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 technique does not require the nonlinearity identification of the AWG or hardware modification/addition; it needs only DSP program change inside the AWG. This technique can contribute low cost and high quality production testing of ADCs.

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

Fig.1 Proposed phase-switching sinusoidal waveform generation technique

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