PHILIPS

Ultrasound

Lumify

Simplicity, quality, and flexibility

Philips Lumify ultrasound system specifications for Android and Apple

Contents

1. Introduction

Philips Lumify delivers ultrasound imaging with exceptional image quality on your compatible Android or Apple device. Lumify is an easy to use, dependable and comprehensive solution.

1.1 Applications

- Abdominal
- Obstetrical/Gynecological
- Gallbladder
- Lung
- Soft tissue

- Vascular
- Cardiac
- FAST
- Musculoskeletal (MSK)
- Superficial

Key advantages

- Combines the exceptional image quality of Philips imaging technologies with the mobility and connectivity of a compatible smart device, Android or Apple

- Integrated tele-ultrasound powered by Reacts* facilitates real-time collaboration

- Enables hand held ultrasound on your device with accessible pricing

- Provides an intuitive interface to help guide decision-making for a confident treatment plan

*Available on Android only

2. System overview

2.1 System architecture

- Next-generation micro-digital broadband beamformer
- Microfine 2D focusing with dynamic focal tuning
- Dynamic range up to 170 dB (full-time input)
- 65,536 digitally processed channels
- SonoCT real-time beam-steered compound imaging
- XRES adaptive image processing
- AutoSCAN: no-touch continuous intelligent optimization for 2D
- Gray shades: 256 (8 bits) in 2D
- Acquisition frame rate: up to 79 frames per second in high frame rate mode (dependent on field of view, depth and angle)
- Power save mode that automatically senses when you are not actively scanning and reduces frame rate then automatically resumes full rate when you resume scanning
- Tissue Harmonic Imaging

2.2 Imaging modes

2D mode
- Microfine 2D focusing
- AutoSCAN
- Digital reconstructed zoom up to three times with pan capability with intuitive multi-touch control
- Cineloop image review (up to 10 second loop length)
- 256 (8 bits) discrete gray levels Philips microfine 2D focusing
- Intuitive "Pinch" to zoom and "Touch" to pan image
- Full-screen mode
  - Available in live-imaging or review

Color Doppler
- Gain 0 to 100 in steps of one
- Cineloop review
- Velocity display
- Touch-controlled color Region of Interest: size and position
- Touch-controlled color steering
- Maps, filters, color sensitivity, scale, line density, smoothing, echo write priority, color persistence, gain and baseline optimized automatically by preset

M-mode
- Available on all transducers
- Time markers: 0.2 seconds
- Simultaneous live 2D image

2.3 Image optimization

SonoCT real-time compound imaging
- High precision beam-steered image compounding acquires additional tissue imaging information compared to orthogonal beams and reduces angle-generated artifacts
- Enhanced needle visualization
- Multiple beam-steered lines of sight
- Operates in conjunction with harmonic and XRES imaging

Tissue Harmonic Imaging
- System processing of second harmonic frequencies (nonlinear energy) in tissue
- Extends high performance imaging capabilities to most patient body types
- Available in 2D imaging mode
- Image display with reduced artifacts

XRES adaptive imaging processing
- Enhances images without altering the image resolution
- Reduces artifacts, enhances contrast resolution, visibility of tissue texture patterns and border definition
- Available in 2D, zoom, post-freeze and when capturing loops
- Applied to grayscale 2D image data
- Specifically optimized for each clinical application

AutoSCAN intelligent optimization
- No-touch continuous intelligent optimization
- In 2D mode, automatically identifies tissue type and continuously adjusts TGC and receiver gain to achieve tissue uniformity and brightness

Full-screen mode
- Available in live-imaging or review

2.4 Touchscreen interface

- Multi-touch user interface
- Alphanumeric QWERTY soft keyboard with Android voice recognition
- Imaging mode keys: 2D and color Doppler
- 2D image controls: depth, freeze, gain and power
- Depth to 30 cm (exam-specific)
- Measurements: 2D distance calculation; M-mode calculation
- Color Doppler controls: angle, scale (fast/slow flow) gain
- Image acquisition keys: review, save image and save loop
- Annotation controls: text and erase

3. Workflow

3.1 Home screen

- Simplified home screen for quick access to scan, create patient profile and select presets
  - Four clinical application presets (C5-2)
  - Five clinical application presets (L12-4, S4-1)
- Main menu
- Configurable cardiac image orientation

3.2 Display information

- On-screen display of all pertinent imaging parameters for complete documentation, including transducer type and frequency range, active clinical options and optimized presets, display depth, grayscale, color map, color scale, frame rate, 2D gain, color gain, color image mode and patient name
- Depth to 30 cm (exam-specific)
- Real-time display of Mechanical Index (MI)
- Real-time display of Thermal Index (TIb, TIc, TIs)
- Annotation text* – places, moves, erases, modifies or appends typed text and arrows
- On-display centerline marker aligned with transducer centerline marker
- End Exam – closes study and returns user to home screen for efficient workflow
- Network connectivity icon to allow immediate feedback about network condition
- Battery status icon and warning to allow immediate feedback about battery condition (depending on compatible smart device chosen)

3.3 Cineloop review

- Acquisition, storage in memory, and display in real time of up to 10 seconds of 2D and color images
- Images for retrospective review and image selection
- Slide control of frame-by-frame image selection
- Functions in 2D and color Doppler imaging modes

3.4 Exam documentation

- Input and output ports (depending on compatible smart device chosen)
  - USB port on Android device; uses include connecting the transducer, supporting data transfer and charging
  - Lightning port on Apple device; uses include connecting the Lumify Power Module and charging the iPhone or iPad device directly
  - Some devices include video output**
  - Wi-Fi/cellular; uses include DICOM networking, emailing exams and network shared drive connection for EMR

3.5 Connectivity

- Patient data storage on device
- Configurable barcode reader* software utilizing device camera
- DICOM modality worklist (query retrieve)
- Direct digital storage of single-frame color and B/W images to internal hard disk
- Direct digital storage of B/W and color loops to internal hard disk
- Ability to export to App Share, or PC format (MP4 clips, PNG images) via email or direct connection to PC (depends on device used)
- Extensive image management capability, including thumbnail image review
- Exam directory
- DICOM image store
- Export to network share drive
- User may email patient exams
- Option to configure patient data in the DICOM header and images (not DICOM tags), as well as anonymize PC format images for exported images and loops
- Use Google AnyCast to mirror device screen to secondary display
- Use Google AnyCast universal Wi-Fi display receiver or Apple Airplay to mirror device screen to secondary display
- Modality Performed Procedure Step (MPPS)
- VISTA compatible
- Export of DICOM files to storage media.
- IPv6 compatible

3.6 Measurements

- Multiple distance calipers
- Ellipse tool
- 2-beat M-mode fetal heart rate calculation
- 4-measurement OB Fetal Growth/Age calculation*
  - Based on Hadlock 1985

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* Available on Android only.
** Specific capabilities such as internal storage size, ports, video connection, and cellular connectivity depend on the specific user-selected host smart device.

4. Lumify on Apple iPhone and iPad

4.1 Lumify Power Module (LPM)

The LPM powers the transducers and allows the same transducers to be used for Android and iOS. This novel solution also avoids the risk of overheating in the transducer, enabling highest levels of clinical workflow for all users.

· 2.25 hrs of continuous scan time
· USB–C Charging/transducer port
· USB–C to Lightning connector (rigid or flexible), connects the LPM and transducer to the Apple device
· Thule Lumify iPhone and iPad case or plate solution secures the LPM to the back of the device
· Works with Lightning connector on iPhone and iPad (please check the Lumify Compatible Device List for the latest information)


5. Integrated tele–ultrasound (Android only)

Lumify integrated tele–ultrasound powered by Reacts enables a live ultrasound stream to be shared with another Reacts user on their Lumify system, mobile device, or computer for real–time collaboration:*

· Face-to-face video sharing
· Live ultrasound streaming
· 2-way audio sharing
· 2-way virtual pointer
· Audio only calling available
· On call status
· Multiparty calls (web app)

*Not approved for diagnostic use.
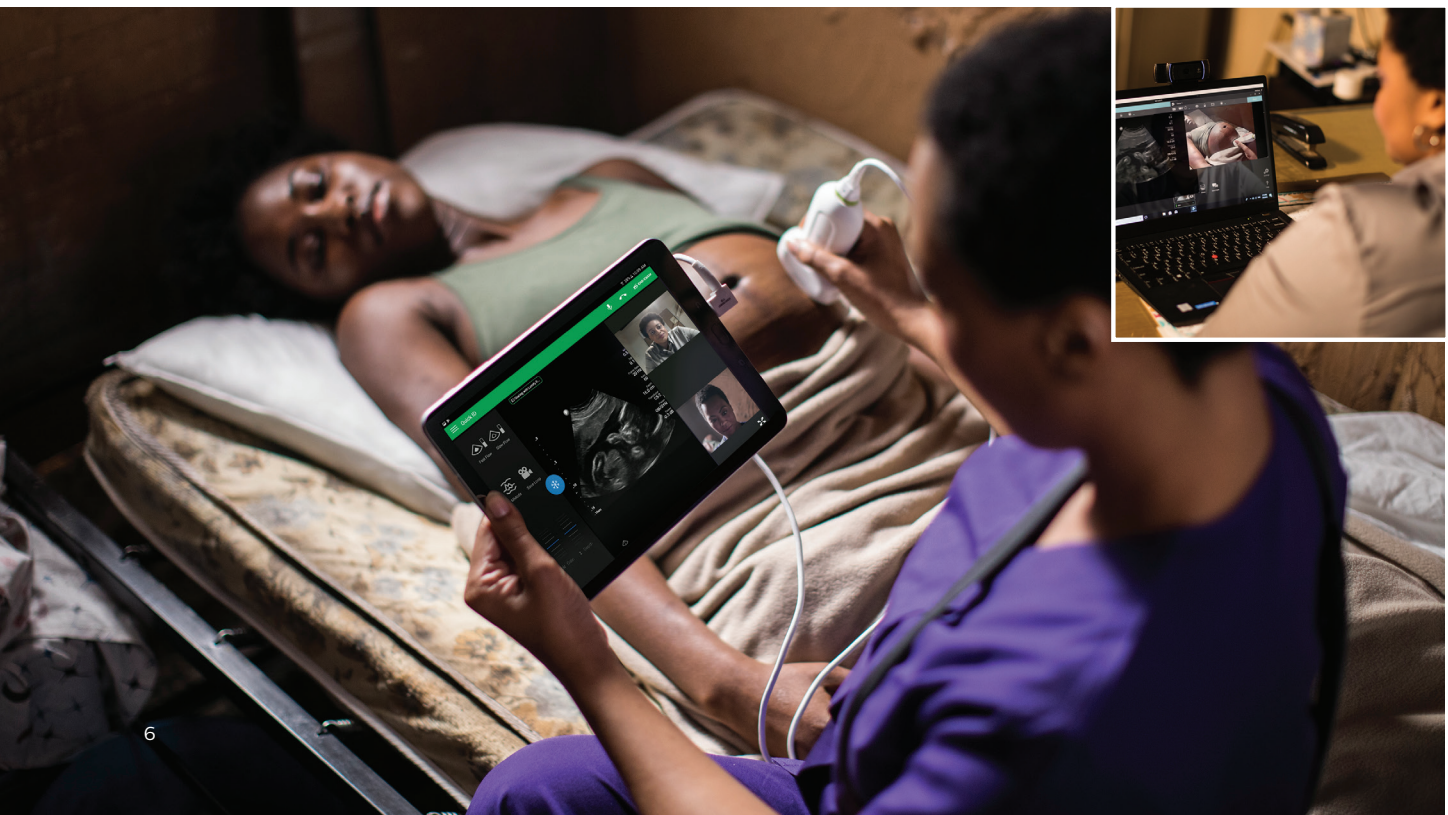
6. Transducers

6.1 Transducer application guide

Transducer		C5-2	L12-4	S4-1
Type of array		Curved	Linear	Sector
Application				
Abdominal	0-4 cm	•		•
	5-10 cm	•		•
	> 11 cm	•		•
	Gallbladder	•		•
	Lung	•	•	•
Gynecology	Transabdominal < 10 cm	•		•
	Transabdominal > 11 cm	•		•
Obstetrics	1st trimester 10-12 cm	•		•
	2nd trimester 12-18 cm	•		•
	3rd trimester 15-20 cm	•		•
Cardiac				•
Vascular	0-3 cm	•		
	3-8 cm	•		
Musculoskeletal			•	
Superficial			•	
Vascular			•	
Soft tissue			•	
FAST				•

Curved array

C5-2 broadband curved array
- Weight: 136 g/4.8 oz (without cable)
- Automatically optimized focal zone based on preset focal zone
- Continuous dynamic receive focusing
- 128 elements
- 5 to 2 MHz extended operating frequency range
- 67.5° field of view
- High-resolution imaging for abdomen, gallbladder, lung and Ob/Gyn applications
- Supports 2D, color Doppler and Tissue Harmonic Imaging
- Lightweight replaceable USB cable

Linear array

L12-4 broadband linear array
- Weight: 108 g/3.8 oz (without cable)
- Automatically adjusted focal zone based on preset focal zone
- Continuous dynamic receive focusing
- 128 elements
- 4 to 12 MHz extended operating frequency range
- 34.5 mm field of view
- High resolution imaging for lung, musculoskeletal, soft tissue, superficial and vascular applications
- Supports 2D, color Doppler and Tissue Harmonic Imaging
- Lightweight replaceable USB cable

Sector array

S4-1 broadband sector/phased array
- Weight: 96 g/3.4 oz (without cable)
- Automatically adjusted focal zone based on preset focal zone
- Continuous dynamic receive focusing
- 64 elements
- 1 to 4 MHz extended operating frequency range
- 90° field of view
- High resolution imaging for lung, echo, abdominal, Ob/Gyn and FAST applications
- Supports 2D, color Doppler and Tissue Harmonic Imaging
- Lightweight replaceable USB cable

7. Physical specifications

User interface localization options

Software – Danish, Dutch, English, French, German, Italian, Norwegian, Portuguese, Simplified Chinese, Spanish and Swedish.

Training and user documentation

Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Indonesian, Italian, Korean, Latvian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Russian, Slovakian, Slovenian, Spanish, Swedish, Traditional Chinese, Turkish, Ukranian and Vietnamese.

Electrical safety standards

- 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
- IEC 60601-2-37, Medical Electrical Equipment: Part 2-37: Particular Requirements for the Basic Safety and Essential Performance of Ultrasonic Medical Diagnostic and Monitoring Equipment
- ANSI/AAMI ES60601-1, Medical Electrical Equipment: Part 1: General Requirements for Basic Safety and Essential Performance

Environmental standards

- 60601-1-11, Medical Electrical Equipment: Part 1-11: General Requirements for Basic Safety and Essential Performance Collateral Standard: Requirements for Medical Electrical Equipment and Medical Electrical Systems Used in the Home Healthcare Environment
- 60601-1-12, Medical Electrical Equipment: Part 1-12: General Requirements for Basic Safety and Essential Performance Collateral Standard: Requirements for Medical Electrical Equipment and Medical Electrical Systems Intended for Use in the Emergency Medical Services Environment
- RTCA DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment

Agency approvals

- CE Mark in accordance with the European Medical Device Directive issued by British Standards Institute (BSI)

See Lumify website for the list of compatible smart device options: www.philips.com/lumify.

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