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.

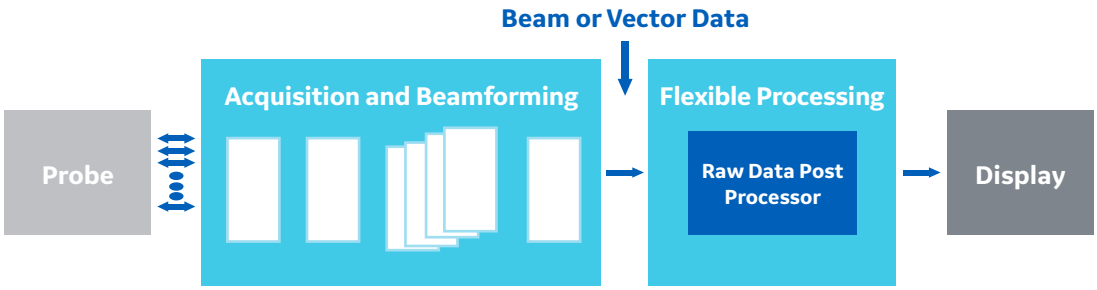


Figure 1. A traditional beamforming architecture.

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

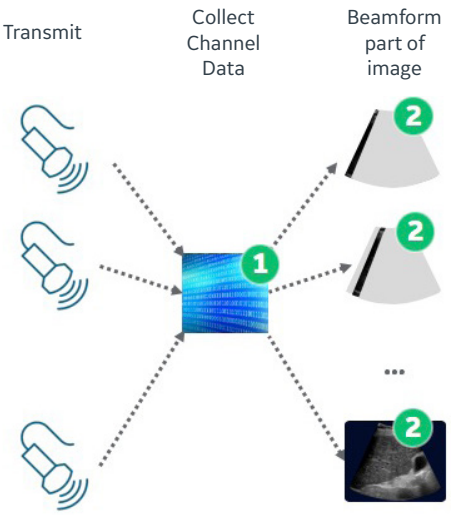


Image created one line (beam) at a time using limited information.

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.

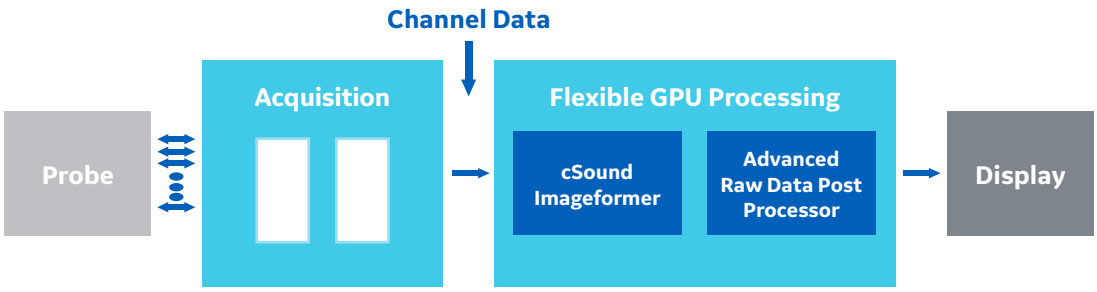
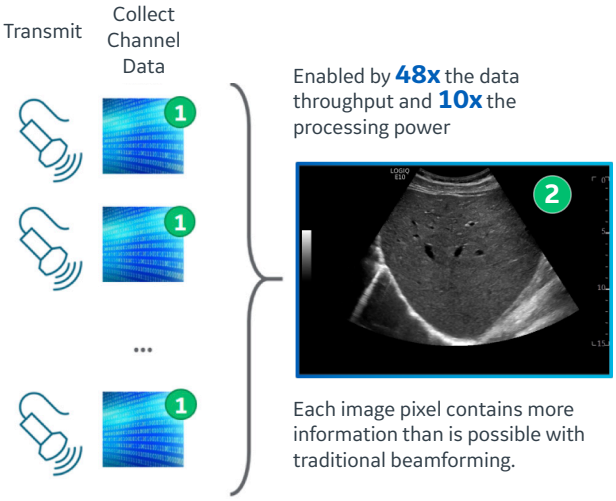


Figure 2. cSound Architecture.

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.

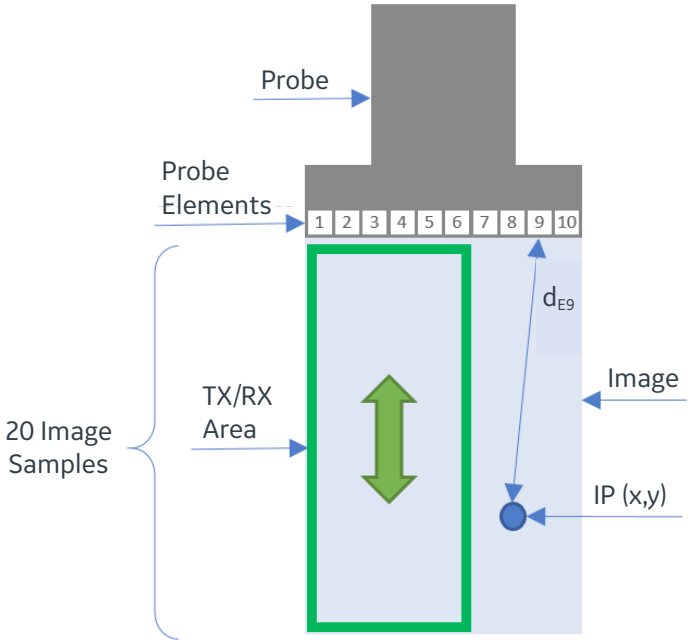


Figure 3. A simplified imaging scenario for illustrating retrospective transmit focus.

- 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

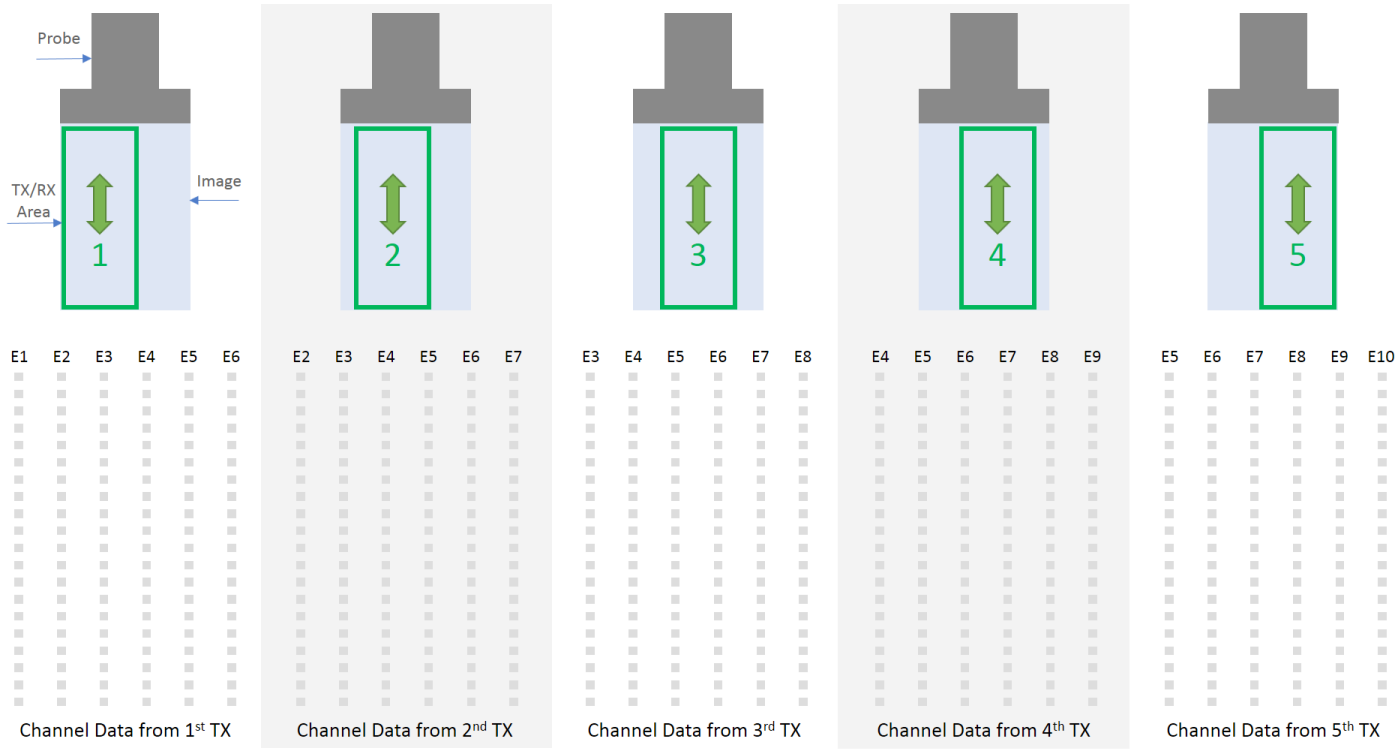


Figure 4. The first transmit (1) occurs and channel data is collected and stored. This is repeated for subsequent transmits (2 through 5) which are each offset from the previous.

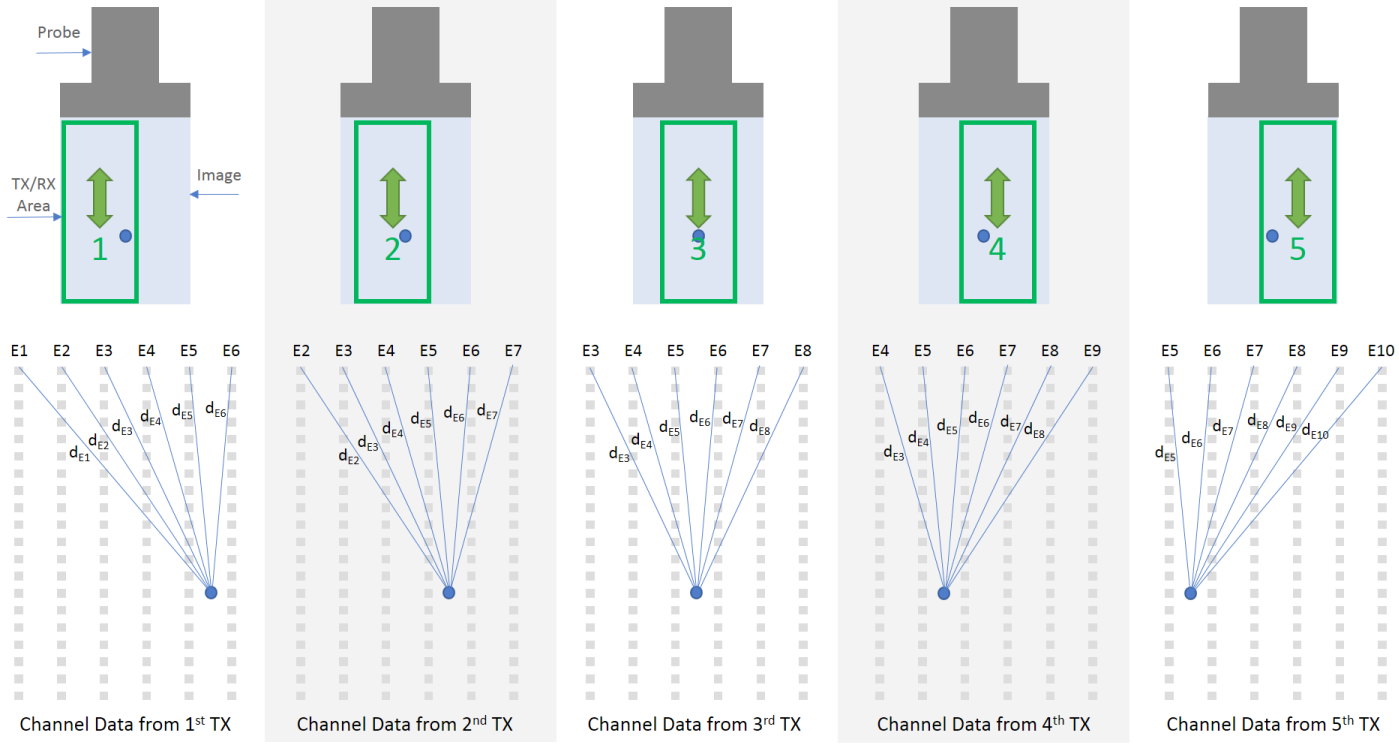


Figure 5. For each set of relevant channel data, the distance between the deep image point (represented by the circle) and each probe element is computed.

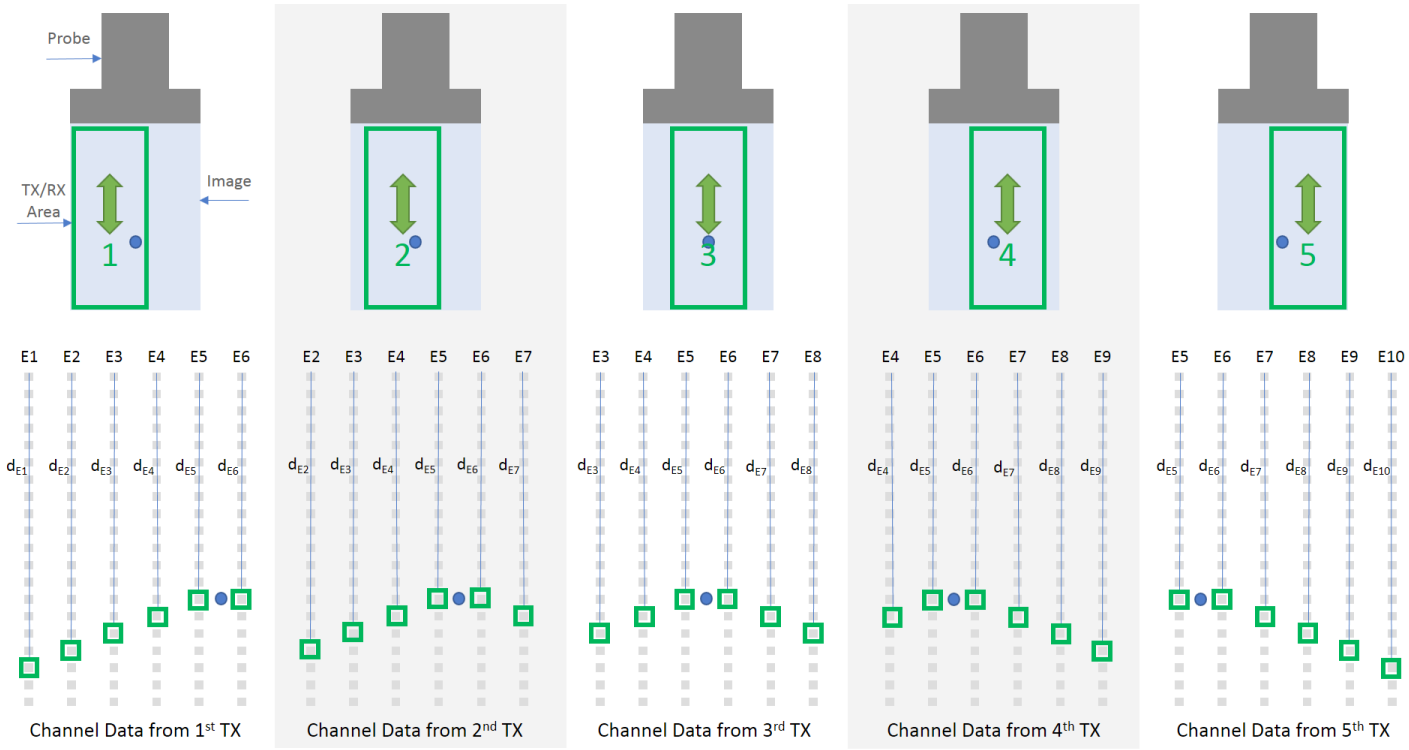


Figure 6. The computed distances between the image point and each element are used to access the channel data that focuses on the image point. The selected channel data from each transmit is coherently summed to determine the signal associated with the image point.

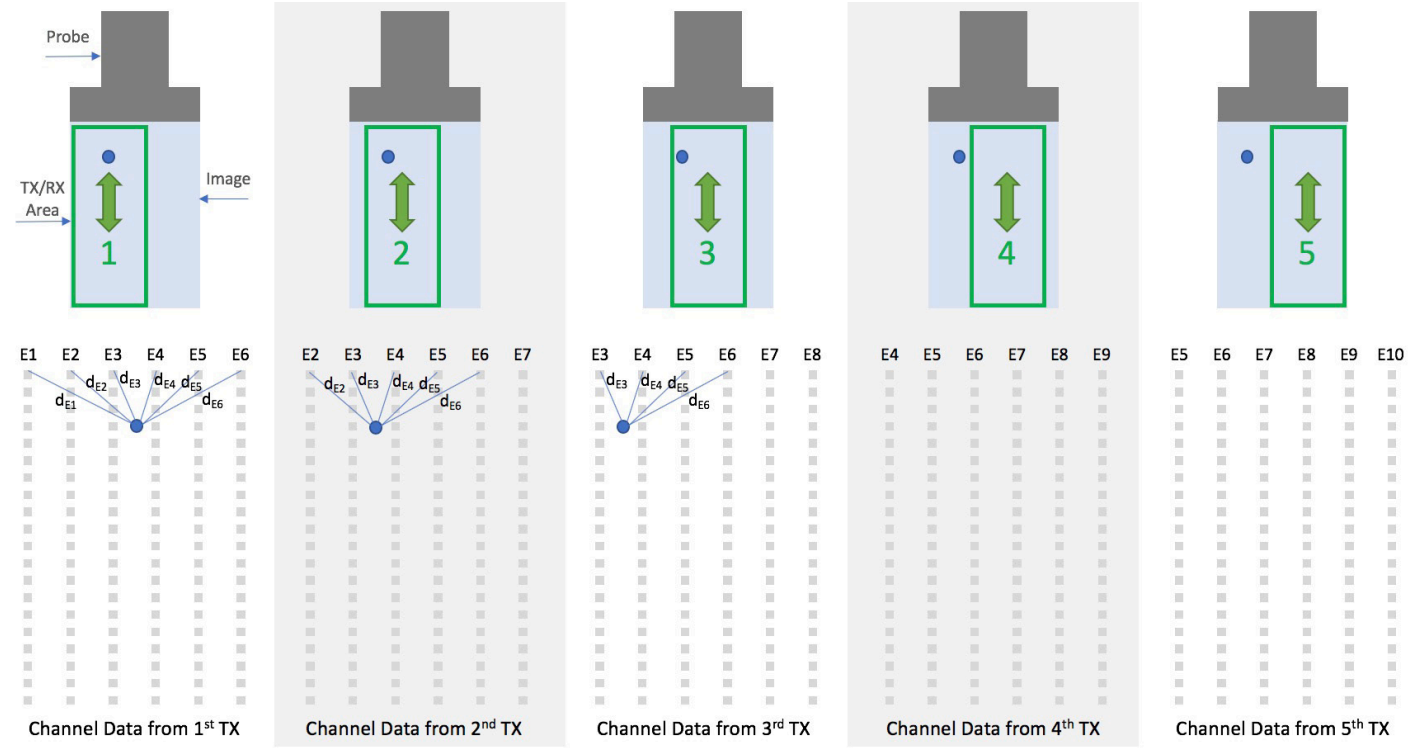


Figure 7. For each set of relevant channel data, the distance between the shallow image point (represented by the circle) and each probe element is computed. Note that transmits 4 and 5 do not overlap with the image point. Further note that some elements, such as E7 and E8 on transmit 3, are not included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

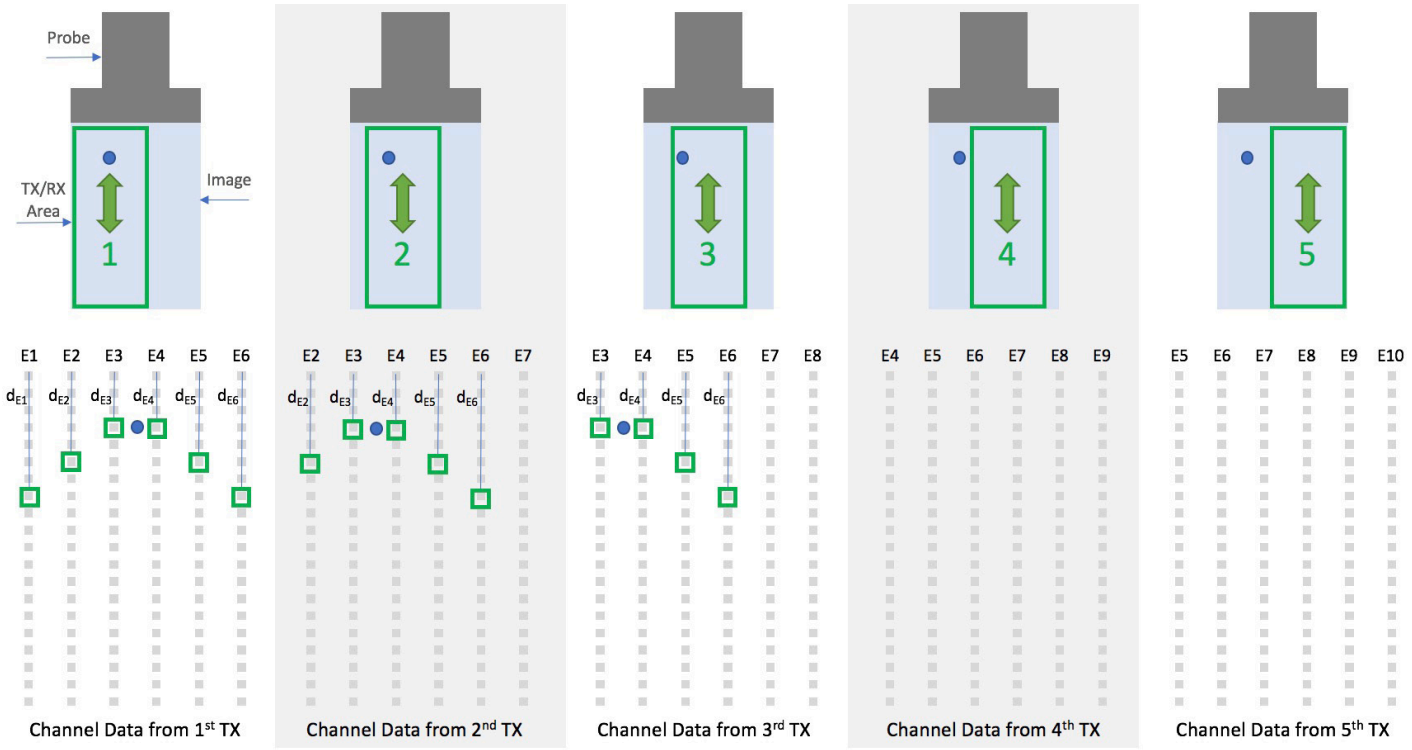


Figure 8. The computed distances between the image point and each element are used to access the channel data that focuses on the image point. The selected channel data from each transmit is coherently summed to determine the signal associated with the image point.

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.

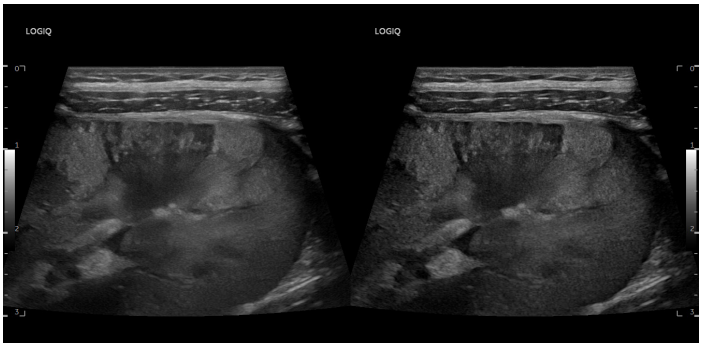
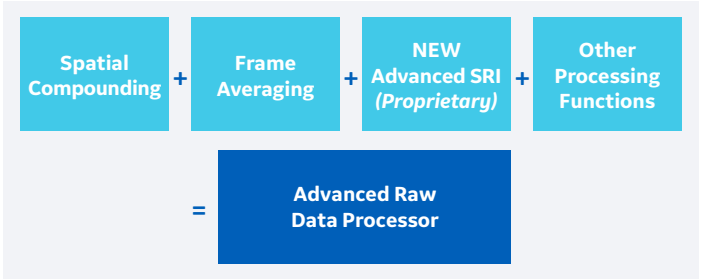


Figure 9. Advanced SRI (right) takes advantage of the increased computational power of the cSound Architecture to identify and enhance structures of all sizes while reducing speckle-based artifacts.



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.

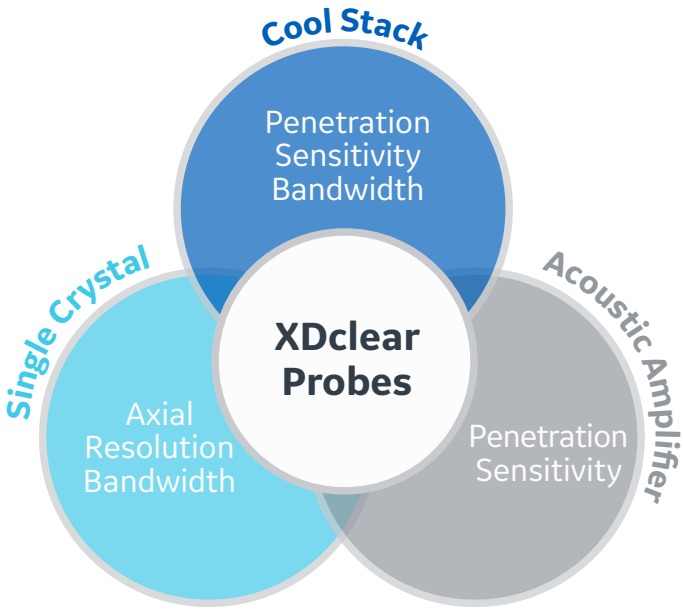


Figure 10. XDclear probes: Derive their superior performance from three key technologies: Single Crystal, Cool Stack, and Acoustic Amplifier.

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.

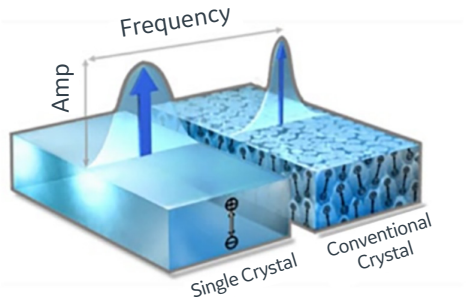


Figure 11. *Single Crystal:* Advanced piezoelectric material that delivers high quality acoustic signal with a wider bandwidth than conventional piezoelectric material.

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.

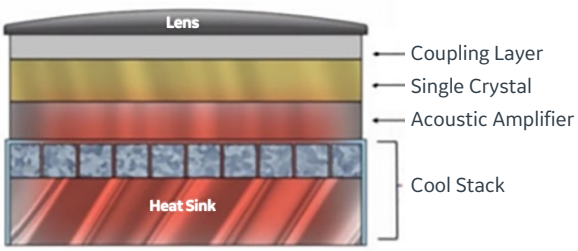


Figure 13. *Cool Stack:* Optimizes energy usage via patented technology integrated into the transducer's internal architecture; it relieves inherent heat generation that can otherwise reduce sensitivity and penetration.

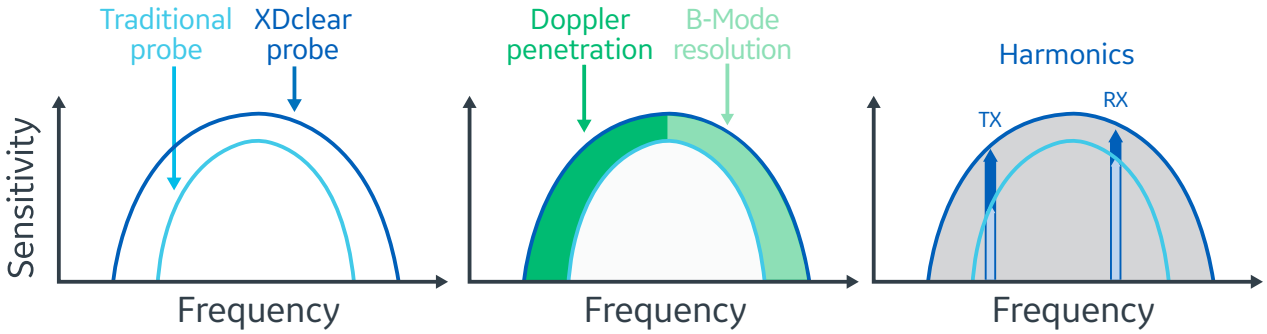


Figure 14. XDclear probe performance benefits are derived from improved sensitivity and wider bandwidth.

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

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

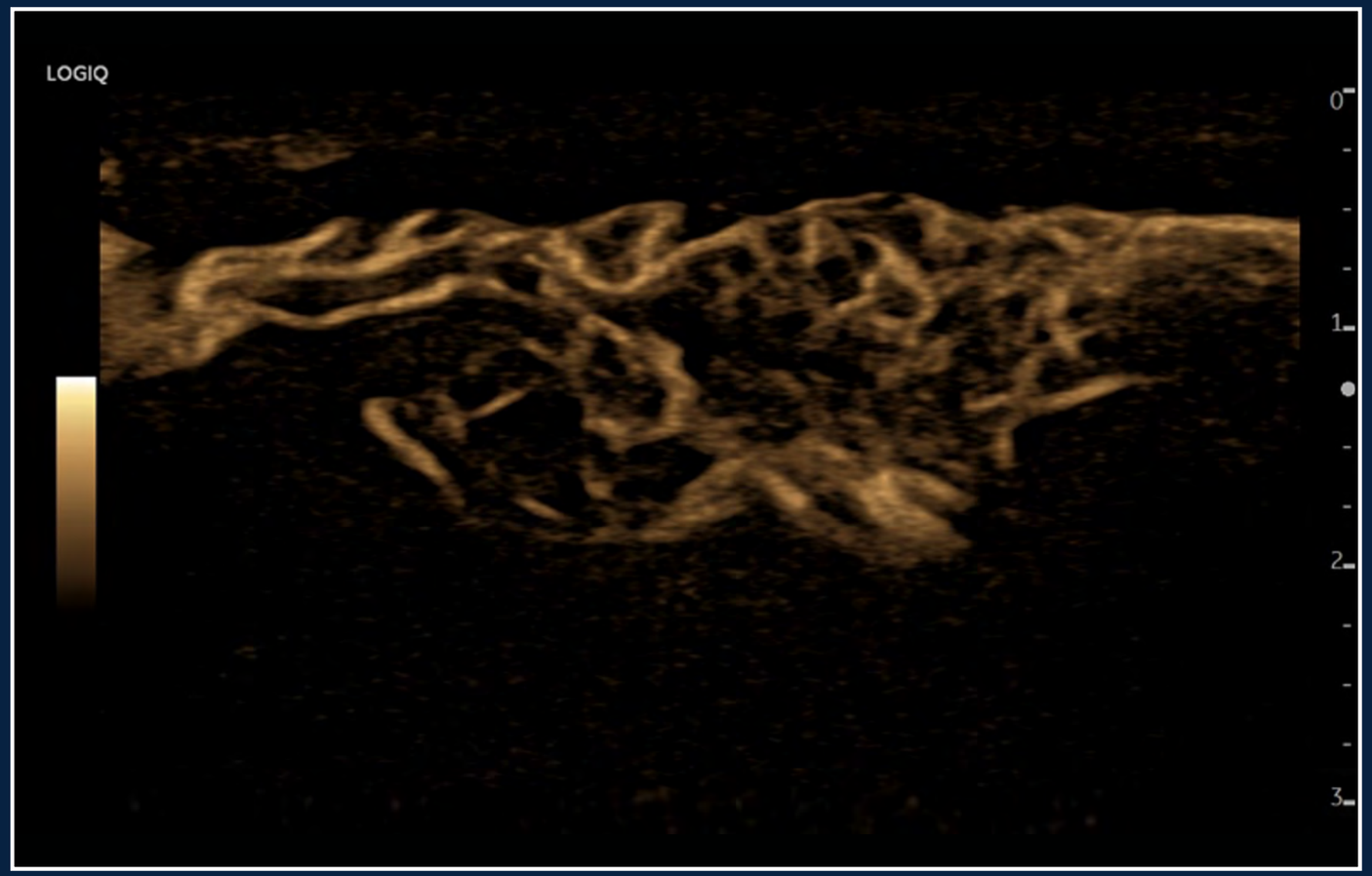

MUSCULOSKELETAL


OB/GYN


VASCULAR

CLINICAL IMAGES | Head & Neck

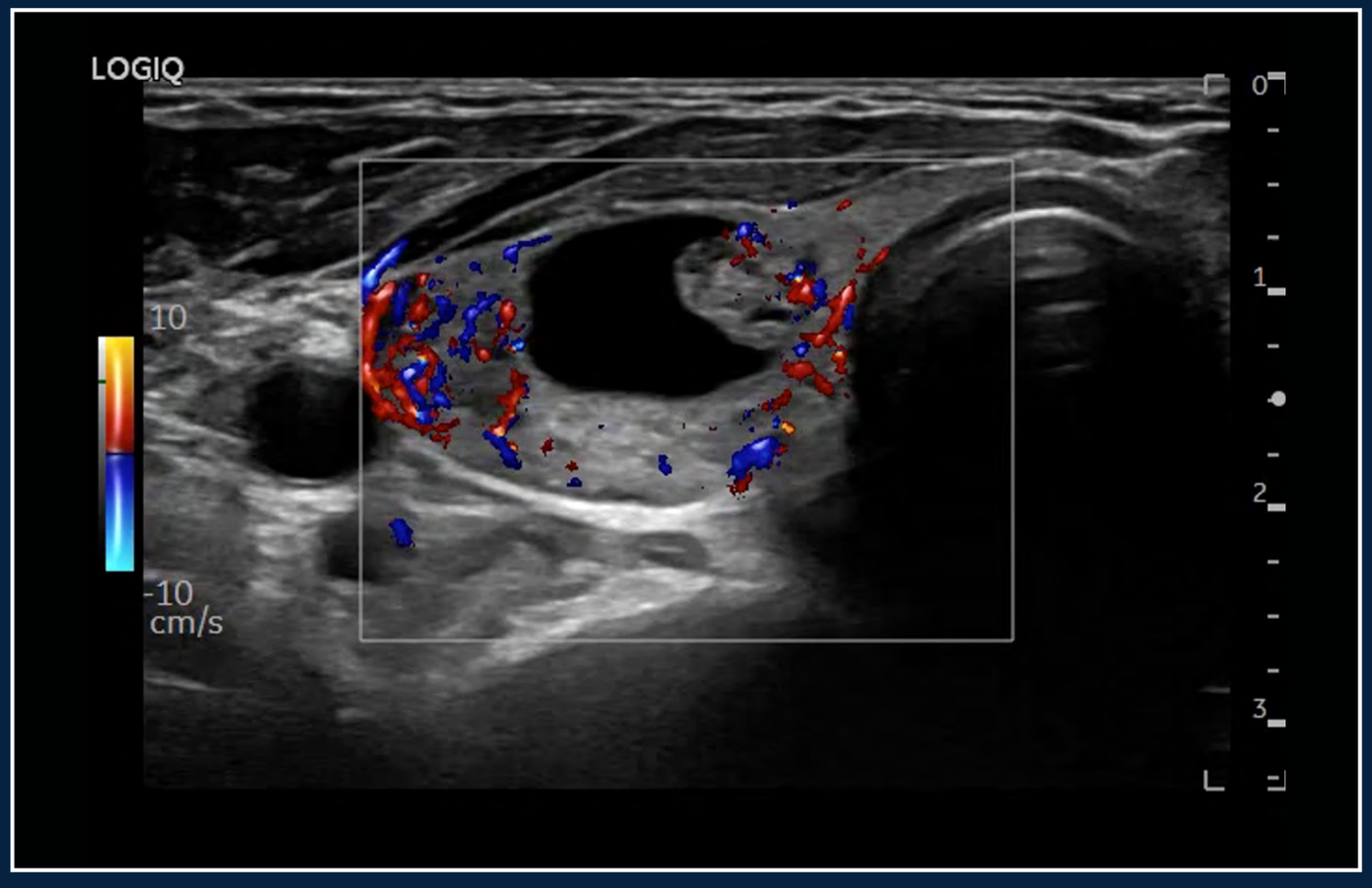
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Head & Neck

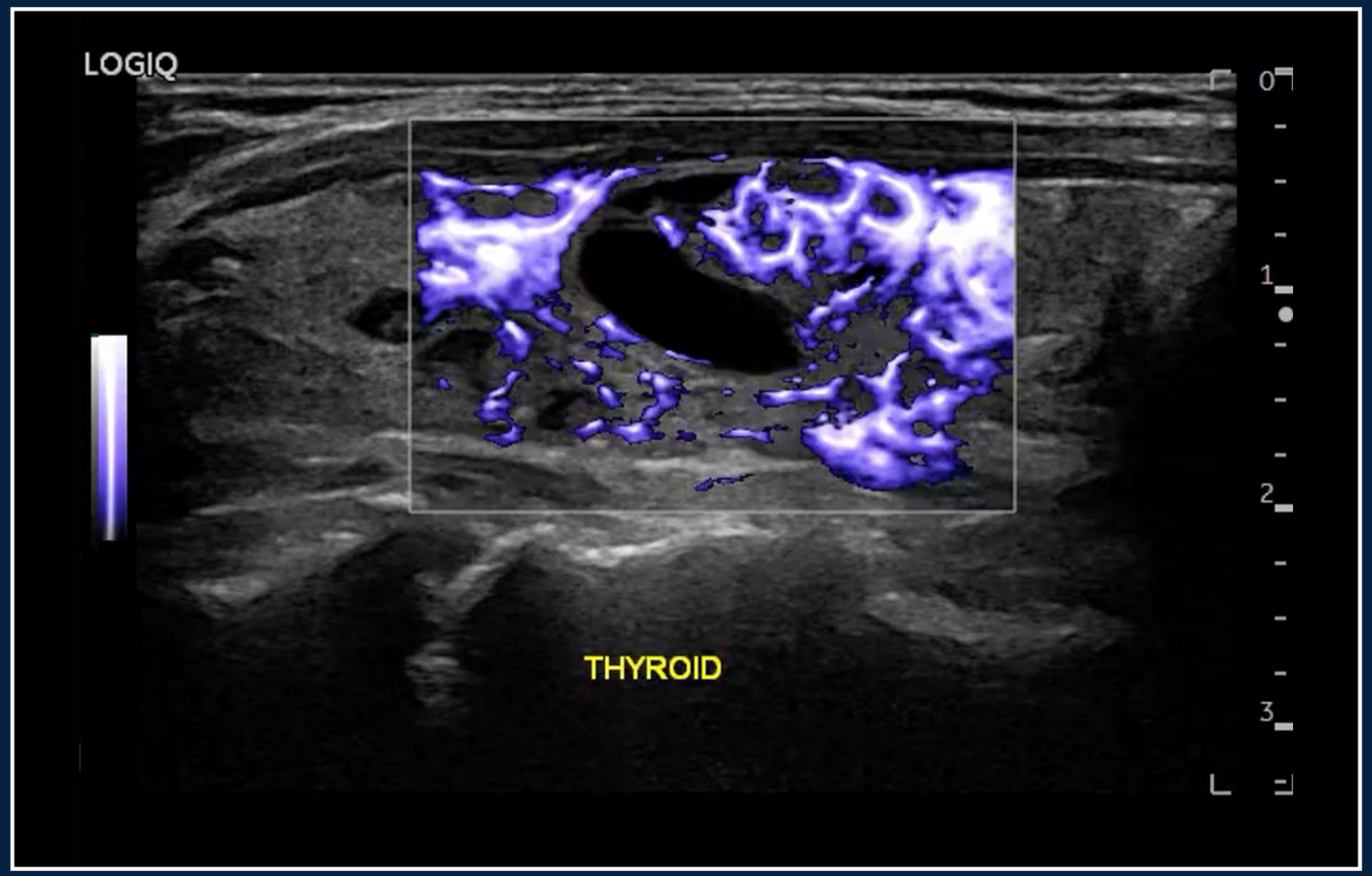
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Head & Neck

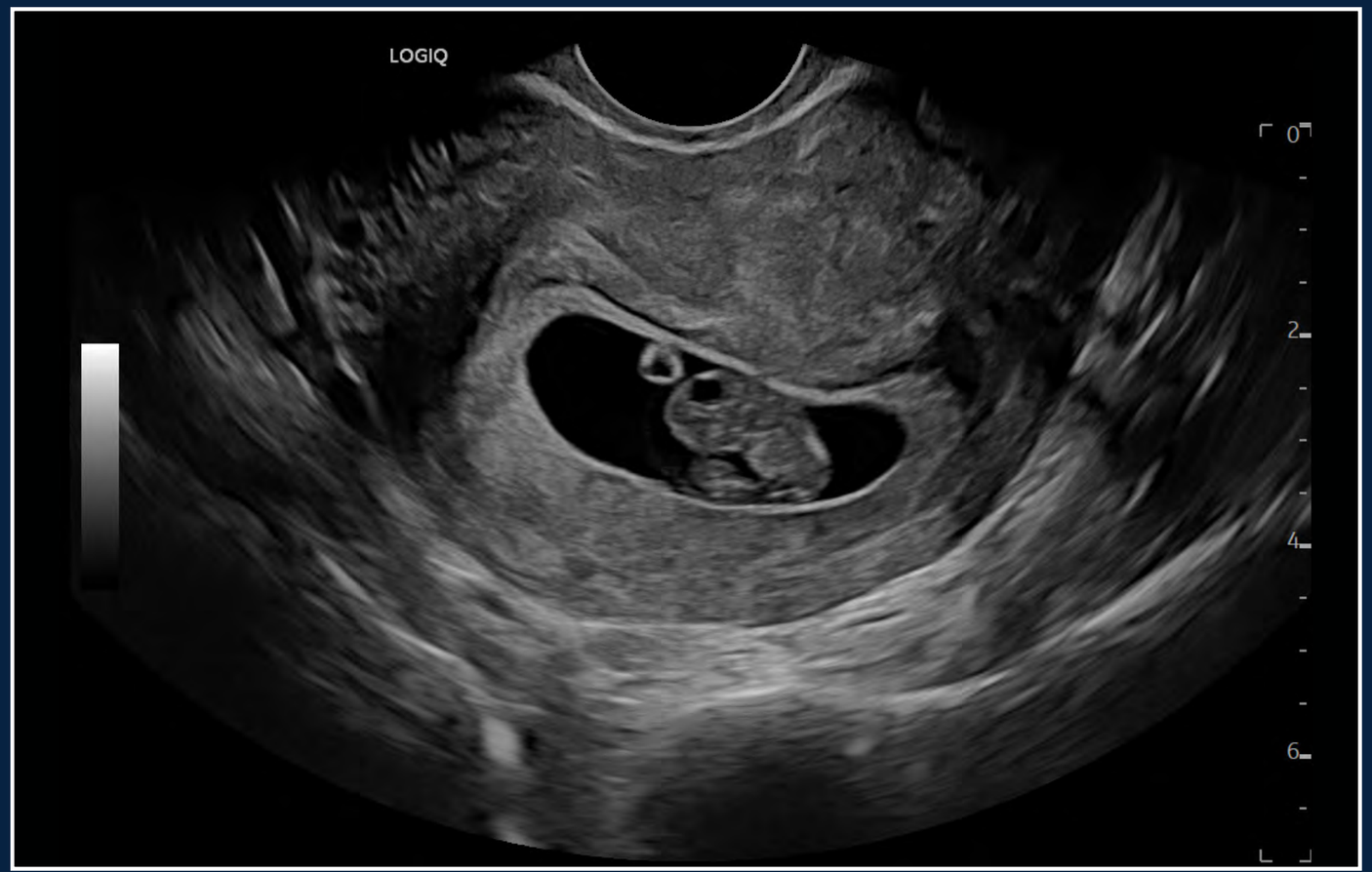
Exceeding your expectations: whole body imaging



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

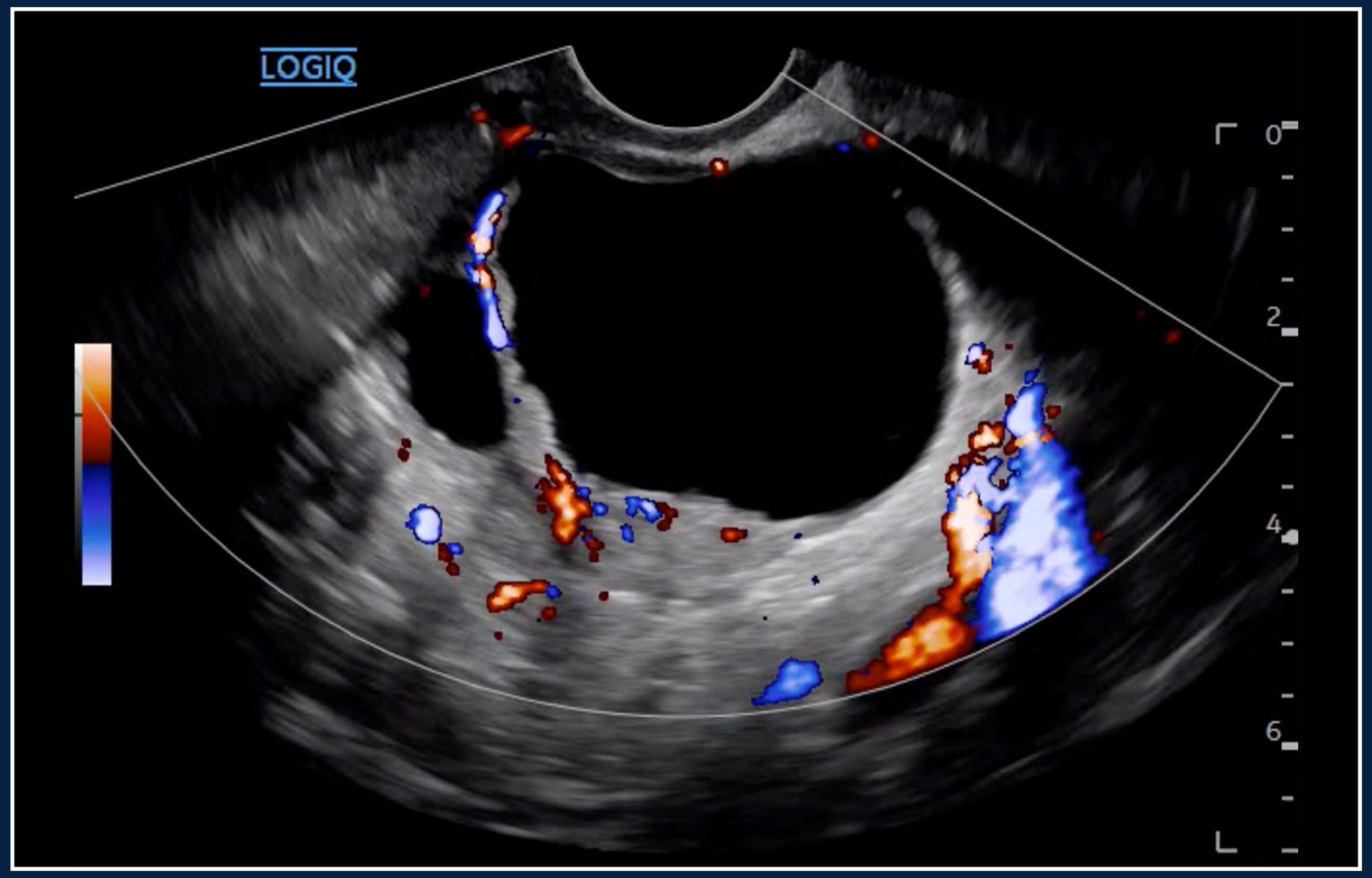
CLINICAL IMAGES | OB/GYN

Exceeding your expectations: whole body imaging

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

CLINICAL IMAGES | OB/GYN

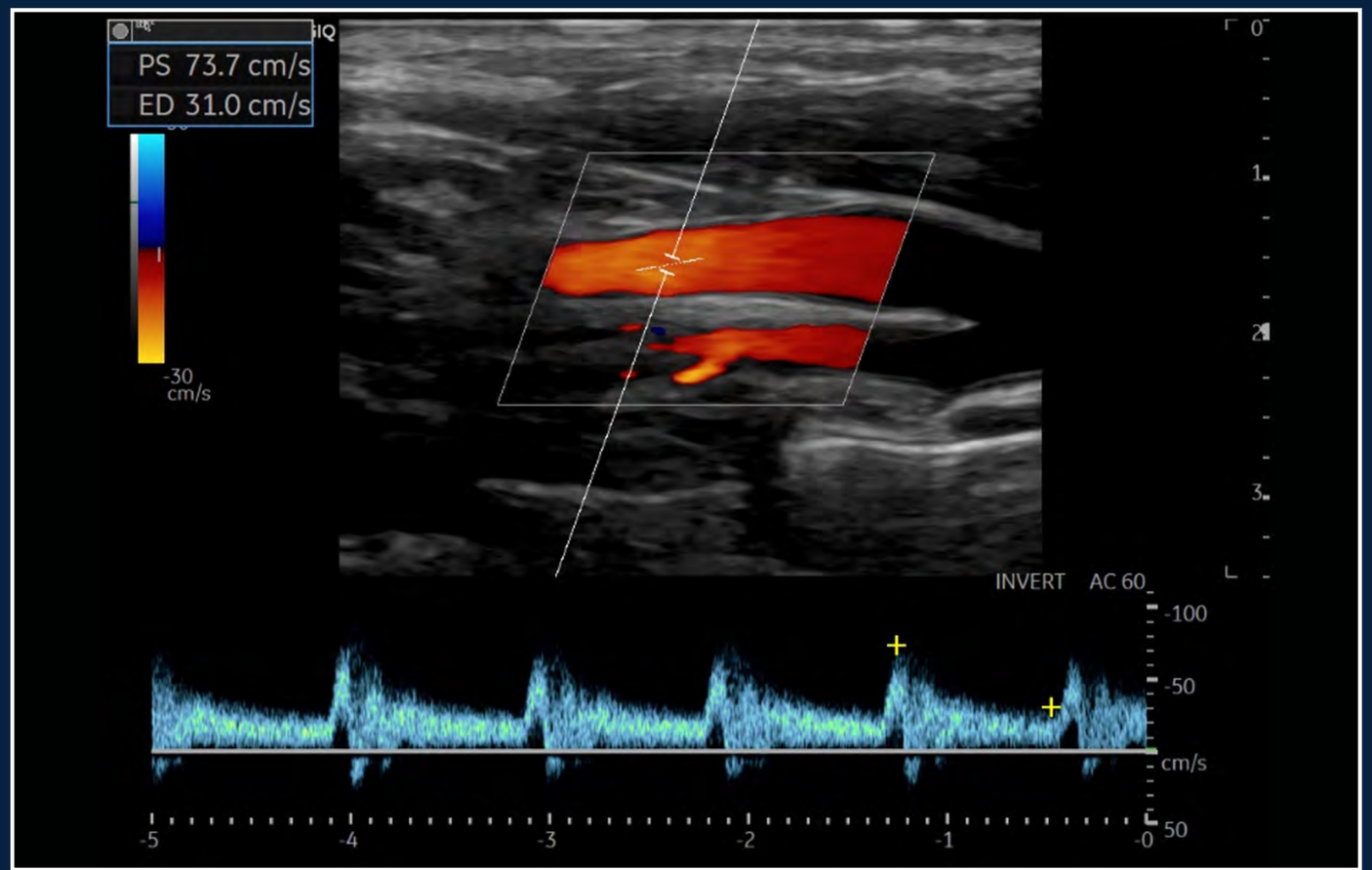
Exceeding your expectations: whole body imaging



PDI of Ovary, IC5-9-D

CLINICAL IMAGES | Vascular

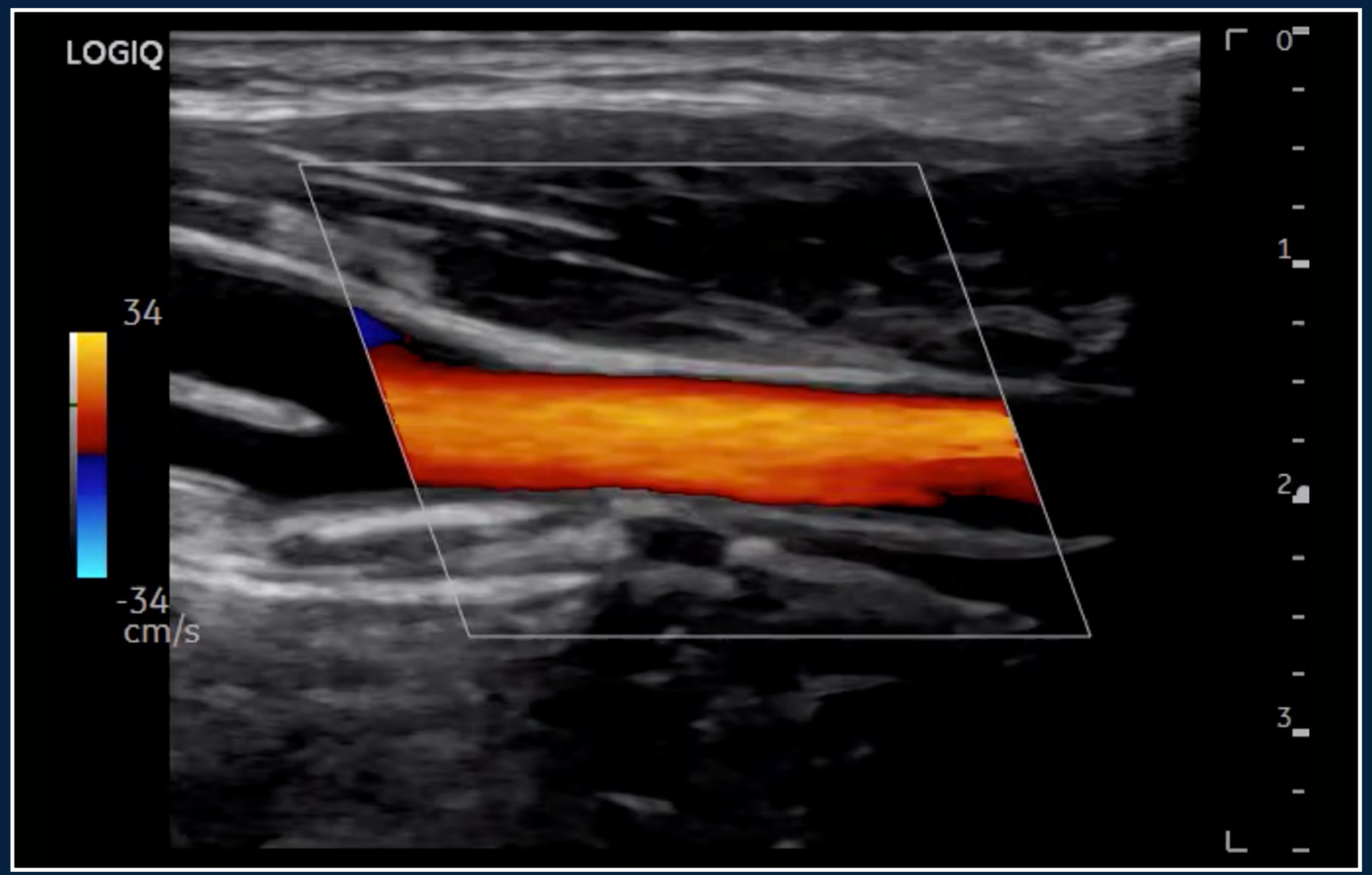
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Vascular

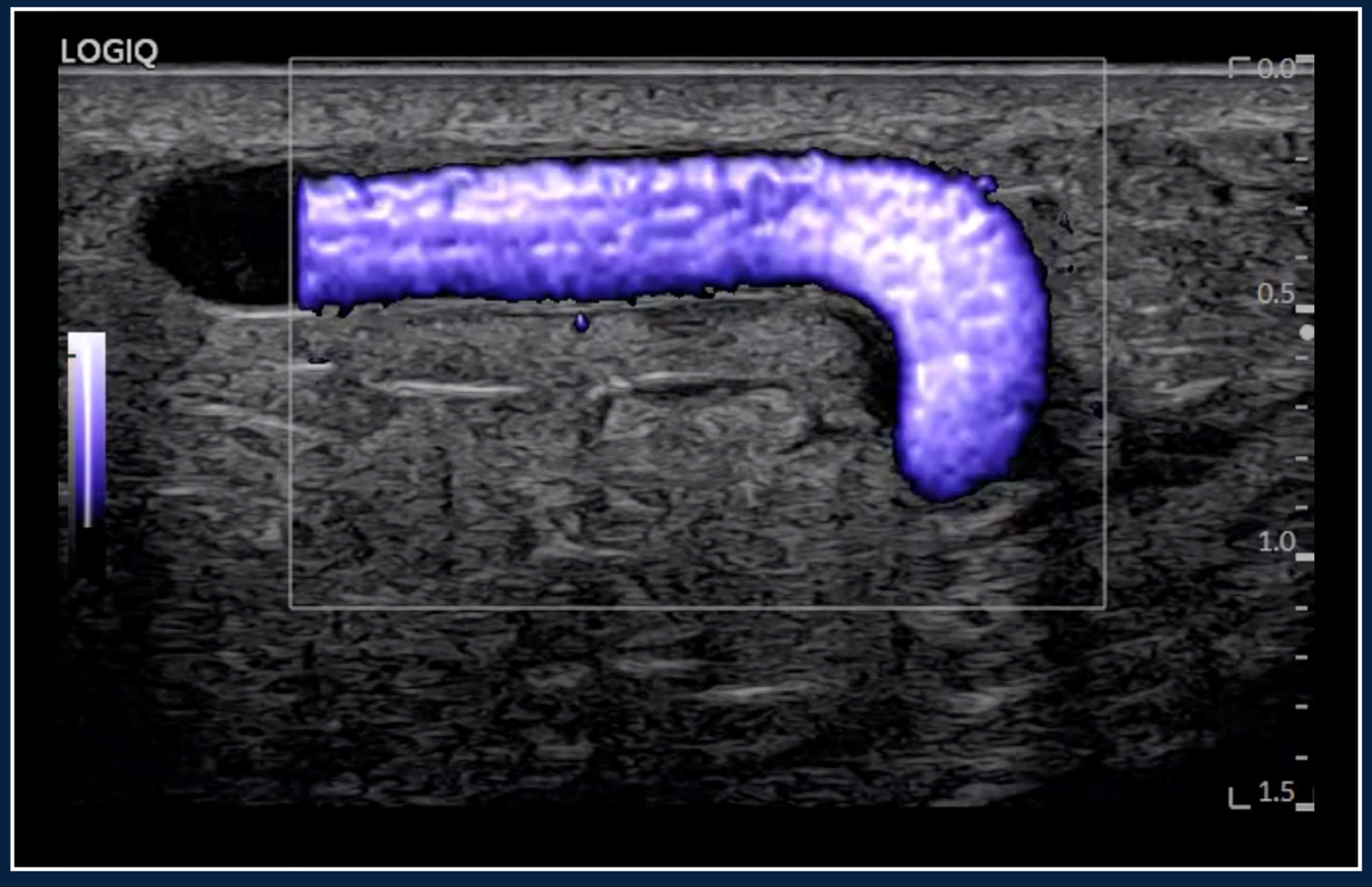
Exceeding your expectations: whole body imaging



Color Flow Carotid, L2-9-D

CLINICAL IMAGES | Vascular

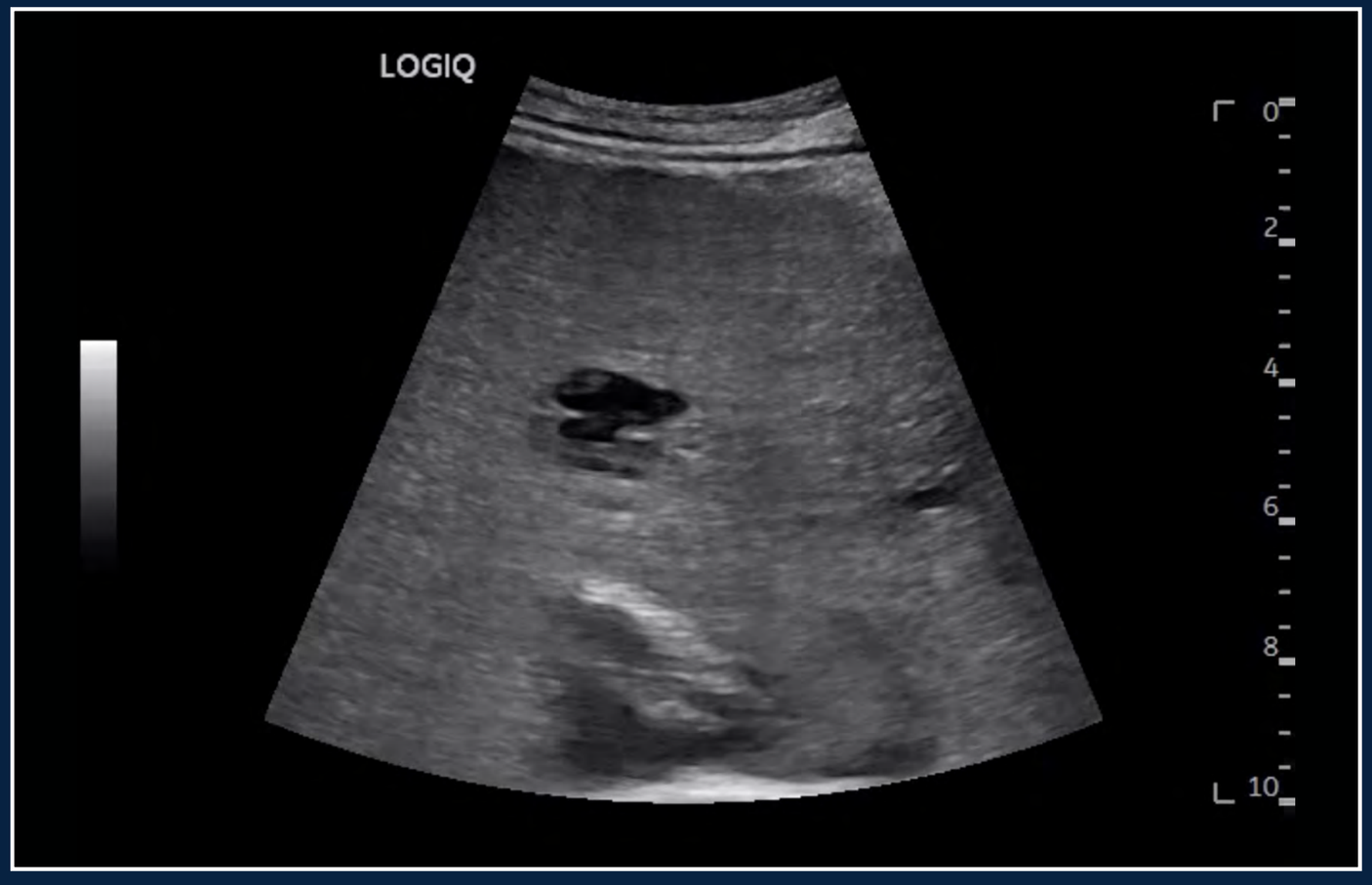
Exceeding your expectations: whole body imaging



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

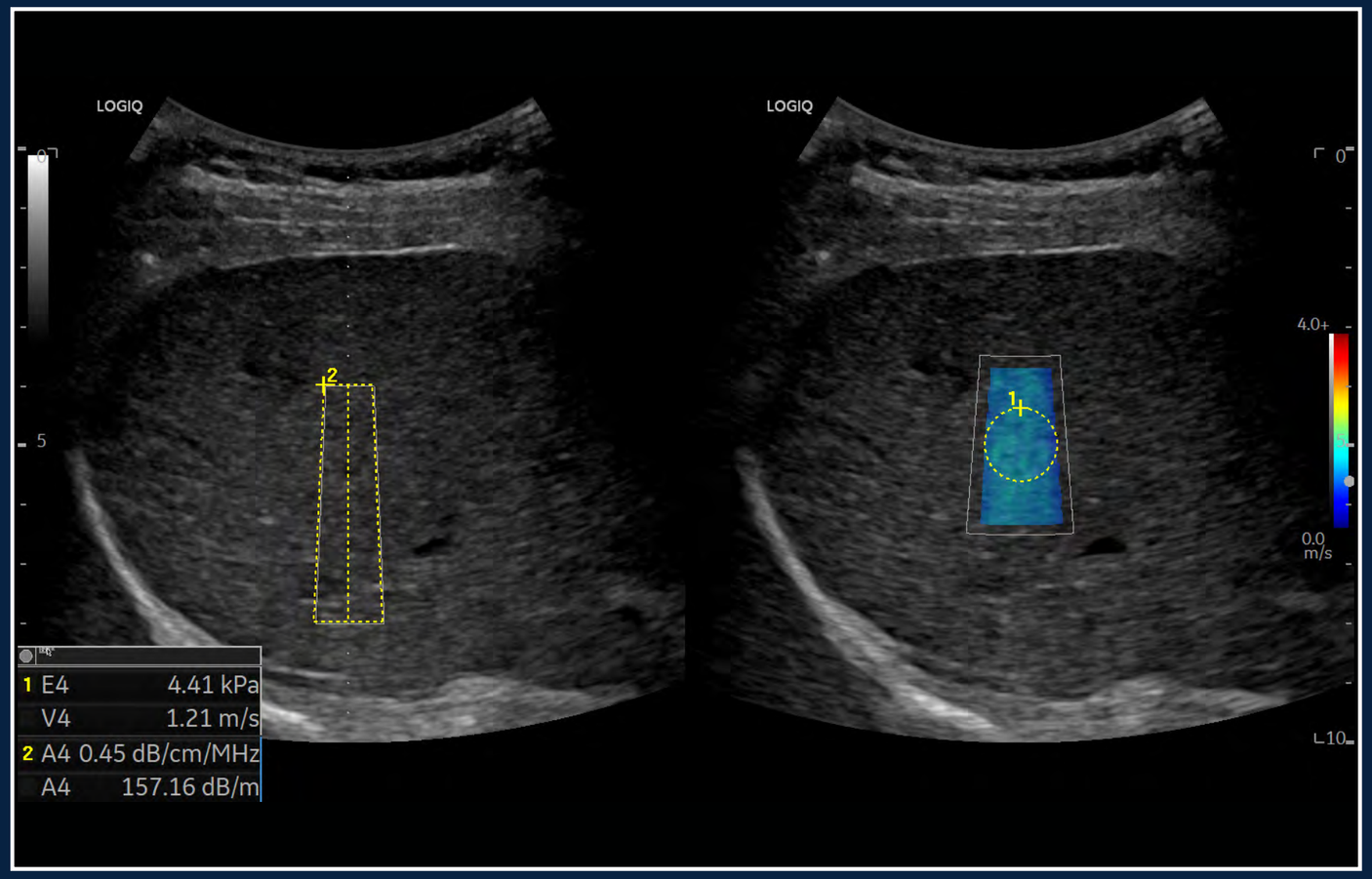
CLINICAL IMAGES | Liver

Exceeding your expectations: whole body imaging

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

CLINICAL IMAGES | Liver

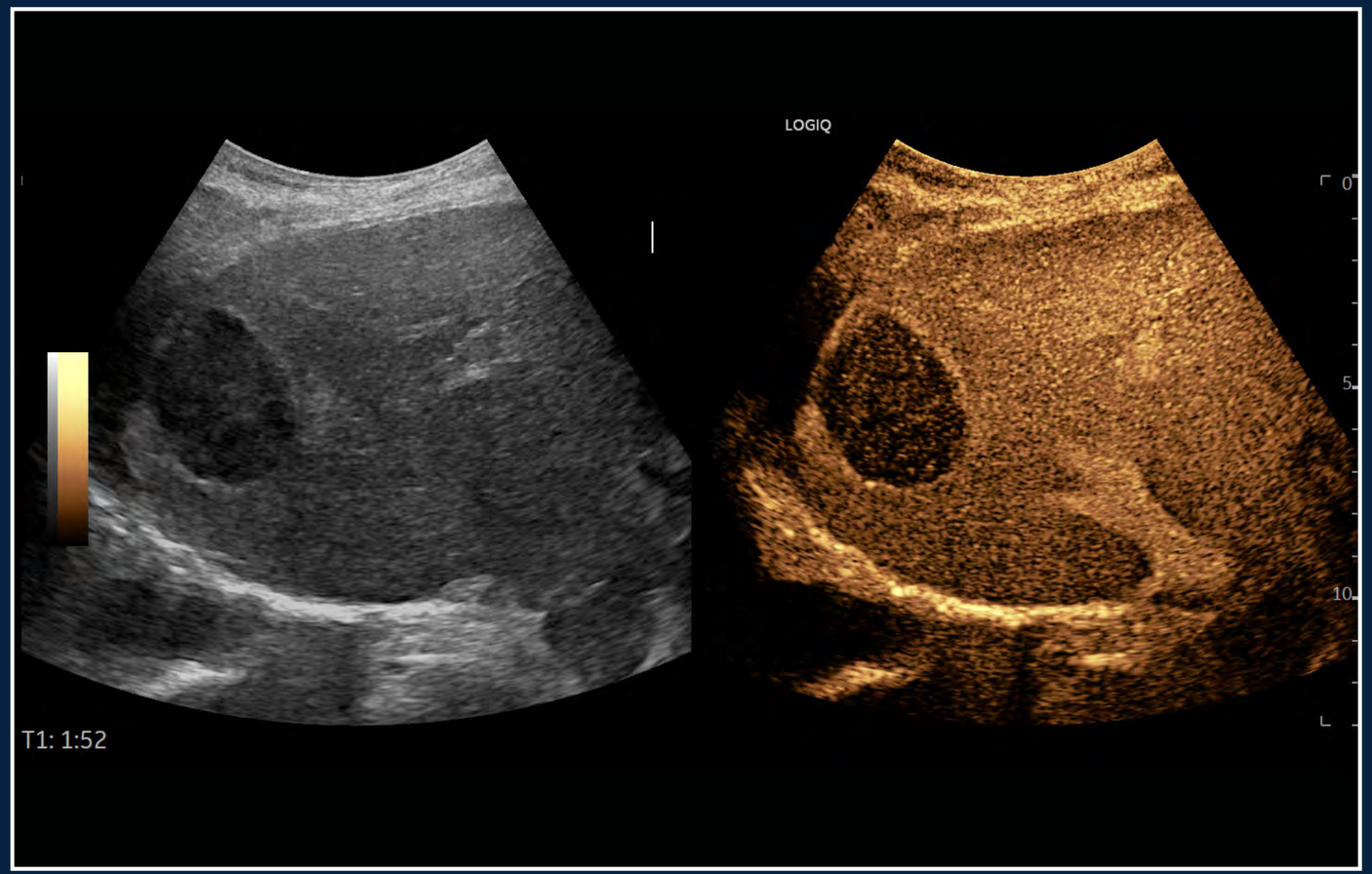
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Liver

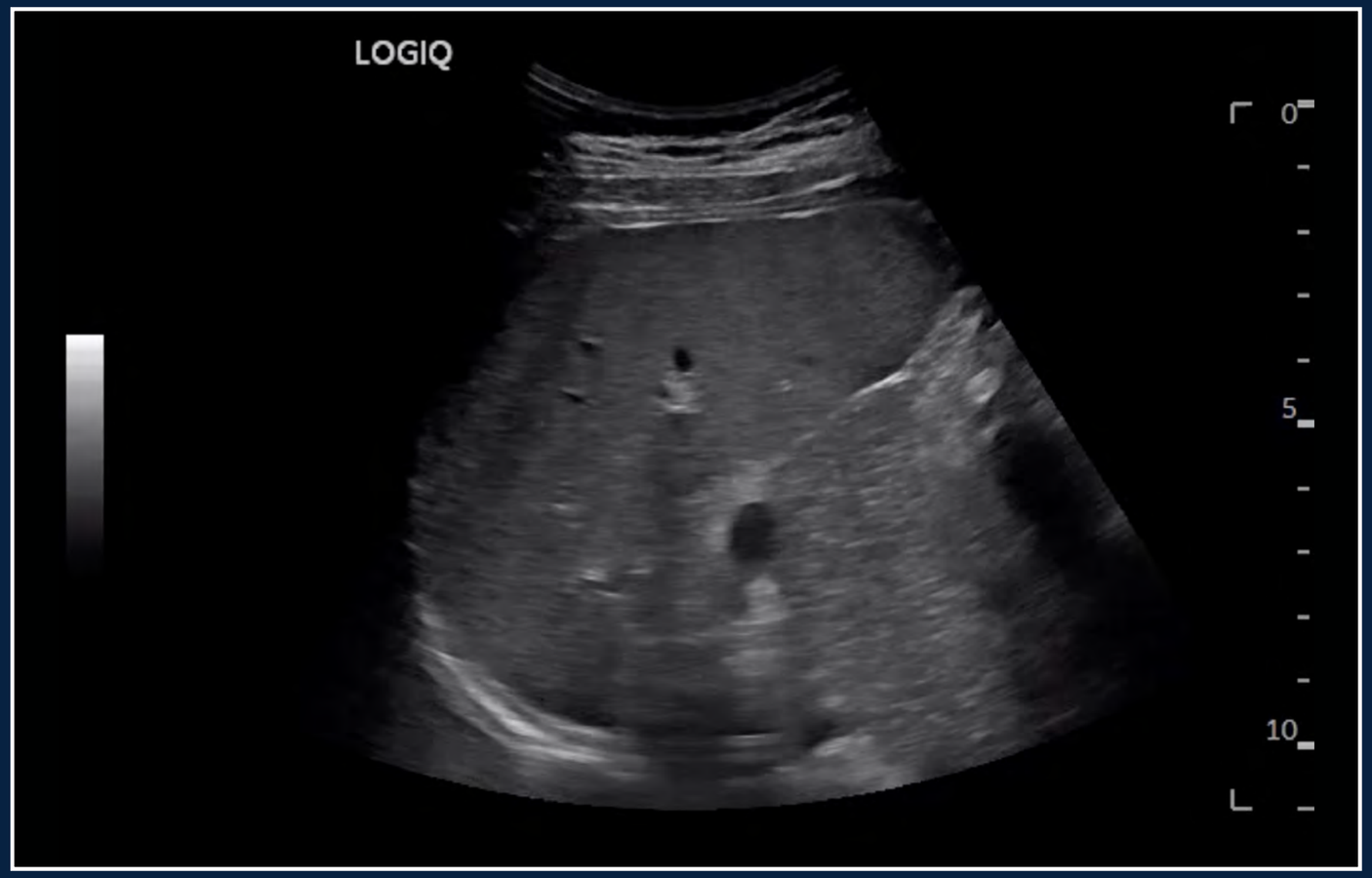
Exceeding your expectations: whole body imaging



Liver Lesion CEUS, C1-6-D

CLINICAL IMAGES | Spleen

Exceeding your expectations: whole body imaging



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

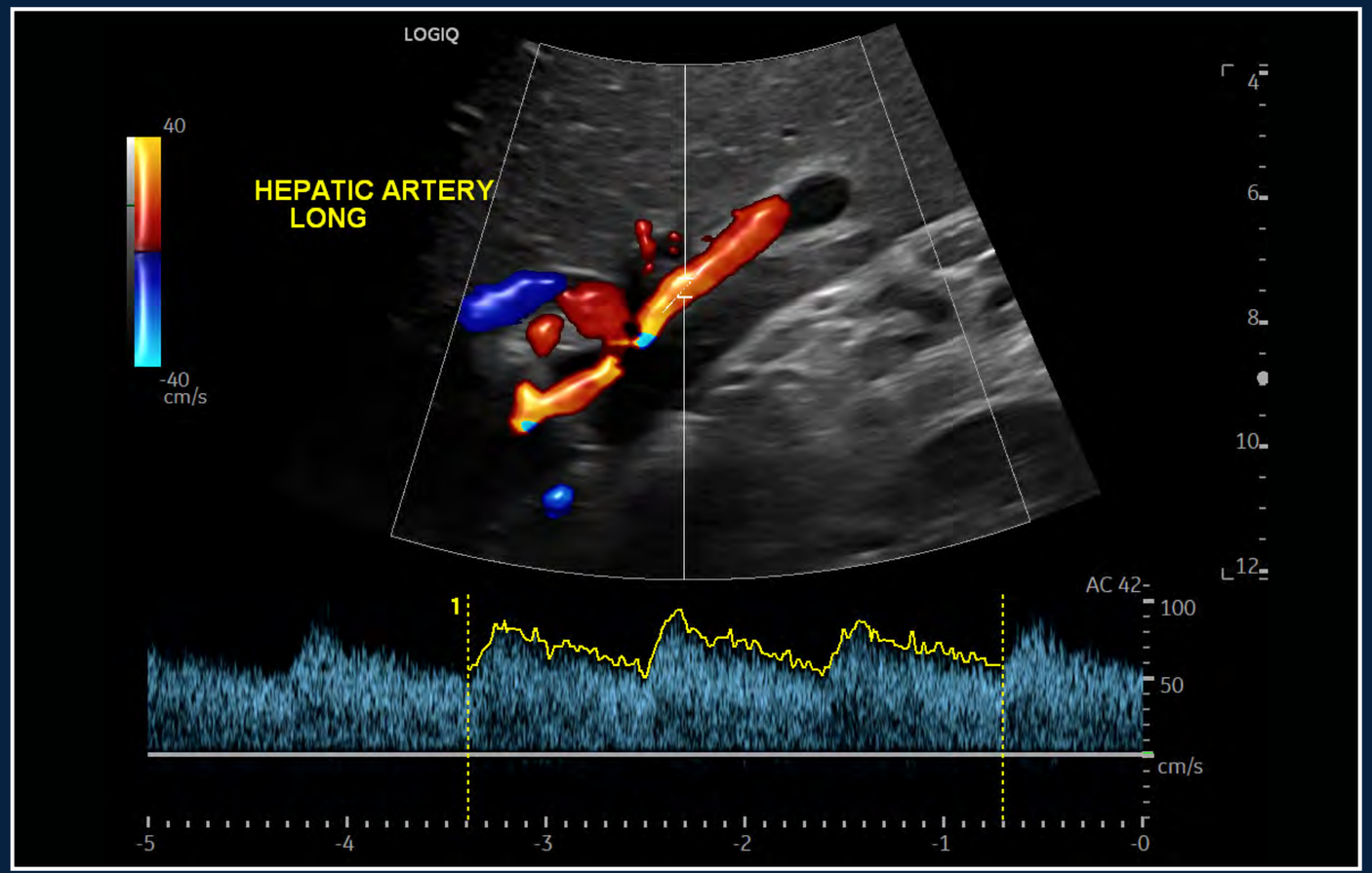
CLINICAL IMAGES | Kidney

Exceeding your expectations: whole body imaging

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

CLINICAL IMAGES | Pediatrics

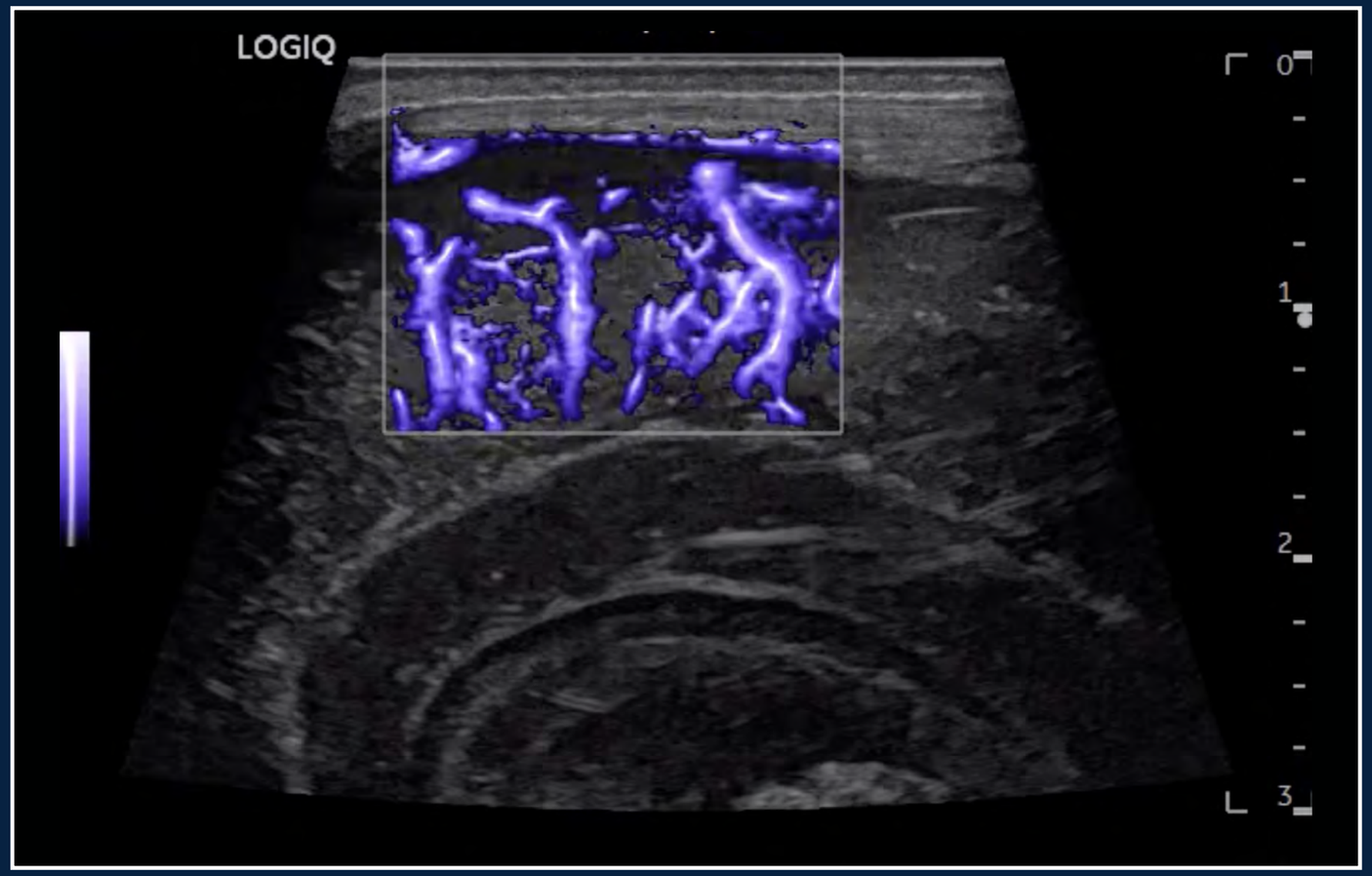
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Pediatrics

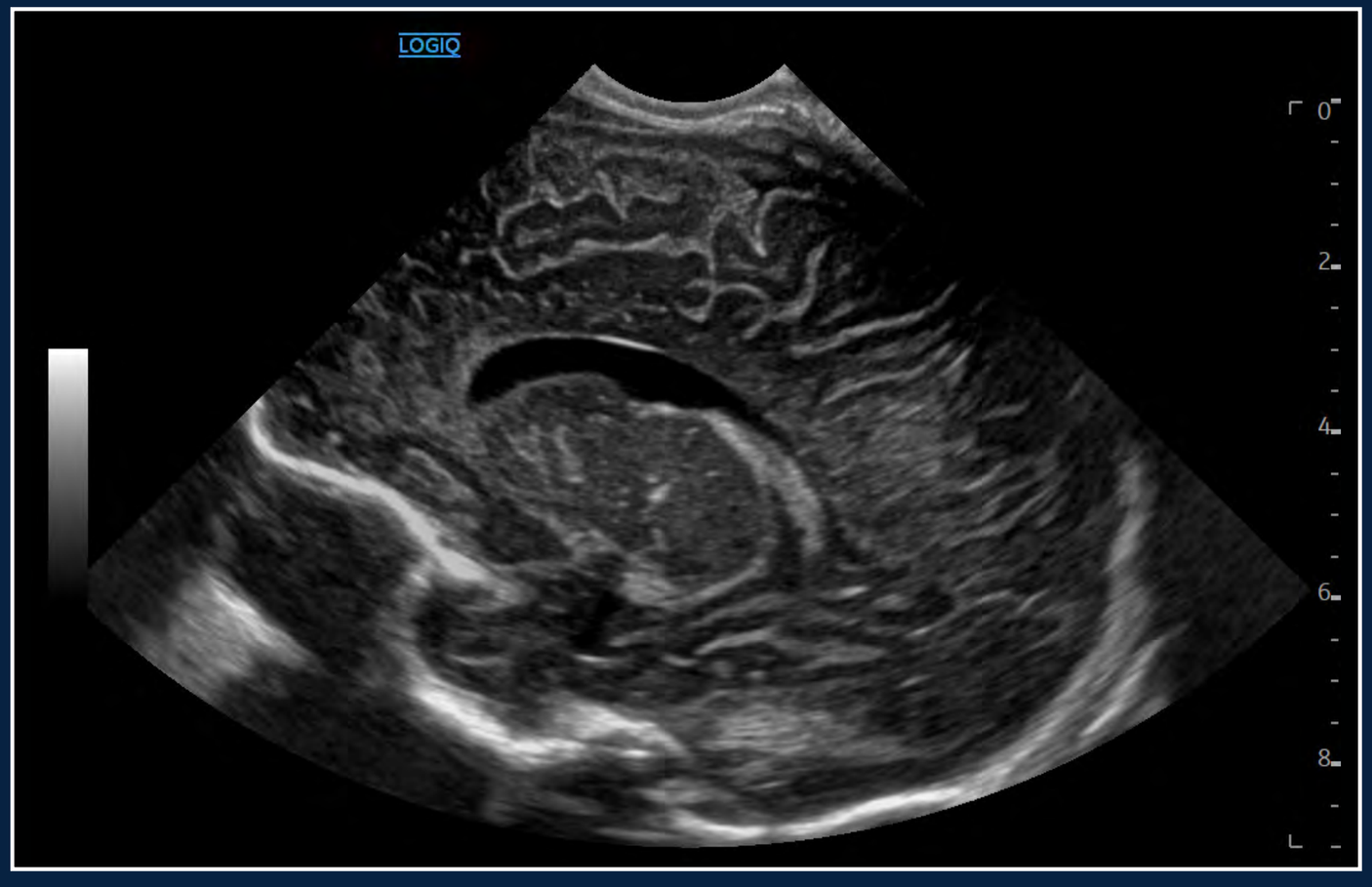
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Pediatrics

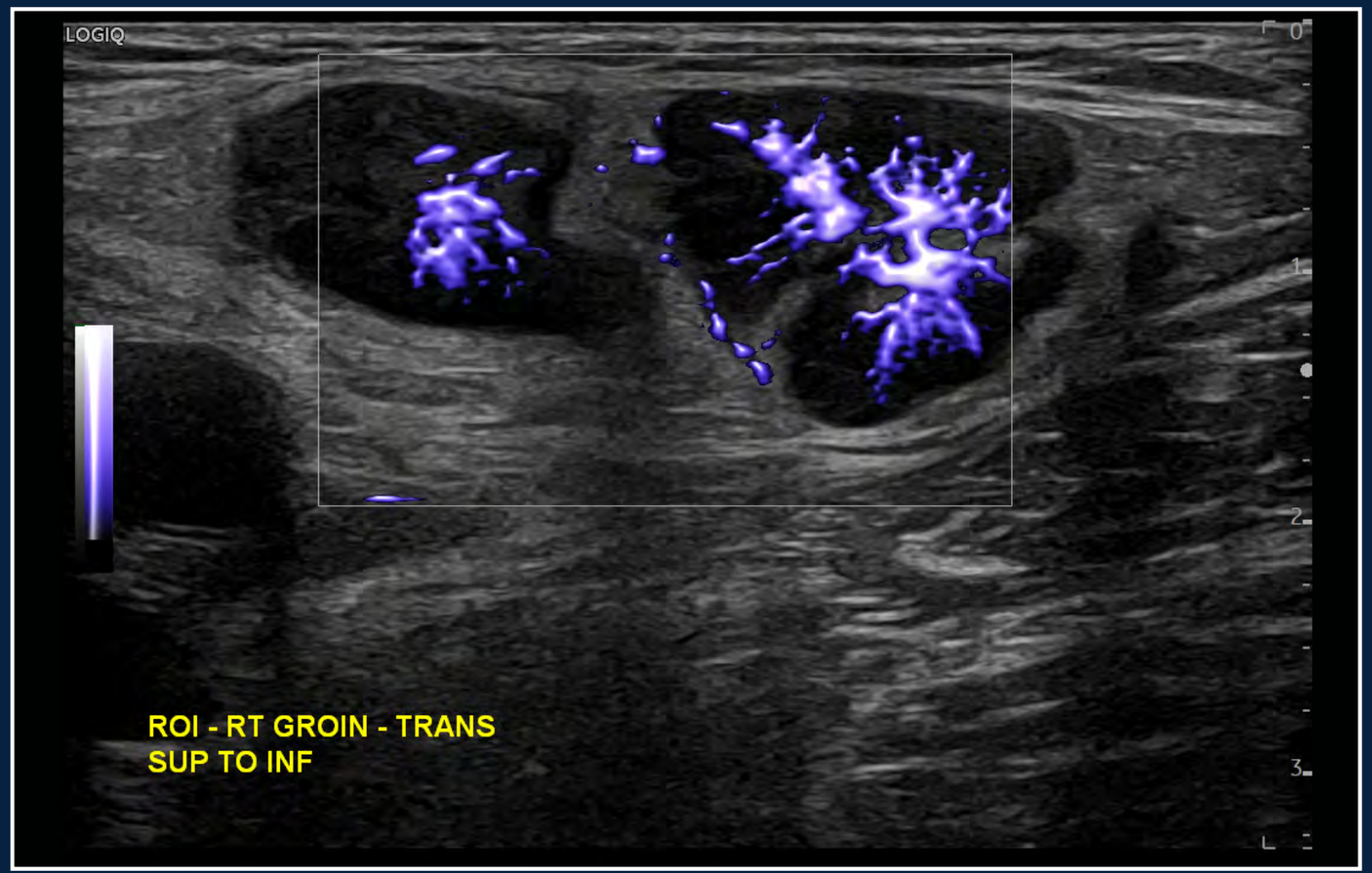
Exceeding your expectations: whole body imaging



Neonatal head, C3-10-D

CLINICAL IMAGES | Small Parts

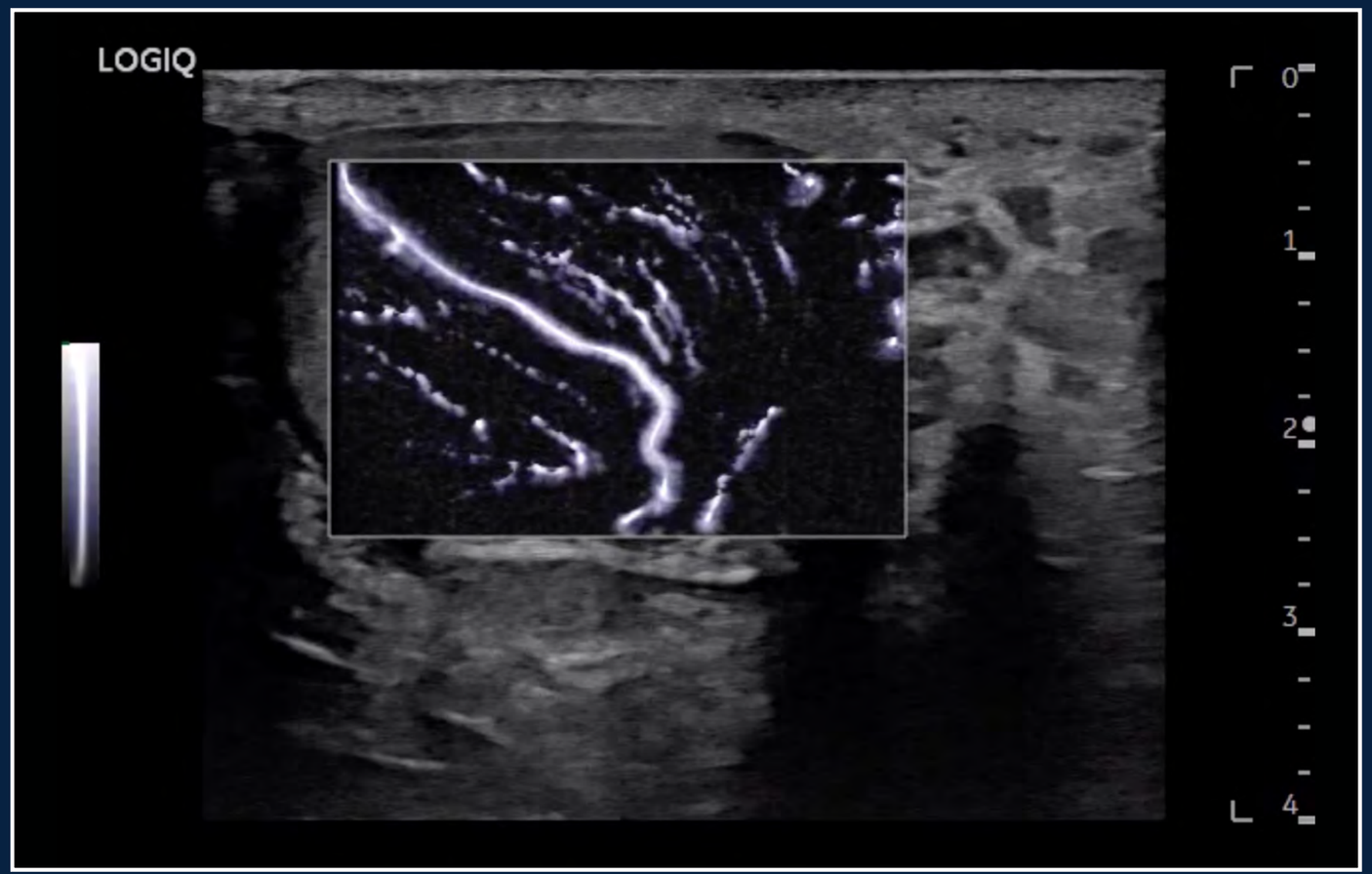
Exceeding your expectations: whole body imaging



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

CLINICAL IMAGES | Small Parts

Exceeding your expectations: whole body imaging



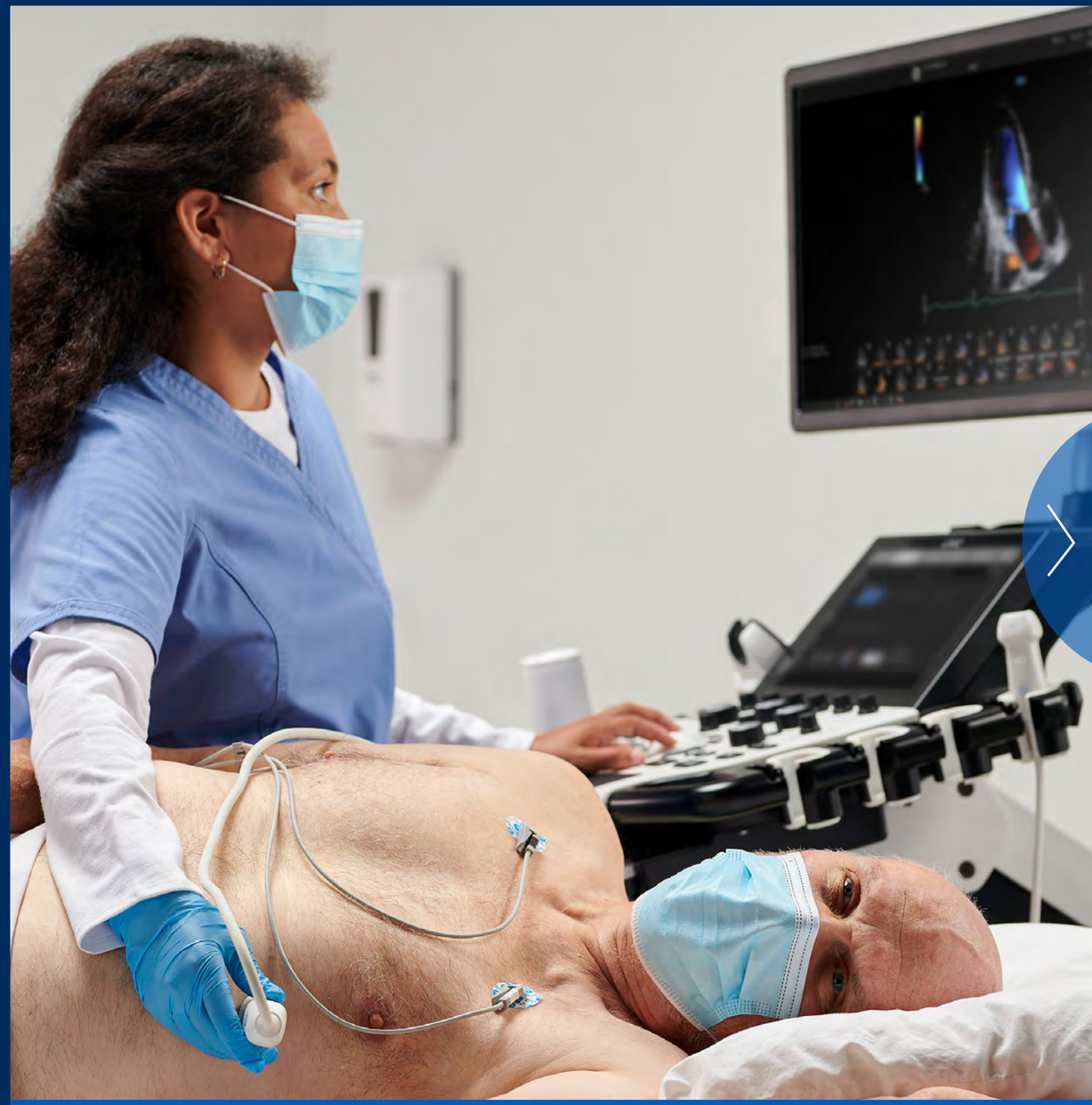
MVI with Radiant*flow* in scrotal, L3-12-D

CARDIOLOGY

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

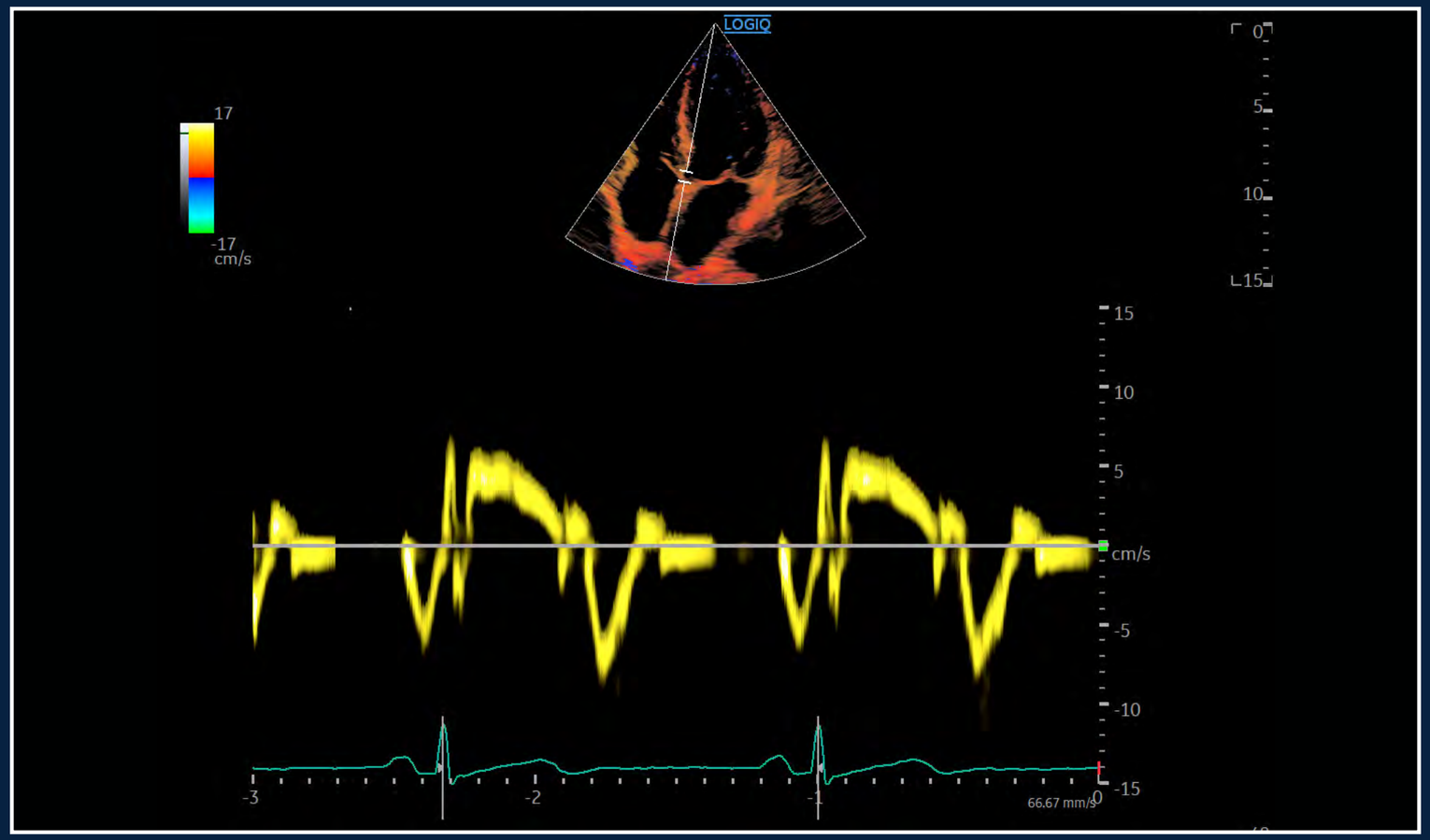
- cSound Architecture with advanced SRI for precise details
- Cardiac Strain assists in early identification of underlying cardiac disease
- Contrast agent imaging with high contrast sensitivity
- TVI/TVD to help assess tissue velocities

+ CLINICAL IMAGES

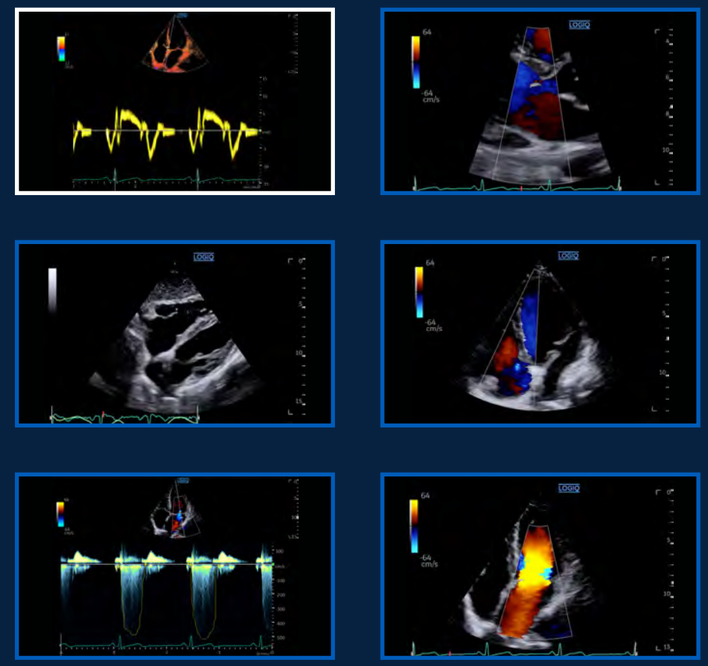


CLINICAL IMAGES | Cardiology

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

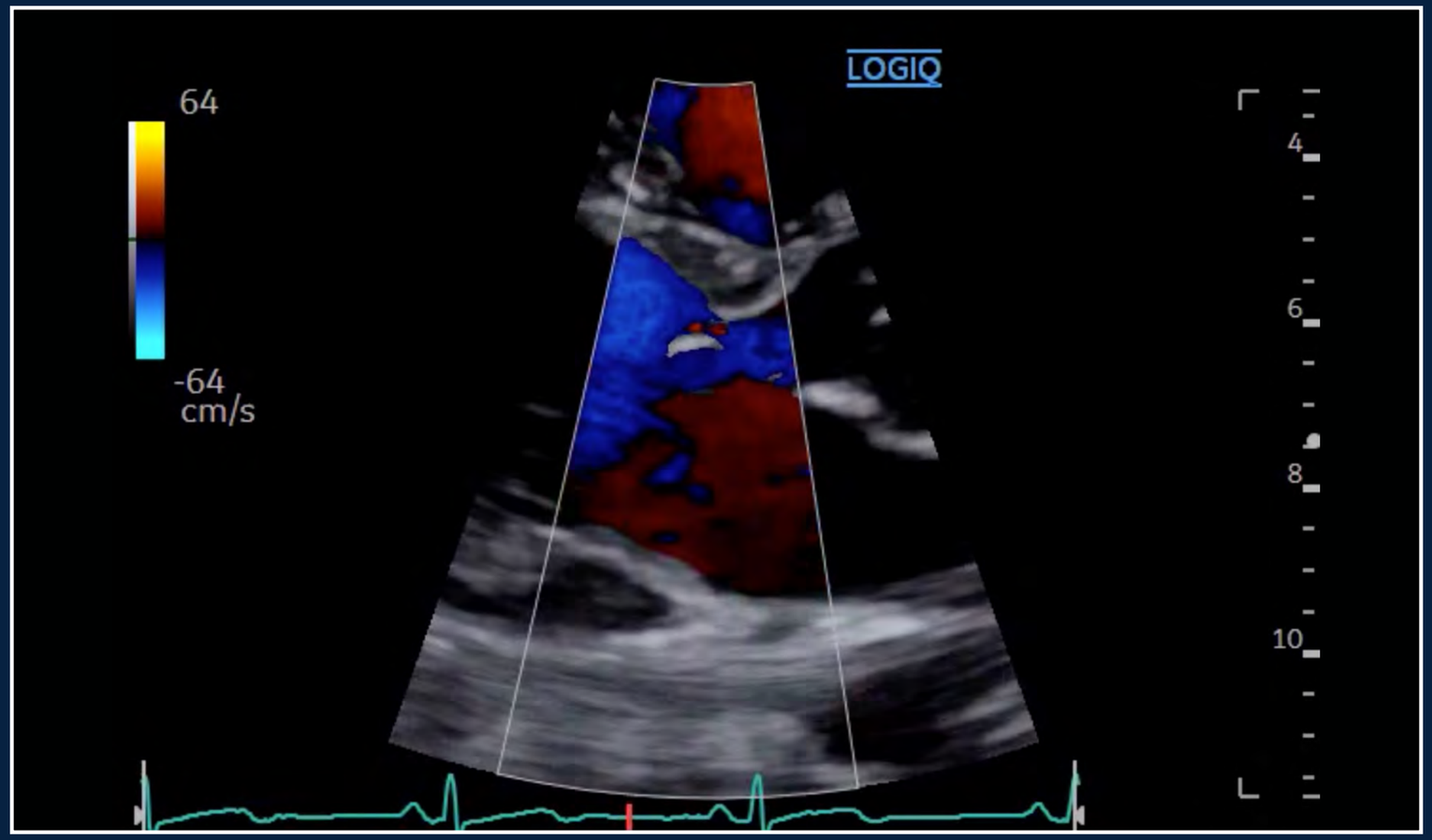


TVI and TVD Apical 4 Chamber View, M5Sc-D

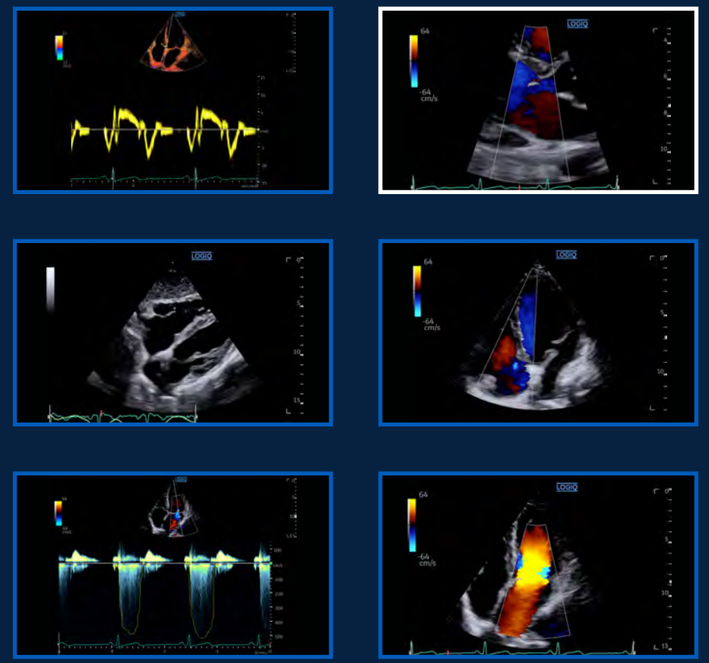


CLINICAL IMAGES | Cardiology

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

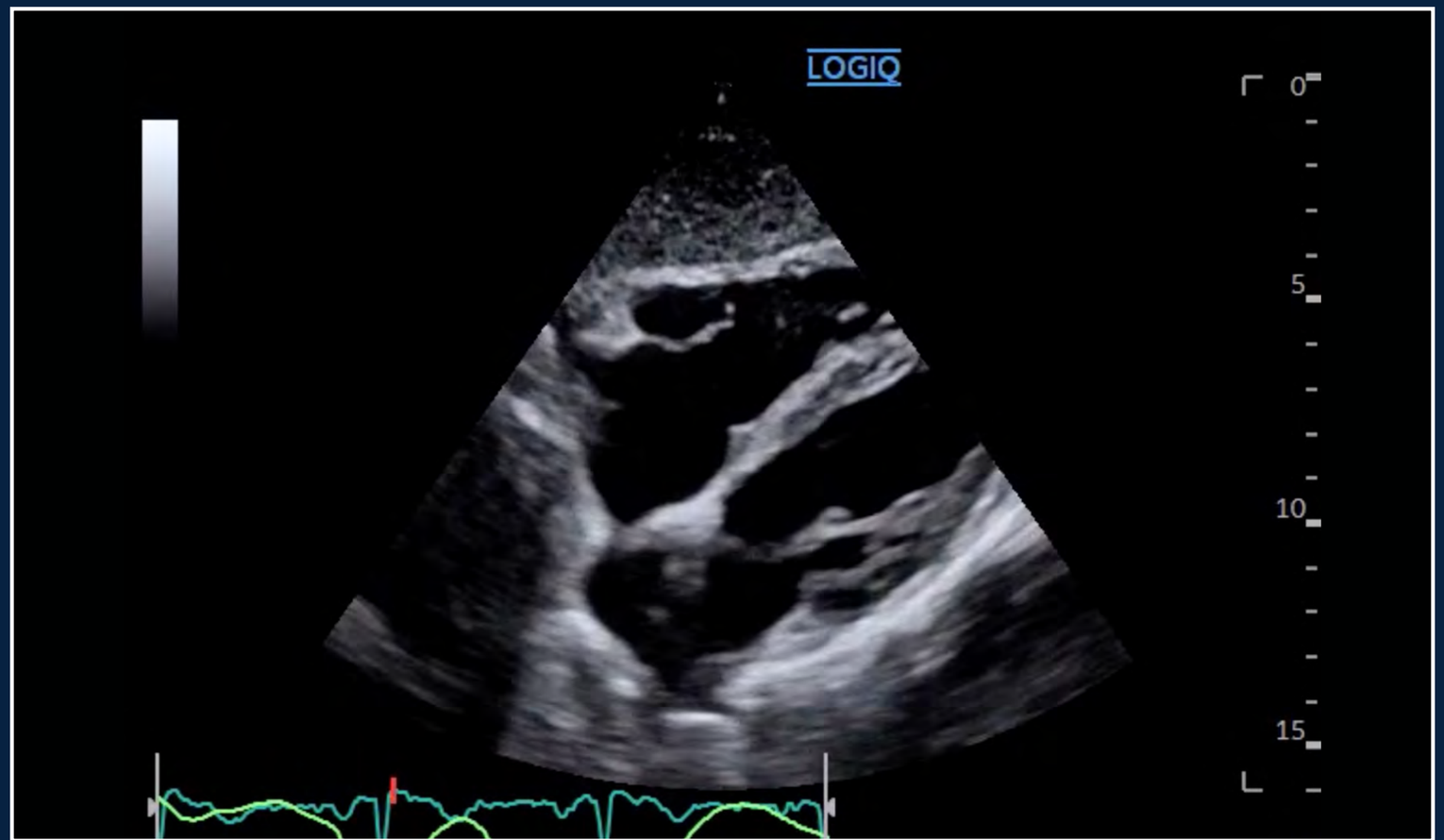


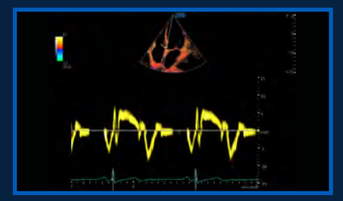
Color Flow in Cardiac Parasternal Long Axis View, M5Sc-D

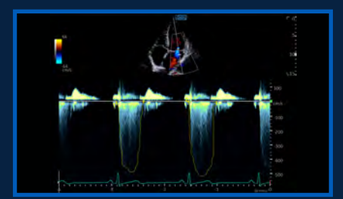


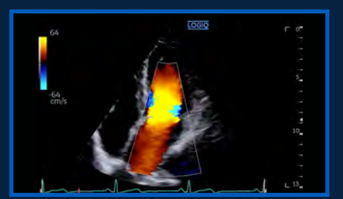
CLINICAL IMAGES | Cardiology

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





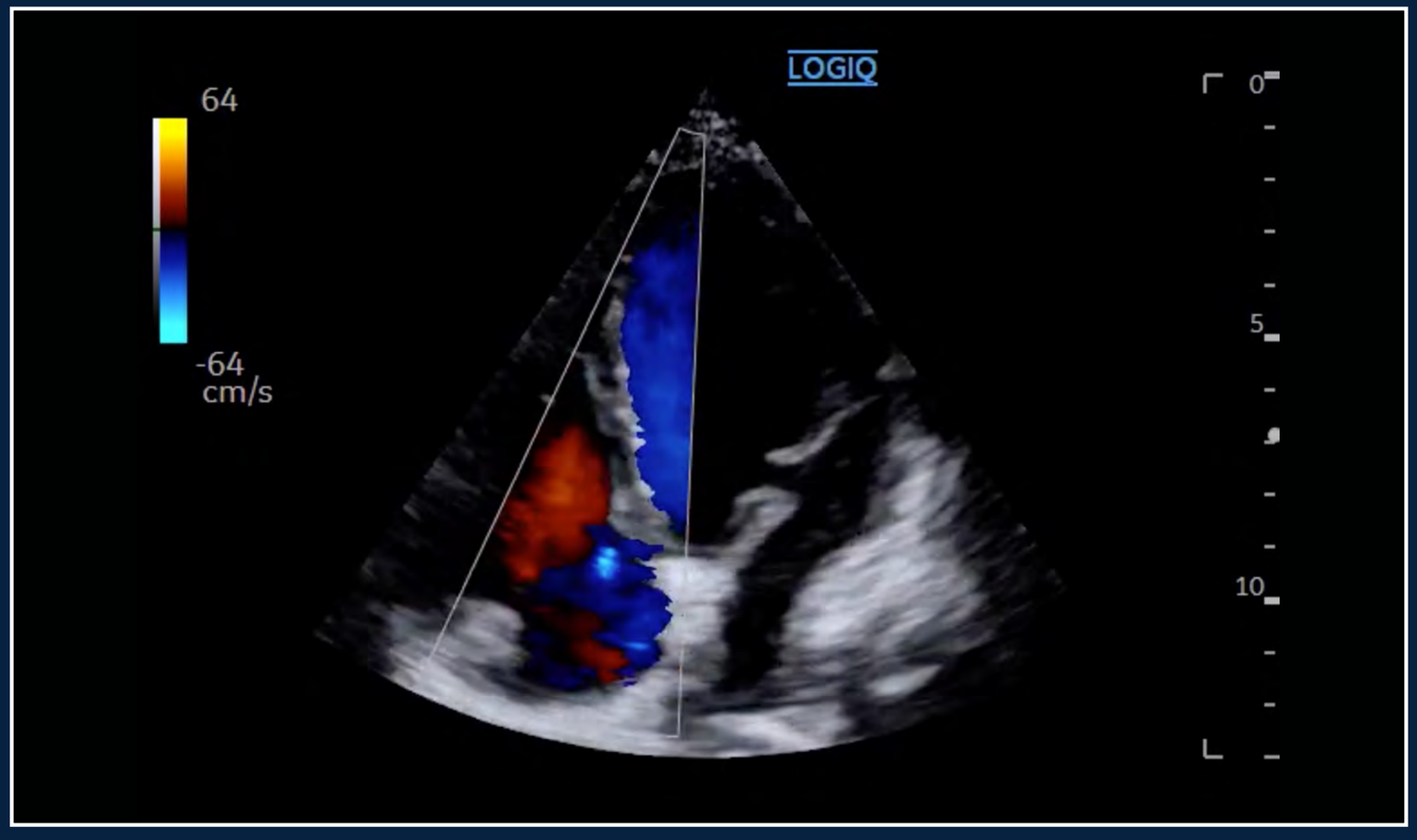


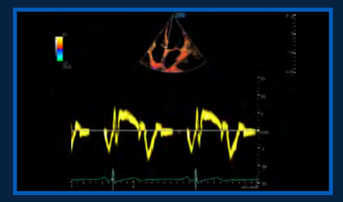


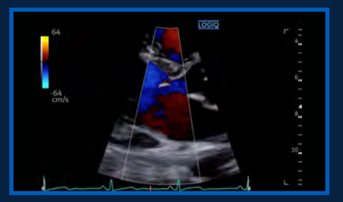
B-Mode with Advanced SRI ECG and Respirometer Display, M5Sc-D

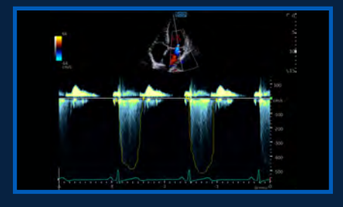
CLINICAL IMAGES | Cardiology

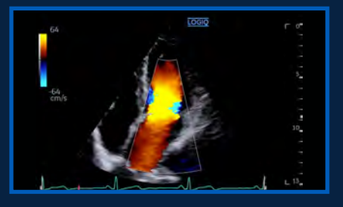
Acquire highly detailed cardiac images within efficient exam times, even in challenging cases







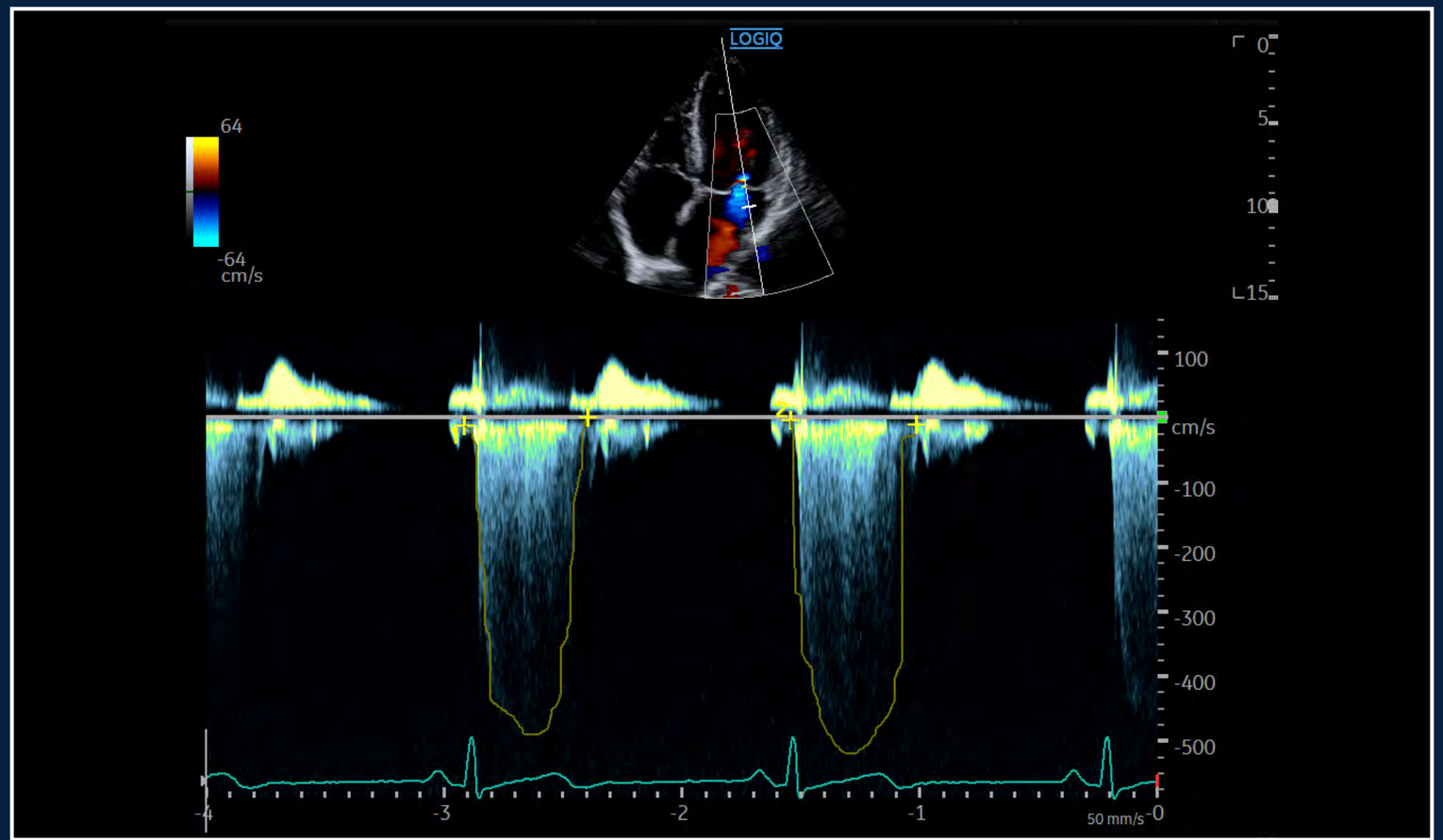




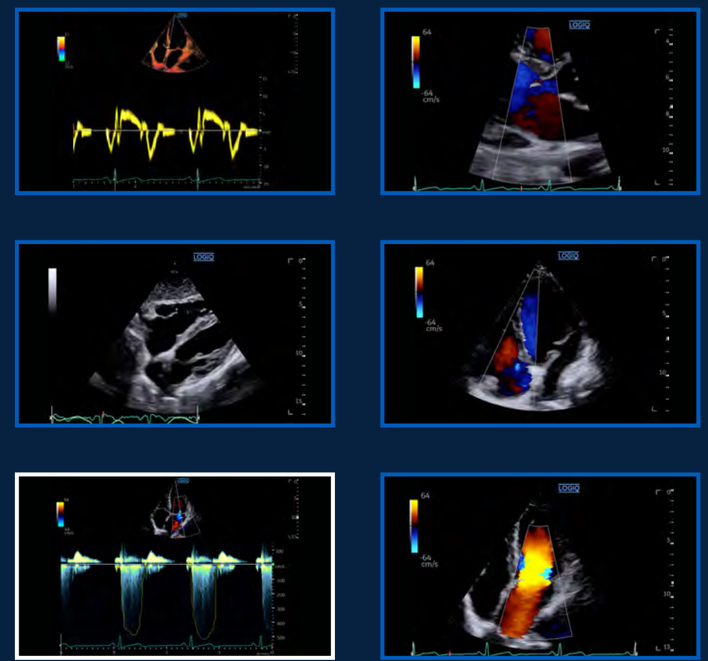
Color Flow Apical 4 Chamber View, M5Sc-D

CLINICAL IMAGES | Cardiology

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

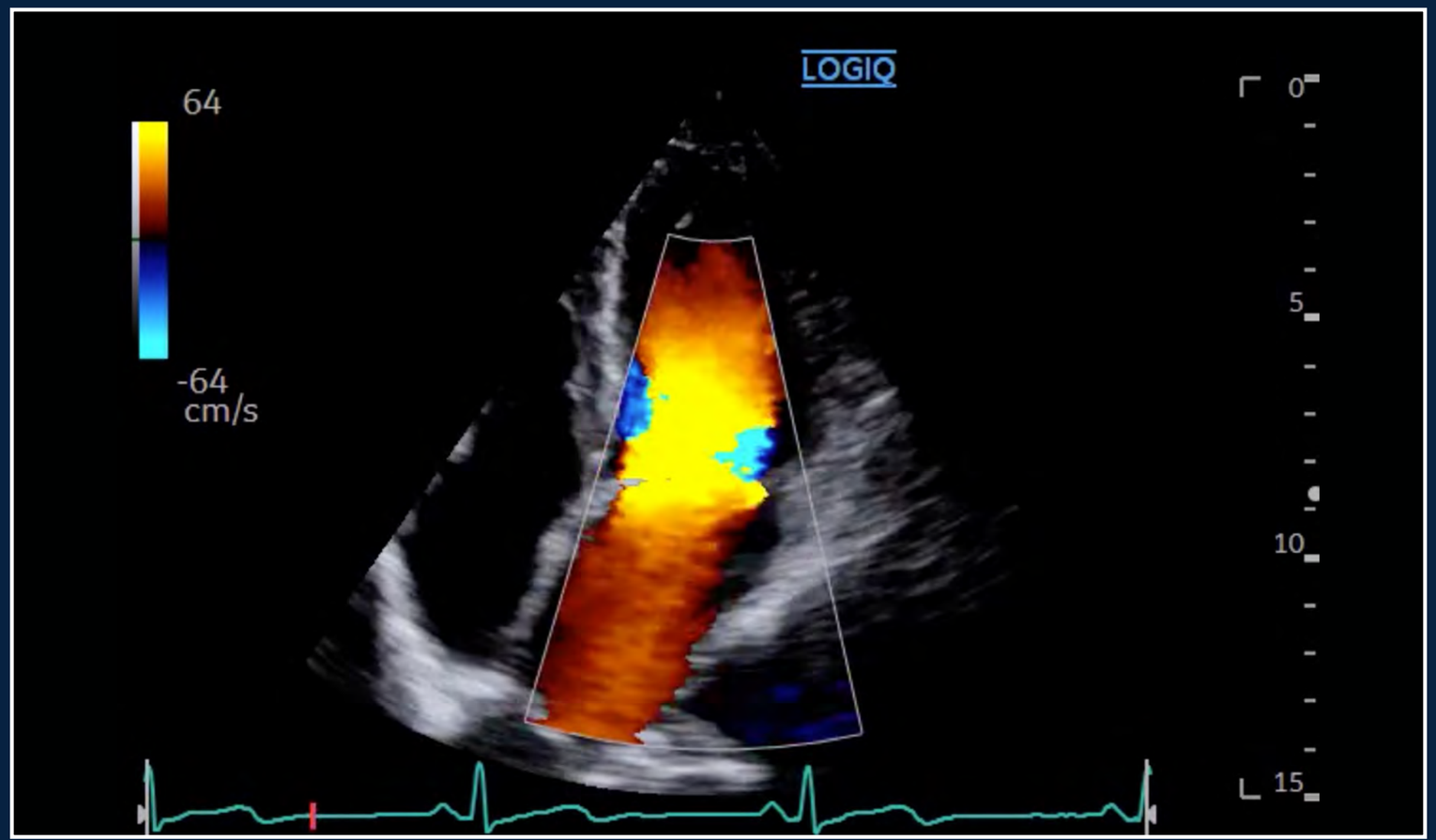


Color Flow and CW Doppler Mitral Valve, M5Sc-D

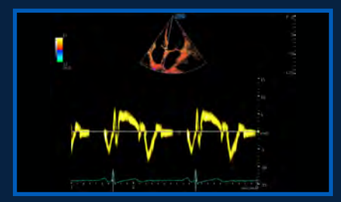


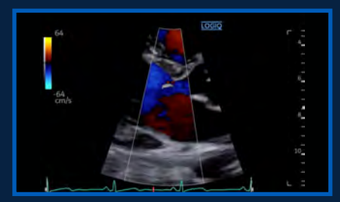
CLINICAL IMAGES | Cardiology

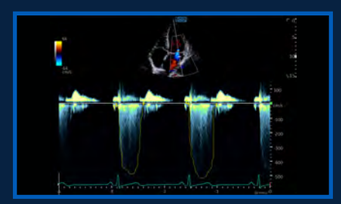
Acquire highly detailed cardiac images within efficient exam times, even in challenging cases



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





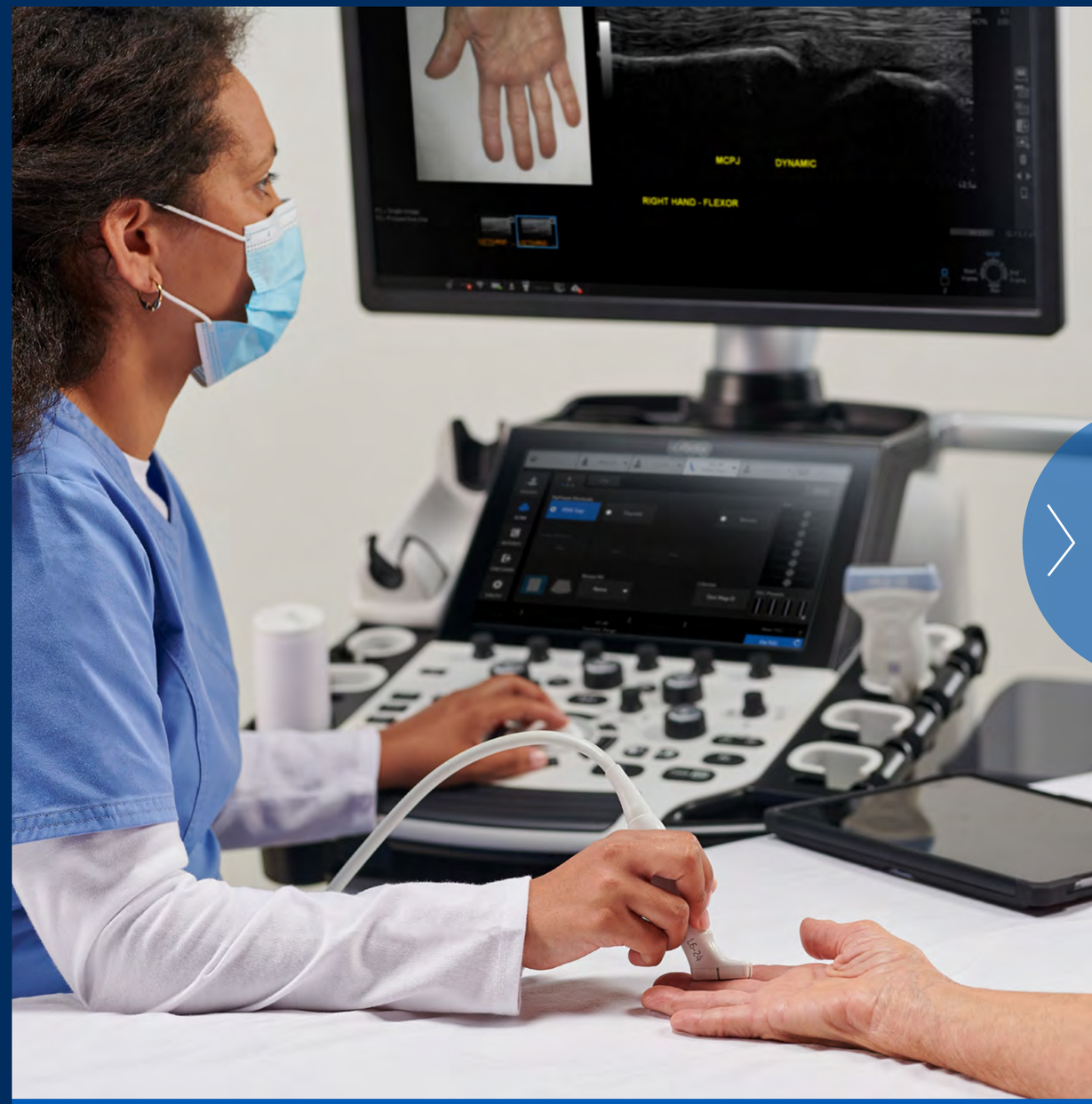


MUSCULOSKELETAL

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

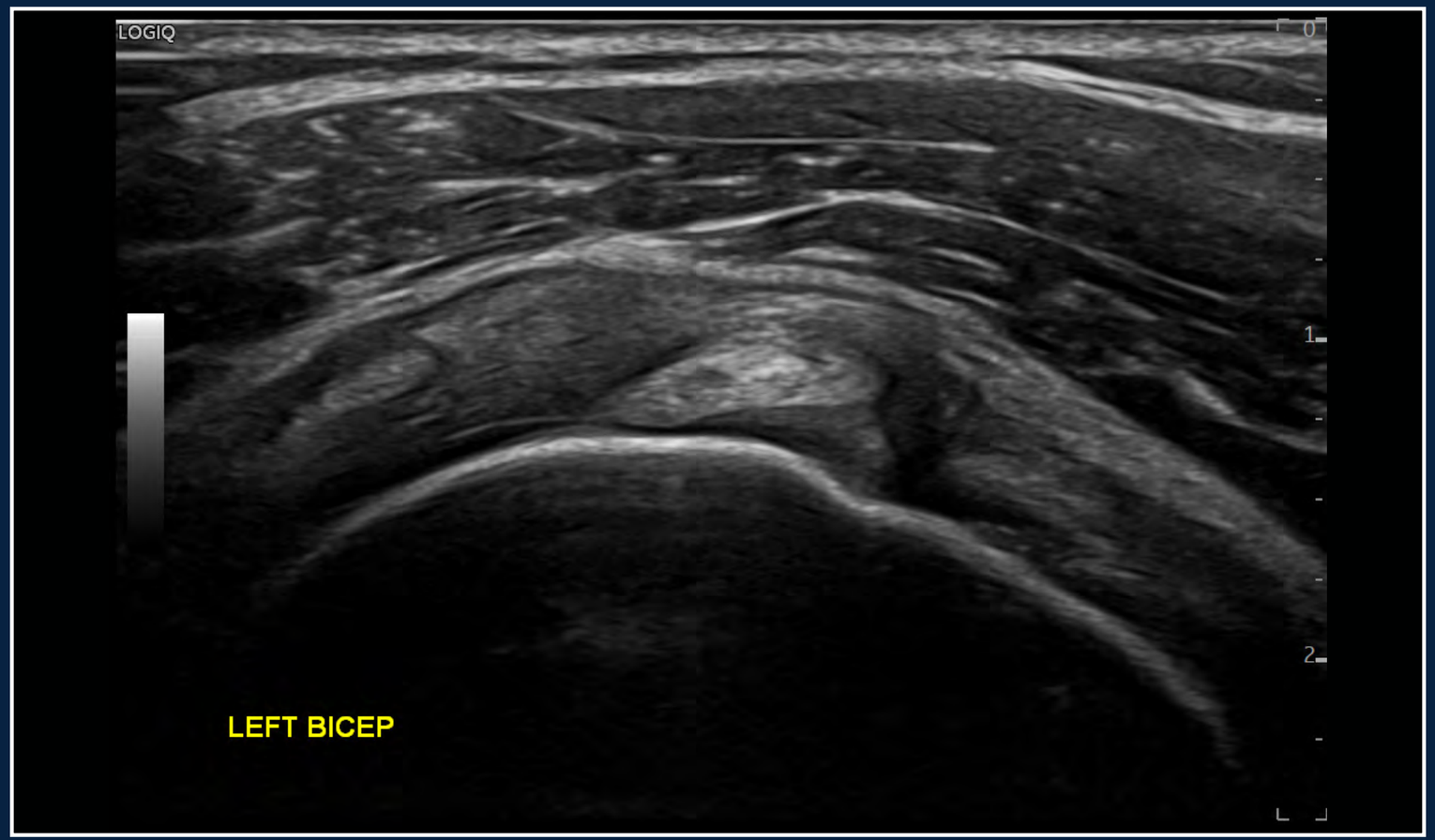
- Micro Vascular Imaging (MVI) and Radiant*flow* combine to enable near-3D visualization of tiny, slow-flow vessels
- 2D Shear Wave Elastography available on multiple probes
- Photo Assistant App lets you acquire and send photos of relevant anatomy from an Android™ device

+ CLINICAL IMAGES

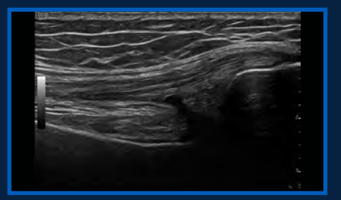


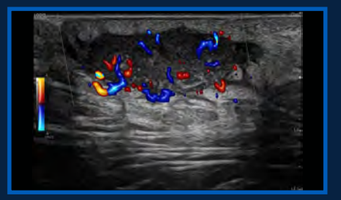
CLINICAL IMAGES | Musculoskeletal

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



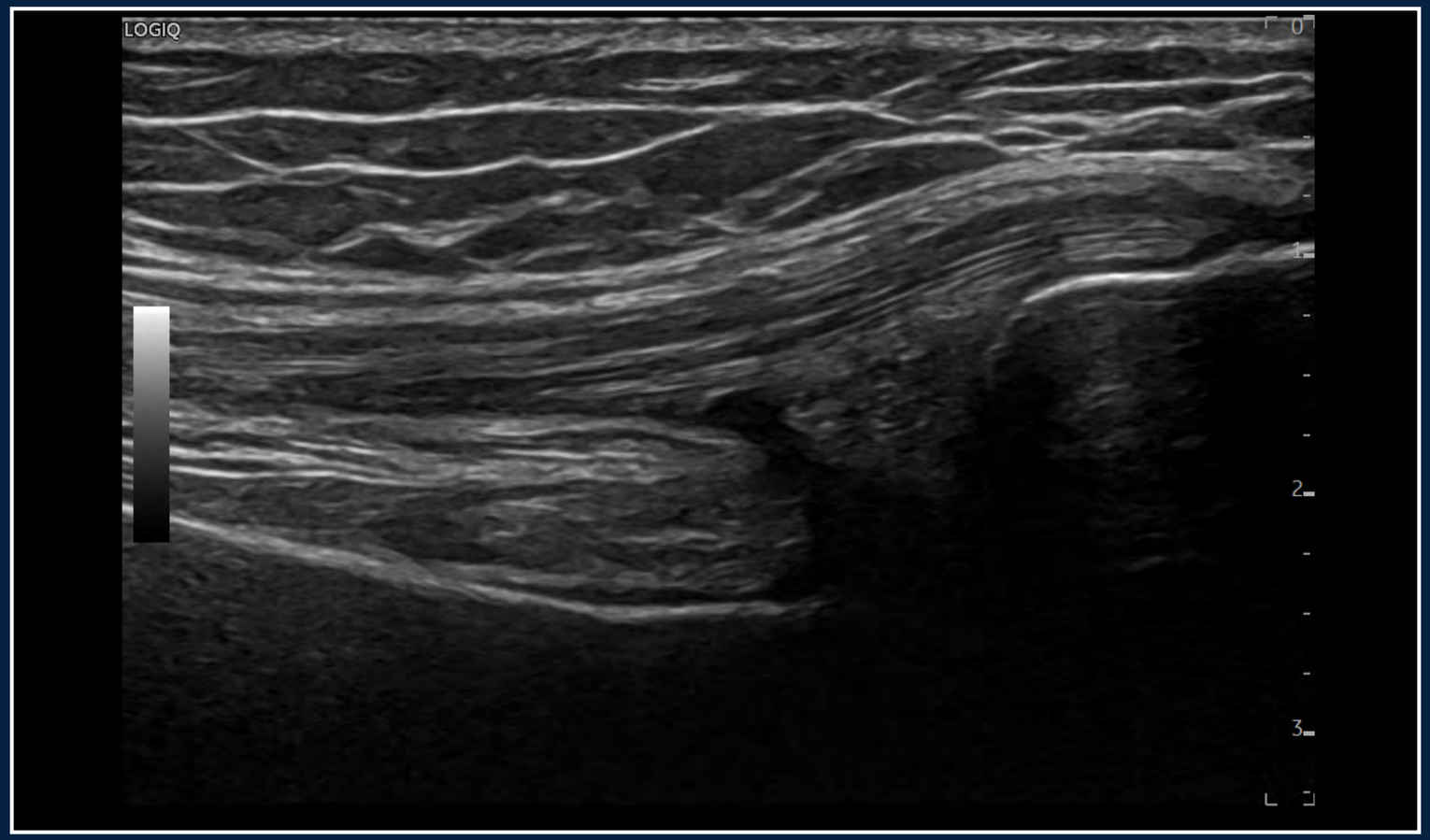
B-Mode with Advanced SRI Shoulder, ML6-15-D



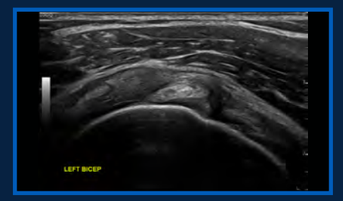


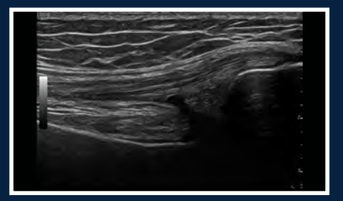
CLINICAL IMAGES | Musculoskeletal

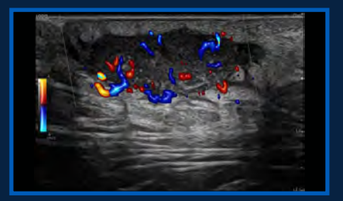
Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



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

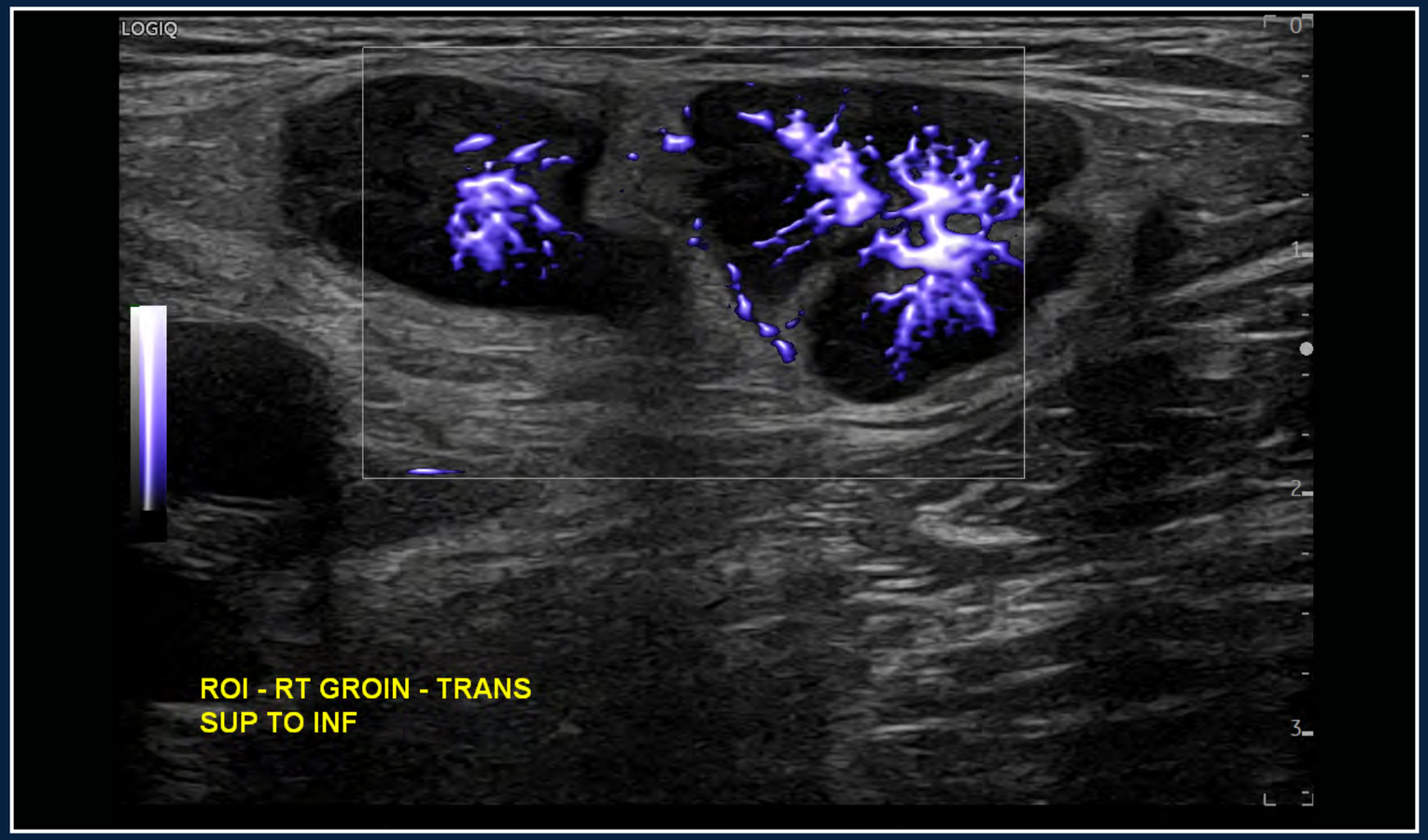


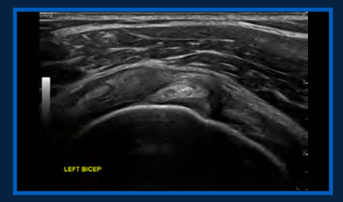


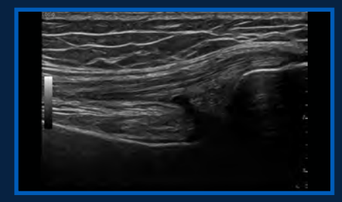


CLINICAL IMAGES | Musculoskeletal

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



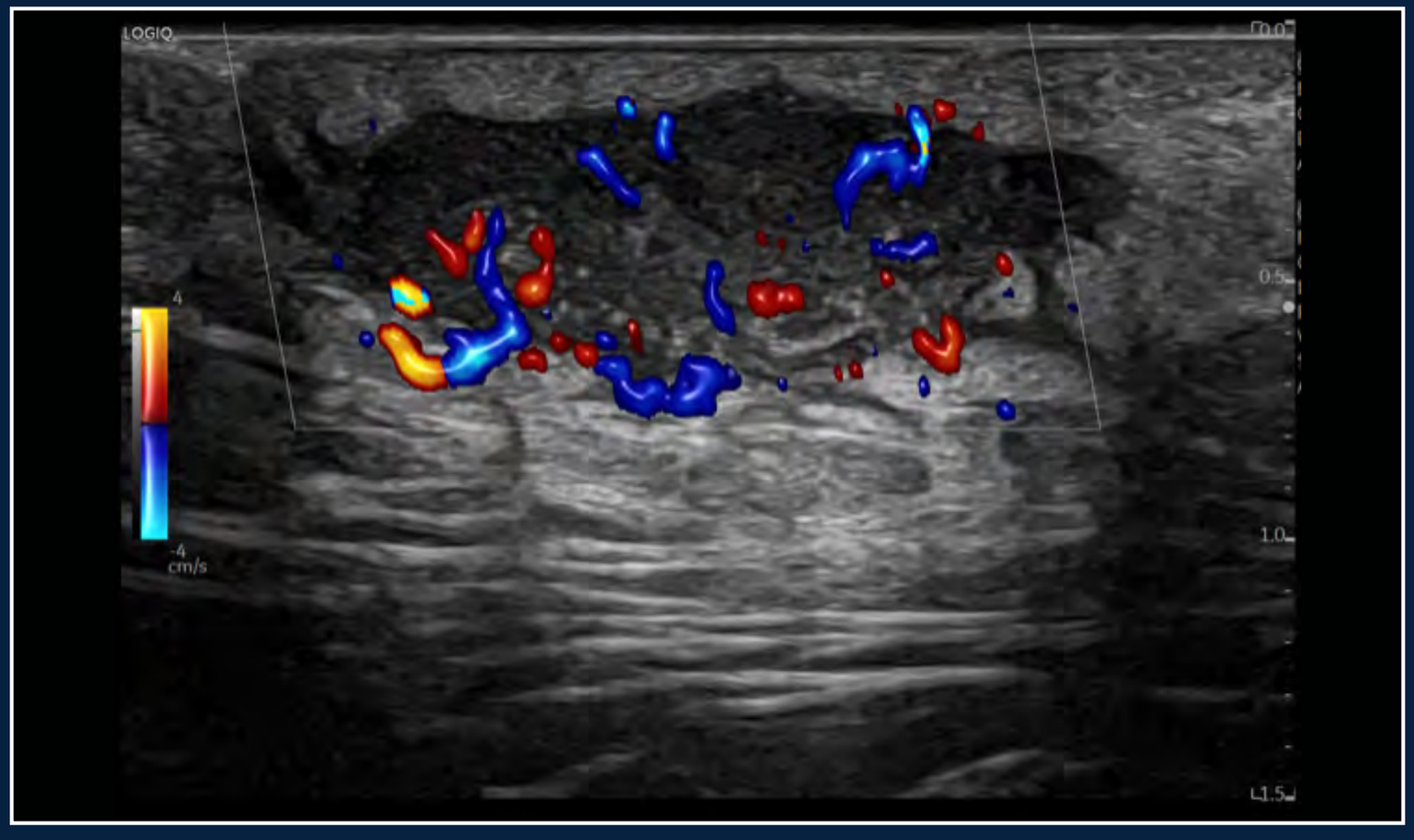




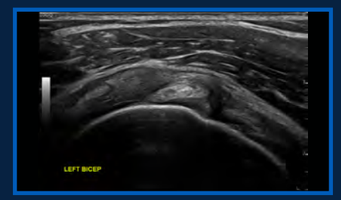
MVI with Radiant*flow* Groin Lymph Node, ML6-15-D

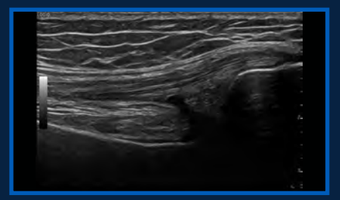
CLINICAL IMAGES | Musculoskeletal

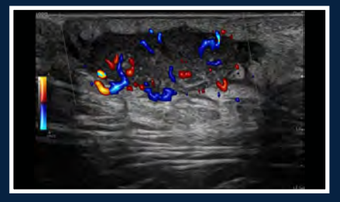
Excellent detail and contrast resolution to support in-depth understanding of tissue, pathology, blood flow, and inflammation



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







BREAST

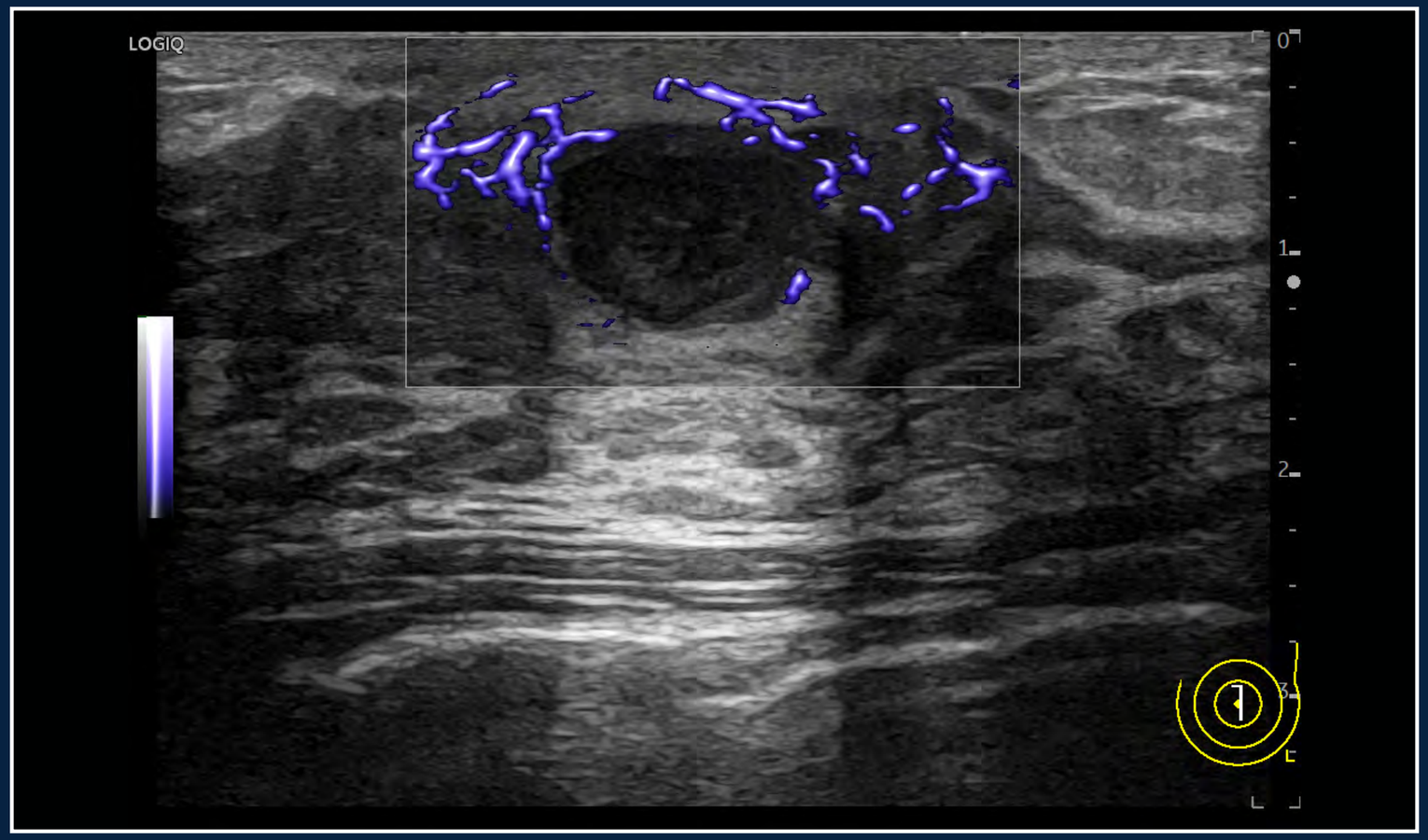
LOGIQ Fortis provides high-quality images and robust tools to help clinicians detect and characterize breast disease as efficiently as possible.

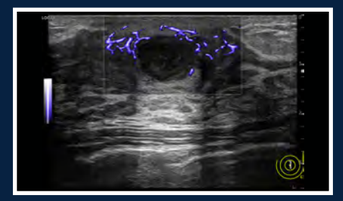
- 2D Shear Wave Elastography with Quality Indicator
- Automated workflow tools, including Measure Assistant and Compare Assistant
- Breast Assistant, powered by Koios DS,™ an AI-based decision support tool providing quantitative risk assessment aligned to a BI-RADS® category*

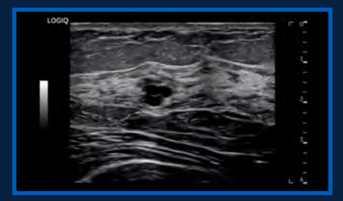
+ CLINICAL IMAGES

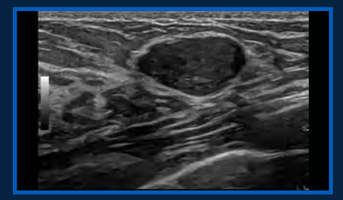
CLINICAL IMAGES | Breast

Highly detailed images to detect and characterize breast disease efficiently





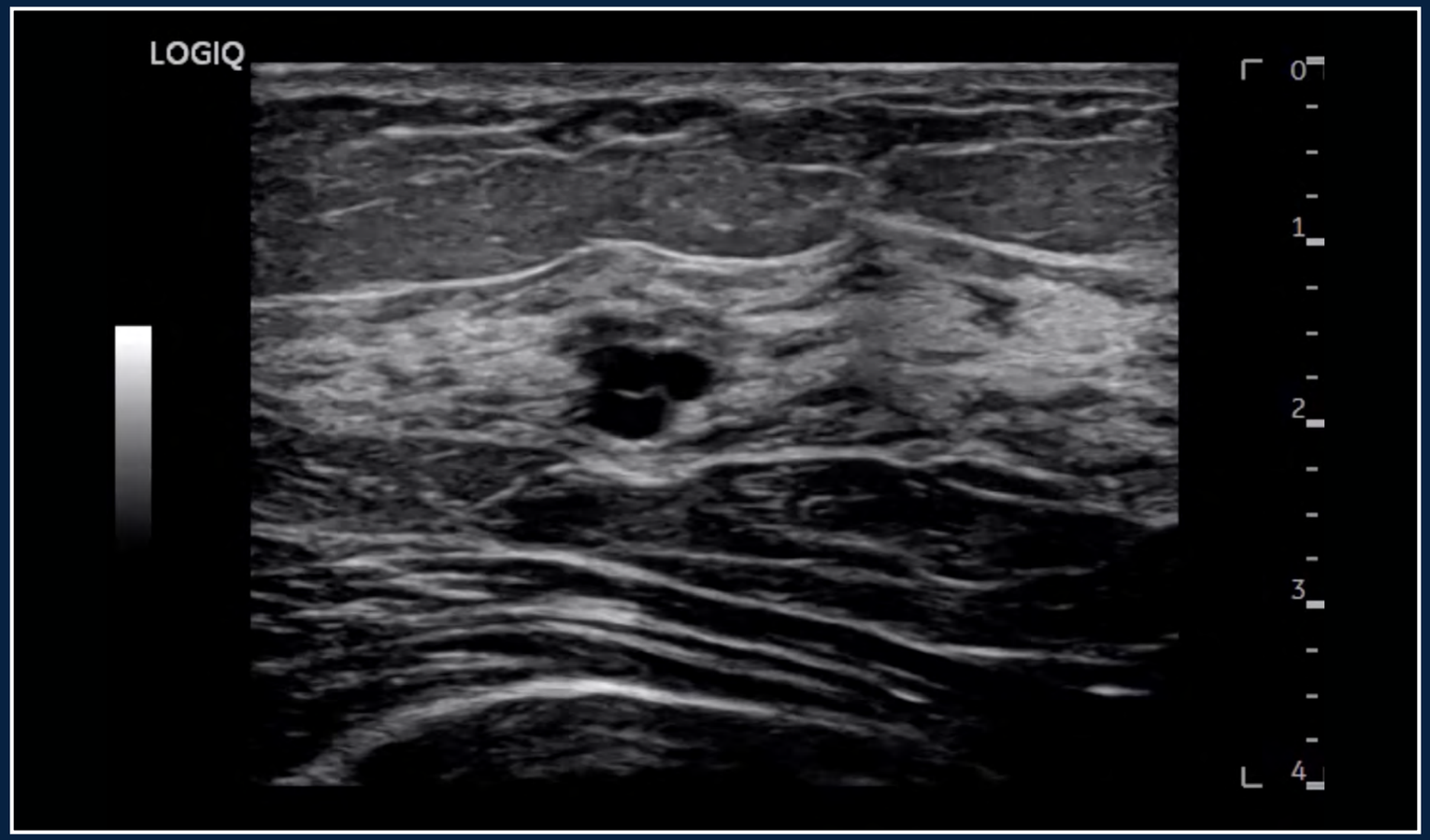


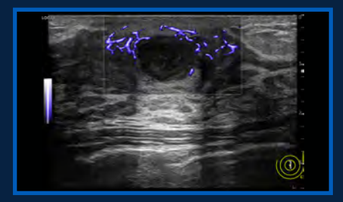


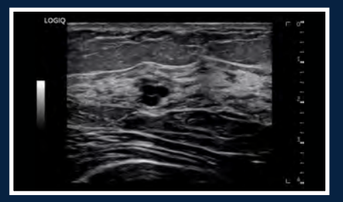
MVI Breast, ML6-15-D

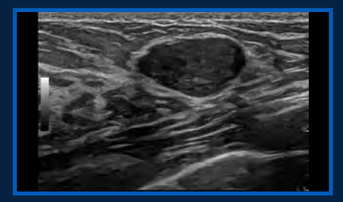
CLINICAL IMAGES | Breast

Highly detailed images to detect and characterize breast disease efficiently





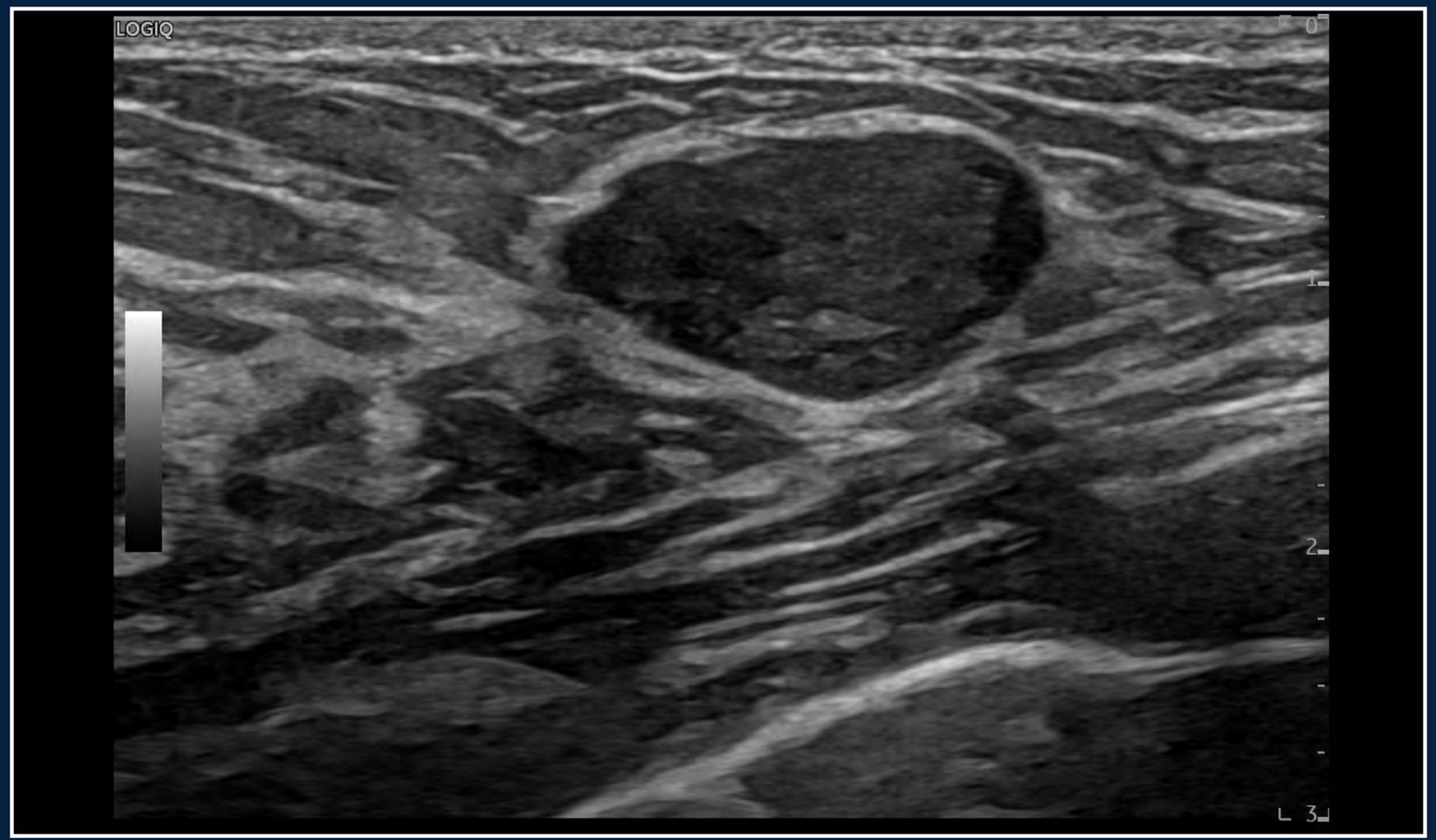


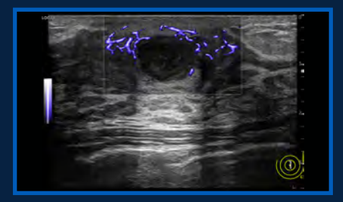


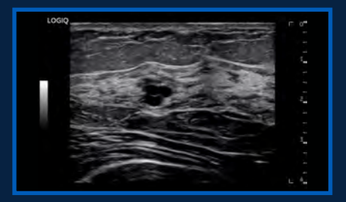
B-Mode with Advanced SRI in Breast, L3-12-D

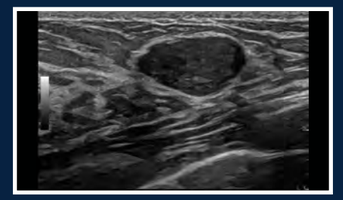
CLINICAL IMAGES | Breast

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 R3.x HDU

Product Specification Sheet

Last updated on: Thursday, January 13, 2022

1	**General Specifications**	
2	**Dimensions and Weight** **(Dimensions given with floating keyboard stowed and display tilted for transport)**	
3	Depth	885 mm, 34.8"
4	Height	1250 – 1800 mm, 49 – 71"
5	Weight	85 kg (187.4 lb)
6	Width	530 mm, 20.9" (Caster), 565 mm, 22.2" (Monitor)
7	**Electrical Power**	
8	Voltage: 100 – 240 Vac	
9	Frequency: 50/60 Hz	
10	Power consumption maximum of 0.9 kVA with peripherals	
11	**Console Design**	
12	4 active probe ports	
13	1 inactive probe storage port	
14	Integrated SSD (1 TB)	
15	Integrated DVD-R Multi Drive	
16	On-board storage of thermal printer	
17	Integrated speaker	
18	Integrated locking mechanism that provides rolling lock and caster swivel lock	
19	Integrated cable management	
20	Front and rear handles	
21	Easily removable air filters	
22	Windows 10 64-bit	
23	**User Interface**	
24	**Operator Keyboard**	
25	Operating keyboard adjustable in height and rotation	
26	Ergonomic hard key layout	
27	Interactive back-lighting	
28	Integrated recording keys for remote control of up to 4 peripheral devices or DICOM® devices	
29	Integrated gel warmer	
30	**Touch Screen**	
31	12.1" High-resolution, color, touch, display screen	
32	Interactive dynamic software menu	
33	Brightness adjustment	
34	User-configurable layout	
35	**Monitor**	
36	23.8" Wide screen high-resolution HDU display	
37	Display translation (independent of console)	
38	350 mm, (13.7 in) horizontal (both directions)	
39	150 mm, (5.9 in) vertical	
40	90° swivel (both directions)	
41	Fold-down and lock mechanism for transportation	
42	Resolution: 1920 X 1080	
43	Anti-glare	
44	Viewing angle 89/89/89/89°	
45	Contrast Ratio: >20,000:1	
46	**System Overview**	
47	**Applications**	
48	Abdominal	
49	Obstetrical	
50	Gynecological	
51	Breast	

52	Small Parts
53	Peripheral Vascular
54	Transcranial (adult and neonatal)
55	Pediatric and neonatal
56	Musculoskeletal (general and superficial)
57	Urological
58	Cardiac (adult and pediatric)
59	Interventional
60	Pleural
61	**Operating Modes**
62	B-Mode
63	M-Mode
64	Color Flow Mode (CFM)
65	B-Flow (Option)
66	Extended Field of View (LOGIQView)
67	Power Doppler Imaging (PDI)
68	PW Doppler
69	CW Doppler (Option)
70	Volume Modes (3D/4D) (Option)
71	Anatomical M-Mode
72	Coded Contrast Imaging (Option)
73	Strain elastography (Option)
74	B Steer+ (Option)
75	Shear wave elastography (Option)
76	UGAP (Option) - Ultrasound Guided Attenuation Parameter Imaging
77	**Scanning Methods**
78	Electronic sector
79	Electronic convex
80	Electronic linear
81	Mechanical volume sweep
82	**Probe Types**
83	Sector phased array
84	Convex array
85	Microconvex array
86	Linear array
87	Matrix array
88	Volume probes (4D)
89	Split crystal
90	**System Standard Features**
91	Advanced user interface with high-resolution 12.1" display touch panel
92	Automatic optimization
93	CrossXBeam™ compounding
94	Speckle Reduction Imaging (SRI-HD, Advanced SRI Type 1)
95	Fine angle steer
96	Coded harmonic imaging
97	Virtual convex
98	Patient information database
99	Image archive on integrated CD/DVD and hard drive
100	Advanced 3D
101	Raw data analysis
102	Real-time automatic Doppler calculations
103	OB calculations
104	Fetal trending
105	Multi gestational calculations
106	Hip dysplasia calculations
107	Gynecological calculations
108	Vascular calculations
109	Urological calculations
110	Renal calculations
111	Cardiac calculations
112	InSite™ capability
113	On-board electronic documentation
114	Auto Doppler Assist

115	Privacy and security, including user and rights management	
116	LOGIQView	
117	External USB printer connection	
118	Network printer support	
119	HDMI output (available for compatible devices)	
120	**System Options**	
121	Tricefy®	
122	DICOM	
123	B-Flow	
124	Compare Assistant	
125	Auto IMT	
126	Scan Assistant	
127	Breast productivity package	
128	Thyroid productivity package	
129	OB measure assistant	
130	Quantificative Flow Analysis available with Color Flow/PDI	
131	Breast Measure Assistant	
132	B Steer+	
133	Strain elastography	
134	Elastography Quantification	
135	Advanced privacy and security (vulnerability scan)	
136	Power assistant and scan on battery	
137	Storage bins	
138	Shear wave Elastography	
139	Volume Navigation	
140	UGAP	
141	Hepatic Assistant	
142	Coded Contrast Imaging	
143	Stress echo	
144	Cardiac Strain (Automatic Function Imaging)	
145	On-board reporting	
146	TVI	
147	Wireless LAN	
148	CW	
149	DVR	
150	Table tools	
151	Advanced probes	
152	Breast Assistant, Powered by Koios DS™	
153	SonoNT SonoIT	
154	Advanced SRI Type 2	
155	**Peripheral Options**	
156	Integrated Option for Digital Color thermal Printer	
157	Digital A6 color thermal printer	
158	Foot switch, with programmable functionality	
159	CRF-200U card reader support (Japan Only)	
160	Console protective cover	
161	LOGIQ smart device apps	• Photo Assistant • Remote Control
162	**Display Modes**	
163	Live and stored display format	• Full size and split screen – both w/ thumbnails. For still and CINE
164	Review image format	• 4x4, and thumbnails. For still and CINE
165	Time line display	• Independent Dual B or CrossXBeam/PW Display • CW • Display formats top/bottom selectable format • Side/side selectable format
166	Virtual convex	
167	**Simultaneous capability**	
168	B or CrossXBeam/PW	
169	B or CrossXBeam/CW (Option)	
170	B or CrossXBeam/CFM or PDI	
171	B/M	
172	B/CrossXBeam	
173	B-Flow/PW	

174	Real-time Triplex Mode - B or CrossXBeam + CFM or PDI/PW	
175	**Selectable alternating modes**	
176	B or CrossXBeam/PW	
177	B or CrossXBeam + CFM (PDI)/PW	
178	B/CW (Option)	
179	**Multi-image (split/quad screen)**	
180	Live and/or frozen	
181	B or CrossXBeam + B or CrossXBeam/CFM or PDI or B-Flow (Option)	
182	PW/M	
183	Independent Cine playback	
184	**Display Annotation**	
185	Patient name: first, last and middle	
186	Patient ID	
187	Alternate patient ID	
188	Age, sex and date of birth	
189	Hospital name	
190	Date format: three types selectable	• MM/DD/YY • DD/MM/YY • YY/MM/DD
191	Time format: 2 types selectable	• 24 hours • 12 hours
192	Gestational age from	• LMP • GA • EDD • BBT
193	Probe name	
194	Map names	
195	Probe orientation	
196	Depth scale marker	
197	Lateral scale marker	
198	Focal zone markers	
199	Image depth	
200	Zoom depth	
201	B-Mode	• Gain • Dynamic range • Imaging frequency • Frame averaging • Gray map • SRI
202	M-Mode	• Gain • Dynamic range • Time scale
203	Doppler Mode	• Gain • Angle • Sample volume depth and width • Wall filter • Velocity and/or frequency scale • Spectrum inversion • Time scale • PRF • Doppler frequency
204	Color Flow Doppler Mode	• Line density • Frame averaging • Color scale, 3 types: Power, directional PDI and symmetrical velocity imaging • Color velocity range and baseline • Color threshold marker • Color gain • PDI • Spectrum inversion • Doppler frequency
205	Digital TGC with 8 independent controls	
206	Acoustic frame rate	

207	CINE gage, image number/frame number	
208	Body pattern: multiple human and animal types	
209	Application name	
210	Measurement results	
211	Operator message	
212	Displayed acoustic output	• TIS: Thermal Index Soft Tissue • TIC: Thermal Index Cranial (Bone) • TIB: Thermal Index Bone • MI: Mechanical Index
213	% of maximum power output	
214	Biopsy guide line and zone	
215	Heart rate	

216	**General System Parameters**	
217	**System Setup**	
218	Pre-programmable categories	
219	User programmable preset capability	
220	Factory default preset data	
221	Languages: English, French, German, Spanish, Italian, Brazilian, Portuguese, Russian, Greek, Swedish, Danish, Dutch, Finnish, Norwegian	
222	OB Report Formats including Tokyo Univ., Osaka Univ., USA, Europe and ASUM and WHO	
223	User defined annotations	
224	Body patterns	
225	Customized comment home position	
226	EZ Imaging: Simplified user interface for high volume workflow	
227	**Complete user manual available on board through Help (F1)**	
228	User manual and service manual are included in USB stick with each system. A printed manual is available upon request.	
229	**CINE Memory/Image Memory**	
230	1 GB of CINE memory	
231	Selectable CINE sequence for CINE review	
232	Prospective CINE mark	
233	Measurements/calculations and annotations on CINE playback	
234	Scrolling timeline memory	
235	Dual Image CINE display	
236	Quad Image CINE display	
237	CINE gauge and CINE image number display	
238	CINE review loop	
239	CINE review speed	
240	**Image Storage**	
241	On-board database of patient information from past exams	
242	Storage formats: DICOM	• Compressed/uncompressed • Single/multi-frame • Enhanced (3D/4D) • With/without raw data
243	Export JPEG, JPEG 2000, WMV (MPEG 4) formats	
244	Storage devices:	• USB memory stick: 64 MB to 64 GB (for exporting individual images/clips) • CD-R storage: 700 MB • DVD storage: -R (4.7 GB) • Hard drive image storage: ~830GB
245	Compare previous exam images with current exam	
246	Reload of archived date sets	
247	Network storage support for import, export, DICOM read, SaveAs, MPEGVue	
248	**Connectivity**	
249	Ethernet network connection	
250	Wireless LAN 802.11ac/a/b/g/n (Option)	
251	DICOM 3.0	• Verify • Print • Store • Modality worklist • Storage commitment • Modality performed procedure step (MPPS) • Media exchange • Off network/mobile storage queue • Query/retrieve
252	Public SR template	
253	Structured Reporting – compatible with vascular and OB, cardiac and breast standard	
254	InSite capability	
255	Advanced privacy and security (Option)	

256	**Physiological input panel (Option)**	
257	Physiological input	• ECG, 1 channel • PCG, 1 channel • AUX, 1 channel • Dual R-Trigger • Pre-settable ECG R delay time • Pre-settable ECG position • Adjustable ECG gain control • Pre-settable PCG position • Adjustable PCG gain control • Pre-settable AUX position • Adjustable AUX gain control
258	Automatic heart rate display	
259	Auto Ejection Fraction	
260	**Report writer (Option)**	
261	On-board reporting package automates report writing	
262	Formats various exam results into a report suitable for printing or reviewing on a standard PC	
263	Exam results include patient info, exam info, measurements, calculations, images, and comments Standard templates provided	
264	Customizable templates	
265	**Scanning Parameters**	
266	cSound™ Imageformer: Infinite number of effective channels	
267	Frame rate: 9,675 Hz maximum	
268	Displayed imaging depth: 0 – 100 cm	
269	Minimum depth of field: 0 – 2 cm (zoom) (probe dependent)	
270	Maximum depth of field: 0 – 100 cm (probe dependent)	
271	Continuous dynamic receive focus	
272	Continuous dynamic receive aperture	
273	Adjustable dynamic range, inifinite upper level	
274	Adjustable field of view (FOV)	
275	System Frequency Range: 0.7-24 MHz	
276	Image reverse: right/left	
277	Image rotation of 0°, 90°, 180°, 270°	
278	8 bits stored per color	
279	256 shades of gray	
280	256 color tones	
281	**Digital B-Mode**	
282	Adjustable	• Acoustic power • Gain • Dynamic range • Frame averaging • Gray scale map • Frequency • Speed of sound (application dependent) • Framerate • Scanning size (FOV or Angle) – Depending on the probe, see probe specifications • CrossXBeam • B colorization • Reject • Suppression • SRI
283	**Digital M-Mode**	
284	Adjustable	• Acoustic power • Gain • Dynamic range • Gray scale map • Frequency • Sweep speed • M colorization • M display format • Rejection
285	**Anatomical M-Mode**	
286	M-mode cursor adjustable at any plane	

287	Can be activated from a CINE loop from a live or stored image	
288	M & A capability	
289	Available with Color Flow Mode	
290	**Digital Spectral Doppler Mode**	
291	Adjustable	• Acoustic power • Gain • Dynamic range • Gray scale map • Transmit frequency • Wall filter • PW colorization • Velocity scale range • Sweep speed • Sample volume length • Angle correction • Steered linear • Spectrum inversion • Trace method • Baseline shift • Doppler auto trace • Time resolution • Compression • Trace direction • Trace sensitivity
292	**Digital Color Flow Mode**	
293	Adjustable	• Acoustic power • Color maps, including velocity-variance maps • Gain • Velocity scale range • Wall filter • Packet size • Line density • Spatial filter • Steering angle • Baseline shift • Frame average • Threshold • Auto ROI placement and steering on linear • Accumulation mode • Flash suppression • Shortcuts
294	**Digital Power Doppler Imaging**	
295	Adjustable	• Acoustic power • Color maps, velocity-variance maps • Gain including • Velocity scale range • Wall filter • Packet size • Line density • Spatial filter • Steering angle • Frame average • Threshold • Accumulation mode • Flash suppression • Shortcuts
296	**Continuous Wave Doppler (Option)**	
297	Available on M5Sc-D, 6S-D, 6Tc-RS, P2D and P6D probes	
298	Steerable CW mode included	

299	Adjustable	• Acoustic power • Gain • Dynamic range • Gray scale map • Transmit frequency • Wall filter • CW colorization • Velocity scale range • Sweep speed • Angle correction • Spectrum inversion • Trace method • Baseline shift • Doppler auto trace • Compression • Trace direction • Trace sensitivity
300	**Automatic Optimization**	
301	Optimize B-Mode image to help improve contrast resolution with one button press	
302	Selectable amount of contrast resolution improvement (low, medium, high)	
303	CTO (Continuous Tissue Optimization) – continuously adjusts B-Mode axial and lateral gain uniformity and overall gain level suppressing the noise	
304	Auto-spectral optimize – adjusts baseline, invert, PRF (on live image), and angle correction with one button press	
305	Auto CF and PW positioning – adjusts ROI position, sample volume position and steering with one button press	
306	**Coded Harmonic Imaging**	
307	Available on all 2D and 4D probes	
308	**B-Flow (Option)**	
309	Available on the following probes: C1-6-D, C1-6VN-D, C2-7-D, C2-7VN-D, C2-9-D, C2-9VN-D, C3-10-D, L2-9-D, L2-9VN-D, L3-12-D, L6-24-D ML6-15-D, M5Sc-D, L8-18i-D	
310	Background	
311	Sensitivity/PRI	
312	Acoustic power	
313	Frequency	
314	Line density	
315	Frame average	
316	Gray scale map	
317	Tint map	
318	Dynamic range	
319	Rejection	
320	Gain	
321	Suppression	
322	SRI	
323	Accumulation	
324	Visualization	
325	**Radiant*flow*™**	
326	Easy, fast visualization of tiny vessels, displaying as a 3D effect	
327	Available in Color Doppler, Power Doppler and MVI	
328	**B Steer+ (Option)**	
329	Available on the following probes: L2-9-D, ML6-15-D, L8-18i-D, L3-12-D, L2-9VN-D	
330	**Coded contrast imaging (Option)**	
331	Available on the following probes: C1-6-D, C1-6VN-D, C2-9-D, C2-9VN-D, C2-7-D, C2-7VN-D, C3-10-D, IC5-9-D, L2-9-D, L2-9VN-D, L3-12-D, M5Sc-D, ML6-15-D, RAB6-D, RIC5-9-D, L6-24-D	
332	2 contrast timers	
333	Timed updates: 0.05 – 10 seconds	
334	Accumulation mode, seven levels	
335	Maximum enhance mode	
336	Flash	
337	Time intensity curve (TIC) analysis	
338	Parametric imaging	
339	Ability to save still image during clip acquisition	

340	The LOGIQ Fortis is designed for compatibility with most commercially available ultrasound contrast agents. Because the availability of these agents is subject to government regulation and approval, product features intended for use with these agents may not be commercially marketed nor made available before the contrast agent is cleared for use. Contrast related product features are enabled only on systems for delivery to an authorized country or region of use.	
341	**LOGIQView**	
342	Extended field of view Imaging	
343	Up to 160 cm (63") scan length	
344	Available on all 2D imaging probes	
345	For use in B-Mode	
346	CrossXBeam is available on linear probes	
347	Auto detection of scan direction	
348	Pre-or post-process zoom	
349	Rotation	
350	Auto best fit on monitor	
351	Measurements in B-Mode	
352	**3D**	
353	Allows unlimited rotation and planar translation	
354	3D reconstruction from CINE sweep	
355	Easy 3D available on all probes	
356	**Advanced 3D**	
357	Acquisition of color data	
358	Automatic rendering	
359	3D landscape technology	
360	3D movie	
361	**Real-time 4D (Option)**	
362	Acquisition modes	• Real Time 4D • Spatio-Temporal Image Correlation (Option) • Static 3D
363	Visualization modes	• 3D rendering (diverse surface and intensity projection modes) • Sectional planes (3 section planes perpendicular to each other) • Omniview (Option) • Volume contrast imaging – Static (Option) • Volume contrast imaging – Omniview (Option) • Tomographic ultrasound imaging (Option) • Volume Analyses – VOCAL: semi-auto/manual segmentation tool (segmentation using touch screen) (Option) – 3D Static only – Threshold Volume: measure volume below and above a threshold
364	Render mode	• Surface texture, surface smooth, max-, min- and X-ray (average intensity projection), mix mode of two render modes • HD*live* ™
365	SonoRender*live*	
366	Curved 3 point Render start	
367	3D Movie	
368	Scalpel: 3D cut tool	
369	Display format:	• Quad: A-/B-/C-Plane/3D • Dual: A-Plane/3D • Single: 3D or A- or B- or C-Plane
370	Automated Volume Calculation – VOCAL II	
371	Betaview	
372	**Volume navigation (Option)**	
373	Available on the following probes: C1-6VN-D, C2-9VN-D, C2-7VN-D, C3-10-D, L2-9VN-D, ML6-15-D, IC5-9-D, L8-18i-D, M5Sc-D	
374	Sensor-based acquisition	
375	Position markers	
376	Needle tip tracking	
377	Virtual tracking	
378	Auto image registration	
379	Tru3D feature includes	
380	Render modes: gray surface, texture, min-, max-, average-intensity	

381	Measurements: distance, angle, area, volume
382	3D Movie
383	**Scan assistant (Option)**
384	Factory programs
385	User-defined programs
386	Steps include image annotations, mode transitions, basic imaging controls and measurement initiation
387	**Compare Assistant (Option)**
388	Allows side-by-side comparison of previous ultrasound and other modality exams during live scanning
389	**Breast productivity package**
390	Auto measurement
391	Worksheet summary includes measurements and locations for lesions and lymph nodes
392	Feature assessment
393	BI-RADS™ assessment
394	User editable
395	**Thyroid productivity package (Option)**
396	Auto measurement
397	Worksheet summary includes measurements and locations for nodule, parathyroid and lymph nodes
398	Feature assessment
399	BI-RADS™ assessment
400	User editable
401	**Start Assistant**
402	Automatically select category, probe, preset, or scan assistant from worklist exam description
403	Learn the category, probe, preset, and scan assistant based on exam description
404	**Shear Wave Elastography (Option)**
405	Available on the following probes: C1-6-D, C1-6VN-D, L2-9-D, L2-9VN-D, IC5-9-D, L8-18i-D, ML6-15-D, L3-12-D
406	User programmable measurement display in kPa and meters per second
407	Single and dual view display
408	Applications: Abdominal, Breast, Musculoskeletal, Small Parts, Prostate
409	**Strain elastography (Option)**
410	Available on the following probes: ML6-15-D, L2-9-D, L2-9VN-D, L3-12-D, IC5-9-D, C2-9-D, C2-9VN-D, C1-6-D, C1-6VN-D, L8-18i-D, BE9CS-D
411	Relative analysis tool
412	Applications: Abdominal, Breast, Musculoskeletal, Small Parts, Prostate, Thyroid
413	**UGAP (Option)**
414	Available on the following probes: C1-6-D, C1-6VN-D, C2-9-D, C2-9VN-D
415	Measures liver attenuation* (attenuation coefficient [dB/cm/MHz]) by auto measure algorithm with reference B-mode
416	Simple and 2D color map (attenuation color map and Measurement Position Indicator Map)
417	**Quantitative flow analysis (Option)**
418	Available in color and power Doppler
419	**TVI (Option)**
420	Available on the following probes: M5Sc-D, 6Tc-RS, 6S-D probes
421	Myocardial Doppler imaging with color overlay on tissue image
422	Tissue color overlay can be removed to show just the 2D image, still retaining the tissue velocity information
423	Curved anatomical M-Mode: free (curved) drawing of M-Mode generated from the cursor independent from the axial plane
424	Q-Analysis: multiple time-motion trace display from selected points in the myocardium
425	**Stress echo (Option)**
426	Advanced and flexible stress echo examination capabilities
427	Provides exercise and pharmacological protocol templates
428	6 default templates
429	Template editor for user configuration of existing templates or creation of new templates
430	Reference scan display during acquisition for stress level comparison (dual screen)
431	Baseline level/previous level selectable
432	Raw data continuous capture
433	Over 100 sec. available
434	Wall motion scoring (bulls-eye and segmental)
435	Smart stress: Automatically set up various scanning parameters (e.g. geometry, frequency, gain) according to same projection on previous level
436	**Auto EF (Option)**
437	Allows semi-automatic measurement of the global EF (Ejection Fraction)
438	User editable
439	**Cardiac AFI (Option)**
440	Allows assessment of the complete left ventricle with all segments at a glance by combining three longitudinal views into one comprehensive bulls-eye view
441	2D strain based data moves into clinical practice

442	**Virtual Convex**	
443	Provides a convex field of view	
444	Compatible with CrossXBeam	
445	Available on all linear and sector probes	
446	**SRI-HD and Advanced SRI**	
447	Speckle reduction imaging	
448	Provides multiple levels of speckle reduction	
449	Compatible with side-by-side DualView display	
450	Advanced SRI: two types selectable	• Type 1 – Compatible with all linear, convex and sector probes • Type 2 (Option) – Compatible with OB/GYN application
451	**CrossXBeam**	
452	Provides variable angle spatial compounding	
453	Live side-by-side DualView display	
454	Compatible with	• Color mode • PW • SRI • Coded harmonic imaging • Virtual convex
455	Available on all curved and linear probes	
456	**Controls available while “live”**	
457	Magnification Zoom: Magnifies the entire image on the screen without zoom ROI, 20x maximum zoom factor	
458	Pan Zoom: Magnifies the display of the data within the ROI	
459	HD Zoom: Magnifies the image within the zoom ROI, with higher spatial resolution than original images	
460	B/M/CrossXBeam-Mode	• Gain • TGC • Dynamic range • Acoustic output • Framerate control • Sweep speed for M-Mode • CrossXBeam angle
461	PW-Mode	• Gain • Dynamic range • Acoustic output • Transmission frequency • PRF • Wall filter • Spectral averaging • Sample volume gate: length, depth • Velocity scale
462	Color Flow-Mode	• CFM gain • CFM velocity range • Acoustic output • Wall echo filter • Packet size • Frame rate control • CFM spatial filter • CFM frame averaging • CFM line resolution • Frequency/velocity baseline shift
463	**Controls available on “freeze” or recall**	
464	Automatic optimization	
465	SRI	
466	CrossXBeam – display non-compounded and compounded image simultaneously in split screen	
467	3D reconstruction from a stored CINE loop	
468	B/M/CrossXBeam-Mode	• Gray map optimization • TGC • Colorized B and M • Frame average (loops only) • Dynamic range
469	Anatomical M-Mode	
470	Magnification zoom	
471	Pan zoom	
472	Maximum read zoom to 8x	

473	Baseline shift	
474	Sweep speed	
475	PW mode	• Gray map • Post gain • Baseline shift • Sweep speed • Invert spectral wave form • Compression • Rejection • Colorized spectrum • Display format • Doppler audio • Angle correct • Quick angle correct • Auto angle correct
476	Color flow	• Overall gain (loops and stills) • Color map • Transparency map • Frame averaging (loops only) • Flash suppression • CFM display threshold • Spectral invert for color/Doppler
477	Anatomical M-Mode on cine loop	
478	4D	• Gray map, colorize • Post gain • Change display – single, dual, quad sectional or rendered
479	**Measurements/Calculations**	
480	**General B-Mode**	
481	Depth and distance	
482	Circumference (ellipse/trace)	
483	Area (ellipse/trace)	
484	Volume (ellipsoid)	
485	% Stenosis (area or diameter)	
486	Angle between two lines	
487	Dual B-mode capability	
488	**General M-Mode**	
489	M-Depth	
490	Distance	
491	Time	
492	Slope	
493	Heart rate	
494	**General Doppler measurements/calculations**	
495	Velocity	
496	Time	
497	A/B ratio (velocities/frequency ratio)	
498	PS (Peak Systole)	
499	ED (End Diastole)	
500	PS/ED (PS/ED Ratio)	
501	ED/PS (ED/PS Ratio)	
502	AT (Acceleration Time)	
503	ACCEL (Acceleration)	
504	TAMAX (Time Averaged Maximum Velocity)	
505	Volume flow (TAMEAN and vessel area)	
506	Heart rate	
507	PI (Pulsatility Index)	
508	RI (Resistivity Index)	
509	**Real-time Doppler Auto Measurements/Calculations**	
510	PS (Peak Systole)	
511	ED (End Diastole)	
512	MD (Minimum Diastole)	
513	PI (Pulsatility Index)	
514	RI (Resistivity Index)	
515	AT (Acceleration Time)	

516	ACC (Acceleration)	
517	PS/ED (PS/ED Ratio)	
518	ED/PS (ED/PS Ratio)	
519	HR (Heart Rate)	
520	TAMAX (Time Averaged Maximum velocity)	
521	PVAL (Peak Velocity value)	
522	Volume flow (TAMEAN and vessel area)	
523	**Abdominal measurements/calculations**	
524	Shear Elasto velocity	
525	Shear Elasto stiffness	
526	Attenuation rate	
527	Attenuation coefficient	
528	Summary reports	
529	**Small Parts measurements/calculations**	
530	Breast Lesion	
531	Thyroid	
532	Parathyroid	
533	Lymph Node	
534	Nodule	
535	Isthmus AP	
536	Shear Elasto velocity	
537	Shear Elasto stiffness	
538	Summary reports	
539	**OB measurements/calculations**	
540	Gestational age by	• GS (Gestational Sac) • CRL (Crown Rump Length) • FL (Femur Length) • BPD (Biparietal Diameter) • AC (Abdominal Circumference) • HC (Head Circumference) • APTD x TTD (Anterior/Posterior Trunk Diameter by Transverse Trunk Diameter) • FTA (Fetal Trunk Cross-sectional Area) • HL (Humerus Length) • BD (Binocular Distance) • FT (Foot Length) • OFD (Occipital Frontal Diameter) • TAD (Transverse Abdominal Diameter) • TCD (Transverse Cerebellum Diameter) • THD (Thorax Transverse Diameter) • TIB (Tibia Length) • ULNA (Ulna Length) • OOD (Outer Orbital Diameter) • IOD (Inner Orbital Diameter) • FIB (Fibula length) • Radius (Radius length) • LV (Lateral Ventricle width) (= SL)
541	Estimated Fetal Weight (EFW) by:	• AC, BPD • AC, BPD, FL • AC, BPD, FL, HC • AC, FL • AC, FL, HC • AC, HC • BPD, APTD, TTD, FL • BPD, APTD, TTD, SL
542	Fetal graphical trending	
543	Growth percentiles	
544	Multi-gestational calculations (4)	
545	Fetal qualitative description (anatomical survey)	
546	Fetal environmental description (biophysical profile)	
547	Programmable OB tables	
548	Over 20 selectable OB calculations	
549	Expanded worksheets	
550	Summary Reports	

551	**OB Calculations and ratios**
552	FL/BPD
553	FL/AC
554	FL/HC
555	HC/AC
556	CI (Cephalic Index)
557	AFI (Amniotic Fluid Index)
558	CTAR (Cardio-Thoracic Area Ratio)
559	Measurements/calculations by: Alexander, ASUM, ASUM 2001, Bahlmann, Baschat, Berkowitz, Bertagnoli, Brenner, Campbell, CFEF, Chervenak, Chitty, Doubilet, Ebing, Eik-Nes Goldstein, Hadlock, Hansmann, Hellman, Hill, Hohler, Jeanty, JSUM, Kramer, Kurmanavicius, Kurtz, Mari, Mayden, Mercer, Merz, Moore, Nelson, Osaka University, Paris, Pexsters, Rempen, Robinson, Shepard, Shepard/Warsoff, Sonek, Tokyo University, Tokyo/Shinozuka, WHO, Williams, Yarkoni
560	**OB measure assistant**
561	Allows automatic measurement of BPD, HC, FL and AC
562	User editable
563	**SonoNT and SonoIT**
564	SonoNT measures the contour detection of the NT border
565	SonoIT is a system supported measurement for Intracranial Translucency
566	**GYN measurements/calculations**
567	Right ovary length, width, height
568	Left ovary length, width, height
569	Uterus length, width, height
570	Cervix length, trace
571	Ovarian volume
572	ENDO (Endometrial thickness)
573	Ovarian RI
574	Uterine RI
575	Follicular measurements
576	Fibroid measurements
577	Qualitative description (anatomical survey)
578	Mean Uterine Artery (Gomez) Doppler Measurement
579	Summary reports
580	**Vascular measurements/calculations**
581	SYS DCCA (Systolic Distal Common Carotid Artery)
582	DIAS DCCA (Diastolic Distal Common Carotid Artery)
583	SYS MCCA (Systolic Mid Common Carotid Artery)
584	DIAS MCCA (Diastolic Mid Common Carotid Artery)
585	SYS PCCA (Systolic Proximal Common Carotid Artery)
586	DIAS PCCA (Diastolic Proximal Common Carotid Artery)
587	SYS DICA (Systolic Distal Internal Carotid Artery)
588	DIAS DICA (Systolic Distal Internal Carotid Artery)
589	SYS MICA (Systolic Mid Internal Carotid Artery)
590	DIAS MICA (Diastolic Mid Internal Carotid Artery)
591	SYS PICA (Systolic Proximal Internal Carotid Artery)
592	DIAS PICA (Diastolic Proximal Internal Carotid Artery)
593	SYS DECA (Systolic Distal External Carotid Artery)
594	DIAS DECA (Diastolic Distal External Carotid Artery)
595	SYS PECA (Systolic Proximal External Carotid Artery)
596	DIAS PECA (Diastolic Proximal External Carotid Artery)
597	VERT (Systolic Vertebral Velocity)
598	SUBCLAV (Systolic Subclavian Velocity)
599	Auto IMT (Option)
600	Summary reports
601	**Urological measurements/calculations**
602	Bladder volume
603	Prostate volume
604	Left/right renal volume
605	Generic volume
606	Post-void bladder volume
607	Pelvic floor measurements
608	Summary reports
609	**TCD measurements/calculations**
610	MCA, ACA, PCA, ICA
611	AComA, PCom A
612	Vert

613	Basilar	
614	MCA/ICA Ratio	
615	Summary reports	
616	**Pediatric and Neonatal measurements/calculations**	
617	Hip angle	
618	Hip orientation	
619	Summary reports	
620	**Probes (All Optional)**	
621	**6S-D, sector probe**	
622	Applications	Pediatric cardiac, pediatric abdomen
623	Bandwidth	2.0 – 8.0 MHz
624	Number of elements	96
625	Field of view (max.)	115°
626	Physical foot print	15 x 9 mm
627	B-Mode frequency	4.0, 4.2, 5.0, 5.5, 6.5 MHz
628	Harmonic frequency	4.7, 4.9, 5.3, 5.7, 6.1, 6.3 MHz
629	PW Doppler frequency	2.8, 3.1, 3.6, 4.2 MHz
630	Color Doppler frequency	2.7, 3.1, 4.2, 5.0 MHz
631	**6Tc-RS, trans-esophageal probe**	
632	Applications	Adult cardiac
633	Bandwidth	2.0 – 8.0 MHz
634	Number of elements	64
635	Field of view (max.)	90°
636	Physical foot print	37 x 13 x 10 mm
637	B-Mode frequency	5.0, 6.0, 6.5 MHz
638	Harmonic frequency	6.0 MHz
639	PW Doppler frequency	3.1, 3.6, 4.2, 5.0, 6.3 MHz
640	Color Doppler frequency	3.3, 4.1, 4.7, 5.5 MHz
641	**BE9CS-D**	
642	Applications	Urology
643	Biopsy guide	Single angle, disposable (E8387M); Single angle, reusable (E8387MA)
644	Bandwidth	3.0 - 12.0 MHz
645	Number of elements	64
646	Field of view (max.)	133°
647	Physical foot print	19 x 19 mm
648	B-Mode frequency	6.0, 7.0, 8.0, 9.0 MHz
649	Harmonic frequency	7.0, 8.0, 9.0, 10.0 MHz
650	PW Doppler frequency	4.2, 5.0, 6.3 MHz
651	Color Doppler frequency	4.3, 6.3, 8.2 MHz
652	**C1-6-D, XDclear™ convex probe**	
653	Applications	Abdomen, OB/GYN, pediatric, peripheral vascular, general musculoskeletal
654	Biopsy guide	Multi-angle, disposable with a reusable bracket (H4917VB)
655	Bandwidth	1.0 – 6.0 MHz
656	Number of elements	192
657	Field of view (max.)	80°
658	Physical foot print	67 x 11 mm
659	B-Mode frequency	2.0, 2.5, 3.0, 4.0 MHz
660	Harmonic frequency	1.5, 2.5, 3.0, 4.5, 6.0, 6.5 MHz
661	PW Doppler frequency	1.7, 2.1, 2.5, 3.6 MHz
662	Color Doppler frequency	1.8, 2.1, 2.5, 2.8, 3.0 MHz
663	**C1-6VN-D, VNav inside XDclear convex probe**	
664	VNav sensor inside probe for Volume Navigation tracking without sensor cables	
665	Applications	Abdomen, OB/GYN, pediatric, peripheral vascular, general musculoskeletal
666	Biopsy guide	Multi-angle, disposable with a reusable bracket (H4917VB)
667	Bandwidth	1.0 – 6.0 MHz
668	Number of elements	192
669	Field of view (max.)	80°
670	Physical foot print	67 x 11 mm
671	B-Mode frequency	2.0, 2.5, 3.0, 4.0 MHz
672	Harmonic frequency	1.5, 2.5, 3.0, 4.5, 6.0, 6.5 MHz
673	PW Doppler frequency	1.7, 2.1, 2.5, 3.6 MHz
674	Color Doppler frequency	1.8, 2.1, 2.5, 2.8, 3.0 MHz

675	**C2-7-D, micro convex biopsy probe**	
676	Applications	Abdomen, pediatric
677	Biopsy guide	Multi-angle, disposable with a reusable bracket (H40482LK), Multi-Angle, reusable stainless bracket (H40482LL)
678	Bandwidth	1.0 – 6.0 MHz
679	Number of elements	144
680	Field of view (max.)	110°
681	Physical foot print	31 x 10 mm
682	B-Mode frequency	2.5, 4.0, 6.0 MHz
683	Harmonic frequency	3.0, 4.0, 5.0, 6.0 MHz
684	PW Doppler frequency	1.8, 2.1, 2.5, 3.1 MHz
685	Color Doppler frequency	2.1, 2.4, 3.1, 3.7 MHz
686	**C2-7-VN-D, VNav inside XDclear convex probe**	
687	VNav sensor inside probe for Volume Navigation tracking without sensor cables	
688	Applications	Abdomen, pediatric
689	Biopsy guide	Multi-angle, disposable with a reusable bracket (H40482LK), Multi-Angle, reusable stainless bracket (H40482LL)
690	Bandwidth	1.0 – 6.0 MHz
691	Number of elements	144
692	Field of view (max.)	110°
693	Physical foot print	31 x 10 mm
694	B-Mode frequency	2.5, 4.0, 6.0 MHz
695	Harmonic frequency	3.0, 4.0, 5.0, 6.0 MHz
696	PW Doppler frequency	1.8, 2.1, 2.5, 3.1 MHz
697	Color Doppler frequency	2.1, 2.4, 3.1, 3.7 MHz
698	**C2-9-D, XDclear convex probe**	
699	Applications	Abdomen, OB/GYN, pediatric, peripheral vascular, neonatal, neonatal transcranial, general musculoskeletal
700	Biopsy guide	Multi-angle, disposable with a reusable bracket (H4913BA)
701	Bandwidth	2.0 – 9.0 MHz
702	Number of elements	192
703	Field of view (max.)	80°
704	Physical foot print	52 x 9 mm
705	B-Mode frequency	3.0, 4.5, 6.0, 7.0 MHz
706	Harmonic frequency	2.5, 3.5, 5.0, 7.0, 9.0 MHz
707	PW Doppler frequency	2.5, 3.1, 3.6, 4.2, 5.0, 6.3 MHz
708	Color Doppler frequency	3.1, 4.2, 4.6, 5.4 MHz
709	**C2-9-VN-D, VNav inside XDclear convex probe**	
710	VNav sensor inside probe for Volume Navigation tracking without sensor cables	
711	Applications	Abdomen, OB/GYN, pediatric, peripheral vascular, neonatal, neonatal transcranial, general musculoskeletal
712	Biopsy guide	Multi-angle, disposable with a reusable bracket (H4913BA)
713	Bandwidth	2.0 – 9.0 MHz
714	Number of elements	192
715	Field of view (max.)	80°
716	Physical foot print	52 x 9 mm
717	B-Mode frequency	3.0, 4.5, 6.0, 7.0 MHz
718	Harmonic frequency	2.5, 3.5, 5.0, 7.0, 9.0 MHz
719	PW Doppler frequency	2.5, 3.1, 3.6, 4.2, 5.0, 6.3 MHz
720	Color Doppler frequency	3.1, 4.2, 4.6, 5.4 MHz
721	**C3-10-D, XDclear micro convex probe**	
722	Applications	Abdomen, neonatal, pediatric, peripheral vascular, neonatal transcranial, small part
723	Bandwidth	2.0 – 11.0 MHz
724	Number of elements	192
725	Field of view (max.)	95°
726	Physical foot print	26 x 5 mm
727	B-Mode frequency	4.0, 6.0, 8.0 MHz
728	Harmonic frequency	6.0, 8.0, 10.0 MHz
729	PW Doppler frequency	3.1, 4.2, 6.3, 7.1 MHz
730	Color Doppler frequency	3.9, 5.3, 6.6 MHz
731	**IC5-9-D, micro convex probe**	
732	Applications	OB/GYN, urology
733	Biopsy guide	Single angle, disposable with a disposable bracket (E8385MJ) or reusable bracket (H40412LN)

734	Bandwidth	3.0 – 10.0 MHz
735	Number of elements	192
736	Field of view (max.)	180°
737	Physical foot print	26 x 6 mm
738	B-Mode frequency	4.5, 5.0, 5.5, 6.0, 7.0, 8.0 MHz
739	Harmonic frequency	6.0, 6.5, 7.0, 9.0 MHz
740	PW Doppler frequency	3.6, 4.2, 5.0 MHz
741	Color Doppler frequency	4.6, 5.9, 6.7 MHz
742	**L2-9-D, XDclear linear probe**	
743	Applications	Peripheral vascular, pediatric, abdomen, OB/GYN, general musculoskeletal, superficial musculoskeletal, neonatal, neonatal transcranial and small parts inculding breast, thyroid and scrotal
744	Biopsy guide	Multi-angle, disposable with a reusable bracket (H44901AM)
745	Bandwidth	2.0 – 10.0 MHz
746	Number of elements	192
747	Field of view (max.)	44 mm
748	Physical foot print	53 x 14 mm
749	B-Mode frequency	4.0, 4.5, 5.0, 6.0, 7.0 MHz
750	Harmonic frequency	5.0, 6.0, 7.0, 8.0, 9.0, 9.4 MHz
751	PW Doppler frequency	2.5, 2.8, 3.1, 3.6, 4.2, 5.0 MHz
752	Color Doppler frequency	3.1, 4.0, 4.6, 5.3 MHz
753	**L2-9VN-D, VNav inside XDclear linear probe**	
754	VNav sensor inside probe for Volume Navigation tracking without sensor cables	
755	Applications	Peripheral vascular, pediatric, abdomen, OB/GYN, general musculoskeletal, superficial musculoskeletal, neonatal, neonatal transcranial and small parts inculding breast, thyroid and scrotal
756	Biopsy guide	Multi-angle, disposable with a reusable bracket (H44901AM)
757	Bandwidth	2.0 – 10.0 MHz
758	Number of elements	192
759	Field of view (max.)	44 mm
760	Physical foot print	53 x 14 mm
761	B-Mode frequency	4.0, 4.5, 5.0, 6.0, 7.0 MHz
762	Harmonic frequency	5.0, 6.0, 7.0, 8.0, 9.0, 9.4 MHz
763	PW Doppler frequency	2.5, 2.8, 3.1, 3.6, 4.2, 5.0 MHz
764	Color Doppler frequency	3.1, 4.0, 4.6, 5.3 MHz
765	**L3-12-D, linear probe**	
766	Applications	Abdomen, OB, general musculoskeletal, superficial musculoskeletal, neonatal, neonatal transcranial, small parts, vascular
767	Biopsy guide	Multi-angle, disposable with a reusable bracket (H78652PA)
768	Bandwidth	3.0 – 11.0 MHz
769	Number of elements	256
770	Field of view (max.)	51 mm
771	Physical foot print	51 x 4 mm
772	B-Mode frequency	6.0, 8.0, 10.0, 12.0 MHz
773	Harmonic frequency	4.0, 6.0, 8.0, 10.0, 12.0 MHz
774	PW Doppler frequency	4.2, 5.0, 6.3, 8.3 MHz
775	Color Doppler frequency	4.3, 4.9, 5.4, 6.1, 7.2, 8.0 MHz
776	**L6-24-D, linear probe**	
777	Applications	General musculoskeletal, superficial musculoskeletal, pediatrics, thyroid
778	Bandwidth	6.0 – 20.0 MHz
779	Number of elements	192
780	Field of view (max.)	26 mm
781	Physical foot print	26 x 2 mm
782	B-Mode frequency	12.0, 16.0, 21.0 MHz
783	Harmonic frequency	12.0, 18.0, 24.0 MHz
784	PW Doppler frequency	8.3, 10.0, 12.5 MHz
785	Color Doppler frequency	9.2, 11.2, 12.2 MHz
786	**L8-18i-D, linear probe**	
787	Applications	Small parts, peripheral vascular, neonatal, neonatal transcranial, general musculoskeletal, superficial musculoskeletal, intraoperative
788	Bandwidth	4.0 – 15.0 MHz
789	Number of elements	168

790	Field of view (max.)	25 mm
791	Physical foot print	35 x 10 mm
792	B-Mode frequency	7.0, 9.0, 13.0, 16.0 MHz
793	Harmonic frequency	14.0, 16.0, 18.0 MHz
794	PW Doppler frequency	5.0, 6.3, 7.1, 8.3 MHz
795	Color Doppler frequency	6.3, 6.7, 9.6, 10.5 MHz
796	**M5Sc-D, XDclear sector probe**	
797	Applications	Adult cardiac, pediatric cardiac, adult cephalic, abdominal
798	Biopsy guide	Multi-angle, disposable with a reusable bracket (H45561FC)
799	Bandwidth	1.0 – 5.0 MHz
800	Number of elements	288
801	Field of view (max.)	120°
802	Physical foot print	28 x 17 mm
803	B-Mode frequency	2.0, 2.5, 3.5, 4.5 MHz
804	Harmonic frequency	2.4, 3.0, 3.2, 3.3, 3.7, 4.0, 4.5 MHz
805	PW Doppler frequency	1.6, 1.7, 1.8, 1.9, 2.1, 2.5, 3.1, 3.6 MHz
806	Color Doppler frequency	1.7, 1.8, 1.9, 2.2, 2.4, 2.5, 3.0, 3.1, 3.7, 3.8 MHz
807	**ML6-15-D, matrix array linear probe**	
808	Applications	Abdomen, peripheral vascular, neonatal, pediatric, neonatal transcranial, general musculoskeletal, superficial musculoskeletal and small parts inculding breast, thyroid and scrotal
809	Biopsy guide	Multi-angle, disposable with a reusable bracket (H40432LJ)
810	Bandwidth	4.0 – 16.0 MHz
811	Number of elements	1008
812	Field of view (max.)	50 mm
813	Physical foot print	50 x 10 mm
814	B-Mode frequency	7.0, 9.0, 10.0, 11.0, 12.0, 15.0 MHz
815	Harmonic frequency	10.0, 12.0, 14.0, 15.0 MHz
816	PW Doppler frequency	5.0, 6.3, 8.3 MHz
817	Color Doppler frequency	5.1, 6.1, 7.3, 8.2, 9.2, 10.3, 11.4, 12.4 MHz
818	**P2D, CW split crystal probe**	
819	Applications	Adult cardiac, pediatric cardiac, peripheral vascular, adult cephalic
820	Frequency	2.1 MHz
821	**P6D, CW split crystal probe**	
822	Applications	Adult cardiac, pediatric cardiac, peripheral vascular, adult cephalic
823	Frequency	6.3 MHz
824	**RAB6-D, convex volume probe**	
825	Applications	Abdomen, OB/GYN, pediatric, neonatal
826	Biopsy guide	Single angle, reusable bracket (H46701AE)
827	Bandwidth	2.0 – 8.0 MHz
828	Number of elements	192
829	Field of view (max.)	80°
830	Physical foot print	62 x 34 mm
831	B-Mode frequency	3.5, 5.0, 8.0 MHz
832	Harmonic frequency	4.0, 5.0, 6.5, 8.0 MHz
833	PW Doppler frequency	3.1, 4.2, 5.0 MHz
834	Color Doppler frequency	2.8, 3.5, 3.8 MHz
835	**RIC5-9-D, convex volume probe**	
836	Applications	OB/GYN, urology
837	Biopsy guide	Single angle, reusable (H46721R)
838	Bandwidth	3.0 – 10.0 MHz
839	Number of elements	192
840	Field of view (max.)	180°
841	Physical foot print	32 x 27 mm
842	B-Mode frequency	5.0, 5.5, 6.0, 6.5, 7.0, 8.0 MHz
843	Harmonic frequency	6.0, 6.5, 7.0, 9.0 MHz
844	PW Doppler frequency	3.6, 4.2, 5.0 MHz
845	Color Doppler frequency	4.3, 6.1, 7.3 MHz
846	**External Inputs and outputs (not including on-board peripherals)**	
847	HDMI	
848	Ethernet	
849	Multiple USB 3.0 ports	
850	**Safety Conformance**	

851	**The LOGIQ Fortis is:**	
852	Classified to UL 60601-1 by a Nationally Recognized Test Lab	
853	Certified to CAN/CSA-C22.2 No. 60601.1-M90 by an SCC accredited test lab	
854	CE Marked to EU Medical Device Regulation MDR 2017/745	
855	Compliant to Council Directive 2011/65/EU for RoHS	
856	Conforms to the following standards for safety (including national deviations)	• EMC Emissions group 1 class A device requirements as per sub clause 4.2 of CISPR 11 • IEC 60601-1 Medical electrical equipment – Part 1: General requirements for safety • IEC 60601-1-2 Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic disturbance – Requirements and tests • IEC 60601-1-6 Medical electrical equipment Part 1-6 general requirements for basic safety and essential performance – Collateral standard: usability • IEC 60601-2-37 Medical electrical equipment – Part 2-37: Particular requirements for the safety of ultrasonic medical diagnostic and monitoring equipment • IEC 62366 Medical devices – Application of usability engineering to medical devices • IEC62366-1 Medical device software – Software life-cycle processes • ISO 10993-1 Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process

857	**Supplement: cardiac measurements/calculations**	
858	**B-Mode measurements**	
859	Aorta	• Aortic Root Diameter (Ao Root Diam) • Aortic Arch Diameter (Ao Arch Diam) • Ascending Aortic diameter (Ao Asc) • Descending Aortic Diameter (Ao Desc Diam) • Aorta Isthmus (Ao Isthmus) • Aorta (Ao st junct)
860	Aortic valve	• Aortic Valve Cusp Separation (AV Cusp) • Aortic Valve Area Planimetry (AVA Planimetry) • (Trans AVA)
861	Left atrium	• Left Atrium Diameter (LA Diam) • LA Length (LA Major) • LA Width (LA Minor) • Left Atrium Diameter to AoRoot Diameter Ratio (LA/Ao ratio) • Left Atrium Area (LAA(d), LAA(s)) • Left Atrium Volume, Single Plane, Method of Disk (LAEDV A2C, LAESV A2C) (LAEDV A4C, LAESV A4C), (LAEDV A-L, LAEDV Index A-L, LAESV A-L, LAESV Index A-L)
862	Left ventricle	• Left Ventricle Mass (LVPWd, LVPWs) • Left Ventricle Volume, Teichholz/Cubic (LVIDd, LVI Ds) • Left Ventricle Internal Diameter (LVIDd, LVI Ds) Left Ventricle Length (LVLd, LVLs) • Left Ventricle Outflow Tract Diameter (LVOT Diam) • Left Ventricle Posterior Wall Thickness (LVPWd, LVPWs) • Left Ventricle Length (LV Major) • Left Ventricle Width (LV Minor) • Left Ventricle Outflow Tract Area (LVOT) • Left Ventricle Area, Two Chamber/Four Chamber/Short Axis (LVA (d), LVA (s)) • Left Ventricle Endocardial Area, Width (LVA (d), LVA(s)) • Left Ventricle Epicardial Area, Length (LVAepi (d), LVAepi (s)) • Left Ventricle Mass Index (LVPWd, LVPWs) • Ejection Fraction, Teichholz/Cube (LVIDd, LVIDs)
863	Left ventricle continued	• Left Ventricle Posterior Wall Fractional Shortening (LVPWd, LVPWs) • Left Ventricle Stroke Index, Teichholz/Cube (LVIDd, LVIDs and Body Surface Area) • Left Ventricle Fractional Shortening (LVIDd, LVIDs) • Left Ventricle Stroke Volume, Teichholz/Cubic (LVIDd, LVIDs) • Left Ventricle Stroke Index, Single Plane, Two Chamber, Method of Disk (LVI Dd, LVIDs, LVSd, LVSs) • Left Ventricle Stroke Index, Single Plane, Four Chamber, Method of Disk (LVI Dd, LVIDs, LVSd, LVSs) • Left Ventricle Stroke Index, Bi-Plane, Bullet, Method of Disk (LVAd, LVAs) • Interventricular Septum (IVS) • Left Ventricle Internal Diameter (LVI D) • Left Ventricle Posterior Wall Thickness (LVPW)
864	Mitral valve	• Mitral Valve Annulus Diameter (MV Ann Diam) • E-Point-to-Septum Separation (EPSS) • Mitral Valve Area Planimetry (MVA Planimetry)
865	Pulmonic valve	• Pulmonic Valve Area (PV Planimetry) • Pulmonic Valve Annulus Diameter (PV Annulus Diam) • Pulmonic Diameter (Pulmonic Diam)
866	Right atrium	• Right Atrium Diameter, Length (RAD Ma) • Right Atrium Diameter, Width (RAD Mi) • Right Atrium Area (RAA) • Right Atrium Volume, Single Plane, Method of Disk (RAAd) • Right Atrium Volume, Systolic, Single Plane, Method of Disk (RAAs)

867	Right ventricle	• Right Ventricle Outflow Tract Area (RVOT Planimetry) • Left Pulmonary Artery Area (LPA Area) • Right Pulmonary Artery Area (RPA Area) • Right Ventricle Internal Diameter (RVIDd, RVIDs) • Right Ventricle Diameter, Length (RVD Ma) • Right Ventricle Diameter, Width (RVD Mi) • Right Ventricle Wall Thickness (RVAWd, RVAWs) • Right Ventricle Outflow Tract Diameter (RVOT Diam) • Left Pulmonary Artery (LPA) • Main Pulmonary Artery (MPA) • Right Pulmonary Artery (RPA)
868	System inferior vena cava	• Systemic Vein Diameter (Systemic Diam) • Patent Ductus Arterosis Diameter (PDA Diam) • Pericard Effusion (PEs) • Patent Foramen Ovale Diameter (PFO Diam) • Ventricular Septal Defect Diameter (VSD Diam) • Interventricular Septum (IVS) Fractional Shortening (IVSd, IVSs)
869	Tricuspid valve	• Tricuspid Valve Area (TV Panimetry) • Tricuspid Valve Annulus Diameter (TV Annulus Diam)
870	**M-Mode measurements**	
871	Aorta	• Aortic Root Diameter (Ao Root Diam) • Aortic Valve • Aortic Valve Diameter (AV Diam) • Aortic Valve Cusp separation (AV Cusp) • Aortic Valve Ejection Time (LVET)
872	Left atrium	• Left Atrium Diameter to AoRoot Diameter Ratio (LA/Ao Ratio) • Left Atrium Diameter (LA Diam)
873	Left ventricle	• Left Ventricle Volume, Teichholz/Cubic (LVIDd, LVI Ds) • Left Ventricle Internal Diameter (LVIDd, LVI Ds) • Left Ventricle Posterior Wall Thickness (LVPWd, LVPWs) • Left Ventricle Ejection Time (LVET) • Left Ventricle Pre-Ejection Period (LVPEP) • Interventricular Septum (IVS) • Left Ventricle Internal Diameter (LVI D) • Left Ventricle Posterior Wall Thickness (LVPW)
874	Mitral valve	• E-Point-to-Septum Separation (EPSS) • Mitral Valve Leaflet Separation (D-E Excursion) • Mitral Valve Anterior Leaflet Excursion (D-E Excursion) • Mitral valve D-E Slope (D-E Slope) • Mitral Valve E-F Slope (E-F Slope) • Mitral Annular Plane Systolic Excursion (MAPSE)
875	Pulmonic valve	• QRS Complex to End of Envelope (Q-PV close)
876	Right ventricle	• Right Ventricle Internal Diameter (RVIDd, RVIDs) • Right Ventricle Wall Thickness (RVAWd, RVAWs) • Right Ventricle Outflow Tract Diameter (RVOT Diam) • Right Ventricle Ejection Time (RVET) • Right Ventricle Pre-Ejection Period (RVPEP)
877	System	• Pericard Effusion (PE (d))
878	Tricuspid valve	• QRS Complex to End of Envelope (Q-TV close) • Tricuspid Annular Plane Systolic Excursion (TAPSE)

879	**Doppler Mode measurements**	
880	Aortic valve	• Aortic Insufficiency Mean Pressure Gradient (AR Trace) • Aortic Insufficiency Peak Pressure Gradient (AR Vmax) • Aortic Insufficiency End Diastole Pressure Gradient (AR Trace) • Aortic Insufficiency Mean Velocity (AR Trace) • Aortic Insufficiency Velocity Time Integral (AR Trace) • Aortic Valve Mean Velocity (AV Trace) • Aortic Valve Velocity Time Integral (AV Trace) • Aortic Valve Mean Pressure Gradient (AV Trace) • Aortic Valve Peak Pressure Gradient (AR Vmax) • Aortic Insufficiency Peak Velocity (AR Vmax) • Aortic Insufficiency End-Diastolic Velocity (AR Trace) • Aortic Valve Peak Velocity (AV Vmax) • Aortic Valve Peak Velocity at Point E (AV Vmax)
881	Aortic valve continued	• Aorta Proximal Coarctation (Coarc Pre-Duct) • Aorta Distal Coarctation (Coarc Post-Duct) • Aortic Valve Insufficiency Pressure Half Time (AR PHT) • Aortic Valve Flow Acceleration (AV Trace) • Aortic Valve Pressure Half Time (AV Trace) • Aortic Valve Acceleration Time (AV Acc Time) • Aortic Valve Deceleration Time (AV Dec Time) • Aortic Valve Ejection Time (AVET) • Aortic Valve Acceleration to Ejection Time Ratio (AV Acc Time, AVET) • Aortic Valve Area(VTI): AVA (Vmax)
882	Left ventricle	• Left Ventricle Outflow Tract Peak Pressure Gradient (LVOT Vmax) • Left Ventricle Outflow Tract Peak Velocity (LVOT Vmax) • Left Ventricle Outflow Tract Mean Pressure Gradient (LVOT Trace) • Left Ventricle Outflow Tract Mean Velocity (LVOT Trace) • Left Ventricle Outflow Tract Velocity Time Integral (LVOT Trace) • Left Ventricle Ejection Time (LVET)
883	Mitral valve	• E' Early diastolic mitral valve annular velocity (E') • E' Avg Averaged early diastolic mitral valve annular velocity (E' Avg) • E' Lat Early diastolic mitral valve lateral annular velocity (E' Lat) • E' Medial Early diastolic mitral valve medial annular velocity (E' Medial) • E' Sept Early diastolic mitral • Mitral inflow E velocity to E' ratio (E/E') • Mitral inflow E velocity to E' Avg ratio (E/E' Avg) • Mitral inflow E velocity to E' Lat ratio (E/E' Lat) • Medial Mitral inflow E velocity to E' Medial ratio (E/E') • Mitral inflow E velocity to E' Sept ratio (E/E' Sept) • Mitral Valve Regurgitant Flow Acceleration (MR Trace) • Mitral Valve Regurgitant Mean Velocity (MR Trace)
884	Mitral valve continued	• Mitral Regurgitant Mean Pressure Gradient (MR Trace) • Mitral Regurgitant Velocity Time Integral (MR Trace) • Mitral Valve Mean Velocity (MV Trace) • Mitral Valve Velocity Time Integral (MV Trace) • Mitral Valve Mean Pressure Gradient (MV Trace) • Mitral Regurgitant Peak Pressure Gradient (MR Vmax) • Mitral Valve Peak Pressure Gradient (MV Vmax) • Mitral Regurgitant Peak Velocity (MR Vmax) • Mitral Valve Peak Velocity (MV Vmax) • Mitral Valve Velocity Peak A (MV A Velocity) • Mitral Valve Velocity Peak E (MV E Velocity)

885	Mitral valve continued	• Mitral Valve Area According to PHT (MV PHT) • Mitral Valve Flow Deceleration (MV DecT) • Mitral Valve Pressure Half Time (MV PHT) • Mitral Valve Flow Acceleration (MV AccT) • Mitral Valve E-Peak to A-Peak Ratio (A-C and D-E) (MV E/ARatio) • Mitral Valve Acceleration Time • (MV Acc Time) • Mitral Valve Deceleration Time (MV Dec Time) • Mitral Valve Ejection Time ((MVET) • Mitral Valve A-Wave Duration (MV A Dur) • Mitral Valve Time to Peak (MV TTP) • Mitral Valve Acceleration Time/Deceleration Time Ratio (MVAcc/Dec Time) • Stroke Volume Index by Mitral Flow (MVA Planimetry, MVTrace)
886	Pulmonic Valve	• Pulmonic Insufficiency Peak Pressure Gradient (PR Vmax) • Pulmonic Insufficiency End-Diastolic Pressure Gradient (PRTrace) • Pulmonic Valve Peak Pressure Gradient (PV Vmax) • Pulmonic Insufficiency Peak Velocity (PR Vmax) • Pulmonic Insufficiency End-Diastolic Velocity (Prend Vmax) • Pulmonic Valve Peak Velocity (PV Vmax) • Pulmonary Artery Diastolic Pressure (PV Trace) • Pulmonic Insufficiency Mean Pressure Gradient (PR Trace)
887	Pulmonic valve continued	• Pulmonic Valve Mean Pressure Gradient (PV Trace) • Pulmonic Insufficiency Mean Square Root Velocity (PR Trace) • Pulmonic Insufficiency Velocity Time Integral (PR Trace) • Pulmonic Valve Mean Velocity (PV Trace) • Pulmonic Valve Velocity Time Integral (PV Trace) • Pulmonic Insufficiency Pressure Half Time (PR PHT) • Pulmonic Valve Flow Acceleration (PV Acc Time) • Pulmonic Valve Acceleration Time (PV Acc Time) • Pulmonic Valve Ejection Time (PVET) • QRS Complex to End of Envelope (Q-to-PV Close) • Pulmonic Valve Acceleration to Ejection TIme Ratio (PV Acc Time, PVET)
888	Right ventricle	• Right Ventricle Outflow Tract Peak Pressure Gradient (RVOT Vmax) • Right Ventricle Outflow Tract Peak Velocity (RVOT Vmax) • Right Ventricle Outflow Tract Velocity Time Integral (RVOTTrace) • Right Ventricle Ejection Time (RV Trace) • Stroke Volume by Pulmonic Flow (RVOT Planimetry, RVOTTrace) • Right Ventricle Stroke Volume Index by Pulmonic Flow (RVOT Planimetry, RVOT Trace)
889	System	• Pulmonary Artery Peak Velocity (PV Vmax) • Pulmonary Vein Velocity Peak A (Reverse) (P Vein A) • Pulmonary Vein Peak Velocity (P Vein D, P Vein S) • Systemic Vein Peak Velocity (PDA Diastolic, PDA Systolic) • Ventricular Septal Defect Peak Velocity (VSD Vmax) • Atrial Septal Defect (ASD Diastolic, ASD Systolic) • Pulmonary Vein A-Wave Duration (P Vein A Dur) • IsoVolumetric Relaxation Time (IVRT) • IsoVolumetric Contraction Time (IVCT) • Pulmonary Vein S/D Ratio (P Vein D, P Vein S) • Ventricular Septal Defect Peak Pressure Gradient (VSD Vmax) • Pulmonic-to-Systemic Flow Ratio (Qp/Qs)
890	Tricuspid valve	• Tricuspid Regurgitant Peak Pressure Gradient (TR Vmax) • Tricuspid Valve Peak Pressure Gradient (TV Vmax) • Tricuspid Regurgitant Peak Velocity (TR Vmax) • Tricuspid Valve Peak Velocity (TV Vmax) • Tricuspid Valve Velocity Peak A (TV A Velocity) • Tricuspid Valve Velocity Peak E (TV E Velocity) • Tricuspid Regurgitant Mean Pressure Gradient (TR Trace) • Tricuspid Valve Mean Pressure Gradient (TV Trace)

891	Tricuspid valve continued	• Tricuspid Regurgitant Mean Velocity (TR Trace) • Tricuspid Regurgitant Velocity Time Integral (TR Trace) • Tricuspid Valve Mean Velocity (TV Trace) • Tricuspid Valve Velocity Time Integral (TV Trace) • Tricuspid Valve Time to Peak (TV TTP) • Tricuspid Valve Ejection Time (TV Acc/Dec Time) • Tricuspid Valve A-Wave Duration (TV A Dur) • QRS Complex to End of Envelope (Q-TV Close) • Tricuspid Valve Pressure Half Time (TV PHT) • Stroke Volume by Tricuspid Flow (TV Planimetry, TV Trace) • Tricuspid Valve E-Peak to A-Peak Ratio (TV E/A Velocity)

892	**Color Flow Mode measurements**	
893	Aortic valve	• Proximal Isovelocity Surface Area: Regurgitant Orifice Area (AR Radius) • Proximal Isovelocity Surface Area: Radius of Aliased Point (AR Radius) • Proximal Isovelocity Surface Area: Regurgitant Flow (AR Trace) • Proximal Isovelocity Surface Area: Regurgitant Volume Flow (AR Trace) • Proximal Isovelocity Surface Area: Aliased Velocity (AR Vmax)
894	Mitral valve	• Proximal Isovelocity Surface Area: Regurgitant Orifice Area (MR Radius) • Proximal Isovelocity Surface Area: Radius of Aliased Point (MR Radius) • Proximal Isovelocity Surface Area: Regurgitant Flow (MR Trace) • Proximal Isovelocity Surface Area: Regurgitant Volume Flow (MR Trace) • Proximal Isovelocity Surface Area: Aliased Velocity (MR Vmax)
895	**Combination Mode measurements**	
896	Aortic valve	• Aortic Valve Area (Ao Root Diam, LVOT Vmax, AV Vmax) • Aortic Valve Area by Continuity Equation by Peak Velocity (Ao Root Diam, LVOT Vmax, AV Vmax) • Stroke Volume by Aortic Flow (AVA Planimetry, AV Trace) • Cardiac Output by Aortic Flow (AVA Planimetry, AV Trace, HR) • Aortic Valve Area by Continuity Equation VTI (Ao Root Diam, LVOT Vmax, AV Trace)
897	Left ventricle	• Cardiac Output, Teichholz/Cubic (LVIDd, LVI Ds, HR) • Cardiac Output Two Chamber, Single Plane, Area-Length/Method of Disk (Simpson) (LVAd, LVAs, HR) • Cardiac Output Four Chamber, Single Plane, Area-Length/Method of Disk (Simpson) (LVAd, LVAs, HR) • Ejection Fraction Two Chamber, Single Plane, Area-Length/Method of Disk (Simpson) (LVAd, LVAs) • Ejection Fraction Four Chamber, Single Plane, Area-Length/Method of Disk (Simpson) (LVAd, LVAs) • Left Ventricle Stroke Volume, Single Plane, Two Chamber/Four Chamber, Area-Length (LVAd, LVAs)
898	Left ventricle continued	• Left Ventricle Stroke Volume, Single Plane, Two Chamber/Four Chamber, Method of Disk (Simpson) (LVIDd, LVIDs, LVAd, LVAs) • Left Ventricle Volume, Two Chamber/Four Chamber, Area-Length (LVAd, LVAs) • Ejection Fraction, Bi-Plane, Method of Disk (LVAd, LVAs, 2CH, 4CH) • Left Ventricle Stroke Volume, Bi-Plane, Method of Disk (LVAd, LVAs, 2CH, 4CH) • Left Ventricle Volume, Bi-Plane, Method of Disk (LVAd, LVAs, 2CH, 4CH) • Left Ventricle Stroke Index, Single Plane, Two Chamber/Four Chamber, Area-Length (LVSd, LVSs and BSA) • Left Ventricle Volume, Single Plane, Two Chamber/Four Chamber, Method of Disk (LVAd, LVAs) • Left Ventricle Volume, Apical View, Long Axis, Method of Disk (LVAd, LVAs)
899	Mitral valve	• Stroke Volume by Mitral Flow (MVA Planimetry, MV Trace) • Cardiac Output by Mitral Flow (MVA Planimetry, MV Trace, HR)
900	Pulmonic valve	• Stroke Volume by Pulmonic Flow (PV Planimetry, PV Trace) • Cardiac Output by Pulmonic Flow (PV Planimetry, PV Trace, HR)
901	Tricuspid valve	• Cardiac Output by Tricuspid Flow (TV Planimetry, TV Trace, HR)
902	**Combination Mode measurements**	
903	Parameter: lists the mode, the measurement folder and the specific measurement	

904	Measured Value: Up to six measurement values for each item. Average, maximum, minimum or last
905	**Generic study in cardiology**
906	Stroke Volume (SV)
907	Cardiac Output (CO)

DOC2671561

LOGIQ Fortis™

Probe Guide

The LOGIQ Fortis is GE's premium ultrasound imaging system designed for abdominal, vascular, obstetric, gynecologic, neonatal, pediatric, urological, transcranial, cardiac, and small parts applications.

Featuring XDclear™ Technology

gehealthcare.com

	Description	Applications	FOV	Bandwidth	Biopsy Guide	Volume Navigation
	CONVEX					
 C1-6-D C1-6VN-D*	XDclear broad-spectrum convex probe	Abdominal, Obstetrics, Gynecology, Vascular, Musculoskeletal	80°	1 – 6 MHz	Multi-angle disposable with a reusable bracket	Yes * Internal VNav sensor, does not require an external bracket
 C2-9-D C2-9VN-D*	XDclear broad-spectrum convex probe	Abdominal, Obstetrics, Gynecology, Pediatrics, Vascular, Musculoskeletal	80°	2 – 9 MHz	Multi-angle disposable with a reusable bracket	Yes * Internal VNav sensor, does not require an external bracket
 C3-10-D	XDclear broad-spectrum convex probe	Neonatal, Pediatrics, Vascular, Small Parts	95°	2 – 11 MHz	No	Yes
 IC5-9-D	Broad-spectrum micro-convex intra-cavitary probe	Obstetrics, Gynecology, Urology	180°	3 – 10 MHz	Single-angle disposable or single-angle reusable	Yes
 C2-7-D C2-7VN-D*	Broad spectrum convex probe	Abdominal	110°	1 – 6 MHz	Multi-angle disposable with reusable bracket options	Yes * Internal VNav sensor, does not require an external bracket
	LINEAR					
 L2-9-D L2-9-VN-D*	XDclear broad-spectrum linear probe	Vascular, Small Parts, Musculoskeletal, Neonatal Cephalic, Pediatric, Abdominal, Obstetrical	44 mm	2 – 10 MHz	Multi-angle disposable with a reusable bracket	Yes * Internal VNav sensor, does not require an external bracket
 L3-12-D	Broad-spectrum linear probe	Abdominal, Obstetric, Vascular, Musculoskeletal, Small Parts, Pediatric, Neonatal	51 mm	2 – 11 MHz	Multi-angle disposable with a disposable bracket	Yes
 L6-24-D	Broad-spectrum linear probe	Musculoskeletal	26 mm	6 – 20 MHz	No	No
 L8-18i-D	Broad-spectrum linear probe	Small Parts, Vascular, Intraoperative, Neonatal	25 mm	4 – 15 MHz	No	Yes
 ML6-15-D	Broad-spectrum linear matrix array probe	Vascular, Small Parts, Neonatal, Pediatrics	50 mm	4 – 16 MHz	Multi-angle disposable with a reusable bracket	Yes

	Description	Applications	FOV	Bandwidth	Biopsy Guide	Volume Navigation
	SECTOR					
 M5Sc-D	XDclear broad-spectrum sector probe	Cardiac, Transcranial, Abdominal	120°	1 – 5 MHz	Multi-angle disposable with a reusable bracket	Yes
 6S-D	Broad-spectrum sector probe	Cardiac	115°	2 – 8 MHz	No	No
	REAL-TIME 4D					
 RAB6-D	Broad-spectrum real-time 4D probe	Abdominal, Obstetrics, Gynecology, Pediatrics	80°	2 – 8 MHz	Single-angle disposable with a reusable bracket	No
 RIC5-9-D	Broad-spectrum real-time 4D micro-convex probe	Obstetrics, Gynecology, Urology	180°	3 – 10 MHz	Single-angle reusable	No
	SPECIALTY					
 P2D	CW split crystal pencil probe	Cardiac, Vascular	N/A	1 – 3 MHz	No	No
 P6D	CW split crystal pencil probe	Cardiac, Vascular, Transcranial	N/A	5 – 7 MHz	No	No
 6Tc-RS	TEE probe	Cardiac	90°	2 – 8 MHz	No	No
 BE9CS-D	Wideband bi-plane micro-convex probe	Urology, Endocavity	133°	3 – 12 MHz	Single-angle disposable bracket or reusable bracket	No

For probe care and cleaning information, visit www.gehealthcare.com/transducers.

September 2021
DOC2621716
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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.

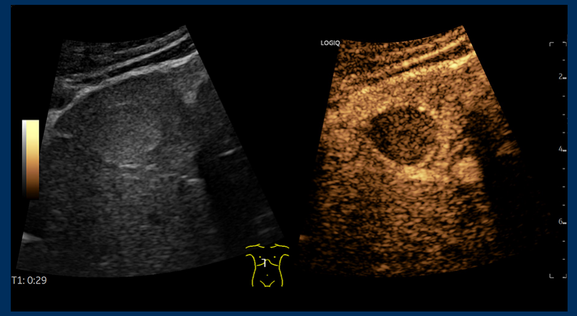
Clinical Expectations: **EXCEEDED**

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.

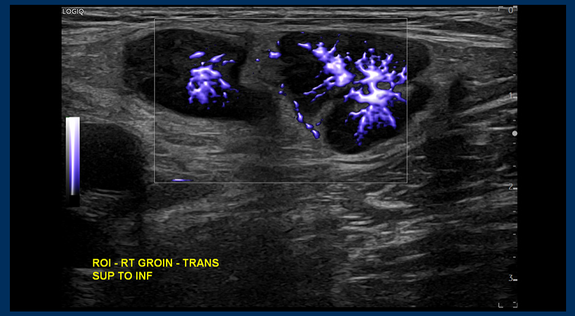
cSound™ Architecture facilitates next-generation imaging
LOGIQ Fortis features cSound Architecture, which combines versatile XDclear™ probes, cSound Imageformer and new, advanced Speckled Reduction Imaging (SRI) technology. The result is increased processing power that delivers enhanced data throughput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

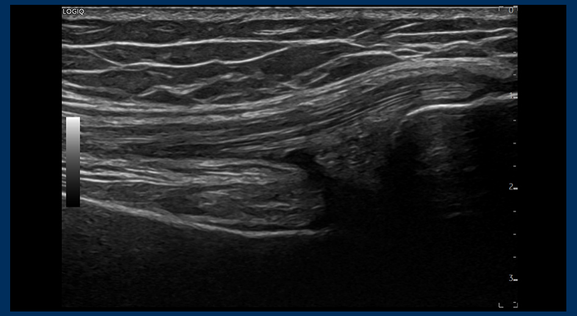
LOGIQ Fortis at work



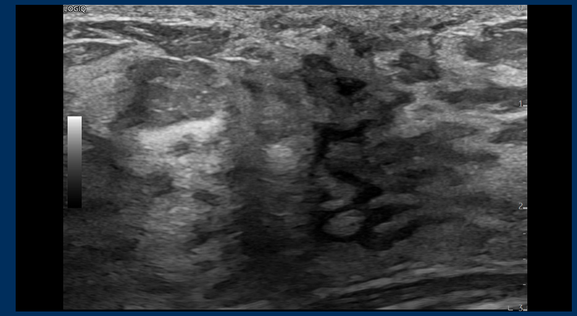
Contrast enhanced liver lesion, C2-9-D



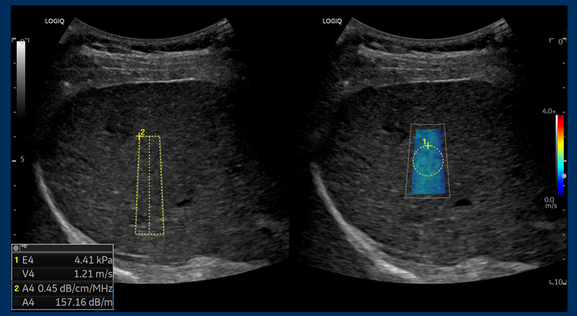
MVI with Radiant*flow* – groin lymph node, ML6-15-D



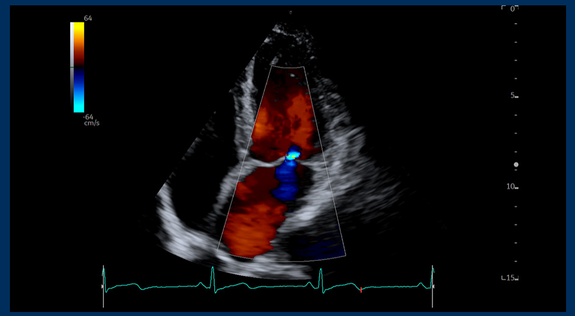
B-Mode with Advanced SRI – knee tendon, ML6-15-D



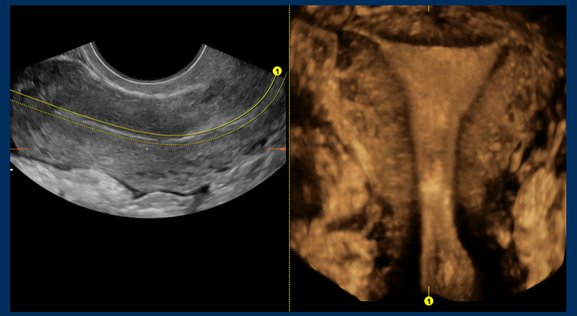
B-Mode with Advanced SRI in breast, ML6-15-D



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
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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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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)

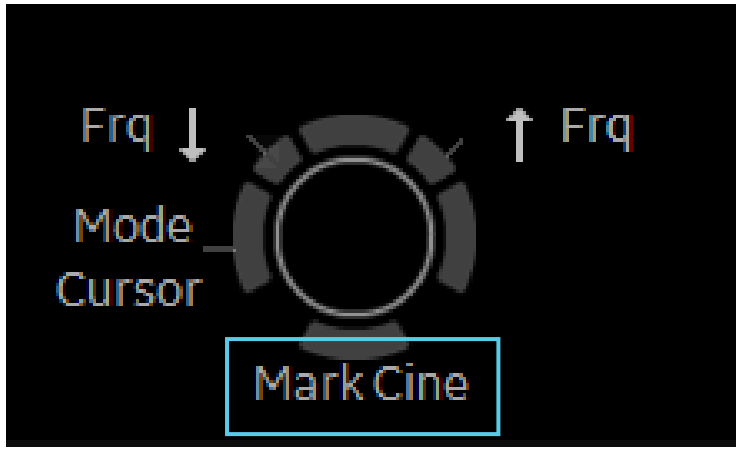
Trackball key functions change depending on which mode is activated. The trackball icon on the lower right of the monitor displays functions as modes change. Use this icon for guidance for functionality.

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

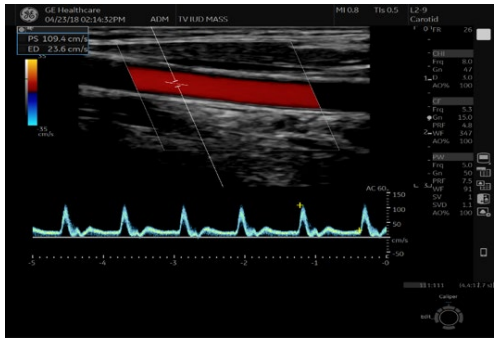


Note: *Print destinations can be programmed by a GE representative upon install of the system*

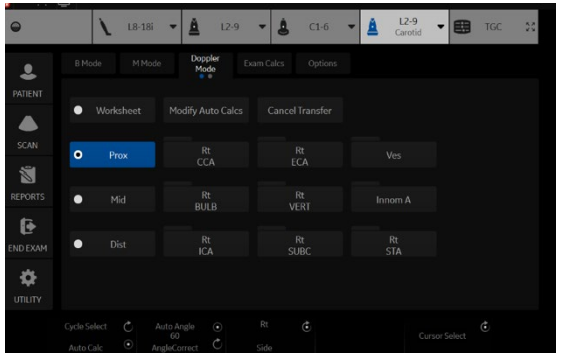
Measurements (Generic)

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



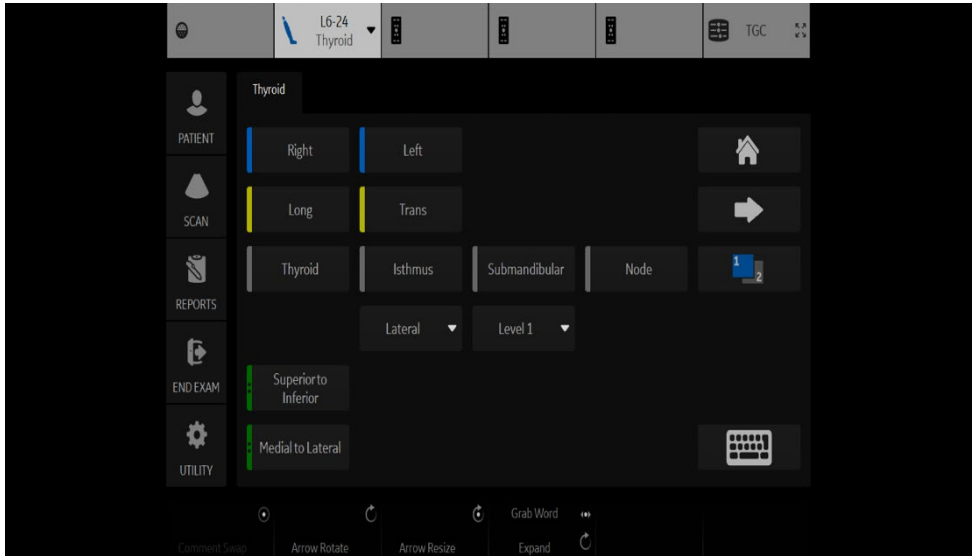
Annotating an image

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.

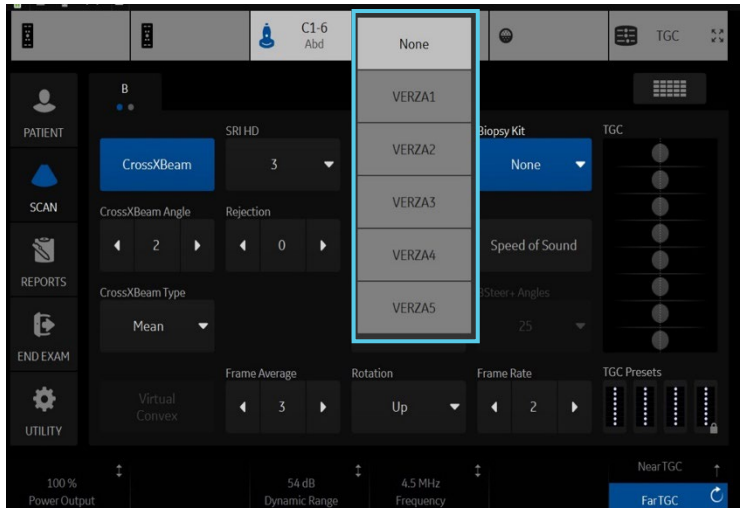
***Note:** At anytime to remove entire text, measurements and arrows, hold down the clear button (18). Word delete (F10) located on keyboard can be used to remove the last text.*

Split screen/Dual View

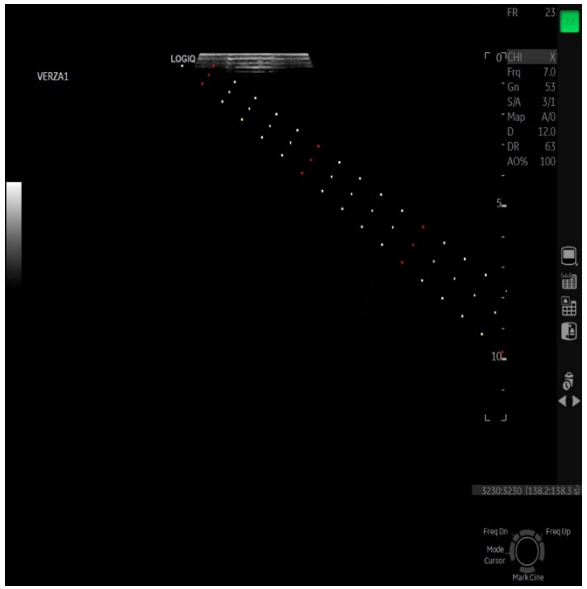
1. Press “L” on the Dual screen keys (4) to display the image on the left side of the screen
2. Press the “R” on the dual screen keys to display the image on the right side of the screen
3. To toggle between two images, press “L” or “R” dual screen keys or use trackball and set in the desired image
4. 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

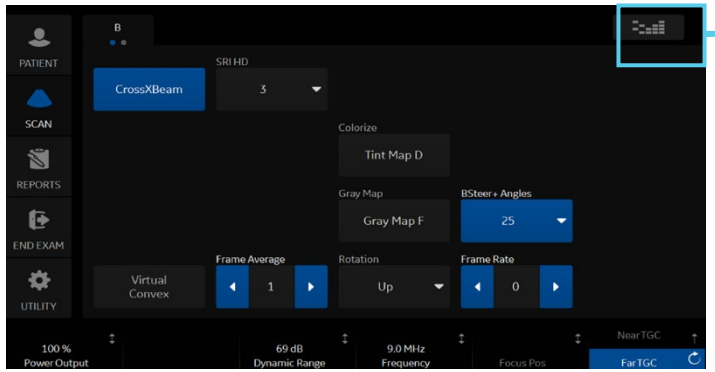
Commonly used parameters	Description
Digital TGC (24)	Use finger to swipe in direction of desired TGC curve. For finer adjustments, use Near TGC/Far TGC control knob below Digital TGC.
CHI Harmonics (Programmable Key 22)	Utilizes Digitally Encoded Ultrasound (DEU) to receive and display harmonic (double) 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)*

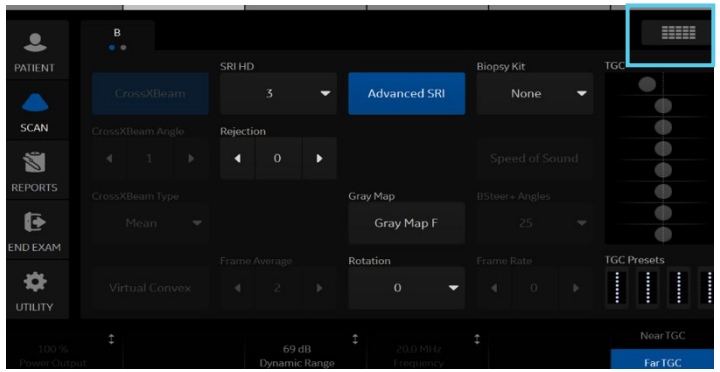
Commonly used parameters	Description
ATO (Auto Tissue Optimization) (5)	ATO analyzes the image data and then optimizes the gray map such that dark areas become darker and bright structures stand out more. For the user this translates into improved contrast resolution and noise suppression.
CTO (Continuous 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.

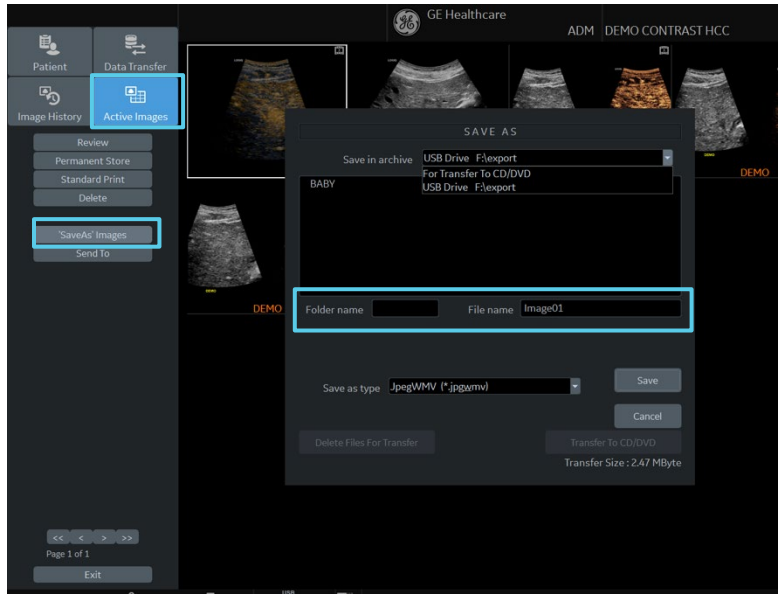
Image management *(continued)*

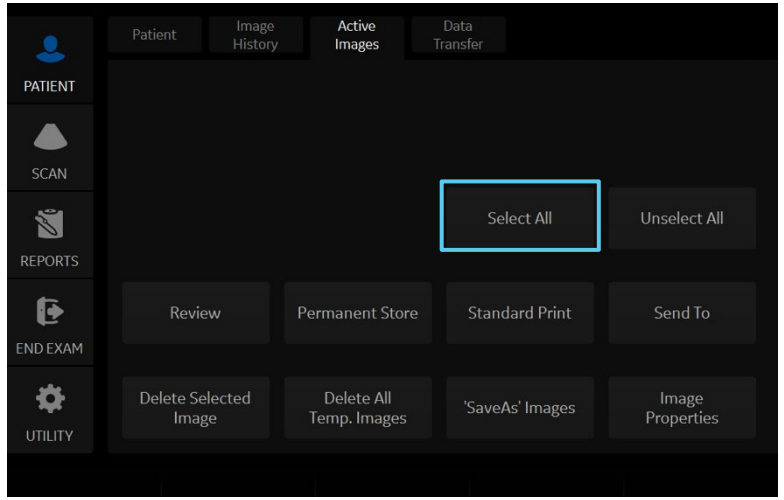
The system hard drive capacity and free space is available on the patient entry page. Move the trackball pointer over the pie icon in the lower left column. A message with the total capacity and the available free space will appear briefly. The color of the pie will change as the hard drive fills.	
To 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

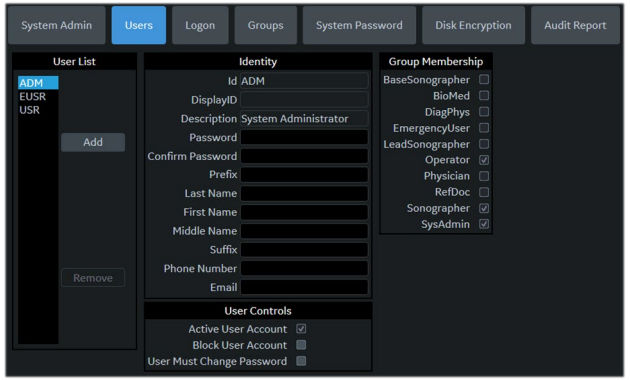
Note: It is recommended to do this with the assistance of a GE Service or GE Applications representative	
To back-up presets: Insert CD-R or DVD-R into the disk drive	1. Select Utility > System > from the touch panel. 2. Use the trackball pointer to select “Backup/Restore” tab on the monitor. 3. Select 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

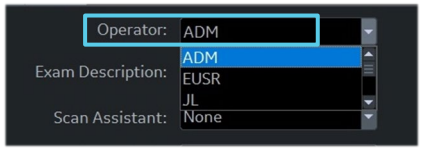
Select Utility > Admin > Users

- 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

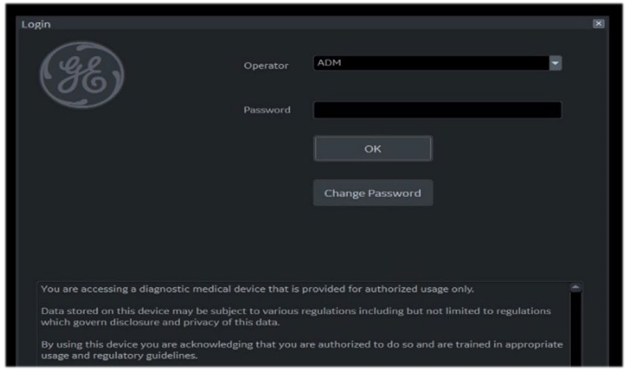
Note: *The system Admin can remove a user from the list. Select the user ID from the list and select “Remove.” The user and password will become inactive. If the user and password need to be removed permanently, select the user and password and select “Remove.” A pop-up dialog will appear to confirm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

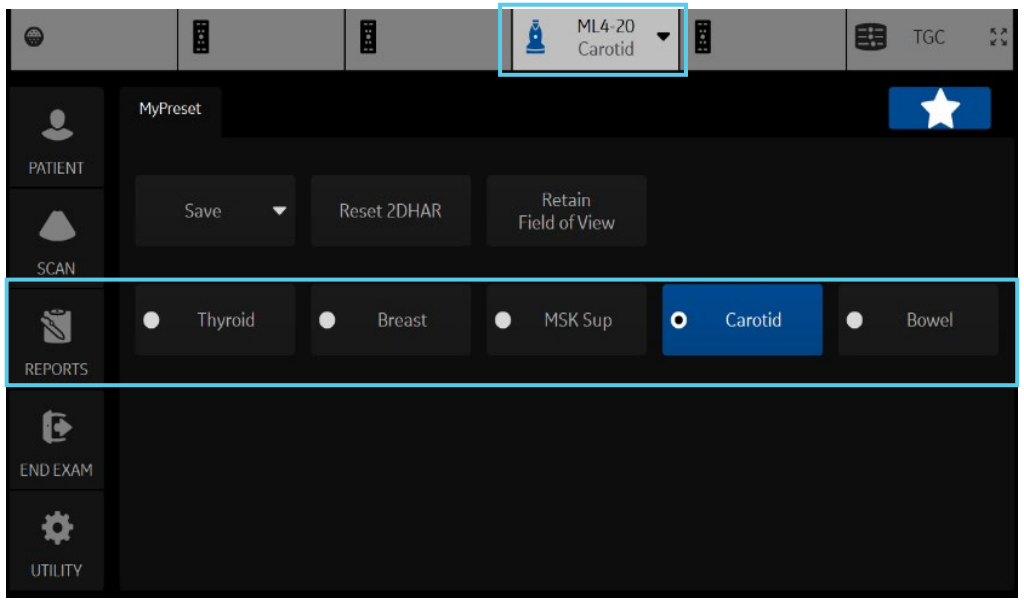


EZ Imaging

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

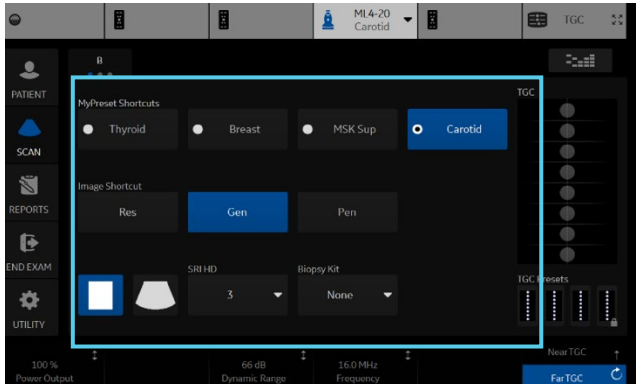
MyPreset:

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:

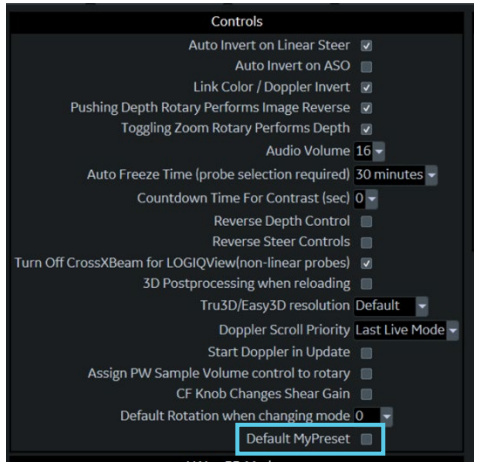
This workflow is for operators who need a quick way to start a new patient, save data and reset the system for next patient without returning to the patient demographic page.

1

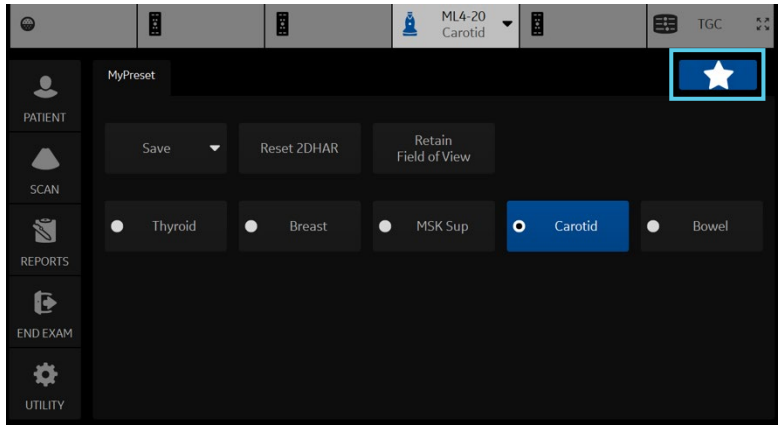
EZ Imaging – MyPreset

To activate MyPreset:

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

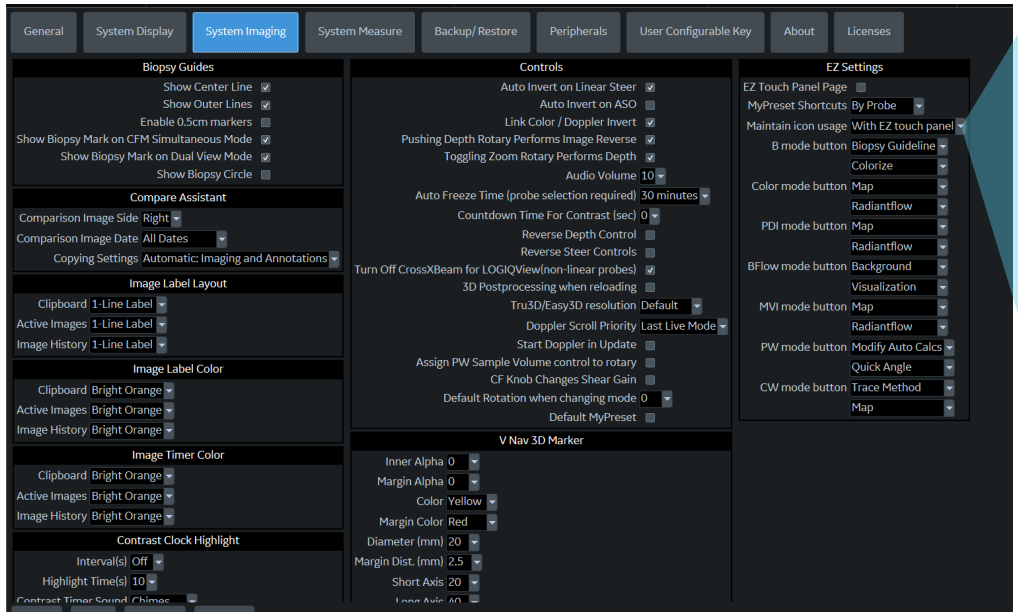


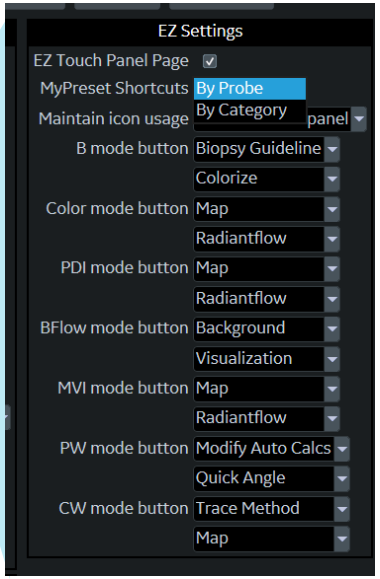
Select star on touch panel to switch between MyPreset and conventional tab



Activate EZ Touch Panel:

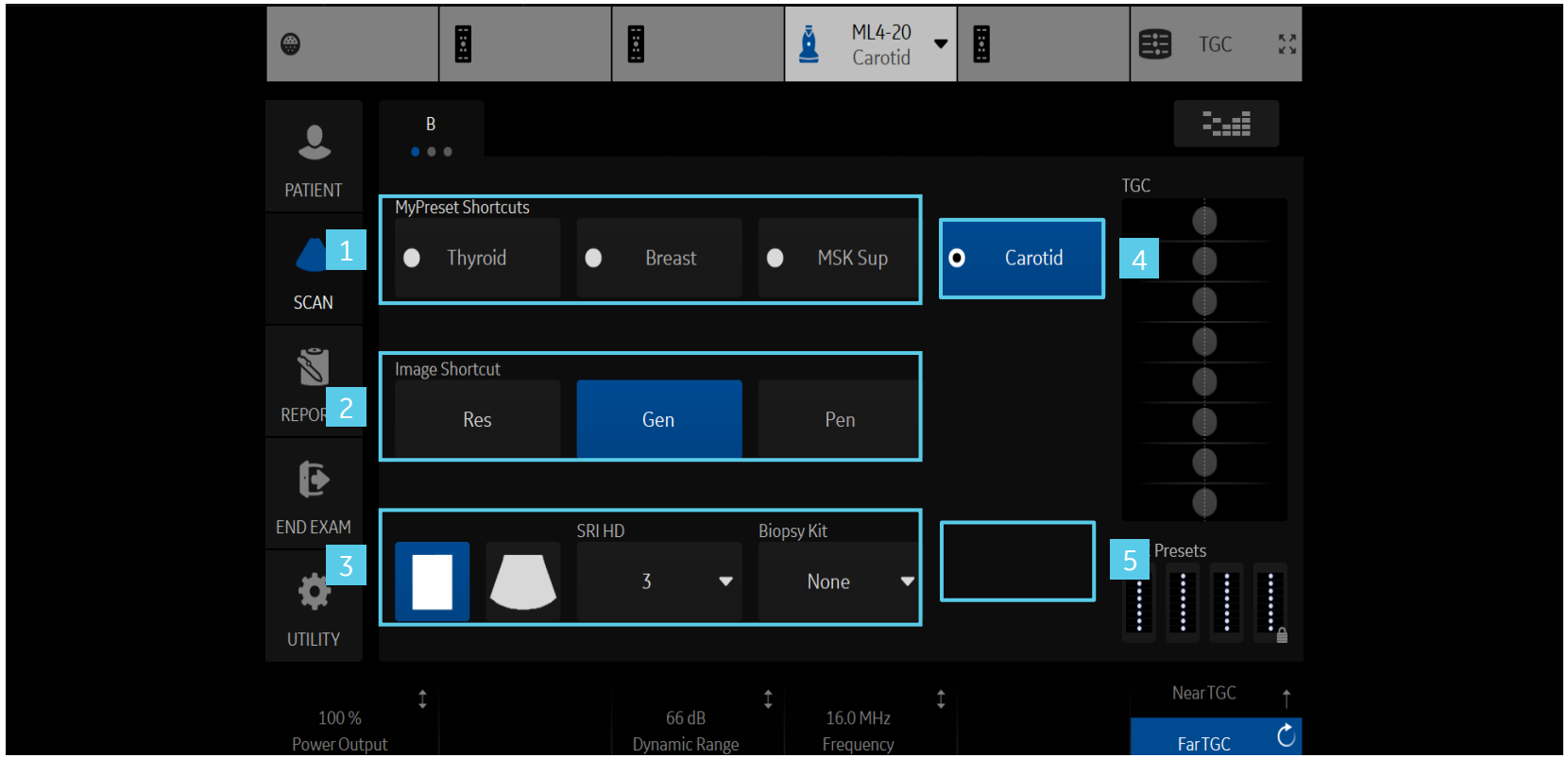
1. Check “Easy Touch Panel Page” – Utility > System > System Imaging > EZ settings
2. Select “By Probe” or “By Category” in MyPreset shortcuts





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

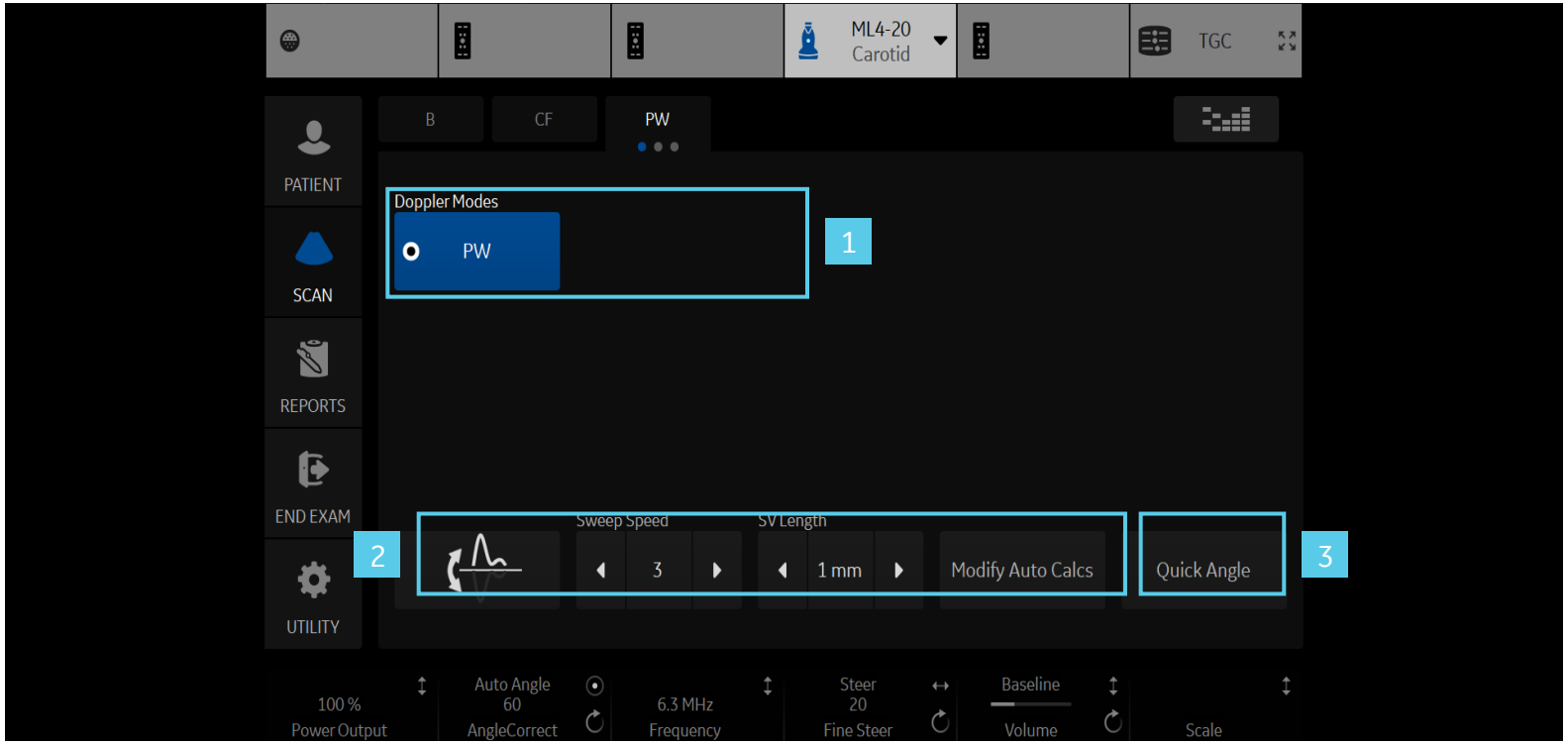
EZ Imaging – EZ Touch Panel *(continued)*

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)*

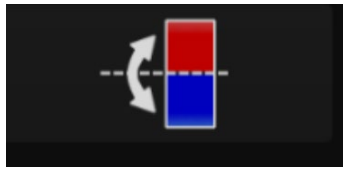
EZ Imaging with Pulsed Wave or Continuous Wave activated



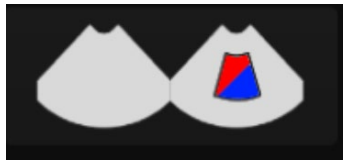
1. Change Doppler technologies quickly on the touch panel (if CW and PW are both supported)
2. Essential controls (Non-configurable)
3. A desired additional essential control can be assigned to the 3rd position

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

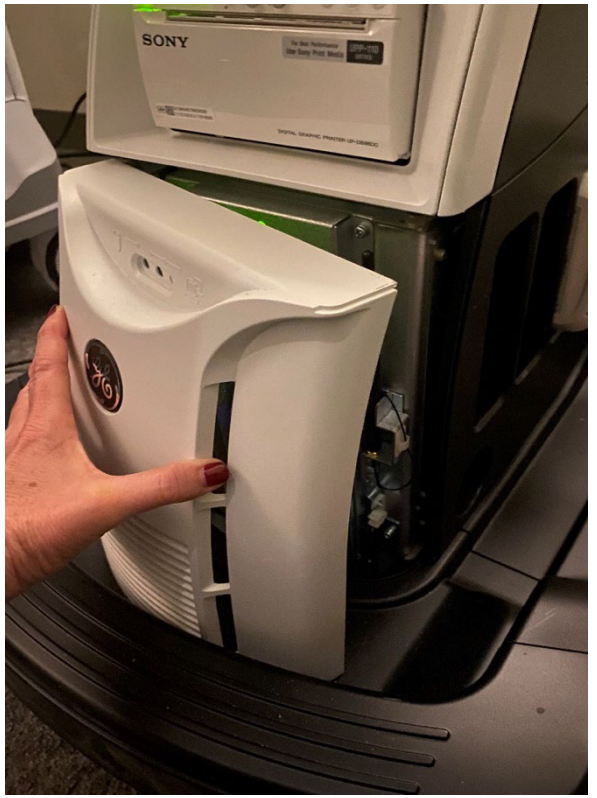
Cleaning the trackball

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

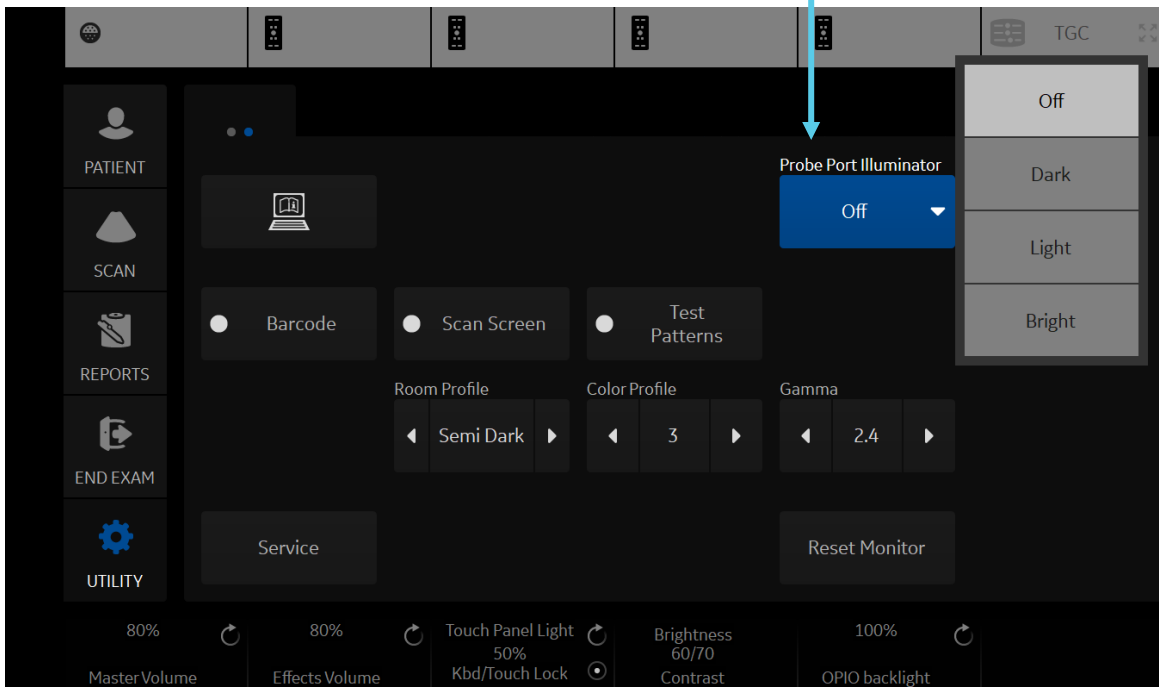
Clean the system's air filters to ensure a clogged filter does not cause the system to overheat and reduce system performance and reliability. It is recommended the filters be cleaned every two weeks, but the requirements will vary due to your system use.

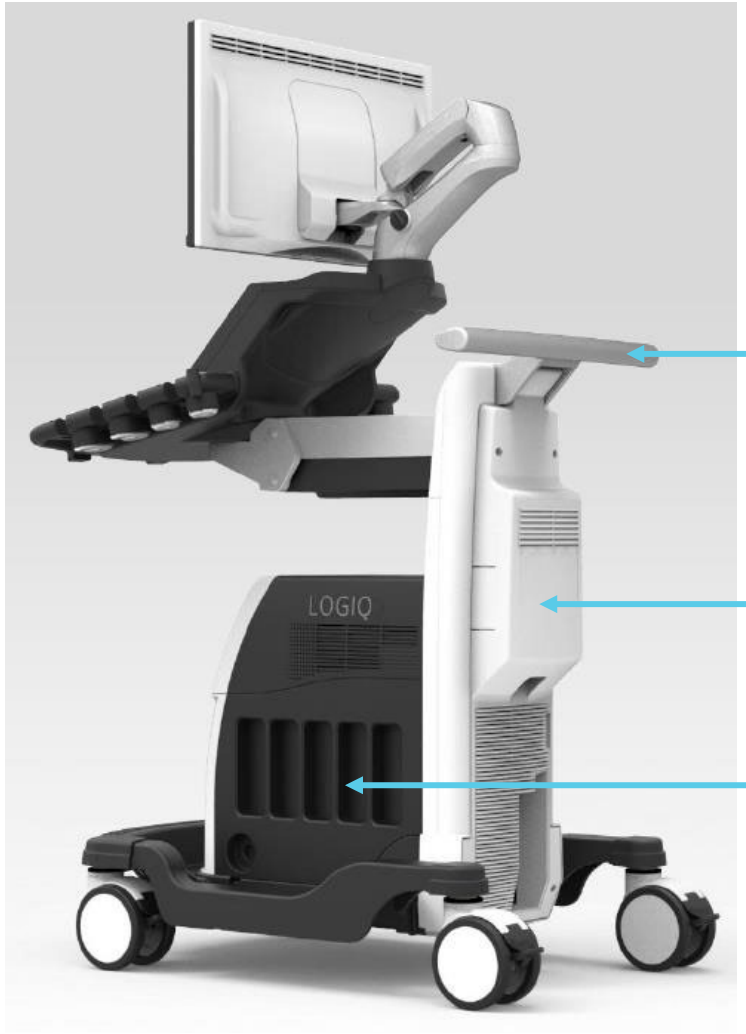
Remove the front cover of the cabinet to access the filter.



Portability

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



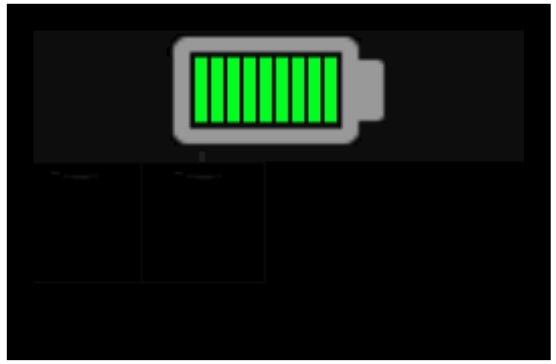


Handle

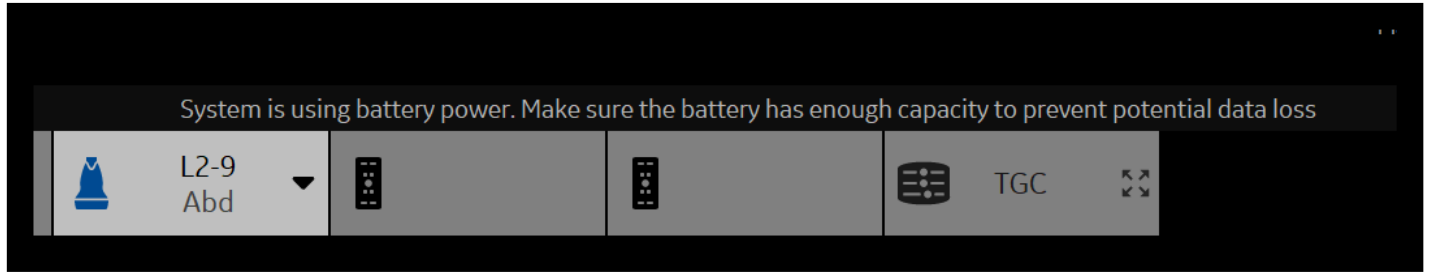
Integrated battery backpack

Illuminator 4 active probe ports and one park port

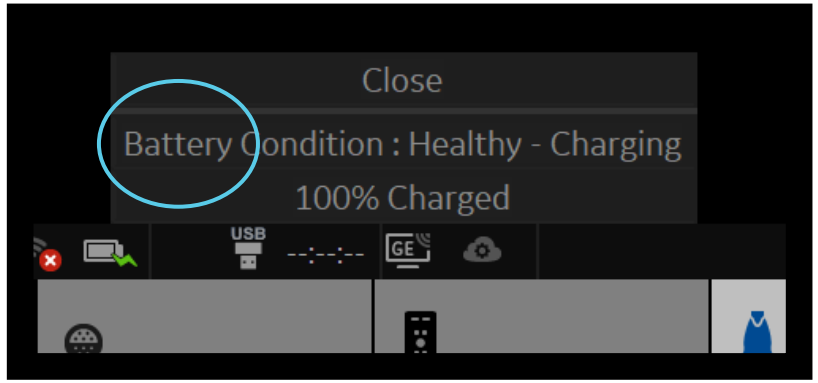
Portability



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.

JB21079XX

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

ATTESTATION / *CERTIFICATE* **N° 7697 rev. 18**
Délivrée à Paris le 14 septembre 2020
Issued in Paris on September 14th, 2020

ATTESTATION CE / *EC CERTIFICATE*

Approbation du Système Complet d'assurance Qualité/ *Approval of full Quality Assurance System*
ANNEXE II excluant le point 4 Directive 93/42/CEE relative aux dispositifs médicaux
ANNEX II excluding section 4 Directive 93/42/EEC concerning medical devices
Pour les dispositifs de classe III, un certificat CE de conception est requis
For class III devices, a EC design certificate is required

Fabricant / *Manufacturer*

GE ULTRASOUND KOREA, Ltd.
9, Sunhwan-ro 214beon-gil, Jungwon-gu,
SEONGNAM-SI, GYEONGGI-DO, REPUBLIC OF KOREA

Catégorie du(des) dispositif(s) / *Device(s) category*

Dispositif ou système de diagnostic par ultrasons

Ultrasound diagnostic device or system

Voir document complémentaire GMED / See GMED additional document
n° 36988

GMED atteste qu'à l'examen des résultats figurant dans le rapport référencé P183396, P601203, le système d'assurance qualité - pour la conception, la production et le contrôle final - des dispositifs médicaux énumérés ci-dessus est conforme aux exigences de l'annexe II excluant le point 4 de la Directive 93/42/CEE.

GMED certifies that, on the basis of the results contained in the file referenced P183396, P601203, the quality system - for design, manufacturing, and final inspection - of medical devices listed here above complies with the requirements of the Directive 93/42/EEC, annex II excluding section 4.

La validité du présent certificat est soumise à une vérification périodique ou imprévue
The validity of the certificate is subject to periodic or unexpected verification

Début de validité / *Effective date :* **September 14th, 2020 (included)**
Valable jusqu'au / *Expiry date :* **May 26th, 2024 (included)**

GMED SAS GMED SAS GMED GROUPE LNE

Lionel DREUX
Certification Director

GMED_b2p3_new2020-V0-04-

GMED - 7697 rev. 18
Modifie le certificat 7697-17

Ce document complémentaire GMED n° 36988 rev. 0 atteste de la validité du certificat CE n° 7697 rev. 18 au regard des informations listées ci-dessous.

This GMED additional document N° 36988 rev. 0 attests to the validity of CE certificate n ° 7697 rev. 18 with regard to the information listed below.

Fabricant / *Manufacturer*:

GE ULTRASOUND KOREA, Ltd.
9, Sunhwan-ro 214beon-gil, Jungwon-gu,
SEONGNAM-SI, GYEONGGI-DO, REPUBLIC OF KOREA

Identification des dispositifs / *Identification of devices*

Désignation du dispositif / Accessoires marqués CE *Device designation / CE marked accessories*	Réf commerciale du dispositif ou code article *Device commercial reference or article code*	Classe du DM *MD class*
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ P7**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ P8**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ P9**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ P10**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON S6**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON S8**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON S8t**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON S10**	**IIa**

Lionel DREUX
Certification Director

Désignation du dispositif / Accessoires marqués CE *Device designation / CE marked accessories*	**Réf commerciale du dispositif ou code article** *Device commercial reference or article code*	**Classe du DM** *MD class*
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON S10 Expert**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON P6**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON P8**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON SWIFT**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**VOLUSON SWIFT+**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ S8**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ S7 Expert**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ S7 Pro**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ S7 XDclear2.0**	**IIa**
Dispositif ou système de diagnostic par ultrasons *Ultrasound diagnostic device or system*	**LOGIQ E10s**	**IIa**

Site couvert et Activités / *Locations and Activities*

Site / *Location*	Activités / *Activities*
GE ULTRASOUND KOREA, Ltd. **9, Sunhwan-ro 214beon-gil, Jungwon-gu,** **Seongnam-si, Gyeonggi-do, REPUBLIC OF KOREA** **équivalent à** *equivalent to* **GE ULTRASOUND KOREA, Ltd.** **65-1, Sangdaewon-dong, Jungwon-gu,** **Seongnam-si, Gyeonggi-do - 462-120 REPUBLIC OF KOREA**	**Conception, fabrication et contrôle final** *Design, manufacture and final control*

Lionel DREUX
Certification Director

GMED • Société par Actions Simplifiée au capital de 300 000 € • RCS Paris 839 022 522 • Organisme notifié n° 0459
Siège social : 1, rue Gaston Boissier - 75015 Paris • Tél. : 01 40 43 37 00 • gmed.fr 720 GMED 0901-4 rev 0 du 31/08/2020

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