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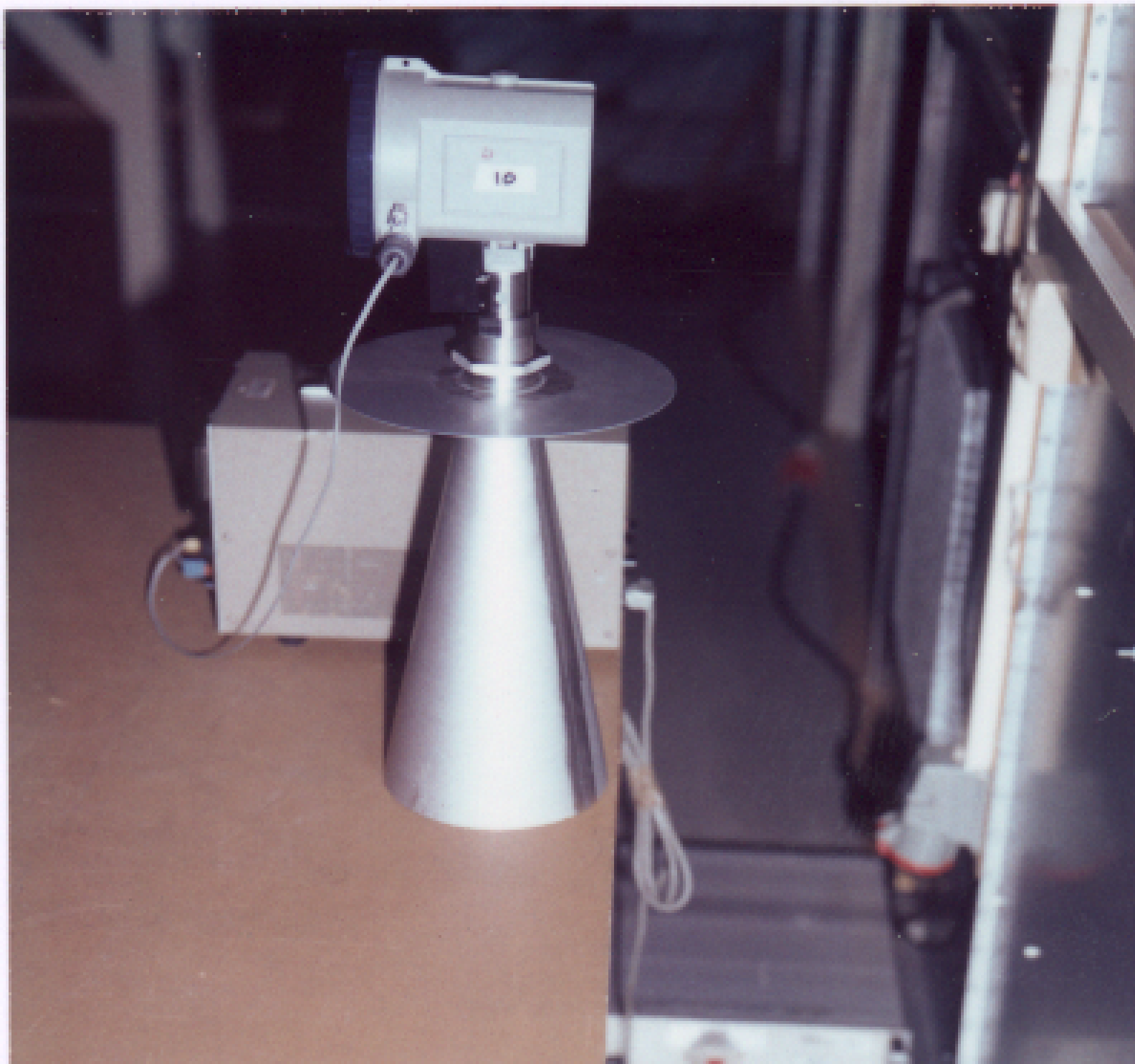
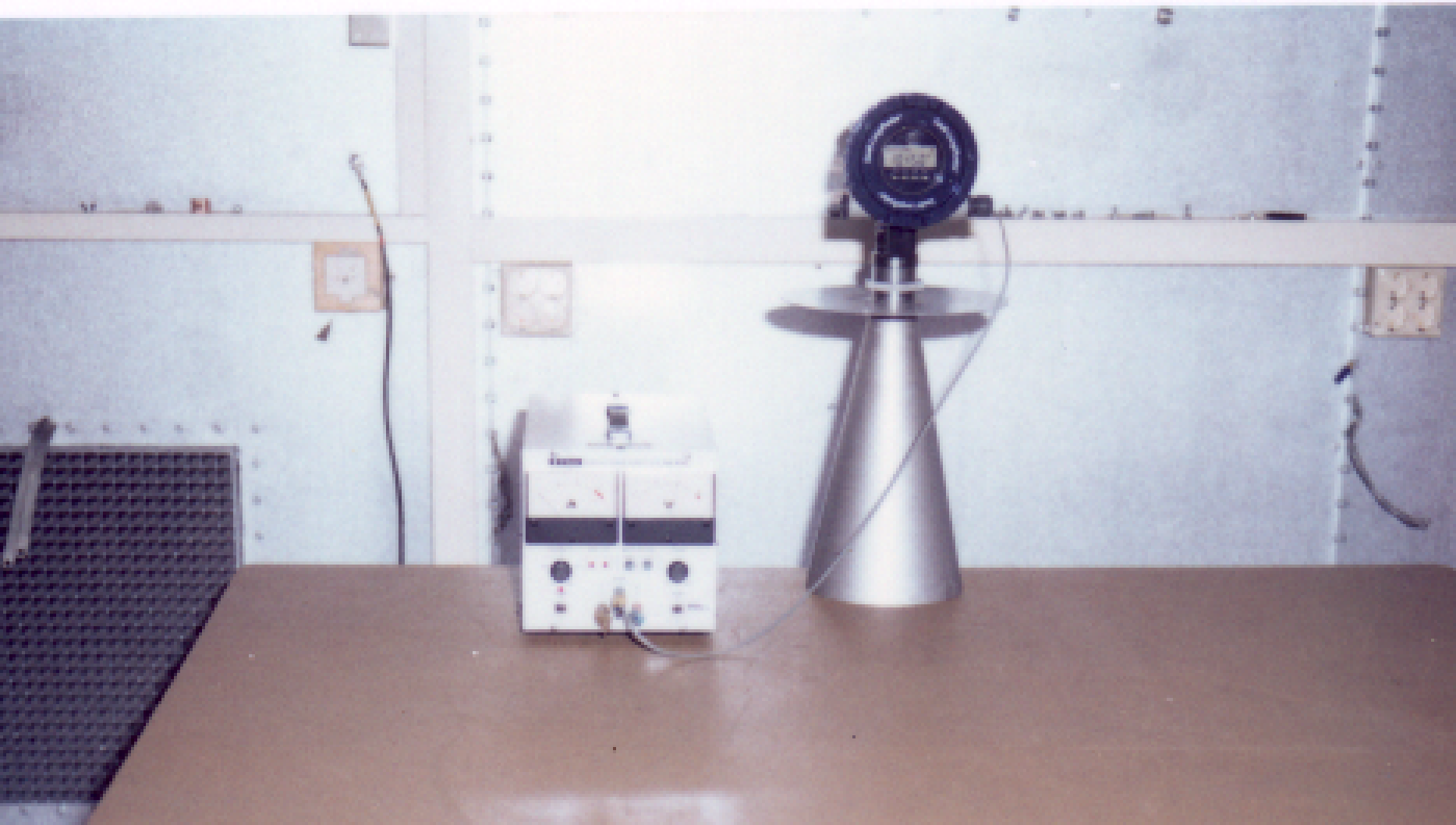
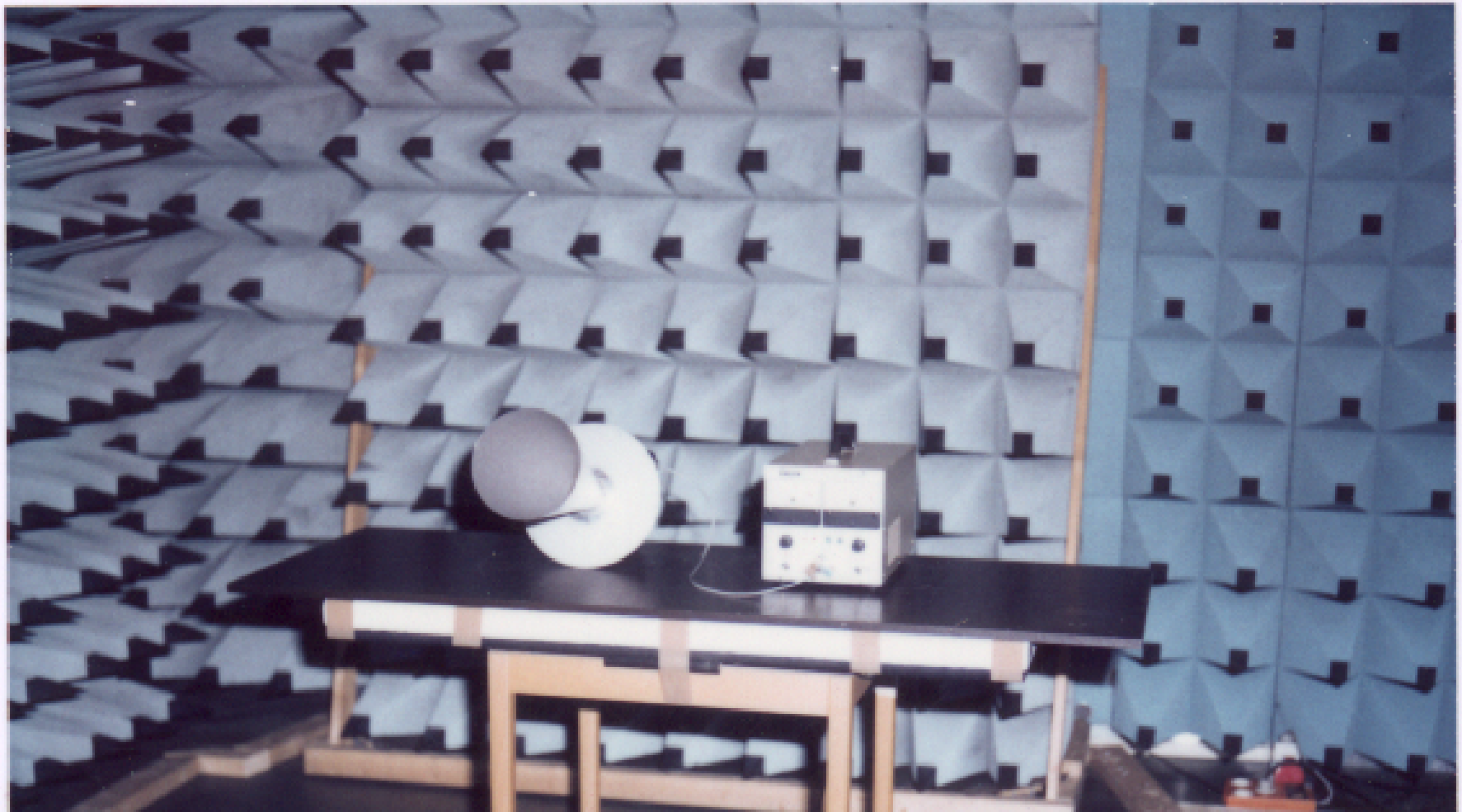
Test set-up, Conducted Emission



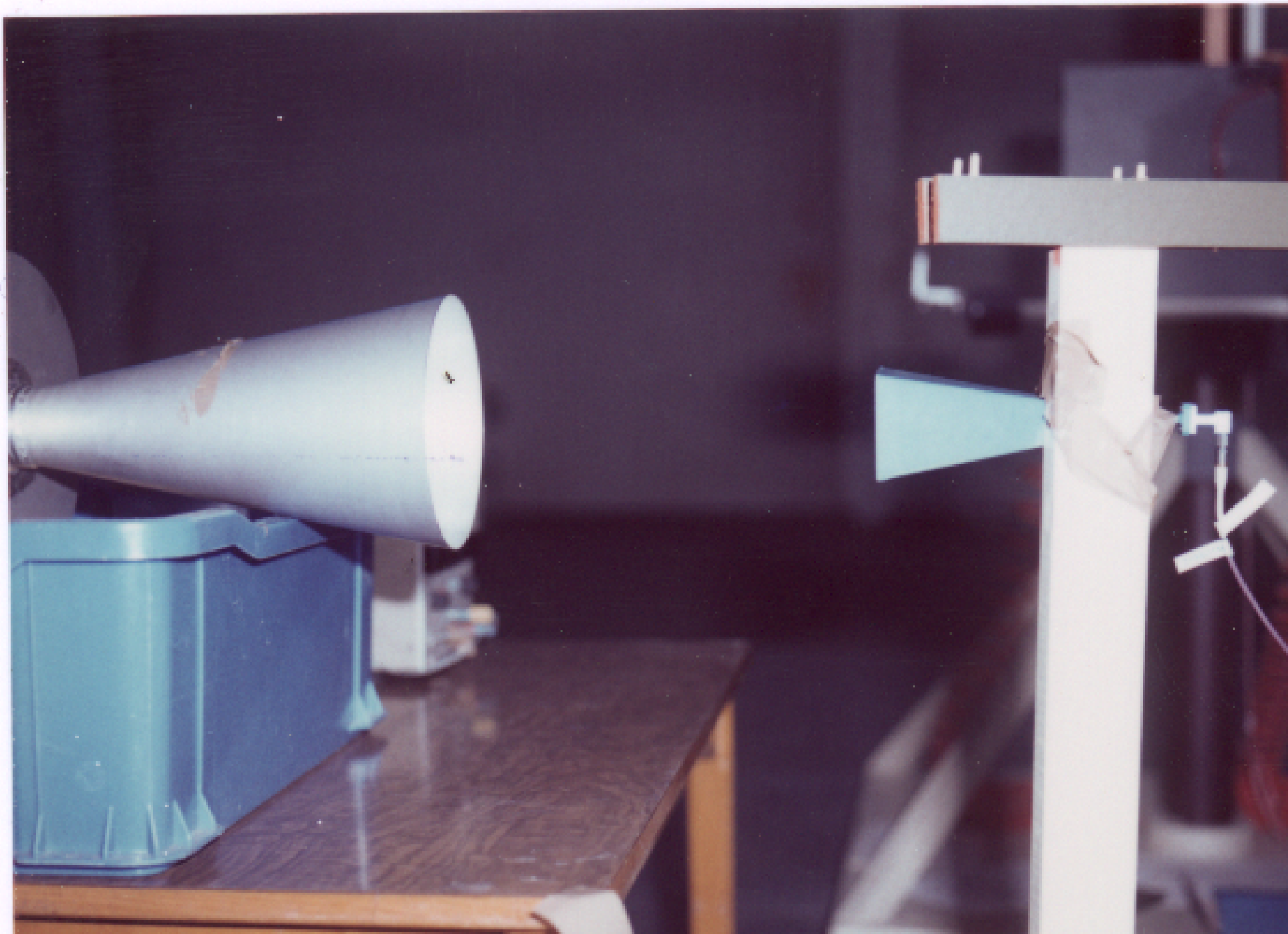
Test set-up, Conducted Emission



Test set-up, Pretest of Radiated Emission 30 - 1000 MHz



Radiated emission, check of harmonics



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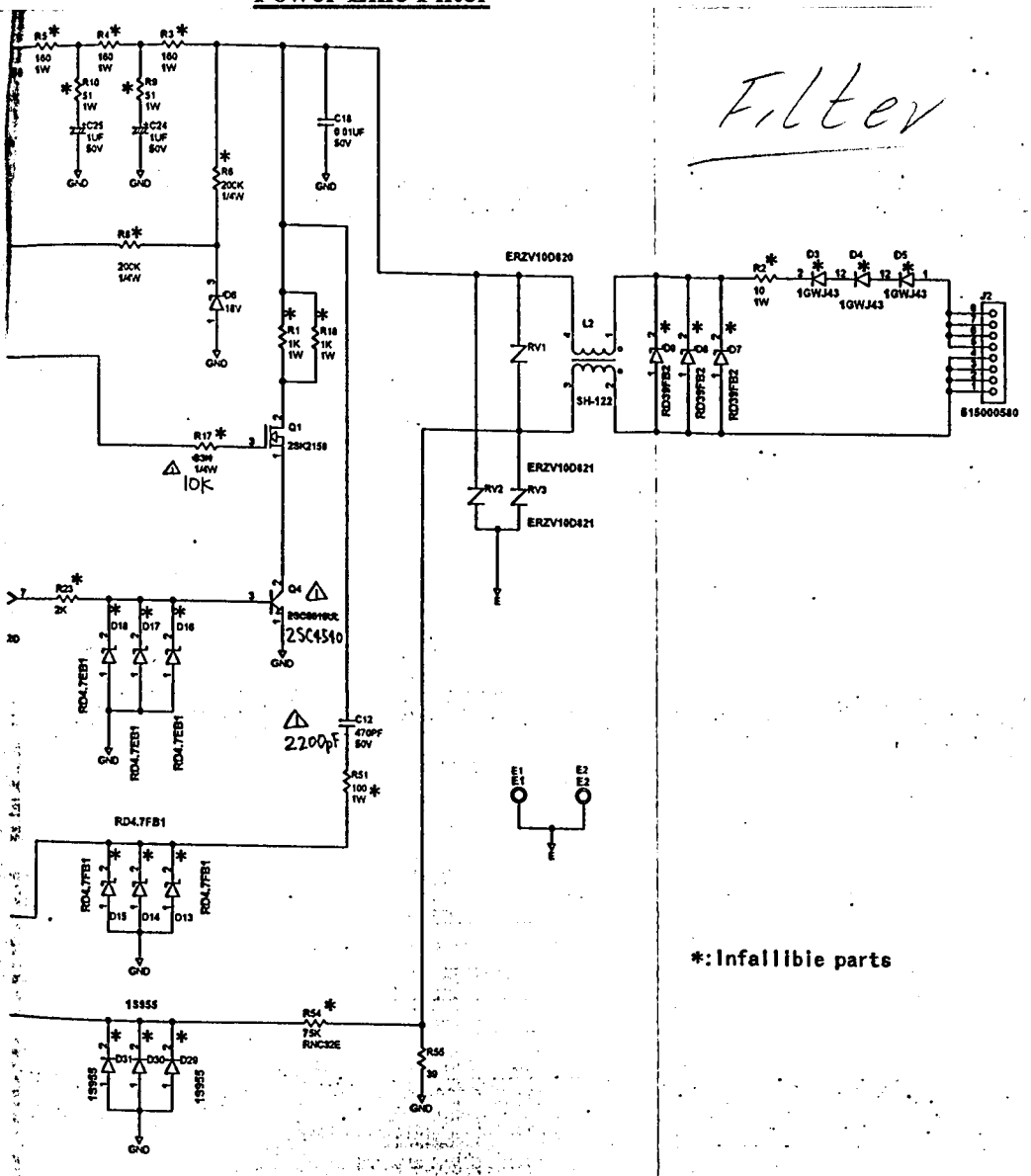
Power Line Filter

Filter



MARK	日付 DATE	変更項目 REVISION	担当 SIGN
△	- -		
△	-		
△	- -		
1	99-9-18	3 parts.	T.Kinoshita

記事 NOTE

サイズ SIZE B

TOKIMEC
株式会社トキメック TOKIMEC INC.

CHK-10 CIRCUIT DIAGRAM

製図 DRAWN BY	設計 CHARGED BY	検図 CHECKED BY	承認 APPROVED BY
T.Kinoshita	T.Kinoshita	T.Takatsuki	H. Kobayashi

尺度 SCALE	図面番号 DRAWING NO.	REV	SHT
1/	51509908	2	1/2
日付 DATE 1999-8-20			

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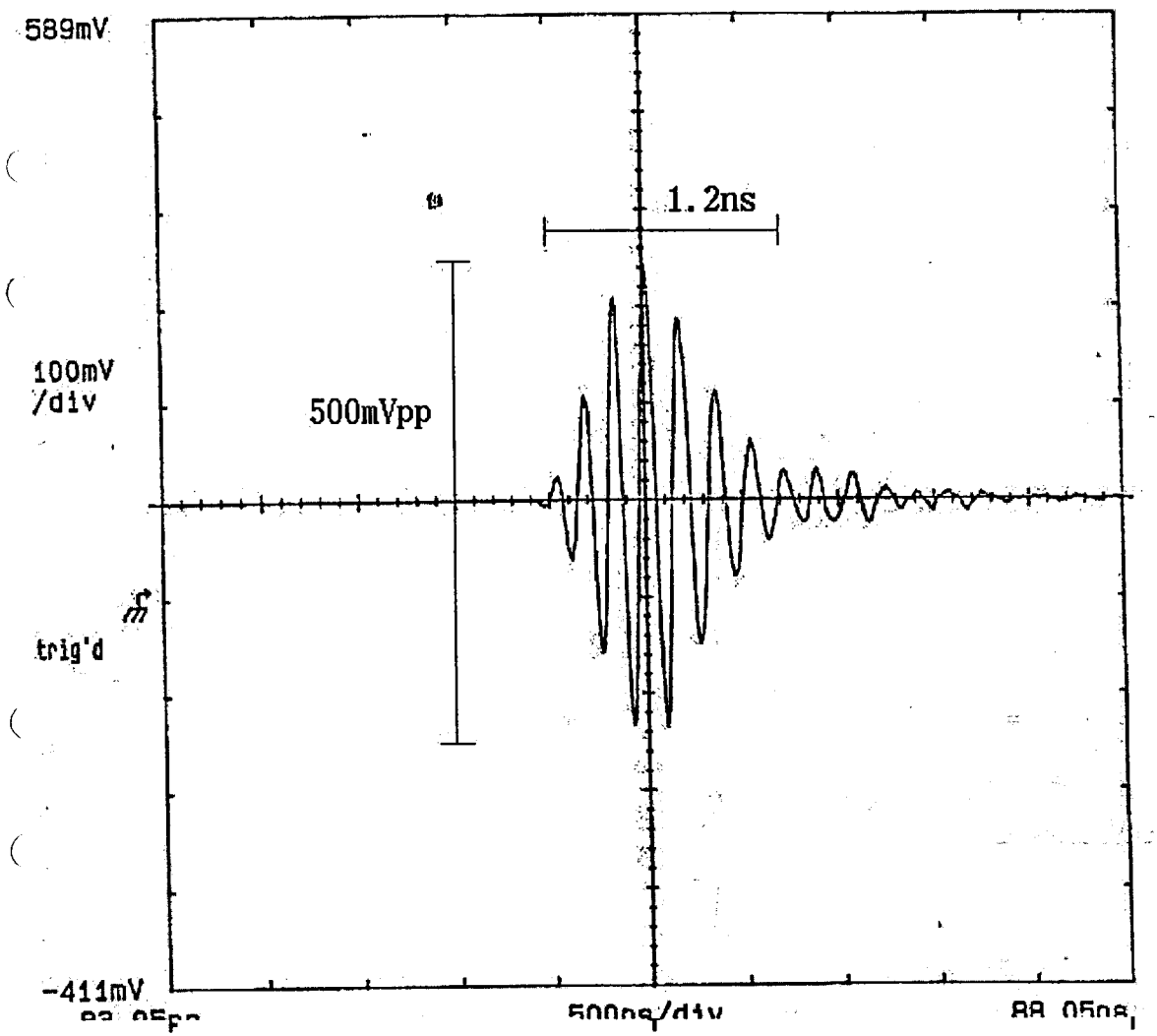
Radar pulse data



77.

Saab Marine Electronics AB
Conducted Emission Test

Start of Test: 14.MAR'00 . 13:51

E.u.T.: Saab Loopradar pre s/n: 10

Oper. Condition: With 6 ' horn. (Unshielded pow. cable)

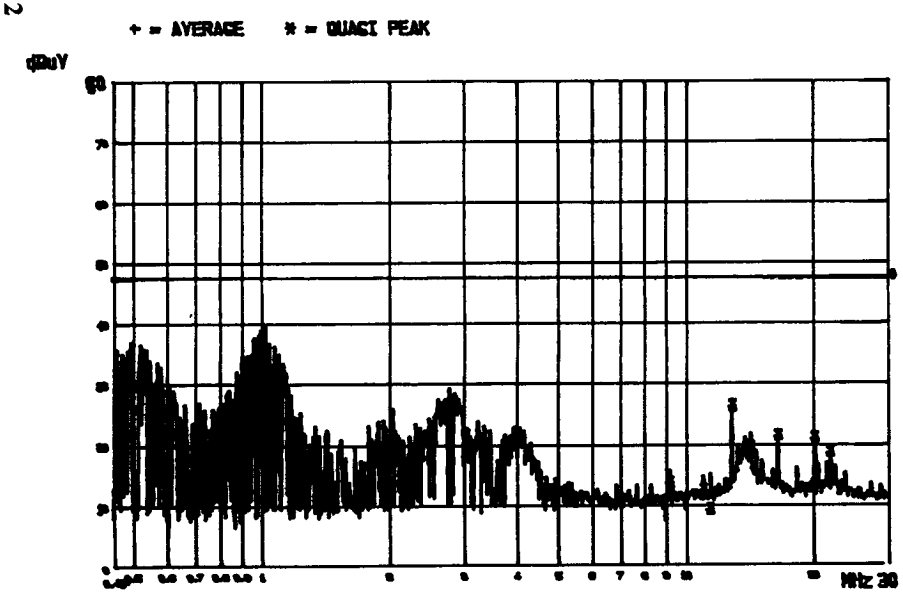
Operator: BO GIDLOEW

Test Spec:
FCC Part 15, Subpart C. Conducted RFI

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Display Mode	Att. dB	Transducer type
0.4500	30.0000	10.00	Max Hold	0	NSLK

Frequency MHz	Average dBuV	AV-Margin dBuV	Quasi	Peak dBuV	QP-Margin dBuV
0.4894	-	-		29.2	-16.7
0.4962	6.2	-41.8		29.5	-16.4
0.5224	-	-		29.9	-16.1
0.5324	-	-		29.6	-16.4
0.9672	-	-		31.2	-15.8
0.9901	-	-		33.1	-14.9
1.0041	-	-		33.4	-14.6
1.0276	-	-		33.2	-14.8
1.0471	-	-		32.2	-15.8
9.2176	-	-		13.6	-34.4
11.0614	-	-		12.6	-35.4
11.5221	-	-		9.4	-38.6
12.9048	-	-		26.5	-21.5
14.2672	-	-		19.8	-28.2
16.5917	-	-		21.7	-26.3
20.2768	-	-		21.2	-26.8
22.1224	-	-		18.8	-29.2

* Limit exceeded



CONDUCTED EMISSION ON 115 V ac, neutral terminal

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Saab Marine Electronics AB
Radiated Emission Pretest

no list available

Start of Test: 14.MAR'00 . 10:24

E.u.T.: Saab Looprader pre s/n: 10

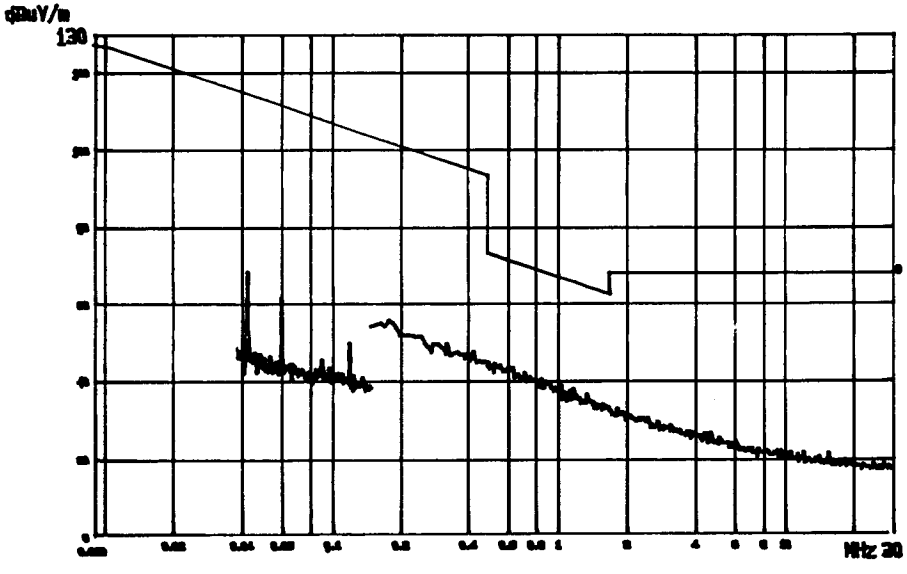
Oper. Condition: With 6 ' horn. (Unshielded pow. cable)

Operator: RO GIDLOEW

Test Spec:
Pretest with 6502, FCC Part 15 Subp. C 0.009 - 30 MHz @ 3 m.

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Detector	Att. dB	Meas.T. s	Transd. type
0.0090	0.1499	0.2	Peak	LD	0.005	LOOP
0.1500	20.0000	10	Peak	LN	0.005	LOOP

13



PRELIMINARY PEAK SPECTRUM SIGNATURE (NOT FINAL TEST)

Saab Marine Electronics AB
Radiated Emission Pretest

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Detector	Att. dB	Meas.T. s	Transd. type
30.0000	299.9999	120	Peak	LN	0.020	~~Loop~~ EM6912

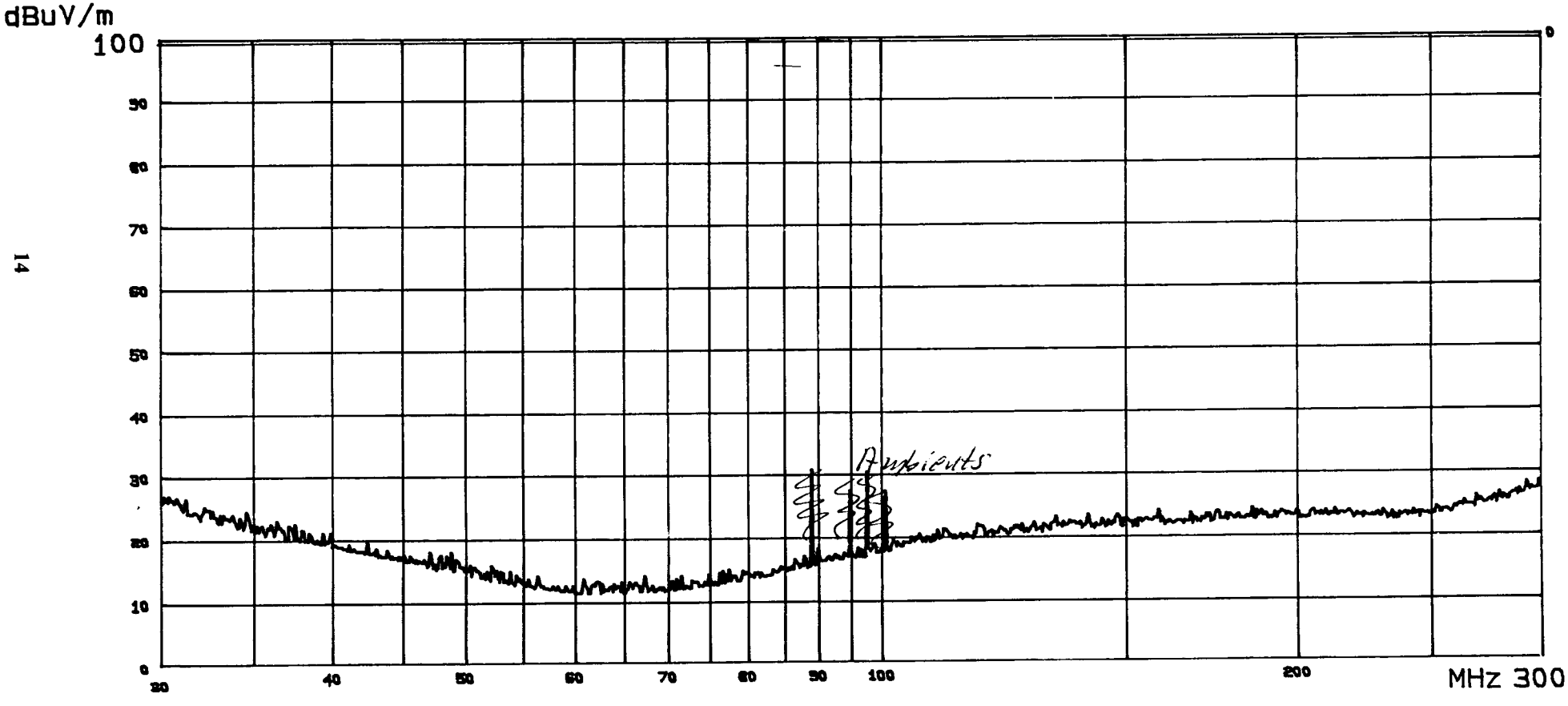
Start of Test: 14.MAR'00 . 11:31

E.u.T.: Saab Loopradar pre s/n: 10

Oper. Condition: With 6 ' horn. (Unshielded pow. cable)

Operator: BO GIDLOEW

Test Spec:
Pretest executed with EM-ant.in anechoic chamber. 30-300 MHz



PRELIMINARY PEAK SPECTRUM SIGNATURE (NOT FINAL TEST) VP

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Saab Marine Electronics AB
Radiated Emission Pretest

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Detector	Att. dB	Meas.T. s	Trained type
30.0000	299.9999	120	PeaK	LN	0.020	~~LOOP~~ EM6982

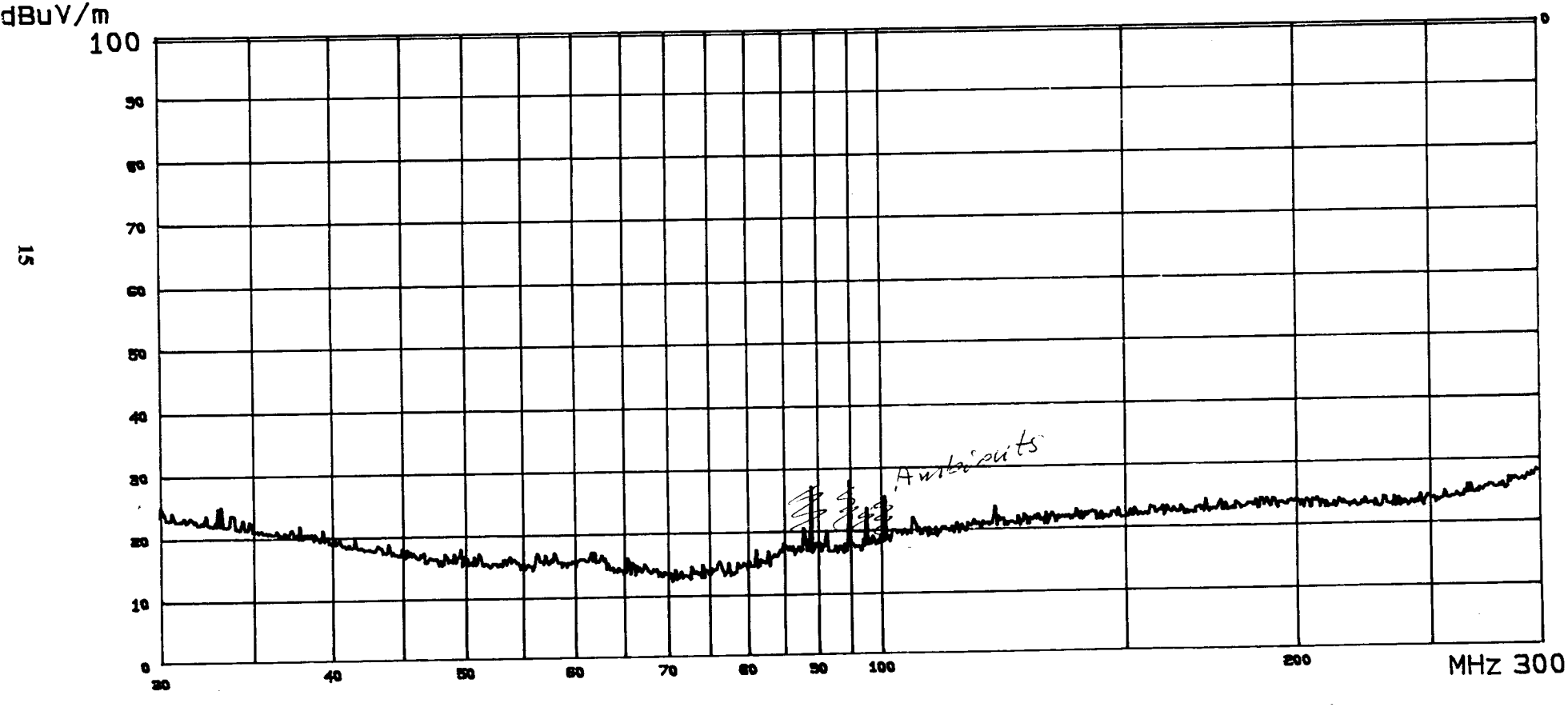
Start of Test: 14.MAR'00 . 11:31

E.U.T.: Saab Loopradar pre s/n: 10

Oper. Condition: With 6 ' horn. (Unshielded pow. cable)

Operator: BO GIDLOEW

Test Spec:
Pretest executed with EM-ant.in anechoic chamber. 30-300 MHz



PRELIMINARY PEAK SPECTRUM SIGNATURE (NOT FINAL TEST) HP

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Saab Marine Electronics AB
Radiated Emission Pretest

Start Fr. MHz	Stop Fr. MHz	IF-BW kHz	Detector	Att. dB	Meas.T. s	Transd. type
200.0000	1000.0000	120	Peak	LN	0.020	EM6950

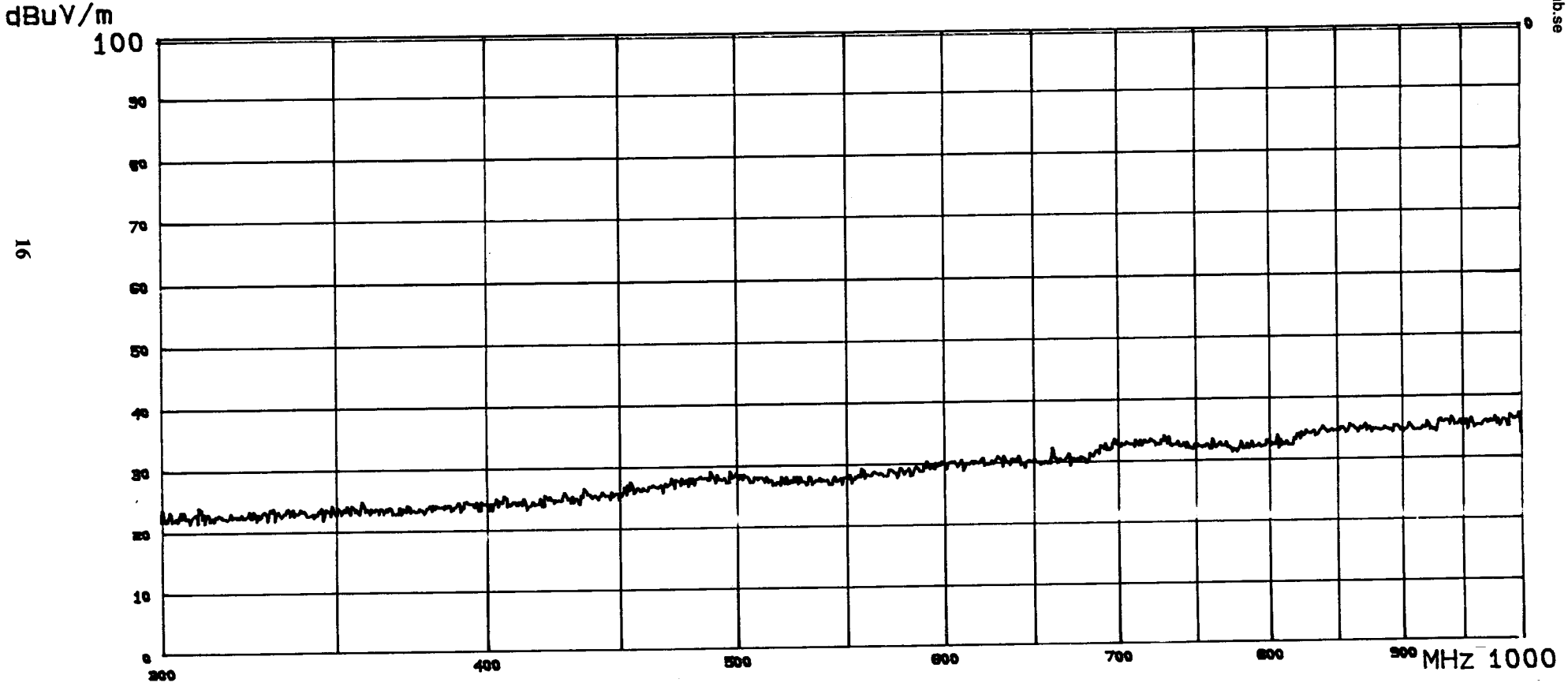
Start of Test: 14.MAR'00 . 11:54

E.u.T.: Saab Loopradar pre s/n: 10

Oper. Condition: With 6 ' horn. (Unshielded pow. cable)

Operator: BO GIDLOEW

Test Spec:
Pretest executed with EM-ant.in anechoic chamber. 0.2-1 GHz



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Saab Marine Electronics AB
Radiated Emission Pretest

Start Fr. MHz	Stop Fr. MHz	IF-BW KHz	Detector	Att. dB	Meas.T. s	Transd. type
200.0000	1000.0000	120	Peak	LN	0.020	EM6950

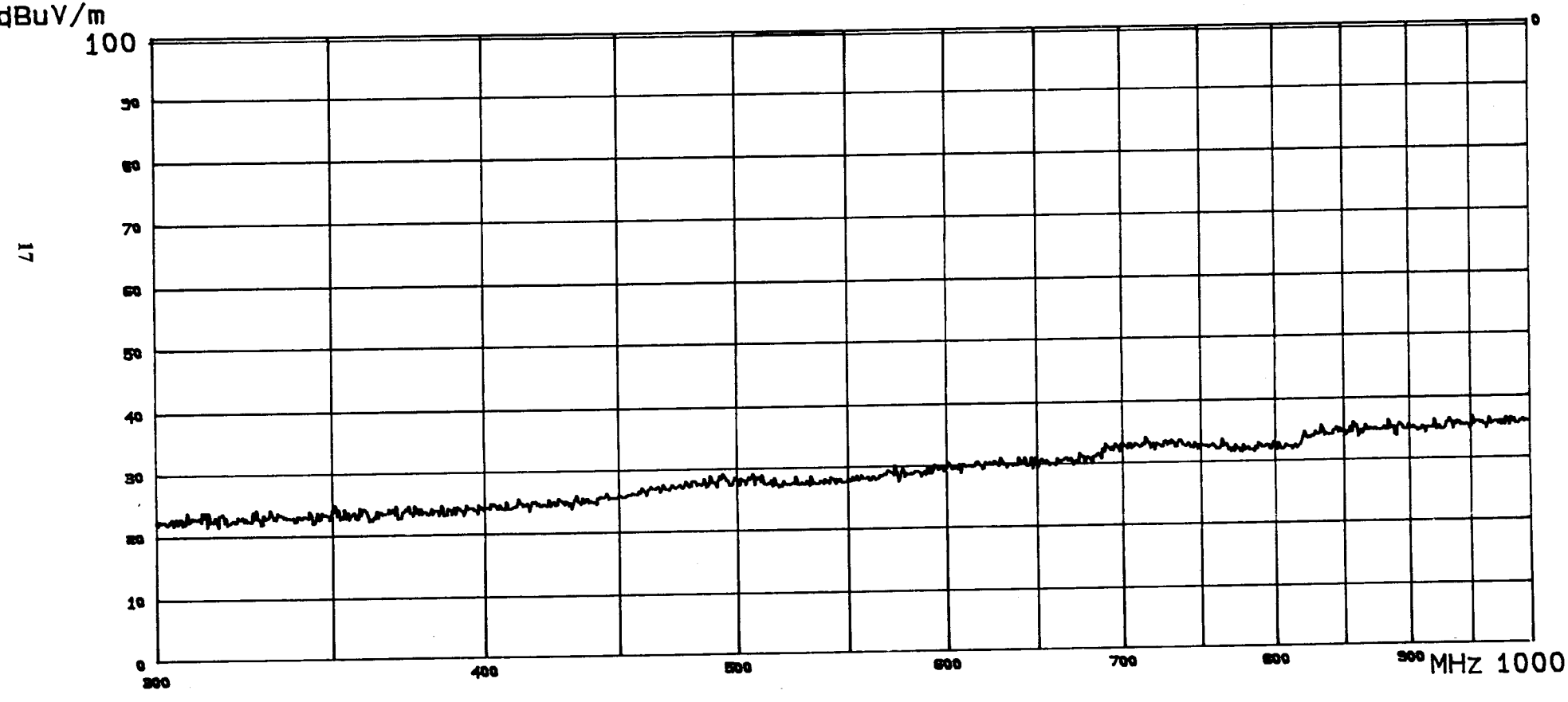
Start of Test: 14.MAR'00 . 11:54

E.u.T.: Saab Loopradar pre s/n: 10

Oper. Condition: With 6 ° horn. (Unshielded pow. cable)

Operator: BO GIDLOEW

Test Spec:
Pretest executed with EM-ant.in anechoic chamber. 0.3-1 GHz



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Radiated Fieldstrength Test. Calculation of Final Emission Levels

EUT: Radar Level Gauge. Model Saab Loopradar, s/n 010.

Test spec.: 47 Cfr Ch. 1 (10-1-99 Edition), Part 15:
- Subpart B, Class B.
- Subpart C, Field Disturbance Sensor.
Radiated emission, Open Area Test Site
3 m antenna distance.

Date: March 14 - 15, 2000

Operation: Normal operating conditions

Field strength (dBuV/m) = Amplitude (dBuV) + Antenna factor (dB/m) + cable loss (dB)

Tested frequency range: 30 - 1000 MHz

Measured quasi-peak values.

Freq.	App.	Ampl	Cable loss	Ant fact	Field streng.	Limit	Dist	Mar-gin	Ant. height	Ant. pola r
MHz	No	dBuV	dB	dB/m	dBuV/m	dBuV/m	m	dB	m	v/h
33.18	12	13.9	1.3	17.7	32.9		3	- 6.1	1.0	v
44.24	12	15.6	1.6	13.7	30.9		3	- 8.1	1.0	v
196.60	12	16.9	3.8	16.5	37.2		3	- 6.2	1.0	v
233.47	12	17.5	4.1	17.3	38.9		3	- 7.5	3.2	h
239.61	12	16.4	4.2	17.4	38.0		3	- 8.4	2.2	h
245.76	12	21.8	4.2	17.5	43.5		3	- 2.9	2.6	v
307.20	12	16.5	4.6	16.1	37.2		3	- 9.2	3.6	h
344.06	12	19.0	5.0	16.3	40.3		3	- 6.1	3.1	h

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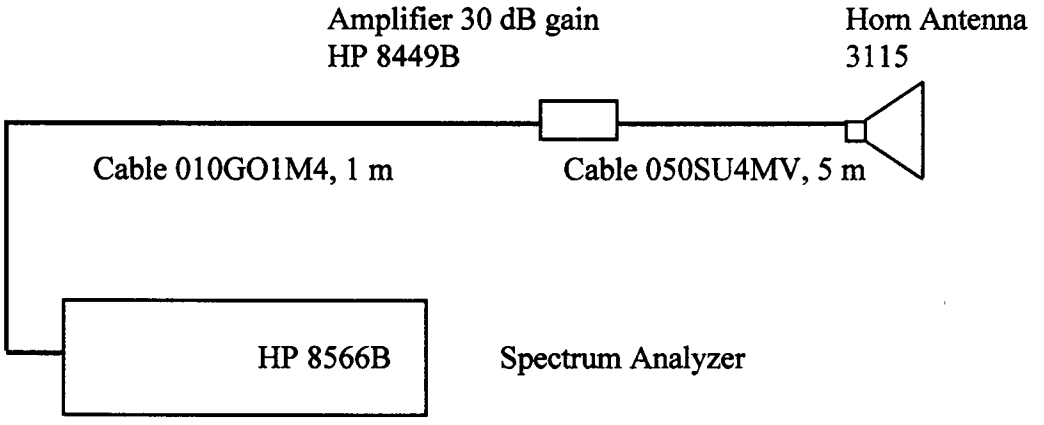
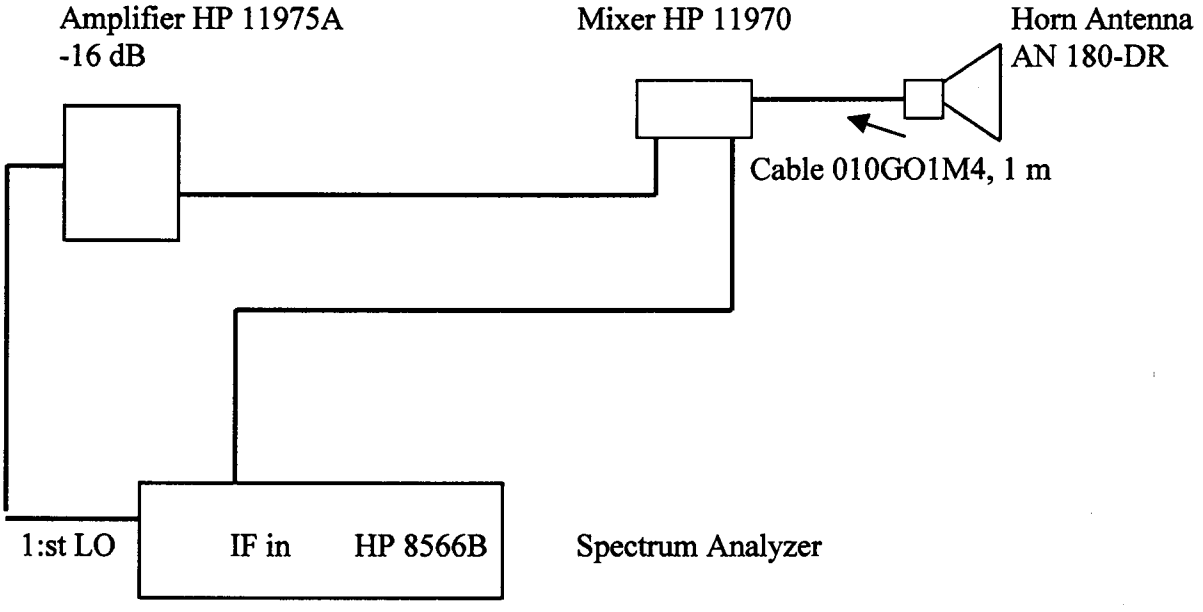
Test equipment set-up

1 - 18 GHz:



18 - 40 GHz:



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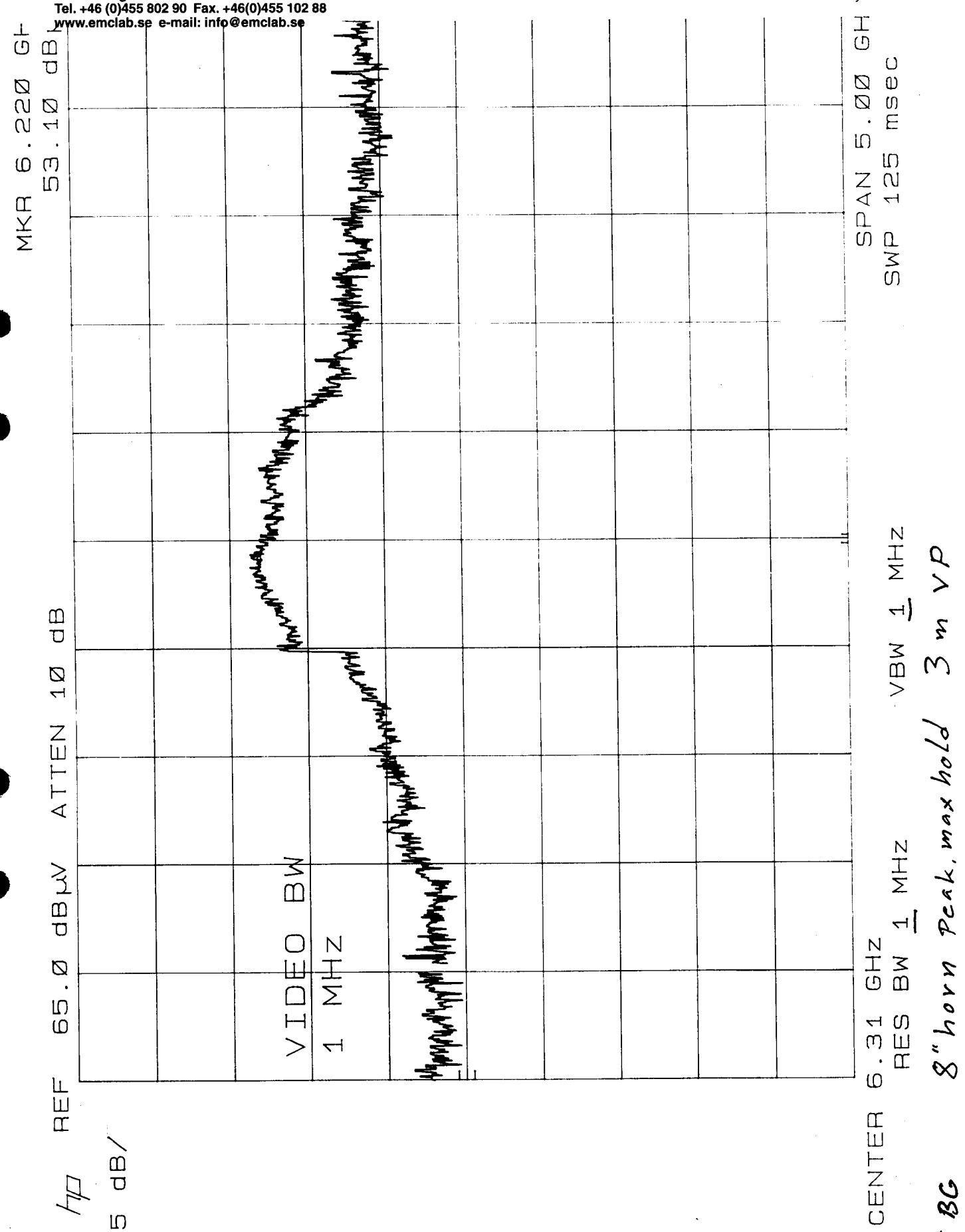

8" horn Peak, max hold 3 m VP

000315 BG

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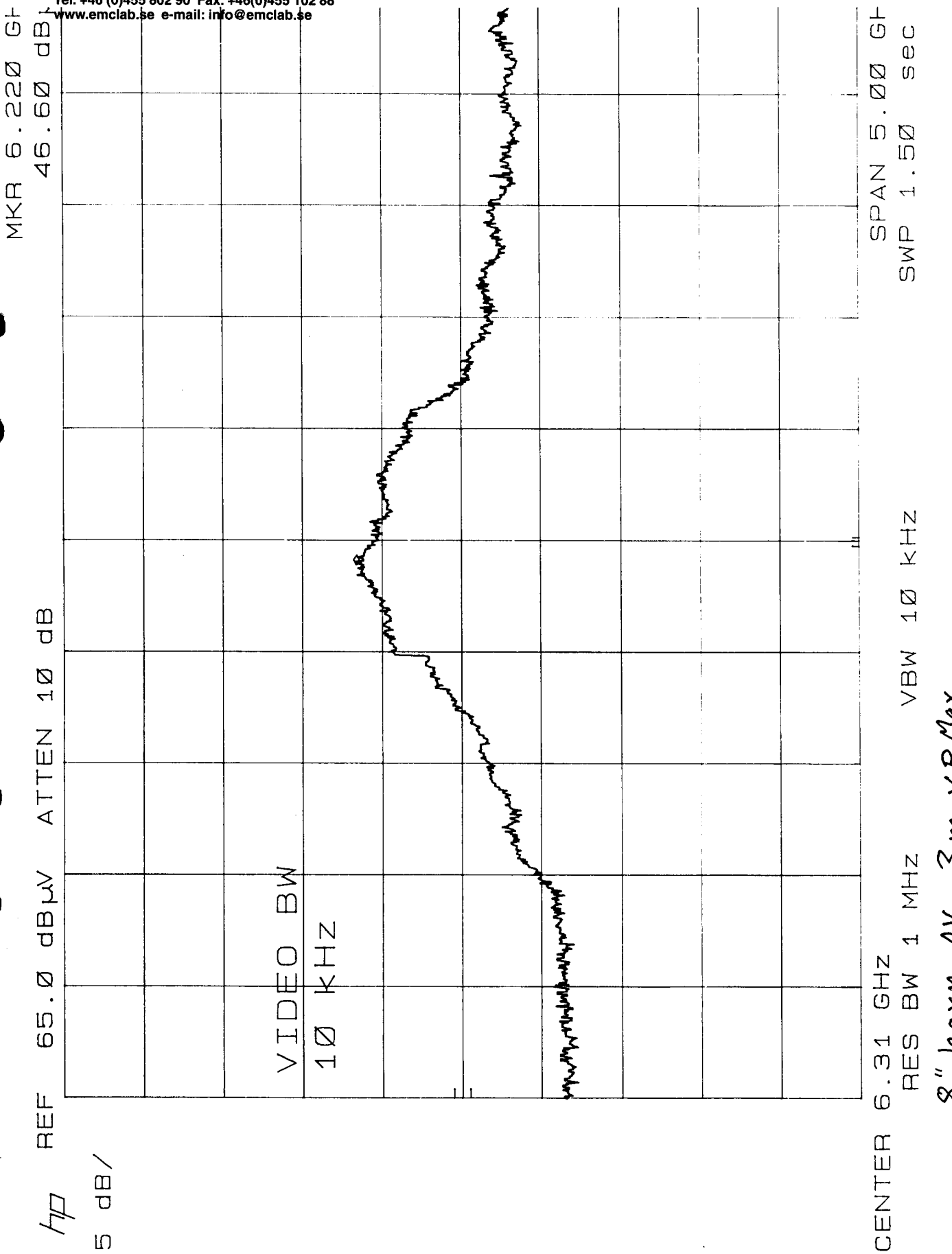

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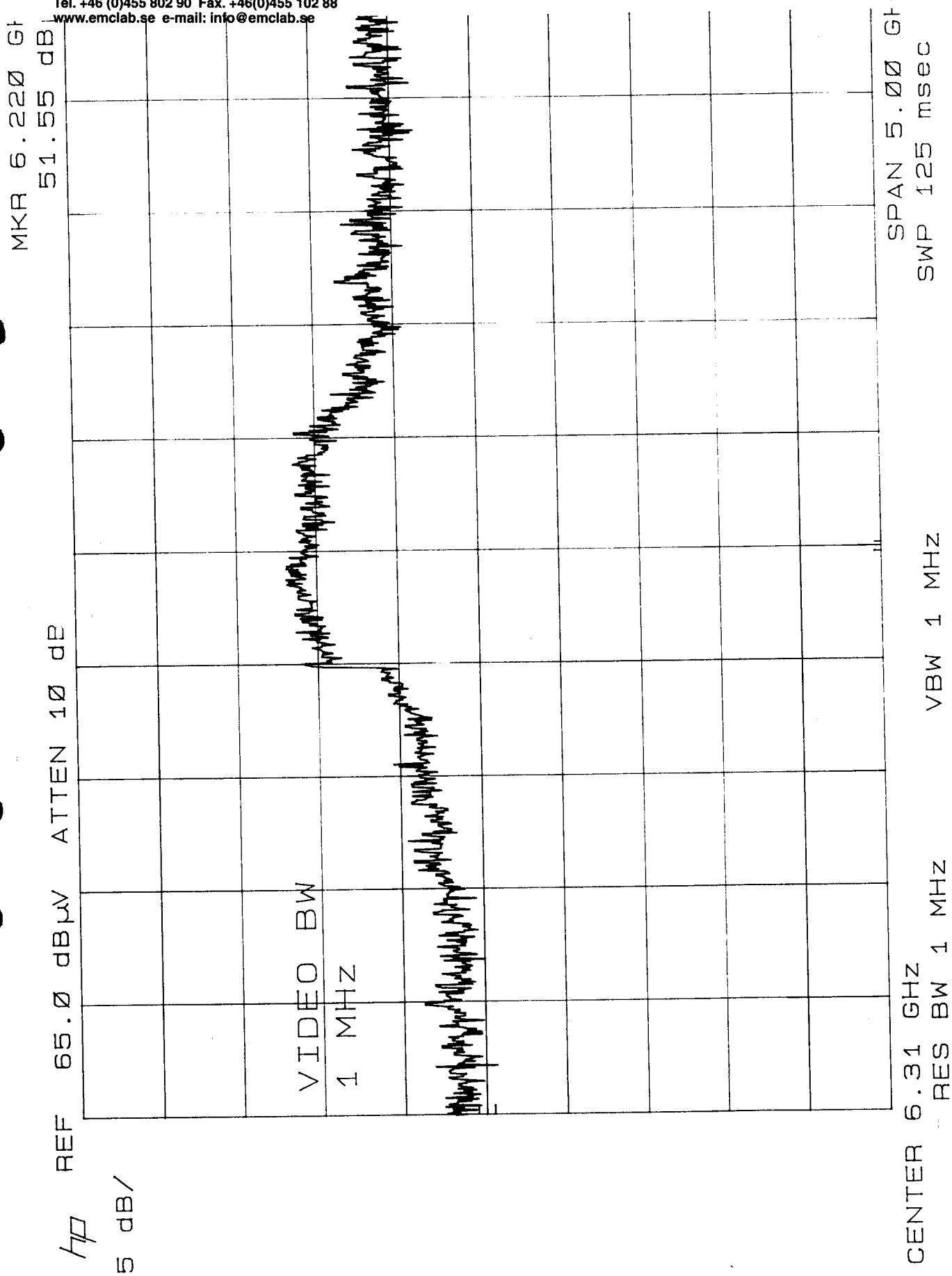

22.

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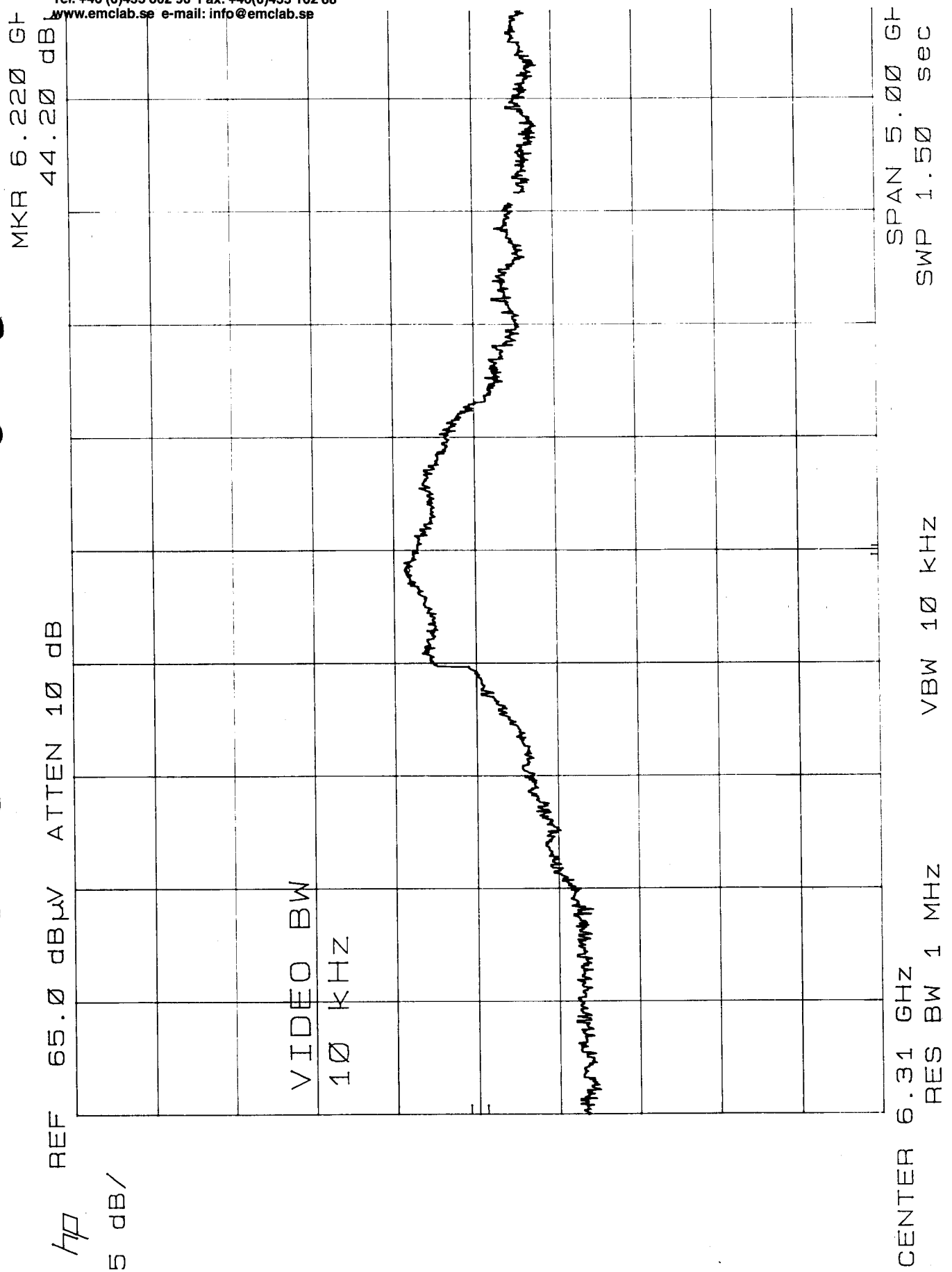

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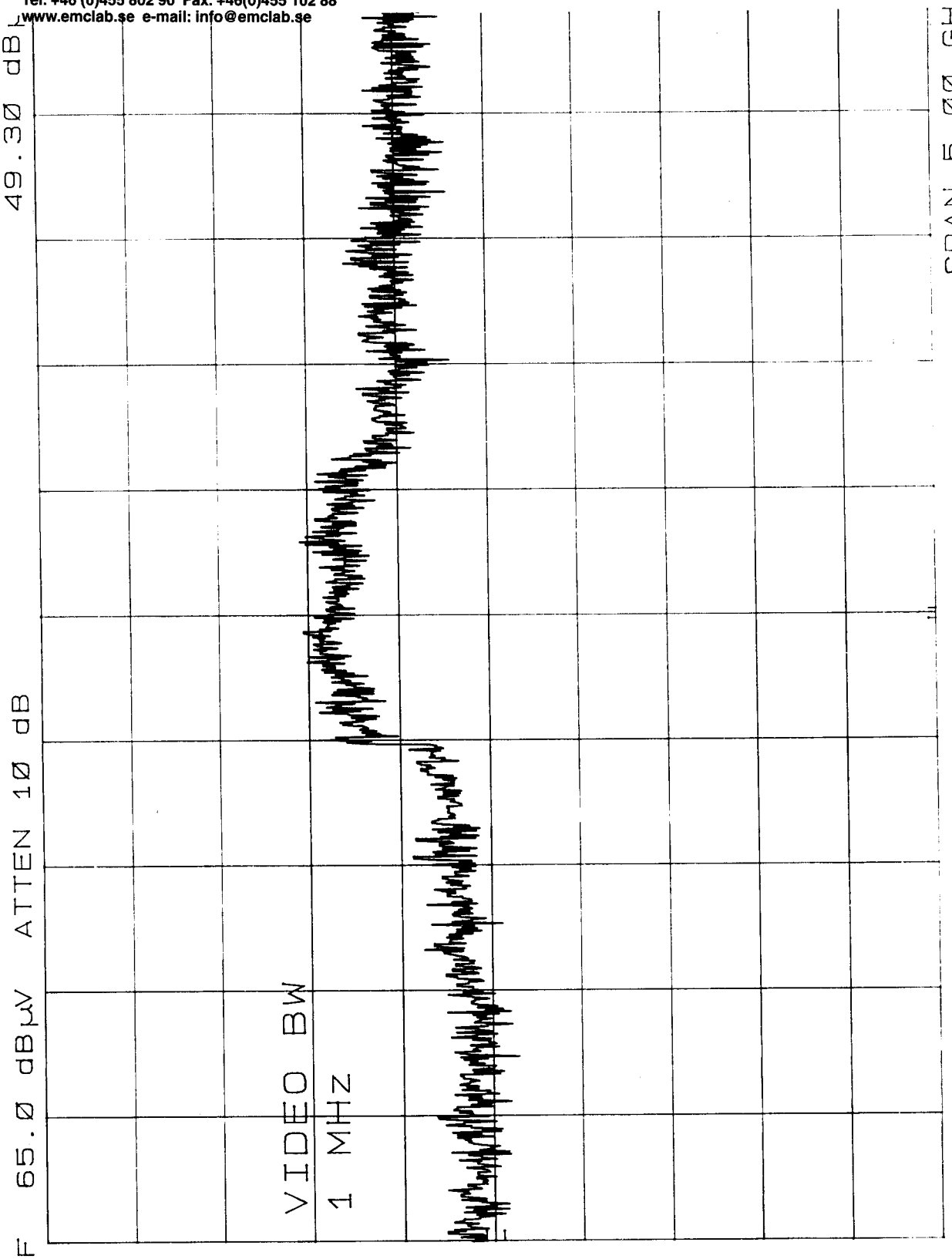

4" horn Peak 3 m VP Max

30.

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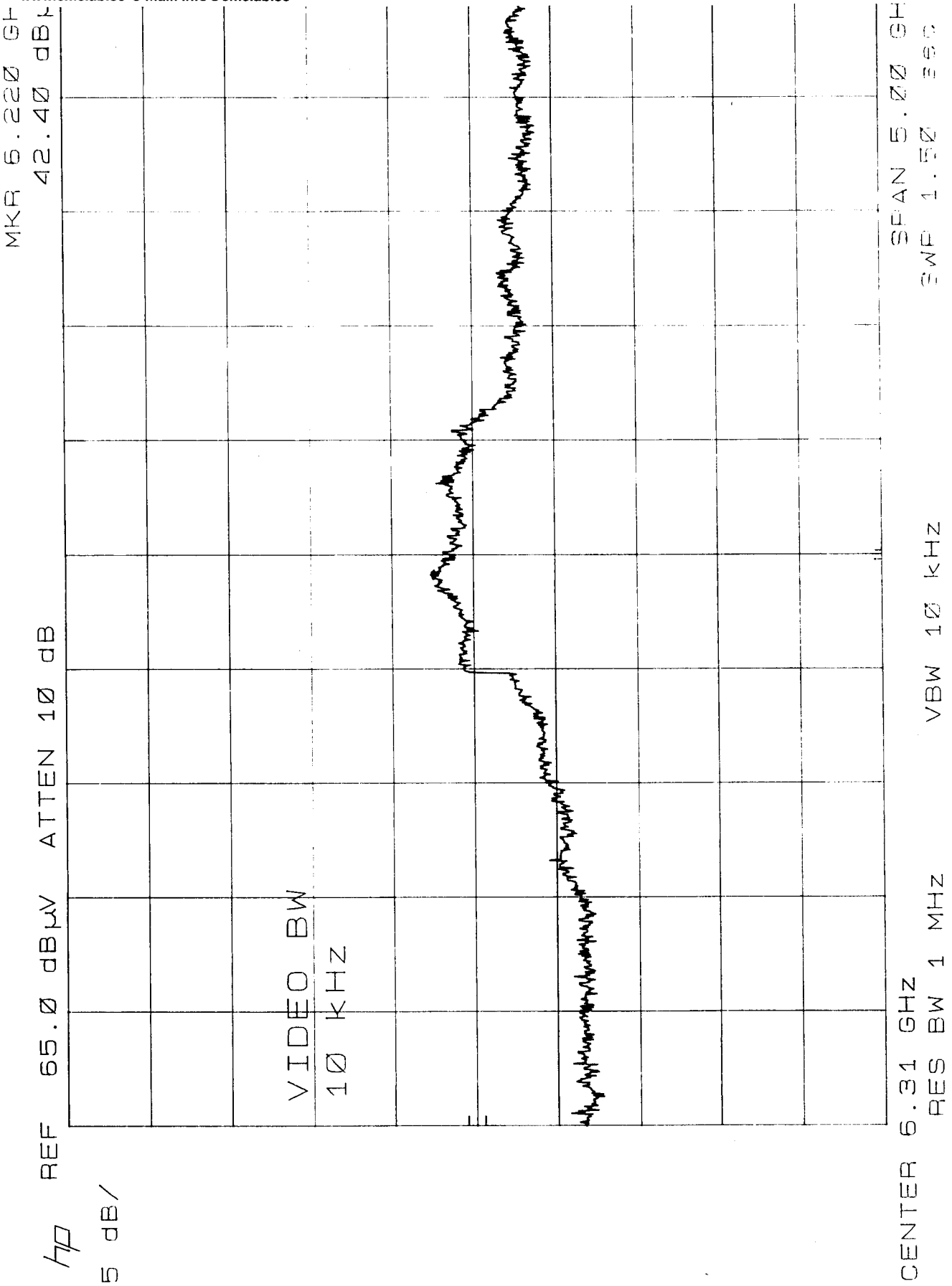

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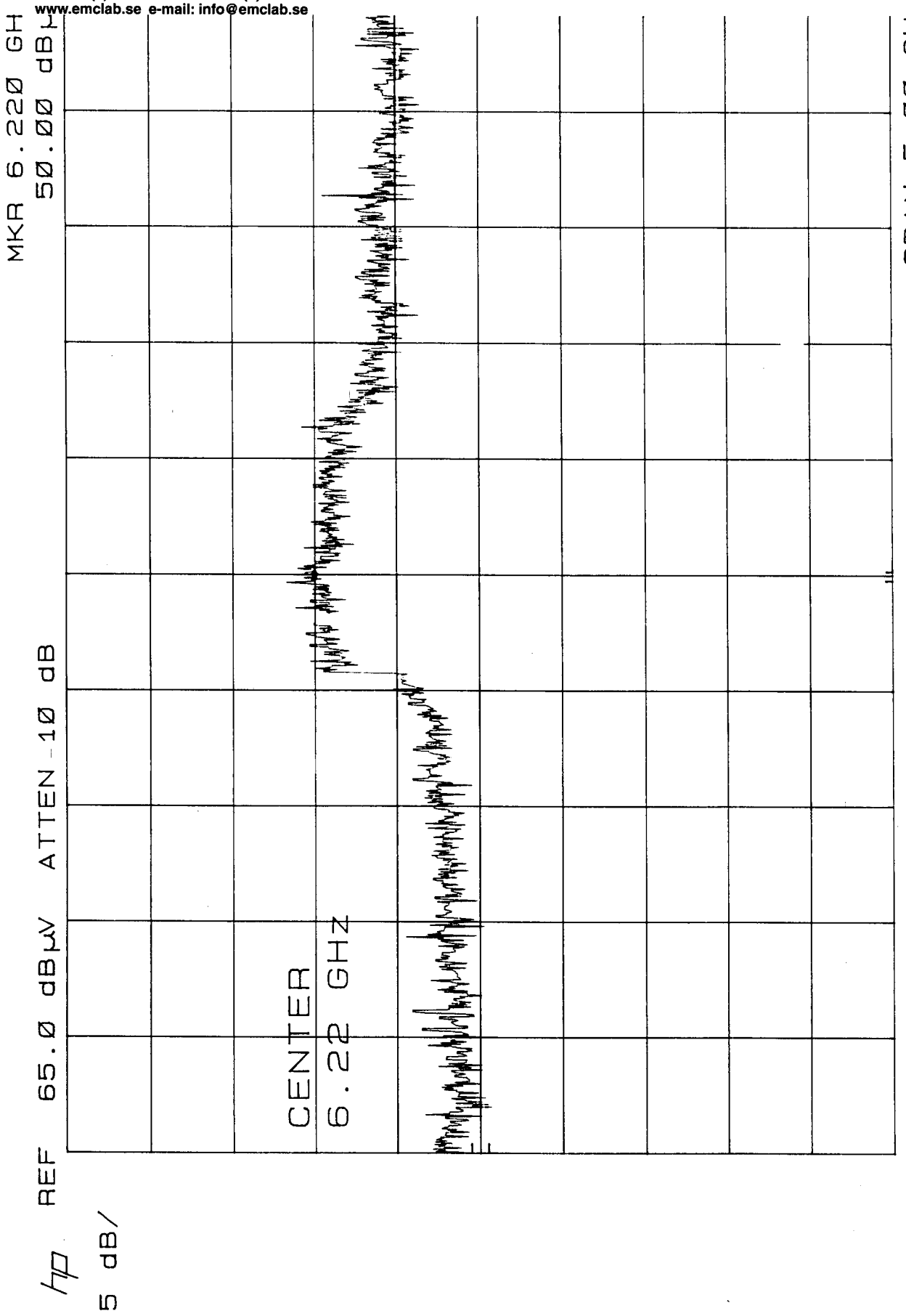

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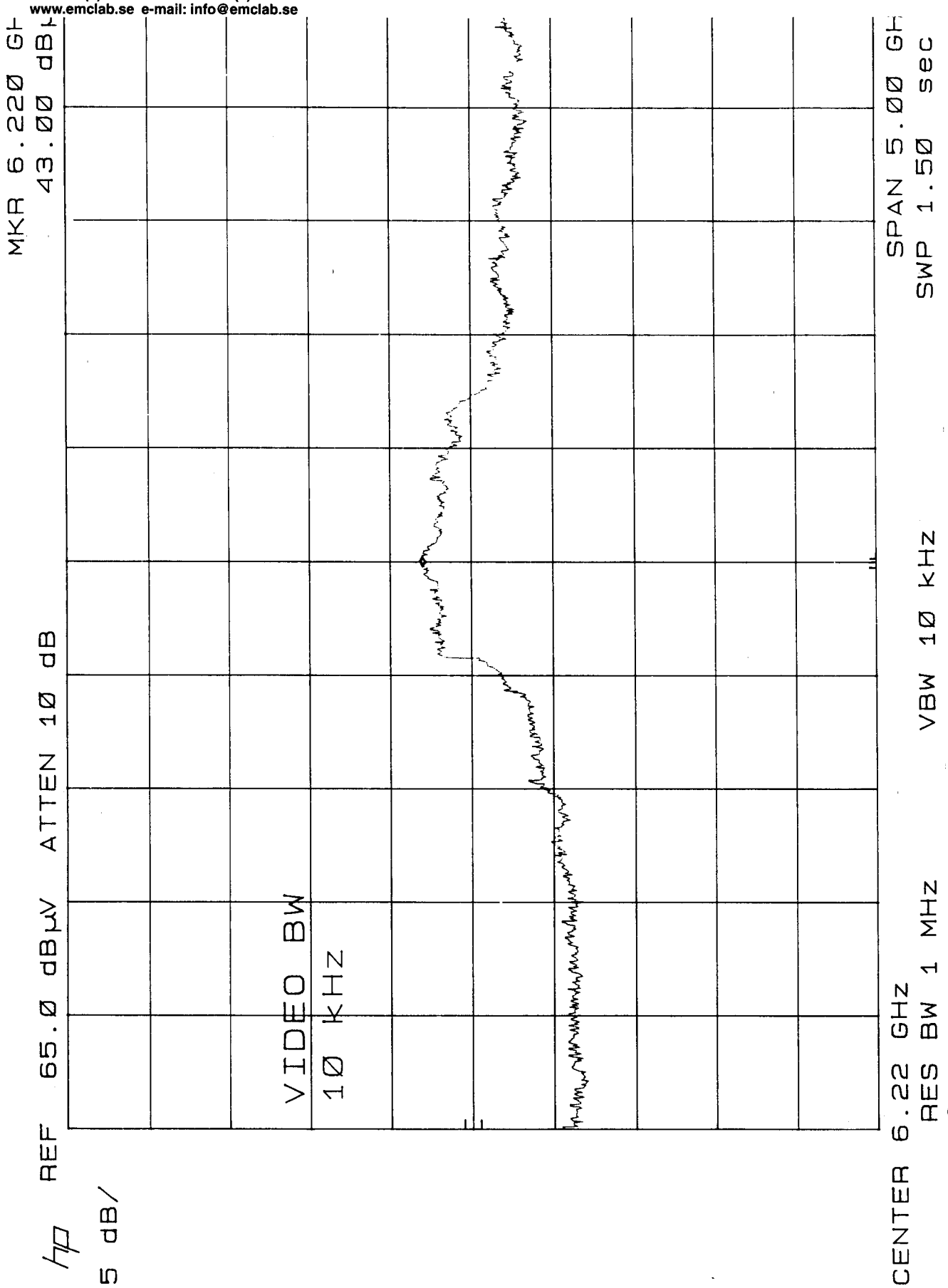

42.

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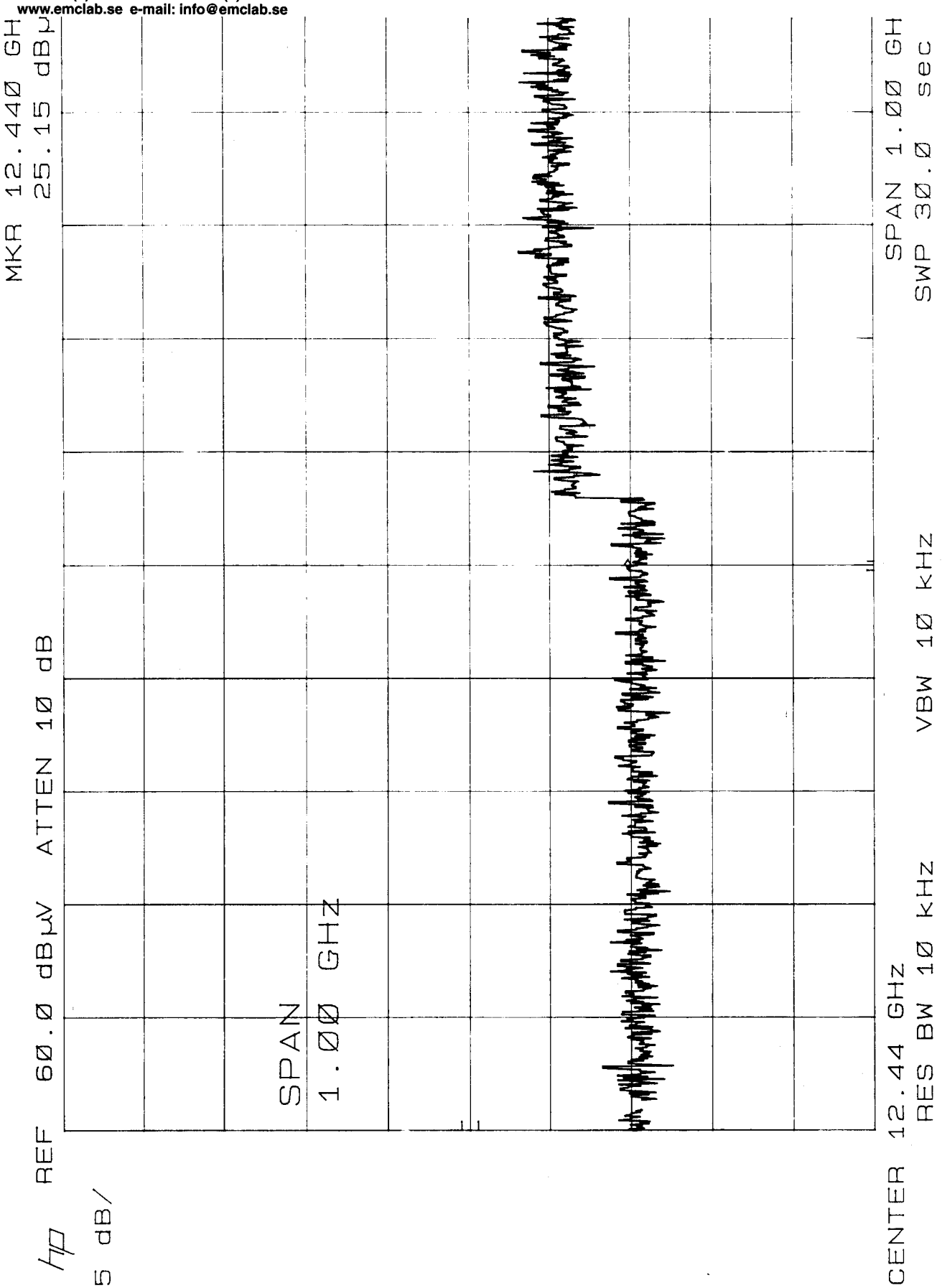

16.

8" horn Peak 0,3m V/P

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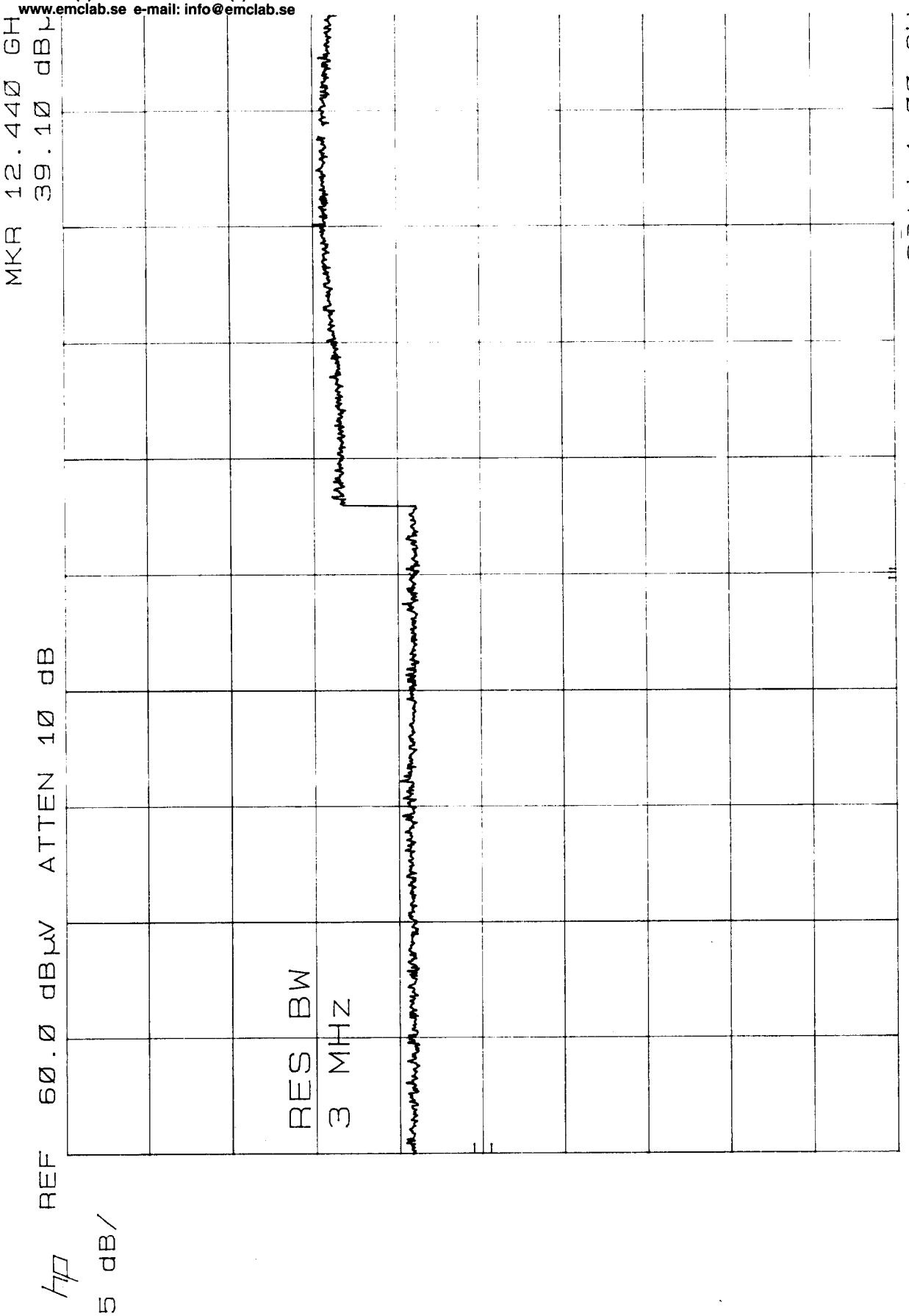

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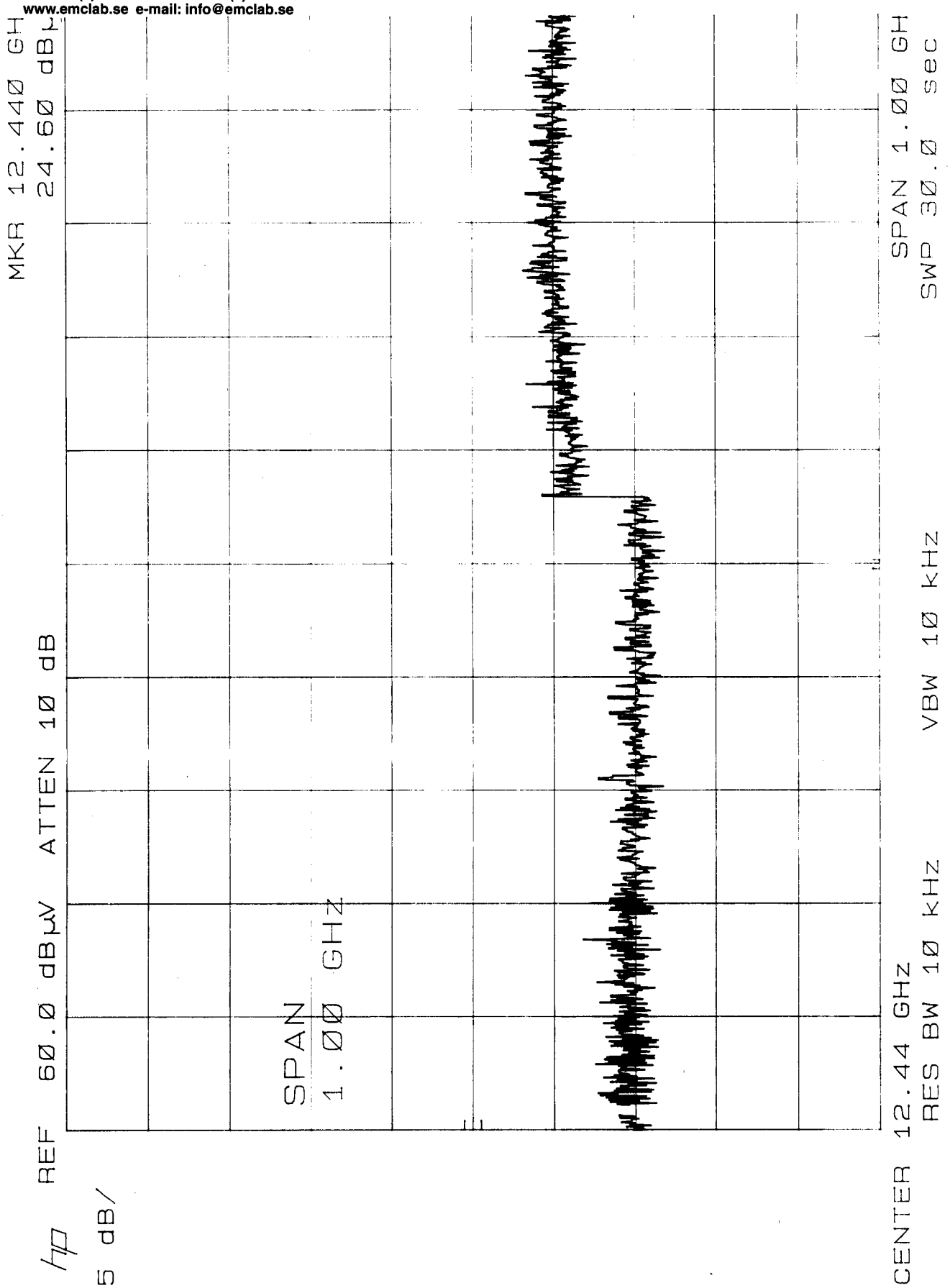

6" horn Peak 0,3 VP

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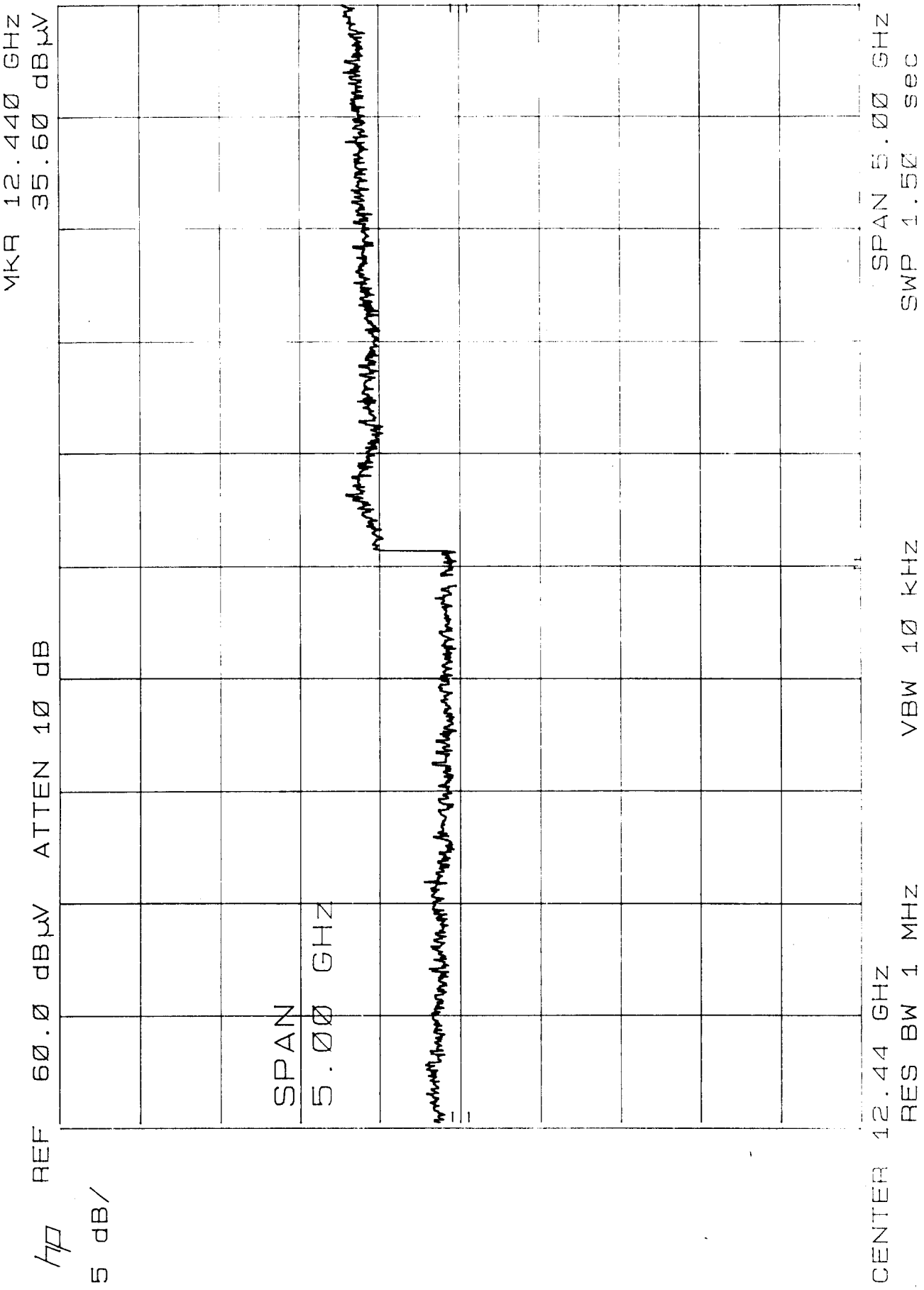

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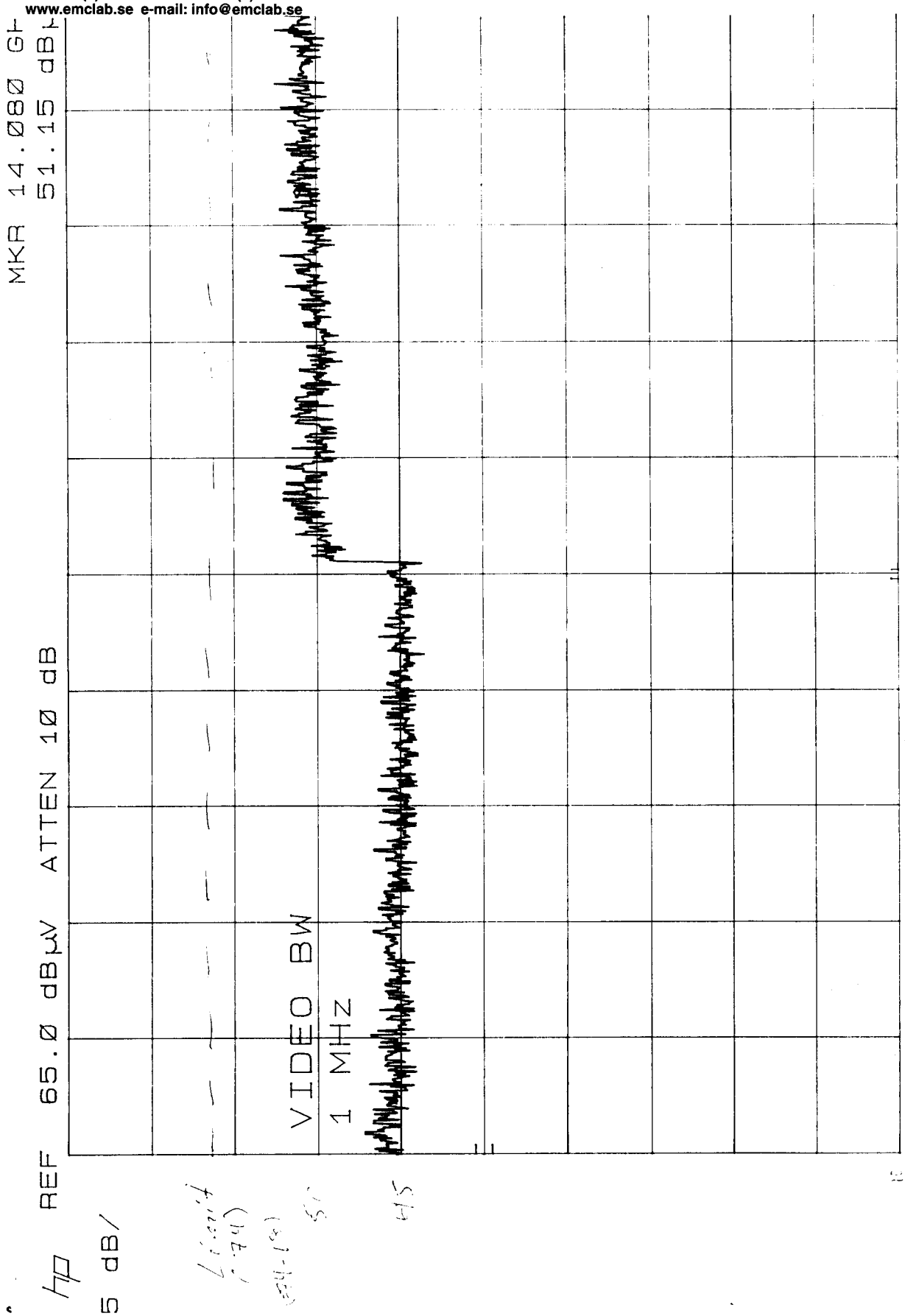

32.

4" horn Peak 0.3 m VP

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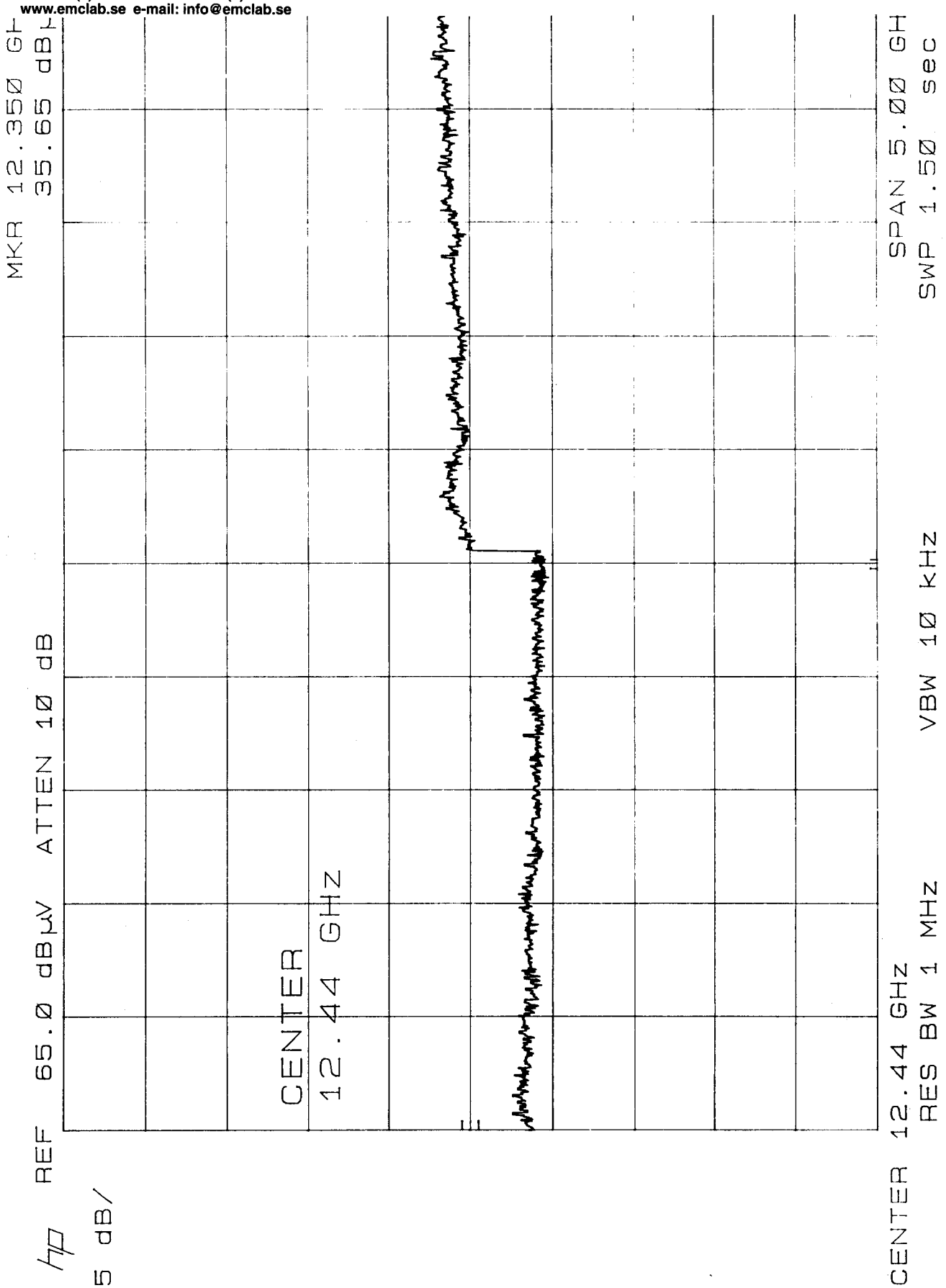

4" horn AV 0.3 m VP

33.

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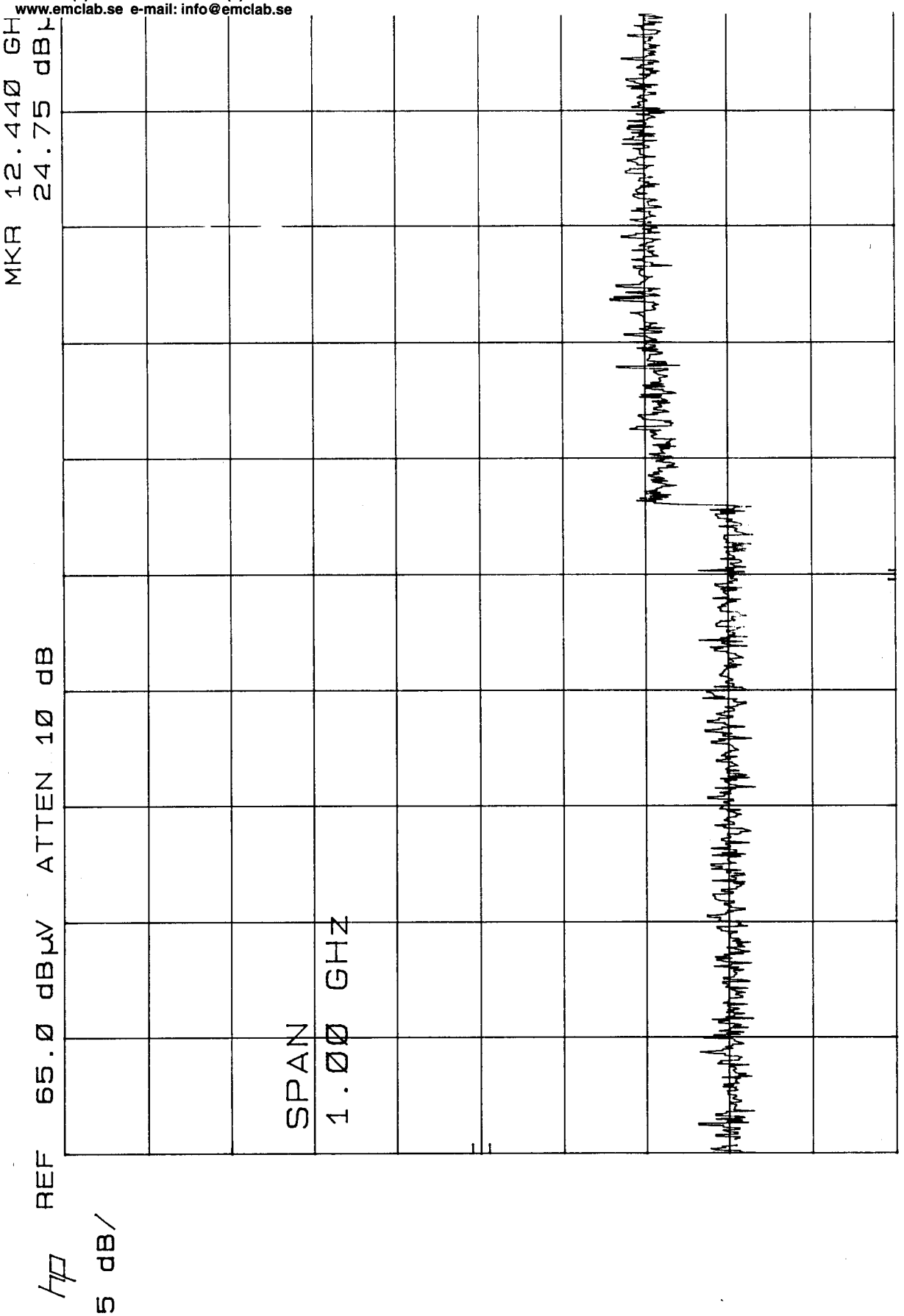

43.

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Radiated Fieldstrength Test. Calculation of Final Emission Levels

EUT: Radar Level Gauge. Model Saab Loopradar, s/n 010.

Test spec.: 47 Cfr Ch. 1 (10-1-99 Edition):
Part 15, Subpart C, Field Disturbance Sensor.
Radiated emission, Open Area Test Site
3 m and 0.3 m antenna distance.

Date: March 14 - 15, 2000

Operation: Normal operating conditions

Field strength (dBuV/m) = Amplitude (dBuV) + Antenna factor (dB/m) + cable loss (dB) + Gain (dB)

Tested frequency range: 1 - 40 GHz

Measured maximum peak and average values.

Freq.	Antenna type	Amplitude peak / av.	RBW / VBW	Antenna factor	Preamp gain	Cable loss C1	C2	Field strength	Dist	Limit (1–40 GHz)	Margin to limit	Note
GHz		dBµV	kHz / kHz	dB/m	dB	dB	dB	dBµV/m	m	dBµV/m	dB	
6.22	8"	53.1 / -	1000/1000	35.3	- 34.5	3.5	1.1	58.5	3	74	- 15.5	peak
6.22	8"	- / 46.6	1000 / 10	35.3	- 34.5	3.5	1.1	52.0	3	54	- 2.0	av.
6.22	6"	51.6 / -	1000/1000	35.3	- 34.5	3.5	1.1	57.0	3	74	- 17.0	peak
6.22	6"	- / 44.2	1000 / 10	35.3	- 34.5	3.5	1.1	49.6	3	54	- 4.4	av.
6.22	4"	49.3 / -	1000/1000	35.3	- 34.5	3.5	1.1	54.7	3	74	- 19.3	peak
6.22	4"	- / 42.4	1000 / 10	35.3	- 34.5	3.5	1.1	47.8	3	54	- 6.2	av.
6.22	Rod	50.0 / -	1000/1000	35.3	- 34.5	3.5	1.1	55.4	3	74	- 18.6	peak
6.22	Rod	- / 43.0	1000 / 10	35.3	- 34.5	3.5	1.1	48.4	3	54	- 5.6	av.
12.44	8"	25* / -	10 / 10	39.7	- 33.0	5.2	1.5	38.4*	0.3	94	- 55.6	peak
12.44	8"	- / 39*	3000 / 10	39.7	- 33.0	5.2	1.5	52.4*	0.3	74	- 21.6	av.
12.44	6"	25* / -	10 / 10	39.7	- 33.0	5.2	1.5	38.4*	0.3	94	- 55.6	peak
12.44	6"	- / 36*	1000 / 10	39.7	- 33.0	5.2	1.5	49.4*	0.3	74	- 24.6	av.
12.44	4"	46* / -	1000/1000	39.7	- 33.0	5.2	1.5	59.4*	0.3	94	- 34.6	peak
12.44	4"	- / 36*	1000 / 10	39.7	- 33.0	5.2	1.5	49.4*	0.3	74	- 24.6	av.
12.44	Rod	25* / -	10 / 10	39.7	- 33.0	5.2	1.5	38.4*	0.3	94	- 55.6	peak
18.66	All	< 18* / -	10 / 10	32.6	-	-	1.9	< 52.5*	0.3	94	- 41	peak
24.88	All	< 15* / -	10 / 10	33.8	-	-	2.3	< 51.1*	0.3	94	- 43	peak
31.10	All	< 18* / -	10 / 10	34.9	-	-	2.5	< 55.4*	0.3	94	- 38	peak
37.32	All	< 16* / -	10 / 10	36.6	-	-	2.9	< 55.5*	0.3	94	- 38	peak

* = Noise level