SAMSUNG

S-Fusion™ for Liver

R20 Quick Guide

Produced by Clinical Training Center / SAMSUNG MEDISON CO.,LTD

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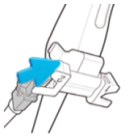
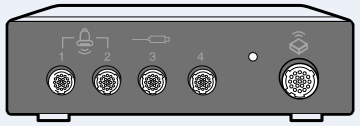
S-Fusion™

Components of S-Fusion

Field Generator (Transmitter)	Generates an electromagnetic field to find the location of sensor.	
Probe Sensors (2EA)	Detects the strength and orientation of the generated electro-magnetic field, and relays the information to the tracking unit.	 • Probe sensor is built in to CA1-7Sn. 
Tracking Bracket	Allows mounting of probe sensors onto the probe.	
Tracking Unit	Calculates the position and orientation of the probe and the biopsy needle based on the data from the sensors. It also displays this information on the monitor.	
External Marker	• Compensates the movement of the patient by placing it on the patient and through a function that finds the patient's position. • In case of 'Matching Auto' method, this function allows you to complete the initial registration automatically by attaching external markers to the patient's body before starting S-Fusion. • Also, in case of 'External marker' method, it can automatically register them, when there are CT data containing markers.	

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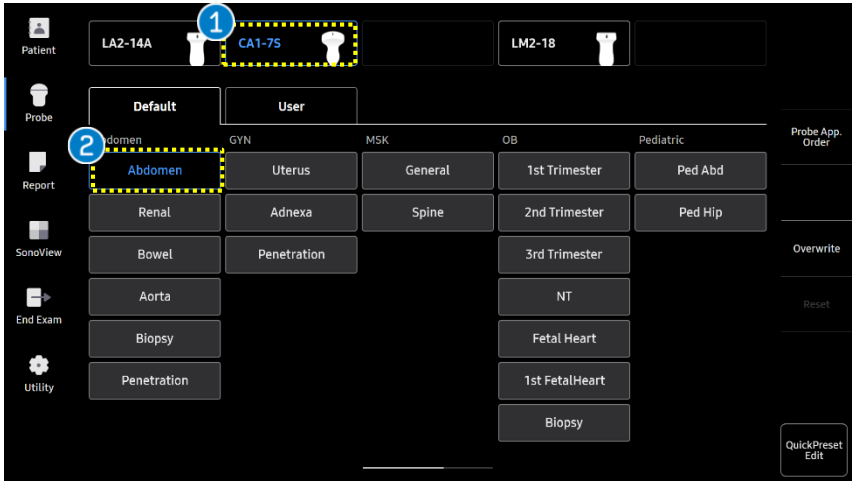
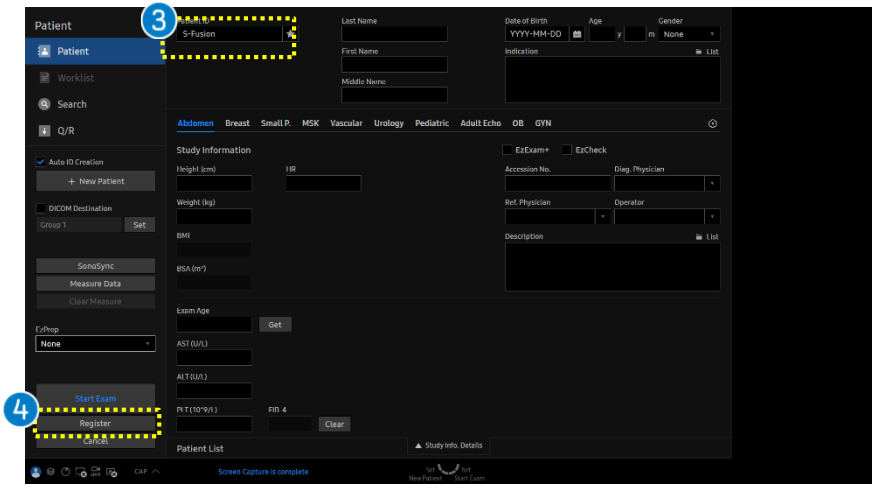
1. Patient Registration



1 Select a Probe	Select a [Probe] for scanning Liver
2 Select a Preset	Select a [Abdomen] preset in Abdomen menu.



3 Patient	Input the patient information.
4 Register	After entering the patient information, select the [Register] button to start an exam.

Notes

In the case of using a worklist server, you can directly access worklist page and search for the patient information.

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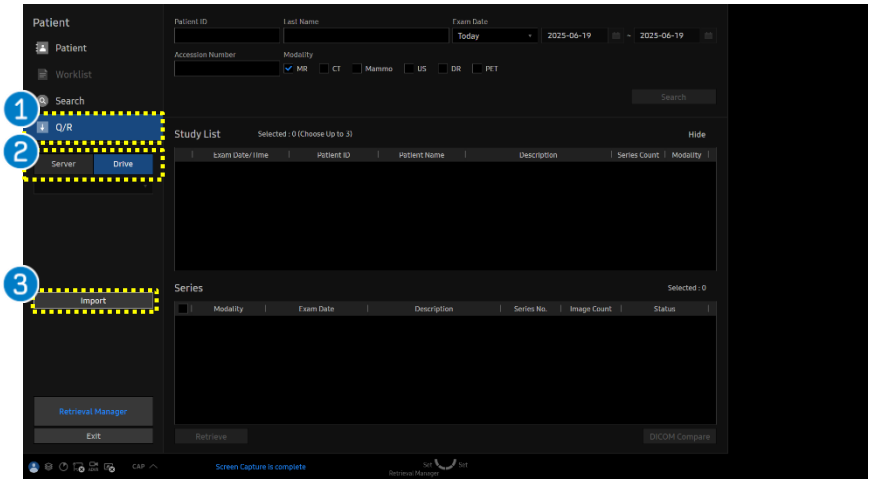
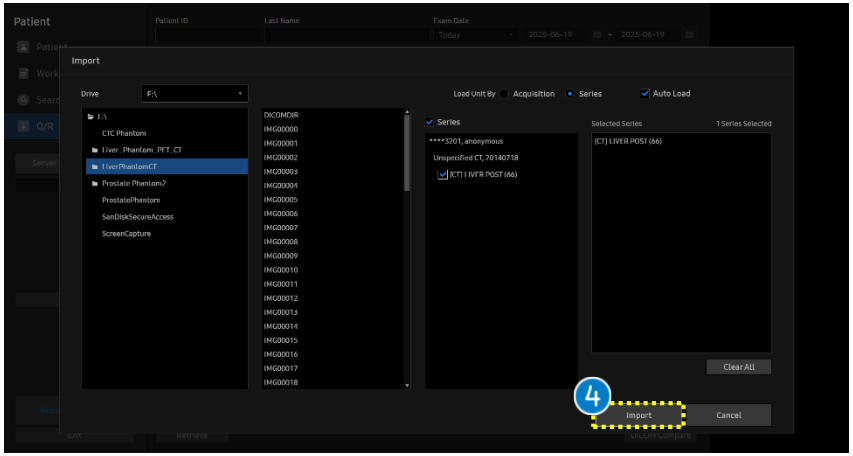
2. Query& Retrieve the datasets

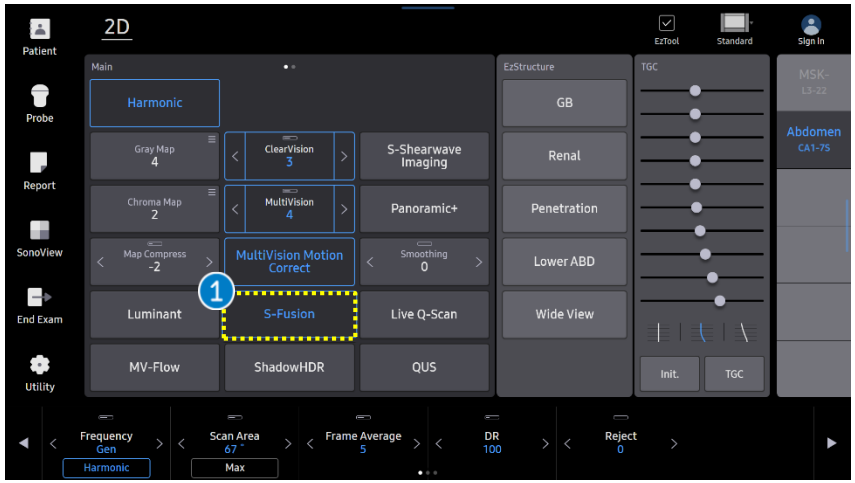


1	Q/R	Click the [Q/R] menu.
2	Source	Choose between Server/Drive. To use Drive source, Put USB in with Fusion data (MR/CT/US/DR/PET).
3	Import	Press [Import] to import data from 2.



4	Import	Press [Import] to bring in the data. Select desired data and press [Import].

3. Activate S-Fusion™



❶ S-Fusion	Select the [S-Fusion] button on the touch screen to start S-Fusion for Liver.

❷ Check the sensor	The green bar indicates the signal strength is at a proper status.
❸ Connect the tracking unit	If the tracking unit is connected properly, 'Tracking unit successfully connected' message will be displayed.

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4. Select a Series

❶ Series List	With [Select a series] button, Retrieved series will be displayed on the touch screen menu.
❷ W.Level	Adjusts the "Brightness" of CT/MR data.
❸ W.Width	Adjusts the "Contrast" of CT/MR data.

❹ Select data	Selected data will be displayed on the monitor screen. If you want to change to another datasets, you can switch to a different series on the list.
❺ Horizontal/ Vertical	Use the [Change] button on the control panel to activate [Horizontal] or [Vertical] direction to find the desire location from the retrieved datasets using trackball.

5-1. Registration - Positioning Auto (1)

❶ Registration Mode	Select the [Positioning Auto] from the registration mode on the touch screen. 'Positioning Auto' helps to offer quick and efficient examination with one-step initial registration between CT/MR and US.
❷ Registration	Tap the [Registration] button to start a registration.

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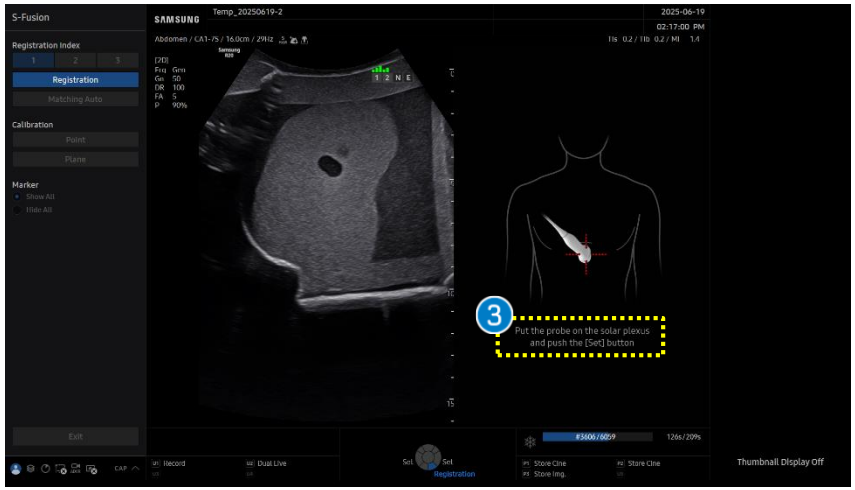
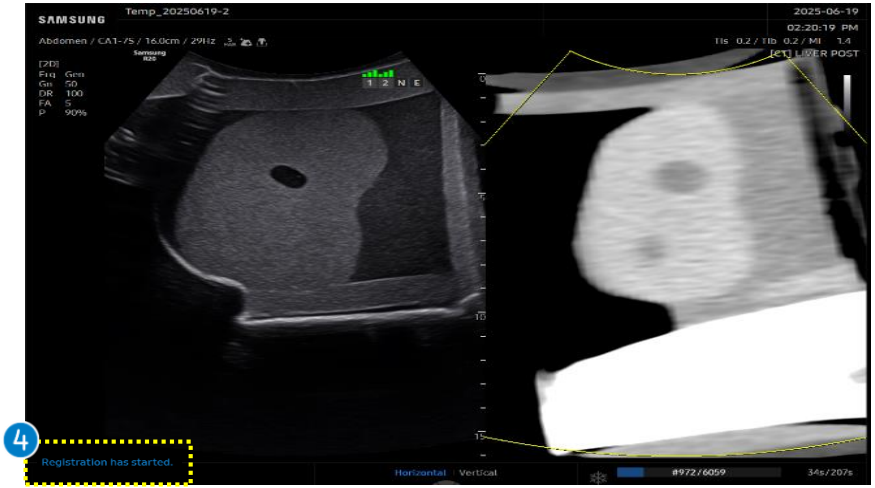
5-1. Registration - Positioning Auto (2)



❸ Orientation Lock	Position the transducer in the sagittal direction and following this guideline 'Put the probe on the solar plexus and push the [Set] button on the control panel'.



❹ Check the Registration	Following the message on the bottom of the monitor screen 'Registration has started'. After Registration is finished, you can check registration accuracy on the monitor screen.

Notes

To increase the accuracy after registration is completed, you may proceed to [Calibration] to register images more in detail.

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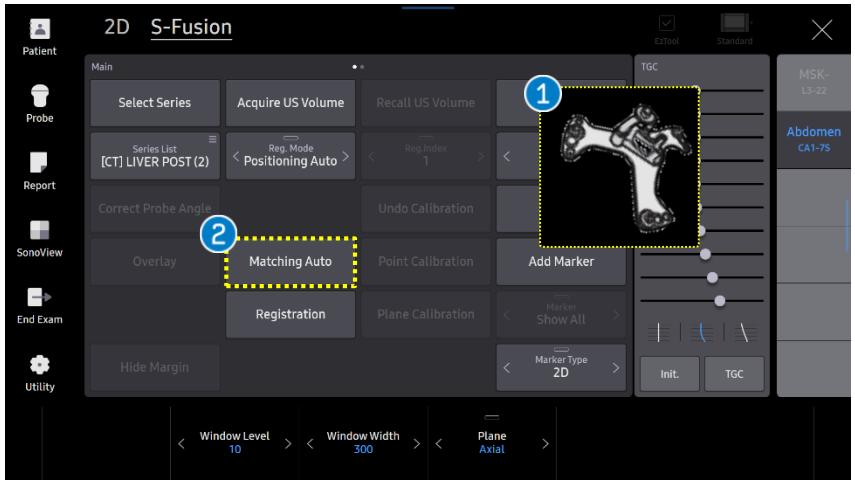
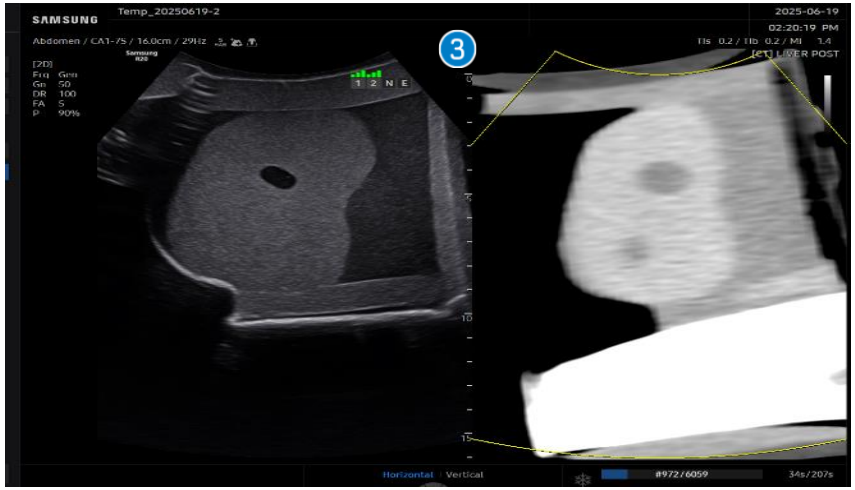
5-2. Registration - Matching Auto



❶ Attaching External Marker	Attach an External Marker to the patient's solar plexus before starting an exam.
❷ Matching Auto	Tap the [Matching Auto] button to start a registration. This function allows you to complete the initial registration automatically by attaching external markers to the patient's body. Then you can remove the external marker.



❸ Check the Registration	Following the message on the bottom of the monitor screen 'Registration has started'. After Registration is finished, you can check registration accuracy on the monitor screen.

Notes

To increase the accuracy after registration is completed, you may proceed to [Calibration] to register images more in detail.

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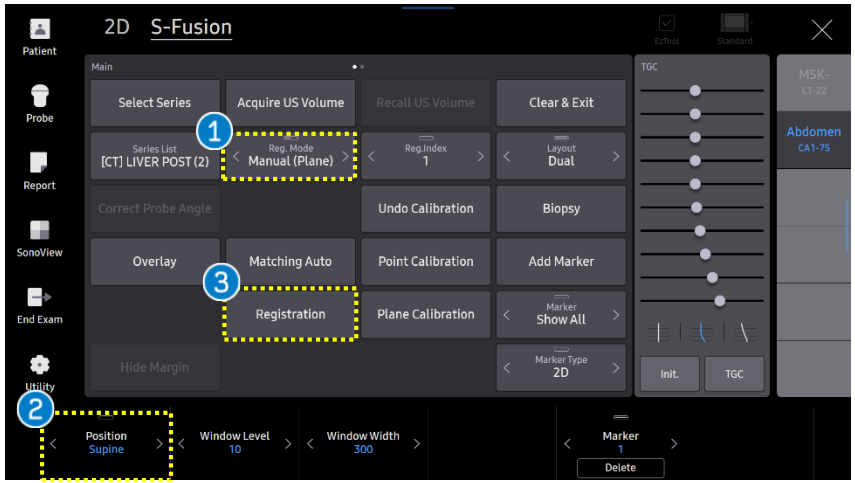
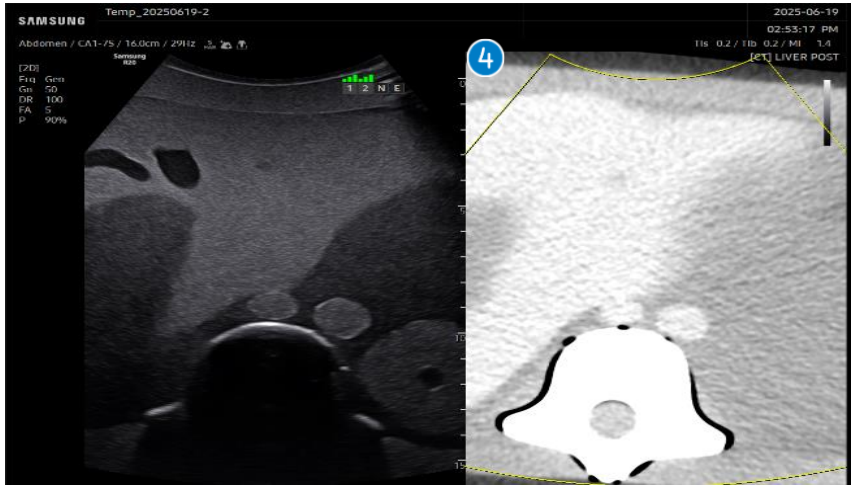
5-3. Registration - Manual(Plane) (1)



❶	Registration Mode	Select the [Manual(Plane)] from the registration mode on the touch screen.
❷	Position	In case of the Manual Registration, it is available to select patient position 'Supine' or 'Prone'.
❸	Registration	Tap the [Registration] button to start a registration.



❹	Match plane	Match US image to (PET)CT/MR image and press [Set] button.

Notes

If you want to perform registration in the prone position, such as for the kidney or spine, the system will automatically recognize the patient's posture as prone when that position is selected.

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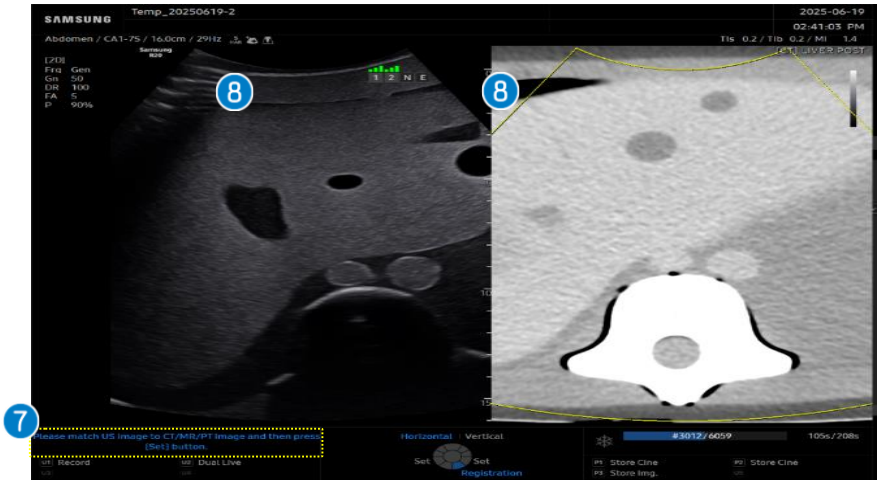
5-3. Registration - Manual(Plane) (2)



5 Horizontal/ Vertical	• Horizontal Find desired location using trackball. • Vertical Use the change button on the control panel to activate the [Vertical]. It will be available to find the desired slice from the retrieved datasets using the trackball.
6 Registration	Press registration to fish the CT Horizontal/Vertical registration.
7 Registration	Match the reference to CT/MRI/PET image and then press [Set] to finish.
8 Check the registration	Check the sync of the registration after.

Notes

To increase the accuracy after registration is completed, you may proceed to [Calibration] to register images more in detail.

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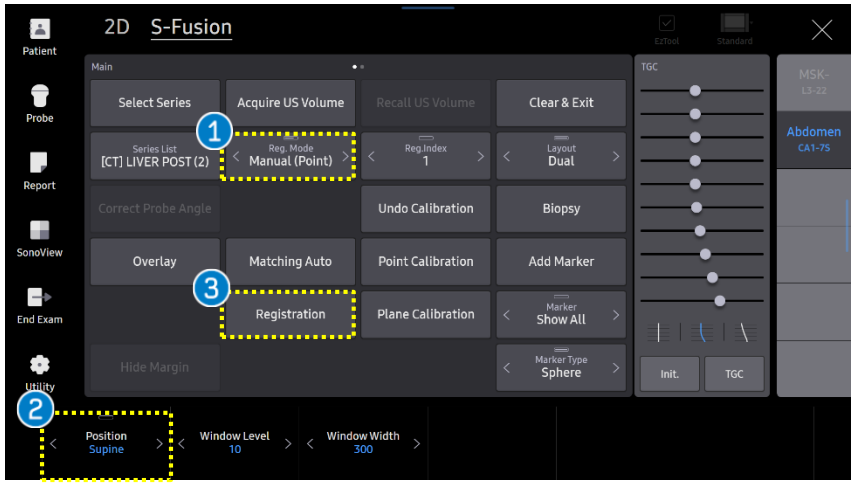
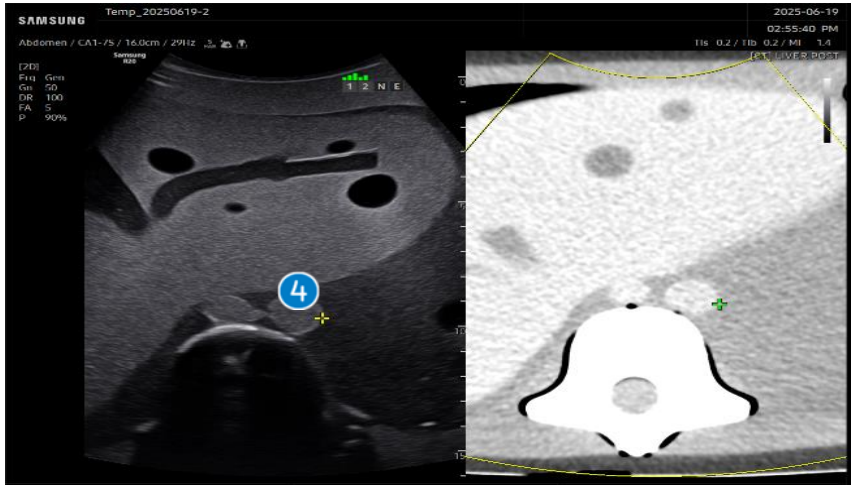
5-3. Registration - Manual(Point)



❶	Registration Mode	Select the [Manual(point)] from the registration mode on the touch screen.
❷	Position	In case of the Manual Registration, it is available to select patient position 'Supine' or 'Prone'.
❸	Registration	Tap the [Registration] button to start a registration.



❹	Match point	Match the same anatomical marker on the same plane on US image and other modality to complete the registration.

Notes

To increase the accuracy after registration is completed, you may proceed to [Calibration] to register images more in detail.

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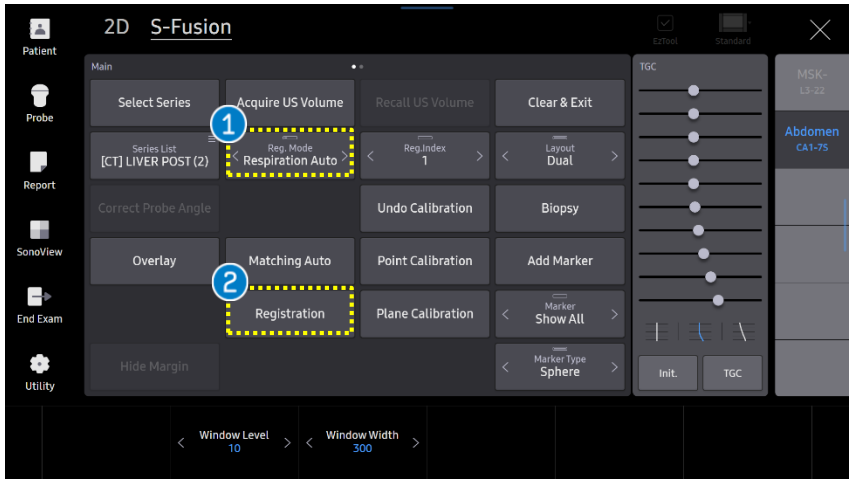
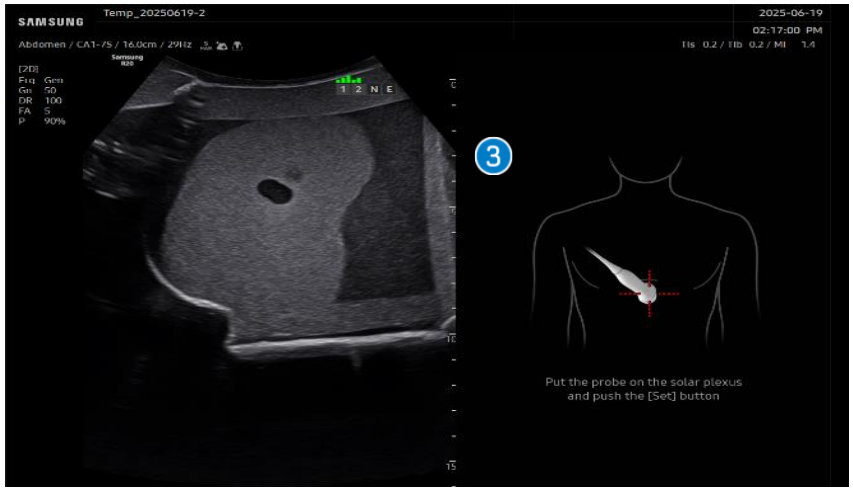
5-4. Registration – Respiration Auto (1)



❶	Registration Mode	Select the [Respiration Auto] from the registration mode on the touch screen. This mode is only available with CT data.
❷	Registration	Tap the [Registration] button to start a registration.



❸	Orientation Lock	Position the transducer in the 'Sagittal' direction and following this guideline 'Put the probe on the solar plexus and push the [Set] button on the control panel.

Notes

To increase the accuracy after registration is completed, you may proceed to [Calibration] to register images more in detail.

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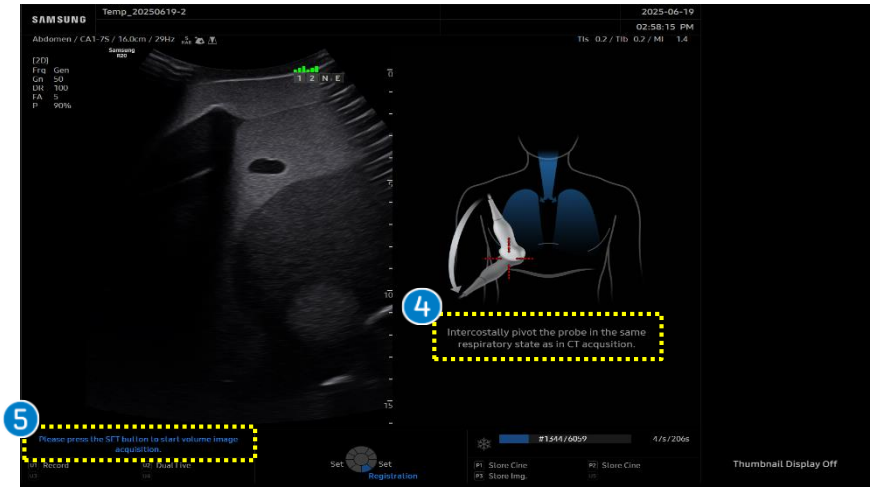
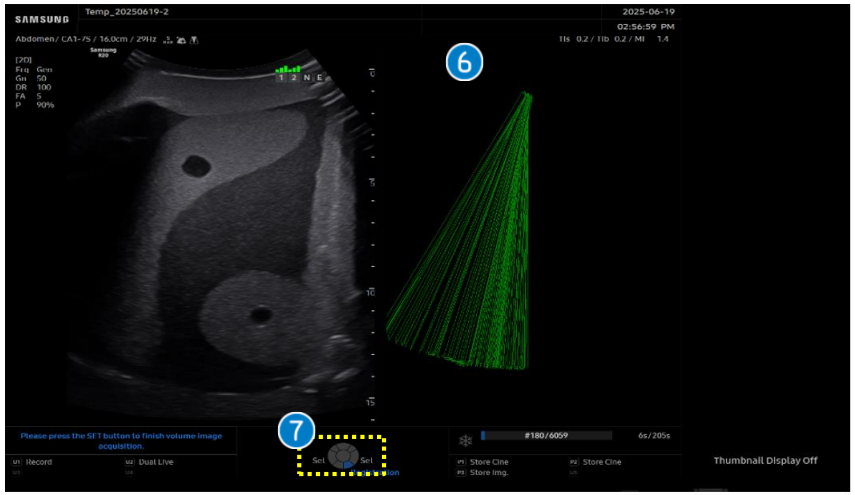
5-4. Registration – Respiration Auto (2)



❹ Check the intercostal view	To find the best intercostal view, pivot the probe and use the respiratory state similar to that of the CT operation [Inhalation].
❺ Start a volume acquisition	Press the [Set] button and pivot the transducer to acquire a 3D volume data of the Liver.



❻ Acquire volume data	Acquire freehand 3D data by tilting the probe, data must include the diaphragm.
❼ Finish the volume acquisition	Press the [Set] button to finish volume image acquisition.

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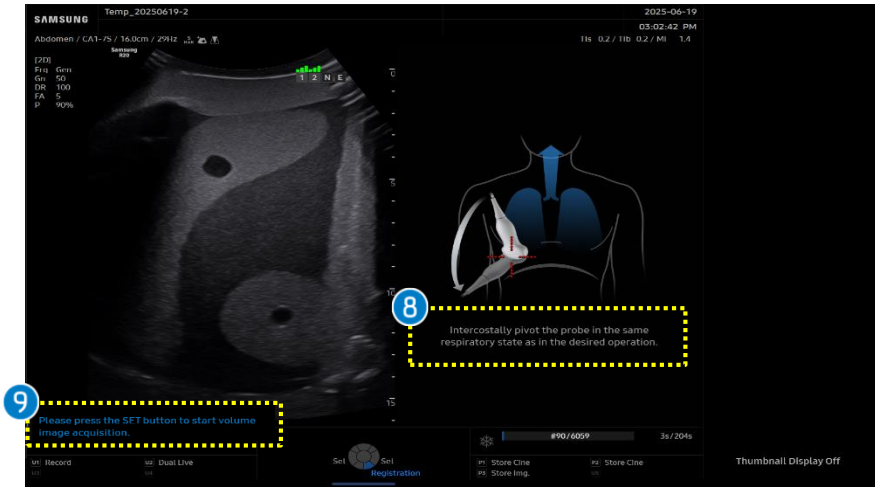
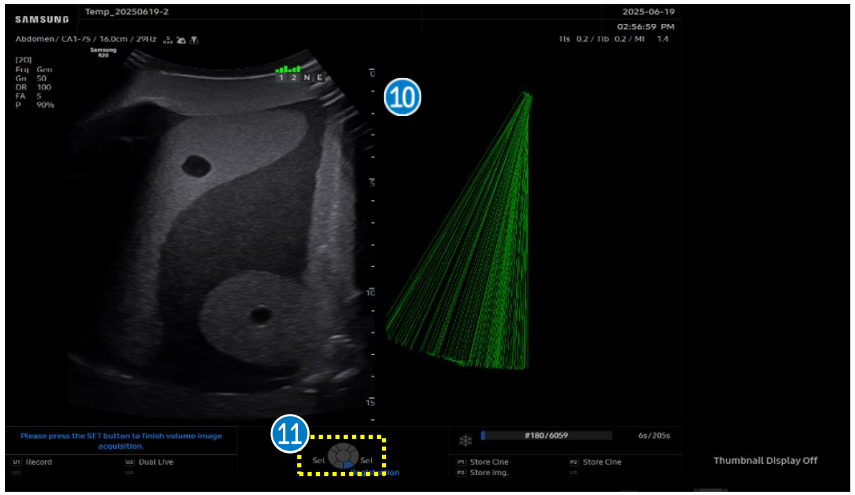
5-4. Registration – Respiration Auto (3)



8 Check the intercostal view	To find the best intercostal view, pivot the probe and use the respiratory state similar to that of the US operation [Exhalation].
9 Start a volume acquisition	Press the [Set] button and pivot the transducer to acquire a 3D volume data of the Liver.



10 Acquire Volume data	Acquire freehand 3D data by tilting the probe. data must include the diaphragm.
11 Finish the volume acquisition	Press the [Set] button to finish the volume image acquisition.

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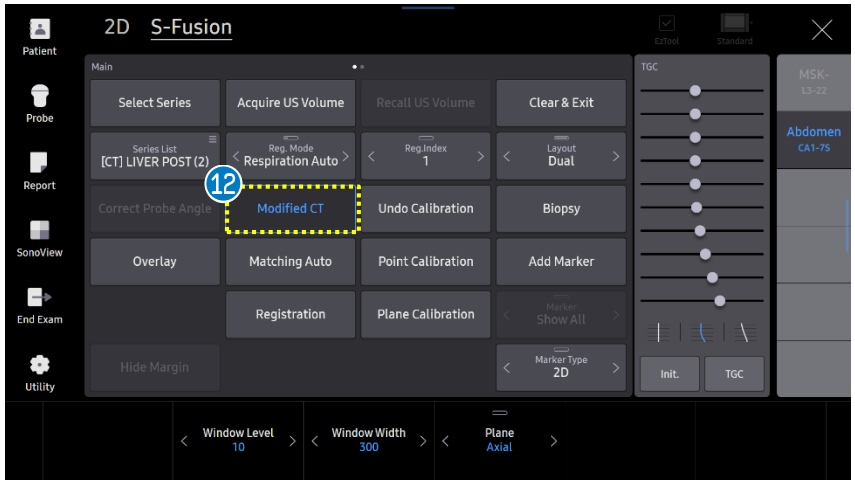
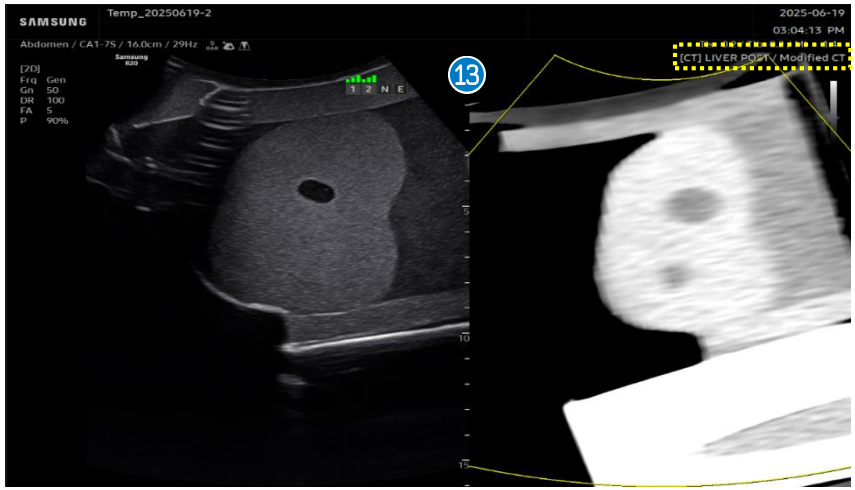
5-4. Registration - Respiration Auto (4)



⑫ Select Modified CT	Press the [Modified CT] button on the touch screen to load CT data with respiratory motion correction.



⑬ Check the registration	Respiration compensated image will be displayed on the right side. The [Modified CT] will be displayed on the top of the image. You can check the matched images on the monitor screen.

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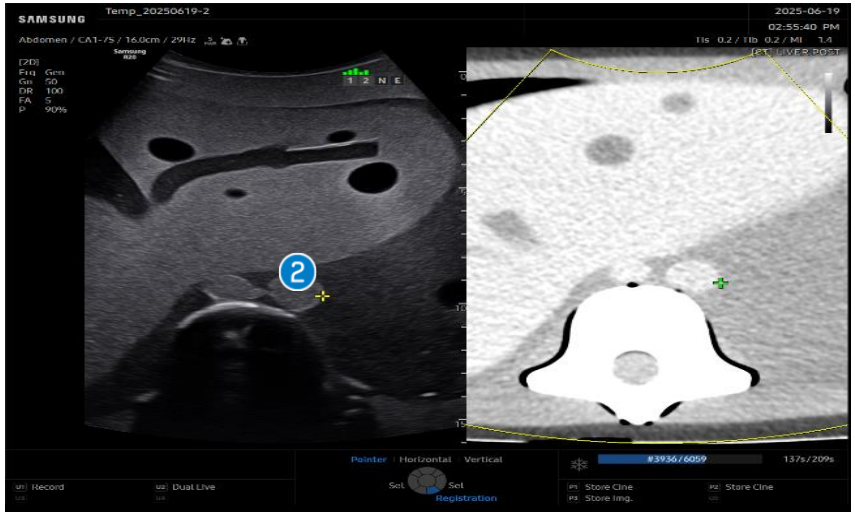
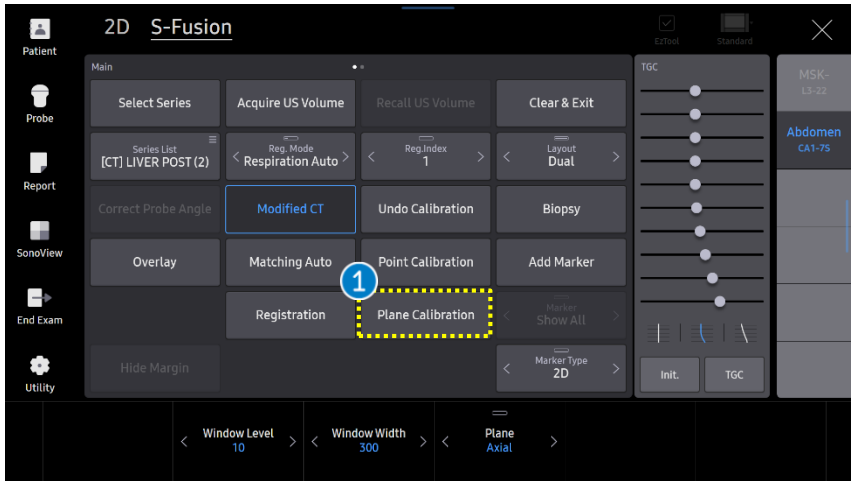
6-1. Calibration - Point Calibration

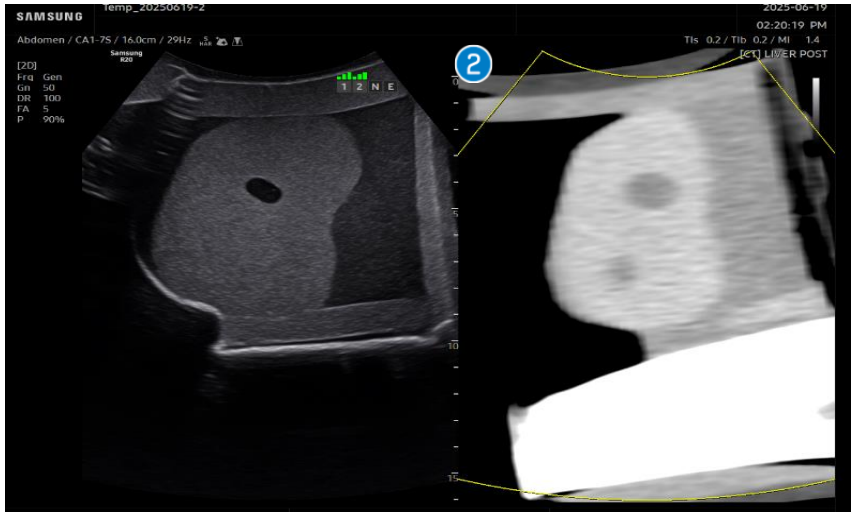
❶ Point Calibration	When you select [Point Calibration] button on the touch screen, a [+] marker will be displayed on the image.



❷ Mark the same location	The [+] marker will be displayed on the US image, put the marker at the same anatomical area on both US and CT/MR sequentially. Then system will be updated with new registration information.

6-2. Calibration - Plane Calibration





❶ Plane Calibration	When you select [Plane Calibration] button on the touch screen, you will be able to adjust the plane of CT/MR datasets.
❷ Match the same plane	Based on US image, you can adjust the CT/MR data. • Up, Down, Right and Left direction using [Horizontal] button on the control panel. • Angle of CT/MR image data by using the [Angle] button on the control panel. • Select the slice of CT/MR image data by using the [Vertical] of the [Change] button on the control panel. After matching the US image, press the [Set] button on the control panel.

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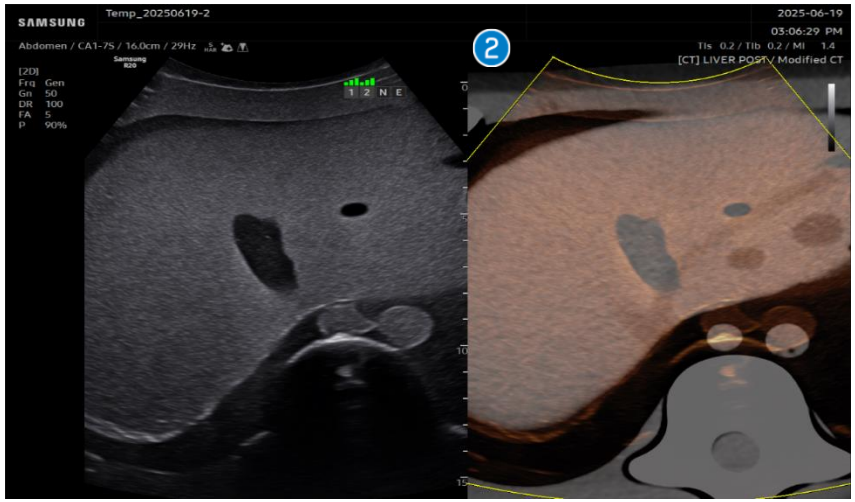
6-3. Calibration - Overlay



❶ Overlay	The real time US Image will be superimposed over the MR Images. Available to turn this function on or off. • Overlay Level(%) When the level is increased, the US image will be more superimposed. If the level is decreased, the CT/MR data will be more superimposed.
❷ Superimposed Image	Superimposed image will be displayed based on Overlay level. You can also perform intuitive registration between US and CT/MR images by Plane Calibration.
❸ Reg. Index	Selects the saved registration.

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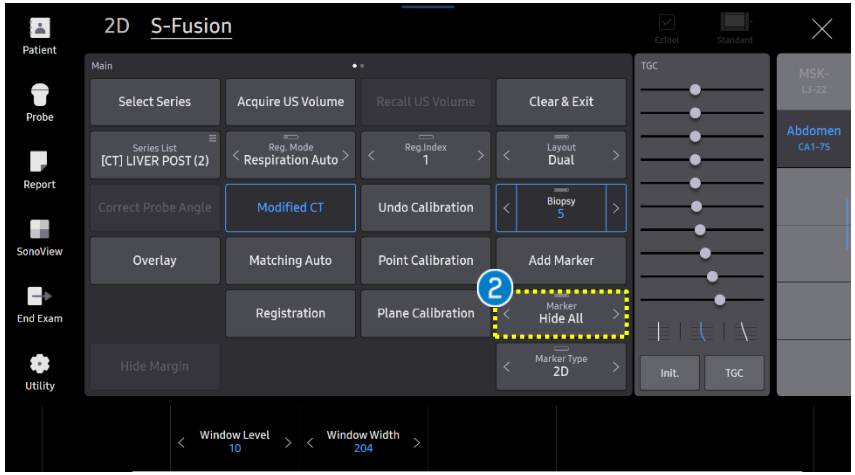
7. Marker- Add and hide marker

❶ Add Marker	Tap the [Add Marker] on the touch screen. This marker can be used to flag the location of a point of interest. There are two Marker types: Sphere and 2D Marker



❷ Hide All	Tap the [Hide All] on the touch screen to hide all the marker.

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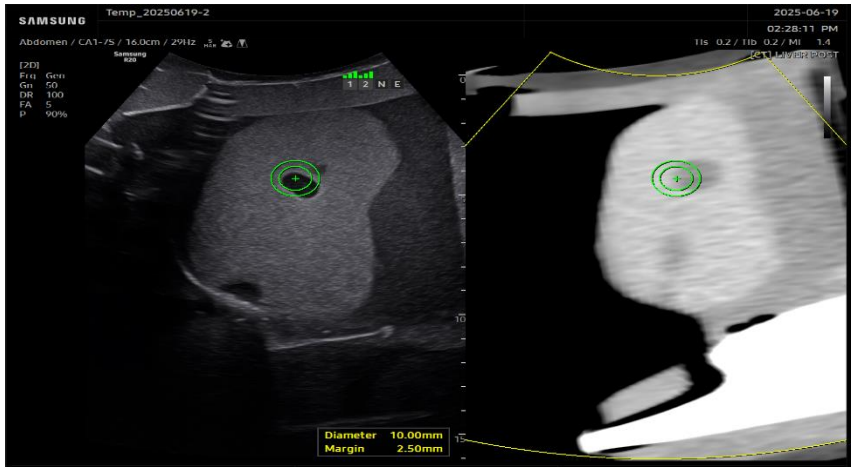
7. Marker - Marker Type



1 Set the marker [Sphere]

Set the point on either the US image or CT/MR image, then this type allows you to mark the ablation margin as well.

Notes

The shape of position marker will be displayed differently depends on the distance to the cross section.

2 Set the Marker [2D]

Set the point on either the US image or CT/MR image, then this marker can be used to flag the location of a point of interest.

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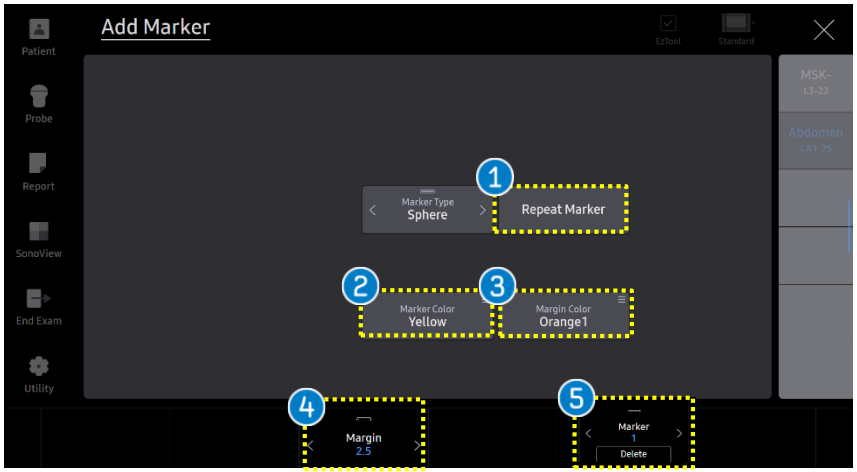
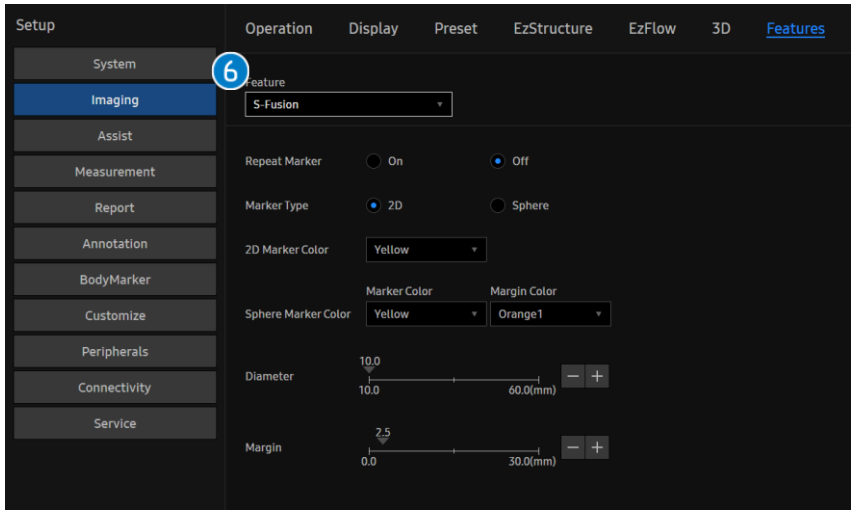
7. Marker- Marker setting





1	Repeat Marker	Press it if you want to mark the marker repeatedly.
2	Marker Color	Change Marker color.
3	Margin Color	Change Margin Color when marker type is sphere.
4	Margin size	Adjust margin size when marker type is Sphere.
5	Delete the Marker	Select the marker you want to delete, and press it to delete marker.
6	Setup	Go to Setup > Imaging > Features to set initial setup for Marker type, color, diameter, etc.

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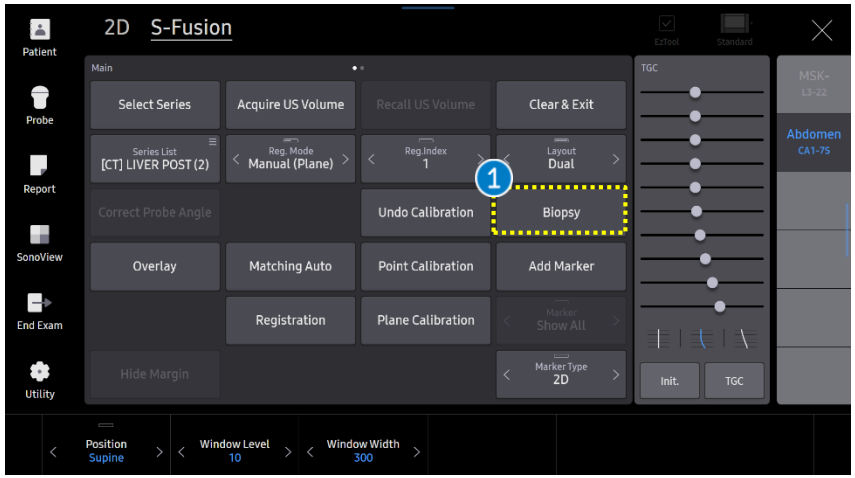
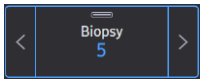
8. Biopsy On/Off

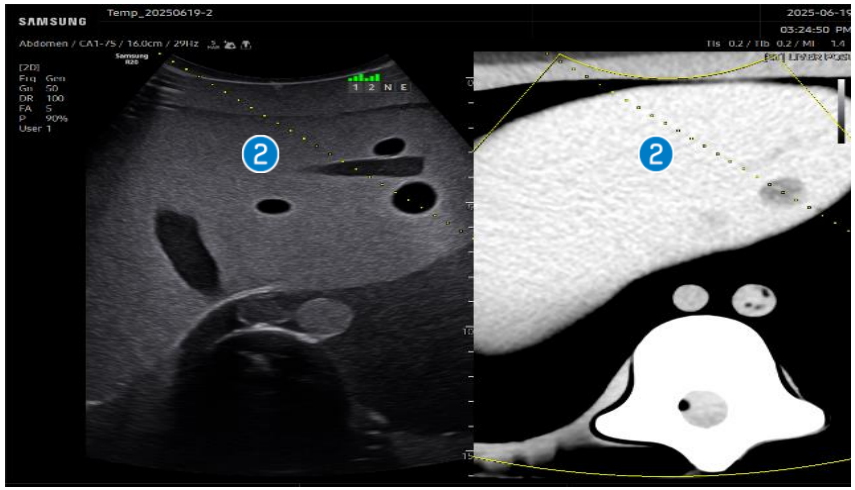


❶ Biopsy On/Off	The Biopsy guideline will appear on US images.

Notes

Number (1~5) indicates number on the biopsy bracket. You can adjust the angle of biopsy line rotating flexible key.





❷ Display the biopsy line	Biopsy line will appear on the monitor screen. If the biopsy guideline displayed on the screen are incorrect, access to the [Utility] and press the [Edit] button to calibrate properly.

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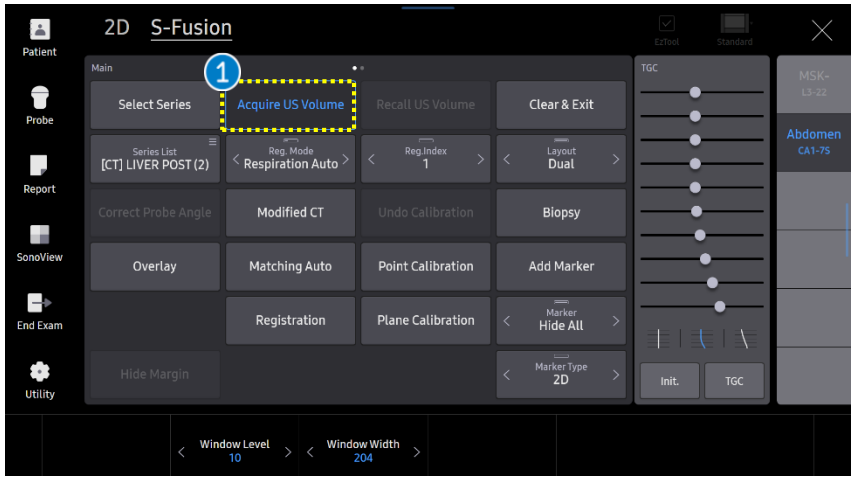
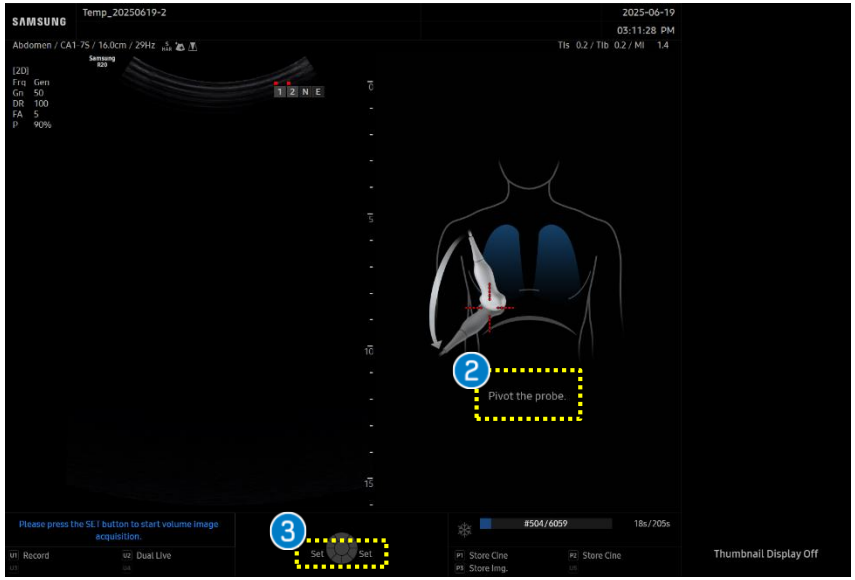
9-1. Acquire/Recall US Volume

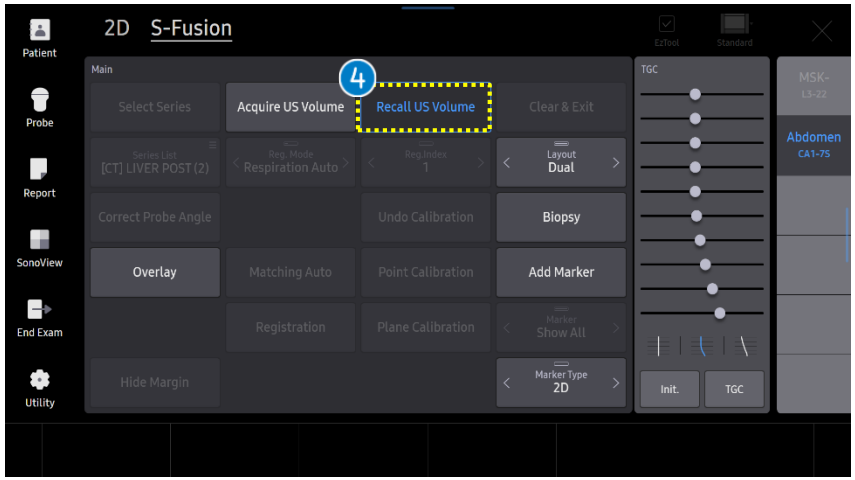


❶ Acquire US Volume	If you tap the [Acquire US Volume], the screen will switch to the Dual mode automatically. This feature is useful for obtaining US volume to check US data before and after procedures such as RFA and Biopsy.

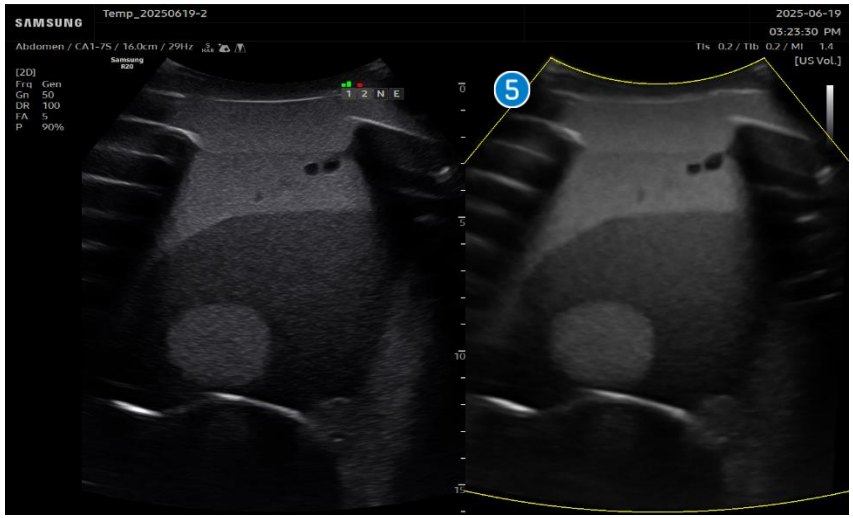


❷ Acquire volume data	Following this guideline 'Pivot the probe' and acquire US volume to save a Freehand 3D dataset.
❸ Finish the volume acquisition	After acquiring dataset, Please press the [Set] button on the control to end the volume acquisition.

9-2. Acquire/Recall US Volume

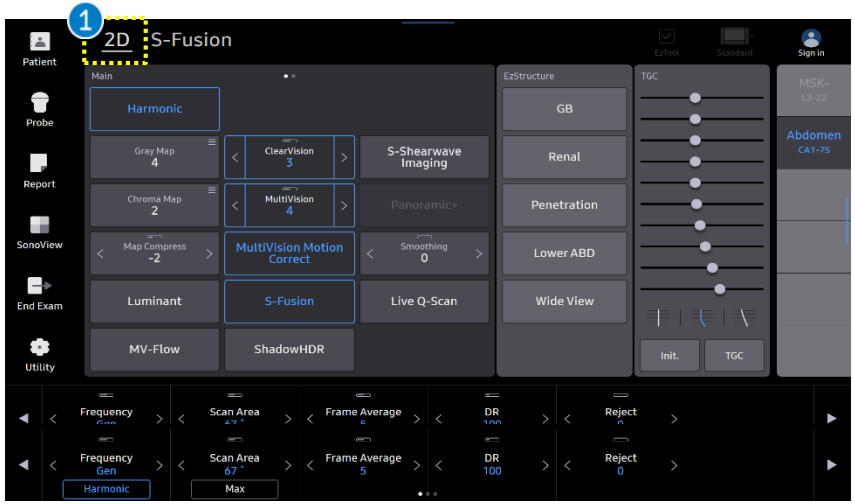


❹ Recall US Volume	Tap the [Recall US Volume] to load the acquired 3D Volume. The lastly acquired US volume data will be displayed on the right side of the monitor screen.



❺ Acquired US Volume data	If you have pre-procedural US volume data, it can be displayed on the right side of the monitor screen, which is useful for comparing with the current US image after the procedure.

10. 2D Image parameters



1 2D	Select the [2D] button to change parameters on 2D mode.

Notes

You can enter 2D, C, PD, Elastoscan+(only on Linear), CEUS+, S-Shearwave, MV-Flow, HQ-Vision.

- The features, options may not be commercially available in some countries.
- Sales and shipments are effective only after the approval by the regulatory affairs. Please contact your local sales representative for further details.
- This Quick guide does not include all of the details of instruction, fore more detail, please refer to R20 User Manual.
- Do not distribute this document to customers unless relevant regulatory and legal affairs officers approve such distribution.
- This User Quick Guide is based on R20 V1.01.
- Disclaimer: Some Images in this content were obtained from other system.

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