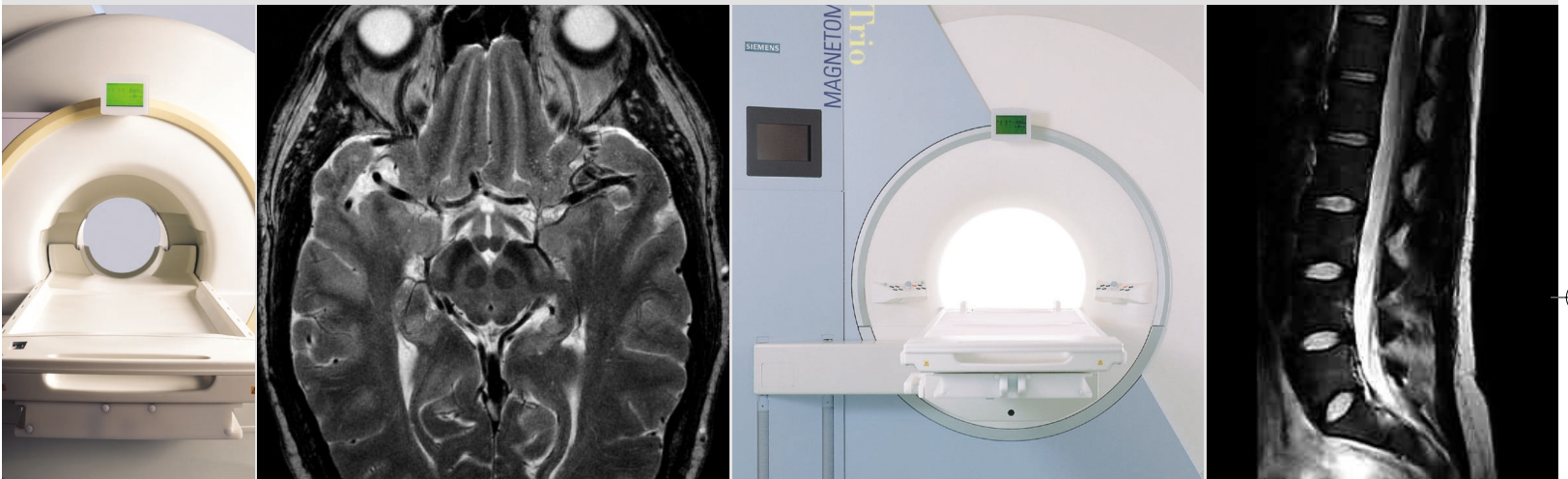


MAGNETOM Family



The Siemens Ultra High-Field Class
MAGNETOM Allegra and MAGNETOM Trio
The Next Dimension in Clinical and Research MR Systems

SIEMENS
medical

Ultra High-Field Magnetic Resonance

3T Magnetic Resonance for the future

Over the past 20 years, MR has travelled the road of success in the clinical world. The formula was an easy one: the technical aspects of MR scanners were of first concern followed by improving patient comfort and user friendliness. Today 1.5 Tesla represents the standard clinical field strength and stands for the success of the MAGNETOM® Symphony and Sonata 1.5T platforms.

But being good is not good enough! Higher field strengths offer more SNR, more BOLD effect and greater chemical shift. This benefits especially functional MR, MR spectroscopy examinations, and more generally with whole-body techniques that require greater spatial resolution or speed. Continuing its tradition of innovation, Siemens invites you to discover its unique world of Ultra High-Field MR.

Fig.1: High-resolution T2-weighted brain image (MAGNETOM Allegra)

(Courtesy of Dr. K. Wicklow, Washington University, Saint Louis, USA)

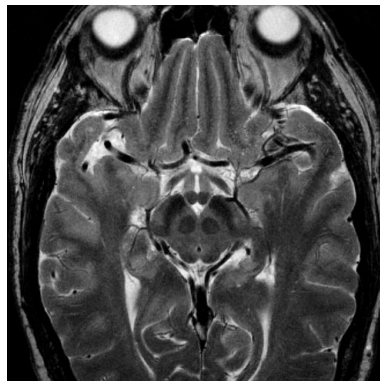
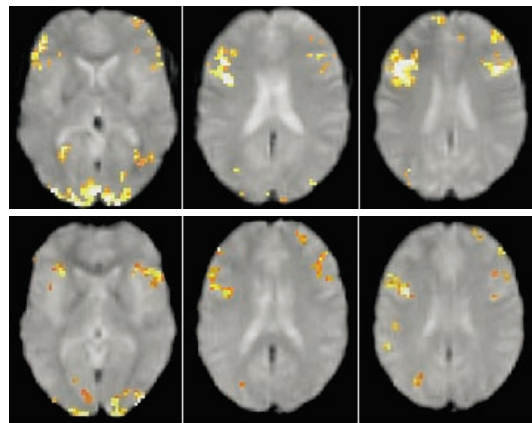


Fig.2: Increased BOLD effect in functional MRI at 3T (top) compared to 1.5T (bottom)

(Courtesy of Dr. R. Poldrack, MGH, Boston, USA)



"Making Research Clinical"

Siemens is the only manufacturer to offer two FDA-approved 3T products, namely MAGNETOM Allegra and MAGNETOM Trio. MAGNETOM Ultra High-Field systems have been developed to take advantage of the increased SNR, BOLD effect as well as the increased chemical shift available at 3 Tesla. In addition, they are based as much as possible on standard clinical components, such as hardware, syngo® software and service components.

In 2000, Siemens launched the most-compact 3 Tesla MR scanner

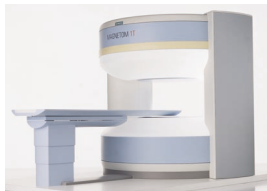
ever, the MAGNETOM Allegra. With a 1.25 m long magnet, MAGNETOM Allegra provides the first patient-friendly Ultra High-Field MR dedicated to neuro-imaging. The gradient power unleashed allows for the fastest 3T image acquisition.

Based on this success, MAGNETOM Trio extended this revolution to whole-body imaging in 2001. MAGNETOM Trio is a 3T MR-scanner offering a full 40 cm FoV. It opens new doors to clinical research in applications such as cardiac, spine, orthopedic MR and a host of additional MR applications.

Fig.3: MAGNETOM product line



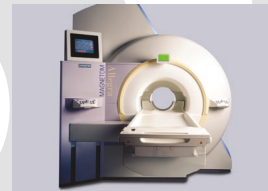
MAGNETOM Jazz



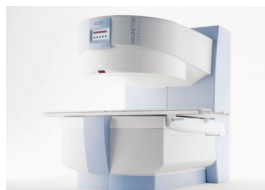
MAGNETOM Rhapsody



MAGNETOM Symphony Maestro Class



MAGNETOM Allegra



MAGNETOM Concerto



MAGNETOM Harmony Maestro Class



MAGNETOM Sonata Maestro Class



MAGNETOM Trio

Tesla

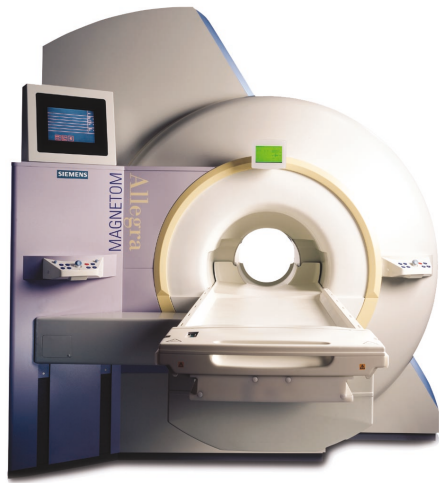
0.2

1.0

1.5

3.0

MAGNETOM Allegra ^[UHF Class]



System Description

MAGNETOM Allegra is the ultimate brain machine. This 3T MR scanner has been optimized for best image quality and fastest imaging of the brain, all in a highly compact design. These features provide best imaging for diagnosing stroke, epilepsy, tumor and multiple sclerosis. In addition, MAGNETOM Allegra provides the ultimate performance for neuro cognitive functional MRI research.

Easy siting in a 1.5T suite!

With a magnet that is 1.25 m long and 1.75 m in diameter, MAGNETOM Allegra is the only 3T magnet that fits in a 1.5T suite! In addition, the electrical and cooling requirements are similar to those of MAGNETOM Sonata, all planned for easy siting.

Advanced technology for best homogeneity

Homogeneity is extremely important for good image quality at 3T. The MAGNETOM Allegra magnet is actively shielded. The system also features the patented External Interference Shielding (EIS) and is equipped with active electrical shims that correct up to second-order terms. These advanced MAGNETOM features assure you the best 3T results.

Leading gradient power

As a leader in the design of gradient coils and amplifiers, Siemens is the first to offer gradient performance as seen with Allegra. Just imagine 40 mT/m and a slew rate of 400 mT/m/ms! This results in EPI with echo-spacing down to 360 μ sec.

A user- and patient-friendly system

The MAGNETOM Allegra is equipped with the standard MAGNETOM patient table and patient communication system. It runs under the multimodality platform *syngo*. With this set-up, you start scanning at 3T, as easily as with all other MAGNETOM scanners.

Brain imaging at its best

MAGNETOM Allegra features all advanced neuro-imaging applications such as T1-, T2- weighted, diffusion, multi-directional diffusion imaging, perfusion, magnetization transfer, CISS, spectroscopy sequences and many more.



Fig.4: MAGNETOM Allegra, the most compact 3T MR scanner

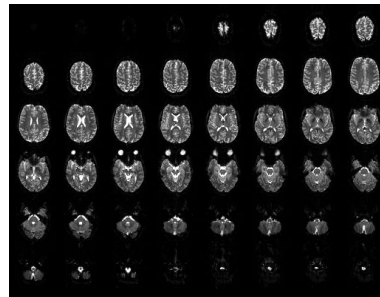


Fig.5: Maximal brain coverage and excellent 3T image quality due to MAGNETOM Allegra gradient system (Courtesy of Dr. L. Wald, MGH, Boston, USA)

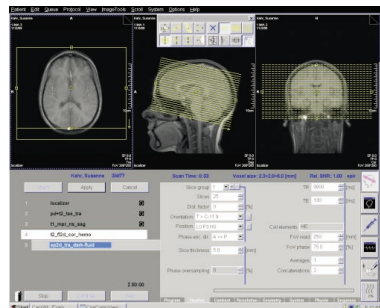


Fig.6: The syngo user interface

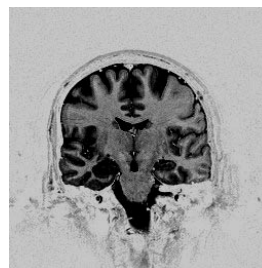


Fig.7.a: True Inversion recovery

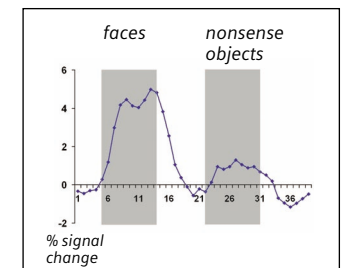
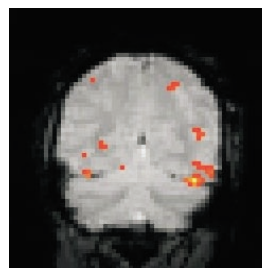
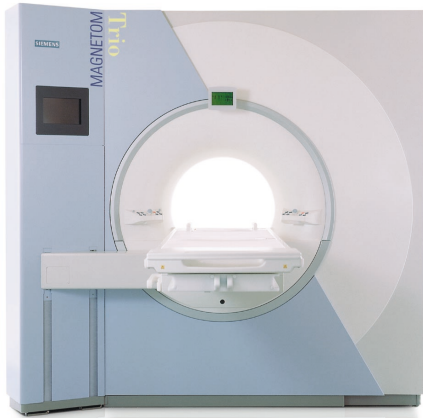


Fig.7.b: Cognitive fMRI study using visual stimuli (Courtesy of Dr. S. Kastner, Princeton University, USA)

MAGNETOM Trio^[UHF Class]



System Description

MAGNETOM Trio consists of a 3 Tesla superconductive actively shielded (AS) magnet equipped with the EIS system. Measuring not more than 2 m in length, as well as guaranteeing homogeneity for a 40 cm FoV as well as a patient aperture of 60 cm, MAGNETOM Trio is the shortest MR scanner allowing true clinical whole-body imaging at 3 Tesla.

Easy siting

The stray field (5 Gauss line) of the Trio extends to only 3.4 m in the x and y direction and 5.9 m in the z direction. In addition, electrical and cooling requirements are similar to those of 1.5T MAGNETOM Sonata, making the 3T Trio very easy to site.

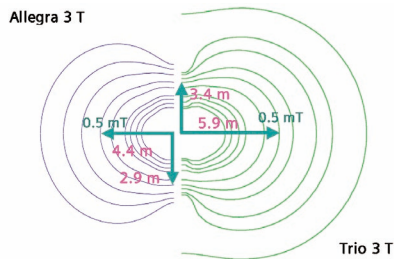


Fig.8: The stray field of MAGNETOM Trio and Allegra

Best homogeneity

In addition to the AS design and the EIS integrated in the magnet MAGNETOM Trio is also equipped with active electrical shims correcting up to second-order terms. These advanced MAGNETOM features guarantee you the homogeneity for 3 Tesla image quality in whole-body applications using up to 40 cm FoV's in all 3 directions.

Sonata gradient power

As a leader in the design of gradient coils and amplifiers, Siemens' MAGNETOM Trio features the Sonata gradient system. The Sonata gradients are capable of 40 mT/m amplitude per axis with a rise time as short as 200 μ s – the maximum performance permitted on a 40 cm FoV without producing peripheral nerve stimulation.

High-technology RF system

The MAGNETOM Trio RF system consists of the most advanced technology available: 8 fully-independent, iPAT compatible, fast RF channels (integrated Parallel Acquisition Techniques). The system allows the use of coil array technology for all imaging techniques with a maximized SNR.

A user- and patient-friendly system

MAGNETOM Trio is equipped with the standard MAGNETOM patient table and patient communication system and runs under the multi-modality platform syngo. These clinically-validated components make the Trio patient- and user-friendly, so that you can concentrate on your diagnosis.

Whole-body applications

MAGNETOM Trio features all 1.5T imaging and spectroscopy applications, ranging from cardiac, abdominal, orthopedic applications all the way to neuro examinations.

Fig. 9.a:
Large FoV TSE spine



Fig. 9.b: TrueFISP long axis, 4-chamber image of the heart

(Courtesy of Dr. D. Hinton and Dr. L. Wald, MGH, Boston, USA)

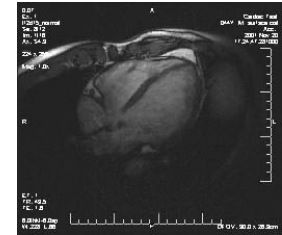


Fig. 9.c:
High-resolution TrueFISP of the kidneys

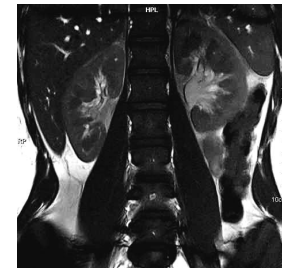


Fig. 9.d: High-resolution orthopedic imaging at 3 T



Fig. 9.e: T1-, T2- and ToF images of the head

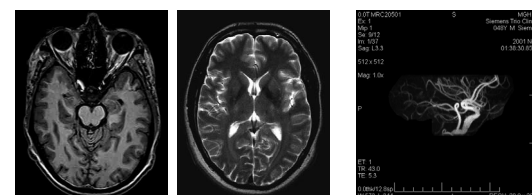
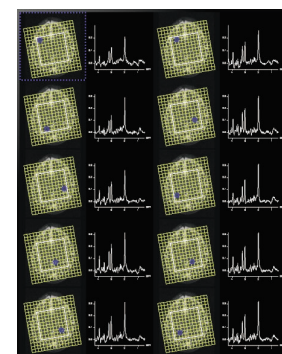
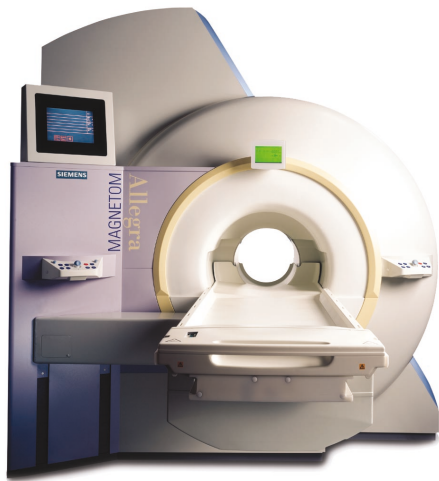


Fig. 9.f: Chemical Shift Imaging (CSI)

(Courtesy of Dr. B. Jenkins, MGH, Boston, USA)



Siemens Ultra High-Field Class



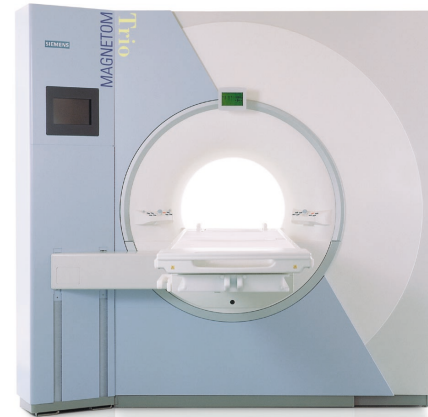
MAGNETOM Allegra

Dedicated Excellence in 3 T MR

- Most compact 3T scanner – the ultimate brain machine
- Fastest gradients in the industry. Optimized for advanced neuro imaging techniques
- syngo MR – the intuitive and flexible clinical user interface
- FDA-approved for 3T head MR

Applications

- Standard neuro imaging: PD-, T1-, T2 -weighted, ToF, ce-MRA
- Advanced neuro imaging: diffusion, perfusion, BOLD acquisition and post-processing protocols
- Spectroscopy: single-voxel, chemical shift imaging 2D & 3D



MAGNETOM Trio

Whole-Body Excellence in 3T MR

- The shortest whole-body 3 Tesla MR scanner with full 40 cm FoV
- 8 fast RF channels supporting integrated Parallel Acquisition Techniques (IPAT)
- syngo MR – the intuitive and flexible clinical user interface
- FDA-approved for 3T whole-body MR

Applications

- Standard and advanced neuro-imaging protocols
- Whole-body protocols: spine, cardiac, abdominal, orthopedic-protocols
- Spectroscopy: single-voxel, chemical shift imaging 2D & 3D



Technical Data MAGNETOM Allegra

System overview

Revolutionary compact Ultra High-Field MR system designed and optimized for advanced brain imaging

Magnet

Extra-short 3T magnet	1.25 m
Actively Shielded technology with patented External Interference Shielding (EIS)	
Active shim up to 2 nd order	
High homogeneity*	220 mm DSV <0.1 ppm Vrms
Weight	4,500 kg (9930 lb.)
Helium refill intervals	approx. 6.5 month

Gradient system

Actively shielded 3 axis gradient system	
Extremely compact water cooled amplifier and coil	
Max. amplitude	40 mT/m per axis
Slew rate	400 mT/m/ms per axis

RF system

Fully digital transmit/receive system
Compact solid state RF amplifier 123.2 MHz
1MHz bandwidth receive channel
CP transmit/receive head coil

Imaging and spectroscopy techniques

Set of protocols providing conventional T1-, T2-, T2* and PD weighted MRI and advanced diffusion, perfusion and BOLD MRI

Sequences optimized for high gradient power and field strength

Single voxel and CSI spectroscopy

syngo-based computer system

Host computer:

Dual processor 2 x Pentium IV™	
Clock rate	1.7 GHz
RAM	1 GB
Hard disk capacity	72 GB

Image processor:

Reconstruction speed	100 ips (true 256°)
RAM	1 GB
Hard disk capacity	72 GB
Parallel scan and reconstruction	

Patient relevant features

Integrated intercom system
Standard pneumatic headphones and coil mirror

Siting

0.5 mT field (z)	4.4 m (14'5")
0.5 mT field (x,y)	2.9 m (9'6")
Minimum room clearance	2.4 m (7'11")
No. of electronics cabinets	Only 3
Cabinets can be placed against the wall	

Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens Sales representative for the most current information.

Note:

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All devices listed herein may not be licensed according to Canadian law:

MAGNETOM Rhapsody
MAGNETOM Allegra
MAGNETOM Concerto
MAGNETOM Trio

* Preliminary product specification.
Contact your Siemens representative for latest information.

* with syngo MR 2002 B
The information about syngo MR 2002 B is being provided for planning purposes. The product is pending 510 (k) review, and is not commercially available in the U.S.

Technical Data MAGNETOM Trio

System overview

Ultra High-Field MR system with full 40 cm FoV for whole-body imaging
Most advanced technology and applications

Magnet

Short 3T magnet	2.0 m
Actively Shielded technology with patented External Interference Shielding (EIS)	
Active shim up to 2 nd order	
High homogeneity*400 mm DSV	<0.35 ppm Vrms
Weight	10,000 kg (22,750 lb.)
Helium refill interval	1 year

Gradient system

Actively shielded 3 axis gradient system	
Extremely compact water cooled amplifier and coil	
Max. amplitude	40 mT/m per axis
Slew rate	200 mT/m/ms per axis

RF system

Fully digital transmit/receive system
Compact solid state RF amplifier 123.2 MHz
8 fully independent receiver channels, each with 1 MHz bandwidth
CP transmit/receive head coil – local coils
Fully integrated CP transmit/receive body coil

Imaging and spectroscopy techniques

Whole-body protocols: neurologic, cardiac, abdominal, orthopedic applications
Optimized for Ultra High-Field strength
Single voxel and CSI spectroscopy

syngo-based computer system

Host computer:

Dual processor 2 x Pentium IV™	
Clock rate	1.7 GHz
RAM	1 GB
Hard disk capacity	72 GB

Image processor:

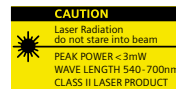
Reconstruction speed	100 ips (true 256°)
RAM	1 GB
Hard disk capacity	72 GB
Parallel scan and reconstruction	

Patient relevant features

Integrated intercom system
Patient-friendly 60 cm bore opening

Siting

0.5 mT field (z)	5.9 m (19'4")
0.5 mT field (x,y)	3.4 m (11'2")
Minimum room clearance	2.8 m (9'2")
No. of electronics cabinets	Only 3
Cabinets can be placed against the wall	



Siemens Medical
Solutions that help

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