PS/RF/Note 83-6
24.8.1983

10,7 MHz MIXER PLUG IN

490008 LE

R. Barthélémy
R. Garoby

1. DESCRIPTION

This unit is modular made. It consists of 3 tinned iron boxes which contain and shield the printed circuit boards.

1.1. The 1st box contains an RF input amplifier (gain 6) to drive the following low pass filter, compensate its losses and reduce the S/N ratio.

1.2. The 2nd box contains a 5 poles Tchebycheff low pass filter (3 dB cut off frequency 4,1 MHz, ripple 0,1 dB, frequency rejection 10,7 MHz: - 54 dB 21,4 MHz - 85 dB). It is necessary to reject the out-of-band frequencies especially the image frequency.

1.3. The 3rd box contains:

1.3.1 A local oscillator amplifier to drive correctly, with the convenient level, the mixer (type HP 10514B). An adjustable capacitive feedback is applied to compensate, for the local oscillator, the feedthrough through the mixer (essentially useful with F_{Lo} near 10,7 MHz).

1.3.2 A quartz filter (TQF 2599 Toyo, center frequency 10,7 MHz, 3 dB band pass: 240 kHz, maximum ripple 1 dB) is used to select the 10,7 MHz component of the mixer output.

1.3.3 The impedance adaptation and insertion loss compensation is made by a commercial transformer (Mini Circuit TMO 16A).

1.3.4 The output amplifiers provide 2 × 180° out-of-phase outputs and a high impedance test one.

1.4. A brass plate on each side of the plug-in gives a good ground plane and decreases the 50 Hz modulation.

2. ADJUSTMENT

2.1. Measuring equipment, see separate drawing.

2.2.

2.2.1 Adjust seep from 10,9 MHz to 12 MHz

2.2.2 Set on spectrum analyser - start freqency 10,5 MHz, stop frequency 15 MHz.

2.2.3 Adjust in the mixer box (A31) C 19 capacitive trimmer to obtain minimum value of the parasitic side band signal especially with $F_{Lo} \approx 11,1$ MHz.

3. SPECIFICATIONS

Input RF 400 kHz → 4 MHz
- 77 dBm → 3 dBm (see curve)

Input Lo 11,1 MHz → 14,7 MHz
10 dBm

Output 10,7 MHz
- 65 dBm → + 15 dBm (see curve)

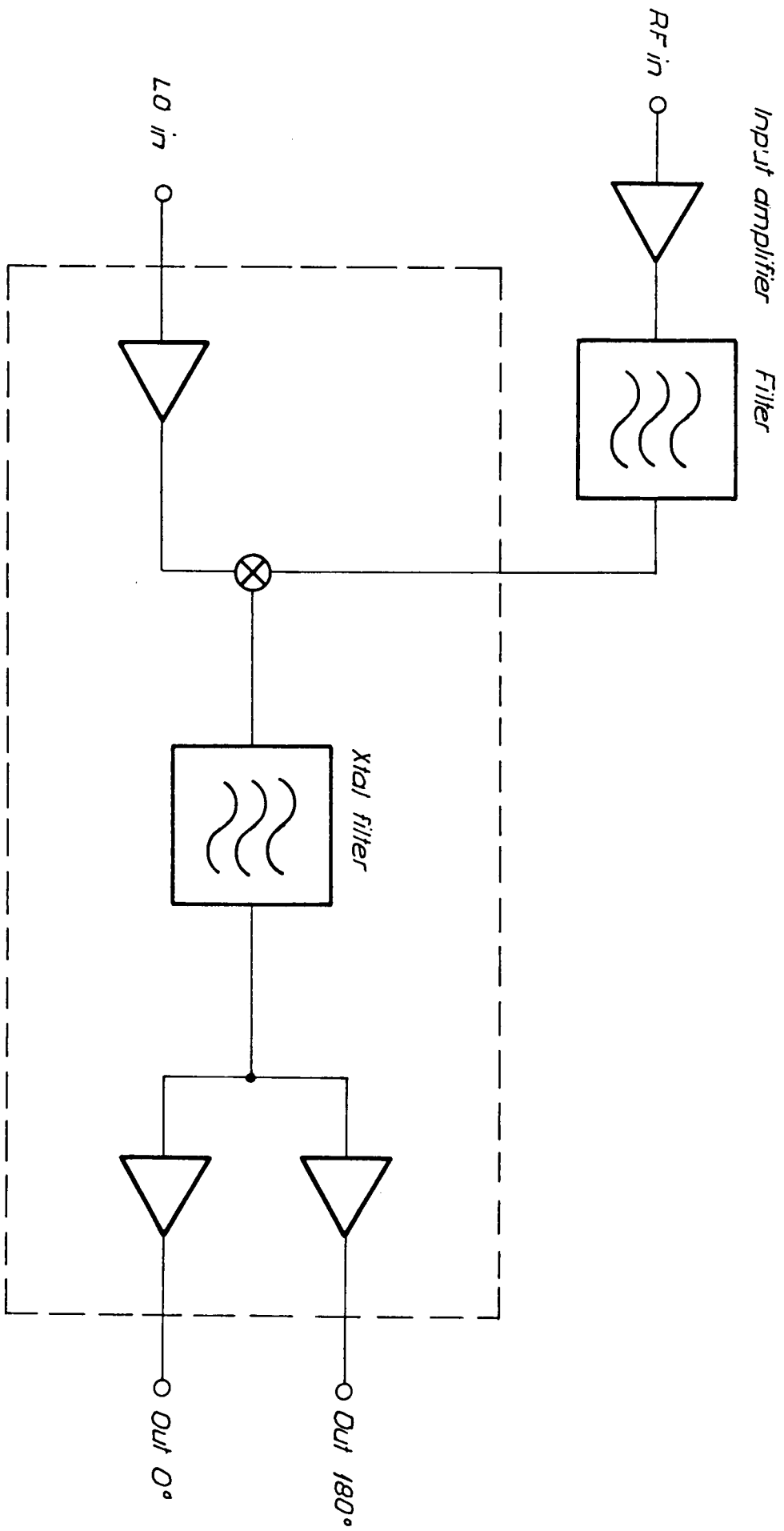
Input - Output linearity, see curve

Maximum side band level dBm for MHz (see photo)

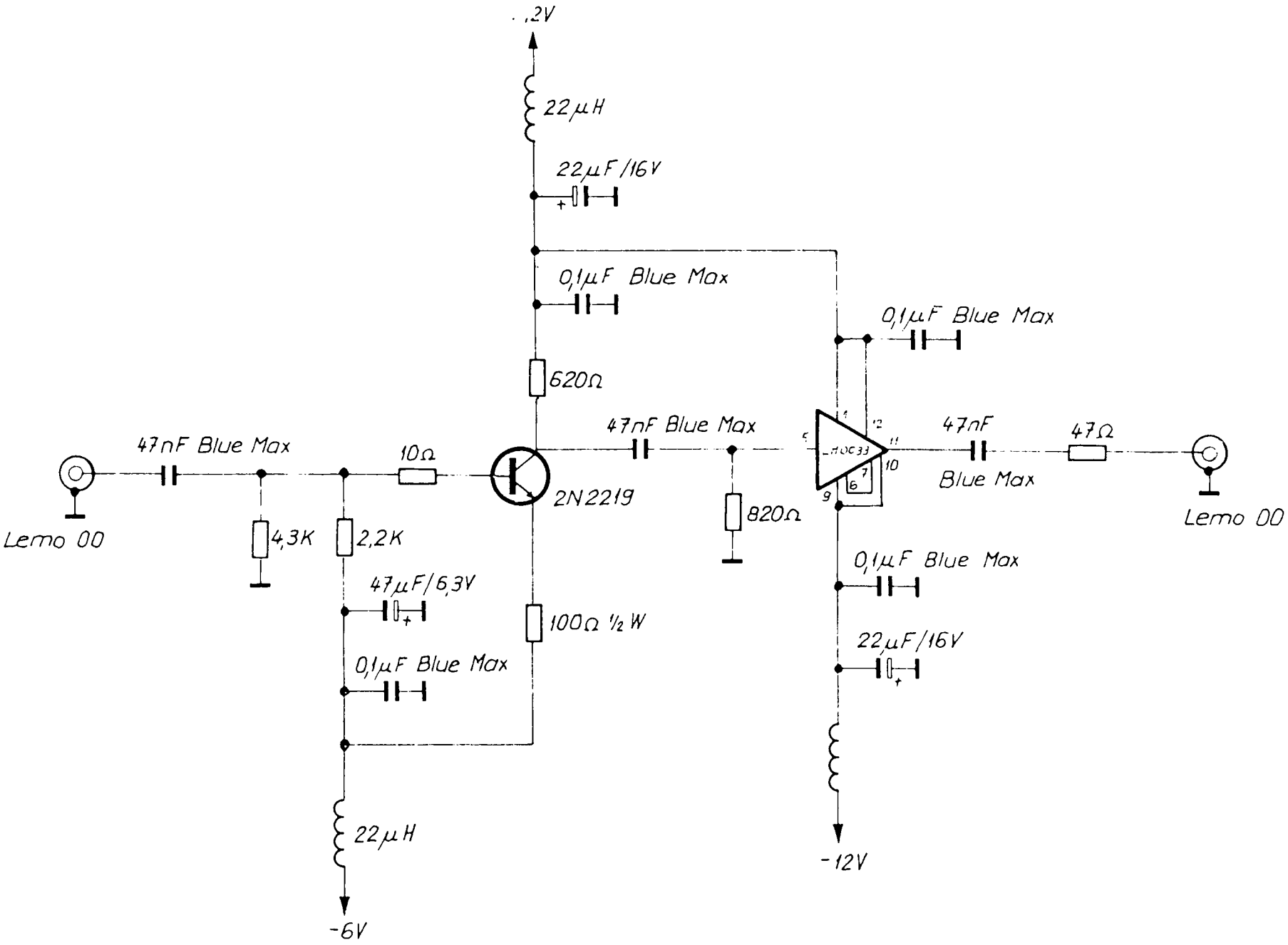
Input noise dBm/Hz for dBm RF input (see photo)

EDITIONS

y. 1.6.82 Padova



TITLE	SCALE					
LEAR Input mixer		CERN MPS DOCU	4 90.008	LE 201	4	
OLD NUMBER						4

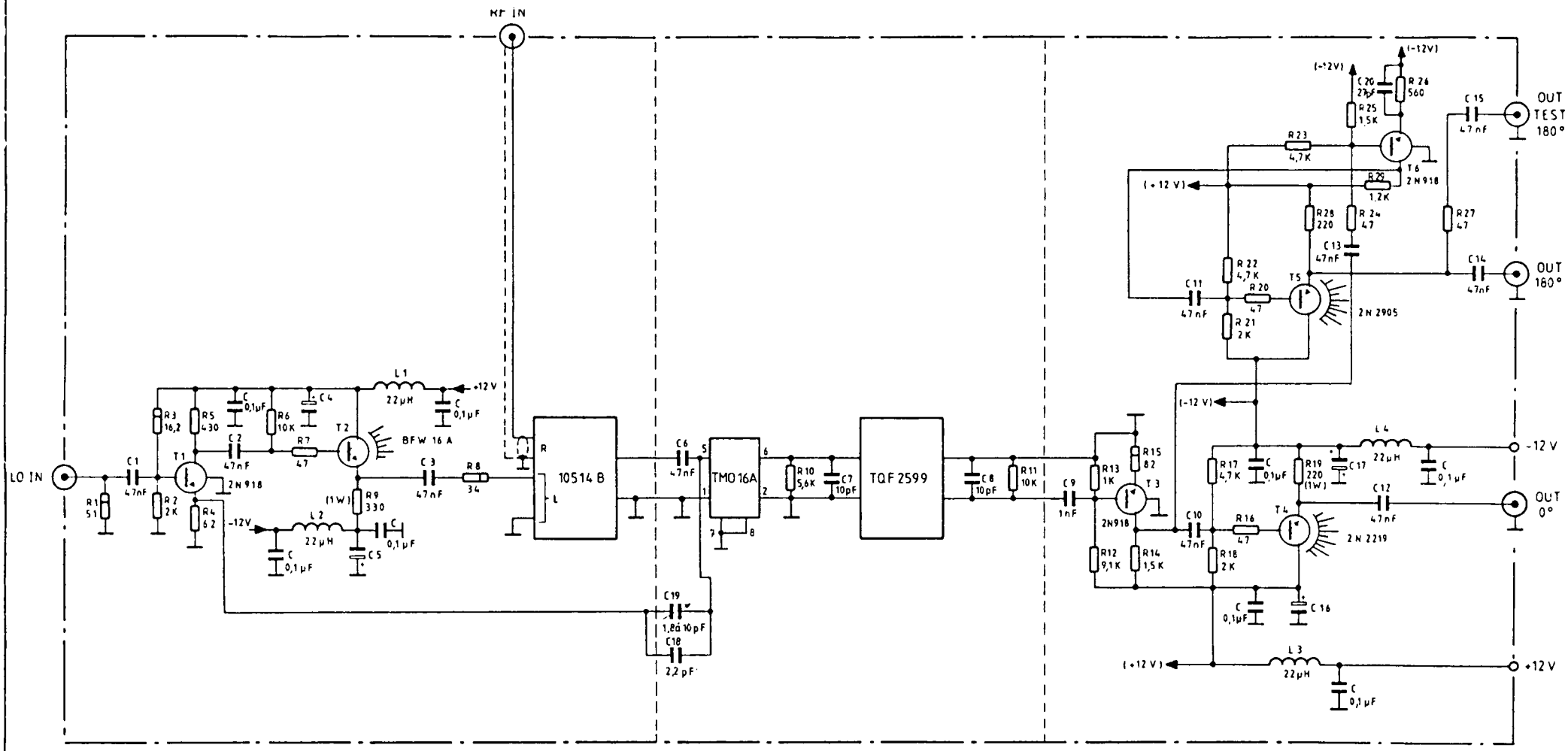


4	90.008	LE	2	02	4		4

TITLE LEAR Mixer Input Amplifier SCALE

EDITIONS

1/ 28.5.82 Jacobsen



RESISTORS

R 1, 3, 8, 15 SFERNICE 1/8 W - 1%

R 2, R4 ÷ R7, R9 ÷ R14 R16 ÷ R28 AB 1/4 W - 5%

CAPACITORS

C = 0,1µF CERAMIC

C1 ÷ C3, C6 ÷ C15, C18, C20 CERAMIC

C4, C5, C16, C17 TANTALE PERLE 20 V

C19 Ajustable Scem 10 02 16 205 9

TRANSISTORS

T1, T3, T6	2N 918
T2	BFW 16 A
T4	2N 2219
T5	2N 2905

LEMOS

LEMOS Scem. 09 46 11 180 6

CHOCKES

ALL CHOCKES PHILIPS Scem 07 91 17 256 0

INDICE	DATE	NOM	ZONE	MODIFICATION

INPUT MIXER

ECHELLE SCALE

DESSINE Gonzalez A. 14 - 4 - 82

CONTROLE

REMPLACE

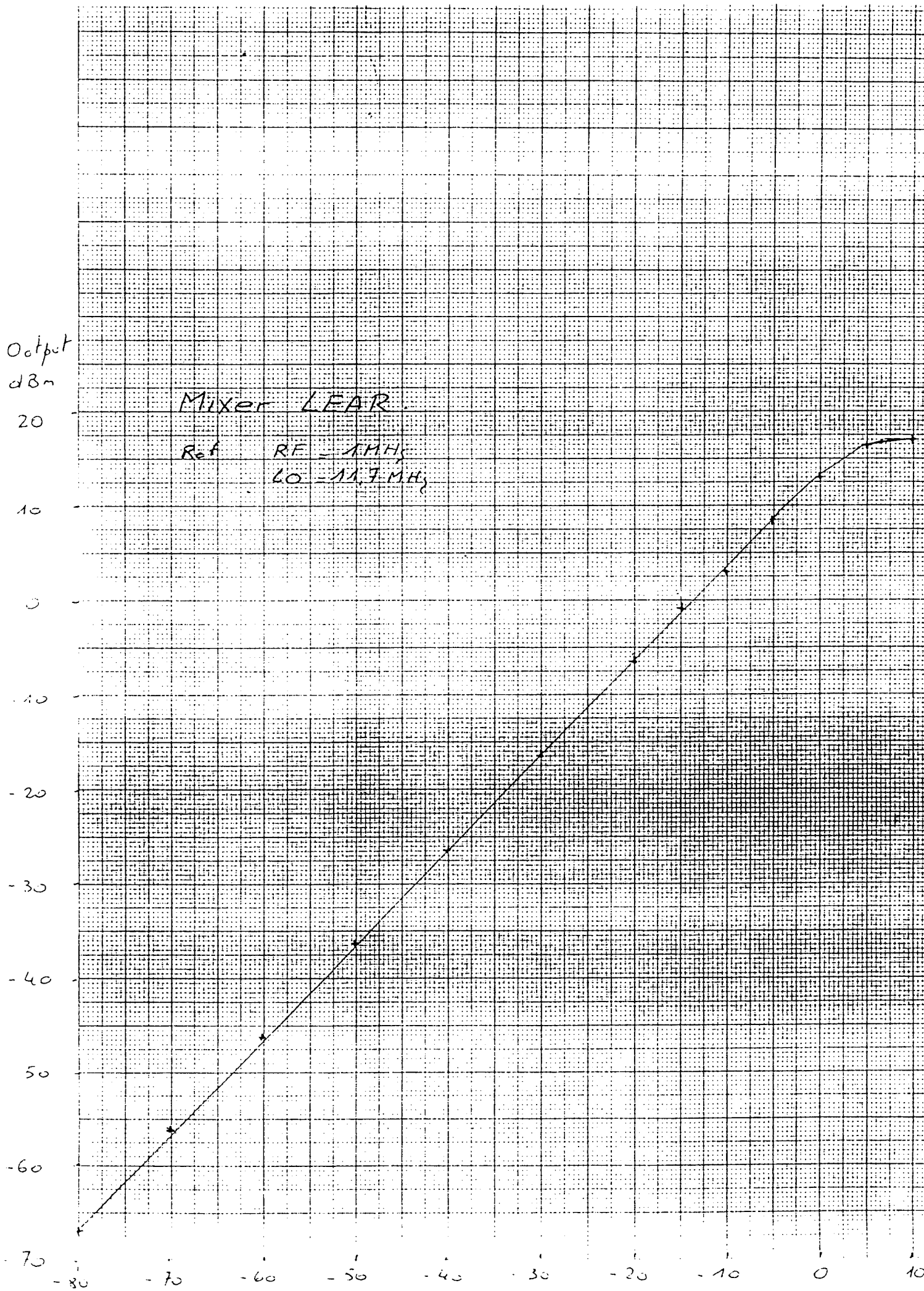
REMPLACÉ PAR

RÉDUCTION

ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
CERN - DIV. TEL (022) 83 61 11

490 008 LE 203 3

INDICE A


Output
dBm
Mixer LEAR.
Ref RF = 1MHz
LO = 11,7 MHz
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-70
-60
-50
-40
-30
-20
-10
0
10