

TABLE OF CONTENTS

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY

FCC ID: N NK1TWTX

TEST REPORT CONTAINING:

PAGE 1.....TEST PROCEDURE
PAGE 2.....CIRCUIT DESCRIPTION & TEST PROCEDURE
PAGE 3.....RADIATION INTERFERENCE TEST DATA
PAGE 4.....CALCULATION OF DUTY CYCLE
PAGE 5.....OCCUPIED BANDWIDTH

EXHIBIT ATTACHMENTS:

EXHIBIT 1.....POWER OF ATTORNEY LETTER
EXHIBIT 2.....LETTER CONFIRMING MODIFICATIONS
EXHIBIT 3.....BLOCK DIAGRAM
EXHIBIT 4.....SCHEMATIC
EXHIBIT 5A-5C.....INSTRUCTION MANUAL
EXHIBIT 6.....FCC ID LABEL SAMPLE
EXHIBIT 7.....SKETCH OF FCC ID LABEL LOCATION
EXHIBIT 8.....DUTY CYCLE PLOT
EXHIBIT 9.....OCCUPIED BANDWIDTH PLOT
EXHIBIT 10.....FRONT VIEW EXTERNAL PHOTO
EXHIBIT 11.....REAR VIEW EXTERNAL PHOTO
EXHIBIT 12-13.....COMPONENT SIDE INTERNAL PHOTO
EXHIBIT 14-15.....COPPER SIDE INTERNAL PHOTO

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY

FCC ID: N NK1TWTX

REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT

PAGE: TABLE OF CONTENTS LIST

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY
FCC ID: NNK1TWTX

TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/
preselector 85685A, & Quasi-Peak Adapter HP 85650A, & HP
8449B - OPT H02 Cal. 7/6/99
2. Signal Generator, Hewlett Packard 8640B, cal. 9/23/99
3. Signal Generator, HP 8614A Serial No.2015A07428 cal. 5/27/99
3. Eaton Biconnical Antenna Model 94455-1
20-200 MHz Serial No. 0997 Cal. 10/30/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/31/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 4/27/99
6. Electro-Metric Antennas Model TDA-30/1-4, Cal. 10/15/98
7. Electro-Metric Line Impedance Stabilization Network Model
No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal.11/19/98
8. Electro-Metric Line Impedance Stabilization Network Model
No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
9. Special low loss cable was used above 1 GHz
10. Tenney Temperature Chamber
11. AC Voltmeter, HP 400FL, Serial No 2213A14499. Cal. 9/21/99
12. Digital Multimeter, Fluke 8010A/12A, Serial No. 4810047.
Cal 9/21/99
13. Digital Multimeter, Fluke 77, Serial No. 43850817. Cal 9/21/99
14. Oscilloscope, Tektronix 2230, Serial No. 300572. Cal 9/23/99
15. Frequency Counter, HP 5385A, Serial No. 3242A07460. Cal 10/6/99

TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz. The ambient temperature of the UUT was 98.3oF with a humidity of 40%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz)	METER READING + ACF = FS
33	20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT
PAGE #: 1

TEST PROCEDURES CONTD.

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings were converted to average readings based on the duration of "ON" time.

Measurements were made by TIMCO ENGINEERING INC. at the registered open field test site located at 6051 N.W. 19th Lane, Gainesville, FL 32605.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

RULES:2.1033(b)(4) CIRCUIT DESCRIPTION

a This is a low power security device transceiver. The TX oscillator is
crystal controlled circuit formed by crystal X4 and transistor Q8. In
series with the crystal is the data modulation components consisting of
D3, a varactor, and associated resistors and capacitors (R26, 27, 28,
and C50, 51, 52, and L17). The crystal oscillator is then 9X multiplied
buffered by the circuits around transistor Q7, Finally, the signal is
peaked by the L11, TC3 network. After this final tuned circuit, the RF
energy is routed via C35 and the pin diode D1 to the antenna. The
calculations are shown in the report and the duty cycle was 100%.

The receiver was tested and complies with the FCC Rules and regulations Part 15.109. We issued a report and Declaration of Conformity for the Receiver.

ANTENNA & GROUND:

This unit uses the PCB inductor as the antenna. There is no provision for an external antenna.

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY
FCC ID: NNK1TWTX
REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT

PAGE #: 2

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
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FCC ID: NNN1TWTX

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.231

REQUIREMENTS:

Fundamental Frequency MHz	Field Strength of Fundamental dBuV	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48	41.94 to 51.48
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94	51.48 to 61.94
470 and above	81.94	61.94

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE FUNDAMENTAL
FREQUENCY= 81.26 dBuV/m. NO FUNDAMENTAL IN ALLOWED IN THE
RESTRICTED BANDS.

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE HARMONICS AND
SPURIOUS FREQUENCIES = 61.26 dBuV/m. SPURIOUS IN THE RESTRICTED
BANDS MUST LESS THAN 54dBuV/m OR 15.209.

TEST DATA:

EMISSION FREQ. MHz	METER READING @ 3m dBuV	COAX LOSS dB	ACF dB	PEAK FIELD STRNGTH dBuV/m	AVERAGE FIELD STRNGTH dBuV/m	MARGIN dB	ANT.
447.80	59.20	1.60	18.10	78.90	78.90	2.36	H
895.50	32.30	2.90	24.15	59.35	59.35	1.92	V

SAMPLE CALCULATION OF LIMIT @ 303 MHz:

(470 - 260)Mhz = 210 MHz
(12500 - 3750)uV/m = 8750 uV/m
8750uV/m/210MHz = 41.67 uV/m/MHz
(303-260)MHz = 43 MHz
43 MHz * 41.67 uV/m/MHz = 1791.81 uV/m
(1791.81 + 3750)uV/m = 5541.81 uV/m limit @ 303 MHz

The transmitter ceases transmitting when the button is released.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS

DATE TESTED: 10/11/99

FCC ID: NNN1TWTX

PAGE #: 3
REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY

FCC ID: NNK1TWTX

CALCULATION OF DUTY CYCLE:

THIS TRANSMITTER HAS 100% DUTY CYCLE.

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY
FCC ID: NNK1TWTX
REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT

PAGE #: 4

APPLICANT: SECURITY ASSOCIATES INTERNATIONAL
D/B/A J. TECHNOLOGY

FCC ID: NNK1TWTX

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.231(C)

REQUIREMENTS: The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

$447.80 \text{ MHz} * .0025 = 1.1195 \text{ MHz}$
 $1.1195 \text{ MHz} / 2 = +/- 559.75$

THE GRAPH IN EXHIBIT 9 REPRESENTS THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the above photo was taken. The vertical scale is set to 10 dB per division: the horizontal scale is set to 100 kHz per division.

TEST RESULTS: The unit meets the FCC requirements.

PERFORMED BY: S. S. SANDERS DATE: 10/11/99

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D/B/A J. TECHNOLOGY

FCC ID: NNK1TWTX

REPORT #: T:\CUS\S\SAI\329Z9\SAI329Z9.RPT

PAGE #: 5