SuperMark 1.5T

MRI System Proposal

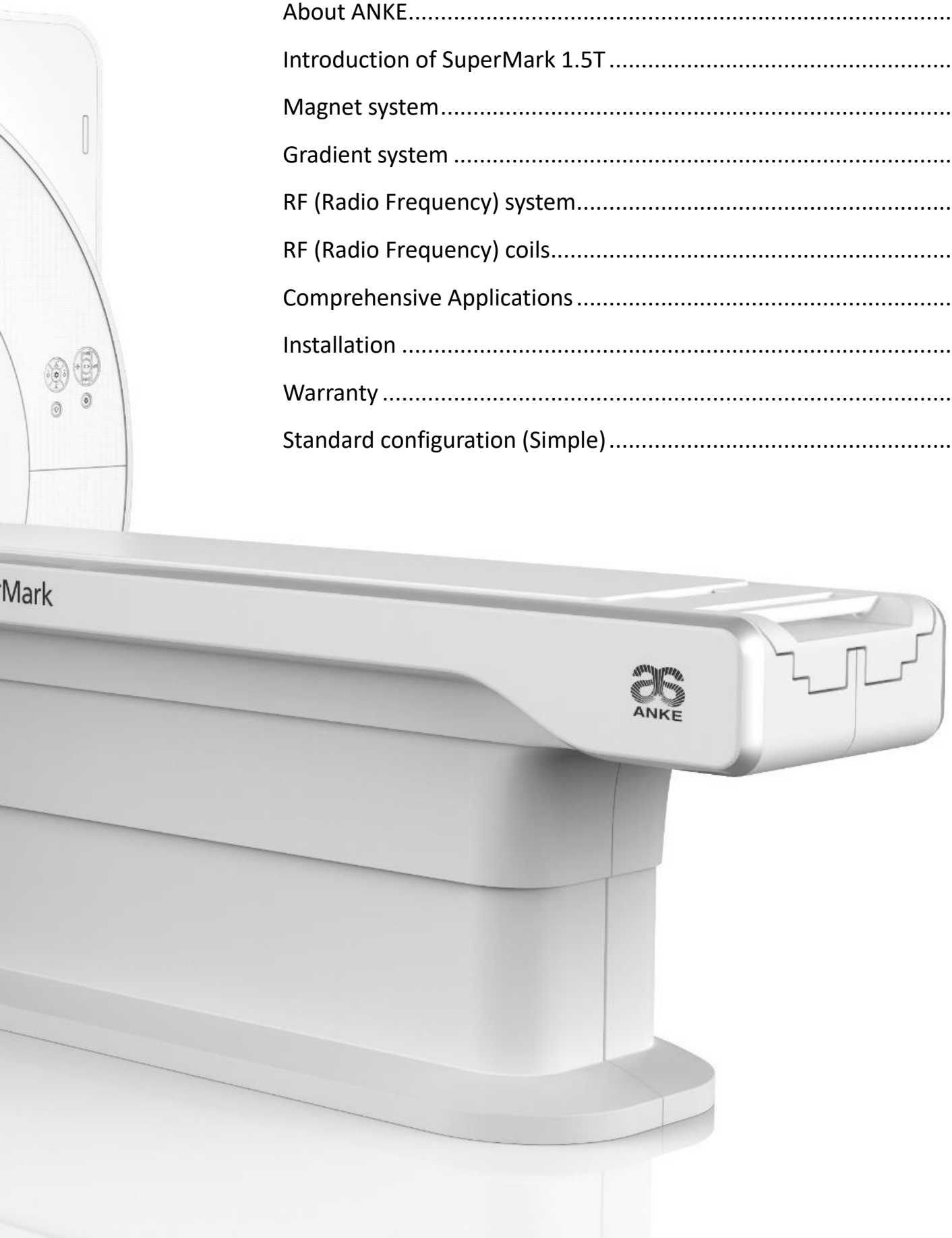
Shenzhen Anke High-tech Co., Ltd.

Ver: MRSM15-2108

ANKE


ANKE
Super

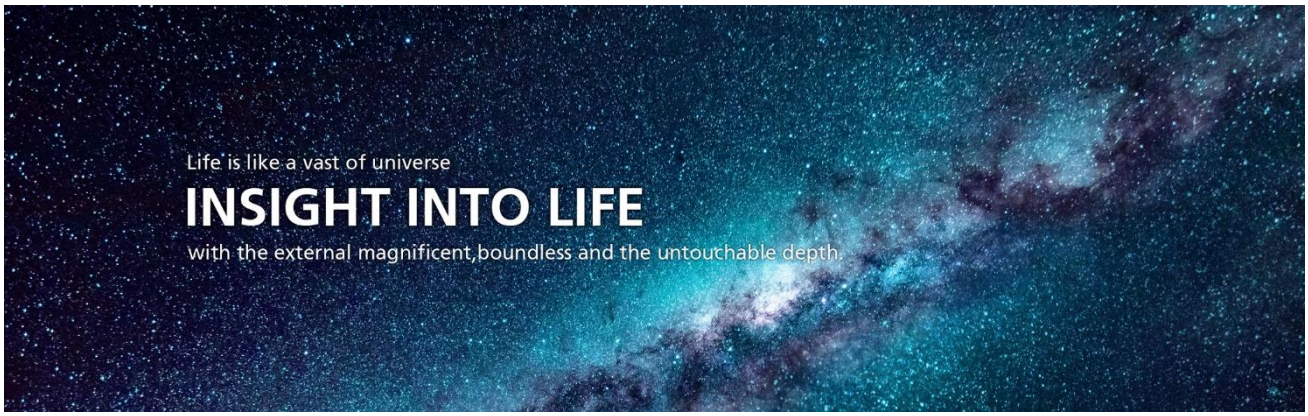
Contents



About ANKE

Founded in 1986, Shenzhen Anke High-tech Co., Ltd. is one of the first high-tech enterprise of national excellency and the first medical imaging engineering center of Guangdong province and Shenzhen municipality.

ANKE specializes in RD, manufacturing, sales and service of medical equipment, currently including CT, MRI, X-ray radiography systems, dental CT, telemedicine (Anke Image Cloud), minimally invasive surgery and other series. ANKE invented the first MRI system, spiral CT, color doppler ultrasound, PACS, fetal monitor and the first surgical navigation system. All products have proprietary intellectual property rights and are ISO13485 and ISO 9001 certified and approved by CFDA, CE and FDA.



ANKE has set up branches and offices throughout China and worldwide for a complete sales and maintenance & service system. By now, ANKE has a customer base of over 10,000 hospitals. ANKE's after-sales service enjoys a good reputation among the medical or healthcare circles. ANKE keeps a leading position in a user comprehensive satisfaction evaluation organized by the Ministry of Healthcare, which includes manufacturers of foreign brands.

Innovative, pioneering, realistic and credible are the principle of ANKE business operations. Over 30 years since establishment, ANKE has always been committed to making high-tech medical equipment, creating globally advanced technologies, providing products and services of reasonable price and super quality. ANKE enjoys high prestige and has established a good brand image in the medical device industry.

Introduction of SuperMark 1.5T

SuperMark 1.5T is a new generation superconducting MRI system designed focused on user concerns, based on over 30 years of experience in research and development. This system is equipped with a new generation of hardware and software platforms to benefit users a lot and provide patients with more comfortable experiences. It features new user-friendly design, faster imaging speed, higher image quality and high work efficiency.

SuperMark 1.5T provides not only conventional pulse sequences and basic clinical applications, but also advanced functional applications. It adopts brand new APEX operating system which ensures easy operation and fast diagnosis.

Technical advantages

- Short bore magnet with zero liquid helium “0” boil-off technology;
- Powerful and high linearity gradient system, Soft sound decreases the noise of scanning;
- High efficiency RF system combined with Dual-engine parallel acquisition technology;
- Multi-channel phased array receiving coil with intelligent identification;
- AI combined platform provide more comfortable operating experience;
- Complete clinical application package to meet all your clinical needs.

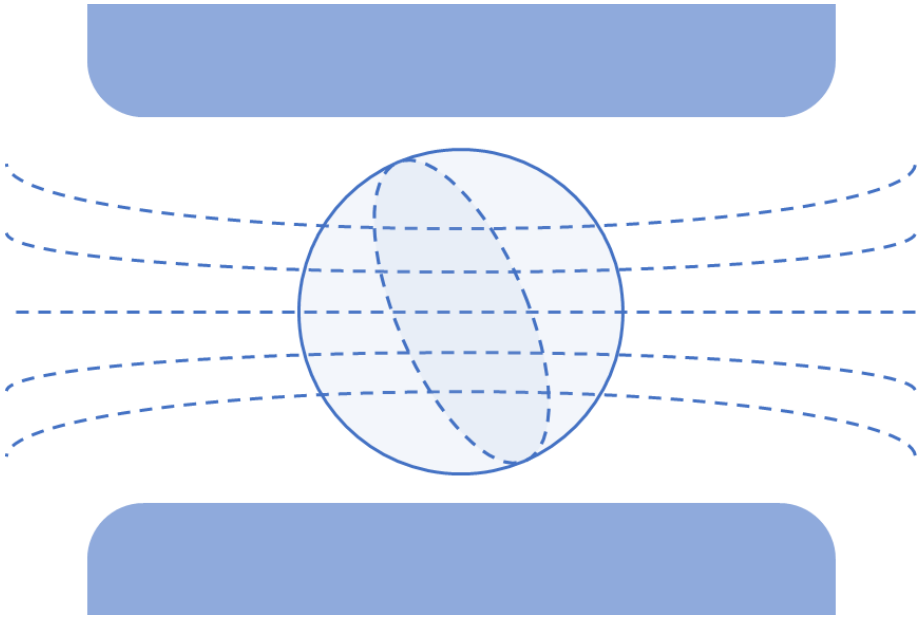
Magnet system

Short bore magnet

Traditional long magnet has a very long aperture, which seriously affects the comfort of patient examination. SuperMark 1.5T system is equipped with an optimally designed short bore superconducting magnet, the length of magnet is only 157cm, it can greatly improve the patient examination experience.

ADS technology

Homogeneity of the main magnetic field is the basis of MR imaging. A good magnetic field homogeneity helps to realize a wide range of abdominal scanning and off-center joints scanning. In particular, fat suppression imaging has a high requirement for the homogeneity of magnetic field.



ANKE provides unique ADS (Automatic 3D dynamic shimming) technology, which automatically performs 3D dynamic shimming according to the tissue and structural characteristics of different parts of human body during scanning. This can greatly reduce problems such as image distortion and failure of fat suppression caused by local magnetic field inhomogeneities.

Liquid helium “0” boil-off

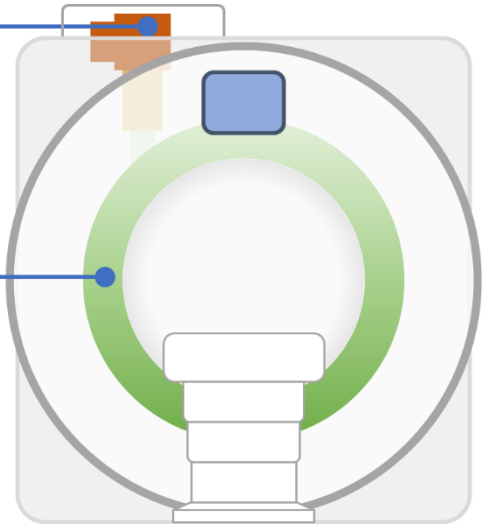
Ultra-low liquid helium capacity design, only 700L (100% fill in) liquid helium is required to ensure a stable running of the magnet.

4K cold head

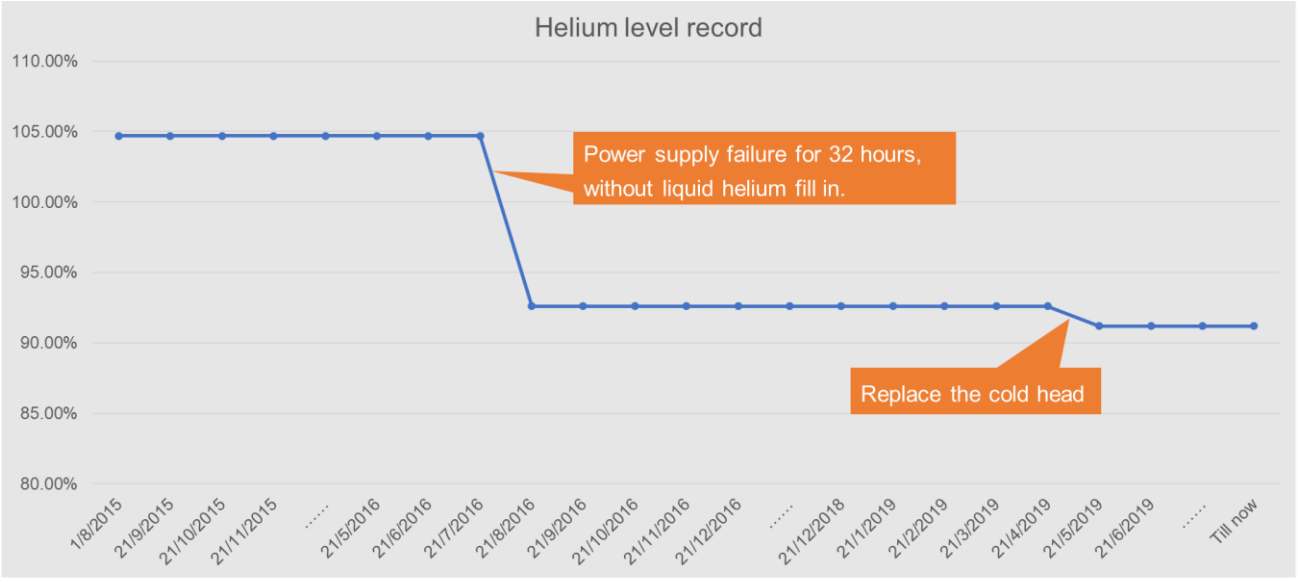
Intelligent control, high efficient and stable, ensure that the internal temperature of the magnet is always at a stable level.

Liquid helium saving design

- Optimized structural to enhance sealing
- Low liquid helium capacity
- Effectively avoid liquid helium boil off

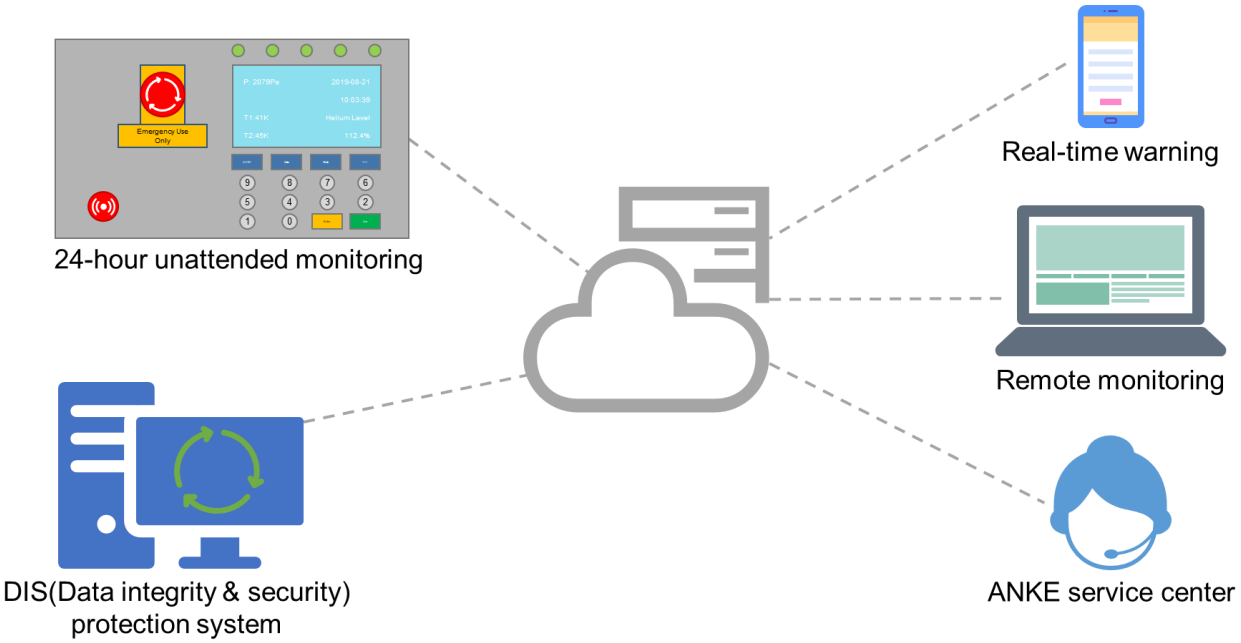


Equipped with 4K cold head and liquid helium “0” boil-off technology, which ensure stably running for more than 5 years without liquid helium fill in.



Data from: Cancer Hospital of Huludao City, China

Safe and reliable



With 24-hour unattended function, it can access the cloud server, monitor the magnet status online, and receive early warning information in real time to avoid major losses.

Magnet specifications	
Magnet type	Superconducting
Magnetic field strength	1.5T ± 1%
Magnet length	157cm
Magnet bore diameter	605mm±5mm
Weight (including 100% liquid helium)	3800kg
Liquid helium volume (100% liquid helium)	700L
Liquid refilling interval	≥ 5 years
Magnetic field homogeneity	⩽ 0.170ppm @40cm DSV (VRSM)

Gradient system

General features

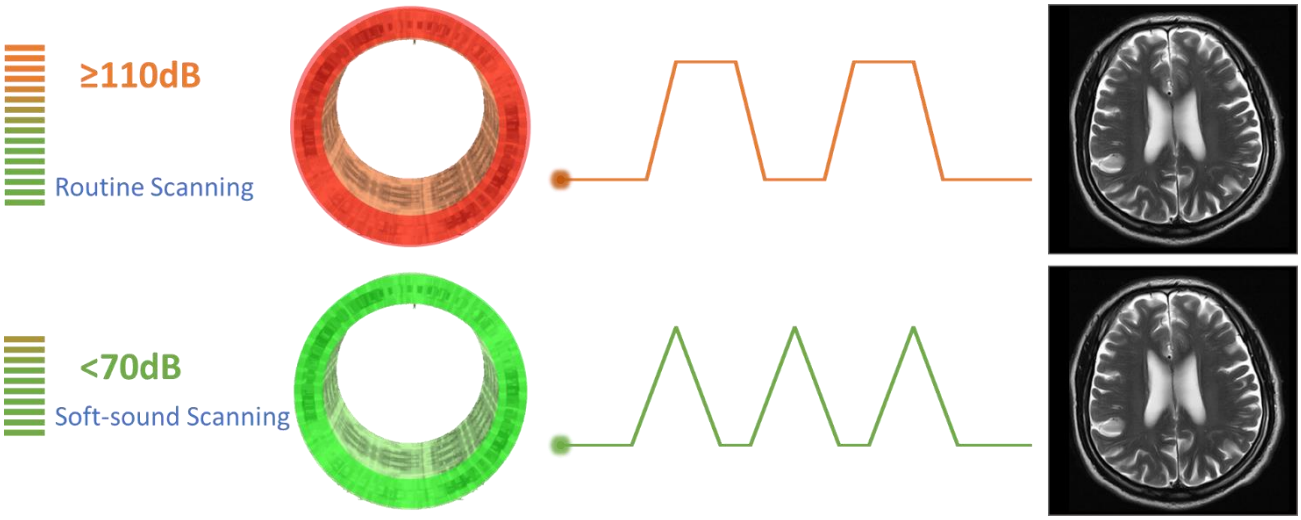
- Water-cooled gradient amplifier and coil, ensure the whole system working in maximum performance.
- Eddy-“0” technology, through the combination of hardware and software, the eddy current is compensated to the maximum extent, ensure excellent imaging quality.
- Ultrafast solid-state technology with very low switching losses.
- Excellent linearity, easy to achieve a wide range of scanning.

Powerful output	
Max. amplitude (single axis)	40mT/m
Max. Effective amplitude	69mT/m
Max. slew rate (single axis)	150T/m/s
Max. Effective slew rate	259T/m/s
Min. rise time	0.27ms
Duty cycle	100%
The technology of maximum gradient amplitude and slew rate to arrive at the same time is provided.	

Soft sound technology

Structurally stable magnet and gradient coil with new design of noise reduction material, these two parts are closely connected, and the force is balanced in all directions, which can effectively reduce the vibration in the scanning process, thus reducing the noise.

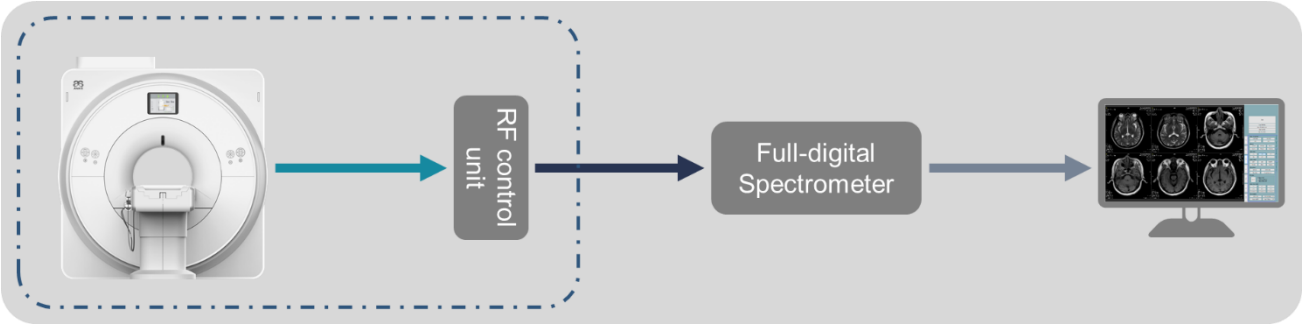
The optimized sequence parameters can effectively avoid the resonance of the gradient coil, on the premise of ensuring image quality and scanning time, the noise generated by scanning is greatly reduced.



RF (Radio Frequency) system

General features

- High efficiency RF system, equipped with new and unique technology, reducing electrical noise and increasing signal detection.
- Real-time RF energy monitoring technology, include short-term and long-term accumulation monitoring.
- 16 channels RF receiving platform, high dynamic range without adjustments.



Transmit technology	
RF amplifier maximum power	20kW
Center frequency	63.86 MHz ± 275 kHz
Transmission bandwidth	550kHz
RF amplifier Cooling type	Water cooling

RF receiving Technology	
Number of independent channels	16
Receiving bandwidth	2.0MHz

RF (Radio Frequency) coils

Integrated body coil

Transmitting & Receiving integrated Body Coil for whole-body coverage scan, can be seamlessly connected with the phased array coils, greatly improve SNR and uniformity of images.

Phased array coils

The phased array coils are designed for high image quality. No-tune high element coils increase SNR and reduce examination times.

Head/Neck coil – 16

Channels	16
Dimensions (L×W×H)	43cm×33cm×32cm
Weight	5.0kg
Applications	• Head imaging • Neck imaging • C-spine imaging • Head & neck MR angiography • Head & neck combined imaging • TMJ (temporomandibular joints) imaging

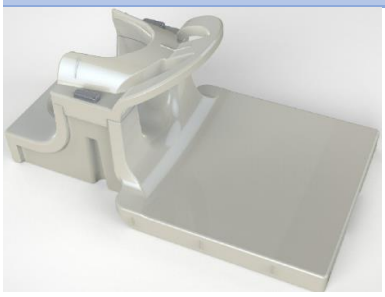
Body coil – 16

Channels	16
Dimensions (L×W×H)	55cm×46cm×3.5cm
Weight	4.6kg
Applications	• Spine imaging • Thorax imaging • Abdomen imaging • Pelvis imaging • Hip imaging • Abdomen MR angiography

Knee coil – 8		
	Channels	8
	Dimensions (L×W×H)	42cm×27cm×27cm
	Weight	4.9kg
	Applications	• High resolution knee imaging • Lower extremities joint imaging

Large flex coil – 4		
	Channels	4
	Dimensions (L×W×H)	51cm×23cm×2.7cm
	Weight	1.4kg
	Applications	Imaging of large regions, such as medium to large shoulder, hip, and knee.

Head coil – 8 (Optional)		
	Channels	8
	Dimensions (L×W×H)	32cm×40cm×31cm
	Weight	4.3kg
	Applications	• Head imaging • Head MR angiography • TMJ (temporomandibular joints) imaging

Neck coil – 8 (Optional)		
	Channels	8
	Dimensions (L×W×H)	70.5cm×42cm×31.7cm
	Weight	7kg
	Applications	• Neck imaging • C-spine & T-spine imaging • Neck MR angiography

Hand/Wrist coil – 8 (Optional)	
	
Channels	8
Dimensions (L×W×H)	32cm×16cm×23cm
Weight	4.6kg
Applications	High resolution hand and wrist imaging

Foot/Ankle coil – 8 (Optional)	
	
Channels	8
Dimensions (L×W×H)	37cm×30cm×32cm
Weight	6.5kg
Applications	High resolution foot and ankle imaging

Breast coil – 8 (Optional)	
	
Channels	8
Dimensions (L×W×H)	50cm×45cm×24cm
Weight	6.5kg
Applications	• High resolution breast imaging • Simultaneous imaging of both breasts • Axillar imaging elements

Shoulder coil – 4 (Optional)	
	
Channels	4
Dimensions (L×W×H)	21cm×29cm×19cm
Weight	5kg
Applications	• High resolution shoulder imaging • Higher SNR and homogeneity

Small flex coil – 4 (Optional)		
	Channels	4
	Dimensions (L×W×H)	36cm×18cm×2.7cm
	Weight	0.8kg
	Applications	Imaging of small regions, such as small to medium shoulder, wrist, elbow, and ankle.

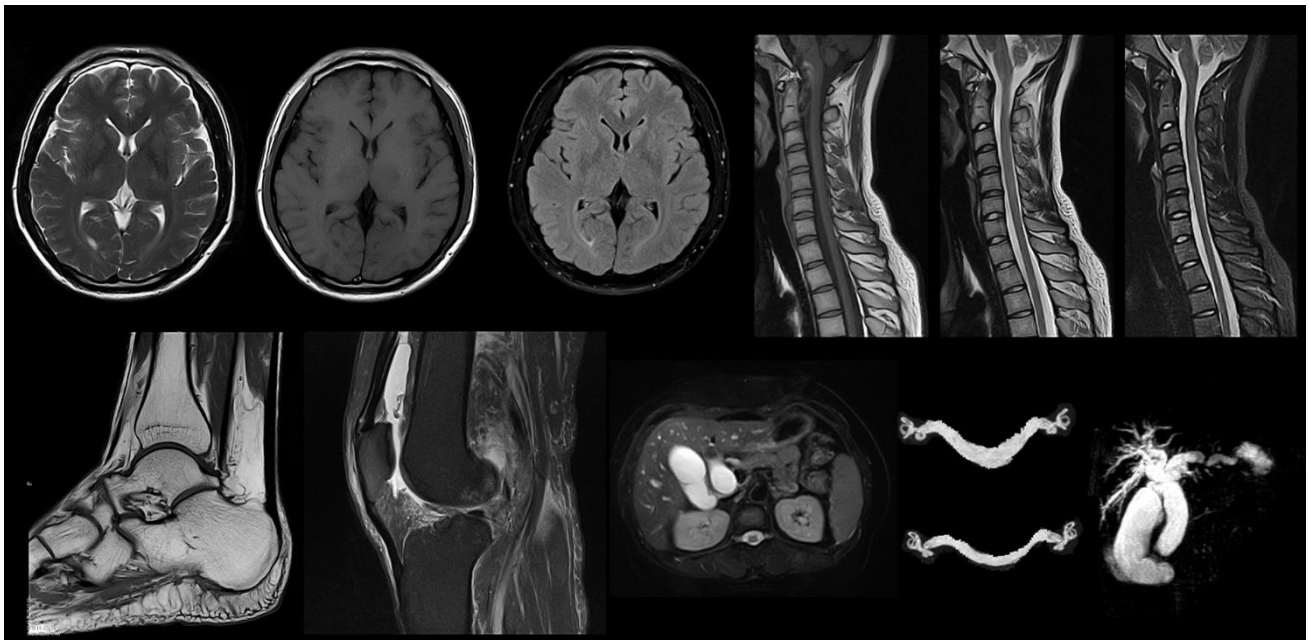
CTL Spine coil – 14 (Optional)		
	Channels	14
	Dimensions (L×W×H)	112cm×42cm×30cm
	Weight	9kg
	Applications	High resolution imaging of the whole spine

1) All the Optional coils are not included in the standard offer, please contact to ANKE for future information about technology and price.

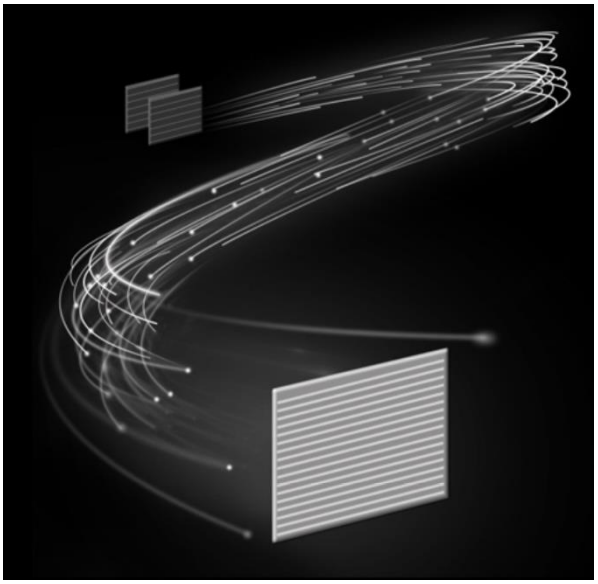
Comprehensive Applications

Full soft-sound platform

Combined with the advanced hardware design, Soft sound technology can be used for whole body scanning without image quality lose, which will provide a more comfortable scanning experience for patients. All the images bellow are collected by soft-sound sequence.



Dual-engine parallel acquisition technology



Parallel acquisition is a technology to reduce the time of signal acquisition, in SuperMark 1.5T, we supply 2 kind of reconstruction method:

- SENSE (SENSitivity Encoding) technology based on Image domain.
- GRAPPA (GeneRalized Auto calibrating Partially Parallel Acquisition) technology based one K-space.

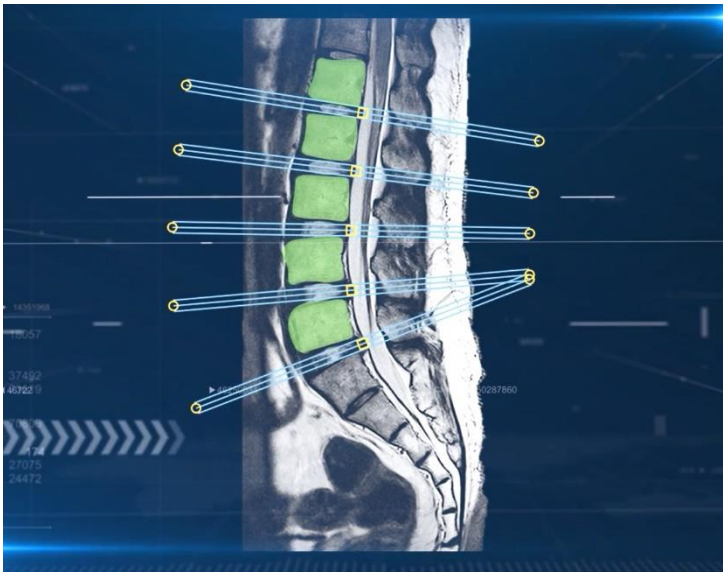
Parallel acquisition technology can fully satisfy your daily application needs and enhance the work efficiency.

AI technology for MRI imaging

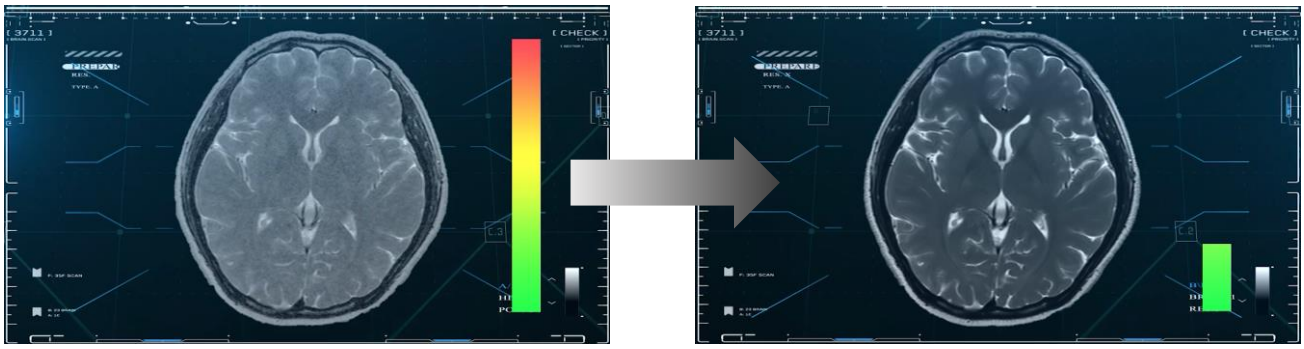
With the development of computer technology, Artificial Intelligence (AI) technology has been more and more widely used in some high-tech fields. Especially in the field of medical imaging, AI technology is also increasingly used in process optimization, image processing, and auxiliary diagnosis, etc. which can greatly improve work efficiency and reduce the workload of medical workers. As one of the top leading high-tech medical imaging manufacturers, ANKE has always been committed to the research on the application of AI technology in MRI.

◆ **AI-Auto Localization technology**

AI-Auto Localization technology uses AI to separate the tissues of the vertebral body, then find the corresponding intervertebral disc based on the vertebral body and place the cross-sectional positioning line parallel to the long axis of the intervertebral disc and perpendicular to the sagittal plane of the spine. This can greatly reduce the complexity of the operation, also, it can save time and avoid position and angle errors caused by manual operation.

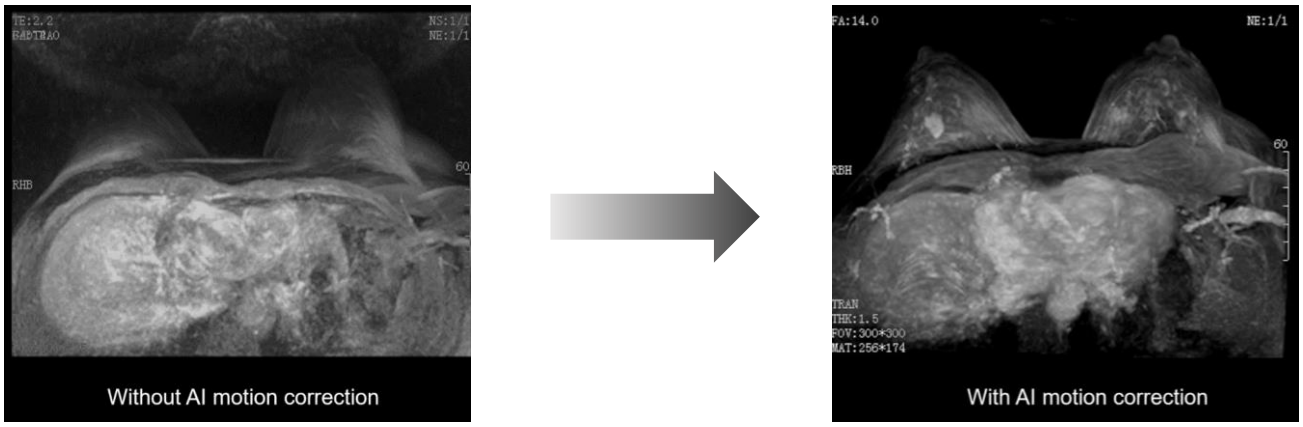


◆ **AI-Image Enhancement**



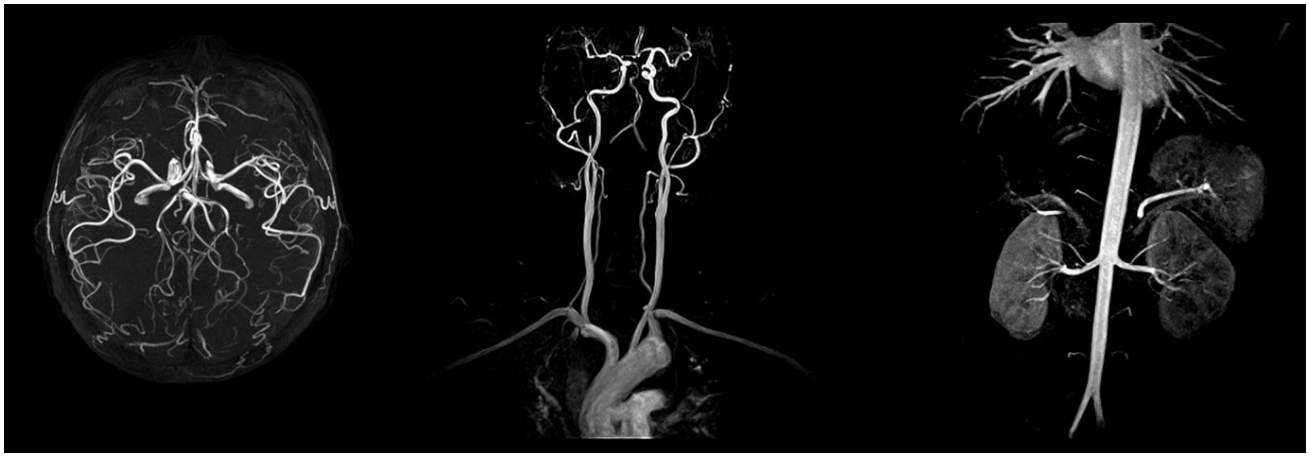
Combined with fast scanning sequence, AI image enhancement technology can greatly shorten patient scanning time, improve patient comfort, and increase the number of patient scans in the hospital every day.

◆ **AI motion correction**



AI motion correction can reduce the image artifact by different data acquisition and reconstruction methods.

Multiple angiography imaging



TOF (Time-of-Flight) 2D/3D based on the enhancement effect of blood flow, and is mainly used for the examination of cerebral blood vessels, neck blood vessels, and lower limb blood vessels.

CEMRA (Contrast Enhanced MR Angiography) 2D/3D for single step, dynamic, peripheral with the shortest TR and TE. The strong gradients make it possible to separate the arterial phase from the venous phase.

PCMRA (Phase Contrast MR Angiography) can be used for venous or sinus scanning, cerebrospinal fluid or blood flow, flow, flow direction analysis, etc.

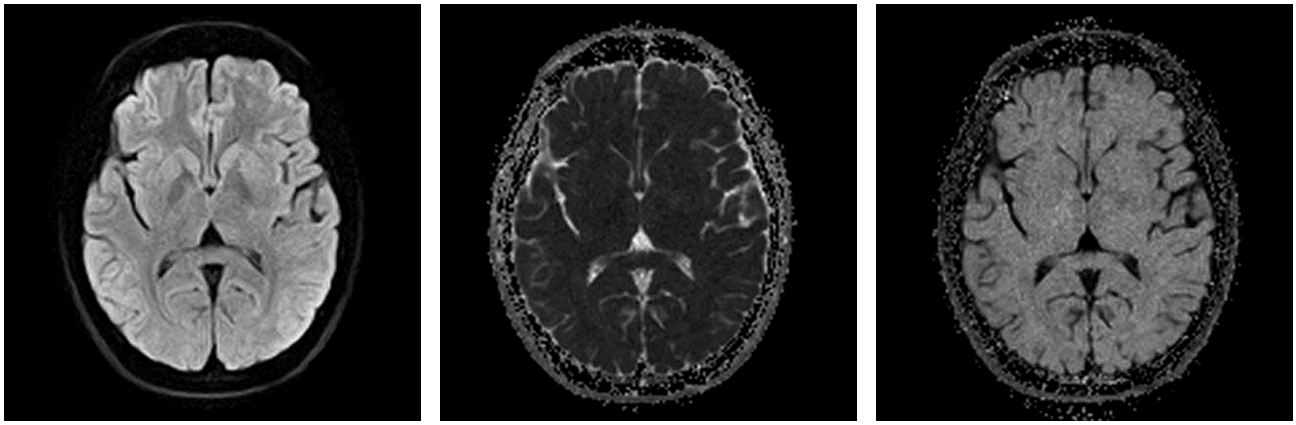
ASL-MRA (Arterial Spin Labeling MR angiography) is a non-contrast MRA imaging function based on SSFP sequence. This function can be used to produce images of portal veins, renal arteries, and upper and lower extremity arteries.

MTC (Magnetization Transfer Contrast) technology and **TONE (Tilted Optimized Non-saturation Excitation)** pulse to improved Contrast to Noise Ratio of images.

High-definition diffusion imaging

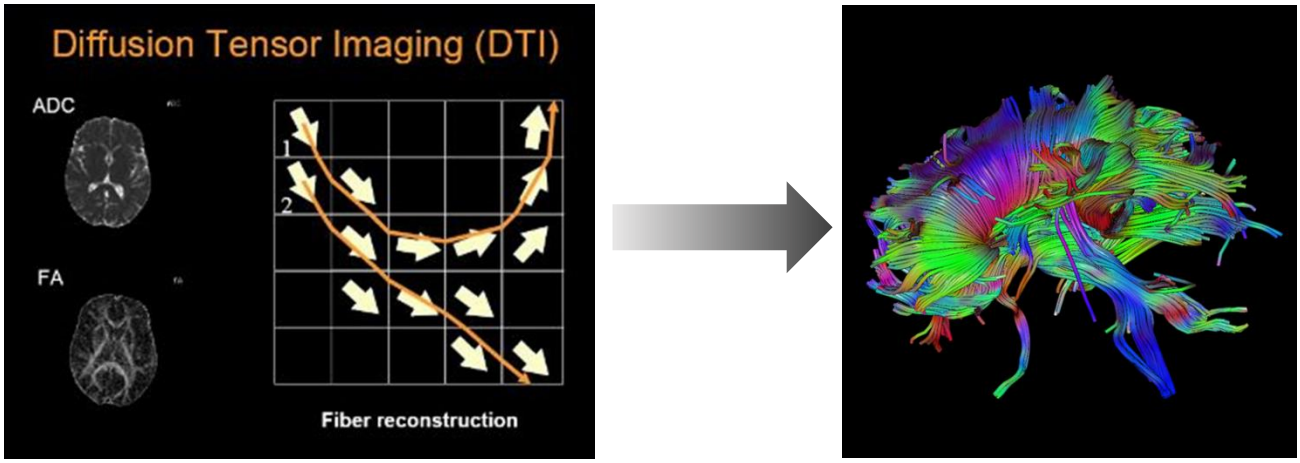
DWI (Diffusion Weighted Imaging) is to show Brownian motion of water molecules by applying diffusion sensitive gradient on the basis of EPI (Echo Plane Imaging) sequence.

In SuperMark 1.5T system, we supply EPI (Echo Planar Imaging) with Single Shot and Multi Shot technology for high-definition diffusion weighted imaging. In one scanning, you can obtain 4 images of DWI: DWI images with high b-value, DWI images with 0 b-value, ADC-map, eADC-map.



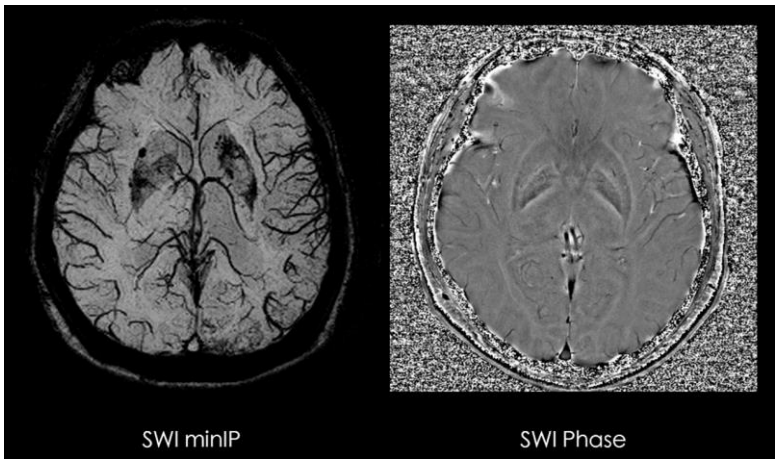
DWI is a necessary function for the examination cerebral infarction, brain tumor, malignant lesions (body) and bone tumor, etc.

DTI (Diffusion Tensor Imaging)[1)] is a more accurate description of the anisotropy of water molecular motion, with multiple diffusion-weightings and up to 256 directions for generating data sets for diffusion tensor imaging.



2) Optional functions. To obtain more accurate image information, the Diffusion tensor imaging (DTI) analysis software (optional) and other accessories are required.

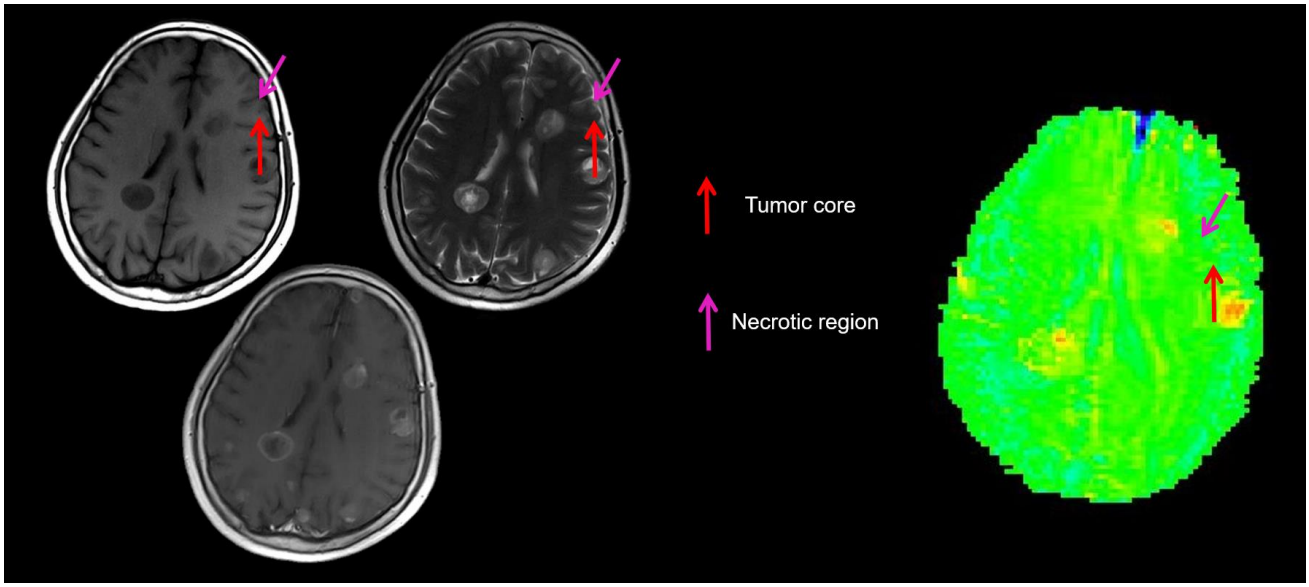
Susceptibility weighted imaging (SWI)



SWI (Susceptibility weighted imaging) is using the magnetic sensitive characteristics of deoxyhemoglobin, to get the image of veins, bleeding and non-heme iron deposits.

Amide Proton Transfer Imaging

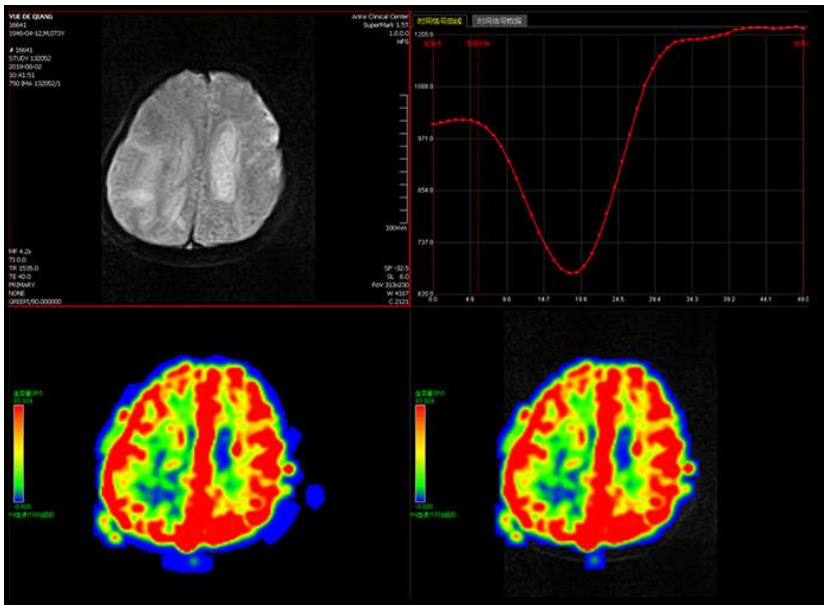
APT (Amide Proton Transfer) imaging is a noninvasive imaging technique based on chemical exchange saturation transfer technology.



APT is a reflection of protein distribution in MRI which can be used to assess protein expression of tumor, stroke and other brain diseases, and provides important information for diagnosis and treatment.

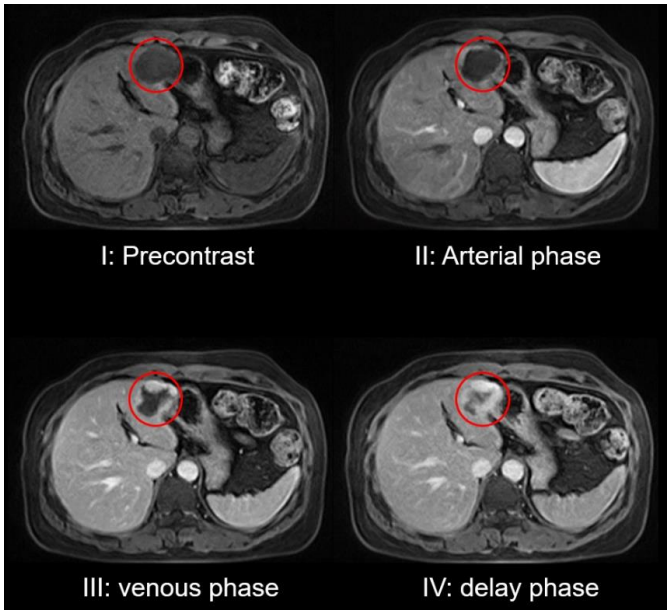
Perfusion weighted imaging[2)]

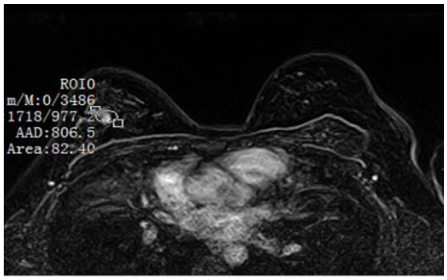
PWI (Perfusion Weighted Imaging)[3)] is observing the changes in cerebral hemodynamics by EPI technology. Inline Perfusion helps to streamline the clinical workflow by automating post-processing perfusion data during data acquisition. Neuro Perfusion measures perfusion deficits and assist in the diagnosis and grading of e.g. vascular deficiencies and brain tumors.

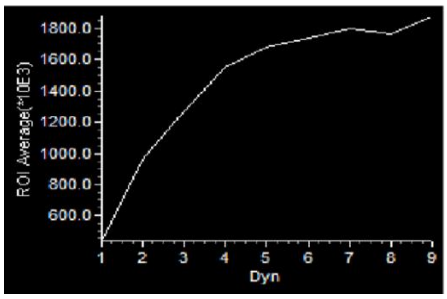


Dynamic contrast enhancement imaging

DCE (Dynamic Contrast Enhanced) is a noninvasive imaging method to detect and evaluate the vascular status of tumors or other tissues by injecting contrast agents.





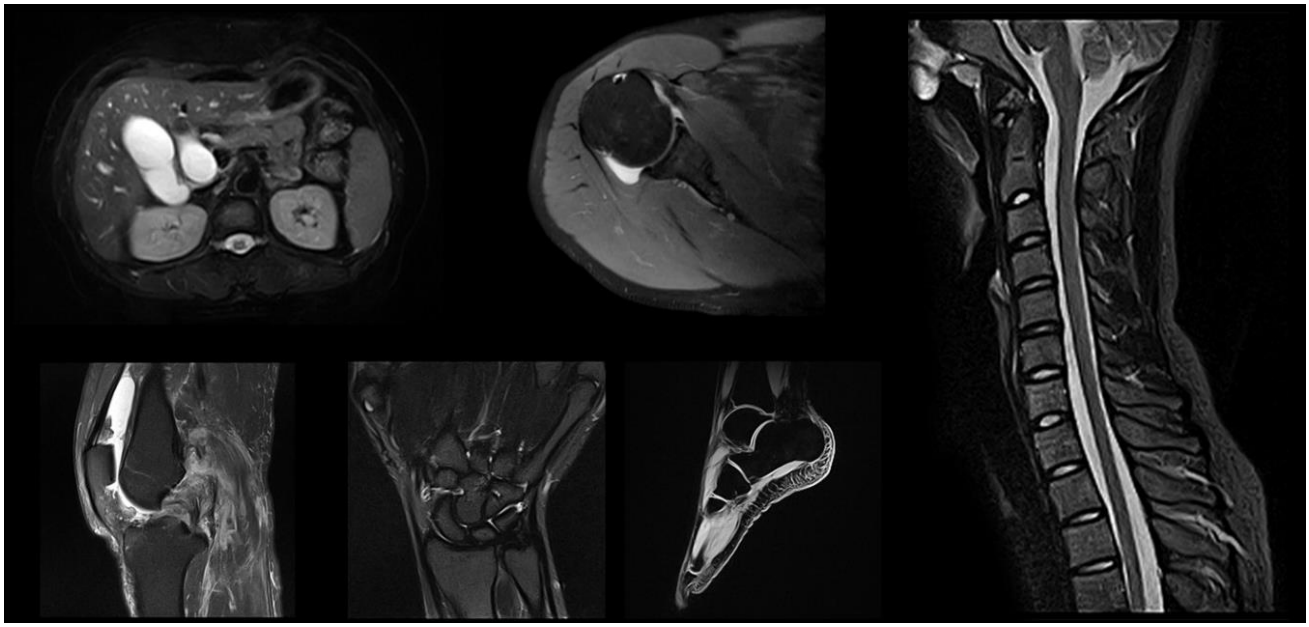


FAST 3D – DCE (Dynamic Contrast Enhancement) imaging with full abdominal coverage scan, can easily to capture the process of lesion signal enhancement, help you analyze the lesion more accurately.

3) Optional functions. To obtain more accurate image information, the MRI perfusion analysis software (optional) and other accessories are required.

Multiple fat and water imaging

SuperMark 1.5T provide multiple precise fat and water imaging technologies.



STIR (Short Time Inversion Recovery)

FS (Fat Saturation) technology based on frequency selective RF pulses with 2 selectable modes: weak, strong

SPAIR (Spectral Adiabatic Inversion Recovery), combined with frequency selective inversion pulse to obtain a high-quality fat suppression body imaging

WE (Water Excitation) technology, can show the cartilage structure clearly

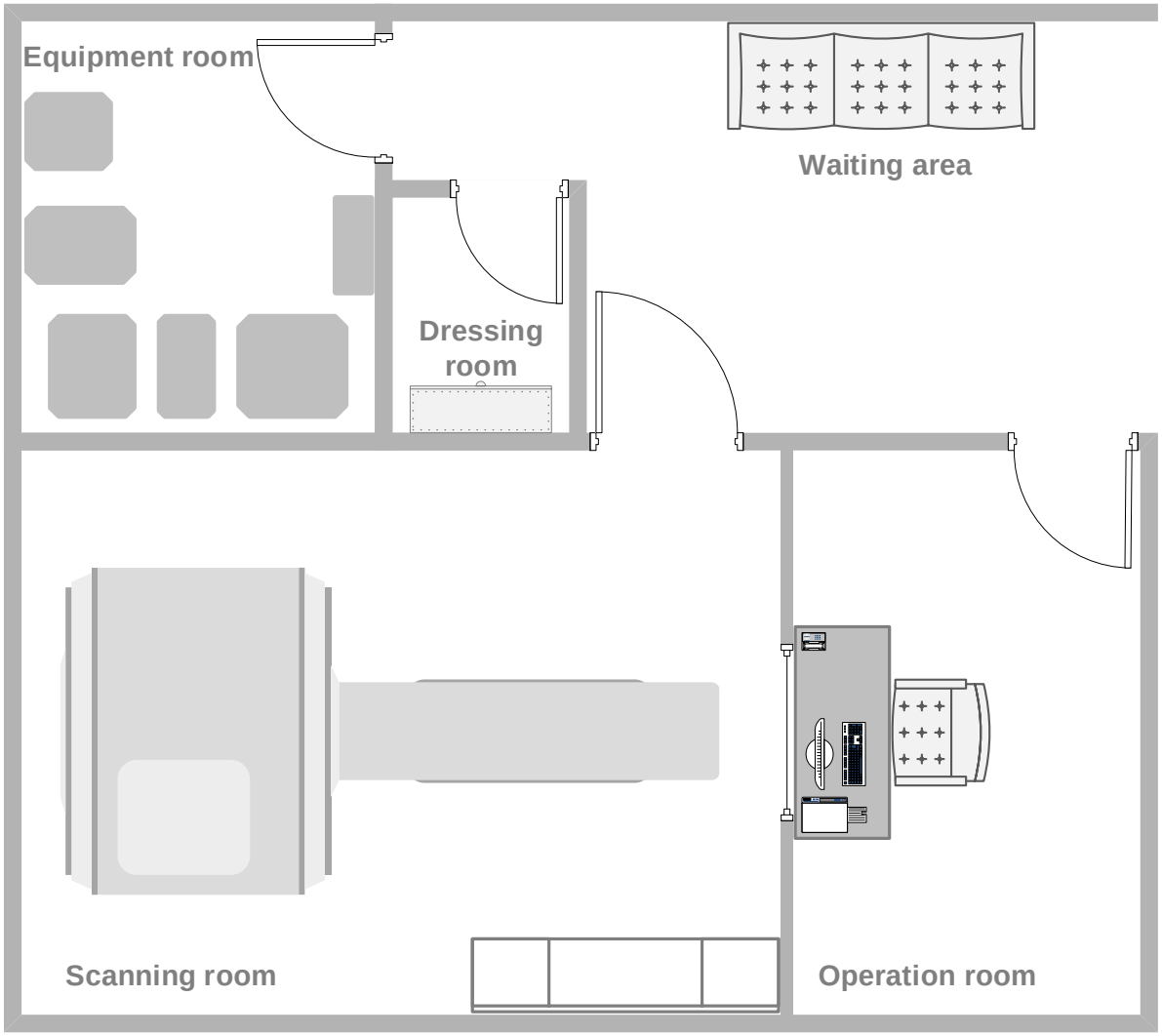
DIXON (Water and Fat Separation) technology.

Installation

Power Requirements

380VAC ± 10%, 50/60 Hz, ±1Hz, Connection value 80 kVA

Recommended dimension[3)]



Scanning room	6.00m x 5.00m
Operation room	3.00m x 3.00m
Equipment room	3.00m x 4.00m

4) The final implementation plan depends on the condition of customer's site, for more information, please refer to the site planning manual.

Warranty

SuperMark 1.5T supplied by ANKE will be, under normal and proper use and care, free from all defects or deficiency in design, material and workmanship for the Warranty Period as specified below:

1) Warranty Period (from acceptance date): 12 months.
2) The warranty shall not extend to:
   - Any products that are misused or that have malfunction attributable to negligence or accidents.
   - Any products where ANKE's original serial number tag or product identification markings have been altered or removed.
   - Any products repaired by anyone unauthorized by ANKE.

The guarantee covers all the materials, main accessories that will be shipped directly from the factory and we offer the service technically by the Internet of 7 x 24 hours.

Standard configuration (Simple)[5)]

1. Main components and accessories

No.	Descriptions	Quantity
1.1	Main imaging system	1 set
1.2	Magnet system	1 set
1.3	Standard cover	1 set
1.4	Gradient system	1 set
1.5	16-Channel digital spectrometer system	1 set
1.6	RF transmitting system	1 set
1.7	16-Channel RF receiving system	1 set
1.8	Patient table and control system	1 set
1.9	Patient communication system	1 set
1.10	Patient supervision TV system (CCTV)	1 set
1.11	Physiological gating system	1 set
1.12	Console system	1 set
1.13	Console table and chair	1 set
1.14	Dedicated isolated regulation power supply	1 set
1.15	Electronic cabinet (With standard PDU inside)	1 set
1.16	1KVA UPS (For console system only)	1 set
1.17	Water cooling system	1 set
1.18	Standard RF shielding cage	1 set
1.19	Accessories	1 set
1.20	Standard software package	1 set

2. Standard RF coils

No.	Descriptions	Quantity
2.1	Transmitting & Receiving integrated body coil	1 set
2.2	Head/Neck coil – 16	1 set
2.3	Body coil – 16	1 set
2.4	Knee coil – 8	1 set
2.5	Large flex coil – 4	1 set
2.6	Coil accessories	1 set
2.7	Standard coil cabinet	1 set

5) Standard configuration (Simple) is for reference only, please contact to ANKE for future information.

Shenzhen Anke High-tech Co., Ltd.

Address: Block B, LingYa Industrial Zone, Tangtou No.1 Road, Bao'an District, Shenzhen, 518108, P.R. China
Tel: +86-755-21622518 26688889
Fax: +86-755-26695307 26685908
Email: anke@anke.com
Website: www.anke.com

Twitter: ANKE (@ankeint)
Facebook: ANKE (@ankemri)
Instagram: ANKE (@ankemarcom)
Linkedin: Shenzhen Anke High-tech Co., Ltd.