TRLEMC

TEST REPORT NO: EL1289/4191

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**REPORT ON THE RFI TESTING OF A
UNIPATH LTD
CHIPCARD READER/PROGRAMMER
WITH RESPECT TO
THE FCC RULES CFR 47: JULY 1998
PART 15 LIMIT B**

TEST DATE: 30 NOVEMBER 1998

TESTED BY: ..... B SHORT

APPROVED BY: ..... R J FYFE

DATE: 17 December 1998

Distribution:

Copy Nos: 1 UNIPATH LTD

2 TRL EMC Ltd

TRL EMC LTD

LONG GREEN FORTHAMPTON GLOUCESTER GL19 4QH UNITED KINGDOM

SUMMARY

TEST REPORT NO:	EL1289/4191
TRL EMC LTD WO:	EL1289
PURPOSE OF TEST:	Radio Frequency Interference Emissions CERTIFICATION
TEST SPECIFICATION:	FCC Rules CFR 47 (JULY 1998) Part 15 LIMIT B
EQUIPMENT UNDER TEST:	CHIPCARD READER/PROGRAMMER
EQUIPMENT SERIAL NO:	4598 358 9R
FCC GRANTEE CODE:	N92
FCC PRODUCT DESIGNATOR:	CRD1
TEST RESULT:	Measured as COMPLIANT (Note uncertainty values in Appendix B)
MANUFACTURER/AGENT:	UNIPATH LTD PRIORY BUSINESS PARK BEDFORD BEDS MK44 3UP
ORDER NO:	11036
TESTED BY:	TRL EMC LTD
DATE OF TEST:	30 NOVEMBER 1998

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1 INTRODUCTION

This report presents the results of Radio Frequency Interference (RFI) tests carried out in accordance with the FCC Rules CFR 47: JULY 1998 Part 15, LIMIT B, specification on equipment type CHIPCARD READER/PROGRAMMER.

The testing was carried out for UNIPATH LTD by TRL EMC Ltd, an independent test house, at their EMC test facility located at Tewkesbury, Gloucestershire, England.

The test site is FCC listed and is calibrated as recommended in Document ANSI C63.4 1992.

This report also details the configuration of the equipment under test, the test methods used and any relevant modifications where appropriate.

The equipment and peripherals were operated as specified in ANSI C63.4: 1992 Document.

2 SYSTEM UNDER TEST

2.1 Equipment Under Test (EUT)

UNIPATH LTD

CHIPCARD READER/PROGRAMMER

Serial No :- 4598 358 9R

FCC Grantee Code :- N92

FCC Product Designator :- CRD1

2.2 System Equipment

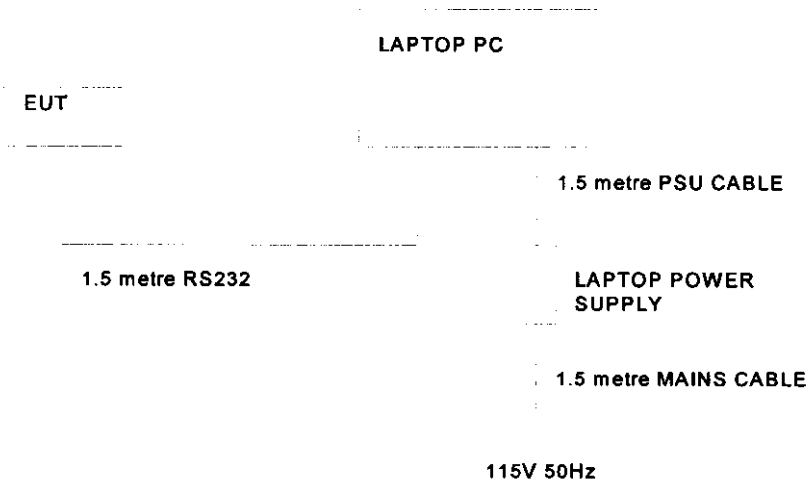
Model :-	DELL LAPTOP PC, PPS
Type :-	LATITUDE Xpi P133ST
Serial No :-	50334
FCC Ident. :-	E2KXPE2KXPT IC CLASS B ICES-3

Model :-	DELL LAPTOP PC POWER SUPPLY
Type :-	ZVC7ONS18.5P28
Serial No :-	N/A

2.3 Modes of Operation of EUT During Testing

The EUT will be powered from and communicate with a test program through the serial port of a laptop PC. The test program will read a text file from disk and download it to the EUT in blocks. The EUT will then write each block to the chipcard and on completion will send a message back to indicate the result of the operation (i.e. success or failure). Should the EUT not respond or indicate failure the test program will display the result as failure, otherwise the next block to be written will be sent. Once all the blocks have been written the result of the operation is shown. The EUT is then requested to read the contents of the chipcard and upload them to the PC. The test program displays the result of the operation before comparing the uploaded and downloaded files. The whole test procedure starts again and another file is selected for the download. The time delay between each process was 100mS.

2.4 Block Diagram of EUT Configuration



NOTE: All cables unshielded unless otherwise stated.
Cable lengths are as shown in diagram.

3 TEST CONDITIONS

3.1 Power Line Conducted Emissions

Measurement Freq Range	:-	450kHz - 30MHz
Line Voltage	:-	N/A
Line Frequency	:-	N/A
Artificial Mains Network (AMN) Impedance	:-	50 ohm/50μH
Receiver		
bandwidth	:-	9kHz
detectors	:-	Quasi-Peak (CISPR Time Constants) and Average
Configuration	:-	Conforming to ANSI C63.4: 1992 Document
EUT Height	:-	N/A
Remarks	:-	POWER LINE CONDUCTION EMISSIONS NOT APPLICABLE TO THIS PRODUCT DUE TO THE EUT BEING POWERED VIA THE SUPPORT EQUIPMENTS COMMUNICATION INTERFACE PORT.
Measurement Uncertainty	:-	See Appendix B

3.1 **Power Line Conducted Emissions** continued..

Test equipment used for the Power Line Conduction measurement was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL EMC No	ACTUAL EQUIPMENT USED
LISN/AMN	R & S	ESH3-Z5	839135/013	238	
LISN/AMN	R & S	ESH3-Z5	837469/010	289	
LISN/AMN	CHASE	MN 2050	1431	25	
LISN/AMN	SCHWARZBECK	NSLK8128	8128151	207	
RECEIVER	R & S	ESH 2	879014/028	06	
RECEIVER	R & S	ESHS 20	837960/003	237	

3.2 Radiated E-Field Emissions

Measurement Freq Range	:-	30MHz - 1000MHz
Measurement Distance	:-	10 metres
Antenna Height	:-	1 - 4 metres
Antenna Polarisation	:-	Vertical and Horizontal
Receiver		
bandwidths	:-	120kHz
detectors	:-	Quasi-peak (CISPR Time constants)
Ambient Conditions		
Temperature	:-	2 °C
Humidity	:-	98%
Air pressure	:-	1030mb
EUT Height	:-	0.8 metres
Remarks	:-	All measurements were carried out on an open field test site constructed and calibrated in accordance with ANSI C63.4: 1992 Document. All significant emissions were maximised by: a) rotating the EUT b) elevating antenna c) polarising antenna Horizontal and Vertical d) manipulation and placement of system and power cables.
Measurement Uncertainty	:-	See Appendix B

3.2 **Radiated E-Field Emissions** continued..

Test equipment used for this radiated emission measurement was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL EMC No	ACTUAL EQUIPMENT USED
OATS	TRL EMC	Site 1		08	X
OATS	TRL EMC	Site 2		182	
BICONE ANT	SCHWARZBECK	VHBA 9123	NONE	196	
LOG. P. ANT	CHASE	UPA 6108	1061	203	
BICONE ANT	CHASE	VBA 6106A	1193	251	
LOG. P. ANT	CHASE	UPA 6108	1016	344	
BILOG ANT	CHASE	CBL 6112	2098	274	X
EASY 1 ANT	FARNELL	S 30280	017	253	
BILOG ANT	CHASE	CBL 6111B	1945	290	
BICONE ANT	CHASE	VHA 9103	7106	35	
BICONE ANT	CHASE	VHA 9103	7011	36	
BICONE ANT	CHASE	BBA 9106	NONE	193	
RECEIVER	CHASE	UHR 4000	6014	01	
RECEIVER	CHASE	UHR 4000	6043	23	
RECEIVER	R & S	ESVS10	837948/003	317	X
SPECTRUM ANALYSER	WAYNE KERR	SSA1000A	9800001488	416	
RECEIVER	R & S	ESVS20	838804/005	415	

4 RESULTS OF TESTS

All measurements were taken with the EUT operating in a mode that activates all components of the equipment see Section 2.3. All external interface cables were connected and loaded with the appropriate terminations.

A radiated emission prescan utilising a semianechoic chamber was initially carried out over the frequency range 30MHz to 1000MHz using the test equipment specified in section 3.2, at a measurement distance of 3 metres to determine the initial profile of the EUT.

Results of this initial profile indicated that there were no significant emissions emanating from the EUT. The EUT was then relocated to the OATS and tested as specified in the previous sections and again no significant emissions were detected.

Significant emissions are shown on the following graphs:

GRAPH A1: Power Line Conducted Emissions
GRAPH A2: Radiated E-Field Emissions

The results recorded on Graph 2 are maximum values recorded with respect to EUT azimuth, receiver antenna polarisation and height.

The table below summarises worst case results.

MEASUREMENT	FREQUENCY	EMISSION LEVEL	LIMIT VALUE
Power Line Conduction Quasi Peak Detector (Graph A1)	N/A	N/A	N/A
Power Line Conduction Average Detector (Graph A1)	N/A	N/A	N/A
Radiated E-Field Emissions (Graph A2)	NO SIGNIFICANT EMISSIONS DETECTED		

4.1 Sample Calculation

The radiated emission levels used in the report are calculated using the formula A+B=C, a sample result is shown below:

FREQUENCY (MHz)	MEASURED VALUE (dBμV) (A)	ANTENNA VALUE (dB) (B)	EMISSION LEVEL (dBμV/m) (C)
200	10	12	22

5 LIST OF RFI MODIFICATIONS

The following RFI modifications were incorporated in the equipment during testing.

NO EMC MODIFICATION UNDERTAKEN.

6 CONCLUSIONS

6.1 Result of Testing

The UNIPATH LTD, CHIPCARD READER/PROGRAMMER meets the requirements of FCC Rules CFR 47 (JULY 1998) Part 15, LIMIT B in the configuration tested defined in section 2 of this report and incorporating any modifications detailed in section 5 of this report.

Note should be taken of modifications (if any) as described in section 5 of this report.

6.2 Conformity in Production

TRL EMC Ltd has based this test report on results from the equipment sample(s) provided.

The manufacturer is advised that they may have an obligation to demonstrate that production samples are in conformity with the Standards noted.

APPENDIX A

GRAPHS

Graph A1: **POWER LINE CONDUCTED EMISSIONS**

POWER LINE CONDUCTION EMISSIONS NOT APPLICABLE TO THIS PRODUCT DUE TO THE EUT BEING POWERED VIA THE SUPPORT EQUIPMENTS COMMUNICATIONS INTERFACE PORT.

Graph A2: **RADIATED E-FIELD EMISSIONS**

NO SIGNIFICANT EMISSIONS DETECTED

APPENDIX B

MEASUREMENT UNCERTAINTY

EMC TEST MEASUREMENT UNCERTAINTY
SCHEDULE A

LABORATORY TESTS

MEASUREMENT		EXPANDED UNCERTAINTY		
		LONG GREEN	UP HOLLAND	SPEC REQ'D
E-FIELD STRENGTH 10m	<300MHz	± 4.45dB	4.77dB	N/A
	>300MHz	± 4.45dB	3.67dB	N/A
E-FIELD STRENGTH 3m	<300MHz	± 4.13dB	4.86dB	N/A
	>300MHz	± 4.03dB	3.92dB	N/A
CONDUCTED EMISSIONS	PROBE	± 1.19dB	1.19dB	N/A
AC Power Line	LISN/AMN	± 1.26dB	0.71dB	N/A
H-FIELD STRENGTH		± 2.25dB	2.9dB	N/A
RFS		1.7dB	1.7dB	N/A
ESD		0.37%	0.37%	10%
FAST BURST TRANSIENTS		2.20%	2.20%	10%
DIPS AND VARIATIONS		2.55%	2.55%	10%
DISTURBANCE POWER		2.65dB	2.65dB	N/A
VOLTAGE SURGES		0.75%	0.75%	10%
RADIATED MAGNETIC FIELDS		3.20%	3.20%	N/A
CONDUCTED RF FIELDS		3.85dB	3.85dB	N/A

SITE TESTS

MEASUREMENT		MOBILE 1	MOBILE 2	SPEC REQ'D
E-FIELD STRENGTH	<300MHz	± 6.38dB	± 6.38dB	N/A
Manufacturers Site	>300MHz	± 5.99dB	± 5.99dB	N/A
E-FIELD STRENGTH	<300MHz	± 1.68dB	± 1.68dB	N/A
User Site	>300MHz	± 1.68dB	± 1.68dB	N/A
CONDUCTED EMISSIONS	PROBE	± 1.19dB	± 1.19dB	N/A
AC Power Line	LISN/AMN	± 1.26dB	± 1.26dB	N/A

FULL MEASUREMENT UNCERTAINTY BUDGETS AND CALCULATIONS APPEAR IN PROCEDURE 54-P015.

Photograph C1 **POWER LINE CONDUCTED EMISSIONS**

POWER LINE CONDUCTION EMISSIONS NOT APPLICABLE TO THIS PRODUCT DUE TO THE EUT BEING POWERED VIA THE SUPPORT EQUIPMENTS COMMUNICATIONS INTERFACE PORT.