



EMC Test Services
1250 Peterson Drive, Wheeling, Illinois 60090, USA

Report No. 8793
03/23/01

TEST SPECIFICATION:

FCC "Rules and Regulations", Part 15, Subpart C
Sections 15.225, 15.209 & 15.207

Intentional Radiators

Operation within the frequency range 13.553 MHz to 13.567 MHz

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: All-Bottle ID System

Kind of Equipment: Liquid dispensing unit

Test Configuration: Stand alone

Transmitter FCC ID: PKBABID1

Model Number: ABID DISPENSER

Serial Number: NA

Dates of Test: January 26, 30 and February 8, 2001

Test Conducted For: BERG Company Division of DEC International

2001 South Stoughton Road

Madison, Wisconsin 53716

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SIGNATURE PAGE

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Lab Manager

Report Approved by:

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Brian J. Mattson
General Manager

Company Official:

BERG Company Division of DEC International



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NVLAP Certificate of Accreditation available upon request.

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1.0 SUMMARY OF TEST REPORT

It was found that the All-Bottle ID System S/N NA **meets** the radio interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.225, 15.209 and 15.207 for Intentional Radiators operating in the Frequency Band.

2.0 INTRODUCTION

On January 26, 30 and February 8, 2001, a series of radio frequency interference measurements were performed on Liquid dispensing unit, S/N NA. The tests were performed according to the procedures of 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), by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

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 C, Sections 15.225, 15.209 and 15.207 for Intentional Radiators operating in the Frequency Band.

4.0 TEST SET-UP

All conducted emission tests were performed in a shield enclosure or lab at D.L.S. electronic Systems, Inc. The conducted tests were performed with the test item placed on a non-conductive table located in the Test Room. 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, (Figure2). The only ground supplied to the unit was through the third wire of the standard power cord when supplied.

All radiated emission tests were performed at D.L.S. Electronic Systems, Inc. The radiated tests were made with the test item placed on a non-conductive turntable located in the Test Room with the receive antenna placed three meters from the device under test. The equipment under test was set up according to ANSI C63.4-1992, Section 8, (Figures 9c and 9d).



5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data was automatically plotted using the Peak or CISPR Detector Functions. This information was then used to determine the frequencies of maximum emissions. Manual measurements were performed on these frequencies using a peak detector function of the Receiver with the bandwidths specified by the FCC.

The final data was taken using the fixed tuned receiver. Plots were made using the Peak Detector, with manual measurements made on the frequencies of interest, using the Peak, CISPR, and Average Detector Functions of the receiver. When average measurements were made using the fixed tuned receiver, the average was taken of a linear IF signal as specified by FCC and ANSI C63.4-1992.

The fundamental frequency was measured using the Average Detector and the CISPR Detector was used for measuring the Harmonics as stated in Section 15.209. From 10 kHz to 30 MHz a bandwidth of 9 kHz was used and from 30 MHz to 1000 MHz a bandwidth of 120 kHz was used to ensure proper measurement of the narrowband signal.

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

The conducted emissions were measured over the frequency range from .45 MHz to 30 MHz in accordance with the power line measurements. As specified in ANSI C63.4-1992. Since the device is operated from the public utility lines, the 120 vac 60 Hz power leads, high and low sides, were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators can not exceed 250 uV (47.96 dBuV) at any frequency between 450 kHz and 30 MHz, as stated in Section 15.207a.



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CONDUCTED DATA TAKEN DURING TESTING

PART 15.207



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SUMMARY DATA SHEET OF CONDUCTED EMISSIONS

TEST DATE:----- January 30, 2001
MANUFACTURER:----- BERG Company Division of DEC International
MODEL NO:----- ABID DISPENSER
S/N:----- NA
CONFIGURATION:----- NA
DETECTOR:----- QUASI-PEAK

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15
SUBPART C / SECTION 15.207

TEST EQUIPMENT: Spectrum Analyzer ----- HP 8566B
Quasi Peak Adapter ----- HP 85650A

TYPE OF TEST: CONDUCTED / / LINE #1

THE FOLLOWING ARE SIGNIFICANT CONDUCTED LEVELS FOUND

FREQ IN MHz.	METER READING dBuV	CABLE LOSSES dB	TOTAL dBuV	LIMIT dBuV	MARGIN dB
0.4576	38.4000	0.05	38.45	47.96	9.51
0.4998	38.3000	0.05	38.35	47.96	9.61
14.4570	38.1000	0.05	38.15	47.96	9.81



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SUMMARY DATA SHEET OF CONDUCTED EMISSIONS

TEST DATE:----- January 30, 2001
MANUFACTURER:----- BERG Company Division of DEC International
MODEL NO:----- ABID DISPENSER
S/N:----- NA
CONFIGURATION:----- NA
DETECTOR:----- QUASI-PEAK

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15
SUBPART C / SECTION 15.207

TEST EQUIPMENT: Spectrum Analyzer ----- HP 8566B
Quasi Peak Adapter ----- HP 85650A

TYPE OF TEST: CONDUCTED / / LINE #2

THE FOLLOWING ARE SIGNIFICANT CONDUCTED LEVELS FOUND

FREQ IN MHz.	METER READING dBuV	CABLE LOSSES dB	TOTAL dBuV	LIMIT dBuV	MARGIN dB
0.4519	40.9000	0.05	40.95	47.96	7.01
0.5961	31.7000	0.05	31.75	47.96	16.21
0.8165	40.9000	0.05	40.95	47.96	7.01
1.1374	39.8000	0.05	39.85	47.96	8.11
13.2934	37.9000	0.05	37.95	47.96	10.01

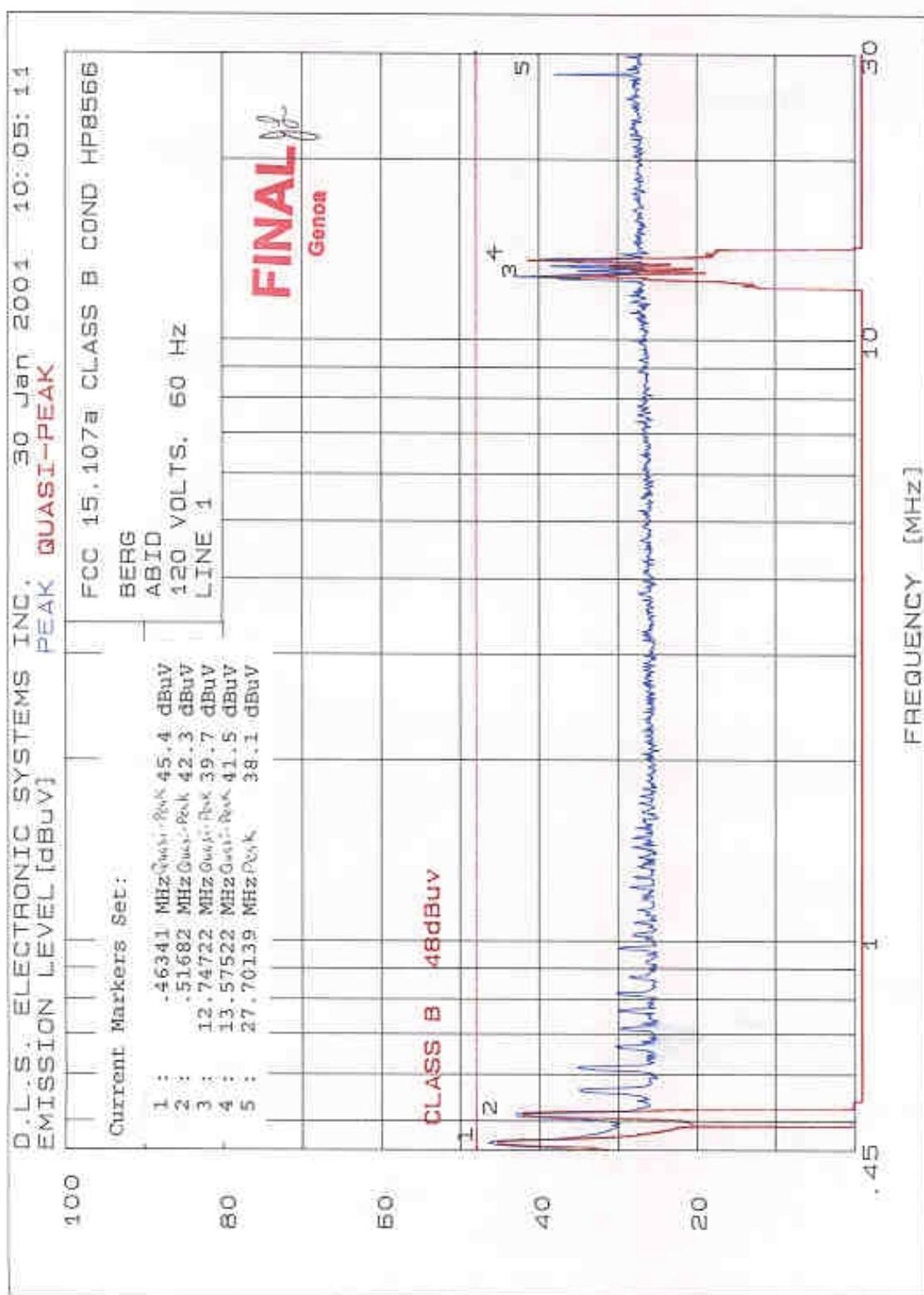


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CONDUCTED GRAPHS TAKEN DURING TESTING

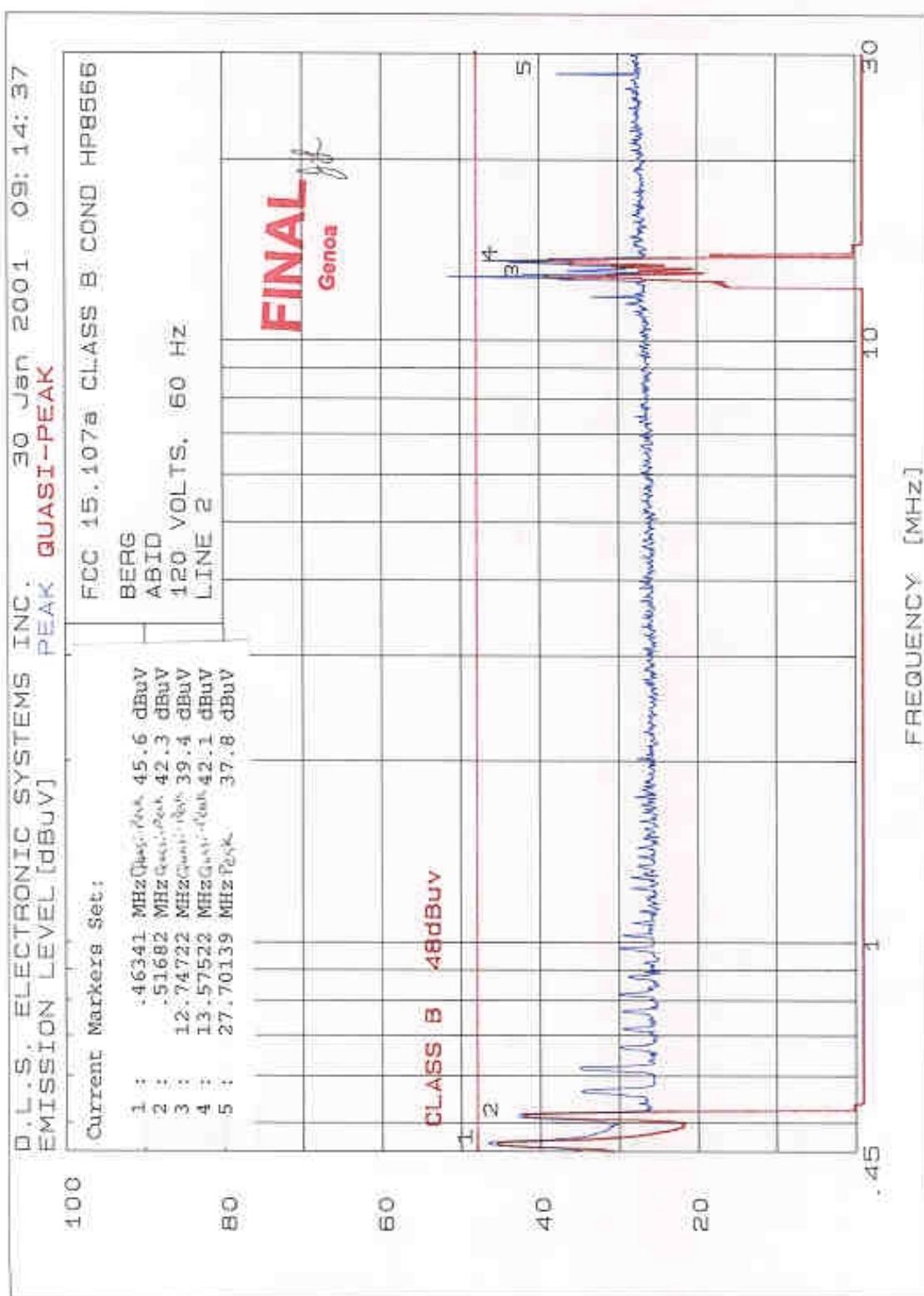
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7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the All-Bottle ID System, Model Number ABID DISPENSER, are shown in tabulated and graph form.

Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 9 kHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the All-Bottle ID System were made up to , in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of . For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or 1000 MHz, whichever is lower.

At those frequencies where significant signals were detected, measurements were made at an open field test site, located at Genoa City, Wisconsin, FCC file number 31040/SIT, to determine the actual radiation levels.

All signals in the frequency range of 9 kHz to 30 MHz were measured with a low frequency Loop Antenna as a pickup device. From 30 to 200 MHz, a Biconical Antenna or tuned dipoles were used and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. Tests were made in both the horizontal and vertical planes of polarization with the Loop (rotated 360° around its vertical axis), Biconical and Log Periodic. The table was rotated to find the maximum emissions.

When the equipment is out of limit at 3 meters, and the signals from the equipment at 30 meters cannot be recorded due to the background, a representative sample of these frequencies were remeasured at various distances such as 4, 5, 6, 8, 15 meters and the greatest distance that can be measured to demonstrate graphically that the emissions are dropping off and will be under the limit at the specified distance.

All signals were then recorded. The allowed levels for Intentional Radiators in the 13.553 MHz to 13.567 MHz band shall not exceed 10,000 uv measured at 30 meters. The field strength of any emissions appearing outside of this band shall not exceed the radiated emissions limits shown in Section 15.209.



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**RADIATED DATA TAKEN FOR FUNDAMENTAL
EMISSION MEASUREMENTS**

PART 15.225



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SUMMARY DATA SHEET OF RADIATED EMISSIONS <30 MHz

TEST DATE:----- January 26, 2001

MANUFACTURER:----- BERG Company Division of DEC International

MODEL NO:----- ABID DISPENSER

S/N:----- NA

CONFIGURATION:----- NA

RATED POWER:----- 0.065

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15
SUBPART C / SECTION 15.225

TEST EQUIPMENT: Receiver --- EMC-30 -- SN 44168

Antennas: -- ALR-25 ---- SN557

TYPE OF TEST: **LOOP ANTENNA** **MEASURED** **AT 3 METERS**

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

FREQ IN MHz.	METER READING dBuV	METER CORR dB	ANTENNA FACTOR dBuV	TOTAL dBuV	LIMIT dB	MARGIN dB
13.56	20.00	4.00	35.90	59.90	89.54	29.64



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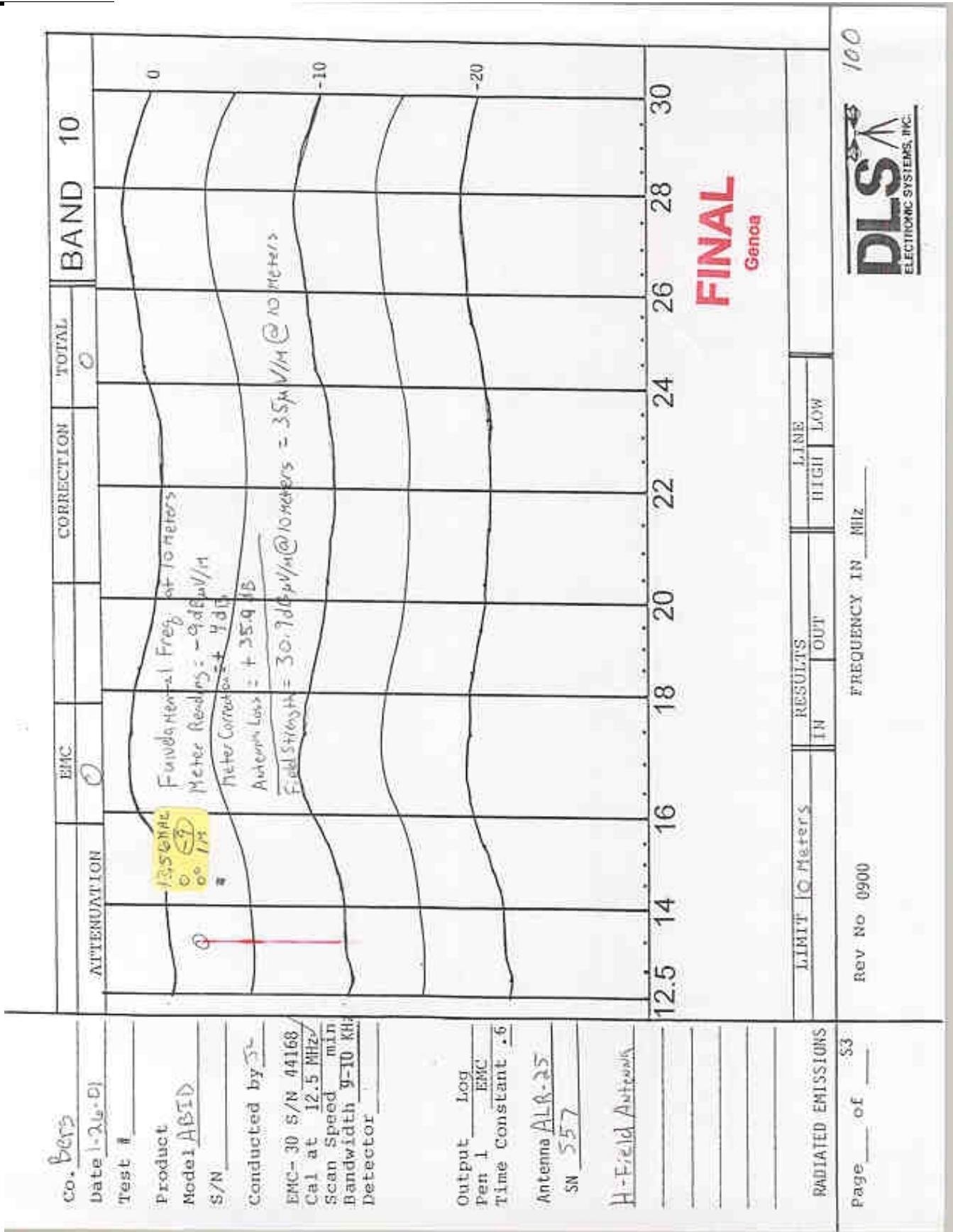
**RADIATED GRAPHS TAKEN FOR FUNDAMENTAL
EMISSION MEASUREMENTS**

PART 15.225



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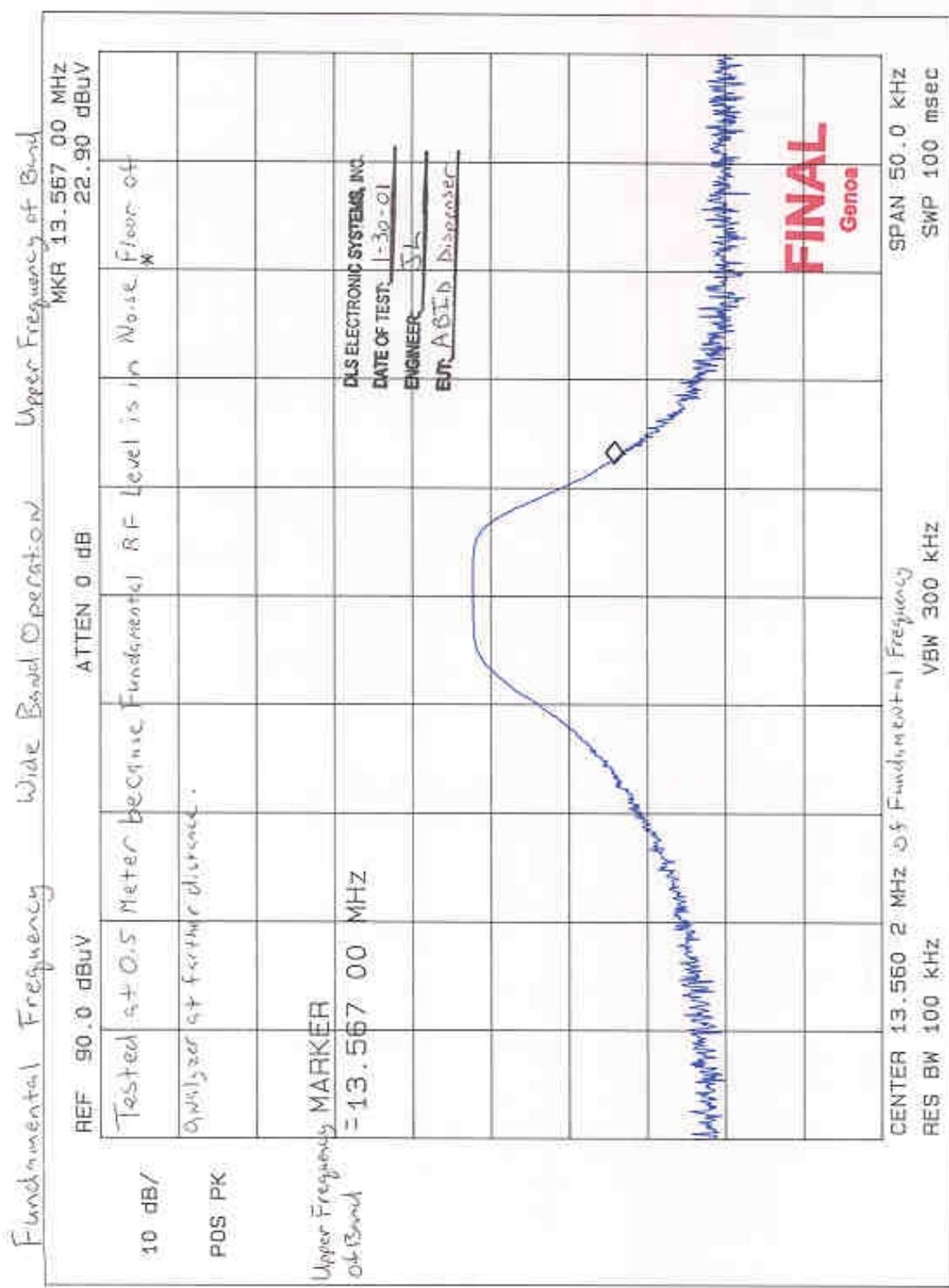
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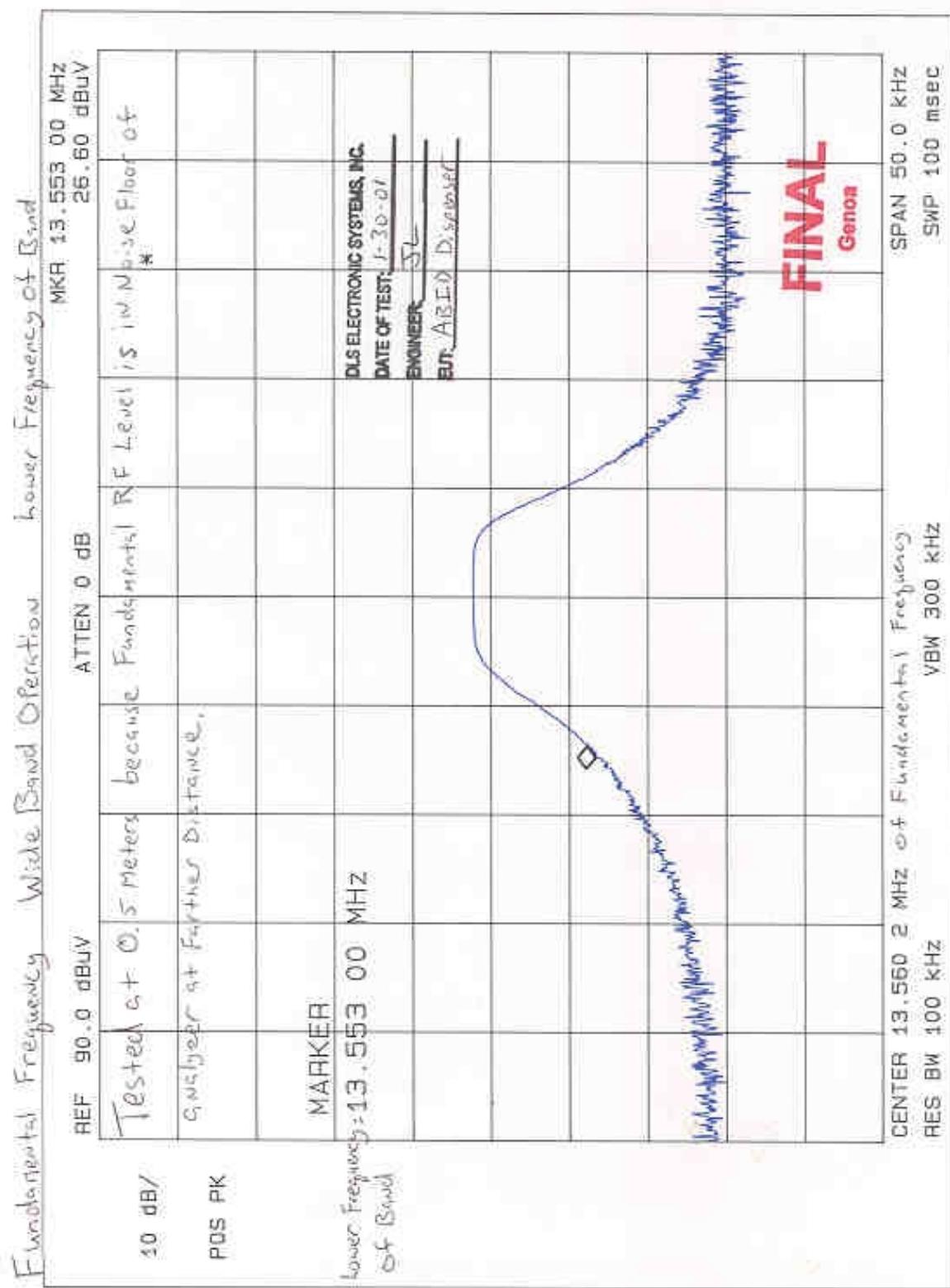
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RADIATED DATA TAKEN FOR

FIELD STRENGTH

SPURIOUS EMISSION MEASUREMENTS

PART 15.209



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Report No. «REPORT_NO»
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TEST DATE:----- January 26, 2001

MANUFACTURER:----- BERG Company Division of DEC International

MODEL NO:----- ABID DISPENSER

S/N:----- NA

CONFIGURATION:----- **NA**

RATED POWER:----- 0.065

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15
SUBPART C / SECTION 15.225

TEST EQUIPMENT: Receiver --- EMC-30 -- SN 44168

Antennas --- 3104C --- SN 4785
3146 --- SN 4895

TYPE OF TEST: **VERTICAL** **MEASURED** **AT 10 METERS**

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

FREQ IN MHz.	METER READING dBuV	METER CORR dB	ANTENNA FACTOR dBuV	TOTAL dBuV	LIMIT dB	MARGIN dB
84.00	12.00	1.00	7.69	20.69	40.00	19.31
152.00	10.00	3.00	12.21	25.21	43.52	18.31
168.00	9.00	2.00	14.17	25.17	43.52	18.35
184.00	7.00	2.00	16.15	25.15	43.52	18.37
201.00	10.00	2.00	11.86	23.86	43.52	19.66
232.10	15.00	2.00	11.14	28.14	46.02	17.88
280.00	14.00	2.00	13.58	29.58	46.02	16.44



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SUMMARY DATA SHEET OF RADIATED EMISSIONS <1000 MHz

TEST DATE:----- January 26, 2001

MANUFACTURER:----- BERG Company Division of DEC International

MODEL NO:----- ABID DISPENSER

S/N:----- NA

CONFIGURATION:----- NA

RATED POWER:----- 0.065

TEST SPECIFICATION: FCC "RULES AND REGULATION", PART 15
SUBPART C / SECTION 15.225

TEST EQUIPMENT: Receiver --- EMC-30 -- SN 44168

Antennas --- 3104C --- SN 4785
3146 --- SN 4895

TYPE OF TEST: **HORIZONTAL** **MEASURED** **AT 10 METERS**

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

FREQ IN MHz.	METER READING dBuV	METER CORR dB	ANTENNA FACTOR dBuV	TOTAL dBuV	LIMIT dB	MARGIN dB
152.00	14.00	3.00	12.21	29.21	43.52	14.31
168.00	11.00	2.00	12.88	25.88	43.52	17.64
232.10	18.00	2.00	11.14	31.14	46.02	14.88
264.00	15.00	3.00	12.56	30.56	46.02	15.46
280.00	15.00	2.00	13.58	30.58	46.02	15.44
520.00	10.00	4.00	18.02	32.02	46.02	14.00



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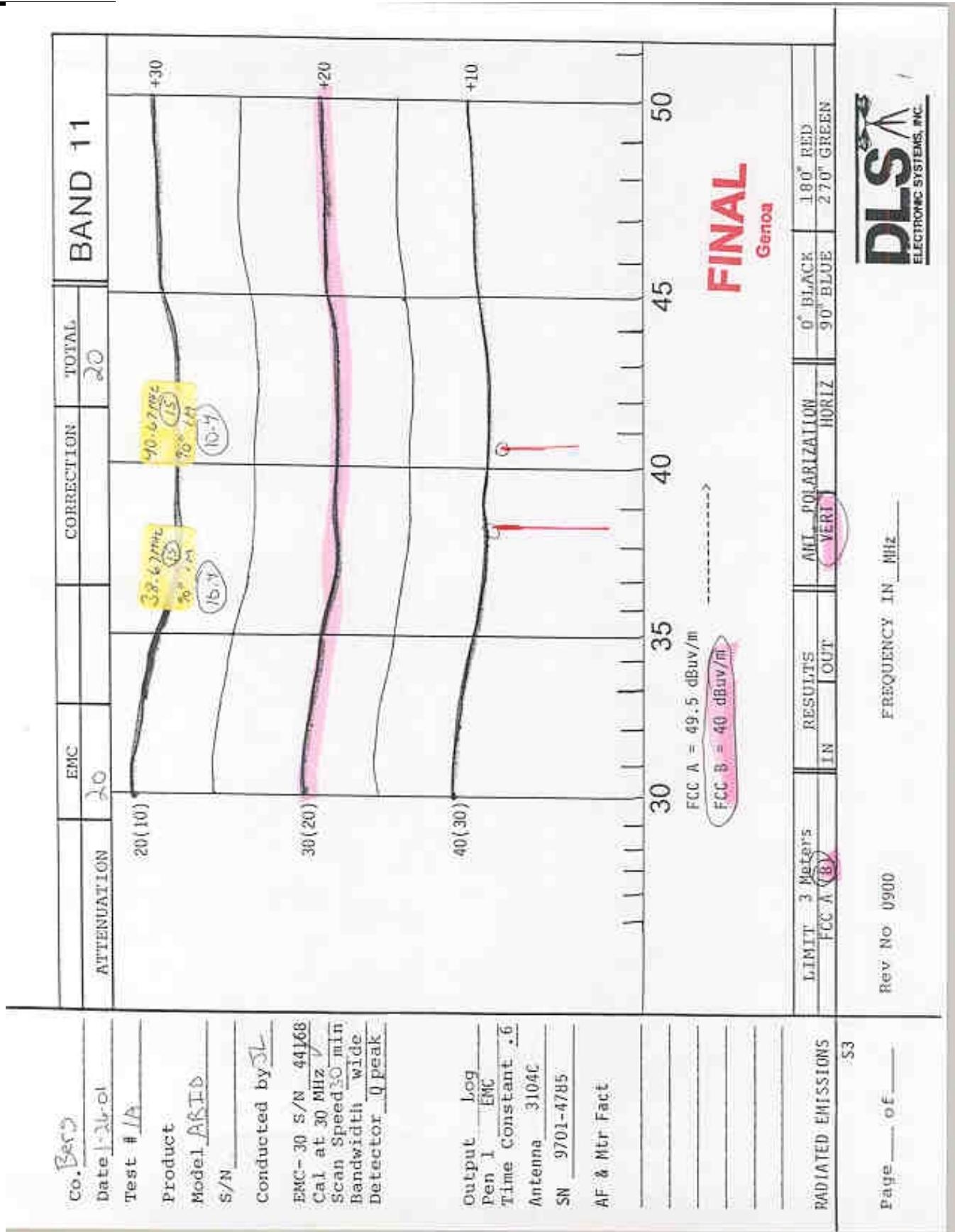
RADIATED GRAPHS TAKEN FOR
FIELD STRENGTH
SPURIOUS EMISSION MEASUREMENTS

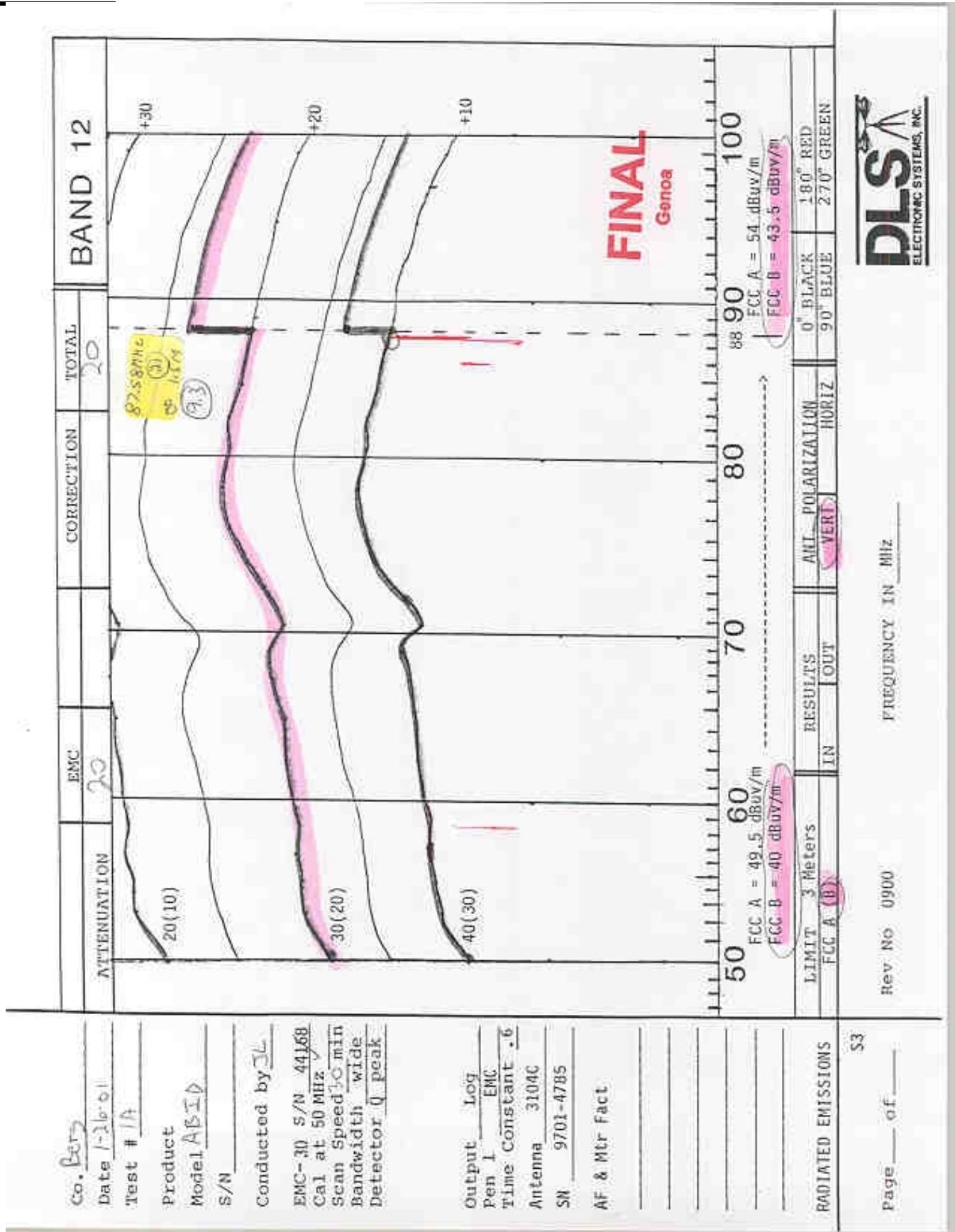
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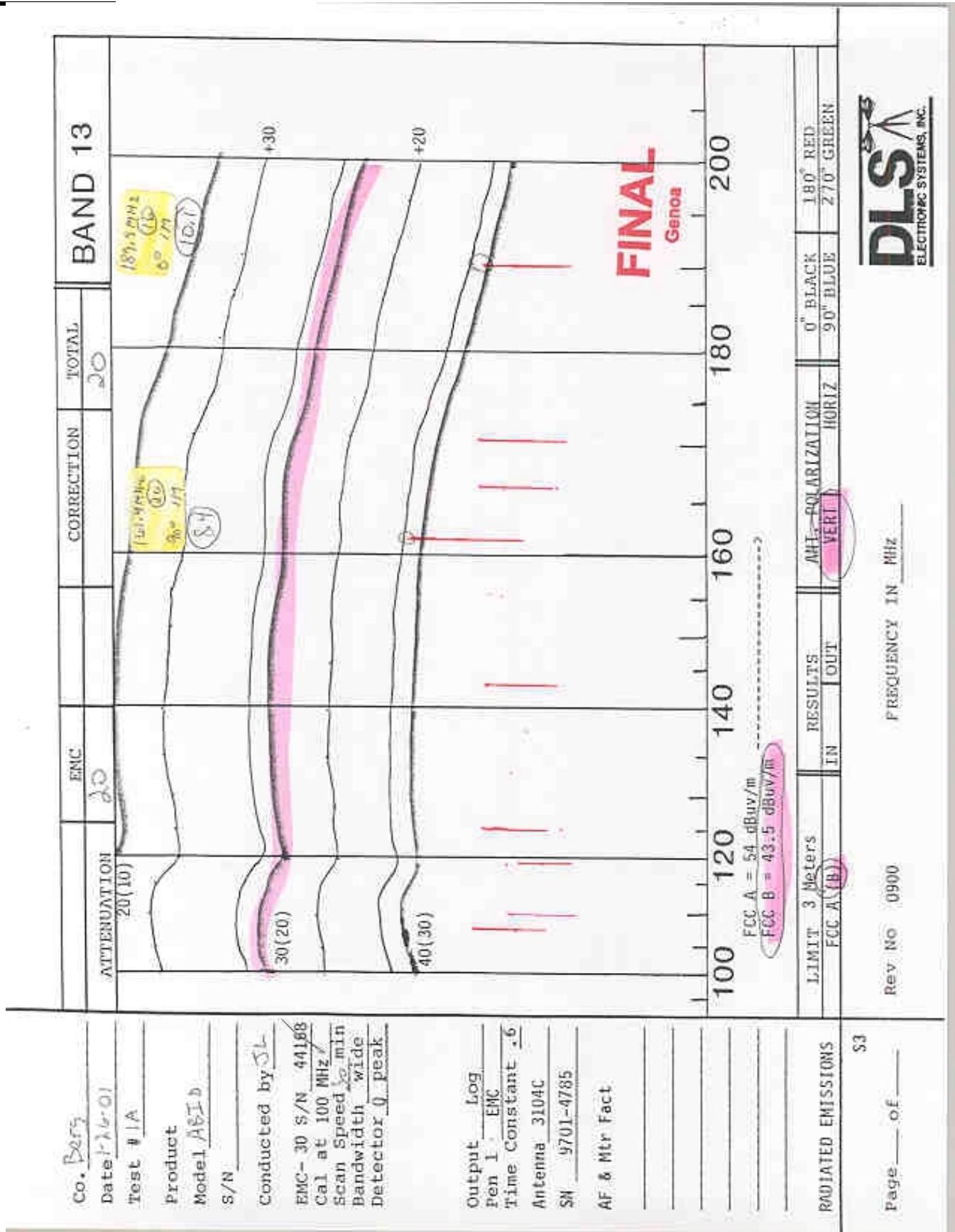


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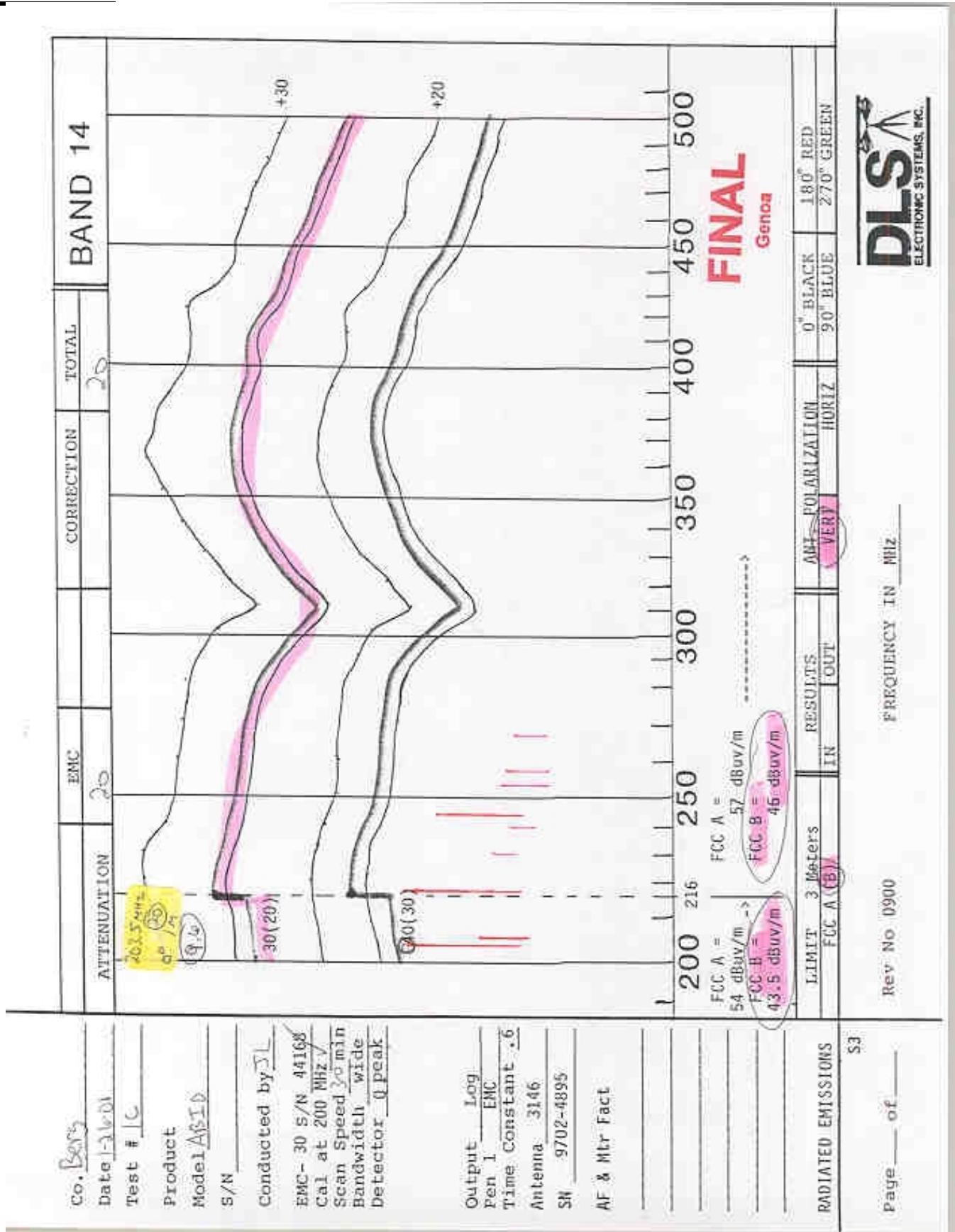






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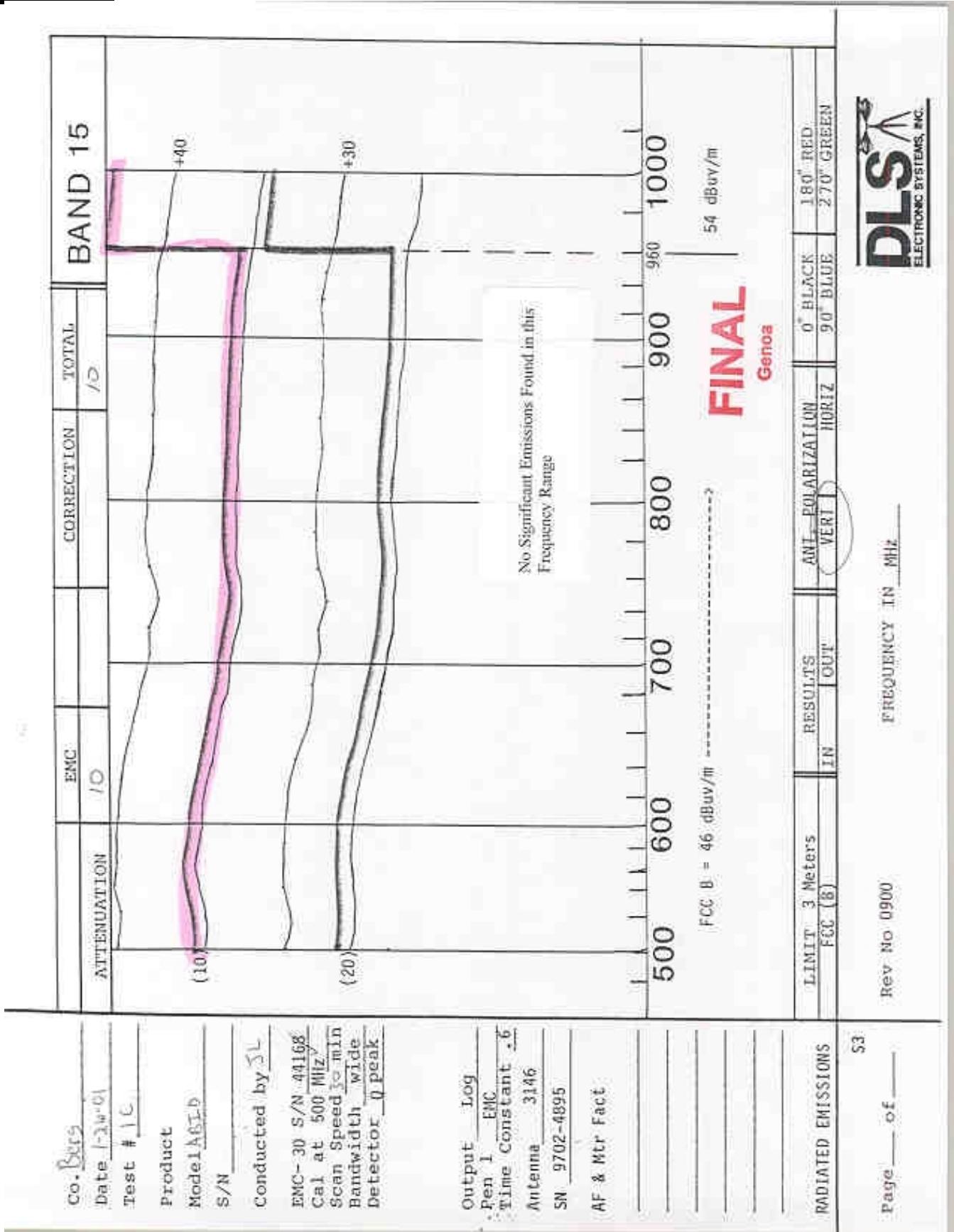
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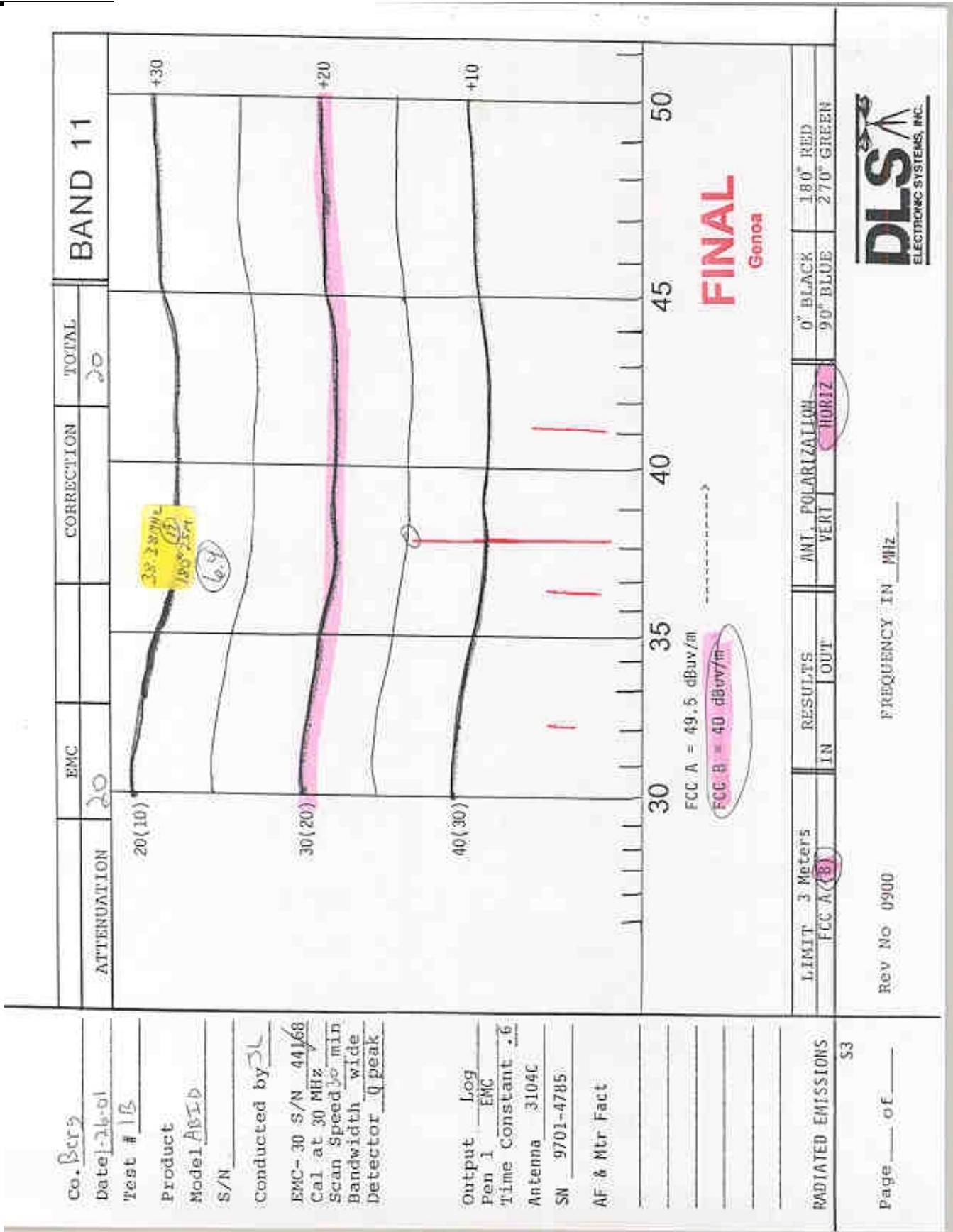
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