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Pure Sine Signal Generation With Arbitrary Waveform Generator

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This paper describes a pure sine signal generation technique using an arbitrary waveform generator (AWG) for high quality testing of analog-to-digital converters (ADCs). The proposed techique does not require the nonlinearity identification of the AWG or hardware modification/additon; it needs only DSP program change inside the AWG. This technique can contribute low cost and high quality production testing of ADCs.

Our approrch uses a phase switching method (Fig.1) and there the 3rd order harmonics due to the AWG nonlinearity is cancelled.[1] We have examined its effects by theoretical analyses, simulations and experiments, and we see from measrement results (Fig.2) that the ADC testing error is reduced by half or more, compared to the conventional methods. [2]

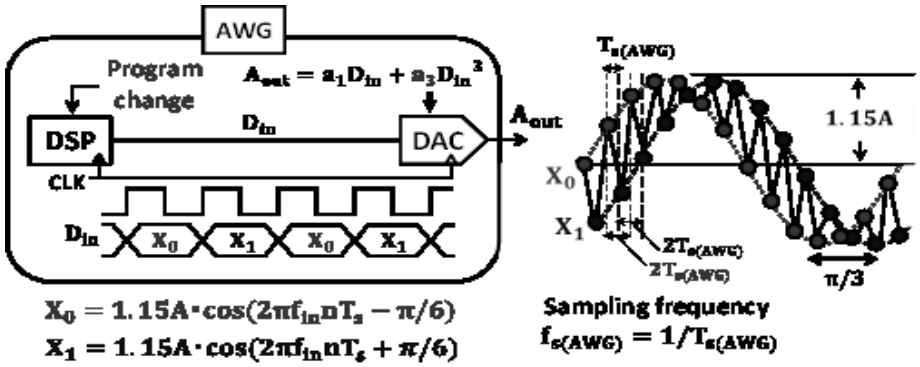

Fig.1 Proposed phase-switching sinusoidalwave generation techniques

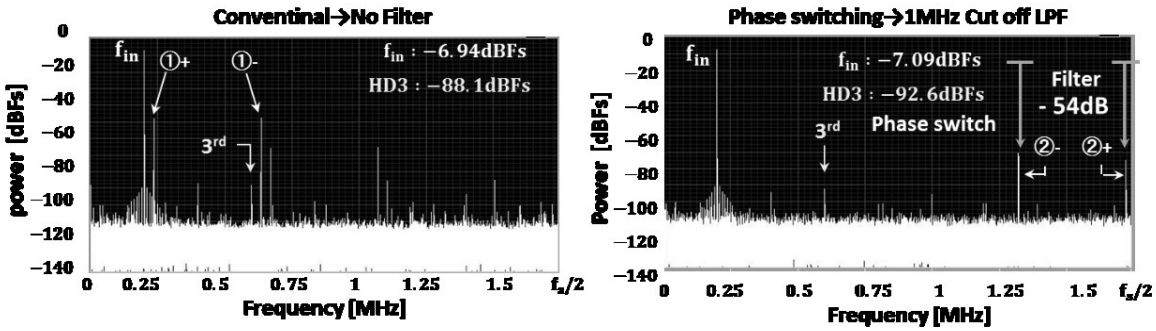

Fig. 2 Measured results of comparison between conventional method (left) and proposed method (right) for ADC test

[1] K. Wakabayashi, K. Kato, T. Yamada, O. Kobayashi, H. Kobayashi, F. Abe, K. Niitsu, "Low-Distortion Sinewave Generation Method Using Arbitrary Waveform Generaton", Journal of Electronic Testing, vol.28, no. 5, pp.641-651 (Oct.2012)

[2] F.Abe, Y.Kobayashi, K. Sawada, K. Kato, O. Kobayashi, H. Kobayashi, "Low-Distortion Signal Generation for ADC Testing", IEEE International Test Conference, Seattle, WA (Oct. 2014)