DIGITAL EMC CO., LTD.

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

CERTIFICATION OF COMPLIANCE

CERTIFICATE OF COMPLIANCE
FCC Part 22 & 24 Certification

Dates of Tests: October 20 ~ 26, 2009
Test Report S/N:DR50110911E
Test Site : DIGITAL EMC CO., LTD.

FCC ID. **QD5-DOTH-100**

APPLICANT **D.O.Tel Co., Ltd.**

Purpose	:	**Original Grant**
Classification	:	**Licensed Non-Broadcast Station Transmitter(PCB)**
EUT Type	:	**Handheld Printer Terminal**
Model name	:	**DOTH-100**
Serial number	:	**Identical prototype**
FCC Rule Part(s)	:	**§22(H), §24(E), §2**
TX Frequency Range	:	**824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)**
RX Frequency Range	:	**869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)**
Max. RF Output Power	:	**GSM850 – 0.411W ERP**
	:	**PCS1900 – 0.292W EIRP**
Date of Issue	:	**November 10, 2009**

The Test results relate only to the tested sample. It is not allowed to copy this report even partly without the allowance of DIGITAL EMC CO., LTD.

TABLE OF CONTENTS

MEASUREMENT REPORT

1. Scope

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

§2.1033 General Information

Applicant: D.O.Tel Co., Ltd.

Address: #412, Kolon Science Valley II, 811 Guro-dong, Guro-gu, Seoul, Korea 152-878

Attention: Sang-Woo Shin

- FCC ID: QD5-DOTH-100
- Quantity: The mass product
- Tx Freq. Range: 824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)
- Rx Freq. Range: 869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)
- Max. Power Rating: GSM850 – 0.411W ERP
  PCS1900 - 0.292W EIRP
- FCC Classification(s): Licensed Non-Broadcast Station Transmitter(PCB)
- Equipment (EUT) Type: Handheld Printer Terminal
- Modulation(s): GMSK
- Frequency Tolerance: ± 0.00025 % (2.5ppm)
- FCC Rule Part(s): §22(H), §24(E), §2
- Dates of Tests: October 20 ~ 26, 2009
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110911E

2. General Information

This report contains the result of tests performed by:

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

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

Tested by: ***Engineer***

Date	Name	Signature
November 10, 2009	Sun-Kyu Ryu	

Reviewed by: ***Manager***

Date	Name	Signature
November 10, 2009	W.J. Lee	

Applicant:

Company name	:	D.O.Tel Co., Ltd.
Address	:	#412, Kolon Science Valley II, 811 Guro-dong, Guro-gu, Seoul, Korea 152-878
Date of order	:	May 08, 2009

3. Test Report

3.1 Summary of test

FCC Part Section(s)	Parameter	Status Note 1
22.913(a) / 24.232(b), 2.1046	Power Output	C
22.917 / 24.238, 2.1049(h)(i)	Occupied Bandwidth	C
22.917(b) / 24.238(b)	Emission Bandwidth	C
22.917 / 24.238 2.1051	Emission Limits Transmitter	C
2.1053 (a)	Field Strength of Spurious Radiation	C
2.1055	Frequency Stability	C
Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable		

The sample was tested according to the following specification:

FCC Parts §22(H), §24(E), §2; ANSI C-63.4-2003

3.2 Power Output

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 2.1046 (a)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

Measurement Procedure:

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

Measurement Data:

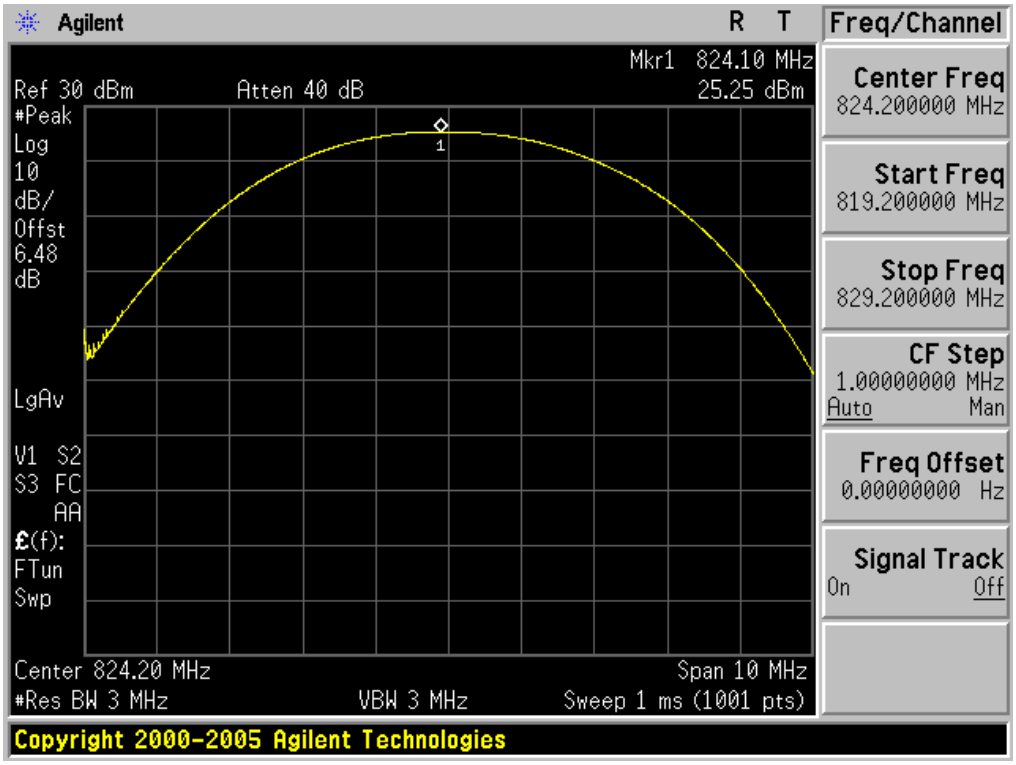
GSM850

Channel	Frequency (MHz)	Power Output(dBm) Power Step: 5
128	824.2	**25.25**
190	836.6	**25.13**
251	848.8	**25.01**

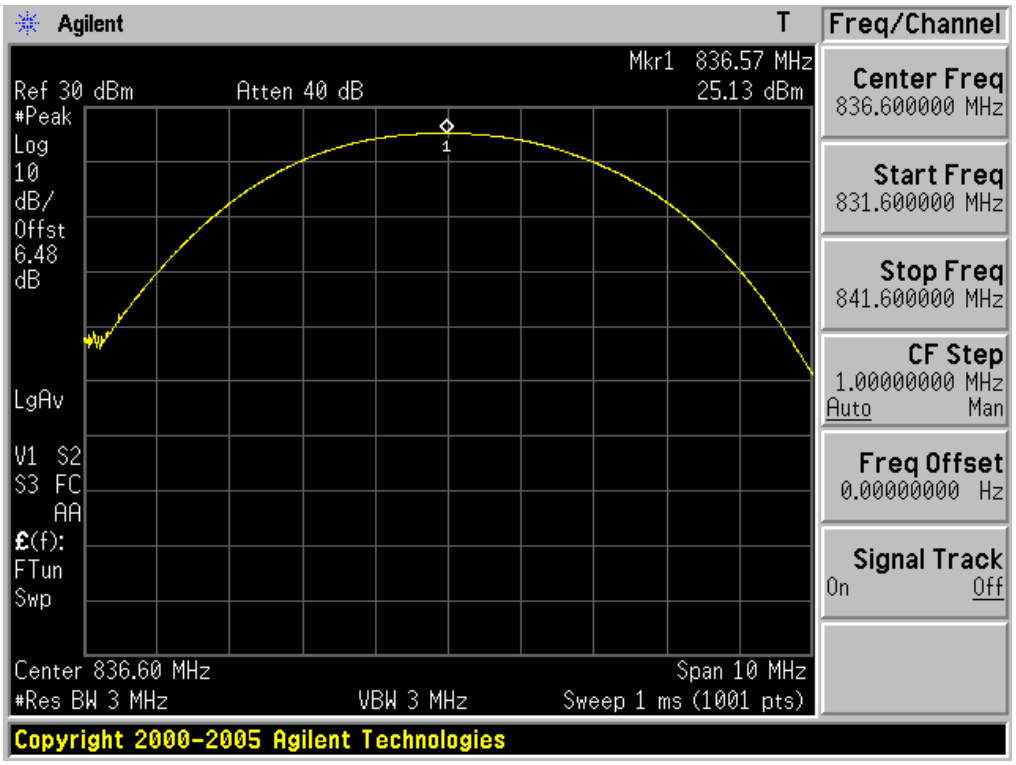
PCS1900

Channel	Frequency (MHz)	Power Output(dBm) Power Step: 0
512	1850.2	**22.46**
661	1880.0	**21.79**
810	1909.8	**19.96**

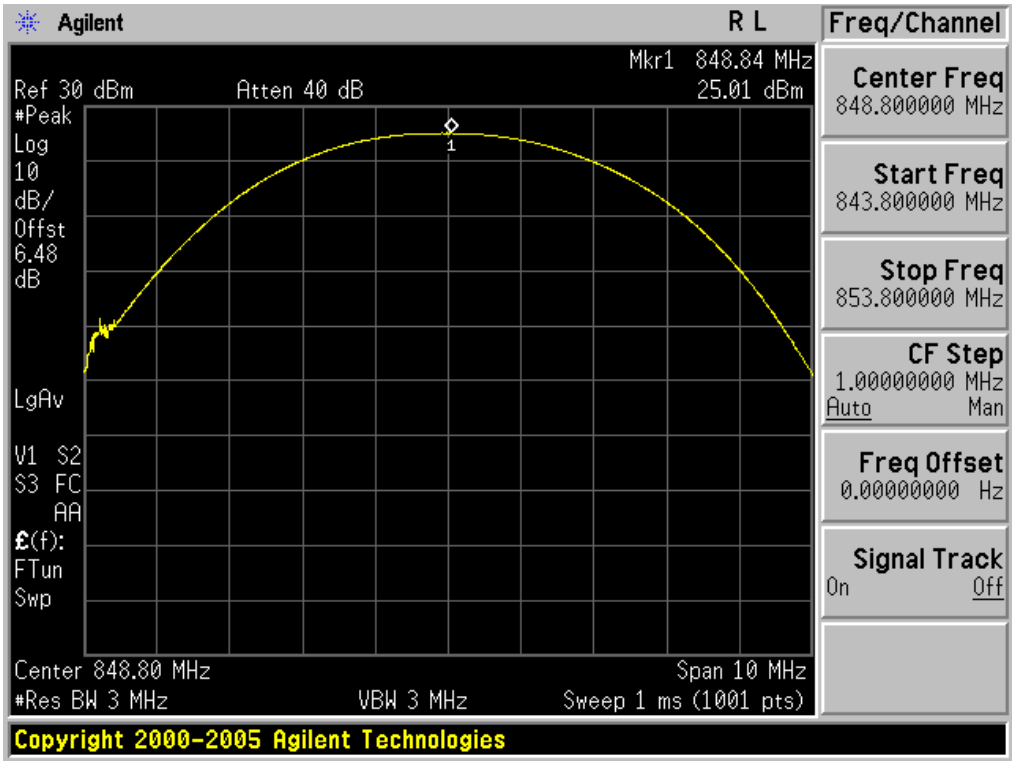
Power Output GSM850 & Channel: 128



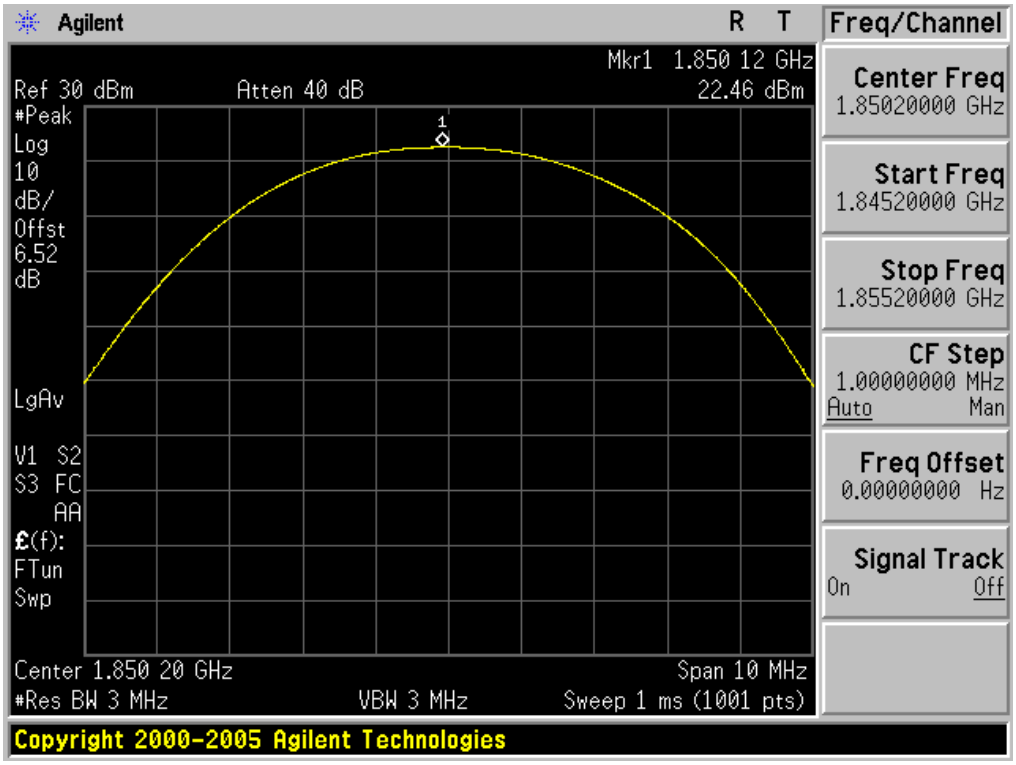
Power Output GSM850 & Channel: 190



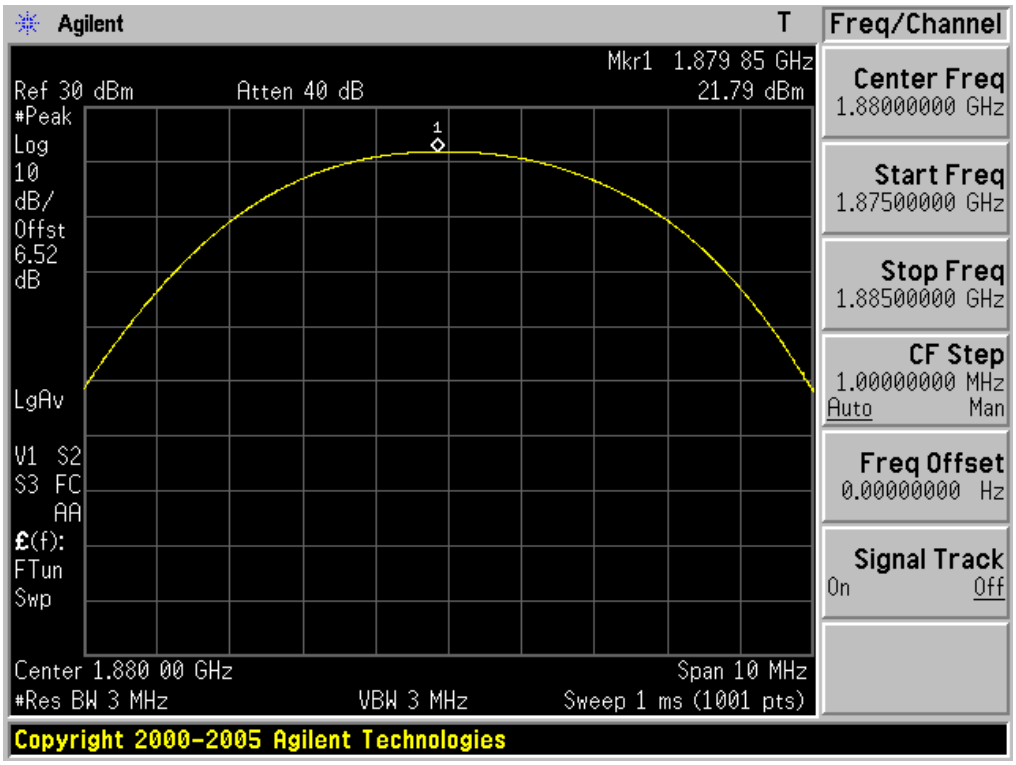
Power Output GSM850 & Channel: 251



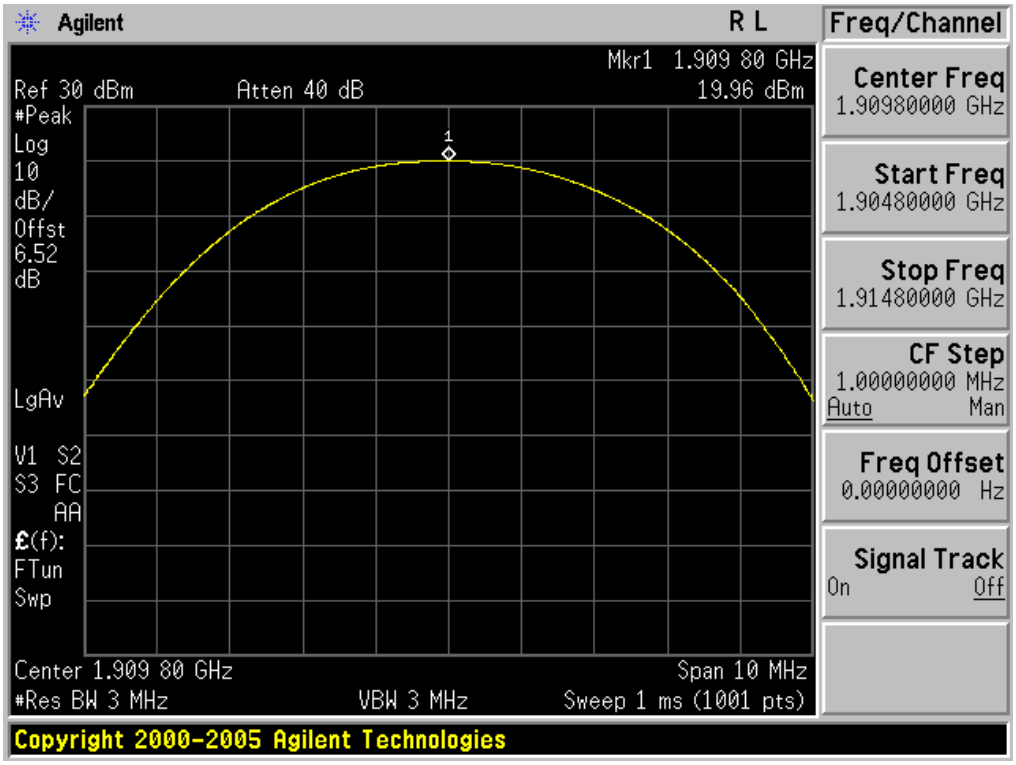
Power Output PCS1900 & Channel: 512



Power Output PCS1900 & Channel: 661



Power Output PCS1900 & Channel: 810



ERP (GSM850)

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 22.913(a)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850
RBW=VBW	:	3MHz

Measurement Procedure:

Effective Radiated Power Output Measurements by Substitution Method

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

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

Measurement Data:

Channel	Frequency (MHz)	TEST CONDITIONS Power Step: 5					
		Ref. level (dBm)	Pol. (H/V)	ERP (dBm)	ERP (W)	Power Supply	Note.
128	824.2	-13.78	H	24.26	0.267	Battery	-
190	836.6	-13.60	H	24.69	0.294	Battery	-
251	**848.8**	**-13.91**	**H**	**26.14**	**0.411**	**Battery**	-

The Battery was fully charged.

EIRP (PCS1900)

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 24.232(b)
Tested Frequency	:	1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900
RBW=VBW	:	3MHz

Measurement Procedure:

Effective Radiated Power Output Measurements by Substitution Method

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

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

Measurement Data:

Channel	Frequency (MHz)	TEST CONDITIONS Power Step: 0						
		Ref. level (dBm)	Pol. (H/V)	Ant Gain (dBi)	EIRP (dBm)	EIRP (W)	Power Supply	Note
512	1850.2	-16.69	H	8.29	22.68	0.185	Battery	-
661	**1880.0**	**-15.47**	**H**	**8.37**	**24.66**	**0.292**	**Battery**	**-**
810	1909.8	-15.14	H	8.44	24.55	0.285	Battery	-

3.3 Occupied Bandwidth

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 2.1049 (h)(i)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

Measurement Procedure:

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

Measurement Data:

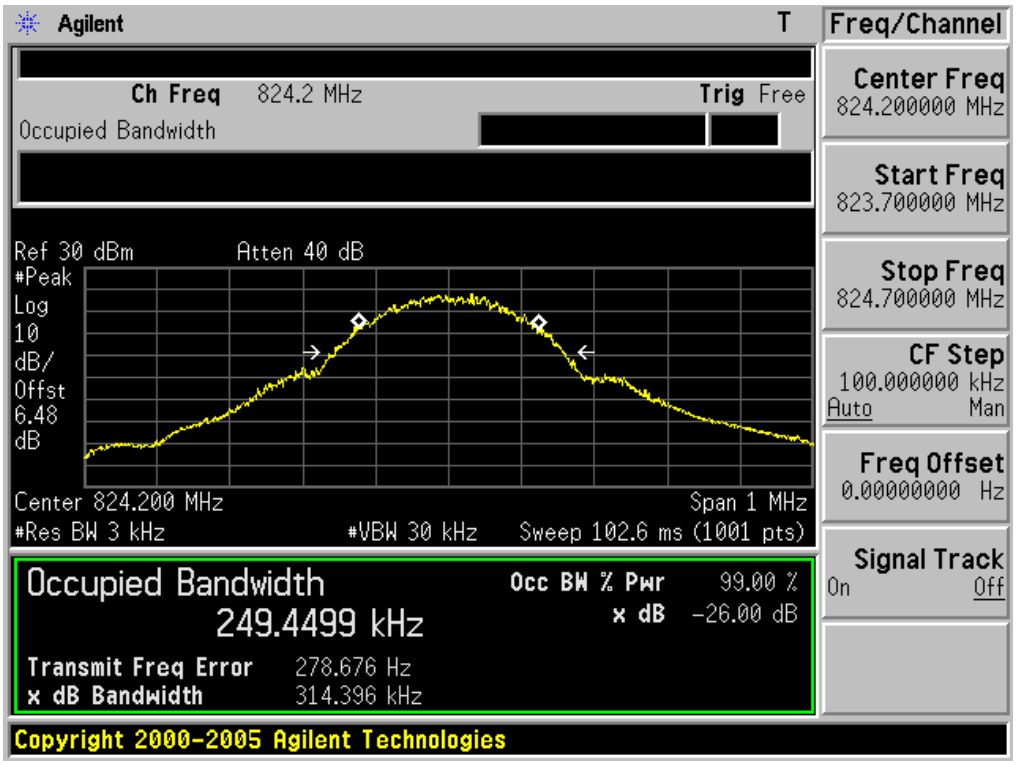
GSM850

Channel	Frequency (MHz)	99% Bandwidth (kHz)
128	824.2	**249.4499**
190	836.6	**248.1199**
251	848.8	**243.4290**

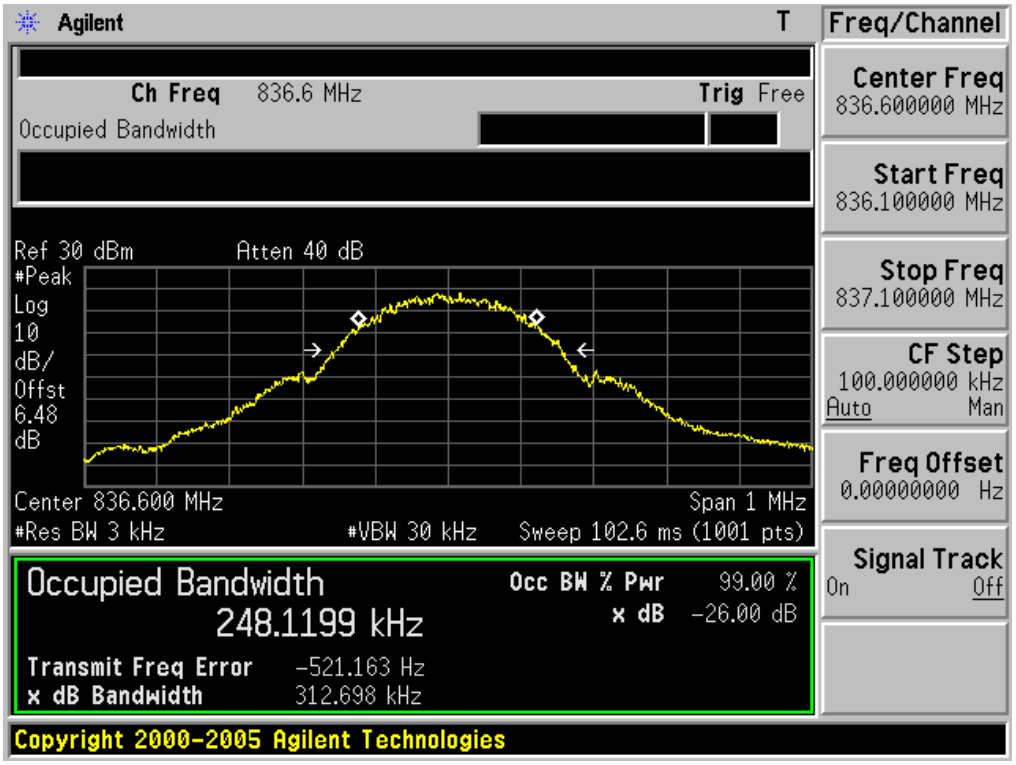
PCS1900

Channel	Frequency (MHz)	99% Bandwidth (kHz)
512	1850.2	**248.2510**
661	1880.0	**244.9728**
810	1909.8	**247.9829**

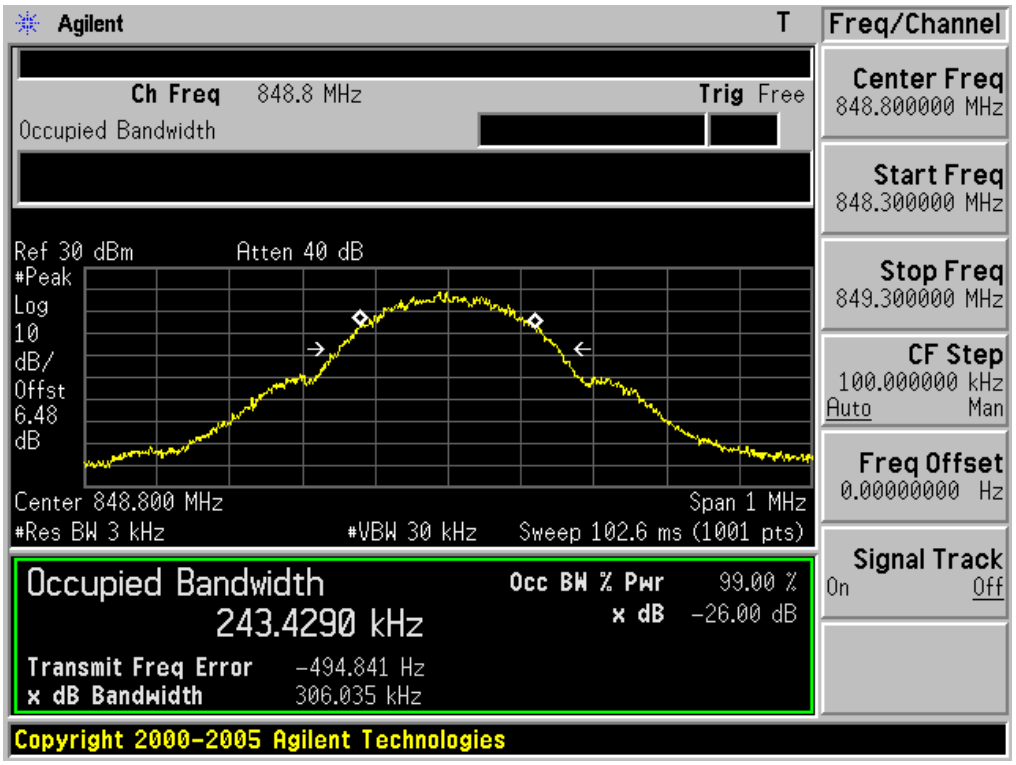
Occupied Bandwidth 99 % Bandwidth GSM850 & Channel: 128



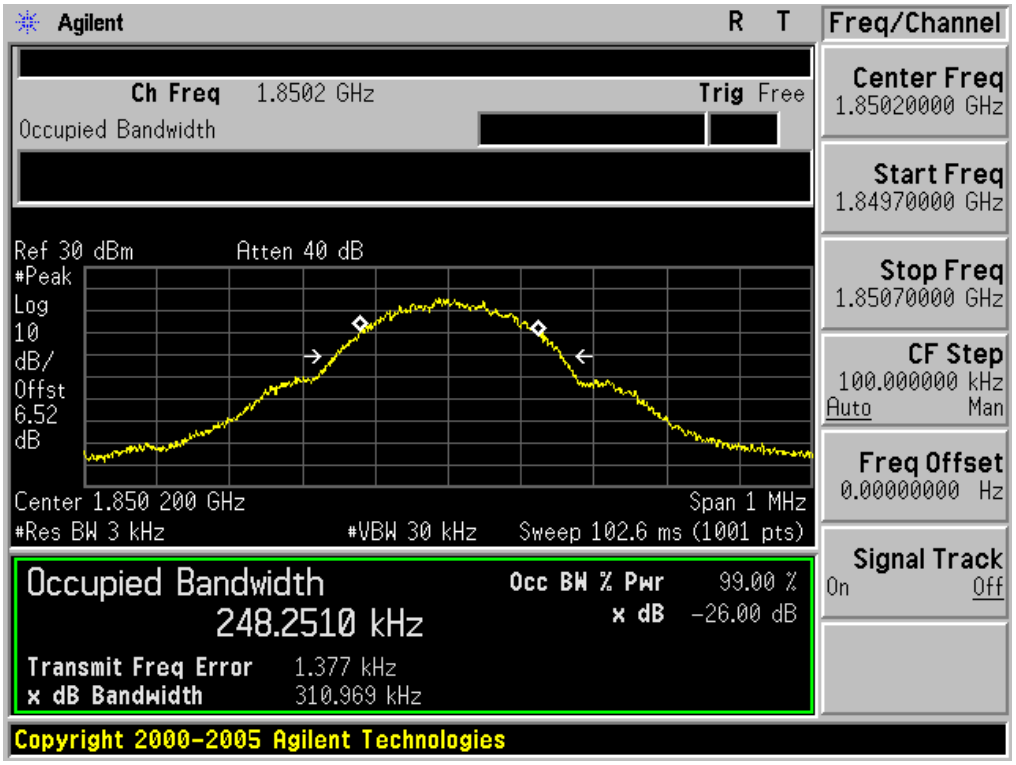
Occupied Bandwidth 99 % Bandwidth GSM850 & Channel: 190



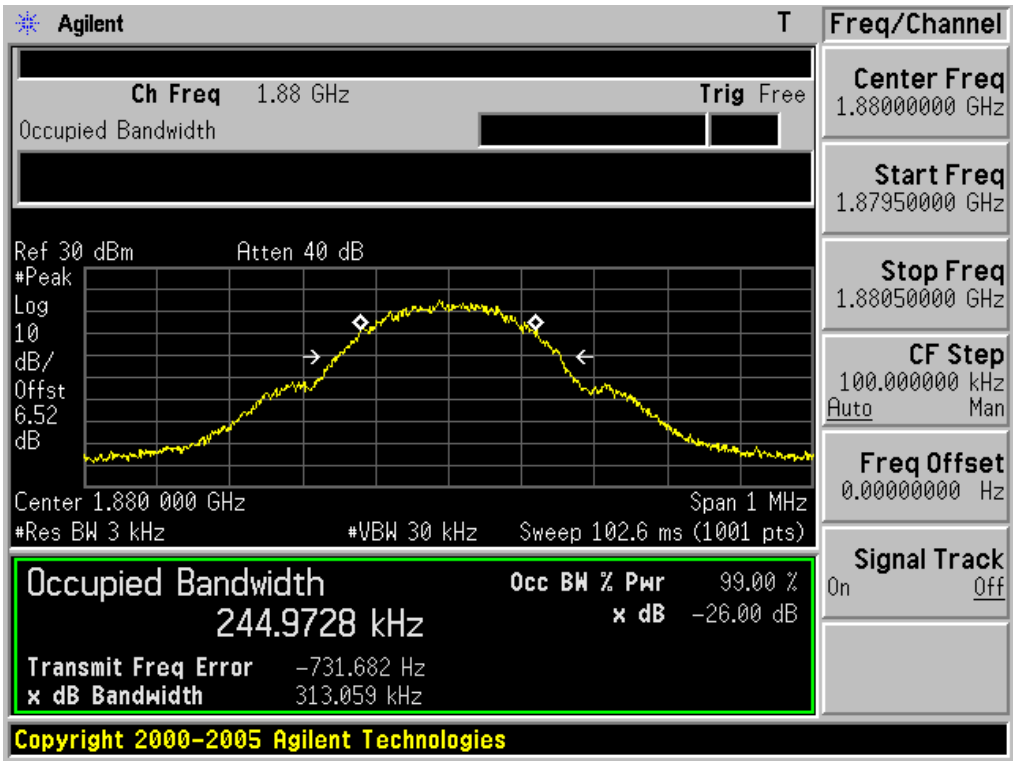
Occupied Bandwidth 99 % Bandwidth GSM850 & Channel: 251



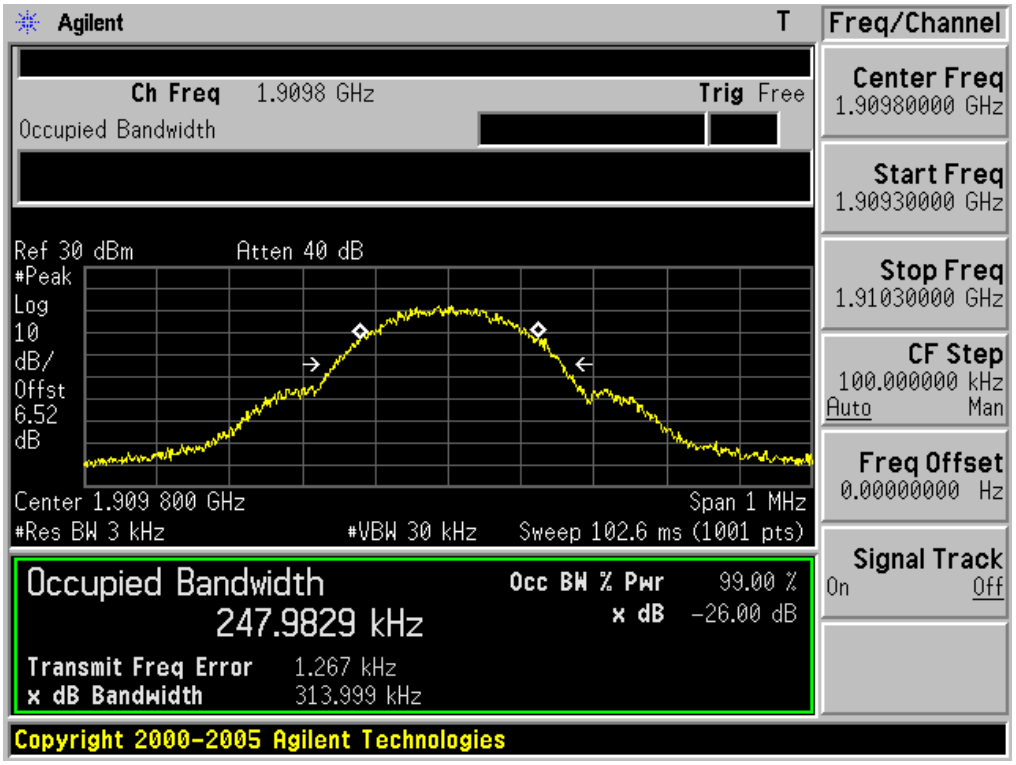
Occupied Bandwidth 99 % Bandwidth PCS1900 & Channel: 512



Occupied Bandwidth 99 % Bandwidth PCS1900 & Channel: 661



Occupied Bandwidth 99 % Bandwidth PCS1900 & Channel: 810



3.4 Occupied Bandwidth Emission Limit

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 24.238(b)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

Measurement Procedure:

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

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

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

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

Measurement Data:

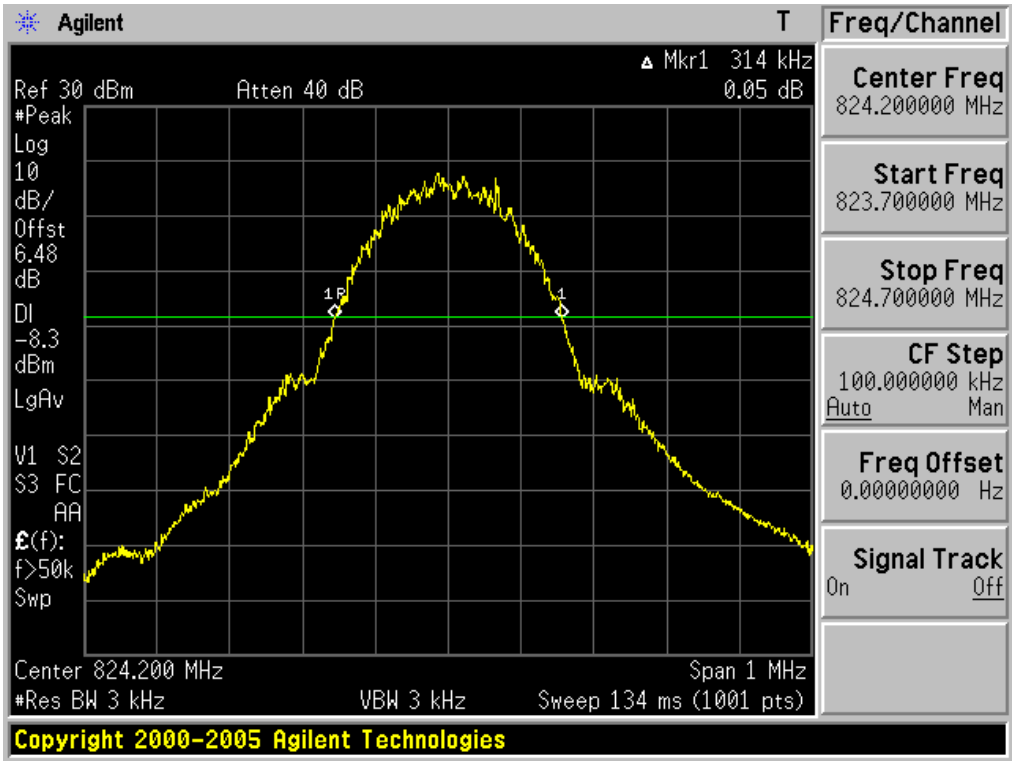
GSM850

Channel	Frequency (MHz)	-26dBc Bandwidth (kHz)
128	824.2	**314**
190	836.6	**311**
251	848.8	**315**

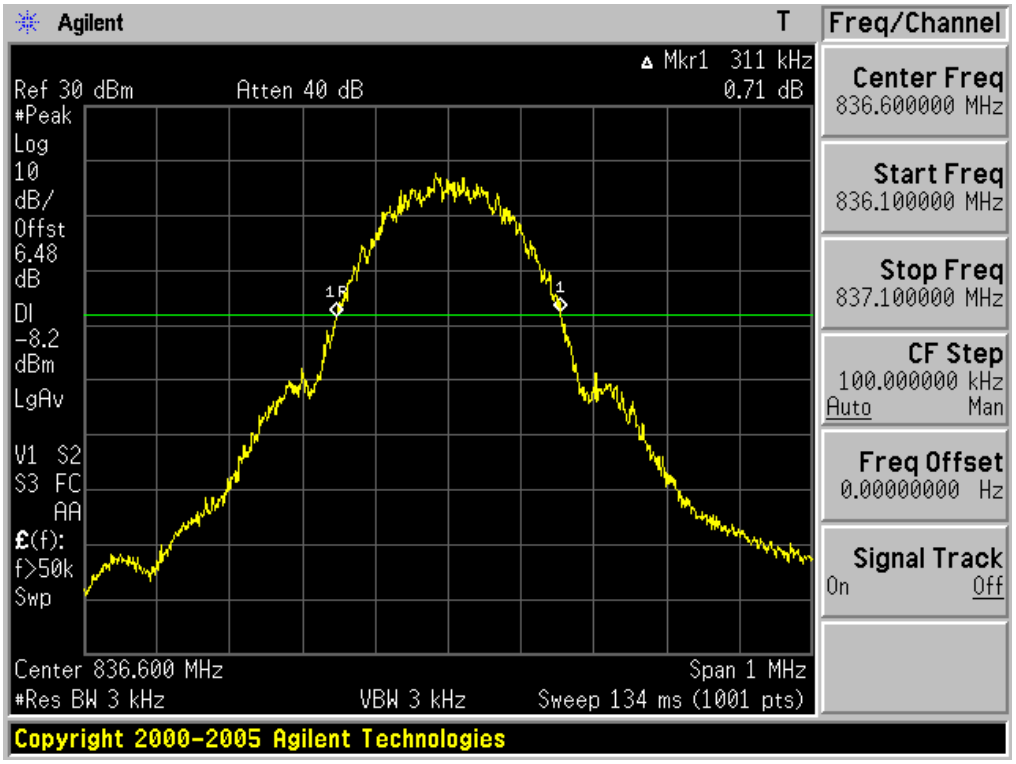
PCS1900

Channel	Frequency (MHz)	-26dBc Bandwidth (kHz)
512	1850.2	**311**
661	1880.0	**312**
810	1909.8	**311**

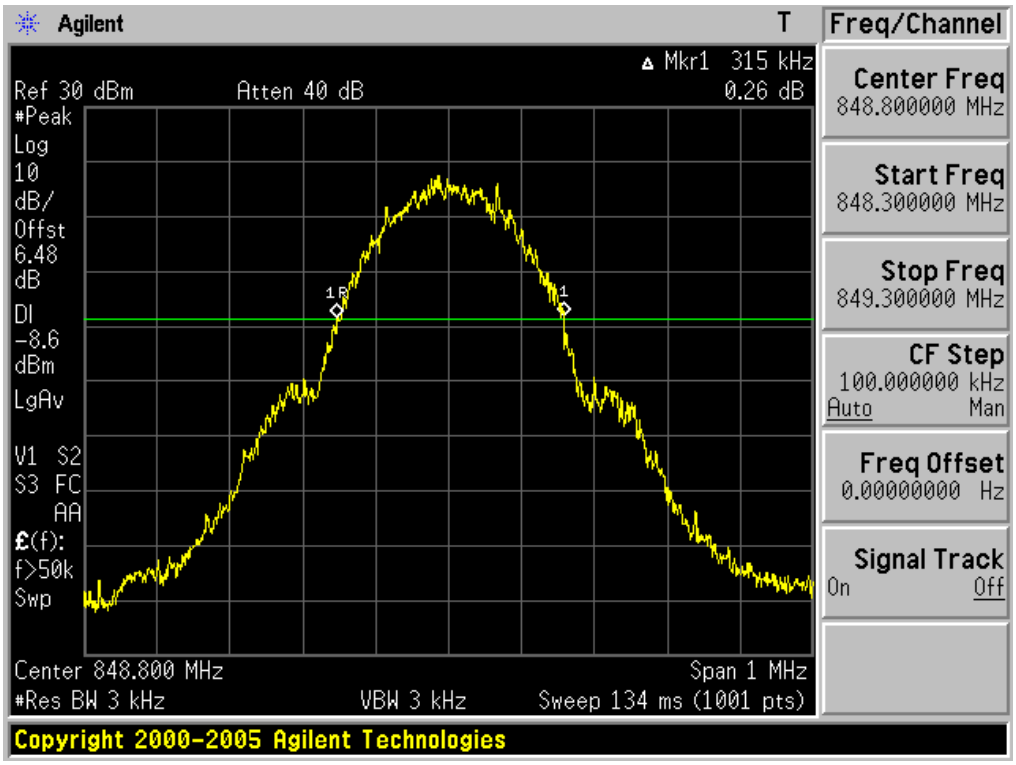
Occupied Bandwidth 26dBc Bandwidth GSM850 & Channel: 128



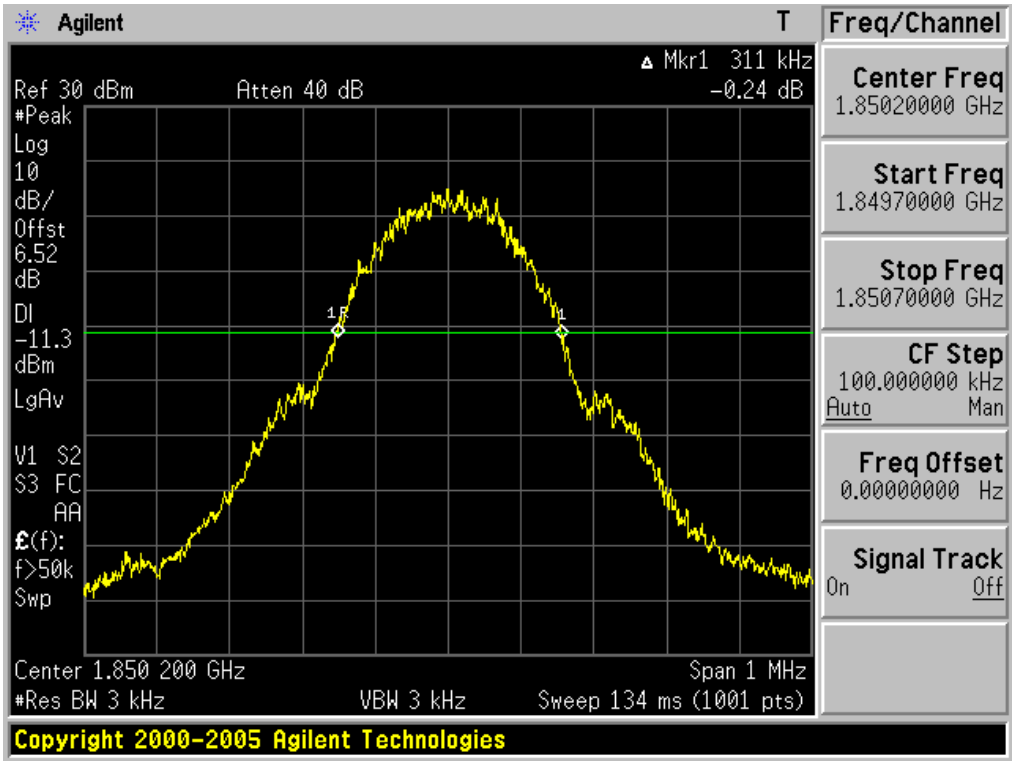
Occupied Bandwidth 26dBc Bandwidth GSM850 & Channel: 190



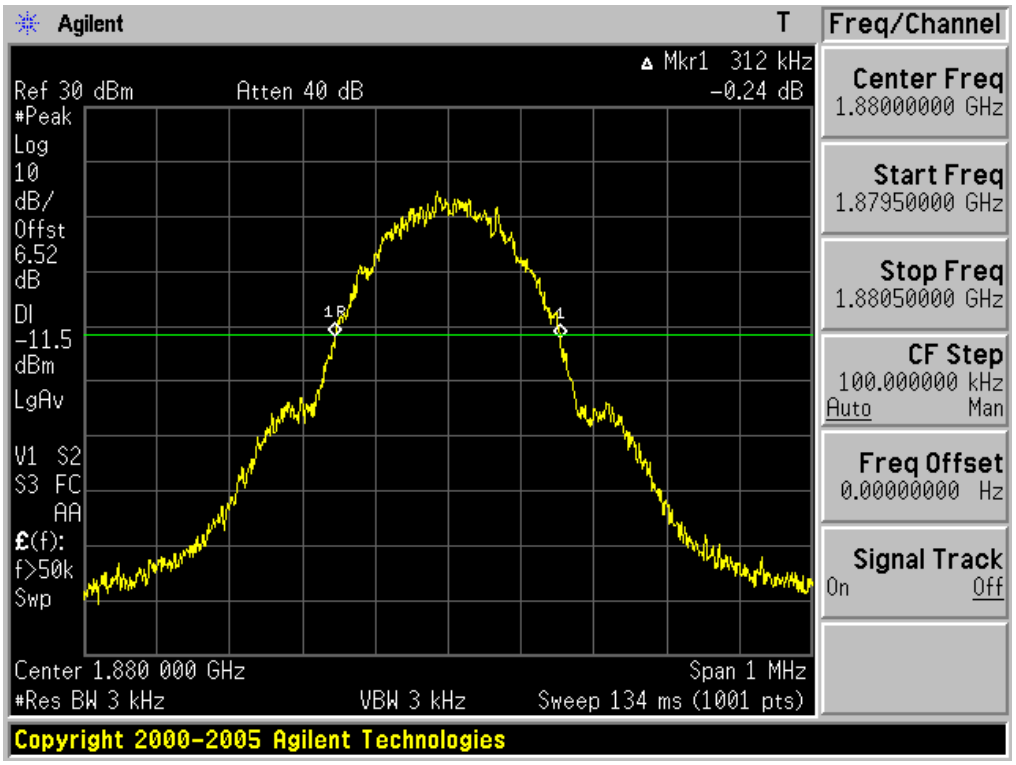
Occupied Bandwidth 26dBc Bandwidth GSM850 & Channel: 251



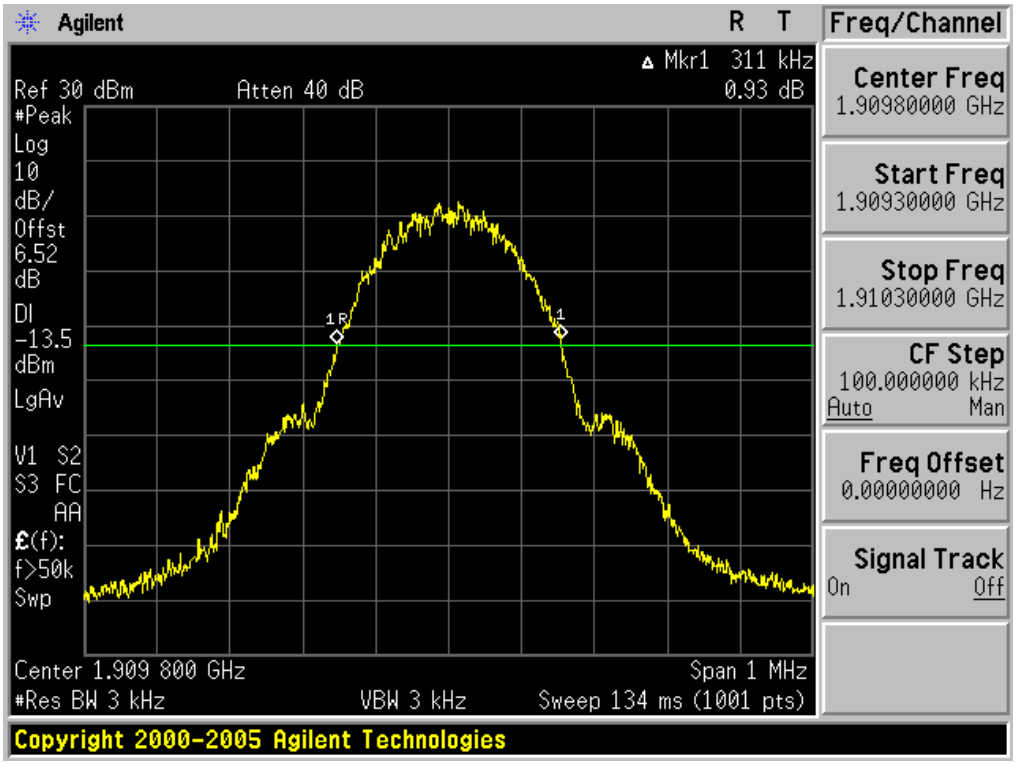
Occupied Bandwidth 26dBc Bandwidth PCS1900 & Channel: 512



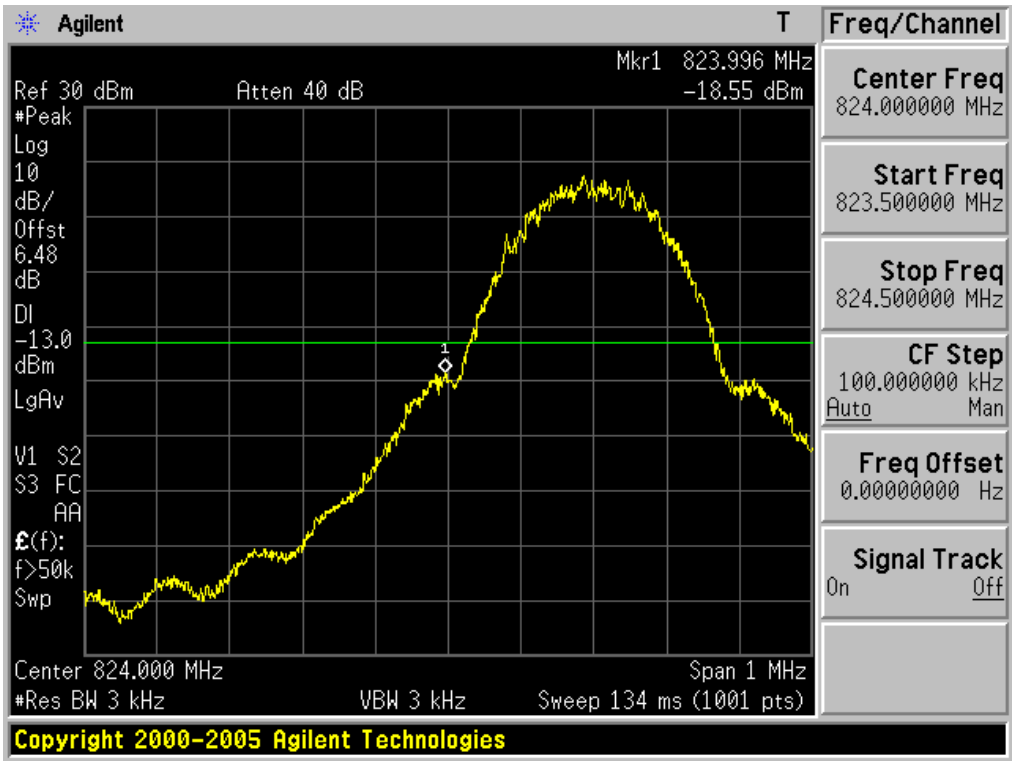
Occupied Bandwidth 26dBc Bandwidth PCS1900 & Channel: 661



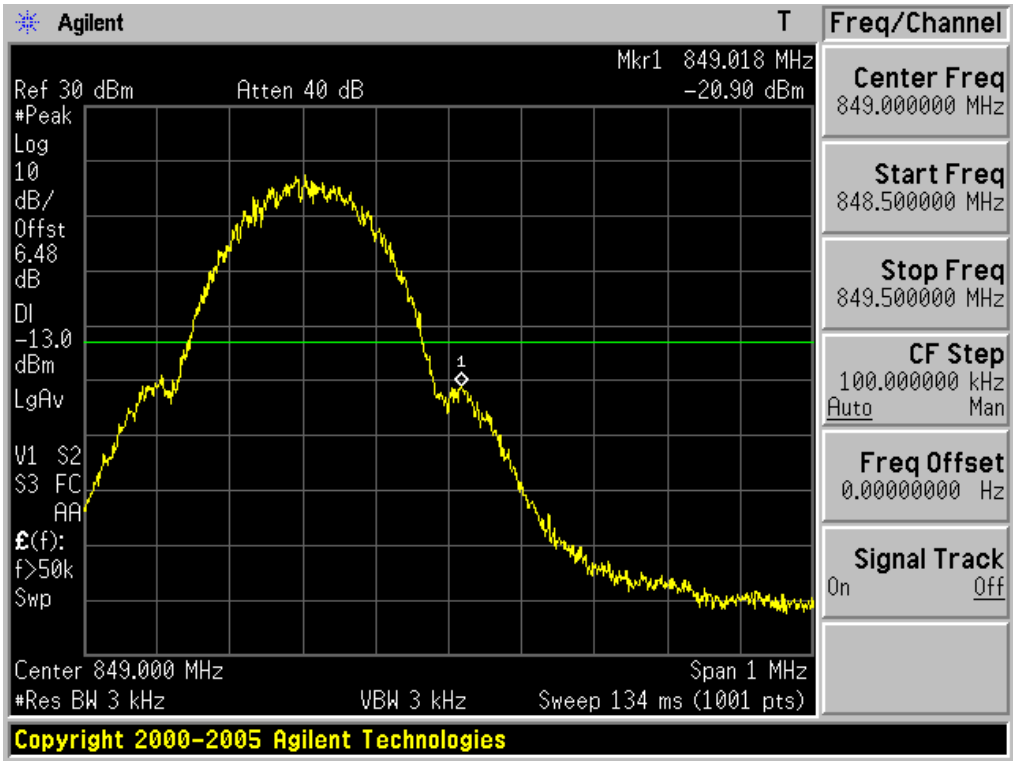
Occupied Bandwidth 26dBc Bandwidth PCS1900 & Channel: 810



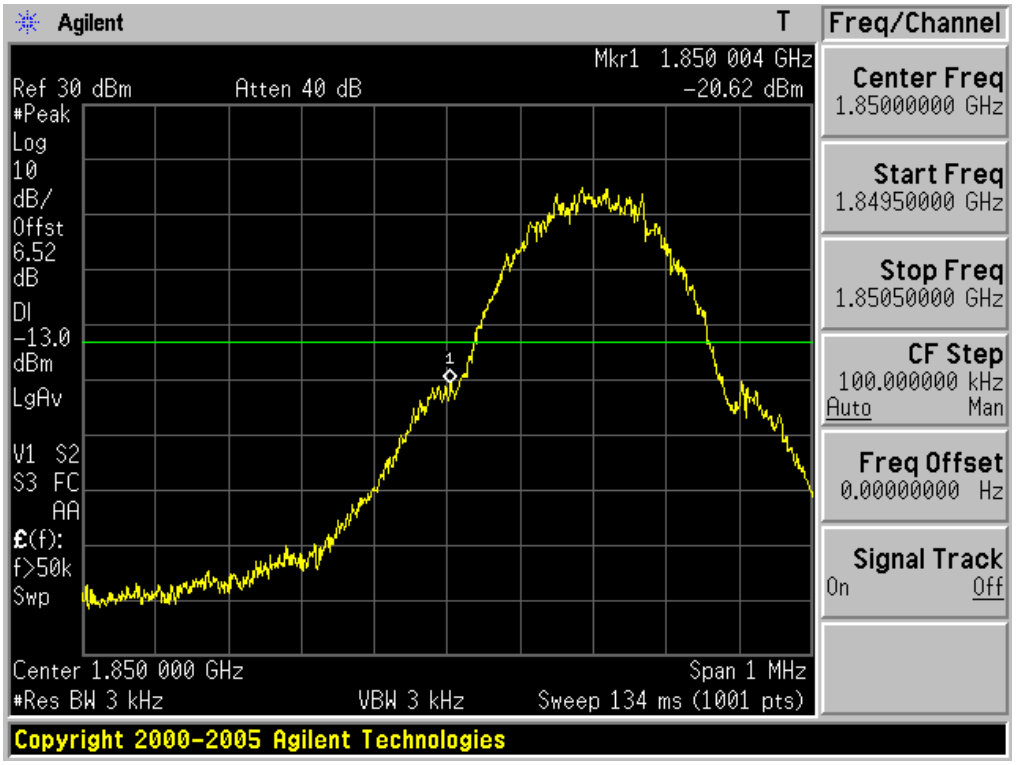
Band Edge GSM850 & Channel: 128



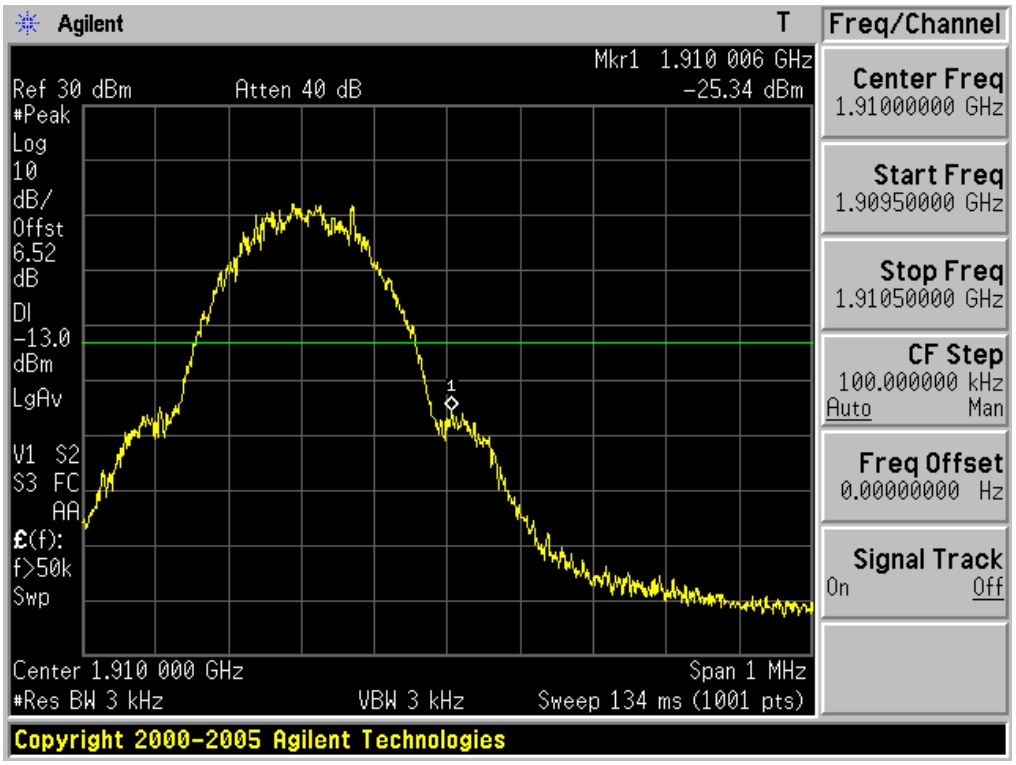
Band Edge GSM850 & Channel: 190



Band Edge PCS1900 & Channel: 512



Band Edge PCS1900 & Channel: 810



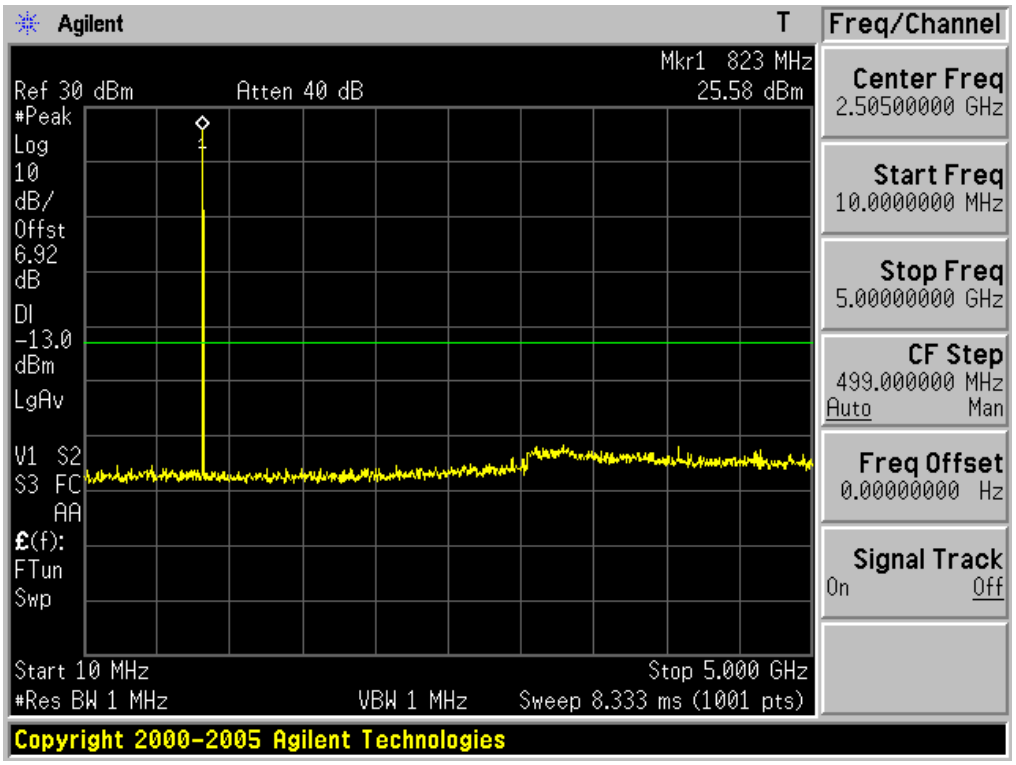
3.5 Spurious and Harmonic Emissions at Antenna Terminal

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 2.1051, 24.238(a)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

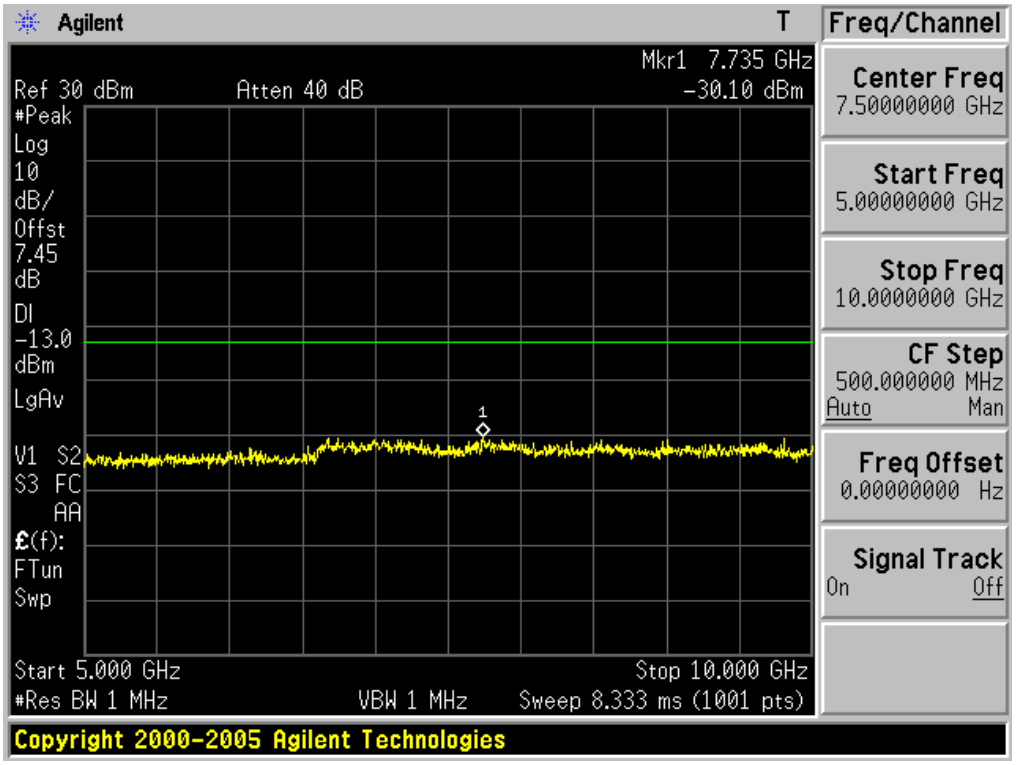
Measurement Procedure:

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

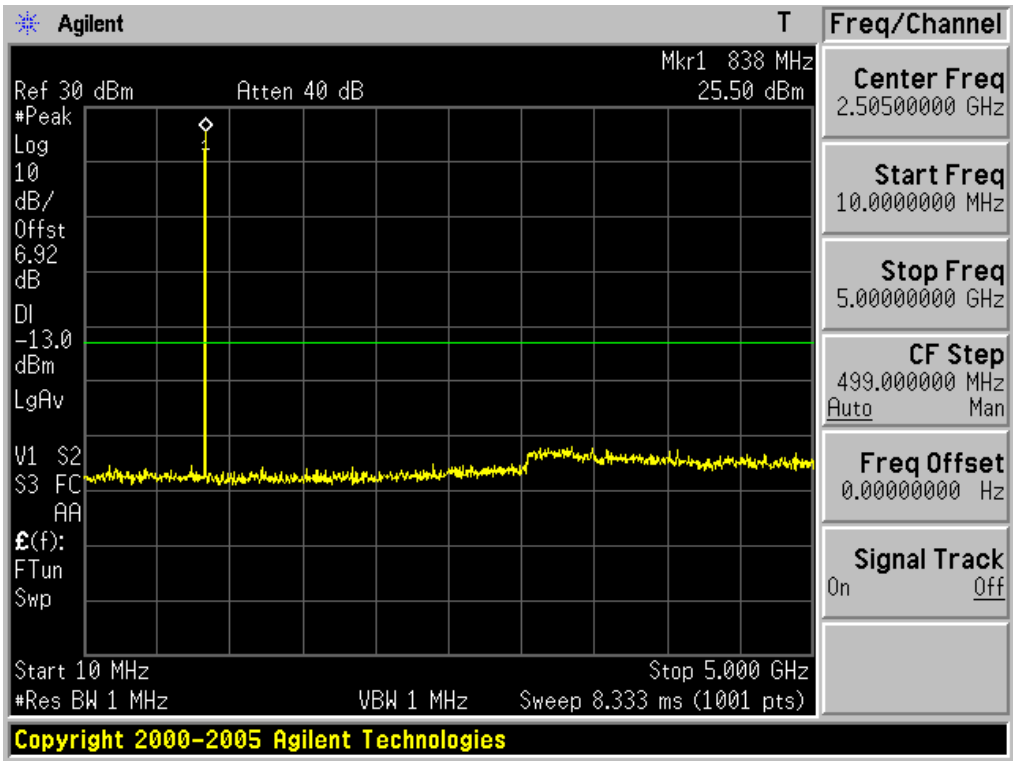
Spurious Emissions at Antenna Terminal GSM850 & Channel: 128



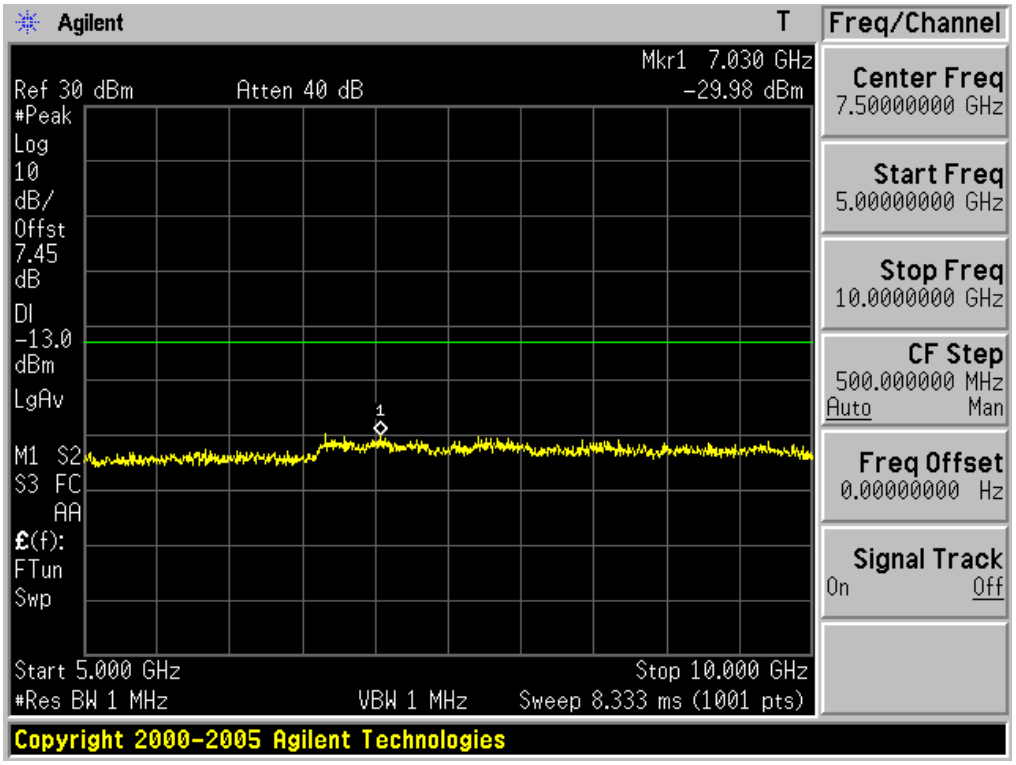
Spurious Emissions at Antenna Terminal GSM850 & Channel: 128



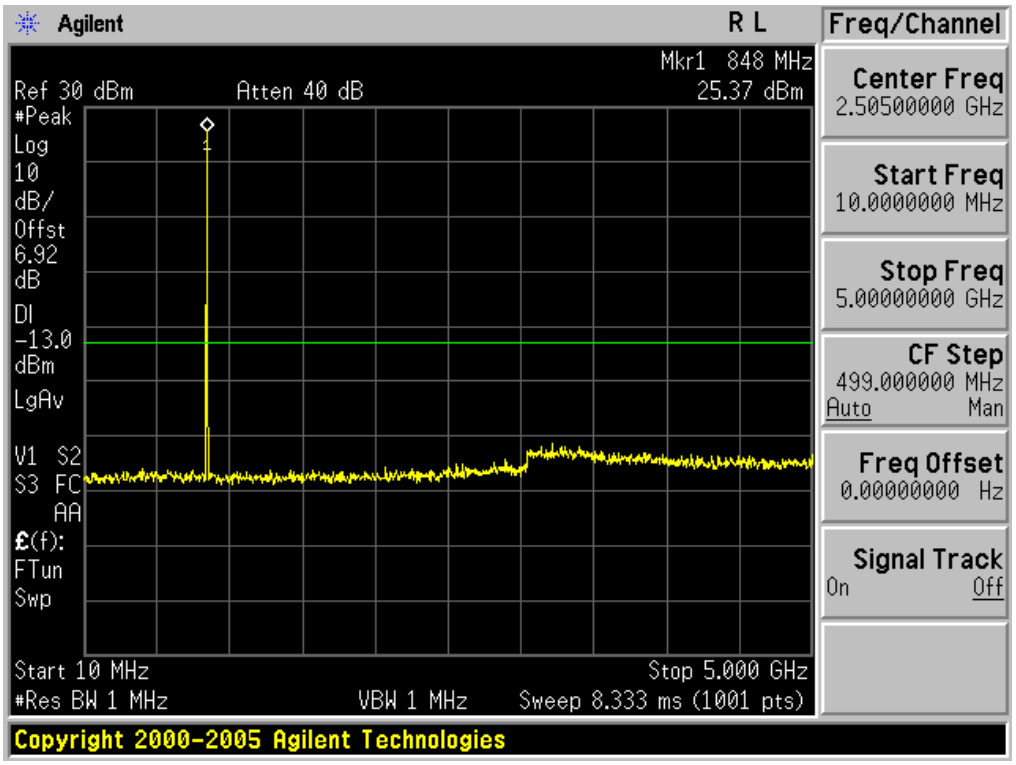
Spurious Emissions at Antenna Terminal GSM850 & Channel: 190



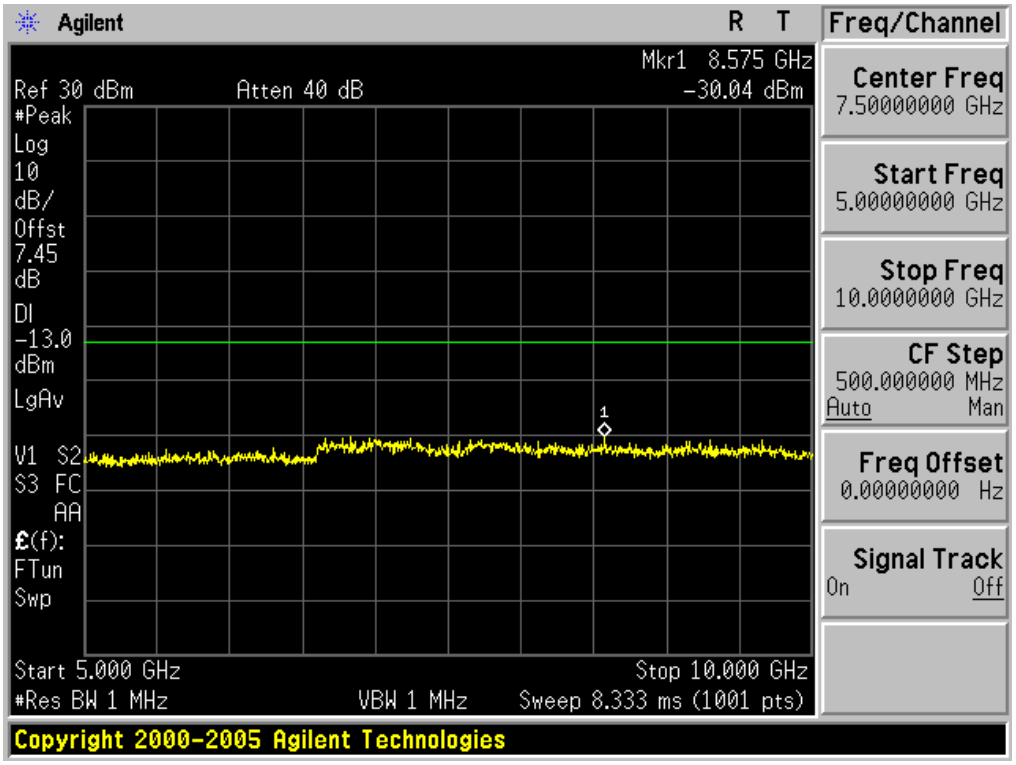
Spurious Emissions at Antenna Terminal GSM850 & Channel: 190



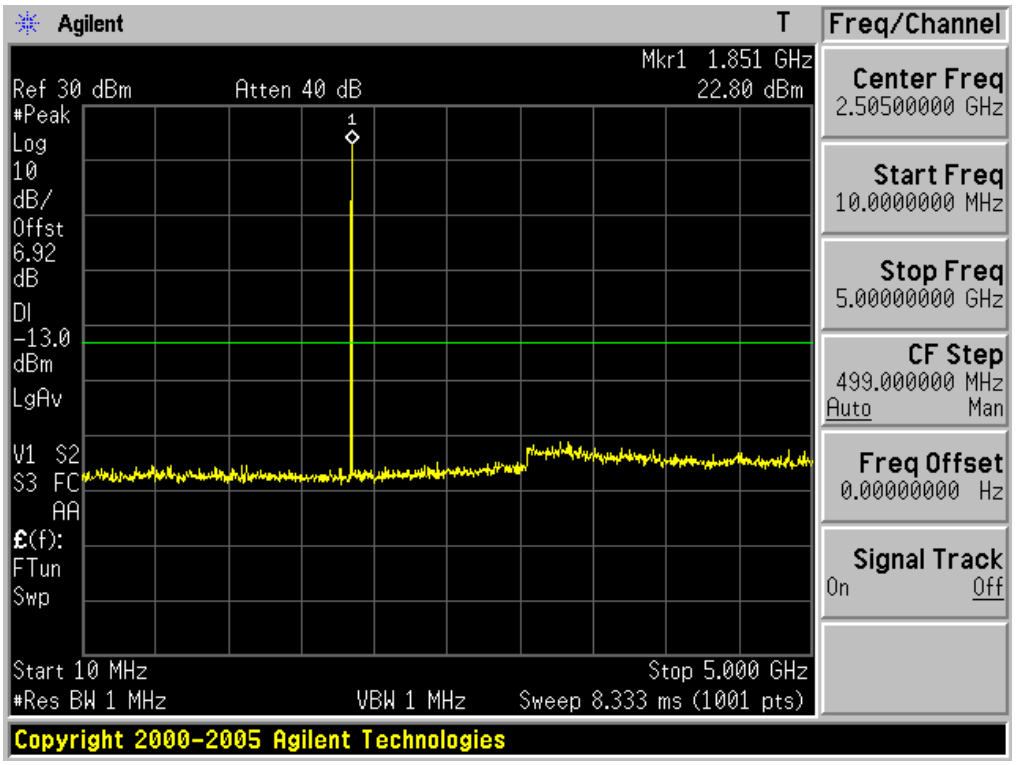
Spurious Emissions at Antenna Terminal GSM850 & Channel: 251



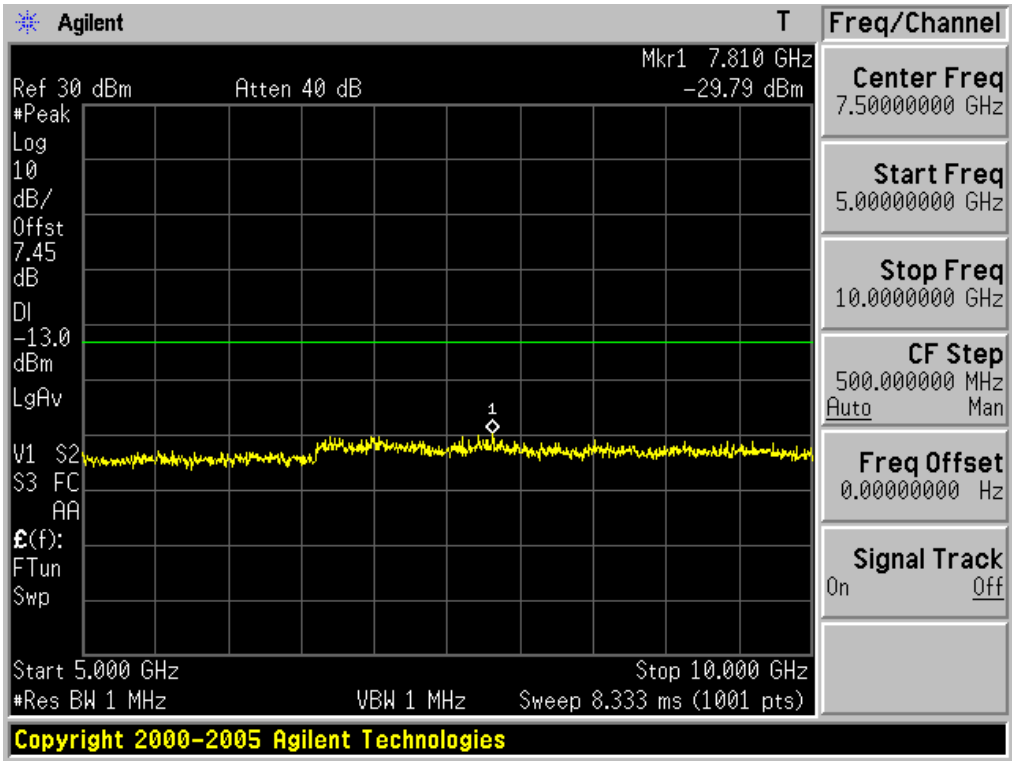
Spurious Emissions at Antenna Terminal GSM850 & Channel: 251



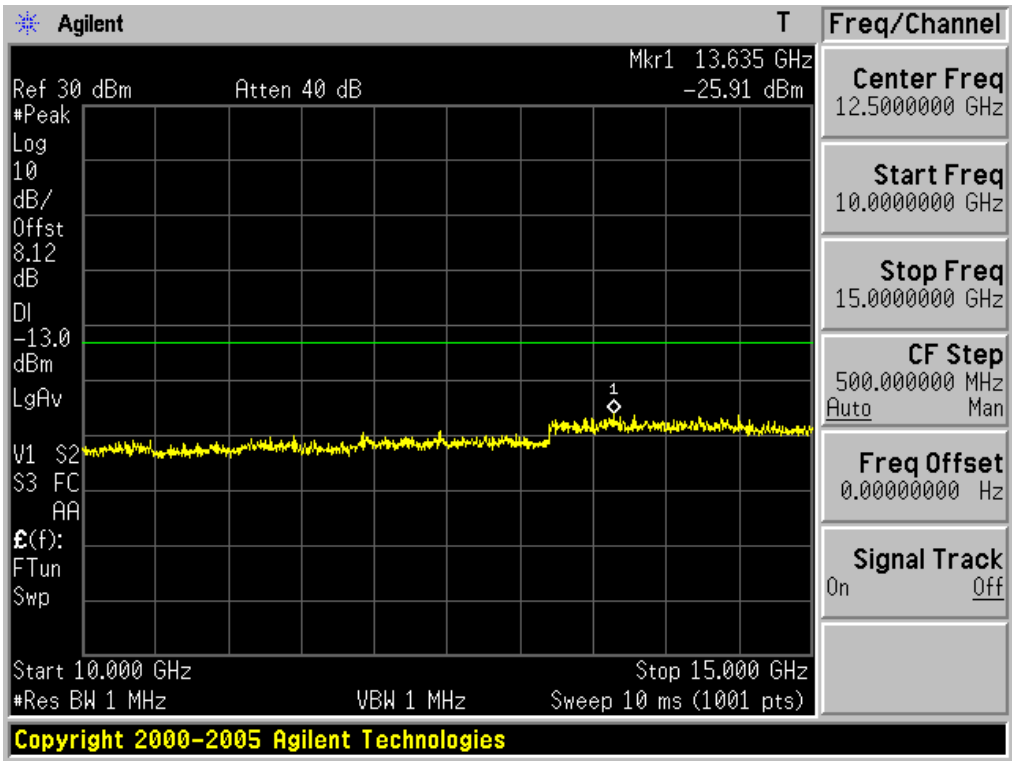
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 512



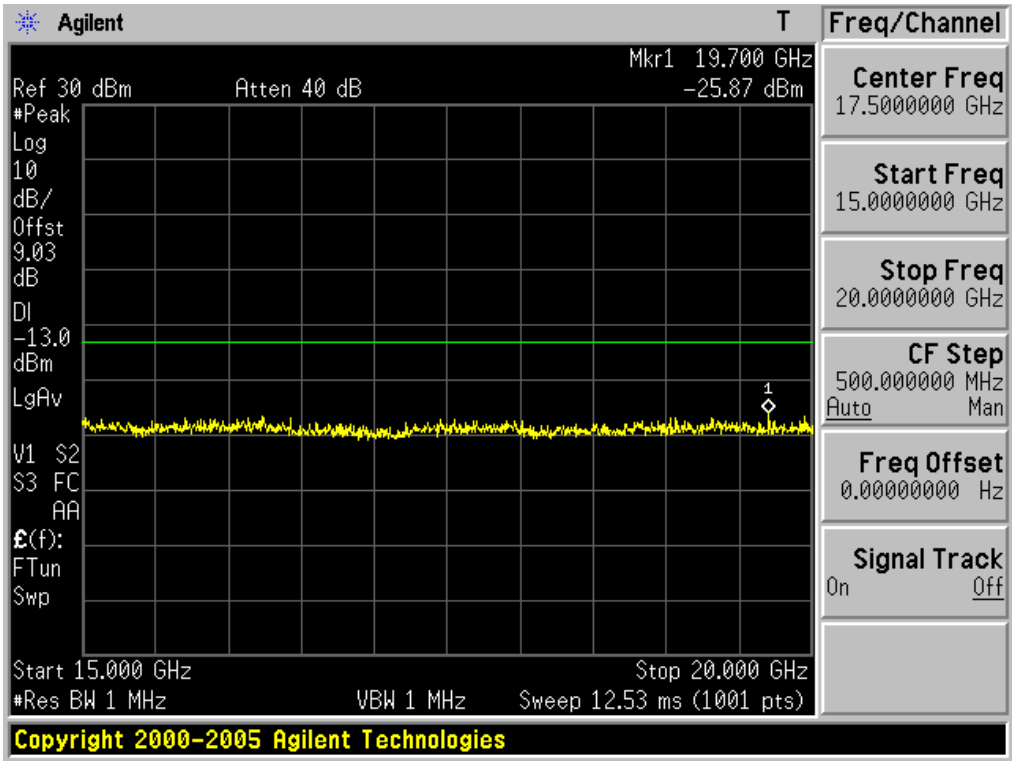
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 512



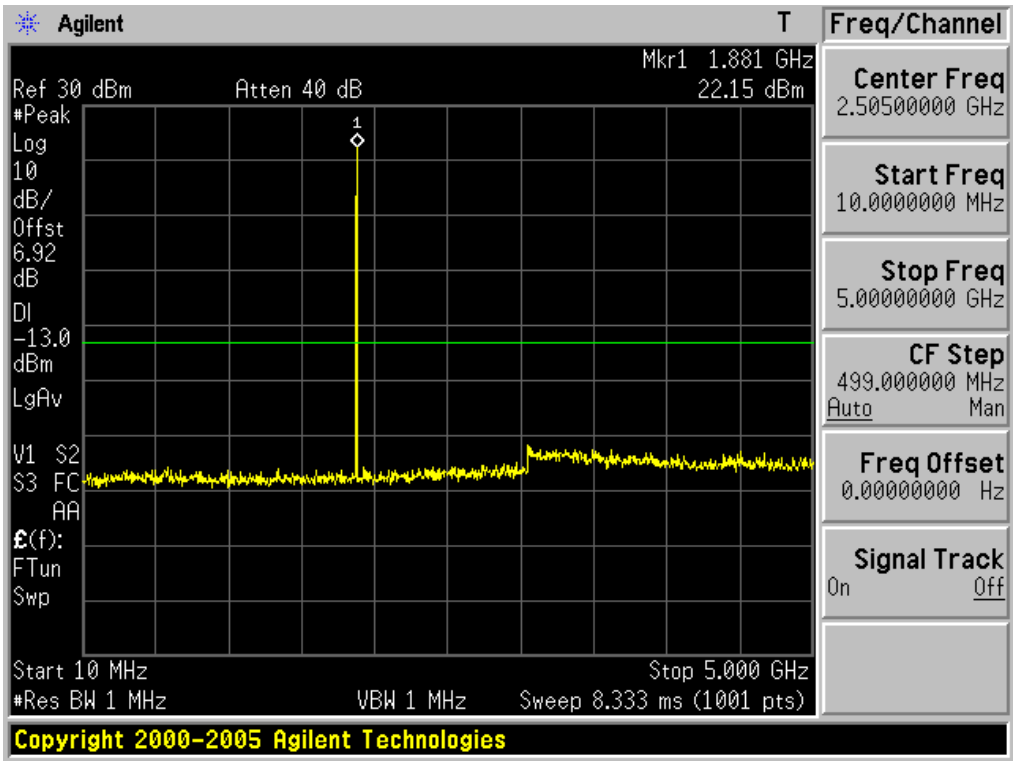
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 512



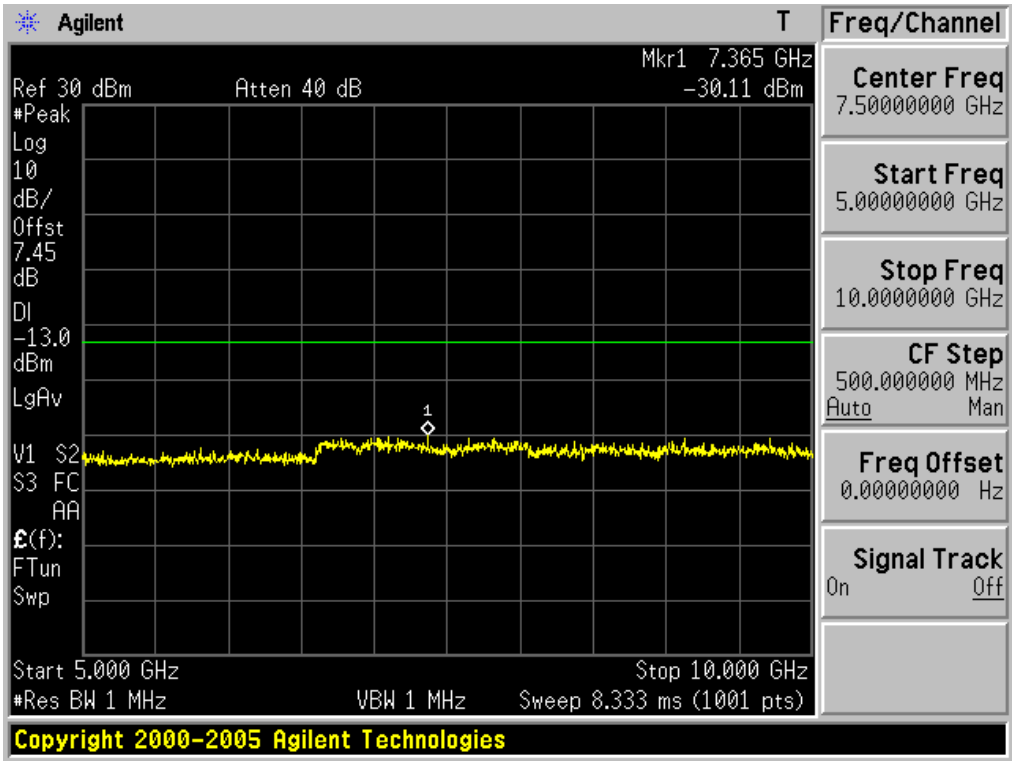
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 512



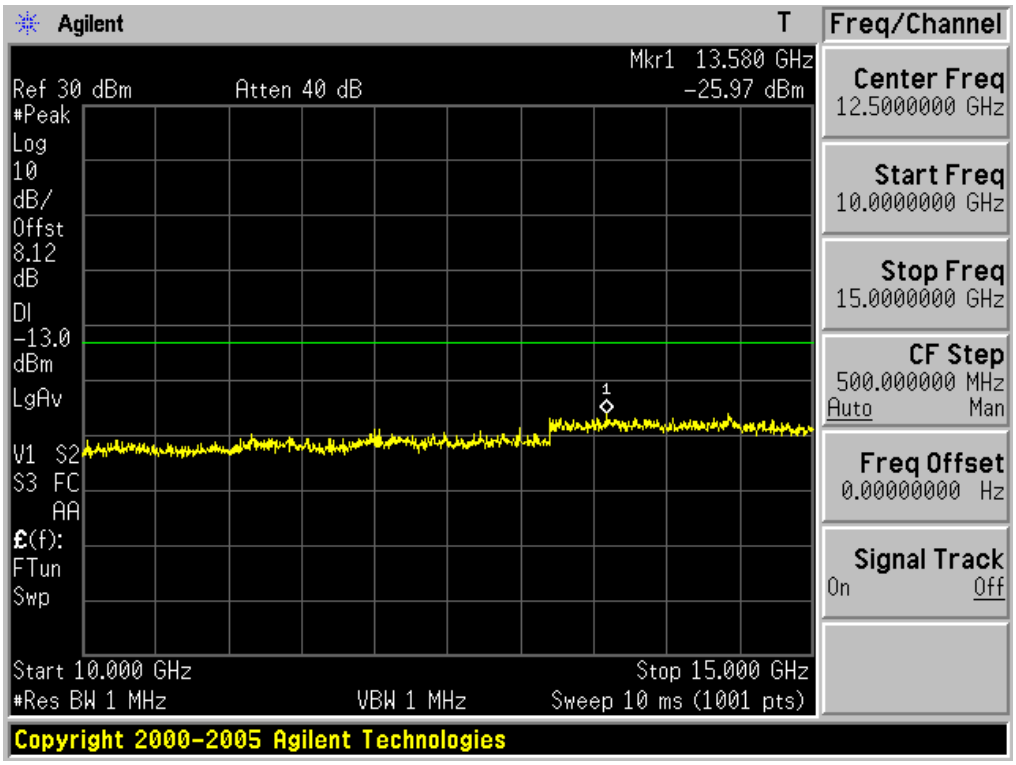
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 661



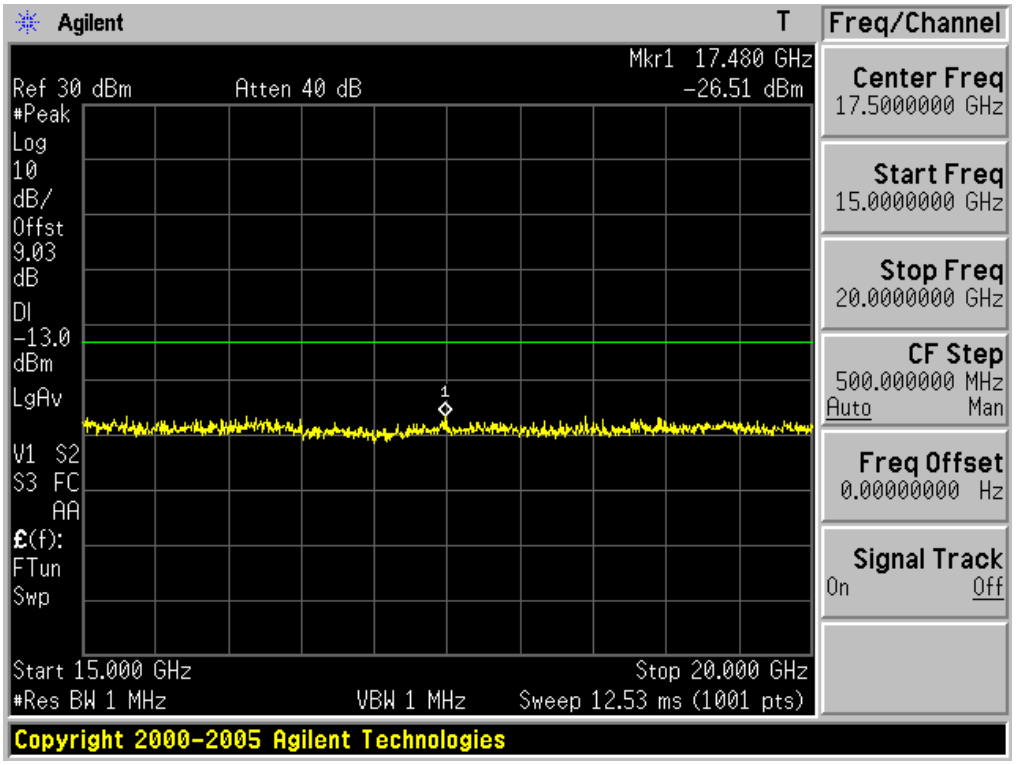
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 661



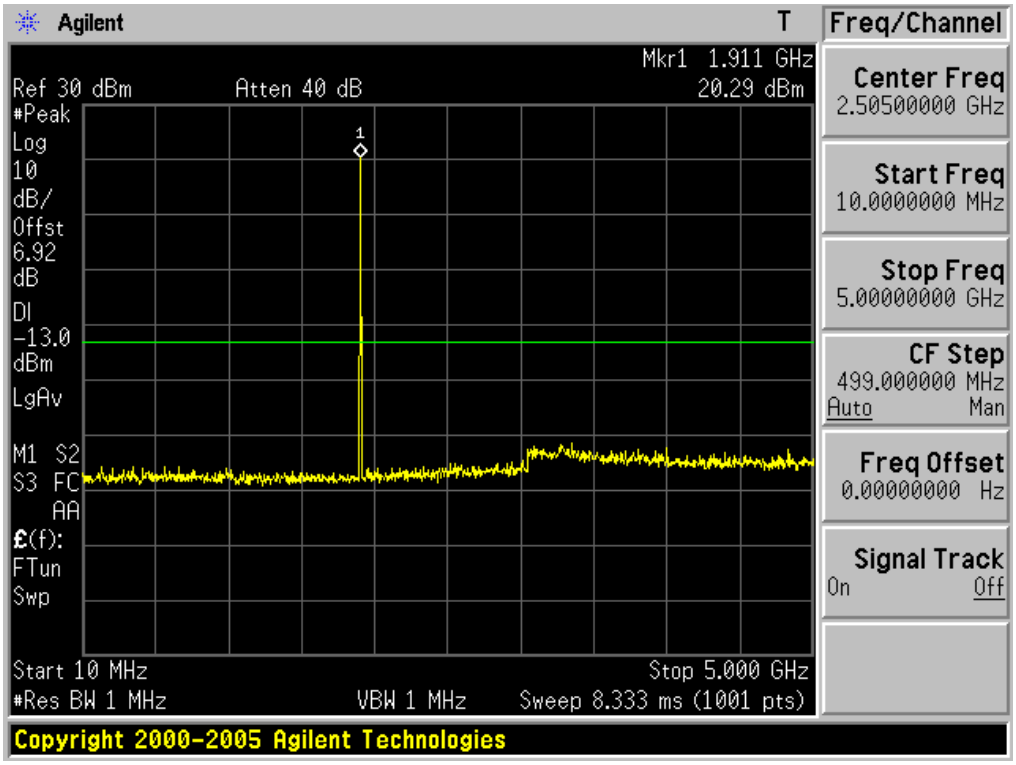
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 661



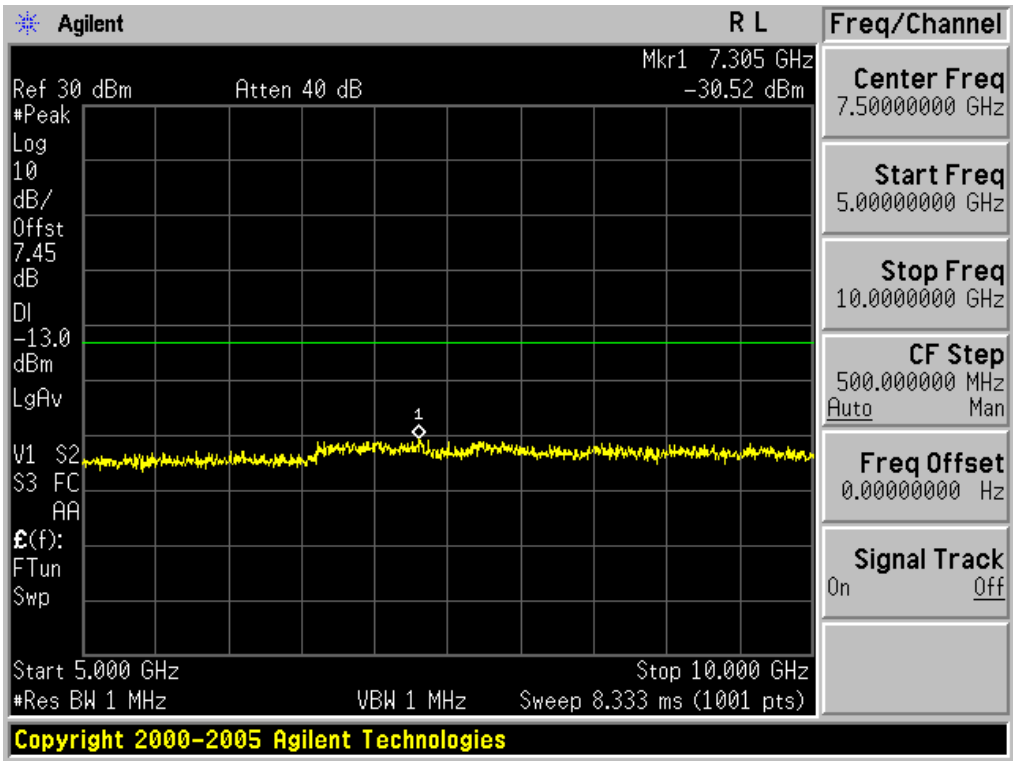
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 661



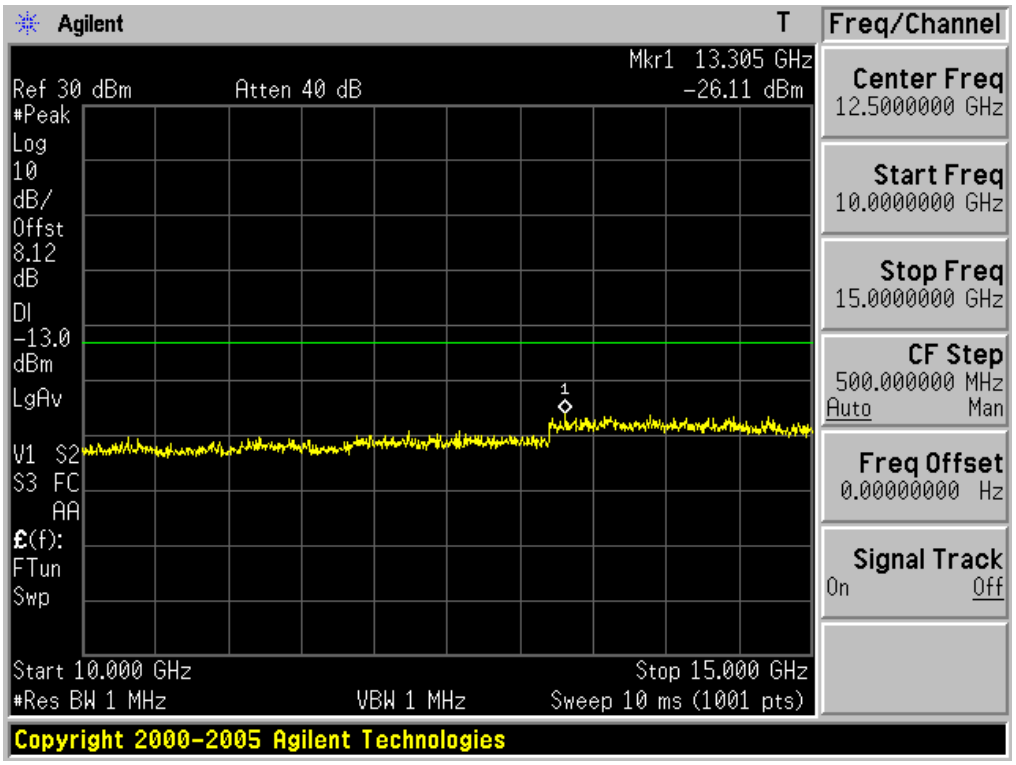
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 810



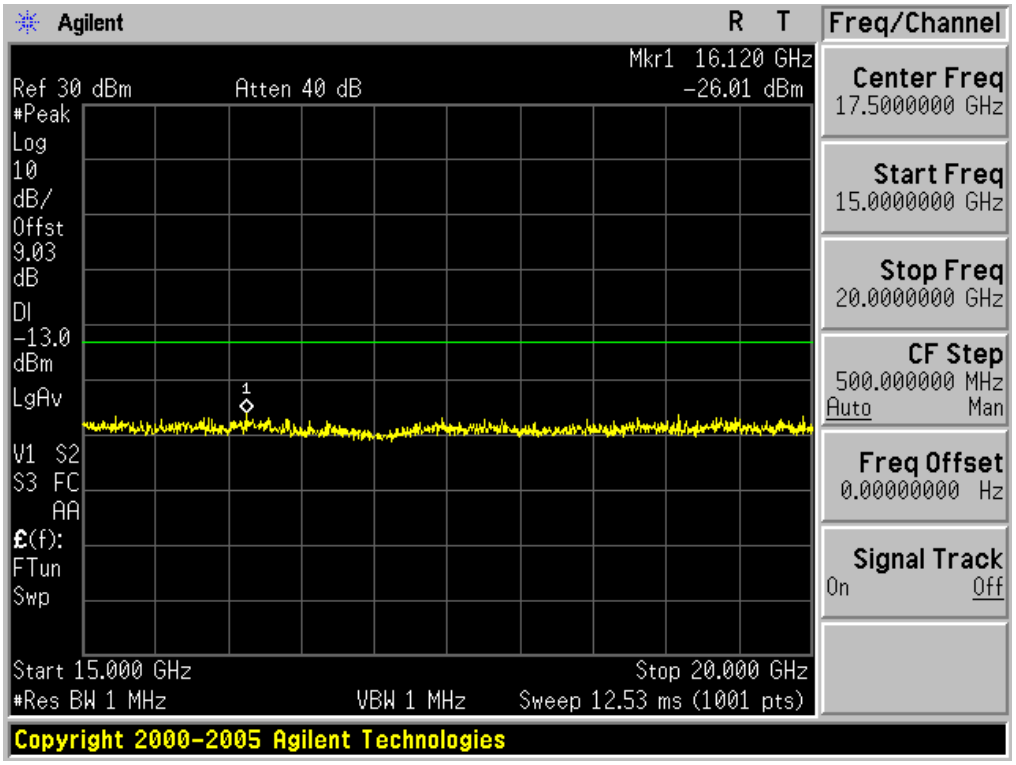
Spurious Emissions at Antenna Terminal PCS1900 & Channel: 810



Spurious Emissions at Antenna Terminal PCS1900 & Channel: 810



Spurious Emissions at Antenna Terminal PCS1900 & Channel: 810



3.6 Field Strength of Spurious Radiation

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 2.1053(a)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

Measurement Procedure:

- Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.
  The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

GSM850 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 824.2 MHz

CHANNEL : 128(Low)

MEASURED OUTPUT POWER : 24.26 dBm = 0.267 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 37.26 dBc

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
1648.4	H	-48.97	5.63	-43.34	67.60
1648.4	V	-51.17	5.63	-45.54	69.80
2472.6	H	-54.56	7.01	-47.55	71.81
2472.6	V	-54.86	7.01	-47.85	72.11

NOTE

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

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

GSM850 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 836.6 MHz

CHANNEL : 190(Mid)

MEASURED OUTPUT POWER : 24.69 dBm = 0.294 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 37.69 dBc

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
1673.2	H	-49.83	5.69	-44.14	68.83
1673.2	V	-51.63	5.69	-45.94	70.63
2509.8	H	-56.01	7.05	-48.96	73.65
2509.8	V	-55.11	7.05	-48.06	72.75

NOTE

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

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

GSM850 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 848.8 MHz
CHANNEL : 251(High)
MEASURED OUTPUT POWER : 26.14 dBm = 0.411 W
MODULATION SIGNAL : GSM (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 39.14 dBc

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
1697.6	H	-31.55	5.75	-25.80	51.94
1697.6	V	-31.75	5.75	-26.00	52.14
2546.4	H	-55.97	7.09	-48.88	75.02
2546.4	V	-54.97	7.09	-47.88	74.02

NOTE

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

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

GSM1900 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 1850.2 MHz

CHANNEL : 512(Low)

MEASURED OUTPUT POWER : 22.68 dBm = 0.185 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

LIMIT : 43 + 10 $\log_{10}$ (W) = 35.68 dBc

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
3700.40	H	-49.67	9.60	-40.07	62.75
3700.40	V	-47.37	9.60	-37.77	60.45
5550.60	H	-50.96	11.12	-39.84	62.52
5550.60	V	-51.56	11.12	-40.44	63.12

NOTE

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

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

GSM1900 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 1880.0 MHz
CHANNEL : 661(Mid)
MEASURED OUTPUT POWER : 24.66 dBm = 0.292 W
MODULATION SIGNAL : GSM (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 37.66 dBc

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
3760.00	H	-50.03	9.59	-40.44	65.10
3760.00	V	-49.23	9.59	-39.64	64.30
5640.00	H	-49.45	11.15	-38.30	62.96
5640.00	V	-50.35	11.15	-39.20	63.86

NOTE

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

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

GSM1900 Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 1909.8 MHz

CHANNEL : 810(High)

MEASURED OUTPUT POWER : 24.55 dBm = 0.285 W

MODULATION SIGNAL : GSM (Internal)

DISTANCE : 3 meters

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

Freq. (MHz)	**POL** (H/V)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBi)	**CORRECT GENERATOR LEVEL** (dBm)	(dBc)
3819.60	H	-43.47	9.58	-33.89	58.44
3819.60	V	-45.47	9.58	-35.89	60.44
5729.40	H	-47.68	11.18	-36.50	61.05
5729.40	V	-49.08	11.18	-37.90	62.45

NOTE

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

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

3.7 Frequency Stability/Temperature Variation.

FCC ID	:	**QD5-DOTH-100**
Specification	:	47 CFR 2.1055
Tested Frequency	:	836.6MHz for GSM850 1880.0MHz for PCS1900

Measurement Procedure:

The frequency stability of the transmitter is measured by:

a) **Temperature** :The temperature is varied from -30°C to + 50°C using an environmental chamber.
b) **Primary Supply Voltage** :The primary supply voltage is varied from 85% to 115% of the voltage Normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification –The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

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

Time Period and Procedure:

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

Frequency Stability (GSM850)

OPERATING FREQUENCY : 836,600,025 Hz

CHANNEL : 190(Mid)

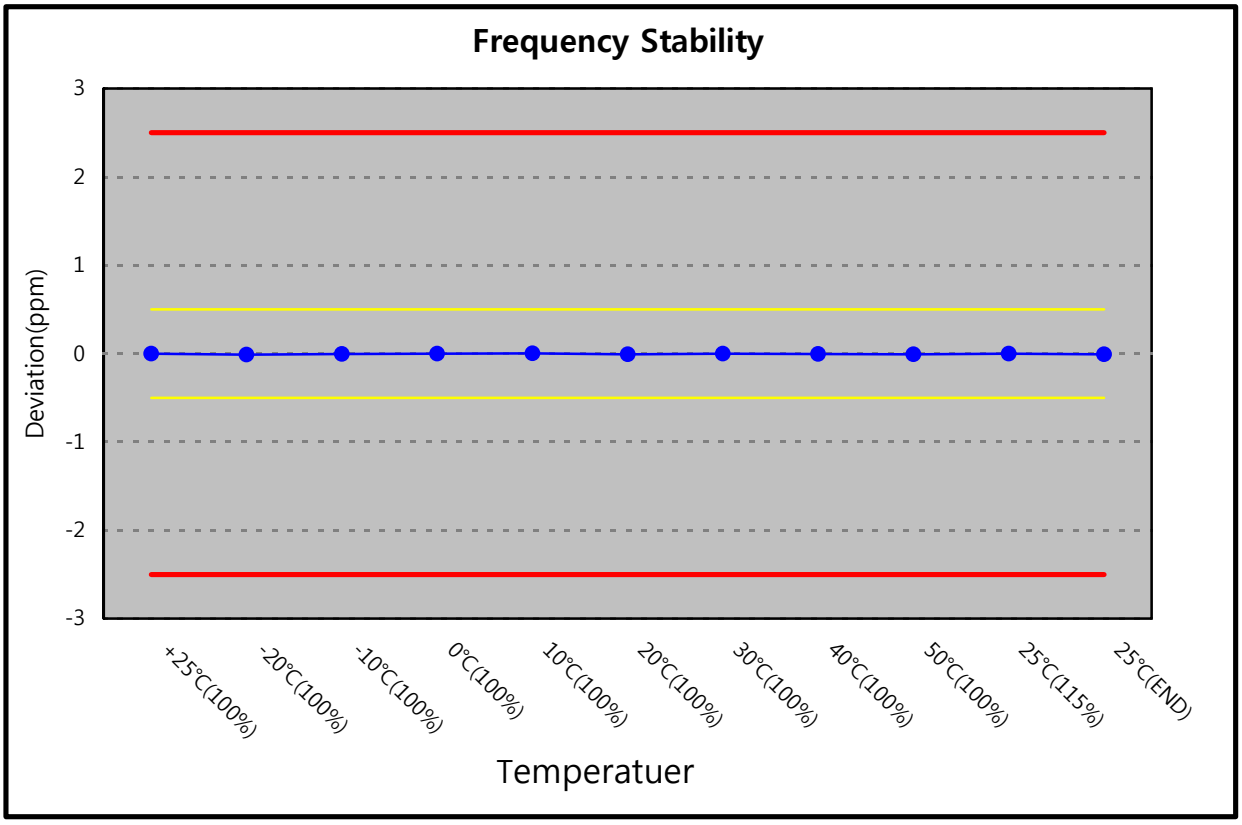
REFERENCE VOLTAGE : 7.40 V DC

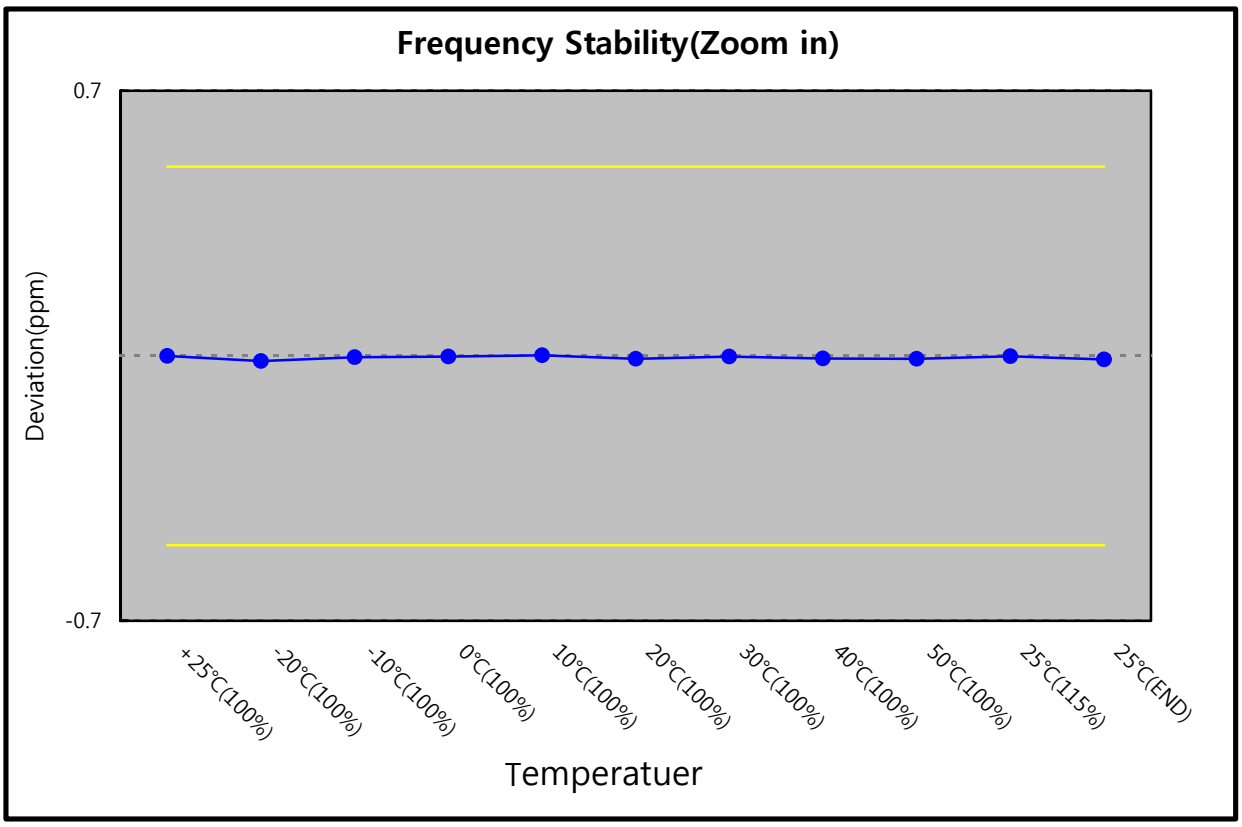
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100%	7.40	+25(Ref)	836,600,025	0.000000	0.000
100%		-20	836,600,013	-0.000001	-0.014
100%		-10	836,600,022	0.000000	-0.004
100%		0	836,600,023	0.000000	-0.002
100%		+10	836,600,026	0.000000	0.001
100%		+20	836,600,018	-0.000001	-0.008
100%		+30	836,600,023	0.000000	-0.002
100%		+40	836,600,019	-0.000001	-0.007
100%		+50	836,600,018	-0.000001	-0.008
85%	6.29	+25	-	-	-
115%	8.51	+25	836,600,024	0.000000	-0.001
BATT.ENDPOINT	7.00	+25	836,600,017	-0.000001	-0.010

Note 1: This device is not operated at 6.29 V (85%).
Note 2: Operating temperature of this device is -20 ~ 50(℃)

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





Frequency Stability (PCS1900)

OPERATING FREQUENCY : 1,880,000, 029 Hz

CHANNEL : 661(Mid)

REFERENCE VOLTAGE : 7.40 V DC

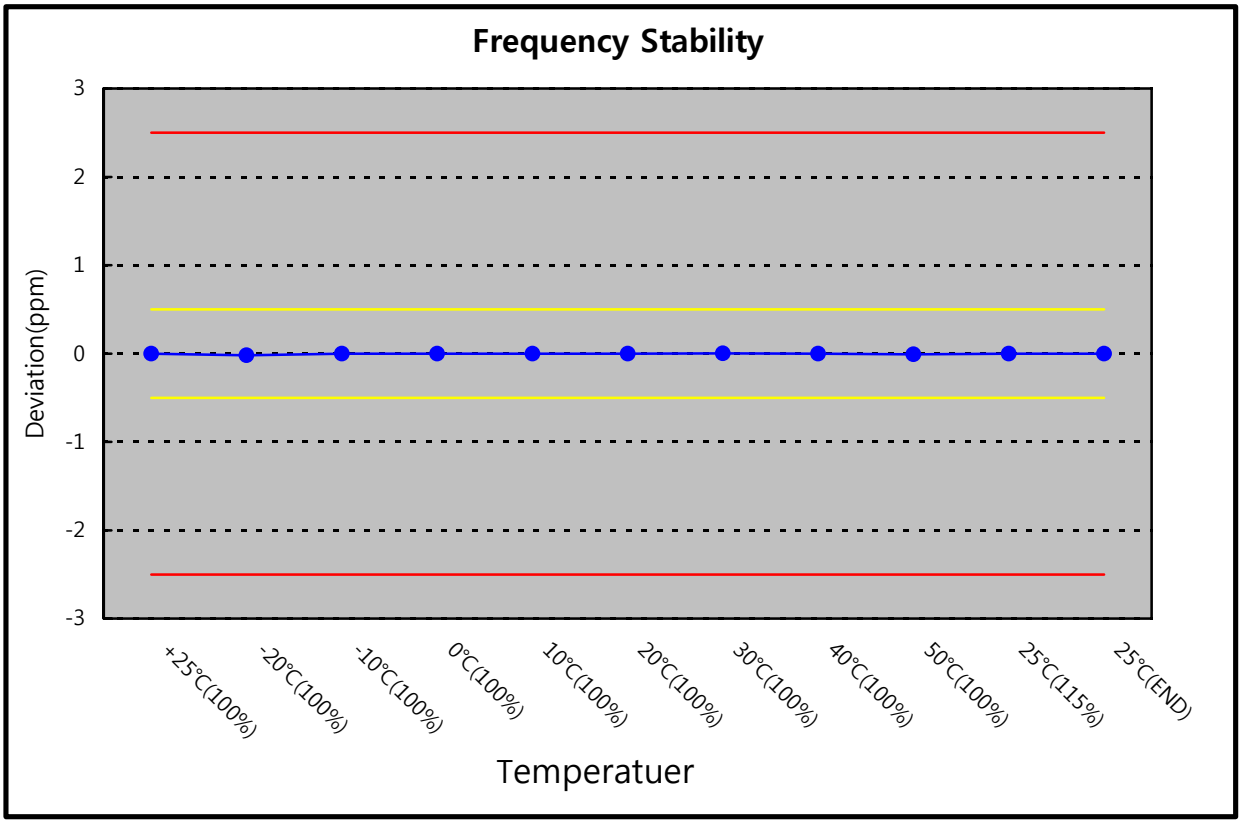
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

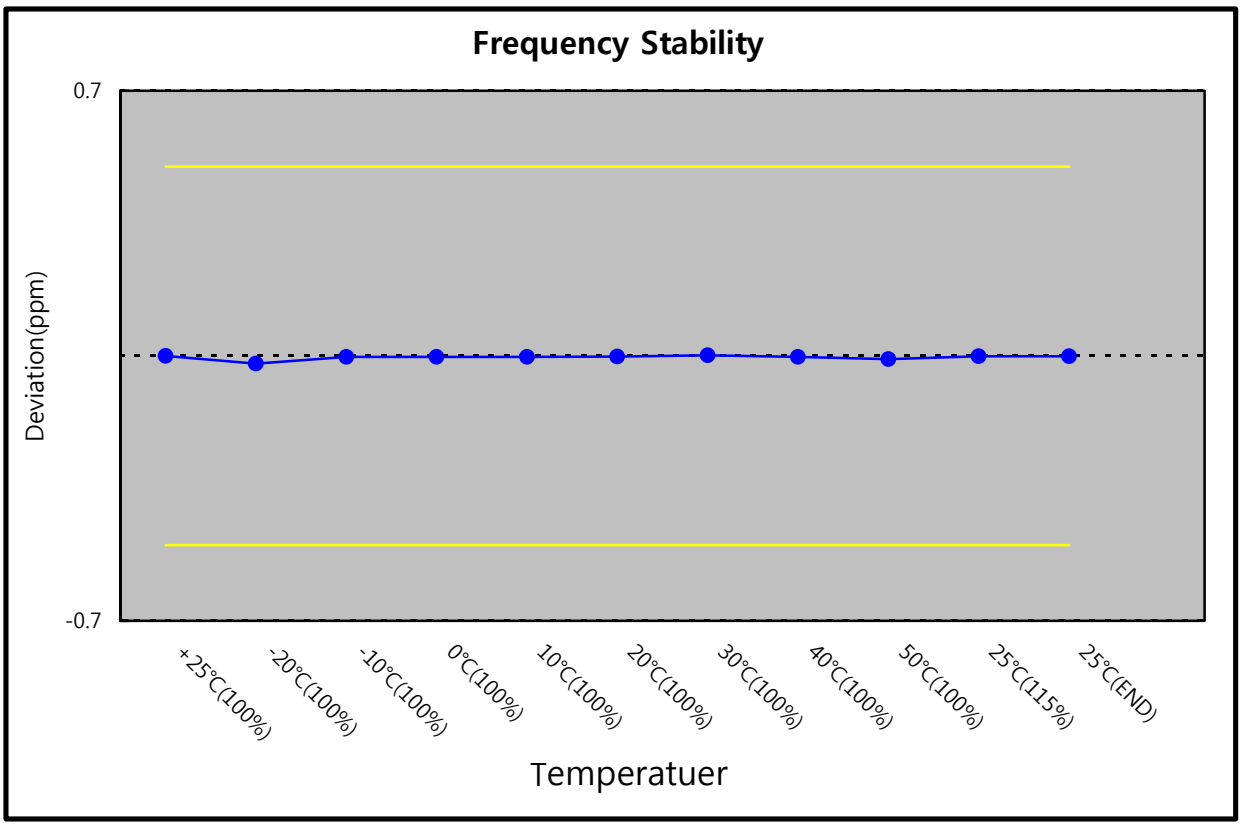
VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation	
				(%)	(ppm)
100%	7.40	+25(Ref)	1,880,000,029	0.000000	0.000
100%		-20	1,879,999,989	-0.000002	-0.021
100%		-10	1,880,000,023	0.000000	-0.003
100%		0	1,880,000,024	0.000000	-0.003
100%		+10	1,880,000,024	0.000000	-0.003
100%		+20	1,880,000,025	0.000000	-0.002
100%		+30	1,880,000,030	0.000000	0.001
100%		+40	1,880,000,024	0.000000	-0.003
100%		+50	1,880,000,012	-0.000001	-0.009
85%	6.29	+25	-	-	-
115%	8.51	+25	1,880,000,027	0.000000	-0.001
BATT.ENDPOINT	7.00	+25	1,880,000,028	0.000000	-0.001

Note 1: This device is not operated at 6.29 V (85%).

Note 2: Operating temperature of this device is -20 ~ 50(℃)

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





4. TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☒	Spectrum Analyzer	Agilent	E4440A	25/09/09	25/09/10	MY45304199
☐	Spectrum Analyzer	Rohde Schwarz	FSQ26	05/06/09	05/06/10	200445
☐	Spectrum Analyzer(RE)	H.P	8563E	13/10/09	13/10/10	3551A04634
☒	Power Meter	H.P	EMP-442A	02/07/09	02/07/10	GB37170413
☒	Power Sensor	H.P	8481A	02/07/09	02/07/10	3318A96332
☐	Power Divider	Agilent	11636B	13/10/09	13/10/10	56471
☒	Power Splitter	Anritsu	K241B	13/10/09	13/10/10	20611
☐	Power Splitter	Anritsu	K241B	02/07/09	02/07/10	017060
☐	Frequency Counter	H.P	5342A	13/07/09	13/07/10	2119A04450
☒	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	10/10/09	10/10/10	30604493/021031
☒	Digital Multimeter	H.P	34401A	13/03/09	13/03/10	3146A13475, US36122178
☐	Multifuction Synthesizer	HP	8904A	06/10/09	06/10/10	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	13/03/09	13/03/10	101251
☒	Signal Generator	H.P	ESG-3000A	02/07/09	02/07/10	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	02/02/09	02/02/10	100148
☐	Audio Analyzer	H.P	8903B	02/07/09	02/07/10	3011A09448
☐	Modulation Analyzer	H.P	8901B	02/07/09	02/07/10	3028A03029
☒	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/09	02/07/10	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU 200	19/05/09	19/05/10	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	02/07/09	02/07/10	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-3
☒	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-4
☐	AC Power supply	DAEKWANG	5KVA	13/03/09	13/03/10	20060321-1
☒	DC Power Supply	HP	6622A	13/03/09	13/03/10	3448A03760
☐	DC Power Supply	HP	6633A	13/03/09	13/03/10	3524A06634
☒	BAND Reject Filter	Microwave Circuits	N0308372	06/10/09	06/10/10	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	06/10/09	06/10/10	2
☐	High-Pass Filter	ANRITSU	MP526D	06/10/09	06/10/10	M27756
☒	High-pass filter	Wainwright	WHKX2.1	N/A	N/A	1
☐	High-Pass Filter	Wainwright	WHKX3.0	N/A	N/A	9
☐	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	10
☐	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	27
☐	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	7
☒	HORN ANT	ETS	3115	17/06/09	17/06/10	6419
☒	HORN ANT	ETS	3115	23/09/09	23/09/10	21097
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	154
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2116
☐	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2117
☒	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2261
☒	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2262
☐	LOOP Antenna	ETS	6502	14/09/09	14/09/10	3471
☐	Coaxial Fixed Attenuators	Agilent	8491B	02/07/09	02/07/10	MY39260700
☐	Coaxial Fixed Attenuators	Agilent	8491B	02/07/09	02/07/10	MY39260699
☒	Attenuator (10dB)	WEINSCHEL	23-10-34	01/10/09	01/10/10	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	19/01/09	19/01/10	BP4387
☐	Attenuator (20dB)	WEINSCHEL	86-20-11	06/10/09	06/10/10	432
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	446
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	408
☐	Attenuator (40dB)	WEINSCHEL	57-40-33	01/10/09	01/10/10	NN837
☐	Attenuator (30dB)	JFW	50FH-030-300	13/03/09	13/03/10	060320-1
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	02/07/09	02/07/10	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	02/07/09	02/07/10	790
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	02/07/09	02/07/10	112
☒	Amplifier (30dB)	Agilent	8449B	10/10/09	10/10/10	3008A01590
☒	Amplifier	EMPOWER	BBS3Q7ELU	02/02/09	02/02/10	1020
☐	RF Power Amplifier	OPHIRRF	5069F	02/07/09	02/07/10	1006
☐	EMI TEST RECEIVER	R&S	ESU	02/02/09	02/02/10	100014
☐	BILOG ANTENNA	SCHAFFNER	CBL6112B	02/06/09	02/06/10	2737
☐	Amplifier (22dB)	H.P	8447E	05/02/09	05/02/10	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/05/09	12/05/10	100364
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	30/05/09	30/05/10	590
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	02/06/09	02/06/10	2233
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	07/10/09	07/10/10	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/10	91031946
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	13/03/09	13/03/10	1252741
☒	Amplifier (25dB)	Agilent	8447D	12/05/09	12/05/10	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	03/07/09	03/07/10	2648A04922
☐	Spectrum Analyzer(CE)	H.P	8591E	26/04/09	26/04/10	3649A05889
☐	LISN	Kyoritsu	KNW-407	03/07/09	03/07/10	8-317-8
☐	LISN	Kyoritsu	KNW-242	13/10/09	13/10/10	8-654-15
☐	CVCF	NF Electronic	4420	13/03/09	13/03/10	304935/337980
☐	DC BLOCK	Hyuplip	KEL-007	N/A	N/A	7-1581-5
☐	50 ohm Terminator	HME	CT-01	22/01/09	22/01/10	N/A
☐	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	03/07/09	03/07/10	4N-170-3

5. EMISSION DESIGNATOR

GSM850

Emission Designator = 249KGXW

GSM BW = 249.4499 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

PCS1900

Emission Designator = 248KGXW

GSM BW = 248.2510 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

6. CONCLUSION

The data collected shows that the **D.O.Tel Co., Ltd. Handheld Printer Terminal (FCC ID: QD5-DOTH-100)** complies with all the requirements of Parts 2 , 22 and 24 of the FCC rules.