PHILIPS

Ultrasound

Lumify

Simplicity, quality and flexibility

Philips Lumify 4.0 ultrasound system specifications for Android

Contents

1. Introduction

Get exceptional quality ultrasound imaging on your compatible smart device with Lumify, the app-based ultrasound solution from Philips. It's a dependable and comprehensive solution that brings simplicity, mobility and flexibility to point-of-care ultrasound technology.

1.1 Exam types*

- Abdominal
- Obstetrical/Gynecological
- Gallbladder
- Lung
- Soft tissue
- Vascular
- Cardiac
- FAST
- Musculoskeletal (MSK)
- Superficial

*Defined as anatomical areas, organs or patient types for which the system has optimized settings.

Key advantages

- **Combines the exceptional quality of Philips imaging technology with the mobility and connectivity of a compatible smart device**
- **Integrated tele-ultrasound powered by Reacts facilitates real-time collaboration**
- **Allows hand-held ultrasound on your device with accessible pricing**
- **Provides an intuitive interface to help guide decision-making to a confident treatment plan**

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
- Auto Scan: 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
- Auto Scan
- 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

Pulsed Wave Doppler

- Available on all three Lumify transducers
- Available in all imaging exams
- Measurement tools for quantitative analysis
- iSCAN

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

Auto Scan 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 B-line detection in lung imaging

- Real-time B-line detection and count during lung imaging
- Automatic maximum B-line count over each cine loop
- Guided scan protocol for comprehensive lung exam (12 regions)
- User edit of B-line count
- Comprehensive lung exam summary page

2.5 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
- Annotation erased with start of new study
- 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 smart device; uses include connecting the transducer, supporting data transfer and charging
  - 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 in PC format (MP4 clips, PNG images) via email or direct connection to PC
- 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 screencasting solutions (e.g., Google Chromecast, AirPlay, AnyCast) to mirror device screen to secondary display. Functionality and availability of these features needs to be evaluated by the 3rd party user, depending on the device chosen
- Modality Performed Procedure Step (MPPS)
- VISTA compatible
- Export of DICOM files to storage media.
- IPv6 compatible

3.6 Measurements

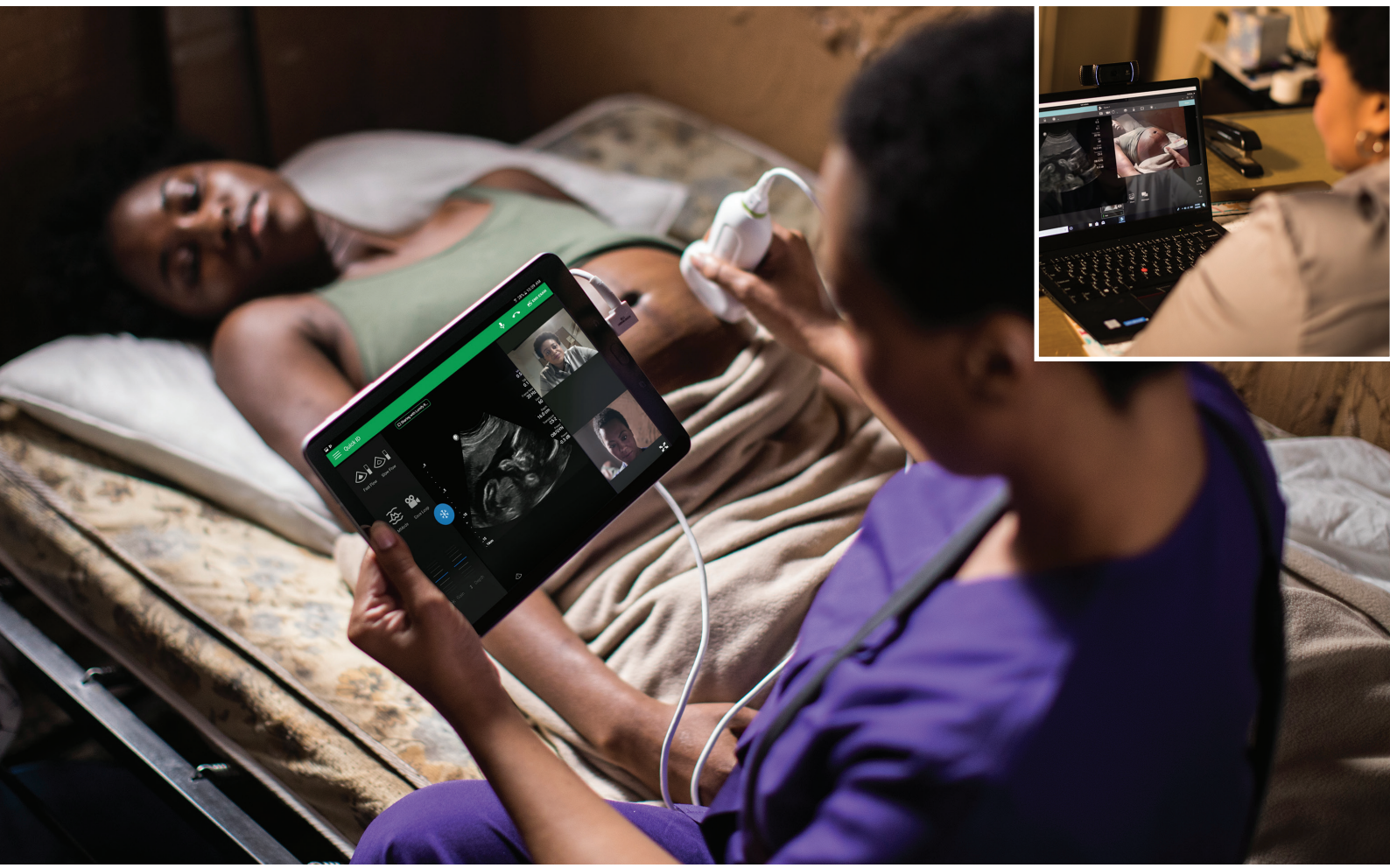
- Multiple distance calipers
- Ellipse tool
- 2-beat M-mode fetal heart rate calculation
- 4-measurement OB fetal growth/age calculation
  - Based on Hadlock 1985
- Early fetal age measurement
  - Crown-rump length (CRL)
  - Gestational mean sac diameter (MSD)

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

4. Integrated tele-ultrasound

Lumify integrated tele-ultrasound powered by Reacts allows 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
- Two-way audio sharing
- Two-way virtual pointer
- Private encrypted network for HIPAA and PHIPA compliance



5. Transducers

5.1 Transducer application guide

Transducer	C5-2	L12-4	S4-1
Type of array	Curved	Linear	Phased
Number of elements	128	128	64
Field of view	67.5^0	34.5 mm	90^0
Broadband frequency range	5 to 2 MHz	12 to 4 MHz	4 to 1 MHz
Maximum depth	30 cm	12 cm	30 cm
Weight	136 g/4.8 oz (without cable)	108 g/3.8 oz (without cable)	96 g/3.4 oz (without cable)
Dimensions	11.4 cm x 4.5 cm 4.5 in x 1.8 in (l x w)	11.4 cm x 4.5 cm 4.5 in x 1.8 in (l x w)	10.2 cm x 5.1 cm 4 in x 2 in (l x w)
Continuous dynamic receive focusing	•	•	•
2D imaging	•	•	•
Color Doppler imaging	•	•	•
Tissue Harmonic imaging	•	•	•
Pulsed Wave Doppler	•	•	•
Lightweight replaceable USB cable	•	•	•
Exam type*			
Abdominal	•		•
FAST			•
Gallbladder	•		•
Lung (imaging)	•	•	•
Lung Auto B-line		•	•
Gynecology	•		•
Obstetrics	•		•
Cardiac			•
Vascular		•	
Musculoskeletal		•	
Superficial		•	
Soft tissue		•	

*Defined as anatomical areas, organs or patient types for which the system has optimized settings.

6. Physical specifications

Localization options

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

Software level and available features may vary between countries, please check the latest version in Google Play store or contact your local Philips representative.

Training and user documentation

Danish, English, Finnish, French, German, Italian, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Traditional Chinese and Vietnamese.

Electrical safety standards

- IEC 60601-1, Medical Electrical Equipment: General requirements for safety, including all applicable collateral and particular standards, as well as all applicable deviations
- IEC 60601-1-2, Collateral Standard, Electromagnetic compatibility – requirements and test
- IEC 60601-2-37, Particular Requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
- ANSI/AAMI ES60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance

Environmental standards

- Home Healthcare standard (60601-1-11)
- EMT standard (60601-1-12)
- Military standard for helicopter – RTCA DO-160G

Agency approvals

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

For a list of compatible smart device options, visit:
www.philips.com/lumify-compatible-devices

www.philips.com/lumify

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