TRANZEO
EMC LABS INC

EMC Test Report

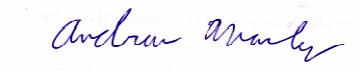
CyberTracker – external antenna

Arcom Control Systems

Date: July 14, 2006

Report No.: 140706.1

Labs: 19473 Fraser Way, Pitt Meadows, BC, Canada V3Y 2V4



Bruce Balston
EMC Engineer

Andrew Marles
EMC Coordinator

Revision History

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1.0 General Information

1.1 EUT Description

Product Name	Wireless Network Adapter
Company Name	Tranzeo Wireless Technologies inc.
Model No.	TR-5a-NC; TR-5a-19C
Rated RF Output Power	Adjustable, 19 dBm MAX
Frequency Range	806-825 MHZ, 896-902 MHz
Number of Channels	IDEN network specification
Transmit Rate	iDEN network specification
Type of Modulation	QAM modulation
Antenna Type	Integrated, Internal
Antenna Gain	5 dBi Max
Product Software	Custom firmware
Test Software	IO200 RFTester application
Operator Channel Selection	none
Power Adapter	Sunny SYS1298-1812-W2 Input: AC 100-240V, 50-60 Hz Output: DC 12 V, 1500 mA Serial: SYS1298-1812

Product samples tested:

Manufacturer	Model No.	Serial No.
Arcom Control Systems	CyberTracker II	EMC-001

In the Ports application, the Cyber Tracker will be used to track tractor-trailer trucks as they move around commercial ports. The Cyber Tracker will be placed inside the vehicle as it enters the port and will use an inbuilt GPS module and iDEN modem to wirelessly transmit information regarding the vehicles speed, location, etc. back to an administrator station.

The tests were performed on production sample models to demonstrate compliance with FCC Part 2 and Part 90.

1.2 Operational Description

This information is contained in an attached document.

1.3 EUT Testing Configuration

The EUT was tested in the following modes:

- **Standby/Receive mode:** In this mode the EUT beacons at the lowest possible rate while searching for a client with which to establish communication.
- **Continuous Tx Mode:** In this mode the EUT transmits a constant modulated carrier at the selected frequency.

1.4 EUT Modifications

No modifications were necessary for this unit to comply with FCC Part 2 and Part 90.

1.5 Overview of Test Results

1)FCC 2.1033(c)(3) User's Manual
The necessary information is contained in a separate document.

2) FCC 2.1033 (c)(4) Type of Emissions
FCC 90: 18K3D7W

3) FCC 2.1033 (c)(5) Frequency Range
FCC 90: 806-825 MHZ, 896-902 MHz.

4) FCC 2.1033 (c)(6) Operating Power
29 dBm Conducted Output Power.

5) FCC 2.1033 (c)(7) Maximum Power Rating
20 dBw Conducted Output Power.

6) FCC 2.1033 (c)(8) DC Voltages
Input: 100-240 VAC
Output: 24 VDC

7) FCC 2.1033 (c)(9) Tune-up Procedure
The necessary information is contained in a separate document.

8) FCC 2.1033(c)(10) Schematics and Circuitry Description
The necessary information is contained in a separate document.

9) FCC 2.1033(c)(11) Label and Placement
The necessary information is contained in a separate document.

10) FCC 2.1033(c)(12) Submittal Photos
The necessary information is contained in a separate document.

11) FCC 2.1033 (c)(13) Modulation Information

The necessary information is contained in a separate document.

1.6 Test Facilities

Tranzeo EMC Labs
19473 Fraser Way
Pitt Meadows, BC V3Y 2V4
Canada

Phone: (604) 460-6002
Fax: (604) 460-6005

FCC registration number: 960532
Industry Canada number: 5238A

1.7 Test Equipment

Manufacturer	Model	Description	Serial No.	Cal Due Date
Sunol Sciences	SM46C	Turntable	051204-2	N/R
Sunol Sciences	Custom	Mast Motor	TREML0001	N/R
Sunol Sciences	JB3	Antenna	A042004	02-Jun-2007
Sunol Sciences	DRH-118	Antenna	A052804	02-Jun-2007
Com-Power	LI-115	LISN	241037	30-Jan-2007
Rohde & Schwarz	FSP40	Spectrum Analyzer	100184	24-Aug-2006
Rohde & Schwarz	NRP	Power Meter	100055	02-Aug-2006
Rohde & Schwarz	ESCI	EMI Receiver	100123	02-Jun-2007

1.8 Test System Details

The unit is a stand-alone device with an interface to attach an external antenna. No other auxiliary equipment was used in the test setup.

1.9 Test Results

The EUT complies with FCC Part 90.

2.0 Conducted Output Power

2.1 Test Standard

FCC § 90.635 Limitations on power and antenna height

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

2.2 Test Limits

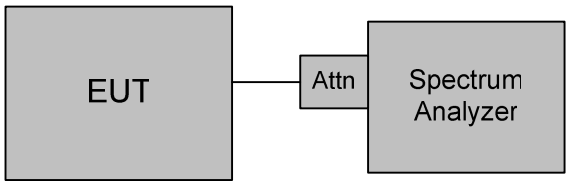
As a mobile station, the maximum output power of the transmitter is 100 watts.

2.3 Test Setup

The EUT was exercised using test software. It was configured to transmit a continuously modulated carrier and tested on the lowest, middle, and highest frequencies of each frequency band.

This test was performed with a modified unit. The antenna was disconnected and a cable was connected to the antenna port. The device was then connected directly to the spectrum analyzer using an appropriate attenuator.

2.3.1 Test Setup Block Diagram



2.4 Test Results

Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)	Result
806.0625	29.1	50	-20.9	PASS
824.9875	28.89	50	-21.11	PASS
896.0188	28.78	50	-21.22	PASS
901.9813	28.32	50	-21.68	PASS

3.0 Field Strength of Spurious Emissions

3.1 Test Standard

FCC § 90.691 Emission mask requirements for EA-based systems

| *(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:*

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 $Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section. |

3.2 Test Limits

-13 dBm out of band radiated emissions limit (3 m).

3.3 Test Setup

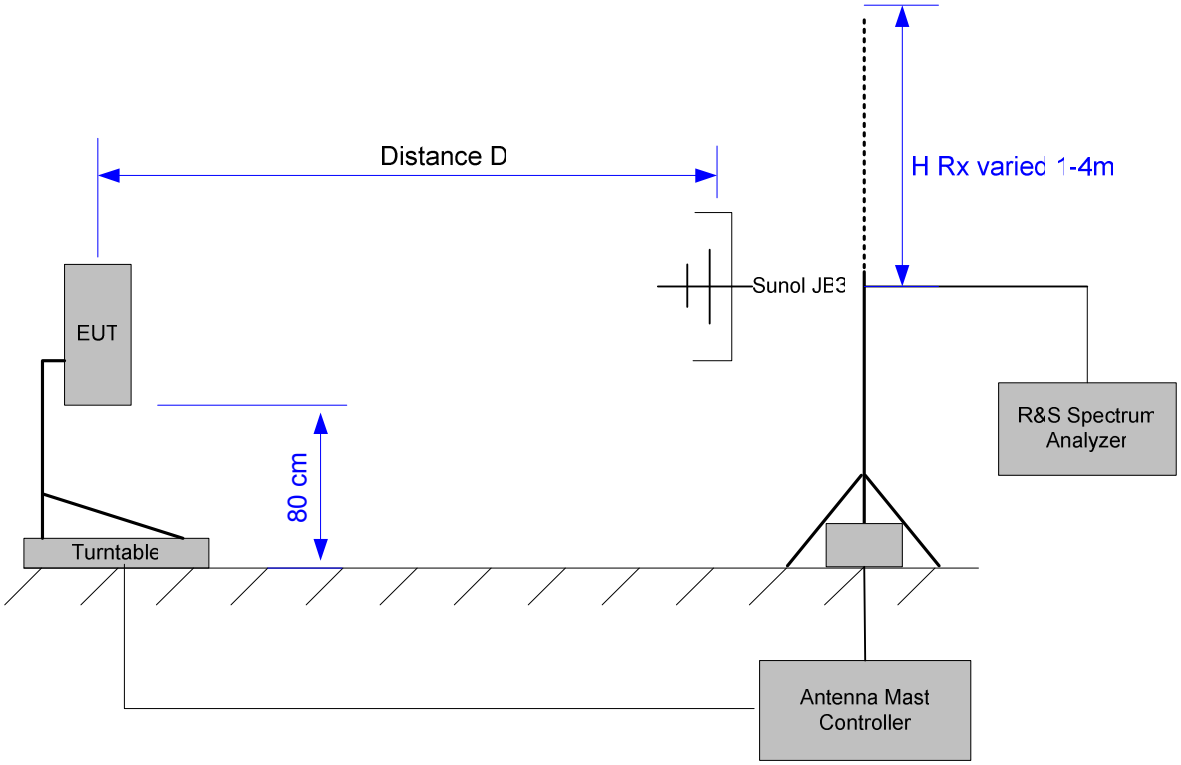
The EUT was exercised using test software. It was configured to transmit a continuously modulated carrier and tested on the lowest, middle, and highest frequencies of each frequency band. Only worst case data is shown below.

Pretesting at a 1 m measurement distance was performed above 1 GHz. The antenna was scanned around all sides of the EUT. Frequencies of interest were identified and final measurements performed at a 3 m measurement distance.

Measurements above 1 GHz were taken with RBW, VBW = 1 MHz.

All emissions within 20 dB of the limit were measured using the substitution method.

3.3.1 Test Setup Block Diagram



Note: Measurements below 1 GHz were performed with the Sunol JB3 antenna. Measurements above 1 GHz were performed with the Com-Power AHA-118 antenna. The measurement distance was 3 m.

3.4 Test Results

Frequency (MHz)	Reading (dBm)	Limit (dBm)	Margin (dBm)	Result
1612.125	-27.1	-13.0	-14.1	Pass
2418.188	-29.6	-13.0	-16.6	Pass
1649.975	-28.6	-13.0	-15.6	Pass
2474.963	-30.1	-13.0	-17.1	Pass
1792.164	-33.1	-13.0	-20.1	Pass
2688.245	-34.4	-13.0	-21.4	Pass
1803.963	-31.3	-13.0	-18.3	Pass
2705.944	-32.7	-13.0	-19.7	Pass

4.0 Effective Radiated Power (ERP)

4.1 Test Standard

FCC § 90.635 Limitations on power and antenna height

| *(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.*

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). |

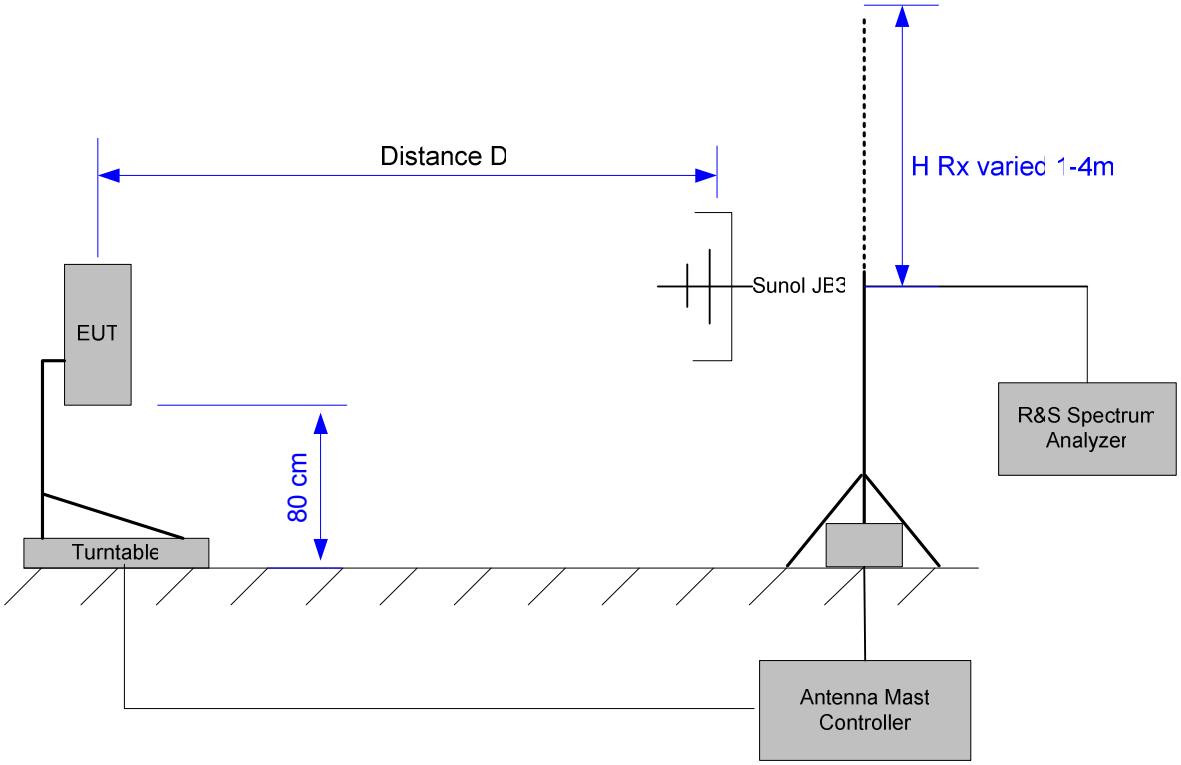
4.2 Test Limits

In order to qualify for MPE measurement exemption as per FCC 2.1091, the EUT must have an ERP of less than 1.5 W.

4.3 Test Setup

The EUT was exercised using test software. It was configured to transmit a continuously modulated carrier and tested on the lowest, middle, and highest frequencies of each frequency band.

4.3.1 Test Setup Block Diagram



Note: Measurements below 1 GHz were performed with the Sunol JB3 antenna. Measurements above 1 GHz were performed with the Com-Power AHA-118 antenna. The measurement distance was 3 m.

4.4 Test Results

Freq (MHz)	ERP (dBm)	MPE ERP Limit (dBm)	Margin
806.06250	27.34	31.76	-4.42
824.98750	27.61	31.76	-4.15
896.08175	24.87	31.76	-6.89
901.98125	23.77	31.76	-7.99

5.0 RF Exposure Evaluation

FCC 1.1310 states the criteria listed in the table below shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Section 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Section 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation".

Frequency Range (MHZ)	Electric Field Strength (V/m)	Magnetic Field Strength (A/M)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposures				
300-1,500	--	--	F/1500	30
1,500-100,000	--	--	1	30

5.1 EUT Operating Condition

Maximum EIRP is obtained with the manufacturer's specified external antenna. This antenna assembly includes 3m of coaxial cable.

5.2 RF exposure evaluation distance calculation

Freq (MHz)	ERP (dBm)	r (cm)
806.0625	27.34	9.0
824.9875	27.61	9.1
896.0188	24.87	6.4
901.9813	23.77	5.6

As shown above, the minimum distance where the MPE limit is reached is 9.1 cm for the EUT.

6.0 Test Photos