

# TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)



## Test Report

Product Name: KEY CAPTAIN REMOTE LAUNCHING SYSTEM - RECEIVER

FCC ID: R932033500

Applicant:

**DELTA SYSTEMS INC.  
10036 AURORA - HUDSON ROAD 1734 FROST ROAD  
STREETSBORO OH 44241  
USA**

**Date Receipt: 3/6/2006**

**Date Tested: 3/6/2006**

APPLICANT: DELTA SYSTEMS INC.

FCC ID: R932033500

REPORT #: D\DELTA SYSTEMS\466AUT6\466AUT6TestReport.doc

COVER SHEET

# TIMCO ENGINEERING INC.

849 NW State Road 45  
Newberry, Florida 32669  
<http://www.timcoengr.com>  
888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)

## TABLE OF CONTENTS LIST

**APPLICANT:** DELTA SYSTEMS INC.

**FCC ID:** R932033500

### TEST REPORT CONTAINING:

PAGE 1.....TEST EQUIPMENT LIST  
PAGE 2.....TEST PROCEDURES  
PAGE 3.....RADIATION INTERFERENCE TEST DATA

### EXHIBITS CONTAINING:

REQUEST FOR CONFIDENTIALITY LETTER  
BLOCK DIAGRAM  
SCHEMATIC  
INSTRUCTION MANUAL  
LABEL SAMPLE  
LABEL LOCATION  
EXTERNAL PHOTOGRAPHS  
INTERNAL PHOTOGRAPHS  
CIRCUIT DESCRIPTION  
TEST SET UP PHOTOGRAPH

APPLICANT: DELTA SYSTEMS INC.

FCC ID: R932033500

REPORT #: D\DELTA SYSTEMS\466AUT6\466AUT6TestReport.doc

TABLE OF CONTENTS

# TIMCO ENGINEERING INC.

849 NW State Road 45  
Newberry, Florida 32669  
<http://www.timcoengr.com>  
888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)

## EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Biconnical Antenna	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Biconnical Antenna	Eaton	94455-1	1096	CAL 8/17/04	8/17/06
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Log-Periodic Antenna	Eaton	96005	1243	CAL 12/14/05	12/14/07

APPLICANT: DELTA SYSTEMS INC.

FCC ID: R932033500

REPORT #: D\DELTA SYSTEMS\466AUT6\466AUT6TestReport.doc

# TIMCO ENGINEERING INC.

849 NW State Road 45  
Newberry, Florida 32669  
<http://www.timcoengr.com>  
888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)

## 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 C63.4-2003 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 80°F with a humidity of 70%.

**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

**ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:** The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation. 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.

APPLICANT: DELTA SYSTEMS INC.  
FCC ID: R932033500  
REPORT #: D\DELTA SYSTEMS\466AUT6\466AUT6TestReport.doc

# TIMCO ENGINEERING INC.

849 NW State Road 45  
Newberry, Florida 32669  
<http://www.timcoengr.com>  
888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)

**APPLICANT:** DELTA SYSTEMS INC.  
**FCC ID:** R932033500  
**NAME OF TEST:** RADIATION INTERFERENCE  
**RULES PART NO.:** 15.109

**REQUIREMENTS:** 30 to 88 MHz: 40.0 dBuV/M @ 3 METERS  
88 to 216 MHz: 43.5 dBuV/M  
216 to 960 MHz: 46.0 dBuV/M  
ABOVE 960 MHz: 54.0 dBuV/M

**TEST RESULTS:** A search was made of the spectrum from 30 to 1000MHz and the measurements indicate that the unit DOES meet the FCC requirements.

## TEST DATA:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Pol	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
433.9	432.90	5.8	H	1.23	16.59	23.62	22.38
433.9	432.90	6.6	V	1.23	16.16	23.99	22.01
433.9	438.60	5.4	V	1.24	16.27	22.91	23.09
433.9	438.60	6.4	H	1.24	16.76	24.40	21.60
433.9	865.80	6.6	H	1.93	22.92	31.45	14.55
433.9	865.80	8.8	V	1.93	22.40	33.13	12.87

Emissions attenuated more than 20 dB below the permissible value are not reported.

**SAMPLE CALCULATION:** FSdBuV/m = MR (dBuV) + ACFdB.

**TEST PROCEDURE:** ANSI STANDARD C63.4-2003 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Preselector, a Hewlett Packard Model 85650A Quasi-Peak adapter, and an appropriate antenna - see the test equipment list. The bandwidth of spectrum analyzer was 100 kHz with an appropriate sweep speed. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported.

**PERFORMED BY:** JOSEPH SCOGLIO

**DATE:** 03/07/2006

APPLICANT: DELTA SYSTEMS INC.  
FCC ID: R932033500  
REPORT #: D\DELTA SYSTEMS\466AUT6\466AUT6TestReport.doc