

### Specificația Tehnică Completată

**Modelul: Vivid IQ Premium; PN: H48012BZ Nr. Reg: DM000193192; Producătorul: GE Healthcare/ GE MEDICAL SYSTEMS (CHINA) CO., LTD.; Țara: China**

Specificarea tehnică deplină solicitată de către autoritatea contractantă	Specificarea tehnică deplină oferită de către autoritatea ofertantă
<p>Ultrasonograf intracardiac (ICE), Consola cu Ultrasunete, portabil specializat in domeniul de ecografie cardiac. Cod APLICAȚII CLINICE cardiac, intracardiac, pentru sala de interventii cardiologice. PROBE TIP incluse la livrare, 1. Phased/Vector/cardiac</p> <p>Gama de fregventa valoarea de jos nu mai mica de 1 MHz si valoarea de sus nu mai mare de 7.5 MHz. Unghiul de vedere <math>\geq 120^\circ</math></p> <p>Adincimea de scanare cu Phased/Vector Cardiaca <math>\geq 20</math> cm</p> <p>2. Sonda intracardiaca (ICE):</p> <p>Sonda ICE 8-10 Fr – 2 buc</p> <p>Diametru 8-10 Fr</p> <p>Numarul de elemente <math>\geq 64</math></p> <p>Gama de fregventa valoarea de jos nu mai mica de 4 MHz si valoarea de sus nu mai mare de 12 MHz.</p> <p>Unghiul de vedere <math>\geq 90^\circ</math></p> <p>Adincimea de scanare cu Sonda ICE <math>\geq 16</math> cm</p> <p>Dispune de modul pentru interfata cu sondele ICE</p> <p>Alte sonde cu care este necesar sa fie compatibil ecograful - Liniar, Cardiac.</p> <p>NIVELE DE GRI <math>\geq 256</math></p> <p>GAMA DINAMICĂ <math>\geq 400</math> dB</p> <p>PREPROCESARE, Canale digitale <math>\geq 950.000</math></p>	<p>Ultrasonograf intracardiac (ICE), Consola cu Ultrasunete, portabil specializat in domeniul de ecografie cardiac. <b>DA</b> Cod APLICAȚII CLINICE cardiac, intracardiac, pentru sala de interventii cardiologice. <b>DA</b> PROBE TIP incluse la livrare, 1. Phased/Vector/cardiac <b>DA 3Sc-RS pag. 18 din Data Sheet Vivid iq Premium.</b></p> <p>Gama de fregventa valoarea de jos - <b>1 MHz</b> si valoarea de sus <b>5 MHz. DA pag. 18 din Data Sheet Vivid iq Premium</b> Unghiul de vedere - <b>120° DA pag. 18 din Data Sheet Vivid iq Premium</b></p> <p>Adincimea de scanare cu Phased/Vector Cardiaca - <b>30 cm DA pag. 18 din Data Sheet Vivid iq Premium</b></p> <p>2. Sonda intracardiaca (ICE): <b>DA AcuNav8F/10F si Sound Star eco 8F/10F pag. 21 din Data Sheet Vivid iq Premium</b> Sonda ICE 8-10 Fr – 2 buc <b>DA la alegerea medicului si va livra marimile</b> Diametru 8-10 Fr <b>DA diametrul modelelor popuse este intre 8-10 Fr</b> Numarul de elemente – 64 <b>DA pag. 21 din Data Sheet Vivid iq Premium</b></p> <p>Gama de fregventa valoarea de jos 4 MHz si valoarea de sus de 12 MHz. <b>DA pag. 21 din Data Sheet Vivid iq Premium</b> Unghiul de vedere - <b>90° DA pag. 21 din Data Sheet Vivid iq Premium</b></p> <p>Adincimea de scanare cu Sonda ICE - 16 cm <b>DA pag. 21 din Data Sheet Vivid iq Premium</b></p> <p>Dispune de modul pentru interfata cu sondele ICE <b>DA ICE Cord-RS pag. 21 din Data Sheet Vivid iq Premium</b></p> <p>Alte sonde cu care este necesar sa fie compatibil ecograful - Liniar, Cardiac, <b>Convex, Endocavitar, Pencil, Intraoperative, TEE DA pag. 3, 21 din Data Sheet Vivid iq Premium</b></p> <p>NIVELE DE GRI – 256 <b>pag. 7 din Data Sheet Vivid iq Premium</b> GAMA DINAMICĂ - <b>415 dB pag. 6 din Data Sheet Vivid iq Premium</b> PREPROCESARE, Canale digitale - <b>950.000 pag. 6 din Data Sheet Vivid iq Premium</b></p>

## Anexa 7

<p>Adincimea de scanare - <math>\geq 30</math> cm</p> <p>Timpul de scanare de la acumulatorul intern <math>\geq 1</math> ora.</p> <p>POSTPROCESARE da</p> <p>Moduri 2D/B-mode</p> <p>M Mode</p> <p>Anatomic M-Mode</p> <p>Color M-Mode Color Anatomic M-Mode</p> <p>Virtual Apex sau analogic</p> <p>Doppler -Color</p> <p>- PDI</p> <p>- Pulsativ /PW</p> <p>- Continu/ Cardiac</p> <p>- Tisular / TVI</p> <p>Alte tehnologii, care sint optionale sa fie incluse:</p> <p>-Tehnologie de afisare a intensitatii fluxurilor sangvine, independenta de unghiul de interogare a razei ultrasunetelor, in vederea vizualizarii cu exactitate a informatie hemodinamice. Aceasta tehnologie va dispune de rezolutie spatiala similara cu cea a scalei modului 2D si permite afisarea informatiei pe intreaga suprafata de scanare. Exemplu B-Flow sau analogic</p> <p>- Dispune de modul tip DICOM Viewer.</p> <p>- Dispune de modul de conectare cu DICOM 3.0</p> <p>- Dispune de posibilitatea de upgradare cu instrument care permite ecografului sa trimita imagini si informatii parametrice catre un sistem de navigare, prin conexiune LAN</p> <p>-Dispune de metoda de stocare a datelor în Cloud, serviciu destinat să faciliteze distribuirea informațiilor medicale cu personalul medical sau pacienții.</p>	<p>Adincimea de scanare - 33 cm <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>Timpul de scanare de la acumulatorul intern - 1 ora. <b>DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>POSTPROCESARE <b>DA pag. 5 din Data Sheet Vvid iq Premium</b></p> <p>Moduri 2D/B-mode <b>DA 2D Tissue pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>M Mode <b>DA Tissue M-Mode pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>Anatomic M-Mode <b>DA pag. 3 Data Sheet Vvid iq Premium</b></p> <p>Color M-Mode <b>DA pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>Color Anatomic M-Mode <b>DA pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>Virtual Apex sau analogic <b>DA pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>Doppler -Color <b>DA 2D Color Flow pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>- PDI – este denumit Color Angio <b>pag. 8 din Data Sheet Vvid iq Premium</b></p> <p>- Pulsativ /PW <b>pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>- Continu/ Cardiac <b>Continus Wave Doppler pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>- Tisular / TVI – Tissue Velocity Imaging <b>pag. 3 din Data Sheet Vvid iq Premium</b></p> <p>Alte tehnologii, care sint optionale sa fie incluse:</p> <p>-Tehnologie de afisare a intensitatii fluxurilor sangvine, independenta de unghiul de interogare a razei ultrasunetelor, in vederea vizualizarii cu exactitate a informatie hemodinamice. Aceasta tehnologie va dispune de rezolutie spatiala similara cu cea a scalei modului 2D si permite afisarea informatiei pe intreaga suprafata de scanare. <b>B-Flow pag. 8 din Data Sheet Vvid iq Premium</b></p> <p>- Dispune de modul tip DICOM Viewer. <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>- Dispune de modul de conectare cu DICOM 3.0 <b>DA pag. 5 din Data Sheet Vvid iq Premium</b></p> <p>- Dispune de instrument care permite ecografului sa trimita imagini si informatii parametrice catre un sistem de navigare, prin conexiune LAN <b>CartoSound Interface- es inclus din motiv ca este necesar pentru comunicare cu sonde de tip ICE pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>-Dispune de metoda de stocare a datelor în Cloud, serviciu destinat să faciliteze distribuirea informațiilor medicale cu personalul medical sau pacienții. <b>DA Tricefy Uplink pag. 6 din Data Sheet Vvid iq Premium</b></p>
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<p>-Sistemul dispune de posibilitate de upgradare cu metoda de a trimite informații sub forma de video in timp real.</p> <p>- Posibilitate de upgrade cu modul de recunoastere automata bazat pe inteligență artificială ce are la baza algoritmi dezvoltati pe modele statistice pentru recunoasterea celor mai potrivite sectiuni din graficul spectral si calculul automat al masuratorilor uzuale pentru examinarile vasculare</p> <p>- Dispune de posibilitatea de upgradare cu modul de scanare bi-planar si tri-planar pentru sonda transesofagiana</p> <p><b>FUNCȚIONALITĂȚI</b>  Măsurători digitale da  Diapazon dinamic selectabil da</p> <p>Focalizare de transmisie ajustabilă da</p> <p>Focalizare de recepție dinamică da</p> <p>Măsurători pe reluarea video da</p> <p>PAN/ZOOM  - imagine în timp real - da  - imagine înghețată – da</p> <p>ZOOM de inalta rezolutie - concentrează toată puterea de achiziție a imaginii în regiunea de interes selectată.</p> <p>STOCARE IMAGINI  Capacitate interna tip SSD ≥250GB</p> <p>Securitatea datelor personale – da</p> <p>Cine memoria ≥ 500 MB</p> <p>Conectarea la monitor extern port minim 1 tip HDMI - da  Port tip LAN minim – 1 unitate</p> <p>USB port minim – 2 unitate</p> <p>Port ECG minim – 1 unitate</p> <p>MONITOR  - Diagonala minim 15"</p>	<p>-Sistemul dispune de posibilitate de upgradare cu metoda de a trimite informații sub forma de video in timp real.</p> <p><b>DA Streaming pag. 5 din Data Sheet Vvid iq Premium</b></p> <p>- Posibilitate de upgrade cu modul de recunoastere automata bazat pe inteligență artificială ce are la baza algoritmi dezvoltati pe modele statistice pentru recunoasterea celor mai potrivite sectiuni din graficul spectral si calculul automat al masuratorilor uzuale pentru examinarile vasculare. <b>DA AI auto measure – 2D pag. 1, 3 din Data Sheet Vvid iq Premium</b></p> <p>- Dispune de posibilitatea de upgradare cu modul de scanare bi-planar si tri-planar pentru sonda transesofagiana <b>DA pag. 4, 7 din Data Sheet Vvid iq Premium</b></p> <p><b>FUNCȚIONALITĂȚI</b>  Măsurători digitale <b>DA</b>  Diapazon dinamic selectabil <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>Focalizare de transmisie ajustabilă <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>Focalizare de recepție dinamică <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>Măsurători pe reluarea video <b>DA pag. 4 din Data Sheet Vvid iq Premium</b></p> <p>PAN/ZOOM  - imagine în timp real - <b>DA</b>  - imagine înghețată –<b>DA</b></p> <p>ZOOM de inalta rezolutie - concentrează toată puterea de achiziție a imaginii în regiunea de interes selectată. <b>DA pag. 6 din Data Sheet Vvid iq Premium</b></p> <p>STOCARE IMAGINI  Capacitate interna tip SSD – 256 GB „<i>Integrated solid-state drive: 256 GB</i>” <b>pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>Securitatea datelor personale – <b>DA pag. 17 din Data Sheet Vvid iq Premium</b></p> <p>Cine memoria - 500 MB <b>DA pag. 4 din Data Sheet Vvid iq Premium</b></p> <p>Conectarea la monitor extern port 1 tip HDMI – <b>DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>Port tip LAN– 1 unitate <b>DA Aln 10/100/1000 base pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>USB port – 5 unitate <b>DA pag.2 din Data Sheet Vvid iq Premium</b></p> <p>Port ECG – 1 unitate <b>DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>MONITOR  - Diagonala -15.6" <b>pag. 2 din Data Sheet Vvid iq Premium.</b></p>
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## Anexa 7

<p>- Tip Touch Screen (optional)</p> <p>-</p> <p>ACCESORII</p> <p>Troleu cu stație doc pentru minimum 2 porturi active</p> <p>- Prezente 4 roti cu minim 2 frine</p> <p>- Sistem de acumulator intern (optional).</p> <p>- Suport/spatiu dedicat termoprinterului</p> <p>- Suport pentru sonde minim 4 unitati</p> <p>- Suport pentru gel minim 1 unitate</p> <p>- Porturi USB minim 3 unitati</p> <p>Imprimantă tip termica optional</p> <p>Cablu ECG adult inclus</p> <p>Sa fie incluse toate componente si accesoriile necesare pentru buna functionare a sondei tip ICE.</p> <p>Alimentarea electrica 230-240 V, Fregventa 50/60 Hz</p> <p>Garantia – minimum 24 luni</p> <p>Prezenta pieselor de schimb dupa instalare minim 10 ani.</p> <p>Declaratia din partea ofertantului,</p> <p>TRANING SI PREGĂTIREA SPECIALISTULUI obligatoriu de catre producator.</p>	<p>- Tip Touch Screen <b>standart pag.2 din Data Sheet Vvid iq Premium</b></p> <p>-</p> <p>ACCESORII</p> <p>Troleu cu stație doc pentru 4 porturi active <b>DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>- Prezente 4 roti cu minim 2 frine <b>DA</b></p> <p>- Sistem de acumulator intern (optional). <b>DA obtional este posibil acest lucru</b></p> <p>- Suport/spatiu dedicat termoprinterului <b>DA</b></p> <p>- Suport pentru sonde <b>6 unitati DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>- Suport pentru gel 1 unitate <b>DA</b></p> <p>- Porturi USB unitati <b>DA pag. 2 din Data Sheet Vvid iq Premium</b></p> <p>Imprimantă tip termica <b>DA</b></p> <p>Cablu ECG adult inclus <b>DA</b></p> <p>Sa fie incluse toate componente si accesoriile necesare pentru buna functionare a sondei tip ICE. <b>DA</b></p> <p>Alimentarea electrica 230-240 V, Fregventa 50/60 Hz <b>Da</b></p> <p>Garantia – minimum 24 luni <b>DA</b></p> <p>Prezenta pieselor de schimb dupa instalare minim 10 ani.</p> <p>Declaratia din partea ofertantului, <b>DA</b></p> <p>TRANING SI PREGĂTIREA SPECIALISTULUI obligatoriu de catre producator. <b>DA in minim 2 etape cu prezenta fizica a traiinirului.</b></p>
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REGISTRUL DE STAT AL DISPOZITIVELOR MEDICALE

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

Nr	Denumire	Den.comerc.	Model	Nr. catalog	Tara	Producatorul	Reprezentant	Ordin	Data	Cod vamal
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Vivid iq pre"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
DM000193192	SISTEM DE IMAGISTICĂ CARDIOVASCULARĂ CU ULTRASUNETE		Vivid iq Premium	5780707-2, H48012BZ	China	GE MEDICAL SYSTEMS (CHINA) CO., LTD.	INTERMED S.R.L.	A07.PS-01.Rg04-378	26-12-2018	
DM000122016	SISTEM DE IMAGISTICĂ CU ULTRASUNETE		VIVID IQ PREMIUM	H48912AB	China	GE MEDICAL SYSTEMS (CHINA) CO., LTD.	INTERMED S.R.L.	A07.PS-01.Rg04-149	11-06-2018	

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ZLG-BS-244.10.08



Product Service

# EC Certificate

Full Quality Assurance System  
Directive 93/42/EEC on Medical Devices (MDD), Annex II excluding (4)  
(Devices in Class IIa, IIb or III)

**No. G1 023782 0112 Rev. 00**

**Manufacturer:****GE Vingmed Ultrasound A/S**

Strandpromenaden 45  
3191 Horten  
NORWAY

**Facility(ies):**

GE Vingmed Ultrasound A/S  
Strandpromenaden 45, 3191 Horten, NORWAY

**Product Category(ies): Diagnostic Ultrasound Systems, related  
Ultrasound Probes and Standalone  
Software for Ultrasound-Image Processing**

The Certification Body of TÜV SÜD Product Service GmbH declares that the aforementioned manufacturer has implemented a quality assurance system for design, manufacture and final inspection of the respective devices / device categories in accordance with MDD Annex II. This quality assurance system conforms to the requirements of this Directive and is subject to periodical surveillance. For marketing of class III devices an additional Annex II (4) certificate is mandatory. See also notes overleaf.

**Report No.:**

713161407

**Valid from:**

2019-12-01

**Valid until:**

2024-05-26

**Date,**

2019-09-02

Stefan Preiß  
Head of Certification/Notified Body



Product Service

# EC Certificate

## Full Quality Assurance System

Directive 93/42/EEC on Medical Devices (MDD), Annex II excluding (4)  
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No. G1 16 03 23782 082

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### Report No.:

713080867

### Valid from:

2016-09-02

### Valid until:

2021-09-01

Date, 2016-06-09

Stefan Preiß



TÜV SÜD Product Service GmbH is Notified Body with identification no. 0123

Page 1 of 1





### Product Description<sup>1</sup>

Vivid™ iq combines the proven high performance of the Vivid product line with an ultra-modern and lightweight laptop. Vivid iq is a comprehensive digital color flow Doppler ultrasound system. It is designed for cardiac and shared service imaging with support for the following applications: Fetal/Obstetrics, Abdominal (includes GYN), Pediatric, Small Organ (includes breast, testes, thyroid), Neonatal Cephalic, Adult Cephalic, Cardiac (includes Adult and Pediatric), Peripheral Vascular, Musculoskeletal Conventional, Musculoskeletal Superficial, Urology (including prostate), Transcranial, Transrec-

tal, Transvaginal, Transesophageal, Interventional Guidance (including Biopsy), Thoracic/Pleural, Intraoperative (Vascular), Intracardiac and Intraluminal.

### System Architecture

GE Healthcare (GEHC)'s exclusive, patented, beamforming technology provides the power for this multi-purpose ultrasound system. Using both coherent and harmonic image processing, the system provides computational power, ease of imaging, workflow flexibility and product upgradeability.

The Vivid iq is designed to excel in the following areas:

**Exceptional image quality** on the Vivid iq is created through ultra-definition clarity filtering and virtual apex (larger field-of-view) for the FPA probes. Coded Harmonics – Produces excellent quality images from even difficult-to-image patients.

**Ergonomic Design** – Vivid iq's ergonomic design is based on real users' feedback and extensive testing. Its ergonomic user interface design makes the Vivid iq an easy-to-learn and highly productive system for experienced and novice users, and similarly for right- and left-hand scanning users alike. The combination of touch screen control, trackpad swipe and click gestures, and a user control panel helps operators maintain their wrist on an ergonomic wrist rest and focus on the patient and ultrasound images during the exam. Other ergonomic features include a touch LCD monitor with easily adjustable viewing

and typing angles and a height-adjustable cart for comfortable standing and sitting positions.

**Ease of use and extreme productivity** are provided by GE Healthcare's exclusive technology delivering auto optimized excellent image quality with minimal manipulation, along with automated quantification tools:

- AI-based automated measurements in 2D and Doppler modes help reduce user interaction by up to 80% and save exam time
- Easy AFI LV and Easy AutoEF include AI-based View Recognition and Auto-ROI, reducing the Strain and EF workflows to just one click<sup>2</sup>, and allowing to perform analysis on image data acquired with other vendors' ultrasound scanners
- Easy AutoEF now provides calculated bi-plane Ejection Fraction, as a quick and effortless validation of visual assessment. Calculated Ejection Fraction can also be calculated without ECG signal from live or stored images.

### Portability and Flexible Workflow –

Vivid iq's innovative compact design and touch user interface is ultra-portable and lightweight. The battery option provides additional scanning time without a power supply and instant boot up from standby mode.

Additionally, Vivid iq uses the proven **raw data format technology** that allows for advanced processing on archived images by applying many of the

<sup>1</sup> Vivid iq Premium version 206 is a configuration of the Vivid iq ultrasound system with software version v206.

<sup>2</sup> View Recognition is only applicable to images acquired with TTE probe on GE Healthcare systems.



same scan controls and advanced quantitative tools as are available during the original exam.

## General Specifications

### Dimensions and Weight

- Height: 64±1 mm (2.5±0.04 inch )  
with feet: 73±1 mm (2.9±0.04 inch )
- Width: 390±1 mm (15.4±0.04 inch )
- Depth: 362±1 mm (14.3±0.04 inch )
- Weight with battery: 5.2±0.1 kg (11.5 ±0.2 lbs)

### Console Electrical Power

- **Input**
  - 22V d.c., 6.8A
- Scanning time from battery without power supply is approximately one hour<sup>3</sup>

### Console Power Adapter Electrical Power

- **Input**
  - Voltage: 100-240 V a.c.
  - Frequency: 50/60 Hz
  - Power: 2.0A max, 175 VA
- **Output**
  - 22V d.c., 6.82A

### Operating System

- Windows® 10

### Console Design

- Laptop style
- ECG port
- Integrated solid-state drive: 256 GB
- Multiple USB ports (front/back)
- Integrated speakers for premium sound
- CPU – Intel dual core
- DC power input
- USB interface (5)
- HDMI interface
- ECG
- LAN 10/100/1000 base

### Cart Dimension

- Height: 835±20 - 1115±20 mm (32.9±0.8 - 43.9±0.8 inch)
- Width: 524.9±10 mm (20.7±0.4 inch)
- Depth: 552.3±10 mm (21.7±0.4 inch)
- Max Weight: 65 kg (143 lbs.) with full configuration (Console, Cart, Multi-probe box, probes, charge box with batteries)

### Cart Electrical Power

- **Input**
  - Voltage: 100-240 V a.c.
  - Frequency: 50/60 Hz
  - Power: 300 VA
- **Output**
  - 22V d.c., 10.4A
- An extended battery is integrated within the Vivid iq cart and provides approximately three additional scanning hours<sup>3</sup>

### Cart Design

- Three USB ports including one isolated USB interface
- Six probe holders
- Four probe cable hooks
- Charge box (optional) – to charge up to three batteries and to scan more than 180 min with four fully charged batteries
- Multi-probe box (optional) – three RS, one DLP to support 6VT-D and 10T-D

### Eco Friendly Design

- Vivid iq offers an inverted B&W background printing, helping to prevent waste of ink and paper
- eDelivery remote software update solution helps decrease use of hardware drivers and decrease our service field engineers carbon emission footprint.

### User Interface

#### Operator Keyboard

- Innovative track pad design – a new track pad provides new ergonomic gestures, including two-finger swipe to control Depth and Gain and Click to Set, allowing the user's arm to stay

rested for a significant time during the exam

- Ergonomic simplified hard key layout with ergonomic design around the track pad
- Interactive back-lighting of application-specific push buttons – adjustable back-light intensity
- Easy-to-learn user interface with intelligent touch keyboard
- Image manager on the touch screen for quick review of image clipboard contents and easy export of images and loops to remote archives or media

### Touch Screen

- Full touch ability including tap, double-tap, swipe, and pinch gestures, for fast and highly responsive user experience
- 15.6" ultra-high-resolution, wide screen format, color, multi-touch LCD screen
- On-screen touch keyboard with support for characters in 14 languages
- Interactive user-configurable short-cut software menu
- Application-specific operator and sidebar touch menu controls operated by finger tapping and swiping
- Overall gain, depth and zoom control bar on the touch for easy adjustment
- Touch-screen control of TGC sliders

### Monitor

- 15.6" wide screen full High-Definition (HD) flicker-free LCD display with full touch ability
- 16.7 million simultaneous colors available
- Ergonomic FlexFit design with adjustable typing angle and flexible view angle
- Resolution: 1920 x 1080 pixels, full HD
- Fold down and lock mechanism for transportation
- Screen can be adjusted in different angles for scanning mode, typing mode and closing, allowing to optimize the viewing angle in each position
- Backlight adjustable

<sup>3</sup> Depending on operation modes used

- Selectable big image size to use more screen area for the ultrasound image for better visibility from a distance
- Adaptive video formats and resolution

## System Overview

### Applications (probe dependent)

- Cardiac
- Transesophageal
- Intracardiac and Intraluminal
- Intraoperative
- Interventional guidance
- Peripheral Vascular
- Fetal/Obstetrics
- Abdominal
- Pediatric
- Small Organ
- Neonatal Cephalic
- Adult Cephalic
- Musculoskeletal Conventional
- Musculoskeletal Superficial
- Transcranial
- Transrectal
- Transvaginal
- Thoracic/Pleural
- Urology

### Operating Modes

- 2D Tissue
- Tissue M-mode
- Anatomical M-mode
- Curved Anatomical M-mode
- Extended field-of-view (LOGIQ™ View)
- Virtual Convex
- Virtual Apex
- Coded Phase Inversion
- Compound Imaging
- 2D Color Flow
- Multi-Dimensional Color Mode
- 2D Color Angio Flow
- Color M-mode
- Anatomical Color M-mode

- B-flow
- Blood Flow Imaging
- Blood Flow Angio Imaging
- Strain Elastography
- Pulsed Wave Doppler
- Continuous Wave Doppler
- LVO Contrast
- Vascular Contrast (optional)<sup>4</sup>
- Contrast Low MI (optional)<sup>4</sup>
- Tissue Velocity Imaging
- Tissue Tracking
- Tissue Synchronization Imaging (optional)
- Strain Imaging (optional)
- Strain Rate Imaging (optional)
- Tissue Velocity M-mode
- Tissue Velocity Doppler
- Automatic Optimization
- Scan Assist Pro
- Scan Coach
- Pre-Post Compare (optional)
- 2D Stress (optional)
- Automated Function Imaging (AFI) 3.0 (optional)
- Easy AFI LV (optional)
- AFI RV (optional)
- AFI LA (optional)
- Automated Ejection-Fraction (AutoEF) 3.0 (optional)
- Easy AutoEF (optional)
- AI Auto Measure – 2D (optional)
- AI Auto Measure – Spectrum Recognition (optional)
- Bi-plane
- Tri-plane

### Scanning Methods

- Electronic sector
- Electronic volume
- Electronic convex
- Electronic linear
- CW pencil

### Transducer Types

- Sector phased array
- Convex array
- Linear array
- Single crystal matrix array
- 2D matrix array
- Endovaginal

### Peripheral Options

- DVDRW
- Color printer
- B/W video printer with optional inverted background printing, allowing for environmentally sensitive ink saving
- USB memory stick
- One TB USB hard drive
- HDMI cable
- Video converter providing electrically isolated video signals for external monitors
  - digital Full HD 1920 x 1080
  - analogue VGA 800 x 600
- Three-pedal configurable footswitch
- Rolling bag
- Ergonomic wrist rest

### Accessories (optional)

- Interface cable for external ECG
- ECG adapter for DIN-type pediatrics electrode leads

### Display Modes

- Live and stored display format: Full size and split screen, both with thumbnails, for still and cine
- Instant-review screen displays 12 simultaneous loops/images for a quick study review
- Selectable display configuration of duplex and triplex modes: side-by-side or top-bottom during live, digital replay and clipboard image recall
- Single, dual and quad-screen view
- Simultaneous capability
  - 2D+PW
  - 2D+CW (with 6VT-D probe)

<sup>4</sup> GE Healthcare's Vivid scanner is designed for compatibility with commercially available 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 approved for use. The Contrast Low MI and Vascular/Abdominal Contrast options are not available in USA.

- 2D + CFM/TVI + PW
- 2D + CFM + CW (with 6VT-D probe)
- 2D + CFM/Angio/TVI/SRI/TT/SI/TSI
- 2D + M/AMM/CAMM
- 2D + CFM/Angio/TVI/SRI/TT/SI/TSI + M/AMM/CAMM
- Real-time duplex or triplex mode (with 6VT-D probe)
- Compound + M/CFM/PW
- 2D + bi-plane (with 6VT-D probe)
- 2D + bi-plane + CFM/AMM/CAMM (with 6VT-D probe)
- 2D + tri-plane (with 6VT-D probe)
- 2D + tri-plane + CFM/AMM/CAMM (with 6VT-D probe)
- 2D + color split screen (simultaneous mode)
- Selectable alternating modes
  - 2D or Compound + PW
  - 2D + CW
  - 2D or Compound + CFM/PW
  - 2D + CFM + CW
- Multi-image (split/quad screen)
  - Live and/or frozen
  - Independent cine playback
- Timeline display
  - Independent 2D (or Compound) + PW/CW/M display
  - A choice of display formats with various sizes of 2D + PW/CW/M
- Top/bottom selectable format
- Side/side selectable format

### Display Annotation

- Patient name: First, last and middle
- Patient ID
- Additional patient ID
- Age, sex and birth date
- Hospital name
- Date format: Three types selectable – MM/DD/YYYY, DD/MM/YYYY, YYYY/MM/DD
- Time format: Two types selectable – 24 hours, 12 hours
- Gestational age from LMP/EDD/GA
- Probe name
- Probe orientation
- Depth scale marker
- Focal zone markers
- Image depth
- Zoom depth
- B-mode
  - Gain
  - Imaging frequency
  - Frame averaging
  - Dynamic range
  - Gray map
- M-mode
  - Gain
  - Frequency
  - Time scale
  - Dynamic range
- Doppler mode
  - Gain
  - Angle
  - Sample volume size and position
  - Wall filter (Low Velocity Reject)
  - Velocity and/or frequency scale
  - Spectrum inversion
- Time scale
  - PRF
  - Doppler frequency
- Color Flow Doppler mode
  - Frame rate
  - Sample volume size
  - Color scale
  - Power
  - Color baseline
  - Color threshold marker
  - Color gain
  - Frame averaging
- Spectrum inversion
- Acoustic frame rate
- CINE gauge, image number/frame number
- Bodymarks: Multiple human anatomical structures
- Application/preset name
- Measurement results
- Operator message
- Displayed acoustic output
  - TIS: Thermal Index Soft Tissue
  - TIC: Thermal Index Cranial (Bone)
  - TIB: Thermal Index Bone

- MI: Mechanical Index
- Power output in dB
- Biopsy guideline and zone
- Heart rate
- TrackPad-driven annotation arrows
- Active mode display
- Stress protocol parameters
- Parameter annotation follows ASE standard
- Free text with word library
- Scan plane position indicator and probe temperature are displayed with all TEE probes
- Image orientation marker

## General System Parameters

### System Setup

- Pre-programmable M&A and annotation categories
- Different user presets per probe/application may be stored for quick access
- User programmable preset capability with administrator preset protection
- Factory default preset data, protected against modification
- QuickApps: Factory and user programmable sub-preset feature that keeps 2D and geometry settings while adapting color flow or contrast parameters
- User Interface languages: English, LA Spanish, French, German, Italian, Portuguese (European and Brazilian), Russian, Swedish, Norwegian, Danish, Dutch, Finnish, Chinese
- User-defined annotations
- Body patterns
- Customized comment home position

### CINE Memory/Image Memory

- 500 MB of cine memory
- Selectable cine sequence for cine review
- Measurements/calculations and annotations on cine playback
- Scrolling timeline memory
- Dual-image cine display
- Quad-image cine display

- CINE gauge and cine image number display
- CINE review loop
- CINE review speed

### Image Storage

- On-board database of patient information from past exams
- User-selectable ECG and time gated acquisition available on touch panel during live scanning
- User-selectable prospective or retrospective capture in config
- Storage formats:
  - DICOM®-compressed/uncompressed, single/multi-frame, with/without raw data, storage via clipboard and/or seamlessly directly to destination device
  - Transfer/ "Save As" JPEG, MPEG, AVI, DICOM, Raw DICOM formats
- Storage devices (optional):
  - USB memory stick: 32 GB
  - CD-RW storage: 700 MB
  - DVD storage: -R (4.7 GB)
  - Mobile hard drive storage: 1 TB
- Compare old images with current exam
- Reload of archived data sets
- Activation control of USB devices (for security)

### Annotations

#### Body Marks

- Body mark icons for location and position of probe
- Option to automatically activate body mark on freeze
- Easy selection of body marks from touch screen
- Easy selection of body marks for dual-screen layout

#### Text Annotations

- Easy selection of text annotations from touch screen
- Option to automatically activate annotation on freeze

### Connectivity and DICOM

- Ethernet network connection

- USB Wireless network connection kit (optional)
- DICOM 3.0
  - Verify
  - Print
  - Store
  - Modality worklist
  - Storage commitment
  - Modality Performed Procedure Step (MPPS)
  - DICOM Media exchange
  - DICOM spooler
  - DICOM Query/Retrieve
- Structured reporting – compatible with adult cardiac, pediatric, vascular and abdominal
- Media store of structured reporting
- InSite™ ExC capability for remote service/access
- Support of two patients' IDs in DICOM
- Separate DICOM SR and image storage destinations
- Simultaneous transfer of DICOM to multiple destinations
- Streaming (optional) sends the image information as digital video stream over Ethernet in real-time to clients
- DICOM PDF Read
- DICOM / TLS (encryption)
- DICOM Implicit Encoding support

### Patient Archive

#### EchoPAC™ Connectivity

- Integrated EchoPAC functionality adds connectivity and image analysis capability to scanner
- Data format fully compatible with offline EchoPAC Plug-in review/reporting stations of same or newer vintage
- EchoPAC Plug-in allows instant access to ultrasound raw data provided by the system
- Comprehensive review, analysis and post-processing capabilities on EchoPAC Plug-in
- Advanced quantitative analysis and post-processing capabilities
- Q-analysis on raw data from Vivid iq on EchoPAC Plug-in

- Three user levels help organize data security requirements
- E-signoff compatibility, with clear indications in patient management screens and report screen that a report was signed off, and by whom and at what time. The signed off report and exam cannot be changed. The "Diagnosing Physician" field is automatically assigned to the user that did the sign-off

### Image and Data Management

- Exceptional workflow with instant access data management
- DICOM 3.0 support – see DICOM conformance statement for details
- Support for transfer of the proprietary raw data files within the DICOM standard. With the use of the AI-based View Recognition this can be automated
- 2D, CFM or TVI data at maximum frame rate may be reviewed by scrolling or by running cine loops (can contain more than 1,000 images for imaging modes)
- Image clipboard for stamp-size storage and review of stored images and loops
- Built-in patient archive with images/loops, patient information, measurements and reports
- DICOM-SR Standard structured reporting mechanism
- Structured findings report tools help support efficient text entries with direct editing of findings text, usability enhancements, various configuration options and conclusion section
- User can enter normal values which are then compared to actual measurements
- Configurable HTML-based report function
- Report templates can be customized on board
- ASE-based default text modules (English), user-customizable
- Internal archive data can be exported to removable image storage through DICOM media

- Internal hard disk – for storing programs, application defaults, ultrasound images and patient archive
- All data storage is based on ultrasound raw data, allowing to change gain, baseline, color maps, sweep speeds, etc., for recalled images and loops
- DICOM media – read/write images on DICOM format
- DICOM viewer embedded on media (optional and selectable in Config)
- Alphanumeric data can be exported in Microsoft® Excel® compatible format
- JPEG export (“Save As”) for still frames
- AVI and MPEG export (“Save As”) for cine loops
- Ability to transfer Systole Only for Stress echo loops to PACS
- Selectable raw data transfer to PACS including AI-based View Recognition for automatic view labelling

#### **CartoSound® Interface (optional)**

- The system can interface with the Carto® 3 EP navigation system and the SOUNDSTAR® ultrasound catheters manufactured by Biosense Webster
- The interface allows Vivid iq system to send images to the Carto 3 EP system
- Vivid iq is able to send ultrasound scanning parameters to the Carto 3 EP system via a peer-to-peer LAN connection

#### **Tricify® Uplink (optional)<sup>5</sup>**

- Tricify is a Cloud service
- Can serve as long-term archive
- Can be used to share complete examinations with colleagues for information exchange and for consultation
- Can be used to send images to patients

#### **Self-contained DICOM Viewer (optional)**

- Exams can be transferred to CD/DVD or USB media with an integrated GE Healthcare Ultrasound DICOM Viewer
- The GE Healthcare Ultrasound DICOM Viewer allows to open and display still images and cine loops from media on

a standard PC without installing any application on the host PC

#### **App Launchpad<sup>5</sup>**

- The App Launchpad is a tab available on the Archive screen – when selected, various applications (“Apps”) can be launched
- Only validated and released Apps are supported
- 3rd-party Apps can be purchased through an AppStore on a GE Healthcare website
- Consult with a GE Healthcare representative for more details

#### **Raw Data Streaming (optional)**

- Provides streaming of raw data out to 3rd-party devices designed to process this data

#### **User Manual Available on Board**

User manual and service manual are included on USB flash drive with each system. A printed user manual is available upon request.

### **Scanning Parameters**

- Digital beamformer with up to 974,026 effective digital channels
- Minimum field-of-view (depth): 1 cm (probe dependent)
- Maximum field-of-view (depth): 33 cm (probe dependent)
- Width range: 10° – 168° (probe dependent)
- Continuous dynamic receive focus/continuous dynamic receive aperture
- Composite dynamic range up to 415 dB
- Adjustable dynamic range
- Image reverse: Right/Left
- Image rotation of 0°, 180°
- Touch user-interface inversion for right-hand scanning users

#### **Tissue Imaging**

##### **General**

- Variable transmit frequencies for resolution/penetration optimization

- Display zoom with zoom area control
- High-Resolution (HR) Zoom – concentrates all image acquisition power into selected Region of Interest (ROI)
- Variable contour filtering – for edge enhancement
- Selectable grayscale parameters (availability preset-dependent): Gain, reject, DDP, clarity, dynamic range and compress – can be adjusted in live, digital replay and image clipboard recall
- Automatically calculated TGC curves help reduce operator interaction
- Automatically calculated lateral gain

#### **2D Mode**

- Sector tilt and width control
- Frame rate in excess of 1,000 fps, depending on probe, settings and applications
- Coded octave imaging with coded phase inversion – GE Healthcare 3rd generation harmonic tissue imaging providing enhanced lateral and contrast resolution as compared to previous generation GE Healthcare products. Features help reduce noise, help improve wall definition and axial resolution, making it well suited for a wide variety of patient groups
- Confocal imaging – allows for multiple transmit focal zones over range of view and a high vector density, probes dependent
- Automatic tissue optimization – single keystroke optimizes immediately, automatically and dynamically different grayscale settings with the goal of signal independent uniform gain and contrast distribution
- UD Clarity and UD Speckle Reduction Imaging – an advanced image processing technique to help reduce speckle in real time examining the relative difference between neighboring pixel values and determining whether the grayscale variations have a sharp difference, follow a trend, or are random in nature

<sup>5</sup> Tricify Uplink and App Launchpad may not be available in all countries and regions. Consult with a GE Healthcare representative for more details.



- Variable image width – a reduction either increases frame rate or increases the number of focal zones while maintaining the frame rate – application dependent
- Multiple-angle Compound Imaging – multiple co-planar images from different angles combined into a single image in real-time to help enhance border definition, contrast resolution and reducing angular dependence of border or edge as compared to no-compound imaging
- LOGIQ View: Provides the ability to construct and view a static 2D image with wider field-of-view of a given transducer. This allows viewing and measurements of anatomy larger than what would fit in a single image
- Virtual convex allows a wider field-of-view (FOV) in the depth to enhance image quality on linear probes
- Virtual apex provides a wider field-of-view with phased array probes, effective at certain imaging views where a wide near field is preferred
- L/R and up/down invert, in live, digital replay or image clipboard recall
- Digital replay for retrospective review or automatic looping of images, allowing for adjustment of parameters such as gain, reject, Anatomical M-mode, persistence and replay speed
- Data Dependent Processing (DDP) performs temporal processing which helps reduce random noise but leaves motion of significant tissue structures largely unaffected – can be adjusted even in digital replay
- 256 shades of gray
- Colorized 2D-mode, user-selectable in real-time, digital replay

#### **Multi-Dimensional Mode (with 6VT-D probe)**

- Bi-plane scanning: two independent simultaneous scan planes where one of them can be rotated and tilted freely
- Tri-plane: three independent simultaneous scan planes that can be rotated freely

- Both bi-plane and tri-plane scanning is possible in all color Doppler modes

#### **M-mode**

- TrackPad steers M-mode line available with all imaging probes – max steering angle is probe dependent
- Simultaneous real-time 2D- and M-mode
- M-mode PRF 1 kHz – image data acquired is combined to give high-quality recording regardless of display scroll speed
- Digital replay for retrospective review of spectral data
- Several top-bottom formats, side-by-side format and time-motion-only format – can be adjusted in live or digital replay
- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display
- Horizontal scroll can be adjusted in live or digital replay

#### **Anatomical M-mode**

- M-mode cursor can be adjusted at any plane
- Curved Anatomical M-mode – free (curved) drawing of M-mode generated from the cursor independent from the axial plane
- Can be activated from live, digital replay or image clipboard recall
- Anatomical color and Tissue Velocity M-mode
- M&A capability

### **Color Doppler Imaging**

#### **General**

- Steerable color Doppler available with all imaging probes – max steering angle is probe dependent
- TrackPad-controlled ROI
- Touchscreen-controlled ROI
- Removal of color map from the tissue during digital replay
- Digital replay for retrospective review of color or color M-mode data allowing for adjustment of parameters such as encoding principle, color priority and color gain even on stored data

- PRF settings – user-selectable
- Advanced regression wall filter gives efficient suppression of wall clutter
- For each encoding principle, multiple color maps can be selected in live and digital replay – variance maps available
- More than 65,000 simultaneous colors processed, providing a smooth display two-dimensional color maps containing a multitude of color hues
- Simultaneous display of grayscale 2D and 2D with color flow
- Color invert – user-selectable in live and digital replay
- Variable color baseline – user-selectable in live and digital replay
- Multi-variate color priority function gives delineation of disturbed flows even across bright areas of the 2D-mode image
- Color Doppler frequency can be changed independently from 2D

#### **Color Flow Imaging**

- TruSpeed imaging allows either ultra-high frame rate or increased lateral resolution as compared to previous generation GE Healthcare products
- Frame Rate in excess of 700 (it is 400 on 12S-RS) fps, depending on probe and settings
- Variable ROI size in width and depth
- User-selectable radial and lateral averaging to help reduce statistical uncertainty in color velocity and variance estimates
- Data Dependent Processing (DDP) performs temporal processing and display smoothing to help reduce loss of transient events of hemodynamic significance
- Digital replay for retrospective review or automatic looping of color images, allowing for adjustment of parameters such as DDP, encoding principle, baseline shift, color maps, color priority and color gain even on frozen/recalled data
- Application-dependent, multi-variate motion discriminator helps reduce flash artifacts

- Dedicated coronary flow application
- Multiple-angle compound imaging in 2D mode is maintained while in color Doppler mode

#### **Multi-Dimensional Color Mode (with 6VT-D probe)**

- Bi-plane and tri-plane scanning with all color Doppler and tissue velocity modes

#### **Color Angio**

- Angle-independent power Doppler mode for visualization of slow flow vessels with enhanced sensitivity compared to standard color flow of previous GE Healthcare products

#### **Color M-mode**

- Variable ROI length and position – user-selectable
- User-selectable radial averaging to help reduce statistical uncertainty in color velocity and variance estimates
- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display – can be adjusted during live, digital replay or image clipboard recall
- Real-time 2D image while in color M-mode
- Same controls and functions available as in standard 2D color Doppler

#### **Anatomical Color M-mode**

- GE Healthcare-patented, any plane color M-mode display derived from color Doppler cine loop
- Applicable to Tissue Velocity Imaging
- M&A capability

#### **B-flow**

- B-flow is a digital imaging technique that provides real-time visualization of vascular hemodynamics by directly visualizing blood reflectors and presenting this information in a grayscale display
- Use of GE Healthcare-patented techniques to boost blood echoes, and to help preferentially suppress non-moving tissue signals
- B-flow is available for most vascular and shared service applications

#### **Blood Flow Imaging**

- Combines color Doppler with grayscale speckle imaging
- Helps improve delineation of blood flow without bleeding into tissue or vessel wall

#### **Blood Flow Angio Imaging**

- Combines angio with grayscale speckle imaging

#### **Strain Elastography**

- Visualization of relative tissue stiffness

#### **Spectral Doppler**

##### **General**

- Operates in PW, HPRF and CW modes
- TrackPad steerable Doppler available with all imaging probes – max steering angle is probe dependent
- Selectable Doppler frequency for enhanced optimization
- High-quality, real-time duplex or triplex operation in all Doppler modes, CW and PW, and for all velocity settings
- Frame rate control for optimized use of acquisition power between spectrum, 2D and color Doppler modes in duplex or triplex modes
- Very fast and flexible spectrum analysis with an equivalent DFT rate of 0.2 ms
- Automatic Spectrum Optimization (ASO) provides a single push, automatic, real-time optimization of PW or CW spectrum scale, and baseline display
- Dynamic gain compensation for display of flows with varying signal strengths over the cardiac cycle to help improve ease of use
- Dynamic reject gives consistent suppression of background – user-selectable in real-time, digital replay or image clipboard recall
- Digital replay for retrospective review of spectral Doppler data
- Several top-bottom formats, side-by-side format and time-motion-only format – can be adjusted in live or digital replay

- Selectable horizontal scroll speed: 1, 2, 3, 4, 6, 8, 12, 16 seconds across display – can be adjusted in live or digital replay
- Adjustable spectral Doppler display parameters: gain, reject, compress, color maps – can be adjusted in live or digital replay
- User-adjustable baseline shift – in live, digital replay and image clipboard recall
- Adjustable velocity scale (depending on probe and setting)
- Wall filters with range 10-2000 Hz (velocity scale dependent)
- Angle correction with automatic adjustment of velocity scale – in live, digital replay and image clipboard recall
- Auto Doppler angle
- Stereo speakers mounted in the front panel
- Display annotations of frequency, mode, scales, Nyquist limit, wall filter setting, angle correction, acoustic power indices
- Compound in duplex

##### **PW/HPRF Doppler**

- Automatic HPRF Doppler maintains its sensitivity even for shallow depths and with high PRF's
- Digital velocity tracking Doppler employs processing in range and time for high-quality spectral displays
- Adjustable sample volume size of 1-16 mm (probe dependent)
- Maximum sample volume depth 30 cm

##### **CW Doppler**

- Highly sensitive steerable CW available with all phased array probes
- Tissue Velocity Doppler

#### **Contrast Imaging (optional)**

##### **LV Contrast (accessed through QuickApps)**

- Enables contrast applications intended for imaging of the left ventricle
- LV harmonic contrast imaging(3Sc-RS probe) enhances delineation of the LV border in combination with ultrasound



contrast agents. The new implementation of GE Healthcare's Coded Phase Inversion (CPI) provides high-resolution detection of contrast in the LV cavity and excellent suppression of myocardial tissue signals

#### **Contrast Low MI (optional)<sup>6</sup>**

Contrast Low MI imaging is enabled by the Advanced Contrast option. Contrast Low MI is a preset that enables real-time continuous imaging of microbubbles using a low enough MI to generate return signals from the bubbles without destroying them. The user can choose between two types of transmit techniques controlled by the Frequency rotary: Power Modulation and Pulse Inversion, each with different characteristics that may affect imaging performance depending on the type of microbubbles being used.

- A high MI Flash feature is available to rapidly destruct bubbles. Other controls are also available for image acquisition optimization.
- Imaging can be performed in live or with ECG triggering.
- The contrast intensity can be quantified using the QAnalysis package.
- The option may not be available in all countries.

#### **Vascular/Abdominal Contrast (optional)<sup>6</sup>**

Vascular contrast – enables contrast applications intended for vascular (9L-RS) and abdominal (C1-5-RS) contrast imaging. The option may not be available in all countries.

- Vascular contrast (9L-RS) – coded phase inversion enables excellent detection and resolution of vascular contrast imaging

#### **Tissue Velocity Imaging**

##### **Tissue Velocity Imaging Mode**

- Myocardial Doppler imaging with color overlay on tissue image

- Tissue Doppler data can be acquired in background during regular 2D imaging
- The velocity of myocardial segments after entire heart cycle can be displayed in one single image
- Tissue color overlay can be removed to show just the 2D image, still retaining the tissue velocity information
- Quantitative profiles for TVI, Tissue Tracking, strain and strain rate can be derived
- Time markers for valve events derived from any TM mode help simplify understanding of signals in velocity traces or Curved Anatomical M-mode

##### **Tissue Tracking Mode**

- Real-time display of the time integral of TVI for quantitative display of myocardial systolic displacement
- Myocardial displacement is calculated and displayed as a color-coded overlay on the grayscale and M-mode image – different colors represent different displacement ranges

##### **Tissue Synchronization Imaging Mode (optional, enabled by Advanced QScan)**

- Parametric imaging which gives information about synchronicity of myocardial motion
- Myocardial segments colored according to time to peak velocity, green for early and red for late peak
- Waveform trace available to obtain quantitative time to peak measurement from TSI Image
- Available in live scanning, as well as an offline calculation derived from Tissue Doppler data
- Additional features in combination with multi-dimensional imaging option
- Simultaneous acquisition of tri-plane TSI images covering all standard segments in apical views (with 6VT-D probe)
- Efficient segment specific TSI time measurements
- Immediate bull's eye report

- Automatic calculated TSI synchrony indexes
- TSI surface mapping
- LV synchronization report template
- CRT programming protocol

##### **Strain/Strain Rate Mode (optional, enabled by Advanced QScan)**

- Tissue deformation (strain) and rate of deformation (strain rate) are calculated and displayed as real-time, color-coded overlay on the 2D image
- Cine Compound calculates and displays cine-loops generated from a temporal averaging of multiple consecutive heart cycles
- Anatomical M-mode and Curved Anatomical M-mode displays (SI and SRI)

#### **Physiological Traces**

- Integrated three-lead ECG module
- Automatic QRS complex detection with user ability to modify QRS trigger positions
- External ECG lead input
- Internally generated respiratory trace using ECG leads
- ECG trigger
- ECG lead selection
- Adjustable ECG QRS markers

#### **Automatic Optimization**

- Optimize B-mode image to help improve contrast resolution, gain, TGC and grayscale
- Auto Spectral Optimize (ASO) – dynamic adjustments of baseline, PRF (on live image) and angle correction

#### **Protocol Features**

##### **Scan Assist Pro**

- Customizable automations that assist the user through each step of the scan
- Helps enhance consistency and reduce keystrokes

<sup>6</sup> GE Healthcare's Vivid scanner is designed for compatibility with commercially available 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 approved for use. The Contrast Low MI and Vascular/Abdominal Contrast options are not available in USA.

- Ultrasound image, anatomical picture, step by step training through a pre-defined protocol
- Supports selection of all modes, all measurements and dual annotations
- Imaging attributes: Octave, Steer, Dual/Quad screen, Compound, LOGIQ View, Zoom, Depth, Scale and Baseline
- On-line or off-line protocol editor
- Image acquisition according to pre-defined protocol templates
- Various factory protocol templates
- User-configurable protocol templates

### Scan Coach

- A reference tool that provides modules depicting basic scanning techniques with animated graphics of probe position, schematic of anatomy and reference clinical image
- Exam protocols can be customized based on local guidelines

### Pre-Post Compare (optional)

- Labelling of measurements and images acquired in different stages of an exam or procedure, allowing to compare measurements pre and post procedure.

### Smart Stress Echo (optional)

#### Supported Protocol Examinations

- 2D pharmacological stress echo
- 2D bicycle stress echo
- 2D continuous capture stress echo (treadmill stress echo)
- Q-Stress protocols (acquire tissue velocity data in background for quantitative analysis)
- Cardiac resynchronization therapy programming protocols (available with the Advanced QScan option)

#### Protocol Examinations Features (enabled with Smart Stress option)

- Wall motion scoring: Analysis by wall motion in individual myocardial segments
- Show reference: Show a reference image from baseline or previous level during acquisition

- Smart stress: Automatically set up various scanning parameters (for instance geometry, frequency, gain, etc.) according to same projection on previous level
- Scan mode settings: Scan mode may be specified for individual views in the protocol
- Stress protocol editor with over 10 levels and maximum 10 projections
- Preview of store: Show running loops as preview before storing to the examination

### Continuous Capture

- Continuously acquire large amounts of 2D image data, and selection of projection views for analysis afterwards
- The entire continuous capture recording may be kept in memory while it is possible to store new images outside the protocol template, or the entire recording can be stored to file
- Selection of projection views on Echo-PAC SW Only when the entire recording is stored to file

### Wall Motion Scoring

- As part of the measurement and analysis package one can access a wall motion assessment module, providing analysis/scoring of individual myocardial segments
- For use with all stress modalities

### Cardiac Resynchronization Therapy (CRT) Programming Protocols

- CRT protocols require Smart Stress and Advanced QScan
- Tailored acquisition protocol for data needed for programming of AV and VV delays in biventricular pacemakers
- Image acquisition of a set of projection views with various scan mode settings
- Template editor
- User-configurable protocol templates
- Configure protocol name, number of levels and views, name of level and views and several other protocol settings (smart stress, show reference, scan mode, preview of store, timer handling, etc.)

## Measurement and Analysis (M&A)

- Personalized measurement protocols allow individual set and order of M&A items
- Measurements can be labeled seamlessly by using protocols or post-assignments
- Measurements assignable to protocol capability
- Parameter annotation follows ASE standard
- Seamless data storage and report creation
- User-assignable parameters
- Comprehensive set of adult and pediatric cardiac measurements and calculations to help assess dimensions, flow properties and other functional parameters of the heart
- Comprehensive set of shared service measurements and calculations covering vascular, abdominal, obstetrics and other application areas
- Configuration package to set up a customized set and sequence of measurements to use, defining user-defined measurements and changing settings for the factory-defined measurements
- Stress echo support allowing wall motion scoring and automatic stress level labeling of measurements
- Stress echo is directly accessible from the system control panel with a dedicated button
- Support for measuring on DICOM images
- AI-based Cardiac Auto 2D Measurement (optional) enables automated quantification of the most common distance measurements performed on parasternal LAX 2D images, with minimum user guidance
- AI-based Spectrum Recognition (optional) enables automated recognition of the most common Doppler spectra and automatically starts the Auto Doppler measurement (where available), or opens the according manual measurement

- Cardiac Auto Doppler automatically provides Doppler measurement results for the most common parameters with minimal user guidance
- Automatic Doppler trace functionality for use in non-cardiac applications in both live and replay
- Worksheet allows user to review, edit and delete performed measurements
- Reporting support allowing a configurable set of measurements to be shown in the exam report
- DICOM SR export of measurement data

### **Automated Function Imaging (AFI 3.0) (optional)**

- Third generation parametric imaging tool which gives quantitative data for global and segmental strain
- Allows comprehensive assessment at a glance by combining three apical longitudinal views into one comprehensive bull's eye view
- Integrated into M&A package with specialized report templates
- 2D strain based data moves into clinical practice
- Simplified and flexible workflow with fully automated ROI tracing (if configured), adaptive ROI width and combined display of traces from all segments
- User-selectable endo or full wall global strain values displayed
- Random sequence of analysis of the three views supported
- Ability to exit tool after one or two views completed
- Applicable to transthoracic and 2D TEE data
- Integrated AutoEF calculation
- On-scanner automatic labelling of views during acquisition enabled by an intelligent algorithm called View Recognition, is used to simplify the AFI workflow eliminating the need to pick views

- Can process GE Healthcare raw data and DICOM data acquired with other vendors' Ultrasound scanners

### **Easy AFI LV (optional)**

- Automated one-click AFI LV analysis. Our AI-based Auto ROI detection algorithm allows users to complete the AFI workflow with no manual interaction apart from initiating the measurement tool and approving the results

### **Automated Function Imaging for the Right Ventricle (AFI RV) (optional)**

- Parametric imaging tool which gives quantitative data for right ventricular longitudinal Global Strain, Free Wall Strain and Segmental Strain derived from the apical 4-chamber RV focused view
  - Tricuspid Annular Plane Systolic Excursion (TAPSE) provided
  - Simplified and flexible workflow with 3-point click method for ROI selection, supports editing of both endo and epicardial borders and adaptive ROI width
  - Combined display of traces from all segments
- User-selectable endo or full wall global strain values displayed

### **Automated Function Imaging for the Left Atrium (AFI LA) (optional)**

- Parametric tool giving quantitative data from GE Healthcare raw data images for LA longitudinal global wall strain, LA volumes and Emptying Fraction
  - Single-plane (4-channel or 2-channel) or bi-plane (4-channel or 2-channel) measurement
  - Simplified and flexible workflow with 3-point click method for ROI selection and adaptive ROI width
  - Full wall tracking

### **Automated Ejection-Fraction Calculation (AutoEF 3.0) (optional)**

- Third generation automated 2D EF measurement tool based on 2D

speckle tracking algorithm and on Simpson

- Calculated Ejection Fraction with or without ECG signals with automated<sup>7</sup> workflow from a frozen image in 2-chamber or 4-chamber view.
- Calculated bi-plane Ejection Fraction with or without ECG signal from recalled images.
- Integrated into M&A package with worksheet summary
- Can process GE Healthcare raw data and DICOM data acquired with other vendors' Ultrasound scanners

### **Easy AutoEF (optional)**

- Automated one-click Ejection Fraction (EF) measurement. Our AI-based Auto ROI detection algorithm allows users to complete the Ejection Fraction (EF) measurement on loops acquired with or without ECG signal, and with no manual interaction apart from initiating the measurement tool and approving the results

### **Quantitative Analysis Package (Q-Analysis)**

- Traces for tissue velocity or derived parameters (strain rate, strain, displacement) inside defined regions of interest as function of time
- Contrast analysis with traces for gray-scale intensity or angio power inside defined regions of interest as function of time
- Curved Anatomical M-mode display allowing an M-mode along an arbitrary curve in a 2D image
- Sample-area points may be dynamically anchored to move with the tissue when running the cine loop
- Cine Compound displays cine loops generated from a temporal averaging of multiple consecutive heart cycles

### **Generic Measurements**

- BSA (Body Surface Area)
- MaxPG (Maximum Pressure Gradient)
- MeanPG (Mean Pressure Gradient)

<sup>7</sup> Automated refers to workflow potentially involving no user interaction before approval; users can adjust contours and frame selection during the process.

- % Stenosis (Stenosis Ratio)
- PI (Pulsatility Index)
- RI (Resistivity Index)
- HR (Heart Rate) – beats/minute
- A/B Ratio (Velocities Ratio)
- TAMAX (Time Averaged Maximum Velocity) – Trace method is Peak or Manual
- TAMIN (Time Averaged Minimum Velocity) – Trace method is Floor
- TAMEAN (Time Averaged Mean Velocity) – Trace method is Mean
- Volume
- Area
- Spline Tool

### Cardiac Measurements/Calculations

- %FS (LV Fractional Shortening)
- %IVS Thck (IVS Fractional Shortening)
- %LVPW Thck (LV Posterior Wall Fractional Shortening)
- Ao Arch Diam (Aortic Arch Diameter)
- Ao Asc (Ascending Aortic Diameter)
- Ao Desc Diam (Descending Aortic Diameter)
- Ao Isthmus (Aortic Isthmus)
- Ao Root Diam (Aortic Root Diameter)
- AR ERO (PISA: Regurgitant Orifice Area)
- AR Flow (PISA: Regurgitant Flow)
- AR PHT (AV Insuf. Pressure Half Time)
- AR Rad (PISA: Radius of Aliased Point)
- AR RF (Regurgitant Fraction over the Aortic Valve)
- AR RV (PISA: Regurgitant Volume Flow)
- AR Vel (PISA: Aliased Velocity)
- AR Vmax (Aortic Insuf. Peak Velocity)
- AR VTI (Aortic Insuf. Velocity Time Integral)
- ARed max PG (Aortic Insuf. End-Diastole Pressure Gradient)
- ARed Vmax (Aortic Insuf. End-Diastolic Velocity)
- AV Acc Slope (Aortic Valve Flow Acceleration)
- AV Acc Time (Aortic Valve Acceleration Time)

- AV AccT/ET (AV Acceleration to Ejection Time Ratio)
- AV EOAI (VTI) (Aortic Valve Effective Orifice Area Index by Continuity Equation VTI)
- AV EOAI Vmax (Aortic Valve Effective Orifice Area Index by Continuity Equation Peak V)
- AV CO (Cardiac Output by Aortic Flow)
- AV Cusp (Aortic Valve Cusp Separation, 2D)
- AV Dec Time (Aortic Valve Deceleration Time)
- AV Diam (Aortic Diameter, 2D)
- AV max PG (Aortic Valve Peak Pressure Gradient)
- AV mean PG (Aortic Valve Mean Pressure Gradient)
- AV SV (Stroke Volume by Aortic Flow)
- AV Vmax (Aortic Valve Peak Velocity)
- AV Vmean (AV Mean Velocity)
- AV VTI (Aortic Valve Velocity Time Integral)
- AVA (Vmax) (AV Area by Continuity Equation by Peak V)
- AVA (VTI) (AV Area by Continuity Equation VTI)
- AVA Planimetry (Aortic Valve Area)
- AVET (Aortic Valve Ejection Time)
- CO (Teich) (Cardiac Output, M-mode, Teicholtz)
- D-E Excursion (MV Anterior Leaflet Excursion)
- E' Avg (Averaged Early Diastolic Mitral Valve Annular Velocity)
- E' Lat (Early Diastolic Mitral Valve Lateral Annular Velocity)
- E' Sept (Early Diastolic Mitral Valve Septal Annular Velocity)
- E/E' Avg (Mitral Inflow E Velocity to E' Avg Ratio)
- E/E' Lat (Mitral Inflow E Velocity to E' Lat Ratio)
- E/E' Sept (Mitral Inflow E Velocity to E' Sept Ratio)
- EDV (Cube) (Left Ventricle Volume, Diastolic, 2D, Cubic)

- EF (A-L A2C) (Ejection Fraction 2CH, Single Plane, Area-Length)
- E-F Slope (Mitral Valve E-F Slope)
- EPSS (E-Point-to-Septum Separation, M-mode)
- ERO (Effective Regurgitant Orifice)
- ESV (Cube) (Left Ventricle Volume, Systolic, 2D, Cubic)
- HR (Heart Rate, 2D, Teicholtz)
- IVC (Inferior Vena Cava)
- IVCT (Isovolumic Contraction Time)
- IVRT (Isovolumic Relaxation Time)
- IVSd (Interventricular Septum Thickness, Diastolic, 2D)
- VSs (Interventricular Septum Thickness, Systolic, 2D)
- LA Diam (Left Atrium Diameter, 2D)
- LA Major (Left Atrium Major)
- LA Minor (Left Atrium Minor)
- LA/Ao (LA Diameter to AoRoot Diameter Ratio, 2D)
- LAAAd (A2C) (Left Atrium Area, Apical 2C)
- LAEDV (A-L) (LA End Diastolic Volume, Area- Length)
- LAEDV Index (A-L) (LA End Diastolic Volume Index, Area-Length)
- LAESV (A-L) (LA End Systolic Volume, Area-Length)
- LAESV Index (A-L) (LA End Systolic Volume Index, Area-Length)
- LAEDV MOD (LA End Diastolic Volume MOD)
- LAESV MOD (LA End Systolic Volume MOD)
- LIMP (Left Index of Myocardial Performance)
- LVA (s) (Left Ventricular Area, Systolic, 2CH)
- LVAd (A2C) (Left Ventricular Area, Diastolic, 2CH)
- LVAd (SAX) (LV Area, SAX, Diastolic)
- LVAend (d) (LV Endocardial Area, SAX)
- LVAepi (d) (LV Epicardial Area, SAX)
- LVAs (A4C) (Left Ventricular Area, Systolic, 4CH)
- LVAs (SAX) (LV area, SAX, Systolic)



- LVd Mass (LV Mass, Diastolic, 2D)
- LVd Mass (LV Mass, Diastolic, M-mode)
- LVd Mass Index (LV Mass Index, Diastolic, 2D)
- LVEDV (A-L A2C) (LV Volume, Diastolic, 2CH, Area-Length)
- LVESV (A-L A2C) (LV Volume, Systolic, 2CH, Area-Length)
- LVET (Left Ventricle Ejection Time)
- LVIDd (LV Internal Dimension, Diastolic, 2D)
- LVIDs (LV Internal Dimension, Systolic, 2D)
- LVLd (Apical) (Left Ventricular Length, Diastolic, 2D)
- LVLs (Apical) (Left Ventricular Length, Systolic, 2D)
- LVOT Area (Left Ventricle Outflow Tract Area)
- LVOT CO (Cardiac Output by Aortic Flow)
- LVOT Diam (Left Ventricular Outflow Tract Diameter)
- LVOT Max PG (LVOT Peak Pressure Gradient)
- LVOT Mean PG (LVOT Mean Pressure Gradient)
- LVOT SI (Stroke Volume Index by Aortic Flow)
- LVOT SV (Stroke Volume by Aortic Flow)
- LVOT Vmax (LVOT Peak Velocity)
- LVOT Vmean (LVOT Mean Velocity)
- LVOT VTI (LVOT Velocity Time Integral)
- LVPWd (Left Ventricular Posterior Wall Thickness, Diastolic, 2D)
- LVPWs (Left Ventricular Posterior Wall Thickness, Systolic, 2D)
- LVs Mass (LV Mass, Systolic, 2D)
- LVs Mass Index (LV Mass Index, Systolic, 2D)
- LAAd (A2C) (Left Atrium Area, Apical 2C)
- MCO (Mitral Valve Closure to Opening)
- MP Area (Mitral Valve Prosthesis)
- MR Acc Time (MV Regurg. Flow Acceleration)
- MR ERO (PISA: Regurgitant Orifice Area)
- MR Flow (PISA: Regurgitant Flow)
- MR Max PG (Mitral Regurg. Peak Pressure Gradient)
- MR Rad (PISA: Radius of Aliased Point)
- MR RF (Regurgitant Fraction Over the Mitral Valve)
- MR RV (PISA: Regurgitant Volume Flow)
- MR Vel (PISA: Aliased Velocity)
- MR Vmax (Mitral Regurg. Peak Velocity)
- MR Vmean (Mitral Regurg. Mean Velocity)
- MR VTI (Mitral Regurg. Velocity Time Integral)
- MV A Dur (Mitral Valve A-Wave Duration)
- MV A Velocity (MV Velocity Peak A)
- MV Acc Slope (Mitral Valve Flow Acceleration)
- MV Acc Time (Mitral Valve Acceleration Time)
- MV Acc/Dec Time (MV: Acc.Time/Decel.Time Ratio)
- MV Ann Diam (Mitral Valve Annulus Diameter, 2D)
- MV CO (Cardiac Output by Mitral Flow)
- MV Dec Slope (Mitral Valve Flow Deceleration)
- MV Dec Time (Mitral Valve Deceleration Time)
- MV E Velocity (MV Velocity Peak E)
- MV E/A Ratio (Mitral Valve E-Peak to A-Peak Ratio)
- MV Max PG (Mitral Valve Peak Pressure Gradient)
- MV Mean PG (Mitral Valve Mean Pressure Gradient)
- MV PHT (Mitral Valve Pressure Half Time)
- MV Reg Frac (Mitral Valve Regurgitant Fraction)
- MV SI (Stroke Volume Index by Mitral Flow)
- MV SV (Stroke Volume by Mitral Flow)
- MV Time to Peak (Mitral Valve Time to Peak)
- MV Vmax (Mitral Valve Peak Velocity)
- MV Vmean (MV Mean Velocity)
- MV VTI (Mitral Valve Velocity Time Integral)
- MVA (Mitral Valve Area)
- MVA By PHT (Mitral Valve Area according to PHT)
- MVA by Plan (Mitral Valve Area, 2D)
- MVET (Mitral Valve Ejection Time)
- P Vein A (Pulmonary Vein Velocity Peak A) – Reverse
- P Vein A Dur (Pulmonary Vein A-Wave Duration)
- P Vein D (Pulmonary Vein End-Diastolic Peak Velocity)
- P Vein S (Pulmonary Vein Systolic Peak Velocity)
- PAEDP (Pulmonary Artery Diastolic Pressure)
- PE(d) (Pericard Effusion, M-mode)
- PEs (Pericard Effusion, 2D)
- PR Max PG (Pulmonic Insuf. Peak Pressure Gradient)
- PR Mean PG (Pulmonic Insuf. Mean Pressure Gradient)
- PR PHT (Pulmonic Insuf. Pressure Half Time)
- PR Vmax (Pulmonic Insuf. Peak Velocity)
- PR VTI (Pulmonic Insuf. Velocity Time Integral)
- PRend Max PG (Pulmonic Insuf. End-Diastole Pressure Gradient)
- PRend Vmax (Pulmonic Insuf. End-Diastolic Velocity)
- Pulmonic Diam (Pulmonary Artery Diameter, 2D)
- PV Acc Slope (Pulmonic Valve Flow Acceleration)
- PV Acc Time (Pulmonic Valve Acceleration Time)
- PV Acc Time/ET Ratio (PV Acceleration to Ejection Time Ratio)
- PV Ann Diam (Pulmonic Valve Annulus Diameter, 2D)
- PV Ann Area (Pulmonic Valve Area)

- PV CO (Cardiac Output by Pulmonic Flow)
- PV Max PG (Pulmonic Valve Peak Pressure Gradient)
- PV Mean PG (Pulmonic Valve Mean Pressure Gradient)
- PV SV (Stroke Volume by Pulmonic Flow)
- PV Vmax (Pulmonary Artery Peak Velocity)
- PV Vmean (PV Mean Velocity)
- PV VTI (Pulmonic Valve Velocity Time Integral)
- PVA (VTI) (Pulmonary Artery Velocity Time Integral)
- PVein S/D Ratio (Pulmonary Vein SD Ratio)
- PVET (Pulmonic Valve Ejection Time)
- PVPEP (Pulmonic Valve Pre-Ejection Period)
- PVPEP/ET Ratio (PV Pre-Ejection to Ejection Time Ratio)
- Qp/Qs (Pulmonic-to-Systemic Flow Ratio)
- RA Major (Right Atrium Major, 2D)
- RA Minor (Right Atrium Minor, 2D)
- RAA (d) (Right Atrium Area, 2D, Diastole)
- RAA (s) (Right Atrium Area, 2D, Systole)
- RAEDV A2C (Right Atrium End Diastolic Volume, Apical 2 Chamber)
- RAESV A-L (RA End Systole Volume [A-L])
- RALd (Right Atrium Length, Diastole)
- RALs (RA Length, Systole)
- RIMP (Right Index of Myocardial Performance)
- RJA (A4C) (Regurgitant Jet Area)
- RJA/LAA (Regurgitant Jet Area Ratio RJA/LAA)
- RV Major (Right Ventricle Major)
- RV Minor (Right Ventricle Minor)
- RV S' (Tricuspid Annulus Systolic Excursion Velocity)
- RVAWd (Right Ventricle Wall Thickness, Diastolic, 2D)
- RVAWs (Right Ventricle Wall Thickness, Systolic, 2D)
- RVET (Right Ventricle Ejection Time)
- RVIDd (Right Ventricle Diameter, Diastolic, 2D)
- RVIDs (Right Ventricle Diameter, Systolic, 2D)
- RVOT Area (Right Ventricle Outflow Tract Area)
- RVOT Diam (RV Output Tract Diameter, 2D)
- RVOT Diam (RV Output Tract Diameter, M-mode)
- RVOT Max PG (RVOT Peak Pressure Gradient)
- RVOT Mean PG (RVOT Mean Pressure Gradient)
- RVOT SI (LV Stroke Volume Index by Pulmonic Flow)
- RVOT SV (Stroke Volume by Pulmonic Flow)
- RVOT Vmax (RVOT Peak Velocity)
- RVOT Vmean (RVOT Mean Velocity)
- RVOT VTI (RVOT Velocity Time Integral)
- RVSP (Right Ventricle Systolic Pressure)
- RVWd (Right Ventricle Wall Thickness, Diastolic, M-mode)
- RVWs (Right Ventricle Wall Thickness, Systolic, M-mode)
- RAA (d) (Right Atrium Area, 2D, Diastole)
- RAA (s) (Right Atrium Area, 2D, Systole)
- SI (A-L A2C) (LV Stroke Index, Single Plane, 2CH, Area-Length)
- SI (A-L A4C) (LV Stroke Index, Single Plane, 4CH, Area-Length)
- SI (Bi-plane) (LV Stroke Index, Bi-plane, MOD)
- SI (bullet) (LV Stroke Index, Bi-plane, Bullet)
- SI (MOD A2C) (LV Stroke Index, Single Plane, 2CH, MOD)
- SI (MOD A4C) (LV Stroke Index, Single Plane, 4CH, MOD)
- SI (Teich) (LV Stroke Index, Teicholtz, 2D)
- SI (Teich) (LV Stroke Index, Teicholtz, M-mode)
- SV (A-L A2C) (LV Stroke Volume, Single Plane, 2CH, Area-Length)
- SV (A-L A4C) (LV Stroke Volume, Single Plane, 4CH, Area-Length)
- SV (Bi-plane) (LV Stroke Volume, Bi-plane, MOD)
- SV (Bullet) (LV Stroke Volume, Bi-plane, Bullet)
- SV (MOD A2C) (LV Stroke Volume, Single-plane, 2CH, MOD) – Simpson
- SV (MOD A4C) (LV Stroke Volume, Single-plane, 4CH, MOD) – Simpson
- SV (Cube) (LV Stroke Volume, 2D, Cubic)
- SV (Cube) (LV Stroke Volume, M-mode, Cubic)
- SV (Teich) (LV Stroke Volume, 2D, Teicholtz)
- SV (Teich) (LV Stroke Volume, M-mode, Teicholtz)
- Systemic Diam (Systemic Vein Diameter, 2D)
- Systemic Vmax (Systemic Vein Peak Velocity)
- Systemic VTI (Systemic Vein Velocity Time Integral)
- TAPSE (Tricuspid Annular Plane Systolic Excursion)
- TCO (Tricuspid Valve Closure to Opening)
- TR Max PG (Tricuspid Regurg. Peak Pressure Gradient)
- TR Mean PG (Tricuspid Regurg. Mean Pressure Gradient)
- TR Vmax (Tricuspid Regurg. Peak Velocity)
- TR Vmean (Tricuspid Regurg. Mean Velocity)
- TR VTI (Tricuspid Regurgitation Velocity Time Integral)
- TV A Dur (Tricuspid Valve A-Wave Duration)
- TV A Velocity (Tricuspid Valve A Velocity)
- TV Acc Time (Tricuspid Valve Time to Peak)
- TV Ann Area (Tricuspid Valve Area)
- TV Ann Diam (Tricuspid Valve Annulus Diameter, 2D)

- TV Area (Tricuspid Valve Area, 2D)
- TV CO (Cardiac Output by Tricuspid Flow)
- TV Dec Slope (Tricuspid Valve Flow Deceleration)
- TV E Velocity (Tricuspid Valve E Velocity)
- TV E/A Ratio (Tricuspid Valve E-Peak to A-Peak Ratio)
- TV Max PG (Tricuspid Valve Peak Pressure Gradient)
- TV Mean PG (Tricuspid Valve Mean Pressure Gradient)
- TV PHT (Tricuspid Valve Pressure Half Time)
- TV SV (Stroke Volume by Tricuspid Flow)
- TV Vmean (TV Mean Velocity)
- TV VTI (Tricuspid Valve Velocity Time Integral)
- VSD Max PG (VSD Peak Pressure Gradient)
- VSD Vmax (VSD Peak Velocity)

Please refer to the Reference Manual for the full list of measurements and calculations for all applications.

## Z-Scores

- Support for six sets of user-selectable Z score publications<sup>8</sup> covering the most common pediatric dimension measurements

## Vascular

### Measurements/Calculations

- RT ECA (Right External Carotid Artery Velocity)
- RT CCA (Right Common Carotid Artery Velocity)
- RT BIFURC (Right Carotid Bifurcation Velocity)
- RT ICA (Right Internal Carotid Artery Velocity)
- RT ICA/CCA (Right Internal Carotid Artery Velocity/Common Carotid Artery Velocity Ratio)
- LT ECA, LT CCA, LT BIFURC, LT ICA, LT ICA/CCA (same as above, for Left Carotid Artery)
- RT BULB (Right Bulbus Artery), RT VERT (Right Vertebral Artery), RT SUBC (Right Subclavian Artery), RT INN (Right Inn Artery)
- LT BULB, LT VERT, LT SUBC, LT INN
- Stent, pre-stent, post-stent
- A/B Ratio (Velocities Ratio)
- % Stenosis (Stenosis Ratio)
- S/D Ratio (Systolic Velocity/Diastolic Velocities Ratio)
- PI (Pulsatility Index)
- RI (Resistivity Index)
- HR (Heart Rate) – beats/minute
- UEV (Upper Extremity Vein velocities): IJV, SUBC, Axill V, BaSV, RV, UV, Ves, Pseudo, AVF, CephV
- UEA (Upper Extremity Artery velocities): Inn, SUBC, Axill, BA, RA, UA, Pseudo, AVF, Ves

- LEV (Lower Extremity Vein velocities): CFV, Saph FemJunc V, PopV, PTV, ATV, FV, GSV Calf, GSV Thigh, GSV Access, LSV, Saph PopJunc
- LEA (Lower Extremity Artery velocities): EIA, SFA, Pop, PTA, Peron, DPA, ATA, CFA, DFALEA
- MCA (Middle Cerebral Artery), ACA (Anterior Cerebral Artery), PCA (Posterior Cerebral Artery), AcomA (Anterior Communicating Artery), PComA (Posterior Communicating Artery), Basilar (Basilar Artery), Ves

## Intima Media Thickness (IMT)

### Measurements

- Automatic measurements of carotid artery Intima-Media Thickness (IMT) on any acquired frame
- On-board IMT package facilitates non-interrupted workflow – fully integrated with M&A, worksheet, archiving and reporting functions
- Algorithm provides robust, quick, reliable measurements which can be stored to the on-board archive for review and reporting
- IMT measurement can be made from frozen images or images retrieved from archive
- IMT package supports measurements of different regions of the intima in the carotid vessel (e.g., Lt./Rt./CCA/ICA etc.)
- Frame for IMT measurement can be selected in relation to the ECG waveform

## OB/GYN Application Module

- OB package for fetal growth analysis containing more than 100 biometry tables

<sup>8</sup> Michael D. Pettersen, MD; Wei Du, PhD; Mary Ellen Skeens, MS; and Richard A. Humes, MD; Detroit, Michigan; and Andover, Massachusetts. Regression Equations for Calculation of Z Scores of Cardiac Structures in a Large Cohort of Healthy Infants, Children, and Adolescents: An Echocardiographic Study. *Journal of the American Society of Echocardiography*. Pettersen et al. 923 Volume 21 Number 8.

C Kampmann, C M Wiethoff, A Wenzel, et. al. Normal Values of M Mode Echocardiographic Measurements of More Than 2000 Healthy Infants and Children in Central Europe. *Heart* 2000; 83; 667-672.

M Cantinotti, MD; M Scalese, MS; B Murzi, MD; et. al. Echocardiographic Nomograms for Chamber Diameters and Areas in Caucasian Children. *Journal of American Society of Echocardiography*. December 2014; Volume 27, Issue 12; 1279-1292.e2.

M Cantinotti, MD; M Scalese, MS; B Murzi, MD; et. al. Echocardiographic Nomograms for Ventricular, Valvular and Arterial Dimensions in Caucasian Children with a Special Focus on Neonates, Infants and Toddlers. *Journal of American Society of Echocardiography*. February 2014; Volume 27, Issue 2; 179-191.e2.

Lopez L et. al. Relationship of Echocardiographic Z Scores Adjusted for Body Surface Area to Age, Sex, Race, and Ethnicity. The Pediatric Heart Network Normal Echocardiogram Database. *Circ Cardiovasc Imaging*. 2017 ov; 10(11). pii: e006979. doi: 10.1161/CIRCIMAGING.117.006979.

BEI Xia, *Pediatric Ultrasound Imaging*. Beijing: People's Medical Publishing House, 2013 (Second Edition): 173-227 and 261-289.



- Dedicated OB/GYN reports
- Fetal graphical growth charts
- Growth percentiles
- Multi-gestational calculations (up to four)
- Programmable OB tables
- Expanded worksheets
- User-selectable fetal growth parameters based on European, American or Asian methods charts
- GYN package for ovary and uterus measurements and reporting

#### **OB Measurements/Calculations**

- Gestational age by:
  - GS (Gestational Sac)
  - CRL (Crown Rump Length)
  - FL (Femur Length)
  - BPD (Bi-Parietal Diameter)
  - AC (Abdominal Circumference)
  - HC (Head Circumference)
  - APTD x TTD (Anterior/Posterior Trunk Diameter by Transverse Trunk Diameter)
  - LV (Length of Vertebra)
  - 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)
- Estimated Fetal Weight (EFW) by:
  - AC, BPD
  - AC, BPD, FL
  - AC, BPD, FL, HC
  - AC, FL
  - AC, FL, HC
  - AC, HC
  - EFBW
- Calculations and Ratios
  - FL/BPD

- FL/AC
- FL/HC
- HC/AC
- CI (Cephalic Index)
- AFI (Amniotic Fluid Index)
- CTAR (Cardio-Thoracic Area Ratio)
- Measurements/calculations by: ASUM, ASUM 2001, Berkowitz, Bertagnoli, Brenner, Campbell, CFEF, Chitty, Eik-Nes, Ericksen, Goldstein, Hadlock, Hansmann, Hellman, Hill, Hohler, Jeanty, JSUM, Kurtz, Mayden, Mercer, Merz, Moore, Nelson, Osaka University, Paris, Rempen, Robinson, Shepard, Shepard/Warsoff, Tokyo University, Tokyo/Shinozuka, Yarkoni
- Fetal graphical trending
- Growth percentiles
- Multi-gestational calculations (four)
- Fetal qualitative description (anatomical survey)
- Fetal environmental description (biophysical profile)
- Programmable OB tables
- Over 20 selectable OB calculations
- Expanded worksheets

#### **GYN Measurements/Calculations**

- Right ovary length, width, height
- Left ovary length, width, height
- Uterus length, width, height
- Cervix length, trace
- Ovarian volume
- ENDO (endometrial thickness)
- Ovarian RI
- Uterine RI
- Follicular measurements
- Summary reports

#### **Abdominal Measurements/Calculations**

- Splenic index
- Liver volume, mass, cyst
- Pancreas
- CBD
- GB wall, length
- Aorta prox, mid, dist
- Aorta iliac

- Spleen volume
- Bladder, post void bladder volume
- Renal
- Cortex thickness
- Mesenteric (CA, SMA, IMA)

## **Safety Conformance**

Vivid iq is:

- The European Medical Device Regulation (MDR) 2017/745 (CE Marking) on Concerning Medical Device, Conforms to the following standards for safety:
- IEC 60601-1 Medical electrical equipment – Part 1: General Requirements for Basic Safety and Essential Performance
- IEC 60601-1-2 Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic disturbances – Requirements and tests
- EMC Emissions Group 1 Class A device requirements as per CISPR 11
- IEC 60601-1-6 Medical electrical equipment – Part 1-6: General requirements for safety - 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
- ISO 10993-1 Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process
- IEC 62366-1 Medical devices – application of usability engineering to medical devices
- IEC 62304 Medical device software – Software life cycle processes
- IEC 62359 Ultrasonic - Field characterization Test methods for the determination of thermal and mechanical indices related to medical diagnostic ultrasonic fields - Edition 2.1, 2017
- Directive 2011/65/EU on the restriction of use of certain hazardous substances

- Directive 2014/53/EU Radio Equipment (RED)
- According to Protection against electric shock in IEC/EN 60601-1, Vivid iq is classified as Class I, with BF (probes) and CF (ECG leads) and Defibrillation-Proof Type (ICE catheters) applied parts according to IEC60601-1
- Commission Regulation (EU) No 207/2012 on electronic instructions for use of medical devices

## Privacy & Security

### Virus Protection

To reduce virus vulnerability, Vivid iq is configured with a minimal set of open ports and with all network services not actively used by the system closed down. This helps to reduce the risk of a virus attack on Vivid iq.

GE Healthcare is continuously judging the need for additional actions to reduce vulnerability of equipment; this includes vulnerability scanning of our products and evaluation of new security patches for the 3rd- party technology used. Microsoft® (and other) security patches that address serious issues with Vivid iq will be made available to customers after GE Healthcare verification of those patches.

### Whitelisting

- Prevents non-listed applications from running
- To improve protection against potentially harmful software

### User Policies

- Secure and advanced user password and login scheme according to user's password requirements

### LDAP

- Users can log in to the system by using the same user credentials as used for domain connected computers

### Disc Encryption

- Optional encryption of the scanner's E drive containing patient identifiable data

### User Management

- Last login information
- Customer configurable login banner

### Microsoft OS Patches

- OS vulnerability patches are distributed as part of regular SW maintenance releases during the life cycle of the product.

## Service / Life cycle Offerings

### Insite™ Express Connection (ExC)

- Enables Remote Service and Training
- Easy, flexible and secure connectivity configuration. The "Contact GE" on-screen button directly generates a real-time service request to the GE Healthcare online engineering or application specialist. It takes a snapshot (e.g., error logs, setup files) of the system at the time of the service request to enable analysis of problem before customer contact
- Virtual Console Observation (VCO) enables the customer to allow desktop screens to be viewed and controlled remotely over the encrypted tunnel to enable real-time training, device configuration
- Operation of Insite Express Connection is dependent on the infrastructure being available – check with your local GE Healthcare service representative
- File transfer enables the customer (biomed or clinician) to directly transfer system information (e.g., system logs, images, parametric data) to GE Healthcare product engineering teams (no patient data transferred)

- Software reload provides remote application reconstruction and recovery capabilities in the event of system corruption

### Smart Service Interface (SSI) (optional)

- A suite of GE Healthcare proprietary service tools, designed for expert Healthcare Technology Management Professionals who want to streamline troubleshooting and diagnostics on their GE Healthcare Vivid systems
- Provides an intelligent visual dashboard with drill-down capability to rapidly assess equipment status and health
- Can drive productivity by quickly isolating specific issues and decreasing overall system downtime
- SSI is available for licensed qualified users. Please contact your local sales representative for more information

### eDelivery (optional)<sup>9</sup>

- eDelivery facilitates download of software patches for service purpose (e.g., security patches)
- It is also an enabler for the ability to download apps from the AppStore

### Digital Expert (optional)<sup>9</sup>

- Enables the user to connect remotely to a GE Healthcare Clinical Specialist to receive application related training and help

### Imaging Insights

- Support of Imaging Insights offering by providing system utilization data

### Probe Check (optional)<sup>10</sup>

- Automated transducer element check and reporting of potential image quality impacts







<sup>9</sup> eDelivery and Digital Expert may not be available in all countries and regions. Consult with a GE Healthcare representative for more details.

<sup>10</sup> Probe Check is offered as a standard feature in USA in compliance with FDA requirements. It may be available in other regions. Consult with a GE Healthcare representative for more details.

## Transducers

						
Name	3Sc-RS	M5Sc-RS	6S-RS	12S-RS	6Tc-RS	6VT-D <sup>+</sup>
Catalog#	H45041DL	H44901AG	H45021RP	H44901AB	H45551ZE	H45581BJ
Description	Phased Array Transducer	XDclear™ Active Matrix Single Crystal Phased Array Transducer	Phased Array Transducer	Phased Array Transducer	TEE Transducer	Active Matrix 4D Volume TEE Transducer
Number of elements	64	240	96	96	64	2500
Foot Print	18 x 24 mm	18 x 27 mm	17 x 24 mm	13 x 18 mm	Tip(LxWxH) 45x14x12 mm	Tip(LxWxH) 45x14x13
Max. Bandwidth	1 - 5 MHz	1 - 5 MHz	2 - 7 MHz	4 - 12 MHz	3 - 8 MHz	3 - 8 MHz
Field of View	120°	120°	120°	90°	90°	90°
Depth of Field	30 cm	30 cm	30 cm	14 cm	30 cm	30 cm
Biopsy Guide Available	Multi-angle disposable with a reusable bracket	Multi-angle disposable with a reusable bracket	N/A	N/A	N/A	N/A
Application						
Fetal/Obstetrics	+	+	+			
Abdominal [1]	+	+	+	+		
Thoracic/Pleural	+	+	+	+		
Pediatric	+	+	+	+		
Small Organ[2]						
Neonatal Cephalic			+	+		
Adult Cephalic	+	+				
Cardiac[3]	+	+	+	+	+	+
Peripheral Vascular						
Musculo-skeletal Conventional						
Musculo-skeletal Superficial						
Urology[4]						
Transesophageal					+	+
Transvaginal						
Transrectal	+	+	+	+		
Intra-cardiac and Intra-luminal						
Intraoperative (Vascular)						
Interventional Guidance[5]	+	+				




## Transducers

						
Name	10T-D	9T-RS	ML6-15-RS	9L-RS	12L-RS	L4-20t-RS
Catalog#	H44901AH	H45531YM	H40462LM	H40442LL	H40402LY	H48062AJ
Description	TEE Transducer	TEE Transducer	Active Matrix Wide Band Linear Array Transducer	Linear Array Transducer	Linear Array Transducer	XDclear Wide Band Linear Array Transducer
Number of elements	32	44	1008	192	192	256
Foot Print	Tip(LxWxH) 16x8x6	Tip(LxWxH) 35x11x8 mm	61 x 16 mm	14 x 53 mm	13 x 47 mm	12 x 49 mm
Max. Bandwidth	3 - 10 MHz	3 - 10 MHz	5 - 15 MHz	2 - 10 MHz	4 - 13 MHz	4 - 20 MHz
Field of View	90°	90°	50 mm	44 mm	38 mm	38°
Depth of Field	18 cm	14 cm	10 cm	16 cm	12 cm	9 cm
Biopsy Guide Available	N/A	N/A	Multi-angle, reusable bracket, disposable sleeve	Multi-angle disposable with a reusable bracket	Multi-angle disposable with a reusable bracket	Multi-angle disposable with a reusable bracket
Application						
Fetal/Obstetrics						
Abdominal [1]			+	+	+	+
Thoracic/Pleural			+	+	+	+
Pediatric			+	+	+	+
Small Organ[2]			+	+	+	+
Neonatal Cephalic			+	+	+	+
Adult Cephalic						
Cardiac[3]	+	+				
Peripheral Vascular			+	+	+	+
Musculo-skeletal Conventional			+	+	+	+
Musculo-skeletal Superficial			+	+	+	+
Urology[4]						
Transesophageal	+	+				
Transvaginal						
Transrectal						
Intra-cardiac and Intra-luminal						
Intraoperative (Vascular)						
Interventional Guidance[5]			+	+	+	+

## Transducers



Name	4C-RS	C1-5-RS	8C-RS	P2D	E8Cs-RS	L8-18i-RS
Catalog#	H4000SR	H40462LA	H40402LS	H45551CA	H48062AF	H40462LF
Description	Curved Array Transducer	Curved Array Transducer	Curved Array Transducer	Pencil Transducer	Endo Micro Convex Transducer	Intraoperative Linear Array Transducer
Number of elements	128	192	128	2	128	168
Foot Print	18 x 66 mm	17 x 69 mm	12 x 22 mm	16 mm	19 x 24 mm	11 x 35 mm
Max. Bandwidth	1 - 5 MHz	1 - 5 MHz	3 - 10 MHz	1 - 3 MHz	3 - 10 MHz	4 - 18 MHz
Field of View	58°	70°	131°	N/A	168°	25 mm
Depth of Field	33 cm	33cm	14 cm	N/A	14 cm	10 cm
Biopsy Guide Available	Multi-angle disposable with a reusable bracket	Multi-angle disposable with a reusable bracket	N/A	N/A	Single angle, disposable	N/A
Application						
Fetal/Obstetrics	+	+			+	
Abdominal [1]	+	+	+		+	
Thoracic/Pleural	+	+	+			+
Pediatric	+	+	+			
Small Organ[2]			+			+
Neonatal Cephalic			+			
Adult Cephalic						
Cardiac[3]			+	+		
Peripheral Vascular			+			+
Musculo-skeletal Conventional	+	+	+			+
Musculo-skeletal Superficial	+	+	+			+
Urology[4]	+	+			+	
Transesophageal						
Transvaginal					+	
Transrectal			+		+	
Intra-cardiac and Intra-luminal						
Intraoperative (Vascular)						+
Interventional Guidance[5]	+	+			+	

<div> <div>Transducers</div> <div>    </div> </div>						
Name	ICE Cord-RS	AcuNav8F**	AcuNav10F**	Sound Star 3D 10F**	Sound Star eco 10F**	Sound Star eco 8F**
Catalog#	H48952AR	Distributed by Biosence Webster, Inc.	Distributed by Biosence Webster, Inc.	Distributed by Biosence Webster, Inc.	Distributed by Biosence Webster, Inc.	Distributed by Biosence Webster, Inc.
Description	Connector Cable	Intra Cardiac Phased Array Catheter	Intra Cardiac Phased Array Catheter	Intra Cardiac Phased Array Catheter	Intra Cardiac Phased Array Catheter	Intra Cardiac Phased Array Catheter
Number of elements	N/A	64	64	64	64	64
Foot Print	N/A	8 Fr diameter	10 Fr diameter	10 Fr diameter	10 Fr diameter	8 Fr diameter
Max. Bandwidth	N/A	4 - 12 MHz	4 - 12 MHz	4 - 12 MHz	4 - 12 MHz	4 - 12 MHz
Field of View	N/A	90°	90°	90°	90°	90°
Depth of Field	N/A	16 cm	16 cm	16 cm	16 cm	16 cm
Biopsy Guide Available	N/A	N/A	N/A	N/A	N/A	N/A
Application						
Fetal/Obstetrics						
Abdominal [1]						
Thoracic/Pleural						
Pediatric						
Small Organ[2]						
Neonatal Cephalic						
Adult Cephalic						
Cardiac[3]						
Peripheral Vascular						
Musculo-skeletal Conventional						
Musculo-skeletal Superficial						
Urology[4]						
Transesophageal						
Transvaginal						
Transrectal						
Intra-cardiac and Intra-luminal		+	+	+	+	+
Intraoperative (Vascular)						
Interventional Guidance[5]						

- [1] Abdominal including GYN
- [2] Small Organ including breast, testes, thyroid
- [3] Cardiac including Adult and Pediatric
- [4] Urology including prostate
- [5] Interventional Guidance including Biopsy

NOTE:

\* *Working in 2D mode and bi-plan/tri-plane mode , but 4D mode is not available*

\*\* *Not available in all countries. Please contact Biosense Webster, Inc. for availability.*



Product may not be available in all countries and regions. Full product technical specification is available upon request. Contact a GE Healthcare Representative for more information. Please visit [www.gehealthcare.com/promotional-locations](http://www.gehealthcare.com/promotional-locations).

Data subject to change.

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