Test Report for Class II Change to Excel Energy Technology, Ltd, Tranceiver FCC ID: PLS-ES500-A-RFT

DUT: Wireless transceiver model ES500-A-RFT

Test Date: 09-May-2002

Manufacturer: Excel Energy Technologies, Ltd.
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(918) 585-5000

Conducted by: Control Design & Testing, Inc.
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CD&T FCC ID: PLS-ES500-A-RFT

A. DEVICE UNDER TEST

The product, designated the RFT, is a transceiver used to collect and relay data as part of an energy management system. The product is designed to operate under the provisions of Part 15.249 of the FCC rules. A Declaration of Conformity has been issued by Timco Engineering, Inc. and a grant for Part 15.249 was issued in September of 2001.

The transmit frequency is 916.500 MHz. nominal. The modulation mode is on/off keying using a pulse width scheme. The device is powered from an external source of either 12VDC or 24VAC and has an internal 9.6 volt NiCad backup battery . The tranceiver circuitry is regulated at 3.0 volts.

The rf section consists of an RF Monolithics TR1000L transceiver module, a two element antenna matching network and molded rubber ¼ wave antenna. The antenna has a reverse pinned SMA connector molded into the base and connects to a matching threaded connector mounted on the circuit board.

B. MEASUREMENT PROCEDURE: RADIATED EMISSIONS

Testing of this device was conducted at the Carl T. Jones Laboratory 3 meter test facility located in Springfield, Virginia, site #90490.

Transmitter field strength measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). Testing was conducted with power supplied from a 12 volt, NEMA class 2, power transformer with back-up batteries installed

The device under test was placed on a rotating turntable 0.8 meters high, centered at 3 meters distant from the measurement antenna. The device was tested with each antenna/cable assembly as shown in the test setup photographs. For the purpose of testing, the sample was made to transmit a continuous 1 kHz, 50% duty cycle pulse stream.

The field strength measurements were taken using an HP8596E spectrum analyzer, an EMCO 3121C dipole set, an EMCO 3115 double ridge guide horn and an Avantek UJ210 preamp. The device was scanned in both transmit and receive modes from 30MHz. to 10GHz. and all emissions were noted. In this case, the only emissions detected were those harmonically related to the fundamental transmit frequency.

At each detected emission frequency, the device was measured by rotating the turntable and adjusting the antenna height over a range of 1 to 4 meters to obtain the maximum output level. This procedure was performed with both horizontal and vertical antenna polarizations for both of the antenna/cable. The peak reading for each frequency was recorded in the fourth column in tables below.

Table 1 (Antenna with 1 meter cable)

RADIATED EMISSIONS DATA

CLIENT: EXCEL ENERGY FCC ID: PLS-ES500-A-RFT
ANTENNA: DIPOLES/DRG HORN EUT: DATA TRANSCEIVER
PART 15.249, 15.35 TEST DATE: 09-May-02

Frequency In MHz.	Ant. Polar. H/V	Ant. Factor dB	Peak reading dBm	Duty Cycle -dB	Peak Power uV/m@3m	Corrected Power uV/m@3m	FCC Limit uV/m@3m
916.502	V	30.8	-44.14	0.0	48195	48195	50000
1833.004	V	30.2	-93.45	0.0	154	154	500
2749.506	V	33.4	-95.70	0.0	172	172	500
3666.008	H	35.7	-99.83	0.0	139	139	500
4582.510	V	36.6	-105.61	0.0	79	79	500
5499.013	H	38.6	-111.68	0.0	50	50	500

Table 2 (Antenna with 3 meter cable)

RADIATED EMISSIONS DATA

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ANTENNA: DIPOLES/DRG HORN EUT: DATA TRANSCEIVER
PART 15.249, 15.35 TEST DATE: 09-May-02

Frequency In MHz.	Ant. Polar. H/V	Ant. Factor dB	Peak reading dBm	Duty Cycle -dB	Peak Power uV/m@3m	Corrected Power uV/m@3m	FCC Limit uV/m@3m
916.502	V	30.8	-44.62	0.0	45604	45604	50000
1833.004	V	30.2	-93.97	0.0	145	145	500
2749.506	V	33.4	-96.43	0.0	158	158	500
3666.008	H	35.7	-101.27	0.0	118	118	500
4582.510	V	36.6	-104.16	0.0	94	94	500
5499.013	H	38.6	-112.08	0.0	47	47	500

Measurements taken for weak emissions were performed by reducing the distance from the measurement antenna to 1 meter and factoring –9.54dB into the calculation. This method was used for the 6th harmonic.

C. DUTY CYCLE AND INTERVAL CALCULATIONS

The duty cycle correction factor for this device is approximately –6dB, but since the peak readings for all detected harmonics were below the limits, the duty cycle correction factor was not applied to the calculations.