PCTEST Engineering Laboratory, Inc.

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http://www.pctestlab.com

CERTIFICATE OF COMPLIANCE
FCC Part 24 Certification

HYUNDAI Electronics Industries Co., Ltd.
San 136-1, Ami-Ri, Bubal-Eub
Ichon-Si, Kyungki-Do, KOREA 467-701
Attn: Mr. Ki-Soo Kim, QM Dept.
System Quality Assurance Office

Dates of Tests: July 24-27, 2000
Test Report S/N: 24.200705388.CKL
Test Site: PCTEST Lab, Columbia MD

FCC ID	**CKLHGP-3100E**
APPLICANT	**HYUNDAI Electronics Industries Co., Ltd.**

Classification:	**Licensed Portable Transmitter Held to Ear (PCE)**
FCC Rule Part(s):	**§24(E); §2**
EUT Type:	**PCS CDMA Phone**
Trade Name/Model:	***HYUNDAI HGP-3100E***
Tx Frequency Range:	**1851.25MHz – 1908.75MHz**
Rx Frequency Range:	**1931.25MHz – 1988.75MHz**
Max. RF Output Power:	**0.4218 W EIRP (26.25 dBm)**
Emission Designator(s):	**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.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President & Chief Engineer

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NVLAP LAB CODE 100431-0

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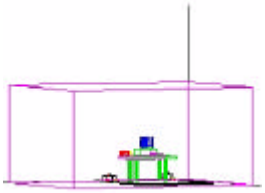
ATTACHMENT C – TEST REPORT



MEASUREMENT REPORT

1.1 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:	**HYUNDAI Electronics Industries Co., Ltd.**
Address:	**San 136-1, Ami-ri, Bubal-Eub**
	Ichon-Si, Kyungki-Do, KOREA 467-701
Attention:	**Mr. Ki-Soo Kim, QM Dept**
	System Quality Assurance Office

- FCC ID: **CKLHGP-3100E**
- Quantity: Quantity production is planned
- Emission Designators: 1M25F9W
- Tx Freq. Range: 1851.25 – 1908.75 MHz
- Rx Freq. Range: 1931.25 – 1988.75 MHz
- Max. Power Rating: 0.4218 W EIRP (26.25 dBm)
- FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: PCS CDMA Phone
- Modulation(s): CDMA
- Frequency Tolerance: ± 0.00025% (2.5 ppm)
- FCC Rule Part(s): § 24(E); §2
- Dates of Tests: July 24-27, 2000
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 24.200705388.CKL

NVLAP Lab Code 100431-0

2.1 INTRODUCTION

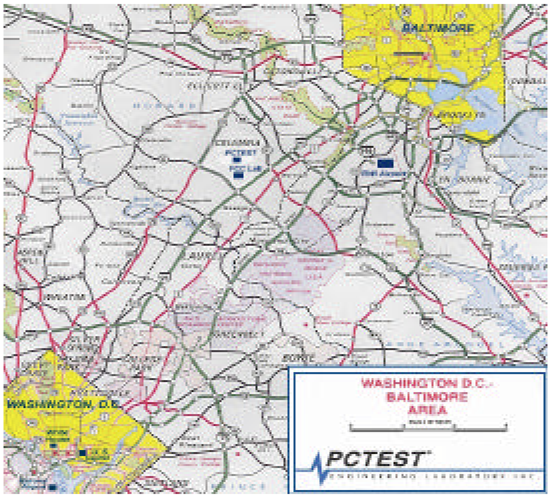


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

Measurement Procedure

The radiated and spurious measurements were made outdoors at 3-meter test range (see Figure 2). The equipment under test is placed on the turntable connected to a RF wattmeter and a dummy RF load, and then its power is adjusted to its rated output. A receiving antenna located 2 meters from the turntable picks up any signal radiated from the transmitter. The turntable containing the system was rotated; the receiving antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna. The actual radiated signal strength is obtained by substitution method with a signal generator with a calibrated output. The signal generator is adjusted in output until its reading is identical to that obtained when the receiving antenna is connected to the receiver. Signal strength is then read directly from the signal generator.

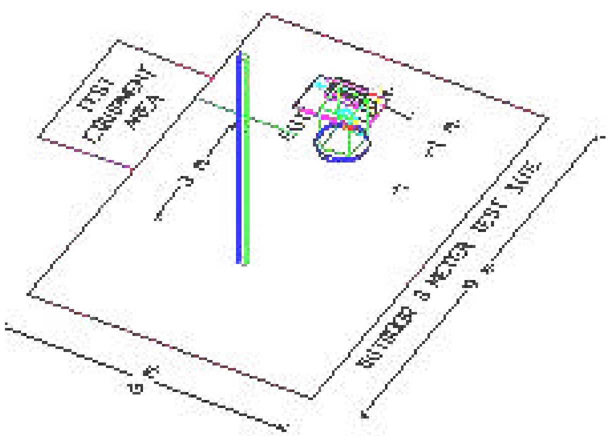


Figure 2. Diagram of 3-meter outdoor test range

3.1 INSERTS PER §2.1033(c)

§2.1033(c)(4) Function of Active Devices

The Function of active devices are shown in Attachment K.

§2.1033(c)(10) Block & Schematic Diagrams (Confidential)

The block diagrams are shown in Attachment I, and the schematic diagrams are shown in Attachment J.

§2.1033(c)(3) Operating Instructions

The instruction manual is shown in Attachment M.

§2.1033(c)(9) Parts List & Tune-Up Procedure

The parts list & tune-up procedure is shown in Attachment L.

§2.1033(c)(4) Description of Freq. Stabilization Circuit (Confidential)

The description of frequency stabilization circuit is shown in Attachment J.

§2.1033(c)(4) Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppresion Circuits (Confidential)

The description of suppression stabilization circuits is shown in Attachment J.

4.1 DESCRIPTION OF TESTS

4.2 §2.1047(a) Transmitter Audio Frequency Response

The frequency response of the audio modulating circuit over the frequency range 100 – 5000 Hz is measured. The audio signal generator is connected to the audio input circuit/microphone of the EUT. The audio signal input is adjusted to obtain 50% modulation at 1kHz and this point is taken as the 0dB reference. With the input held constant and below the limit at all frequencies, the audio signal generator is varied from 100 to 50 kHz.

4.3 §22.915(d) Audio Low Pass Filter Frequency Response

The response in dB relative to 1kHz is measured using the HP8901 a Modulation Analyzer. For the frequency response of the audio low-pass filter, the audio input is connected at the input to the modulation limiter and the modulated stage. The audio output is connected at the output of the modulated stage. The corresponding plots are shown herein.

4.4 §2.1047(b) & §22.915(b) Modulation Limiting

The audio signal generator is connected to the audio input circuit/microphone of the EUT. The modulation response is measured for each of the three modulating frequencies (300Hz, 1000 Hz, and 3000Hz), and the input voltage is varied from 30% modulation (±3.6kHz deviation) to at least 20dB higher than the saturation point. Measurements of modulation and the plots are attached herein. Measurements were performed for ST, SAT, and wide-band data modulations. The corresponding results are shown herein.

Note: ST, SAT, & Wide-Band data were internally generated by the EUT.

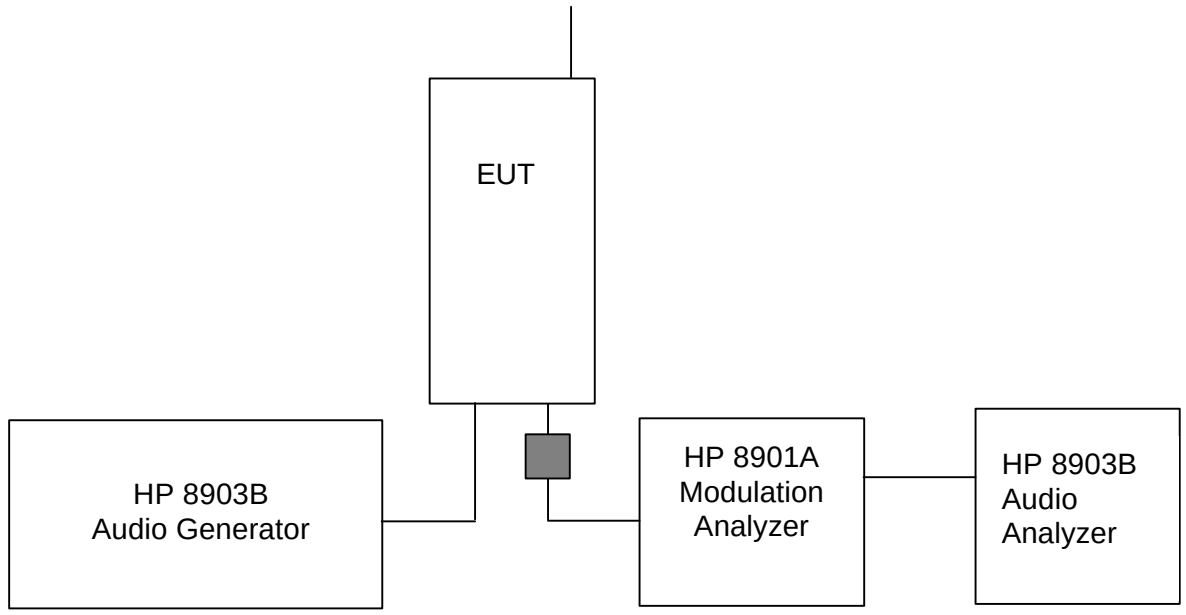


Fig. 3. Transmitter Audio Frequency & Tone Modulation Test Setup.

4.1 DESCRIPTION OF TESTS (CONTINUED)

4.5 §24.238 Occupied Bandwidth Emission Limits

(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 + 10 log(P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz 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 26 dB 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.

(d) 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.

BLOCK	Freq. Range (MHz) Transmitter (Tx)	Freq. Range (MHz) Receiver (Rx)
A	1850 - 1865	1930 - 1945
B	1870 - 1885	1950 - 1965
C	1895 - 1910	1975 - 1990
D	1865 - 1870	1945 - 1950
E	1885 - 1890	1965 - 1970
F	1890 - 1895	1970 - 1975

Table 1. Broadband PCS Service Frequency Blocks.

4.1 DESCRIPTION OF TESTS (CONTINUED)

4.6 §2.1049(c)(1) Occupied Bandwidth

The audio signal generator is adjusted to 1kHz. The output level is set to ±6kHz deviation. With the level constant, the frequency is set to 2500Hz. Then the audio signal level is increased by 16dB. The occupied bandwidth data is obtained for the SAT (Supervisory Audio Tone), ST (Signaling Tone), WBD (Wideband data), and DTMF (Dual Tone Multi Frequencies). The results are shown on the attached graphs.

Specified Limits:

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

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

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

4.7 §2.1051 Spurious and Harmonic Emissions at Antenna Terminal

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 GHz. The transmitter is modulated with a 2500Hz tone at a level of 16dB greater than that required to provided 50% modulation.

At the input terminals of the spectrum analyzer, an isolator (RF circulator with on port terminated with 50 ohms) and an 870 MHz to 890 MHz bandpass filter is connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The rejection of the bandpass filter to signals in the 825 – 845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than –90dBm. Calibration of the test receiver is performed in the 870 – 890 MHz range to insure accuracy to allow variation in the bandpass filter insertion loss to be calibrated.

4.8 §24.229 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and an high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter (signals below 2 GHz) is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

4.9 §2.1053 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions above 1 GHz is measured at out 3-meter indoor site. The EUT is placed on the turntable connected to a dummy load in normal operation using the intended power source. A receiving antenna located 3 meters from the turntable receives any signal radiated from the transmitter and its operating accessories. The antenna is varied from 1 to 4 meters and the polarization is varied (horizontal and vertical) to determine the worst-case emission level. To obtain actual radiated signal strength, a signal generator is adjusted in output until a reading identical to that obtained with the actual transmitter is obtained at the receiver. Signal strength is read directly from the generator and recorded on the attached table.

4.10 §24.135 Frequency Stability/Temperature Variation

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +60°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 frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are 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.

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

5.1 Test Data

5.2 Equivalent Isotropic Radiated Power (E.I.R.P.)

Radiated measurements at 3 meters

Supply Voltage: 3.8 VDC

Modulation: PCS CDMA

FREQ. (MHz)	LEVEL (dBm)	POL (H/V)	Azimuth (° angle)	EIRP (dBm)	EIRP (W)	Battery
1851.25	-21.22	H	60	25.86	0.386	Standard
1880.00	-21.00	H	60	26.25	0.422	Standard
1908.75	-22.00	H	60	25.42	0.348	Standard
1880.00	-21.20	H	60	26.05	0.403	Extended

NOTES:

ERP Measurements by Substitution Method:
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 ERP 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 antenna are taken into consideration.

6.1 Test Data

6.2 Radiated Measurements

Field Strength of SPURIOUS Radiation (PCS CDMA)

OPERATING FREQUENCY:	1851.25	MHz	
CHANNEL:	025 (Low)		
MEASURED OUTPUT POWER:	26.25 dBm =	0.4218	W
MODULATION SIGNAL:	CDMA (Internal)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 $\log_{10}$ (W) =	39.25	dBc

FREQ. (MHz)	LEVEL (dBm)	AFCL (dB)	POL (H/V)	F/S (μV/m)	EIRP (dBm)	(dBc)
3702.50	-88.70	44.4	H	1364.58	-32.53	58.8
5553.75	-91.67	49.7	H	1785.05	-30.20	56.4
7405.00	-117.00	53.7	H	153.09	-51.53	77.8
9256.25	-126.50	57.2	H	76.74	-57.53	83.8
11107.50	< -130					

NOTES:

1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 25 MHz up to the 10th harmonic.
3. All emissions not listed were found to be more than 20dB below the limit.
4. < -130dBm is below the floor of the spectrum analyzer.
5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
6. The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

   EIRP (dBm) = 10 Log 10 (((r(mV/m)/1 x 10^6)^2 / 30.0/1 x 10^{-3})
   EIRP (dBm) = 10 Log 10 [(3 x FS/1 x 10^6)^2 / (30.0) x 1000]
   EIRP (Watts) = {(3 x FS)/1 x 10^6}^{2} / 30.0

6.1 Test Data (Continued)

6.3 Radiated Measurements

Field Strength of SPURIOUS Radiation (PCS CDMA)

OPERATING FREQUENCY:	1880.00	MHz	
CHANNEL:	600 (Middle)		
MEASURED OUTPUT POWER:	26.25 dBm =	0.4218	W
MODULATION SIGNAL:	CDMA (Internal)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 $\log_{10}$ (W) =	39.25	dBc

FREQ. (MHz)	LEVEL (dBm)	AFCL (dB)	POL (H/V)	F/S (μV/m)	EIRP (dBm)	(dBc)
3760.00	-86.45	44.7	H	1830.84	-29.98	56.2
5640.00	-91.50	49.9	H	1862.09	-29.83	56.1
7520.00	-116.50	54.0	H	167.88	-50.73	77.0
9400.00	-125.40	57.4	H	89.13	-56.23	82.5
11280.00	< -130					

NOTES:

1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 25 MHz up to the 10th harmonic.
3. All emissions not listed were found to be more than 20dB below the limit.
4. < -130dBm is below the floor of the spectrum analyzer.
5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
6. The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

   EIRP (dBm) = 10 Log 10 (((r(mV/m)/1 x 10^6)^2 / 30.0/1 x 10^{-3})

   EIRP (dBm) = 10 Log 10 [(3 x FS/1 x 10^6)^2 / (30.0) x 1000]

   EIRP (Watts) = {(3 x FS)/1 x 10^6}^{2} / 30.0

6.1 Test Data (Continued)

6.4 Radiated Measurements

Field Strength of SPURIOUS Radiation (PCS CDMA)

OPERATING FREQUENCY:	1908.75	MHz	
CHANNEL:	1175 (High)		
MEASURED OUTPUT POWER:	26.25	dBm =	0.4218 W
MODULATION SIGNAL:	CDMA (Internal)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 $\log_{10}$ (W) =	39.25	dBc

FREQ. (MHz)	LEVEL (dBm)	AFCL (dB)	POL (H/V)	F/S (μV/m)	EIRP (dBm)	(dBc)
3817.50	-89.00	45.0	H	1412.54	-32.23	58.5
5726.25	-92.67	50.1	H	1665.90	-30.80	57.0
7635.00	-118.50	54.2	H	136.40	-52.53	78.8
9543.75	-127.00	57.7	H	76.74	-57.53	83.8
11452.50	< -130					

NOTES:

1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 25 MHz up to the 10th harmonic.
3. All emissions not listed were found to be more than 20dB below the limit.
4. < -130dBm is below the floor of the spectrum analyzer.
5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
6. The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

   EIRP (dBm) = 10 Log 10 $(((r(mV/m)/1 \times 10^6)^2 / 30.0/1 \times 10^{-3})$
   EIRP (dBm) = 10 Log 10 $[(3 \times FS/1 \times 10^6)^2 / (30.0) \times 1000]$
   EIRP (Watts) = $\{(3 \times FS)/1 \times 10^6\}^2 / 30.0$

7.1 Test Data

7.2 FREQUENCY STABILITY (PCS CDMA)

OPERATING FREQUENCY: 1,880,000,010 Hz

CHANNEL: 600

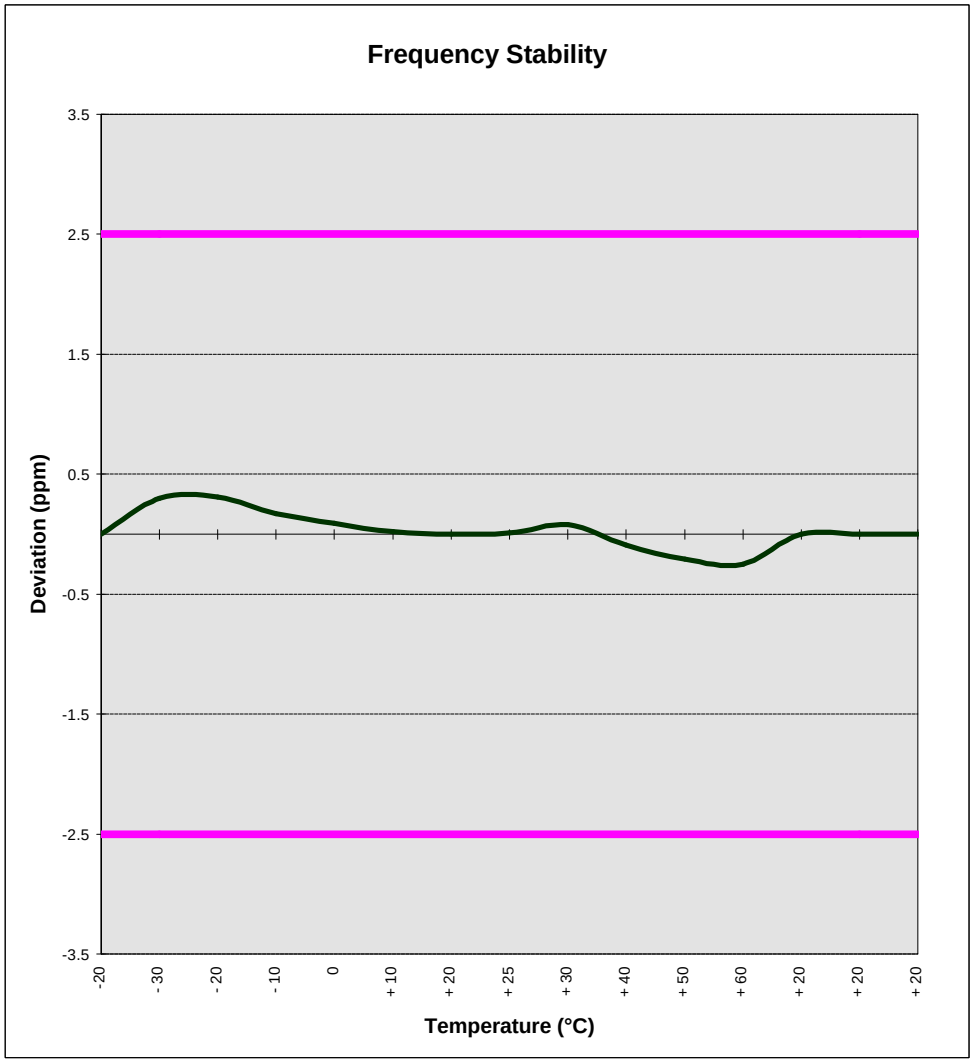
REFERENCE VOLTAGE: 3.8 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,880,000,010	0.000000
100 %		- 30	1,879,999,446	0.000030
100 %		- 20	1,879,999,427	0.000031
100 %		- 10	1,879,999,690	0.000017
100 %		0	1,879,999,841	0.000009
100 %		+ 10	1,879,999,972	0.000002
100 %		+ 20	1,880,000,010	0.000000
100 %		+ 25	1,879,999,991	0.000001
100 %		+ 30	1,879,999,860	0.000008
100 %		+ 40	1,880,000,179	-0.000009
100 %		+ 50	1,880,000,405	-0.000021
100 %		+ 60	1,880,000,480	-0.000025
85 %	3.23	+ 20	1,880,000,010	0.000000
115 %	4.37	+ 20	1,880,000,010	0.000000
BATT. ENDPOINT	2.77	+ 20	1,880,000,010	0.000000

7.1 Test Data (Continued)

7.3 FREQUENCY STABILITY GRAPH (PCS CDMA)



8.1 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT D)

9.1 TEST EQUIPMENT

Type	Model	Cal. Due Date	S/N
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	12/05/00	3638A08713
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/01	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (9kHz-1.8GHz)	06/02/01	3144A02458
Spectrum Analyzer	HP 8591A (9kHz-1.8GHz)	10/15/00	3108A02053
Spectrum Analyzer	HP 8594A (9kHz-2.9GHz)	11/02/00	3051A00187
Signal Generator*	HP 8640B (500Hz-1GHz)	06/02/01	2232A19558
Signal Generator*	HP 8640B (500Hz-1GHz)	06/02/01	1851A09816
Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/00	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/01	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/01	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	09/17/00	0608-03241
Quasi-Peak Adapter	HP 85650A	08/09/00	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/01	0194-04082
RG58 Coax Test Cable	No. 167		n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)		3531A00115
Broadband Amplifier (2)	HP 8447D		1145A00470, 1937A03348
Broadband Amplifier	HP 8447F		2443A03784
Transient Limiter	HP 11947A (9kHz-200MHz)		2820A00300
Horn Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 0355		
Log-Spiral Antenna (3)	Ailtech/Eaton 93490-1		0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set) A100	08/25/00	5118
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCO LISN (2)	3816/2		1077, 1079
EMCO LISN	3725/2		2009
Microwave Preamplifier 40dB Gain	HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Ailtech/Eaton Receiver	NM37/57A-SL		0792-03271
Spectrum Analyzer	HP 8591A		3034A01395
Modulation Analyzer	HP 8901A		2432A03467
NTSC Pattern Generator	Leader 408		0377433
Noise Figure Meter	HP 8970B		3106A02189
Noise Figure Meter	Ailtech 7510		TE31700
Noise Generator	Ailtech 7010		1473
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Shielded Screen Room	RF Lindgren Model 26-2/2-0		6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81		R2437 (PCT278)
Environmental Chamber	Associated Systems Model 1025 (Temperature/Humidity)		PCT285

* Calibration traceable to the National Institute of Standards and Technology (NIST).

10.1 SAMPLE CALCULATIONS

A. EIRP Sample Calculation

$$\text{Level } \mu\text{/Vm @ 3 meters} = \text{Log}_{10}^{-1}\left(\frac{\text{dBm} + 107 + \text{AFCL}}{20}\right)$$

$$\text{Log}_{10}^{-1}\left(\frac{-14 + 107 + 31.7}{20}\right)$$

1717908.4 µ/Vm @ 3 meters

Sample Calculation (relative to a dipole)

EIRP (dBm) = $10\ \text{Log}_{10}(((r(\mu V/m)1x10^{6})^{2}/30.0/1x10^{-3})$

EIRP (dBm) = $10\ \text{Log}_{10}(((3(1717908.4)1x10^{6})^{2}/30.0/1x10^{-3})$

EIRP (dBm) = 29.46

B. Emission Designator per §2.201

CDMA Sample

2M + 2DK

CDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

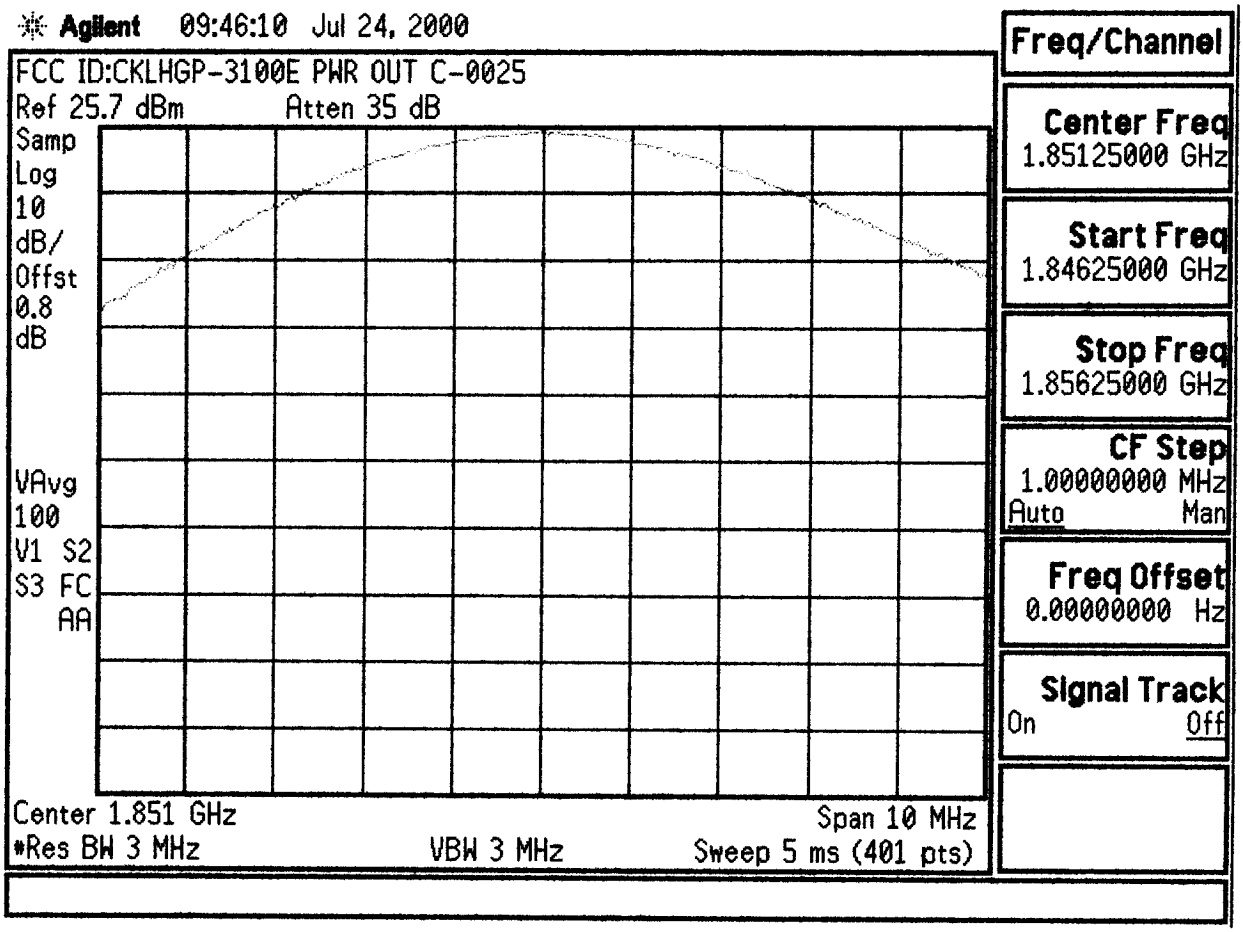
W = Combination (Audio/Data)

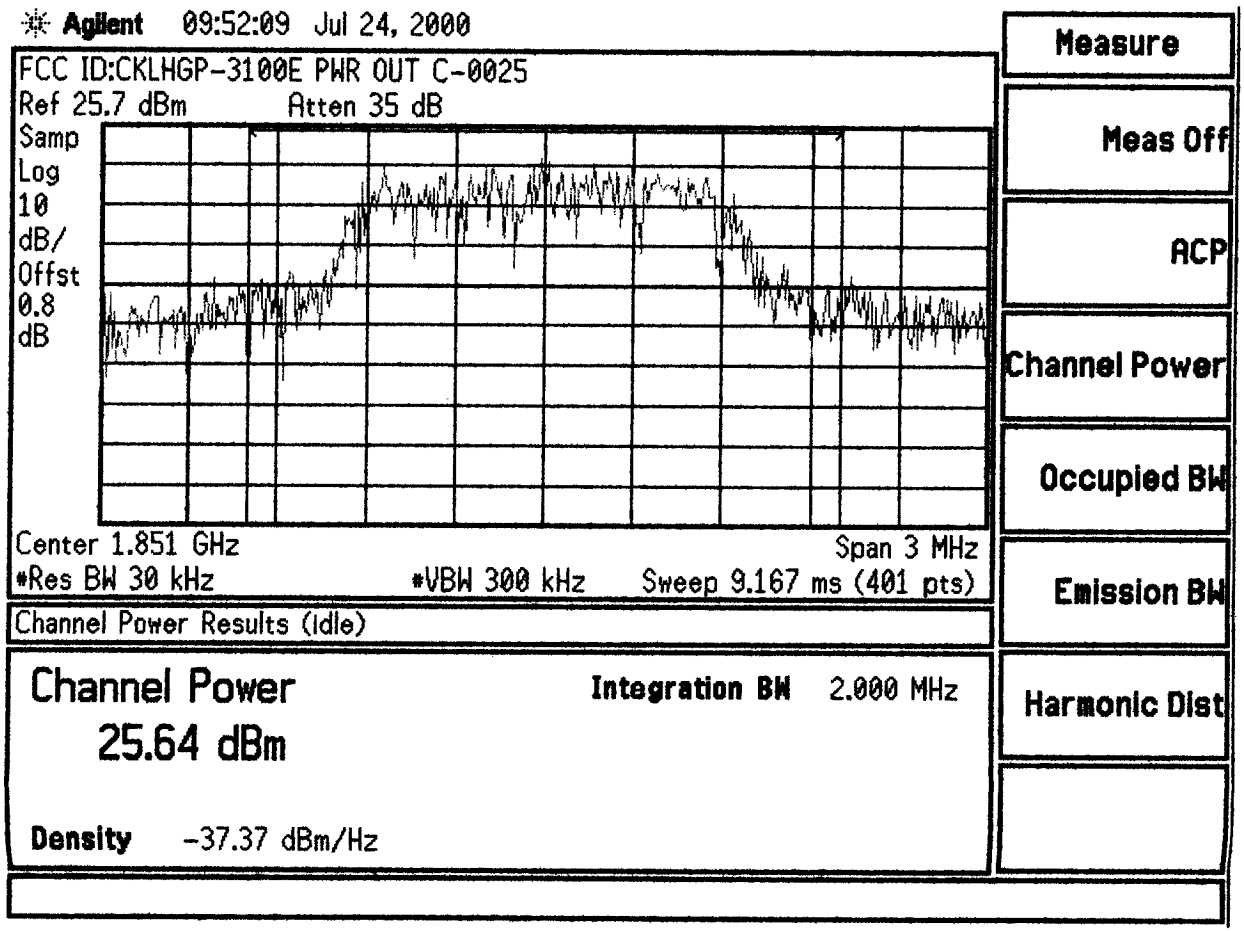
Emission Designator = 1M25F9W

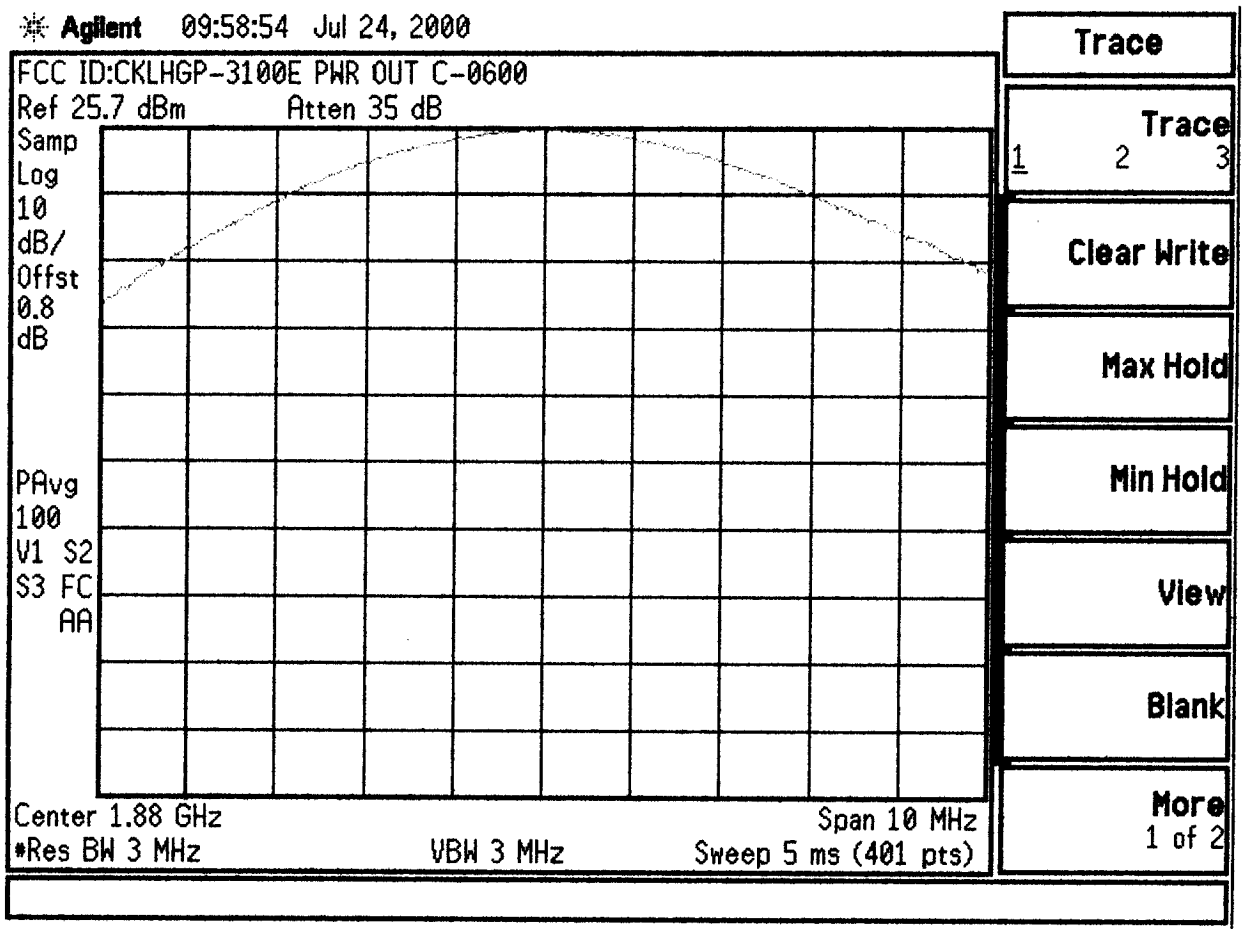
11.1 CONCLUSION

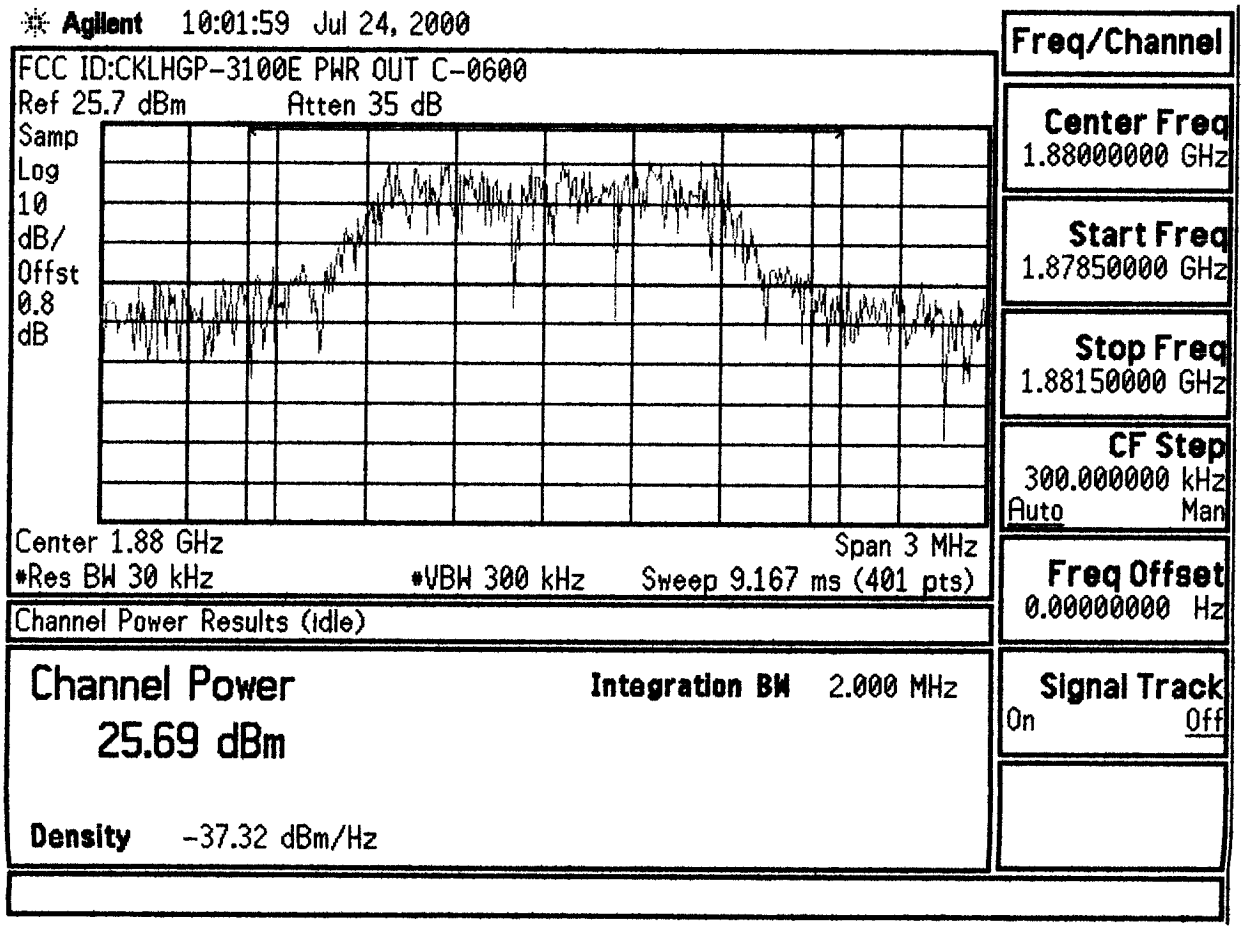
The data collected shows that the **HYUNDAI PCS CDMA Phone FCC ID: CKLHGP-3100E** complies with all the requirements of Parts 2 and 24 of the FCC rules.

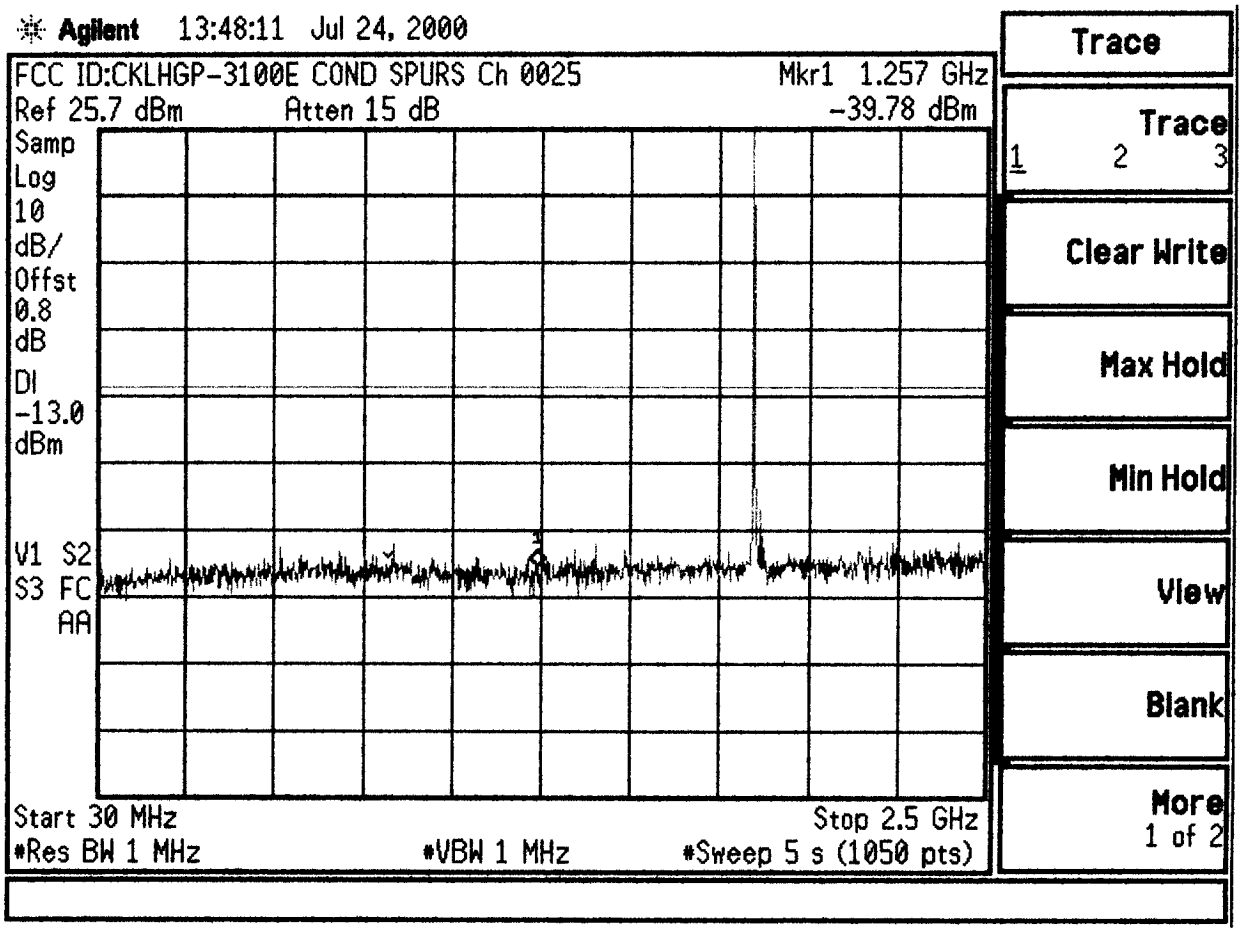
ATTACHMENT D – TEST PLOTS

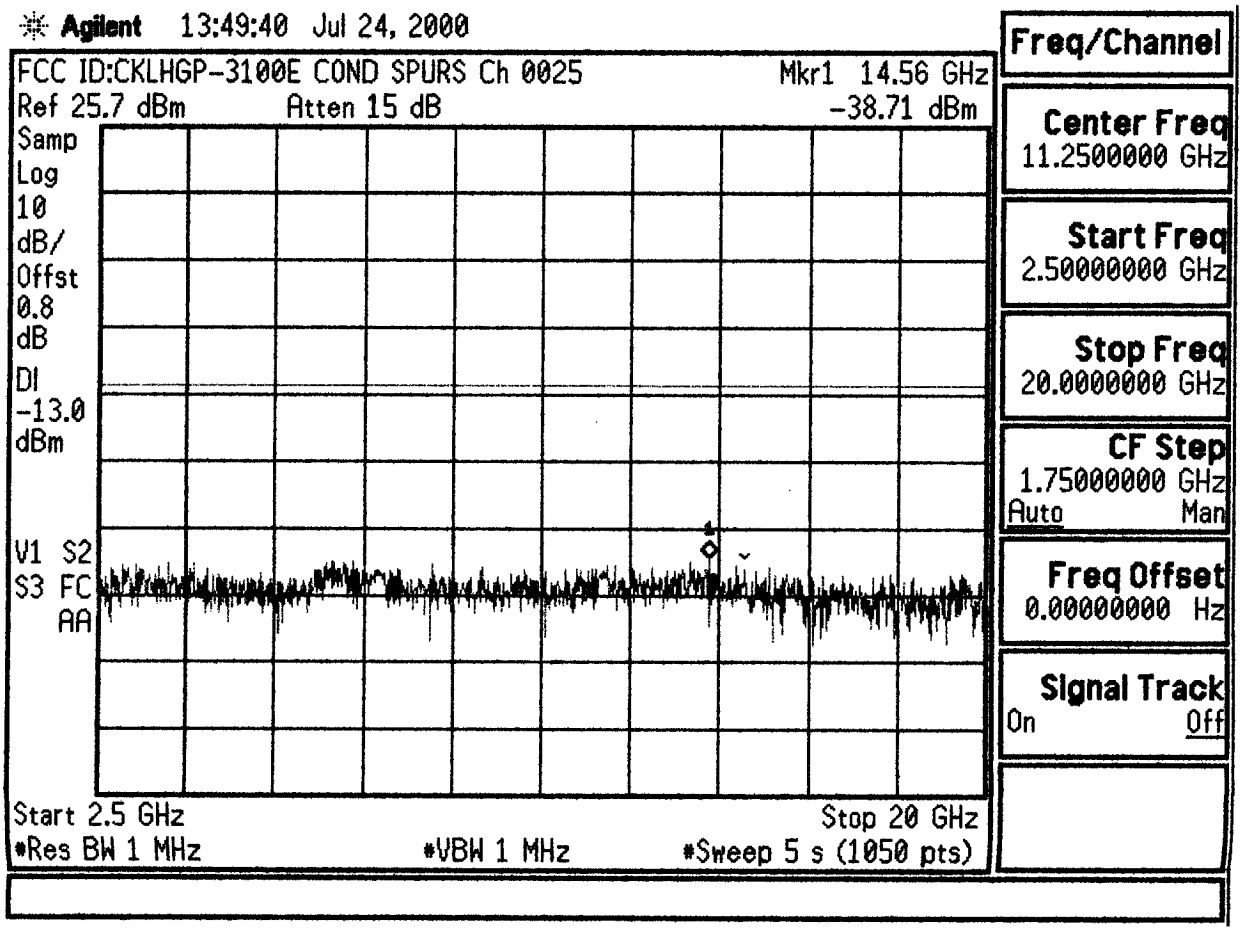

Agilent 09:46:10 Jul 24, 2000
FCC ID:CKLHGP-3100E PWR OUT C-0025
Ref 25.7 dBm
Atten 35 dB
Samp
Log
10
dB/
Offst
0.8
dB
VAvg
100
V1 S2
S3 FC
AA
Center 1.851 GHz
Span 10 MHz
#Res BW 3 MHz
VBW 3 MHz
Sweep 5 ms (401 pts)
Freq/Channel
Center Freq
1.85125000 GHz
Start Freq
1.84625000 GHz
Stop Freq
1.85625000 GHz
CF Step
1.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

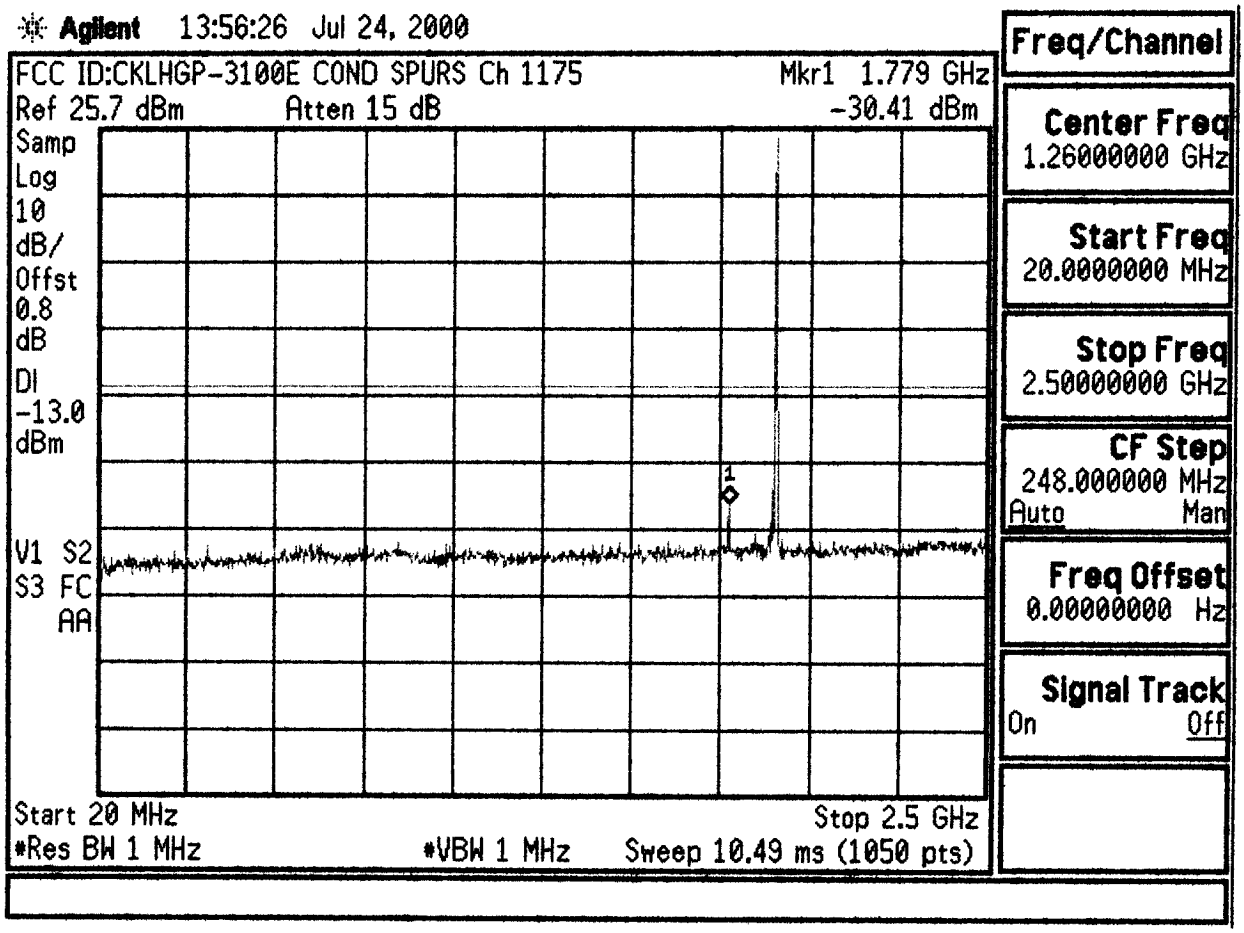

Agilent 09:52:09 Jul 24, 2000
FCC ID:CKLHGP-3100E PWR OUT C-0025
Ref 25.7 dBm
Atten 35 dB
Samp
Log
10
dB/
Offst
0.8
dB
Center 1.851 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 300 kHz
Sweep 9.167 ms (401 pts)
Channel Power Results (Idle)
Channel Power
25.64 dBm
Integration BW 2.000 MHz
Density -37.37 dBm/Hz
Measure
Meas Off
ACP
Channel Power
Occupied BW
Emission BW
Harmonic Dist

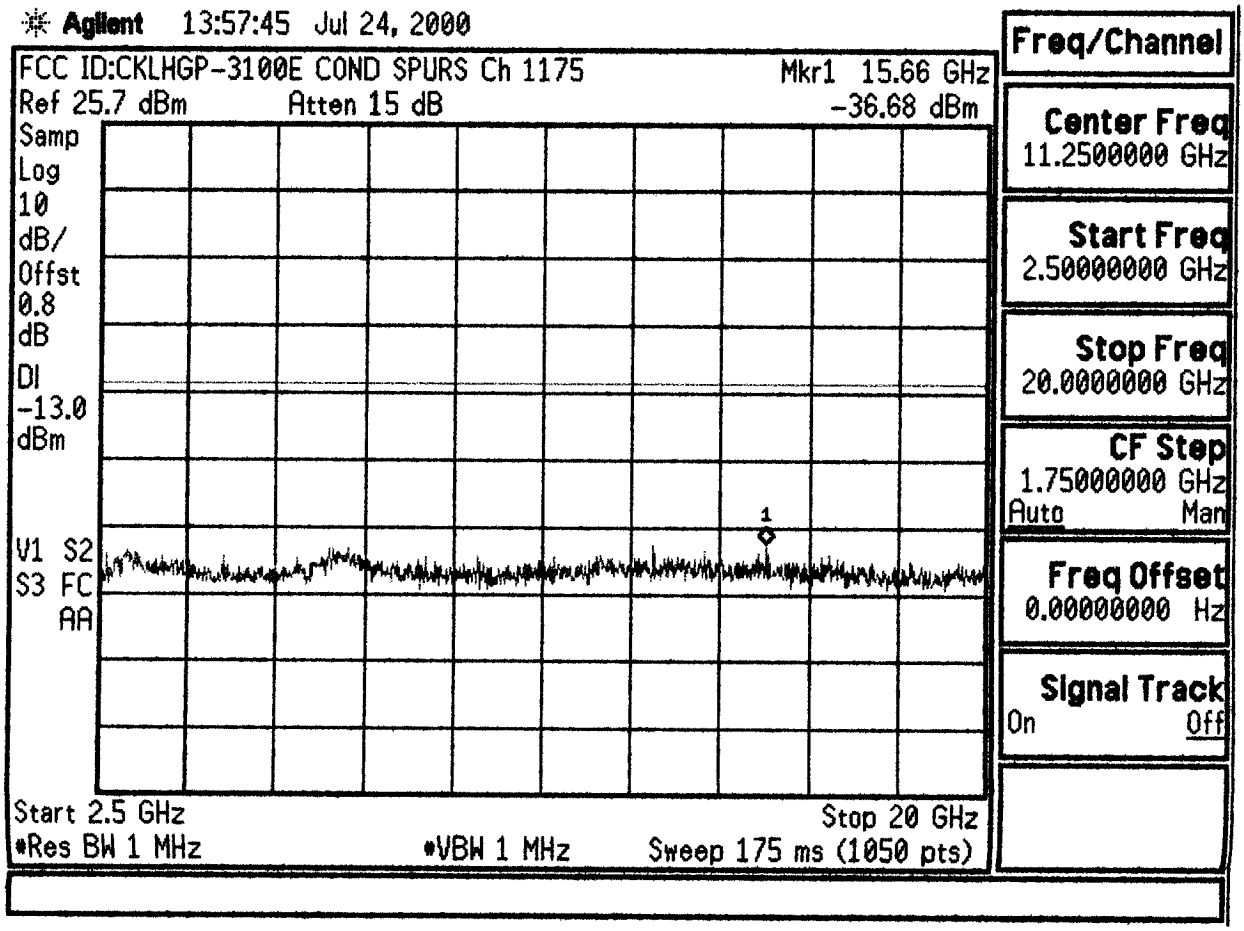

Agilent 09:58:54 Jul 24, 2000
FCC ID:CKLHGP-3100E PWR OUT C-0600
Ref 25.7 dBm
Atten 35 dB
Samp
Log
10
dB/
Offst
0.8
dB
PAvg
100
V1 S2
S3 FC
AA
Center 1.88 GHz
Span 10 MHz
#Res BW 3 MHz
VBW 3 MHz
Sweep 5 ms (401 pts)
Trace
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

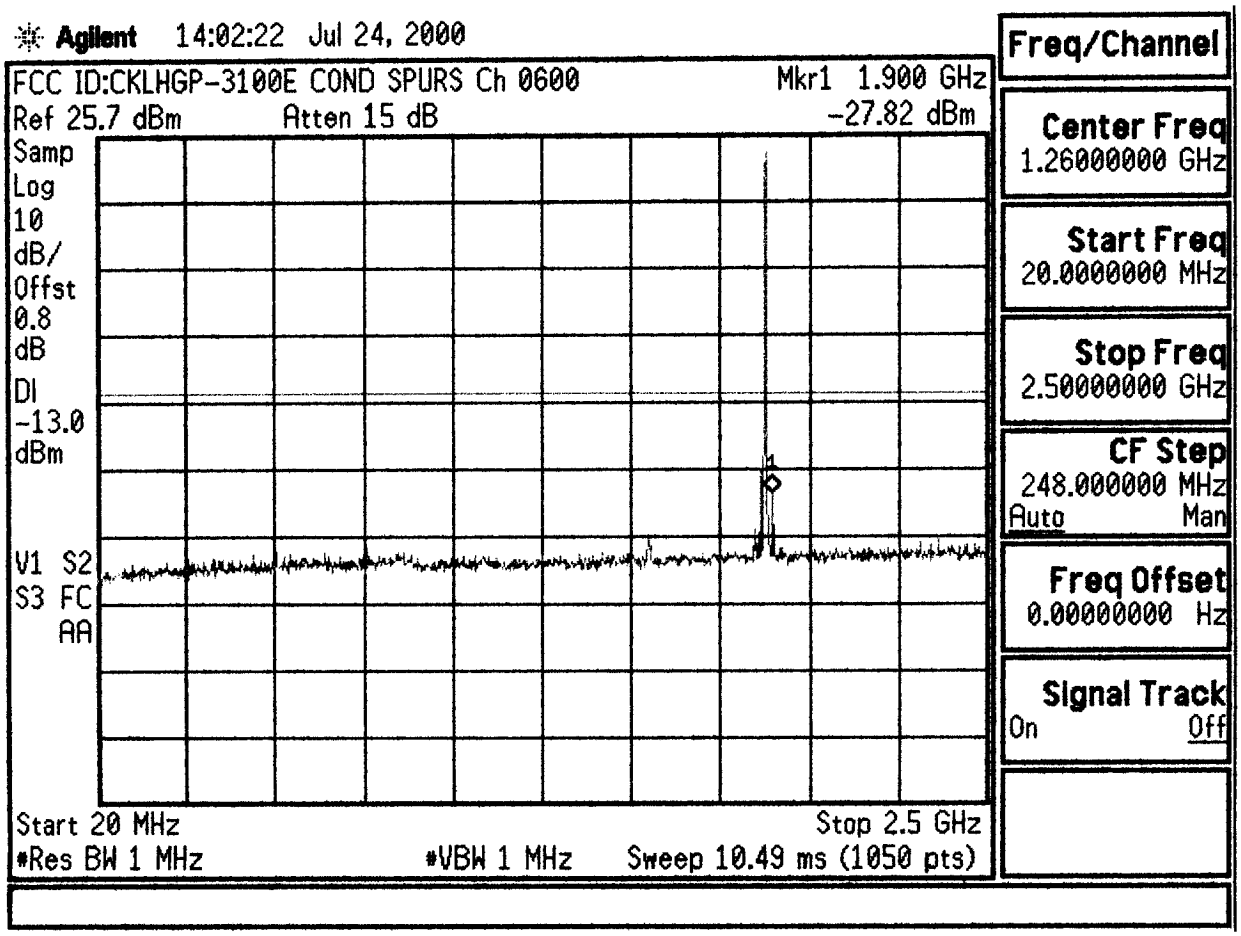

Agilent 10:01:59 Jul 24, 2000
FCC ID:CKLHGP-3100E PWR OUT C-0600
Ref 25.7 dBm
Atten 35 dB
Samp
Log
10
dB/
Offst
0.8
dB
Center 1.88 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 300 kHz
Sweep 9.167 ms (401 pts)
Channel Power Results (idle)
Channel Power
25.69 dBm
Integration BW 2.000 MHz
Density -37.32 dBm/Hz
Freq/Channel
Center Freq
1.88000000 GHz
Start Freq
1.87850000 GHz
Stop Freq
1.88150000 GHz
CF Step
300.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

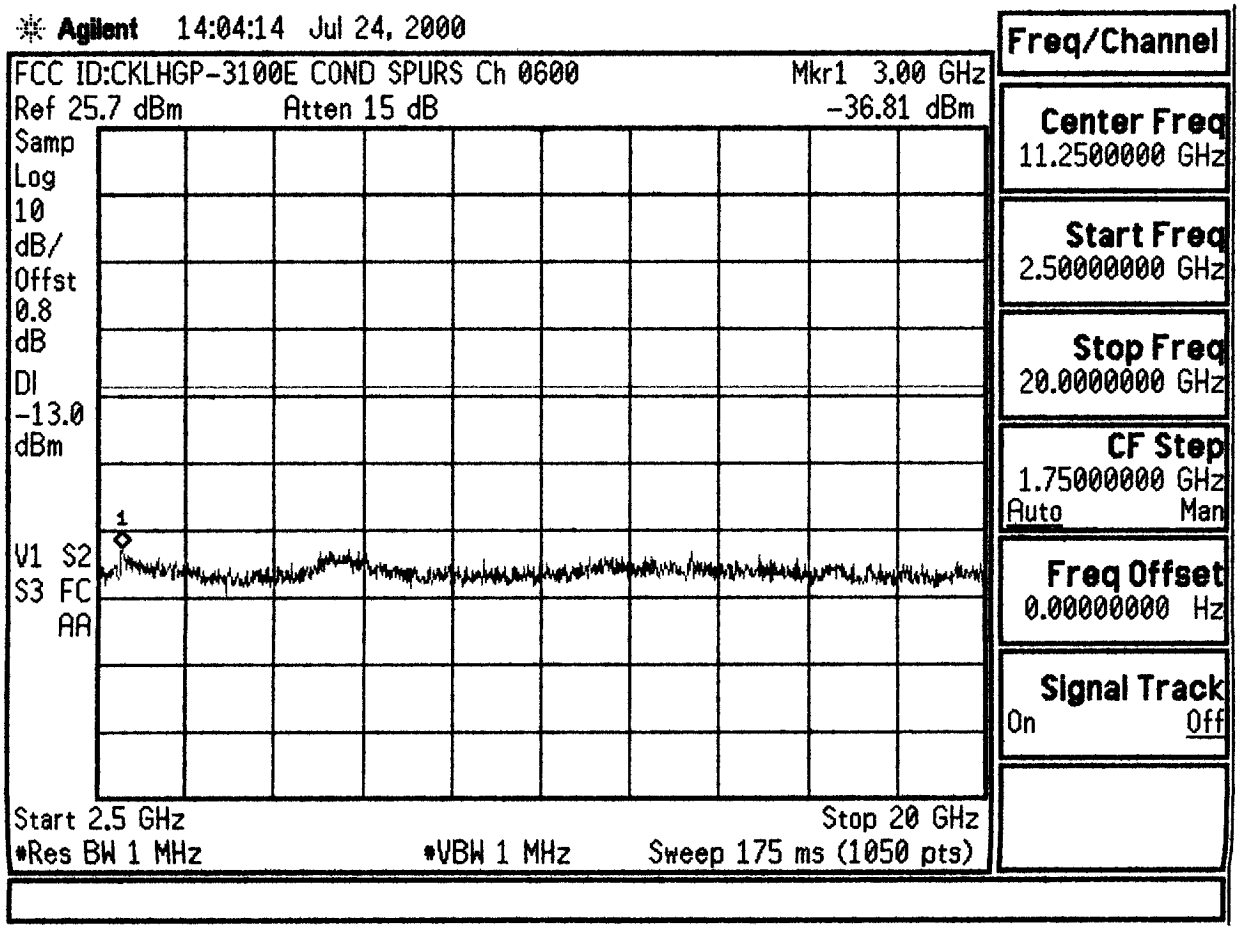

Agilent 13:48:11 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 0025
Mkr1 1.257 GHz
Ref 25.7 dBm
Atten 15 dB
-39.78 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Start 30 MHz
Stop 2.5 GHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 5 s (1050 pts)
Trace
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

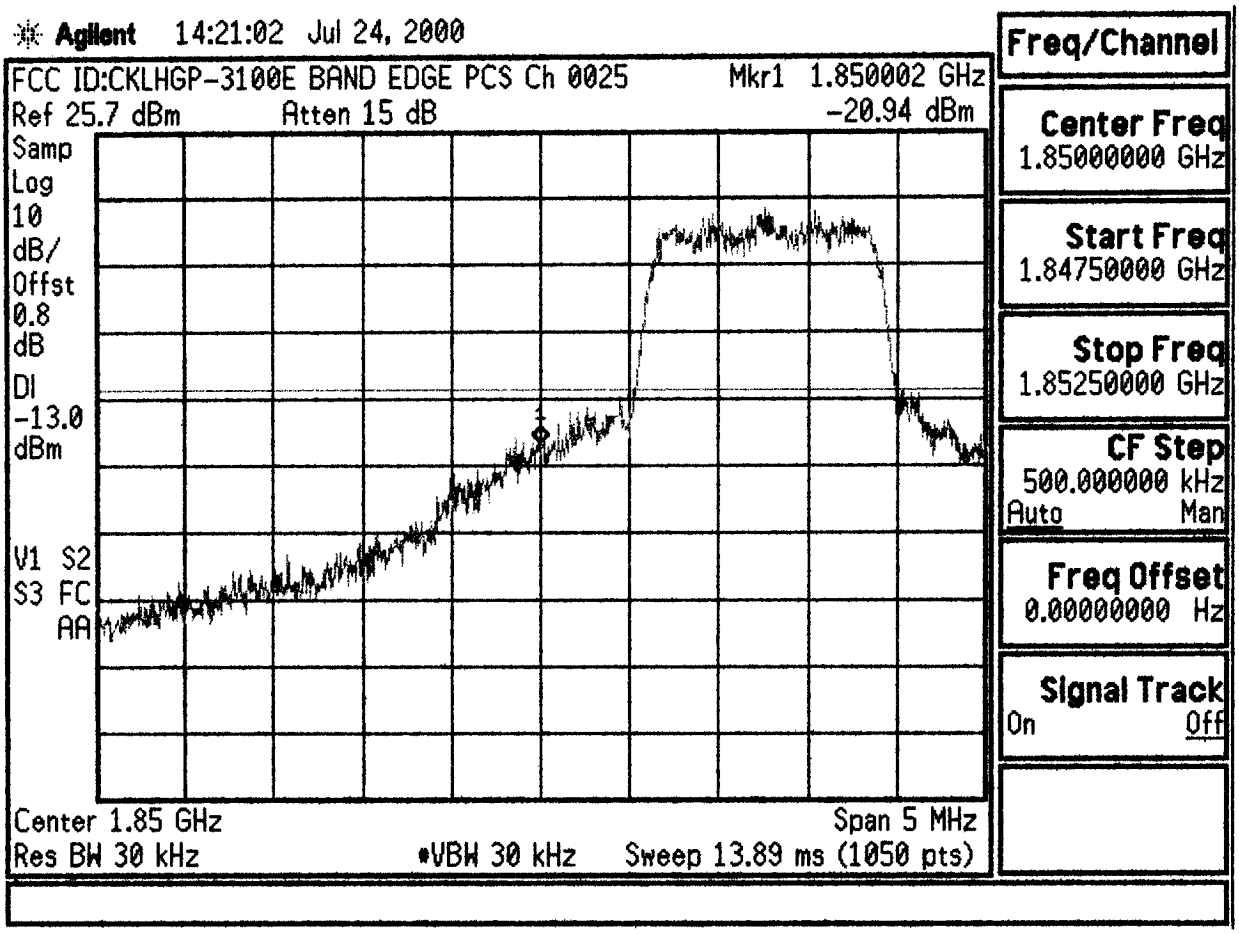

Agilent 13:49:40 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 0025
Mkr1 14.56 GHz
Ref 25.7 dBm
Atten 15 dB
-38.71 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Start 2.5 GHz
Stop 20 GHz
#Res BW 1 MHz
#VBW 1 MHz
#Sweep 5 s (1050 pts)
Freq/Channel
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

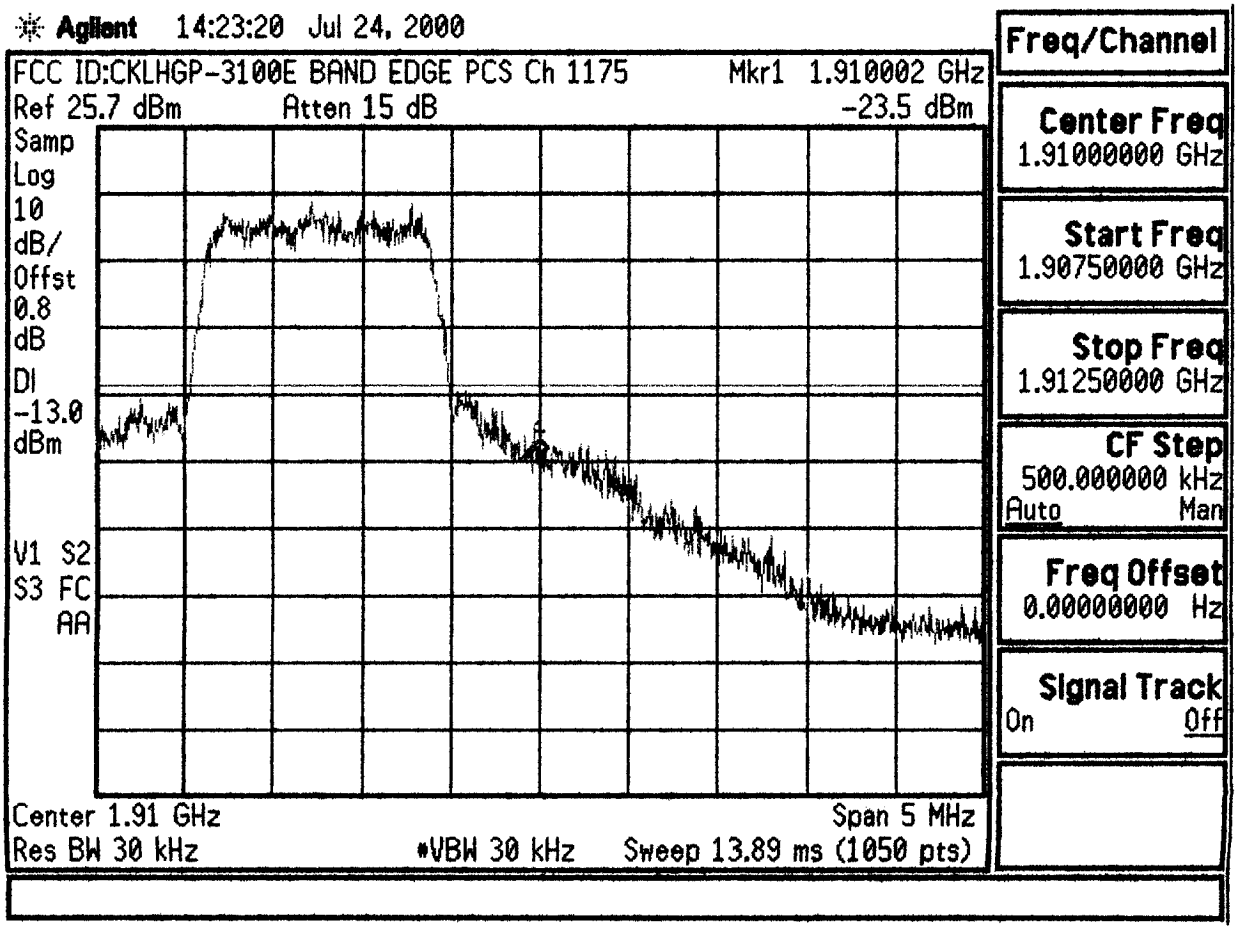

Agilent 13:56:26 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 1175
Mkr1 1.779 GHz
Ref 25.7 dBm
Atten 15 dB
-30.41 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Start 20 MHz
Stop 2.5 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.26000000 GHz
Start Freq
20.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
248.000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

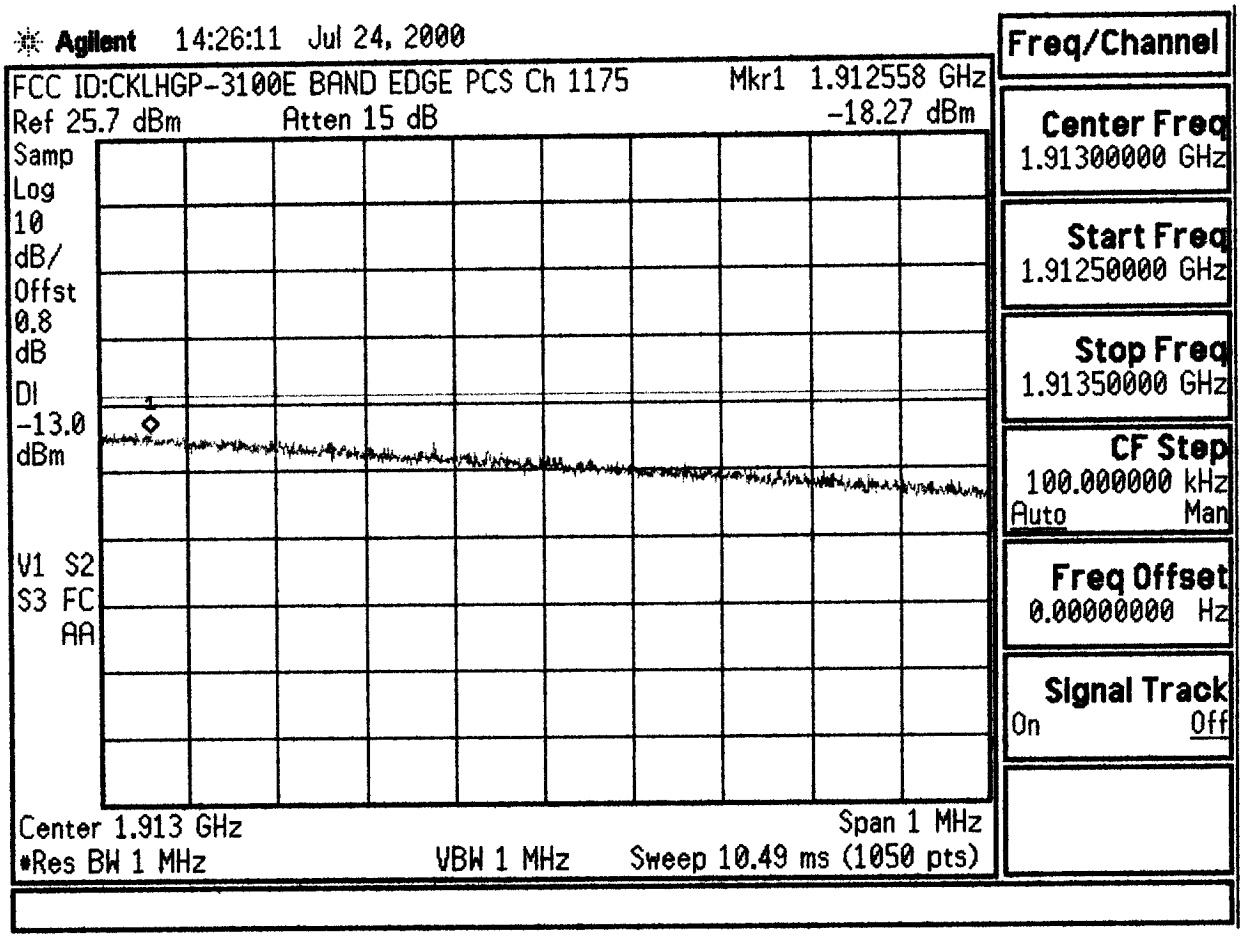

Agilent 13:57:45 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 1175
Mkr1 15.66 GHz
Ref 25.7 dBm
Atten 15 dB
-36.68 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Start 2.5 GHz
Stop 20 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 175 ms (1050 pts)
Freq/Channel
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

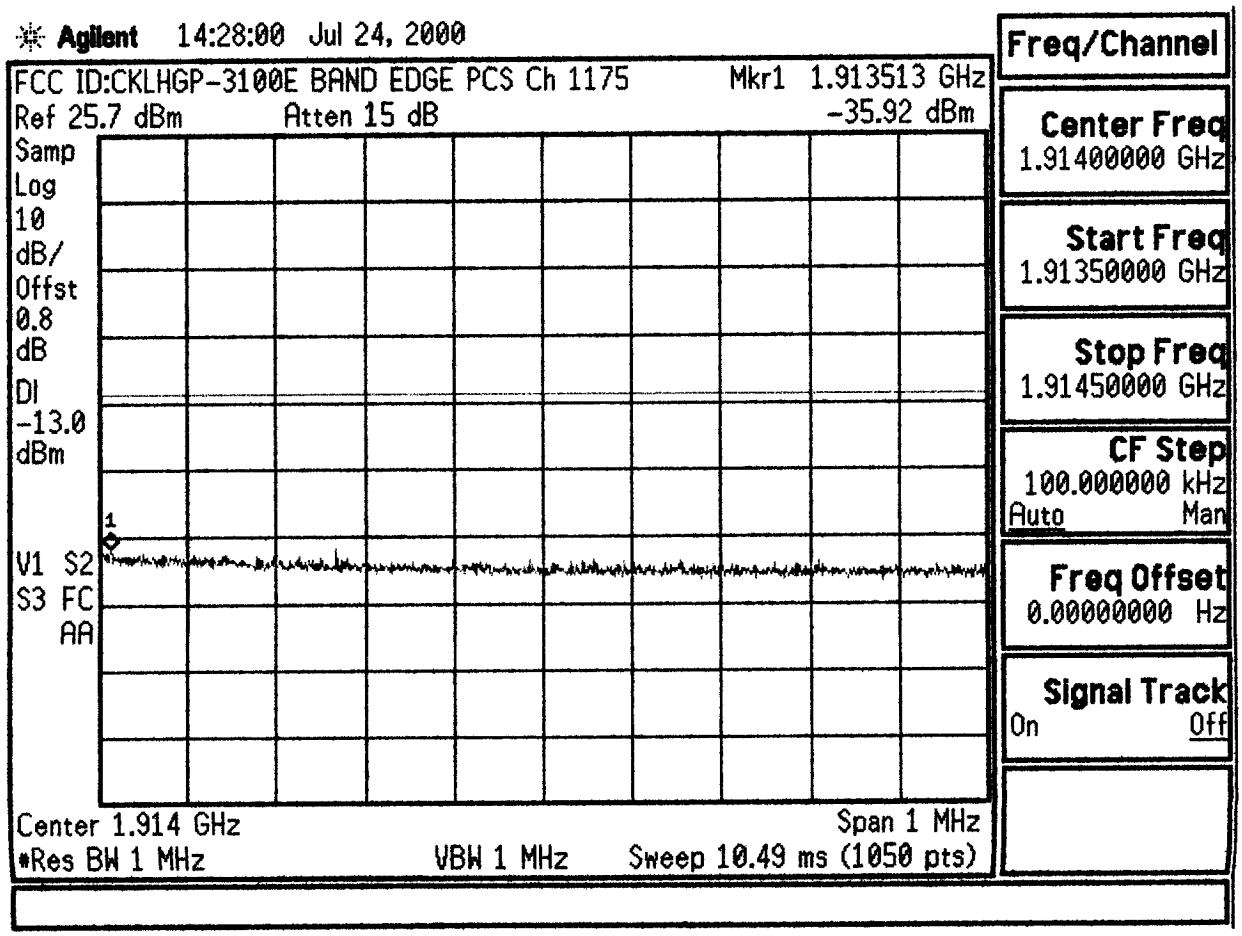

Agilent 14:02:22 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 0600
Mkr1 1.900 GHz
Ref 25.7 dBm
Atten 15 dB
-27.82 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Start 20 MHz
Stop 2.5 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.26000000 GHz
Start Freq
20.0000000 MHz
Stop Freq
2.50000000 GHz
CF Step
248.000000 MHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off

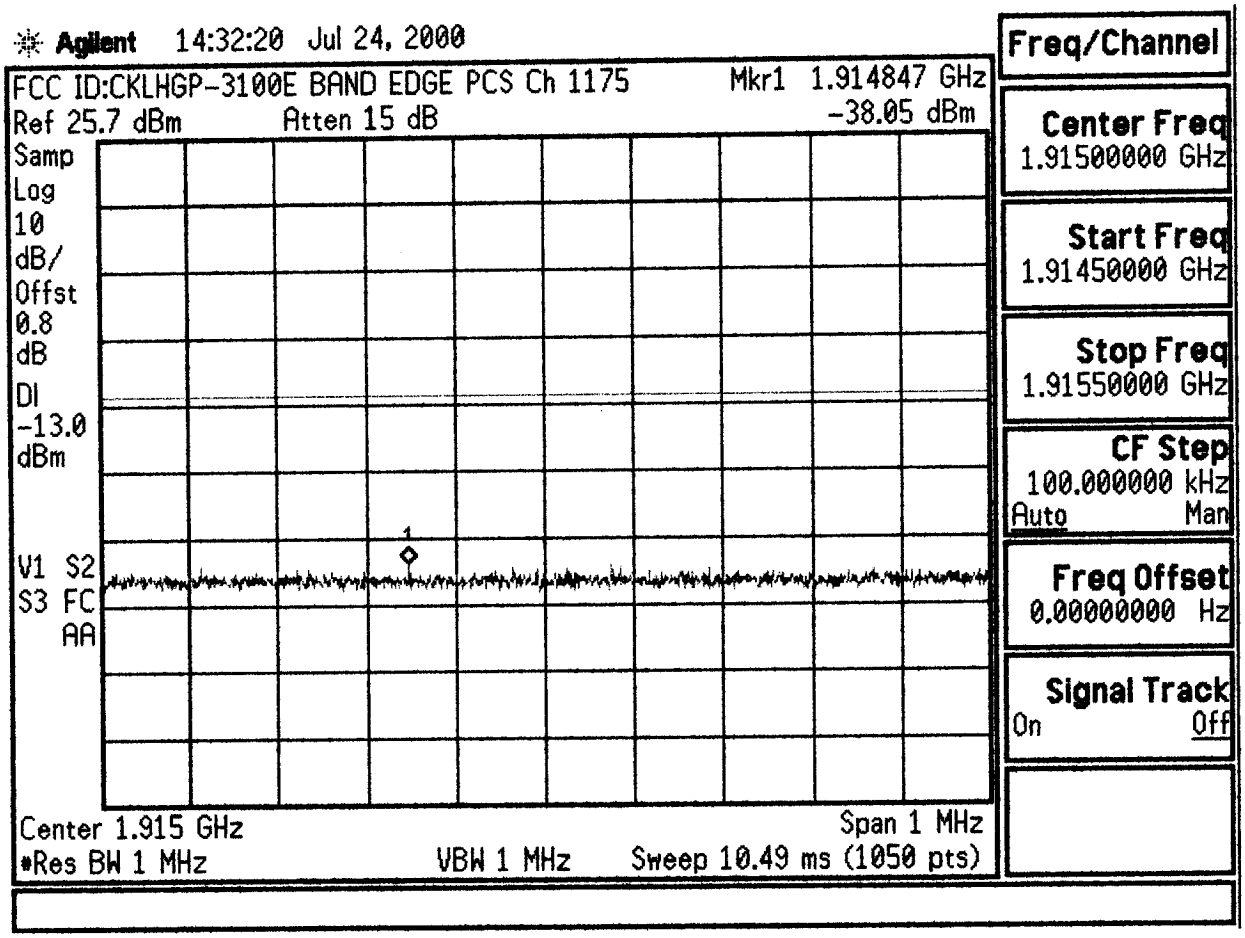

Agilent 14:04:14 Jul 24, 2000
FCC ID:CKLHGP-3100E COND SPURS Ch 0600
Mkr1 3.00 GHz
Ref 25.7 dBm
Atten 15 dB
-36.81 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
1
V1 S2
S3 FC
AA
Start 2.5 GHz
Stop 20 GHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 175 ms (1050 pts)
Freq/Channel
Center Freq
11.2500000 GHz
Start Freq
2.50000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.75000000 GHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off

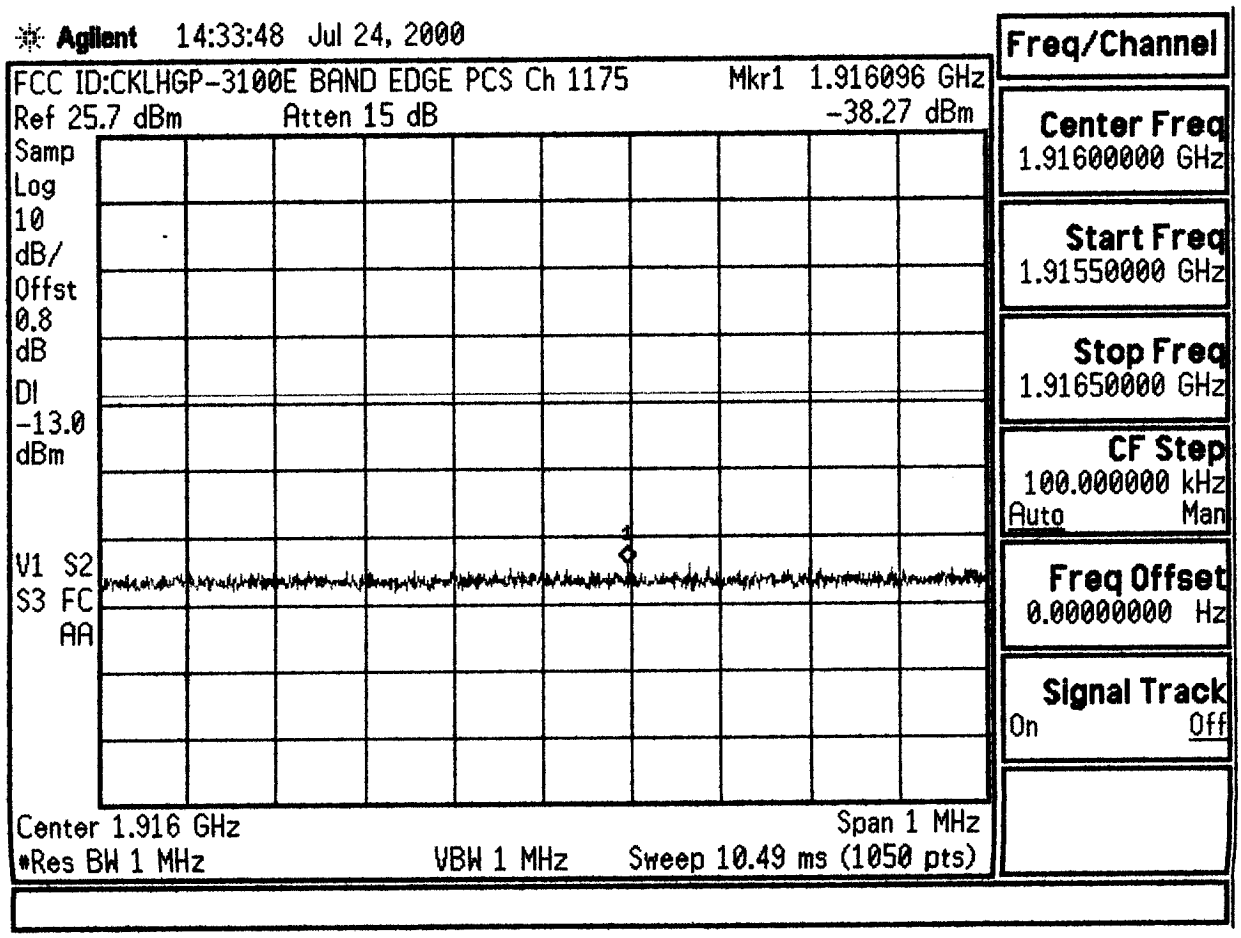

Agilent 14:21:02 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 0025
Mkr1 1.850002 GHz
Ref 25.7 dBm
Atten 15 dB
-20.94 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.85 GHz
Span 5 MHz
Res BW 30 kHz
#VBW 30 kHz
Sweep 13.89 ms (1050 pts)
Freq/Channel
Center Freq
1.85000000 GHz
Start Freq
1.84750000 GHz
Stop Freq
1.85250000 GHz
CF Step
500.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

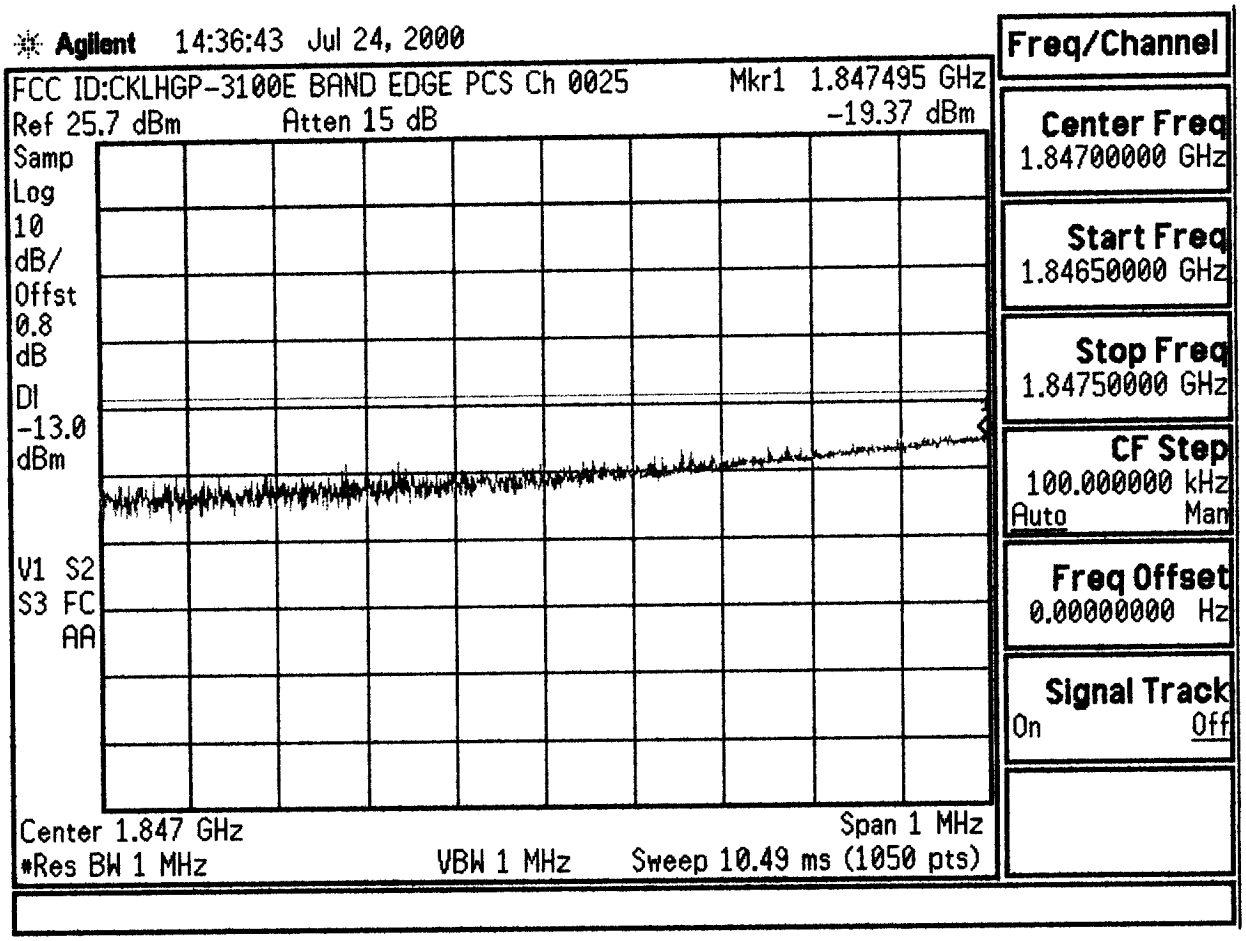

Agilent 14:23:20 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Mkr1 1.910002 GHz
Ref 25.7 dBm
Atten 15 dB
-23.5 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.91 GHz
Span 5 MHz
Res BW 30 kHz
#VBW 30 kHz
Sweep 13.89 ms (1050 pts)
Freq/Channel
Center Freq
1.91000000 GHz
Start Freq
1.90750000 GHz
Stop Freq
1.91250000 GHz
CF Step
500.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

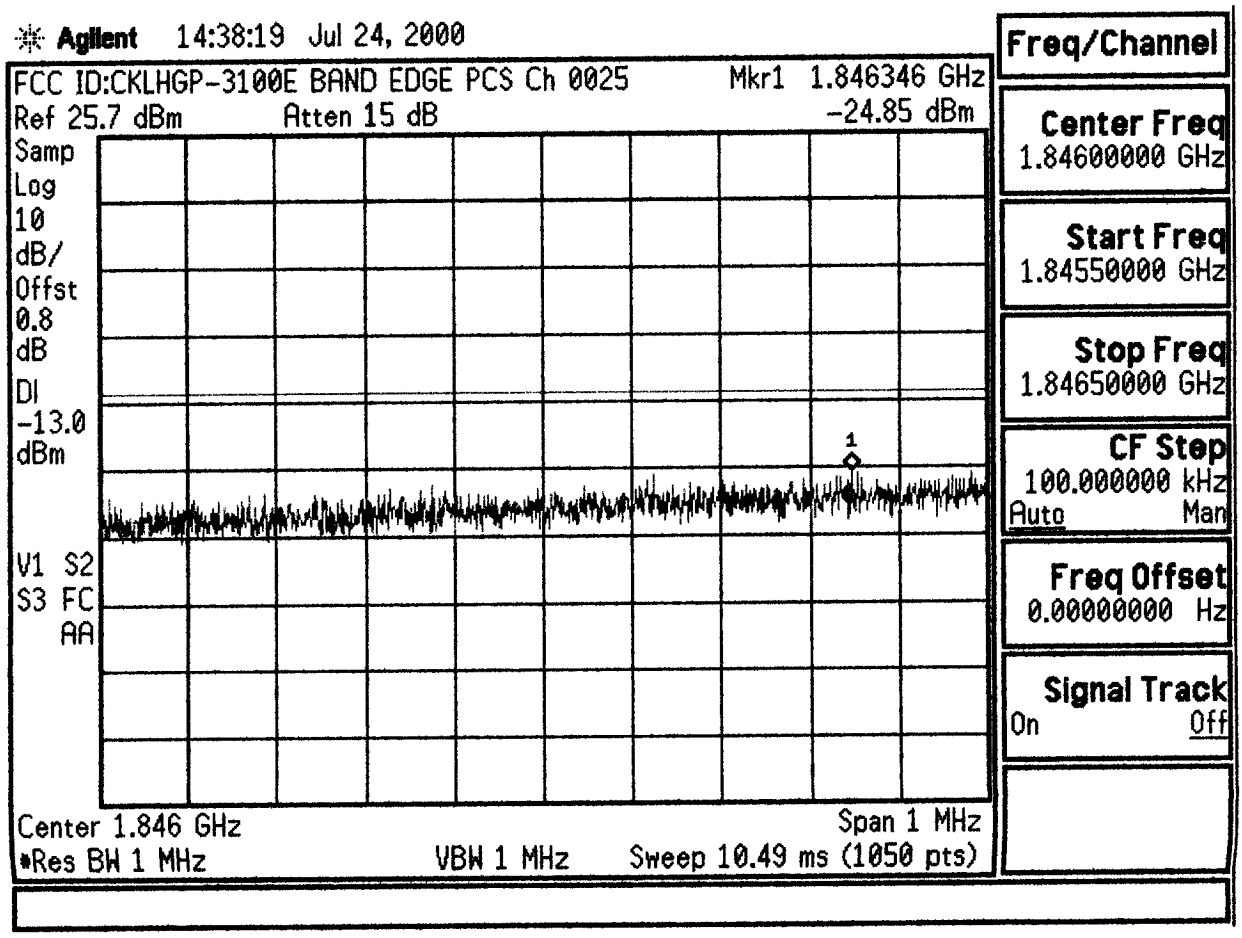

Agilent 14:26:11 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Mkr1 1.912558 GHz
-18.27 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.913 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.91300000 GHz
Start Freq
1.91250000 GHz
Stop Freq
1.91350000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

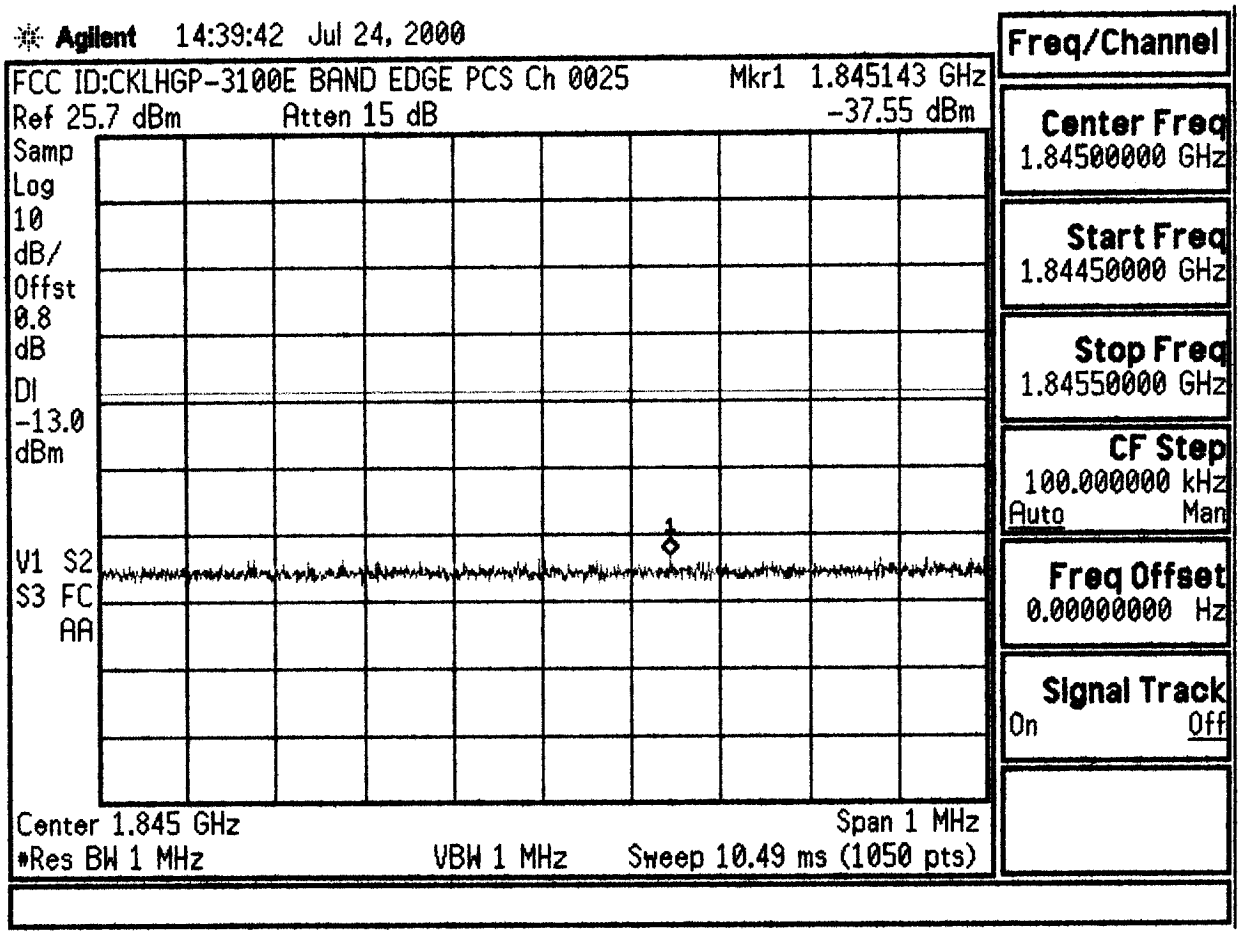

Agilent 14:28:00 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Mkr1 1.913513 GHz
-35.92 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.914 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.91400000 GHz
Start Freq
1.91350000 GHz
Stop Freq
1.91450000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

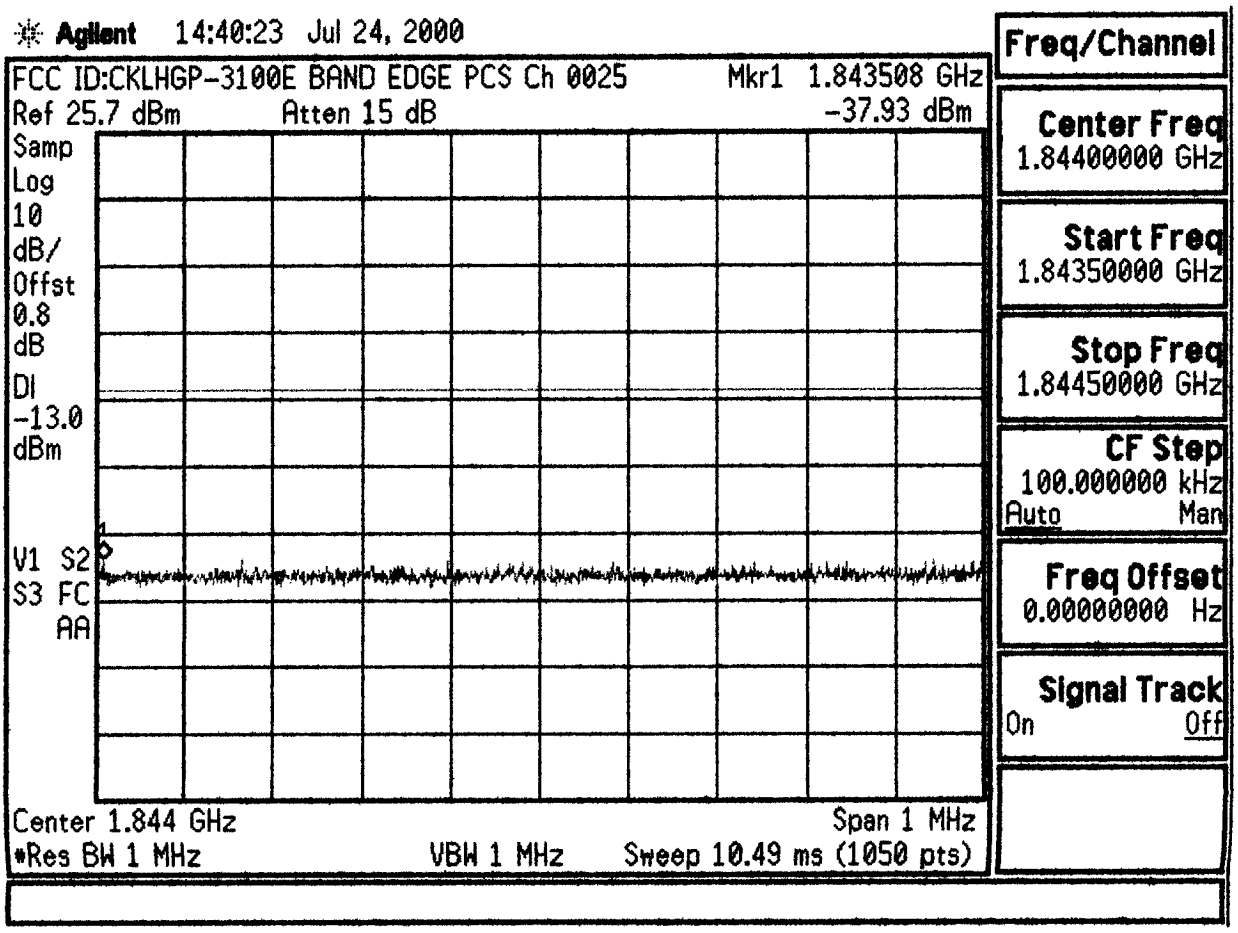

Agilent 14:32:20 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Mkr1 1.914847 GHz
-38.05 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.915 GHz
#Res BW 1 MHz
VBW 1 MHz
Span 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.91500000 GHz
Start Freq
1.91450000 GHz
Stop Freq
1.91550000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

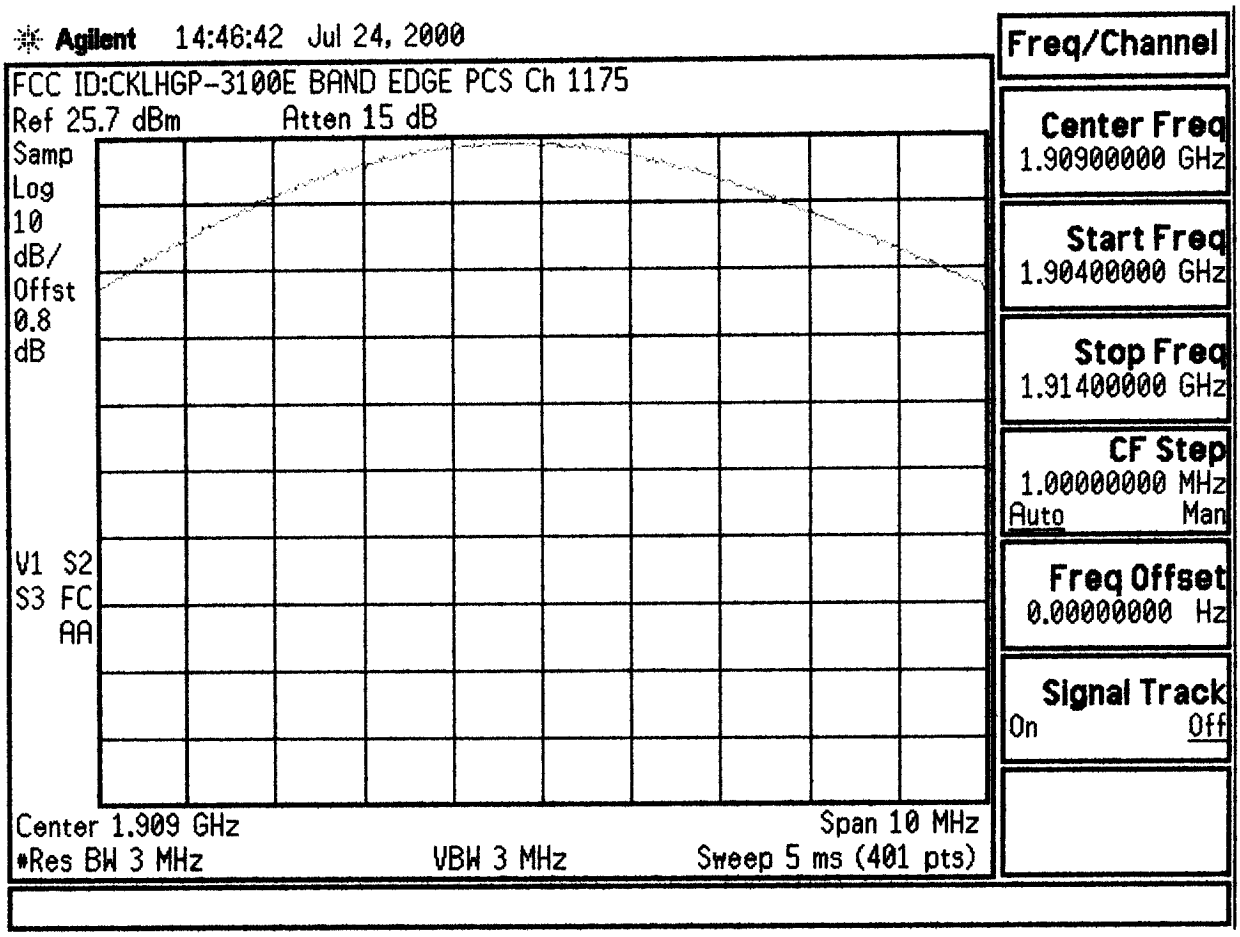

Agilent 14:33:48 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Mkr1 1.916096 GHz
-38.27 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.916 GHz
#Res BW 1 MHz
VBW 1 MHz
Span 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.91600000 GHz
Start Freq
1.91550000 GHz
Stop Freq
1.91650000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off

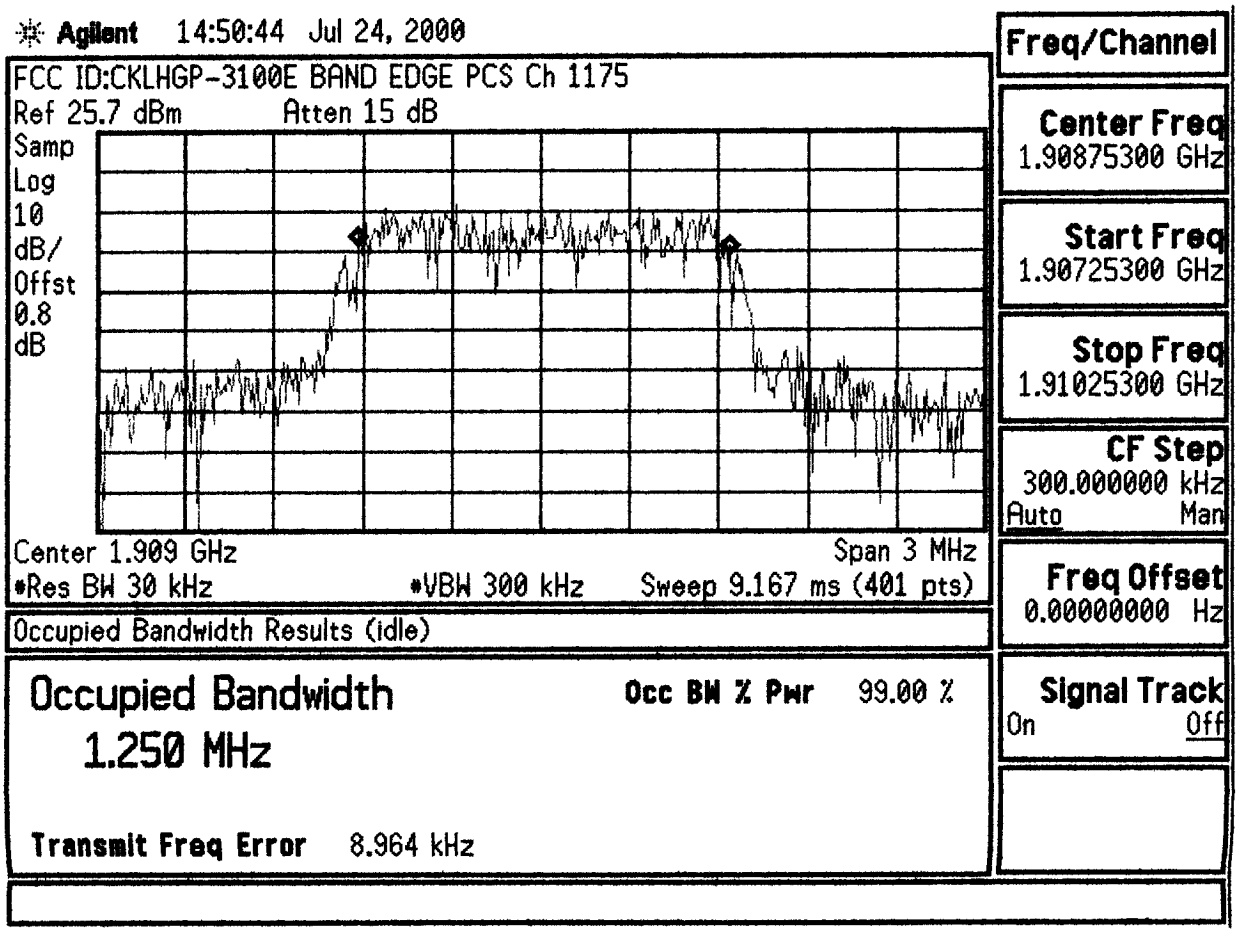

Agilent 14:36:43 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 0025
Mkr1 1.847495 GHz
Ref 25.7 dBm
Atten 15 dB
-19.37 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.847 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.84700000 GHz
Start Freq
1.84650000 GHz
Stop Freq
1.84750000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent 14:38:19 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 0025
Mkr1 1.846346 GHz
Ref 25.7 dBm
Atten 15 dB
-24.85 dBm
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
1
V1 S2
S3 FC
AA
Center 1.846 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.84600000 GHz
Start Freq
1.84550000 GHz
Stop Freq
1.84650000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent 14:39:42 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 0025
Mkr1 1.845143 GHz
-37.55 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.845 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.84500000 GHz
Start Freq
1.84450000 GHz
Stop Freq
1.84550000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent 14:40:23 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 0025
Mkr1 1.843508 GHz
-37.93 dBm
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Dl
-13.0
dBm
V1 S2
S3 FC
AA
Center 1.844 GHz
Span 1 MHz
#Res BW 1 MHz
VBW 1 MHz
Sweep 10.49 ms (1050 pts)
Freq/Channel
Center Freq
1.84400000 GHz
Start Freq
1.84350000 GHz
Stop Freq
1.84450000 GHz
CF Step
100.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent 14:46:42 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
V1 S2
S3 FC
AA
Center 1.909 GHz
Span 10 MHz
#Res BW 3 MHz
VBW 3 MHz
Sweep 5 ms (401 pts)
Freq/Channel
Center Freq
1.90900000 GHz
Start Freq
1.90400000 GHz
Stop Freq
1.91400000 GHz
CF Step
1.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent 14:50:44 Jul 24, 2000
FCC ID:CKLHGP-3100E BAND EDGE PCS Ch 1175
Ref 25.7 dBm
Atten 15 dB
Samp
Log
10
dB/
Offst
0.8
dB
Center 1.909 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 300 kHz
Sweep 9.167 ms (401 pts)
Occupied Bandwidth Results (idle)
Occupied Bandwidth
1.250 MHz
Occ BW % Pwr 99.00 %
Transmit Freq Error 8.964 kHz
Freq/Channel
Center Freq
1.90875300 GHz
Start Freq
1.90725300 GHz
Stop Freq
1.91025300 GHz
CF Step
300.000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off