Date 5/2/21 Expt. No. 2

Expt. Name Envelope detector Page No. 3

EXPERIMENT-2

AM Transmission - Envelope Detector

Aim:

a) Change the modulation index values and increase it upto 4 to see the changes in output signal.

b) Switch off the carrier wave ŝ.

c) Change the phase and frequency of carrier wave one by one, Keep phase value as 45, 60, 90 and frequency as 30, 60, 120 KHz.

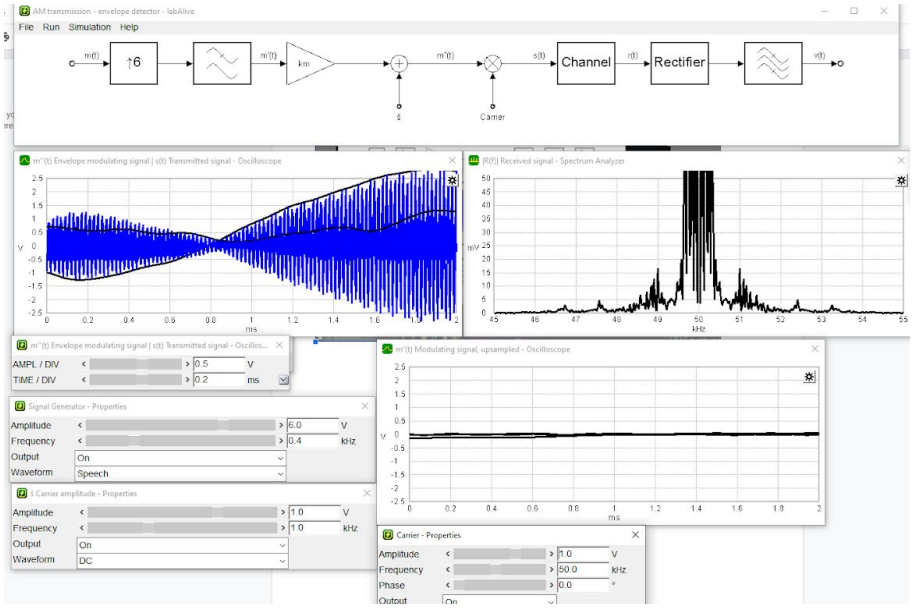
Online / Virtual Lab:

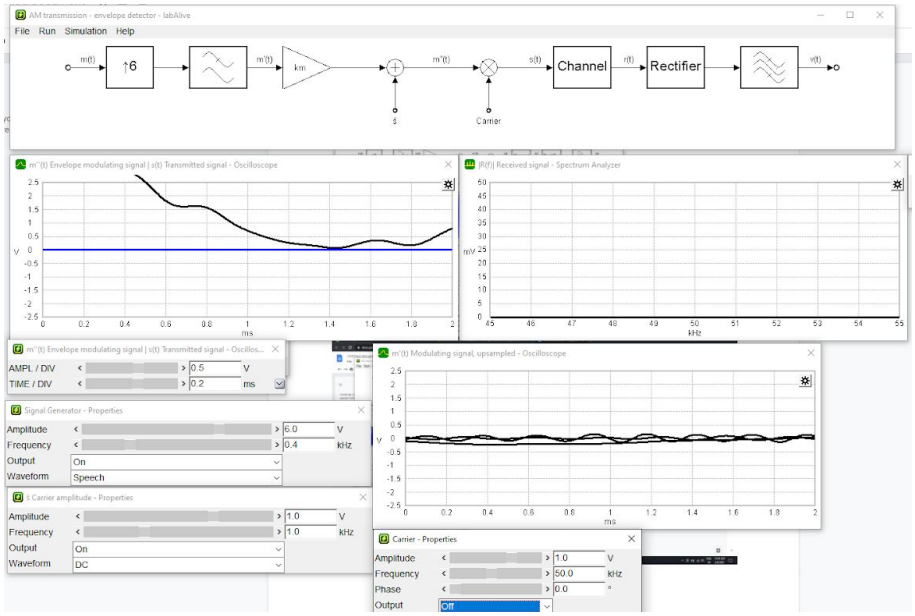
1) Java Runtime Environment.
2) LabAline Online Simulator.

Theory:

The crystals capability to rectify signals caused amplitude modulation to become the prevelent method to send the messages and reciere them. The amplitude of a high frequency carreier is modified by low freq. information signal, which is detected afterwards by rectification. An easy way to recover the message

Teacher's Signature:


AM transmission - envelope detector - labAlive
File Run Simulation Help
m(t)
↑6
m'(t)
km
m''(t)
s(t)
Channel
r(t)
Rectifier
v(t)
Carrier
m''(t) Envelope modulating signal | s(t) Transmitted signal - Oscilloscope
|R(f)| Received signal - Spectrum Analyzer
m''(t) Envelope modulating signal | s(t) Transmitted signal - Oscillos...
AMPL / DIV 0.5 V
TIME / DIV 0.2 ms
m'(t) Modulating signal, upsampled - Oscilloscope
Signal Generator - Properties
Amplitude 6.0 V
Frequency 0.4 kHz
Output On
Waveform Speech
Carrier amplitude - Properties
Amplitude 1.0 V
Frequency 1.0 kHz
Output On
Waveform DC
Carrier - Properties
Amplitude 1.0 V
Frequency 50.0 kHz
Phase 0.0 °
Output On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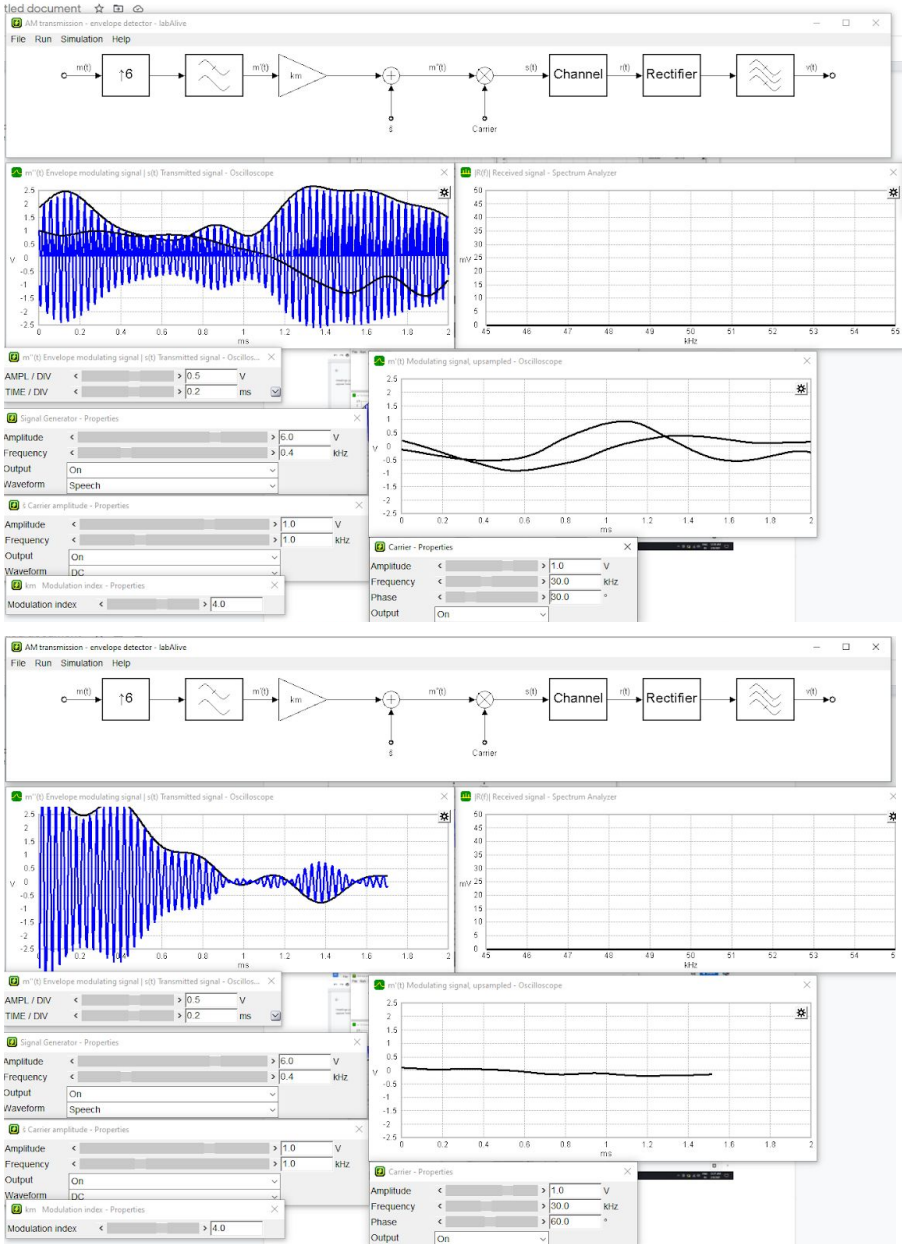
Amplitude 1.0 V
Frequency 1.0 kHz
Output On
Waveform DC
Carrier - Properties
Amplitude 1.0 V
Frequency 50.0 kHz
Phase 0.0 °
Output Off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AMPL / DIV
TIME / DIV
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Amplitude
Frequency
Output
Waveform
Speech
$ Carrier amplitude - Properties
km Modulation index - Properties
Modulation index
Carrier - Properties
Phase

AM transmission - envelope detector - labAlive
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Modulation index
Carrier - Properties
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Signal is the envelope detection. This non-coherent detection doesn't require a carrier recovery circuit.

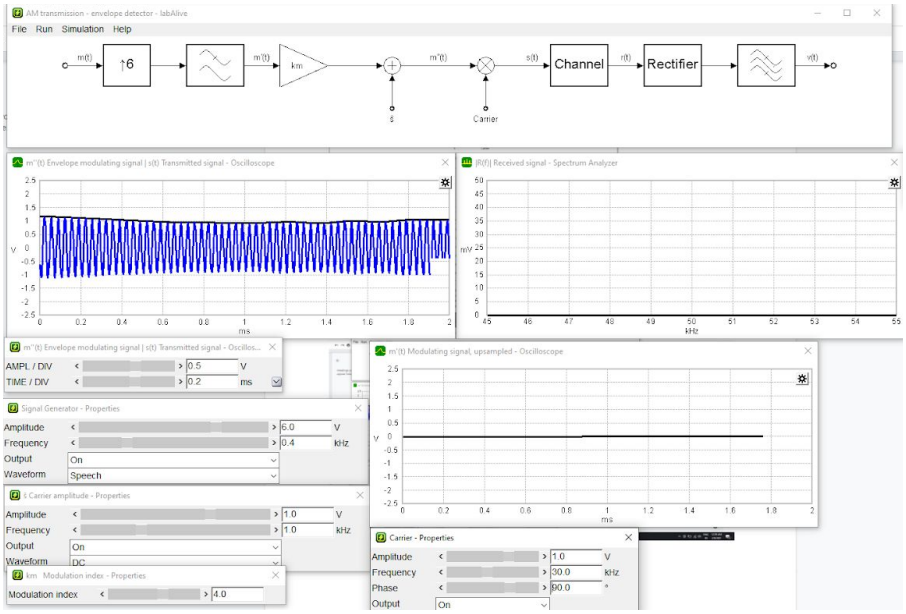
Procedure :

- Switch on the source and carrier wave.
- Adjust the modulation index and observe the spectrum analyser and oscilloscope.
- Observe the change in waveform by changing the value of modulation index to 4.
- Switch off the carrier and observe the change in output signal.
- Change the frequency of carrier wave to 30KHz and phase to 30°.
- Increase the values to 60° and 90° and repeat.

Observations:

All the changes are seen in the simulator representing waveforms in oscilloscope.

Teacher's Signature:_____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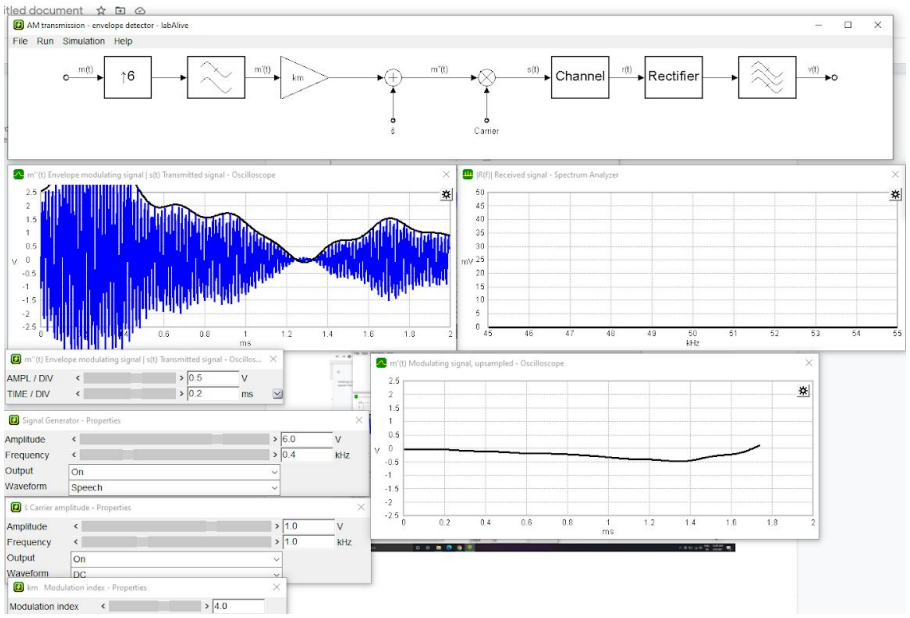
Amplitude 1.0 V
Frequency 1.0 kHz
Output On
Waveform DC
Carrier - Properties
Amplitude 1.0 V
Frequency 30.0 kHz
Phase 90.0 °
Output On
km Modulation index - Properties
Modulation index 4.0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Waveform DC
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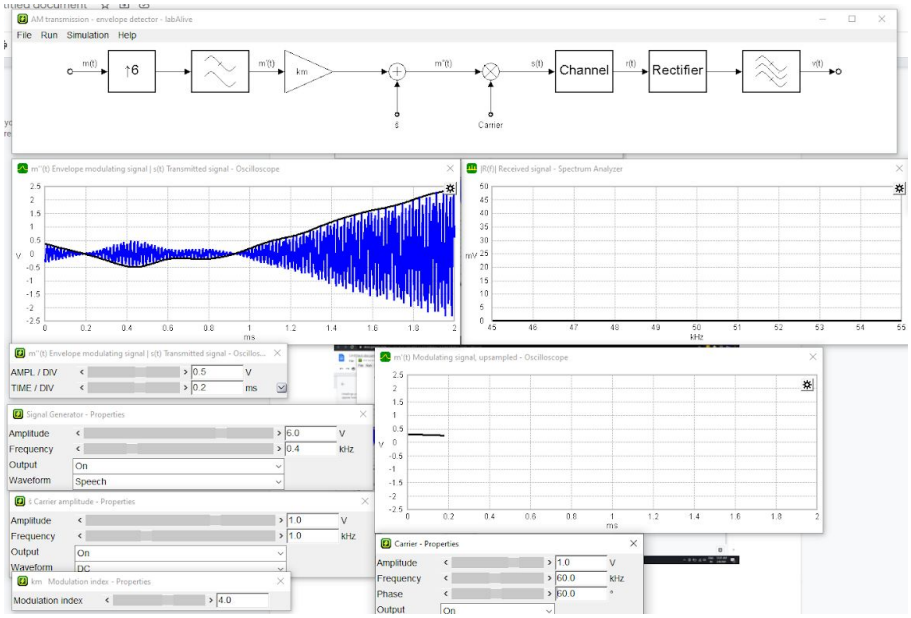
Modulation index 4.0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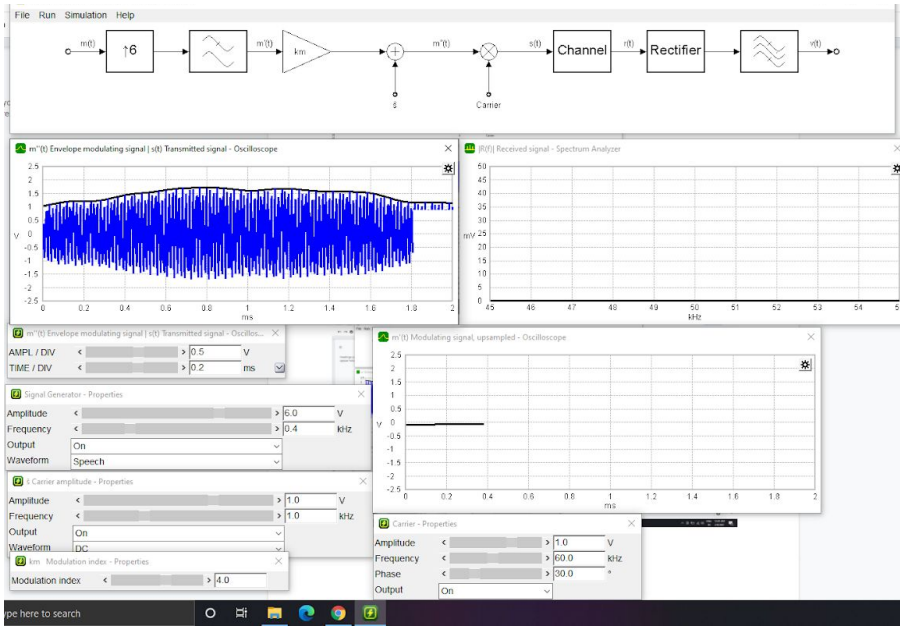
Amplitude 1.0 V
Frequency 1.0 kHz
Output On
Waveform DC
km Modulation index - Properties
Modulation index 4.0
Carrier - Properties
Amplitude 1.0 V
Frequency 60.0 kHz
Phase 60.0 °
Output On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Frequency 60.0 kHz
Phase 30.0 °
Output On
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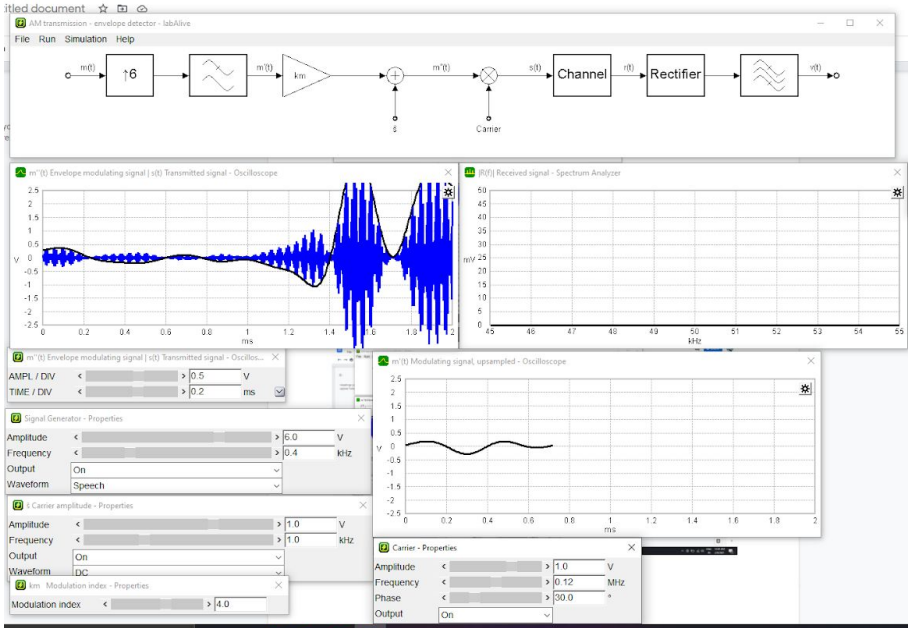
Modulation index 4.0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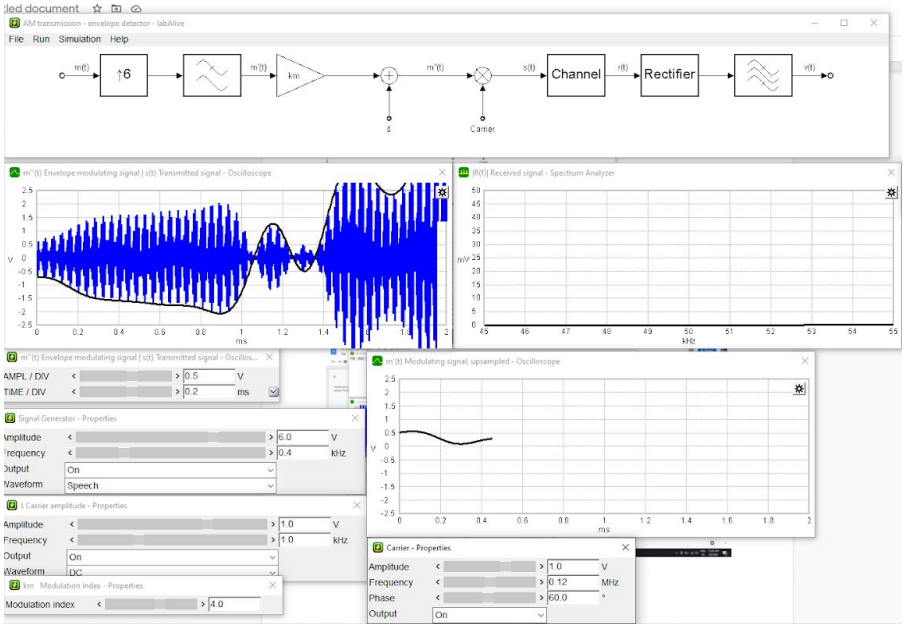
Signal Generator - Properties
Amplitude 6.0 V
Frequency 0.4 kHz
Output On
Waveform Speech
Carrier - Properties
Amplitude 1.0 V
Frequency 0.12 MHz
Phase 30.0 °
Output On
km Modulation index - Properties
Modulation index 4.0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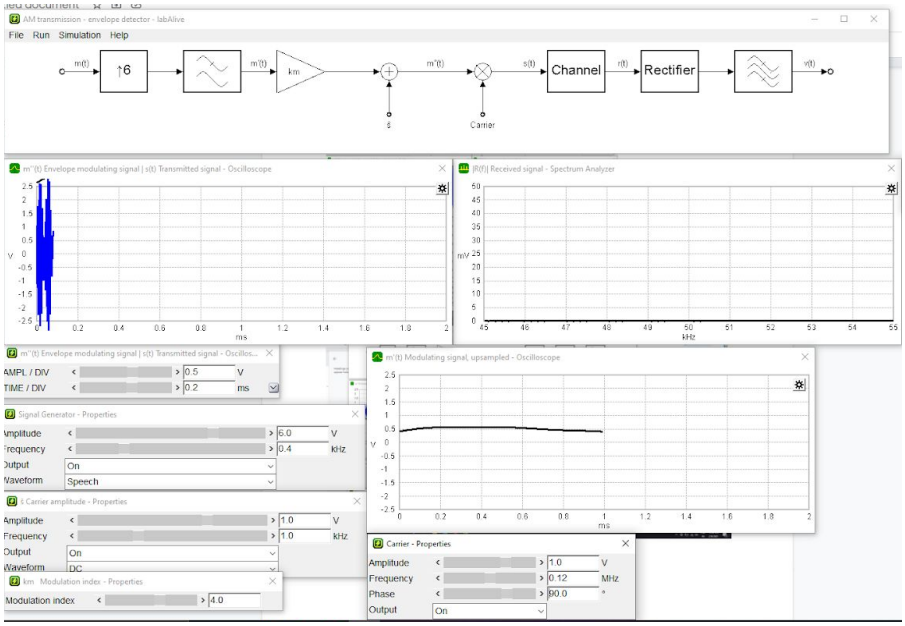
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Carrier - Properties
Amplitude 1.0 V
Frequency 0.12 MHz
Phase 90.0 °
Output On