Modulation Waveforms Lab Report

EXPERIMENT CP-SRP EE20017

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Contents

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:

```
% AM Power
R = 50; % Ohms
AM_Power = (AM_time.^2) / (2*R); % RMS Power in Watts V^2/2R
% Peak Envelope Power
PEP = max(AM_Power)
% Peak to Average Power Ratio
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: 41.44W
- PAPR: 8.22

”S” Symbol @ 2.5V

- PEP: 1.8W
- PAPR: 8.22

4.2 64-QAM on OFDM

Symbols	PEP	PAPR
”X”	141W	2
”+”	150W	3.99
”Y”	425W	3.99
”¡”	11.4WW	3.97
”3”	57.4W	3.98
”X+Y¡3”	1372W	5.92