REPORT ON

EMC Emissions Testing of a Displaymate Touchscreen

Report No B0604706/1

August 1998

TÜV
PRODUCT SERVICE
ASSESSMENT SERVICE

TÜV
PRODUCT SERVICE
ASSESSMENT SERVICE

TÜV Product Service Ltd
Snitterfield Road Bearley
Stratford-Upon-Avon Warwickshire
United Kingdom CV37 0EX

Tel: +44 (0)1789 731155
Fax: +44 (0)1789 731264

REPORT ON

EMC Emissions Testing of a Displaymate Touchscreen

Report No BO604706/1

August 1998

PREPARED FOR

Interactive Displays Limited
5 Thames Park
Lester Way
Wallingford
Oxfordshire
OX10 9TJ

APPROVED BY

Jensen Adams

J J ADAMS
Manager, Civil EMC Test - Birmingham

DATED

27th August 1998

DISTRIBUTION

Interactive Displays Limited	1 Copy
TÜV Product Service Limited	1 Copy

Copy No 1

Total No of Pages 10

REPORT BODY CONTENT

1 STATUS

OBJECTIVE	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specifications.
MANUFACTURING DESCRIPTION	Displaymate Touchscreen
MANUFACTURER	Interactive Displays Ltd
MANUFACTURERS MODEL NUMBER	RP96
SERIAL NUMBER	Screen (DAV0014) Controller (97242)
BUILD STATUS	Complete touchscreen including controller and serial cable.
SOFTWARE VERSION	2.0
TEST SPECIFICATION NUMBER	FCC Part 15 Subpart B; 1997
REGISTRATION NUMBER	BO604706/1
QUANTITY OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Unclassified
INCOMING RELEASE SERIAL NUMBER DATE	Build State Declaration <> <> 1998
DISPOSAL REFERENCE NUMBER DATE	Packing Note 44118 6th August 1998
ORDER NUMBER DATE	1236 14th July 1998
START OF TEST FINISH OF TEST	3rd August 1998 4th August 1998
TEST ENGINEERS	R A Bennett J J Laydon
RELATED DOCUMENTS	ANSI C63.4 1988. Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 10 kHz to 1 GHz.

2 BRIEF SUMMARY OF RESULTS

Table 2 below shows a brief summary of the results obtained.

Specification and Section Number	Test	EUT Modification State	Result
FCC Part 15 Subpart B	Radiated Electric Field Emissions 30MHz - 1000MHz Enclosure Port	0	Pass

Table 2

3 EUT MODIFICATION CHRONOLOGY

Table 3 below details modifications necessary in order for the EUT to pass the relevant tests applied.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As Supplied by Manufacturer	Not Applicable	Not Applicable

Table 3

4 SYSTEM CONFIGURATION DURING EMC TESTING

The Displaymate - Touchscreen Display with all associated cabling was set up simulating a typical user installation on the Open Field Site, then retested in accordance with the specification.

The EUT was supported by a metal frame and placed on a 0.8m high table above the Open Field Site ground plane. The communication cable from the Touchscreen Display was connected via the "controller" to a Laptop PC, operating under Windows 95, and powered with a 110VAC 60Hz supply voltage.

The PC was running the "Displays" software which continuously monitored the Touchscreen for activation's. A motor operated "mechanical finger" was positioned in front of the Touchscreen. The finger touched the display every 3/4 seconds, monitored by the Laptop PC.

5 RADIATED ELECTRIC FIELD EMISSIONS TEST PROCEDURE

5.1 FCC Part 15 Subpart B

A preliminary profile of the Radiated Electric Field Emissions was obtained by placing the Equipment Under Test (EUT) in a Characterisation Chamber; measurements were taken at a 3m distance. Measurements of emissions from the EUT were obtained with the Measurement Antenna in Horizontal and Vertical Polarisations. The characterisation produced a list of the highest emissions and associated antenna polarisation.

The EUT was then transferred to the Open Field Site and placed on a remotely controlled turntable. Using the information from the preliminary profiling of the EUT, a search was made of the frequency spectrum from 30MHz to 1000MHz. The list of the highest emissions was then confirmed or updated under Open Site conditions. These emissions were then formally measured using a Quasi-Peak Detector and measurement bandwidth of 120kHz which meets the CISPR requirements. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification. The details of these highest emissions were then recorded in the Job Log Book.

Details of the highest emissions are presented in Table 6.1.

The Radiated Electric Field Emission measurements were made using a Rohde and Schwarz ESVP test receiver.

The climatic conditions recorded at the time of this test were:-

Temperature - 21.5°C Relative Humidity - 58.3%rh Atmospheric Pressure - 1013HPa

The test was performed in accordance with ANSI C63.4.

6 RADIATED ELECTRIC FIELD TEST RESULTS-RECEIVE MODE

Equipment Designation : Unintentional Radiator.

The EUT met Class B requirements of FCC Part 15 Subpart B for Radiated Electric Field Emissions.

The emissions have been measured at 3m.

Open Field Results : The levels of the six highest emissions measured in accordance with the specification are presented in Table 1 below :-

Frequency	Pol	Hgt	Azm	Level at 3m	Cable Loss	Antenna Factor	F.S at 3m		Spec Limit	
MHz	H/V	cm	deg	dBµV	dB	dB	dBµV/m	µV/m	dBµV/m	µV/m
32.011	v	100	148	13.4	0.7	18.6	32.7	43.2	40.0	100.0
64.014	v	150	122	22.4	1.0	6.0	29.4	30.5	40.0	100.0
120.000	v	100	5	9.1	1.6	11.7	22.4	13.2	43.5	150.0
147.019	v	100	54	9.6	1.6	11.0	22.2	12.9	43.5	150.0
891.858	v	100	354	7.7	4.6	22.9	35.2	57.5	46.0	200.0
992.877	v	100	354	7.8	5.0	24.5	37.3	73.9	54.0	500.0

Table 6.1

The margin between the specification requirements and all other emissions was 18.5dB or more below the specification limit.

ABBREVIATIONS FOR ABOVE TABLE

H	Horizontal Polarisation	V	Vertical Polarisation
Pol	Polarisation	Hgt	Height
deg	degree	Azm	Azimuth
Spec	Specification	F S	Field Strength

Procedure Test Performed in accordance with ANSI C63.4.

Performed by J J Laydon, EMC Engineer.

7 EMISSION TESTING

Instrumentation used for Emission Testing:

Instrument	Manufacturer	Type No	EMC No
Computer	Opus	PCV	CV5
Test Receiver	Rohde and Schwarz	ESVP	1806
Test Receiver	Rohde and Schwarz	ESVP	1807
Spectrum Monitor	Rohde and Schwarz	EZM	1811
Turntable & Controller	British Turntables	RH253	1858
Automatic Antenna Mast & Controller	Emco	1050	1844/5
Antenna Mast	Electrometrics	AMU74A	1853
Plotter	Hewlett Packard	7550A	–
Printer	Epson	LQ400	–
Anechoic Screened Enclosure	Ray Proof	6277	1804
Open Area Test Site	Assessment Services	OATS 2	2280
Bilog Antenna	Chase	CBL6111B	2451

8 FCC SITE COMPLIANCE LETTER

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

October 20, 1997

IN REPLY REFER TO
31040/SIT
1300F2

Assessment Services
Segensworth Road Titchfield
Fareham Hampshire
England PO15 5RH

Attention: K. F. Archer

Re: Measurement facility located at Bearley
(3 and 10 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is updated monthly and is available on the Laboratory's Public Access Link (PAL) at 301-725-1072, and also on the Internet at the FCC Website www.fcc.gov/oet/info/database/testsite/.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

9 SYSTEM MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems, in accordance with the recommendations of NIS 81 Edition 1, May 1994 are :-

For Radiated Emissions, Quasi-Peak Measurements using the ESVP Test Receiver and Bilog Antenna:-

Frequency	±5ppm + 500Hz
Amplitude	±4.2dB