

MEASUREMENT/TECHNICAL REPORT

OLIVETTI PRINTER

FCC ID: DYK00AJ12

July 19th, 2000

This report concerns (check one): Original grant ☒ Class II change ☐

Equipment type: PRINTER (ex.: computer, printer, modem, etc.)

Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes ☐ no ☒

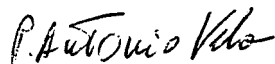
If yes, defer until: _____
date

Company Name agrees to notify the Commission by _____
date

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

Report prepared by: P.Antonio VELO

Giuseppe MECCHIA



TÜV QSL srl
Via Montalenghe 12
10010 Scarmagno (TO)
Italy

Phone : 0125 - 525441

Phone : 0125 - 525440

Fax : 0125 - 525499

Table of Contents	Page
1 GENERAL INFORMATION	3
1.1 Product Description	3
1.2 Related Submittal(s)/Grant(s)	3
1.3 Tested System Details	4
1.4 Test Methodology	5
1.5 Test Facility	5
2 PRODUCT LABELING	6
Figure 2.1 FCC ID Label	6
Figure 2.2 Location of the Label on EUT	7
3 SYSTEM TEST CONFIGURATION	8
3.1 Justification	8
3.2 EUT Exercise Software	8
3.3 Special Accessories	9
3.4 Equipment Modifications	9
3.5 Configuration of the Tested System	10
Figure 3.1 Configuration of the Tested System	10
4 BLOCK DIAGRAM(S) OF THE EUT	11
4.1 Block Diagram Description	11
Figure 4.1 Block Diagram of the EUT	12
5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS	13
6 CONDUCTED EMISSION DATA	14
7 RADIATED EMISSION DATA	15
7.2 Field Strength Calculation	16
8 PHOTOS OF TESTED EUT	17
User Manual	18

1 GENERAL INFORMATION

1.1 Product Description

The EUT is a desk-top bubble ink-jet printer intended to be connected to Personal Computers in a system configuration: two interface ports are provided (parallel and USB). It is equipped with a printing head that can be fitted alternatively with color or black ink-cartidges being capable of driving one or the other according to the instructions received from the Computer.

It is supplied by a Switched Mode Power Supply Unit and includes a Controller (Printed Wiring Board with standard electronic components) and a printing unit driven by dc stepping motors.

1.2 Related Submittal(s)/Grant(s)

None

1.3 Tested System Details

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

Model & Serial No.	FCC ID	Description	Cable Descriptions
<hr/>			
Artjet 12 (1) s/n EMC-2000-0351	DYK00AJ12	Printer, parallel and USB I/F	Shielded parallel cable Shielded USB cable Unshielded power cord
Acer TravelMate 517 s/n 9145C01Q0I- 94400122K	Declaration of Conformity	Personal Computer	Unshielded power cord Shielded signal cables
Delta Electronics mod. ADP-60JB s/n DND9939132283	None	AC adapter	Unshielded power cords
HP 7440A s/n 2539A94878	BSD8537440	Plotter, serial I/F	Shielded serial cable Unshielded power cord

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV QSL test site No. 2

The open area test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 12, Scarmagno, Italy. This site has been fully described in a report dated May 4, 2000 submitted to your office, and accepted in a letter dated May 30, 2000 (registration Number: 90860)

Test equipment list:

Test receiver	Rohde & Schwarz ESH3	s/n 881364/012
LISN	Schwarzbeck NNLA8120	s/n 8120399
Test receiver	Rohde & Schwarz ESVP	s/n 879783/029
Biconical antenna	EMCO 3110	s/n 1735
Log-periodic antenna	EMCO 3146	s/n 3678

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See file: ID Label. doc

Figure 2.2 Location of Label on EUT

See file: ID Label. doc

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The printer was configured for testing in a typical fashion (as a customer would normally use it).

It was connected to the parallel and to USB port of a personal computer and operated in standard mode.

Two tests have been run:

- 1. With parallel port selected and
- 2. With USB port selected

Data attached to this report refer to worst case configuration only.

3.2 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, (EMI_DIA) contained on a 3-1/2 inch disc, was inserted into drive A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is: an H is printed on the monitor, speaker beep, mass storage devices exercised, plotter and printer prints an "H" pattern. The complete cycle takes about 2 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are, however, continuously scanned for data input activity.

3.3 Special Accessories

Line Filter on the Power Supply Unit:

Capacitors:

C6 (X2 class) 0.1 μ F-250 V Matsushita ECQ-MV or
..... Arcotronics R47K or R47L or
..... Roederstein F1772 or
..... Philips 2222

C17; C26; 680pF - 250 V Murata KY series or
(Y class) Draloric WKO

C18; C25; 1000pF – 250 V Murata KY series or
(Y class) Draloric WYO

Inductors:

L2 Filter coil 2 x 50 mH Moelettra 209428-G or
..... Elettronica Rossoni ER817

L3 Filter coil 2 x 100 μ H Radiohm 42V15 or
..... Moelettra 100176E

Metal shieldings:

Metal shield on the controller board (see picture attached as Figure 8.8);

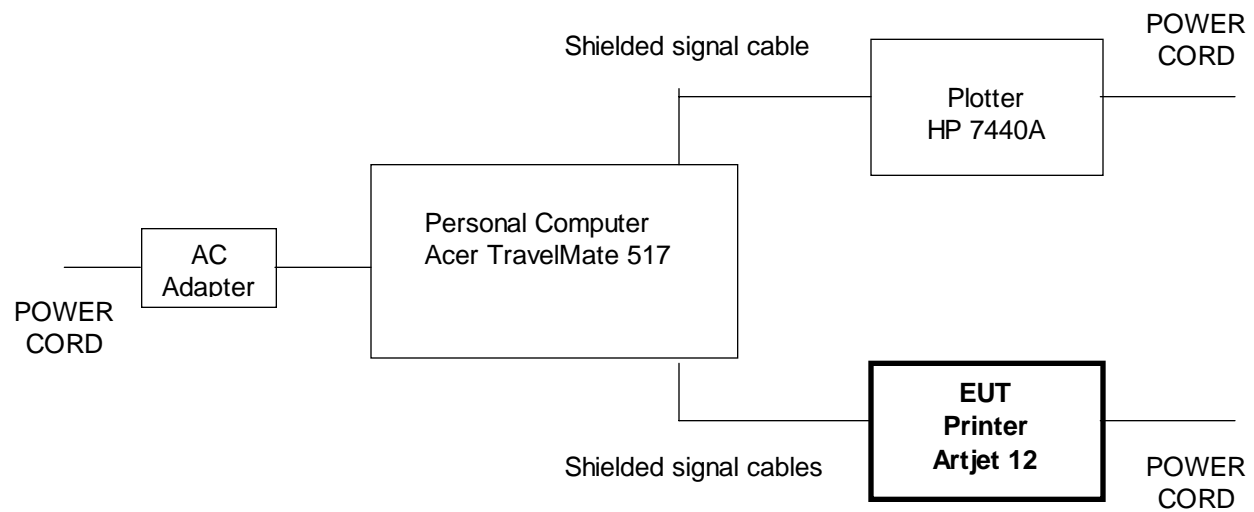
As shown in Figure 3.1 all interface cables used for compliance testing are shielded as normally supplied by Olivetti Company. These cable model and part numbers are marketed with the Olivetti Company peripherals to the end user, and appear on the related product price list supplied to our customers. All cable connectors feature integral metal hoods for shielding.

3.4 Equipment Modifications

To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 3.1 Configuration of the Tested System



4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

The Controller Board of the EUT is provided with the following frequency generators:

XT1 = 20.000 MHz Ceramic resonator

XT2 = 6.000 MHz crystal oscillator (USB interface)

Carriage Motor Controller (PWM frequency):..... 15 to 30 KHz

Paper Feed Motor Controller (PWM Frequency): 25 to 30 KHz

Power Supply Unit switching frequency: 50 to 70 KHz

Fig. 4.1 - Block Diagram of the EUT

See file: BLOCK DIAGRAM . doc

5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See file: TEST SETUP PHOTOS . doc

6 CONDUCTED EMISSION DATA


6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dB μ V)	Limit (dB μ V)
neutral	1.9	46	48
	2.7	43	
	3	45	
	4.9	45	
	12.3	44	
	16.4	37	
line	1.9	46	48
	2.7	44	
	3	46	
	4.9	44	
	12.3	45	
	16.4	36	

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date June 23, 2000
Typed/Printed Name Giuseppe MECCHIA

7 RADIATED EMISSION DATA

7.1 Tests of the worst case configuration


The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strength calculation is given in paragraph 7.2.

Judgement: Passed by 5 dB

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dB μ V)	Correction Factor (dB/m)	Corrected Reading (dB μ V/m)	3 Meter Limit (dB μ V/m)
144	H	21.5	14.5	36	43.5
240.1	V	23.5	14.5	38	46
326.1	V	21.6	18.4	40	46
391.4	V	21.1	19.9	41	46
433.2	H	19	21	40	46
456.6	H	19.4	21.6	41	46

* All readings are quasi-peak, with an IF bandwidth of 120 kHz.

Test Personnel:

Tester Signature  Date June 21, 2000
Typed/Printed Name Giuseppe MECCHIA

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The Antenna and Cable Factor of 14.5 is added, giving a field strength of 36 dB μ V/m. The 36 dB μ V/m value was mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 14.5 = 36 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(36 \text{ dB}\mu\text{V/m})/20] = 63.1 \mu\text{V/m}$$

8 PHOTOS OF TESTED EUT

- Fig. 8.1 Overall front view**
- Fig. 8.2 Overall rear view**
- Fig. 8.3 Internal view with upper cover removed**
- Fig. 8.4 Internal view with upper cover removed (without paper feeder)**
- Fig. 8.5 Power Supply Unit P.W.A. - Components side**
- Fig. 8.6 Power Supply Unit P.W.A. - Foil side**
- Fig. 8.7 Controller Board - Components side**
- Fig. 8.8 Controller Board - Components side (with additional metal shield)**
- Fig. 8.9 Controller Board - Foil side**

See files: EXTERNAL PHOTOS . doc and INTERNAL PHOTOS. doc

User Manual

See file: userman.pdf