

Installation and Image Verification Guide

Version 2.0



The Installation and Image Verification Manual contains information for appropriate Installation and Image verification of RIOScan. The operator should read this document carefully before using the product. It is required to follow the instructions and safety information described herein the Installation and Image Verification Manual to prevent any injuries or material damages.

Caution (US only): This product should be sold only to or by the order of a dentist or dental professional by the Federal Law.

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This manual is valid for following software revisions: RIOView Ver. 1.1 or higher.

This manual is subject to change without prior notice.

For further inquiries, contact your sales representative or customer service of manufacturer.



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RIOScanManager

1

1 RIOScan Manager

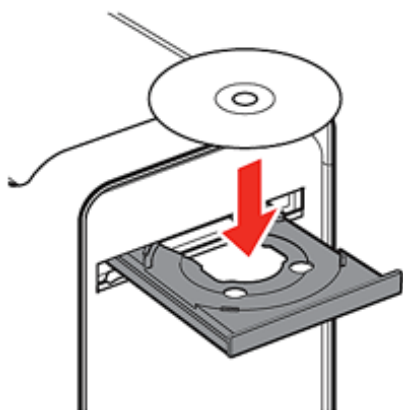


Restart the device after any modifications changed in RIOScanManager. Otherwise, the device might not function properly.

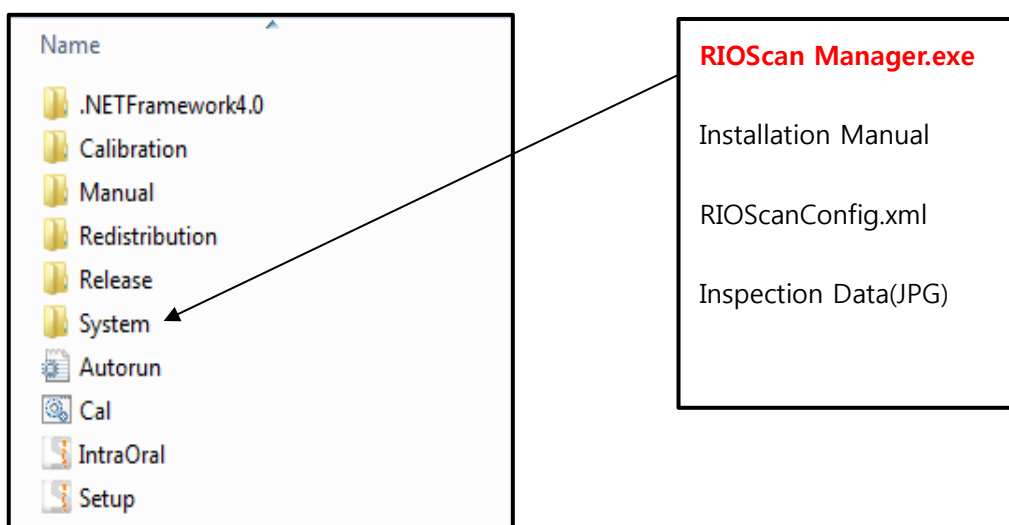
Please make sure the lists before proceed RIOScanManager.

- Manufacturer's recommended PC specifications
- Prepare CD (RIOView Ver. 1.1) to install the software

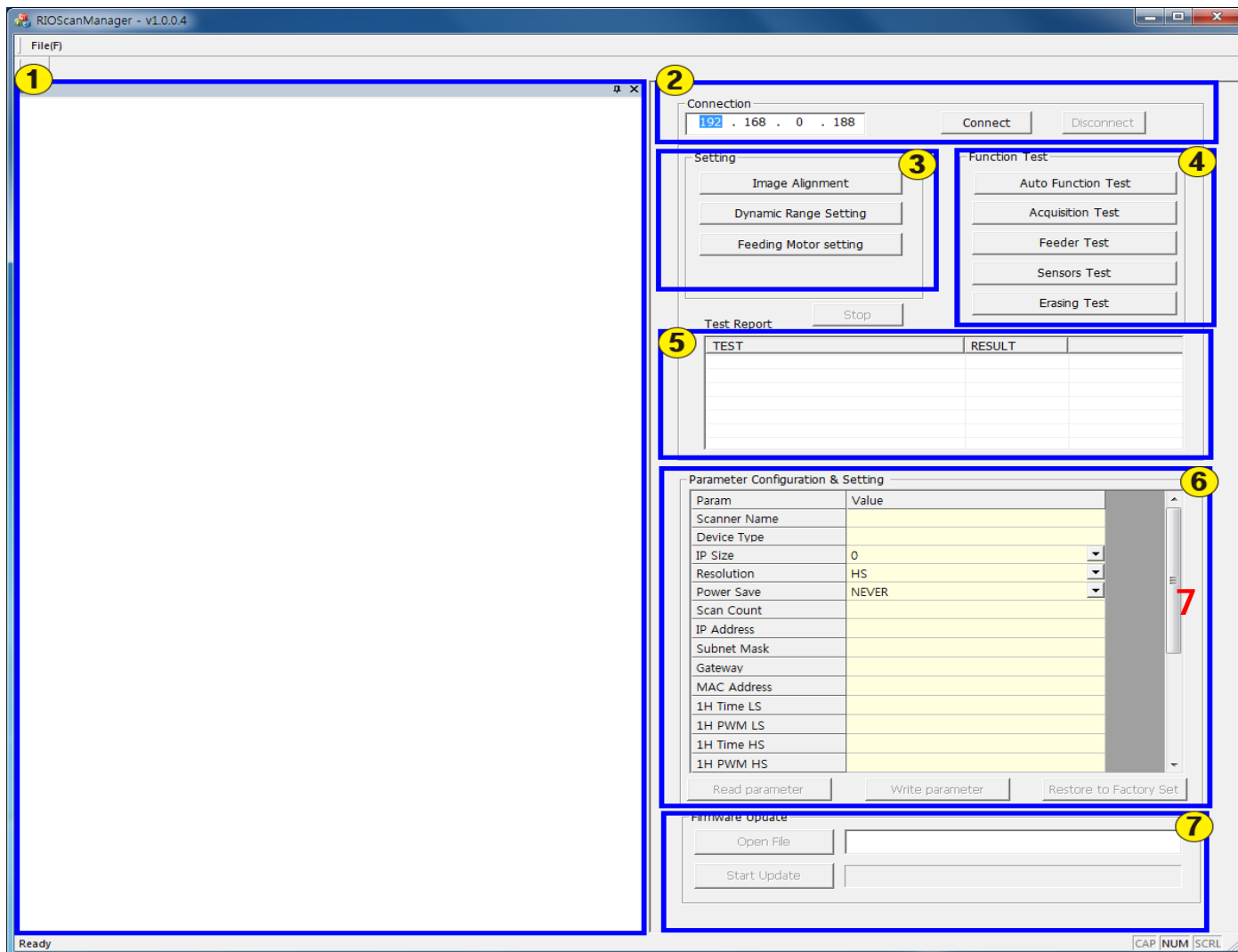
(1) Insert CD in the CD-ROM.



(2) Go to the System folder inside the CD-ROM and run **RIOScan Manager.exe**.



■ RIOScanManager Overview



- (1) **Log View:** It shows the records of communication and commands ordered.
- (2) **Connection:** IP setup section to connect RIOScanManager with a device.
- (3) **Setting:** The menu is consisted of Image Alignment / Dynamic Range Setting / Feeding Motor Setting test.
The tests provides to calibrate the Imaging plate system and x-ray source.
- (4) **Function Test:** The system checks the operation of each component. A user can select either Auto Function Test or manual test as preferred.
- (5) **Test Report:** It displays the result of Function Tests.
- (6) **Parameter Configuration & Setting:** A user can check the current parameters on MCB (Main Control Board) and upload modifications back to a device.
- (7) **Firmware Update:** A user can update firmware for new features and fixes on previous version.



Refer to Service Manual for more details about RIOScanManager.

Function Test

2

2 Function Test

The system automatically tests from Acquisition Test to Erasing Test in an order. The function should be preformed during the initial installation onsite.



- **Acquisition Test**

: The system checks the interface among ROB (Read Out Board) module, ASM Optical Module, and MCB (Main Control Board).

- **Feeder Test**

: The system operates ASM Feeder Module at different speeds to check the components.

- **Sensors Test**

: The system operates each sensor on Imaging plate and guides to check the functions.

- **Erasing Test**

: The system operates Erasing module Lamp to check the functions.

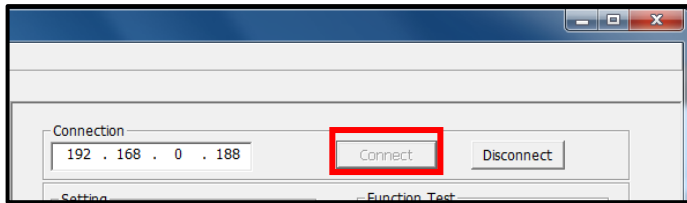


Refer to Service Manual for more details about RIOScanManager.

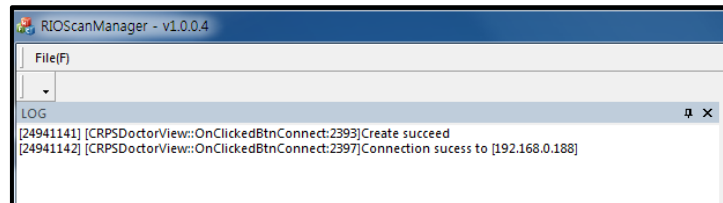
2.1 Acquisition Test

The system checks the interface among ROB (Read Out Board) module, ASM Optical Module, and MCB (Main Control Board).

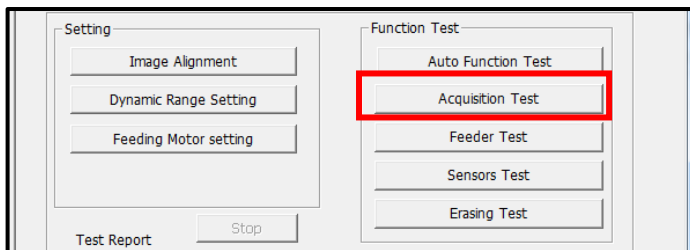
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



The messages are generated on Log View if the connection succeeded correctly.



- 2) Click on Acquisition Test button and wait for the tests are finished.



- 3) Check the results of test on Test Report. Please fill out the test result in Installation Report. Refer to Service Manual if any failure occurred.

```
[26945034]
[26945034] *****
[26945034]
[26945034]
[26963704] [CRPSDoctorView::OnUmCmdMsg:662] Res_ImageWith
[26963816] [CRPSDoctorView::OnUmCmdMsg:673]RES_SEND_IMAC
[26963928] [CRPSDoctorView::OnUmCmdMsg:684]RES_SEND_IMAC
[26963930] Connection success : CRPSDoctorView::ReqReadStart:
[26963930] [CRPSDoctorView::ReqReadStart:1154] Create UDP Sock
[26966502] [CRPSDoctorView::OnUmCmdMsg:698]Scan Finish
[26966502] [CRPSDoctorView::OnUmStatusChange:1622]Raw File C
[26966502]
[26966503]
[26966503]
[26966503]
[26966503]
[26966504]
[26966504]
[26966505] ROB Interface Diagnostic
[26966505] -> ROB LOGIC TEST OK
[26966505] -> ROB TO MCB PATH TEST OK
[26966506] -> MCB TO PC INTERFACE TEST OK
[26966506]
[26966506] Beam Control Diagnostic
[26966506] -> BLDC TEST OK
[26966506] -> DISK & ENCODER TEST OK
[26966507]
[26966507]
```

Test Report

TEST	RESULT
ROB LOGIC TEST	OK
ROB TO MCB PATH TEST	OK
MCB TO PC INTERFACE TEST	OK
BLDC TEST	OK
DISK & ENCODER TEST	OK

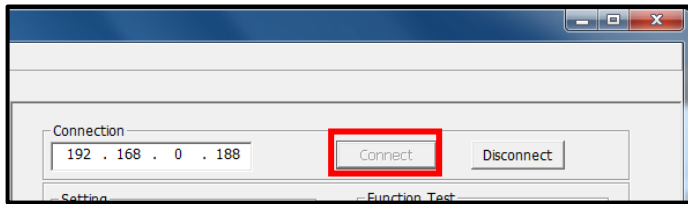
Parameter Configuration & Setting

Param	Value
Scanner Name	
Device Type	
IP Size	0
Resolution	HS
Power Save	NEVER
Scan Count	
IP Address	
Subnet Mask	

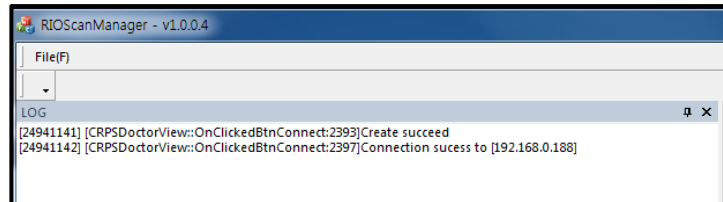
2.2 Feeder Test

The system operates ASM Feeder Module at different speeds to check the components.

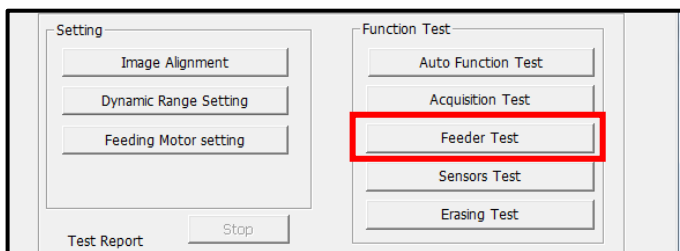
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



The messages are generated on Log View if the connection succeeded correctly.



- 2) Click on Feeder Test button and wait for the test finished.



- 3) Check the result of test on Test Report. Please fill out the test result in Installation Report. Refer to Service Manual if any failure occurred.

```
[73352177]
[73352177] #####
[73352177] Feeder Diagnostic
[73352177] 1. RIOScanManager will check the Feeder module of RIOScan.
[73352178] 2. Please wait until the test is finished.
[73352178] #####
[73352178] [73440975] [CRPSDoctorView::OnUmCmdMsg:865]Time is 7437 msec, result in I
[73440975] It tooks 89 sec
[73440976]
[73440976] #####
[73440976] Test Report
[73440977] -> FEEDER TEST OK
[73440977] #####
[73440978] [73440978] [CRPSDoctorView::OnUmSendTestCmd:1748]TEST_CMD_FEEDER_TEST
[73440978] [CRPSDoctorView::SendProtocol:1301] CMD (29193) Send Bytes=10
[73441477] [CRPSDoctorView::SendProtocol:1301] CMD (4115) Send Bytes=10
[73441681] [CRPSDoctorView::OnClickedBtnDisconnect:2472] DataSocket is Dis
```

Feeding Motor setting

Feeder

Sensor

Erasing

Test Report

Stop

TEST	RESULT
FEEDER TEST	OK

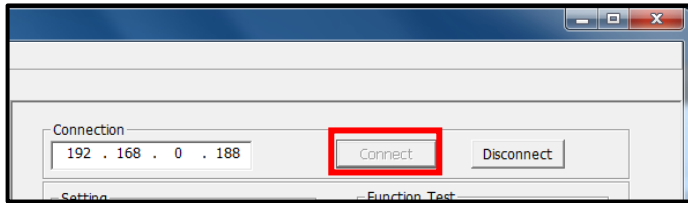
Parameter Configuration & Setting

Param	Value
Scanner Name	
Device Type	
IP Size	0
Resolution	HS

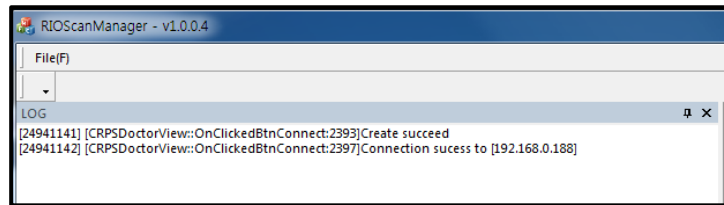
2.3 Sensors Test

The system operates each sensor on Imaging plate and guides to check the functions.

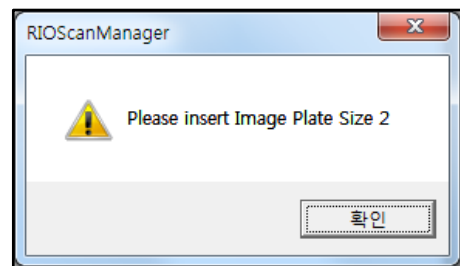
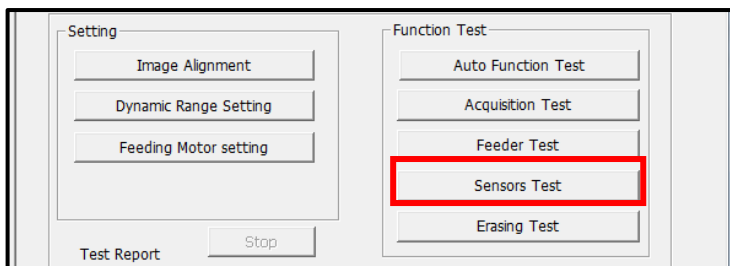
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



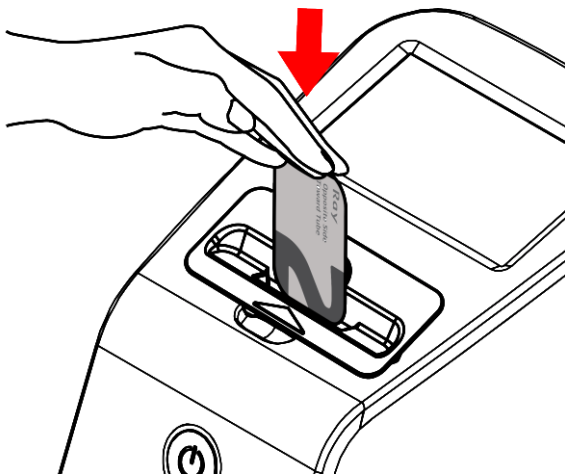
The messages are generated on Log View if the connection succeeded correctly.



- 2) Click on Sensors Test button. Click “OK” button on pop-up window for the confirmation.



- 3) Insert Imaging palte size 2 and tap “Touch to Scan” button on LCD monitor.



- 4) Check the result of test on Test Report. Please fill out the test result in Installation Report. Refer to Service Manual if any failure occurred.

The screenshot displays a software interface with a log window on the left and a control panel on the right.

Log Window (Left):

- SENSOR Diagnostic**
 - 1. Insert the Image Plate Size2 into the IP Guide.
 - 2. Please wait until the test is finished.
- Test Report**
 - > Insertion Panel Sensor OK
 - > IP Insertion Sensor OK
 - > IP Position Sensor OK

Control Panel (Right):

- Dynamic Range Setting**
- Feeding Motor setting**
- Stop** button
- Test Report** table:

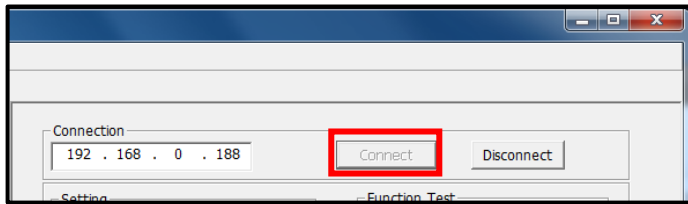
TEST	RESULT
Insertion Panel Sensor	OK
IP Insertion Sensor	OK
IP Position Sensor	OK
- Parameter Configuration & Setting** table:

Param	Value
Scanner Name	
Device Type	
IP Size	0
Resolution	HS
Power Save	NEVER
Scan Count	
IP Address	
Subnet Mask	

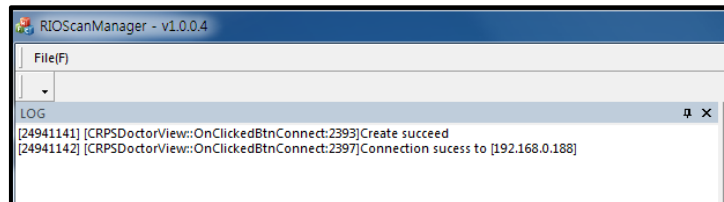
2.4 Erasing Test

The system operates Erasing module to check the functions.

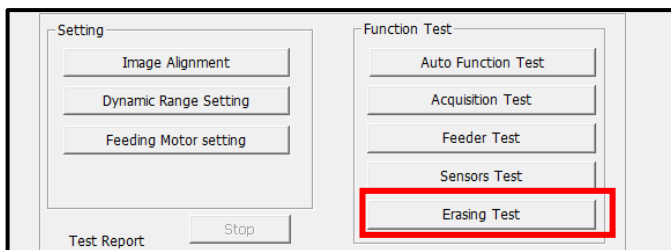
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



The messages are generated on Log View if the connection succeeded correctly.

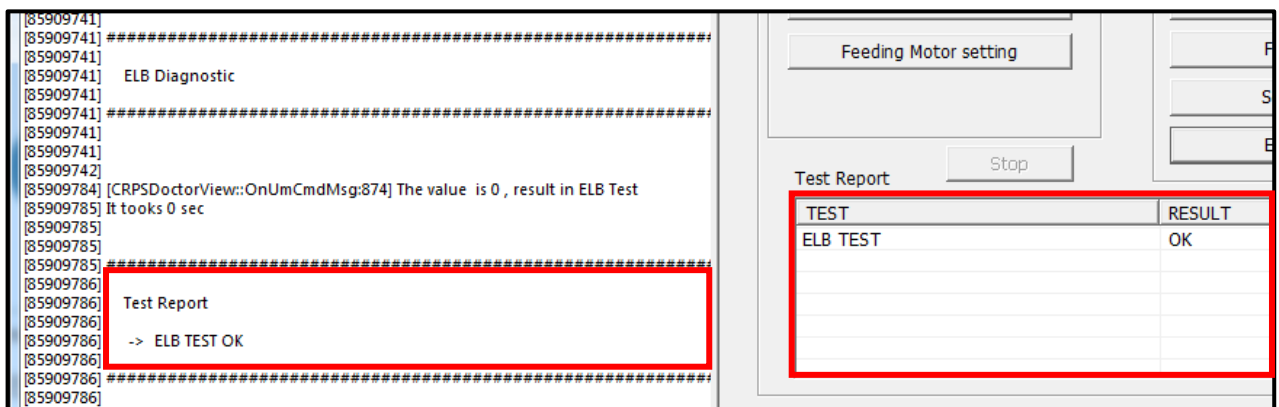


- 2) Click on Erasing Test button and wait for the test finished.



- 3) Check the result of test on Test Report. Please fill out the test result in Installation Report.

Refer to Service Manual if any failure occurred.



Setting

3

3 Setting

In order to optimize the X-ray image quality, it is highly required to proceed the scanner and x-ray source calibration.



- **Feeding Motor Setting**

: Realign the length of an objet for X-ray image distortion.

- **Image Acquisition**

: Calibrate the margin-ratio of Imaging plate after the IP inserted.



Refer to Service Manual for more details about RIOScanManager.

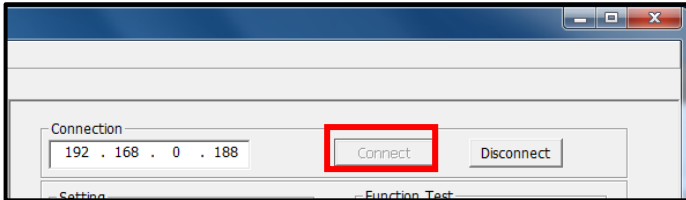
3.1 Feeding Motor Setting

Realign the length of an object for X-ray image distortion.

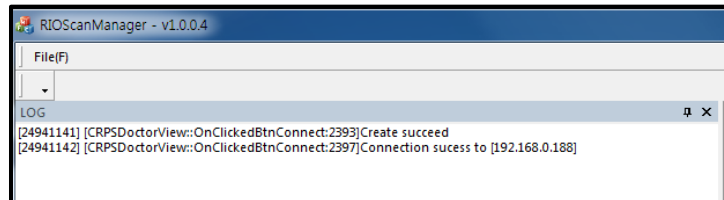


All resolution modes (HS, HR, and SHR) should be performed.

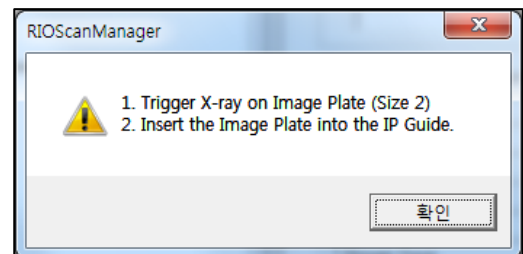
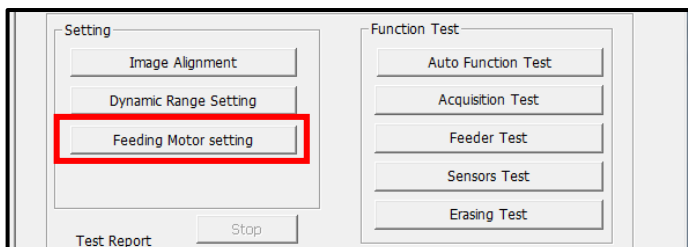
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



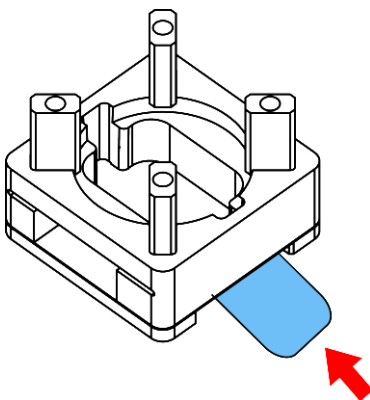
The messages are generated on Log View if the connection succeeded correctly.



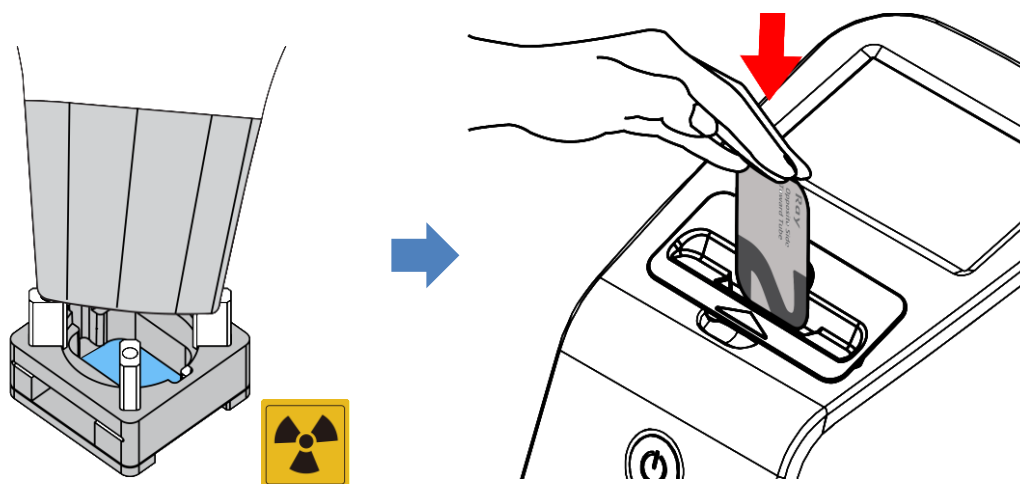
- 2) Click on Feeding Motor Setting button. Click “OK” button on pop-up window for the confirmation.



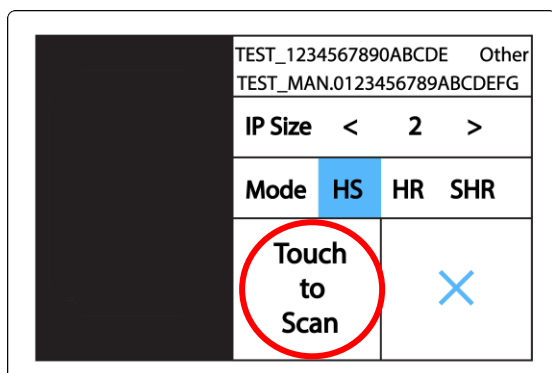
- 3) Place Imaging plate (Size 2) underneath Step wedge phantom as the figure.



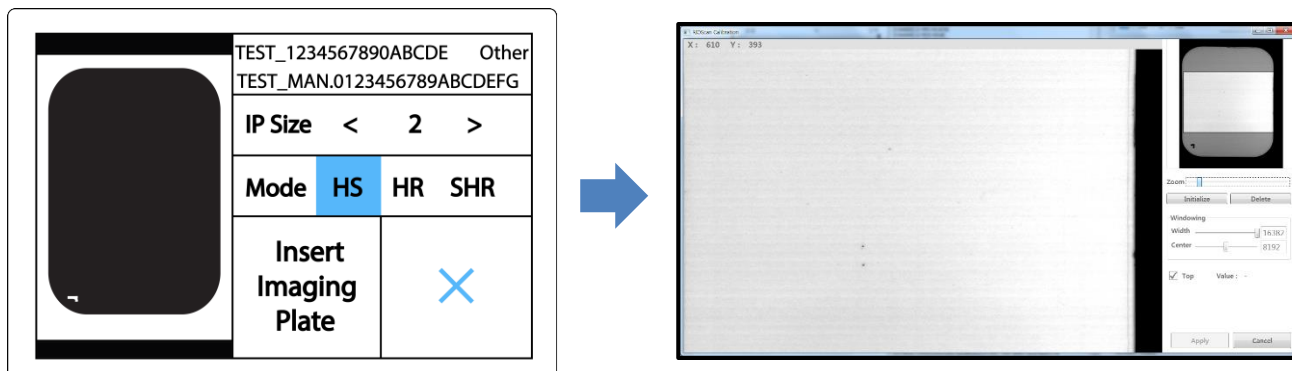
- 4) Insert the Imaging plate (Size 2) as soon as trigger X-ray on the plate.



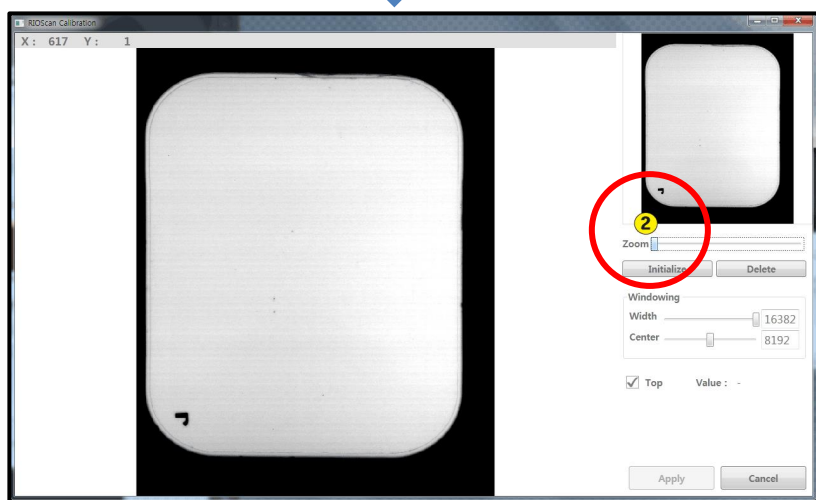
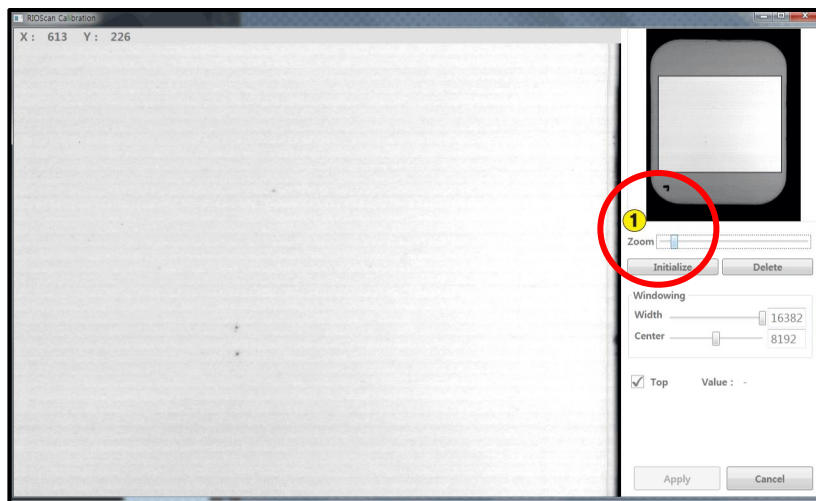
- 5) Select HS mode (default) on RIOScan LCD monitor and tap “Touch to Scan” button.



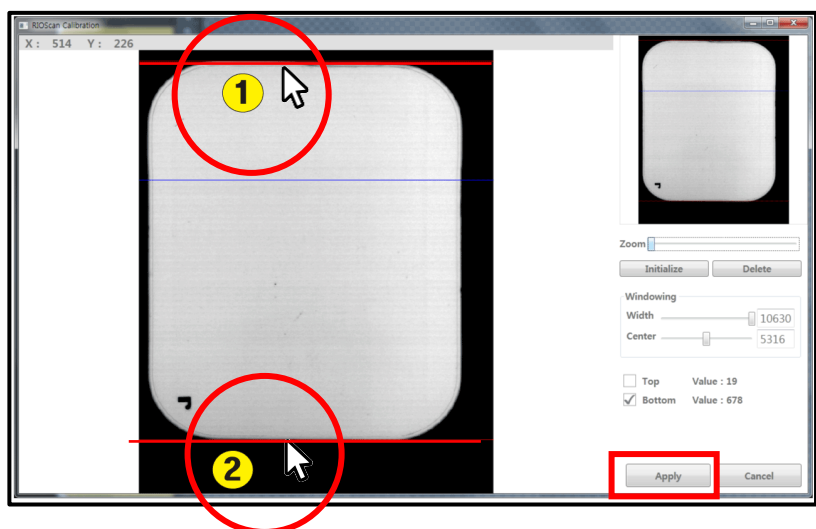
- 6) As soon as the scan finished, RIOScan Calibration View will pop-up.



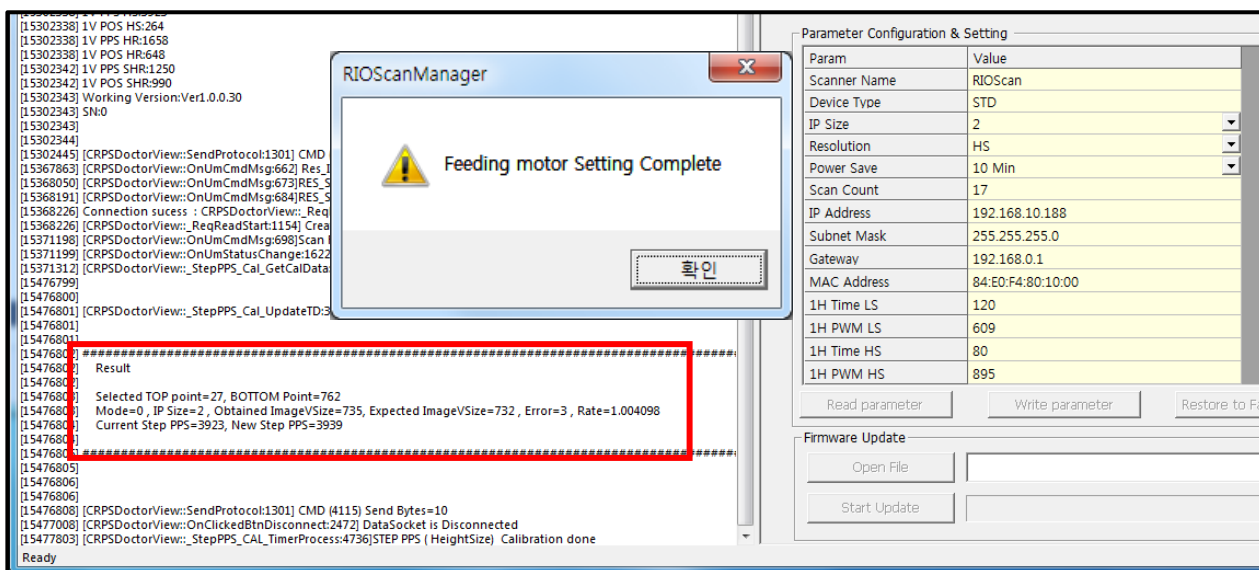
7) Move the Zoom function to the left to see the image at once.



8) Use the red-lines as an indicator and click upside/downside-ends. Then, click on "Apply" button.



- 9) Check the result of test is in reference range of ± 10 Pixel on Log View. Please fill out error value in Installation Report.



Reference range for Feeding Motor Setting is:

- Error : ± 10 Pixel

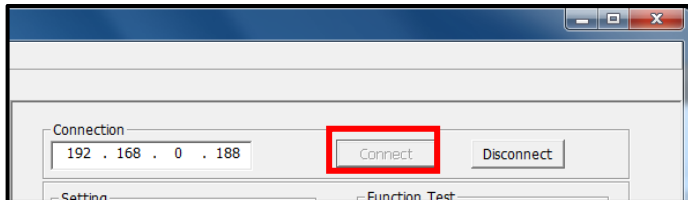
3.2 Image Alignment

Calibrate the margin-ratio of Imaging plate after the Imaging plate inserted.

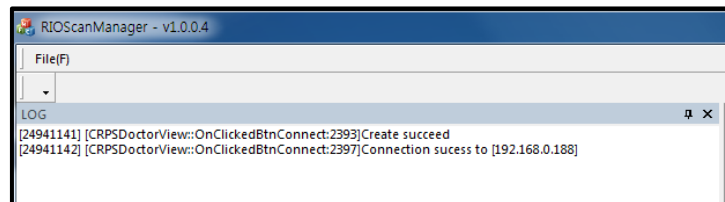


All resolution modes (HS, HR and SHR) should be performed.

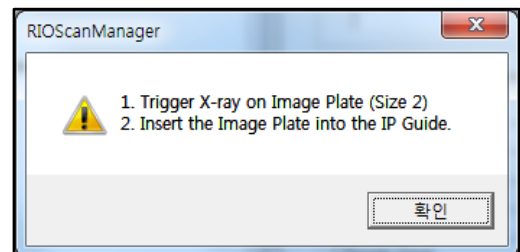
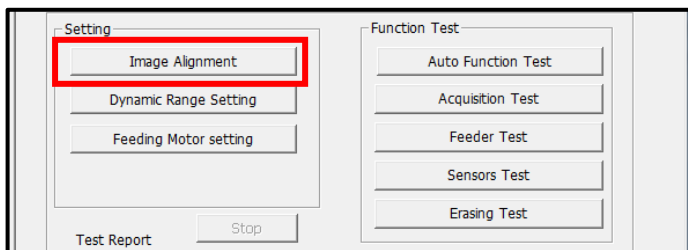
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



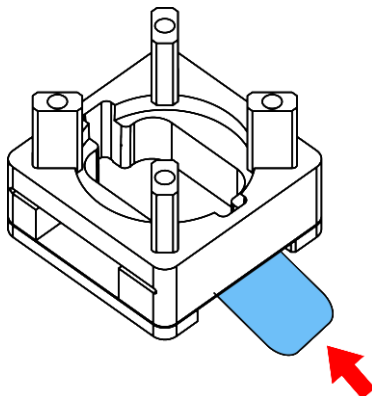
The messages are generated on Log View if the connection succeeded correctly.



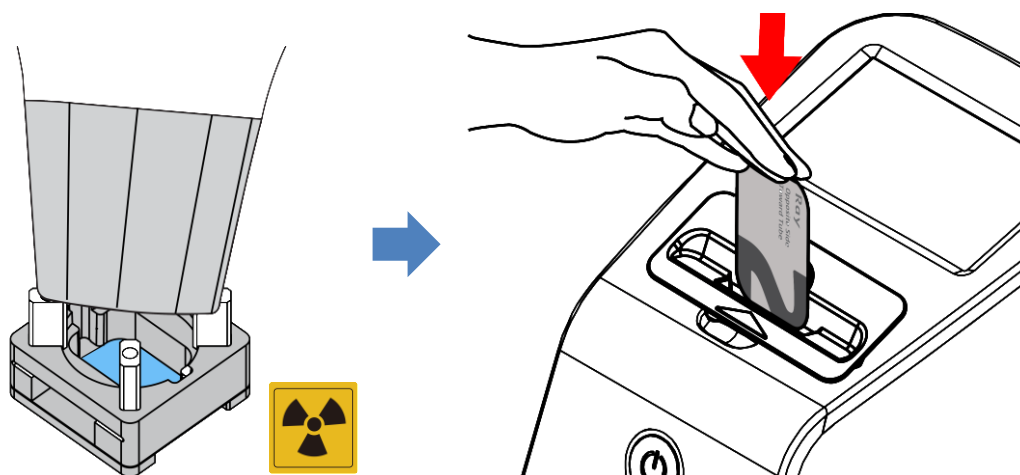
- 2) Click on Image Alignment button. Click “OK” button on pop-up window for the confirmation.



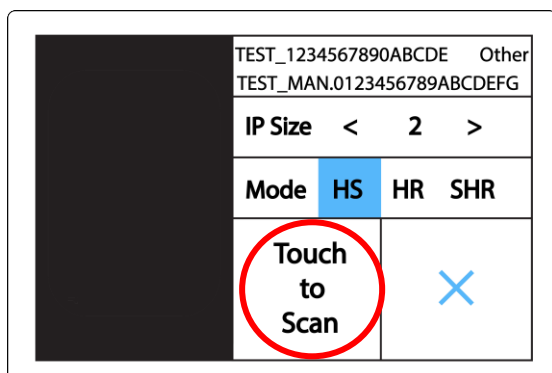
- 3) Place Imaging plate (Size 2) underneath Step wedge phantom as the figure.



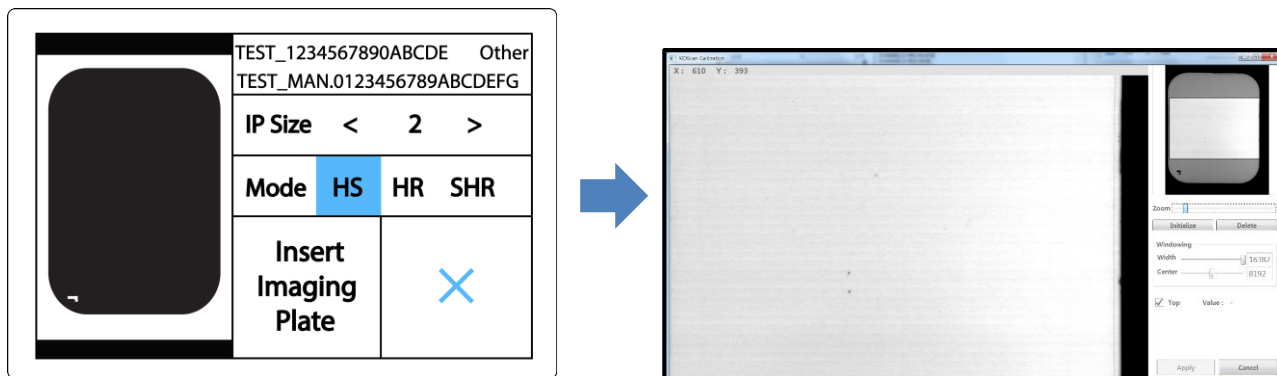
- 4) Insert the Imaging plate (Size 2) as soon as trigger X-ray on the plate.



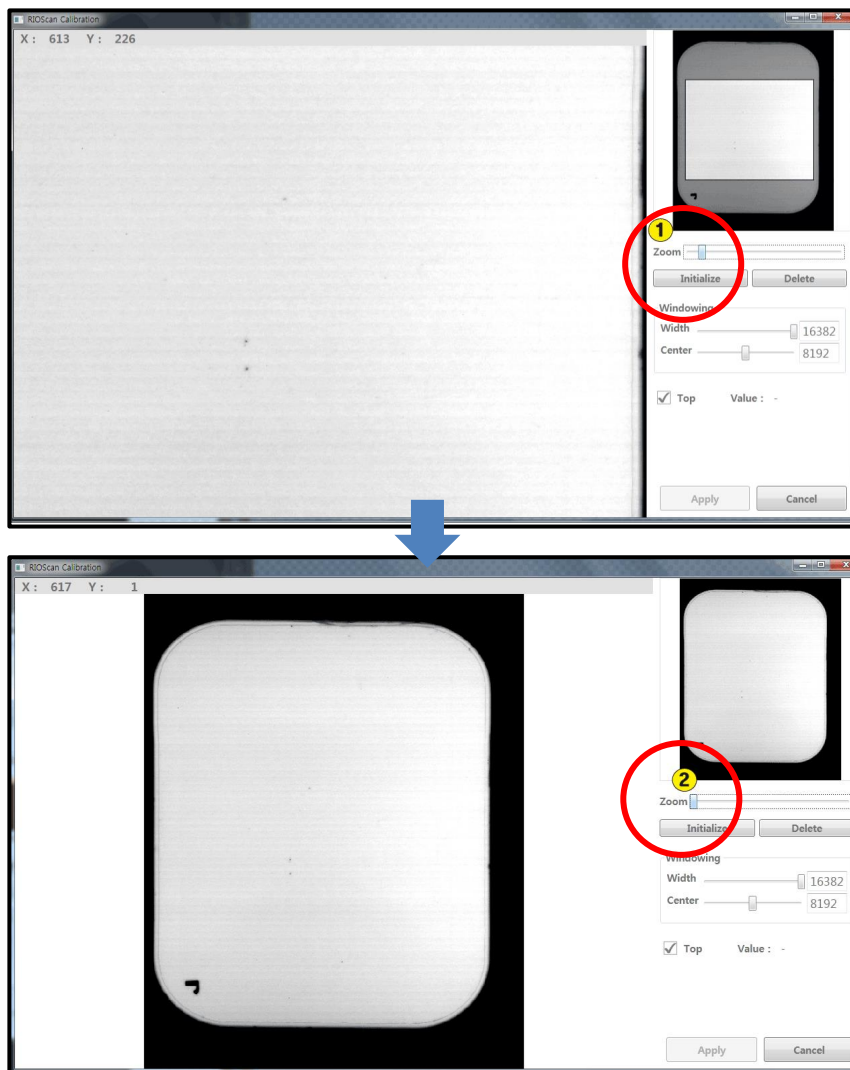
- 5) Select HS mode (default) on RIOScan LCD monitor and tap “Touch to Scan” button.



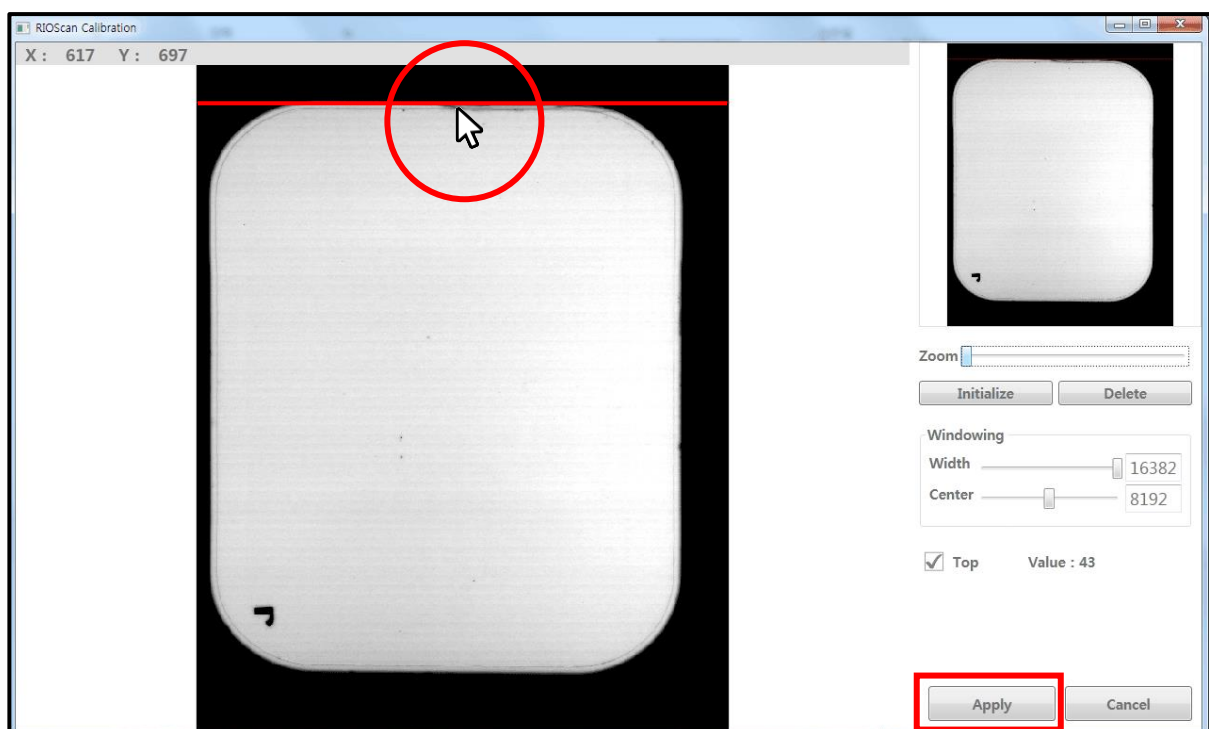
- 6) As soon as the scan finished, RIOScan Calibration View will pop-up.



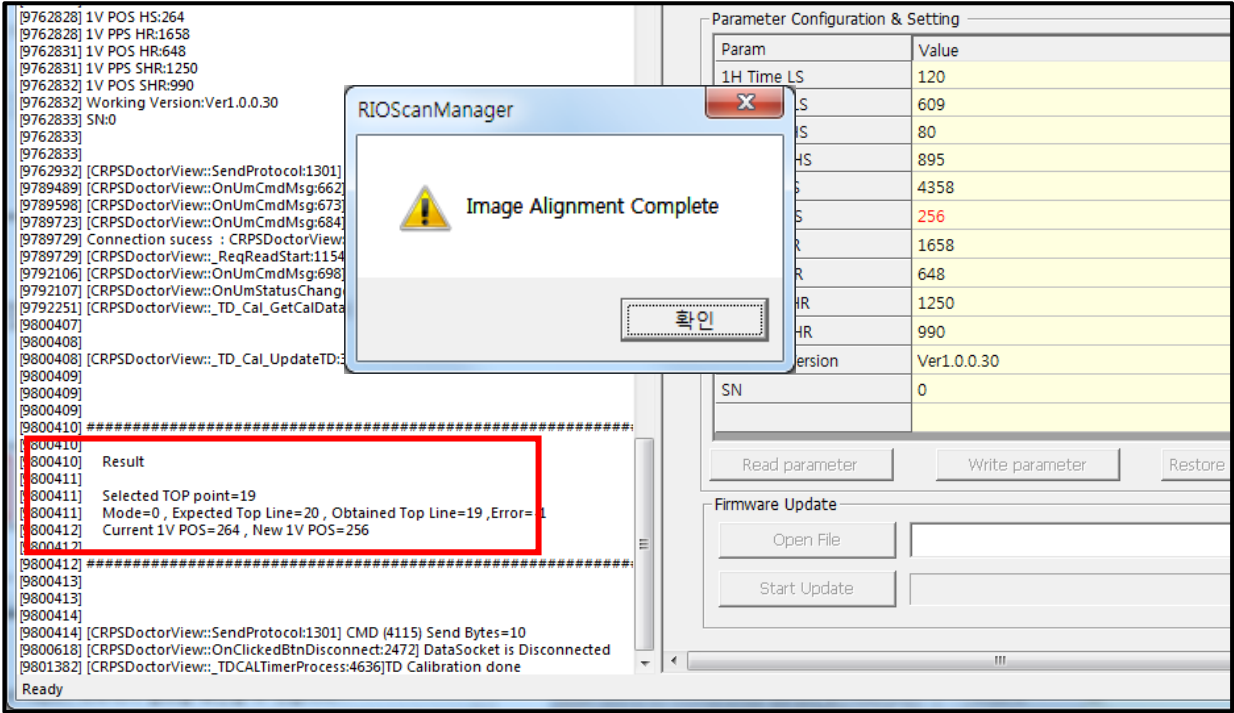
7) Move the Zoom function to the left to see the image at once.



8) Use the red-line as an indicator and click the upside-end. Then, click on "Apply" button.



9) Check the result of test is in reference range of ± 5 Pixel on Log View. Please fill out error value in Installation Report.



Reference range for Image Alignment is:

- Error : ± 5 Pixel

Image Verification

4

4 Image Verifications

Dynamic Range Setting enables to optimize X-ray source and Acceptance Test establishes an acceptable baseline as well as monitoring the processing for quality assurance test.



- **Dynamic Range Setting**

: Exposure Step Wedge and recalibrate the X-ray source as a reference guide.

- **Acceptance Test**

: Test conducted to determine if the requirements of a specification or contract are met with QC Test phantom.

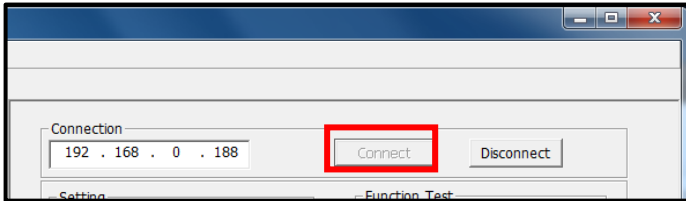
4.1 Dynamic Range Setting

Expose Step wedge and recalibrate the X-ray source as a reference guide.

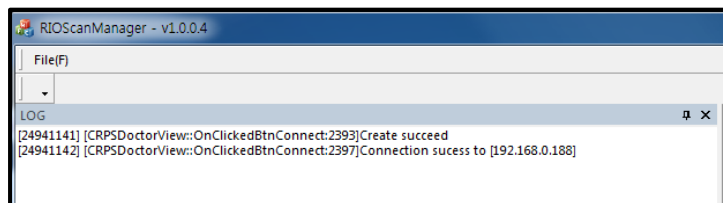


This test might be performed at the initial installation onsite.

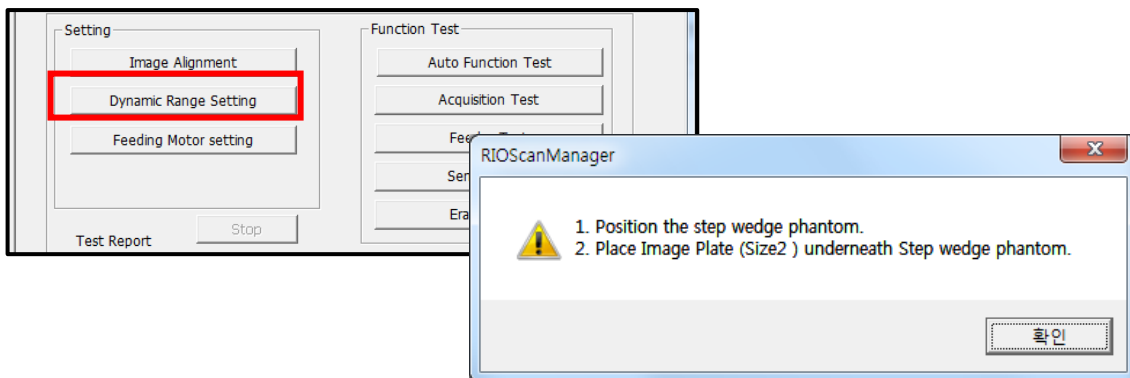
- 1) Type the same IP Address on Connection section from RIOScan device. Then, click on Connect button.



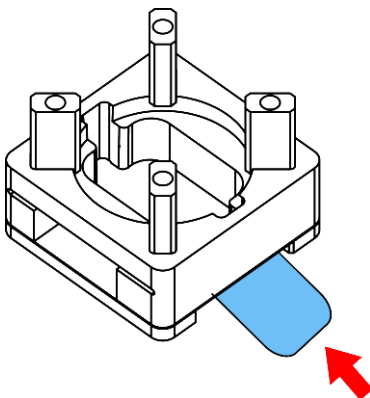
The messages are generated on Log View if the connection succeeded correctly.



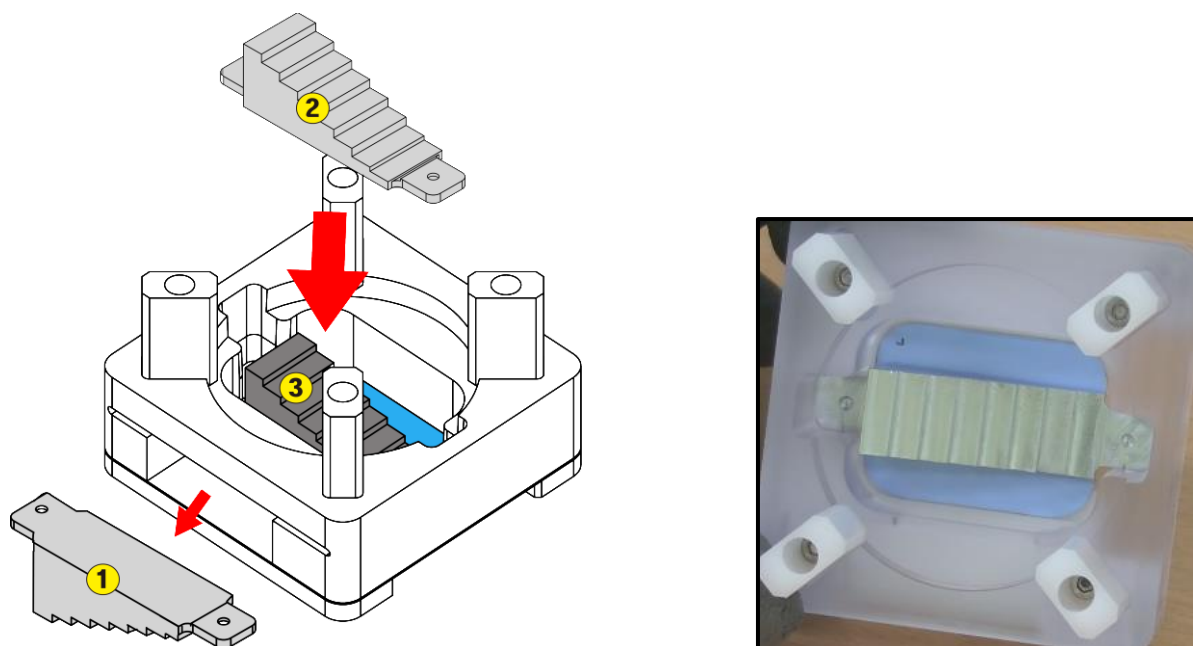
- 2) Click on Dynamic Range Setting button. Click 'OK' button on pop-up window for the confirmation.



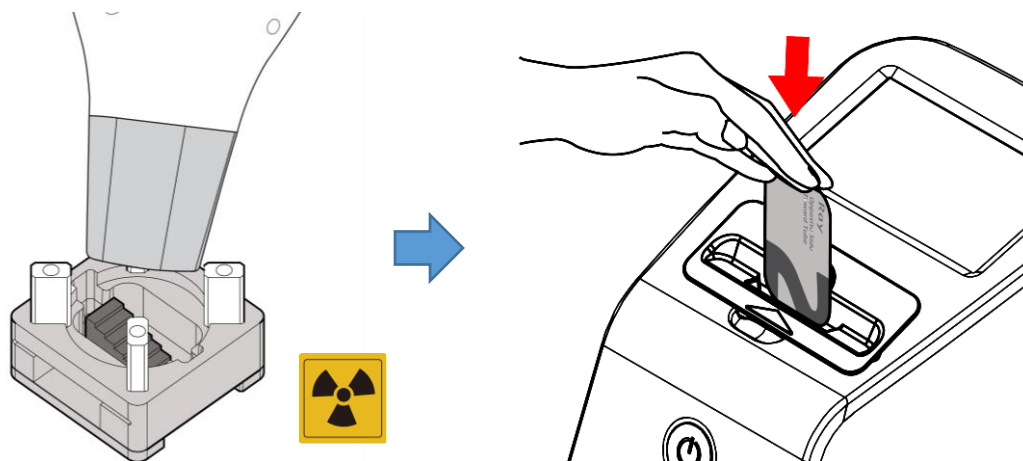
- 3) Place Imaging plate (Size2) underneath Step wedge phantom as the figure.



- 4) Separate the Step Wedge on side and place on the Phantom holder as the figure.



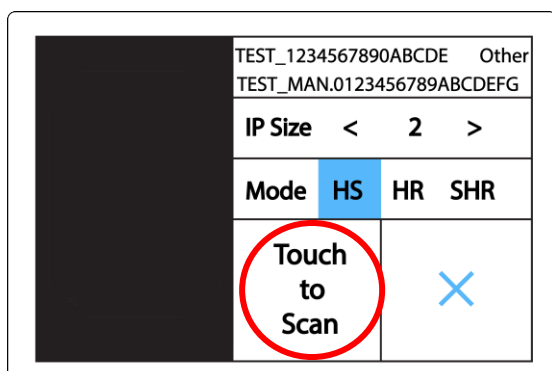
- 5) Insert the Imaging plate (Size2) as soon as trigger x-ray on the plate.



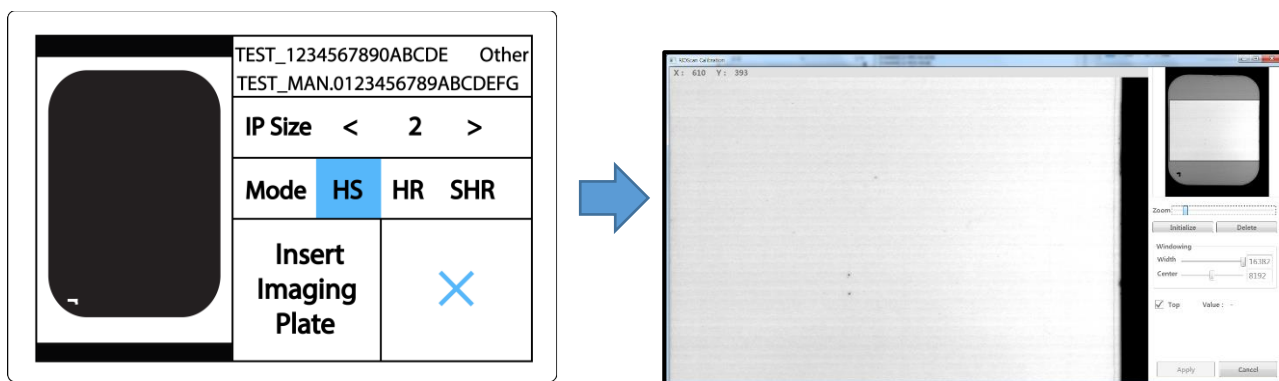
Step Wedge Phantom exposure value

- ① Standard X-ray(70kV/7mA) unit : 0.14 ~ 0.18 sec
- ② Portable X-ray(60kV/2mA) unit : 0.25 ~ 0.30 sec

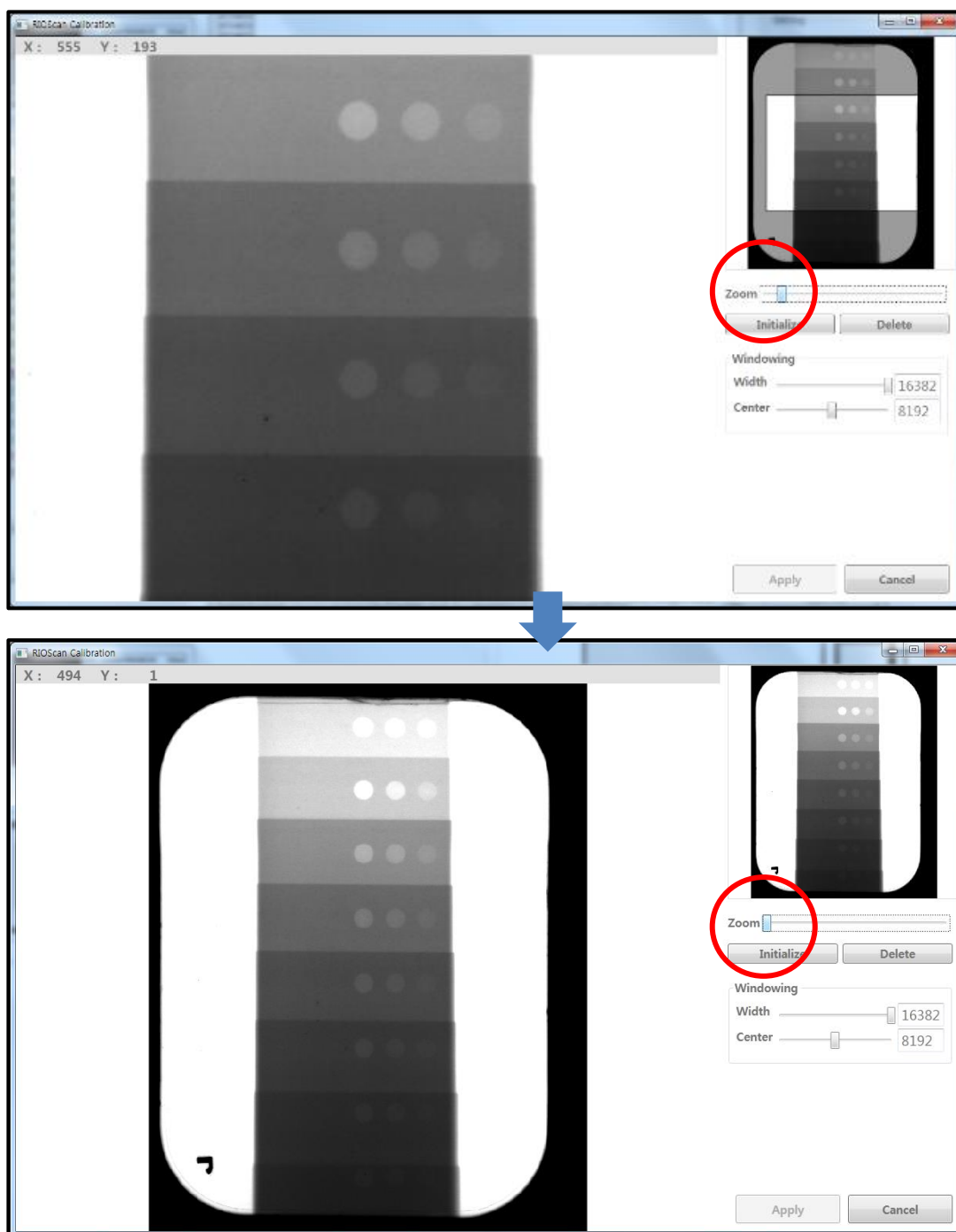
- 6) Select HS mode (default) on RIOScan LCD and tap “Touch to Scan” button.



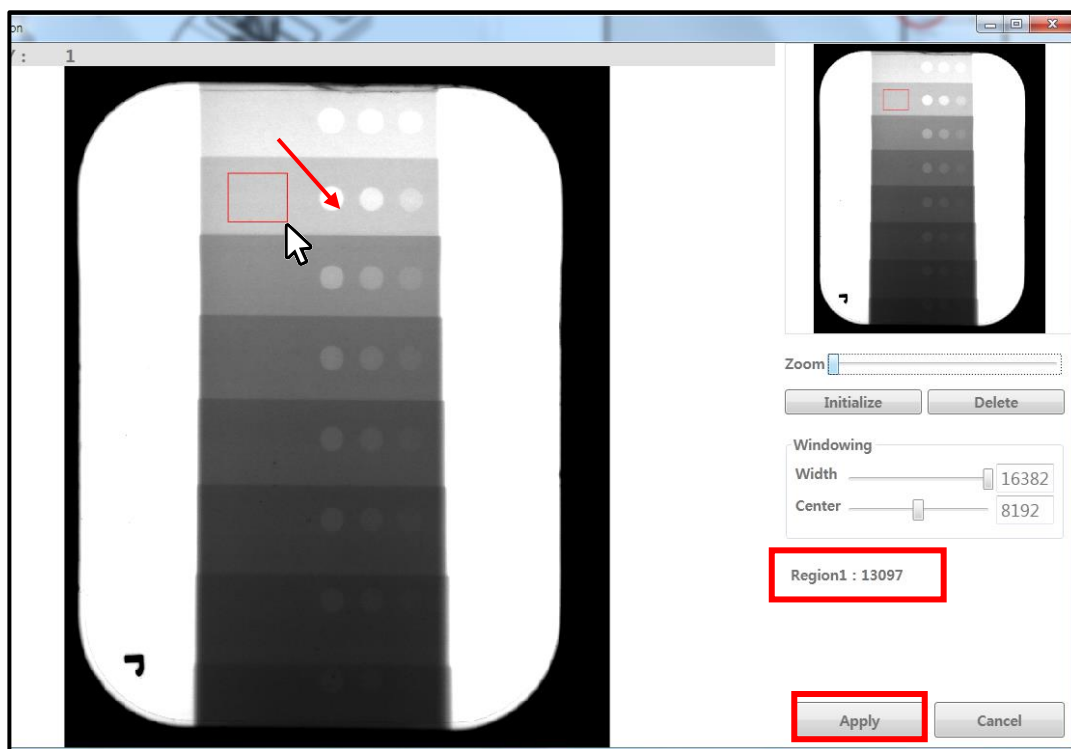
7) As soon as the scan finished, RIOScan Calibration View will pop-up.



8) Move the Zoom function to the left to see the image at once.



- 9) Drag the ROI on the 2nd step of wedge on RIOScan Calibration View. Check the value on the right hand side. Please fill out error value in Installation Report. Refer to Service Manual if any failure occurred.



2nd Step ROI Value reference range (Mandible Molar)
: 12000 ~ 14000

- 2nd Step ROI Value 12000 ~ 14000 exposure time = A or a

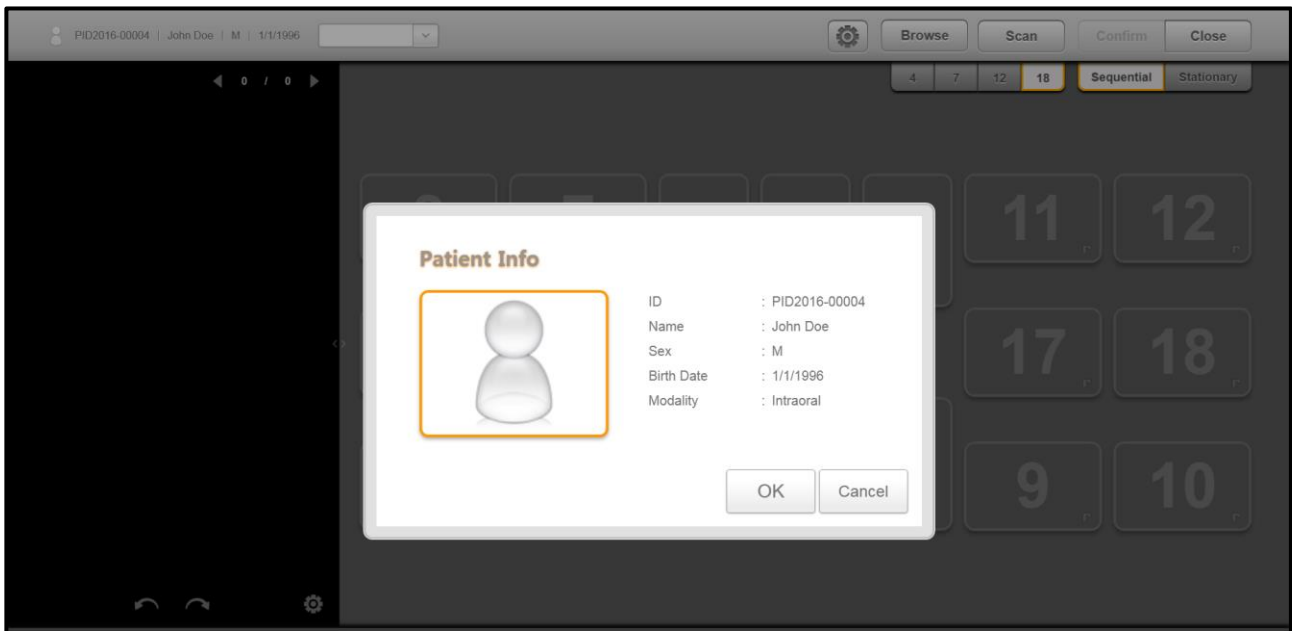
Protocol		Exposure values (sec)	
		Standard X-ray	Portable X-ray
Maxilla	Incisors	A - 0.04	a - 0.05
	Premolars and Canines	A - 0.02	a + 0.05
	Molars	A + 0.02	a + 0.15
Mandible	Incisors	A - 0.06	a - 0.10
	Premolars and Canines	A - 0.04	a - 0.05
	Molars	A	a

< Exposure Value Recommendation with Step Wedge Phantom >

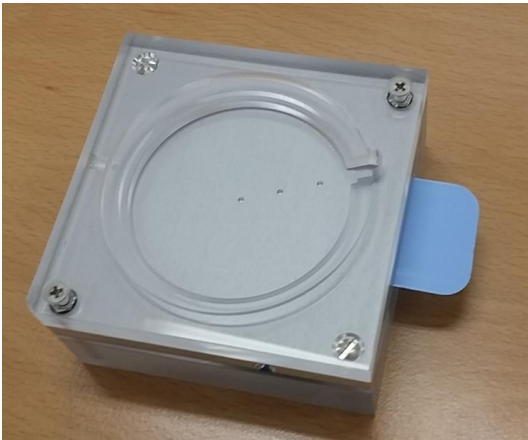
4.2 Acceptance Test

Test conducted to determine if the requirements of a specification or contract are met with QC Test phantom.

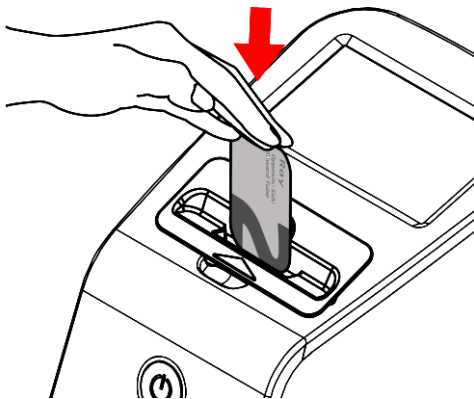
- (1) Run RIOView software to acquire x-ray image. (The UI should be different on 3rd party imaging software.)



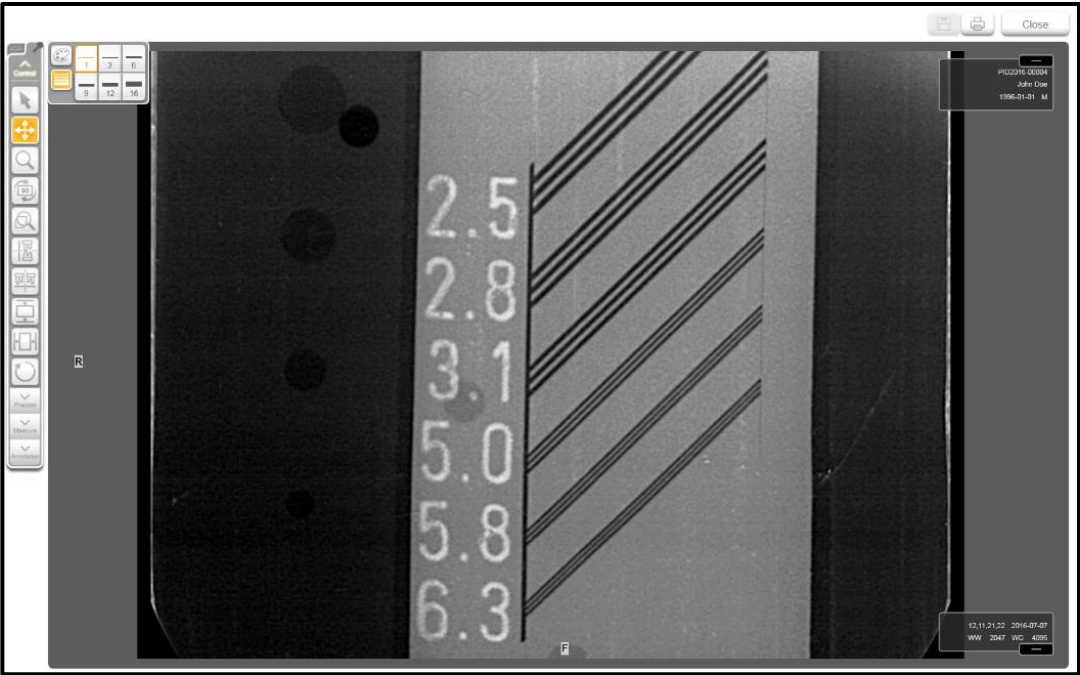
- (2) Place Imaging plate (Size 2) underneath QC phantom(QUART: digitest2.0) as the figure.



- (3) Insert the Imaging plate (Size 2) as soon as trigger X-ray on the plate.



(4) Check the X-ray image in the viewer. Please screen-capture the result image and attach in Installation Report.

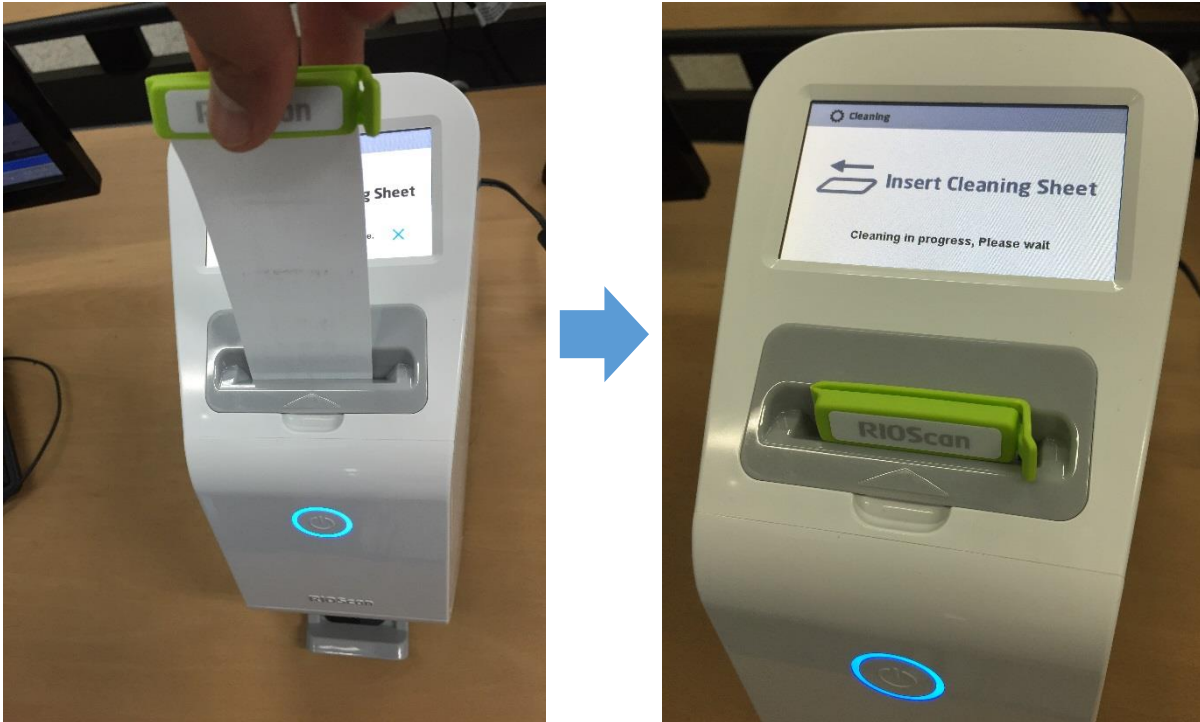


Cleaning

5

5 Cleaning

- 1) Prepare a cleaning sheet clip, sheet and guide.
- 2) Place the cleaning sheet guide onto the scanner.
- 3) On the touch screen menu, select the cleaning function.
- 4) Prepare the cleaning sheet and clip the holder at one end.
- 5) Touch the screen and insert the cleaning sheet as below image.




- 6) Cleaning will automatically proceed when the cleaning sheet is inserted. When cleaning is complete, the sheet will automatically remove itself from the scanner.
- 7) Repeat the cleaning process two or three times to completely remove dust or other foreign substances in the scanner.

Appendix

RIOScan - Installation Report

Customer Information					
Name				Phone	
Street				Fax	
City		Zip code		e-mail	
Installer Information					
Name				Phone	
Company		Country		e-mail	
Product Information					
Device Option	<input type="checkbox"/> Standard			Serial Number	
	<input type="checkbox"/> Standard with Occlusal Kit (Optional)			Installation Date	
X-ray Unit					
Generator Type	<input type="checkbox"/> Standard / Wall		Manufacturer / Model		
	<input type="checkbox"/> Portable		kV / mA		
Configurations					
IP setting	<input type="checkbox"/> Use factory default (192.168.0.188)			<input type="checkbox"/> Etc. [. . .]	
Device setup	<input type="checkbox"/> Direct connection type			<input type="checkbox"/> Network connection type	
Integration	<input type="checkbox"/> RIOView		<input type="checkbox"/> TWAIN	<input type="checkbox"/> SDK	<input type="checkbox"/> PACS
Verifications					
Acquisition Test	Check if all lists (5) are passed in Test Report.				<input type="checkbox"/> OK <input type="checkbox"/> NG
Feeder Test	Check if Feeder test is passed in Test Report.				<input type="checkbox"/> OK <input type="checkbox"/> NG
Sensors Test	Check if all lists (3) are passed in Test Report.				<input type="checkbox"/> OK <input type="checkbox"/> NG
Erasing Test	Check if ELB test is passed in Test Report.				<input type="checkbox"/> OK <input type="checkbox"/> NG
Feeding Motor Set	Check if the error is in reference range of ± 10 Pixel on Log View.				[Error #]
Image Alignment	Check if the error is in reference range of ± 5 Pixel on Log View.				[Error #]
Dynamic Range	Check if the ROI of second step on Step Wedge is in 12,000~14,000.				[ROI]
Acceptance Test	High contrast (lp/mm)	<input type="checkbox"/> 3.1	<input type="checkbox"/> 5.0	<input type="checkbox"/> 5.8	<input type="checkbox"/> 6.3 <input type="checkbox"/> Etc.
	Low contrast (mm)	<input type="checkbox"/> 1.0	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.0	<input type="checkbox"/> 2.5 <input type="checkbox"/> Etc.
User Training					
<input type="checkbox"/> RIOScan System and Interface Overview.			<input type="checkbox"/> Maintenance and Quick Troubleshooting.		
<input type="checkbox"/> Acquiring images and software manipulations.			<input type="checkbox"/> Exposure value recommendation.		

RCS-RIOScan-01 (Rev.0)

Confirmation	
<p>■ I certify that the item of installed equipment was received and installed in a good condition.</p> <p>■ I certify that the user training was carried out on the check lists of the User Manual.</p>	
For RAY Co., Ltd.	For Distributor
Title :	Title :
Name:	Name:
Date:	Date:
Acceptance Test Image captured	Clinical Image captured
Installation Photo	
	<p>1. Please refer to Service Manual if you have any further inquiries during the installation.</p> <p>2. Please fill out the Installation Report and send to ray_cs@raymedical.co.kr.</p>



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