CERTIFICATE OF COMPLIANCE
FCC PART 22 CERTIFICATION

Test Lab:	**Applicant Information:**
CELLTECH RESEARCH INC. Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250 - 860-3130 Fax: 250 - 860-3110 Toll Free: 1-877-545-6287 e-mail: info@celltechlabs.com web site: www.celltechlabs.com	**SSENTECH CO., LTD.** 14F. Daegak Bldg., 1319-5 Seocho-dong Seocho-gu, Seoul, Korea Contact: David Kim, Manager Mobile Communication R&D Lab

FCC Classification:	**Licensed Non-Broadcast Transmitter Held to Ear (TNE)**
FCC Rule Part(s):	**§22.901(d), §2**
FCC ID:	**PPPCWH-100**
Model(s):	**CWH-100**
Equipment Type:	**Single-Mode CDMA Cellular Phone**
Tx Frequency Range:	**824.70 - 848.31 MHz**
Rx Frequency Range:	**869.70 - 893.31 MHz**
Max. RF Output Power:	**0.251 Watts (ERP)**
Frequency Tolerance:	**2.5 PPM**
Emission Designator:	**1M25F9W**

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

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

Celltech Research Inc. certifies that no party to this application has been denied FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Shawn McMillen
General Manager
Celltech Research Inc.

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MEASUREMENT REPORT - FCC PART 22.901(d)

1.1 SCOPE

Measurement and determination of electromagnetic emissions (EME) from radio frequency devices for compliance with the technical rules and regulations of the Federal Communications Commission.

§2.1033(a) General Information

APPLICANT:

SSENTECH CO., LTD.
14F. Daegak Bldg.,
1319-5 Seocho-dong
Seocho-gu, Seoul, Korea
Contact: David Kim - Manager, Mobile Communication R&D Lab

FCC ID	**PPPCWH-100**
Model(s)	**CWH-100**
EUT Type	**Single-Mode CDMA Cellular Phone**
Classification	**Licensed Non-Broadcast Transmitter Held to Ear (TNE)**
Rule Part(s)	**§22.901(d), §2**
Max. RF Output Power	**0.251 Watts (ERP)**
Tx Freq. Range	**824.70 - 848.31 MHz**
Rx Freq. Range	**869.70 - 893.31 MHz**
Emission Designator	**1M25F9W**
Modulation	**CDMA**
Battery Type(s)	**Slim: 3.7V Lithium Polymer or Standard: 3.7V Lithium Ion**

2.1 MEASUREMENT PROCEDURES

2.2 OCCUPIED BANDWIDTH - §2.1049(c)

The antenna output terminal of the EUT was connected to the input of a 50Ω spectrum analyzer through a matched 30dB attenuator. The radio transmitter was operating at maximum output power with and without internal data modulation. 100% of the in-band modulation was below the specified mask per §22.917.

Specified Limits:

(a) On any frequency removed from the assigned carrier frequency by more than 20kHz, up to and including 45kHz, the sideband was at least 26dB below the carrier.

(b) On any frequency removed from the assigned carrier frequency by more than 45kHz, up to and including 90kHz, the sideband was at least 45dB below the carrier.

(c) On any frequency removed from the assigned carrier frequency by more than 90kHz, up to the first multiple of the carrier frequency, the sideband was at least 60dB below the carrier of $40 + \log_{10}$ (mean power output in Watts) dB, whichever was the smaller attenuation.

2.3 SPURIOUS EMISSIONS AT ANTENNA TERMINAL - §2.1051

The level of the carrier and the various conducted spurious and harmonic frequencies was measured by means of a calibrated spectrum analyzer. The spectrum was scanned from 10MHz to 20GHz. The antenna output terminal of the EUT was connected to the input of a 50Ω spectrum analyzer through a matched 30dB attenuator and coaxial cable. The transmitter was operating at maximum power with internal data modulation.

2.4 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

Radiated and harmonic emissions above 1 GHz were measured at our 3-meter outdoor site. The EUT was placed on the turntable with the transmitter transmitting into a non-radiating load. A receiving antenna located 3 meters from the turntable received any signal radiated from the transmitter and its operating accessories. The receiving antenna was varied from 1 to 4 meters and the polarization was varied (horizontal and vertical) to determine the worst-case emission level.

2.5 FREQUENCY STABILITY / TEMPERATURE VARIATION - §2.1055

Minimum Standard:

The minimum frequency stability shall be ± 0.00005% (±300Hz) referenced to a received carrier frequency from a base station. This meets the requirement for operational accuracy of 0.00005% for digital mode.

Measurement Method:

The frequency stability of the transmitter was measured by:

1. Temperature: The temperature was varied from -30°C to +60°C at intervals no more than 10°C throughout the temperature range using an environmental chamber. A period of time sufficient to stabilize all of the components in the equipment shall be allowed prior to each frequency measurement.

2. Primary Supply Voltage: The primary supply voltage was 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. The EUT was tested down to the battery endpoint.

Time Period and Procedure:

1. The carrier frequency of the transmitter was measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment was subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight “soak” at -30°C, the measurement of the carrier frequency of the transmitter was made within a three-minute interval after applying power to the transmitter.

Frequency measurements were made at 10°C intervals up to +60°C, then back to room temperature. A minimum period of one hour was provided to allow stabilization of the equipment at each temperature level.

3.1 TEST DATA

3.2 EFFECTIVE RADIATED POWER OUTPUT - §2.1046

800MHz CDMA MODE

Freq. Tuned	EUT Conducted Power	Max. Field Strength of EUT (dBm) (Horizontal Polarization)		Dipole Gain	Dipole Forward Conducted Power	ERP of EUT Dipole Gain + Dipole Forward Conducted Power	
(MHz)	(dBm)	Antenna Retracted	Antenna Extended	(dBd)	(dBm)	(dBm)	Watts
824.70	24.8	- 12.19	- 10.47	- 1.44	24.61	23.17	0.207
835.89	24.8	- 13.60	- 11.77	- 1.34	25.53	23.99	0.251
848.31	24.8	- 12.85	- 11.07	- 1.24	24.39	23.15	0.207
835.89	24.8	- 13.32	- 11.49	- 1.34	25.25	23.91	0.246*

Notes:

1. ERP Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The spectrum analyzer was set to measure channel power for CDMA mode. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A half-wave dipole was substituted in place of the EUT. The dipole was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the dipole, and the input level of the dipole was adjusted to the same field strength level as the EUT. The feed point for the dipole was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the dipole antenna. The conducted power at the antenna feed point was recorded. The forward power for the dipole was then determined and the ERP level was determined by adding the forward dipole power and the dipole gain in dB. For readings above 1GHz the above method is repeated using standard gain horn antennas.

2. ERP measurements were performed using the standard battery, except for * using the extended battery.

3.3 FIELD STRENGTH OF SPURIOUS RADIATION - 2.1053

Operating Frequency (MHz):	824.70
Channel:	1013 (Low)
Measured Cond. Pwr. (dBm):	24.8
Measured ERP (dBm):	23.17
Modulation:	CDMA (Internal)
Distance:	3 Meters
Limit:	43 + 10 log (W) = 38.13 dBc

Frequency (MHz)	Field Strength of Spurious Radiation (dBm)	Horn Forward Cond. Pwr. (dBm)	Standard Gain Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBm)	ERP (dBm)	dBc
1649.40	-73.85	-46.05	6.6	H	-39.45	-41.59	64.76
2474.10	-82.20	-52.40	7.8	H	-44.60	-46.74	69.91
3298.80	-101.81	-72.43	7.75	H	-64.68	-66.82	89.99
4123.50	-104.97	-75.95	7.6	H	-68.35	-70.49	93.66
4948.20	-105.40	-79.04	8.5	H	-70.54	-72.68	95.85
5772.90	-105.13	-74.25	8.8	H	-65.45	-67.59	90.76
6597.60	-104.32	-64.96	9.6	H	-55.36	-57.50	80.67
7422.30	-102.16	-64.02	9.0	H	-55.02	-57.16	80.33
8247.00	-101.20	-67.90	9.3	H	-58.60	-60.74	83.91

Radiated Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward power for the antenna was then determined and the EIRP level was determined by adding the forward power and the antenna gain in dB.

Operating Frequency (MHz):	835.89
Channel:	363 (Mid)
Measured Cond. Pwr. (dBm):	24.8
Measured ERP (dBm):	23.99
Modulation:	CDMA (Internal)
Distance:	3 Meters
Limit:	43 + 10 log (W) = 38.13 dBc

Frequency (MHz)	Field Strength of Spurious Radiation (dBm)	Horn Forward Cond. Pwr. (dBm)	Standard Gain Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBm)	ERP (dBm)	dBc
1671.78	-76.38	-49.08	6.6	H	-42.48	-44.62	68.61
2507.67	-84.13	-51.79	7.8	H	-43.99	-46.13	70.12
3343.56	-107.38	-79.44	7.75	H	-71.69	-73.83	97.82
4179.45	-106.39	-76.16	7.6	H	-68.56	-70.70	94.69
5015.34	-107.69	-78.97	8.5	H	-70.47	-72.61	96.60
5851.23	-102.95	-67.09	8.8	H	-58.29	-60.43	84.42
6687.12	-105.84	-74.56	9.6	H	-64.96	-67.10	91.09
7523.01	-105.00	-65.05	9.0	H	-56.05	-58.19	82.18
8358.90	-109.38	-74.91	9.3	H	-65.61	-67.75	91.74

Radiated Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward power for the antenna was then determined and the EIRP level was determined by adding the forward power and the antenna gain in dB.

Operating Frequency (MHz):	848.31
Channel:	777 (High)
Measured Cond. Pwr. (dBm):	24.8
Measured ERP (dBm):	23.15
Modulation:	CDMA (Internal)
Distance:	3 Meters
Limit:	43 + 10 log (W) = 38.13 dBc

Frequency (MHz)	Field Strength of Spurious Radiation (dBm)	Horn Forward Cond. Pwr. (dBm)	Standard Gain Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBm)	ERP (dBm)	dBc
1696.62	-74.61	-49.08	6.6	H	-42.48	-44.62	67.77
2544.93	-83.79	-51.79	7.8	H	-43.99	-46.13	69.28
3393.24	-106.41	-79.44	7.75	H	-71.69	-73.83	96.98
4241.55	-106.84	-76.16	7.6	H	-68.56	-70.70	93.85
5089.86	-105.58	-78.97	8.5	H	-70.47	-72.61	95.76
5938.17	-105.66	-67.09	8.8	H	-58.29	-60.43	83.58
6786.48	-103.54	-74.56	9.6	H	-64.96	-67.10	90.25
7634.79	-104.88	-65.05	9.0	H	-56.05	-58.19	81.34
8483.10	-103.84	-74.91	9.3	H	-65.61	-67.75	90.90

Radiated Measurements by Substitution Method:

The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A standard gain horn antenna was substituted in place of the EUT. The antenna was fed through a directional coupler and the power at the coupler port was monitored. A signal generator and power amplifier controlled the antenna, and the input level of the antenna was adjusted to the same field strength level as the EUT. The feed point for the antenna was then connected to a calibrated power meter and the power adjusted to read the same as the coupler port previously recorded, this is to account for any mismatch in impedance, which may occur at the horn antenna. The conducted power at the antenna feed point was recorded. The forward power for the antenna was then determined and the EIRP level was determined by adding the forward power and the antenna gain in dB.

3.4 FREQUENCY STABILITY - § 2.1055

Operating Frequency: 835,890,000 Hz

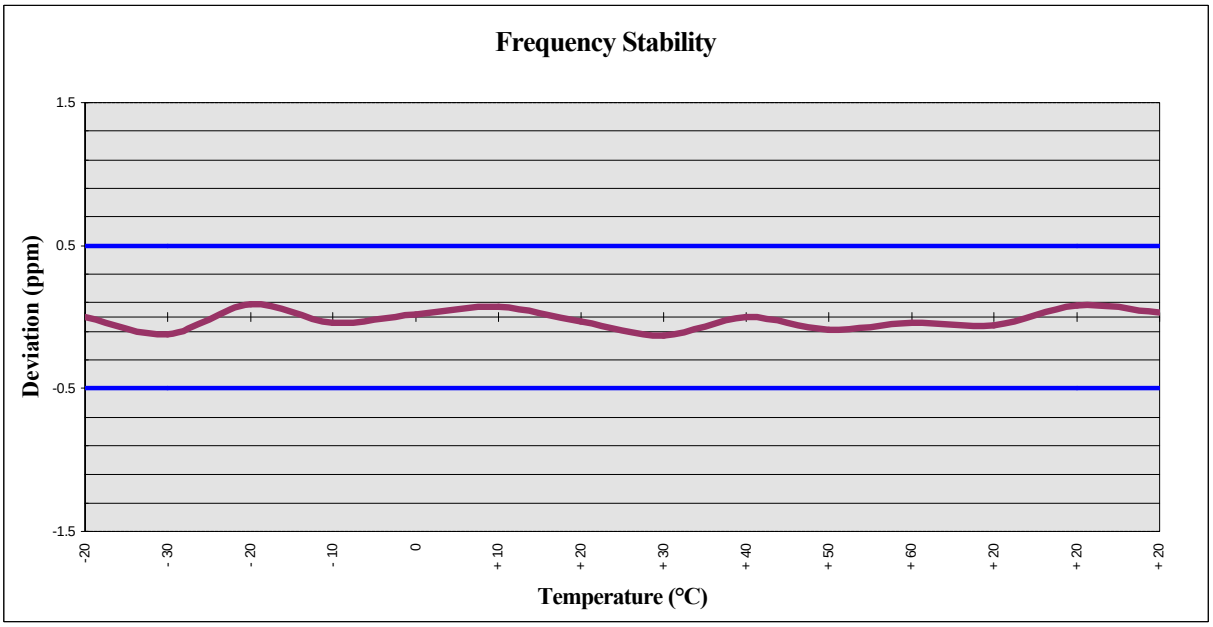
Channel: 363

Reference Voltage: 3.7 VDC

Deviation Limit: ± 0.00005 % or 0.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	835,890,000	0.000000
100 %		- 30	835,890,100	-0.000012
100 %		- 20	835,889,925	0.000009
100 %		- 10	835,890,033	-0.000004
100 %		0	835,889,983	0.000002
100 %		+ 10	835,889,941	0.000007
100 %		+ 20	835,890,025	-0.000003
100 %		+ 30	835,890,109	-0.000013
100 %		+ 40	835,890,000	0.000000
100 %		+ 50	835,890,075	-0.000009
100 %		+ 60	835,890,033	-0.000004
85 %	3.15	+ 20	835,890,050	-0.000006
115 %	4.26	+ 20	835,889,933	0.000008
BATT. ENDPOINT	3.00	+ 20	835,889,975	0.000003

FREQUENCY STABILITY - § 2.1055



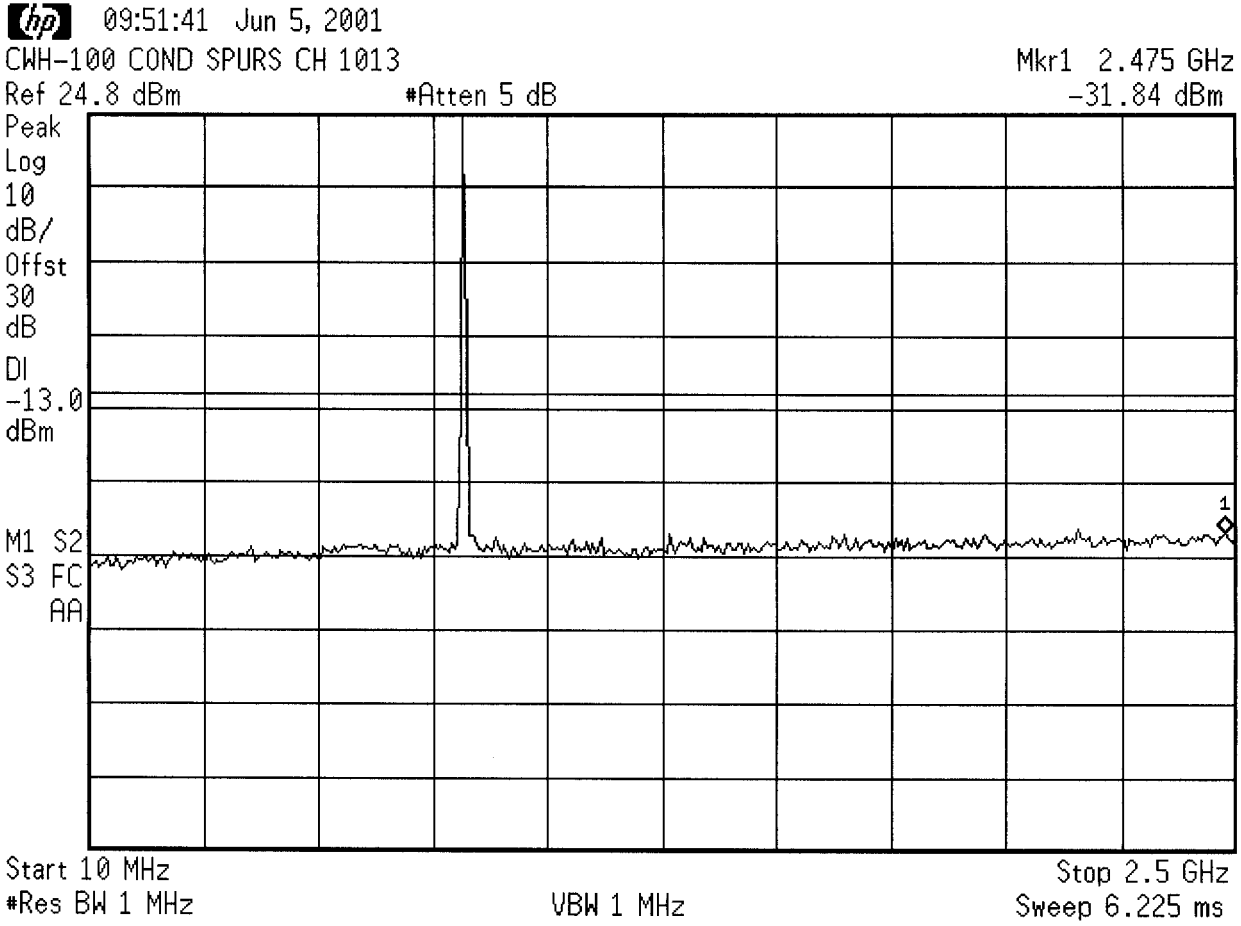
4.1 TEST EQUIPMENT

Type	Model	Calib. Date	Serial No.
HP Signal Generator	8648D (9kHz-4.0GHz)	Nov 1999	3847A00611
Rohde & Schwarz Signal Generator	SMR40 (10MHz-40GHz)	Nov 2000	835537/022
Gigatronics Power Meter	8652A	Oct 1999	1835272
Gigatronics Power Sensor (2)	80701A (0.05-18GHz)	Oct 1999	1833535, 1833542
Amplifier Research Power Amp.	5S1G4 (5W, 800MHz-4.2GHz)	N/A	26235
Microwave System Amplifier	HP 83017A (0.5-26.5GHz)	N/A	3123A00587
Network Analyzer	HP 8753E (30kHz-3GHz)	Nov 1999	US38433013
Audio Analyzer	HP 8903B	March 1999	3729A18691
Modulation Analyzer	HP 8901A	March 1999	3749A07154
Frequency Counter	HP 53181A (3GHz)	May 1999	3736A05175
DC Power Supply	HP E3611A	N/A	KR83015294
CDMA Base Station Test Set	Agilent E8285A	N/A	US40332926
Multi-Device Controller	EMCO 2090	N/A	9912-1484
Mini Mast	EMCO 2075	N/A	0001-2277
Turntable	EMCO 2080-1.2/1.5	N/A	0002-1002
Double Ridged Horn Antenna	ETS 3115 (1-18GHz)	Oct. 2000	6267
Double Ridged Horn Antenna	ETS 3115 (1-18GHz)	Oct. 2000	6276
Horn Antenna	Chase BBHA 9120-A (0.7-4.8GHz)	Sept 1998	9120A-239
Horn Antenna	Chase BBHA 9120-A (0.7-4.8GHz)	Sept 1998	9120A-240
Roberts Dipoles	Compliance Design (2 sets) 3121C	June 2000	
Spectrum Analyzer	HP 8594E	March 2000	3543A02721
Spectrum Analyzer	HP E4408B	Nov 1999	US39240170
Shielded Screen Room	Lindgren R.F. 18W-2/2-0	N/A	16297
Environmental Chamber	ESPEC ECT-2 (Temperature/Humidity)	Feb 2000	0510154-B

5.1 CONCLUSION

The data in this measurement report shows that the SSENTECH CO., LTD. Model: CWH-100 Single-Mode CDMA Cellular Phone FCC ID: PPPCWH-100 complies with all the requirements of Parts 2 and 22.901(d) of the FCC rules.

TEST PLOTS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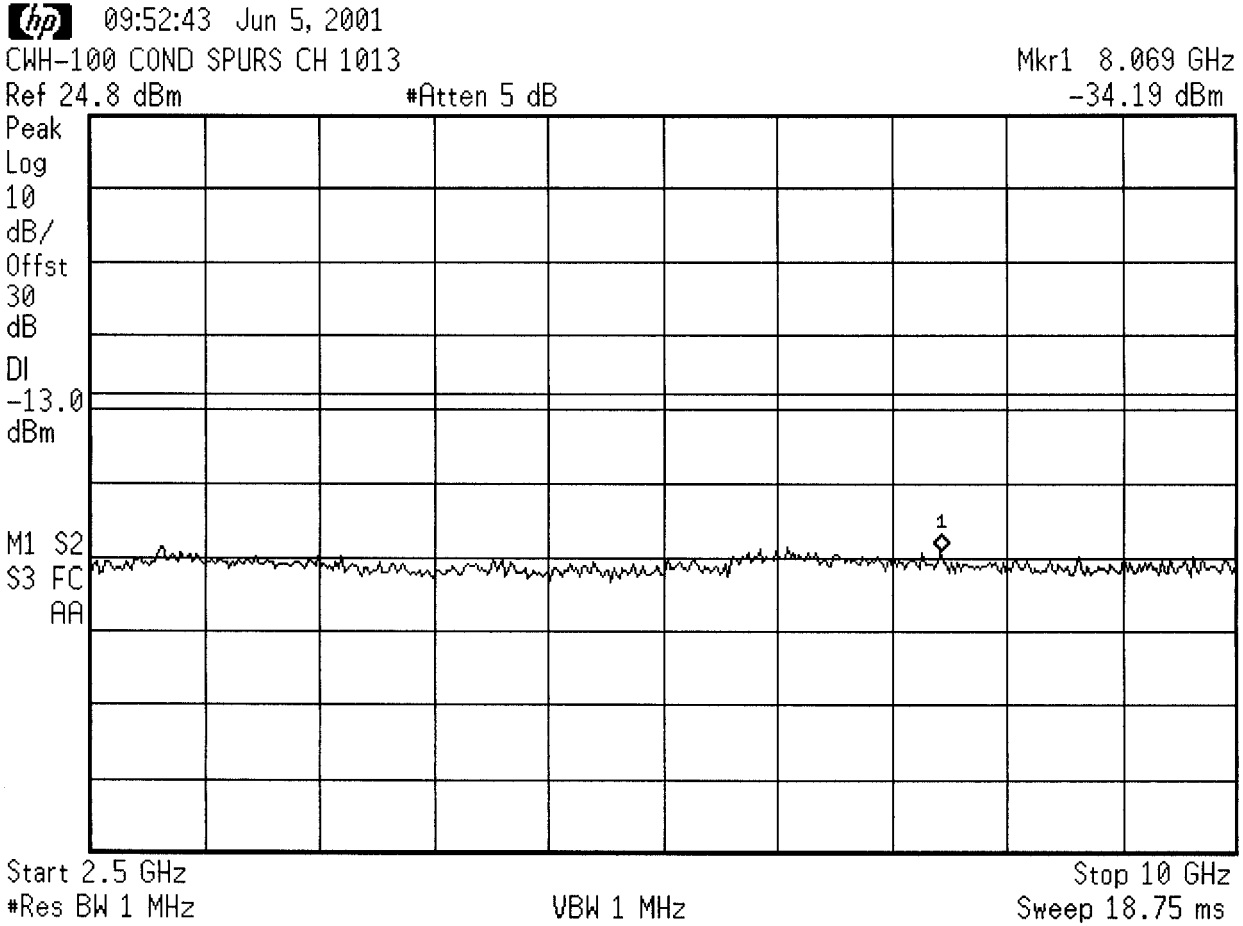
-31.84 dBm
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
Start 10 MHz
Stop 2.5 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 6.225 ms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Ref 24.8 dBm
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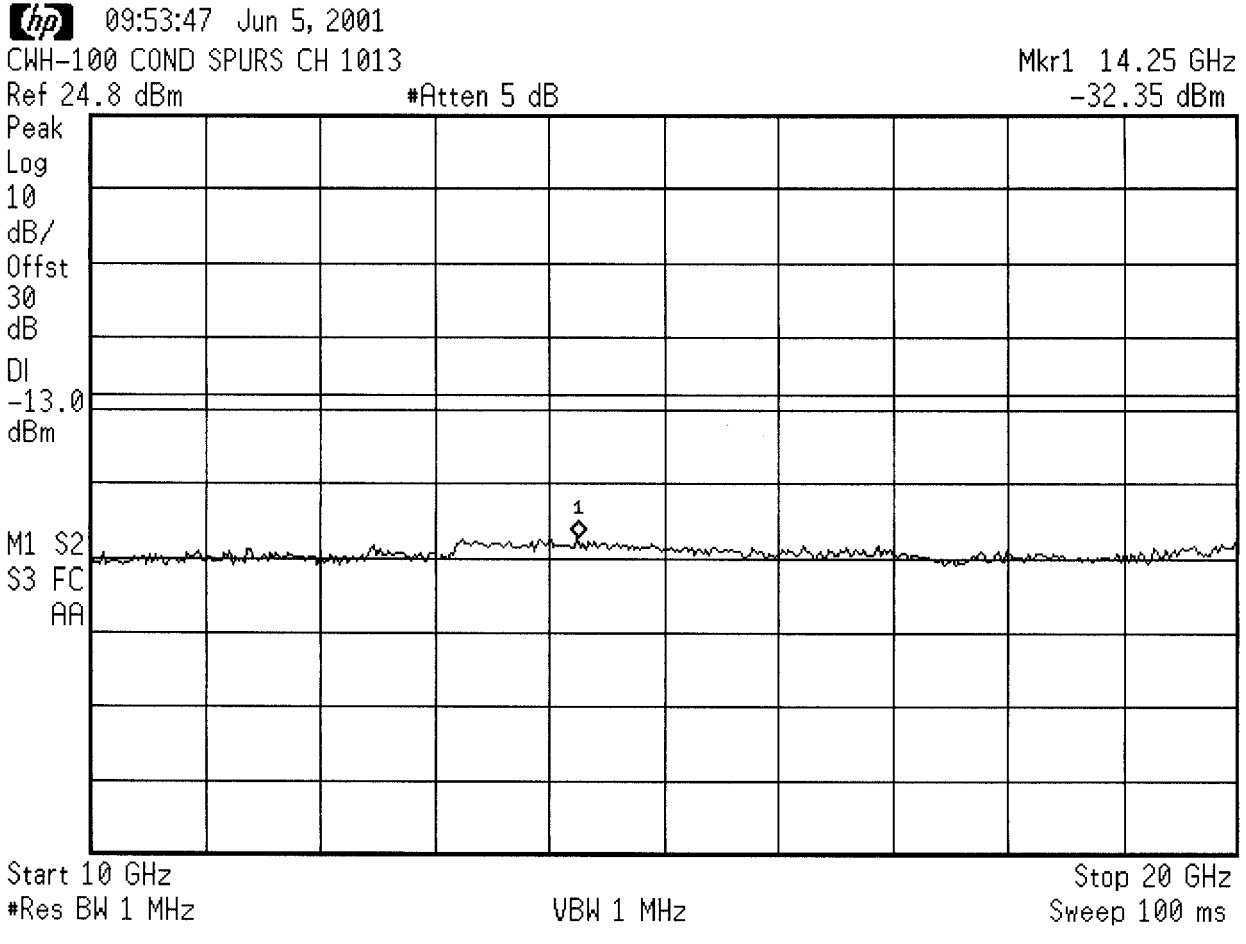
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
Start 2.5 GHz
Stop 10 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 18.75 ms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Mkr1 14.25 GHz
Ref 24.8 dBm
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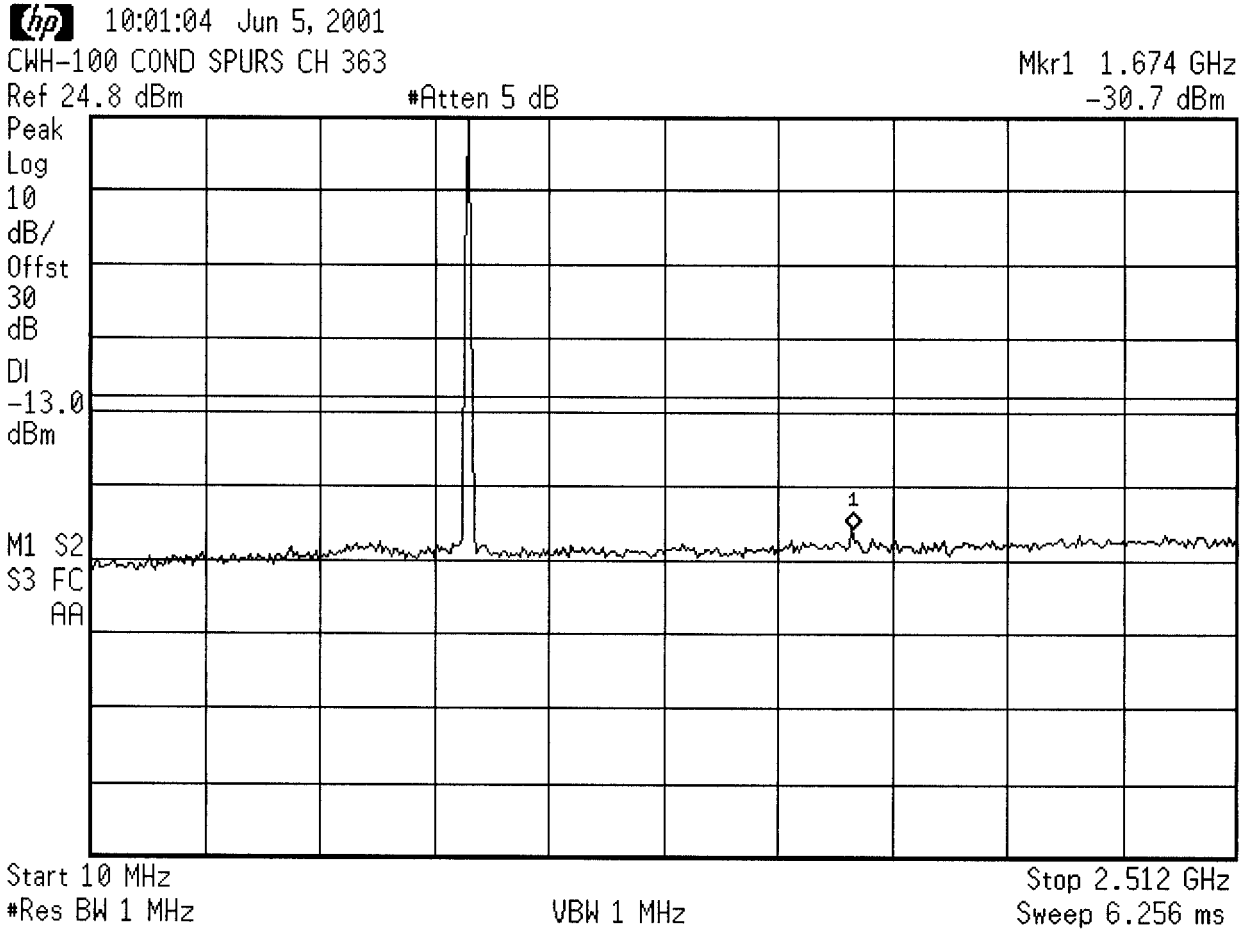
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
1
M1 S2
S3 FC
AA
Start 10 GHz
Stop 20 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 100 ms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Ref 24.8 dBm
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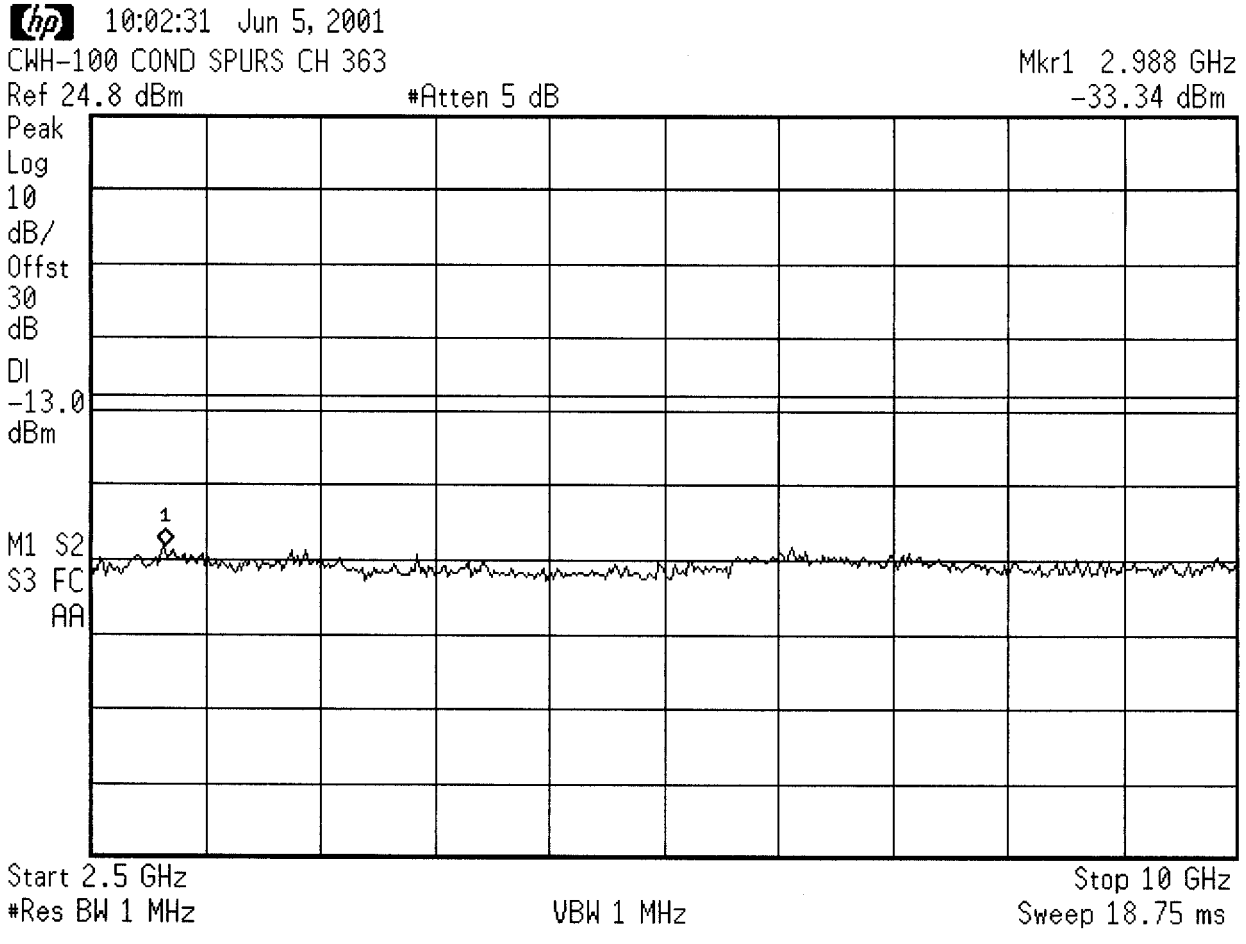
Mkr1 1.674 GHz
-30.7 dBm
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
Start 10 MHz
#Res BW 1 MHz
VBW 1 MHz
Stop 2.512 GHz
Sweep 6.256 ms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Mkr1 2.988 GHz
Ref 24.8 dBm
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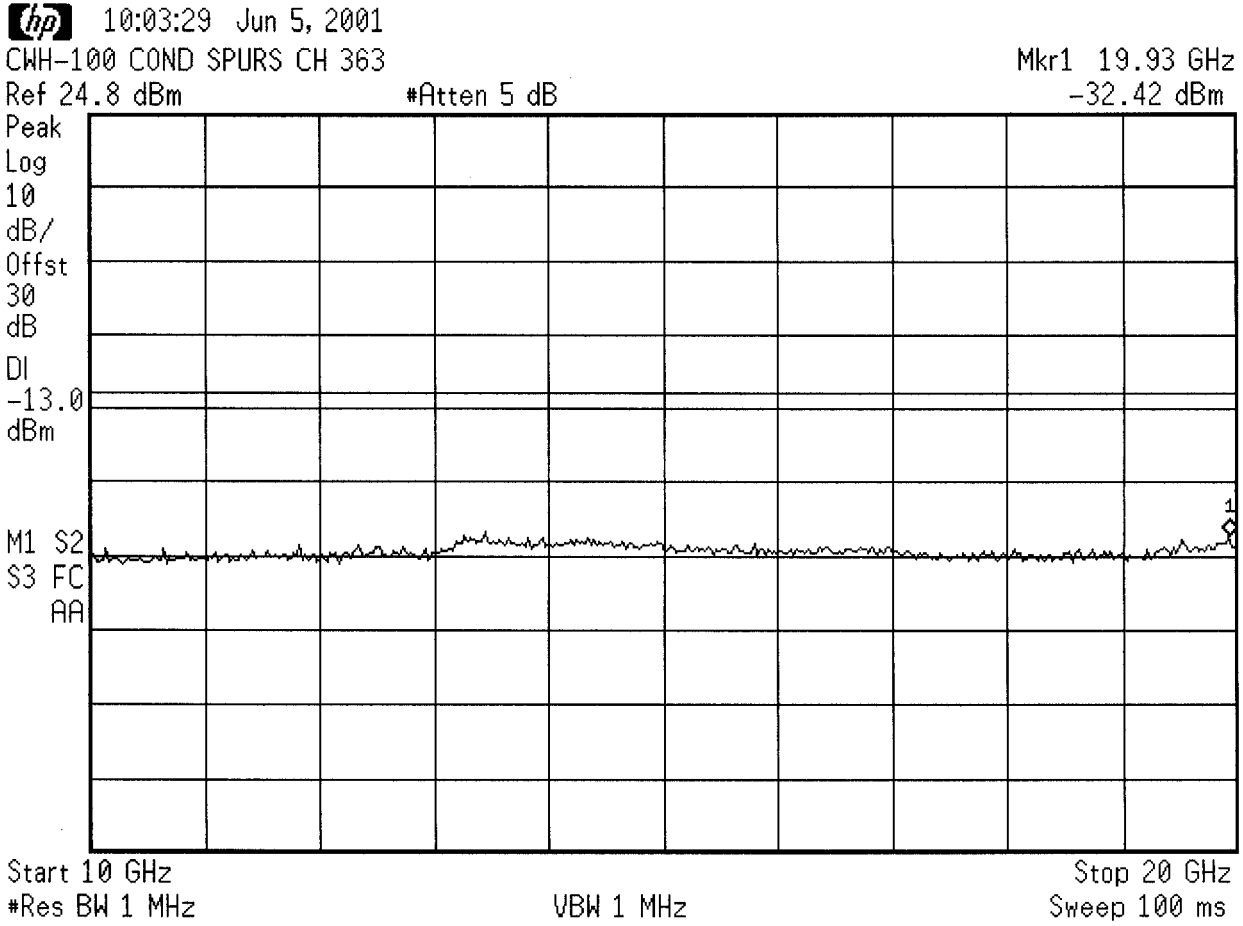
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
1
M1 S2
S3 FC
AA
Start 2.5 GHz
Stop 10 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 18.75 ms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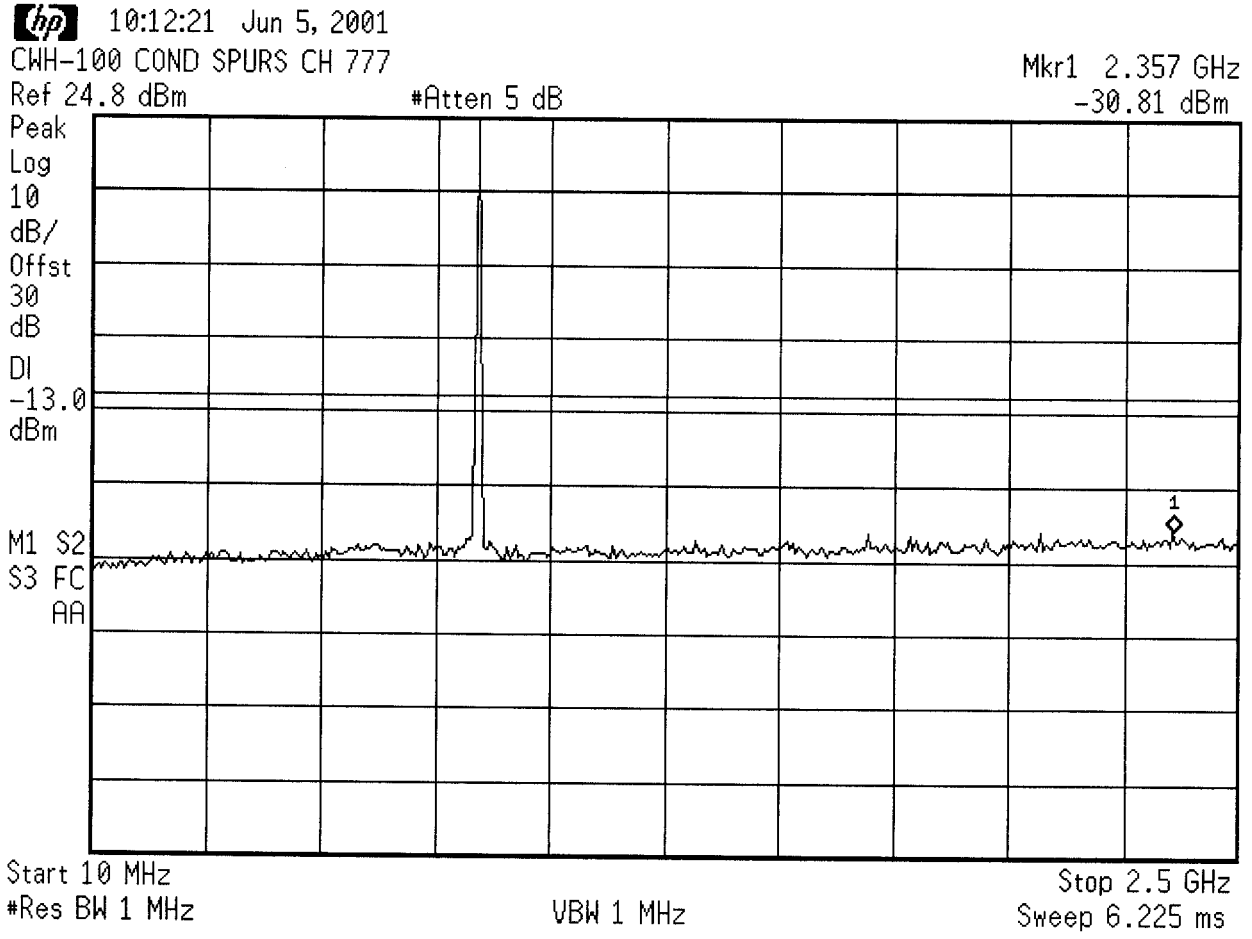
-32.42 dBm
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Start 10 GHz
Stop 20 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 100 ms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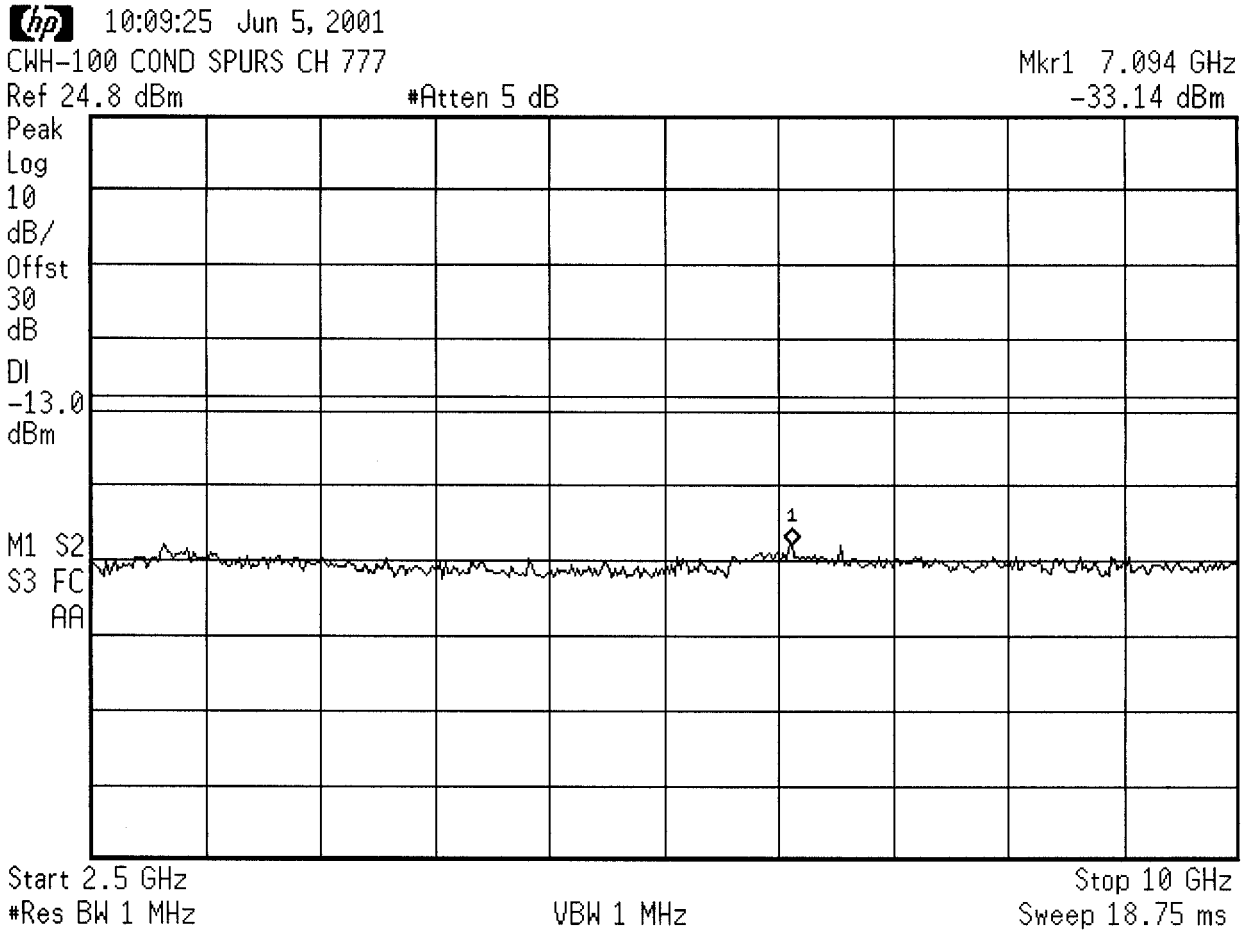
Mkr1 2.357 GHz
-30.81 dBm
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
Start 10 MHz
#Res BW 1 MHz
VBW 1 MHz
Stop 2.5 GHz
Sweep 6.225 ms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Mkr1 7.094 GHz
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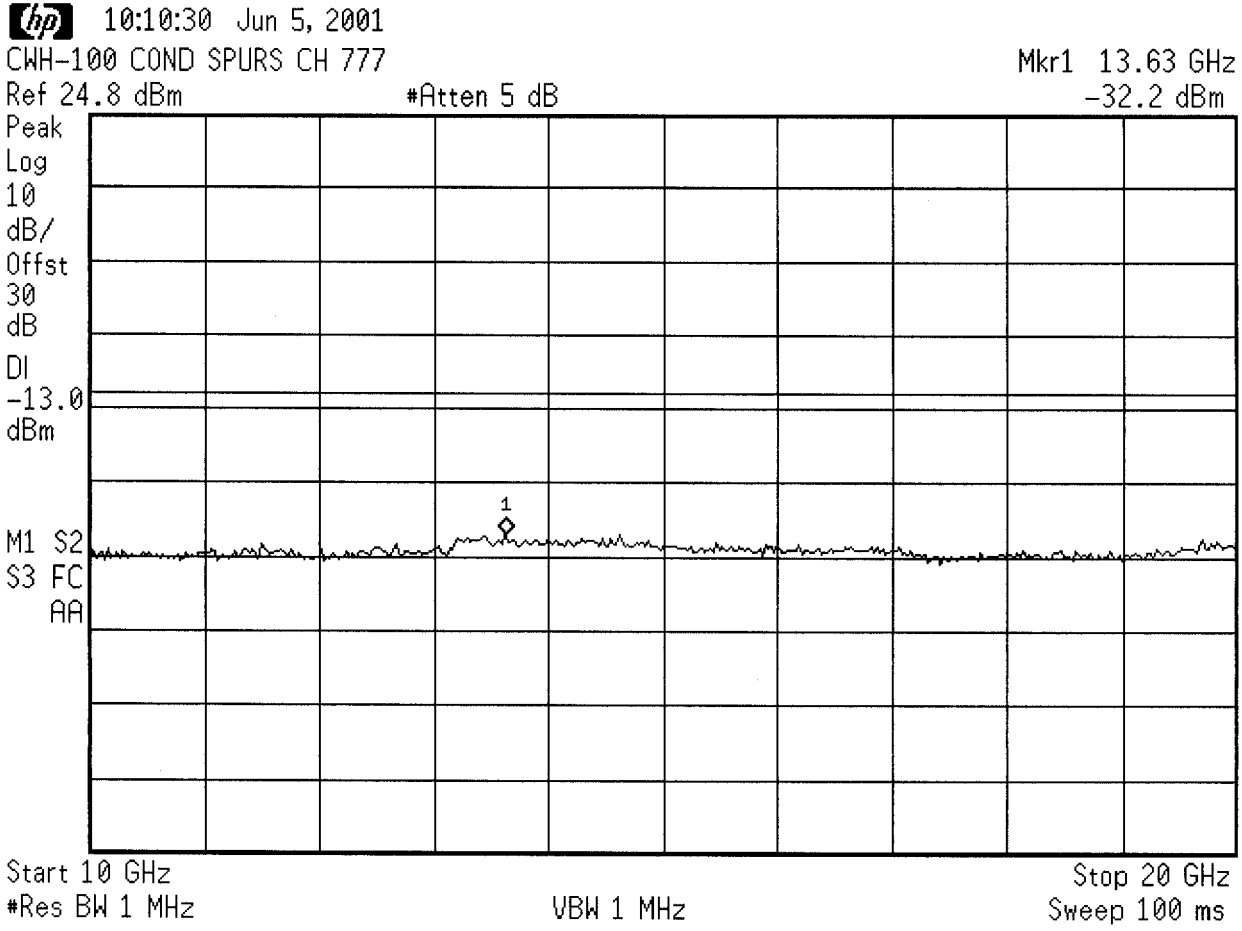
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
1
Start 2.5 GHz
Stop 10 GHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 18.75 ms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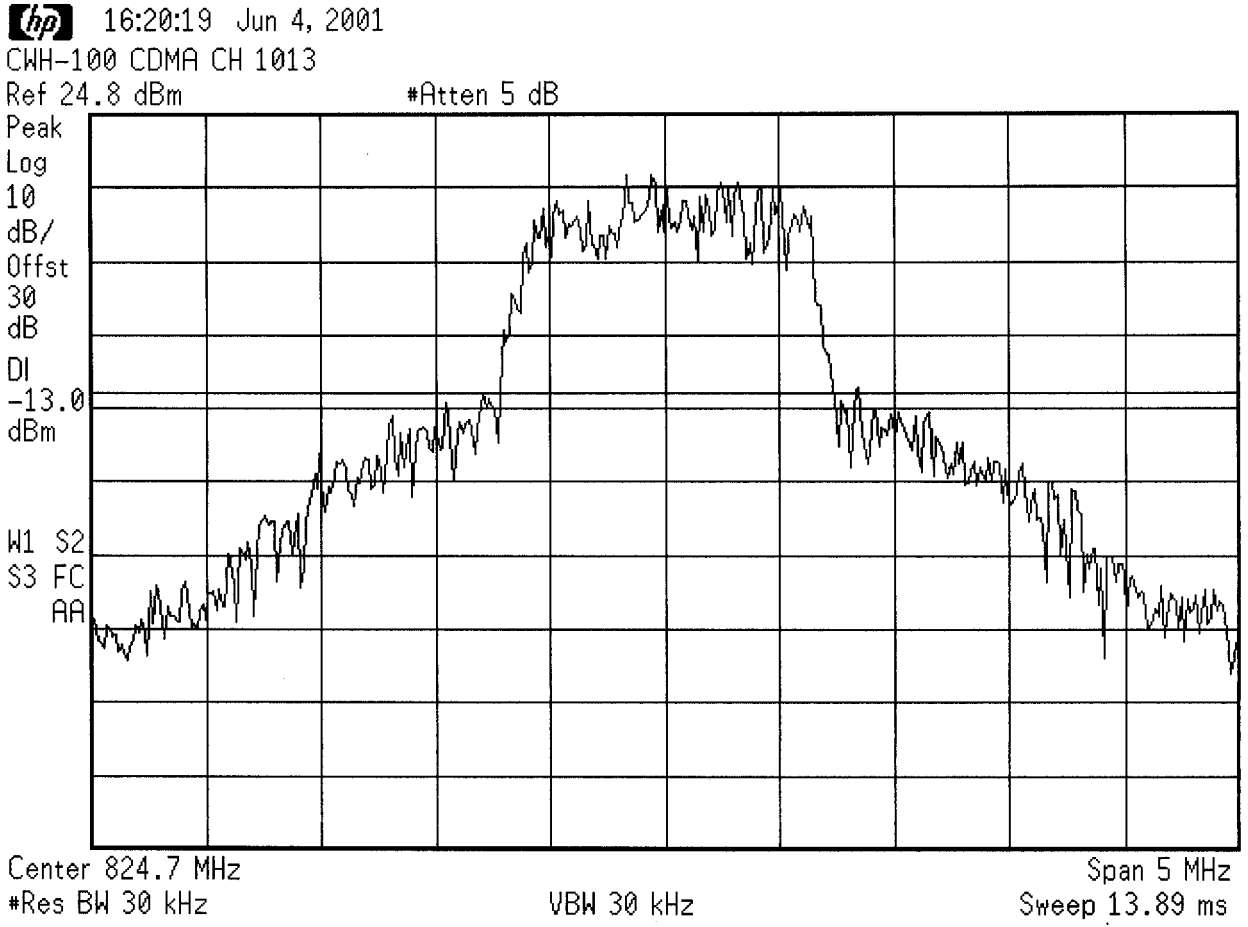
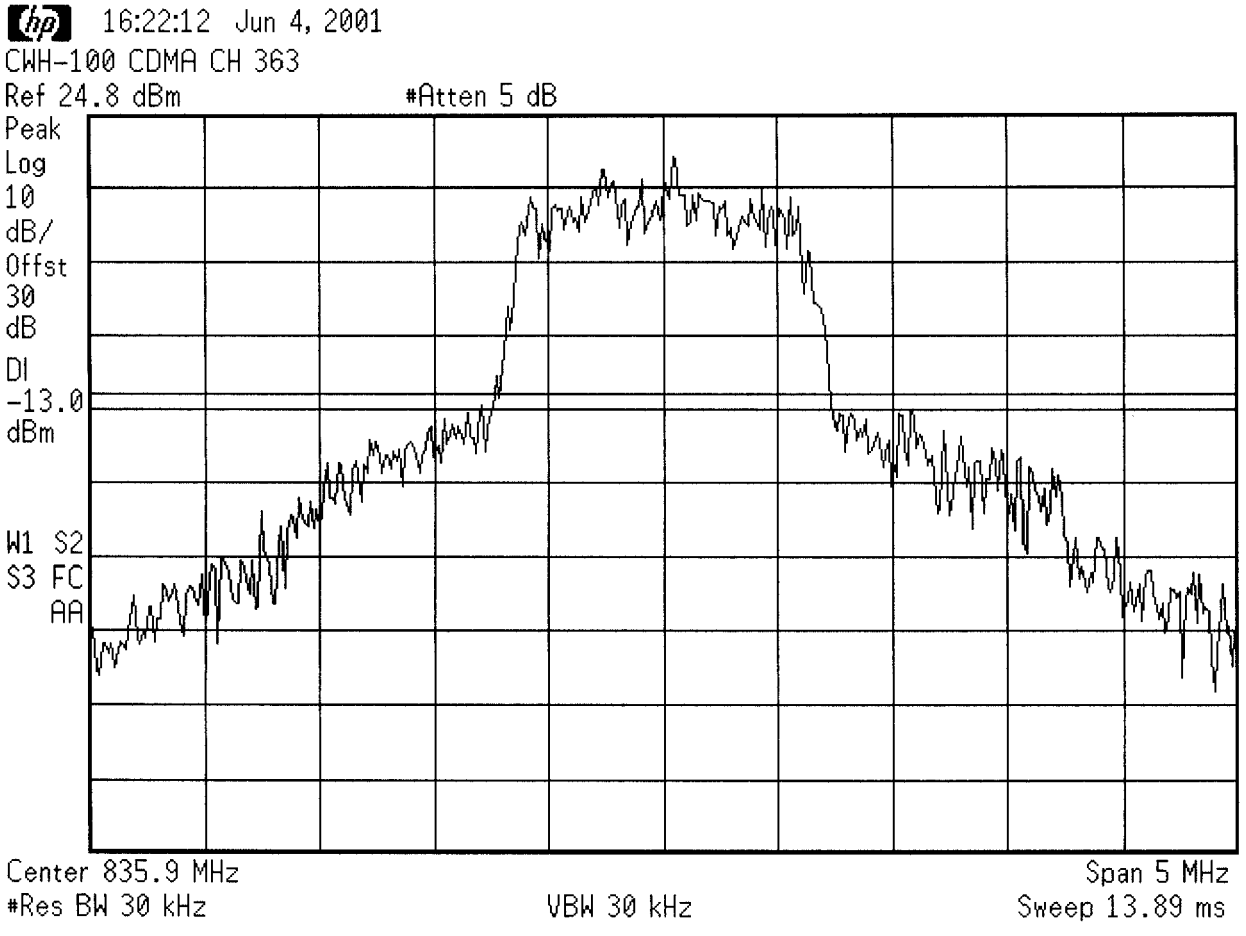
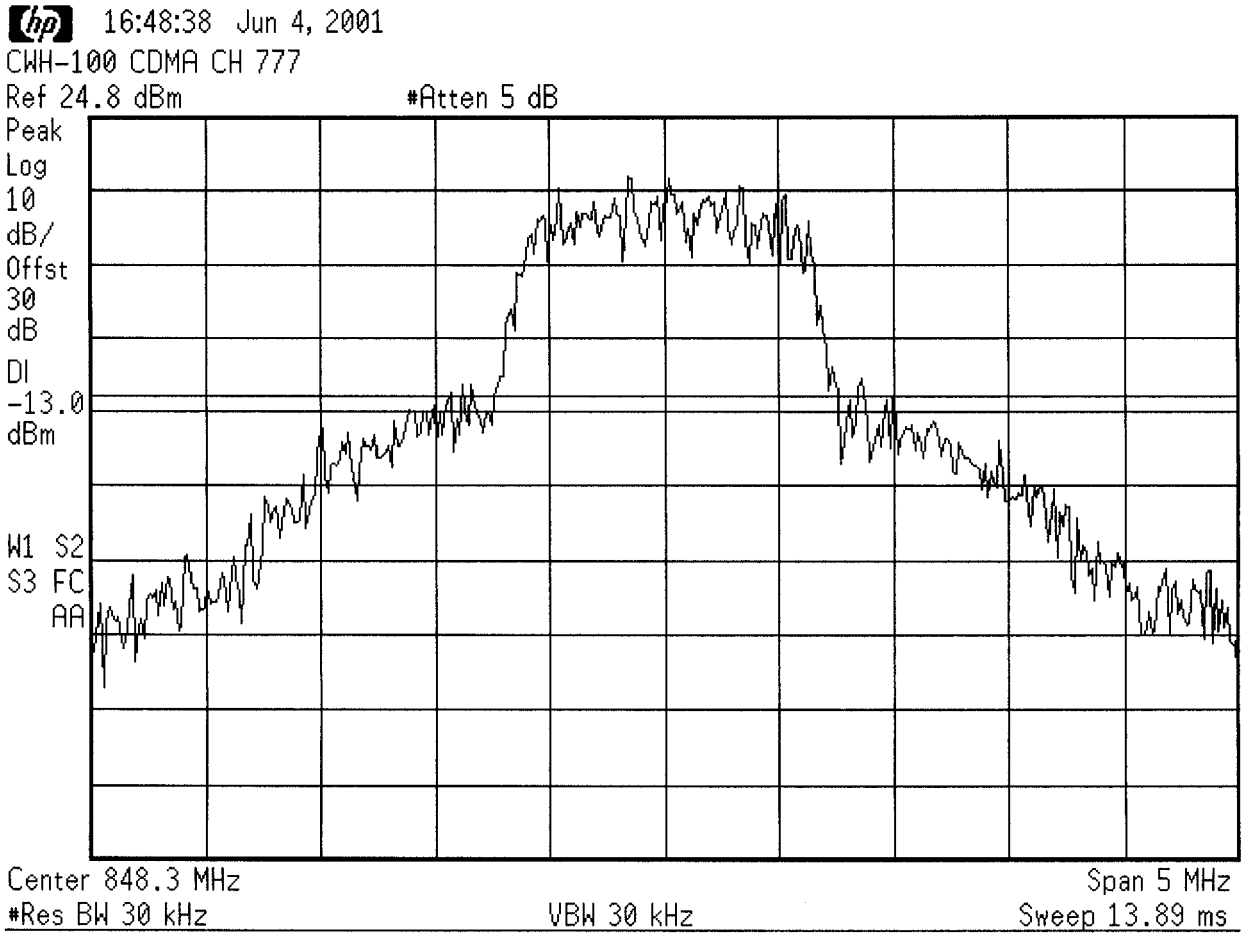
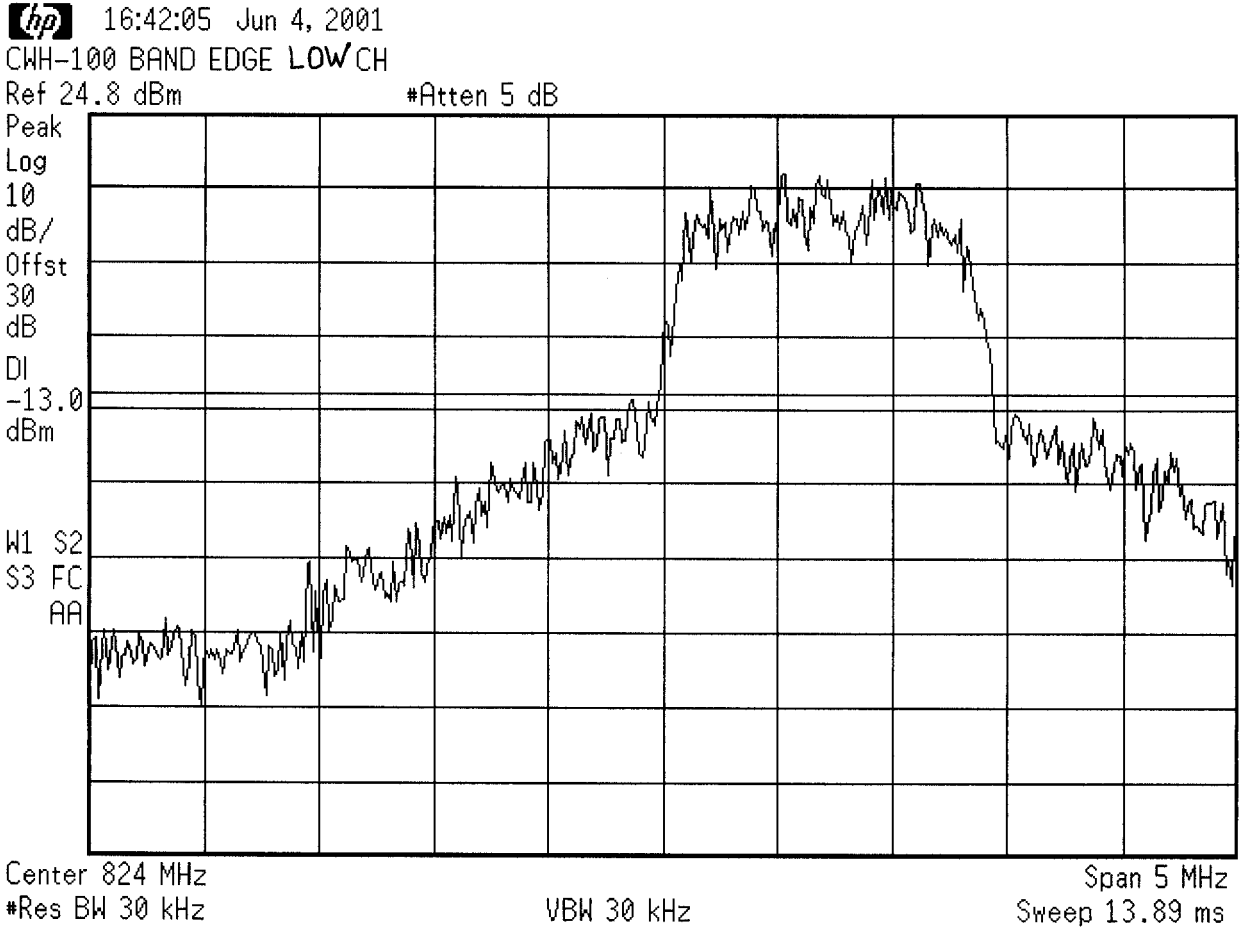
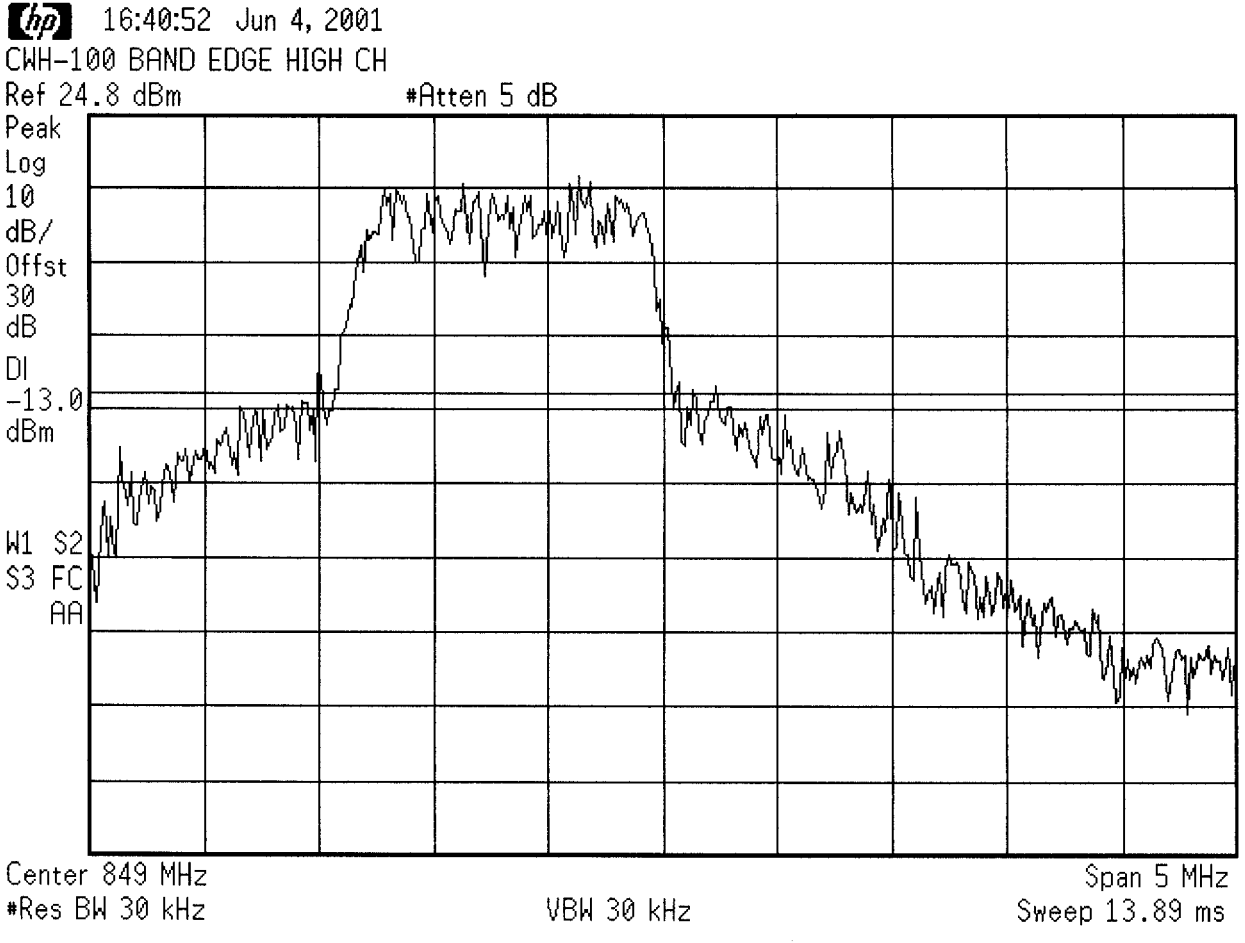
CWH-100 COND SPURS CH 777
Ref 24.8 dBm
#Atten 5 dB
Mkr1 13.63 GHz
-32.2 dBm
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
1
M1 S2
S3 FC
AA
Start 10 GHz
#Res BW 1 MHz
VBW 1 MHz
Stop 20 GHz
Sweep 100 ms

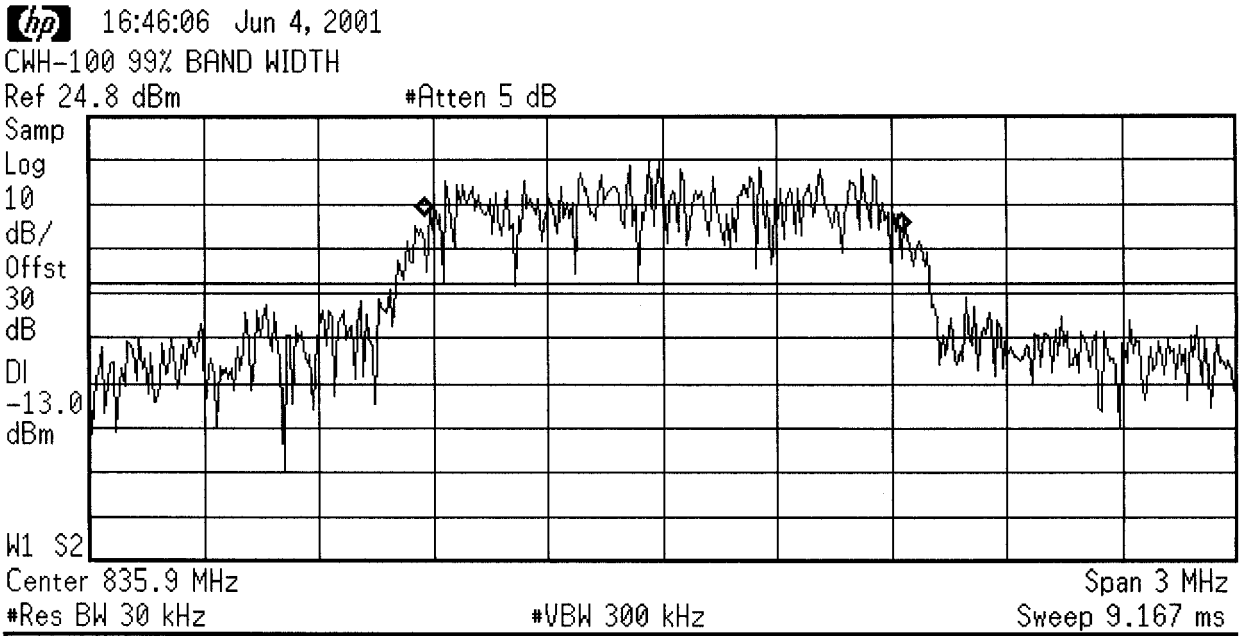

16:20:19 Jun 4, 2001
CWH-100 CDMA CH 1013
Ref 24.8 dBm
#Atten 5 dB
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 824.7 MHz
#Res BW 30 kHz
VBW 30 kHz
Span 5 MHz
Sweep 13.89 ms


16:22:12 Jun 4, 2001
CWH-100 CDMA CH 363
Ref 24.8 dBm
#Atten 5 dB
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 835.9 MHz
#Res BW 30 kHz
VBW 30 kHz
Span 5 MHz
Sweep 13.89 ms


16:48:38 Jun 4, 2001
CWH-100 CDMA CH 777
Ref 24.8 dBm
#Atten 5 dB
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 848.3 MHz
Span 5 MHz
#Res BW 30 kHz
VBW 30 kHz
Sweep 13.89 ms


16:42:05 Jun 4, 2001
CWH-100 BAND EDGE LOW CH
Ref 24.8 dBm
#Atten 5 dB
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 824 MHz
#Res BW 30 kHz
VBW 30 kHz
Span 5 MHz
Sweep 13.89 ms


16:40:52 Jun 4, 2001
CWH-100 BAND EDGE HIGH CH
Ref 24.8 dBm
#Atten 5 dB
Peak
Log
10
dB/
Offst
30
dB
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 849 MHz
#Res BW 30 kHz
VBW 30 kHz
Span 5 MHz
Sweep 13.89 ms



Occupied Bandwidth Results (measuring..)

Occupied Bandwidth

1.253 MHz

Occ BW % Pwr 99.00 %

Transmit Freq Error 2.449 kHz