

Modulation Waveforms Lab Report

EXPERIMENT CP-SRP EE20017

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1 Introduction

Introduce the topic of your report and provide background information.

2 Modulation Tests

A square wave and triangle wave were generated and modulated using an AM modulator. The modulated waveforms were then observed in MATLAB where the [Peak Envelope Power \(PEP\)](#) and [Peak to Average Power Ratio \(PAPR\)](#) were derived with the following code:

```
1 % AM Power
2 R = 50; % Ohms
3 AM_Power = (AM_time.^2) / (2*R); % RMS Power in Watts V^2/2R
4 % Peak Envelope Power
5 PEP = max(AM_Power)
6 % Peak to Average Power Ratio
7 PAPR = PEP/mean(AM_Power)
```

2.1 Results

Square Wave

- [PEP](#): 134.5mW
- [PAPR](#): 4.74

Triangular Wave

- [PEP](#): 369.6mW
- [PAPR](#): 8.14

3 Demodulation/detection

3.1 AM detection

Phase offset in receiver carrier

Frequency offset in receiver carrier

4 Orthogonal Frequency Division Multiplexing (OFDM)

4.1 OFDM Baseband Signal

"S" Symbol @ 1V

- [PEP](#): 287.8mW
- [PAPR](#): 8.22

"S" Symbol @ 2.5V

- [PEP](#): 1.8W
- [PAPR](#): 8.22

4.2 64-QAM on OFDM

- [PEP](#): 1003W
- [PAPR](#): 6.64