

TEST REPORT

47 Cfr Ch. 1 (10-1-97 Edition).

CUSTOMER: Saab Marine Electronics AB
SE-581 88 Linköping
Sweden

MANUFACTURER: Saab Marine Electronics AB
Box 13045
SE-402 51 Göteborg
Sweden

**EQUIPMENT
UNDER
TEST (EUT):** Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050.

TEST SPEC.: 1) 47 Cfr Ch. 1 (10-1-97 Edition), Part 15:
- Subpart B, Class A.
- Subpart C, Field Disturbance Sensor.
2) 47 Cfr Ch. 1 (10-1-97 Edition), Part 90:
- Subpart F

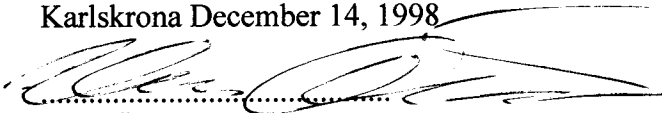
DATE: November 23 - 24, 1998

TEST SITE: Svenska EMC Lab AB, Karlskrona, Sweden.
FCC List No 31040/SIT 1300F2.

TEST PERSONNEL: Svenska EMC Lab AB: Bo Gidlöw.
Saab Marine Electronics AB: Mikael Kleman.

TEST RESULT: The EUT (Equipment Under Test) did pass the above mentioned test.

Karlskrona December 14, 1998


Hans Östergren
Manager Svenska EMC Lab AB

TEST EQUIPMENT:

Type/Manufacturer/Bandwidth	s/n	Calibration information	
		Date	Interval
For emission test up to 1 GHz:			
EMI Test System, Monitor EZM,	860157/014	9807	12 months
Rohde & Schwarz EP-6, 20 Hz-1300 MHz			
Test Receiver, Rohde & Schwarz ESH-3,	894979/013	9807	12 months
9 kHz-30 MHz			
Test Receiver, Rohde & Schwarz ESVP,	893497/006	9808	12 months
20-1300 MHz			
Pulse Limiter Rohde & Schwarz ESH3-Z2	357881052	9807	12 months
DC-30 MHz			
Plotter Tektronix HC 100	JP05851	-	-
LISN 50 OHM/50 uH, Electro Metrics EM-7820	2771	9807	12 months
10 kHz - 30 MHz, 16 A			
Software, Rohde & Schwarz K-1	-	-	-
Biconical Antenna, Schwarzbeck BBA9106	93-92196.1	9807	12 months
30-300 MHz			
Log-periodic Antenna, Schwarzbeck UHALP9107,	91071205	9807	12 months
300-1000 MHz			
Antenna Mast System, Jyske EMC, h = 1 - 5 m	93-90172	NA	NA
Turn Table, Jyske EMC	93-90171	NA	NA
Shielded Chamber, Jyske EMC, 11 x 6 x 4.5 m	93-90168	9703	36 months
Anechoic Chamber, 8 x 4.5 x 3 m	93-87151	9704	36 months
Open Area Test Site for 10 m antenna distance	-	9704	36 months
For emission test at fundamental frequency 10.244 GHz:			
Spectrum Analyzer, HP 8566B	2950A06284	9710	12 months
Plotter, HP 7475A	2641L16543	NA	NA
Signal Amplifier, Avantek AMN 12713	E6395	9805	12 months
Signal Amplifier, Avantek AMN 12713	E6396	9805	12 months
Standard Gain Horn Antenna, Narda mod. 640,	8909SME180588	NA	NA
8.2 - 12.4 GHz			
Coaxial Cable, Sealectro u-wave-cable, l = 3 m	A4746	9805	12 months
Coaxial Cable, Sealectro u-wave-cable, l = 1 m	D0658	9805	12 months
Coaxial Cable, Sealectro u-wave-cable, l = 0.3 m	D0460	9805	12 months
For emission test 1 to 18 GHz:			
Spectrum Analyzer, HP 8566B	2950A06284	9710	12 months
Plotter, HP 7475A	2641L16543	NA	NA
Double Ridged Guide Antenna, EMCO 3115,	2338	9709	36 months
1 - 18 GHz			
Coaxial Cable, Suhner RG 214, l = 3 m	009	9805	12 months

TEST EQUIPMENT (CONTINUED):

Type/Manufacturer/Bandwidth	s/n	Calibration information	
		Date	Interval
For emission test at harmonic frequencies above 12.4 GHz:			
Spectrum Analyzer, HP 8566B	2950A06284	9710	12 months
Plotter, HP 7475A	2641L16543	NA	NA
Signal Mixer, HP 11970K, 18 - 26.5 GHz	2332A00478	9801	12 months
Signal Mixer, HP 11970A, 26.5 - 40 GHz	2332A00749	9801	12 months
Signal Mixer, HP 11970U, 40 - 60 GHz	2332A00133	9806	12 months
Mixer Amplifier, HP 11975A, 2 - 8 GHz	2517A00748	9801	12 months
Standard Gain Horn Antenna, Flann 20 24 20, 18 - 26.5 GHz.	YA2762	9705	36 months
Standard Gain Horn Antenna, Flann 22 24 20, 26.5 - 40 GHz.	YA2763	9705	36 months
Standard Gain Horn Antenna, Hughes 4582UH, 40 - 60 GHz.	x	NA	NA

CALIBRATION DECLARATION:

The test equipment is calibrated as indicated in the calibration information of the Test Equipment list. Before starting of the tests the checkpoints in Checklist CE and in checklist RE (Appendix 1 and 2) were confirmed.

TEST SET-UP AND PROCEDURE:

See Appendix 3 to 6. As laid out in ANSI C.63.4:1992 Document.

DESCRIPTION OF THE EUT:

The EUT is a Radar Tank Gauge used in industrial environments. The used radar frequency is sweeping in the range 9.5 GHz to 10.6 GHz. The output power is below 1 mW. To control the radar digital circuits are integrated in the same enclosure as the radar transmitter-receiver. After installation is the radar antenna totally enclosed in a metal tank and the unwanted radiation is therefor extremely low. The test sample was mounted on the top of a metal tank with the dimensions of approx. 1.3 x 1.3 x 1.3 m. Together with the external shielded boxes (temperature sensors, analogue input, bus interface, pressure sensor and Saab Tankradar) is a normal system configured.

Configuration: See Appendix 7.

Rating: 115 VAC, 60 Hz, 60 W.

Peripherals: Personal Computer, Dell Latitude CPI, s/n 0009321C-12800-87E-2166. Saab Tankradar L/2 DAU 2100 s/n 10317. Smart Pressure Sensor, Rosemount, s/n 127973. Field Bus Modem, FBM 2170, P/N 9240002-632. Simulator, Analogue Inputs, Saab JB12. Simulator, Temperature Sensors, Saab JB12.

DESCRIPTION OF THE EUT (CONTINUED):

Power Line Filter: X2-Capacitor, Rifa PME271, 0.1 microfarade, 2 x Y2-Capacitor Rifa PME271, 0.0047 microfarade. Choke Siemens Matsushita B82732-R2901-A30, 2 x 27 milli-Henry.

See Appendix 8.

Cables: Shielded power line cable of 1.5 m length with protective earth. Shielded cable of 1.5 m length from the EUT to JB12 Analogue Input. Shielded cable of 1.5 m length from the EUT to JB12 Temperature Sensors. Shielded cable of 1.5 m length from JB12 Analogue Input to DAU. Shielded cable of 1.5 m length from JB12 Analogue Input to Smart Pressure Sensor. Shielded cable of 1.5 m length from the EUT to the FBM. Shielded cable of 15 m length from FBM to the PC. All shielded cables designed with contact hoods of metal.

Clock Frequency: 49.152 MHz. Radar frequency locked at 10.244 GHz.

Effective radiated power: 0.5 mW.

Modulation type: FXN. Frequency modulation, 96 kHz sine wave.

Modifications: No modifications.

Operating Conditions: Normal operating conditions. Active level gauging with level measurements, temperature measurements and pressure measurements. During the radiation test above 1 GHz the frequency sweep was stopped at 10.244 GHz. Tested at 115 VAC.

TEST PERFORMANCE:

Part 15:

§ 15.107. Conducted Emission test: The conducted emission was measured on the Power input terminals through a 50 ohm 50 micro-Henry LISN (Line Impedance Stabilization Network) in the frequency range 0.45 to 30 MHz. The two lines were measured with a quasi-peak detector. See Appendix 9- 10. Worst cases were recorded.

§ 15.109. Radiated Electromagnetic Field (30 - 1000 MHz):

Final Test. Measured in the frequency range 30 - 1000 MHz at an antenna distance of 10 m, on the open area test site. The emission was maximized by rotating the table, varying the antenna height and the antenna polarization. See Appendix 11 and 12. Test instruments: Rohde & Schwarz EP-6 System, 30 MHz - 1000 MHz. Antennas: Schwarzbeck BBA9106, 30 - 300 MHz and UHALP9107, 300 - 1000 MHz. Worst cases were recorded.

Radiated Electromagnetic Field (1 - 60 GHz):

Measured in the frequency range 1 - 60 GHz on the open area test site. The emission was maximized by rotating the table, varying the antenna height 1 to 4 m and the antenna polarization in vertical or horizontal positions. Test instruments according to "TEST EQUIPMENT"- list on page 2 and 3. Test equipment set-up as in Appendix 13.

Measurements on the fundamental: Antenna distance of 3 m was used. To find the frequency with the highest amplitude in the sweeping range the EUT was set in normal operating mode, with frequency sweeping. The analyzer was in max hold with average detector (RBW = 1 MHz, VBW = 10 kHz). The maximum amplitude was found at 10.244 GHz. Then the sweep was stopped at this frequency. The emission of the fixed frequency was now maximized by rotating the table, varying the

TEST PERFORMANCE (CONTINUED):

antenna height and the antenna polarization. Measured with peak detector and with average detector. See Appendix 14 to 16. The limit for class A at 10 m distance is with average detector 49.5 dBuV/m (300 uV/m) and with peak detector 69.5 dBuV/m. Linear conversion was used to get the limit at the 3 m measurement distance. The limits will be 59.5 dBuV/m (Average) and 79.5 dBuV/m (Peak)

Measurements on the harmonics: Measured up to 51.220 GHz with the sweep stopped at 10.244 GHz. Measurement at 3 m distance was not possible because the harmonics were too low. The distance was changed to 0.3 m and the limit linearly converted to this distance by adding 20 dB. The peak limit is then 79.5 dBuV/m plus 20 dB = 99.5 dBuV/m. The antenna was moved around and over the EUT and the flanges of the EUT and around and over all other parts on the Tank there leakage could appear, both with vertical and horizontal antenna polarization. No emission was observed. The noise level was appr. 58 dBuV/m with peak detector. See Appendix 14 and 17 to 20.

Part 90, Subpart F:

§2.985: RF power output.

Not measured in antenna terminal. Antenna terminal is non existing. Instead, the radiated power was calculated from the measured radiated field strength. Direct on the waveguide of The EUT was a circular horn antenna with a gain of 21 dB mounted. The radiated emission was measured with this horn antenna oriented to give maximum signal from the receiving antenna.

Antenna distance of 3 m (far field) was used. Measured with peak detector and with RBW = 3 MHz. The emission was maximized by small variations in the antenna height. See Appendix 14 and 21. The relationship field strength – effective radiated power for free space propagation in far field is:
 $E = k \sqrt{P} / d$; $k = 7$;

Test result: Measured field strength was 78 dBuV/m at the distance of 3 m. The calculated output power (erp) will be 0.012 mW.

§2.987: Modulation.

The modulation is a frequency modulation with 96 kHz sine wave. Type: FXN. The frequency is swept from a start frequency (factory set to 9.5 GHz) to a stop frequency (factory set to 10.5 GHz).

Test result: The modulation was measured and found in compliance with the manufacturers technical description.

§2.989: Occupied bandwidth.

The sweep was stopped at 10.2469 GHz, and Measured with RBW = 100 kHz and peak detector, in max hold. The modulation was activated. The bandwidth of the signal was measured between the points "Peak value minus 26 dB".

Test result: See Appendix 22. Maximum bandwidth @-26 dB = 7.56 MHz.

Note: The frequency at the swept band edges were also measured at the points "Peak– 26 dB".

Result: With the modulation on is no emission outside the band 9.500 – 10.500 GHz.

§2.991: Spurious at antenna terminals.

Not applicable.

TEST PERFORMANCE (CONTINUED):

§2.993: Field strength of spuriuos radiation.

See: Radiated Electromagnetic Field (1 - 60 GHz), above.

§2.995: Frequency stability.

Not applicable.

SUMMARY OF RESULTS:

A) In the frequency range of 0.45 to 1000 MHz:

§ 15.107 and 15.207: The conducted emission margin to the tighter limit in § 15.207 was – 8.7 dB (QP) at 0.4999 MHz. See Appendix 9 - 10.

§ 15.109. The radiated emission margin to Class A limit was – 2.9 dB (QP) at 245.7555 MHz. See Appendix 11 and 12.

B) In the frequency range of 1 to 60 GHz: See Appendix 14 to 20.

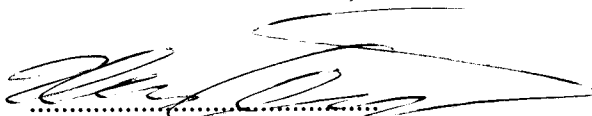
Margin to limit (Class A) of the fundamental was with average detector – 17.2 dB and with peak detector – 24.2 dB as worst case.

Margin to limit (Class B) of the fundamental was with average detector – 11.7 dB and with peak detector – 18.7 dB as worst case.

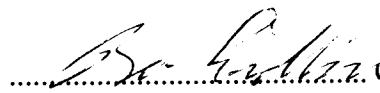
Margin to limit (Class B) of the harmonics were more than -30 dB with peak detector (noise level). No measurements with average detector were performed.

The Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050, did pass the above mentioned tests in Part 15: Subpart B, Digital Devices Class A, and Subpart C, Field Disturbance Sensor.

Karlskrona December 14, 1998



Hans Östergren
Manager Svenska EMC Lab AB



Bo Gidlöw
Test Engineer

List over Appendixes.

<u>Appendix No</u>	<u>Note</u>
1	Check-list RE
2	Check-list CE
3	Test set-up, photos
4	Test set-up, photos
5	Test set-up, photos
6	Test set-up, photos
7	Configuration
8	Power Line Filter
9	CE, 0.45 - 30 MHz, live
10	CE, 0.45 - 30 MHz, neutral
11	Calculation of Final Emission Levels, 30 - 1000 MHz
12	RE, 30 - 1000 MHz, 3 m
13	Test equipment set-up
14	Calculation of Final Emission Levels, 1 - 60 GHz.
15	Fundamental, 10.244 GHz. Peak
16	Fundamental, 10.244 GHz. Average
17	Harmonic, 20.427 GHz
18	Harmonic, 30.640 GHz
19	Harmonic, 40.850 GHz
20	Harmonic, 51.220 GHz
21	Field strength from open EUT at 3 m
22	Bandwidth

CHECK-LIST, RE
(Radiated emission)

**EQUIPMENT
UNDER**

TEST (EUT): Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050.

TEST SPEC.: 47 Cfr Ch. 1 (10-1-97 Edition), Part 15:
- Subpart B, Class B.
- Subpart C, Field Disturbance Sensor.

DATE: November 23 - 24, 1998

Check point. (REF. NO: 97010)	Checked by Sign/Date	Not applicable Sign/Date
A. EUT set-up in accordance with the standard:	BG 981123	
B. All instruments calibrated with traceability:	BG 981123	
C. Antennas: No defects:	BG 981123	
D. Calibrated antennas used:		
30 - 300 MHz, BBA9106 No: 93-92196-1	BG 981123	
300 - 1000 MHz, UHALP9107 No: 91071205	BG 981123	
1 - 18 GHz, 3115 No: Se Appendix 40	BG 981123	
E. Antenna Mast position: 3 m:	BG 981123	
-10 m:		BG 981123
F. No equipment in the obstruction free area:	BG 981123	
G. Calibrated cables used:		
Antenna - receiver: Cable No 001	BG 981123	
H. Test Receiver, Rohde & Schwarz ESVP. Warm-up time min. 1/2 h. Total Calibration done.	BG 981123	
I. Reference measurement with CNE III. The deviation is within the tolerance for Radiated Emission:	BG 981123	

CHECK-LIST, CE
(Conducted emission)

**EQUIPMENT
UNDER**

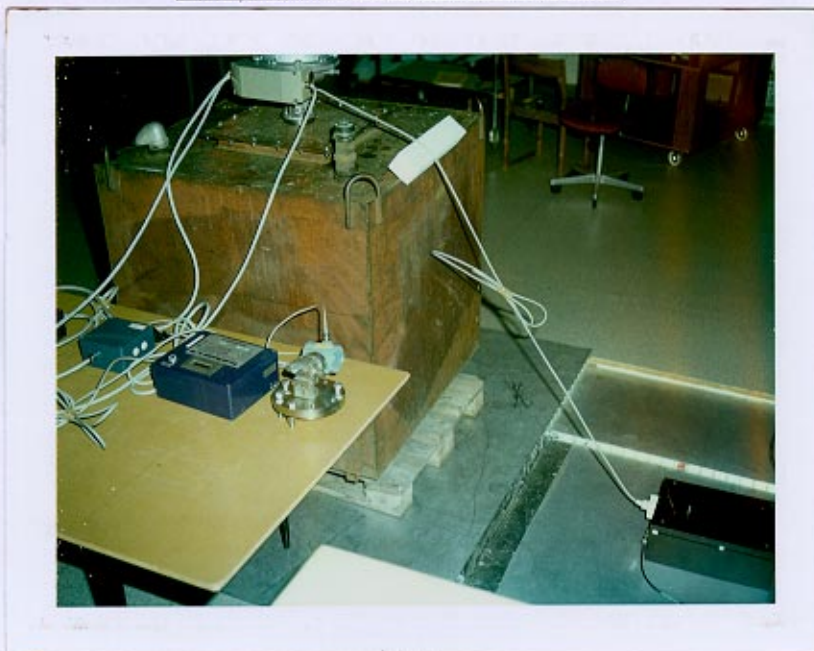
TEST (EUT): Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050.

TEST SPEC.: 47 Cfr Ch. 1 (10-1-97 Edition), Part 15:
- Subpart B, Class B.
- Subpart C, Field Disturbance Sensor.

DATE: November 23 - 24, 1998

Check point. (REF. NO: 97011)	Checked by Sign/Date	Not applicable Sign/Date
A. EUT set-up in accordance with the standard	BG 98/11/24	
B. All instruments calibrated with traceability	BG 98/11/24	
C. LISN, ISN, HF-Probes: No defects	BG 98/11/24	
D. Calibrated LISN, ISN, HF-Probes used: LISN, 0.15 - 30 MHz: EM 7820 7271	BG 98/11/24	
~~ISN~~ , 0.15 - 30 MHz:		BG 98/11/24
~~HF-Probe~~ , 0.15 - 30 MHz:		BG 98/11/24
E. No additional equipment in 1 m distance from EUT: Tested in the shielded room no:.....	BG 98/11/24 BG 98/11/24	
F. Calibrated cables used: LISN - feed through - receiver: Cables No 005 / 006	BG 98/11/24	
ISN - feed through - receiver: Cables No...../.....		BG 98/11/24
HF-Probe - feed through - receiver: Cables No...../.....		BG 98/11/24
G. Test Receiver, Rohde & Schwarz ESH3. Warm-up time min. 1/2 h. Total Calibration done.	BG 98/11/24	
H. Reference measurement with CNE III and adapter CNE A. The deviation is within the tolerance for Conducted Emission	BG 98/11/24	

Test set-up, Conducted Emission



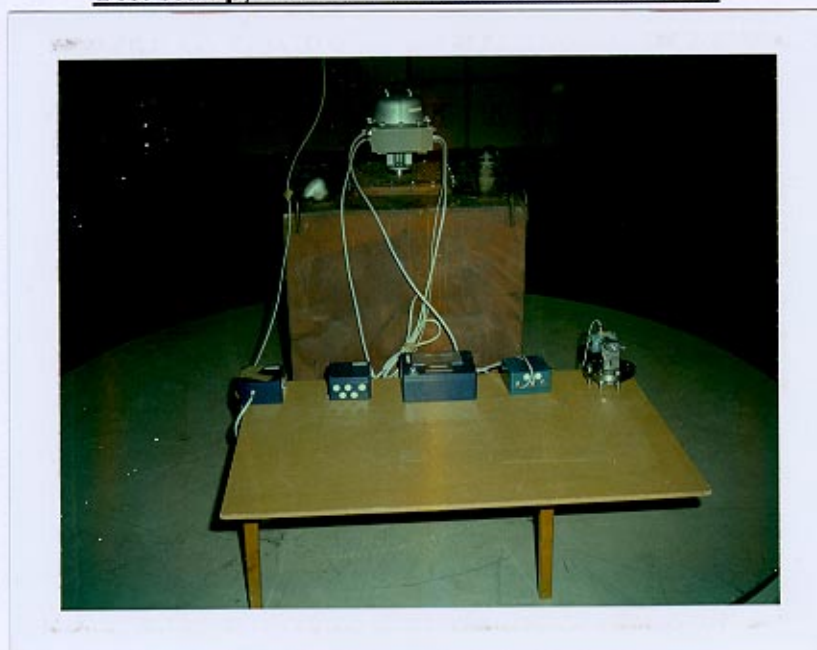
Test set-up, Conducted Emission



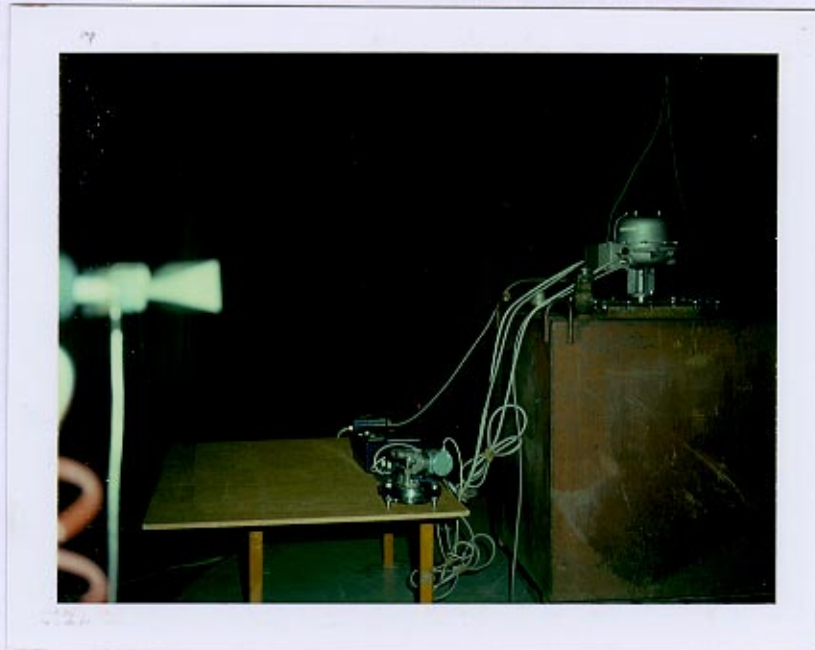
Test set-up, Radiated Emission 30 - 1000 MHz



Test set-up, Radiated Emission 30 - 1000 MHz



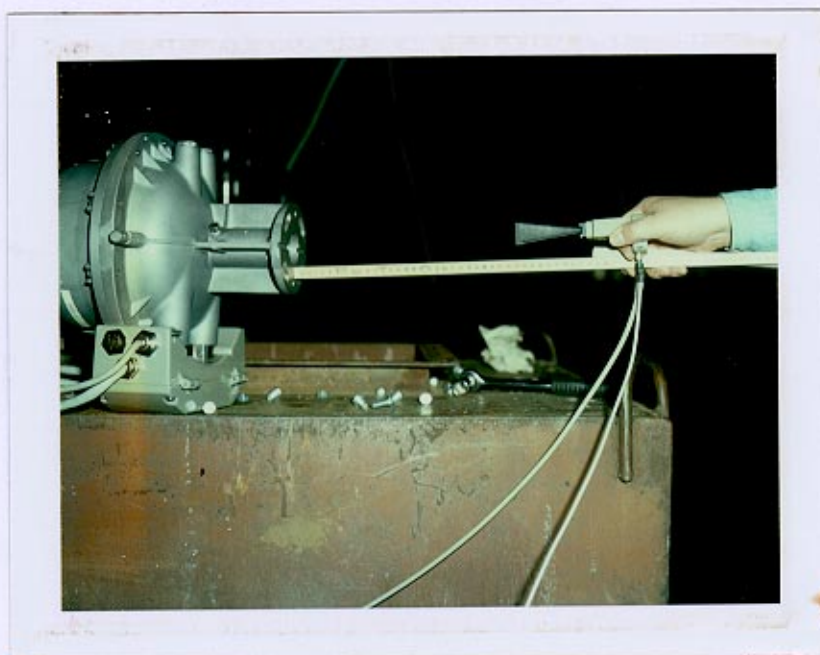
Test set-up, radiated emission, fundamental



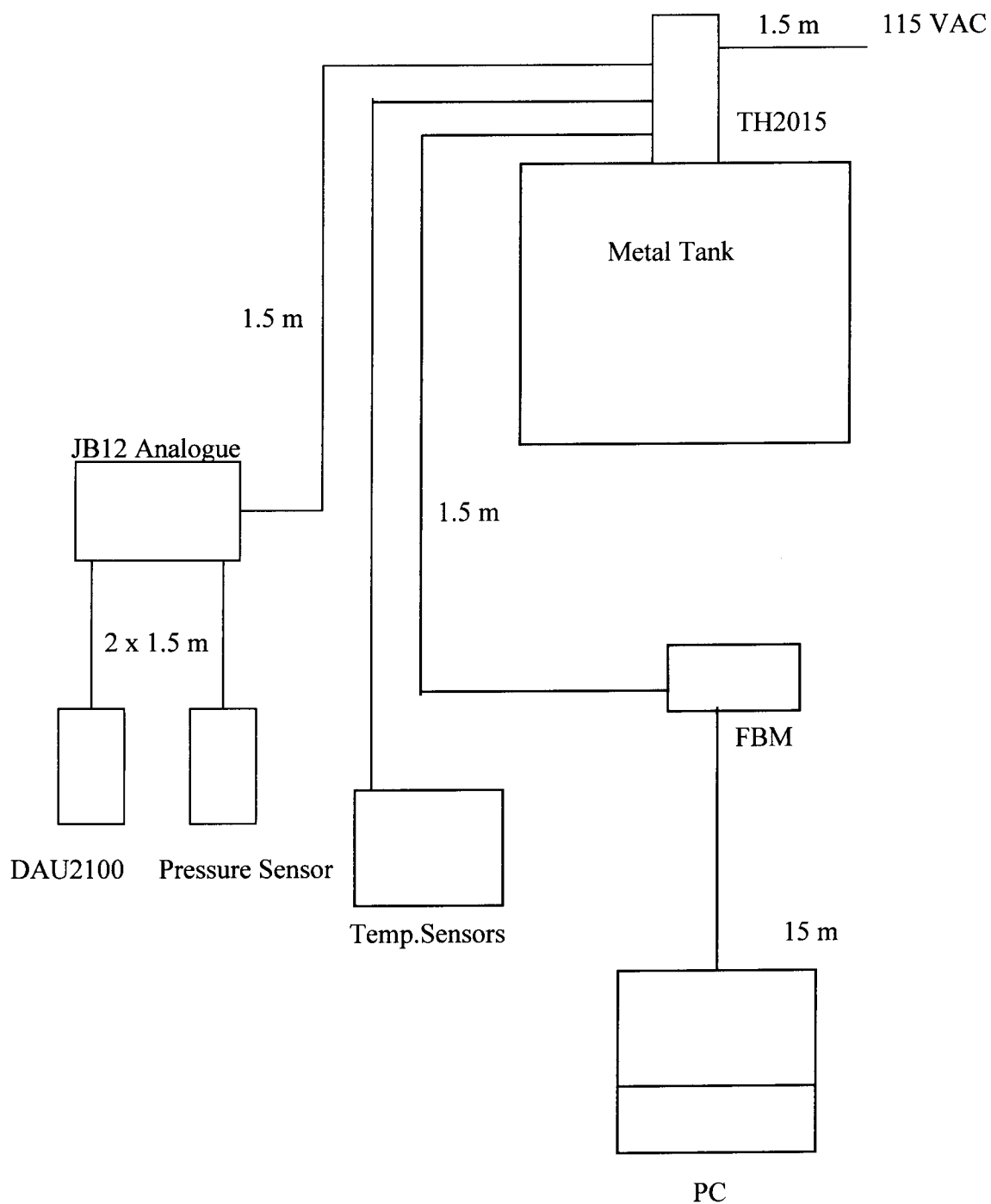
Radiated emission, check of subharmonics



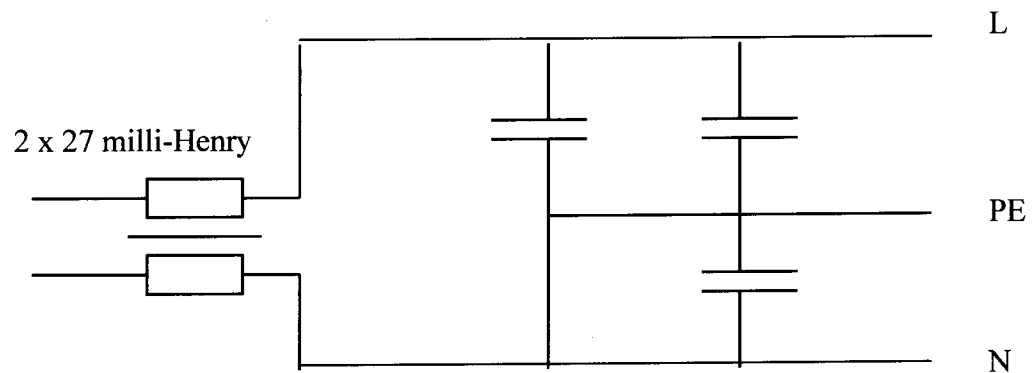
Radiated emission, check of harmonics



Configuration



Power Line Filter



X-Capacitor
0.1 micro-Farad

2 x Y-Capacitors
0.0047 micro-Farad

8,

SAAB MARINE ELECTRONICS. AB Conducted Emission Test

Start of Test: 24.NOV'98 . 15:22

E.U.T.: RADAR LEVEL GAUGE TH 2015.

Oper. Condition: ACTIVE

Operator: Bo Gidloew.

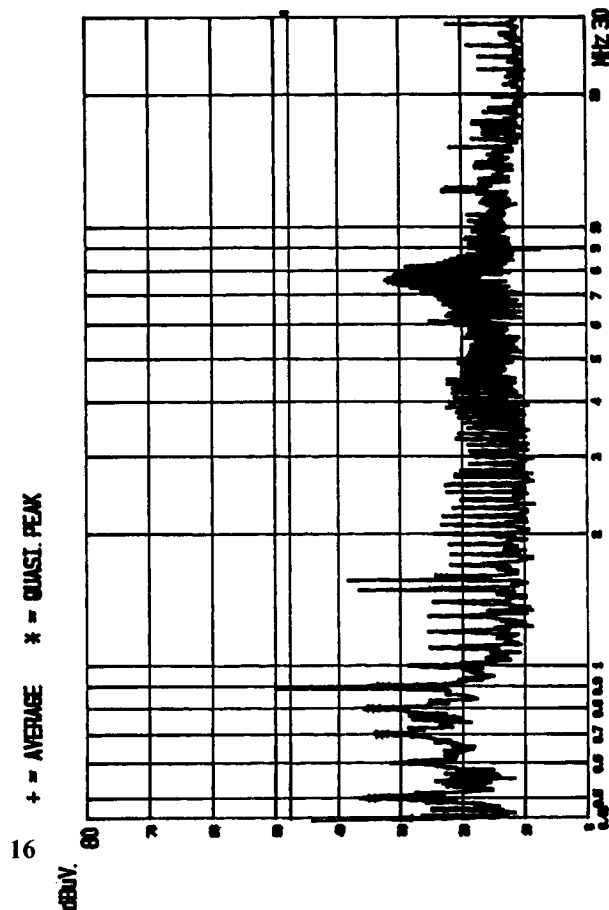
Test Spec:
FCC Part 15, Subpart B. Conducted RFI, Class. B.

Start Fr. Stop Fr. IF-BW. Display Att. Transducer.
MHz kHz Mode dB type

0.4500 30.0000 10.00 Max Hold 0 EM7820

Frequency MHz	Average dBuV	AV-Margin dBuV	Quasi. dBuV	Peak dBuV	QP-Margin dBuV
0.4500	-	-	-	29.5	-18.4
0.5024	-	-	-	34.5	-13.4
0.7032	-	-	-	33.5	-14.5
0.8041	-	-	-	34.8	-13.2
0.9043	-	-	-	33.2	-14.8
1.5074	-	-	-	24.8	-23.2
1.5081	-	-	-	23.9	-24.1
7.6350	-	-	-	31.3	-15.7

* Limit exceeded



CONDUCTED EMISSION ON 115 V. AC, LINE TERMINAL

Appendix 9 (22)
TEST REF. NO: 98/1899
DATE: December 14, 1998

7.

SAAB MARINE ELECTRONICS. AB
Conducted Emission Test

Start of Test: 24.NOV.98 . 15:06.

E.U.T.: RADAR LEVEL GAUGE TH 2015.

Oper. Condition: ACTIVE

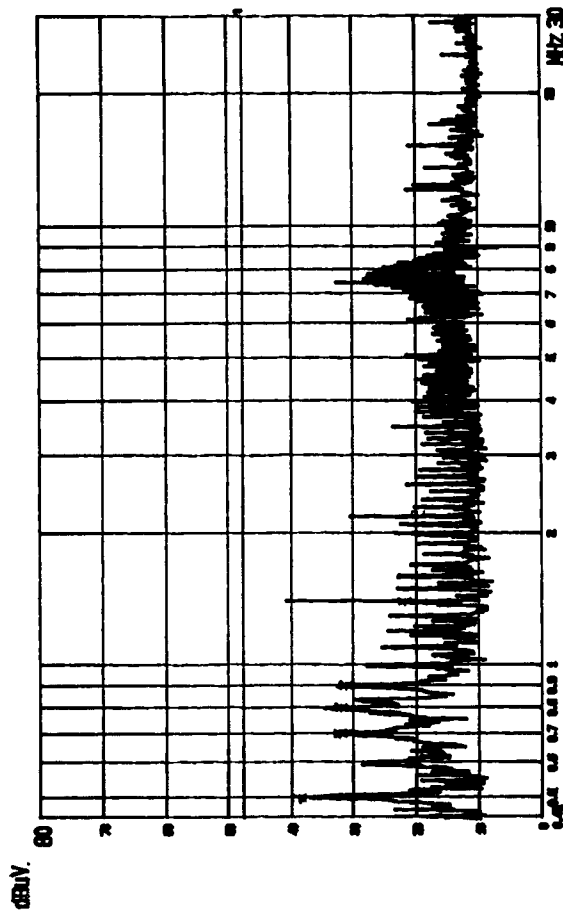
Operator: Bo Gidloew.

Test Spec: FCC Part 15, Subpart B. Conducted RFI. Class. B.

Start Fr. Stop Fr. IF-BW. Display Att. Transducer.
MHz MHz KHz Mode dB type

0.4500 30.0000 10.00 Max Hold 0 EM7820

17 + = AVERAGE * = QUASI PEAK



CONDUCTED EMISSION. ON. 115. V. AC, NEUTRAL TERMINAL

Frequency MHz	Average dBuV	AV-Margin dBuV	Quasi. dBuV	Peak dBuV	QP-Margin dBuV
0.4999				39.3	-8.7
0.7004				32.6	-15.4
0.8008				32.4	-15.6
0.9009				31.6	-16.4
1.4015				22.3	-25.7
2.2028				20.0	-28.0
7.5110				27.1	-20.9

* Limit exceeded

Radiated Fieldstrength Test. Calculation of Final Emission Levels

EUT: Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050.

Test spec.: 47 Cfr Ch. 1 (10-1-97 Edition), Part 15:
- Subpart B, Class A.
- Subpart C, Field Disturbance Sensor.
Radiated emission, Open Area Test Site
10 m antenna distance.

Date: November 23 - 24, 1998

Operation: Normal operating conditions. Active level gauging with level measurements
4 times pro second

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

Tested frequency range: 30 - 1000 MHz
Measured quasi-peak values.

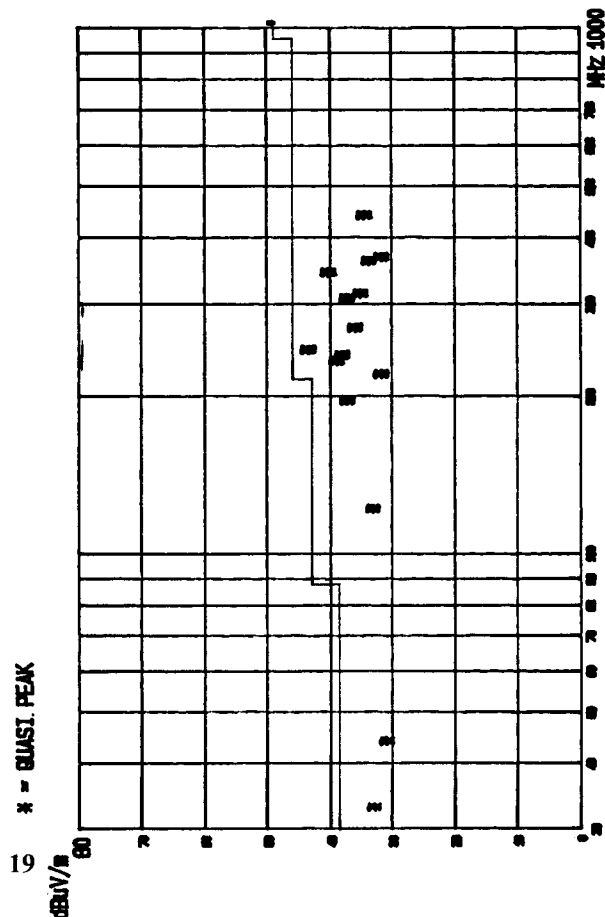
Freq.	App.	Ampl	Cable loss	Ant fact	Field streng.	Limit	Dist	Mar- gin	Ant. height	Ant. pola r
MHz	No	dBuV	dB	dB/m	dBuV/m	dBuV/m	m	dB	m	v/h
33.18	12	13.9	1.3	17.7	32.9	39.0	10	- 6.1	1.0	v
44.24	12	15.6	1.6	13.7	30.9	39.0	10	- 8.1	1.0	v
196.60	12	16.9	3.8	16.5	37.2	43.4	10	- 6.2	1.0	v
233.47	12	17.5	4.1	17.3	38.9	46.4	10	- 7.5	3.2	h
239.61	12	16.4	4.2	17.4	38.0	46.4	10	- 8.4	2.2	h
245.76	12	21.8	4.2	17.5	43.5	46.4	10	- 2.9	2.6	v
307.20	12	16.5	4.6	16.1	37.2	46.4	10	- 9.2	3.6	h
344.06	12	19.0	5.0	16.3	40.3	46.4	10	- 6.1	3.1	h

6,

SAAB MARINE ELECTRONICS. AB
Radiated Emission test on. OATS.

Start of Test: 23.NOV'98 . 13:34
E.U.T.: RADAR LEVEL GAUGE TH 2015.
Oper. Condition: ACTIVE
Operator: Bo Gidloew.
Test Spec: FCC Part 15, Subpart B. Class. A, 10 m OATS.

Start Fr. Stop Fr. IF-BW Detec Att.. Mass.T.. Transd.
MHz MHz KHz tor_ dB s. type
30.0000 299.9999 120 Peak LN. 0.020 BICON.
300.0000 1000.0000 120 Peak LN. 0.020



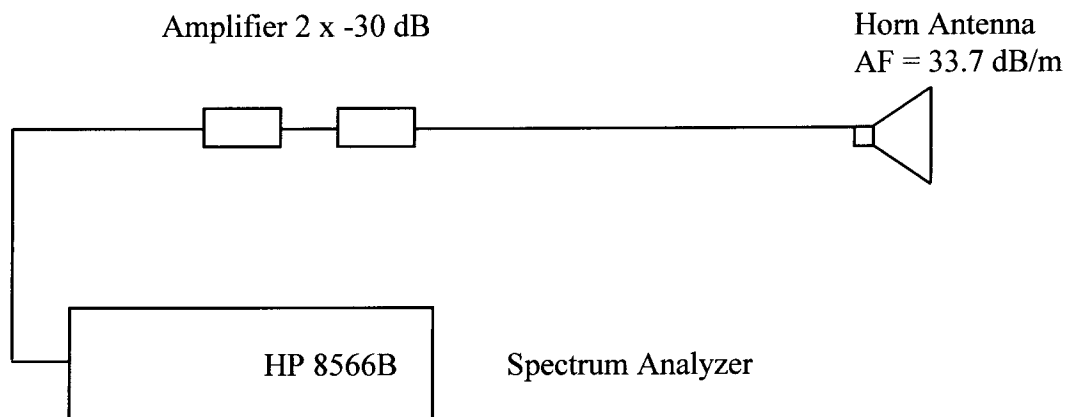
RADIATED EMISSION. ON. OATS. AT. 10 m. DISTANCE

Frequency MHz	measured Level dBuV/m	Margin dB	P	Pol. h/v	Height m	Azimuth deg.
33.1825	32.9	-6.1		v	1.00	00
44.2409	30.9	-8.1		v	1.00	00
122.8779	33.1	-10.3		v	1.00	00
196.6045	37.2	-6.2		v	1.00	00
221.1803	31.7	-14.7		v	1.00	00
233.4679	38.9	-7.5		h	3.20	00
239.6116	38.0	-8.4		h	2.20	00
245.7555	43.5	-2.9		h	2.50	00
270.3315	35.9	-10.5		h	2.10	00
307.1960	37.2	-9.2		h	3.60	00
313.3290	35.0	-11.4		h	3.10	00
344.0600	40.3	-5.1		h	3.10	00
362.4640	33.7	-12.7		h	1.50	00
368.6350	31.7	-14.7		h	1.50	00
442.3500	34.4	-12.0		h	1.00	00

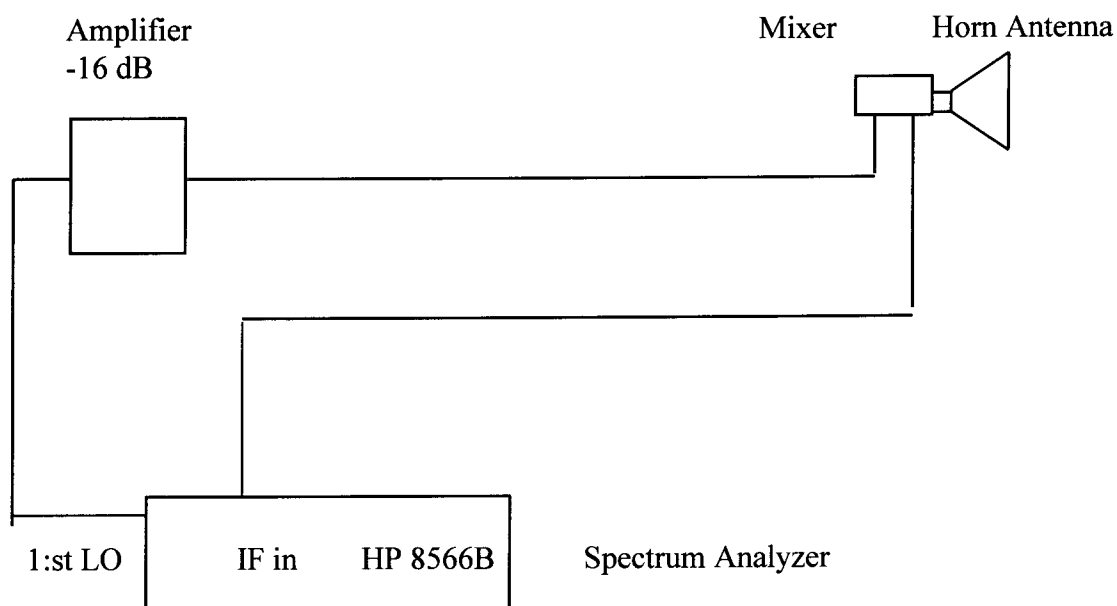
* Limit exceeded

Test equipment set-up

F0, 8.2 - 12.4 GHz:



F1 - F3, 18 - 60 GHz:



Radiated Fieldstrength Test. Calculation of Final Emission Levels

EUT: Radar Level Gauge. Model: TankRadar TH2015, s/n: TP-3050.

Test spec.: 47 Cfr Ch. 1 (10-1-97 Edition):
Part 15, Subpart C, Field Disturbance Sensor.
Part 90, Subpart F.
Radiated emission, Open Area Test Site
3 m and 0.3 m antenna distance.

Date: November 23 - 24, 1998

Operation: Fixed operating frequency.

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

Tested frequency range: 1 - 60 GHz
Measured maximum peak and average values.

[illegible]

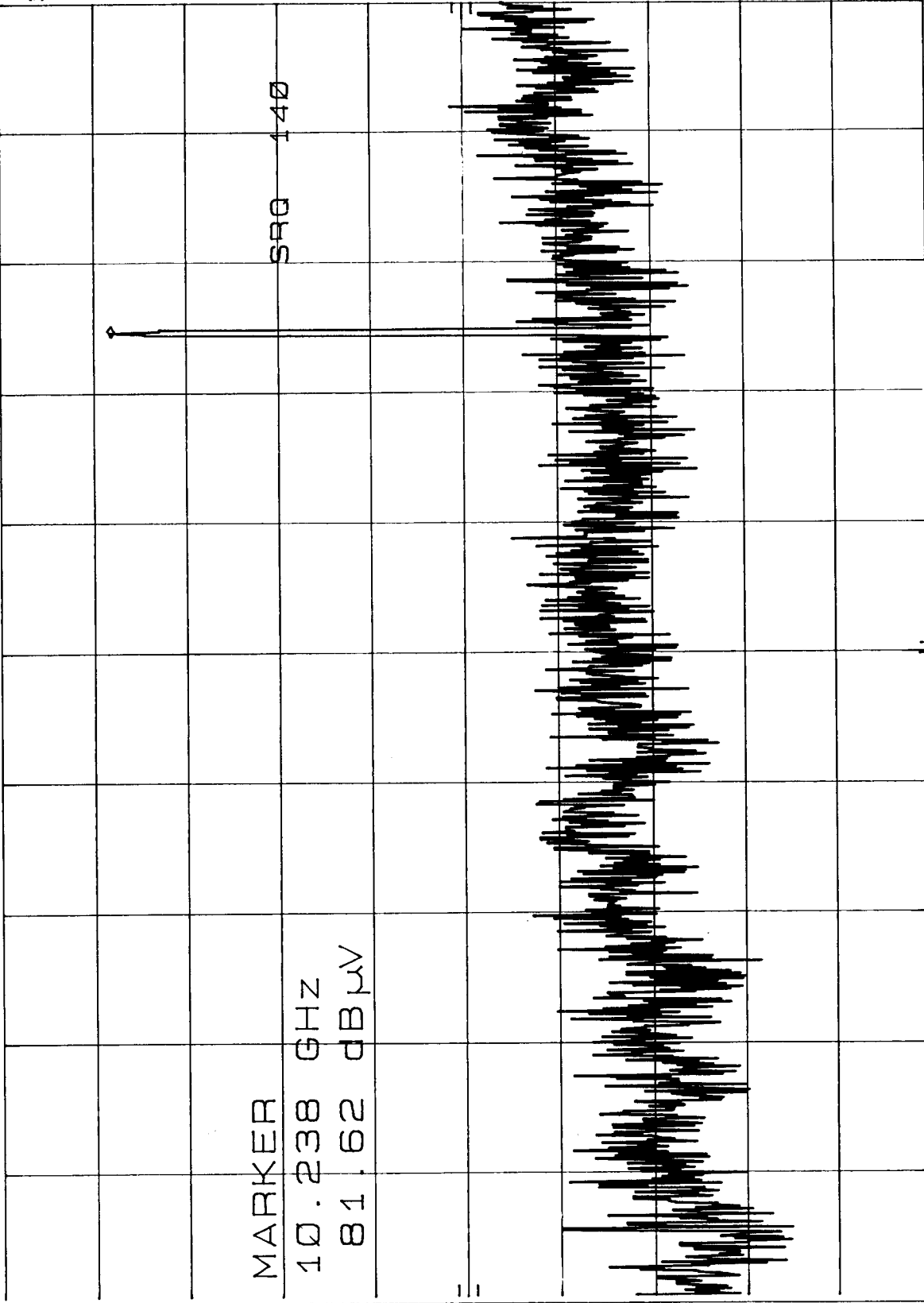
* = Noise level

981123

1. to peak
 HP
 2 dB/

MR 10.238 GHz
 81.62 dBμV

REF 84.0 dBμV ATTEN 10 dB



STOP 11.00 GHz
 SWP 75.0 msec

VBW 1 MHz

START 8.00 GHz
 RES BW 1 MHz

981123

to average

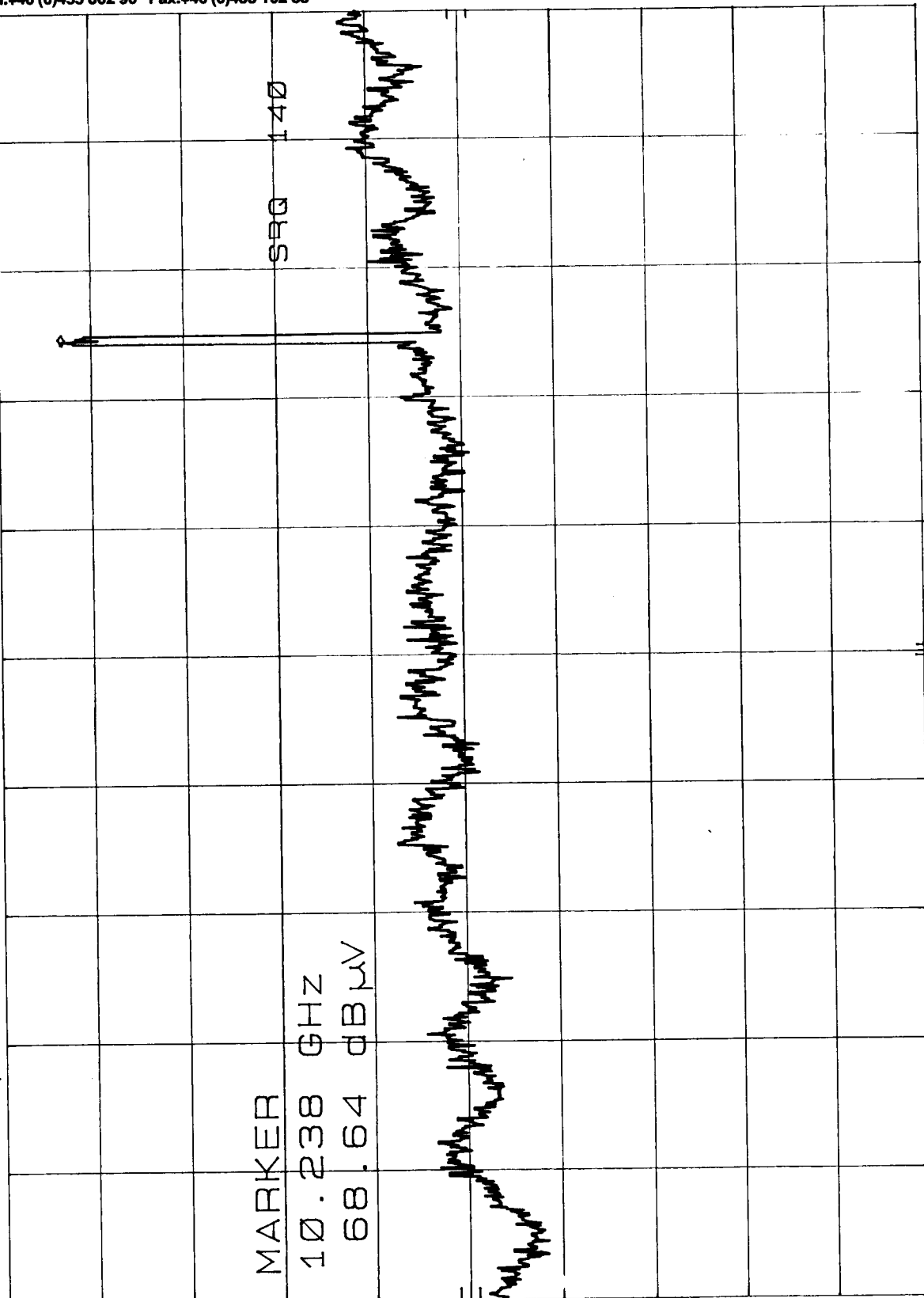
2.

HP

2 dB/

MR 10.238 GHz
 68.64 dBμV

REF 70.0 dBμV ATTN 10 dB



STOP 11.00 GHz
 SWP 900 msec

VBW 10 KHZ

START 8.00 GHz
 RES BW 1 MHz

3. f2

98111

MKR 20.427 9 GHz
21.60 dB μ V

REF 111.5 dB μ V HARMONIC 6L

hp

10 dB/

CNVLOSS
22.5
dB

MARKER
20.427 9 GHz
21.60 dB μ V

SPAN 100 MHz
SWP 3.00 sec

VBW 10 kHz

CENTER 20.427 GHz
RES BW 10 kHz

981124

MARK 30.740 0 GHz
15.20 dBμV

HP REF 110.0 dBμV HARMONIC 8L

10 dB/

CNVLOSS
23.0
dB

MARKER

30.740 0 GHz
15.20 dBμV

==

SPAN 200 MHz
SWP 6.00 sec

VBW 10 KHz

CENTER 30.740 GHz
RES BW 10 KHz



5. f4

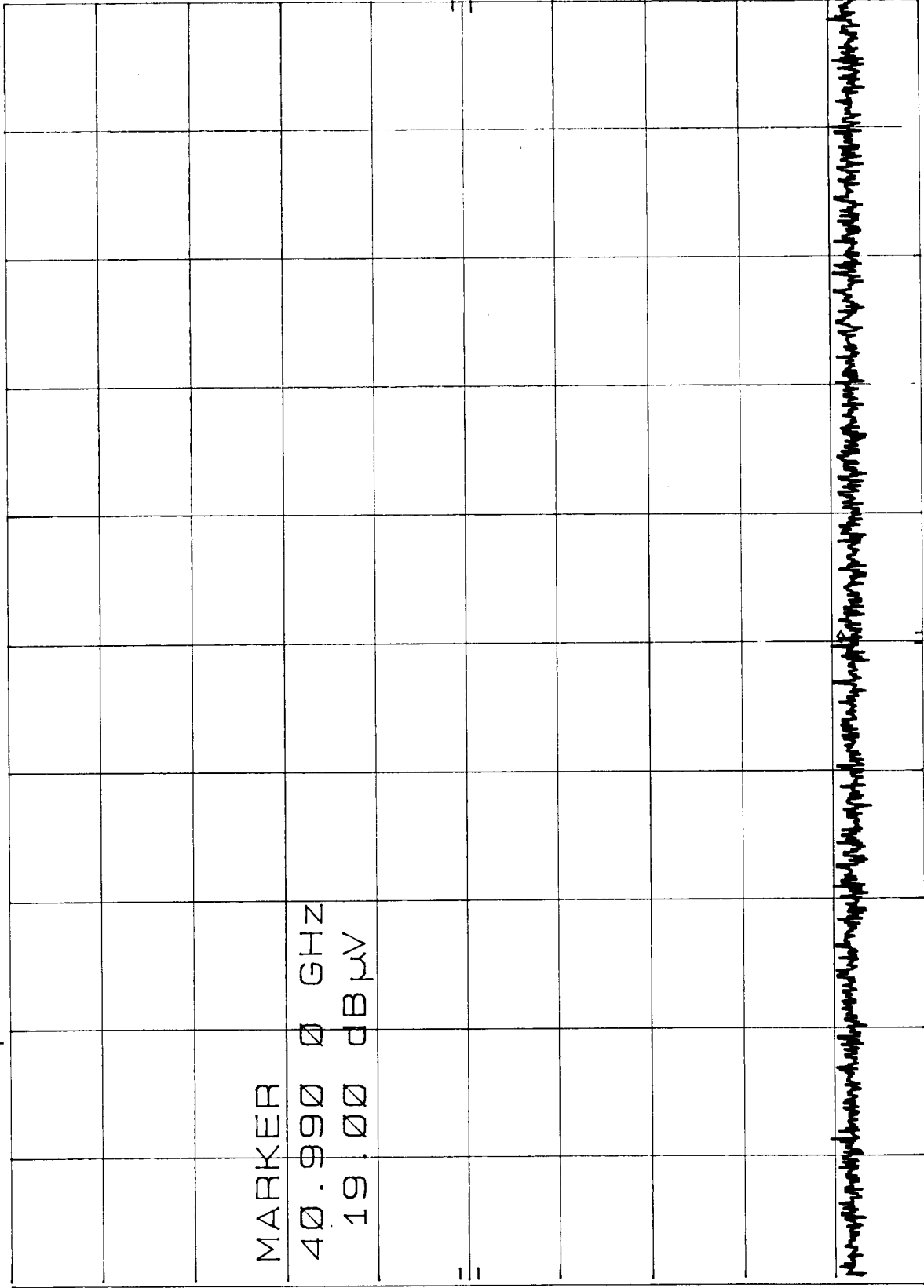
981124

MR 40.990 0 GHz
19.00 dBμV

REF 110.0 dBμV HARMONIC 10L

10 dB/

CNVLOSS
25.0
dB



CENTER 40.990 GHz
RES BW 10 kHz
SPAN 200 MHz
SWP 6.00 sec
VBW 10 kHz

6.

f5

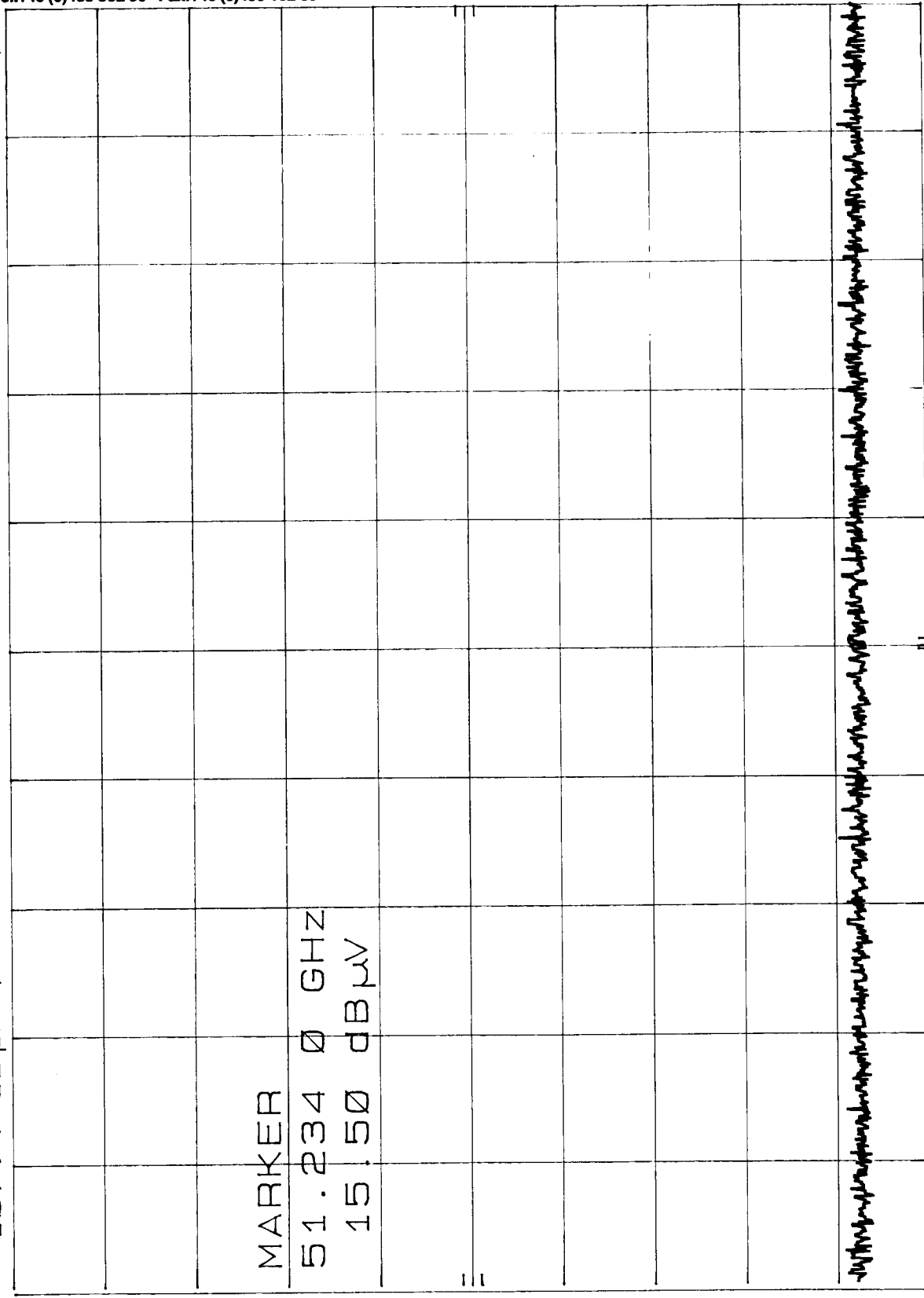
981124

HP MK-3 51.234 GHz
15.50 dBμV

REF 107.4 dBμV HARMONIC 10L

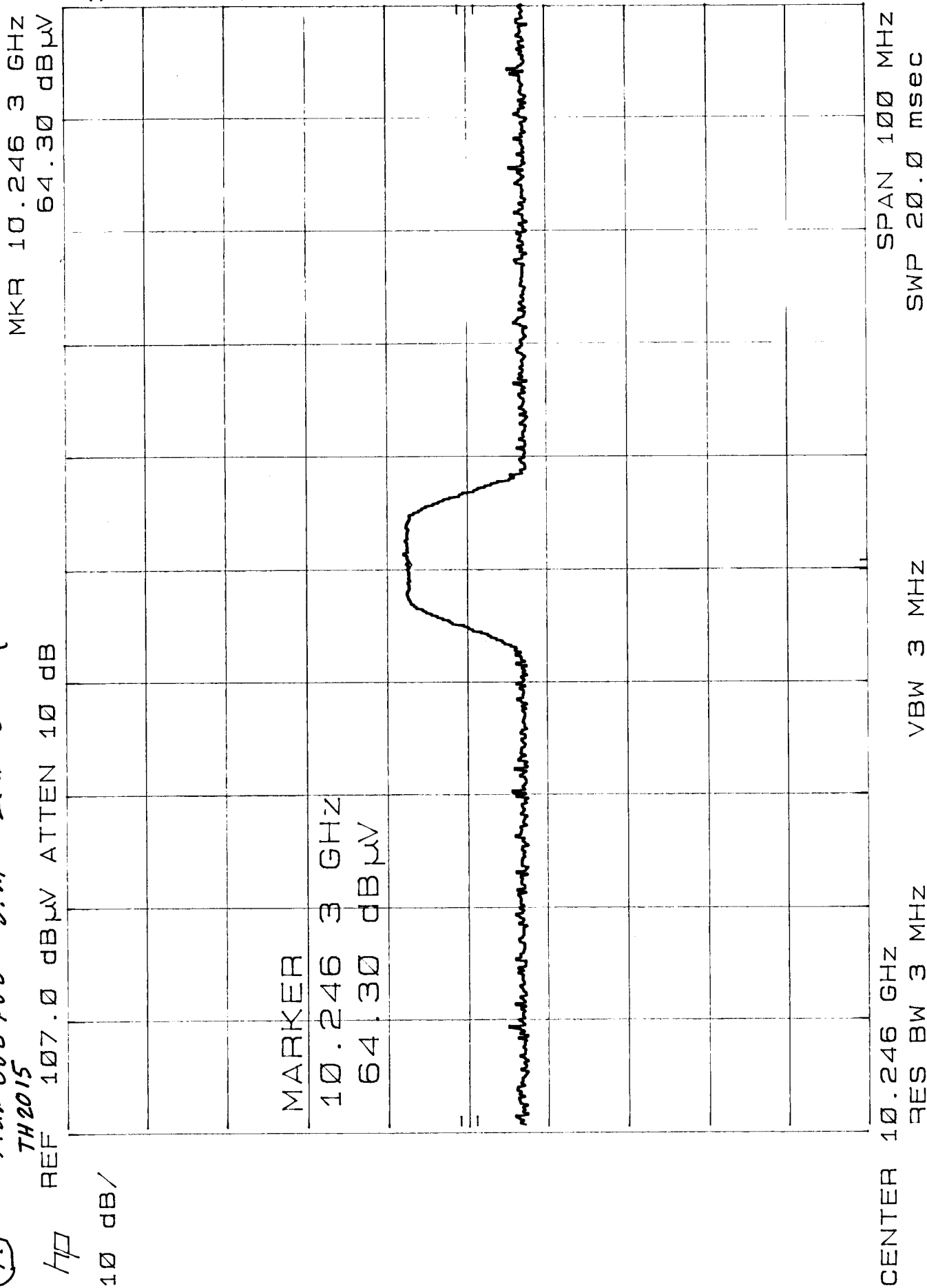
10 dB/

CNVLOSS
22.4
dB



CENTER 51.234 GHz RES BW 10 KHz
SPAN 200 MHz SWP 6.00 sec
VBW 10 KHz

7. Max output 3.m 2. dB Gain (sänd. ant 6" hor)
 TH2015
 REF 107.0 dBμV ATTN 10 dB
 10 dB/



981124

Bandbredd
 TH2015

8.

hp

5 dB/

