

EQUIPMENT FCC ID :N6HPAC9806CE

FCC CLASS B

EMI MEASUREMENT TEST REPORT

TEST LAB FCC ID : I6U

This report concerns : **Original grant** ☐ **Class II change** ☐

Equipment tested : **INDUSTRIAL P.C PAC9806CE**

Equipment FCC ID : **N6HPAC9806CE**

Designed by : **A PLUS**
Z.I du Parc - 2 rue Léonard de VINCI
91120 Le Plessis- PATE - FRANCE

Manufactured by : **A PLUS**
Z.I du Parc - 2 rue Léonard de VINCI
91120 Le Plessis- PATE - FRANCE

Deferred grant requested per 47 CFR 0.457 (d)(1)(ii)

YES ☐

NO ☐

if yes, defer until :

Company Named agrees to notify the Commission by : **02/15/1999**

of the intended date of announcement of the product so that the grant can be issued on the date

Transition rules requested per 15.37?

YES ☐

NO ☐

If no, assumed Part 15, Subpart B for intentional or
unintentional radiator

The new 47 CFR [10-1-96 edition] provision

Report Prepared by :

Name: A.LEQUIER



(33) 02 41 73 63 89 Fax : +33 02 41 73 74 74

Test facility :

Bull Electronics Angers
34 Rue du Nid de Pie - BP 428
49004 ANGERS Cédex - France

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8 EQUIPMENT DOCUMENTATION

EXIBIT 8

ROCKY-538TXV CPU BOARD TECHNICAL DOCUMENTATION
CUSTOMER DOCUMENTATION
INDUSTRIAL AC INPUT POWER SUPPLY DOCUMENTATION

1.

EQUIPMENT FCC ID :N6HPAC9806CE

GENERAL INFORMATION

1.1 Product description

The APLUS Company name PAC9806CE is an industrial PC

The micro-computer is composed of:

A passive 14 slots PCI bus riser card

A CPU board(ROCKY-538TXV) using a 166 MHz Pentium microprocessor and having printer, mouse, keyboard, display, and two serial ports

A power supply: ACE-723 A

ACQUIRE.inc

A hard disk: Model Fireball S/N: 673900145206

QUANTUM

A floppy disk: Model D359M3 S/N: 8L17WF1930

MITSUMI

A metallic chassis

1.2 Tested systems details

The FCC IDs for all equipment, plus description of all cables used in the tested system (including inserted cards which have grants) are :

Description Model & Serial number	FCC ID	Cable description	Cable termination	Length (m)
PC : PAC9806CE S/N : P0199-20358(1)	N6HPAC9806CE	1 unshielded power cord	Plastic	2
		Serial shielded cable BULL # 76956954-403(2)	Metal	5
		Serial shielded cable BULL # 76957915-309 + shielded	Metal	10
		adapter 9pts/25pts(2)	Metal	0.20
Zenith Data System Display ZCM-1426-XT S/N : MYZE4104023521	CKLHCM-427	1 Unshielded power cord	Plastic	2
		1 Shielded Video cable(3)	Metal	1.2
Zenith Data System Keyboard Model ZKB-3 S/N : D8429	GJK101RX-5	1 Shielded cable (4)	Metal	2
Microsoft PS/2 Mouse S/N : 0566202	C3K5K5400PS2	1 Shielded cable (5)	Metal	2.5
Hewlett Packard Printer Model 2277A S/N : 2906A16132	B948JA2277X	1 Unshielded power cord with external power module ETT76J2A	Plastic	2
		1 Shielded parallel cable # N0856675000.01C	Metal/Metal	2

(1) EUT submitted for grant

(2) Used to load P.C serial ports

(3) Attached cable includes grantee supplied ferrite

(4) Keyboard cable permanently attached to keyboard

(5) Mouse cable permanently attached to mouse

1.3 Test Methodology and procedure

Both conducted and radiated testing were performed in accordance with ANSI C63.4 procedure, as revised in 1992. The specification used was the Class B limits of FCC Rules Part 15 Subpart B for conductive (§ 15-107) and radiated (§ 15-109) interference measurements.

Final radiated measurement is performed with an antenna located at 3 meters distance from EUT (Preliminary radiated emission test was realized at a distance of 1 meter in the underground of open area test site)

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at the following address :

BULL ELECTRONICS ANGERS
34 Rue du Nid de Pie
B.P 428
49004 ANGERS Cedex 01
France

This site has been fully described in a report dated August 21, 1997 submitted to your Office, and accepted in a letter dated October 9, 1997 (31040/SIT 1300F2)

1.5 List of measurement apparatus

APPARATUS	MANUFACTURER	REFERENCE	SERIAL NUMBER	DATE OF VERIFICATION
RECEIVERS				
CISPR Receptive chain :	Hewlett Packard	HP 8574A		
Quasi-Peak Detector	Hewlett Packard	HP 85650A	2811A01134	August 1998
Spectrum Analyzer	Hewlett Packard	HP 8568B	2816A116603	August 1998
Pre-selector	Hewlett Packard	HP 85685A	287A00784	August 1998
EMI Software (For conducted emission)	Hewlett Packard	HP 85869A		
REMS Software (For radiated emission)	Hewlett Packard	HP 85879A Rev A.02.01		
ARTIFICIAL MAINS NETWORKS				
LISN	Rohde&Schwarz	ESH2-Z5	861741/019	August 1998
LISN	Rohde&Schwarz	ESH2-Z5	872094/037	August 1998
ANTENNAS				
Bilog	Chase	CBL6112	2434	October 1998

2. PRODUCT LABELLING

2.1 FCC ID Label

FCC ID : N6HPAC9806CE This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions :(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation
--

2.2 Location of the Label on EUT

On the midle side of the PC rear side

See picture FCC label.jpg

3.SYSTEM TEST CONFIGURATION

3.1 Justification

Even if, for this specific use the computer is sold without peripherals, the system was configured for testing in a standard configuration, as a customer would normally use it in order to verify all possible external connections behavior.

Two conducted lines perturbations measurements are performed, one on power supply of the P.C and one on the display and printer connected together. The radiated measurements are performed with P.C, display and printer in the field measurement.

3.2 EUT CONFIGURATION

see photos test config.jpg

3.3 EUT exciser software

In order to reflect the final utilization, the Industrial P.C PAC9806CE is using Windows NT 4.0 creating disk access, memory access and printing sequence:

3.4 Required Signatures

Applicant Signature:

Date

Typed/printed Name: G. LENAOUR

Position: Director

Test Lab. manager Signature:

Date:

Typed/printed Name: JL. CANDELON

Position: Lab. manager

Staff test

Test Signature:

Date

Typed/printed Name: A.LEQUIER

4.E.U.T TECHNICAL DESCRIPTION

4.1Electric drawing

4-1 Electric drawing (continued)

4.2 List of EMI critical components

Quartz:
14.318 MHz; 32.718 KHz;

Shielding: The chassis is fully metallic and to ensure a good shielding, the top cover is equipped with elastomer EMI gasket (as shown by the photos coverdetail.jpg).

5.POWER LINE CONDUCTED EMISSION

5.1 Test results measurements

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data pages, and then are measured with quasi-peak detector.

SUMMARY OF 6 HIGHEST SIGNALS PER WIRE MEASURED ON THE CONFIGURATION

Product	Result	MINIMUM MARGIN				Data and Plot on following Pages
		WIRE LINE		NEUTRAL LINE		
		dBµV	MHz	dBµV	MHz	
E.U.T PAC9806CE	Pass	-7.4	0.830	-7.8	0.830	35 and 37
		-8.5	0.763	-8.9	0.769	
		-9.5	0.895	-9.6	0.895	
		-9.9	15.330	-9.9	15.330	
		-10.9	0.512	-11.4	0.510	
		-11.7	0.702	-13.1	0.702	
DISPLAY+PRINTER	Pass	-8.5	15.140	-8.7	0.469	36 and 38
		-10.2	0.910	-9.0	15.200	
		-14.9	0.941	-9.4	0.499	
		-16.6	0.876	-11.3	0.564	
		-18.7	0.501	-12.9	0.656	
		-18.8	29.010	-17.6	1.820	

CISPR RECEPTIVE CHAIN H.P 8574A CONFIGURATION		
Quasi-Peak	Normal mode	
Adapter	Band With = 9 kHz	
Spectrum	Resolution Band With = 100 kHz	
	Video Band With = 300 kHz	
Analyzer	Sweep	Peak measurement : 100 ms/MHz
Pre-selector	min	Quasi-peak measurement : 200s/MHz
	Normal mode	
	Internal preamplifier : 20 dB	

All readings are quasi-peak unless stated otherwise.

5.2 POWER LINE CONDUCTED EMISSION DATA AND PLOTTING (LINE WIRE)

see photos conducdata.jpg

5.2 POWER LINE CONDUCTED EMISSION DATA AND PLOTTING (LINE WIRE cont'd)

see photos conducdata1.jpg

5.3 POWER LINE CONDUCTED EMISSION DATA AND PLOTTING (NEUTRAL WIRE)

see photos conducdata2.jpg

5.3

POWER LINE CONDUCTED EMISSION DATA AND PLOTTING (NEUTRAL WIRE cont'd)

see photos conducdata3.jpg

5.4 POWER LINE CONDUCTED PHOTOS

See photo conduction1.jpg

5.4 POWER LINE CONDUCTED PHOTOS (cont'd)

See photo conduction2.jpg

6. OPEN FIELD RADIATED EMISSION**6.1 Test results measurements**

The following data pages lists the significant emission frequencies, measured level, correction factor (includes cable and antenna corrections), corrected reading and the limit. The highest peaks are measured in quasi-peak detection mode. Explanation of the Correction Factor is given in paragraph 6.4.

SUMMARY OF 6 HIGHEST SIGNALS MEASURED ON THE CONFIGURATION

Product	Result	MINIMUM MARGIN		Data and Plot on following Pages
		dB μ V	MHz	
P.C+ DISPLAY + PRINTER		-2.0	200.511	42 and 43
		-4.1	740.650	
+ KEYBOARD +MOUSE+	Pass	-5.6	437.654	
		-6.9	208.055	
RS232 cables		-7.6	48.000	
		-7.7	38.620	

CISPR RECEPTIVE CHAIN H.P 8574A CONFIGURATION			
Quasi-Peak Adapter			Normal mode
			Band With = 120 kHz
			Resolution Band With = 1 MHz
Spectrum Analyzer			Video Band With = 3 MHz
	Sweep min		Peak measurement : 1 ms/MHz
			Quasi-peak measurement : 20s/MHz
Pre-selector			Normal mode
			Internal preamplifier : 20 dB

All readings are quasi-peak unless stated otherwise.

6.2 OPEN FIELD EMISSION DATA AND PLOTTING

See photos emissiondata.jpg

6.2 OPEN FIELD EMISSION DATA AND PLOTTING (cont'd)

See photos emissiondata1.jpg

6.3 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and cable loss, and subtracting the preamplifier gain (if any) from the measured reading. The basic equation with a sample calculation is as follows :

$$FS = RA + AF + CF - PG$$

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable loss

PG = Preamplifier Gain (Pre-selector)

Assume a receiver reading. The antenna factor and the cable loss are added. The internal pre-selector gain of 20 dB is subtracted, giving the field strength.

REMS software performs calculation and result of table in column ABS (MEASUREMENTS) is FIELD STRENGTH.

6.4 ANTENNA FACTORS AND CABLE LOSS FOR 3m DISTANCE MEASUREMENT

6-4-1 Cable loss

E field 3 meters cable losses

FREQUENCY	LOSS
F (MHz)	(dB)
30	0.7
40	0.7
50	0.9
100	1.0
120	1.2
160	1.5
200	1.7
250	2.0
300	2.2
400	2.7
500	3.1
600	3.4
700	3.8
800	4.2
900	4.5
1000	4.7
1100	5.0
1200	5.4
1300	5.6
1400	5.9
1500	6.0
1600	6.6
1700	6.3
1800	6.8
1900	7
2000	7.1

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6-4-2 Antenna factor BILOG CBL6112 30-2000 MHz (3m)

Frequency (MHz)	Factor antenna (dB)
30	19.4
35	16.9
40	14.3
45	11.9
50	9.5
55	7.7
60	6.7
65	6.4
70	6.7
75	7.6
80	8.6
90	10.5
100	11.9
150	11.9
200	10.1
250	13.7
300	14.4
400	17.1
500	19.0
600	20.2
700	20.4
800	21.3
900	21.8
1000	22.6
1100	23.4
1200	24.3
1300	24.8
1400	25.7
1500	26.6
1600	26.9
1700	28.0
1800	28.1
1900	28.6
2000	29.2

6.5 RADIATED EMISSION PHOTOS

See photos radiated1.jpg and radiated2.jpg

7. PHOTOS OF TESTED E.U.T

See photos Front view.jpg

See photos Rearview.jpg

See photos PCgeneral.jpg

7.1 GENERAL PAC9806CE VIEW

See photos coverdetail.jpg

7.2.. TOP COVER VIEW SHOWING THE EMI GASKET

See photos Internal3.jpg

7.3 INTERNAL VIEW SHOWING CPU BOARD MOUNTED ON THE PASSIVE RISER CARD

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**PHOTOS OF PAC9806CE MOTHER BOARD
CPU BOARD ROCKY-538TXV**

See photo CPU componentside and CPU solder side.jpg

**POWER SUPPLY : ACE 723-A
ACQUIRE.Inc**

See photo Power supply.jpg; PWSinternal1.jpg, PWSinternal2.jpg

**HARD DISK : Model Fireball
S/N : 673900145206
QUANTUM**

See photo HDSgeneral.jpg; HDS component.jpg, HDS solder.jpg

EQUIPMENT FCC ID :N6HPAC9806CE

FLOPPY DISK : D359M3 MITSUMI S/N : 8L17WF1930
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See photo Floppytop.jpg; Floppybot.jpg, floppyinter.jpg

PASSIVE PCI BUS RISER CARD

See photo risercomponent.jpg; risersolder.jpg