PAC and PSS Simulation Results: Ratio of Sideband to Harmonic Amplitudes [1]
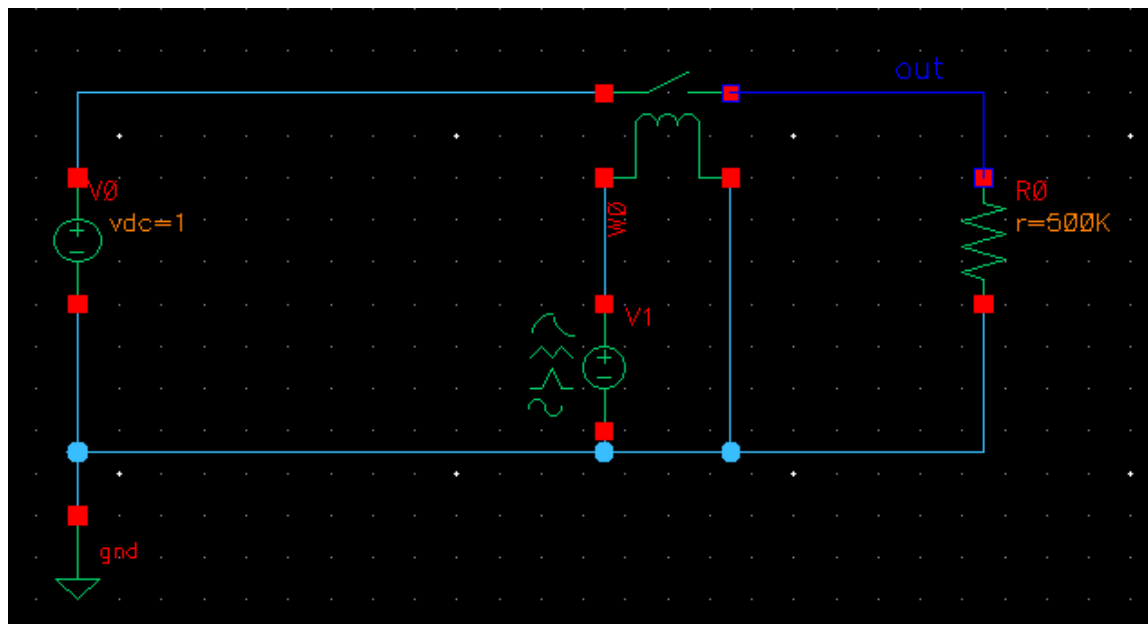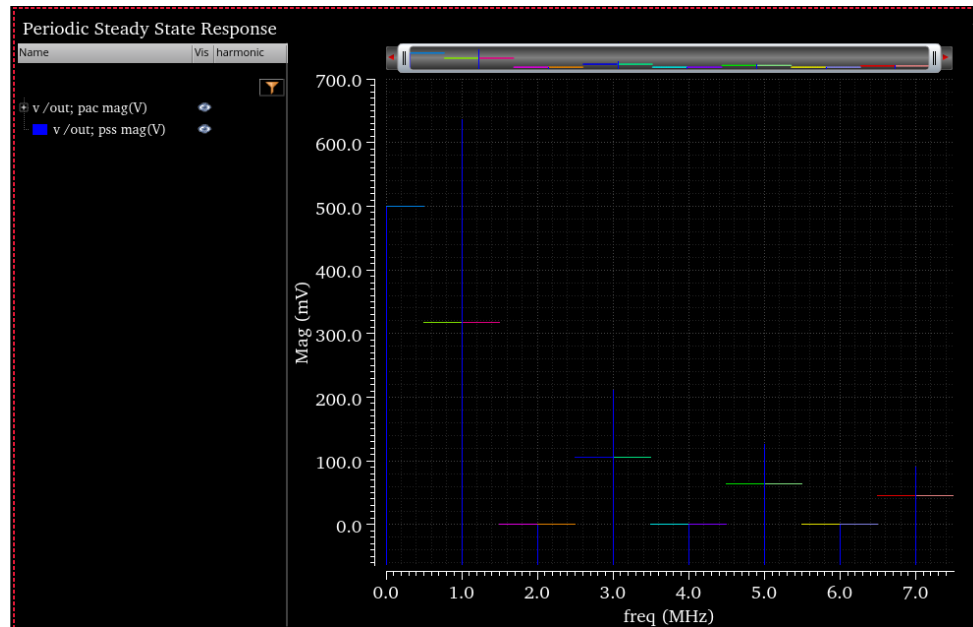

"So I use this simple circuit with a switch that commute at 1Mhz, and applied a 1V PAC signal on V0
I launched a PSS and then PAC simulation with input sweep from 0 to 500kHz."

[1] https://community.cadence.com/cadence_technology_forums/f/mixed-signal-design/56859/pac-simulation-results
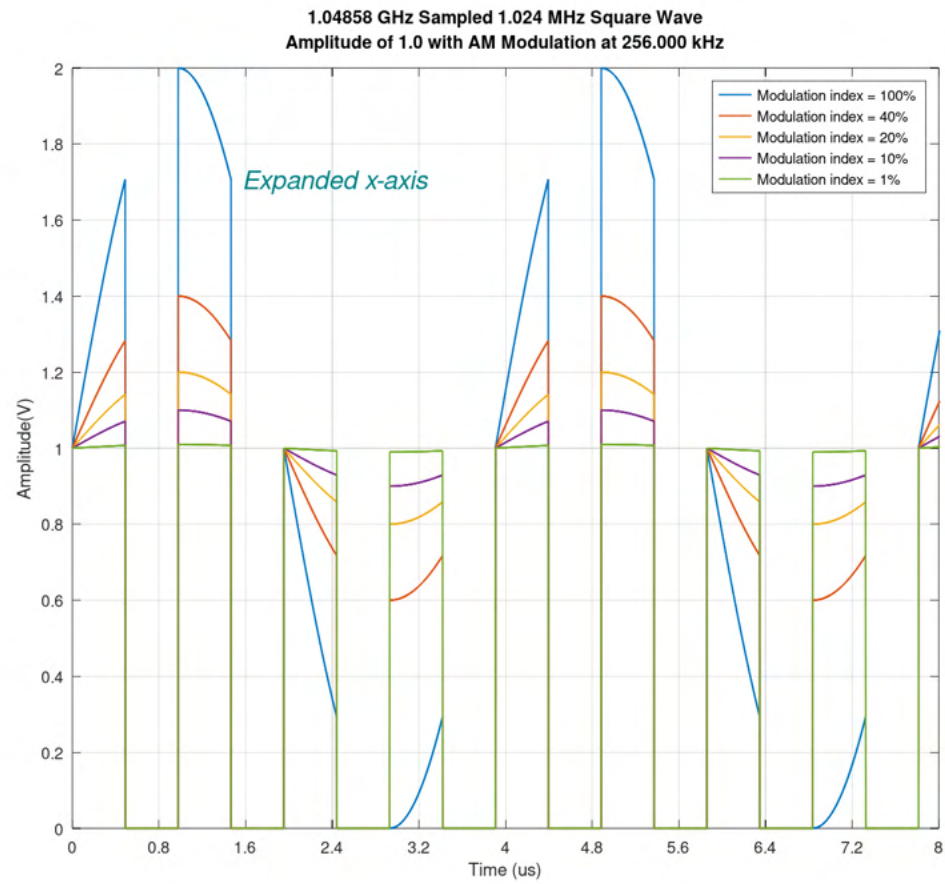
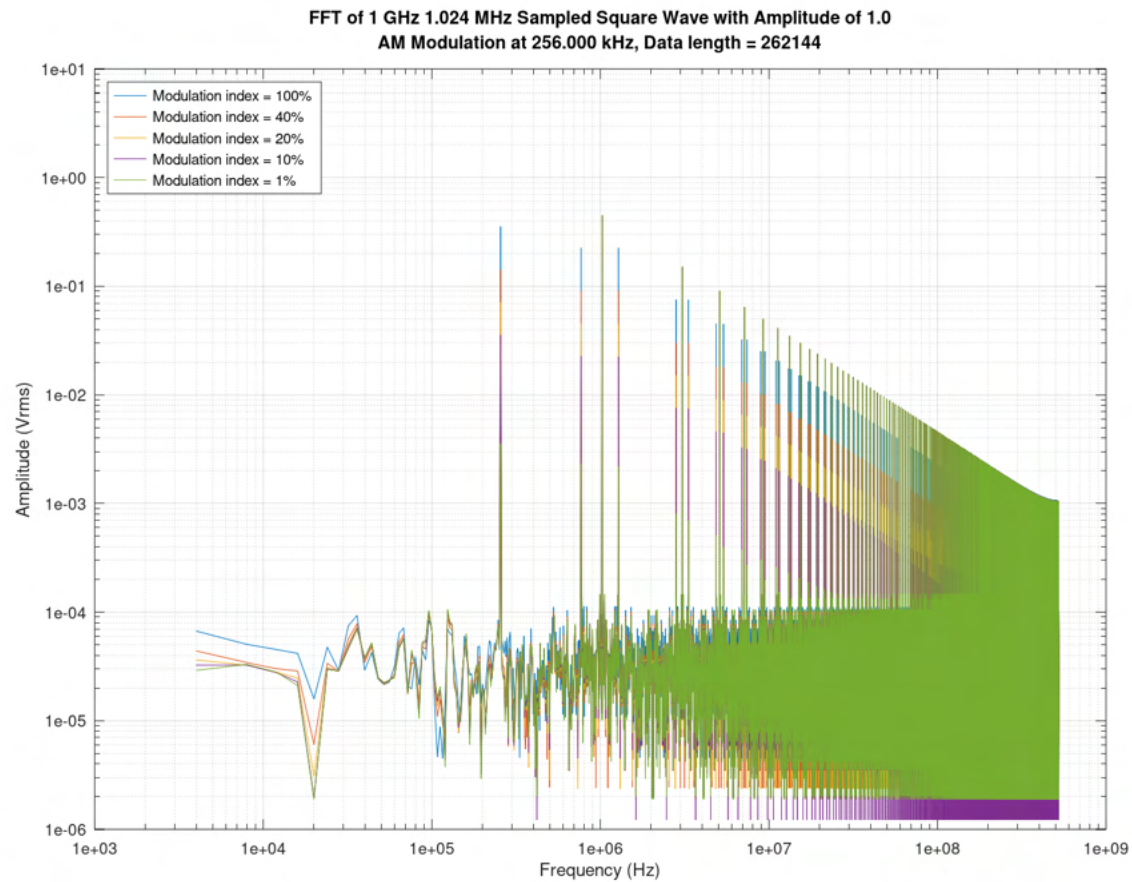## PAC and PSS Simulation Results: Ratio of Sideband to Harmonic Amplitudes: Results

"I was expecting the sidebands at the same magnitude of the squarewave spectrum components, but I see that they have half of the magnitude. WHy this happens? ."

Time Domain Simulation Results: Apply 256 kHz Modulation to 1.024 MHz Commutator Switch
Vary modulation index from 100% to 1%

1.04858 GHz Sampled 1.024 MHz Square Wave
Amplitude of 1.0 with AM Modulation at 256.000 kHz

Expanded x-axis

Legend:
- Modulation index = 100%
- Modulation index = 40%
- Modulation index = 20%
- Modulation index = 10%
- Modulation index = 1%

Y-axis: Amplitude(V)
X-axis: Time (us)

Frequency Domain Simulation Results: Apply 256 kHz Modulation to 1.024 MHz Commutator Switch
Vary modulation index from 100% to 1%

FFT of 1 GHz 1.024 MHz Sampled Square Wave with Amplitude of 1.0
AM Modulation at 256.000 kHz, Data length = 262144

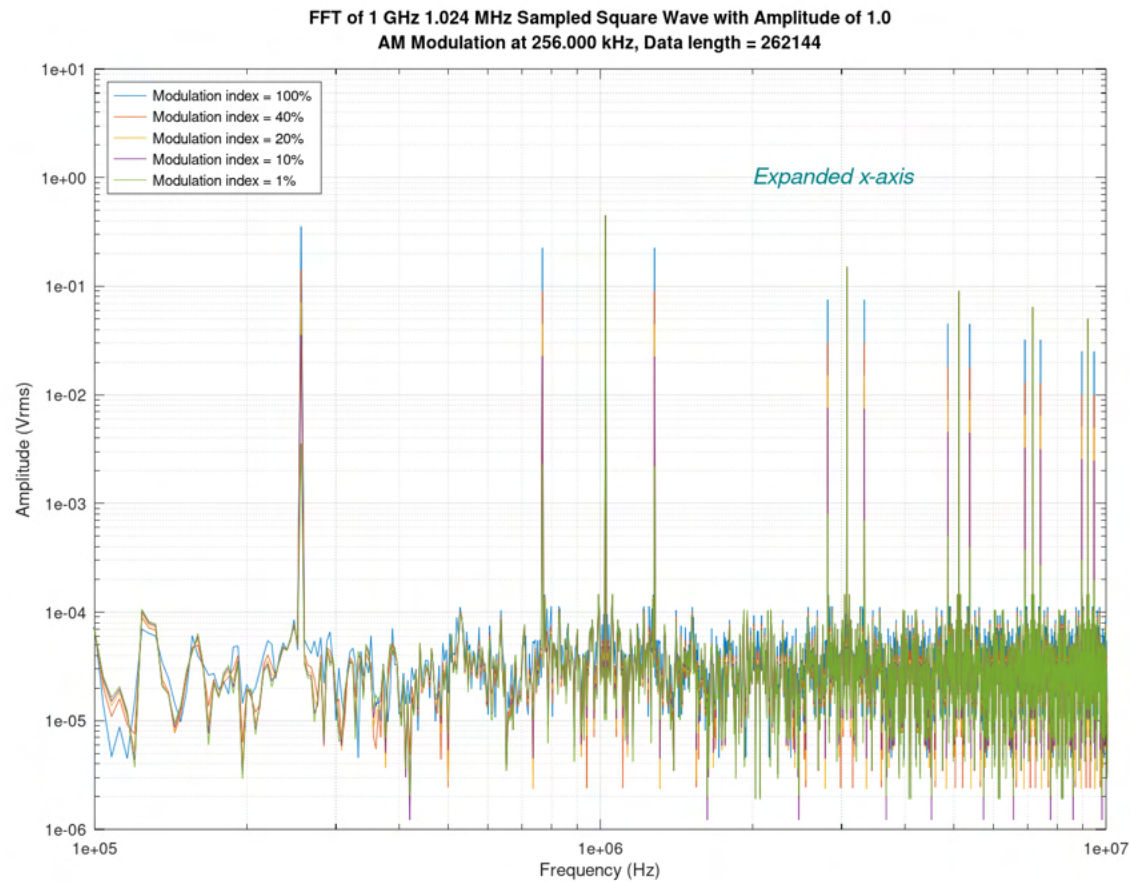**Frequency Domain Simulation Results: Apply 256 kHz Modulation to 1.024 MHz Commutator Switch Vary modulation index from 100% to 1% (*expanded view*)**

FFT of 1 GHz 1.024 MHz Sampled Square Wave with Amplitude of 1.0
AM Modulation at 256.000 kHz, Data length = 262144

Frequency Domain Simulation Results: Ratios of Lower and Upper Sidebands to 1.024 MHz Harmonic