FCC PART 15, SUBPART C
TEST REPORT

for

SECURITY TRANSPONDER

Model: ST1-99

Prepared for

ENTERTAINMENT SYSTEMS TECHNOLOGY
17011 BEACH BLVD.
HUNTINGTON BEACH, CALIFORNIA 92647-5989

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: DECEMBER 27, 1999

	REPORT BODY	APPENDICES				TOTAL
		A	*B*	*C*	*D*	
PAGES	16	2	2	11	20	**51**

TABLE OF CONTENTS

LIST OF APPENDICES

APPENDIX	TITLE
A	Modifications to the EUT
B	Additional Models Covered Under This Report
C	Diagrams, Charts and Photos • Test Setup Diagrams • Radiated Emissions Photos • Antenna and Effective Gain Factors
D	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site

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 procedures described in the test specifications 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 with the written permission of Compatible Electronics.

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

Device Tested:	Security Transponder Model: ST1-99 S/N: 001
Product Description:	See Expository Statement.
Modifications:	The EUT was modified during the testing. Please see the list located in Appendix A.
Manufacturer:	Entertainment Systems Technology 17011 Beach Blvd Huntington Beach, California 92647
Test Dates:	December 20 and 21, 1999
Test Specifications:	EMI requirements FCC Title 47, Part 15 Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.249
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	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.207
2	Spurious Radiated RF Emissions, 10 kHz – 1000 MHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart B, section 15.109(b) (**See Note 1**)
3	Emissions produced by the intentional radiator 10 kHz – 9300 MHz	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 (a), and 15.249

Note 1: **The digital circuits of the EUT have been tested and verified to comply with FCC Part 15, Subpart B, Verification – Class A Digital Devices. This test report can be provided upon FCC request.**
This device will be used for commercial and/or business environments only (i.e. restaurants)

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Security Transponder Model: ST1-99. 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 equipment under test, referred to as EUT hereafter, are within the specification limits defined by CFR Title 47, Part 15, Subpart C, sections 15.205, 15.207, 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 92823.

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

Entertainment Systems Technology

Anthony Le	Senior Project Engineer
Tony Wong	Senior Engineer
Tony Lopez	President

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on December 20, 1999

2.5 Disposition of the Test Sample

The test sample was returned to Entertainment Systems Technology on December 21, 1999.

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

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
CFR Title 47, Subpart C.	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
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.
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators.

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Security Transponder Model: ST1-99 (EUT) was connected to the antenna via a low pass filter. The EUT is usually mounted on the wall with the antenna mounted on a doorway. To maximize the emissions to the receiving antenna, the EUT's antenna was mounted vertically on a 10 cm x 10 cm block.

Note: The EUT has a standard MMCX connector for the antenna. **However, the EUT will be professionally installed by either a certified electrician and/or by Entertainment Systems Technology personnel.** The EUT only has 1 channel (916.5 MHz).

The final radiated as well as conducted data was taken in the mode above. Please see Appendix D for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 This is a 1 meter braid shielded cable connecting the EUT to the low pass filter. It has a metallic MMCX connector at the EUT and a metallic SMA connector at the low pass filter end. The shield of the cable was grounded to the chassis via the connectors.

Cable 2 This is a 1 meter braid shielded cable connecting the antenna to the low pass filter. It has a metallic SMA connector at the low pass filter end and is hard wired into the antenna. The shield of the cable was grounded to the chassis via the connectors.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
SECURITY TRANSPONDER (EUT)	ENTERTAINMENT SYSTEMS TECHNOLOGY	ST1-99	001	**ORUEST-ST1-99**
LOW PASS FILTER	MINI-CIRCUITS	SLP-1000	N/A	**N/A**
ANTENNA	ASTRON ANTENNA COMPANY	ASTPCG09HDAML	N/A	**N/A**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Spectrum Analyzer	Hewlett Packard	8566B	3638A08789	July 28, 1999	1 Year
Preamplifier	Com Power	PA-102	1017	January 16, 1999	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	July 14, 1999	1 Year
RF Attenuator	Sertek	412-10	N/A	November 22, 1999	1 Year
LISN	Com Power	LI-215	12075	November 13, 1999	1 Year
LISN	Com Power	LI-215	12078	November 13, 1999	1 Year
Biconical Antenna	Com Power	AB-100	1548	October 14, 1999	1 Year
Log Periodic Antenna	Com Power	AL-100	16039	October 14, 1999	1 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Microwave Preamplifier	Com-Power	PA-122	25195	December 14, 1999	1 Year
Horn Antenna	Antenna Research	DRG-118/A	1053	December 8, 1995	N/A
Loop Antenna	Com-Power	AL-130	25309	April 13, 1999	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 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.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak 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 offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this 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 conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the HP software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix D.

7.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. 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.

For the peak readings below 1000 MHz that were within 3 dB of the spec limit or higher, the quasi-peak adapter was used.

For the peak readings above 1000 MHz that were within 3 dB of the spec limit or higher, the readings were averaged manually by narrowing the video filter down to 10 Hz and slowing the sweep time to keep the measurement calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

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 the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

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. The final qualification data sheets are located in Appendix D.

8. CONCLUSIONS

The Security Transponder Model: ST1-99 meets all of the specification limits defined in CFR Title 47, Part 15, Subpart C, sections 15.205, 15.207, and 15.249.

APPENDIX A

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.249 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

Modifications:

1) Add low pass filter to the RF output

2) Add shield to the RF section

See the external and internal photographs for pictures of the mods

APPENDIX B

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Security Transponder
Model: ST1-99
S/N: 001

There were no additional models covered under this report.

APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

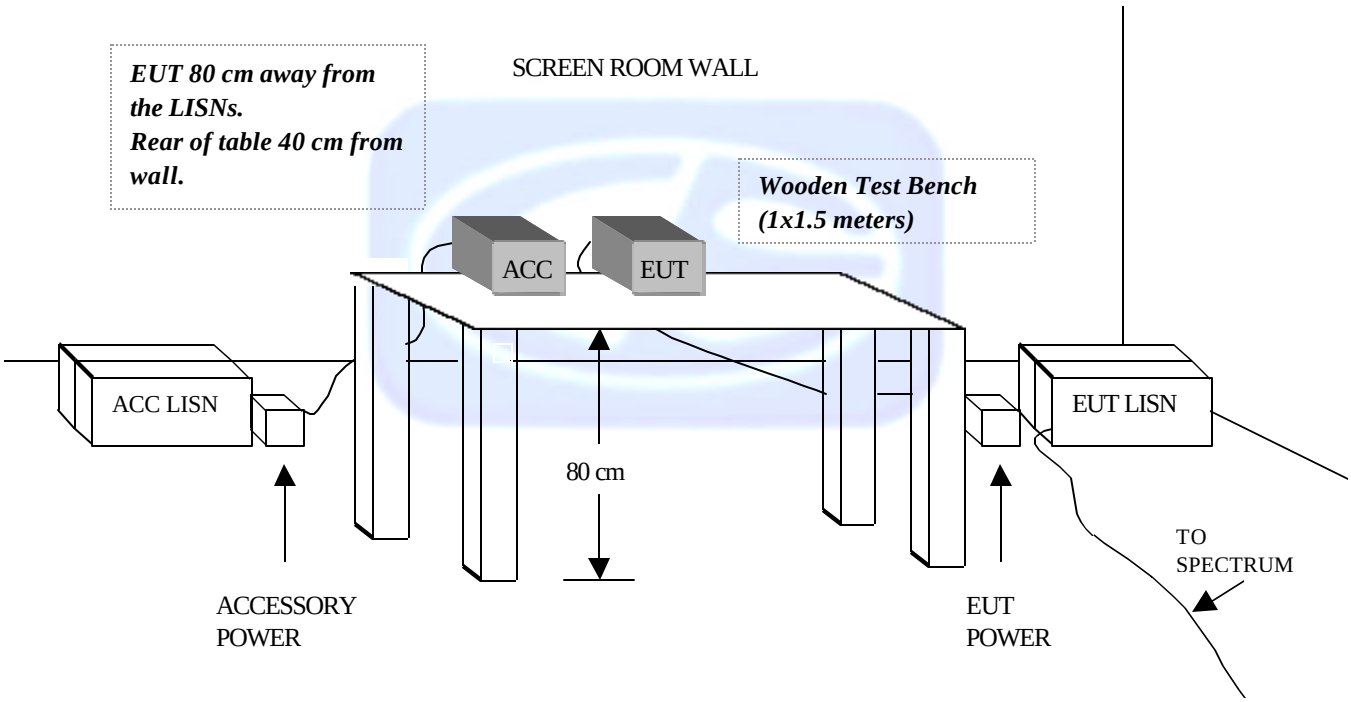
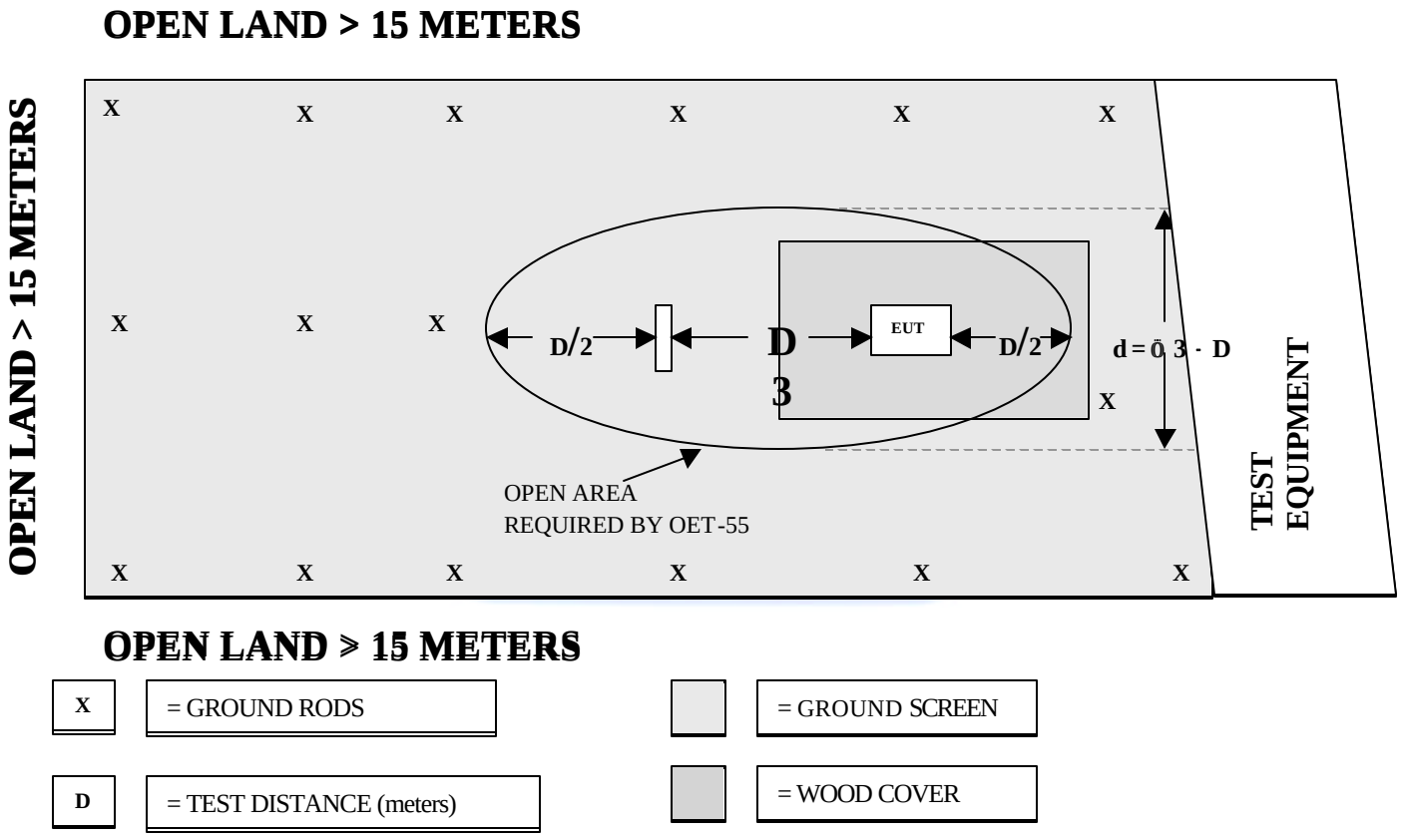


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE



FRONT VIEW

ENTERTAINMENT SYSTEMS TECHNOLOGY
SECURITY TRANSPONDER
MODEL: ST1-99
FCC SUBPART C - RADIATED EMISSIONS – 12-21-99

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

ENTERTAINMENT SYSTEMS TECHNOLOGY
SECURITY TRANSPONDER
MODEL: ST1-99
FCC SUBPART C - RADIATED EMISSIONS – 12-21-99

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

ENTERTAINMENT SYSTEMS TECHNOLOGY
SECURITY TRANSMITTER
MODEL: ST1-99
FCC SUBPART C - CONDUCTED EMISSIONS – 12-20-99

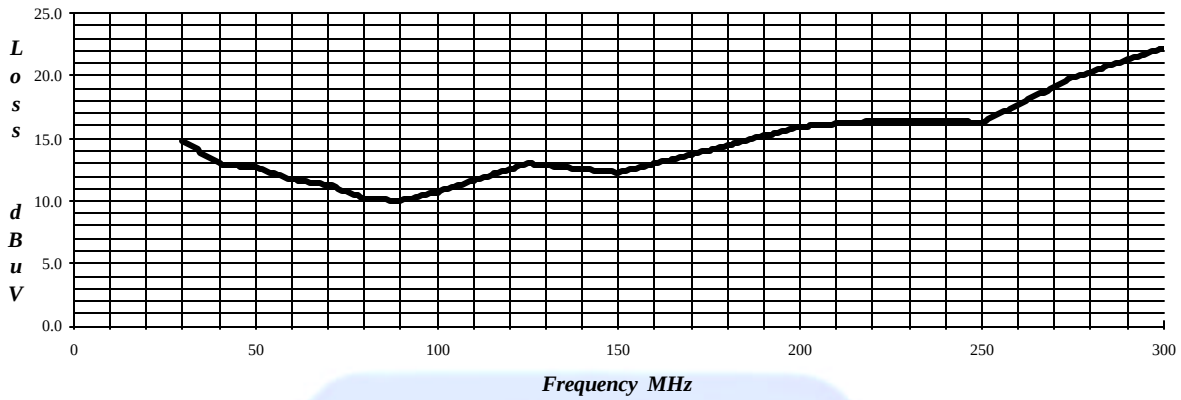
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

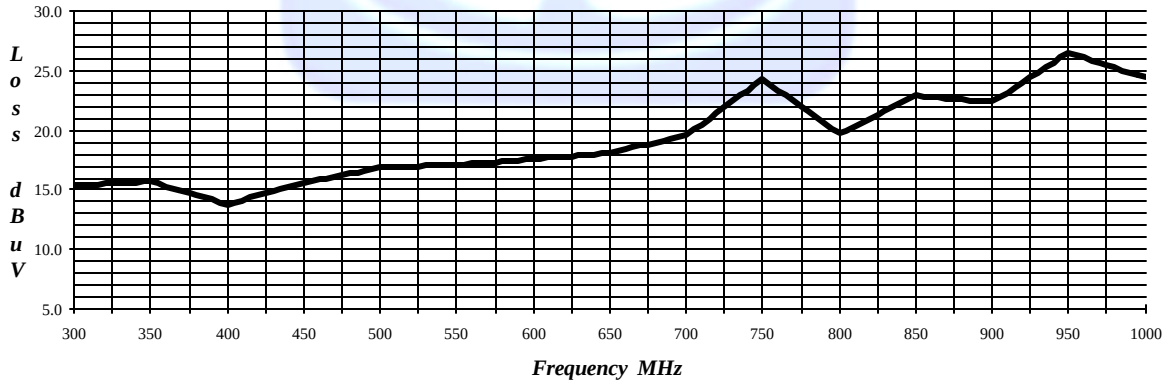
ENTERTAINMENT SYSTEMS TECHNOLOGY
SECURITY TRANSMITTER
MODEL: ST1-99
FCC SUBPART C - CONDUCTED EMISSIONS – 12-20-99

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

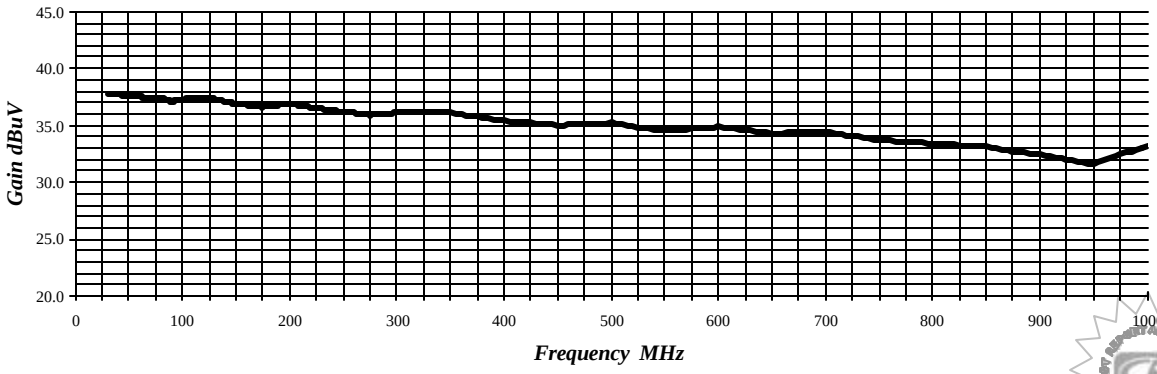
LAB "D" BICONICAL ANTENNA AB-100 S/N 01548 Cal: 10-14-99



LAB "D" LOG PERIODIC ANTENNA AL-100 S/N 16039 Cal: 10-14-99



PREAMPLIFIER EFFECTIVE GAIN AT 3 METERS PA-102 S/N: 1017 Lab "D"
Effective 1-16-99



COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: DECEMBER 14, 1999

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
0.5	34.4	10.5	31.7
1.0	34.0	11.0	30.8
1.5	36.4	11.5	31.1
2.0	36.2	12.0	30.4
2.5	36.3	12.5	30.3
3.0	35.7	13.0	31.5
3.5	35.9	13.5	33.2
4.0	35.7	14.0	32.3
4.5	35.6	14.5	31.9
5.0	35.5	15.0	30.3
5.5	35.4	15.5	30.7
6.0	35.6	16.0	30.6
6.5	35.2	16.5	31.9
7.0	35.2	17.0	31.4
7.5	34.3	17.5	31.0
8.0	34.1	18.0	31.1
8.5	34.3	19.0	29.6
9.0	33.0	20.0	30.6
9.5	34.1	21.0	31.7
10.0	34.5	22.0	28.7

ANTENNA RESEARCH ASSOCIATES, INC.
11317 Frederick Avenue, Beltsville, MD 20705

E-FIELD ANTENNA FACTOR CALIBRATION

E(dB V/m) = Vo(dB V) + AFE(dB/m)

Model number : DRG-118/A

Frequency GHz	AFE dB/m	Gain dBi
1	22.3	8.0
2	26.7	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

Com-Power Corporation

(949) 587-9800

Antenna Calibration

Antenna Type:	Loop Antenna
Model:	AL-130
Serial Number:	25309
Calibration Date:	4/13/99

Frequency MHz	Magnetic (dB/m)	Electric dB/m
0.01	-40.6	10.9
0.02	-41.5	10.0
0.03	-39.9	11.6
0.04	-40.2	11.3
0.05	-41.5	10.0
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	-41.7	9.8
0.2	-44.0	7.5
0.3	-41.6	9.9
0.4	-41.6	9.9
0.5	-41.7	9.8
0.6	-41.5	10.0
0.7	-41.4	10.1
0.8	-41.5	10.0
0.9	-41.6	9.9
1	-41.2	10.3
2	-40.5	11.0
3	-40.8	10.7
4	-41.0	10.5
5	-40.5	11.0
6	-40.5	11.0
7	-40.7	10.8
8	-40.8	10.7
9	-40.1	11.4
10	-40.4	11.1
12	-41.0	10.5
14	-42.1	9.4
15	-42.3	9.2
16	-42.7	8.8
18	-41.0	10.5
20	-41.1	10.4
25	-43.4	8.1
30	-45.3	6.2

Trans. Antenna Height	2 meter
Receiving Antenna Height	2 meter

APPENDIX D

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
916.5000	49.6	49.5 A	H	1.0	180	Y		23.8	4.9	0.0	**78.2**	**-15.8**	**94.0**	
916.5000	64.0	63.9 A	V	1.0	90	Y		23.8	4.9	0.0	**92.6**	**-1.4**	**94.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
1833.0000	59.0	54.0 A	H	1.0	180	Y		24.5	3.5	32.8	**49.2**	**-4.8**	**54.0**	
1833.0000	61.5	56.7 A	V	1.0	270	Y		24.5	3.5	32.8	**51.9**	**-2.1**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RP-1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2749.5000	40.7	32.0 A	H	1.0	180	Y		28.2	4.5	32.2	**32.5**	**-21.5**	**54.0**	
2749.5000	44.4	34.0 A	V	1.0	180	Y		28.2	4.5	32.2	**34.5**	**-19.5**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
3666.0000	47.4	40.3 A	H	1.5	270	Y		29.6	5.0	32.0	42.9	-11.1	54.0	
3666.0000	47.3	40.0 A	V	1.0	180	Y		29.6	5.0	32.0	42.6	-11.4	54.0	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4582.5000	53.0	47.0 A	H	1.5	180	Y		30.9	5.6	30.8	**52.7**	**-1.3**	**54.0**	
4582.5000	51.8	45.6 A	V	1.0	180	Y		30.9	5.6	30.8	**51.3**	**-2.7**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
5499.0000	48.3	40.2 A	H	2.0	270	Y		32.4	6.0	31.1	47.5	-6.6	54.0	
5499.0000	48.9	42.3 A	V	1.0	180	Y		32.4	6.0	31.1	49.6	-4.4	54.0	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
6415.5000	47.5	37.5 A	H	2.0	270	Y		34.3	6.9	32.6	**46.1**	**-7.9**	**54.0**	
6415.5000	49.3	40.0 A	V	2.0	270	Y		34.3	6.9	32.6	**48.6**	**-5.4**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
7332.0000	40.4	31.1 A	H	1.0	0	Y		36.8	9.1	33.4	43.6	-10.4	54.0	
7332.0000	44.8	31.9 A	V	2.5	270	Y		36.8	9.1	33.4	44.4	-9.6	54.0	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
8248.5000	41.3	30.8 A	H	1.5	270	Y		37.4	8.1	33.1	**43.2**	**-10.8**	**54.0**	
8248.5000	43.5	34.4 A	V	1.0	270	Y		37.4	8.1	33.1	**46.8**	**-7.2**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	ENTERTAINMENT SYSTEMS TECHNOLOGY	DATE	12/21/99
EUT	SECURITY TRANSPONDER	DUTY CYCLE	N/A
MODEL	ST1-99	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
9165.0000	***	*** A	H	***	***	Y		36.8	9.4	31.0	***	***	54.0	
9165.0000	***	*** A	V	***	***	Y		36.8	9.4	31.0	***	***	54.0	

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

** DELTA = SPEC LIMIT - CORRECTED READING

*** No Emissions found for this reading

COMPATIBLE ELECTRONICS

Test location: Compatible Electronics
Customer : ENTERTAINMENT SYSTEMS TECH. Date : 12/21/1999
Manufacturer : ENTERTAINMENT SYSTEMS TECH. Time : 10.11
EUT name : SECURITY TRANSPONDER Model: ST1-99
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS (TRANSMITTER PORTION) OF THE
SECURITY TRANSPONDER
TEMPERATURE 80 DEGREES F.
RELATIVE HUMIDITY 25%
TESTED BY: Kyle Fujimoto
KYLE FUJIMOTO

NO SPURIOUS EMISSIONS FROM THE TRANSMITTER
PORTION OF THE SECURITY TRANSPONDER
FROM 10 kHz TO 9300 MHz IN EITHER POLARIZATION

CONDUCTED EMISSIONS

DATA SHEETS

COMPATIBLE ELECTRONICS

12/20/1999 12:58:49

ENTERTAINMENT SYSTEMS
SECURITY TRANSPONDER
MODEL: ST1-99
FCC B - BLACK LEAD
TEST ENGINEER : Kyle Fujimoto
KYLE FUJIMOTO

---

25 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.50 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.513	46.30	48.00	-1.70
2	0.507	45.40	48.00	-2.60
3	0.484	43.80	48.00	-4.20
4	0.496	43.30	48.00	-4.70
5	0.480	43.10	48.00	-4.90
6	0.476	43.00	48.00	-5.00
7	0.646	43.00	48.00	-5.00
8	0.528	41.90	48.00	-6.10
9	0.791	40.90	48.00	-7.10
10	0.807	40.70	48.00	-7.30
11	0.544	40.10	48.00	-7.90
12	0.553	40.10	48.00	-7.90
13	0.761	39.80	48.00	-8.20
14	0.853	39.70	48.00	-8.30
15	0.563	39.20	48.00	-8.80
16	0.597	39.10	48.00	-8.90
17	0.771	39.10	48.00	-8.90
18	0.831	39.10	48.00	-8.90
19	0.897	39.00	48.00	-9.00
20	1.021	38.80	48.00	-9.20
21	0.927	38.40	48.00	-9.60
22	0.607	38.30	48.00	-9.70
23	0.755	38.20	48.00	-9.80
24	0.602	38.10	48.00	-9.90
25	0.920	38.10	48.00	-9.90

SEE QUASI-PEAK READINGS ON NEXT PAGE AND ON PLOT

COMPATIBLE ELECTRONICS

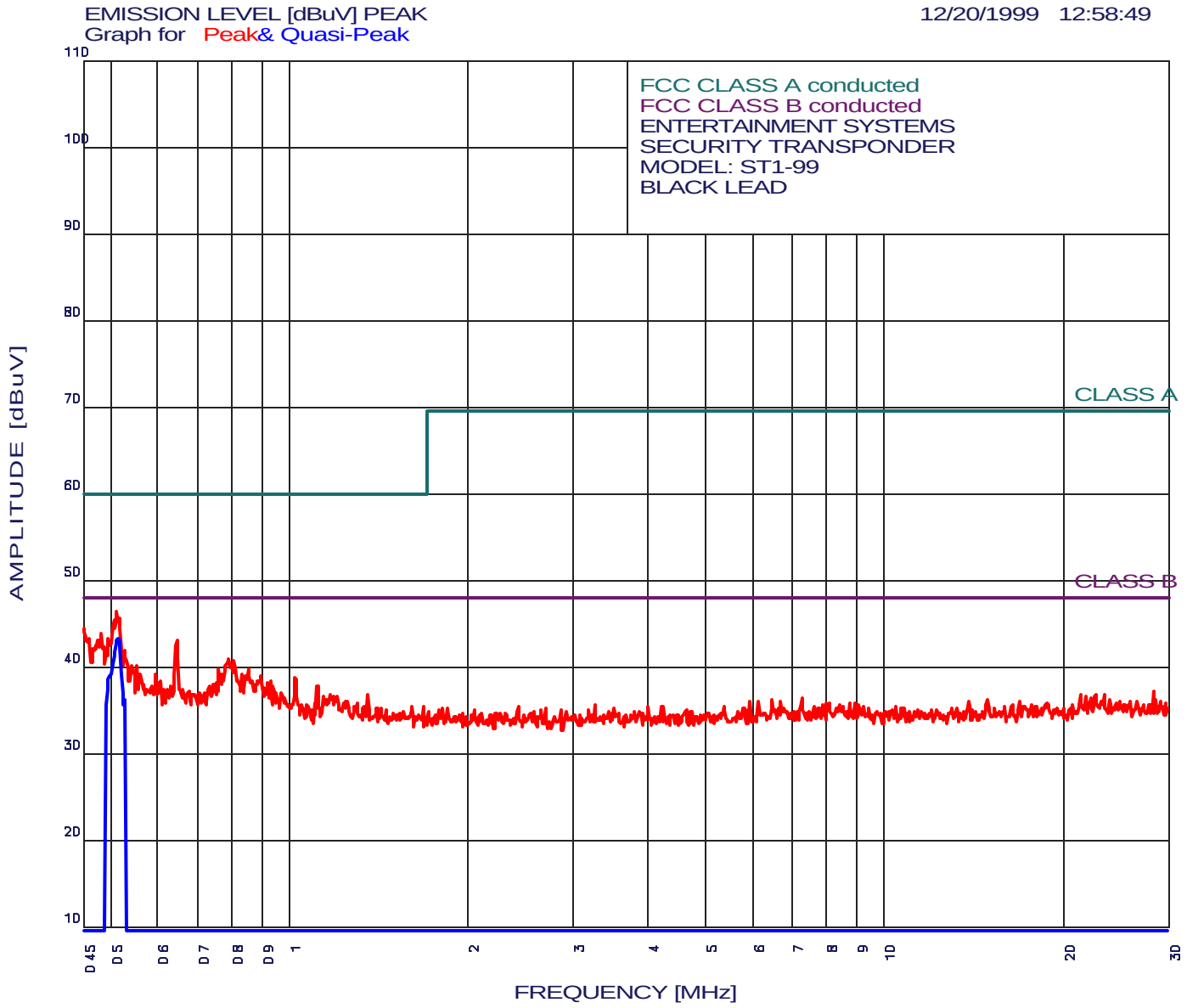
12/20/1999 12:58:49

ENTERTAINMENT SYSTEMS
SECURITY TRANSPONDER
MODEL: ST1-99
FCC B - BLACK LEAD
TEST ENGINEER : Kyle Fujimoto
KYLE FUJIMOTO

---

2 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.10 dB, Curve : Quasi-peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.515	43.17	48.00	-4.83
2	0.530	36.26	48.00	-11.74



COMPATIBLE ELECTRONICS

COMPATIBLE ELECTRONICS

12/20/1999 13:08:57

ENTERTAINMENT SYSTEMS
SECURITY TRANSPONDER
MODEL: ST1-99
FCC B - WHITE LEAD
TEST ENGINEER : Kyle Fujimoto
KYLE FUJIMOTO

---

25 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.50 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.515	45.58	48.00	-2.42
2	0.454	43.49	48.00	-4.51
3	0.476	41.99	48.00	-6.01
4	0.460	41.29	48.00	-6.71
5	0.485	41.09	48.00	-6.91
6	0.649	40.47	48.00	-7.53
7	1.026	39.28	48.00	-8.72
8	0.810	39.27	48.00	-8.73
9	0.530	39.18	48.00	-8.82
10	0.794	39.17	48.00	-8.83
11	0.856	38.78	48.00	-9.22
12	0.846	38.57	48.00	-9.43
13	0.771	38.47	48.00	-9.53
14	0.897	38.28	48.00	-9.72
15	1.115	37.28	48.00	-10.72
16	21.533	37.25	48.00	-10.75
17	22.848	37.23	48.00	-10.77
18	0.920	37.18	48.00	-10.82
19	0.824	37.07	48.00	-10.93
20	24.850	37.01	48.00	-10.99
21	0.935	36.88	48.00	-11.12
22	0.745	36.87	48.00	-11.13
23	1.168	36.79	48.00	-11.21
24	0.835	36.77	48.00	-11.23
25	0.975	36.68	48.00	-11.32

SEE QUASI-PEAK READINGS ON NEXT PAGE AND ON PLOT

COMPATIBLE ELECTRONICS

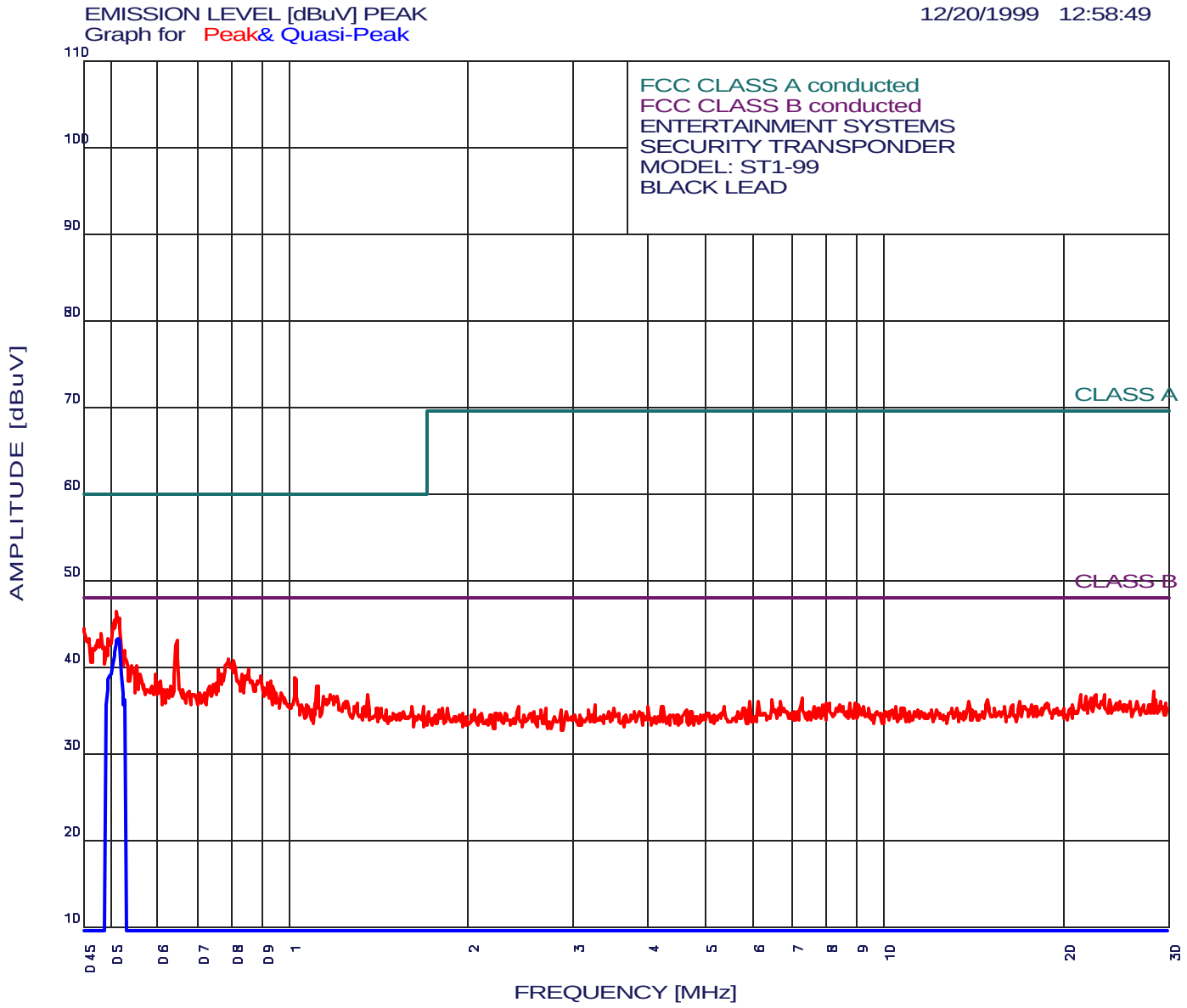
12/20/1999 13:08:57

ENTERTAINMENT SYSTEMS
SECURITY TRANSPONDER
MODEL: ST1-99
FCC B - WHITE LEAD
TEST ENGINEER : Kyle Fujimoto
KYLE FUJIMOTO

---

2 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.10 dB, Curve : Quasi-peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.515	42.58	48.00	-5.42
2	0.487	37.85	48.00	-10.15



COMPATIBLE ELECTRONICS