
ASUS

Asus LU700 Series Manual

Ultrasound imaging system

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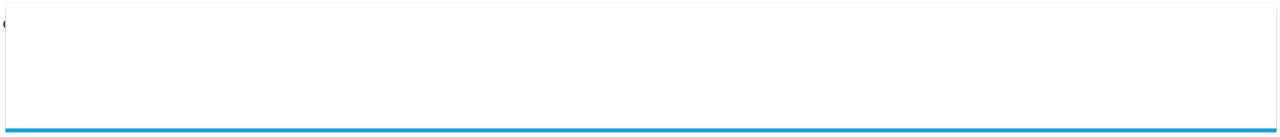

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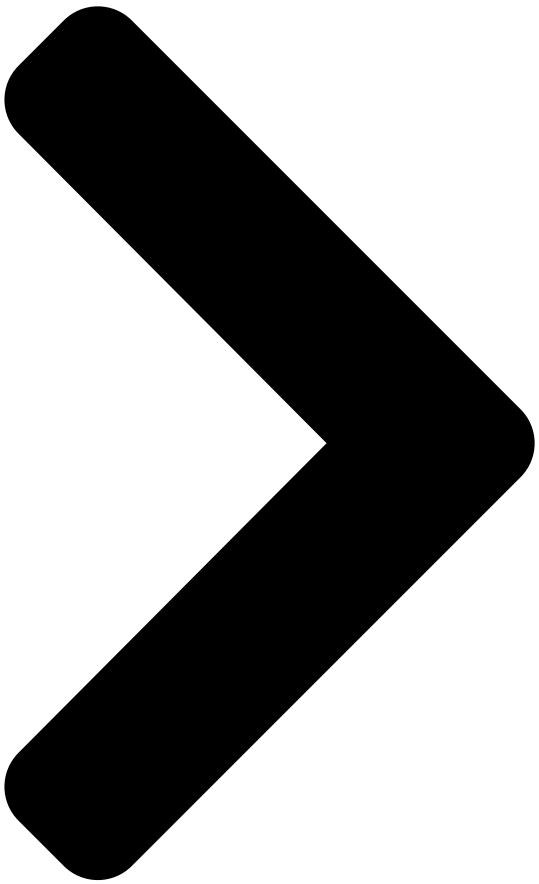

ASUS Ultrasound Imaging System

LU700 Series

(LU700C, LU700L)

USER MAUNAL REV. A

LK_UI-LU700-01(E)

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Related Manuals for Asus LU700 Series

Medical Equipment Asus LU700 Troubleshooting Manual

Ultrasound imaging system (5 pages)

All in One Printer Asus LU800 Series User Manual

Ultrasound imaging system (66 pages)

Summary of Contents for Asus LU700 Series

Page 1 ASUS Ultrasound Imaging System LU700 Series (LU700C, LU700L) USER MAUNAL REV. A LK_UI-LU700-01(E)

Page 2: Table Of Contents

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Page 5: About This Manual

This document is written for trained medical professionals who operate and maintain user's ASUS Ultrasound Imaging System. It Target Audience contains instructions and reference material pertaining to the usage and maintenance of the product.

Page 6: Disclaimer

The ASUS logo is a registered trademark and is the sole and exclusive property of ASUS. All names used in ASUS (whether online, in print, or any other media) are fictitious and are used herein for the purposes of example and demonstration on how to use the ASUS Ultrasound System.

Page 7: Revision History

Revision History Revision Date User Manual Revision A 2018-07-18 Initial release User Manual Revision B 2018-08-16 Add TI/MI related information Add company contact info User Manual Revision C Update the battery supplier 2020-12-27 Add LU710C/ LU710M/LU710PA/LU710E probe contents Update App introduction...

Page 8: Symbols

Symbols Symbols Description/Function This icon indicates information material or helpful suggestions. Note Indicates the need for the user to consult the instructions for use for important cautionary information such as warnings, cautions and precautions that cannot, for a variety of reasons, be presented on the medical device itself.

Page 9 Non-sterile Keep dry. It means a medical device which needs to be protected from moisture. Indicates medical device that should not be used if the package has been damaged or

opened. Atmospheric pressure limitation Indoor use only. To identify electrical equipment designed primarily for indoor use.

Page 10: Chapter 1 About Asus Ultrasound Imaging System

Incorrect use of the product, or use for purposes other than those intended and expressly stated by ASUS, may relieve ASUS or its agents from some or all responsibility for any resultant noncompliance, damage, or injury. Using portable and mobile radio-frequency (RF) communications equipment can affect the operation of medical equipment.

Page 11: Ultrasound Gels

LU700 Series Ultrasound Imaging System Description The LU700 Series Ultrasound Imaging System is a wireless, portable, software controlled, handheld ultrasound system used to acquire and display hi-resolution and real-time ultrasound data through a commercial off-the-shelf (COTS) Android mobile device.

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Wi-Fi directly. This allows users to export ultrasound images and display them across a range of portable personal devices. The imaging system houses a built-in battery, multichannel beamformer, prescan converter and Wi-Fi components The LU700 Series Ultrasound System included BATTERY Ultrasound Beamforming &...

Page 13: Battery Specification

Battery Specification Item Specification Description Rechargeable Li-ion Battery Pack Capacity 6000mAh Battery Life 300 discharge cycle Manufacture Shen Zhen Yu Xin Technology Co., Ltd. Model SZYX1036B7 Cell Type Prismatic cell Dimensions 120mm*36mm*10.5mm Safety UN38.3, EN IEC 62133 System Dimension Length (mm) Item Width (mm) Height(mm)

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LU700C Array type: Curvilinear Number of elements: 128 Depth(cm): 18.0 Frequency bandwidth (MHz): 2.0 – 5.0 Center Frequency: 3.5MHz Field of view: 60° B mode, M mode, CF mode, Color Doppler, PW Doppler LU710C Array type: Curvilinear Number of elements: 128 Depth(cm): 18.0 Frequency bandwidth (MHz): 2.0-5.0 Center Frequency: 3.2MHz...

Page 15: Rf Energy Spec

B mode, M mode, CF mode, Color Doppler, Power Doppler RF energy spec Tx frequency: 2412Mhz-2462Mhz TX modulation: DSSS/CCK/OFDM Tx Power: □ 18dbm @1DSSS □ 14.5dbm @54OFDM Rx frequency: 2412Mhz-2462Mhz Rx Sensitivity: □ -95.7dbm @1DSSS □ -74.0dbm @54OFDM...

Page 16: Chapter 2 Product Usage

CHAPTER 2 PRODUCT USAGE Intended Use The ASUS Ultrasound Imaging System is a software-based imaging system and accessories intended for use by qualified physicians and healthcare professionals who has the ability to conduct ultrasound scan process for evaluation by ultrasound imaging system or fluid flow analysis of the human body.

Page 17: Contraindications And Warnings

Contraindications and Warnings Contraindications Do NOT use the ASUS Ultrasound Imaging System to do following situations then result in the produce images with inaccurate results: Patients who have had surgery, which may have changed the composition of the examining tissue, as this could skew or alter the measured density.

Page 18: Warnings

Purchases and Upgrades • The equipment has a lifetime of 300 battery charging cycle. • To order additional supplies and accessories, go to www.asus.com and contact Leltek. Warranty • This equipment includes a one-year warranty. To purchase extended warranty programs, go to www.asus.com and contact Leltek.

Page 19: Disposal

Disposal • ASUSsupports and protects the natural environment. This equipment is designed and manufactured according to environmental protection guidelines. Improper disposal of this equipment (e.g. if the battery is no longer functioning or the scanner has exceeded its shelf life) can add hazardous materials to landfills. For information on the proper disposal of this equipment or any of its parts, please contact the manufacturer or an authorized disposal

company to decommission your equipment in accordance with local regulations.

Page 20: Integrity Constrains

Wi-Fi network where only trusted parties are permitted. The Wi-Fi network encrypts all image data sent from other Wi-Fi networks. Wi-Fi Direct network. The Wi-Fi Direct network encrypts all image data, and because no other users are on the Wi-Fi Direct network, the image data is confidential.

Page 21: System Requirements

• Internal battery continuous use of time B mode (approx.) 4.5 hours Color Doppler(approx.) 3.5 hours M mode(approx.) 4.5 hours PW Doppler(approx.) 2.5 hours. Power Doppler(approx.) 3.5 hours • Charging power supply by micro USB(DC: 5.0V, 2A(Max)) • Weight(g): 357g(LU700L)/388g(LU700C)/340g(LU710M)/388g (LU710C)/ 350g(LU710PA)/412g(LU710E) (with battery) System Requirements Product /Package Components:...

Page 22: Chapter 3 Safety

CHAPTER 3 SAFETY Please read this information before operating your ultrasound system. It applies to the device, the transducers, and the software. This section covers general safety information that applies only to a specific task and is included in the procedure for that task. Please follow the following requirements: Product Safety ASUStakes the responsible for the safety of the equipment.

Page 23: Product Compatibility

Such use may lead to a possibility of measurement errors or product damage. • While the LU700 Series device is being charged using a mobile charging power supply, do NOT use for diagnostic work. •...

Page 24: Electrical Safety

were only briefly exposed to temperatures in excess of 35°C (95°F), then the time required for to return to operating temperature may be shortened. If the system or transducers have been in an environment below 0°C (32°F), allow them to return to operating temperature before initiating the system or connecting the transducers.

Page 25: Battery Safety

4°F) and 20°C (68°F) • Do Not disassemble the device by yourself. The lithium battery may explode due to a short circuit. Again, if user finds any abnormal behavior of device LU700 Series, please turn-off the equipment and contact with Leltek's local agent.

Page 26: Thermal Safety

Thermal safety Keep a safety thermal environment for the patient always been a design priority at Leltek. The operating temperature of the ultrasound probe must remain below 43°C. Biological Safety This section contains information about biological safety and a discussion of the prudent use of the system.

Page 27

the machine output intensities. The visual display of thermal and mechanical indices during ultrasound imaging provides an aid to limit the output of the machine. Sonographic evaluation of the human body, including potentially sensitive tissues, such as developing fetus and the eye, have been performed on millions of patients without documentation of serious adverse events.

Page 28: Alara Principles

containing structures (e.g., lungs, intestines) are most susceptible to the effects of acoustic cavitation. Ultrasound wavelength has an important role in bubble formation and growth: short wavelength ultrasound (observed at higher frequencies) does not provide sufficient time for significant bubble growth; therefore, cavitation is less likely under these circumstances compared with long wavelengths.

Page 29

the examination. Using too high a level may not necessarily increase the quality of the information, but it will expose the patient to unneeded ultrasound energy. The use of ALARA is a way of implementing safety assurance. The threshold for diagnostic ultrasound bioeffects is undetermined.

Page 30: Acoustic Output Limits

image quality and minimize output intensity. There are several variables which affect the way in which the output display indices can be used to implement the ALARA principle. These variables involve: Index values • Body size • Location of the bone relative to the focal point •...

Page 31: Additional Considerations

The equipment's mechanical index (MI) does not exceed values greater than 1.9 and thermal index (TI) does not exceed values greater than 6.0. Indirect Controls The indirect controls are those that have an indirect effect on acoustic intensity. These controls affect imaging mode, pulse repetition frequency (PRF), pulse length. The choice of imaging mode determines the nature of the ultrasound beam.

Page 32: Mechanical Index (Mi) Display

The thermal index further consists of the following indices: soft tissue (TIS), bone (TIB), and cranial bone (TIC). Only one of these is displayed at any time. Each transducer application has a default selection that is appropriate for that combination. The TIB, TIS, or TIC is continuously displayed over the range of 0.0 to maximum output, based on the transducer and application.

Page 33: Controls Affecting The Indices

Bone at Focus TIS at Surface (Cranial bone) Bone at Surface The TI informs the user about the conditions that exist that might lead to an increase in temperature at the surface of the body, within the body tissue, or at the point of focus of the ultrasound beam on bone. That is, the TI informs the user of the potential for temperature rise in body tissue.

Page 34: Acoustics

corresponding pulse repetition frequency and maximum intensity point. In combined or simultaneous modes, the TI is the sum of the contribution from the modes enabled, and the displayed MI is the largest of the MI values associated with each mode and focal zone enabled.

Page 35

In October 1987, the American Institute of Ultrasound in Medicine (AIUM) ratified a report prepared by its Bioeffects Committee ("Bioeffects Considerations for the Safety of Diagnostic Ultrasound." Journal of Ultrasound in Medicine, Vol. 7, No. 9 Supplement, September 1988), sometimes referred to as the Stowe Report, which reviewed available data on possible effects of ultrasound exposure.

Page 36: Chapter 4 Device Maintenance

• We strongly recommend that transducer LU700 series shall be fully charged before user start imaging. To avoid unexpected battery discharging, charge your device at regular intervals, or when the device displays the low-battery warning.

Page 37: Maintenance

Spray 70% Isopropyl Alcohol onto the surface of probe head. • Repeat step one for two or three times. • Wipe out the disinfectant with a clean paper towel. Maintenance If this device is not functional, you may contact local distributor or contact ASUS by email: ServiceCenter@asus.com...

Page 38: Chapter 5 Regarding Diagnostic Ultrasounds

Please make sure to have full battery power on your smart device by charging it regularly. • Please download the ASUSLU700 App as " ASUS MediConnect " from Android App store. Link: https://play.google.com/store/apps/details?id=com.asus.medical.ultrasound " ASUS MediConnect " from iOS App store. Link: https://apps.apple.com/tw/app/asus-mediconnect/id1545553946 •...

Page 39: Status Lights

Status Lights For the equipment’s status lights, please refer to following table: Color Display Meaning White Solid Wi-Fi connection Purple Solid Power-On Blue Solid Battery Charging Purple/Blue Flash Low battery The light goes off when the battery is full.

Page 40: Equipment Description

Equipment description...

Page 41: Device Operation

FREEZE Button Stopping the image during the scanning; or re-activating the stopped image. Power Button Press this button to power on FAN Outlet For Heat dissipation Wi-Fi Antenna Power Charging Port Probe case Device Operation Power On (1) Press the power button for 3 seconds. (2) The power LED is purple.

Page 42: App Introduction

App Introduction App Interface Design Home Page - Android (a) Review Button (b) Exit Button (c) Current ultrasound probe (d) Ultrasound probe List (e) Patient info button (f) QRcode scan button (g) Refresh Button (h) Connect button (i) Connect percentage (j) Cancel Connection button Home Page - iOS...

Page 43 App Interface Design Home Page, Patient Info (a) Back Button (b) Patient Info Edit (c) Download worklist button (it only appears when the user enters the page from Home Page) (d) Save Button (e) Checkbox for detailed form Home Page, Patient Info: DICOM Worklist (a) Back Button (b) Initial the server button...

Page 44 Home Page, Patient Info: DICOM Worklist, DICOM Server Setup (a) Server info edit (b) Check box for showing the input box of station name (c) Test the server response button (d) Cancel button (e) Save the server setting button Home Page, Patient Info: DICOM Worklist, DICOM Server Setup (a) Server info edit (b) Check box for showing the input...

Page 45 (f) Back Button Home Page, Patient Info: Batch Management (a) Back Button (b) Saved Image (DICOM: Optional), Saved Image and Video (c) Export Button (Including DICOM: Optional) (d) Tool Bar Home Page, Patient Info: DICOM Server Setup (a) Back Button (b) Return to Home Page button (c) Initial the server...

Page 46 Home Page, Patient Info: Export Report (Select images) (a) Back Button (b) Saved Image (c) Tool Bar Annotation and Measurement, Save , Restore and PlayBack : Freeze/Live (a) Live: The combination of mode buttons in scanning state (Optional) (b) Freeze Parameter Tuning: Parameter Tuning &...

Page 47 Annotation and Measurement: Body Mark (a) Body mark icons of the body part (b) Body part (c) Button to close (d) and (e) (d) Body Mark with degree mark (e) Turning degree mark Parameter Tuning, Image Display and Gesture: Scan (a) Menu Button (b) Patient Info (c) Image...

Page 48 B mode (a) Image (b) Depth Ruler (c) Gray Scale (d) Mirror Mark M mode Linear Convex (a) Area with B mode (b) M Line (c) Time-Base Graticule...

Page 49 CF mode Linear Convex (a) Image (Optional) (b) Color Scale (c) ROI (Region of Interest) PD (Power Except that only one color is used to indicate blood flow intensity, the other Doppler) is the same as CF mode. mode Linear Convex (Optional)

Page 50 PW mode Linear Convex (a) Area with sample gate suspended CF positioning mode (Optional) (b) LOI (Line of Interest) (c) Gap, beam/flow angle PW (Pulsed Linear Convex (a) Area with wave) mode suspended CF (Optional) mode (b) LOI (Line of Interest) (c) Gap, beam/ flow angle...

Page 51: Starting New Exams

Starting New Exams Home Page -Android: Home Page - iOS: Step 1: After starting ASUSapp, please select the SSID or scan the QR code of the probe to be connected. Step 2: When the selected probe is connected, the loading progress will appear. Functions in Home Page REVIEW: The user touches this button;...

Page 52 Connect Probe: The user can tap "Connect Probe" button to enter the main scanning page without re-connecting the probe via Wi-Fi. : Suspend the loading progress and cancel connection. : Enter Edit Patient Info page with worklist button. The user can download the worklist from the server or the latest records.

Page 53 Step 5: Switch to CF mode (Optional) Functions in SCAN (LIVE) Mode selection:

Touch B, the system would be selected for B mode which means a two-dimensional ultrasound image display composed of bright dots representing the ultrasound echoes. Touch CF (Optional), the system would be selected for CF mode, the velocity and direction of blood flows are depicted in a color map superimposed on the 2-D image.

Page 54 Freq: The carrier frequency of the ultrasound wave transmitted and received by the transducer. Gain: The digital gain is used to adjust the brightness of the image. Persistence: It is a type of temporal smoothing used in ultrasound imaging. Successive frames are averaged as they are displayed to reduce the variations in the image between frames, hence lowering the temporal resolution of the image.

Page 55 PW Exit: When the user taps this button, it will go back to CF mode. PW Angle: It is used in the CF mode image to line up the angle correction cursor along the vessel wall for velocity measurement. PW Baseline: The PW mode image is levelly shifted up and down according to the baseline position corresponding to "0".

Page 56 Functions in FREEZE : Tap Annotate, the user can fill in one or more text notes and move to anywhere on the ultrasonic image and can also be removed by long press. : For the user to mark which parts of human body scanning. : To save an ultrasonic image which is in the ultrasound image area.

Page 57 Others: : An ultrasonic image can be added with a center dotted line, whether it is in Freeze or Live mode. : The part of the ultrasound image can be enlarged to full-screen viewing. Whether it is Freeze or Live status or historical record viewing, this function can be used if the ultrasound image is displayed.

Page 58: Chapter 6 References

CHAPTER 6 REFERENCES Compliance Statement ASUSproducts comply with international and national standards and laws. Users are responsible for ensuring that the chosen smart device and scanner are compliant with the law in the jurisdiction where the product is used. ASUSmeets all regulatory standards listed in this chapter.

Page 59: System Specifications

Month of manufacture, 1~9 means January to September, A is for Oct., B is for Nov. and C for Dec. XXXXXX Manufactured in this batch of production. 6-digit numerical counter starting from 01. System Specifications • Gray shades: 256 in B-Mode •...

Page 60: Standards

Standards Acoustic EN IEC 60601-2-37:2008/AMD1:2015 - Medical electrical equipment - Part 2-37: Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment Biocompatibility EN ISO 10993-1:2009 -Biological evaluation of medical devices - Evaluation and testing within a risk management process EN ISO 10993-5:2009 -Biological evaluation of medical devices - Tests for in vitro cytotoxicity...

Page 61: Safety Conformance

Safety Conformance Conforms to the following safety standards Performance IEC 60601-1:2005+AMD1:2012 / EN 60601-1 :2006+ A1 2013 CSV Medical electrical equipment - Part 1: General requirements for basic safety and essential performance IEC 60601-1-2: 2014 / EN 60601-1-1 :2015 Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic Capability - Requirements and tests EN IEC 60601-2-37 2007 Medical electrical equipment - Part 2-37: Particular requirements for the...

Page 62 EN ISO 10993-1:2009 -Biological evaluation of medical devices - Evaluation and testing within a risk management process EN ISO 10993-5:2009 -Biological evaluation of medical devices - Tests for in vitro cytotoxicity ISO 10993-10:2010-Biological evaluation of medical devices. Tests for irritation and skin sensitization...

Page 63: Acoustic Output Tables

Acoustic Output Tables Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700C SN:LT702D-47-00001 Operating Model: B Mode Index Lebel Below Below surface surface surface surface Maximum Index Value 0.42 0.60 0.60 Index

component value 0.60 0.60 0.60 at Z (MPa) 0.77 (mW)

Page 64 Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700L SN:LT702D-49-00007 Operating Model: B+CF Mode Index Lebel Below Below surface surface surface surface Maximum Index Value 0.54 0.61 0.61 B:0.56 B:0.56 B:0.56 Index component value CF:0.05 CF:0.05 CF:0.05 at Z (MPa) 0.77 (mW)

Page 65 Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700C SN:LT702D-47-00001 Operating Model: PW Mode Index Lebel Below Below At surface At surface surface surface Maximum Index Value 1.09 0.72 3.13 Index component value 0.72 3.13 at Z (MPa) 1.81 (mW) 92.74...

Page 66 Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700L SN:LT702D-49-00007 Operating Model: B Mode Index Lebel Below Below surface surface surface surface Maximum Index Value 0.54 0.56 0.56 Index component 0.56 0.56 0.56 value at Z (MPa) 1.30 (mW) 22.23 22.23...

Page 67 Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700L SN:LT702D-49-00007 Operating Model: B+CF Mode Index Lebel Below Below surface surface surface surface Maximum Index Value 0.54 0.61 0.61 B:0.56 B:0.56 B:0.56 Index component value CF:0.05 CF:0.05 CF:0.05 at Z (MPa) 0.77 (mW)

Page 68 Acoustic output reporting table (EN IEC60601-2-37:2007+AMD1:2015, table 201.103) Transducer Model: LU700L SN:LT702D-49-00007 Operating Model: PW Mode Index Lebel Below Below surface surface surface surface Maximum Index Value 0.67 0.49 1.22 Index component value 0.49 1.22 at Z (MPa) 1.81 (mW) 20.82 20.82 (mW)

Page 69: Id Label

Using the wrong cable and accessories may adversely affect the EMC performance Electromagnetic Emissions The LU700 Series are intended for use in electromagnetic environments, as specified below. The customer or the user of the LU700 Series should ensure that it is used in such an environment.

Page 70 Manufacturer’s declaration-electromagnetic emissions The LU700 Series is intended for use in the electromagnetic environment (for professional healthcare) specified below. The customer or the user of the LU700 Series should assure that it is used in such an environment. Emission Compliance...

Page 71 Manufacturer’s declaration-electromagnetic immunity The LU700 Series is intended for use in the electromagnetic environment (for professional healthcare) specified below. The customer or the user of the LU700 Series should assure that it is used in such an environment. Immunity test...

Page 72: Electromagnetic Immunity

Manufacturer’s declaration-electromagnetic immunity The LU700 Series is intended for use in the electromagnetic environment (for professional healthcare) specified below. The customer or the user of the LU700 Series should assure that it is used in such and environment. Immunity test...

Page 73 (for professional healthcare) in which radiated RF disturbances are controlled. The customer or the user of the LU700 Series can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the LU700 Series as recommended below, according to the maximum output power of the communications equipment.

Page 74 ENCLOSURE PORT IMMUNITY The LU700 Series is intended for use in the electromagnetic environment (for professional healthcare) specified below. The customer or the user of the LU700 Series should assure that it is used in such an environment. Compliance LEVEL...

Page 75: Trouble Shooting

Trouble Shooting Issue Solution LED indicator flashing and could not turn When low battery state, please plug in the adapter to charge off device. device then could turn off the device. Wi-

Fi could not be connected. When LED indicator of the device (transducer) is purple, the device (transducer) may be low battery state and need to be charged by an adapter.

Page 76: Federal Communications Commission (Fcc) Statement

Federal Communications Commission (FCC) Statement 15.21 You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user’s authority to operate the equipment. 15.105(b) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

Page 77: Manufacturer's Address

Manufacturer’s address ASUSTeK Computer Inc. 6F-3., No. 293, Sec. 1, Beixin Rd., Xindian Dist., New Taipei City 23147, Taiwan, R.O.C www.asus.com 0598 MedNet GmbH Borkstrasse 10, 48163 Muenster, Germany Phone +49 25132266-61, Fax +49 251 32266-22...

This manual is also suitable for:

Lu700lLu700cLu710mLu710cLu710paLu710e