

# TIME DOMAIN

---

## THE NEW WIRELESS MEDIUM

### NOTE FOR EXHIBIT 5

This application seeks approval for an ultra-wideband device that is the subject of a waiver request that was filed by Time Domain with the Commission on February 2, 1998. Ultra-wideband technology developed by Time Domain has been evaluated under a joint FCC-NTIA measurement program conducted in June and July of 1998; Phil Inglis headed the FCC effort. Because the intentional emissions from this device appear "noise-like" and, therefore, as if they were the emissions from an unintentional radiator, the following test report was prepared by DLS Electronic Systems at the request of Time Domain Corporation as if the equipment under test were subject to regulation as an unintentional radiator. This is consistent with the terms of the waiver request, which states that the ultra-wideband devices be tested, but not categorized, as unintentional radiators.

The 1280 MHz frequency referred to in the DLS Report is a timing frequency used in the device. DLS needed the highest clock frequency produced in the device, and this is what the 1280 MHz frequency is referring to. The frequency is a part of the timing circuitry that very precisely places a digital pulse in time (an essential part of the time-modulation). However, this frequency is not related to the intentional radiation, since the unit under test is a carrier free system. The intentionally radiated signal is generated by a very short pulse not using traditional sinewave carrier methods, and does not operate at the 1280 MHz frequency. The intentionally radiated signal is ultra-wideband in nature and is spread from 1 GHz to 3 GHz with a nominal center of 2 GHz.

D.L.S. ELECTRONIC SYSTEMS, INC.  
1250 PETERSON DRIVE  
WHEELING, ILLINOIS 60090

REPORT NO. 7484

FCC "Rules and Regulations" / Unintentional Radiators

Class B Digital Devices

Part 15, Subpart B, Sections 15.107d & 15.109a

THE FOLLOWING **"MEETS"** THE ABOVE TEST SPECIFICATION

Formal Name: Radarvision 1000

Kind of Equipment: Ultrawideband Receiver

FCC ID NUMBER: NA

Test Configuration: Continuous Pulse Mode

Model Number: 1000

Serial Number: 16

Date of Tests: July 2, 1999

Test Conducted For: Time Domain Corporation  
6700 Odyssey Drive, Suite 100  
Huntsville, Alabama 35806

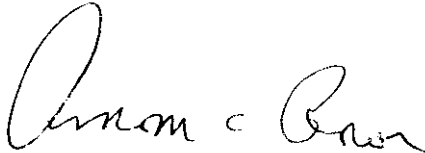
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1250 PETERSON DRIVE  
WHEELING, ILLINOIS 60090

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SIGNATURE PAGE

Report Written By:

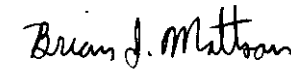


Arnom C. Rowe  
Test Engineer  
EMC-001375-NE

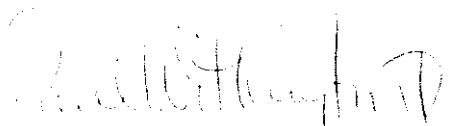
Report Reviewed by:

 FOR  
Jack Prawica  
Lab Manager

Report Approved by:

  
Brian J. Mattson  
General Manager

Company Official:

  
Time Domain Corporation

D.L.S. ELECTRONIC SYSTEMS, INC.  
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Kind of Equipment: Ultrawideband Receiver

S/N: 16

## 1.0 SUMMARY OF TEST REPORT

It was found that the Radarvision 1000, S/N: 16 **"meets"** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart B, Sections 15.107d & 15.109a for Unintentional Radiators, Class B digital devices. **The conducted emissions test was not required because the Radarvision 1000 is powered from a DC power source. It does not have a line cord to plug into the A.C. power line. It should be noted that the amount of margin was only 2.68 dB at 1528.79 MHz, radiated. The normal tolerance of the test equipment is + or - 3 dB. Due to this tolerance and the variation in normal production, a margin of at least 4 dB is recommended. With only a 2.68 dB margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar equipment, it could be found to not meet the above requirement. .**

## 2.0 INTRODUCTION

On July 2, 1999, a series of radio frequency radiated interference measurements were performed on Ultrawideband Receiver, S/N: 16. For Class B digital devices the tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-1992 (Revision of ANSI C63.4-1988). These test procedures were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

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### 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency emission requirements of the FCC "Rules and Regulations", Part 15, Subpart B, Sections 15.107a & 15.109a for Unintentional Radiators, Class B digital devices.

### 4.0 TEST SET-UP

All conducted emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-1992, Section 7, (Figures 9a and 9b). The conducted tests were performed with the test item placed on a wooden table (table top equipment), located in the Test Room. Equipment normally operated on the floor, was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface. The power line supplied was connected to a dual line impedance stabilization network located on the floor (a ground plane). The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-1992, Section 4, (Figure 2). The only ground supplied to the unit was through the third wire of the standard power cord when supplied.

All radiated emissions tests were performed with the test item placed on a rotating wooden table, located in the Test Room. Equipment normally operated on the floor was placed on top of the rotating platform, less than 30 centimeters above the floor. The equipment under test was set up according to ANSI C63.4-1992, Section 8, (Figures 9c and 9d).

When testing a monitor or a device that includes a monitor as part of the test, a repeating "H" pattern is used with white letters on a black background. When the software does not allow the "H" pattern, the screen is filled with ASCII characters or a display we determine to be a normal worst case condition.

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## 5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the HP Spectrum Analyzer or EMC-25 Tuned Receiver. The data was taken using Peak or Quasi-Peak Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Peak Detector.

Below 1000 MHz, final data was taken using the HP Spectrum Analyzer and or the EMC-25 fixed tuned receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak Detector Function of the Analyzer or EMC-25 Receiver. Above 1000 MHz, final data was taken using the Peak Detector on the Spectrum Analyzer.

The bandwidths used are specified by the FCC as stated in the American National Standards Institute, ANSI C63.4-1992, Section 4.2. From 450 kHz to 30 MHz a bandwidth of 9 or 10 kHz was used. From 30 MHz to 1000 MHz a bandwidth of 120 kHz and above 1000 MHz, a bandwidth of 1 MHz was used.

A list of the equipment used can be found in Table 1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

## 6.0 CONDUCTED EMISSION MEASUREMENTS

### NOTE:

The Radarvision 1000 is powered from a DC power source and will not at any time be directly plugged into the public utility lines, therefore the conducted emissions test was not performed.

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## 7.0 RADIATED EMISSION MEASUREMENTS

The allowed radiated emissions for Class B digital devices (Unintentional Radiators) shall not exceed the following field strength limits at a distance of three meters. The allow levels are 100 uV/m (40 dBuV/m) from 30 to 88 MHz, 150 uV/m (43.52 dBuV/m) from 88 to 216 MHz and 200 uV/m (46.02 dBuV/m) from 216 to 960 MHz. Above 960 MHz the limit is 500 uV/m (53.98 dBuV/m).

Preliminary radiation measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to over 960 MHz as stated in Section 15.33b, was automatically scanned and plotted at various angles.

### NOTE:

As stated in Section 15.33b for Unintentional Radiators, the Radarvision 1000 measurements were made up to 10000 MHz, since the fundamental frequency is 1280 MHz.

All radiated emissions measurements were made at a test room temperature of 72° F at 69% humidity.

At those frequencies where significant signals were detected, measurements were made at a 3 meter open field test site, located at Genoa City, Wisconsin, FCC file number 31040/SIT, to determine the actual radiation levels. When required, levels were extrapolated from 3 meters to 10 meters using a linear extrapolation.

All signals in the frequency range of 30 to 200 MHz were measured with a Biconical Antenna or Tuned Dipoles as the pickup device. From 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used and above 1000 MHz a Double Ridge Horn Antenna was used.

During the test for frequencies below 1000 MHz, the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level of emissions. For frequencies greater than 1000 MHz the Double Ridge Horn Antenna was set at 1 meter from the EUT with the antenna set at a fixed height of 1 meter off the ground plane. The EUT was rotated with the equipment moved and the cables (if any) placed within the range of positions likely to find their maximum emissions. Tests were made in both the horizontal and vertical planes of polarization.

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8.0 PHOTO INFORMATION AND TEST SET-UP

The test set-up can be seen on the accompanying photo page.

Item 0 Radarvision 1000  
FCC ID #: NA SN: 16

Item 1 Shielded RF In Cable with Metal Shells. 1'

Item 2 Shielded RF Out Cable with Metal Shells. 1'

Item 3 Shielded 12 vdc Power Cord. 5"

Item 4

Item 5

Item 6

Item 7

Item 8

Item 9

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9.0 CONDUCTED PHOTOS TAKEN DURING TESTING

NOTE:

There were no conducted photos taken. The conducted emissions test was not required because the Radarvision 1000 is powered from a DC power source.

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10.0 CHANGE INFORMATION

The following changes were implemented during the testing and must be incorporated into the production units to insure compliance.

Change 1. Added 3 dB pad to RF Out (inside box).

Change 2.

Change 3.

Change 4.

Change 5.

The responsibility of implementing the changes listed in this report is accepted or I certify that no changes were made

by [Signature]  
Signature

V.P. [Signature]  
Title

for [Signature]  
Company Name

August 15, 1999  
Date

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11.0 RESULTS OF TESTS

The radiated emission results can be seen on pages at the end of this report. Data sheets indicating the open field radiated measurements can also be found with this report. On the radiated charts the PINK horizontal line indicates the Class B limit. Those points on the radiated charts shown with a yellow mark are background frequencies which were verified during the test.

SAMPLE CONDUCTED CALCULATIONS:

$$\begin{array}{rclclcl} \text{Meter Reading} & & & & & & \\ \text{in (dBuV)} & + & \text{Cable Losses (dB) or} & = & \text{Total} \\ & & \text{Meter Factors (dB)} & & \text{in (dBuV)} \end{array}$$

$$\begin{array}{rclcl} \text{Limit} & & & & \\ \text{(dBuV)} & - & \text{Total} & = & \text{Margin} \\ & & \text{(dBuV)} & & \text{(dB)} \end{array}$$

SAMPLE RADIATED CALCULATIONS:

$$\begin{array}{rclclcl} \text{Meter Reading} & + & \text{Cable Losses (dB) or} & + & \text{Antenna} & = & \text{Total} \\ \text{in (dBuV)} & & \text{Meter Factors (dB)} & & \text{(dBuV)} & & \text{(dBuV/m)} \end{array}$$

$$\begin{array}{rclcl} \text{Limit} & & & & \\ \text{(dBuV)} & - & \text{Total} & = & \text{Margin} \\ & & \text{(dBuV)} & & \text{(dB)} \end{array}$$

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12.0 CONCLUSION

It was found that the Ultrawideband Receiver, Model NO: 1000, S/N: 16 **"meets"** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart B for Class B equipment. **The conducted emissions test was not required because the Radarvision 1000 is powered from a DC power source. It does not have a line cord to plug into the A.C. power line. It should be noted that the amount of margin was only 2.68 dB at 1528.79 MHz, radiated. The normal tolerance of the test equipment is + or - 3 dB. Due to this tolerance and the variation in normal production, a margin of at least 4 dB is recommended. With only a 2.68 dB margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar equipment, it could be found to not meet the above requirement.**

This test report relates only to the items tested and contains the following number of pages.

|               |          |
|---------------|----------|
| Text:         | 20 pages |
| Data Summary: | 4 pages  |
| Charts:       | 16 pages |

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TABLE 1 - EQUIPMENT LIST

| Test Equipment       | Manufacturer/Description | Model Number       | Serial Number  | Frequency Range | Cal Due Date |
|----------------------|--------------------------|--------------------|----------------|-----------------|--------------|
| *Spectrum Analyzer   | Hewlett/Packard          | 8566B              | 2240A<br>02041 | 5 Hz -22GHz     | 4/00         |
| Quasi-Peak Adapter   | Hewlett/Packard          | 85650A             | 2043A<br>00121 | 10 kHz - 1GHz   | 4/00         |
| **Spectrum Analyzer  | Hewlett/Packard          | 8566B              | 2421A<br>00452 | 25 Hz-22 GHz    | 9/99         |
| Quasi-Peak Adapter   | Hewlett/Packard          | 85650A             | 2043A<br>00248 | 10 kHz-1 GHz    | 9/99         |
| ***Spectrum Analyzer | Hewlett/Packard          | 8591A              | 3009A<br>00700 | 9 kHz-1.8 GHz   | 6/00         |
| Receiver             | Electrometrics           | EMC-25<br>Mark-III | 772            | .01-1000 MHz    | 10/99        |
| Meter Module         | Electrometrics           | CRM-25             | 162            | .01-1000 MHz    | 10/99        |
| Receiver             | Electrometrics           | EMC-25<br>Mark-III | 804            | .01-1000 MHz    | 10/99        |
| Meter Module         | Electrometrics           | CRM-25             | 138            | .01-1000 MHz    | 10/99        |
| Antenna              | Electrometrics           | BIA-25             | 2453           | 20-200 MHz      | 10/99        |
| Antenna              | Electrometrics           | LPA-25             | 1114           | 200-1000 MHz    | 10/99        |
| Antenna              | Electrometrics           | BIA-25             | 2614           | 20-200 MHz      | 10/99        |
| Antenna              | Electrometrics           | LPA-25             | 1205           | 200-1000 MHz    | 10/99        |
| Antenna              |                          | Dipoles            |                | 20-1000 MHz     | I/O          |
| Antenna              | Electro-Mechanics Co     | 3115               | 2479           | 1 - 18 GHz      | I/O          |
| LISN                 | Solar                    | Dual               |                | 10 - 30 kHz     | 4/00         |

\*Firmware Version 29.9.86

Software Version

85864C Rev A

\*\*Firmware Version 14.1.85

Software Version

85864C Rev A

\*\*\*Firmware Version 5.1.3

Software Version

82301-12029 Rev C

I/O Initial Calibration Only

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APPENDIX A

**DATA SUMMARY**

D.L.S. ELECTRONIC SYSTEMS INC. REPORT NO. 7484

SUMMARY DATA SHEET OF **RADIATED EMISSIONS <1000 MHz**

TEST DATE:-----July 2, 1999  
MANUFACTURER:-----Time Domain Corporation  
MODEL NO:-----1000  
S/N:-----16  
CONFIGURATION:----**NA**

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15, SUBPART B,  
CLASS B EQUIPMENT / SECTION 15.109a

TEST EQUIPMENT: Receiver --- EMC-30 -- SN 44168  
Antennas --- BIA-25 -- SN 4785  
LPA-25 -- SN 4895

TYPE OF TEST: RADIATED **VERTICAL** MEASURED **AT 3 METERS**

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

| FREQ<br>IN<br>MHz. | METER<br>READING<br>dBuV | METER<br>CORR.<br>dBuV | ANTENNA<br>FACTOR<br>dB | TOTAL<br>dBuV/m | LIMIT<br>dBuV/m | MARGIN<br>dB |
|--------------------|--------------------------|------------------------|-------------------------|-----------------|-----------------|--------------|
| -----              |                          |                        |                         |                 |                 |              |
| ALL                |                          |                        |                         |                 |                 | >15dB        |

D.L.S. ELECTRONIC SYSTEMS INC. REPORT NO. 7484

SUMMARY DATA SHEET OF **RADIATED EMISSIONS <1000 MHz**

TEST DATE:-----July 2, 1999  
MANUFACTURER:-----Time Domain Corporation  
MODEL NO:-----1000  
S/N:-----16  
CONFIGURATION:----**NA**

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15, SUBPART B,  
CLASS B EQUIPMENT / SECTION 15.109a

TEST EQUIPMENT: Receiver --- EMC-30 -- SN 44168  
Antennas --- BIA-25 -- SN 4785  
LPA-25 -- SN 4895

TYPE OF TEST: RADIATED **HORIZONTAL** MEASURED AT 3 METERS

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

| FREQ<br>IN<br>MHz. | METER<br>READING<br>dBuV | METER<br>CORR.<br>dBuV | ANTENNA<br>FACTOR<br>dB | TOTAL<br>dBuV/m | LIMIT<br>dBuV/m | MARGIN<br>dB |
|--------------------|--------------------------|------------------------|-------------------------|-----------------|-----------------|--------------|
| 240.00             | 18.00                    | 2.00                   | 11.74                   | 31.74           | 46.02           | 14.28        |

D.L.S. ELECTRONIC SYSTEMS INC. REPORT NO. 7484

SUMMARY DATA SHEET OF RADIATED EMISSIONS >1000 MHz

TEST DATE:-----July 2, 1999  
MANUFACTURER:-----Time Domain Corporation  
MODEL NO:-----1000  
S/N:-----16  
CONFIGURATION:----**NA**

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15, SUBPART B,  
CLASS B EQUIPMENT / SECTION 15.109a

TEST EQUIPMENT: SPECTRUM ANALYZER -- HP 8566B

TYPE OF TEST: RADIATED EMISSIONS USING **VERTICAL** POLARIZATION

NOTE: LIMIT LINE ON CHARTS INCLUDE ALL CORRECTION FACTORS

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

| FREQ<br>IN<br>MHz. | METER<br>READING<br>dBuV | ANTENNA<br>PLUS<br>CABLE | PRE-AMP<br>GAIN<br>dB | TOTAL<br>dBuV/m | LIMIT<br>dBuV/m | ANT DIST.<br>IN METERS | MARGIN<br>dB |
|--------------------|--------------------------|--------------------------|-----------------------|-----------------|-----------------|------------------------|--------------|
| 1782.83            | 55.53                    | 30.30                    | -40.13                | 45.70           | 53.98           | 3                      | 8.28         |
| 2015.00            | 62.00                    | 29.70                    | -39.90                | 51.80           | 63.52           | 1                      | 11.72        |

D.L.S. ELECTRONIC SYSTEMS INC. REPORT NO. 7484

SUMMARY DATA SHEET OF RADIATED EMISSIONS >1000 MHz

TEST DATE:-----July 2, 1999  
MANUFACTURER:-----Time Domain Corporation  
MODEL NO:-----1000  
S/N:-----16  
CONFIGURATION:----**NA**

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15, SUBPART B,  
CLASS B EQUIPMENT / SECTION 15.109a

TEST EQUIPMENT: SPECTRUM ANALYZER -- HP 8566B

TYPE OF TEST: RADIATED EMISSIONS USING **HORIZONTAL** POLARIZATION

NOTE: LIMIT LINE ON CHARTS INCLUDE ALL CORRECTION FACTORS

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

| FREQ<br>IN<br>MHz. | METER<br>READING<br>dBuV | ANTENNA<br>PLUS<br>CABLE | PRE-AMP<br>GAIN<br>dB | TOTAL<br>dBuV/m | LIMIT<br>dBuV/m | ANT DIST.<br>IN METERS | MARGIN<br>dB |
|--------------------|--------------------------|--------------------------|-----------------------|-----------------|-----------------|------------------------|--------------|
| 1270.73            | 55.98                    | 28.64                    | -40.02                | 44.60           | 53.98           | 3                      | 9.38         |
| 1528.79            | 62.30                    | 29.30                    | -40.30                | 51.30           | 53.98           | 3                      | 2.68         |
| 1813.96            | 59.59                    | 30.75                    | -40.05                | 50.30           | 53.98           | 3                      | 3.68         |
| 2098.06            | 66.70                    | 29.70                    | -39.90                | 56.50           | 63.52           | 1                      | 7.02         |

D.L.S. ELECTRONIC SYSTEMS, INC.  
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APPENDIX B

**CHARTS TAKEN DURING TESTING**

## HOW TO READ EMC-30 RADIATED CHARTS

The EMC-30 Attenuation (receiver) is written at the top of each chart.

The total attenuation (B) is the receiver attenuation plus any correction due to the pre-amps.

The total attenuation is then used to determine the limit on the chart.

Example: Say we are testing a computer to meet FCC "B" Limit.

Step 1: Look at the top of the page for the total attenuation (B)

Let's say the total attenuation is 20. See sample chart.

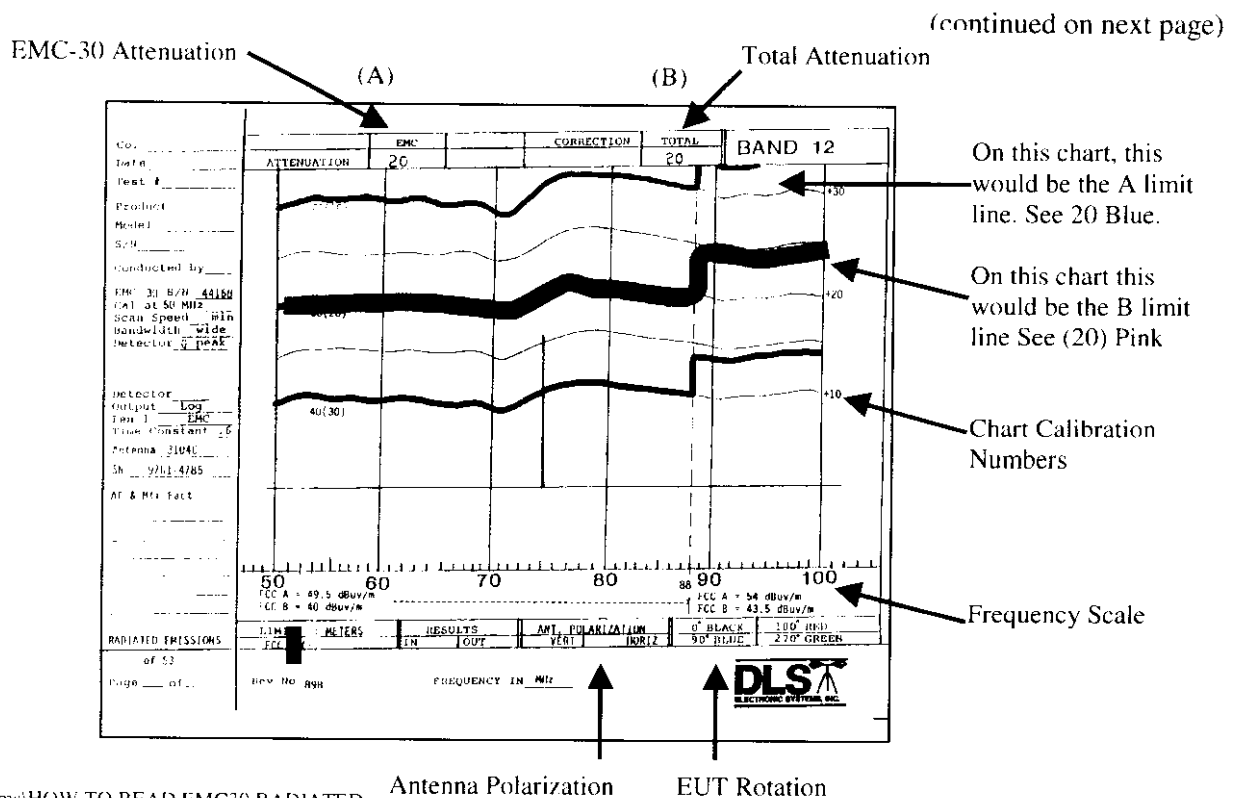
Step 2: Look for the bold horizontal line with the number 20 written inside the parenthesis (20). This is the number above or below the bold line without a + or - sign associated with it. "B" limit numbers are written in parenthesis, while "A" limit numbers are written outside parenthesis. See limit above Rev No near bottom left of page.

Step 3: The bold line marked (20) would be the FCC "B" limit line and should be marked with a pink highlighter marker. See sample chart.

Step 4: The proximity of the signals to the limit can now be determined. Each bold, horizontal line represents 10 dB, while the narrow line indicates 5 dB. The sample signal is 4/5 of a small division below the pink line. The signal is therefore below the FCC B limit by 4 dB. The frequency of the signals can be determined from the numbers on the x-axis of the chart.

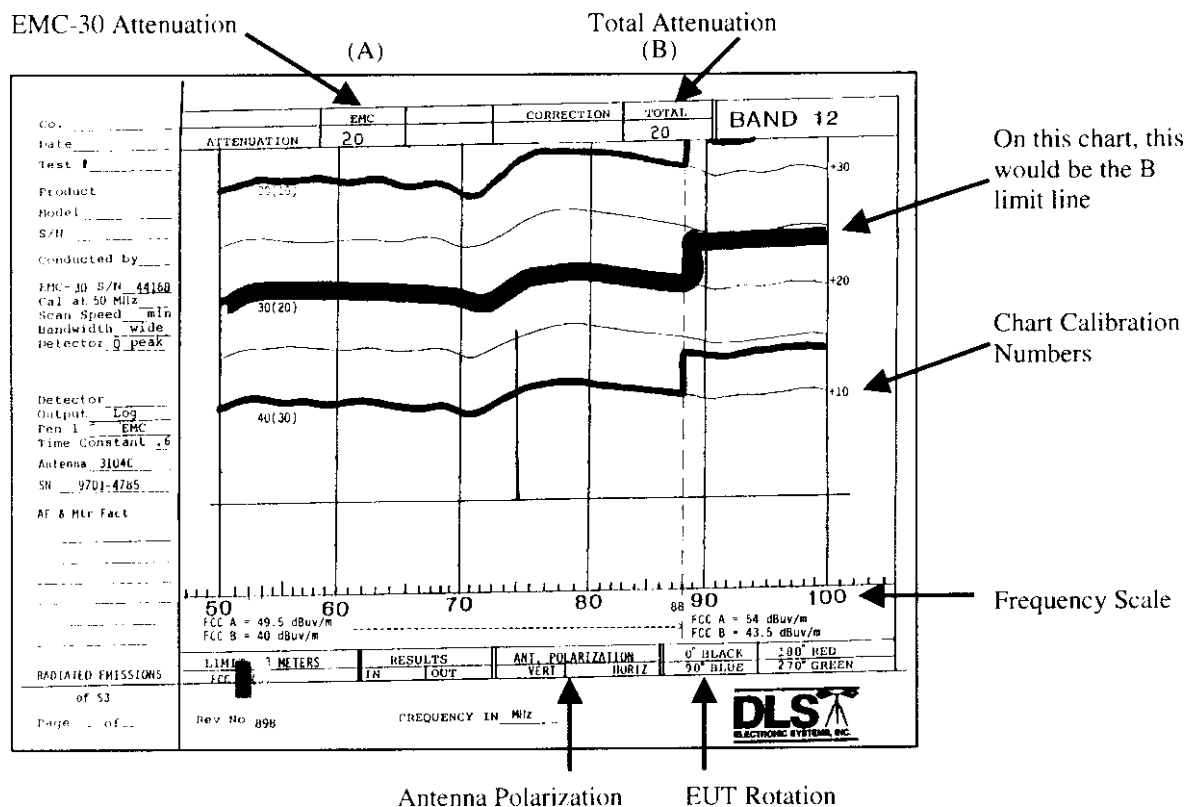
Step 5: The plot may be run in several different colors which represent the angle of the EUT with respect to the antenna. To determine what color corresponds to what angle, see the boxes in the lower right-hand corner of the chart.

Step 6: The polarization of the antenna at the time of the test, either vertical or horizontal, can be seen in the lower center portion of the chart.



## HOW TO READ EMC-30 RADIATED CHARTS (continued)

- Step 7: If yellow or blue tags are present: Yellow tags are broad band antenna measurements which contain the frequency, meter reading, antenna height, and the EUT rotation with respect to the antenna. Blue tags are dipole readings which contain the same information. When dipoles are used, the margin cannot be approximated graphically but must be calculated.
- Step 8: To determine the approximate signal strength of a frequency, first determine the total attenuation from the chart (B). Second, find the chart calibration number on the right vertical axis of the chart which is nearest to the level of signal strength you are trying to determine. Adding this number to the total attenuation gives you the level of this line in dBuv/m. Example: A total attenuation of 20 added to the +20 line (chart calibration number) makes this line 40 dBuv/m. Let's call this the amplitude line. Next, determine the approximate height of the signal with respect to the amplitude line remembering that each horizontal division is 5 dB. The amount above or below the amplitude line determines the approximate signal strength. The signal on the sample chart at 75 MHz would be below the "B" limit by approximately 4 dB or 36 dBuv/m.



Note: All backgrounds are indicated with yellow markers and each is verified before being marked.

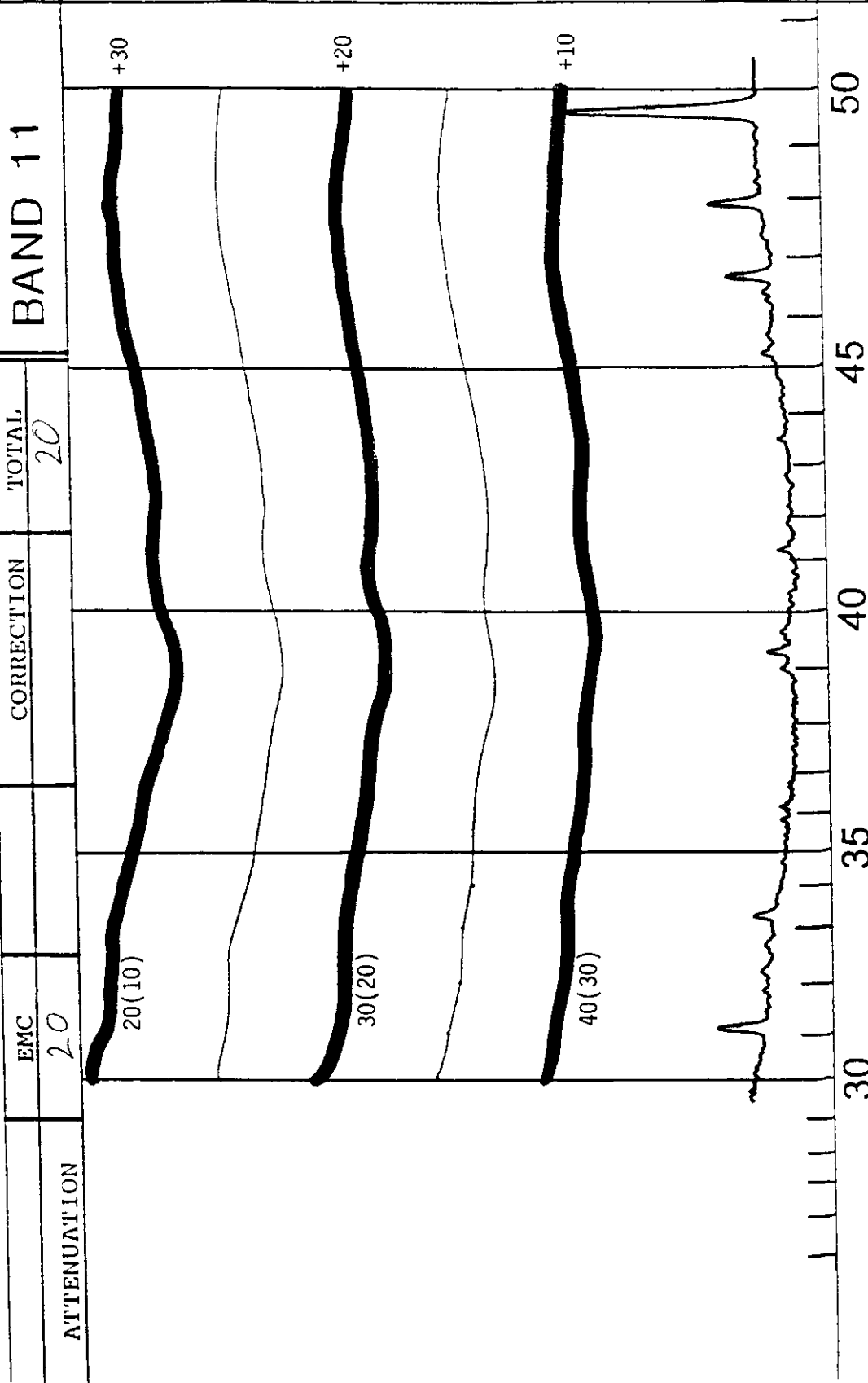
Co. Time Domain  
 Date 7-2-99  
 Test # 1A  
 Product  
 Model RadarVision  
~~SN#~~ 1000-16  
 Conducted by CB  
 EMC-30 S/N 44158  
 Cal at 30 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector a peak

Detector Log  
 Output EMC  
 Pen I EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Htr Fact

RADIATED EMISSIONS

of S3

Page     of    



FCC A = 49.5 dBuv/m

FCC B = 40 dBuv/m

| LIMIT | 3 METERS  | RESULTS | ANT. POLARIZATION | 0° BLACK | 180° RED   |
|-------|-----------|---------|-------------------|----------|------------|
|       |           | IN      | VERT              | 90° BLUE | 270° GREEN |
|       | FCC A (B) | OUT     | HORIZ             |          |            |

FREQUENCY IN MHz

Rev No 898

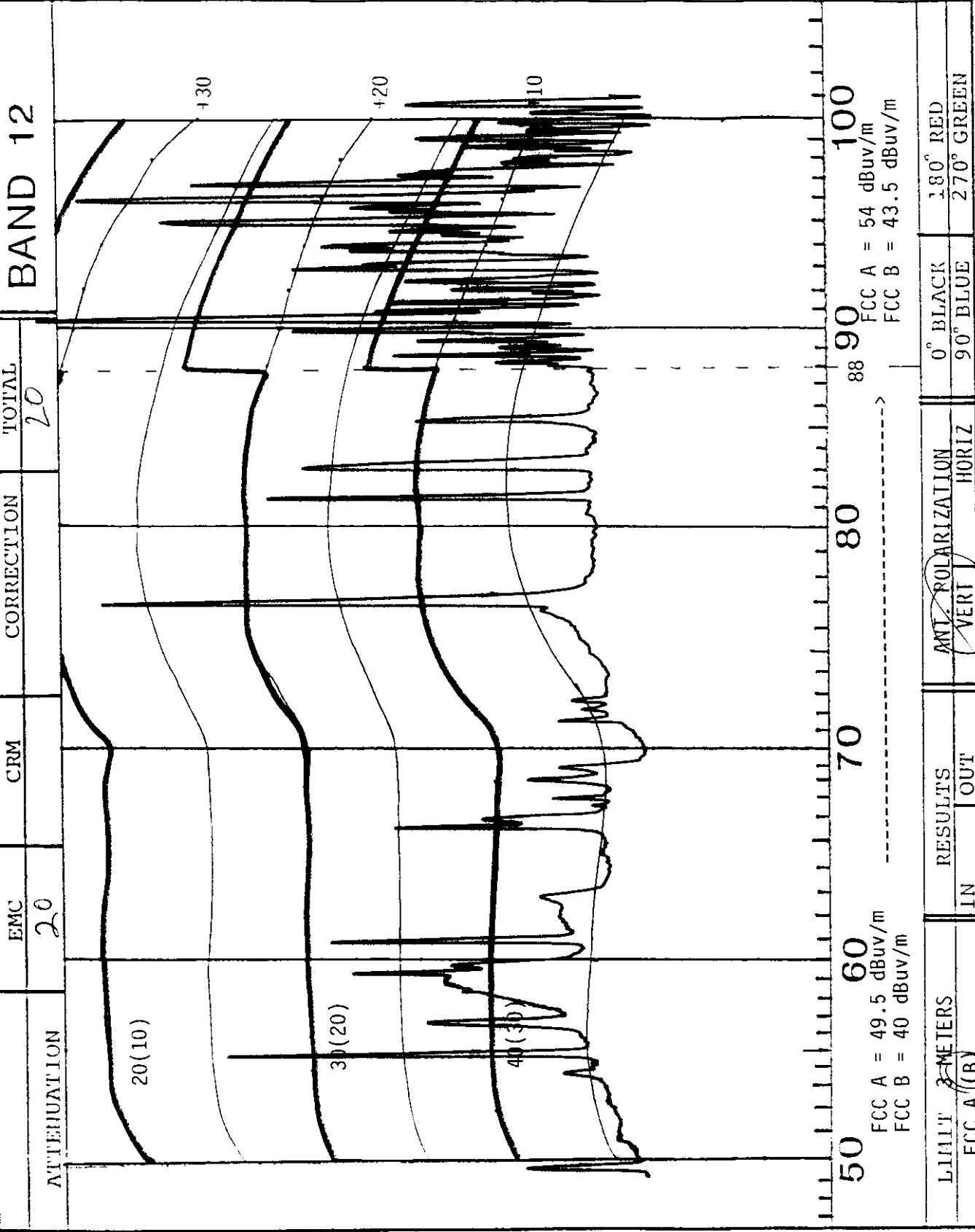


Co. Time Domain  
 Date 7-2-99  
 Test # \_\_\_\_\_  
 Product \_\_\_\_\_  
 Model RadarVision  
~~1000-16~~  
 Conducted by CB  
 EMC-30 S/N 44168  
 Cal at 50 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak

Detector \_\_\_\_\_  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Mtr Fact \_\_\_\_\_

RADIATED EMISSIONS

Page \_\_\_\_\_ of \_\_\_\_\_  
 S3



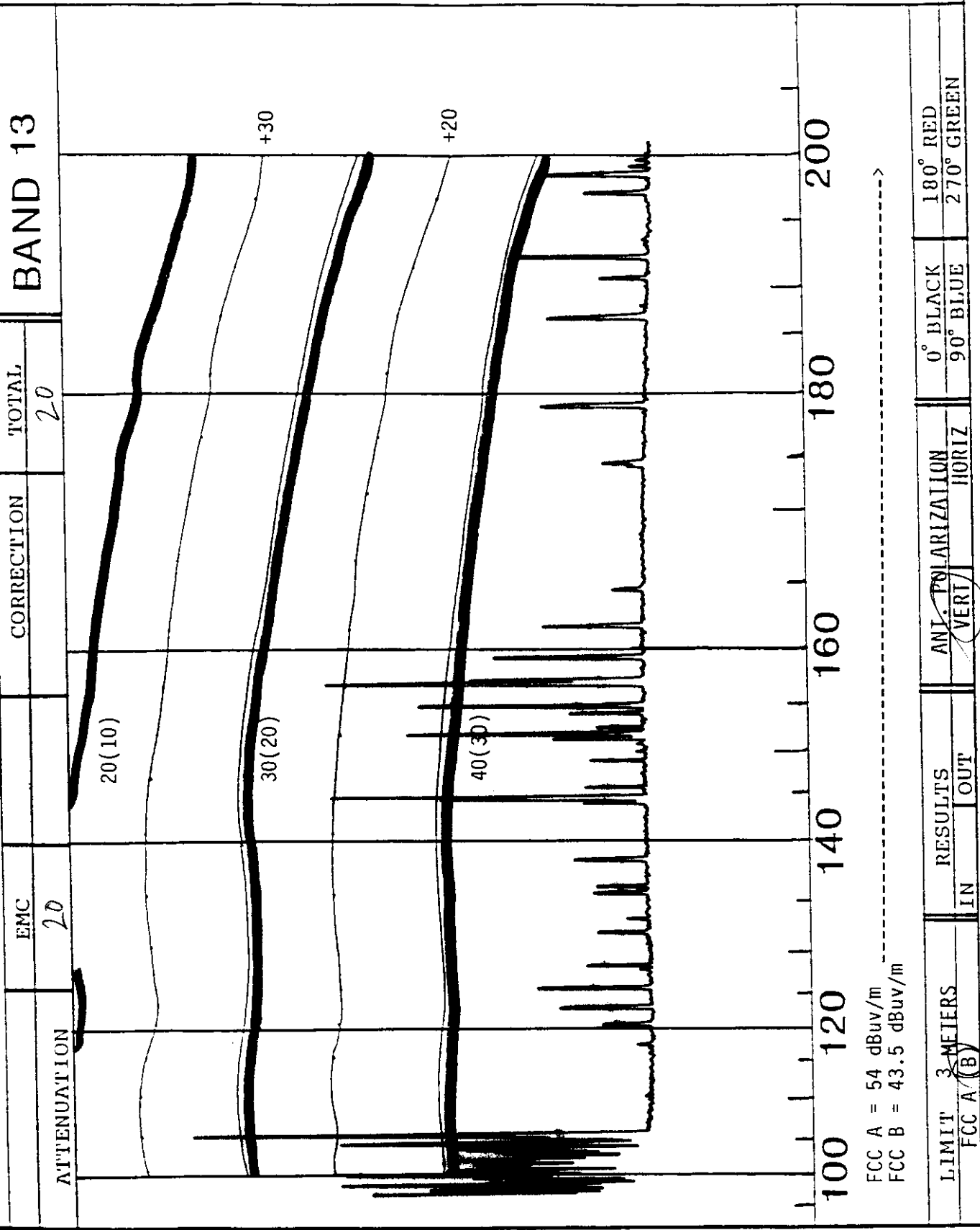
| LIMIT | 3 METERS  | RESULTS |     | ANT. POLARIZATION | 0° BLACK                     | 180° RED   |
|-------|-----------|---------|-----|-------------------|------------------------------|------------|
|       |           | IN      | OUT | VERT              | 90° BLUE <th>270° GREEN</th> | 270° GREEN |
|       | ECC A (R) |         |     | HORIZ             |                              |            |



Co. Time Domain  
 Date 7-2-99  
 Test # 1A  
 Product \_\_\_\_\_  
 Model RadarVision  
 S/N \_\_\_\_\_  
 Conducted by CB  
 EMC- 30 S/N 44168  
 Cal at 100 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector q peak

Detector \_\_\_\_\_  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Mtr Fact \_\_\_\_\_

RADIATED EMISSIONS  
 of S3  
 Page \_\_\_\_\_ of \_\_\_\_\_



|           |          |         |     |                   |          |          |
|-----------|----------|---------|-----|-------------------|----------|----------|
| LIMIT     | 3 METERS | RESULTS |     | ANT. POLARIZATION | 0° BLACK | 180° RED |
|           |          | IN      | OUT |                   |          |          |
| FCC A (B) |          |         |     | VERT              |          |          |
|           |          |         |     | HORIZ             |          |          |



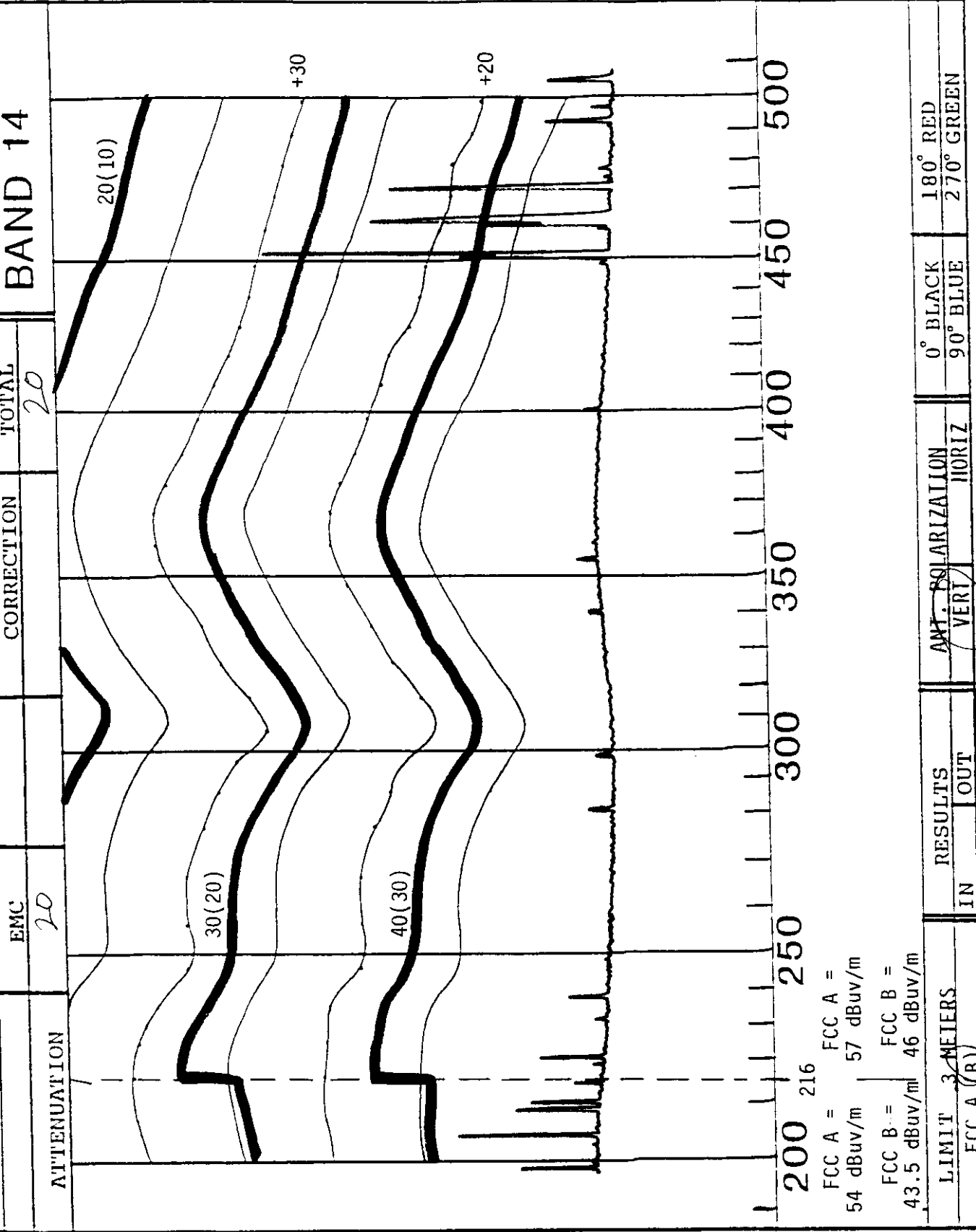
Rev No 898  
 FREQUENCY IN MHz

Co. Time Domain  
 Date 7-2-99  
 Test # 1C  
 Product  
 Model RadacVision  
1000-16  
 Conducted by CB  
 EMC- 30 S/N 44168  
 Cal at 200 MHz  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak

Detector Log  
 Output EMC  
 Pen 1  
 Time Constant .6  
 Antenna 3146  
 SN 9702-4895  
 AF & Mtr Fact

RADIATED EMISSIONS

of S3  
 Page      of     

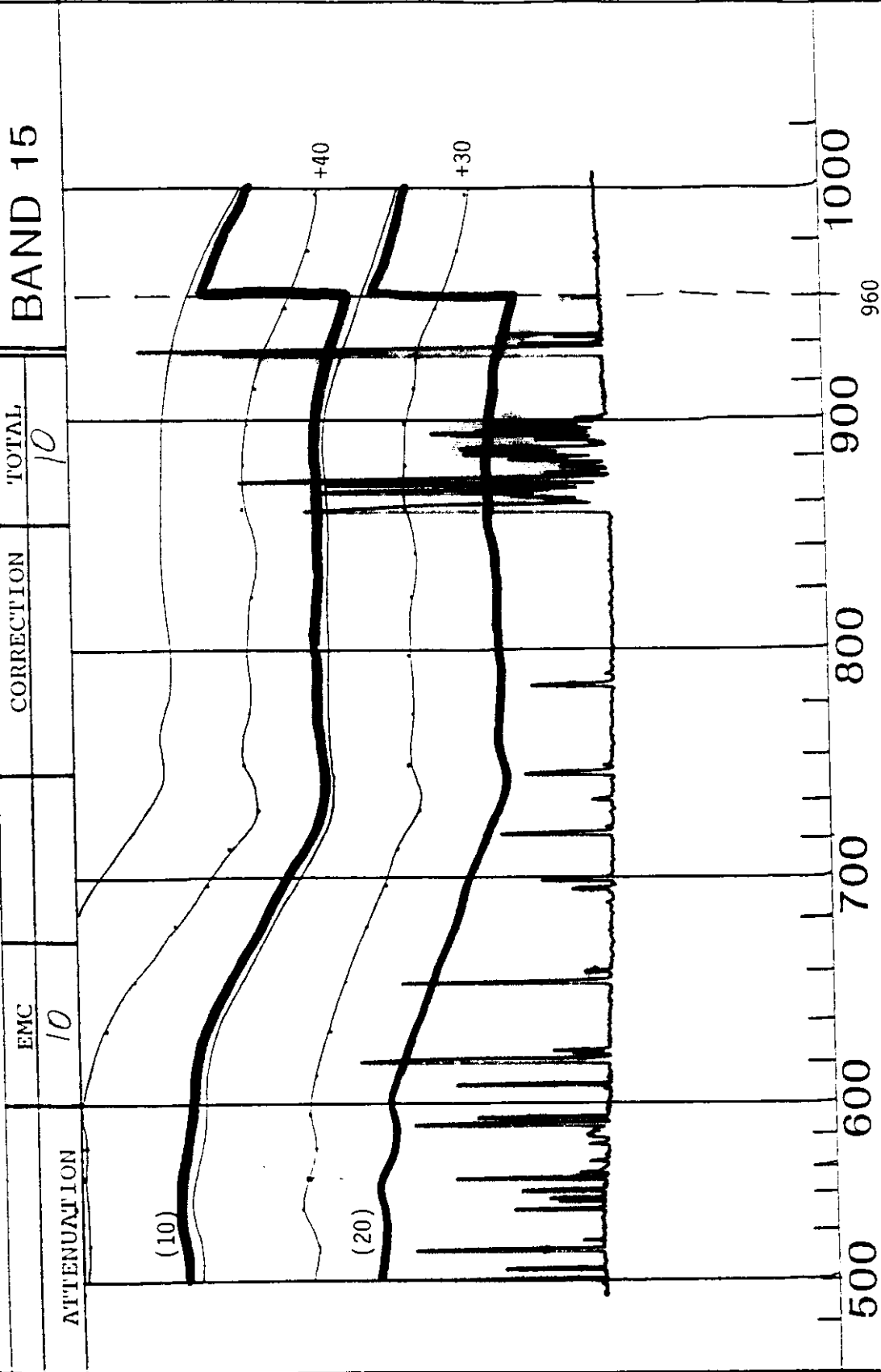


FREQUENCY IN MHz

Rev No 898



Co. Time Domain  
 Date 7-2-99  
 Test # 1C  
 Product  
 Model RadarVision  
1000-16  
 Conducted by CB  
 EMC-30 S/N 44168  
 Cal at 500 MHz  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak  
 Detector Output Log  
 Pen I EMC  
 Time Constant .6  
 Antenna 3146  
 SN 9702-4895  
 AF & Mtr Fact



|                |         |                   |          |            |
|----------------|---------|-------------------|----------|------------|
| LIMIT 3 METERS | RESULTS | AWT. POLARIZATION | 0° BLACK | 180° RED   |
| FCC (B)        | IN      | OUT               | 90° BLUE | 270° GREEN |
|                |         |                   |          |            |



FREQUENCY IN MHz

Rev No 898

RADIATED EMISSIONS

of S3

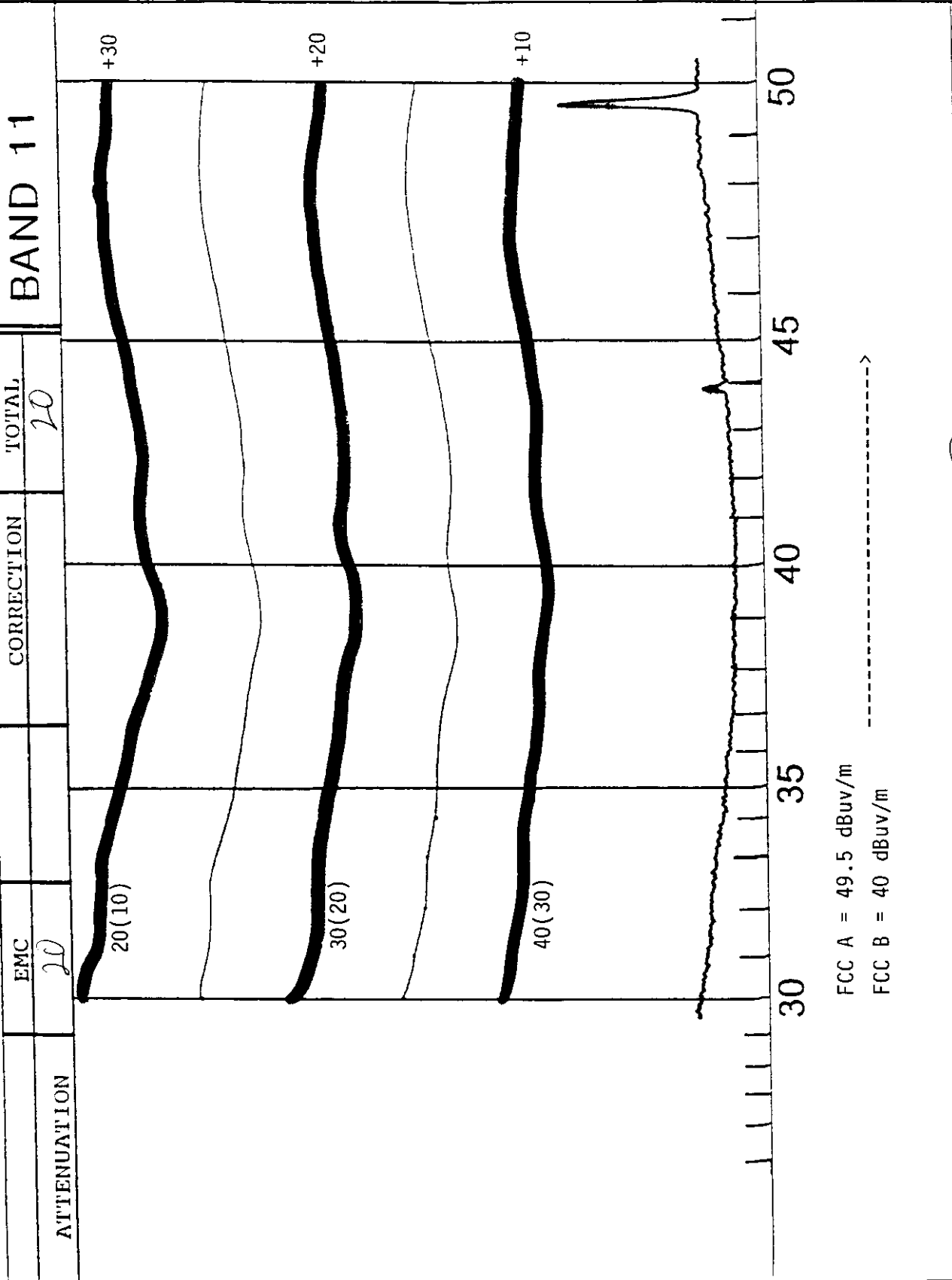
Page of

Co. Time Domain  
 Date 7-2-99  
 Test # 1B  
 Product  
 Model Radar Vision  
~~874~~ 1000-16  
 Conducted by CB  
 EMC-30 S/N 44168  
 Cal at 30 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector A peak

Detector  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Mtr Fact

RADIATED EMISSIONS

of S3  
 Page     of    



| LIMIT     | 3 METERS | RESULTS | ANT. POLARIZATION | 0° BLACK | 180° RED   |
|-----------|----------|---------|-------------------|----------|------------|
| FCC A (B) | IN       | OUT     | VERT              | 90° BLUE | 270° GREEN |
|           |          |         | HORIZ             |          |            |

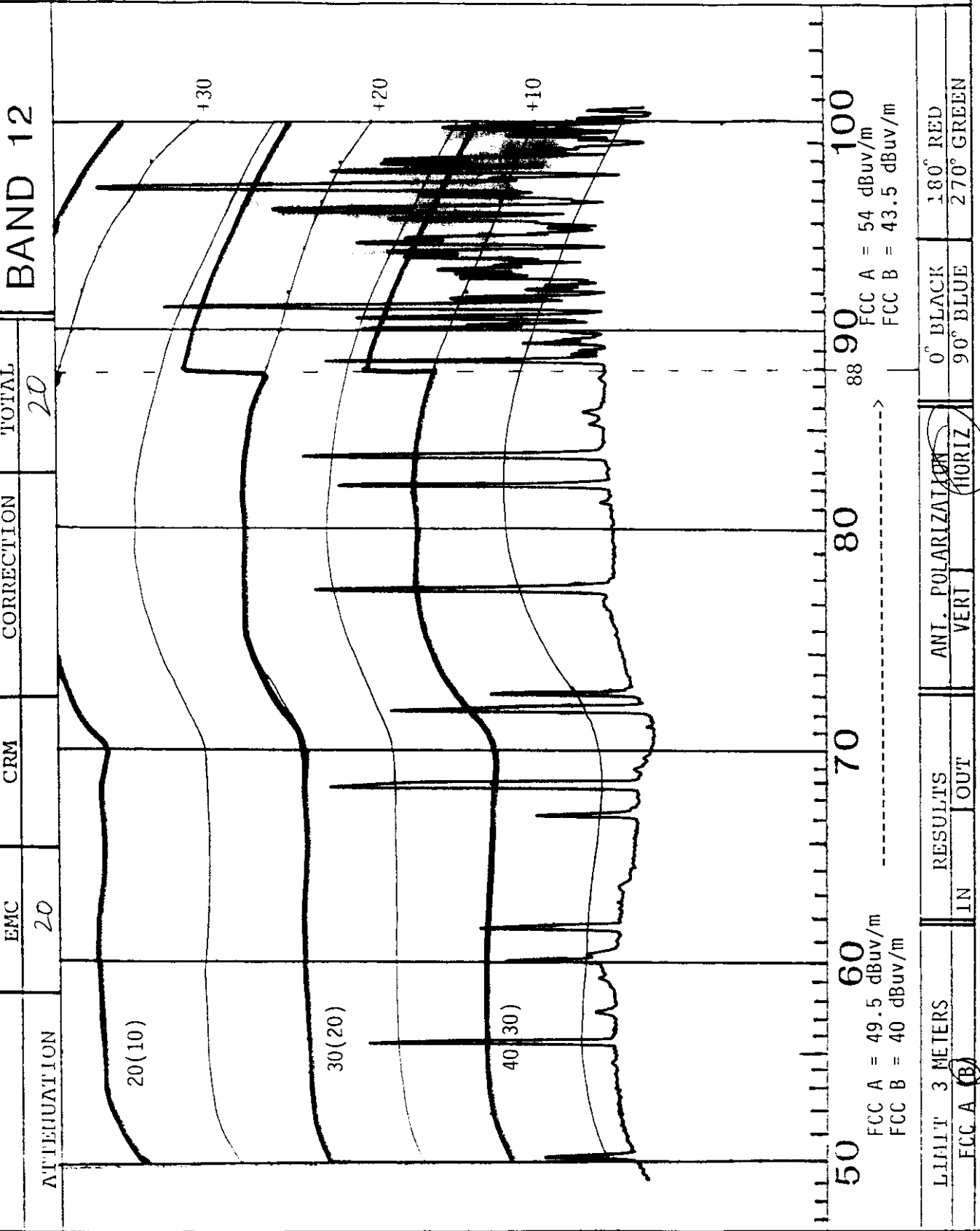


Rev No 898  
 FREQUENCY IN MHz

Co. Time Domain  
 Date 7-2-99  
 Test # 1B  
 Product  
 Model RadarVision  
~~1000-16~~  
 Conducted by CB  
 EMC-30 S/N 44168  
 Cal at 50 MHz  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak

Detector  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Mtr Fact

RADIATED EMISSIONS  
 S3  
 Page \_\_\_ of \_\_\_



|                |         |                   |          |            |
|----------------|---------|-------------------|----------|------------|
| LIMIT 3 METERS | RESULTS | ANT. POLARIZATION | 0° BLACK | 180° RED   |
| FCC A (B)      | IN OUT  | VERT HORIZ        | 90° BLUE | 270° GREEN |

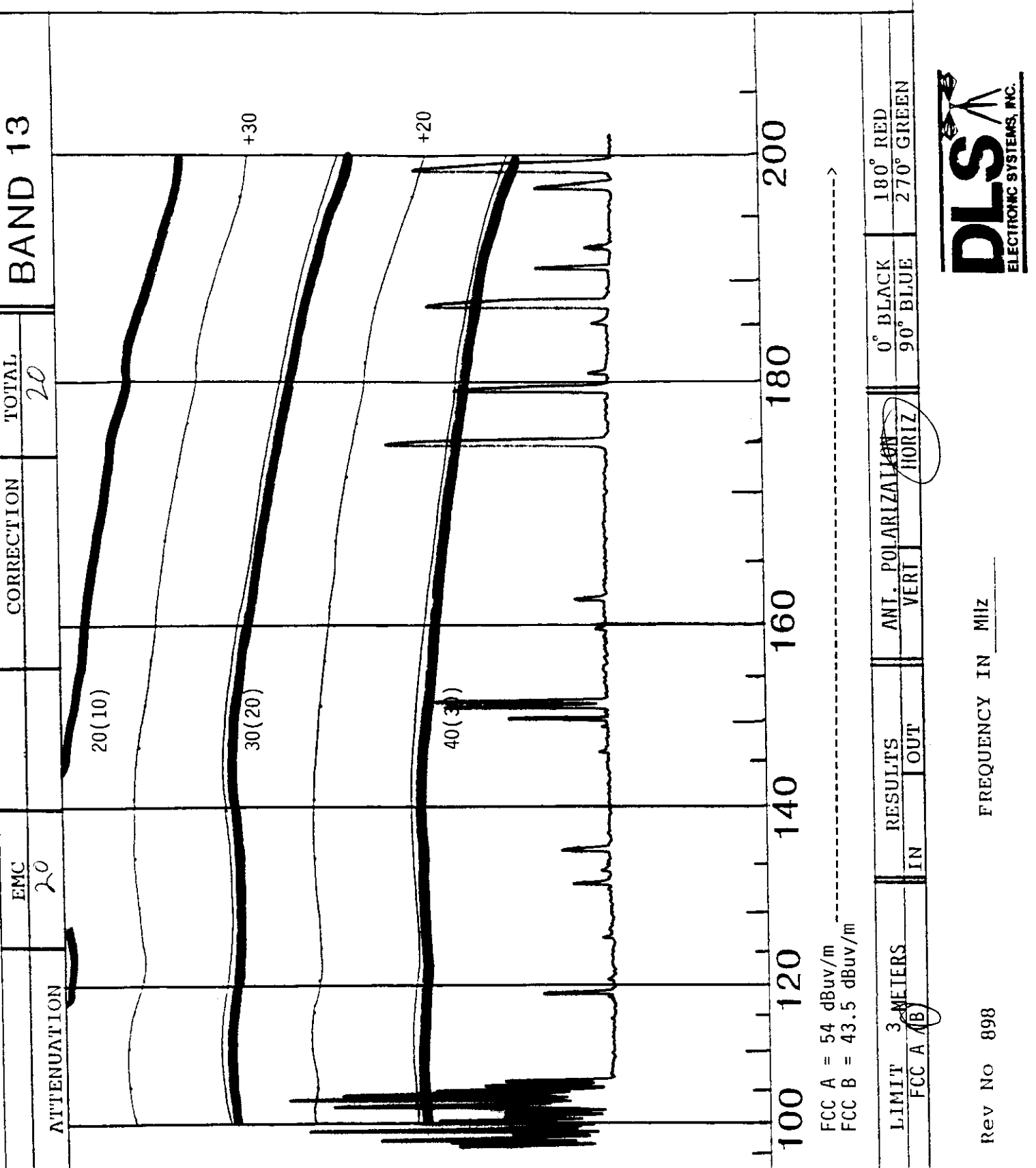


Rev Ho 0299  
 FREQUENCY IN MHz

Co. Time Domain  
 Date 7-2-99  
 Test # 1B  
 Product  
 Model Radar Vision  
~~Star~~ 1000-16  
 Conducted by CB  
 EMC- 30 S/N 44168  
 Cal at 100 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector 0 peak

Detector Log  
 Output EMC  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3104C  
 SN 9701-4785  
 AF & Mtr Fact

RADIATED EMISSIONS  
 of S3  
 Page     of    

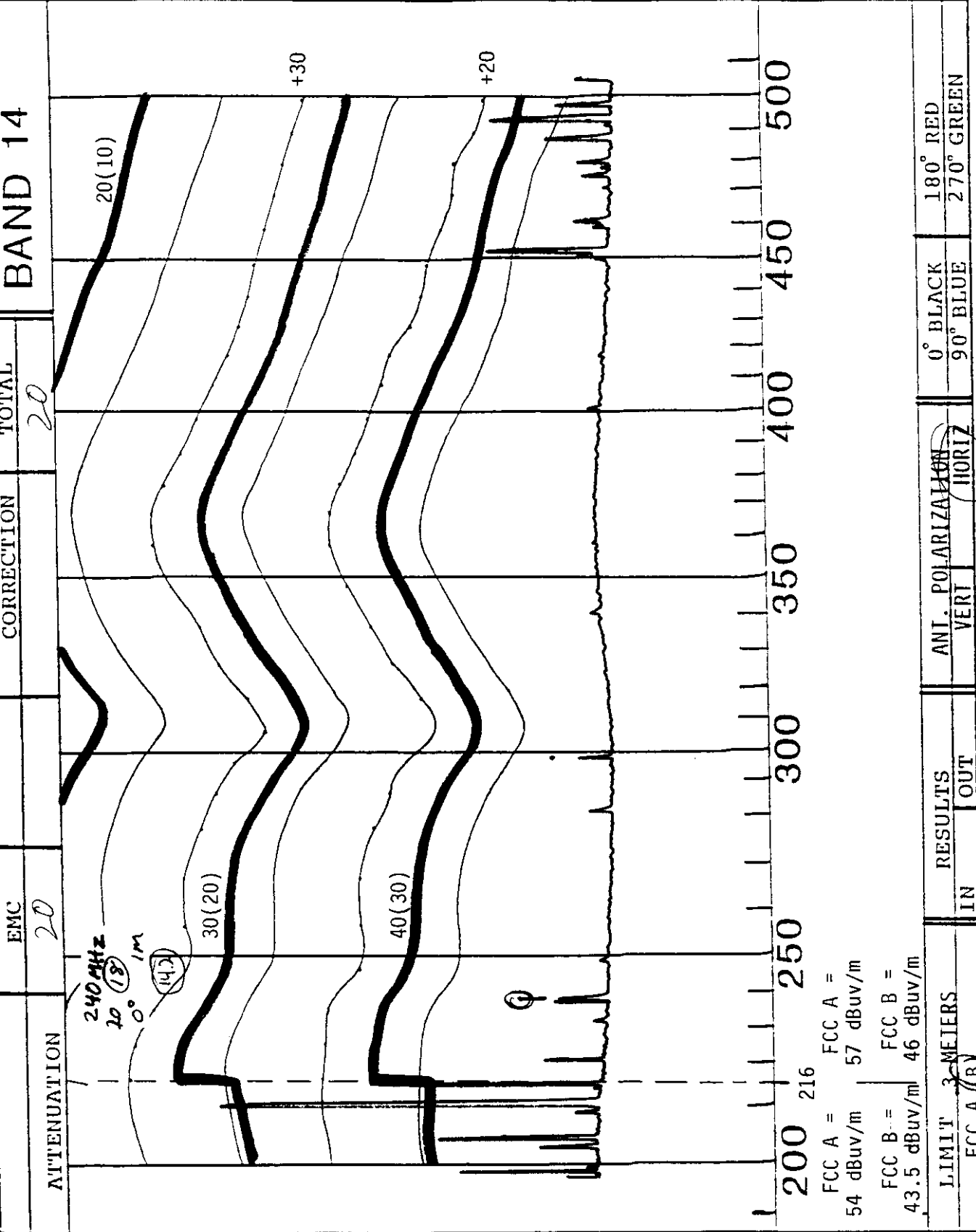


Co. Time Domain  
 Date 7-2-99  
 Test # 1D  
 Product  
 Model RadarVision  
 S/N  
 Conducted by CB  
 EMC- 30 S/N 44168  
 Cal at 200 MHz  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak

Detector  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3146  
 SN 9702-4895  
 AF & Mtr Fact

RADIATED EMISSIONS

of S3  
 Page      of     



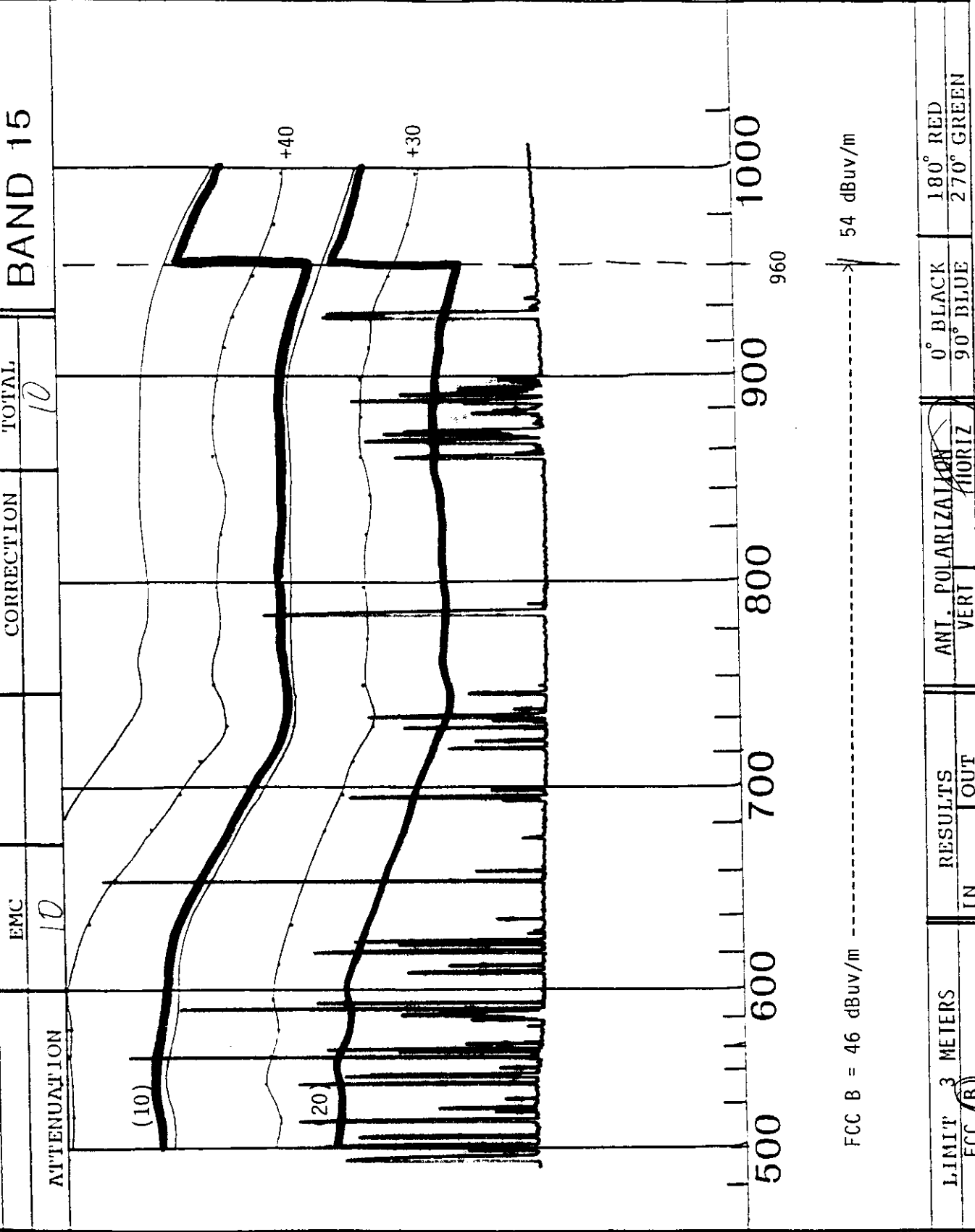
FREQUENCY IN MHz

Rev No 898

Co. Time Domain  
 Date 7-2-99  
 Test # 1D  
 Product  
 Model RadarVision  
~~1000-16~~  
 Conducted by CB  
 EMC-30 S/N 44168  
 Cal at 500 MHz ✓  
 Scan Speed 30 min  
 Bandwidth wide  
 Detector Q peak

Detector  
 Output Log  
 Pen 1 EMC  
 Time Constant .6  
 Antenna 3146  
 SN 9702-4895  
 AF & Mtr Fact

RADIATED EMISSIONS  
 of S3  
 Page      of     



|         |          |         |                   |          |            |
|---------|----------|---------|-------------------|----------|------------|
| LIMIT   | 3 METERS | RESULTS | ANT. POLARIZATION | 0° BLACK | 180° RED   |
| FCC (B) |          | IN      | VERT              | 90° BLUE | 270° GREEN |
|         |          | OUT     | HORIZ             |          |            |



Rev No 898

FREQUENCY IN MHz

hp<sub>100</sub>

Current Markers Set:

1 : 1782.82591 MHz

45.7 dBuV/m

FCC PART 15 CLASS B RADIATED

TIME DOMAIN

RADARVISION 1000-16

VERTICAL 0 DEG, 1.8 METERS

CLASS B (3 m)

80

60

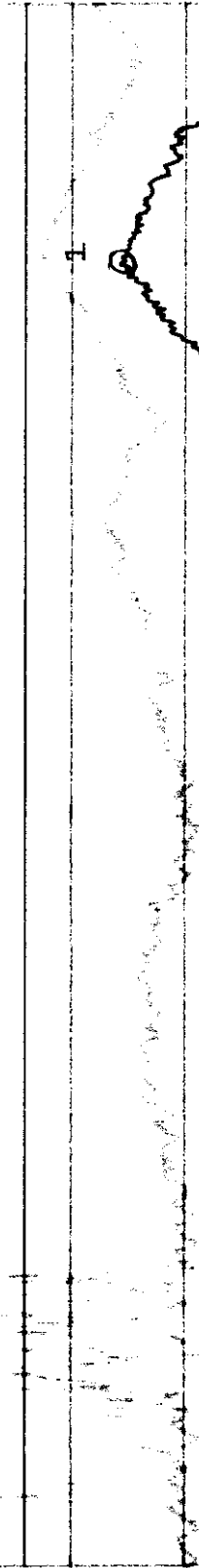
40

20

1000

2000

FREQUENCY [MHz]



hp

10 dB/

POS PK

1 meter  
Vertical

MKR 2.015 GHz  
62.00 dBuV

ATTEN 10 dB

REF 90.0 dBuV

Time Domain  
RadarVision 1000-14  
7-2-99

FCC B limit 63.5 dBuV/m at 1 meter

62.0 dBuV  
+27.5 dB cable Antenna  
+2.2 dB cable  
-39.9 dB pre-amp

51.8 dBuV

11.7 dB margin

START 2.00 GHz

RES BW 1 MHz

VBW 3 MHz

STOP 5.80 GHz

SWP 95.0 msec

hp

10 dB/

POS PK

Vertical  
1 meter

REF 90.0 dBuV

Time Domain  
Radar-vision 1000-16  
7-2-99

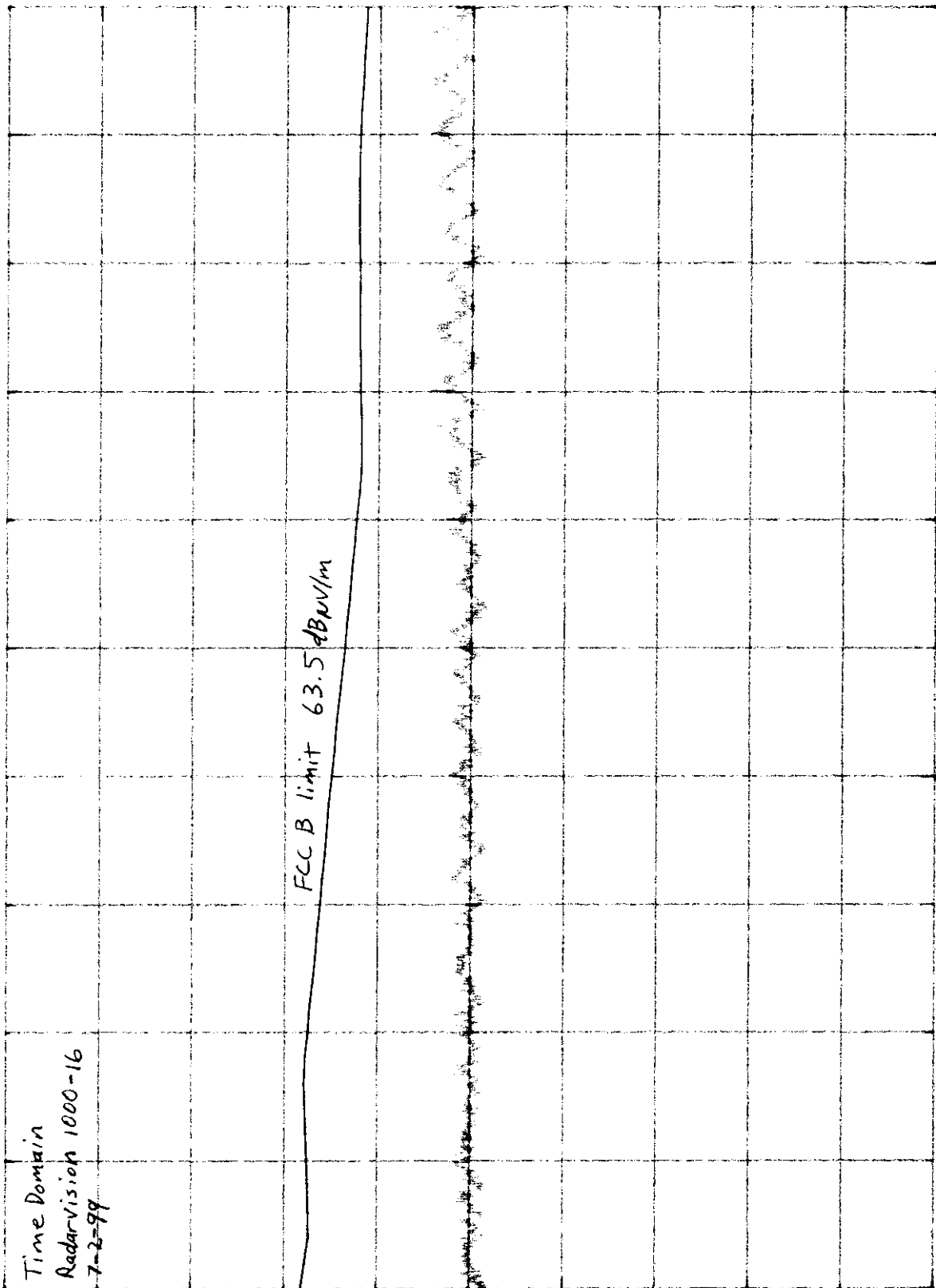
ATTEN 0 dB

FCC B limit 63.5 dBuV/m

START 5.80 GHz  
RES BW 300 kHz

VBW 3 MHz

STOP 10.00 GHz  
SWP 144 msec



hp

10 dB/

POS PK

Horizontal  
1 meter

REF 90.0 dBuV

ATTEN 0 dB

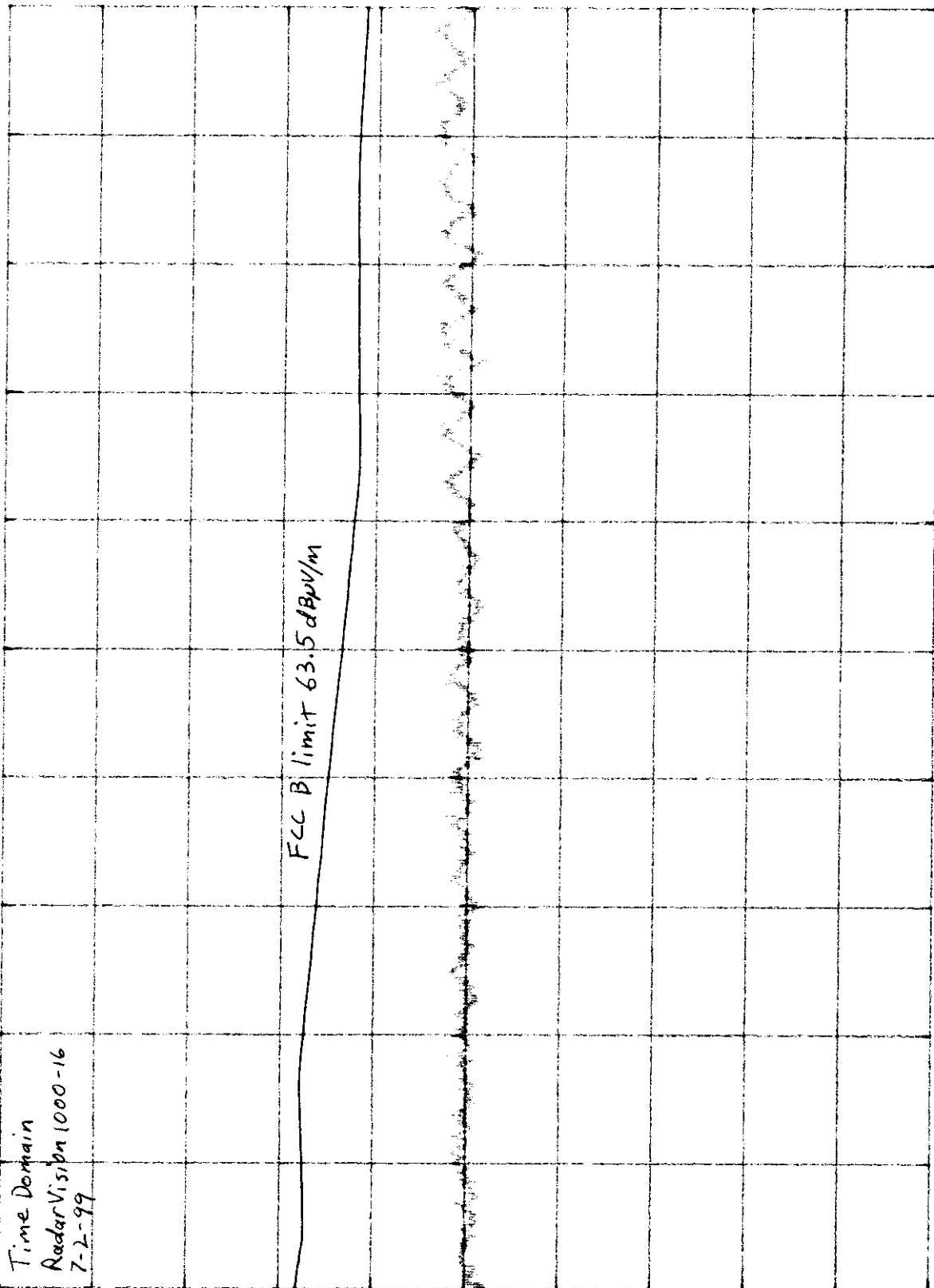
Time Domain  
RadarVision 1000-16  
7-2-99

FCC B limit 63.5 dBuV/m

START 5.80 GHz  
RES BW 300 kHz

VBW 3 MHz

STOP 10.00 GHz  
SWP 144 msec



hp  
100

FCC PART 15 CLASS B RADIATED  
TIME DOMAIN  
RADARVISION 1000-16  
HORIZONTAL, 0 DEG, 1.5 METER

Current Markers Set:

- |                    |             |
|--------------------|-------------|
| 1 : 1270.7272 MHz  | 44.6 dBuV/m |
| 2 : 1528.78721 MHz | 51.3 dBuV/m |
| 3 : 1813.95776 MHz | 50.3 dBuV/m |

80

CLASS B (3 m)

60

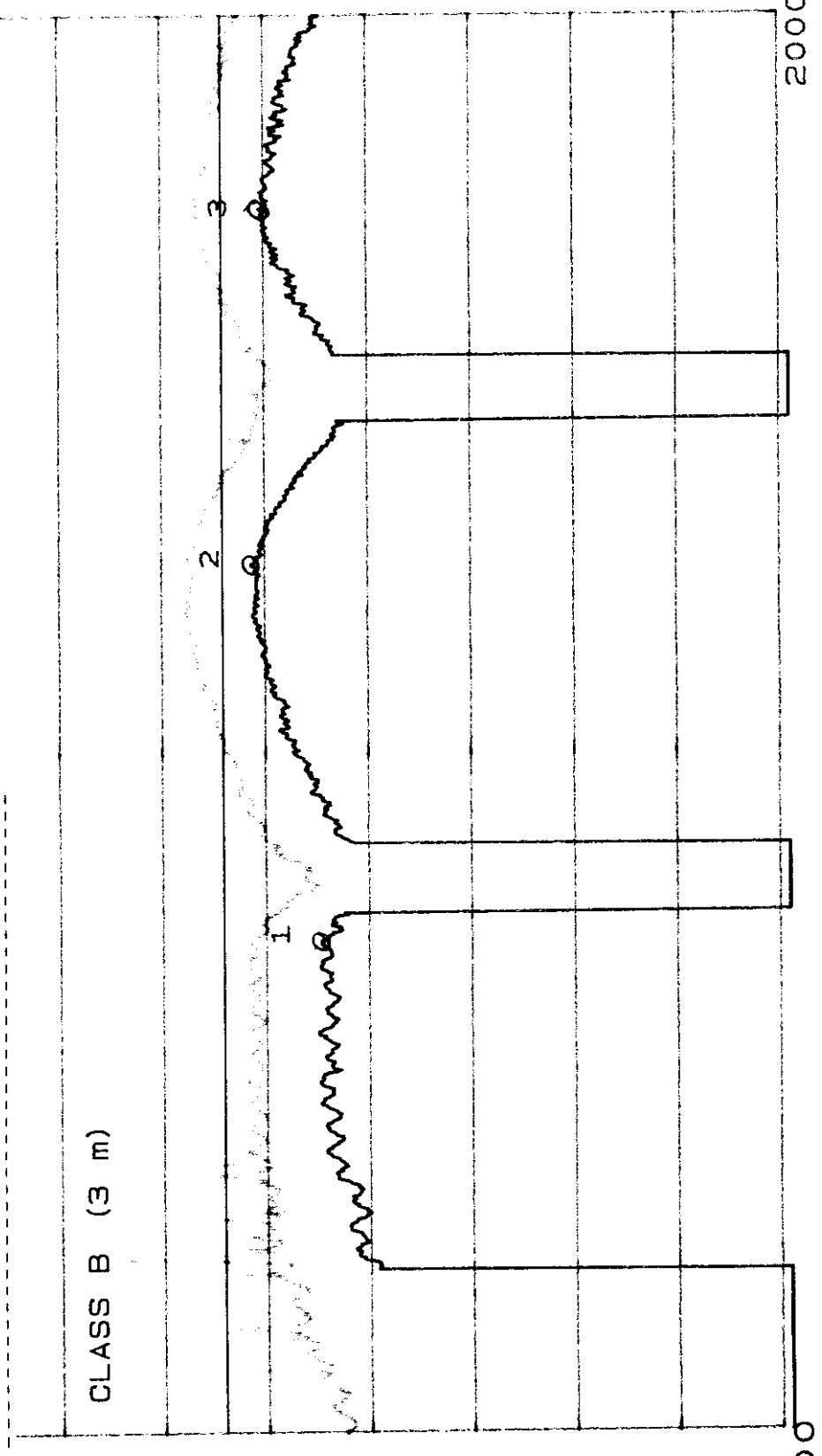
40

20

1000

2000

FREQUENCY [MHz]



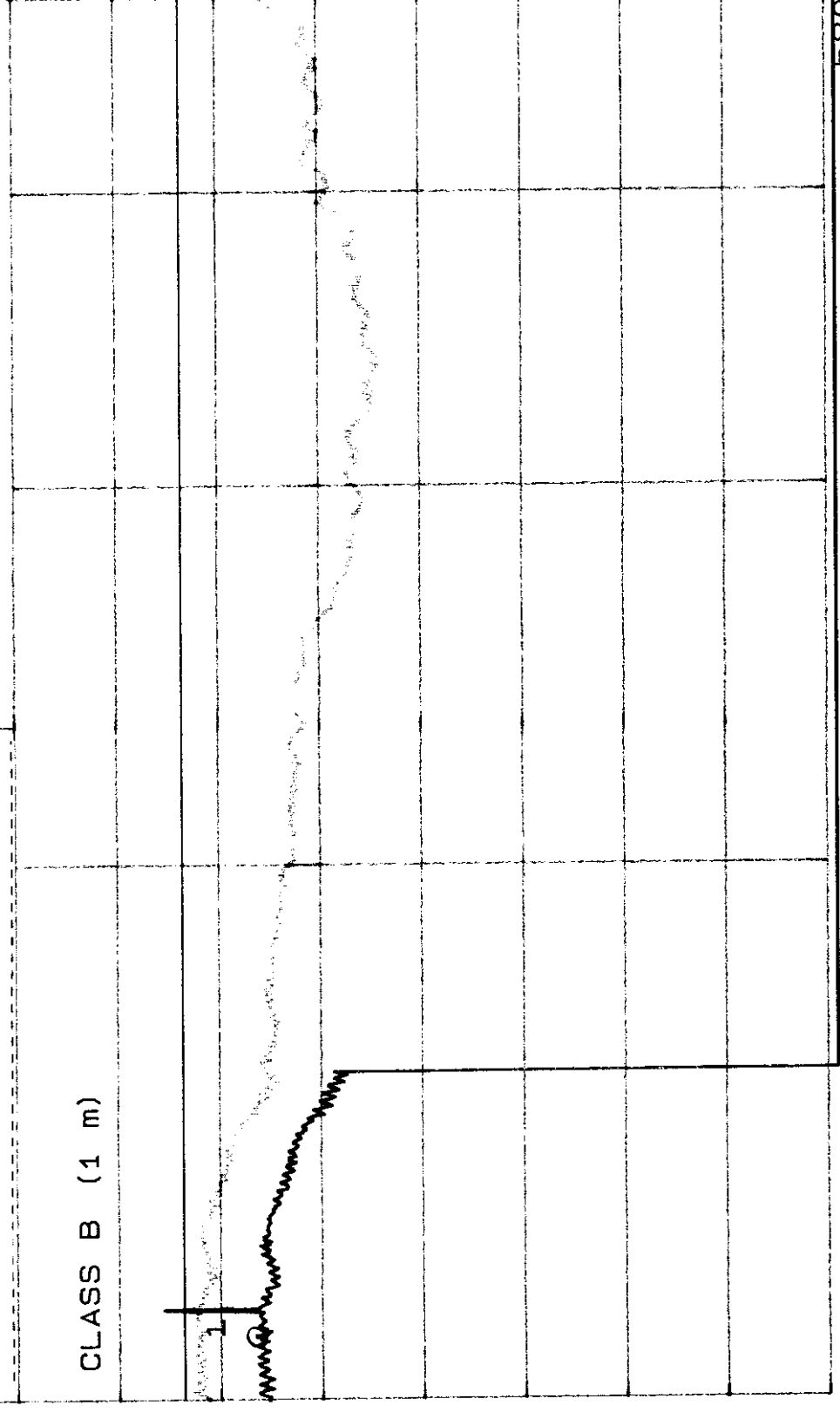
hp<sub>100</sub>

FCC PART 15 CLASS B RADIATED  
TIME DOMAIN  
RADARVISION 1000-16  
HORIZONTAL 0 DEG, 1 METER

Current Markers Set:

1 : 2098.05621 MHz 56.5 dBuV/m

CLASS B (1 m)



2000

5800

FREQUENCY [MHz]