RF Emissions Test Report
To Determine Compliance With:
FCC, Part 15
Rules and Regulations

Model number: 837-3510
October 23, 2000

Manufacturer: Computer Process Control
1640 Airport Road
Suite 104
Kennesaw, GA 30144

Contents Section

Section 1

General Information

Manufacturer:	Computer Process Control 1640 Airport Road Suite 104 Kennesaw, GA 30144
Manufacturer representative:	**Mr. Scott Gelber**
Equipment covered by this report:	Model no. 837-3510
Options covered by this report:	None
Equipment serial no.	Prototype
Test specifications:	To determine compliance with: FCC, Part 15, Subpart B Rules and Regulations, Class B
Test report number:	00-199A
Test commenced:	October 20, 2000
Test completed:	October 20, 2000
Test engineer:	**Kent Stewart**

Test Facility: The test facility used to perform these tests is on file with the FCC under file 31040/SIT, 1300F2 and located at:

EMC Testing Laboratories, Inc.
2420 Oak Street West
Cumming, GA. 30041-6456

Section 2

Test report summary sheet 1 of 3

Summary:

Tests	Results
FCC, Part 15, Class B, Radiated emissions:	**Pass**
FCC, Part 15, Class B, Conducted emissions:	**Pass**

1- The product(s) covered by this report was found to comply with the Class B radiated and conducted emission limits of the FCC, Part 15, Subpart B Rules and Regulations.

2- There were no measurable emissions within 20 dBμv of the radiated or conducted limits with the antenna in the vertical or horizontal polarization.

3- The test results apply only to the products identified in this test report.

Product description:
The product(s) covered by this report consisted of a model 837-3510 receiver, which is intended for receiving temperature data at 418Mhz and outputs the data via RS-485 to a Gateway controller.

The enclosure is constructed of plastic with overall dimensions measuring 3.7cm high by 20.1cm wide by 20.1cm deep and house's the following components:

1- A wall adapter, manufactured by Airstack, model no. DV-9200, input rated 120Vac, 60Hz, 5W and output rated 9Vdc, 200mA.

2- A printed wiring board (antenna ground plane) manufactured by Computer Process Control, part number 237-3520 rev. 1.

3- A printed wiring board (main board) manufactured by Computer Process Control, part number 237537-3510 rev. 1.

Test report summary sheet 2 of 3

Test configuration:
The Equipment Under Test (EUT) was set-up and configured as specified by the manufacturer as follows:

1- The EUT was connected to the following support peripherals.

A) None

2- The EUT utilized the following cables and were connected as indicated below:

A) A shielded, unterminated 2-conductor cable was connected to the EUT's RS-485 port.

Test operation:
For all measurements, the equipment under test was caused to function in a continuous mode of operation for maximum electrical activity as specified by the manufacturer. Specifically, the EUT was powered on and waiting to receive while simultaneously try to communicate out the RS-485 cable.

Modifications:
The following modifications were required to comply with the indicated limits:

1- None

Engineering Statement:
All measurement data, of this test report, was taken in accordance with the FCC, Part 15, Subpart B Rules and Regulations and ANSI C63.4-1992 by EMC Testing Laboratories, Inc., located in Cumming, Georgia. Although this data is taken under stringent laboratory conditions and to the best of our knowledge, represents accurate data, it must be recognized that emissions from or immunity to this type equipment may be greatly affected by the final installation of the equipment. Therefore, EMC Testing Laboratories, Inc., while supporting the accuracy of the data in this report, takes no responsibility for use of equipment based on these tests. The manufacturer of this equipment must take full responsibility for any field problems which may arise, and agrees that EMC Testing Laboratories, Inc., in performing its functions in accordance with its objectives and purposes, does not assume or undertake to discharge any responsibility of the manufacturer to any other party or parties.

Section 2 cont…

Test report summary sheet 3 of 3

Conclusion:
With the above indicated modifications, the product(s) covered by this report has been tested and found to comply with the limits for a Class B device in accordance with the FCC, Part 15, Subpart B Rules and Regulations.

Tested by:

Kent Stewart
Laboratory Manager

Reviewed by:

Gene J. Bailey
Engineering Manager
EMC Testing Laboratories, Inc.
October 23, 2000

Section 2 cont…

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(Reserved for future use)

Section 3

STANDARD REFERENCE

The following primary standards were used for this test:

1) **ANSI C63.4-1992:** Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 Khz to 40 Ghz.

2) **US Code of Federal Regulations (CFR) (1998):** Title 47, Part 15, Radio Frequency Devices, Subpart B, Unintentional Radiators.

Section 4

TEST METHOD

INTRODUCTION:

The product(s) covered by this report were subjected to electromagnetic interference emissions measurements to determine compliance with the FCC, Part 15 requirements.

Radiated and conducted emissions were measured in accordance with Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz, ANSI C63.4.

MEASUREMENT CALCULATIONS:

Radiated Emissions:

For radiated emissions measurements, the signal attenuation due to impedance losses in the antenna and signal cable was significant and was added to the spectrum analyzer reading to give corrected signal strength reading. If a preamplifier was used, the signal gain was subtracted from the signal strength reading. Radiated emissions data was specified as decibels above 1 microvolt per meter (dBμV/m) of radiated field strength.

Radiated emissions (dBμV) = Analyzer reading (dBμV) plus
antenna factor (dB) plus cable factor (dB) minus Amplifier gain (dB)

Conducted Emissions:

For conducted emissions, the signal attenuation due to impedance losses in the LISN and signal cables were negligible and assumed to be 0dB. The conducted emissions were directly equal to the spectrum analyzer reading. Conducted emissions data was specified as decibels above 1 microvolt (dBμV) of conducted line voltage.

Conducted emissions (dBμV) = Analyzer reading (dBμV)

RADIATED EMISSIONS MEASUREMENT:

Radiated emissions measurements are performed at an open field test site. The receiving antennas were positioned 3 & 10 meters from the equipment under test along the center axis of the test site. Measurements were made with broadband antennas and if necessary, detected emissions were verified with dipole antennas. The dipole antenna was manually tuned to the signal frequency by adjusting the length of the antenna elements. The radiated emissions were measured for both the horizontal and vertical signal planes by rotating the antennas. Additionally, the EUT was rotated by the turntable and the antenna height was raised and lowered 1 to 4 meters to locate the maximum emission strength at each frequency.

The radiated emissions were measured over the frequency span of 30 Mhz to 2200 Mhz. The following antennas were used to measure the radiated emissions within the specified frequency spans.

Emission measurements made from 30MHz to 1000MHz were made at an antenna to EUT distance of 10 meters.

Emission measurements made from 1000 MHz to 10 GHz were made at an antenna to EUT distance of 3 meters.

Antenna	**Frequency Span**
Biconical	20 - 200 Mhz
Log Periodic	200 - 1000 Mhz
Dipoles	20 - 1000 Mhz
Horn	1-18 Ghz

CONDUCTED EMISSIONS MEASUREMENT:

Conducted emissions measurements were performed on a ground plane that was electrically bonded to earth ground. The equipment under test was positioned 0.8 meter above the ground plane and 0.8 meter minimum from the LISN that was positioned on the ground plane. The LISN housings were electrically bonded to the ground plane. The conducted emissions for both the ungrounded supply conductor (L1) and the grounded conductor (L2) of the power supply cord were measured. The conducted emissions were measured over the frequency span of 0.45 to 30 Mhz. The measurements were conducted in the quasi-peak and average detector modes.

INSTRUMENTATION:

Radiated and conducted signal strength measurements were taken with a spectrum analyzer. Radiated emissions were measured with broadband and tuned dipole antennas. Conducted emissions were measured with a 50 UH line impedance stabilization network (LISN). The test equipment consists of the following:

Test Equipment	Model No.	Serial No.	Cal. Due
Spectrum Analyzer	HP 8591A	2919A00171	06-20-01
Spectrum Analyzer	8592L	3649A00744	02-10-01
LISN	94641-1	0145/0146	06-05-01
Biconical Antenna	3110B	1708	10-09-01
Biconical Antenna	BIA-25	2451	10-20-01
Log Periodic	LPA25	1112	10-20-01
Dipole Antenna	DM-105A-T1	31402-110	05-25-01
Dipole Antenna	DM-105A-T2	31402-105	05-25-01
Dipole Antenna	DM-105A-T3	31402-109	05-25-01
Horn Antenna	3115	9405-4264	10-09-01
R.F. Amplifier	QB-820	11602	10-10-01
Preamplifier	8449B	3008A00914	10-10-01

DETECTOR FUNCTION:

All measurements were taken using a peak hold signal detector function. In this mode, the spectrum analyzer makes continuous scans across the frequency band and stores the highest emission value detected at each frequency for all scans. The peak hold integration will detect transient or low duty cycle emissions peak which might be missed on single scan measurement. The emission value at each frequency was a true value.

SPECTRUM ANALYZER SETTING:

For all measurements, the spectrum analyzer was set for a 10 dB input attenuation. 10 dB/Division vertical scale and 90 or 100 dBμV reference level. The resolution bandwidth was set at 9 Khz for the 0.45 - 30 Mhz span, 120 kHz for 30 - 1000 MHz span and 1 MHz for the 1000 – 5000 MHz span. The video bandwidth and sweep rate was automatically coupled by the analyzer.

Section 5

RADIATED EMISSIONS MEASUREMENTS

RADIATED EMISSIONS MEASUREMENTS

Model number: 837-3510 **Test date:** 10/20/00

Frequency Mhz	Measurement Reading dBμV/m	Corrected Reading dBμV/m	FCC Limit dBμV/m	Minimum Margin dBμV/m
There were no measurable emissions within 20 dBμV of the radiated emissions limits with the antenna in the vertical or horizontal polarization.				

Section 6

CONDUCTED EMISSIONS MEASUREMENTS

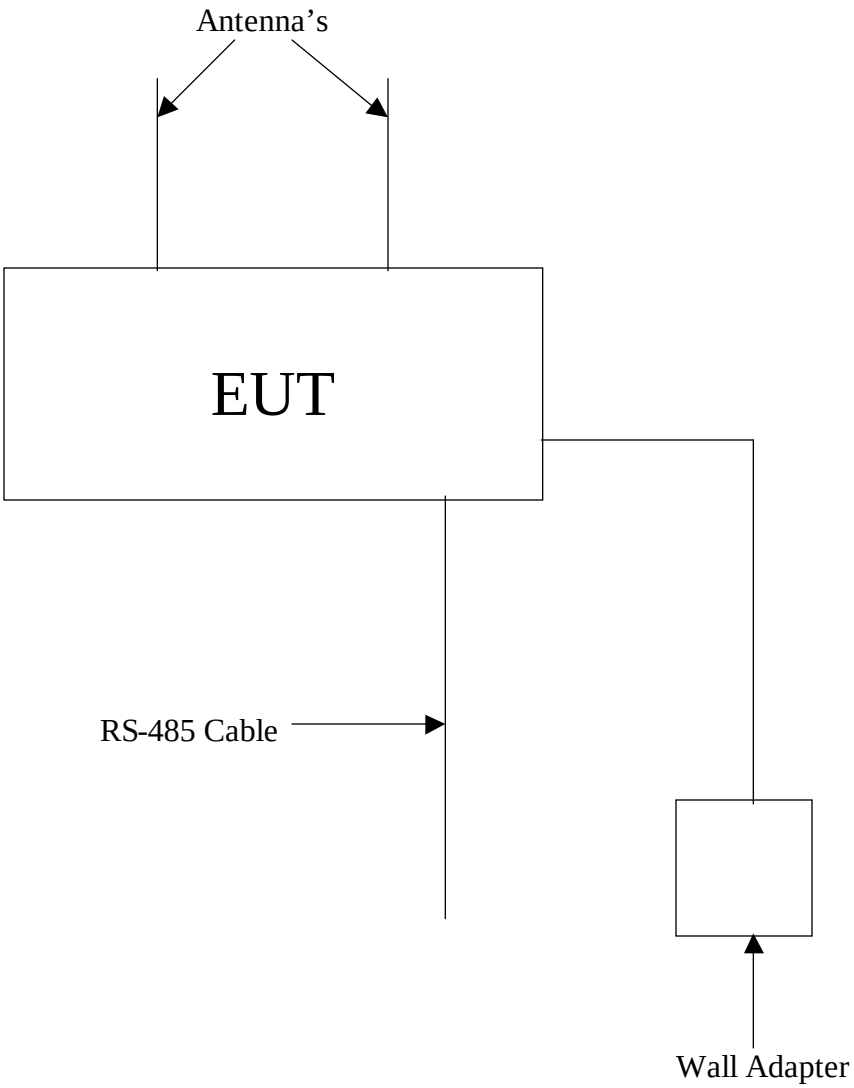
CONDUCTED EMISSIONS MEASUREMENTS

Model number: 837-3510
Test voltage: 120V, 60Hz **Test date:** 10/20/00

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBµV	Margin dBuV
There were no measurable emissions within 20 dBµV of the conducted emissions limits with the antenna in the vertical or horizontal polarization.					

Section 7

Configuration



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