

*FCC PART 15, SUBPART B and C  
TEST REPORT*

*for*

**FLOJET SEARCHLIGHT TRANSMITTER**

**MODEL: 8035**

Prepared for  
ITT INDUSTRIES  
20 ICON  
FOOTHILL RANCH, CA 92610

Prepared by: \_\_\_\_\_

**MICHAEL CHRISTENSEN**

Approved by: \_\_\_\_\_

**KYLE FUJIMOTO**

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

DATE: JANUARY 6, 2004

	REPORT BODY	APPENDICES					TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
PAGES	15	2	2	2	10	16	<b>47</b>

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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 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 without the written permission of Compatible Electronics, unless done so in full.

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

Device Tested: Flojet Searchlight Transmitter  
Model: 8035  
S/N: N/A

Product Description: See Expository Statement

Modifications: The EUT was modified in order to meet the specifications. Please see a list of the modifications in Appendix B.

Manufacturer: ITT Industries  
20 Icon  
Foothill Ranch, CA 92610

Test Date: December 29, 2003

Test Specifications: EMI requirements  
CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205, 15.209 and 15.231

Test Procedure: ANSI C63.4: 2001

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

## SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	This test was not performed because the EUT operates on DC power only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz - 4400 MHz	Complies with the <b>Class B</b> limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.

**1. PURPOSE**

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Flojet Searchlight Transmitter Model: 8035. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2001. 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 **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.



## 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

William McDonough    President of Mission Microsystems, Inc.

Compatible Electronics, Inc.

Kyle Fujimoto            Test Engineer  
Michael Christensen    Sr. Test Engineer

### 2.4 Date Test Sample was Received

The test sample was received on December 29, 2003.

### 2.5 Disposition of the Test Sample

The test sample was returned ITT Industries on December 30, 2003.

### 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.

<b>SPEC</b>	<b>TITLE</b>
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2001	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**

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Flojet Searchlight Transmitter Model: 8035 (EUT) was tested as a stand alone device. The EUT was tested while it was continuously transmitting and in three orthogonal axis. The EUT has a PCB trace as an antenna. During normal operation, the EUT will be programmed not transmit longer than 5 seconds.

The final radiated data was taken in the mode above. Please see Appendix E for the data sheets.

#### 4.1.1 Cable Construction and Termination

The EUT has no external cables.



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

<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>FCC ID</b>
FLOJET SEARCHLIGHT TRANSMITTER (EUT)	ITT INDUSTRIES	8035	N/A	RT491006393



## 5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiate Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Emissions Program	Compatible Electronics	2.3 (SR19)	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	June 20, 2003	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22279	June 20, 2003	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	June 20, 2003	1 Year
Preamplifier	Com Power	PA-103	1582	March 6, 2003	1 Year
Biconical Antenna	Com Power	AB-900	15226	April 21, 2003	1 Year
Log Periodic Antenna	Com Power	AL-100	16202	February 3, 2003	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
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Loop Antenna	Com-Power	AL-130	25310	June 4, 2003	1 Year
Horn Antenna	Com-Power	AH-118	10073	January 21, 2002	2 Year
Microwave Preamplifier	Com-Power	PA-122	181917	October 31, 2003	1 Year

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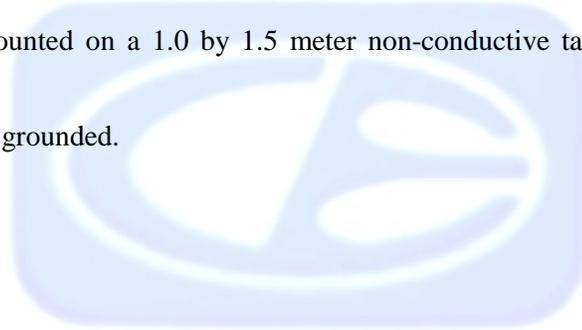
**6. TEST SITE DESCRIPTION****6.1 Test Facility Description**

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 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-103 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.

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

<b>FREQUENCY RANGE</b>	<b>EFFECTIVE MEASUREMENT BANDWIDTH</b>	<b>TRANSDUCER</b>
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 3.15 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: 2001. 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 loop antenna was also rotated in the horizontal and vertical axis 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 E.

## 7.2 Bandwidth of the Fundamental

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT. Photographs of the -20 dB bandwidth are located in Appendix E.



**8. CONCLUSIONS**

The Flojet Searchlight Transmitter Model: 8035 meets all of the Class B specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.





**APPENDIX A**

***LABORATORY RECOGNITIONS***

---

**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

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## ***LABORATORY RECOGNITIONS***

### **Compatible Electronics has the following agency accreditations:**

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

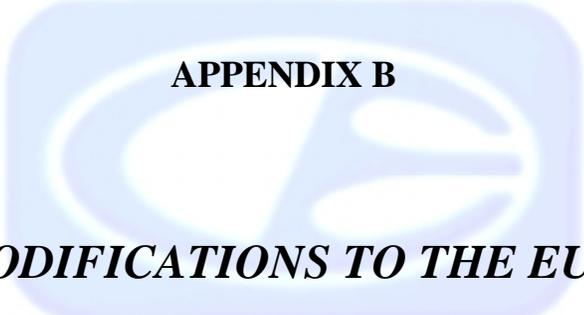
### **Compatible Electronics is recognized or on file with the following agencies:**

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)





**APPENDIX B**

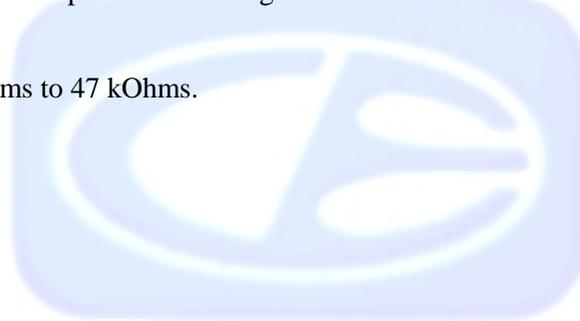
***MODIFICATIONS TO THE EUT***

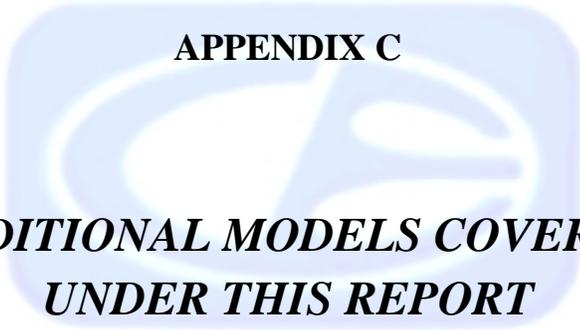
## **MODIFICATIONS TO THE EUT**

The modifications listed below were made to the EUT to pass FCC 15.231 or FCC Class B 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.

- 1) R1 was changed from 220 kOhms to 47 kOhms.



  
**APPENDIX C*****ADDITIONAL MODELS COVERED  
UNDER THIS REPORT***

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**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

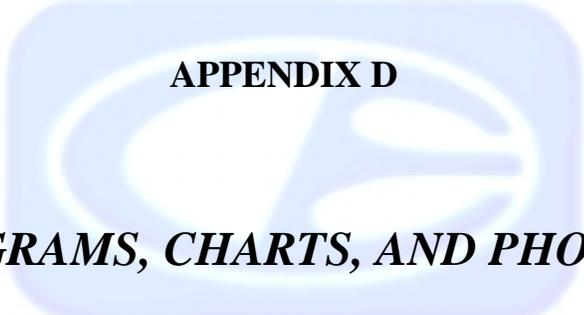
## **ADDITIONAL MODELS COVERED UNDER THIS REPORT**

USED FOR THE PRIMARY TEST

Flojet Searchlight Transmitter  
Model: 8035  
S/N: N/A

There were no additional models under this report.



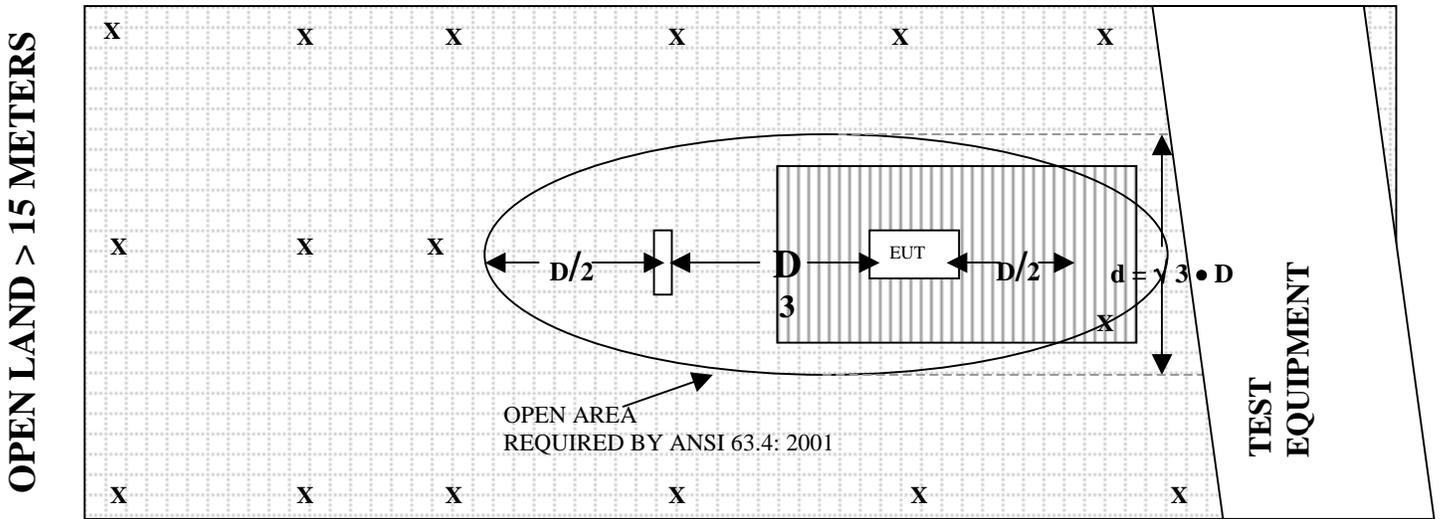


**APPENDIX D**

***DIAGRAMS, CHARTS, AND PHOTOS***

**FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE**

**OPEN LAND > 15 METERS**



**OPEN LAND > 15 METERS**

- |          |                          |  |                 |
|----------|--------------------------|--|-----------------|
| <b>X</b> | = GROUND RODS            |  | = GROUND SCREEN |
| <b>D</b> | = TEST DISTANCE (meters) |  | = WOOD COVER    |

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15226

CALIBRATION DATE: APRIL 21, 2003

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	11.20	120	13.80
35	10.40	125	12.50
40	10.20	140	12.50
45	11.00	150	10.90
50	11.30	160	11.50
60	9.60	175	14.90
70	7.40	180	15.50
80	6.10	200	16.90
90	7.70	250	15.50
100	10.50	300	23.80

**COM-POWER AL-100****LOG PERIODIC ANTENNA**

S/N: 16202

CALIBRATION DATE: FEBRUARY 3, 2003

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
300	12.70	700	20.60
400	15.40	800	21.80
500	16.50	900	21.00
600	17.20	1000	21.50

**COM-POWER PA-103****PREAMPLIFIER**

S/N: 1582

CALIBRATION DATE: MARCH 6, 2003

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	33.6	300	33.3
40	33.6	350	33.3
50	33.6	400	33.1
60	33.6	450	33.0
70	33.5	500	32.9
80	33.5	550	33.0
90	33.5	600	32.8
100	33.6	650	32.6
125	33.6	700	32.7
150	33.4	750	32.4
175	33.5	800	32.4
200	33.4	850	32.7
225	33.3	900	31.9
250	33.2	950	31.8
275	33.3	1000	32.5

**COM-POWER PA-122****MICROWAVE PREAMPLIFIER**

S/N: 181917

CALIBRATION DATE: OCTOBER 31, 2003

<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (GHz)</b>	<b>FACTOR (dB)</b>
1.0	33.5	6.0	34.5
1.1	33.6	6.5	34.6
1.2	33.6	7.0	33.1
1.3	33.3	7.5	32.5
1.4	33.1	8.0	33.5
1.5	32.7	8.5	35.1
1.6	32.6	9.0	35.5
1.7	32.5	9.5	36.8
1.8	31.5	10.0	35.7
1.9	31.4	11.0	31.8
2.0	30.0	12.0	29.5
2.5	33.2	13.0	31.2
3.0	32.0	14.0	31.7
3.5	33.0	15.0	31.1
4.0	33.4	16.0	32.9
4.5	34.7	17.0	33.6
5.0	34.2	18.0	31.0
5.5	33.2		

**COM-POWER AH-118****HORN ANTENNA**

S/N: 10073

CALIBRATION DATE: JANUARY 21, 2002

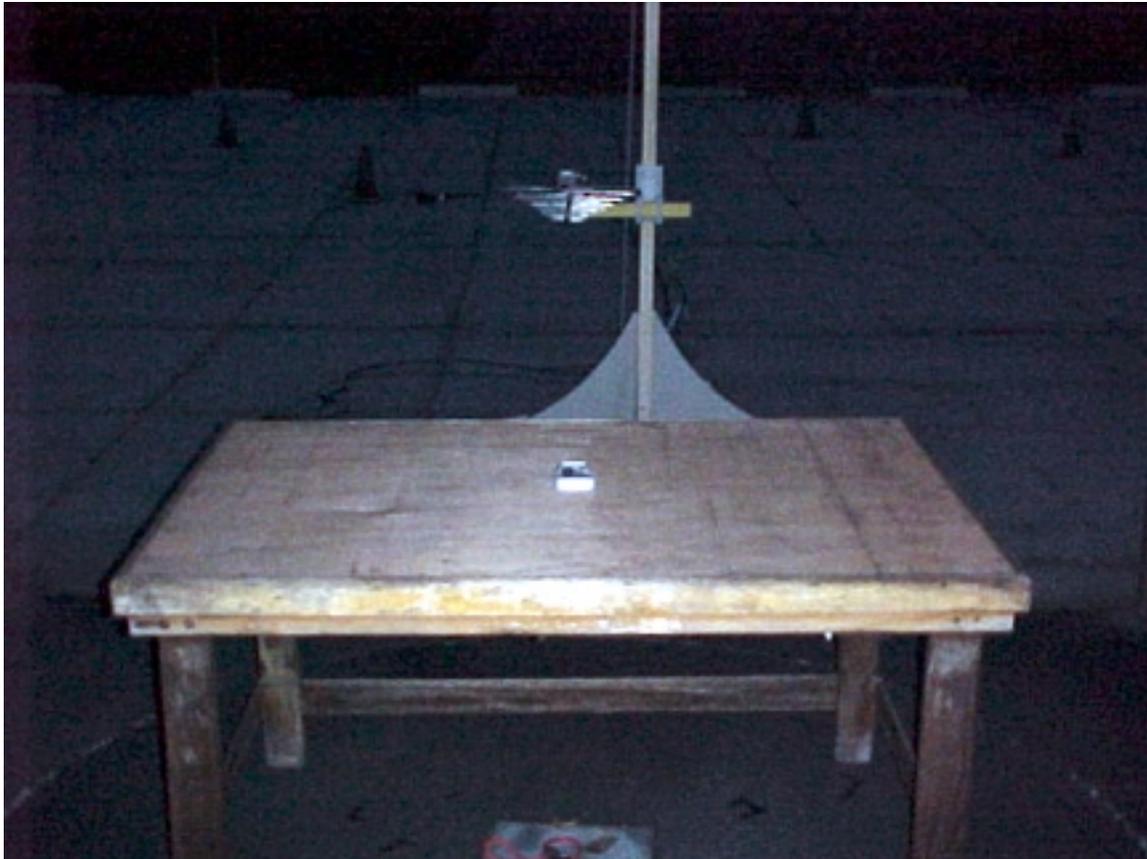
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	26.6	10.0	41.8
1.5	29.2	10.5	40.4
2.0	32.4	11.0	37.5
2.5	32.3	11.5	42.2
3.0	31.4	12.0	40.4
3.5	31.8	12.5	43.6
4.0	31.1	13.0	44.2
4.5	32.0	13.5	41.8
5.0	33.9	14.0	43.3
5.5	32.0	14.5	47.0
6.0	37.8	15.0	49.4
6.5	36.8	15.5	49.9
7.0	42.4	16.0	49.9
7.5	39.5	16.5	48.2
8.0	41.3	17.0	44.0
8.5	40.3	17.5	44.8
9.0	39.5	18.0	44.7
9.5	41.4		

**COM-POWER AL-130****LOOP ANTENNA**

S/N: 25310

CALIBRATION DATE: JUNE 4, 2003

<b>FREQUENCY (MHz)</b>	<b>MAGNETIC (dB/m)</b>	<b>ELECTRIC (dB/m)</b>
0.009	-41.2	10.3
0.01	-41.3	10.2
0.02	-42.3	9.2
0.05	-42.5	9.0
0.07	-42.3	9.2
0.1	-42.5	9.0
0.2	-44.6	6.9
0.3	-42.1	9.4
0.5	-42.4	9.1
0.7	-42.1	9.4
1	-41.5	10.0
2	-41.0	10.5
3	-41.3	10.2
4	-41.3	10.2
5	-40.9	10.6
10	-41.6	9.9
15	-42.1	9.4
20	-42.2	9.3
25	-42.7	8.8
30	-44.3	7.2



**FRONT VIEW**

ITT INDUSTRIES  
FLOJET SEARCHLIGHT TRANSMITTER  
MODEL: 8035

FCC SUBPART B AND C - RADIATED EMISSIONS – 12-29-03

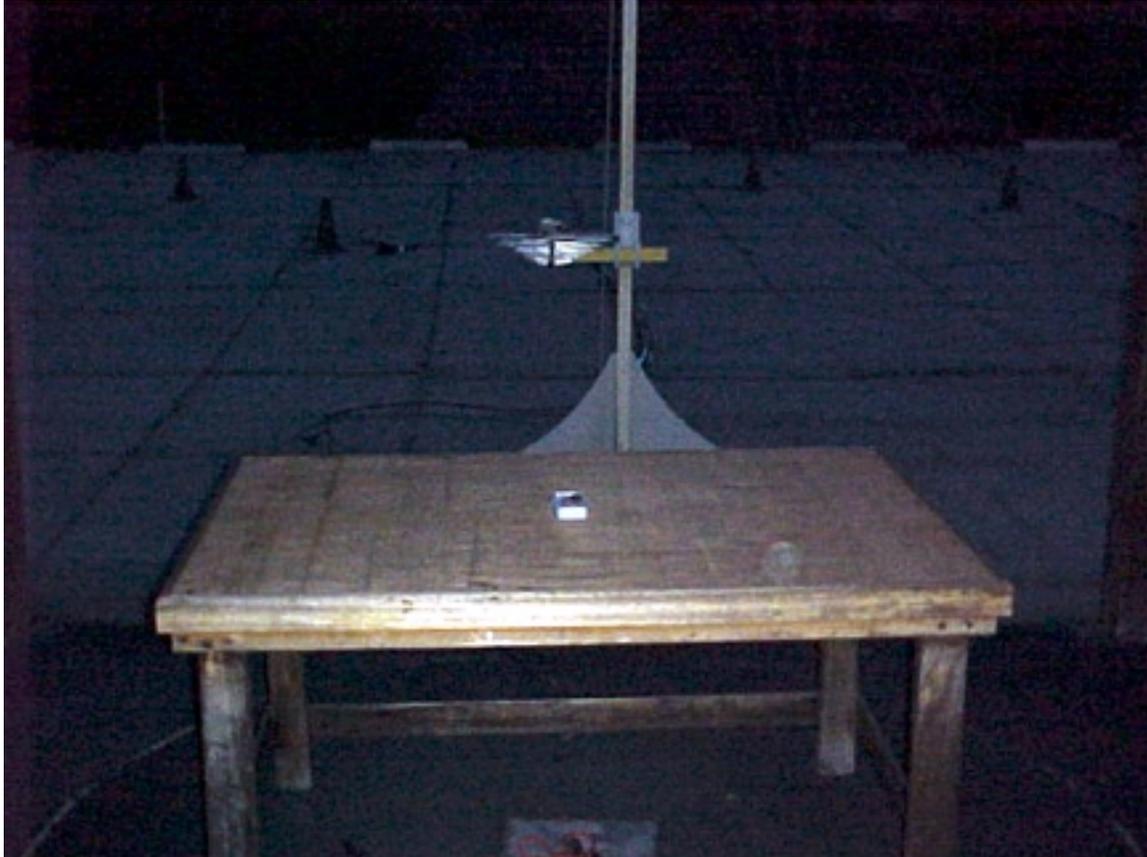
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**

**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400



**REAR VIEW**

ITT INDUSTRIES  
FLOJET SEARCHLIGHT TRANSMITTER  
MODEL: 8035

FCC SUBPART B AND C - RADIATED EMISSIONS – 12-29-03

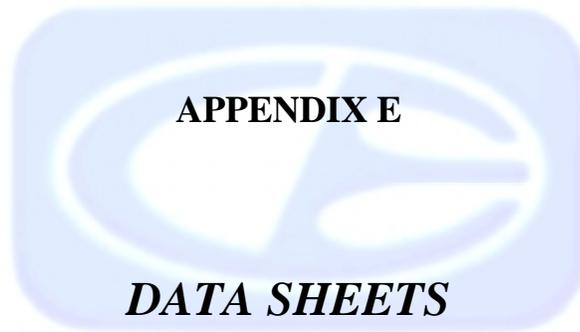
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**

**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
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Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400



***RADIATED EMISSIONS***

***DATA SHEETS***





















**Test Location** : Compatible Electronics **Page** : 1/1  
**Customer** : ITT INDUSTRIES **Date** : 12/29/2003  
**Manufacturer** : ITT INDUSTRIES **Time** : 14:41:52  
**Eut name** : FLOJET SEARCHLIGHT TRANSMITTER **Lab** : A  
**Model** : 8035 **Test Distance** : 3  
**Serial #** :  
**Specification** : FCC Class B  
**Distance correction factor (20 \* log(test/spec))** : 0.00  
**Test Mode** : TESTED BY MICHAEL CHRISTENSEN  
 NO\_EMISSIONS\_FOUND\_ABOVE\_1GHZ  
 NO\_EMISSIONS\_FOUND\_BELOW\_30MHZ

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1V	433.572	60.70	3.64	15.80	33.03	47.10	46.00	1.10
2V	433.572Qp	58.86	3.64	15.80	33.03	45.26	46.00	-0.74
3V	434.557	60.20	3.64	15.81	33.03	46.62	46.00	0.62
4V	434.557Qp	58.78	3.64	15.81	33.03	45.20	46.00	-0.80
5V	867.556	45.40	5.04	21.25	32.41	39.27	46.00	-6.73
6V	868.545	47.50	5.04	21.24	32.40	41.38	46.00	-4.62
7V	436.275	48.70	3.65	15.83	33.03	35.15	46.00	-10.85
8V	431.851	49.30	3.63	15.78	33.03	35.67	46.00	-10.33
9H	433.559	61.00	3.64	15.80	33.03	47.40	46.00	1.40
10H	433.559Qp	59.27	3.64	15.80	33.03	45.67	46.00	-0.33
11H	434.549	60.60	3.64	15.81	33.03	47.02	46.00	1.02
12H	434.549Qp	58.97	3.64	15.81	33.03	45.39	46.00	-0.61
13H	867.576	48.70	5.04	21.25	32.41	42.57	46.00	-3.43
14H	868.560	47.30	5.04	21.24	32.40	41.18	46.00	-4.82





