

# Adversarial MRI Defense System Report

## MRI Adversarial Purification Report

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**Image:** bim\_0.01\_9eaa8720\_adversarial.png

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### Purification Metrics

**PSNR:** 31.34 dB

**SSIM:** 0.8015

### Interpretation of Metrics:

PSNR (Peak Signal-to-Noise Ratio): 31.34 dB

This indicates excellent image quality after purification. Higher PSNR values indicate better quality.

SSIM (Structural Similarity Index): 0.8015

This indicates good structural preservation. SSIM values above 0.7 typically indicate good perceptual quality.

### Technical Details

#### Purification Model:

This purification was performed using a U-Net based deep learning model with attention mechanisms. The model was trained in two phases:

1. Phase 1: Initial training with pixel-wise and perceptual losses to learn the mapping from adversarial to clean images.
2. Phase 2: GAN-based fine-tuning with a PatchGAN discriminator for improved sharpness and detail preservation.

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The model incorporates self-attention mechanisms, residual connections, and multi-scale feature fusion to effectively remove adversarial perturbations while preserving important diagnostic features.