

**EXHIBIT 6: Report of Measurements**

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### FCC TYPE ACCEPTANCE INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, sections 2.983 - 2.999.

**2.983(a)** Applicant: Powerwave Technologies, Inc.  
2026 McGaw Avenue  
Irvine, CA 92614

**2.983(b)** FCC ID: E675JS0027

**2.983(c)** Quantity production is planned.

**2.983(d) Technical Description**

The SPS9301-100 amplifier system is a single channel GSM power amplifier that operates from 1930 MHz to 1990 MHz. The amplifier system is module in design, and is ideally suited for use in GSM base station. The amplifier system is comprised of a minirack and two fan assemblies, two SPA9301-50 plug-in power amplifier modules, input and output coaxial cables, and ac-dc converter. The SPA9301-50 is a TDMA amplifier that operates in a 60 MHz bandwidth from 1930 MHz to 1990 MHz. Each amplifier is a self-contained plug-in module and is functionally independent of the other amplifier module. The rear panel of each amplifier as well as each fan in the minirack assembly has a connector that interfaces with the minirack power converter which, in turn, plugs into a conventional (U.S.) 120Volt AC outlet. Each amplifier front panel has I/O connectors that interface with the host RF signal source and system antenna.

Subsections

**(1) Types of Emissions**

PCS-1900(GSM) : GXW

**(2) Frequency Range**

GSM(PCS-1900) :1930 - 1990 MHz

**(3) Range of Operating Power**

0-/± 48dBm

**(4) Maximum Power Rating**

52Watts

**(5) Applied voltages and currents into the final transistor elements**

Refer to Exhibit 2 .Schematic and Functional Block Diagram. Confidentiality is requested for these items

**(6) Function of Each Active Device**

Refer to Exhibit 2. Schematic and Functional Block Diagram. Confidentiality is requested for these items

**(7) Complete Circuit Diagrams and Functional Block Diagram**

Refer to Exhibit 2 .Schematic and Functional Block Diagram. Confidentiality is requested for these items.

**(8) Instructions/Installation Manual**

Refer to Exhibit 5.

**(9) Tune-up/Optimization Procedure**

Refer to installation manual, Exhibit 5.

**(10) Means for Frequency Stabilization**

Not Application . EUT is a power amplifier.

**(11) Means for Limiting Modulation**

Not applicable. EUT is a power amplifier.

**(11) Means for Limiting Power**

The alarm logic controls the +5Vdc bias voltage which shuts down the amplifier on an input overpower condition.

**(11) Means for Attenuating Higher Audio Frequencies**

Not Applicable.

**(12) Description of Digital Modulation Techniques**

Not Applicable

**2.983(e) Standard Test Conditions**

The power amplifier was tested under the following conditions:

DC Supply Voltage: 27V

AC Supply Voltage: 120V AC

The transmitter was aligned and tuned up according to manufacturer's alignment procedure, prior to testing. All data presented represents the worst case parameter being measured.

**Section 2.983(f) Equipment Identification**

A drawing of the equipment identification nameplate appears in Exhibit 5.

**Section 2.983(g) Photographs**

Photographs of the equipment, internal and external views, are found in Exhibit 3.

**Section 2.983 Description of Various Base Station Configurations**

Not Applicable

**Section 2.983 Use of Various Power Supplies**

Supply Voltage :27V dc input.

**Section 2.987 Measurement Required: Modulation Characteristics**

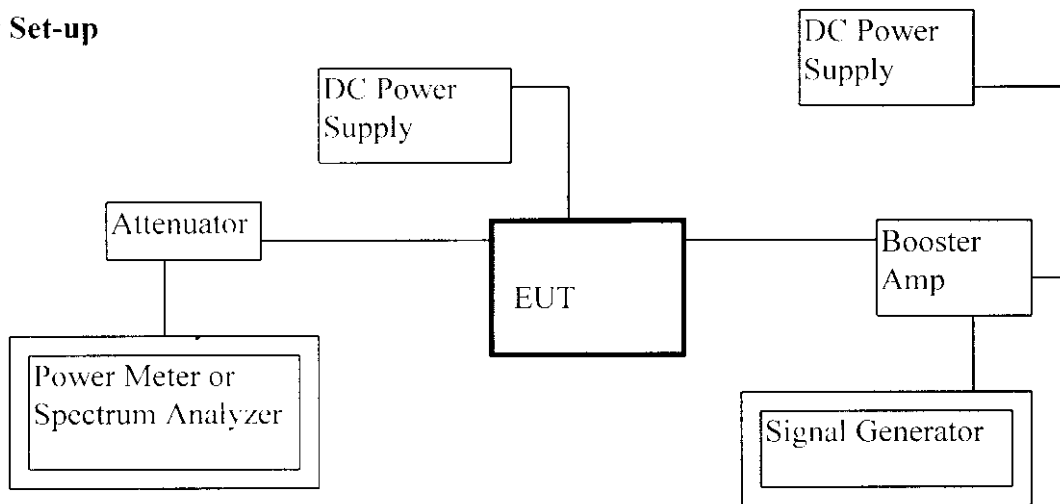
Not Applicable

**Section 2.989 Measurement Required: Occupied Bandwidth  
Limits:24.238**

**Measurement Equipment Used:**

HP Signal Generator/ E:SG-D2000A  
Powerwave Booster Amplifier  
HP Power Meter/ 437B  
HP 8563E Spectrum Analyzer  
QIM "The Workhorse" low loss cable, 9 ft (loss: 0.85 dB/ft@ 26 GHz)

**Test Set-up**



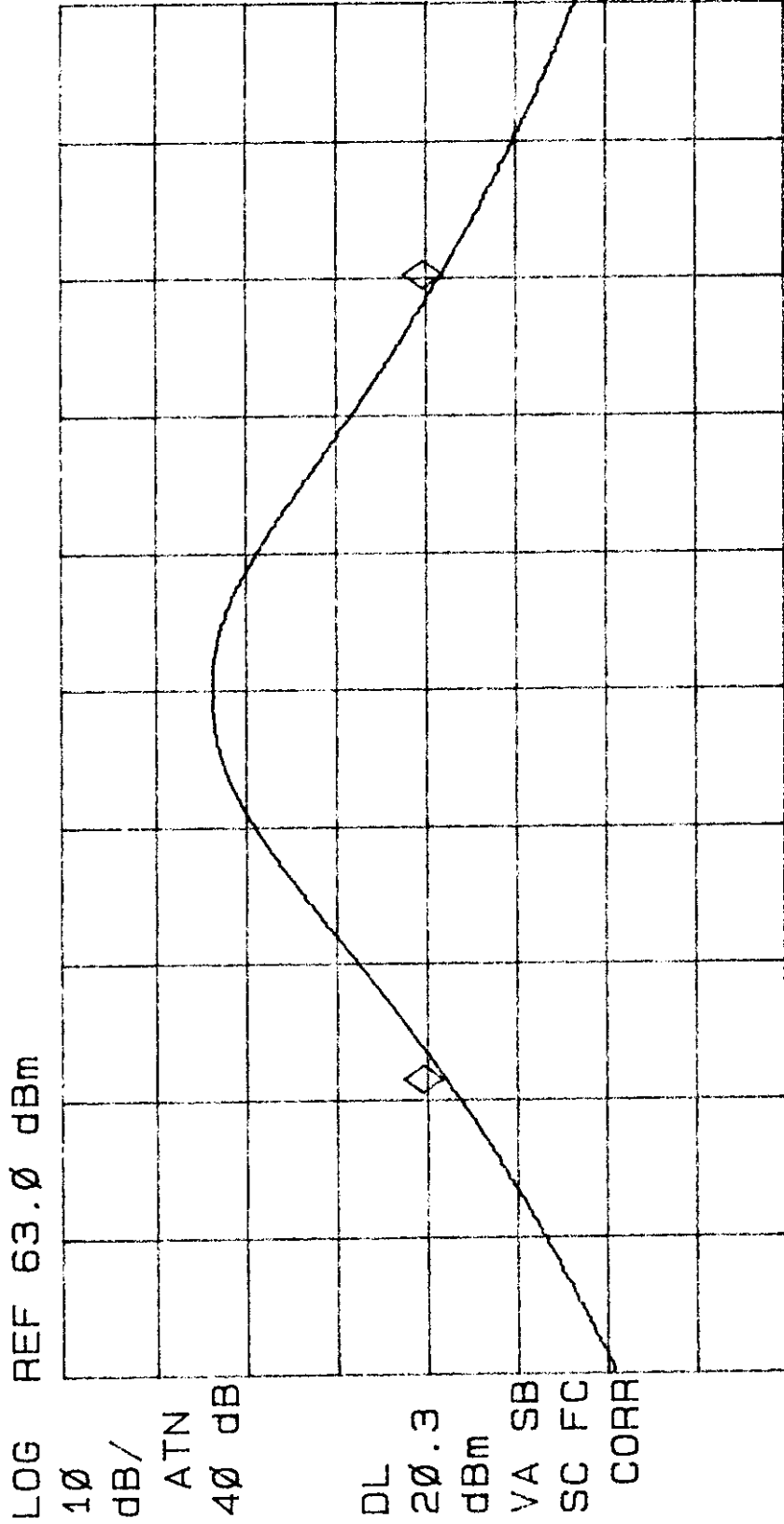
Data on the bandwidth occupied by this transmitter is presented in graphical form using spectrum analyzer plots. Emission bandwidth ( per 24.238b, the 26dB BW) was measured with RBW=1 MHz. VBW=1 Mhz..Please refer to Spectrum plots attached.

09:28:28 MAR 04, 1998

POWERWAVE SPA9XXX-50 BANDWIDTH

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR 2.938 MHZ  
--.10 dB

REF OFFST 33.0 dB  
REF 63.0 dBm



CENTER 1.960000 GHz  
#IF BW 1.0 MHz  
#AVG BW 1 MHz  
SPAN 5.000 MHz  
SWP 20.0 msec

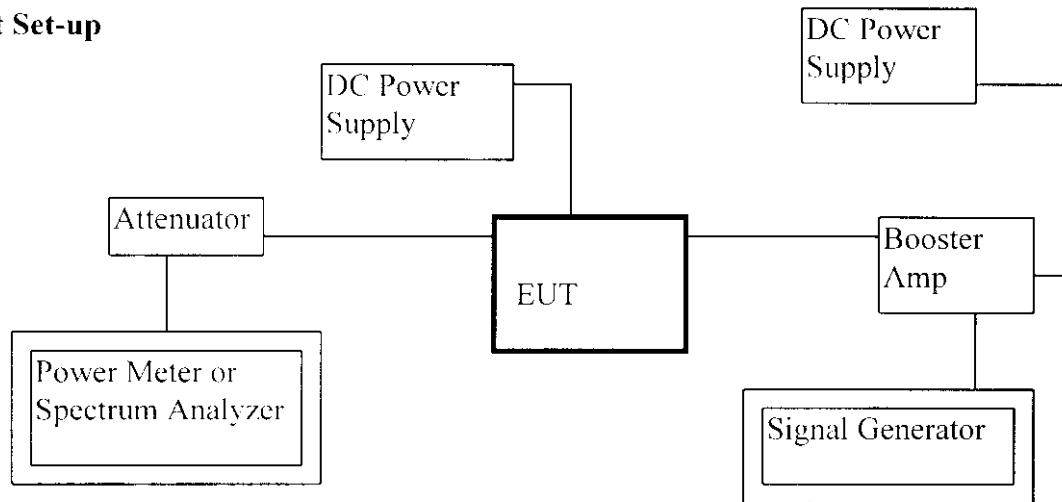
**Section 2.991 Measurements Required: Spurious and Harmonic Emissions at Antenna Terminals**

**Section 24.238 Limits**

**Measurement Equipment Used:**

HP Signal Generator/ ESG-D2000A  
Powerwave Booster Amplifier  
HP Power Meter/ 437B  
HP 8563E Spectrum Analyzer  
QIM "The Workhorse" low loss cable, 9 ft (loss: 0.85 dB/ft@ 26 GHz)

**Test Set-up**



Minimum standard: The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be less than  $43+10 \log(\text{mean output power in watts})$  dBc below the mean power output outside a licensee's frequency block.

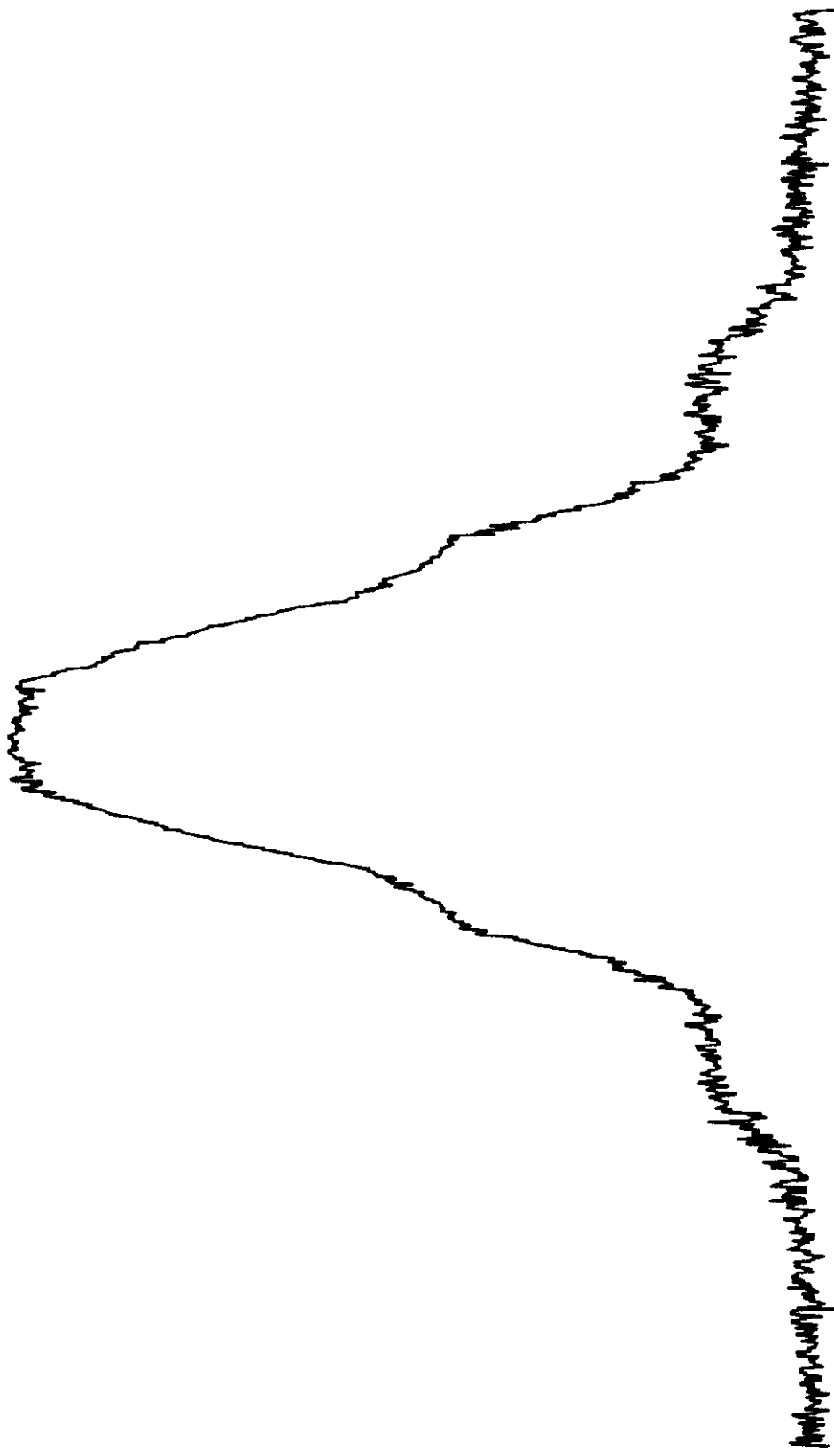
24.238 (b) & (c) Compliance with out of band emissions requirement is based on test being performed with 1MHz analyzer RES BW. At block edges, RES BW may be adjusted to a level at least as large as 1% of emission bandwidth. For the EUT this is at least

$.01 * 2.938\text{MHz} = 29.38\text{kHz}$ . A RES BW of 30kHz was used for band edge measurement.

**Test Results**

Please refer to the following plot for Band Edge and Low , High Spurious Emissions.

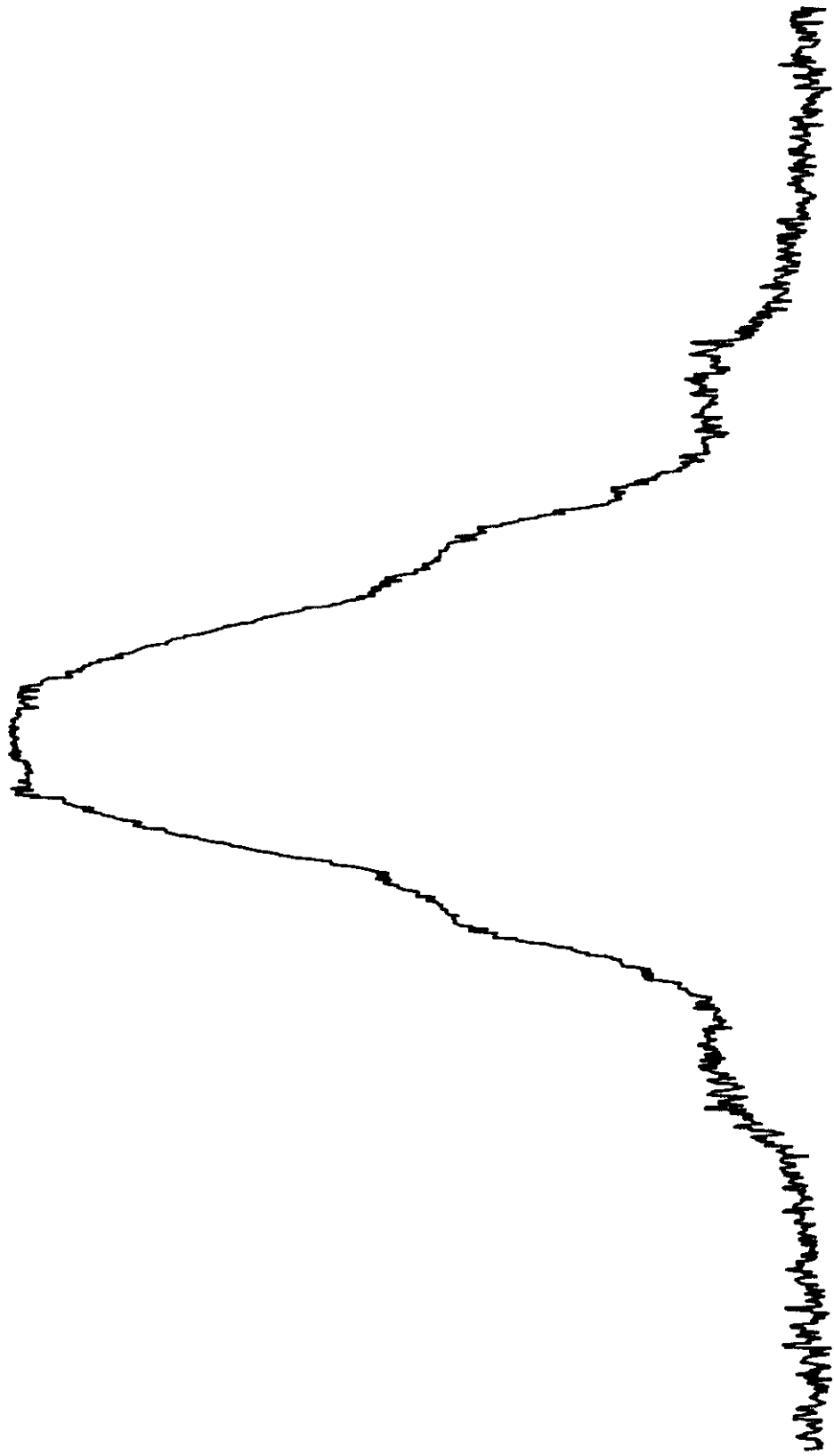
7/6



Block A (7/6)

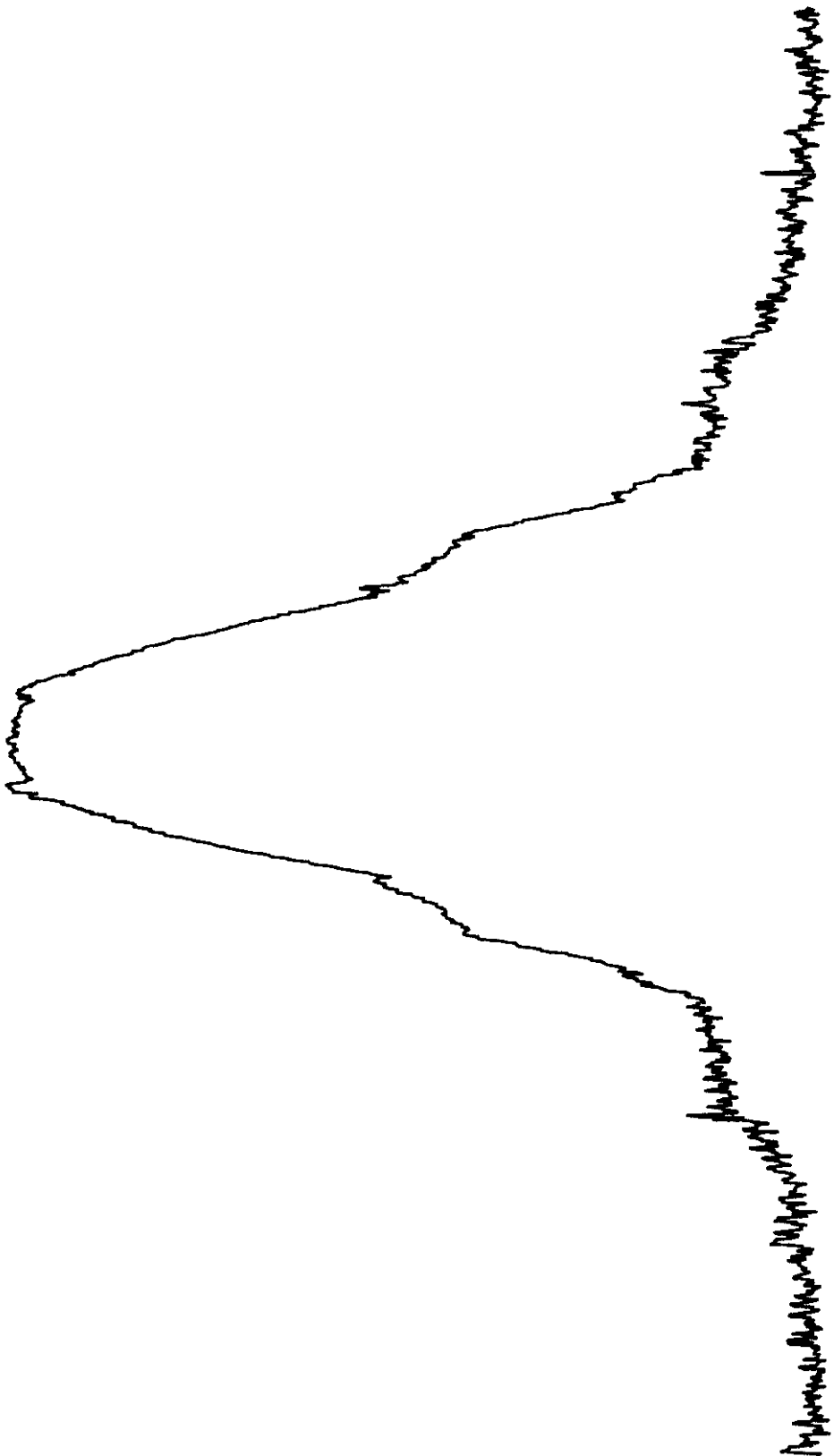


78

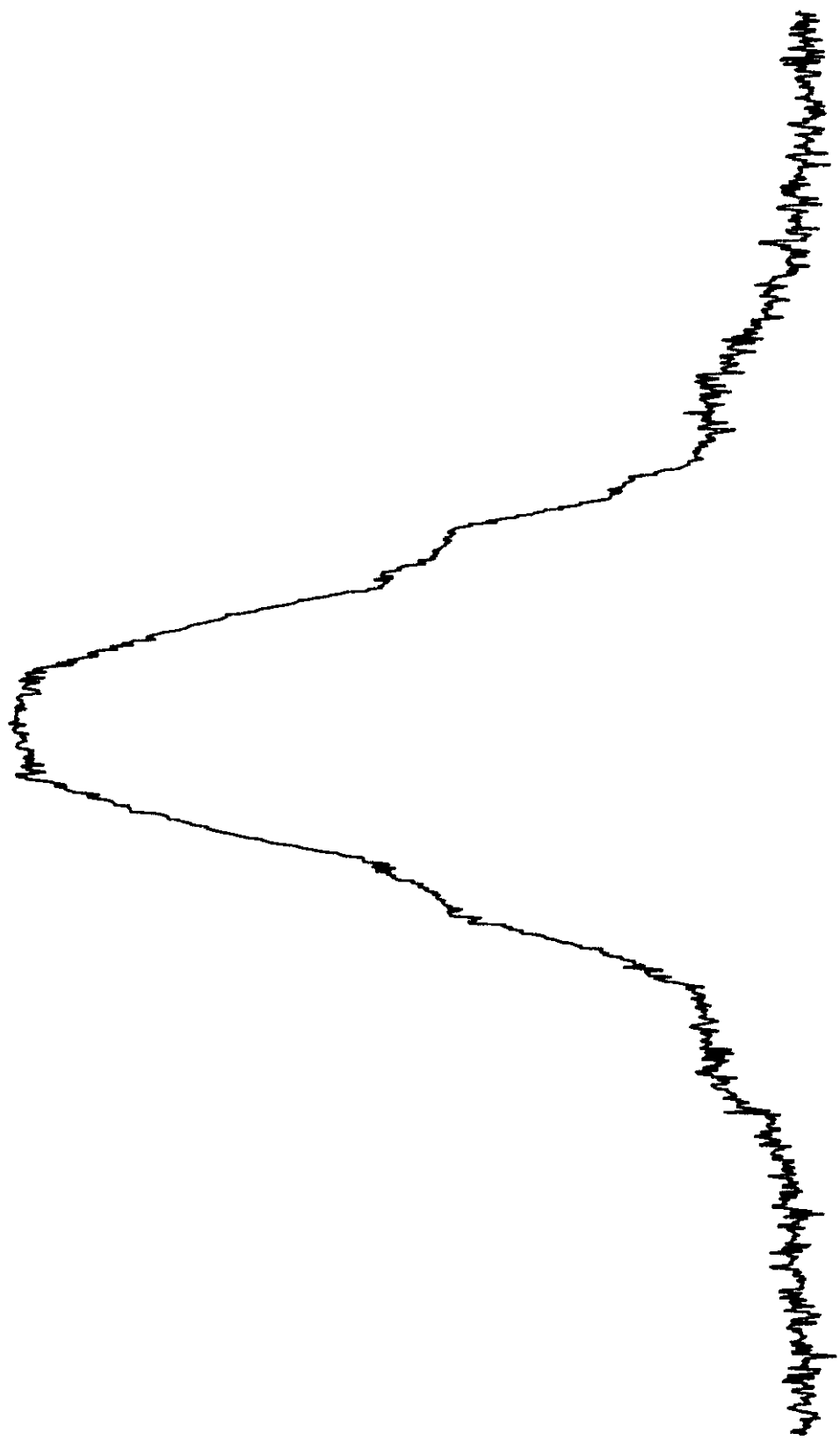


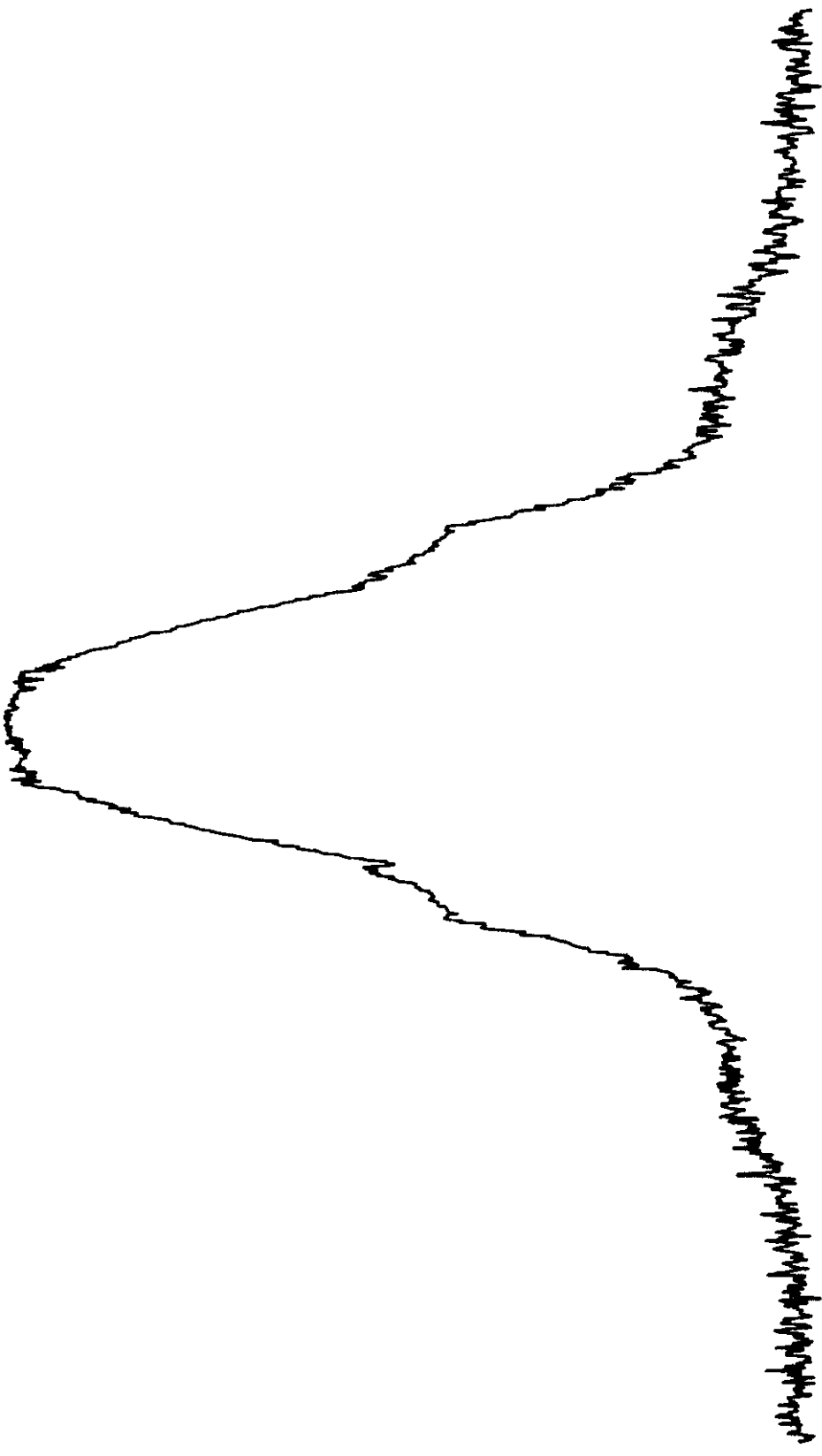
Black B (Demo)

73



Black B. ...

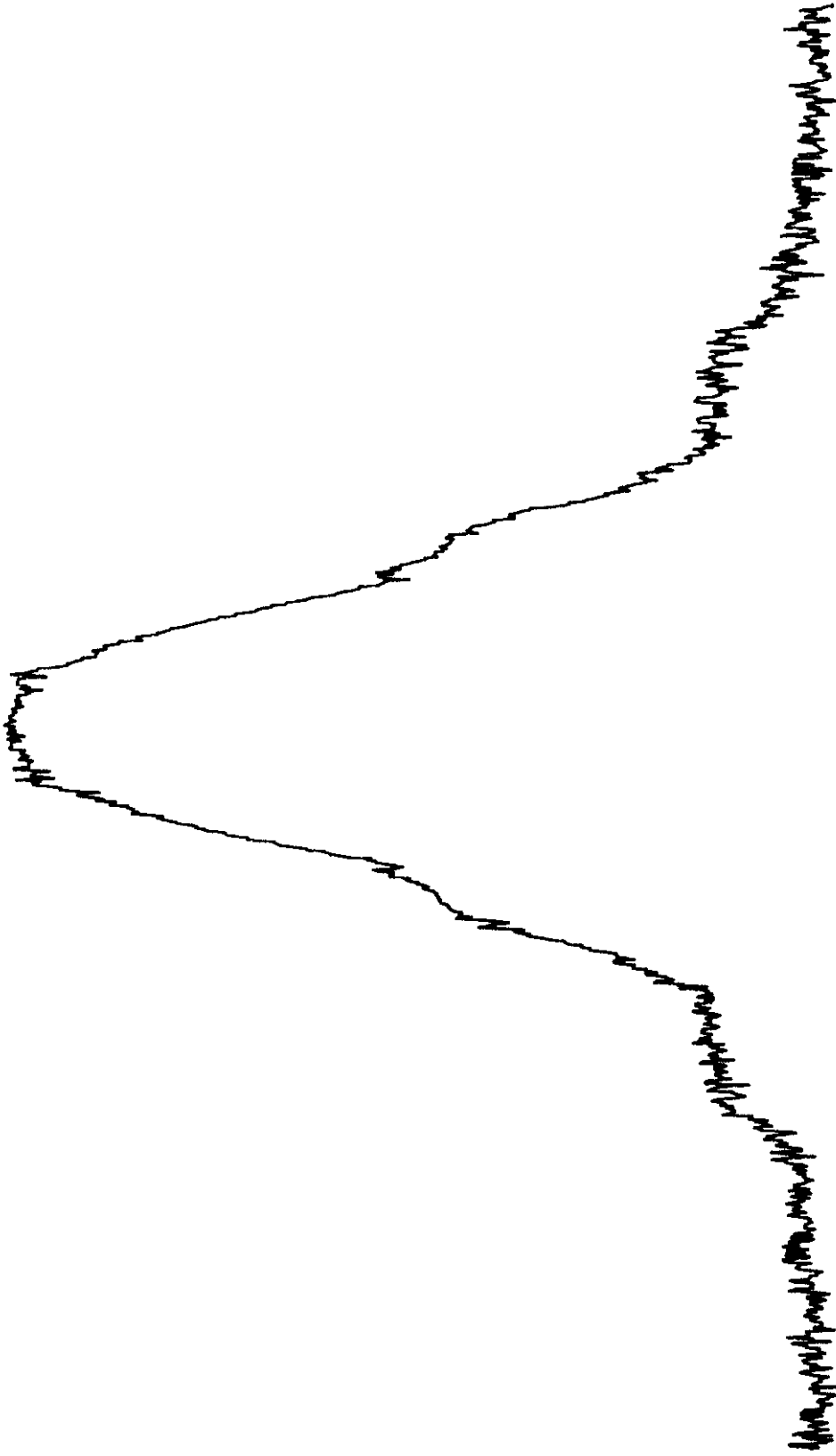




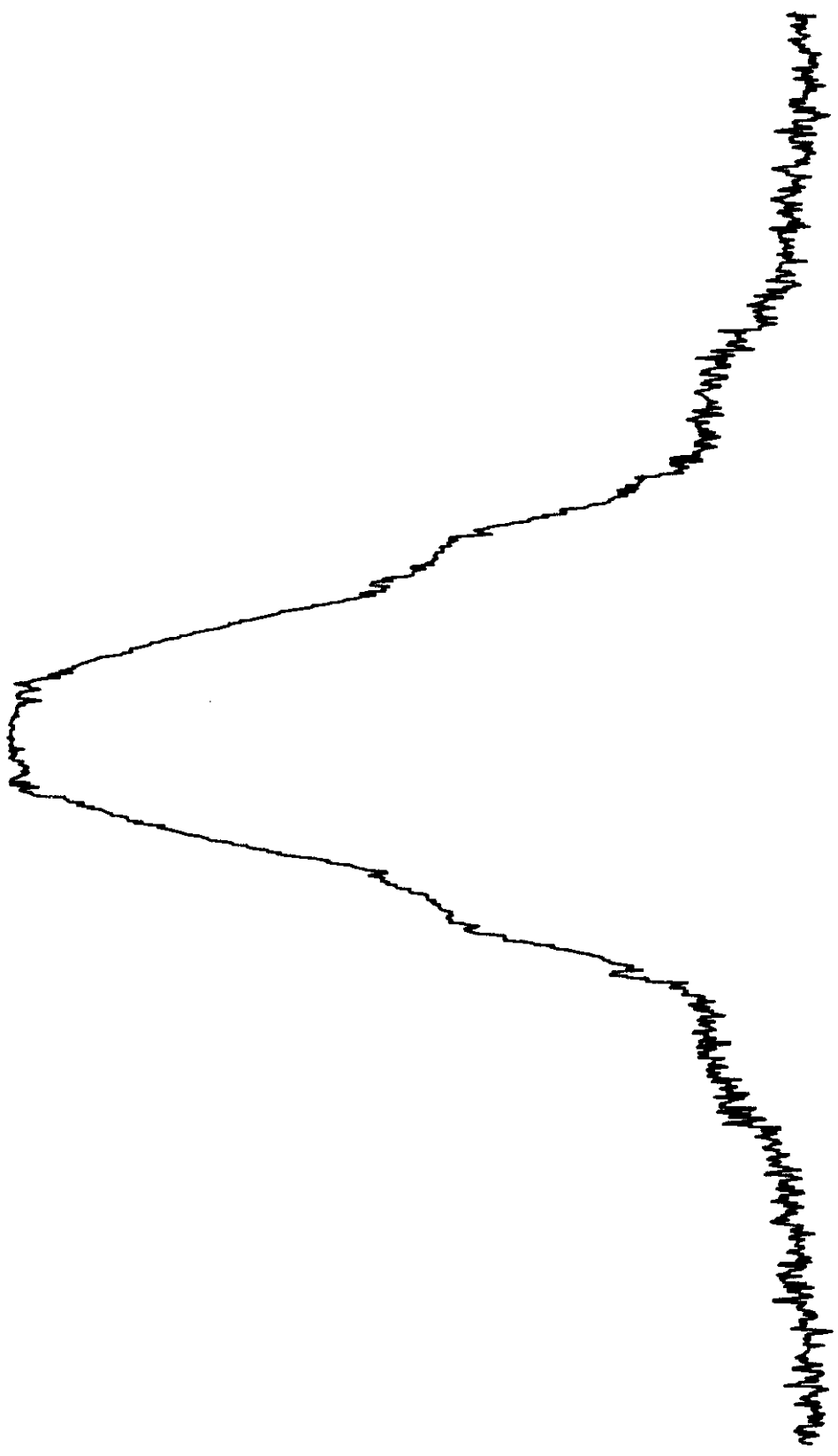
75

Figure 1 (cont.)

78

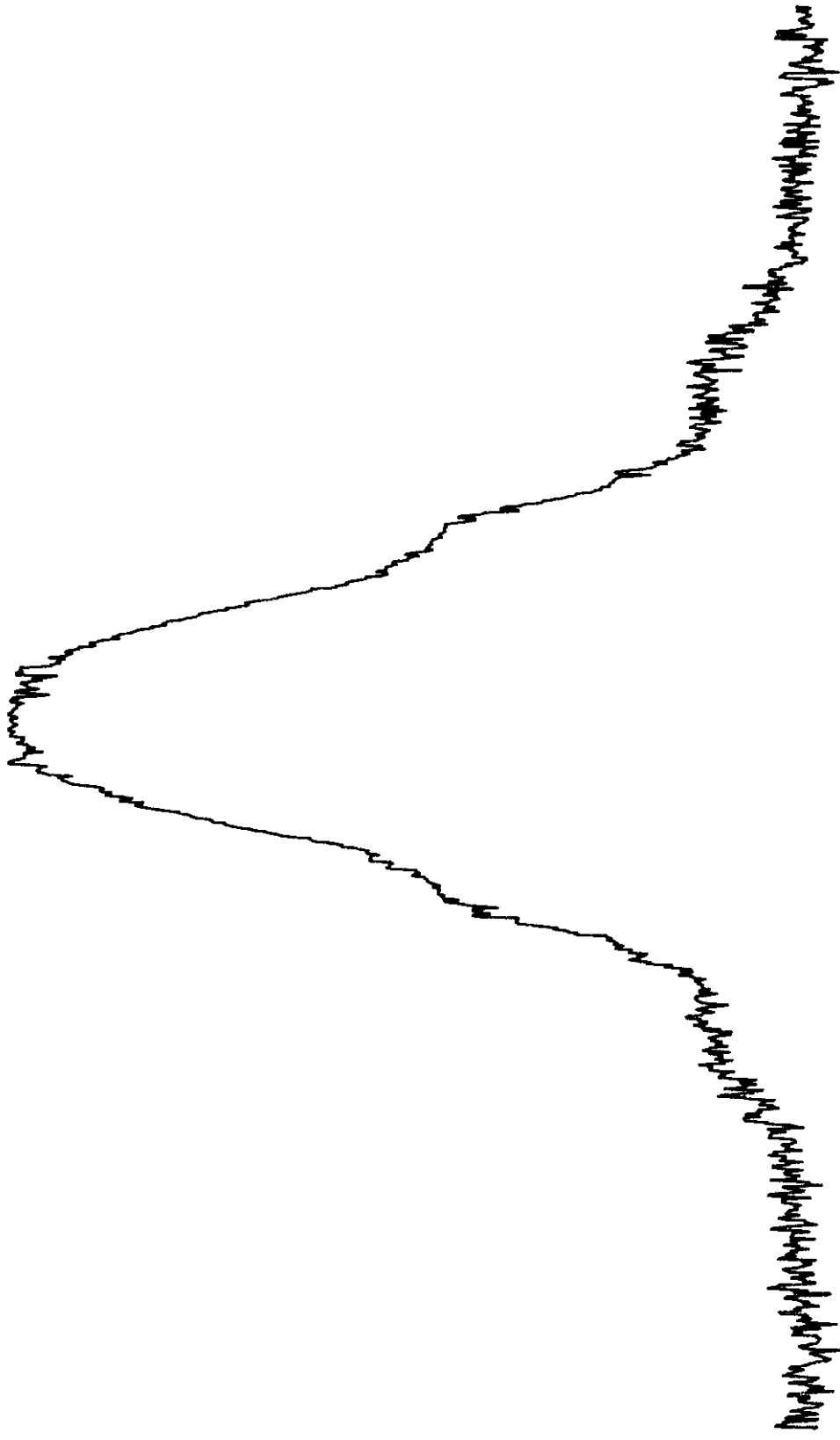


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7A

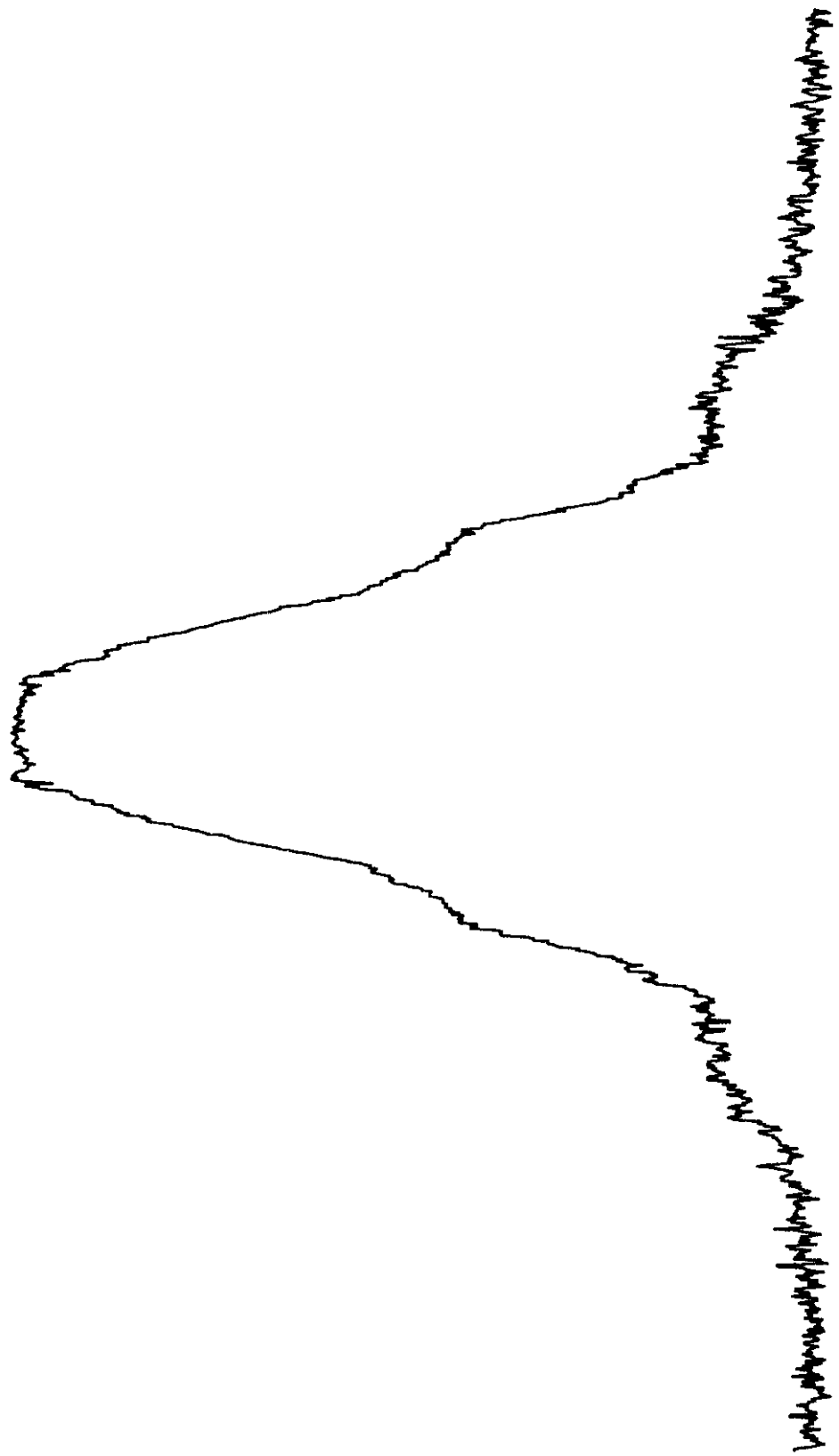
Block E (Mean)



Blackboard

7/2

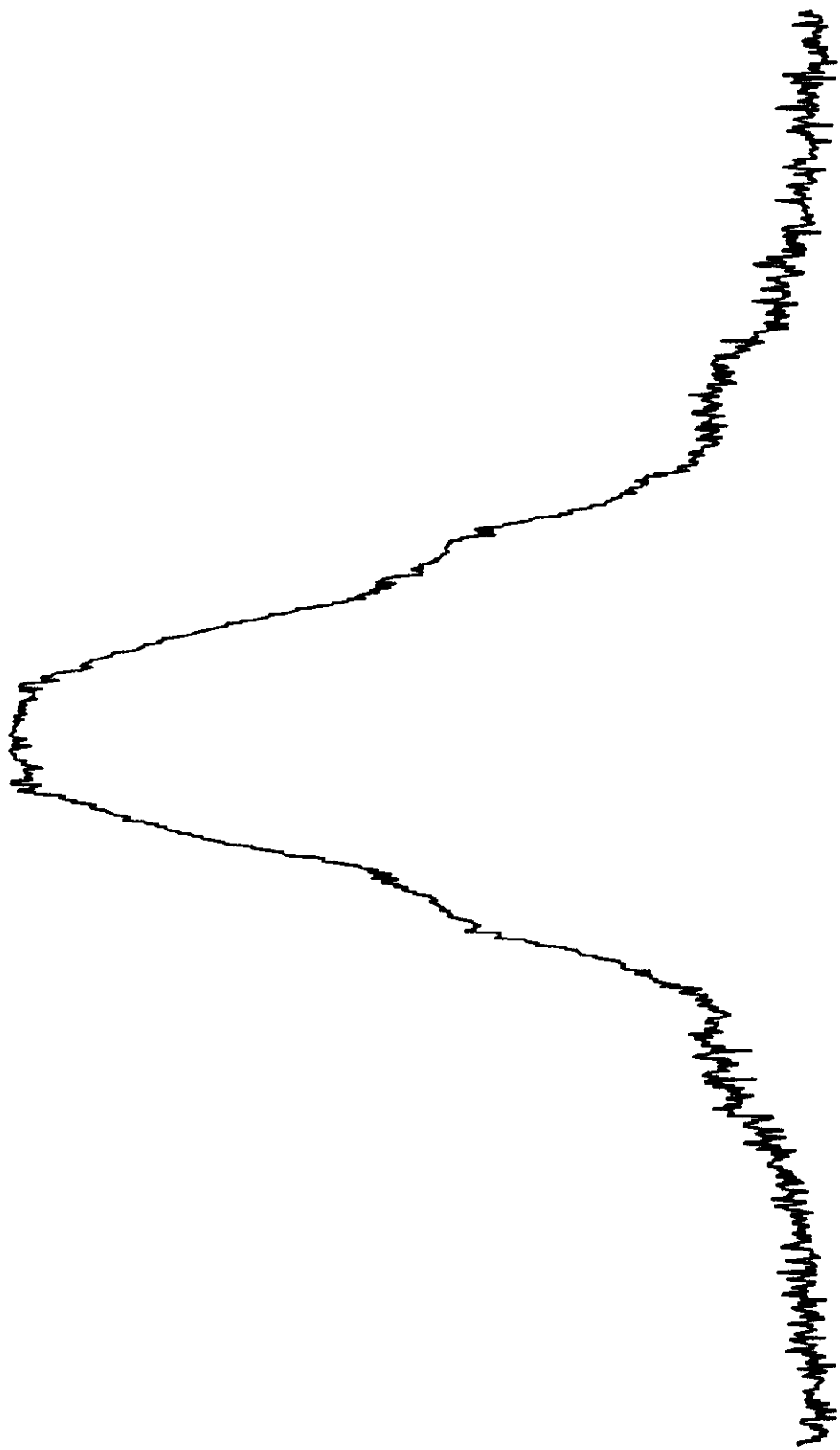
24



Black F (Mean)



76



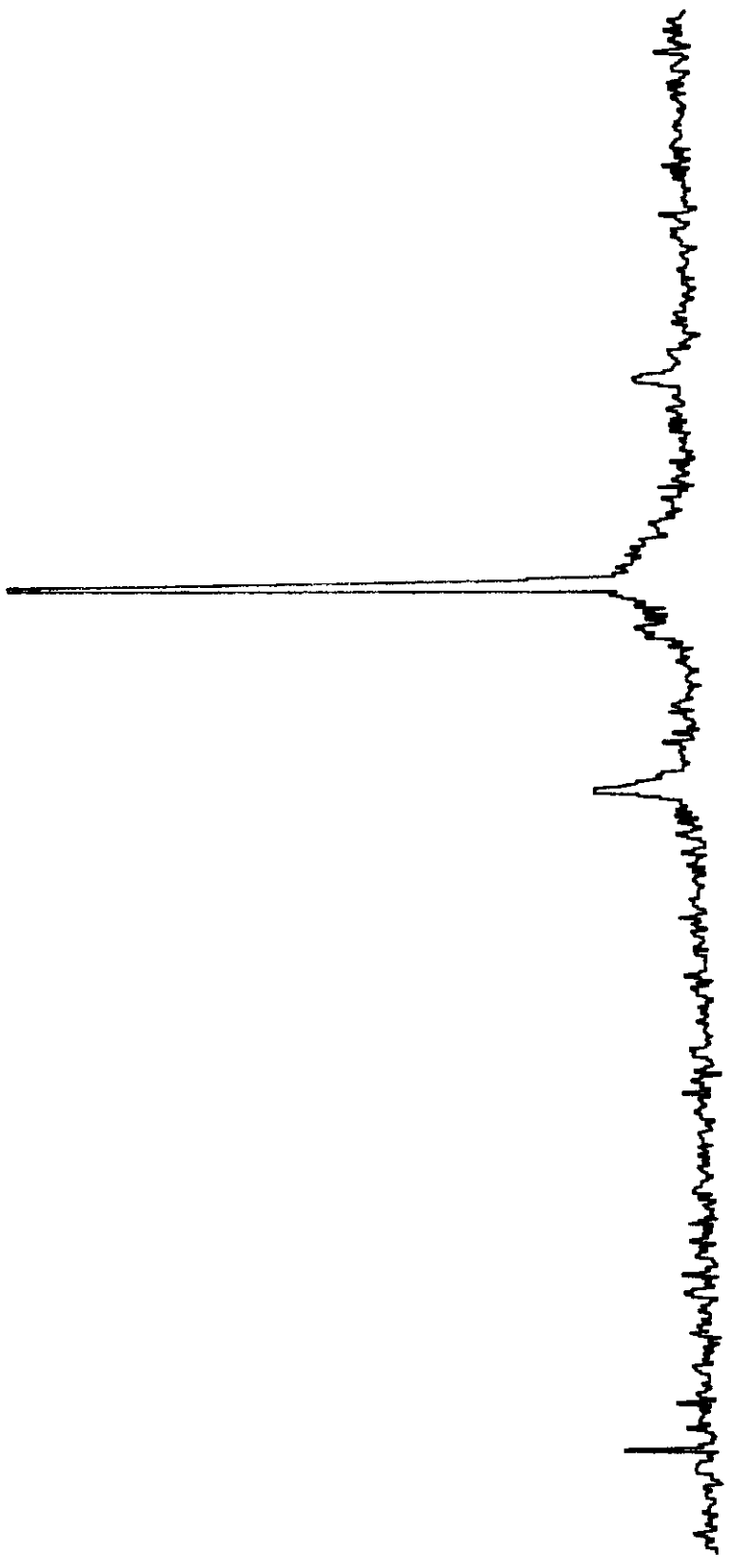
Blackburn

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Back A

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Block A

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Handwritten scribbles and lines, possibly representing a signature or a series of marks.

Block A

110

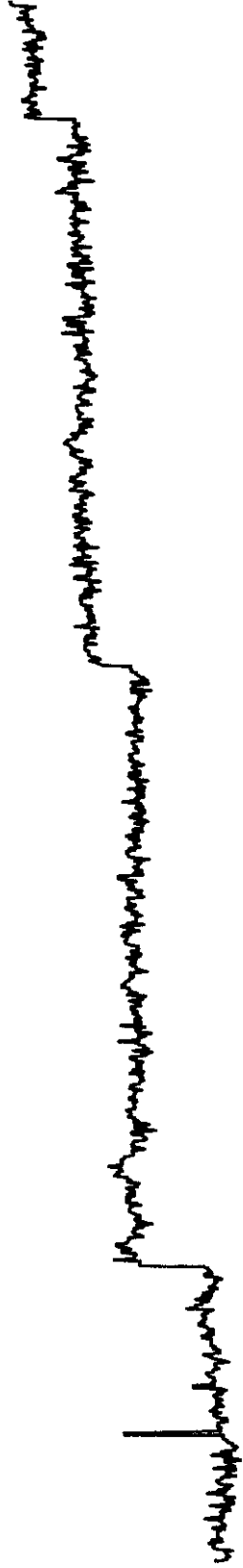
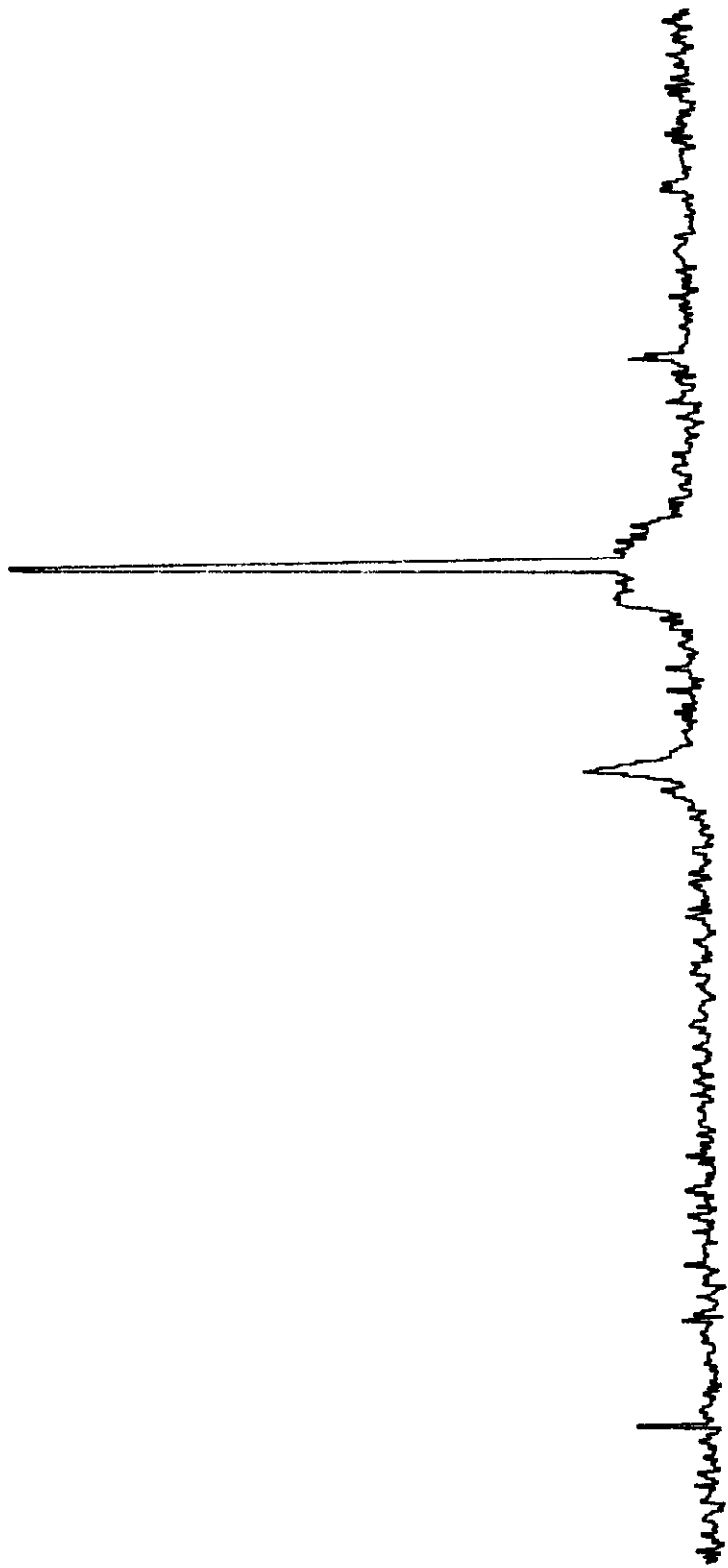


Figure B

73

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Black B



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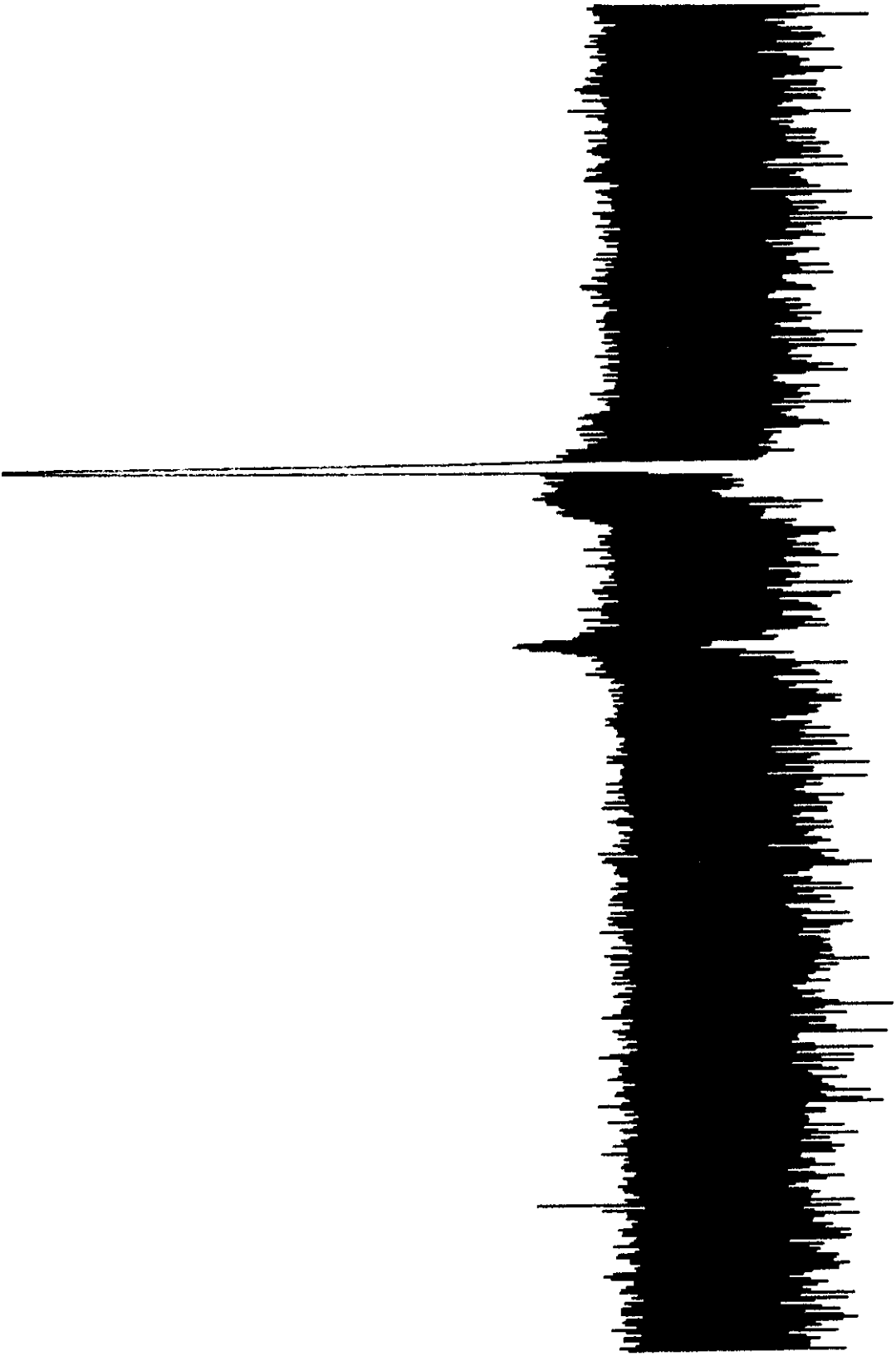
Block B

78

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Black C





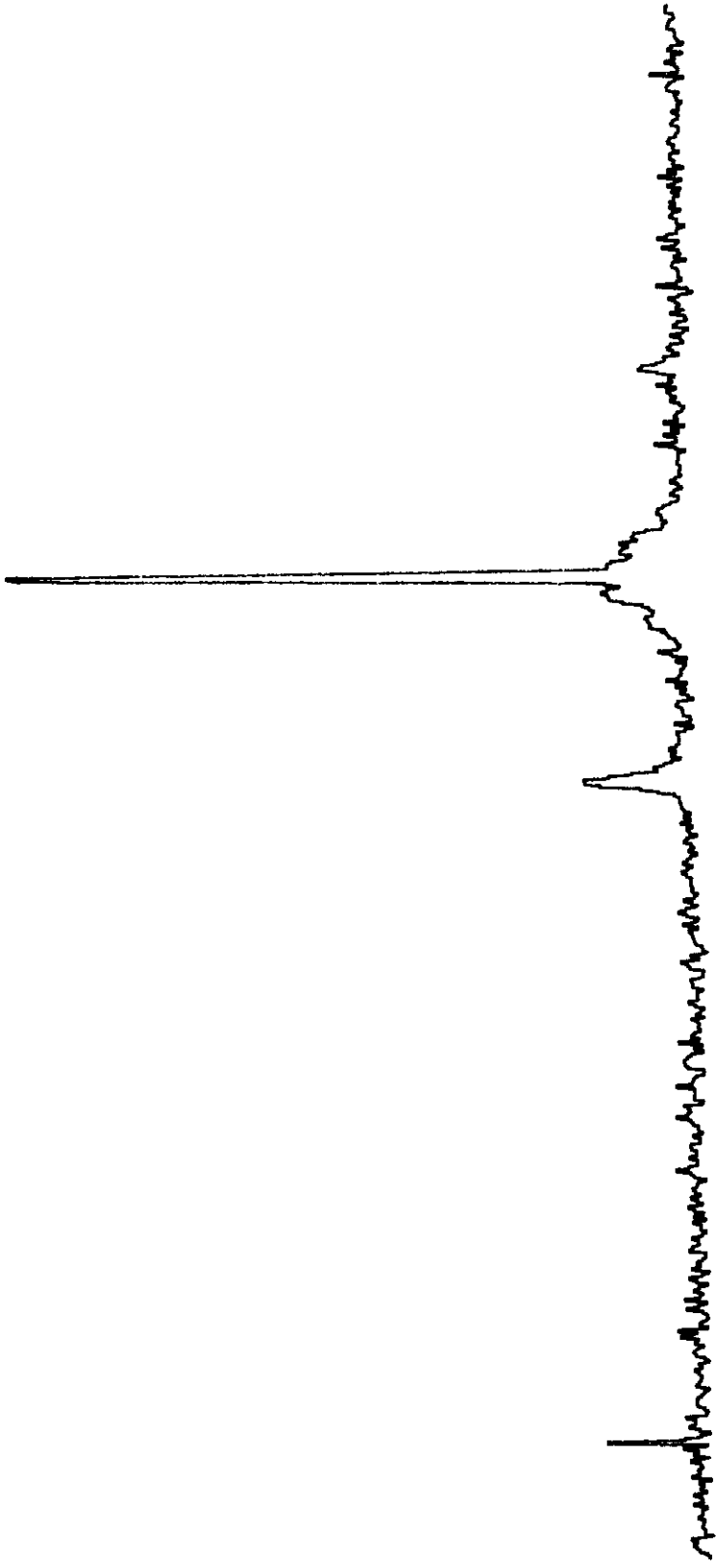
Black C

76

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Block C



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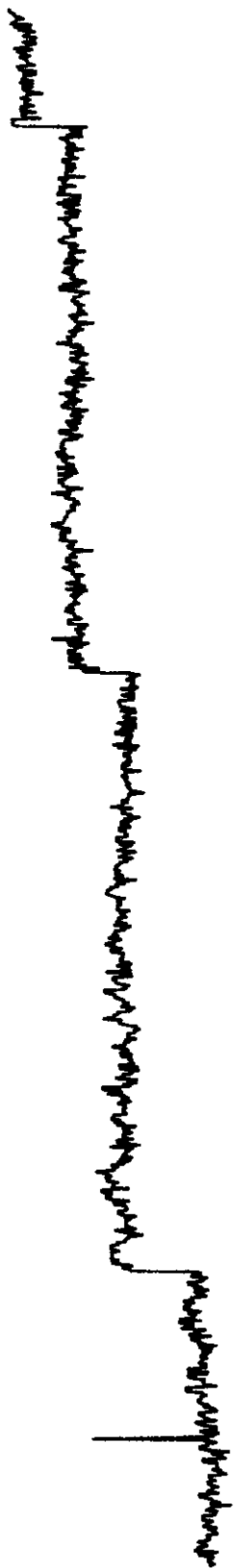
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26

Handwritten text, possibly a list or notes, written vertically on the page. The text is illegible due to its orientation and cursive style.

Block D

7/1



1. Die folgenden Aussagen sind wahr oder falsch?  
 a) Die Nullmatrix ist invertierbar.  
 b) Die Inverse einer Matrix ist eindeutig.  
 c) Die Inverse einer Matrix existiert genau dann, wenn die Determinante ungleich Null ist.  
 d) Die Inverse einer Matrix ist die Transponierte der adjungierten Matrix.  
 e) Die Inverse einer Matrix ist die Umkehrabbildung.  
 f) Die Inverse einer Matrix ist die Umkehrabbildung der Umkehrabbildung.  
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 m) Die Inverse einer Matrix ist die Umkehrabbildung der Umkehrabbildung.  
 n) Die Inverse einer Matrix ist die Umkehrabbildung der Umkehrabbildung.  
 o) Die Inverse einer Matrix ist die Umkehrabbildung der Umkehrabbildung.  
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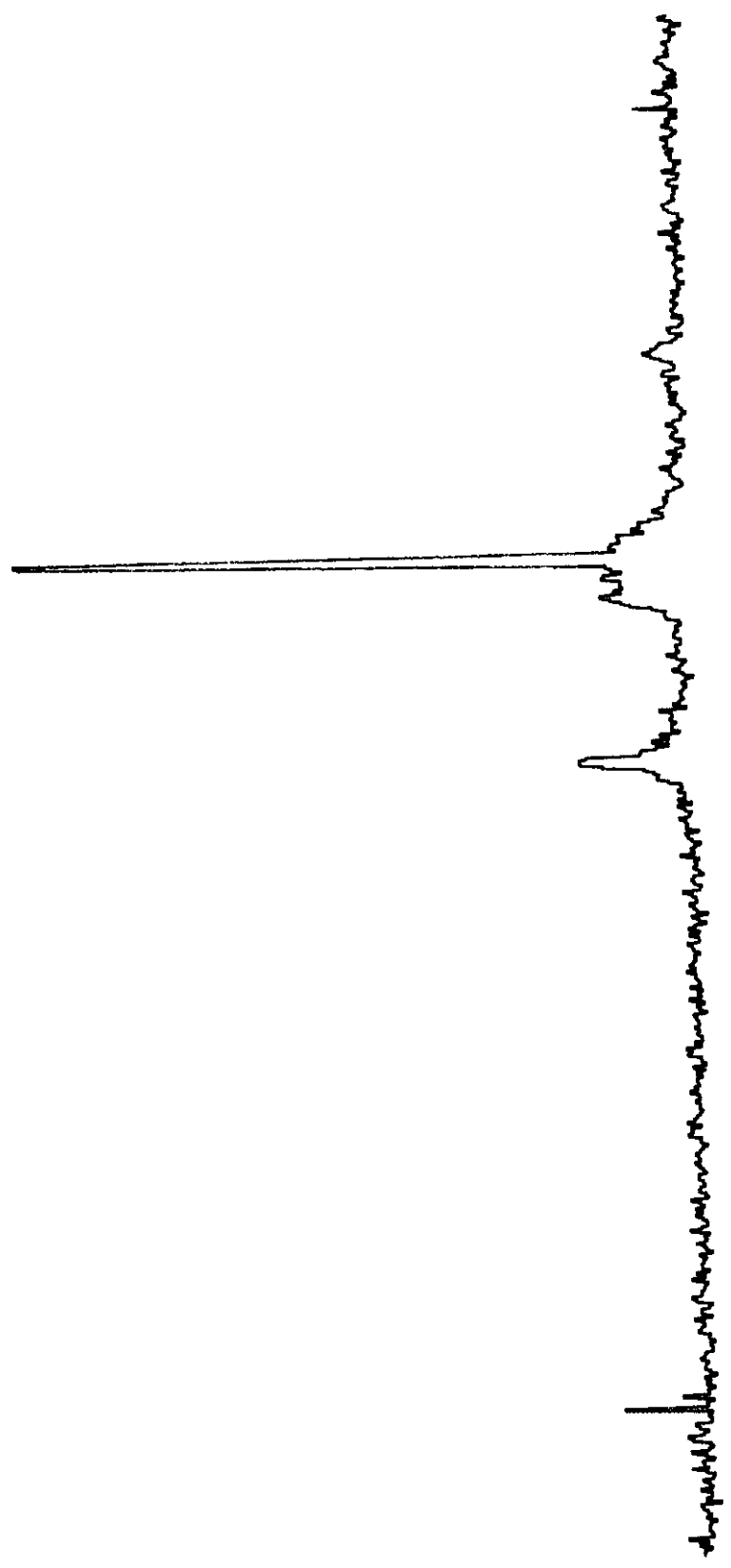


Fig. 1 E

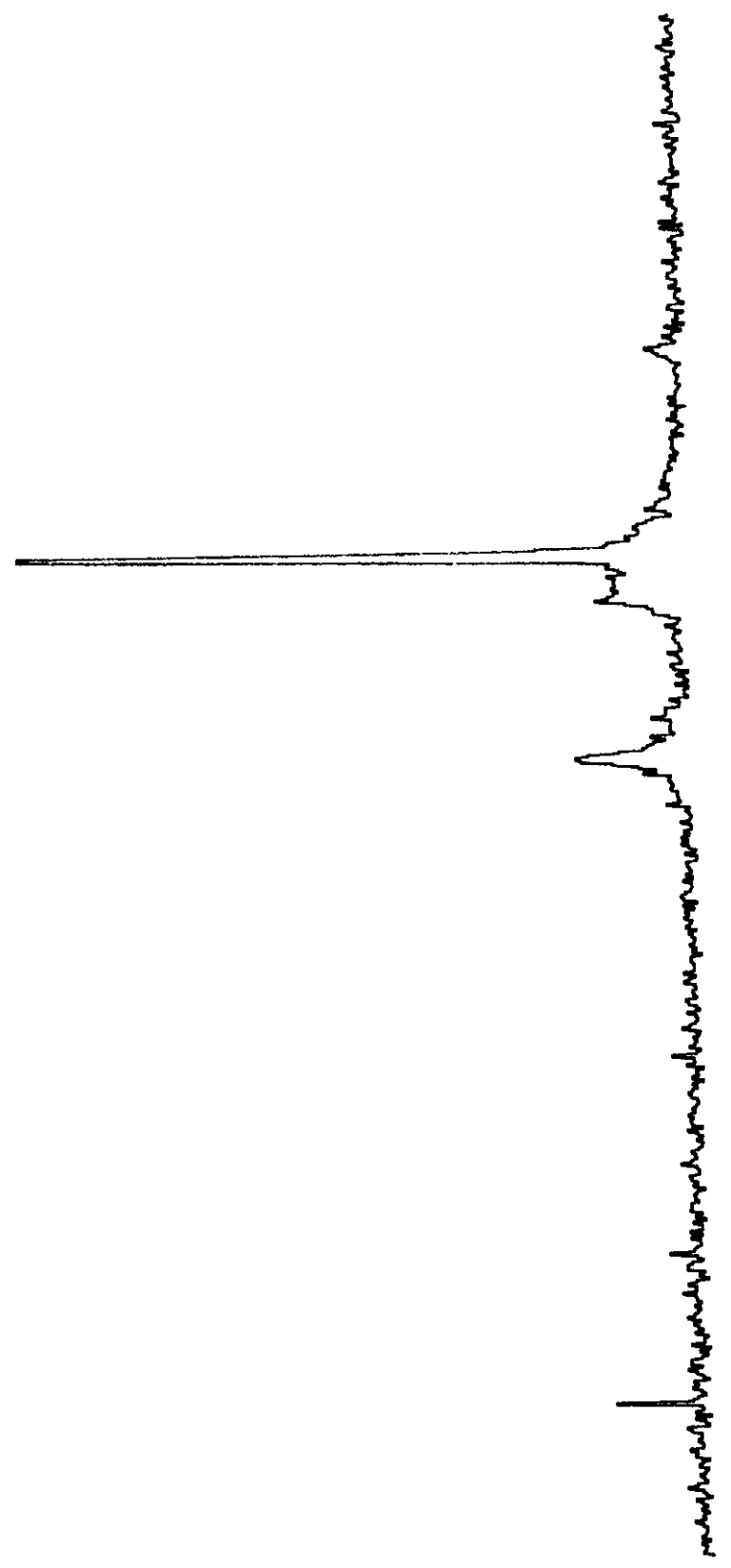


PK

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Risch F

24



24

7/6

Man  
The first part of the text is a vertical line of text, possibly a list or a series of notes, written in a cursive or shorthand style. It appears to be a list of items or a series of observations, though the individual words are difficult to decipher due to the handwriting. The text is oriented vertically on the page.

Block F

**Section 2.993 Measurement Required: Field Strength of Spurious and Harmonic Radiation**

**Measurement Equipment Used:**

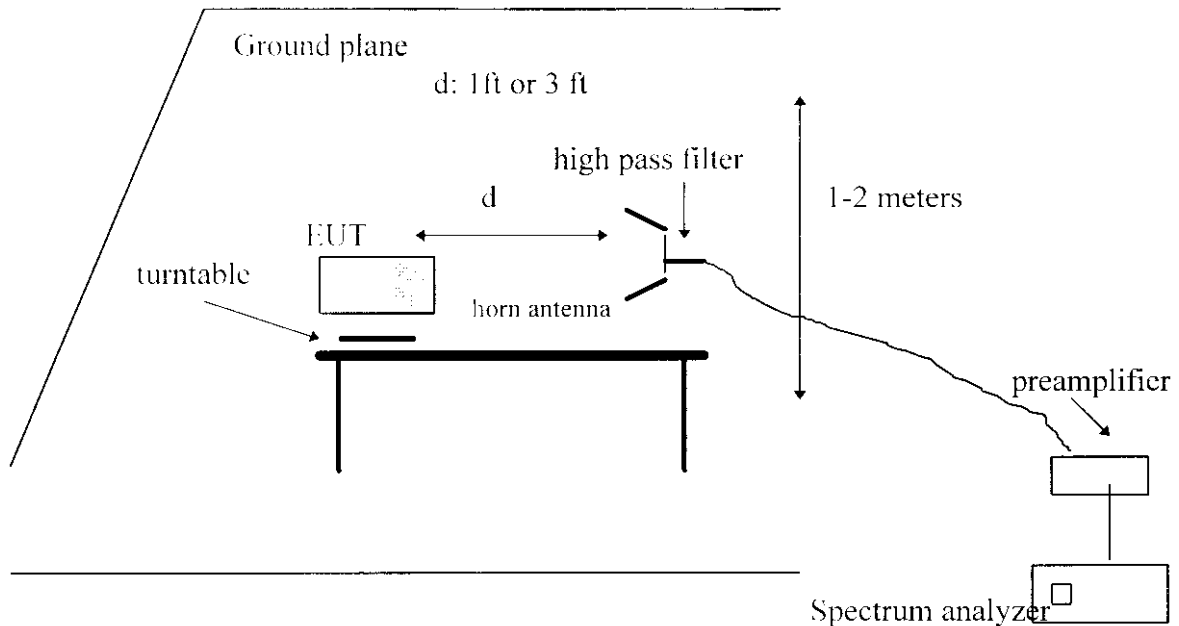
HP 8563E Spectrum Analyzer

IIP 8449 B Preamplifier, 1-26 GHz

ARA DRG-118/A Double Ridged Horn antenna, 1 - 18 GHz

QIM "The Workhorse" low loss cable, 9 ft (loss: 0.85 dB/ft@ 26 GHz)

**Test Set-Up**



**Minimum Requirement**

The magnitude of each spurious and harmonic emission detected as being radiated from the EUT must be at a level more than  $43 + 10 \log(\text{mean output power, watts})$  dB below the mean power output ( = -13 dBm).

Resultant radiated field at 3 m from -13 dBm source feeding isotropic antenna: 82 dBuV/m

**Test Method**

The antenna output port of the EUT was load and source with a 50 ohm termination. With the transmitter operating at full power, the EUT was rotated 360° and the search antenna was raised and lowered in both polarities, all in an attempt to maximize the levels of the received emission for each harmonic and spurious emission up to 10 fo.

**Test Results**

Corrected field strength readings extrapolated to 3m: Please refer to the following work sheet.

FCC 24.238  
 POWERWAVE TECHNOLOGIES  
 SPA9XXX-50 PCS AMP

PETE KREBILL  
 3/5/98  
 SITE A

ALL READINGS ARE PEAK

F (MHz)	Level (dBuV)	AF (dB)	FILTER (dB)	CL (dB)	DIST (dB)	AMP (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)
<u>VERTICAL</u>									
3920	87.3	32.2	1	5.04	-10.5	-35.5	79.54	82	-2.46
5880	65.4	35.3	1	5.58	-10.5	-35.5	61.28	82	-20.72
7840	62	37	1	7.2	-10.5	-35.5	61.2	82	-20.8
9800	62.3	38	1	7.92	-10.5	-35.5	63.22	82	-18.78
11760	64.2	39.3	1	8.46	-10.5	-35.5	66.96	82	-15.04
13720NF	60.18	40.2	1	9	-10.5	-35.5	64.38	82	-17.62
15680NF	58.6	39.6	1	10.44	-10.5	-35.5	63.64	82	-18.36
17640NF	59.2	45.9	1	10.98	-10.5	-35.5	71.08	82	-10.92
19600NF	62.2	47.9	1	12.6	-10.5	-35.5	77.7	82	-4.3

C

NF=NOISE FLOOR READINGS  
 AF=ANTENNA FACTOR  
 FILTER=FILTER LOSS  
 CL=CABLE LOSS  
 DIST=DISTANCE CORRECTION  
 AMP=AMPLIFIER GAIN

**Section 9.295 Measurement Required: Frequency Stability**

Not Applicable .

**Section 24.232: RF Power Output**

**Test Result:**

Maximum power measured: 47.2dbM=52 WATTS.

**Section 1.1307 Routine Environmental Evaluation**

The SPA9XXX-50 amplifier total power output is much less than 2000W ERP and therefore routine evaluation is NOT required for RF exposure to personnel.