



TEST SPECIFICATION:

**FCC "Rules and Regulations", Part 15, Subpart C**  
Sections 15.231 (a-d), 15.207 & 15.205

**Intentional Radiators**

Periodic operation in the band 40.6 – 40.77 MHz & above 70 MHz

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: Syver-Tech, Inc. Maitre D'oor Key Code Transmitter

Kind of Equipment: Key Code Transmitter

Test Configuration: Continuous Transmitting

Transmitter FCC ID: PF6-KC0118

Model Number: KC0118

Serial Number: NA

Dates of Test: November 2, 2000

Test Conducted For: Syver-Tech, Inc.

20 Park Place Circle

Hawthorn Woods, Illinois 60047

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

Report No. 8641  
01/22/01

## SIGNATURE PAGE

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General Manager

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Syver-Tech, Inc.



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## 1.0 SUMMARY OF TEST REPORT

It was found that the Syver-Tech, Inc. Maitre D'oor Key Code Transmitter S/N NA **meets** the radio interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.231 (a-d), 15.207 and 15.205 for Intentional Radiators operating in the 315 MHz Frequency Band with periodic operation.

### NOTE:

**The conducted emissions test was not required because the EUT is powered from a DC power source. It does not have a line cord to plug into the A.C. power line.**

## 2.0 INTRODUCTION

On November 2, 2000, a series of radio frequency interference measurements were performed on Key Code Transmitter, S/N NA. The tests were performed according to the procedures of FCC as stated in MP-1 "FCC Methods of Measurement for determining Compliance of Radio Control and Security Alarm Devices and Associated Receivers". Tests were performed 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 15.231 (a-d), 15.207 and 15.205 for Intentional Radiators operating in the 315 MHz Frequency Band with periodic operation.

## 4.0 TEST SET-UP

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 below 1000 MHz 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. Above 1000 MHz final data was taken using the Peak Detector.

Below 1000 MHz final data was taken using the fixed tuned receiver. Plots were made using the Quasi Peak Detector, with manual measurements made on the frequencies of interest. Above 1000 MHz, 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. From 30 MHz to 1000 MHz a bandwidth of 120 kHz was used and above 1000 MHz, a bandwidth of 1 MHz 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

### NOTE:

**The conducted emissions test was not required because the EUT is powered from a DC power source. It does not have a line cord to plug into the A.C. power line.**



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## **CONDUCTED DATA TAKEN DURING TESTING**

### **PART 15.207**

#### **NOTE:**

**The conducted emissions test was not required because the EUT is powered from a DC power source. It does not have a line cord to plug into the A.C. power line.**



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## **CONDUCTED GRAPHS TAKEN DURING TESTING**

### **PART 15.207**

#### **NOTE:**

**The conducted emissions test was not required because the EUT is powered from a DC power source. It does not have a line cord to plug into the A.C. power line.**

## 7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The allowed radiated emissions for transmitters of this type can not exceed the following field strength limits at a distance of three meters as shown in Section 15.231b. The limits are show in the following table.

Fundamental Frequency in MHz	Field Strength of Fundamental (uV/m at 3m)	Field Strength of Harmonics (uV/m at 3m)
40.66 to 40.70	2250 (67.04 dBuV)	225 (47.04 dBuV)
70 to 130	1250 (61.94 dBuV)	125 (41.94 dBuV)
130 to 174	1250 (61.94 dBuV) to 3750 (71.48 dBuV)	125 (41.94 dBuV) to 375 (51.48 dBuV)
174 to 260	3750 (71.48 dBuV)	375 (51.48 dBuV)
260 to 470	3750 (71.48 dBuV) to 12500 (81.84 dBuV)	375 (51.48 dBuV) to 1250 (61.94 dBuV)
470 and above	12500 (81.84 dBuV)	1250 (61.94 dBuV)

### NOTE:

As stated in 15.35b the 20 dB peak-to-average limit is applicable to all devices measured using an average detector.

For pulsed operation, the switches were set to generate its maximum “on” time, and measurements were made with the peak detector. As stated in Docket 86-422, the duty cycle of the pulse is determined from the total “on” time for the worst case condition during 100 msec. Using the percentage of the total “on” time over a 100 msec period, the total absolute average value was determined.

## 7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (CON'T)

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 1000 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the Syver-Tech, Inc. Maitre D'oor Key Code Transmitter were made up to 5800 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 315 MHz. 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.

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 30 MHz 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, 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.



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# **RADIATED DATA TAKEN FOR FUNDAMENTAL**

## **EMISSION MEASUREMENTS**

### **PART 15.225**



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

TEST DATE:----- November 2, 2000  
MANUFACTURER:----- Syver-Tech, Inc.  
MODEL NO:----- KC0118  
S/N:----- NA  
CONFIGURATION:----- **Continuous transmitting**  
RATED POWER: (w)----- 0.0025

TEST SPECIFICATION: FCC "RULES AND REGULATIONS", PART 15  
SUBPART C / SECTION 15.231

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

Antennas --- BIA-25 --- SN 4785  
LPA-25 --- SN 4895

TYPE OF TEST: **VERTICAL** 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
315.00	53.00	3.00	18.84	74.84	75.62	0.78
630.00	27.00	3.00	24.66	54.66	55.60	0.94
945.00	22.00	3.00	28.48	53.48	55.60	2.12



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

TEST DATE:----- November 2, 2000  
MANUFACTURER:----- Syver-Tech, Inc.  
MODEL NO:----- KC0118  
S/N:----- NA  
CONFIGURATION:----- **Continuous transmitting**  
RATED POWER: (w)----- 0.0025

TEST SPECIFICATION: FCC "RULES AND REGULATIONS", PART 15  
SUBPART C / SECTION 15.231

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

Antennas --- BIA-25 --- SN 4785  
LPA-25 --- SN 4895

TYPE OF TEST: **HORIZONTAL** 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
315.00	53.00	3.00	18.84	74.84	75.62	0.78
630.00	27.00	3.00	19.13	49.13	55.60	6.47
945.00	21.00	3.00	22.82	46.82	55.60	8.78





## SUMMARY DATA SHEET OF **RADIATED EMISSIONS >1000 MHz**

TEST DATE:----- November 2, 2000  
MANUFACTURER:----- Syver-Tech, Inc.  
MODEL NO:----- KC0118  
S/N:----- NA  
CONFIGURATION:----- **Continuous transmitting**  
RATED POWER: (w)---- 0.0025

TEST SPECIFICATION FCC "RULES AND REGULATIONS", PART 15  
SUBPART C / SECTION 15.231

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

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

THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

FREQ IN MHz.	METER READING dBuV	ANTENNA PLUS CABLE	PRE-AMP GAIN dB	TOTAL dBuV	ANTENNA DISTANCE IN METERS	LIMIT dBuV	MARGIN dB
1259.70	64.30	27.20	-42.40	49.10	3	55.60	6.50
1574.62	61.00	28.50	-42.40	47.10	3	55.60	8.50
1889.60	57.20	29.60	-42.40	44.40	3	55.60	11.20
2204.64	59.10	28.70	-42.40	45.40	1	65.10	19.70
2519.54	57.30	29.30	-42.50	44.10	1	65.10	21.00
2834.16	57.00	30.90	-42.70	45.20	1	65.10	19.90
3149.34	62.50	32.20	-42.70	52.00	1	65.10	13.10



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## SUMMARY DATA SHEET OF **RADIATED EMISSIONS >1000 MHz**

TEST DATE:----- November 2, 2000  
MANUFACTURER:----- Syver-Tech, Inc.  
MODEL NO:----- KC0118  
S/N:----- NA  
CONFIGURATION:----- **Continuous transmitting**  
RATED POWER: (w)---- 0.0025

TEST SPECIFICATION FCC "RULES AND REGULATIONS", PART 15  
SUBPART C / SECTION 15.231

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

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

### THE FOLLOWING ARE SIGNIFICANT RADIATED LEVELS FOUND:

FREQ IN MHz.	METER READING dBuV	ANTENNA PLUS CABLE	PRE-AMP GAIN dB	TOTAL dBuV	ANTENNA DISTANCE IN METERS	LIMIT dBuV	MARGIN dB
1259.80	64.00	27.20	-42.40	48.80	3	55.60	6.80
1574.62	61.20	28.50	-42.40	47.30	3	55.60	8.30
1889.47	57.00	29.60	-42.40	44.20	3	55.60	11.40
2204.52	58.80	28.70	-42.40	45.10	1	65.10	20.00
2519.38	63.40	29.30	-42.50	50.20	1	65.10	14.90
2834.37	60.20	30.90	-42.70	48.40	1	65.10	16.70
3149.21	60.90	32.20	-42.70	50.40	1	65.10	14.70



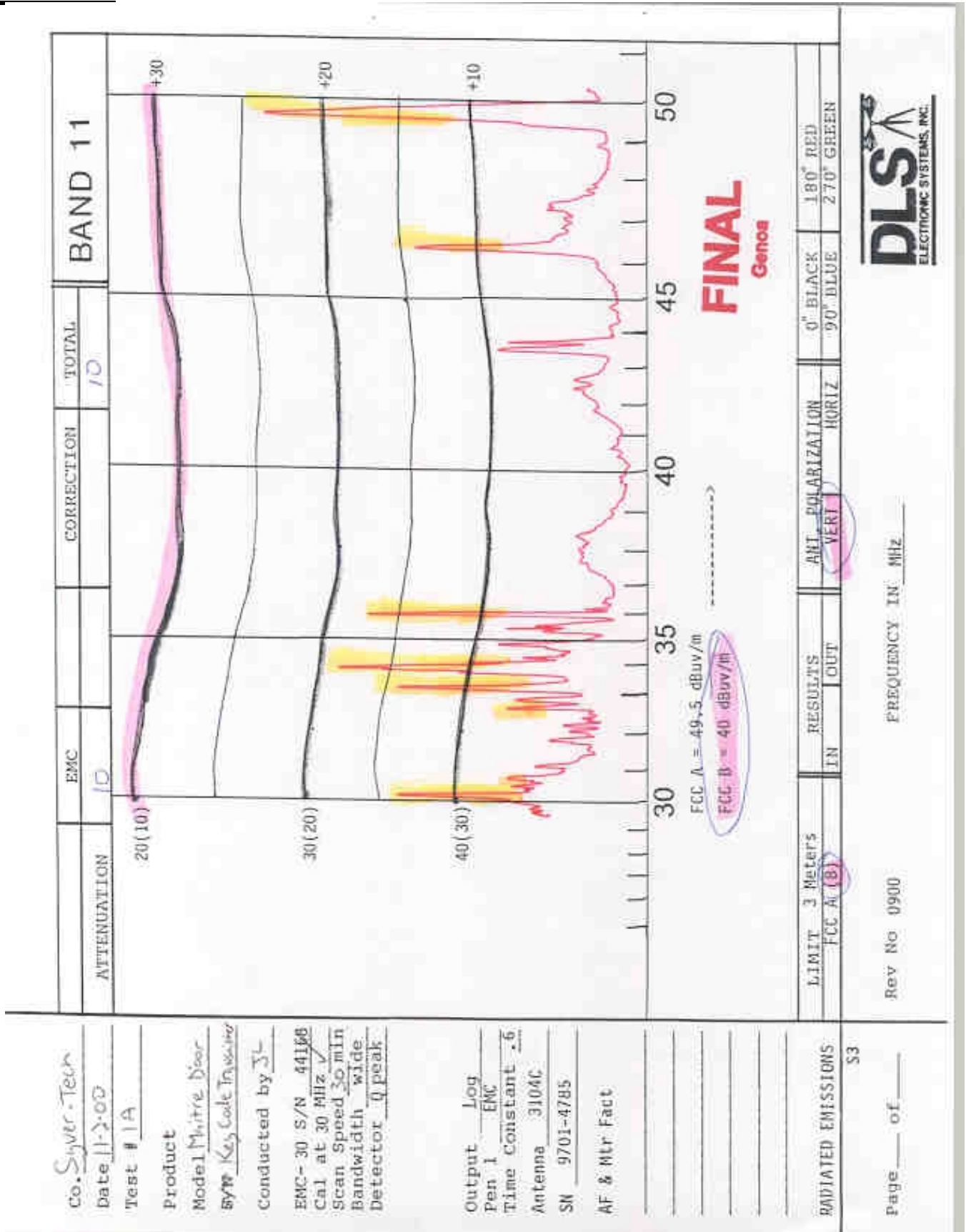
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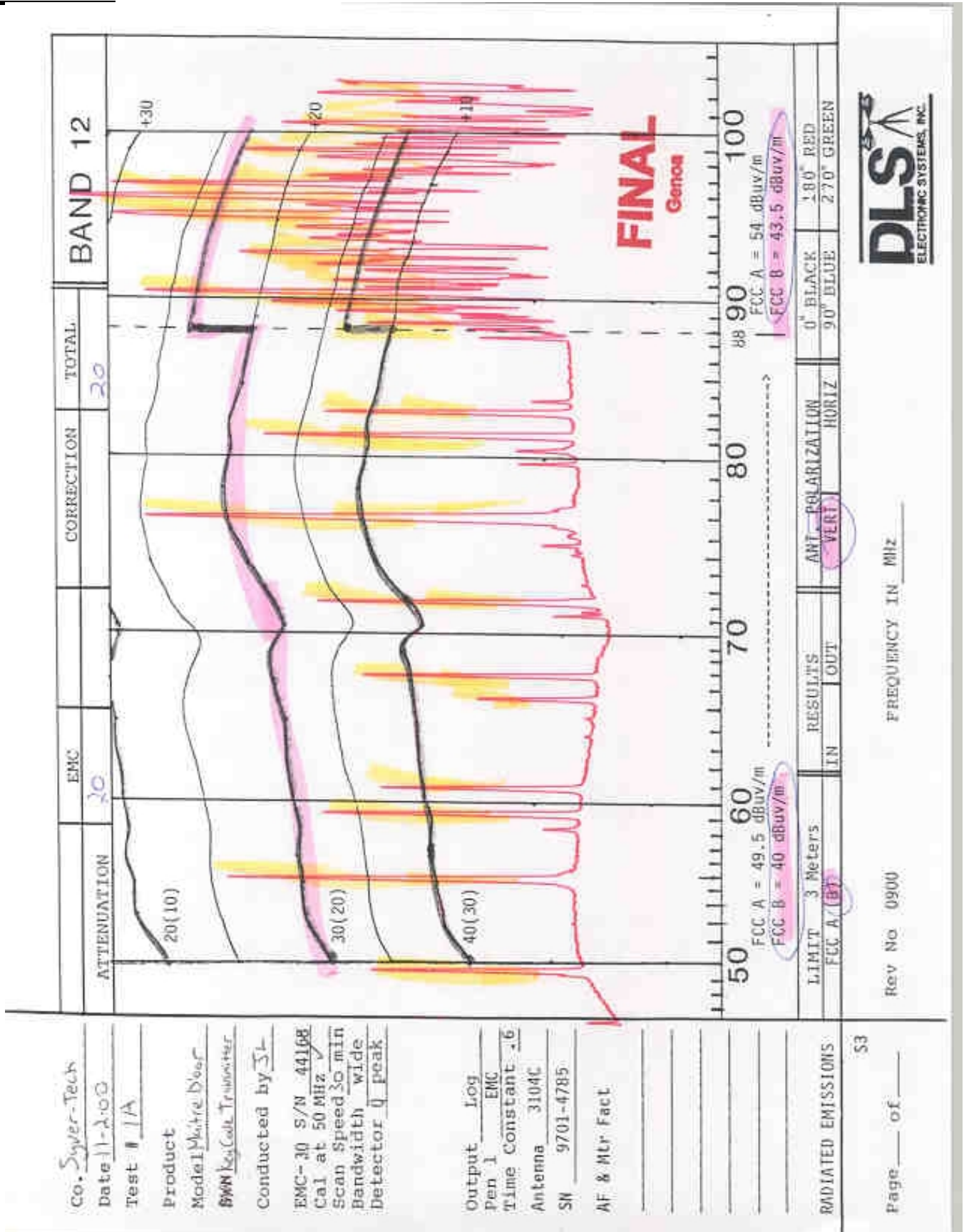
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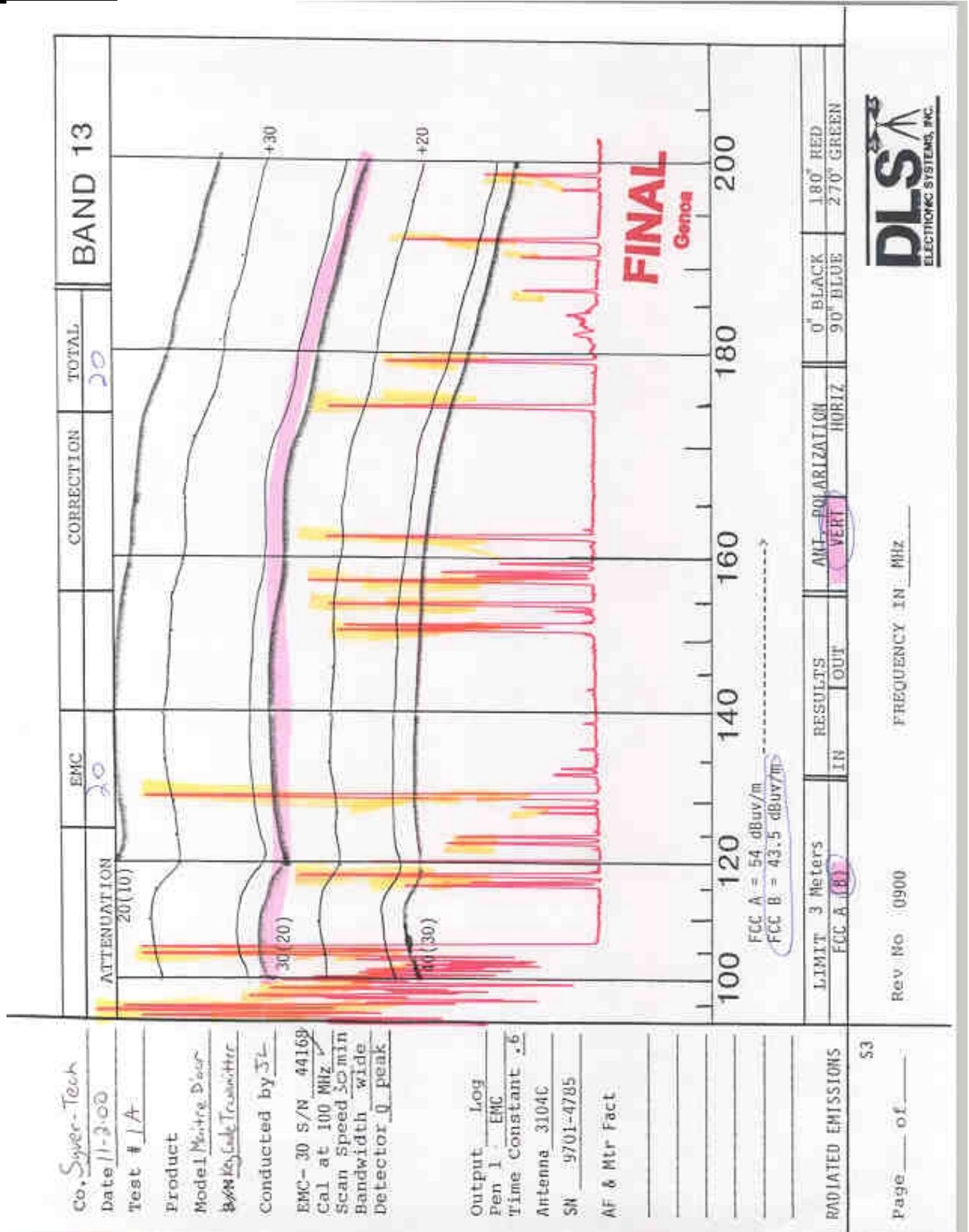
# **RADIATED GRAPHS TAKEN FOR FUNDAMENTAL**

## **EMISSION MEASUREMENTS**

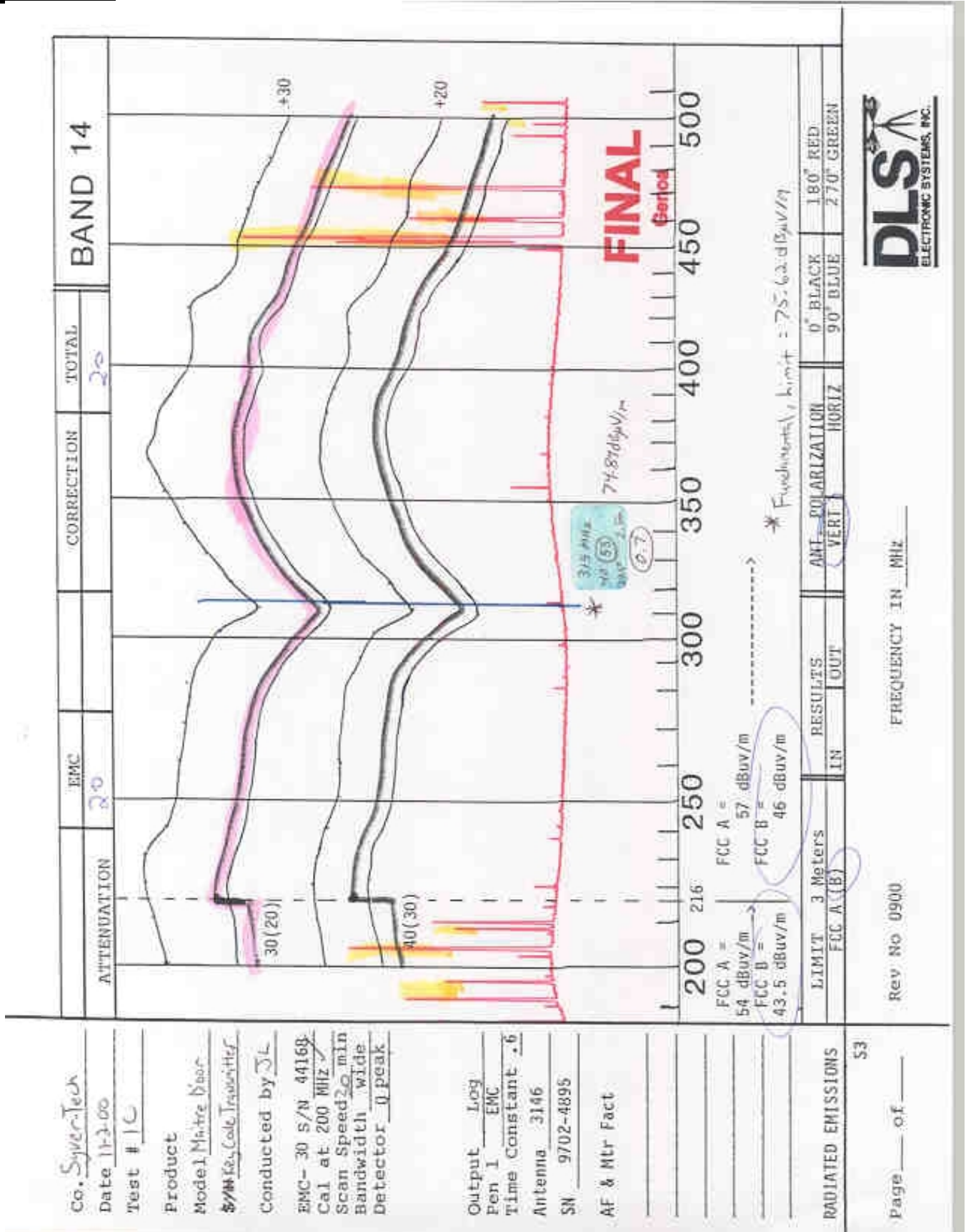
### **PART 15.225**

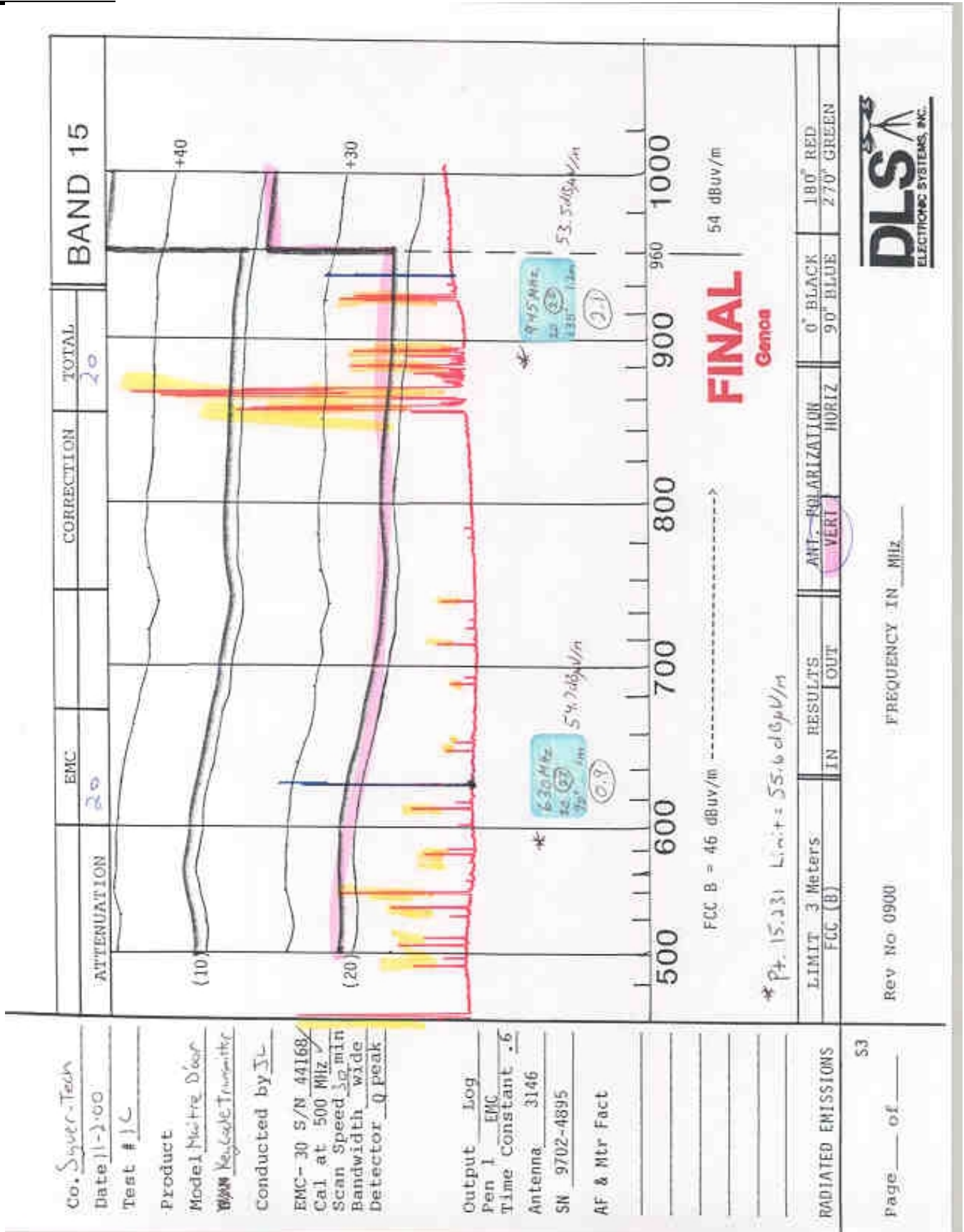




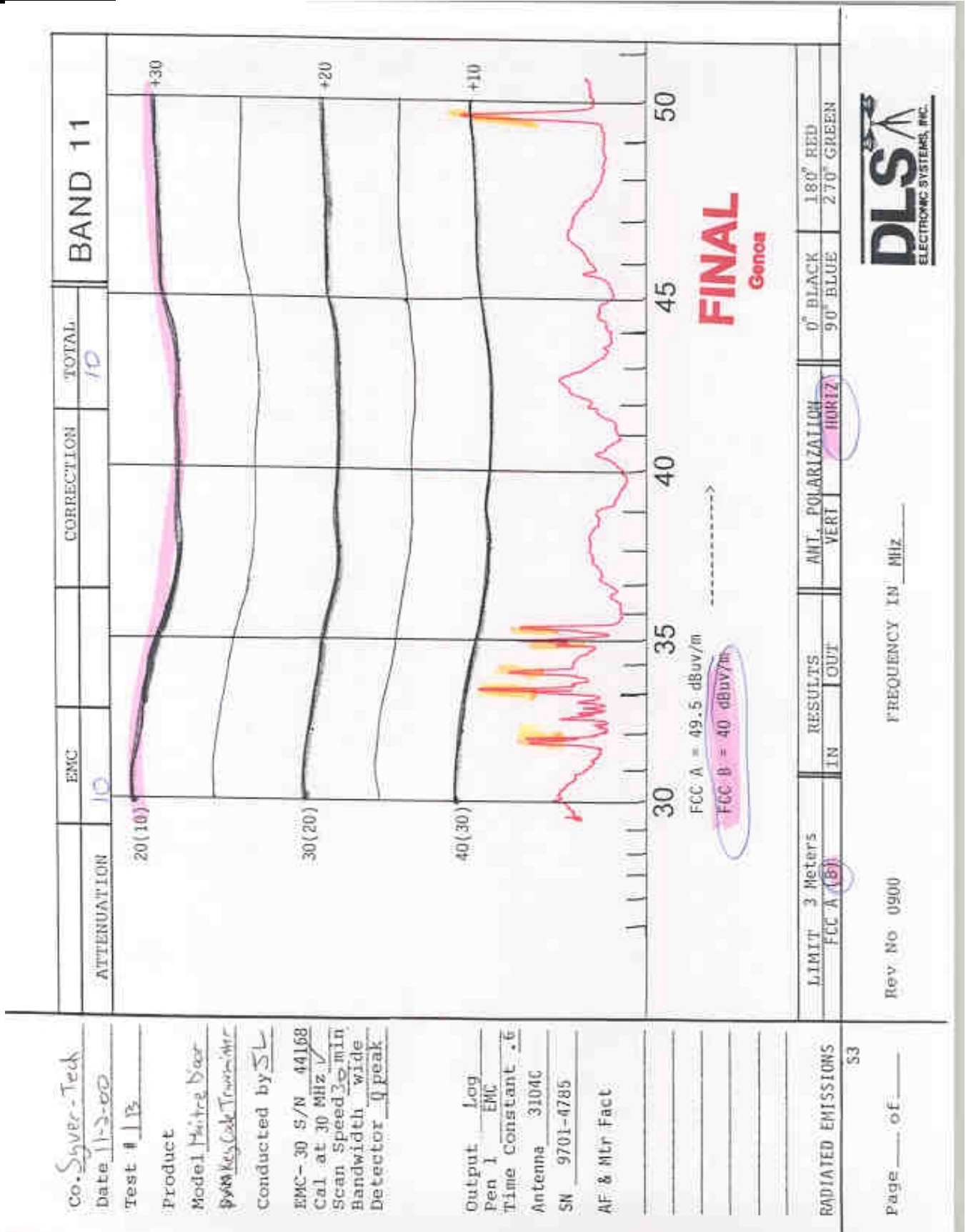


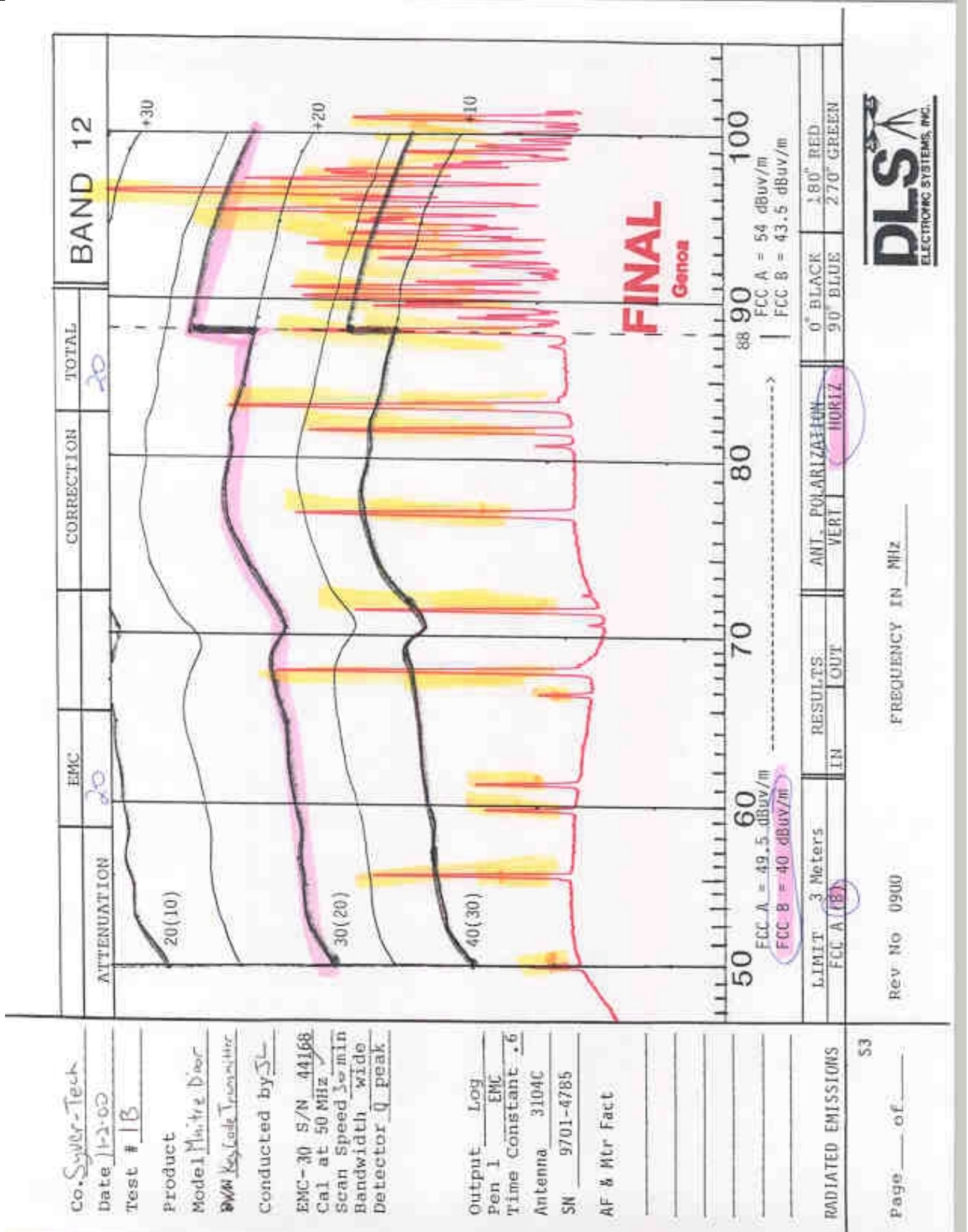


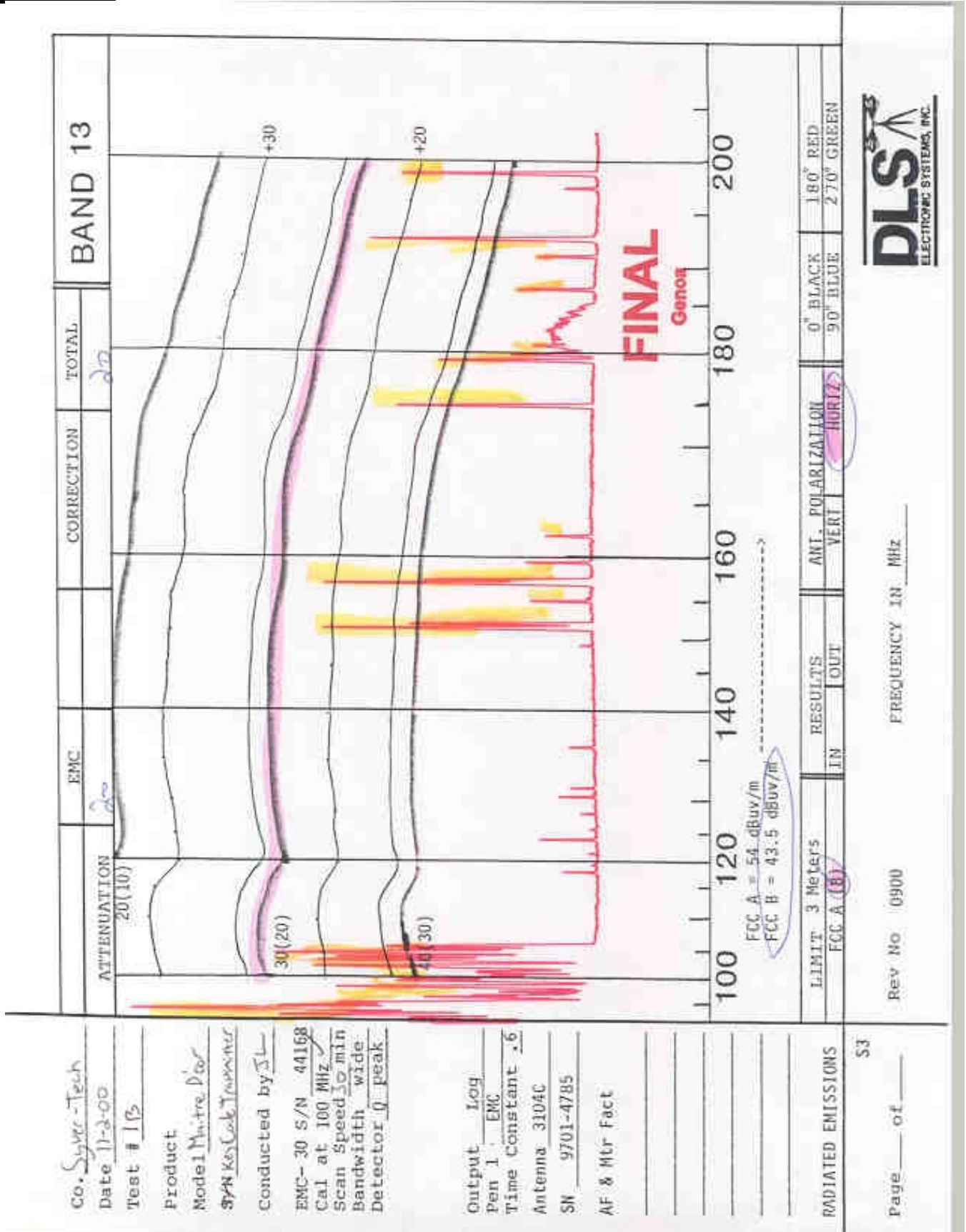




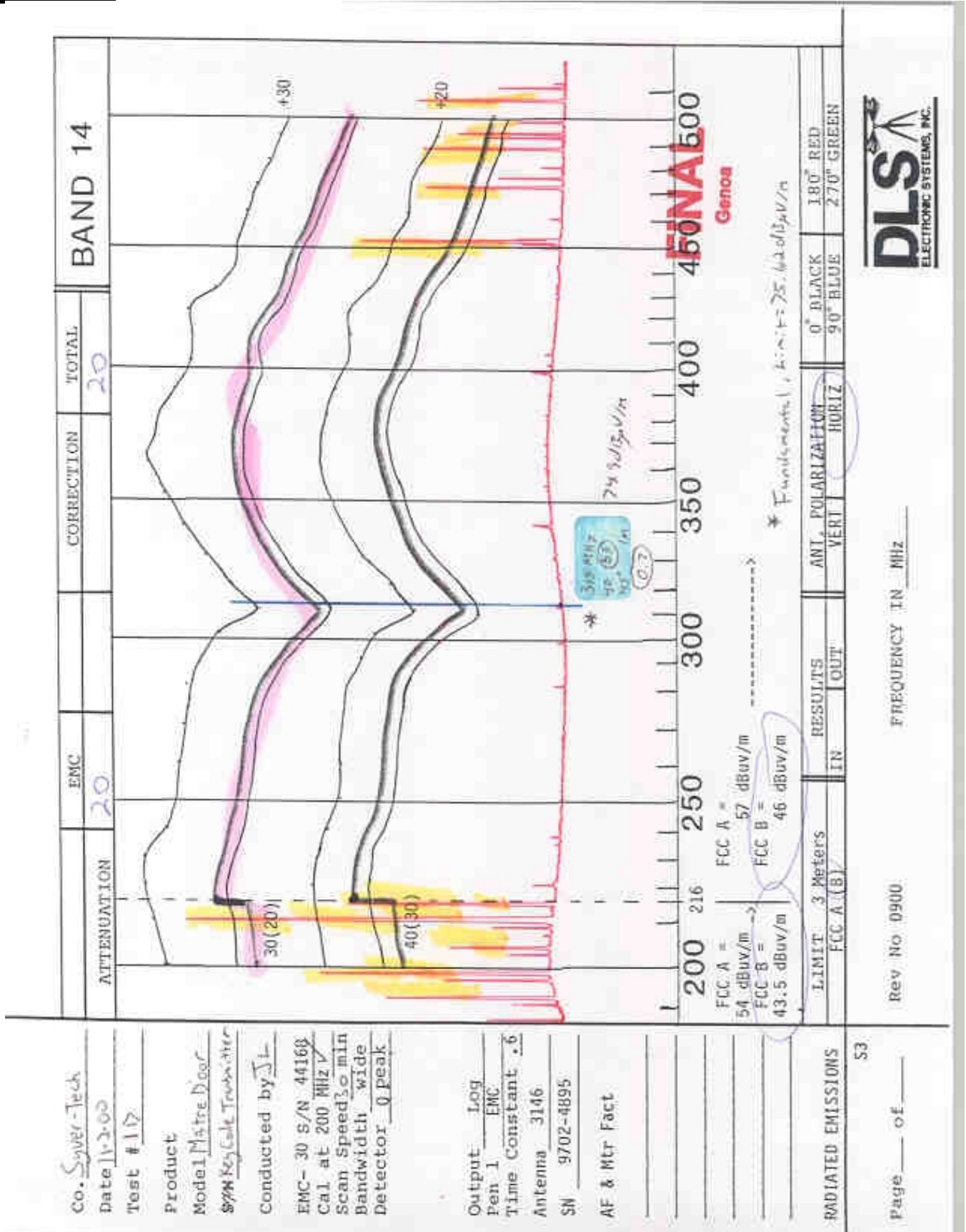


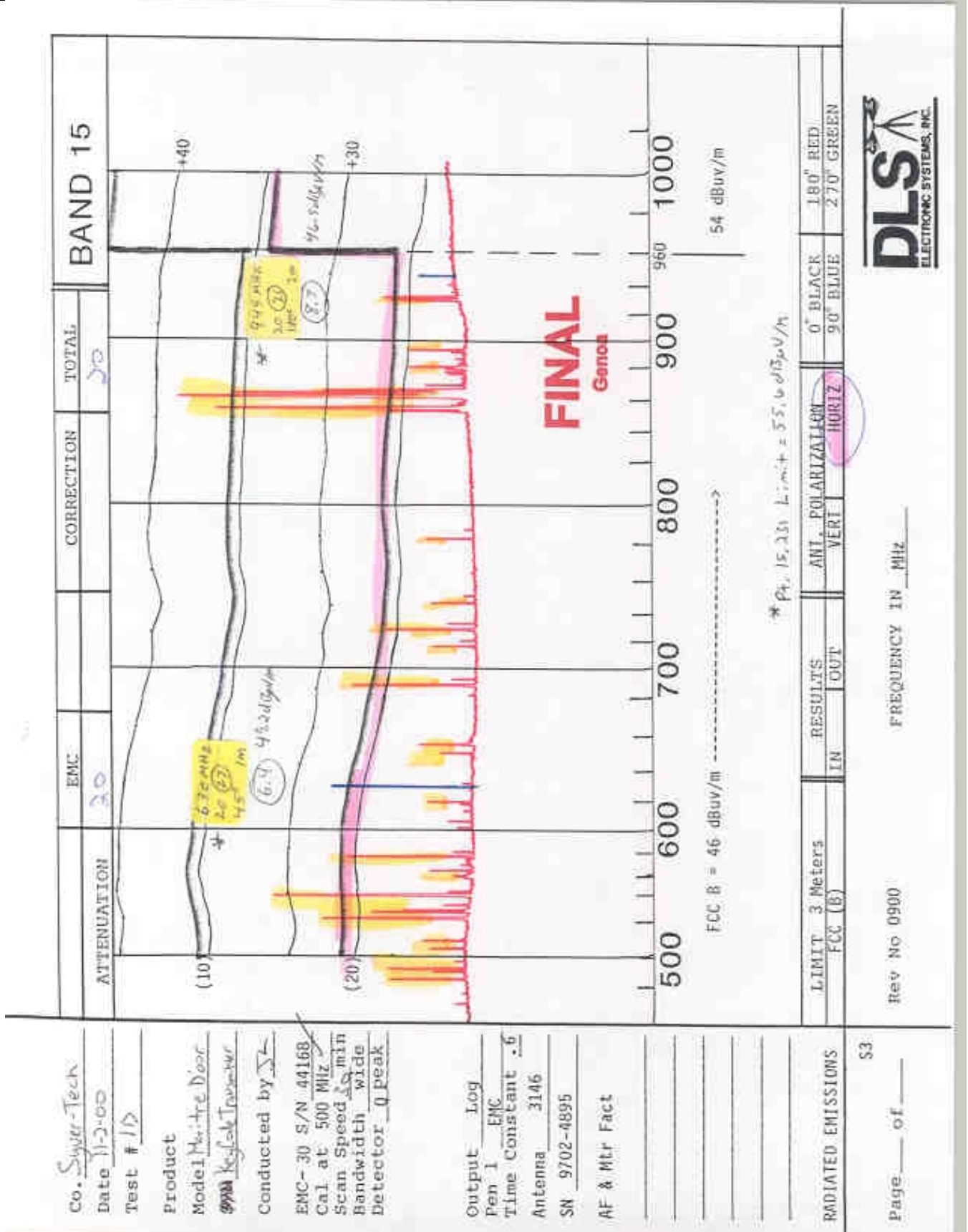


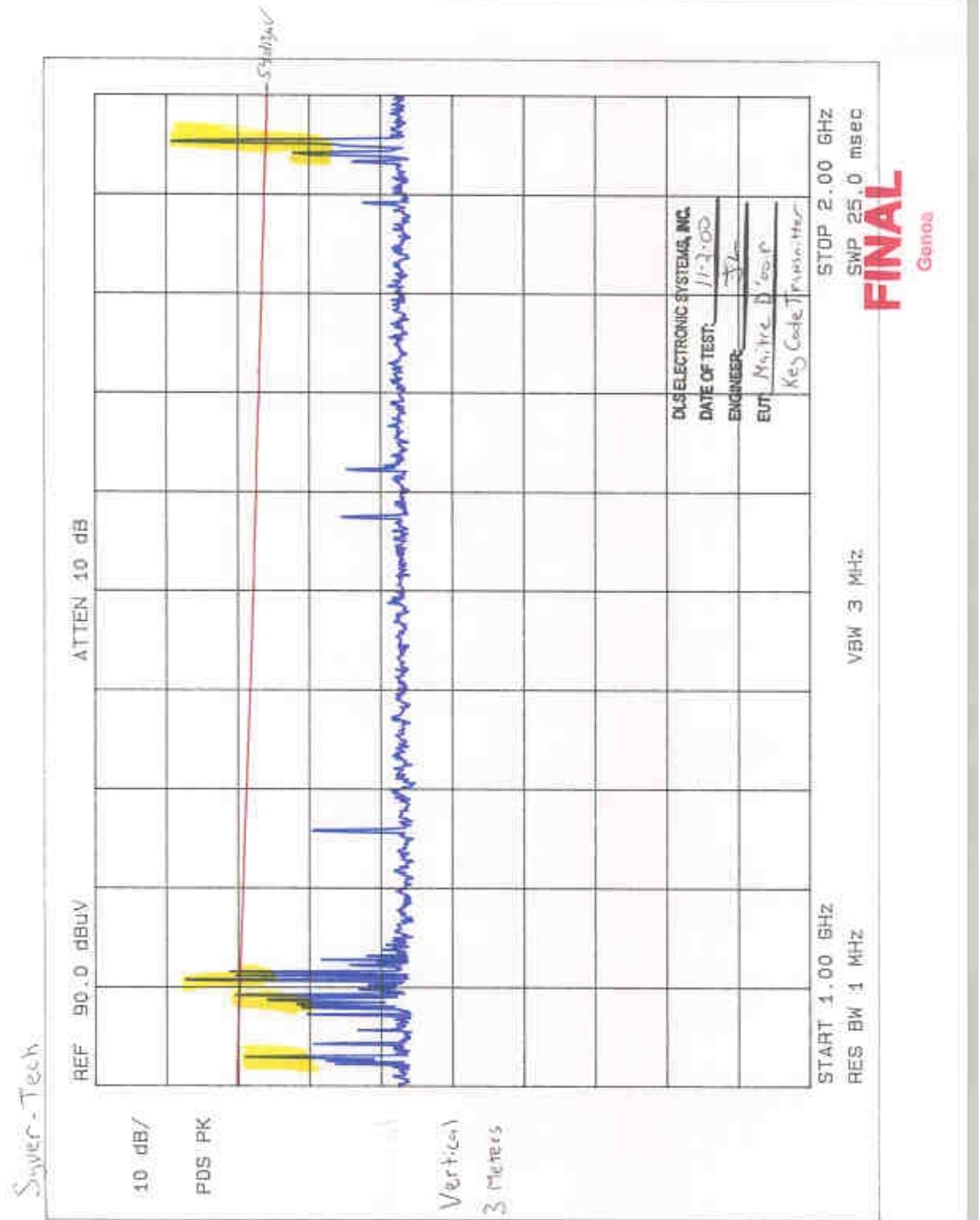


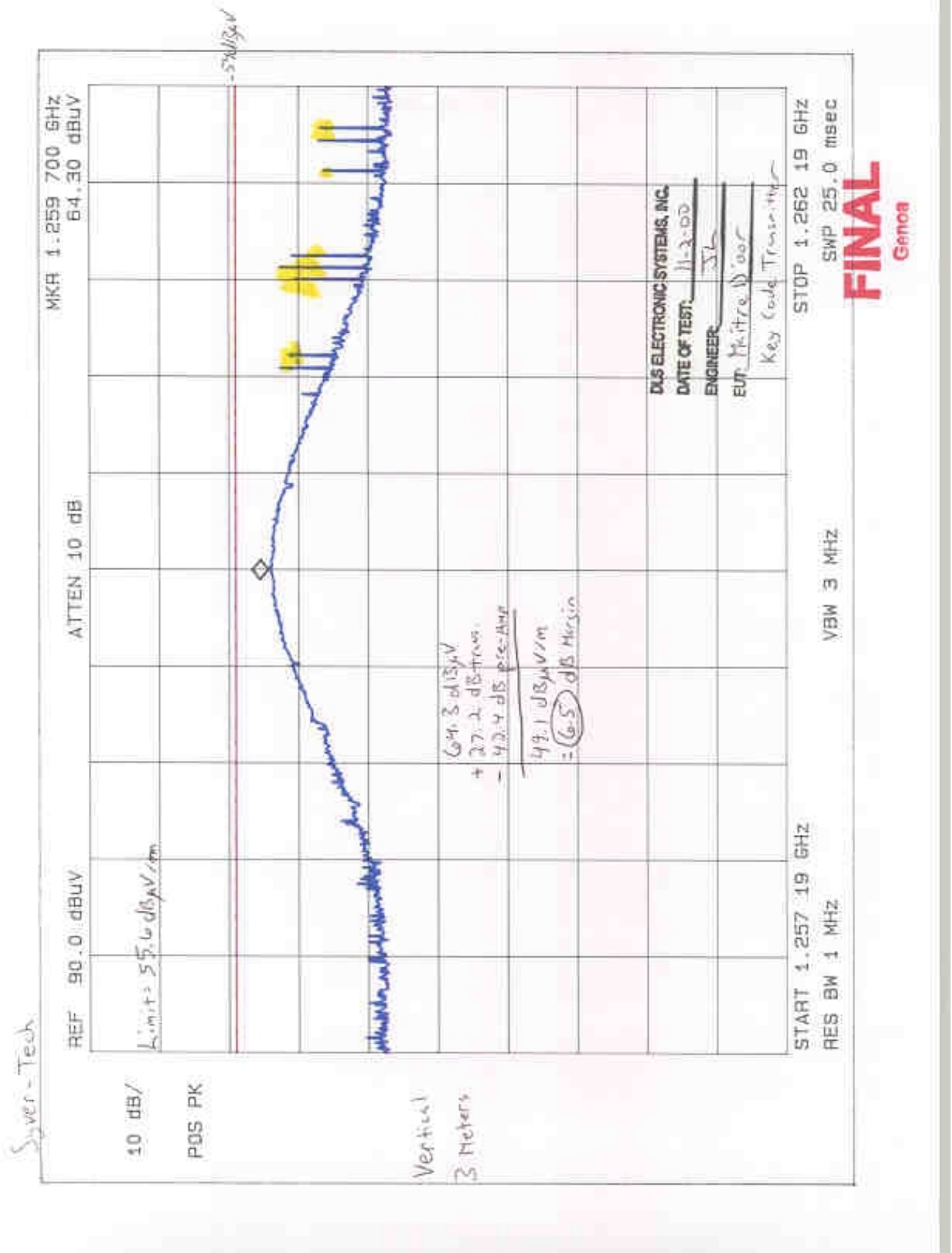




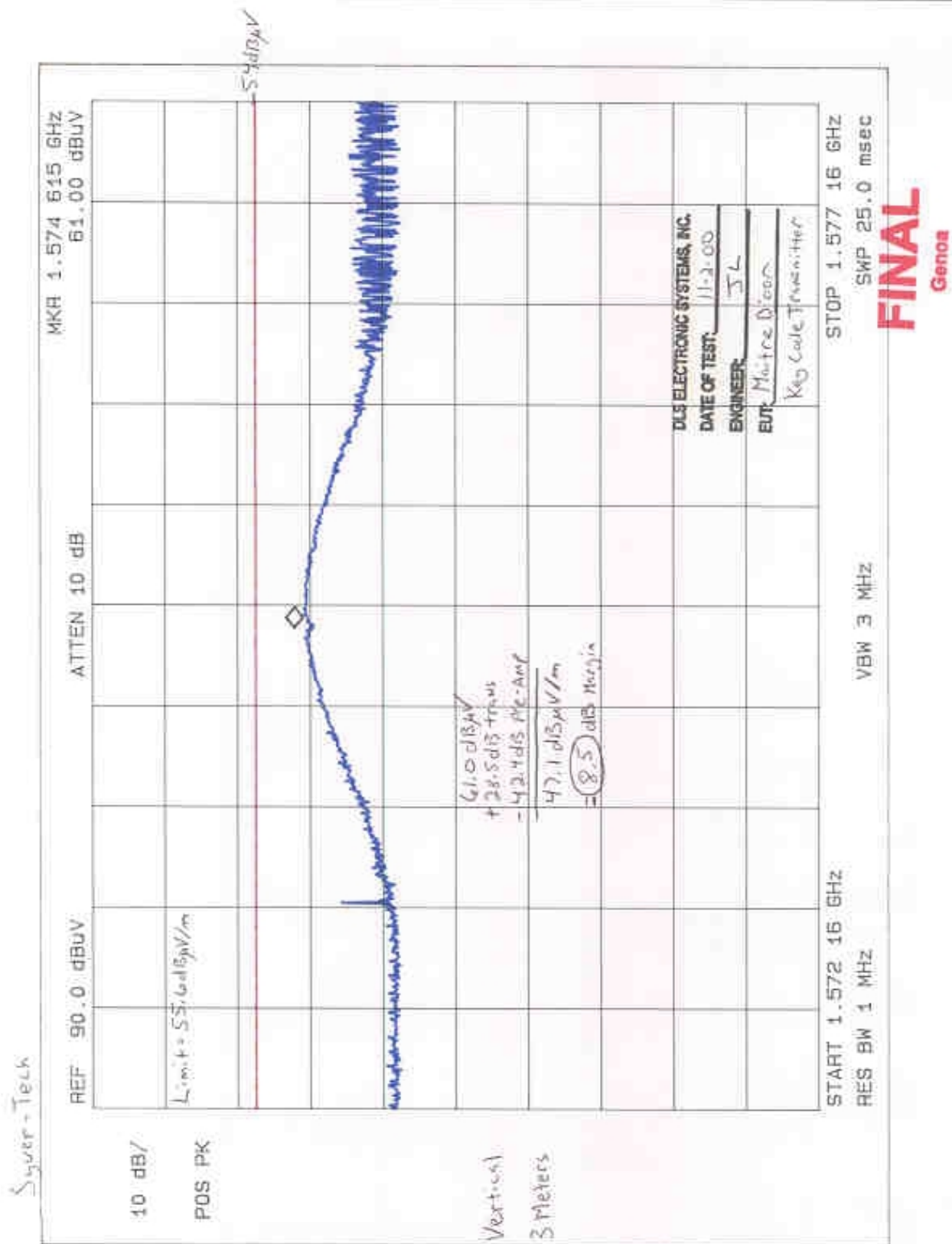




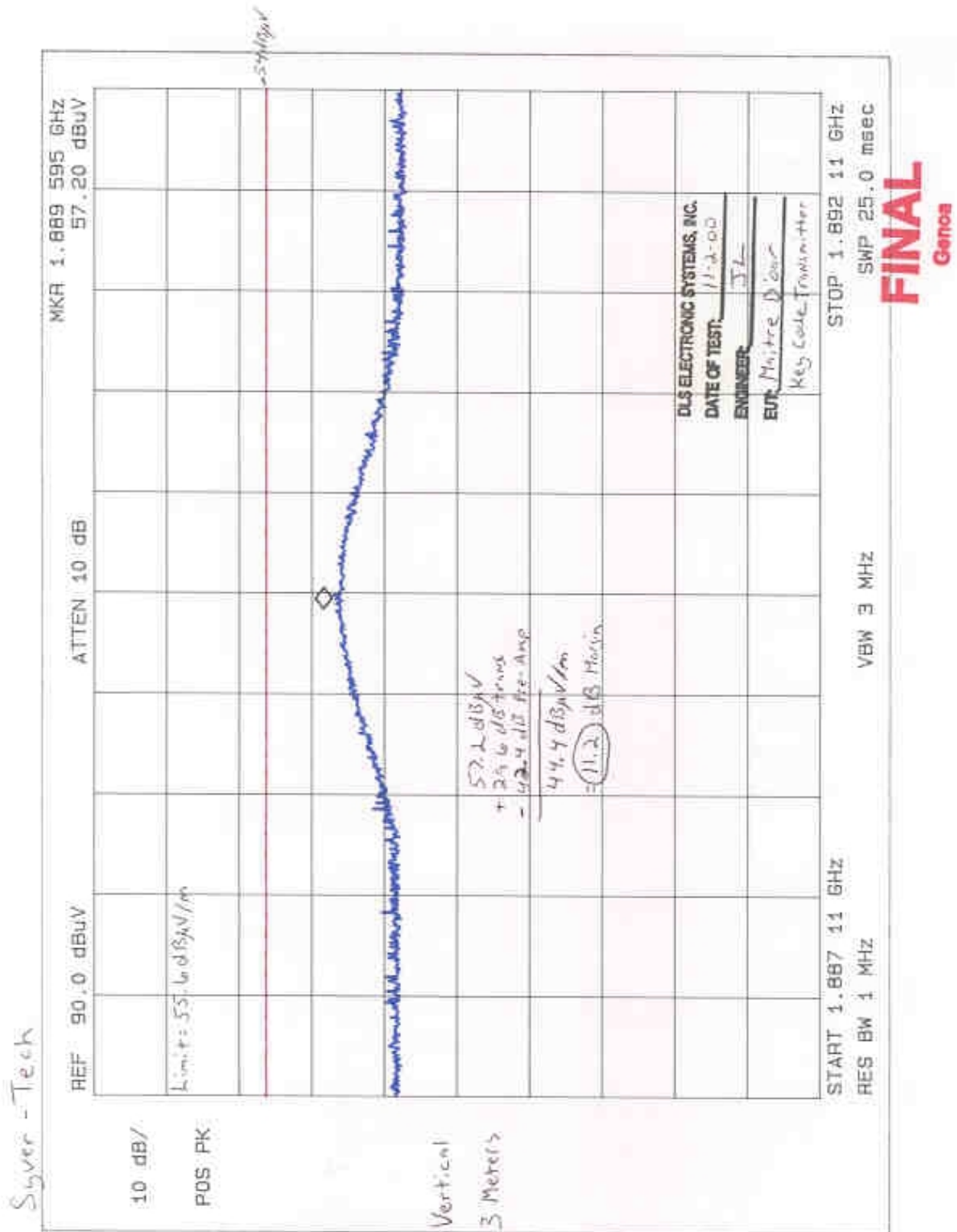




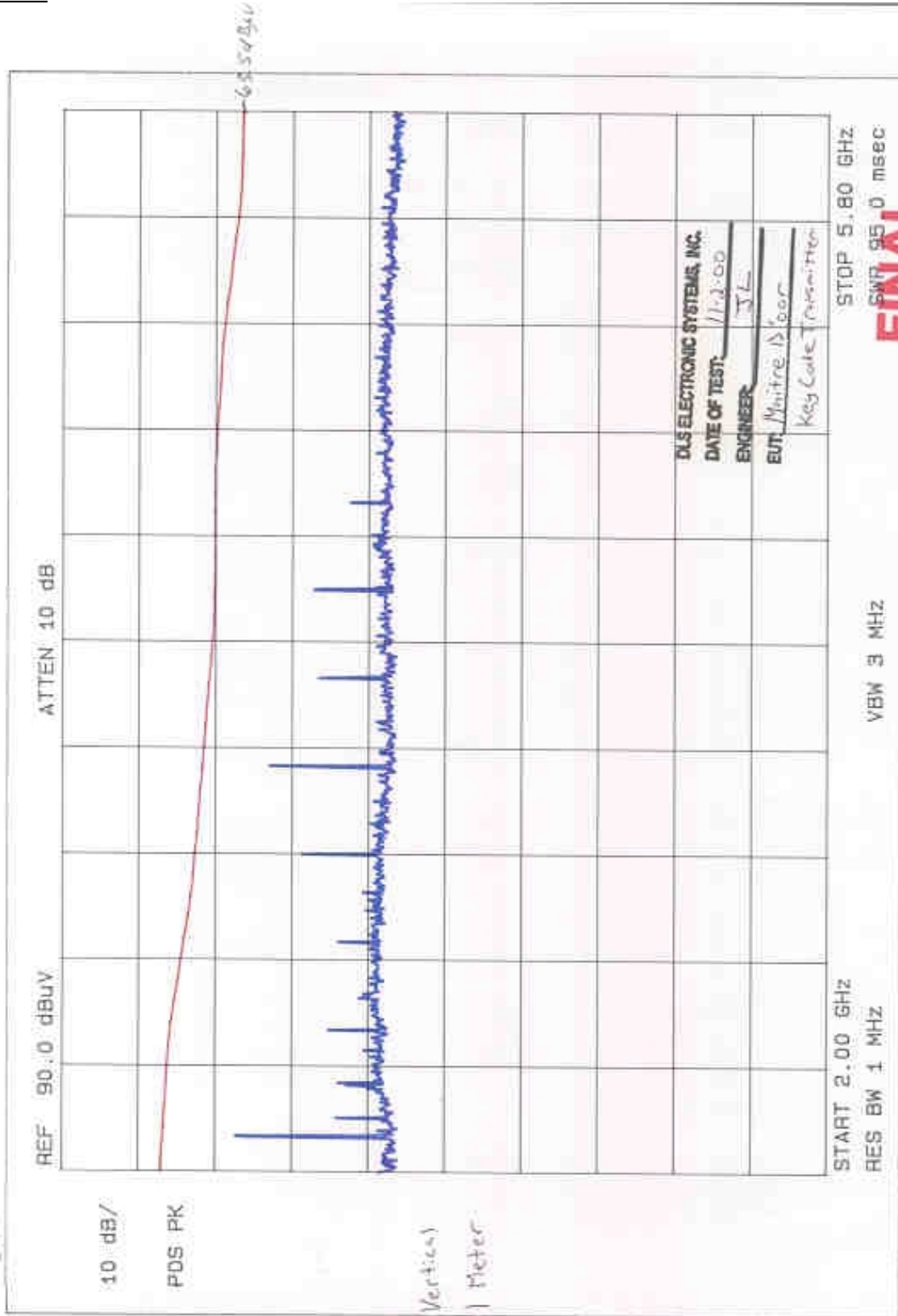




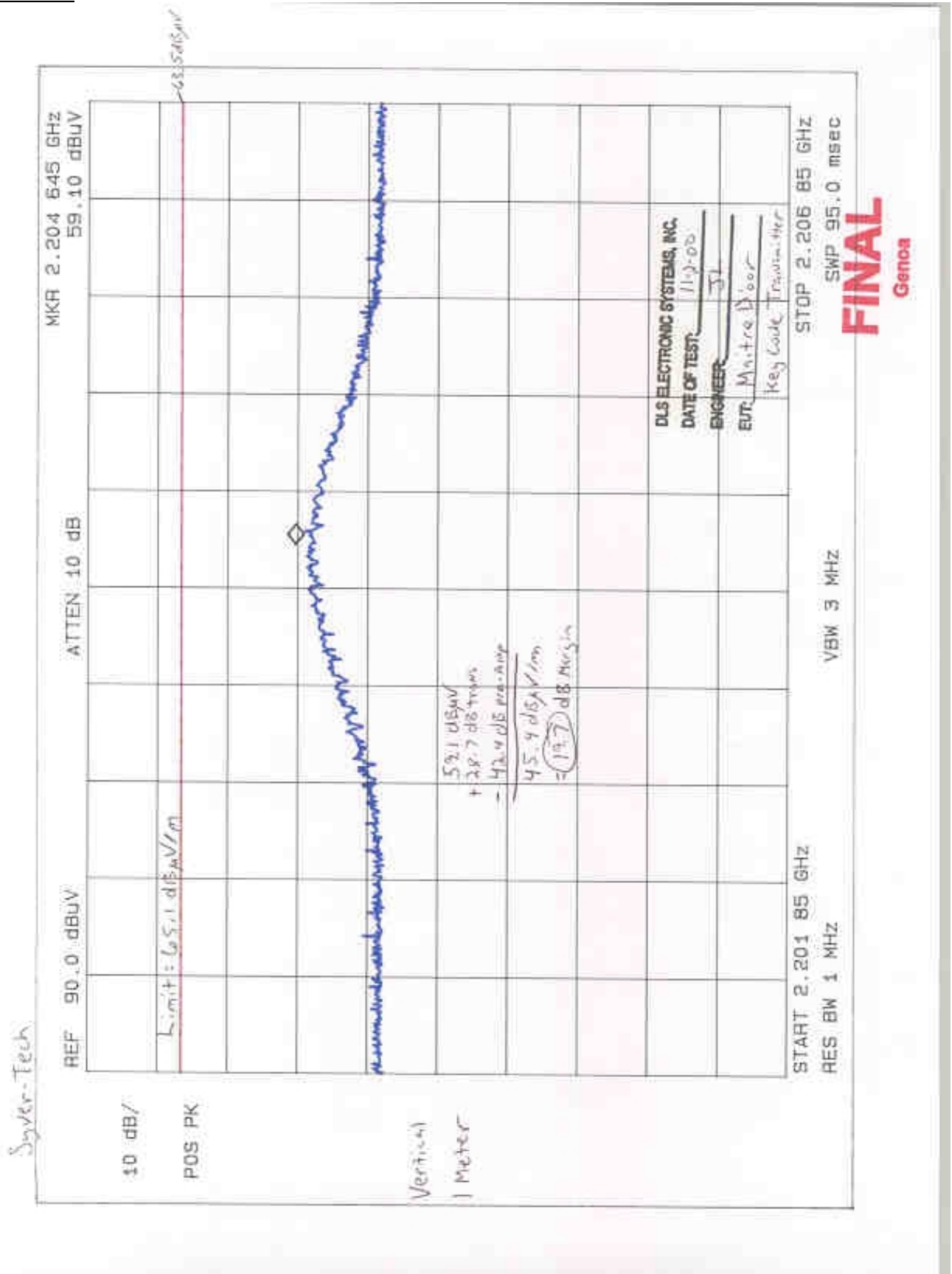


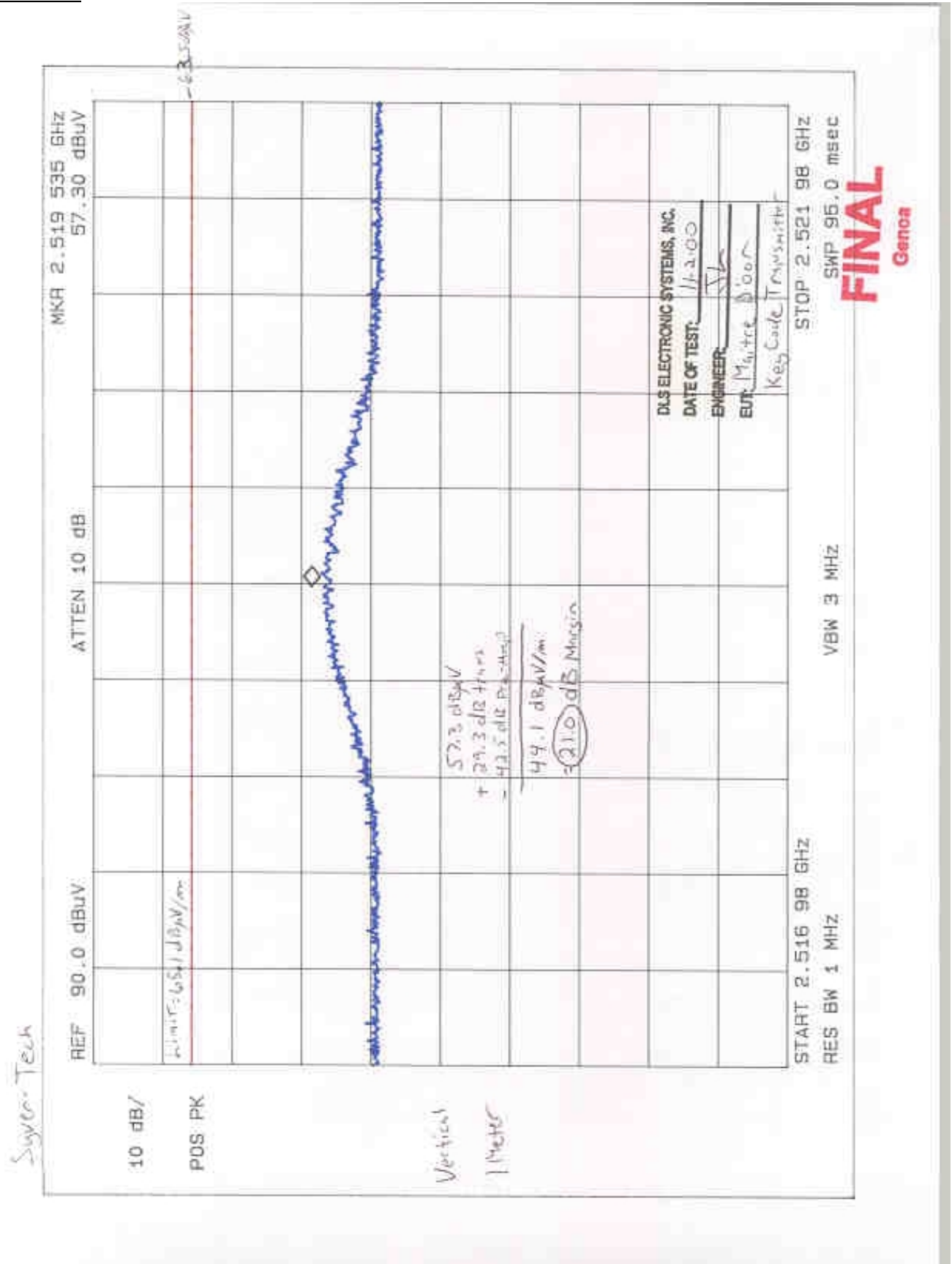


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**FINAL**  
Genoa

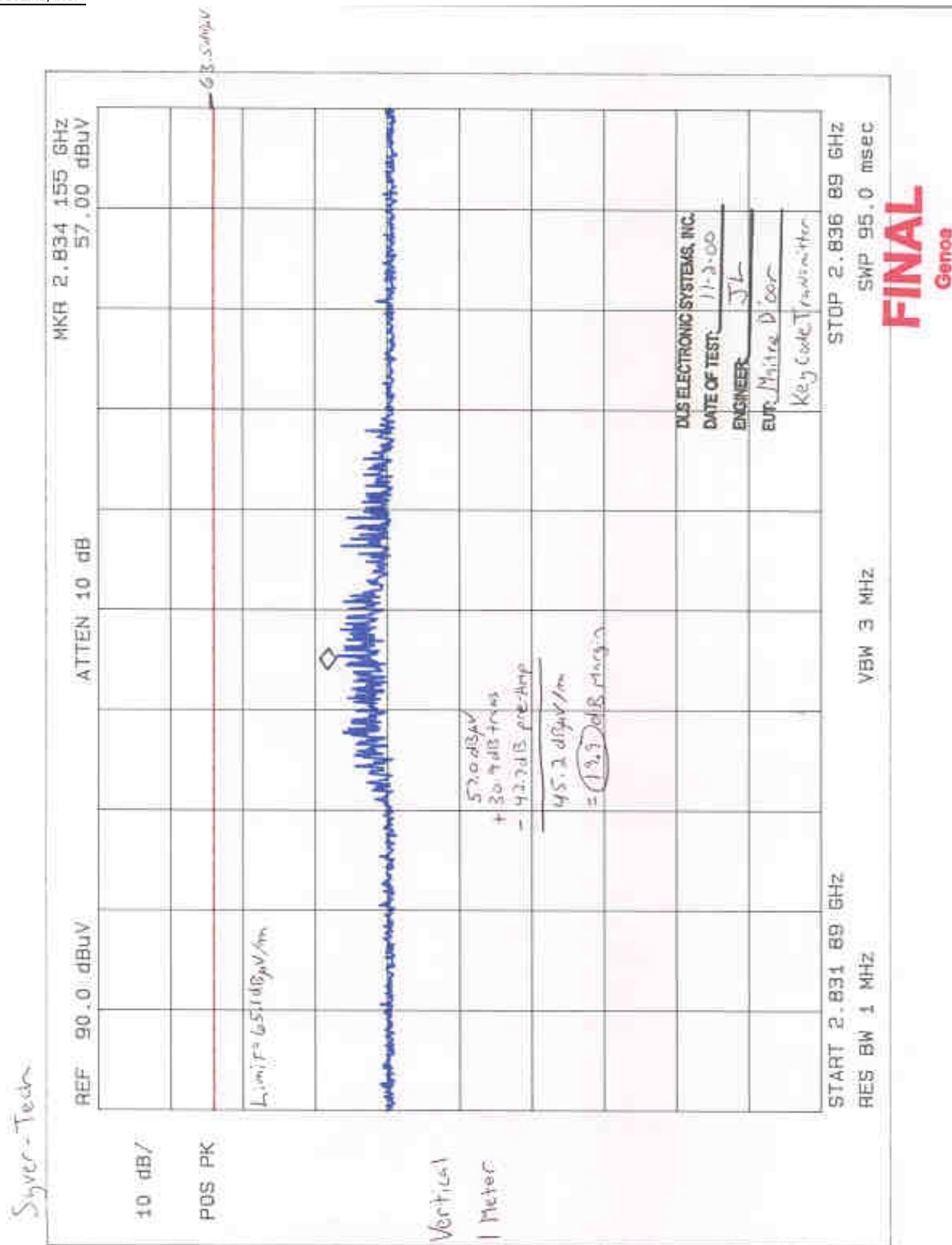


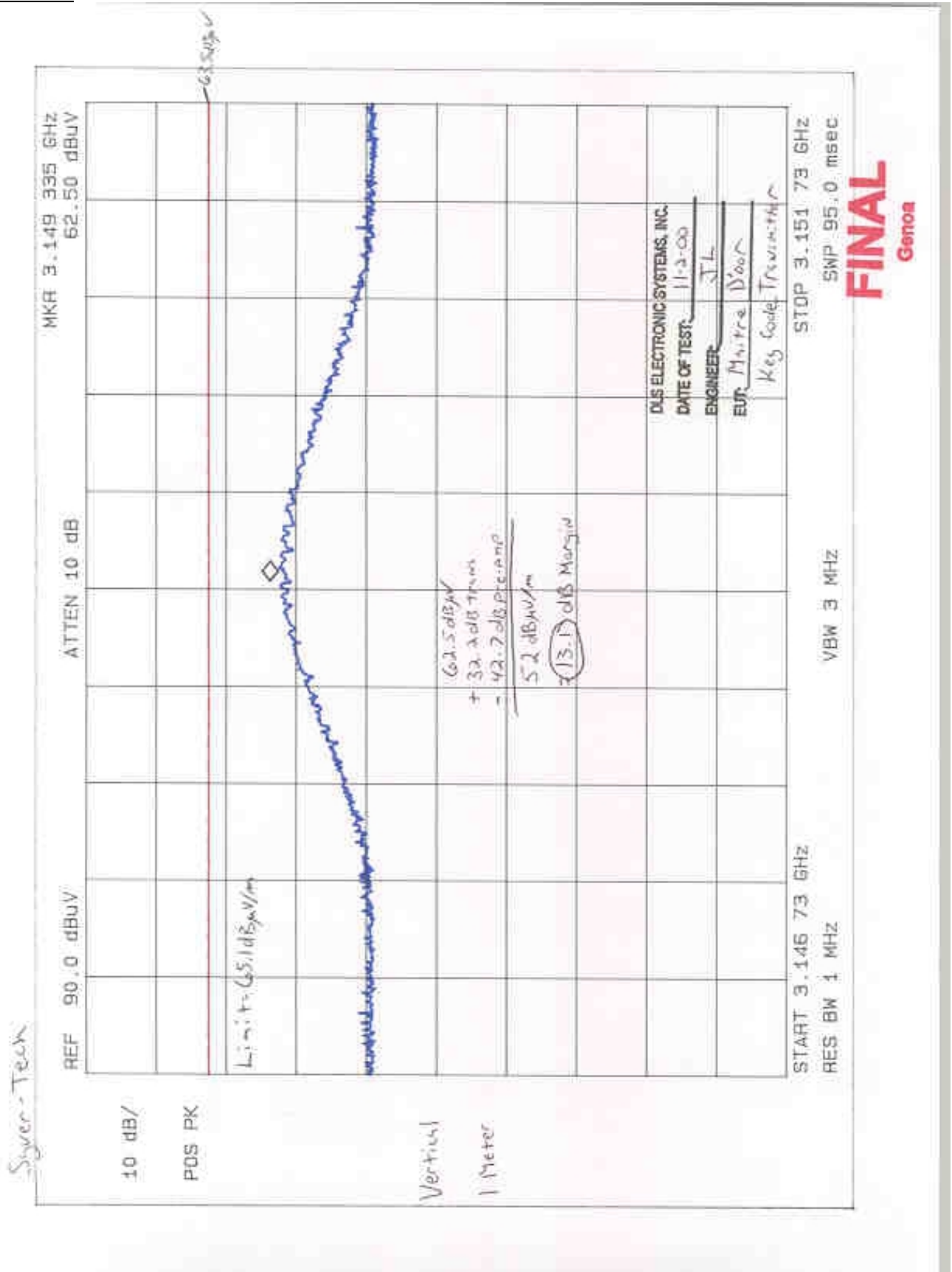




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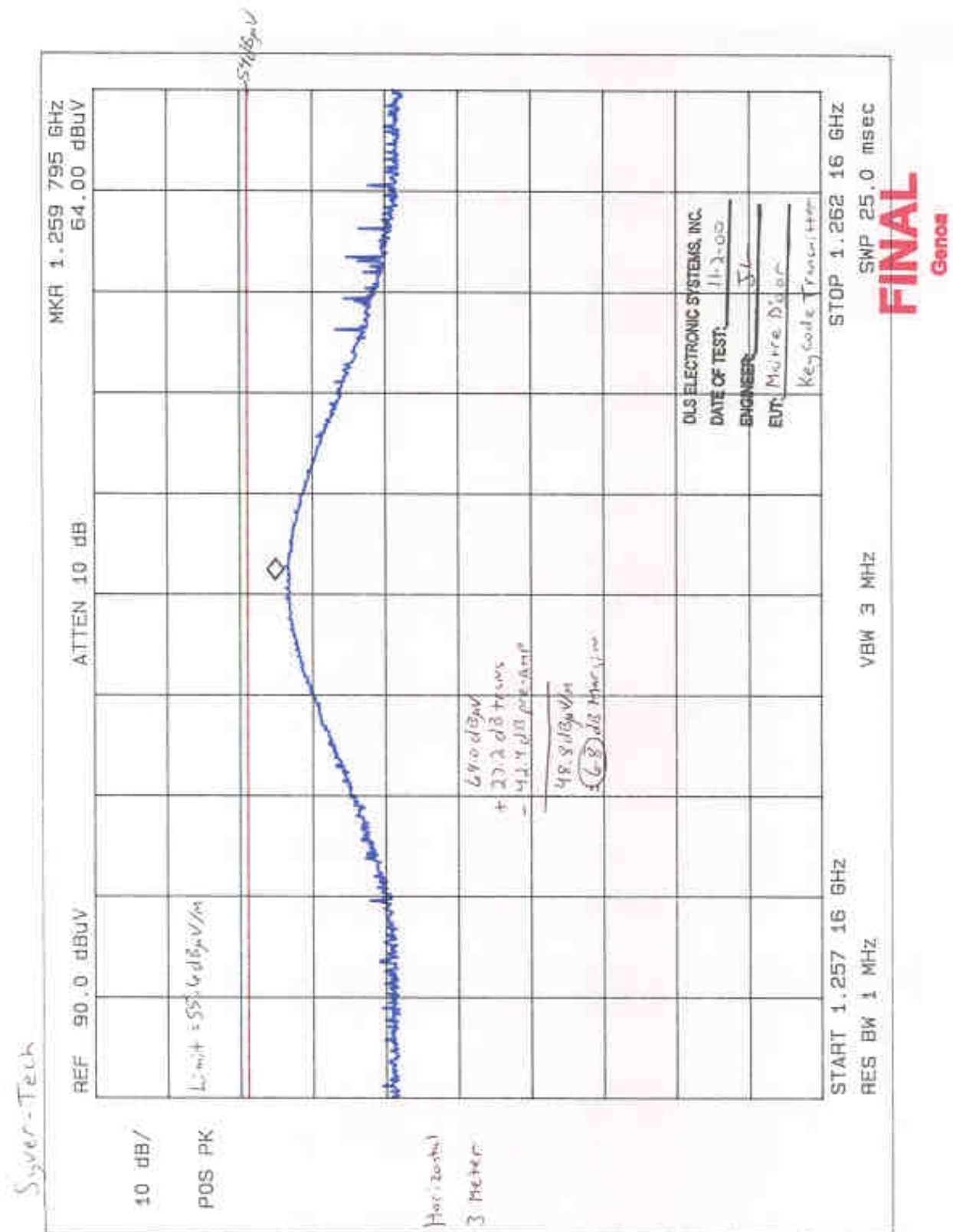
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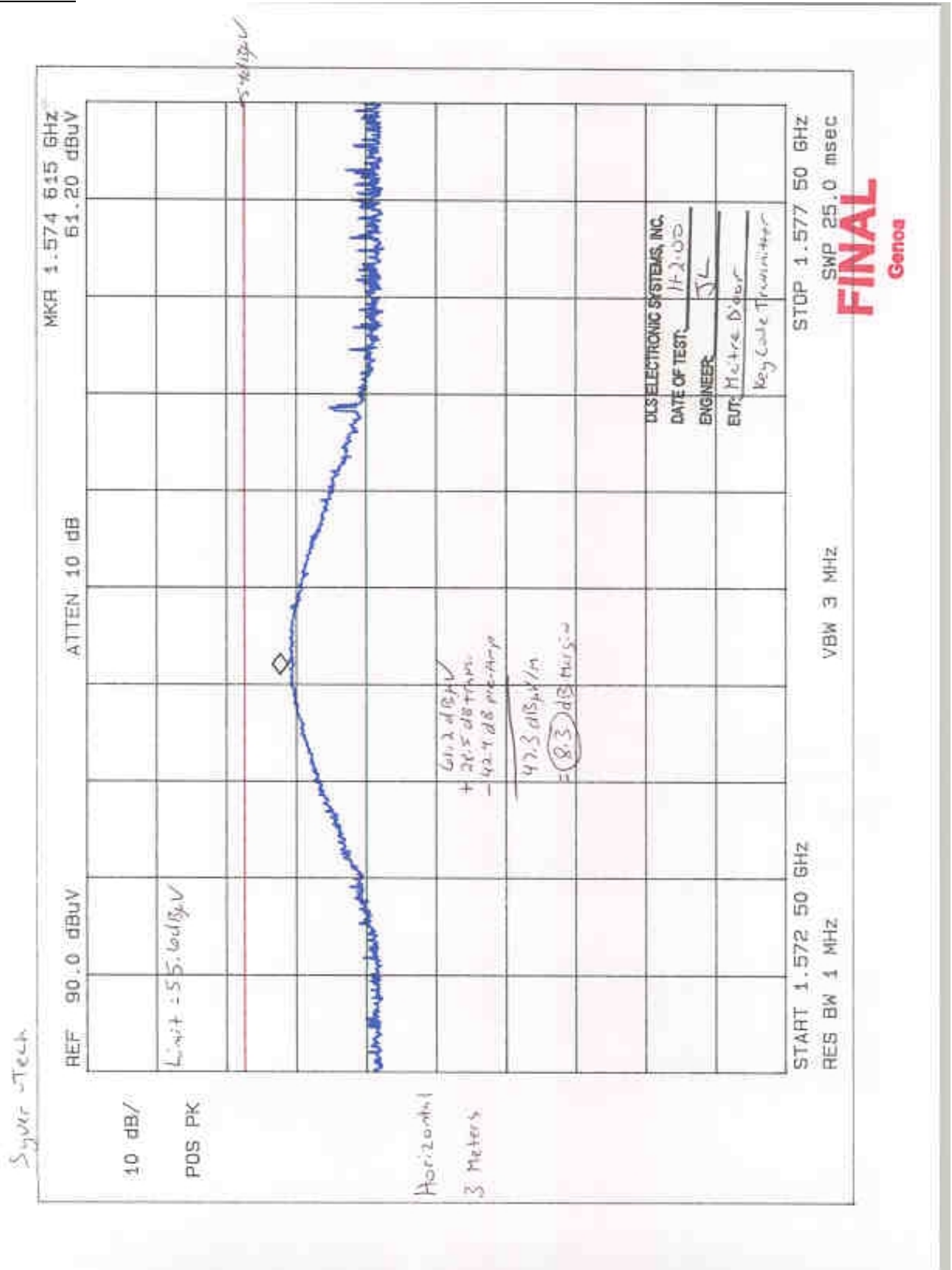


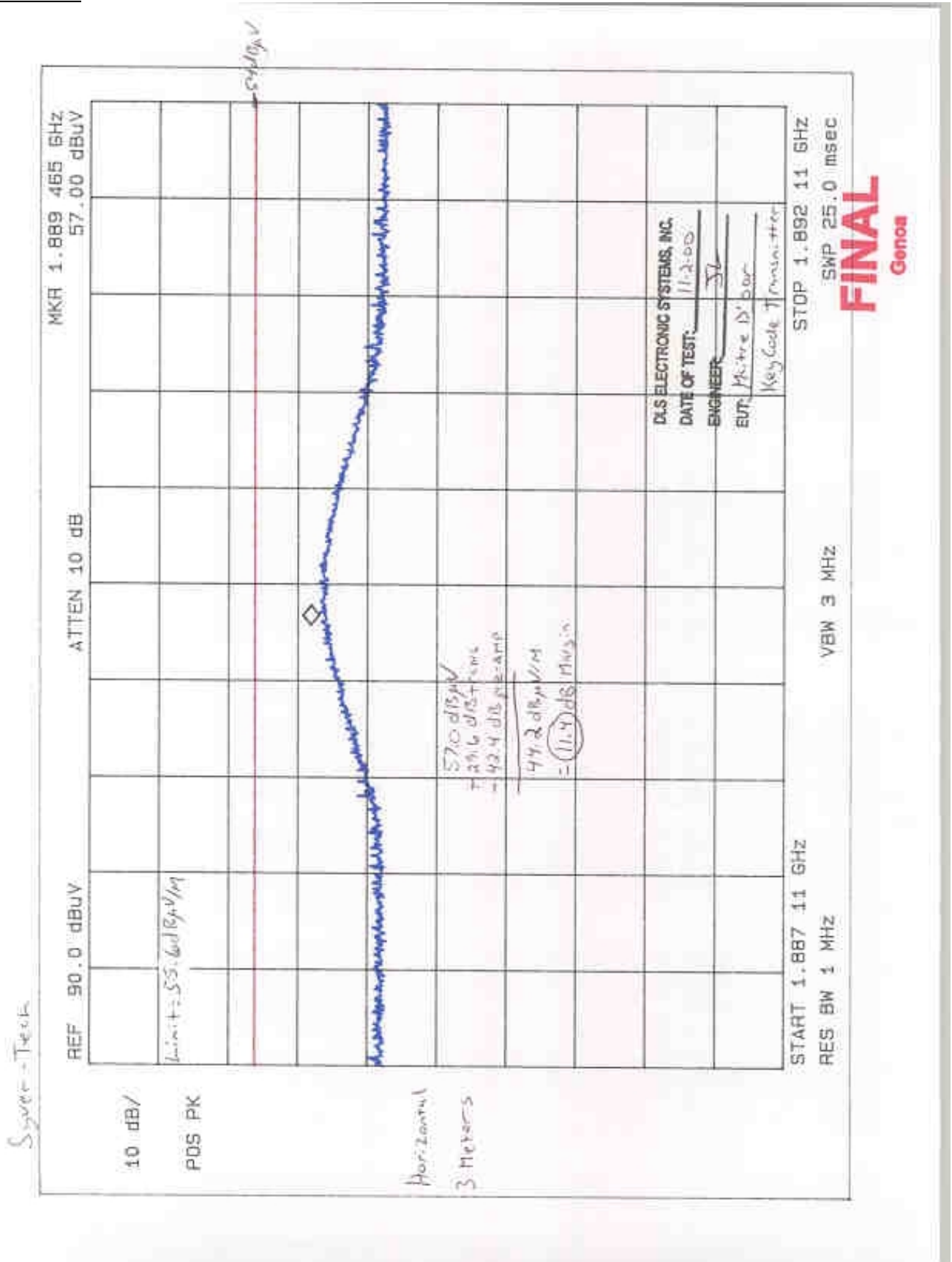


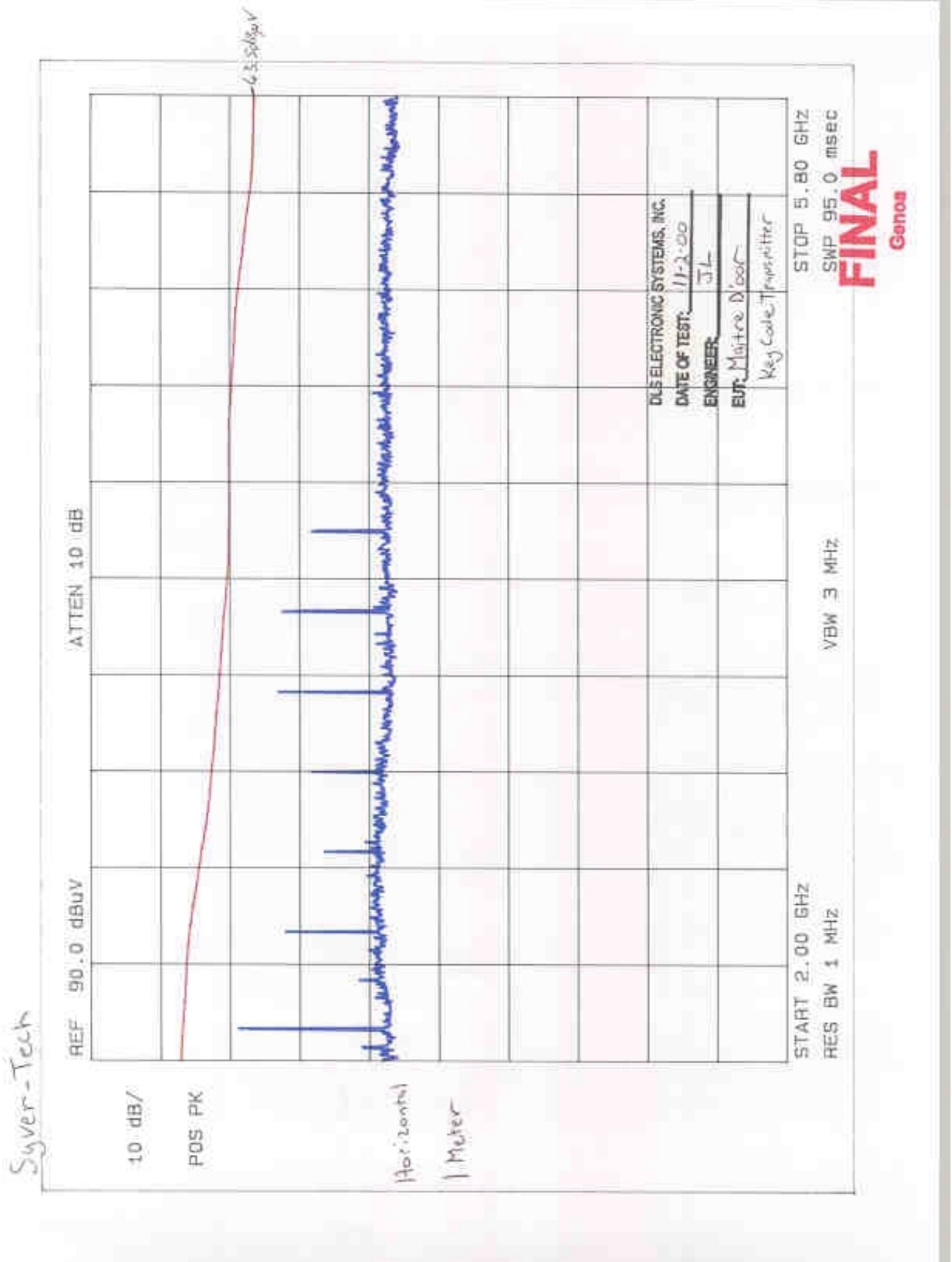




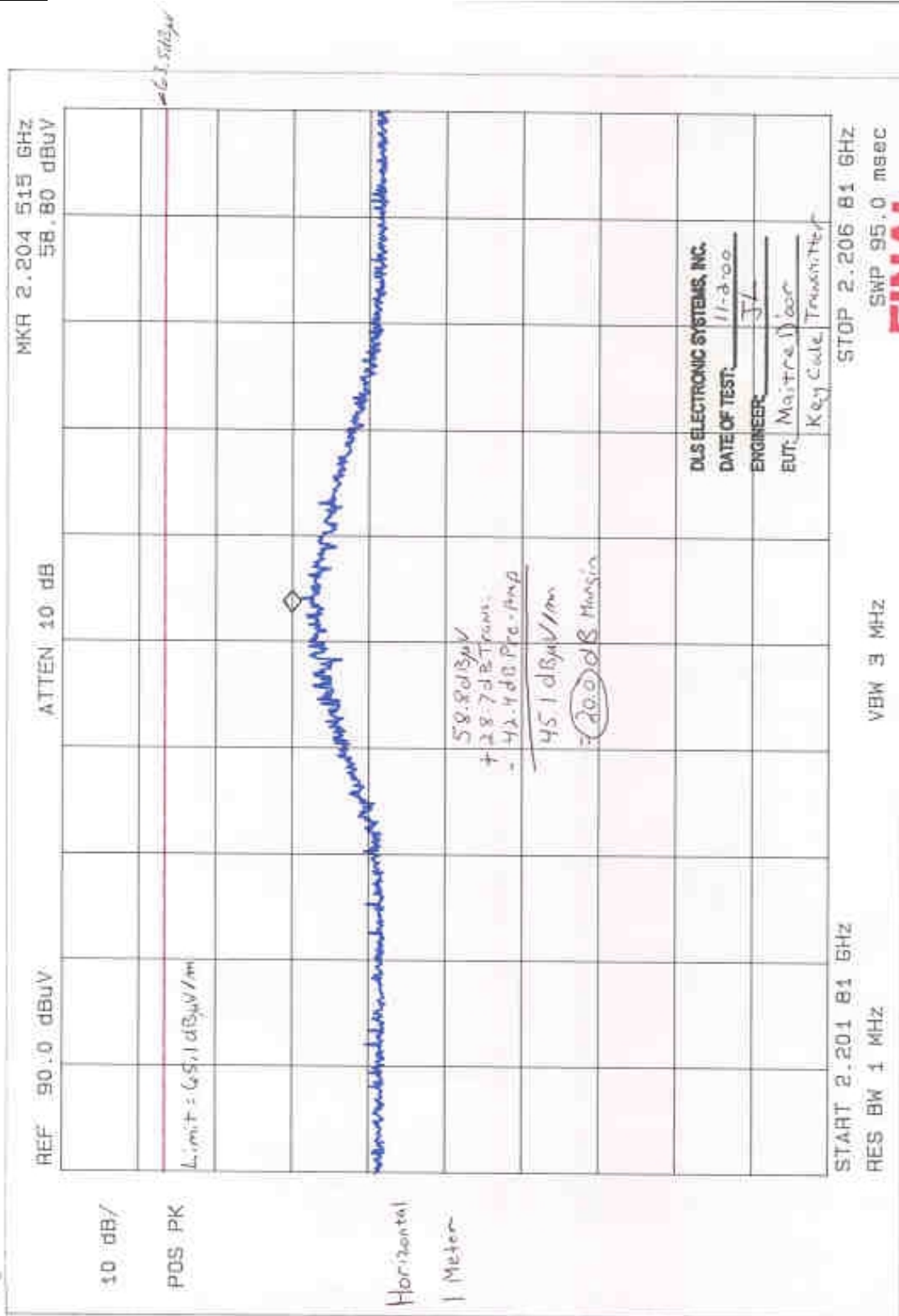


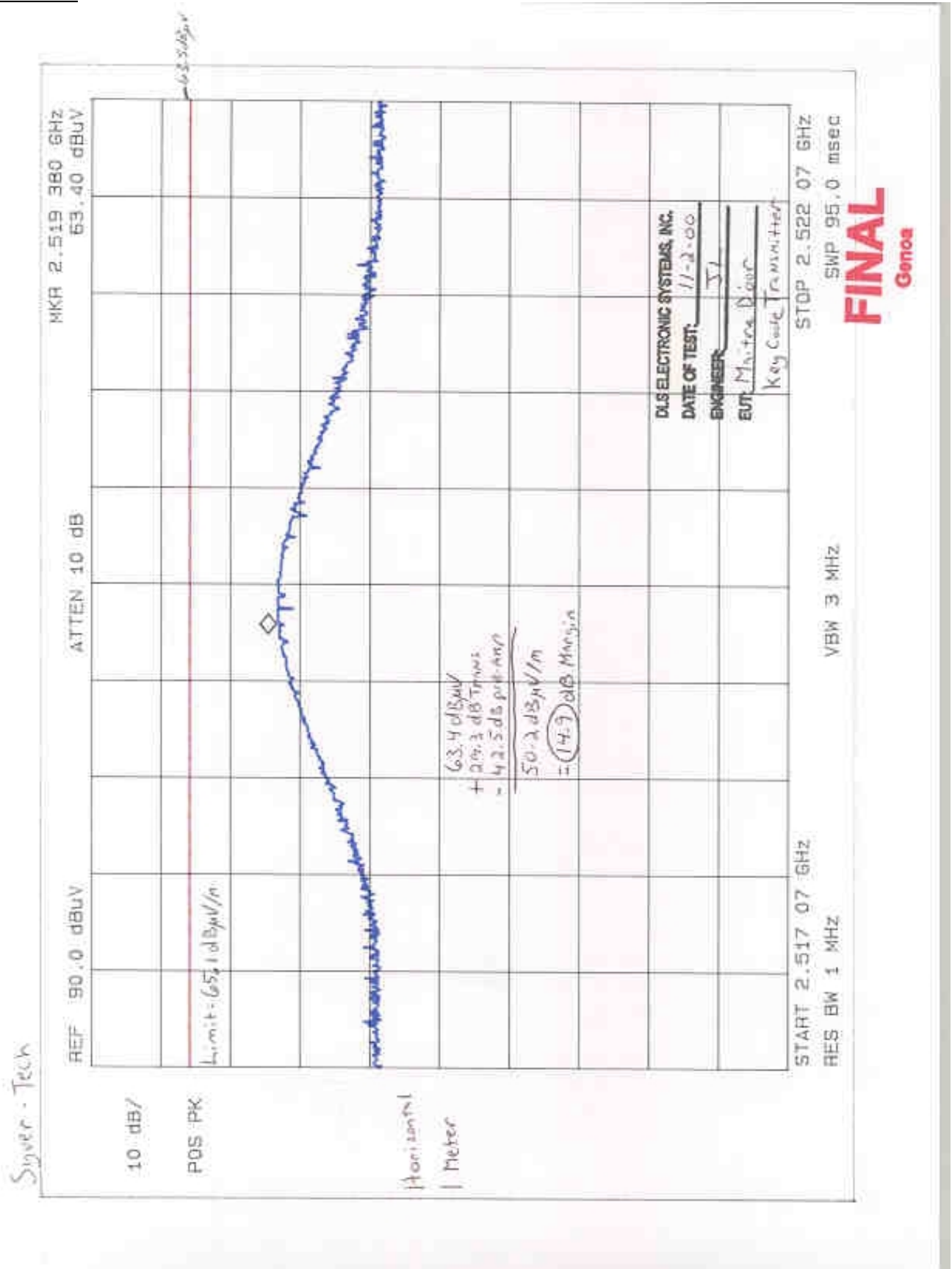


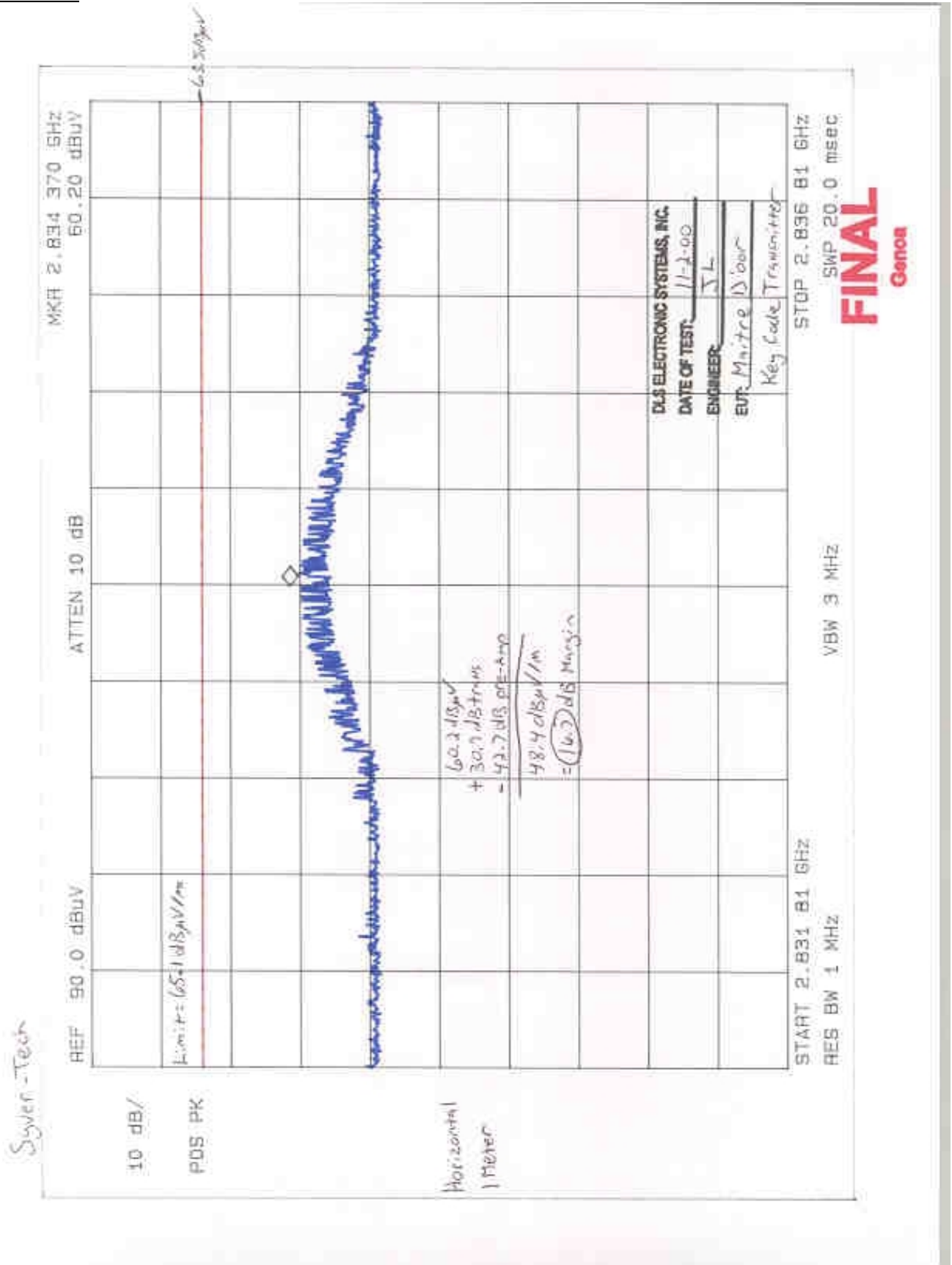




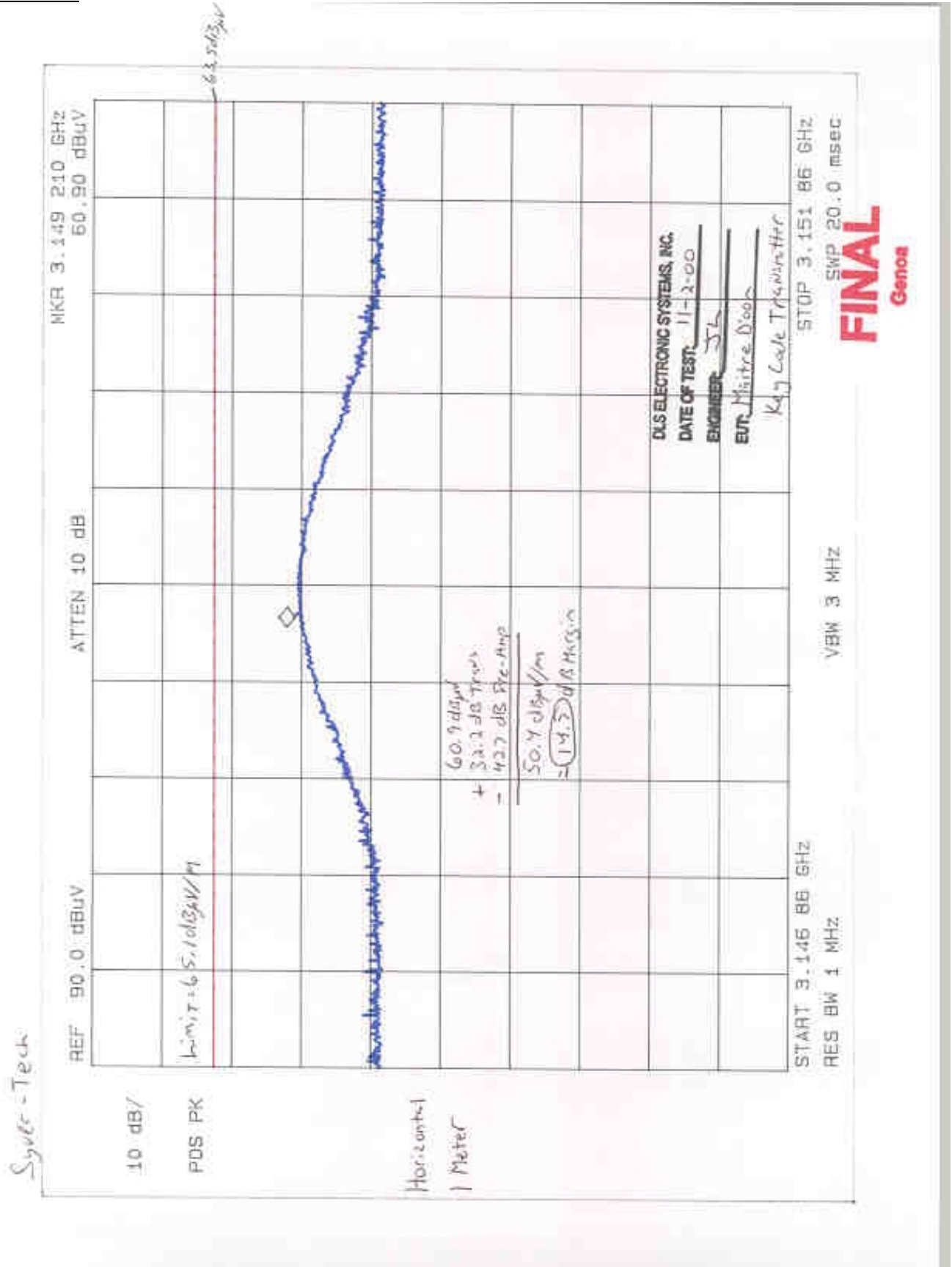
Syner-Tech











## 8.0 PULSED OPERATION (Duty Cycle Correction Factor)

### **NOTE:**

**The Duty Cycle Correction Factor does not need to be determined because the measurements made using the Quasi Peak detector are under the 15.231b limit.**



# **PULSED OPERATION CHARTS TAKEN DURING TESTING**

## **PART 15.231**

**GRAPHS TAKEN OF THE PULSE TRAIN SHOWING THE FOLLOWING:**

### **NOTE:**

**The Duty Cycle Correction Factor does not need to be determined because the measurements made using the Peak detector are under the 15.231b limit.**

## 9.0 BANDWIDTHS

The bandwidth of the transmitter shall be confined to the following specifications as specified in Section 15.231c & d:

40.66 to 40.7 MHz	$\pm 0.01\%$ within the band edges
70.00 to 900 MHz	.25% of the center frequency
Above 900 MHz	.50% of the center frequency

The bandwidth is determined at the points 20 dB down from the modulated carrier.

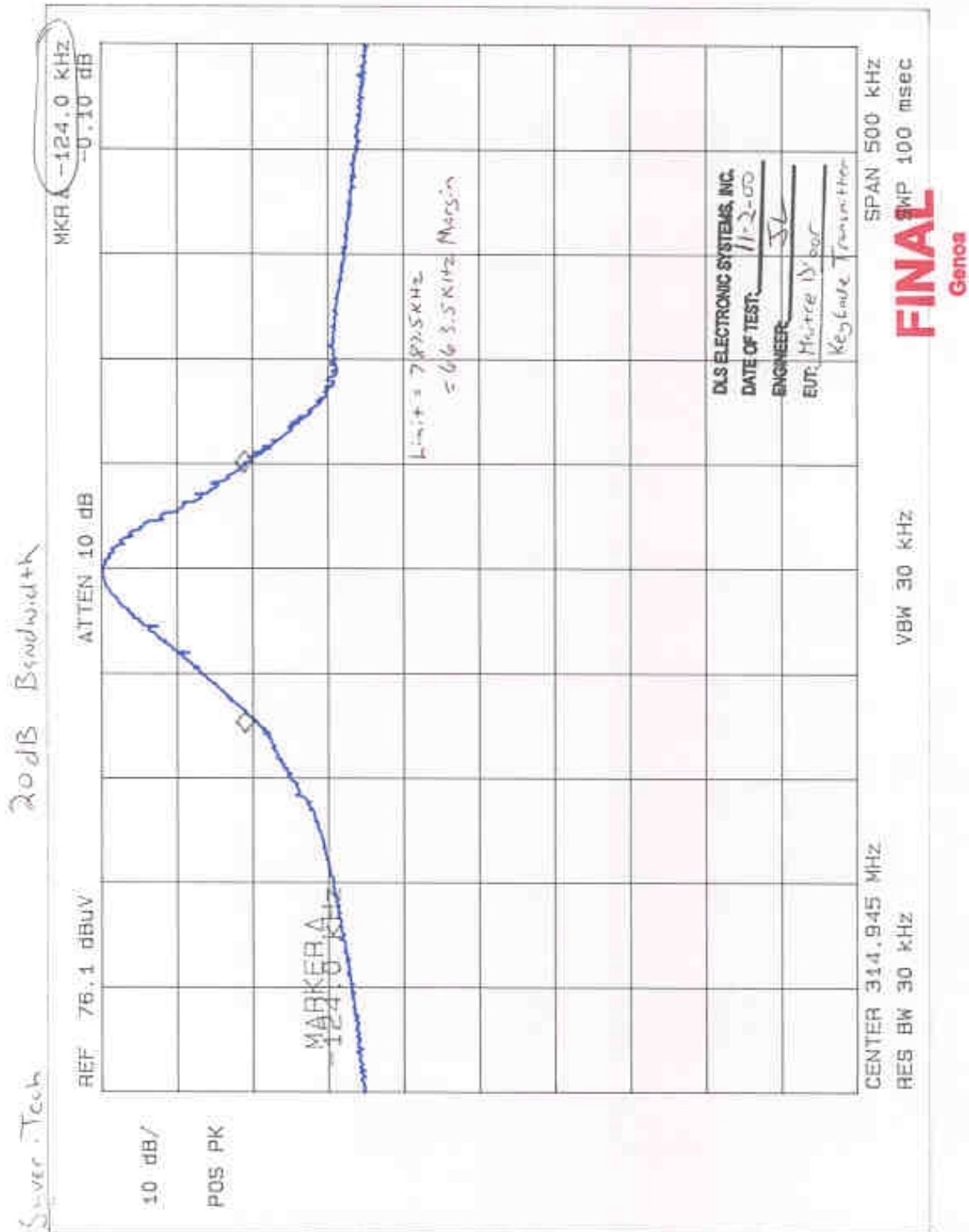
As shown by the graph on the following page, the bandwidth for the Syver-Tech, Inc. Maitre D'oor Key Code Transmitter was measured at **124**, which meets the above specification. With a fundamental frequency of **315 MHz**, the margin is **663.5 MHz** when multiplying the fundamental by **.25%** and subtracting it from the measured bandwidth.



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## **GRAPHS TAKEN OF THE FUNDAMENTAL FREQUENCY AND BANDWIDTH**



## 10.0 RESTRICTED BANDS

As stated in Section 15.205a, the fundamental emission from the Syver-Tech, Inc. Maitre D'oor Key Code Transmitter shall not fall within any of the bands listed below:

Frequency in MHz	Frequency in MHz	Frequency in MHz	Frequency in GHz
.0900 to .1100	162.0125 to 167.17	2310.0 to 2390	9.30 to 9.50
.4900 to .5100	167.7200 to 173.20	2483.5 to 2500	10.60 to 12.70
2.1735 to 2.1905	240.000 to 285.00	2655.0 to 2900	13.25 to 13.40
8.362 to 8.3660	322.200 to 335.40	3260.0 to 3267	14.47 to 14.50
13.36 to 13.410	399.900 to 410.00	3332.0 to 3339	15.35 to 16.20
25.50 to 25.670	608.000 to 614.00	3345.8 to 3358	17.70 to 21.40
37.50 to 38.250	960.000 to 1240.00	3600.0 to 4400	22.01 to 23.13
73.00 to 75.500	1300.000 to 1427.00	4500.0 to 5250	23.60 to 24.00
108.00 to 121.94	1435.000 to 1626.50	5350.0 to 5450	31.20 to 31.80
123.00 to 138.00	1660.000 to 1710.00	7250.0 to 7750	36.43 to 36.50
149.90 to 150.00	1718.800 to 1722.20	8025.0 to 8500	ABOVE 38.60
156.70 to 156.90	2200.000 to 2300.00	9000.0 to 9200	

### NOTE:

The noise floor within the Restricted Bands for the EMC Reveiver and HP Spectrum Analyer typically lies 20 dB below the limit.



## 11.0 PHOTO INFORMATION AND TEST SET-UP

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

Item 0 Syver-Tech, Inc. Maitre D'oor Key Code Transmitter  
FCC ID#: PF6-KC0118 SN: NA

Item 1

Item 2

Item 3

Item 4

Item 5

Item 6

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## 12.0 CONDUCTED PHOTOS TAKEN DURING TESTING.

**The equipment under test is battery operated and will not at any time be plug into the Public Utility lines, therefore the conducted test was not performed.**

## 12.0 RADIATED PHOTOS TAKEN DURING TESTING







### 13.0 CHANGE INFORMATION

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

Change 1.      There were no changes made at D.L.S. Electronic Systems, Inc.

Change 2.

Change 3.

Change 4.

Change 5.



### 13.0 CHANGE INFORMATION (CON'T)

Change 6.

Change 7.

Change 8.

Change 9.

Change 10.

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

by \_\_\_\_\_  
Signature Title

for \_\_\_\_\_  
Company Name Date



#### 14.0 RESULTS OF TESTS

The emission test 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. Those points on the radiated charts shown with a yellow mark are background frequencies that were verified during the test.

#### 15.0 CONCLUSION

It was found that the Key Code Transmitter, Model Number KC0118, S/N NA meets the radio interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.231 (a-b), 15.207 and 15.205 for Intentional Radiators operating in the 315 MHz Frequency Band. This test report relates only to the items tested.

#### NOTE:

**The conducted emissions test was not required because the EUT is powered from an DC power source. It does not have a line cord to plug into the A.C. power line.**

This report contains the following number of pages.

Text:	27 pages
Data Summary:	4 pages
Charts:	29 pages

TABLE 1 - EQUIPMENT LIST

Test Equipment	Manufacturer/Description	Model Number	Serial Number	Frequency Range	Cal Due Date
*Spectrum Analyzer	Hewlett/Packard	8566B	2240A 02041	25 Hz –22 GHz	10/01
Quasi-Peak Adapter	Hewlett/Packard	85650A	2043A 00121	10 kHz – 1 GHz	10/01
***Spectrum Analyzer	Hewlett/Packard	8591A	3009A 00700	9 kHz- 1.8 GHz	3/01
Receiver	Electrometrics	EMC-25 Mark-III	772	.01-1000 MHz	10/01
Meter Module	Electrometrics	CRM-25	162	.01-1000 MHz	10/01
Receiver	Electrometrics	EMC-25 Mark-III	804	.01-1000 MHz	10/01
Meter Module	Electrometrics	CRM-25	138	.01-1000 MHz	10/01
Receiver	Electrometrics	EMC-25 Mark-III	645	.01-1000 MHz	10/01
Meter Module	Electrometrics	CRM-25	116	.01-1000 MHz	10/01
Receiver	Electrometrics	EMC-30 Mark-III	44168	.01-1000 MHz	9/01
Antenna	Electrometrics	BIA-25	2453	20 - 200 MHz	4/01
Antenna	Electrometrics	LPA-25	1114	200 - 1000 MHz	4/01
Antenna	Electrometrics	BIA-25	2614	20 - 200 MHz	4/01
Antenna	Electrometrics	LPA-25	1205	200 - 1000 MHz	4/01
Antenna	Electrometrics	BIA-25	4785	20 - 200 MHz	4/01
Antenna	Electrometrics	LPA-25	4895	200 - 1000 MHz	4/01
Antenna	EMCO	6502	143	.01-30 MHz	10/01

\*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