Microwave Amplifier OIP3 Report

Template: see website for instructions

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*Abstract*— *See the website for all of the detailed requirements.* ***Project reports may not exceed 2-page limit***. The project web-page information overrides any information contained in this template. This report summarizes the topic of your report ...,. The source of every item copied into the report must be cited. All figures must be clear and legible as would be submitted for IEEE publication. The examples in this template are not necessarily up to such clear and legible standards. You must include references in the bibliography for any formulas used.

# Introduction

The first paragraph introduction should begin with an overall description of the “big picture” of the project topic, similar to the content in the abstract above, but stated somewhat differently and less details. bla blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah

The second paragraph of the introduction should explain the organization of the rest of the paper. In the next section we describe the theory, ...blah blah. In Section III, we discuss various implementations of the whatever. The following section describes simulations/measured/whatever ... blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah

# Theory

The theoretical formula for OIP3 is:

OIP3 = Plin + (Plin-P3rd)/2  (1)

where OIP# is output third order intercept point in dBm, Plin is finish this sentence describing your formula. blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah

# Simulation Results

First, say what the schematic is. In this project, we were provided with an ADS design simulating OIP3 spectra for an amplifier. The ADS harmonic balance simulator allowed simulation of nonlinear behavior. The ADS specifications for the amplifier are given in Table I.

1. ADS amplifier Specifications

| Parameter | Value |
| --- | --- |
| |S21| in dB (gain in dB) | ??? dB |
| Third order output intercept | ??? dBm |
| Noise figure | ??? dB |

The amplifier was simulated in ADS, with the schematic shown in Fig. 1, with the input frequency spectrum shown in Fig. 2.



Fig. 1. Schematic of amplifier OIP3 simulation. Include whatever is required and describe what is in this figure blah, blah, blah ... Fix all captions!!



Fig. 2. Simulation input frequency spectrum. Include whatever is required and describe what is in this figure... Fix all captions!!

The two input frequencies and power levels are shown in Fig. 2 are given in Table II.

1. Simulation Input frequencies and Power

| Parameter | Frequency | Power |
| --- | --- | --- |
| Input frequency 1 and power level | zz?? GHz | zz dBm?? |
| Input frequency 2 | zz?? GHz | zz dBm?? |



Fig. 3. Simulation output frequency spectrum. Include whatever is required and describe what is in this figure... Fix all captions!!

The output spectrum of Fig. 3 shows the amplified input frequencies, plus two third-order frequencies. The frequencies and power levels of the two lowest frequencies in the output frequency spectrum of Fig. 3 are shown in Table III.

1. Simulation Input frequencies and Power

| Parameter | Frequency | Power |
| --- | --- | --- |
| Lowest frequency and power level | zz?? GHz | zz dBm?? |
| 2nd Lowest frequency and power | zz?? GHz | zz dBm?? |

Using (1), the third order intercept can now be calculated from the data in Table II and Table III, and is given in Table IV.

1. Calculated Third Order Output Intercept

| Parameter | Value |
| --- | --- |
| Calculated OIP3 | xx dBm?? |
| TOI from Table I | xx dBm?? |

# Conclusion

Summarize any problems you may have encountered, or summarize what you learned from the items discussed in this paper. Dont forget to include your references, one must bea journal or conference paper. Do not use websites as references, all figures must be sourced from conference or journal papers.

##### References

*At least 1 reference must be Pozar*

1. T.P. Weldon, J.M.C. Covington III, K.L. Smith, and R.S. Adams ``Performance of Digital Discrete-Time Implementations of Non-Foster Circuit Elements,'' *2015 IEEE Int. Sym. on Circuits and Systems*, Lisbon, Portugal, May 24-27, 2015.
2. T.P. Weldon, J.M.C. Covington III, K.L. Smith, and R.S. Adams, ``Stability Conditions for a Digital Discrete-Time Non-Foster Circuit Element,'' *2015 IEEE Int. Symposium on Antennas and Propagation*, Vancouver, BC, Canada, July 19-25, 2015.