MT8870A
Universal Wireless
Test Set
Operation Manual

15th Edition

For safety and warning information, please read this manual before attempting to use the equipment.
Keep this manual with the equipment.

ANRITSU CORPORATION

Document No.: M-W3605AE-15.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

⚠ DANGER This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

⚠ WARNING This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

⚠ CAUTION This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

MT8870A
Universal Wireless Test Set
Operation Manual

20 August 2012 (First Edition)
19 January 2018 (15th Edition)

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Printed in Japan

For Safety

⚠ DANGER

Replacing Battery

- When replacing the battery, use the specified battery and insert it with the correct polarity. If the wrong battery is used, or if the battery is inserted with reversed polarity, there is a risk of explosion causing severe injury or death.

Battery Disposal

- DO NOT expose batteries to heat or fire. This is dangerous and can result in explosions or fire. Heating batteries may cause them to leak or explode.

⚠ WARNING

- ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the advice in the operation manual is not followed there is a risk of personal injury or reduced equipment performance. The alert mark shown on the left may also be used with other marks and descriptions to indicate other dangers.

- Overvoltage Category
  This equipment complies with overvoltage category II defined in IEC 61010. DO NOT connect this equipment to the power supply of overvoltage category III or IV.

Electric Shock

- To ensure that the equipment is grounded, always use the supplied 3-pin power cord, and insert the plug into an outlet with a ground terminal. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock or causing damage to the internal components.

For Safety

⚠ WARNING

Repair

- Only qualified service personnel with a knowledge of electrical fire and shock hazards should service this equipment. This equipment cannot be repaired by the operator. DO NOT attempt to remove the equipment covers or unit covers or to disassemble internal components. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

Calibration

- The performance-guarantee seal verifies the integrity of the equipment. To ensure the continued integrity of the equipment, only Anritsu service personnel, or service personnel of an Anritsu sales representative, should break this seal to repair or calibrate the equipment. Be careful not to break the seal by opening the equipment or unit covers. If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed.

Falling Over

- This equipment should always be positioned in the correct manner. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.
  Always set up the equipment in a position where the power switch can be reached without difficulty.

Battery Fluid

- DO NOT short the battery terminals and never attempt to disassemble the battery or dispose of it in a fire. If the battery is damaged by any of these actions, the battery fluid may leak. This fluid is poisonous.
  DO NOT touch the battery fluid, ingest it, or get in your eyes. If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, rinse them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly with clean water.

For Safety

⚠ CAUTION

Cleaning

- Always remove the main power cable from the power outlet before cleaning dust around the power supply and fan.
  - Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire.
  - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

- This is a heavy object. When lifting and moving this equipment, always work in a group of two or more, or use a trolley. There is a risk of back injury, if this equipment is lifted or moved by one person.

Check Terminal

- Never input a signal of more than the indicated value between the measured terminal and ground. Input of an excessive signal may damage the equipment.

For Safety

⚠ CAUTION

Replacing Memory Back-up Battery

This equipment uses a Poly-carbomonofluoride lithium battery to backup the memory. This battery must be replaced by service personnel when it has reached the end of its useful life; contact the Anritsu sales section or your nearest representative.

Note: The battery used in this equipment has a maximum useful life of 7 years. It should be replaced before this period has elapsed.

The life of the battery will vary depending on the length of equipment usage and the operating environment.
The following conditions may be observed if the battery has expired.

- When power to the equipment is supplied, the time display may no longer match the actual time.
- Parameter and data settings may not be retained when the power to the equipment is cut.

Use in a Residential Environment

This equipment is designed for an industrial environment.
In a residential environment this equipment may cause radio interference in which case the user may be required to take adequate measures.

Use in Corrosive Atmospheres

Exposure to corrosive gases such as hydrogen sulfide, sulfurous acid, and hydrogen chloride will cause faults and failures.
Note that some organic solvents release corrosive gases.

Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories, including the National Institute of Advanced Industrial Science and Technology, and the National Institute of Information and Communications Technology, and was found to meet the published specifications.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within one year after shipment due to a manufacturing fault. However, software fixes will be made in accordance with the separate Software End-User License Agreement. Moreover, Anritsu Corporation will deem this warranty void when:

- The fault is outside the scope of the warranty conditions separately described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster, including fire, wind, flooding, earthquake, lightning strike, or volcanic ash, etc.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war, etc.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant, etc.
- The fault is due to use of non-specified peripheral or applied equipment or parts, or consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.
- The fault is due to use in unusual environments(Note).
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Note:
For the purpose of this Warranty, "unusual environments" means use:

- In places of direct sunlight
- In dusty places
- Outdoors
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in places where chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present
- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes

Anritsu Corporation Contact

In the event of this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the PDF version.

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.
Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.
When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

Trademark and Registered Trademark

CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States and other countries.

Reuse Parts

Anritsu group promotes recycling activities in order to reuse available resources and save energy. This product may use recycled parts (mechanical components) that conform to Anritsu's quality standards.

Lifetime of Parts

The life span of certain parts used in this instrument is determined by the operating time or the power-on time. Due consideration should be given to the life spans of these parts when performing continuous operation over an extended period. These parts must be replaced at the customer's expense even if within the guaranteed period described in Warranty at the beginning of this manual. For details on life span, refer to the corresponding section in this manual.

Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2012/19/EU (the “WEEE Directive”) in European Union.

For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

Software End-User License Agreement (EULA)

Please read this Software End-User License Agreement (hereafter this EULA) carefully before using (includes executing, copying, registering, etc.) this software (includes programs, databases, scenarios, etc., used to operate, set, etc., Anritsu electronic equipment). By reading this EULA and using this software, you are agreeing to be bound by the terms of its contents and Anritsu Corporation (hereafter Anritsu) hereby grants you the right to use this Software with the Anritsu-specified equipment (hereafter Equipment) for the purposes set out in this EULA.

1. Grant of License and Limitations

1. Regardless of whether this Software was purchased from or provided free-of-charge by Anritsu, you agree not to rent, lease, lend, or otherwise distribute this Software to third parties and further agree not to disassemble, recompile, reverse engineer, modify, or create derivative works of this Software.
2. You may make one copy of this Software for backup purposes only.
3. You are not permitted to reverse engineer this software.
4. This EULA allows you to install one copy of this Software on one piece of Equipment.

2. Disclaimers

To the extent not prohibited by law, in no event shall Anritsu be liable for personal injury, or any incidental, special, indirect or consequential damages whatsoever, including, without limitation, damages for loss of profits, loss of data, business interruption or any other commercial damages or losses, arising out of or related to your use or inability to use this Software.

3. Limitation of Liability

a. If a fault (bug) is discovered in this Software, preventing operation as described in the operation manual or specifications whether or not the customer uses this software as described in the manual, Anritsu shall at its own discretion, fix the bug, or exchange the software, or suggest a workaround, free-of-charge. However, notwithstanding the above, the following items shall be excluded from repair and warranty.

   i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.
   ii) If this Software is used in conjunction with other non-Anritsu-approved software.
   iii) Recovery of lost or damaged data.
   iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
   v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.

c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

4. Export Restrictions

You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

5. Termination

Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

6. Reparations

If Anritsu suffers any loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

7. Responsibility after Termination

Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

9. Court of Jurisdiction

This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Decision 768/2008/EC to indicate that they conform to the EMC, LVD, and RoHS directive of the European Union (EU).

CE marking

1. Product Model

Model: MT8870A Universal Wireless Test Set

2. Applied Directive

EMC: Directive 2014/30/EU
LVD: Directive 2014/35/EU
RoHS: Directive 2011/65/EU

3. Applied Standards

- EMC: Emission: EN 61326-1: 2013 (Class A)
  Immunity: EN 61326-1: 2013 (Table 2)

	Performance Criteria*
IEC 61000-4-2 (ESD)	B
IEC 61000-4-3 (EMF)	A
IEC 61000-4-4 (Burst)	B
IEC 61000-4-5 (Surge)	B
IEC 61000-4-6 (CRF)	A
IEC 61000-4-11 (V dip/short)	B, C

*: Performance Criteria

A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used

as intended.

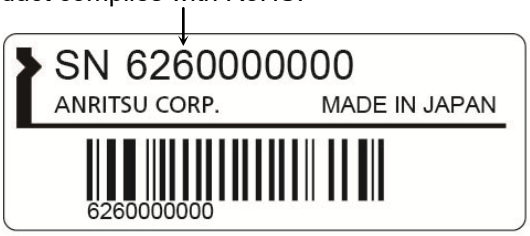
B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Harmonic current emissions:
EN 61000-3-2: 2014
(Class A equipment)

- LVD: EN 61010-1: 2010 (Pollution Degree 2)
- RoHS: EN 50581: 2012 (Category 9)

If the third digit of the serial number is “6”, the product complies with RoHS.



Serial number example

4. Authorized representative

Name:	Murray Coleman
	Head of Customer Service EMEA
	ANRITSU EMEA Ltd.
Address, city:	200 Capability Green, Luton
	Bedfordshire, LU1 3LU
Country:	United Kingdom

RCM Conformity Marking

Anritsu affixes the RCM mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

RCM marking

1. Product Model

Model: MT8870A Universal Wireless Test Set

2. Applied Standards

EMC: Emission: EN 61326-1: 2013 (Class A equipment)

About Eco label

The label shown on the left is attached to Anritsu products meeting our environmental standards.

Details about this label and the environmental standards are available on the Anritsu website at https://www.anritsu.com/

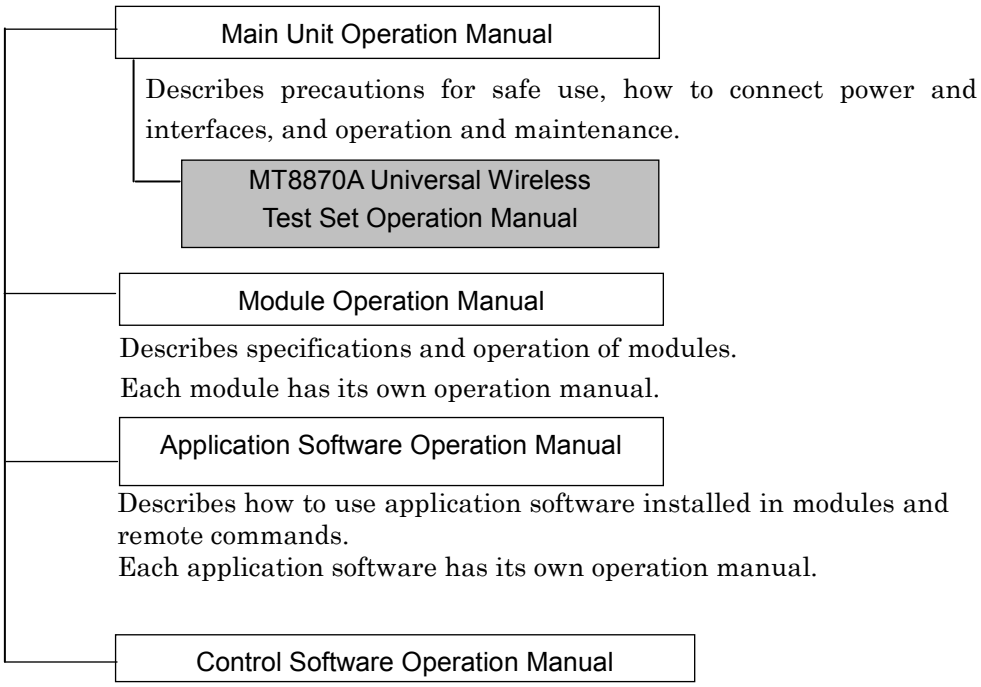
About This Manual

This manual mainly describes the operation, calibration, and maintenance of the MT8870A Universal Wireless Test Set.

Products related to the MT8870A (main unit) include:

- Modules installed in MT8870A
- Application software installed in modules
- Control software installed in external PC controller

These products are called the Universal Wireless Test Set Series. The operation manuals for the Universal Wireless Test Set Series consist of separate documents for the main unit, module(s), application software, and control software as listed below.



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IV.

Chapter 1 Outline

This chapter outlines the MT8870A Universal Wireless Test Set and describes the product configuration.
Refer to Appendix A “Specifications” for the performance and specifications.

1.1 Outline

The MT8870A Universal Wireless Test Set (hereafter MT8870A) is a platform for measuring the transmission and reception characteristics of wireless terminals (hereafter mobiles) used in the mobile communications.

Up to four modules can be installed in the MT8870A for testing multiple mobiles simultaneously.

To speed-up automatic testing of mobiles, the MT8870A has no operation panel and is controlled using a remote interface. At least one module is required to control the MT8870A remotely.

The following items can be tested depending on the combination of software installed in the modules.

Table 1.1-1 Test Items

Test Item	Specifications								
	W-CDMA/HSPA	GSM/EDGE	LTE FDD	LTE TDD	CDMA2000	1xEV-DO	TD-SCDMA	IEEE 802.11a/b/g/n/ac/p/ax	Bluetooth
Tx/Rx vs frequency	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multipower measurement	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spectrum monitor	✓	✓	✓	✓	✓	✓	✓	✓	✓
Narrowband power vs time	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power measurement	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power vs time	–	✓	–	–	–	–	–	–	–
Power template	–	–	–	–	–	–	✓	–	–
Occupied bandwidth	✓	–	✓	✓	✓	✓	✓	✓	–
Spectrum emission mask	✓	–	✓	✓	✓	✓	✓	✓	–
Adjacent channel leakage power ratio	✓	–	✓	✓	–	–	✓	–	–
Modulation	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peak code domain error	✓	–	–	–	–	–	✓	–	–
Code domain error	–	–	–	–	✓	✓	–	–	–
Relative code domain error	✓	–	–	–	–	–	–	–	–
Discontinuous phase	✓	–	–	–	–	–	–	–	–
Tx IQ	–	✓	–	–	–	–	–	–	–

The MT8870A can be controlled remotely via a PC using the following software without creating a remote control program.

- MX880051A Cellular Application Applet
- MX880052A SRW Application Applet
- MX880053A FM/Audio Application Applet
- MX880054A Signal Generator Application Applet
- MX880055A Small Cell Application Applet
- MX880056A IEEE 802.15.4 Application Applet
- MX880057A Z-Wave Application Applet

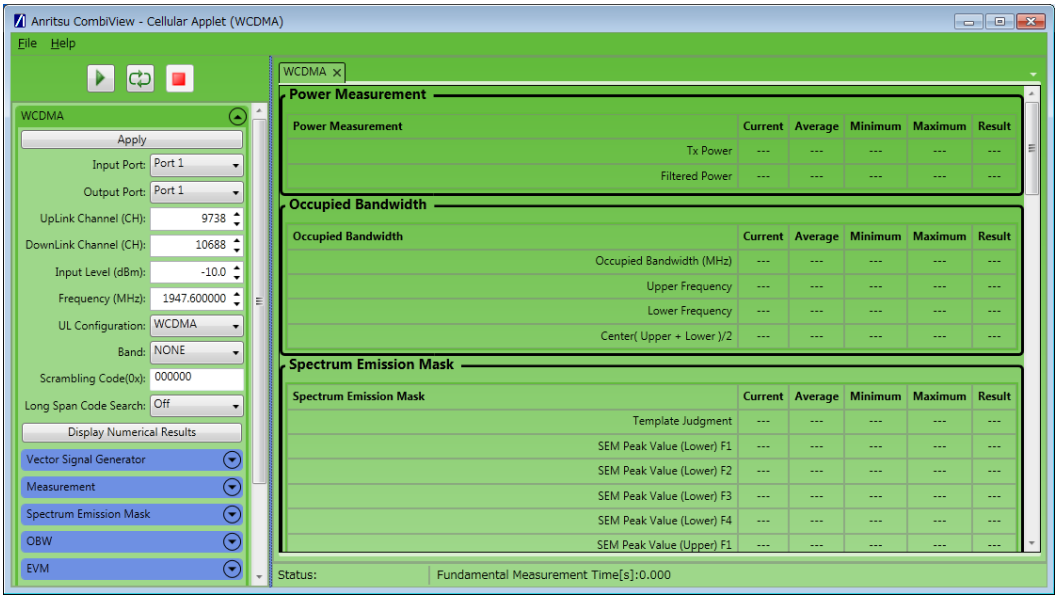

Figure 1.1-1 Cellular Application Applet Screen

1.2 Features

The MT8870A can:

(1) Test up to four wireless devices

Up to four modules can be installed in the MT8870A to test multiple wireless devices simultaneously.

(2) Be controlled from a remote PC

The MT8870A can be controlled remotely from an external controller such as a PC via GPIB or Ethernet (1000BASE-T).

1.3 Configuration

This section introduces the standard MT8870A configuration as well as modules, options, application software, application parts and peripherals.

1.3.1 Standard configuration

The standard MT8870A configuration is listed in the following table.
The operation manuals and software files are included on the supplied storage media (DVD, etc.).
The electronic files are stored in one or more storage media (DVD, etc.).

Table 1.3.1-1 Standard Configuration

Items	Model/Code	Name	Qty	Remarks
Main Unit	MT8870A	Universal Wireless Test Set	1	
Standard Accessories	J0491	Shielded Power Cord, 3 m	1	
	B0666A	Blank Panel	3	
	MX880050A	CombiView		
	MX880051A	Cellular Application Applet		
	MX880052A	SRW Application Applet		
	MX880053A	FM/Audio Application Applet		
	MX880054A	Signal Generator Application Applet		
	MX880055A	Small Cell Application Applet		
	MX880056A	IEEE 802.15.4 Application Applet		
	MX880057A	Z-Wave Application Applet		
	MX887900A	MT8870A Utility Tool		
	W3605AE	MT8870A Universal Wireless Test Set Operation Manual		English
	W3606AE	MU887000A TRX Test Module Operation Manual		English

Refer to the *MU887000A TRX Test Module Operation Manual* for the operation of the MX889000A MT8870A Utility Tool.

1.3.2 Modules

The following table lists the modules that can be installed in the MT8870A. They are all sold separately.
Order by specifying the model/code, product name, and quantity.

Table 1.3.2-1 Module

Model/Code	Name	Remarks
MU887000A	TRX Test Module	

1.3.3 Options

The following table lists the options to expand the functions of the MT8870A. They are all sold separately. Order by specifying the model/code and product name.

Table 1.3.3-1 MT8870A Options

Model/Code	Name	Remarks
MT8870A-001	GPIB Control	
MT8870A-101	GPIB Control Retrofit	

1.3.4 Application software

The MT8870A tests each communications specification using application software and waveform files (sold separately). Contact the Anritsu Service and Sales office or your nearest Anritsu representative for details of the application software functions and performance.

The application software and waveform are listed in the following tables. Refer to each software operation manual for the software options.

Table 1.3.4-1 Application Software

Model/Code	Name
MX887010A	Cellular Standards Sequence Measurement
MX887011A	W-CDMA/HSPA Uplink TX Measurement
MX887012A	GSM/EDGE Uplink TX Measurement
MX887013A	LTE FDD Uplink TX Measurement
MX887014A	LTE TDD Uplink TX Measurement
MX887015A	CDMA2000 Reverse Link TX Measurement
MX887016A	1xEV-DO Reverse Link TX Measurement
MX887017A	TD-SCDMA Uplink TX Measurement
MX887021A	W-CDMA/HSPA Downlink TX Measurement
MX887023A	LTE FDD Downlink TX Measurement
MX887030A	WLAN 802.11b/g/a/n TX Measurement
MX887031A	WLAN 802.11ac TX Measurement
MX887032A	WLAN 802.11p TX Measurement
MX887033A	WLAN 802.11ax TX Measurement
MX887040A	Bluetooth TX Measurement
MX887050A	Short Range Wireless Average Power and Frequency Measurement
MX887060A	IEEE 802.15.4 TX Measurement
MX887061A	Z-Wave TX Measurement
MX887065A	Category M FDD Uplink TX Measurement
MX887067A	NB-IoT Uplink TX Measurement
MX887070A	FM/Audio TRX Measurement
MX887090A	Multi-DUT Measurement Scheduler

Table 1.3.4-2 Waveforms

Model/Code	Name
MV887011A	W-CDMA/HSPA Downlink Waveforms
MV887012A	GSM/EDGE Downlink Waveforms
MV887013A	LTE FDD Downlink Waveforms
MV887014A	LTE TDD Downlink Waveforms
MV887015A	CDMA2000 Forward Link Waveforms
MV887016A	1xEV-DO Forward Link Waveforms
MV887017A	TD-SCDMA Downlink Waveforms
MV887021A	W-CDMA/HSPA Uplink Waveforms
MV887023A	LTE FDD Uplink Waveforms
MV887030A	WLAN 802.11b/g/a/n Waveforms
MV887031A	WLAN 802.11ac Waveforms
MV887032A	WLAN 802.11p Waveforms
MV887033A	WLAN 802.11ax Waveforms
MV887040A	Bluetooth Waveforms
MV887060A	IEEE 802.15.4 Waveforms
MV887061A	Z-Wave Waveforms
MV887065A	Category M FDD Downlink Waveforms
MV887067A	NB-IoT Downlink Waveforms
MV887070A	FM RDS Waveforms
MV887100A	GPS Waveforms
MV887102A	GLONASS Waveforms
MV887103A	BeiDou Waveforms
MV887110A	DVB-H Waveforms
MV887111A	ISDB-T Waveforms
MV887112A	ISDB-Tmm Waveforms

Table 1.3.4-3 Application Software Option

Model/Code	Name
MX887013A-001	LTE-Advanced FDD Uplink CA TX Measurement
MX887014A-001	LTE-Advanced TDD Uplink CA TX Measurement
MX887040A-001	DLE TX Measurement
MX887040A-002	2LE TX Measurement
MX887040A-003	BLR TX Measurement

Table 1.3.4-4 Waveforms Option

Model/Code	Name
MV887040A-001	DLE Waveforms
MV887040A-002	2LE Waveforms
MV887040A-003	BLR Waveforms

1.3.5 Application parts

Application parts (accessories) can be ordered separately by specifying the model/code, product name and quantity.

Table 1.3.5-1 Application Parts

Model/Code	Name	Remarks
W3605AE	MT8870A Universal Wireless Test Set Operation Manual	English, storage media (DVD, etc.)
J0576B	Coaxial Cord, 1.0 m	N-P·5D-2W·N-P
J0576D	Coaxial Cord, 2.0 m	N-P·5D-2W·N-P
J0127A	Coaxial Cord, 1.0 m	BNC-P·RG58A/U·BNC-P
J0127C	Coaxial Cord, 0.5 m	BNC-P·RG58A/U·BNC-P
J0007	GPIB Cable, 1.0 m	408JE-101
J0008	GPIB Cable, 2.0 m	408JE-102
B0664A	Rack Mount Kit	
B0665A	Carrying Case (MT8870A)	
B0666A	Blank Panel	
B0669A	Front Cover For 1MW5U	

1.3.6 Warranty

The following extended warranty services can be purchased to extend the standard warranty.

Table 1.3.6-1 MT8870A Warranty Services

Model/Symbol	Product Name	Remarks
MT8870A-ES210	2 Years Extended Warranty Service	
MT8870A-ES310	3 Years Extended Warranty Service	
MT8870A-ES510	5 Years Extended Warranty Service	

1.4 Abbreviations

The abbreviations used on the MT8870A panels and in this manual are listed in Table 1.4-1.

Table 1.4-1 Abbreviations

Abbreviation	Name
1xEV-DO	1x Evolution Data Only
Aux	Auxiliary
CDMA	Code Division Multiple Access
EDGE	Enhanced Data GSM Environment
Ext	External
FDD	Frequency Division Duplex
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
HSPA	High Speed Packet Access
IP	Internet Protocol
LTE	Long Term Evolution
OPT	Option
SRW	Short Range Wireless
TDD	Time Division Duplex
TD-SCDMA	Time Division Synchronous Code Division Multiple Access
TRX	Transceiver
TTL	Transistor–Transistor Logic
WLAN	Wireless Local Area Network

Chapter 2 Before Use

This chapter describes how to install the MT8870A, the names and functions of each part, and how to connect external equipment.

2.1 Installing

2.1.1 Carrying unit

When carrying the MT8870A, hold both the right and left grips to keep the unit level.

⚠ CAUTION

- **Never carry the unit while the power is on. This may damage the internal circuits and result in fire, electric shock and/or failure.**
- **Carry the MT8870A by holding both grips to keep the unit level. Carrying by holding only one grip puts excess strain on internal precision components and may result in damage.**

⚠ CAUTION

When lifting the MT8870A, keep it level by holding the side strap handles. The center of gravity is moved to the back side of the cabinet if no module is installed to the MT8870A.

2.1.2 Installing unit

Install the MT8870A horizontally in a stable place at an ambient temperature of 5 to 45°C. Install where the cooling vents on rear panel are at least 10 cm from walls, peripherals, or other obstructions so as not to block the air flow through the vents.

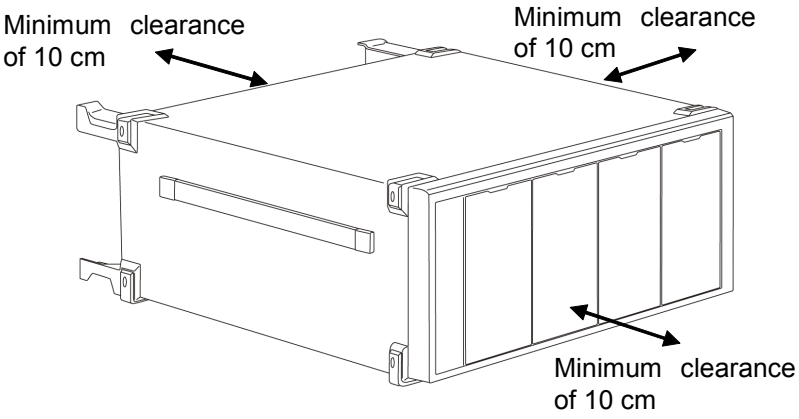

Figure 2.1.2-1 Installation Location

⚠ CAUTION

Never block the MT8870A internal ventilation, otherwise the internal temperature will rise, causing fire. Avoid the following uses:

- **In an upright position (on side).**
- **With the unit covered.**
- **With the fan or vents blocked by dust.**

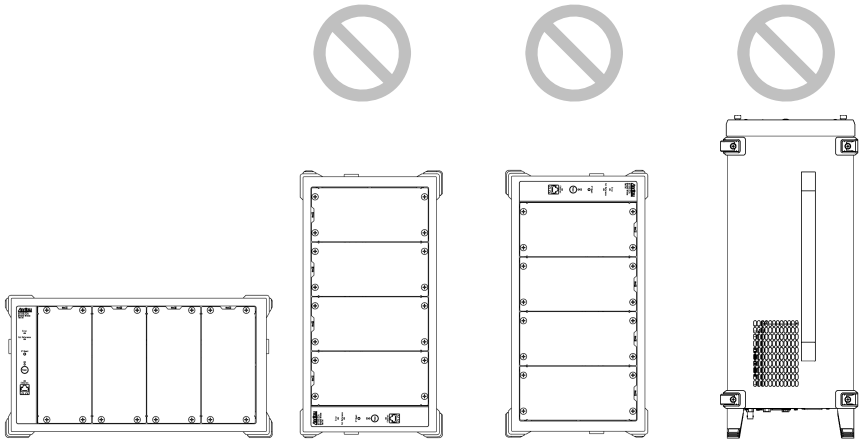

Figure 2.1.2-2 Installation Orientation

⚠ CAUTION

If the MT8870A is installed in a ⃠ direction as above, a small shock may turn it over and harm the user.

⚠ CAUTION

To prevent risk of fire, personal injury or unit failure, avoid using the MT8870A in the following locations.

- **In direct sunlight for extended periods**
- **Outdoors**
- **In excessively dusty locations**
- **In liquids, such as water, oil, organic solvents, and medical fluids, or places where these liquids may adhere**
- **In salty air or where chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present**
- **Where toppling over may occur**
- **Where static electric charges or high electromagnetic fields are present**
- **Where abnormal power voltages (high or low) occur**
- **In the presence of lubricating oil mists**
- **Where condensation occurs**
- **In places at an altitude of more than 2,000 m**
- **In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes**

2.1.3 Stacking units

When stacking two units on top of each other, ensure that the feet of the top unit are locked into the four adjusters on the top panel of the bottom unit. Secure the two units together with a strong strap to prevent them toppling over. Do not stack more than two units.

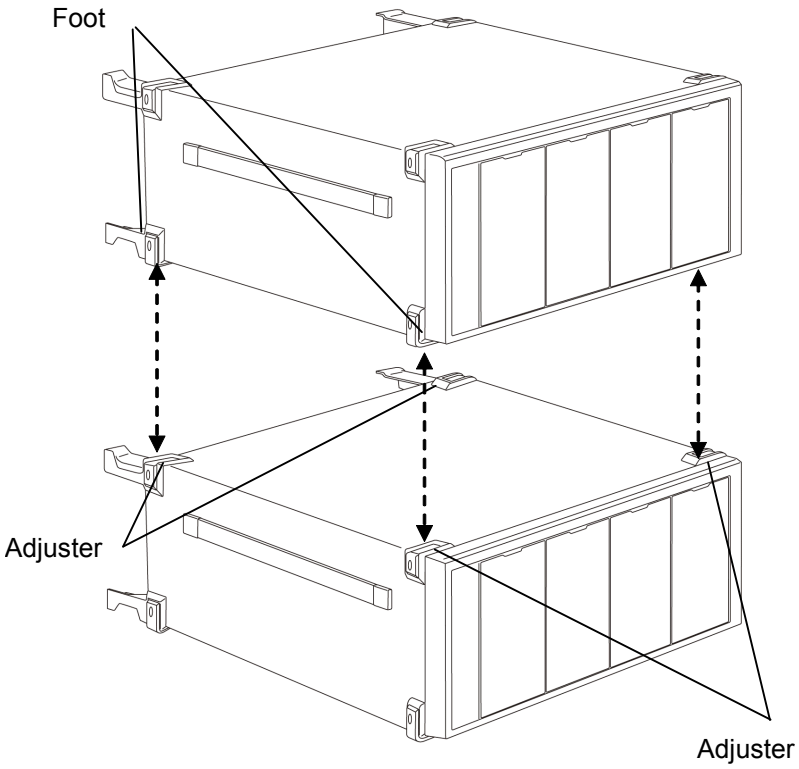

Figure 2.1.3-1 Stacking Units

2.1.4 Mounting units in rack

An optional rack mount kit is required to mount units in a rack. For details on rack mounting, refer to the instructions supplied with the rack mount kit.

2.2 Part Names and Functions

2.2.1 Front panel

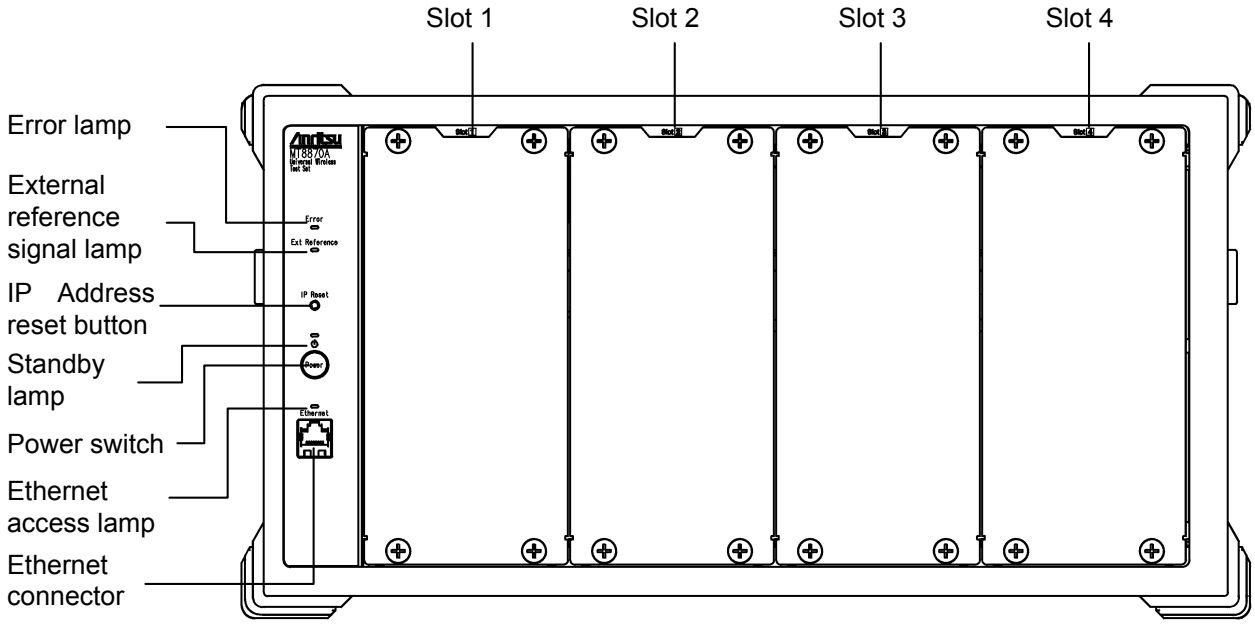

Figure 2.2.1-1 MT8870A Front Panel

Table 2.2.1-1 MT8870A Front Panel Functions

Name	Function
Slots 1 to 4	For installing modules
Error lamp (Error)	Lit red when: ● Cooling fan stopped. ● Abnormal temperature detected inside MT8870A or module. ● Abnormal voltage detected inside MT8870A or module. This is flashing red while the module is starting. Do not switch the power off while it is flashing.
External reference signal lamp (Ext. Reference)	Indicates status of reference signal. Off: Using internal signal. Flashing: Using external signal not synchronized. On: Using external signal while synchronized.
IP Address reset button (IP Reset)	Sets network configuration of modules in MT8870A to settings shown in Tables 2.6.1-1 and 2.6.1-2.
Standby lamp	Lit when power supplied to power inlet but power switch not turned on.
Power switch (Power)	Switches power on and off. Lit when power on.
Ethernet access lamp	Indicates Ethernet connection status. Off: Ethernet not connected. Flashing: Ethernet communicating (Act). On: Ethernet connected (Link).
Ethernet connector	Connects to PC controller. Supports 10BASE-T/100BASE-TX/1000BASE-T.

⚠ CAUTION

Turn off the power if the error lamp remains flashing for 10 minutes after the power is turned on. In this case, contact an Anritsu Service and Sales office. Contact information is available in a separate file (for the PDF version), and on the last page of this manual (for the printed version).

2.2.2 Rear panel

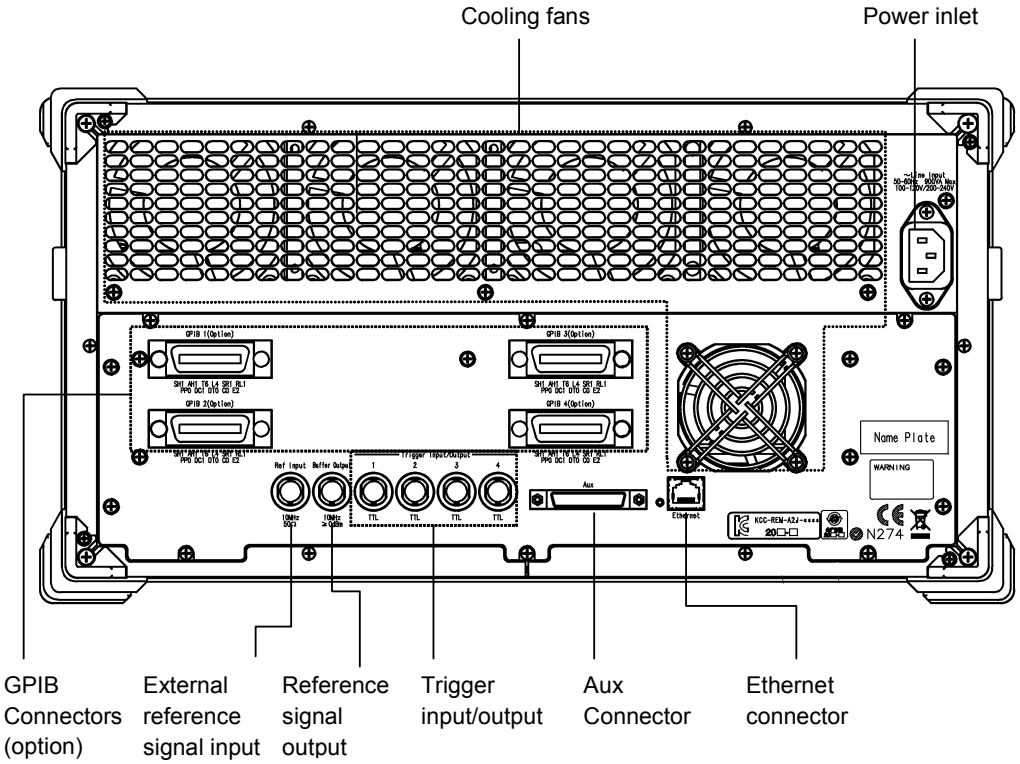

Figure 2.2.2-1 MT8870A Rear Panel

Table 2.2.2-1 MT8870A Rear Panel Functions

Name	Function
Cooling fans	Cool each module in each slot of MT8870A.
Power inlet	To connect power cord (standard accessory)
GPIB Connectors (option)	GPIB interfaces for modules Linked to each of slots 1 to 4.
External reference signal input (Ref Input)	Input connector for 10 MHz reference signal Used when: ● Requiring higher stability than internal reference signal. ● Synchronizing with other devices.
Reference signal output (Buffer Output)	Reference signal monitor output.
Trigger input/output	Trigger input/output connectors for modules Linked to each of slots 1 to 4.
Aux Connector	Reserved.
Ethernet connector	Connected to PC controller. Supports 10BASE-T/100BASE-TX/1000BASE-T.

2.3 Installing modules

⚠ CAUTION

Disconnect power to the MT8870A before installing modules.

Regardless of whether the power is on or off, do not put your hand, foot or any metal objects into empty module slots in which there are protrusions and the 12VDC power supply for the internal connectors. There is a risk of injury, electric shock or short circuit.

2.3.1 Installing module

A module can be installed to every position of a slot.

1. Loosen four screws on the front blank panel using a Phillips screwdriver #1.
   A blank panel is not fitted to slot 1 at MT8870A shipment.
2. Pull the screws to remove the blank panel.
3. Firmly insert the module into the slot.
4. Tighten the four screws using a Phillips screwdriver.

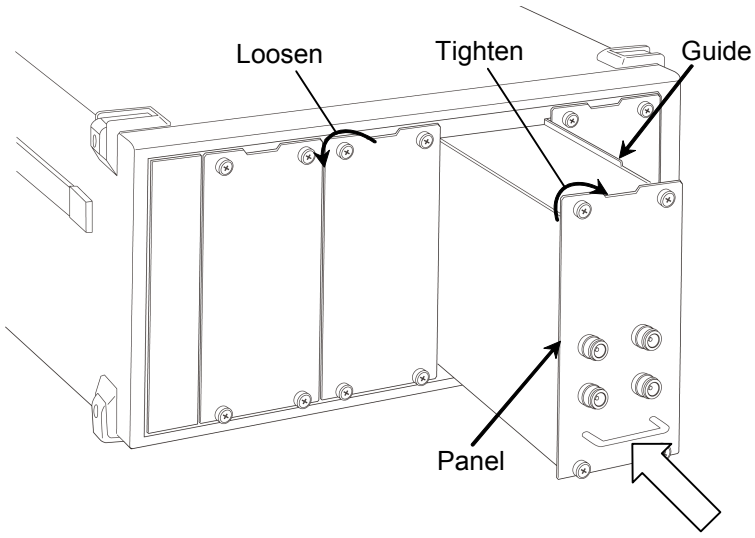

Figure 2.3.1-1 Installing Module

⚠ CAUTION

Avoid your fingers from being pinched between the module panel and the MT8870A when inserting a module.

⚠ CAUTION

- **Take anti-static precautions such as wearing an electrostatic discharge wrist band when installing or removing a module.**
- **When installing or removing a module, disconnect any connected coaxial cable from the module panel. Otherwise, a signal may be applied accidentally to the module, damaging it.**
- **When installing a module, do not block the ventilation. If the ventilation is blocked by items, such as a label, the module cannot be sufficiently cooled, resulting in poor performance or unstable operation.**
- **Unused slots must be fitted with blank panels. If slots are not covered by blank panels, modules installed in other slots may not be cooled sufficiently, resulting in poor performance or unstable operation.**

2.3.2 Removing module

1. Loosen the four screws on the panel using a Phillips screwdriver.
2. Grip the handle and pull the module out.
3. A blanking panel is used to cover slots from which the module has been removed.
4. Tighten four screws on the panel using a Phillips screwdriver.

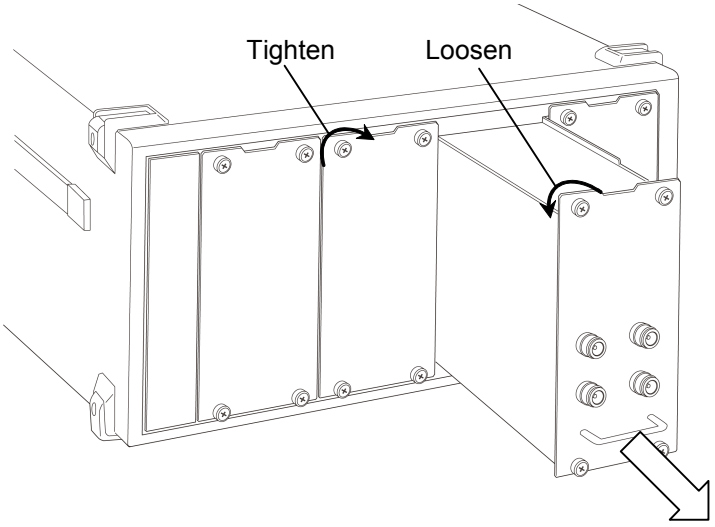

Figure 2.3.2-1 Removing module

⚠ CAUTION

When removing the module from the cabinet, pull the handle, supporting the module from below with the other hand. Otherwise, there is a risk of dropping the module when separating it from the MT8870A, and causing injury to the hand holding the handle.

⚠ CAUTION

Unused slots must be fitted with blank panels. If slots are not covered by blank panels, modules installed in other slots may not be cooled sufficiently, resulting in poor performance or unstable operation.

2.4 Supplying Power

This section describes the procedures for supplying power.

2.4.1 Verifying power voltage

For normal operation of the instrument, observe the power voltage range described below.

Power Supply	Voltage Range	Frequency
100 Vac system	100 to 120 V	50 to 60 Hz
200 Vac system	200 to 240 V	50 to 60 Hz

Vac-system changeover is automatically made between 100 Vac and 200 Vac.

⚠ CAUTION

Supplying power exceeding the above range may result in electrical shock, fire, failure, or malfunction.

2.4.2 Connecting power cable

Insert the power plug into a grounded outlet, and connect the other end to the power inlet on the rear panel. To ensure that the instrument is properly grounded, always use the supplied 3-pin power cord.

⚠ WARNING

Use the supplied power cord to connect the MT8870A to the power supply. Using the other power cord may result in overheat or fire.

⚠ WARNING

Always connect the instrument to a properly grounded outlet. Do not use the instrument with an extension cord or transformer that does not have a ground wire.

If the instrument is connected to an ungrounded outlet, there is a risk of receiving a fatal electric shock. In addition, the peripheral devices connected to the instrument may be damaged.

Unless otherwise specified, the signal-connector ground terminal, like an external conductor of the coaxial connector, of the instrument is properly grounded when connecting the power cord to a grounded outlet. Connect the ground terminal of DUT to a ground having the same potential before connecting with the instrument. Failure to do so may result in an electric shock, fire, failure, or malfunction.

⚠ CAUTION

If an emergency arises causing the instrument to fail or malfunction, disconnect the instrument from the power supply by disconnecting either end of the power cord.

When installing the instrument, place the instrument so that an operator may easily connect or disconnect the power cord from the power inlet and outlet. Moreover, DO NOT fix the power cord around the plug and the power inlet with a holding clamp or similar device.

If the instrument is mounted in a rack, a power switch for the rack or a circuit breaker may be used for power disconnection.

It should be noted that, the power switch on the front panel of the instrument is a standby switch, and cannot be used to cut the main power.

2.5 Connecting Cables

2.5.1 Connecting Ethernet cable

Connect a category-5, straight-through Ethernet cable to one of the Ethernet connectors on the front or rear panel.

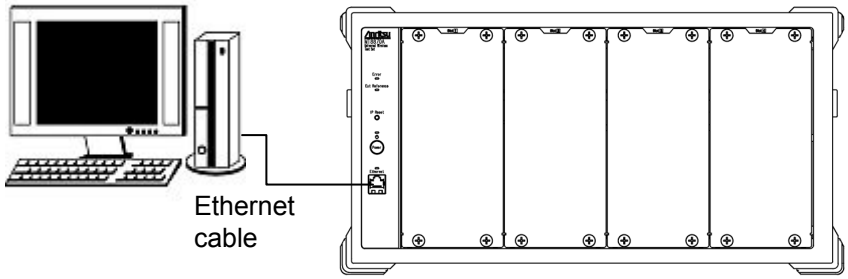

Figure 2.5.1-1 Connecting to Front Ethernet Connector

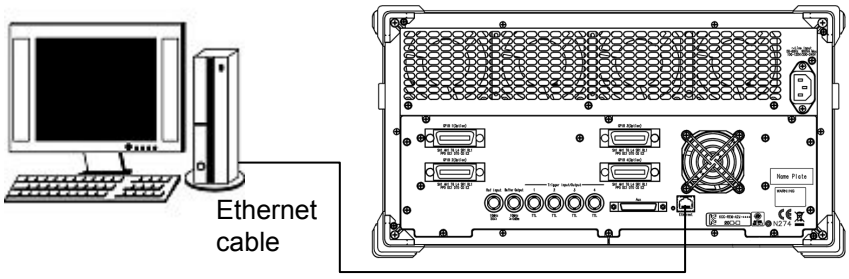

Figure 2.5.1-2 Connecting to Rear Ethernet Connector

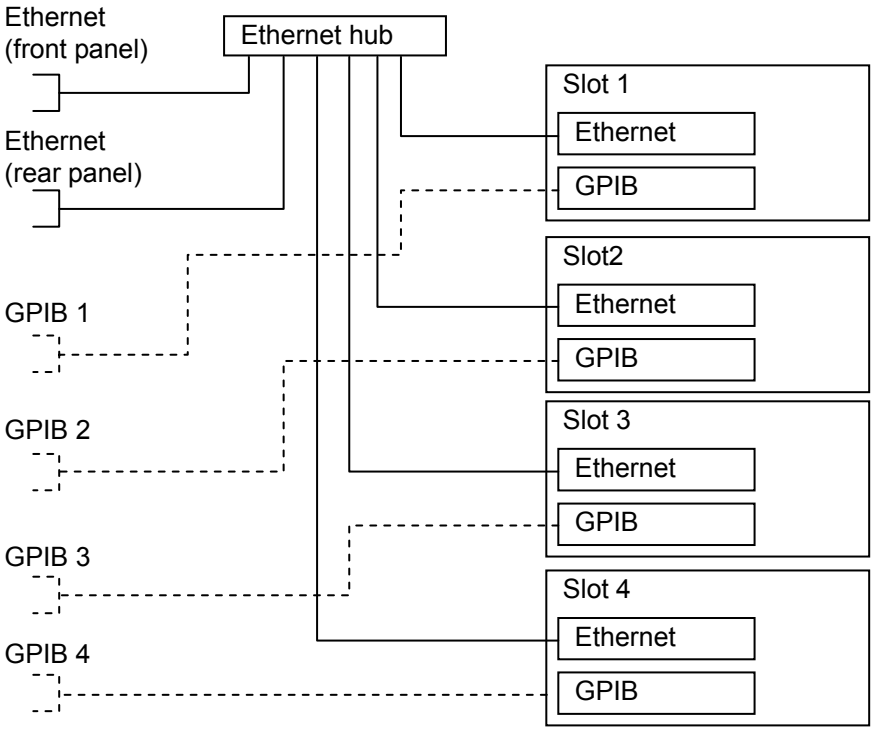

Figure 2.5.1-3 MT8870A Internal Signal Connections for Remote Control

2.5.2 Connecting GPIB cables

Option 001 adds GPIB connectors for each module to the MT8870A rear panel. Connectors 1 to 4 correspond to slots 1 to 4.
Refer to Figure 2.5.1-3 MT8870A Internal Signal Connections for Remote Control.

To control the module in slot 1, connect a GPIB cable to the GPIB 1 (OPT) connector.

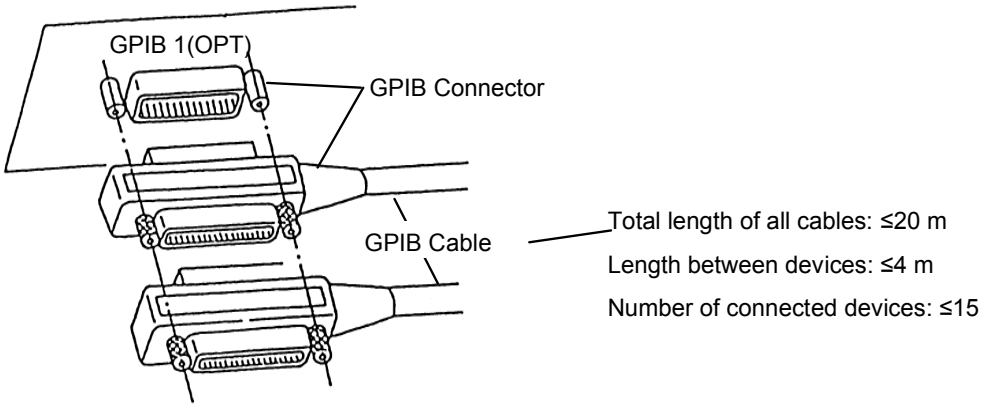

Figure 2.5.2-1 Stacked GPIB Connectors

⚠ CAUTION

Always connect GPIB cables before powering-up. Connecting a GPIB cable while the MT8870A is powered may damage internal circuits.

Avoid a cable loop when connecting cables (Figure 2.5.2-2).

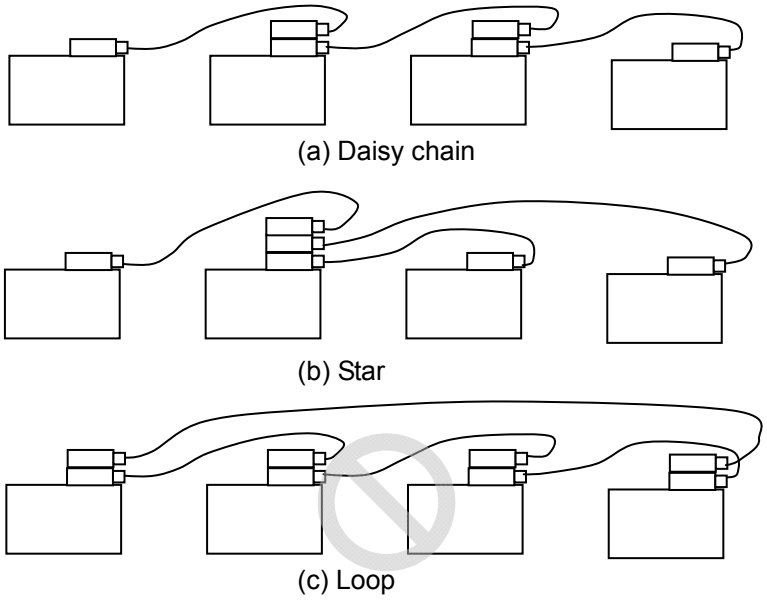

Figure 2.5.2-2 GPIB Cable Arrangement

2.5.3 Connecting reference signal

The MT8870A supplies a frequency and phase reference signal to installed modules. The reference signal can be:

- A signal from the internal oscillator (internal reference signal),
- A signal input to the Ref Input connector on the rear panel (external reference signal)

For details of the remote control command to switch between the internal and external reference signals, refer to *MU887000A TRX Test Module Operation Manual.*

The external reference signal must be within the frequency range of 10 MHz ±1 ppm and level range of –15 to +25 dBm.

The external reference signal lamp (Ext. Reference) is on or flashing when using an external reference signal.

To monitor the reference signal, connect a 50 Ω coaxial cable to the Buffer Output connector (BNC) on the rear panel.

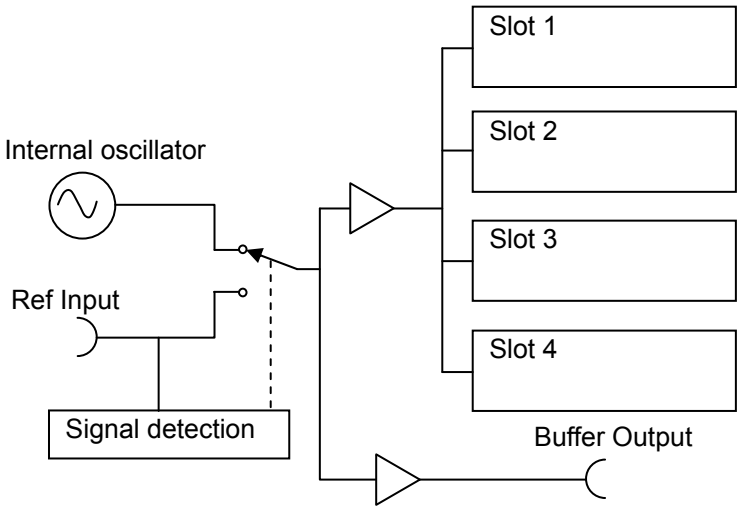

Figure 2.5.3-1 MT8870A Internal Reference Signal Connection Block Diagram

2.5.4 Using trigger signal

The Trigger Input/Output connectors (BNC) on the rear panel can be used either to input a trigger to modules at the start of measurement or to output the event timing to external devices.

Connect a 50 Ω coaxial cable to the Trigger Input/Output connectors.

For details of the remote control command to switch the connectors between input/output, refer to *MU887000A TRX Test Module Operation Manual*.

2.6 Turning Power On/Off

2.6.1 Power-on

⚠ CAUTION

Do not power-up the MT8870A if there is risk of internal condensation because it has been stored at cold temperatures before use at room temperature. Allow it to stand at room temperature first so all condensation has dried and then power-up.

Ensure that the MT8870A is grounded before powering-up.

<Procedure>

1. Connect the power cable to the power inlet on the rear panel. The Standby lamp on the front panel lights to indicate that power is supplied.

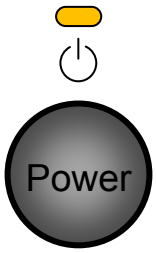

Figure 2.6.1-1 Standby Status (Standby Lamp Lit)

2. Turn on the Power switch by pressing it for more than 1 second. The Standby lamp goes off and Power switch lights. One short audible signals are emitted.

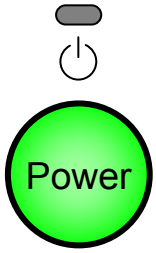

Figure 2.6.1-2 Power-on Status (Power Switch Lit)

3. All lamps on the MT8870A and modules light. The MT8870A can be used as soon as the Error lamp goes off.
   Audible signals are issued as follows when the module buzzer setting is on.
   When all the software products on the installed module(s) have been started: Three short audible signals
   If two or more modules are mounted to MT8870A, audible signals are issued according to the setting of the module to which the last-started software is installed.
   When an error is detected during module self-diagnostic: One long audible signal
   If an error is detected during self-diagnostic, the status lamp on the module panel is lit red.

For the commands related to the module buzzer settings, refer to 3.4.1 "General Settings" in the *MU887000A TRX Test Module Operation Manual*.

Note:

The Power switch on the front panel must be pressed for more than 1 second to toggle the power on and off. This prevents the power from being turned on accidentally or going into standby.

The communication status can be initialized by using the following procedure. Initialization sets the MT8870A network configuration to known values.

<Procedure>

1. Press the IP Reset button using an object with a thin tip.
   Press the button for 3 seconds after power-on.
2. The network configuration is initialized to the following values.
   Port number 56001 is used.

Table 2.6.1-1 Initial IP Addresses

Slot Number	IPv4 Address	IPv6 Address/Prefix Length
1	192.168.1.1	0/0
2	192.168.1.2	0/0
3	192.168.1.3	0/0
4	192.168.1.4	0/0

Table 2.6.1-2 Initial Ethernet Values

Item		Value
IPv4	Subnet mask	255.255.255.0
	Default gateway	(N/A)
	DNS settings	Not used
	DNS primary address	(N/A)
	DNS secondary address	(N/A)
IPv6	Link local address/Prefix length	Assigned automatically using MAC address
	Default router	(N/A)
	DNS settings	Not used
	DNS primary address	(N/A)
	DNS secondary address	(N/A)
Common	Host name	HOST-n*
	Domain name	DOMAIN

*: n is the number of the slot (1 to 4).
Example: If the MU887000A is installed in slot 2 of the MT8870A, the host name is HOST-2.

2.6.2 Power-off

Turn off the power when not using the MT8870A.

<Procedure>

1. Press the Power switch on the front panel for more than 1 second. Two short audible signals are issued when the module buzzer setting is on. The Power switch lamp goes off and the Standby lamp lights. Leave the MT8870A in this state if it will be used again soon.

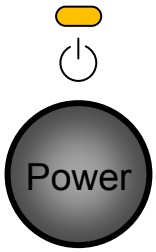

Figure 2.6.2-1 Standby Status (Standby Lamp Lit)

2. If the MT8870A is not going to be used for a long time, disconnect the power cable from the power inlet on the rear panel. The Standby lamp goes off and the main power is off.

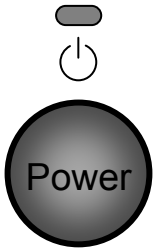

Figure 2.6.2-2 Main Power Off Status (both Standby Lamp and Power Switch Off)

<Forced shutdown >

To force shutdown, press the Power switch on the front panel for 5 seconds. The Standby lamp lights and the main power enters the standby state.

Chapter 3 Performance Test and Calibration

This chapter describes how to verify the performance of the MT8870A and how to calibrate measured values. If the results of the described performance tests show that the unit does not meet the specifications, contact the Anritsu Service and Sales office or your nearest service representative. Check the following items before requesting repairs:

- Unit name and serial number
- Nature of failure
- Name and information of contact person

3.1 Performance Test

3.1.1 Purpose and test interval

Test the performance at the first acceptance inspection, at the periodic inspections, and after repairs. Test at regular intervals (once or twice each year) to ensure the MT8870A remains within specification. If the tests show the MT8870A is out-of-specification, contact the Anritsu Service and Sales office. Contact information is available in a separate file (for the PDF version), and on the last page of this manual (for the printed version).

3.1.2 Performance test item

This manual explains the reference oscillator frequency stability test.

3.1.3 Required measuring instruments

Table 3.1.3-1 lists the required measuring instruments.

⚠ CAUTION

Warm-up the MT8870A and the required measuring instruments for at least 30 minutes (except when specified otherwise) to stabilize them. To achieve the highest accuracy, the test should be performed at room temperature using a power supply with as little voltage fluctuation as possible in an environment free from noise, vibration, dust and humidity.

Table 3.1.3-1 Instruments for Performance Tests

Performance Test Item	Recommended Instrument (Anritsu Model)	Instrument Required Performance*
Reference oscillator frequency stability	Frequency counter (MF2412C)	10 MHz to 2.7 GHz Resolution 0.1 Hz External reference input (10 MHz)
	Frequency standard	Frequency 10 MHz Stability ±1×10^{-8} or better

*: The performance covers the test item measurement range.

3.1.4 Reference oscillator frequency stability

The following describes how to test the frequency stability of the 10 MHz crystal oscillator used as the MT8870A reference oscillator. Evaluate the frequency stability by measuring the frequency change after 24 hours of operation, and the frequency change at ambient temperatures of 5°C and 45°C.

Note:

Because the MU88700xA Test Module tunes voltage for the MT8870A reference oscillator, execute the frequency stability test with the MU88700xA inserted.

(1) Test target standards

Table 3.1.4-1 Reference Oscillator Specifications

Item	Specifications
Frequency	10 MHz
Starting characteristics*1	$\pm 5 \times 10^{-8}$ max. (at 5 minutes after power-on)
Aging rate*1	$\leq \pm 1 \times 10^{-7}$/year max.
Temperature stability*2	$\pm 2 \times 10^{-8}$ max.

*1: 25°C, After power-on, referenced to frequency after 24 hours

*2: 5 to 45°C

(2) Setup

Connect each instrument as shown in Figure 3.1.4-1. Connect the 10 MHz Buffer Output connector on the rear panel of the MT8870A to the 10 MHz reference input connector of the frequency counter.

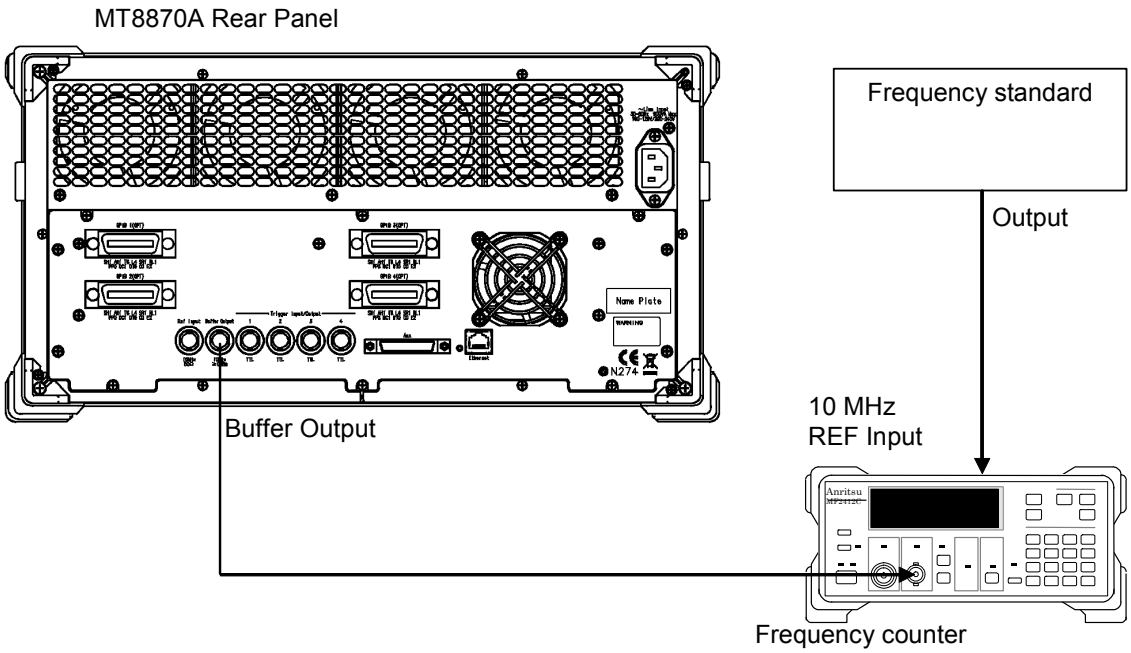

Figure 3.1.4-1 Setup for Reference Oscillator Frequency Stability Test

(3) Start the characteristics test

Note:

Test in a place free from vibration where the ambient temperature fluctuation is within ±2°C.

<Procedure>

1. Set the frequency counter to use an external frequency standard.
2. 24 hours after power-on, measure the output frequency at the MT8870A Buffer Output connector using the frequency counter. Read all measurements to the 0.1 Hz digit.
3. Turn off the power, wait 12 hours then turn the power on again.
4. Wait 5 minutes and then measure the output frequency at the MT8870A Buffer Output connector using the frequency counter.
5. Calculate the stability using the following equation:

$$\text{Frequency stability} = \frac{\text{(2nd frequency counter reading)} - \text{(1st frequency counter reading)}}{\text{(1st frequency counter reading)}}$$

(4) Aging rate test

Note:

Test in a place free from vibration where the ambient temperature fluctuation is within ±2°C.

<Procedure>

1. Set the frequency counter to use an external frequency standard.
2. 24 hours after power-on, measure the output frequency at the MT8870A Buffer Output connector using the frequency counter. Read all measurements to the 0.1 Hz digit.
3. After another 24 hours, measure the output frequency at the MT8870A Buffer Output connector again using the frequency counter. Read all measurements to the 0.1 Hz digit.
4. Calculate the stability using the following equation:

$$\text{Frequency stability} = \frac{\text{(2nd frequency counter reading)} - \text{(1st frequency counter reading)}}{\text{(1st frequency counter reading)}}$$

(5) Temperature stability test

Note:

Test in a constant-temperature chamber free from vibration.

<Procedure>

1. At setup, put only the MT8870A in the constant-temperature chamber (Figure 3.1.4-1). Set the chamber temperature to 25°C.
2. Turn on the MT8870A and wait until the internal temperature has stabilized (about 1.5 hours after the constant-temperature chamber temperature stabilizes. This is the same for subsequent measurements)
3. After the MT8870A internal temperature stabilizes, measure the output frequency at the MT8870A Buffer Output connector using the frequency counter. Read all measurements to the 0.1 Hz digit.
4. Set the chamber temperature to 45°C.
5. After the temperatures of the chamber and MT8870A stabilize, measure the output frequency at the MT8870A Buffer Output connector using the frequency counter.
6. Calculate the stability using the following equation:

$$\text{Frequency stability} = \frac{(\text{Frequency counter reading at } 45°\text{C}) - (\text{Frequency counter reading at } 25°\text{C})}{(\text{Frequency counter reading at } 25°\text{C})}$$

7. Set the chamber temperature to 5°C.
8. After the temperatures of the chamber and MT8870A stabilize, measure the output frequency at the MT8870A Buffer Output connector using the frequency counter.
9. Calculate the stability using the following equation:

$$\text{Frequency stability} = \frac{(\text{Frequency counter reading at } 5°\text{C}) - (\text{Frequency counter reading at } 25°\text{C})}{(\text{Frequency counter reading at } 25°\text{C})}$$

3.2 Calibration

Calibrate the frequency accuracy of the reference oscillator once or twice a year.

For calibration, contact the Anritsu Service and Sales office.

3.3 Sample Format for Performance Test Result Sheet

Document No. _____

Test Location _____

Date _____

Person-in-Charge _____

Model/Name _____

Serial Number _____

Software Version _____

_____

Options _____

Ambient Temperature _____ °C

Relative Humidity _____ %

Test Instruments

Model _____ Serial number _____

Model _____ Serial number _____

Model _____ Serial number _____

Model _____ Serial number _____

Remarks _____

_____

_____

Table 3.3-1 Reference Oscillator Frequency Stability

Item	Min. Specification (Typical)	Measured Value	Max. Specification (Typical)	Uncertainty	Pass/Fail
Starting Characteristics	-5×10^{-8}		$+5 \times 10^{-8}$		Pass/Fail
Aging Rate	-1×10^{-7}		$+1 \times 10^{-7}$		Pass/Fail
Temperature Stability (45°C)	-2×10^{-8}		$+2 \times 10^{-8}$		Pass/Fail
Temperature Stability (5°C)	-2×10^{-8}		$+2 \times 10^{-8}$		Pass/Fail

Chapter 4 Maintenance

This chapter describes the maintenance, storage, and final disposal of the MT8870A.

4.1 Daily Maintenance

Always turn off the power and unplug the MT8870A from the AC wall outlet before daily maintenance.

Panel surface dirt

When dirt is noticed on the MT8870A panel, after it has been used in a dusty environment, or when it has not been used for an extended period of time, wipe the surface panels with a soft cloth slightly moistened with detergent.

Screen

During maintenance, do not clean using organic solvents, such as benzene or thinners. Such chemicals can damage the screen surface.

Lightly wipe a dirty screen surface with a dry, soft cloth or a soft cloth slightly moistened with ethanol.

Loose screws

Check for loose screws. Tighten any using a Phillips screwdriver.

Blocked vents

Use a vacuum clear to remove dust blocking vents on the sides and rear of the MT8870A.

4.2 Software Update

The MU887000A TRX test module and the MX887900A MT8870A Utility Tool are required to update the MT8870A software and data.

For details, refer to *MU887000A TRX Test Module Operation Manual.*

4.3 Storage Precautions

Wipe off dust, fingerprints, stains, spots, etc. on the surface of the MT8870A before storing it.

Put the power cable, the storage media (DVD, etc.) and other accessories in the accessory box and store with the MT8870A.

Avoid storing the MT8870A in places:

- In direct sunlight for extended periods
- Outdoors
- In excessively dusty locations
- Where condensation may occur
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- Where toppling over may occur
- In the presence of lubricating oil mists
- At low atmospheric pressure
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes
- Temperature: −20°C or lower, or 60°C or higher
  Relative humidity: 90% or more

Recommended storage conditions

The MT8870A should be meeting the above listed conditions. If it is not to be used for a long period of time the following conditions recommended:

- Temperature: 5 to 45°C
- Humidity: 40 to 80%
- No daily temperature and humidity fluctuations

4.4 Transport and Final Disposal

The following describes the precautions for transporting and disposing of the MT8870A.

Repacking

Repack the MT8870A in the original packing (box) when it was delivered.

If the packing has been thrown away or damaged, repack the MT8870A as follows:

1. Put the accessories in the accessory box.
2. Obtain a corrugated cardboard, wooden, or aluminum box large enough to pack shock-absorbing cushioning material around the MT8870A.
3. Wrap the MT8870A in plastic sheet or similar material to protect against water and dust.
4. Put the MT8870A in the box.
5. Pack the cushioning material around the MT8870A so it cannot move in the box.
6. Put the accessory box in the packing box.
7. Close and secure the box with cord, tape, bands, or similar materials.

Transport

Avoiding mechanical vibration and shock as far as possible and meet the recommended storage conditions during transport.

Disposal

Follow the instructions of your local waste disposal office when disposing of the MT8870A.

Before disposal, dismantle or physically destroy any non-volatile memory media in the MT8870A to ensure that data in memory cannot be recovered by third parties.

⚠ WARNING

DO NOT expose MT8870A to heat or fire.

MT8870A uses a Poly-carbomonofluoride lithium battery to backup the memory. Do not expose batteries to fire. This is dangerous and can result in explosions or fire. Heating batteries may cause them to leak or explode.

4.5 Troubleshooting

If the MT8870A fails during operation, check the items in Table 4.5-1. If the failure cannot be recovered, contact the Anritsu Service and Sales office immediately. Contact information is available in a separate file (for the PDF version), and on the last page of this manual (for the printed version).

For measurement, refer to the relevant measurement software operation manual.

Table 4.5-1 Troubleshooting Problems and Remedial Action

Problem	Possible Cause	Action
Power switch lamp not lit orange	Power cable not connected, or pulled out of wall socket or MT8870A inlet	Connect power cable.
	Power plug not fully inserted into power outlet or inlet	Fully insert and press Power switch for more than 1 second.
Error lamp lit.	Fan stopped	Remove any object in fan
	Internal temperature too high	Operate MT8870A at ambient temperatures below +45°C. Do not use in direct sunlight. Do not block MT8870A ventilation.
Cannot control via Ethernet	Ethernet cable not connected	Connect the Ethernet cable correctly. Replace the Ethernet cable if it is damaged.
	Incorrect Ethernet cable (not straight through)	Replace the Ethernet cable with the correct type.
	Incorrect IP address setting	Press IP Reset button at power-on to initialize the IP addresses.
	Incorrect port number setting	Press IP Reset button at power-on to initialize the port number.
Cannot control via GPIB	GPIB cable not connected	There is a back-panel GPIB connector for each module. Confirm that the slot number of module to be remotely controlled and the number of the GPIB connector are the same.
	Incorrect GPIB address setting GPIB	Set the GPIB address for each module. The GPIB address setting at factory shipment is 1.
Ext Reference neither lit nor flashing	Incorrect amplitude or frequency of reference clock input to rear panel	Input a sine or square-wave signal with a frequency of 10 MHz ±1 ppm and an amplitude range of 2.0 to 4.5 Vp-p.
Ext Reference flashing continuously	Incorrect reference clock frequency input to rear panel or modulated reference clock	Input an unmodulated signal with a frequency of 10 MHz ±1 ppm.

Appendix A Specifications

This section describes the MT8870A specifications. Refer to Section 1.3 Product Configuration for the product configuration, options, and application parts.

Unless otherwise noted, all specifications are at a stable ambient temperature after warming-up for 30 minutes.

Table A-1 Input/Output Connectors

Item	Specifications
Number of slots	4
Internal reference oscillator	Aging rate: ±1 × 10^{-7}/year Temperature characteristics*1: ±2 × 10^{-8} Starting characteristics*2: 2 minutes after power-on: ±5 × 10^{-7} 5 minutes after power-on: ±5 × 10^{-8} Initial calibration accuracy*3: ±2.2 × 10^{-8}
Connectors	
External reference input	Connector: Rear panel, BNC-J, 50 Ω (nominal) Frequency: 10 MHz Operating range: ±1 ppm Input level: –15 to +20 dBm, 50 Ω, AC coupling
Reference signal output	Connector: Rear panel, BNC-J, 50 Ω (nominal) Frequency: 10 MHz Output level: 0 dBm min., AC coupling
Trigger	Connector: Four BNC-J connectors on rear panel Input/output switching: Trigger input/output selectable Input/output level: TTL level
Ethernet	Connector: RJ-45 connector on rear panel and front panel Communication standard: 1000BASE-T
GPIB*4	Connector: Four IEEE488 bus connectors on rear panel
AUX Connector	Connector: 50-pin connector on rear panel (DX10BM-50S correspondence)

*1: 5 to 45°C

*2: Based on frequency 24 hours after power-on, at 25°C

*3: 20 to 30°C, 1 hour after power-on

*4: With options 001/101

Table A-2 General Performance

Item	Specifications
Dimensions	426 (W) × 221.5 (H) × 498 (D) mm (excluding protrusions)
Mass	≤11.5 kg (excluding options and modules) ≤30 kg (including options and modules)
Power supply	Rated voltage: AC 100 to 120 or 200 to 240 V* Rated frequency: 50/60 Hz Power consumption: 900 VA max. (including options and modules)
Temperature	Operating temperature range: +5 to +45°C Storage temperature range: –20 to +60°C
Environment conditions	
Conducted interference	Conforms to EN 61326-1
Radiated interference	Conforms to EN 61326-1
Harmonic current emission	Conforms to EN 61000-3-2
Electrostatic discharge	Conforms to EN 61326-1
Electromagnetic immunity	Conforms to EN 61326-1
Fast transient/burst	Conforms to EN 61326-1
Surge	Conforms to EN 61326-1
RF Conductive immunity	Conforms to EN 61326-1
Power frequency magnetic field immunity	Conforms to EN 61326-1
Voltage drop/ power supply interruption	Conforms to EN 61326-1

*: Operating voltage: within the range of +10% to –15% from the rated voltage

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