Table 1: Comparison with recently proposed non-uniform clock generator designs

Design	Technology ($V_{nominal}$)	$Power_{norm}$	$Area_{norm}$
[11]	65nm (1.1V)	~ 1×	~ 1×
[13]	65nm (1.1V)	~ 2×	~ 21×
[4]	90nm (1.2V)	~ 2×	~ 51×
[3]	28nm (1.0V)	~ 18×	N/A
This Work	14nm (0.8V)	1×	1×

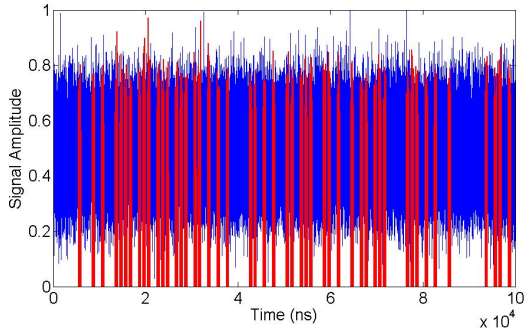

Figure 4: Sampling an analog signal with sparsity rate of 5% using AQR generator. Blue represents the signal and Red represents the samples taken using the AQR generator.

order to recover the signal from the samples taken using the AQR generator. According to the results, the mean normalized errors of the reconstruction of the signals with 5%, 10%, and 15% sparsity rates using OMP are 0.0504, 0.0446, and 0.0252, respectively. Moreoever, the mean normalized errors of the reconstruction of the signals with 5%, 10%, and 15% sparsity rates using CoSaMP are 0.0487, 0.0304, and 0.0245, respectively.

5 CONCLUSIONS

We have devised a novel non-uniform clock generator called Adaptive quantization rate (AQR) generator using MRAM-based stochastic oscillator devices. Our proposed AQR generator considers signal constraints, such as sparsity rate, as well as hardware constraints, such as area and power dissipation, in order to generate the non-uniform clock for the asynchronous CS-ADC. Compared to similar non-uniform clock generators presented in the literature, AQR generator provides significant area reduction of ~ 25-fold on average, while achieving power dissipation reduction of ~ 6-fold, on average.

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