AGENȚIA MEDICAMENTULUI ȘI DISPOZITIVELOR MEDICALE

REGISTRUL DE STAT AL DISPOZITIVELOR MEDICALE

Tip	Denumire
I.3. Certificatul CE	Certificat CE
I.2. Declarația de conformitate CE	Declaratie de conformitate CE

Введите текст для поиска...

Nr	Denumire	Den.comerc.	Model	Nr. catalog	Tara	Producatorul	Reprezentant	Ordin	Data	Cod vamal
		logiq fortis		h43302						
DM000349916	ULTRASONOGRAF	LOGIQ FORTIS™	ULTRASOUND CONSOLE LCD	H43302LB	Coreea Sud	GE ULTRASOUND KOREA, LTD.	INTERMED S.R.L.	Rg04-000115	12-05-2022	
DM000349915	ULTRASONOGRAF	LOGIQ FORTIS™	ULTRASOUND CONSOLE HDU	H43302LA	Coreea Sud	GE ULTRASOUND KOREA, LTD.	INTERMED S.R.L.	Rg04-000115	12-05-2022	

Содержит([NameMake], 'logiq fortis') И Содержит([Nr. catalog], 'h43302') Очистить

Digitally signed by Chicu Natalia
Date: 2023.06.10 01:04:46 EEST
Reason: MoldSign Signature
Location: Moldova

cSound Architecture

Ultrasound for today, platform for tomorrow

The breadth of clinical scenarios in general imaging ultrasound places significant demands on the ultrasound device. A patient who cannot hold her breath while a renal Doppler is performed. A patient whose tendon tear requires sub millimeter resolution. An obese patient needing a liver biopsy. A brain scan of a neonate in an incubator. A liver fibrosis assessment that depends on detecting a shear wave signal thinner than a human hair. In today's demanding clinical environment, the ultrasound machine is a partner in helping the clinician meet every challenge.

GE Healthcare has designed its advanced cSound™ Architecture to put the latest ultrasound technology in the hands of clinicians. It combines the power of XDclear™ probes with a new cSound Imageformer to enable confident diagnoses, provide comprehensive tools, and support concise workflow.

cSound Imageformer

The cSound Imageformer is the data acquisition and processing engine of the new architecture. At its core are cutting-edge NVIDIA® GPUs, the same graphics processing technology that is advancing the driverless car industry and the next generation of video gaming. This technology gives GE ultrasound engineers access to 48 times the data throughput and 10 times the processing power of our previous systems.* This opens up new opportunities, allowing the cSound Imageformer to collect and use more data to create every ultrasound image.

Traditional Beamforming

To understand cSound Imageforming, it helps to review how traditional beamforming works. As shown in Figure 1, traditional beamforming is performed in customized hardware and only the resulting beam or vector data is provided to the flexible, software-based processor that creates the ultrasound images.

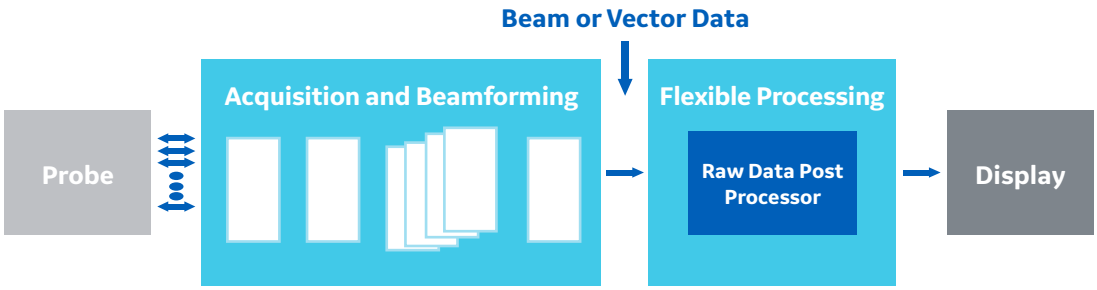


Figure 1. A traditional beamforming architecture.

Traditional Beamforming Steps

1. A transmit event is performed. The return ultrasound data is dynamically received and collected in a single instance of channel memory.
2. The collected channel data is processed to create a particular portion of the image often referred to as one or more vectors or beams.

   Note: If multiple focal depths are desired, steps 1 and 2 are also repeated with a transmit event focused at a different depth.
3. Steps 1-2 are repeated for another portion of the image until the entire image has been created.

Traditional Beamformer

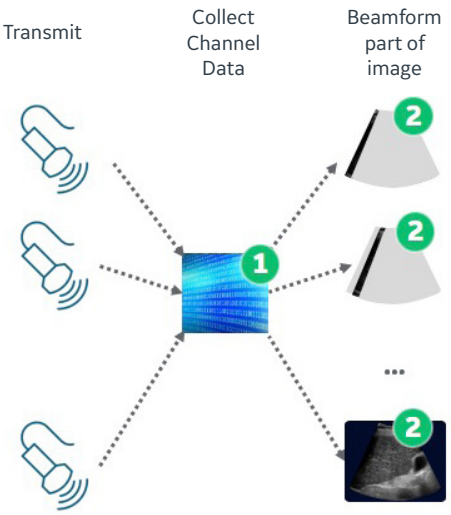


Image created one line (beam) at a time using limited information.

The channel data processed in step 2 and then overwritten still has useful information. However, a traditional beamformer has no means to extract this additional value before the channel data associated with the next transmit event overwrites it.

cSound Imageforming – Methodology

As shown in Figure 2, cSound Imageforming is performed using flexible, GPU-based processing. In contrast to traditional beamforming, the cSound Architecture moves raw channel data at high speeds from the acquisition system to components that perform flexible, software-based processing, including the cSound Imageformer. This channel data can be retained in memory even as channel data from subsequent transmit events is acquired and transferred to the cSound Imagefomer.

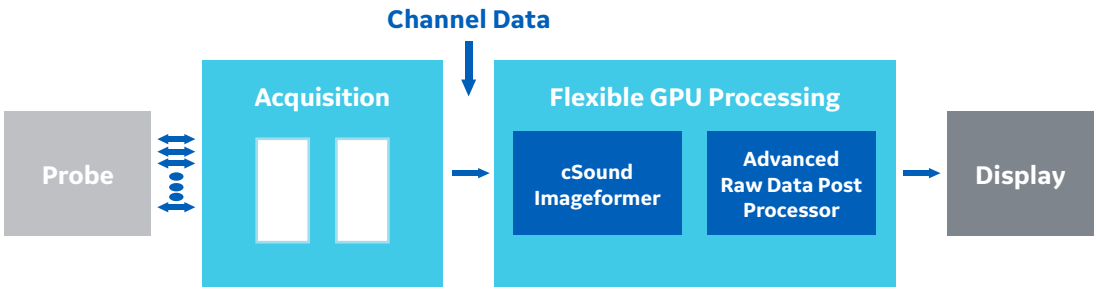
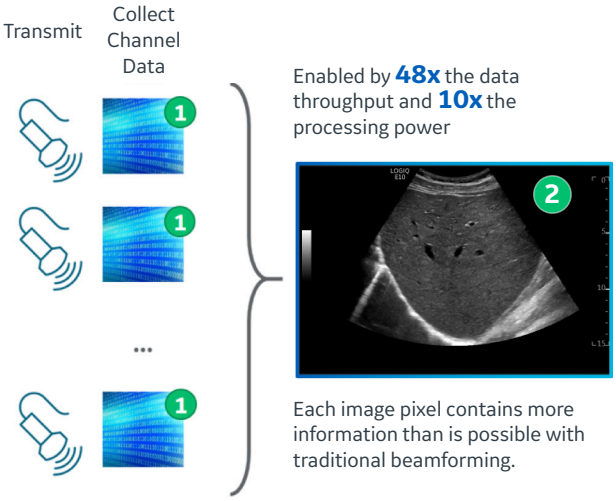


Figure 2. cSound Architecture.

cSound Imageforming Phases

1. Acquisition – A series of transmit events are performed with the return ultrasound data being dynamically received and transferred to memory.
2. Reconstruction – The channel data from all of the transmits is combined to form the image.

New cSound Imageformer



Similar to CT and MRI, cSound Imageforming has a distinct acquisition phase followed by a reconstruction phase. This requires the cSound Architecture to acquire, move and store large amounts of channel data and, once collected, the cSound Imagefomer must be able to process the data at high speeds to enable real-time image reconstruction. The image formation process leverages channel data that would have been discarded in traditional beamforming. This additional data provides numerous samples for every point in the image. The image formation process combines these samples to achieve transmit focus for each point in the image, enhance contrast resolution and deliver fine spatial resolution.

cSound Imageformer – Retrospective Transmit Focus

In traditional beamforming, each transmit event has a transmit focus that is created by adjusting the time delays of individual transducer elements. This generates a curved wave front that converges until reaching a particular depth (the focus depth) and then diverges as it continues to propagate beyond the focus depth. The focus is the location that is insonified from multiple directions.

For each transmit event, the cSound Imageformer collects and saves the receive ultrasound data for each element. This is referred to as channel data. *Even when a new transmit event occurs, the channel data associated with previous transmit events is retained and not overwritten.*

Individual transmit events are spatially and/or angularly offset from one another creating significant overlap. As a result, for any point in the image, there are multiple transmit events that have insonified the point, each from a different direction. Knowing the spatial locations of a particular point in the image relative to a given transmit event, the cSound Imageformer can retrospectively process the channel data of each intersecting transmit event, and then coherently combine the results to achieve retrospective transmit focus at that point. It is worth noting that noise associated with each transmit beam is independent and therefore sums incoherently while the signal itself sums coherently. This increases the signal-to-noise ratio, further improving contrast resolution throughout the image.

This approach to focusing at each point in an image is possible for all types of transmit events providing there is overlap.

- **Converging waves** – Sound from multiple elements converges at a finite depth relative to the transducer face
- **Plane waves** – Sound from multiple elements is unfocused or essentially focused at an infinite depth
- **Diverging waves** – Sound from multiple elements diverges as if the focus was behind the transducer face

The cSound Imageformer is capable of all types of transmit events, giving engineers the flexibility to optimize the system uniquely depending on the needs of each clinical application.

cSound Imageformer – Retrospective Transmit Focus, an Example

For illustrative purposes consider a simplified scenario, as shown in Figure 3.

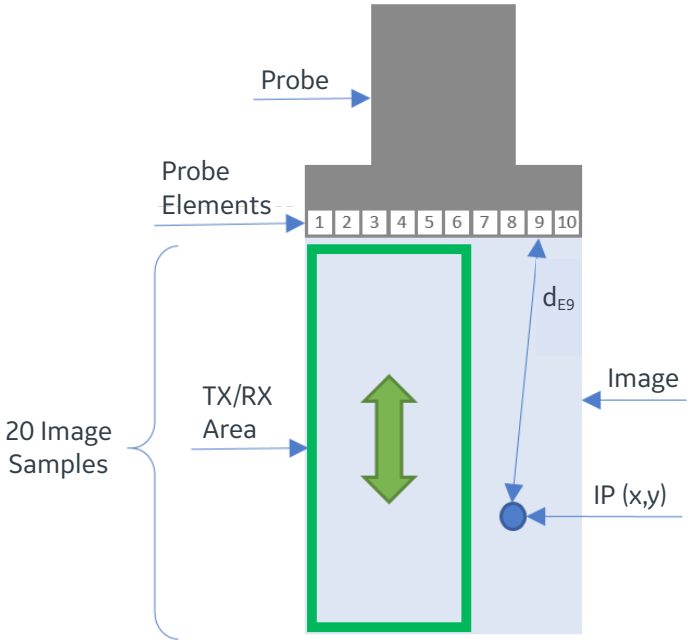


Figure 3. A simplified imaging scenario for illustrating retrospective transmit focus.

- Linear transducer with just 10 elements (E1 – E10)
- Each transmit event uses just six elements for transmitting and receiving. In this case, the first transmit event uses elements 1 through 6 (1-6) and then subsequent transmit events shift by a single element to use elements 2-7, 3-8, 4-9, and 5-10 for a total of 5 transmit events to create the image
- All transmit events are unfocused
- The receive signal is sampled so that 20 samples cover the depth of the image
- Each point in the image can be represented by IP (x,y) where x is the lateral direction and is restricted to the width of the image (which equals the width of the probe) and y is the axial direction and is restricted to the depth of the image
- The distance between IP (x,y) and a particular probe element is defined as d_{EN} where N is the element number 1-10

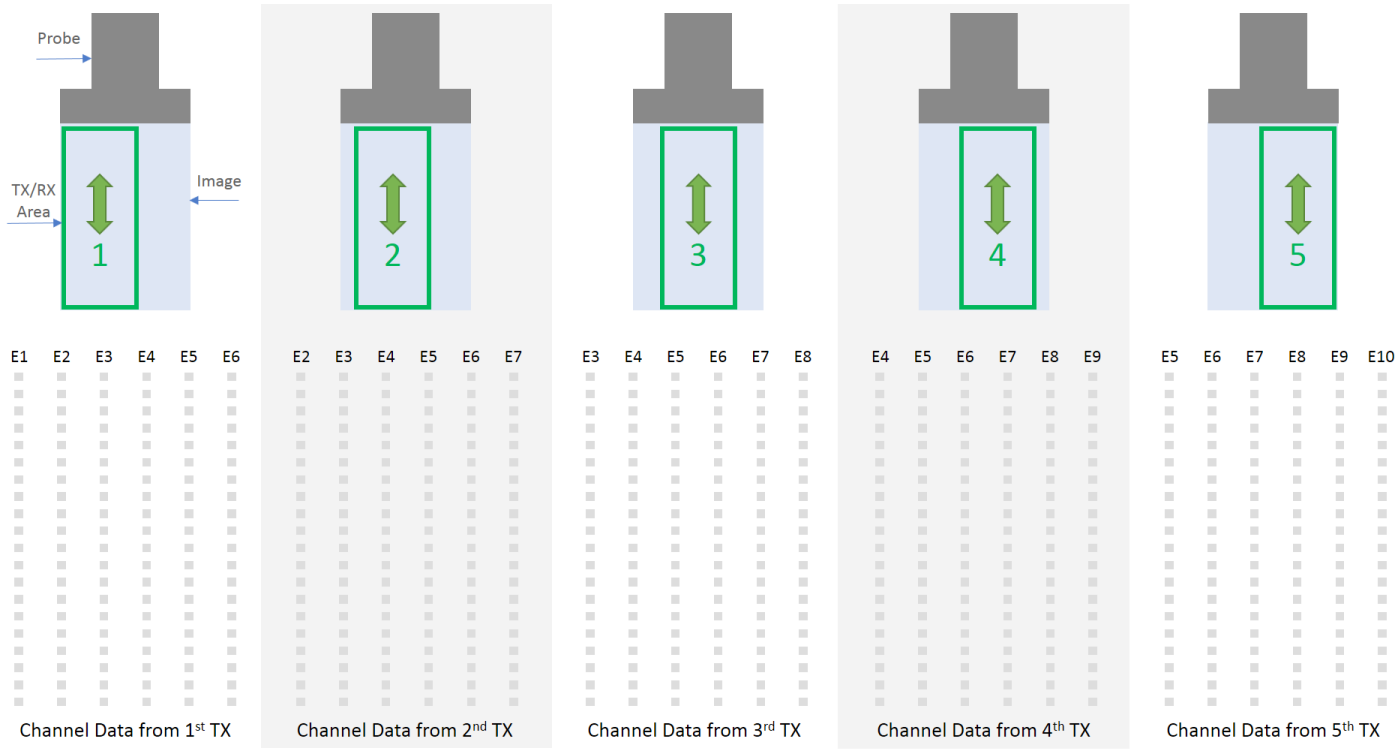


Figure 4. The first transmit (1) occurs and channel data is collected and stored. This is repeated for subsequent transmits (2 through 5) which are each offset from the previous.

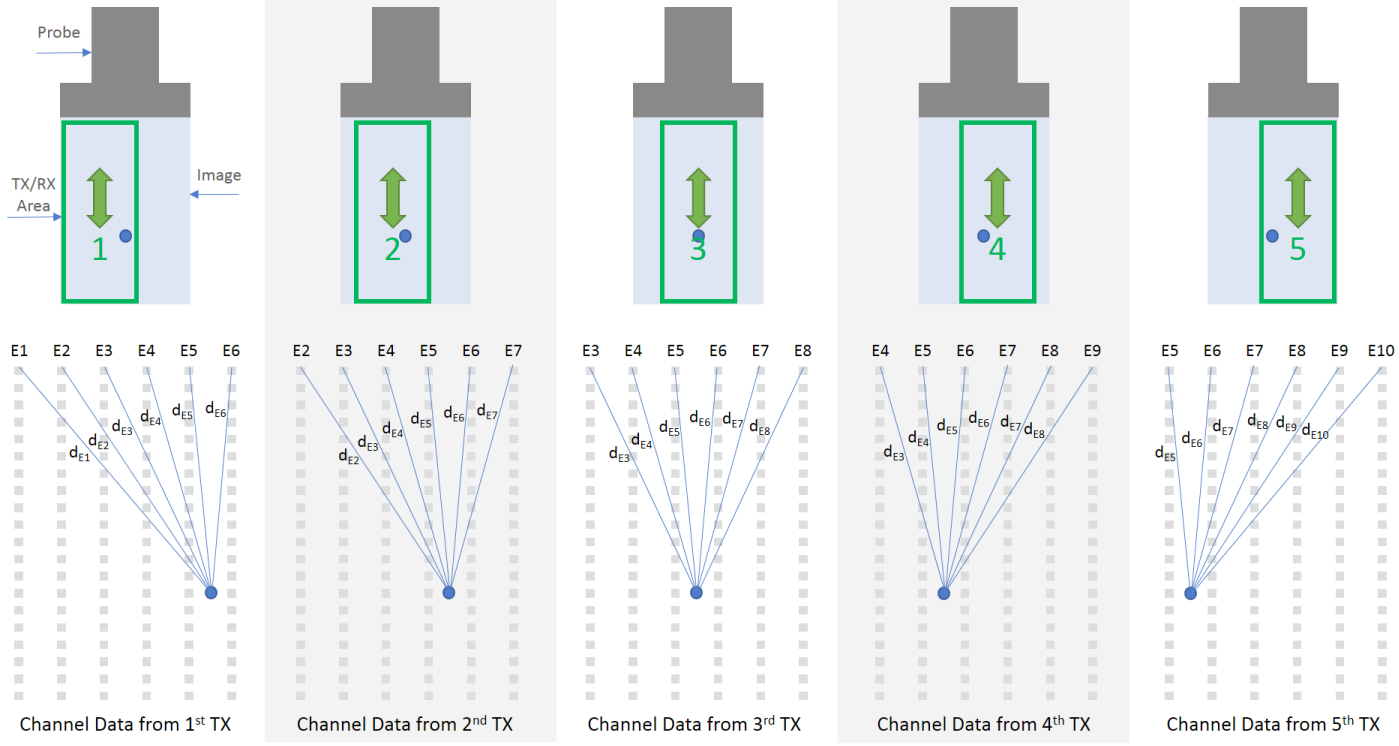


Figure 5. For each set of relevant channel data, the distance between the deep image point (represented by the circle) and each probe element is computed.

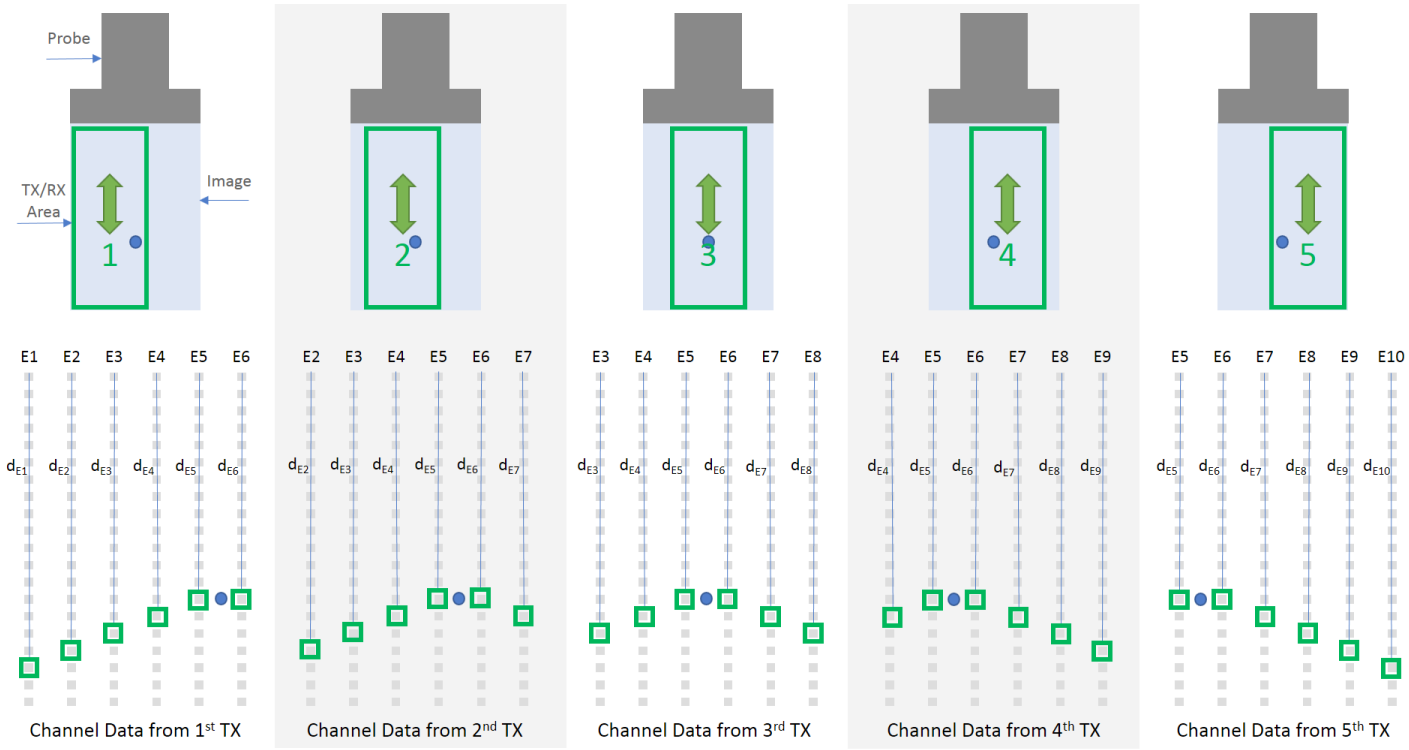


Figure 6. The computed distances between the image point and each element are used to access the channel data that focuses on the image point. The selected channel data from each transmit is coherently summed to determine the signal associated with the image point.

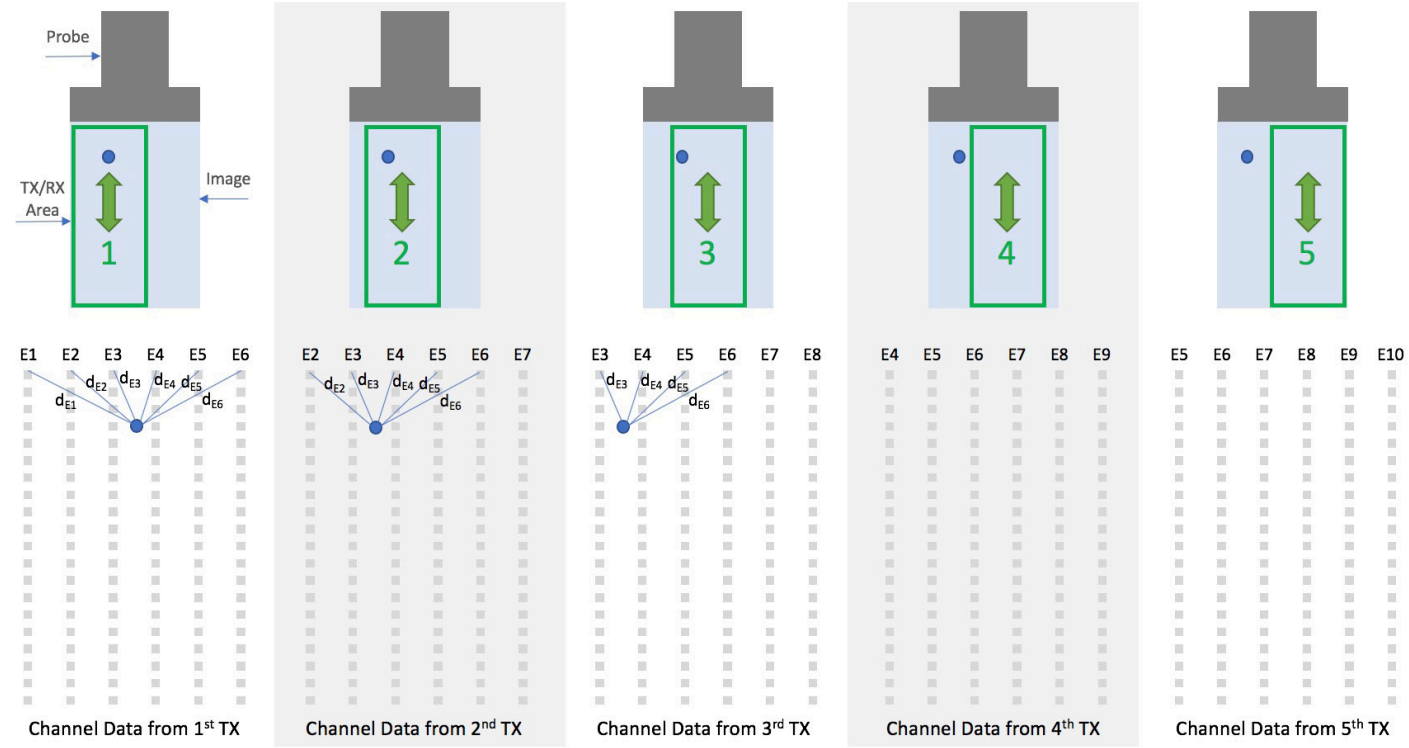


Figure 7. For each set of relevant channel data, the distance between the shallow image point (represented by the circle) and each probe element is computed. Note that transmits 4 and 5 do not overlap with the image point. Further note that some elements, such as E7 and E8 on transmit 3, are not included because of their steep angle relative to the image point.

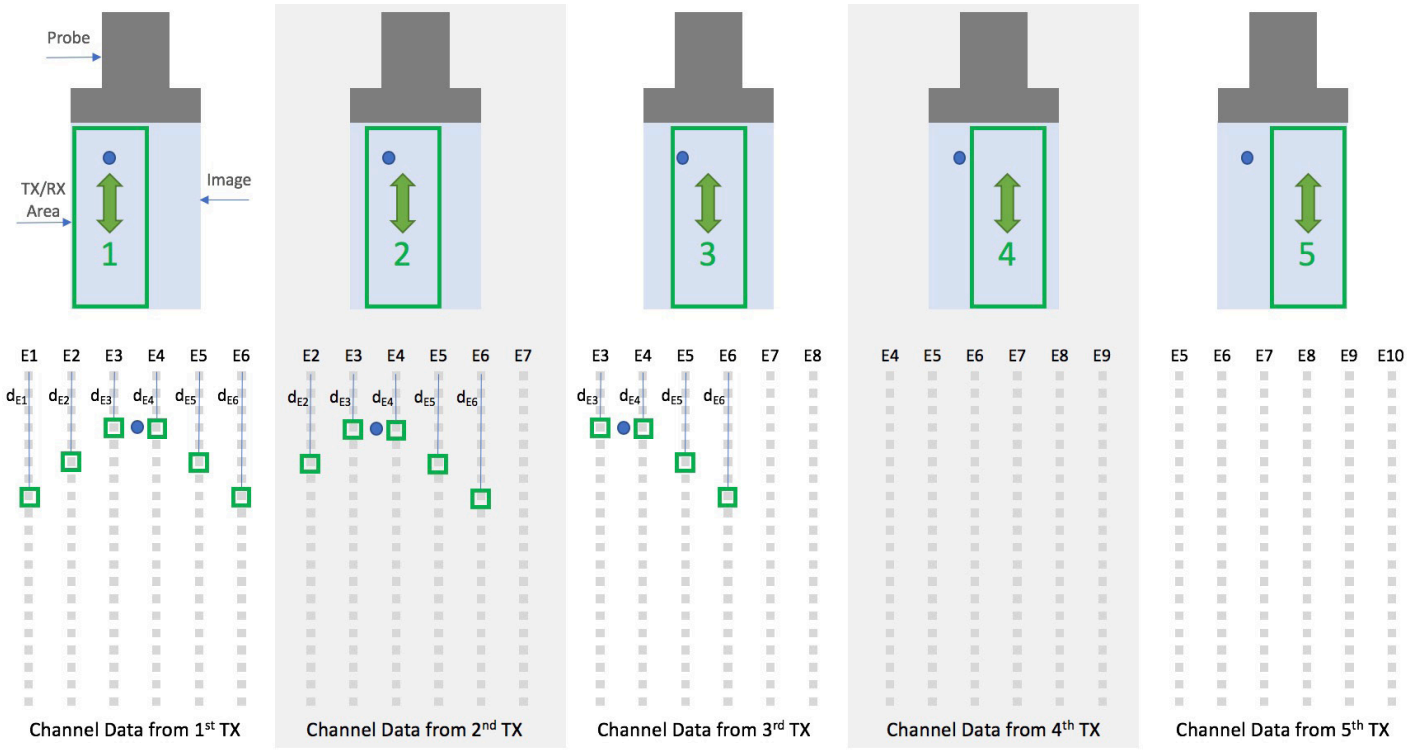


Figure 8. The computed distances between the image point and each element are used to access the channel data that focuses on the image point. The selected channel data from each transmit is coherently summed to determine the signal associated with the image point.

When extending this simplified scenario to the cSound Imageformer, there are additional complexities to consider. For example, the geometry of the transducer and the delay profile of the transmit event impact the computation of the image point to probe element distance and therefore the offset needed to reference the correct channel data. In another difference, the received elements are often larger than the number of transmit elements. Most notably, the sheer volume of data puts extensive demands on the system:

- The large quantity of collected channel data must be reliably and quickly streamed to the channel data memory before additional channel data is collected from the next transmit
- A massive amount of channel memory is required to store the channel data collected from many transmit events
- The retrospective processing of each relevant set of channel data for each point in the image requires intensive, ultra-high-speed, parallel computations to be performed to achieve real-time imaging at very high frame and volume rates

In a less powerful system, the real-time nature of imageforming could be achieved by restricting the amount of data collected by each transmit; speed would come at the expense of image quality. The cSound Architecture, in contrast, is able to keep up without restricting the data, even in radiology's most challenging applications. To put the cSound Architecture's performance in context, it can move the equivalent of multiple DVDs worth of data in one second.

cSound Imageformer – Benefits

Imagine an ultrasound department where no image is acquired with the focal zone in the wrong position. With each point in the image in focus, the user doesn't need to select multiple focal zones or to move the focus position. Additionally, there are no trade-offs between near- and far-field image quality. Deep liver imaging provides detailed data from the capsule to the diaphragm. When biopsying a deep lesion, there is no compromise to needle visualization as it enters the image area. When surveying breast tissue, a clinician is able to see small lesions present from the skin line to the chest wall – all without the user having to make any adjustments.

While greater focal range in ultrasound has traditionally meant lower frame rates, cSound Imageforming actually increases frame rates. It requires a smaller collection of transmit events, a direct result of efficiently using the data collected from each individual transmit event. To understand this efficiency, consider that an ultrasound transmit event can be focused, but the sound energy still travels in many directions; it acts like a flashlight rather than a laser.

Though a flashlight generates maximum light energy in the center of its beam, there is still useful visual information in the light outside of the central beam. Similarly, there is much useful ultrasound image data in the sound that propagates outside the focused direction and the cSound Imageformer is designed to take full advantage of this data.

cSound Imageformer – A Platform for Growth

cSound Imageforming runs on high performance NVIDIA GPUs, but the imageforming algorithms are software based. This affords significant flexibility; the algorithms can be adjusted for specific applications and evolve over time without impacting the underlying hardware architecture. In addition to forming the image, current algorithms can incorporate Adaptive Contrast Enhancement (ACE) and other GE proprietary techniques to boost the real image signal and suppress artifact. And with advances in GPU technology, there is potential to incorporate newer GPUs into the platform, enabling even more sophisticated algorithms.

Advanced Raw Data Post Processor

The improved images resulting from the cSound Imageformer flow into the Advanced Raw Data Post Processor where additional enhancement is performed by spatial compounding, frame averaging, advanced speckle reduction imaging (Advanced SRI), and other functions. The post-processed image data is then mapped to gray scale levels and the scan is converted for display to the operator.

While speckle reduction imaging has been a feature of ultrasound systems for many years, Advanced SRI is GE's most sophisticated algorithm to date, and requires the expanded computational power of the cSound architecture to achieve real-time results. It employs proprietary processing steps at different resolutions of the raw image data to smooth speckle-based artifacts while simultaneously enhancing structures of all sizes within the image. The level of smoothing and enhancement is adjustable by the user.

The "Raw Data" aspect of the Advanced Raw Data Post Processor refers to the fact that image data is saved prior to the processing steps. This allows the user to continue to adjust the processing long after the images have been saved.

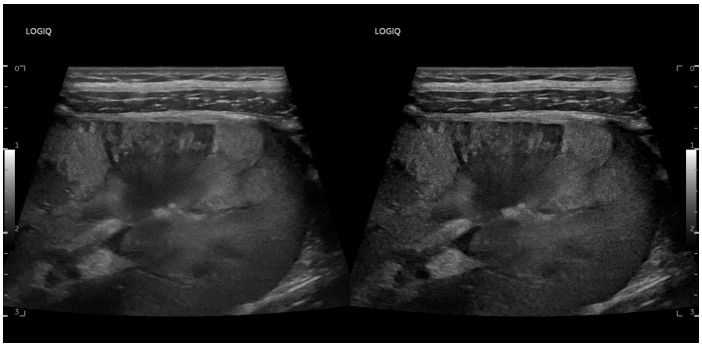
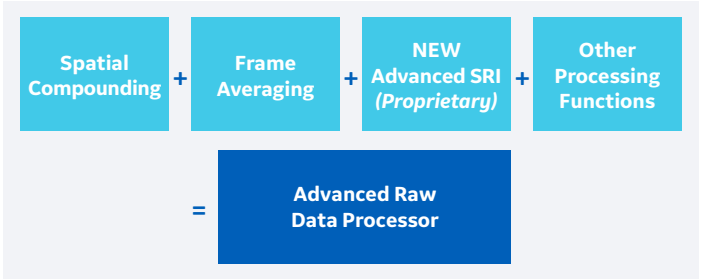


Figure 9. Advanced SRI (right) takes advantage of the increased computational power of the cSound Architecture to identify and enhance structures of all sizes while reducing speckle-based artifacts.



XDclear Probes

While cSound Imageforming provides numerous benefits over traditional beamforming, the quality of the acoustic data coming into the system is still of utmost importance. In combination with the cSound Architecture's state-of-the-art transmit and receive electronics, XDclear transducers help deliver a more powerful, pure, and efficient sound wave with wider bandwidth than traditional GE transducer technology. This results in impressive deep penetration and high resolution, enabling ultrasound to be used effectively on a broad range of patients.

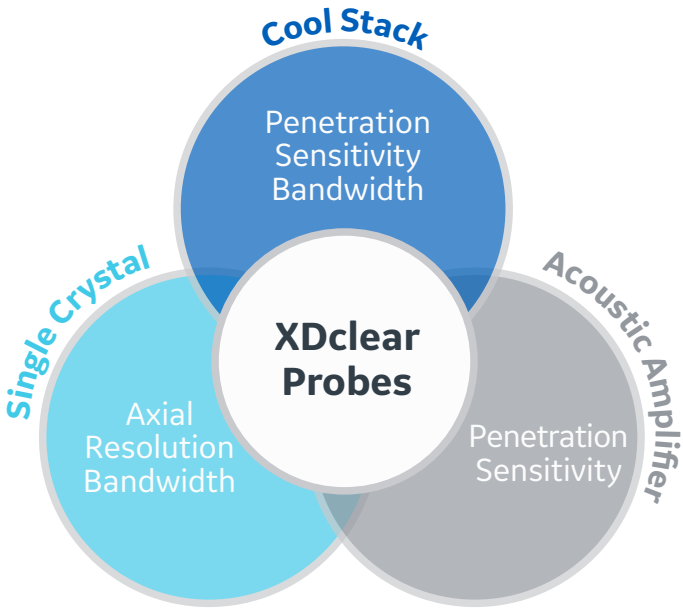


Figure 10. XDclear probes: Derive their superior performance from three key technologies: Single Crystal, Cool Stack, and Acoustic Amplifier.

XDclear transducers are a proprietary combination of advanced materials and innovative design. The XDclear design incorporates an enhanced piezoelectric material, Single Crystal, to generate a high quality acoustic signal. The quality of that signal is preserved through an innovative Acoustic Amplifier design coupled with GE's Cool Stack technology to help optimize energy management. The ability to effectively and efficiently combine these technologies is what makes XDclear extraordinary.

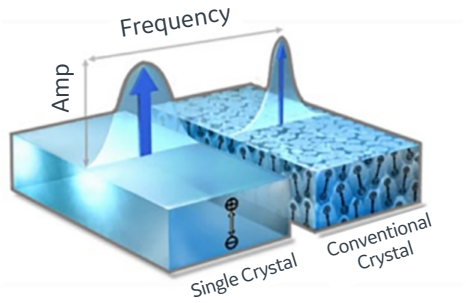


Figure 11. *Single Crystal:* Advanced piezoelectric material that delivers high quality acoustic signal with a wider bandwidth than conventional piezoelectric material.

Figure 12. *Acoustic Amplifier*: Preserves the acoustic signal through an innovative design that captures and redirects the unused energy that passes through the crystal to enhance sensitivity, axial resolution, and penetration.

XDclear transducers enable deep penetration and resolution. One objective measure of transducer performance is bandwidth: the range of frequencies that the transducer can transmit and receive. Increased bandwidth allows a transducer to cover a broader frequency range, which makes it possible to achieve deep penetration and high resolution, as well as enhanced performance in harmonic imaging.

With sufficient bandwidth, one transducer can cover the range of acoustic frequencies that previously required separate transducers. XDclear transducers with Single Crystal materials have measurably enhanced bandwidth, achieving a -6 dB fractional bandwidth that can exceed 100 percent compared with 70 to 80 percent for traditional GE transducers. The result is a new level of penetration, resolution, and sensitivity in GE transducer performance.

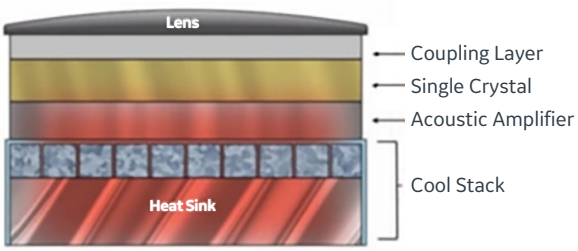


Figure 13. *Cool Stack:* Optimizes energy usage via patented technology integrated into the transducer's internal architecture; it relieves inherent heat generation that can otherwise reduce sensitivity and penetration.

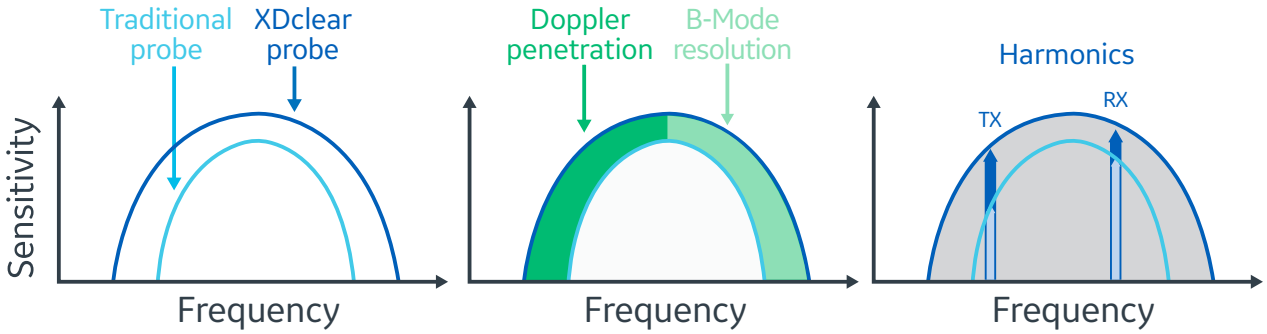


Figure 14. XDclear probe performance benefits are derived from improved sensitivity and wider bandwidth.

cSound Architecture Summary

The cSound Architecture leverages next-generation data rates and processing power that were previously unavailable, allowing significantly more data to be collected and used to create every image. This additional data is used to achieve focus at every point and to increase contrast and spatial resolution—all while significantly improving frame rates. Combined with the performance advantages of XDclear probes and the Advanced Raw Data Post Processor, these advancements make the cSound Architecture an excellent imaging system for today and its flexible design makes it a powerful imaging platform for tomorrow.

*As compared to the LOGIQ™ E9.

March 2022
JB19417XX

EC DECLARATION OF CONFORMITY

Following the provisions of the medical devices regulation 2017/745
Following the directive 2011/65/EU, directive 2014/53/EU

We

Manufacturer and manufacturing site	EU Authorized Representative
GE Ultrasound Korea, Ltd.	**GE Medical Systems SCS**
9, Sunhwan-ro 214beon-gil,	283 rue de la Minière
Jungwon-gu, Seongnam-si	78530 BUC, France
Gyeonggi-do 13204, Republic of Korea	SRN: FR-AR-000000344
SRN: KR-MF-000001860	

Declare under our sole responsibility that the device:

LOGIQ Fortis

Basic UDI-DI: **8406821BUG00214GZ**

Identification number:

REF Catalog	H-Catalog Number	UDI-DI
LOGIQ Fortis HDU	**H43302LA**	**00195278405326**
LOGIQ Fortis LCD	**H43302LB**	**00195278405333**

Intended Purpose: The LOGIQ Fortis is a general-purpose diagnostic ultrasound system intended for use by qualified and trained healthcare professionals for ultrasound imaging, measurement, display and analysis of the human body and fluid.

EMDN Code: **Z110401**
EMDN Description: Ultrasound Scanners

GMDN Code: **40761**
GMDN Description: General-purpose ultrasound imaging system

UMDNS Code: **15-976**

Classification: **IIa**
Classification rule (Annex VIII): **Rule 10, Class: IIa**

To which this declaration relates is in conformity with the requirements of the medical devices regulation 2017/745 that apply to it and with the requirements of the directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and the directive 2014/53/EU on the radio equipment (RED).

This conformity is based on the following elements:

- Technical Documentation reference: DOC2379389, of the product to which this declaration relates.
- EC certificate No. HZ 2004702-01:
  - Conformity assessment procedure followed: Annex IX of the medical device regulation 2017/745
  - Delivered by TUV Rheinland LGA Products GmbH (Notified Body n° 0197)

This EC declaration of conformity is the initial release.

SIGNATURE:

Date of issue:	13-12-2021
Place of issue:	China
Name:	Qingmeng Chen
Function:	Regulatory Affairs Program Manager
Signature:	

Qingmeng Chen

ADDENDUM TO THE EC DECLARATION OF CONFORMITY
LOGIQ Fortis including accessories and components
dated 13-12-2021

Product Description	H-Catalog Number[1]
Ultrasound Console	
LOGIQ Fortis HDU Console	H43302LA / 6602000
LOGIQ Fortis LCD Console	H43302LB / 6601000
Probe Options[2]	
IC5-9-D	H40442LK
ML6-15-D	H40452LG
L8-18i-D	H40452LL
C2-9-D (XDClear)	H40462LN
C1-6-D (XDClear)	H40472LT
C1-6VN-D (XDClear)	H40472LW
C2-9VN-D (XDClear)	H40472LY
C3-10-D (XDClear)	H40482LB
M5Sc-D (XDClear)	H44901AE
L2-9-D	H44901AI
L2-9VN-D	H44901AJ
6Tc-RS	H45551ZE
C2-7-D	H46422LM
C2-7VN-D	H46422LN
P2D	H4830JE
RIC5-9-D	H48651MS
RAB6-D	H48681MG
P6D	H4830JG
BE9CS-D	H40482LE
L3-12-D	H48062AA
6S-D	H45021RR
L6-24-D Probe	H4920HF
TEE Probe Accessories[2]	
TEE RS-DLP Adapter	H46352LK
Adult TEE Clip-on Bite Guard	H45511EE
Adult TEE Clip-on Bite Guard Opr.	H45521CB
Adult TEE Scanhead Protection Cover	H45521CK
Adult TEE Conventional Bite Guard	H45521JH
BITE HOLE INDICATOR	H45531HS
TEE STORAGE RACK	H45551NM
Software Options	
Advanced Security	H46622LL
Coded Contrast	H43332LA
Parametric Imaging	H43332LB
Cardiac AFI	H46622LN
LOGIQ Exx DVR	H4918DR
Report Writer	H46622LR
Stress Echo	H46622LS
Tricefy	H46622LT
LOGIQ Apps	H46622LW
KOIOS SW	H46622LY
LOGIQ Exx KOIOS Thyroid	H4920KT
LOGIQ E10 KOIOS INSTALL	H4919KI

Product Description	H-Catalog Number[1]
KOIOS 3.x INSTALL	H4921KY
Scan Assistant	H46622LZ
Advanced Probes	H46612LS
AUTO IMT	H46612LT
B Steer+	H46612LW
B-FLOW	H46612LY
Compare Assistant	H46612LZ
DICOM	H46622LA
FLOW QA	H46622LB
Measure Assist Breast	H46622LC
Measure Assist OB	H46622LD
Elastography	H43332LC
Elasto QA	H43332LD
Shear Wave Elastgraphy	H46622LE
LOGIQ Exx SRI HD Type2	H4920SR
UGAP	H46622LH
SonoNT SonoIT	H46622LJ
LOGIQ Exx VNAV Image	H4920VR
Hepatic Assistant - SWE-UGAP	H43332LE
Omni View	H43332LF
STIC	H43332LG
TUI	H43332LH
VCI-Static	H43332LJ
VOCAL_II	H43332LK
Thyroid Productivity	H43332LL
Breast Productivity	H43332LM
Vita on Demand	H43332LN
Hardware Options[2]	
CW Doppler	H43342LA
Realtime 4D	H43342LB
ECG Option	H43342LC
Scan on battery option kit	H43342LD
Power Assistant	H43342LE
Volume Navigation	H43342LF
Volume Navigation for V-Nav Inside T1	H43372LK
Wireless Option	H43342LG
S-Video Option	H43342LH
Pencil CW	H43342LJ
Peripheral Options[2]	
USB FOOTSWITCH 3 BUTTON	H46732LF
SONY UPD25MD COLOR PRINTR	H4911JT
BW Printer Installation Kit T1	H43342LK
LOGIQ Exx Protective Cover	H4918DC
LOGIQ Exx Inkjet Printer	H4918RP
LOGIQ Fortis High Cabinet	H43342LL
LOGIQ Fortis Low Cabinet	H43342LM
LOGIQ Fortis Side Cabinet	H43342LN
5inch bay Option	H43342LP
An Keyboard Assembly	
AN Keyboard ENGLISH	H43342LR
AN Keyboard GERMAN	H43342LS
AN Keyboard FRENCH	H43342LT
AN Keyboard GREEK	H43342LW
AN keyboard NORWEGIAN	H43342LY

Product Description	H-Catalog Number[1]
AN Keyboard SWEDISH	H43352LA
Accessories[2]	
Ethernet protection Cable	H43272LJ
FC389,ECG CABLE SET	H45521AL
VNav Stand (Offboard)	H4908NS
ECG CABLE - AHA STYLE	H4910EC
VNav NEEDLE TRACKING	H4910NT
VNav VirtuTRAX Starter Kit	H4910NY
ECG Cables IEC Style	H4911JC
VNav Virtual Tracker	H4911NG
VNav Active Tracker kit	H4913AT
VNav Needle Tracking storage insert	H4913NS
VNav Needle Tracking Kit - 18/20g or less	H4913NT
VNav ETRAX 12 14G ST KT	H4913NU
VNav ETRAX 14 16G ST KT	H4913NV
VNav Probe sensors	H4913PS
VNav MR Active Tracker	H4915MT
Small Probe Holder	H43352LC
VERTICAL TV PROBE HOLDER	H43352LD
TVTR Probe Holder	H43352LE
PROBE CABLE HANGER	H44412LA
OPTION TRAY BOX	H43372LF
OPTION TRAY Bracket	H43372LG
Power Cords Destination Sets	
Power Cord 220V for EU	H46342LZ
Power Cord DK STD C13 GRY	H46692LK
DESTINATION SET UK	H46712LM
DESTINATION SET SWISS	H46712LS
DESTINATION SET DENMARK	H46712LT
DESTINATION SET ITALY	H46722LD
V-nav Options[2]	
ML6-15 M_BPSY_TRU3D_SKIT	H40432LK
C3-10 VNav Holder Starter Kit	H40482LF
IC5-9 V NAV BRACKET	H4908NF
L8-18I V NAV BRACKET	H4908NH
M5S V NAV BRACKET	H4908NM
Biopsy Kits[2]	
E721 STARTER KIT	E8385MJ
IC5-9-D Reusable Biopsy Guide	H40412LN
ML6-15 M_BIOPSY_SKIT	H40432LJ
C2-7 Biopsy Kit	H40482LK
C2-7 Biopsy Kit Stainless	H40482LL
L2-9 Needle Guide Starter Kit	H44901AM
M5Sc-D Biopsy Bracket	H45561FC
RAB BIOPSY STARTER KIT	H46701AE
RIC5-9-D Biopsy Guide	H46721R
C2-9 Biopsy Starter Kit	H4913BA
C1-6-D Verza Biopsy Starter Kit	H4917VB
C1-6-D Biopsy Starter Kit	H4913BB
L3-12-D Biopsy Kit	H48302AA
RAB6-D BIOPSY STARTER KIT	H48681ML
BE9CS Biopsy Kit 742-401	H42742LJ

Notes:

[1] *H-Catalog number identifies the device(s) in the manufacturer's catalog and is usually included on commercial documents like sales contract, order processing documents and shipping documents.*

[2] *Probes and accessories may carry the CE-mark and when applicable, the Notified Body number corresponding to the EC Declaration under which the products are CE-marked by their manufacturer. GE Ultrasound Korea Ltd. has verified the mutual compatibility of the devices in combination with LOGIQ Fortis and included relevant information to users with the LOGIQ Fortis instructions for use.*

End of Document

Certificate

TÜVRheinland®

Quality Management System
EN ISO 13485:2016

Registration No.:	SX 2004702-1
Organization:	GE Ultrasound Korea, Ltd. 9, Sunhwan-ro, 214beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do 13204 Republic of Korea
Scope:	Design and Development, Manufacture and Distribution of Ultrasound Diagnostic Devices and Systems

The Certification Body of TÜV Rheinland LGA Products GmbH certifies that the organization has established and applies a quality management system for medical devices.
Proof has been furnished that the requirements specified in the abovementioned standard are fulfilled. The quality management system is subject to yearly surveillance.

Report No.:	156138907-40
Effective date:	2021-11-05
Expiry date:	2024-10-18
Issue date:	2021-10-19

TÜV Rheinland Product Safety GmbH
TÜVRheinland®
Zertifizierungsstelle

S. Liu
TÜV Rheinland LGA Products GmbH
Tillystraße 2 · 90431 Nürnberg · Germany

DAkkS
Deutsche
Akkreditierungsstelle
D-ZM-14169-01-02

LOGIQ Fortis™

Powerful | Streamlined | Multi-purpose

Always ready. Always by your side.

gehealthcare.com

Powerfully streamlined

New GE LOGIQ Fortis

LOGIQ Fortis is the affordable, all-in-one solution for your ultrasound imaging needs. Powerfully streamlined and equipped with the most advanced technology, it helps users deliver on the promise of confident care in multiple clinical settings.

- **Exceeding your expectations** ... with next-generation imaging technologies for a wide range of patients and clinical applications—head to toe, obese to thin, neonate to geriatric
- **Optimizing your productivity** ... with user-friendly apps and AI-based productivity tools, and the ability to scan on battery
- **Maximizing your investment** ... with a future-focused digital platform, robust cybersecurity protection, and value-added lifecycle solutions

LOGIQ Fortis.
Your trusted companion for every body.

MULTI-PURPOSE/ RADIOLOGY

The high-performing LOGIQ Fortis enables a full spectrum of ultrasound exams and procedures on any body type.

- Exceptional image quality with cSound™ Architecture—now including advanced Speckle Reduction Imaging (SRI)
- Whole body imaging with versatile XDclear™ probes
- Advanced quantification and productivity tools, including 2D Shear Wave Elastography, Ultrasound-Guided Attenuation Parameter (UGAP), CEUS, and Volume Navigation

+ CLINICAL IMAGES

LOGIQ Fortis Overview


INTERVENTIONAL


PEDIATRICS


THYROID

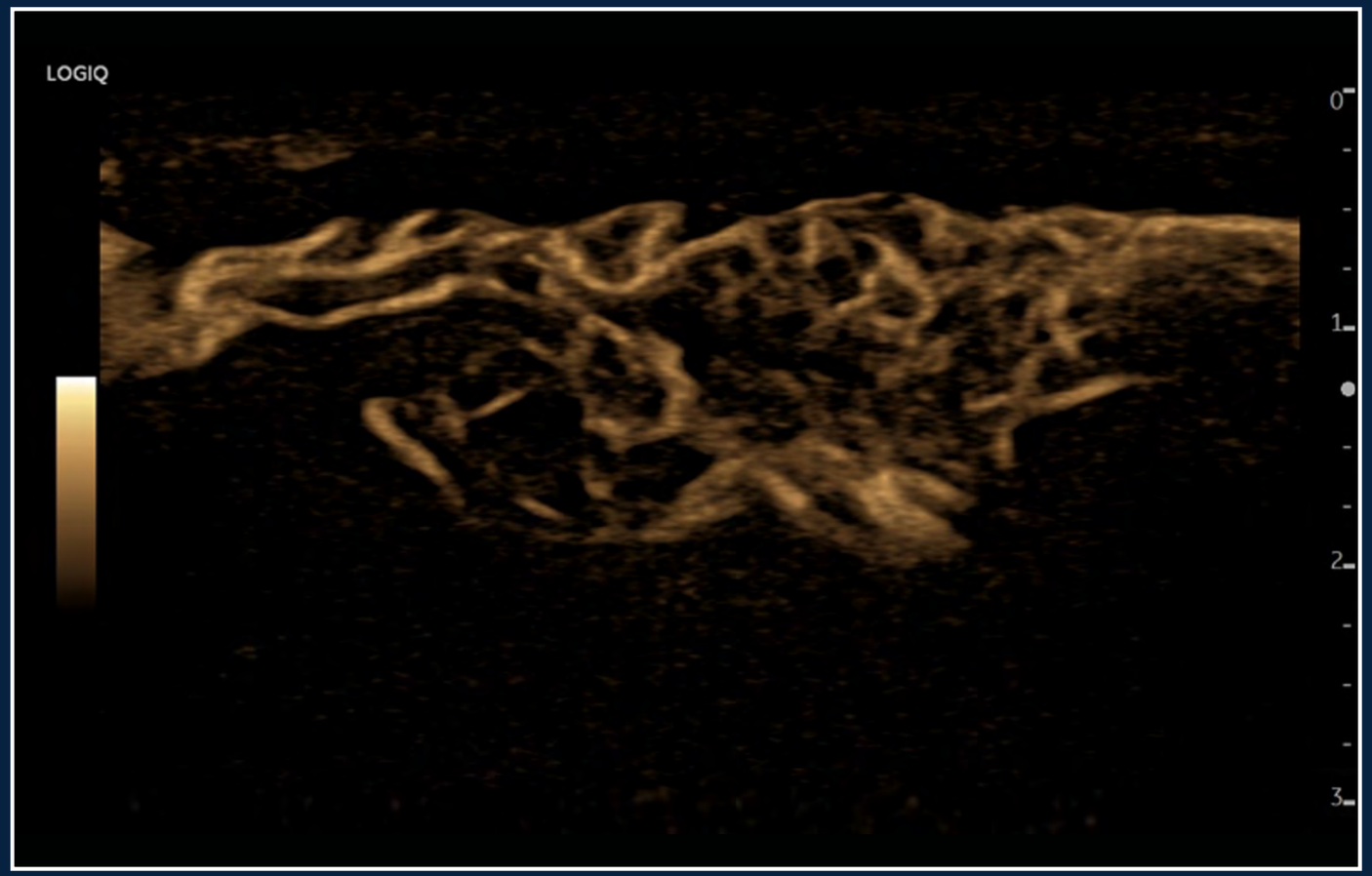

MUSCULOSKELETAL


OB/GYN


VASCULAR

CLINICAL IMAGES | Head & Neck

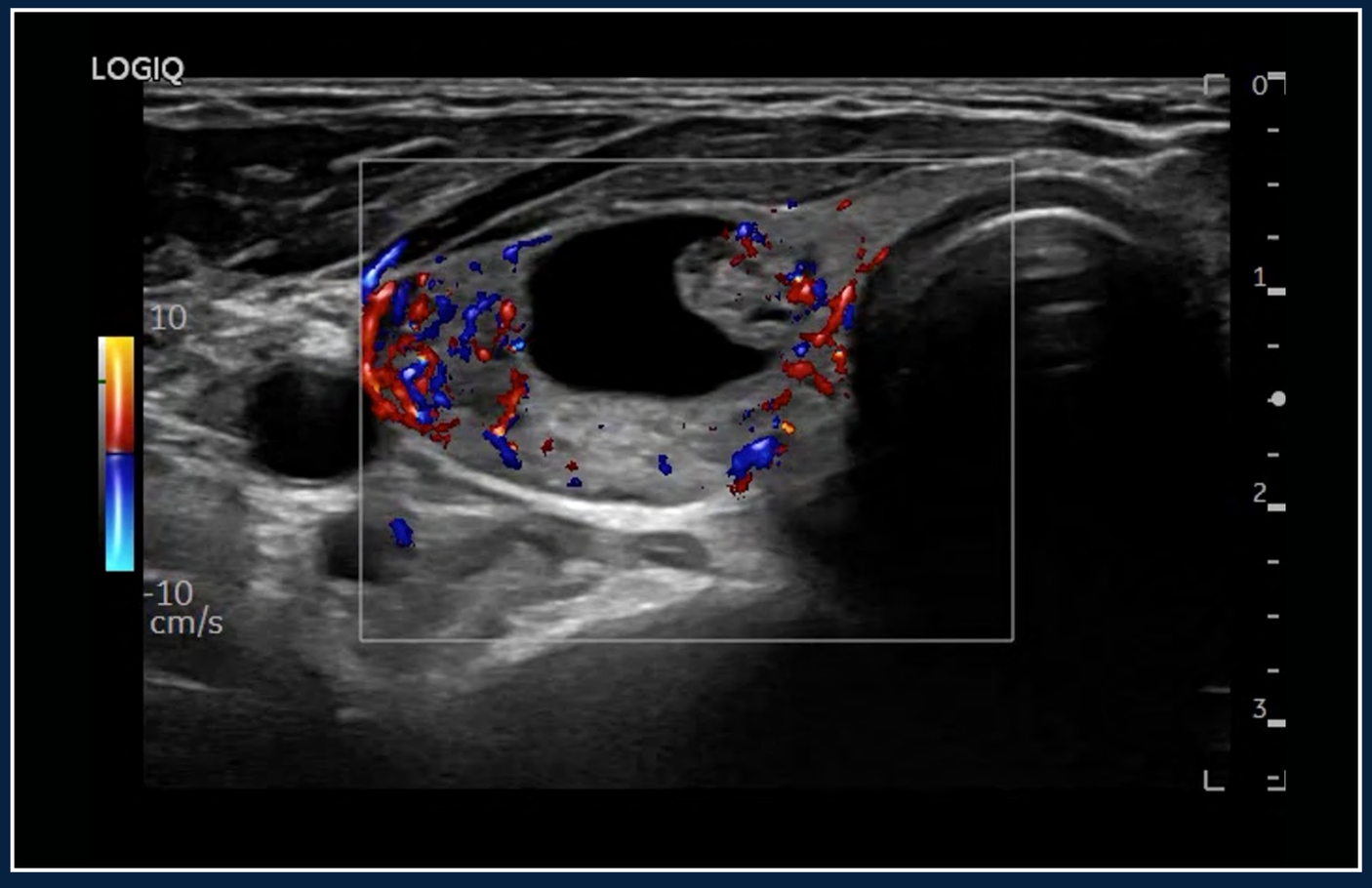
Exceeding your expectations: whole body imaging



Flow Visualization, B-Flow in Thyroid, ML6-15-D

CLINICAL IMAGES | Head & Neck

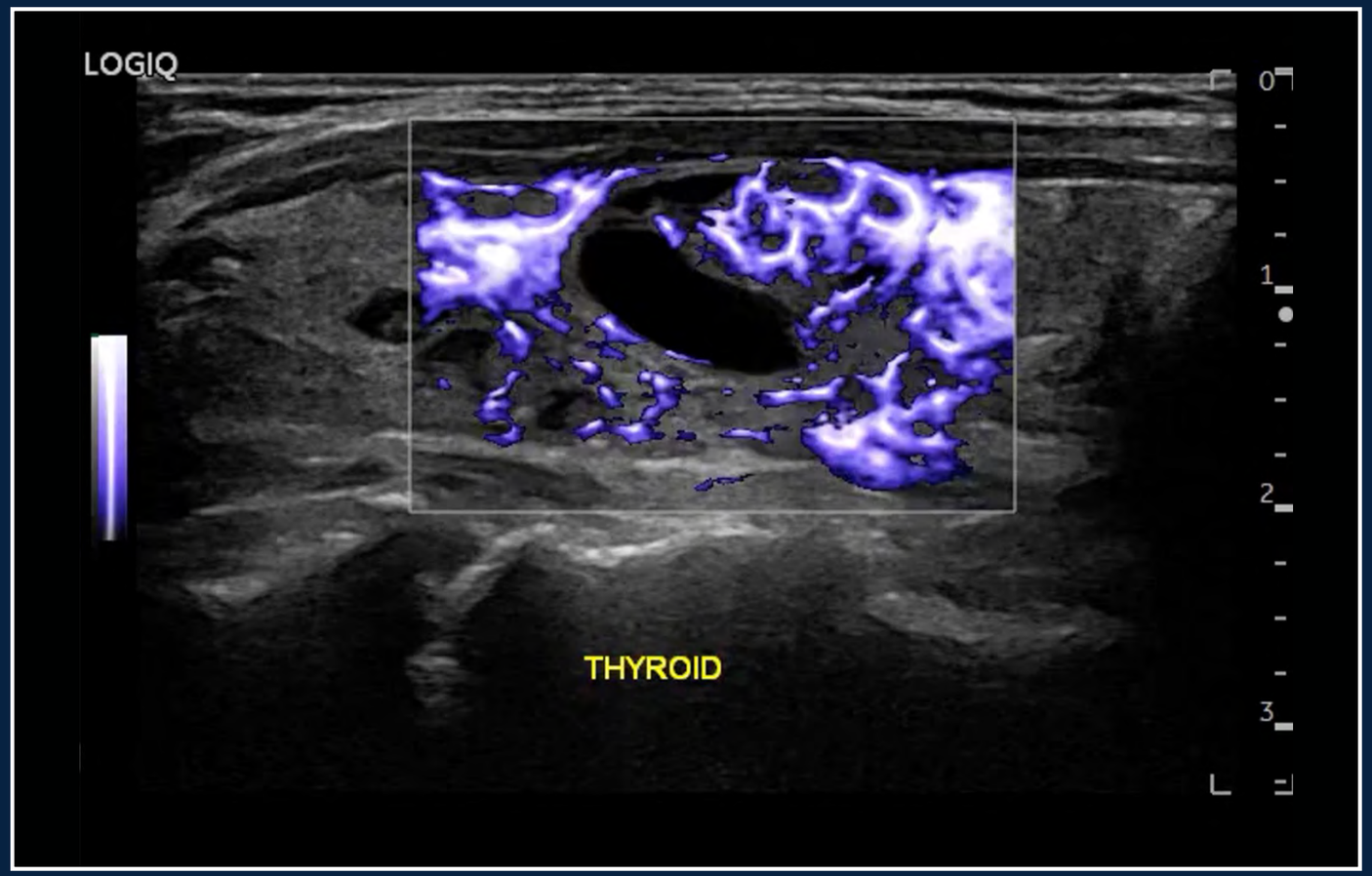
Exceeding your expectations: whole body imaging



Radiant*flow*™ Color Flow in Thyroid, ML6-15-D

CLINICAL IMAGES | Head & Neck

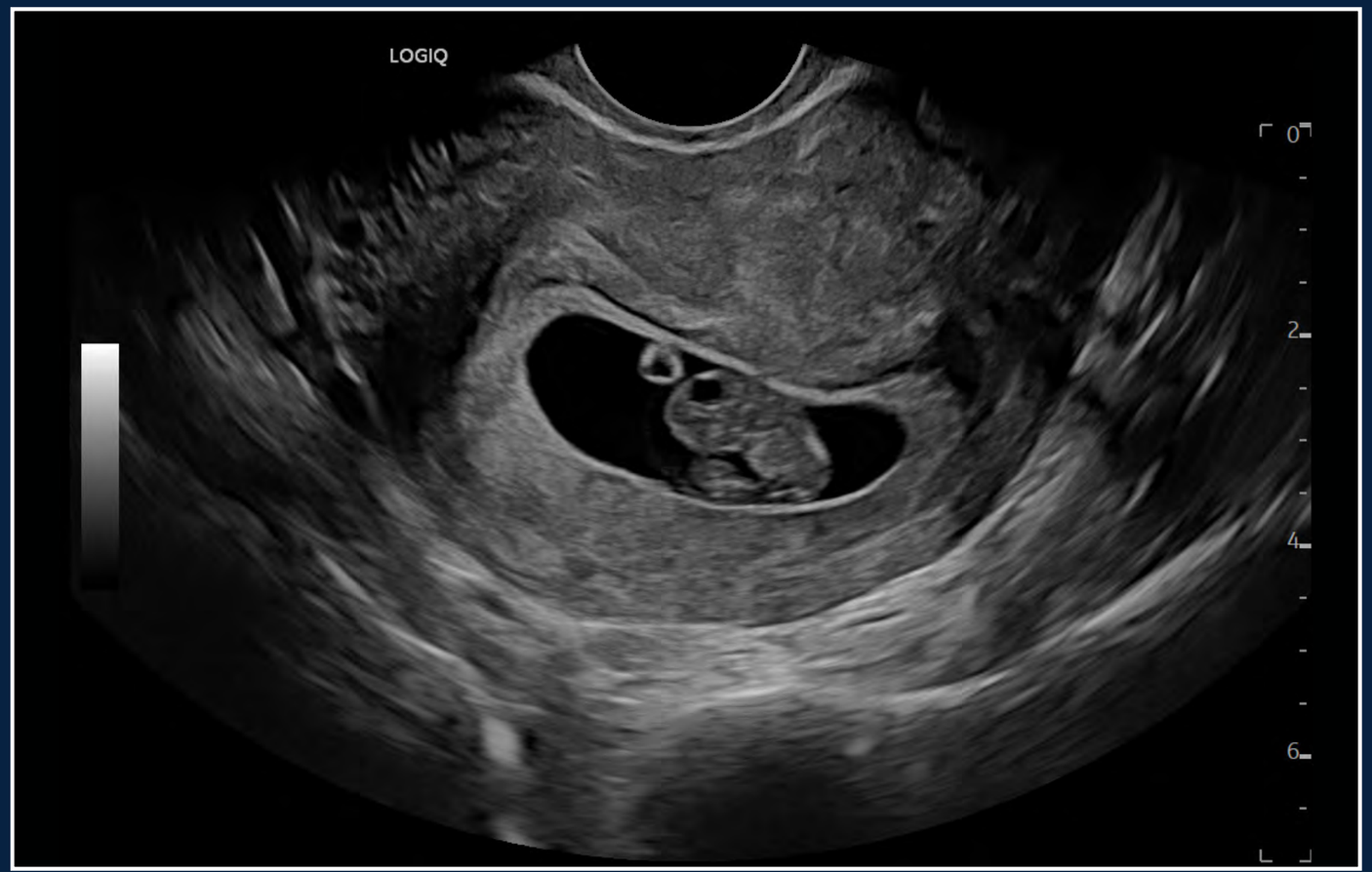
Exceeding your expectations: whole body imaging



MVI with Radiant*flow* in Thyroid, ML6-15-D

CLINICAL IMAGES | OB/GYN

Exceeding your expectations: whole body imaging



B-Mode with Advanced SRI Early Fetus and Yolk Sac, IC5-9-D

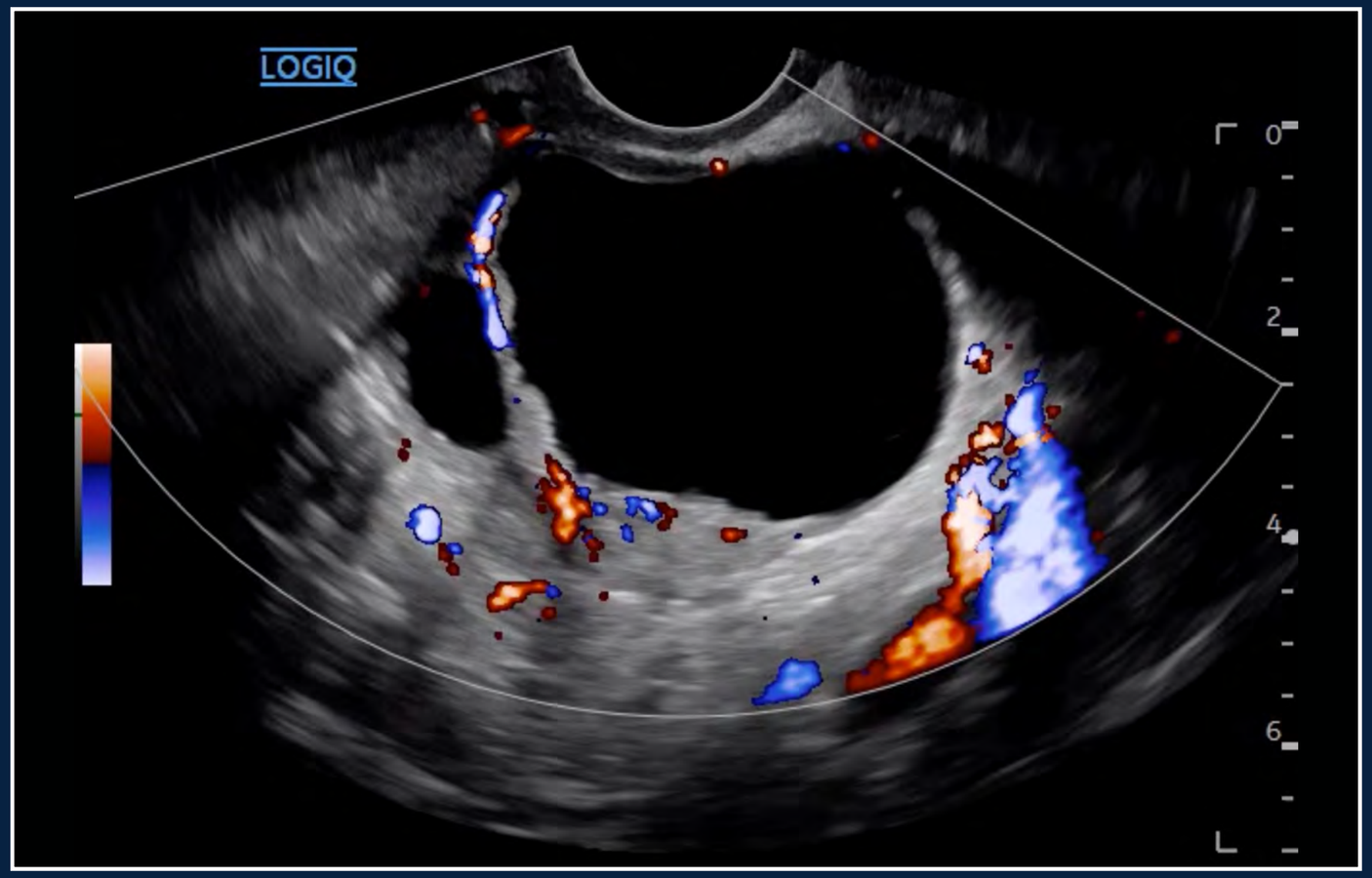
CLINICAL IMAGES | OB/GYN

Exceeding your expectations: whole body imaging

PDI with Radiant*flow* in Umbilical Cord, C1-6-D

CLINICAL IMAGES | OB/GYN

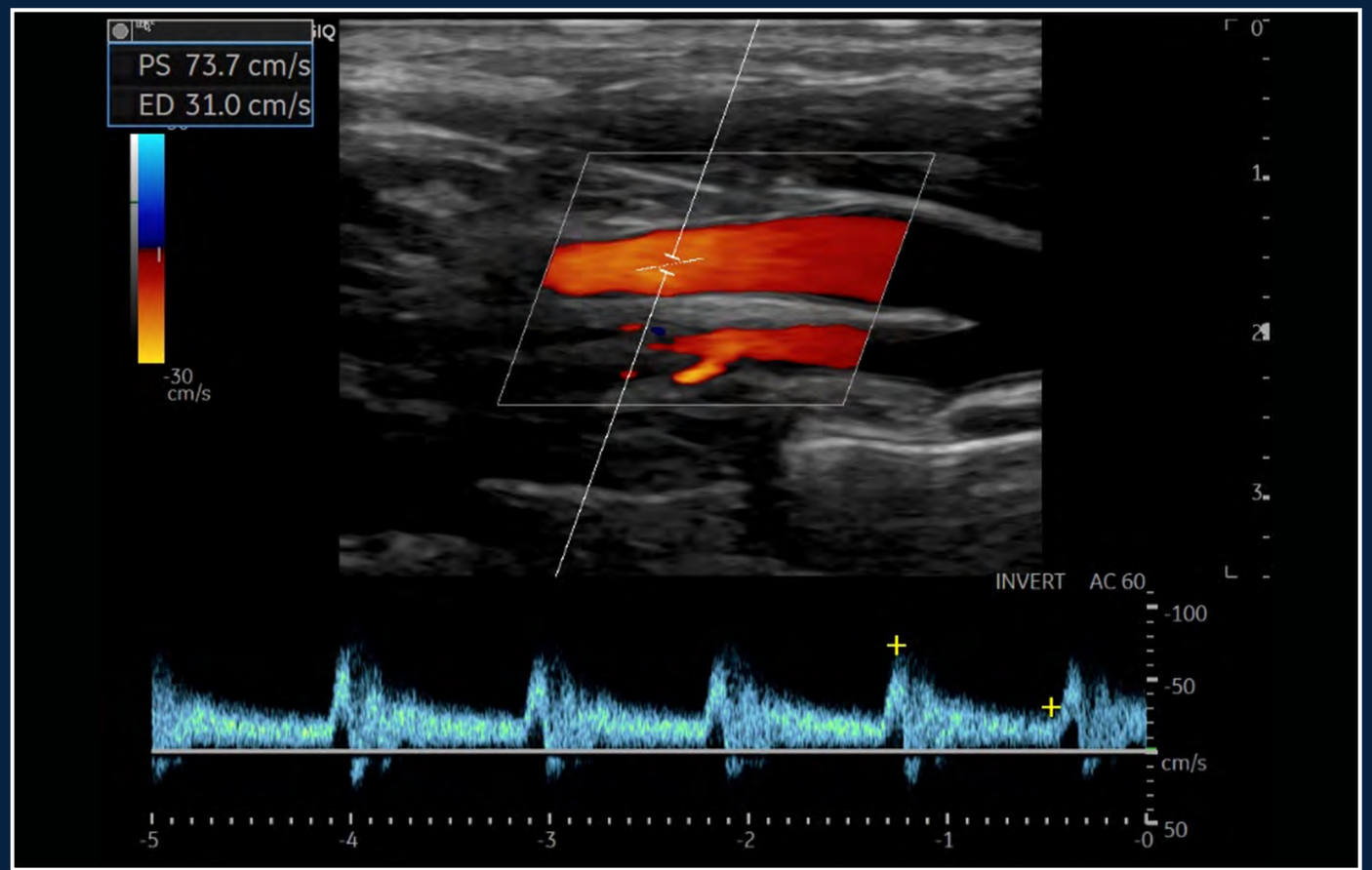
Exceeding your expectations: whole body imaging



PDI of Ovary, IC5-9-D

CLINICAL IMAGES | Vascular

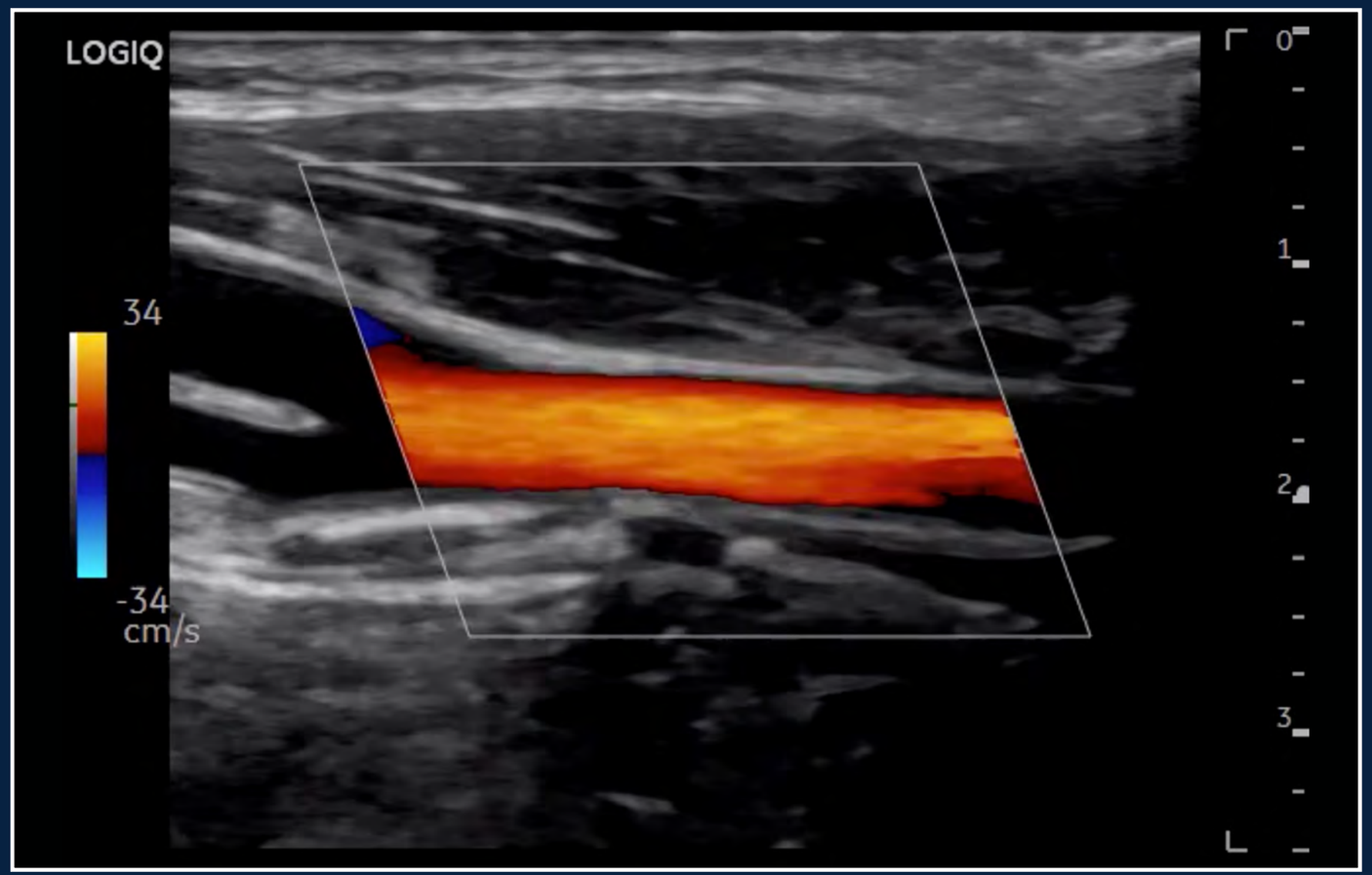
Exceeding your expectations: whole body imaging



Color Flow and PW Doppler in Internal Carotid Artery, L2-9-D

CLINICAL IMAGES | Vascular

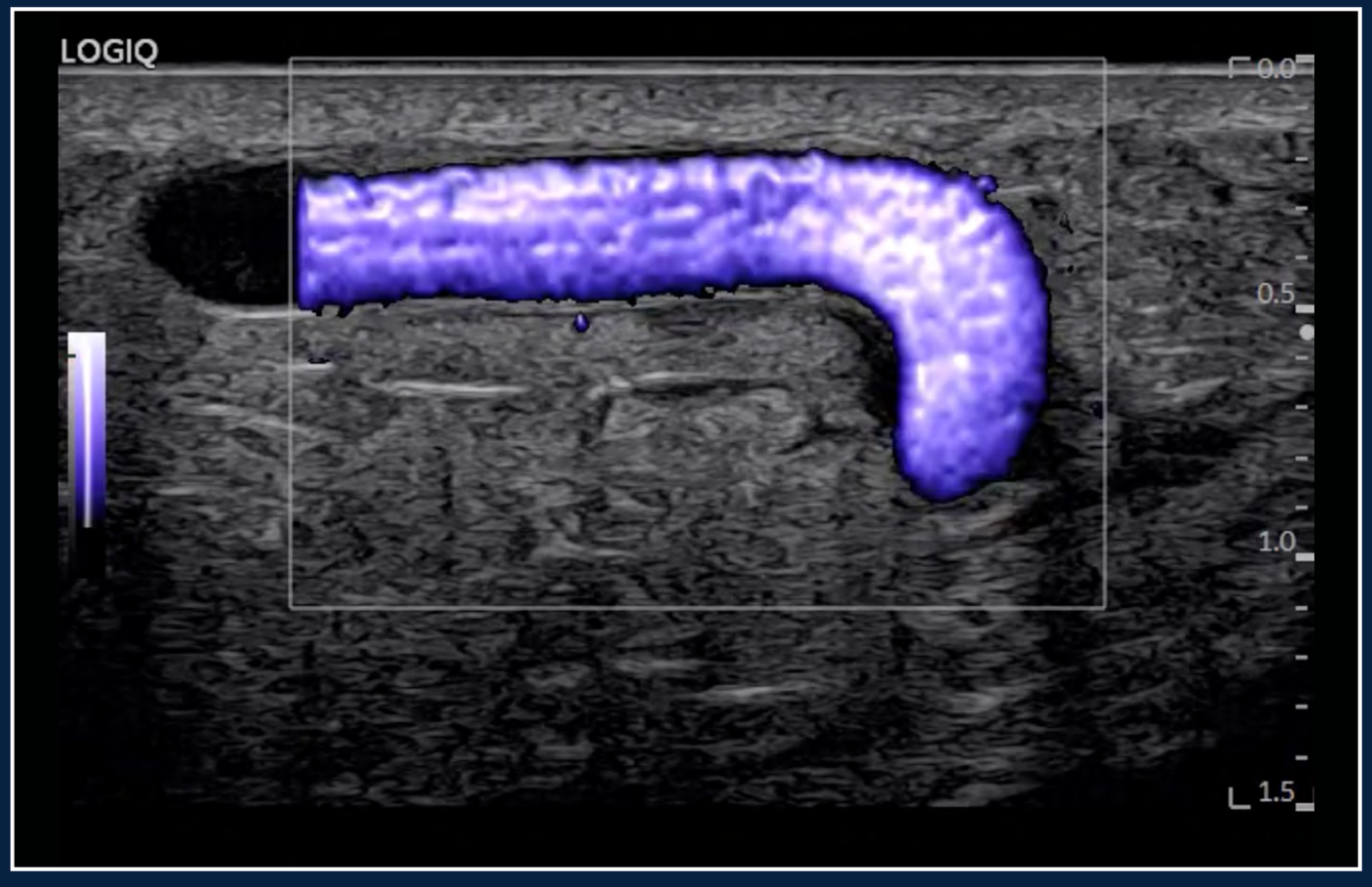
Exceeding your expectations: whole body imaging



Color Flow Carotid, L2-9-D

CLINICAL IMAGES | Vascular

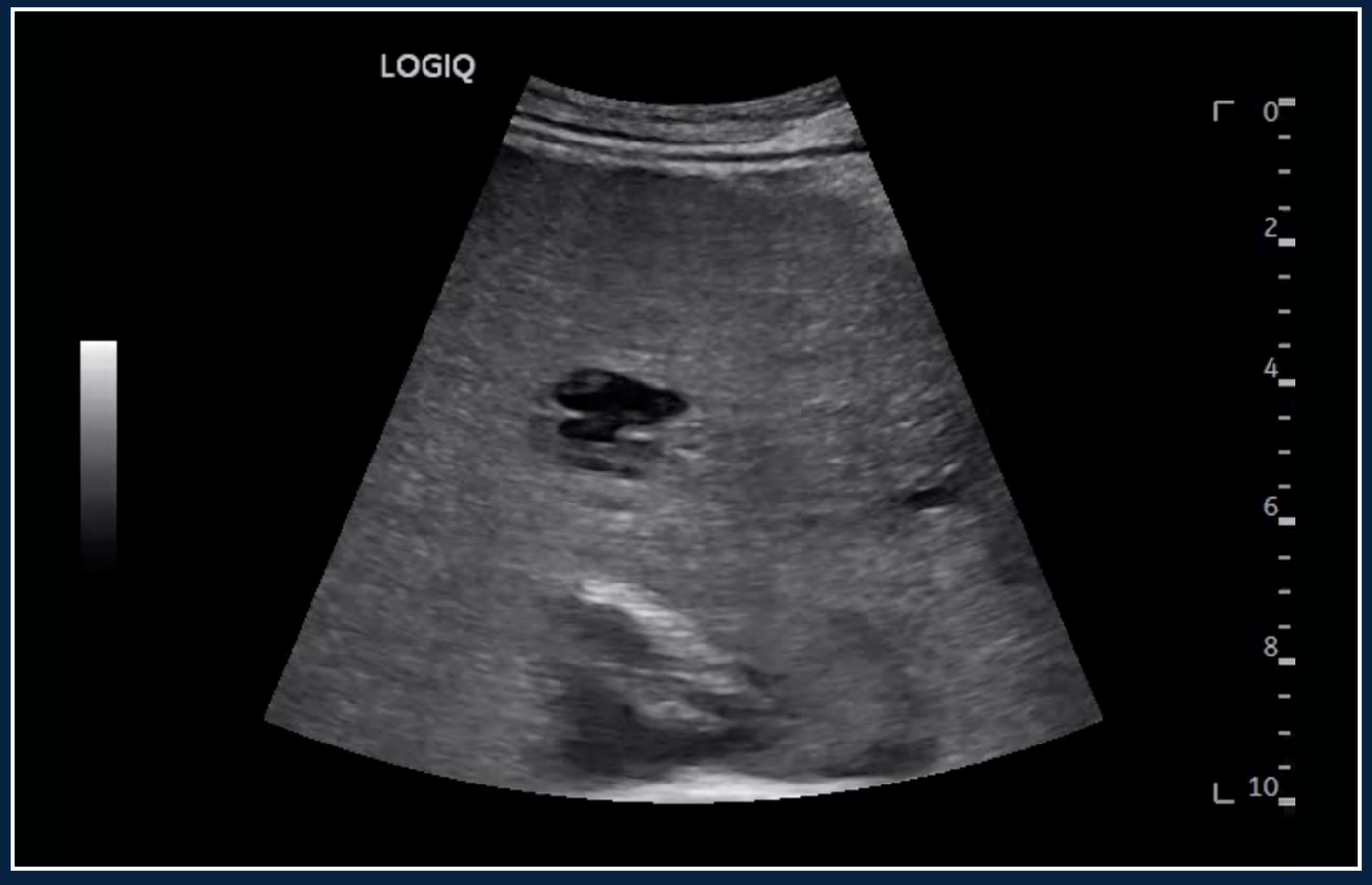
Exceeding your expectations: whole body imaging



MVI Superficial Vein, L6-24-D

CLINICAL IMAGES | Liver

Exceeding your expectations: whole body imaging



B-Mode with Advanced SRI Liver with TIPS, C1-6-D

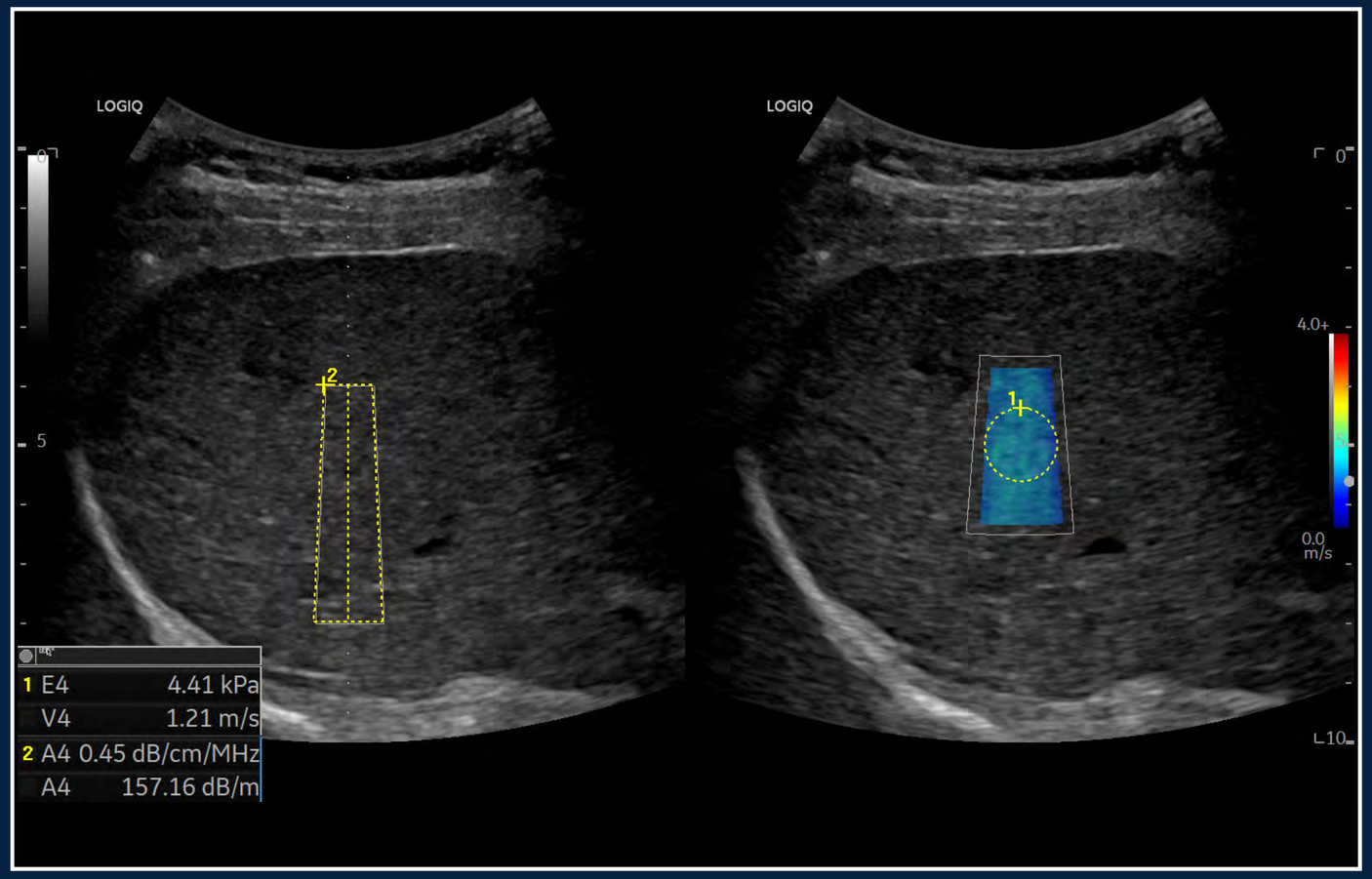
CLINICAL IMAGES | Liver

Exceeding your expectations: whole body imaging

Liver B-Flow Cine Capture, C2-9-D

CLINICAL IMAGES | Liver

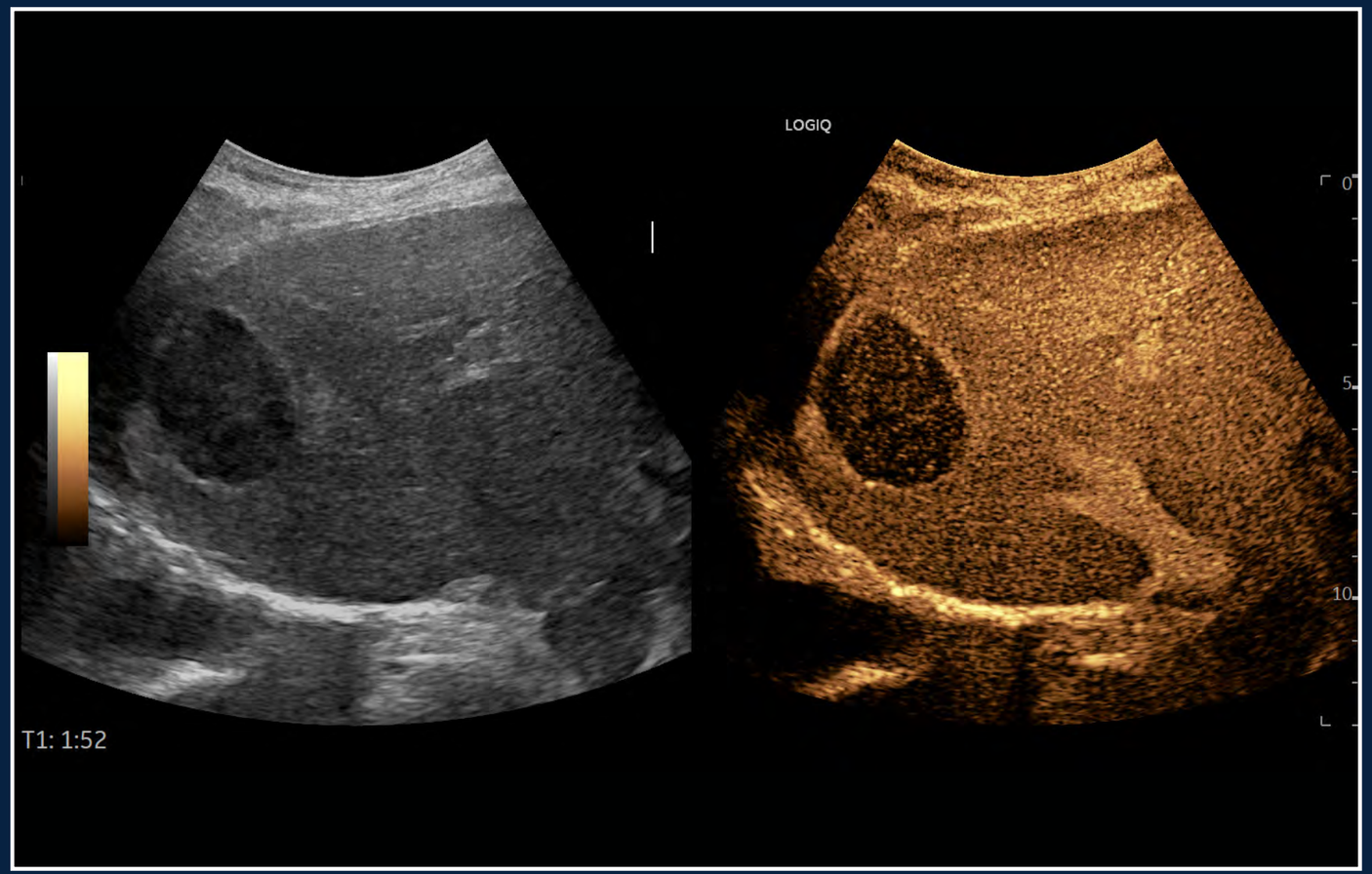
Exceeding your expectations: whole body imaging



Hepatic Assistant UGAP and Shear Wave, C1-6-D

CLINICAL IMAGES | Liver

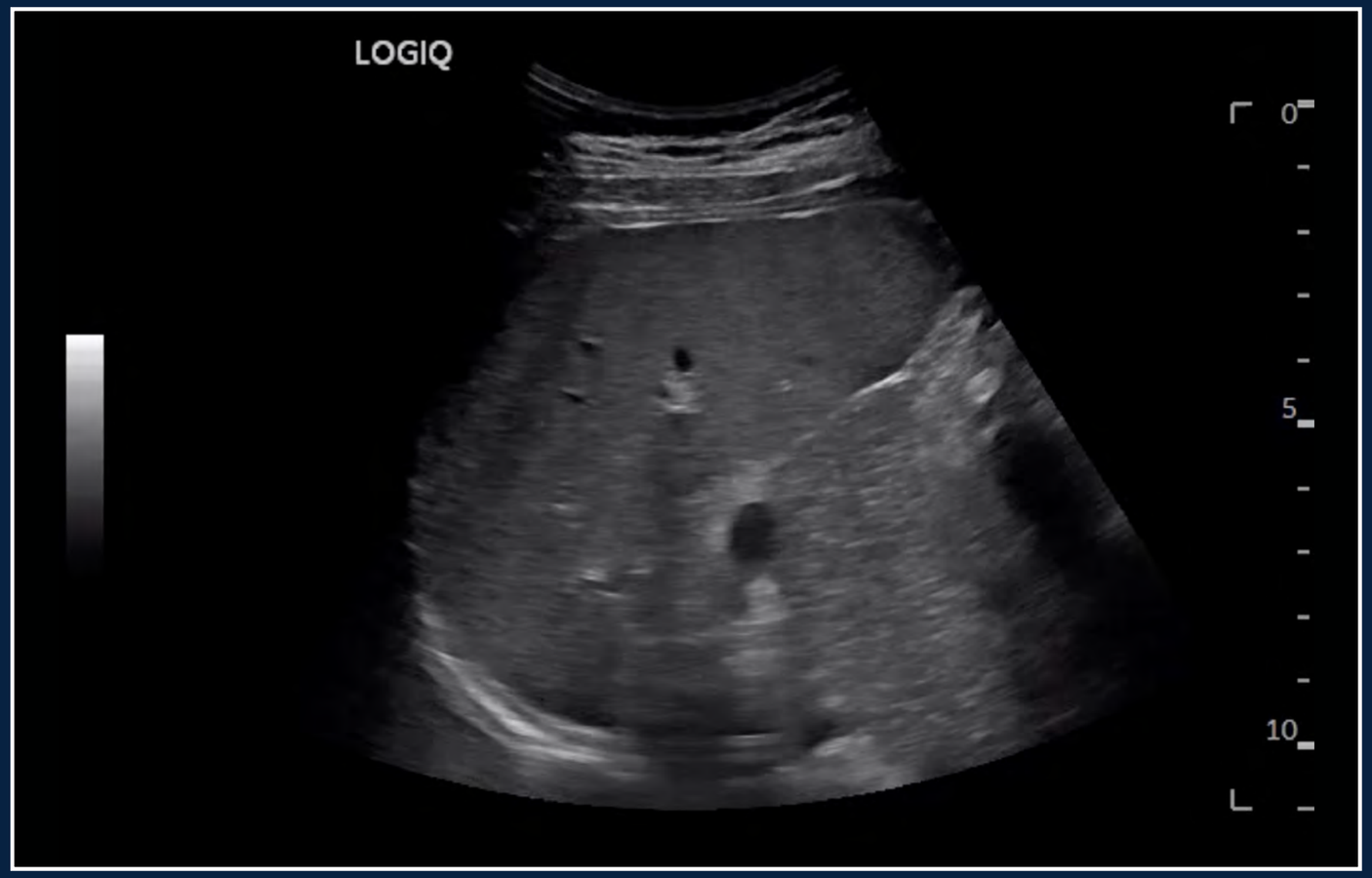
Exceeding your expectations: whole body imaging



Liver Lesion CEUS, C1-6-D

CLINICAL IMAGES | Spleen

Exceeding your expectations: whole body imaging



B-Mode with Advanced SRI Spleen, C2-9-D

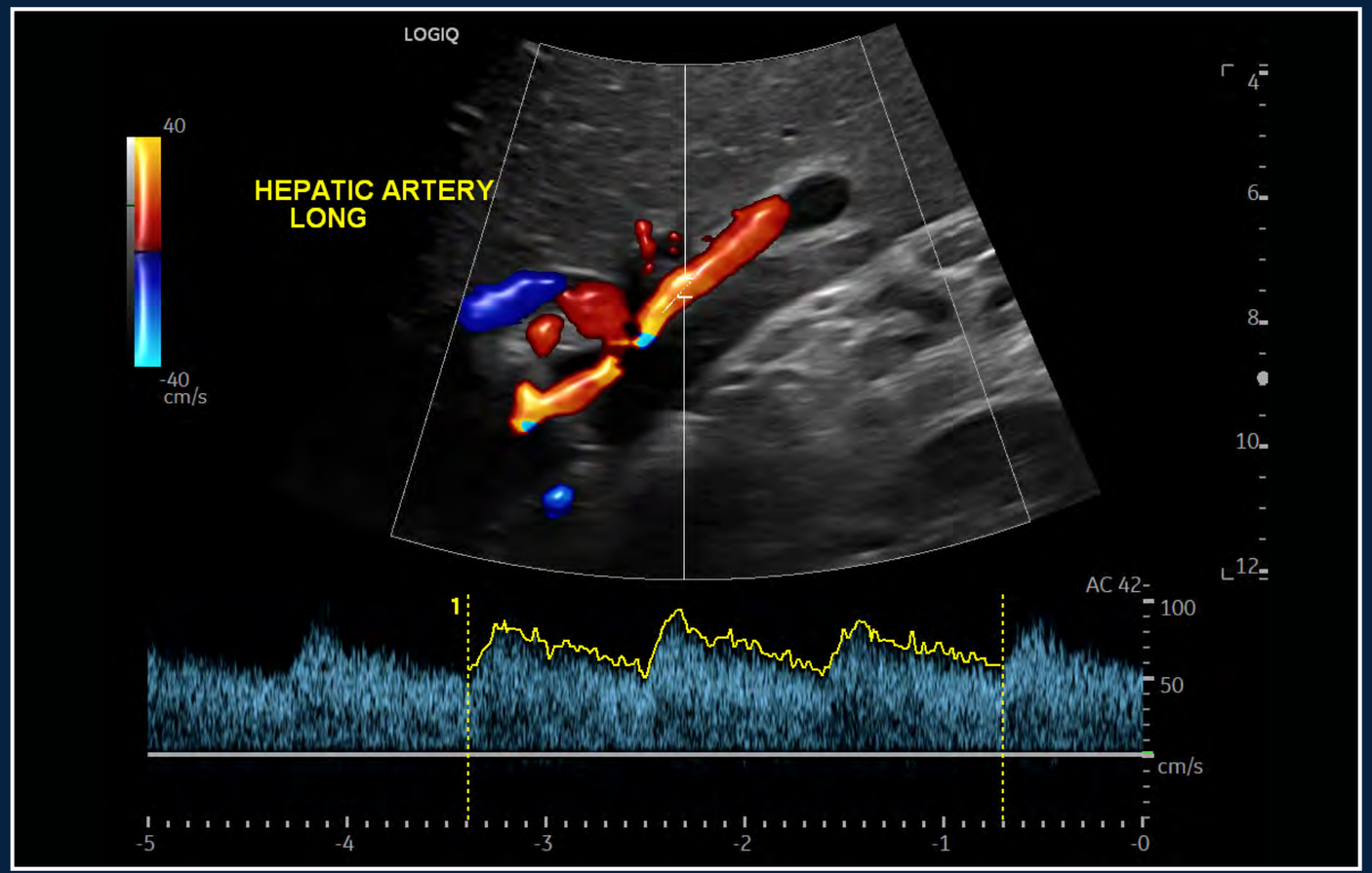
CLINICAL IMAGES | Kidney

Exceeding your expectations: whole body imaging

Color Flow with Radiant*flow*, C2-9-D

CLINICAL IMAGES | Pediatrics

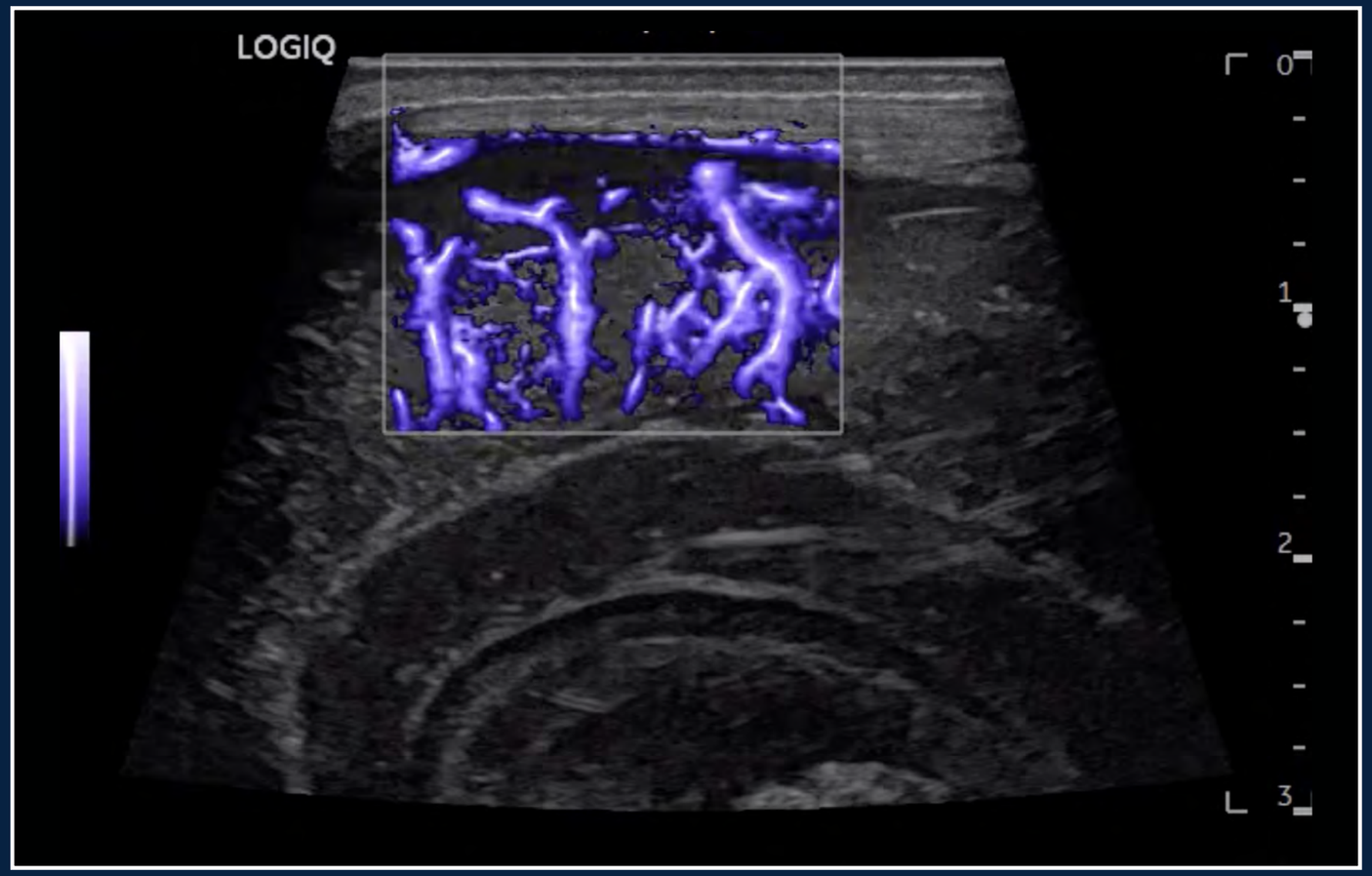
Exceeding your expectations: whole body imaging



cSound B-Mode CF with Radiant*flow* and PW Doppler, C1-6-D

CLINICAL IMAGES | Pediatrics

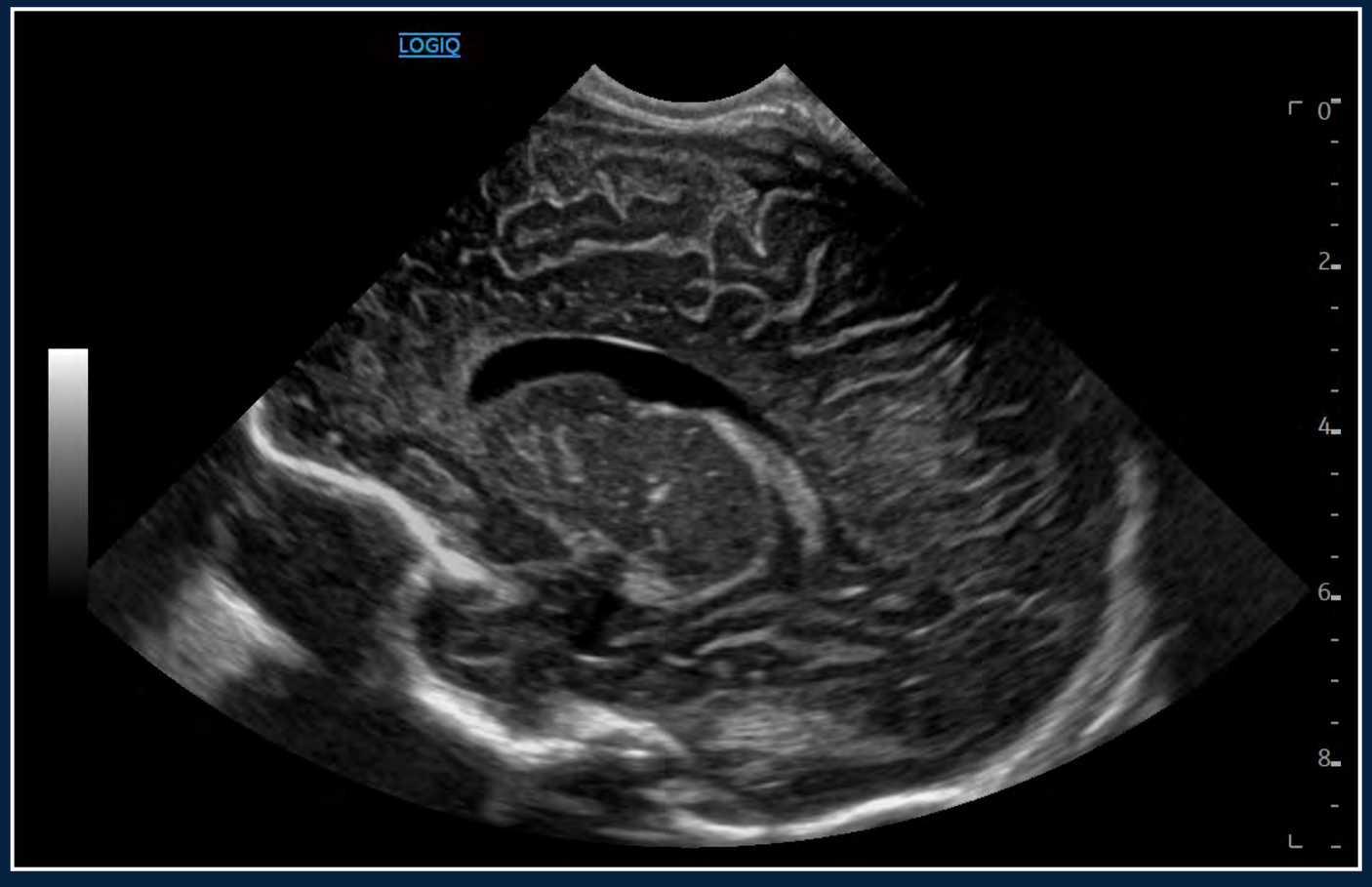
Exceeding your expectations: whole body imaging



MVI with Radiant*flow* neonatal brain, L6-24-D

CLINICAL IMAGES | Pediatrics

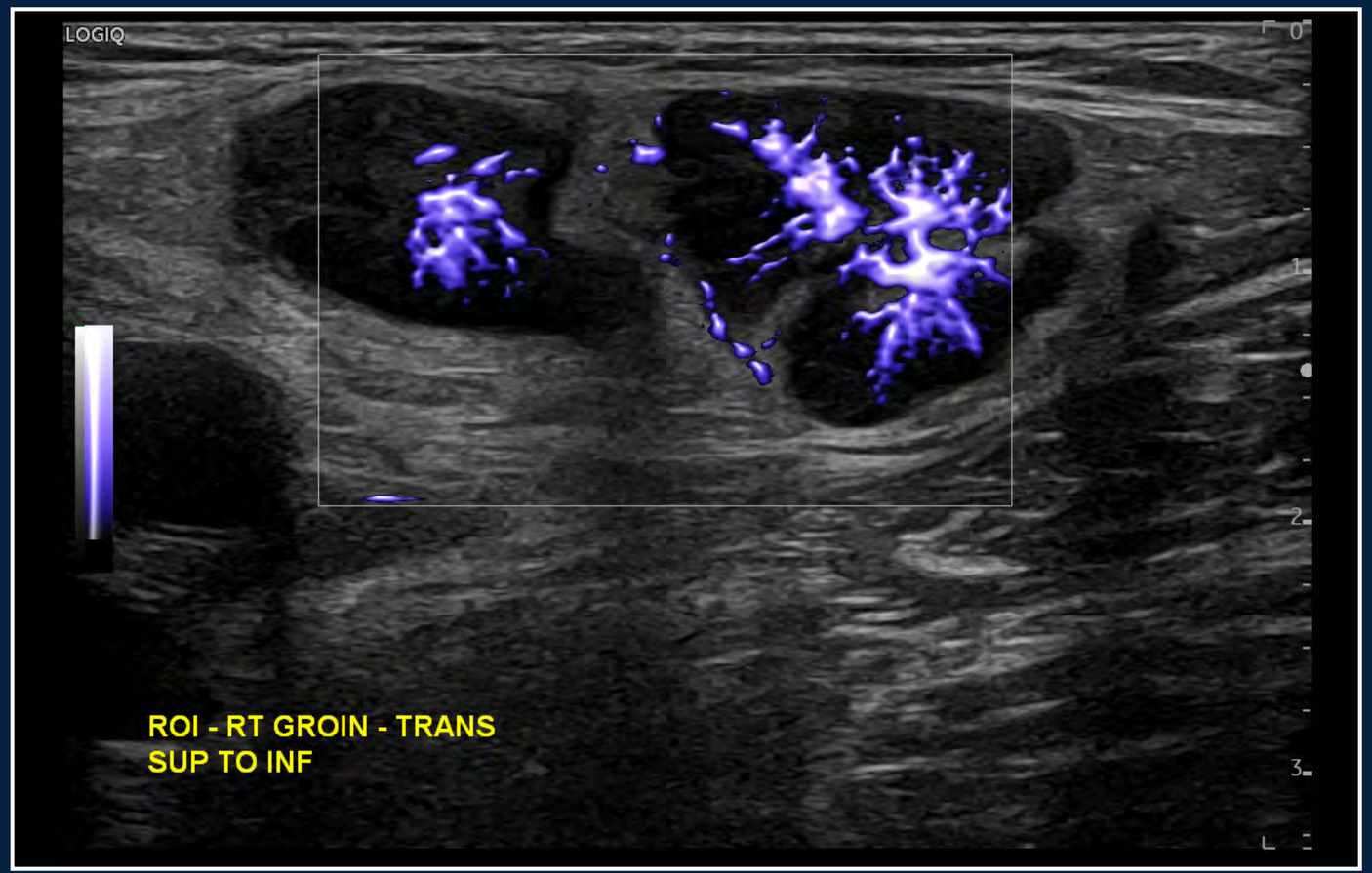
Exceeding your expectations: whole body imaging



Neonatal head, C3-10-D

CLINICAL IMAGES | Small Parts

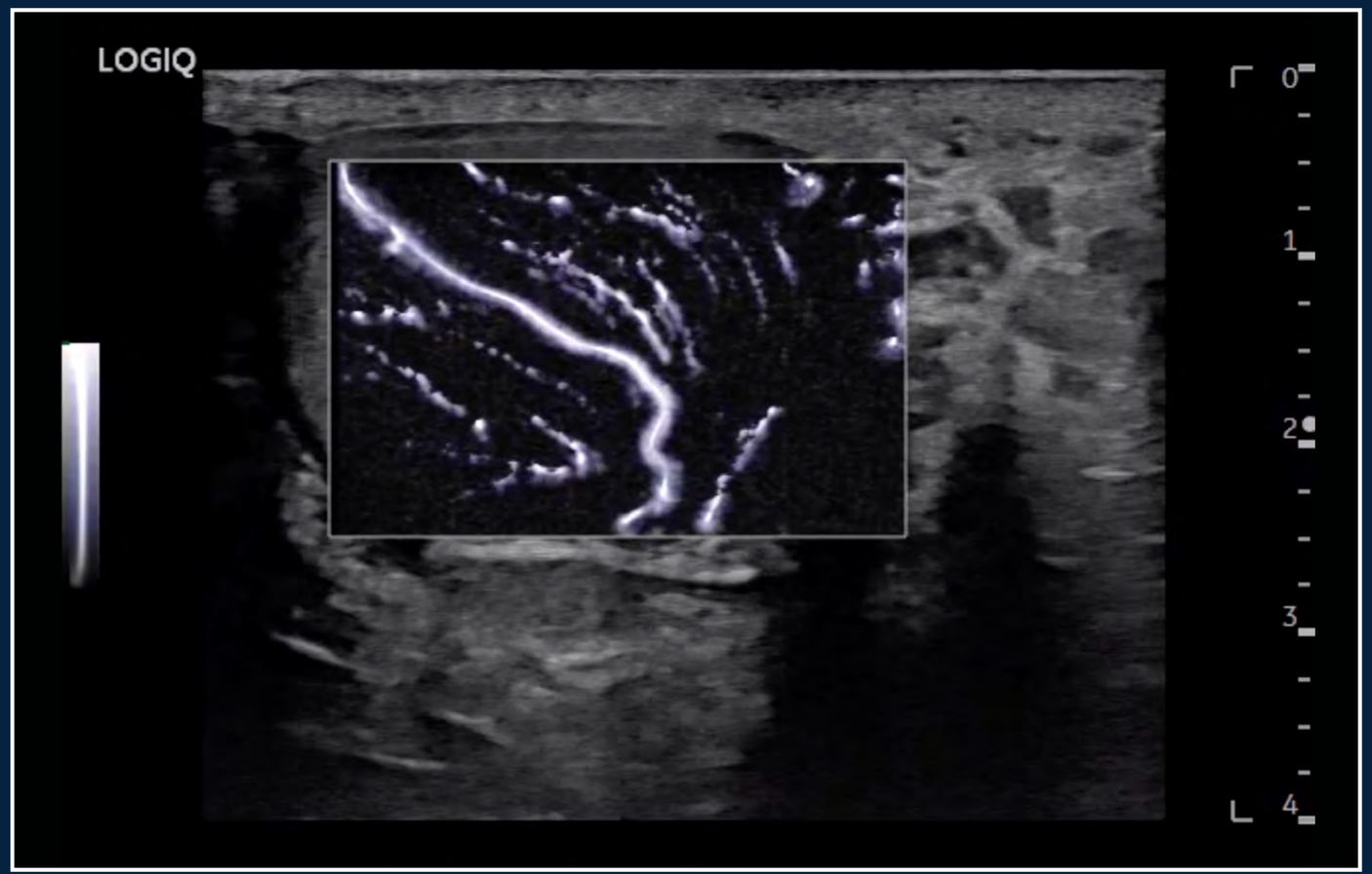
Exceeding your expectations: whole body imaging



MVI with Radiant*flow* groin lymph node, ML6-15-D

CLINICAL IMAGES | Small Parts

Exceeding your expectations: whole body imaging



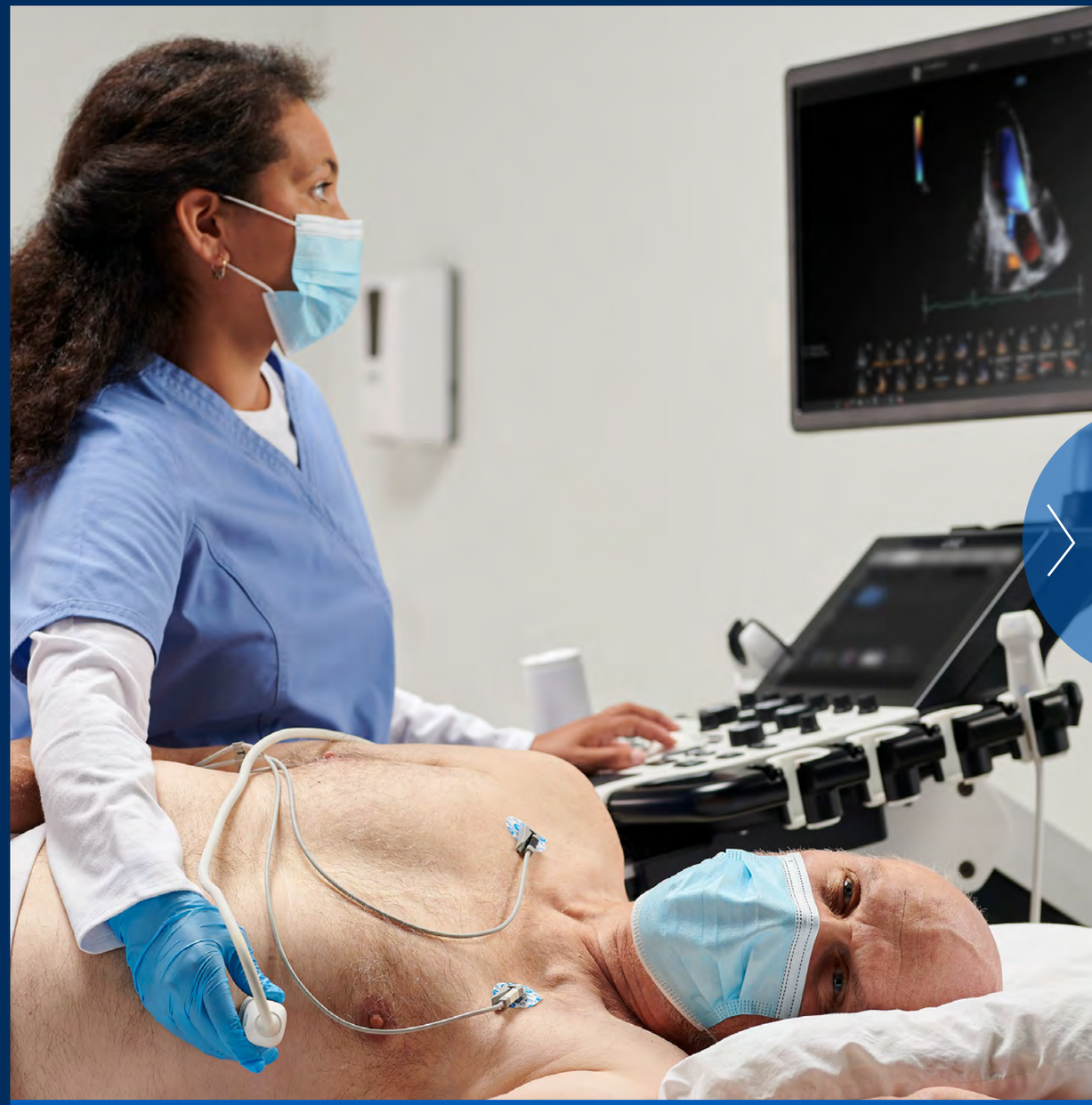
MVI with Radiant*flow* in scrotal, L3-12-D

CARDIOLOGY

LOGIQ Fortis delivers superb image quality within fast scan times across a wide range of cardiac exams.

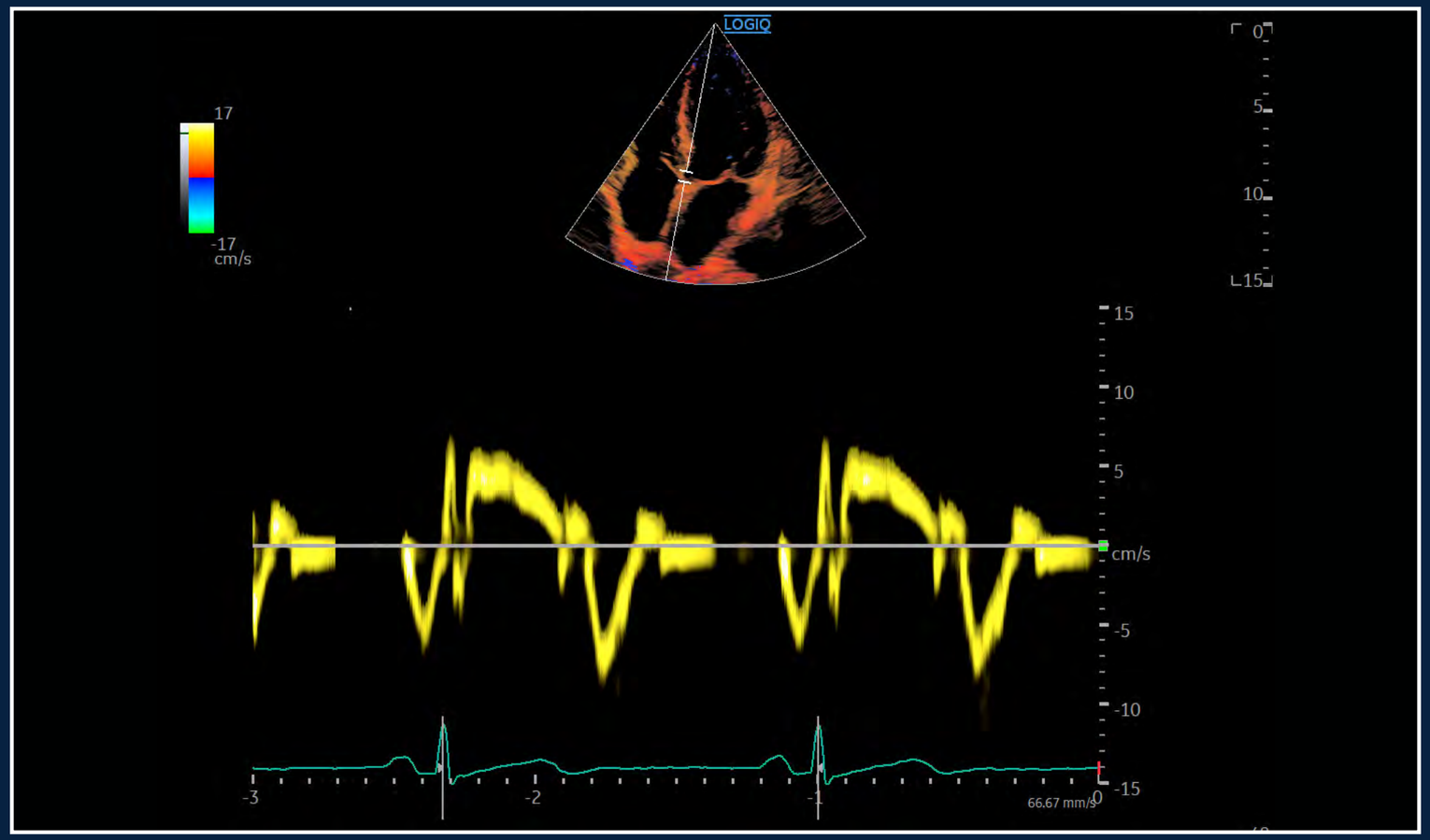
- cSound Architecture with advanced SRI for precise details
- Cardiac Strain assists in early identification of underlying cardiac disease
- Contrast agent imaging with high contrast sensitivity
- TVI/TVD to help assess tissue velocities

+ CLINICAL IMAGES

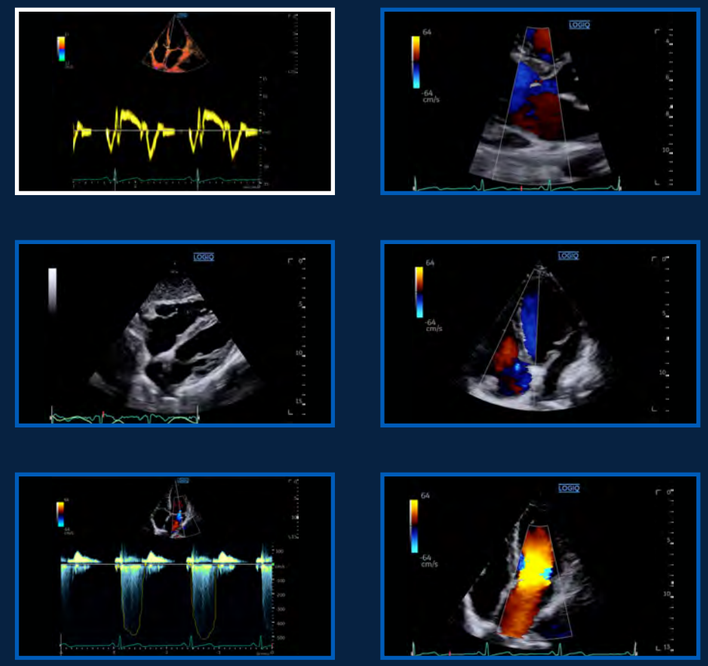


CLINICAL IMAGES | Cardiology

Acquire highly detailed cardiac images within efficient exam times, even in challenging cases

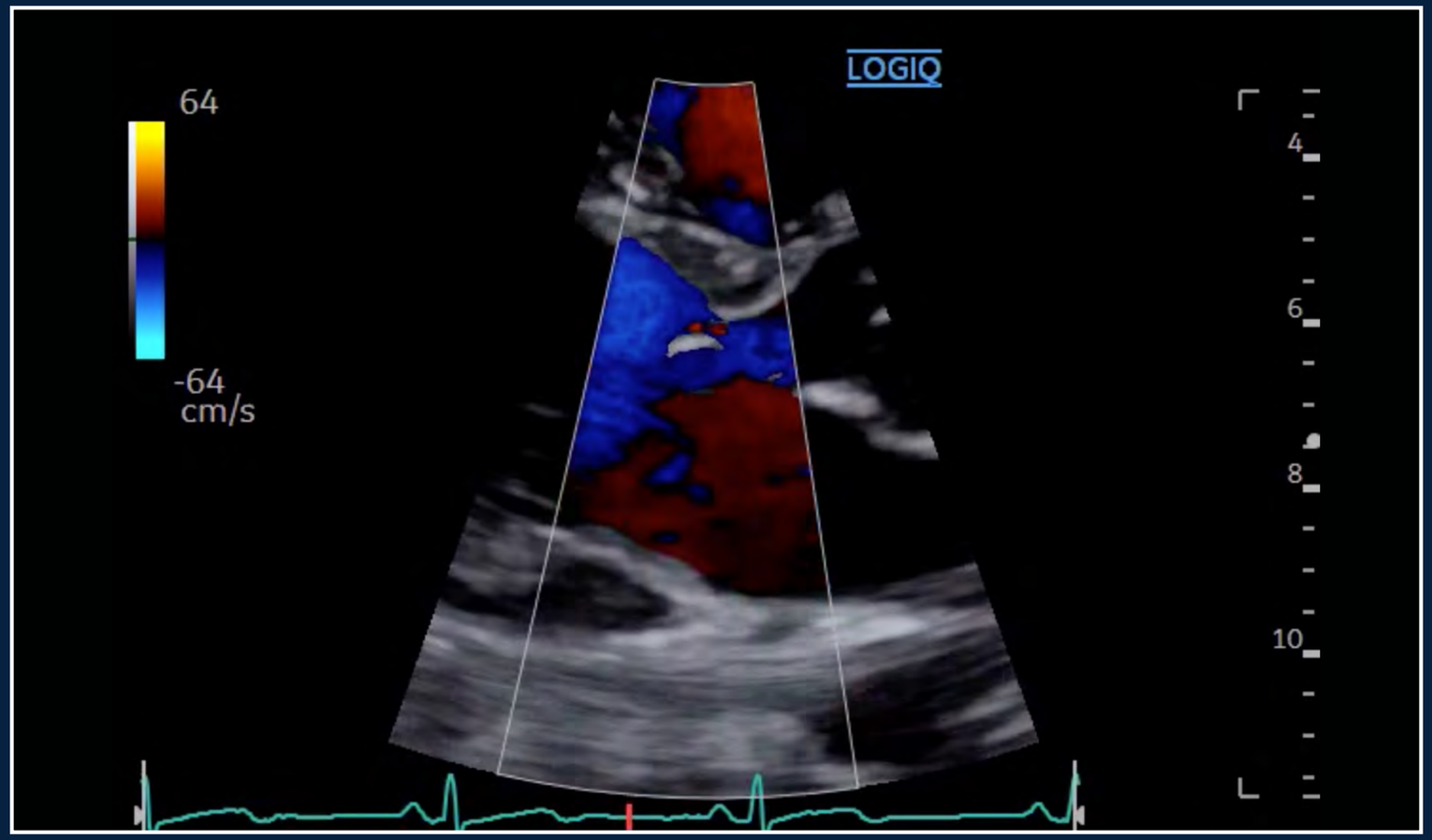


TVI and TVD Apical 4 Chamber View, M5Sc-D

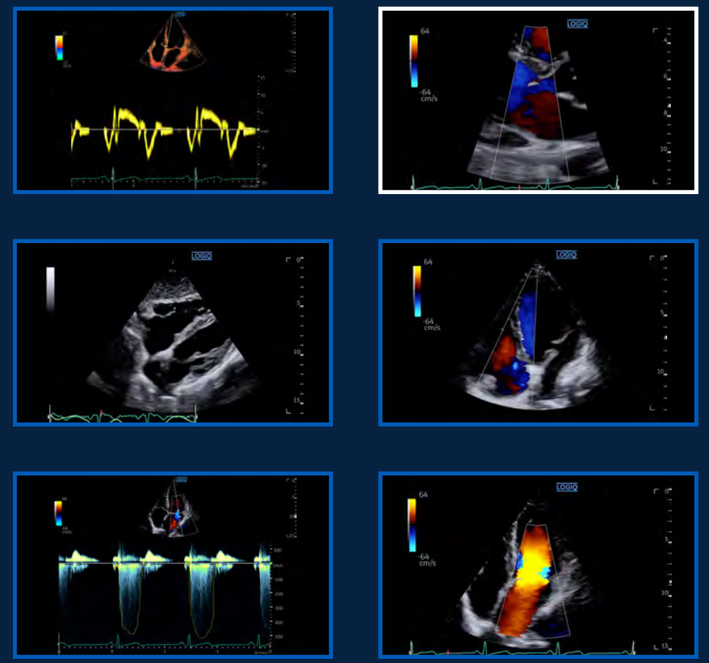


CLINICAL IMAGES | Cardiology

Acquire highly detailed cardiac images within efficient exam times, even in challenging cases

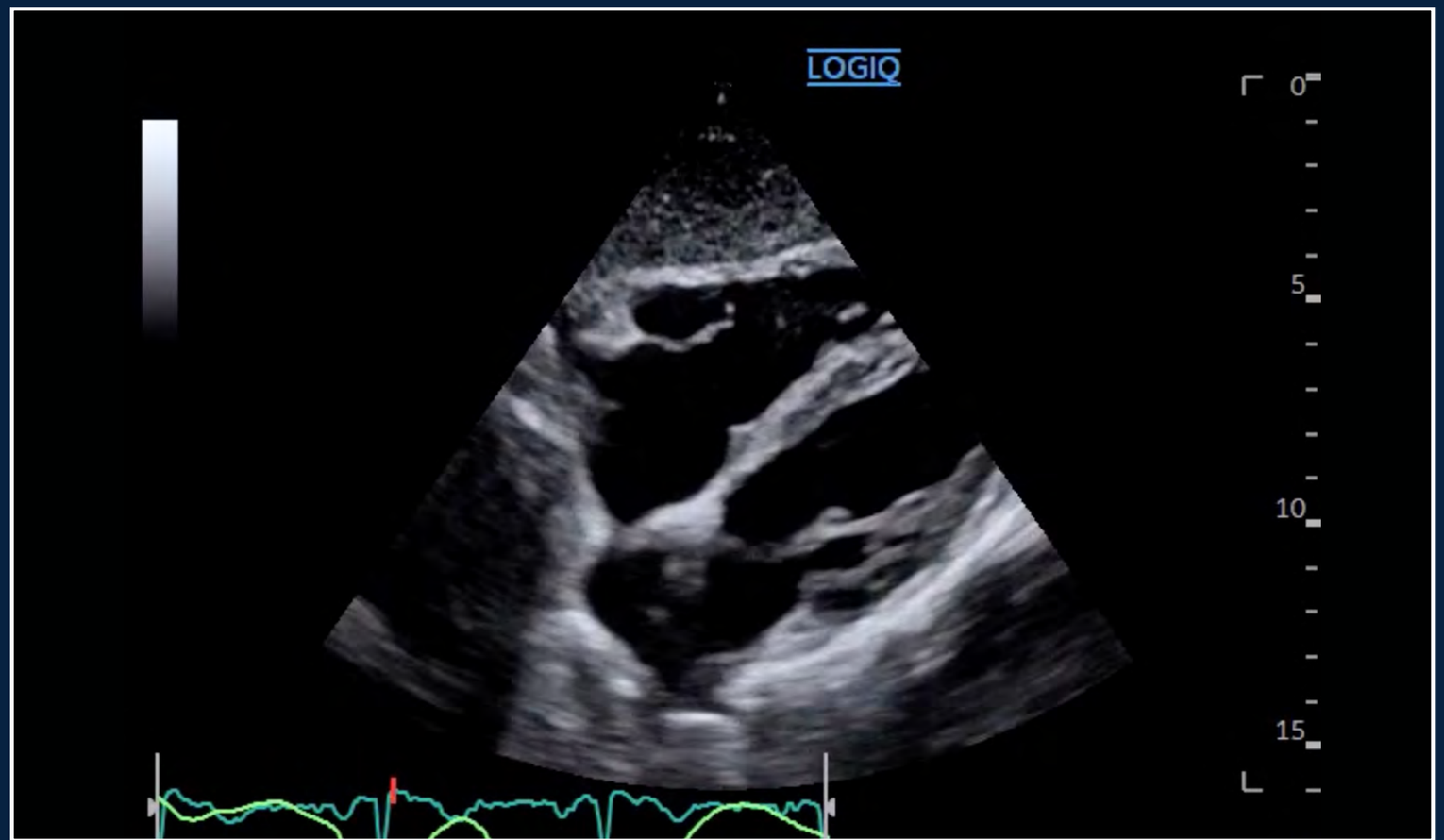


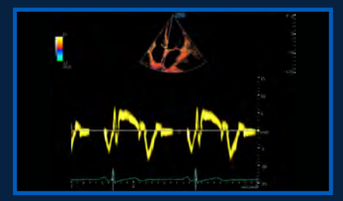
Color Flow in Cardiac Parasternal Long Axis View, M5Sc-D

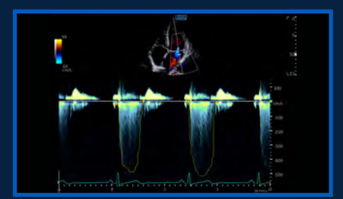


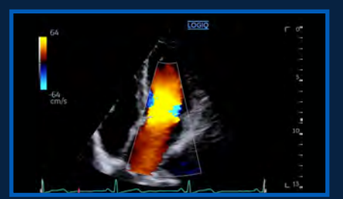
CLINICAL IMAGES | Cardiology

Acquire highly detailed cardiac images within efficient exam times, even in challenging cases





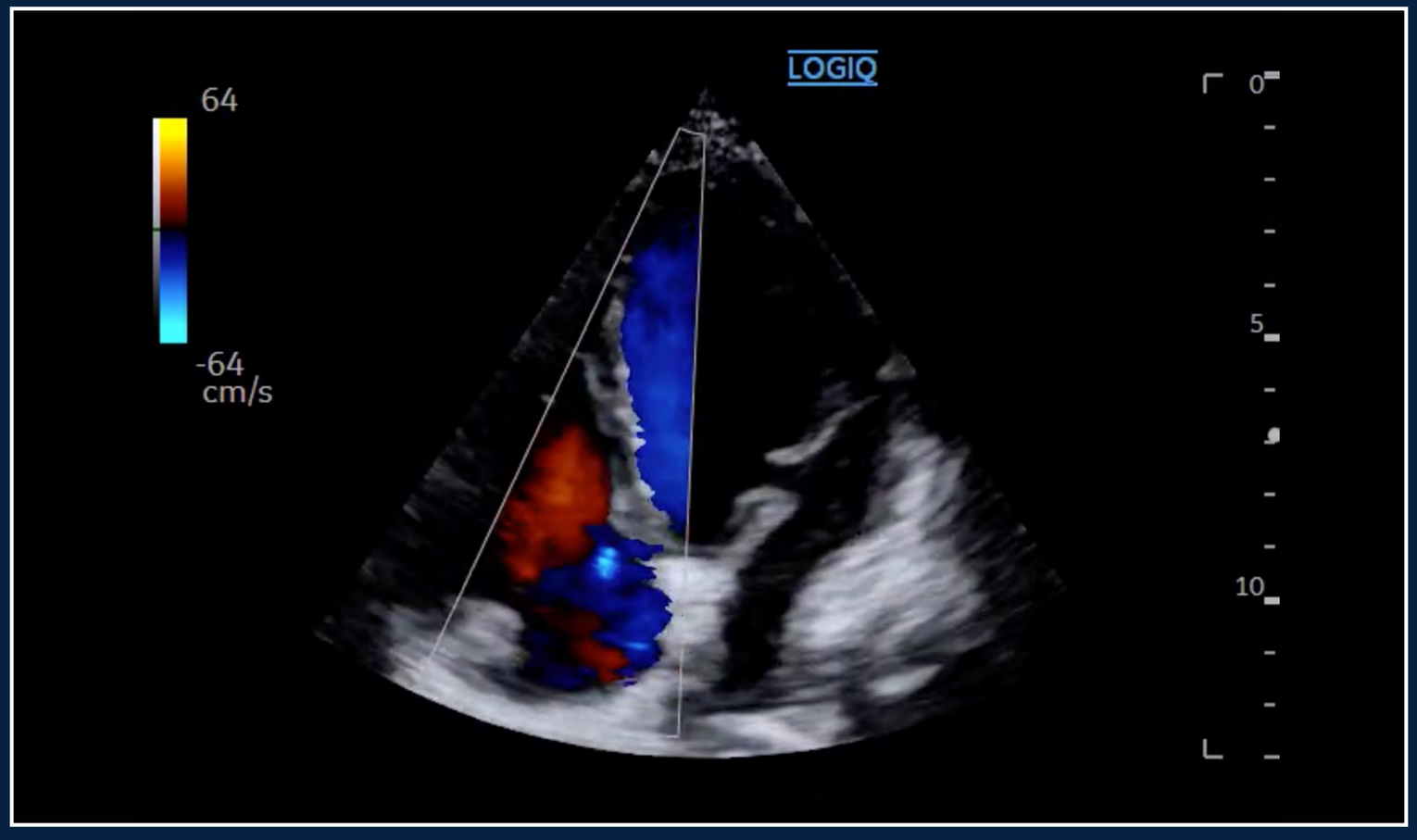


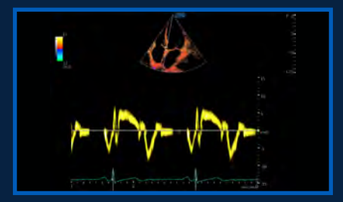


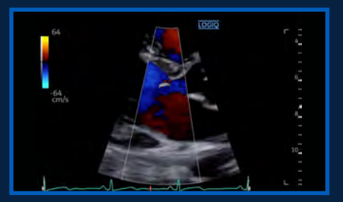
B-Mode with Advanced SRI ECG and Respirometer Display, M5Sc-D

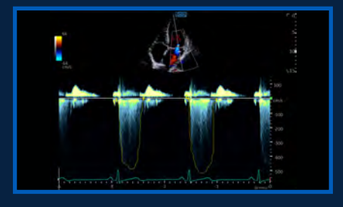
CLINICAL IMAGES | Cardiology

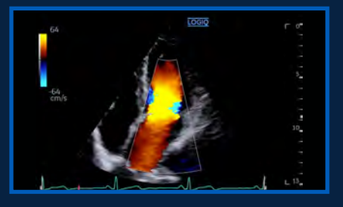
Acquire highly detailed cardiac images within efficient exam times, even in challenging cases







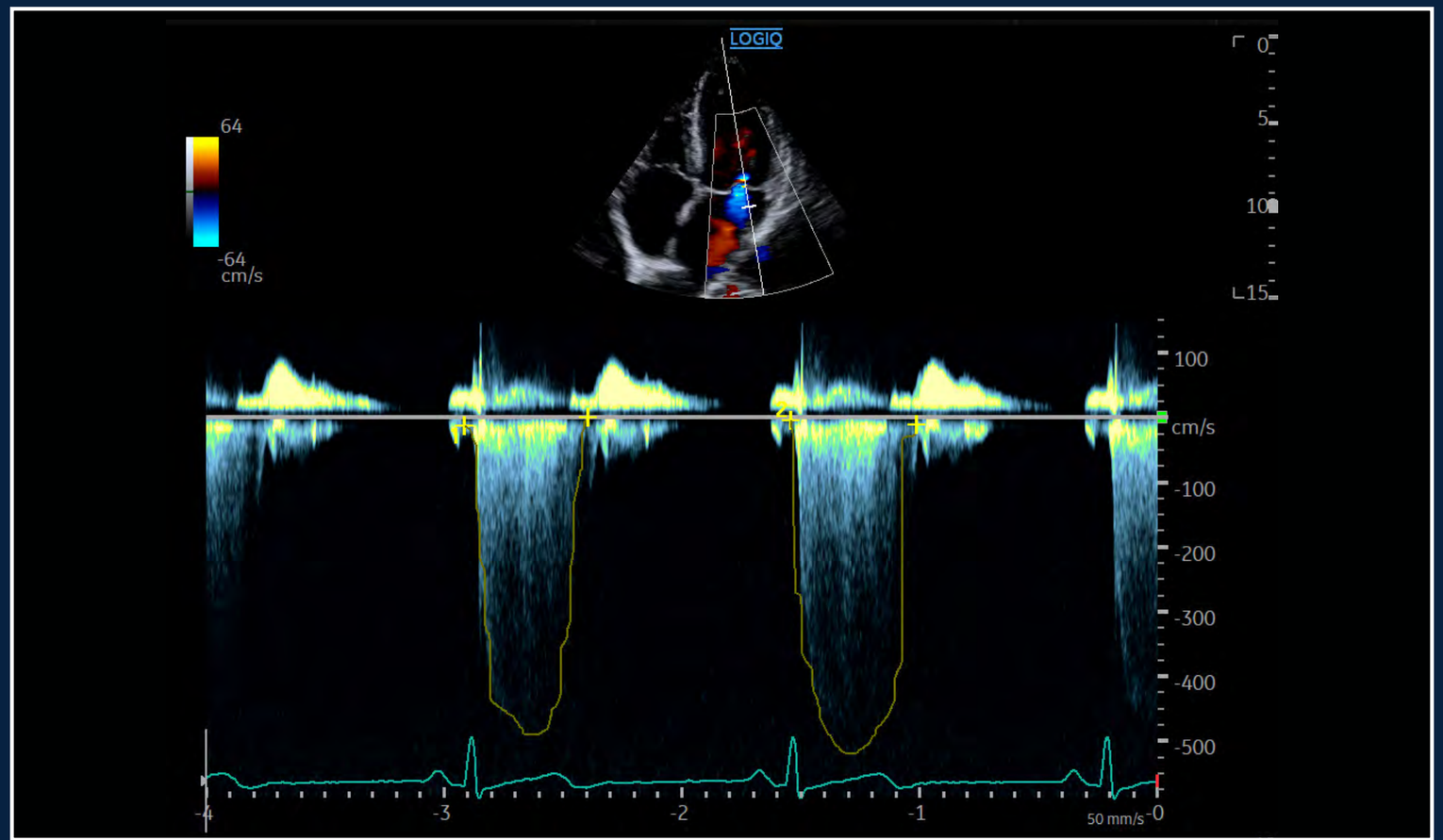




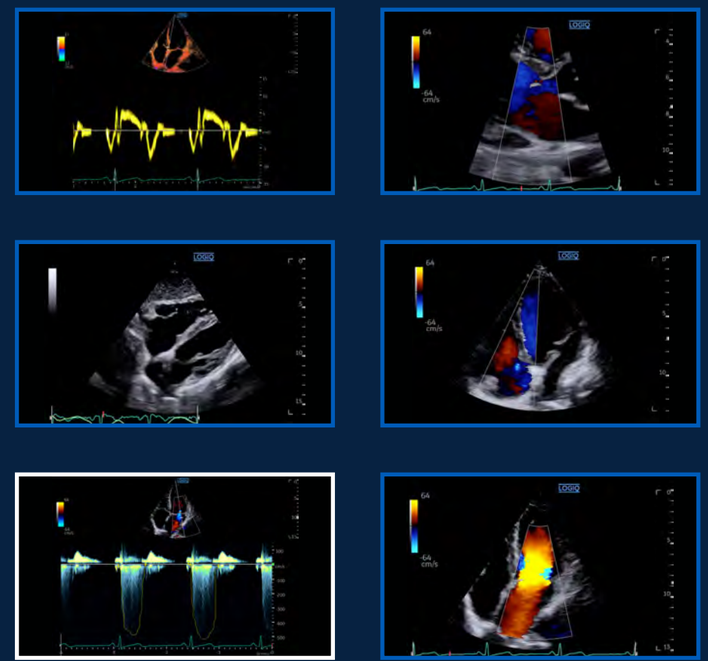
Color Flow Apical 4 Chamber View, M5Sc-D

CLINICAL IMAGES | Cardiology

Acquire highly detailed cardiac images within efficient exam times, even in challenging cases

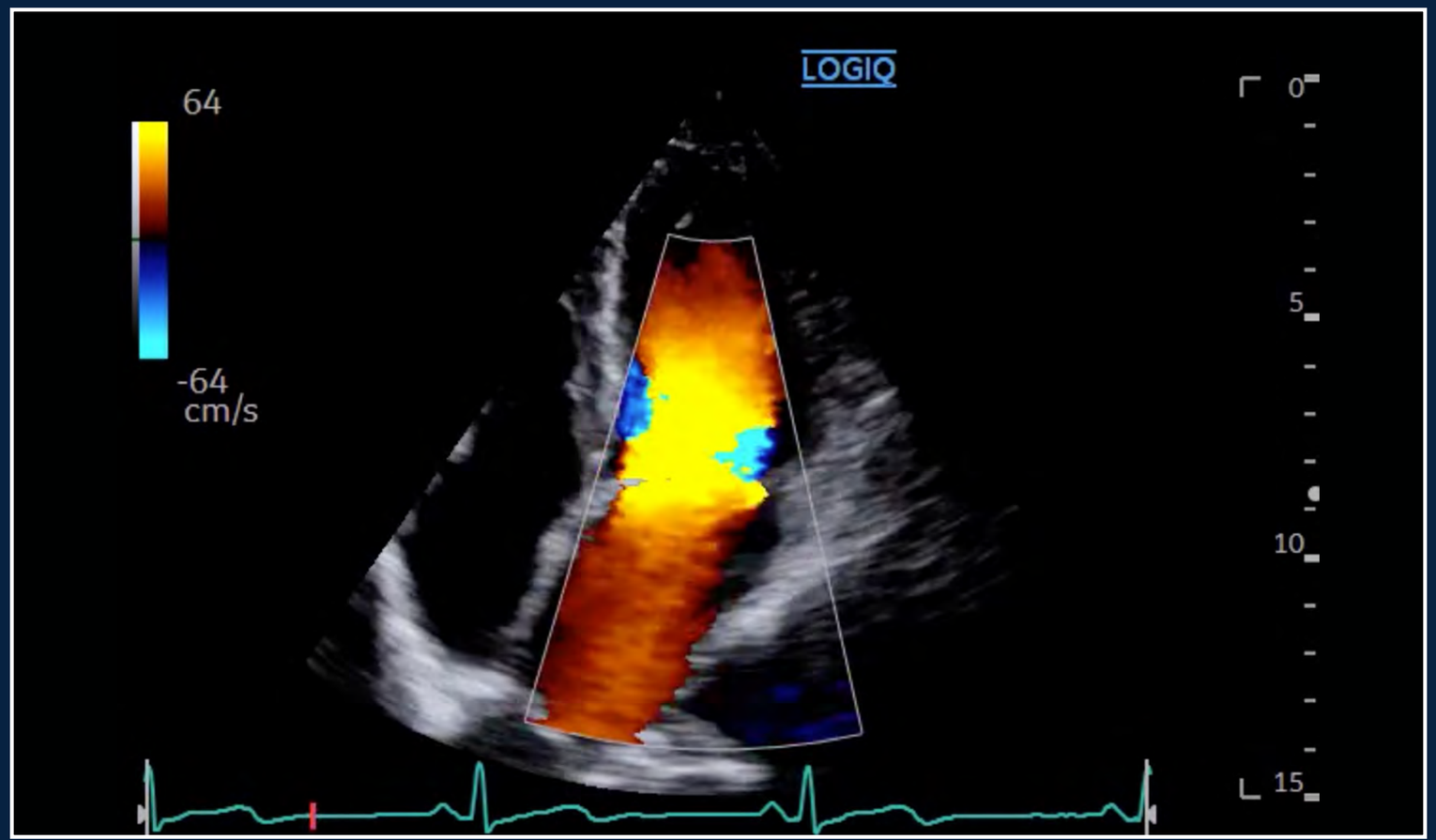


Color Flow and CW Doppler Mitral Valve, M5Sc-D

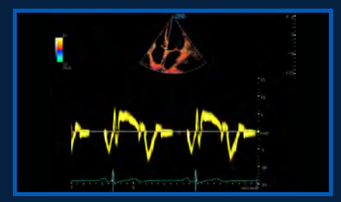


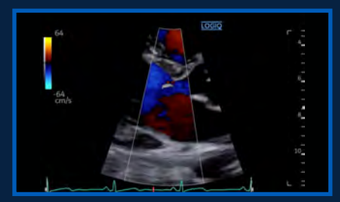
CLINICAL IMAGES | Cardiology

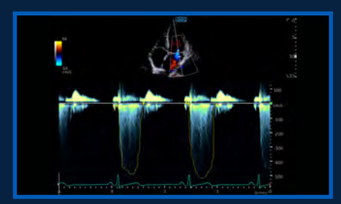
Acquire highly detailed cardiac images within efficient exam times, even in challenging cases



Color Flow Apical 4 Chamber View Mitral Valve, M5Sc-D





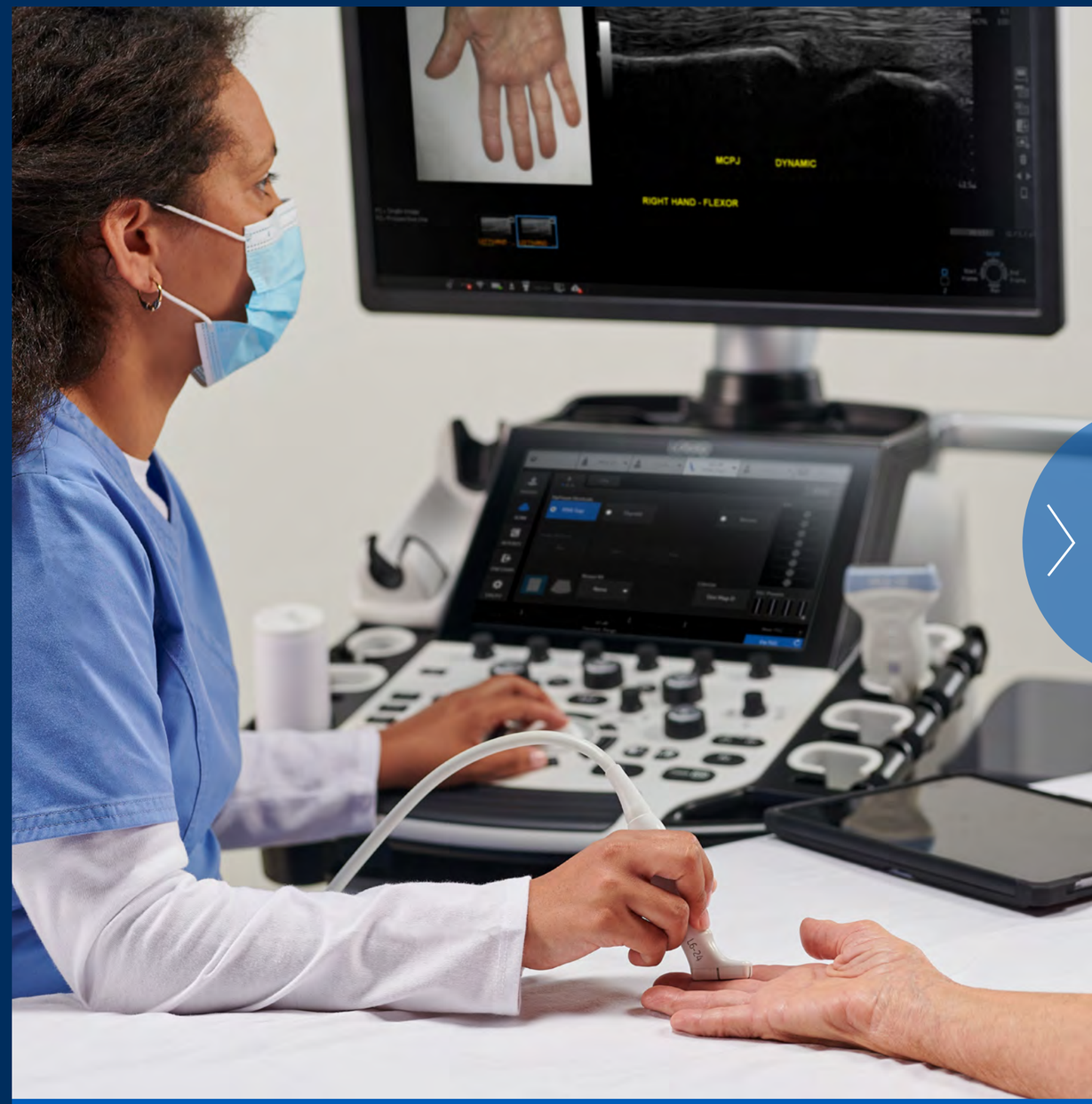


MUSCULOSKELETAL

With precise, efficient imaging, LOGIQ Fortis assists clinicians in managing a wide range of musculoskeletal conditions and a high volume of patients.

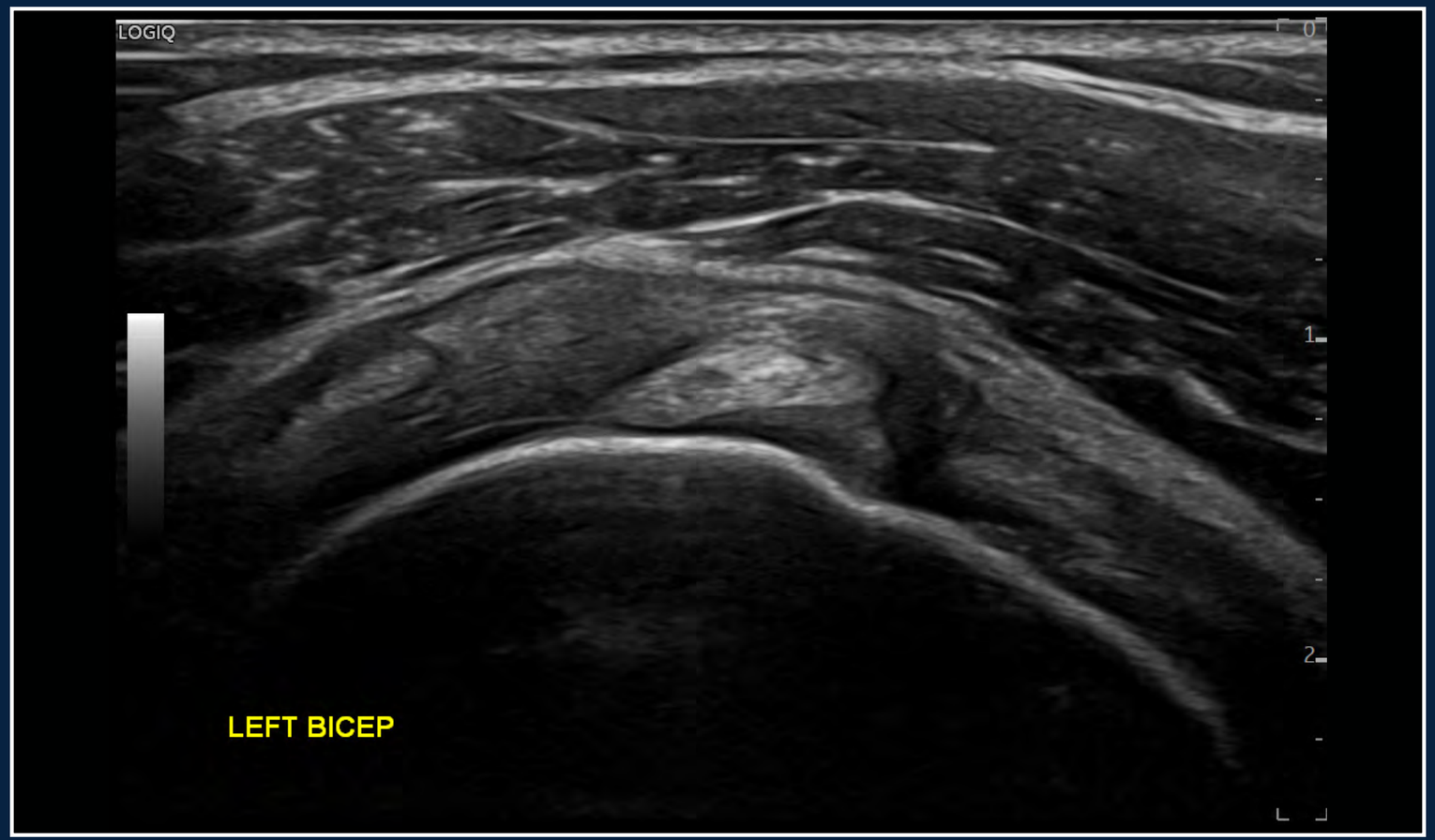
- Micro Vascular Imaging (MVI) and Radiant*flow* combine to enable near-3D visualization of tiny, slow-flow vessels
- 2D Shear Wave Elastography available on multiple probes
- Photo Assistant App lets you acquire and send photos of relevant anatomy from an Android™ device

+ CLINICAL IMAGES

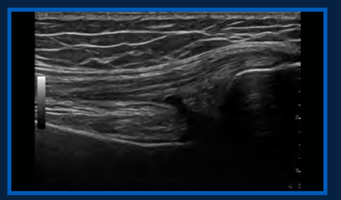


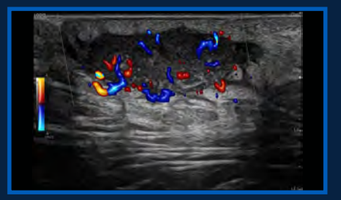
CLINICAL IMAGES | Musculoskeletal

Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



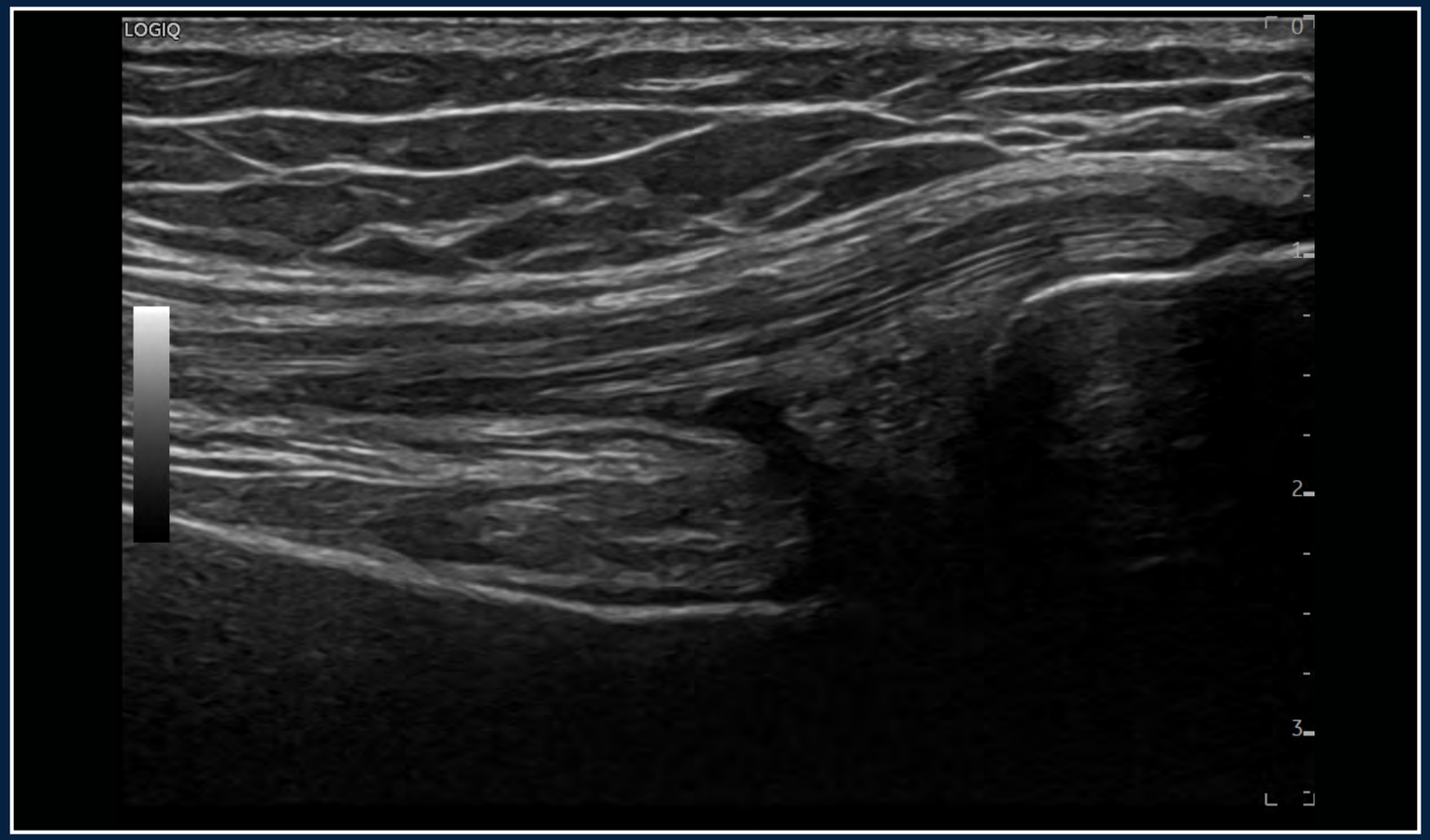
B-Mode with Advanced SRI Shoulder, ML6-15-D



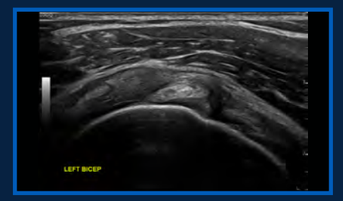


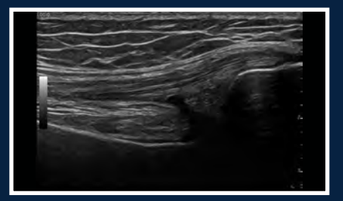
CLINICAL IMAGES | Musculoskeletal

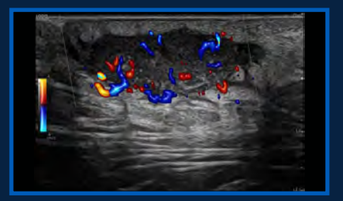
Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



B-Mode with Advanced SRI Knee Tendon, ML6-15-D

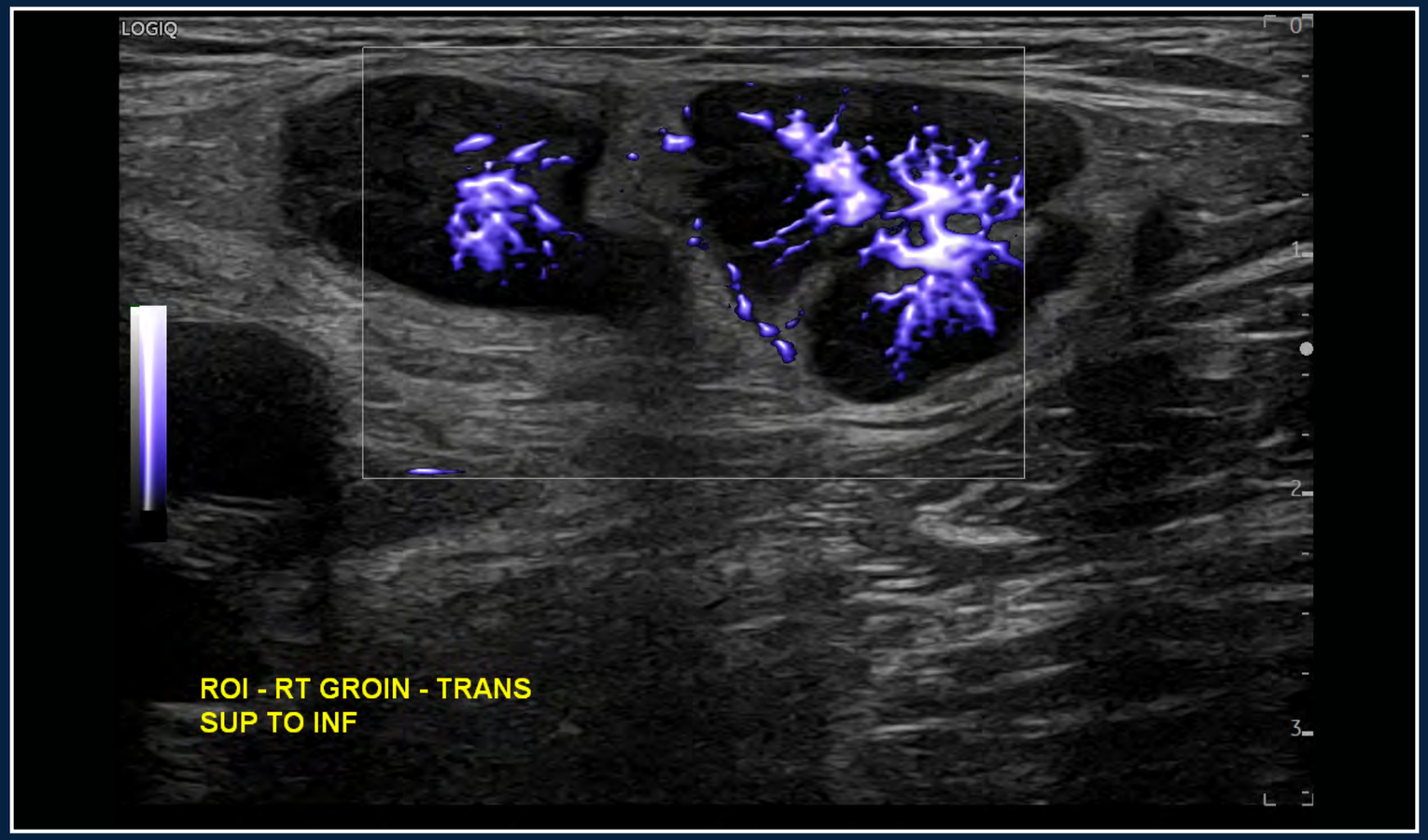


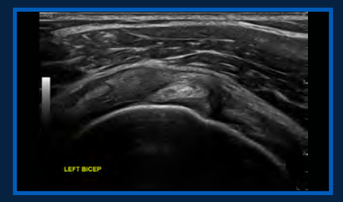


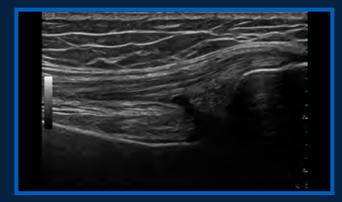


CLINICAL IMAGES | Musculoskeletal

Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



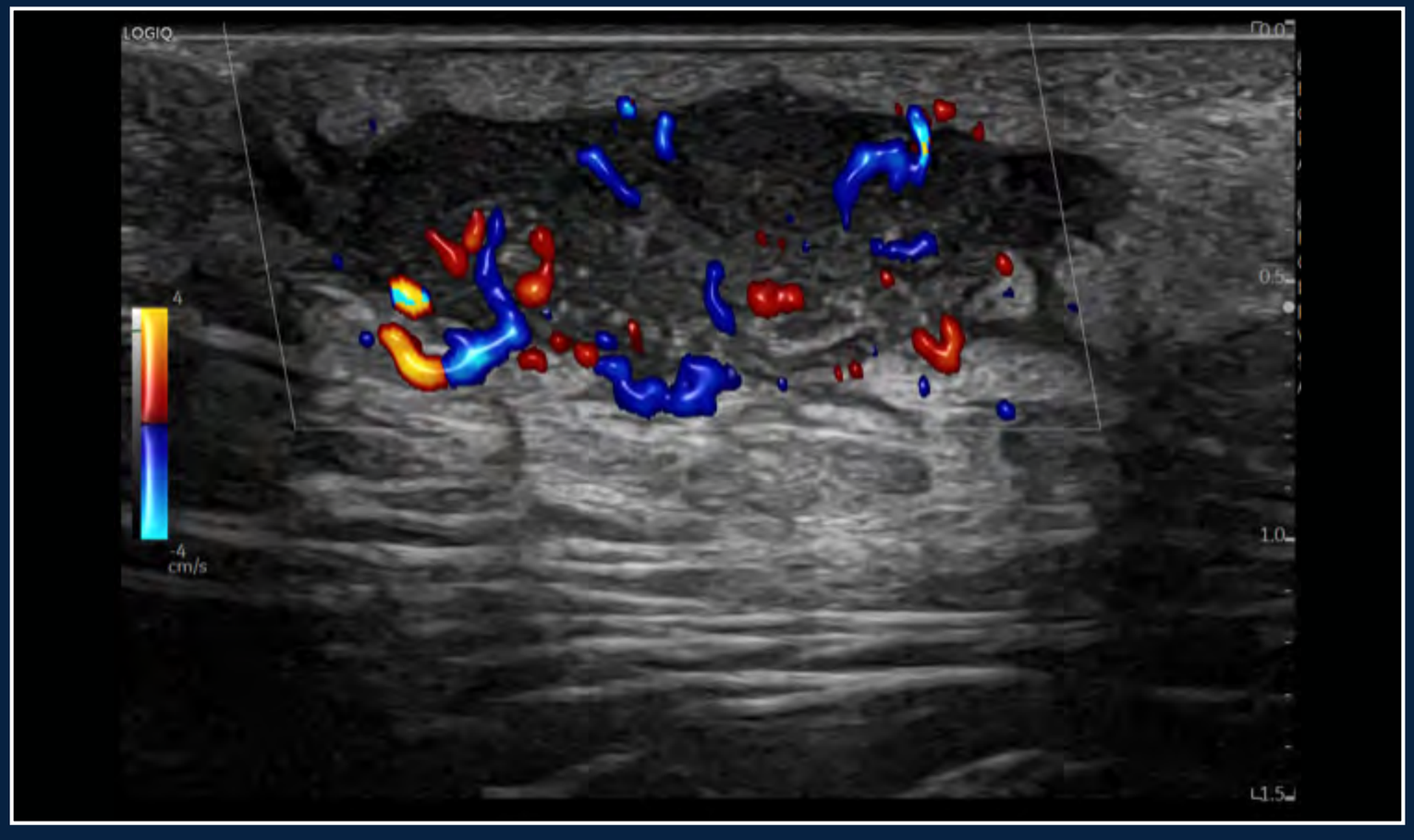




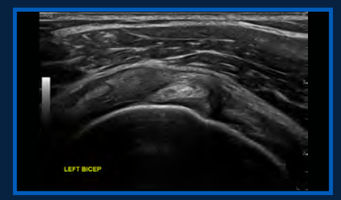
MVI with Radiant*flow* Groin Lymph Node, ML6-15-D

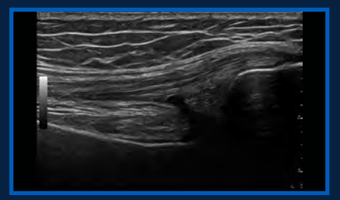
CLINICAL IMAGES | Musculoskeletal

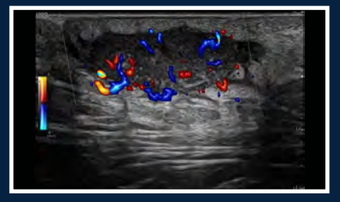
Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



Leg Mass with Color Flow and Radiant*flow*, L6-24-D







BREAST

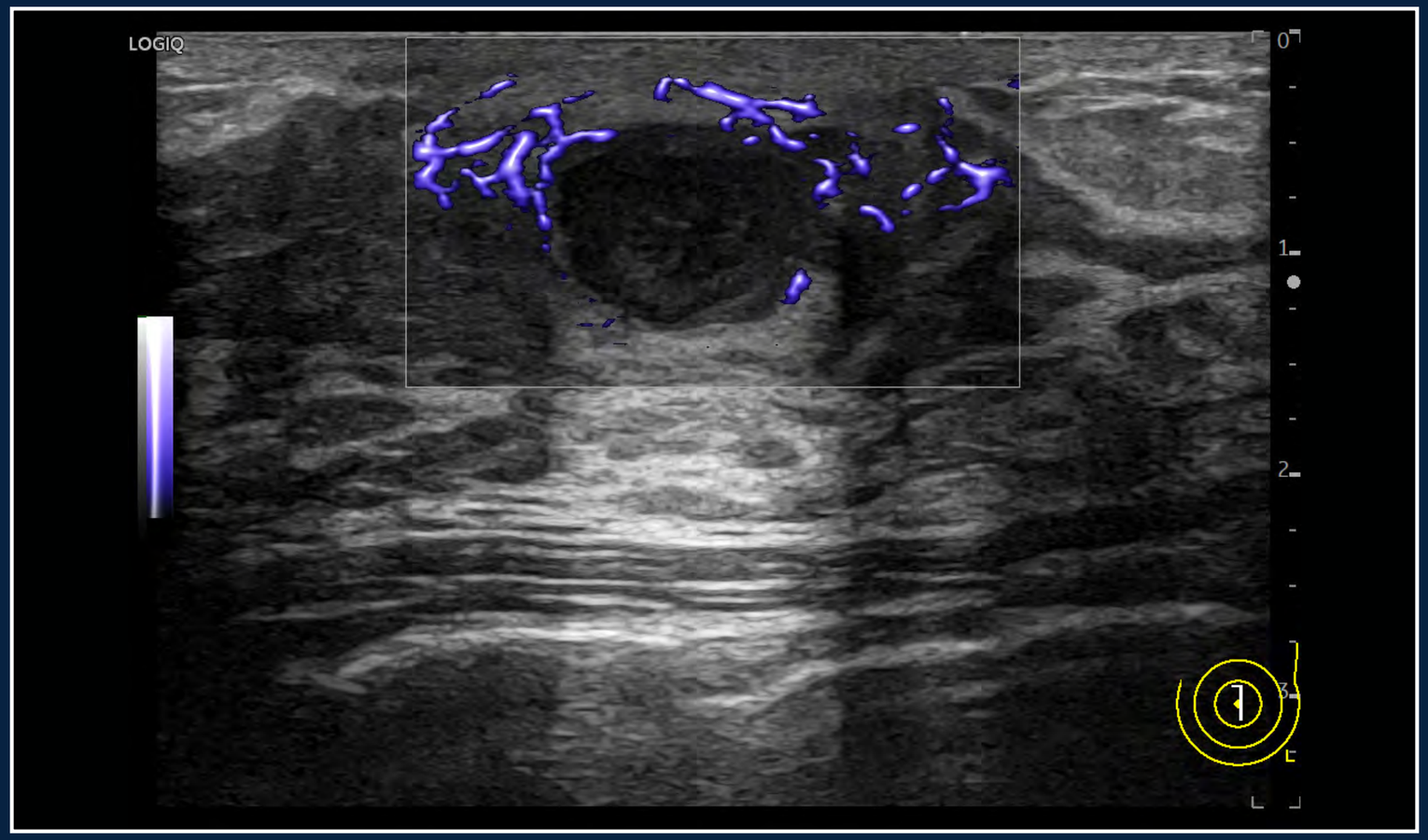
LOGIQ Fortis provides high-quality images and robust tools to help clinicians detect and characterize breast disease as efficiently as possible.

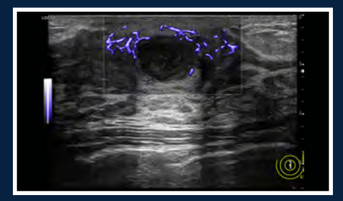
- 2D Shear Wave Elastography with Quality Indicator
- Automated workflow tools, including Measure Assistant and Compare Assistant
- Breast Assistant, powered by Koios DS,™ an AI-based decision support tool providing quantitative risk assessment aligned to a BI-RADS® category*

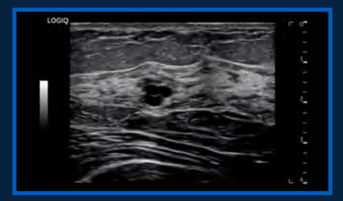
+ CLINICAL IMAGES

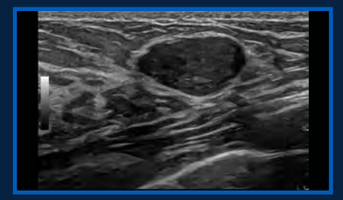
CLINICAL IMAGES | Breast

Highly detailed images to detect and characterize breast disease efficiently





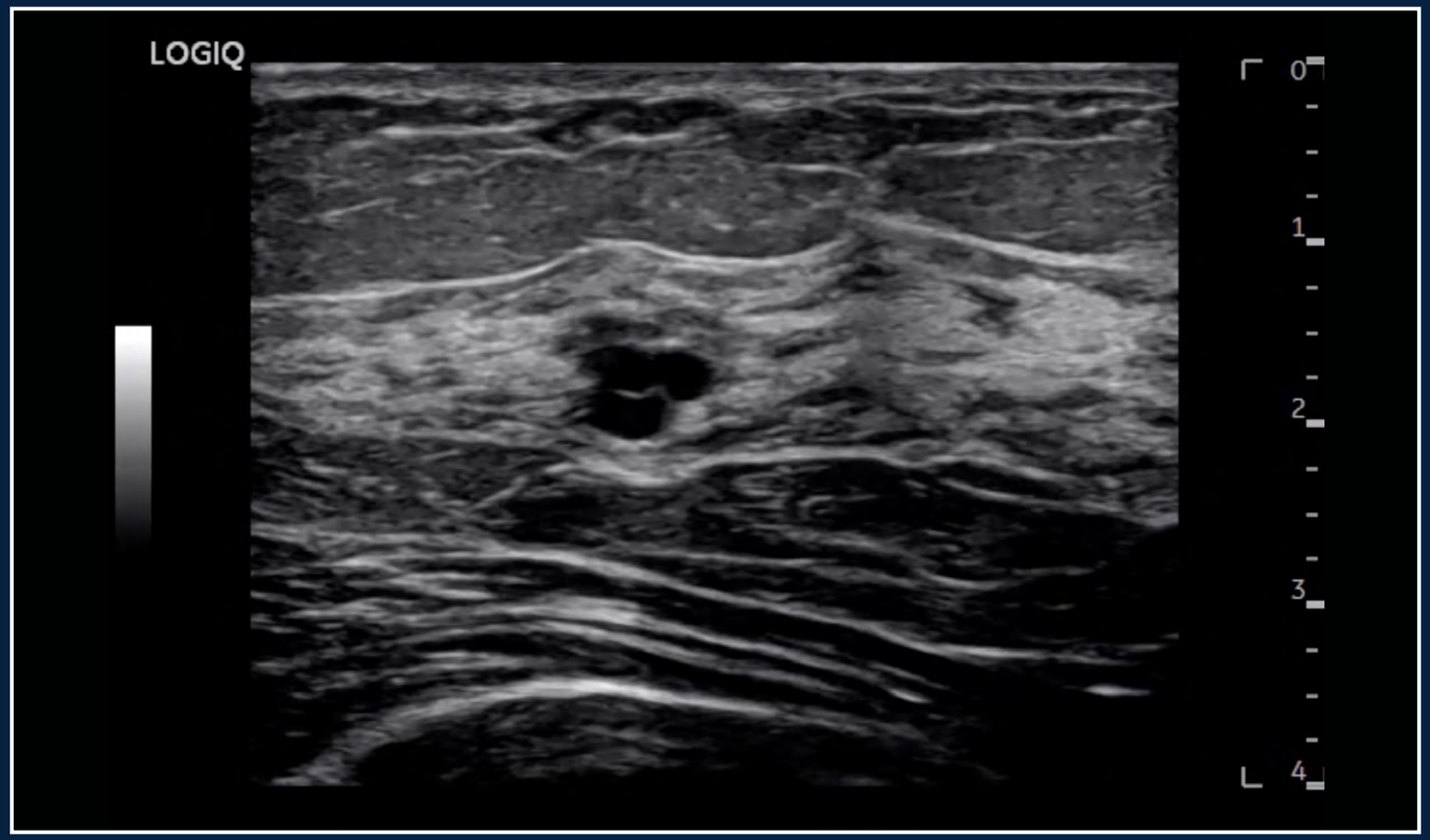


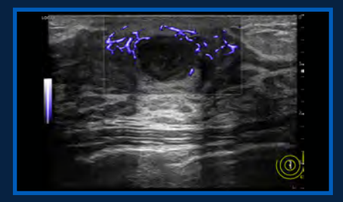


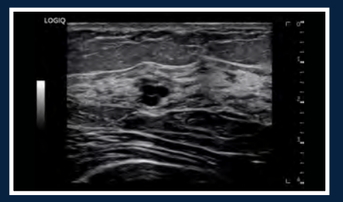
MVI Breast, ML6-15-D

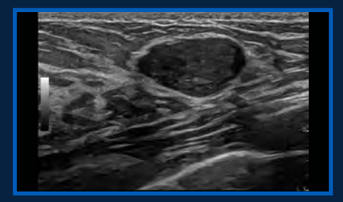
CLINICAL IMAGES | Breast

Highly detailed images to detect and characterize breast disease efficiently





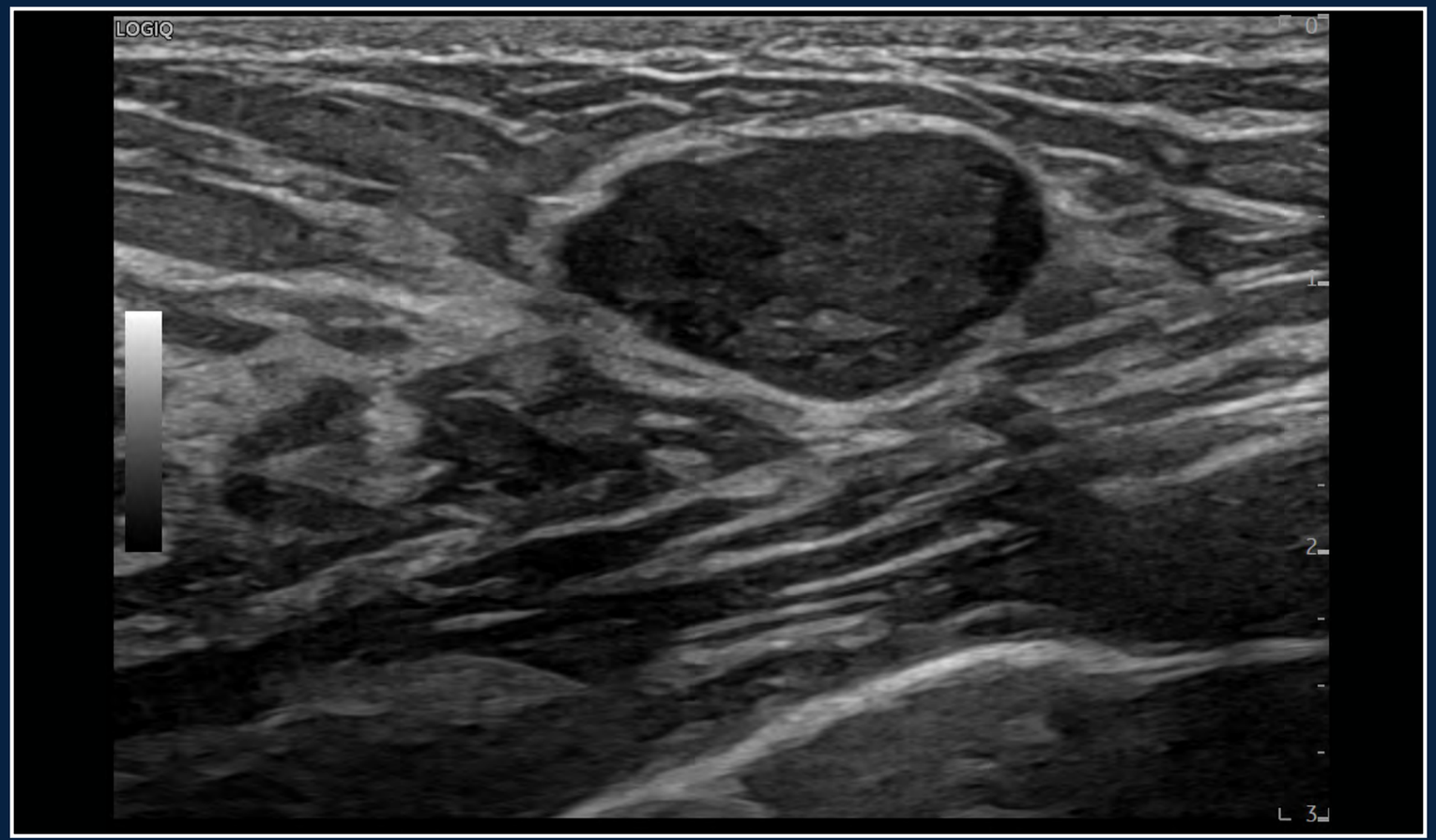


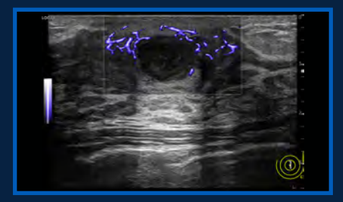


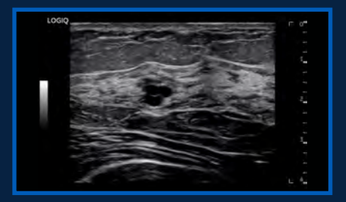
B-Mode with Advanced SRI in Breast, L3-12-D

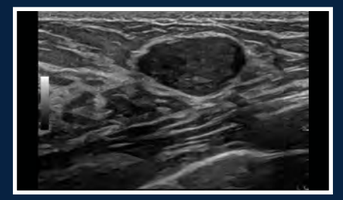
CLINICAL IMAGES | Breast

Highly detailed images to detect and characterize breast disease efficiently









B-Mode with Advanced SRI in Breast, ML6-15-D

OPTIMIZING YOUR PRODUCTIVITY

LOGIQ Fortis is powerfully streamlined to help clinicians optimize workflow, ensure accurate results, and enhance clinical confidence.

- New EZ Imaging with customizable probe presets, simplified touch panel to reduce operator interactions, and quick patient set-up
- AI-based and automated tools to speed up workflow
- Easy system maneuverability with Scan on Battery

COVID-19 Support

Systems Cleaning Compatibility

Transducers Cleaning Compatibility

LOGIQ Club

MAXIMIZING YOUR INVESTMENT

From radiology to cardiology, the multi-purpose LOGIQ Fortis is easily scaled to your needs, so you can avoid acquiring multiple ultrasound systems for different requirements.

- A to A digital platform lets you add next-generation capabilities to stay at the forefront of ultrasound
- Lifecycle solutions—from InSite™ remote support to iCenter™ performance analytics—help optimize asset performance and utilization
- SonoDefense multi-layer cybersecurity and data privacy protection guards your investment 24/7

LOGIQ Fortis

A powerful, streamlined ultrasound solution that's always ready, always by your side.

*For more information, visit the **LOGIQ Digital Experience**.*

* Not all products or features are available in all geographies.
Check with your local GE Healthcare representative for availability in your country.

January 2022
JB18811XX

LOGIQ Fortis™

A powerfully streamlined,
next-generation ultrasound solution

gehealthcare.com

Introducing GE LOGIQ Fortis—the next generation of LOGIQ ultrasound technology.

LOGIQ Fortis—the LOGIQ platform's newest member—provides a multi-purpose, all-in-one, ultra-secure ultrasound solution that can be easily scaled to fit your specific needs.

LOGIQ Fortis is characterized by both its **strength** and its **power**. It gives you the power to enhance your clinical capabilities and increase productivity exponentially.

Everything you expect in a LOGIQ system—*powerfully streamlined*
With a sleek and compact design, LOGIQ Fortis can be used in almost any space. Its state-of-the-art features and technologies make it strong enough to conduct a full spectrum of ultrasound exams and procedures on any body type. It was specifically designed to optimize clinicians' productivity, exceed expectations regarding performance, and to maximize your investment.

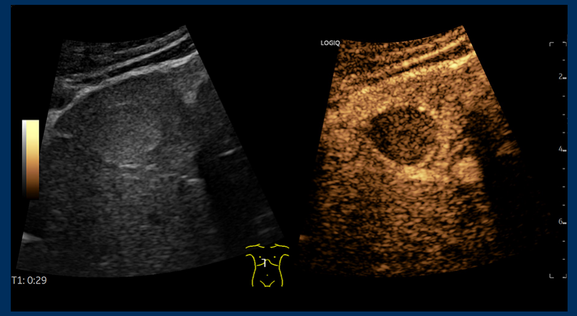
Clinical Expectations: **EXCEEDED**

With LOGIQ Fortis, you'll find that any expectations you might have regarding an all-in-one, high-performing ultrasound system aren't just met. They're exceeded. If your facility needs a powerful and scalable ultrasound solution, LOGIQ Fortis is the answer.

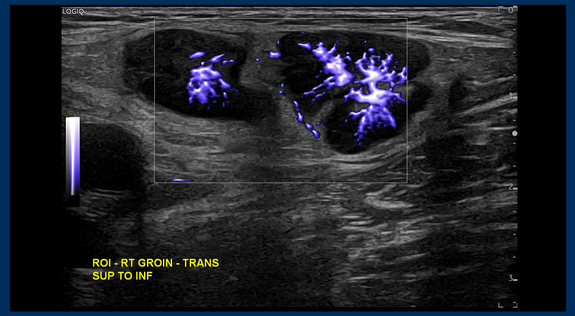
cSound™ Architecture facilitates next-generation imaging
LOGIQ Fortis features cSound Architecture, which combines versatile XDclear™ probes, cSound Imageformer and new, advanced Speckled Reduction Imaging (SRI) technology. The result is increased processing power that delivers enhanced data throughput for exceptional image quality, clarity and confidence.

Advanced quantification simplifies patient management
Robust tools, such as 2D Shear Wave Elastography and Ultrasound-Guided Attenuation Parameter (UGAP), help reduce the need for invasive procedures and help provide valuable information for patient management decisions.

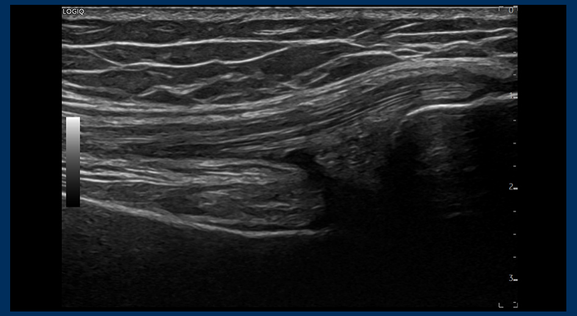
LOGIQ Fortis at work



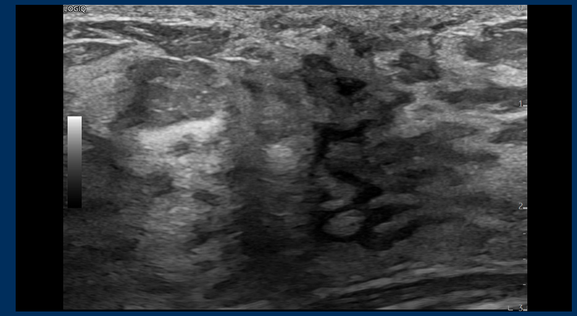
Contrast enhanced liver lesion, C2-9-D



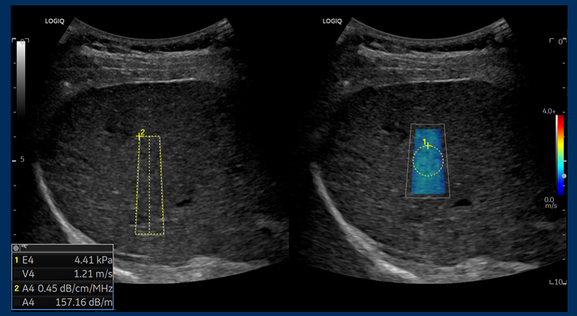
MVI with Radiant*flow* – groin lymph node, ML6-15-D



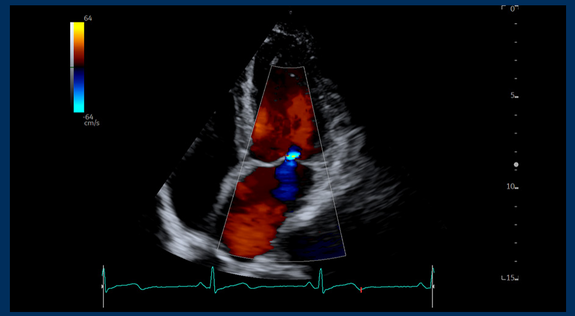
B-Mode with Advanced SRI – knee tendon, ML6-15-D



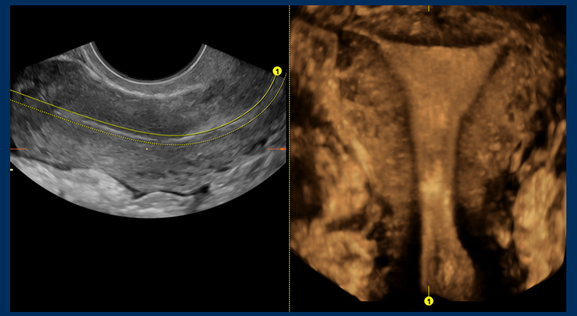
B-Mode with Advanced SRI in breast, ML6-15-D



Hepatic Assistant – UGAP and Shear Wave Elastography, C1-6-D



Color flow of mitral valve apical 4-chamber view, M5Sc-D



OmniView dual screen, RIC5-9-D

For your multi-purpose ultrasound needs, LOGIQ Fortis is always ready and always by your side.

LOGIQ Fortis helps clinicians streamline their workflow, ensure accurate results, and enhance patient comfort. Its productivity tools help facilitate diagnoses and its design makes it easy to clean and simple to operate.

A system that's easily moved to where it's needed
Due to its sleek footprint, LOGIQ Fortis is simple to maneuver and can fit into almost any space—from patient rooms to exam rooms to operating rooms.

AI-based tools streamline and optimize workflow
LOGIQ Fortis harnesses the power of artificial intelligence to improve the speed, ease and comfort of exams. With its AI-based tools, users can achieve exceptional images quickly.

LOGIQ apps make remote usage possible—and simple
A variety of apps for mobile devices add next-level context with photos and enable users to control LOGIQ Fortis remotely. The result is an optimized ergonomic experience for you and your patients.

Productivity & workflow: **OPTIMIZED**

Your investment: **MAXIMIZED**

When you purchase an ultrasound system, it's not just an investment for your facility—it's also an investment in your clinicians and patients. With LOGIQ Fortis, you'll be able to maximize that investment for everyone. Because it's easily scaled to meet the evolving needs of today and tomorrow, you'll be able to depend on LOGIQ Fortis for years to come. And, because it can be used for a wide variety of exams and procedures on any body type, the need to purchase multiple ultrasound systems for different requirements is eliminated. LOGIQ Fortis is the all-in-one ultrasound system that delivers a one-of-a-kind solution.

The A to A digital platform enhances the intelligence of the LOGIQ Fortis
From Awareness to Assistance, our A to A digital platform allows your organization to stay at the forefront of clinical imaging. It's specifically engineered so you can add next-generation capabilities to LOGIQ Fortis in the years ahead.

Lifecycle solutions for where you are today—and where you will be tomorrow
The advanced digital support features of LOGIQ Fortis make it easy to optimize your ownership experience. From InSite™ remote support, to iCenter™ performance analytics, to AVURI remote device management, you'll have access to the tools you'll need to optimize your assets, streamline your operations, and to ensure you're prepared to meet your facility's evolving needs.

SonoDefense Data Security Protection guards your investment 24/7
With its multi-layer approach to cybersecurity and data privacy protection, SonoDefense protects LOGIQ Fortis from cyberthreats and unauthorized access around the clock. Your investment is secured—and so is your confidence.






LOGIQ Fortis

A powerful, streamlined ultrasound solution that's always ready, always by your side.

September 2021
JB16976XX
Global

LOGIQ Fortis™ Getting Started Guide


LOGIQ
ML6-15
C1-6 AbdDetail
L2-9
C2-9
TGC
PATIENT
SCAN
REPORTS
END EXAM
UTILITY
MyPreset Shortcuts
AbdDetail
Renal
Gyn
Image Shortcut
Res
Gen
Pen
Biopsy Kit
None
Colorize
Tint Map D
TGC Presets
100 % Power Output
Near TGC
Far TGC
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PW
PDI TVI
CF
B Flow
3D/4D
Contrast
Elasto
CHI
UGAP
MVI
V Nav
LOGIQ View
LOGIQ Apps
Abc
Clear
P1
P2
Freeze

1	Power
2	Print keys
3	Freeze
4	Dual screen
5	Auto Optimize
6	Depth/steer/sector width
7	B-Mode Gain
8	B-Flow
9	Depth/zoom
10	Color
11	TVI/PDI
12	PW
13	CW
14	M-Mode
15	Measure
16	Body pattern/ellipse
17	ABC (comments)
18	Clear
19	Pointer
20	Trackball keys
21	Smart keys
22	Programmable keys
23	Rotary knobs
24	Digital TGCs
25	Probe selection
26	Touch panel

Connecting a probe

1. Turn latch horizontal for unlock position
2. Slide connector straight into port, cord side up. Turn latch vertical to lock. Image of probe will appear on TP after connected

Modality worklist

1. Select Patient icon on touch panel (26)
2. Select Worklist from the column on the left of the monitor
3. When the new window opens, select Query to refresh the worklist
4. Highlight the desire patient from the names in the top window using the pointer and press set (right trackball key) (20). Select “Transfer”
5. Confirm you have the correct patient selected, select scan category (ABD,OB, etc.) from the tabs
6. Exit the patient entry page by pressing Scan or select desired probe on the touch panel

Selecting probe and model/preset

1. Push the desired probe icon (25) to change from one transducer to another at any time
2. Select type of exam you would like to perform. For ex. Abd, Renal, etc.

Activating modes

1. B-Mode (7) is always active. To adjust the overall B-Mode brightness, turn the B-Mode button. Push down on B-Mode button to exit all modes
2. To activate B-Flow, select the B-Flow (8) button on console. To adjust brightness for B-Flow, turn the B-Mode button
3. Color Flow (10) – Push the CF button to activate color doppler
4. Push PDI/TVI (11) to activate power doppler
5. When using a cardiac probe and model, pushing the PDI/TVI button will activate TVI
6. M-Mode (14) – Push the M button to activate M-Mode. Turn M-Mode button to adjust overall M-Mode gain

Trackball keys (20)

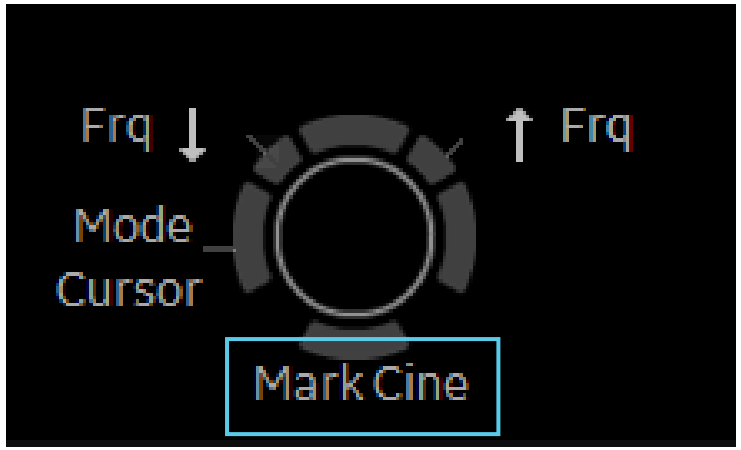
Trackball key functions change depending on which mode is activated. The trackball icon on the lower right of the monitor displays functions as modes change. Use this icon for guidance for functionality.

To configure the “Frq” keys, press Utility, System on Touch Panel, then User configurable key to choose the User Defined Trackball Set Key.

Note: *Use the CF button to adjust the overall gain when in Color doppler, PDI, TVI, and Color M-Mode.*

Print keys (2) programmable

1. Press P1 to store images to hard drive
2. Press P2 to print images on the thermal printer when one is present
3. Press Mark Cine then P1 to store a cine clip

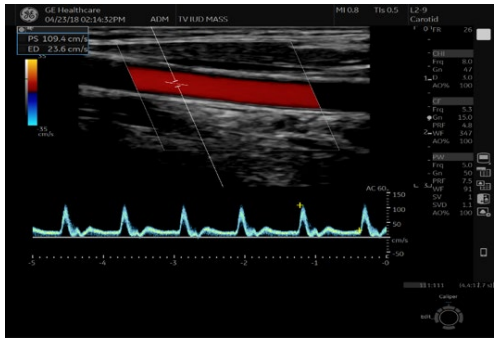


Note: *Print destinations can be programmed by a GE representative upon install of the system*

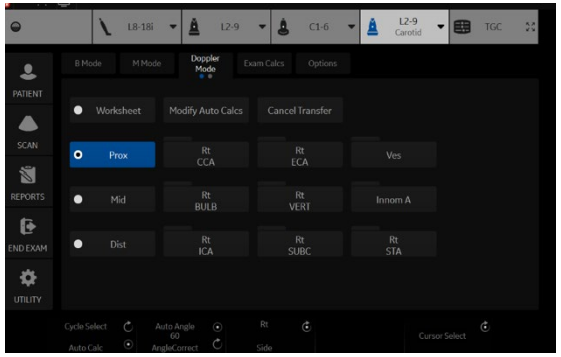
Measurements (Generic)

1. Press “Measure” key (15), a caliper will appear on the screen
2. Use the trackball to move the caliper to the appropriate location, press “Set” either the left or right trackball key (20), a second caliper will appear

3. Place the second caliper in the appropriate location and press the “Set” right or left trackball key
4. Measurement window appears on the the screen and will display the distance between the two points. To activate 2nd set of calipers, push top trackball key. Additional measurements options available on upper trackball key
5. To remove measurement, select clear (18) button while the measure key is backlit green
6. When timeline is displayed on the screen select measure and select appropriate waveform for velocity measurement



7. Pre-programmed measurements for each mode can be found on the touch panel when the measure key is active. These can be programmed per type of exam by your GE representative



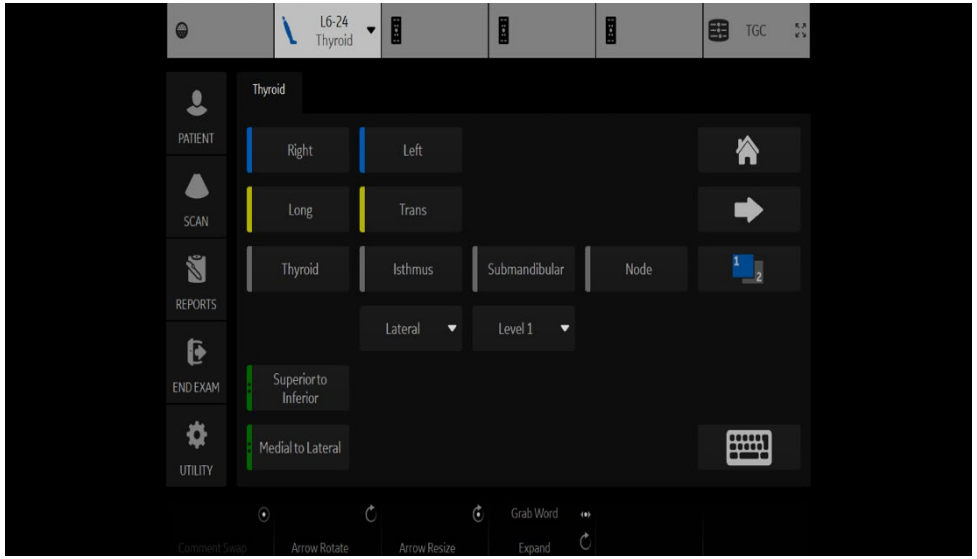
Annotating an image

1. Using digital or pop-out keyboard to annotate

- To add text to an image, type on A/N keyboard while text color is green. While green, the text can be moved to another part of the image with the trackball
- Push the right trackball key to set the comment. Text color will change from green to yellow after comment is set
- To edit or move a set text, move cursor to text, select right trackball key. Text will turn green and can be moved to desired location
- To display the digital keyboard when pushing the ABC button, Utility-System-General, check the box “Display Keyboard with Comment Button”

2. Using touch panel to annotate

- Select ABC (17) comment button
- Touch panel will display annotations. Select comment as needed
- Annotations are laid out on Touch panel with designated colors. Each color represents a set of comments which will replace each other. For ex. Select CCA then select ICA. Text will change to ICA since they are the same color code
- If annotation is designated as white in color, these annotations do not replace each other. Dots represent groupings for color blind users
- To customize comments, go to Utility, Comments on Touch Panel. Under Libraries, select the desired Library to edit comments. Up to 6 columns/ 5 rows. Each number followed by a word represents the color associated to that group i.e., 1 is blue group. Words within each group will replace each other. Small list will replace up to 12



To select the comment cursor “home” position, move the cursor to the desired position. Push and hold the Home icon on the touch panel. The message “Set new home position” will be displayed on the bottom of the monitor.

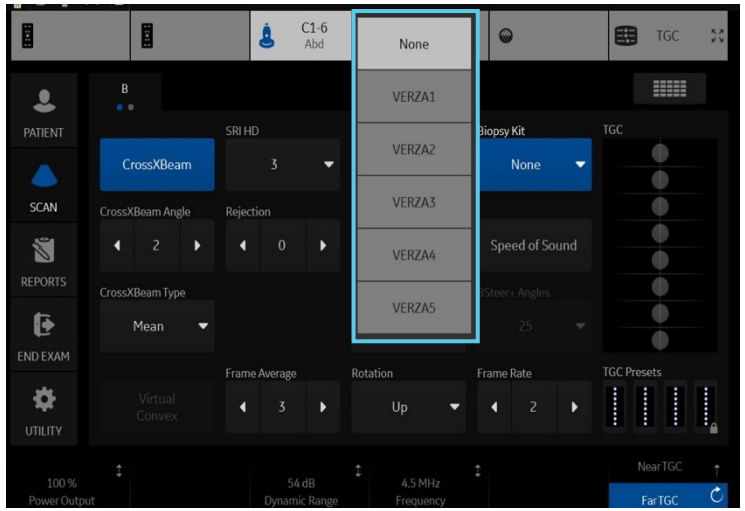
***Note:** At anytime to remove entire text, measurements and arrows, hold down the clear button (18). Word delete (F10) located on keyboard can be used to remove the last text.*

Split screen/Dual View

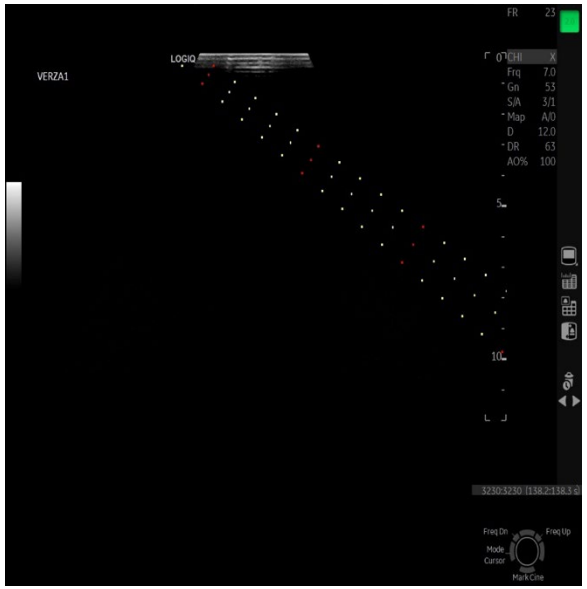
1. Press “L” on the Dual screen keys (4) to display the image on the left side of the screen
2. Press the “R” on the dual screen keys to display the image on the right side of the screen
3. To toggle between two images, press “L” or “R” dual screen keys or use trackball and set in the desired image
4. Press the “L” and “R” simultaneously to display the same image as live simultaneous side by side images
5. When using Color mode, simultaneous side by side will display color ROI on one side and B-Mode on the other
6. Press and hold “L” down to activate a quad screen. Use the “L” to toggle between the upper and lower images on the left. Use the “R” to toggle between the upper and lower images on the right
7. To return to single image, push down on the B-Mode (7) button

Biopsy Guide

1. Under B-Mode tab on the touch panel, select biopsy kit. The system will display the corresponding type of bracket and appropriate number of the guide



2. Select desired guide. Name and biopsy lines will show up on the screen. Be sure to match the number chosen on the screen with the number on the guide
3. To turn the biopsy guide off, select the “none” form the dropdown list



Note: *The IC5-9 has two biopsy guides available, the disposable TR5 and the reusable RU guides. The reusable guide bracket is made of stainless steel. The disposable guide is white plastic and has 5 angle options. Please refer to the instructions found in the biopsy guide kit for cleaning and handling the guides.*

B-Mode Optimization

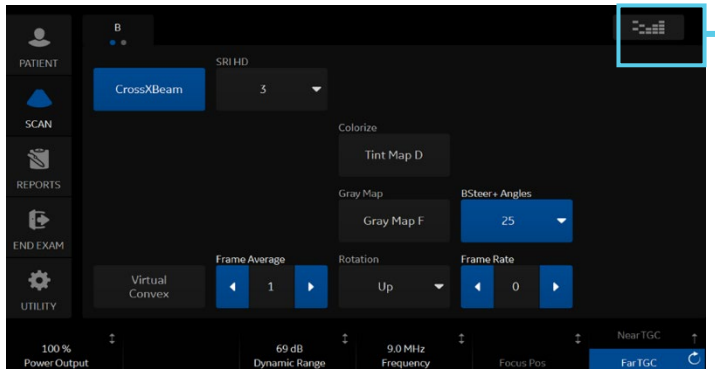
Commonly used parameters	Description
Digital TGC (24)	Use finger to swipe in direction of desired TGC curve. For finer adjustments, use Near TGC/Far TGC control knob below Digital TGC.
CHI Harmonics (Programmable Key 22)	Utilizes Digitally Encoded Ultrasound (DEU) to receive and display harmonic (double) frequencies. Enhances near field resolution. Multiple frequencies area available to help increase penetration.
Frequency	Range is dependent on probe and system. Use higher frequency for thinner/smaller patients, lower frequency for thicker/larger patients. Use lower frequency for deeper structures, higher frequency for more superficial structures.
Dynamic Range	Controls how echo intensities are converted to shades of gray, increasing the adjustable range of contrast. Increase dynamic range for more shades of gray, decrease for more contrast.
Gray Maps	Varies the appearance of the shades of gray from black to white. Choose the gray map prior to making other parameter changes. There is interdependency between the gray maps, gain and dynamic range.
CrossXBeam™ **CrossXBeam Angle** **CrossXBeam Type**	CrossXBeam, or compound imaging, combines three or more frames from different steering angles into a single frame. May help reduce speckle and noise in the image. Enhances tissue interfaces and border detection. CrossXBeam Angle allows the user to adjust the angle of send and receive signals. CrossXBeam Type: **Mean** averages all returning values (normal scanning mode), **Hybrid** combines a mix of both average and maximum values (center line + Max), **Max** displays only the maximum returning values (Max only).

B-Mode Optimization *(continued)*

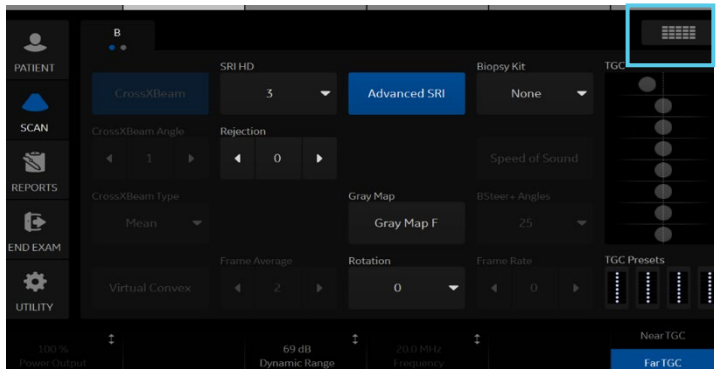
Commonly used parameters	Description
ATO (Auto Tissue Optimization) (5)	ATO analyzes the image data and then optimizes the gray map such that dark areas become darker and bright structures stand out more. For the user this translates into improved contrast resolution and noise suppression.
CTO (Continuous Tissue Optimization) (22)	CTO automatically adjusts B-Mode gain based on the signal and noise levels in the real-time image, reducing the chances of over-gain or under-gain. The gain adjustment is applied over depth and laterally as well as the whole image, resulting in a more uniform and appropriate gain across the entire image.
SRI HD	SRI HD is an image processing algorithm that smooths speckle and enhances edges. This increases contrast resolution, improves border delineation, reduces noise, and smooths speckle while maintaining its natural texture. SRI HD may be used on any probe or in any clinical application.
Advanced Speckle Reduction	The increased processing power available on the LOGIQ Fortis™ applies significantly more sophisticated smoothing and edge enhancement relative to SRI HD. This results in the differentiated imaging performance of Advanced SRI without impacting the high frame rates delivered by the cSound™ architecture. There are two types of Advanced SRI available in OB/GYN applications (Advanced SRI Type 1 and Advanced SRI Type 2).
Speed of Sound	A control to help fine-tune image resolution in applications where tissue have wide ranges of speed of sound such as breast and liver. It changes the speed of sound used by the imageformer for transmit and receive of ultrasound signals. Adjusting the speed of sound can help improve resolution, contrast, and reduce noise.

B-Mode Optimization *(continued)*

Commonly used parameters	Description
Rejection	Selects a level below which echoes caused by noise will not be amplified. The higher the rejection the more low-level echoes are eliminated.
Virtual Convex	Changes linear probe images from rectangular shape to convex shape and adds 20% more viewing area. ***Note:*** *When in Color Mode, you can select "Virtual Convex" on touch panel to display the color in convex.*
Frame Average	Helps to optimize line density or spatial resolution. Decrease frame rate for enhanced resolution, such as in Small Parts. Increase frame rate for faster frames such as for Vascular imaging.
Frame Rate	Helps to optimize line density or spatial resolution. Decrease frame rate for enhanced resolution, such as in Small Parts. Increase frame rate for faster frames such as for Vascular imaging.
B-Mode Raw Data (post processing)	On a frozen or recalled image you can adjust the following parameters; Gain, TGC, Auto Optimize, Dynamic Range, Gray Maps, SRI, Rejection, Zoom, Image reverse, Image rotation, as well as Comments and Measurements.



To display ALL touch panel parameters, select quick button on top right corner



B-Mode Optimization *(continued)*

IF	THEN
Image is too soft	1. Decrease SRI-HD 2. Activate Auto Optimize 3. Decrease frame average 4. Decrease dynamic range 5. Change gray map 6. Turn off CrossXBeam™
Image is too grainy	1. Increase SRI-HD 2. Increase dynamic range 3. Increase frequency 4. Increase frame average 5. Activate CrossXBeam 6. Change gray map
Image is too dark	1. Increase overall gain 2. Decrease frequency 3. Change gray map 4. Decrease dynamic range
Image is too noisy	1. Decrease overall gain 2. Activate Harmonics (CHI) 3. Activate Auto Optimize 4. Adjust digital TGC

IF	THEN
Image is not uniform	1. Decrease frame rate 2. Decrease scan area 3. Adjust depth 4. Adjust digital TGC
Image whites are too bright	1. Decrease overall gain 2. Increase dynamic range 3. Increase frequency
Technically difficult patient	1. Select appropriate Model, if abdominal exam select ABD2 2. Lower frequency 3. Turn off Harmonics (CHI) 4. Activate Auto Optimize 5. Lower dynamic range
Frame rates are too slow	1. Increase frame rate 2. Decrease scan area

Color Doppler optimization

Commonly used parameters	Description
Velocity Scale (PRF)	Range of velocities that are assigned a color. Adjust the pulse repetition frequency (PRF) for an enhanced representation of the magnitude of the flow pattern. Increase for higher flow velocity, decrease for lower flow velocity.
Angle Steer	Provides a Doppler angle suitable for linear probe orientation. You can slant the ROI of the Color Flow linear image left or right to get more information without moving the probe.
Frequency	Changes the color parameters to enhance flow in different depths. Use lower color frequency for deeper vessels. Increase color frequency for superficial vessels. Range is dependent on probe and model.
Wall Filter	Filters out low velocity signals and affects low flow sensitivity versus motion artifact. Assists in reducing motion artifacts from motion outside the vessel wall.
Focus Position	Adjust focal zone within the color ROI for the best vessel filling, position focal zone in the middle or lower half of the ROI.
Frame Average	Temporal smoothing filter helps to create a smooth and persistent flow profile.
Line Density	Helps optimize color flow frame rate for sensitivity and spatial resolution. Higher line density will tighten vessel. Lower line density will increase frame rate.
Color Threshold	Percentage of gray scale level where color Doppler is overwritten. Decrease where vessels are large and easily identified, Increase where multiple small vessels need to be visualized.
Flash Suppression	Algorithm to help control motion artifacts.
Radiant*flow*™	Radiant*flow* is a rendering technique for Color Flow and Power Doppler Imaging, available on all probes. Radiant*flow* provides an easy, fast visualization of tiny vessels, displaying as a 3D.

Color Doppler optimization *(continued)*

The table below discusses adjustments that can be made to help in some scanning situations.
Not all listed adjustments may be necessary to achieve the desired result.

Flow	Adjust
Color does not fill the vessel	Increase color gain until flashes area seen in the surrounding tissue, then decrease the gain just until the color fills the vessel. If color does not fill the vessel decrease velocity scale (PRF), increase threshold, decrease Wall Filter. Decrease color frequency for penetration when needed.
Color displays mixed directions	Forward flow and reverse flow should be separated by a black transitional line. If there is no line between red and blue, increase the Velocity Scale (PRF).
Color is seen in right and/or left side of vessel, but the middle is blank	The color ROI box is perpendicular to vessel flow. If using a linear probe, change the ROI box angle using the touch panel knob selection “Angle Steer.” ***Note:*** *If vessel is angled in the image, try a straight ROI box.*
Color is outside the vessel wall	Decrease color gain until color is within the vessel walls. Increase velocity scale (PRF) just until color is within vessel walls. Increase wall filter. Decrease color threshold.
Color is in superficial vessels, but not in deeper vessels	Decrease color frequency, increase color gain until flashes area seen in the surrounding tissue, then decrease gain just until color fills the deep vessels.
Frame rate is too slow	Decrease Color ROI box size, slightly taller then wider preferable. Decrease color line density.

Image management

Print keys are programmed upon install by your GE representative to send to printers, PACS or Network storage devices and the system Internal Hard Drive.	
When you want to print/store an image, the P1 is most commonly used for the primary destination and internal hard drive:	1. Push P1 to print/store an image. The images will be visible in a thumbnail view at the bottom or left side of the image screen. 2. To store a Cine loop, push P1 during live scanning (do not push freeze first) or select Mark Cine on bottom track ball key to initiate cine then P1 to end. The Cine loop stored will be a pre-determined length of time specified during system set-up. 3. When the exam is complete, select “End Exam” on the left column of the touch panel. Select “End Current Patient” on the next touch panel screen. A list of patients and their exams currently stored on the system appears on the screen in the patient entry page.
To send to a PACS or Printer that is not the “Default” destination:	1. From the Patient entry page, highlight the patient's name and set to open the studies. If there is more than one exam, highlight the exams needed. 2. Select “Send To” from the bottom right corner of the page. 3. Select the destination form the “To” drop down menu and then select OK.
Once an exam has been closed, if there is a need to add additional images to the exam, these steps will reopen a closed exam:	1. From the patient entry page, select the patient from the list on the bottom of the screen. 2. Select “Resume” at the bottom of the screen. 3. Select “Save and Exit” from patient screen or push the “Freeze” button. The prior images will be visible in the thumbnail views, add images and repeat the “End Exam” process.

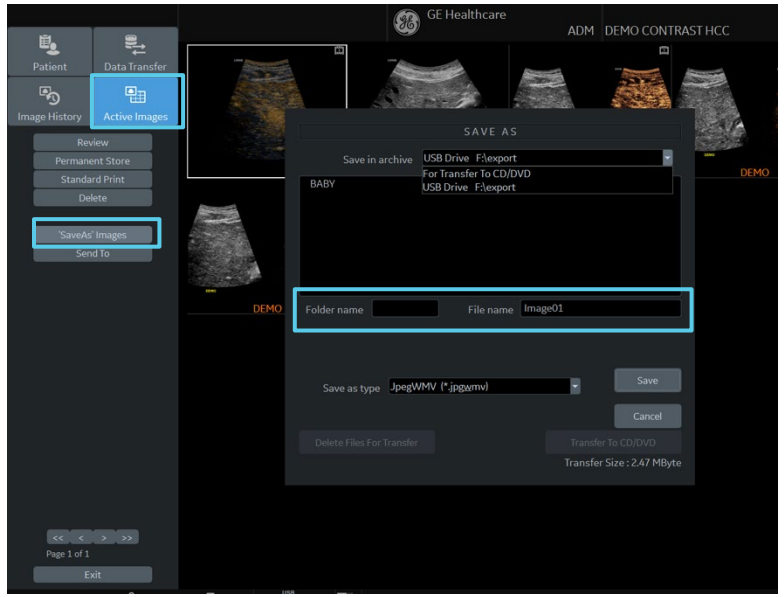
Image management *(continued)*

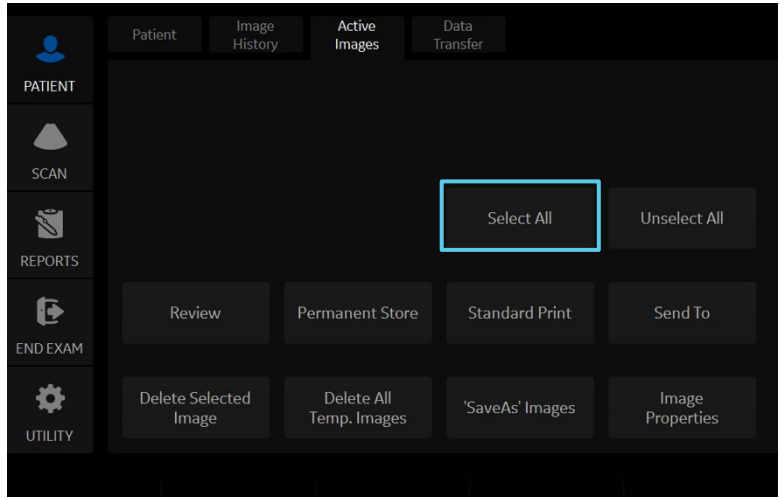
The system hard drive capacity and free space is available on the patient entry page. Move the trackball pointer over the pie icon in the lower left column. A message with the total capacity and the available free space will appear briefly. The color of the pie will change as the hard drive fills.	
To review a closed exam from the internal hard drive:	1. From the patient entry page, double click the patient's name from the list on the bottom of the screen. 2. Highlight the desired exam from the list, or if just one, highlight the exam. 3. Select “Save and Exit” or push the “Freeze” key. The images will appear in the thumbnail display at the bottom or left side of screen. 4. Select any image from the thumbnails to bring into full screen view and use the “Body Pattern” toggle to scroll through images. 5. Select the “Active Images” icon from the lower right menus to view the exam in a multi-image format.
To start a patient who has a previous exam on the hard drive:	1. From the patient entry page, begin typing in the patient ID. 2. Once the ID has been entered the text will turn red, indicating there is a patient with this ID. 3. Highlight the patient ID from the list at the bottom of the page and select “New Exam” from the options on the touch panel. 4. Select “Save and Exit” or press “Freeze” to begin the exam.
To delete patients from the internal hard drive: ***Note:*** *Patients or exams do not automatically delete from the internal hard drive.*	1. In the patient entry page, select the operator drop down menu, choose ADM. The user must have admin rights to delete patients from the hard drive. 2. In the list of patient names, highlight the patient's name to be deleted. 3. Select “Delete” in the menu at the bottom of the list. A message box will appear to confirm the action, select OK.

Image management *(continued)*

To save images to CD/DVD or USB drive in PC format (Jpeg):

1. Insert a CD-R or DVD-R into the CD/DVD burner or insert a USB stick into the USB port.
2. Highlight the patient from the list of names on the hard drive. Select “Active Images” from the upper left corner of the screen.
3. Select the individual images you want to save or alternatively select “Select All” from the touch panel.
4. Select “Save As” images from the touch panel or left side of screen.
5. A window box will appear. From the drop down “Save in Archive” menu select either “For Transfer to CD/DVD” or USB.
6. Allocate a ‘Folder Name’ to the selected saved images.
7. From the drop down “Save As Type” menu, select JPEG AND WMV. This will save still images as JPEG and Cine loops as WMV files.
8. Select “Save”. The image is saved to a temporary directory. If using a USB drive, skip to step 10 to eject; there is no “finalize” procedure
9. Once all the desired images are saved/converted, select “Save As” images again, the select Transfer to CD/DVD to transfer the images to the media.
10. Push the “F3” (Eject) button on the A/N keyboard. A new message box will appear; if ejecting a CD/DVD the message will have a choice to “finalize”. The disc must be finalized for the images to be opened on a computer.





Back-up and restore presets

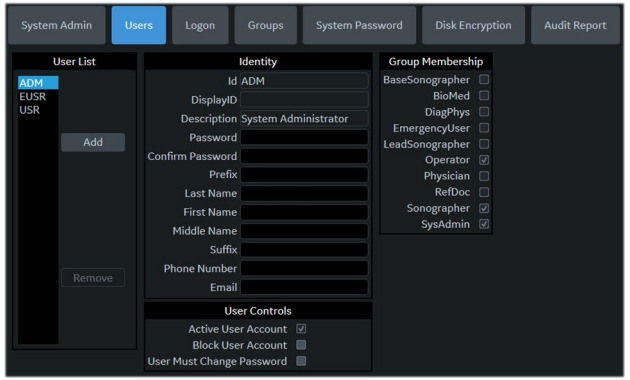
Note: It is recommended to do this with the assistance of a GE Service or GE Applications representative	
To back-up presets: Insert CD-R or DVD-R into the disk drive	1. Select Utility > System > from the touch panel. 2. Use the trackball pointer to select “Backup/Restore” tab on the monitor. 3. Select check box “User Defined Configuration” under the Backup column on the left. 4. Select CD/DVD from the dropdown menu under “Media.” 5. Select “Backup” to save presets to CD/DVD. 6. Press “F3” (Eject) to eject and finalize the CD/DVD preset disk. 7. Label and store the CD/DVD in a secure location, in case a service call results in the need to restore presets.
To restore presets: Insert the “preset CD/DVD” into the disk drive	1. Select Utility > System from the touch panel. 2. Use the trackball pointer to select “Backup/Restore” tab on the monitor. 3. Select CD/DVD from the dropdown menu under “Media.” 4. Select “User Defined Configuration” from the RESTORE field in the upper right column, which restores ALL the imaging parameters including your DICOM®/Connectivity settings. ***Note:*** *If you have multiple systems ensure your preset disk is specific to the system you are restoring to.* 5. Alternatively, under “Detailed Restore of User Defined,” select the desired fields you wish to restore on the system i.e., Imaging Presets. 6. Select “Restore.” The system will automatically shut down and re-boot to restore the presets.

Adding new user initials

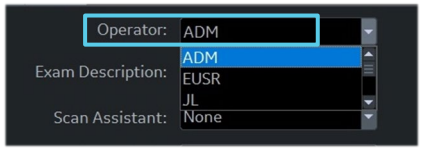
Select Utility > Admin > Users

- Select “Add” and enter user details
- ENSURE that you DO NOT include the following characters in a user’s ID: slash (/), dash (-), asterisk (*), question mark (?), an underscore (_), ampersand (&), lower case letters or blank spaces. DO NOT set up users with the same initials or ID. The system will overwrite the first user ID if a second is created with the same initials
- Display ID, type in the short form ID (typically initials) of the user for display on the title bar when storing images. This is limited to 5 characters
- Enter password using the defined policies
- ***Note:*** *If a password is created the user will be required to enter the password when logging on*
- The system administrator can specify whether the users account is active, blocked or requires a password change. If needed, select the check box “user must change password.” The user will be prompted to change their password on the next logon
- Select the Group Membership for the new user. Multiple groups can be selected if needed. The user will need Operator access rights to appear on the dropdown list of operators

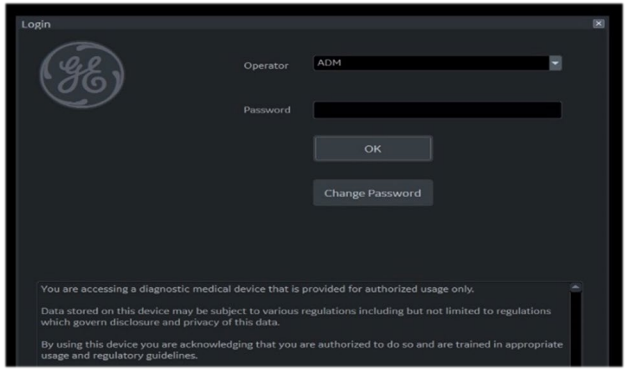
Note: *The system Admin can remove a user from the list. Select the user ID from the list and select “Remove.” The user and password will become inactive. If the user and password need to be removed permanently, select the user and password and select “Remove.” A pop-up dialog will appear to confirm the complete removal of the user account.*



When the user selects their ID from the list in the “operator” field in the patient entry page, the logon window will pop up.



Enter Operator Id then the password and select “Ok”
Note: *The user can change their password at anytime*
The user will have access according to the rights in their assigned group.

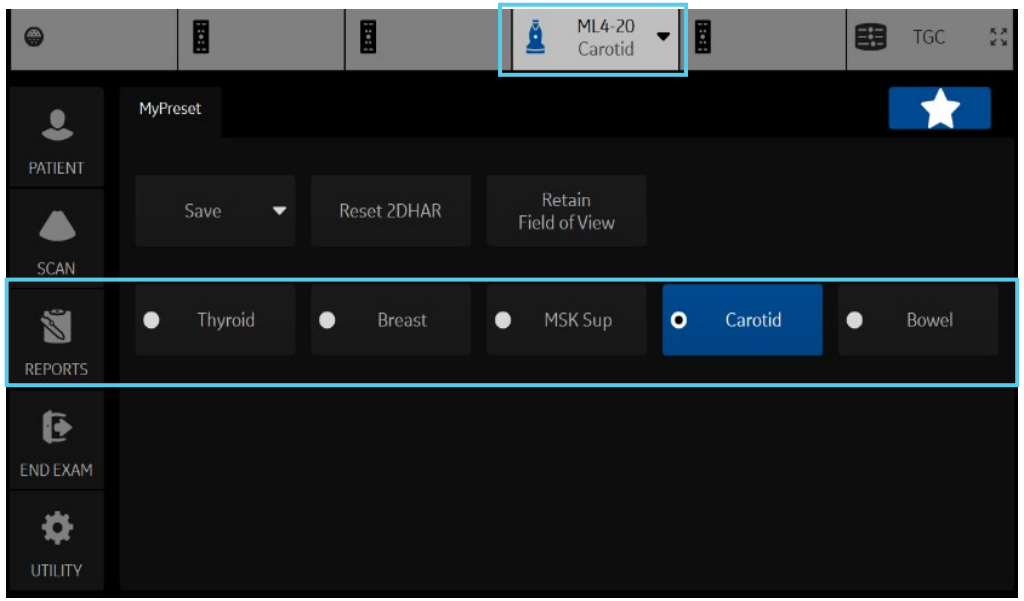


EZ Imaging

This feature includes ***MyPreset***, ***EZ Touch Panel*** and ***Quick Patient Change***.

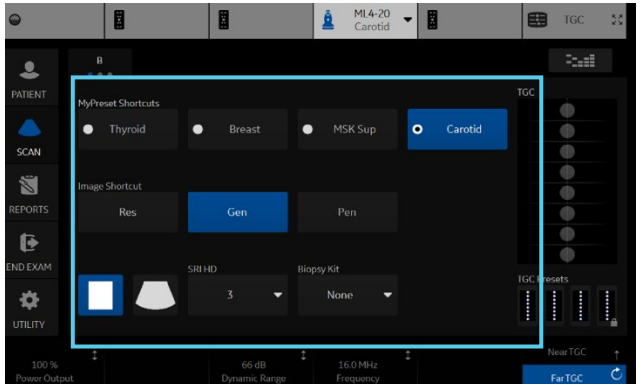
MyPreset:

MyPreset allows you to configure the models available on the touch panel according to the Probe or Category.



EZ Touch Panel:

EZ Touch Panel allows the operator quick access to change model, flow modes and Doppler modes without searching through multiple pages or many different parameters



Quick Patient Change:

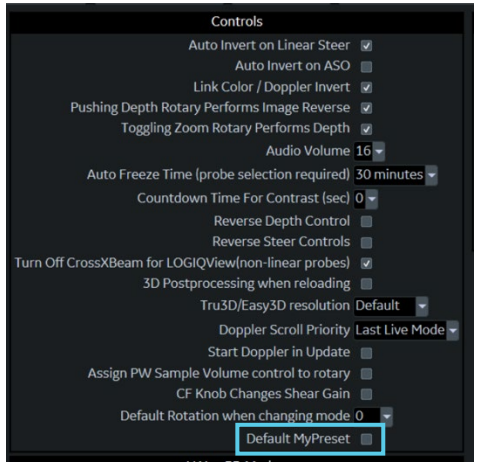
This workflow is for operators who need a quick way to start a new patient, save data and reset the system for next patient without returning to the patient demographic page.

1

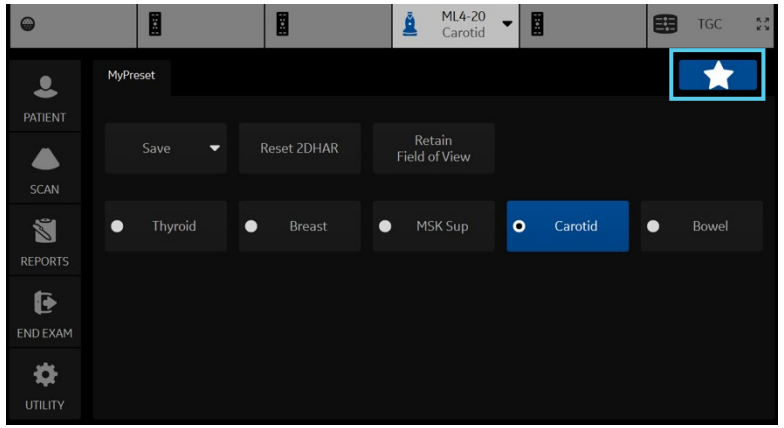
EZ Imaging – MyPreset

To activate MyPreset:

Go to Utility > System > System Imaging
Under controls, check the Default MyPreset

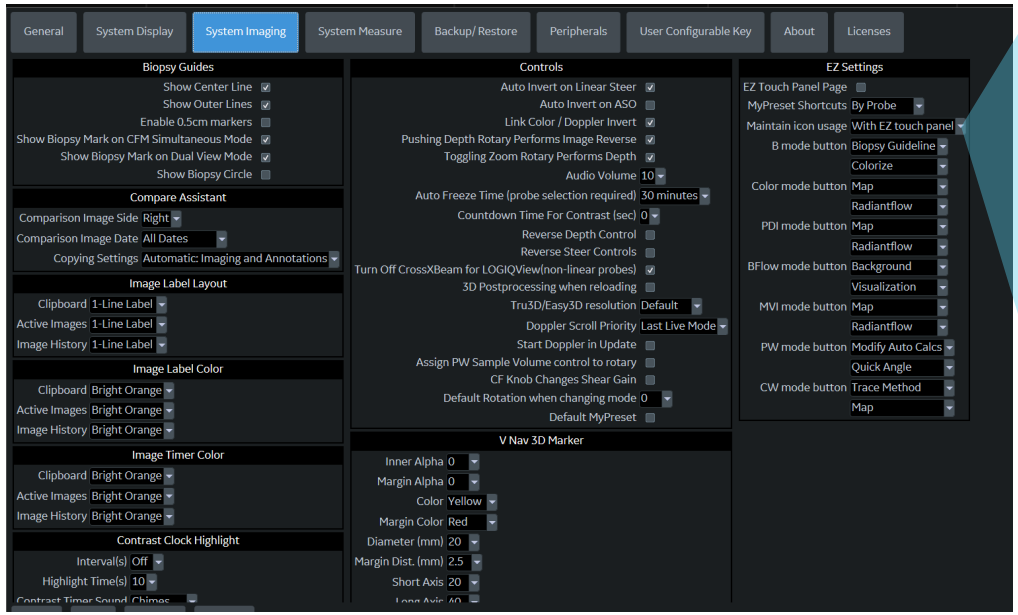


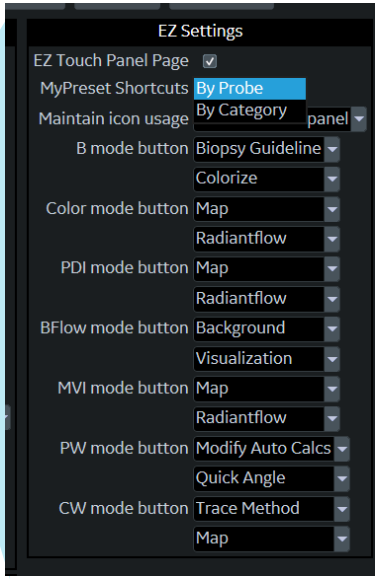
Select star on touch panel to switch between MyPreset and conventional tab



Activate EZ Touch Panel:

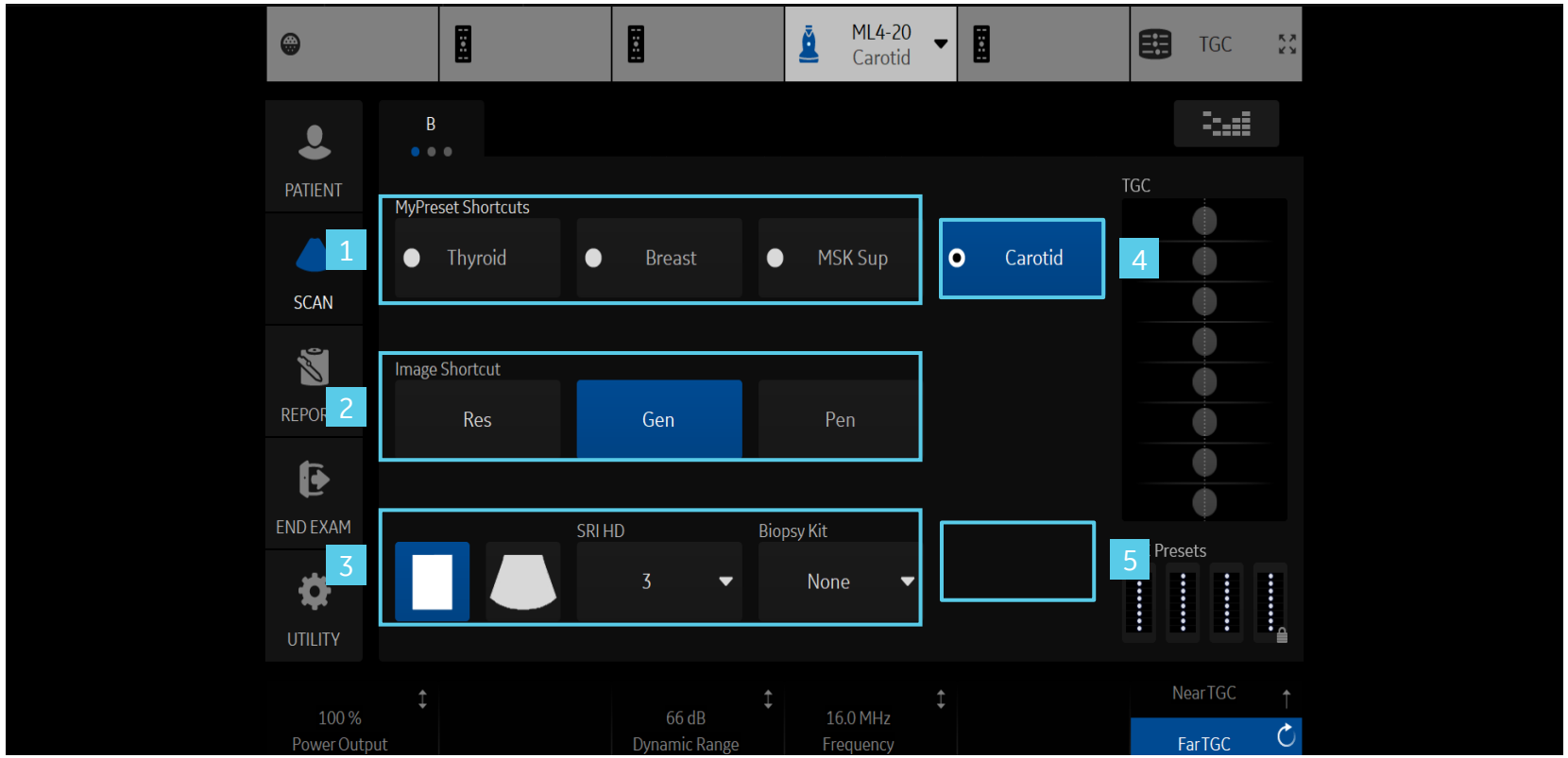
1. Check “Easy Touch Panel Page” – Utility > System > System Imaging > EZ settings
2. Select “By Probe” or “By Category” in MyPreset shortcuts





EZ Imaging – EZ Touch Panel

EZ Touch Panel in B-Mode



1. Models can be quickly changed on the touch panel.
2. Shortcuts available to quickly change the frequency using Gen, Pen. and Res
3. Essential presets (Non-configurable)
4. The last used or current model is displayed in the 4th position
5. A desired additional preset can be assigned to the 5th position

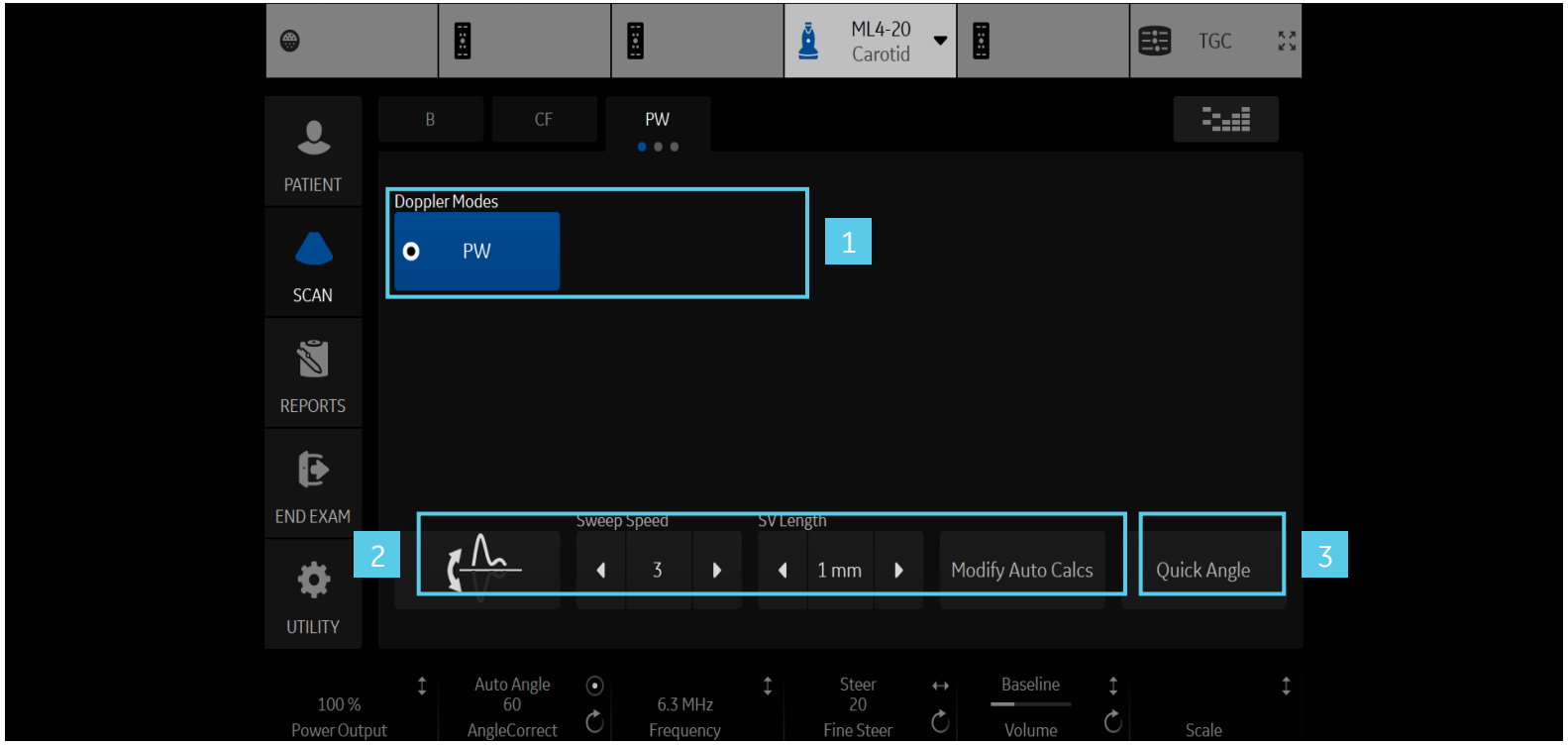
EZ Imaging – EZ Touch Panel *(continued)*

EZ Imaging with Flow Modes

1. Change flow models quickly
2. Color and Power Doppler Flow shortcuts
3. Essential controls available on the touch panel
4. A desired additional essential control can be assigned to the 4th position

EZ Imaging – EZ Touch Panel *(continued)*

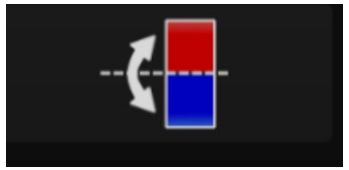
EZ Imaging with Pulsed Wave or Continuous Wave activated



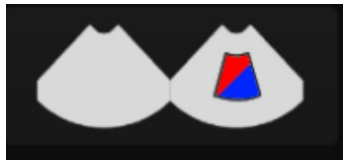
1. Change Doppler technologies quickly on the touch panel (if CW and PW are both supported)
2. Essential controls (Non-configurable)
3. A desired additional essential control can be assigned to the 3rd position

EZ Touch Panel imaging icons

PW/CW invert: Select to invert PW or CW Waveform



Color Invert: Select to Invert the Color Doppler



Simultaneous display: Select to show a live image in both color and B-Mode

Virtual Convex: Select for an extended field of view with linear probes

Reverse: Select to reverse the image orientation

EZ Touch Panel icons are only available when EZ Touch Panel is checked in the utility pages

Cleanability

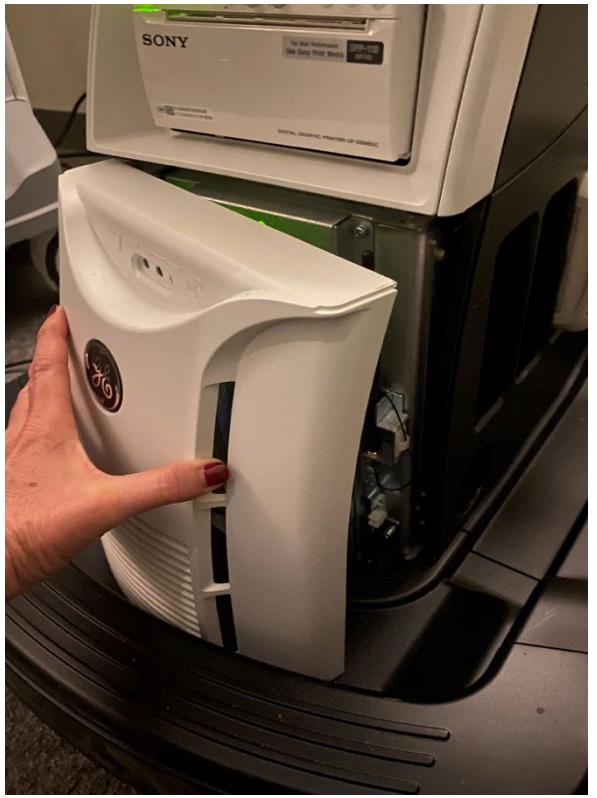
Cleaning the trackball

1. Twist and remove the trackball prior to cleaning the trackball and the trackball housing (1-3)
2. Clean the trackball and the trackball housing with a dry soft cloth (4-6)
3. After cleaning the trackball, replace and twist the trackball into the trackball housing (7-8)

Cleaning filters

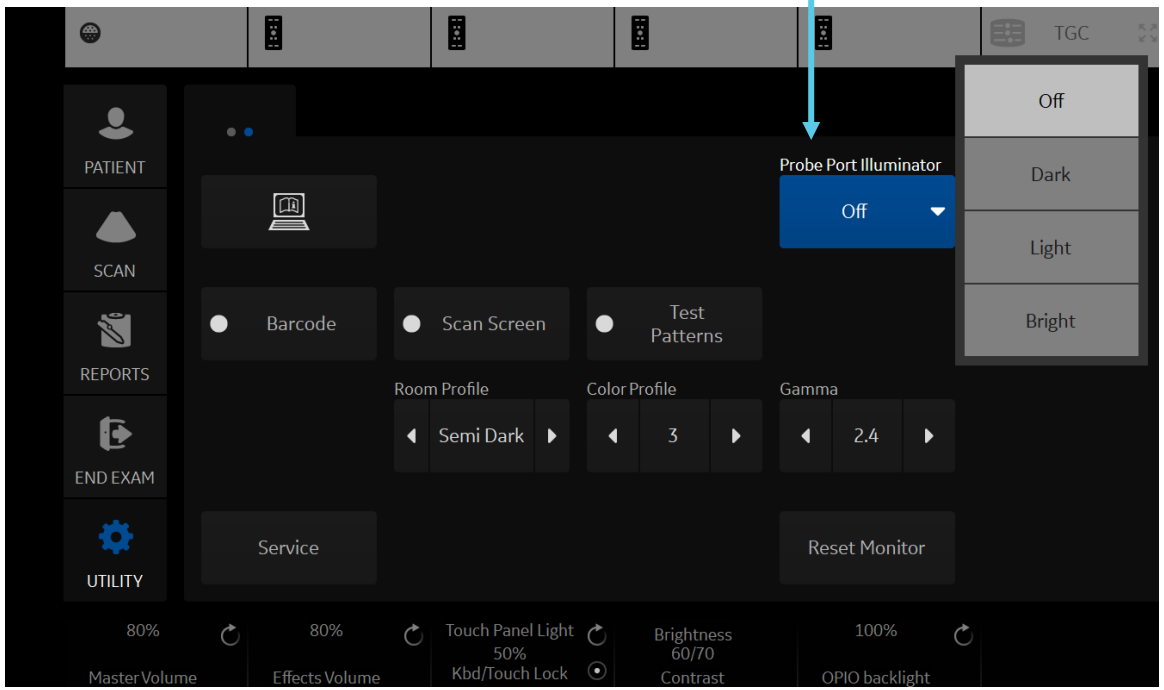
Clean the system's air filters to ensure a clogged filter does not cause the system to overheat and reduce system performance and reliability. It is recommended the filters be cleaned every two weeks, but the requirements will vary due to your system use.

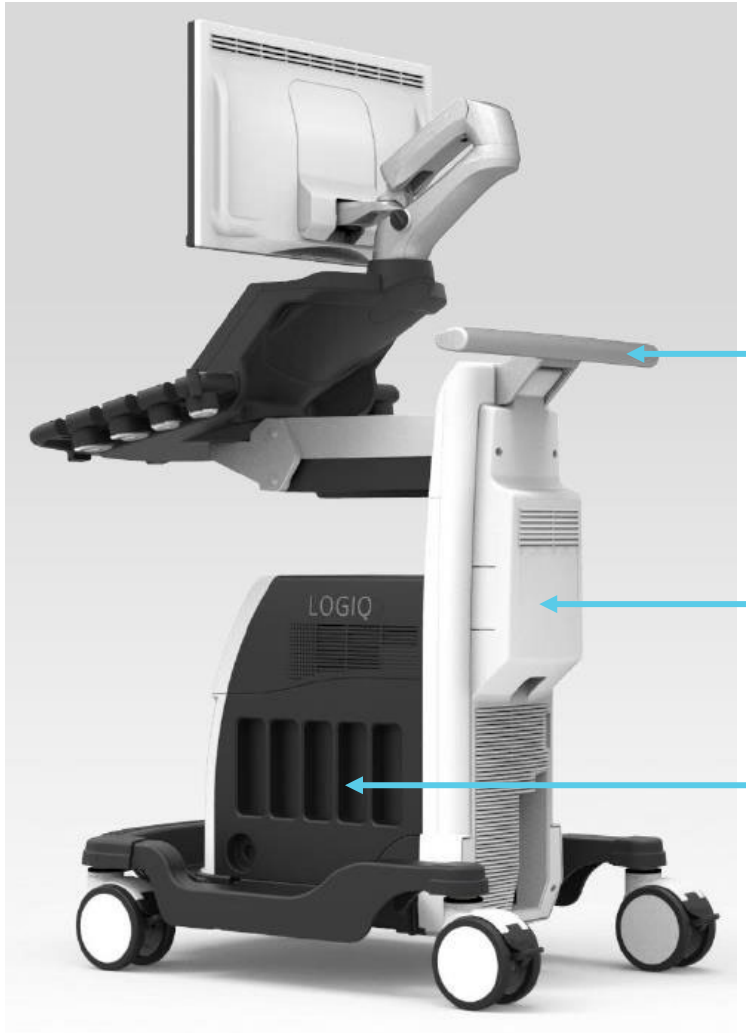
Remove the front cover of the cabinet to access the filter.



Portability

Touch panel page 2 illuminator settings
- Off
- Dark
- Light
- Bright



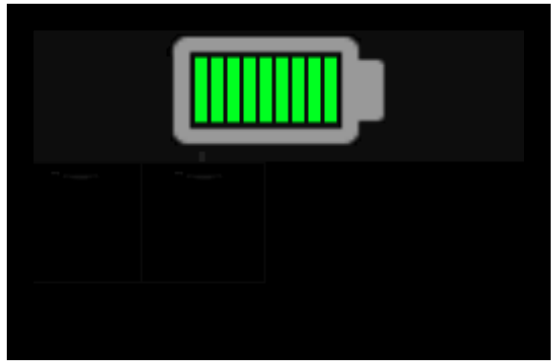


Handle

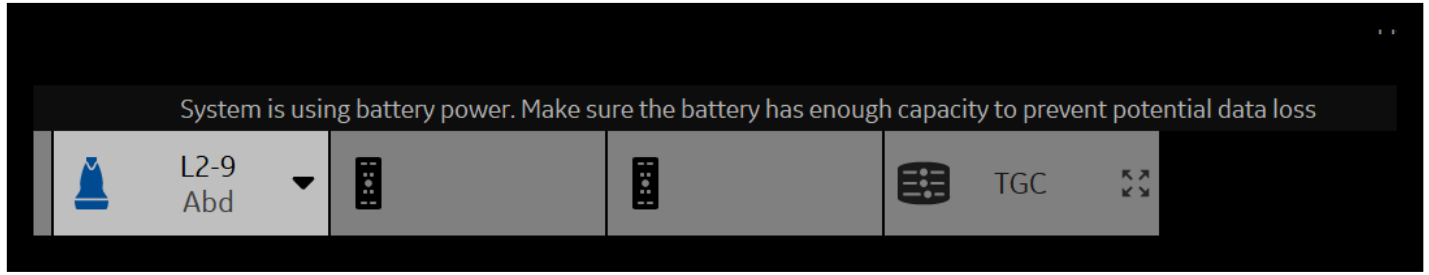
Integrated battery backpack

Illuminator 4 active probe ports and one park port

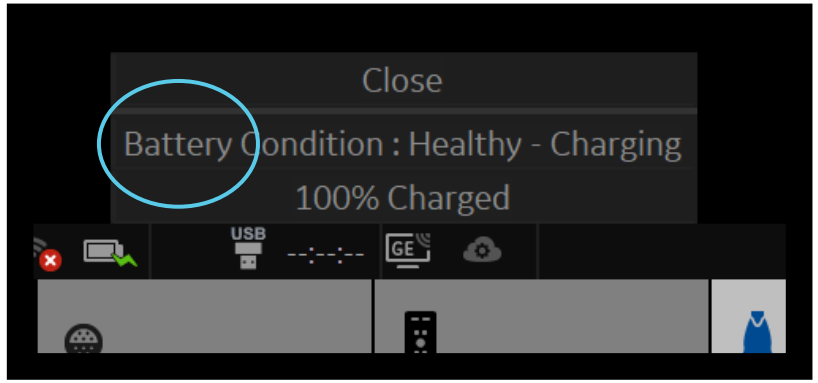
Portability



The Battery Indicator icon at the top left of the monitor indicates the status of the battery.



A message will pop up when-scanning on battery to remind you to check your battery capacity.



To check the percentage of battery life before disconnecting from AC power, click on the battery icon on the bottom left of the monitor.

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