

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: TRANSCEIVER - TX

FCC ID: RUDS3E401PI

Applicant:

ENERGY TECHNOLOGIES GROUP, LLC
2840 BROADHEAD ROAD
ALIQUIPPA PA 15001
USA

Date Receipt: JANUARY 28, 2004

Date Tested: MARCH 15, 2004

APPLICANT: ENERGY TECHNOLOGIES GROUP LLC

FCC ID: RUDS3E401PI

REPORT #: E\ENERGY TECH_\91BUT4\91BUT4TestReport.doc

COVER PAGE

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EXHIBIT INCLUDED:

REQUEST FOR CONFIDENTIALITY LETTER
BLOCK DIAGRAM
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USERS MANUAL
LABEL SAMPLE
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INTERNAL PHOTOGRAPHS
OPERATIONAL DESCRIPTION
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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 3/26/01 | 3/26/04 |
| 3-Meter OATS | TEI | N/A | N/A | Listed 1/13/03 | 1/13/06 |
| Biconnical Antenna | Eaton | 94455-1 | 1057 | CAL 3/18/03 | 3/18/05 |
| Biconnical Antenna | Eaton | 94455-1 | 1096 | CAL 10/1/01 | 10/1/03 |
| Biconnical Antenna | Electro- Metrics | BIA-25 | 1171 | CAL 4/26/01 | 4/26/03 |
| Blue Tower Quasi-Peak Adapter | HP | 85650A | 2811A01279 | CAL 4/15/03 | 4/15/05 |
| Blue Tower RF | HP | 85685A | 2926A00983 | CAL 4/15/03 | 4/15/05 |
| Preselector Blue Tower Spectrum Analyzer | HP | 8568B | 2928A04729 2848A18049 | CAL 4/15/03 | 4/15/05 |
| LISN | Electro- Metrics | ANS-25/2 | 2604 | CAL 10/9/01 | 10/9/03 |
| LISN | Electro- Metrics | EM-7820 | 2682 | CAL 3/12/03 | 3/12/05 |
| Log- Periodic Antenna | Eaton | 96005 | 1243 | CAL 5/8/03 | 5/8/05 |

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TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. The UUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a pre-selector. 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 up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the UUT was 74.3°F with a humidity of 69%.

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 |

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 74.3oF with a humidity of 69%.

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 (1.5m side). 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.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-1992 with the EUT 40 cm from the vertical ground wall.

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APPLICANT: ENERGY TECHNOLOGIES GROUP, LLC

FCC ID: RU DS3E401PI

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.249, 15.209

REQUIREMENTS:

| FIELD STRENGTH | FIELD STRENGTH | S15.209 |
|---|---------------------------------------|--|
| of Fundamental: 902-928 MHz 2.4-2.4835 GHz 94 dBuV/m @3m | of Harmonics 54 dBuV/m @3m | 30 - 88 MHz 40 dBuV/m @3M 88 - 216 MHz 43.5 216 - 960 MHz 46 ABOVE 960 MHz 54dBuV/m |

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

TEST RESULTS: This unit DOES meet the FCC requirements.

TEST DATA:

| Tuned Frequency MHz | Emission Frequency MHz | Meter Reading dBuV | Ant. Polarity | Coax Loss dB | Correction Factor dB | Field Strength dBuV/m | Margin dB |
|------------------------|---------------------------|-----------------------|---------------|-----------------|-------------------------|--------------------------|--------------|
| 916.4 | 916.40 | 52.9 | H | 3.71 | 24.38 | 80.99 | 13.01 |
| 916.4 | 916.40 | 59.6 | V | 3.71 | 23.76 | 87.07 | 6.93 |
| 916.4 | 1,832.90 | 21.0 | H | 1.62 | 28.03 | 50.65 | 3.35 |
| 916.4 | 1,832.90 | 23.7 | V | 1.62 | 28.10 | 53.42 | 0.58 |
| 916.4 | 2,749.40 | 9.8 | H | 2.00 | 29.95 | 41.75 | 12.25 |
| 916.4 | 2,749.40 | 11.4 | V | 2.00 | 29.95 | 43.35 | 10.65 |

TEST PROCEDURE: ANSI STANDARD C63.4-1992 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Pre-selector, a Hewlett Packard Model 85650A Quasi-Peak adapter, and an appropriate antenna. 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. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

PERFORMED BY: JOSEPH SCOGLIO

DATE: MARCH 15, 2004

APPLICANT: ENERGY TECHNOLOGIES GROUP LLC

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APPLICANT: ENERGY TECHNOLOGIES GROUP, LLC

FCC ID: RUDS3E401PI

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.249

REQUIREMENTS: The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

TEST DATA:

**THE GRAPH ON THE FOLLOWING PAGE REPRESENTS THE EMISSIONS TAKEN FOR
OCCUPIED BANDWIDTH FOR THIS DEVICE.**

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division. The horizontal scale is set to 10 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

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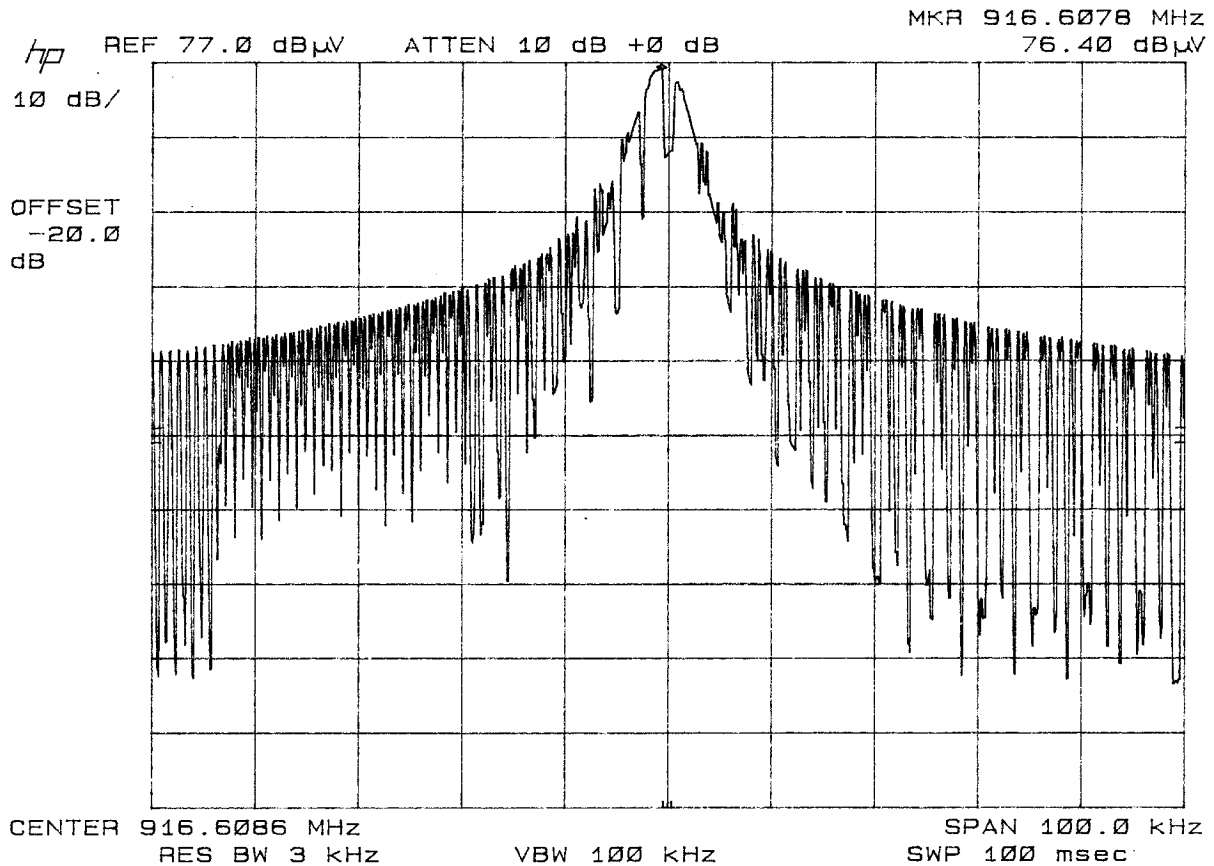
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OCCUPIED BANDWIDTH



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APPLICANT: ENERGY TECHNOLOGIES GROUP, LLC
FCC ID: RUDS3E401PI
NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE
RULES PART NO.: 15.107

| REQUIREMENTS: | QUASI-PEAK | AVERAGE |
|---------------|------------|------------|
| .15 - 0.5 MHz | 66-56 dBuV | 56-46 dBuV |
| 0.5 - 5.0 | 56 | 46 |
| 5.0 - 30. | 60 | 50 |

TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum was scanned from .15 to 30 MHz.

TEST DATA:

THE GRAPHS ON THE FOLLOWING PAGE REPRESENT THE EMISSIONS READ FOR POWER LINE CONDUCTED FOR THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

PERFORMED BY: JOSEPH SCOGLIO

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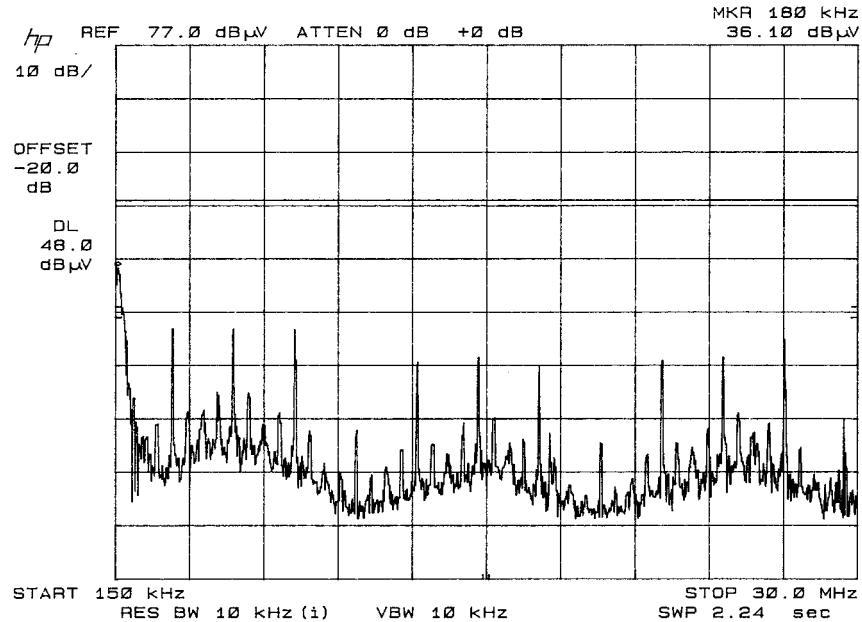
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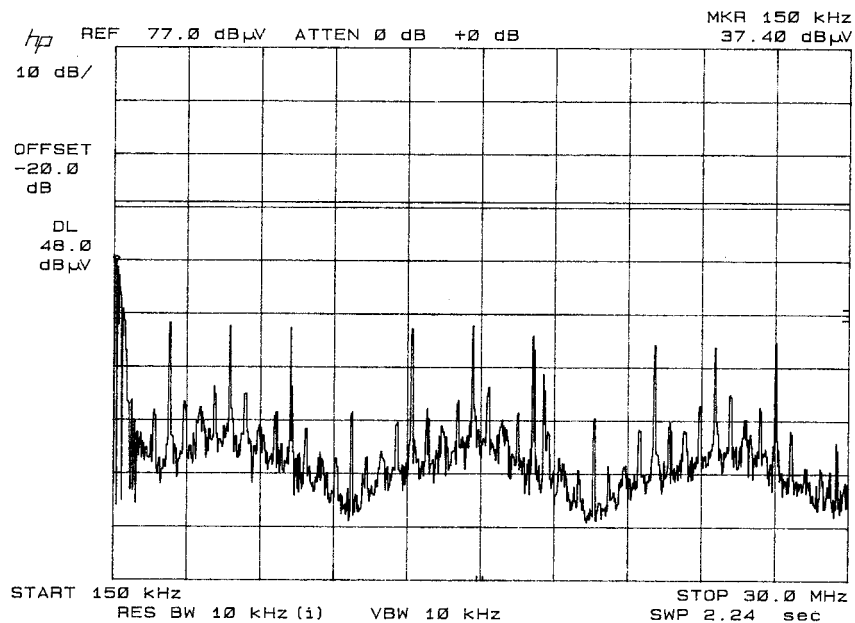
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POWER LINE CONDUCTED LINE 1



LINE 2



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