

Test Report



DANAK

Reg. no. 19

Measurement of radio frequency interference, mains harmonic current and mains flicker from SELCO Arc Detecting and Protection System

Performed for SELCO A/S

DANAK-197672

Project no.: E502289-2

Page 1 of 11

6 annexes

02 November 2004

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Title Measurement of radio frequency interference, mains harmonic current and mains flicker from SELCO Arc Detecting and Protection System

Test object SELCO Arc Detecting and Protection System

Report no. DANAK-197672

Project no. E502289-2

Test period 14 July 2004

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Manufacturer SELCO A/S

Specifications EN 50263:1999 Electromagnetic compatibility (EMC) - Product standard for measuring relays and protection equipment

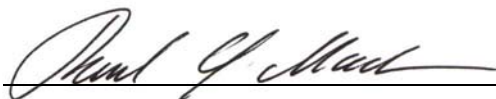
Results The AC mains conducted emission and the radiated electromagnetic field from the test object were measured and found to be within the specification.

The mains harmonic current emission and the induced mains voltage fluctuations and flicker were within the requirements. Please, see *Section 1*.

Test personnel Poul Fjeldsted Nørgaard

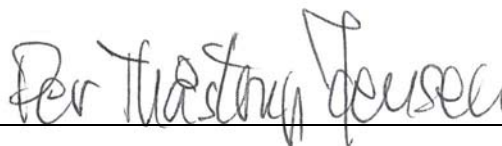
Date 02 November 2004

Project Manager



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Responsible



Per Thåstrup Jensen
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(2 pages)

Annex 4 Test record sheets regarding measurements of radiated electromagnetic field
(4 pages)

1. Summary of tests

Tests	Test methods	Results
Radiated electromagnetic field	EN 50263:1999 EN 55022+A1 Class A	Passed
AC mains conducted emission	EN 50263:1999 EN 55022+A1 Class A	Passed
Mains harmonic current emission	EN 61000-3-2:2000	Compliant
Induced mains voltage fluctuations and flicker	EN 61000-3-3:1995+A1	Compliant

Abbreviations

Passed	:	The requirements are met. Test was performed.
Not done	:	No test was performed.
N/A	:	Not applicable.
Not relevant	:	The test was not relevant for the test object.
Compliant	:	The requirements are met. No test was performed.

Conclusion

The test objects mentioned in this report meet the emission requirements of the following standards as to the test phenomena mentioned above

- EN 50263:1999 Electromagnetic compatibility (EMC) - Product standard for measuring relays and protection equipment.

The test results relate only to the objects tested.

2. Test objects and auxiliary equipment

2.1 Test object 1 - Arc detecting relay

Category	Electrical relays
Manufacturer	SELCO A/S
Model / type	D0900
Part no.	-
Serial no.	-
Supply voltage	230 VAC
Operational mode	Normal

2.2 Test object 2 - Junction box

Category	Electrical relays
Manufacturer	SELCO A/S
Model / type	D0400
Part no.	-
Serial no.	-
Supply voltage	From test object 1
Operational mode	Normal

2.3 Test object 3 - Detector

Category	Electrical relays
Manufacturer	SELCO A/S
Model / type	A0200/0300
Part no.	-
Serial no.	-
Supply voltage	From test object 2
Operational mode	Normal

2.4 AUX equipment - Circuit breaker

Manufacturer	Mitsubishi Electronics
Model / type	NF100-CS
Part no.	-
Serial no.	-
Supply voltage	230 VAC

3. General test conditions

3.1 Test set-up

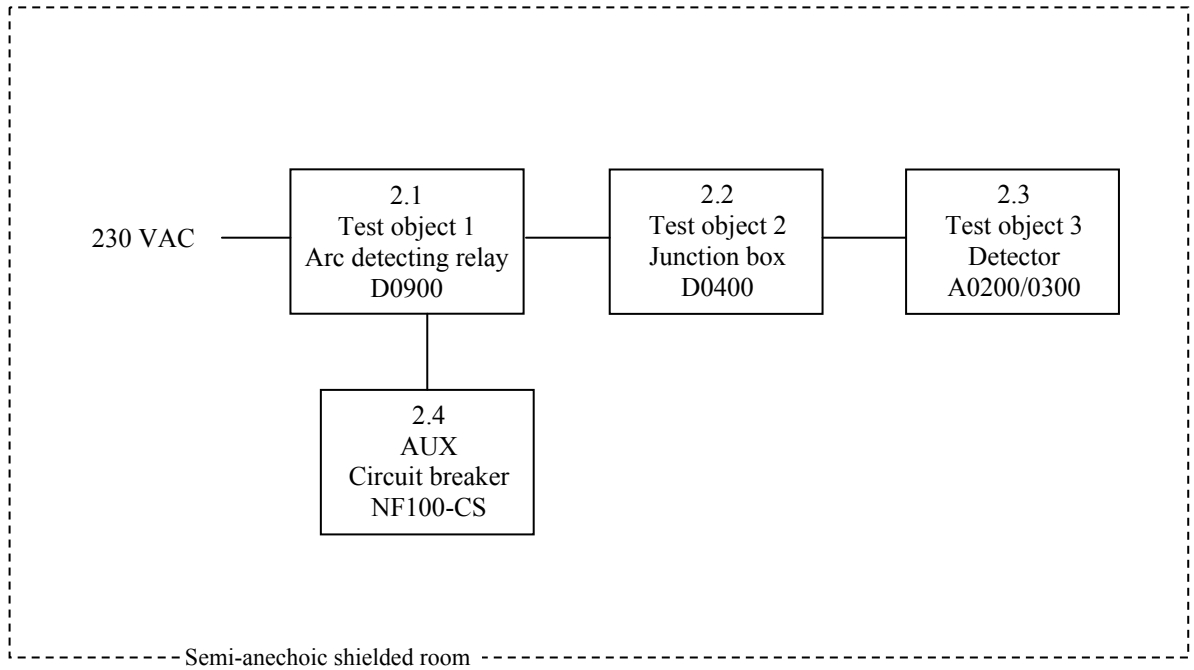


Fig. 1 Test set-up.

4. Test and results

4.1 AC mains conducted emission

Client	SELCO A/S	Sheets	See <i>Annex 3</i>
Item	D0900, D0400 and A0200/0300	Project no.	E502289-2
Manufacturer	SELCO A/S	Date	2004-07-14
Type	-	Sign.	PFN
Serial no.	-	Test site	Room 5
Test method(s)	EN 50263:1999 EN 55022+A1 Class A		
Temperature	23.1 °C	Humidity	44.7 % R.H.

Limit using quasi-peak detector	0.15 - 0.50 MHz	79 dB μ V
	0.50 - 30.0 MHz	73 dB μ V

Limit using average detector	0.15 - 0.50 MHz	66 dB μ V
	0.50 - 30.0 MHz	60 dB μ V

Supply voltage 230 VAC.

Results The emission was within the specified limits.

Comments None.

4.2 Radiated electromagnetic field

Client	SELCO A/S	Sheets	See <i>Annex 4</i>
Item	D0900, D0400 and A0200/0300	Project no.	E502289-2
Manufacturer	SELCO A/S	Date	2004-07-14
Type	-	Sign.	PFN
Serial no.	-	Test site	Room 5
Test method(s)	EN 50263:1999 EN 55022+A1 Class A		
Temperature	23.1°C	Humidity	44.7% R.H.

Measuring distance	10 m	
Limit using quasi-peak detector	30 - 230 MHz:	40 dB μ V/m
	230 - 1000 MHz:	47 dB μ V/m

Supply voltage 230 VAC.

Results The emission was within the specified limits.

Comments None.

4.3 Mains harmonic current emission

	Requirements
Specification	EN 61000-3-2:2000
EUT Class	A

Equipment class	According to the specification, the test object is defined as Class A equipment.
Power consumption of test object	20 W (measured maximum).
Supply voltage	230 VAC.
Results	According to A14, Section 7, of the specification no limits apply to equipment with power consumption ≤ 75 W other than lighting equipment. According to information from the manufacturer the power consumption of this apparatus is below 20 W. Therefore, the test objects comply with the requirements without test.
Comments	None.

4.4 Induced mains voltage fluctuations and flicker

	Requirements
Specification	EN 61000-3-3:1995 + A1

Type of operation Continuous.

Power consumption of test object 20 W (measured maximum).

Power fluctuations Not measured.

Supply voltage 230 VAC.

Results According to Section 6 of the specification tests shall not be made on equipment which is unlikely to produce significant voltage fluctuations or flicker (including inrush current). According to the manufacturers information the rated power consumption of this equipment is below 20 W. Based upon DELTA's experience and experimental results, this power value is too low to produce significant voltage fluctuations or flicker. Therefore, the test objects comply with the requirements without test.

Comments None.

Annex 1

List of instruments

(1 page)

NO.	DESCRIPTION	MANUFACTURER	TYPE NO.
29337	ARTIFICIAL MAINS NETWORK	ROHDE & SCHWARZ	ESH2-Z5
29680	IMPULSE VOLTAGE LIMITER	ROHDE & SCHWARZ	ESH3/Z2
29797	BILOG ANTENNA, 30-1000 MHz	CHASE ELECTRICS LTD	CBL 6111A
29861	EMI-SOFTWARE Ver. 1.60	ROHDE & SCHWARZ	ES-K1, PART: 1026.6790.02
29916	AUTOMATIC TEST RECEIVER, 9 kHz - 2.75 GHz	ROHDE & SCHWARZ	ESCS 30 1102.4500.30

Annex 2
Photos
(2 pages)



Photo A2.1 AC mains conducted emission.



Photo A2.2 AC mains conducted emission.



Photo A2.3 Radiated emission.



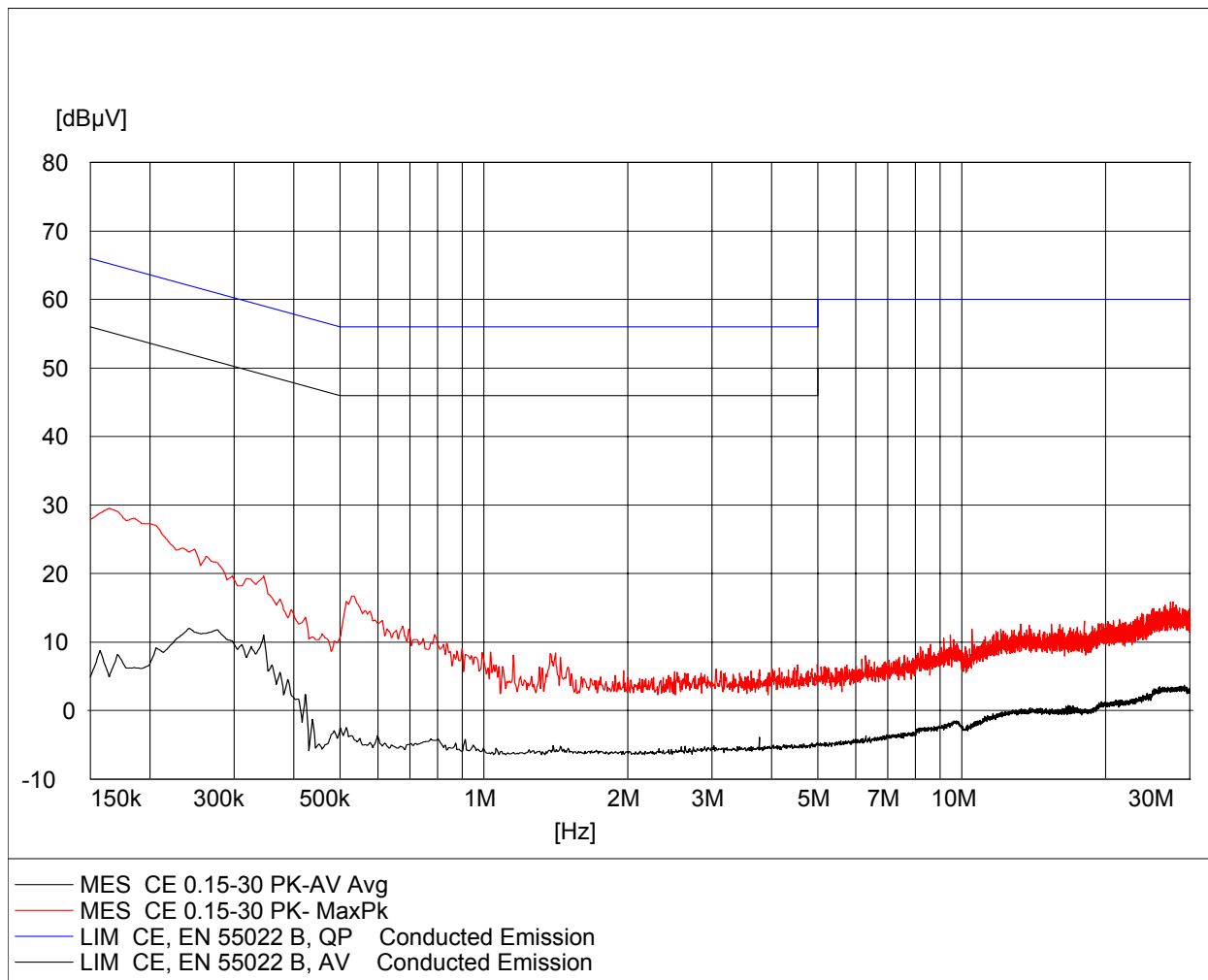
Photo A2.3 Radiated emission.

Annex 3

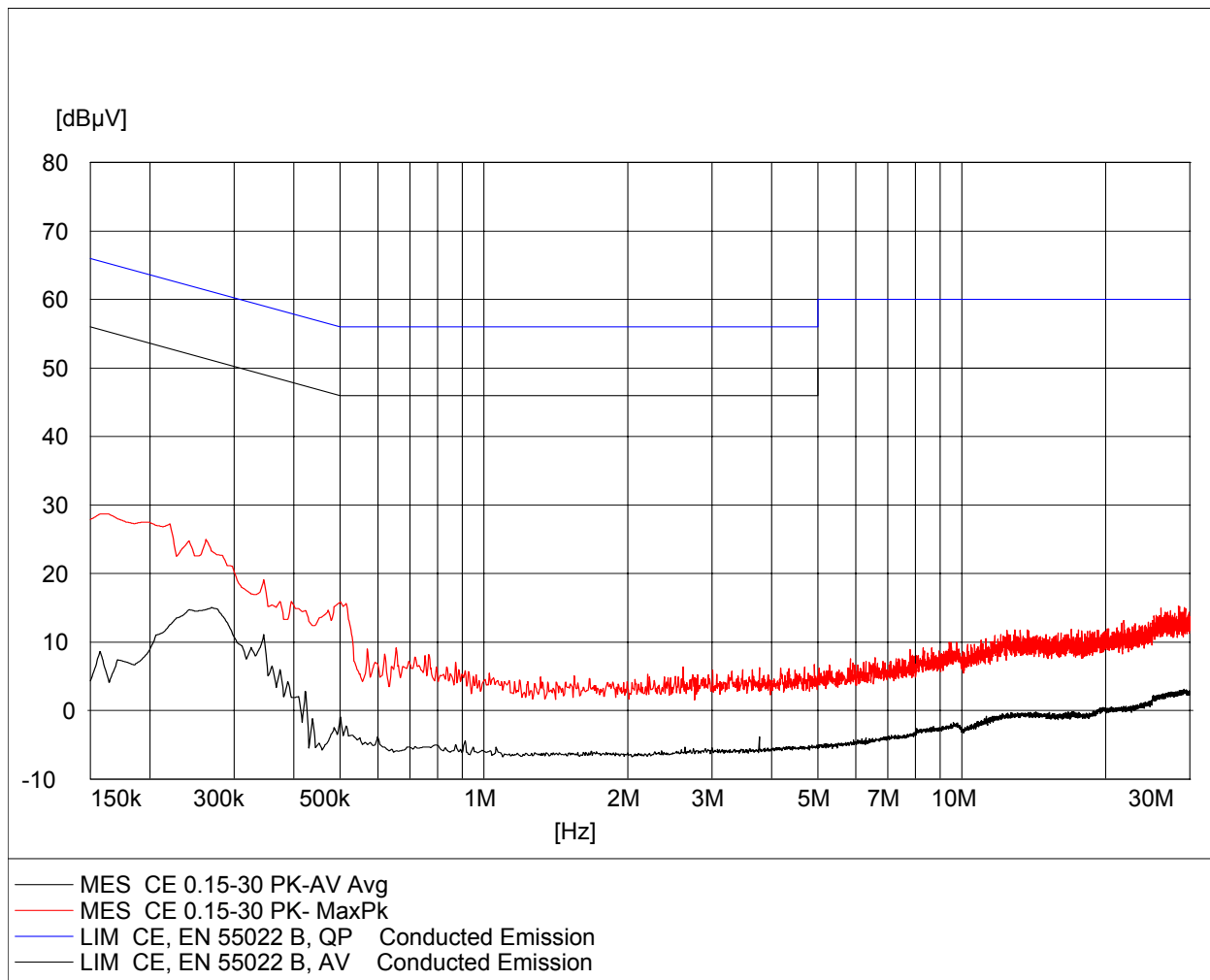
**Test record sheets regarding measurements of
AC mains conducted emission**

(2 pages)

EUT: D0900, D0400 and A0200/0300
Manufacturer: SELCO A/S
Operating Condition: Neutral 0.15 - 30 MHz
Test Site: EMC-5
Operator: Proj no.: E502289 - PFN
Test Specification: EN 50263:1999
Comment: Sheet 4



EUT: D0900, D0400 and A0200/0300
Manufacturer: SELCO
Operating Condition: Line 0.15 - 30 MHz
Test Site: EMC-5
Operator: Proj no.: E502289 - PFN
Test Specification: EN 50263:1999
Comment: Sheet 5

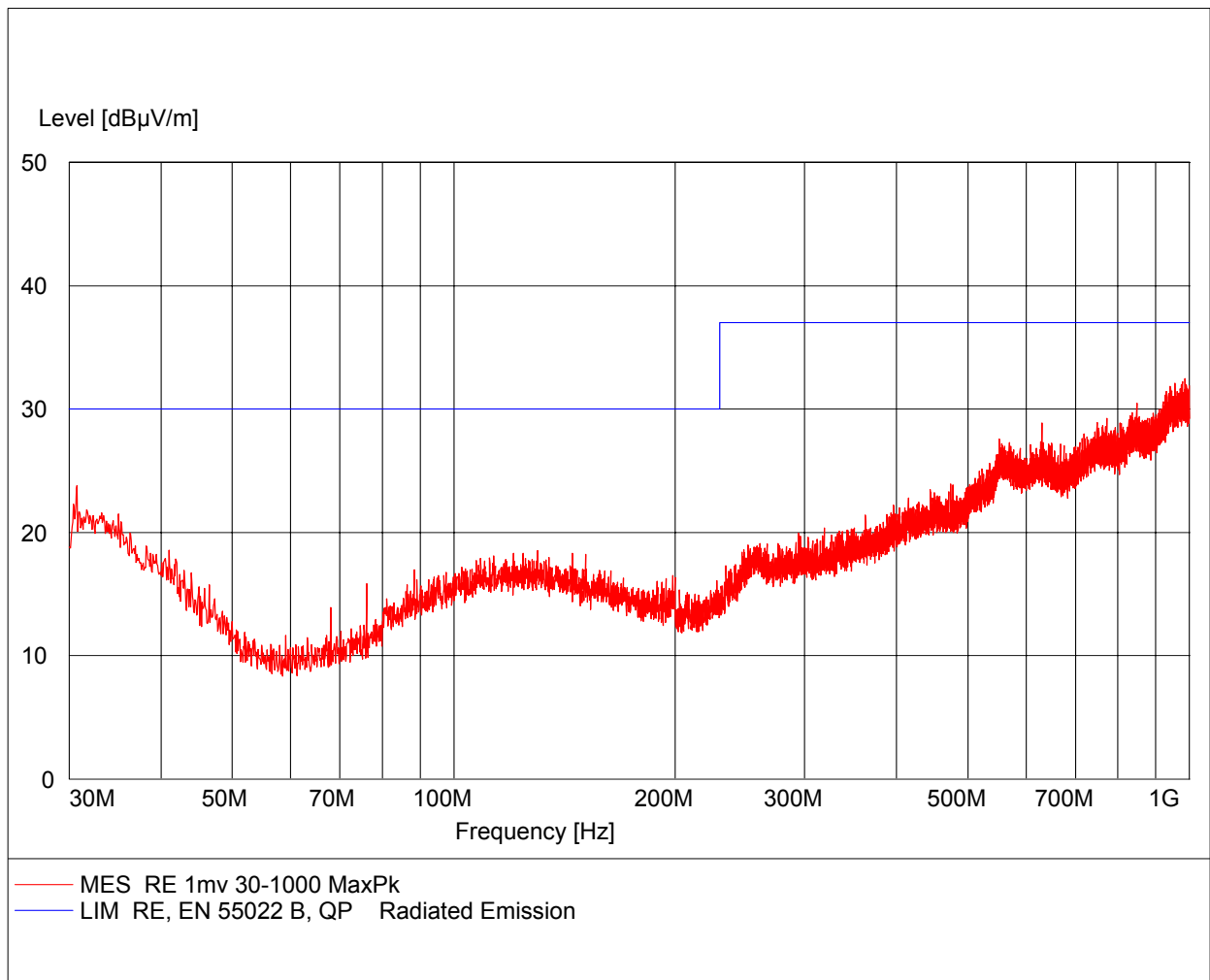


Annex 4

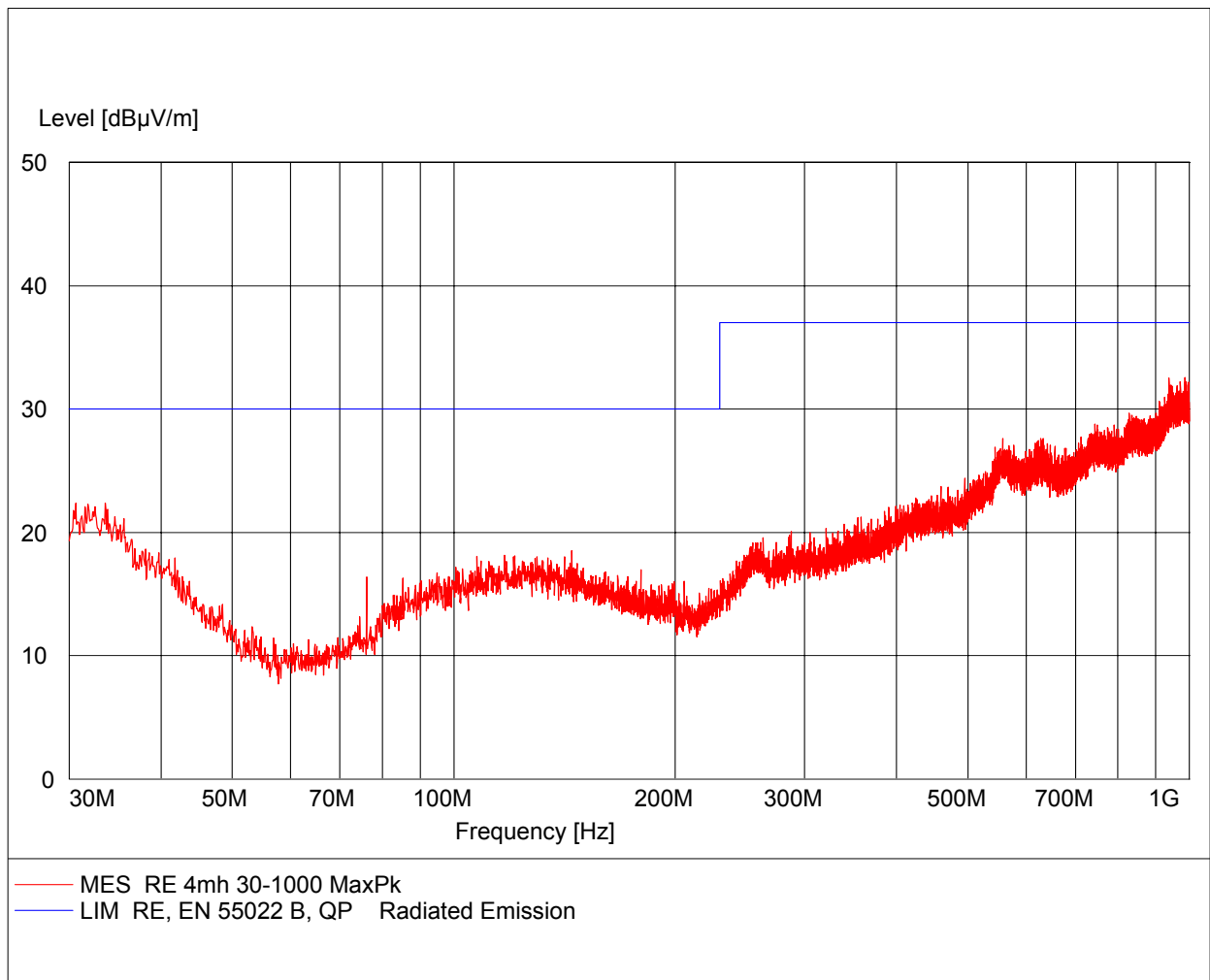
**Test record sheets regarding measurements of
radiated electromagnetic field**

(4 pages)

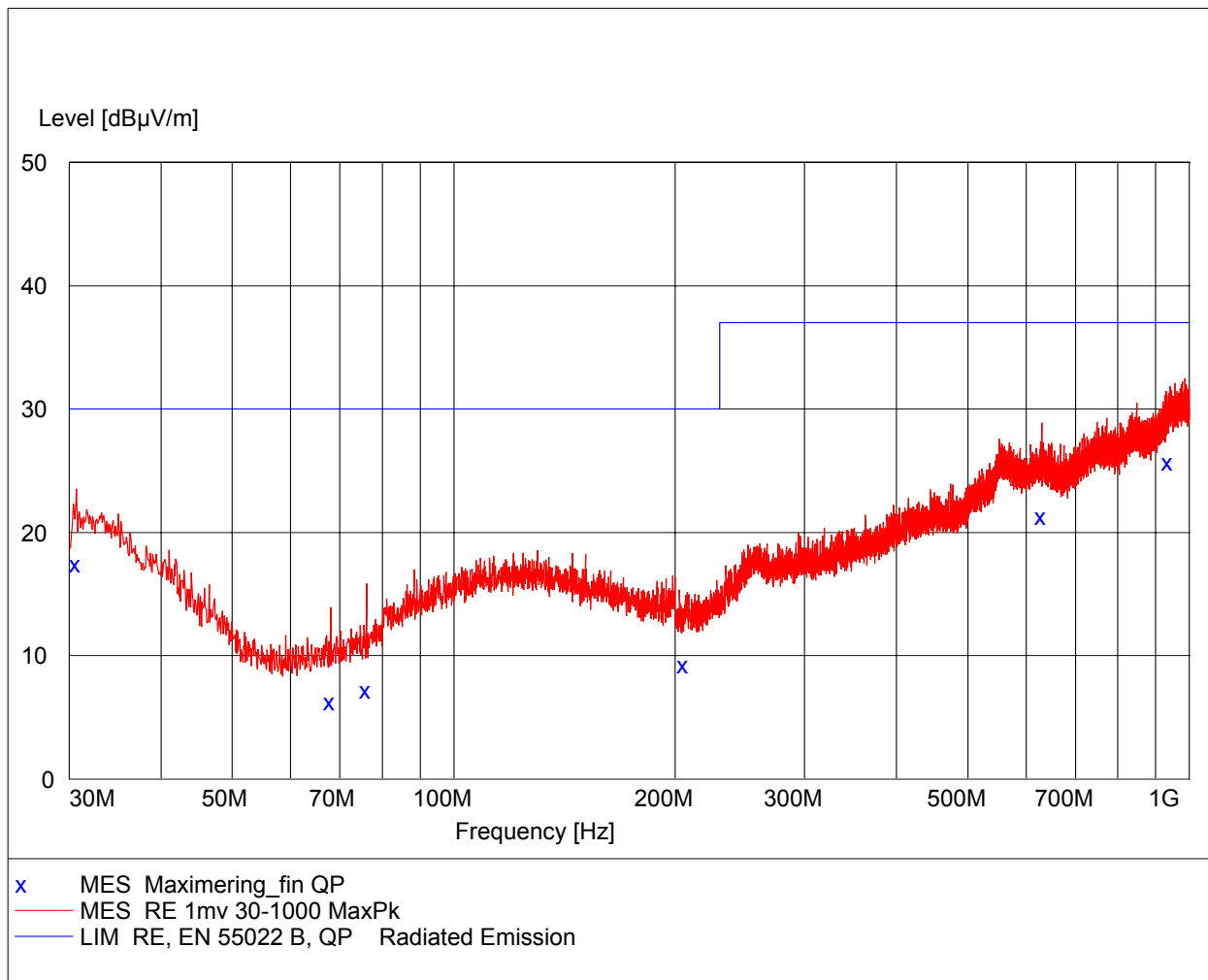
EUT: D0900, D0400 and A0200/0300
Manufacturer: SELCO A/S
Operating Condition: Ant: 1 m vertical
Test Site: EMC-5
Operator: Proj no.: E502289 - PFN
Test Specification: EN 50263:1999
Comment: Sheet 1



EUT: D0900, D0400 and A0200/0300
Manufacturer: SELCO A/S
Operating Condition: Ant: 4 m horizontal
Test Site: EMC-5
Operator: Proj no.: E502289 - PFN
Test Specification: EN 50263:1999
Comment: Sheet 2



EUT: D0900, D0400 and A0200/0300
 Manufacturer: SELCO A/S
 Operating Condition: Maximizing
 Test Site: EMC-5
 Operator: Proj no.: E502289 - PFN
 Test Specification: EN 50263:1999
 Comment: Sheet 3



MEASUREMENT RESULT: "Maximizing_fin QP"

14-07-2004 12:04

Frequency MHz	Level dBµV/m	Transd. dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg.	Polarisation
30.70	17.40	19.40	30.00	12.60	180.00	76.00	Vertical
68.00	6.30	7.30	30.00	23.70	400.00	187.00	Vertical
76.10	7.20	8.50	30.00	22.80	119.00	207.00	Vertical
205.80	9.20	10.90	30.00	20.80	173.00	270.00	Horizontal
630.00	21.30	23.40	37.00	15.70	363.00	33.00	Vertical
937.70	25.70	27.90	37.00	11.30	365.00	166.00	Vertical