



**COMPATIBLE
ELECTRONICS**

FCC ID: NWQSC98V1

EXHIBIT 4
TECHNICAL TEST REPORT



*FCC PART 15, SUBPART B CLASS A
AND SUBPART C TEST REPORT*

for

LASER TAG VEST

Model: G9701

Prepared for

STUNNER CORPORATION
1310 ROCKEFELLER ROAD
CERES, CALIFORNIA 95307

Prepared by: Kyle Fujimoto

KYLE FUJIMOTO

Approved by: Scott McCutchan

SCOTT McCUTCHAN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: APRIL 24, 1998

REPORT BODY	APPENDICES				TOTAL
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	
PAGES	15	9	6	3	38

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: Laser Tag Vest Model: G9701 S/N: N/A

Product Description: This unit is used for playing laser tag. The vest contains a 916.7 MHz transceiver, which was approved as a stand-alone unit under FCC ID: LNZ-TR1222A. This transceiver communicates with the main scoreboard during laser tag games.

The vest also contains other digital circuitry not associated with the transmitter. This digital circuitry was tested to comply with FCC Class A, since it will not be marketed for home use.

Modifications: The EUT was not modified in order to meet the specifications.

Manufacturer: Stunner Corporation
1310 Rockefeller Road
Ceres, California 95307

Test Dates: April 9, 14 and 19, 1998.

Test Specifications: EMI requirements
FCC Title 47, Part 15, Subpart B and Subpart C.
Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz - 30 MHz.	The digital portion of the device complies with the Class A limits of FCC Title 47, Part 15 Subpart B. The equipment only plugs into the AC line to charge the batteries, the transceiver is not active during charging.
2	Radiated RF Emissions, 30 MHz - 1000 MHz.	The digital portion of the device complies with the Class A limits of FCC Title 47, Part 15, Subpart B.
3	Radiated RF Emissions, 10 kHz to 10 GHz	The transceiver portion of the device complies with limits defined in FCC, Title 47, Part 15, Subpart C, sections 15.209 and 15.249.



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) test performed on the Laser Tag Vest Model: G9701. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the digital portion of the equipment under test, referred to as EUT hereafter, are within the Class A specification limits defined by FCC Title 47, Part 15, Subpart B. The transceiver (radio) portion of the EUT meets the specification limits defined in FCC, Title 47, Part 15, Subpart C, sections 15.209 and 15.249.

**2. ADMINISTRATIVE DATA****2.1 Location of Testing**

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Stunner Corporation

Kathi Terri

Compatible Electronics Inc.

Michael Christensen	Test Technician
Kyle Fujimoto	Test Engineer
Arnold Gaffud	Test Engineer
Brian Voegele	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on April 8, 1998.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Stunner Corporation.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program

**3. APPLICABLE DOCUMENTS**

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15 1996	FCC Rules - Radio frequency devices (including digital devices).
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

**4. DESCRIPTION OF TEST CONFIGURATION****4.1 Description of Test Configuration - EMI**

The EUT was set up as a stand-alone device. The vest is hard wired to the laser gun. The EUT was tested in two configurations for radiated emissions. During the first configuration, the EUT was continuously transmitting. During the second configuration, the EUT was continuously receiving a signal from another transmitter. For conducted emissions testing, the transceiver is not active, and the charger was charging the batteries.

The gun cable was moved to maximize the emissions. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix A and B.

**5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT****5.1 EUT and Accessory List**

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
LASER TAG VEST (EUT)	STUNNER CORPORATION	G9701	N/A	NWQSC98V1
AC ADAPTER	RADIO SHACK	Catalog Number: 273-1651D	N/A	N/A



5.2

EMI Test Equipment (For Testing Above 1 GHz and Conducted Emissions)

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	2950A06250	February 2, 1998	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2521A00924	June 16, 1997	1 Year
RF Attenuator	Com-Power	A-410	1602	November 25, 1997	1 Year
LISN	Com Power	LI-200	1764	January 3, 1998	N/A
LISN	Com Power	LI-200	1771	January 3, 1998	N/A
LISN	Com Power	LI-200	1775	January 3, 1998	1 Year
LISN	Com Power	LI-200	1780	January 3, 1998	1 Year
Computer	Hewlett Packard	HP98561A	2522A05178	N/A	N/A
Printer	Hewlett Packard	2225A	2925S33268	N/A	N/A
Microwave Amplifier	Hewlett-Packard	8349B	2548A00432	February 18, 1998	N/A
Horn Antenna	Antenna Research	DRG-118/A	1053	December 8, 1995	N/A
Computer	Dell	MMP	CT4KZ	N/A	N/A

5.3

EMI Test Equipment (For Testing Below 1 GHz)

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	2517A01420	November 18, 1997	1 Year
Preamplifier	Com Power	PA-102	1204	December 11, 1997	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	3303A01688	May 7, 1997	1 Year
Biconical Antenna	Com Power	AB-900	02835	November 10, 1997	1 Year
Log Periodic Antenna	Com Power	AL-100	1105	February 13, 1998	1 Year
Loop Antenna	Com Power	AL-130	01130	February 5, 1998	1 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded during the testing.



7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the HP 8566B spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequencies ranges of 0.45 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 9000/300 in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The six highest emissions are listed in Table 1.



7.1.2

Radiated Emissions Test

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The HP 85650A quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was 120 kHz. The following transducers and measurement bandwidths were used during the testing.

FREQUENCY (MHz)	TRANSDUCER	EFFECTIVE BANDWIDTH
.01 to .15	Active Loop Antenna	200 Hz
.15 to 30	Active Loop Antenna	9 kHz
30 to 300	Biconical Antenna	120 kHz
300 to 1000	Log Periodic Antenna	120 kHz
1000 to 10000	Horn Antenna	1 MHz

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and, for frequencies above 30 MHz, the antenna height was varied from 1 to 4 meters (for E field radiated field strength). For frequencies below 30 MHz, the center of the loop antenna remained one meter above the ground plane. The loop antenna was rotated about its axis in an effort to maximize the measured emissions. For frequencies above 1 GHz, the "gunsight" method was used to account for the directivity of the horn antenna.

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data.



8.

CONCLUSIONS

The digital portion of the Laser Tag Vest Model: G9701 meets all of the Class A specification limits defined in FCC Title 47, Part 15, Subpart B.

The transceiver (radio) portion of the Laser Tag Vest Model: G9701 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C, sections 15.209 and 15.249.

APPENDIX A***RADIATED AND CONDUCTED EMISSIONS
DATA SHEETS (DIGITAL PORTION)***

Page: 1 of 2

Test location: Compatible Electronics
 Customer : Stunner Corporation
 Manufacturer : Same
 EUT name : Laser Tag Vest
 Specification: Fcc_A Test distance: 10.0 mtrs Lab: A
 Distance correction factor($20 \log(\text{test/spec})$) : 0.00
 Test Mode :

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
1V	40.05	54.20	1.00	9.41	35.50	29.11	39.10	-9.99
2V	50.05	52.40	1.10	11.00	35.50	29.00	39.10	-10.10
3V	60.05	52.30	1.10	11.19	35.60	28.99	39.10	-10.11
4V	70.06	50.40	1.30	8.59	35.70	24.59	39.10	-14.51
5V	75.07	47.10	1.30	7.64	35.65	20.39	39.10	-18.71
6V	80.08	52.50	1.30	6.72	35.60	24.92	39.10	-14.18
7V	90.02	45.00	1.40	8.60	35.40	19.60	43.50	-23.90
8V	110.09	47.00	1.54	11.79	35.56	24.77	43.50	-18.73
9V	125.07	43.20	1.60	13.10	35.50	22.40	43.50	-21.10
10V	130.11	46.20	1.62	12.88	35.50	25.20	43.50	-18.30
11V	140.11	49.30	1.66	12.44	35.50	27.90	43.50	-15.60
12V	145.09	43.90	1.68	12.22	35.50	22.30	43.50	-21.20
13V	150.08	45.90	1.70	12.02	35.50	24.12	43.50	-19.38
14V	160.06	48.70	1.82	14.05	35.50	29.07	43.50	-14.43
15V	180.12	40.10	1.98	17.33	35.50	23.90	43.50	-19.60
16V	190.10	39.00	1.94	17.76	35.50	23.20	43.50	-20.30
17V	200.12	42.40	1.90	18.19	35.50	26.99	43.50	-16.51
18V	280.16	38.70	2.36	19.67	35.24	25.49	46.40	-20.91

Page: 2 of 2

Test location: Compatible Electronics
 Customer : Stunner Corporation Date : 4-15-98
 Manufacturer : Same Time : 13.30
 EUT name : Laser Tag Vest Model:
 Specification: Fcc_A Test distance: 10.0 mtrs Lab: A
 Distance correction factor(20*log(test/spec)) : 0.00
 Test Mode :

Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB
1H	50.07	45.60	1.10	11.00	35.50	22.20	39.10	-16.90
2H	60.05	54.70	1.10	11.19	35.60	31.39	39.10	-7.71
3H	100.09	48.40	1.50	10.91	35.60	25.21	43.50	-18.29
4H	140.07	47.00	1.66	12.44	35.50	25.60	43.50	-17.90
5H	180.09	42.80	1.98	17.32	35.50	26.60	43.50	-16.90
6H	200.09	41.70	1.90	18.19	35.50	26.29	43.50	-17.21
7H	220.13	42.00	1.98	16.43	35.42	24.99	46.40	-21.41

MEASUREMENT NOTES:

STUNNER CORPORATION
 LASER TAG VEST
 BLACK LEAD - MODEL: G9701
 FCC C - CHARGING MODE - 10 APR 1998 00:03:30

12 highest Peaks above -50 dB of Limit Line #2
 peak criteria = .1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.4595	41.8	-6.2
2	.4693	41.5	-6.5
3	.4752	40.4	-7.6
4	.4792	40.1	-7.9
5	.5621	39.9	-8.1
6	.4557	39.7	-8.3
7	.4634	39.7	-8.3
8	.4935	39.7	-8.3
9	.5212	39.5	-8.5
10	.5278	39.4	-8.6
11	.555	39.4	-8.6
12	.5082	39.3	-8.7

MEASUREMENT NOTES:

STUNNER CORPORATION
 LASER TAG VEST
 WHITE LEAD MODEL: G9701
 FCC C - CHARGING MODE - 9 APR 1998 23:59:27

12 highest Peaks above -50 dB of Limit Line #2
 peak criteria = .1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.7383	37.5	-10.5
2	.4634	37.4	-10.6
3	.7321	37.4	-10.6
4	.7445	37.4	-10.6
5	.7667	37.4	-10.6
6	.6891	37.1	-10.9
7	.6732	36.8	-11.2
8	.7571	36.8	-11.2
9	.6846	36.7	-11.3
10	.7079	36.7	-11.3
11	.6932	36.6	-11.4
12	.6789	36.5	-11.5

MEASUREMENT NOTES:

TEST ENGINEER: Kyle Fujimoto
 KYLE FUJIMOTO

COMPATIBLE ELECTRONICS INC.
EMISSION LEVEL [dB_{UV}]

100

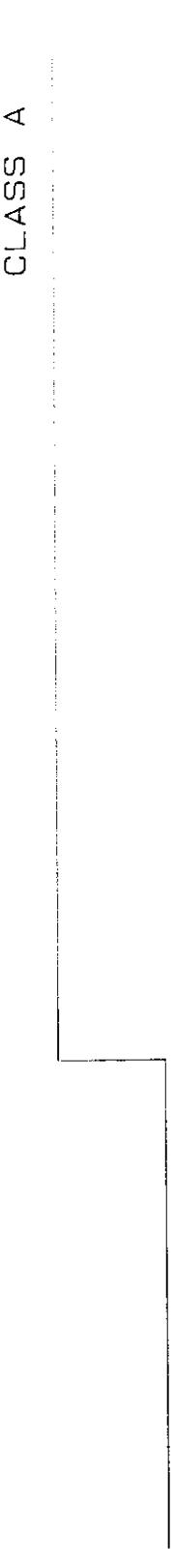
FCC PT 15 CLASS A & B CONDUCTED

9 Apr 1998 23: 59: 27

STUNNER CORPORATION
LASER TAG VEST
WHITE LEAD MODEL: 69701
FCC SUBPART C - CHARGING MODE

80

CLASS A



CLASS B

10
20
30
40
50
60
70
80
90
100

.45

1

FREQUENCY [MHz]

10

30

COMPATIBLE ELECTRONICS INC.
EMISSION LEVEL [dB_{UV}]

100

10 APR 1998 00:03:30

FCC PT 15 CLASS A & B CONDUCTED
STUNNER CORPORATION
LASER TAG VEST
BLACK LEAD MODEL: G9701
FCC SUBPART C - CHARGING MODE

FCC PT 15 CLASS A & B CONDUCTED

80

60

40

20

45

1

CLASS A

CLASS B

10

30

FREQUENCY [MHz]



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APPENDIX B

RADIATED EMISSIONS DATA SHEETS (TRANSCEIVER PORTION)

114 OLINDA DRIVE, BREA, CALIFORNIA 92823 PHONE: (714) 579-0500 FAX: (714) 579-1850



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PAGE B1

RADIATED EMISSIONS

COMPANY NAME: _____ **DATE:** 4-19-48

DATE: 4-9-98

EUT: LASER TAG UNIT EUT S/N: _____

EUT MODEL: _____ **LOCATION:** BREA SILVERADO AGOURA

SPECIFICATION: Fl **CLASS:** **TEST DISTANCE:** 3 m **LAB:** D

ANTENNA: LOOP BICONICAL LOG HORN **POLARIZATION:** VERT HORIZ

QUALIFICATION ENGINEERING MFG. AUDIT ENGINEER: Visa Venkates

NOTES: TRANSMIT MODE

NO OTHER EMISSIONS FOUND 104Hz TO 106Hz FROM TRANSCIEVER

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

BREA (714) 579-0500

SILVERADO (714) 589-0700

AGOURA (818) 597-0600



COMPATIBLE ELECTRONICS

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RADIATED EMISSIONS

COMPANY NAME:

DATE: 4-9-98

EUT: Laser Tao M. T

EUT S/N:

EIIT MODEL:

LOCATION: BREA SILVERADO AGOURA

SPECIFICATION: FCC

CLASS:

TEST DISTANCE: 3 m

LAB: 1

ANTENNA: LOOP BICONICAL LOG HORN

POLARIZATION: VERT HORIZ

QUALIFICATION ENGINEERING MFG. AUDIT

ENGINEER: *D. E. G. V. S. E. G. L. C.*

NOTES: *TRANSMIT MODE*

NO OTHER EMISSIONS FOUND 10KHz to 10GHz FROM TRANSCIVER

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

BREA (714) 579-0500

SILVERADO (714) 589-0700

AGOURA (818) 597-0600



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RADIATED EMISSIONS

COMPANY NAME: _____ **DATE:** 4-9-48

DATE: 4-9-98

EUT: LASER Trac Unit EUT S/N: _____

EUT MODEL: **LOCATION:** BREA SILVERADO AGOURA

SPECIFICATION: FCC CLASS: TEST DISTANCE: 3M LAB: 0

ANTENNA: LOOP BICONICAL LOG HORN **POLARIZATION:** VERT HORIZ

QUALIFICATION ENGINEERING MFG. AUDIT ENGINEER: Deepti Patel

NOTES: RECEIVE MODE

NO OTHER EMISSIONS FOUND 10Hz to 10GHz FROM TRANSCIEVER

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

BREA (714) 579-0500

SILVERADO (714) 589-0700

AGOURA (818) 597-0600



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RADIATED EMISSIONS

COMPANY NAME: _____ **DATE:** 4-9-98

DATE: 4-9-98

EUT: LASER TAG UNIT EUT S/N: _____

EUT S/N:

EUT MODEL: **LOCATION:** BREA SILVERADO AGOURA

LOCATION: BREA SILVERADO AGOURA

SPECIFICATION: FCC CLASS: TEST DISTANCE: 3m LAB:

CLASS: TEST DISTANCE: 30 LAB:

ANTENNA: LOOP BICONICAL LOG HORN **POLARIZATION:** VERT HORIZ

POLARIZATION: VERT HORIZ

QUALIFICATION ENGINEERING MFG. AUDIT **ENGINEER:** DIA SENIOR

ENGINEER: John D. Seelye

NOTES: RECEIVED MODE

NO OTHER EMISSIONS FOUND 10KHz to 10GHz FROM TRANSCIEVER

• CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

BREA (714) 579-0500

SILVERADO (714) 589-0700

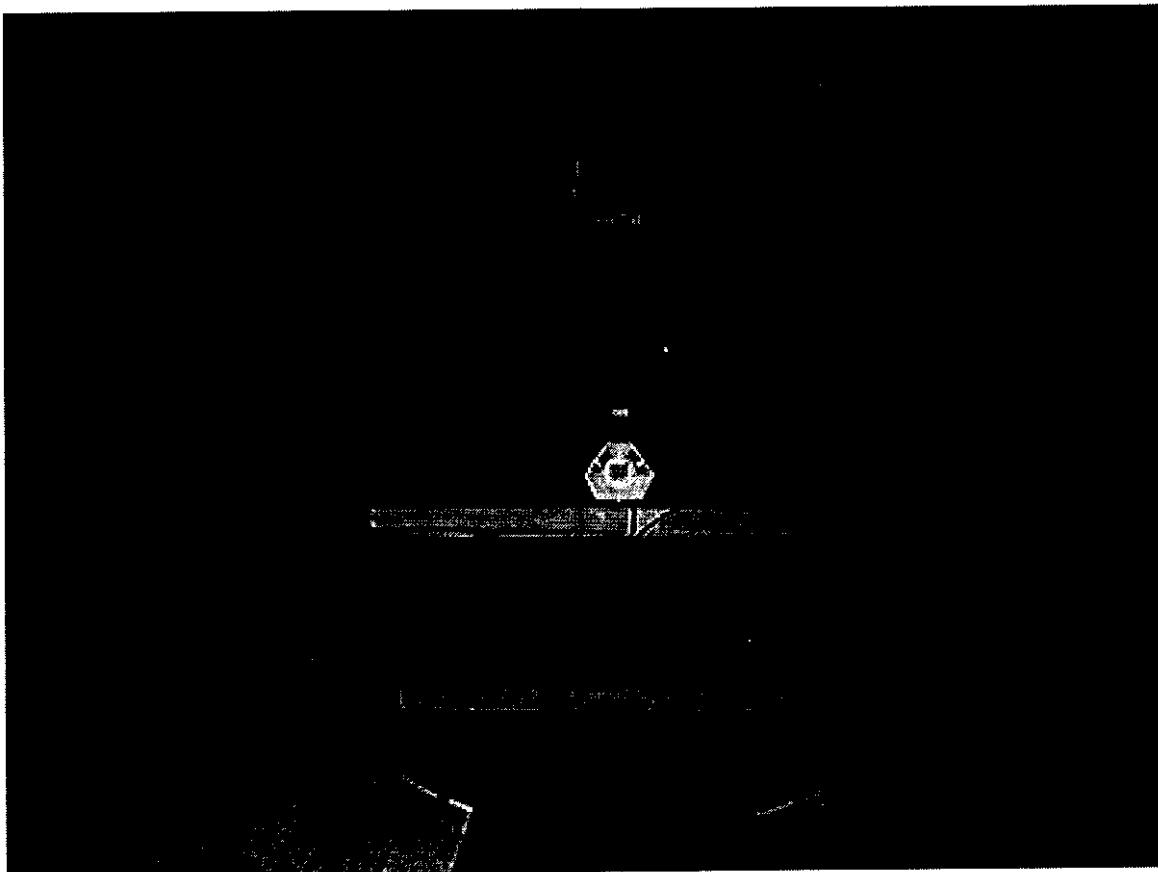
AGOURA (818) 597-0600



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STUNNER CORPORATION
LASER TAG VEST
Model: G9701
RADIATED EMISSIONS > 1 GHz – 4-9-98

**PHOTOGRAPHS SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



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APPENDIX C

TEST SETUP DIAGRAMS

114 OLINDA DRIVE, BREA, CALIFORNIA 92823 PHONE: (714) 579-0500 FAX: (714) 579-1850



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2.5 x 3.0 Meter Vertical Conductive Surface

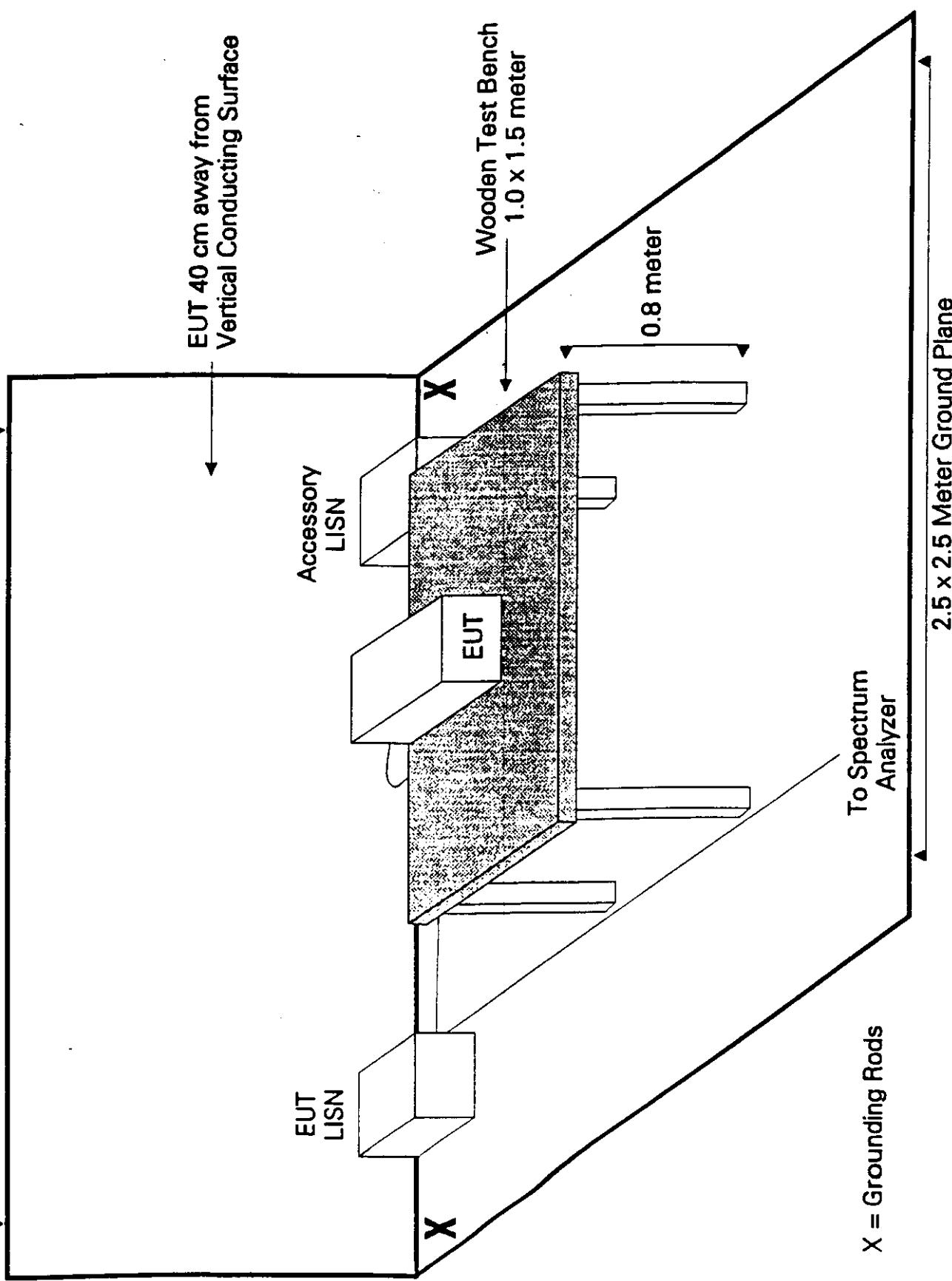


FIGURE 1 - CONDUCTED EMISSIONS TEST SETUP SITE D



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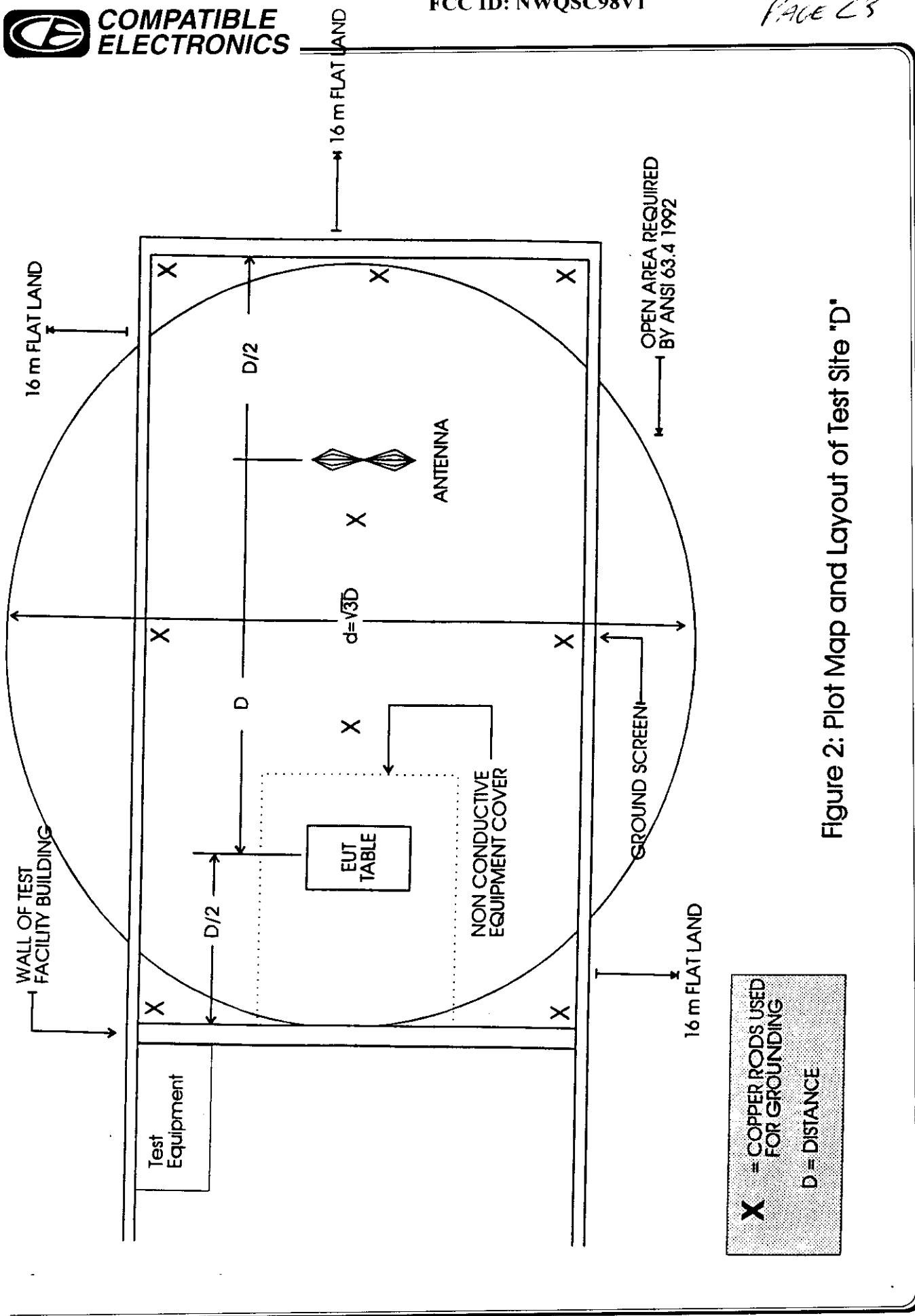


Figure 2: Plot Map and Layout of Test Site 'D'



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APPENDIX D

ANTENNA FACTORS AND EFFECTIVE GAIN CHARTS

Com-Power Corporation		
	(714) 587-9800	
	Antenna Calibration	
Antenna Type:		Loop Antenna
Model:		AL-130
Serial Number:		25309
Calibration Date:		2/5/98
Frequency MHz	Magnetic (dB/m)	Electric dB/m
0.01	-40.5	11.0
0.02	-41.6	9.9
0.03	-40.0	11.5
0.04	-40.3	11.2
0.05	-41.6	9.9
0.06	-41.1	10.4
0.07	-41.3	10.2
0.08	-41.6	9.9
0.09	-41.7	9.8
0.1	-41.8	9.7
0.2	-44.0	7.5
0.3	-41.6	9.9
0.4	-41.7	9.8
0.5	-41.7	9.8
0.6	-41.5	10.0
0.7	-41.5	10.0
0.8	-41.6	9.9
0.9	-41.6	9.9
1	-41.1	10.4
2	-40.7	10.8
3	-40.7	10.8
4	-40.9	10.6
5	-40.1	11.4
6	-40.0	11.5
7	-40.3	11.2
8	-39.8	11.7
9	-38.8	12.7
10	-40.8	10.7
12	-41.4	10.1
14	-41.4	10.1
15	-40.9	10.6
16	-40.8	10.7
18	-41.5	10.0
20	-41.5	10.0
25	-41.2	10.3
30	-41.4	10.1
Trans. Antenna Height		2 meter
Receiving Antenna Height		2 meter

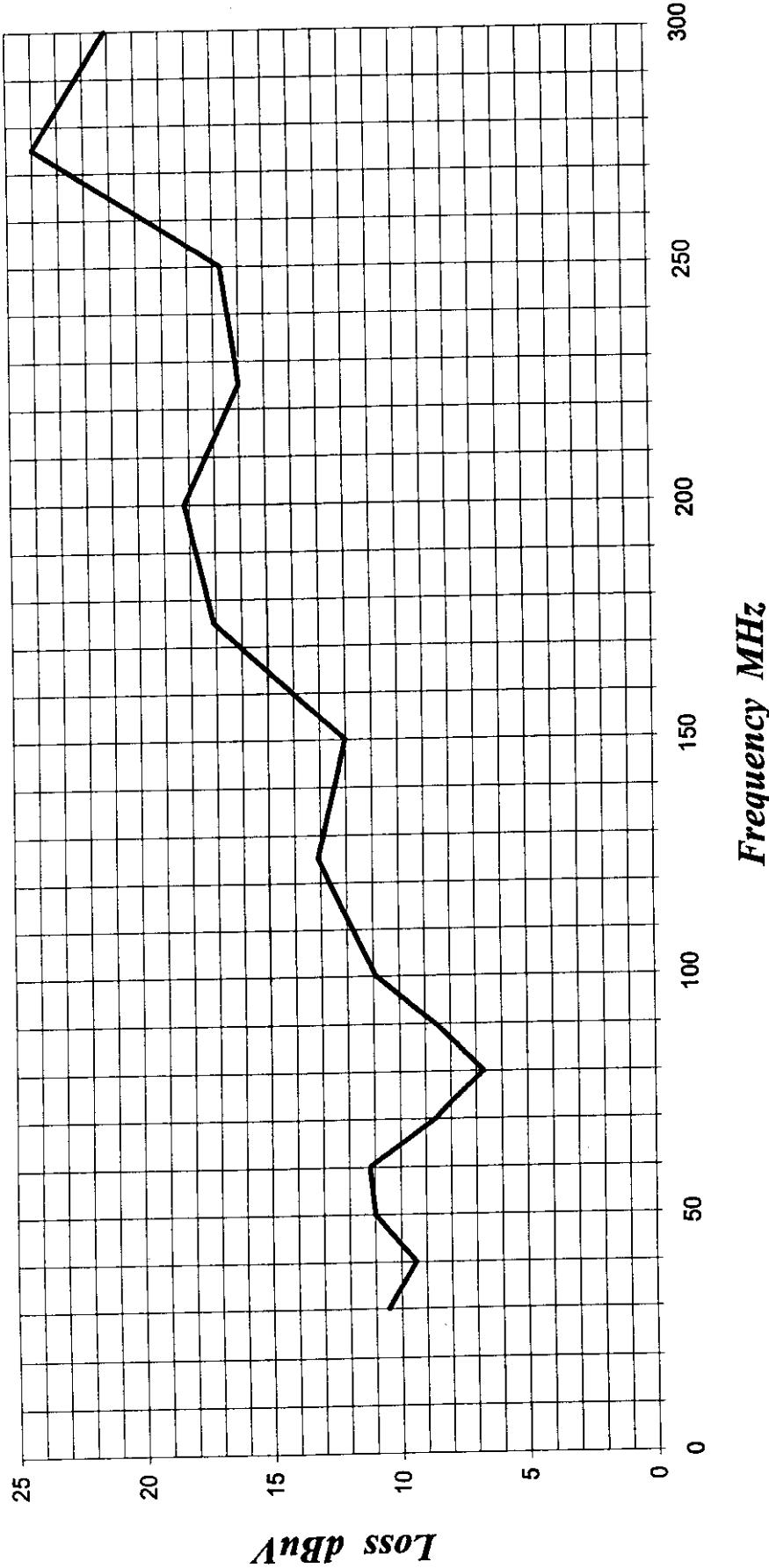


**COMPATIBLE
ELECTRONICS**

FCC ID: NWQSC98V1

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Cal: 11/10/97
LAB "A" BICONICAL ANTENNA AB-900 S/N: 2835





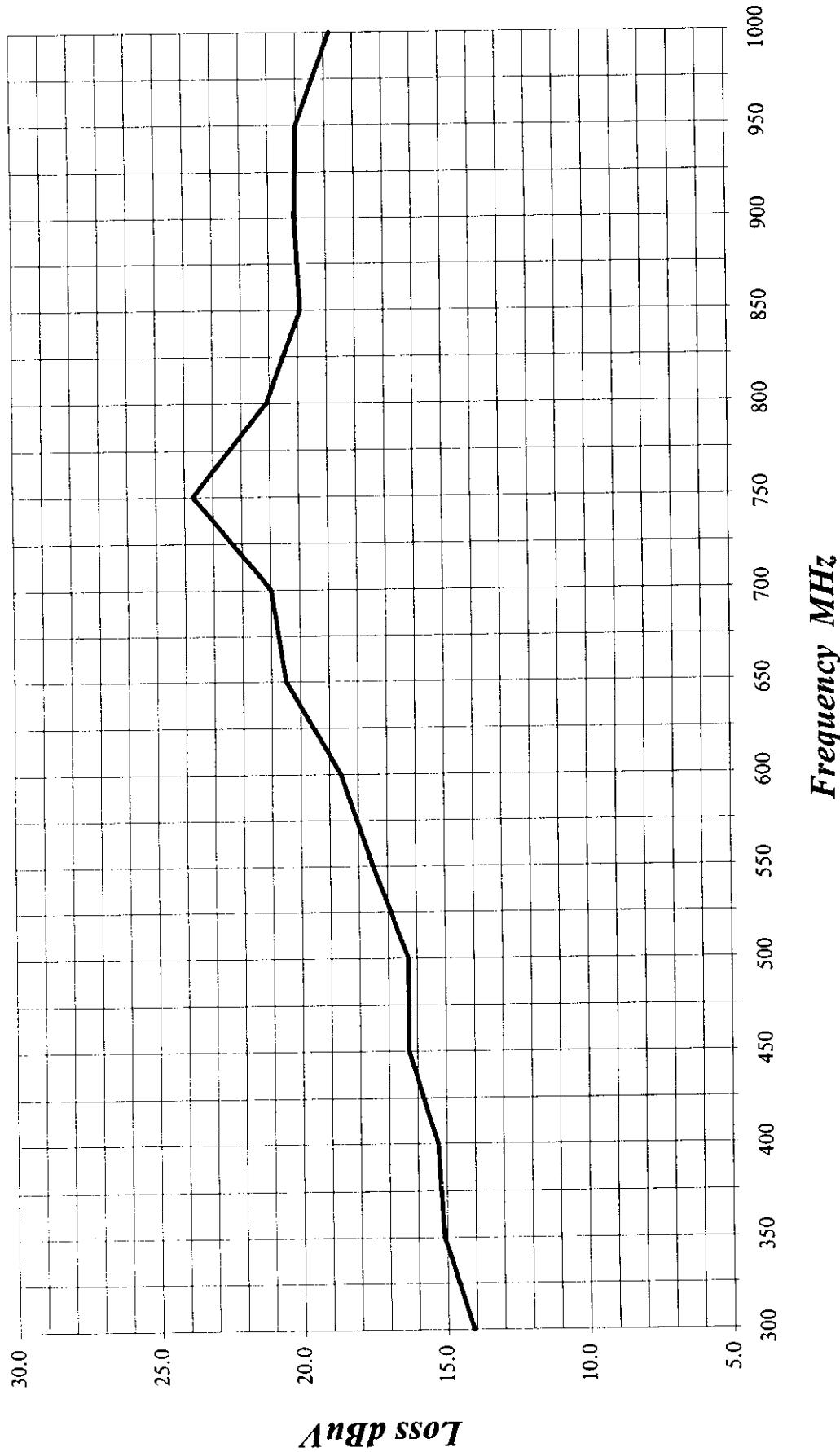
**COMPATIBLE
ELECTRONICS**

FCC ID: NWQSC98V1

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LAB "A" LOG PERIODIC ANTENNA AL-100 S/N: 1105

Cal: 12/11/97





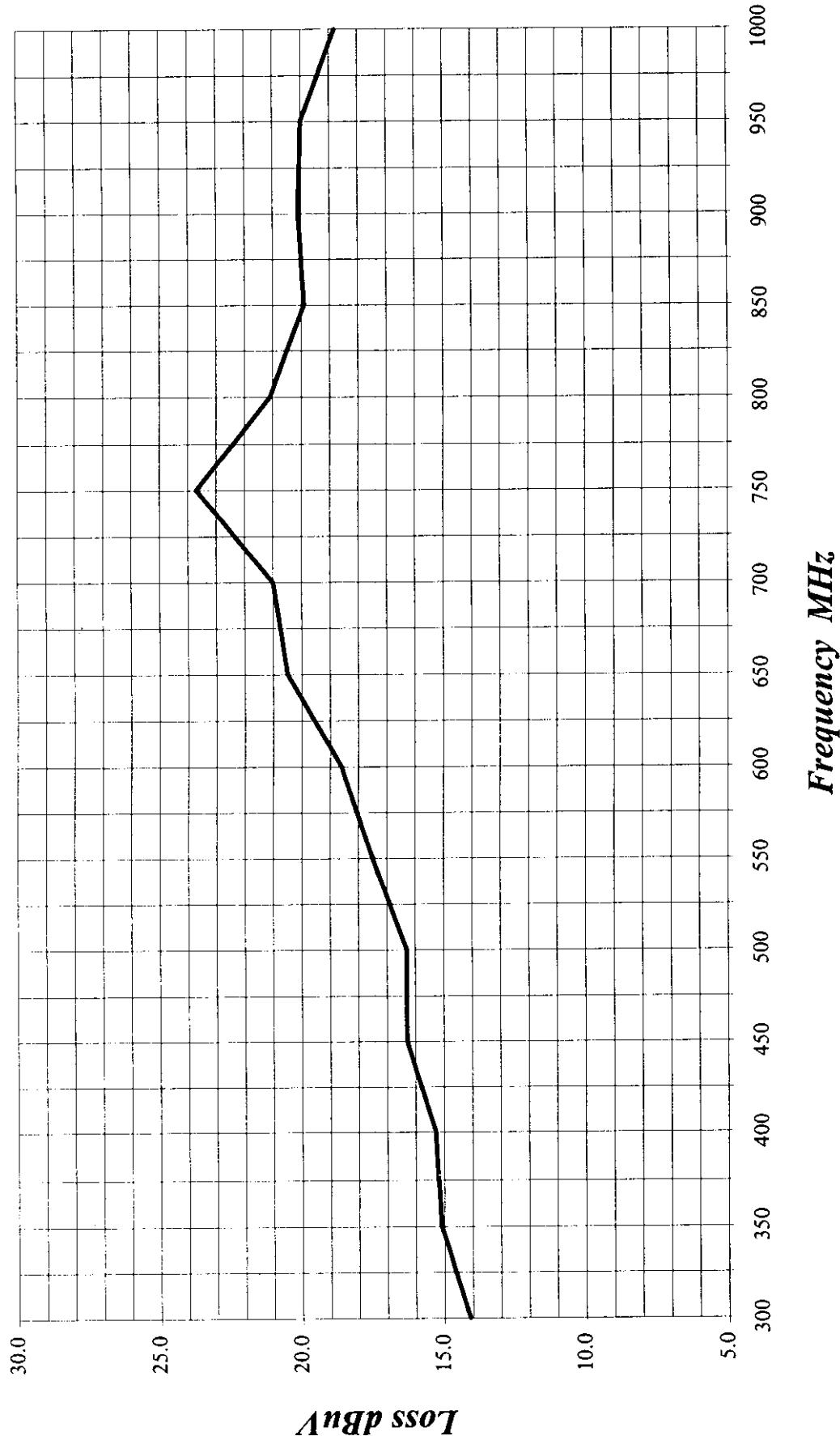
**COMPATIBLE
ELECTRONICS**

FCC ID: NWQSC98V1

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LAB "A" LOG PERIODIC ANTENNA AL-100 S/N: 1105

Cal: 12/11/97





E-FIELD ANTENNA FACTOR CALIBRATION

$$E(\text{dB V/m}) = V_o(\text{dB V}) + AFE(\text{dB/m})$$

Model number : DRG-118/A

Frequency GHz	AFE dB/m	Gain dBi
1	22.3	8.0
2	28.7	9.5
3	29.7	10.1
4	29.5	12.8
5	32.3	12.0
6	32.4	13.4
7	36.1	11.0
8	37.4	10.9
9	36.8	12.5
10	39.5	10.7
11	39.6	11.5
12	39.8	12.0
13	39.7	12.8
14	41.8	11.3
15	41.9	11.9
16	38.1	16.3
17	41.0	13.9
18	46.5	8.9

Serial number : 1053
 Job number : 96-092
 Remarks : 3 meter calibration
 Standards : LPD-118/A, TE-1000

Temperature : 72° F
 Humidity : 56 %
 Traceability : A01887
 Date : December 08, 1995

Calibrated By