# CERTIFICATE OF COMPLIANCE
# FCC PART 22 CERTIFICATION

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**Applicant:**

**VACOM WIRELESS INC.**
Yungchang Bldg. 5F, 250, Cheolsan3-Dong
Gwangmyung City, Gyunggi-Do, Korea
Attn: Mr. Peter Na
Principal Engineer of H/W Team

| | |
|---|---|
| **FCC Classification:** | **Licensed Non-Broadcast Transmitter Held to Ear (TNE)** |
| **FCC Rule Part(s):** | **§22(H), §22.901(d), §2** |
| **FCC ID:** | **PAPVC-1** |
| **Model(s):** | **VC-1** |
| **Equipment Type:** | **Dual-Mode AMPS/CDMA Cellular Phone** |
| **Tx Frequency Range:** | **824.04 - 848.97 MHz (AMPS)** |
| | **824.70 - 848.31 MHz (CDMA)** |
| **Rx Frequency Range:** | **869.04 - 893.97 MHz (AMPS)** |
| | **869.70 - 893.31 MHz (CDMA)** |
| **Max. RF Output Power:** | **0.210 Watts ERP (AMPS)** |
| | **0.120 Watts ERP (CDMA)** |
| **Frequency Tolerance:** | **2.5 PPM** |
| **Emission Designator(s):** | **40K0F8W, 40K0F1D, 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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# TABLE OF CONTENTS

| | | |
|---|---|---|
| 1.1 | GENERAL INFORMATION | 1 |
| 2.1 | MEASUREMENT PROCEDURES | 2 |
| | Transmitter Audio Frequency Response (2.1047) | 2 |
| | Audio Low Pass Filter Frequency Response (22.915) | 2 |
| | Modulation Limiting (2.1047, 22.915) | 2 |
| | Occupied Bandwidth (2.1049) | 3 |
| | Spurious/Harmonic Emissions at Antenna Terminal (2.1051) | 3 |
| | Radiated Spurious & Harmonic Emissions (2.1053) | 3 |
| | Frequency Stability/Temperature Variation (2.1055) | 4 |
| 3.1 | TEST DATA | 5 |
| | Modulation Characteristics | 5-7 |
| | Effective Radiated Power Output | 8-9 |
| | Field Strength of Spurious Radiation | 10-15 |
| | Frequency Stability | 16-17 |
| 4.1 | SAMPLE CALCULATIONS | 18 |
| 5.1 | LIST OF TEST EQUIPMENT | 19 |
| 6.1 | CONCLUSION | 20 |

| | |
|---|---|
| ATTACHMENT A: | COVER LETTER(S) |
| ATTACHMENT B: | ATTESTATION STATEMENT(S) |
| ATTACHMENT C: | TEST REPORT |
| ATTACHMENT D: | TEST PLOTS |
| ATTACHMENT E: | FCC ID LABEL & LOCATION |
| ATTACHMENT F: | TEST SETUP PHOTOGRAPHS |
| ATTACHMENT G: | EXTERNAL EUT PHOTOGRAPHS |
| ATTACHMENT H: | INTERNAL EUT PHOTOGRAPHS |
| ATTACHMENT I: | BLOCK DIAGRAM(S) |
| ATTACHMENT J: | CIRCUIT DIAGRAMS / DESCRIPTION |
| ATTACHMENT K: | PARTS LIST / TUNE UP PROCEDURE |
| ATTACHMENT L: | OPERATIONAL DESCRIPTION |
| ATTACHMENT M: | USER'S MANUAL / RF EXPOSURE WARNING |
| ATTACHMENT N: | SAR MEASUREMENT REPORT |

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# MEASUREMENT REPORT - FCC PART 22

## *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:**

**VACOM WIRELESS INC.**
**Yungchang Bldg. 5F, 250, Cheolsan3-Dong**
**Gwangmyung City, Gyunggi-Do, Korea**
**Attn: Mr. Peter Na – Principal Engineer of H/W Team**

| | |
|---|---|
| **FCC ID** | **PAPVC-1** |
| **Model(s)** | **VC-1** |
| **EUT Type** | **Dual-Mode AMPS/CDMA Cellular Phone** |
| **Classification** | **Licensed Non-Broadcast Transmitter Held to Ear (TNE)** |
| **Rule Part(s)** | **§22(H) , §22.901(d), §2** |
| **Max. RF Output Power** | **0.210 Watts ERP (AMPS)**<br>**0.120 Watts ERP (CDMA)** |
| **Tx Freq. Range** | **824.04 - 848.97 MHz (AMPS)**<br>**824.70 - 848.31 MHz (CDMA)** |
| **Rx Freq. Range** | **869.04 - 893.97 MHz (AMPS)**<br>**869.70 - 893.31 MHz (CDMA)** |
| **Emission Designator(s)** | **40K0F8W, 40K0F1D, 1M25F9W** |
| **Modulation(s)** | **AMPS / CDMA** |
| **Battery Type(s)** | **3.6V Li-ion Standard** |

## 2.1 MEASUREMENT PROCEDURES

### 2.2 TRANSMITTER AUDIO FREQUENCY RESPONSE - §2.1047(a)

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.

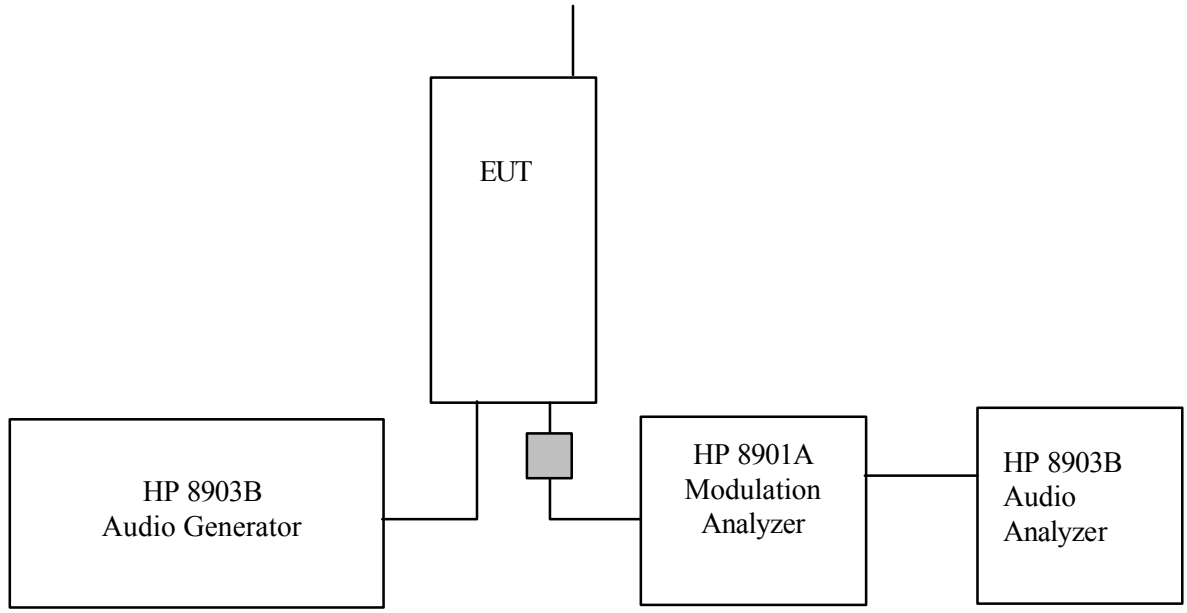
### 2.3 AUDIO LOW PASS FILTER FREQUENCY RESPONSE - §22.915(d)

The response in dB relative to 1kHz is measured using the HP8901 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.

### 2.4 MODULATION LIMITING - §2.1047(b) & §22.915(b)

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.

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




Transmitter Audio Frequency & Tone Modulation Test Setup

### *2.5 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 is 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 is 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 is 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 is at least 60dB below the carrier of 40 + $\log_{10}$ (mean power output in Watts) dB, whichever is the smaller attenuation.

### *2.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL - §2.1051*

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 10MHz to 20GHz. The transmitter is modulated with a 2500Hz tone at a level of 16dB greater than that required to provided 50% modulation. 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.

### *2.7 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053*

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

## *2.5 FREQUENCY STABILITY/TEMPERATURE VARIATION - §2.1055*

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. The EUT is tested down to the battery endpoint.

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

Time Period and Procedure:

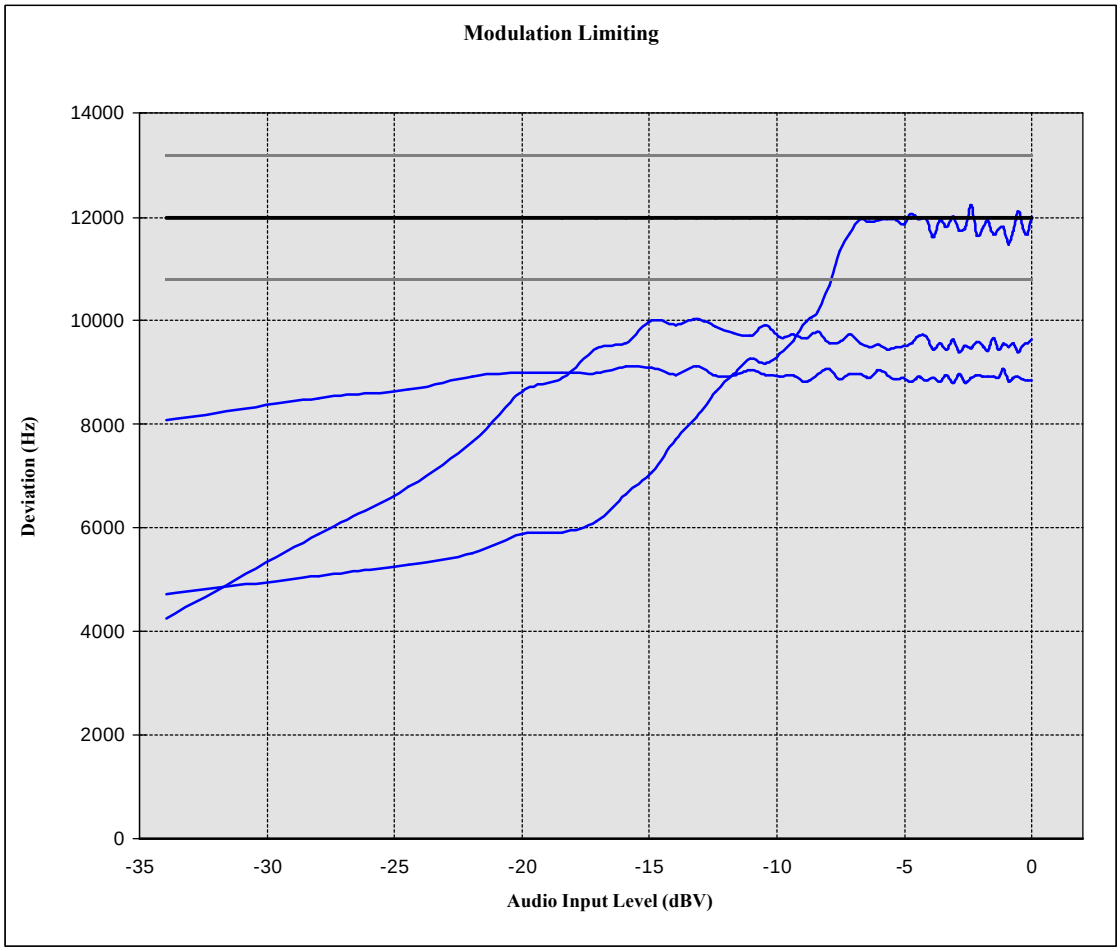
1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment is subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C (usually 14-16 hours), the 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 were made at 10°C intervals up to +60°C, then back to room temperature. A minimum period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.

## *3.1 TEST DATA*

### *3.2 MODULATION LIMITING - §2.1047(b) & §22.915(b)*

Test Date: 10/10/00
EUT: VACOM Dual-Mode AMPS/CDMA Cellular Phone
Model: VC-1
FCC ID: PAPVC-1

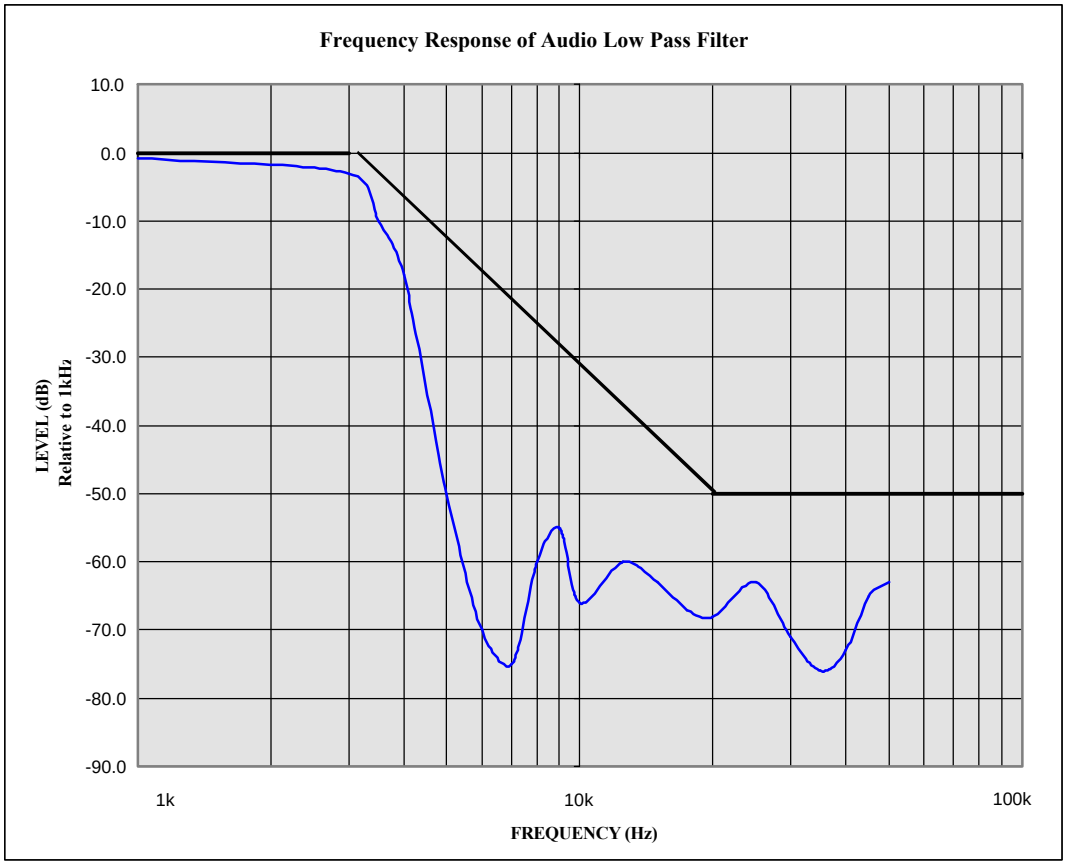
REFERENCE: 1 kHz = 0 dB



### *3.3 FREQUENCY RESPONSE OF LOW PASS FILTER - §22.915(d)*

Test Date: 10/10/00
EUT: VACOM Dual-Mode AMPS/CDMA Cellular Phone
Model: VC-1
FCC ID: PAPVC-1

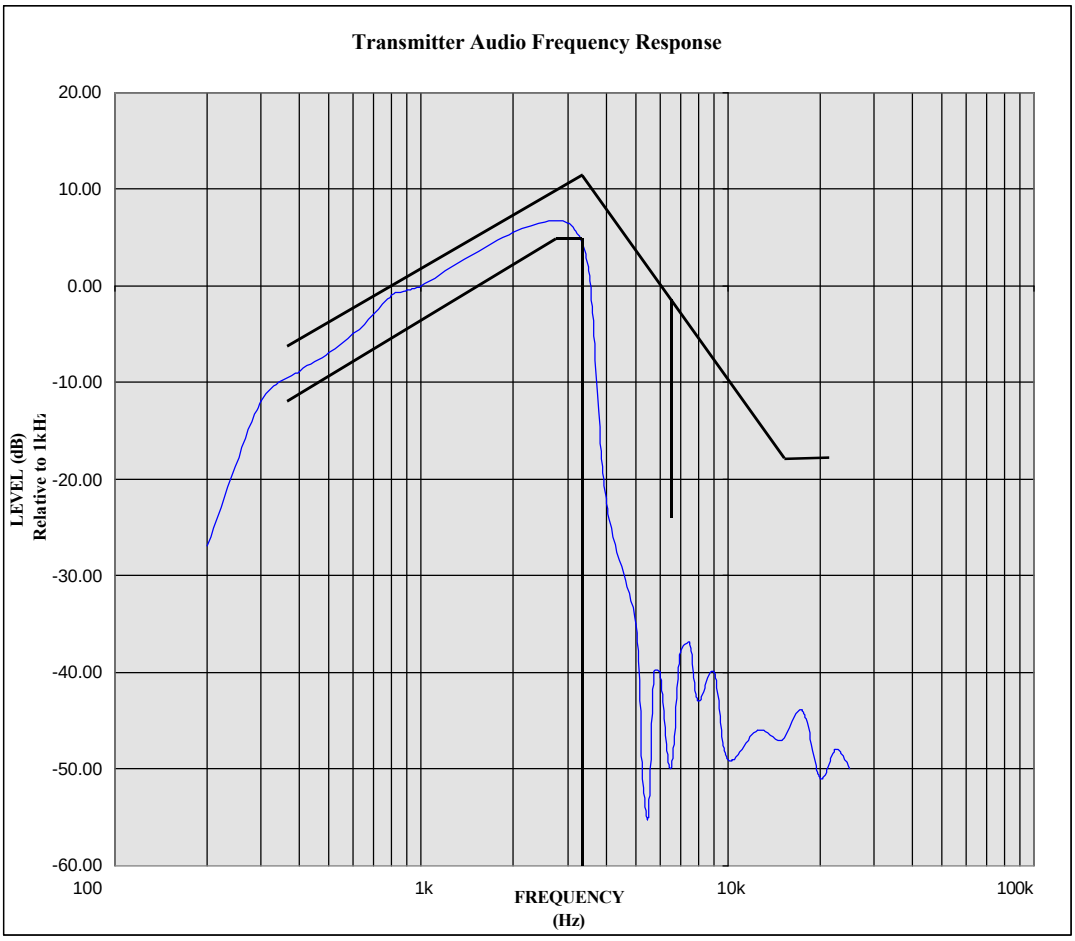
REFERENCE: 1 kHz = 0 dB



### *3.4 TRANSMITTER AUDIO FREQUENCY RESPONSE - §2.1047(a)*

Test Date: 10/10/00
EUT: VACOM Dual-Mode AMPS/CDMA Cellular Phone
Model: VC-1
FCC ID: PAPVC-1

REFERENCE: 1 kHz = 0 dB



### *3.5 EFFECTIVE RADIATED POWER OUTPUT - §2.1046*

**AMPS MODE**

| Frequency Tuned | EUT Conducted Power | Max. Field Strength of EUT (antenna extended) (dBm) | | Dipole Gain | Dipole Forward Conducted Power | ERP of EUT Dipole Gain + Dipole Forward Conducted Power | |
|---|---|---|---|---|---|---|---|
| (MHz) | (dBm) | V | H | (dBd) | (dBm) | (dBm) | (Watts) |
| 824.04 | 26.5 | - 12.88 | - 10.28 | - 1.44 | 23.48 | 22.04 | 0.160 |
| 836.49 | 25.5 | - 13.43 | - 10.83 | - 1.34 | 23.63 | 22.29 | 0.169 |
| 848.97 | 25.5 | - 12.56 | - 9.96 | - 1.24 | 24.44 | 23.20 | 0.210 |

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 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, which is the only battery option for this handset.

## CDMA MODE

| Frequency Tuned | EUT Conducted Power | Max. Field Strength of EUT (antenna extended) (dBm) | | Dipole Gain | Dipole Forward Conducted Power | ERP of EUT Dipole Gain + Dipole Forward Conducted Power | |
|---|---|---|---|---|---|---|---|
| (MHz) | (dBm) | V | H | (dBd) | (dBm) | (dBm) | (Watts) |
| 824.70 | 24.0 | - 14.38 | - 11.78 | - 1.44 | 21.98 | 20.54 | 0.113 |
| 835.89 | 24.0 | - 14.97 | - 12.37 | - 1.34 | 22.06 | 20.72 | 0.118 |
| 848.31 | 24.0 | - 14.95 | - 12.35 | - 1.24 | 22.05 | 20.81 | 0.120 |

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, which is the only battery option for this handset.

### *3.6 FIELD STRENGTH OF SPURIOUS RADIATION – §2.1053*

**AMPS MODE**

| | |
|---|---|
| Operating Frequency: | 824.04 MHz |
| Channel: | 991 (Low) |
| Measured Conducted Power: | 26.5 dBm |
| Modulation: | ST (Signaling Tone) |
| Distance: | 3 meters |
| Limit: | 43 + 10 $\log_{10}$ (W) = 40.31 dBc |

| Frequency (MHz) | Level (dBm) | AFCL (dB) | POL (H/V) | ERP (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1648.08 | ≤ - 63.1 | 30.55 | H | - 20.43 | 42.47 |
| 2472.12 | ≤ - 64.8 | 34.22 | H | - 18.46 | 40.50 |
| 3296.16 | ≤ - 66.4 | 37.15 | H | - 17.13 | 39.17 |
| 4120.20 | ≤ - 68.9 | 40.22 | H | - 16.56 | 38.60 |
| 4944.24 | < - 100 | | | | |

Notes:
1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula.
   ERP (dBm) = 10 $\text{Log}_{10}$ (((r(mV/m)/1 x $10^6)^2$ / 49.2/1 x $10^{-3}$)
   ERP (dBm) = 10 $\text{Log}_{10}$ [ (3 x FS/1 x $10^6)^2$ / (49.2) x 1000]
   ERP (Watts) = {(3 x FS)/1 x $10^6\}^2$ / 49.2
   Note: The antenna factor and cable loss were determined prior to the test.

## AMPS MODE

| | |
|---|---|
| Operating Frequency: | 836.49 MHz |
| Channel: | 383 (Mid) |
| Measured Conducted Power: | 25.5 dBm |
| Modulation: | ST (Signaling Tone) |
| Distance: | 3 meters |
| Limit: | 43 + 10 $\log_{10}$ (W) = 40.31 dBc |

| **Frequency** (MHz) | **Level** (dBm) | **AFCL** (dB) | **POL** (H/V) | **ERP** (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1672.98 | ≤ - 65.8 | 30.25 | H | - 23.43 | 45.72 |
| 2509.97 | ≤ - 68.3 | 34.01 | H | - 22.17 | 44.46 |
| 3345.96 | ≤ - 69.8 | 36.98 | H | - 20.70 | 42.99 |
| 4182.45 | ≤ - 71.4 | 39.89 | H | - 19.39 | 41.68 |
| 5018.94 | < - 100 | | | | |

Notes:
1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula.
   ERP (dBm) = 10 $\text{Log}_{10}$ (((r(mV/m)/1 x $10^6)^2$ / 49.2/1 x $10^{-3}$)
   ERP (dBm) = 10 $\text{Log}_{10}$ [ (3 x FS/1 x $10^6)^2$ / (49.2) x 1000]
   ERP (Watts) = {(3 x FS)/1 x $10^6\}^2$ / 49.2
   Note: The antenna factor and cable loss were determined prior to the test.

## AMPS MODE

Operating Frequency: 848.97 MHz
Channel: 799 (High)
Measured Conducted Power: 25.5 dBm
Modulation: ST (Signaling Tone)
Distance: 3 meters
Limit: $43 + 10 \log_{10} (W) = 40.31$ dBc

| Frequency (MHz) | Level (dBm) | AFCL (dB) | POL (H/V) | ERP (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1697.94 | ≤ - 66.5 | 30.12 | H | - 24.26 | 47.46 |
| 2546.91 | ≤ - 70.3 | 33.88 | H | - 24.30 | 47.50 |
| 3395.88 | ≤ - 72.9 | 36.75 | H | - 24.03 | 47.23 |
| 4244.85 | ≤ - 74.6 | 39.68 | H | - 22.80 | 46.00 |
| 5093.82 | < - 100 | | | | |

Notes:
1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula.
   ERP (dBm) $= 10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3})$
   ERP (dBm) $= 10 \text{ Log}_{10} [ (3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$
   ERP (Watts) $= \{(3 \times FS)/1 \times 10^6\}^2 / 49.2$
   Note: The antenna factor and cable loss were determined prior to the test.

**CDMA MODE**

| | |
|---|---|
| Operating Frequency: | 824.70 MHz |
| Channel: | 1013 (Low) |
| Measured Conducted Power: | 24.0 dBm |
| Modulation: | CDMA (Internal) |
| Distance: | 3 meters |
| Limit: | 43 + 10 $\log_{10}$ (W) = 37.48 dBc |

| Frequency (MHz) | Level (dBm) | AFCL (dB) | POL (H/V) | ERP (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1649.40 | ≤ - 63.8 | 30.55 | H | - 21.13 | 41.67 |
| 2474.10 | ≤ - 65.2 | 34.22 | H | - 18.86 | 39.40 |
| 3298.80 | ≤ - 66.6 | 37.15 | H | - 17.33 | 37.87 |
| 4123.50 | ≤ - 67.9 | 40.22 | H | - 15.56 | 36.10 |
| 4948.20 | < - 100 | | | | |

Notes:

1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula.
   ERP (dBm) = 10 $\text{Log}_{10}$ $(((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3})$
   ERP (dBm) = 10 $\text{Log}_{10}$ $[ (3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$
   ERP (Watts) = $\{(3 \times FS)/1 \times 10^6\}^2 / 49.2$
   Note: The antenna factor and cable loss were determined prior to the test.

## CDMA MODE

| | |
|---|---|
| Operating Frequency: | 835.89 MHz |
| Channel: | 363 (Mid) |
| Measured Conducted Power: | 24.0 dBm |
| Modulation: | CDMA (Internal) |
| Distance: | 3 meters |
| Limit: | 43 + 10 $\log_{10}$ (W) = 37.48 dBc |

| **Frequency** (MHz) | **Level** (dBm) | **AFCL** (dB) | **POL** (H/V) | **ERP** (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1671.78 | ≤ - 65.1 | 30.25 | H | - 22.73 | 43.80 |
| 2507.67 | ≤ - 67.2 | 34.01 | H | - 21.07 | 41.79 |
| 3343.56 | ≤ - 71.7 | 36.98 | H | - 22.60 | 43.32 |
| 4179.45 | ≤ - 74.3 | 39.89 | H | - 22.29 | 43.01 |
| 5015.34 | < - 100 | | | | |

Notes:

1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula:
   ERP (dBm) = 10 $\text{Log}_{10}$ (((r(mV/m)/1 x $10^6)^2$ / 49.2/1 x $10^{-3}$)
   ERP (dBm) = 10 $\text{Log}_{10}$ [ (3 x FS/1 x $10^6)^2$ / (49.2) x 1000]
   ERP (Watts) = {(3 x FS)/1 x $10^6\}^2$ / 49.2
   Note: The antenna factor and cable loss were determined prior to the test.

## CDMA MODE

| | |
|---|---|
| Operating Frequency: | 848.31 MHz |
| Channel: | 777 (High) |
| Measured Conducted Power: | 24.0 dBm |
| Modulation: | CDMA (Internal) |
| Distance: | 3 meters |
| Limit: | 43 + 10 $\log_{10}$ (W) = 37.48 dBc |

| Frequency (MHz) | Level (dBm) | AFCL (dB) | POL (H/V) | ERP (dBm) | (dBc) |
|---|---|---|---|---|---|
| 1696.62 | ≤ - 68.8 | 30.12 | H | - 26.56 | 47.37 |
| 2544.93 | ≤ - 72.5 | 33.88 | H | - 26.50 | 47.31 |
| 3393.24 | ≤ - 74.6 | 36.75 | H | - 25.73 | 46.54 |
| 4241.55 | ≤ - 78.9 | 39.68 | H | - 27.10 | 47.91 |
| 5089.86 | < - 100 | | | | |

Notes:

1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
2. The spectrum was checked from 10 MHz up to 20GHz.
3. < -100dBm is below the floor of the spectrum analyzer.
4. The EUT is manipulated through 3 orthogonal axis and the worst-case emission are reported.
5. The EUT is placed 3.0 meters away from the receiving antenna and the ERP is calculated using the formula:
   ERP (dBm) = 10 $\text{Log}_{10}$ (((r(mV/m)/1 x $10^6)^2$ / 49.2/1 x $10^{-3}$)
   ERP (dBm) = 10 $\text{Log}_{10}$ [ (3 x FS/1 x $10^6)^2$ / (49.2) x 1000]
   ERP (Watts) = {(3 x FS)/1 x $10^6\}^2$ / 49.2
   Note: The antenna factor and cable loss were determined prior to the test.

### *3.7 FREQUENCY STABILITY - § 2.1055*

Operating Frequency: 836,490,000 Hz

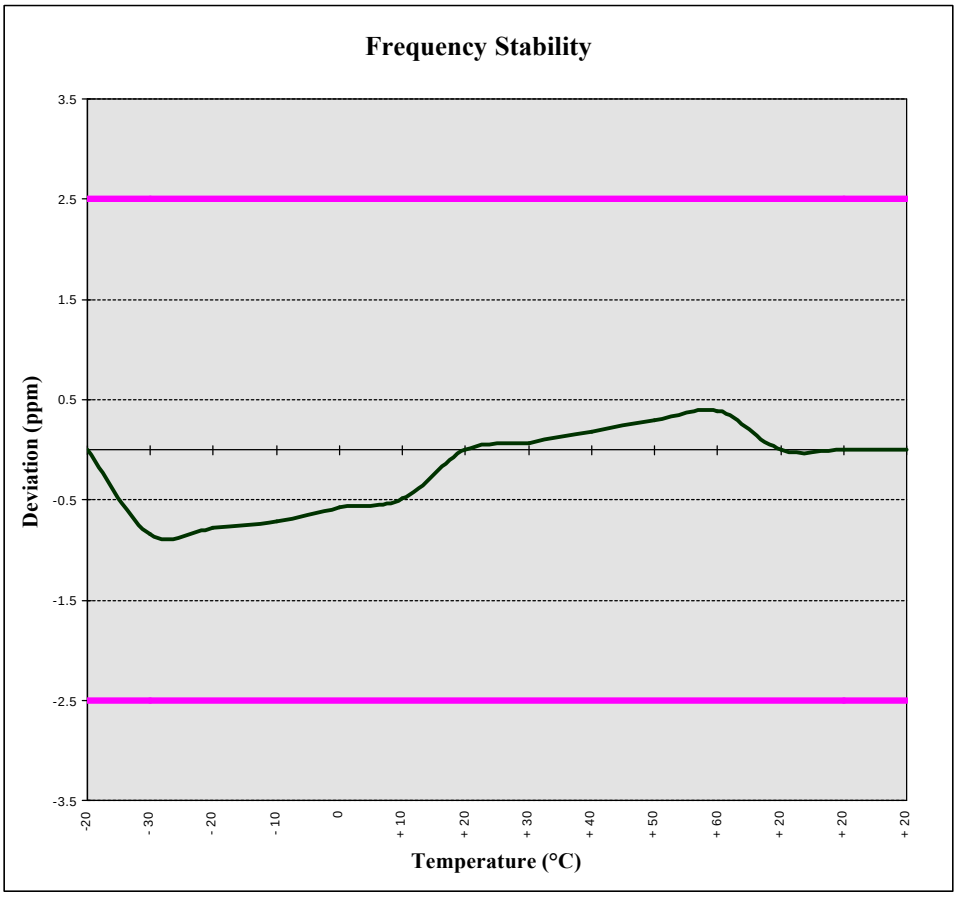
Channel: 383

Reference Voltage: 3.6 VDC

Deviation Limit: ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (ºC) | FREQ. (Hz) | Deviation (%) |
|---|---|---|---|---|
| 100 % | 3.60 | + 20 (Ref) | 836490000 | 0.00000000 |
| 100 % | | - 30 | 836490708 | -0.00000085 |
| 100 % | | - 20 | 836490653 | -0.00000078 |
| 100 % | | - 10 | 836490598 | -0.00000071 |
| 100 % | | 0 | 836490482 | -0.00000058 |
| 100 % | | + 10 | 836490408 | -0.00000049 |
| 100 % | | + 20 | 836489997 | 0.00000000 |
| 100 % | | + 30 | 836489939 | 0.00000007 |
| 100 % | | + 40 | 836489843 | 0.00000019 |
| 100 % | | + 50 | 836489756 | 0.00000029 |
| 100 % | | + 60 | 836489672 | 0.00000039 |
| 85 % | 3.06 | + 20 | 836490000 | 0.00000000 |
| 115 % | 4.14 | + 20 | 836490000 | 0.00000000 |
| BATT. ENDPOINT | 2.88 | + 20 | 836490000 | 0.00000000 |

***FREQUENCY STABILITY - § 2.1055***



## *4.1 SAMPLE CALULATIONS*

### *A. ERP*

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

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

1717908.4 µ/Vm @ 3 meters

Sample Calculation (relative to a dipole)

ERP (dBm) = 10 $\text{Log}_{10}$ $(((r(\mu V/m)1x10^6)^2/49.2/1x10^{-3})$

ERP (dBm) = 10 $\text{Log}_{10}$ $(((3(1717908.4)1x10^6)^2/49.2/1x10^{-3})$

ERP (dBm) = 28.95

### *B. EMISSION DESIGNATOR (§2.201)*

CDMA

2M + 2DK

CDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

Emission Designator = 1M25F9W

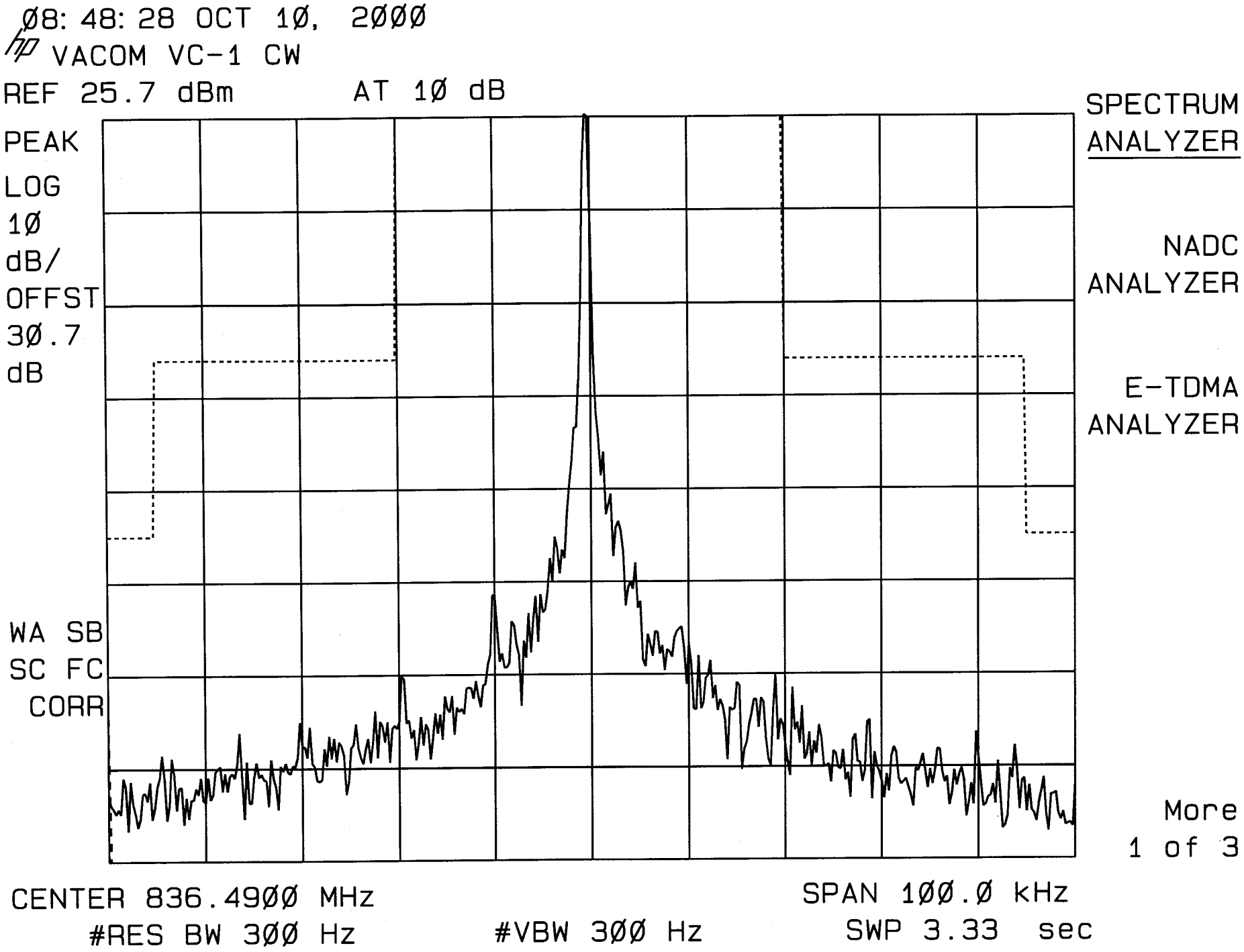
## *5.1 TEST EQUIPMENT*

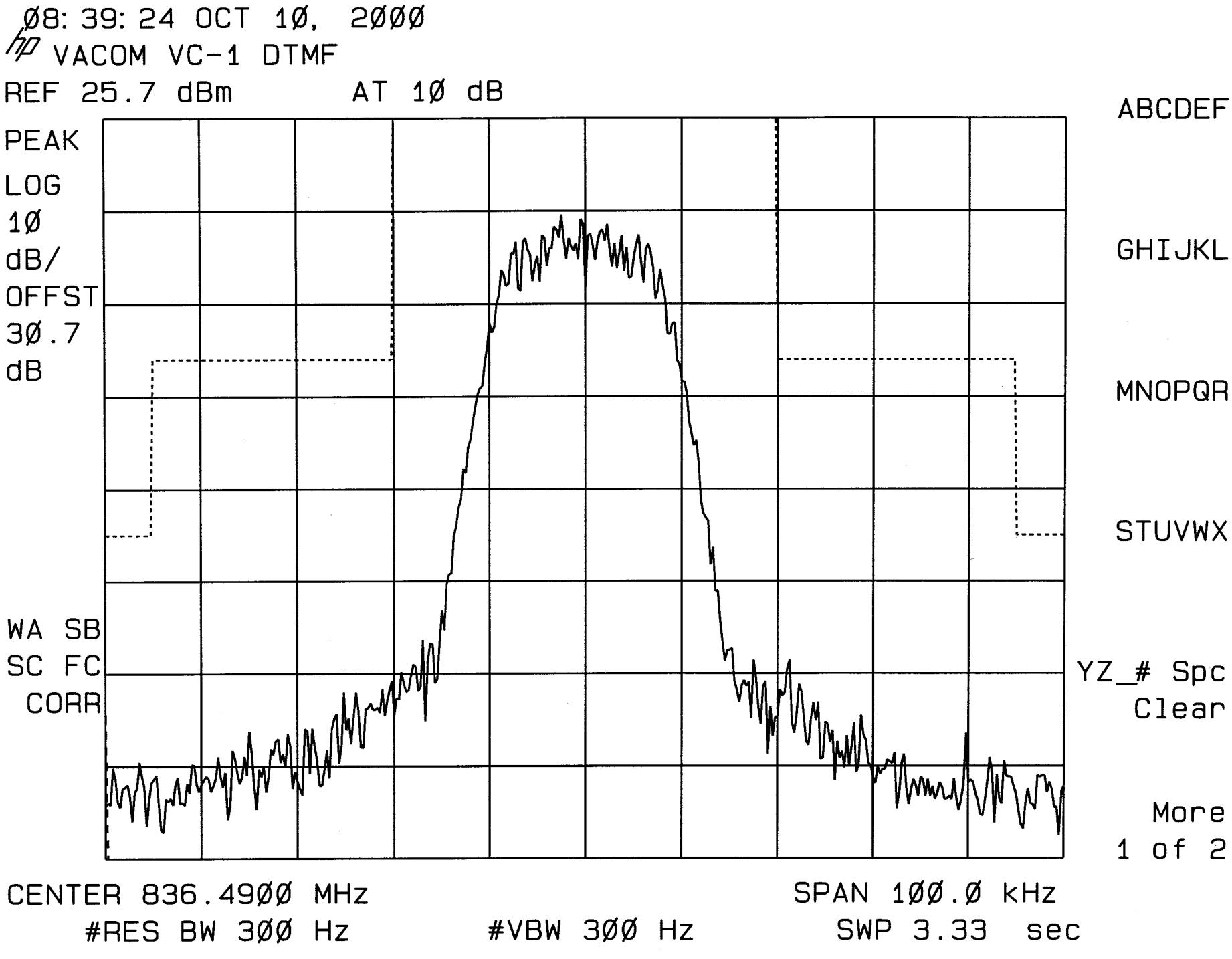
| Type | Model | Calib. Date | Serial No. |
|---|---|---|---|
| Signal Generator | HP 8648D (9kHz-4.0GHz) | Nov 1999 | 3847A00611 |
| Gigatronics Power Meter | 8652A | Oct 1999 | 1835272 |
| Gigatronics Power Sensor (2) | 80701A (0.05-18GHz) | Oct 1999 | 1833535, 1833542 |
| Amplifier Research Power 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 |
| 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 |
| 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 |

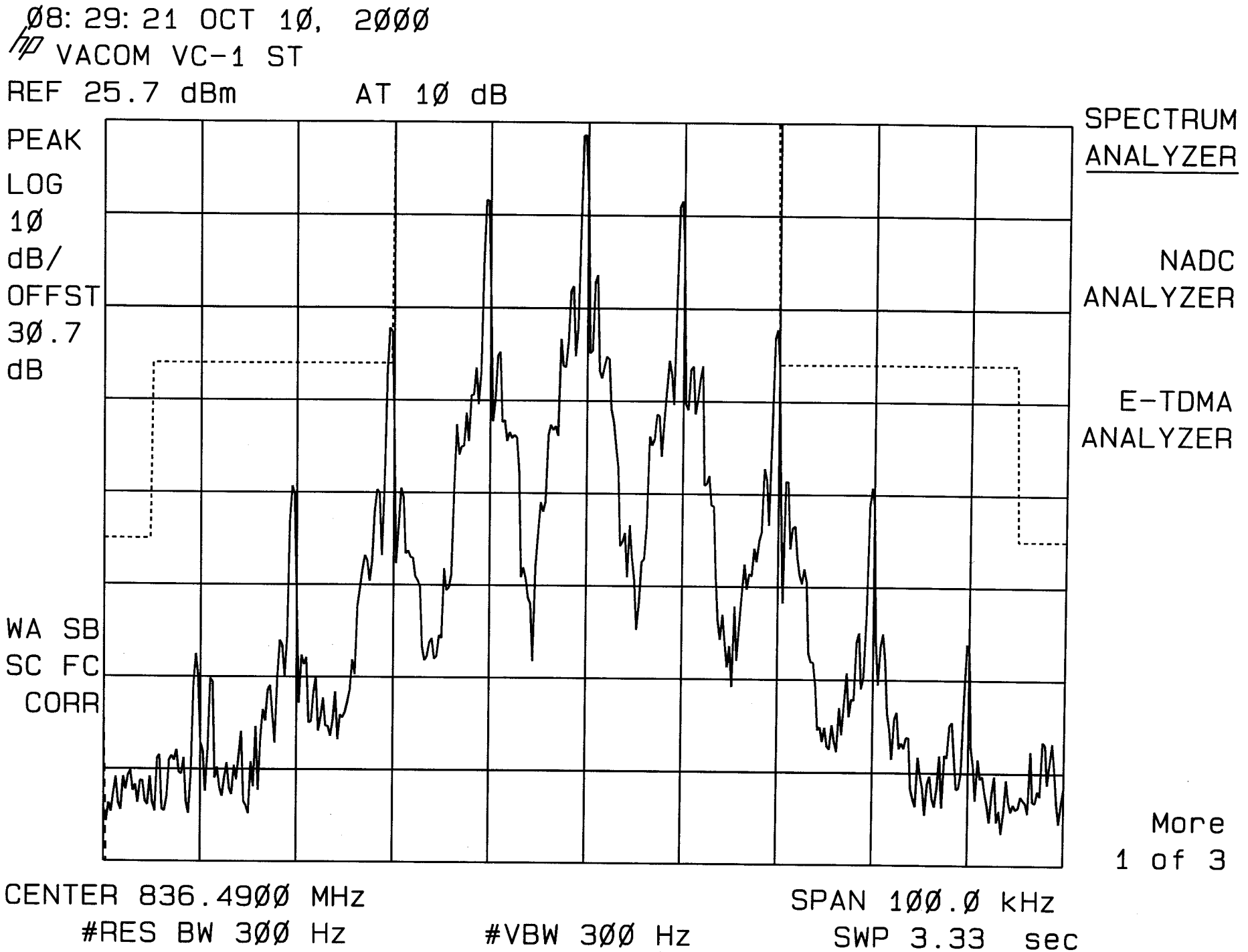
## *6.1 CONCLUSION*

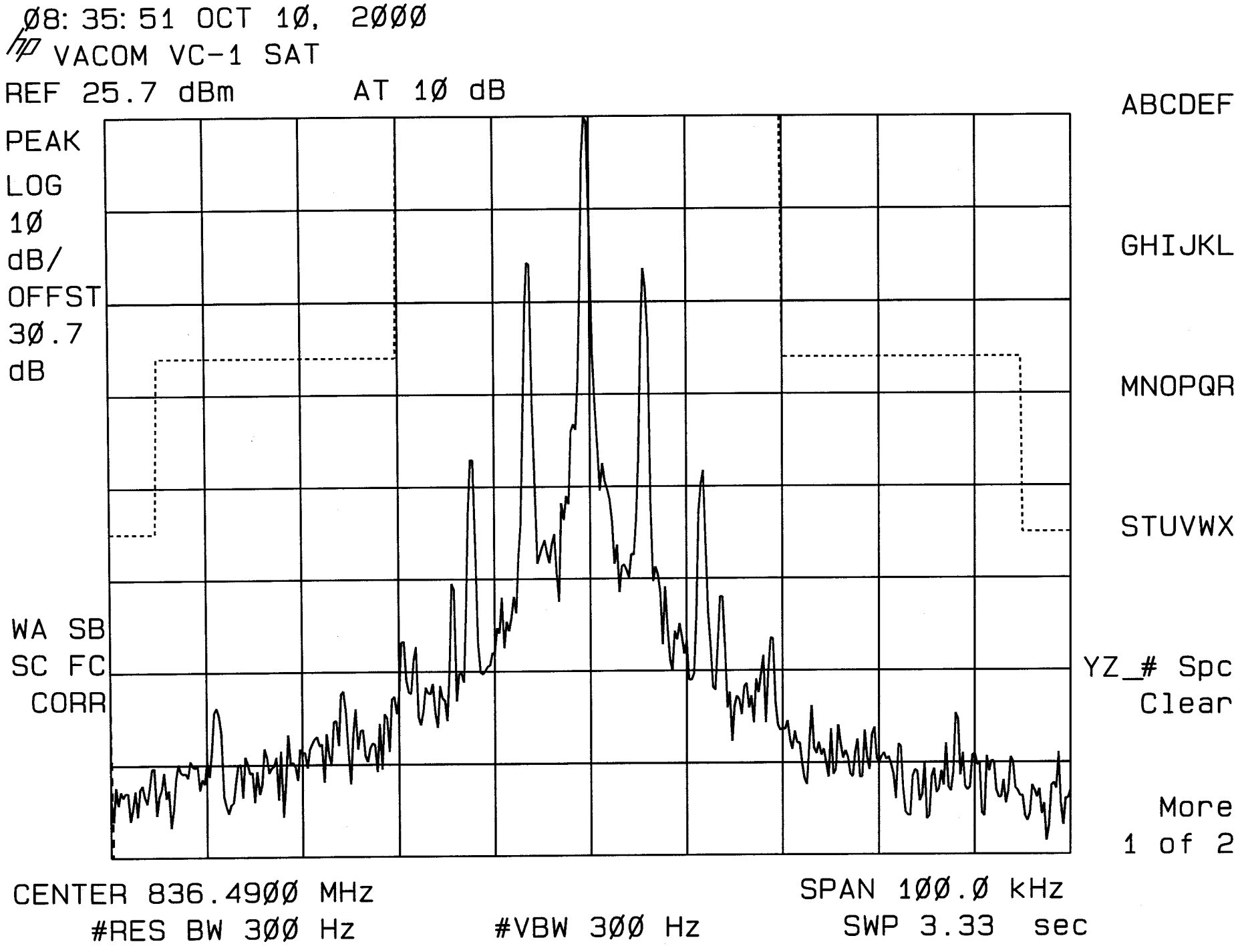
The data collected shows that the VACOM WIRELESS INC. Model: VC-1 Dual-Mode AMPS/CDMA Cellular Phone FCC ID: PAPVC-1 complies with all the requirements of Parts 2 and 22 of the FCC rules.

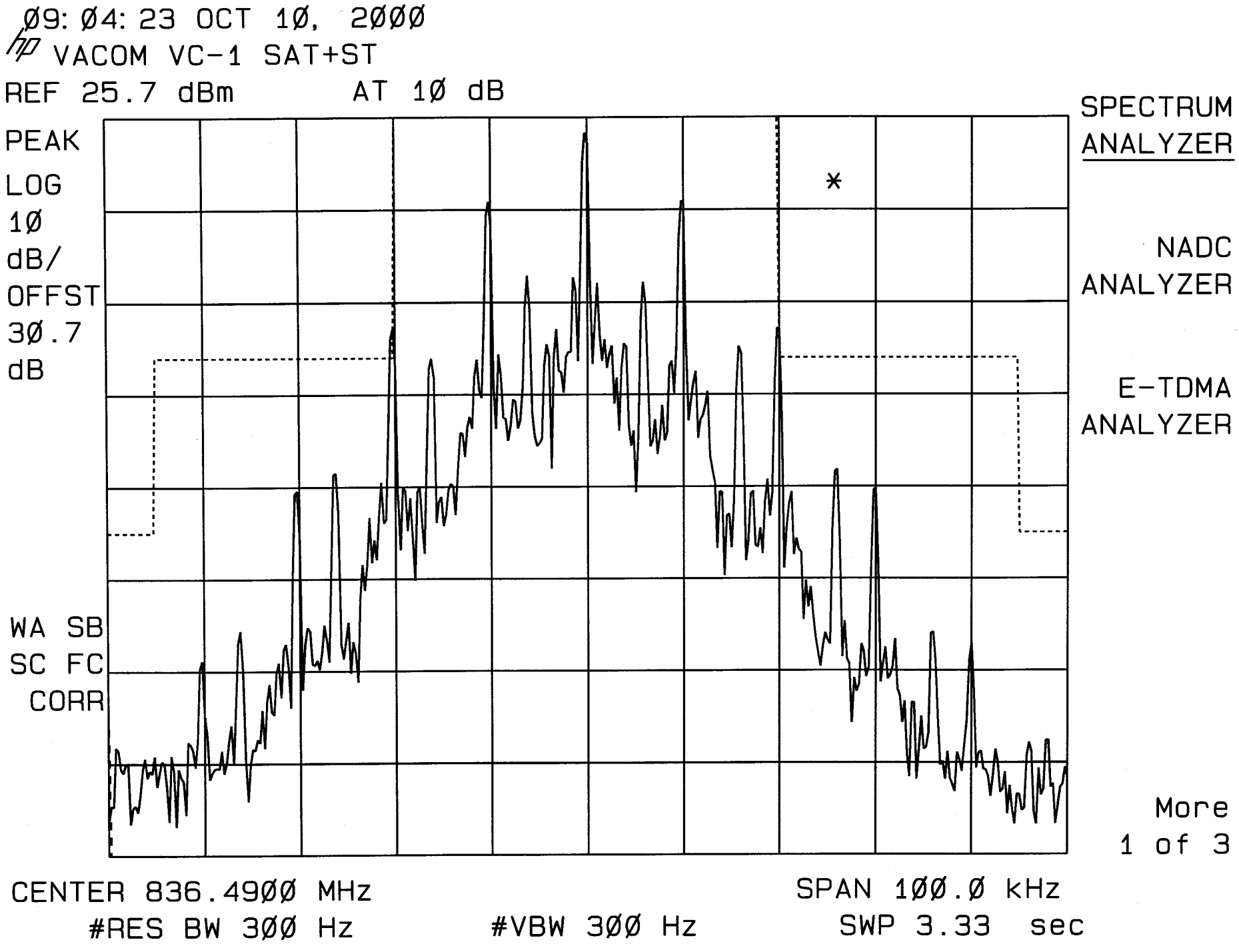
# TEST PLOTS

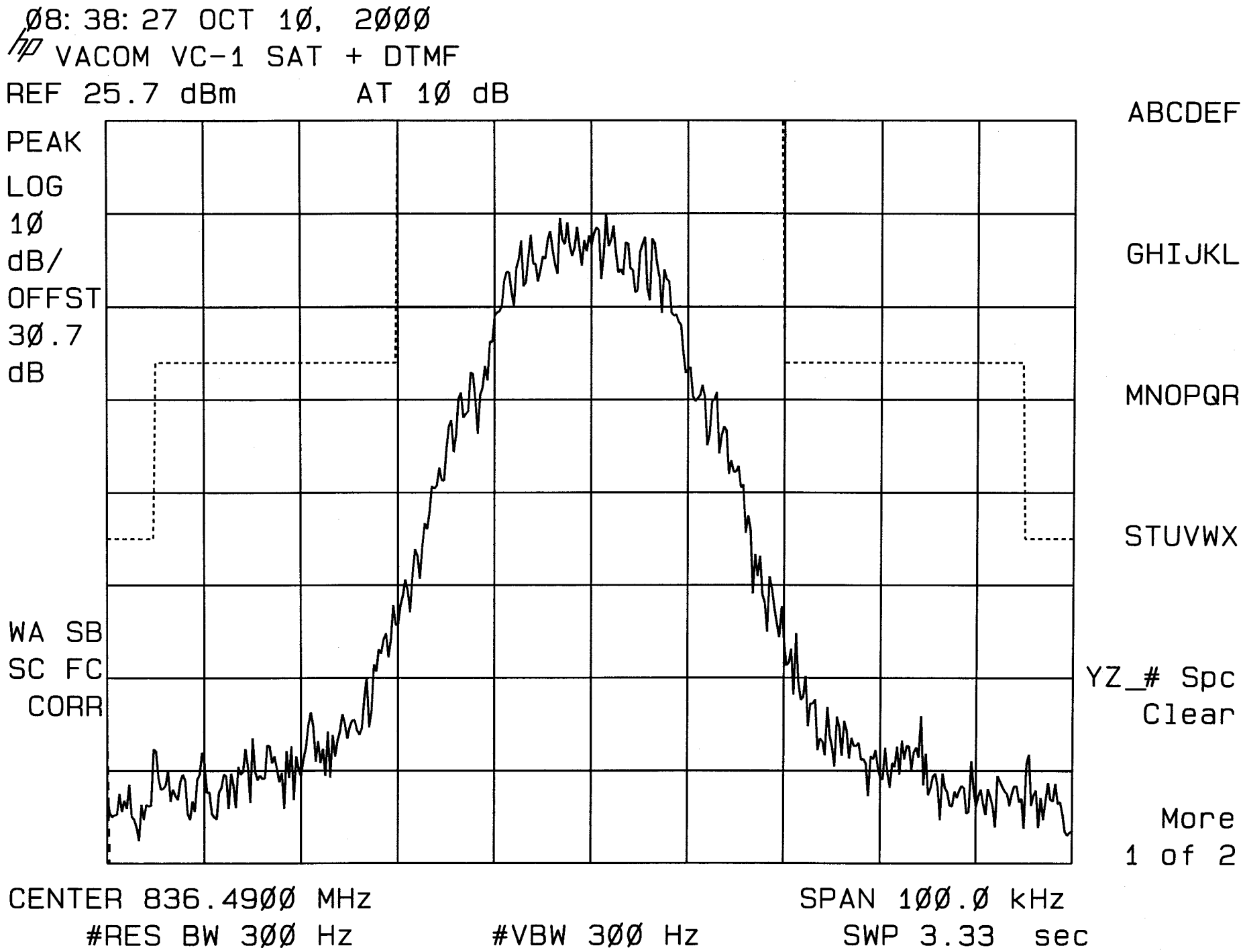

Ø8: 48: 28 OCT 1Ø, 2ØØØ
VACOM VC-1 CW
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
SPECTRUM
ANALYZER
NADC
ANALYZER
E-TDMA
ANALYZER
More
1 of 3
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec

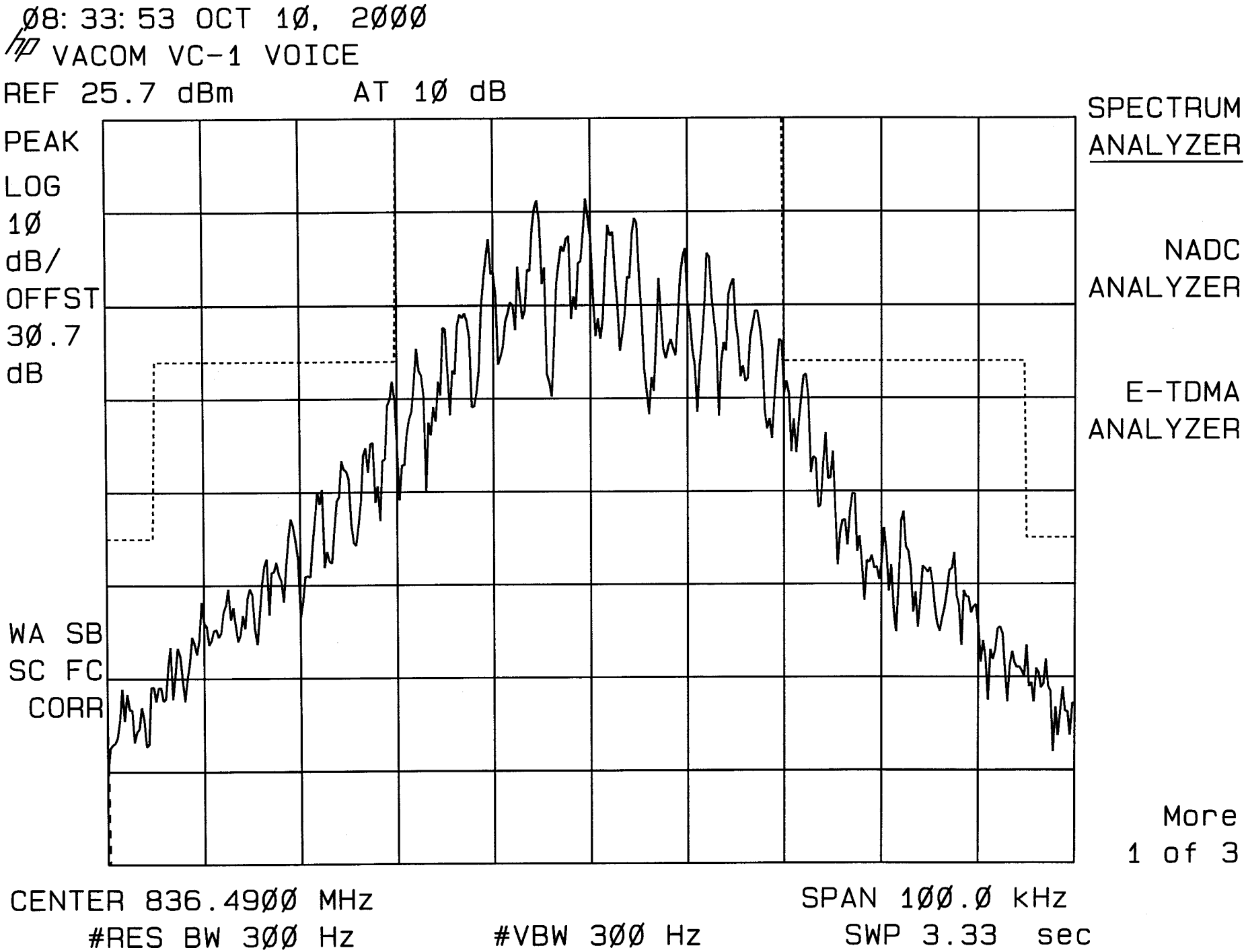

Ø8: 39: 24 OCT 1Ø, 2ØØØ
VACOM VC-1 DTMF
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
ABCDEF
GHIJKL
MNOPQR
STUVWX
YZ_# Spc
Clear
More
1 of 2
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec

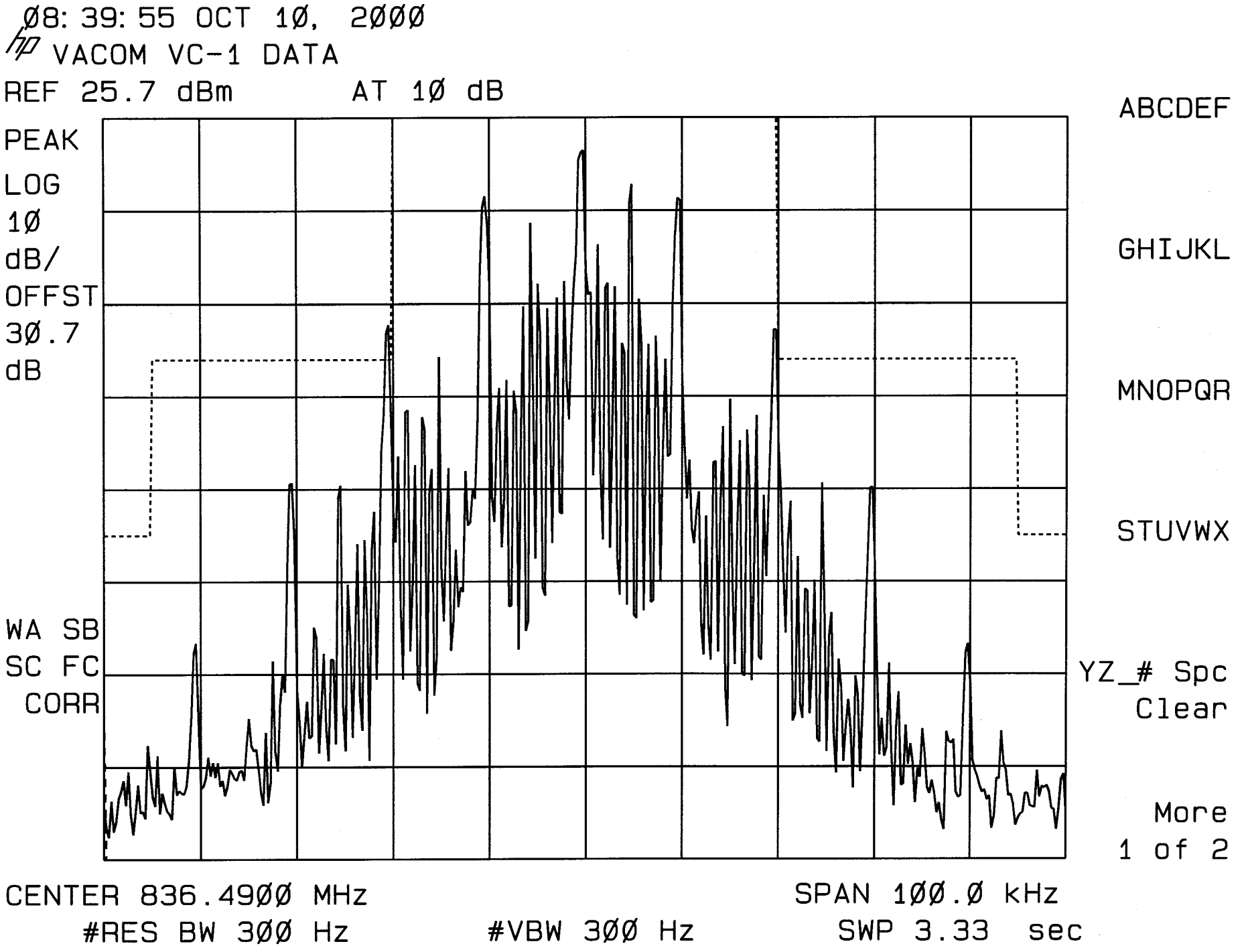

Ø8: 29: 21 OCT 1Ø, 2ØØØ
VACOM VC-1 ST
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
SPECTRUM
ANALYZER
NADC
ANALYZER
E-TDMA
ANALYZER
More
1 of 3
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec


Ø8: 35: 51 OCT 1Ø, 2ØØØ
VACOM VC-1 SAT
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
ABCDEF
GHIJKL
MNOPQR
STUVWX
YZ_# Spc
Clear
More
1 of 2
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec

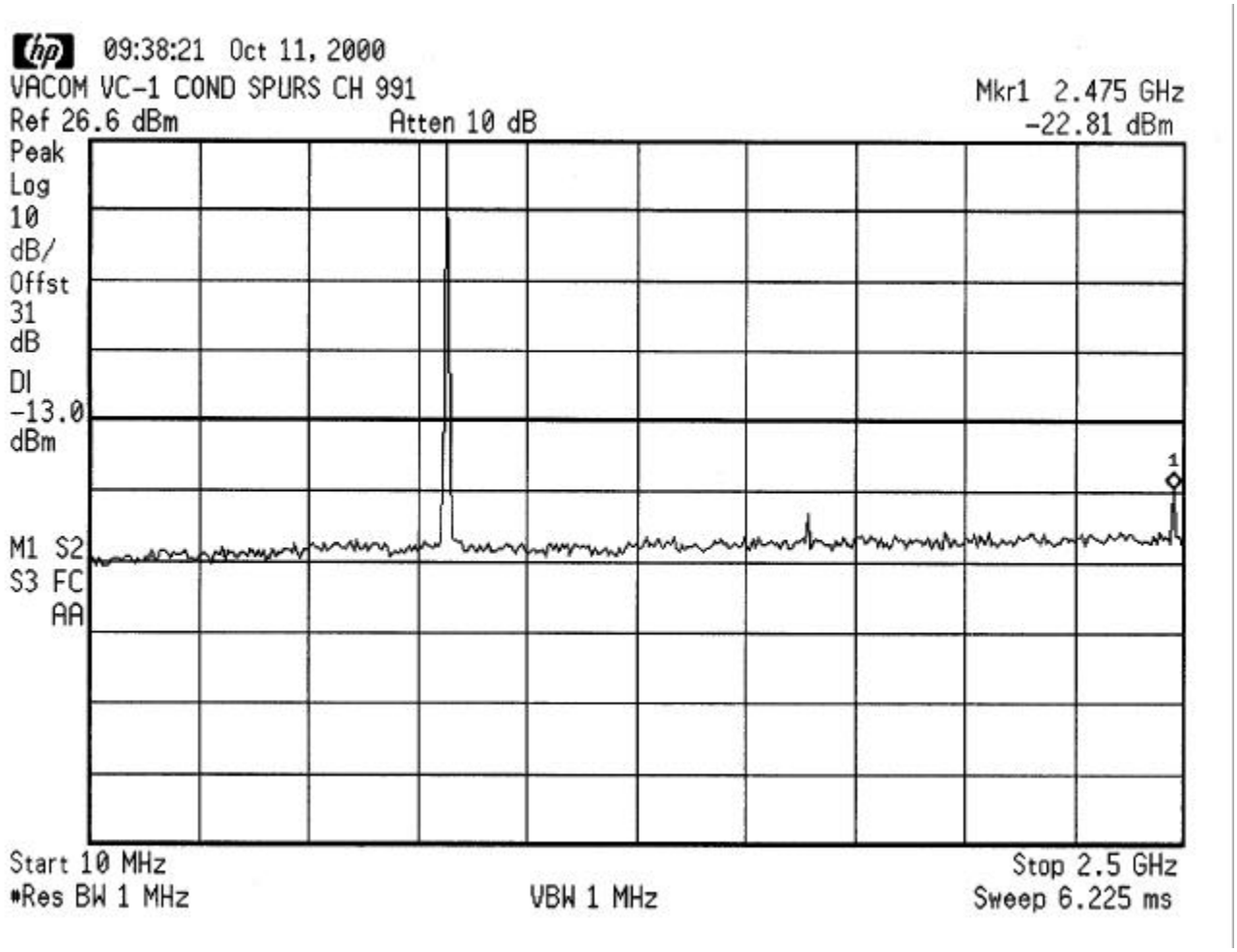

Ø9: Ø4: 23 OCT 1Ø, 2ØØØ
VACOM VC-1 SAT+ST
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
SPECTRUM
ANALYZER
NADC
ANALYZER
E-TDMA
ANALYZER
More
1 of 3
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec


Ø8: 38: 27 OCT 1Ø, 2ØØØ
VACOM VC-1 SAT + DTMF
REF 25.7 dBm
AT 1Ø dB
ABCDEF
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
GHIJKL
MNOPQR
STUVWX
WA SB
SC FC
CORR
YZ_# Spc
Clear
More
1 of 2
CENTER 836.49ØØ MHz
SPAN 1ØØ.Ø kHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SWP 3.33 sec

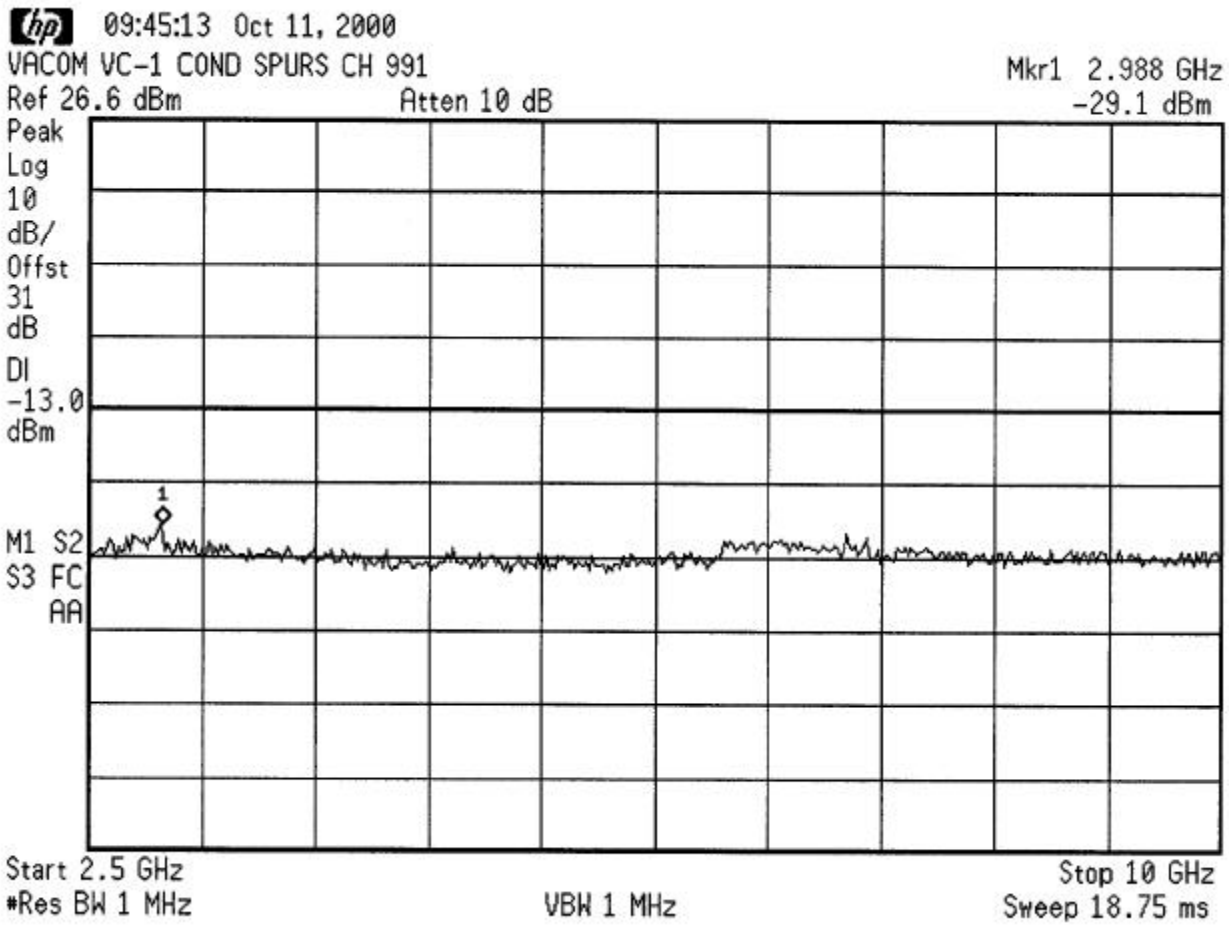

Ø8: 33: 53 OCT 1Ø, 2ØØØ
VACOM VC-1 VOICE
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
SPECTRUM
ANALYZER
NADC
ANALYZER
E-TDMA
ANALYZER
More
1 of 3
CENTER 836.49ØØ MHz
SPAN 1ØØ.Ø kHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SWP 3.33 sec


Ø8: 39: 55 OCT 1Ø, 2ØØØ
VACOM VC-1 DATA
REF 25.7 dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
OFFST
3Ø.7
dB
WA SB
SC FC
CORR
ABCDEF
GHIJKL
MNOPQR
STUVWX
YZ_# Spc
Clear
More
1 of 2
CENTER 836.49ØØ MHz
#RES BW 3ØØ Hz
#VBW 3ØØ Hz
SPAN 1ØØ.Ø kHz
SWP 3.33 sec

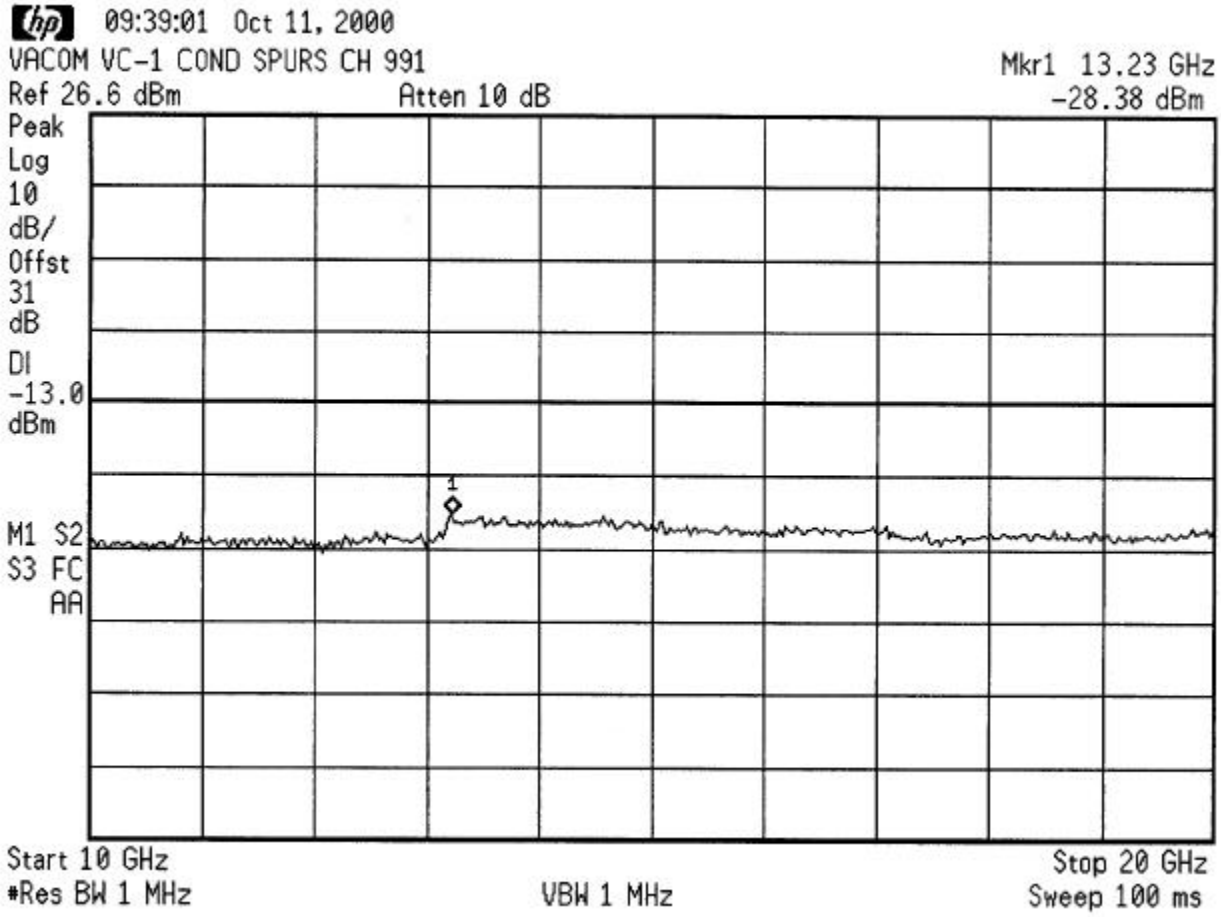
**CONDUCTED SPURIOUS**
**Channel 991**



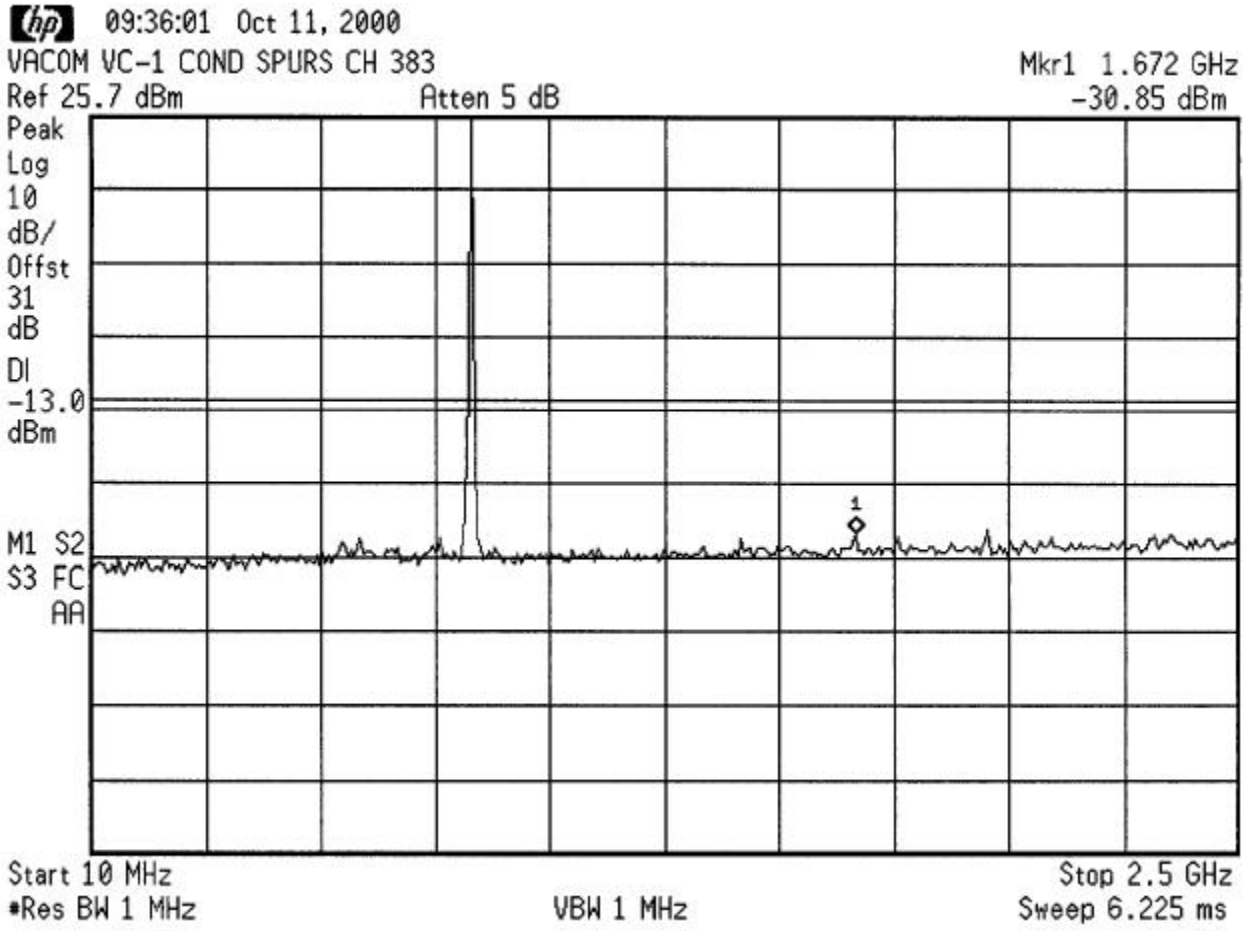
**CONDUCTED SPURIOUS**
**Channel 991**



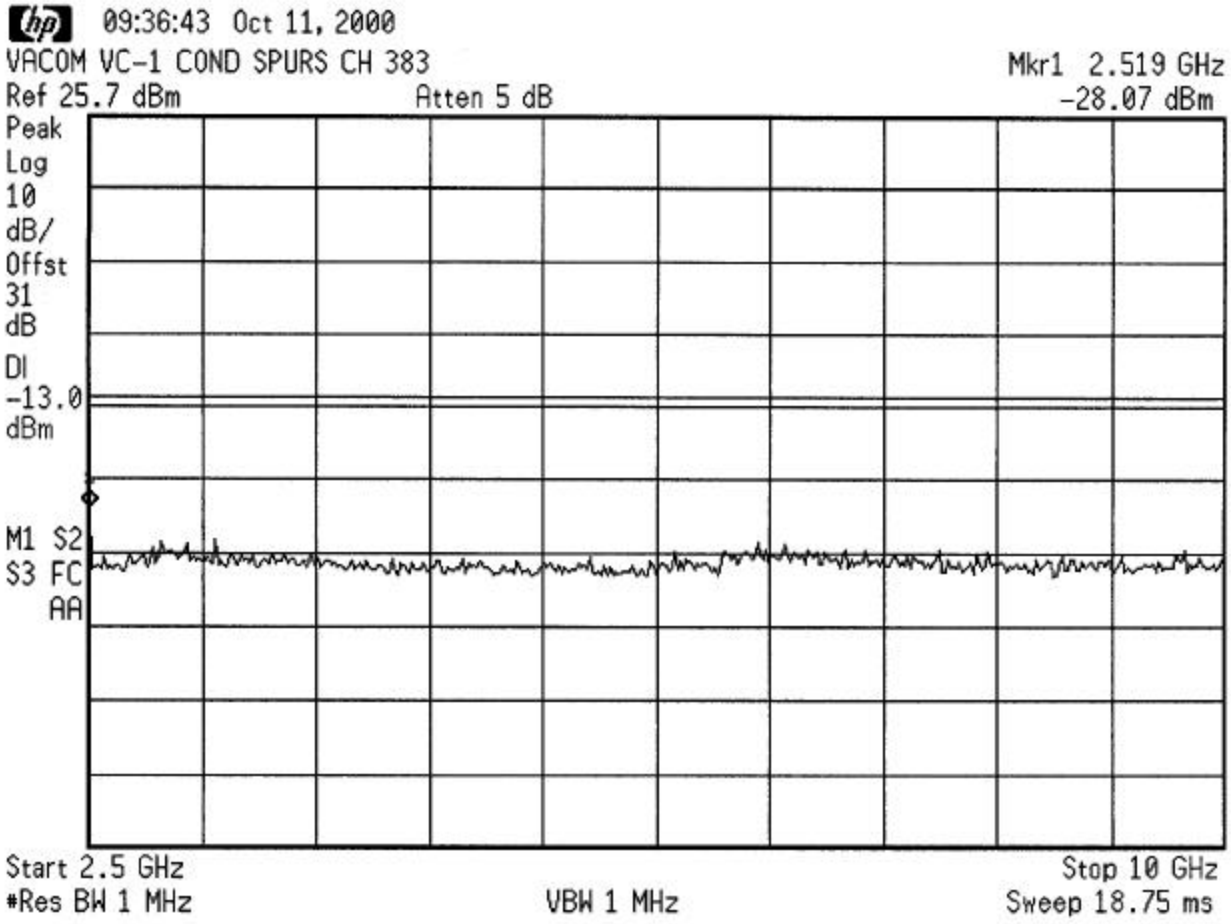
**CONDUCTED SPURIOUS**
**Channel 991**



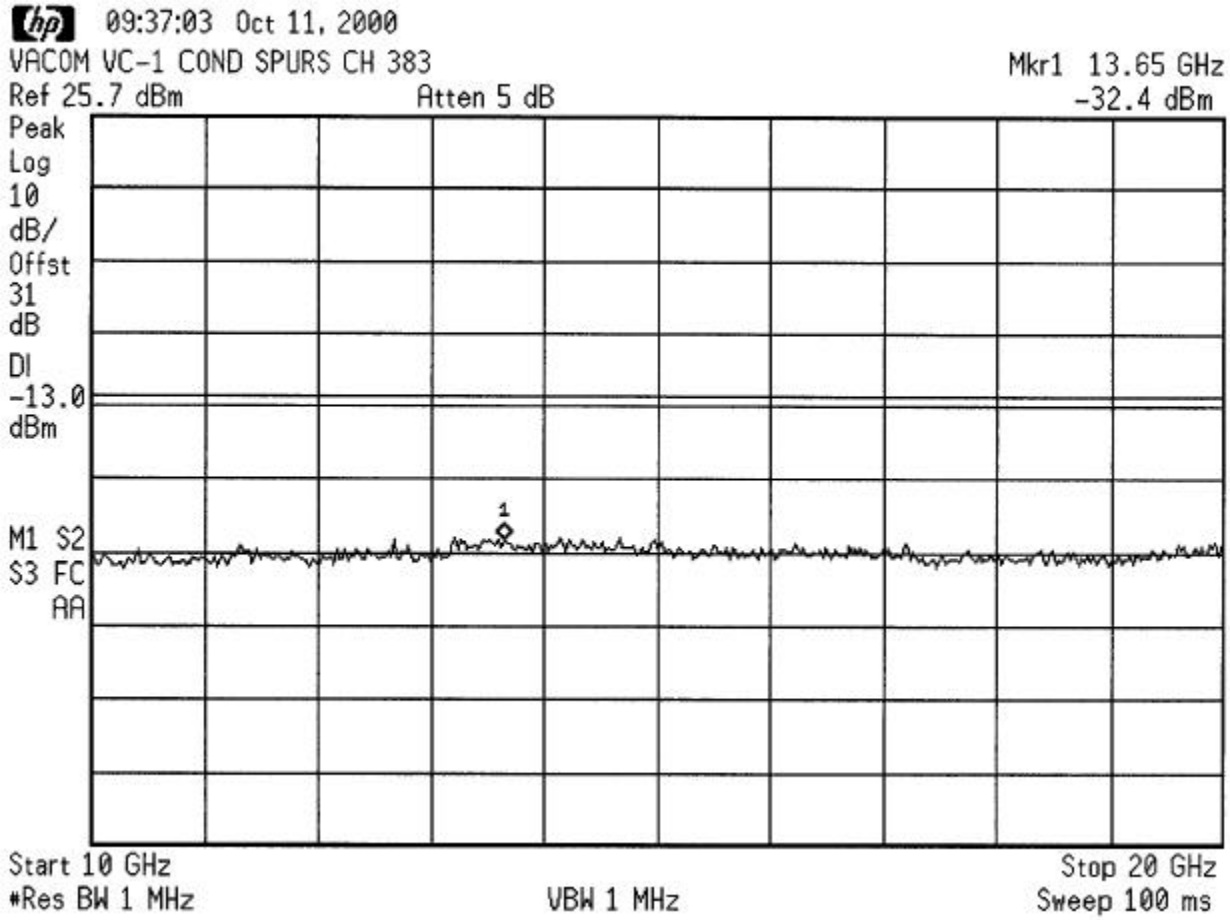
**CONDUCTED SPURIOUS**
**Channel 383**



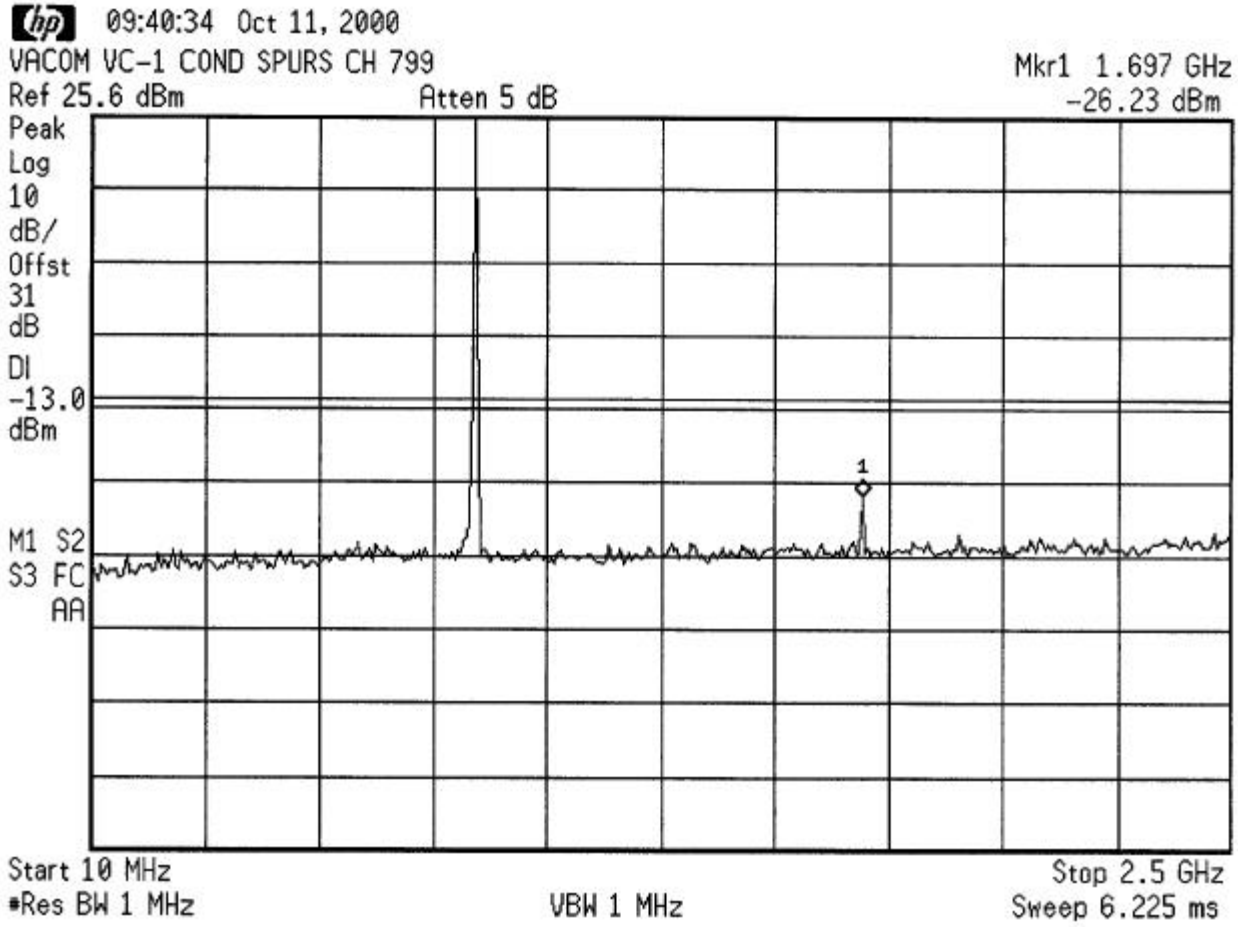
**CONDUCTED SPURIOUS**
**Channel 383**



**CONDUCTED SPURIOUS**
**Channel 383**



**CONDUCTED SPURIOUS**
**Channel 799**



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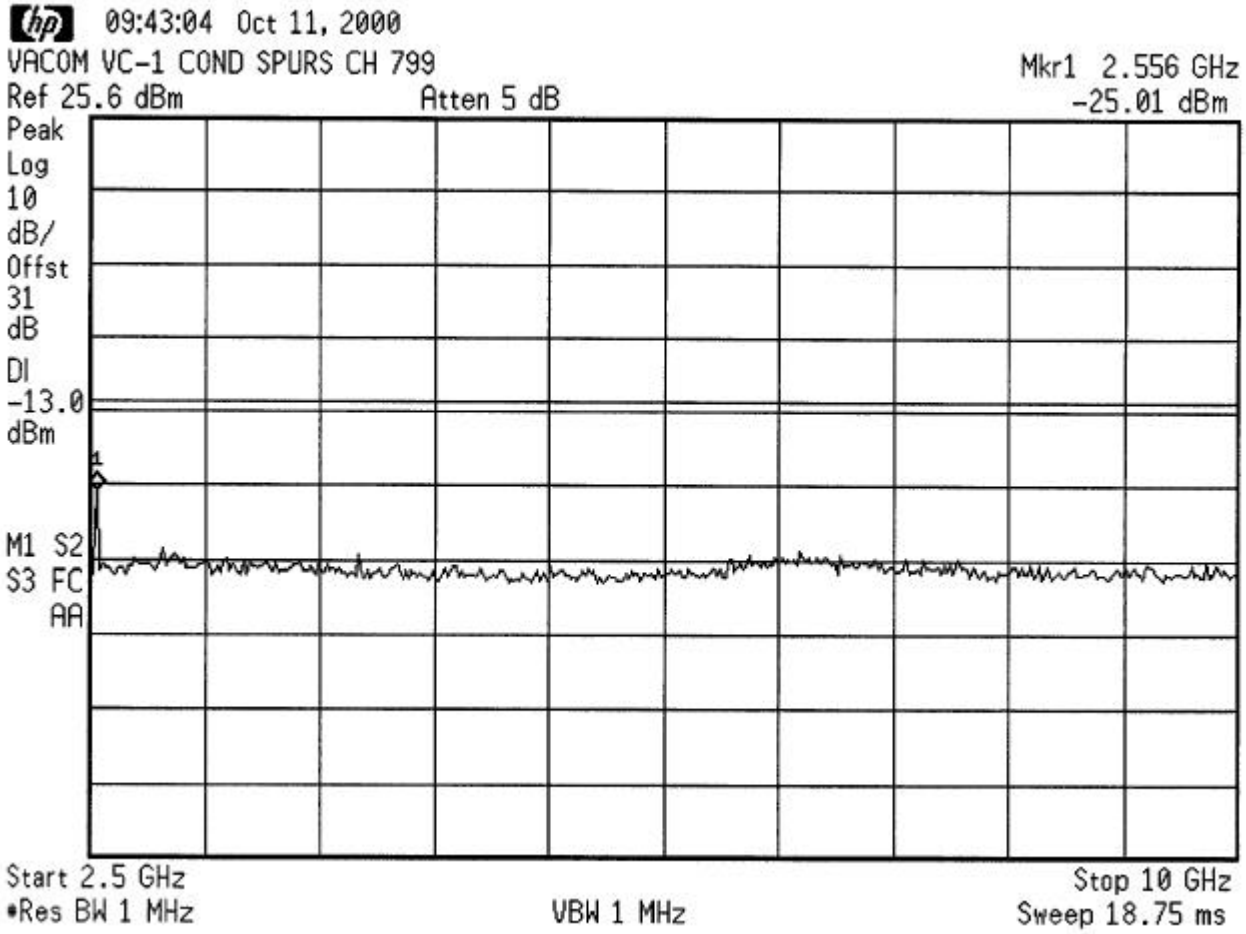
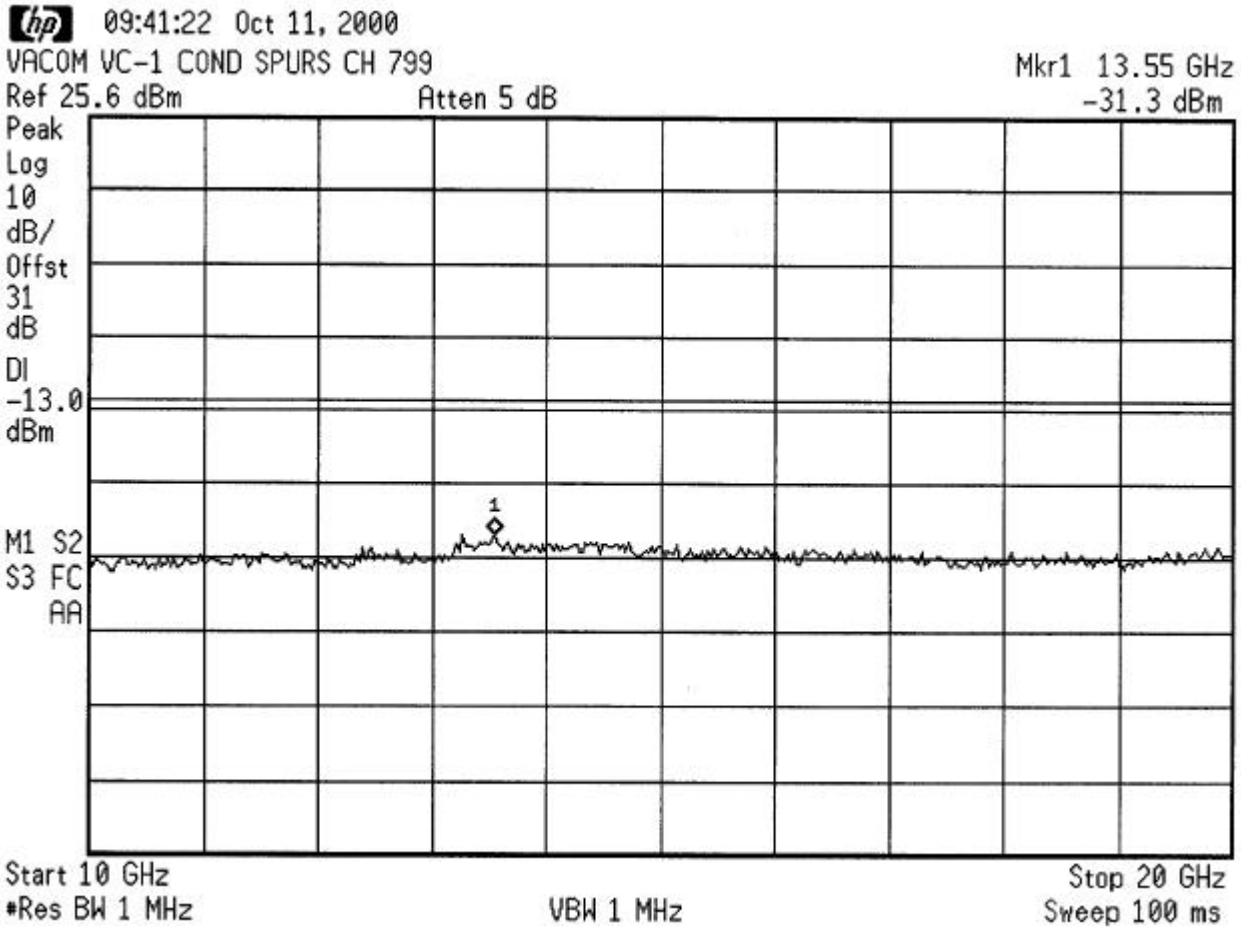
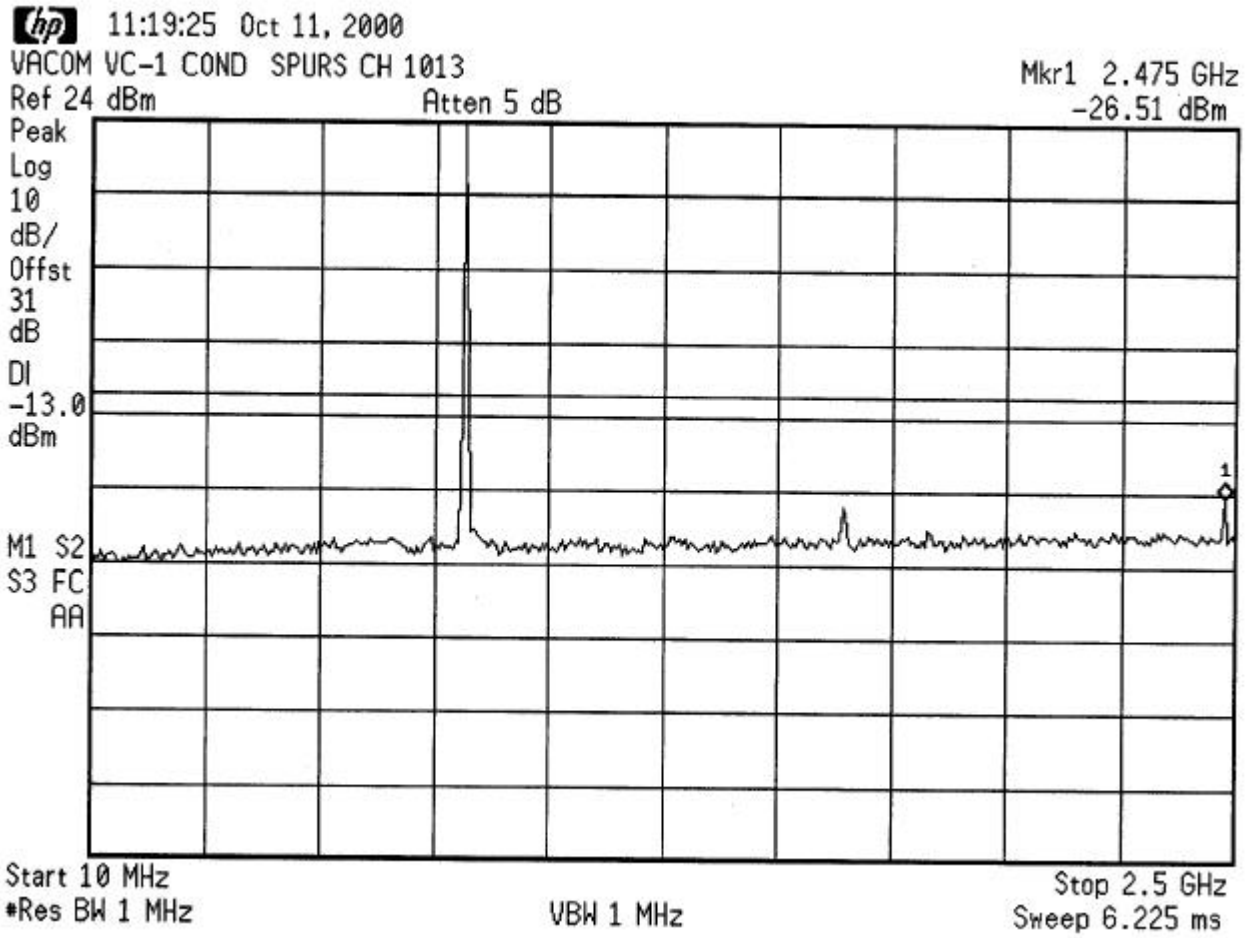
**Channel 799**



**CONDUCTED SPURIOUS**
**Channel 799**



**CONDUCTED SPURIOUS**
**Channel 1013**



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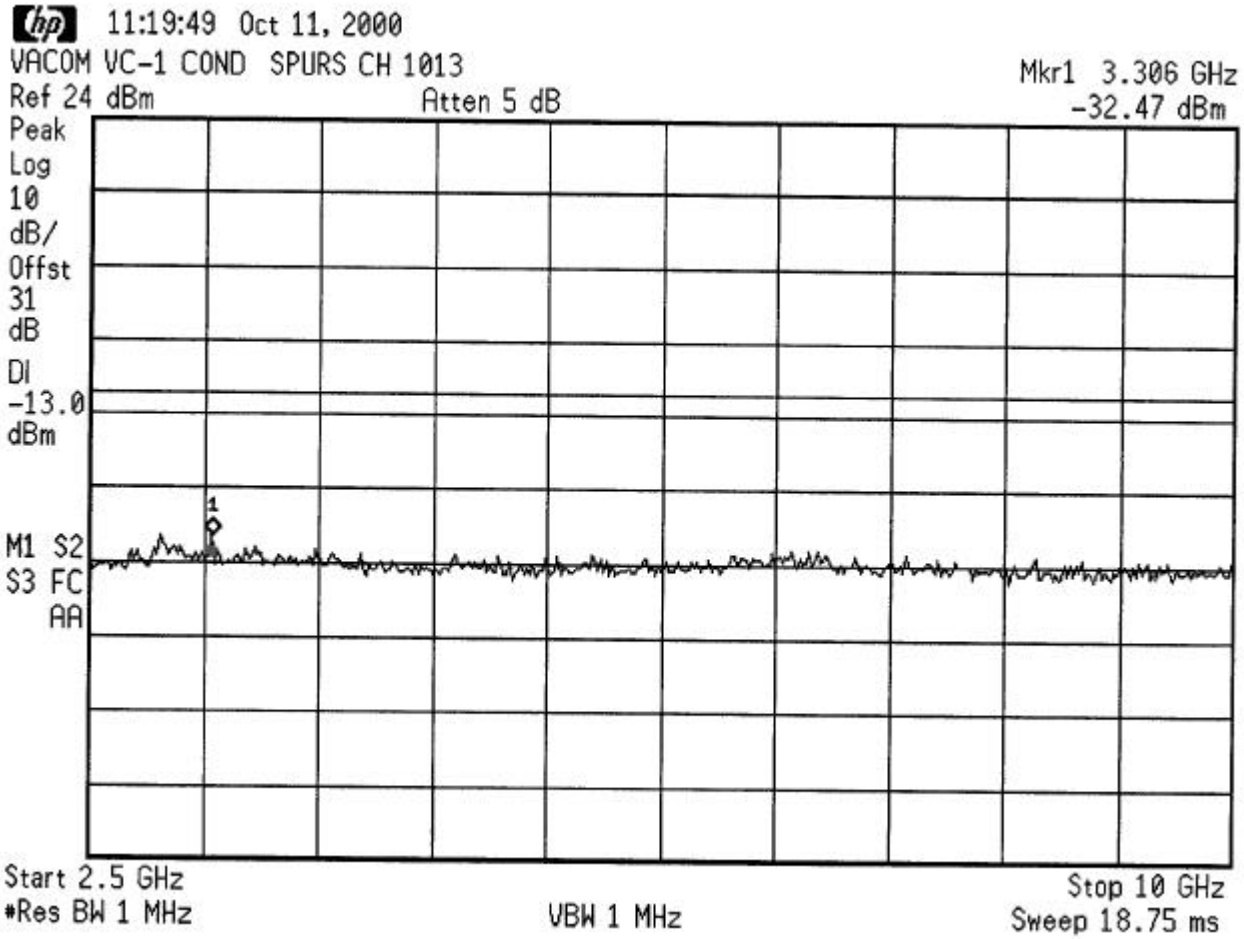
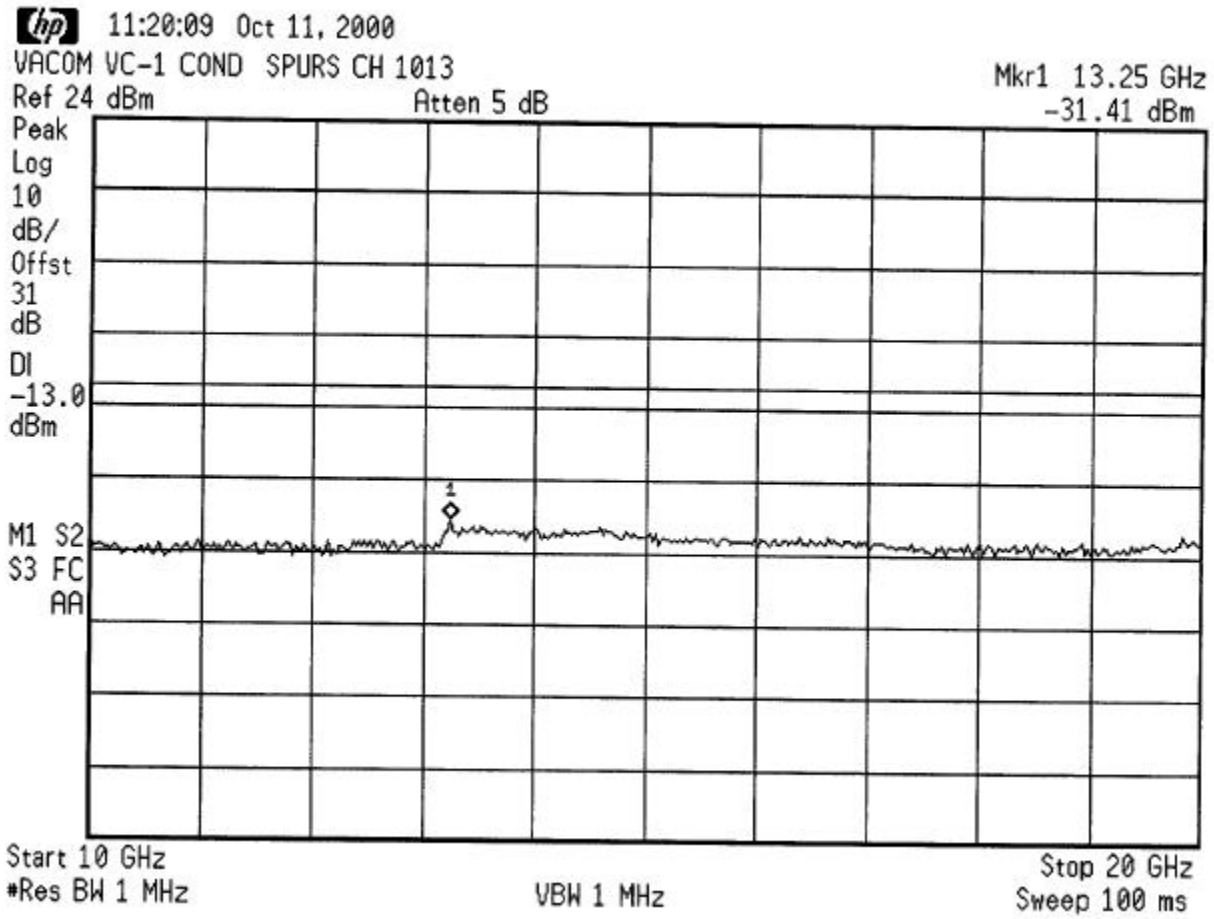
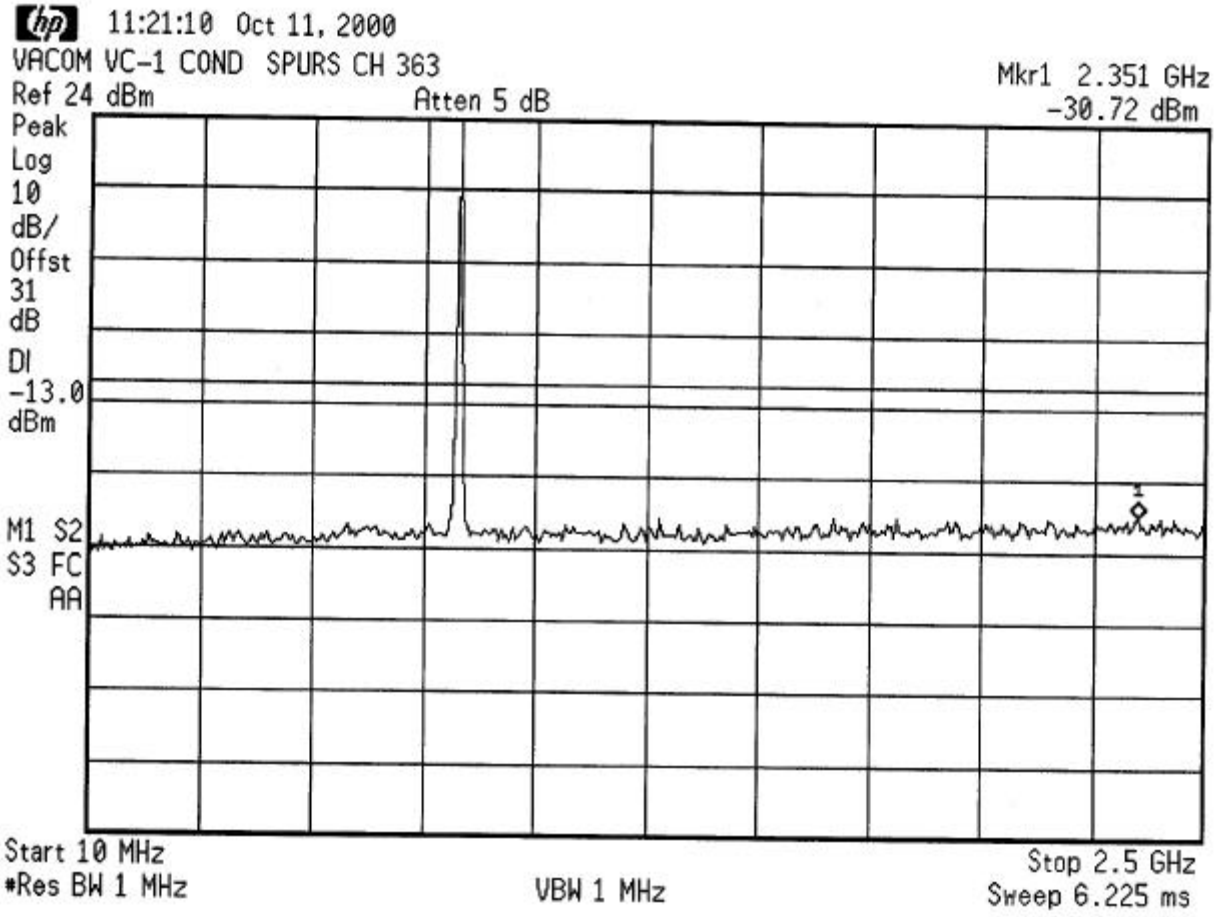


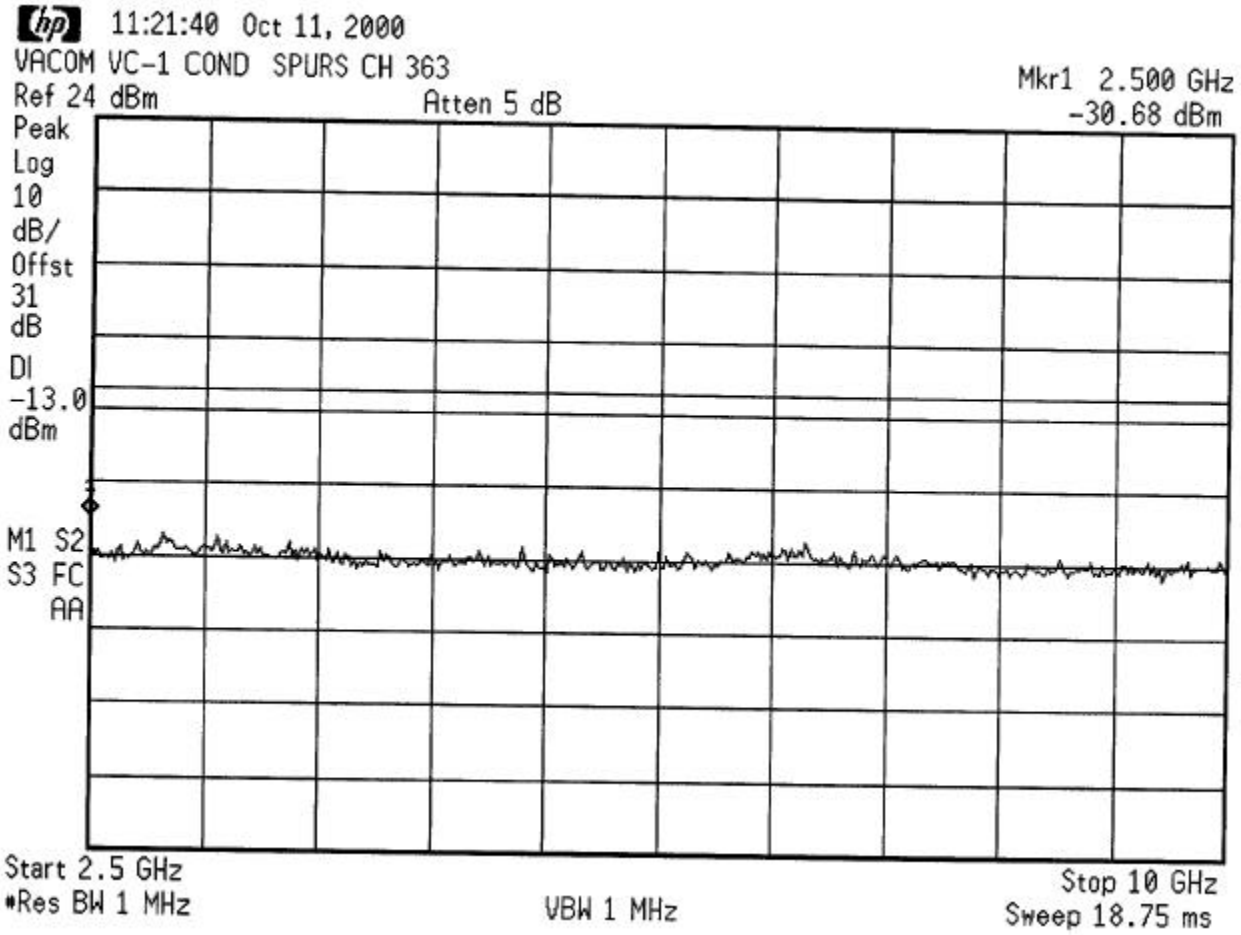
**CONDUCTED SPURIOUS**
**Channel 1013**



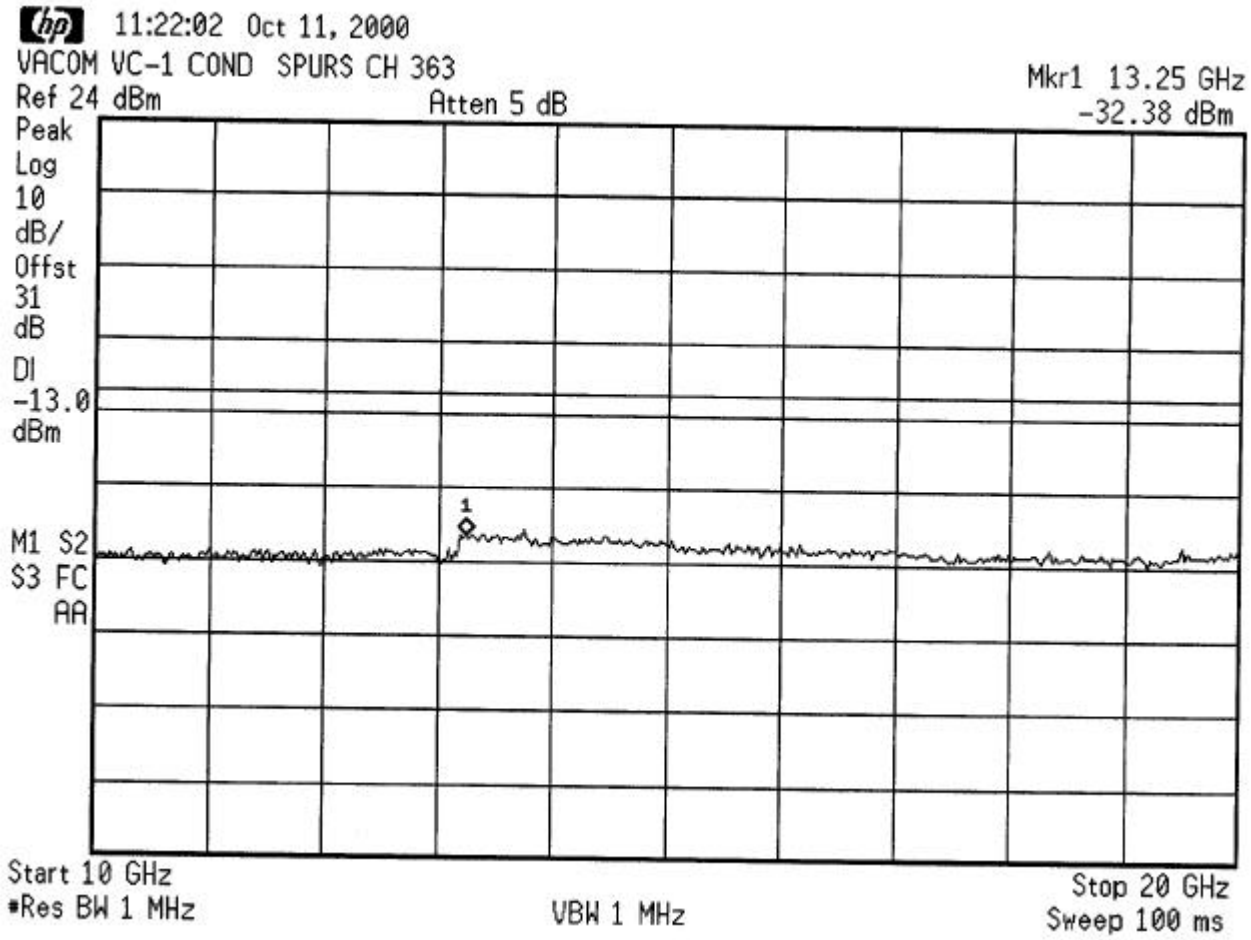
**CONDUCTED SPURIOUS**
**Channel 363**



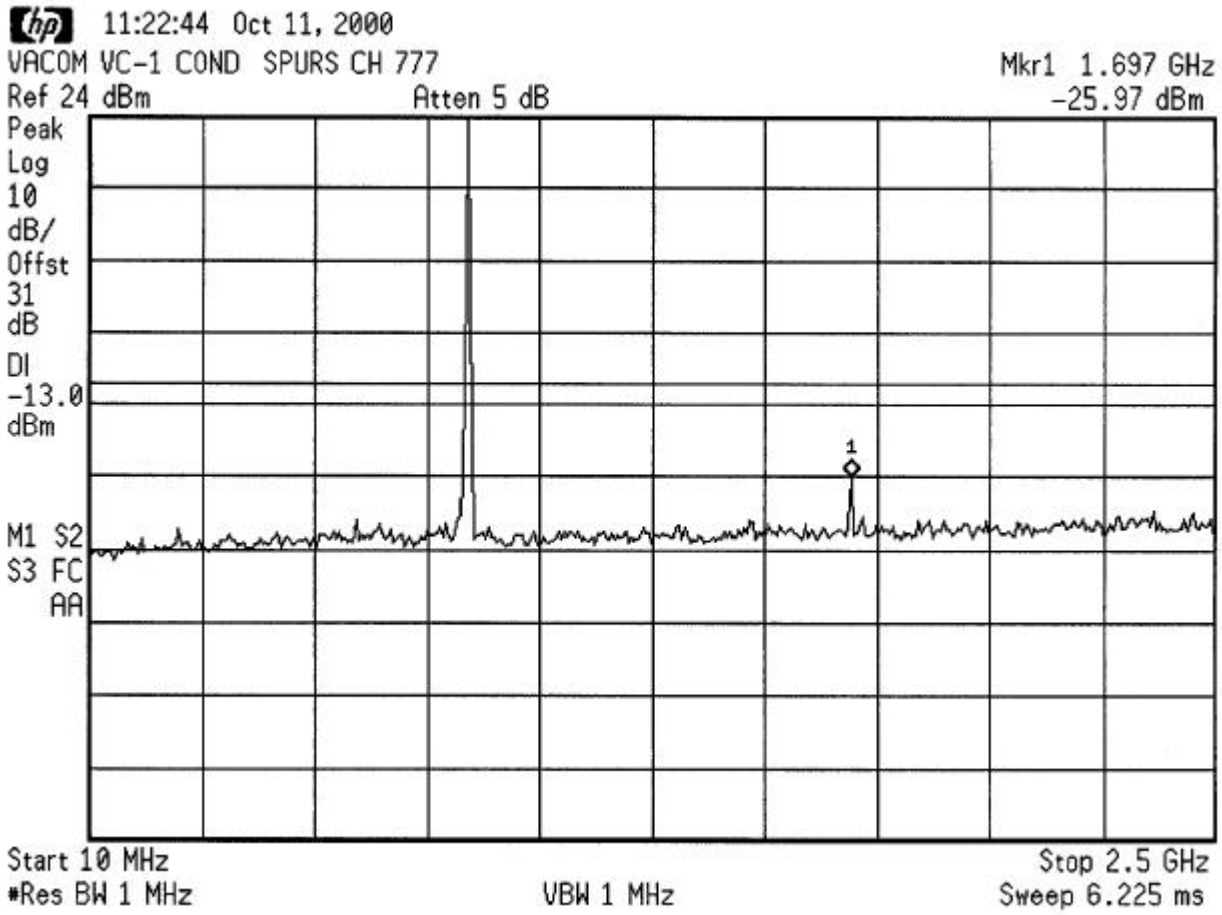
**CONDUCTED SPURIOUS**
**Channel 363**



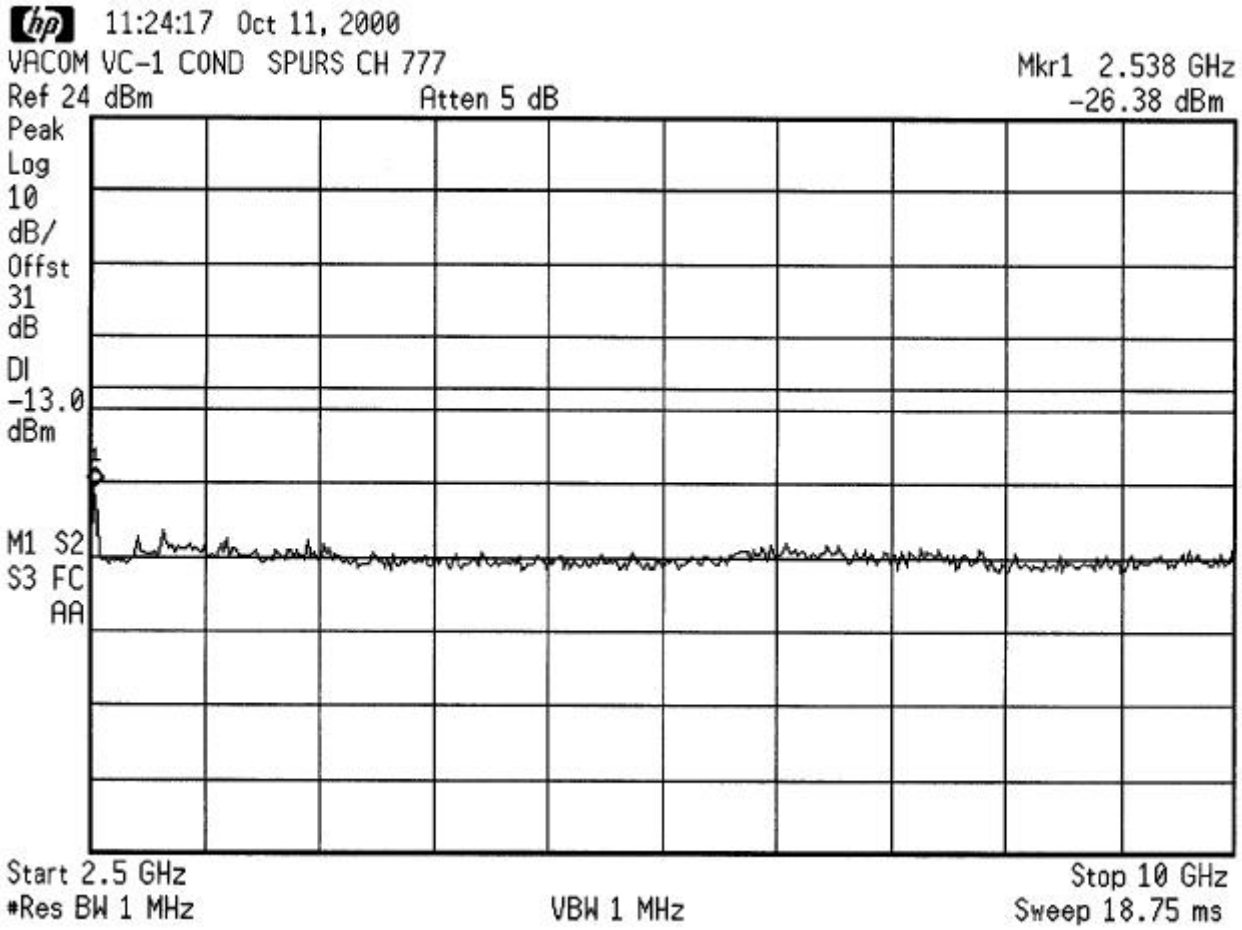
**CONDUCTED SPURIOUS**
**Channel 363**



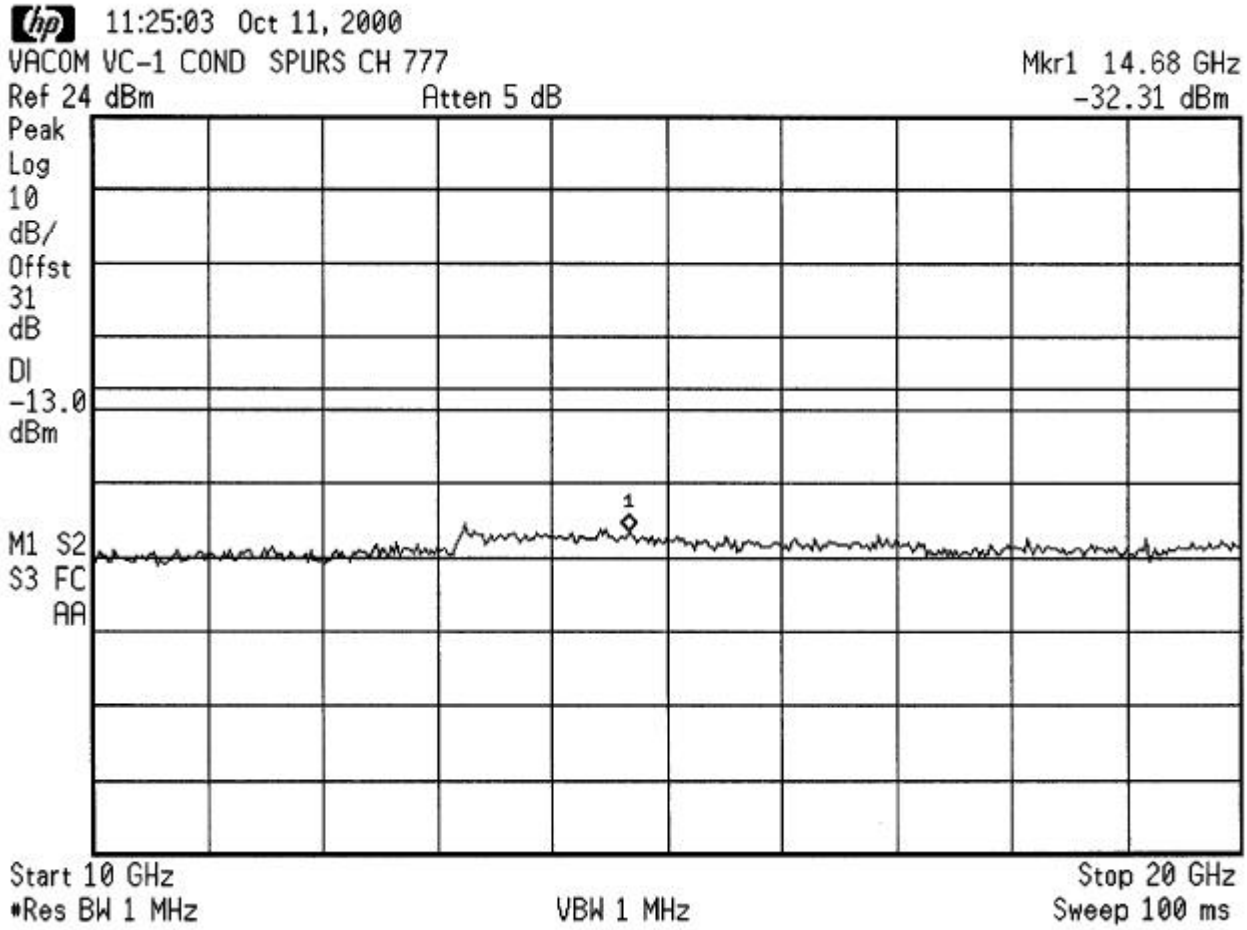
**CONDUCTED SPURIOUS**
**Channel 777**



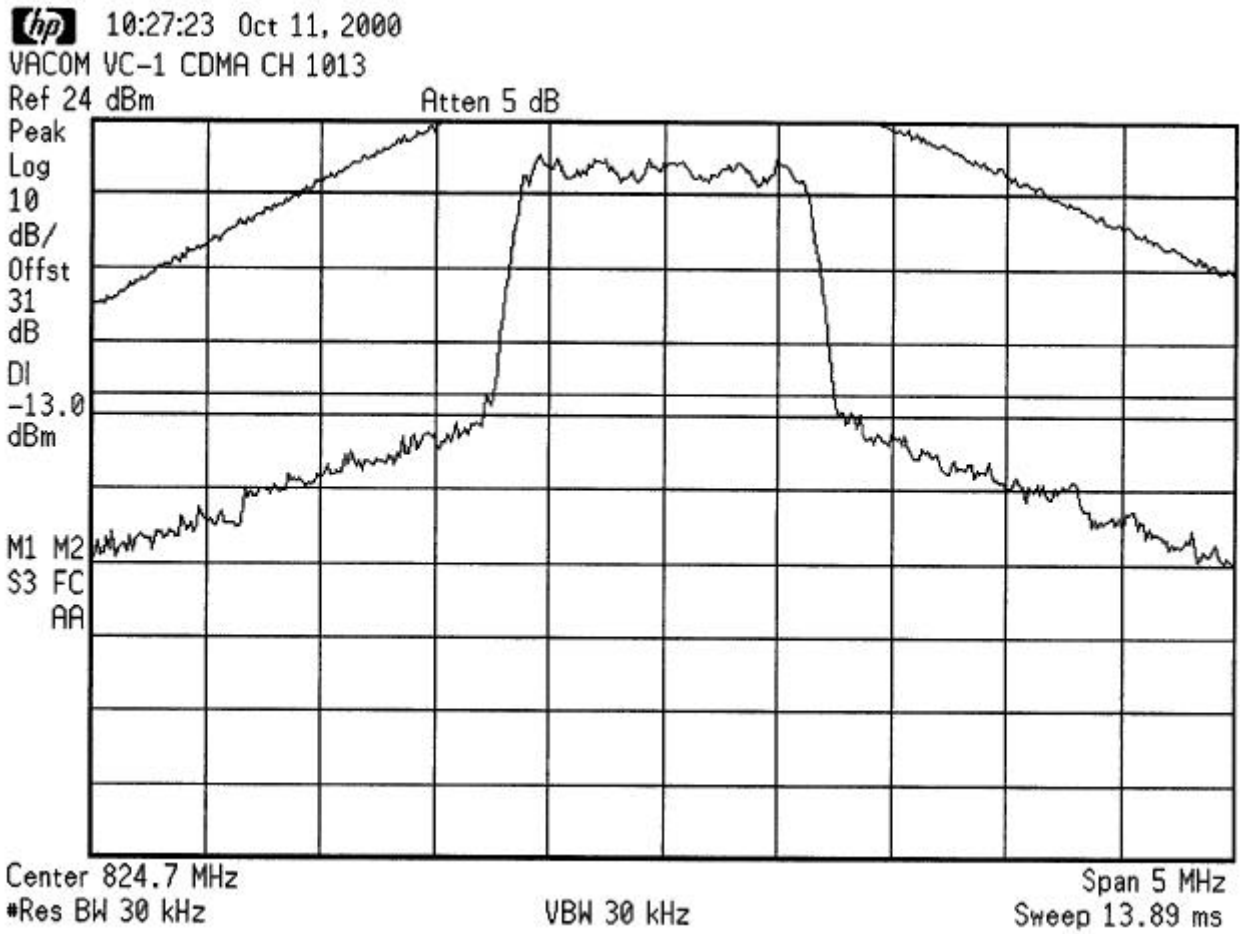
**CONDUCTED SPURIOUS**
**Channel 777**



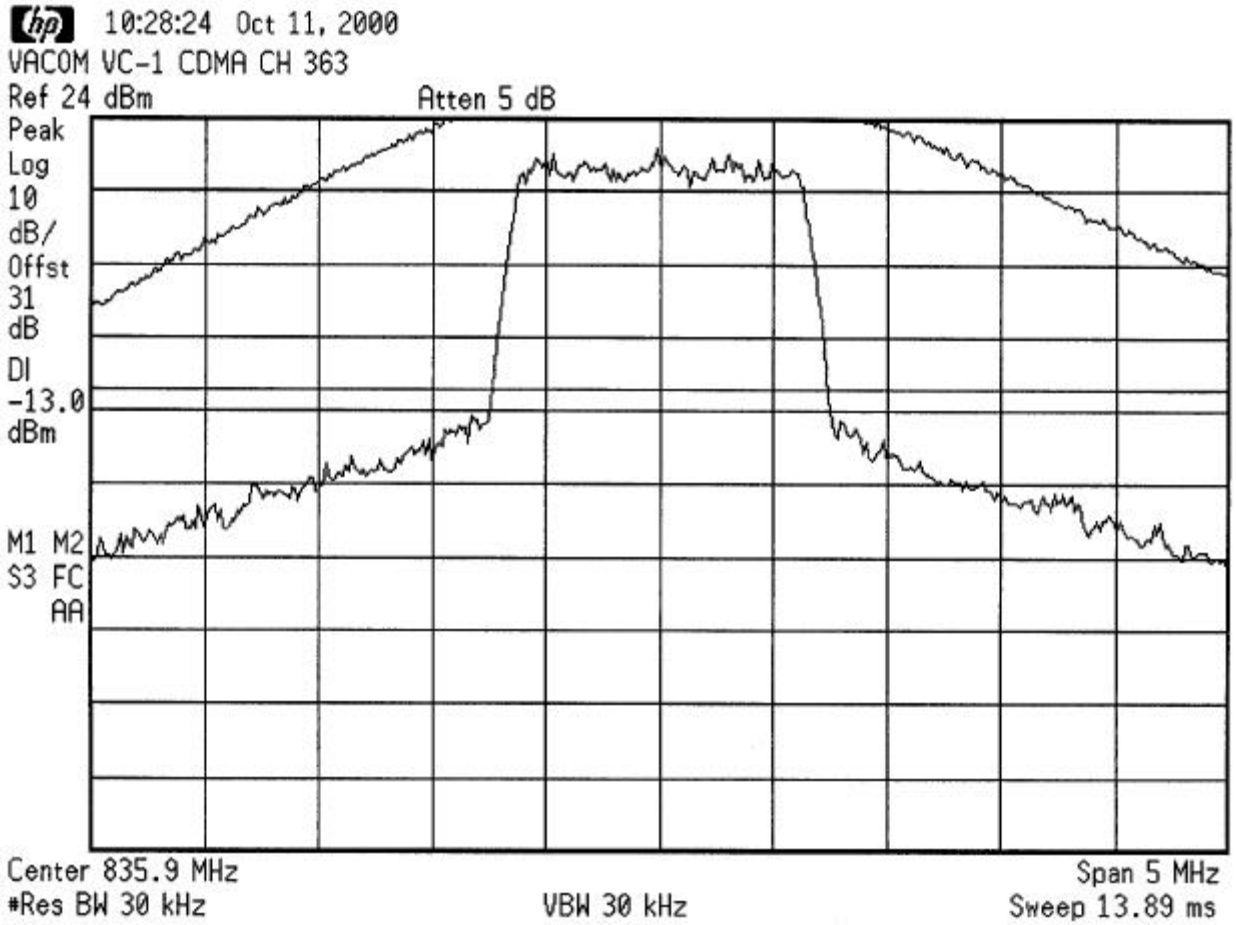
**CONDUCTED SPURIOUS**
**Channel 777**



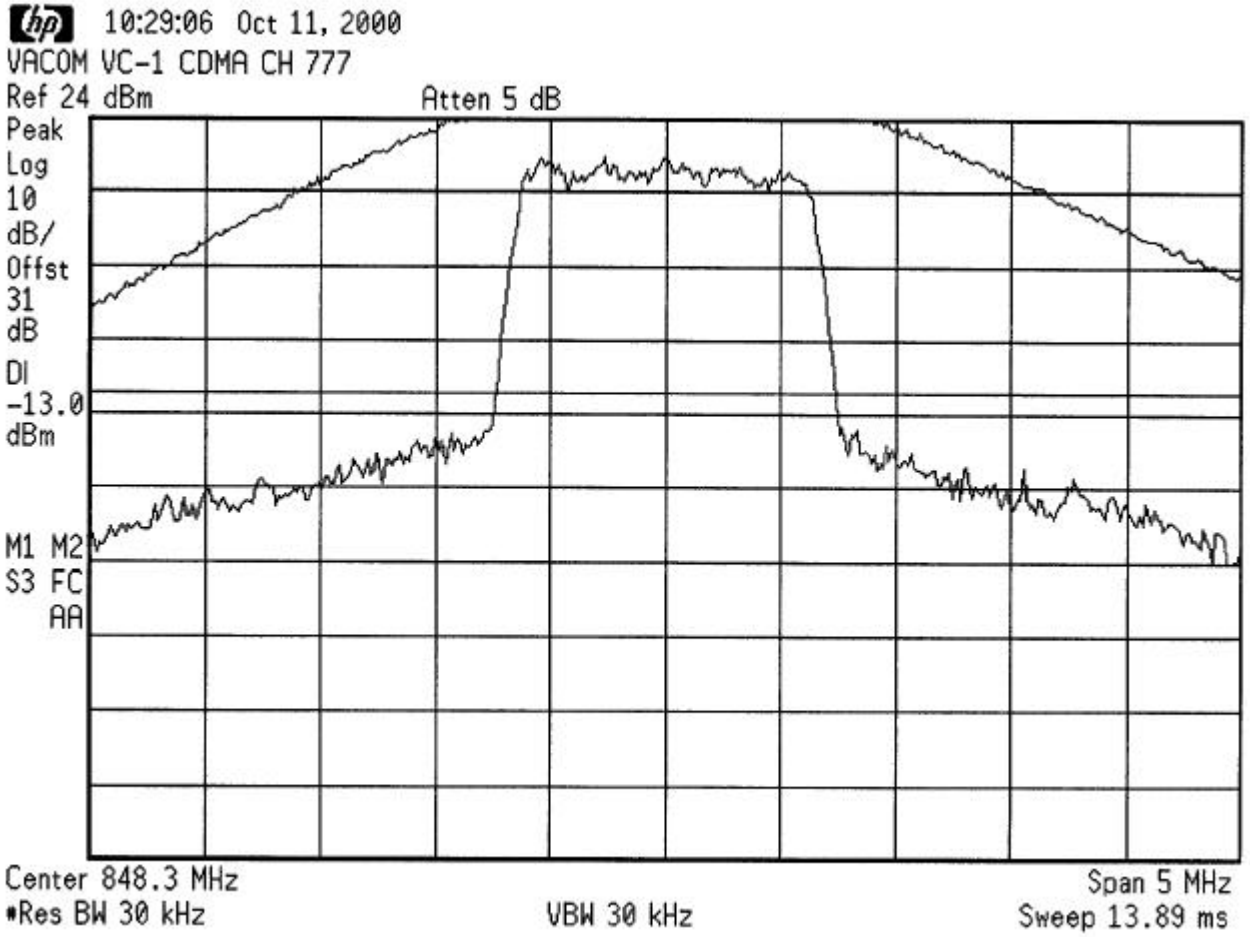
**OCCUPIED BANDWIDTH**
**Channel 1013**



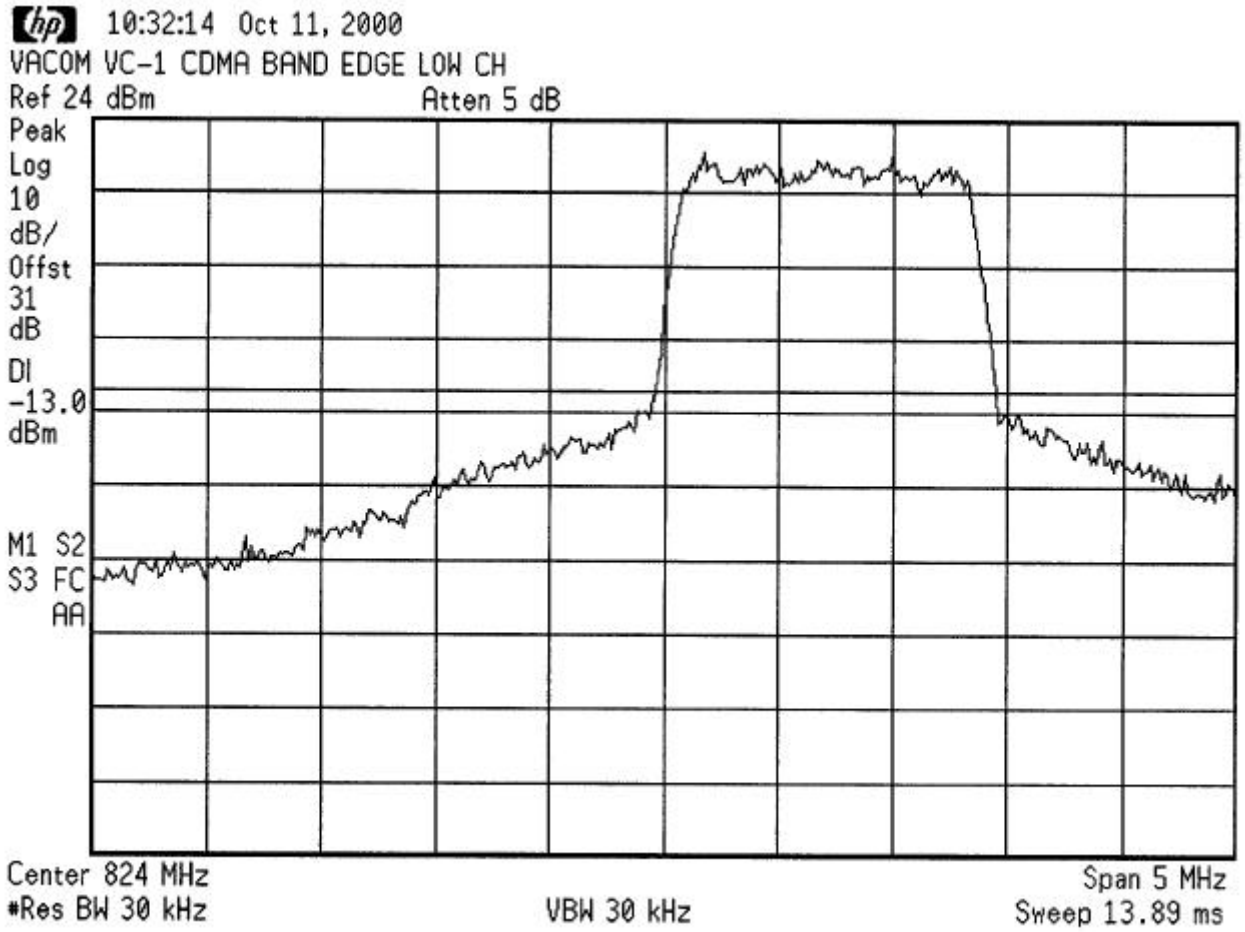
**OCCUPIED BANDWIDTH**
**Channel 363**



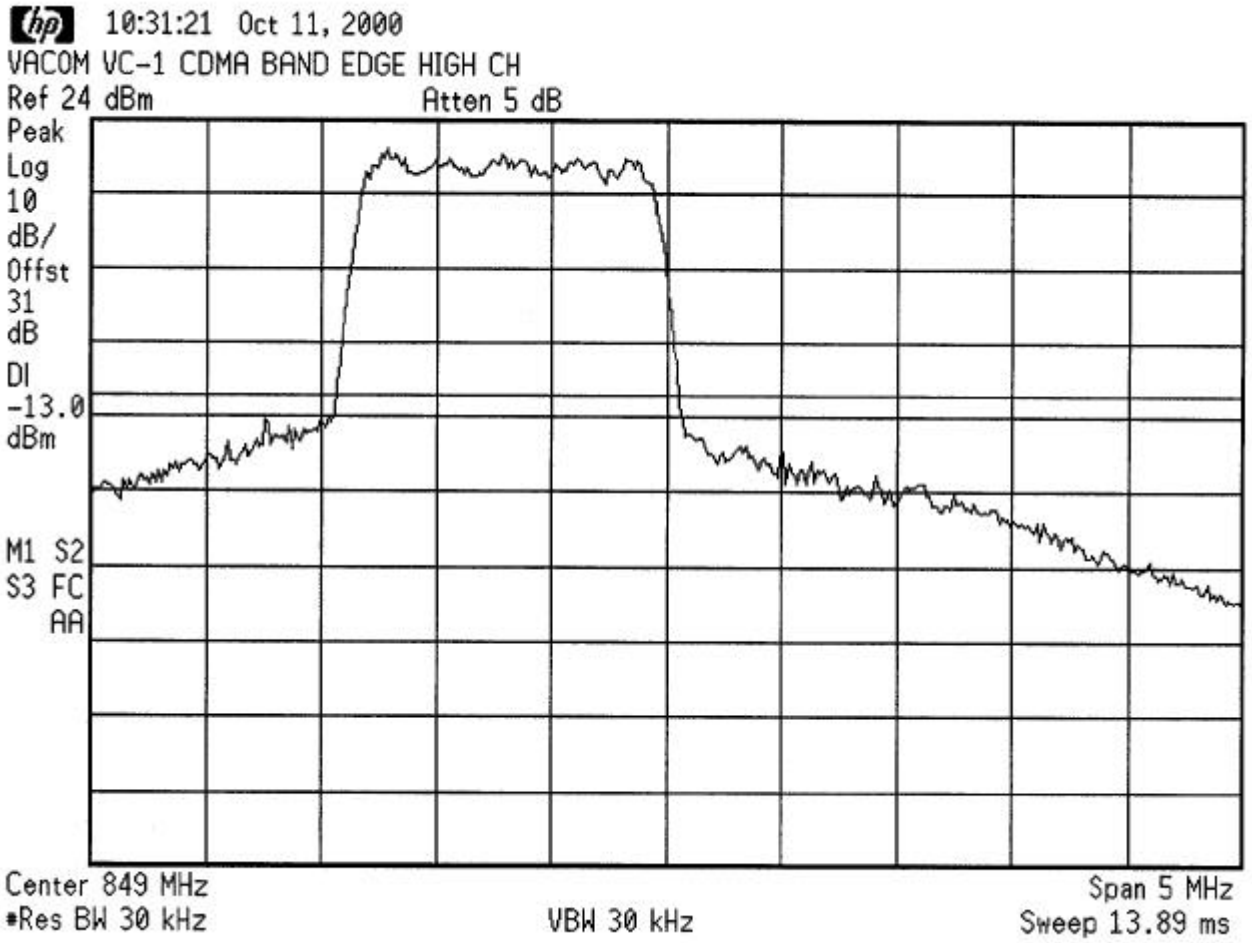
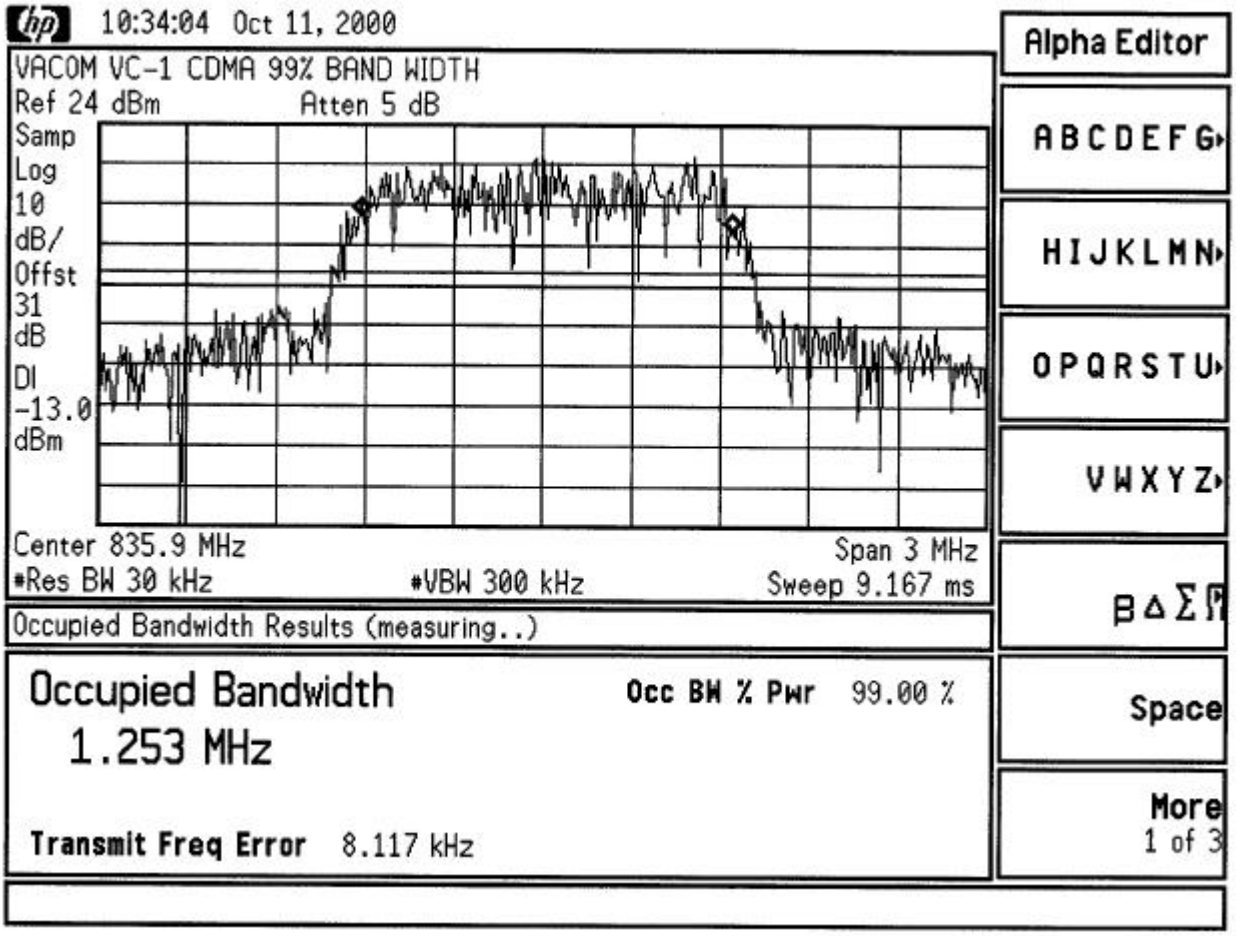
**OCCUPIED BANDWIDTH**
**Channel 777**



## LOWER BAND EDGE



## UPPER BAND EDGE



**99% BANDWIDTH**