MEASUREMENT AND TECHNICAL REPORT

WAVECOM, INC.
5405 Morehouse Drive, Suite 330
San Diego, CA 92121

DATE: 04 August 1999

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	Wavecom GSM1900 Modem	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: **Defer until:**	No: X
Company Name **agrees to notify the Commission by:** **of the intended date of announcement of the product so that the grant can be issued on that date.**	N/A	
Transition Rules Request per 15.37?	Yes:	*No:

(*) FCC Part 2, Paragraphs 2.1033, 2.1046, 2.1049, 2.1051, 2.1055 and Part 24, Paragraph 24.238

Report Prepared by:

TÜV PRODUCT SERVICE
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TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

1 GENERAL INFORMATION

1.1 Product Description

EUT Name: GSM Modem, Model: WMO2-G1900 S/N:WM06139

1.0 EUT Description: This is a GSM Modem. A finished product capable to establish a connection to a GSM 1900 Network. This equipement is driven trough a serial link by a Set of Standardized At Commands. Its software is composed of the nominal GSM software, and a AT interpretor. It gathers the Wavecom generic GSM transceiver, a SIM Slot, Antenna Connector, and a DB15 connector for serial and audio link.

1.2 Operating modes:

Transmit

1.3 EUT I/O Ports and Cables:

1.3.1 I/O Cables

CONNECTION:	**Serial Interface**
SHIELD:	**No**
CONNECTORS:	**SUB-HD**
TERMINATION TYPE:	**DB9**
LENGTH:	**3 Feet**
REMOVABLE:	**Yes**

CONNECTION:	**Power Supply**
SHIELD:	**No**
CONNECTORS:	**Micro-fit**
TERMINATION TYPE:	**2 "Open Wires"**
LENGTH:	**3 feet**
REMOVABLE:	**Yes**

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CONNECTION:	**Antenna**
SHIELD:	**No**
CONNECTORS:	**SMA**
TERMINATION TYPE:	**Antenna**
LENGTH:	**10 feet**
REMOVABLE:	**Yes**

1.3.2 Power Cords

UNIT:	**--**
MANUFACTURER:	**Wavecom**
SHIELDED:	**No**
LENGTH:	**3 feet**

1.3.3 Power requirements:

6-32 VDC 100m Amps

1.4 Oscillator Frequencies

Frequency	EUT Location	Description of use
13 Mhz	Wismo Module	To synchronize to GSM frequencies

1.5 Power Supply

Description	Manufacturer	Model #	Serial #	Switching frequency or linear
N/A				

1.6 Interfacing and/or Simulators Peripheral Equipment

DESCRIPTION:	**PC Computer**

DESCRIPTION:	**GSM NEtwork Simulator**
MANUFACTURER:	**Rohde&Schwartz**
MODEL NUMBER:	**CMD-55**

1 GENERAL INFORMATION (continued)

1.2 Related Submittal/Grant

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

Test Performed:

X 1. Conducted Emissions, FCC Part 2, Paragraphs 2.1046, 2.1049, 2.1051, and Part 24, Paragraph 24.238
2. Radiated Emissions EN55022: 1992 Class B limit, 30 - 1,000 MHz, 10 meters
X 3. Radiated Emission per FCC Part 2, Paragraph 2.1033, & Part 24, Paragraph 24.238
4. Engineering evaluations
X 5. Frequency Stability, Part 2, Paragraph 2.1055

Both Conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 - M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 10 GHz).

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1.5 Test Facility

The open area test site and conducted measurement data were tested by:

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San Diego, CA 92121-2912
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The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

1.6 Part 2 Requirements

Manufacturer: Wavecom SA, 39 rue du Gouverneur Gal Eboue, 92130 Issy les Moulineaux, France

Applicant: Wavecom, Inc., 5404 Morehouse Drive, Suite 330, San Diego, CA 92121

Type of Emissions: Time Division Multiple Access, GSMK Modulation

Frequency Range: RX 1930-1900 TX 1850-1910

Range of Operating Power Values: 1 Watt (30 dBm) to 1mWatt (0 dBm) by 2 dBm Step
Description of means provided for variation of operting power:
Software driven power control

Maximum Power Rating: 1 Watt

DC voltages applied to and dc currents: 4.8 volts and 0.65 A

Description of modulation system and response characteristics:
GMSK modulation, BT = 0.3, gaussian filter

Means for determining and Stabilizing frequency, suppression of spurious radiation, limiting modulation, and limiting power

- The modem is locked on the network by computing the frequency drift between its local oscillator and the network reference (0.05ppm) and applying the correction to a VCO. In case of VCO failure, no network lock will be possible. In absence of network, the module cannot transmit.
- The spurious are suppressed thanks to full modem shielding and external connectors filtering
- Power is limited due to RF power components dimensioning, power supply limitation (2.5 A) and hardware watchdog in case of software crash.
- Modulation limitation is done through harmonic filters, hardware-made modulation (only global component failure is possible in which case no modulation at all will occur)

Description of Modulation System

Modulation format

Modulating bit rate

The modulating bit rate is 1/T = 1 625/6 kbit/s (i.e. approximately 270,833 kbit/s).

Start and stop of the burst :

Before the first bit of the bursts as defined in GSM 05.02 [3] enters the modulator, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones ($d_j = 1$) had entered the differential encoder. Also after the last bit of the time slot, the modulator has an internal state as if a modulating bit stream consisting of consecutive ones ($d_j = 1$) had continued to enter the differential encoder. These bits are called dummy bits and define the start and the stop of the active and the useful part of the burst as illustrated in figure 1. Nothing is specified about the actual phase of the modulator output signal outside the useful part of the burst.

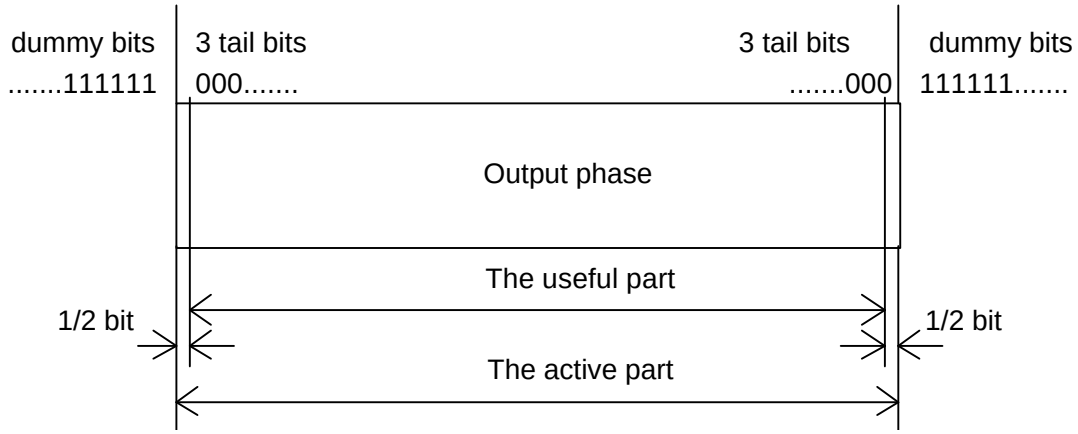


Figure 1 : Relation between active part of burst, tail bits and dummy bits.
For the normal burst the useful part lasts for 147 modulating bits

Description of Modulation System (continued)

Differential encoding

Each data value $d_i = [0,1]$ is differentially encoded. The output of the differential encoder is:

$$\hat{d}_i = d_i \oplus d_{i-1} \qquad (d_i \in \{0,1\})$$

where $\oplus$ denotes modulo 2 addition.
The modulating data value a_i input to the modulator is:

$$a_i = 1 - 2\hat{d}_i \qquad (a_i \in \{-1,+2\})$$

Filtering

The modulating data values a_i as represented by Dirac pulses excite a linear filter with impulse response defined by:

$$g(t) = h(t) * rect\left(\frac{t}{T}\right)$$

where the function *rect(x)* is defined by:

$$rect\left(\frac{t}{T}\right) = \frac{1}{T} \qquad for\ |t| < \frac{T}{2}$$

$$rect\left(\frac{t}{T}\right) = 0 \qquad otherwise$$

and * means convolution. *h(t)* is defined by:

$$h(t) = \frac{\exp\left(\frac{-t^2}{2d^2T^2}\right)}{\sqrt{(2p)}\ .\ dT}$$

where $d = \frac{\sqrt{\ln(2)}}{2pBT} \qquad and\ BT = 0.3$

where B is the 3 dB bandwidth of the filter with impulse response *h(t)*, and *T* is the duration of one input data bit. This theoretical filter is associated with tolerances defined in GSM 05.05 [4].

Output phase

The phase of the modulated signal is:

$$j(t') = \sum_i a_i ph \int_{-\infty}^{t'-iT} g(u)du$$

where the modulating index *h* is 1/2 (maximum phase change in radians is π/2 per data interval).
The time reference $t' = 0$ is the start of the active part of the burst as shown in figure 1. This is also the start of the bit period of bit number 0 (the first tail bit) as defined in GSM 05.02 [2].

Modulation

The modulated RF carrier, except for start and stop of the TDMA burst may therefore be expressed as:

$$x(t') = \sqrt{\frac{2E_c}{T}}\ .\ \ \cos(2p\ f_0 t' + j(t') + j_0)$$

where E_c is the energy per modulating bit, f_0 is the centre frequency and j_0 is a random phase and is constant during one burst.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The Wavecom GSM1900 Modem **was initially tested for FCC emission in the following configuration:**

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.

3 RADIATED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

Wavecom GSM1900 Modem

See following page(s).

REPORT No: S9220 TESTED BY: MW Mary Washington SPEC: FCC Part 2/24 Part 2.1033

CUSTOMER: Wavecom TEST DIST: 3 Meters

E U T: 1900 MHz GSM Modem TEST SITE: 3

EUT MODE: Transmit BICONICAL: N/A

DATE: /25&26/1999 LOG: N/A

NOTES: RBW and VBW = 1 MHz. OTHER: 453

No emissions were detectable after fourth harmonic.

v.beta

FREQ (MHz)	VERTICAL (dBuv) pk	av	HORIZONTAL (dBuv) pk	av	CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m) pk	av	SPEC LIMIT (dBuV/m) pk	av	MARGIN (dB) pk	av	EUT Rotatio	Antenna Height
1850.18	43.3		38.1		29.5	**72.8**				72.85		356	1.2
3700.36	15.3		16.9		40.3	**57.2**		84.4		-27.2			
5550.54	19.7		21		43.2	**64.2**		84.4		-20.2		356	1.2
7400.72	15.7		16.4		45.9	**62.3**		84.4		-22.1			
9250.67	11		11.7		48.6	**60.3**		84.4		-24.1			
1880	39.3		40.1		32.3	**72.4**				72.43		42	1
3760	17.5		18.7		40.5	**59.2**		84.4		-25.2			
5640	17.8		19.6		43.5	**63.1**		84.4		-21.3			
7520	20.8		23.2		46.0	**69.2**		84.4		-15.2		303	1.3
9400	12.9		12		48.3	**61.2**		84.4		-23.2			
1909.7	40.8		37.5		32.5	**73.3**				73.29		353	1
3819.4	19.7		20.3		40.8	**61.1**		84.4		-23.3			
5729.1	21		22.4		43.7	**66.1**		84.4		-18.3		302	1.3
7638.8	23.4		30.1		46.2	**76.3**		84.4		-8.1		317	1.2
9548.5	13.6		15.8		48.2	**64.0**		84.4		-20.4		28	1.3

Emissions Test Conditions: RADIATED EMISSIONS, FCC Part 2, Paragraph 2.1033 and Part 24, Paragraph 24.238

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ **- Test not applicable**

■ - Roof (Small Open Area Test Site)

Testing was performed at a test distance of:

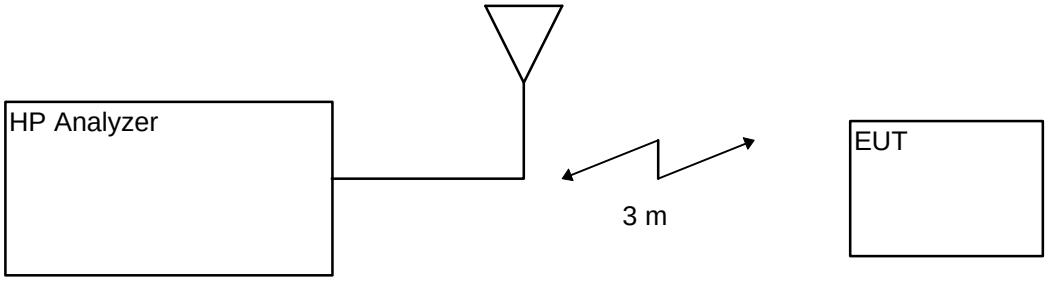
☐ - 1 meters
■ - 3 meters
☐ - 10 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
3115	453	Antenna, Double Ridge Guide	EMCO	9412-4363	10/99
AFD3-0208-40-25	367	Pre-Amplifier	Miteq, Inc.	155382	N/A
AFS4-08001800-70-10P-4	368	Pre-Amplfier	Miteq, Inc.	167879	N/A
AA-190-06.00.0	657	High Frequency Cable	United Microwave Pro.	--	N/A
AA-190-30.00.0	733	High Frequency Cable	United Microwave Pro.	--	N/A
8566B	720	Spectrum Analyzer	Hewlett Packard	211500842	03/00
8566B	721	Spectrum Analyzer Display	Hewlett Packard	2112A02185	03/00

Remarks: _____

Test Setup for FCC Part 2. 1033



Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna , cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

Corrected Meter Reading Limit (CMRL) = SAR + AF + CL - AG - DC

Where, SAR = Spectrum Analyzer Reading
AF = Antenna Factor
CL = Cable Loss
AG = Amplifier Gain (if any)
DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

CMRL = 29.4 dBuV + 9.2dB = 1.4 dB - 20 dB/M - 0.0 dB

CMRL = 20.0 dBuV/M

This result is well below the FCC and CSA Class A limit of 29.5 dbuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

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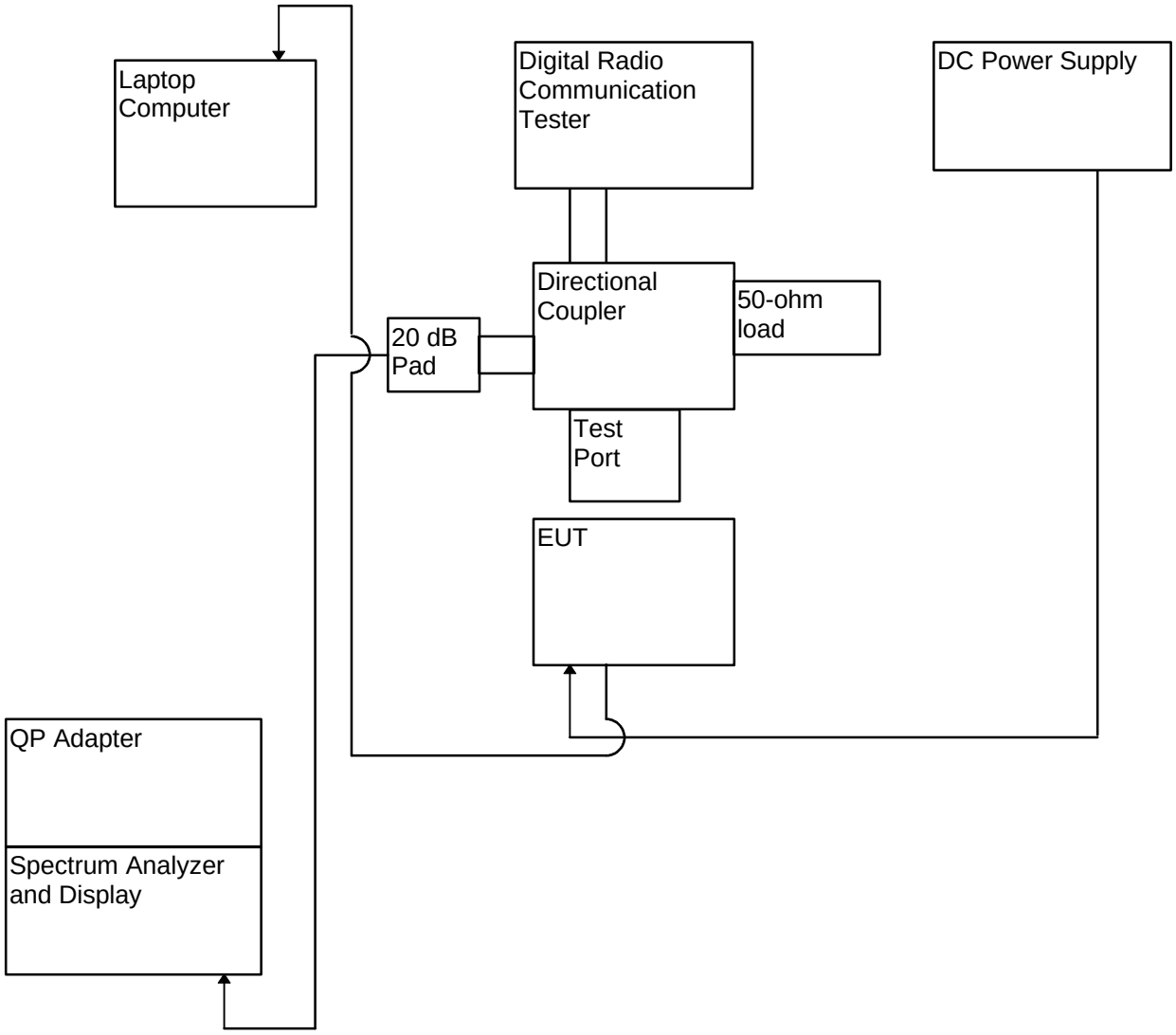
4 CONDUCTED EMISSION EQUIPMENT/DATA

Wavecom GSM1900 Modem

See following page(s).

Test Setup for Part 2, Paragraphs 2.1046, 2.1046, 2.1051, and Part 24, Paragraph 24.238



Emissions Test Conditions: CONDUCTED EMISSIONS, FCC Part 2, Paragraphs 2.1046, 2.1051, and Part 24, Paragraph 24.238

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ **- Test not applicable**

■ - SR-3, Shielded Room, 12’ x 20’ x 8’, Metal Chamber

Test Equipment Used :

Equipment List

Attenuator, Hewlett Packard, P/N 636, Model 8491A (internal verification cal date)
QP Adapter, Electro Rent Corporation, Model HP-85650A, S/N 2521A00597, P/N 746 Cal Date 03/00
Spectrum Analyzer & Display, Model HP-8566B, S/N 2618A02913, P/N 744 Cal Date 02/00
Cable, United Microwave, Model AA-190-06.00.0, P/N 729 Verified 5/13/99
Attenuator, Werlatone, Model C2630, S/N 4172 (internal verification cal date)
Attenuator, Werlatone, Model 11691D, S/N 1212A02137 (internal verification cal date)
Attenuator, Werlatone, Model 778D S/N 1144A08801 (internal verification cal date)
DC Power Supply, Hewlett Packard, Model E 3611A NCR
Digital Radio Communication Tester, Rhode & Schwarz, Model CMD55, S/N 849709/050, CAL DUE 3/00

Remarks: _____

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S9220
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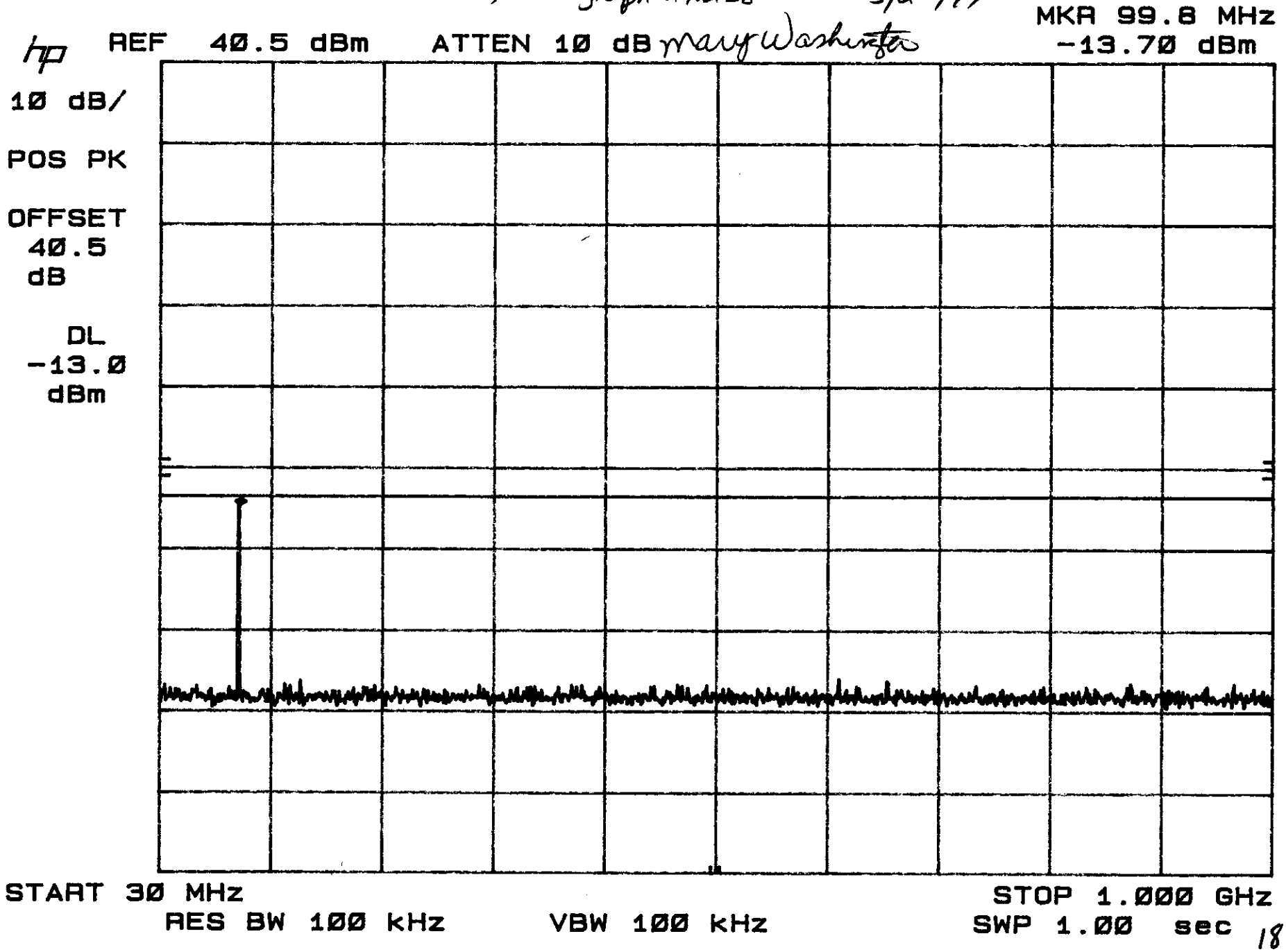
FCC Part 2, Paragraph 2.1051 and
Part 24, Paragraph 24.238

High Channel, 810
5/25/99



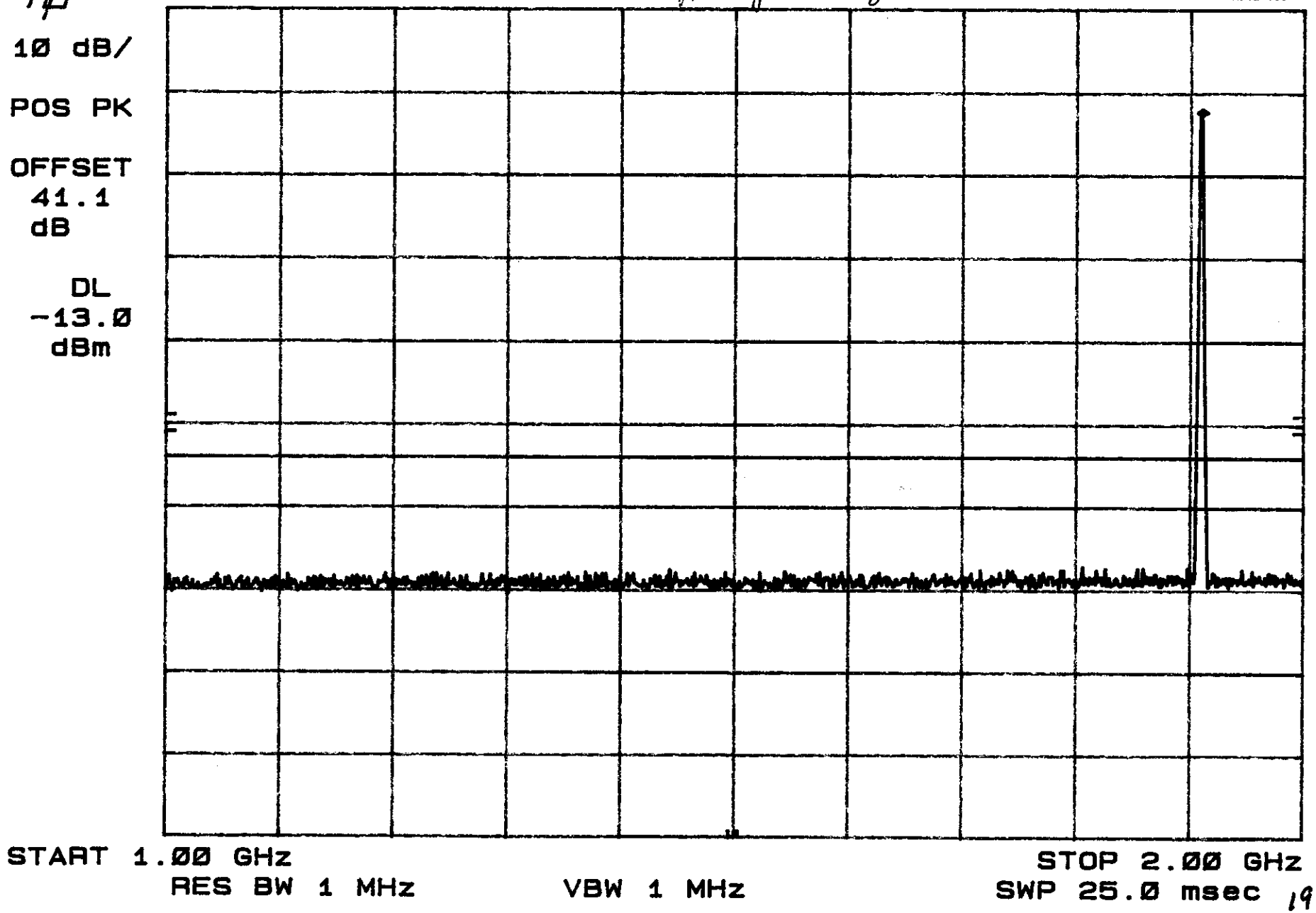
59220 Wavecom

FCC Part 2, Paragraph 2.1051 and Part 24, Paragraph 24.238

High channel, 810

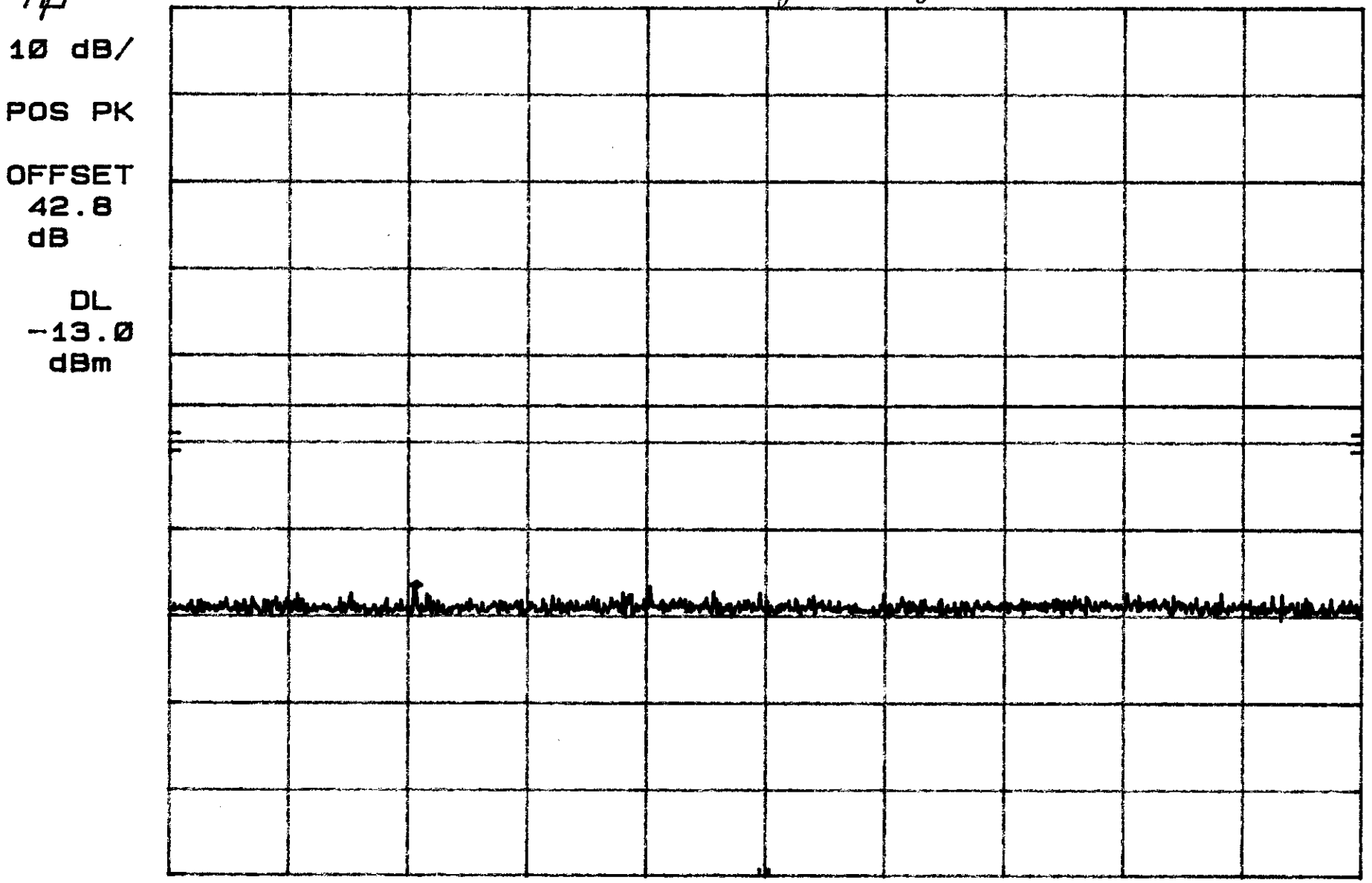
5/13/99

Mary Washington



59220 FCC Part 2, Paragraph 2.1051 and
Wavecom Part 24, Paragraph 24.238

High channel, 810
5/25/99
Mary Washington



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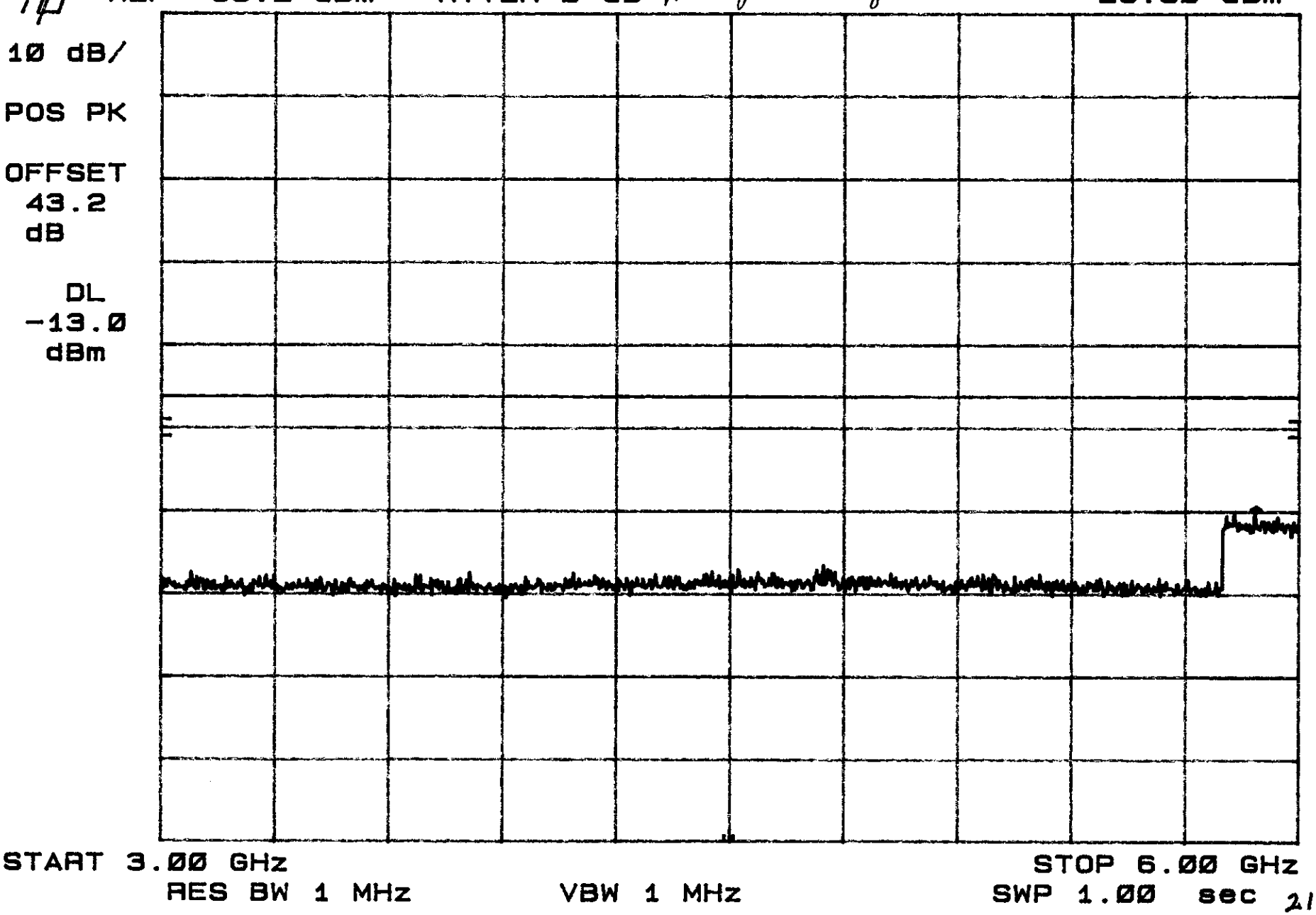
Wavecom Part 24, Paragraph 24.238 5/25/99



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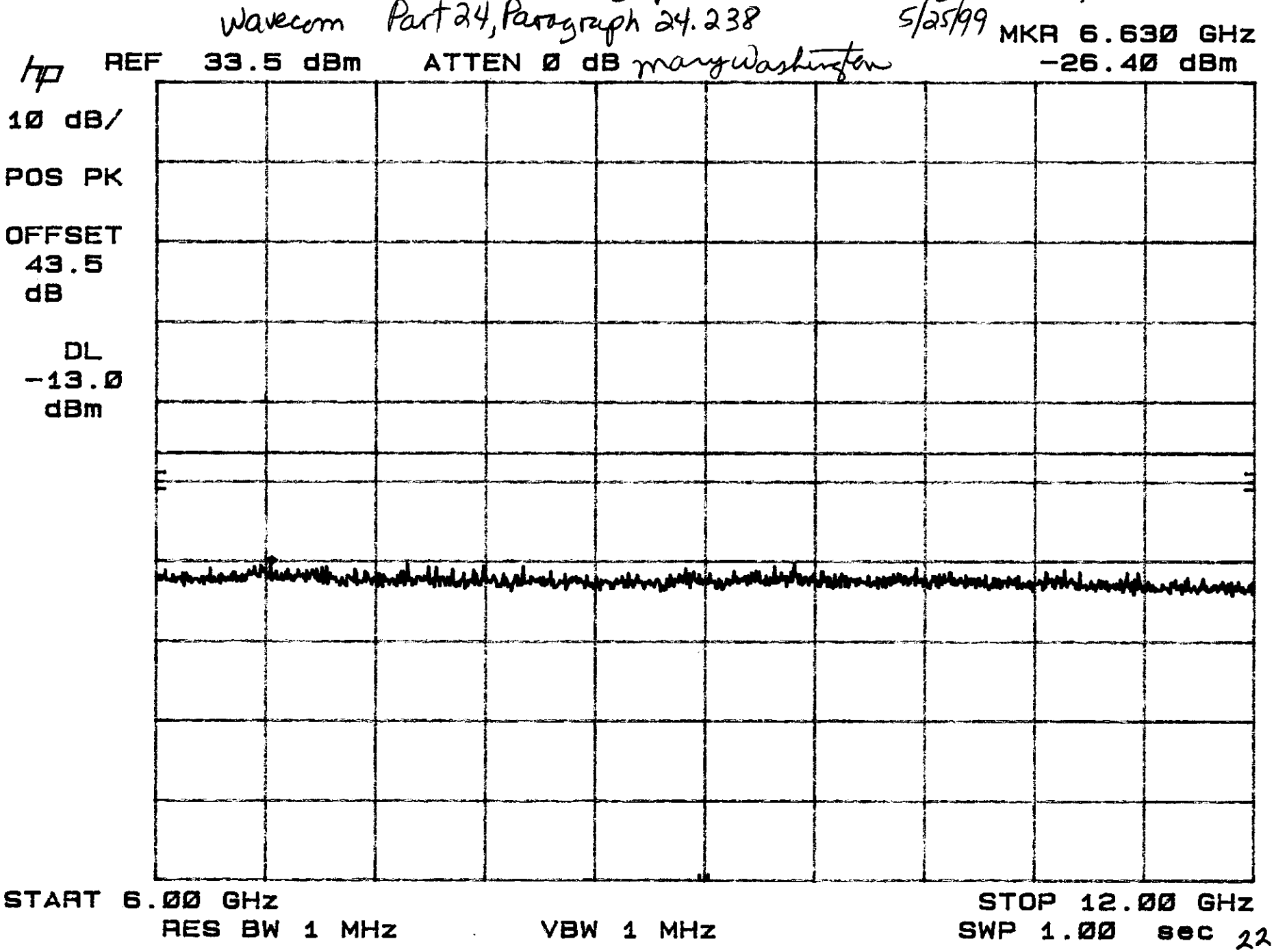
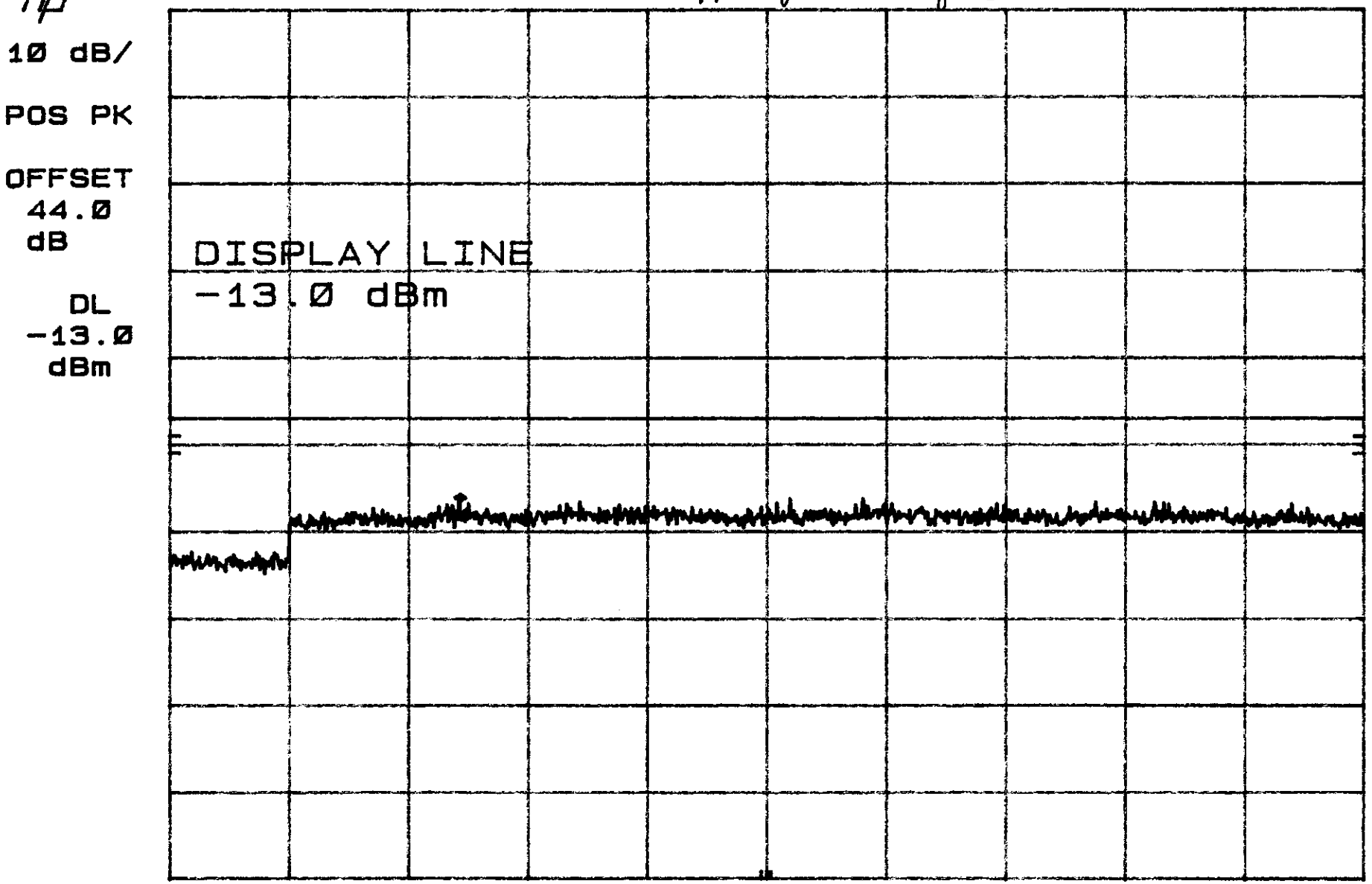
Wavecom Part 24, Paragraph 24.238 5/25/99



59220 FCC Part 2, Paragraph 2.1051 and High channel, 810
Wavecom Part 24, Paragraph 24.238 5/25/99
Mary Washington



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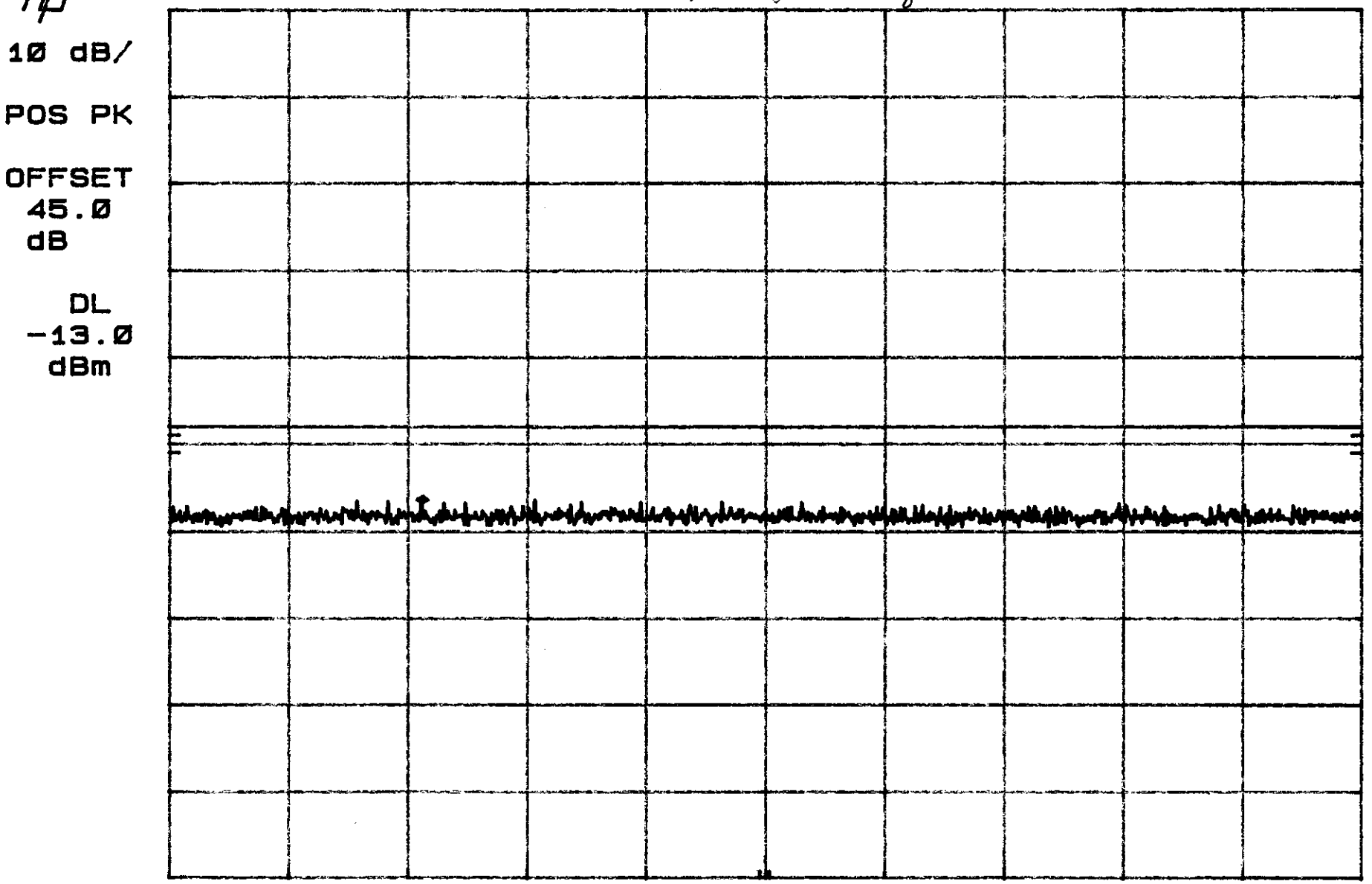
Waveform Part 24, Paragraph 24.238 5/25/99



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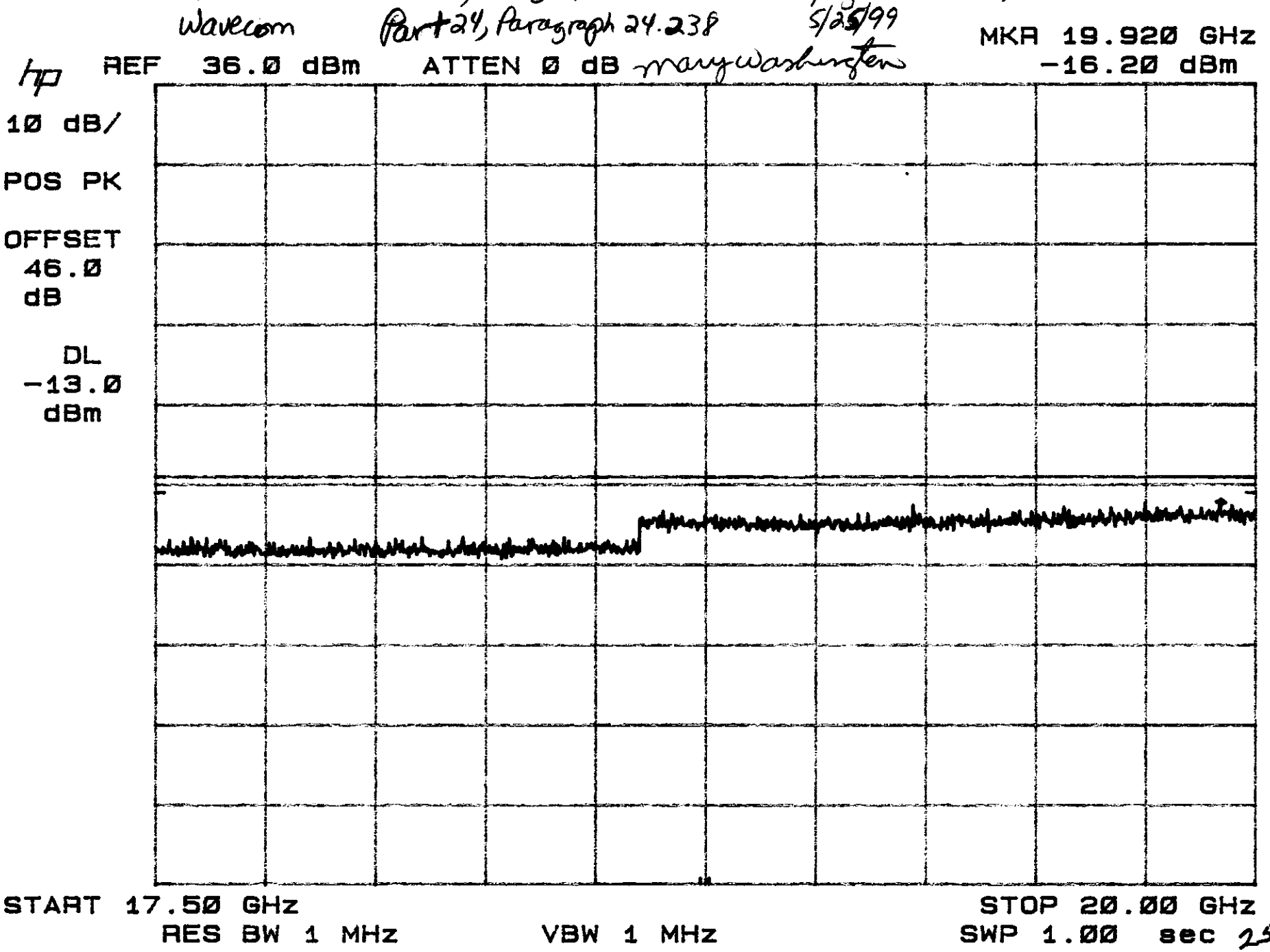
S9220 FCC Part 2, Paragraph 2.1051 and High channel, 810
Wavecom Part 24, Paragraph 24.238 5/25/99



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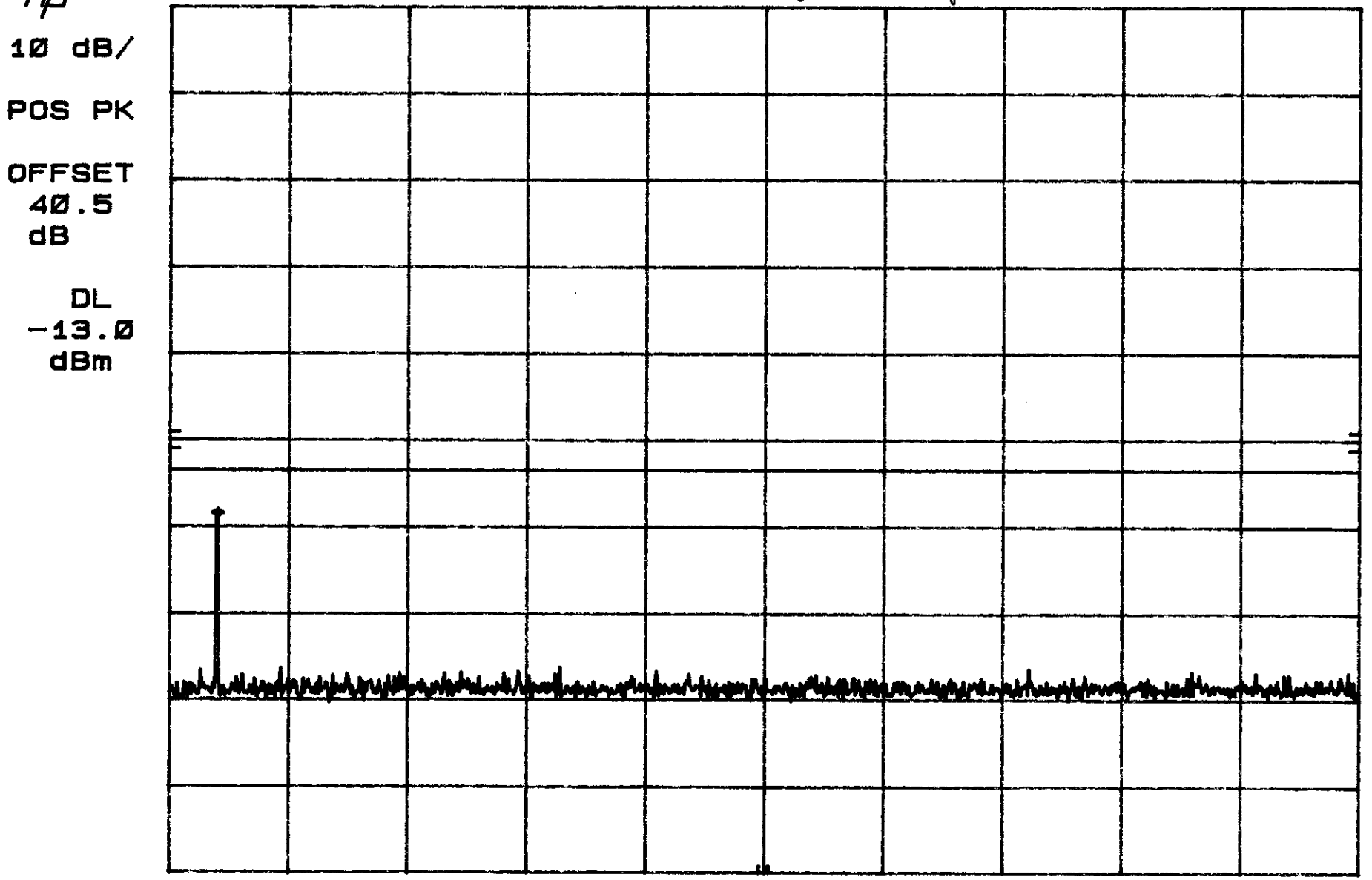
S9220 FCC Part 2, Paragraph 2.1051 and mid channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99
MKR 68.8 MHz
hp REF 40.5 dBm ATTEN 10 dB mary Washington -17.90 dBm



S9220 FCC Part 2, Paragraph 2.1051 and mid channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99
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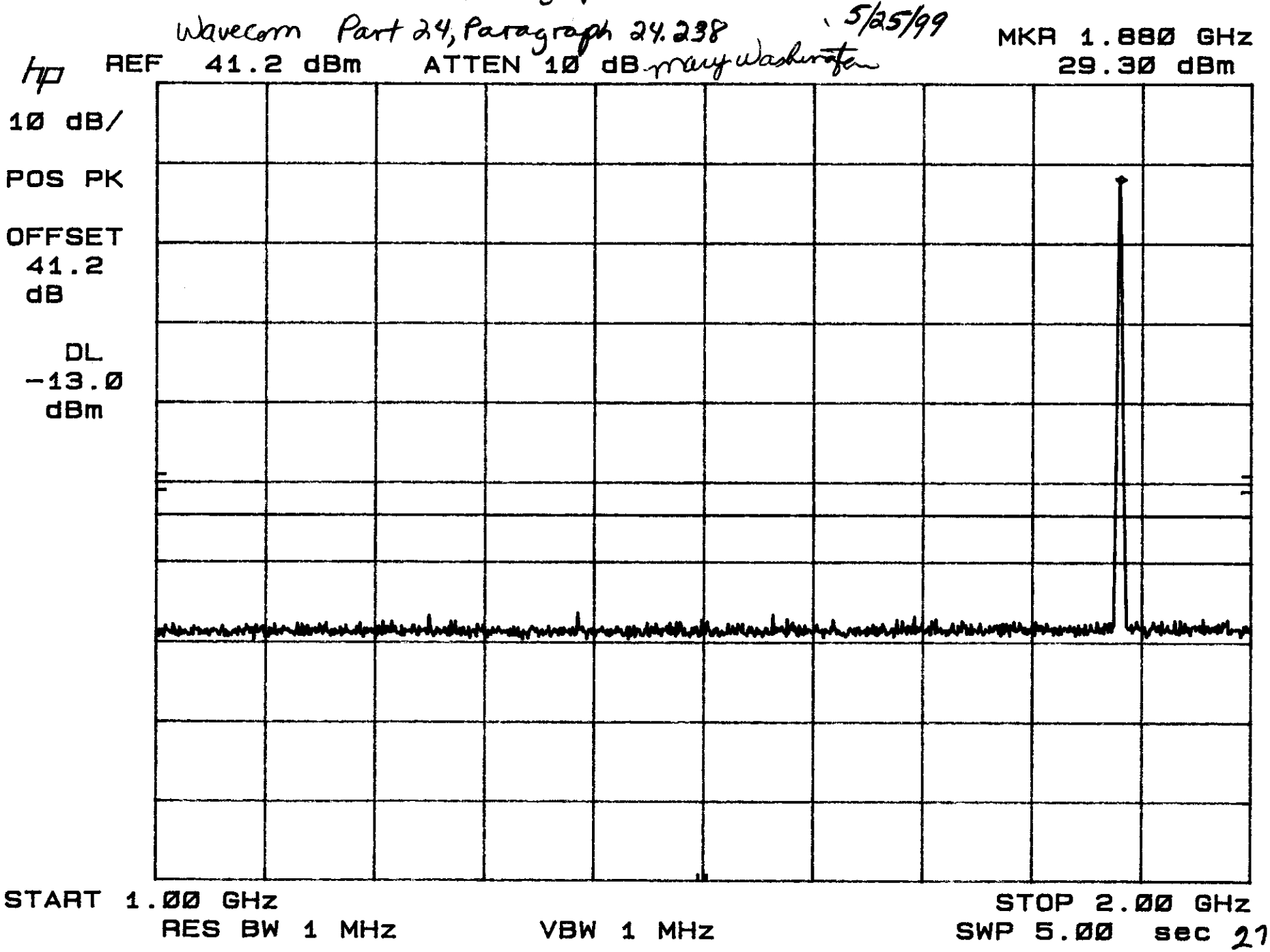
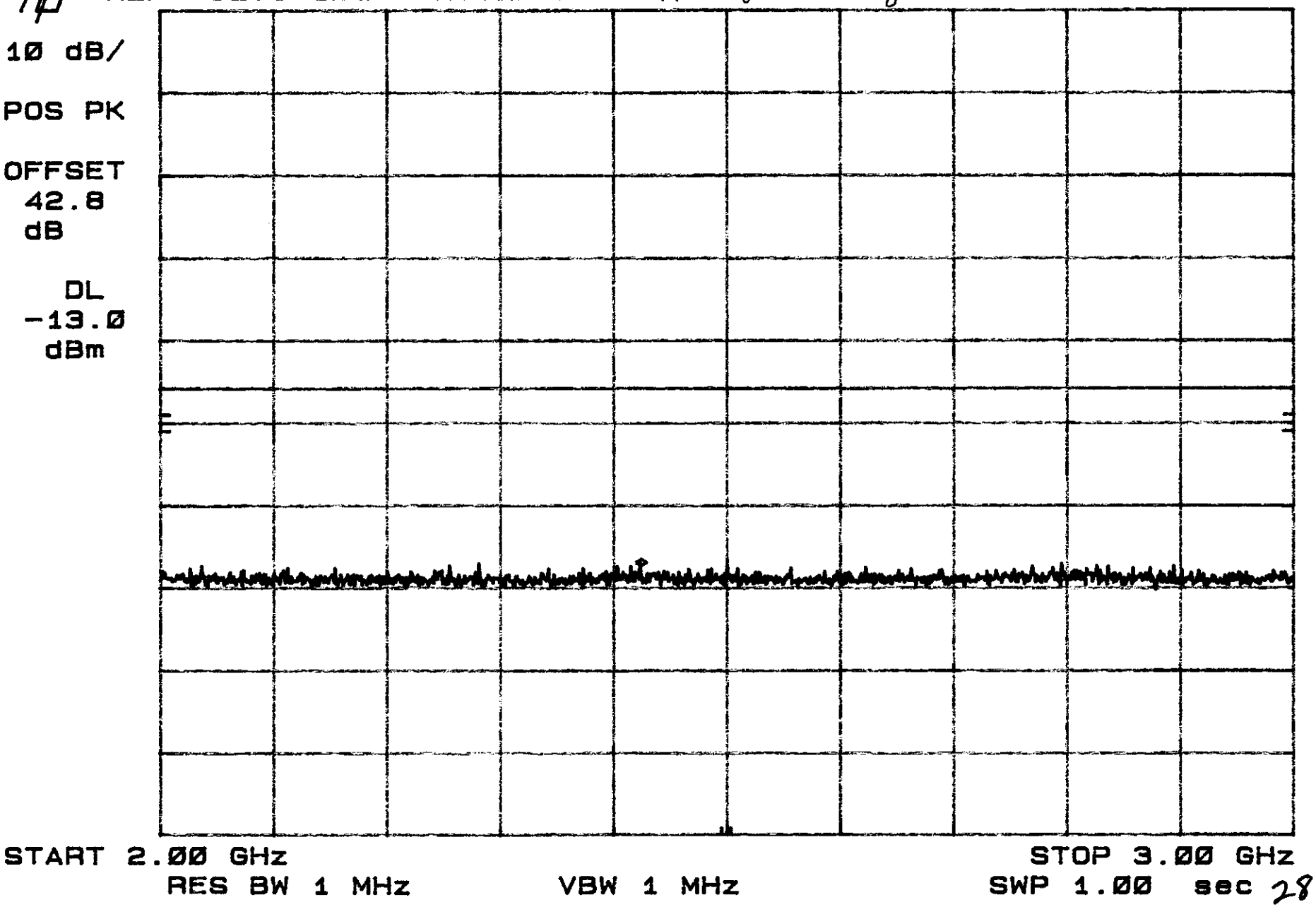


S9220 FCC Part 2, Paragraph 2.1051 and Mid Channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99



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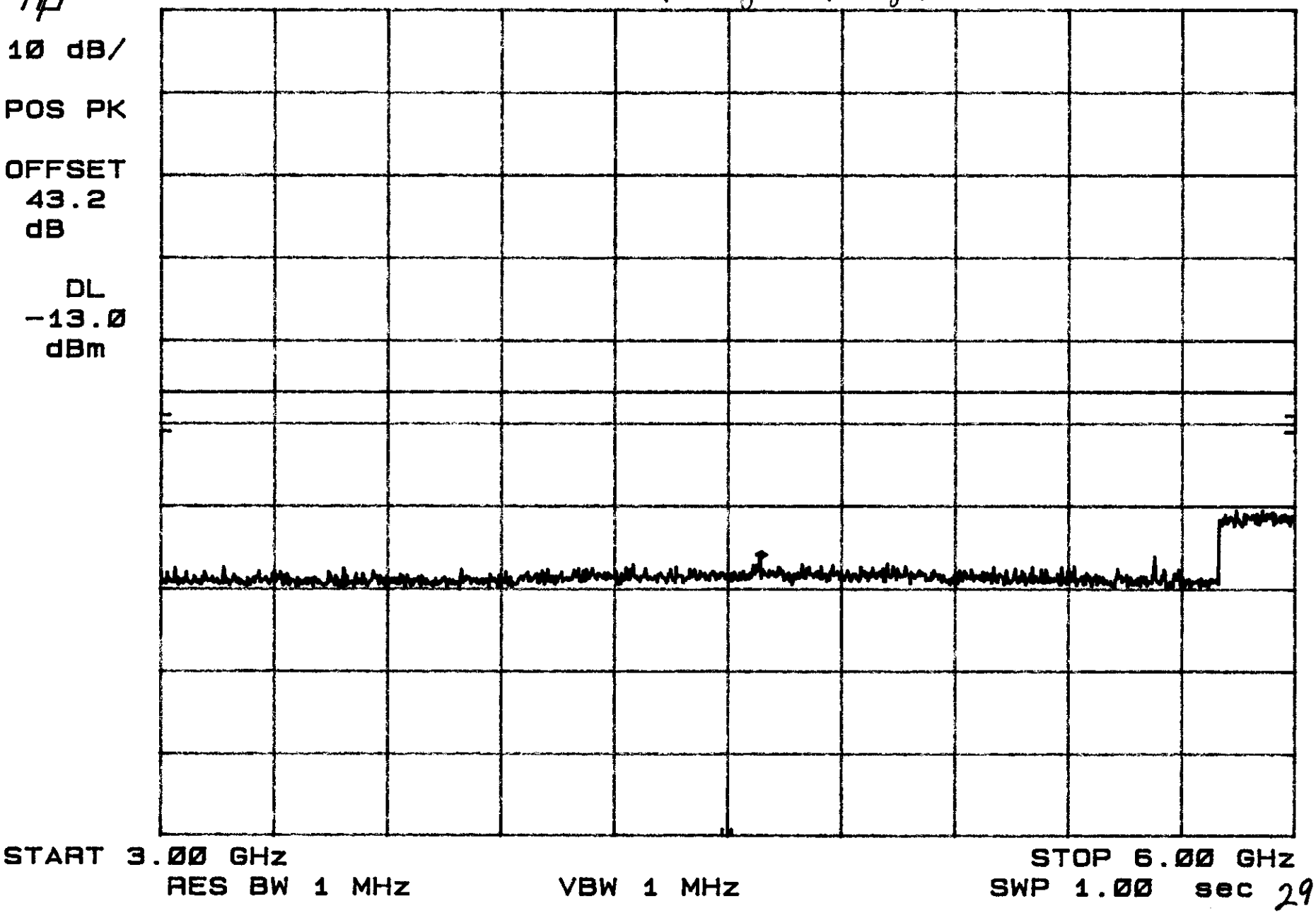
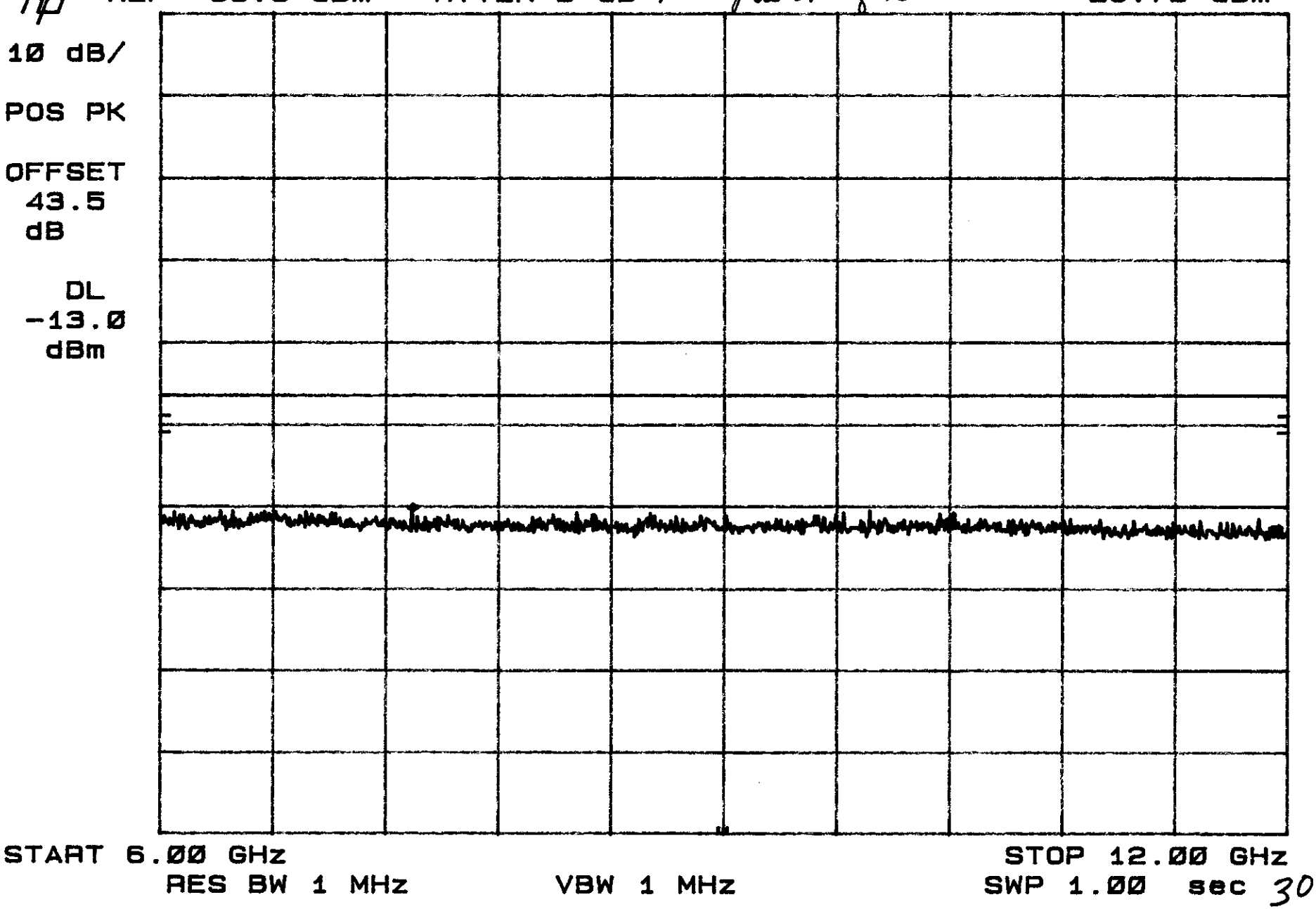
S9220 FCC Part 2, Paragraph 2.1051 and mid channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99



S9220 FCC Part 2, Paragraph 2.1051 and mid channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99



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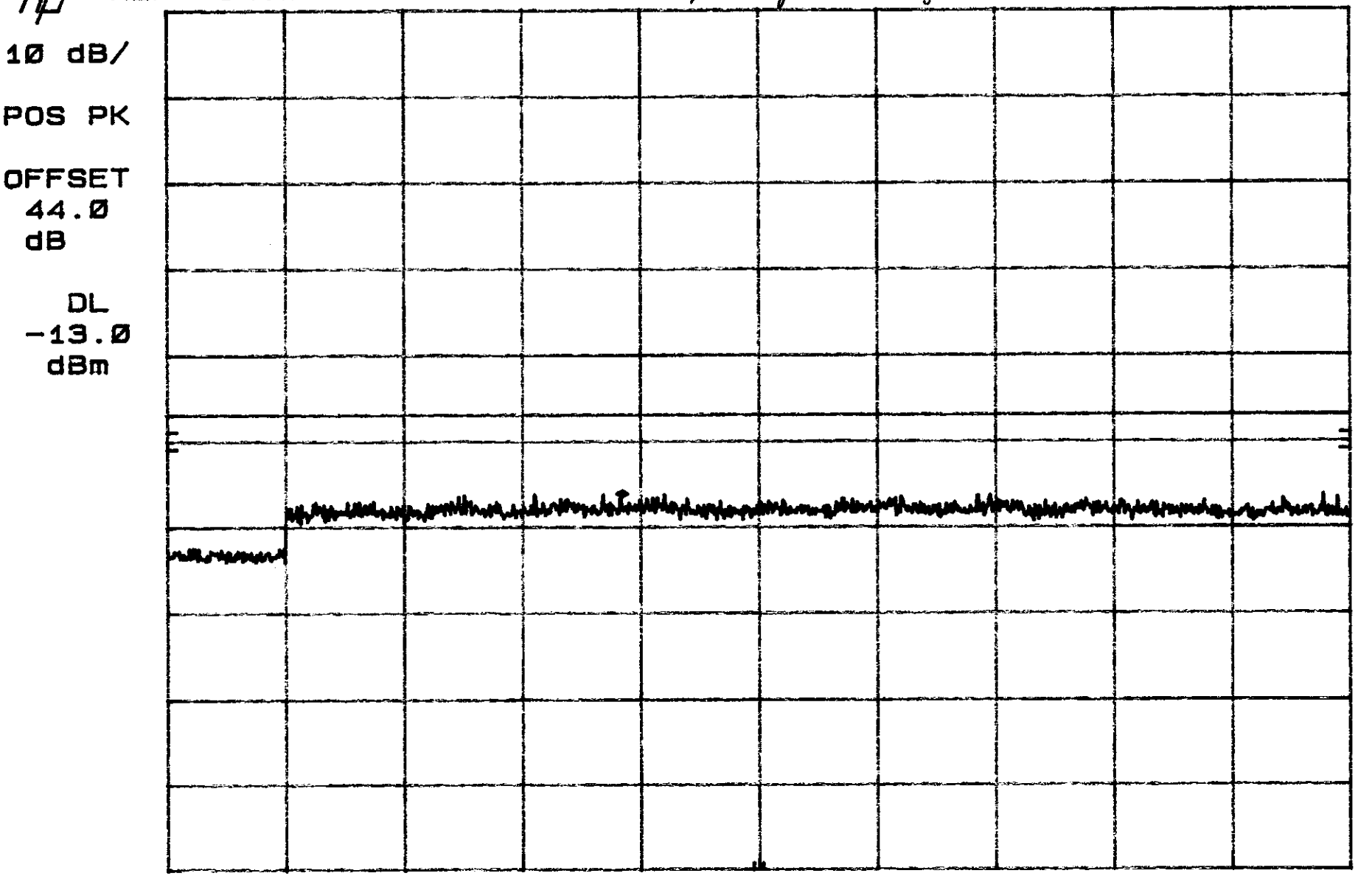
S9220 FCC Part 2, Paragraph 2.1051 and mid channel, 661
Wavecom Part 24, Paragraph 24.238 5/25/99
MKR 13.920 GHz
hp REF 34.0 dBm ATTEN 0 dB mary Washington -22.20 dBm



START 12.00 GHz STOP 17.00 GHz
RES BW 1 MHz VBW 1 MHz SWP 1.00 sec

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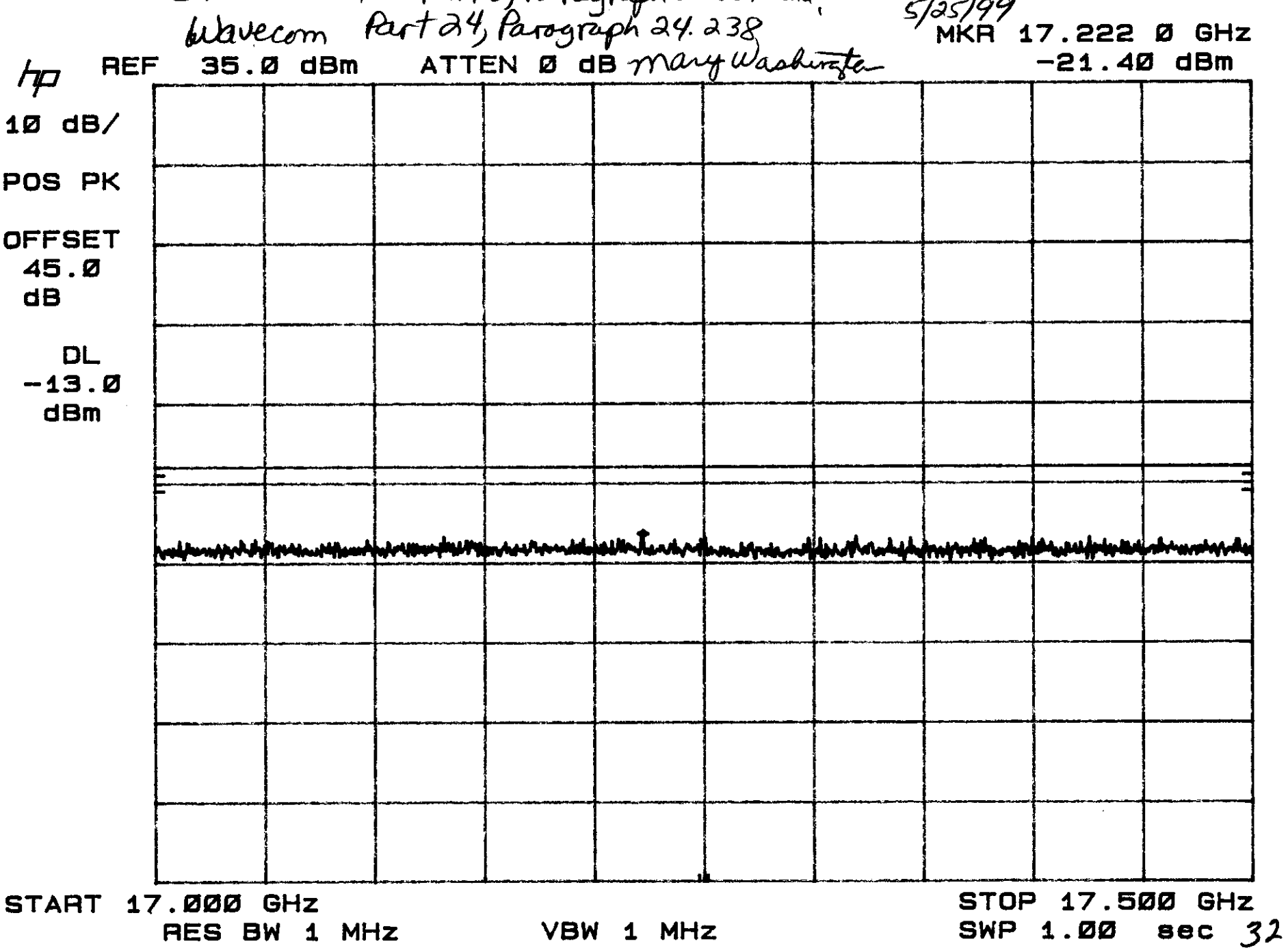

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wavecom Part 24, Paragraph 24.238 5/25/99
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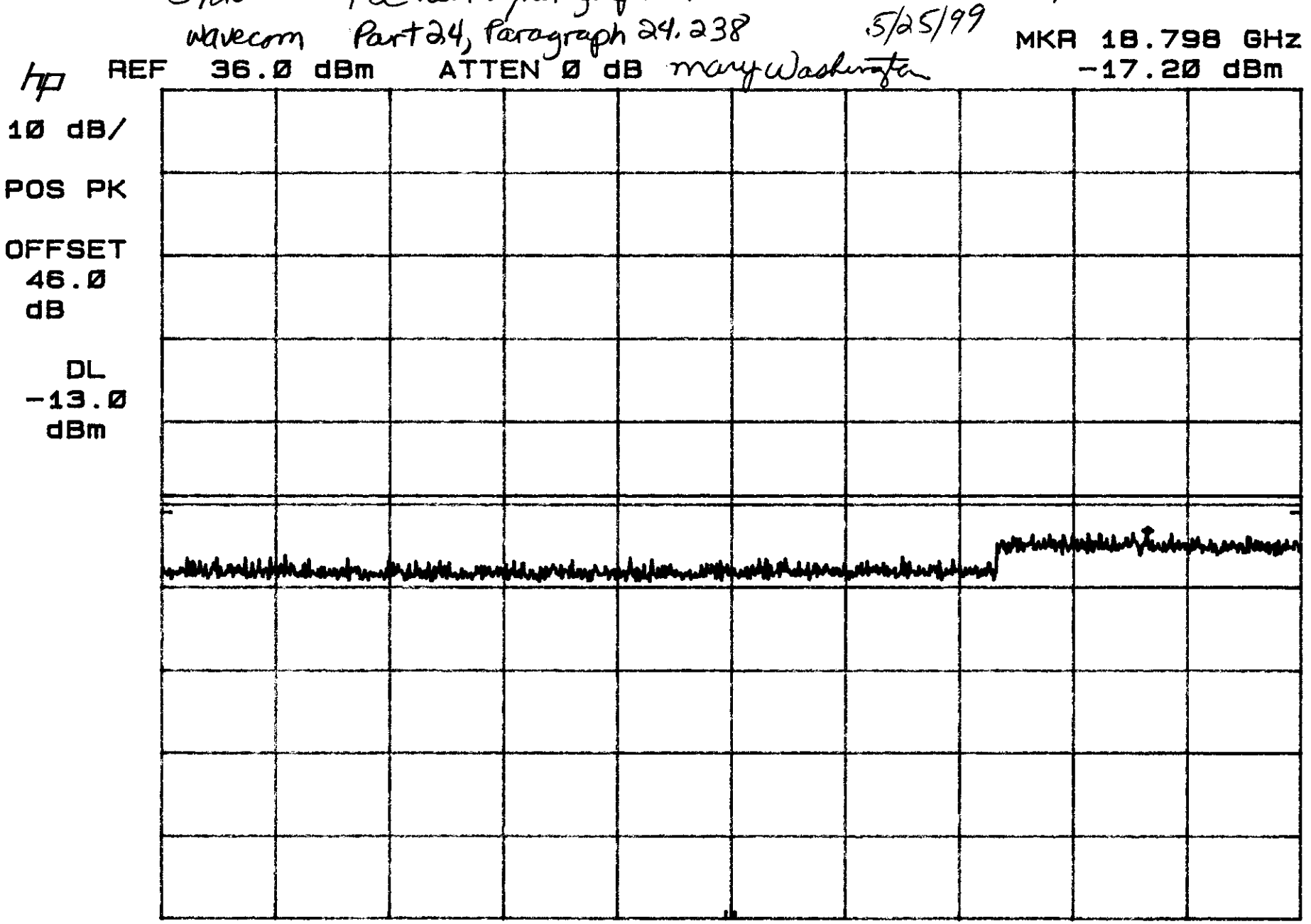
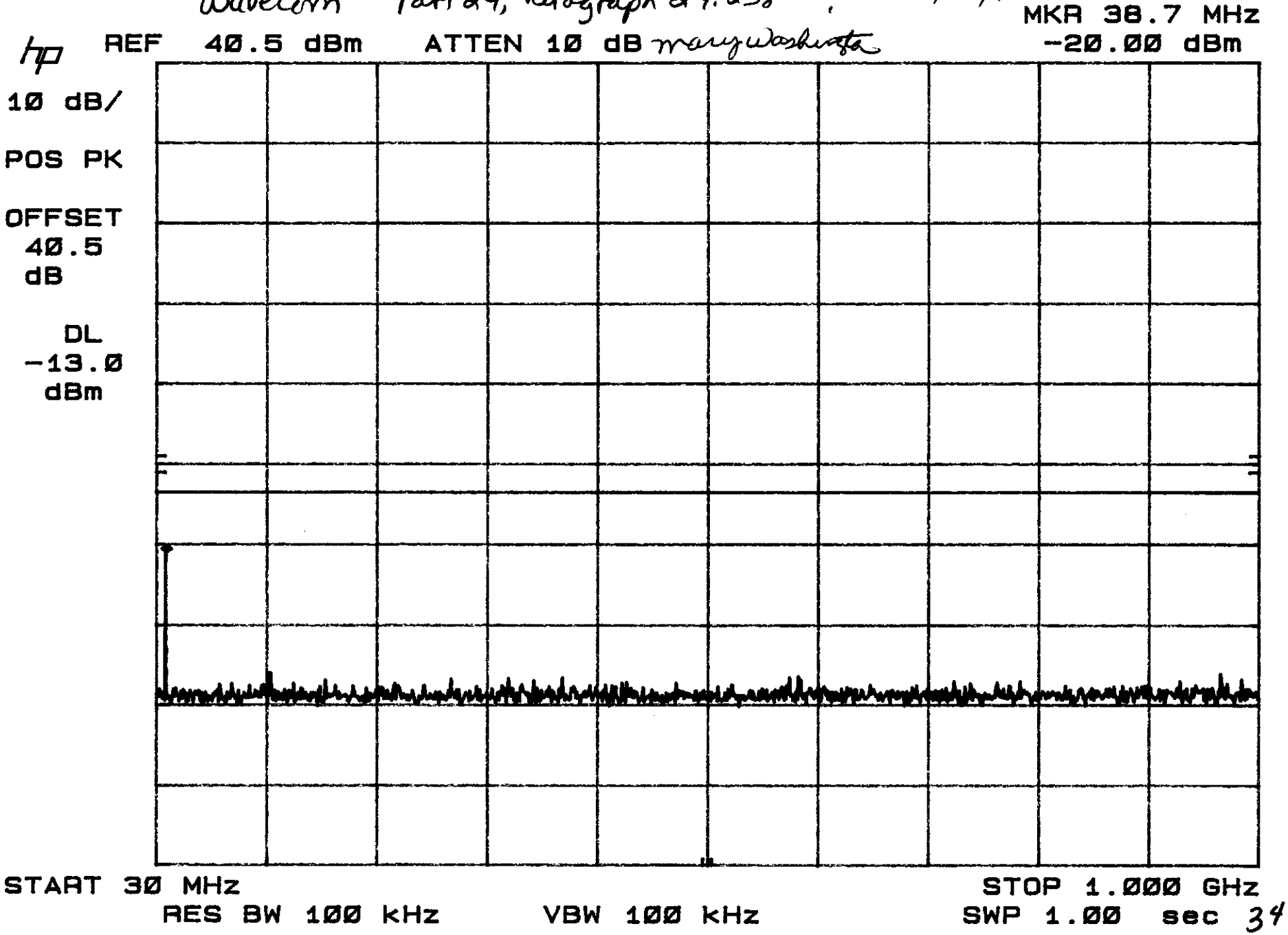


S9220 FCC Part 2, Paragraph 2.1051 and
Wavecom Part 24, Paragraph 24.238

Low Channel, 512
5/25/99
Mary Washista

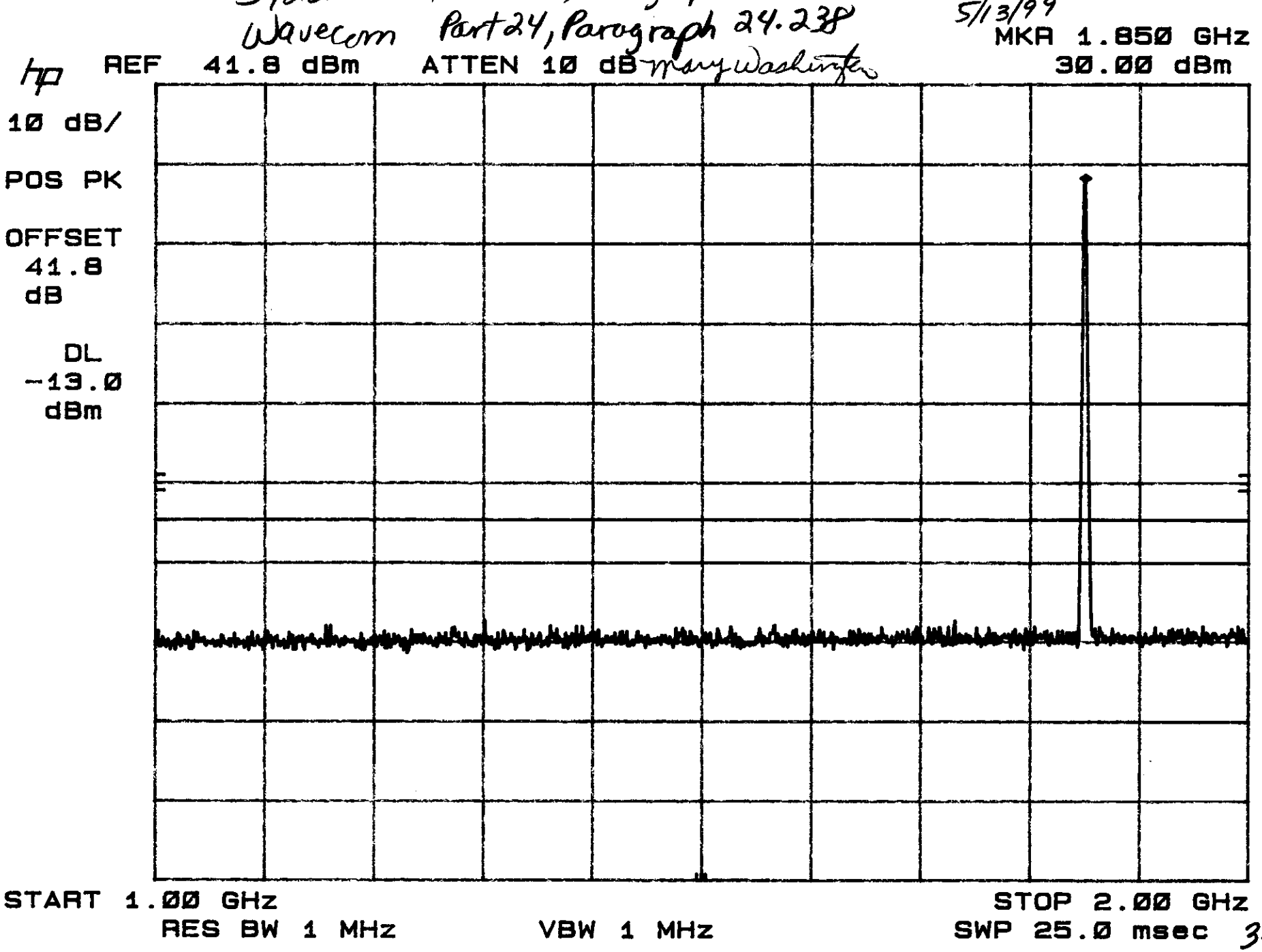


34

S9220 Wavecom

FCC Part 2, Paragraph 2.1051 and Part 24, Paragraph 24.238

Low channel, 512
5/13/99
Mary Washington



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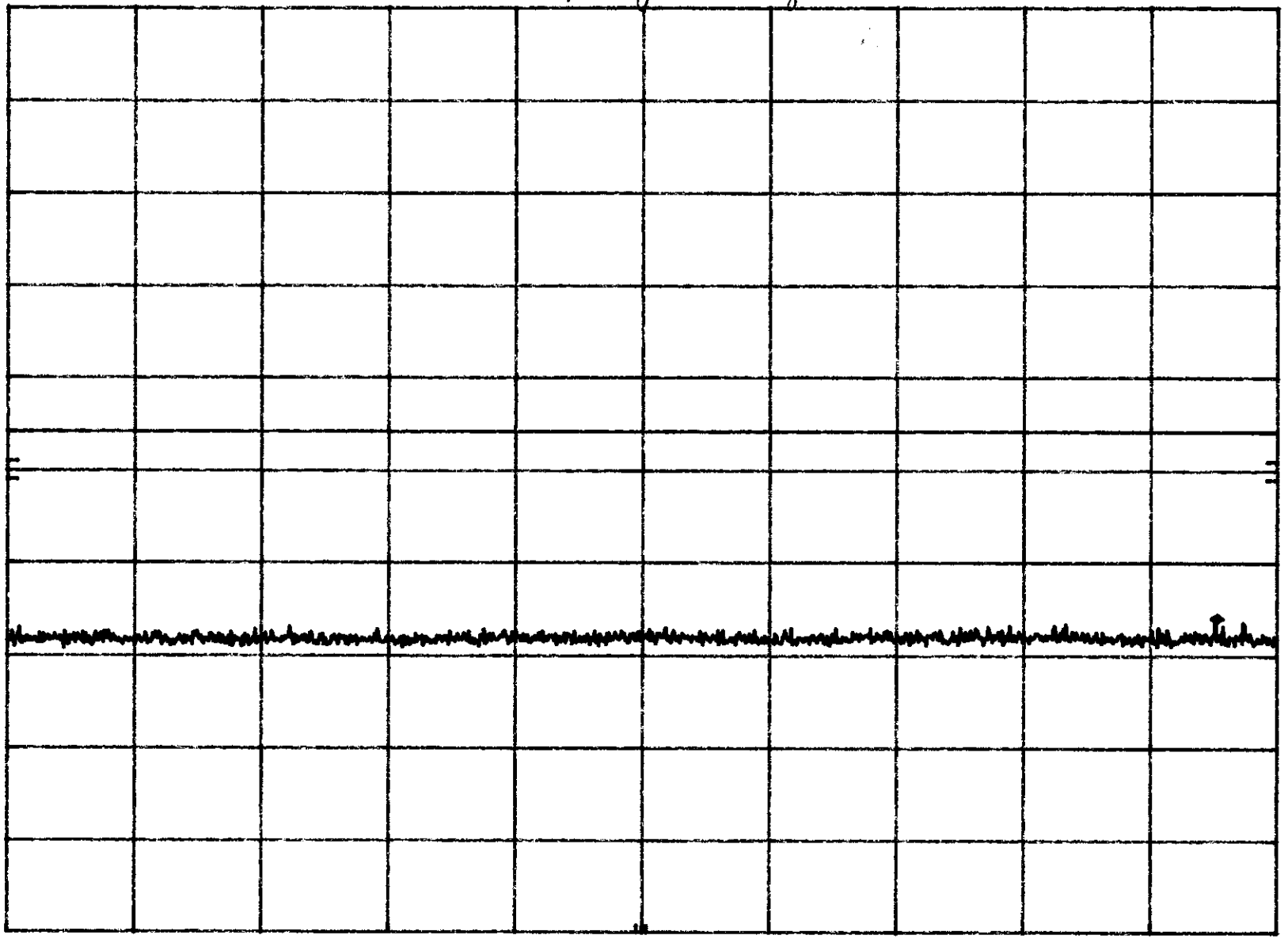
Wavecom

FCC Part 2, Paragraph 2.1051 and
Part 24, Paragraph 24.238

Low Channel, 512
5/25/99

MKR 2.952 GHz
-33.10 dBm

hp REF 32.8 dBm ATTEN 0 dB mary washington

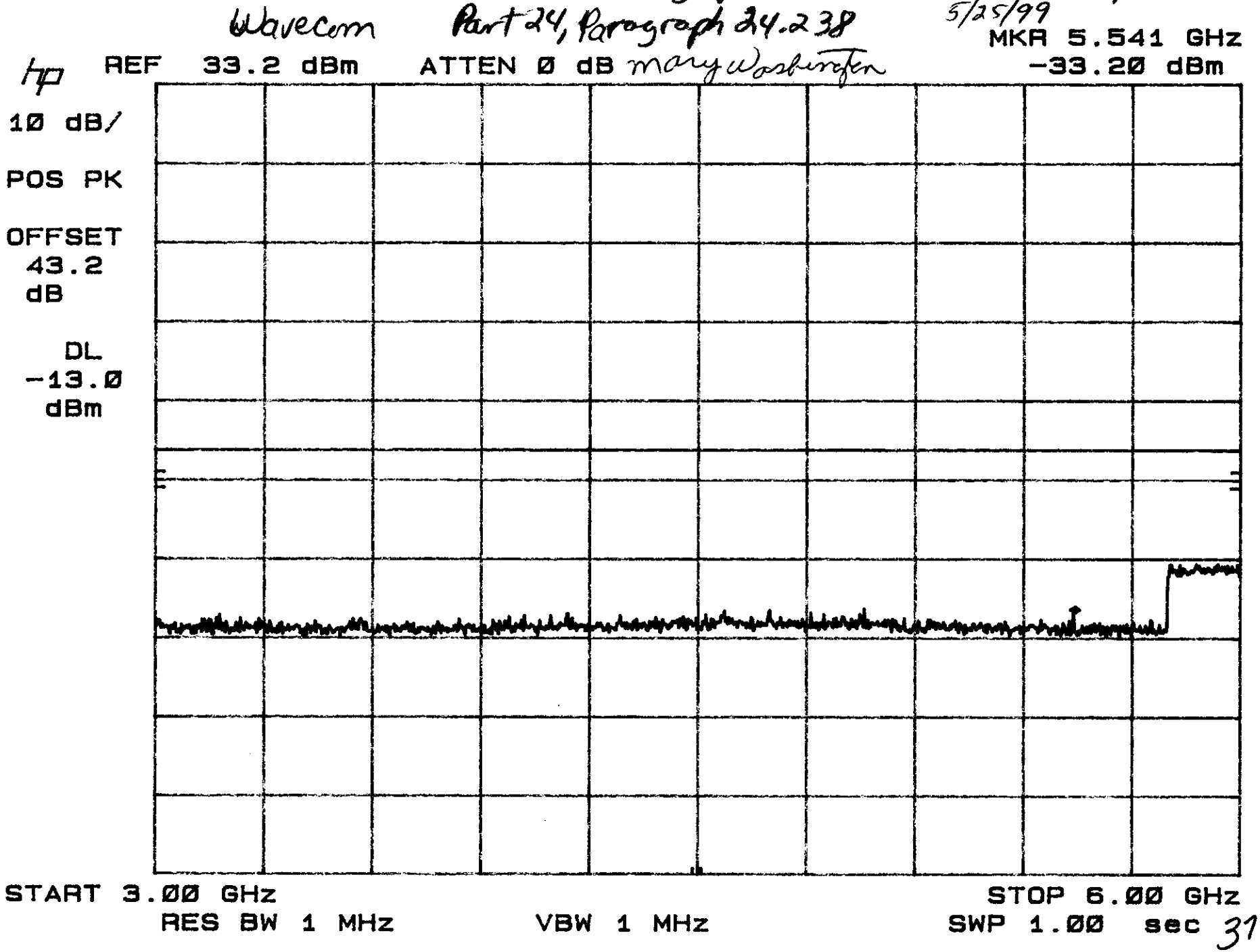


START 2.00 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 3.00 GHz
SWP 1.00 sec

59220
Wavecom

FCC Part 2, Paragraph 2.1051 and
Part 24, Paragraph 24.238

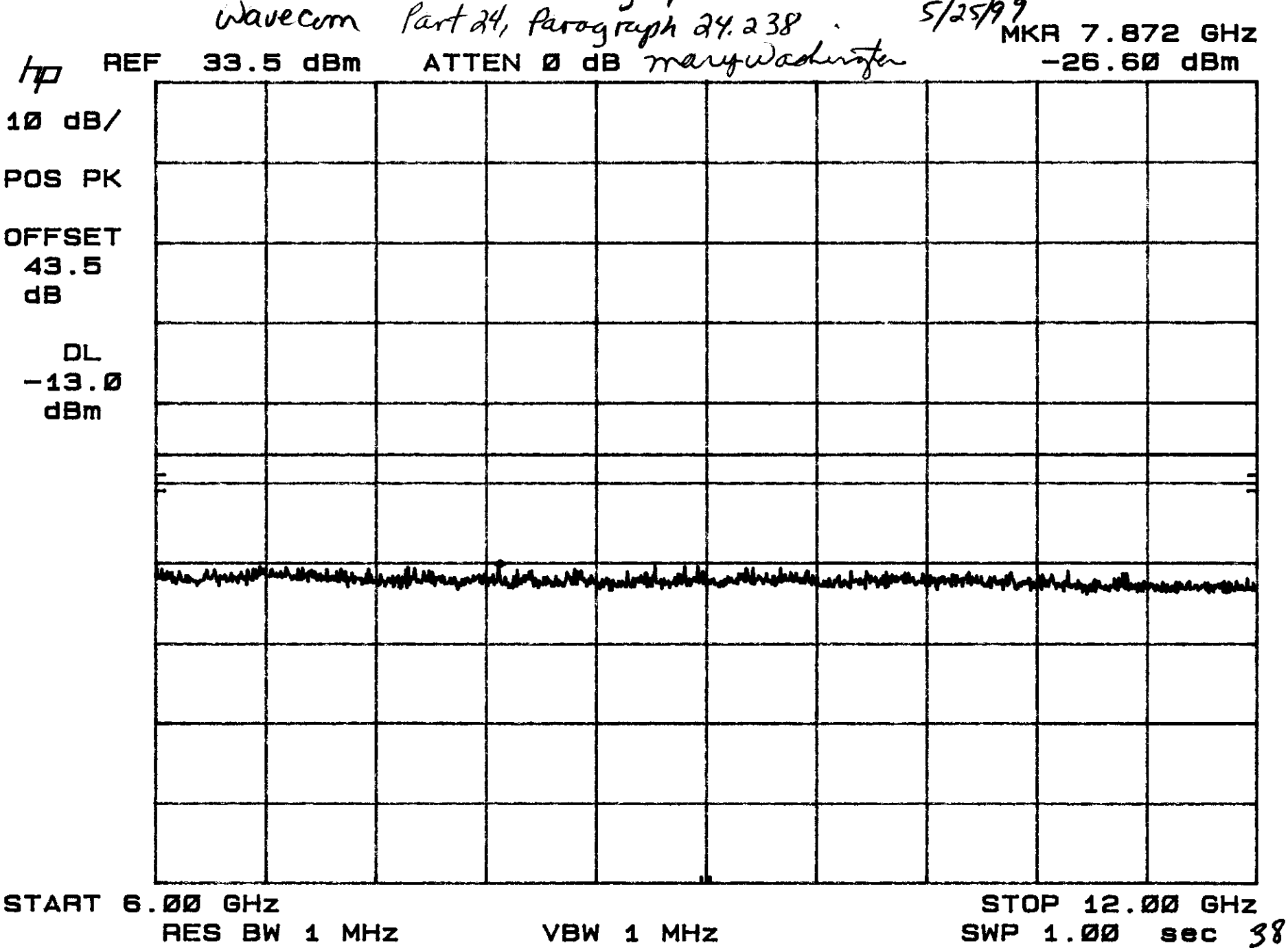
LawChannel, 512
5/25/99



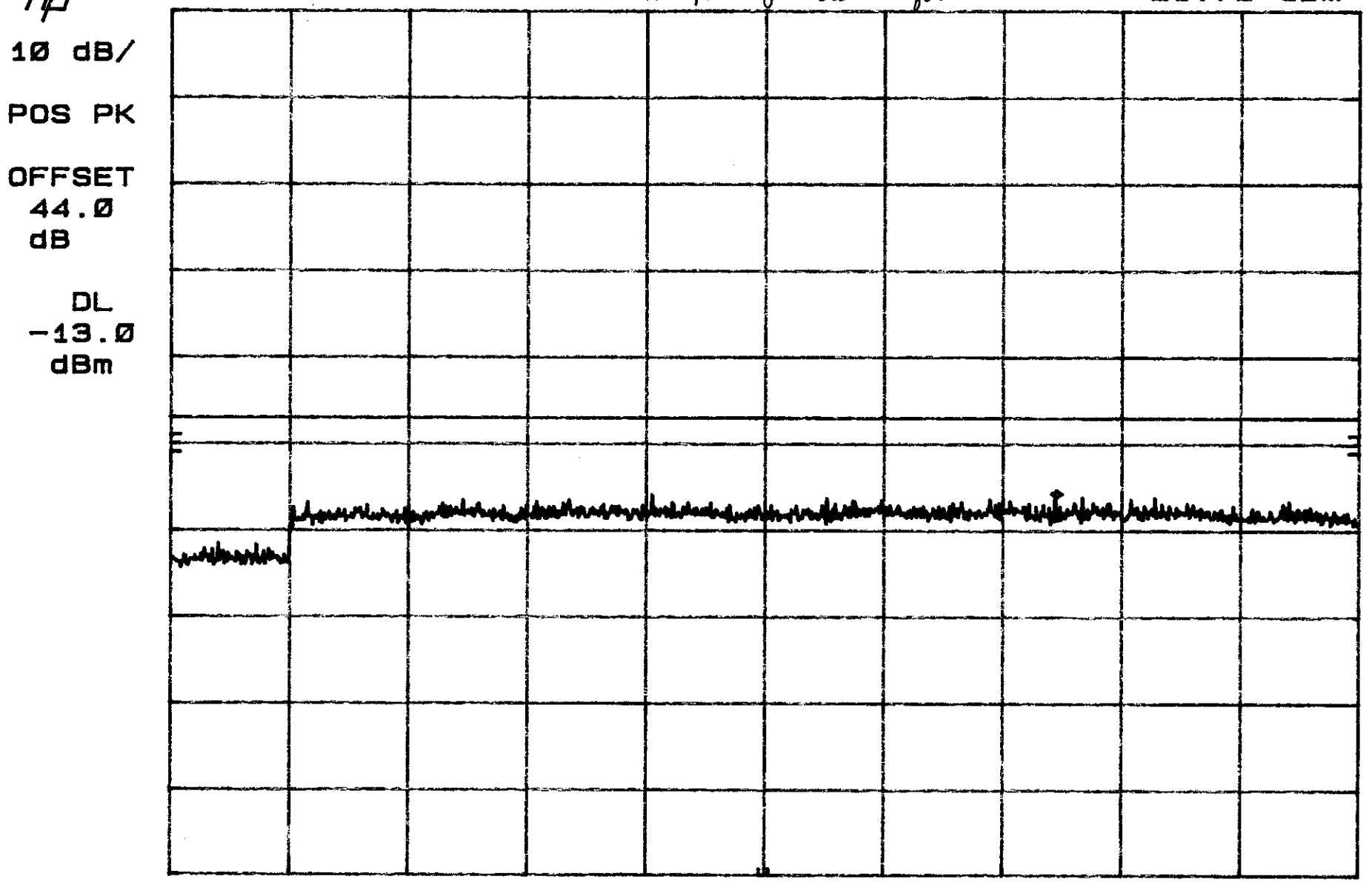
S9220
Wavecom

FCC Part 2, Paragraph 2.1051 and Part 24, Paragraph 24.238.

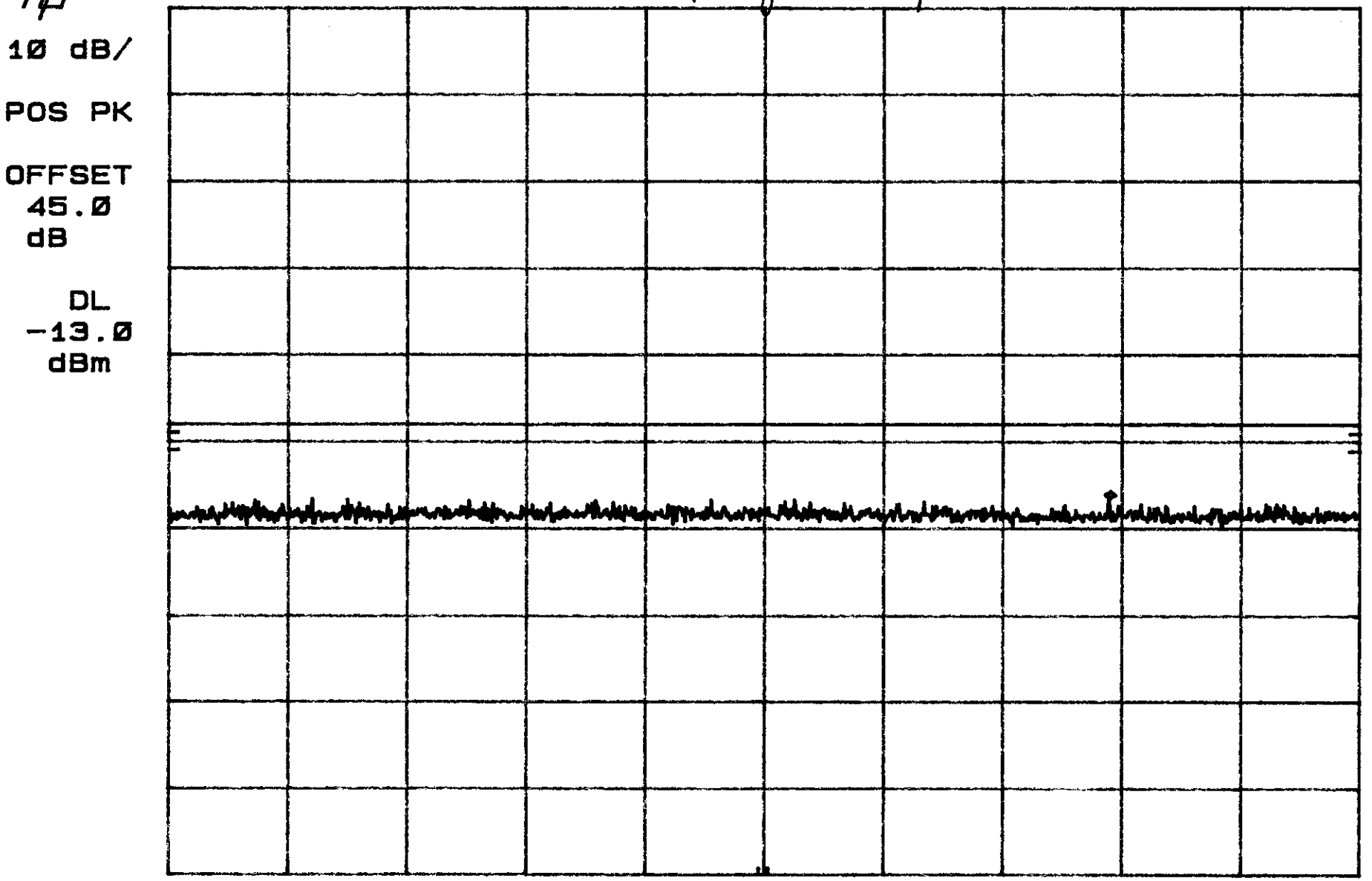
Low Channel, 512
5/25/99
Mary Washington



S9220 FCC Part 2, Paragraph 2.1051 and Low Channel, 512
Wavecom Part 24, Paragraph 24.238 5/25/99
Mary Washington



S9220 FCC Part 2, Paragraph 2.1051 and Low Channel, 512
Wavecom Part 24, Paragraph 24.238 5/25/99
Mary Washington



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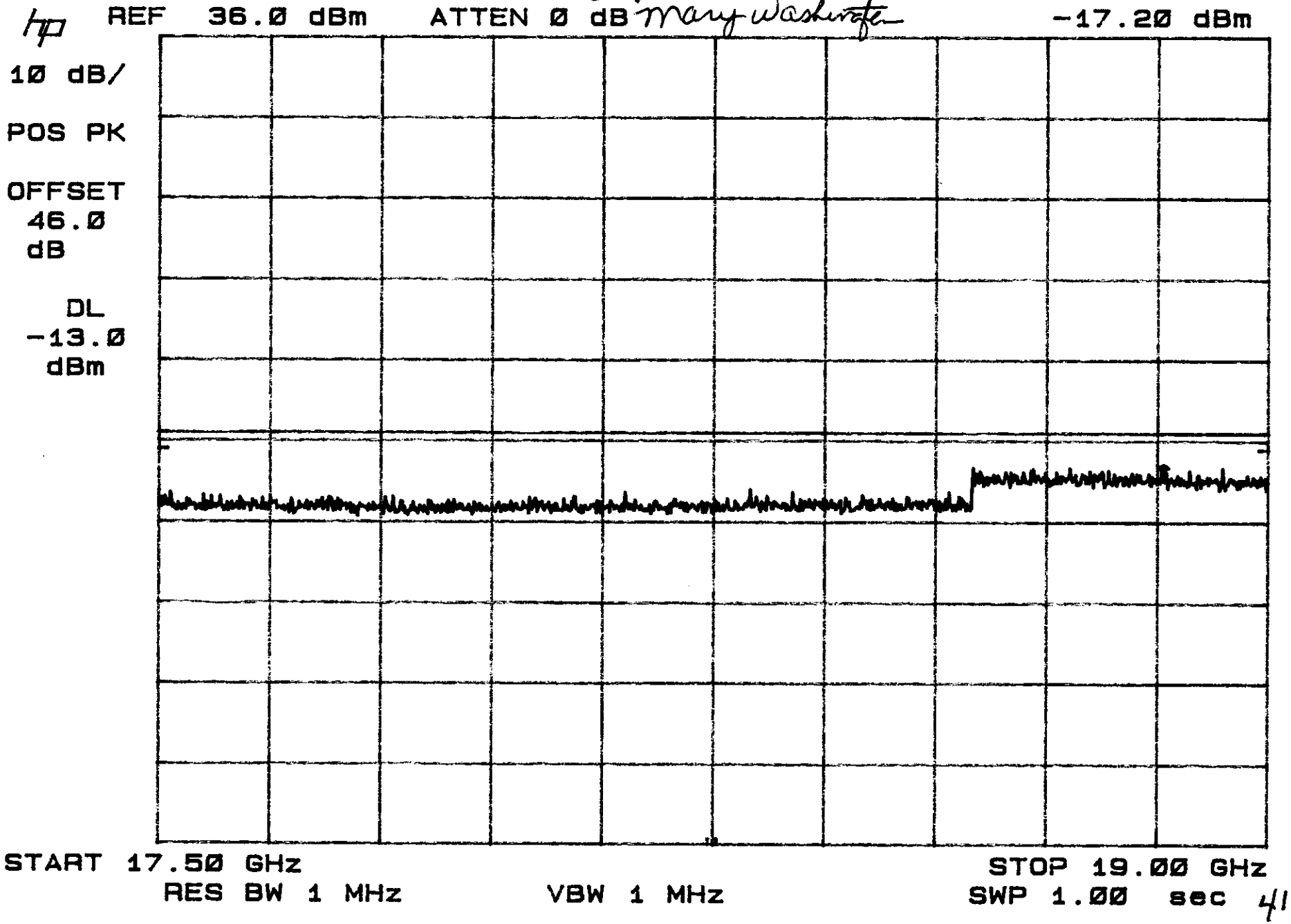
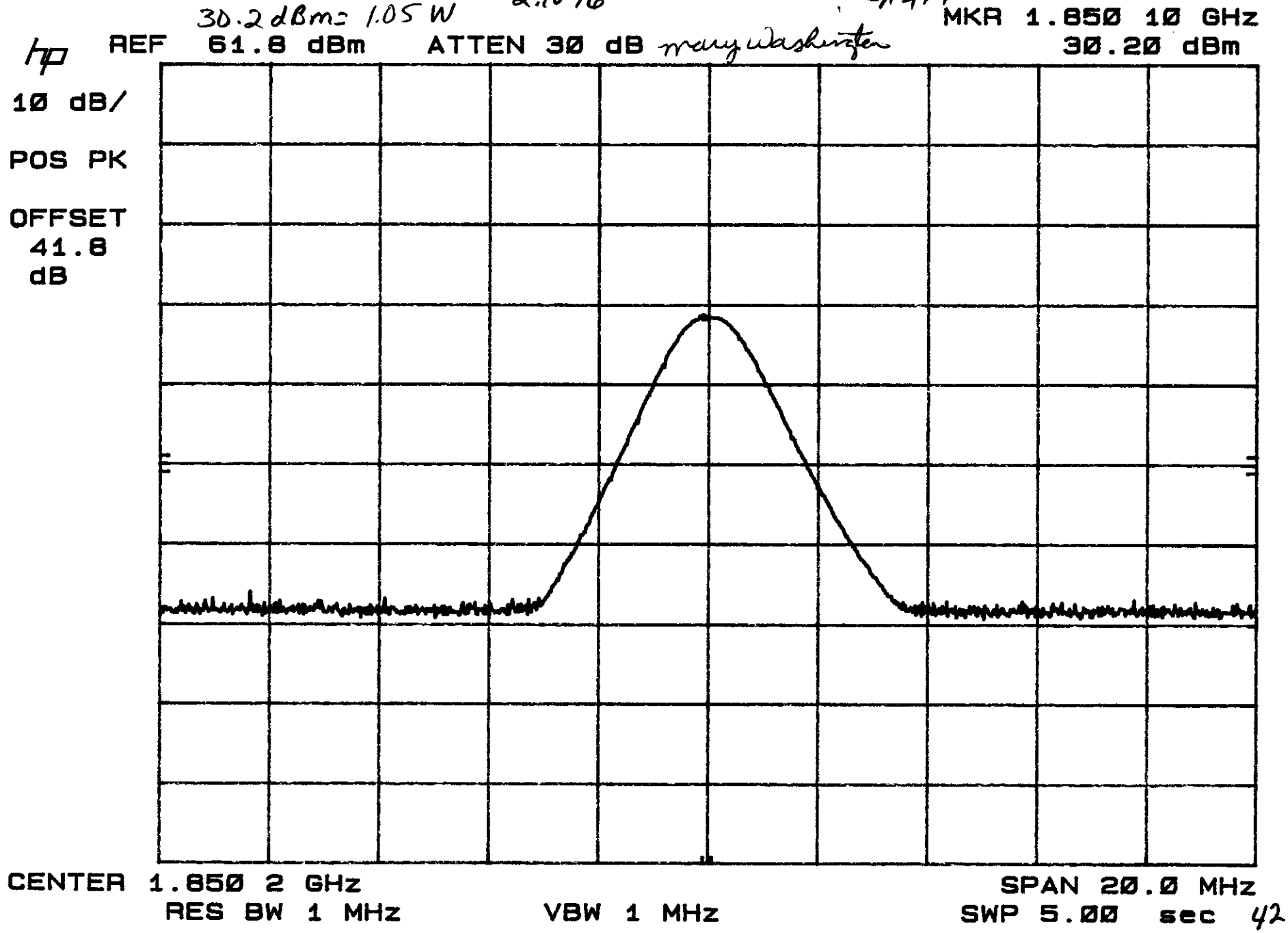
59220 FCC Part 2, Paragraph 2.1051 and Low Channel, 512
Wavecom Part 24, Paragraph 24.238 5/25/99



S9220
Wavecom
30.2 dBm = 1.05 W

FCC Part 2, Paragraph
2.1046

Low channel, 512
5/13/99

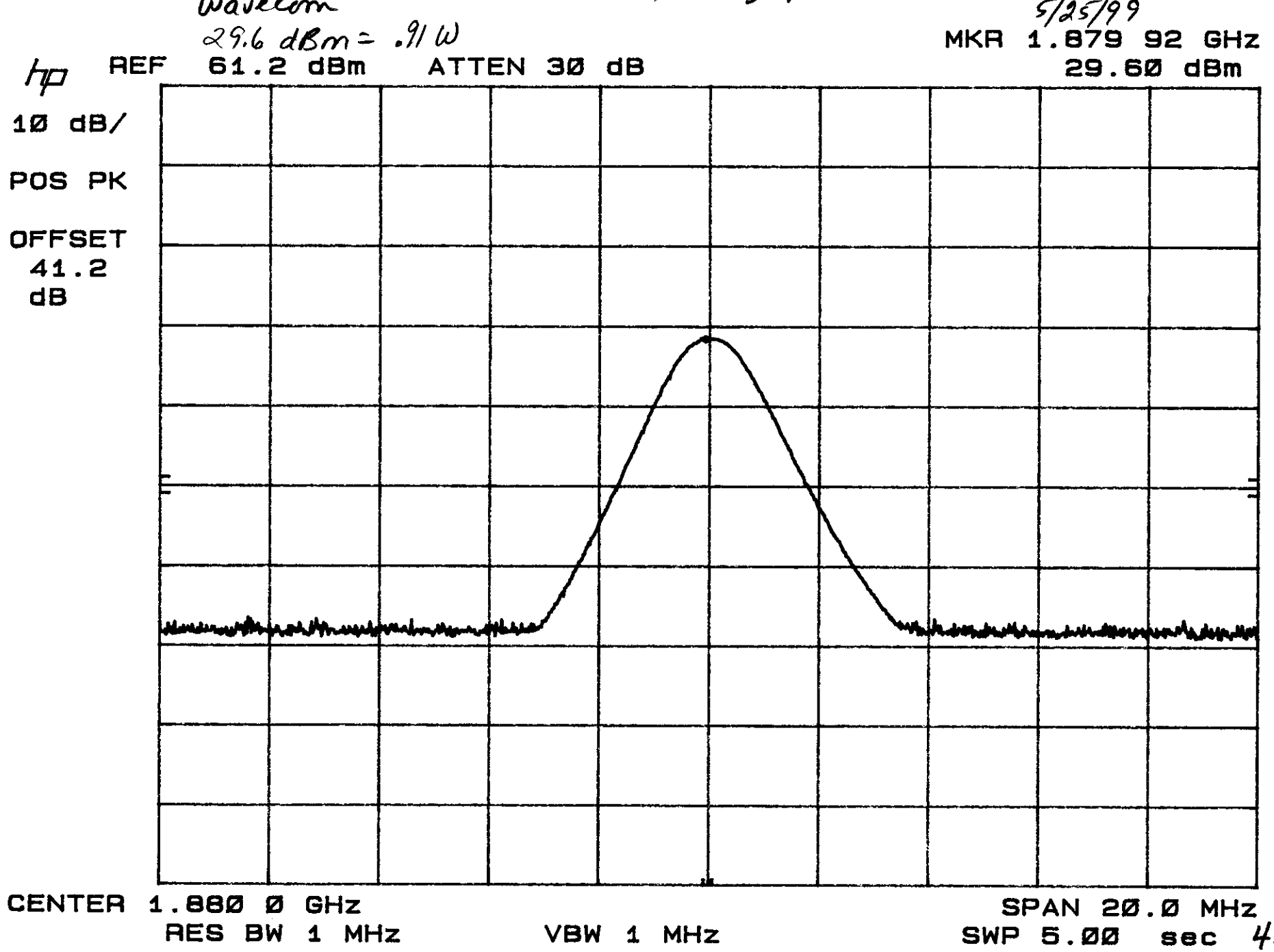


mary washington

S9220
Wavecom
29.6 dBm = .91 W

FCC Part 2, Paragraph 2.1046

Mid channel, 661
5/25/99



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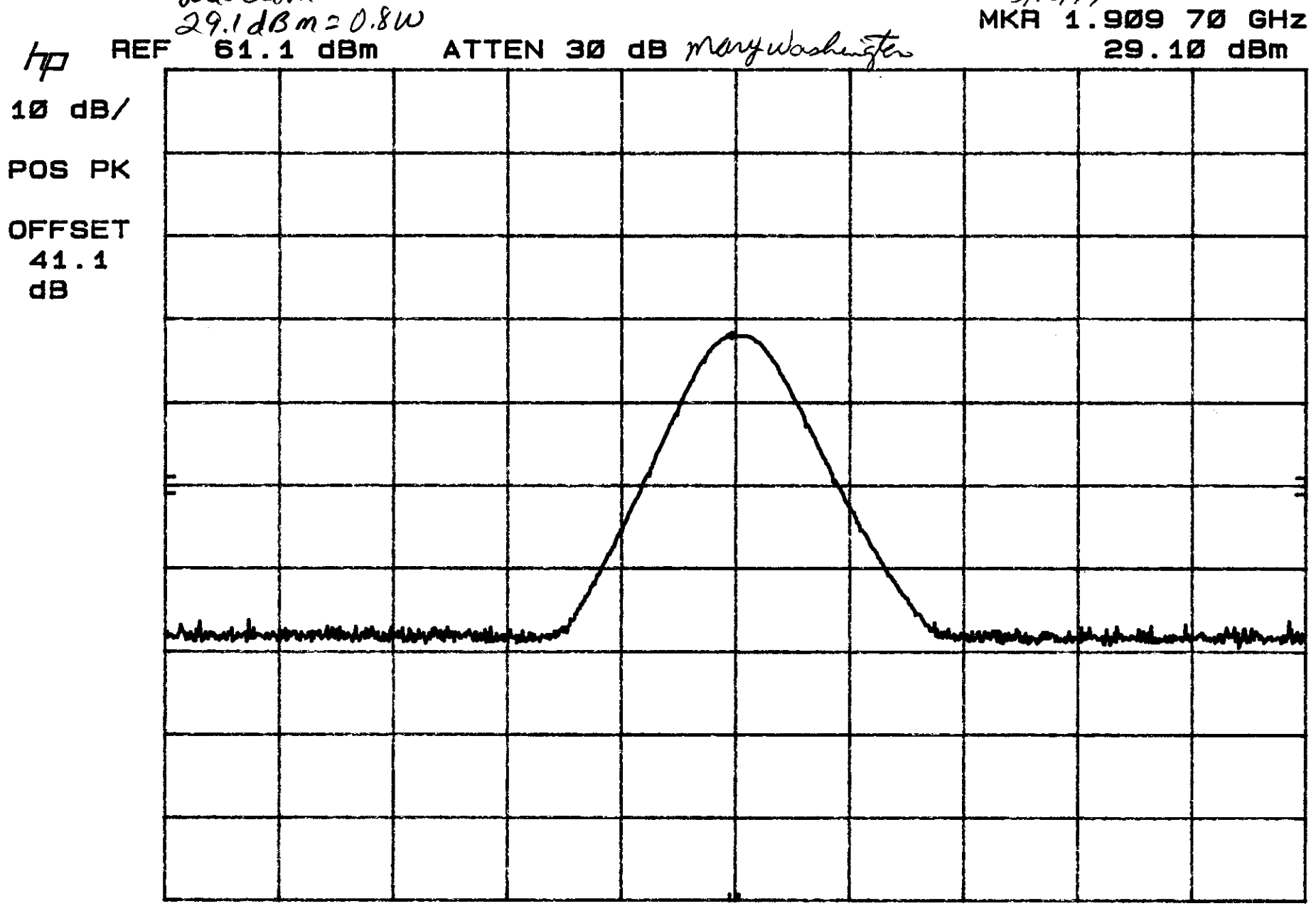
Wavecom
29.1 dBm = 0.8W

FCC Part 2, Paragraph 2.1046

High Channel, 810
5/13/99



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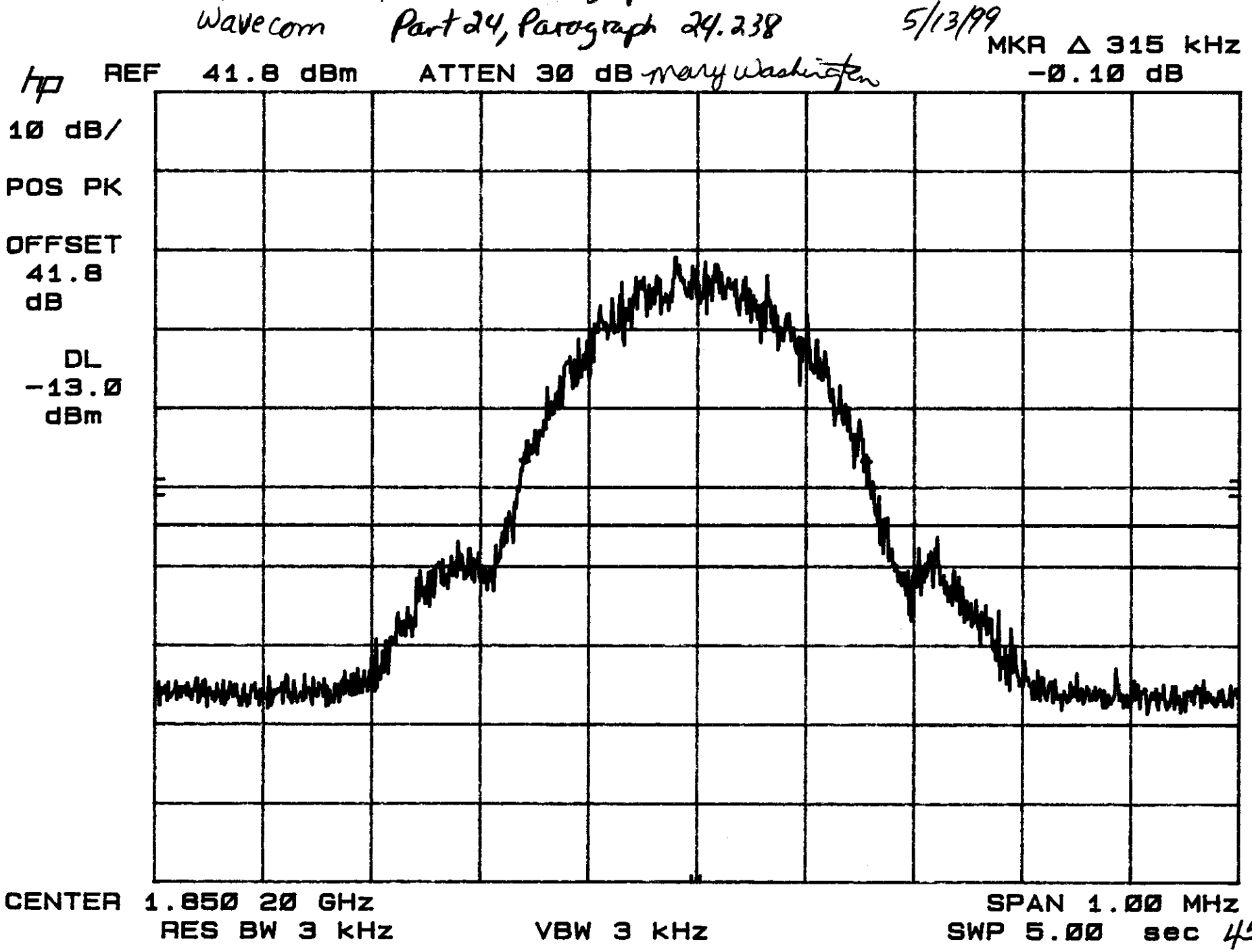
Wavecom

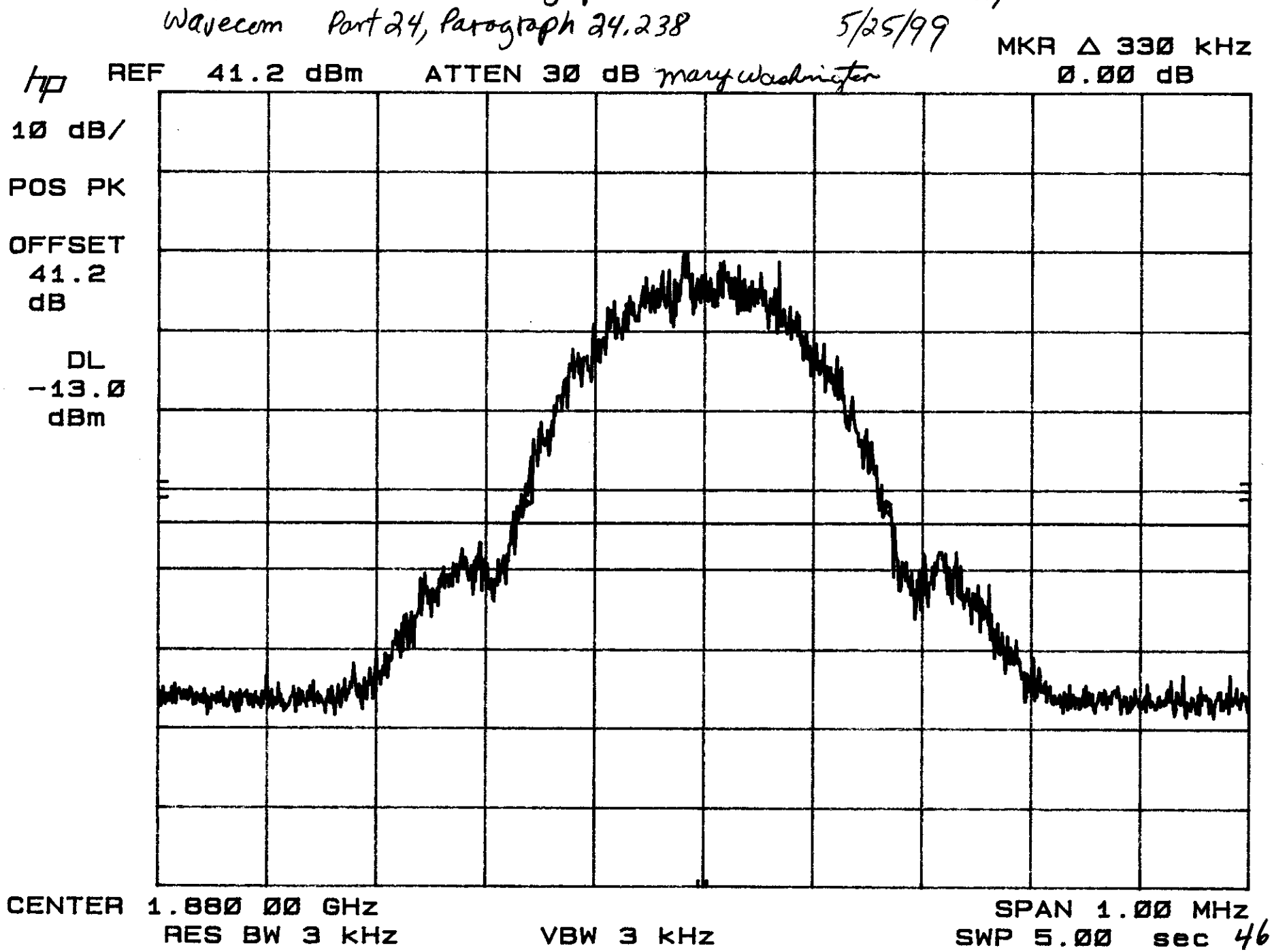
FCC Part 2, Paragraph 2.1049 and
Part 24, Paragraph 24.238

Low channel, 512
5/13/99

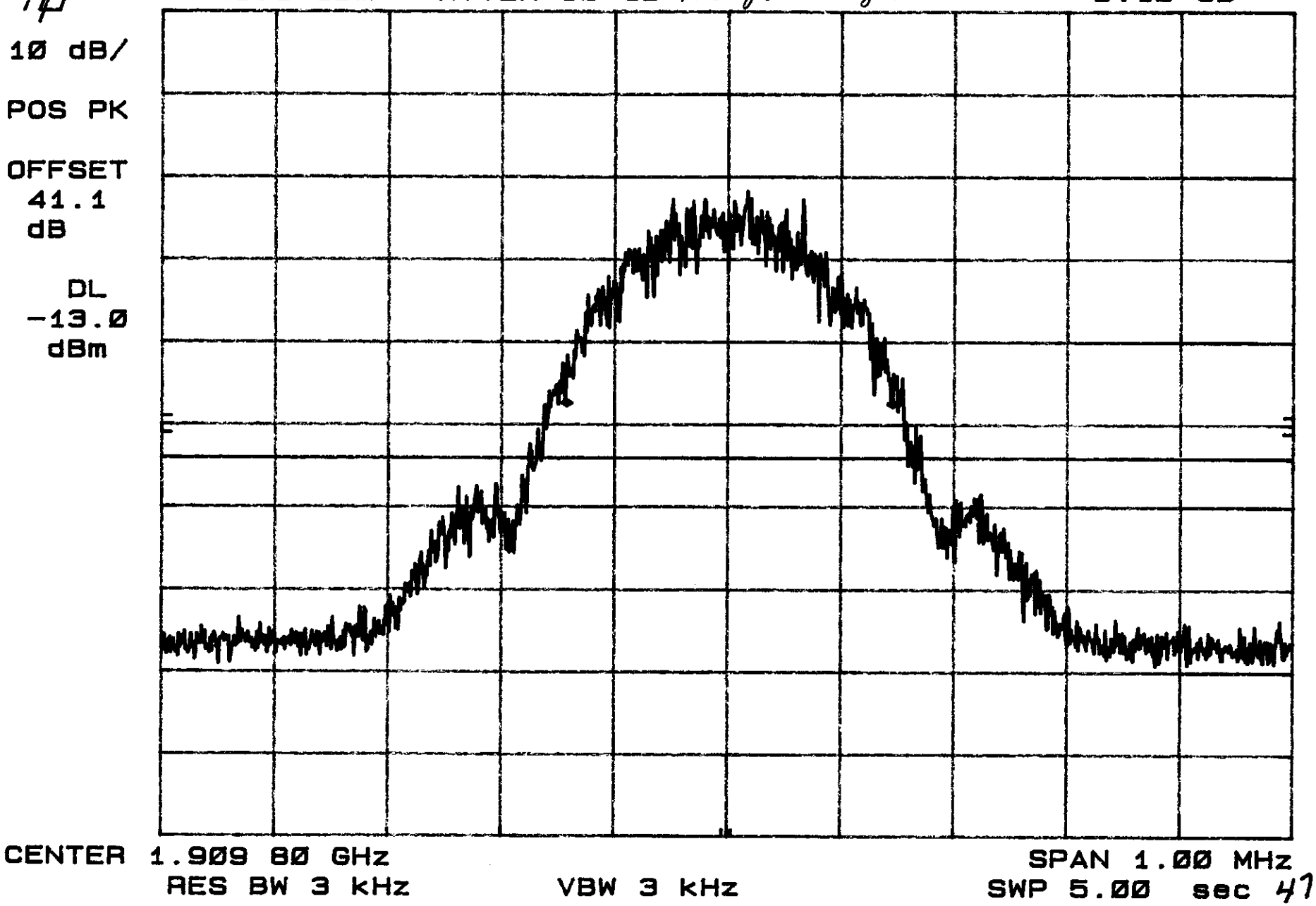


59220 FCC Part 2, Paragraph 2.1049 and
Wavecom Part 24, Paragraph 24.238

mid channel, 512
5/25/99



S9220 FCC Part 2, Paragraph 2.1049 and High channel, 810
Wavecom Part 24, Paragraph 24.238 5/13/99



may washington

47

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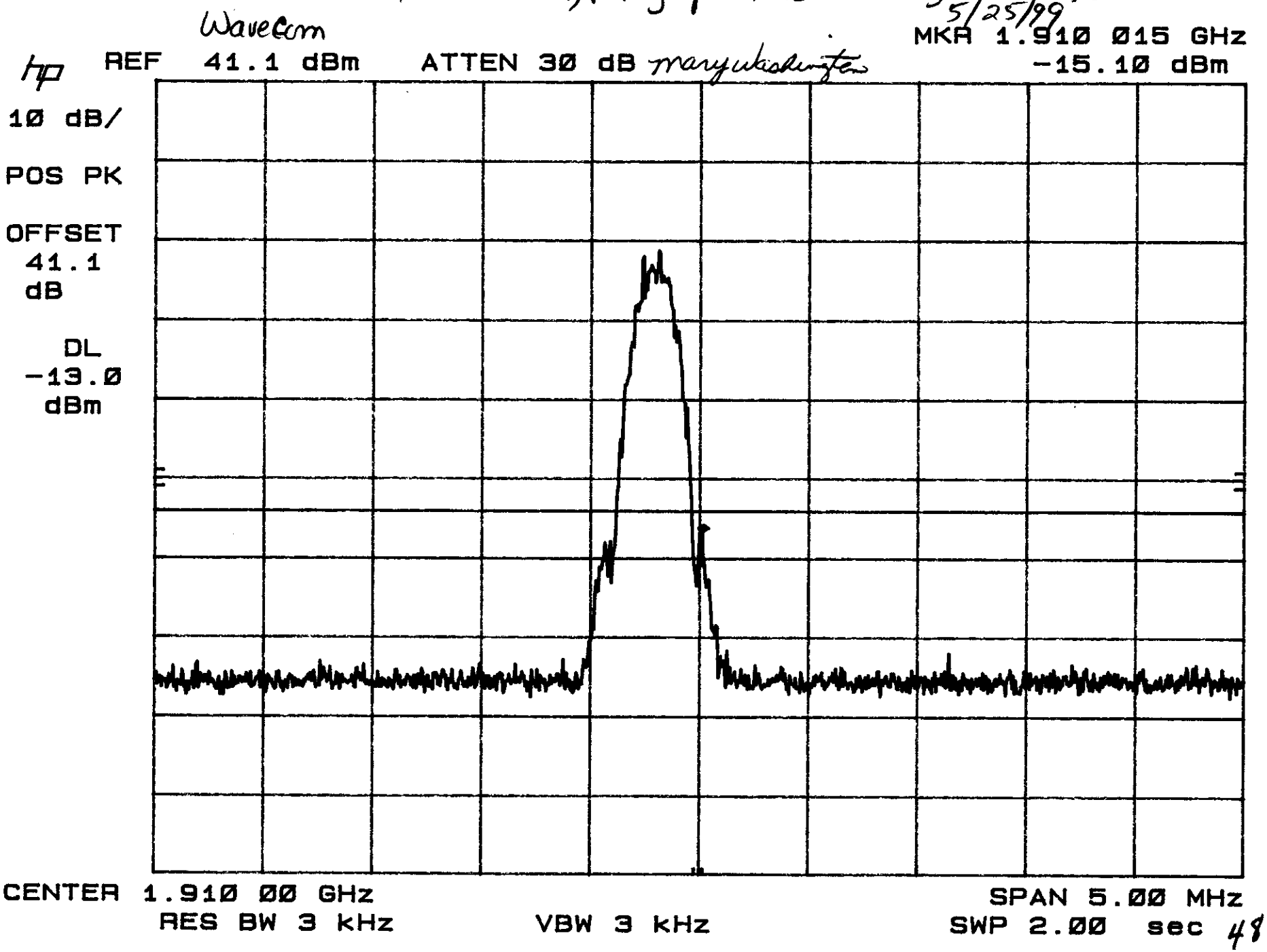
WaveCom

FCC Part 24, Paragraph 24.238

High Channel, 810
5/25/99



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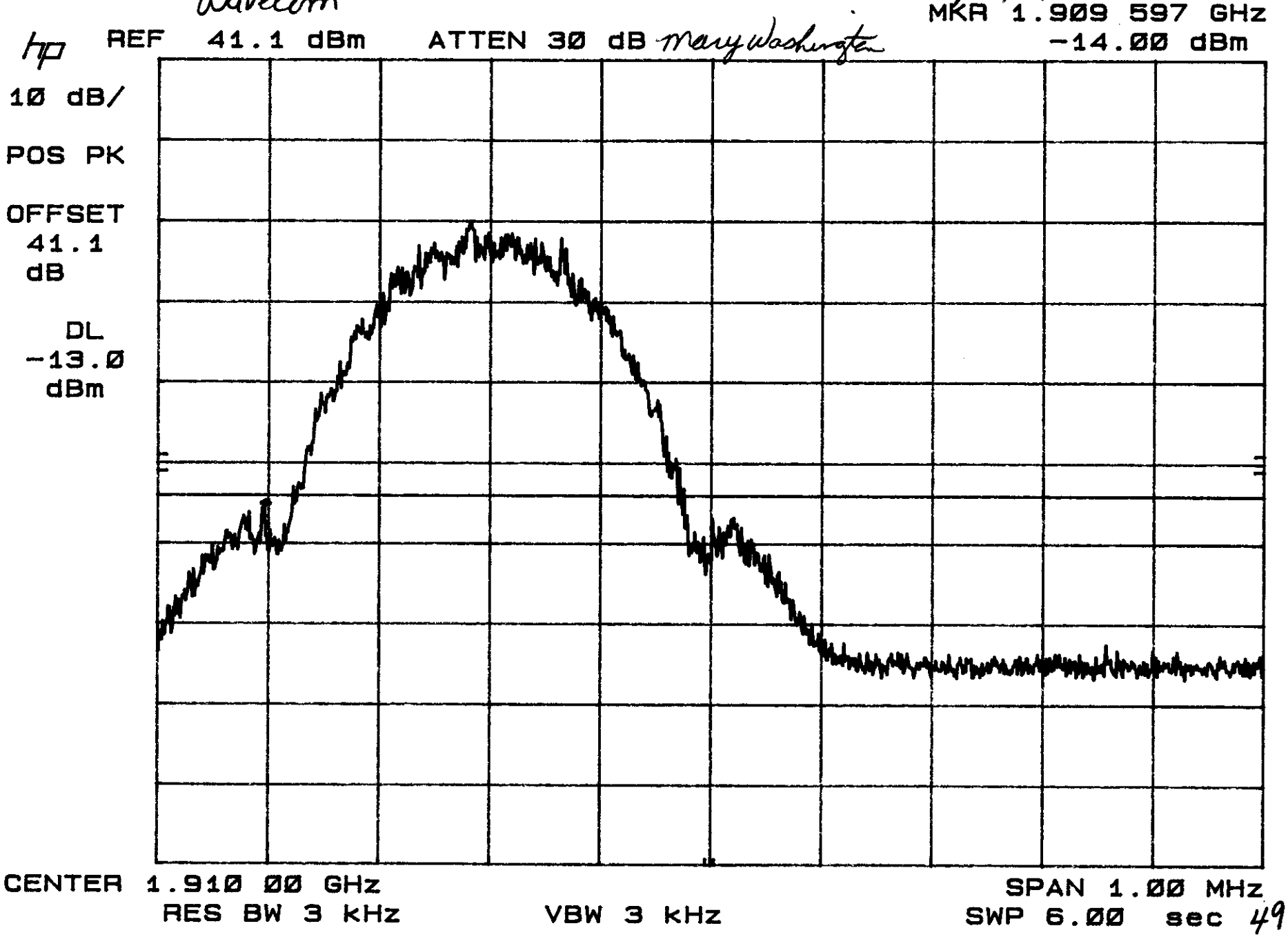
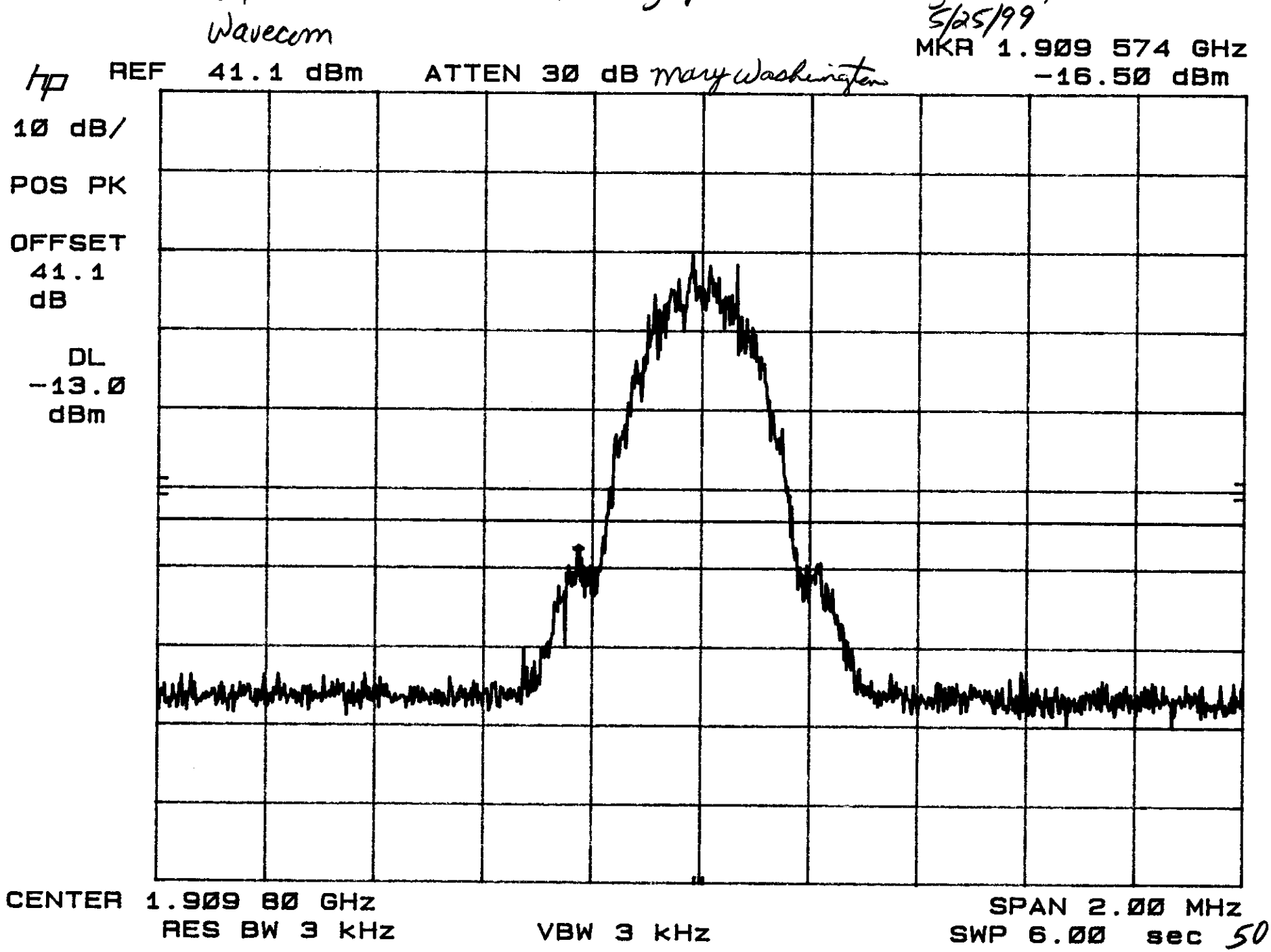
59220 FCC Part 24, Paragraph 24.238 High channel, 810
Wavecom 5/25/99



S9220
Wavecom

FCC Part 24, Paragraph 24.238

High channel, 810
5/25/99



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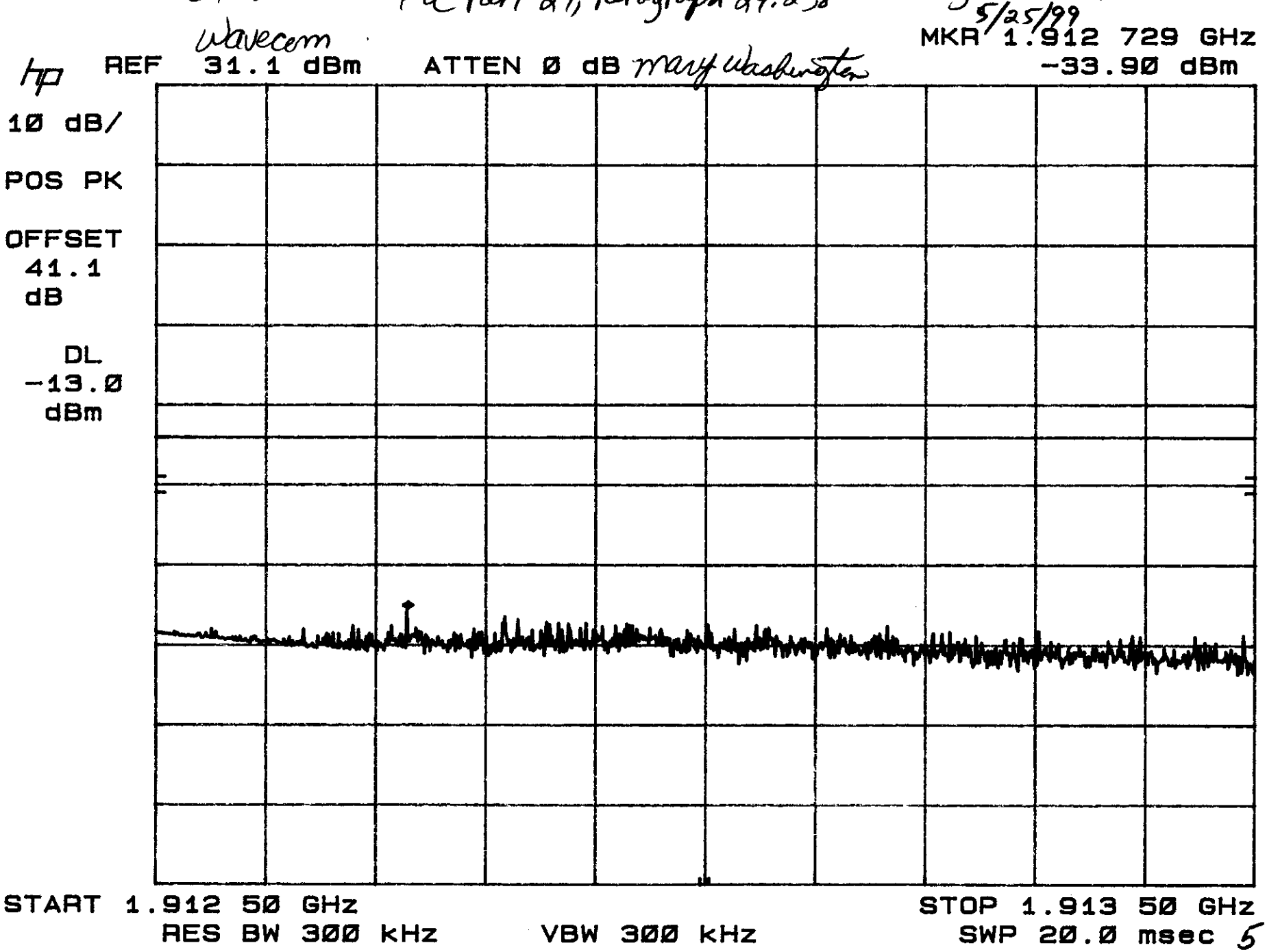
S9220
Wavecom

FCC Part 24, Paragraph 24.238

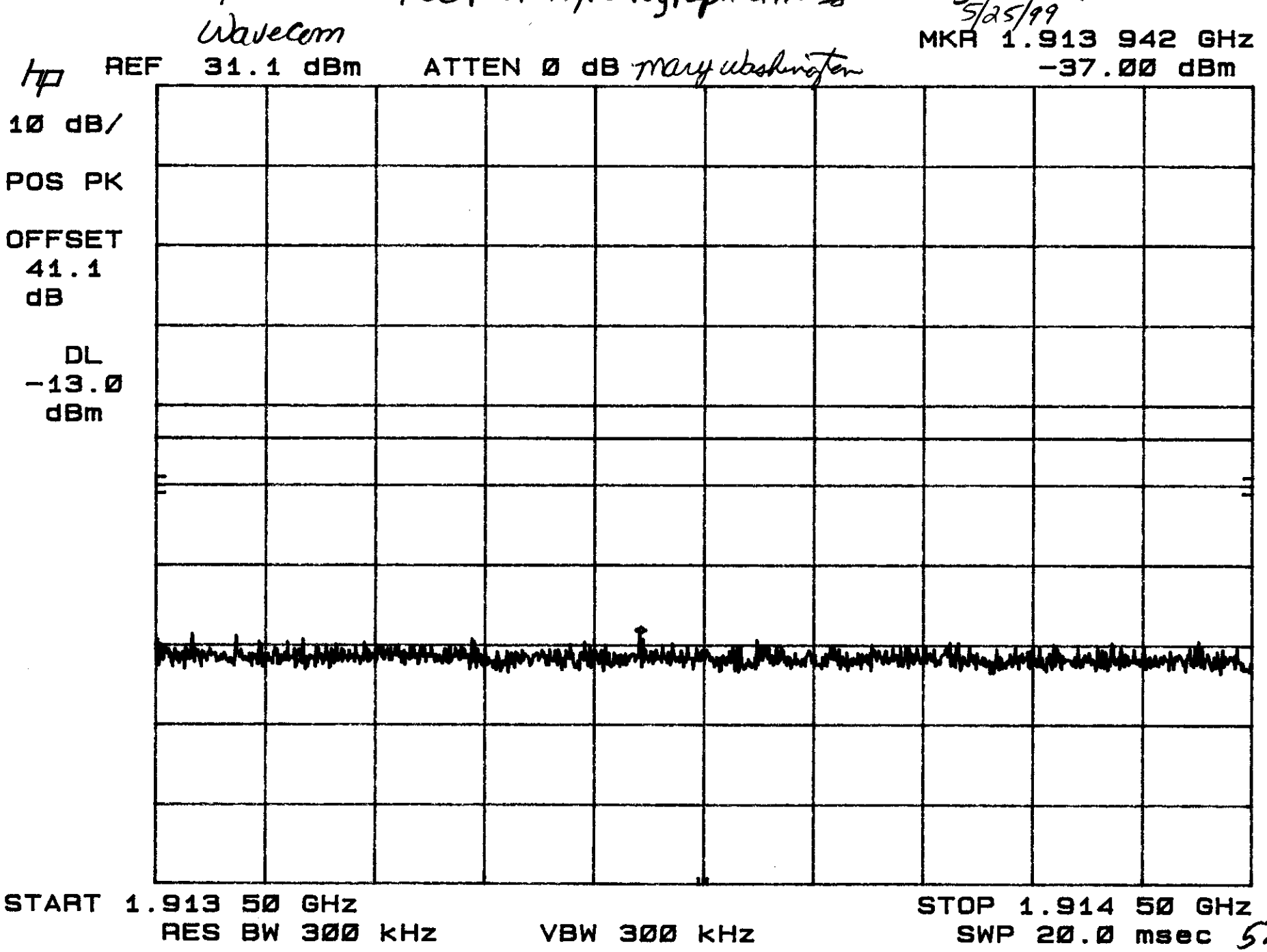
High channel, 810
5/25/99



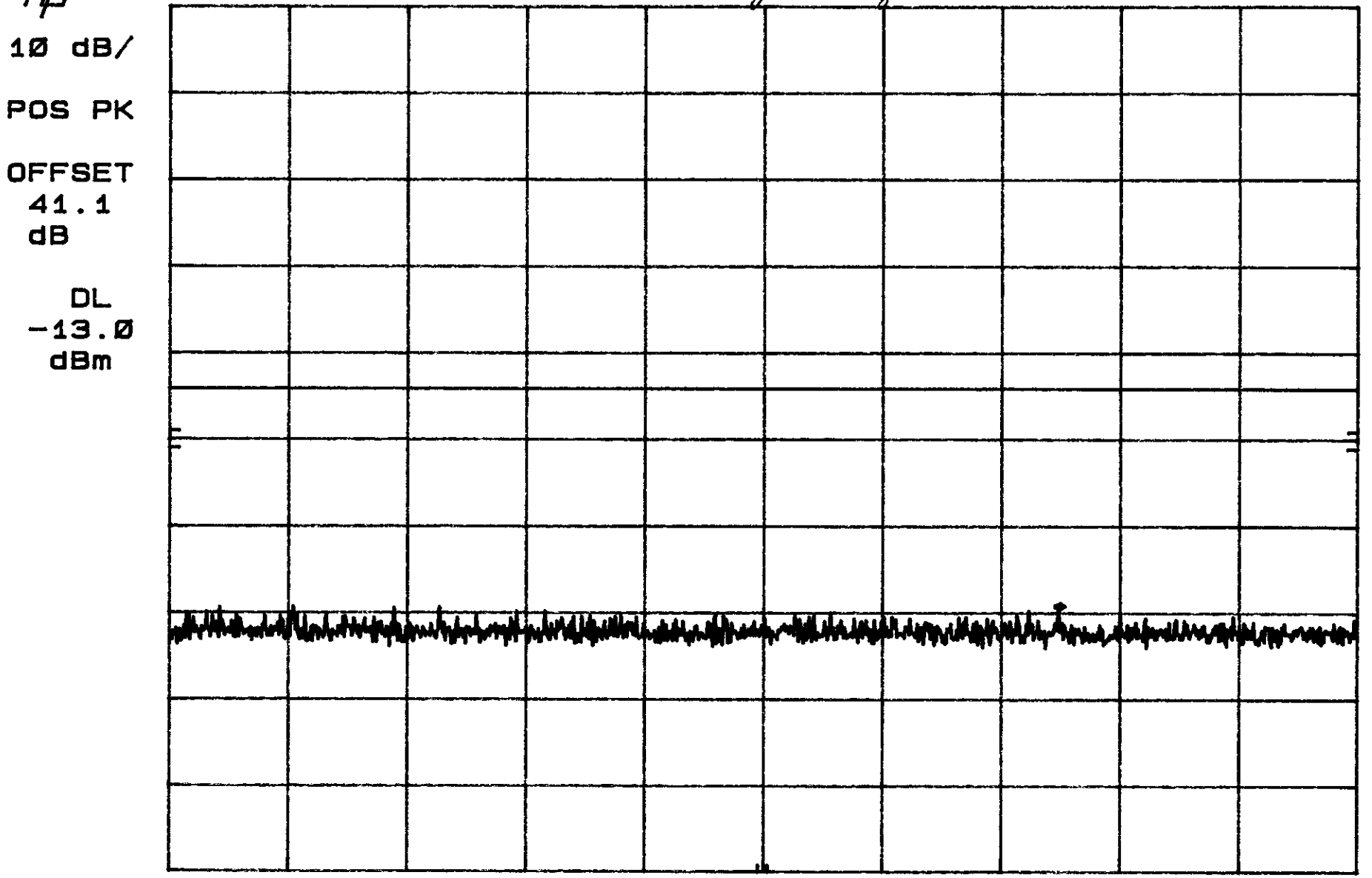
S9220
Wavecom

FCC Part 24, Paragraph 24.238

High channel, 810
5/25/99



S9220 FCC Part 24, Paragraph 24.238 High channel, 810
Wavecom 5/25/99
MKR 1.915 249 GHz
hp REF 31.1 dBm ATTEN 0 dB Mary Washington −38.10 dBm

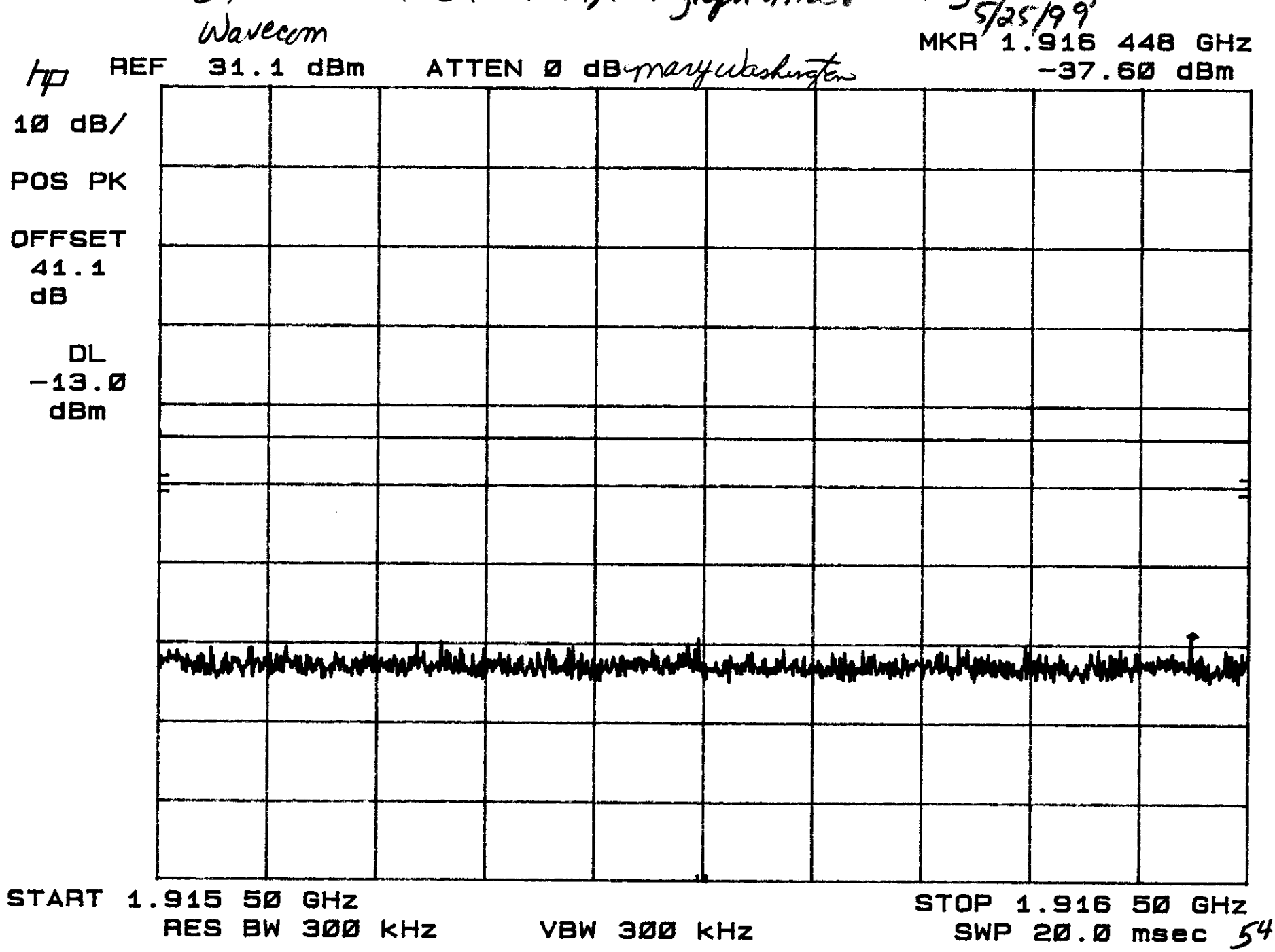


START 1.914 50 GHz
RES BW 300 kHz VBW 300 kHz
STOP 1.915 50 GHz
SWP 20.0 msec

5922Ø
Wavecom

FCC Part 24, Paragraph 24.238

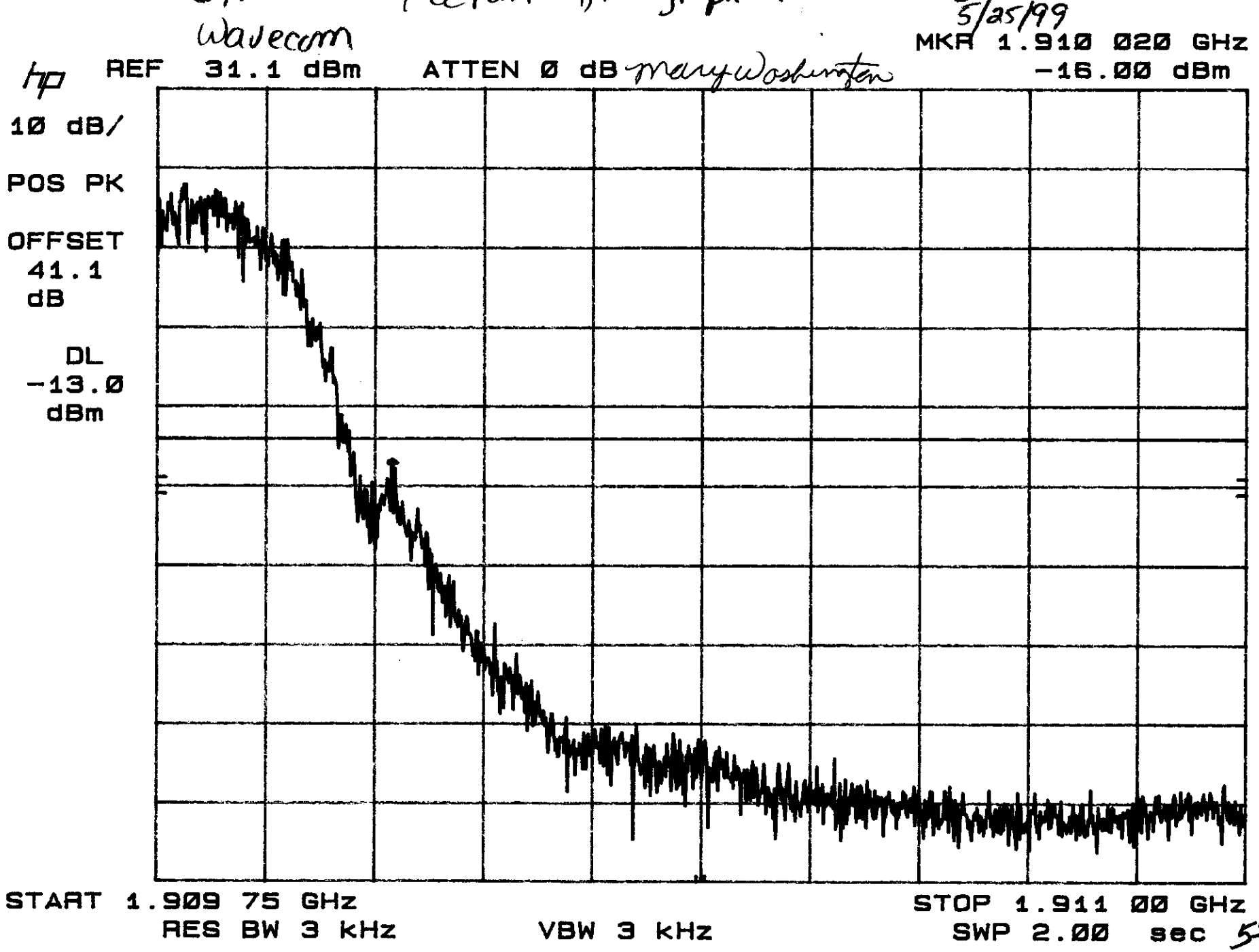
High channel, 810
5/25/99
mary washington



59220
Wavecom

FCC Part 24, Paragraph 24.238

High channel, 810
5/25/99

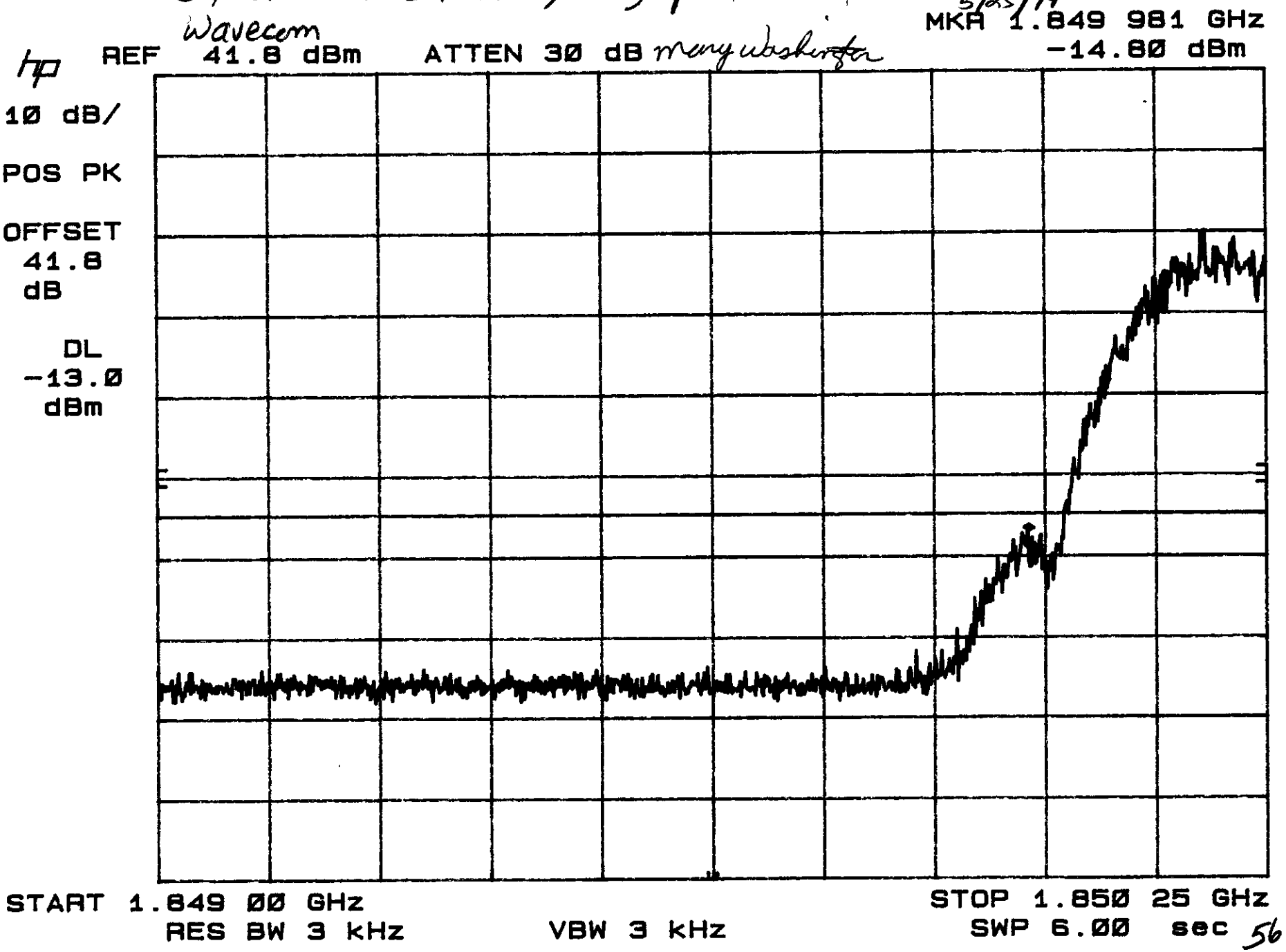


mary washington

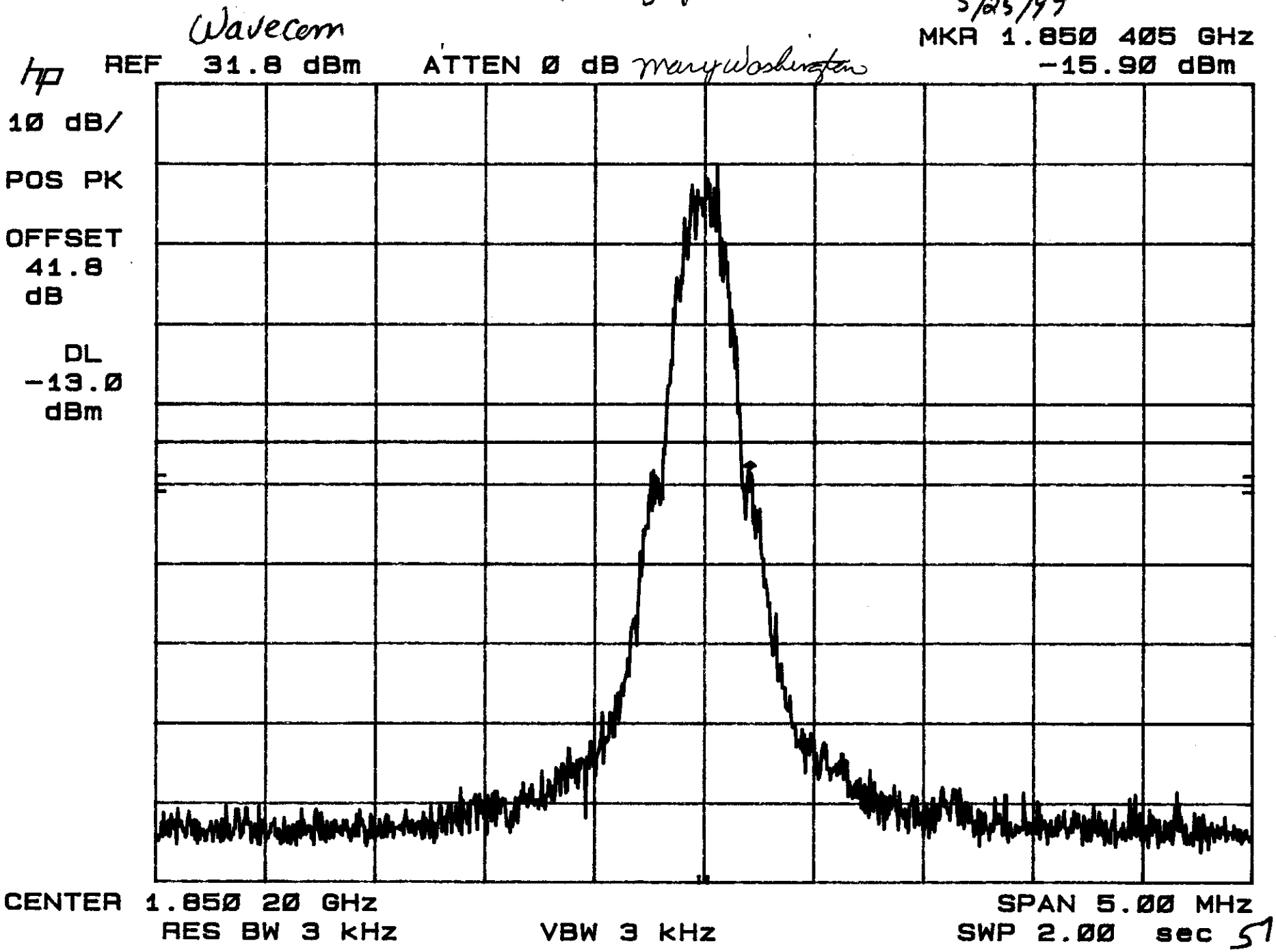
55

5/25 Hoglch, 810

59220 FCC Part 24, Paragraph 24.238 Low Channel, 512
Wavecom 5/25/99
Mary Washington



S9220 FCC Part 24, Paragraph 24.238 Low Channel, 512
Wavecom 5/25/99



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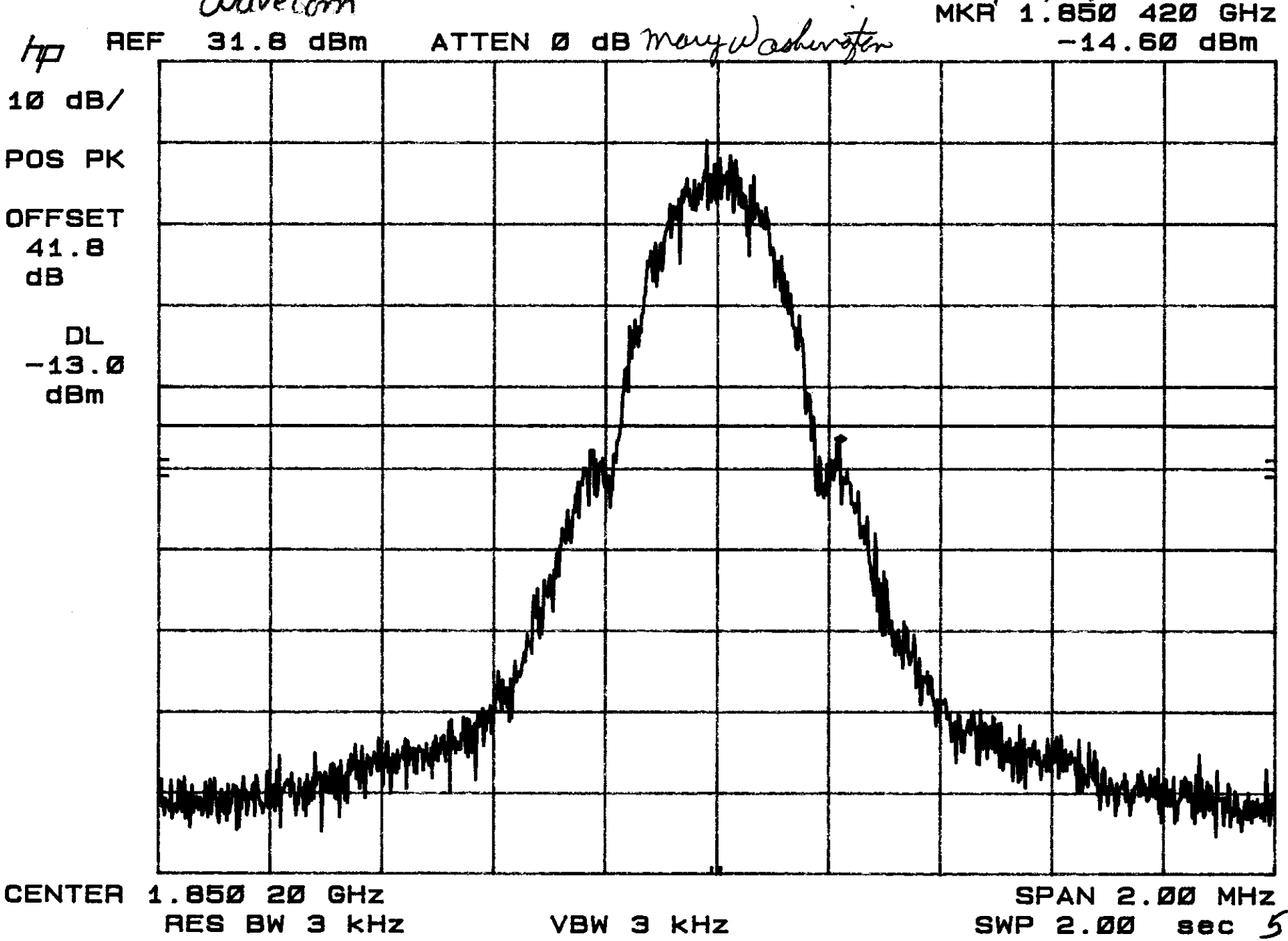
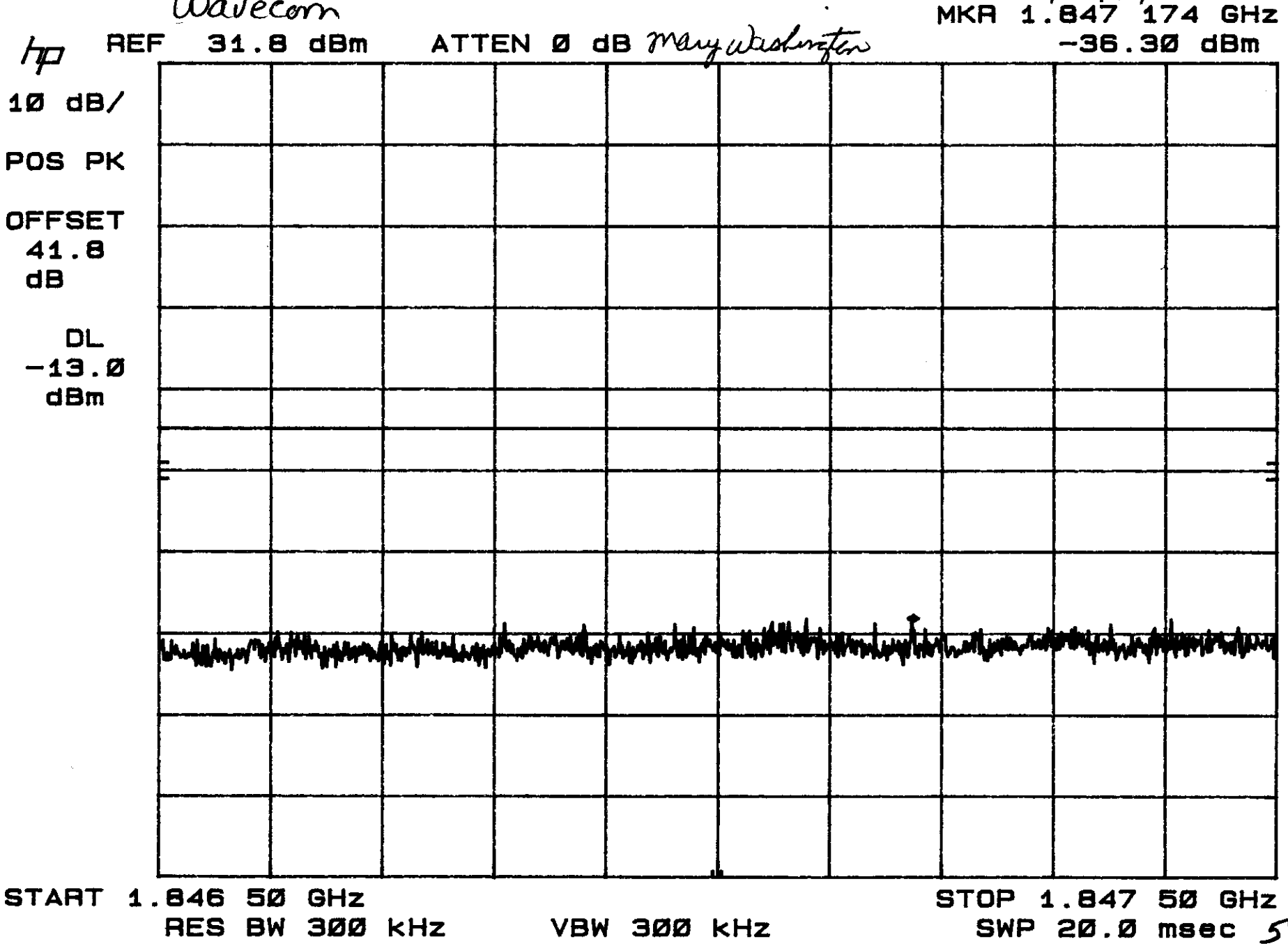
59220 FCC Part 24, Paragraph 24.238 Low Channel, 512
Wavecom 5/25/99
Mary Washington



S9220
Wavecom

FCC Part 24, Paragraph 24.238

Low channel, 512
5/25/99



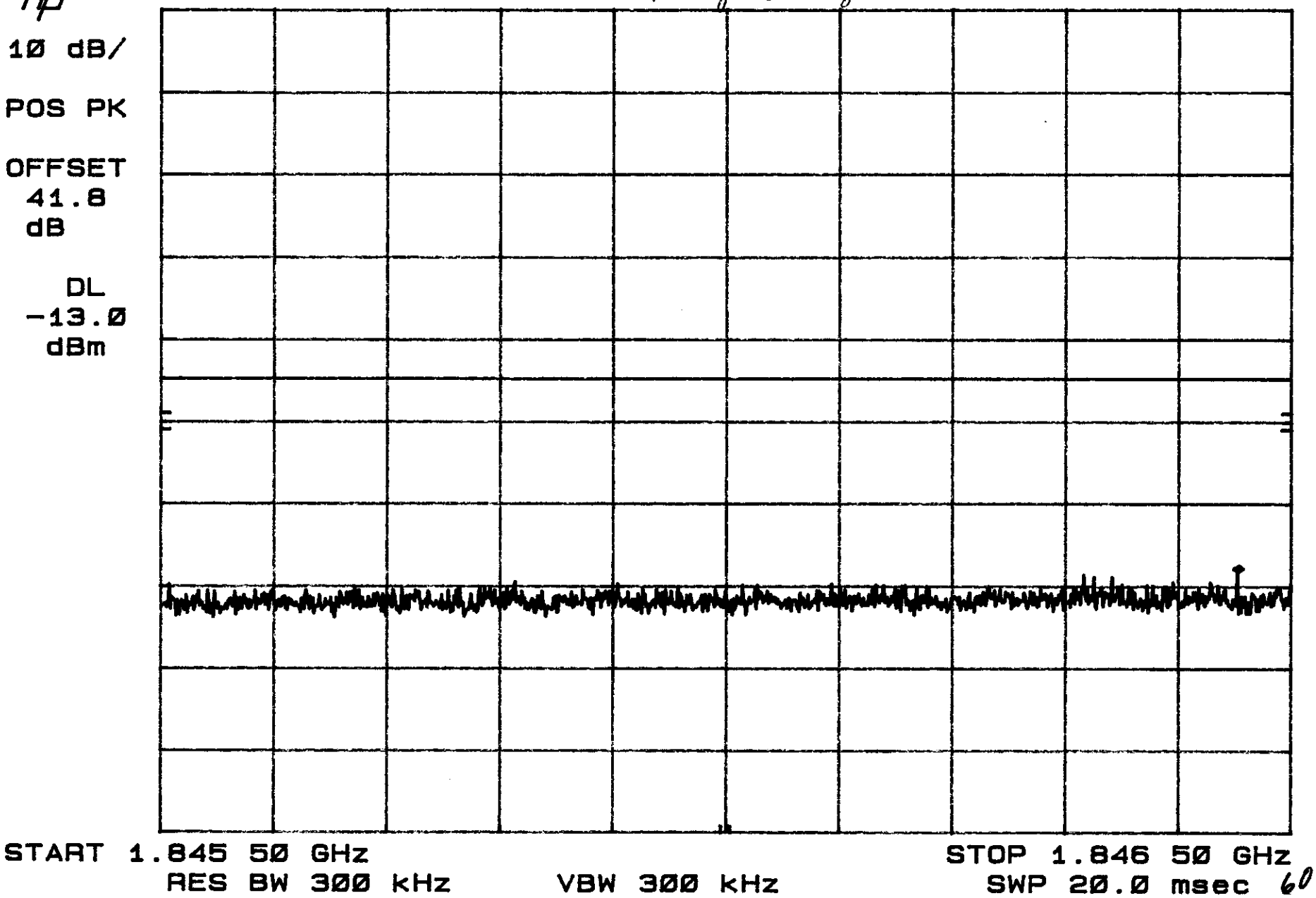
May Washington

S9220 FCC Part 24, Paragraph 24.238 Low channel, 512

Wavecom

5/25/99

Mary Washington



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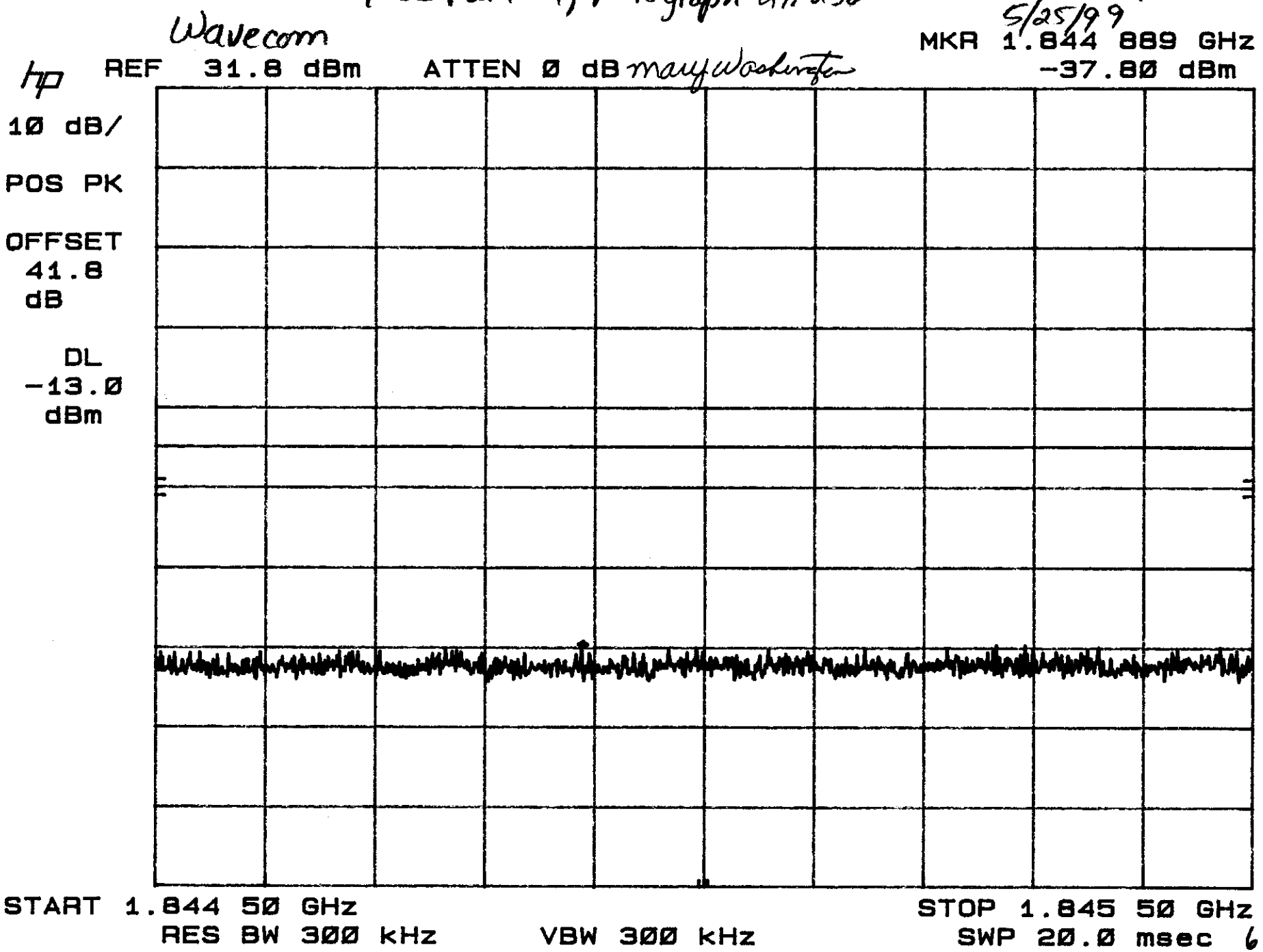
S9220
Wavecom

FCC Part 24, Paragraph 24.238

Low Channel, 512
5/25/99
Mary Washington

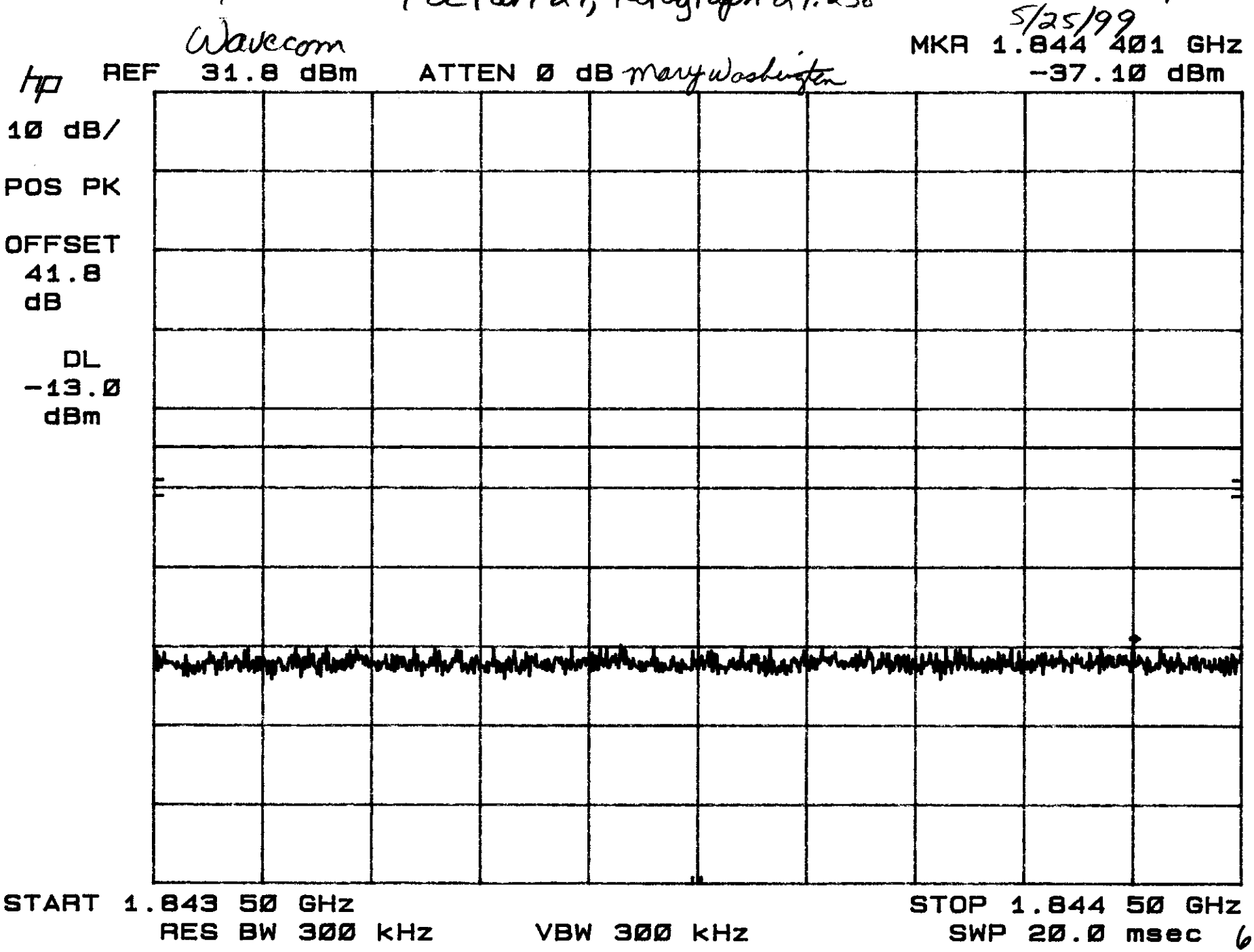


6

S9220
Wavecom

FCC Part 24, Paragraph 24.238

Low Channel, 512
5/25/99
Mary Washington



5 FREQUENCY STABILITY EQUIPMENT/DATA

Wavecom GSM1900 Modem

See following page(s).

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Emissions Test Conditions: FREQUENCY STABILITY, FCC Part 2, Paragraph 2.1055 and Part 24, Paragraph 24.238

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ **- Test not applicable**

■ - Temperature Chamber

Test Equipment Used :

Equipment List

HP 8594E Spectrum analyzer, S/N 3801A01300, Cal Date 07/00
Associated Environmental Chamber, Model SK3102, S/N 1831-2
Directional coupler, Narda, Model 4242-10 NCR
Digital Radio Communication Tester, Rhode & Schwarz, Model CMD55, S/N 849709/050, CAL DUE 3/00

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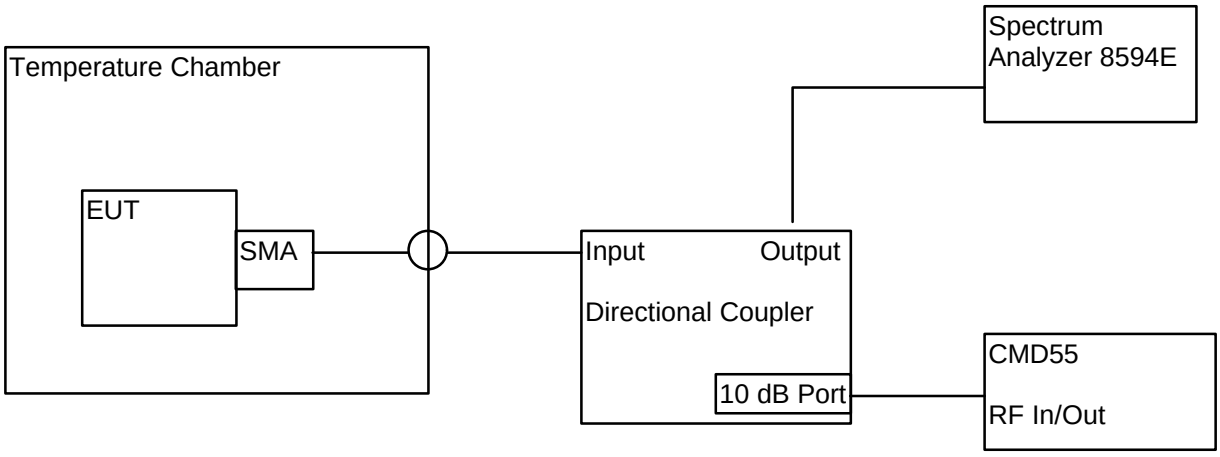
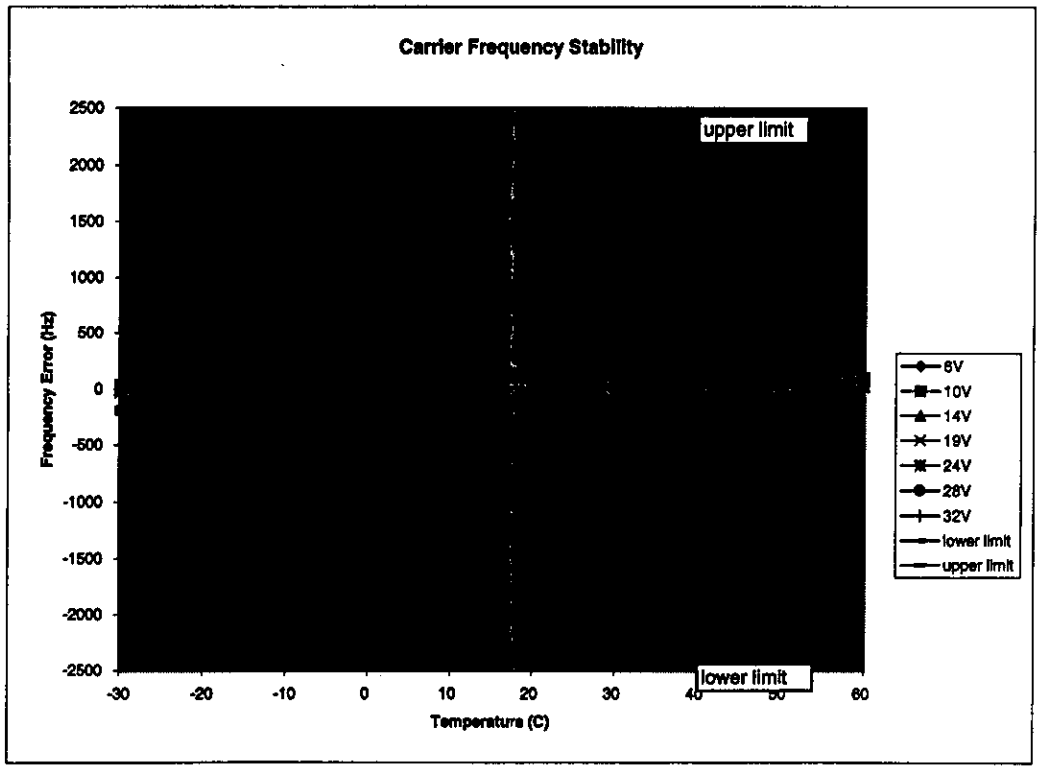
Test Setup for Part 2.1055



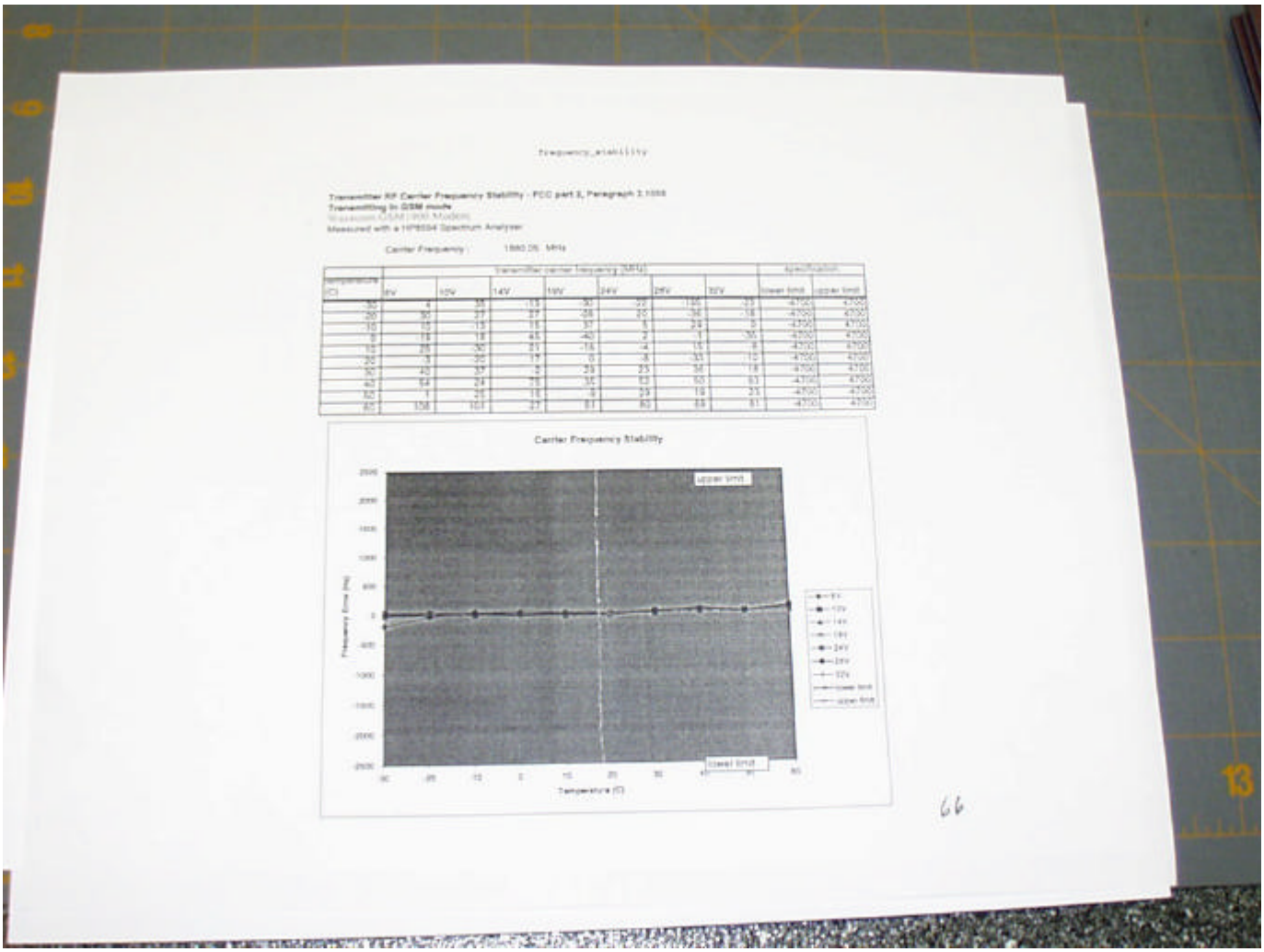
Transmitter RF Carrier Frequency Stability - FCC part 2, Paragraph 2.1055
Transmitting in GSM mode
Wavecom GSM1900 Modem
Measured with a HP8594 Spectrum Analyzer

Carrier Frequency : **1880.05 MHz**

	transmitter carrier frequency (MHz)							specification	
temperature (C)	6V	10V	14V	19V	24V	28V	32V	lower limit	upper limit
-30	4	35	-13	-30	-22	-195	-23	-4700	4700
-20	30	27	27	-28	20	-36	-18	-4700	4700
-10	10	-13	15	37	5	29	0	-4700	4700
0	-19	16	45	-40	2	-1	-35	-4700	4700
10	25	-30	21	-18	-4	15	-8	-4700	4700
20	-3	-20	17	0	-8	-33	-10	-4700	4700
30	40	37	-2	29	23	36	18	-4700	4700
40	54	24	75	35	52	50	83	-4700	4700
50	1	25	16	-9	29	19	23	-4700	4700
60	108	101	27	51	80	68	81	-4700	4700



Picture of graph for frequency stability.



SIGNATURE PAGE

GENERAL REMARKS:

SUMMARY:

All tests according to the standards sited on page 1 of this report.

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 1.

☐ - **Does not** fulfill the general approval requirements cited on page 1.

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Mary Washington
(EMC Engineer)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364