Student 1 – Name **Student 2 – Name** **Group Date/hour**

FIRST LABORATORY
AMPLITUDE MODULATED SIGNALS WITH HARMONIC CARRIER SIGNAL

A) Determining the division factor

OUTPUT LEVEL [dBm] = θ =

B) Determination of the modulation index using spectral measurements

$A_{M,ef}$ [V]	$A_{-1,ef}$ [dBm]	$A_{0,ef}$ [dBm]	$A_{1,ef}$ [dBm]	$A_{-1,ef}$ [V]	$A_{0,ef}$ [V]	$A_{1,ef}$ [V]	m_{-1}	m_1
0,6								
1,0								
1,4								
1,8								

C) Determination of the modulation index using measurements in time domain

A_M [V_{rms}]	$2A_{max}$ [V]	$2A_{min}$ [V]	m	m [%]
0,6				
1,0				
1,4				
1,8				

A_M = 0,6 V_{rms}

A_M = 1,0 V_{rms}

A_M = 1,0 V_{rms} triangular signal

A_M = 1,4 V_{rms}

A_M = 1,8 V_{rms}

A_M = 1,0 V_{rms} rectangular signal

D) The measurement of the bandwidth occupied by the AM signal, B_{MA} , using the spectrum analyzer

$B_{MA} =$ $B_m =$

Observation:

E) The bandwidth of the amplitude modulated signal generator is measured

f_m [kHz]	5	7	9	15	20	30	40	50		
F_1 [kHz]	505	507	509							
A_1 [dBm]	−16.47									
F_{-1} [kHz]	495	493	491							
A_{-1} [dBm]	−16.47									

$B_{MA} =$

F) Rectangular message signal **G)** $B_{MA} =$ **H)**

k	F_{-k} [kHz]	$A_{-k,ef}$ [dBm]	$A_{-k,ef}$ [V]	F_k [kHz]	$A_{k,ef}$ [dBm]	$A_{k,ef}$ [V]
1	495			505		
2	490			510		

k	$A_{k,p,ef}$	$\frac{A_{k,p,ef}}{A_{1,p,ef}}$	$\frac{A_{-k,ef}}{A_{-1,ef}}$	$\frac{A_{k,ef}}{A_{1,ef}}$	m_{-k}	m_k
1						
2						

I) Triangular message signal $B_{MA} =$

k	F_{-k} [kHz]	$A_{-k,ef}$ [dBm]	$A_{-k,ef}$ [V]	F_k [kHz]	$A_{k,ef}$ [dBm]	$A_{k,ef}$ [V]
1	495			505		
2	490			510		

k	$A_{k,p,ef}$	$\frac{A_{k,p,ef}}{A_{1,p,ef}}$	$\frac{A_{-k,ef}}{A_{-1,ef}}$	$\frac{A_{k,ef}}{A_{1,ef}}$	m_{-k}	m_k
1						
2						

K) The characteristic of the modulator is drawn $m = f(A_m)$ **on millimeter paper.** $K_A =$

K) The amplitude spectrum of the MA signal is drawn on a millimeter sheet for all effective values of the amplitude of the message signal

L) The power of the modulated signal for the sinusoidal modulating signal

A_m [V]	P_1 [mW]	P_2 [mW]	$X_{1\text{ef}}$ [V]	$X_{2\text{ef}}$ [V]	P_{U1} [mW]	P_{U2} [mW]	$\frac{P_{U1}}{P_1}$	$\frac{P_{U2}}{P_2}$
0,6								
1,0								
1,4								
1,8								

M) The spectrums of normalized amplitudes $\frac{A_k}{A_0}$ and $\frac{A_k}{A_1}$ according to frequency, for the MA signal, respectively $\frac{A_{k,p}}{A_{1,p}}$ for the modulating signal, are drawn on a millimeter sheet.

N) The power of the MA signal with a rectangular message signal

P_1 [mW]	P_2 [mW]	$X_{1\text{ef}}$ [V]	$X_{2\text{ef}}$ [V]	P_{U1} [mW]	P_{U2} [mW]	$\frac{P_{U1}}{P_1}$	$\frac{P_{U2}}{P_2}$

O) The power of the MA signal with a triangular message signal

P_1 [mW]	P_2 [mW]	$X_{1\text{ef}}$ [V]	$X_{2\text{ef}}$ [V]	P_{U1} [mW]	P_{U2} [mW]	$\frac{P_{U1}}{P_1}$	$\frac{P_{U2}}{P_2}$