

TEST REPORT



DANAK

Reg. no. 19

DELTA
Electronics Testing

Venlighedsvej 4
DK-2970 Hørsholm
Denmark

Tel. (+45) 45 86 77 22
Fax (+45) 45 86 58 98
www.delta.dk

*This report is issued
under the rules of
DANAK (The Danish
Accreditation Scheme)
– see overleaf.*

*The report must not
be reproduced,
except in full,
without the written
approval of DELTA.*

**Measurements of radio frequency interference from
TallyCom+
Manufactured by i-data International A/S
Project no.: K221045-1
Date: 1999-10-12**



Title Measurements of radio frequency interference from TallyCom+

Test object TallyCom+

Report no. DANAK-194756

Project no. K221045-1

Date of test 1999-10-06

Client i-data International A/S
Vadstrupvej 27
DK-2880 Bagsværd
Denmark

Telephone: +45 44 36 60 00
Fax: +45 44 36 61 11

Contact person Mr. Jens Henneke

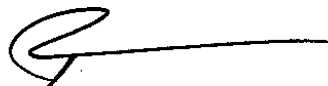
Manufacturer i-data International A/S

Specification EN 55022:1994 class B + A1:1995 + A2:1997
(CISPR 22:1993 + A1:1995 + A2:1996)
FCC part 15 Subpart B class B demonstrated by
compliance with EN 55022:1994, class B.

Test personnel Henrik Egeberg Nielsen

Results The emission from the TallyCom+ was below the limit of
the above specifications.

Date 1999-10-12

Project manager 
Per Hansen, Facility Manager, EMC
DELTA Electronics Testing

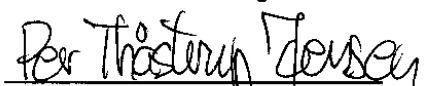
Responsible 
Per Thåstrup Jensen, M.Sc.E.E., EMC
DELTA Electronics Testing

	TABLE OF CONTENTS	PAGE
1.	SUMMARY OF TEST RESULTS	4
2.	TEST SPECIMEN	5
3.	GENERAL TEST CONDITIONS	6
3.1	Test set-up	6
4.	TESTS AND RESULTS	10
4.1	Conducted emission, AC mains (EN 55022, class B)	10
4.2	Radiated electromagnetic field (EN 55022, class B)	11
4.3	Conducted emission, AC mains (FCC class B / EN55022, class B)	12
4.4	Radiated electromagnetic field (FCC class B / EN55022, class B)	13
ANNEX 1	List of instruments	
ANNEX 2	Test record sheets and photos regarding conducted emission, AC mains (EN 55022, class B)	
ANNEX 3	Test record sheets and photos regarding radiated electromagnetic field (EN 55022, class B)	
ANNEX 4	Test record sheets and photos regarding conducted emission, AC mains (FCC class B / EN55022, class B)	
ANNEX 5	Test record sheets and photos regarding radiated electromagnetic field (FCC class B / EN55022, class B)	
ANNEX 6	Photo of the EUT	
ANNEX 7	EUT, general information and settings	

1. **SUMMARY OF TEST RESULTS**

The results of the emission tests can be summarised as follows:

Emission tests	EN 55022:1994 class B + A1:1995 + A2:1997 (CISPR 22:1993 + A1:1995 + A2:1996)	FCC part 15 Subpart B class B *
Conducted emission, AC mains	Passed	Passed
Radiated electromagnetic field	Passed	Passed

Abbreviations : Passed : The emission was below the limit.
Not done : No test was performed.
N/A : Not applicable.
Not relevant : The test was not relevant for the test object.

* The FCC class B was demonstrated by compliance with EN 55022:1994, class B.

The test results relate only to the specimen tested.

2. TEST SPECIMEN

Category : Card for printer

Manufacturer : i-data International A/S

Model/Type : TallyCom+

Part no. : X62 512

Serial no. : -

Supply voltage : + 5 VDC.

Operational mode : The printer card was continuously receiving data from the PC.

Comments : The test object was built into the printer 3.1.2 and was powered from this.

The tests were performed in two configurations:

- 1) with Card Reader (3.1.4) and AC / DC Adapter (3.1.3)
- 2) without Card Reader (3.1.4) and AC / DC Adapter (3.1.3)

3. GENERAL TEST CONDITIONS

3.1 Test set-up

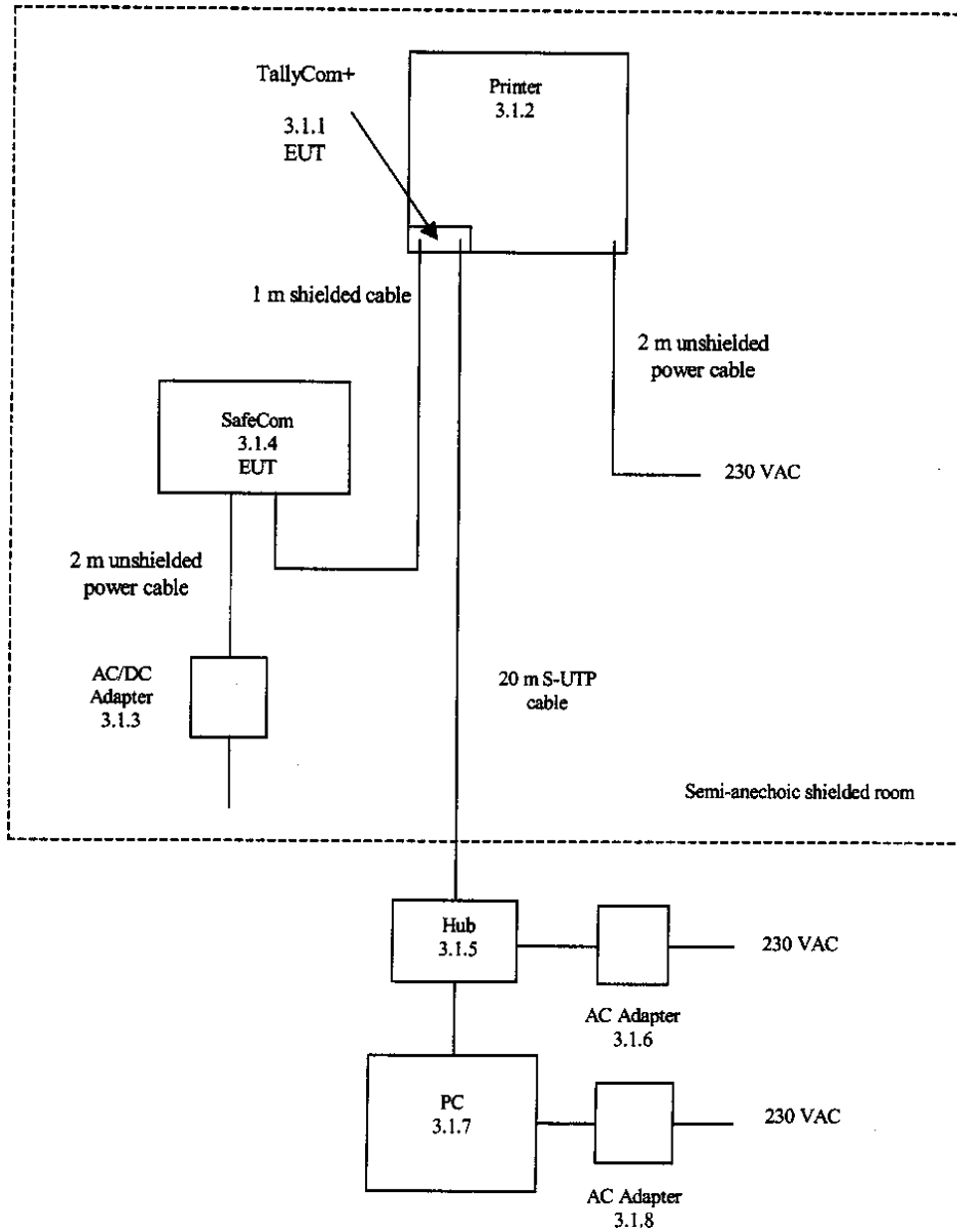


FIG. 1 Test configuration 1 including test object and peripheral equipment

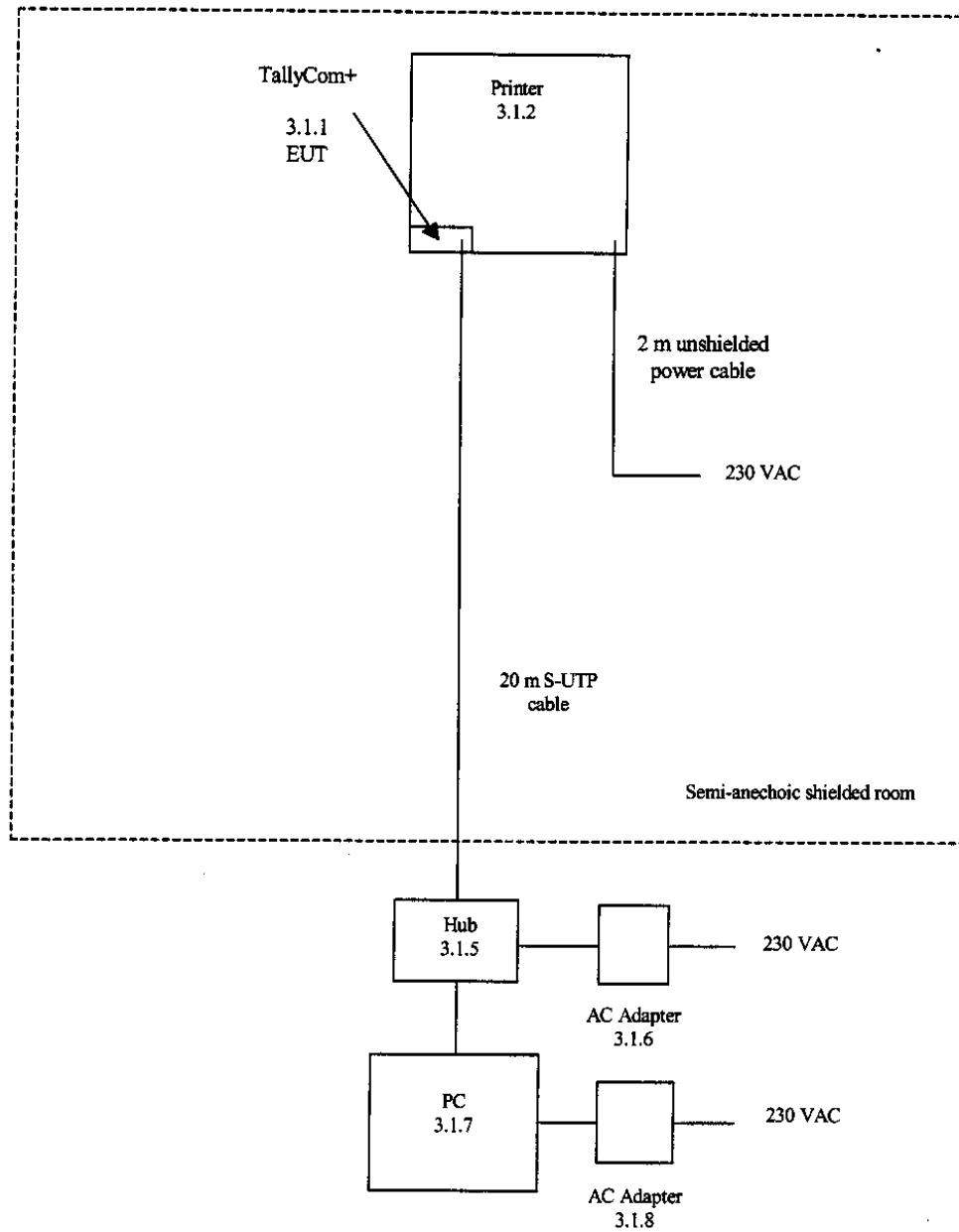


FIG.2 Test configuration 2 including test object and peripheral equipment

The complete system used during the tests consisted of the following units:

- 3.1.1 TallyCom+ EUT**
- | | | |
|--------------|---|--------------------------|
| Manufacturer | : | i-data International A/S |
| Model/type | : | TallyCom+ |
| Part no. | : | X62 512 |
| Serial no. | : | - |
| FCC ID. | : | - |
- 3.1.2 Printer**
- | | | |
|--------------|---|---------|
| Manufacturer | : | Tally |
| Model/type | : | T2170 |
| Part no. | : | - |
| Serial no. | : | 2900079 |
| FCC ID. | : | - |
- 3.1.3 AC / DC Adapter (used in test configuration 1 only)**
- | | | |
|--------------|---|---------|
| Manufacturer | : | FRIWO |
| Model/type | : | FW 3288 |
| Part no. | : | - |
| Serial no. | : | - |
| FCC ID | : | - |
- 3.1.4 Card Reader (used in test configuration 1 only)**
- | | | |
|--------------|---|--|
| Manufacturer | : | i-data International A/S |
| Model/type | : | SafeCom X34 150 (EXPRESS E10 10.1.1.102) |
| Part no. | : | - |
| Serial no. | : | - |
| FCC ID | : | - |
- 3.1.5 Hub**
- | | | |
|--------------|---|------------------------|
| Manufacturer | : | EDIMAX |
| Model/type | : | Palmtop Dual Speed Hub |
| Part no. | : | - |
| Serial no. | : | - |
| FCC ID. | : | - |
- 3.1.6 AC / DC Adapter**
- | | | |
|--------------|---|---------------|
| Manufacturer | : | - |
| Model/type | : | T48-6-1000D-3 |
| Part no. | : | - |
| Serial no. | : | - |
| FCC ID. | : | - |

3.1.7 LapTop PC

Manufacturer	:	IBM
Model/type	:	Thinkpad
Part no.	:	-
Serial no.	:	-
FCC ID	:	-

3.1.8 AC / DC Adapter

Manufacturer	:	IBM
Model/type	:	AA19210
Part no.	:	29H6704
Serial no.	:	-
FCC ID	:	-

4. TESTS AND RESULTS

4.1 Conducted emission, AC mains (EN 55022, class B)

	Requirements	
Specification	EN 50081-1:1992	
Test method	EN 55022:1994 class B + A1:1995 + A2:1997 (CISPR 22:1993 + A1:1995 + A2:1996)	
Frequency range	0.15 - 30 MHz	
Limit: (quasi-peak)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.)	66-56 dB μ V
	0.50-5 MHz:	56 dB μ V
	5-30 MHz:	60 dB μ V
Limit: (average)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.)	56-46 dB μ V
	0.50-5 MHz:	46 dB μ V
	5-30 MHz:	50 dB μ V
Test record sheets and photos		Annex 2

Results:

The emission was within the specified limits.

Comments:

The test object was powered from the printer (+ 5 VDC).

4.2 Radiated electromagnetic field (EN 55022, class B)

	Requirements	
Specification	EN 50081-1:1992	
Test method	EN 55022:1994 class B + A1:1995 + A2:1997 (CISPR 22:1993 + A1:1995 + A2:1996)	
Measuring distance	10 m	
Frequency range	30 - 1000 MHz	
Limit: (quasi-peak)	30-230 MHz:	30 dB μ V/m
	230-1000 MHz:	37 dB μ V/m
Test record sheets and photos		
Annex 3		

Results:

The emission was within the specified limits.

Comments:

The test object was powered from the printer (+ 5 VDC).

4.3 Conducted emission, AC mains (FCC, class B / EN 55022, class B)

	Requirements	
Specification	FCC Rules and Regulations:1997, part 15, subpart B class B, demonstrated by compliance with EN 55022:1994, class B	
Test method	CISPR 22:1993 + A1:1995 + A2:1996	
Frequency range	0.15 - 30 MHz	
Test set-up	ANSI C63.4:1992	
Limit: (quasi-peak)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.) 0.50-5 MHz: 5-30 MHz:	66-56 dB μ V 56 dB μ V 60 dB μ V
Limit: (average)	0.15-0.50 MHz: (decreasing lin. with the logarithm of freq.) 0.50-5 MHz: 5-30 MHz:	56-46 dB μ V 46 dB μ V 50 dB μ V
Test record sheets and photos		<i>Annex 4</i>

Results:

The emission was within the specified limits.

Comments:

The test object was powered from the printer (+ 5 VDC).

4.4 Radiated electromagnetic field (FCC, class B / EN 55022, class B)

	Requirements	
Specification	FCC Rules and Regulations:1997, part 15, subpart B, class B, demonstrated by compliance with EN 55022:1994, class B	
Test method	CISPR 22:1993 + A1:1995 + A2:1996	
Test set-up	ANSI C63.4:1992	
Measuring distance	10 m	
Frequency range	30 - 1000 MHz	
Limit: (quasi-peak)	30-230 MHz: 230-1000 MHz:	30 dB μ V/m 37 dB μ V/m
Test record sheets and photos		
Annex 5		

Results:

The emission was within the specified limits.

Comments:

The test object was powered from the printer (+ 5 VDC).

DANAK-194756
DELTA-K221045-1

ANNEX 1

List of instruments

(1 page)

DANAK-194756
DELTA-K221045-1

LIST OF INSTRUMENTS

EC NO.	INSTRUMENT	MANUFACTURER	TYPE
29985	BILOG ANTENNA, 26-2000 MHz	CHAFFNER / CHASE	6140A
29301	ARTIFICIAL MAINS NETWORK	ROHDE & SCHWARZ	ESH2-Z5
29916	AUTOMATIC EMI RECEIVER	ROHDE & SCHWARZ	ESCS-30
29861	EMI-SOFTWARE Ver. 1.50c	ROHDE & SCHWARZ	ES-K1, PART: 1026.6790.02

DANAK-194756
DELTA-K221045-1

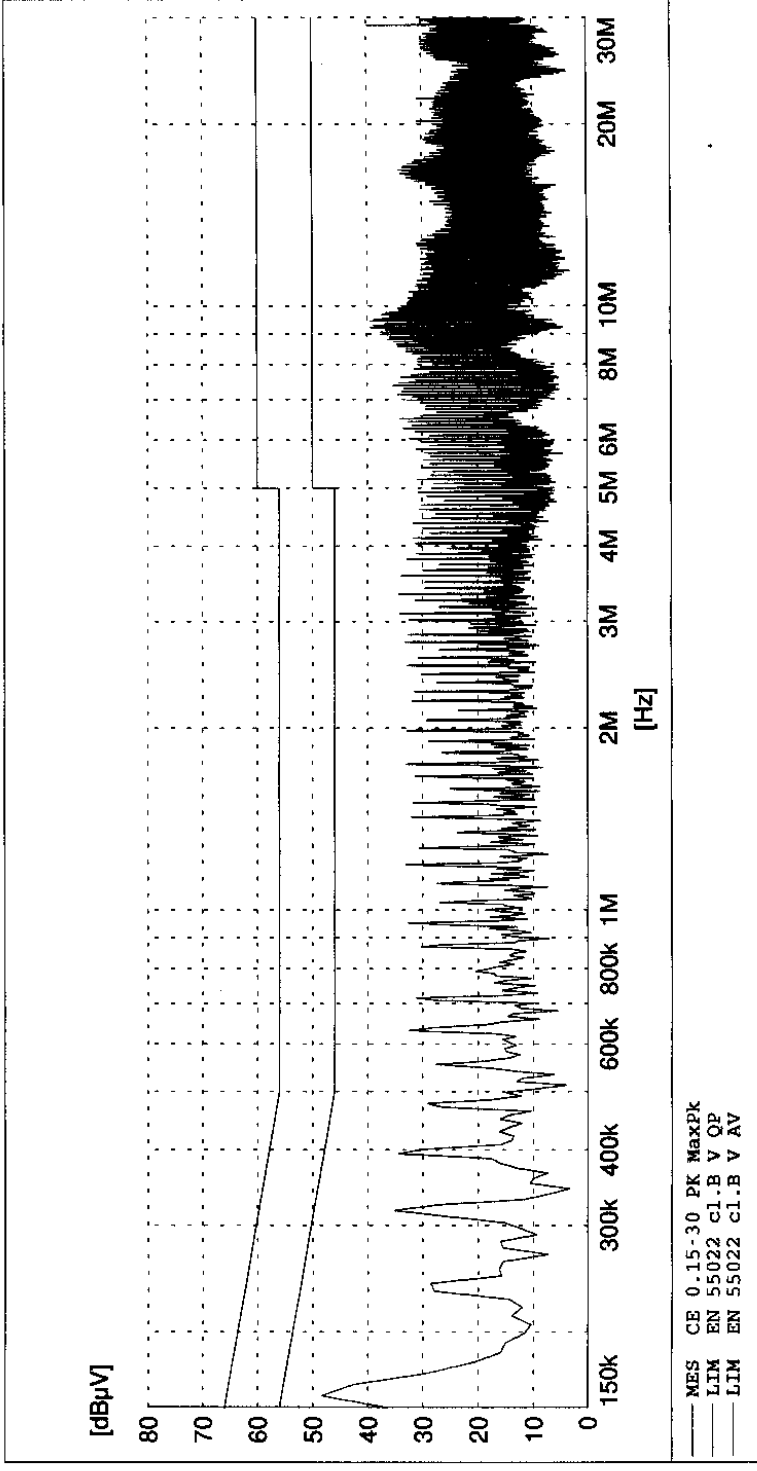
ANNEX 2

Test record sheets and photos regarding
conducted emission, AC mains (EN 55022, class B)

(6 pages)

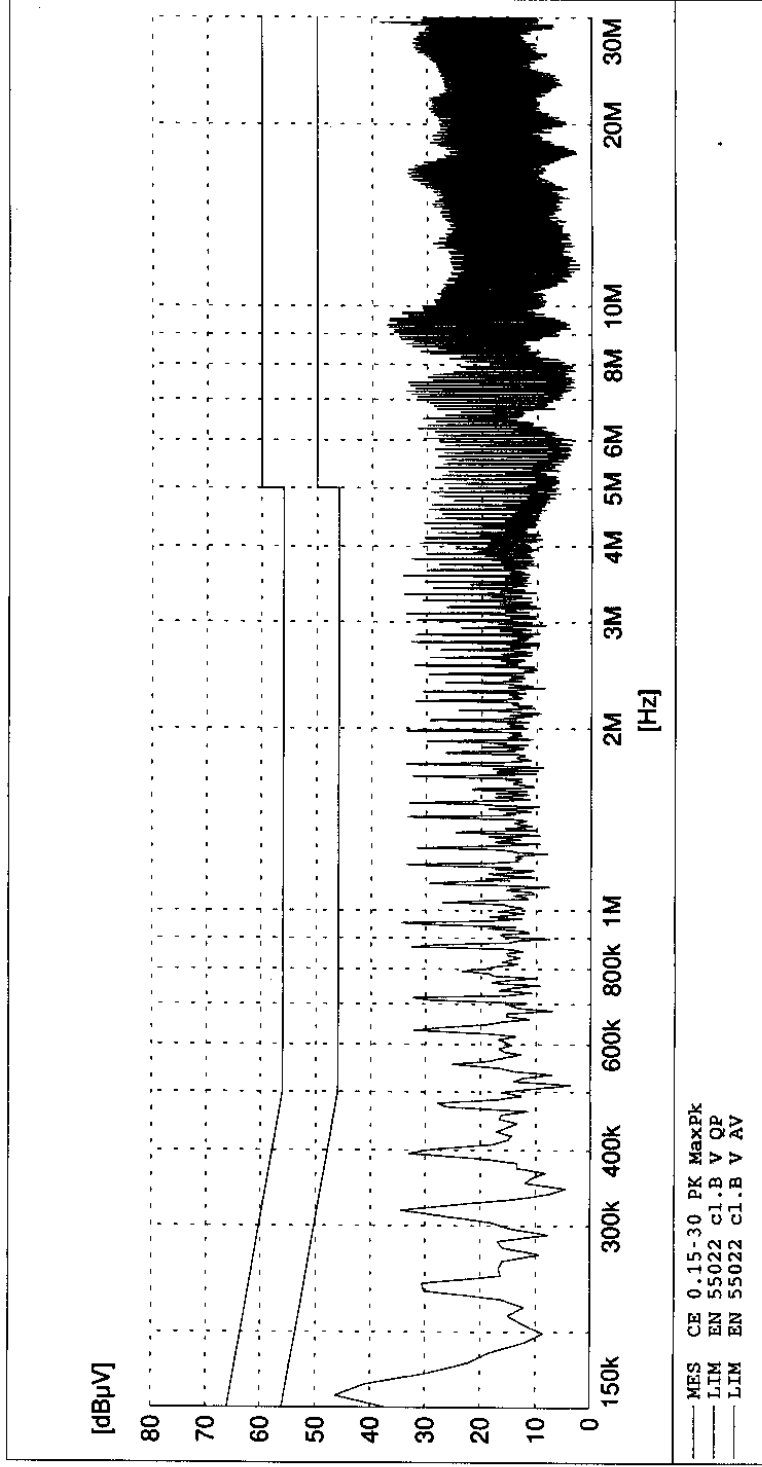
DELTA Electronics Testing

EUT: X62512.
 Manufacturer: I-Data.
 Operating Condition: Line no.: Neutral. 230 VAC. **Test configuration 1.**
 Test Site: EMC-5
 Operator: HEN K221045
 Test Specification: EN 55022 Class B. **FCC class B**
 Comment: Sheet 6
 Start of Test: 1999-10-06



DELTA Electronics Testing

EUT: X62512.
 Manufacturer: I-Data.
 Operating Condition: Line no.: Line 1. 230 VAC. *Test configuration 1.*
 Test Site: EMC-5
 Operator: HEN K221045
 Test Specification: EN 55022 Class B. *FCC class B*
 Comment: Sheet 7
 Start of Test: 1999-10-06



DANAK-194756
DELTA-K221045-1

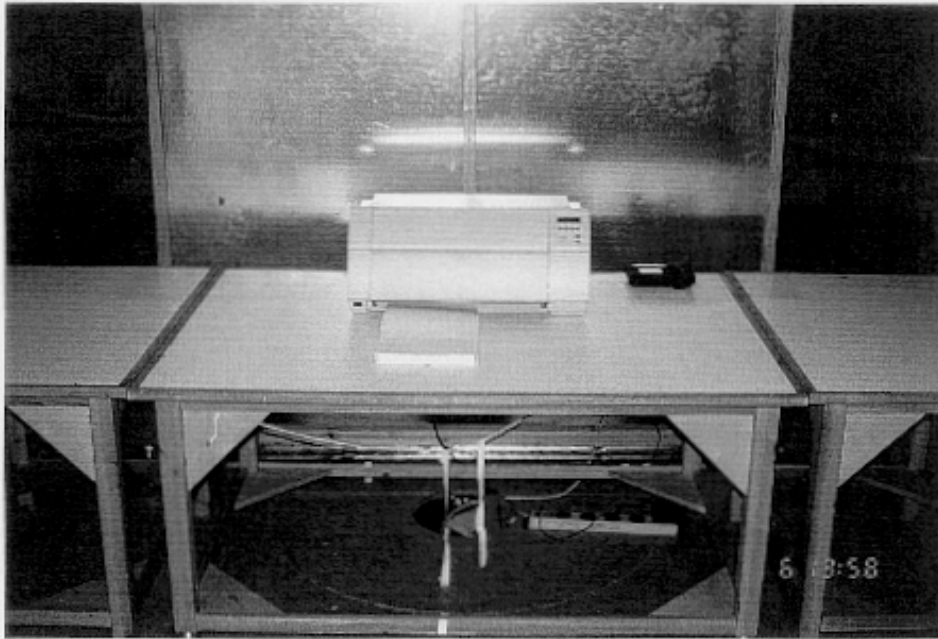


PHOTO A2.1

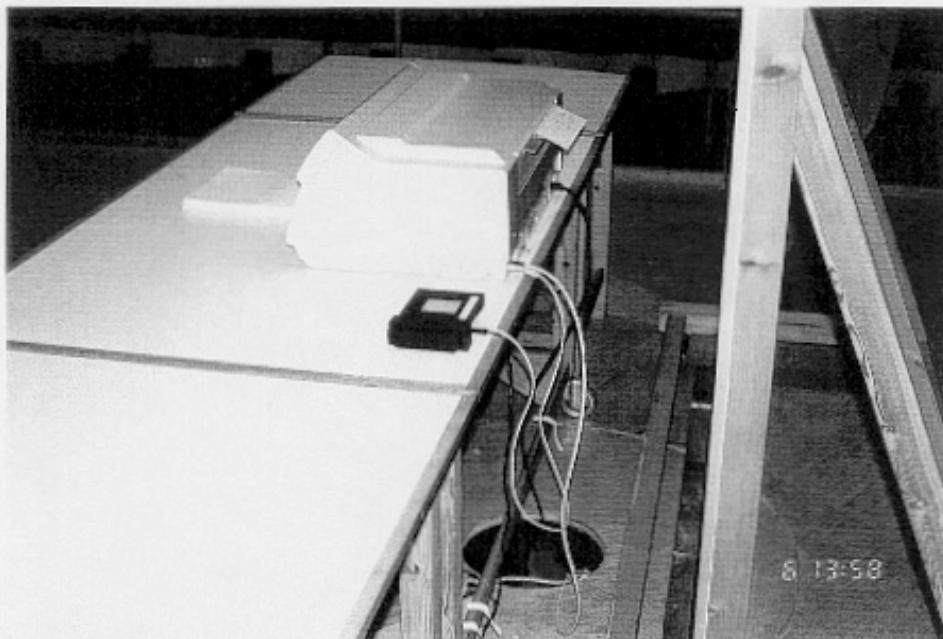
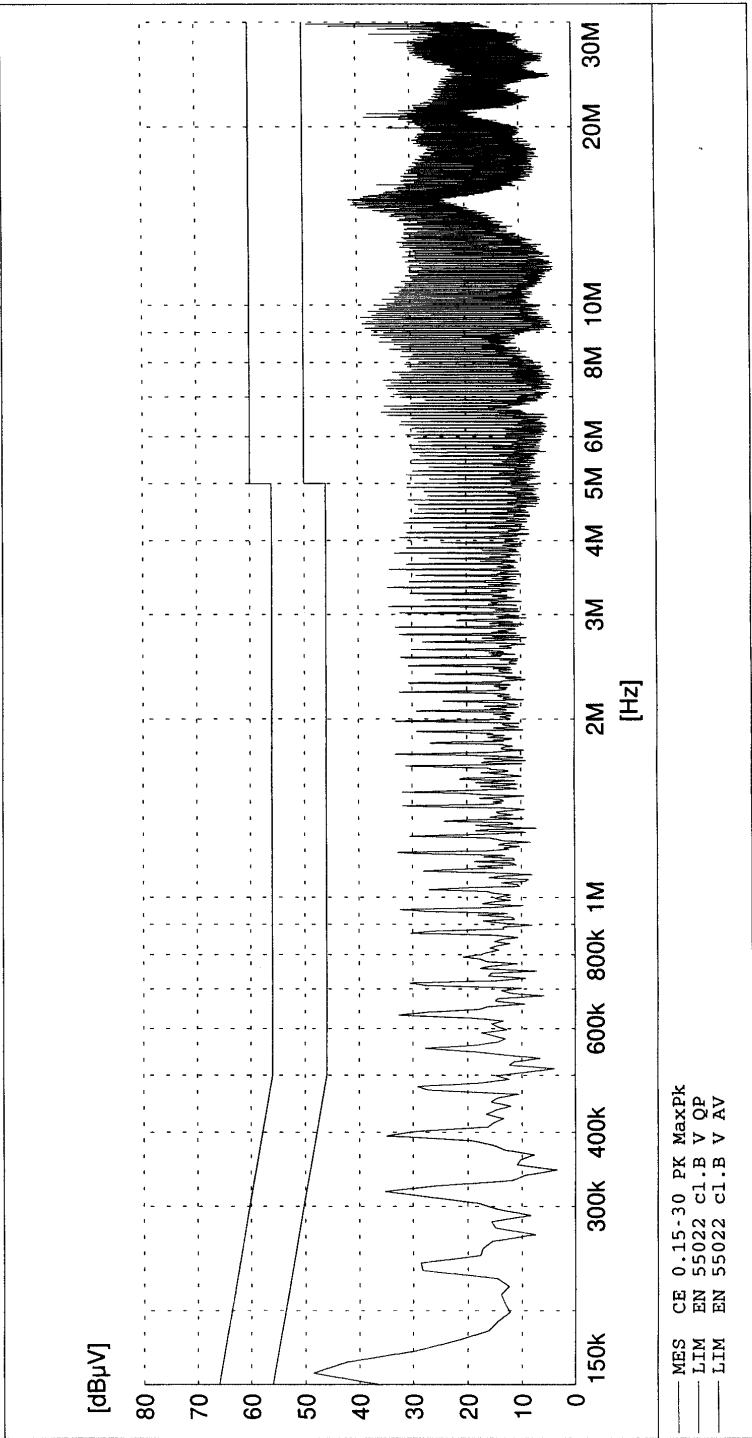


PHOTO A2.2

DELTA Electronics Testing

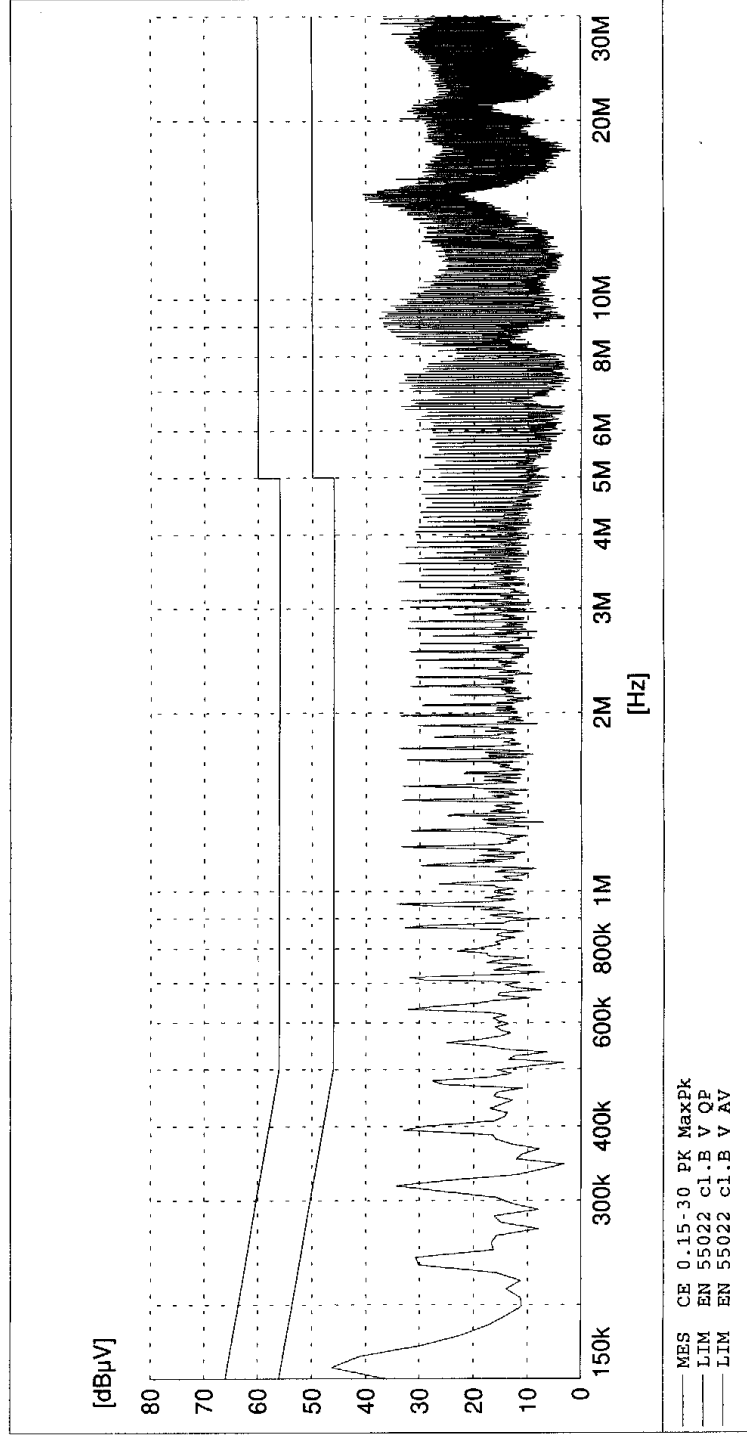
EUT: X62512.
Manufacturer: I-Data.
Operating Condition: Line no.: Neutral. 230 VAC. **Test configuration 2.**
Test Site: EMC-5
Operator: HEN K221045
Test Specification: EN 55022 Class B. **FCC class B**
Comment: Sheet 9
Start of Test: 1999-10-06



DELTA Electronics Testing

EUT: X62512.
 Manufacturer: I-Data.
 Operating Condition: Line no.: Line 1. 230 VAC.
 Test Site: EMC-5
 Operator: HEN K221045
 Test Specification: EN 55022 Class B. FCC class B
 Comment: Sheet 8
 Start of Test: 1999-10-06

Test configuration 2.



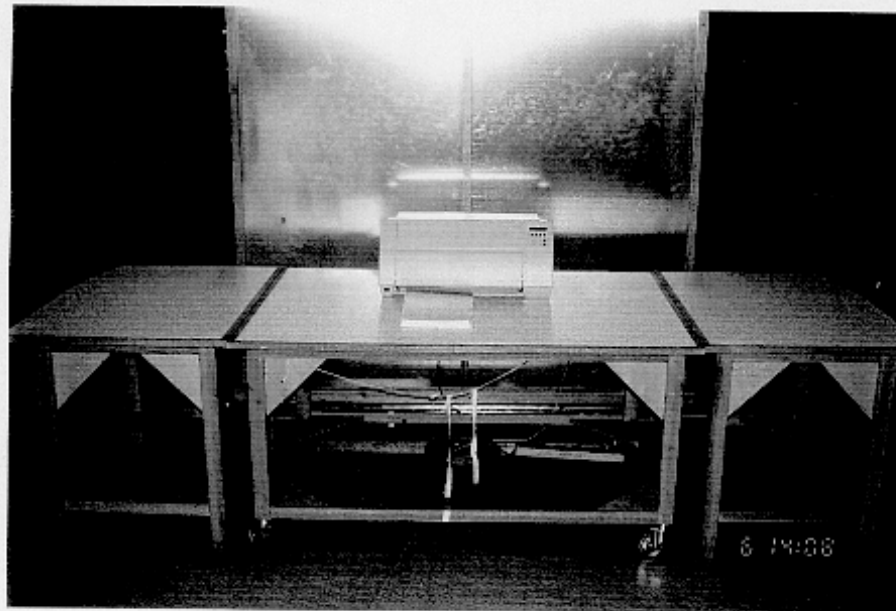


PHOTO A2.3

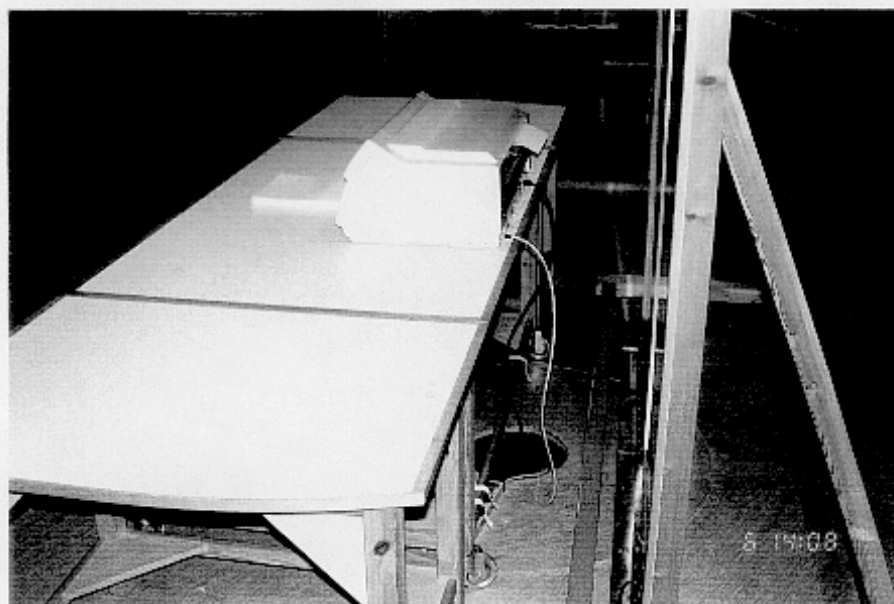


PHOTO A2.4

~~DELTA-K221045-1~~
DELTA-K221045-1

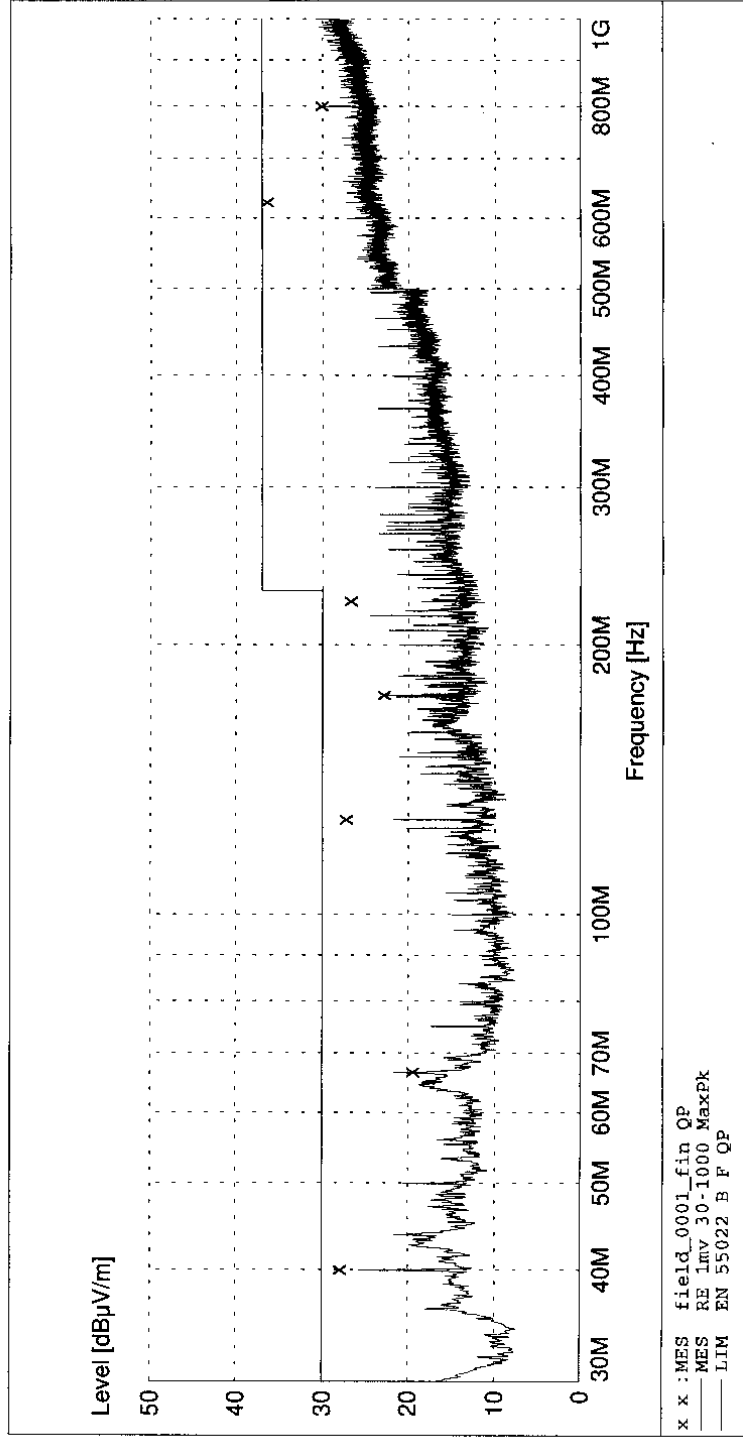
ANNEX 3

Test record sheets and photos regarding
radiated electromagnetic field (EN 55022, class B)

(6 pages)

DELTA Electronics Testing

EUT: X62512.
Manufacturer: I-Data.
Operating Condition: Ant. 1 m vertical. 230 VAC. *Test configuration 1*
Test Site: EMC-5
Operator: HEN K221045
Test Specification: EN 55022 Class B. *FCC class B*
Comment: Sheet 4
Start of Test: 1999-10-06



MEASUREMENT RESULT: "field_0001_fin_QP"

06-10-99 13:43

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
40.000000	28.20	9.0	30.0	1.7	123.0	115.00	VERTICAL
66.600000	19.70	9.8	30.0	10.2	294.0	145.00	VERTICAL
127.820000	27.50	7.6	30.0	2.4	352.0	339.00	HORIZONTAL
175.750000	23.10	8.7	30.0	6.8	112.0	38.00	VERTICAL
223.680000	27.00	11.0	30.0	2.9	399.0	165.00	HORIZONTAL
625.010000	36.70	21.3	37.0	0.2	222.0	190.00	VERTICAL
749.980000	25.90	22.9	37.0	11.0	186.0	170.00	VERTICAL
800.000000	30.40	23.0	37.0	6.5	146.0	306.00	VERTICAL

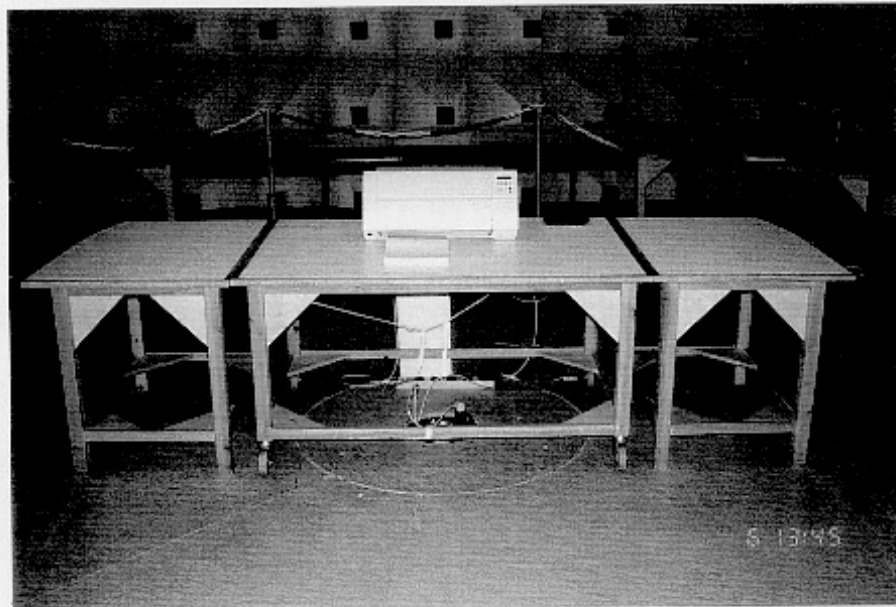


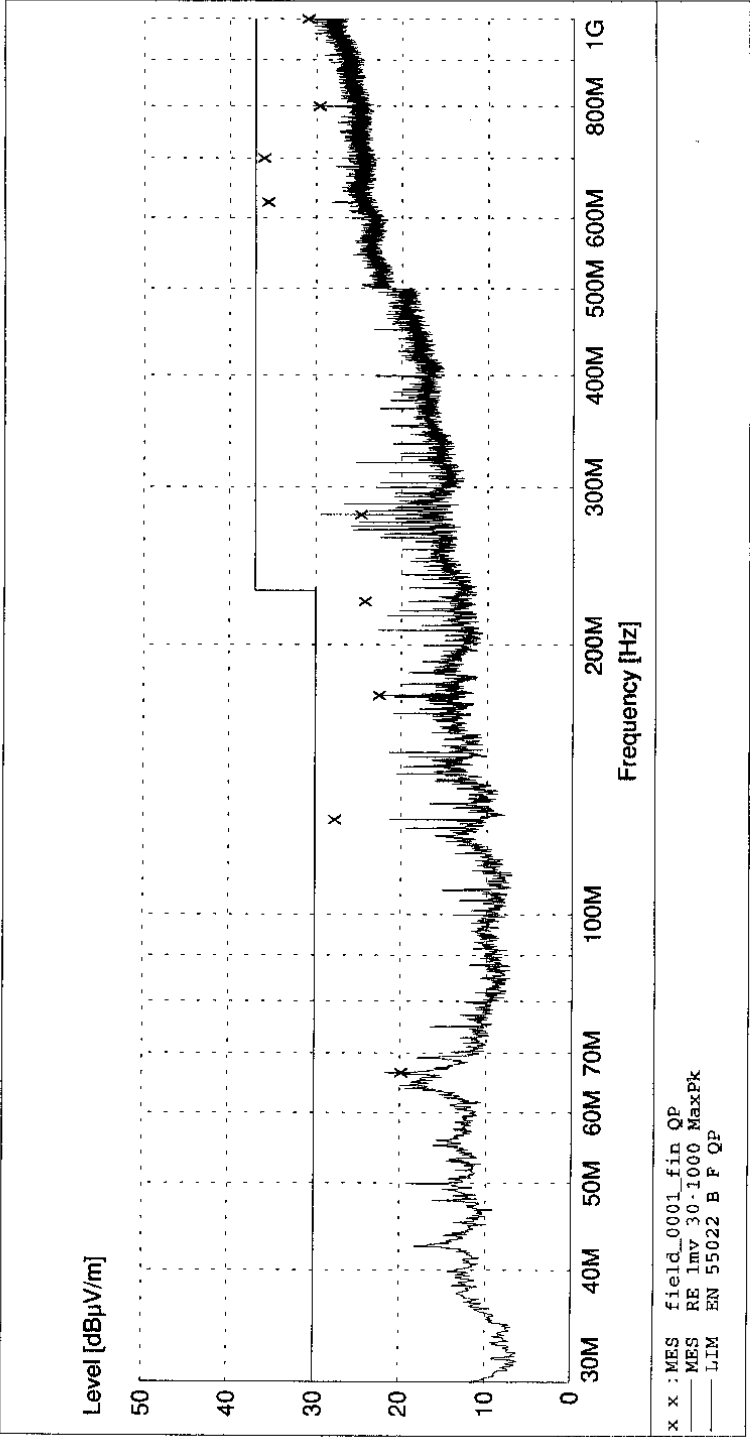
PHOTO A3.1



PHOTO A3.2

DELTA Electronics Testing

EUT: X62512.
Manufacturer: I-Data.
Operating Condition: Ant. 1 m vertical. 230 VAC. **Test configuration 2**
Test Site: EMC-5
Operator: HEN K221045
Test Specification: EN 55022 Class B. **FCC class B**
Comment: Sheet 2
Start of Test: 1999-10-06



MEASUREMENT RESULT: *field 0001 fin QP*

06-10-99 11:33

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Height cm	Azimuth deg	Polarisation
66.600000	20.10	9.8	30.0	9.8	327.0	145.00	VERTICAL
127.820000	28.00	7.6	30.0	1.9	353.0	333.00	HORIZONTAL
175.750000	22.80	8.7	30.0	7.1	112.0	44.00	VERTICAL
223.680000	24.50	11.0	30.0	5.4	353.0	6.00	HORIZONTAL
279.600000	25.00	12.6	37.0	11.9	242.0	185.00	HORIZONTAL
625.010000	35.80	21.3	37.0	1.1	258.0	189.00	VERTICAL
700.000000	36.30	21.9	37.0	0.6	126.0	45.00	HORIZONTAL
800.000000	29.90	23.0	37.0	7.0	148.0	304.00	VERTICAL
999.970000	31.20	25.7	37.0	5.7	344.0	354.00	VERTICAL

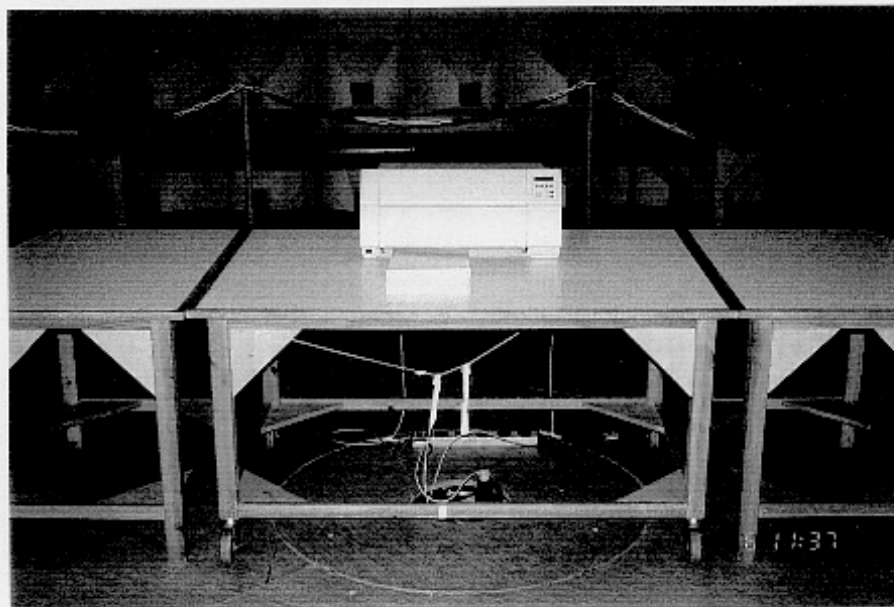


PHOTO A3.3

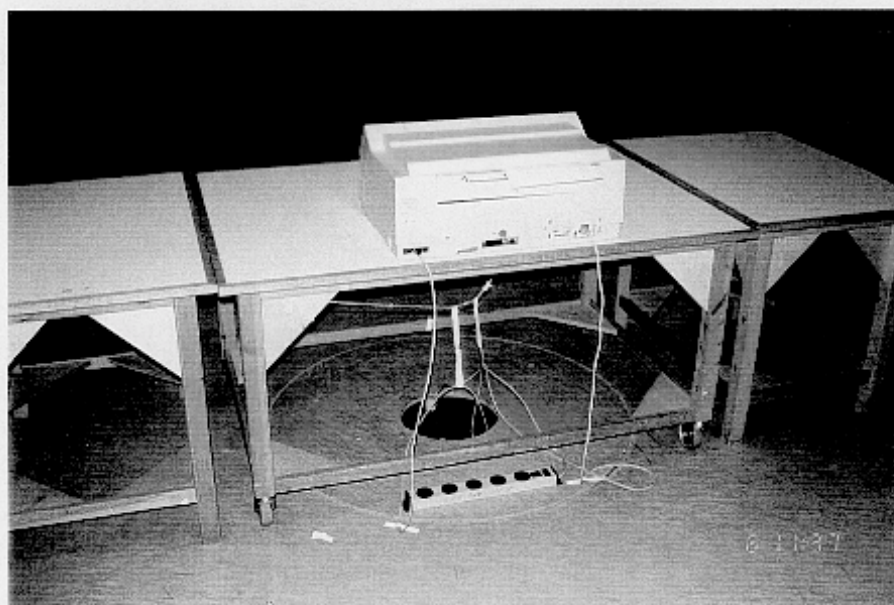


PHOTO A3.4