

TEST RESULT SUMMARY

EUROPEAN STANDARD EN 55022: 1998 + Amd. 1: 2000

AS/NZS 3548: 1995 + A1 & A2: 1997

VCCI V-3/99.05

FCC PART 15 SUBPART B

Class A Limit

MANUFACTURER'S NAME	Monarch Marking Systems, Inc, dba Paxar Corporation
NAME OF EQUIPMENT	Ultra Gold Thermal Barcode Printer with Cisco Radio Card
MODEL NUMBER	M06037 (Printer) LMC352 (Cisco Radio Card)
MANUFACTURER'S ADDRESS	170 Monarch Lane Miamisburg, OH 45342
TEST REPORT NUMBER	NC202932.1
TEST DATE	28 & 29 May 2002

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15, VCCI V-3/99.05, AS/NZS 3548 and European Standard EN 55022.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15, VCCI V-3/99.05, AS/NZS 3548 and European Standard EN 55022: "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment".

Date: 05 August 2002

Location: Taylors Falls MN
USA



R M Johnson
Test Technician



T. K. Swanson
Test Technician

EMC EMISSION - TEST REPORT

Test Report File No. : **NC202932.1** Date of issue: 05 August 2002

Model / Serial No. : **M06037 (Printer) /**
LMC352 (Cisco Radio Card) /

Product Type : Ultra Gold Thermal Barcode Printer with Cisco Radio Card

Applicant : Monarch Marking Systems, Inc, dba Paxar Corporation

Manufacturer : Monarch Marking Systems, Inc, dba Paxar Corporation

License holder : Monarch Marking Systems, Inc, dba Paxar Corporation

Address : 170 Monarch Lane

: Miamisburg, OH 45342

Test Result : ☒ **Positive** ☐ **Negative**

Test Project Number :
Reference(s) : **NC202932.1**

Total pages including
Appendices : **34**

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- | | | |
|---|---|------------------------------------|
| ☐ - EN 50081-1 / 1991 | ☐ - Group 1 | ☐ - Group 2 |
| ☐ - EN 55011 / 1998
w/Amendment A1:1999 | ☐ - Class A | ☐ - Class B |
| ☐ - EN 55013 / 1990 | ☐ - Household appliances and similar | |
| ☐ - EN 55014 / 1987 | ☐ - Portable tools | |
| | ☐ - Semiconductor devices | |
|
 | | |
| ☐ - EN 55014 / A2:1990 | ☐ - Household appliances and similar | |
| ☐ - EN 55014 / 1993 | ☐ - Portable tools | |
| | ☐ - Semiconductor devices | |
|
 | | |
| ☐ - EN 55015 / 1987 | ☐ - Class A | ☐ - Class B |
| ☐ - EN 55015 / A1:1990 | ☒ - Class A | ☐ - Class B |
| ☐ - EN 55015 / 1993 | | |
| ☐ - EN 55022 / 1987 | ☒ - Class A | ☐ - Class B |
| ☒ - EN 55022 / 1998 | ☒ - Class A | ☐ - Class B |
| ☐ - BS | ☒ - Class A | ☐ - Class B |
| ☒ - VCCI | ☒ - Class A | ☐ - Class B |
| ☒ - FCC | ☒ - Class A | ☐ - Class B |
| ☒ - AS 3548 (1995) | ☒ - Class A | ☐ - Class B |
|
 | | |
| ☐ - CISPR 11 (1990) | ☐ - Group 1 | ☐ - Group 2 |
| | ☐ - Class A | ☐ - Class B |
| ☒ - CISPR 22 (1993) | ☒ - Class A | ☐ - Class B |

Environmental conditions in the lab:

	<u>Actual</u>
Temperature	: 21 °C
Relative Humidity	: 34 %
Atmospheric pressure	: 99.0 kPa
Power supply system	: 50/60 Hz – 230/115 VAC – 1 Phase

Sign Explanations:

- ☐ - not applicable
☒ - applicable



Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The **CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)** measurements were performed at the following test location:

☐ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☒ - Wild River Lab Screen Room
- ☐ - New Brighton Lab Shielded Room

Test equipment used :

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	2417	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1439	1-23-03
■ -	2534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	8-22-02

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The **RADIATED EMISSIONS (MAGNETIC FIELD)** measurements were performed at the following test location:

☒ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

- ☐ - 3 meters
- ☐ - 30 meters

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

- - Wild River Lab Large Test Site (Open Area Test Site) – NSA measurements made 7-01, due 7-02.
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

- ☐ - 3 meters
- - 10 meters
- ☐ - 30 meters

Test equipment used :

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	3202	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	9-24-02
■ -	3926	11867A	Hewlett-Packard	Limiter	02442	3-18-03
■ -	2665	ZHL-1042J	Mini-Circuits	Preamplifier	32296	9-12-02
■ -	2690	8566B	Hewlett-Packard	Spectrum Analyzer (Unit F)	2430A00930	11-19-02
■ -	2678	85662A	Hewlett-Packard	Analyzer Display (Unit F)	2403A08134	11-19-02
■ -	2684	85650A	Hewlett-Packard	Quasi-Peak Adapter (Unit F)	2521A01006	11-19-02

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

■ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☐ - Wild River Lab Screen Room
- ☐ - New Brighton Lab Shielded Room

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 18 GHz were performed in a horizontal and vertical polarization at the following test location:

☒ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☐ - Wild River Lab Screen Room

at a test distance of:

- ☐ - 1 meters
- ☐ - 3 meters
- ☐ - 10 meters



Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☐ - Practice operation
- ☐ - Normal Operating Mode
- - 1. Printer will scan a barcode every 5 seconds and print a line of 'H's.
2. The access point will ping the radio transmitter, variably set from 10ms to 1000ms.

Configuration of the device under test:

- - See Constructional Data Form in Appendix B - Page B2
- ☐ - See Product Information Form in Appendix B - beginning on Page B3

The following peripheral devices and interface cables were connected during the measurement:

- | | |
|---|----------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ■ - unshielded power cable | |
| ☐ - unshielded cables | |
| ■ - shielded cables | MPS.No.: _____ |
| ☐ - customer specific cables | |
| ☐ - _____ | |
| ☐ - _____ | |

Emission Test Results:

Conducted emissions 10/150 kHz - 30 MHz

The requirements are ☒ - MET ☐ - NOT MET

Minimum margin of compliance _____ 9 dB at _____ 565.0 kHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

Conducted common mode disturbance at telecommunication ports – 150 kHz to 30 MHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum margin of compliance _____ dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are ☒ - MET ☐ - NOT MET

Minimum margin of compliance _____ 9 dB at _____ 187.54 MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

Interference Power at the mains and interface cables 30 MHz - 300 MHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Equivalent Radiated emissions 1 GHz - 18 GHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

□ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

□ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 28 May 2002

Testing End Date: 29 May 2002

- TÜV PRODUCT SERVICE INC -

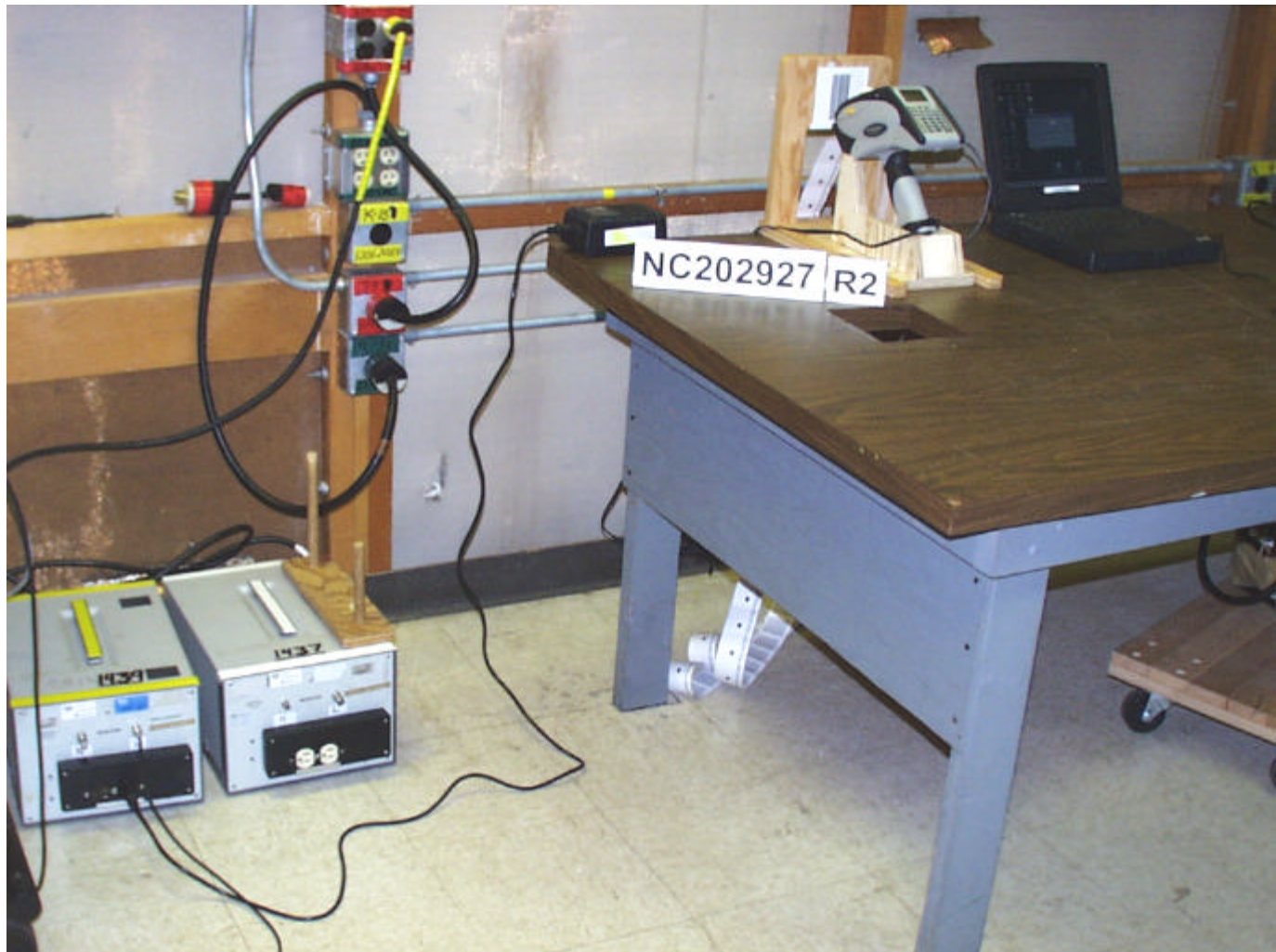
Thomas K. Swanson

T. K. Swanson
Test Technician

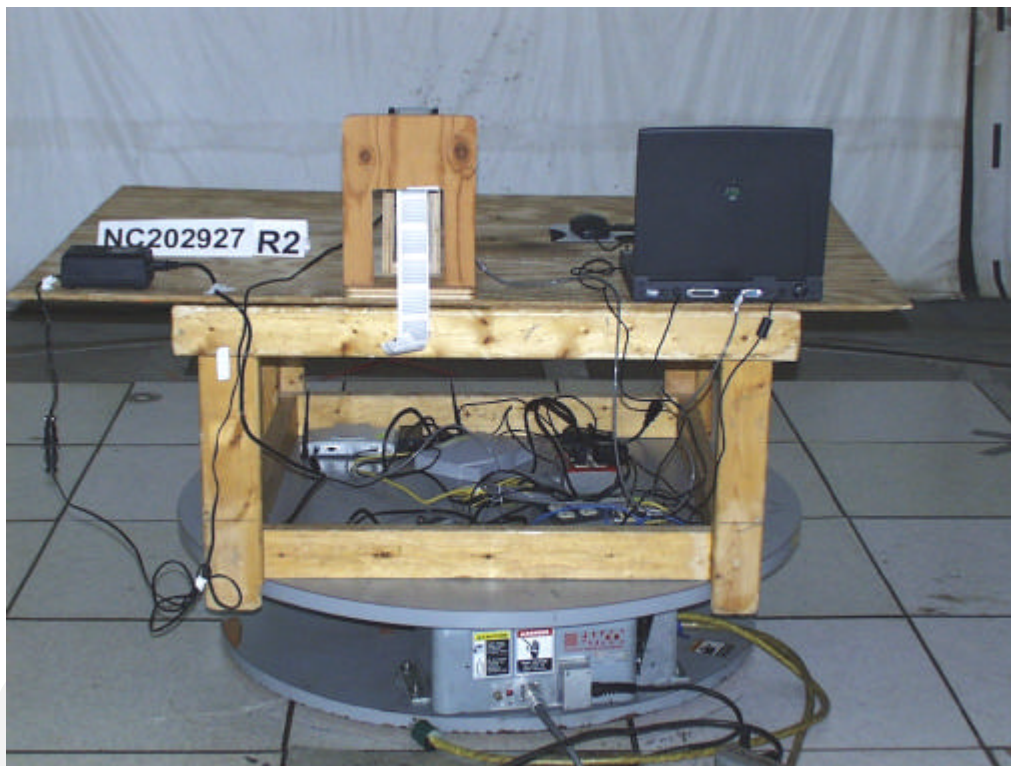
Russ M. Johnson

Tested By:
R. M. Johnson

Test-setup photo(s):
Conducted emission 10/150 kHz - 30 MHz

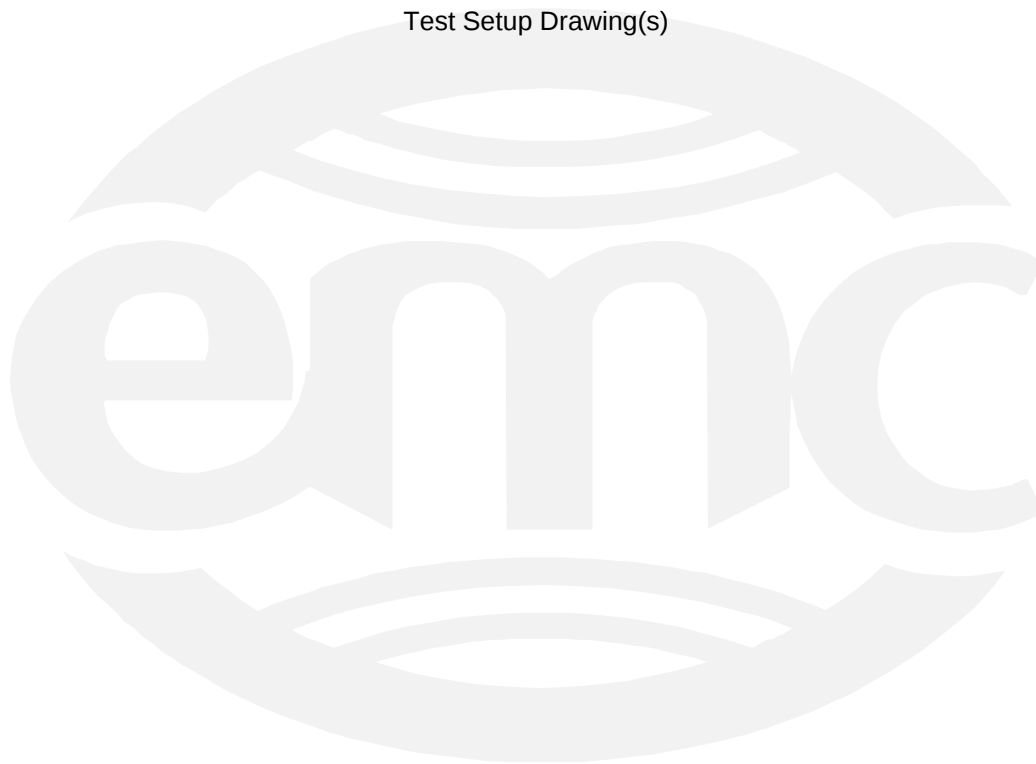


Test-setup photo(s):
Radiated emission 30 MHz - 1000 MHz



Appendix A

Test Data Sheets
and
Test Setup Drawing(s)

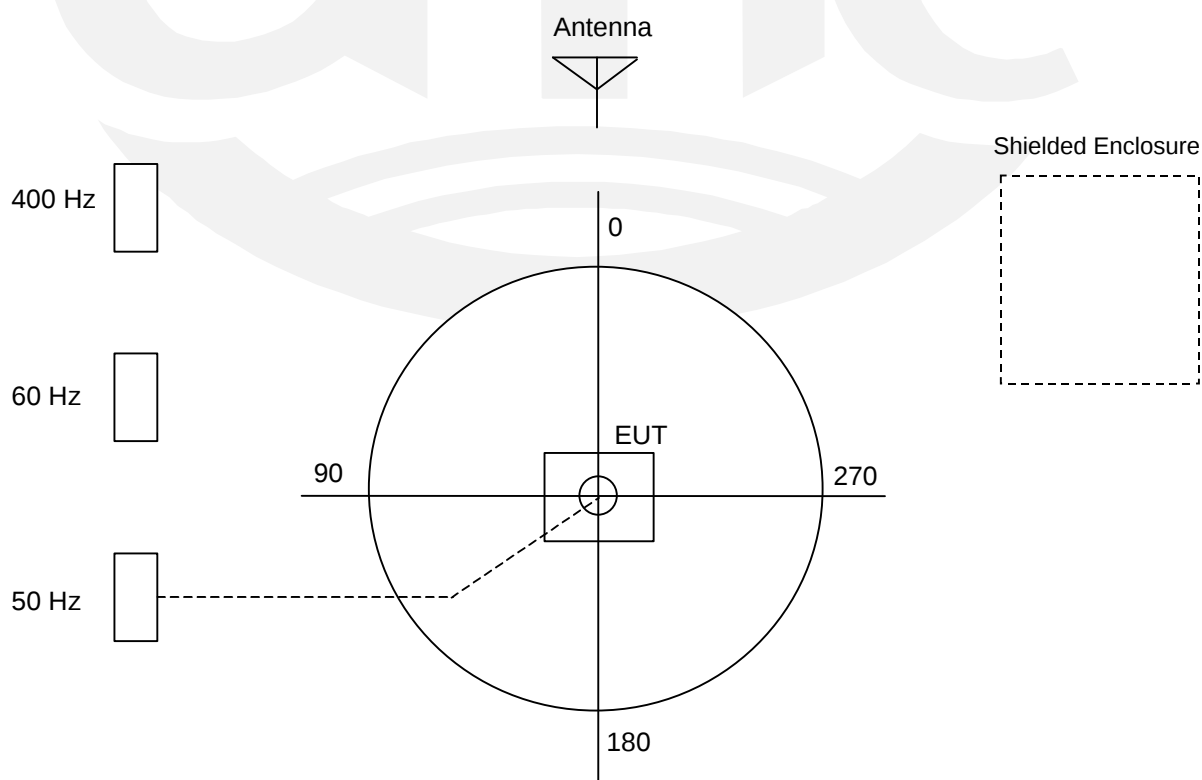


TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:

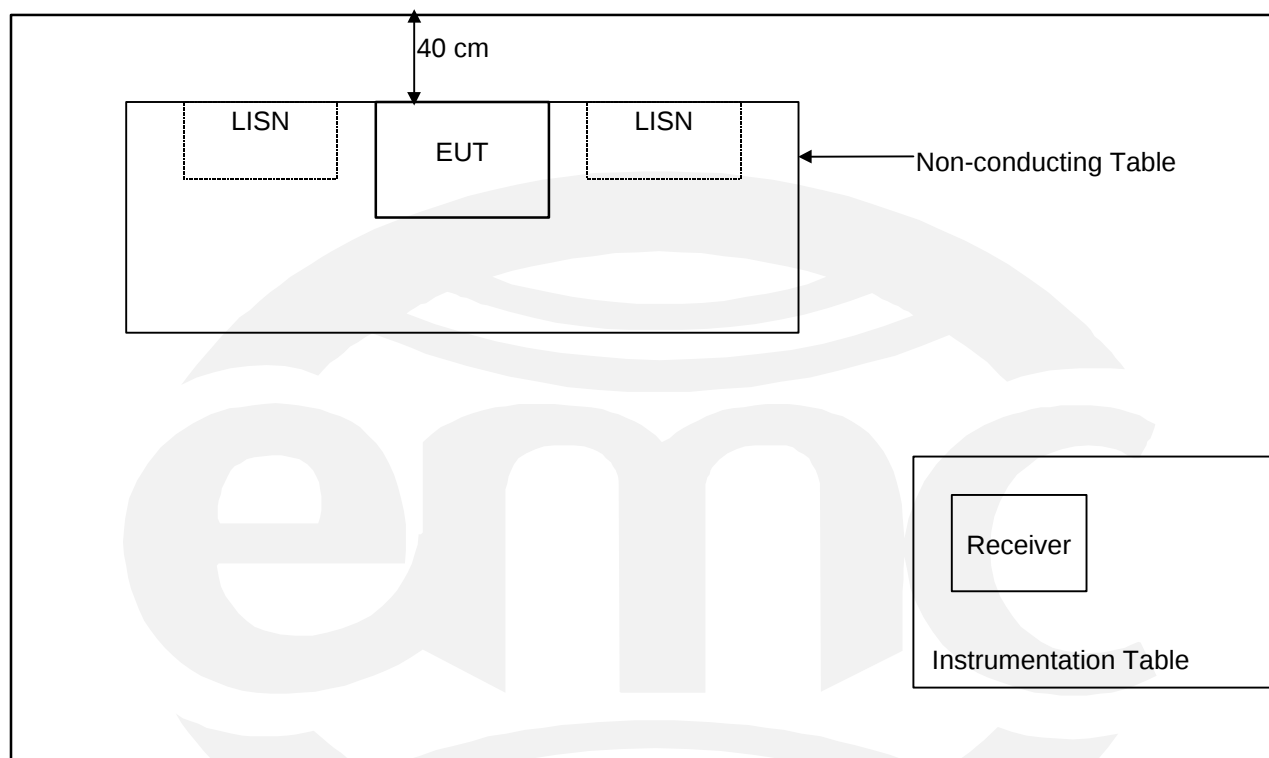
1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



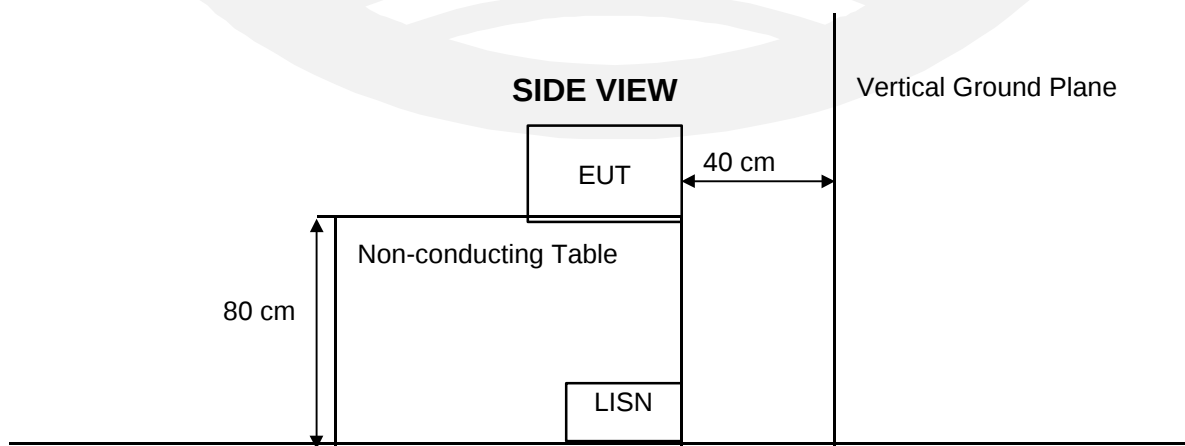
TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Screen Room

TOP VIEW



SIDE VIEW



Other Measurements:
2 meters from top of EUT to ceiling
80 cm from closest part of EUT to the LISN

Conducted Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	SCREEN ROOM		
Test Method:	EN55022	Test Date:	29-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING	EUT Power:	50/60HZ / 230/110VAC		
EUT Serial #:				Temperature:	21 °C
Manufacturer:	MONARCH MARKING SYSTEMS			Relative Humidity:	34 %
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)			Air Pressure:	99 kPa
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	1 of 4
	UNINTENTIONAL RADIATOR CE SCAN				

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
50HZ/230VAC						
0.565	60.5 Qp	0.0 / 0.1 / 0.0	60.6	Neutral	-12.4	N/A
0.670	52.6 Qp	0.1 / 0.0 / 0.0	52.8	Neutral	-20.2	N/A
0.775	57.3 Qp	0.1 / 0.0 / 0.0	57.4	Neutral	-15.6	N/A
1.35	56.7 Qp	0.1 / 0.0 / 0.0	56.8	Neutral	-16.2	N/A
2.08	54.6 Qp	0.1 / 0.0 / 0.0	54.7	Neutral	-18.3	N/A
6.33	54.6 Qp	0.1 / 0.1 / 0.0	54.8	Neutral	-18.2	N/A
0.565	50.3 Av	0.0 / 0.1 / 0.0	50.4	Neutral	N/A	-9.6
0.670	28.2 Av	0.1 / 0.0 / 0.0	28.4	Neutral	N/A	-31.6
0.775	38.4 Av	0.1 / 0.0 / 0.0	38.5	Neutral	N/A	-21.5
1.35	47.3 Av	0.1 / 0.0 / 0.0	47.4	Neutral	N/A	-12.6
2.08	37.6 Av	0.1 / 0.0 / 0.0	37.7	Neutral	N/A	-22.3
6.33	33.9 Av	0.1 / 0.1 / 0.0	34.1	Neutral	N/A	-25.9
0.565	60.1 Qp	0.0 / 0.1 / 0.0	60.2	Line 1	-12.8	N/A
0.670	54.4 Qp	0.1 / 0.0 / 0.0	54.6	Line 1	-18.4	N/A
0.775	55.8 Qp	0.1 / 0.0 / 0.0	55.9	Line 1	-17.1	N/A
1.35	55.2 Qp	0.1 / 0.0 / 0.0	55.3	Line 1	-17.7	N/A
2.08	56.7 Qp	0.1 / 0.0 / 0.0	56.8	Line 1	-16.2	N/A
6.33	54.0 Qp	0.1 / 0.1 / 0.0	54.2	Line 1	-18.8	N/A
0.565	47.0 Av	0.0 / 0.1 / 0.0	47.1	Line 1	N/A	-12.9
0.670	27.6 Av	0.1 / 0.0 / 0.0	27.8	Line 1	N/A	-32.2
0.775	49.5 Av	0.1 / 0.0 / 0.0	49.6	Line 1	N/A	-10.4

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Conducted Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	SCREEN ROOM		
Test Method:	EN55022	Test Date:	29-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING	EUT Power:	50/60HZ / 230/110VAC		
EUT Serial #:				Temperature:	21 °C
Manufacturer:	MONARCH MARKING SYSTEMS			Relative Humidity:	34 %
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)			Air Pressure:	99 kPa
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	2 of 4
	UNINTENTIONAL RADIATOR CE SCAN				

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
1.35	45.1 Av	0.1 / 0.0 / 0.0	45.2	Line 1	N/A	-14.8
2.08	37.6 Av	0.1 / 0.0 / 0.0	37.7	Line 1	N/A	-22.3
6.33	35.3 Av	0.1 / 0.1 / 0.0	35.5	Line 1	N/A	-24.5
60HZ/110VAC						
0.315	53.3 Qp	0.0 / 0.1 / 0.0	53.4	Line 1	-25.6	N/A
0.650	46.9 Qp	0.2 / 0.0 / 0.0	47.1	Line 1	-25.9	N/A
0.790	54.1 Qp	0.1 / 0.0 / 0.0	54.2	Line 1	-18.8	N/A
0.960	52.4 Qp	0.1 / 0.0 / 0.0	52.5	Line 1	-20.5	N/A
1.45	49.6 Qp	0.1 / 0.1 / 0.0	49.8	Line 1	-23.2	N/A
1.87	41.0 Qp	0.1 / 0.0 / 0.0	41.1	Line 1	-31.9	N/A
0.315	48.5 Av	0.0 / 0.1 / 0.0	48.6	Line 1	N/A	-17.4
0.650	34.7 Av	0.2 / 0.0 / 0.0	34.9	Line 1	N/A	-25.1
0.790	42.5 Av	0.1 / 0.0 / 0.0	42.6	Line 1	N/A	-17.4
0.960	41.0 Av	0.1 / 0.0 / 0.0	41.1	Line 1	N/A	-18.9
1.45	38.0 Av	0.1 / 0.1 / 0.0	38.2	Line 1	N/A	-21.8
1.87	27.1 Av	0.1 / 0.0 / 0.0	27.2	Line 1	N/A	-32.8
0.315	53.5 Qp	0.0 / 0.1 / 0.0	53.6	Neutral	-25.4	N/A
0.565	12.7 Qp	0.0 / 0.1 / 0.0	12.8	Neutral	-60.2	N/A
0.650	46.5 Qp	0.2 / 0.0 / 0.0	46.7	Neutral	-26.3	N/A
0.790	54.2 Qp	0.1 / 0.0 / 0.0	54.3	Neutral	-18.7	N/A
0.960	52.6 Qp	0.1 / 0.0 / 0.0	52.7	Neutral	-20.3	N/A
1.87	50.6 Qp	0.1 / 0.0 / 0.0	50.7	Neutral	-22.3	N/A

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Conducted Electromagnetic Emissions



Test Report #: 2927 Run 02 Test Area: SCREEN ROOM
Test Method: EN55022 Test Date: 29-May-2002
EUT Model #: M06037 CISCO EUT Power: 50/60HZ / 230/110VAC
EUT Serial #: _____
Manufacturer: MONARCH MARKING SYSTEMS
EUT Description: CISCO LASER SCANNING PRINTER (FHSS MODE)
Notes: SCANNING/PRINTING (NO ACCESS POINTS ON)
UNINTENTIONAL RADIATOR CE SCAN

Temperature: 21 °C
Relative Humidity: 34 %
Air Pressure: 99 kPa
Page: 3 of 4

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
0.315	48.5 Av	0.0 / 0.1 / 0.0	48.6	Neutral	N/A	-17.4
0.650	22.4 Av	0.2 / 0.0 / 0.0	22.6	Neutral	N/A	-37.4
0.790	41.1 Av	0.1 / 0.0 / 0.0	41.2	Neutral	N/A	-18.8
0.960	32.3 Av	0.1 / 0.0 / 0.0	32.4	Neutral	N/A	-27.6
1.87	32.2 Av	0.1 / 0.0 / 0.0	32.3	Neutral	N/A	-27.7
1.45	31.7 Av	0.1 / 0.1 / 0.0	31.9	Neutral	N/A	-28.1
END OF SCAN.						

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Conducted Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	SCREEN ROOM		
Test Method:	EN55022	Test Date:	29-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING	EUT Power:	50/60HZ / 230/110VAC		
EUT Serial #:				Temperature:	21 °C
Manufacturer:	MONARCH MARKING SYSTEMS			Relative Humidity:	34 %
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)			Air Pressure:	99 kPa
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON) UNINTENTIONAL RADIATOR CE SCAN			Page:	4 of 4

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
---------------	-----------------	------------------------------	-----------------	------------	------------------------	-------------------------

***** MEASUREMENT SUMMARY *****						
0.565	50.3 Av	0.0 / 0.1 / 0.0	50.4	Neutral	N/A	-9.6
0.775	49.5 Av	0.1 / 0.0 / 0.0	49.6	Line 1	N/A	-10.4
0.315	53.4 Qp	0.0 / 0.1 / 0.0	53.5	Neutral	-25.5	N/A
1.35	47.3 Av	0.1 / 0.0 / 0.0	47.4	Neutral	N/A	-12.6
2.08	56.7 Qp	0.1 / 0.0 / 0.0	56.8	Line 1	-16.2	N/A
0.790	42.5 Av	0.1 / 0.0 / 0.0	42.6	Line 1	N/A	-17.4
6.33	54.6 Qp	0.1 / 0.1 / 0.0	54.8	Neutral	-18.2	N/A
0.670	54.4 Qp	0.1 / 0.0 / 0.0	54.6	Line 1	-18.4	N/A
0.960	41.0 Av	0.1 / 0.0 / 0.0	41.1	Line 1	N/A	-18.9
1.45	38.0 Av	0.1 / 0.1 / 0.0	38.2	Line 1	N/A	-21.8
1.87	50.6 Qp	0.1 / 0.0 / 0.0	50.7	Neutral	-22.3	N/A
0.650	34.7 Av	0.2 / 0.0 / 0.0	34.9	Line 1	N/A	-25.1

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

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Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m		
Test Method:	EN55022	Test Date:	28-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.		
EUT Serial #:		Temperature:	21	°C	
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34	%	
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99	kPa	
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	1 of 6
	UNINTENTIONAL RADIATOR SCAN.				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
46.24	37.1 Qp	0.7 / 14.1 / 27.8	24.0	V / 1.0 / 0.0	-16.0	N/A
70.69	39.6 Qp	1.0 / 8.4 / 27.8	21.2	V / 1.0 / 0.0	-18.8	N/A
150.03	37.4 Qp	1.5 / 9.2 / 27.9	20.2	V / 1.0 / 0.0	-19.8	N/A
172.41	40.0 Qp	1.6 / 8.7 / 27.9	22.5	V / 1.0 / 0.0	-17.5	N/A
175.98	43.7 Qp	1.6 / 9.0 / 27.9	26.5	V / 1.0 / 0.0	-13.5	N/A
175.14	38.6 Qp	1.6 / 9.0 / 27.9	21.4	V / 1.0 / 0.0	-18.6	N/A
175.98	43.5 Qp	1.6 / 9.0 / 27.9	26.3	V / 1.0 / 0.0	-13.7	N/A
181.35	41.1 Qp	1.7 / 9.4 / 27.9	24.3	V / 1.0 / 0.0	-15.7	N/A
187.54	42.2 Qp	1.7 / 9.9 / 27.9	26.0	V / 1.0 / 0.0	-14.0	N/A
193.86	46.7 Qp	1.8 / 10.2 / 27.8	30.9	V / 1.0 / 0.0	-9.1	N/A
195.33	36.1 Qp	1.8 / 10.3 / 27.8	20.3	V / 1.0 / 0.0	-19.7	N/A
200.14	43.1 Qp	1.8 / 10.3 / 27.8	27.3	V / 1.0 / 0.0	-12.7	N/A
215.70	32.2 Qp	1.8 / 10.6 / 27.7	17.0	V / 1.0 / 0.0	-23.0	N/A
222.94	33.4 Qp	1.8 / 10.6 / 27.7	18.1	V / 1.0 / 0.0	-21.9	N/A
243.94	39.8 Qp	2.0 / 11.1 / 27.8	25.1	V / 1.0 / 0.0	-21.9	N/A
250.15	38.4 Qp	2.0 / 11.4 / 27.8	23.9	V / 1.0 / 0.0	-23.1	N/A
262.65	34.1 Qp	2.0 / 12.1 / 27.8	20.5	V / 1.0 / 0.0	-26.5	N/A
268.96	37.1 Qp	2.0 / 12.4 / 27.8	23.6	V / 1.0 / 0.0	-23.4	N/A
275.10	35.3 Qp	2.1 / 12.6 / 27.9	22.1	V / 1.0 / 0.0	-24.9	N/A
293.92	39.5 Qp	2.1 / 12.4 / 27.8	26.2	V / 1.0 / 0.0	-20.8	N/A
300.21	37.4 Qp	2.1 / 12.7 / 27.7	24.5	V / 1.0 / 0.0	-22.5	N/A
300.64	39.1 Qp	2.1 / 12.7 / 27.7	26.2	V / 1.0 / 0.0	-20.8	N/A
337.69	37.6 Qp	2.3 / 13.9 / 27.6	26.1	V / 1.0 / 0.0	-20.9	N/A
341.98	30.5 Qp	2.3 / 14.2 / 27.6	19.4	V / 1.0 / 0.0	-27.6	N/A
344.01	34.0 Qp	2.3 / 14.4 / 27.6	23.0	V / 1.0 / 0.0	-24.0	N/A

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Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m		
Test Method:	EN55022	Test Date:	28-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.		
EUT Serial #:		Temperature:	21	°C	
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34	%	
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99	kPa	
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	2 of 6
	UNINTENTIONAL RADIATOR SCAN.				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
344.93	31.2 Qp	2.3 / 14.4 / 27.6	20.3	V / 1.0 / 0.0	-26.7	N/A
362.66	38.0 Qp	2.4 / 15.1 / 27.7	27.8	V / 1.0 / 0.0	-19.2	N/A
412.77	34.9 Qp	2.5 / 16.8 / 27.7	26.4	V / 1.0 / 0.0	-20.6	N/A
425.31	30.1 Qp	2.5 / 17.1 / 27.7	21.9	V / 1.0 / 0.0	-25.1	N/A
431.49	31.8 Qp	2.6 / 16.8 / 27.7	23.4	V / 1.0 / 0.0	-23.6	N/A
470.19	28.2 Qp	2.8 / 17.5 / 27.6	20.9	V / 1.0 / 0.0	-26.1	N/A
474.12	27.7 Qp	2.8 / 17.7 / 27.6	20.6	V / 1.0 / 0.0	-26.4	N/A
143.82	38.1 Qp	1.5 / 9.1 / 27.9	20.8	V / 1.0 / 0.0	-19.2	N/A
169.88	38.2 Qp	1.6 / 8.5 / 27.9	20.4	V / 1.0 / 0.0	-19.6	N/A
362.66	38.9 Qp	2.4 / 15.1 / 27.7	28.7	V / 1.0 / 90.0	-18.3	N/A
412.77	38.1 Qp	2.5 / 16.8 / 27.7	29.7	V / 1.0 / 90.0	-17.3	N/A
425.31	31.9 Qp	2.5 / 17.1 / 27.7	23.7	V / 1.0 / 90.0	-23.3	N/A
505.07	27.4 Qp	2.9 / 17.6 / 27.6	20.3	V / 1.0 / 90.0	-26.7	N/A
150.03	40.0 Qp	1.5 / 9.2 / 27.9	22.8	V / 1.0 / 180.0	-17.2	N/A
175.14	42.5 Qp	1.6 / 9.0 / 27.9	25.2	V / 1.0 / 180.0	-14.8	N/A
175.98	45.1 Qp	1.6 / 9.0 / 27.9	27.8	V / 1.0 / 180.0	-12.2	N/A
181.35	46.6 Qp	1.7 / 9.4 / 27.9	29.7	V / 1.0 / 180.0	-10.3	N/A
187.54	47.3 Qp	1.7 / 9.9 / 27.9	31.0	V / 1.0 / 180.0	-9.0	N/A
200.14	44.0 Qp	1.8 / 10.3 / 27.8	28.3	V / 1.0 / 180.0	-11.7	N/A
362.66	43.0 Qp	2.4 / 15.1 / 27.7	32.8	V / 1.0 / 180.0	-14.2	N/A
337.69	39.1 Qp	2.3 / 13.9 / 27.6	27.6	V / 1.0 / 270.0	-19.4	N/A
344.01	36.2 Qp	2.3 / 14.4 / 27.6	25.2	V / 1.0 / 270.0	-21.8	N/A

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Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m		
Test Method:	EN55022	Test Date:	28-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.		
EUT Serial #:		Temperature:	21	°C	
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34	%	
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99	kPa	
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	3 of 6
	UNINTENTIONAL RADIATOR SCAN.				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
344.93	34.4 Qp	2.3 / 14.4 / 27.6	23.5	V / 1.0 / 270.0	-23.5	N/A
MAXIMIZED.						
187.54	45.7 Qp	1.7 / 9.9 / 27.9	29.4	V / 1.0 / 0.0	-10.6	N/A
MAXED ANTENNA AND ROTATED EUT 360 DEGREES.						
215.70	35.1 Qp	1.8 / 10.6 / 27.7	19.9	H / 3.0 / 180.0	-20.1	N/A
MAXIMIZED.						
215.72	37.9 Qp	1.8 / 10.6 / 27.7	22.6	H / 3.5 / 0.0	-17.4	N/A
MAXED ANTENNA AND ROTATED EUT 360 DEGREES.						
END OF SCAN 30 - 1000MHZ.						

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Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m
Test Method:	EN55022	Test Date:	28-May-2002
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.
EUT Serial #:		Temperature:	21 °C
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34 %
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99 kPa
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)		Page: 4 of 6
	UNINTENTIONAL RADIATOR SCAN.		

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
---------------	-----------------	--	-------------------	-----------------------------	---------------------	---------------

***** MEASUREMENT SUMMARY *****						
187.54	47.3 Qp	1.7 / 9.9 / 27.9	31.0	V / 1.0 / 180.0	-9.0	N/A
193.86	46.7 Qp	1.8 / 10.2 / 27.8	30.9	V / 1.0 / 0.0	-9.1	N/A
181.35	46.6 Qp	1.7 / 9.4 / 27.9	29.7	V / 1.0 / 180.0	-10.3	N/A
200.14	44.0 Qp	1.8 / 10.3 / 27.8	28.3	V / 1.0 / 180.0	-11.7	N/A
175.98	45.1 Qp	1.6 / 9.0 / 27.9	27.8	V / 1.0 / 180.0	-12.2	N/A
362.66	43.0 Qp	2.4 / 15.1 / 27.7	32.8	V / 1.0 / 180.0	-14.2	N/A
175.14	42.5 Qp	1.6 / 9.0 / 27.9	25.2	V / 1.0 / 180.0	-14.8	N/A
46.24	37.1 Qp	0.7 / 14.1 / 27.8	24.0	V / 1.0 / 0.0	-16.0	N/A
150.03	40.0 Qp	1.5 / 9.2 / 27.9	22.8	V / 1.0 / 180.0	-17.2	N/A
412.77	38.1 Qp	2.5 / 16.8 / 27.7	29.7	V / 1.0 / 90.0	-17.3	N/A
215.72	37.9 Qp	1.8 / 10.6 / 27.7	22.6	H / 3.5 / 0.0	-17.4	N/A
172.41	40.0 Qp	1.6 / 8.7 / 27.9	22.5	V / 1.0 / 0.0	-17.5	N/A
70.69	39.6 Qp	1.0 / 8.4 / 27.8	21.2	V / 1.0 / 0.0	-18.8	N/A
143.82	38.1 Qp	1.5 / 9.1 / 27.9	20.8	V / 1.0 / 0.0	-19.2	N/A
337.69	39.1 Qp	2.3 / 13.9 / 27.6	27.6	V / 1.0 / 270.0	-19.4	N/A
169.88	38.2 Qp	1.6 / 8.5 / 27.9	20.4	V / 1.0 / 0.0	-19.6	N/A
195.33	36.1 Qp	1.8 / 10.3 / 27.8	20.3	V / 1.0 / 0.0	-19.7	N/A
293.92	39.5 Qp	2.1 / 12.4 / 27.8	26.2	V / 1.0 / 0.0	-20.8	N/A
300.64	39.1 Qp	2.1 / 12.7 / 27.7	26.2	V / 1.0 / 0.0	-20.8	N/A
344.01	36.2 Qp	2.3 / 14.4 / 27.6	25.2	V / 1.0 / 270.0	-21.8	N/A
222.94	33.4 Qp	1.8 / 10.6 / 27.7	18.1	V / 1.0 / 0.0	-21.9	N/A
243.94	39.8 Qp	2.0 / 11.1 / 27.8	25.1	V / 1.0 / 0.0	-21.9	N/A
300.21	37.4 Qp	2.1 / 12.7 / 27.7	24.5	V / 1.0 / 0.0	-22.5	N/A

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Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m		
Test Method:	EN55022	Test Date:	28-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.		
EUT Serial #:		Temperature:	21	°C	
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34	%	
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99	kPa	
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	5 of 6
	UNINTENTIONAL RADIATOR SCAN.				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
***** MEASUREMENT SUMMARY *****						
250.15	38.4 Qp	2.0 / 11.4 / 27.8	23.9	V / 1.0 / 0.0	-23.1	N/A
425.31	31.9 Qp	2.5 / 17.1 / 27.7	23.7	V / 1.0 / 90.0	-23.3	N/A
268.96	37.1 Qp	2.0 / 12.4 / 27.8	23.6	V / 1.0 / 0.0	-23.4	N/A
344.93	34.4 Qp	2.3 / 14.4 / 27.6	23.5	V / 1.0 / 270.0	-23.5	N/A
431.49	31.8 Qp	2.6 / 16.8 / 27.7	23.4	V / 1.0 / 0.0	-23.6	N/A
275.10	35.3 Qp	2.1 / 12.6 / 27.9	22.1	V / 1.0 / 0.0	-24.9	N/A
470.19	28.2 Qp	2.8 / 17.5 / 27.6	20.9	V / 1.0 / 0.0	-26.1	N/A
474.12	27.7 Qp	2.8 / 17.7 / 27.6	20.6	V / 1.0 / 0.0	-26.4	N/A
262.65	34.1 Qp	2.0 / 12.1 / 27.8	20.5	V / 1.0 / 0.0	-26.5	N/A
505.07	27.4 Qp	2.9 / 17.6 / 27.6	20.3	V / 1.0 / 90.0	-26.7	N/A
341.98	30.5 Qp	2.3 / 14.2 / 27.6	19.4	V / 1.0 / 0.0	-27.6	N/A

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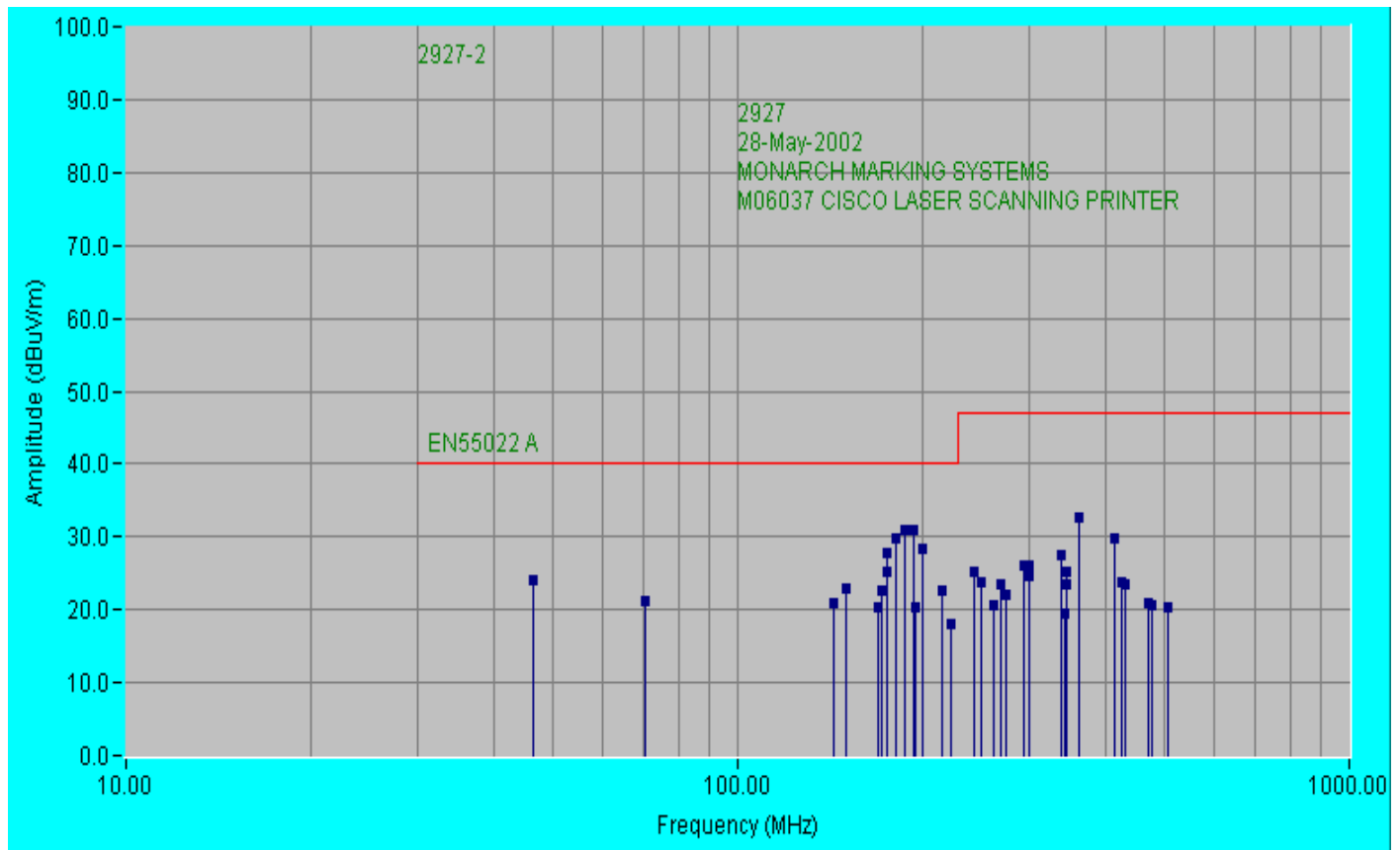
Signature

Radiated Electromagnetic Emissions



Test Report #:	2927 Run 02	Test Area:	LTS 10m		
Test Method:	EN55022	Test Date:	28-May-2002		
EUT Model #:	M06037 CISCO LASER SCANNING PRINTER	EUT Power:	60HZ/110VAC.		
EUT Serial #:		Temperature:	21	°C	
Manufacturer:	MONARCH MARKING SYSTEMS	Relative Humidity:	34	%	
EUT Description:	CISCO LASER SCANNING PRINTER (FHSS MODE)	Air Pressure:	99	kPa	
Notes:	SCANNING/PRINTING (NO ACCESS POINTS ON)			Page:	6 of 6
	UNINTENTIONAL RADIATOR SCAN.				

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 N/A
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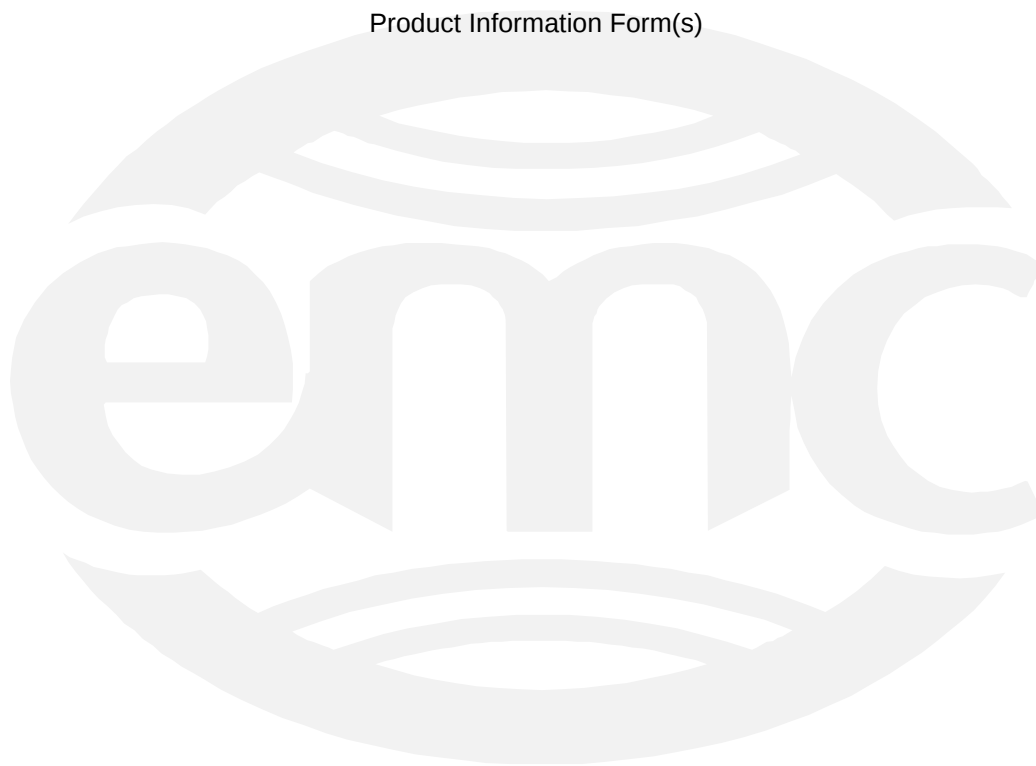
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Appendix B

Constructional Data Form(s)

and/or

Product Information Form(s)



EMC Test Plan and Constructional Data Form



PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- NOTE: This information will be input into your test report as shown below.
Press the F1 key at any time to get HELP for the current field selected.

Company: Monarch Marking Systems, Inc, dba Paxar Corporation

Address: 170 Monarch Lane
Miamisburg, OH 45342

Contact: Jim Bacher Position: Senior Engineer

Phone: 937-865-2020 Fax: 937-865-2048

E-mail Address: jim.bacher@paxar.com

General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description Thermal Barcode Printer

EUT Name Ultra Gold

Model No.: M06037 Serial No.: 05020005

Product Options: Laser Scanner and PCMCIA 2.4GHz 802.11b Radio
Cisco LMC352, FCC id LDK102035

Configurations to be tested: Above

Test Objective

- | | |
|--|--|
| ☒ EMC Directive 89/336/EEC (EMC)
Std: _____ | ☒ FCC: Class ☒ A ☐ B Part _____ |
| ☐ Machinery Directive 89/392/EEC (EMC)
Std: _____ | ☒ VCCI: Class ☒ A ☐ B |
| ☐ Medical Device Directive 93/42/EEC (EMC)
Std: _____ | ☐ BSMI: Class ☐ A ☐ B |
| | ☒ Canada: Class ☒ A ☐ B |
| | ☐ Australia: Class ☐ A ☐ B |
| | ☒ Other: <u>France, Germany, Spain, Uk, Japan, Hong Kong</u> |
| ☐ Vehicle Directive 72/245/EEC (EMC)
Std: _____ | |
| ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | |

TÜV Product Service Certification Requested

- | | |
|---|---|
| ☐ Attestation of Conformity (AoC) | ☒ EMC Certification (used with Octagon Mark) |
| ☒ Certificate of Conformity (CoC) | ☒ Compliance Document |
| Protection Class (N/A for vehicles) | ☐ Class I ☐ Class II ☐ Class III |
- (Press **F1** when field is selected to show additional information on Protection Class.)

EMC Test Plan and Constructional Data Form

**Attendance**Test will be: ☒ Attended by the customer ☐ Unattended by the customer**Failure - Complete this section if testing will not be attended by the customer.**

If a failure occurs, TUV Product Service should:

- ☒ Call contact listed above, if not available then stop testing. (After hrs phone): 937-367-5107 (cell)
- ☐ Continue testing to complete test series.
- ☐ Continue testing to define corrective action.
- ☐ Stop testing.

EUT Specifications and RequirementsLength: 233.07mm Width: 88.93mm Height: 262.54mm Weight: 4.96Kg**Power Requirements***Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)*Voltage: 7.4VDC (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements**Typical Installation and/or Operating Environment**

(ie. Hospital, Small Business, Industrial/Factory, etc.)

Retail and warehouses

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): _____

☐ Shielded OR ☐ Unshielded

☐ Not Applicable

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables												
Interface			Shielding									
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE:												
RS232	☐	☒	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	☒	☐
RS232	☐	☒	1	☒	☐	Foil		9-pin D-Sub and 3 position 3.5mm phono plug		2	☒	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
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	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

**EUT Software.**

Revision Level: BIOS Rev 3.01, Print Engine Rev 1.0.0.0.9, ROM DOS Rev 6.22

Description: Print engine firmware controls printing functions. DOS is the operating system for end user's application software.

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Printer will scan a barcode every 5 seconds and print a line of 'H's.
2. The access point will ping the radio transmitter, variably set from 10ms to 1000ms.
- 3.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

Description	Model #	Serial #	FCC ID #
Printer	M06037		
Cisco Radio Card	LMC352		LDK102035
AC Power Adapter	M06063		

EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)

<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
802.11b Access Point			
Gateway Portable PC			

Oscillator Frequencies

<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
32.768KHz	25MHz	X1 on 120841 assembly	Crystal for DOS processor
3.6864MHz	3.6864MHz	X2 on 120841 assembly	Crystal for UART
4.194MHz	22.020MHz	X1 on 120708 assembly	Crystal for Print Engine Processor
10MHz	10MHz	X2 on 120919 assembly	Crystal for keyboard controller
4.19MHz	4.19MHz	X1 on 120919 assembly	Crystal for LCD display controller

Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
Martek Power	PES-40-10A-1		☒ Switched-mode: (Frequency) <u>Unknown</u> ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

<i>Manufacturer</i>	<i>Model #</i>	<i>Location in EUT</i>
Built into OEM power supply		

Form

EMC Test Plan and Constructional Data Form



Critical EMI Components (Capacitors, ferrites, etc.)

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>
Bypass capacitors and best practice on board layout				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization Signatures

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

Reviewed by TÜV Product Service Associate

Date

Appendix C

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the CISPR 22 Limits.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ± 4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V), adding the antenna correction factor and cable loss factor (Factor dB) to it, then subtracting the preamp gain. This result then has the CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dB μ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dB μ V/m)	POL/HGT/AZ (m) (deg)	DELTA1 EN 55022 A
60.80	42.5Qp	+ 1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.