

7.3 RADIATED SPURIOUS EMISSIONS

7.3.1 RADIATED SPURIOUS EMISSIONS (GSM850)

- ▣ MEASURED OUTPUT POWER: 25.62 dBm = 0.365 W
- ▣ MODULATION SIGNAL: GSM850
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $-(43 + 10 \log_{10}(W)) =$ -38.62 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
128 (824.2)	1,648.40	-26.34	7.05	-33.18	1.18	H	-27.31	-52.93
	2,472.60	-48.23	7.90	-51.98	1.57	V	-45.65	-71.27
	3,296.80	-	-	-	-	-	-	-
190 (836.6)	1,673.20	-25.95	7.22	-32.95	1.20	H	-26.93	-52.55
	2,509.80	-44.18	8.51	-47.97	1.65	V	-41.11	-66.73
	3,346.40	-	-	-	-	-	-	-
251 (848.8)	1,697.60	-24.00	7.34	-31.02	1.20	H	-24.88	-50.50
	2,546.40	-43.82	8.61	-47.36	1.65	H	-40.40	-66.02
	3,395.20	-52.50	10.22	-57.03	1.99	V	-48.80	-74.42

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

7.3.2 RADIATED SPURIOUS EMISSIONS (GSM1900)

- ▣ MEASURED OUTPUT POWER: 29.53 dBm = 0.897 W
- ▣ MODULATION SIGNAL: GSM1900
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: - (43 + 10 log₁₀ (W)) = - 42.53 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	EIRP (dBm)	dBc
512 (1850.2)	3,700.40	-47.14	12.27	-51.88	2.19	H	-41.80	-71.33
	5,550.60	-54.66	13.40	-54.33	2.88	H	-43.81	-73.34
	7,400.80	-55.34	11.37	-45.05	3.29	V	-36.97	-66.50
661 (1880.0)	3,760.00	-46.70	12.31	-51.25	2.11	H	-41.05	-70.58
	5,640.00	-55.52	13.41	-54.85	2.92	H	-44.36	-73.89
	7,520.00	-54.85	11.55	-45.33	3.34	V	-37.12	-66.65
810 (1909.8)	3,819.60	-47.92	12.37	-52.40	2.14	H	-42.17	-71.70
	5,729.40	-53.70	13.42	-52.26	3.02	H	-41.86	-71.39
	7,639.20	-56.59	11.70	-46.83	3.13	V	-38.26	-67.79

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

7.3.3 RADIATED SPURIOUS EMISSIONS (WCDMA850)

- MEASURED OUTPUT POWER: 19.09 dBm = 0.081 W
- MODULATION SIGNAL: WCDMA850
- DISTANCE: 3 meters
- LIMIT: - (43 + 10 log₁₀ (W)) = - 32.09 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBd)	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
4,132 (826.4)	1,652.80	-46.10	7.11	-53.03	1.20	H	-47.12	-66.21
	2,479.20	-49.98	8.40	-53.87	1.62	V	-47.09	-66.18
	3,305.60	-	-	-	-	-	-	-
4,183 (836.6)	1,673.20	-45.19	7.22	-52.19	1.20	H	-46.17	-65.26
	2,509.80	-	-	-	-	-	-	-
	3,346.40	-	-	-	-	-	-	-
4,233 (846.6)	1,693.20	-43.85	7.34	-50.87	1.20	H	-44.73	-63.82
	2,539.80	-	-	-	-	-	-	-
	3,386.40	-	-	-	-	-	-	-

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
 2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5th Harmonic for all channel.
 3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

7.4 PEAK-TO-AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown Page 27.

7.5 OCCUPIED BANDWIDTH

Band	Channel	Frequency(MHz)	Data (GSM: kHz / WCDMA : MHz)
GSM850	128	824.20	243.2242
	190	836.60	246.4321
	251	848.80	247.1015
GSM1900	512	1850.20	241.4641
	661	1880.00	245.0759
	810	1909.80	249.2617
WCDMA850	4132	826.40	4.1492
	4183	836.60	4.1194
	4233	846.60	4.1687

- Plots of the EUT's Occupied Bandwidth are shown Page 24 ~ 26, 27 ~ 28.

7.6 CONDUCTED SPURIOUS EMISSIONS

Band	Channel	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
GSM850	128	4.65185	-28.19
	190	4.62551	-28.25
	251	4.57432	-29.01
GSM1900	512	6.97703	-24.77
	661	8.83699	-25.08
	810	6.98141	-25.17
WCDMA850	4132	4.90135	-28.84
	4183	4.60613	-29.05
	4233	4.77362	-28.85

- Plots of the EUT's Conducted Spurious Emissions are shown Page 35 ~ 43.

7.6.1 BAND EDGE

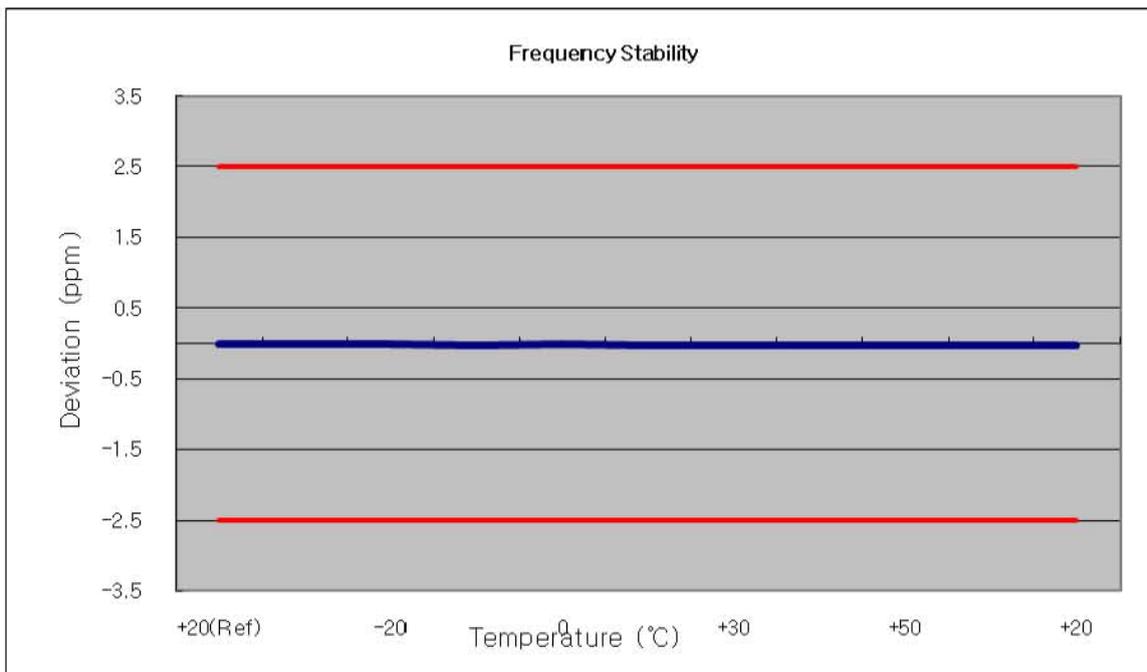
- Plots of the EUT's Band Edge are shown Page 29 ~ 34.

7.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.7.1 FREQUENCY STABILITY (GSM850)

- ▣ OPERATING FREQUENCY: 836,600,000 Hz
- ▣ CHANNEL: 190
- ▣ REFERENCE VOLTAGE: 3.8 VDC
- ▣ DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

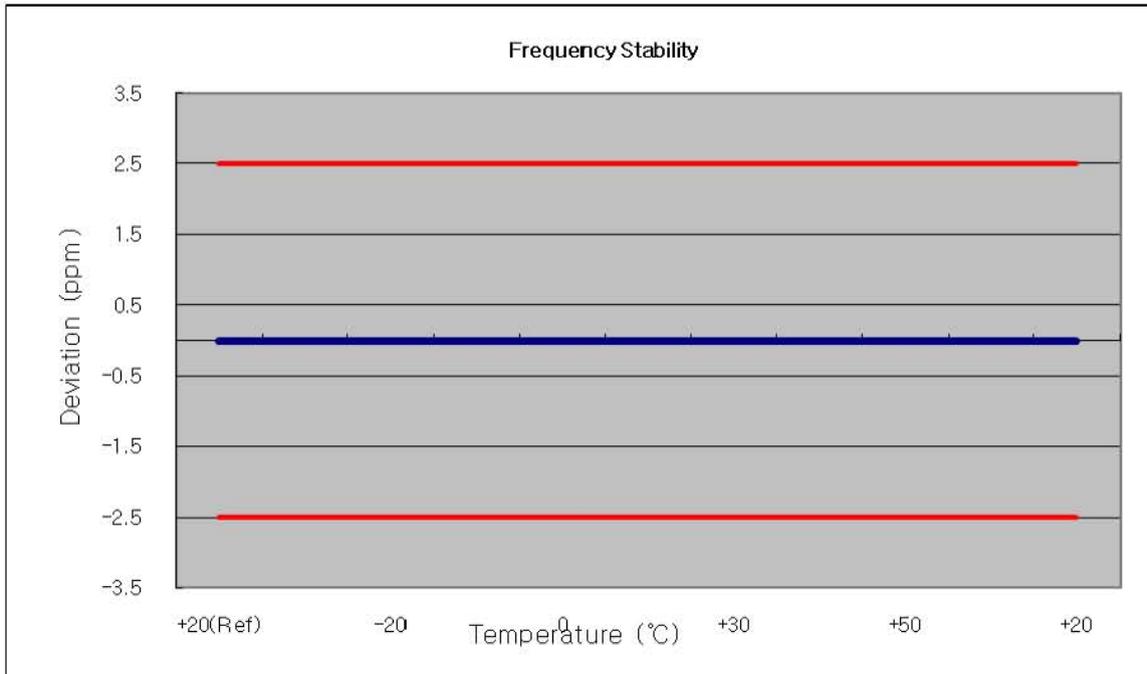
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.800	+20(Ref)	836 600 014	0	0.000 000	0.000
100%		-30	836 599 999	-14.71	-0.000 002	-0.018
100%		-20	836 599 999	-14.77	-0.000 002	-0.018
100%		-10	836 599 997	-16.46	-0.000 002	-0.020
100%		0	836 600 002	-11.89	-0.000 001	-0.014
100%		+10	836 599 997	-16.68	-0.000 002	-0.020
100%		+30	836 599 996	-17.07	-0.000 002	-0.020
100%		+40	836 599 997	-16.18	-0.000 002	-0.019
100%		+50	836 599 997	-16.76	-0.000 002	-0.020
115%		4.370	+20	836 599 998	-15.82	-0.000 002
Batt. Endpoint	3.500	+20	836 599 996	-17.36	-0.000 002	-0.021



7.7.2 FREQUENCY STABILITY (GSM1900)

- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 661
- ▣ REFERENCE VOLTAGE: 3.8 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.800	+20(Ref)	1880 000 031	0	0.000 000	0.000
100%		-30	1879 999 999	-31.41	-0.000 002	-0.017
100%		-20	1879 999 998	-32.78	-0.000 002	-0.017
100%		-10	1880 000 007	-23.42	-0.000 001	-0.012
100%		0	1880 000 005	-25.53	-0.000 001	-0.014
100%		+10	1880 000 004	-26.44	-0.000 001	-0.014
100%		+30	1880 000 002	-28.46	-0.000 002	-0.015
100%		+40	1880 000 006	-24.38	-0.000 001	-0.013
100%		+50	1880 000 006	-25.10	-0.000 001	-0.013
115%	4.370	+20	1880 000 011	-19.84	-0.000 001	-0.011
Batt. Endpoint	3.500	+20	1880 000 014	-16.61	-0.000 001	-0.009



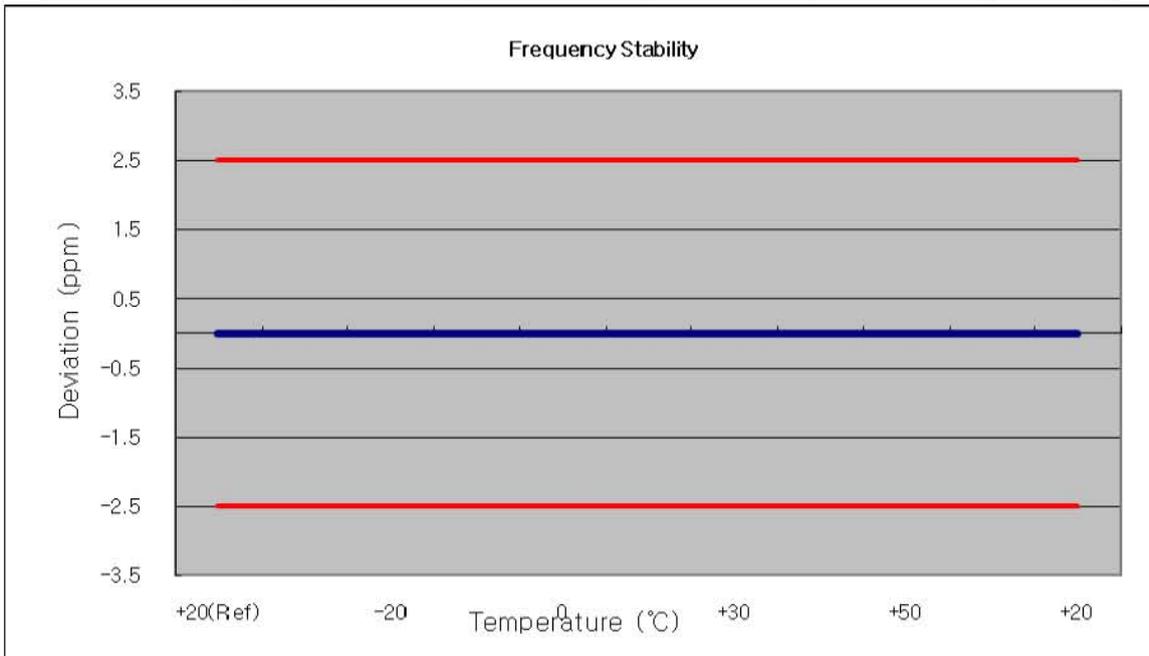
FCC CERTIFICATION REPORT

Test Report No. HCTR1304FR22	Date of Issue: April 18, 2013	EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN, NFC(Felica), A-GPS, Wireless Charger, Wi-Fi Direct	www.hct.co.kr FCC ID: ZNFL05E
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7.7.3 FREQUENCY STABILITY (WCDMA850)

- ▣ OPERATING FREQUENCY: 836,600,000 Hz
- ▣ CHANNEL: 4183
- ▣ REFERENCE VOLTAGE: 3.8 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.800	+20(Ref)	836 599 998	0	0.000 000	0.000
100%		-30	836 600 002	1.73	0.000 000	0.002
100%		-20	836 600 002	2.07	0.000 000	0.002
100%		-10	836 599 998	-2.04	0.000 000	-0.002
100%		0	836 599 998	-1.56	0.000 000	-0.002
100%		+10	836 599 998	-1.71	0.000 000	-0.002
100%		+30	836 599 998	-2.12	0.000 000	-0.003
100%		+40	836 600 003	2.61	0.000 000	0.003
100%		+50	836 599 998	-2.04	0.000 000	-0.002
115%	4.370	+20	836 600 002	1.89	0.000 000	0.002
Batt. Endpoint	3.500	+20	836 600 002	1.96	0.000 000	0.002



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8. TEST PLOTS

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■ GSM850 MODE (128 CH.) Occupied Bandwidth



■ GSM850 MODE (190 CH.) Occupied Bandwidth



■ GSM850 MODE (251 CH.) Occupied Bandwidth



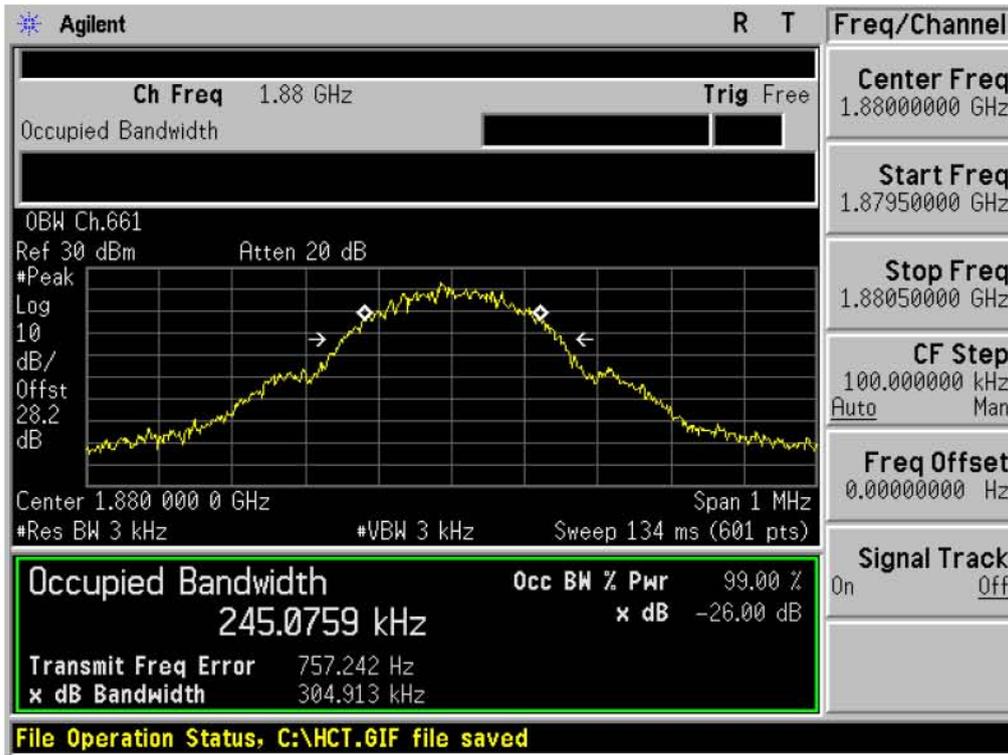
■ GSM1900 MODE (512 CH.) Occupied Bandwidth



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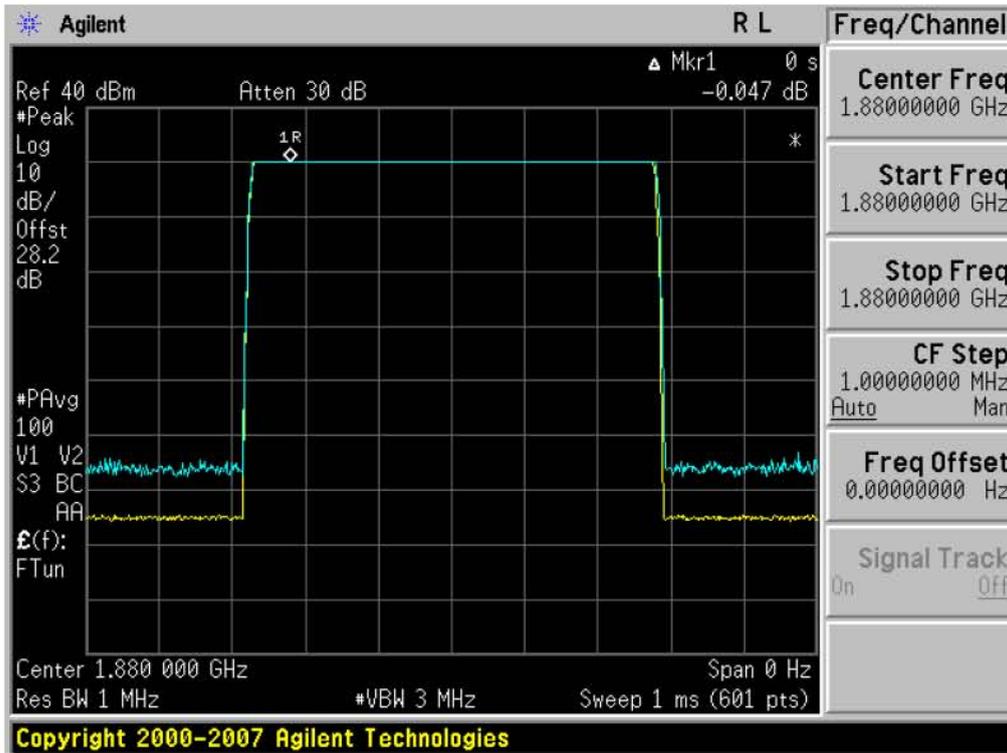
■ GSM1900 MODE (661 CH.) Occupied Bandwidth



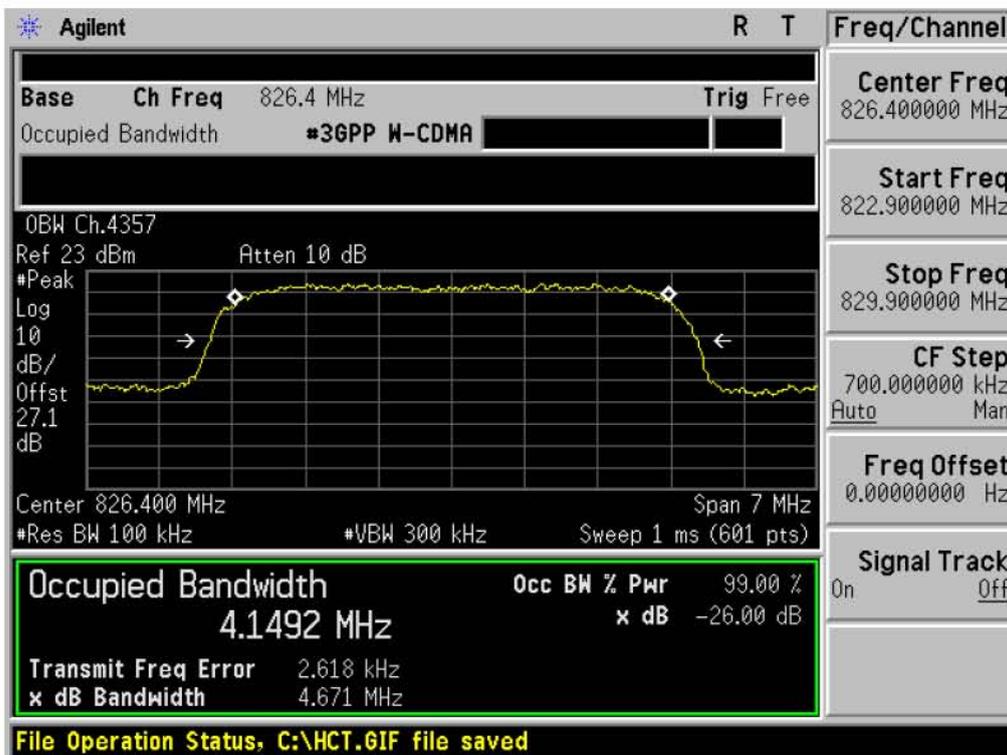
■ GSM1900 MODE (810 CH.) Occupied Bandwidth



■ GSM1900 MODE (661 CH.) Peak-to-Average Ratio



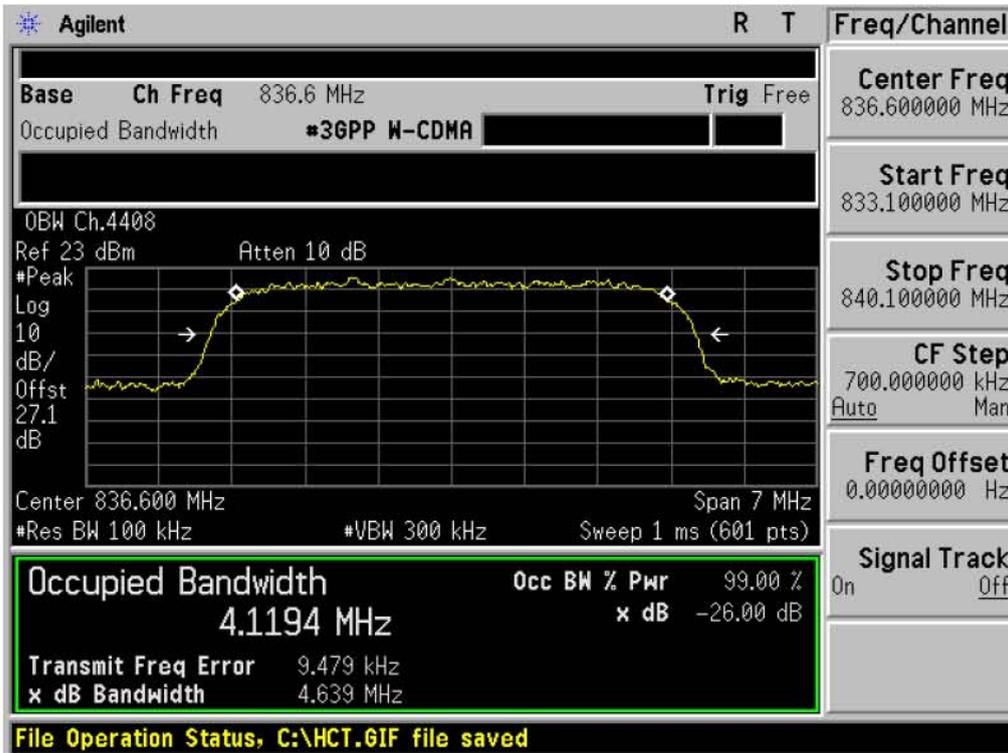
■ WCDMA850 MODE (4132 CH.) Occupied Bandwidth



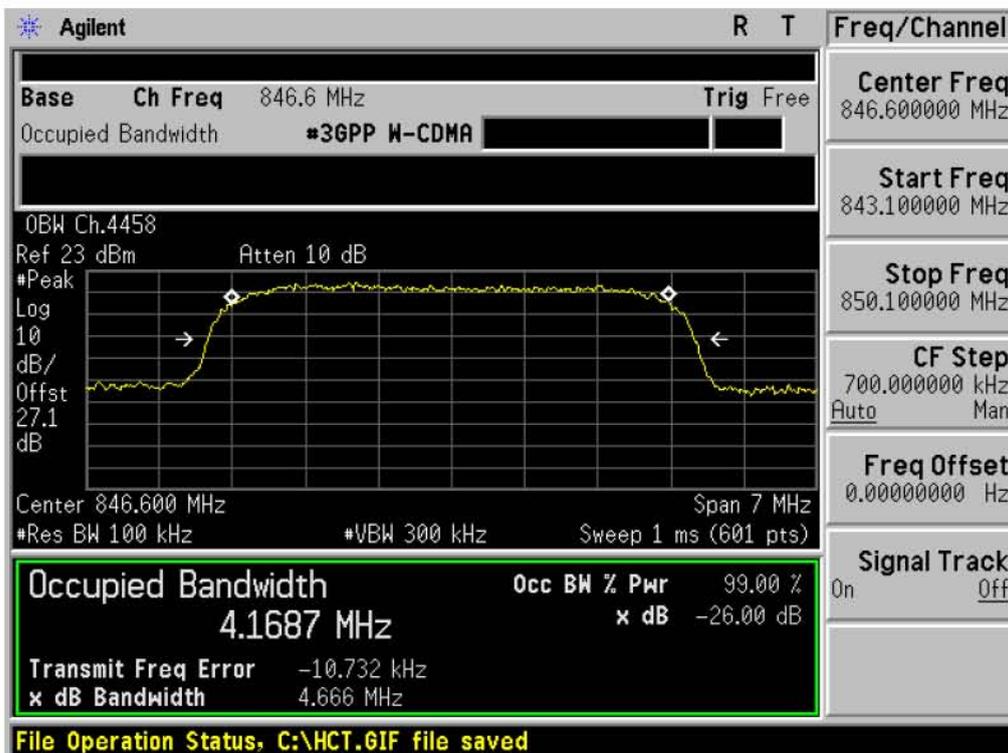
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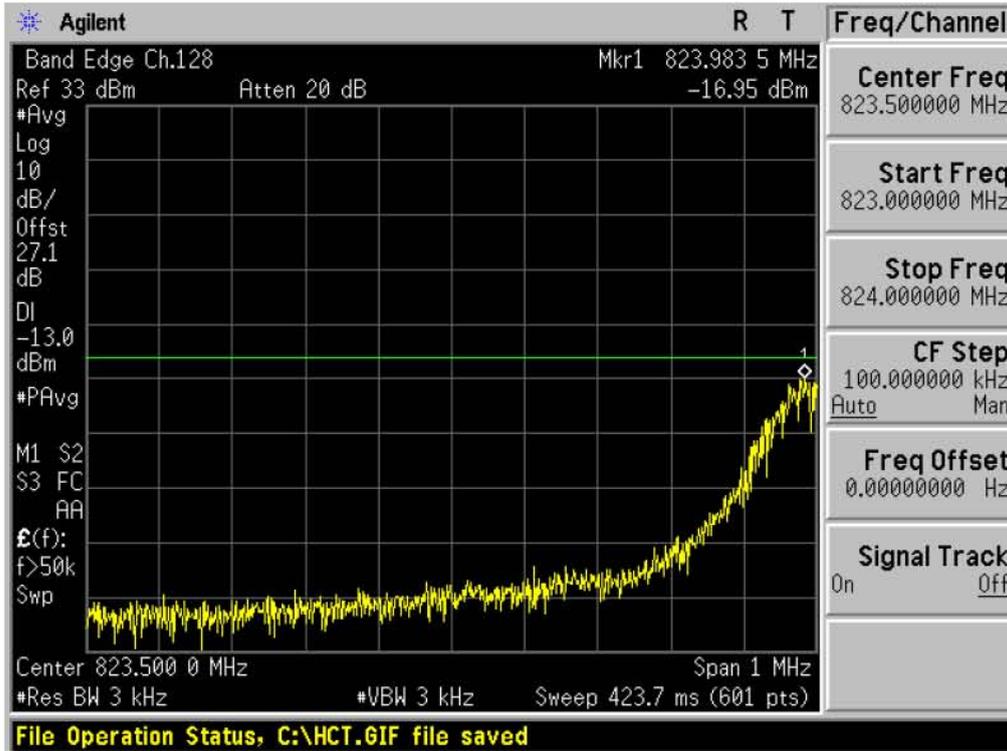
■ WCDMA850 MODE (4183 CH.) Occupied Bandwidth



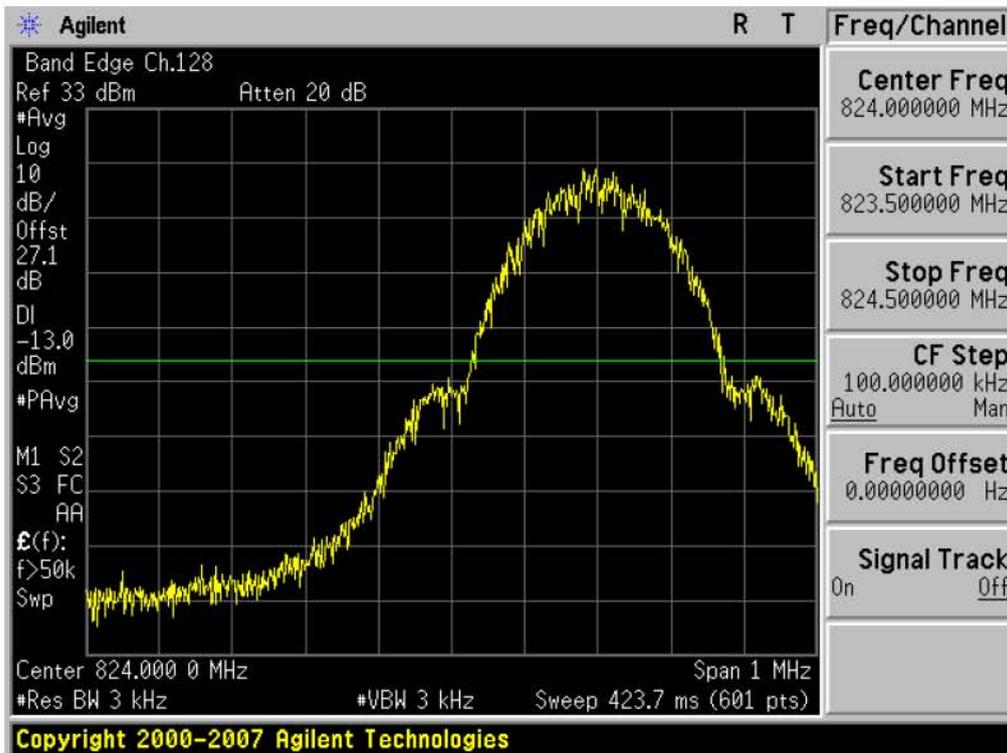
■ WCDMA850MODE (4233 CH.) Occupied Bandwidth



■ GSM850 MODE (128 CH.) Block Edge 1



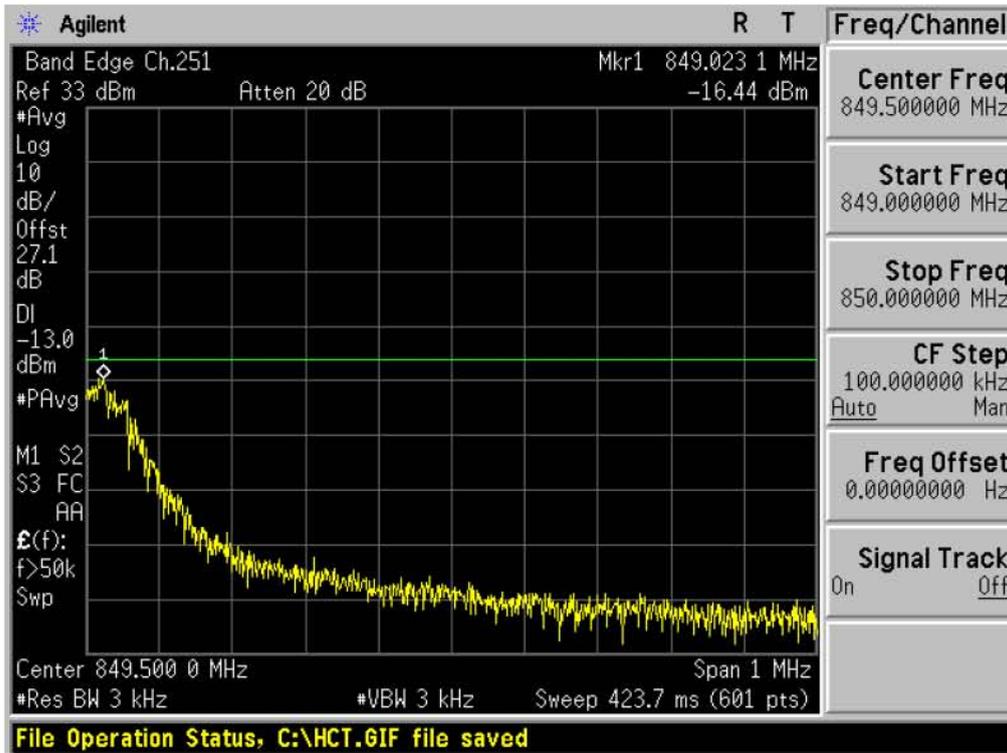
■ GSM850 MODE (128 CH.) Block Edge 2



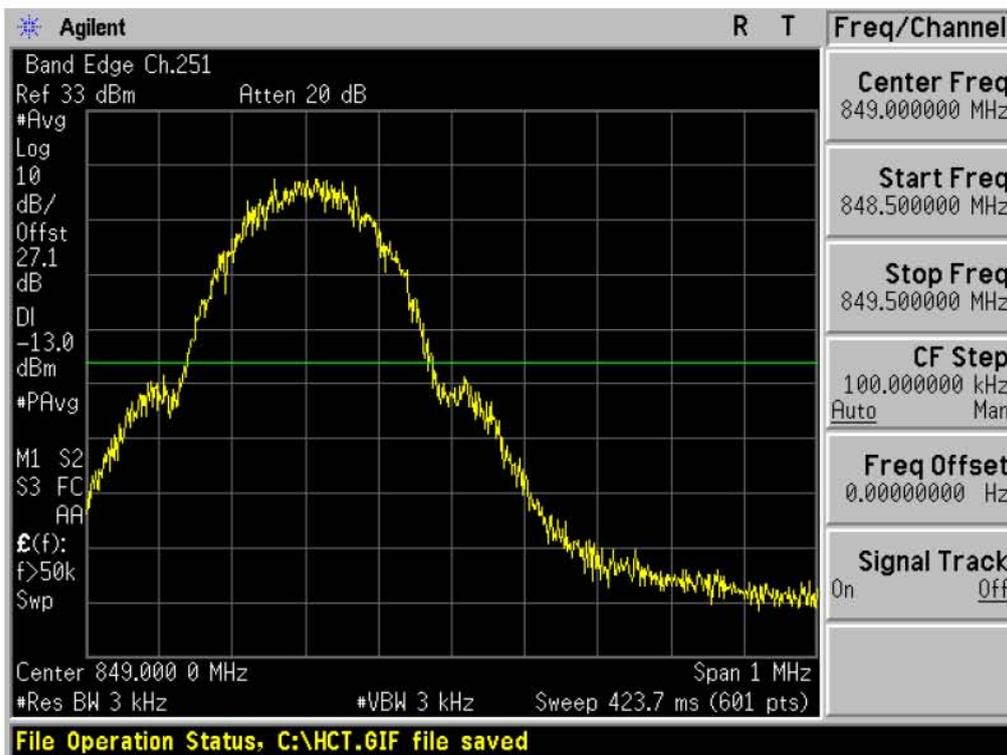
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■ GSM850 MODE (251 CH.) Block Edge 1



■ GSM850 MODE (251 CH.) Block Edge 2



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