Version	Date	Comments
1.0	5/27/22	Initial release
1.1	6/15/22	1. Added study to determine root cause of difference between SNR reported by Spectrum Assistant and theoretical value starting on page 50 2. Updated Outline, Table of Contents, and Summary section to include new study

Table of Contents

Summary

- A test bench and study is presented to provide insight to a Custom IC Design Forum post by Fede26 concerning the reported signal power level from ViVA's Spectrum Assistant tool
- A Transient Noise analysis was performed and the spectrum (frequency, amplitude, and power) of the filtered sinusoidal output were measured using the ViVA Spectrum Assistant and its default Rectangular windowing setting, the ViVA Calculator dft() function, and the authors FFTW based DFT algorithm with identical DFT settings
- A comparison of the signal amplitudes and powers is provided
  - *A hypothesis for the one source of the difference between the Spectrum Assistant signal power and the Forum poster's expected signal power results is presented*
- A detailed study of the ViVA Spectrum Assistant DFT and ViVA dft() algorithm is presented
  - *A second hypothesis as to the difference between the signal amplitudes each reports and the expected amplitude is presented*
- A second analysis was performed to reconcile the difference between the reported Spectrum Assistant SNR and theoretical SNR

Author's Comments and Recommendations

- Author's comments and recommendations from study
  - *The use of ViVA Spectrum Assistant to accurately determine signal power requires a detailed understanding of its "Peak Saturation Level" to set its value correctly*
  - *The amplitudes reported in the Fourier Transform waveforms (DFT) of the ViVA Spectrum Assistant or its Calculator dft() function represent signal amplitudes per frequency bin and are not rms values*
  - *To satisfy Parseval's theorem using the ViVA Spectrum Assistant Fourier analysis (DFT) results or its Calculator dft() function requires that the Fourier Transforms be weighted by a scale factor*
  - *The ViVA Spectrum Assistant Power Spectral Density function reports signal amplitude and power correctly*
  - *The ViVA Spectrum Assistant reported noise does not differentiate between actual circuit noise and dft() based artifacts*
    - *It is recommended to examine the Spectrum Assistant's noise floor using a parallel Transient simulation without circuit noise to validate its noise floor with the chosen dft() settings*