



# Magnetization Transfer Contrast Preparation

**IP Status:** Issued US Patent; **Application #:** 15/623,496

## Multi-band RF pulses in MT preparation

Multi-Banded (MB) RF-pulse Enhanced Magnetization Imaging (MBE-MTI) uses multi-banded RF pulses in MT preparation. These multi-banded RF pulses not only provide simultaneous off-resonance saturations of bound water spins on both sides of the central frequency of mobile water, but also increase the coverage of off-resonance frequency range without increasing the potential of direct saturations while eliminating the need to increase the gap between the central frequencies of mobile water and the MT RF pulse to maintain optimal MT contrast.

## Traditional Magnetization Transfer Contrast Preparation Limits

Magnetization transfer imaging (MTI) usually requires increased bandwidth to achieve off-resonance saturations of bound water spins within a large frequency range. A consequence of increasing the bandwidth is the undesired augmentation of direct saturation unless the MT pulses are shifted further away from the mobile water. However, shifting the MT pulses further off-resonance has its own disadvantages, such as the decrease of MT contrast. This new method overcomes the limitations faced by traditional magnetization transfer contrast preparation. In addition, the MBE-MTI allows multiple frequency selection and amplitude modulation for each band of the MT RF pulses, a unique feature that can target specific groups of macromolecules.

### BENEFITS AND FEATURES:

- Multi-banded RF pulses in MT preparation
- Overcomes limitations of traditional magnetization transfer contrast preparation
- Simultaneous off-resonance saturations of bound water spins on both sides of the central frequency of mobile water
- Increases the coverage of off-resonance frequency range without increasing the potential of direct saturations and eliminating the need to increase the gap between the central frequencies of mobile water and the MT RF pulse to maintain optimal MT contrast
- Allows multiple frequency selection and amplitude modulation for each band of the MT RF pulses
- Targets specific groups of macromolecules

### APPLICATIONS:

- MT contrast preparation
- Various imaging acquisition methods (e.g., interleaved spin echo readout to examine bound water with both short and long T2 values, interleaved dual-echo GRE readout to have automatically co-registered M0 and MT images)
- Combined with a multi-banded/simultaneous multiple slice dual-echo GRE imaging readout
- Chemical exchange saturation transfer (CEST) imaging applications

**Phase of Development** - Pilot scale demonstration. Implemented and tested on Siemens Scanners at the CMRR.

## Technology ID

20170084

## Category

Engineering & Physical  
Sciences/MRI & Spectroscopy  
Life Sciences/Diagnostics &  
Imaging  
Life Sciences/Human Health  
Life Sciences/MRI &  
Spectroscopy  
Life Sciences/Neuroscience  
Life Sciences/Research Tools  
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## Publications

[Multi-Band Enhanced Magnetization Transfer Contrast \(MBE-MTC\) Preparation](#)

*Proceedings of Annual Meeting Annual Meeting & Exhibition , 2017: 3769*