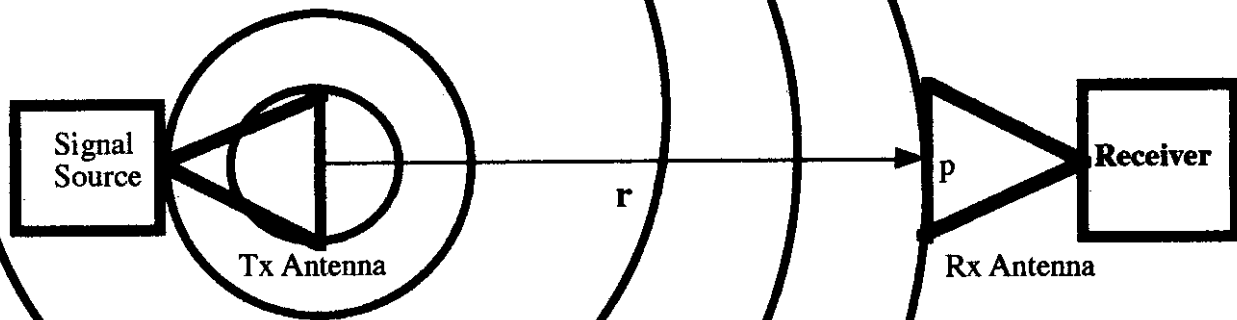


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EXHIBIT B.6

**REPORT OF EMI MEASUREMENTS
RADIATED AND CONDUCTED
EMISSIONS.**



$$P_{d,t} = \frac{P_t g_t}{4\pi r^2}$$

$$P_{d,rec} = \frac{4\pi}{g_r \lambda^2} P_{rec}$$

Where:

g_r = Receiver Antenna gain above isotropic

P_r = Intercepted power

$$P_r = \frac{V^2}{Z_{rec}}$$

$Z_{rec} = 50 \text{ Ohms}$

$$\frac{4\pi}{g_r \lambda^2} = \frac{1}{A_{eff}}$$

$$\lambda = \frac{300}{f_{(MHz)}}$$

$P_{d,rec}$ = Power intercepted by receiver antenna divided by the effective area of the receive antenna

$4\pi r^2$ = Surface area of Sphere with radius r .

$P_t g_t$ = Effective Radiated power (ERP)

P_t = power presented by Sig Source to Transmit Antenna

g_t = numeric gain with respect to isotropic of transmit antenna

r = radius of sphere and distance to a point of interest in space.

$P_{d,t}$ = ERP divided by the surface area of the sphere of radius r .

Equating the two expressions for power density:

$$P_{d,t} = P_{d,rec}$$

$$\frac{P_t g_t}{4\pi r^2} = \frac{4\pi P_r}{g_r \lambda^2}$$

Then, solving for P_{rec}

$$P_{rec} = \frac{P_t g_t}{4\pi r^2} \times \frac{g_r \lambda^2}{4\pi} = \left(\frac{\lambda}{4\pi r} \right)^2 P_t g_t g_r$$

Substituting for P_{rec} to find the Receiver input voltage,

$$\frac{V_{rec}^2}{Z_{rec}} = \frac{g_r \lambda^2}{4\pi} \times \frac{P_t g_t}{4\pi r^2}$$

For $Z_{\text{rec}} = 50 \text{ Ohms}$

$$V_{\text{rec}}^2 = \frac{50 P_t g_t g_r \lambda^2}{(4\pi r)^2}$$

$$V_{\text{rec}} = \frac{\lambda}{r} \times (P_t g_t g_r)^{1/2} \times 0.562$$

$$\text{substituting: } \lambda = \frac{300}{f_{\text{MHz}}}$$

$$V_{\text{rec}} = \frac{168.8}{r f_{(\text{MHz})}} (P_t g_t g_r)^{1/2}$$

Because the voltage equally divides between the antenna and the receiver, subtract 6 dB

$$V_{(\text{dBuV})} = 152.5 + 10\text{LOG}(P_{t,\text{Watts}}) + G_t + G_r - 20\text{LOG}(f_{\text{MHz}}) - 20\text{LOG}(r)$$

$$P_{t,\text{dBm}} = V_{(\text{dBuV})} - (152.5 + 30) - G_t - G_r + 20 \text{ LOG}(f_{\text{MHz}}) + 20\text{LOG}(r)$$

The electric field, E, can be calculated by adding the receive antenna antenna factor, AF, to the voltage calculated at the receiver.

$$AF = 20\text{LOG}(f_{\text{MHz}}) - G_r - 29.75$$

$$E = V_{(\text{dBuV})} + AF_{(\text{dB/m})}$$

Calculate Source Power

$$P_{(dBm)} = V_{dBV} - G_t - G_r - + 20\text{LOG}(f_{\text{MHz}}) + 20\text{LOG}(r_{\text{meters}}) - (158.5 + 30)$$

[illegible]

NOTES: 1) Power calculation for final stage of Spider Tag manufactured by C-Code.

2) E field measured with peak detector using CISPR bandwidths.

$$3) \text{ AF} = 20 \cdot \text{LOG}(f_{\text{MHz}}) - G_r - 29.75$$
$$4) E = V_{(\text{dBuV})} + AF_{(\text{dB/m})}$$

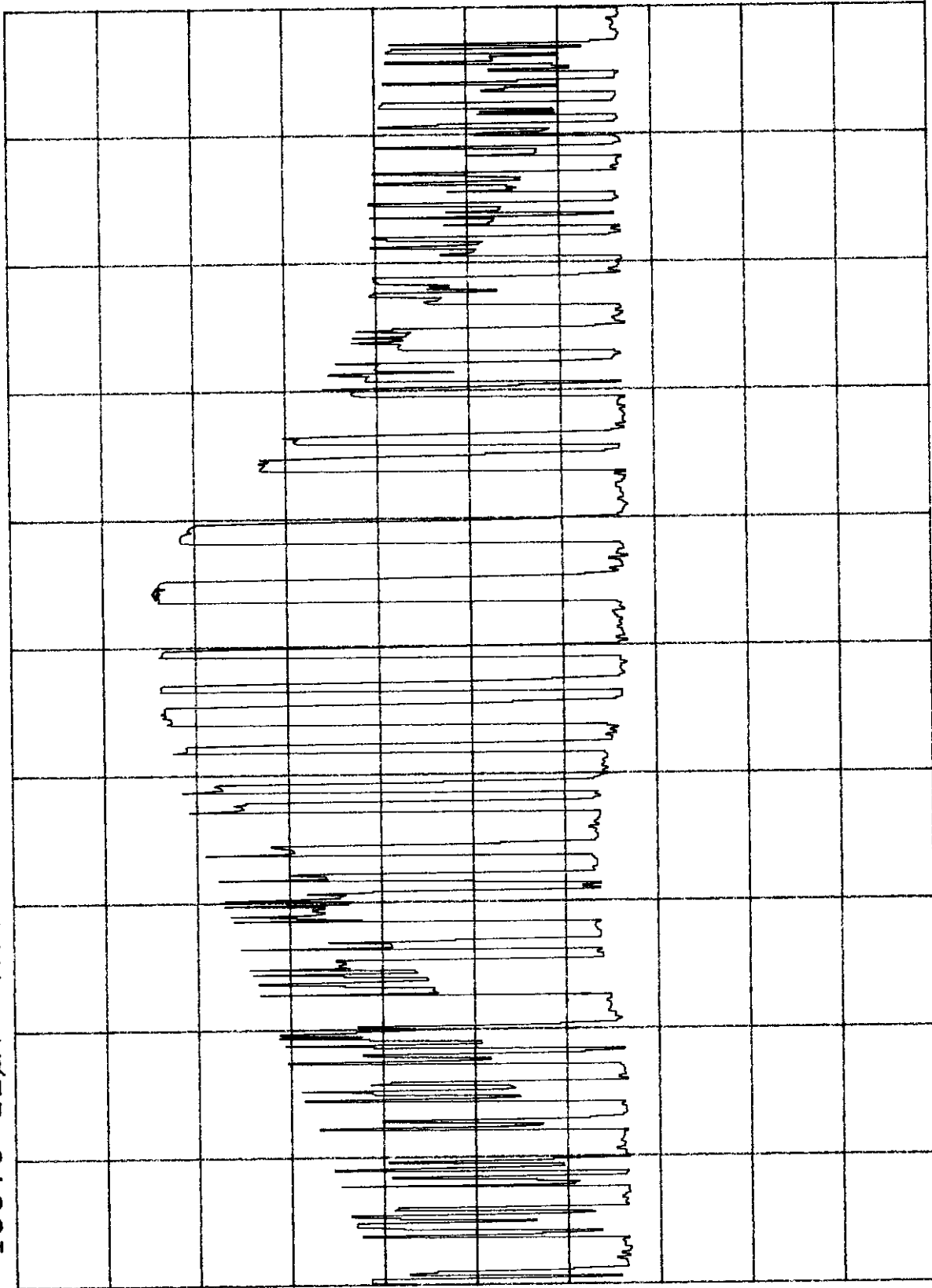
3M 1ES1 DISTANCE
PRE-AMP ON

HORIZ POL
PEAK
LOG PERIODIC

MKR 303.8490 MHZ
84.20 dBμV

HP REF 100.0 dBμV ATTN 10 dB

10 dB/



SPAN 500.0 KHZ
SWP 20 msec

CENTER 303.8280 MHZ
RES BW 1 MHZ
VBW 1 MHZ
 $E = 84.2 - 28 + 14.2 + 3 = 73.4 \text{ dBμV/m}$

VER 100
PEAK
LOG PERIODIC

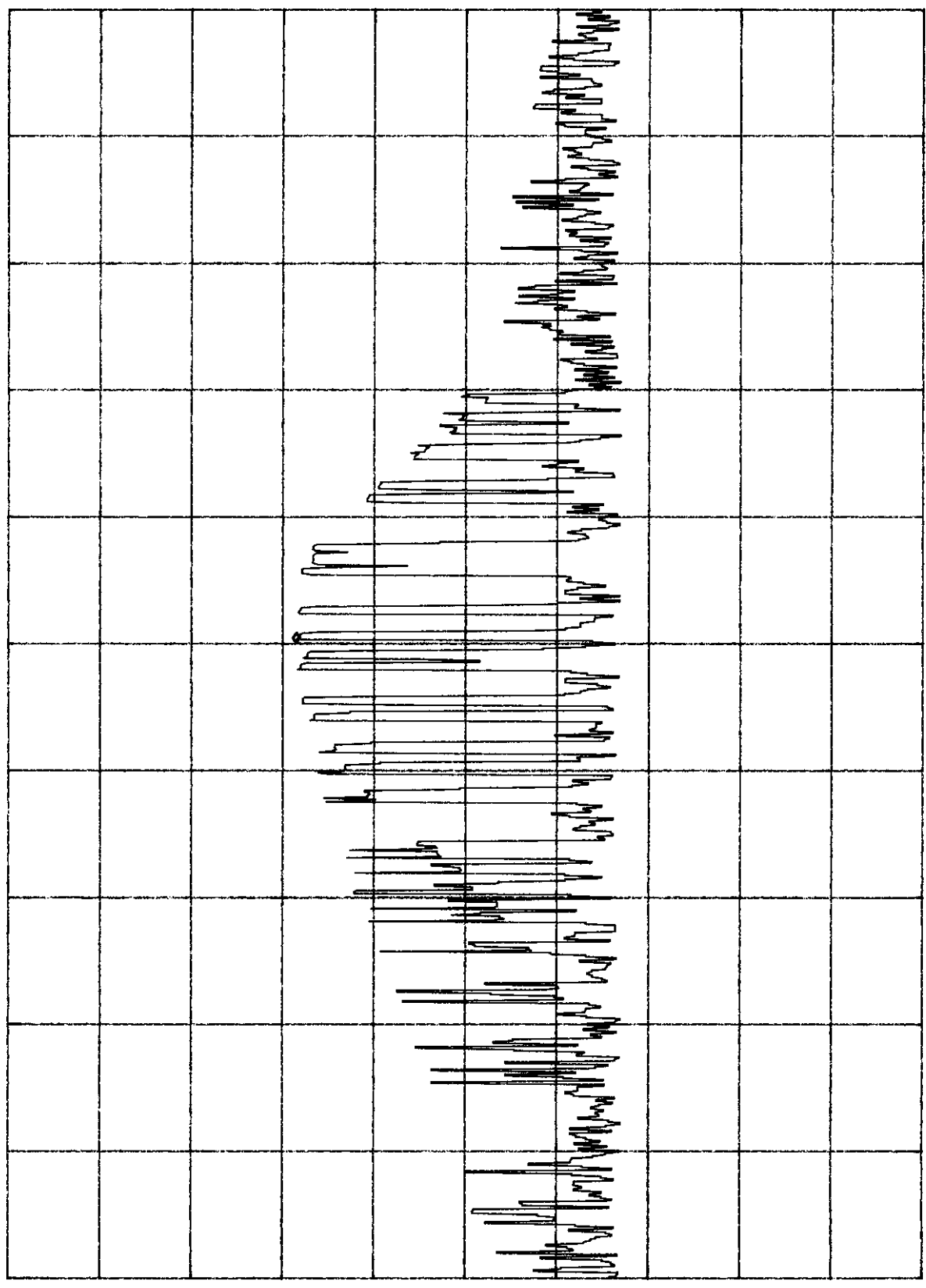
SW TEST DISTANCE
PRE-AMP ON

8/5/79

MKR 303.8300 MHZ
68.50 dBμV

HP REF 100.0 dBμV ATTN 10 dB

10 dB/



CENTER 303.8280 MHZ
RES BW 1 MHZ
SPAN 500.0 KHZ
SWP 20 msec

VBW 1 MHZ

$E = 57.7 \text{ dBμV/m}$

ENGINEERING, Inc.
Electro Magnetic Controlled Environment

Stephen A. Sawyer, NCE

CERTIFICATE OF COMPLIANCE

REPORT NUMBER: ECD 0799
REPORT DATE: July 30, 1999
APPLICABLE SPECIFICATION:
FCC2.1031 & 15.201

PREPARED FOR:
E-Code
113 West Hoover Avenue
Suite 101
Mesa, AZ85210
TEL(602)969-2828 FAX (602)969-6670

I Hereby Certify that the measurements shown on this test report were made in accordance with the requirements of USC Title 47 Part 15, Paragraph 15.201 using the procedures of ANSI C63.4:1992. The equipment listed below was found to be within the Applicable Limits. Tests were performed on 9 June 1999.

Equipment Under Test
SPIDER TAG

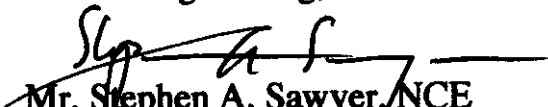
Model Number
ES - 0586

Serial Number
H9100

EMCE Engineering, Inc. assumes no responsibility for the continuing validity of test data when the Equipment Under Test is not under the continuous physical control of EMCE.

The signature below attests to the fact that all measurements reported herein were performed by me or were made under my supervision by qualified EMCE personnel utilizing test equipment maintained in a "Current" state of calibration with traceability to NIST. All test indications are correct to the best of my knowledge and belief as of the date specified above.

CERTIFIED BY:
EMCE Engineering, Inc.


Mr. Stephen A. Sawyer, NCE
President

ELECTROMAGNETIC INTERFERENCE

TEST REPORT

OF

AN INTENTIONAL RADIATOR

PER

47 CFR 15.201

FOR THE

ADDISON TECHNOLOGIES (DBA E - CODE)

SPIDER TAG

MODEL NUMBER : ES - 0586

SERIAL NUMBER: H9100

REPORT NUMBER: FCC ID: N3S2001B01

DATED: 30 July 1999

PREPARED FOR:

Mr. John Coulthard

E - Code

113 West Hoover Avenue

Suite 101

Meas, AZ 85210

(602)969-2828 FAX (602)969-6670

PREPARED BY:

Mr. Stephen A. Sawyer

EMCE ENGINEERING, INC.

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1.0 SCOPE

This test report describes the equipment setup, test methods employed, and results obtained during FCC testing of an Identification transmitter containing an **INTENTIONAL RADIATOR**. The tests described herein measured the RF radiated emissions of the equipment under test (EUT). Power line conducted emissions were not measured because the EUT is battery powered with no provision for recharging. The frequency range of 30 MHz to 1,000 MHz was tested for any emanations from the EUT. Above 1000 MHz, harmonics of the fundamental were measured to the tenth harmonic (3038 MHz). Measurements were made in both the vertical and horizontal polarizations. The fundamental and all harmonics were scrutinized for falling into the restricted bands of paragraph 15.205.

1.1 Objective

The tests described herein were performed to show compliance with the requirements of 47 CFR 15.201 for the limits of 15.205 and 15.209 and to provide Test data to present to the FCC for the purpose of obtaining a Grant of Certification.

1.2 Description of EUT

The Spider Tag Identification Transmitter is a small Tag like device (approximately 2.5 cm by 2.5 cm by 0.5 cm thick) that can be attached to another object (perhaps a garment in a retail store) for the purpose of tracking the whereabouts of the Tag. The transmitter is battery powered.

2.0 APPLICABLE DOCUMENTS

2.1 FCC Documents

<u>DOCUMENT</u>	<u>FUNCTION</u>
47 CFR 15.201	Equipment Authorization requirements for Intentional Radiators.
ANSI C63.4-1992	American national Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

3.0 GENERAL TEST SETUP AND TEST CONDITIONS

3.1 Test Facility

The tests described herein were performed at the test facility of:

EMCE Engineering, Inc.
44366 S. Grimmer Blvd
Fremont, CA 94538

Phone (510) 490-4307 Fax (510)490-3441

This laboratory has two electromagnetic shielded enclosures and a 3-meter and 10 meter Open-Area Test Site (OATS). The shielded rooms are available for preliminary determination of radiated emission frequencies, and formal conducted emission measurements, or for other investigative work. A computer controlled automatic spectrum analyzer with quasi-peak detector, plotter, and printer were used for gathering and recording and reproducing test data.

3.2 Description of Open-Field Test Site

The 3 and 10 meter site is located on a cleared level site of one acre square. This site is suitable to expand to 30 meters if necessary. The remainder of ground is comprised of gravel with stones no larger than 1 inch in diameter.

This site is where the bulk of EMC testing takes place (30 MHz to 1 GHz).

3.3 Site Attenuation

The site attenuation is a measure of merit describing how well the test site approximates free space far field radiation conditions. The site attenuation for both the 3 meter and 10 meter sites has been measured (by the method of ANSI C63.4-1992) and found to satisfactorily fall within the allowed error bounds.

3.4 Ground Plane (Ground Screen)

The outdoor site has a 3000 (18.3 m x 15.2 m) square foot floor area of poured reinforced concrete, 6 to 8 inches thick. A 20 meter by 18 meter (approximately 66 by 59 feet) solid 24 gauge galvanized sheet steel ground plane is centered on the test area with its long dimension along the major axis of the test site. It is made up of 4 foot wide sheets overlapped one inch on each other and cement nailed at 18 inch intervals. The measurement antenna mast and turntable are located 3 meters apart on the center line of the major axis so that each is >3 meters from the edges of the ground plane. The ground plane is connected to a nine foot long earth ground rod at each corner of the ground plane.

For the 10 meter site, a cement pad was prepared with size of 57 ft (17.3 m) wide by 66 ft (20 m) long and covered by a combination of solid galvanized steel sheets and galvanized hardware cloth so as to contain an ellipse with the origin bisecting the major and minor axes and with foci (f and f') of 5 (and -5) meters along the 20 meter major axis. The minor axis is 17.3 (8.67 and -8.67) meters by definition. The final defining characteristic is the ellipses eccentricity. For the above ellipse, the eccentricity, e, is 0.5. Cable trenches exist beneath the steel cover. Each corner of the ground plane has a 3 meter ground rod electrically attaching the ground plane to earth.

3.5 Input Power for the EUT

Electricity for the EUT is provided by buried power lines in trenches below the metallic ground plane. An outlet box is placed near the EUT. Power for the EUT is taken from the outlet box which is connected to two "shielded enclosure" quality power line filters located on the ground plane near the EUT. The filters are electrically bonded to the ground plane.

3.6 Accessory Equipment Precautions

Care was taken that accessory equipment or adjacent equipment did not produce unacceptable interference or reflections so as to contaminate the final test data. The EMI receiver and its associated computer, printer, and plotter were located >15 meters away from the EUT during testing and were powered from a separately filtered power source.

3.7 Ambient Interference

Ambient interference from radio and television stations, vehicles, mobile radio, etc. were present at the open field test site during testing. Care was taken to assure that ambient interference did not overload the receiver or mask emissions from the EUT. The method of measurement used to deal with ambient noise during radiated emission testing is described in Paragraph 5.2.1.

3.8 Personnel

All testing was performed by EMCE Engineering personnel who were properly trained for the instruments and procedures used. The test data sheets have been signed off by the attending EMC Test Engineer.

3.9 USE OF INTERFERENCE MEASUREMENT EQUIPMENT

All of the emission measurements and field strength measurements were performed with a Hewlett Packard Spectrum Analyzer System. This Spectrum Analyzer System utilizes the following basic instruments.

- (1) HPC- 8566A Spectrum Analyzer
- (2) HPC- 9836 Desktop Computer/Controller
- (3) HPC- Laserjet III Printer
- (4) HPC- 8447D Preamplifier

General details of the operation of these instruments is give in Appendix A. Specific details are given in the separate sections on emission testing. Antenna factors and cable loss characteristics, though programmed into the computer, are listed in Appendix B.

3.9 Use of Interference Measuring Equipment, (Cont'd).

Test results are recorded on both tabular data sheets and graphical plotter charts and show final corrected values compared to the specification limit. Sample calculations show how the antenna factors, cable losses, amplifier gain, etc. are combined in the automatic analyzer program to produce the final corrected values shown on the graphs and data sheets.

3.10 Calibration of Measuring Equipment

The EMI receivers (Spectrum Analyzer) are calibrated by an outside calibration Laboratory on a 12 month basis. The calibration laboratory provides Certification to NIST. Antenna factors are measured at 2 year intervals by EMCE using the REFERENCE ANTENNA method of ANSI C63.5-1988. The reference antenna set is rented from the manufacturer. Cable losses as well as amplifier gains are swept at least every month to verify accurate values.

4.0 PREPARATION OF EUT FOR TEST

4.1 Operation of EUT

Equipment Type: Mobile low power RF Transmitter.

4.2 Setup of EUT

Special Software: There was no special setup of EUT.

4.3 Power and Grounding of EUT

Power Source of EUT: Internal lithium batteries of 3 VDC.

Grounding of EUT: The EUT is not grounded.

4.4 **Peripherals**

<u>Type</u>	<u>Manufacturer & Model</u>	<u>Serial Number</u>
*****None*****		

4.5 **I/O Cables**

<u>Type</u>	<u>Port</u>	<u>Length</u>	<u>From</u>	<u>To</u>
*****None*****				

4.6 **Interfaces:** None

5.0 **DETAILED MEASUREMENTS**

Because the EUT was battery operated with no provision for recharging, conducted emissions were not measured.

*****THE EUT HAD NO TEST FAILURES*****

Radiated emissions were measured from 30 MHz to 3038 MHz. The measurement bandwidths were 120 kHz from 30 MHz to 1000 MHz, and 1MHz from 1000 MHz to 3038 MHz. Detection modes included quasi peak mode to 1000 MHz. Above 1000 MHz, a peak mode measurement was made and was converted to average reading by addition of a duty cycle factor. The EUT was placed on a nonmetallic stand in the open-field site, 1 meter above the ground plane, as shown in Figure 2. General arrangements of the open-field site are shown in Figure 1. Above 1000 MHz, the antenna height was fixed at 1.5 meters.

Preliminary scans of the frequency range were used to determine the equipment positions which produced maximum emissions. These configurations were then kept intact while the angle of rotation of the EUT with respect to the antenna was scanned for maximum readings. The angles are shown on the data sheets. The actual data sheets are found in Appendix D.

5.1 Radiated Emissions Test, 30 MHz to 1000 MHz

Radiated emission measurements were started with the antenna in a vertical orientation at 1.0 meters in height and 1.0 meters from the EUT and with the front of the EUT facing the antenna. The measurement antenna was connected to the spectrum analyzer through a 50 foot section of RG-214 coaxial cable.

The automatic spectrum analyzer scanning procedure used for radiated measurements is a two-step process, described in detail in APPENDIX A. Readings were made at this point using Sampling techniques. The first pass accumulates and stores both EUT and background ambient emissions received by the measurement antenna for 1000 samples per frequency segment. The second pass was performed with the EUT turned **OFF** thus accumulating only background ambient emissions for 1000 samples per frequency segment. The computer was programmed to subtract the second pass data from the first pass data on a point by point basis per frequency segment, thus removing steady state ambients and leaving only EUT emissions. This culling process reduces the total number of emissions which must be examined manually.

A preliminary list of possible EUT frequencies was printed at the end of the second pass after the subtraction process. This list contained both EUT emissions and background ambients, particularly ambient signals which fluctuated in amplitude or which went on and off rapidly (such as communication transmitters). This list, labeled "Signals within 15 dB of Limit are:", is included with the data sheets in Appendix D. At this point each listed frequency was individually examined by a manual procedure. Some of these signals were ambients and some were EUT signals. They were sorted and the EUT signals were accurately measured with the Quasi peak detector after maximizing the signal in both azimuth and height. The final print-out indicates along with other information, final corrected signal level, its limit, and the turntable angle.

As the evaluation process continues each signal attributed to the EUT is further examined for maximum value. The angle of rotation of the EUT with respect to the antenna was varied from 0 to 360 degrees.

5.1.1 Test Results.

There were the fundamental and the second and third harmonic signals measured over the 30 MHz to 1000 MHz frequency range. Above 1000 MHz, only harmonics were found. No signals were greater than the specification limits. Test data are found in Appendix D.

5.1.2 Test Equipment.

The following electronic test equipments were gathered together and used for these measurements.

<u>NOMENCLATURE</u>	<u>MANUFACTURER and MODEL No.</u>	<u>ASSET No.</u>	<u>CAL DATE</u>	<u>CAL DUE</u>
Spectrum Analyzer	HPC8568B	00450	12/13/98	12/13/99
Spectrum Analyzer	HPC8566A	00328	12/13/98	12/13/99
Computer	HPC-9836	00380	N/A	N/A
Plotter	HPC-7470A	00441	N/A	N/A
Printer	HPC-2673A	00416	N/A	N/A
Antenna, Dipole Set	CDI A100	00431	5/7/99	5/7/00
Antenna, Horn	Pol CA-L	00400	1/6/99	1/6/00
Antenna, Horn	Pol CA-S	00398	1/6/99	1/6/00
Preamplifier	HPC8447D	00451	N/A	N/A

5.1.3 Recommendations.

Because there were no test failures, there are no recommendations.

APPENDIX A

EMI MEASUREMENT WITH THE AUTOMATIC SPECTRUM ANALYZER

<u>Section</u>	<u>Title</u>	<u>Page</u>
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3.0	PROGRAM OPERATION	15
3.1	General Operations	16
3.2	Conducted Emission Measurements	17
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EMI MEASUREMENT WITH THE AUTOMATIC SPECTRUM ANALYZER

1.0 INTRODUCTION

This document describes application of an Automatic Spectrum Analyzer and the necessary peripheral Units to measurement of Electromagnetic interference (EMI) emissions for either FCC Computing Device or European Community compliance testing. The measurement methods are designed to comply with FCC Measurement Procedure ANSI 63.4-1992 as well as CISPR 22 1997.

The measurement of EMI involves a repetitive process of collecting, analyzing and reformatting large amounts of data. It is a process which lends itself to computer controlled automation. The benefits are: reduced setup time; reduced operation time; increased accuracy; and better repeatability.

The detailed description which follows provides insight into the programming of the analyzer and computer. The steps describe how data is collected, analyzed, displayed and reproduced.

2.0 OVERVIEW

The HP-8566A is a a general purpose programmable Spectrum Analyzer System and the HP-85650A is a programmable accessory which sets the overall measurement bandwidth and detector time constants to those required for FCC measurements. By adding appropriate transducers, such as antennas or LISNs, and the proper software, the system becomes an interference measurement set operating under the control of HP-9836 Computer. An HP-7475A Plotter and a Hewlett Packard 2227B Printer are accessories which provide hard copy output in the form of graphs and data sheets.

Several measurement sweeps are taken to characterize the interference from the Equipment Under Test (EUT). The data is analyzed in the computer and later reformatted in both semi-log graph and a measurement summary data sheet. The data sheets indicate compliance by including PASS/FAIL messages and specification limits.

3.0 PROGRAM OPERATION

3.1 General Operations

A stored program is loaded into the computer. This program determines whether the system is set up for conducted or radiated emissions. It contains all of the necessary operation steps, the antenna factors, and any data needed for calculation of final emission values. The Analyzer has a built-in self calibration program. This is run each time the analyzer is set up for testing. It checks all of the pertinent internal parameters and display the error value for each. A calibration data sheet is normally printed out for inclusion in the test report.

This program begins by prompting the operator to provide administrative data such as date, customer, model number, serial setup diagram on the Analyzer CRT. This prompts the operator to check the setup to see that the equipment is properly connected before making measurements. A blinking message on the analyzer CRT reminds the operator that program execution will continue after the "Hz" key on the analyzer keyboard is pressed.

The Analyzer Frequency Span, Resolution Bandwidth, Video Bandwidth and Sweep time are set automatically to programmed values at this time. The Quasi-Peak Adapter is also set automatically to programmed values. The Quasi-Peak Adapter is set to the "Normal" mode QP detector "OFF" (passes peak signals through the Quasi Peak Adapter) during the automatic scans. This allows faster scans of the analyzer and produces peak values of the data. Quasi-Peak detector scans are processed manually as described in the later paragraphs on conducted and radiated emission testing. The programmed setup values depend upon whether conducted or radiated emissions are to be measured. The system is now ready for the first measurement sweep. The total frequency span to be measured is divided into several ranges which are swept separately.

The EUT is prepared for testing and is turned on in the operating mode to be used during the test. Preliminary evaluations have already been made to determine worst case cable and equipment positioning in the EUT test setup.

3.1 General Operations (Continued)

Table A-1 shows the sweep ranges and sweep times programmed for both conducted and radiated emission measurements. The Analyzer divides the spectrum scanned in a sweep into 1001 separate incremental measurement segments and stores these for processing. The width of the scan and the number of segments per scan determines the width of each incremental segment. The column "Bandwidth of Stored Segments" in Table A-1 shows the bandwidths programmed. These have been selected to be narrow enough for the assured sensing of all EUT emissions in the presence of typical ambient signals. Scan time is slow enough to allow the EUT signals to reach a peak value and be sense.

Analyzer Bandwidth RBW-VBW (Note 1) (MHz)	System Bandwidth with QP (Note 2) (KHz)	Range of Band Swept (Note3) (MHz)	Span of Stored Segment (MHz)	Sweep Time (Seconds)
<u>CONDUCTED EMISSIONS</u>				
0.003	0.2	0.01 - 0.15	0.14	90
0.1	9.0	0.45 - 1.60	1.15	90
0.1	9.0	1.60 - 8.00	6.40	60
0.1	9.0	8.00 -30.00	22.00	60
<u>RADIATED EMISSIONS</u>				
0.003	0.2	0.01 - 0.15	0.14	90
0.1	9.0	0.15 - 0.45	0.30	90
0.1	9.0	0.45 - 1.60	1.15	90
0.1	9.0	1.60 - 8.00	6.40	90
0.1	9.0	8.00 - 30.0	22.0	90
1.0	120.0	30 - 60	30	90
1.0	120.0	60 - 88	28	90
1.0	120.0	88 -108	20	90
1.0	120.0	108 -200	92	90
1.0	120.0	200 -400	200	90
1.0	120.0	400 -700	300	90
1.0	120.0	700-1000	300	90

3.1 General Operations (Continued)

NOTE (1): System Bandwidth is determined by the quasi-peak detector when its function is selected. The automatic scans are made with the QP detector in the bypass mode. Data values are peak.

NOTE (2): Bandwidth of stored segment is equal to the range of band scanned divided by the number of data points. The analyzer provides 1001 data points for any span. For example, the scan from 30 MHz to 160 MHz equals scanned range of 30 MHz when this is divided by 1001, the bandwidth of the stored segment is 30 kHz per data point (less than the RBW of 120 kHz).

NOTE (3): The analyzer system is set up to process peak signals during the automatic scan and when the quasi-peak detector is in "normal" signals are analyzed manually with the quasi-peak function using the procedures described in paragraphs on conducted and radiated emission testing.

Upon completion of the first measurement sweep the Analyzer sends an "End-of-Sweep" interrupt message along the bus which tells the computer that the Analyzer is ready to output its trace data.

A fast Read/Write routine then transfers the 1001 data points from the Analyzer buffer to the computer memory and the analyzer is set for a second measurement sweep. While the analyzer is collecting data during the next sweep, the computer is analyzing and reformatting the previous sweep data. The finally formatted trace data contains up to 12,000 data points overall after all of the sweeps are combined and includes all significant EUT emissions.

3.2 Conducted Emission Measurements (Continued)

The LISN and Highpass Filter are connected through 50 feet of RG-214 coax cable to the Limiter and Spectrum Analyzer input. The switch on the LISN is set to the Supply Line position and AC power is applied to the EUT.

The computer is commanded to begin the data collection scanning process as described in Paragraph 3.1 above. Correction factors for filter loss are programmed and are taken into consideration. Data tabulations and graphical plots of peak values are produced by the system at the conclusion of the test scans. Sample calculations of conducted emission are shown on the data sheets. The switch in the LISN is then set to the return line position and the interference scan is repeated and an additional set of data sheets and plotter charts are prepared. The six highest EUT emission measurement values, two from each of the three scan ranges are listed out on the data sheet.

This completes the automatic scans of Conducted Emissions. If the test results and EUT characteristics indicate a need, additional manual scans of maximum value readings will be made with the Quasi-Peak Detector ON. If readings exceed the Conducted Emission limit, and if broadband noise is evident, then the provisions of MP-4, Paragraph 4.2.2.2, Note 2, will be applied.

3.3 Radiated Emission Measurements

Radiated emissions from the EUT are measured over the frequency range from 30 to 1000 MHz using a combination of automatic and manual methods which conform to ANSI 63.4 1992. The EUT is placed on a nonmetallic stand 1 meter above the ground plane in an open-field test site. The interface cables and equipment positions are varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

3.2 Radiated Emission Measurements (Continued)

The automatic scanning procedure divides the total frequency range of 30 to 1000 MHz into 7 sweeps which are arranged to yield the greatest resolution possible over the entire frequency range of the test. These are listed in Table A1. In the signal sampling mode, each sweep consists of 260 averages done automatically by the analyzer. This tends to reduce the effect of random or short-term ambient signals. Antenna changes are made as required at the end of each sweep.

A preliminary list of residual frequencies is printed at the end of the second pass after the subtraction process. This list contains both EUT emissions and background ambients, particularly ambient signals which fluctuated in amplitude or which went quickly on and off. At this point, each listed frequency is individually examined by a manual procedure consisting of maximizing the signal in direction and antenna height. The dipole antenna is "cut" for the frequency of interest and the quasi peak detector is engaged. The final reading of the signal under these conditions is then modified by antenna factor, cable loss and preamplifier gain.

The EUT is turned on again and the computer is set to display each frequency from the preliminary list on the spectrum analyzer starting at the 30 MHz end of the range. A manual command is used to end investigation of one listed frequency and then go on to the next. This allows sufficient time to evaluate each suspected signal. Several methods are used to separate residual ambient from EUT signals: (1) If the signal disappears from the screen when the analyzer is tuned to the indicated frequency, with the EUT operating, then the signal is not caused by the EUT and is considered to be an ambient. (2) With the EUT operating and the analyzer turned to the indicated frequency, if the demodulated signal from the speaker on the quasi-peak adapter is voice or music then the signal is recognized as a radio or TV station and is considered an ambient. (3) If either step 1 or 2 above is inconclusive, then with the analyzer turned to the indicated frequency the EUT power is turned OFF. If the signal on the analyzer remains unchanged, then the signal is considered to be an ambient. (4) Sometimes, it is helpful to decrease the analyzer resolution bandwidth so that resolution of close together frequencies can be achieved.

3.3 Radiated Emission Measurements (Continued)

Preliminary manual scans of the frequency range are used to determine the cable configurations and equipment positions which produce maximum emissions. These configurations are then kept in tact while both angle of rotation of the EUT with respect to the antenna and antenna height are scanned for maximum readings.

Automatic scans with the antenna first vertically polarized and then horizontally polarized are made to determine a set of preliminary maximum peak values. These are then processed manually with the quasi-peak detector to determine exact emission values from the EUT. The automatic scanning proceeds in general as described in Paragraph 3.1 above.

Radiated emission measurements are started with the test antenna in a vertical orientation at 1.5 meter in height and with the front of the EUT facing the antenna. The measurement antenna is connected to the preamplifier, and spectrum analyzer through 50 foot length of RG-214 coaxial cable. The EUT is placed into operation.

The automatic spectrum analyzer scanning procedure used for radiated measurements is a 2-step process. Two separate scans of each frequency range are made. The test operator has the choice of selecting either the analyzer, peak detector or signal sampling techniques. The first pass accumulates and stores both EUT and background ambient emissions received by the measurement antenna. The second pass is run with the EUT turned OFF and accumulates only background ambient emissions. The quasi-peak adapter is in "Normal Mode" and the readings are peak values. The computer and analyzer are programmed to subtract the second scan from the first scan, removing steady state ambients and leaving only EUT emissions and fluctuating ambients. This reduces the total number of emissions which must be examined manually.

3.3 Radiated Emission Measurements (Continued)

The automatic scanning procedure divides the total frequency range of 30 to 1000 MHz into 7 sweeps which are arranged to yield the greatest resolution possible over the entire frequency range of the test. These are listed in Table A1. In the signal sampling mode, each sweep consists of 250 averages done automatically by the analyzer. This tends to reduce the effect of random or short-term ambient signals. Antenna changes are made as required at the end of each sweep.

A preliminary list of residual frequencies is printed at the end of the second pass after the subtraction process. This list contains both EUT emissions and background ambients, particularly ambient signals which fluctuated in amplitude or which went quickly on and off. At this point, each listed frequency is individually examined by a manual procedure consisting of maximizing the signal in direction and antenna height. The dipole antenna is "cut" for the frequency of interest and the quasi peak detector is engaged. The final reading of the signal under these conditions is then modified by antenna factor, cable loss and preamplifier gain. The EUT is turned on again and the computer is set to display each frequency from the preliminary list on the spectrum analyzer starting at the 30 MHz end of the range. A manual command is used to end investigation of a listed frequency and then go to the next. This allows sufficient time to evaluate each suspected signal.

SORTING OUT RESIDUAL AMBIENTS

Several methods are used to distinguish residual ambient from EUT signals: (1) If the signal disappears from the screen when the analyzer is tuned to the indicated frequency, with the EUT operating, then the signal is not caused by the EUT and is considered to be an ambient. (2) With the EUT operating and the analyzer turned to the indicated frequency, if the demodulated signal from the speaker on the quasi-peak adapter is voice or music then the signal is recognized as a radio or TV station and is considered an ambient. (3) If either step 1 or 2 above is inconclusive, then with the analyzer turned to the indicated frequency the EUT power is turned OFF. If the signal on the analyzer remains unchanged, then the signal is considered to be an ambient.

3.3 Radiated Emission Measurements (Continued)

(4) Sometimes, it is helpful to decrease the analyzer resolution bandwidth so that resolution of close together frequencies can be achieved.

As the evaluation process continues, each signal attributed to the EUT is further examined for maximum value. The dipole antenna is adjusted to the proper length, the height of the measurement antenna is searched from one to four meters, and the angle of rotation of the EUT with respect to the antenna is varied from 0 to 360 degrees.

The quasi-peak detector is engaged and sweep time is set to 50 seconds. The analyzer display is cleared and signal is traced on the screen. After the maximum quasi-peak signal is displayed, the "CONTINUE" button on the computer is pressed and the amplitude and frequency information is stored in the computer for later printout and plotter display. The angle of the EUT and height of the antenna are also stored for print out on the data sheet.

If the four steps listed above indicate that the signal is not an EUT signal, then that signal is passed over and not recorded for final printout. The screen is cleared and manual actuation of the CONTINUE button steps the analyzer to the next signal for evaluation. Evaluation of the preliminary frequency list continues until all of the signals are either confirmed, maximized and measured, or are rejected as not originating from the EUT. Then the computer prints out a final data sheet showing frequency, amplitude, limit, antenna height and angle of rotation of the EUT. A graphical plot of the data is also traced by the plotter.

When all signals have been examined in this manner, the test is complete and it is only necessary to examine the data plots and print-outs to determine whether the EUT passes or fails.

FCC ID:
DATE:
PAGE:

N3S2001B01
30 JULY 1999
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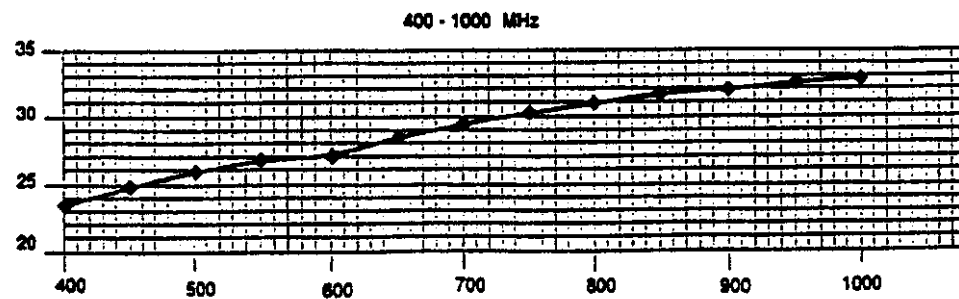
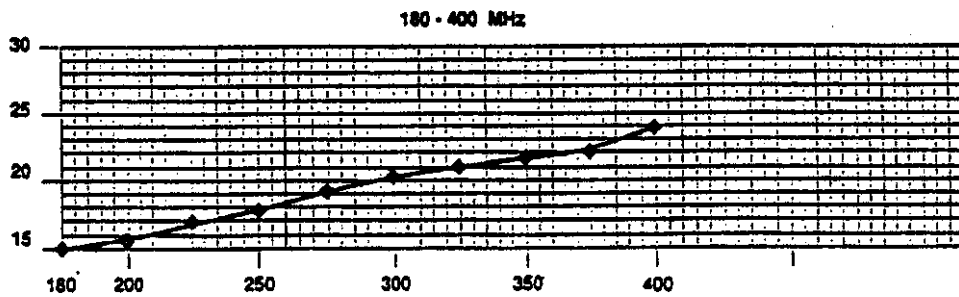
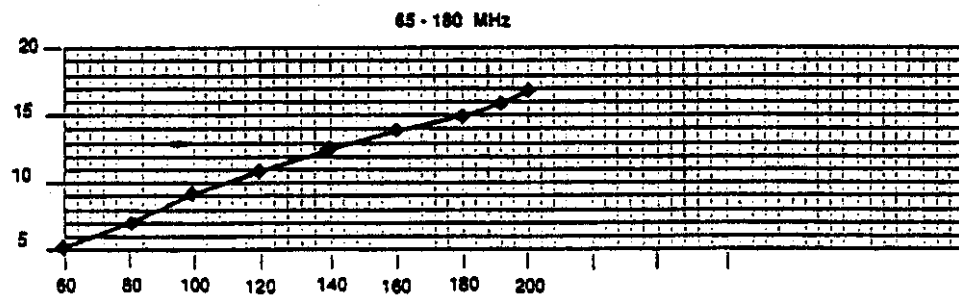
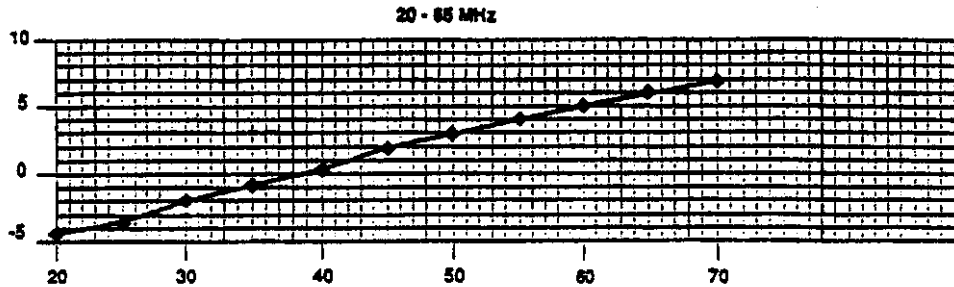
APPENDIX B

INSTRUMENT DATA

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1	Antenna Factors, Roberts	23
2	Antenna Factors, Biconical	24
3	Antenna Factors, CA-L & CA-S	25
4	Preamplifier Gain, 30-1000 MHz	26
5	Coaxial Cable Loss, 30-1000 MHz	27

ROBERTS ANTENNA FACTORS
Factors Include 30' of RG-58/U cable

FCC ID: N3S2001B01
DATE: 30 JULY 1999
PAGE: 23



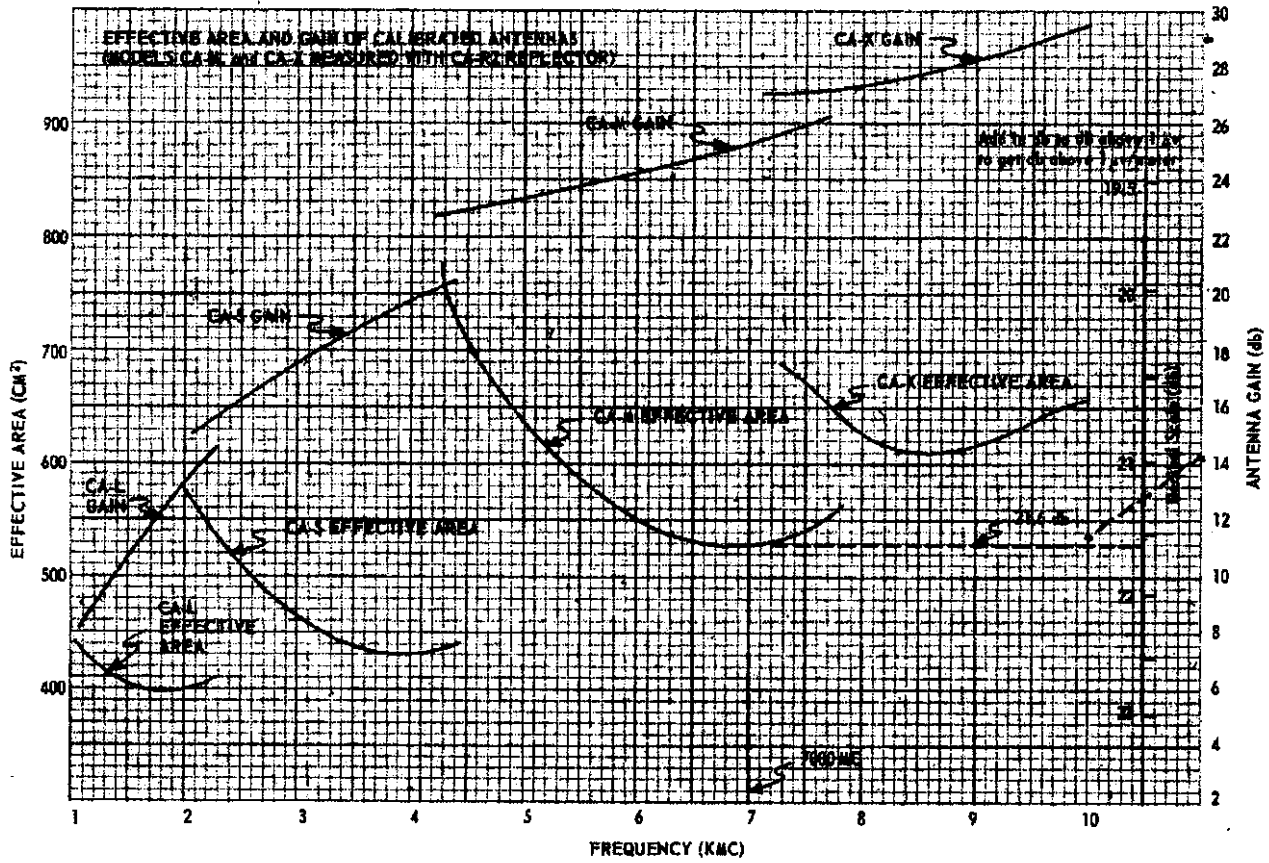


FIGURE . EFFECTIVE AREA AND GAIN OF POLARAD HORN ANTENNAS.

ELECTRO-METRICS
GAIN AND ANTENNA FACTORS
MODEL LPA-30
LOG PERIODIC ANTENNA
SERIAL NO: 307

FCC ID: N3S2001B01
DATE: 30 JULY 1999
PAGE: 25

3 METRE CALIBRATION

CALIBRATION DATE:

FREQUENCY (MHz)	GAIN NUMERIC	ANTENNA FACTOR (dB)	GAIN (dB)
200	2.09	13.0	3.2
225	3.55	11.8	5.5
250	3.89	12.3	5.9
275	3.80	13.2	5.8
300	3.63	14.2	5.6
325	2.75	16.0	4.4
350	4.27	14.8	6.3
375	4.57	15.1	6.6
400	4.79	15.5	6.8
425	3.63	17.2	5.6
450	4.27	17.0	6.3
475	2.82	19.2	4.5
500	3.80	18.4	5.8
525	3.09	20.1	4.9
550	3.72	19.3	5.7
575	3.89	19.5	5.9
600	4.07	19.7	6.1
625	3.80	20.3	5.8
650	3.55	21.0	5.5
675	3.63	21.2	5.6
700	3.80	21.3	5.8
725	3.47	22.0	5.4
750	4.07	21.6	6.1
775	3.72	22.3	5.7
800	3.09	23.4	4.9
825	3.47	23.1	5.4
850	3.63	23.2	5.6
875	3.80	23.3	5.8
900	3.47	23.9	5.4
925	3.47	24.1	5.4
950	3.24	24.7	5.1
975	3.31	24.8	5.2
1000	3.39	24.9	5.3

SPECIFICATION COMPLIANCE TESTING FACTOR (3 METRE SPACING) TO
BE ADDED TO RECEIVER METER READING IN dB(μ V) TO CONVERT IT
TO FIELD STRENGTH IN dB(μ V/m).

Amplifier Gain for HP 8447D Preamplifier

REF. 100.0 dBuV ATTN 10 dB

Original Plotter Scans on File

FCC ID: N3S2001B01

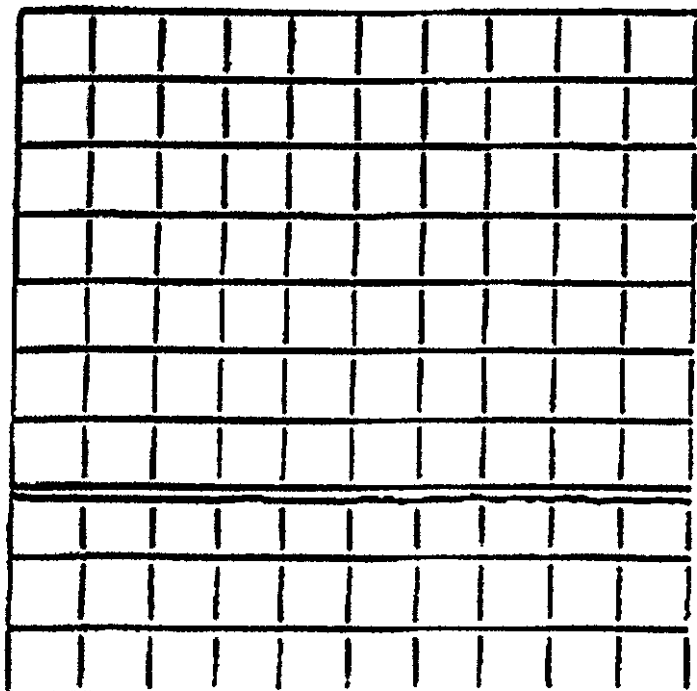
DATE: 30 JULY 1999

PAGE: 26

10 dB/
POS Peak

RBW 1MHz
VBW 1MHz

30 MHz - 200 MHz



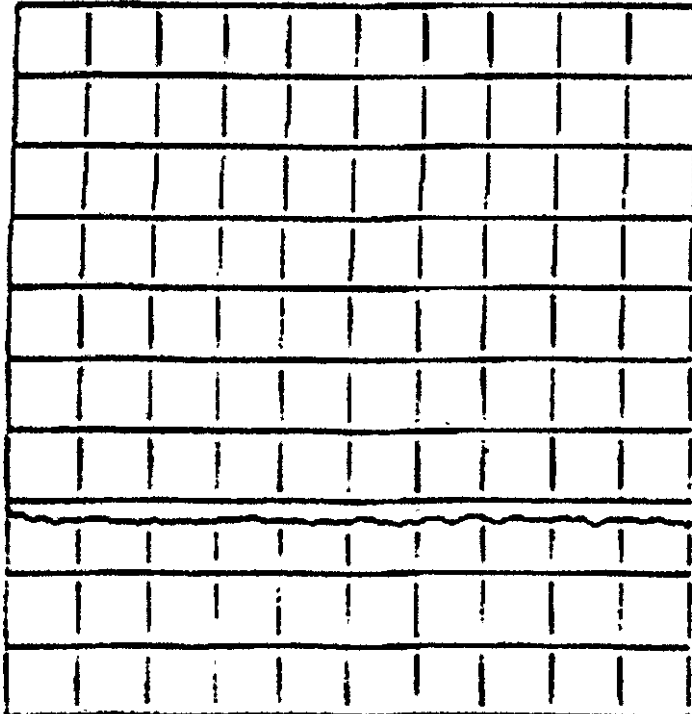
Start 30 MHz

200 MHz Stop

10 dB/
POS Peak

RBW 1MHz
VBW 1MHz

200 MHz - 1.0 GHz



Start 200 MHz

1.0 GHz Stop

COAXIAL CABLE LOSS for 50ft. RG-214

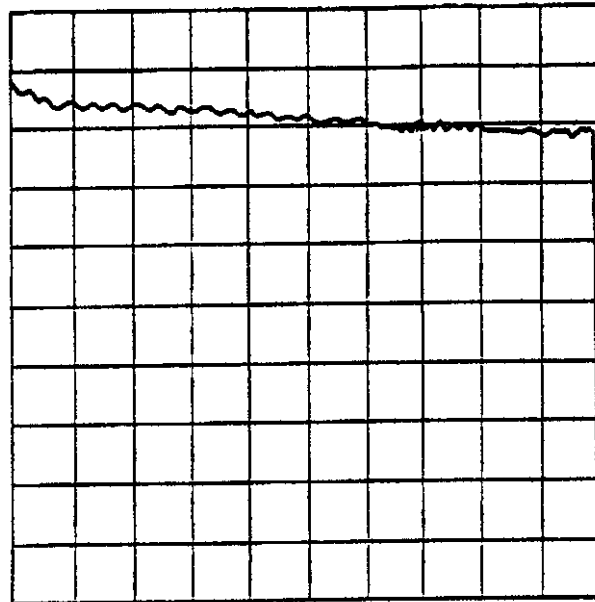
REF.0.0 dBm ATTEN 10 dB

PAGE: 27

Original plotter scans on file

1dB/
POS Peak

RBW 1 MHz
VBW 3 MHz
SWP 20.0 msec.



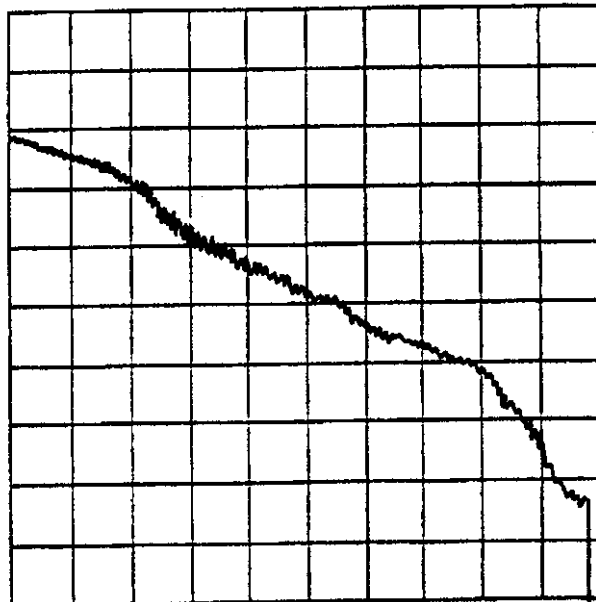
30 MHz - 200 MHz

Start 30 MHz

200 MHz Stop

1dB/
POS Peak

RBW 1 MHz
VBW 3 MHz
SWP 20.0 msec.



200 MHz - 1.0 GHz

Start 200 MHz

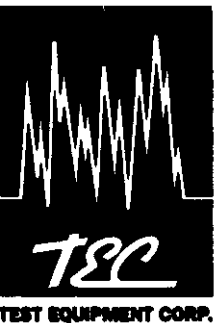
1.0 GHz Stop

FCC ID:
DATE:
PAGE:

3N3S2001B01
30 JULY 1999
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APPENDIX C

MEASUREMENT EQUIPMENT CALIBRATION CERT



CERTIFICATE OF CALIBRATION

Test Equipment Corporation does certify the below listed instrument has been calibrated to meet all manufacturer's published operating specification.

Test Equipment Corporation's calibration measurement standards have accuracy which is traceable to the National Institute of Standards and Technology to the extent allowed by the Bureau's calibration facilities.

Calibration Date: 12-13-98

Manufacturer: Hewlett-Packard

Model Number: 8568B

Serial Number: 00488


Test Equipment Corporation



2232 Old Middlefield Way, Mountain View, CA 94043

Rentals and Sales of Electronic Test Equipment
(415) 964-3923 (800) 227-1995

CALIBRATION DATA SHEET NO. 9901

CUSTOMER EMCE		PHONE (510) 490-4307
MANUFACTURER HP	MODEL NO. 8568B	ASSET NR. 00488
DATE RECEIVED 12-10-98	☐ REPAIR ☒ CALIBRATE	CONTACT NAME STEVE

TECHNICIAN Tom A.	TEMPERATURE 68%	TEST EQUIPMENT CORPORATION WARRANTS REPAIRS AND CALIBRATION SERVICES TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF THIRTY DAYS FROM DATE OF SERVICE. LIMIT OF LIABILITY UNDER THIS WARRANTY SHALL BE REPLACEMENT OF MATERIALS AND RECALIBRATION OF THE INSTRUMENT. THIS WARRANTY SHALL EXCLUDE EQUIPMENT FAILURES DUE FROM DAMAGES CAUSED BY MISUSE, NEGLIGENCE, ABUSE, ACCIDENT, FIRE, OR OTHER ABNORMAL USE. TEST EQUIPMENT CORPORATION'S STANDARDS ARE TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS. TEC'S CALIBRATION PROCEDURE CONFORMS TO ANSI/NCSL Z.540
CALIBRATION DATE 12-13-98	RELATIVE HUMIDITY < 45%	
DUE DATE 12-13-99		

MEASUREMENT STANDARDS USED DURING CALIBRATION				PARTS REPLACED
MANUFACTURER	MODEL	ASSET NUMBER	RECALL - DATE	
HP	436A	31899	8-31-99	
EIP	548	43993	9-26-99	
EAF	PTB-100	28114	2-20-99	
HP	3550	42573	9-26-99	
HP	355C	42363	9-26-99	
HP	8482A	29645	12-08-99	

COMMENTS - INCOMING

	CUSTOMER P.O. NO. DATE
	LAST CALIBRATION DATE
	INOPERATIVE
	MEETS MFG.'S SPEC. (NO ADJUSTMENT REQ.) X
	OUT OF MFG.'S SPEC.

COMMENTS - OUTGOING

	DATE
	RECEIVED BY
	COMPANY
	PAID ☐ BILL ☐

FCC ID:
DATE:
PAGE:

N3S2001B01
30 JULY 1999
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APPENDIX D

ACTUAL TEST DATA SHEETS

<u>TITLE</u>	<u>PAGE</u>
Radiated Emissions, E- Field, Vertical	32
Radiated Emissions, E-Field, Horizontal	34
Graph of Device PULSE REPETITION TIME	35
Tabular printout, Vertical	36
Tabular Printout, Horizontal	37
Graph of vertical harmonics	38
Graph of horizontal harmonics	49

EMCE ENGINEERING, INC.
44370 S. GRIMMER BLVD
FREMONT, CA 94538

DATE: 8/4/99

FILE:

PAGE:

32

PERFORMED FOR: E-CODE
TEST SPECIMEN: SPIDER TAG

MODEL NUMBER: SPIDER TAG
SERIAL NUMBER: 001

LOCATION: VERT POL

FINAL FCC-B, RADIATED RESULTS:

Freq	Analyzer	CF	Correct	Spec	margin	Ht	Angle
MHz	Reading	dB	Reading	Limit	dB	cm	Deg
_____	_____	_____	_____	_____	_____	_____	_____

NONE OUT OF SPECIFICATION

COMMENTS: Test Dist = 3.0 m. QP detector ON.

SAMPLE CALCULATION:

At 10.00 MHz

Analyzer Reading = 0.00 dBuV

Correction Factor, CF, = AF 13.09 dB + Cable \$\$\$\$ dB

-Preamp Gain 27.00 dB = 9.00 dB

CORRECTED READING = 9.00 dBuV/m

VERIFIED BY

Don Ballard

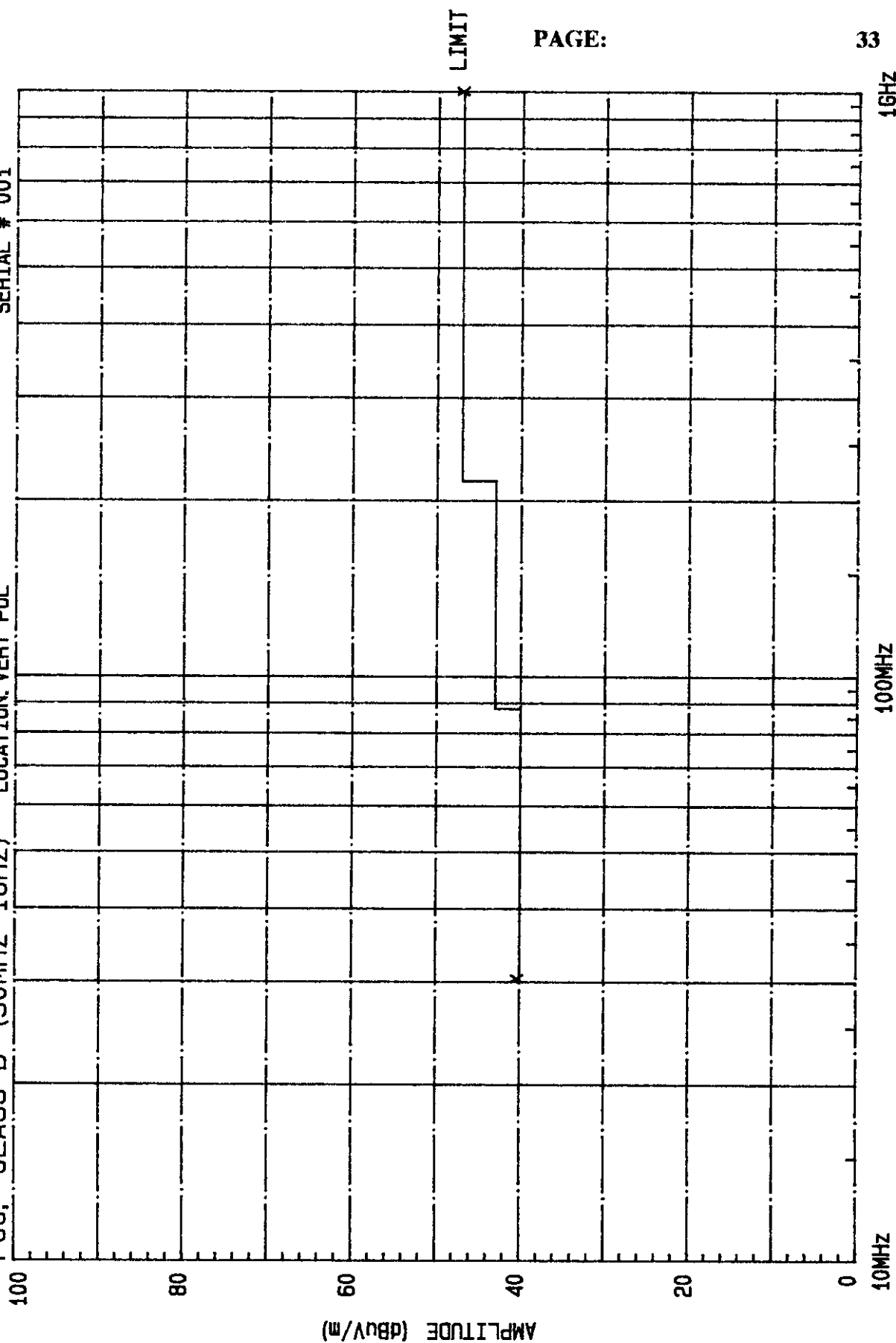
NARROWBAND RADIATED EMI
FCC, CLASS B (30MHz-1GHz)

PERFORMED FOR: E-CODE

MODEL # SPIDER TAG

LOCATION: VERT POL

SERIAL # 001



EMCE ENGINEERING, INC.
44370 S. GRIMMER BLVD
FREMONT, CA 94538

DATE: 8/4/99

FILE:

PAGE:

34

PERFORMED FOR: E-CODE
TEST SPECIMEN: SPIDER TAG

MODEL NUMBER: SPIDER TAG
SERIAL NUMBER: 001

LOCATION: HORIZ POL

FINAL FCC-B, RADIATED RESULTS:

Freq	Analyzer	CF	Correct	Spec	margin	Ht	Angle
MHz	Reading		Reading	Limit			
	dBuV	dB	dBuV/m	dBuV/m	dB	cm	Deg

NONE OUT OF SPECIFICATION

COMMENTS: Test Dist = 3.0 m. QP detector ON.

SAMPLE CALCULATION:

At 10.00 MHz

Analyzer Reading = 0.00 dBuV

Correction Factor, CF, = AF 26.58 dB + Cable \$\$\$\$ dB

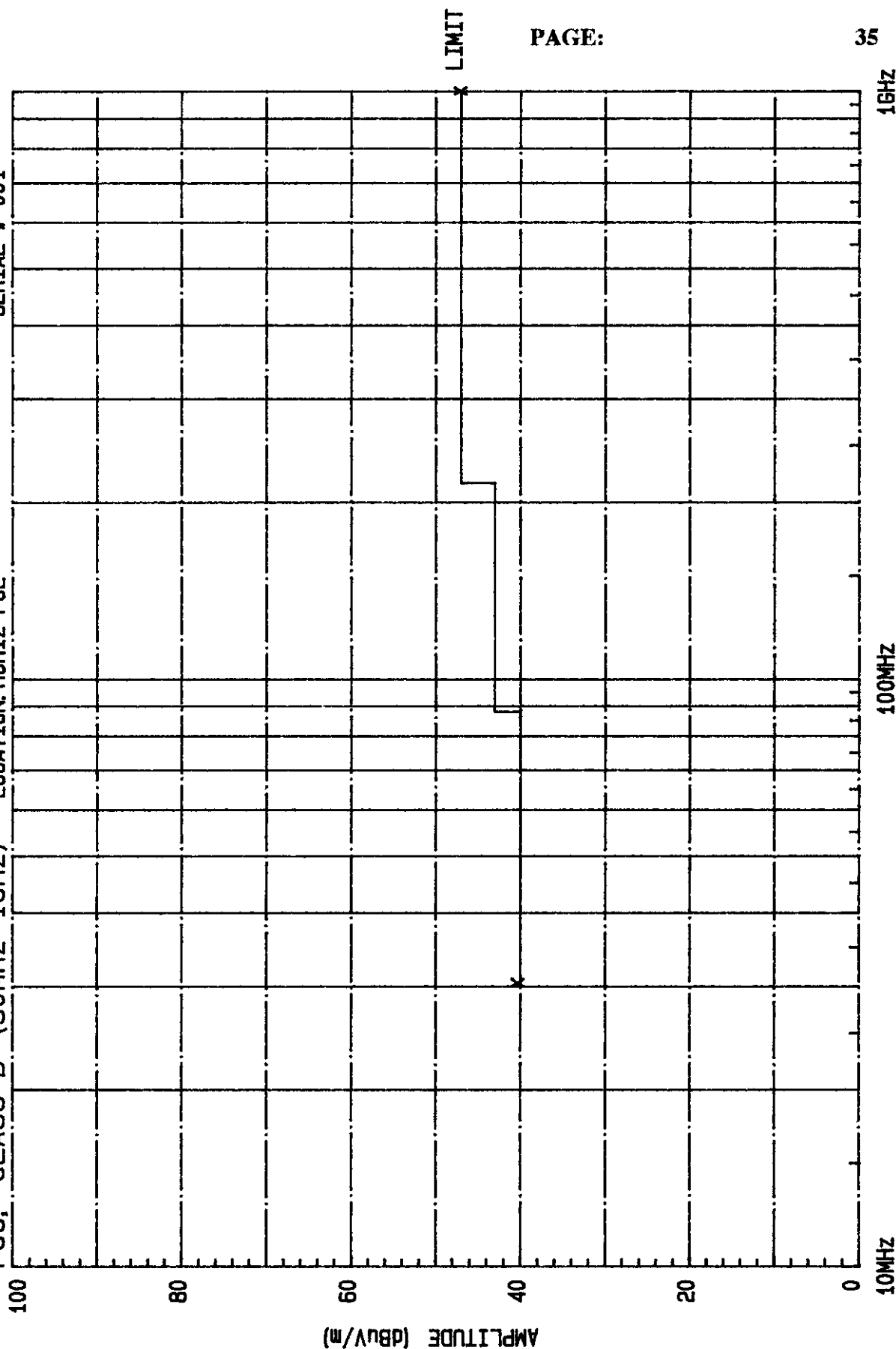
-Preamp Gain 27.00 dB = 9.00 dB

CORRECTED READING = 9.00 dBuV/m

VERIFIED BY



NARROWBAND RADIATED EMI
FCC, CLASS B (30MHz-1GHz)
PERFORMED FOR: E-CODE
LOCATION: HORIZ POL
MODEL # SPIDER TAG
SERIAL # 001



PAGE:

35

1GHz

100MHz

10MHz

FREQUENCY (NOTE: Test Dist=3.0 m)

6/7/99

EUT IN WORST CASE POSITION
LO6 PERIODIC ANTENNA

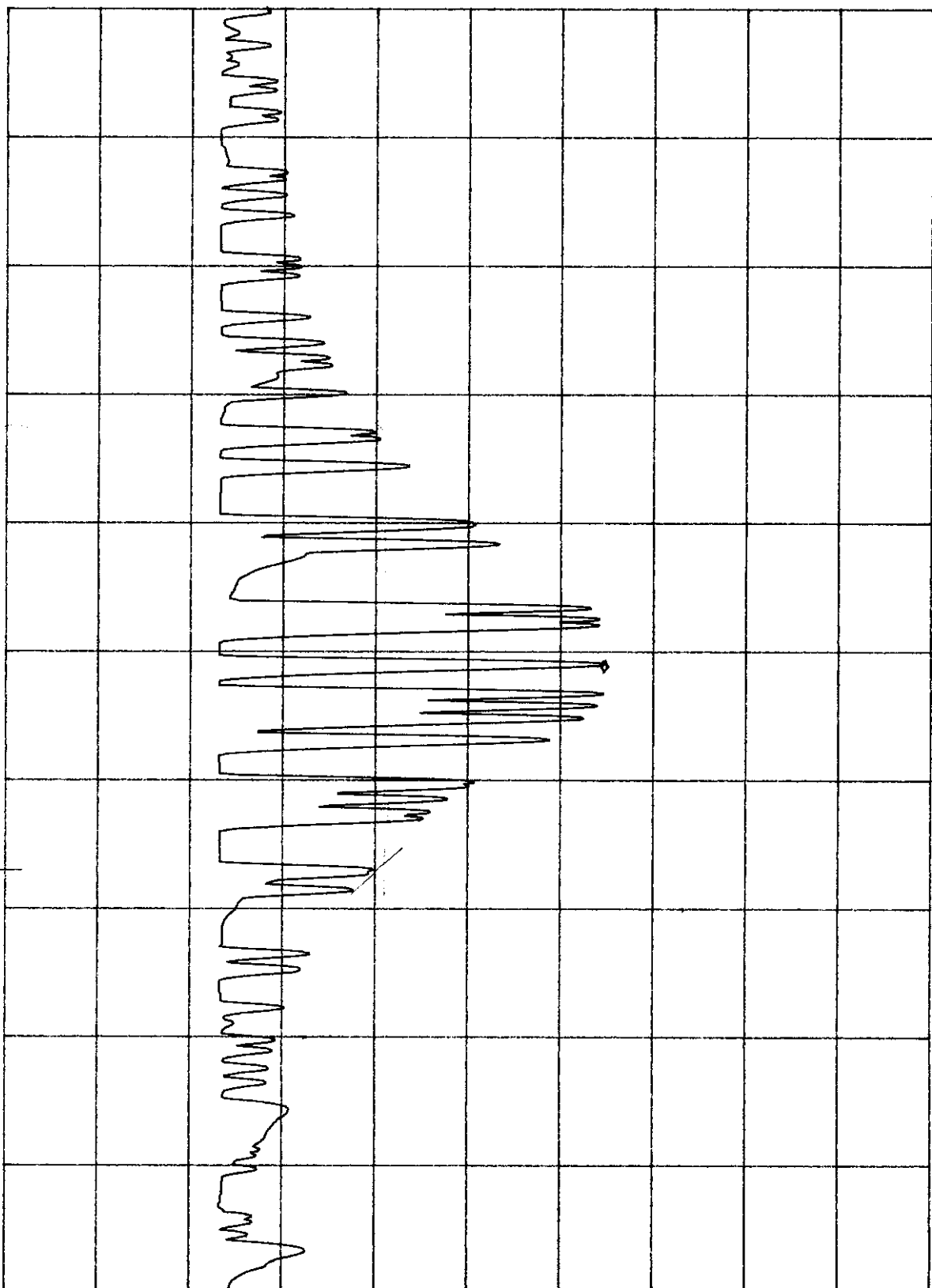
FUNDAMENTAL FREQUENCY

HORIZONTAL REC

HP REF 100.0 DBμV ATTEN 10 DB

QUASI PEAK
3M TEST DIST
PRE-AMP ON
MKR 303.836 MHZ
64.70 DBμV

10 DB/



PAGE:

CENTER 303.825 MHZ

RES BW 1 MHZ

VBW 1 MHZ

SPAN 1.000 MHZ
SWP 50 sec

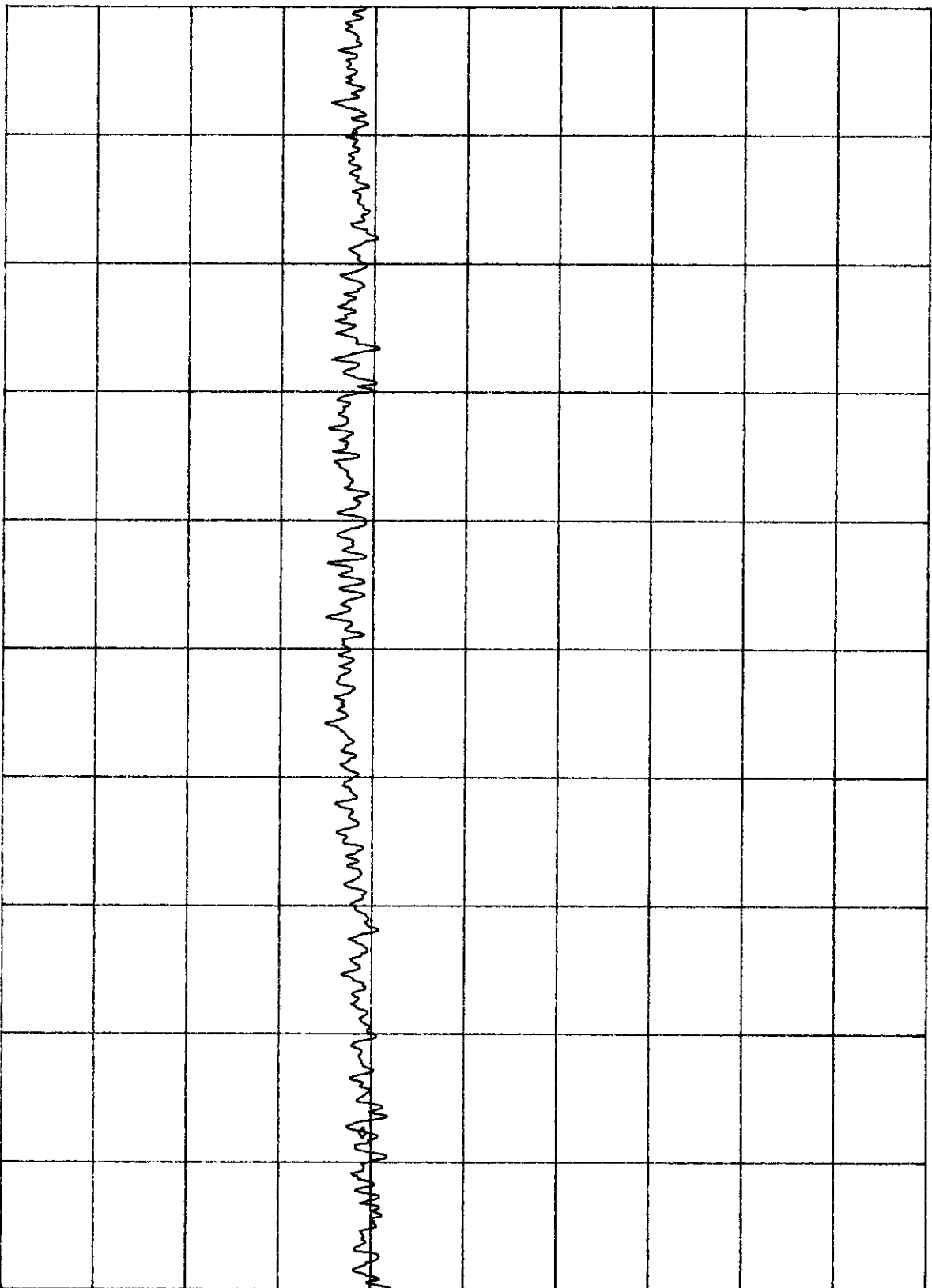
6/9/99

HORIZ FOL

hP REF 100.0 dBμV ATTEN 10 dB

MKR 607.65376 MHz
39.10 dBμV

10 dB/



CENTER 607.65000 MHz

RES BW 300 Hz

VBW 1 MHz

SPAN 10.00 KHz
SWP 50 sec

PAGE:

6/8/99

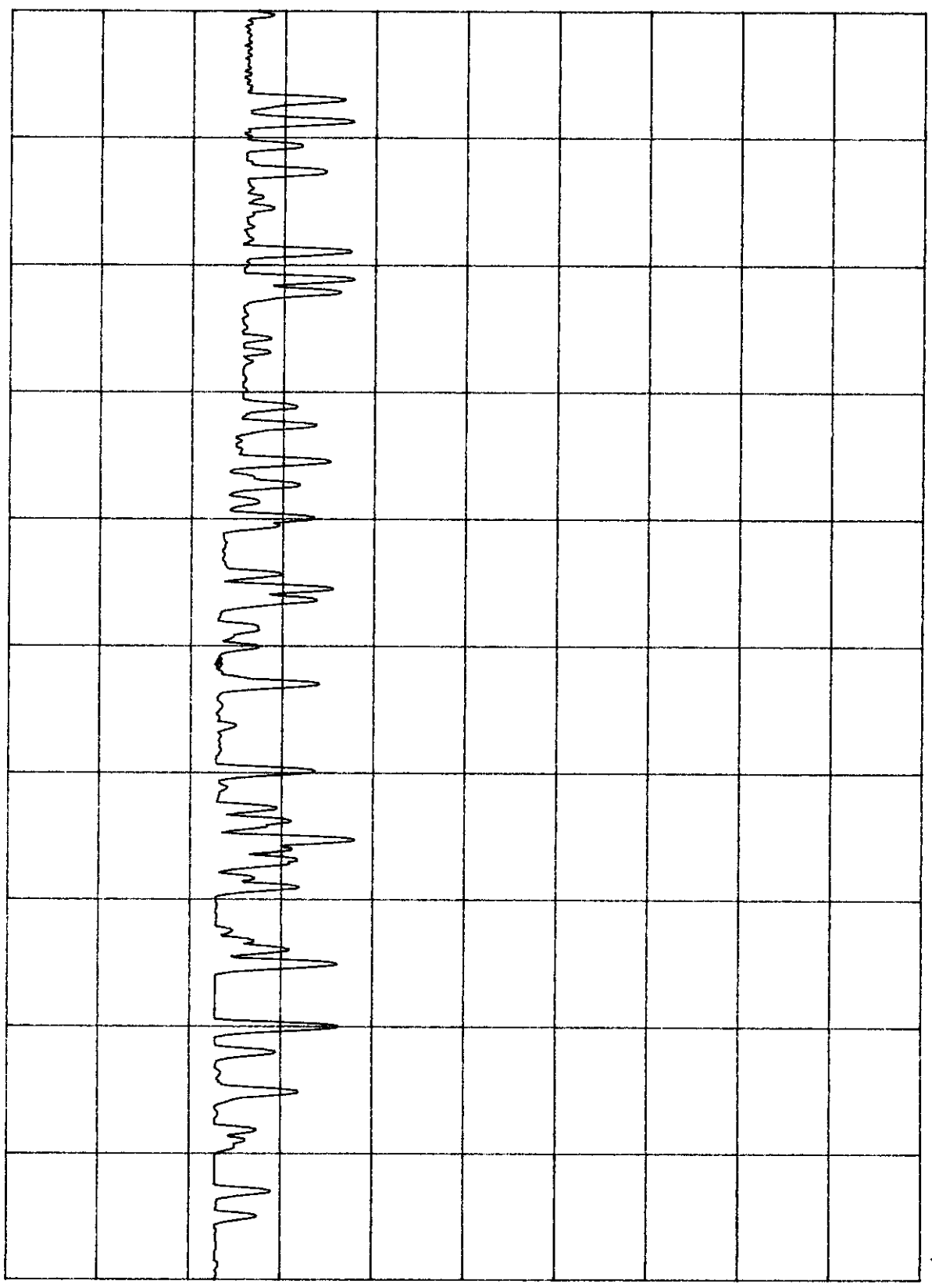
HORIZ POL

3RD HARMONIC

HP REF 100.0 dBμV ATTEN 10 dB

MKR 911.4792 MHz
23.00 dBμV

10 dB/



CENTER 911.4750 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 300.0 kHz
SWP 50 sec

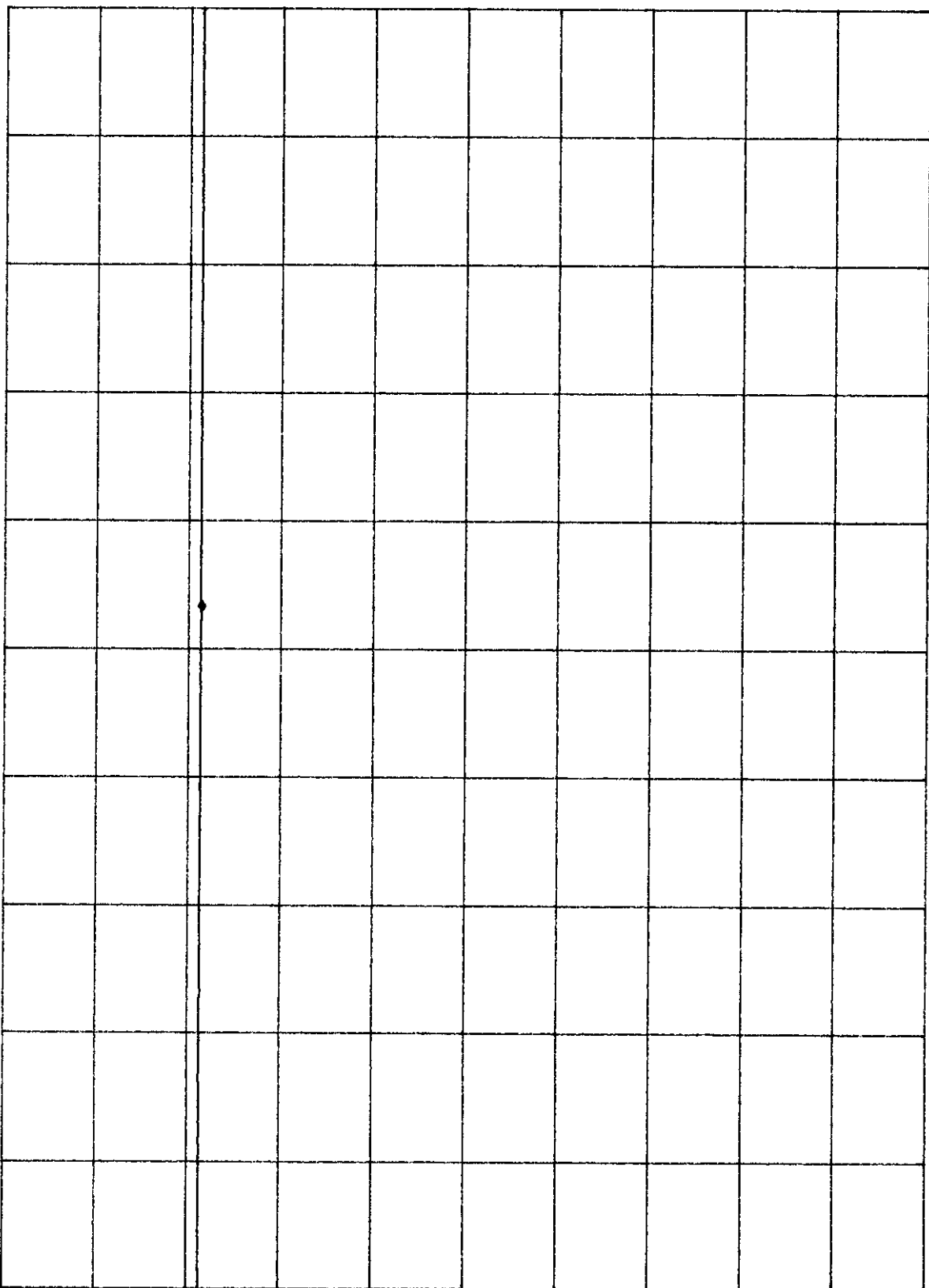
6/9/99 EUT IN WORST
CASE POSITION

H0212 POL

HP REF 100.0 dBμV ATTEN 10 dB

AVERAGE DET.
H0212 ANTENNA
3M TEST DIST
MKR 1215.2898 MHz
21.40 dBμV

10 dB/



CENTER 1215.3000 MHz
RES BW 1 MHz

VBW 10 Hz

SPAN 300.0 KHz
SMP 5.0 sec

HOE12 POL

AVG. DET
HORN ANT.
3W TEST DIST.

REF 100.0 DBμV ATTEN 10 DB

MKR 1518.9759 MHz
21.30 dBμV

10 dB/

[illegible]

CENTER 1519.1250 MHZ
RES BW 1 MHZ

VBW 10 HZ

SPAN 300.0 KHZ
SWP 5.0 sec

6/9/99

HORIZ POL

AVG. DET

HORN ANTENNA

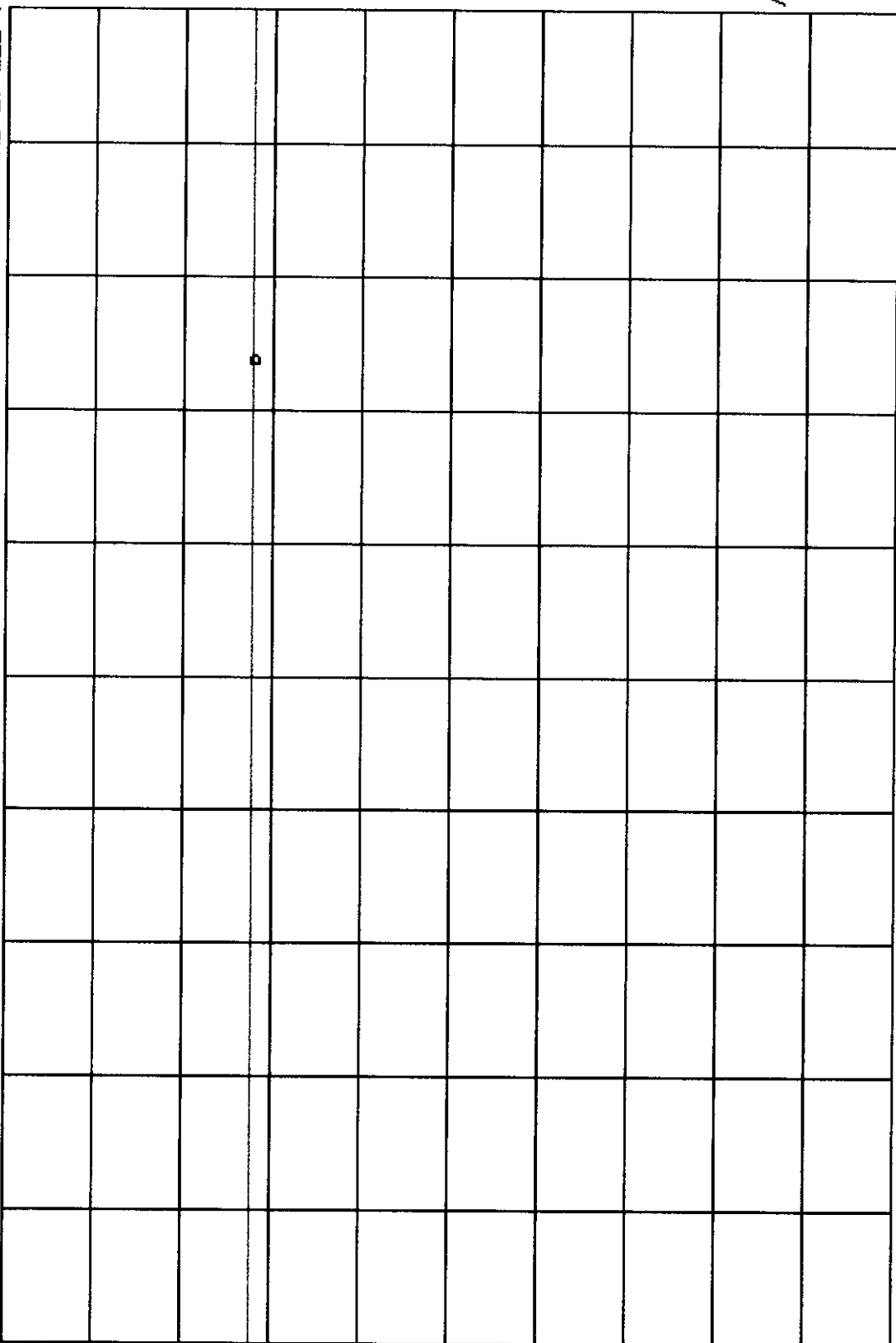
3M T.D.

ENCE Engineering
REF 100.0 dBuV

DATE: 9 Jun 1999 @ 12:16:10
ATTEN 10 dB

MKR 1.821 750 GHz
27.60 dBuV

10 dB/



START 1.820 45 GHz
RES BW 1 MHz

UBW 10 Hz

STOP 1.825 45 GHz
SWP 5.00 dB

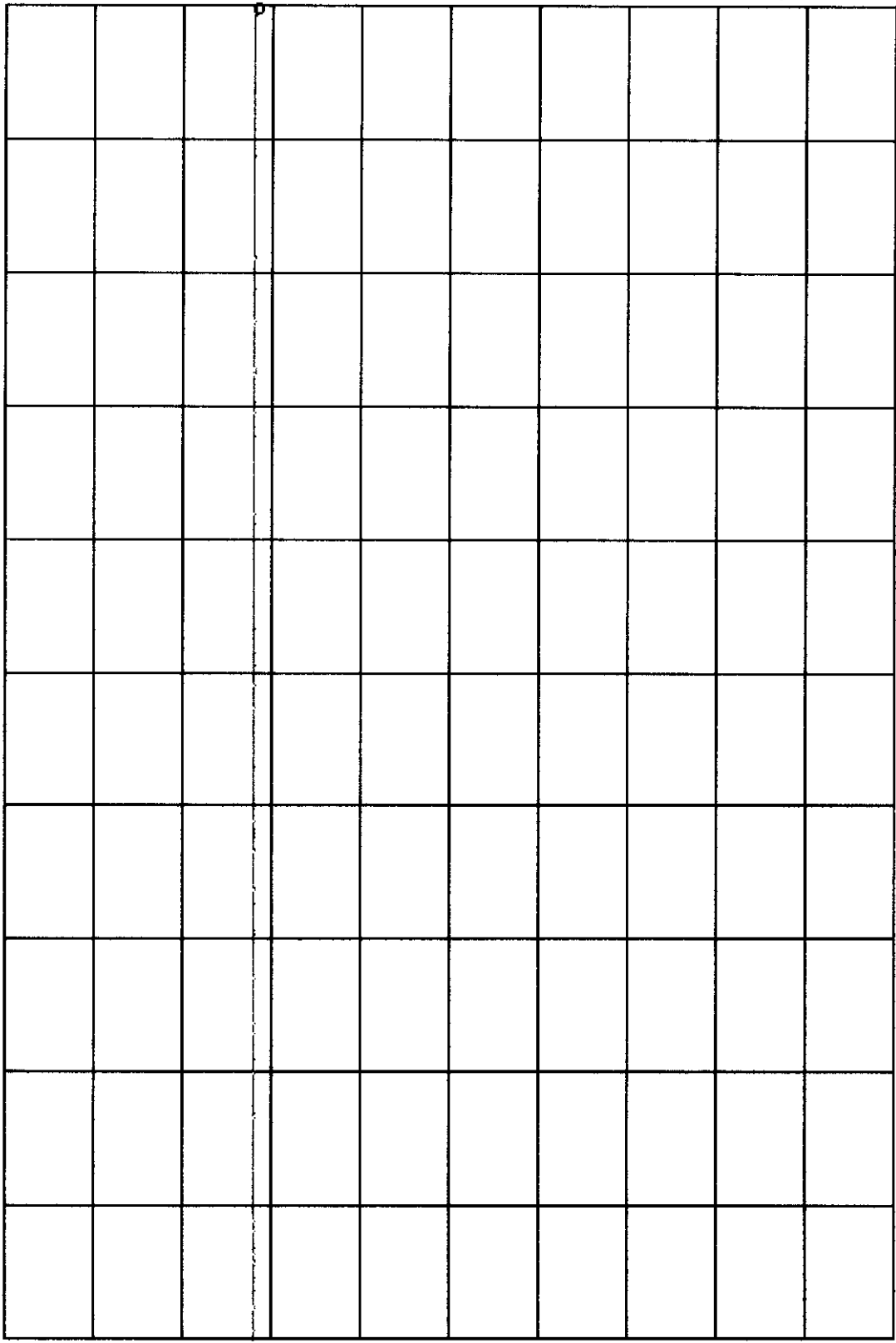
FIGURE

EMCE Engineering
REF 100.0 dBuV

DATE: 9 Jun 1999 @ 12:37:14
ATTEN 10 dB

MKR 2.124 275 GHz
28.00 dBuV

10 dB/



START 2.124 27 GHz
RES BW 1 MHz

USB 10 Hz

STOP 2.129 27 GHz
SWP 5.00 sec

FIGURE

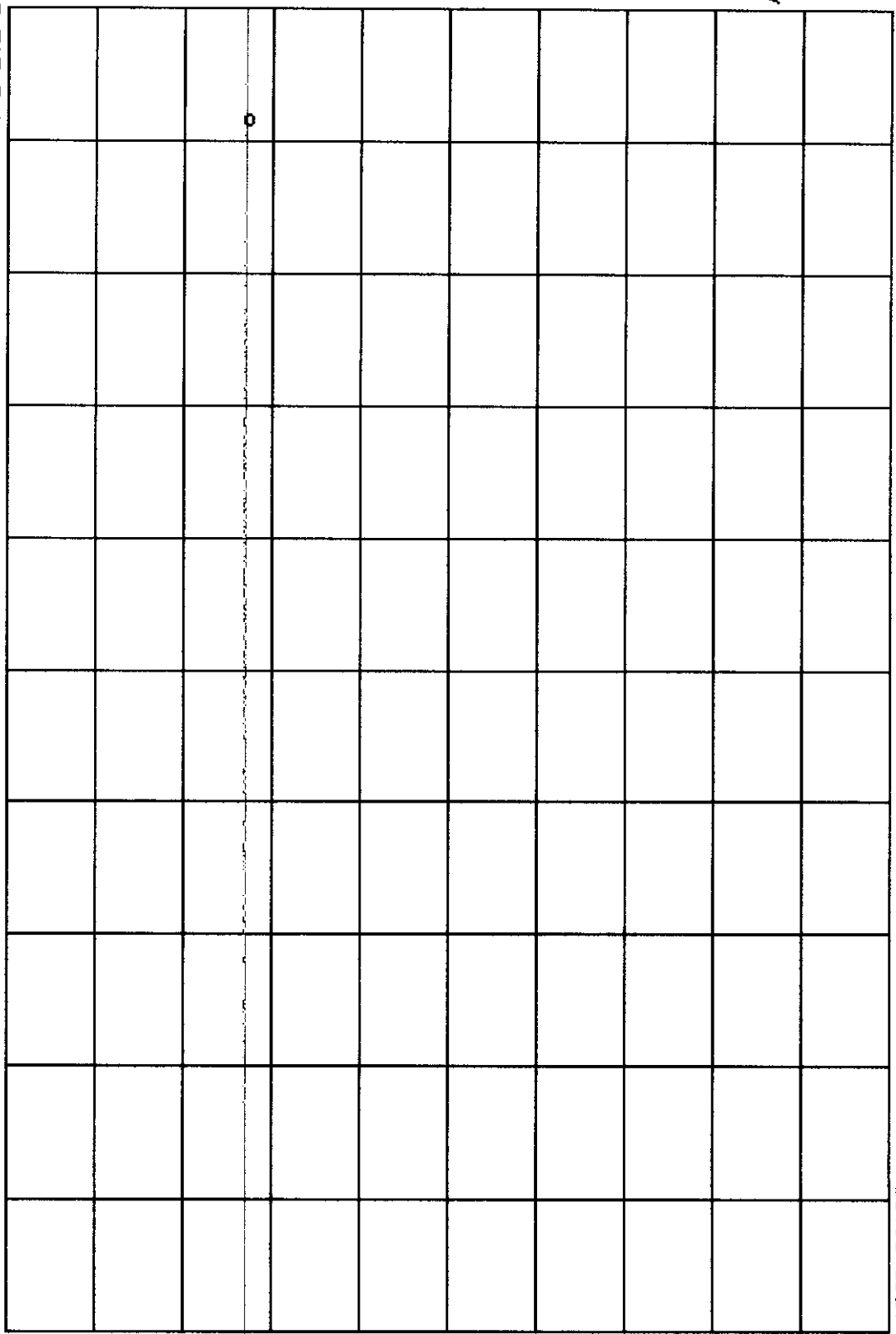
Horiz. fol

EMCE Engineering
REF 100.0 dBuV

DATE: 10 Jun 1999 @ 15:54:30
ATTEN 10 dB

MKR 2.714 10 GHz
26.80 dBuV

10 dB/



START 2.710 0 GHz
RES BW 1 MHz

VBW 10 Hz

STOP 2.760 0 GHz
SWP 15.0 snc

FIGURE

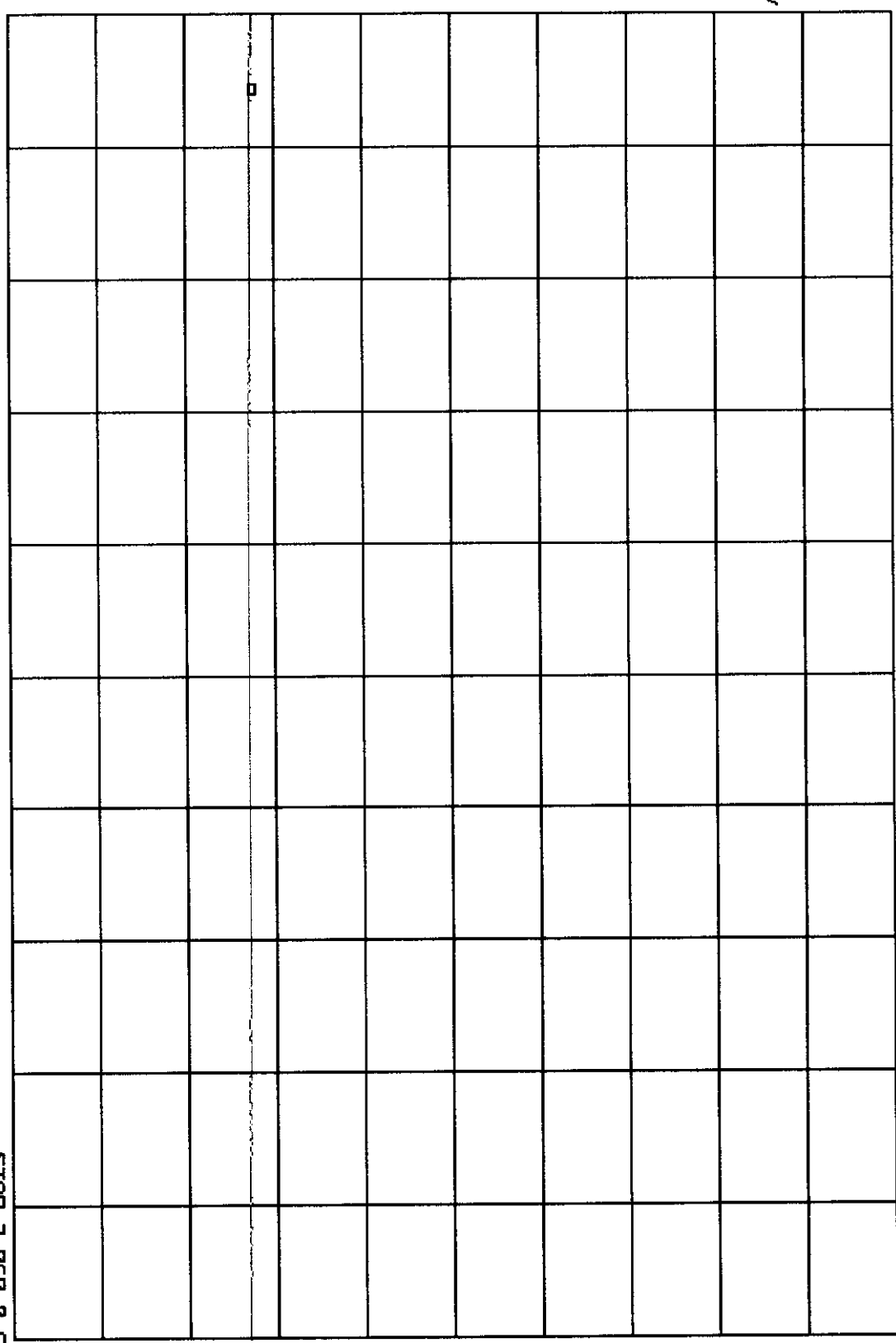
Horiz. Pol

ENCE EngLinearIng
REF 100.0 dBuV

DATE: 10 Jun 1999 @ 16:05:10
ATTEN 10 dB

MKR 3.012 70 GHz
27.20 dBuV

10 dB/



START 3.010 0 GHz
RES BW 1 MHz

UBW 10 Hz

STOP 3.060 0 GHz
SWP 15.0 sec

FIGURE

EMCE ENGINEERING, INC.
44370 S. GRIMMER BLVD
FREMONT, CA 94538

FCC ID: N3S2001B01
DATE: 30 JULY 1995
PAGE: 32

PERFORMED FOR: E-Code
TEST SPECIMEN Mobile Identification Tx

MODEL NUMBER: None
SERIAL NUMBER: None

LOCATION: VERTICAL POLARIZATION

FINAL FCC-B RADIATED RESULTS (Harmonics):

FREQUENCY MHz	ANALYZER READING dBuV	DC Duty Cycle dB	CF Ant-amp+AT+CL dB	CORRECT READING dBuV/m	SPEC LIMIT dBuV/m	MARGIN dB	HEIGHT Ant Ht cm	ANGLE Turntable Degrees
303.83	48.4	-8	-9.80	30.60	46	N/A	1500	0
607.65	48.1	-8	4.40	44.50	46	1.50	1500	0
911.48	37.1	-8	12.00	41.10	54	12.90	1500	0
1215.30	21.4	-8	13.79	27.19	54	26.81	1500	0
1519.12	21.2	-8	13.93	27.13	54	26.87	1500	0
1820.45	27.5	-8	14.60	34.10	54	19.90	1500	0
2124.54	28.0	-8	12.94	32.94	54	21.06	1500	0
2455.00	28.4	-8	13.20	33.60	54	20.40	1500	0
2710.00	26.8	-8	13.06	31.86	54	22.14	1500	0
3010.00	27.3	-8	13.47	32.77	54	21.23	1500	0

PAGE:

EMCE ENGINEERING, INC.
44370 S. GRIMMER BLVD
FREMONT, CA 94538

FCC ID: N3S2001B01
DATE: 30 JULY 1995
PAGE: 23
24
49

PERFORMED FOR: E-Code
TEST SPECIMEN Mobile Identification Tx

MODEL NUMBER: None
SERIAL NUMBER: None

LOCATION: HORIZONTAL POLARIZATION

FINAL FCC-B RADIATED RESULTS (Harmonics):

FREQUENCY	ANALYZER READING	DC Duty Cycle	CF Ant-amp+AT+CL	CORRECT READING	SPEC LIMIT	MARGIN	HEIGHT Ant Ht	ANGLE Turntable
MHz	dBuV	dB	dB	dBuV/m	dBuV/m	dB	cm	Degrees
303.83	64.7	-8	-14.30	42.40	46	3.60	1500	0
607.65	39.1	-8	4.00	35.10	46	10.90	1500	0
911.48	23.0	-8	12.00	27.00	46	19.00	1500	0
1215.30	21.4	-8	13.79	27.19	54	26.81	1500	0
1519.12	21.3	-8	13.93	27.23	54	26.77	1500	0
1821.75	27.6	-8	14.60	34.20	54	19.80	1500	0
2124.27	28.0	-8	12.94	32.94	54	21.06	1500	0
2451.90	28.4	-8	13.20	33.60	54	20.40	1500	0
2714.10	26.8	-8	13.06	31.86	54	22.14	1500	0
3012.70	27.2	-8	13.47	32.67	54	21.33	1500	0

6/9/99

WORST CASE POSITION
LOG PERIODIC

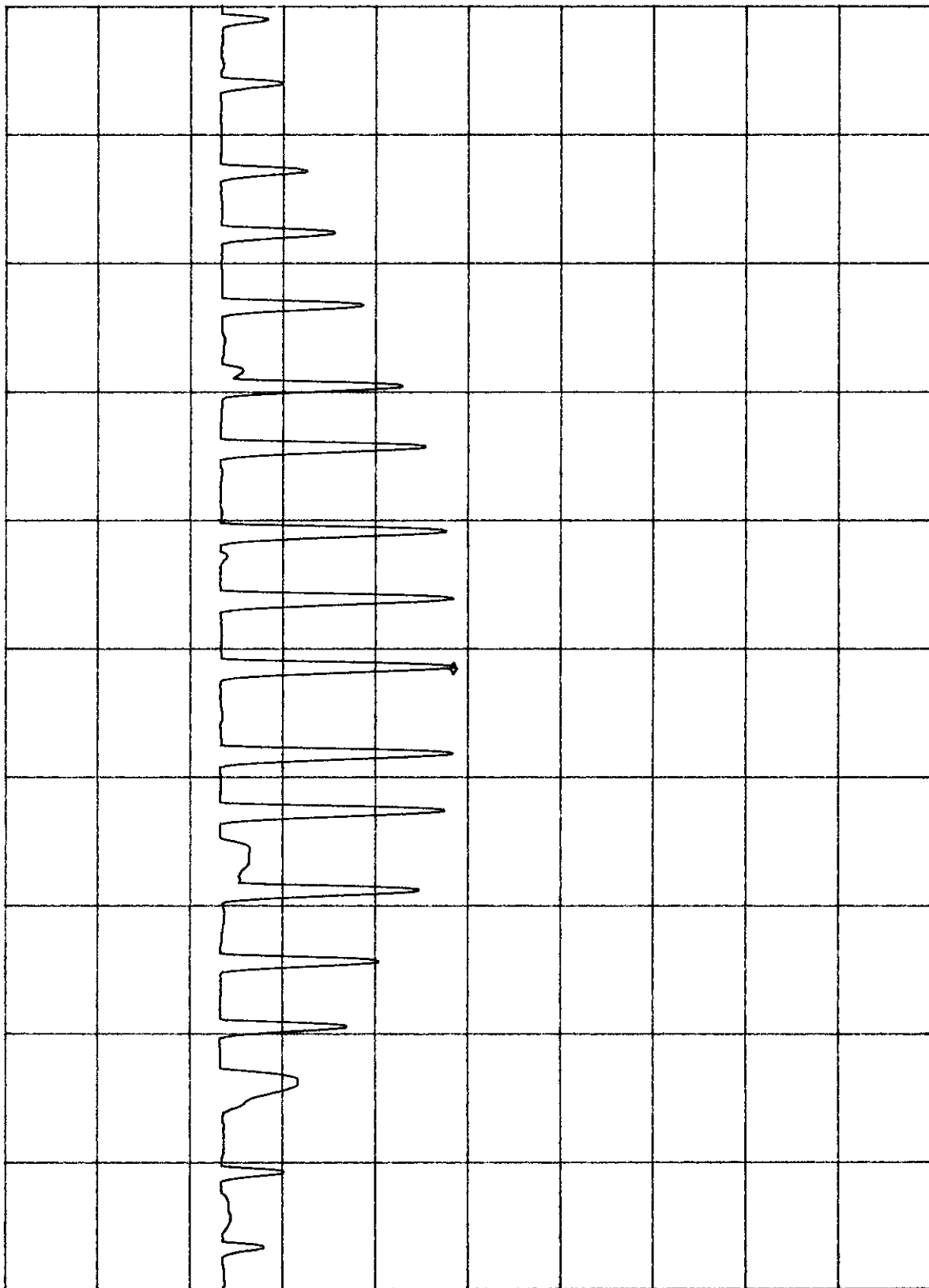
VERT POL

FUNDAMENTAL FREQ

HP REF 100.0 DB μ V ATTEN 10 DB

QUASI PEAK
3M T.D.
PRE AMP ON
MKR 303.8295 MHZ
48.40 DB μ V

10 DB/



CENTER 303.8250 MHZ

RES BW 1 MHZ

VBW 1 MHZ

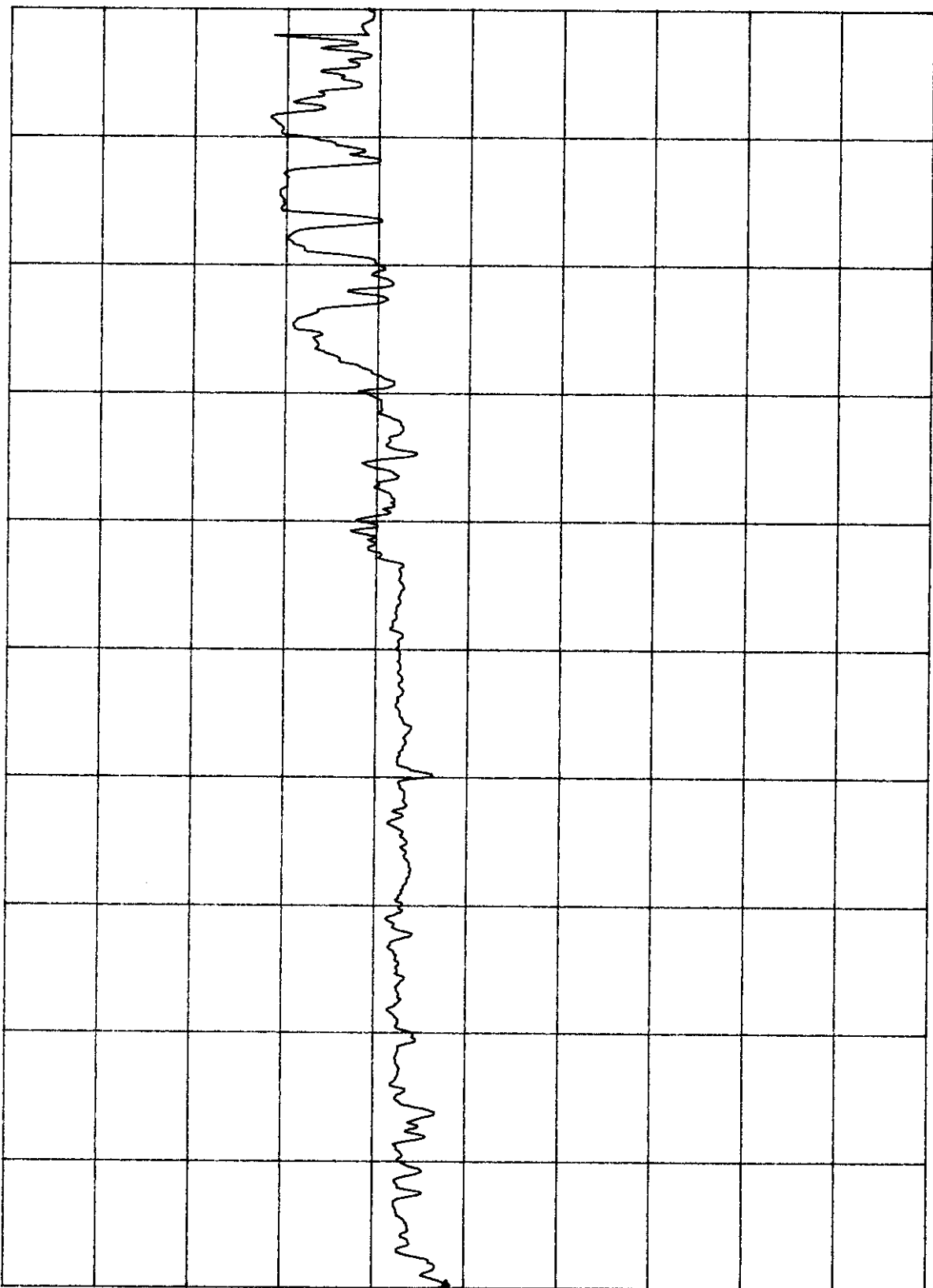
SPAN 300.0 KHZ
SWP 50 sec

6/9/99

13ET DBL

hP REF 100.0 dBμV ATTEN 10 dB MKR 607.65497 MHz 48.10 dBμV

10 dB/



CENTER 607.65000 MHz

RES BW 1 KHz

VBW 1 MHz

SPAN 10.00 KHz

SWP 50 sec

PAGE:

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WORST CASE
POSITION

LOG PERIODIC

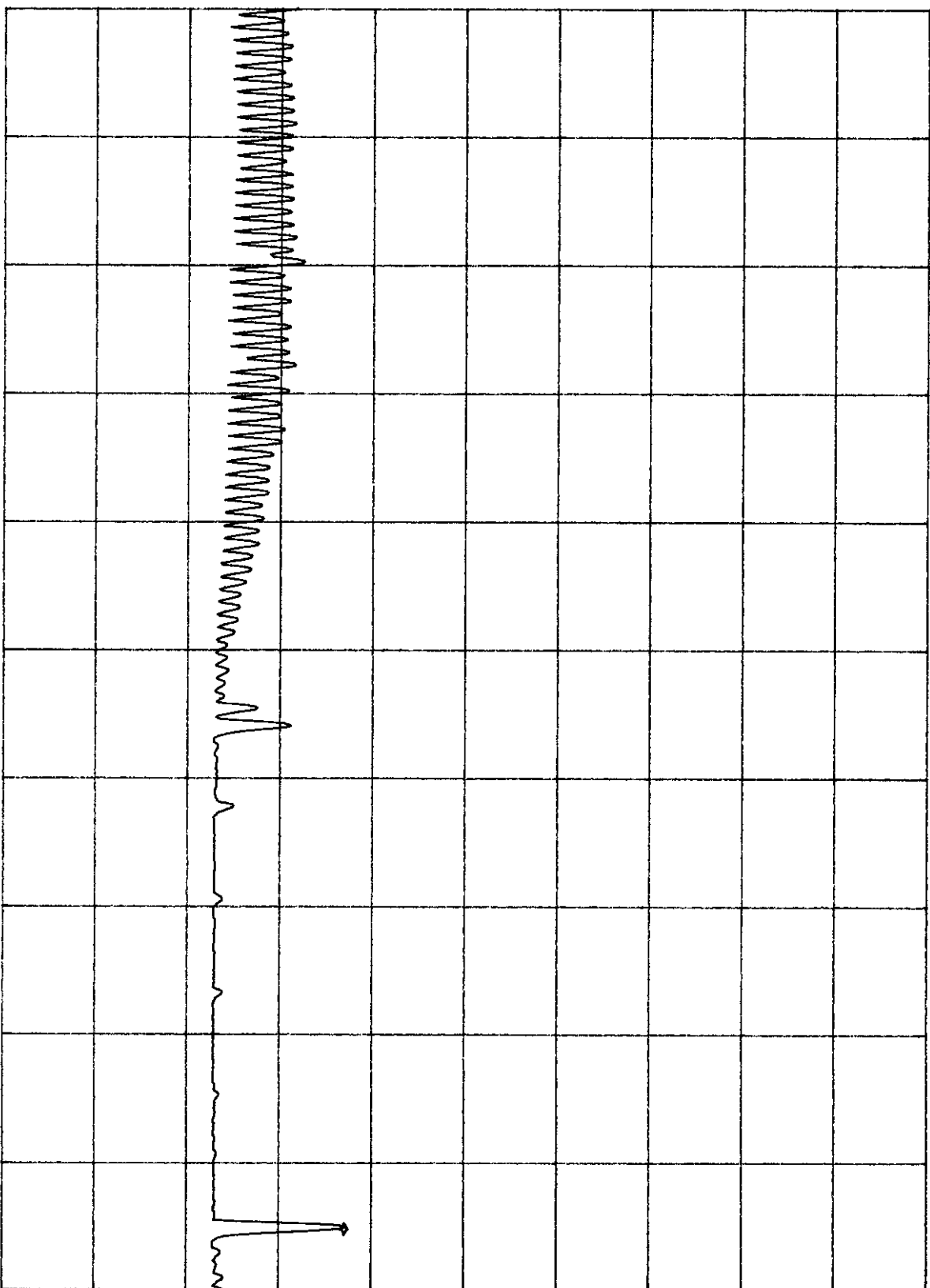
VERT FOL

3RD HARMONIC

HP REF 100.0 DBμV ATTEN 10 DB

10 DB/

QUASI PEAK ON
3M TEST DIST
PRE-AMP ON
MKR 911.6103 MHZ
37.10 DBμV



CENTER 911.4750 MHZ
RES BW 1 MHZ
VBW 1 MHZ
SPAN 300.0 KHZ
SWP 50 sec

6/9/99

EUT IN WORST
CASE POSITION

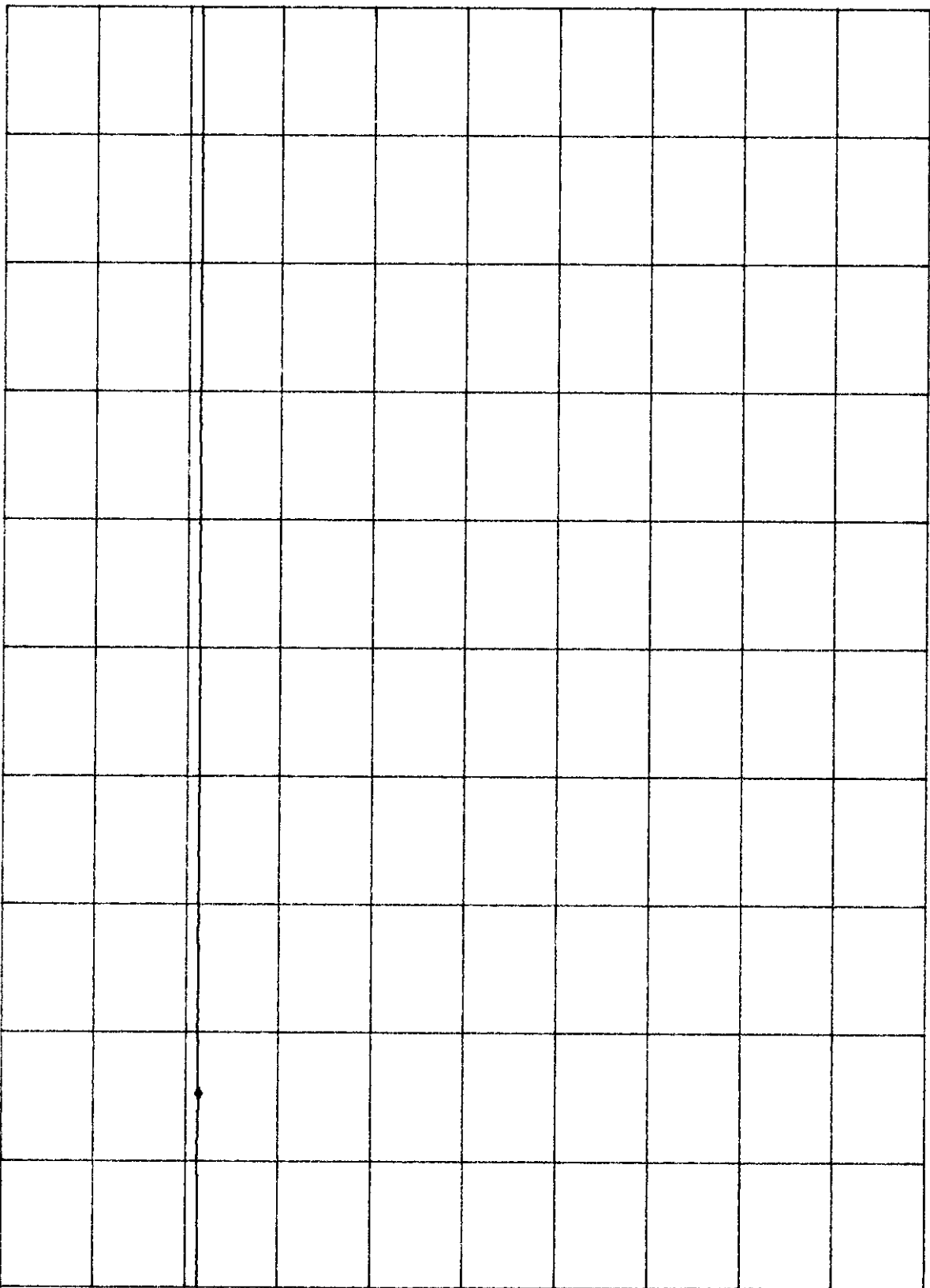
VERTICAL POLARIZATION

AVERAGE DETECTOR
HORN ANTENNA

HP REF 100.0 DBμV ATTEN 10 DB

3M TEST DISTANCE
MKR 1215.4041 MHZ
21.40 DBμV

10 DB/



CENTER 1215.3000 MHZ
RES BW 1 MHZ
VBW 10 HZ
SPAN 300.0 KHZ
SMP 5.0 sec

6/9/99 EUT IN WORST CASE POSITION

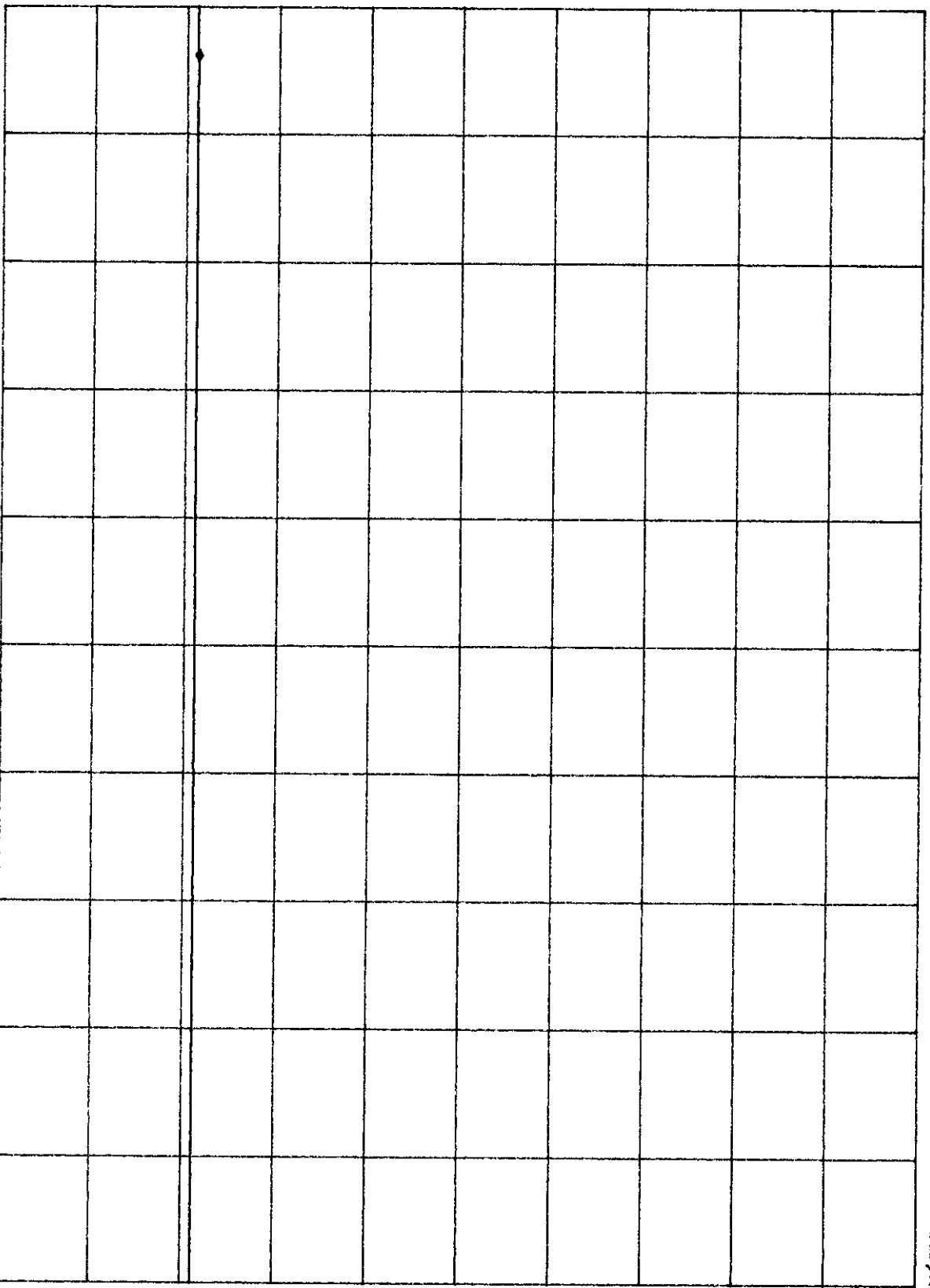
VERT POI

AVG DET
HOLD ANT
3M TEST DIST.

HP REF 100.0 dBμV ATTN 10 dB

MKR 1518.9861 MHz
21.20 dBμV

10 dB/



CENTER 1519.1250 MHz
RES BW 1 MHz
VBW 10 Hz
SPAN 300.0 KHz
SMP 5.0 sec

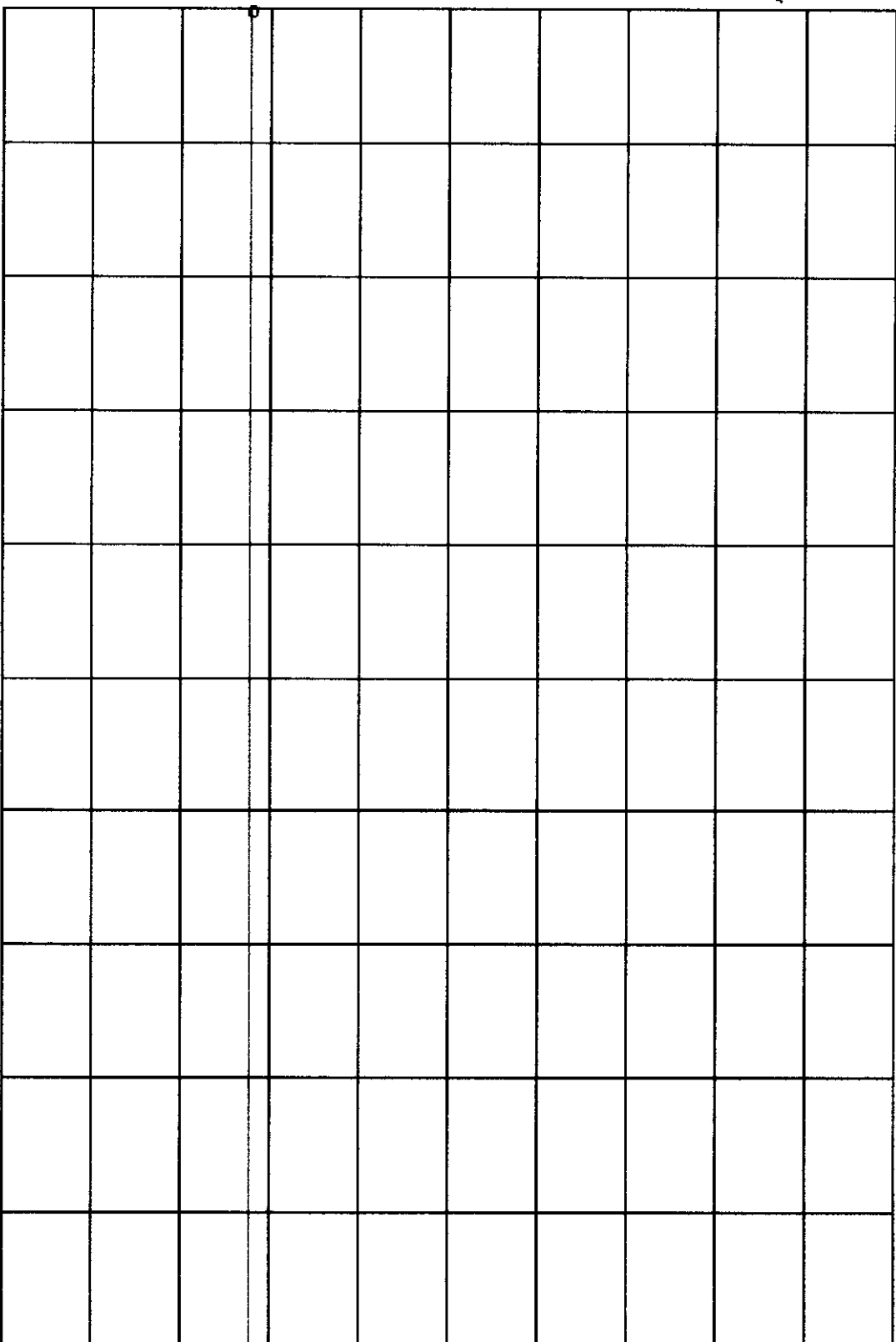
VERT POL

EMCE Engineering
REF 100.0 dBuV

DATE: 9 Jun 1999 @ 12:31:44
ATTEN 10 dB

MKR 1.820 450 GHz
27.50 dBuV

10 dB/



START 1.820 45 GHz
RES BW 1 MHz

USB 10 Hz

STOP 1.825 45 GHz
SWP 5.00 dB

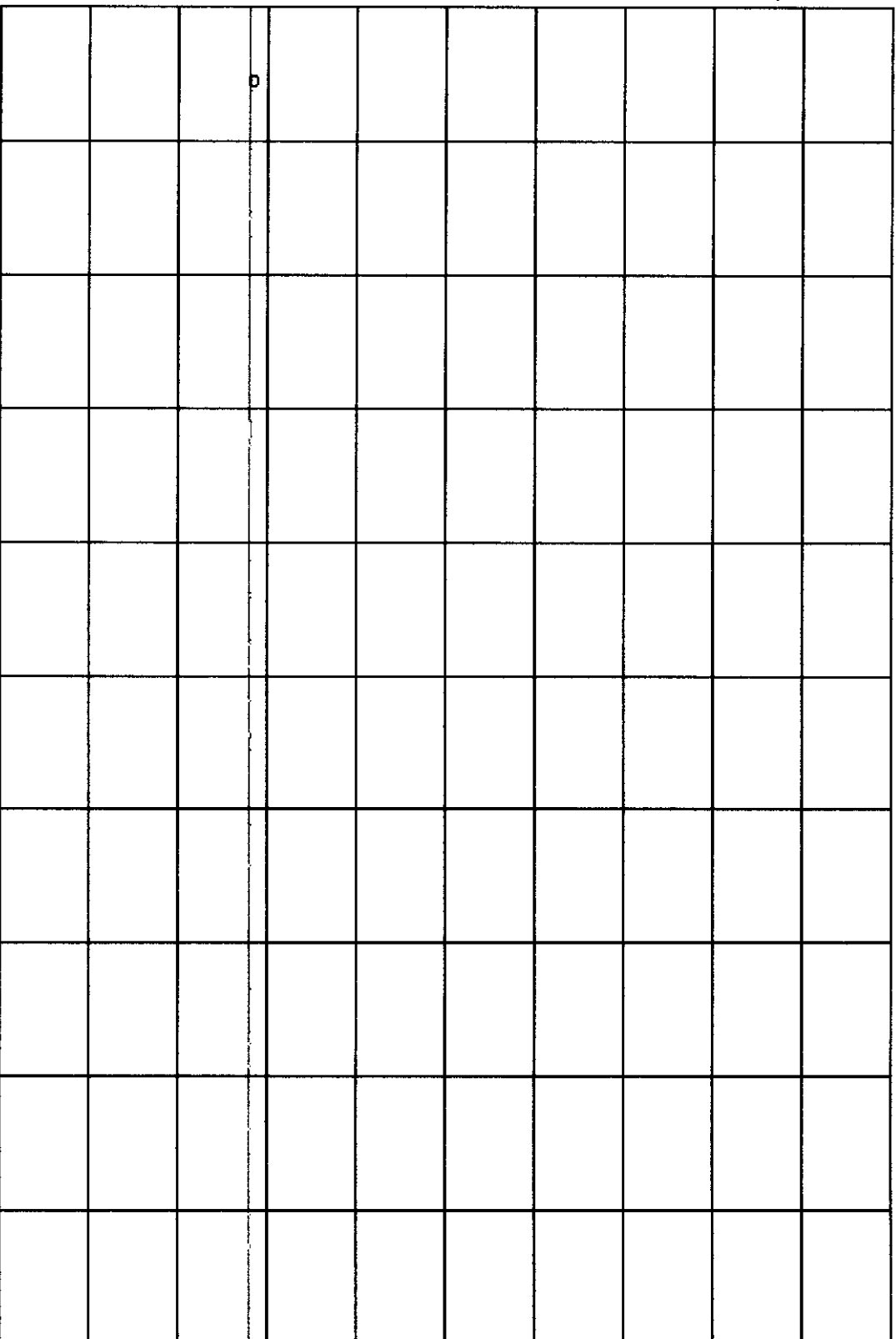
FIGURE

EMCE Engineering
REF 100.0 dBuV

DATE: 9 Jun 1999 @ 12:42:05
ATTEN 10 dB

MKR 2.124 540 GHz
28.00 dBuV

10 dB/



START 2.124 27 GHz
RES 8M 1 MHz

UBW 10 Hz

STOP 2.129 27 GHz
SWP 5.00 snc

FIGURE

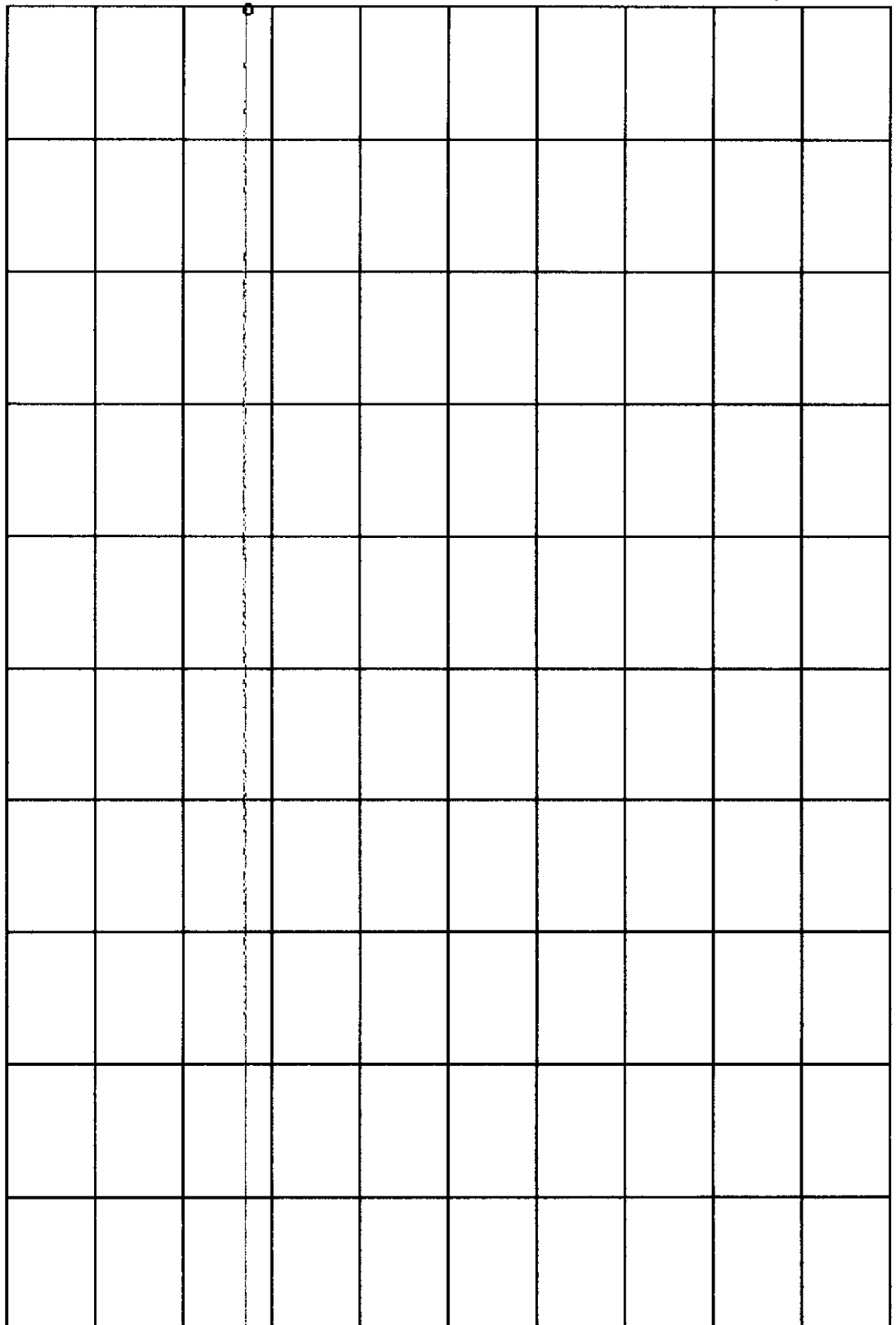
VKRT, fol

ENCE EngInearIng
REF 100.0 dBuV

DATE: 10 Jun 1999 @ 15:49:35
ATTEN 10 dB

MKR 2.710 00 GHz
26.80 dBuV

10 dB/



START 2.710 0 GHz
RES BW 1 MHz

UBW 10 Hz

STOP 2.760 0 GHz
SWP 15.0 sec

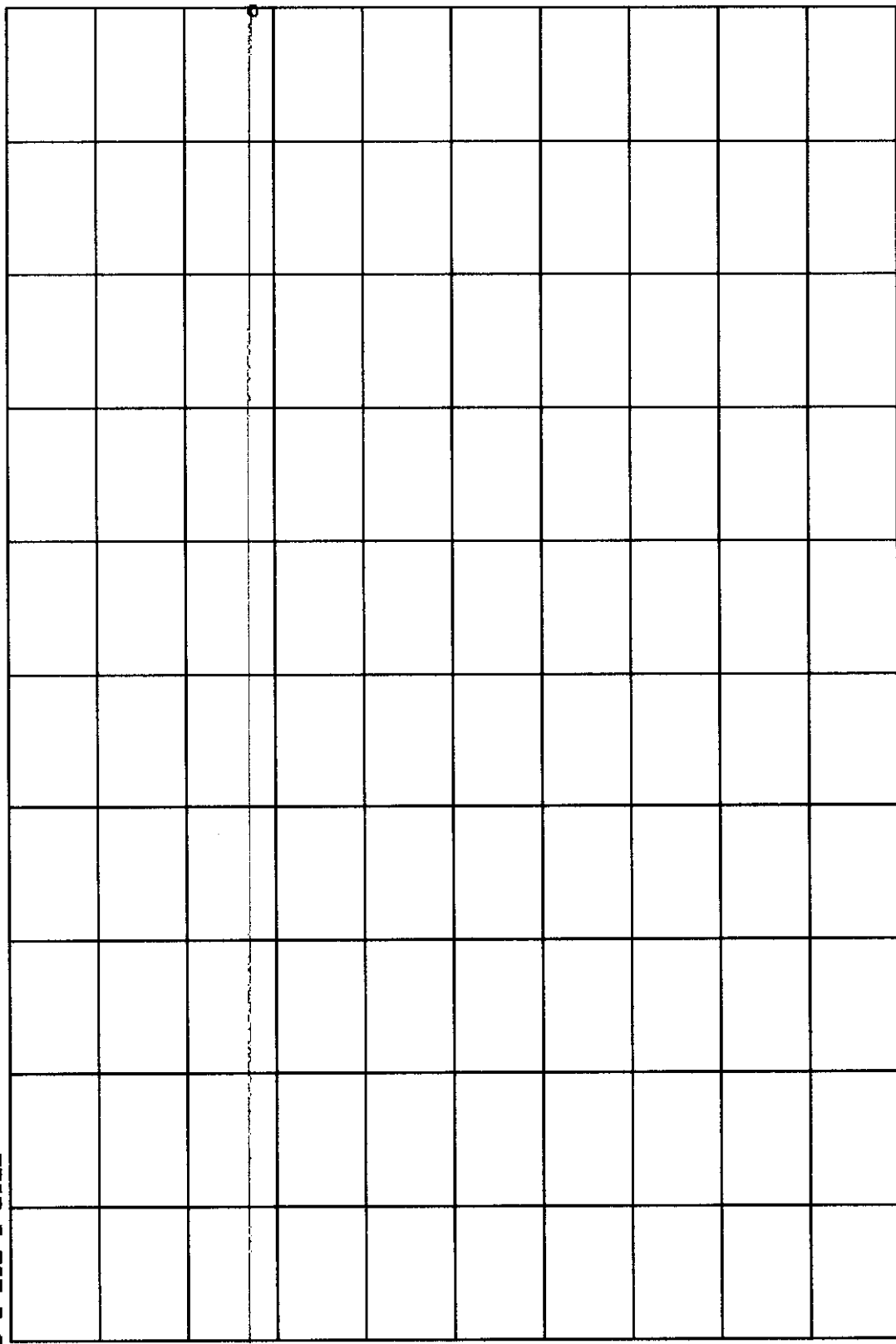
V:RT, fol

ENCE Engineering
REF 100.0 dBu

DATE: 10 Jun 1999 @ 15:59:00
ATTEN 10 dB

MR 3.010 00 GHz
27.30 dBu

10 dB/



START 3.010 0 GHz
RES BW 1 MHz

UBW 10 Hz

STOP 3.060 0 GHz
SWP 15.0 dB

FIGURE

6/8/99

2ND HARMONIC

AMBIENT
(NO EUT)

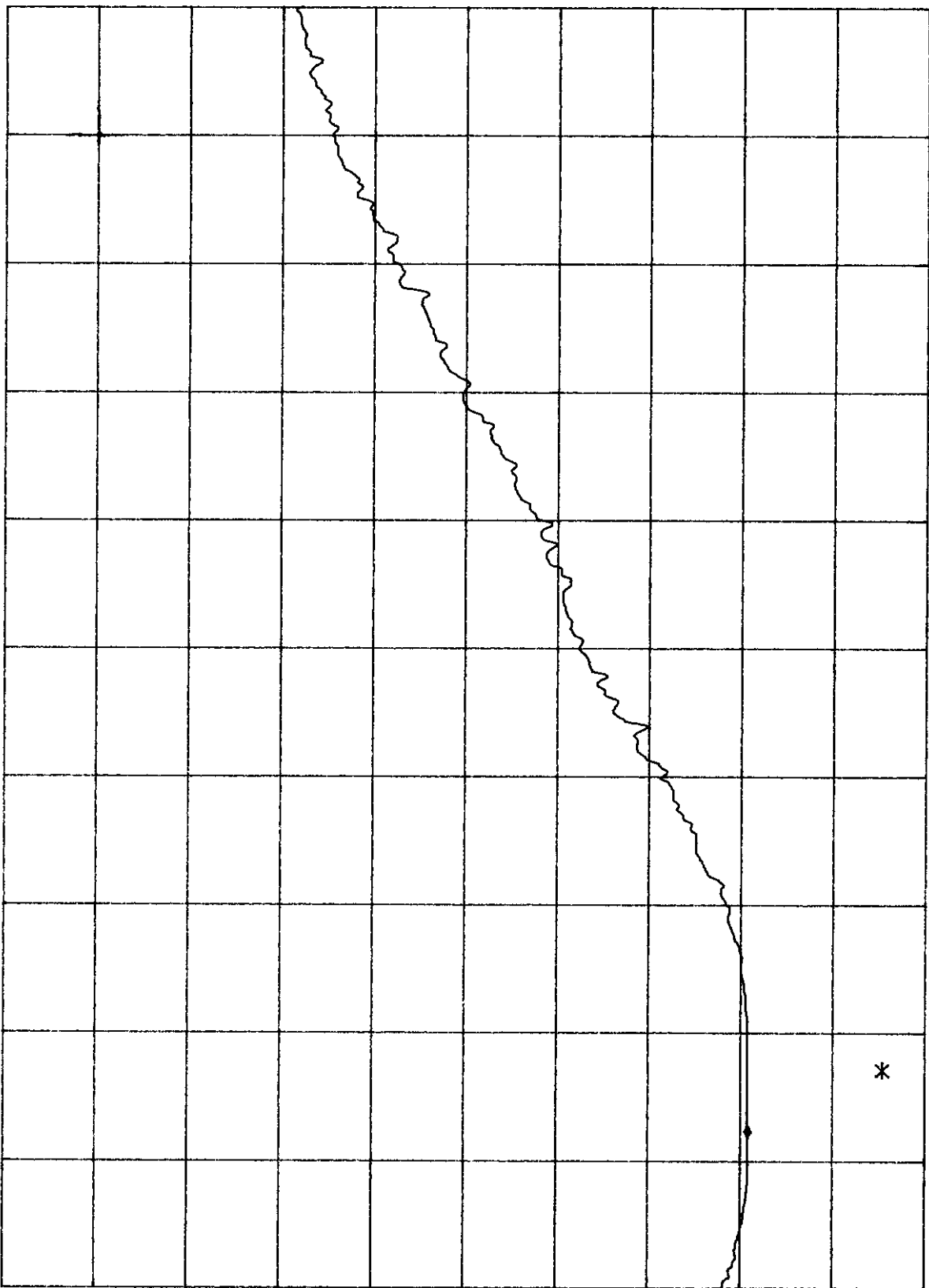
HORIZONTAL AXIS

HP REF 100.0 DB μ V

ATTEN 10 DB

MKR 607.7628 MHZ
80.80 DB μ V

10 DB/



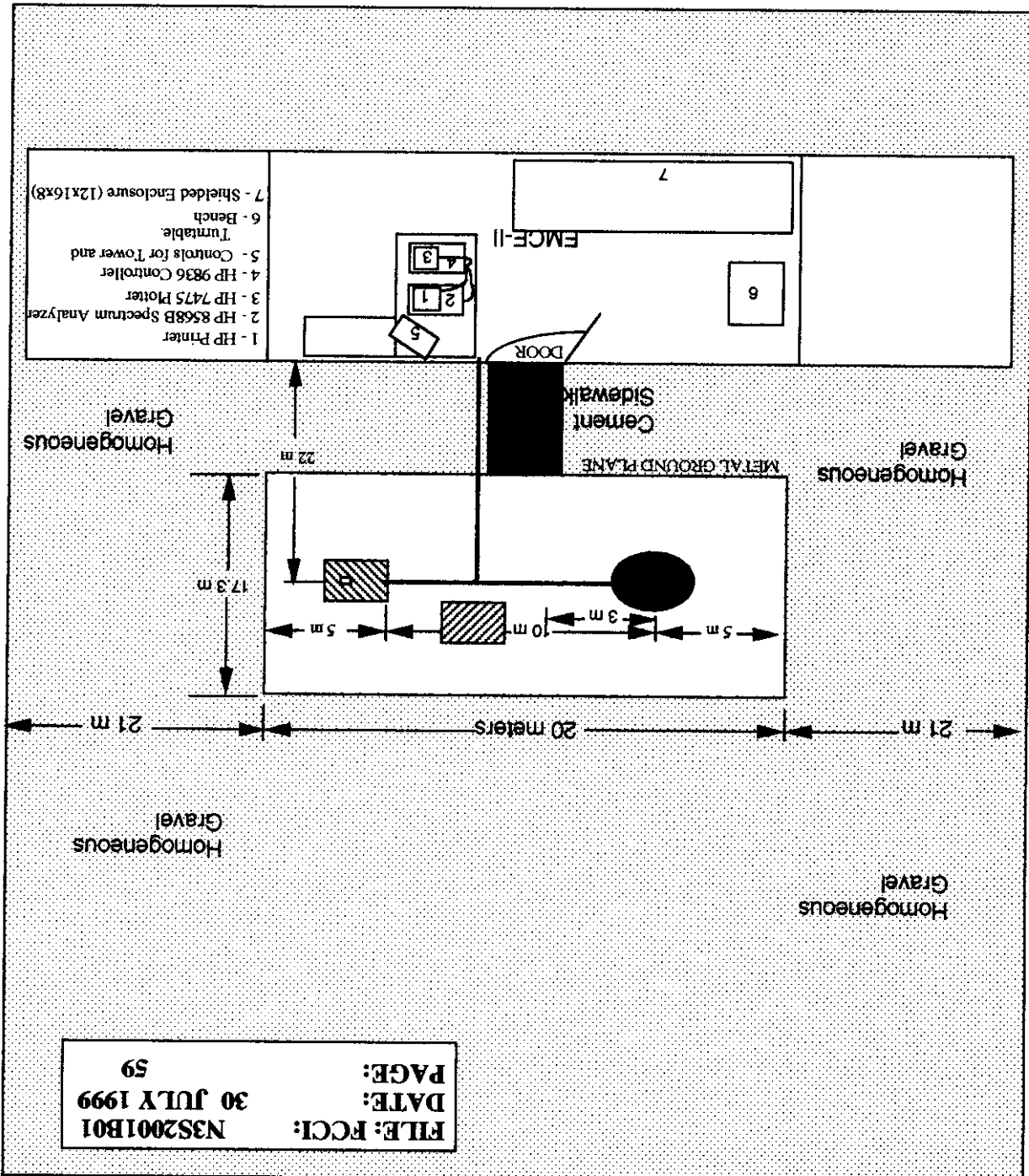
CENTER 607.6500 MHZ

RES BW 1 MHZ

VBW 1 MHZ

SPAN 300.0 KHZ
SWP 50 sec

FIGURE 1. TEST SITE LAYOUT.



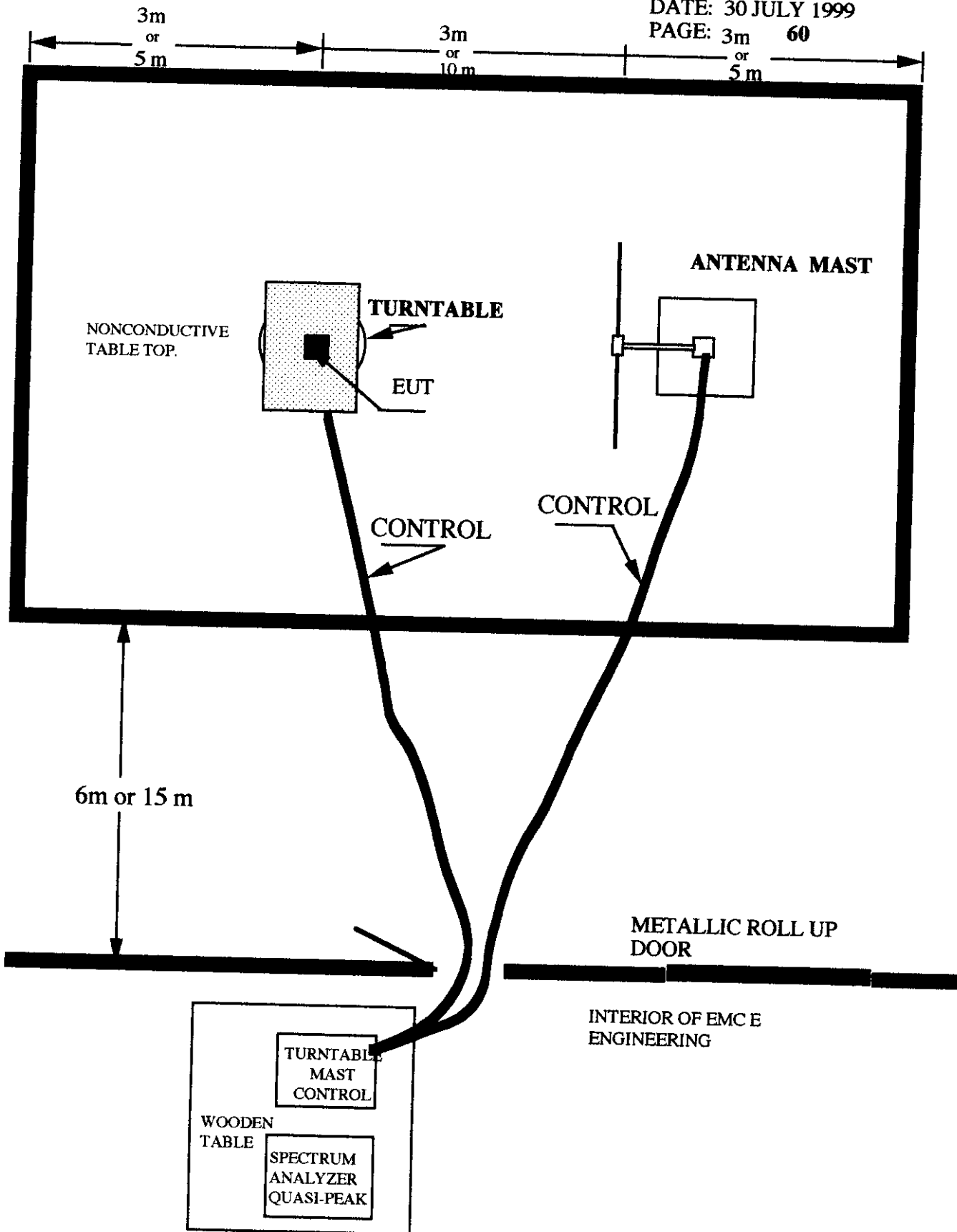


FIGURE 2. TEST SETUP, RADIATED EMISSIONS.