

Multi-parametric Fatty Liver Lab Demo Guide

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Background

Fatty liver disease has a high incidence rate worldwide and is a serious threat to human health. Traditional B-mode ultrasonography diagnoses fatty liver disease and determines its severity based on the following characteristics of liver images: (1) increased echogenicity of the liver parenchyma; (2) blurred and thinner wall of the intrahepatic portal vein; (3) attenuated posterior echo and unclear image of diaphragm. A clinical consensus has been reached on disadvantages of b-mode ultrasonography, such as the high subjectivity, lack of quantitative indicators, and low sensitivity to low-grade fatty liver. To overcome these disadvantages, Mindray has developed a method of fatty liver quantitative analysis based on multiple parameters, including the ultrasonic attenuation (USAT), liver texture index (LTI), and RF-based hepatorenal index (HRI+). This method allows for comprehensive analysis of fatty infiltration of liver and provides more accurate, reliable diagnostic information.

Ultrasonic Attenuation (USAT)

1. Ask the patient to be supine and raise the right arm to the side of head.
2. Select the SC6-1U probe and ABD examination mode (ABD difficult and Pediatric ABD are also available), and scan the right intercostal space of the patient. Keep the incident ultrasound beam perpendicular to the liver capsule and ask the patient to breathe steadily.
3. Tap **Fatty Liver Lab** on the touch screen to start fatty liver assessment (see Figure 1) and retain the default choice **USAT** on the screen that appears.

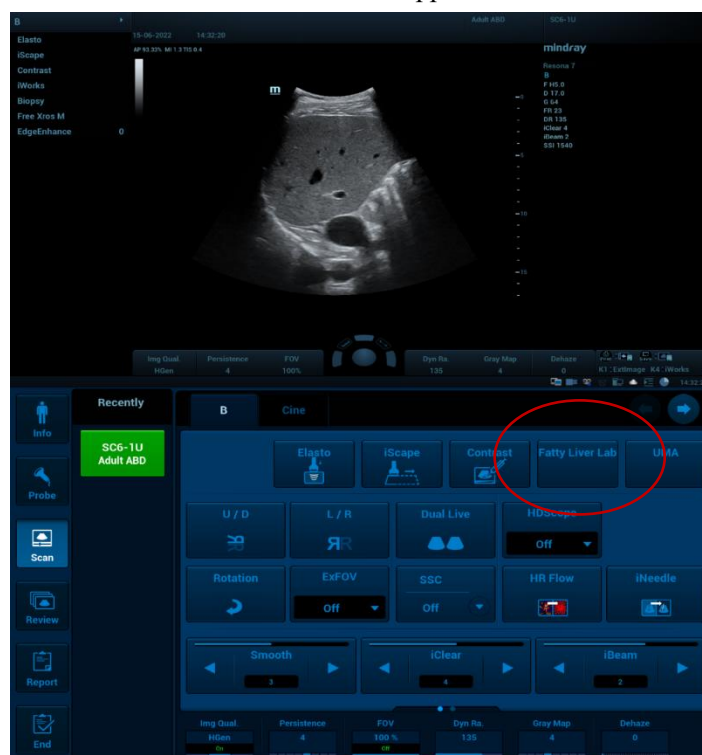


Figure 1 Entering the fatty liver imaging window and touch screen

4. On the USAT screen, you can see big and small regions of interests (ROIs) in a liver image. The big ROI is the USAT imaging region that needs to cover as much liver parenchyma as possible. The small green ROI is the USAT measuring region, with a default size of 2 cm x 2 cm. The size and position of the measuring region are adjustable, and the recommended position is the liver parenchyma of segment S5/S6. Keep the top edge of the measuring region 1-2 cm away from the liver capsule, and avoid large blood vessels and acoustic shadows of ribs.

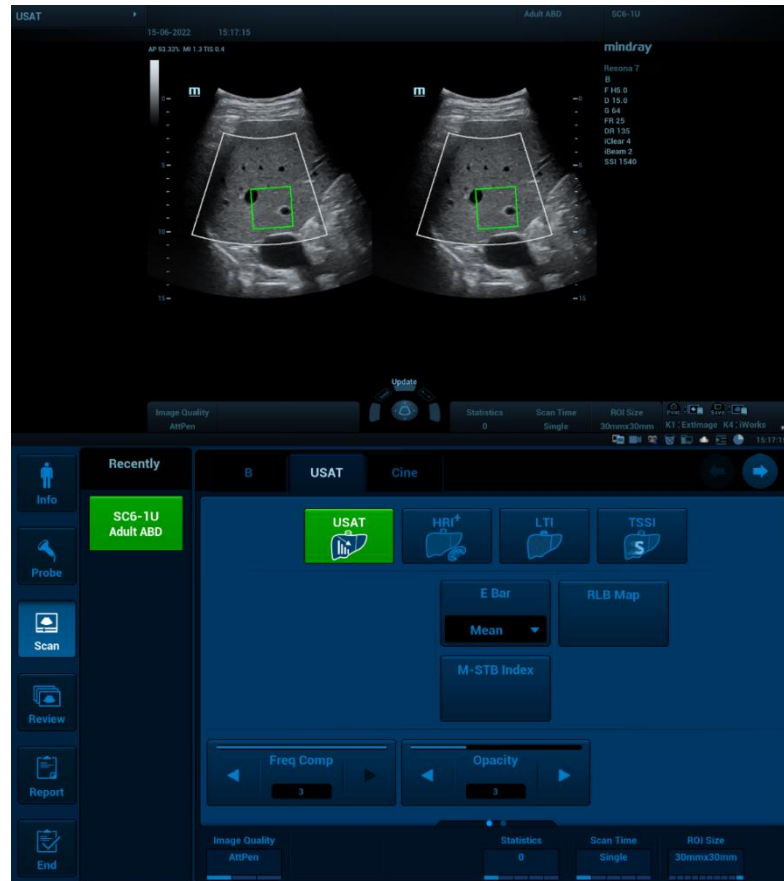


Figure 2 Entering the USAT imaging window and touch screen

5. Tap **Update** to start USAT imaging and measuring. Then, the image is frozen automatically, and the following measurements are displayed: mean value (**Mean**), maximum value (**Max**), minimum value (**Min**), and standard deviation (**Std**). You can still move the measuring region on the frozen image, and the measurements are updated automatically (see Figure 4).

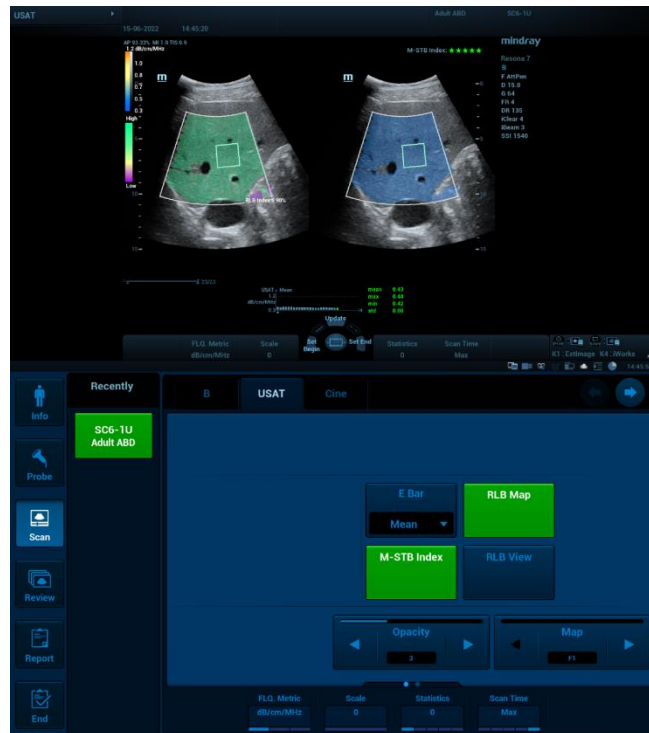


Figure 3 Tapping Update to start imaging and measuring

6. The **RLB Map** (reliability map) and **M-STB Index** (motion stability index) parameters determine the quality of USAT images. It is recommended that you set **RLB Map** to 80% or higher and **M-STB Index** to green 4 stars or higher.

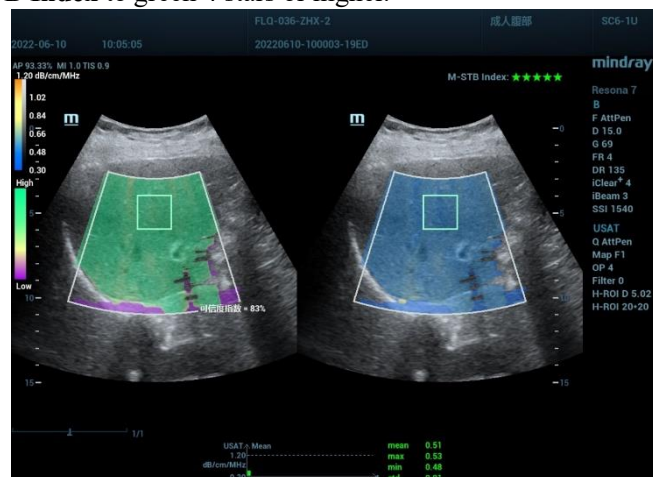
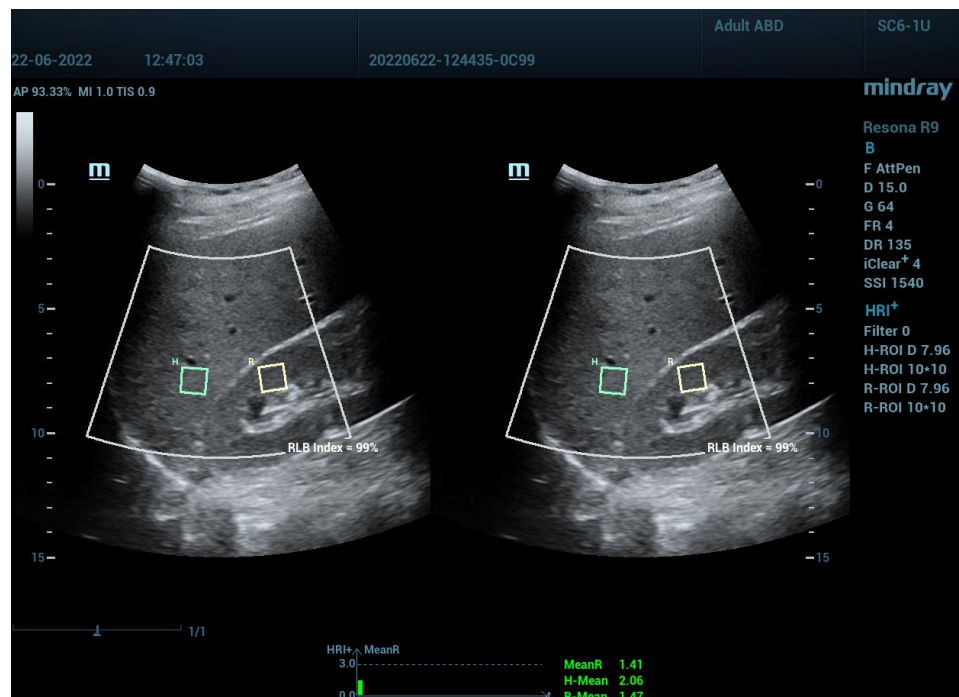


Figure 4 Left: reliability map; right: USAT image and measurements

7. Measure five times in the same position and obtain the mean value. The measurement results will be used in statistical calculation and provided in the examination report (see Figure 4).

Hepatorenal Index (HRI+)

1. Ask the patient to be supine and select SC6-1U probe, ABD examination mode (ABD difficult and Pediatric ABD are also available).
2. Place the probe between the anterior axillary line and midaxillary line to scan the longitudinal section of the liver and right kidney. Avoid acoustic shadows of ribs during the scan.
3. Tap **Fatty Liver Lab** on the touch screen to start fatty liver assessment, and select **HRI+** on the screen that appears. Then, two ROIs appear. Place the bigger green one in the liver parenchyma area and the smaller yellow one in the renal cortex area.
4. Tap **Update** on the touch screen. The calculated mean hepatorenal index (MeanR) is then displayed.
5. The **RLB Map** (reliability map) and **M-STB Index** (motion stability index) parameters determine the quality of HRI+ measurements. It is recommended that you set RLB Map to 80% or higher and M-STB Index to green 4 stars or higher.
6. Measure five times in the same position and obtain the mean value. The measurement results will be used in statistical calculation and provided in the examination report.



Liver Texture Index (LTI)

1. Ask the patient to be supine and raise the right arm to the side of head.
2. Select the SC6-1U probe and ABD examination mode (ABD difficult and Pediatric ABD are also available), and scan the right intercostal space of the patient. Keep the incident ultrasound beam perpendicular to the liver capsule and ask the patient to breathe steadily.
3. Tap **Fatty Liver Lab** on the touch screen to start fatty liver assessment and select **LTI** on the screen that appears. Move the green ROI to the renal cortex area and avoid large blood vessels.
4. Tap **Update** to obtain the calculated LTI.

5. The **RLB Map** (reliability map) and **M-STB Index** (motion stability index) parameters determine the quality of LTI measurements. It is recommended that you set RLB Map to 80% or higher and M-STB Index to green 4 stars or higher.
6. Measure five times in the same position and obtain the mean value. The measurement results will be used in statistical calculation and provided in the examination report.

