

New 7 Tesla MRI Research System Ready for Future Clinical Use



- First ultra-high field scanner with all components designed, built and serviced by Siemens
- New actively shielded system generation with 50 percent lighter magnet and zero Helium boil-off to enable easier siting and lower operating costs
- Dual mode functionality for easy switching from research modes to specific clinical protocols
- Expanded RF architecture with up to eight transmit and up to 64 receive channels
- Identical software platform as Siemens latest flagship 3 Tesla MRI systems for consistent usability
- World's first 7 Tesla research system ready for future clinical use with planned CE and FDA authorization to market for selected neurological and musculoskeletal MRI applications

"I am extremely proud to announce the introduction of our new 7 Tesla scanner Magnetom Terra1. It is the first 7 Tesla MRI scanner fully designed and manufactured by Siemens, with a completely new designed 7 Tesla magnet in its core", said Dr. Bernd Ohnesorge, CEO Magnetic Resonance at Siemens Healthcare. "Now, Siemens is the only company to manufacture a complete human ultra-high field MRI system fully in-house."

The Magnetom Terra 7 Tesla MRI system is designed to translate cutting-edge MRI research results into clinical application, and it is the world's first ultra-high field research system ready for future clinical use with planned CE and FDA authorization to market for selected neurological and musculoskeletal MR imaging applications.

The Dual Mode functionality allows users to switch from cutting-edge research modes to specific clinical protocols in less than ten minutes. The new 7 Tesla MRI system provides the whole range of cutting-edge 7 Tesla research functionalities, and is based on the latest software platform syngo MR E11, identical to Siemens' latest flagship 3 Tesla MRI systems, to enable consistent usability and protocol exchange. Magnetom Terra's new actively shielded magnet is the lightest 7 Tesla whole body magnet in the world – 50 percent lighter than previous actively shielded 7 Tesla magnet generations. This is the result of a multi-year engineering project at Siemens Magnet Technologies in Oxford, capitalizing on the long-term experience of the team in the design and manufacturing of state-of-the-art 3 Tesla magnets for clinical use. As a result, with Magnetom Terra, siting of a 7 Tesla MRI system becomes much easier and its location in a clinical environment becomes feasible. Combined with the Zero Helium boil-off technology, Magnetom Terra improves the lifecycle costs of ultra-high field MRI.

Magnetom Terra increases the potential for translating cutting-edge research capabilities into future clinical application – for anatomical, functional or metabolic MR imaging. This specially designed 7 Tesla technology makes this possible by offering:

- Up to eight channel parallel transmit technology for selective excitation and higher homogeneity in challenging body regions such as cardiac and abdominal.
- Up to 64 receive channels for higher coil density in the field of view to achieve higher acceleration factors, higher signal-to-noise ratio and higher spatial resolution, and a better coverage of the body regions of interest.
- High gradient strength of up to 80 millitesla per meter (mT/m) and a fast gradient switching rate of up to 200 Tesla per meter per second (T/m/s) for advanced studies with diffusion and functional MR imaging.
- The latest Siemens software platform syngo MR E11 identical to Siemens' latest flagship 3 Tesla MRI systems such as Magnetom Skyra and Magnetom Prisma.

For specific clinical areas, Magnetom Terra is prepared for future clinical use with planned CE and FDA authorization to market of the system and the corresponding local coils:

- Getting better insights into the musculoskeletal system through unprecedented high isotropic spatial resolution of 0.2 mm.
- Imaging brain tumors and irregularities in the brain's metabolic processes.
- Visualizing neurodegenerative diseases such as Alzheimer's disease, epilepsy, schizophrenia and multiple sclerosis.

"Based on our long-standing experience and the largest innovation network in human ultra-high field MRI, Siemens is committed to further grow the footprint of 7 Tesla MRI in research and clinical application", explained Dr. Bernd Ohnesorge. "I am confident that our Magnetom Terra will help explore new territories in MRI research and at the same time it's the world's first 7 Tesla scanner designed for clinical use."

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