QA PHANTOM KIT USER MANUAL | Version 1.0.0

VATECH

Notice

This manual is intended to give information about VATECH PHANTOM KIT for 3D IMAGE QUALITY INSPECTION and CALIBRATION. It is recommended that you thoroughly familiarize yourself with this manual to perform the regular QA test effectively by using the PHANTOM KIT.

This manual is a part of the Phantom Kit so always keep this manual with the PHANTOM KIT.

Due to continuous technological improvements, the manual may not contain the most updated information. For further information not covered in this manual, please contact us at:

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This document is originally written in English.

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Manufactured by VATECH Co., Ltd.

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1. INTRODUCTION

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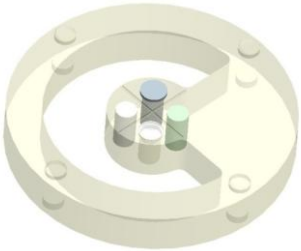
1.2 PHANTOM LIST

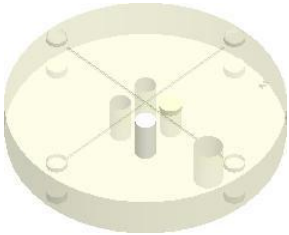
CT NUMBER CHECK PHANTOM(A-TYPE)



- Manufacturer
  - Vatech Company Limited
- Intended Use
  - CT Number Inspection
  - CT Number Calibration
- Complies with
  - IEC 61223-2-6
  - IEC 61223-3-5

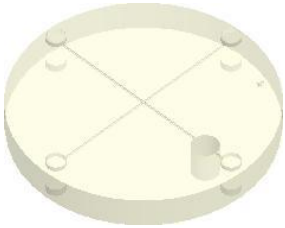
CT NUMBER CHECK PHANTOM(B-TYPE)

- Manufacturer
  - Vatech Company Limited
- Intended Use
  - CT Number Inspection
  - CT Number Calibration
- Complies with
  - IEC 61223-2-6
  - IEC 61223-3-5



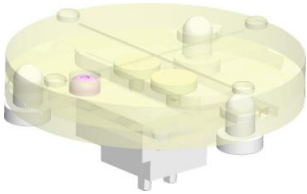
CT UNIFORMITY CHECK PHANTOM

- Manufacturer
  - Vatech Company Limited
- Intended Use
  - CT Image Homogeneity Inspection
  - CT Image Noise Inspection
- Complies with
  - IEC 61223-2-6
  - IEC 61223-3-5



PHANTOM JIG ASSEMBLY

- Manufacturer
  - Vatech Company Limited
- Intended Use
  - CT Image Inspection
  - CT Image Calibration



2. SETTING UP TEST MODE

Before you start the first QA test by using QA phantom kit, set up the test mode as follows.

1. Run Capture Software in 2D viewer.

- For EasyDent V4, click 

.
- For EzDent-i, click 

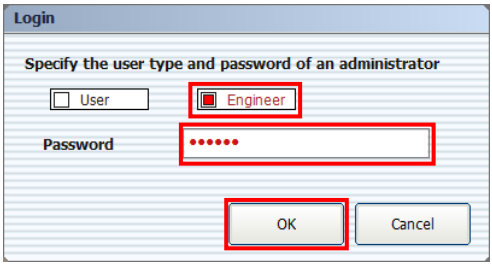
.

2. Select the exposure parameters as follows.

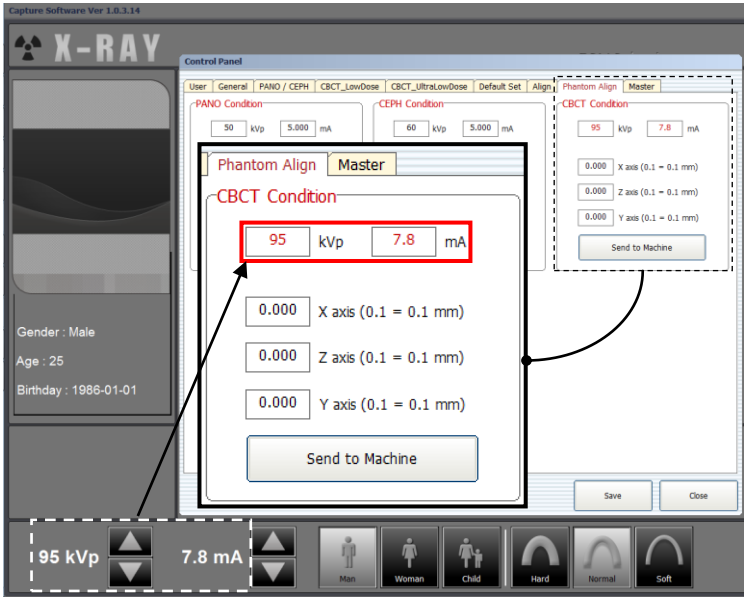
EXPOSURE PARAMETERS	**MODALITY**	**CBCT**	
	FOV	**Max. FOV available**	
	IMAGE QUALITY	High	
		Low Dose	* PaX-i3D Green
	PATIENT GENDER		
	X-RAY INTENSITY		
			* PaX-i3D Green

3. Click  and select **Engineer** check box in Login screen.

4. Type the password(password: vatech) and click **OK** to open the control panel.



5. Click **Phantom Align** tab and type kVp and mA as shown in the main screen.

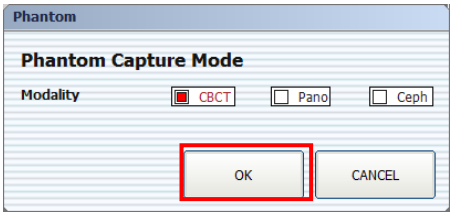


CAUTION	Do not change any values not described in this guide. If you do, the system may not operate correctly.

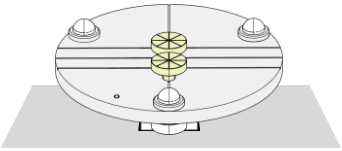
6. Click **Save** and close the control panel. Exit the Capture Software.

7. Run the Capture Software again
8. Click  to enter in **Phantom Capture mode**.

9. Select **CBCT** check box and click **OK**.



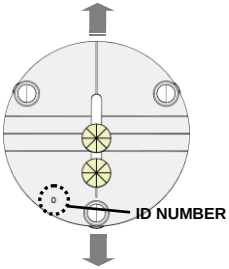
10. Click **CONFIRM** in the bottom of the Capture Software screen.
11. Go to the unit and remove Bite Block and Temple Supports from the Unit.
12. Insert the PHANTOM JIG BOTTOM into the Chinrest .



NOTE

Phantom Jig Orientation

Rear(Patient)



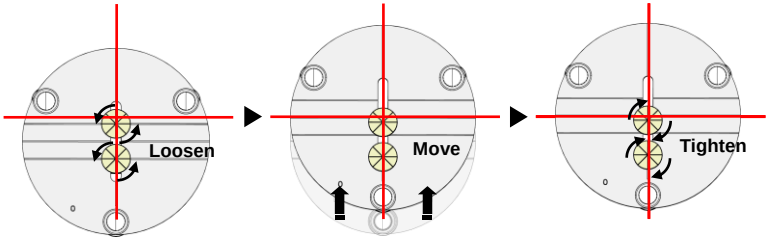
Front(Operator)

13. Make sure that the PHANTOM JIG BOTTOM center line is aligned with the VERTICAL LASER BEAM(Y-Axis).
If not aligned, do the following:

① Loosen the Phantom Block Bolts.

② Move the Phantom Jig Bottom to be aligned to the Laser Beam.

③ Tighten the Phantom Block Bolts.



<Not Aligned> **<Aligned>**

14. Remove the PHANTOM JIG BOTTOM from the Chinrest.

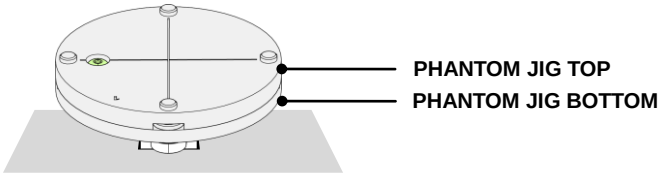
3. QA TEST PROCEDURE

3.1 QA CT NUMBER TEST

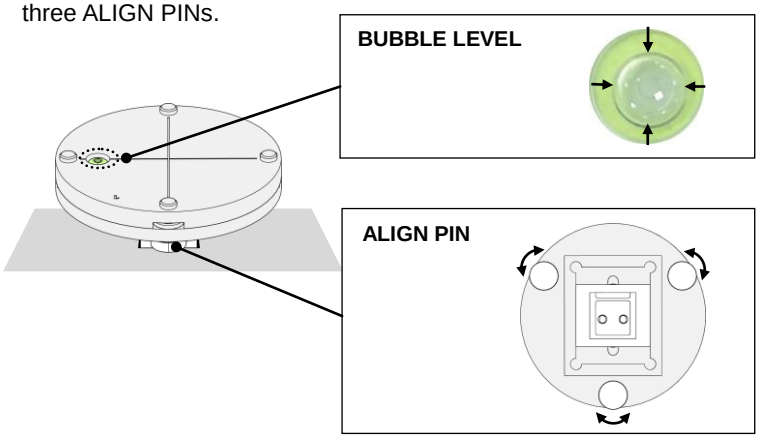
Follow the following CT Number Test procedure to correctly image and analyze the CT Number Check Phantom. Test results must be documented and maintained for at least one year. The CT number for water should be recorded and compared each day to the established specifications.

Setting up CT Number Check Phantom

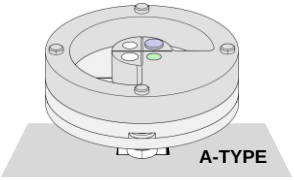
1. Remove Bite Block and Temple Supports from the Unit.
2. Insert the PHANTOM JIG BOTTOM into the Chinrest and then put the PHANTOM JIG TOP on the PHANTOM JIG BOTTOM



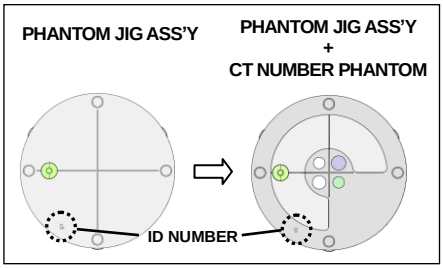
3. Make the PHANTOM JIG ASS'Y level by using BUBBLE LEVEL and three ALIGN PINs.

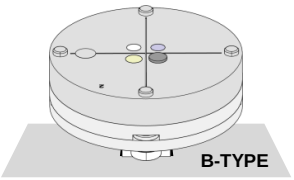


4. Put CT NUMBER CHECK PHANTOM on the PHANTOM JIG ASS'Y.

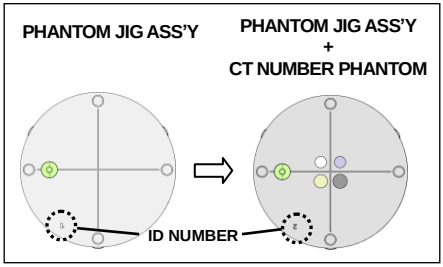


For PaX-i3D





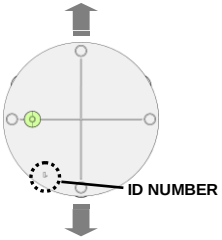
For PaX-i3D Green



NOTE

Phantom Orientation

Rear(Patient)



Front(Operator)

5. Run the 2D Viewer and add a patient for QA TEST.

- For EasyDent V4, click 

and add a patient for QA TEST.

- For EzDent-I, go to **PATIENT** tab and click  and add a patient for QA TEST.

Imaging CT Number Check Phantom

1. Run Capture Software in 2D viewer.

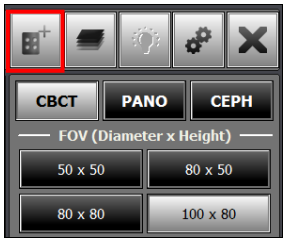
- For EasyDent V4, click 

.
- For EzDent-i, click 

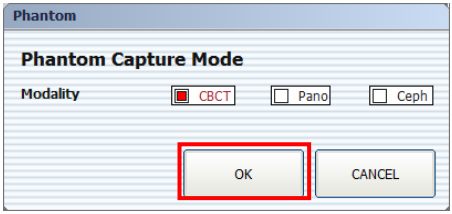
> 

.

2. Click  to enter in **Phantom Capture mode**.

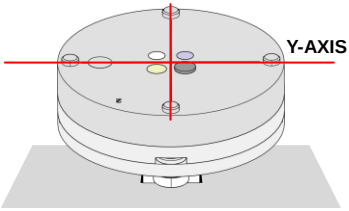


3. Select **CBCT** check box and click **OK**.

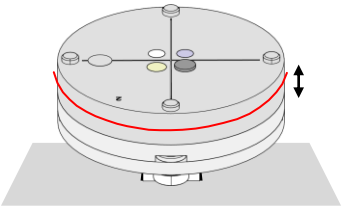


4. Click **CONFIRM** in the bottom of the Capture Software screen.

5. When “Please position the patient for image capturing, and then click READY.” appears, make sure that CT NUMBER CHECK PHANTOM is aligned with VERTICAL LASER BEAM(Y-Axis)



6. Adjust the Chinrest height so that HORIZONTAL LASER BEAM(Z-Axis) is aligned with the center of CT NUMBER CHECK PHANTOM by using CHINREST UP/DOWN button.



NOTE

For PaX-i3D Green Large FOV(16x10, 15x15) model, move the Chinrest to the top position.

7. Click **READY** when CT NUMBER CHECK PHANTOM beam alignment is completed.

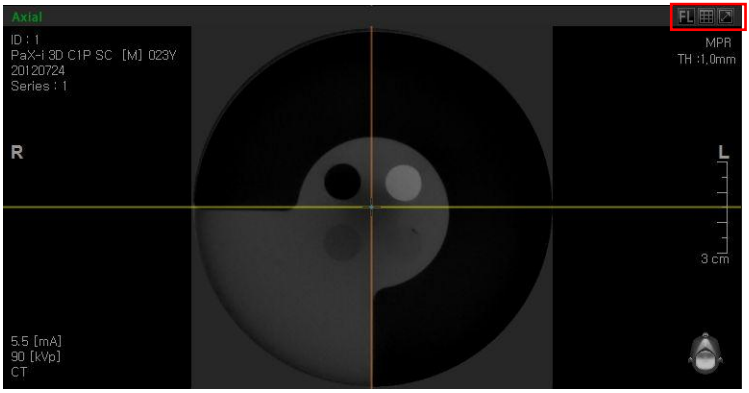
8. Capture the PHANTOM image according to capture software instruction.

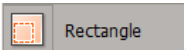
9. When image capturing is completed, save the image in the 2D Viewer.

Analyzing CT Number Check Phantom(by using Ez3D plus)

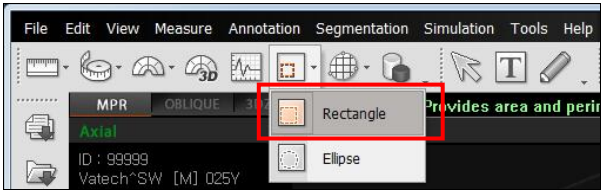
1. Double-click the saved PHANTOM image in the EasyDent 4 to run Ez3D plus.

2. Go the Axial view in full screen mode by clicking  .

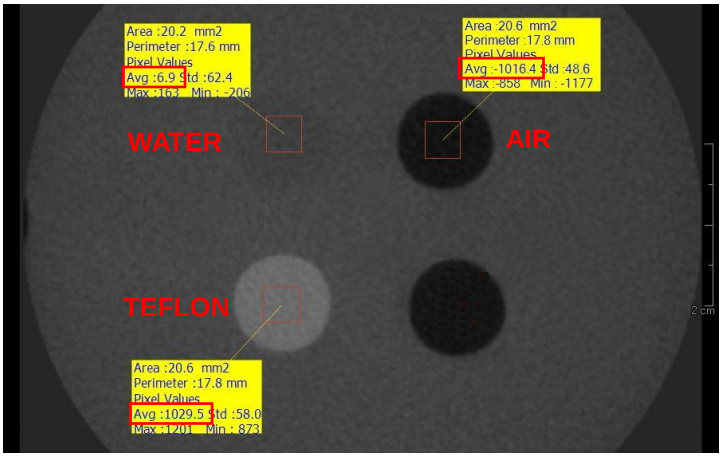


3. Click  > 

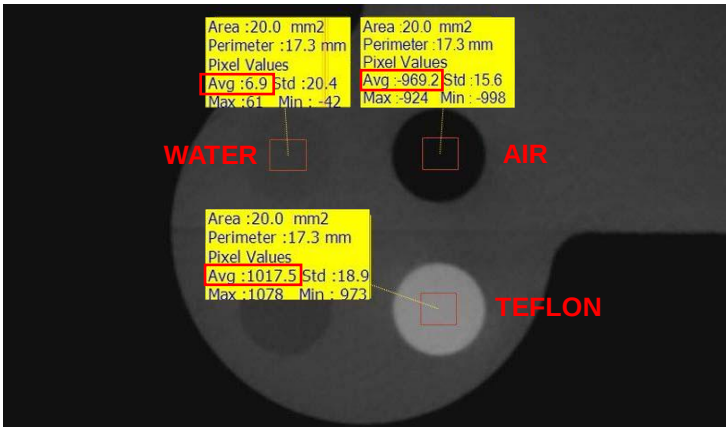
.



4. Make the boxes on the WATER, TEFLON and AIR area as shown below.



[CT NUMBER CHECK PHANTOM SAMPLE IMAGE – B TYPE]



[CT NUMBER CHECK PHANTOM SAMPLE IMAGE – A TYPE]

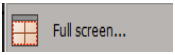
NOTE

Try to make each box as close as 20.0 mm^2 in area.

5. Compare the CT NUMBER Avg values from the WATER, TEFLON, AIR area with the standard.

MATERIAL	MEAN	LOWER LIMIT	UPPER LIMIT	Scope
AIR	-1000 HU	-1200 HU	-800HU	IEC 61223-2-6: 5.5.4, 5.5.5
WATER	0 HU	-200 HU	200 HU	
TEFLON	1000 HU	800 HU	1200 HU	

6. Record the mean CT Number value of each material.

7. Click  > 

and save the captured screen in the EasyDent 4.

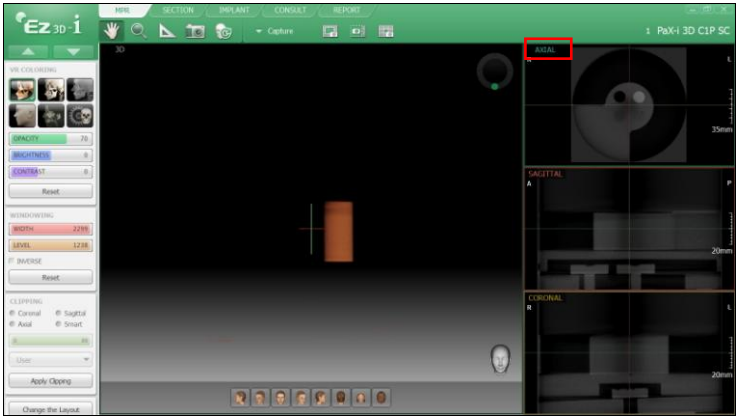
8. Remove CT NUMBER CHECK PHANTOM from the PHANTOM JIG ASS'Y

Analyzing CT Number Check Phantom(by using Ez3D-i)

1. Double-click the saved PHANTOM image in the EzDent-i to run Ez3D-i.

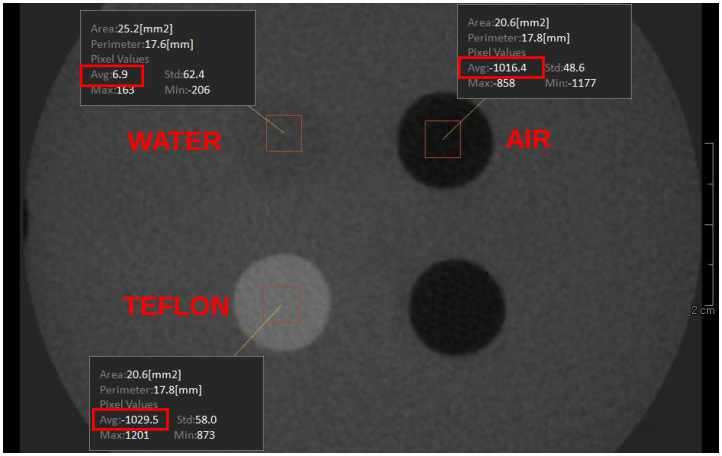
2. Go the Axial view in full screen mode by double-clicking 

.

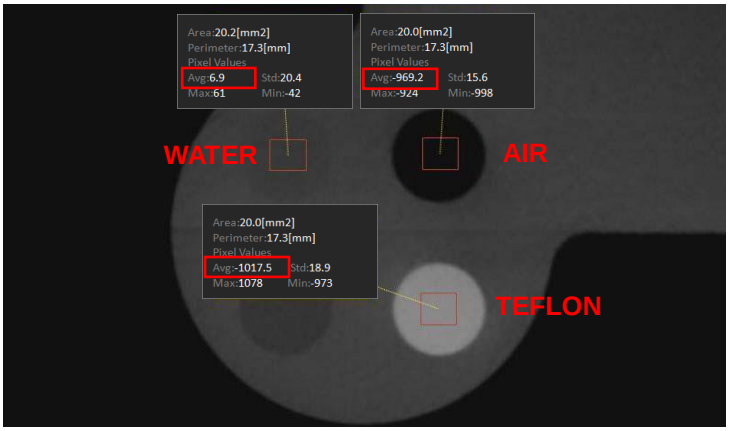


3. Click **Measurement > ROI**.

4. Make the boxes on the WATER, TEFLON and AIR area as shown below.



[CT NUMBER CHECK PHANTOM SAMPLE IMAGE – B TYPE]



[CT NUMBER CHECK PHANTOM SAMPLE IMAGE – A TYPE]

NOTE

Try to make each box as close as 20.0 mm^2 in area.

5. Compare the CT NUMBER Avg values from the WATER, TEFLON, AIR area with the standard.

MATERIAL	MEAN	LOWER LIMIT	UPPER LIMIT	Scope
AIR	-1000 HU	-1200 HU	-800HU	IEC 61223-2-6: 5.5.4, 5.5.5
WATER	0 HU	-200 HU	200 HU	
TEFLON	1000 HU	800 HU	1200 HU	

6. Record the mean CT Number value of each material.

7. Click  and save the captured screen in the EzDent-i.

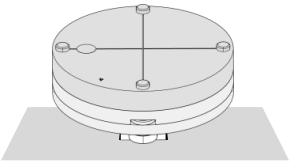
8. Remove CT NUMBER CHECK PHANTOM from the PHANTOM JIG ASS'Y

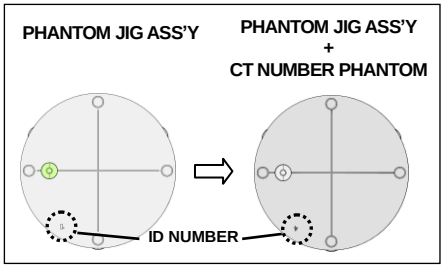
3.2 QA CT UNIFORMITY TEST

Follow the following CT Uniformity Test procedure to correctly image and analyze the CT Uniformity Check Phantom. Test results must be documented and maintained for at least one year.

Imaging CT Uniformity Check Phantom

1. Remove Bite Block and Temple Supports from the Unit.
2. Insert the PHANTOM JIG BOTTOM into the Chinrest and then put the PHANTOM JIG TOP on the PHANTOM JIG BOTTOM.
3. Make the PHANTOM JIG ASS'Y level by using BUBBLE LEVEL and three ALIGN PINs.
4. Put CT UNIFORMITY CHECK PHANTOM on the PHANTOM JIG ASS'Y.





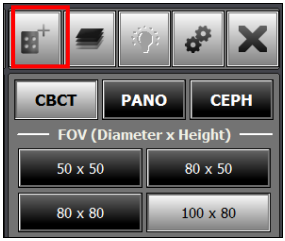
5. Run Capture Software in 2D viewer.

   - For EasyDent V4, click 

.

   - For EzDent-i, click 

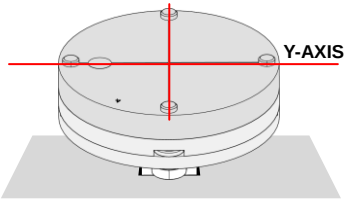
6. Click  to enter in **Phantom Capture mode**.



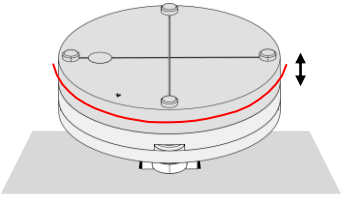
7. Select **CBCT** check box and click **OK**.

8. Click **CONFIRM** in the bottom of the Capture Software screen.

9. When “Please position the patient for image capturing, and then click READY.” appears, make sure that CT UNIFORMITY CHECK PHANTOM is aligned with VERTICAL LASER BEAM(Y-Axis).



10. Adjust the Chinrest height so that the HORIZONTAL LASER BEAM(Z-Axis) is aligned with the center of the CT UNIFORMITY CHECK PHANTOM by using CHINREST UP/DOWN button.



NOTE

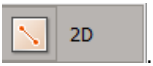
For PaX-i3D Green Large FOV(16x10, 15x15) model, move the Chinrest to the top position.

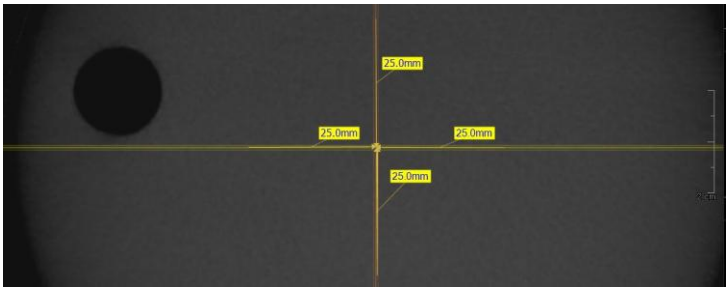
11. Click **READY** when CT UNIFORMITY CHECK PHANTOM beam alignment is completed.

12. Capture the PHANTOM image according to capture software instruction.

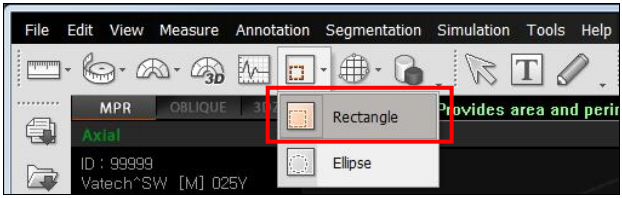
13. When image capturing is completed, save the image in the the 2D Viewer.

Analyzing CT Uniformity Check Phantom(by using Ez3D plus)

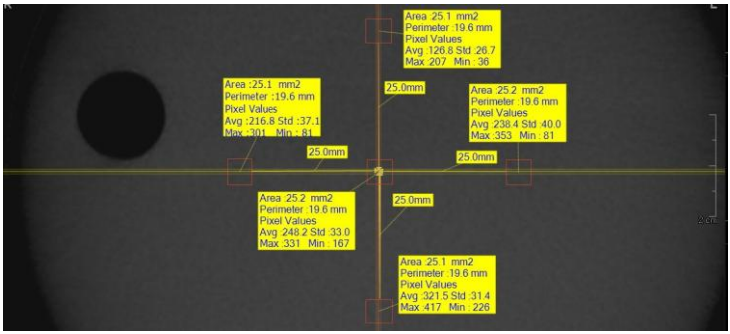
1. Double-click the saved PHANTOM image in the EasyDent 4 to run Ez3D plus.
2. Go the Axial view in full screen mode by clicking  .
3. Click  >  .
4. Make the 25mm lines from the center to UP/DOWN/LEFT/RIGHT directions as shown below.



5. • Click  >  .



6. Make the four boxes next to each 25mm line and one box in the center as shown below.



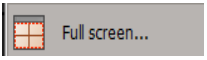
NOTE

- Try to make each box as close as 25.0 mm^2 in area.
- Put the 4 ROIs at the end of each 25mm line.

7. Measure the HOMOGENEITY by calculating the difference between Max. avg value and min. avg value among the 5 ROIs and compare it with its standard.

CALCULATION	EVALUATION	Scope
Subtract the minimum avg value from the Maximum avg value among the 5 ROIs	The difference should be less than 400 HU	61223.3.5 INTRODUCTION

8. Record the mean CT Number value of each material.

9. Click  > 

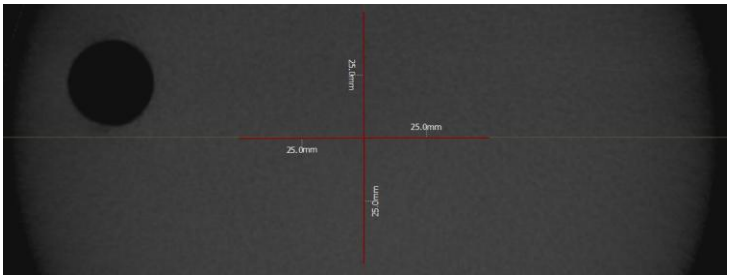
and save the captured screen in EasyDent 4.

10. When finished, exit the EasyDent 4.

Analyzing CT Uniformity Check Phantom(by using Ez3D-i)

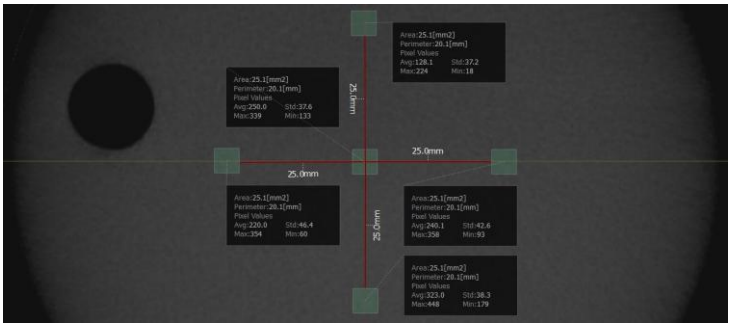
1. Double-click the saved PHANTOM image in the EzDent-i to run Ez3D-i.
2. Go the Axial view in full screen mode by double-clicking 

.
3. Click  .
4. Make the 25mm lines from the center to UP/DOWN/LEFT/RIGHT directions as shown below.



5. Click **Measurement > ROI**.

6. Make the four boxes next to each 25mm line and one box in the center as shown below.



NOTE

- Try to make each box as close as 25.0 mm^2 in area.
- Put the 4 ROIs at the end of each 25mm line.

7. Measure the HOMOGENEITY by calculating the difference between Max. avg value and min. avg value among the 5 ROIs and compare it with its standard.

CALCULATION	EVALUATION	Scope
Subtract the minimum avg value from the Maximum avg value among the 5 ROIs	The difference should be less than 400 HU	61223.3.5 INTRODUCTION

8. Record the mean CT Number value of each material.

9. Click  and save the captured screen in EzDent-i.

10. When finished, exit the EzDent-i.

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