RAYDOSE®

ArcMap

(Model: ArcMap - I)

User Manual

ArcMap User Manual

Revision Date: August 18, 2025

i. Statement

This manual is the official user manual for ArcMap and its accessories, intended to guide users in the correct operation of the equipment and ensure optimal performance and safe use. This manual should be kept properly with the equipment for ready reference.

ArcMap and its accessories are only to be used for the purposes explicitly mentioned in this manual and accompanying documents. It is strictly prohibited to use this equipment for other unauthorized or undefined applications. When using this device, the operating instructions and safety precautions provided in this manual must be strictly followed. Unauthorized use beyond the specified scope will automatically invalidate the authorization and may lead to unforeseeable risks.

ii. Product Information

- **Product Name:** ArcMap
- **Product Model:** ArcMap-I
- **Manufacturing Date:** Refer to the product label
- **Hardware Expected Lifetime:** 8 years

iii. Registration Information

- **Registrant:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Registration Address:** Room 203, No. 6 Lianhuayan Road, Huangpu District, Guangzhou City, Guangdong Province, China
- **Manufacturer:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Product Supplier:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Product Seller:** Guangzhou Raydose Medical Technology Co., Ltd.
- **After-Sales Service Unit:** Guangzhou Raydose Medical Technology Co., Ltd.
- **Production Address:** Room 203, No. 6 Lianhuayan Road, Huangpu District, Guangzhou City, Guangdong Province, China
- **Postal Code:** 510700
- **Contact Email:** info@raydose.com
- **Official Website:** https://www.raydose.com/

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1. Introduction

1.1. Product Description

The ArcMap device is a detector array used for measuring the dose distribution of radiation beams, containing 1,764 air ionization chambers. The accompanying RayMap software is used to display and analyze the measurement data acquired by ArcMap and compare it with imported treatment plans, thereby assisting in verifying the quality of the treatment plan and ensuring the accuracy and safety of the treatment process.

1.2. Intended Use

ArcMap is primarily used for quality assurance prior to the application of radiotherapy techniques such as IMRT (Intensity-Modulated Radiation Therapy) and VMAT (Volumetric Modulated Arc Therapy). By accurately measuring the radiation dose distribution, the measurement results obtained by ArcMap can be compared with the planned data from the Treatment Planning System (TPS), thereby verifying whether the patient's treatment plan is executed as intended.

1.3. Intended Users

Personnel using ArcMap must be trained according to this manual and possess professional knowledge in the relevant field of radiotherapy.

1.4. Contraindications

ArcMap is for QA (Quality Assurance) purposes only and must not be used directly on patients. Its measurement data is solely for verifying patient treatment plans and cannot be used to directly control radiotherapy equipment.

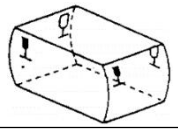
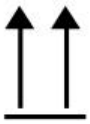
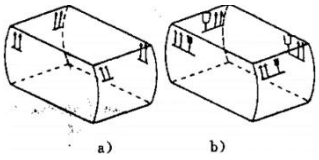
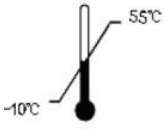
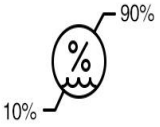
1.5. Copyright Notice

2. Health and Safety Information

2.1. Overview

This chapter primarily describes potential hazards related to the equipment. Before performing installation, operation, or equipment maintenance, all personnel must carefully read and fully understand the content of this chapter, strictly adhere to all markings, prompts, and warnings, and correctly operate according to the instructions in the manual to avoid accidents.

2.2. Symbols and Labels

No.	Symbol Name	Symbol Graphic	Meaning	Remarks/Example
1	Fragile		Package contains fragile items, handle with care.	Example: 
2	This Way Up		Package must be placed vertically, keeping the arrow direction upwards.	Example: 
3	Keep Dry		Avoid package being rained on or exposed to damp environments.	/
4	Do Not Roll		Do not roll the package during transport.	/
5	Do Not Stack		Package cannot be stacked; no other items should be placed on top.	/
6	Temperature Limit		Suitable transport temperature range: -10°C ~ +55°C.	/
7	Humidity Limit		Suitable transport humidity range: 10% ~ 90%.	/

8	Warning		Alerts user to consult important warnings in the instructions to avoid accidents due to improper operation.	/
9	/		Indicates Alternating Current.	
10	/		Indicates that the product must not be disposed of as unsorted municipal waste and requires separate collection.	/
11	Refer to Instructions		Prompt user to refer to the instructions for related operations or information.	/
12	Serial Number		Indicates the manufacturer's serial number for identifying the specific medical device.	/
13	Manufacturer		Indicates the manufacturer information of the medical device.	/
14	/		Indicates that the equipment generates or involves non-ionizing radiation.	/
15	Protective Earth		Indicates the need for protective earth connection to ensure safe operation.	/

2.3. Responsibilities

- General Responsibility: Raydose is not responsible for incidental or indirect losses caused by improper operation or other factors during the use of the equipment, including but not limited to data loss, loss of income, and business interruption.

- Usage Responsibility: This equipment is only for use by personnel with professional knowledge in radiotherapy, such as medical physicists or engineers. Users must have received relevant training and possess appropriate qualifications. Unauthorized personnel are not permitted to operate the equipment.
- Safety Responsibility: Users need to strictly comply with the safety warnings and precautions in this manual. Failure to comply may result in personal injury or equipment damage, and Raydose assumes no responsibility for consequences arising therefrom.

2.4. Assembly, Maintenance, and Accessories

- Only Raydose or personnel authorized by Raydose with sufficient technical competence are qualified to perform equipment assembly, expansion, modification, or repair.
- During maintenance, only original spare parts provided by Raydose or parts approved by Raydose may be used. The use of unauthorized components may compromise operator safety, equipment measurement accuracy, and operational interference, and violation of this rule will void the warranty.
- Raydose is not responsible for any hazards or problems caused by the use of accessories or consumables not provided or approved by Raydose.

2.5. Power Supply and Connections

The power input module consists of the following:

- Power Input Standard: Complies with IEC/EN 60320-1/C14, Protection Class 1.
- Fuse: The power adapter is equipped with dual fuses internally, installed on the neutral and live wires respectively.

The input and output specifications of the power adapter are as follows:

- Input: 100-220V~, 50Hz
- Output: 24V⎓

The output end of the power cable is 24V, and the input is 220V 50Hz.

Data Connection:

- The ionization chamber array requires connection of an Ethernet cable and a power cable.
- The Ethernet cable is 25 meters long, with one end connected to the ionization chamber array and the other end directly connected to the computer.

2.6. Electromagnetic Compatibility

⚠ **Note:**

- This equipment complies with the electromagnetic compatibility requirements of the YY 9706.102-2021 standard.
- Users should install and use the equipment according to the electromagnetic compatibility information provided in the accompanying documents.
- Portable and mobile RF communications equipment may affect the performance of this equipment; therefore, strong electromagnetic interference should be avoided, especially near devices like mobile phones, microwave ovens, etc.
- Refer to the appendix for detailed guidelines and manufacturer's declaration.

⚠ **Warning:**

- Even if other equipment complies with the corresponding national standard emission requirements, this equipment may still be subject to interference from other equipment.
- This equipment should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, verification should be performed to ensure normal operation in that configuration.
- Group A equipment is primarily intended for use in industrial environments. Since this equipment may generate conducted and radiated disturbances, ensuring electromagnetic compatibility in non-industrial environments may be challenging.
- Using accessories and cables that do not comply with specifications may result in increased emissions or decreased immunity of the equipment, unless they are replacement cables for internal components provided by the equipment manufacturer.
- Cable Description:

No.	Name	Cable Length / m	Shielded
1	Power Cord	1.8	No
2	Power Adapter Cable	0.1	No
3	Adapter Cable	1.2	No
4	Ethernet Cable	25	No

Note: Cables include external connection cables for the product (such as power cords, adapter cables, port connection wires, terminal wires, etc.) and connection cables between various components of the product.

2.6.1. Electromagnetic Emissions

The purchaser or user of the equipment should ensure it is used under the following electromagnetic environment conditions.

Emission Test	Compliance	Electromagnetic Environment Guidance

RF Emissions GB4824	Group 1	This equipment uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions GB4824	Class A	This equipment is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions GB17625.1	Not Applicable	
Voltage Fluctuations/ Flicker Emissions GB17625.2	Not Applicable	

2.6.2. Electromagnetic Immunity

The purchaser or user of the equipment should ensure it is used under the following electromagnetic environment conditions.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic Discharge (ESD) GB/T 17626.2	±6kV contact discharge ±8kV air discharge	±6kV contact discharge ±8kV air discharge	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/Burst GB/T 17626.4	±2kV for power supply lines ±1kV for input/output lines	±2kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge GB/T 17626.5	±1kV differential mode voltage ±2kV common mode voltage	±1kV differential mode voltage ±2kV common mode voltage	Mains power quality should be that of a typical commercial or hospital environment.
Voltage Dips, Short Interruptions and Voltage Variations on Power Supply Input Lines GB/T 17626.11	<5% U~T~, for 0.5 cycle (at U~T~, >95% dip) 40% U~T~, for 5 cycles (at U~T~, 60% dip) 70% U~T~, for 25 cycles (at U~T~, 30% dip) <5% U~T~, for 5 sec (at U~T~, >95% dip)	<5% U~T~, for 0.5 cycle (at U~T~, >95% dip) 40% U~T~, for 5 cycles (at U~T~, 60% dip) 70% U~T~, for 25 cycles (at U~T~, 30% dip) <5% U~T~, for 5 sec (at U~T~, >95% dip)	Mains power quality should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an uninterruptible power supply or a battery.
Power Frequency Magnetic Field (50/60 Hz GB/T 17626.8	3A/m	3A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U~T~ is the a.c. mains voltage prior to application of the test level.			
RF Conducted GB/T 17625.6 RF Radiated GB/T 17626.3	3Vrms 150kHz to 80MHz 3V/m 80MHz to 2.5GHz	3 Vrms 3 V/m	Portable and mobile RF communications equipment should not be used closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d=1.2\sqrt{P}$ $d=1.2\sqrt{P}$ 80MHz - 800MHz $d=2.3\sqrt{P}$ 800MHz - 2.5GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a] should be less than the compliance level in each frequency range [b]. Interference may occur in the vicinity of equipment marked with the following symbol: 

Note 1: At 80 MHz and 800 MHz, the higher frequency range formula applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

2.6.3. Recommended Separation Distances

This equipment is intended for use in an electromagnetic environment where the radiated RF disturbances are controlled. The customer or the user of the equipment can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the equipment as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (W)	Separation Distance According to Frequency of Transmitter (m)		
	150kHz～80MHz $d=1.2\sqrt{P}$	80MHz～800MHz $d=1.2\sqrt{P}$	800MHz～2.5GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

2.7. Regulatory Authority Requirements

Guangzhou Raydose Medical Technology Co., Ltd., as the manufacturer, follows the quality management system standard YY/T 0287-2017 IDT ISO 13485:2016 *Medical devices -- Quality management systems -- Requirements for regulatory purposes* for product production and management.

2.8. Safety Precautions

2.8.1. Electrical Installation

The electrical installation shall comply with the relevant IEC regulations. The room where the system is located and its connected equipment must comply with the corresponding electrical safety standards. The equipment is typically grounded via the power cord to ensure safe use.

2.8.2. Operators

The equipment may only be operated by the following personnel:

- Professionals familiar with the limitations of the equipment's measured radiation output.
- Personnel capable of following safety procedures for operating Co-60 or linear accelerators.
- Personnel who have the ability to take necessary safety precautions when using electrical or electronic equipment to avoid potential hazards.

Before using the equipment, operators must confirm that the equipment is correctly connected and in normal working condition, and complete the following checks:

- Confirm the normal functions of the equipment and ensure all safety devices are operating properly.
- Check data cables and power cords to ensure they are intact and undamaged.

2.8.3. Operation Process

- When handling the system and connection equipment, take care to avoid any impact, especially avoiding applying surface pressure or subjecting the equipment to strong vibrations. The maximum load capacity of the equipment is 25 g/cm². Overloading may cause equipment damage.
- Do not operate the equipment with wet hands. Moisture may cause internal short circuits or damage.
- The field size must not exceed the irradiable area marked on the equipment to avoid radiation damage to internal circuits. In the event of an emergency or equipment abnormality, immediately deactivate the equipment and perform a comprehensive inspection before the next use to ensure the equipment is in normal working condition.
- The equipment is equipped with ventilation ports. Ensure these ports are unobstructed during use. Prevent liquids or other impurities from entering the equipment interior to avoid damage or impact on its normal function.
- The equipment should be cleaned regularly to maintain good operating condition. If the environment where the equipment is placed has severe stains or dust accumulation, increase the cleaning frequency. Before performing cleaning operations, refer to the hospital's relevant cleaning regulations and use appropriate cleaning agents and tools.

2.8.4. Transportation and Storage

(1) Transportation Requirements

- Equipment packaging should use environmentally friendly, non-toxic materials, equipped with shock-proof and moisture-proof devices to ensure safety during transportation and storage.
- During transportation, keep the equipment stable, avoid rolling, collision, or severe shaking. Use professional equipment and follow standard procedures during loading and unloading.
- For long-distance transportation or extreme environments, additional protection such as insulation, moisture-proofing, or reinforced packaging should be added to ensure the equipment arrives safely and undamaged.

(2) Storage Requirements

- The equipment should be stored in an environment free of corrosive gases, ensure good ventilation, and keep away from strong magnetic fields and radiation protection areas. It is not recommended to store the equipment in the accelerator room for extended periods to avoid damage caused by radiation.
- When the equipment is not in use, unplug the power plug. The equipment should be placed separately and stably, face up, avoiding stacking or mutual collision to prevent damage.
- The equipment should be protected from dust, liquids, or other contaminants. It is recommended to store it in a dedicated storage box.

(3) Environmental Requirements

The environment for transportation and storage shall meet the following requirements:

Environmental Temperature Range	-10℃ ~ +55℃
Atmospheric Pressure Range	760hPa ~ 1100hPa
Relative Humidity Range	10% ~ 90%

2.8.5. Operating Environment

- The equipment must be used in a clean, dry, and room temperature environment.
- Avoid exposing the equipment to low temperatures, high pressure, unnecessary moisture, solvents, or steam.
- If temperature changes cause humidity fluctuations, do not use the equipment directly until it is completely dry.
- The operating environment shall meet the following requirements:

Temperature	+10℃ ~ +40℃
Pressure	760hPa ~ 1100hPa
Relative Humidity Range	30% ~ 75%

2.8.6. Emergency Measures

- If the equipment suffers external impact, vibration, or overload use, first check the equipment appearance for obvious damage and ensure no internal damage. If severe damage is found, stop use immediately, record the equipment status, and contact professional personnel for repair or replacement.
- If the equipment shows signs of overheating, abnormal noise, or other malfunctions during operation, stop use immediately and disconnect the power supply, then contact technical support for troubleshooting.
- If the equipment is submerged in water, immediately cut off the power supply and wait for about one minute before touching or inspecting it.
- During equipment cleaning, if any components become loose or detached, stop cleaning immediately and check all connections for tightness. If there is a problem, contact technical support for inspection and repair.
- When the equipment experiences system failure or operational abnormality, preliminary troubleshooting can be performed first, checking if the equipment is

affected by moisture or water, or if any components show obvious wear. For further diagnosis, please contact relevant technical support personnel.

2.9. User Suggestions and Complaint Handling

Users can provide feedback through the following channels:

- Email: service@raydose.com
- Agent Feedback: Users can also report equipment issues or complaints directly to Raydose's authorized agents. We will respond to your feedback as soon as possible and provide you with support and solutions.

3. Product Description

3.1. Product Composition Description

Equipment Configuration List			
Category	**Name**	**Quantity**	**Configuration Type**
Detector Array	ArcMap	1	Standard
Insert	Solid Water Insert	1	
	Ionization Chamber Insert	1	
Software	RayMap (ArcMap Module)	1	
Note: Actual shipped accessories are subject to the configuration in the customer's order.			

3.2. Terminology Explanation

Term	Explanation
QA	Quality Assurance
TPS	Treatment Planning System
MLC	Multi-Leaf Collimator
IP	Internet Protocol Address
DICOM	Digital Imaging and Communications in Medicine
SN	Device Serial Number
MU	Monitor Unit
ID	Identifier
AAPM	American Association of Physicists in Medicine (referred to as the calculation standard in the software)
IAEA	International Atomic Energy Agency (referred to as the calculation standard in the software)
IEC	International Electrotechnical Commission (referred to as the calculation standard in the software)
Profile	Dose distribution curve measured along the direction perpendicular to the beam central axis (X/Y direction) at a certain depth.

3.3. Data Interface Description

Interface Item	Description
DICOM Import	**Purpose:** RayMap software receives DICOM format files sent from the planning system. **User:** Physicist, maintenance personnel, authorized personnel. **Controls Equipment:** No, only used for passively receiving files. **Specification:** Supports or is compatible with DICOM 3.0 standard

	plan and dose files. **Data Type:** DICOM files **Verified Planning Systems:** Monaco, Eclipse, Pinnacle **Standard:** DICOM 3.0 **Time Synchronization:** Not applicable **Potential Issues:** • Incorrect port or IP configuration, causing file reception failure. • Incompatibility with DICOM 3.0 standard, causing file reception failure. **Prohibited Actions:** None **Recommended Method:** None, it is the only receiving method. **Configuration:** Requires setting IP and port; the port must be ensured not to be occupied by other applications. After configuration is complete, the software needs to be restarted for the configuration to take effect. **Security Requirements:** None **Other:** Not recommended for use as it requires changing network IP configuration, which is relatively cumbersome.
File Import	**Purpose:** RayMap software imports DICOM format files exported from the planning system, and imports/exports RayMap format measurement files. **User:** Physicist, maintenance personnel, authorized personnel. **Controls Equipment:** No **Specification:** Supports or is compatible with DICOM 3.0 standard plan and dose files, and RayMap software exported measurement files. **Data Type:** DICOM files, RayMap measurement files. **Verified Planning Systems:** Monaco, Eclipse, Pinnacle **Standard:** DICOM 3.0 **Time Synchronization:** Not applicable **Potential Issues:** • Plan file incompatible with DICOM 3.0 standard, causing parsing failure. • Measurement file not in RayMap export format, causing import failure. **Prohibited:** None **Recommended Method:** None, it is the only operation method. **Configuration:** None **Security Requirements:** None
File Export	**Purpose:** RayMap software exports plan data and measurement data for re-import into RayMap software. **User:** Physicist, maintenance personnel, authorized personnel **Controls Equipment:** No **Specification:**

	• Exported plan files are the imported data, unmodified by RayMap software. • Exported measurement files are defined by RayMap software; it is recommended to use RayMap software to import and view them. **Data Type:** DICOM files, RayMap measurement files **Supported Devices:** RayMap software **Standard:** None **Time Synchronization:** Not applicable **Potential Issues:** Requires available storage space on the local computer for exported files and write permissions for the RayMap software. **Prohibited:** None **Recommended Method:** None, there is only one method. **Configuration:** None **Security Requirements:** None
Print Report	**Purpose:** RayMap software calls the printer to print the verification result report. **User:** Physicist, maintenance personnel, authorized personnel **Controls Equipment:** Yes, used to operate the printer to print documents. **Specification:** None **Data Type:** Verification result report documents generated by RayMap software. **Verified Devices:** HP OfficeJet Pro 7730 Series, EPSON L6170 Series, HP Color LaserJet MFP M277dw **Standard:** None **Time Synchronization:** Not applicable **Potential Issues:** Printer driver not installed on the computer or not connected to the printer's network. **Prohibited Actions:** It is not recommended to connect the printer via a non-internal network. If the printer is on a non-internal network, it is recommended to first export the PDF document and then copy it to another network for printing. **Recommended Method:** None **Configuration:** None **Security Requirements:** None **Other:** Not recommended for use as it requires changing network IP configuration, which is relatively cumbersome.
Export Report as PDF File	**Purpose:** RayMap software exports the verification result report as a PDF document for electronic archiving or printing reports. **User:** Physicist, maintenance personnel, authorized personnel **Controls Equipment:** No **Specification:** PDF document format

	Data Type: Verification result report generated by RayMap software. **Verified Devices:** Edge browser, WPS software **Standard:** PDF format **Time Synchronization:** Not applicable **Potential Issues:** • The computer needs sufficient storage space to export the file. • RayMap software requires file write permissions. **Prohibited:** None **Recommended Method:** Use the Edge browser to open the PDF file. **Configuration:** None **Security Requirements:** None

3.4. Cybersecurity Description

Item	Description
Network Environment	• The system should only operate within an internal network environment; connecting to external networks is not recommended to ensure data security. • Network Conditions: Local Area Network (100 Mbps), Local Area Network (1000 Mbps)
Antivirus Software and Firewall	To ensure the security and stability of the system, it is recommended that users install antivirus software and enable the system firewall for routine protection. • Firewall Settings: If the firewall is enabled, RayMap software needs to configure the DICOM network port to ensure normal communication. Ensure that the relevant port is not blocked by the firewall. • Antivirus Software: When installing antivirus software, ensure that the software does not falsely identify RayMap as malicious software. It has been verified that RayMap software has passed checks by 360 Antivirus and is confirmed to contain no malicious code.
Receiving Network Port	The system supports the DICOM file interface.
Sending Network Port	The system supports calling the printer to print reports.
SBOM List	Typically, components in the SBOM list do not require upgrades. This list contains compiled DLL and Lib files. If any vulnerabilities that may affect system security are discovered, the Raydose after-sales team will promptly provide users with software upgrade services.
Authorization	System authorization is bound to the computer via a License. If

Identification	the user can successfully log in to the software, it indicates successful authorization and usability; otherwise, it may be that the authorization is not active or the trial period has expired. In this case, please contact the Raydose after-sales team for handling.
Potential Issues and Solutions	1) Cannot receive DICOM files: • Check if the network IP configuration is correct. • Check if the configured DICOM port conflicts with other services. • Check if the DICOM port is allowed through the firewall. 2) Cannot find printer when printing report: • Check if the network IP configuration is correct. • Check if the printer driver is correctly installed and functioning properly.
Performance Impact	None
Restore Configuration	Users can restore the system to the factory default configuration when needed.
User-Retained Configuration	The software default configuration is the factory setting, but users can make personalized configurations as needed during use. All real-time configuration changes by the user are saved in configuration files. Users can restore to the initial configuration at any time using the 'Restore Factory Settings' function.
Issue Logging	All cybersecurity-related issues are recorded in log files. Log files are stored in the LogInfo folder under the program execution directory. The default retention period for log files is 45 days.
Support	If the software's operating environment no longer supports cybersecurity updates or technical support, the Raydose after-sales team will notify users promptly. At that point, although the system can still continue to operate, it may face higher security risks due to the lack of cybersecurity updates.
Data Handling upon Decommissioning	Data is stored locally by default; users can back up data or delete it themselves.
Updates	When vulnerabilities affecting cybersecurity appear, the Raydose after-sales team will provide users with software update packages to help users upgrade and ensure system security is not compromised.
Network Unavailable	1) Import: Measurement files can be loaded via local import. 2) Print Report: Users can export the report as a PDF document and copy it to a device on an available network for printing.
Unresolvable Issues	If users encounter network problems or security vulnerabilities that cannot be resolved, please contact the Raydose after-sales team for handling.

3.5. Operating Environment Description

- Software Environment: Win10/Win11
- Hardware Environment:
  CPU：Intel I5/Intel I6/Intel I7
  Memory: 4G/8G
  Hard Disk: 500G/1TB/2TB
- Network Conditions: Local Area Network (100 Mbps Ethernet), Local Area Network (1 Gbps Ethernet).

3.6. User Access Control Requirements

License authorization is bound to the computer and can be used directly upon binding, requiring account login. If the authorization file is accidentally deleted, please contact us or after-sales personnel for assistance in recovery.

4. Hardware Section

4.1. Composition

The main hardware components of ArcMap consist of two parts: the detector array and the insert.

Category	Name
Detector Array	ArcMap
Insert	Solid Water Insert
	Ionization Chamber Insert

4.2. Detector Array

4.2.1. Working Principle

The detector array uses ionization chambers as detectors, with a total of 1,764 ionization chambers uniformly distributed in a 21cm × 21cm area. When exposed to radiation, rays enter the ionization chamber, ionizing the air within the sensitive volume. Charged particles drift under the influence of an external electric field, generating an output signal. These signals are transmitted to the PC via a Gigabit Ethernet port for processing.

4.2.2. Structural Description

The ArcMap ionization chamber array adopts a double-layer ring arrangement structure, with inner ring and outer ring ionization chambers arranged adjacently.

- Viewed from the G/T direction, the arrangement is as shown in the figure below.

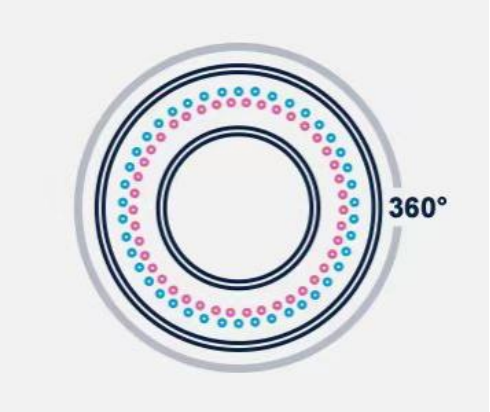


Figure 1. ArcMap Structure_GT Direction View

- When expanded to a plane, the arrangement is as shown below. The red parts represent the outer layer ionization chambers, and the black parts represent the inner layer ionization chambers.

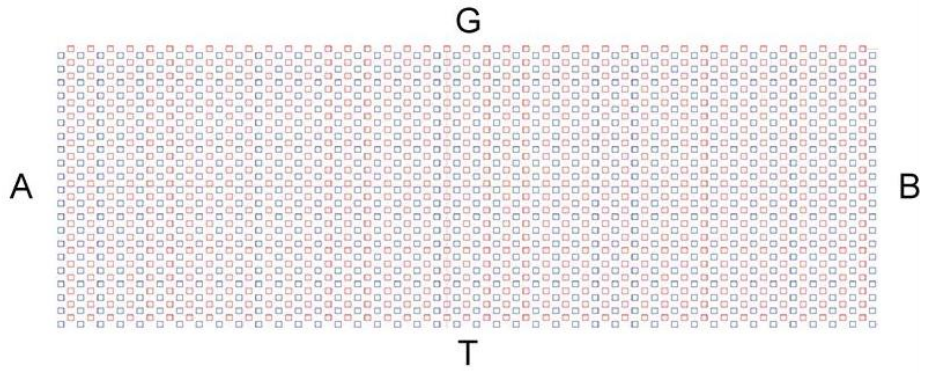


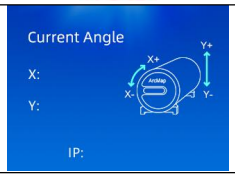
Figure 2. ArcMap Structure_Planar Expansion

4.2.3. Technical Parameters

Detector Array	
Detector Type	Ionization Chamber
Number of Detectors	1764
Effective Measurement Range	21 cm × 21 cm
Ionization Chamber Diameter	5.0 mm
Ionization Chamber Height	4.8 mm
Ionization Chamber Volume	0.094 cc
Chamber Spacing (Center to Center)	GT Direction ≤ 5.4mm AB Direction ≤ 7.85mm
Dimensions (L × W × H)	373.4 mm × 309 mm× 280 mm
Weight	18.5 kg
Buildup Material	PMMA
Measurement Consistency	≤ 1.5%
Repeatability	≤ ± 0.5%
Non-linearity	≤ ± 0.5% (≥ 10mGy)
Background Signal Error	≤ 1%
Minimum Sampling Time	≤ 120ms
Housing Water Equivalent	Inner Ring 38.4mm，Outer Ring 25.9mm
Nominal Sensitivity	3.6 nc/Gy ± 0.2 nc/Gy
Maximum Dose Rate	14 Gy/min ± 2 Gy/min
Minimum Dose Rate	0.2 Gy/min ± 0.1 Gy/min

4.2.4. Interfaces and Indicators

Label		Description
Power Interface		For connecting the power supply.
Ethernet Interface		For connecting the Ethernet cable. One end connects to the ionization chamber array, the other end connects to the computer.
USB Data Interface		For data transfer.

Status Indicator		• Blue light off: Device not powered. • Blue light steady on: Device powered on.
Reset Button		Press to refresh the display.
Display Screen		Central area: Displays real-time positioning angle information for X and Y. Bottom area: Displays Ethernet connection status and IP address.

4.2.5. Power Supply and Adapter

- Power Input Module

  This power input module complies with IEC/EN 60320-1/C14 standard, Protection Class 1. The power adapter is equipped with dual fuses internally, installed on the neutral and live wires respectively, to ensure safety.

- Power Adapter Specifications

  Input: 100-240V~, 47-63Hz, 1.62-0.72A

  Output: 24V⎓ 2.62A (Max.)

4.3. Inserts

4.3.1. Working Principle

➢ Material Description

The solid water insert and ionization chamber insert are made of water-equivalent density material, with symmetrical material thickness on top/bottom and left/right, capable of simulating the radiation absorption characteristics of water.

➢ Insert Composition

- **Solid Water Insert:** Consists of the insert body, ABS tube, and solid rod.
- **Ionization Chamber Insert:** There are two different specifications of ionization chamber tubes.
- **Common Parts:** The insert body and ABS tube are common components for both the solid water insert and the ionization chamber insert.

➢ Usage Method

- **Solid Water Insert**

Insert the solid water insert into the ionization chamber array before measurement. This effectively increases the buildup thickness of the ionization chamber array, thereby improving measurement accuracy.

- **Ionization Chamber Insert**

First insert the ionization chamber insert into the solid water insert, then insert the combination into the ionization chamber array, and finally perform measurement with a Cylindrical Ion Chamber.

4.3.2. Technical Parameters

Name	Dimensions	Weight	Material
Solid Water Insert	Φ180 mm × 305.5 mm	3.7 kg	ABS
ABS Tube	Φ37 mm × 327 mm	0.29 kg	ABS
Solid Rod	Φ20 mm × 260 mm	0.083 kg	ABS
Ionization Chamber Tube (for 0.65cc chamber)	Φ20 mm × 260 mm	0.055 kg	ABS
Ionization Chamber Tube (for 0.13cc chamber)	Φ20 mm × 260 mm	0.063 kg	ABS

4.4. Maintenance and Cleaning

4.4.1. Routine Maintenance

- Handle the equipment with care during use, avoid dropping or colliding.
- When not in use, store the equipment in a dedicated storage box and keep it away from radiation sources.
- Regularly check power cords, plugs, and batteries to ensure no aging or damage.
- Ensure the equipment housing is intact and undamaged, avoiding external physical damage.

4.4.2. Cleaning and Disinfection

- Cleaning Tools: Use soft cloth, lint-free cloth, or cleaning sponge to clean the equipment surface. Avoid using hard objects to prevent scratching the surface.
- Cleaning Agent: Use only neutral cleaning agents. Avoid corrosive or strongly irritating chemicals.
- Cleaning Operation: Before cleaning, be sure to turn off the equipment power and unplug the power cord. Dampen a cloth with clean water, wring it out, and gently wipe the equipment housing. If there are stubborn stains on the equipment surface, a small amount of neutral cleaning agent can be used, followed by wiping dry with a dry cloth. After cleaning, ensure the equipment is completely dry before reusing.
- Disinfection Operation: The equipment should be disinfected regularly to ensure hygiene and safety. When disinfecting, use 75% purity medical alcohol to wipe the equipment surface.
- Precautions: During cleaning and disinfection, be sure to avoid liquids entering the equipment interior.

5. RayMap Software

5.1. Login, Lock Screen, and Exit

(1) Login

- RayMap requires login before use. Users must correctly enter their username and password to log in normally. Multiple consecutive incorrect entries will temporarily lock RayMap.
- Upon factory shipment, RayMap has a preset default user: username "raydose", password "raydose".

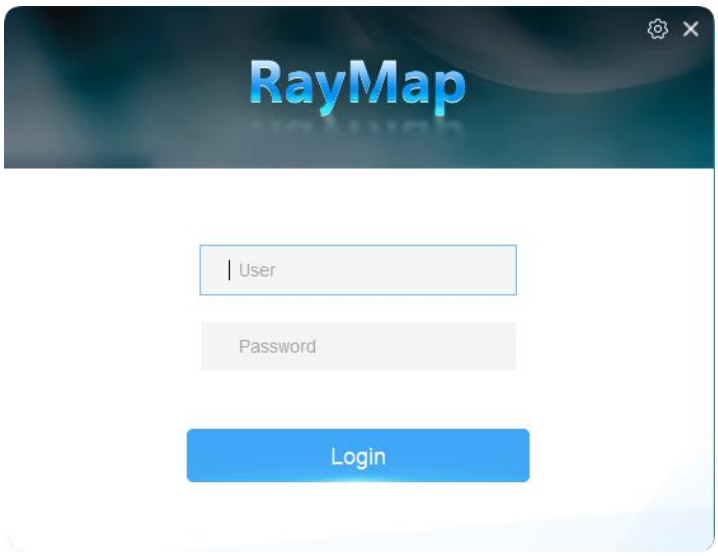


Figure 3. Login Interface

(2) Lock Screen

- If no operation is performed for 10 minutes, RayMap will automatically lock the screen. To unlock, re-enter the username and password.
- Users can quickly lock the screen using the keyboard shortcut "CTRL+L".

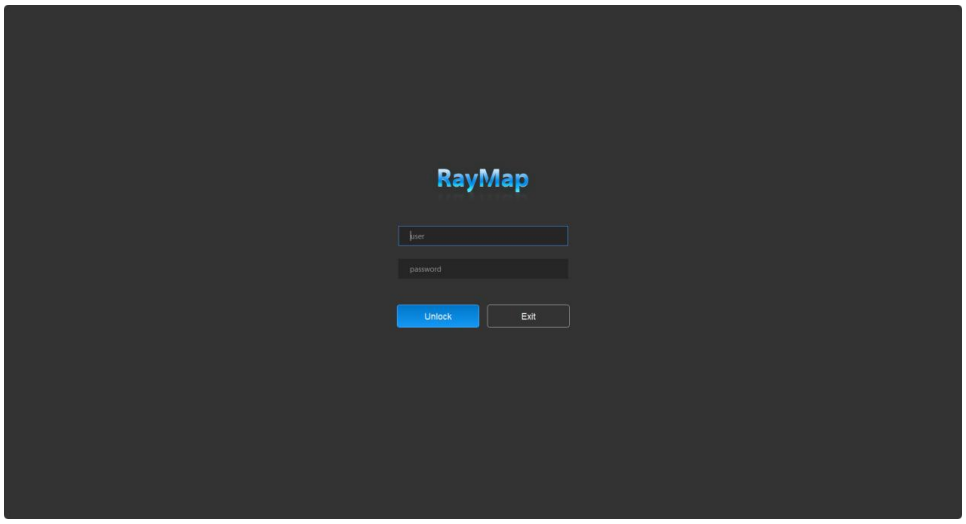


Figure 4. Lock Screen Interface

(3) Exit

- If the "Exit" button is clicked, the program will close.

5.2. Main Interface

The RayMap main interface provides the functions needed to complete most operations, including performing dose verification measurements, browsing gamma calculation results of plans, matching plans with measurement results, printing report results, etc. Users can access the corresponding functional interfaces through various entry points on the main interface for more detailed analysis and settings.

5.2.1. Overview

After successfully logging into RayMap, the system will automatically enter the main interface.

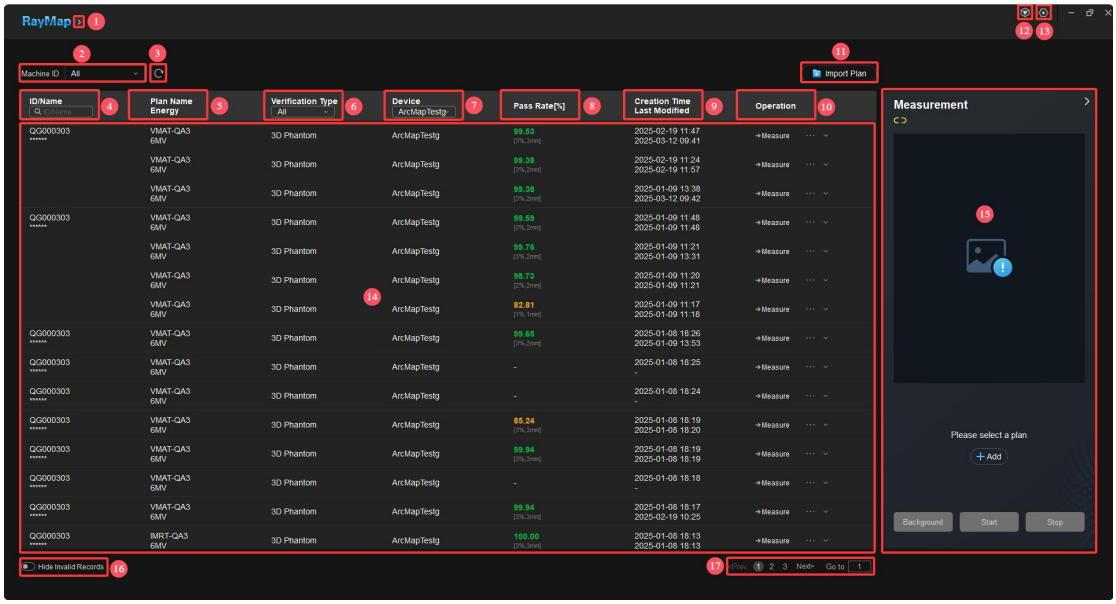


Figure 5. RayMap Main Interface

① Click this button to jump to the RayMap analysis interface.
② Filter patient records by Machine ID.
③ Refresh the current interface.
④ This column displays Patient ID and Name. Users can also enter Patient ID or Name in the input box for search.
⑤ This column displays Plan Name and Energy.
⑥ This column displays the verification type of the patient plan. Users can click the dropdown button to filter by different verification types.
⑦ This column displays the measurement device. Users can click the dropdown button to filter by different measurement devices.
⑧ This column displays the pass rate of the verification record.
⑨ This column displays the creation time and last modified time of the verification record.
⑩ More operations can be performed on the verification record.

⑪ Click this button to import patient plans.
⑫ Enter the Device interface for related operations.
⑬ Enter the Settings interface for system configuration.
⑭ Display related information of the verification record.
⑮ Display measurement information.
⑯ Click this button to hide invalid verification records.
⑰ Navigate pages: go forward, backward, or jump to a specified page.

5.2.2. Specific Operations

(1) Import Plan

Step 1: Click the Import Plan button on the main interface, and the import window will pop up.

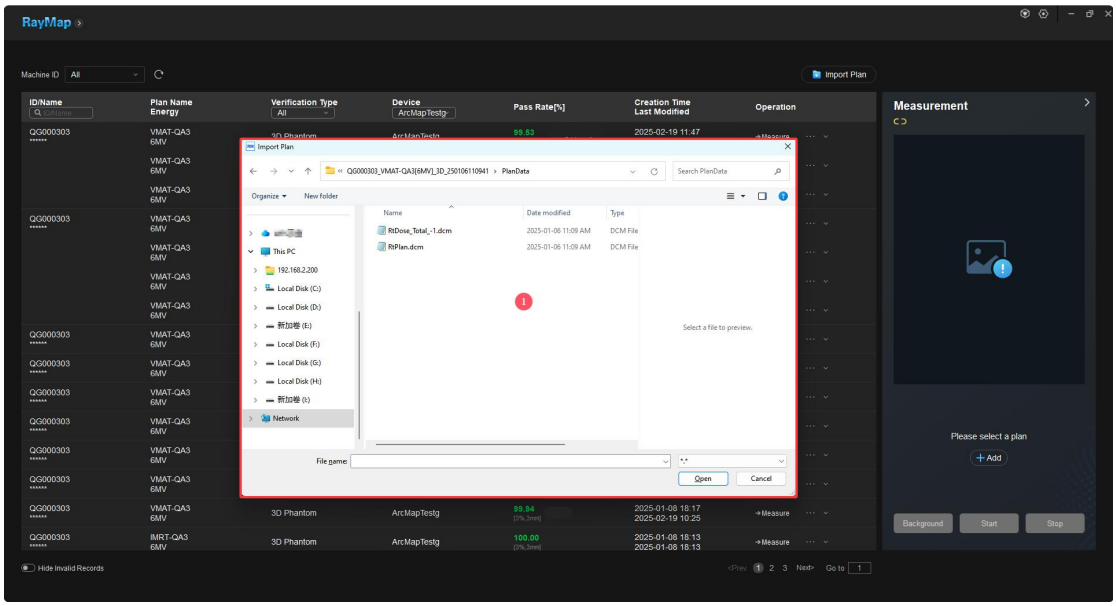


Figure 6. Import Window

① In this pop-up window, select the plan(s) to import, and click the "Open" button to complete the import.

Step 2: Subsequently, the "Import Plan" window will pop up, where users can browse the basic information of the plan.

- Click the Add button to import multiple plans simultaneously, facilitating batch operations for users.
- Click the Delete button to clear the data in the window.
- Click the Save button to complete the plan import operation.

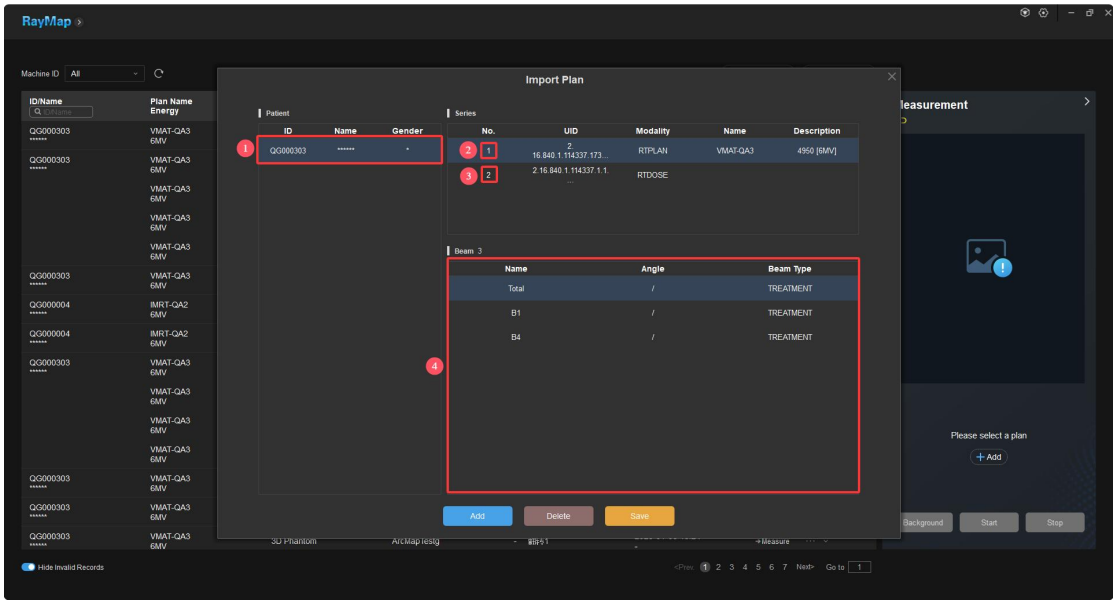


Figure 7. Import Plan Window

① Patient record area, displaying Patient ID, Patient Name, and Patient Gender.
② Patient plan information.
③ Patient dose file(s).
④ Information preview area. Clicking any item in ② or ③ will display the corresponding preview information.

Step 3: Double-clicking the patient record area will pop up the "Edit Patient Information" window, where users can edit patient information.

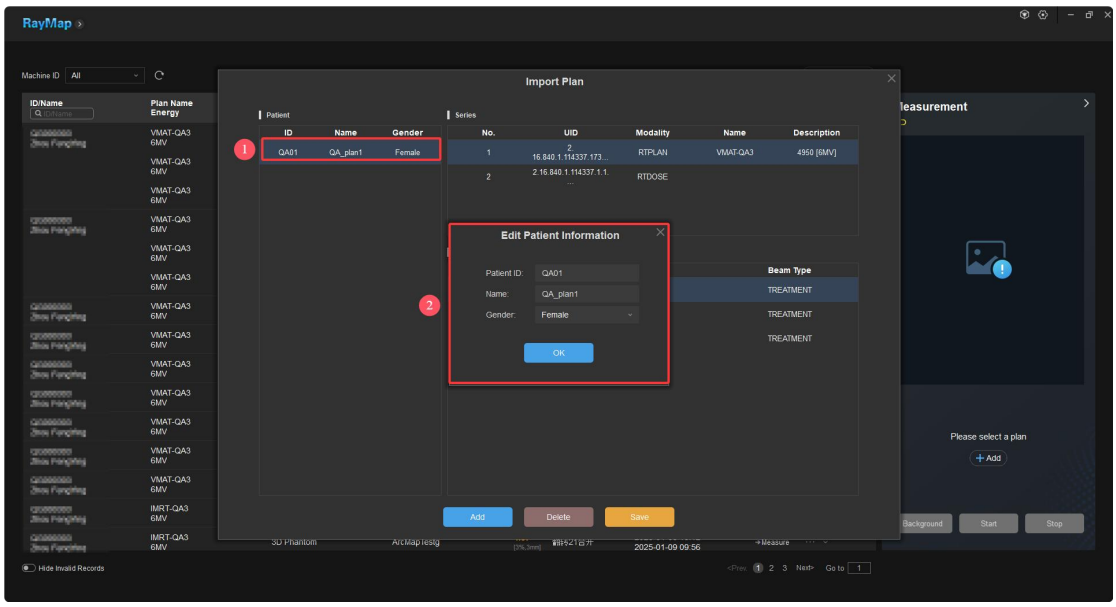


Figure 8. Edit Patient Information Window

① Double-click this area to pop up the Edit Patient Information window ②.
② In this window, you can edit Patient ID, Patient Name, and Patient Gender; click OK to save.

Step 4: Double-clicking the patient plan area will display the "Edit Plan Information" window, where users can edit plan information.

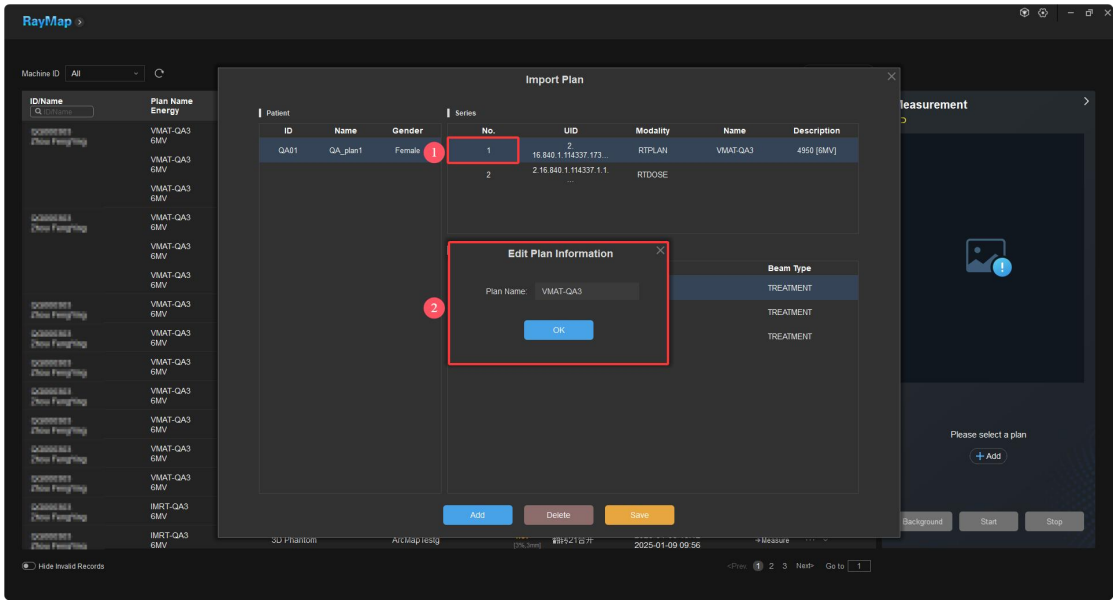


Figure 9. Edit Plan Information Window

① Double-click this area to pop up the Edit Plan Information window ②.
② In this pop-up window, you can edit the patient plan name; click the OK button to save.

(2) Operations on Records

- Each record can represent either a patient plan or a set of measurement data.
- When a plan is imported, or a measurement is performed, RayMap adds a corresponding record.
- After performing operations like measurement or calculation on the record, the relevant information is automatically updated.

Click the ··· button after a record to expand the menu, allowing more operations on that record.

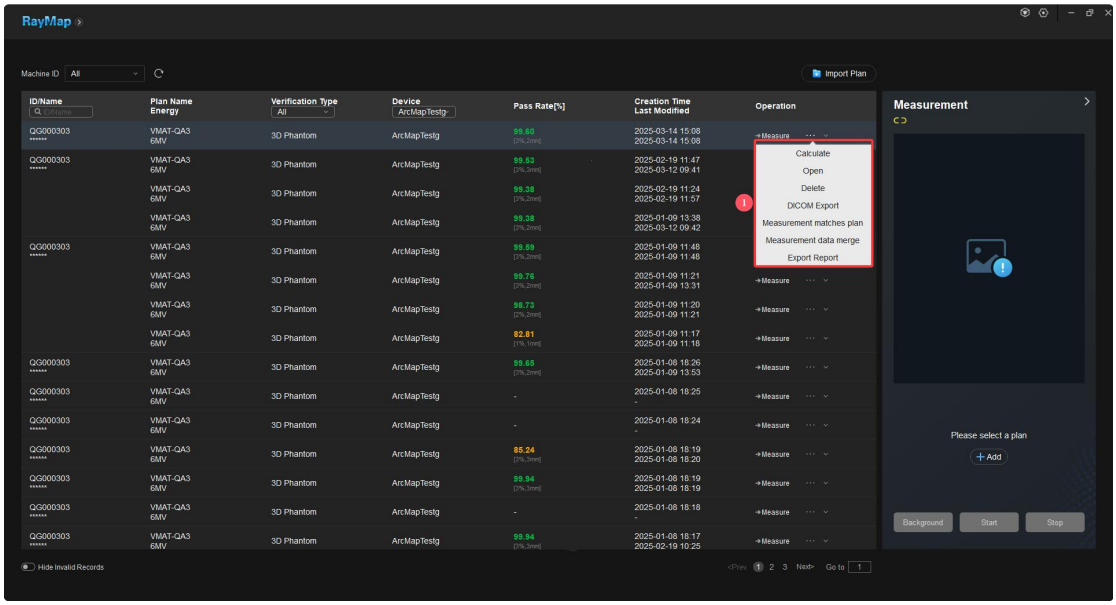


Figure 10. Operations on Records_Menu

① Record menu bar, users can perform operations on this record. The operations are introduced as follows:

- Calculate
  - When the record has matched measurement data, clicking "Calculate" will perform calculation and analysis based on the calculation conditions set in "Settings" -> "Calculation".
  - If the current record has no matched measurement data, this option will not appear in the menu bar.
  - After calculation is complete, the result will automatically update in the "Pass Rate[%]" column.
- Open
  - Click "Open" in the menu bar, or double-click the current record, to enter the analysis interface for that record.
- Delete
  - If the current record is a patient plan and has matched measurement data, this operation will delete the matched measurement data. Click the OK button to delete, click the Cancel button to cancel.

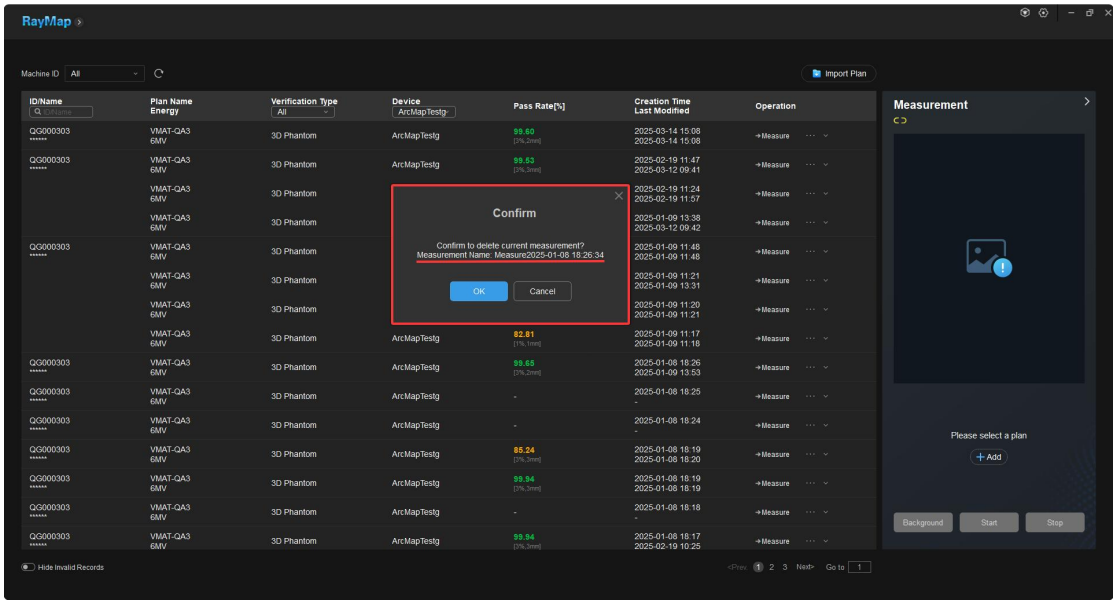


Figure 11. Operations on Records_Delete Measurement Data

- If the current record is a patient plan and has no matched measurement data, the delete operation will directly delete the patient plan.

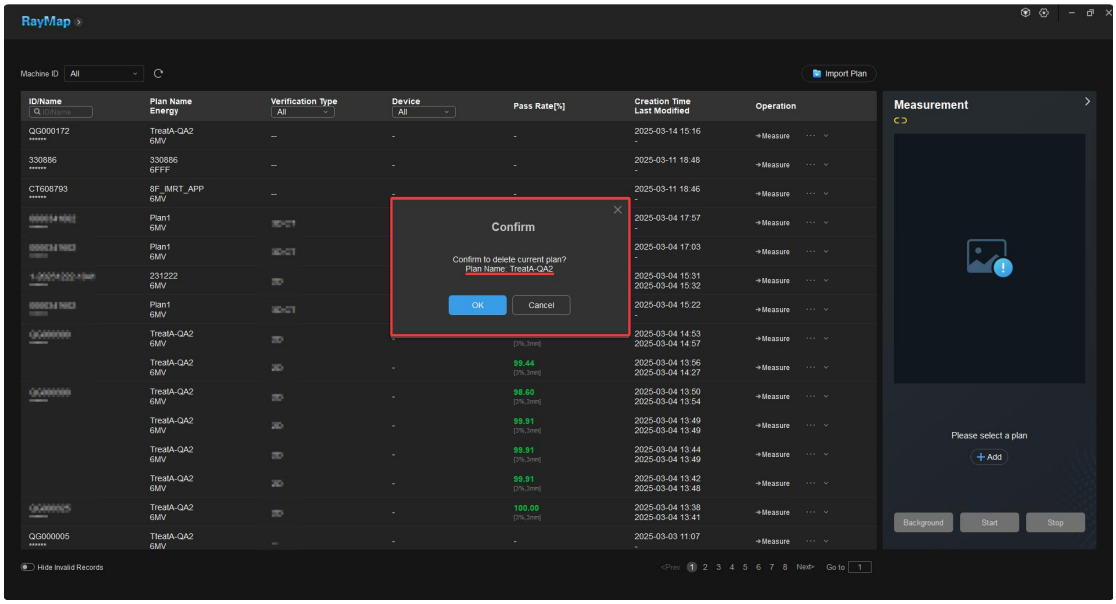


Figure 12. Operations on Records_Delete Patient Plan

➢ DICOM Export

- This operation exports the patient plan data and measurement data of this record to the local drive.
- After clicking the "DICOM Export" button in the menu bar, a window will pop up, as shown below. Users can select a local folder and save the data to that folder. The saved file contents include: Plan file-PlanData, Measurement file-Measurement (if any), Analysis result-CalData (if any).

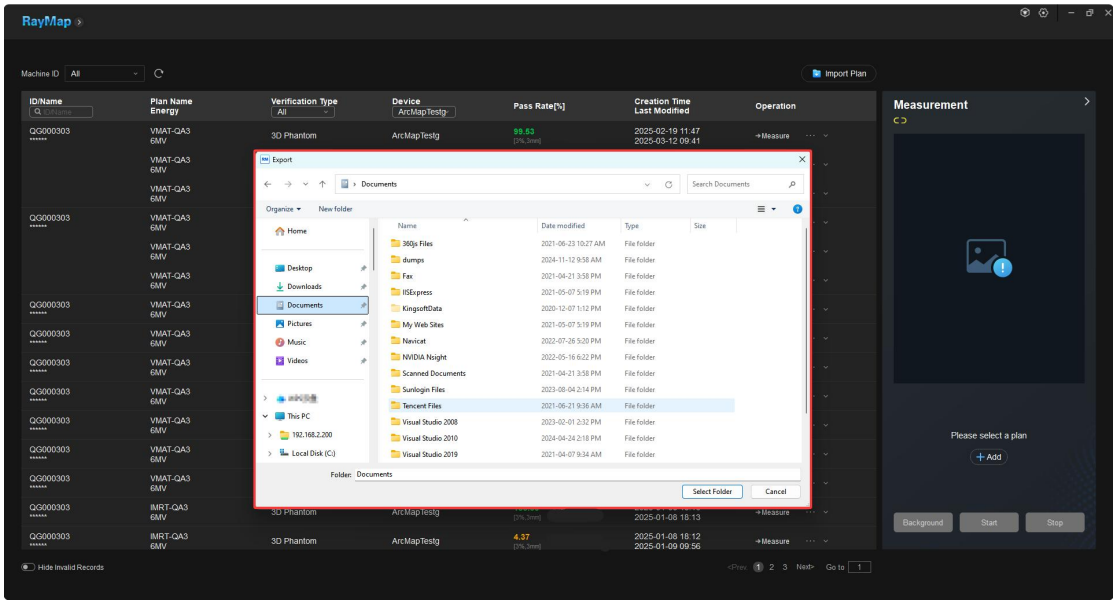


Figure 13. Operations on Records_Data Export

➢ Measurement matches plan

- This operation matches measurement data with a patient plan.
- After clicking the "Measurement matches plan" button, a window will pop up, as shown below.
- In this pop-up window, users can select an already imported plan, and click the Match button to match the current measurement data with the selected plan. After matching is complete, the system will generate a new record.
- If no plan matching the current measurement data is displayed on the page, users can enter the complete Patient ID in the input box after "ID" to search.
- If the current record is a plan rather than measurement data, the "Measurement matches plan" option will not appear in the menu bar.

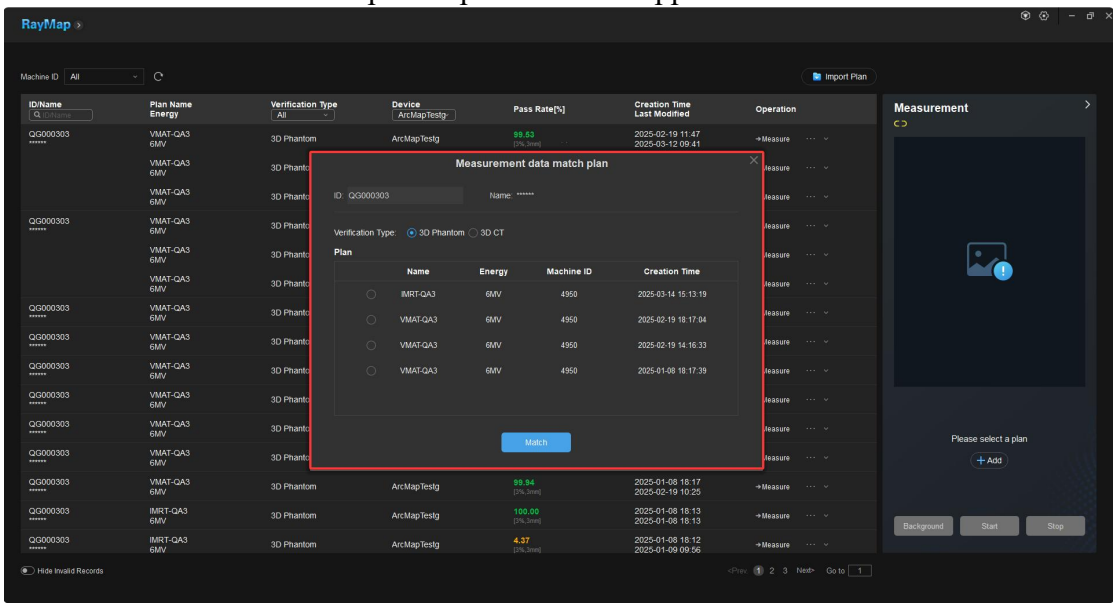


Figure 14. Operations on Records_Match Measurement Data with Plan

➢ Measurement data merge

- The field merge function is primarily used when a large field cannot be fully covered within the RayMap measurement range. It involves measuring with two different setups and merging the two obtained measurement images into one complete image.
- Click the "Measurement data merge" button, and the interface below pops up.

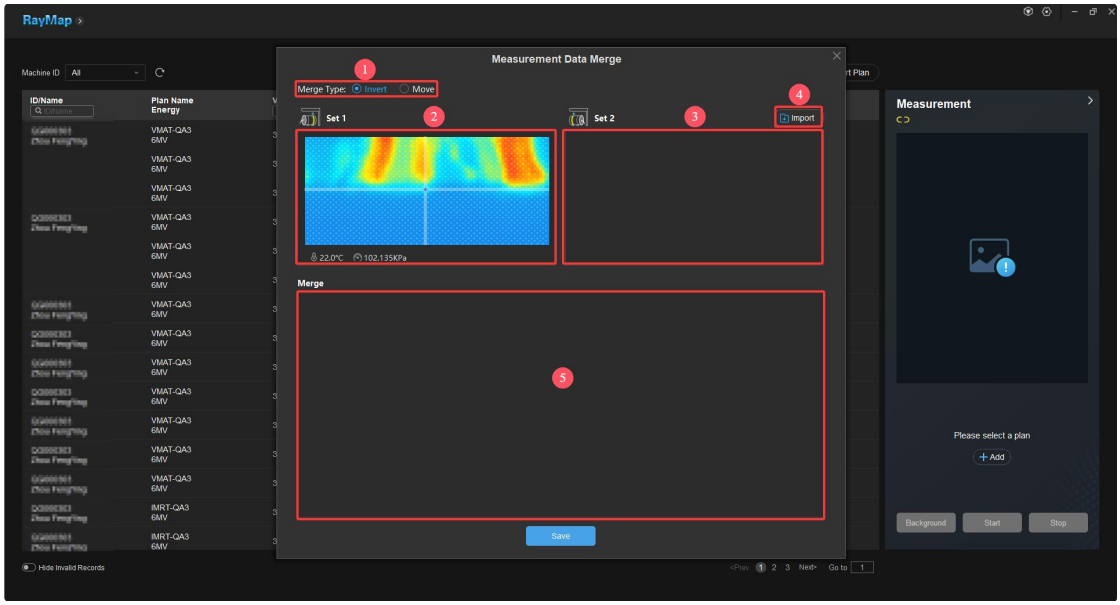


Figure 15. Operations on Records_Merge Measurement Images

① Merge Type, the type of merge, can choose Invert or Move.

- Invert can be used to extend the irradiation area of the field.
- Move can be used to improve image resolution.

② Preview area for the first measurement image.

③ Preview area for the second measurement image.

④ Used to import the second measurement image.

- After clicking the Import button, a selection interface will pop up (as shown below).
- Users can directly select the image to merge in the interface, or enter the Patient ID in the "ID" input box to search.
- After selecting the measurement record, click the OK button to save.

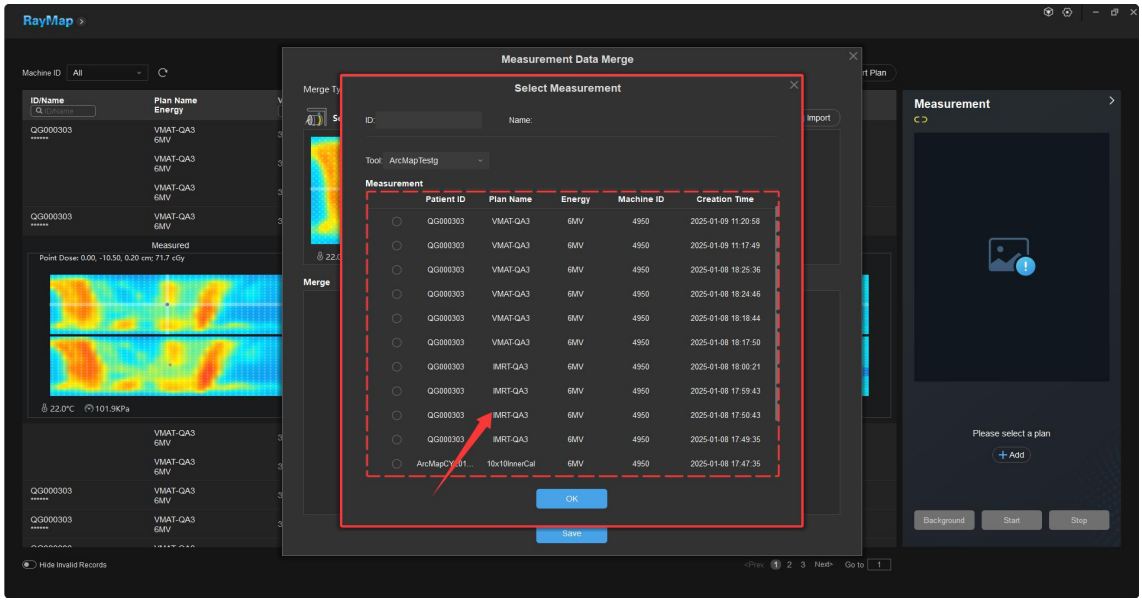


Figure 16. Operations on Records_Merge Measurement Images_Select Image

⑤ Preview area for the merged image. After importing the second image, the software will display the merged result in the area below. Click the Save button to save, and a new record will be generated on the main interface.

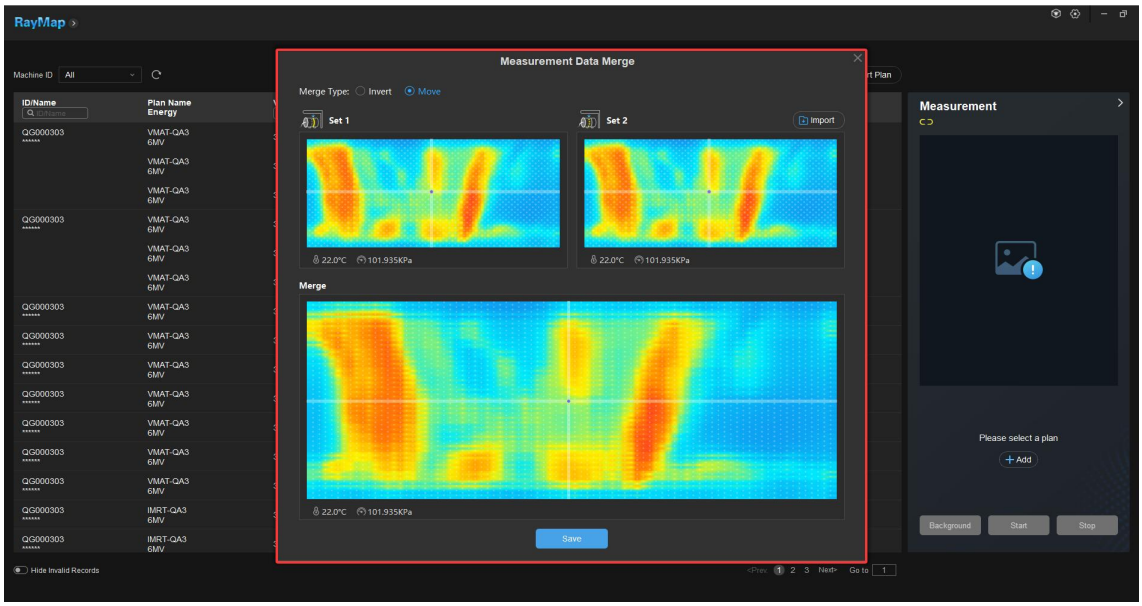


Figure 17. Operations on Records_Merge Measurement Images_Preview Merge Result

➢ Export Report

- This operation exports the report in PDF format.
- After clicking the "Export Report" button, a window will pop up, as shown below. Users can select a folder to save the PDF format report in that folder. After successful saving, users can view the report in the selected folder.

- If the current plan has no matched measurement data, or if the plan has matched measurement data but has not been calculated and analyzed, the "Export Report" option will not appear in the menu bar.

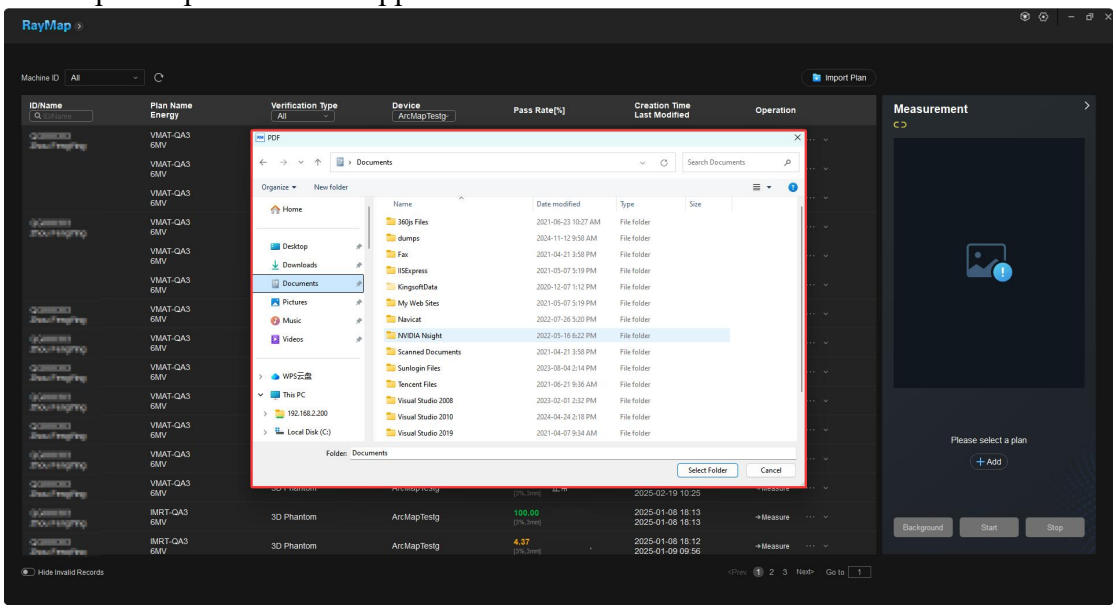


Figure 18. Operations on Records_Report Export

(3) Expand Record Image Information

Click any record or click the button after the record to display the detailed information of that record. The displayed content varies depending on the record type.

- If the record is from ArcMap, the interface will display the following from left to right: Measurement image, Dose curve image corresponding to the crosshair (can be moved to view dose details at a point), Gamma plane image.

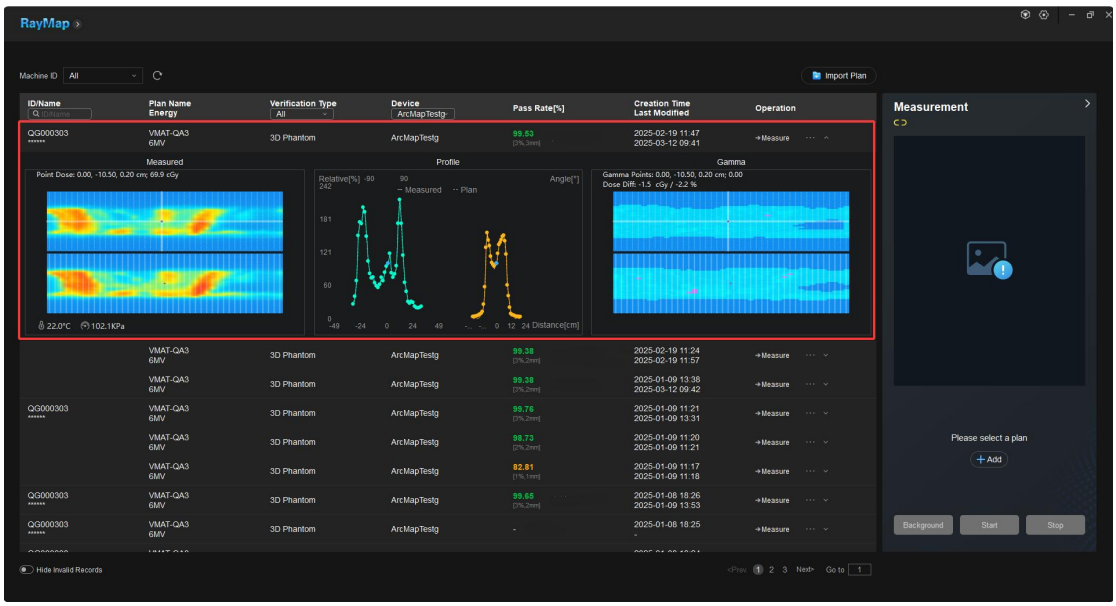


Figure 19. Expand Record Image Information_ArcMap Device

(4) View Record Pass Rate

- When hovering the mouse over the "Pass rate[%]" column of a record, the pass rate of the current plan will be displayed.
- Clicking this column will pop up the following window, displaying the overall pass rate of the current plan.
- Below the pass rate display, users can add remarks, as shown in the figure.

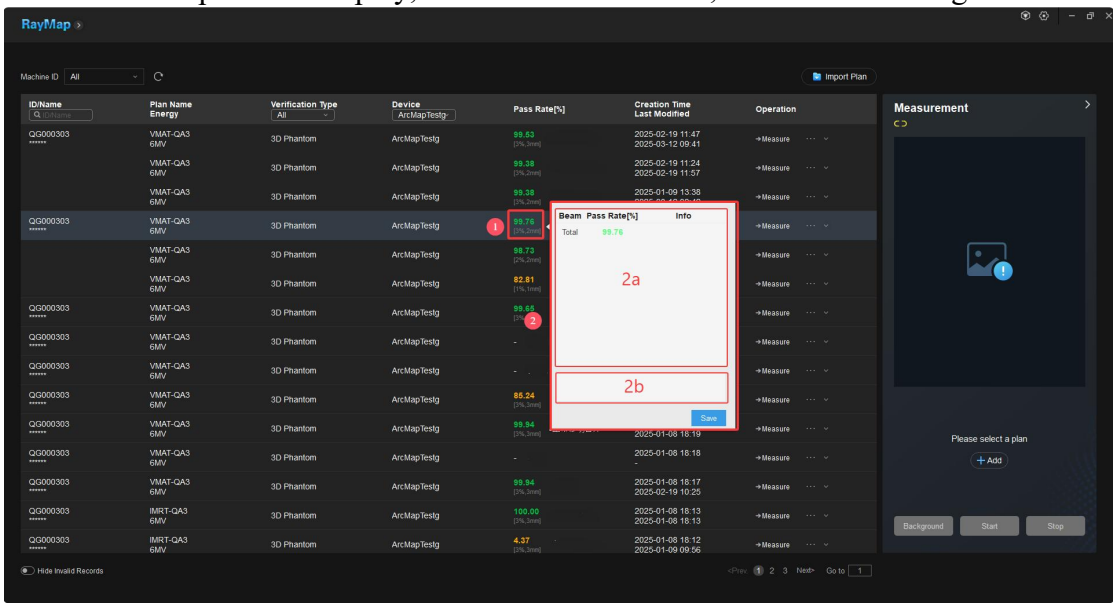


Figure 20. View Record Pass Rate

① Click the pass rate of the record to display pop-up ②.

2a： In this area, you can view the pass rate situation of the field(s).

2b： In this area, you can add remark content; click the button Save to save.

(5) Perform Measurement Operation on Record

This operation allows measuring an imported plan.

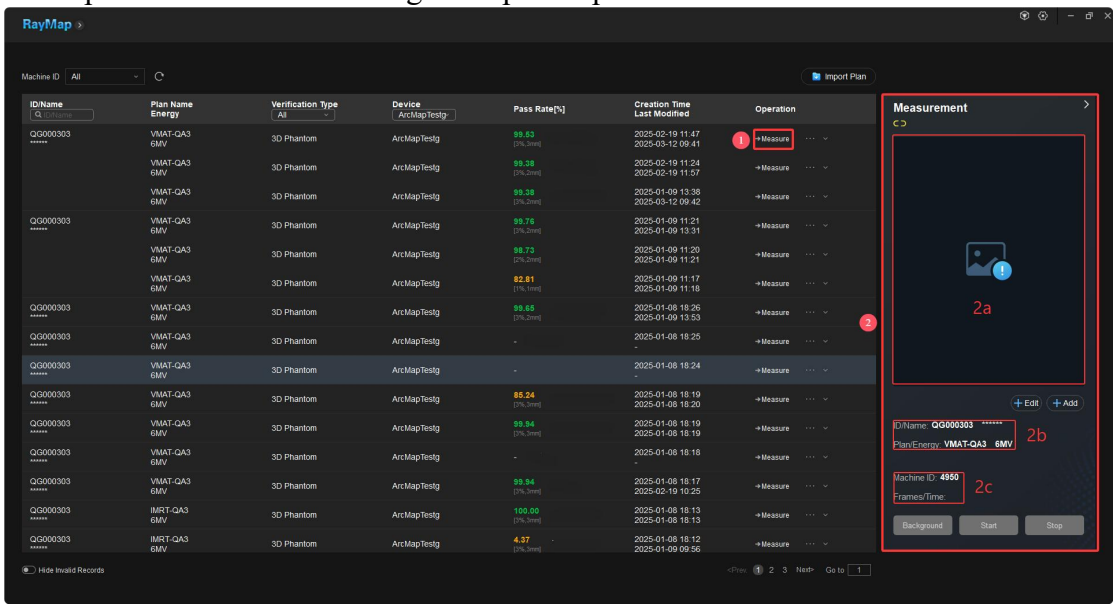


Figure 21. Perform Measurement Operation on Record

① Measure button, transmits the plan information of this record to the measurement area.

② Measurement area, where measurement-related information can be viewed.

- 2a：Measurement image display area. After starting measurement, relevant image content will be displayed here.
- 2b：Current measurement information display area, including Patient ID, Patient Name, Plan Name, Energy, and Energy Type.
- 2c：Displays the current frame number and the time required for measurement.
- Details of area②：
  - ➢ View device connection status. When the status icon is it indicates RayMap has successfully connected to the device; when the status icon is , it indicates the connection between RayMap and the device is disconnected.
  - ➢ Edit measurement information. Click the edit button Edit , and an edit window pops up, as shown below. Users can edit the energy type in this pop-up window, but other information cannot be modified.

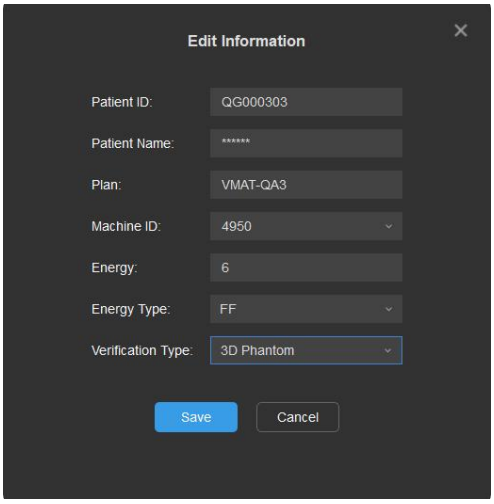


Figure 23. Perform Measurement Operation on Record_Add Measurement Information

- Add new measurement information. Click the add button Add , and an add window pops up, as shown below. Users can input measurement-related information in this pop-up window, such as Patient ID, Patient Name, Patient Plan, Machine ID, Energy, and Energy Type.

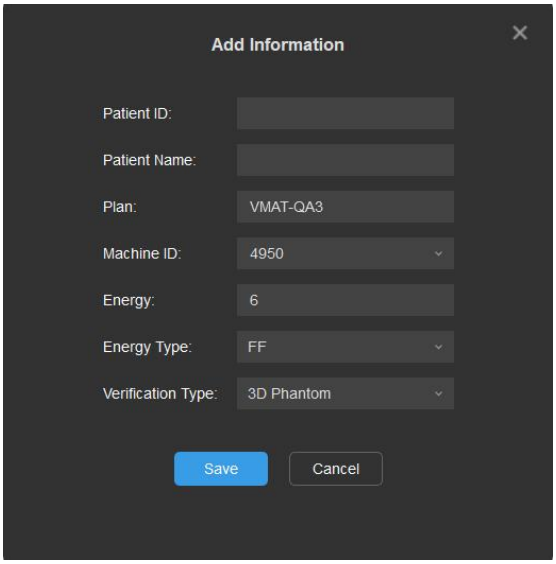


Figure 23. Perform Measurement Operation on Record_Add Measurement Information

(6) Enter Analysis Interface

- Click the RayMap icon on the main interface, and it will enter the initial analysis interface by default. Click "Patient Management" to enter the corresponding analysis interface.

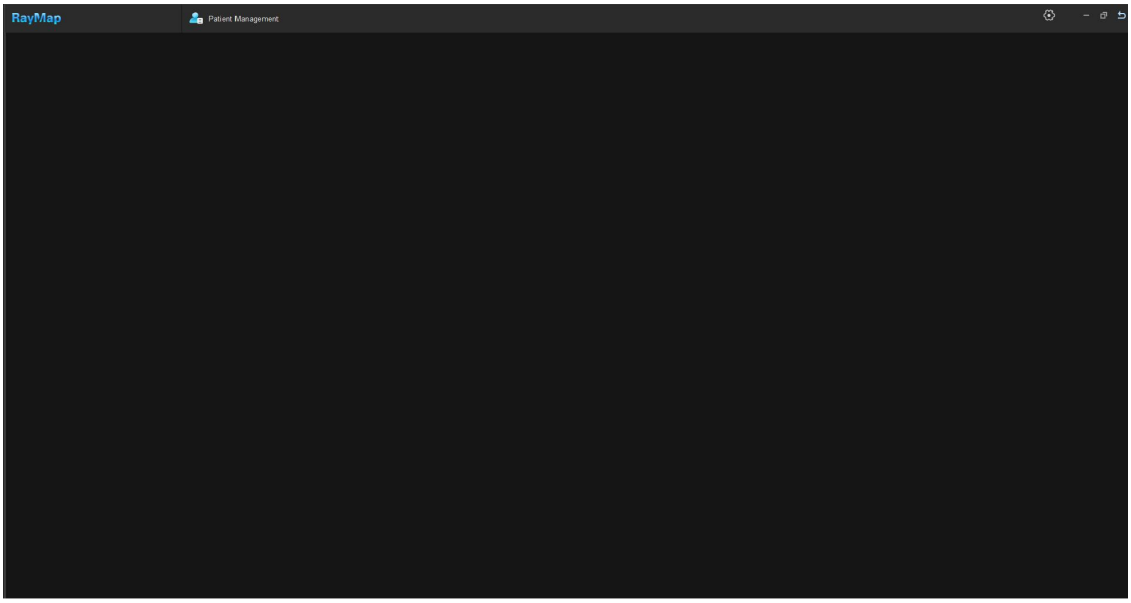


Figure 24. Enter Analysis Interface_Initial Analysis Interface

- Users can also enter the corresponding analysis interface by double-clicking a record on the main interface, as shown below.

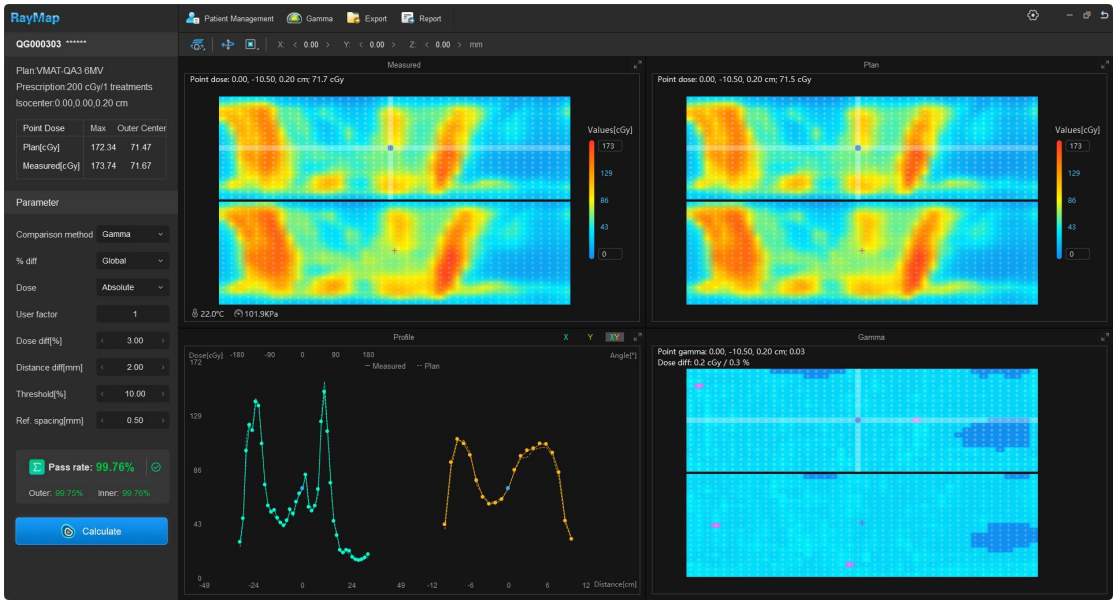


Figure 25. Enter Analysis Interface_ArcMap Analysis Interface

5.2.3. Device

Click the icon in the upper right corner of the main interface to enter the Device interface, as shown below.

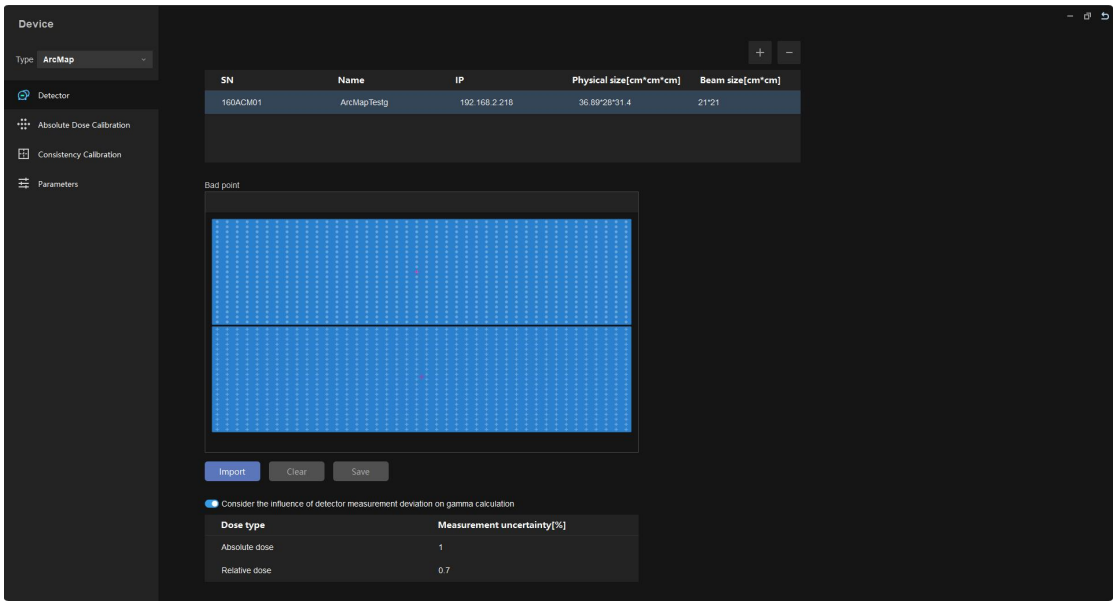


Figure 26. Device_Interface

(1) Detector

Click "Detector" on the left side of the interface to enter the Detector interface, as shown below.

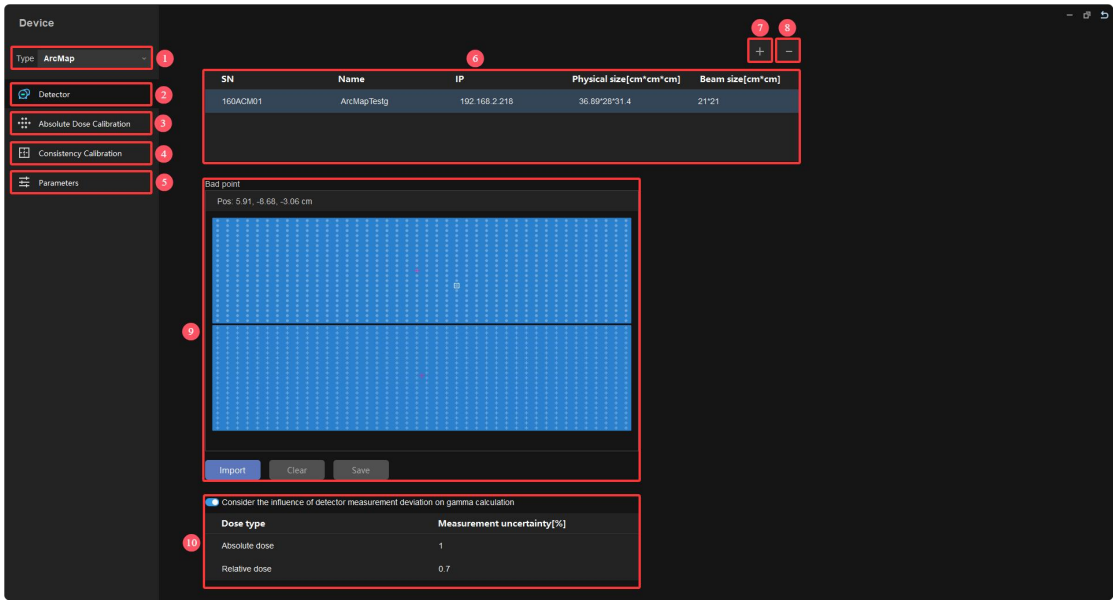


Figure 27. Device_Detector

① Device Type, dropdown select ArcMap.

② Detector, detector interface.

③ Absolute Dose Calibration，absolute dose calibration interface.

④ Consistency Calibration，consistency calibration interface.

⑤ Parameter，parameter interface.

⑥ Detector device list, items explained as follows:

Item	Description
SN	Device Serial Number
Name	Device Name
IP	Device IP
Physical size	Physical dimension size
Beam size	Detector field size

⑦ Add Device button. Click this button to pop up a window where users can add an ArcMap device.

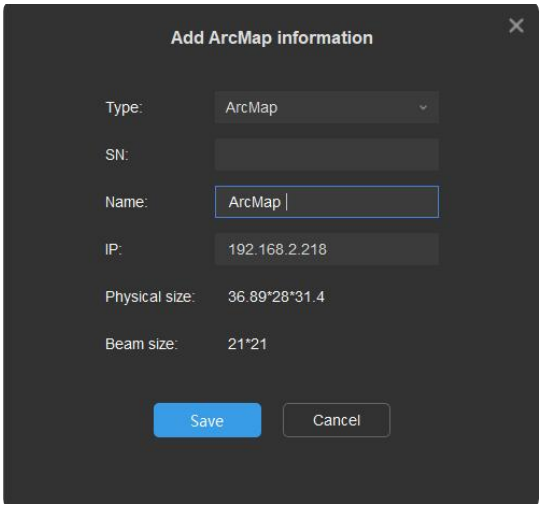


Figure 28. Device_Detector_Add ArcMap Device

Items explained as follows:

Item	Description
Type	Product Type is ArcMap
SN	Device Serial Number
Name	Device Name
IP	Device Connection IP
Physical size	Physical Dimension
Beam size	Field Size

⑧ Delete Device. Click this button to delete the selected device. To prevent accidental deletion, deleting a device requires entering the password of the currently logged-in account.

⑨ Mark Bad Points area. Each circle in the figure represents an ionization chamber. Clicking a circle marks that chamber as a bad point.

- Before marking bad points, a complete measurement image needs to be imported to better distinguish bad points. Click the Import import button, pop up the "Select measurement" window, as shown below, and select the corresponding measurement image in this window.
- Users can click Clear to clear marked bad points, and click the Save button to save the currently marked bad points.

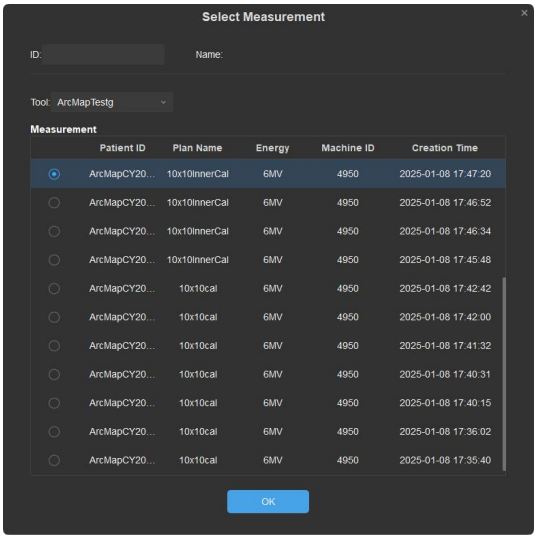


Figure 29. Device_Detector_Import Measurement Image

⑩ Consider the influence of detector measurement deviation on gamma calculation. When this item is enabled:

- When the dose type is "Absolute dose", an additional 1% deviation will be added to the actual dose deviation.
- When the dose type is "Relative dose", an additional 0.7% deviation will be added to the actual dose deviation.

(2) Absolute Dose Calibration

Click the "Absolute Dose Calibration" button to enter the Absolute Dose Calibration interface, as shown below:

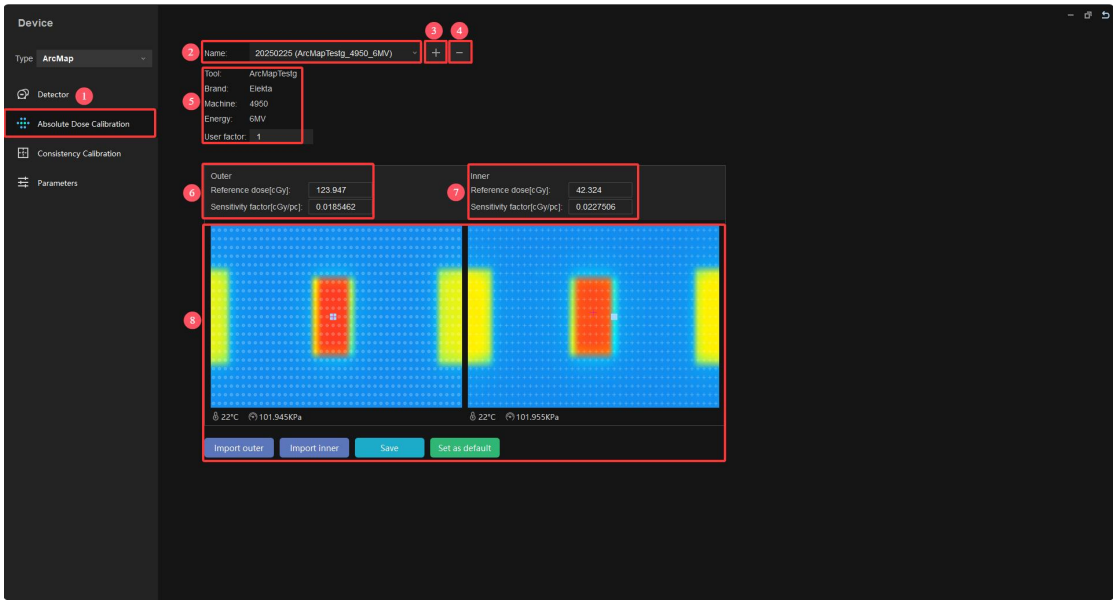


Figure 30. Device_Absolute Dose Calibration

① Absolute Dose Calibration.

② Name of the current absolute dose calibration.

③ Add Absolute Dose Calibration button. Click this button to pop up the "Add absolute dose calibration" window, where users can add an absolute dose calibration.

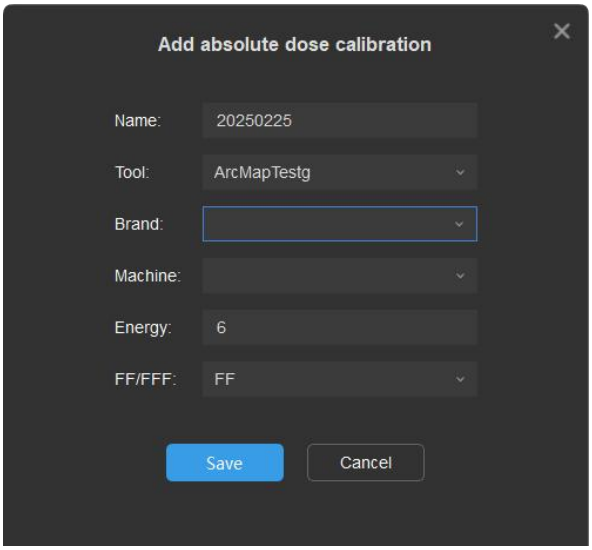


Figure 31. Device_Absolute Dose Calibration_Add Absolute Dose Calibration

Items explained as follows:

Item	Description
Name	Absolute Dose Calibration Name.
Tool	Corresponding absolute dose calibration device. If multiple devices exist, absolute dose calibration can be performed for different devices separately.

Brand	Accelerator brand. Selectable brands include Elekta, Varian, UIH, SHINVA, and Tomo.
Machine	Accelerator ID. If multiple accelerators exist, absolute dose calibration can be performed for different accelerators separately.
Energy	Energy corresponding to the calibration.
FF/FFF	Selectable FF or FFF.

④ Delete button. Click this button to delete the current absolute dose calibration. To prevent accidental deletion, the delete operation requires entering the password of the currently logged-in account.

⑤ Basic information of the current absolute dose calibration.

⑥ Outer Layer Sensitivity Factor. Enter the dose value referring to data from the TPS. After entering the reference dose, the software will automatically calculate the outer layer sensitivity factor.

⑦ Inner Layer Sensitivity Factor. Enter the dose value referring to data from the TPS. After entering the reference dose, the software will automatically calculate the inner layer sensitivity factor.

⑧ Calibration Image Display Area.

- Click the Import outer button to import the outer measurement image, click the Import inner button to import the inner measurement image.
- After clicking the import button, the"Select measurement"window will pop up, as shown below. Select the measurement image that needs to be imported in this window.
- After selection, click the Save button to save the current absolute dose calibration.
- Click the Set as Default button to set the current absolute dose calibration as the default calibration.

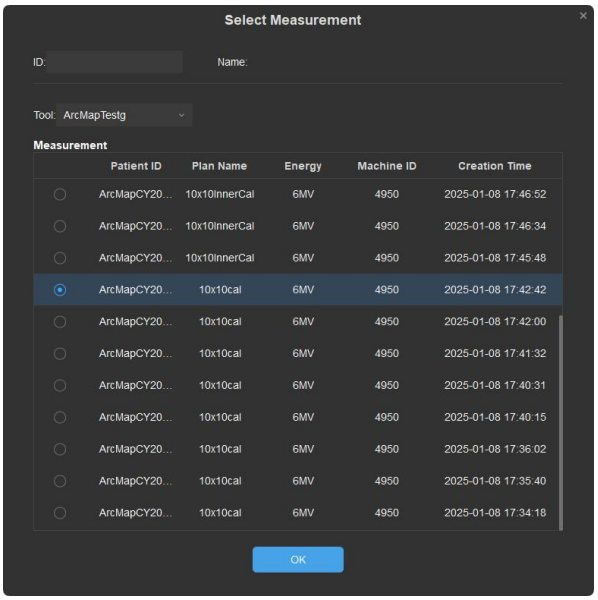


Figure 32. Device_Absolute Dose Calibration_Import Measurement Image

(3) Consistency Calibration

Click the "Consistency Calibration" button to enter the Consistency Calibration interface, as shown below. Note: Before performing consistency calibration, ensure the device is connected successfully.

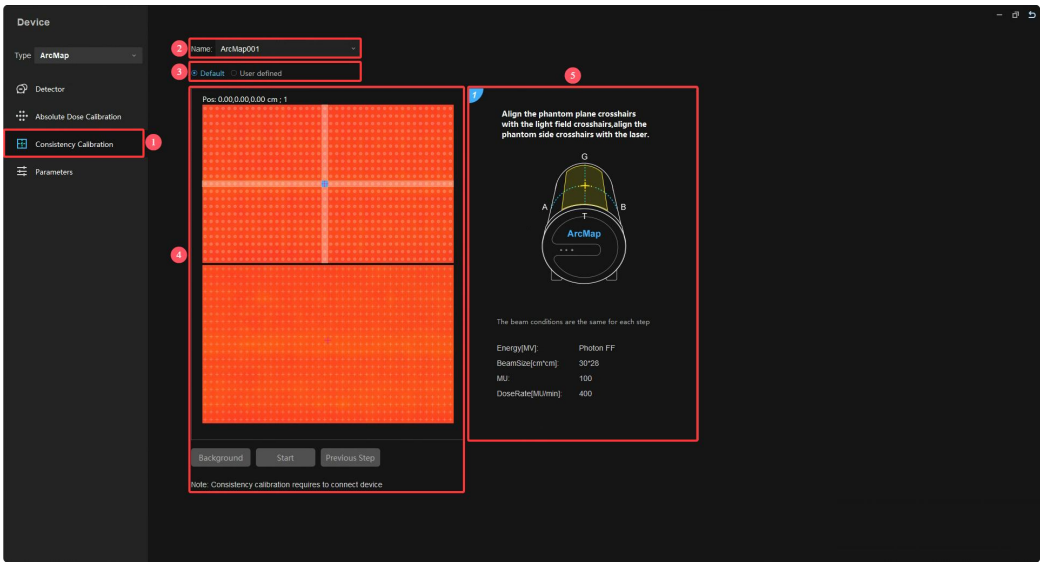


Figure 33. Device_Consistency Calibration

① Consistency Calibration.

② If multiple ArcMap devices exist, different devices can be selected via the dropdown menu.

③ Consistency Calibration Mode, mainly "Default" and "User defined" modes.

- Each ArcMap array is calibrated once before leaving the factory. When "Default" is selected, the factory calibration parameters are used.
- When "User defined" is selected, users can re-perform consistency calibration for the ArcMap array on this interface.

④ Image Display and Operation Area.

- Before performing consistency calibration, need to click Background to measure the background.
- After the background measurement is complete, click Start to start the consistency calibration measurement. Consistency calibration is divided into 10 steps, each step requires the accelerator to deliver beam twice.
- Click Previous Step to return to the previous step and redo the measurement.

⑤ Consistency Calibration Operation Step Indicator. The serial number of the current step is displayed in the upper left corner of the area. The illustration shows step 1. Follow the illustrated operations to complete the consistency calibration.

(4) Parameters

Click the "Parameters" button to enter the "Parameters" interface, as shown below. In this interface, basic settings can be made for different ArcMap devices and accelerators.

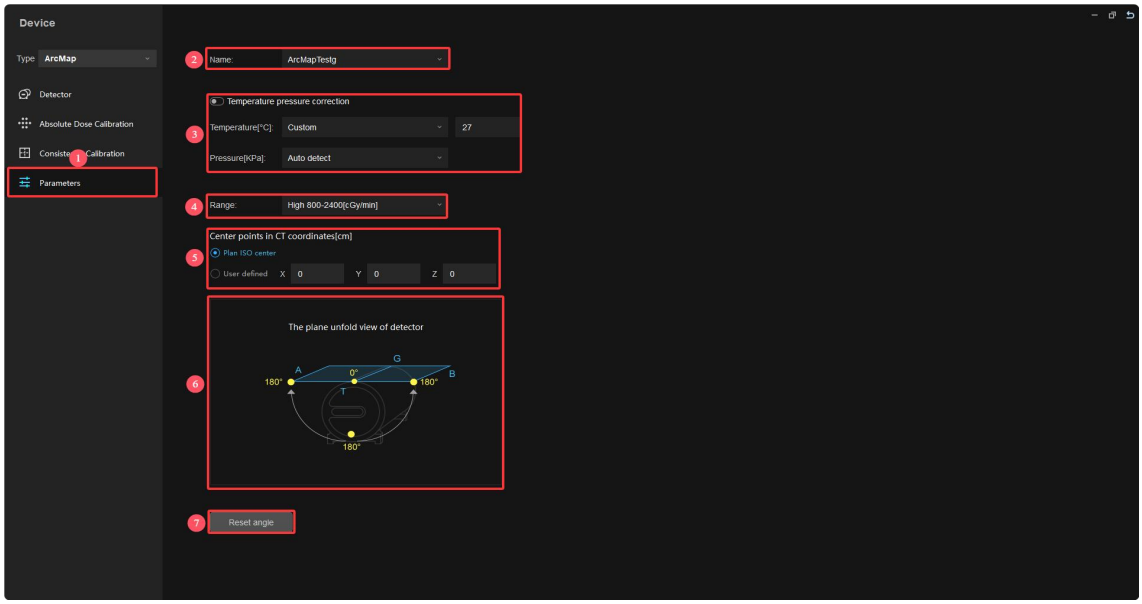


Figure 34. Device_Parameters

① Parameters interface.

② Current device name. If multiple devices exist, users can switch selection from the dropdown menu.

③ Temperature and Pressure Correction switch. Users can choose whether to enable the temperature and pressure correction function.

- Temperature Correction: Only available in "Custom" mode, user needs to manually enter the temperature value.
- Pressure Correction: Supports both "Custom" and "Auto detect" modes.
  - "Auto detect"mode: The ArcMap detector array has a built-in pressure sensor, the software can automatically obtain the pressure value and perform correction.
  - "Custom"mode: User can manually enter the pressure value, and the software will perform correction based on the input value during measurement.

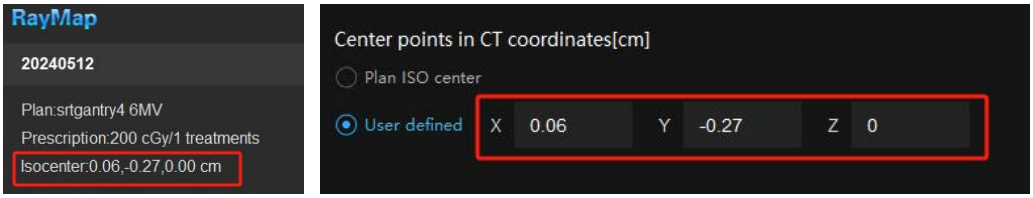
④ Range, measurement range. Selectable measurement modes are:

- Normal mode, range 50~800 [cGy/min].
- High mode, range 800~2400 [cGy/min].

⑤ Center points in CT coordinates. Can choose "Plan ISO center" or "User defined".

- When "Plan ISO center" is selected, the isocenter of the measurement phantom will coincide with the plan's isocenter.
- When "User defined" is selected, users can manually set the isocenter of the measurement phantom. Note that RayMap uses the DICOM coordinate system. If the user's TPS uses the IEC coordinate system, the IEC coordinates need to be converted to DICOM coordinates before filling. Conversion rules are as follows:
  - DICOM_X = IEC_X; DICOM_Y = −IEC_Z; DICOM_Z = IEC_Y

• Recommended to set as "User defined", and create an OA plan with the isocenter at the phantom CT center. After importing this plan into RayMap and opening it, check the Isocenter value in the upper left corner of the plan. Fill this value into the user-defined coordinates. This method can be used to measure plans where the isocenter is not at the phantom center. As shown below:



⑥ Detector plane expansion schematic.

⑦ Can zero the angle reading on the detector display screen.

5.2.4. Settings

Click the icon in the upper right corner of the main interface to enter the Settings interface, as shown below.

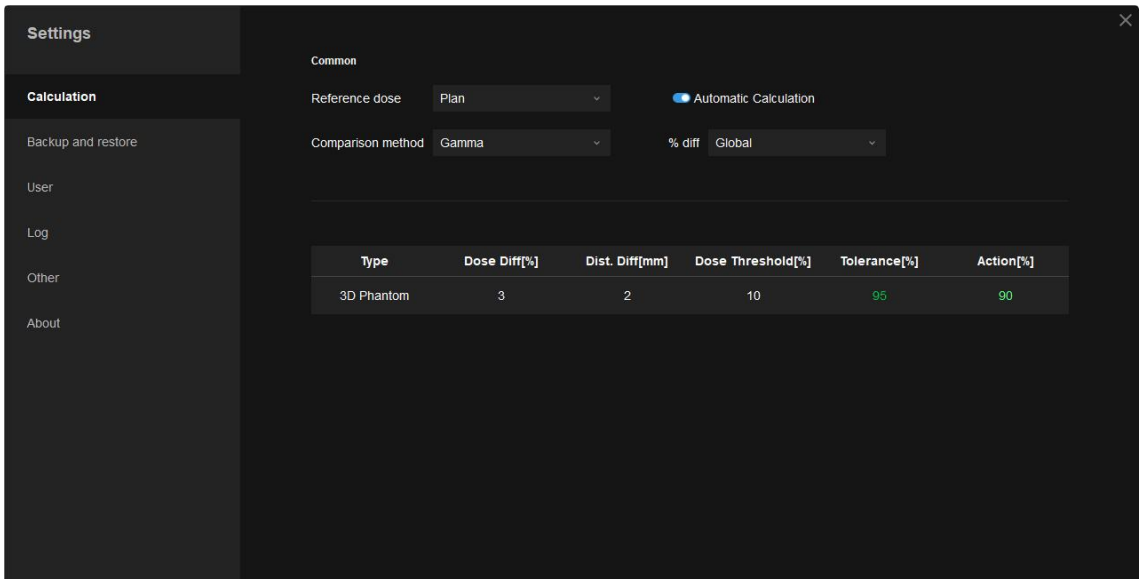


Figure 35. Settings_Interface

(1) Calculation

Click "Calculation" on the left to enter the "Calculation" interface, as shown below:

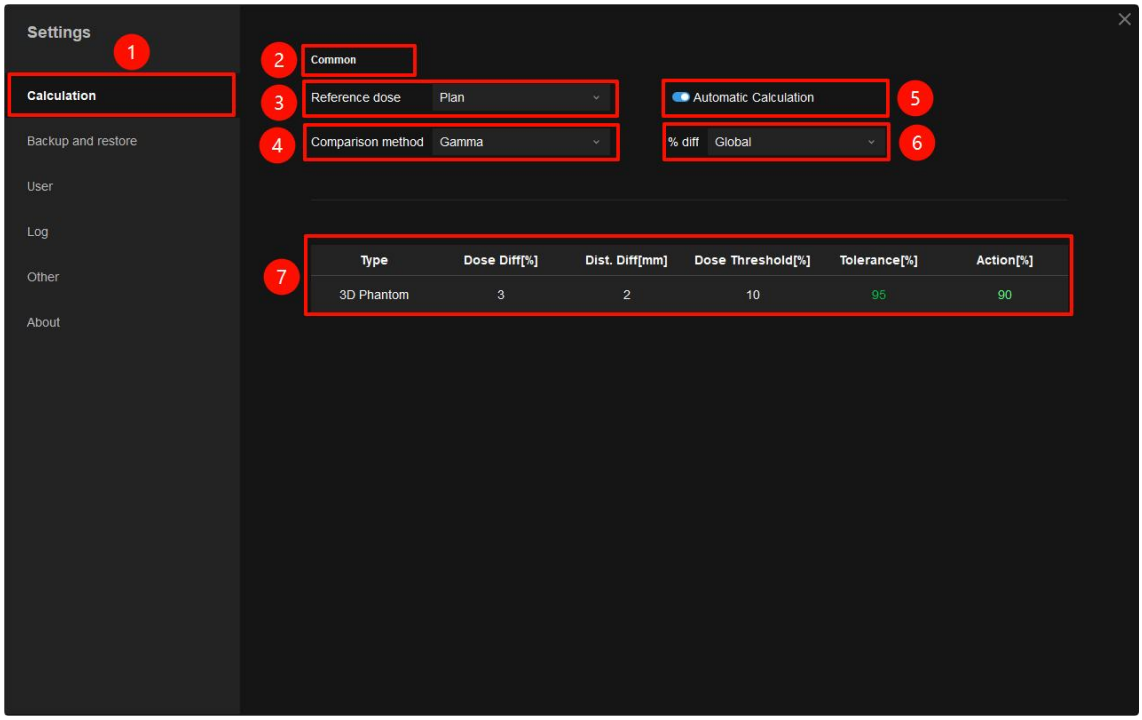


Figure 36. Settings_Calculation

① Calculation interface, used to edit the default settings for RayMap automatic calculation.

② Common Settings.

③ Reference dose for calculation, only "Plan" can be selected.

④ Comparison method, can choose "gamma" or "DTA".

⑤ Automatic Calculation.

- Checked: After measurement ends, the system will automatically calculate this verification record on the main interface.
- Unchecked: Will not calculate automatically after measurement ends; requires manually clicking the calculate button.

⑥ % Diff, can choose "Global" or "Local" type.

⑦ Can double-click the values in the table to edit. When RayMap performs automatic calculation, it will use the values in this table as the default conditions for plan verification evaluation. Items explained as follows:

Item	Description
Type	Analysis type.
Dose Diff[%]	Double-click the value to set the dose difference for gamma calculation in automatic calculation.
Dis Diff[mm]	Double-click the value to set the distance difference for gamma calculation in automatic calculation.
Dose threshold[%]	Double-click the value to set the dose threshold for automatic calculation. Gamma analysis will only compare doses above this

	threshold.
Tolerance[%]	Double-click the value to set the gamma tolerance for automatic calculation.
Action[%]	Double-click the value to set the action level for automatic calculation. It must be less than or equal to the Tolerance[%].

(2) Backup and Restore

Click the "Backup and restore" button to enter the "Backup and Restore" interface, as shown below:

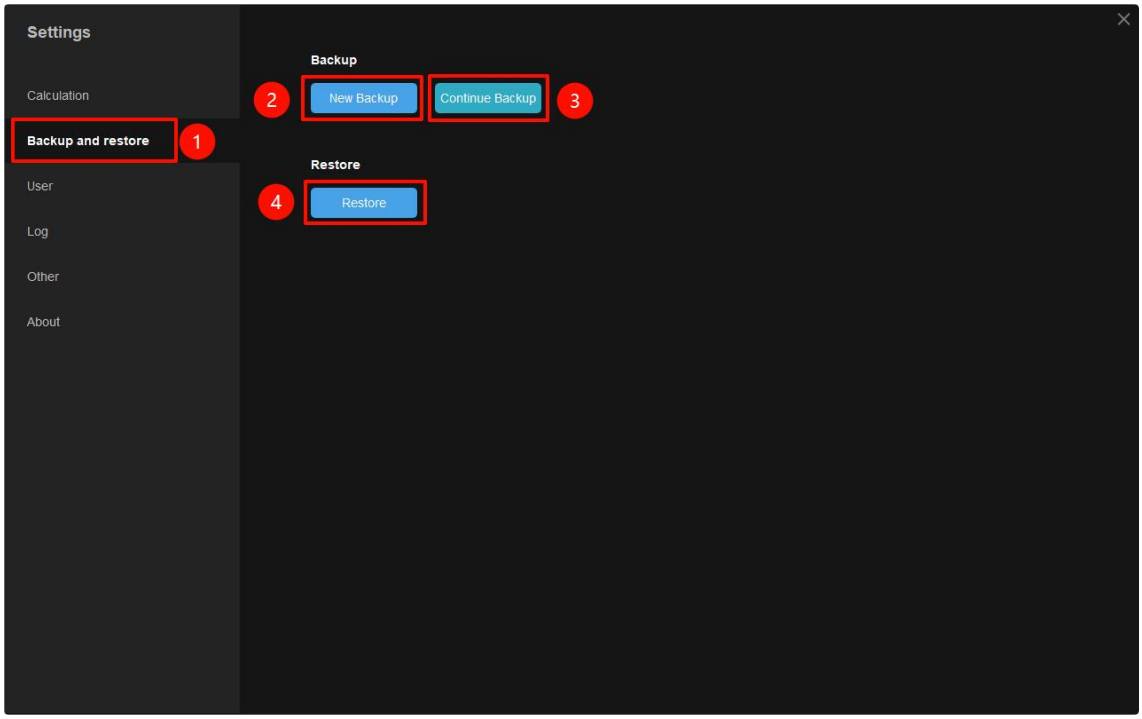


Figure 37. Settings_Backup and Restore

① Backup and Restore interface.

② New Backup: Backs up current data to a specified location.

③ Continue Backup: If the backup process is interrupted, clicking this button continues the unfinished backup task.

④ Restore: Click this button, select the backed-up data, and it can be restored to RayMap.

(3) User

Click "User" to enter the "User" interface, as shown below:

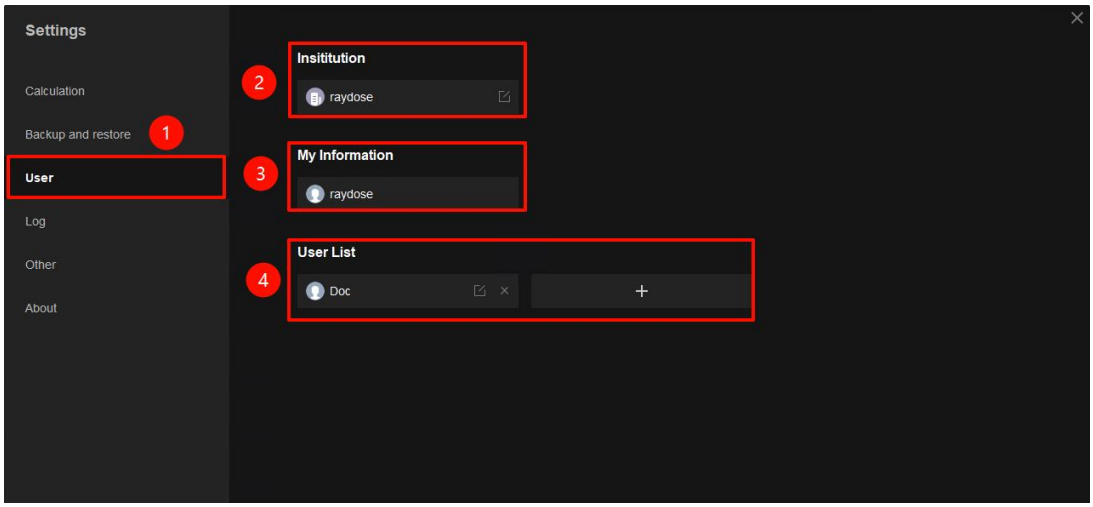


Figure 38. Settings_User

① User interface, provides functions to add, delete, edit users, etc.

② Institution Information, displays the current user's institution information. Users can click the button to edit the institution name. Changing the institution name requires entering the current account password.

③ Current User Information, displays the username of the currently logged-in account.

④ User List, displays all user information.

- Only the super administrator can view all user information; regular accounts can only view their own information.
- Only the super administrator can perform operations on users. Click the button to edit user information, click the button to delete a user, click the + button to add a new user. Operations require entering the current account password.

(4) Log

Click "Log" to enter the "Log" interface, as shown below:

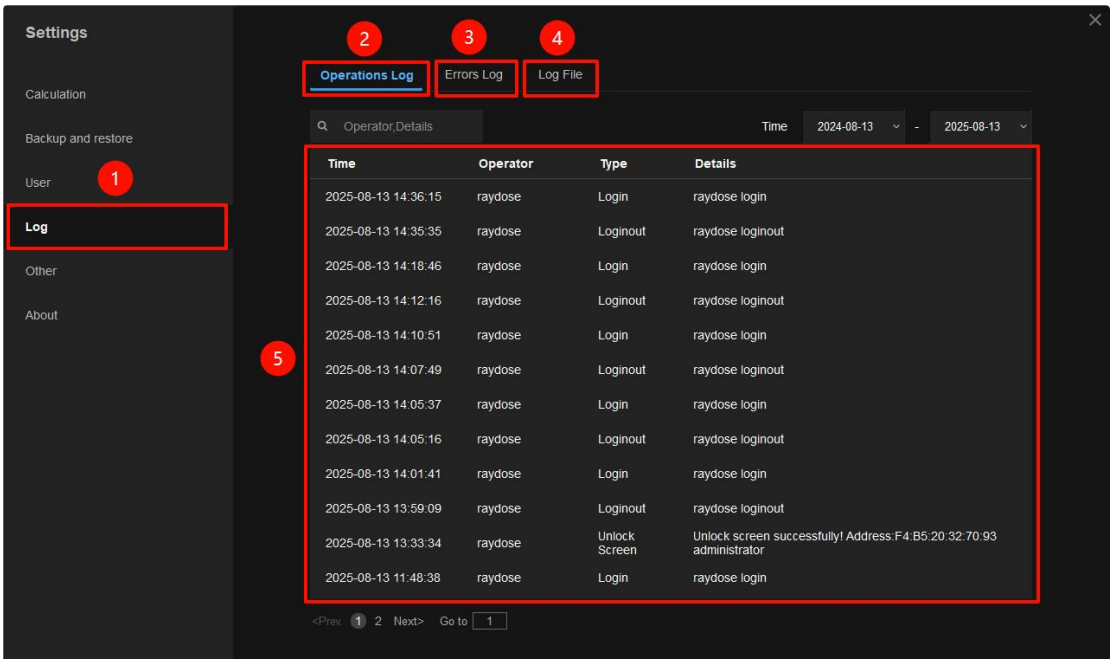


Figure 39. Settings_Log

① Log interface: Displays system operation related logs.
② Operation Log: Click to view system operation records.
③ Error Log: Click to view system error records.
④ Log Files: On this page, click Export to export all logs.
⑤ Log Display Area: Displays the content of the currently selected log.

(5) Other

Click "Other" to enter the "Other" interface, as shown below:

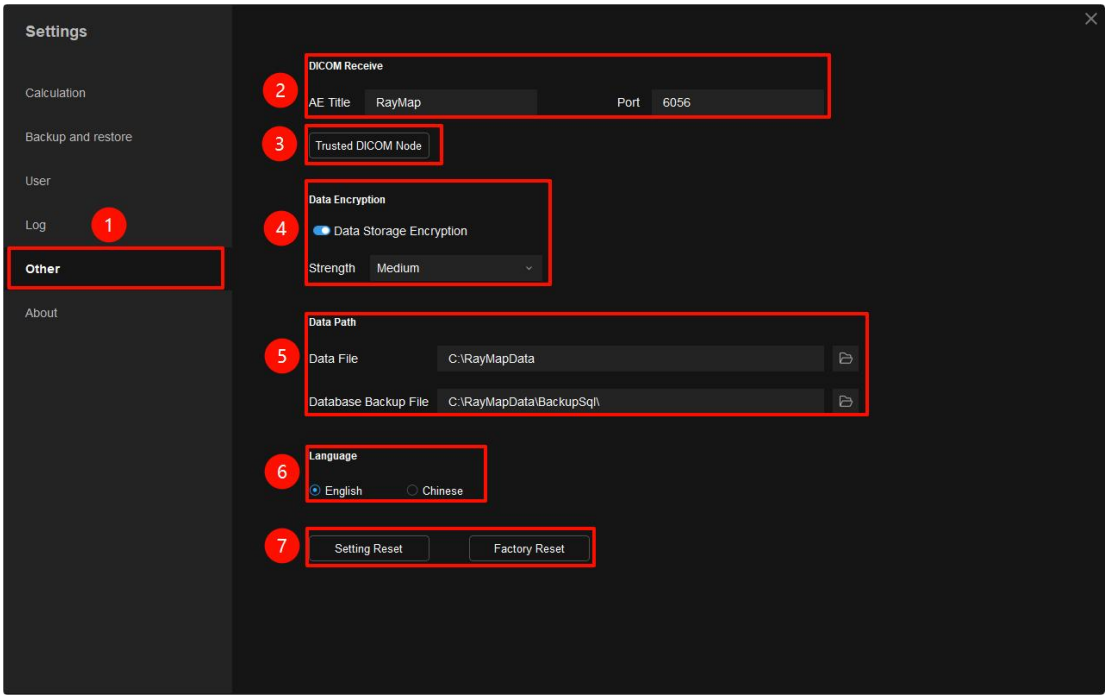


Figure 40. Settings_Other

① "Other" interface, contains other related settings.

② DICOM Receive Settings. Users can receive plan data from the TPS to RayMap via a specified AE Title and port. Note, when using this function, ensure RayMap and the TPS are on the same network.

③ Trusted DICOM Node. Click this button to set a trusted DICOM transfer port in RayMap, allowing plans to be sent from the TPS to RayMap.

④ Data Encryption Settings. Provides three encryption levels: Low, Medium, and High, to prevent external malicious programs from stealing data.

⑤ Measurement Data Save Path. When this option is enabled, all measurement records will be automatically saved to the specified path.

⑥ Supports selecting Chinese and English language interfaces.

⑦ Reset Settings.

- Setting Reset: Restore factory settings.
- Factory Reset: Factory reset, will clear all data in the RayMap program (including the database), and cannot be recovered. Performing this operation requires entering the current account password. Please operate with caution.

(6) About

Click "About" to enter the "About" interface, as shown below:

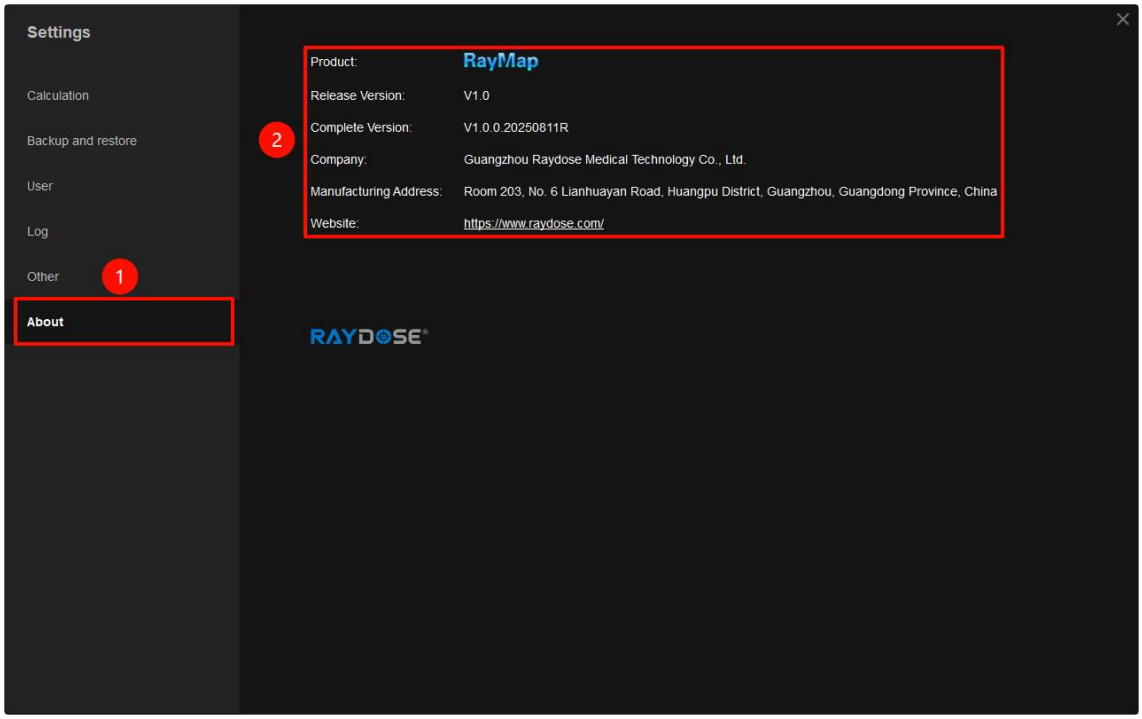


Figure 41. Settings_About

① "About" interface, contains software and manufacturer related information.

② Displays software name, release version, full version number. Manufacturer Information: Displays company name, company address, company website.

5.3. ArcMap Module

5.3.1. Interface Overview

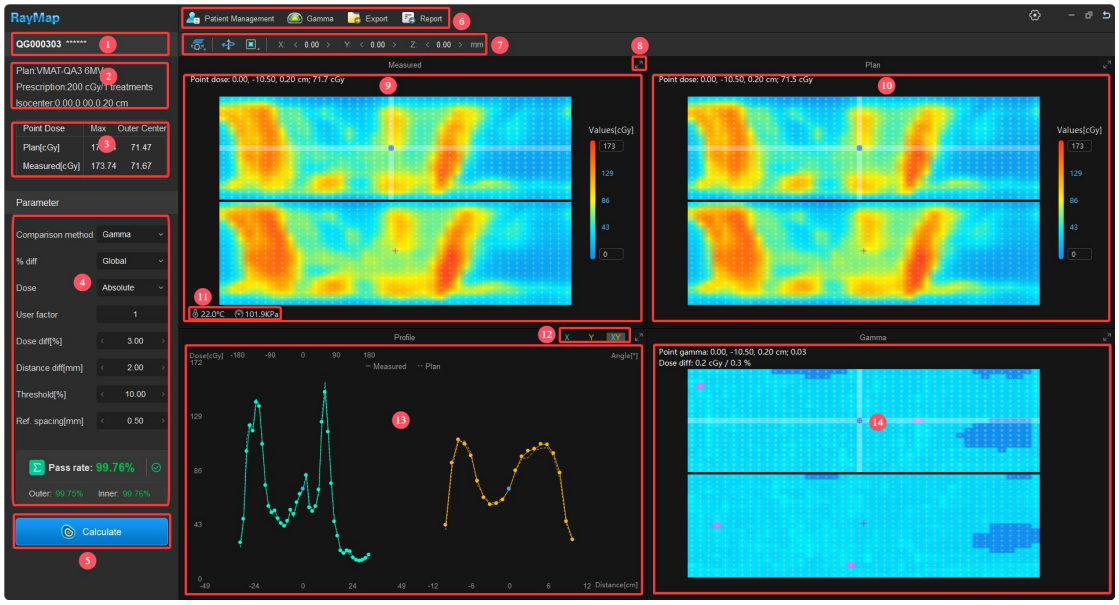


Figure 42. ArcMap Module_Interface Overview

① Display Patient ID and Patient Name.

② From top to bottom, left to right: Patient Plan, Energy and Type (FF/FFF); Prescription Dose and Number of Fractions; Isocenter.

③ Point Dose Display Area. Can display the maximum value and center point value of the patient plan, and the measured maximum value and center point value.

④ Gamma Calculation Parameter Setting Area. Please refer to [5.3.2]

⑤ Calculate Calculate button, click this button to perform gamma analysis calculation.

⑥ ArcMap Function Area. Please refer to [5.3.3].

⑦ Image Operation Area. Please refer to [5.3.4].

⑧ Image Zoom Operation. Click this button to enlarge the image to full screen display.

⑨ Measurement Image.

⑩ Plan Image.

⑪ Temperature & Pressure.

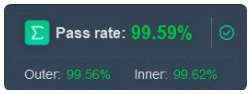
⑫ Switch the profile image display. Can choose to display only X or Y profile, or display both X and Y profiles simultaneously.

⑬ Profile Image.

⑭ Gamma Image.

5.3.2. Gamma Calculation Parameter Setting Area

This section introduces the Gamma Calculation Parameter Setting Area (part ④ in [5.3.1].

Item	Description
Comparison method	Two comparison methods: gamma and DTA.
% diff	Percent Difference, two types can be chosen: Global and Local.
Calculation	Calculation method, three types: Absolute (dose), Relative to max, Relative to center.
User Factor	User Factor, used to set the user's correction factor, default is "1", meaning no other corrections.
Dose diff[%]	Can set the dose difference in gamma calculation.
Dist. diff[mm]	Can set the distance difference in gamma calculation.
Threshold[%]	Comparison threshold. During gamma analysis, only doses above the threshold are compared.
Ref.Spacing[mm]	Can set the reference grid spacing.
	• Click this area to perform gamma pass rate calculation. • After calculation is complete, users can click the button on the right to confirm or cancel the confirmation of this calculation. • The bottom area displays the pass rate results for the outer layer and inner layer ionization chambers respectively.

5.3.3. Function Area

This section introduces the ArcMap Function Area (part ⑥ in 5.3.1).

(1) Patient Management

Click the button to enter the Patient Management function interface, as shown below.

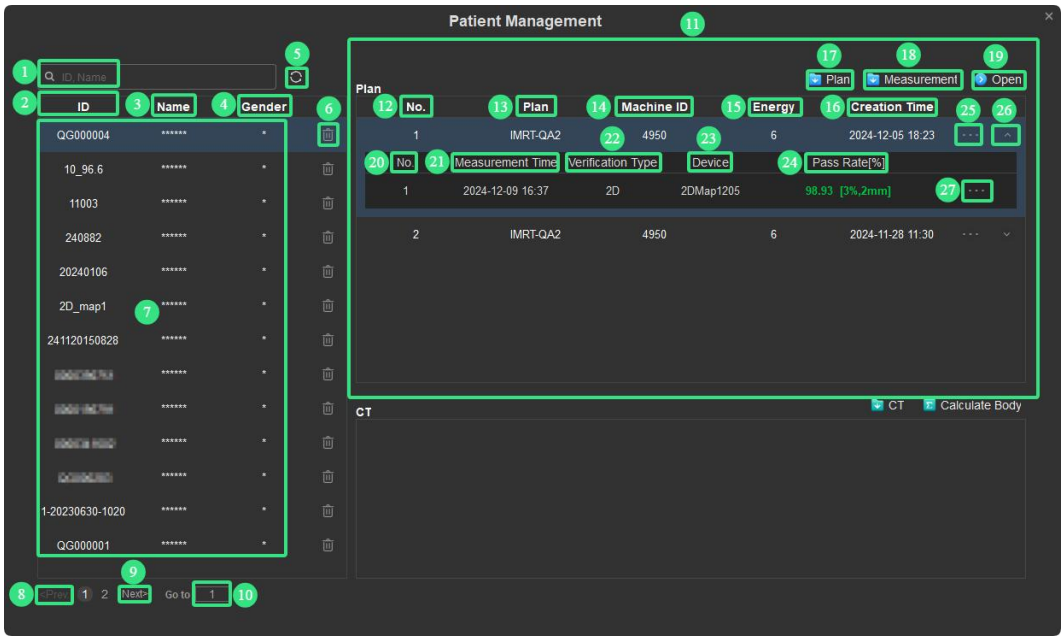


Figure 43. ArcMap Module_Patient Management

① Patient record search box, enter Patient ID or Patient Name to search for corresponding patient records.
② Patient ID display column.
③ Patient Name display column.
④ Patient Gender display column.
⑤ Refresh button, click this button to refresh patient records.
⑥ Delete button, click this button to delete patient records.
⑦ Patient record display area.
⑧ Previous Page button, click this button to show the previous page of patient records.
⑨ Next Page button, click this button to show the next page of patient records.
⑩ Enter page number to jump to a specified page.
⑪ Plan record and measurement record display area.
⑫ Plan sequence number display column.
⑬ Patient Plan Name display column.
⑭ Machine ID display column.
⑮ Patient Plan Energy display column.
⑯ Patient Plan Creation Time display column.
⑰ Import patient record button.
⑱ Import patient measurement button.

⑲ Open the currently selected patient plan or measurement.
⑳ Patient measurement record sequence number display column.
㉑ Patient measurement creation time display column.
㉒ Patient measurement verification type display column.
㉓ Measurement device name display column.
㉔ Gamma pass rate display column.
㉕ Patient plan operation button, click to pop up a window, as shown below.

- Click the "Open" button to open this patient plan.
- Click the "Delete" button to delete this patient plan. Note, all measurement records under this plan will also be deleted.

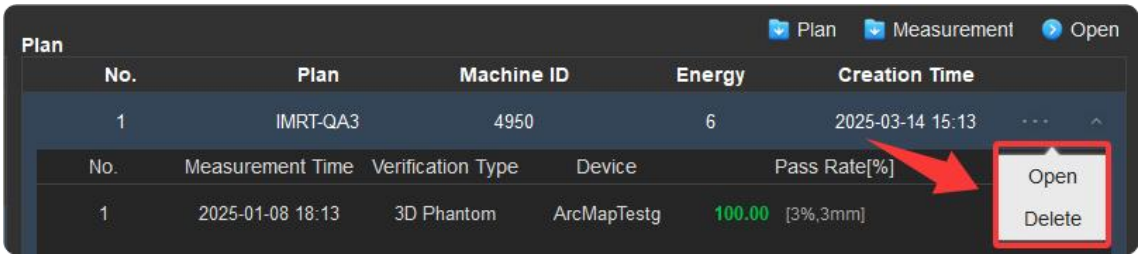


Figure 44. ArcMap Module_Patient Management_Patient Plan Record Operation

㉖ Expand/Collapse button. Click this button to expand or collapse all measurements for this plan.
㉗ Patient measurement record operation button. Click to pop up a window, as shown below.

- Click the "Open" button to open this measurement record and the patient plan.
- Click the "Delete" button to delete the current patient measurement data.
- Click the "Match Measurement" button to pop up a window. For specific operations, please refer to 5.2.2. Specific Operations > (2) Operations on Records > Measurement matches plan.

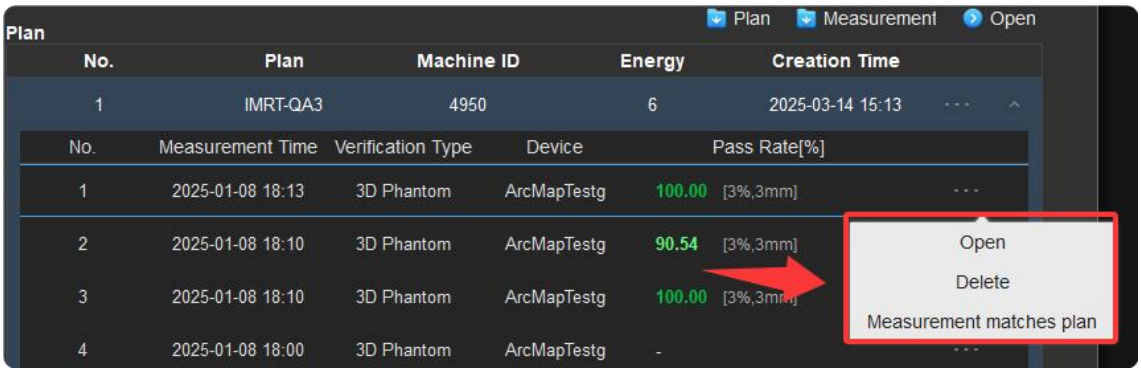


Figure 45. ArcMap Module_Patient Management_Measurement Record Operation

(2) Gamma

Click the button, and the Gamma Details window will pop up, as shown below.

• The top of the window displays the gamma pass rate, gamma pass rate for the outer ionization chambers, gamma pass rate for the inner ionization chambers, average gamma value, and standard deviation.
• The middle of the window displays the gamma distribution map.
• The upper left corner of the window displays the coordinates of the current crosshair center position and the corresponding gamma value. Moving the crosshair allows viewing gamma values at different positions.
• The bottom is the gamma histogram. Users can switch the vertical axis to display Absolute volume or Relative volume.

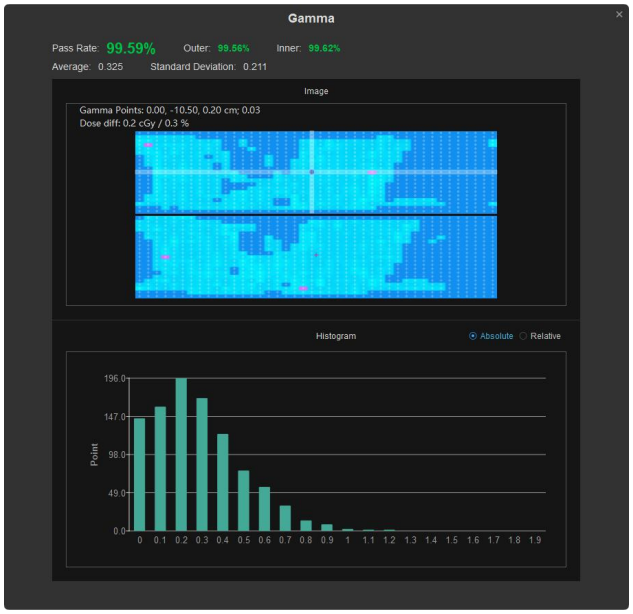


Figure 46. ArcMap Module_Gamma_Gamma Details

(3) Export

Click the button to perform the export operation.

• If the currently opened record has completed verification, it will export the verification data (CalData), measurement acquisition image (Measurement), and plan data (PlanData) of this record.
• If the current record has not been verified, it will only export the measurement acquisition image (Measurement) and plan data (PlanData) of this record.

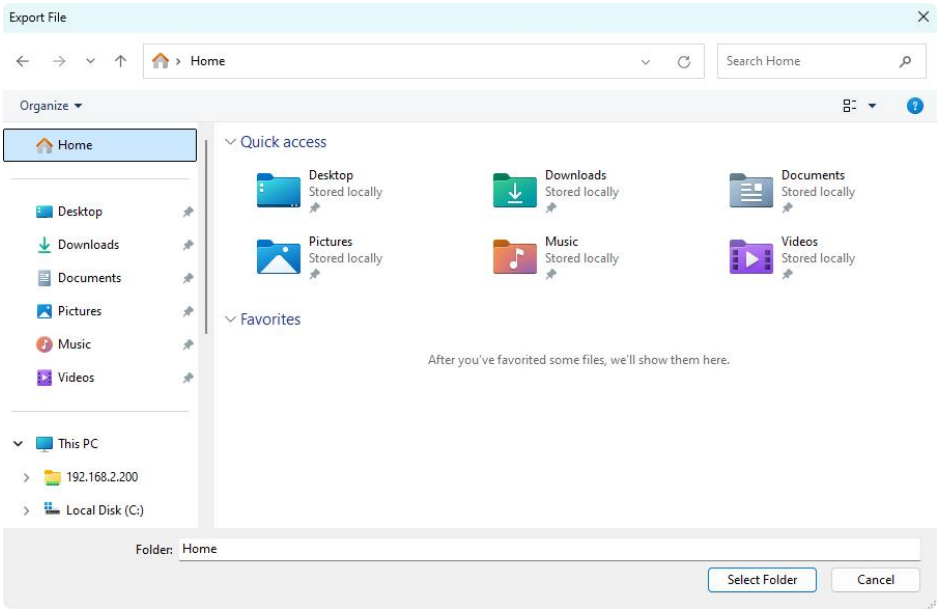


Figure 47. ArcMap Module_Gamma_Export

(4) Report

Click the button to print the report. The report mode can be selected as "Basic" or "Details".

- Click the Print button will directly jump to the printer print interface.
- Click the PDF button can generate a PDF report file saved locally.

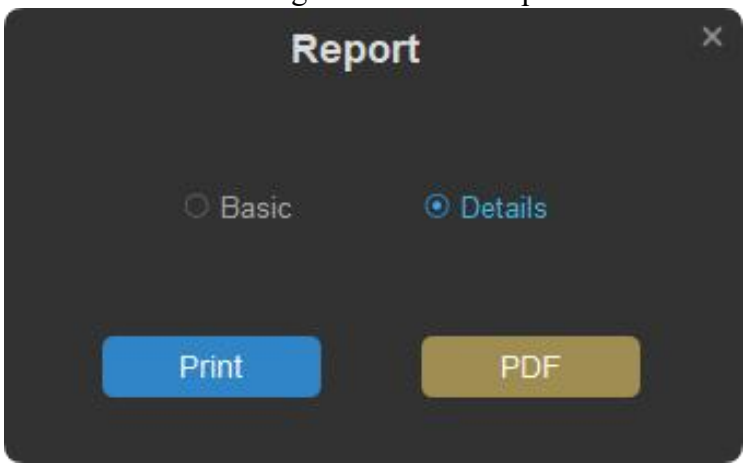


Figure 48. ArcMap Module_Gamma_Report

5.3.4. Image Operation Area

This section introduces the Image Operation Area (part ⑦ in 5.3.1).

Item	Description
	Ionization chamber display method. Users can choose different display methods: • 2-Layer: Two-layer display. • Merged: Merged layer display. • 3D: Three-dimensional display.
	Rotation tool: Used to rotate the image.
	Image display method. Can choose to display the image as "Points" or "Plane".
	Move tool (X-axis): Used to move the image along the X-axis.
	Move tool (Y-axis): Used to move the image along the Y-axis.
	Move tool (Z-axis): Used to move the image along the Z-axis.

6. Usage Guide

6.1. Overview

This section guides users on how to use ArcMap.

6.2. Pre-Use Preparation

6.2.1. QA Phantom Preparation

(1) Overview

This step aims to generate a QA phantom required for plan verification by performing a CT scan of the ArcMap. Users may conduct their own CT scanning or use the virtual CT phantom image file provided by Raydose.

(2) CT Scanning Operation Steps Description

Note: If the user chooses to use the virtual CT phantom image file provided by our company for plan QA and other setup work, this step is not required.

Step 1: Preparation

- Use a dedicated treatment couch, ensuring it is level.
- Place the ArcMap on the treatment couch, ensuring it is stable. Users need to pay special attention that in the following four stages: phantom CT, absolute dose calibration, QA plan, and actual QA measurement, the usage of the phantom must be completely consistent.
  - a. If using the phantom insert, then the CT image with the phantom insert must be used, and during absolute dose calibration and actual QA measurement, the phantom insert needs to be inserted into the central cavity of ArcMap.
  - b. If not using the phantom insert, then the phantom insert must not appear throughout the entire process.
- Connect all cables, ensure the device is powered on, and check if the ArcMap indicator lights are on normally.
- Place lead markers at the centers of the three crosshairs on the left side, right side, and top surface of ArcMap.

Step 2: Positioning

- Use the laser to position the ArcMap, ensuring the lasers align with the crosshairs on the side of the array.

Step 3: CT Scan

- After positioning is completed, begin the CT scan. The scan range must cover all ionization chambers, but ensure it does not exceed the non-irradiable area marked on the ionization chamber array board.
- A recommended slice thickness is 0–3 mm.

Step 4: Output and Save

- Transfer the scanned images to the TPS and save them as the QA verification phantom.

(3) Using the Virtual CT Phantom Image Provided by Raydose

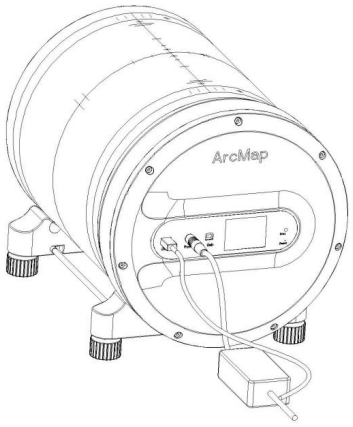
Users can also directly use the virtual CT phantom image file provided by our company as the QA verification phantom. The virtual CT phantom image file provides two versions: with phantom insert and without phantom insert. Please note that the usage of the phantom must be consistent throughout the entire verification process.

6.2.2. First-Time Connection of ArcMap to Computer

(1) Overview

When connecting ArcMap to a computer for the first time, it is necessary to configure the computer's IP address and ArcMap's network settings to ensure proper communication between the two systems.

(2) Operation Steps Description



- Connect ArcMap with the power cable and connect it to the computer via an Ethernet cable.
- Log in to the RayMap account. If you see the icon  in the Measurement module, this indicates that ArcMap has not yet established a connection with the computer.
- Open computer [Settings] -> [Network & Internet] -> [Ethernet]
- Click [IP settings] [Edit] -> Select [Manual] -> Enable [IPv4]
- Fill in the following parameters:
  - IP address: [192.168.2.xxx] (where xxx is any number between 2 and 255, except 212, recommended to use 10)
  - Subnet mask: [255.255.255.0] (fixed value)

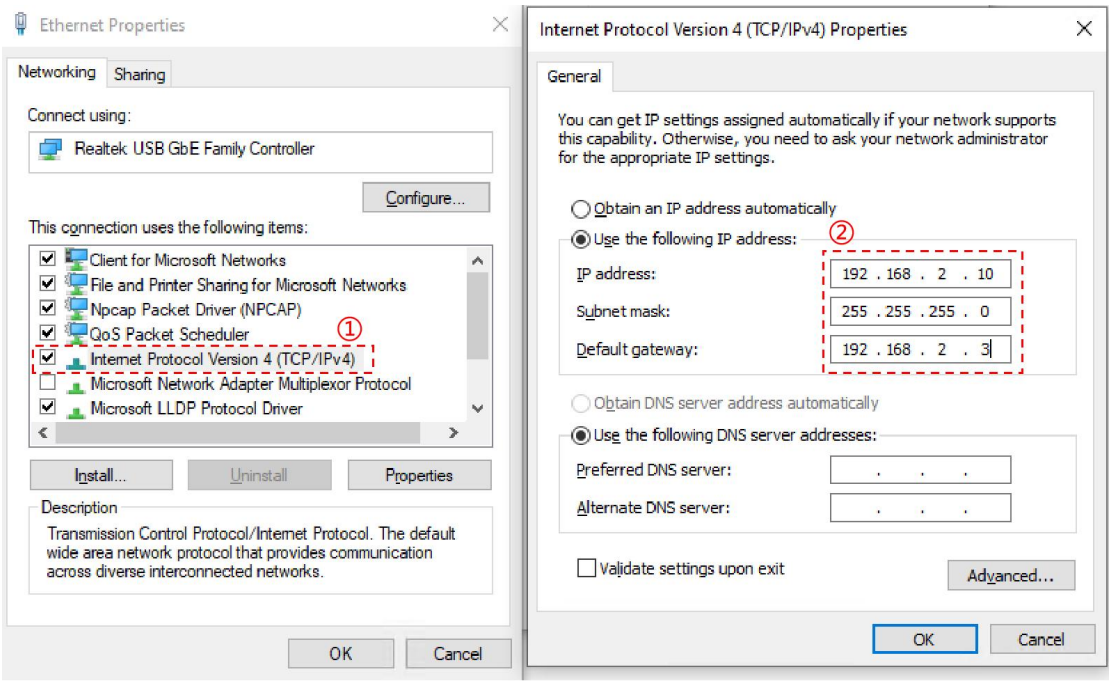


Figure 49. IP settings

- Save the changes. Return to the RayMap main interface and check the icon status. If the icon shows connected  , it indicates that ArcMap has successfully connected to the computer, and subsequent operations can be performed.

6.2.3. Consistency Calibration

(1) Overview

- The product has undergone consistency calibration before leaving the factory. Users can also perform an additional consistency calibration before first use.
- It is recommended to perform consistency calibration once a year on the ArcMap array to ensure measurement accuracy and device performance.
- When the measured values in the Profile curve differ significantly from the planned values, users should check configuration parameters and determine whether recalibration is required.

(2) Operation Steps Description

Step 1: Positioning

- Zero the accelerator gantry and collimator (0°), ensure the treatment couch is level.
- Place the ArcMap array flat on the treatment couch (without inserting the solid water or ionization chamber insert). Connect all cables, confirm the device is powered on, and check if the ArcMap indicator lights are on.
- Turn on the lasers, adjust the treatment couch height so that the laser lines align with the crosshairs on the side of the ArcMap array.
- Adjust the accelerator light field to be large enough, ensuring the crosshairs of the light field overlap with the crosshairs on the ArcMap array.

Step 2: Stabilization and Pre-Irradiation

- After starting ArcMap, let the device sit for at least 10 minutes to allow its temperature and pressure to stabilize.
- Ensure the accelerator's MLC can be fully opened. Adjust the accelerator's field size to completely cover all ionization chambers within ArcMap (field size needs to be larger than 21cm×21cm, but must not exceed 24cm×24cm).
- Set the accelerator output dose to 200 MU and perform one pre-irradiation.

Step 3: Consistency Calibration

- Open the RayMap software on the computer connected to ArcMap.
- Enter Device via the upper right corner, switch the device to ArcMap, and enter the "Consistency Calibration" interface.
- Select "User defined", then click "Background" to start background measurement.
- After background measurement is complete, adjust the accelerator gantry angle, field size, and output according to the prompts on the interface.
- Click "Start". Ensure the accelerator's measurement conditions exactly match those provided on the interface, then the accelerator begins delivering beam for measurement. Note: Each step requires repeating the measurement twice; the measurement count is prompted in the lower right corner of the interface.
- After the accelerator beam delivery is complete, click the "Stop" button on the interface, and the system will automatically proceed to the next step's measurement conditions. Follow the interface prompts to complete all measurement steps sequentially until the consistency calibration is finished.
- To return to the previous step and repeat the measurement, click "Previous Step".

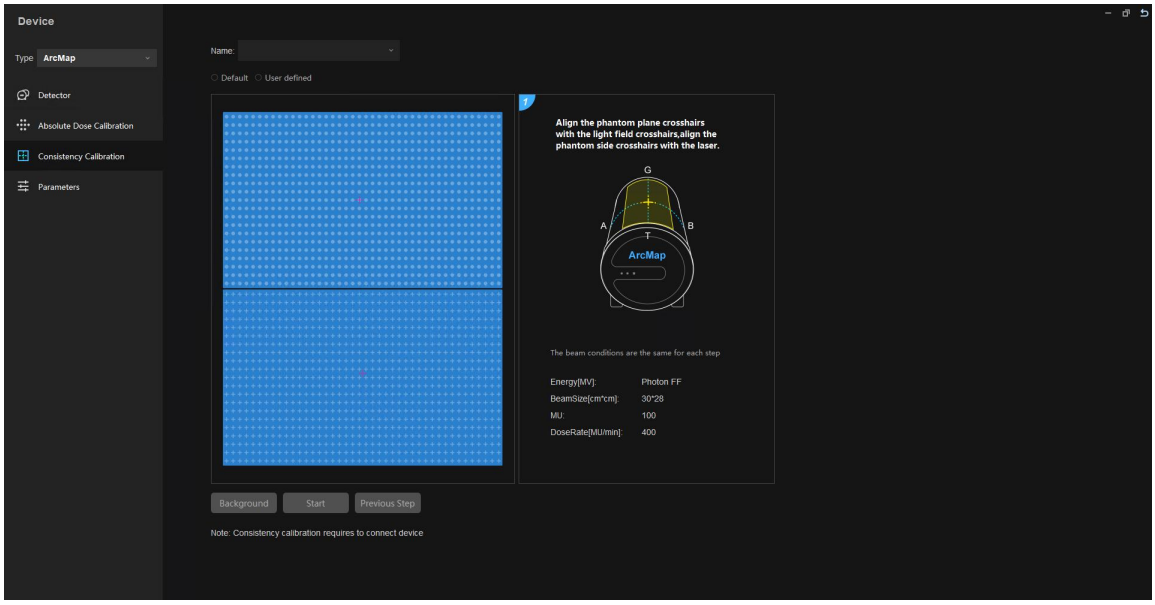


Figure 50. Device_Consistency Calibration_Operation Interface

6.2.4. Absolute Dose Calibration

(1) Overview

After completing consistency calibration, absolute dose calibration of the accelerator needs to be performed before formal measurement to ensure the accuracy and reliability of subsequent measurements.

Note: An absolute dose calibration must be performed for each accelerator. The accelerator's name, energy, and FF/FFF settings must exactly match those defined in the plan.

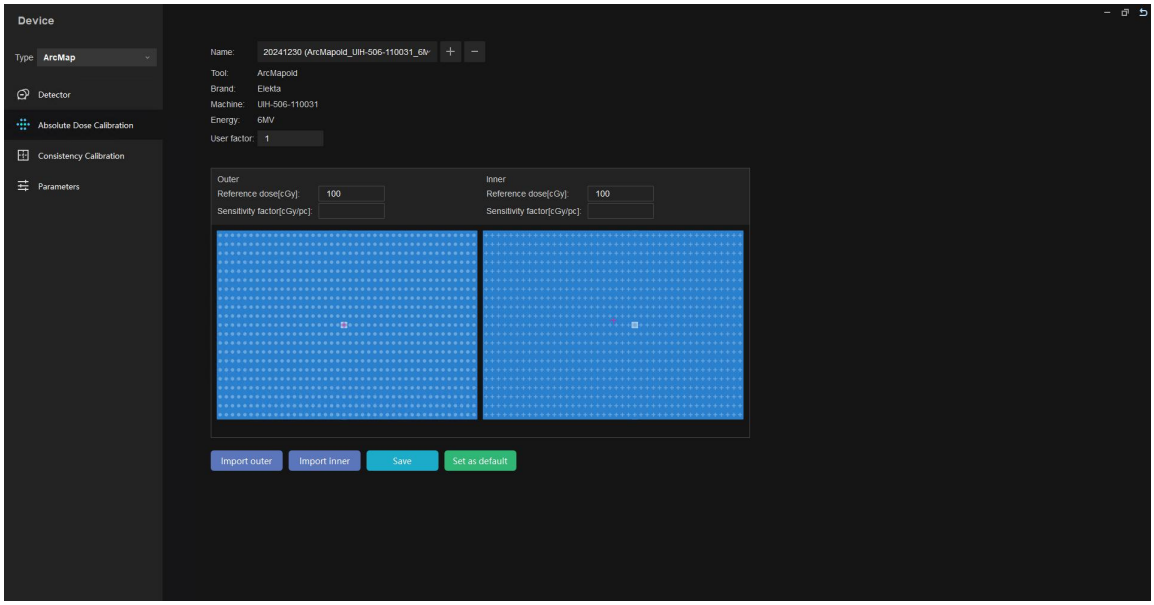


Figure 51. Device_Absolute Dose Calibration

(2) Operation Steps Description

Step 1: Obtain Reference Dose Values

Reference dose values can be obtained through the TPS or measured using a Cylindrical Ion Chamber. Users can choose the applicable method based on their actual situation. When creating a plan for the ArcMap in the TPS, it is recommended to directly use the virtual CT phantom provided by Raydose. This virtual CT phantom provides two versions: with phantom insert and without phantom insert. Please ensure that the phantom usage method remains consistent throughout the entire verification process.

①. Obtain Reference Dose via TPS

- Find the isocenter layer in the virtual CT phantom (this cross-section corresponds to the outer layer ionization chambers of ArcMap), and confirm the isocenter based on the CT markers.

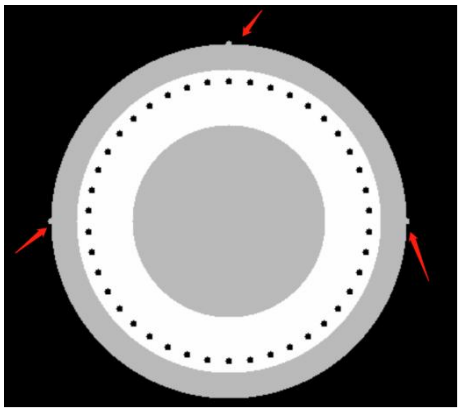


Figure 52. Isocenter Level

• Obtain Outer Reference Point Dose: In the TPS, set a field at 0°, 10cm×10cm, 100 MU, and calculate the dose distribution. Check the point dose inside the ionization chamber cavity at the center of the field (the ionization chamber at the yellow indicator in the figure below), and record this value as the outer reference point dose.

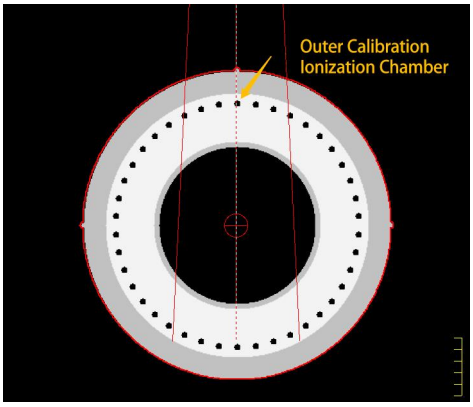


Figure 53. Isocenter Level_Outer Ionization Chamber

• Obtain Inner Reference Point Dose: Change the beam incidence angle to 30°, and recalculate the dose distribution using the same field parameters. In the CT slices, slide up or down one layer to switch to the slice adjacent to the isocenter (this cross-section corresponds to the inner layer ionization chambers of ArcMap). Check the point dose inside the ionization chamber cavity at the field center at the yellow indicator line, and record this value as the inner reference point dose.

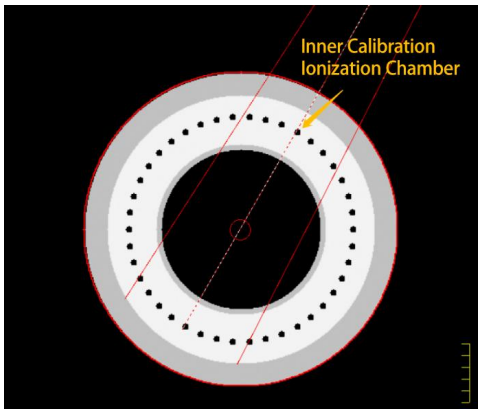


Figure 54. Isocenter Level_Inner Ionization Chamber

- Enter the obtained reference point doses into the corresponding positions in the RayMap -> Device-> Absolute Dose Calibration interface.

②. Obtain Reference Dose via a Cylindrical Ion Chamber

- Under standard conditions (SAD=100cm), measure the solid water according to the following setups, and enter the obtained reference point doses into the corresponding positions in the Absolute Dose Calibration interface.

  a. Outer reference point dose: SSD=86.2cm, depth 3cm in water, field size 10cm×10cm, measure the outer calibration value.

  b. Inner reference point dose: SSD=86.3cm, depth 3.9cm in water, field size 10cm×10cm, measure the inner calibration value.

- Note:

  a. If the accelerator's SAD differs from the standard conditions, adjust the solid water setup accordingly. For TOMO machines, a field size of 5cm×5cm is recommended.

  b. Users must ensure that the phantom usage is completely consistent across the four stages: phantom CT, absolute dose calibration, QA plan, and actual QA measurement. If using the phantom insert, the CT image with the phantom insert must be used, and during absolute dose calibration and actual QA measurement, the phantom insert needs to be inserted into the central cavity of ArcMap. If not using the phantom insert, the phantom insert must not appear throughout the entire process.

Step 2: Positioning

- Zero the accelerator gantry and collimator (0°), ensure the treatment couch is level.
- Place the ArcMap array on the treatment couch. Connect all cables, confirm the device is powered on, and check if the ArcMap indicator lights are on.
- Turn on the lasers, adjust the treatment couch height so that the laser lines align with the crosshairs on the side of ArcMap.
- Adjust the accelerator light field to be large enough, ensuring the crosshairs of the light field completely overlap with the crosshairs on the top surface of

ArcMap.

Step 3: Stabilization and Pre-Irradiation

- After starting ArcMap, let the device sit for at least 10 minutes to ensure its temperature and pressure stabilize.
- Ensure the accelerator's MLC can be fully opened. Adjust the accelerator's field size to completely cover all ionization chambers within ArcMap (field size needs to be larger than 21cm×21cm, but must not exceed 24cm×24cm).
- Set the accelerator output dose to 200 MU and perform one pre-irradiation.

Step 4: Absolute Dose Calibration

- Open the RayMap software on the computer connected to ArcMap.

① If the reference dose is obtained via the TPS:

- Acquire Outer Calibration Image: Accelerator field size 10cm×10cm, gantry angle 0°, dose rate 400 MU/min, deliver 100 MU. Measure background, then start measuring the outer calibration image and save it.
- Acquire Inner Calibration Image: Accelerator field size 10cm×10cm, gantry angle 30°, dose rate 400 MU/min, deliver 100 MU. Measure background, then start measuring the inner calibration image and save it.
- After measurement is complete, click Device in the upper right corner, switch the device to ArcMap, click to enter the "Absolute Dose Calibration" interface. Click the "Import outer" and "Import inner" buttons respectively, and in the popped-up "Select measurement" window, select and import the outer and inner calibration images correspondingly.
- Enter the actual reference dose values in the "Reference dose" input boxes.
- Click the "Save" button, and the software will automatically calculate and save the sensitivity factors.
- If you need to set the current calibration result as the default absolute dose calibration, click the "Set as default" button. After setting, this calibration will be applied by default for subsequent measurements.

②If the reference dose is obtained via a Cylindrical Ion Chamber**:**

- Acquire Outer Calibration Image: Accelerator field size 10cm×10cm, gantry angle 0°, dose rate 400 MU/min, deliver 100 MU. Measure background, then start measuring the outer calibration image and save it.
- Acquire Inner Calibration Image: Rotate ArcMap by 30°, aligning the crosshair in the red box in the figure below with the field center. Then, adjust the treatment couch position and perform positioning again using the surface markings on ArcMap. Set the accelerator field size to 10cm×10cm, gantry angle 0°, dose rate 400 MU/min, deliver 100 MU. Measure background, then start measuring the inner calibration image and save it.
- After measurement is complete, click Device in the upper right corner, switch the device to ArcMap, click to enter the "Absolute Dose Calibration" interface. Click the "Import outer" and "Import inner" buttons respectively, and in the popped-up "Select measurement" window, select and import the

outer and inner calibration images correspondingly.

- Enter the actual reference dose values in the "Reference dose" input boxes.
- Click the "Save" button, and the software will automatically calculate and save the sensitivity factors.
- If you need to set the current calibration result as the default absolute dose calibration, click the "Set as default" button. After setting, this calibration will be applied by default for subsequent measurements.

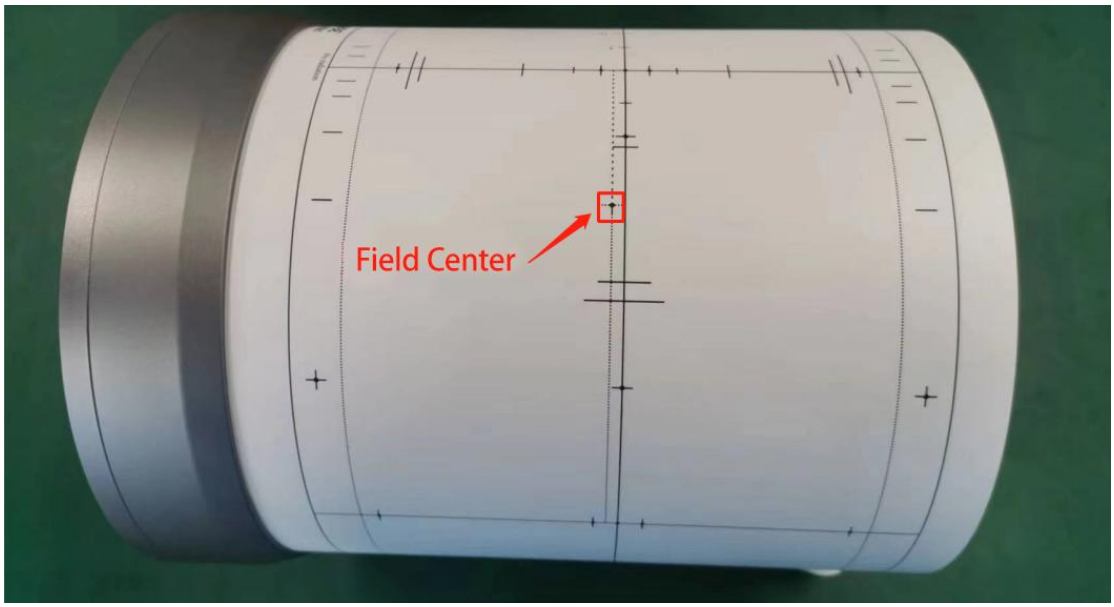


Figure 55. Acquire Inner Ionization Chamber Calibration Dose_Positioning Diagram

6.2.5. Parameter Settings

If other settings are needed, such as detector configuration or parameter adjustment, you can enter the "Detector" and "Parameters" interfaces in the "Device" menu in the upper right corner of the software for related settings. After completing all settings, ArcMap can be used normally.

6.3. Patient QA

Step 1: Positioning

- Zero the accelerator gantry and collimator (0°), ensure the treatment couch is level.
- Place the ArcMap array on the treatment couch (whether to combine the solid water insert with the array depends on the virtual CT phantom used for creating the QA plan; if the virtual CT phantom has the solid water insert, then the ArcMap needs the solid water insert inserted during patient QA; otherwise, it does not). Connect all cables, confirm the device is powered on, and check if the ArcMap indicator lights are on.
- Turn on the lasers, adjust the treatment couch height so that the laser lines align with the crosshairs on the side of ArcMap.

- Adjust the accelerator light field to be large enough, ensuring the crosshairs of the light field completely overlap with the crosshairs on the top surface of ArcMap.

Step 2: Stabilization and Pre-Irradiation

- After starting ArcMap, let the device sit for at least 10 minutes to ensure its temperature and pressure stabilize.
- Ensure the accelerator's MLC can be fully opened. Adjust the accelerator's field size to completely cover all ionization chambers within ArcMap (field size needs to be larger than 21cm×21cm, but must not exceed 24cm×24cm).
- Set the accelerator output dose to 200 MU and perform one pre-irradiation.

Step 3: Generate and Export QA Plan in TPS

- In the TPS, find and open the patient plan that needs verification.
- Enter the QA module of the TPS and load the previously created and saved QA verification phantom.
- When creating the QA plan, set the couch position to 3cm below the ArcMap phantom. The ISOCenter needs to be marked as the coordinates of the central ionization chamber on the phantom CT. Simultaneously, set the dose calculation grid to 2mm.
- The accelerator gantry and collimator can be set to 0° for calculation, or calculated according to the actual treatment plan angles.
- Export the calculated QA plan via DICOM as RT Plan and RT Dose files.

Step 4: Import and Open Plan in RayMap

- Click the "Import Plan" button on the RayMap main interface, select the RT Plan and RT Dose files exported from the TPS, and import them into the software.
- After import is complete, find the corresponding plan record on the RayMap main interface. Drag the selected plan into the Measurement area, or click the Measure button on the right side of the plan record.

Step 5: Measurement

- In the Measurement area on the main interface, click "Background" to perform background measurement. (After connecting ArcMap and the computer, background measurement only needs to be performed once. If disconnected and reconnected, background measurement needs to be performed again.)
- After background measurement ends, drag the plan to the measurement area (or click Measure on the right side of the plan).
- Click "Start" to enter the measurement state, then execute the patient's QA plan on the accelerator.
  - *Note: If the QA plan's gantry and collimator are zeroed, they need to be zeroed when executing the plan. If the QA plan's gantry and collimator*

are generated at actual angles, they do not need to be zeroed when executing the plan.

- After the accelerator plan execution ends, click "Stop" to stop the measurement.

Step 6: Calculation

- After the measurement ends, the interface will automatically calculate and display the gamma pass rate.
- Double-click the plan to enter the details interface. You can adjust calculation parameters on the left, and click the "Calculate" button to recalculate the gamma pass rate based on the updated parameters.
- The details interface also supports more settings and operations on the plan.

7. Service and Support

7.1. Frequently Asked Questions

Problem	Possible Cause	Solution
Cannot find device on computer or network	IP/Subnet Mask not entered correctly	Turn on device, check IP/Subnet Mask settings
	Device and computer have different gateways	Check gateway settings
	Ethernet cable/port damaged or disconnected; network socket disconnected	Replace cable or repair network socket
	Firewall enabled, blocking communication	Turn off firewall
	Laptop has WiFi interface	Verify wireless connection is turned off
Cannot install/modify/set up device on computer	Operator does not have administrator privileges	Obtain administrator privileges before operation

7.2. Software Updates and Fixes

(1) Obtain Installation Package

Raydose regularly maintains the software. Currently, new versions cannot be obtained directly online. When a new version is released, users can contact Raydose sales personnel or agents to obtain the updated version. Simultaneously, we will notify users promptly and inquire if a version update is needed.

(2) Installation Steps

- Download the latest update package.
- Double-click the update package to install, follow the installation wizard to complete the update.
- After the update is complete, restart the software for it to take effect.

(3) Update Content

- Feature Enhancements: Add or optimize existing features to improve user experience.
- Bug Fixes: Fix known software issues to enhance system stability.
- Performance Optimization: Optimize software performance, reduce latency, improve operational efficiency.

(4) Precautions

- Ensure stable power connection for the device during the update process to avoid update interruption.
- It is recommended to back up important data before updating to prevent

unexpected situations.

(5) Technical Support

If any problems are encountered during the update process, or abnormalities occur after the update, users can contact the Raydose after-sales service department for further assistance.

7.3. Technical Support

For technical support, please contact the local agent or sales personnel, or contact the Raydose after-sales service department through the following methods.

- Company Website: https://www.raydose.com
- Email: service@raydose.com

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