

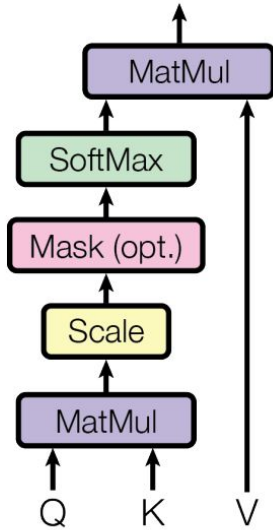
Attention-Based Signal Fusion

Frequency Estimation & Denoising

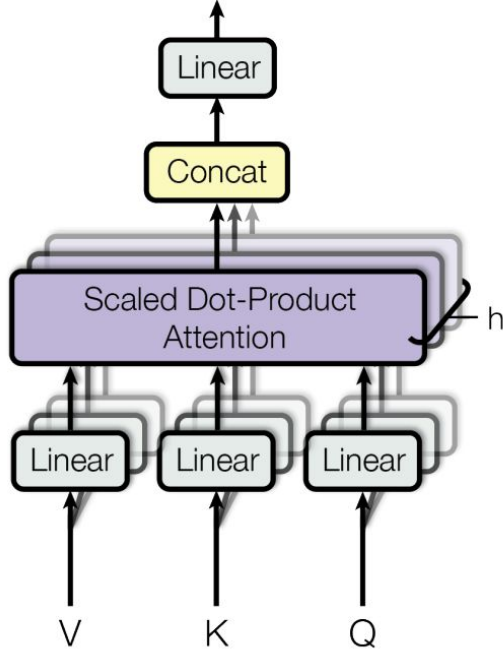
Frequency Estimation

Attention 종류

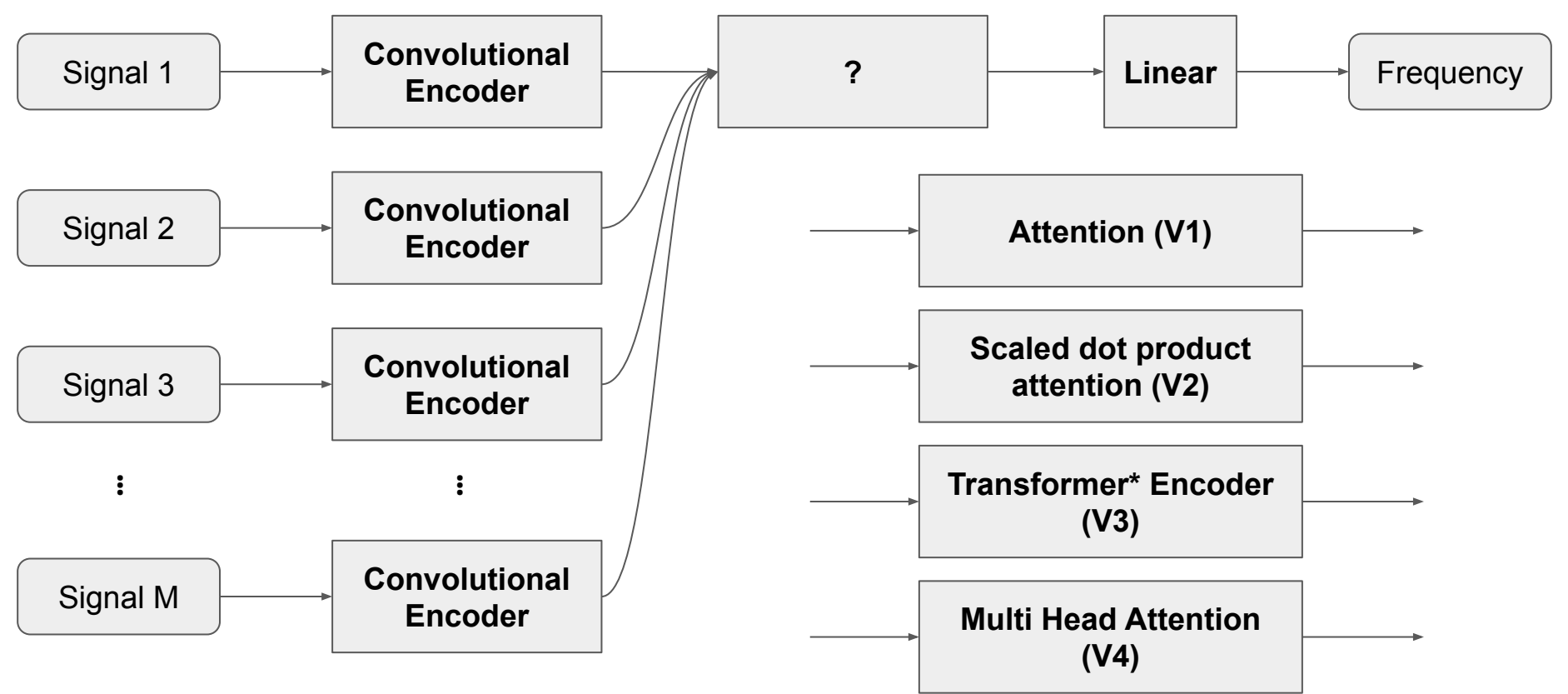
Scaled Dot-Product Attention



Multi-Head Attention



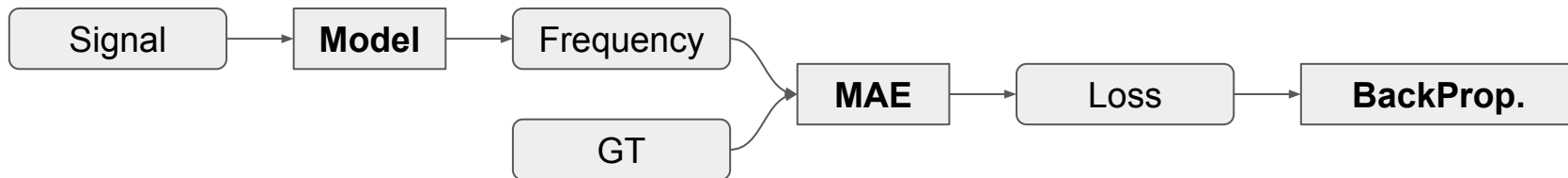
Attention 종류에 따른 성능 비교



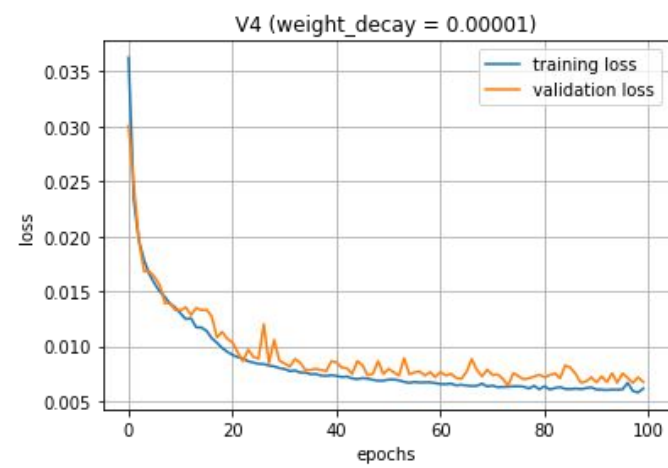
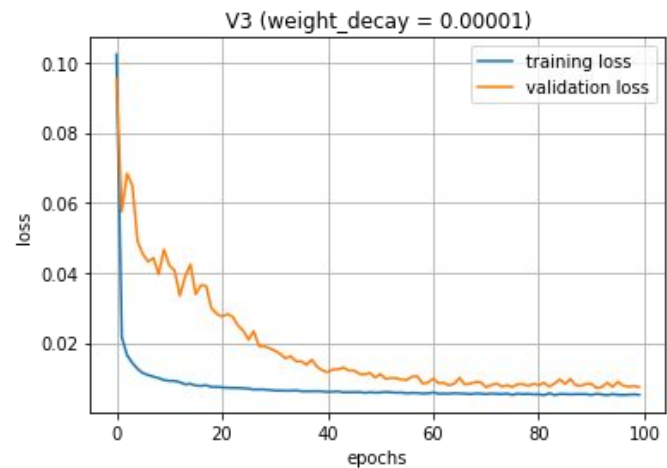
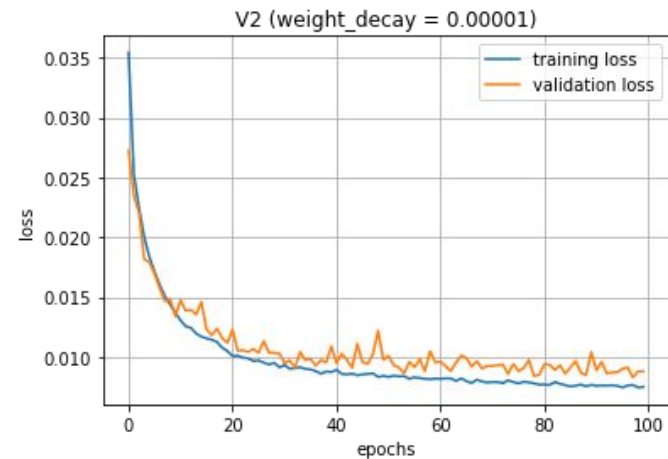
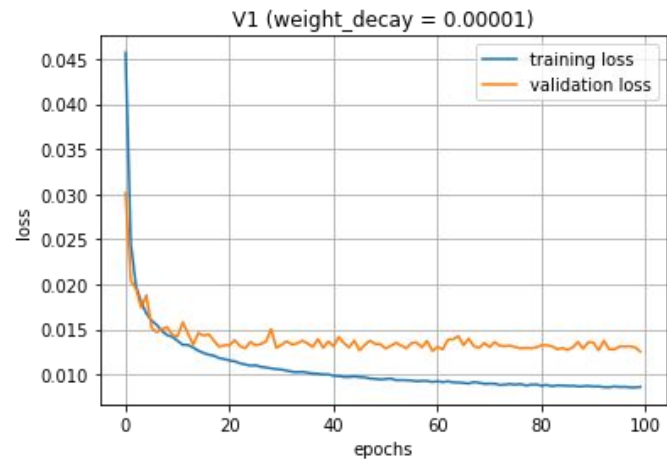
*<https://arxiv.org/abs/1706.03762>

Training Setup

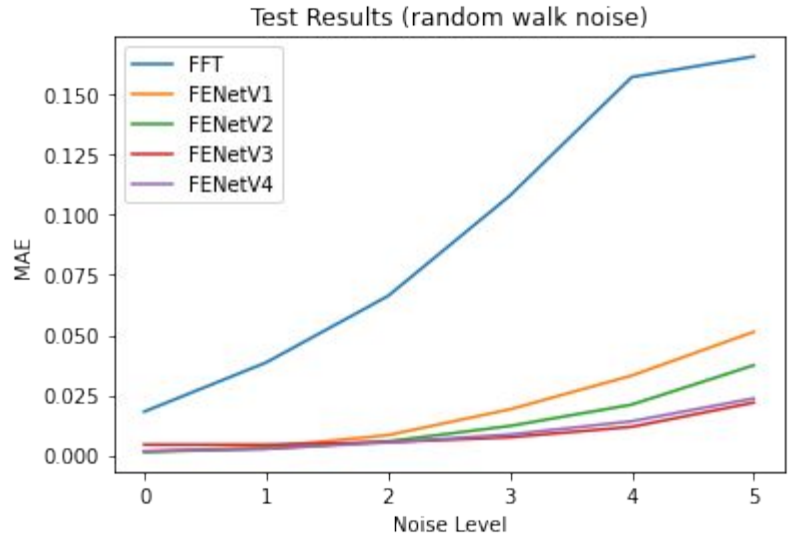
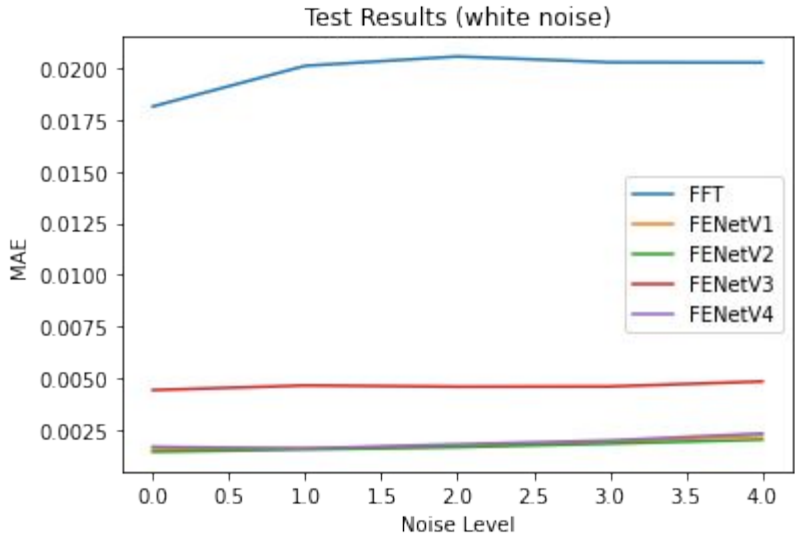
1. 학습 및 검증 데이터는 두가지 노이즈(white, random walk)를 적용하여 생성
 - a. 신호 길이 $\rightarrow 512$
 - b. Training $\rightarrow 100,000$
 - c. Validation $\rightarrow 10,000$
 - d. Test $\rightarrow 10,000$
2. 학습 파라미터
 - a. Optimizer \rightarrow Adam (lr = 0.001)
 - b. Weight_decay $\rightarrow 0.00001$
 - c. Epoch $\rightarrow 100$



Training & Validation Loss

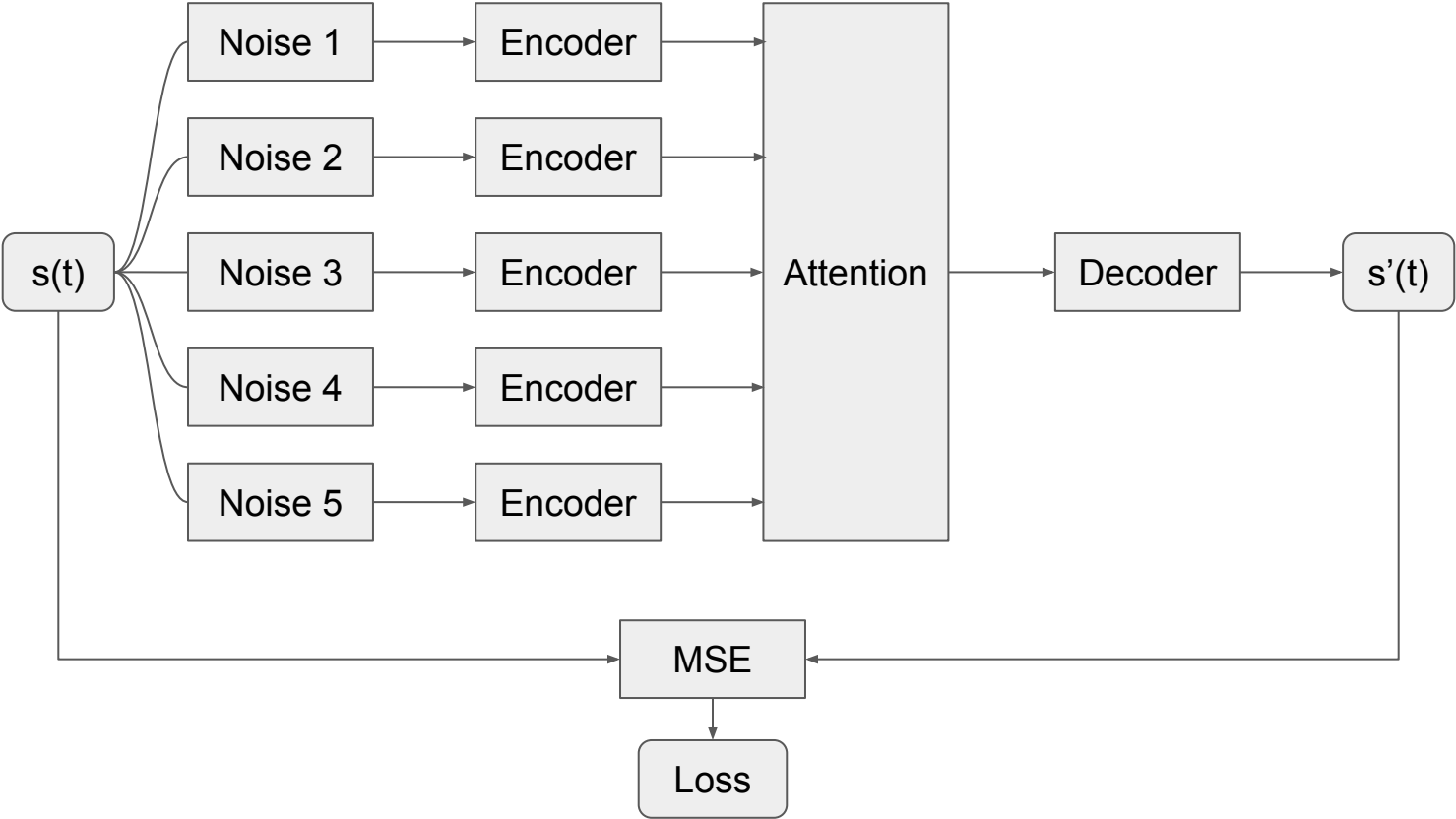


테스트 결과

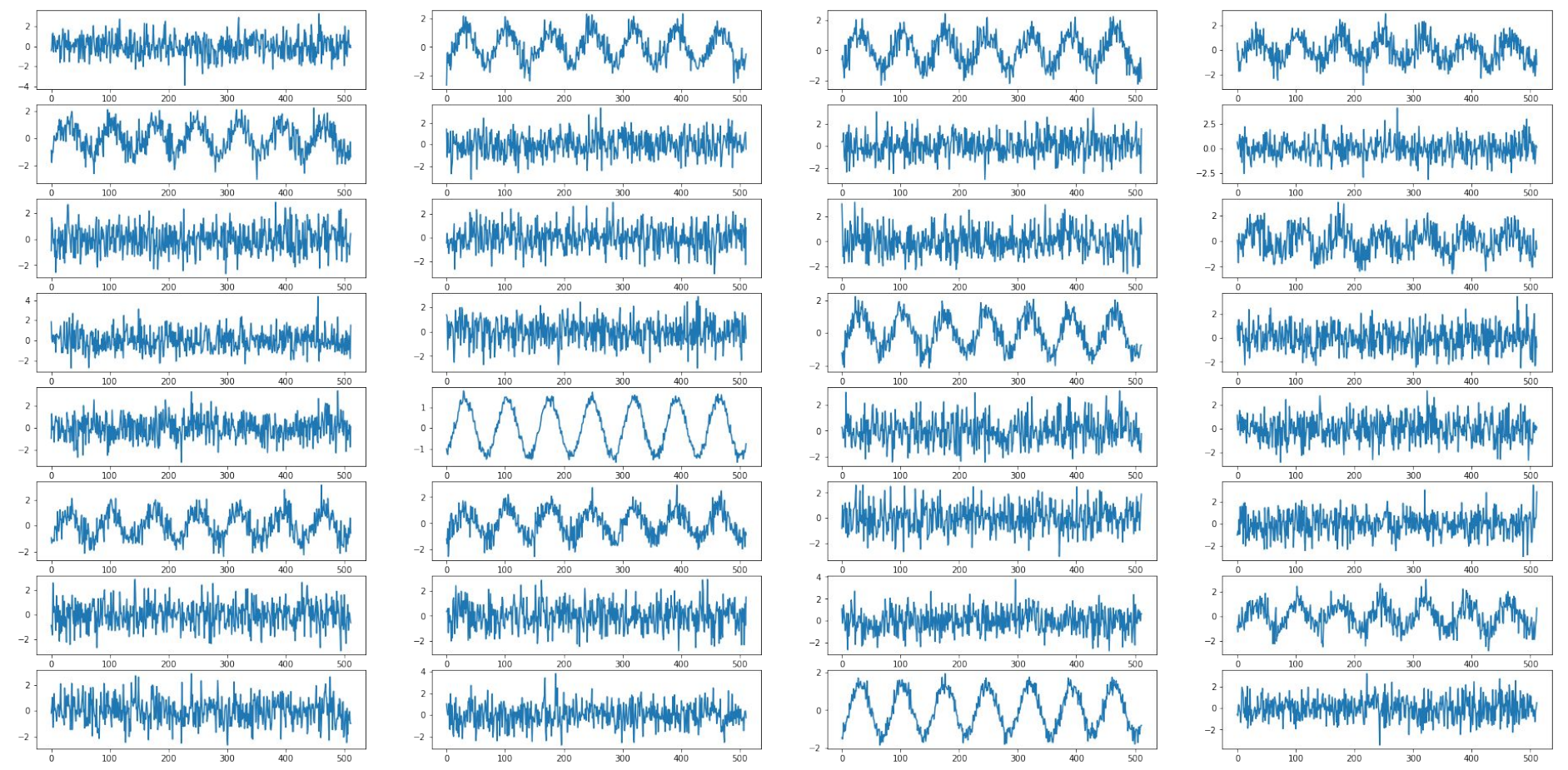


Denoising

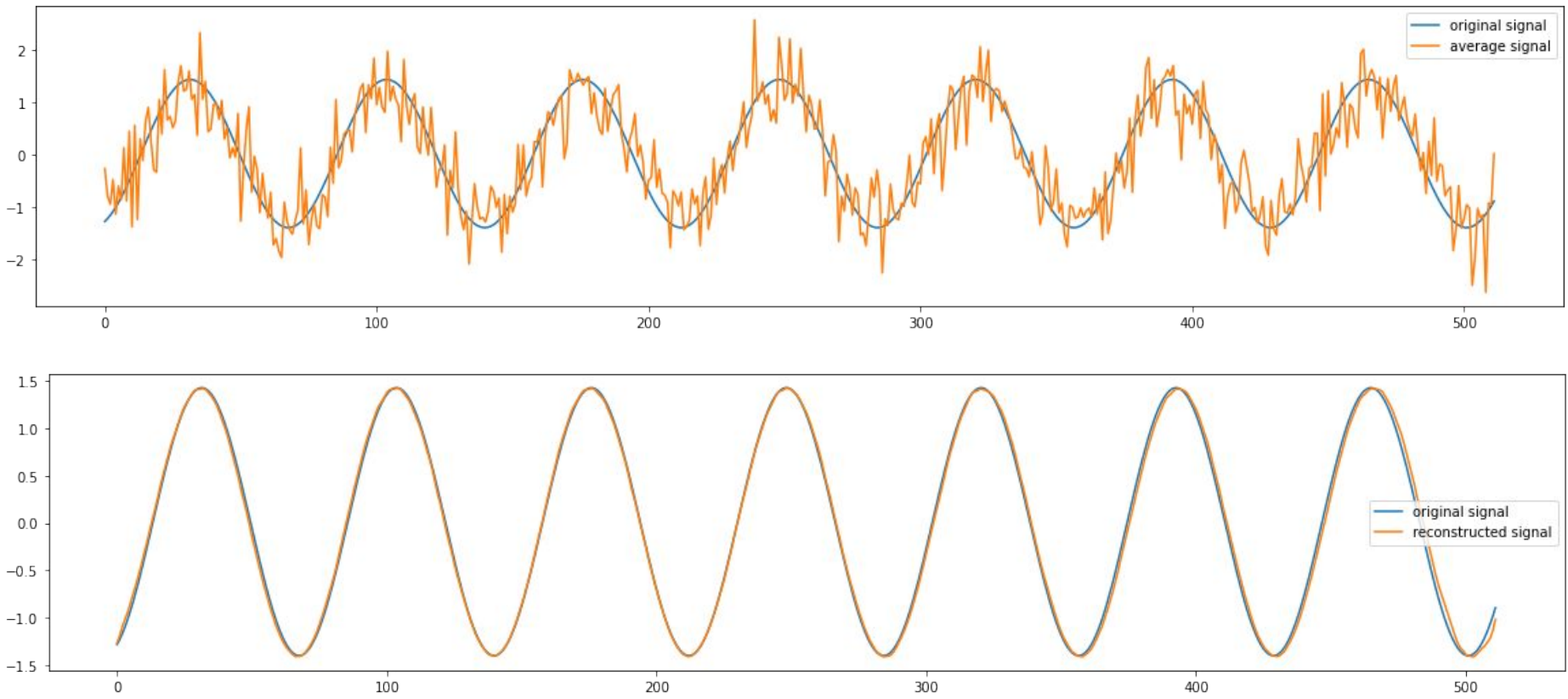
Attention-Based Denoising Autoencoder



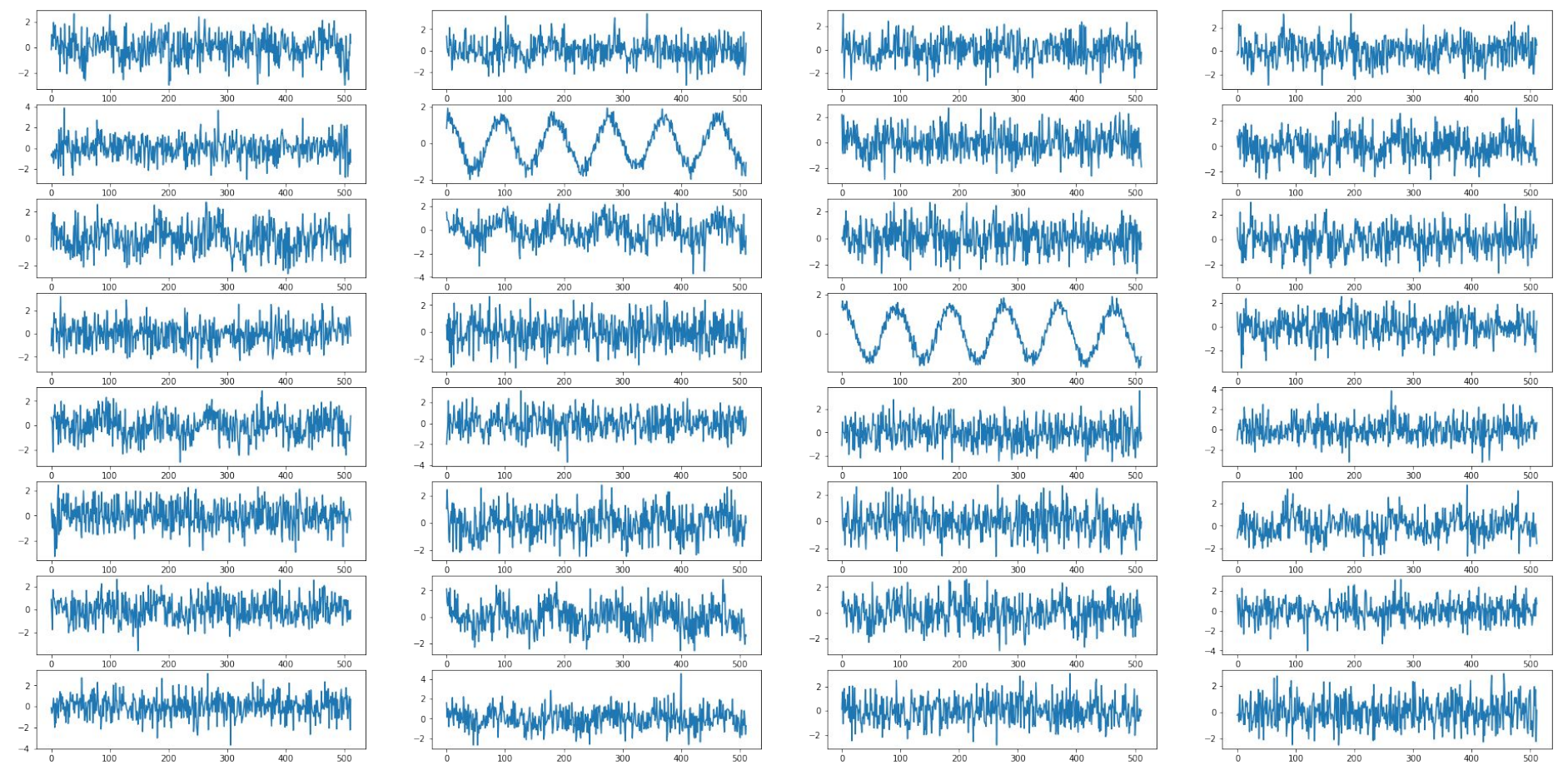
테스트 케이스 #1 (white noise) — 32개의 입력 신호



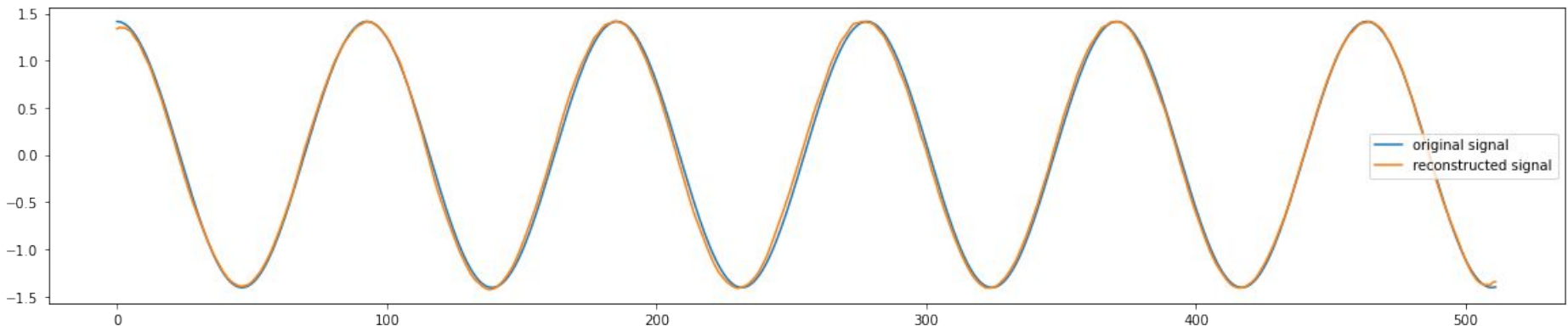
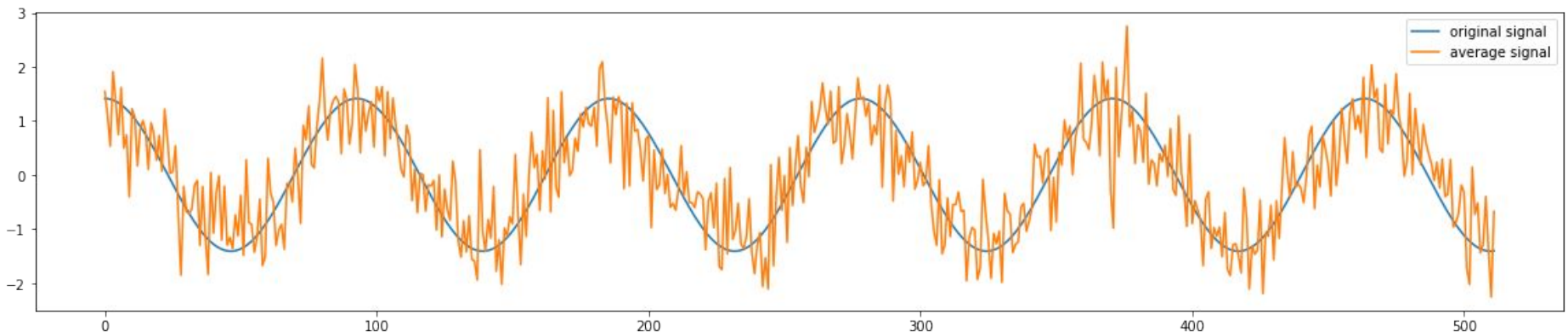
테스트 케이스 #1 (white noise) — 입력 신호 평균과 오토인코더 결과 비교



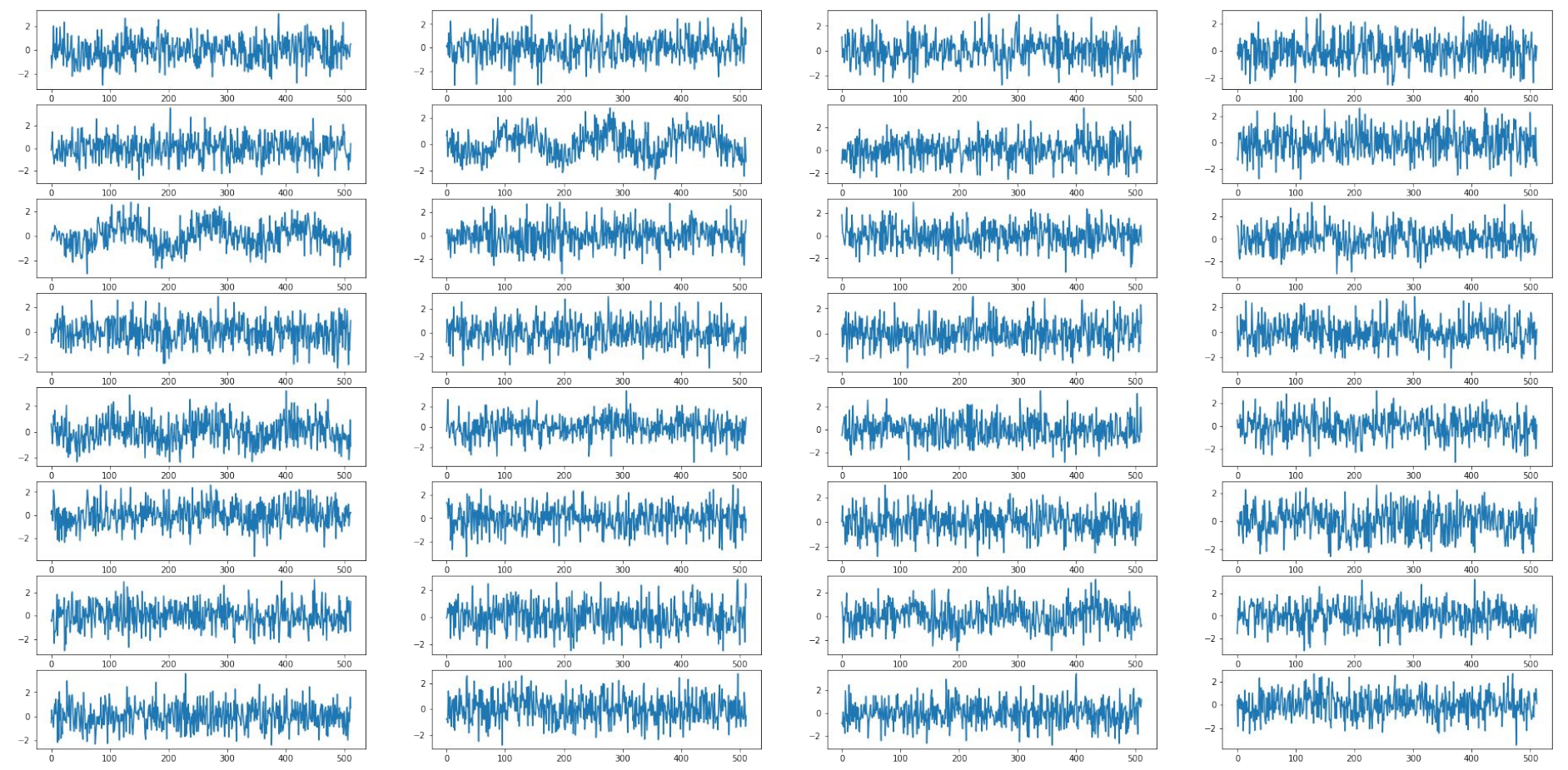
테스트 케이스 #2 (white noise) — 32개의 입력 신호



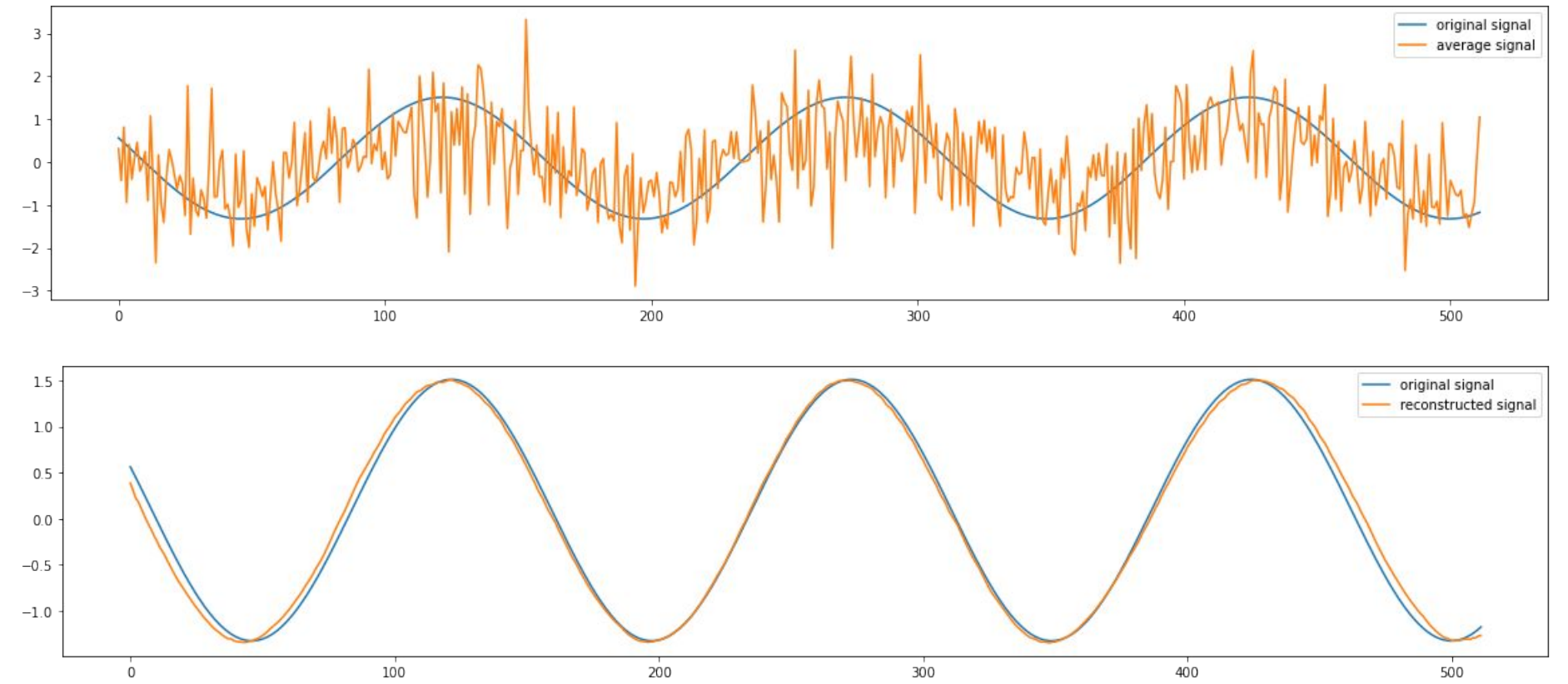
테스트 케이스 #2 (white noise) — 입력 신호 평균과 오토인코더 결과 비교



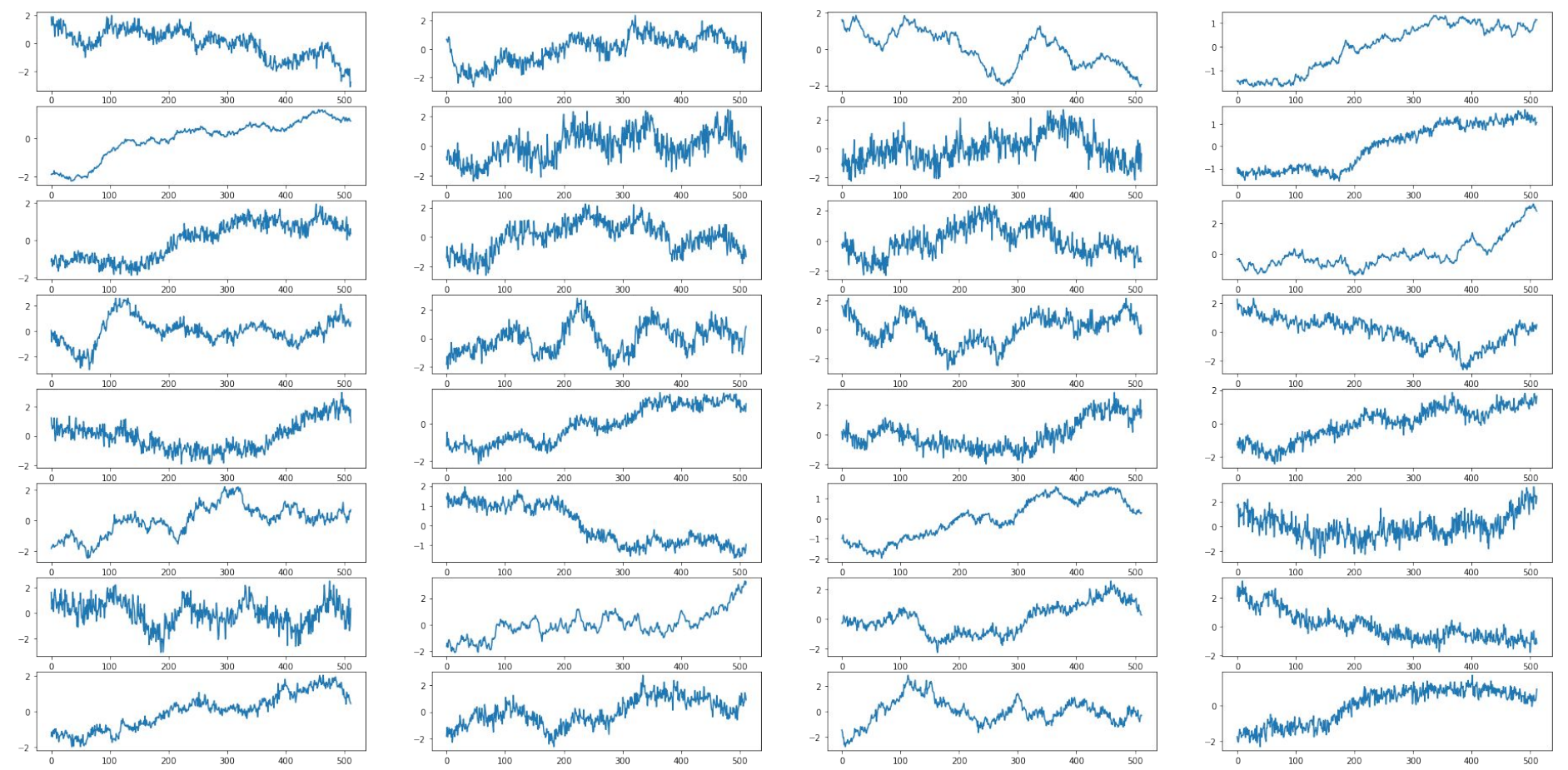
테스트 케이스 #3 (white noise) — 32개의 입력 신호



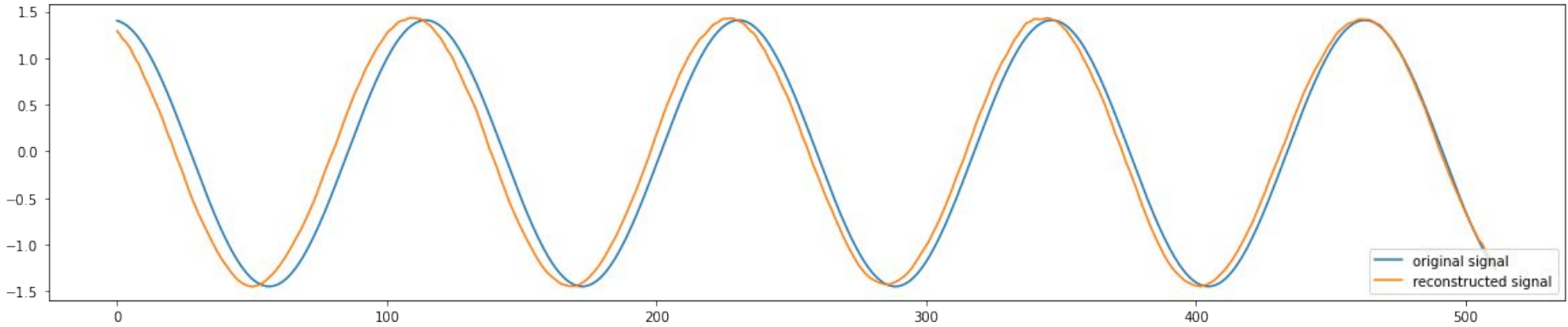
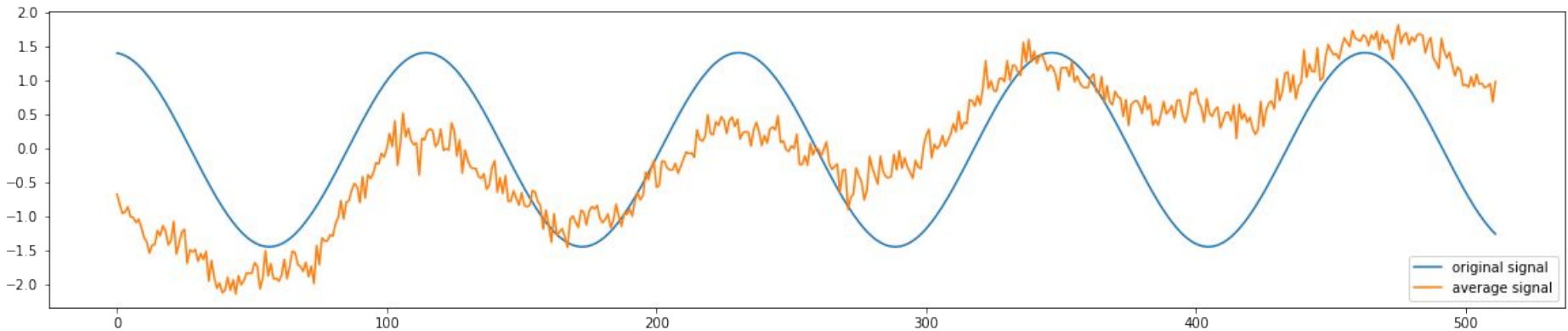
테스트 케이스 #3 (white noise) — 입력 신호 평균과 오토인코더 결과 비교



테스트 케이스 #4 (random walk noise) — 32개의 입력 신호



테스트 케이스 #4 (random walk noise) — 입력 신호 평균과 오토인코더 결과 비교



TODO

TODO — LSTM 적용 및 시가변적인 신호 테스트 (ex. time-varying frequency)

