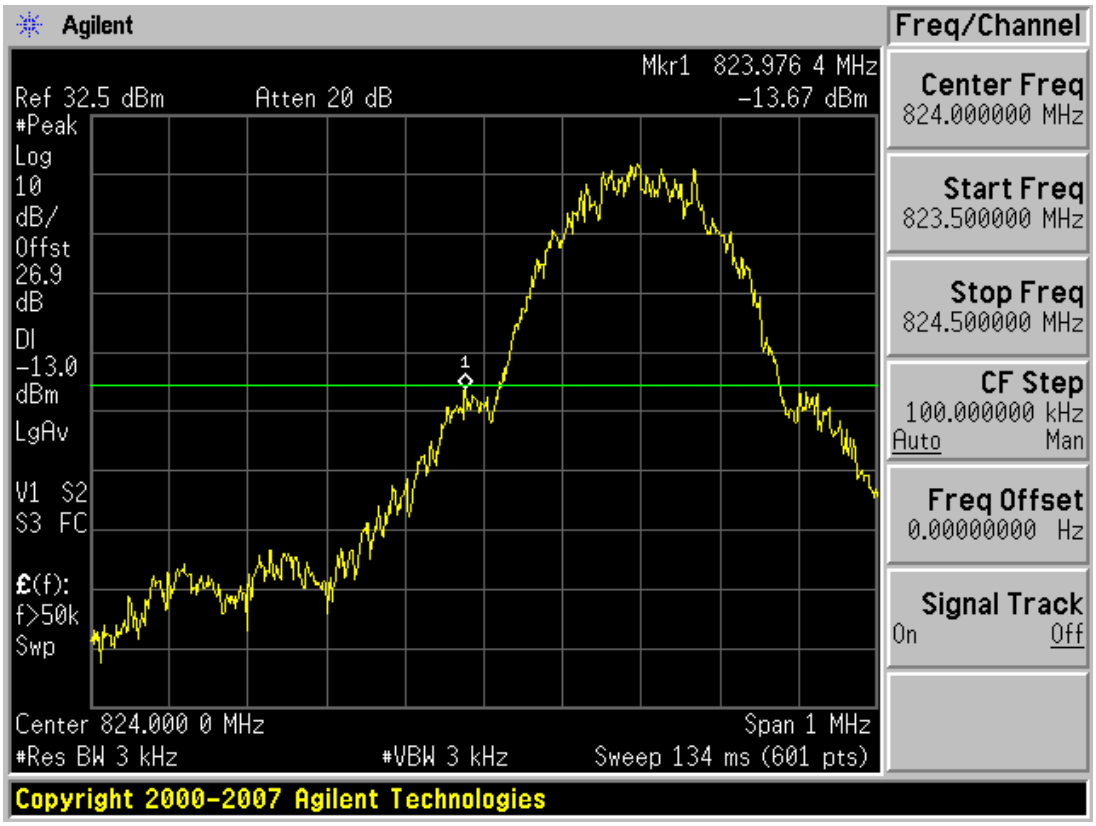
■ GSM1900 MODE (661 CH.) Occupied Bandwidth



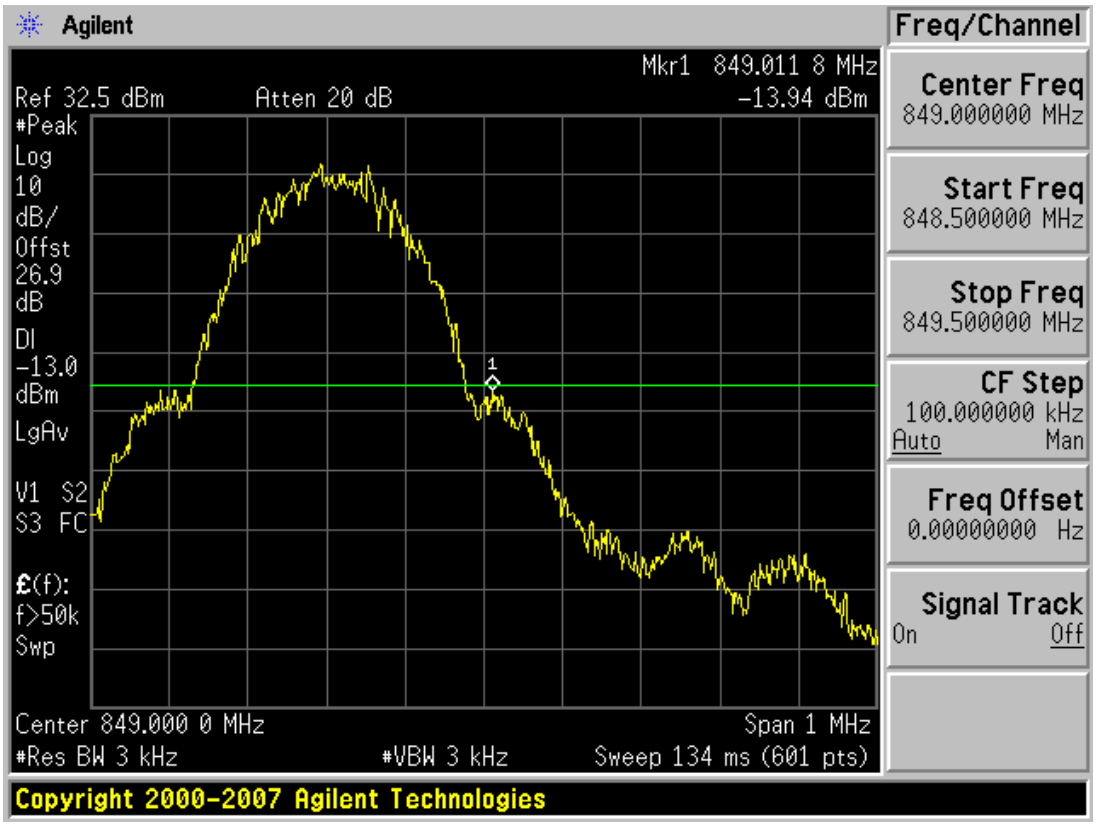
■ GSM1900 MODE (810 CH.) Occupied Bandwidth



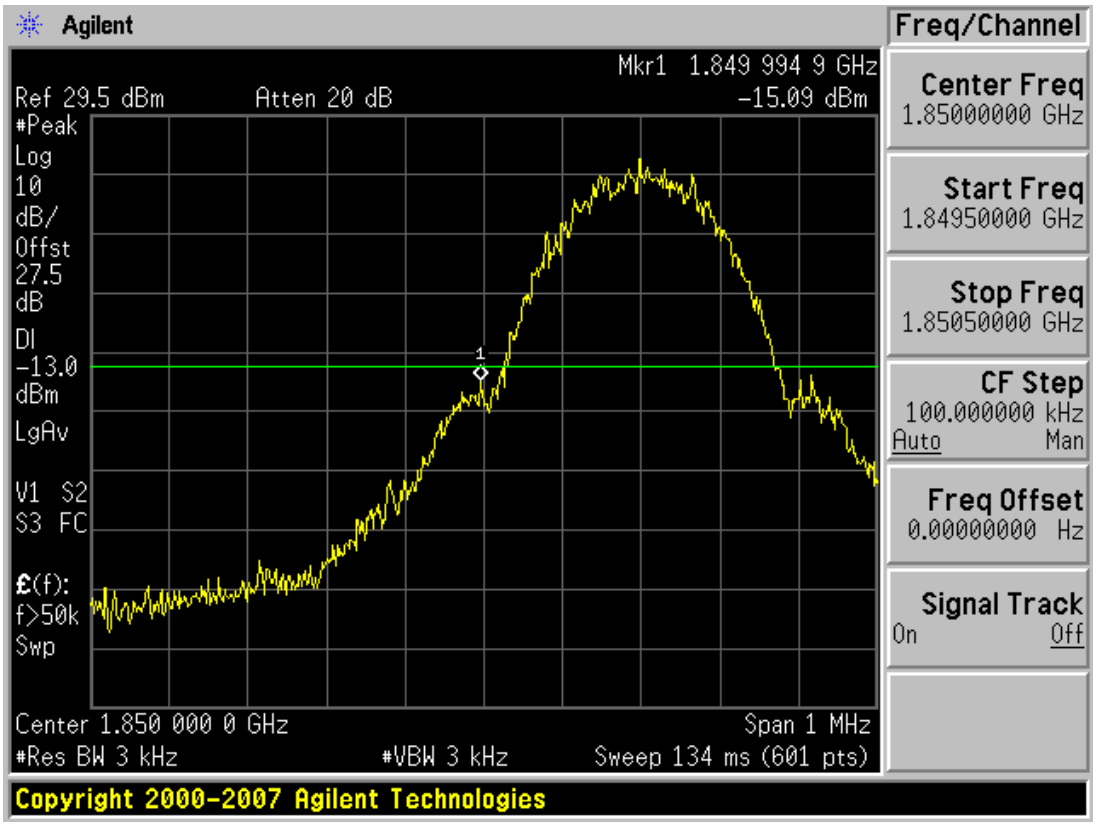
■ GSM850 MODE (128 CH.) Block Edge



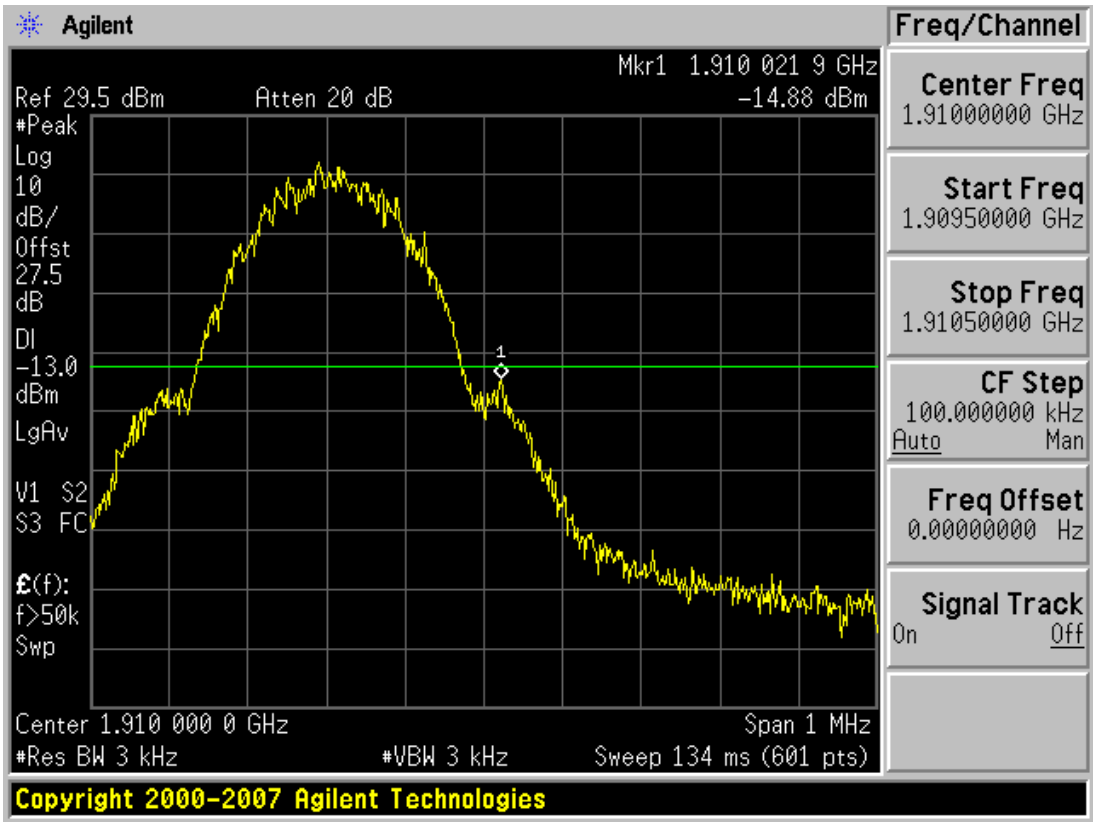
■ GSM850 MODE (251 CH.) Block Edge



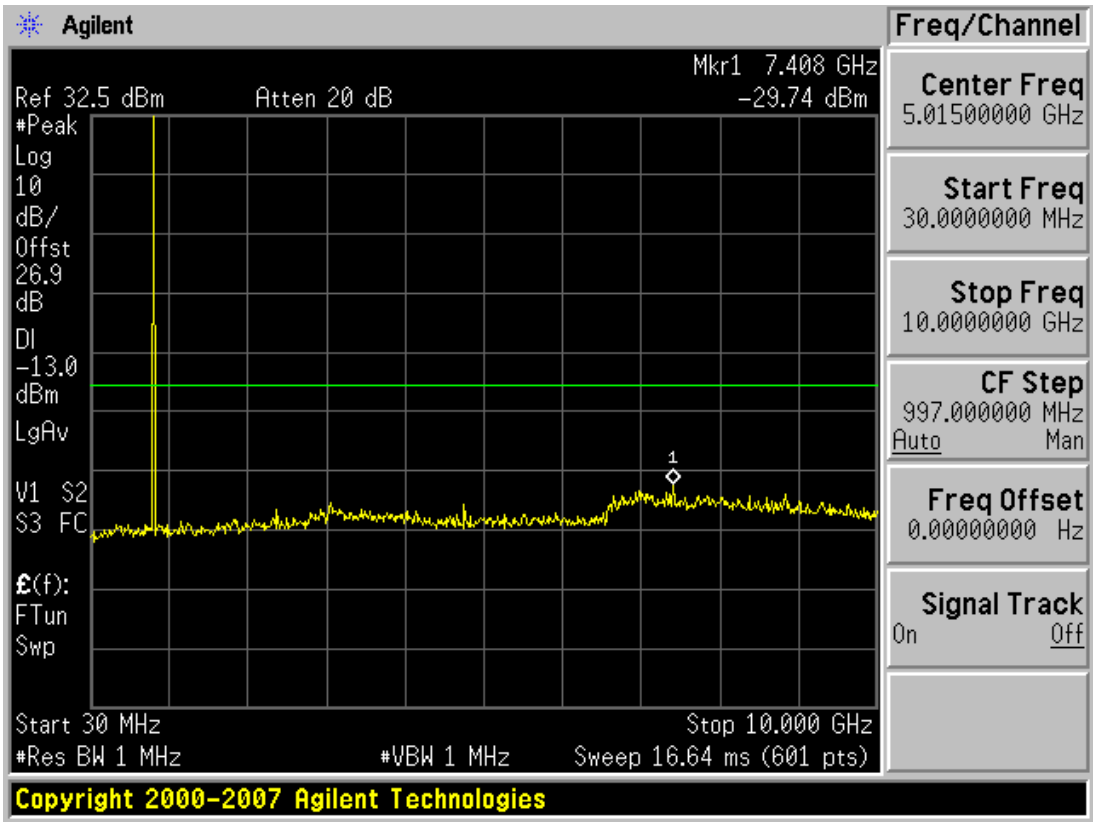
■ GSM1900 MODE (512 CH.) Block Edge



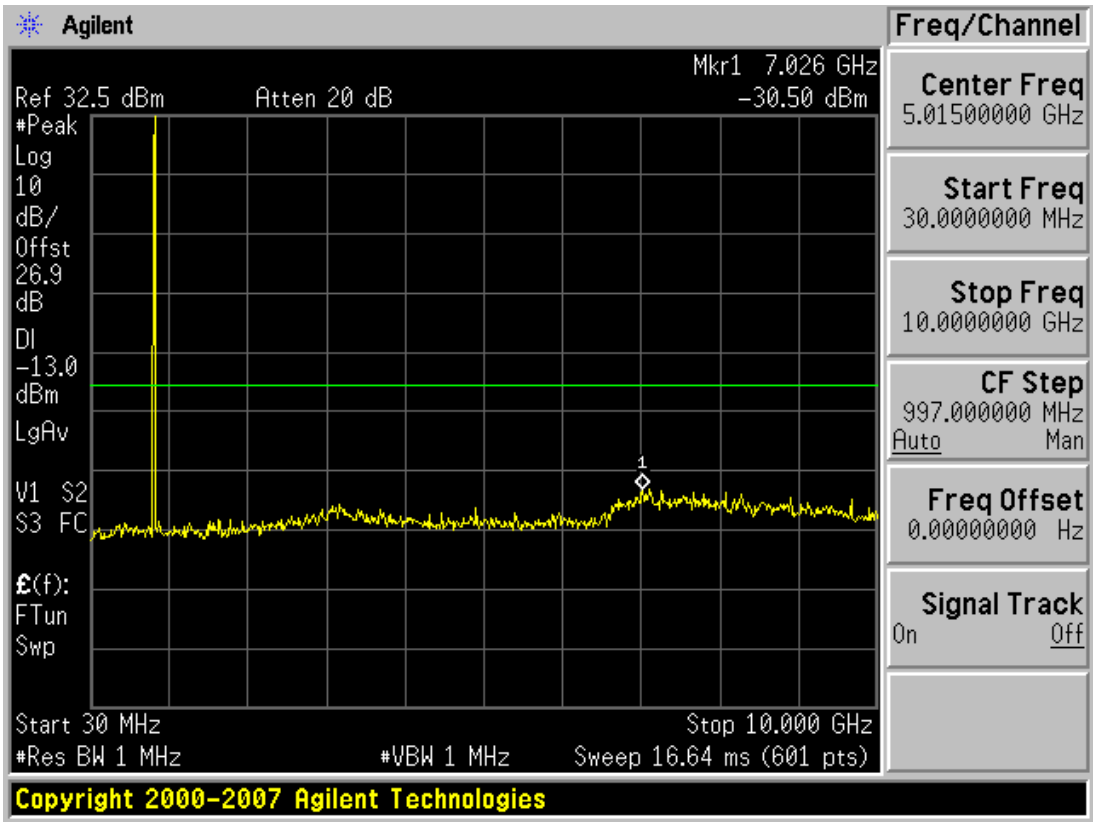
■ GSM1900 MODE (810 CH.) Block Edge



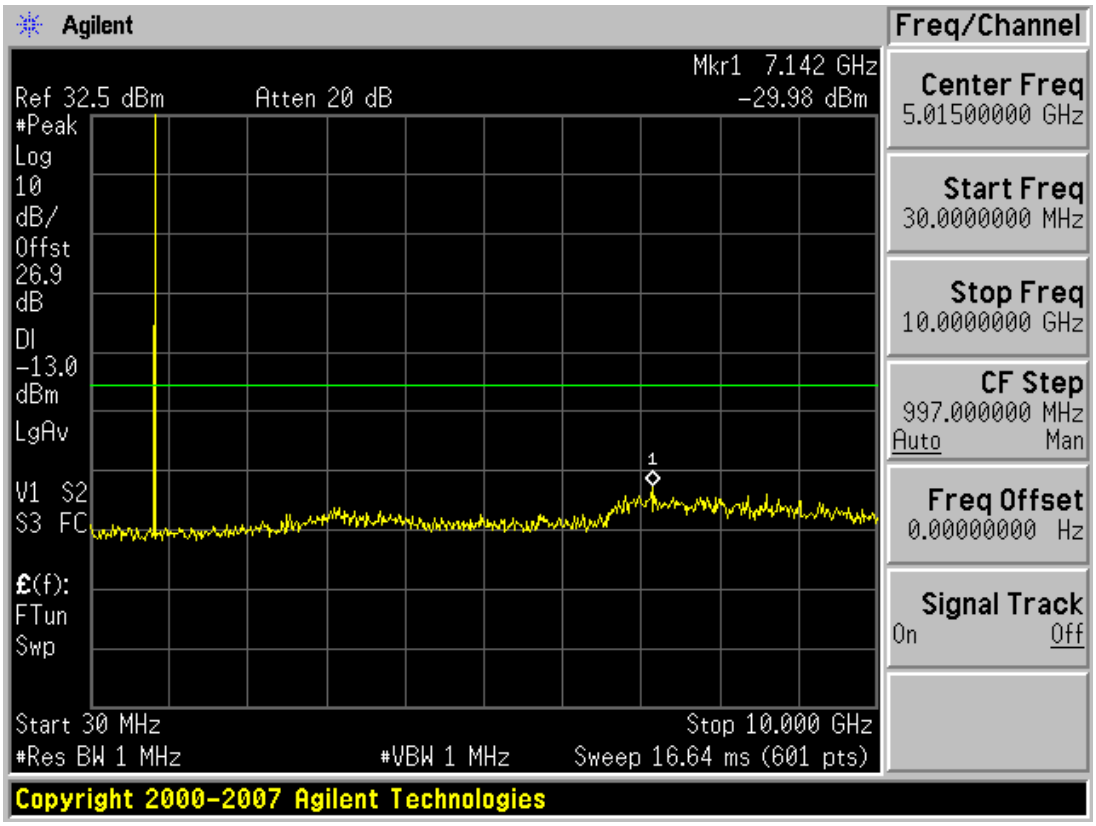
■ GSM850 MODE (128 CH.) Conducted Spurious Emissions



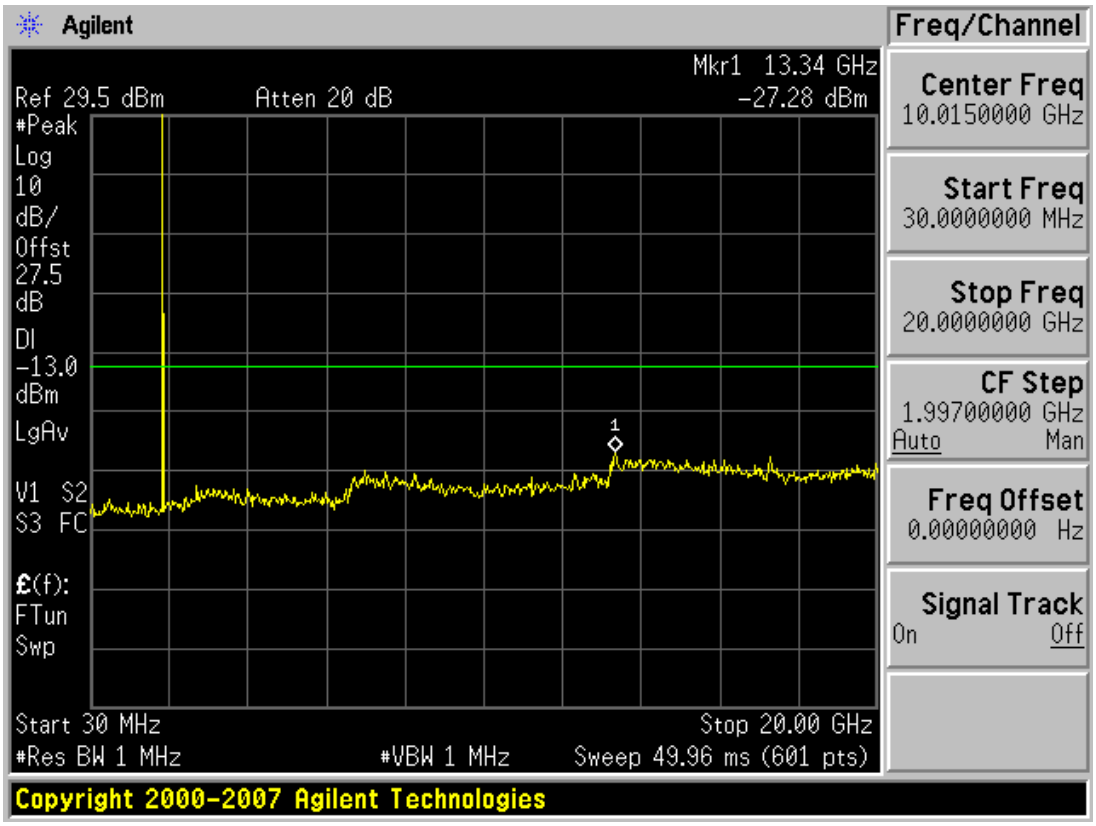
■ GSM850 MODE (190 CH.) Conducted Spurious Emissions



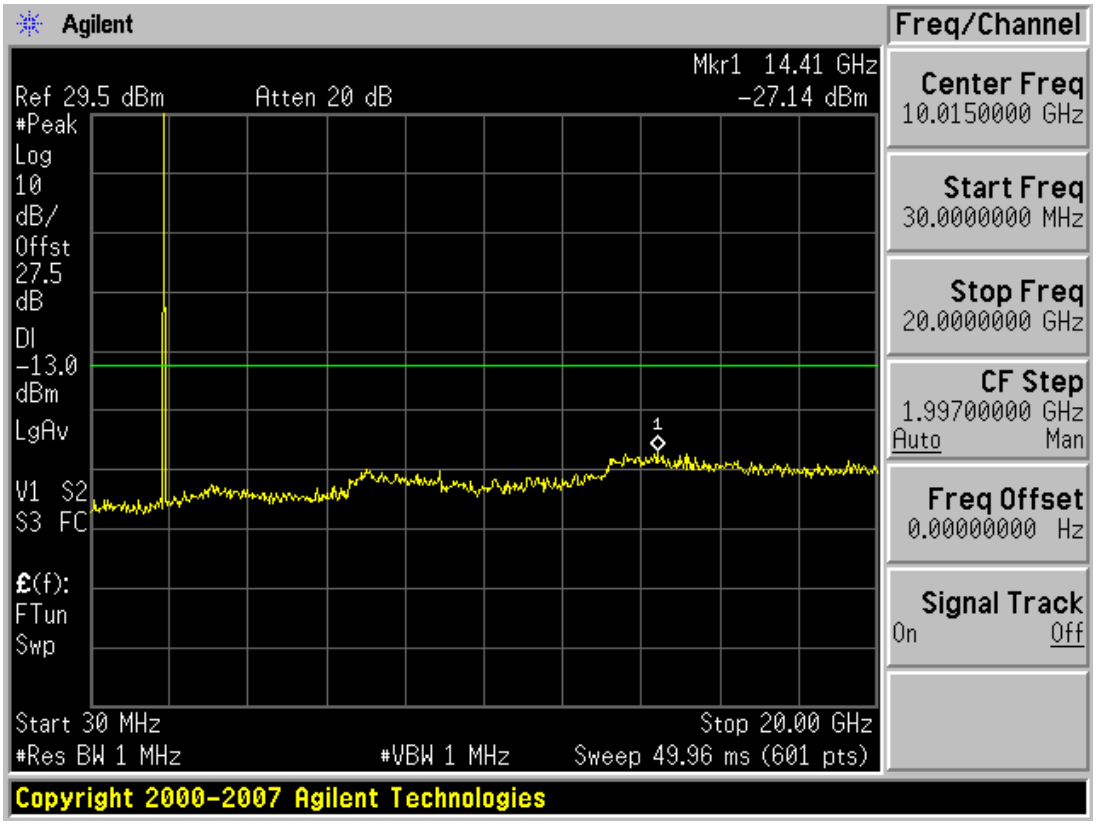
■ GSM850 MODE (251 CH.) Conducted Spurious Emissions



■ GSM1900 MODE (512 CH.) Conducted Spurious Emissions



■ GSM1900 MODE (661 CH.) Conducted Spurious Emissions



■ GSM1900 MODE (810 CH.) Conducted Spurious Emissions