

# 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**

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

COVER SHEET

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## EMC Equipment List

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

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## 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.

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**APPLICANT:** DELTA SYSTEMS INC.  
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**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<br>MHz | Emission Frequency<br>MHz | Meter Reading<br>dBuV | Ant. Pol | Coax Loss<br>dB | Correction Factor<br>dB | Field Strength<br>dBuV/m | Margin<br>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

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