Veterinarian Pocket Ultrasound System

Model：WF-1v

IMPORTANT！

Read and understand this manual before operating the equipment. After reading, keep this manual in an easily accessible place.

WireFree Ultrasound, LLC

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Introduce

This manual describes the operation of the ultrasonic diagnostic equipment. In order to ensure the safe operation of the system, please read and understand the contents of the manual before using the system

This specification is formulated and explained by the company

The company reserves the right to change the contents of the instruction manual without prior notice

Important statement!

1. The part or all of the contents of this manual shall not be copied or copied prior to the written permission;
2. It is forbidden to modify the software or hardware of this product;
3. The utility model can provide the doctor with the image and data needed for clinical diagnosis, and the doctor is responsible for the diagnosis process;
4. Quality assurance does not include the following, even within the warranty period：
   (1) Damage or loss caused by improper installation or environmental conditions that do not meet the requirements;
   (2) Damage or loss caused by the supply voltage exceeding the specified range;
   (3) Damage or loss of equipment or components purchased from the company or its authorized distributor or agent;
   (4) There is no damage or loss caused by the use of this instrument in the initial purchase area;
   (5) Damage or loss caused by maintenance of non authorized personnel of the company;
   (6) Damage or loss caused by force majeure such as fire, earthquake, flood or lightning;
   (7) Damage or loss caused by error or rough use;
   (8) Failure caused by other non product itself
5. Part of the waste or vulnerable parts may be produced when the product is in use or after the service life is exceeded, which will cause serious pollution to the environment or cross-infection if discarded at will, It shall be regulated and handled in accordance with local laws and regulations and other relevant provisions. It cannot be dealt with in the same way that normal waste is disposed of.

Maintenance and repair service

The standard warranty period of this product is 2 years, and the main warranty period is about 1 years. The warranty period from the product warranty card fill in the attached "date of installation" date, the warranty card is the only certificate calculation warranty period.

Within the warranty period, the product can enjoy free customer service; but please note that even in the warranty period, due to the reasons on the page "important statement" caused by the products need maintenance, the company will charge maintenance services, you need to pay the cost of maintenance and spare parts costs.

After the expiration of the warranty, the company can provide maintenance services.

It should be noted that if you do not pay or delay the payment of maintenance costs, the company will temporarily suspend maintenance services until you pay

We hereby declare that you must familiarize yourself with the operating instructions before use and operate and use it in strict accordance with the requirements and methods of operation of the operating instructions. The Company does not assume any responsibility for safety, reliability and performance assurance due to any abnormality caused by operation, use, maintenance and storage in accordance with the requirements of this manual.

Operation taboo:

⚠**Danger** ※ Do not modify this equipment, including equipment components, software, cables and so on. User modifications may result in security problems or reduced system performance. All modifications must be completed by the personnel approved by the company.

Intellectual Property Statement

This specification and the intellectual property rights of the products are owned by the company. No individual or organization may copy, modify or translate any part of this manual without the written consent of the company

Version information

The version of this instruction is as follows:

- Version number: 1.0
- Issue date: November 2019

OPI

Product name: Veterinarian Pocket Ultrasound System
Product Model: WF-1v

Name of the registrant: WireFree Ultrasound, LLC

Registered address：1400 112th Ave SE, Suite 100, Bellevue, WA 98004, USA

After-sales service unit

Company Name: WireFree Ultrasound, LLC

Address: 1400 112th Ave SE, Suite 100, Bellevue, WA 98004, USA

1 Safety precautions

1.1 Security classification

- According to the type of anti electric shock：

  Internal power supply, where the adapter is Class 1;
- According to the degree of anti electric shock：

  Type BF application part;
- According to the protection degree of harmful liquid：

  The Machine is IPX4；
- According to the degree of safety in the presence of flammable anesthetic gas mixed with air (or oxygen, nitrous oxide two):
- According to the working mode:

  Continuous working equipment.

1.2 Symbol definition

In this manual， “⚠DANGER”“⚠WARNING”、“**CAUTION**”is used to indicate the safety and other important matters, and their specific meanings are as follows.

Symbols and vocabulary	Meaning
⚠DANGER	Indicates that a hazardous situation may occur and, if not avoided, may result in death or serious injury.
⚠WARNING	Indicates that a potentially hazardous situation may occur and, if not avoided, may result in death or serious injury.
CAUTION	Indicates that the risk may occur, if not avoided, may cause property damage.

1.3 Security symbol

Security symbol	Detailed description
	Type BF application part Description: all the ultrasonic probes connected to the system are part of the BF application.
⚠	"Be careful" indicates what should be noted. Be sure to read the instructions carefully before using the system.

1.4 Safety warning information

In order to ensure the safety of the patient and the operator, the following safety rules should be strictly observed in the use of the wireless ultrasonic probe.

⚠DANGER:	Do not use a probe in an environment where a combustible gas, such as an anesthetic gas, hydrogen, or the like, or a flammable liquid, such as ethanol, may cause an explosion.

⚠WARNING:	1.	Do not disassemble the ultrasonic probe, which may cause electric shock.
	2.	Use the power cord supplied with this unit; use only the power supply provided by the company to supply power, the use of other specific power supply (such as UPS, etc.) on the ultrasonic probe power supply may bring the risk of electric shock.
	3.	Use the probe carefully, if the probe is scratched with the contact surface of the animal body, immediately stop using the probe and contact the service representative. If you use a scratched probe, there is a risk of electric shock
	4.	Every time you use the instrument must be checked for safety, do not let the probe by the impact of damaged ultrasound probe may cause the patient to be shocked.
	5.	Before performing an ultrasound check, check the surroundings to ensure safe use within the environment. Do not operate the unit in an environment with flammable or explosive liquids, vapors or gases such as oxygen or hydrogen.
	6.	Be sure to wear a sterile probe case on the probe when performing an ultrasonic chamber check.
	7.	Do not immerse the ultrasonic probe Type-C interface or above in water or disinfectant. Because the Type-C interface of the ultrasonic probe does not have a waterproof function, this may cause an electric shock or a probe malfunction.
	8	Before and after each inspection, you must ensure that the ultrasound sound normal. A defective ultrasonic probe may cause the patient to be shocked.
	9	Please select the correct type of probe head according to the different parts of the inspection. Do not use any probe provided by our company. Otherwise, it will damage the machine and the probe.
	10	In order to ensure safety, the charging of the system can only be carried out in the state of shutdown, and the charging is not allowed under the power-on state.

⚠ CAREFUL:

1. Matters needing attention in clinical examination technology:
   - This equipment can only be operated by qualified medical personnel.
   - This manual does not introduce a clinical examination technique. It is necessary to select the correct inspection techniques according to the professional training knowledge and clinical experience.
2. The equipment can not be checked for a long time.
3. Please follow the ALARA principle during ultrasonic diagnosis, especially in the examination of pregnant women, fetuses and newborns. The sound power can be reduced as much as possible when satisfactory clinical diagnostic maps can be obtained.
4. If the APP software fails during installation or use, please promptly provide feedback to the after-sales maintenance personnel to avoid misdiagnosis.
5. The APP software will be upgraded from time to time, and new updates will be submitted by the developer. If you want a better experience, please pay attention to download and upgrade.
6. Do not use incompatible coupling agents, disinfectants, probe protective cover, probe, puncture rack.
7. Sterile gloves must be worn to prevent infection when using ultrasonic probes.
8. You must use a sterile ultrasound coupling agent. Use a coupling agent that is in compliance with local regulatory requirements. In addition, it is necessary to properly manage and use the ultrasonic coupling agent to ensure that it does not become a source of infection.
9. Normal ultrasound does not cause burns at room temperature; however, if the probe is placed in the same position for a long time, the patient may be burned.
10. The probe cover is made of natural rubber and is used with caution for natural rubber allergy.
11. For in vivo transducers in a single fault condition, the surface temperature rise shall not exceed 43 ° C.

CAUTION：

1 In order to prevent abnormal probe function, read the following safety precautions:

After each ultrasonic examination, the ultrasonic coupling agent on the surface of the probe should be thoroughly erased. Otherwise, the ultrasonic coupling agent will be solidified on the probe head, which will affect the quality of the ultrasound image.

The probe should be cleaned and disinfected before and after each ultrasonic examination。

2 Ambient environmental requirements:

Please use the ultrasonic probe in the specified environment:

- ambient temperature: 0℃～ 32℃
- relative humidity: 30% ～ 85% (No condensation)
- Atmospheric pressure: 70KPa ～ 106KPa。

To prevent damage to the ultrasonic probe, do not expose the probe to the following environment:

- Place where the sun shines
- A place where the temperature changes dramatically.
- A place filled with dust
- Easy to vibrate place
- Place near the heat source

3 Repeated disinfection will lead to the safety and performance of the probe, the performance of the probe should be regularly checked.

CAUTION： This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.5 WARNING Labels

The system has a variety of identification to cause the user to pay attention to the potential danger.

The symbol on the warning sign ⚠indicates the precautions for system security.

The instructions explain in detail the meaning of these warning signs. Read the instructions carefully before using the system.

2 Product overview

2.1Intended use

It is mainly used for pregnancy diagnosis of animals such as dogs, cats, equines, bovines, ovines; disease diagnosis of animal digestive system, urinary system and reproductive system; animal abdomen (liver, gallbladder, spleen, pancreas, gastrointestinal), kidney, urinary system (Ultrasound examination of the bladder, ureter, gynecology (uterus, ovary), obstetrics (follicles, fetuses).

2.2 Contraindication

This product is not suitable for skin surface of burned and burned animals.

2.3 Product specifications

2.3.1 Imaging mode

B mode

M mode

C mode

Power mode

PW mode

2.3.2 Software version information

a) Embedded software release version：1.3.1.
b) Controlled software release：
   — Android platform Software version：V2.1.5；

2.3.3Software running IT environment

Software Environment	
Network bandwidth	＜500KBbps
Port	8080-8084
IP range	192.168.254.10-192.168.254.200
Operating system	Android5.0 or above
Antivirus	The general Android system brand equipment has built-in

software	security procedures, no need to download; if the original system does not have its own security software, it is recommended to download some of the top anti-virus software to ensure system software security.
Antivirus frequency	It is recommended to perform anti-virus once a week to protect the system.

2.3.4 Power condition

Charging port power input：DC 5V，2A

2.3.5 environment condition

	work environment	Storage and transportation environment
ambient temperatue	0℃～32℃	-20℃～+55℃
relative humidity	30%～85% （No condensation）	30%～95% （No condensation）
atmospheric pressure	700hPa～1060hPa	700hPa～1060hPa

⚠ WARNING:	Transport: 1. Do not use or store the system outside the specified environmental conditions. Working: 1. Please ensure that the use of the equipment to master a solid, otherwise, equipment may hurt the patient fall. 2. To ensure that the equipment in a dry environment, the operation of environmental temperature and humidity changes, may lead to liquid condensation in the circuit board, there is the risk of short circuit. 3. Do not operate the unit in an environment with flammable or explosive liquids, vapors or gases such as oxygen or hydrogen. Equipment failure or fan motor sparks may be electronically detonated of these substances. A. Please ensure that the environment before use, if the detection of flammable substances in the environment, please do not plug in the power or open the system. B. Use the real-time detection environment to detect flammable substances after the system is turned on. Do not attempt to turn off the device or unplug the power supply. First empty the air in the area and ensure a smooth ventilation and then turn off the power. 4. If the system fails, please do not disassemble the view, please contact the service center or your sales representative.

2.3.6 Probe outline dimensions and weight

Convex array size: 148mm (L) * 53mm (W) * 26mm (thickness)

Net weight: 170g (R50) (wC5-2Sv)

Convex array size: 148mm (L) * 73mm (W) * 26mm (thickness)

Net weight: 180g (R60) (wC5-2v)

Linear array size: 140mm (L) * 55mm (W) * 26mm (thickness)

Net weight: 140g (L40) (wL11-4v)

Linear array size: 140mm (L) * 41mm (W) * 26mm (thickness)

Net weight: 135g (L25) (wL11-4Sv)

Micro-Convex array size: 142mm (L) * 41mm (W) * 26mm (thickness)

Net weight: 140g (R15) (wC8-5v)

Endocavitary array size：325mm(L)*41mm(W)*26mm(thickness）

Net weight：160g (R10) (wE10-4v)

2.4 system configuration

The system is mainly composed of host equipment, probe and application(Android platform)

The configurable probe model is:C5-2Sv(Convex array)，C5-2v(Convex array)，L11-4v(Linear array)，L11-4Sv(Linear array)，C8-5v(Micro-Convex array) and E10-4v(Endocavitary array)

2.4.1 Standard configuration

- Main unit: 1 set
- Appendix:
  - Application
  - Operation manual

2.4.2 Components

2.4.2.1 Optional Transducer

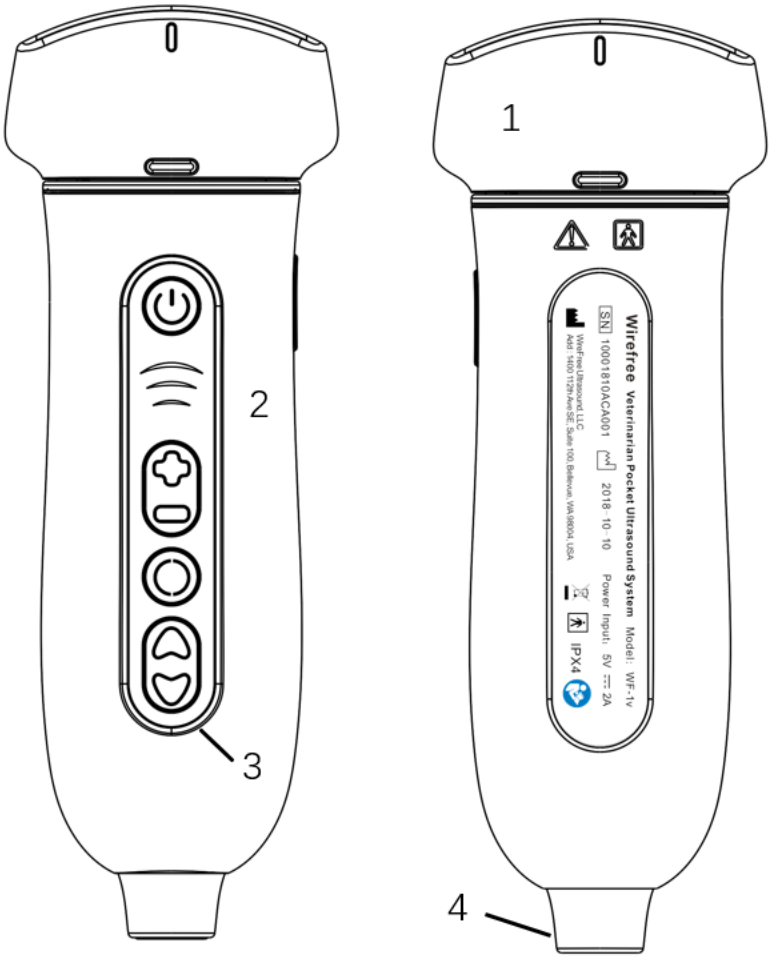
Transducer model	Type of Transducer	Intended use	Applicable site	Center frequency	Frequency range
C5-2Sv	Large convex transducer	Gynecology and obstetrics, abdominal kidney, urology	body surface	3.5MHz	2.0~5.0MHz
C5-2v	Large convex transducer	Gynecology and obstetrics, abdominal kidney, urology	body surface	3.5MHz	2.5~5.0MHz
L11-4v	Linear array transducer	Gynecology and obstetrics, abdominal kidney, urology	body surface	7.5 MHz	6.0~11.0MHz
L11-4Sv	Linear array transducer	Gynecology and obstetrics, abdominal kidney, urology	body surface	7.5 MHz	6.0~11.0MHz
C8-5v	Micro-convex transducer	Gynecology and obstetrics, abdominal kidney, urology	body surface	6.5 MHz	5.0~8.0MHz
E10-4v	Cavity transducer	Department of Obstetrics and Gynecology, urinary system	Via vagina	6.5 MHz	5.0~8.5MHz

2.5 Symbol description

This device uses the following symbol identification, the following list shows its meaning.

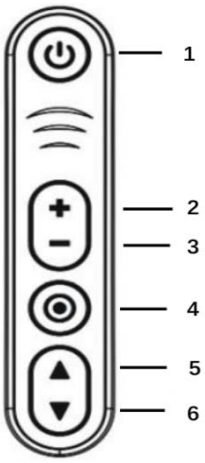
Serial number	Symbol	Explain
1		Type BF application part explain：All ultrasonic probes are part of the BF application.
2		Please refer to the instruction manual for this symbol to avoid accidents
3	SN	This symbol represents the product serial number
4		This symbol represents the date of production
5	IPX 4	This symbol product as the IPX4 grade

2.6 Introduction of each component of the system



Serial number	Name	Function
1	Transducer	Transmit ultrasound
2	Main Device	Control transducer operation
3	Control Panel	Operation control
4	Type-Cinterface	External adapter power supply

2.7 Control panel

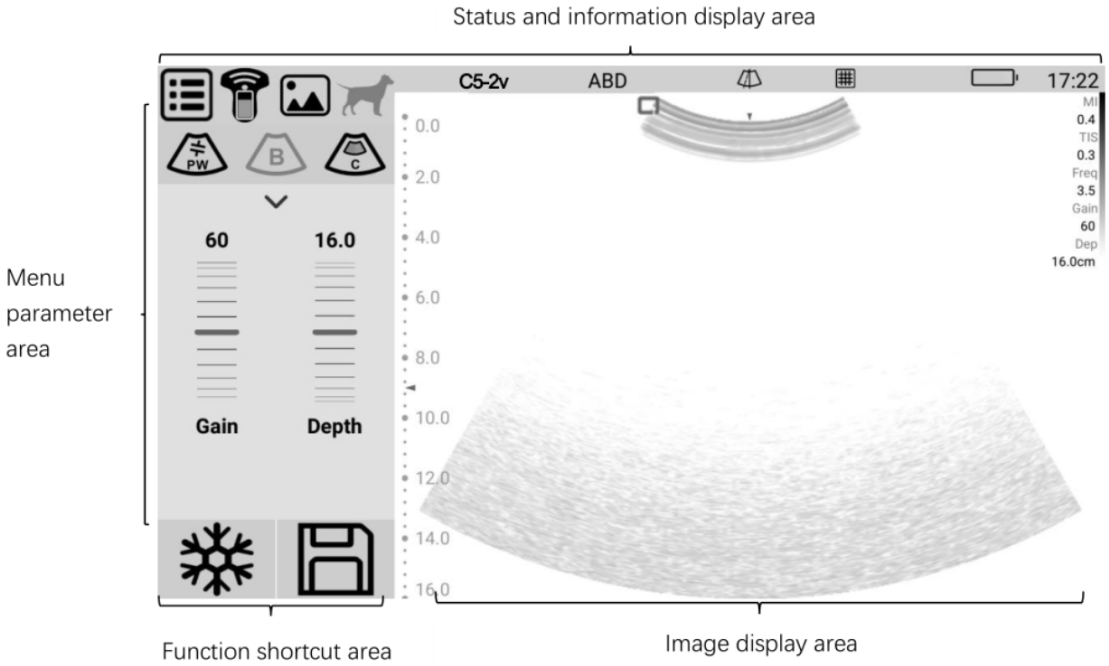


Serial number	Button icon	Key name	Function
1		Power switch / freeze / thaw button	1, long press: power off 2, press: power on / freeze / thaw image
2		(Gain) "+" button	Gain increase
3		(Gain) "–" button	Gain reductio
4		Main menu button	1、Long press: one key optimization Press short: toggle image mod
5		(Depth) "▲" button	Depth increase
6		(Depth) "▼" button	Depth reduction

2.8 Basic interface

2.8.1 Android application interface

The interface layout diagram for the Android application is as follows:



2.8.1 Interface layout diagram

Status and information display area

The status and information display area includes system menu, WiFi/USB connection sign, patient information management, probe type, inspection type, puncture line, battery charge and system time.

- System menu

  Contains pre-set, version information, operation manual.

- WiFi/USB connection sign

  Displays the current probe connection.When connected to a WIFI, the flag indicates signal strength， and you can also click to pop up the probe selection dialog box

- Probe type

  Displays the currently used probe model or the default probe model.

- Inspection type

  Displays the type of examination currently in use, such as abdomen, heart, etc., click to select the check mode.

- Puncture line

  Piercing line switch symbol, this system supports two puncture guide wire, open can carry on piercing line position, angle preset.

- Battery charge

  The display device opens the application and displays the current power of the display device (mobile phone / tablet).

- System time

  Displays the current system time. Check time as the image freezes when the system freezes.

Menu and Image Parameter display area

The region can be divided into two regions: image mode switching area and image parameter adjustment area.

- B mode,click to switch to M mode, click back to B mode;

-

Color mode，Click to enter Color mode, click again to enter Power mode;
-

PW mode，Click to enter the pre-startup statu of PW mode and click again to start / pause to get the map.It's the same as update.
-
Drop-down menu flag, click to enter the corresponding image mode of all parameters adjustment.
-

Image parameter adjusting pulley：Slide up and down or click on the pulley to adjust the corresponding parameters.

Function shortcut key area

Contains freeze / active buttons and saves image button icons.

In the active state for the white icon, click to enter the frozen state, the icon appears blue;

Save a single frame image button, suitable for freeze / active two states.

Image area

The image area displays images of each mode and probe direction markers, time lines (in M mode), PW sampling lines (PW mode), axes (including depth axes, time axes), etc., while annotating information and measuring, The gray bar also appears here

2.9 Information security

2.9.1 Forget password

When the user forgets the password, the software can be reinstalled. At this time, the original password is cleared and a new password can be set.

2.9.2 User classification

User category		Permission division
Main user	Admin	Administrators, regular users and login passwords can be added/modified/deleted to view all patient information
	Manager	Add/modify/delete common users and login passwords, browse all patient information
	Ordinary account	Can only manage patient information under this account
	First aid mode	No need to log in to the password, only the patient information under the account can be managed
Secondary user	This product is easy to install and configure, and can be downloaded and installed by the main users.	

2.9.3 Password setting

The user's login password is 8-20 digits and consists of numbers, letters or special symbols.
When you first install it, the default login password is 12345678. Please change your password in time to ensure your account is secure.
After selecting the save password and automatic login function, the user can log in without a password next time, but need to enter the password again every month to ensure the security of use.

2.10 Indicator light

Classification	Status indication	Features
Power Indicator	Flashing	Boot process
	Slow flash	Freeze
	Constantly bright	work
Battery level indicator	Two grids are always bright	More than 75% of electricity
	One grid is always bright (left)	50%~75% of electricity

	One grid is always bright (right)	10%~50% of electricity
	Slow flash	10% or less

3 Basic introduction

3.1 Working power supply

WF-1v Veterinarian Pocket Ultrasound System does not work when external Power supply is connected.

Connect to the Type-C interface of the probe by the charging power cord as required by the standard.

The external power supply system of WF-1v Veterinarian Pocket Ultrasound System must meet the following requirements:

Output:5V 2A DC

internal electric source :7.4V

The internal power supply system should meet the following requirements:

Battery: first use the battery, the battery may have little residual power, need to charge the battery. Please do not disconnect the power when charging. Do not use non system specific battery before using the three. The first three uses need to ensure that the electric quantity in the battery is completely exhausted and the charging time is greater than the first charging,, to activate cells to maximize the effective use of time, ensure the battery.

When you disconnect the AC-DC adapter, the system will automatically switch to the battery, the battery is full about battery life 4 hours. There will be the phenomenon of self discharge (a day is about 1%), should be maintained every month for a full charge and discharge the battery. If you do not use your head long time, battery because of the long-term self discharge due to lack of electricity consumption even light, this is the inherent characteristics of lithium battery, which is normal. You should use an external power supply.

3.2 Turn on / off probe

3.2.1 Turn on probe

⚠WARN	1. Before opening the probe, the probe must be free of cracks or loose.

ING:	2. When handling the probe head, make sure that the probe is closed or frozen

⚠ **CAREFUL:**	In order to ensure the safety of the probe, work effectively, the need for daily inspection. Once the check to the abnormal situation, should immediately close the probe and contact with the service representative. If the probe will cause abnormal use of examination results is not accurate and even harm the patient and damage the probe itself.

Check before opening the probe

Before opening the probe, please carefully check or operate the following items:

Serial number	Inspection items
1	Temperature, humidity and atmospheric pressure shall meet the requirements for use.
2	The probe shall not be damaged or soiled.
3	Clean the site and the environment.
4	Probe cleaning and disinfection.

Open probe and check after open probe

Long press the power button to turn on the probe.

Check whether the probe is normally activated, refer to the following items to open the probe:

Serial number	Inspection items
1	There shall be no abnormal sound, smell or overheating.
2	There is no obvious abnormal noise.
3	If the device is connected to the probe after the launch of the wireless signal, check the surface of the probe in the use of abnormal heating

⚠ **WARNING:**	1. The use of abnormal heating probes may burn patients. 2. If any abnormality is found, the probe is faulty. Close the probe immediately and contact the service representative.

3.2.2 Turn off the probe

Long press the power button to close the probe.

The normal use of the need to turn off the probe, or when the probe appears some unusual situation when the user needs to close the probe

After ultrasonic examination, the ultrasonic coupling agent on the surface of the probe should be completely erased. Otherwise, the coupling agent will be solidified on the probe head and affect the quality of the ultrasonic image

Before and after each ultrasonic examination, the probe should be cleaned and disinfected.

3.2.3 Loading and unloading the probe

Be sure that the probe is in a closed state, the head of the loading and unloading operations.

When installing the acoustic head, align the end of the transducer with the corresponding end of the main device and carefully push into place.

When the head is disassembled, the finger can be carefully drawn out by the convex part on the surface of the transducer.

3.3 Connection

3.3.1 Wifi Connection

After the machine starts, select the current host corresponding to the WiFi hot spot name, on the end device click to connect.

3.3.2 USB Connection

Windows:USB connected to the computer, Type-C connected to the probe, boot can be automatically connected.

Android: terminal connected to the terminal equipment, Type-C end connected to the probe, power-up can be automatically connected.

4 Detailed operation introduction

4.1 Image mode

mode	explain
【B】	Click to enter B mode.
【M】	Click to enter M mode.
【Color】	Click to enter Color mode.。
【Power】	Click to enter Power mode.
【PW】	Click to enter PW mode.

4.2 Image parameter adjustment

Before adjusting the image parameters to optimize the image, adjust the brightness of the display so that it works best.

purpose	Optional operation
Changing image brightness	Adjust gain Adjust sound power Adjust the TGC for the corresponding target area
Changing gray-scale image effect	Adjust dynamic range Adjust effect Adjust frame correlation Click [one key Optimization] to optimize one key
Increasing frame rate of Gray-scale Image	Reduce depth
Change the effect of blood flow image display	Adjust color gain Adjust color frequency Adjust of deflection Adjust afterglow Adjust scale Adjust speed Adjust wall filter Adjust color priority

4.3 Parameter adjustment about B mode

The B mode is the most basic imaging mode, and the intensity of the echo signal of a fault interface in the body is displayed by the light spot brightness and dark. The two-dimensional image of the animal soft tissue organ of the moving body is displayed in real time, and the organ morphology, the anatomical level and the adjacent relation can be clearly observed.

4.3.1 B mode image parameter

During B-mode image scanning, the image parameter area on the left side of the screen provides real-time parameter information, which allows you to adjust the following parameters:

Adjustment method	Parameter term
Control panel adjustment	Gain, depth, one-button optimization
SoftKey adjustment	Frequency, extended imaging, frame-related, dynamic range, effect, focus, spatial compounding, image enhancement, pseudo-color map, left and right turning, up and down, sound power, TGC, TSI

4.3.2 B mode image optimization

Gain

Resume The total gain of the image in the two-dimensional mode ，displays in real time on the image parameter area on the left side of the screen.

Effect By increasing the brightness of the gain image, more echo signals can be observed, but at the same time, there will be more noise.。

Depth

Resume For adjusting the depth of the image display, the range of image depth can be adjusted by different probes. The depth value is displayed in the image parameter area on the left side of the screen in real time.

Effect The deeper the depth, the wider the observed tissue; the smaller the depth, the shallower the observed tissue. When the depth increases, the frame rate decreases.

One-bond optimization

Resume According to the organization characteristics of the scanning area, the automatic adjustment and optimization of the image effect is realized.

Effect Auto-adjust optimized image.

TGC

Resume The attenuation caused by increasing tissue depth is compensated and the depth gain is adjusted in a piecewise manner.

Effect By adjusting the signal gain in a specific depth range, the echo of the tissue image is uniform.

Frequency

Resume The emission frequency of the probe can be selected by fundamental frequency or harmonic frequency.

The frequency value is displayed in real time on the image parameter area on the left side of the screen. There are three frequency modes in the fundamental wave or the harmonic wave: "penetrating power", "conventional", and "resolution".

Effect The higher the frequency, the better the near-field resolution, but the penetration force decreases.

Harmonics can enhance the near-field resolution and reduce the noise with low frequency and large amplitude.

Photographic enhancement

Resume By enhancing the contour of the image to distinguish the boundary of the image, the goal of optimizing the image is achieved.

Effect The larger the value, the finer the image, and the more prominent the image outline.

Frame correlation

Resume The B images of adjacent frames are averaged to optimize the images.

Effect Reduce the image noise, optimize the image, make the image more delicate, may cause the loss of specific information.

Dynamic range

Resume Adjust the contrast of black-and-white images, compress or expand the gray-scale display range.

Effect The larger the dynamic range, the darker the overall image, the smaller the contrast, and the greater the noise.

Focus

Resume Optimize the image of a specific depth by adjusting the location of the focus.

Effect The penetration and resolution near the focal point are higher than those outside the focus.

Effect

Resume Adjust the black and white grayscale contrast to optimize the image.

Effect This function is effective for real-time, frozen and movie playback images.

QBeam

Resume The image is optimized by merging multiple frames from different deflection angles into a single frame.

Effect After opening space recombination, the image has the characteristics of reduced speckle noise and clear image, which improves the contrast resolution and reveals the location of the lesion more easily.

Extend

Resume Increase the scanning range of the probe.

Effect The probe's scan range expands and the frame rate drops slightly.

Overturn

Resume By changing the way the image is displayed to obtain a better viewing angle, the vertical flip up and down and the left and right horizontal flip can be carried out. The "Q" mark on the screen is used to identify the direction of the image, and the "Q" mark in the upper left corner is the default image direction of the system.

Effect This function is effective for real-time, frozen and movie playback images.

A.Power

Resume Adjust the power of the probe to emit ultrasound.

Effect The louder power, the overall brightness of the image increases evenly, and the detectable depth also increases. In clinical application, the proper sound power must be selected according to the actual situation and the "ALARA sound power principle".

TSI

Resume Tissue feature imaging, according to tissue features to select sound velocity, make the image more typical.

WF-1v Veterinarian Pocket Ultrasound System offers four characteristic tissue optimizations: fat, fluid, routine and muscle.

Pseudo-color map

Resume Color difference is used instead of gray difference to image, that is, grayscale map colorization.

Effect WF-1v Veterinarian Pocket Ultrasound System provides four different pseudo-color maps, which are effective for real-time, frozen and movie playback images.

4.4 Parameter adjustment about M mode

The M-mode adopts brightness modulation, reflecting the echo intensity, representing the spatial position from shallow to deep in the vertical direction and time in the horizontal direction, showing the curve of the distance between the various layers of the body tissue to the body surface (probe) over time. It reflects one-dimensional spatial structure, so M-mode is often used to detect the heart.

4.4.1 M mode image parameter

During M-mode image scanning, the image parameter area on the left side of the screen provides real-time parameter information, which allows you to adjust the following parameters:

Adjustment method	Parameter term
Control panel adjustment	Gain, depth
SoftKey adjustment	Frequency, dynamic range, time mark, scanning speed, pseudo-color map, effect, line correlation

4.4.2 M mode image optimization

Gain

Resume Adjust the gain of M mode ， displays in real time on the image parameter area on the left side of the screen.

Effect By increasing the brightness of the gain image, more echo signals can be observed, but at the same time, there will be more noise.。

Depth

Resume For adjusting the depth of the image display, the range of image depth can be adjusted by different probes. The depth value is displayed in the image parameter area on the left side of the screen in real time.

Effect The deeper the depth, the wider the observed tissue; the smaller the depth, the shallower the observed tissue. When the depth increases, the frame rate decreases.

Frequency

Resume The emission frequency of the probe can be selected by fundamental frequency or harmonic frequency.

The frequency value is displayed in real time on the image parameter area on the left side of the screen. There are three frequency modes in the fundamental wave or the harmonic wave: "penetrating power", "conventional", and "resolution".

Effect The higher the frequency, the better the near-field resolution, but the penetration force decreases.

Harmonics can enhance the near-field resolution and reduce the noise with low frequency and large amplitude.

Scan speed

Resume Control M mode refresh speed, scan speed value real-time display in the left side of the screen in the image parameter area.

Effect More detailed observations can be obtained, such as changing the scanning speed to detect anomalies in the cycle

Dynamic range

Resume Adjust the contrast of black-and-white images, compress or expand the gray-scale display range.

Effect The larger the dynamic range, the darker the overall image, the smaller the contrast, and the greater the noise.

Pseudo-color map

Resume Color difference is used instead of gray difference to image, that is, grayscale map colorization.

Effect WF-1v Veterinarian Pocket Ultrasound System provides four different pseudo-color maps, which are effective for real-time, frozen and movie playback images.

Effect

Resume Adjust the black-and-white gray-scale contrast to optimize the image.

Effect WF-1v Veterinarian Pocket Ultrasound System provides 18 effects, and is effective for real-time, frozen and cine-played images.

Time mark

Resume Sets the display state of the time mark on the M image.

Effect It is helpful to identify the cardiac cycle and find the characteristic lesions.

Line correlation

Resume Line correlation is the processing of scan lines of M images.

Effect Suppress noise to make image details clearer.

A.Power

Resume Adjust the power of the probe to emit ultrasound.

Effect The louder power, the overall brightness of the image increases evenly, and the detectable depth also increases. In clinical application, the proper sound power must be selected according to the actual situation and the "ALARA sound power principle".

M line

Resume Adjust the position of the M sampling line.

4.5 Parameter adjustment about Color mode

Color Doppler is used to observe the color blood flow and provide the flow direction and velocity information of the blood flow. In general, red indicates the blood flow to the probe, blue indicates the blood flow away from the probe, the brighter the color, the faster the blood flow, the darker the color, and the slower the blood flow rate.

⚠ **WARNING:**

1. **Color Doppler flow can only be used as a reference for doctors and can not be diagnosed directly. It is generally compared with other machines or diagnosed by non-ultrasonic means.**
2. **This device cannot perform long-term examination of the fetus in Doppler mode.**

4.5.1 Color mode image parameter

During C-mode image scanning, the image parameter area on the left side of the screen provides real-time parameter information, which allows you to adjust the following parameters:

Adjustment method	Parameter term
Control panel adjustment	Gain, depth
SoftKey adjustment	Velocity, deflection, Frequency, Color first, baseline, map, Wall filter, Sound Power, afterglow

The Color mode shares the probe sound power of the B mode ,When the acoustic power is adjusted, the sound power of the two imaging modes changes synchronously.

Because the Color mode is superimposed by two-dimensional (B) mode and Doppler mode, the two kinds of images change synchronously when magnifying or adjusting the depth.

4.5.2 Color mode image optimization

Gain

Resume To adjust the total sensitivity of the blood flow signal, the gain value is displayed in real time in the image parameter area on the left side of the screen.

Influence If the gain is too high, it will amplify the noise; if the gain is too low, it is easy to lose the blood flow signal.

Velocity

Resume Showing the velocity range of blood flow, for this product, is actually regulating the measurable range of blood flow velocity.

Effect After adjustment, the color blood flow image can be displayed more clearly and accurately.

A lower velocity range should be used to measure low velocity blood flow, and a higher velocity range should be used to measure high speed blood flow.

Influence Aliasing is easy to occur when measuring high-speed blood flow using a lower velocity range.

If the speed scale is too high, it will result in the loss of smaller blood flow signals.

Deflection

Resume Used to tilt left and right color blood flow images to obtain more information without moving the probe.

Effect Changing the incident direction of the acoustic beam in color mode, thus changing the angle between the acoustic beam and the direction of blood flow, is only effective for the linear array probe.

Wall filter

Resume The low frequency noise caused by vessel wall vibration is filtered out to display the image information effectively. This function is used to adjust the cut-off frequency of the wall filter in WF-1v Veterinarian Pocket Ultrasound System.

Influence May cause loss of blood flow signals.

Colour frequency

Resume Toggles the probe frequency in Doppler mode.

Effect The higher the frequency, the higher the resolution and sensitivity, but the lower the penetration force.

Afterglow

Resume Time smoothing is performed to optimize the image.

Base line

Resume An area of zero speed is displayed on the ruler. Adjust to the needs of different tests to make the blood flow more clear.

Influence This function is effective for real-time, frozen and movie playback images.

Map

Resume Color image display effect parameters, according to the need to switch different map can get more comprehensive blood flow information.

Influence This function is effective for real-time, frozen and movie playback images.

Overturn

Resume Set the display mode of Color mode, turn over the color ruler when it is turned on, and change the display mode of blood flow on the image.

Influence This function is effective for real-time, frozen and movie playback images.

A.Power

Resume Adjust the power of the probe to emit ultrasound.

Effect The louder power increases the overall brightness of the image evenly, and the detection depth also increases.

Influence In clinical application, proper sound power should be selected according to the actual situation and ALARA sound power principle.

Color preference

Resume Used to set the level of blood flow display, select the preferred black-and-white or color blood flow display.

Effect Large value, priority display color image, small value, priority display black-and-white image.

4.6 Parameter adjustment about Power mode

Power Doppler mode is used to show the density and energy information of red blood cells in blood flow for a certain period of time, and to express it by color of different luminance, to provide perfusion information of blood flow, but not to provide information of velocity.

4.6.1 Power mode image parameter

During Power mode image scanning, the image parameter area on the left side of the screen provides real-time parameter information, which allows you to adjust the following parameters:

Adjustment method	Parameter term

Adjustment method	Parameter term
Control panel adjustment	Gain, depth
SoftKey adjustment	Velocity, Frequency, Color first, dynamic range, map, Wall filter, Sound Power, afterglow

The Power mode shares the probe sound power of the B mode ,When the acoustic power is adjusted, the sound power of the two imaging modes changes synchronously.

Because the Color mode is superimposed by two-dimensional (B) mode and Doppler mode, the two kinds of images change synchronously when magnifying or adjusting the depth.

4.6.2 Power mode image optimization

Because of the same Doppler color imaging, most of the image parameter adjustment items in Power mode are consistent with Color mode. Therefore,the following is just a introduction of the image parameters independently adjusted in Power mode.

Gain

Resume Adjusting the total sensitivity of the blood flow energy signal, the gain value is displayed in real time in the image parameter area above the screen.

Effect If the gain is too high, it will amplify the noise; if the gain is too low, it is easy to lose the blood flow signal

Map

Resume Color image display effect parameters.

Effect The energy map provides perfusion information of the image and is sensitive to low-speed blood flow.

Dynamic range

Resume Controls how the echo intensity is converted into a color signal.

Effect After adjusting, it has greater sensitivity to the low energy signal, and increases the display range of the signal.

Deflection

Resume Used to tilt left and right color blood flow images to obtain more information without moving the probe.

Effect Changing the incident direction of the acoustic beam in color mode, thus changing the angle between the acoustic beam and the direction of blood flow, is only effective for the linear array probe.

4.7 Parameter adjustment about PW mode

PW mode (spectral Doppler mode) is used to provide the information of blood flow direction and velocity. The transverse axis of the spectrum pattern represents the time and the longitudinal axis indicates the Doppler frequency shift.

PW mode has the function of distance gating, which can show the velocity, direction and nature of local blood flow at a certain depth.

⚠ CAREFUL:	The timing of PW mode is not consistent with that of B/C mode, so it is impossible to move the probe to change the position of measurement when entering PW mode.

4.7.1 PW mode image parameter

During PW mode image scanning, the image parameter area on the left side of the screen provides real-time parameter information, which allows you to adjust the following parameters:

Adjustment method	Parameter term
Control panel adjustment	Gain, depth
SoftKey adjustment	Speed, baseline, deflection, quick correction angle, flip, SV, wall filter, frequency, dynamic range, volume, recording range, pseudo-color map, sound power, time mark, automatic calculation,automatic calculation parameters

4.7.2 PW mode image optimization

Gain

Resume Adjusting the output signal size of the spectrum map, the gain value is displayed in the image parameter area on the left side of the screen in real time.

Effect By increasing the brightness of the gain image, more echo signals can be observed, but at the same time, there will be more noise.

Speed

Resume Showing the velocity range of the blood flow, for this product, is actually a regulation of the speed. The speed value is displayed in real time in the image parameter area on the left side of the screen.

Effect The color blood flow image can be displayed more clearly and accurately after adjustment.

A lower velocity range should be used to measure low velocity blood flow, and a higher velocity range should be used to measure high speed blood flow.

Influence Aliasing is easy to occur when measuring high-speed blood flow using a lower velocity range.

If the speed scale is too high, it will result in the loss of smaller blood flow signals.

Baseline

Resume The area where the speed is zero is shown on the spectrum map

Effect The requirements of the speed detected at different parts are adjusted, so that the display of the blood flow is more clear and the aliasing is eliminated.

A positive value shows a larger range below the baseline and a negative value shows a larger range above the baseline.

Deflection

Resume Change the incident direction of the acoustic beam in PW mode, so as to change the angle between the acoustic beam and the direction of blood flow.

Effect Get more information without moving the probe.

Quick correction angle

Resume The correction angle is adjusted rapidly by 60 degrees step, and the angle value is displayed on the right side of the spectrum map in real time.

Influence This feature is valid for real-time, frozen, and movie playback images.

Correction angle

Resume Adjusting the measurement speed and the actual speed as close as possible, is a kind of correction angle.

When adjusting the angle, the angle value is displayed on the right side of the spectrum map in real time.

Influence This feature is valid for real-time, frozen, and movie playback images.

Overturn

Resume Turn on this function to flip the spectrum.

Influence This feature is valid for real-time, frozen, and movie playback images.

SV

Resume Adjusting the position and width of the pulse Doppler sampling volume gate, the current SV value is displayed in real time in the image parameter area on the left side of the screen.

Effect When the sampling gate is small, the obtained result is more accurate, and when the sampling gate is large, the information range obtained is larger.

Wall filter

Resume It is used to adjust the cut-off frequency of the wall filter in WF-1v Veterinarian Pocket Ultrasound System and to filter the low frequency noise caused by the vibration of the vessel wall so as to display the image information effectively. Wall filter values are displayed in real time in the image parameter area on the left side of the screen.

Influence May cause Losing of signals about blood flow velocity.

Description range

Resume Sets the range of Doppler waveforms involved in the calculation.

Influence This feature is valid for real-time, frozen, and movie playback images.

Automatic calculation and of parameters automatic calculation

Resume The spectrum Doppler waveform is recorded and the parameters are calculated. The results of the automatic spectrum calculation will be displayed in the measurement window in real time.

Influence The heart rate value obtained by automatic spectrum calculation may have some deviation. If you want to obtain accurate heart rate value, please choose manual measurement to obtain.

Scanning speed

Resume Controls the refresh speed of PW mode.

Effect More detailed observations can be obtained, such as changing the scanning speed to detect anomalies in the period.

Time mark

Resume Sets the display state of the time flag on the PW image.

Effect It is helpful to accurately locate the time information of special points and identify the characteristic lesions in the fluctuation cycle.

Influence This feature is valid for real-time, frozen, and movie playback images.

A.Power

Resume Adjust the power of the probe to emit ultrasound.

Effect The louder power increases the overall brightness of the image evenly, and the detection depth also increases.

Influence In clinical application, proper sound power should be selected according to the actual situation and ALARA sound power principle.

Frequency

Resume Switching the probe frequency in Doppler mode, the frequency value is displayed in the image parameter area on the left side of the screen in real time.

Effect The higher the frequency, the higher the resolution and sensitivity, but the lower the penetration force.

Dynamic range

Resume The amount of information that represents the conversion of echo intensity into grayscale gradient spectrum.

Effect Corresponding to the adjustable contrast range of the image, the larger the dynamic range, the richer the level of image display and more information, but the noise will also increase.

Influence This feature is valid for real-time, frozen, and movie playback images.

Volume

Resume Controls and adjusts the output audio size generated by spectrum Doppler.

Effect Combined with the volume signal, we can judge the blood flow state and nature more effectively.

5 Measure

The operation of measurement can be divided into conventional measurement and applied special measuring package.

⚠CAREFUL：

1. **All unsaved data will be lost by shutting down during the measurement process.**
2. **During the measurement process, all measurement information on the image will be deleted and the conventional measurement data will be lost once the frozen state is lifted.**
3. **A change in mode clears the conventional / applied special measurement data on the screen.**
4. Pointless measurements are prohibited.

5.1 Conventional measure

5.1.1 2D Conventional measure

2D conventional measurements are suitable for regular measurements of 2D images such as B, Color, Power and so on. The items of measurement are as follows:

Measure item	Function
Distance	Measure the distance between two points on an ultrasonic image.
Angle	Measured the angle between the two intersecting planes on the ultrasonic image.
Area	Measure the area and perimeter of an enclosed area on an ultrasonic image.
Three distance volume	Measure the volume of the target object.
Recording length	Measure the length of a curve on an ultrasonic image.
Recording area	Measure the area and perimeter of a closed curve area on the ultrasound image.
Length ratio	Measure the length of the two lines on the ultrasonic image and calculate the ratio.
Area ratio	Measure the area of two enclosed areas on ultrasonic images and calculate the ratio.
Histogram	Measure the gray distribution of ultrasonic echo signal in a closed area of ultrasonic image.

5.1.2 Conventional measure in M mode

M mode measurements are as follows:

Measure item	Function
Distance	Measure the distance between any two points on a vertical line at a given time.
Time	Measure the time interval between two points on the M image.
Gradient	The average slope between two points is calculated by measuring the distance and time of the two points.
Heart rate	On M cardiogram, the interval between two cardiac cycles was measured and the heart rate was calculated.

5.1.2 Conventional measure in Doppler mode

PW mode measurements are as follows:

Measure item	Function
D speed	On Doppler images, the velocity and pressure difference at some point in the Doppler spectrum waveform are measured.
PS/ED	The velocity (PS) of the systolic peak point and the velocity (ED) of the end diastolic phase were measured on the blood flow waveforms in Doppler images and their pressure difference and resistance index RI, ratio were calculated.
D trace	The clinical parameters such as velocity, pressure difference, index and so on were obtained by depicting the Doppler spectrum waveforms of two cycles.

5.2 Special measuring package

This product provides the following application measurement capabilities:

- Conventional measurement；
- Abdominal application measuring package；
- Obstetrical application measuring package；
- Gynecological application measuring package；
- Cardiac application measuring package；
- Small organ application measuring package；
- Neural application measuring package。

6 Cineloop/annotation/body mark

During image scanning, freeze the image by pressing the freeze key. After the image freezes, the probe stops the sound output, leaving all images and image parameters unchanged.
Image freeze state, press the freeze key will thaw the image, the system continues to scan the image.

6.1 Cineloop

After the image freezes, the system supports movie playback and editing functions. At the same time, it supports magnification, post-processing, measurement, annotation, adding body mark and so on.

WF-1v Veterinarian Pocket Ultrasound System supports manual playback and automatic playback; automatic and manual playback can be switched between each other.

6.1.1 Linkage movie playback

The linkage movie playback is freezing images after scanning in the B-M synchronization mode.Then on playback, B and M keep synchronized in timing.

6.1.2 Store Movie

In the image freeze state, click [Save Movie] in the SoftKey area. After you save the movie, you can view it locally.

6.2 Annotation

It is often necessary to add comments to ultrasound images during diagnosis. WF-1v Veterinarian Pocket Ultrasound System supports two annotation types: typing characters and indicating arrowheads.

6.3 Body mark

The body position of the probe and the position of the probe scanning direction are indicated by the body mark, which can help to explain the image.

7 Probe

7.1 Probe description

7.1.1 Probe type

L-Linear array probe；

C-Convex array probe；

E-Cavity probe.

7.1.2 Probe composition

The probe is composed of piezoelectric ceramic wafer, acoustic focusing lens, shell and so on.

7.1.3 Probe performance index

The performance indicators of each probe are published as follows:

Table 1 Image performance Indexes

Mode	Order number	Project	Probe model			
			C5-2Sv	C5-2v	L11-4v	L11-4Sv
B/M	A	Probe nominal frequency (MHz)	3.5	3.5	7.5	7.5
	B	Deviation between acoustic working frequency and nominal frequency(%)	≤±15	≤±15	≤±15	≤±15
	C	Maximum detection depth(mm)	≥180	≥170	≥60	≥60
	D	lateral resolution (mm)	≤2(depth≤80) ≤3(80＜depth≤130)	≤2(depth≤80) ≤3(80＜depth≤130)	≤2 (depth≤40)	≤2 (depth≤40)
	E	Azimuthal resolution (mm)	≤1(depth≤80) ≤2(80＜depth≤130)	≤1(depth≤80) ≤2(80＜depth≤130)	≤1 (depth≤50)	≤1 (depth≤50)
	F	Fade zone(mm)	≤3	≤3	≤3	≤3
	G	Slice thickness(mm)	≤8	≤8	≤8	≤8

Mode	Order number	Project	Probe model							
			C5-2Sv		C5-2v		L11-4v		L11-4Sv	
	H	Transverse geometric position precision(%)	≤10		≤10		≤5		≤10	
	I	Longitudinal geometric position precision(%)	≤10		≤10		≤5		≤5	
	J	Perimeter and area measurement deviation(%)	≤±15		≤±15		≤±15		≤±15	
	K	M mode time display deviation(%)	≤10		≤10		≤10		≤10	
Color	L	Service frequency（MHz）	2.0	3.5	2.5	3.5	6.0	7.5	6.0	7.5
	M	Depth of investigation (mm)	≥120		≥120		≥40		≥40	
	N	Relationship between color blood flow image and gray-scale image of the pipe in which it is located	coincide		coincide		coincide		coincide	
	O	Blood flow direction requirement	It can be correctly identified and there is no aliasing.		It can be correctly identified and there is no aliasing.		It can be correctly identified and there is no aliasing.		It can be correctly identified and there is no aliasing.	
PW	P	Service frequency（MHz）	2.0	3.5	2.5	3.5	6.0	7.5	6.0	7.5
	Q	Depth of investigation(mm)	≥120		≥120		≥40		≥40	
	R	Velocity measurement deviation(%)	±20		±20		±20		±20	

Mode	Order number	Project	Probe model			
			C5-2Sv	C5-2v	L11-4v	L11-4Sv
	S	Accuracy of position of Vernier in Doppler sampling area	Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display	Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display	Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display	Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display

Table 2 Image performance Indexes

Mode	Order number	Project	Probe model	
			E10-4v	C8-5v
B/M	A	Probe nominal frequency (MHz)	6.5	6.5
	B	Deviation between acoustic working frequency and nominal frequency(%)	±15	±15
	C	Maximum detection depth(mm)	⩾60	⩾60
	D	lateral resolution (mm)	⩽2 (depth⩽30)	⩽2 (depth⩽40)
	E	Azimuthal resolution (mm)	⩽1 (depth⩽40)	⩽1 (depth⩽50)
	F	Fade zone(mm)	⩽3	⩽3
	G	Slice thickness(mm)	⩽8	⩽8
	H	Transverse geometric position precision(%)	⩽10	⩽10
	I	Longitudinal geometric position precision(%)	⩽5	⩽5
	J	Perimeter and area measurement deviation(%)	±15	±15
	K	M mode time display deviation(%)	⩽10	⩽10

Mode	Order number	Project	Probe model			
			E10-4v		C8-5v	
Color	L	Service frequency（MHz）	5.0	6.0	5.0	6.0
	M	Depth of investigation (mm)	⩾40		⩾40	
	N	Relationship between color blood flow image and gray-scale image of the pipe in which it is located	coincide		coincide	
	O	Blood flow direction requirement	It can be correctly identified and there is no aliasing.		It can be correctly identified and there is no aliasing.	
PW	P	Service frequency（MHz）	5.0	6.0	5.0	6.0
	Q	Depth of investigation(mm)	⩾40		⩾40	
	R	Velocity measurement deviation(%)	±20		±20	
	S	Accuracy of position of Vernier in Doppler sampling area	Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display		Near the wall of the pipe, no velocity indication; center of pipe, maximum velocity display	

7.2 Probe description

In order to reduce the spread of the disease, it is necessary to take some protective measures. In clinic, the probe sheath is conducive to prevent infection. Strongly recommended in accordance with requirements of the sterile transducer sheath cavity inspection.

On the animal body are examined using the probe to probe must be put on the probe set. Please use the protection cover market acceptance.

⚠CAREFUL:

1. In order to avoid infection, in the inspection, the probe cover can only be used once.
2. The probe sheath is made of natural latex and talc, which may cause allergic reactions in some people
3. Do not use expired probe sheath. Check the probe sheath for expiration before using the probe sheath

Operation procedure (for reference only):

1.In the protective sleeve or inside the probe surface coated with an appropriate amount of coupling agent, without the use of coupling agent, the image is not clear.

2.To probe into the protective sleeve to ensure the sterility of the probe. The protective sleeve of the tension to remove wrinkles and bubbles, do not pull too far.

3.With the rope to ensure the protection of security.

4.Check the protective sleeve to ensure no damage

7.3 Inspection and maintenance

7.3.1 Inspect

Frequently check the probe cable, if found damaged, broken phenomenon, prohibit the use of immediate replacement or repair.

Regularly check the socket, the sound window parts, if found damaged, bubble phenomenon, prohibit the use of immediate replacement or repair.

7.3.2 Life cycle

According to the manufacturer's design, production and other related documents, this type of product life is generally 5 years, constituting the product material over time will gradually aging, continue to use the products beyond the life of the post, may cause performance degradation and failure rate is significantly high.

⚠WARNING:	The manufacturer will not be held responsible for the risks arising from the continued use of the product life cycle.

7.3.3 Probe maintenance

The probe after every use, with a soft cloth with a damp heat 3.4% saturated aldehyde solution gently and thoroughly probe.

The probe is expensive wearing parts, no collision, drop. When diagnosis is suspended, it should be placed in the probe box, and the instrument under the "frozen" state.

Medical ultrasonic coupling agent should be used in diagnosis.

⚠ CAREFUL:	The probe on the probe for a long time with a coupling agent may damage the probe.

7.4 Cleaning and disinfection

Probe into direct contact with the patient's components, in order to avoid infection, when a closed detection, ultrasonic detection system, please according to the requirements of the probe cleaning and disinfection (sterilization).

⚠ **Waring:**	1. Probe non-immersion equipment, Not recommended for underwater use. 2. It is forbidden to immerse the probe plug in a liquid such as water or an anti - virus solution. Immersion can cause shock or failure. 3. If the detector is not completely removed, it will solidify and affect the image quality of the probe 4. Cleaning and disinfection will not as high temperature environment probe (more than 55 DEG C), high temperature probe may lead to missing or damaged.

Be careful:	1. For cleaning or disinfection, with antibacterial gloves to prevent infection 2. After disinfection, the disinfection water is used to clean the residue, chemical residue or harmful to animal body 3. If you do not guarantee the effectiveness of disinfection and sterilization solution, please contact the manufacturer to obtain product information

- clean

Please follow the instructions on the instructions:

A) with antibacterial gloves to prevent infection

B) cleaning the probe with water, remove the attached stains. Can also use soap and water, cleaning can be used. Avoid using polyurethane sponge brush to avoid damage to the probe.

C) after washing, sterilizing cloth or gauze wipe not drying probe.。

- General disinfection

Gently wipe the probe back and forth with a medical cotton ball dipped in 75% medical grade alcohol

- Note on disinfectant solution: dilution and concentration, the way of disinfection, and the process of use, please refer to the instructions provided by the manufacturer regarding the concentration of disinfectant solution, the use of disinfection methods;
- After cleaning, wipe the probe with germicidal cloth or gauze, and then let the alcohol evaporate naturally on the probe surface. Do not dry the probe.

Be careful:	1. The probe must be cleaned after each use; 2. Do not use surgical brush to clean the probe, even if the use of soft brush may damage the probe, only use a soft cloth;

⚠WARNING:	1. The product must be away from machine with high current or strong magnetic. 2. Do not immerse the probe in any type of liquid or detergent. 3. Probe is strictly prohibited from immersing by any type of liquid. 4. The method of disinfecting probe with gas or heating is strictly prohibited. 5. It is strictly prohibited to probe cable probe socket or immersed in the solution, although the surface of the probe is waterproof but only the head of the probe. Please be careful using the coupling agent and cleaning, disinfection of the probe surface. 6. Equipment failure, Users are not allowed to repair without authorization. Product must be sent back to the company

■ Check the following items after cleaning and disinfection:

Inspection item item item	Inspection method	Acceptance Criteria
Lens	Visual inspection of the lens surface and the connection between the lens and the shell of the acoustic head	There shall be no cracks in the connection between the lens and the housing.
Shell	Visual inspection of shell surface	No damage or crack on the surface of the shell
Shell connection	Visual inspection of shell connection	There shall be no cracks in the joint of the shell, lack of glue
Hangover	Visual inspection of probe surfaces, especially pits and narrow areas	There shall be no residual detergent or disinfectant

8 Puncture guide

8.1 Enter or exit puncture mode

- Under the Windows platform, in the SoftKey area, click B mode [Image Parameter Settings], and select [puncture (on / off)].

Set [Piercing frame model] for quick calibration.

Set [guide line], depending on needle selection, A, B, and ALL.

Set [linetype], have thick, medium, thin.

⚠ WARNING:	1. The guide leads must be calibrated before each puncture. 2. The frozen is not allowed at the time of puncture. 3. If the puncture needle is not consistent with the position of the puncture guide lead, do not puncture.

- Exit puncture guiding function：
- The system is in the puncture status. Click[Exit] to exit the puncture status.

8.2 Puncture lead calibration

Place the puncture frame and the sound head of the puncture needle in the water;

Click [calibrate] to align the needle with the puncture guide line by adjusting the “position” “angle” “+” and“-”.

After coincident, save the calibrated puncture guide wire parameters.

9 Acoustic output description

The contents of this chapter for the entire system (including host, probe, accessories and peripherals), in order to provide relevant information to the operator output sound and how to use ALARA control principle of irradiation time and other important safety information. In addition, this chapter also includes information related to the system of acoustic output real-time display.

Please read this chapter carefully before use.

9.1 Biological effect

It is generally believed that the diagnosis with ultrasound is safe. So far, there is no any reports about ultrasonic cause bodily injury.

In spite of this, we can not arbitrarily believe all the ultrasonic is absolutely safe. Studies have shown that ultrasound with high intensity is harmful to animal body.

In recent years, with the rapid development of ultrasound technology, people are increasingly concerned about the application of ultrasonic technique in diagnosis and may lead to the potential risk of biological effect.

9.2 Caution use declaration

Although there is no confirmation of diagnosis by ultrasonic instrument can cause the patient to produce biological effect, but there are still likely to prove the biological effects of existing applications in the future. So we must be careful to use ultrasound, exert their clinical effect in the premise to obtain the necessary clinical information, avoid long time using high intensity ultrasound the.

9.3 ALARA principle(As Low As Reasonably Achievable)

The use of ultrasonic should be carried out under the premise of ensuring the ALARA principle, obtain diagnostic information, as far as possible will not lead to the lowest level of the biological effects of energy. The ultrasonic energy depends on the size of the output intensity and irradiation time. The strength of ultrasonic wave need different patients and clinical cases are not the same.

Not all of the examinations can be output by ultrasonic low energy ultrasonic can be completed. Very low energy will only lead to low quality images or weak Doppler signal, thus affecting the reliability of diagnosis. However, the use of sound power is greater than the actual needs but also help to improve the quality of information for the diagnosis, but will increase the risk of biological effects.

Users must be responsible for the safety of patients, to the use of ultrasonic, the output power of ultrasonic to choose according to the principle of ALARA.

Other information about the ALARA principle and the potential biological effects of ultrasound, can see the Research Institute of medical ultrasound (AIUM) published the "medical ultrasound safety" file.

9.4 MI/TI description

9.4.1 Basic knowledge of MI and TI

Ultrasonic output parameters (such as frequency, pressure and intensity etc.) and the relationship between the biological effect is not yet clear, but acknowledged there are two possible cause biological effects. One is the thermal effect of ultrasonic absorption, refers to the organization; the other is a mechanical effect including cavitation effect, thermal index (TI). Said heat effect caused by temperature index, mechanical index (MI) and MI index.TI index that reflects the mechanical effect of the instantaneous output, without considering the cumulative effect of the examination time.

- MI（Mechanical index）:

The mechanical effect is caused by the acoustic wave within the organization micro bubbles, increasing vibration and the results diabrosis, this reaction is called cavitation.

MI said the possibility of pressure cavitation effect, MI value is obtained by the square root of the peak negative pressure divided by the frequency. Therefore, the higher the frequency or peak negative pressure is low, the MI value is smaller, so the possibility of generating cavitation effect is smaller。.

$$MI = \frac{P_{r,\alpha}}{\sqrt{f_{awf}} \times C_{MI}}$$

$$C_{MI} = 1\ (\mathrm{MPa}/\sqrt{\mathrm{MHz}}\ )$$

When the frequency is 1 MHz and the peak pressure is 1 MPa, the MI value is 1 MI can be considered as a threshold for cavitation. When gas and soft tissue exist at the same time to set the MI value to the low value.

- TI （Thermal index）:

TI is determined by the total acoustic power and the tissue temperature rise of 1 degrees Celsius required sound power ratio. In addition, the organizational structure of different temperature is different, so the TI is divided into three categories: TIS (soft tissue thermal index (TIB), and TIC (bone thermal index) skull thermal index).

- TIS: soft tissue thermal index applications, such as the abdomen and the heart
- TIB: the use of bone thermal index, such as the fetus (in late pregnancy), focused on or close to the focus of the acoustic beam in the bone
- TIC: Skull thermal index applications such as pediatric and adult skulls.

WFUMB (World Federation of ultrasound in medicine and Biology) statement: 5 minutes irradiation temperature rise of 4 degrees may cause potential harm to the embryo and fetal tissue.

The smaller the MI/TI, the lower the biological effect。

9.4.2 MI/TI display instructions

TI and MI display on the screen of centre. The operator should monitor these index values in the inspection process, and to ensure that in the premise of effective diagnostic information under the irradiation time and the output value is maintained at the lowest possible level.

The TI and MI values are displayed at any operating conditions, and the step value is not more than 0.2.

TI display items can be set in the prefab, open [the image preset parameter]"B/THI" page, you can see the acoustic output parameters preset, as shown below:

Here you can set the level of TI display items and power levels.

Display accuracy is 0.1.

Be careful:	If the MI or TI display values are greater than 1, please follow the ALARA principle carefully

9.5 Sound power setting

Acoustic output regulation

According to the bottom of the screen menu area [soft sound power] project regulating sound power. Regulation at the same time, the soft menu item and the middle of the screen will display the sound power offset position size. Numerical sound power level is big, said the sound output of current energy increases.

In the frozen state of the image, the ultrasonic energy is not output.

Default settings description

The operator is the most important factor to control the sound output

The intensity level depends on the acoustic output in the scanning area. In the fetal examination, be especially careful control of acoustic output intensity.

In this system, the user can preset the image parameters. Once the preset change default settings for the original machine becomes invalid. Therefore, the user is responsible for the default settings.

Default setting range

Initial setting range of sound output	10% to 100%

The maximum acoustic output limit depending on the selected mode of the probe surface temperature rise and the provisions of the FDA acoustic output of each probe.

Be careful:	When the boot, probe switch, new patient or return to the preset value, the system will automatically return to the user preset value. In a factory setting, sound power value is lower than the preset value. The user in accordance with the principle of ALARA and meet the FDA 510 (k) Guidance-Track3 limits, the user can through the corresponding increase in the sound power soft menu you can also set the AP value in the preset level.

The sound output system is based on EN60601-2-37:2008, FDA510 (K) GUIDANCE, the diagnostic ultrasound equipment acoustic output measurement standard (NEMA UD-2 2004) "," diagnostic ultrasound equipment thermal and mechanical index real-time display standard (AIUM and NEMA UD-3 2004) were measured and calculated. The acoustic output of published values see Appendix C.

9.6 Acoustic power control

Sound output depends on the system operator, the operator should obtain qualified under the premise of effective diagnostic image to reduce the acoustic output. There are three types of operation control and sound output control: direct control and indirect control and receiver control.

- Direct control

The system of direct control of acoustic output through the soft menu area [] sound power project adjusting acoustic output size. But in any mode of the acoustic output maximum value can not exceed the acoustic output limit (MI limit of 2 TI, the limit value is 6, ISPTA.3 limit of 720 mW/cm2).

- Indirect control

Indirect control of acoustic output is mainly caused by the control of image related parameters. These include control operation mode, probe and frequency, focus, depth image and pulse repetition frequency (PRF).

The operating mode determines the ultrasonic beam is scanning and non scanning mode, the thermal effect with M, Doppler, Color are closely related.

The attenuation of the tissue is directly related to the change of the probe and its frequency. The image depth is related to the effective aperture of the probe.

- Receiver control

The receiver (such as gain control, dynamic range, image processing etc.) does not affect the sound output. Therefore, in image optimization, priority should be adjusted to optimize the image receiver control class, followed by direct control and indirect control.

9.7 Acoustic output description

9.7.1 Damping output parameter

In order to determine the relevant parameters of the acoustic output, compared to using a method of ultrasonic system for different frequencies and different depth of focus. This method (also called attenuation method) by measuring the acoustic output of the tank that ultrasonic wave propagation in tissues. Usually 0.3 dB/cm/ MHz average sound intensity attenuation, namely ultrasonic probe launch each transmission of a 0.3 dB/MHz cm ultrasonic intensity attenuation, the calculation formula is as follows：

$$I_{atten} = I_{water} \times 10^{(-0.3/10 \times f_c \times z)}$$

Among them, I_{atten} is the attenuation of sound intensity, I_{water} is in the tank the measured sound intensity (at a distance z), fc is the center frequency of the ultrasonic (measured in water), and Z is the distance apart. The attenuation value of pressure probe formula is similar, but the attenuation coefficient is 0.15 dB/cm/MHz, half of the sound strong. Because of pressure and pressure is proportional to the square, so the sound intensity coefficient is two times of pressure coefficient.

Although the 0.3 dB/cm/MHz than any solid body tissue attenuation coefficients are much lower, but it can be treated as the examination of the fetal condition. In early pregnancy test, ultrasonic probe arrived from the fetus, through the middle of almost all liquid, and the liquid attenuation is very small. Because of this 0.3 dB/cm/MHz lower than the actual attenuation coefficient check the number。

9.7.2 Acoustic output limit

In accordance with the FDA requirements of Track 3, the acoustic output limits using the derating (or attenuation) method, as shown in the table below. The use of any probe in any mode of operation, the maximum acoustic output should be listed in the following table limits.

FDA 3 Track maximum sound output limit (attenuation)

Application	$I_{spta.3}$ (mW/cm^2)	$I_{sppa.3}$ (W/cm^2)	MI
Other parts (in addition to the eye)	720	or ≤ 190	≤ 1.9

9.7.3 The difference between the actual MI/TI value and the display value

During operation, the system always show the acoustic output parameters, thermal and mechanical index TI index MI. of these parameters is the ultrasonic thermal effect and mechanical effect of risk indicators. They are a set of system to the operator that may increase or reduce the possibility of thermal or mechanical effects. More precisely, these parameters are for the implementation of ALARA design principles. When the operator changes a control system, the system will display the change of acoustic output changes. However, the heat index is not equal to the body temperature. First of all, in order to provide a single display index, had to make several simplifying assumptions, one hypothesis is that the frontThe attenuation method for animal body, most of the organization the actual value is much smaller (such as attenuation produced in muscle or organ when the scan is far higher than 0.3 dB/cm/MHz), for the thermal property of organization also made simplified. Therefore, when scanning high perfusion tissue (such as cardiac or vascular system), the thermal effect will have the heat index is much lower than that.

Mechanical index is used to represent the mechanical effect (cavitation) the possibility of.MI depends on the attenuation of peak pressure and the center frequency, the actual peak negative pressure by the actual attenuation effect, which is caused by the actual attenuation between the probe and the focus of the organization. The organization of all animal solid attenuation is higher than 0.3 dB/cm/MHz, the peak value is lower than the actual value of negative pressure that change will change with the scan position.

Based on the above reasons, TI and MI display value is used to help the operator to implement ALARA principle in ultrasonic inspection process.

9.8 Uncertainty of measurement

I_{spta}	31.2%
I_{sppa}	30.4%
center frequency (f_c)	2%
Total power (W)	30.1%（5.6% Scan mode and combination mode）
Peak negative pressure(pr)	15.5%

9.9 Reference literature for sound power and its safety

(1) “Bio-effects and Safety of Diagnostic Ultrasound” issued by AIUM in 1993

(2) “Medical Ultrasound Safety” issued by AIUM in 1994

(3) "Acoustic Output Measurement Standard for Diagnostic Ultrasound Equipment, Revision 3" issued by AIUM/NEMA in 2004

(4) "Standard for real-time display of thermal and mechanical acoustic output indices on diagnostic ultrasound equipment, Revision 2" issued by AIUM/NEMA in 2004

(5) "Information for Manufacturers Seeking Marketing Clearance of Diagnostic Ultrasound Systems and Transducers" issued by FDA in 2008.

(6) “Medical electrical equipment - Part 2-37: Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment” issued by IEC in 2007.

9.10 Transducer surface temperature

EN60601-2-37:2008 according to the requirements of clause 201.11, the transducer surface

temperature was measured under two conditions: transducer suspension in the absence of air circulation environment (Still Air) and probe contact phantom (Method B).

The maximum surface temperature and maximum temperature rise of the transducer are listed below：

Transducer	test method	Operation mode	Ambient (°C)	Initial temperature (°C)	Final Radiating Surface temp.(TF) and/or Temp.Rise(TR) (°C)
C5-2Sv	TMM	Normal(B+C+PW)	25.554	25.261	TF=30.020 TR=4.759
C5-2Sv	Still Air	Normal(B+C+PW)	24.612	24.612	TF=35.528 TR=10.916
C5-2v	TMM	Normal(B+C+PW)	24.590	24.539	TF=29.08 TR=4.541
C5-2v	Still Air	Normal(B+C+PW)	23.272	23.368	TF=32.995 TR=9.627
L11-4v	TMM	Normal(B+C+PW)	23.140	24.330	TF = 29.421 TR =5.091
L11-4v	Still Air	Normal(B+C+PW)	22.380	23.340	TF = 34.73 TR =11.390
L11-4Sv	TMM	Normal(B+C+PW)	24.717	26.109	TF = 30.553 TR =4.444
L11-4Sv	Still Air	Normal(B+C+PW)	23.827	24.037	TF = 35.407 TR =11.37
E10-4v	TMM	Normal(B+C+PW)	24.801	24.658	TF = 28.094 TR =3.436
E10-4v	Still Air	Normal(B+C+PW)	24.747	24.275	TF = 33.943 TR =9.668
C8-5v	TMM	Normal(B+C+PW)	24.656	25.740	TF = 31.553 TR =5.813
C8-5v	Still Air	Normal(B+C+PW)	23.731	23.838	TF = 38.376 TR =14.538

10 Electromagnetic compatibility statement

The system complies with the EMC test standard IEC60601-1-2: 2007+AC:2010.

⚠ **WARNING:**	1、The use of inappropriate accessories will reduce the performance of the product. 2、The selected adapter should meet the requirements of the IEC60601-1-2: 2007 AC:2010 3、The equipment or system may be interfered with by other equipment even if it meets the emission requirements of the corresponding national standards.

Cable information table

Order number	Name	Cable length（m）	Whether to shield or not	Remarks
1	DC input power cord	1.5	yes	/
2	C5-2Sv Probe cable	1.5	yes	/
3	C5-2v Probe cable	1.5	yes	/
4	L11-4v Probe cable	1.5	yes	/
5	L11-4Sv Probe cable	1.5	yes	/
6	C8-5v Probe cable	1.5	yes	/
7	E10-4v Probe cable	1.5	yes	/

CAUTION：

1. **The use of specified accessories, transducers, and cables may cause the system to be launched with increased or decreased immunity**
2. **This system can not be close to or in contact with other equipment, if it is necessary, it must ensure the normal operation of the system in use.**
3. **This system requires special protection against EMC, and the need for the installation and maintenance of EMC provided in the information environment to meet the following.**
4. **This system is lower than the minimum prescribed amplitude products or minimum operating conditions will lead to incorrect results in physiological signals of patients.**
5. **Portable and mobile communication devices will affect the performance of the system. See table 1,2,3,4.**
5. **The user shall install and use according to the EMC information provided by the random file.**
7. **Portable and mobile RF communication equipment may affect the WF-1v Veterinarian Pocket Ultrasound System to avoid strong magnetic interference, such as near microwave ovens, elevators, etc.**

8. Frequency band of emission：2412MHz～2470MHz
Modulation type：DSSS modulate/OFDM modulate
Frequency characteristic：802.11a/802.11b/802.11g
Effective radiated power：
① TX power：
— 18.0dBm@1DSSS
— 14.5dBm@54OFDM
② RX sensitivity
— -95.7dBm@1DSSS
— -74.0dBm@54OFDM

9. The guide and manufacturer's statement are detailed in the following table.

Table 1：

Electromagnetic launch guide and manufacturer statement		
This system can be used in a specified electromagnetic environment, users should ensure the use of electromagnetic environment in the following provisions.		
Radiation test	**Radiation test**	**Electromagnetic environment - Description**
RF launch CISPR 11	Group 1	This system uses RF energy inside the machine function only, so the RF emission is very low, not in the vicinity of the electronic equipment to produce any electromagnetic interference.
RF launch CISPR 11	Class B	The system is suitable for both home and direct connection to residential public low voltage power networks
Harmonic lunch IEC 61000-3-2	Class A	
Voltage fluctuation / scintillation emission IEC 61000-3-3	accord	

Table 2：

Electromagnetic disturbance guidance and manufacturer statement			
This system can be used in a specified electromagnetic environment, users should ensure the use of electromagnetic environment in the following provisions.			
Immunity test	**IEC 60601Test level**	**Accord level**	**Electromagnetic environment - A Guide**
electrostatic discharge(ESD) IEC 61000-4-2	±6 kV Contact discharge； ±8 kV Air discharge	±6 kV Contact discharge； ±8 kV Air discharge	The ground must be made of wood, concrete or tile. If the floor is covered with synthetic material, the relative humidity is at least 30%
Electric fast pulse group(EFT) IEC 61000-4-4	±2 kV Power cord， ±1 kV I/OCable (length greater than 3 M）	±2 kV Power cord， ±1 kV I/OCable (length greater than 3 M）	The power quality of the network must be a typical commercial or hospital environment
Surge IEC 61000-4-5	±1 kV Differential mode， ±2 kV common mode	±1 kV Differential mode， ±2 kV common mode	The power quality of the network must be a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations IEC 61000-4-11	<5% U_T (drop >95% U_T) 0.5cycle 40% U_T (drop 60% U_T) 5 cycle 70% U_T (drop30% U_T) 25cycle <5% U_T (drop >95% U_T) 5s	<5% U_T (drop >95% U_T) 0.5cycle 40% U_T (drop 60% U_T) 5 cycle 70% U_T (drop30% U_T) 25cycle <5% U_T (drop >95% U_T) 5s	The quality of the power supply network must be a typical commercial or hospital environment. If the system needs to be maintained during continuous operation in the power network interruption, we recommend the use of an uninterruptible power supply UPS power supply.
Power frequency magnetic field(50/60Hz) IEC 61000-4-8	3 A/m	3 A/m	The power frequency magnetic field must conform to the characteristics of a typical commercial or hospital environment
Be careful： U_T is the AC voltage value before the test voltage is applied			

Table 3：

Electromagnetic disturbance guidance and manufacturer statement			
This system can be used in a specified electromagnetic environment, users should ensure the use in the electromagnetic environment in the following provisions.			
Immunity test	**IEC 60601 Test level**	**Accord level**	**Electromagnetic environment - A Guide**
Conduction disturbance rejection IEC 61000-4-6	3 Vrms 150 kHz - 80 MHz	1 Vrms	Portable and mobile radio communication equipment must be from the equipment and / or system (including cable included) use any parts of the prescribed distance. This is based on the isolation distance transmitter frequency selection equation is calculated. The calculation formula is recommended isolation distance： $d = 3.5 \times \sqrt{P}$ $d = 1.2 \times \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3 \times \sqrt{P}$ 800 MHz to 2.5GHz Among them, P is the rated maximum output power of transmitter manufacturers, is a unit of Watt; D is the recommended distance, the units are in meters. Through the measurement of a electromagnetic field by RF transmitter in each frequency range of B must be less than meets the level。 Among them, P is the rated maximum output power of transmitter manufacturers, is a unit of Watt; D is the recommended distance, the units are in meters. Through the measurement of a electromagnetic field by RF transmitter in each frequency range of B must be less than meets the level.
Radiated immunity IEC 61000-4-3	**10 V/m** **80MHz － 2.7GHz**	**10 V/m**	

Be careful 1: In 80MHz-800MHz, using a higher frequency formula **Be careful 2: These guidelines do not apply in all cases. The material structure, objects and people can absorb and reflect electromagnetic waves, thus affecting the electromagnetic propagation**
a The radio base station (cellular and wireless) and ground mobile radio mobile phone antenna, receiver, field FM and am radio as well as TV broadcast is unable to use pure theory to accurately estimate. In order to evaluate the electromagnetic environment of fixed RF transmitter generates, should be taken into account. Electromagnetic field measurement method using field measured if the equipment operating environment more than the required RF level, it is necessary to observe the equipment to work properly. Once the abnormal situation, some measures should be taken, such as re placing the machine direction or move it to the environment. b In the 150kHz-80MHz frequency range, the field strength should be less than 1V/m.

Table 4：

Recommended distance between this system and portable / mobile RF communication equipment			
This system can be used to control the electromagnetic environment in RF interference. In order to avoid the electromagnetic interference, customers or users should maintain the minimum distance between the proposed system and portable / mobile RF communication equipment. The following suggestions to keep the distance is calculated according to the maximum output power of communication equipment.			
Maximum rated output power of transmitter（W）	**Distance from the transmitter frequency**（m）		
	150kHz -80MHz $d=\left[\frac{3.5}{1}\right]\sqrt{P}$	80MHz-800MHz $d=\left[\frac{3.5}{3}\right]\sqrt{P}$	800MHz-2.5GHz $d=\left[\frac{7}{3}\right]\sqrt{P}$
0.01	0.35	0.12	0.23
0.1	1.11	0.37	0.74
1	3.50	1.17	2.34
10	11.07	3.69	7.38
100	35.00	11.67	23.34

If the rated maximum output power of the transmitter is not included in the values given above, can be estimated by using the corresponding column isolation distance equation. In the equation P is the nominal maximum output power of transmitter manufacturers are given, measured in watts. If the system image severely disturbed affect diagnosis, it is necessary to set the device away from the noise source or install the external RF transmission power noise filter the noise reduced to an acceptable level. **Be careful 1：In 80MHz-800MHz, using a higher frequency formula** **Be careful 2: These guidelines do not apply in all cases. The material structure, objects and people can absorb and reflect electromagnetic waves, thus affecting the electromagnetic propagation.**

Table 5

Fundamental characteristics

Scanning mode: the mode of operation of an ultrasonic diagnostic device, including a series of ultrasonic pulses that generate scanning lines that do not follow the same acoustic path.

Scanning mode	Parameter
B mode	**Gain：0-100 tunable** **Maximal acoustic output ：10-100% tunable** **Depth：** — C5-2Sv probe≥30cm — C5-2v probe≥30cm — L11-4v probe≥14cm — L11-4Sv probe≥14cm — C8-5v probe≥14cm — E10-4v probe≥14cm
M mode	
C mode	
Power mode	
PW mode	

Appendix A **Names and contents of toxic and hazardous substances or elements**

Table：Names and contents of toxic and hazardous substances or elements

Toxic or hazardous substances or elements	Toxic or hazardous substances or elements					
	lead（Pb）	mercury（Hg）	cadmium（Cd）	Six valence chromium（Cr(VI)）	Six valence chromium（PBB）	Two phenyl ether（PBDE）
Internal wire rod	×	○	○	○	○	○
LCD	○	○	○	○	○	○
key/knob	○	○	○	○	○	○
Shell(Plastic cement)	○	○	○	○	○	○
Shield	○	○	×	×	○	○
PCBA	×	○	○	○	○	○

○：Said the content of toxic and harmful substances in all homogeneous materials in the parts of the SJ/T11363-2006 in the specified limits requires the following.
×：The toxic and harmful substances exceeded the limitation of SJ/T11363-2006 standard in the content of at least one of the homogeneous materials.

Appendix B **Acoustic output data**

The meaning of each symbol in the sound output table：

Symbol	Meaning
A	Acoustic attenuation coefficient
A_{aprt}	-12dBOutput acoustic beam area
D_{eq}	Equivalent pore diameter
d_{eq}	Equivalent sound beam diameter
f_{awf}	Sound working frequency
I_{pa}	Pulse average sound intensity
$I_{pa,\alpha}$	Average sound intensity after attenuation
I_{pi}	Impulsive sound intensity integral
$I_{pi,\alpha}$	Pulse sound intensity integral
$I_{ta}(z)$	Time average sound intensity
$I_{ta,\alpha}(z)$	Decay time average sound intensity
$I_{zpta}(z)$	Spatial peak time average sound intensity

$I_{zpta,\alpha}(z)$	Decay time space peak time average sound intensity
MI	Mechanical index
P	output power
P_α	Output power after attenuation
P_1	Bounded output power
p_i	Pulse sound pressure square integral
p_r	Peak sparse sound pressure
$p_{r.a}$	Peak sparse sound pressure
Prr	Pulse repetition frequency
TI	Thermal index
TIS	Soft tissue thermal index
TIB	Bone thermal index
TIC	Skull thermal index
Z	Distance from the sound source to the specified point
z_b	Distance from the sound source to the specified point
z_{bp}	Breakpoint depth
z_s	Depth for TIS

Probe ： C5-2Sv　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.94	0.20		0.20		N/A
Index component value			0.20	N/A	0.20	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.56					
	P (mW)		25.39		25.39		N/A
	P_{1x1} (mW)		14.03		14.03		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	2.58					
	$z_{PII.\alpha}$ (cm)	2.58					
	f_{awf} (MHz)	2.76	2.76		2.76		N/A
Other Information	prr (Hz)	7163.8					
	srr (Hz)	22.53					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	23.10					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	33.44					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	53.52					
	$p_{r.}$ at z_{PII} (MPa)	1.99					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	Frequency(MHz)	3.2	3.2	N/A	3.2	N/A	N/A

Probe：C5-2Sv　Mode：B+M

Index label		*MI*	*TIS*		*TIB*		*TIC*
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.00	0.34		0.31		*N/A*
Index component value			0	0.34	0	0.31	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	*1.71*					
	P (mW)		14.20		14.20		*N/A*
	P_{1x1} (mW)		*N/A*		*N/A*		
	z_s (cm)			1.75			
	z_b (cm)					1.85	
	z_{MI} (cm)	2.58					
	$z_{PII.\alpha}$ (cm)	2.58					
	f_{awf} (MHz)	2.93	2.93		2.93		*N/A*
Other Information	*prr* (Hz)	7250.3					
	srr (Hz)	*N/A*					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	30.04					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	73.56					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	120.24					
	$p_{r.}$ at z_{PII} (MPa)	2.01					
Operating control conditions	Focus(mm)	20	20	20	20	20	*N/A*
	Depth(mm)	30	30	30	30	30	*N/A*
	Frequency(MHz)	3.2	3.2	3.2	3.2	3.2	*N/A*
	Speed	2	2	2	2	2	*N/A*

Probe：C5-2Sv　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.94	0.29		0.29		N/A
Index component value			0.29	N/A	0.29	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.56					
	P (mW)		40.36		40.36		N/A
	P_{1x1} (mW)		22.30		22.30		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	2.58					
	$z_{PII.\alpha}$ (cm)	2.58					
	f_{awf} (MHz)	2.76	2.26		2.26		N/A
Other Information	prr (Hz)	7163.8					
	srr (Hz)	22.53					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	23.10					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	42.18					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	65.74					
	p_r at z_{PII} (MPa)	1.99					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	B_Frequency(MHz)	3.2	3.2	N/A	3.2	N/A	N/A
	C_Frequency(MHz)	2.0	2.0	N/A	2.0	N/A	N/A

Probe：C5-2Sv　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.83	0.14		1.21		N/A
Index component value			0	0.14	0	1.21	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.25					
	P (mW)		25.33		25.33		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			2.20			
	z_b (cm)					2.88	
	z_{MI} (cm)	3.08					
	$z_{PII.\alpha}$ (cm)	3.08					
	f_{awf} (MHz)	2.26	2.26		2.26		N/A
Other Information	prr (Hz)	1695.4					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	95.67					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	149.8					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	330.85					
	p_r at z_{PII} (MPa)	1.85					
Operating control conditions	Focus(mm)	20	20	20	20	20	N/A
	Depth(mm)	30	30	30	30	30	N/A
	Frequency(MHz)	2.0	2.0	2.0	2.0	2.0	N/A

Probe：C5-2Sv　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.94	0.31		0.31		N/A
Index component value			0.31	N/A	0.31	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.56					
	P (mW)		43.36		43.36		N/A
	P_{1x1} (mW)		23.96		23.96		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	2.58					
	$z_{PII.\alpha}$ (cm)	2.58					
	f_{awf} (MHz)	2.76	2.26		2.26		N/A
Other Information	prr (Hz)	7163.8					
	srr (Hz)	22.53					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	23.10					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	44.23					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	70.05					
	p_r at z_{PII} (MPa)	1.99					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	B_Frequency(MHz)	3.2	3.2	N/A	3.2	N/A	N/A
	C_Frequency(MHz)	2.0	2.0	N/A	2.0	N/A	N/A

Probe：C5-2v　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.35		0.35		N/A
Index component value			0.35	N/A	0.35	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		42.28		42.28		N/A
	P_{1x1} (mW)		23.36		23.36		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	5.13					
	$z_{PII.\alpha}$ (cm)	5.13					
	f_{awf} (MHz)	3.10	3.10		3.10		N/A
Other Information	prr (Hz)	7162.6					
	srr (Hz)	24.959					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	68.49					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	45.47					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	143.12					
	p_r at z_{PII} (MPa)	3.41					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	Frequency(MHz)	3.3	3.3	N/A	3.3	N/A	N/A

Probe：C5-2v　Mode：B+M

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.19	0.29		0.48		N/A
Index component value			0	0.29	0	0.48	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	2.11					
	P (mW)		22.29		22.29		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			4.00			
	z_b (cm)					4.47	
	z_{MI} (cm)	5.13					
	$z_{PII.\alpha}$ (cm)	5.13					
	f_{awf} (MHz)	3.13	3.13		3.13		N/A
Other Information	prr (Hz)	7250.3					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	57.39					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	188.2					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	565.5					
	p_r at z_{PII} (MPa)	3.65					
Operating control conditions	Focus(mm)	20	20	20	20	20	N/A
	Depth(mm)	30	30	30	30	30	N/A
	Frequency(MHz)	3.3	3.3	3.3	3.3	3.3	N/A
	Speed	2	2	2	2	2	N/A

Probe：C5-2v　　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.40		0.40		N/A
Index component value			0.40	N/A	0.40	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		49.93		49.93		N/A
	P_{1x1} (mW)		27.58		27.58		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	5.13					
	$z_{PII.\alpha}$ (cm)	5.13					
	f_{awf} (MHz)	3.10	2.29		2.29		N/A
Other Information	prr (Hz)	7162.6					
	srr (Hz)	24.959					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	68.49					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	63.76					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	177.72					
	$p_{r.}$ at z_{PII} (MPa)	3.41					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	B_Frequency(MHz)	3.3	3.3	N/A	3.3	N/A	N/A
	C_Frequency(MHz)	2.0	2.0	N/A	2.0	N/A	N/A

Probe：C5-2v　　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		1.12	0.42		0.42		N/A
Index component value			0.42	N/A	0.42	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.97					
	P (mW)		53.05		53.05		N/A
	P_{1x1} (mW)		29.31		29.31		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	5.13					
	$z_{PII.\alpha}$ (cm)	5.13					
	f_{awf} (MHz)	3.10	2.29		2.29		N/A
Other Information	prr (Hz)	7162.6					
	srr (Hz)	24.959					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	68.49					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	66.95					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	186.61					
	$p_{r.}$ at z_{PII} (MPa)	3.41					
Operating control conditions	Focus(mm)	20	20	N/A	20	N/A	N/A
	Depth(mm)	30	30	N/A	30	N/A	N/A
	B_Frequency(MHz)	3.3	3.3	N/A	3.3	N/A	N/A
	C_Frequency(MHz)	2.0	2.0	N/A	2.0	N/A	N/A

Probe：C5-2v　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.98	0.25		1.17		N/A
Index component value			0	0.25	0	1.17	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.55					
	P (mW)		32.50		32.50		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			3.00			
	z_b (cm)					3.73	
	z_{MI} (cm)	3.80					
	$z_{PII.\alpha}$ (cm)	3.80					
	f_{awf} (MHz)	2.53	2.53		2.53		N/A
Other Information	prr (Hz)	1695.4					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	116					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	235.3					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	456.6					
	p_r at z_{PII} (MPa)	2.16					
Operating control conditions	Focus(mm)	20	20	20	20	20	N/A
	Depth(mm)	30	30	30	30	30	N/A
	Frequency(MHz)	2.5	2.5	2.5	2.5	2.5	N/A

Probe：L11-4v　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.37	0.078		0.078		N/A
Index component value			0.078	N/A	0.078	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.02					
	P (mW)		3.68		3.68		N/A
	P_{1x1} (mW)		2.15		2.15		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.65	7.65		7.65		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	110.23					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	11.73					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	16.92					
	p_r at z_{PII} (MPa)	1.24					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A

Probe：L11-4v　　Mode：B+M

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.40	0.11		0.07		N/A
Index component value			0.11	0	0	0.07	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.11					
	P (mW)		2.10		2.10		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			N/A			
	z_b (cm)					1.65	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.65	7.65		7.65		N/A
Other Information	prr (Hz)	4750					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	99.82					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	177.3					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	255.75					
	$p_{r.}$ at z_{PII} (MPa)	1.27					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
	Speed	2	2	2	2	2	N/A

Probe：L11-4v　　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.37	0.21		0.21		N/A
Index component value			0.21	N/A	0.21	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.02					
	P (mW)		12.26		12.26		N/A
	P_{1x1} (mW)		7.17		7.17		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.65	5.67		5.67		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	110.23					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	49.77					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	81.28					
	$p_{r.}$ at z_{PII} (MPa)	1.24					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A
	C_Frequency(MHz)	6.0	6.0	N/A	6.0	N/A	N/A

Probe：L11-4v　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.37	0.22		0.22		N/A
Index component value			0.22	N/A	0.22	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.02					
	P (mW)		12.52		12.52		N/A
	P_{1x1} (mW)		7.32		7.32		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.65	5.67		5.67		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	110.23					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	45.37					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	74.33					
	p_r at z_{PII} (MPa)	1.24					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A
	C_Frequency(MHz)	6.0	6.0	N/A	6.0	N/A	N/A

Probe：L11-4v　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.61	0.55		0.83		N/A
Index component value			0.55	0	0	0.83	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.46					
	P (mW)		20.07		20.07		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			N/A			
	z_b (cm)					1.65	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	5.71	5.71		5.71		N/A
Other Information	prr (Hz)	4169.2					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	147.85					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	354.11					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	400.03					
	p_r at z_{PII} (MPa)	1.59					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	6.0	6.0	6.0	6.0	6.0	N/A

Probe：L11-4Sv　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.39	0.084		0.084		N/A
Index component value			0.084	N/A	0.084	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.08					
	P (mW)		3.93		3.93		N/A
	P_{1x1} (mW)		2.30		2.30		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.66	7.66		7.66		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	132.05					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	13.60					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	18.81					
	p_r at z_{PII} (MPa)	1.31					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A

Probe：L11-4Sv　Mode：B+M

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.41	0.14		0.07		N/A
Index component value			0.14	0	0	0.07	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.13					
	P (mW)		2.25		2.25		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			N/A			
	z_b (cm)					1.70	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.66	7.66		7.66		N/A
Other Information	prr (Hz)	4750.1					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	115					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	204.2					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	292.7					
	p_r at z_{PII} (MPa)	1.29					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	7.5	7.5	7.5	7.5	7.5	N/A
	Speed	2	2	2	2	2	N/A

Probe：L11-4Sv　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.39	0.23		0.23		N/A
Index component value			0.23	N/A	0.23	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.08					
	P (mW)		13.15		13.15		N/A
	P_{1x1} (mW)		7.69		7.69		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.66	5.67		5.67		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	132.05					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	55.12					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	87.88					
	$p_{r.}$ at z_{PII} (MPa)	1.31					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A
	C_Frequency(MHz)	6.0	6.0	N/A	6.0	N/A	N/A

Probe：L11-4Sv　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.39	0.24		0.24		N/A
Index component value			0.24	N/A	0.24	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.08					
	P (mW)		13.53		13.53		N/A
	P_{1x1} (mW)		7.91		7.91		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	7.66	5.67		5.67		N/A
Other Information	prr (Hz)	4848.6					
	srr (Hz)	13.696					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	132.05					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	56.34					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	90.15					
	$p_{r.}$ at z_{PII} (MPa)	1.31					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	7.5	7.5	N/A	7.5	N/A	N/A
	C_Frequency(MHz)	6.0	6.0	N/A	6.0	N/A	N/A

Probe：L11-4Sv　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.64	0.52		0.81		N/A
Index component value			0.52	0	0	0.81	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.52					
	P (mW)		19.12		19.12		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			N/A			
	z_b (cm)					1.70	
	z_{MI} (cm)	0.68					
	$z_{PII.\alpha}$ (cm)	0.68					
	f_{awf} (MHz)	5.67	5.67		5.67		N/A
Other Information	prr (Hz)	4169.2					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	153.35					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	403.35					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	453.6					
	$p_{r.}$ at z_{PII} (MPa)	1.61					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	6.0	6.0	6.0	6.0	6.0	N/A

Probe：C8-5v　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.56	0.11		0.11		N/A
Index component value			0.11	N/A	0.11	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.38					
	P (mW)		6.93		6.93		N/A
	P_{1x1} (mW)		3.83		3.83		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.72					
	$z_{PII.\alpha}$ (cm)	1.72					
	f_{awf} (MHz)	6.04	6.04		6.04		N/A
Other Information	prr (Hz)	4848.4					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	91.22					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	30.99					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	51.39					
	$p_{r.}$ at z_{PII} (MPa)	1.61					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A

Probe：C8-5v　　Mode：B+M

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.57	0.22		0.26		N/A
Index component value			0	0.22	0	0.26	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.42					
	P (mW)		7.50		7.50		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			1.74			
	z_b (cm)					1.74	
	z_{MI} (cm)	1.72					
	$z_{PII.\alpha}$ (cm)	1.72					
	f_{awf} (MHz)	6.07	6.07		6.07		N/A
Other Information	prr (Hz)	4750					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	90.56					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	89.59					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	122.2					
	$p_{r.}$ at z_{PII} (MPa)	1.61					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	6.5	6.5	6.5	6.5	6.5	N/A
	Speed	2	2	2	2	2	N/A

Probe：C8-5v　　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.56	0.19		0.19		N/A
Index component value			0.19	N/A	0.19	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.38					
	P (mW)		13.27		13.27		N/A
	P_{1x1} (mW)		7.33		7.33		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.72					
	$z_{PII.\alpha}$ (cm)	1.72					
	f_{awf} (MHz)	6.04	4.48		4.48		N/A
Other Information	prr (Hz)	4848.4					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	91.22					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	46.41					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	90.09					
	$p_{r.}$ at z_{PII} (MPa)	1.61					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A
	C_Frequency(MHz)	5.0	5.0	N/A	5.0	N/A	N/A

Probe：C8-5v　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.56	0.20		0.20		N/A
Index component value			0.20	N/A	0.20	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.38					
	P (mW)		14.19		14.19		N/A
	P_{1x1} (mW)		7.84		7.84		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.72					
	$z_{PII.\alpha}$ (cm)	1.72					
	f_{awf} (MHz)	6.04	4.48		4.48		N/A
Other Information	prr (Hz)	4848.4					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	91.22					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	47.99					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	95.17					
	$p_{r.}$ at z_{PII} (MPa)	1.61					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A
	C_Frequency(MHz)	5.0	5.0	N/A	5.0	N/A	N/A

Probe：C8-5v　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.71	0.31		0.70		N/A
Index component value			0	0.31	0	0.70	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.58					
	P (mW)		20.44		20.44		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			1.74			
	z_b (cm)					1.74	
	z_{MI} (cm)	1.76					
	$z_{PII.\alpha}$ (cm)	1.76					
	f_{awf} (MHz)	4.97	4.97		4.97		N/A
Other Information	prr (Hz)	4069.2					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	96.28					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	303.1					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	381.75					
	$p_{r.}$ at z_{PII} (MPa)	1.99					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	5.0	5.0	5.0	5.0	5.0	N/A

Probe：E10-4v　　Mode：B

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.67	0.18		0.18		N/A
Index component value			0.18	N/A	0.18	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.59					
	P (mW)		12.20		12.20		N/A
	P_{1x1} (mW)		6.74		6.74		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.65					
	$z_{PII.\alpha}$ (cm)	1.65					
	f_{awf} (MHz)	5.57	5.57		5.57		N/A
Other Information	prr (Hz)	4850.3					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	109.5					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	50.18					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	99.06					
	$p_{r.}$ at z_{PII} (MPa)	2.19					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A

Probe：E10-4v　　Mode：B+M

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.67	0.18		0.45		N/A
Index component value			0	0.18	0	0.45	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.59					
	P (mW)		6.60		6.60		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			1.75			
	z_b (cm)					1.75	
	z_{MI} (cm)	1.65					
	$z_{PII.\alpha}$ (cm)	1.65					
	f_{awf} (MHz)	5.57	5.57		5.57		N/A
Other Information	prr (Hz)	4749.9					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	103.5					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	152					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	287					
	$p_{r.}$ at z_{PII} (MPa)	2.19					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	6.5	6.5	6.5	6.5	6.5	N/A
	Speed	2	2	2	2	2	N/A

Probe：E10-4v　　Mode：B+C

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.67	0.28		0.28		N/A
Index component value			0.28	N/A	0.28	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.59					
	P (mW)		20.53		20.53		N/A
	P_{1x1} (mW)		11.34		11.34		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.65					
	$z_{PII.\alpha}$ (cm)	1.65					
	f_{awf} (MHz)	5.57	4.51		4.51		N/A
Other Information	prr (Hz)	4850.3					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	109.5					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	60.02					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	115.56					
	p_r at z_{PII} (MPa)	2.19					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A
	C_Frequency(MHz)	5.0	5.0	N/A	5.0	N/A	N/A

Probe：E10-4v　　Mode：B+P

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.67	0.30		0.30		N/A
Index component value			0.30	N/A	0.30	N/A	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.59					
	P (mW)		25.29		25.29		N/A
	P_{1x1} (mW)		13.97		13.97		
	z_s (cm)			N/A			
	z_b (cm)					N/A	
	z_{MI} (cm)	1.65					
	$z_{PII.\alpha}$ (cm)	1.65					
	f_{awf} (MHz)	5.57	4.51		4.51		N/A
Other Information	prr (Hz)	4850.3					
	srr (Hz)	23.198					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	109.5					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	61.11					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	120.24					
	p_r at z_{PII} (MPa)	2.19					
Operating control conditions	Focus(mm)	5	5	N/A	5	N/A	N/A
	Depth(mm)	15	15	N/A	15	N/A	N/A
	B_Frequency(MHz)	6.5	6.5	N/A	6.5	N/A	N/A
	C_Frequency(MHz)	5.0	5.0	N/A	5.0	N/A	N/A

Probe：E10-4v　Mode：PW

Index label		MI	TIS		TIB		TIC
			At surface	Below surface	At surface	Below surface	
Maximum index value		0.75	0.32		0.71		N/A
Index component value			0	0.32	0	0.71	
Acoustic Parameters	$p_{r.\alpha}$ at z_{MI} (MPa)	1.67					
	P (mW)		21.22		21.22		N/A
	P_{1x1} (mW)		N/A		N/A		
	z_s (cm)			1.75			
	z_b (cm)					1.75	
	z_{MI} (cm)	1.70					
	$z_{PII.\alpha}$ (cm)	1.70					
	f_{awf} (MHz)	4.97	4.97		4.97		N/A
Other Information	prr (Hz)	4177.5					
	srr (Hz)	N/A					
	n_{pps}	1					
	$I_{pa.\alpha}$ at $z_{PII.\alpha}$ (W/cm^2)	101					
	$I_{spta.\alpha}$ at $z_{PII.\alpha}$ or $z_{SII.\alpha}$(mW/cm^2)	311					
	I_{spta} at z_{PII} or z_{SII} (mW/cm^2)	428.36					
	p_r at z_{PII} (MPa)	2.30					
Operating control conditions	Focus(mm)	5	5	5	5	5	N/A
	Depth(mm)	15	15	15	15	15	N/A
	Frequency(MHz)	5.0	5.0	5.0	5.0	5.0	N/A

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

§ 15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.19 Labeling requirements.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.