MT8815A/MT8820A
Radio Communication Analyzer
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-W2457AE-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.

MT8815A/MT8820A
Radio Communication Analyzer
Operation Manual

15 September 2004 (Ninth Edition)
6 November 2007 (15th Edition)

For Safety

WARNING ⚠

1. 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.

2. IEC 61010 Standard
   The IEC 61010 standard specifies four categories to ensure that an instrument is used only at locations where it is safe to make measurements. This instrument is designed for measurement category I (CAT I). DO NOT use this instrument at locations specified as category II, III, or IV as defined below.
   Measurement category I (CAT I):
   Secondary circuits of a device that is not directly connected to a power outlet.
   Measurement category II (CAT II):
   Primary circuits of a device that is directly connected to a power outlet, e.g., portable tools or home appliance.
   Measurement category III (CAT III):
   Primary circuits of a device (fixed equipment) to which power is supplied directly from the distribution panel, and circuits running from the distribution panel to power outlet.
   Measurement category IV (CAT IV):
   Building service-line entrance circuits, and circuits running from the service-line entrance to the meter or primary circuit breaker (distribution panel).

For Safety

WARNING ⚠

Electric Shock

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

Repair

WARNING ⚠

4. This equipment cannot be repaired by the operator. DO NOT attempt to remove the equipment covers or unit covers or to disassemble internal components. Only qualified service personnel with a knowledge of electrical fire and shock hazards should service this equipment. 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

5. 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. If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed. Be careful not to break the seal by opening the equipment or unit covers.

Falling Over

6. 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.

LCD

7. This instrument uses a Liquid Crystal Display (LCD). DO NOT subject the instrument to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may break and liquid may leak.
   This liquid is very caustic and poisonous.
   DO NOT touch it, ingest it, or get in your eyes. If it is ingested accidentally, 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.

For Safety

CAUTION ⚠

Cleaning

1. Keep the power supply and cooling fan free of dust.
   - 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.

2. Use two or more people to lift and move this equipment, or use a trolley. There is a risk of back injury, if this equipment is lifted by one person.

Check Terminal

3. 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.

External Storage Media

This equipment uses memory cards as external storage media for storing data and programs.

If this media is mishandled or becomes faulty, important data may be lost. To prevent this chance occurrence, all important data and programs should be backed-up.

Anritsu will not be held responsible for lost data.

Pay careful attention to the following points.

- Never remove the memory card from the pulse tester while it is being accessed.
- The memory card may be damaged by static electric charges.
- Anritsu has thoroughly tested all external storage media shipped with this instrument. Users should note that external storage media not shipped with this instrument may not have been tested by Anritsu, thus Anritsu cannot guarantee the performance or suitability of such media.

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, under the condition that this warranty is void when:

- The fault is outside the scope of the warranty conditions 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, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

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.

Anritsu Corporation Contact

In the event that 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 CD 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.

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 2002/96/EC (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.

CE Conformity Marking

Anritsu affixes the CE Conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking

1. Product Model

Model: MT8815A/8820A Radio Communication Analyzer

2. Applied Directive

EMC: Council Directive 89/336/EEC
LVD: Council Directive 73/23/EEC

3. Applied Standards

- EMC: Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003 (Class A)
  Immunity: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003 (Annex A)

	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 61000-4-8 (RPFMF)	A
IEC 61000-4-11 (V dip/short)	B

*: Performance Criteria
A: During testing normal performance within the specification limits.
B: During testing temporary degradation, or loss of function or performance which is self-recovering.

Harmonic current emissions:
EN 61000-3-2: 2000 (Class A equipment)

- LVD: EN 61010-1: 2001 (Pollution Degree 2)

C-tick Conformity Marking

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

C-tick marking

1. Product Model

Model: MT8815A/8820A Radio Communication Analyzer

2. Applied Standards

EMC: Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003

(ISM, Group 1, Class A equipment)

About This Manual

The MT8815A/MT8820A Radio Communication Analyzer is a measuring instrument platform that allows both transmitter/receiver characteristics measurement in mobile communication systems and call processing tests with one unit.

When using MT8815A/MT8820A, confirm that installed measurement software of specifications and test method that are supported by mobile systems must be installed. Optional devices may be required depending on the function.

This manual explains use of the panel keys and connectors, setting up the main unit, basic operations, common functions for measurement software and basic remote control.

Refer to the separate operation manual of the measurement software or optional devices for transmitter/receiver characteristic measurement and call processing test procedures.

■ Contents of this manual

- Notes and precautions for safe use of MT8815A/MT8820A
- How to use the panel keys and connectors
- Installation of the main unit
- Turning the power On/Off
- Basic operations for the cursor and screens
- Parameter settings (numeric values, character strings etc.)
- Common functions and usage of measurement software
- Basic remote control functions
- Remote control commands implementing common functions
- Performance test and calibration procedures

■ Items not explained in this manual

Refer to the separate operation manual for measurement software or optional devices.

- Functions and usage of measurement software
- Remote control commands implementing the measurement software functions
- Performance test and calibration procedures implemented by the measurement software
- Setting up procedures and usage of optional devices

Checking Accessories

When unpacking, check that the products listed in the attached component list are provided. If a missing or damaged component is found, contact Anritsu Service and Sales offices at the address at the end of paper-edition manual or the separate file of CD-edition manual.

The following components are provided with this product. For details, refer to "1.3 Product Configuration" in this manual.

■ Standard parts

Main unit and standard accessories

- MT8815A/MT8820A Radio Communication Analyzer (main unit, 1)
- Power cord (1)
- Power supply adapter for conversion from 3-pole to 2-pole (1)
- CompactFlash card (1)
- PC card adapter (1)
- MT8815A/MT8820A Operation Manual (CD-ROM, 1)

■ Parts on order

Provided on your request. Check the attached component list.

- Option
- Measurement software
- Application parts
- Others

Manual Configuration

Section 1 Product Overview

This section explains the overview, product configurations and the specifications of MT8815A/MT8820A.

Section 2 Setup

This section explains the name and function of each part, installation of MT8815A/MT8820A, and connection method with external devices.

Section 3 Getting Started

This section explains the operation flow of MT8815A/MT8820A from turning On the power and measuring to turning Off the power.

Section 4 Basic Operation

This section explains the basic operation procedure of MT8815A/MT8820A. Basic operations required for measurement, such as usage of basic items and parameter settings, are provided.

Section 5 Using Common Functions

This section explains the operation procedure of common functions in measurement software such as initialization and measurement start.

Section 6 Common Screen Functions

This section explains the common screen functions. Functions explained in this section are common for all measurement software.

Section 7 Remote Control Using PC

This section explains the basic operation of remote control commands and status reports for remote control of MT8815A/MT8820A using a PC.

Section 8 Remote Control Commands

This section explains the remote control commands implementing common functions in measurement software, such as IEEE488.2 common commands etc.

Section 9 Maintenance

This section explains the performance test and calibration procedure to use MT8815A/MT8820A in its optimal status.

Notations in This Manual

Notation (font)	Example	Meaning
[ ]	[Local]	Indicates a panel key. Character strings printed on the panel key or function name (incase there is no printing) are written.
[Shift] + [ ]	[Shift] + [Recall]	Indicates to press a panel key after pressing [Shift]. This procedure is used to execute the function printed on the panel key in blue (Save for [Recall])
Arial	Main1 Input/Output	Indicates the characters printed on the panel; mainly connector name or functions when pressing the panel key after shifting [Shift].
"Century"	"Screen Select"	Character strings written in Century closed with " " indicates the description displayed on LCD.
COURIER (Capital English/ numeric characters)	SWP	Indicates the reservation words for remote control command
courier (Lower case English/numeric characters)	SCRSEL screen	Indicates parameter for remote control command. Numeric characters or reservation words in "screen" part.
/* */ (courier)	/*setting date*/	A part closed with "/* */" indicates a remote control command comment. This part is not transmitted as it means the explanation of command to be transmitted.

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Section 1 Product Overview

This section describes the overview, product configuration and specifications of MT8815A/MT8820A.

Replacing terms when using MT8815A

The MT8815A is dedicated for single phone measurements and is not equipped with parallelphone functions. Part (option) names therefore may differ between the MT8815A and MT8820A (as shown in Table 1-1). This document provides explanations of the MT8820A unless otherwise mentioned, so replace the terms shown in Table 1-1 when using the MT8815A. The Connector I/O functions, however, have not been changed.

Table 1-1 Different MT8815A and MT8820A terms

Description in this document	Replace with:
MT8820A	MT8815A
10Base-T-1	10Base-T
AF1	AF
AUX1	AUX
Call Proc I/O-1	Call Proc I/O
GPIB-1	GPIB
HandSet 1	HandSet
Main1	Main
RS-232C-1	RS-232C

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1.1 Product Overview

MT8815A/MT8820A Radio communication analyzer is a measurement instrument platform that is able to perform both transmitter/receiver characteristics measurement of radio terminals in mobile communication systems and call processing test with one unit.

1.2 Features

MT8815A/MT8820A has the following features:

(1) Supports the third-generation mobile communication standards
By installing measurement software, you can conduct a test of mobile terminals conforming to the third-generation communication systems.

(2) Possible to conduct transmission/reception characteristics measurement and call test using a single MT8815A/MT8820A.
By installing measurement software, you can measure transmission/reception characteristics and conduct a call-processing test with a MT8815A/MT8820A.

(3) High-speed measurement
MT8815A/MT8820A, with state-of-the-art processors and a measurement algorithm, allows high-speed measurement.

(4) Graphical user interface
The user interface employs the window system thus displaying specified parameters and related measurement results on the same screen.

(5) Parameter save/recall
All the measurement parameters set to MT8815A/MT8820A can be saved as a file, which eliminates the need for repeating similar setting for each measurement.

(6) Listing the function menu
You can use the Functions key to list the function menu for the current screen or window. You can locate the target menu item at a glance.

(7) Remote control through the GPIB interface
You can use the GPIB or Serial interface to remotely control the MT8815A/MT8820A from an external controller such as a PC.

Note:

The remote control function via the Serial interface can be used only with the MT8815A. It is not available for the MT8820A.

1.3 Product Configuration

This section introduces the standard configuration of MT8815A/ MT8820A as well as accessories, optional equipment, measurement software products, application parts and peripherals to utilize MT8815A/ MT8820A.

1.3.1 Standard configuration

The following table lists standard configuration of one MT8815A/ MT8820A:

Table 1.3.1-1 Standard configurations

Item	Model name/ Symbol	Product name	Quantity	Remarks
Main unit	MT8815A/MT8820A	Radio Communication Analyzer	1	
Standard Attachments		Power supply cord	1	
	W2458AE	MT8815A/MT8820A Operation Manual	1	English, CD-ROM
	HB28B064C8H	CF card	1	64 MB
	CA68ADP	PC card adopter	1	For CF card

1.3.2 Options

The following table lists options for expanding the functions of MT8815A/ MT8820A. All the options are to be ordered separately. For ordering them, specify the model name/symbol, product name and quantity.

Table 1.3.2-1 MT8815A Options

Model name/ Symbol	Product name	Remarks
W2457AE	MT8815A/MT8820A Operation Manual	English, Printed document
MT8815A-01	W-CDMA Measurement Hardware	
MT8815A-02	TDMA Measurement Hardware	
MT8815A-03	CDMA2000 Measurement Hardware	
MT8815A-04	1xEV-DO Measurement Hardware	
MT8815A-11	Audio Board	
MT8815A-21	W-CDMA Measurement Hardware Retrofit	
MT8815A-22	TDMA Measurement Hardware Retrofit	
MT8815A-23	CDMA2000 Measurement Hardware Retrofit	
MT8815A-24	1xEV-DO Measurement Hardware Retrofit	
MT8815A-31	Audio Board Retrofit	
MT8815A-43	CDMA2000 Time Offset Calibration For GPS SG	

Table 1.3.2-2 MT8820A Options

Model name/ Symbol	Product name	Remarks
W2457AE	MT8815A/MT8820A Operation Manual	English, Printed document
MT8820A-01	W-CDMA Measurement Hardware	
MT8820A-02	TDMA Measurement Hardware	
MT8820A-03	CDMA2000 Measurement Hardware	
MT8820A-04	1xEV-DO Measurement Hardware	
MT8820A-11	Audio Board	
MT8820A-21	W-CDMA Measurement Hardware Retrofit	
MT8820A-22	TDMA Measurement Hardware Retrofit	
MT8820A-23	CDMA2000 Measurement Hardware Retrofit	
MT8820A-24	1xEV-DO Measurement Hardware Retrofit	
MT8820A-31	Audio Board Retrofit	
MT8820A-12	Parallel Phone Measurement Hardware	For MT8820A only
MT8820A-32	Parallel Phone Measurement Hardware Retrofit	
MT8820A-43	CDMA2000 Time Offset Calibration For GPS SG	

1.3.3 Measurement software and options

Measurement software and options available for MT8815A/MT8820A is to be ordered separately.
For detailed function and performance of the measurement software, please contact Anritsu or your nearest distributor.

The following table lists measurement software products and options available for MT8815A/MT8820A.

Table 1.3.3-1 Measurement software

Model name/ Symbol	Product name	Remarks
MX882000B	W-CDMA Measurement Software	MT8820A-01 (or MT8820A-21) and Call processing Software required.
MX882000B-01	W-CDMA Voice CODEC	MT8820A-11 (or MT8820A-31) and MX882000B are required.
MX882000B-11	HSDPA Measurement Software	MX882000B is required.
MX882001A	GSM Measurement Software	MT8820A-02 (or MT8820A-22) is required.
MX882001A-01	GSM Voice CODEC	MT8820A-11 (or MT8820A-31) and MX882001A are required.
MX882001A-02	GSM External Packet Data	MX882001A is required.
MX882001A-11	EGPRS Measurement Software	MX882001A is required.
MX882002A	CDMA2000 Measurement Software	MT8820A-03 (or MT8820A-23) is required.
MX882002A-02	CDMA2000 External Packet Data	MX882002A is required.
MX882003A	1xEV-DO Measurement Software	MT8820A-03 (or MT8820A-23), MT8820A-04 (or MT8820A-24) and MX882002A are required.
MX882003A-02	1xEV-DO External Packet Data	MX882003A is required.
MX882004A	PDC Measurement Software	MT8820A-02 (or MT8820A-22) is required.
MX882005A	PHS Measurement Software	MT8820A-02 (or MT8820A-22) is required.
MX882005A-11	Advanced PHS Measurement Software	MX882005A is required.
MX882022A	CDMA2000 Wireless Application Test Software	MT8820A-03 (or MT8820A-23) is required.
MX882050A	W-CDMA Call Processing Software	MX882000B is required.
MX882050A-02	W-CDMA External Packet Data	MX882050A is required.
MX882050A-03	W-CDMA Video Phone Test	MX882050A is required.
MX882050A-08	W-CDMA Band XI	MX882050A is required.
MX882050A-09	W-CDMA Band IX	MX882050A is required.
MX882050A-11	HSDPA External Packet Data	MX882050A is required.

Table 1.3.3-1 Measurement software (Cont'd)

Model name/ Symbol	Product name	Remarks
MX882051A	W-CDMA Call Processing Software	MX882000B is required.
MX882051A-02	W-CDMA External Packet Data	MX882051A is required.
MX882051A-03	W-CDMA Video Phone Test	MX882051A is required.
MX882070A	W-CDMA Ciphering Software	MX882000B and MX882050A are required.
MX882071A	W-CDMA Ciphering Software	MX882000B and MX882051A are required.
MX882010A	Parallel Phone Measurement Software	MT8820A-12 (or MT8820A-32) is required. MT8820A only.

Note:

For the MT8815A, the model name becomes MT8815A-XX (XX: option number). (Refer to Table 1.3.2-1 "MT8815A Options".)

1.3.4 Application parts

Use application parts (accessories) as required. All the application parts are to be ordered separately. For ordering them, specify the model name/symbol, article name and quantity.

Table 1.3.4-1 Application parts

Model name/ Symbol	Article name	Remarks
J0576B	Coaxial cable, 1.0 m	N-P•5D-2W•N-P
J0576D	Coaxial cable, 2 m	N-P•5D-2W•N-P
J0127A	Coaxial cable, 1 m	BNC-P•RG58A/U•BNC-P
J0127C	Coaxial cable, 0.5 m	BNC-P•RG58A/U•BNC-P
J0007	GPIB connection cable, 1.0 m	408JE-101
J0008	GPIB connection cable, 2.0 m	408JE-102
A0012	Handset	S80AF-16 (01) (DG) handset
J1267B	RS-232C cable	D-SUB 9-pin, female-female interlink
MN8110B	I/O adapter	For Call Processing I/O
B0332	Clip	4/1 set
B0333G	Rack mount kit	
B0544	Carrying case (for MT8815A)	Hard type, with Protective cover and casters
B0545	Carrying case (for MT8815A)	Hard type, with protective cover, no caster
B0499	Carrying case (for MT8820A)	Hard type, with Protective cover and casters
B0499B	Carrying case (for MT8820A)	Hard type, with protective cover, no caster

1.3.5 Warranty service

Table 1.3.5-1 MT8815A Warranty service

Model name/ Symbol	Product name	Remarks
MT8815A-90	3-year Warranty Service	
MT8815A-91	5-year Warranty Service	

Table 1.3.5-2 MT8820A Warranty service

Model name/ Symbol	Product name	Remarks
MT8820A-90	3-year Warranty Service	
MT8820A-91	5-year Warranty Service	

1.4 Specifications

The following tables show the specifications for MT8815A/MT8820A:

Table 1.4-1 Specifications

Item	Specifications
General	Frequency range: 30 to 2700 MHz Maximum input level: +35 dBm (Main 1) Main 1 input/output connector • Impedance: 50 Ω • VSWR ≤1.2 (<1.6 GHz), ≤1.25 (1.6 to 2.2 GHz), ≤1.3 (>2.2 GHz) • Connector: N type AUX 1 output connector • Impedance: 50 Ω • VSWR ≤1.3 (when SG output level is ≤–10 dBm) • Connector: SMA type Reference oscillator • Frequency: 10 MHz • Level: TTL • Activation characteristics: $\leq 5 \times 10^{-8}$ (Using the frequency obtained 24 hours after power-on as a reference) • Aging rate: $\leq 2 \times 10^{-8}$/day, $\leq 1 \times 10^{-7}$/ year (Using the frequency obtained 24 hours after power-on as a reference) • Temperature characteristics: $\leq 5 \times 10^{-8}$ • Connector: BNC type External reference signal input • Frequency: 10 or 13 MHz (±1ppm) • Level: ≥0 dBm • Impedance: 50 Ω • Connector: BNC type

Table 1.4-1 Specifications (Cont'd)

Item	Specification
RF signal generator	Frequency • Frequency range: 30 to 2700 MHz (settable range: 0.4 to 2700 MHz) • Setting resolution: 1 Hz • By the accuracy of Standard Signal Generator Output level • Level range: –140 to –10 dBm (Main 1), –130 to 0 dBm (AUX1) • Resolution: 0.1 dB • Level accuracy: Main 1: ±1.0 dB (–120 to –10 dBm, after calibration) AUX 1: ±1.0 dB (–110 to 0 dBm, after calibration) Signal purity • Non-harmonic spurious: –50 dBc (at offset frequency of 100 kHz or more, except for [up frequency – down frequency + 4.1825 GHz]) –40 dBc (in ≥2.1 GHz, spurious at [4.8 GHz – down frequency GHz]) • Harmonics: ≤–25dBc Un-interruptible level variable • Variable range: 0 to –30 dB • Set resolution: 1 dB
Other	Display • Color TFT LCD, Size: 8.4", Number of dots: 640 × 480 dots External control • GPIB: Controlled by an external controller, assuming the MT8815A/MT8820A as a device (except some functions such as power switch etc.). No controller function • Interface function: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2 • Serial (RS-232C): Controlled by an external controller (except some functions such as power switch etc.). No controller function for external device. (MT8815A only. Refer to Table 7.4.1-1 "Standards".)
Power	MT8815A 100 to 120 Vac/200 to 240 Vac (–15%/+10%, maximum: 250 V) 47.5 to 63 Hz, ≤350 VA (All options installed) MT8820A 100 to 120 Vac/200 to 240 Vac (–15%/+10%, maximum: 250 V) 47.5 to 63 Hz, ≤300 VA (Option 01 installed), ≤650 VA (All options installed)
Dimensions, Mass	MT8815A 426 mm (W), 221.5 mm (H), 351 mm (D) (except protrusions), ≤24 kg (All options installed) MT8820A 426 mm (W), 221.5 mm (H), 498 mm (D) (except protrusions), ≤27 kg (Option 01 installed), ≤34 kg (All options installed)

Table 1.4-1 Specifications (Cont'd)

Item	Specification
Operating temperature and humidity range	0 to 50°C, ≤95% (no condensation)
Storage temperature and humidity	–20 to +60°C, ≤85% (no condensation)
EMC	Conducted Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Class A) Radiated Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Class A) Harmonic Current Emission: EN 61000-3-2: 2000(Class A) Electrostatic Discharge: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Electromagnetic Field Immunity: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Fast Transient / Burst: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Surge: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Conducted RF: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Power Frequency Magnetic Field: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A) Voltage Dips / Short Interruptions: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003(Annex A)
Safety	In conformance with EN 61010-1: 2001 (Pollution Degree 2)

Table 1.4-2 Specifications (MX882010A Parallelphone Measurement Software)

Item	Specification
Application	When the MX882010A Parallelphone Measurement Software is installed in the MT8820A in combination with the MT8820A-12 (or MT8820A-32) Parallelphone Measurement Hardware, the Phone-2 side becomes enabled. In this event, the functions that accord with the installed measurement software and the measurement hardware equipped on the Phone-2 side are available on the Phone-2 side, and two phones can be measured simultaneously.
General	Main 2 input/output, AUX2 output • The same characteristics performance and functions as those of the Main 1 input/output and AUX1 output specified by the MT8820A and the measurement software installed in the MT8820A are applied to the Main 2 input/output and AUX2 output. AF2 input/output • The same characteristics performance and functions as those of the AF1 input/output specified by the measurement software are applied to the AF2 input/output. This is enabled only when the MT8820A-11 (or MT8820A-31) Audio Board is installed.

Section 2 Setup

This section describes names and functions of each part, installation method of MT8815A/MT8820A and connection procedures with external devices.

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2.1 Part Names and Functions

This section describes the names and functions of the panel keys for operating MT8815A/MT8820A and connectors for connecting to external devices.

2.1.1 Exterior

The front panel is composed of the LCD panel, panel keys and connectors.

The rear panel includes the power inlet, GPIB connector, etc.

On the sides of MT8815A/MT8820A are provided two grips for transporting MT8815A/MT8820A and an exhaust fan.

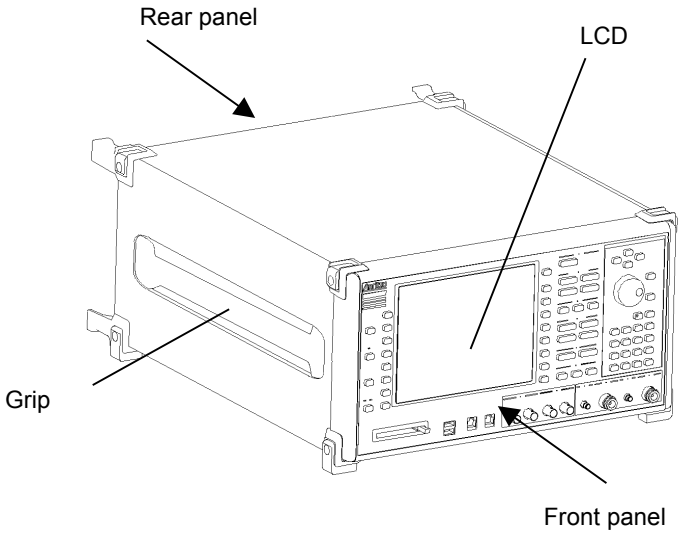


Fig. 2.1.1-1 External appearance

2.1.2 Front panel

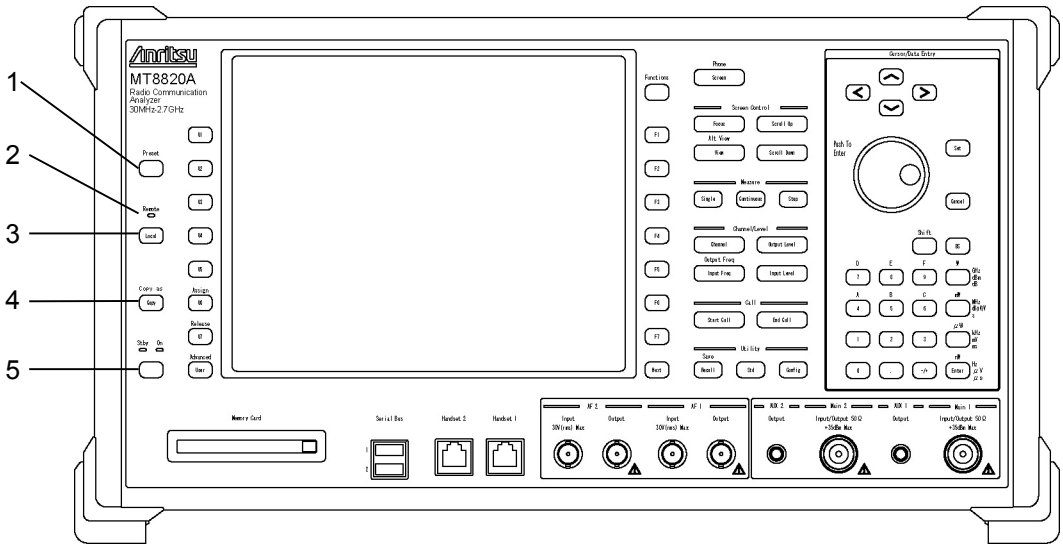


Fig. 2.1.2-1 Front panel (1)

1. Preset Preset key
   Starts initialization.
2. Remote Remote lamp
   Illuminates while MT8815A/MT8820A is operating in the remote control mode.
3. Local Local key
   Switches from remote control operation mode to local control mode.
4. Copy Copy key
   Performs hard copy of a current screen.
   Shift + Copy Copy as
   Currently not available.
5. Power Power switch
   Switches power state between power on (On) and standby (Stby).

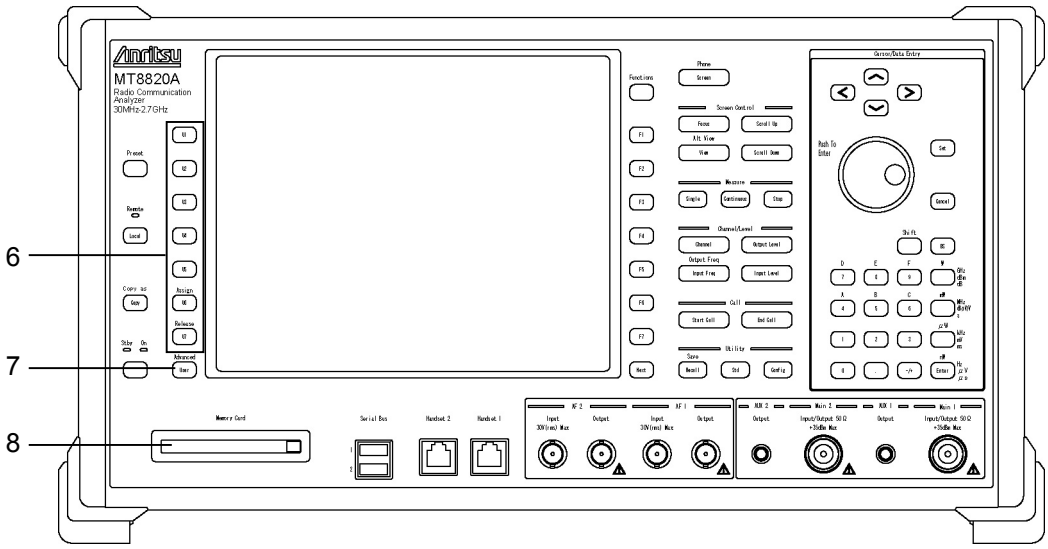


Fig. 2-1-2-2 Front Panel (2)

6. U1, U2, U3, U4, U5, U6, U7 User function keys
   Execute user menu contents displayed in the leftmost area of the screen.
   Shift + U6 Assign Assign key
   Currently not available.
   Shift + U7 Release Release key
   Currently not available.
7. User User key
   Currently not available.
   Shift + User Advanced Advanced key
   Currently not available.
8. Memory Card Memory card slot
   Insert a PCMCIA-compliant PC-card-type memory card (Type II) in this slot.

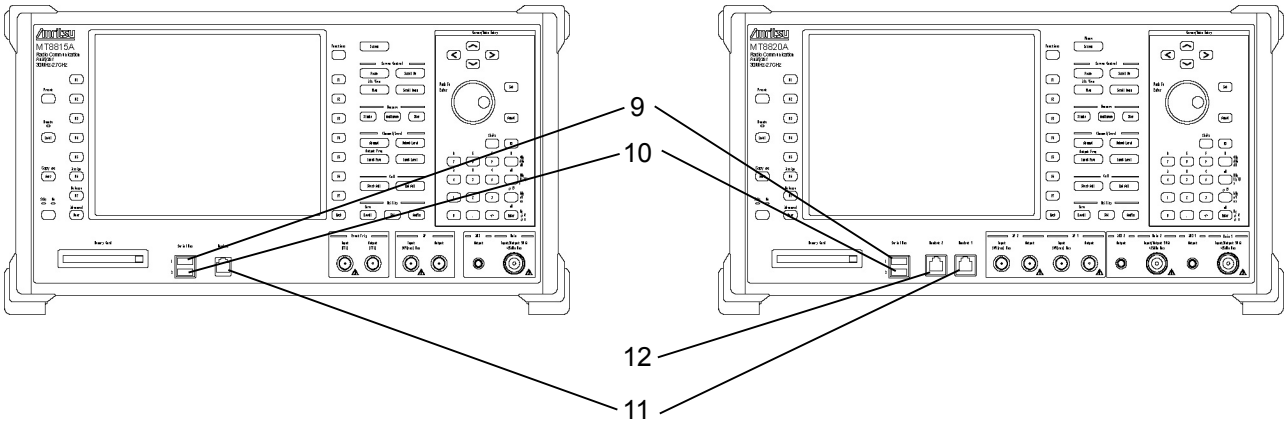


Fig. 2.1.2-3 Front panel (3) (left: MT8815A, right: MT8820A)

9. Serial Bus 1 Serial bus connector 1
   Currently not available.
10. Serial Bus 2 Serial bus connector 2
    Currently not available.
11. Handset 1 Handset connector 1
    Handset connector (RJ11) used for a voice communication test on Phone 1.
    To use this connector, the voice codec and audio board options are required.
12. Handset 2 Handset connector 2
    Handset connector (RJ12) used for a voice communication test on the second phone (Phone 2), which is available when the Parallelphone Measurement Software is installed.
    To use this connector, the voice codec and audio board options are required.

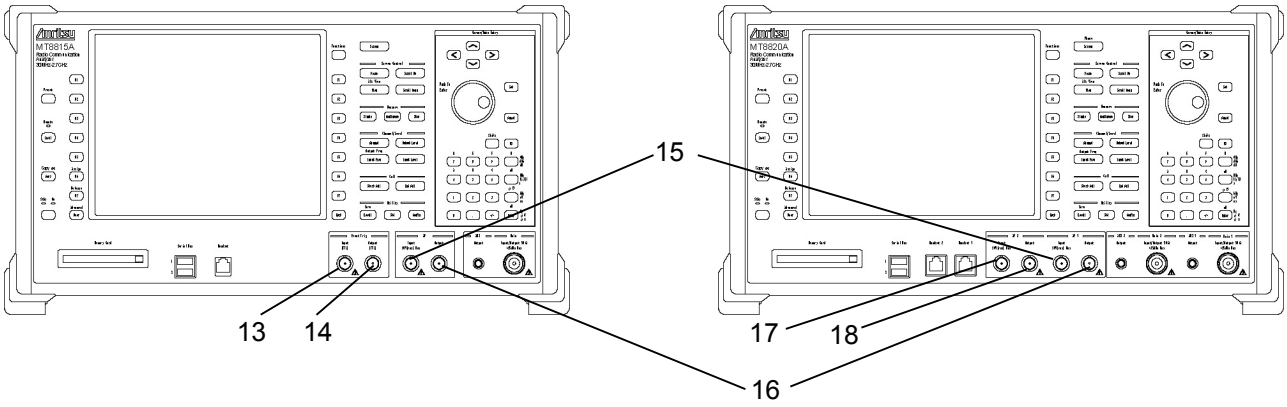


Fig. 2.1.2-4 Front panel (4) – AF connector (left: MT8815A, right: MT8820A)

Event Trig connectors (MT8815A)

13. Event Trig Input Trigger input connector
    A BNC connector for a trigger signal input from an external device and Tx measurement on the phone in synchronization with an external device.
14. Event Trig Output Trigger output connector
    A BNC connector used for outputting event timing to the external device allocated to the phone.

AF connectors

15. AF1 Input AF1 input connector
    A BNC input connector used for AF measurement on Phone 1. The voice codec and audio board options are required.
16. AF1 Output AF1 output connector
    A BNC output connector used for AF measurement on Phone 1. The voice codec and audio board options are required.
17. AF2 Input AF2 input connector
    A BNC input connector used for AF measurement on the second phone (Phone 2), which is available when the Parallelphone Measurement Software is installed. The voice codec and audio board options are required.
18. AF2 Output AF2 output connector
    A BNC output connector used for AF measurement on the second phone (Phone 2), which is available when the Parallelphone Measurement Software is installed. The voice codec and audio board options are required.

CAUTION ⚠

Do not feed power exceeding the maximum permissible power specified on the label or in the specification to the AF input connector. Do not feed signals to the AF output connector. Such attempts may damage the internal circuits thus causing a fire accident or failure.

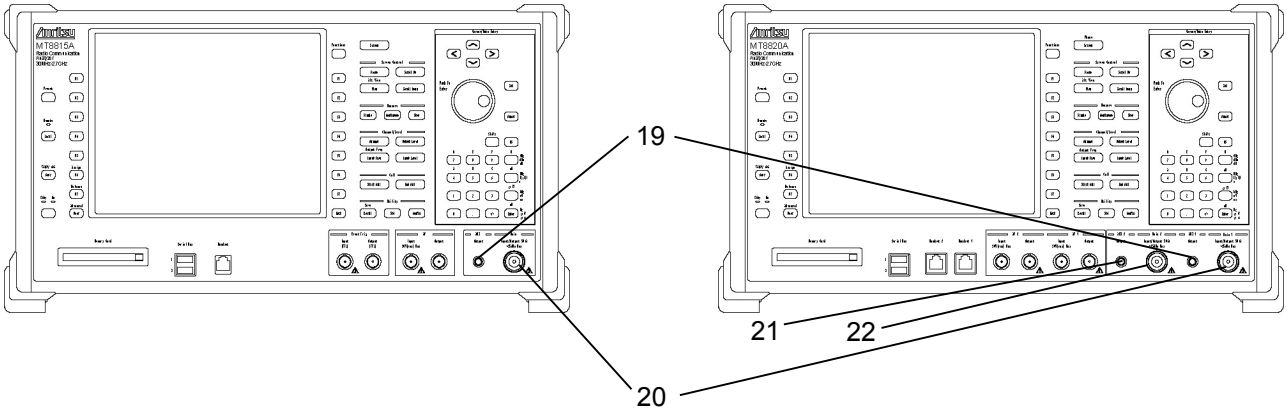


Fig. 2-1-2-5 Front panel (5) – RF connector (left: MT8815A, right: MT8820A)

RF connectors

19. AUX1 Output AUX1 output connector
    SMA type auxiliary output connector used for RF measurement on Phone 1.
20. Main1 Input/Output Main1 input/output connector
    N type connector used for RF measurement on Phone 1.
21. AUX2 Output AUX2 output connector
    SMA type connector used for RF measurement on the second phone (Phone 2), which is available when the Parallelphone Measurement Software is installed.
22. Main2 Input/Output Main2 input/output connector
    N type connector used for RF measurement on the second phone (Phone 2), which is available when the Parallelphone Measurement Software is installed.

CAUTION ⚠

Do not feed power exceeding the maximum permissible power specified on the label or in the specification to the RF input connector. Do not feed signals to the RF output connector. Such attempts may damage the internal circuits thus causing a fire accident or failure.

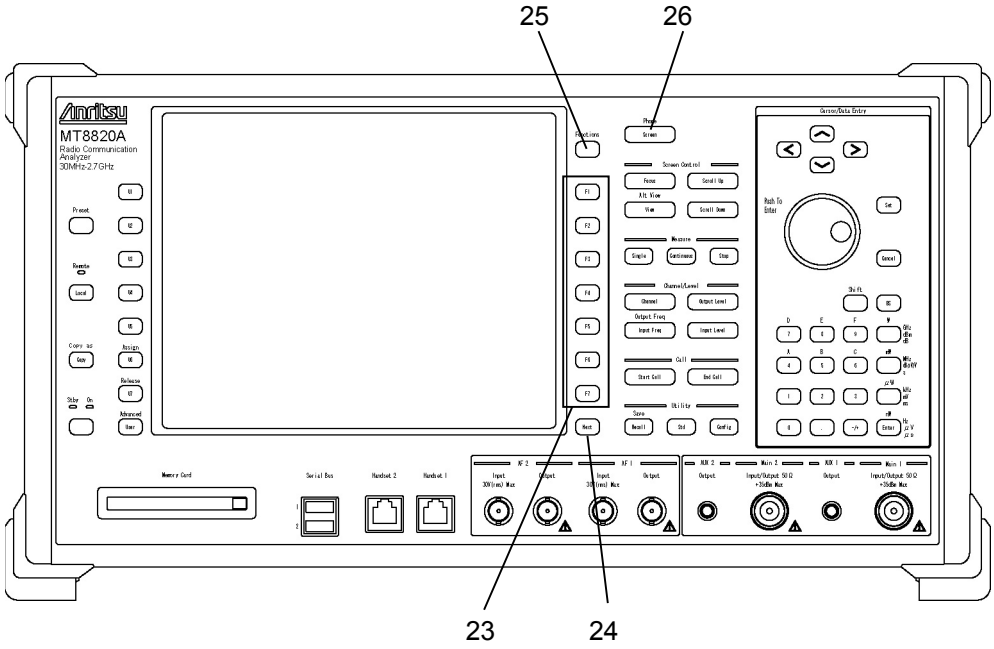


Fig. 2-1-2-6 Front panel (6)

23. F1, F2, F3, F4, F5, F6, F7 Function keys
Executes function menu items displayed in the rightmost area of the screen.

24. Next Page switch key
Switches pages of the menu displayed in the rightmost area of the screen.

25. Functions All function key
Lists the function menus.

26. Screen Screen selection key
Selects a screen.
Shift + Screen Phone Change key
When the Parallelphone Measurement Software is installed, this key switches the screen operation for Phone 1 or Phone 2, to display on the LCD and to operate by the front panel.

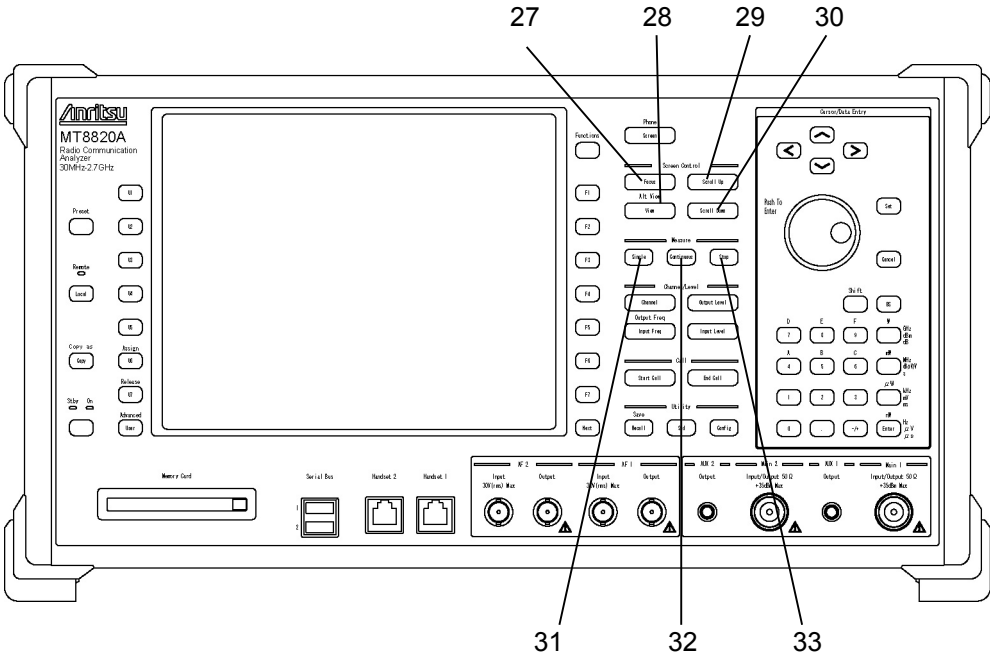


Fig. 2-1-2-7 Front panel (7)

Screen control keys (Screen Control)

27. [Focus] Focus key
Switches between windows to be operated.

28. [View] View key
Opens/Closes the View window.
[Shift] + [View] Alt View Alt View key
Currently not available.

29. [Scroll Up] Up scroll key
Scrolls up screens or windows.

30. [Scroll Down] Down scroll key
Scrolls down screens or windows.

Measurement keys (Measure)

31. [Single] Single key
Starts measurement in the single mode.

32. [Continuous] Continuous key
Starts measurement in the continuous mode.

33. [Stop] Measurement stop key
Stops measurement.

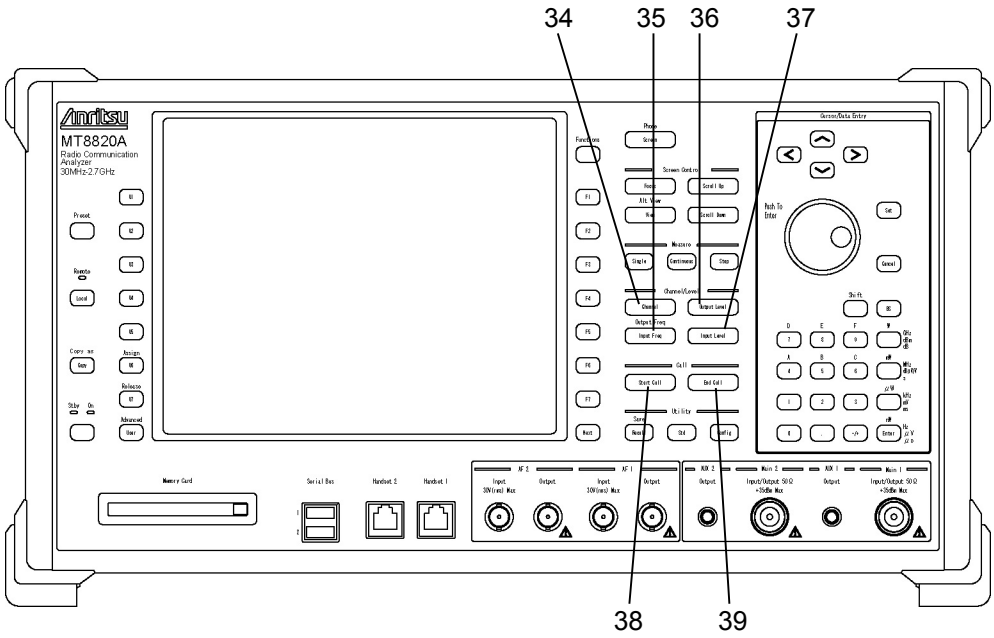


Fig. 2.1.2-8 Front panel (8)

Channel/level keys (Channel/Level)

34. Channel Channel key
Sets the input channel.

35. Input Freq. Input frequency key
Sets the input frequency.
Shift + Input Freq. Output Freq Output frequency key
Sets the output frequency.

36. Output Level Output level key
Sets the output level.

37. Input Level Input level key
Sets the input level.

Call processing keys (Call)

38. Start Call Phone call key
Makes a call from MT8815A/MT8820A to a phone.

39. End Call Network-side ending key
Releases communications with a phone from MT8815A/MT8820A.

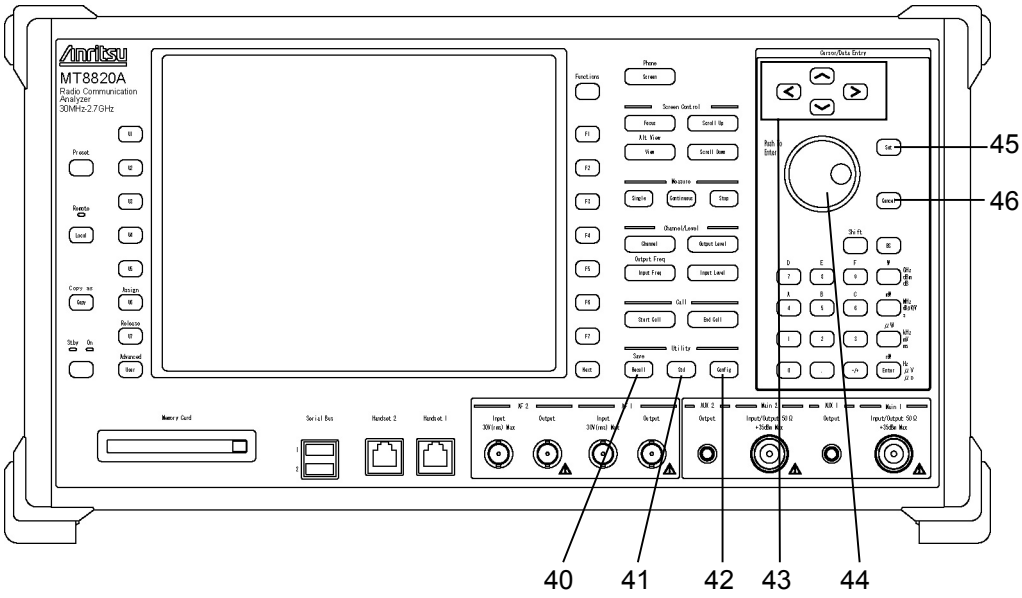


Fig. 2.1.2-9 Front panel (9)

Utility key (Utility)

40. [Recall] Recall key
Starts reading parameter files.
[Shift] + [Recall] Save Save key
Starts saving of parameter files.

41. [std] Standard key
Starts change of the system.

42. [Config] Configuration key
Opens the Configuration menu.

Cursor operation/data entry keys (Cursor/Data Entry)

43. [∧] [∨] [<] [>] Cursor keys
Moves cursor or enters parameters.

44. Rotary control
Turning this knob moves cursor or enters parameters. Pressing this knob starts entering or determines the parameters.

45. [Set] Set key
Starts entering or determines the entered parameters.

46. [Cancel] Cancel key
Cancels the current input value and returns the previous settings.

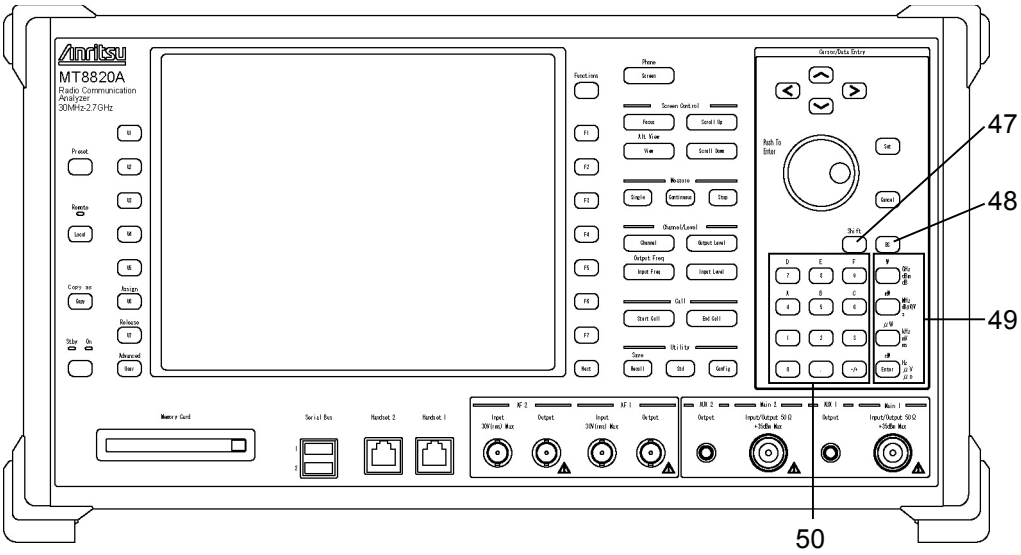


Fig. 2.1.2-10 Front panel (10)

Cursor operation/data entry keys (Cursor/Data Entry) <continued>

47. [Shift] Shift key

Press this key, before executing functions indicated in blue on the panel.

48. [BS] Back space key

Deletes one character before the cursor, while a value is being entered.

49. Unit and enter keys

Sets the unit for values being input and validates parameters.

[Unit key]	GHz, dBm, dB, W
[Unit key]	MHz, dBμV/V, s, mW
[Unit key]	kHz, mV, ms, μW
[Enter]	Default unit, Hz, μV, μs, nW

50. Numeric keypad/symbol key

[0] to [9], [.], [–/+]

Starts parameter entry or enters numeric values.

[Shift] + [4] to [Shift] + [9] A to F

Enters A to F for hexadecimal notation.

2.1.3 Rear panel

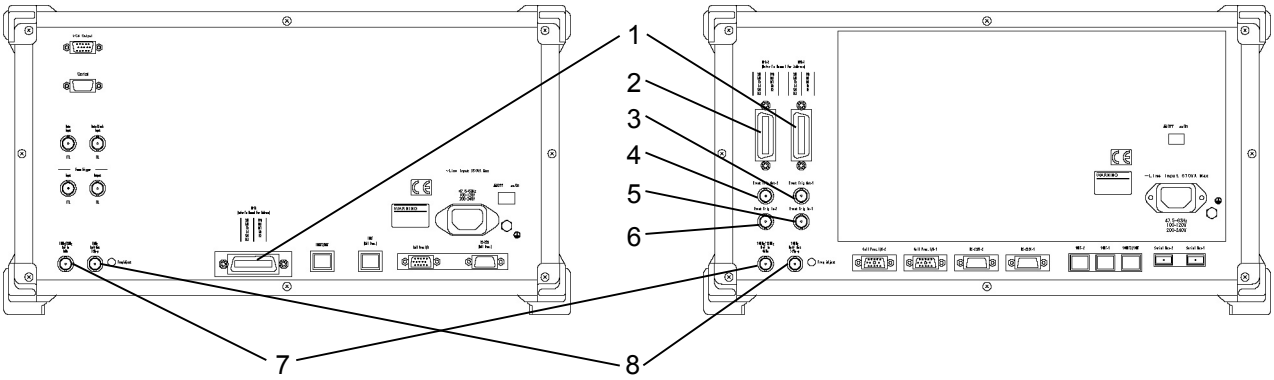


Fig. 2.1.3-1 Rear panel (1) (left: MT8815A, right: MT8820A)

1. GPIB-1 GPIB connector 1
   Remote control connector for Phone 1 through GPIB.
2. GPIB-2 GPIB connector 2
   Remote control connector for Phone 2 (available when the Parallelphone Measurement Software is installed) through GPIB.

Event Trig connector (MT8820A)

3. Event Trig Out-1 Trigger output connector 1
   BNC connector for outputting the event timing to external device allocated to Phone 1.
4. Event Trig Out-2 Trigger output connector 2
   BNC connector for outputting the event timing to external device allocated to Phone 2 (available when the Parallelphone Measurement Software is installed).
5. Event Trig In-1 Trigger input connector 1
   BNC connector for inputting trigger signal from external device and performing transmission measurement on Phone 1 in synchronization with the external device.
6. Event Trig In-2 Trigger input connector 2
   BNC connector for inputting trigger signal from external device and performing transmission measurement on Phone 2 (available when the Parallelphone Measurement Software is installed) in synchronization with the external device.
7. 10 MHz/13 MHz Ref In Reference signal input connector
   BNC connector for inputting an external reference signal. The frequency lock range is ±1 ppm and the input level range is 2 to 5 Vpp.
8. 10 MHz Buff Out Reference signal output connector
   BNC connector for outputting a reference signal from MT8815A/MT8820A.

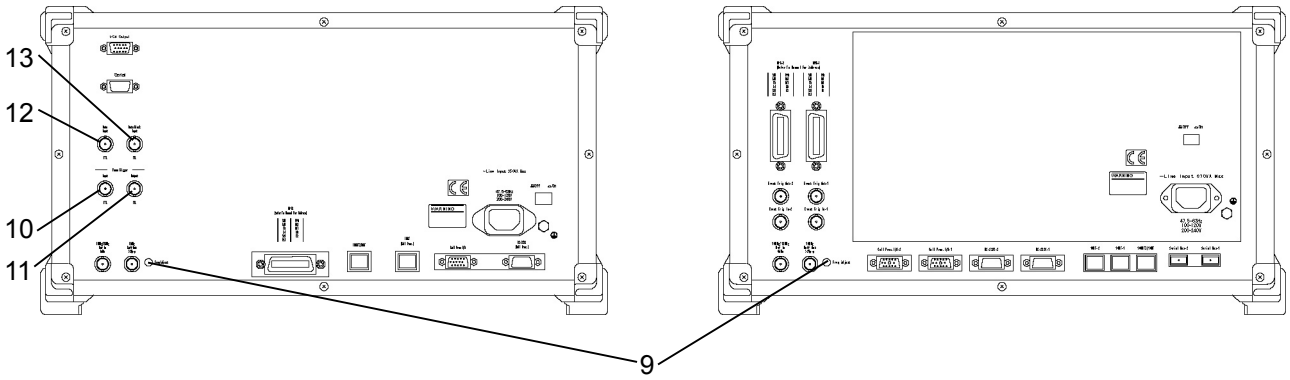


Fig. 2.1.3-2 Rear panel (2) (left: MT8815A, right: MT8820A)

9. Freq Adjust Frequency adjustment
   Adjuster knob (trimmer) for the reference oscillation frequency.
10. Frame Trigger Input Frame trigger input connector
    BNC connector for inputting the frame trigger from external device.
    Some options do not support this connector.
    Refer to the operation manual for each option.
11. Frame Trigger Output Frame trigger output connector
    BNC connector for outputting the frame trigger to external device.
12. Data Input Data input connector
    BNC connector for inputting data from external device.
13. Data Clock Input Data clock input connector
    BNC connector for inputting data clock from external device.

Note:

When using the MT8815A, I/O connectors from 10 to 13 and 19. Call Proc I/O connector cannot be used at the same time since they are common I/O terminals.

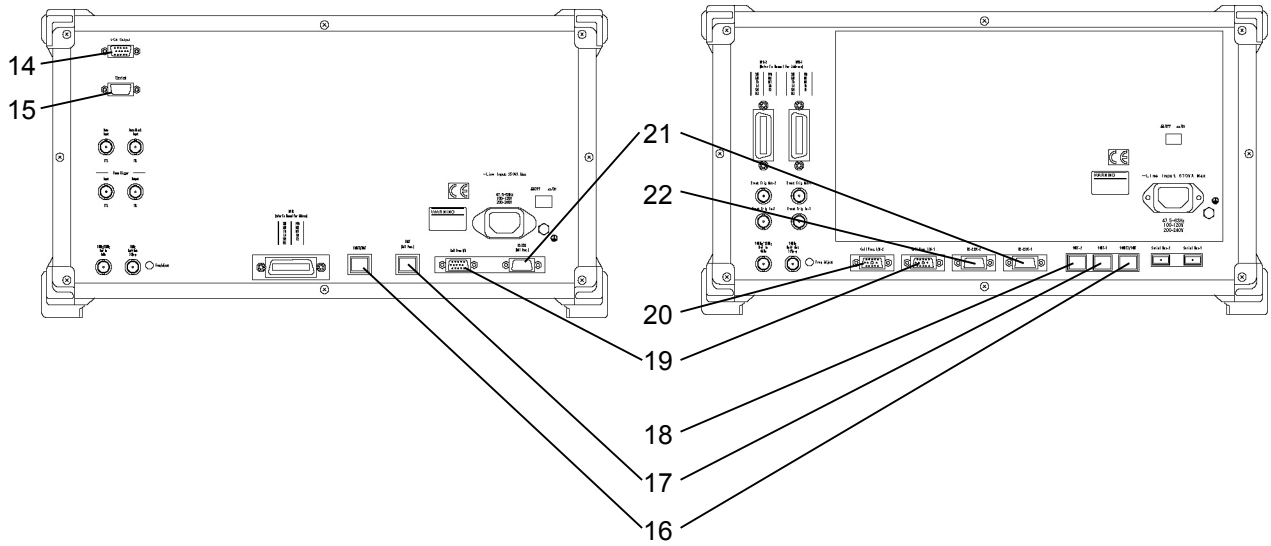


Fig. 2.1.3-3 Rear panel (3) (left: MT8815A, right: MT8820A)

14. VGA Output VGA output port
    15-pin mini D-Sub connector for outputting VGA to external device.

Note:

To confirm VGA output of the MT8815A, turn on the power of the monitor after startup of the MT8815A is completed.

15. Serial Serial port
    9-pin D-Sub connector for remote control via RS-232C.
16. 100BTX/10BT 100Base- TX/10BTX port
    Currently not available.
17. 10Base-T-1 10Base-T port 1
    An interface for packet or communication test allocated to Phone 1.
18. 10Base-T-2 10Base-T port 2
    An interface for packet or communication test allocated to Phone 2 (available when the Parallelphone Measurement Software is installed).
19. Call Proc I/O-1 call processing input/output port 1
    15-pin D-Sub connector for call processing allocated to Phone 1.

Note:

When using the MT8815A, I/O connectors from 10 to 13 and 19. Call Proc I/O connector cannot be used at the same time since they are common I/O terminals.

20. Call Proc I/O-2 call processing input/output port 2
    15-pin mini D-Sub connector for call processing allocated to Phone 2 (available when the Parallelphone Measurement Software is installed).

21. RS-232C-1 RS-232C port 1
    Data interface for packet or communication test allocated to Phone 1.
22. RS-232C-2 RS-232C port 2
    Data interface for packet or communication test allocated to Phone 2 (available when the Parallelphone Measurement Software is installed).

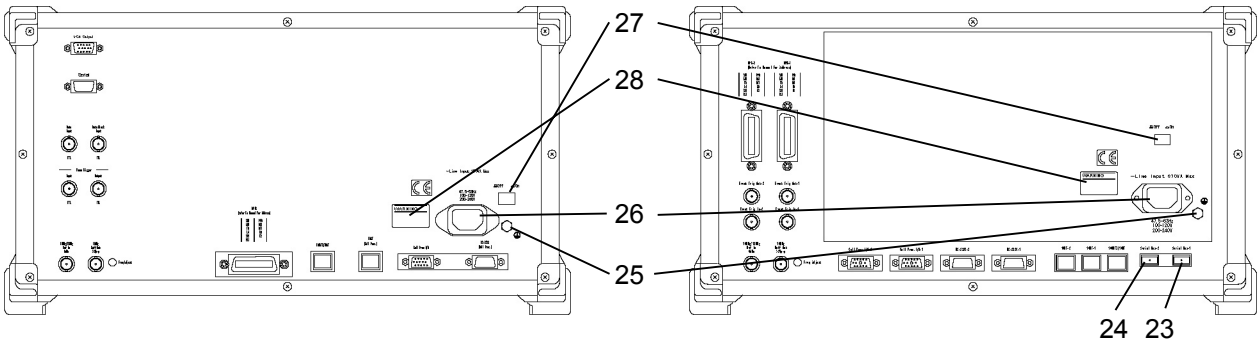


Fig. 2.1.3-4 Rear panel (4) (left: MT8815A, right: MT8820A)

23. Serial Bus-1 Serial bus connector 1
    An interface for packet or communication test allocated to Phone 1.
24. Serial Bus-2 Serial bus connector 2
    An interface for packet or communication test allocated to Phone 2 (available when the Parallelphone Measurement Software is installed).
25. Functional earth terminal
    This is the terminal that is electrically connected to the chassis of the equipment.
26. Power inlet Power cable inlet. Permissible power range is 100 to 120 Vac or 200 to 240 Vac (47.5 to 63 Hz). This power inlet supports both 100 and 200-V system with no need to make particular setting change.
27. Main power switch
    Turns the main power to On or Off. Turning the main power switch on, power switch on the front panel turns standby (Stby).
28. Safety labels
    WARNING label for safe operation of MT8815A/MT8820A. Observe the description on the label.

WARNING ⚠
NOOPERATOR SERVICE-
ABLE PARTS INSIDE.
REFER SERVICING TO
QUALIFIED PERSONNEL.

2.2 Installation

Install MT8815A/MT8820A after you have taken it from a package box and have checked the packed items. This section describes how to install it and precautions before use.

2.2.1 Transportation

Carry MT8815A/MT8820A with the grips provided on both sides of it and keeping it horizontal.

CAUTION ⚠

1. **Do not move MT8815A/MT8820A with the power turned on. Such an attempt may damage the internal circuits thus resulting in a fire accident, electric shock and/or failure.**

2. **Carry MT8815A/MT8820A with the grips provided on both sides of it, and keep it in a horizontal position while you are transporting it. Carrying MT8815A/MT8820A only with one of the grips while inclining it may cause an excessive force on the internal precision parts, which may be damaged.**

3. **MT8815A/MT8820A should be carried by two or more persons or placed on a transportation cart. MT8815A/MT8820A is too heavy for one person to carry. Doing so gives burden to the waist thus causes possible injury. Avoid strong vibration in loading the cart with MT8815A/MT8820A.**

2.2.2 Installation

Install MT8815A/MT8820A horizontally in a stable place at a low-drift temperature between 0 and 50°C. Keep the rear and sides of MT8815A/MT8820A at least 10 cm apart from obstacles such as walls and peripherals in order to provide space around the exhaust holes.

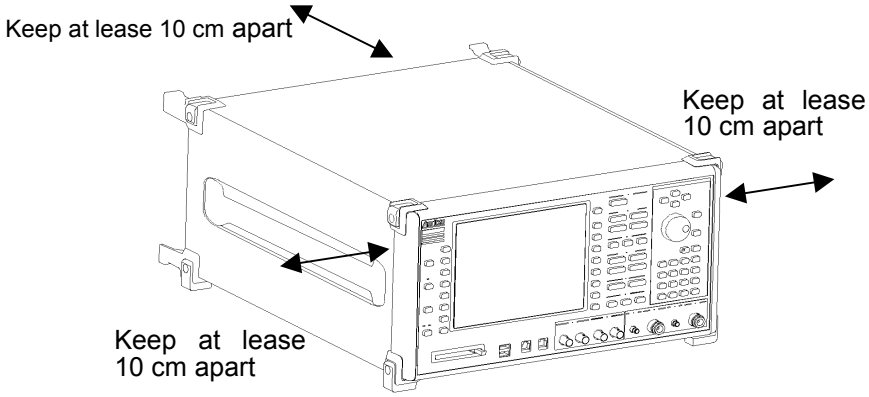


Fig. 2.2.2-1 Installation place

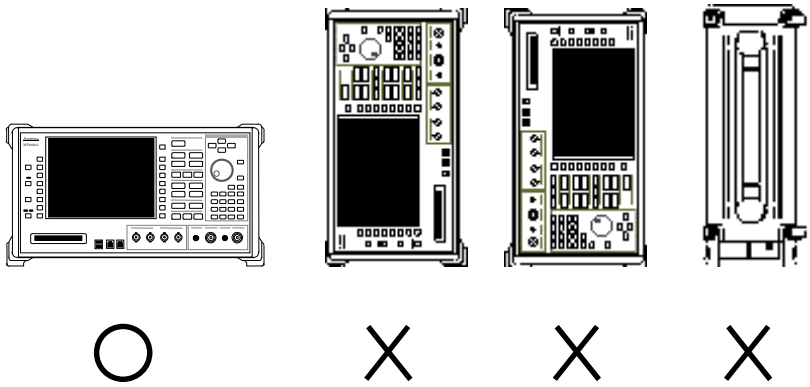


Fig. 2.2.2-2 Installation direction

CAUTION ⚠

In order to avoid fire accidents, personal damage and/or failure, do not use MT8815A/MT8820A in the following places:

× Unstable place

Avoid installing MT8815A/MT8820A in an unstable place, that is, in a place with vibration, on an unstable stand or in a slanted place. Otherwise, it will lose balance and be turned down or fall down, leading to injury.

× Humid or dusty place

Avoid installing MT8815A/MT8820A in a humid or dusty place. Drops of water or accumulated dust may constitute a short circuit, thus causing a fire accident, electric shock and/or failure.

× High temperature

Avoid direct sunlight or high temperatures. Otherwise the internal temperature will rise, and may result in a fire accident and/or failure.

× Place where it is exposed to active gas

Avoid installing MT8815A/MT8820A in a place that may be exposed to active gas. Otherwise MT8815A/MT8820A may be damaged, thus causing a fire accident and/or failure.

× Excessive fluctuation in temperature

Avoid excessive fluctuation in temperature. When using MT8815A/MT8820A at normal temperatures after using it at low temperatures for a long time, make sure that turn on its power after it is dried up well. Otherwise drops of water produced inside may constitute a short circuit thus causing a fire accident, electric shock and/or failure.

CAUTION ⚠

Do not block the airflow from the exhaust fan of MT8815A/MT8820A. Otherwise the internal temperature will rise and may cause a fire accident. Avoid using MT8815A/MT8820A in the following way:

× Using MT8815A/MT8820A in the upright position
× Using MT8815A/MT8820A with the protective cover
× Using MT8815A/MT8820A with dust accumulated on the fan

2.2.3 Piggyback installation

To install two units of MT8815A/MT8820A in a piggyback structure, mate four feet (at the corners of the bottom of the upper unit) with four adjusters (at the corners of the top of the lower unit). Anchor the two units using a band designed to prevent them from falling. Do not piggyback 3 or more MT8815A/MT8820A units.

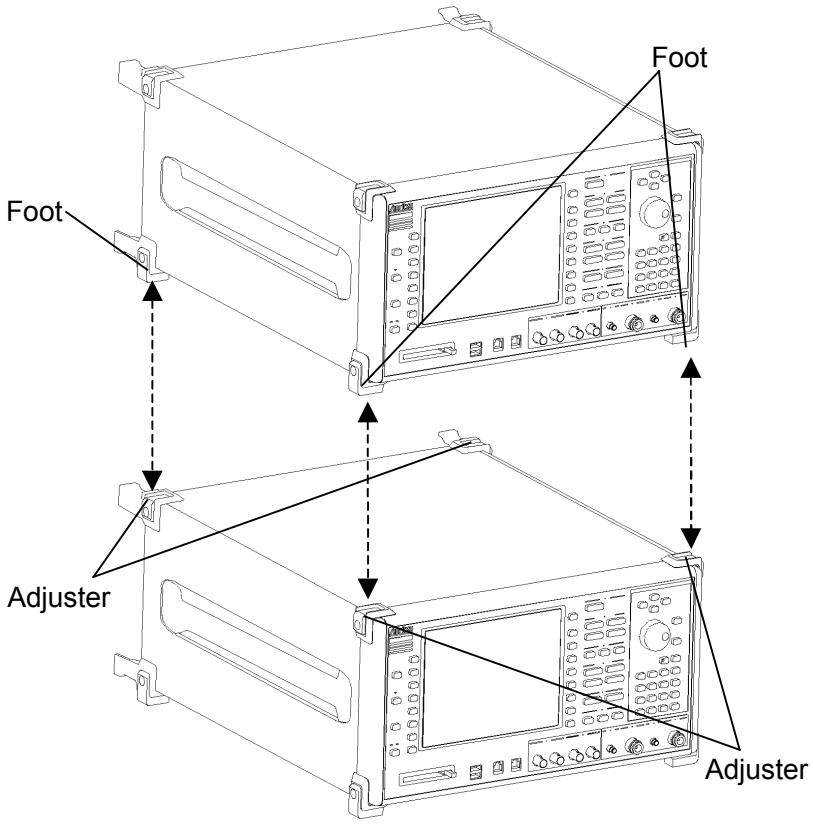


Fig. 2.2.3-1 Piggyback installation

2.2.4 Installation on rack

To install MT8815A/MT8820A on a rack, Rack-mount (separately ordered) is required. For how to attach rack-mount, refer to its operation manual.

2.3 Power Connection

This section describes the procedures for supplying power.

2.3.1 Power Requirements

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

Power source	Voltage range	Frequency
100 Vac system	100 to 120 V	47.5 to 63 Hz
200 Vac system	200 to 240 V	47.5 to 63 Hz

Changeover between 100 and 200 V systems is made automatically.

CAUTION ⚠

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

2.3.2 Connecting the Power Cord

Check that the main power switch on the rear panel is turned off (switched to the (O) side).

Insert the power plug into an outlet, and connect the other end to the power inlet on the rear panel. To ensure that the instrument is earthed, always use the supplied 3-pin power cord, and insert the plug into an outlet with an earth terminal.

WARNING ⚠

If the power cord is connected without the instrument earthed, there is a risk of receiving a fatal electric shock. In addition, the peripheral devices connected to the instrument may be damaged.

When connecting to the power supply, DO NOT connect to an outlet without an earth terminal. Also, avoid using electrical equipment such as an extension cord or a transformer.

CAUTION ⚠

If an emergency arises causing the instrument to fail or malfunction, disconnect the instrument from the power supply by either turning off the main power switch on the rear panel (switch to the (O) side), or by pulling out the power cord or the power inlet.
When installing the instrument, place the instrument so that an operator may easily operate the main power switch.
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.

2.3.3 Connecting to phone

Methods for connecting MT8815A/MT8820A to a phone to be measured differ according to AF of a phone, RF connector type or assignment. This section describes the basic connection method.

Note:

To perform RF signal measurement, check that output connector of MT8815A/MT8820A is in conformance with the RF Output setting (Refer to Section 6.1.10 "Setting signal output connector").

(Ex. 1) Connecting Main1 Input/Output with phone

Use an RF cable to connect the Main1 Input/Output on the front panel of MT8815A/MT8820A to the RF signal input/output connector of a phone. When direct connection is not allowed, use an adapter separately.

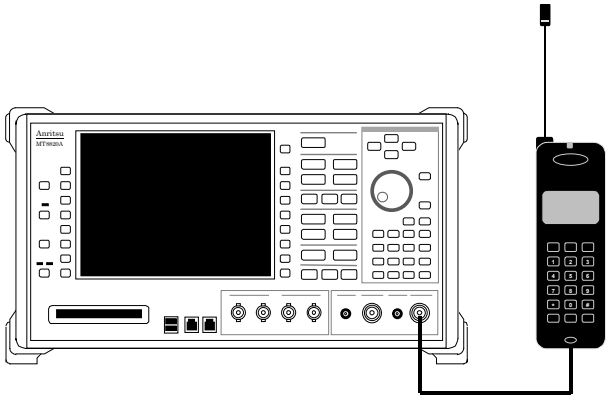


Fig. 2.3.3-1 Example of connection to a phone (1)

(Ex. 2) Outputting from AUX1 Output and inputting from Main1 Input/Output connector.

Use an RF cable to connect AUX1 Output to the input connector of a phone and Main Input/Output and RF output connector of a phone. When direct connection is not allowed, use an adapter separately.

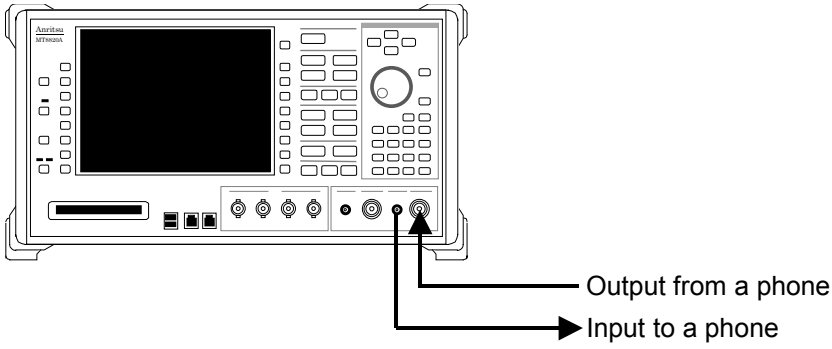


Fig. 2.3.3-2 Example of connection to a phone (2)

2.3.4 Connecting GPIB cable

MT8815A/MT8820A is provided with GPIB connector as remote control interface. Connect the connector of the GPIB cable to GPIB-1 (or GPIB-2) on the rear panel.

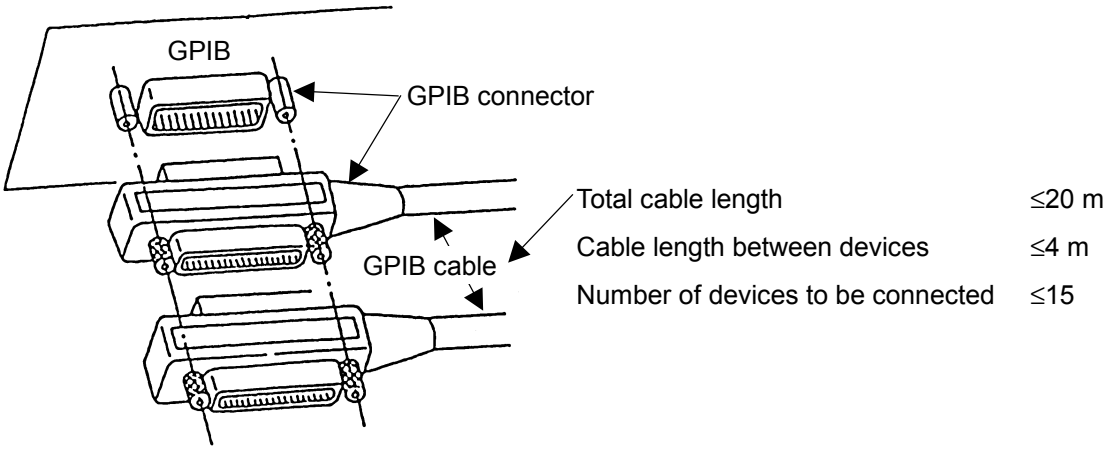
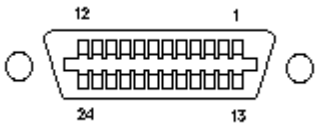


Fig. 2.3.4-1 Stack connection of GPIB connector



12 GND	11 ATN	10 SRQ	9 IFC	8 NDAC	7 NRFD	6 DAV	5 EOI	4 DIO4	3 DIO3	2 DIO2	1 DIO1
24 GND	23 GND	22 GND	21 GND	20 GND	19 GND	18 GND	17 REN	16 DIO8	15 DIO7	14 DIO6	13 DIO5

Fig. 2.3.4-2 Signal assignment of GPIB connector

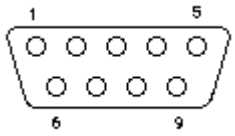
CAUTION ⚠

Connect a GPIB cable before turning MT8815A/MT8820A on. Otherwise the internal circuit parts in the interface unit may be damaged.

2.3.5 RS-232C port

The RS-232C-1 and RS-232C-2 ports (D-Sub, 9-pin, female) are connectors for performing data communication test between MT8815A/MT8820A and a phone.

Table 2.3.5-1 Signal assignment of RS-232C



Pin No.	Signal name	Description
1	CF (DCD)	Carrier detection (input to MT8815A/MT8820A)
2	BB (RXD)	Receive data (input to MT8815A/MT8820A)
3	BA (TXD)	Transmission data (output from MT8815A/MT8820A)
4	CD (DTR)	Data terminal ready (output from MT8815A/MT8820A)
5	AB (GND)	Ground
6	CC (DSR)	Data set ready (input to MT8815A/MT8820A)
7	CA (RTS)	Signal request (output from MT8815A/MT8820A)
8	CB (CTS)	Send ready (input to MT8815A/MT8820A)
9	CE (R)	Ring indicator (input to MT8815A/MT8820A)

2.3.6 10 Base-T port

The 10Base-T-1 and 10Base-T-2 ports on the rear panel are connectors for performing high-speed data communication test between MT8815A/MT8820A and a phone.

Table 2.3.6-1 Signal assignment of 10Base-T

Pin No.	Signal name
1	TD+
2	TD–
3	RD+
4	NC
5	NC
6	RD–
7	NC
8	NC

2.3.7 Reference signal input/output connector

The BNC-type 10 MHz/13 MHz Ref In on the rear panel of MT8815A/MT8820A is a connector inputting an external reference signal. Input the signal with the frequency accuracy of ±1 ppm and the level of 2 to 5 Vp-p.

Reference frequency to be used needs to be set in the Reference Frequency on System Configuration screen. Following reference signals can be used in MT8815A/MT8820A.

- 10 MHz Built-in reference signal in MT8815A/MT8820A
- 10 MHz External input reference signal
- 13 MHz External input reference signal

The BNC-type 10 MHz Buff Out outputs the internal 10 MHz reference signal of the TTL level.

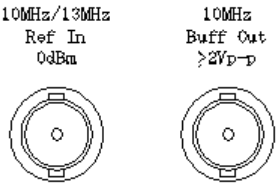


Fig. 2.3.7-1 10 MHz/13 MHz Ref In and 10 MHz Buff Out

2.3.8 Event trigger connector

The Event Trig Out-1 and Event Trig Out-2 on the front panel of the MT8815A or rear panel of the MT8820A are BNC connectors for outputting the event timing to an external device.

The Event Trig In-1 and Event Trig In-2 are BNC connectors for inputting a trigger signal from an external device, and performing transmission measurement on Phone 1 or Phone 2 in synchronization with the external device.

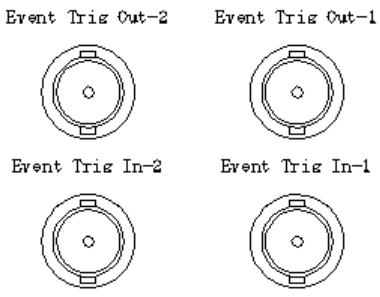
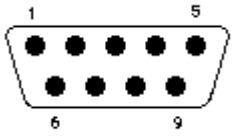


Fig. 2.3.8-1 Event Trig

2.3.9 Serial port

The MT8815A is equipped with a Serial port as a remote control interface. Connect an RS-232C cable connector to the Serial (D-Sub 9-pin, male) port on the rear panel.

Table 2.3.9-1 Serial and signal assignment



Pin No.	Signal name	Description
1	(NC)	Not connected
2	BB (RXD)	Receive data (input to MT8815A/MT8820A)
3	BA (TXD)	Transmission data (output from MT8815A/MT8820A)
4	(NC)	Not connected
5	AB (GND)	Ground
6	(NC)	Not connected
7	CA (RTS)	Signal request (output from MT8815A/MT8820A)
8	CB (CTS)	Send ready (input to MT8815A/MT8820A)
9	(NC)	Not connected

Note:

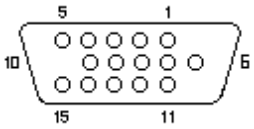
Remote control via the Serial interface is only for the MT8815A. It cannot be used with the MT8820A.

2.3.10 Call processing I/O port

The Call Proc I/O-1 and Call Proc I/O-2 ports (mini D-Sub, 15-pin) on the rear panel of MT8815A/MT8820A are used to input/output signals related to the call-processing test.

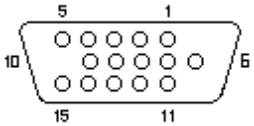
Pin assignment varies depending on the measurement software. Check the measurement software to be used.

Table 2.3.10-1 Signal assignment of Call Proc I/O
When using W-CDMA, GSM, PDC or PHS measurement software



Pin No	Signal name	Description
1	BER_DAT_IN	Input the data for BER measurement. The phone inputs the demodulated data of the TTL or CMOS level
2	BER_DAT_OUT	Outputs the demodulated data of the CMOS level.
3	FRAME_TRG_IN	Inputs the trigger signal in a frame period (for PHS only.)
4	DSUB15_RSV4	Reserved
5	DSUB15_RSV7	Reserved
6	FRAME_TRG_OUT	Outputs the trigger signal of the CMOS level in a frame period.
7	BER_CLK_IN	Input the clock signal for BER measurement. Input the data clock of the TTL or CMOS level, demodulated by the tested terminal.
8	BER_CLK_OUT	Outputs the demodulated data clock of the CMOS level.
9	DSUB15_RSV2	Reserved
10	DSUB15_RSV5	Reserved
11	SYNC IN	Input the synchronization signal of the TTL or CMOS level from the master unit, when two units of MT8815A/MT8820A are synchronized.
12	SYNC OUT	Outputs the synchronization signal of the CMOS level to the slave unit, when two units of MT8815A/MT8820A are synchronized.
13	GND	Ground
14	DSUB15_RSV3	Reserved
15	DSUB15_RSV6	Reserved

Table 2.3.10-2 Signal assignment of Call Proc I/O port When using CDMA2000, 1xEV-DO or CDMA2000 WAT* measurement software



Pin No	Signal name	Description
1	RSV_1	Reserved
2	PP2S Multi	Timing signal for even seconds. (LVCMOS level pulse signal, 813.8 ns interval)
3	(NC)	Not connected
4	RSV_OUT_1	Reserved
5	RSV_OUT_2	Reserved
6	Slot	1.25 ms interval slot signal (LVCMOS level pulse signal, 813.8 ns interval)
7	RSV_2	Reserved
8	Frame	20 ms interval frame signal (LVCMOS level pulse signal, 813.8 ns interval)
9	(NC)	Not connected
10	(NC)	Not connected
11	SYNC IN	Input the synchronization signal of the TTL or CMOS level from the master unit, when two units of MT8815A/MT8820A are synchronized.
12	SYNC OUT	Outputs the synchronization signal of the CMOS level to the slave unit, when two units of MT8815A/MT8820A are synchronized.
13	GND	Ground
14	DSUB15_RSV3	Reserved
15	DSUB15_RSV6	Reserved

* WAT: Wireless Application Test Software

MN8110B I/O adapter is available separately as an application part for the call processing port.

MN8110B is a unit that converts D-Sub 15-pin connector into a BNC connector. Connect the Call Proc. I/O port (D-Sub 15-pin) on the rear panel to that on MT8815A/MT8820A using the connection cable provided with MN8110B. This allows input/output of the MT8815A/MT8820A Call Proc. I/O port input/output signal with the BNC connector.

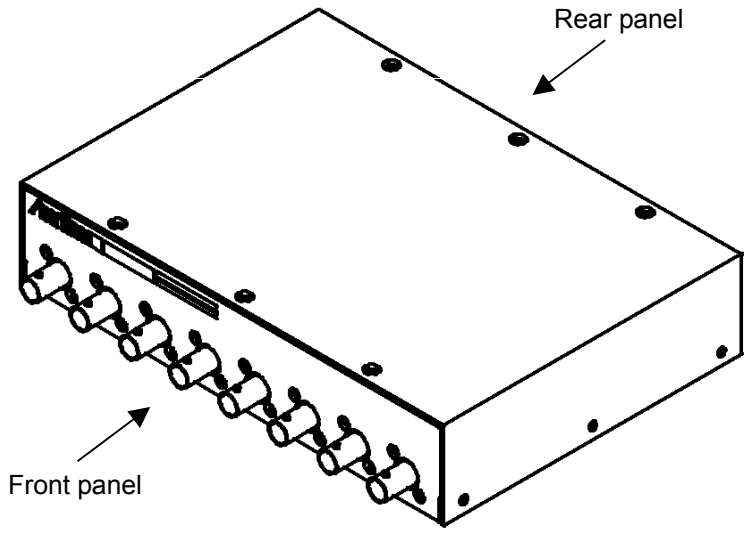


Fig. 2.3.10-1 External view of MN8110B

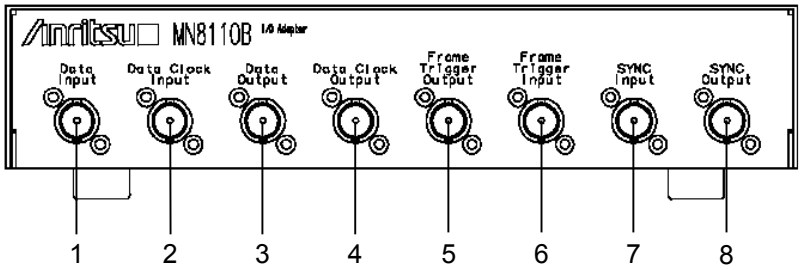


Fig. 2.3.10-2 MN8110B Front panel

<When using W-CDMA, GSM, PDC or PHS measurement software>

1.	Data Input	Data input connector
2.	Data Clock Input	Data clock input connector
3.	Data Output	Data output connector
4.	Data Clock Output	Data clock output connector
5.	Frame Trigger Output	Trigger signal output connector
6.	Frame Trigger Input	Trigger signal input connector
7.	SYNC Input	Synchronization signal input connector
8.	SYNC Output	Synchronization signal output connector

<When using CDMA2000, 1xEV-DO, or CDMA2000 WAT measurement software>

1.	RSV1	Reserved
2.	RSV2	Reserved
3.	PP2S Output	PP2S output
4.	Frame Output	Frame interval signal output
5.	Slot Output	Slot interval signal output
6.	Frame Trigger Input	Trigger signal input connector
7.	SYNC Input	Synchronization signal input connector
8.	SYNC Output	Synchronization signal output connector

Note:

When using the MT8815A, I/O connectors from 10 to 13 and 19. Call Proc I/O connector cannot be used at the same time since they are common I/O terminals.

* WAT: Wireless Application Test Software

Table 2.3.10-3 Relationships between front panel connector and MT8815A/MT8820A Call Proc I/O port When using W-CDMA, GSM, PDC or PHS measurement software

MN8110B front panel	Call Proc. I/O on MT8815A/MT8820A
Connector name	**Signal name**
Data Input	BER_DAT_IN
Data Clock Input	BER_CLK_IN
Data Output	BER_DAT_OUT
Data Clock Output	BER_CLK_OUT
Frame Trigger Output	FRAME_TRG_OUT
Frame Trigger Input	FRAME_TRG_IN
SYNC Input	SYNC IN
SYNC Output	SYNC OUT

Table 2.3.10-4 Relationships between front panel connector and MT8815A/MT8820A Call Proc I/O port When using CDMA2000, 1xEV-DO or CDMA2000 WAT* measurement software

MN8110B front panel	Call Proc. I/O on MT8815A/MT8820A
Connector name	**Signal name**
RSV1	RSV_OUT_1
RSV2	RSV_OUT_2
PP2S Output	PP2S
Frame Output	Frame
Slot Output	Slot
Frame Trigger Input	None
SYNC Input	SYNC IN
SYNC Output	SYNC OUT

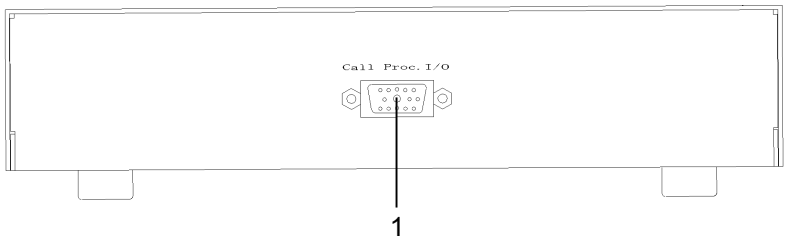


Fig. 2.3.10-3 MN8110B Rear panel

1. Call Proc. I/O MT8815A/MT8820A interface connector

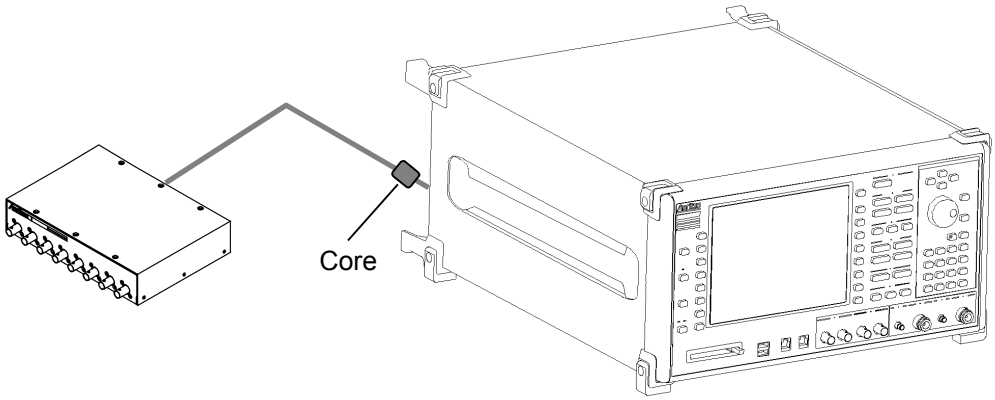


Fig. 2.3.10-4 Connection between MT8815A/MT8820A and MN8110B

Table 2.3.10-5 MN8110B standards

Dimensions	213 mm (W), 44 mm (H), 150 mm (D) (projecting items not included)
Mass	1 kg or less

2.3.11 Checking power to be input to connector

Avoid feeding a power exceeding the maximum permissible power to input connectors of MT8815A/MT8820A. Do not input signals to connectors dedicated for output or the internal circuits should be damaged.

Table 2.3.11-1 Maximum permissible power

Connector name	Maximum permissible power
Main1 Input/Output	35 dBm
10 MHz/13 MHz Ref In	2 to 5 Vp-p
Event Trig In-1	TTL level
Call Proc. I/O-1	TTL level

CAUTION ⚠

MT8815A/MT8820A is not provided with a circuit for protecting the internal circuits from the input power exceeding the maximum permissible power. Never feed the power exceeding the maximum permissible power. Such an attempt may damage the internal circuits thus causing a fire accident or failure.

2.4 Memory Card

Memory cards available to MT8815A/MT8820A are PC-card-type (Type II) memory cards. Use a compactflash card with PC card adapter attached. Please use an attached memory card.

2.4.1 Precautions for use

Note the following points when using a memory card:

(1) Never remove a memory card while MT8815A/MT8820A is accessing the card. Otherwise data saved on the card may be lost and besides the card itself may be damaged.

(2) A memory card that has been magnetized or exposed to static electricity may no longer work.

(3) Avoid high temperatures and humidity as well as direct sunlight when storing the memory card.

(4) It is recommended to backup the data when saving data onto a memory card. Anritsu Corporation will not be responsible for data loss in the memory card.

(5) The memory card shipped with the instrument has been thoroughly tested. Users should note that, as not all other such devices have been tested in this manner, Anritsu is unable to guarantee their performance or suitability.

2.4.2 Inserting and removing Memory card

Insert a memory card into the memory card slot on the front panel.

Insert a memory card, with the notch for preventing incorrect insertion on the memory card (PC-card adapter) in the direction as shown in the figure below. You can insert a single memory card at a time.

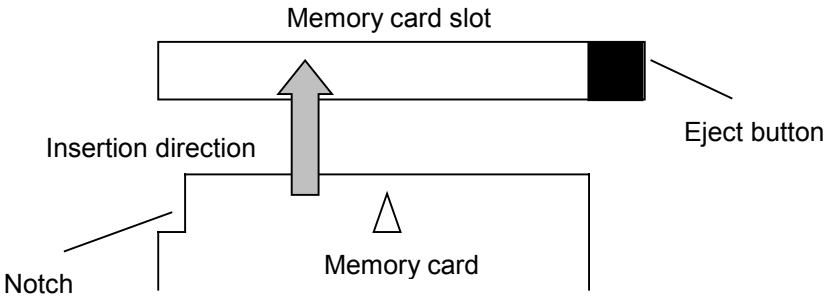


Fig. 2.4.2-1 Inserting a memory card

Press the eject button on the right side of the memory card slot to remove the card.

2.4.3 Formatting memory card

Format a memory card to be used in the MS-DOS format beforehand. An unformatted memory card cannot be used. MT8815A/MT8820A is not equipped with the format function.

Section 3 Getting Started

This section outlines the basic procedures for using MT8815A/MT8820A, from power-on to power-off. For details of each operation when power is on, refer to Sections 4 to 6 of this manual or operation manual for the measurement software.

3.1 Power-on 3-2
3.2 Initialization 3-4
3.3 Selecting Screen 3-5
3.4 Viewing Screen 3-6
3.5 Calibration 3-8
3.6 Setting Parameter 3-9
3.7 Measurement 3-11
3.8 Reading Measurement Results 3-12
3.9 Power-Off 3-14

3.1 Power-on

CAUTION ⚠

Turn on the power after making sure that MT8815A/MT8820A is dried up well. When using MT8815A/MT8820A at normal temperatures after using it at low temperatures near 0°C, drops of water produced inside may constitute a short circuit thus causing failure.

To power on MT8815A/MT8820A, turn on both the main power switch on the rear panel and the power switch on the front panel.

[Procedure]

1. Turn on the main power switch on the rear panel. This turns on the Stby lamp on the front panel. The illuminating Stby lamp indicates that the main power switch is on.
   When turned into Standby status, preheating of the reference crystal oscillator circuit starts. To operate MT8815A/MT8820A at lower temperatures, preheat MT8815A/MT8820A at least 24 hours to enhance stability of the crystal oscillator.

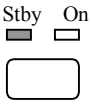


Fig. 3.1-1 Standby status (Stby lamp for the power switch is On.)

2. Next, hold down the power switch on the front panel for at least one second to turn it on. The Stby lamp goes Off and the power On lamp goes On.

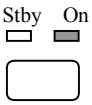


Fig. 3.1-2 Power-on status (power On lamp for the power switch is On.)

3. Some time after the power lamp goes on, various messages are displayed on the screen and the measurement software is started.

Note:

To switch between power On and Off, you must hold down the power switch on the front panel for at least one second. This is to prevent the power from being turned On or switched to standby (Stby) by mistake.

3.2 Initialization

When the power is turned On, perform initialization. Initialization aims at returning the parameters set for MT8815A/MT8820A in the default status. Initialization prevents MT8815A/MT8820A from being influenced by the previous setting. For details, refer to Section 5.1 "Initialization."

Notes:

1. Initialization cannot be performed on the Standard Load screen. When the Standard Load screen is displayed, therefore, change the screen to another one before starting initialization by referring to Section 4.3 "Operating Screen."
2. Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

[Procedure]

1. Press [Preset] to display the Preset pop-up window

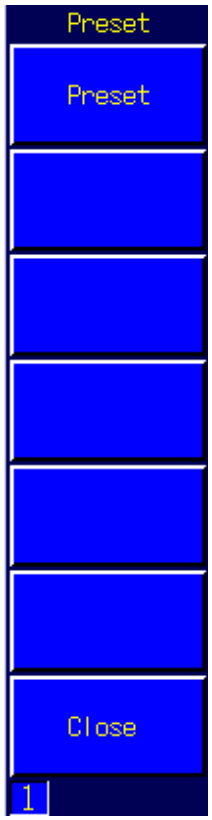


Fig. 3.2-1 Preset

2. Press [F1] "Preset" to perform the initialization.

3.3 Selecting Screen

Select a screen corresponding to the items to be set after initialization. Functions and operation status of MT8815A/MT8820A depends on the screen.

Select measurement screen (Phone-1 or Phone-2 Screen) to set or measure a parameter. Measurement screen is the general name for screens in which measurements are performed. Several screens are prepared for measurement and they differ depending on the measurement software.

Select Common Screen to display system settings and information. Common Screen can be selected in any software.

For details of the screen operation, refer to Section 4.3 "Operating Screen."

Example:

Selecting Fundamental Measurement screen for measurement screen in W-CDMA measurement software.

Note:

MX882000B W-CDMA measurement software must be loaded.

[Procedure]

1. Press Screen to display Screen Select pop-up window.

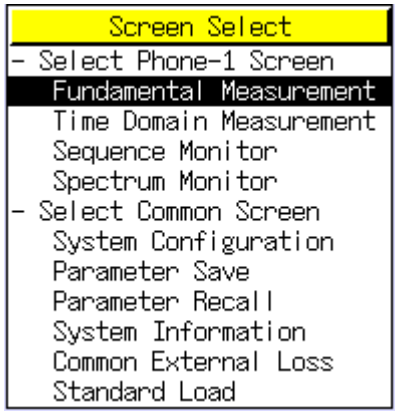


Fig. 3.3-1 Screen Select

2. Turn the rotary control to move the cursor on "Fundamental Measurement" under the "Select Phone-1 Screen" (or "Select Phone-2 Screen") tree.
3. Press the rotary control to open the Fundamental Measurement screen.

3.4 Viewing Screen

This section describes how to view a screen using the Fundamental Measurement screen of W-CDMA measurement software as an example. For details, refer to Section 4.1 "Display Area."

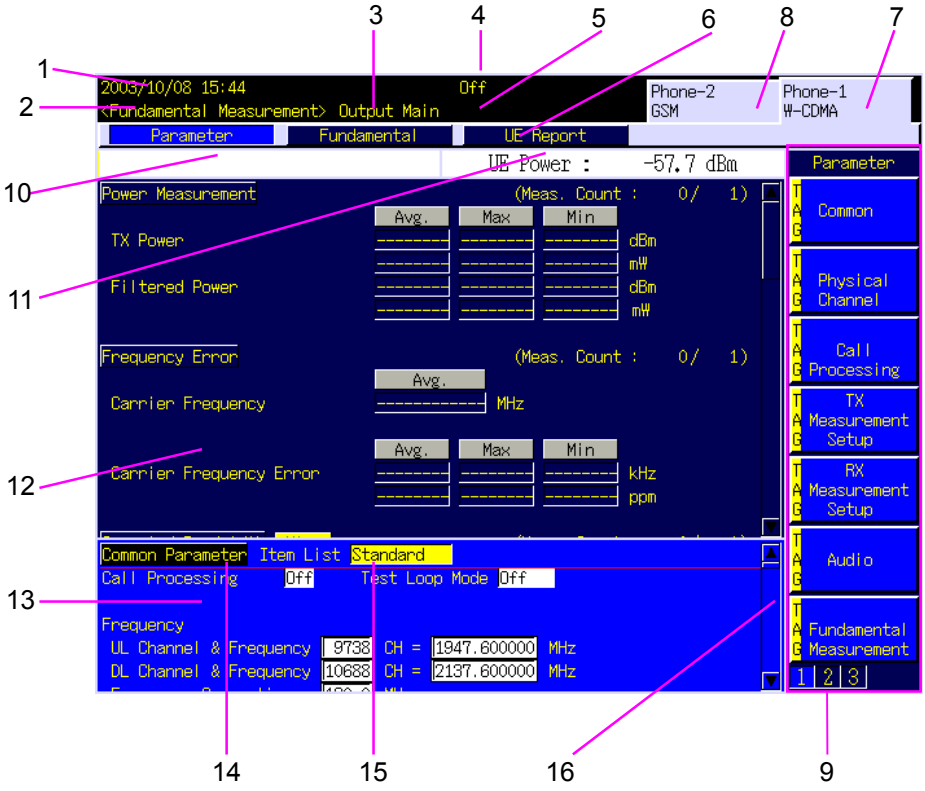


Fig. 3.4-1 W-CDMA•Fundamental Measurement screen

1. Date and time
   Shows date and time, or user-defined character string.
2. Screen type
   Shows the name of the currently selected screen.
3. RF signal output connector
   Shows message on currently selected RF connector or UNCAL status.
4. Call processing status
   Shows current call processing status.
5. Measurement mode
   Shows measurement mode under execution. This is displayed only during measurement.
6. Window list bar
   Lists windows that are currently opened or active.

7. The phone currently being measured and measurement software (Phone-1)
   When Phone-1 is being measured, shows the measurement software being used. The first connector, such as Main 1 or GPIB-1, is used.
8. The phone currently being measured and measurement software (Phone-2)
   This tab is displayed only when the Parallelphone Measurement Software is installed in MT8820A. When Phone-2 is being measured, shows the measurement software being used. The second connector, such as Main 2 or GPIB-2, is used.
   The display for Phone-1 and Phone-2 can be switched by pressing Shift + Screen.
9. Function menu
   Functions to be executed by pressing the corresponding function key on the right hand side.
10. Measurement indicator or error messages
    Shows measurement progress/completion messages or error message when an error occurs.
11. Transmission power monitor value for a phone
    Shows transmission power monitor value for a phone.
12. Upper window
    Display field for results of each measurement.
13. Lower window
    Display field for the Parameter window for parameter settings and others.
14. Tag
    A marker for major items such as parameter or measured result groups. A tag becomes active when the cursor is put on a parameter or measured result.
15. Cursor
    Used to select values to be set to parameters or scroll a window.
16. Scroll bar
    Appears when all information cannot be displayed within the current screen/ window size. You can see all information by scrolling the screen/window.

3.5 Calibration

Perform calibration before measurement. This flattens the frequency characteristics of the level accuracies for the input/output levels to calibrate level accuracy error due to internal temperature change.

Band Calibration and Full Calibration can be performed by a single MT8815A/MT8820A unit. Band Calibration performs calibration within the band of the communication system supported by the measurement software. Full Calibration performs calibration within the input/output band for MT8815A/MT8820A (30 to 2700 MHz).

Note:

It takes about one and a half minutes to perform Full Calibration.

It is best to conduct Band Calibration each time the machine is tested. Full Calibration takes care of the same items in Band Calibration but takes more time. Full Calibration is performed after power is turned on or at a performance test.

Note:

Wait at least 60 minutes after turning the power on before performing Full Calibration.

After performing Full Calibration once, perform Band Calibration at any time between measurements, such as when replacing phones.

Example:

To perform calibration at MT8815A/MT8820A input/output band

[Procedure]

1. Press Next to display the function menu containing the Full Calibration menu.

Fig. 3.5-1 Full Calibration menu

2. Press F6 "Full Calibration" to perform calibration.

3.6 Setting Parameter

Set parameters for measurement conditions on the screen setting (Parameter) window to be measured.

To operate a window such as setting window, the window must be active. For details of window operations, refer to Section 4.4 “Operating Window”.

Example:

Changing Reference Level from –10.0 dBm to –15.0 dBm in the setting window on the W-CDMA measurement software Fundamental Measurement screen.

[Procedure]

1. Check that Fundamental Measurement screen is open.

Fig. 3.6-1 Checking the screen

2. The setting window is displayed at the lower part of the screen. Check that the Setting (Parameter) window is active at the window list bar.

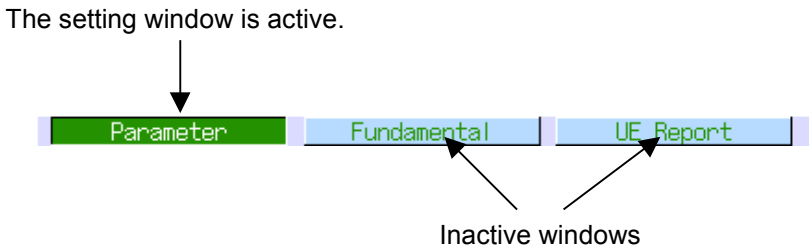


Fig. 3.6-2 Setting window

3. If the setting window is not active, press Focus to activate the setting window. The cursor is displayed when the setting window is activated.
4. Turn the rotary control to move the cursor on “Input Level”.

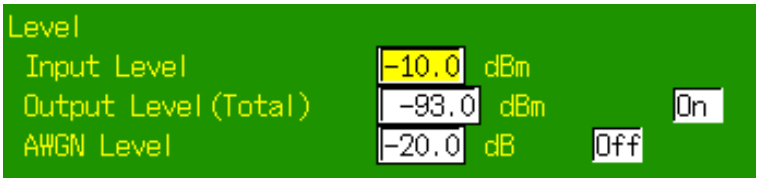


Fig. 3.6-3 Input Level selection

5. Press the rotary control to open the pop-up window and start entry of values. The upper and lower limits for input values are displayed.

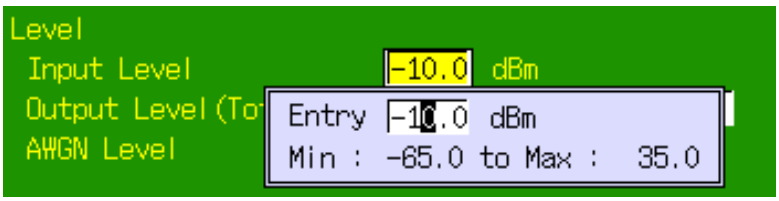


Fig. 3.6-4 Starting to enter

6. Use the numeric keypad to enter a value to be changed. To enter –15.0 dBm, press [–/+], [1], [5], [.], and [0] of the numeric keypad in this order.

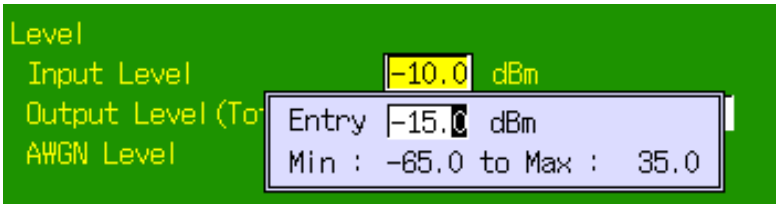


Fig. 3.6-5 Entering numeric values

7. After inputting, press the rotary control to determine the value.

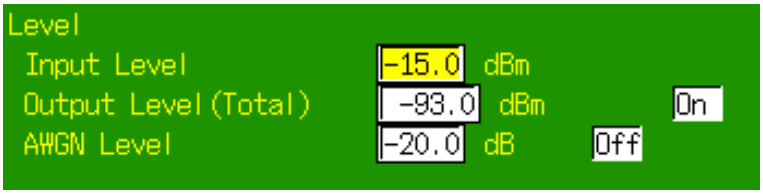


Fig. 3.6-6 Determining the value

3.7 Measurement

Start measurement after all the parameters necessary for measurement have been specified, the terminal to be tested has been prepared and the state of MT8815A/MT8820A has been checked. For details, refer to Section 5.3 “Starting Measurement”.

[Procedure]

Press Single.

Note:

Measurement can be executed only on the measurement screen and cannot be executed on the common screen. Measurement items differ depending on the measurement screen.

When measurement is completed normally, a message indicating completion of measurement appears in the measurement indicator error status area.

Fig. 3.7-1 Message for measurement complete

An error message as shown in the figure below if an error occurs during the measurement. Check the setting and measure again. Error messages differ depending on the error type occurred.

Fig. 3.7-2 Error message example

3.8 Reading Measurement Results

When the measurement has been completed, read the measurement results. The measurement results are displayed in the measurement results window of the measurement screen.

Example:

To read measurement results for Occupied Bandwidth in W-CDMA measurement software.

[Procedure]

1. Occupied Bandwidth measurement is performed on the Fundamental Measurement screen. Select Fundamental Measurement screen and start measurement.
2. Check that the measurement completes. If an error message is displayed, check the setting and perform the measurement again.

Fig. 3.8-1 Checking measurement completion

3. Measurement result window is displayed on the upper part of the screen. Press Focus to activate the measurement result window (Fundamental Meas. Window). Then, the cursor is displayed on the measurement result window.

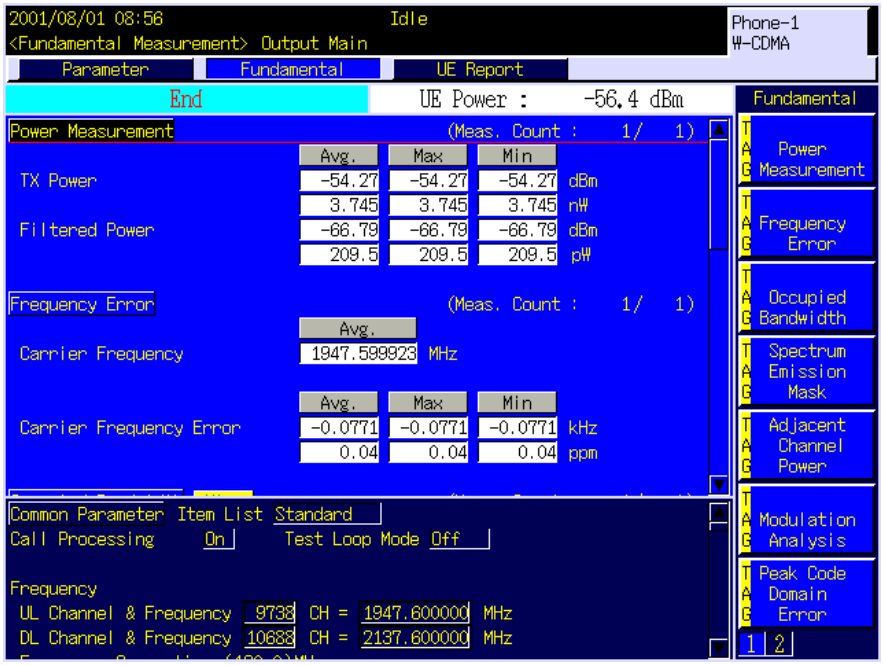


Fig. 3.8-2 Activating the measurement result window

4. Press F3 "Occupied Bandwidth" to display the measurement results for Occupied Bandwidth. Other measurement results can be viewed by turning the encoder.

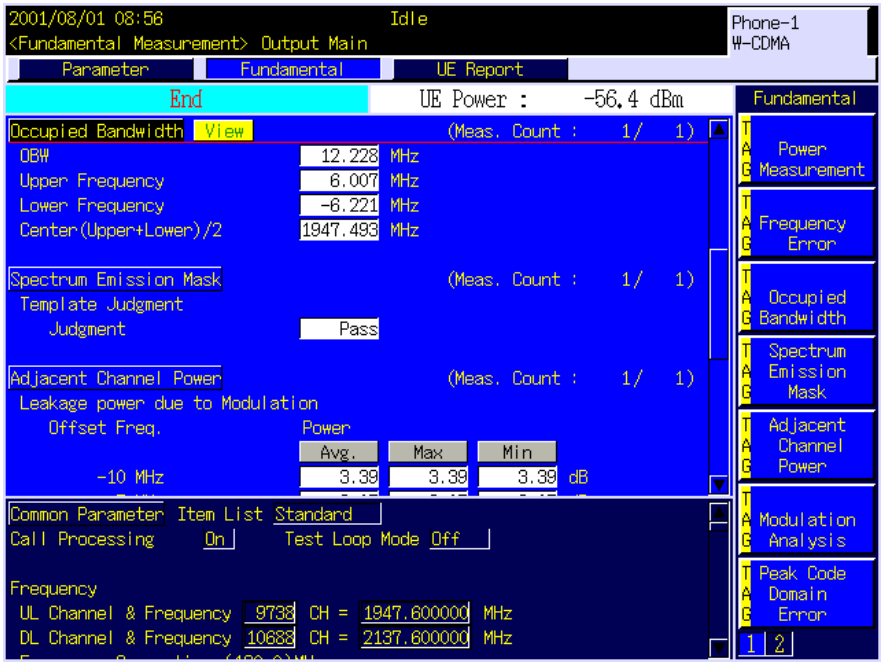


Fig. 3.8-3 Displaying measurement results

3.9 Power-Off

Power Off MT8815A/MT8820A when it is not used. Turn Off both the main power switch on the rear panel and the power switch on the front panel.

[Procedure]

1. Hold down the power switch on the front panel for at least one second to turn it Off. The power On lamp goes Off and the Stby lamp goes On. In case you use MT8815A/MT8820A immediately afterwards, keep MT8815A/MT8820A in this status. Power is fed to the internal circuits to stabilize the reference crystal oscillator.

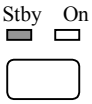


Fig. 3.9-1 Standby status (Stby lamp for the power switch is On.)

2. If MT8815A/MT8820A is not used for a long time, press the main power switch on the rear panel to turn it Off. The Stby lamp goes Off and the main power is turned Off.

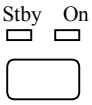


Fig. 3.9-2 Power-Off status (both Stby lamp and On lamp are Off)

Section 4 Basic Operation

This section describes basic operation required for a measurement including screen description, how to enter parameters and execute functions.

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4.1 Display Area

This section describes the contents displayed on LCD of MT8815A/MT8820A. Display position is determined according to the display contents.

4.1.1 Names and positions in display area

The screen consists of the following seven display areas. Some areas are not displayed depending on the operation statuses.

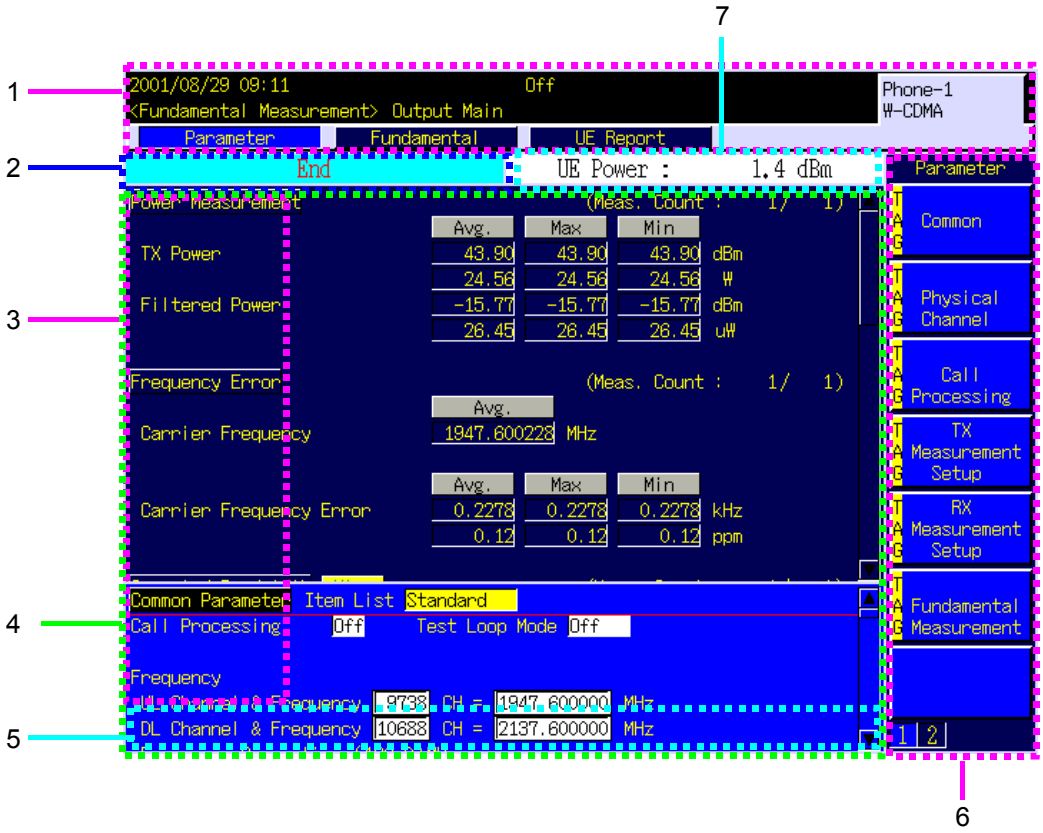

Fig. 4.1.1-1 Display area

1. Status area (Refer to 4.1.2)
2. Measurement-indicator/ Error-status area (Refer to 4.1.3)
3. User menu area (Refer to 4.1.4)
4. Window area (Refer to 4.1.5)
5. Entry area (Refer to 4.1.6)
6. Function menu area (Refer to 4.1.7)
7. Transmission-power monitor-value area (Refer to 4.1.8)

4.1.2 Status area

The status area displays the measurement software type, opened screen type, window status, and basic information to indicate the current operation status such as date/time, call processing status, etc.

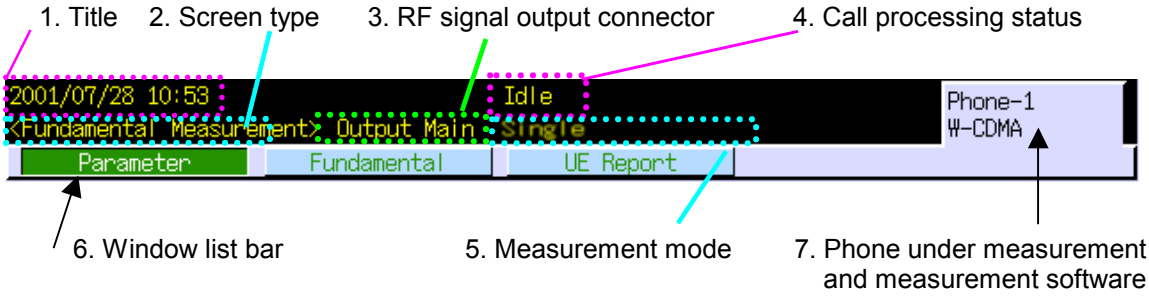

Fig. 4.1.2-1 Status area

1. Title

   The date and time or character information is displayed. The title can be set on the System Configuration screen.

2. Screen type

   The screen type currently being opened is displayed. It indicates operation mode for MT8815A/MT8820A.

3. Output connector/status for RF signal

   Connector type or status for RF signal output from MT8815A/MT8820A is displayed. Output connector for RF signal can be set in RF Output on the System Configuration screen.

Table 4.1.2-1 Output connector/status for RF signal

Display	Description
Output Main	Main 1 main input/output connector
Output AUX	AUX 1 auxiliary output connector
UNCAL	Output level is UNCAL status (Output signal is outside of guaranteed accuracy.
CW	Outputs non-modulation CW signals.
Off	Output Off.

4. Call processing status

   The call processing status is displayed. It indicates the communication status between MT8815A/MT8820A and the phone.

5. Measurement mode

   The current measurement mode is displayed. This is displayed only during measurement.

Table 4.1.2-2 Measurement mode

Display	Measurement mode
Single	Single measurement mode
Continuous	Continuous measurement mode

6. Window list bar
   The types and active/inactive status of the opened windows are displayed.
7. Phone under measurement and measurement software
   The phone under measurement and the software type are displayed.

4.1.3 Measurement-indicator/error-status area

The measurement-indicator/error-status area displays the measurement progress status and an occurred error type on the measurement screen. They are not displayed on the common screen.

(1) Display under measurement
Display during the measurement.

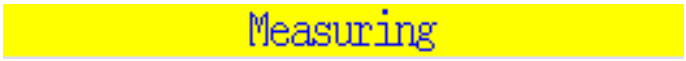

Fig. 4.1.3-1 Under measurement

(2) Display for normal measurement completion
Display for normal measurement completion.

Fig. 4.1.3-2 Normal completion of measurement

(3) Display for error message
A message indicating the error type is displayed when an error occurs during the measurement.

Fig. 4.1.3-3 Error message example

4.1.4 User menu area

User menu area displays seven user menus. User menu is a list for executable functions displayed on each screen or window. Press [U1] to [U7] user function keys to execute a user menu.

4.1.5 Window area

Window area displays parameters and measurement results indicating MT8815A/MT8820A settings and measurement conditions. Format and content of a window area differs depending on the screen or window. For some screens, two windows are displayed in upper and lower areas.

4.1.6 Entry area

Entry area is displayed when Pressing [Channel] or [Input Freq.] to enter parameter for channel or input frequency or when specifying the parameter file number. It displays a numeric value being entered or error messages.

4.1.7 Function menu area

The function menu area displays seven function menus. The function menu is a list for executable functions displayed on each screen or window. Press [F1] to [F7] user keys to execute a function.

4.1.8 Transmission-power monitor-value area

Transmission-power monitor-value area displays the measured monitor value of transmission power for an active phone. The most accurate measurement result for transmission power is displayed in the window area.

The transmission-power monitor value is displayed on the measurement screen only and will be updated in a given time regardless of the start of measurement by [Single], etc. Time for updating differs according to the measurement software. This will not be displayed on the common screen.

4.2 Operating Cursor

The cursor is used to scroll the screens and windows, select a desired parameter or digit of numeric value, and activate a tag.

4.2.1 Cursor type

The cursor can be classified as follows according to their shapes and functions. In this manual, the all the types are called "cursor" without making distinction except for special reason.

(1) Normal cursor

The cursor is used to select parameter and digit of numeric value. The parameter or the numeric value of the digit at the cursor position can be changed.

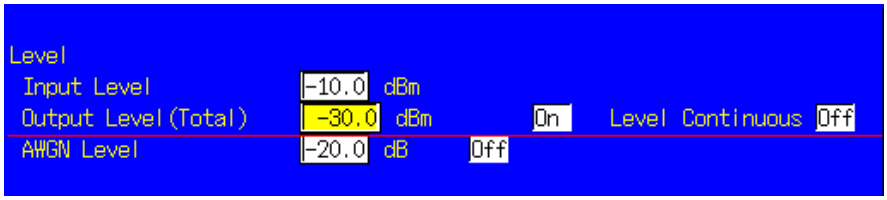

Fig. 4.2.1-1 Normal cursor

(2) Line cursor

The line cursor is displayed in the measurement result display window. The tag in the area indicated with the line cursor enters the active state.

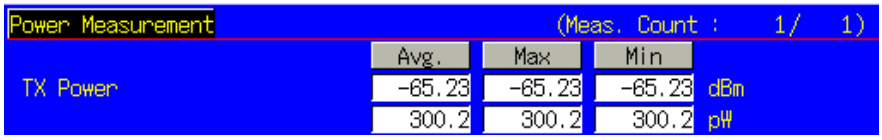

Fig. 4.2.1-2 Line cursor

(3) Menu cursor

Cursor displayed in the pop-up windows for all menus by pressing Functions. It selects a function menu.

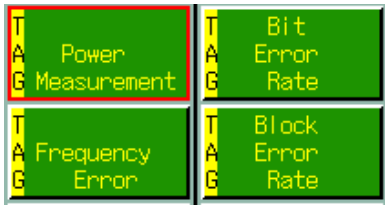

Fig. 4.2.1-3 Menu cursor

4.2.2 Moving cursor

The cursor is moved in the following ways:

Table 4.2.2-1 Operating a cursor

Cursor	Operation
Moving upward	• Turn the rotary control to the left. • [∧]
Moving downward	• Turn the rotary control to the right. • [∨]
Moving to the left	• Turn the rotary control to the left. • [<]
Moving to the right	• Turn the rotary control to the right. • [>]

Note:

Even if an attempt is made to move the line cursor when the window can be scrolled up or down, the window is scrolled and the line cursor remains displayed in the center of the window. When the displayed window section is at the upper or lower end of scroll, the line cursor can be moved up or down.

4.3 Operating Screen

Screen indicates current operation status. Executable functions, display contents and settable parameters vary depending on the screen. To execute a desired function, select a screen that allows to execute the function.

4.3.1 Screen type

The screens vary depending on the measurement software. They are classified into the following two types according to their characteristics:

(1) Measurement screen (Phone-1 or Phone-2 Screen)
A screen to execute a measurement. The types and functions of the measurement screens vary depending on measurement software products.

(2) Common Screen
The common screens provide the functions common for all measurement software. Common screen includes the following screens. Measurement cannot be executed when a common screen is selected.

- System Configuration screen (Setting systems/interface)
- System Information screen (Indicating system information)
- Common External Loss screen (Setting common cable loss)
- Parameter Save screen (Saving parameters)
- Parameter Recall screen (Reading parameters)
- Standard Load screen (Selecting measurement software)

4.3.2 Selecting screen

The screen is selected in the following four ways:

(1) Press Screen to open the screen selection list and select any screen
(2) Execute the screen selection function of the user menu
(3) Execute the screen selection function of the function menu
(4) Execute the GPIB command to select a screen

(1) Press Screen to open the screen selection list and select any screen

Normally, press Screen to select a screen. Select any screen from the Screen Select pop-up window displayed by pressing Screen.

Example:

To select the System Information screen: (one of the common screen)

[Procedure]

1. Press Screen to display the Screen Select pop-up window.

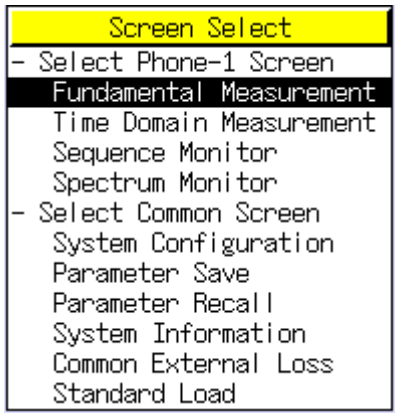

Fig. 4.3.2-1 Screen Select

2. Turn the rotary control to move the cursor onto "System Information."

3. If “System Information” cannot be found, turn the rotary control and move the cursor onto the “Select Common Screen” and perform one of the following operations to display the common screen list:
   - Press the rotary control
   - Press Set
   - Press Enter

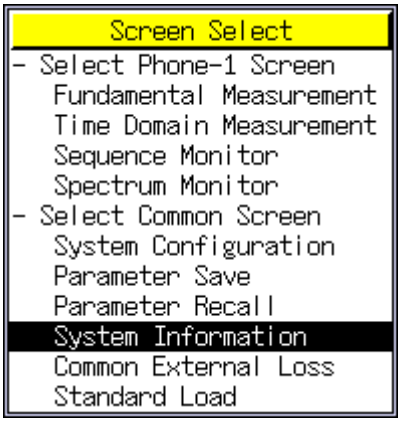

Fig. 4.3.2-2 System Information selection

4. Perform one of the following operations to open the System Information screen:
   - Press rotary control
   - Press Set
   - Press Enter

(2) Executing the screen select function of the user menu

A screen can be opened by executing the screen select function of the user menu. Screen name such as System Information Screen are displayed in the user menu.

Example:

To open System Information screen from System Configuration screen

System Information screen is opened by pressing U4 “System Information Screen” in the System Configuration screen.

(3) Execute the screen select function in the function menu

A screen can be opened by executing the screen select function of the function menu. However, selectable screens in the function menu are limited for some screens. The screen name is displayed with -> mark in the function menu for screen select function.

Example:

To open the System Configuration screen from the Configuration menu

[Procedure]

1. Press Config to open Configuration menu

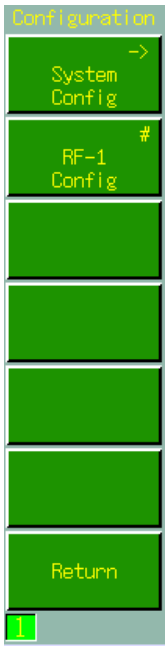

Fig. 4.3.2-3 Configuration menu

2. Press F1 "System Config" to open System Configuration screen.

(4) Execute the GPIB command to select a screen

A screen can be opened by executing the GPIB command "SCRSEL."

Example:

To open the System Information screen:

■ Example of programming by remote control

```
SCRSEL SYSINFO        /*Open the System Information screen*/
```

4.3.3 Scrolling screen

When the scroll bar is displayed at the right edge of the screen (on the left of the function menu), scrolling enables the items that have remained to be displayed.

Fig. 4.3.3-1 Scroll bar

The screen is scrolled by one of the following ways:

Table 4.3.3-1 Scrolling a screen

Scrolling the screen	Operation
Scrolling upward	• Turn the rotary control to the left • [∧] • [Scroll Up]
Scrolling downward	• Turn the rotary control to the right • [∨] • [Scroll Down]

When operating [∧], [∨] or rotary control, the screen is scrolled together with an up-and-down movement of the cursor. When pressing [Scroll Up] or [Scroll Down], the screen is scrolled by the window width.

4.3.4 Change screen color pattern

It is possible to change the color of the letters, background or other details shown on the screen. There are five color patterns to choose from on the measurement screen.

Press [Next] to move to the Color Setting menu. Press the color Pattern function key fitting the color desired.

Fig. 4.3.4-1 Color Setting menu

Example:

To change the screen color pattern to Pattern 2

[Procedure]

1. Press [Screen] to open the desired measurement screen.
2. Press [Next] to display the Color Setting menu.
3. Press [F2] "Color Pattern 2" to set screen color pattern to Pattern 2.

4.4 Operating Window

The window is a field to set the measurement condition parameter and display the measurement result. The window is displayed only in the measurement screen, which is unique for each screen.

4.4.1 Window type

Windows can be classified as follows.

(1) Setting window
A window is for setting the parameter. It is displayed in the lower part of the window area in default.

(2) Measurement result window
A window to display the measurement result. It is displayed in the lower part of the window area in default.

(3) Screen specific window
Windows other than setting or measurement result window that are specific for the measurement screen.

Two windows for setting and measurement result are already opened when measurement screens open and they cannot be closed. On the other hand, measurement screen specific windows may require some operations to open and they can be closed.

4.4.2 Window status

Multiple windows can be opened in a screen. A window must be active to operate the window such as changing the window size and setting parameters in the window. One window can be activated in one screen.

Window list bar indicates the window type being opened and active/non-active status.

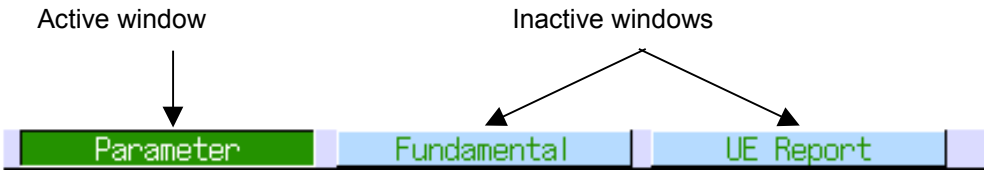

Fig. 4.4.2-1 Window list bar

Cursor is displayed on the activated window when the windows for Measurement result and setting are displayed.

4.4.3 Activating window

Press [Focus] to activate the window to be operated. Each time [Focus] is pressed, active window changes in sequence. Press [Focus] until the desired window becomes active.

4.4.4 Changing window size

To display more parameters and items in a window, enlarge the window size. The window size can only be changed in the vertical direction on the screen.

To change the window size, select "Window Size" from the function menu. Window size can be specified from Full Window, 70%, 50% or 30%, setting window area vertical width as Full Window.

If two windows are displayed and when changing one window size, another window size changes. For example, if lower active window is specified to display in 70%, upper non-active window is displayed in 30%.

When setting the window size to 100%, all the opened window sizes are set to 100% and an active window is displayed on the window. By pressing [Focus], another opened window is activated and displayed in the size of 100%.

Example:

To set the window size to 50%:

[Procedure]

1. Press [Next] to change the page of the function menu and display Window Size menu.
2. Press [F1] "Window Size" to display Window Size of the function menu.
3. Press [F3] "50%" to change the proportion of the window

■ Example of programming by remote control

```
WINSIZE 50          /*Set the active window size to 50%*/
```

4.4.5 Scrolling window

As with the screen, the window can be scrolled up and down when the scroll bar is displayed. Scrolling the window is effective only for an active window.

The window scrolling operations are described in the table below.

Table 4.4.5-1 Scrolling a window

Scrolling the window	Operation
Scrolling upward	• Turn the rotary control to the left • [∧] • [Scroll Up]
Scrolling downward	• Turn the rotary control to the right • [∨] • [Scroll Down]

When operating [∧], [∨] or rotary control, the screen is scrolled together with an up-and-down movement of the cursor. When pressing [Scroll Up] or [Scroll Down], the screen is scrolled by the window width.

4.5 Operating User Menu

User menu is the executable function list displayed in each screen or window. Up to seven functions: U1 to U7 are displayed and user menu is executed by pressing the corresponding user function keys.

User menus are displayed only on the common screen and are all screen select function menus.

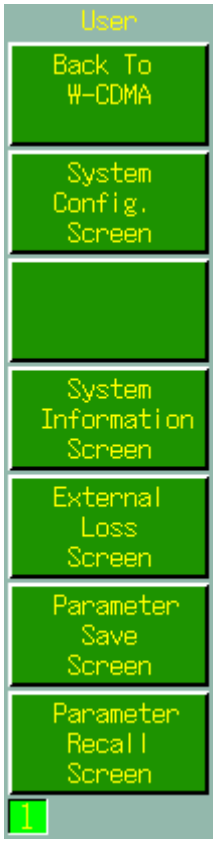

Fig. 4.5-1 User menu

4.5.1 Executing user menu

To execute the user menu, Press user function keys on the left of menu to be executed.

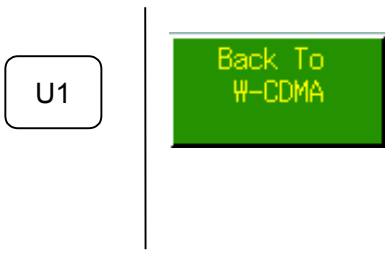

Fig. 4.5.1-1 Executing user menu

4.6 Operating Function Menu

Function menu is displayed in each screen or window and executed by pressing the function keys on the right of the menu to be executed.

4.6.1 Viewing function menu

The number of function menu items displayed on one screen is 7 (F1 to F7). The more functions that do not appear are displayed by switching the function menu page number of the function menu.

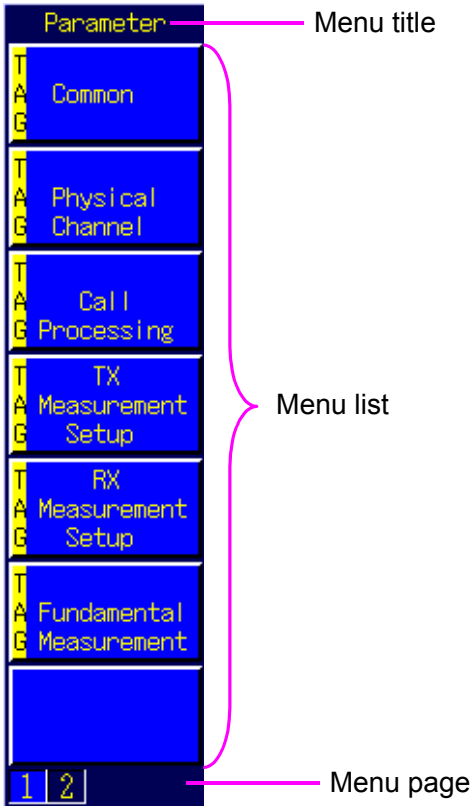

Fig. 4.6.1-1 Viewing the function menu

1. Menu title:
   The title of the function menu is displayed.
2. Menu list:
   The function to be executed is displayed.
3. Menu page:
   The number of pages for the function menu and page number being selected is displayed.

4.6.2 Switching menu page

When a screen or window has seven or more functions, menus are displayed by switching the pages.

Press Next to switch the menu page. Press Next to change the page.

Example:

To switch from page1 to 2 of the function menu.

[Procedure]

1. Page 1 of the function menu is displayed.

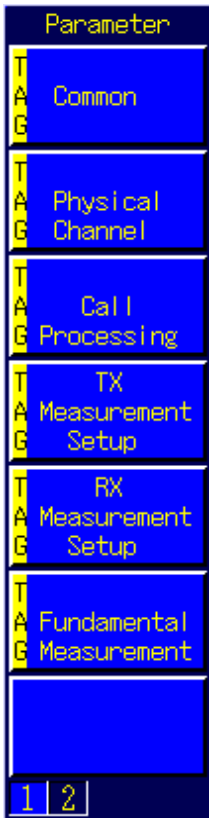

Fig 4.6.2-1 Page 1 of the function menu

2. Press Next.
3. Page 2 of the function menu is displayed.

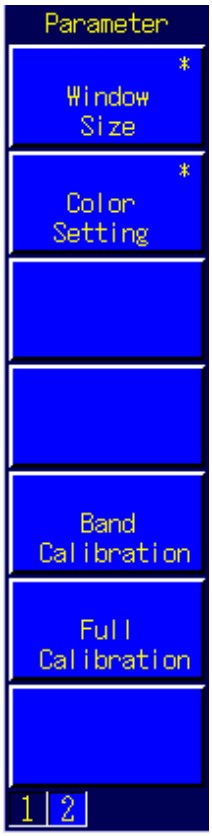

Fig. 4.6.2-2 Page 2 of the function menu

4.6.3 Displaying menu list of all pages

Menus in all the pages for displayed menu title can be displayed as a list.
Press [Functions] to display all menus.

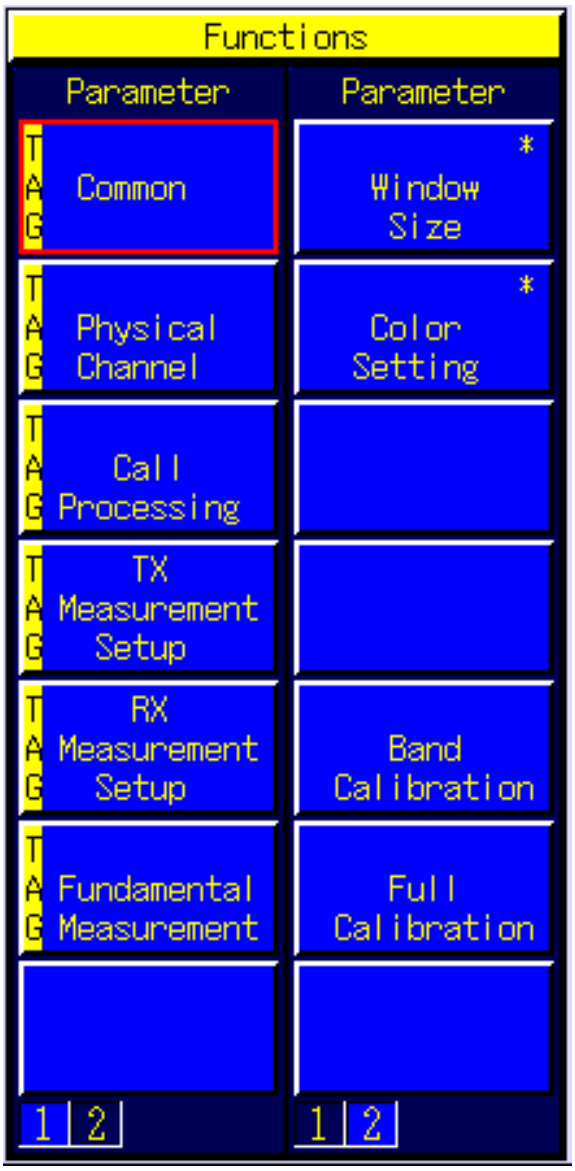

Fig. 4.6.3-1 Displaying the all menu list

Operations described in a table below are performed in a pop-up window for all menus.

Table 4.6.3-1 Operating pop-up window for all menus

Pop-up window for all menus	Operation
Display/hide all menus	Functions
Move the cursor upward	• Turn the rotary control to the left • ∧ (Move between pages)
Move the cursor downward	• Turn the rotary control to the right • ∨ Move between pages
Move the cursor to the left	<
Move the cursor to the right	>
Execute the menu for cursor	• Press the rotary control • Set • Enter
Execute the menu on the page on which cursor is displayed	F1 to F7

Example:

To perform Band Calibration with all menus displayed

[Procedure]

1. Press Screen to open the desired measurement screen.
2. Press Functions to open the Functions menu.
3. Press > and ∨ to move the cursor to Band Calibration.
4. Press Set to start calibration within the system band.

4.6.4 Types of function menus

The following types of function menus are provided according to the functions:

(1) Execution menu
(2) Numeric value entry menu
(3) Character string entry menu
(4) Item display menu
(5) Item selection menu
(6) Tag selection menu
(7) Toggle menu
(8) Screen selection menu

4.6.5 Execution menu

Press function key in the execution menu to set execution status for displayed function. Screen selection function and calibration execution function are included in the execution menu.

Fig. 4.6.5-1 Example of an execution menu

Example:

To execute Full Calibration on the measurement screen
Press [F6] "Full Calibration" to execute Full Calibration.

4.6.6 Numeric value entry menu

Menu to enter the numeric value for parameter, etc. Pop-up window to enter the numeric value is opened by pressing the function key of the numeric value entry key.

Menus for which a pop-up window opens, including the Numeric value entry menu, are displayed with a # mark.

Fig. 4.6.6-1 Example of a numeric value entry menu

Operations in the pop-up window are described in Table 4.6.6-1.

Table 4.6.6-1 Operations in numeric value entering pop-up window

Numeric value entry	Operation
Increase the value for cursor by 1	• Turn the rotary control to the right • ^
Reduce the value for cursor by 1	• Turn the rotary control to the left • v
Move the cursor to the left	<
Move the cursor to the right	>
Enter the numeric value	Numeric keypad
Deleting the value for cursor	BS
Determine the numeric value and entry end /moving to the next entry item*	• Press rotary control • Enter
Determine the numeric value and entry end	Set
Cancel the entry	Cancel

Note:

For multiple entry items, the cursor selects one entry item. If an entry item is on the right of the cursor, press rotary control or Enter to determine the numeric value of the current cursor position and move to the next item on the right. If no item is on the right, the value for cursor position is determined.

4.6.7 Character string entry menu

A menu to enter a character string. Press function key of the character string entry menu to open the pop-up window to enter character strings.

Menus for which a pop-up window opens, including the Character string entry menu, are displayed with a # mark.

Operations in the pop-up window are described below.

Table 4.6.7-1 Operations in character string entry pop-up window

Character strings entry	Operation
Move the cursor in the Entry column to the left	• [<] • [^]
Move the cursor in the Entry column to the right	• [>] • [v]
Move the cursor to select the characters to the left.	Turn the rotary control to the left
Move the cursor to select the characters to the right.	Turn the rotary control to the right
Select characters (input to Entry column)	• Press rotary control • [Enter]
Determine character strings	[Set]
Chancel entry	[Cancel]

4.6.8 Item display menu

A menu to display item selection menu for displayed item. Press the function key of item display menu to display the item selection menu.

Item display menu is displayed with asterisk (*).

Fig. 4.6.8-1 Example of an item display menu

4.6.9 Item selection menu

This menu is displayed by executing the item display menu. Options on menu title are displayed. Press function key for item selection to select one of the options.

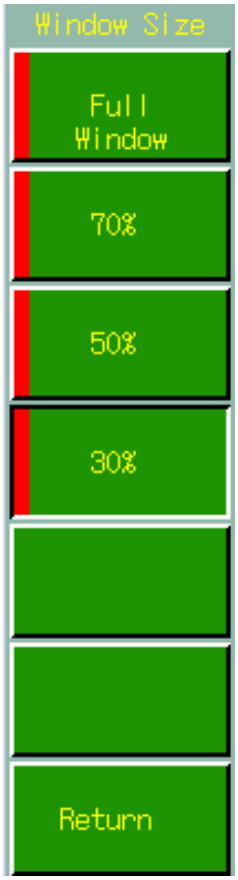

Fig. 4.6.9-1 Example of an item selection menu

4.6.10 Tag selection menu

By pressing the function key for a tag selection menu, the selected tag is activated and displayed at the top of the screen or window. Operations are similar to the execution menu.

TAG mark is displayed on the left of the tag selection menu.

Fig. 4.6.10-1 Example of a tag selection menu

4.6.11 Toggle menu

Toggle menu displays two options. Cursor is displayed on one item, indicating the selected status. Cursor moves alternatively by pressing the function key for toggle menu. Parameter is determined to the value displayed in the toggle menu every time the cursor moves.

Fig. 4.6.11-1 Example of a Toggle menu

4.6.12 Screen selection menu

By pressing the function key for a screen selection menu, the corresponding screen is displayed. Note that only limited screens can be displayed from the screen selection menu.

A "->" mark is displayed on the screen selection menu.

Fig. 4.6.12-1 Example of a screen selection menu

4.7 Setting Parameters

Setting status and measurement conditions are called parameter. In this section, procedures for setting parameters are described for each parameter type.

4.7.1 Settable parameters

Parameters displayed on the setting window can be classified into two types: one that can be changed the value and one that is only for display and no value can be changed. Parameter values may be changed or may not be able to be set because of one parameter value since multiple parameter relate with each other.

Cursor can be moved onto the settable parameter but cannot be move onto the unsettable parameter. Unsettable parameters are closed with parenthesis.

(1) Settable parameter

Fig. 4.7.1-1 Settable parameter

(2) Unsettable parameter

Fig. 4.7.1-2 Unsettable parameter (for display only)

4.7.2 Parameter type

Parameter can be classified into the following types according to their format and entry methods:

(1) List selection type
This parameter is used to select an item such as date format from a list of choices.

(2) Numeric value type
This parameter is used to enter numeric values such as channel number and frequency.

(3) Numeric value group type
This type of parameter is a set of several numeric value-type parameters. Date and time are of this type.

(4) Character string type
This parameter is configured of character string to be displayed in a file name and a title.

4.7.3 Parameter setting procedures

Manual parameter setting is performed by procedures below regardless of a parameter type.

[Procedure]

1. Move the cursor onto the parameter to be set.
2. Start entry.
3. Select parameter or enter numeric values or character strings.
4. Determine the entered value.

During remote control, values are directory changed by sending a programming command. All parameters can be set in any screen satisfying setting conditions.

4.7.4 Setting list selection type parameter

The procedure for setting a list-selection-type parameter is as follows:

[Procedure]

1. Turn the rotary control and move the cursor onto the parameter to be set.
2. Start entry by one of the following operations.
   - Press the rotary control
   - Press Set
   - Press Enter
3. When starting entry, selection list pop-up window is displayed.

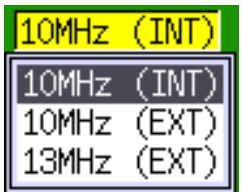

Fig. 4.7.4-1 Example of a selection list

4. Turn the rotary control and move the cursor onto the value to be set.
5. Determine the value by one of the following operations.
   - Press the rotary control
   - Press Set
   - Press Enter
6. Pop-up window is closed and entered value is displayed.

4.7.5 Setting numeric value type parameter

The procedure for setting a numeric-value-type parameter is as follows:

[Procedure]

1. Turn the rotary control to move the cursor onto the parameter to be set.
2. Perform one of the following operations to start entry.
   - Press the rotary control
   - Press [Set]
   - Press [Enter]

   → To step 3

   - Press numeric keypad
   - Press [–/+]
   - Press [BS]

   → To step7
3. When starting entry with rotary control, [Set] or [Enter], the pop-up window to enter the numeric value is opened.

Fig. 4.7.5-1 Example of the numeric value entry pop-up window

4. Enter numeric values by the operations described in Table 4.7.5-1.

Table 4.7.5-1 Operations in the numeric value entry pop-up window

Numeric value entry	Operation
Increase the value for cursor by 1	• Turn the rotary control to the right • [∧]
Reduce the value for cursor by 1	• Turn the rotary control to the left • [∨]
Move the cursor to the left	[<]
Move the cursor to the right	[>]
Numeric value entry	Numeric keypad
Reverse the symbol	[–/+]
Delete the value for cursor	[BS]
Cancel the entry operation	[Cancel]

5. Determine the value by one of the following operations. Unit is set to the one displayed on the pop-up window.
   - Press the rotary control
   - Press [Enter]
   - Press [Set]
6. Pop-up window is closed and entered value is displayed.
7. When the value entry starts with numeric keypad, [–/+] or [BS], the value is displayed according to the entry keys (pressing [BS] deletes the previous value). Operation for numeric value entry is described in the table below.

Table 4.7.5-2 Operation for numeric value entry

Numeric value entry	Operation
Numeric value entry	Numeric keypad
Reverse the symbol	[–/+]
Delete the value for the cursor	[BS]
Cancel the entry operation	[Cancel]

8. Determine the value by one of the following operations and finish the entry.
   - Press rotary control
   - Press [Set]
   - Press [Enter]

   } Determined with default unit
   - Press the unit key → Determined with specified unit

4.7.6 Setting numeric value group type parameter

The procedure for setting a numeric-value-group-type parameter is as follows:

[Procedure]

1. Turn the rotary control to move the cursor onto the parameter to be set.
2. Perform one of the following operations to start entry.
   - Press the rotary control
   - Press [Set]
   - Press [Enter]
3. When starting entry, the pop-up window to enter the numeric value is opened.

Fig. 4.7.6-1 Example of the numeric value group entry pop-up window

4. Operation for numeric value entry is described in the table below.

Table 4.7.6-1 Operations in the numeric value group entry pop-up window

Numeric value entry	Operation
Increase the value for the cursor by 1	• Turn the rotary control to the right • [∧]
Reduce the value for the cursor by 1	• Turn the rotary control to the left • [∨]
Move the cursor to the left	[<]
Move the cursor to the right	[>]
Numeric value entry	Numeric keypad
Reverse the symbol	[–/+]
Delete the value for cursor	[BS]
Cancel the entry operation	[Cancel]
Determine the value where the cursor is placed and move the cursor to the next item.	• Press the rotary control • [Enter]

5. Press [Set] to determine the entry.
6. The pop-up window is closed and entered value is displayed.

4.7.7 Setting character string parameter

The procedure for setting a character-string-type parameter is as follows:

[Procedure]

1. Turn the rotary control to move the cursor onto the parameter to be set.
2. Perform one of the following operations to start entry.
   - Press the rotary control
   - Press [Set]
   - Press [Enter]
3. When starting entry, the pop-up window to enter the character string is opened.
4. Perform the operations in Table 4.7.7-1 to enter the character string.

Table 4.7.7-1 Operations in character string entry pop-up window

Character string entry	Operation
Move the cursor in the Entry column to the left	[<]
Move the cursor to the character at right most in the Entry column	[^]
Move the cursor in the Entry column to the right	[>]
Move the cursor to the character at left most in the Entry column	[v]
Move the cursor to select the characters to the left.	Turn the rotary control to the left
Move the cursor to select the characters to the right.	Turn the rotary control to the right
Enter selected characters to the Entry column	• Press rotary control • [Enter]
Delete a character just before the cursor in the Entry column	[BS]
Chancel the entry	[Cancel]

5. Press [Set] to determine the character string in the Entry column.
6. Finish entry and close the pop-up window.

4.7.8 Setting channel, frequency or level

Pressing the channel level key of the panel key ease the operation to set the input/output channel, frequency and level on the measurement screen.

Table 4.7.8-1 Parameter and channel level key

Parameter	Channel level key
Channel	Channel
Input frequency	Input Freq.
Output frequency Output Freq.	Shift + Input Freq.
Input level	Input Level
Output level	Output Level

Note:

Concrete parameter types and qualities vary depending on the measurement software.

[Procedure]

1. Press a channel level key corresponding to the parameter to be set.
2. Enter numeric values in the entry area by the operations described in Table 4.7.8-2.

Table 4.7.8-2 Operations in the entry area

Entry area	Panel key
Increase the value for cursor by 1*1	• Turn the rotary control to the right • ∧
Reduce the value for cursor by 1*1	• Turn the rotary control to the left • ∨
Move the cursor to the left*2	<
Move the cursor to the right*2	>
Enter the numeric value	Numeric keypad
Deleting the value for cursor	–/+
Determine the numeric value and entry end /moving to the next entry item*3	BS
Determine the numeric value and entry end	Cancel

1:

When the value is changed, the display value is set (frequency or level changes).

2:

This operation is invalid after pressing the numeric keypad, [–/+], or [BS]. It is validated again by pressing [Set], [Enter] or the rotary control.

3:

Pressing [BS] after turning the rotary control or pressing [∧], [∨], [<] or [>] deletes all the displayed value.

3. Press one of the following keys if the numeric keypad, [–/+] or [BS] is pressed at the end of operations in the entry area.
   - Press rotary control
   - Press [Set]
   - Press [Enter]
4. Press one of the following keys to determine the entry and close the entry area.
   - Press rotary control
   - Press [Set]
   - Press [Enter]

4.8 Tag Operation

Tag is generic name for parameters and display items, which is displayed on the left side of a screen or a window. Each parameter and measurement result belonging to Tag is displayed under the tag. By tracing a tag, parameters and display items can be found speedily.

4.8.1 Tag status

A tag can be active or non-active. Only one tag can be active for one screen or window and other tags are all non-active.

To open a view window or template, a tag for which a view window or template belongs must be active.

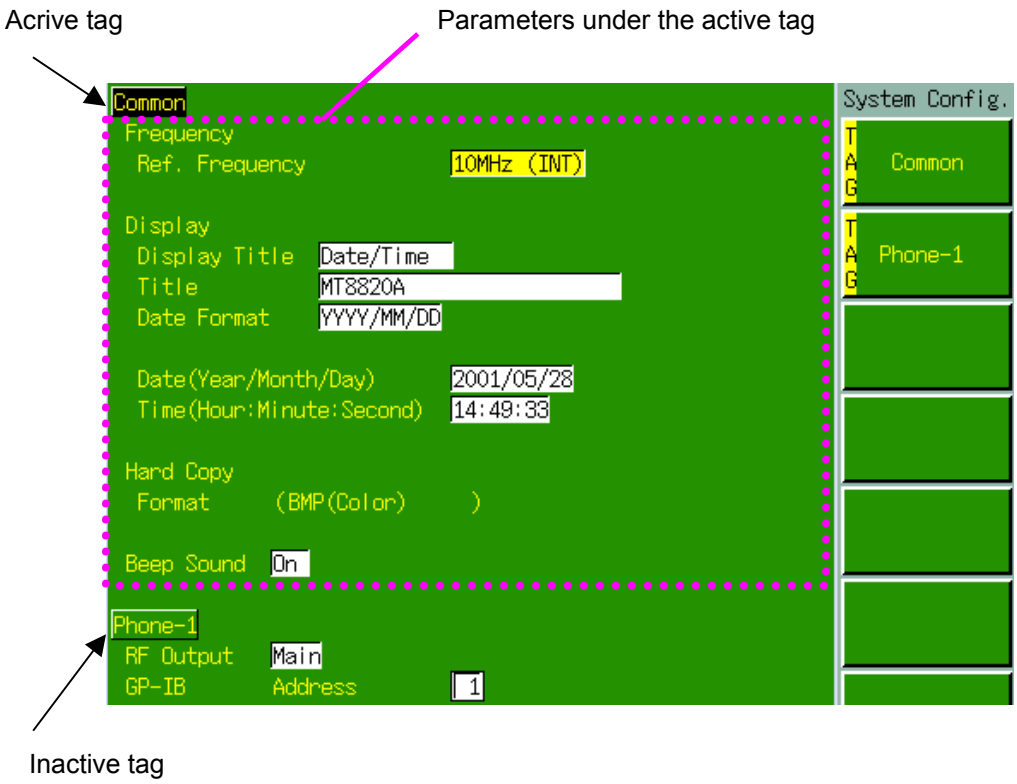

Fig. 4.8.1-1 Tag status

4.8.2 Activating tag

A tag can be activated by the following operation

(1) Move the cursor onto the parameter belonged to the tag.

(2) Move the cursor within the tag display area.

(3) Execute the tag selection menu in the function menu.

(1) Move the cursor onto a parameter belonged to the tag

In the common screen or setting window, tag can be activated by moving the cursor onto a parameter belonged to the tag.

Example:

To activate the Phone-1 (or Phone-2) tag on the System Configuration screen.

[Procedure]

1. Open Configuration screen.
2. Turn the rotary control to move the cursor onto the GPIB Address. As GPIB Address is a parameter that belongs to the Phone-1 (or Phone-2) tag, the Phone-1 (or Phone-2) tag becomes active.

(2) Move the cursor within the tag display area

In the measurement result display window, the tag can be activated by moving the cursor (line cursor) within the tag display area. The tag display area includes the area between a tag and the next tag.

Example:

To activate the Occupied Bandwidth tag on the Fundamental Measurement screen/measurement result window of W-CDMA measurement software.

[Procedure]

1. Open Fundamental Measurement screen.
2. Press Focus to activate the measurement result window by pressing.
3. Turn the rotary control to move the cursor within the display area of the Occupied Bandwidth tag.

(3) Execute the tag selection menu in the function menu

Function menu marked with "TAG" is the tag selection menu. By executing the function menu on which tag name to be activated is written, the tag is activated.

Example:

To activate the Occupied Bandwidth tag on the Fundamental Measurement screen/measurement result window of the W-CDMA measurement software.

[Procedure]

1. Open Fundamental Measurement screen.
2. Press [Focus] to activate the measurement result window.
3. Press [F3] "Occupied Bandwidth."

4.8.3 Jump to tag

By executing a function menu marked with "TAG," parameters and display items belonged to a tag can be displayed faster than displaying by scroll. The displayed tag is activated.

4.9 Operating Template

Template is to judge the measurement result waveform. A template can be opened when a mark as shown in the figure below is displayed in the setting window.

Fig. 4.9-1 Template mark

Note:

The screen cannot be switched to another window when a template is opened. Close the template to switch to other window.

4.9.1 Opening template

A template can be opened by the following two methods.

(1) Open from the setting window.

(2) Open from the function menu on the view window.

(1) Open from the setting window

[Procedure]

1. Press [Screen] to open the measurement screen.
2. Press [Focus] to activate the setting window.
3. Turn the rotary control to move the cursor onto the template mark.
4. Press one of the following keys to open the template.
   - Press rotary control
   - Press [Set]
   - Press [Enter]

(2) Open from the function menu on the view window.

[Procedure]

1. Press [View] to open the view window.
2. Press [Next] to display the "Template" menu.
3. Open the template by pressing the "Template" function key.

4.9.2 Closing template

Execute "Close" in the function menu to close the template.

[Procedure]

1. Press [Next] to display the first page of the function menu.
2. Press [F7] "Close" to close the template.

4.10 Operating View Window

Open the view window to display the measurement waveform. A view window can be displayed for each tag in the measurement result window on the measurement screen. For a tag that can display the view window, a view window mark as shown in the figure below is displayed on the right of the tag.

Fig. 4.10-1 View window mark

4.10.1 Opening view window

A view window is displayed in the measurement result window on the measurement screen.

[Procedure]

1. Press [Screen] to open the measurement screen.
2. Press [Focus] to activate the parameter window.
3. Press "Fundamental Measurement" on the function menu.
4. Set "Measurement Mode" to Normal.
5. Press [Focus] to activate the measurement result window.
6. Activate the tag to which the view window to be displayed is assigned.
7. Press [View] to open the view window.

4.10.2 Closing view window

To close a view window, press [View] while the view window is displayed.

[Procedure]

1. Close the view window by performing one of the followings:
   - Press [View]
   - Press [F7] "Close" on the first page of the function menu

Note:

Operations in the view window differ depending on the view window. Refer to the operation manual of the measurement software.

Section 5 Using Common Functions

This section describes the operation procedure of the common functions for the measurement software such as initialization, measurement start and methods for saving/reading parameters. Refer to Section 6 for the common screen functions.

5.1 Initialization 5-2
5.2 Calibration 5-3
5.2.1 Calibrating communication system band 5-3
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5.3 Starting Measurement 5-5
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5.1 Initialization

Before starting a new measurement, perform initialization. Initialization returns all the parameters to the known state to prevent from being affected by the previous operations.

The procedure for initialization is as follows.

[Procedure]

1. Press [Preset] to open the Preset menu.
2. Press [F1] "Preset" to execute the initialization.

Notes:

1. Initialization cannot be performed on the Standard Load screen. When the Standard Load screen is displayed, therefore, change the screen to another one before starting initialization by referring to Section 4.3 "Operating a screen."

2. Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

■ Example of programming by remote control

```
*RST
```

Initialization by execution of Preset menu or via GPIB interface initializes the following items:

- Selection screen
- All parameters on the measurement screen
- Call processing status
- Measurement status/results display

The following items are not initialized:

- Setting for the System Configuration screen
- Calibration data acquired by executing Band Calibration
- Calibration data acquired by executing Full Calibration
- Screen color pattern

5.2 Calibration

Calibration flattens the frequency characteristics of level accuracy against input and output levels and adjusts the level accuracy changes caused by internal temperature change. Calibration is performed after power is turned on or a terminal to be tested is changed.

Band Calibration and Full Calibration can be performed by a single MT8815A/MT8820A unit. Band Calibration performs calibration within the band of the communication system supported by the measurement software. Full Calibration performs calibration for RF input/output bands for MT8815A/MT8820A.

To perform calibration, execute Band Calibration or Full Calibration in the function menu. Calibration can be performed from any measurement screen or window with the same kind of operation. Calibration cannot be performed on a common screen.

5.2.1 Calibrating communication system band

Band Calibration performs calibration within all the bands of the communication system supported by the measurement software. For example, calibration is performed at the W-CDMA band (Uplink: 1850 to 1910 MHz and 1920 to 1980 MHz, Downlink: 1930 to 1990 MHz and 2110 to 2170 MHz) for the W-CDMA measurement software. Band Calibration takes less time than Full Calibration.

Perform Band Calibration after changing the tested phone, and other occasions.

[Procedure]

1. Press Screen to select the desired measurement screen.
2. Press Next to switch from the function menu page and display the Band Calibration menu.

Fig. 5.2.1-1 Band Calibration menu

3. Press F5 "Band Calibration" to perform calibration.

■ Example of programming by remote control

```
BANDCAL
```

5.2.2 Calibrating all input/output bands

Full Calibration performs calibration on the RF input/output bands (30 to 2700 MHz) for MT8815A/MT8820A.

Full Calibration is performed when the MT8815A/MT8820A is turned on.

The time for the last Full Calibration is displayed at "Full CAL Time" field on System Information screen.

Note:

Wait at least 60 minutes after turning the power on before performing Full Calibration.

After performing Full Calibration once, perform Band Calibration at any time between measurements, such as when replacing phones.

[Procedure]

1. Press Screen to select desired measurement screen.
2. Press Next to switch function menu page and display the Full Calibration menu.

Fig. 5.2.2-1 Full Calibration menu

3. Press F6 "Full Calibration" to perform calibration.

■ Example of programming by remote control

```
FULLCAL
```

5.3 Starting Measurement

A measurement is performed on the measurement screen (Phone-1 or Phone-2 Screen). A measurement cannot be performed on the Common Screen.

Common screen on which a measurement cannot be performed

- System Configuration screen
- System Information screen
- Common External Loss screen
- Parameter Save screen
- Parameter Recall screen
- Standard Load screen

5.3.1 Measurement mode

The following three measurement modes are available:

(1) Single mode
A measurement is performed only once. Averaging measurements are made by the specified number of averaging times (number of measurements).

(2) Continuous mode
A measurement in Single mode is repeated unless the measurement stop condition is met by pressing [Stop], etc.

(3) Synchronous single mode (for remote control only)
This mode is only for remote control. A measurement is performed in the single mode. If the measurement is started with `SWP` command, the next command is not processed until the measurement finishes. This can prevent from returning the response of the measurement result before the measurement completion.

5.3.2 Starting measurement in Single mode

[Procedure]
Press [Single] on the measurement screen.

■ Example of programming by remote control

```
SNGLS
```

5.3.3 Starting measurement in Continuous mode

[Procedure]
Press [Continuous] on the measurement screen.

■ Example of programming by remote control

```
CONTS
```

5.3.4 Starting measurement in Synchronous single mode

[Procedure]

Transmits SWP command on the measurement screen.

■ Example of programming by remote control

```
SWP
```

5.3.5 Stopping measurement

To stop a measurement under execution, press Stop on the front panel.

Under remote control, measurement start commands SNGLS, S2 (single) or CONTS, S1 (continuous mode) are used. If SWP or TS command is used, the MEASSTOP command is not processed until the measurement ends.

To check if the measurement is being performed, view the measurement indicator error status area. Refer to Section 4.1.3 "Measurement-indicator/error-status area".

Note:

A measurement operation is aborted when changing parameters while the measurement is being performed.

[Procedure]

Press Stop during the measurement.

■ Example of programming by remote control

```
SNGLS                /*Starts a measurement in the single mode*/
MEASSTOP             /*Stops a measurement*/
```

5.4 Connecting Call

MT8815A/MT8820A can realize pseudo network function in the mobile communication system. By physically connecting MT8815A/MT8820A to phone with RF cable and connecting a call, establish the communication between the network and the phone to control the phone.

Call processing status to connect/release a call is different depending on the specifications of mobile communication systems. Refer to the operation manual for the measurement software.

This clause describes the basic operations using a panel key.

5.4.1 Connecting call

Connecting a call means establishing communication status between MT8815A/MT8820A and a phone being tested. To connect a call, call from MT8815A/MT8820A (network) or from the phone being tested to MT8815A/MT8820A.

Note:

To connect a call, the call processing status must be in idle (wait).

(1) Calling from MT8815A/MT8820A

Call from MT8815A/MT8820A to the phone as follows:

[Procedure]

1. Connect MT8815A/MT8820A to the phone with RF cable (refer to Section 2.3.4 “Connecting to phone).
2. Set a parameter required for connecting a call. Then put MT8815A/MT8820A into idle status.
3. Put the phone into idle status. The location or phone number of the phone must be registered to MT8815A/MT8820A.
4. Press [Start Call].

(2) Calling from the phone

Call from the phone to MT8815A/MT8820A as follows:

[Procedure]

1. Connect MT8815A/MT8820A to the phone with RF cable (refer to Section 2.3.4 “Connecting to phone”).
2. Set a parameter required for connecting a call. Then put MT8815A/MT8820A into idle status.
3. Put the phone into idle status. The location or phone number of the phone must be registered to MT8815A/MT8820A.
4. Call from the phone using any phone number (emergency call, etc.).

5.4.2 Ending call

Ending a call means terminating communication status between MT8815A/MT8820A and the phone being tested and putting them into idle status. A call can be ended from MT8815A/MT8820A (network) or from the phone, just as when connecting a call.

Note:

To end a call, the call processing status must be in communication. The term indicating communication status varies depending on the measurement software.

(1) Ending from MT8815A/MT8820A

Perform the following procedures to end a call from MT8815A/MT8820A:

[Procedure]

1. Check that the call-processing status is in communication (calling).
2. Press End Call on the front panel.

(2) Ending from the phone

Perform the following procedures to end a call from a phone:

[Procedure]

1. Check that the call-processing status is in communication (calling).
2. Press the Hold button on the phone, or perform the equivalent operation.

5.5 Hard Copy

Hard copy is a function to save an image displayed on LCD of MT8815A/MT8820A in the file. This function is useful for recording the measurement result or waveform or pasting on a report.

5.5.1 Media and format of saving destination

A hard copy is saved in a memory card with a bitmap format file (extension: .bmp).

The file name is made of two parts: WCACP and a three-digit sequential number plus ".bmp". The smallest unused number from WCACP000.bmp. to WCAP999.bmp is used. If there are already 1000 files from WCACP000.bmp. to WCAP999 in the save destination folder, saving cannot be performed.

Note:

The file format for a memory card is MS-DOS.

5.5.2 Taking hard copy

[Procedure]

1. Press Copy.
2. Copy completes when a message "Hard Copy/Complete: WCACP***.BMP" is displayed.

Note:

Never eject the memory card until a message "Hard Copy/Complete: WCACP***.BMP" is displayed.

5.6 Functions Can be Set Only for Remote Control

This clause describes the special functions that can be executed only in the remote control mode.

5.6.1 Setting LCD power source

Turn the LCD power source off when the mode is remote control and information display on the screen is not required so that electric power consumption can be restrained. In this operation, the measurement throughput can be improved by turning off the image operation.

■ Example of programming by remote control

```
DISPL OFF          /*Turns the LCD power off*/
DISPL ON           /*Turns the LCD power on (normal display)*/
```

5.6.2 Setting image operation

Turn the image operation off when the mode is remote control and information display on the screen is not required so that the measurement throughput can be improved. This is because time for displaying the measurement result on the screen after the measurement is omitted. “Screen Off” is displayed when the image operation is off.

■ Example of programming by remote control

```
SCREEN OFF         /*Turns the image operation Off*/
SCREEN ON          /*Turns the image operation On (normal display)*/
```

5.6.3 Setting delimiter

Set the delimiter to be added at the end of a query message for the remote control command. Set the delimiter according to settings of the remote control communication program to be used.

■ Example of programming by remote control

```
DELM 0             /*Sets delimiter to LF*/
DELM 1             /*Sets delimiter to CR/LF*/
```

5.6.4 Setting terminator

Sets a terminator added at the end of a query message for the remote control command. Set the terminator in conformance with the settings for the remote control communication program currently being used.

■ Example of programming by remote control

```
TRM 0              /*Set the terminator to LF*/
TRM 1              /*Set the terminator to CR/LF*/
```

5.6.5 Setting processing at error occurrence

Sets a processing for the case when an error occurred.

(1) Normal mode
Continues the processing for succeeding commands ignoring an occurrence of an error. An error pup-up window for the occurred error is displayed only at the error occurrence, but deleted when the succeeding command is processed.

(2) Error remain mode
Displays the error pop-up window until the next error occurred. If a new error occurs for the succeeding command, an error pop-up window for it is displayed.

(3) Stop mode
When an error occurs, command processing is interrupted while an error pop-up window is being displayed.

The manual control mode can be returned from any mode by pressing Local. In this case, the displayed message is deleted.

■ Example of programming by remote control

```
REMDISP NORMAL      /*Normal mode*/
REMDISP REMAIN      /*Error remain mode*/
REMDISP STOP        /*Stop mode*/
```

5.7 Other Functions

5.7.1 Outputting non-modulation CW signals

Normally, RF signals output from MT8815A/MT8820A are modulated signal. However, output of non-modulation CW signal may be required in the special occasion such as a performance test. Return to the normal mode that outputs the modulation signal when a performance test completes.

The procedure for outputting non-modulation CW signals is as follows.

[Procedure]

1. Press Screen to select the desired measurement screen.
2. Press Next to switch from the function menu page and display the Modulation menu.

Fig. 5.7.1-1 Modulation menu

3. Press F4 "Modulation" to output non-modulation CW signals.

■ Example of programming by remote control

```
MOD OFF          /*Outputs non-modulation CW signals*/
MOD ON           /*Outputs modulation signals (normal mode)*/
```

Section 6 Common Screen Functions

This section describes the functions and procedures on common screen such as the System Configuration screen and System Information screen.

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6.1 Setting Systems and Interfaces

This section describes setting method for MT8815A/MT8820A systems such as reference frequency, date and time, and interfaces such as GPIB. Systems and interfaces are set on the System Configuration screen.

6.1.1 Opening System Configuration screen

[Procedure]

1. Press Config to open the Configuration menu.

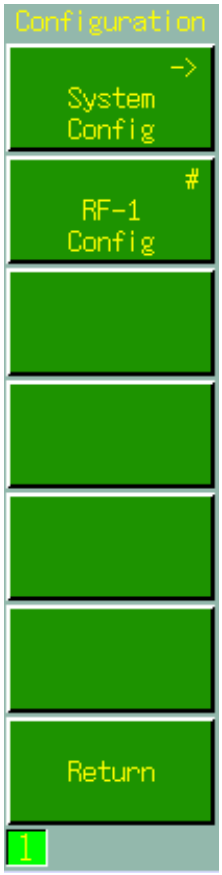


Fig. 6.1.1-1 Configuration menu

2. System Configuration is opened by pressing F1 "System Config".

The screen can also be opened by pressing Screen to select the screen or using user menu screen switching function

6.1.2 Viewing System Configuration screen

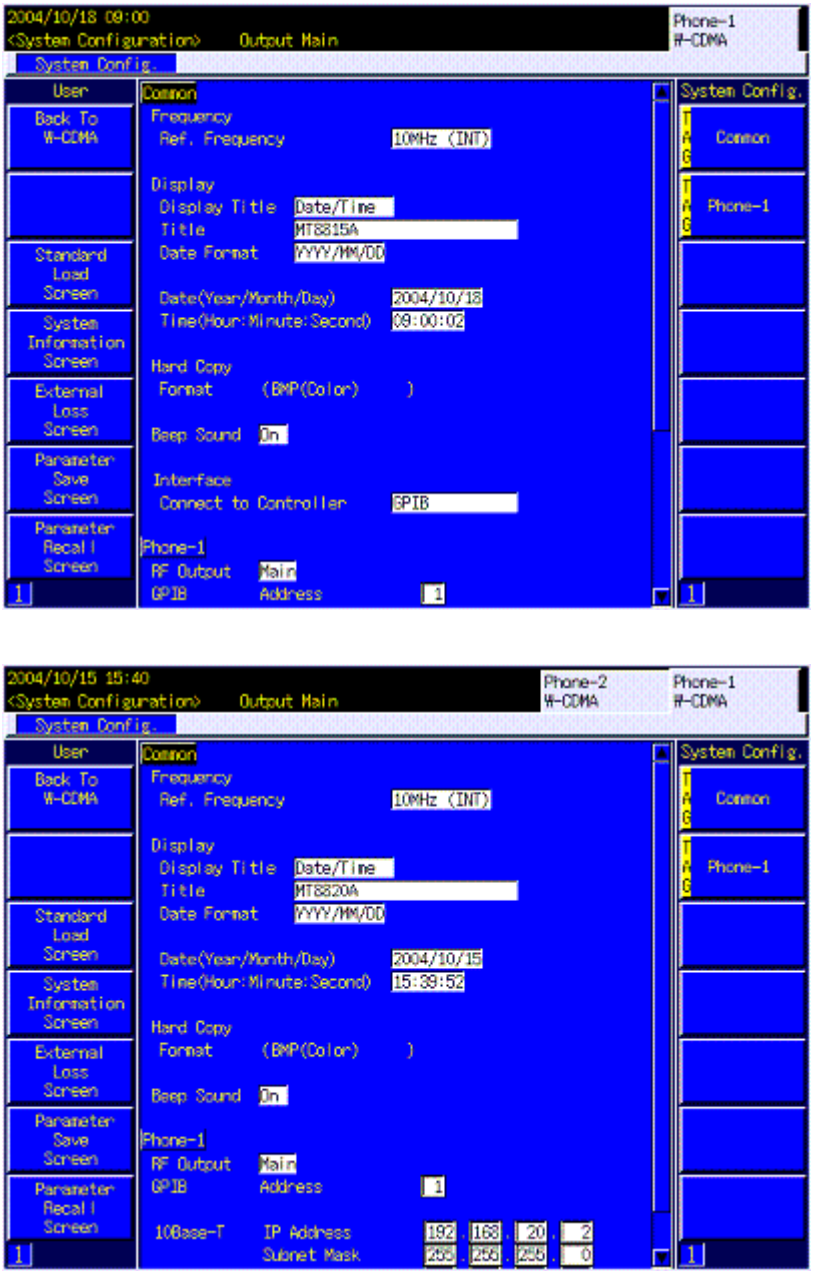


Fig. 6.1.2-1 System Configuration screen (upper: MT8815A, lower: MT8820A)

Parameter

Notes:

1. The following parameters cannot be initialized by Preset.

2. RS232C (Serial) is displayed only for the MT8815A.

(1) Common parameter (tag)

Sets basic system values for MT8815A/MT8820A

(a) Frequency

(i) Ref. Frequency

Sets the frequency of externally input reference signal.

- Set value: 10 MHz (INT) MT8815A/MT8820A internal 10 MHz Reference signal
  10 MHz (EXT) External input 10 MHz Reference signal
  13 MHz (EXT) External input 13 MHz Reference signal
- Initial value: 10 MHz (INT)

(b) Display

(i) Display Title

Sets the type of the title to be displayed in the upper-left corner of the screen

- Set value: Off (display Off)
  User Define (user-defined character string)
  Date/Time (date and time)
- Initial value: Date/Time

(ii) Title

Sets a user-defined character string to be displayed in the upper-left corner of the screen.

- Set value: Up to 25 characters
- Initial value: MT8815A (for MT8815A)
  MT8820A (for MT8820A)

(iii) Date Format

Sets the date display format

- Set value: YYYY/MM/DD (Year/Month/Date)
  MM/DD/YYYY (Month/Date/Year)
  DD/MM/YYYY (Date/Month/Year)
- Initial value: YYYY/MM/DD

(iv) Date (Year/Month/Day)

Sets the date display format.

- Set value: 2001/01/01 to 2030/12/31

(v) Time (Hour:Minute:Second)

Sets the time in 24-hour system.

- Set value: 00:00:00 to 23:59:59

(c) Hard Copy

(i) Format (BMP (Color)) Saves

Saves the screen display on the memory card with a bit map format file (extension .bmp).

The settings cannot be changed.

(d) Beep Sound

Sets whether or not to beep for an error, etc.

- Set value: On (beep), Off (does not beep)
- Initial value: On

(e) Interface

(i) Connect to Controller

Sets the controller used for external control.

- Set value: GPIB
  Serial (RS232C)
- Initial value: GPIB

Note:

The Interface is displayed for only the MT8815A.

(2) Phone-1 (Phone-2) parameter (tag)

Sets the interface for Phone-1 (or Phone-2).

(a) RF Output

Sets the connector for output destination of RF signal.

- Set value: Main, AUX
- Initial value: Main

(b) GPIB

(i) GPIB Address

Sets the GPIB interface address for remote control.

- Set value: 0 to 30
- Initial value: 1

(c) RS232C (Serial)

(i) Baud Rate

Sets the baud rate (transmission speed) of the communication port used for RS-232C.

- Set value: 38400 bps
  19200 bps
  9600 bps
  4800 bps
  2400 bps
  1200 bps
- Initial value: 4800 bps

(ii) Parity
Sets the parity check on the communication port used for RS-232C.

- Set value: Even: Even parity
  Odd: Odd parity
  Off: No parity (None)
- Initial value: Off

(iii) Data Bit
Sets the bit length of the communication port used for RS-232C.

- Set value: 7 bits
  8 bits
- Initial value: 8 bits

(iv) Stop Bit
Sets the stop bit for RS-232C.

- Set value: 1 bit
  2 bits
- Initial value: 1 bit

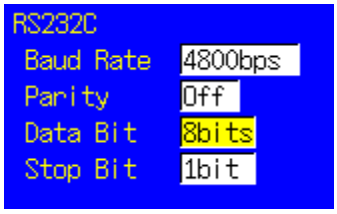


Fig. 6.1.2-2 RS232C selection

Note:
The RS232C (Serial) is displayed for only the MT8815A.

(d) 10Base-T

(i) IP Address
Sets the IP address for the MT8815A/MT8820A for Phone-1 (or Phone-2).

- Set value: 0.0.0.0 to 255.255.255.255
- Initial value: 192.168.20.2

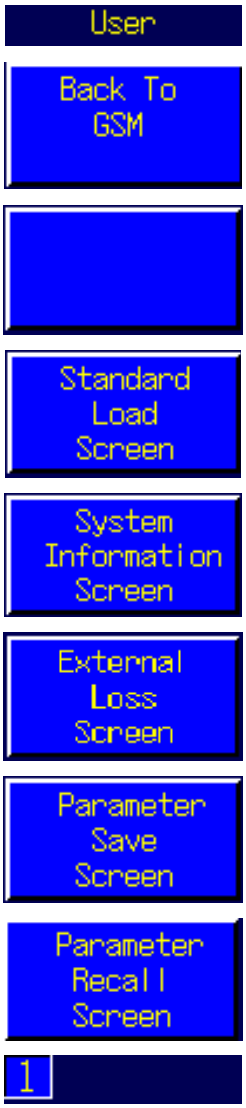
(ii) Subnet Mask
Sets the subnet mask of the MT8815A/MT8820A for Phone-1 (or Phone-2).

- Set value: 0.0.0.0 to 255.255.255.255
- Initial value: 255.255.255.0

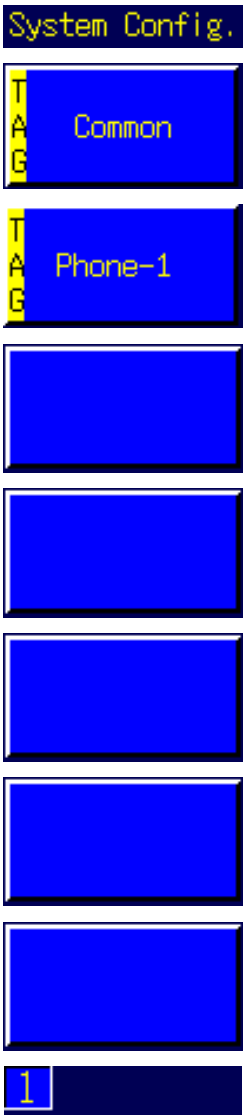
(iii) Default Gateway
Sets the default gateway of the MT8815A/MT8820A for Phone-1 (or Phone-2).

- Set value: 0.0.0.0 to 255.255.255.255
- Initial value: 192.168.20.1

User menu



Function menu



F1 Activates the Common parameter tag.

F2 Activates the Phone-1 (or Phone-2) parameter tag. ("Phone-2" is displayed for Phone-2.)

F3 None

F4 None

F5 None

F6 None

F7 None

6.1.3 Setting reference frequency

Set the reference frequency to be used for measurement.

In addition to the 10 MHz internal reference signal, MT8815A/MT8820A can use the 10 MHz or 13 MHz external reference signal input from the 10 MHz/13 MHz Ref. In on the rear panel. By default, the 10 MHz internal reference signal is set.

Example:

To use an externally input 10 MHz reference signal

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Ref.Frequency."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "10 MHz (EXT)."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
REF 10MHZEXT        /*To set to external input 10 MHz reference signal*/
```

Note:

Check that the reference signal code is connected to the reference signal input connector when using external input reference signals.

6.1.4 Displaying date/time or character string

The Title displayed in the upper left of the screen can be selected from among the date/time, any character string, and display off. The date/time cannot be displayed together with a character string.

Displaying the date and time

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Display Title."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "Date/Time."
6. Press the rotary control to display date and time.

■ Example of programming by remote control

```
TTL DATE
```

Displaying any character string

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Display Title."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "User Define."
6. Press the rotary control to display the character string.

■ Example of programming by remote control

```
TTL USER
```

Setting title display to Off

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Display Title."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "Off."
6. Press the rotary control to set the title display off.

■ Example of programming by remote control

```
TTL OFF
```

6.1.5 Setting character string to be displayed

Up to 25 characters can be set for the character string to be displayed in the left end of the screen. By default, "MT8815A" or "MT8820A" is set.

Example:

To set the character string of the title to "Line1":

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Display Title."
4. Press the rotary control to open the pop-up window for entering the title.
5. Press BS to delete the already entered characters.
6. Turn the rotary control to move the cursor for selecting characters onto "L."
7. Enter "L" in the Entry column.
8. Enter "i", "n", "e", and "1" in the same way.
9. Press Set to fix the title.
10. Set "Display Title" to "User" to display the set character string.

■ Example of programming by remote control

```
TITLE "Line1"        /*Sets the character string*/
TTL USER             /*Display the character string*/
```

6.1.6 Setting date display format

MT8815A/MT8820A is able to set the date display format. By default, the date is displayed in the format of year/month/day order.

Example:

To display the date in the format of month/day/year (MM/DD/YYYY):

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Date Format."
4. Press the rotary control to open the pop-up window
5. Turn the rotary control to move the cursor onto "MM/DD/YYYY."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
DATEMODE MDY
```

6.1.7 Setting date

The date can be adjusted. The date is set in order of year, month, and day, regardless of the display format.

Example:

To set the date to December 24, 2003:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Date (Year/Month/Day)"
4. Press the rotary control to open the pop-up window.
5. Press the numeric keypad to set the year to 2003.
6. Press the rotary control to determine the year, and then move the cursor to the month column.
7. Press the numeric keypad to set the month to 12.
8. Press the rotary control to determine the month and then move the cursor to the day column.
9. Press the numeric keypad to set the day to 24.
10. Press Set to end the setting.

■ Example of programming by remote control

```
DATE 2003,12,24
```

Note:

Press Set to end the input while the cursor is on the year or month column.

6.1.8 Setting time

The time for the internal clock can be adjusted. The time is set and displayed on a 24-hour system.

Example:

To set the time to 12:15:00:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto [Display Time (Hour:Minute:Second)].
4. Press the rotary control to open the pop-up window.
5. Press the numeric keypad to set the hour to 12.
6. Press the rotary control to determine the hour, and then move the cursor to the minute column.
7. Press the numeric keypad to set the minute to 15.
8. Press the rotary control to determine the minute, and then move the cursor to the second column.
9. Press the numeric keypad to set the second to 00.
10. Press Set to end the setting.

■ Example of programming by remote control

```
TIME 12,15,00
```

Note:

Press Set to end the input while the cursor is on the year or month column.

6.1.9 Setting beep sound

Beep sound emitted at the error of setting operation can be set. It is set to On by default.

Example:

To set the beep sound to Off:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Beep Sound."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "Off."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
ALARM OFF
```

6.1.10 Setting signal output connector

Set whether the RF signal of MT8815A/MT8820A is output from the Main1 Input/Output connector or from the AUX1 output connector. The signal output to Phone-1 is output from the RF1 connector.

* The signal output to the Phone-2 is output from the RF2 connector.

The signal output connector is set in any of the following ways:

(1) Opening the Configuration menu from any screen for setting

(2) Use the System Configuration screen for setting

Opening the Configuration menu from any screen for setting RF output connector

[Procedure]

1. Press Config to open the "Configuration" menu.
2. Press F2 "RF-1 (2) Config" to open the "RF-1 (2) Configuration" pop-up window.
3. Turn the rotary control to move the cursor onto "RF Output."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto the connector that outputs the RF signal.
6. Press the rotary control to determine the value.
7. Turn the rotary control to move the cursor onto "Close."
8. Press the rotary control to close the pop-up window.

Using the System Configuration screen for setting

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "RF Output" of "Phone-1" (or "Phone-2").
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto the connector that outputs the RF signal.
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
RFOUT MAIN              /*Sets output destination to Main*/
```

6.1.11 Setting GPIB address

The computer performing remote control searches for the measuring instrument that receives the instructions sent from the computer, based on the GPIB address. Before performing remote control through the GPIB interface, confirm that the address set in the computer matches the address of MT8815A/MT8820A. The address that can be set on MT8815A/MT8820A is primary address.

GPIB address cannot be set by remote control. Set GPIB address by manual operation before performing the remote control.

Example:

To set the GPIB address for Phone 1 to 3:

[Procedure]

1. Press [Config] to open the Configuration menu.
2. Press [F1] "System Config" to open System Configuration screen.
3. Turn the rotary control to move the cursor onto "GPIB – Address" of "Phone-1."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to set the GPIB address to 3.
6. Press the rotary control to fix the value.

6.1.12 Setting Baud Rate for RS-232C (Serial)

Sets the baud rate (transmission speed) of the communication port used for the RS-232C

Example:

To set the baud rate of the communication port to 1200 bps:

[Procedure]

1. Press [Config] to open the Configuration menu.
2. Press [F1] "System Config" to open System Configuration screen.
3. Turn the rotary control to move the cursor onto "Baud Rate."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "1200 bps."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
BAUD 1200
```

6.1.13 Setting Parity for RS-232C (Serial)

Sets the parity check of the communication port used for the RS-232C

Example:

To set the parity check of the communication port to Even:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open System Configuration screen.
3. Turn the rotary control to move the cursor onto "Parity."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "Even."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
PRTY EVEN
```

6.1.14 Setting Date Bit for RS-232C (Serial)

Sets the bit length of the communication port used for the RS-232C

Example:

To set the bit length of the communication port to 7 bits:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open System Configuration screen.
3. Turn the rotary control to move the cursor onto "Date Bit."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "7 bits."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
DTAB 7
```

6.1.15 Setting Stop Bit for RS-232C (Serial)

Sets the stop bit of the communication port used for the RS-232C

Example:

To set the bit length of the communication port to 2 bits:

[Procedure]

1. Press [Config] to open the Configuration menu.
2. Press [F1] "System Config" to open System Configuration screen.
3. Turn the rotary control to move the cursor onto "Stop Bit."
4. Press the rotary control to open the pop-up window.
5. Turn the rotary control to move the cursor onto "2 bits."
6. Press the rotary control to fix the value.

■ Example of programming by remote control

```
STPB 2
```

6.1.16 Setting IP address and subnet mask for 10Base-T

Using corresponding measurement software and its optional functions, it is possible to conduct IP protocol communication via the MT8815A/MT8820A between a phone connected to its RF connector and a server connected to its 10Base-T port.

This section describes the setting method for the IP Address and Subnet Mask of the MT8815A/MT8820A.

The IP address for MT8815A/MT8820A can be set in "IP Address" within "10Base-T" on the System Configuration screen.
The subnet mask for MT8815A/MT8820A can be set in "Subnet Mask" within "10Base-T" on the System Configuration screen.

The default setting for the IP address is 192.168.20.2 and subnet mask is 255.255.255.0.

The IP address for the phone connected to Main 1 Input/Output connector (or Main 2 Input/Output connector for the Phone-2) can be set on the measurement screen. For further details, refer to the manuals for measurement software and options.

Note:

Before carrying out data communication with the MT8815A/MT8820A, be sure to confirm that the IP address, subnet mask and default gateway are all set correctly.

Example:

To set the IP address to 192.168.0.5 and subnet mask to 255.255.255.0:

[Procedure]

1. Press [Config] to open the Configuration menu.
2. Press [F1] "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "IP Address" in "10Base-T."
4. Press the rotary control to open the pop-up window.
5. Press the numeric keypad to enter 192. Entering a 3-digit number moves the cursor to the next entry box.
6. Press the numeric keypad to enter 168.
7. Press the numeric keypad to enter 0.
8. Move the cursor to next entry box by pressing [>].
9. Press the numeric keypad to enter 5.
10. Press [Set] to fix the value.
11. In the same manner, set subnet mask by moving cursor onto "Subnet Mask."

■ Example of programming by remote control

```
PSETIPADDR 192,168,0,5
PSETSNM 255,255,255,0
```

6.1.17 Setting 10Base-T default gateway

Set the Default Gateway that is used to connect to the external network using the MT8815A/MT8820A data communication function. The default setting is 192.168.20.1.

Example:

To set default gateway to 192.168.0.1:

[Procedure]

1. Press Config to open the Configuration menu.
2. Press F1 "System Config" to open the System Configuration screen.
3. Turn the rotary control to move the cursor onto "Default Gateway" in "10Base-T."
4. Press the rotary control to open the pop-up window.
5. Press the numeric keypad to enter 192. Entering a 3-digit number moves the cursor to the next entry box.
6. Press the numeric keypad to enter 168.
7. Press the numeric keypad to enter 0.
8. Move the cursor to the next entry box by pressing >.
9. Press the numeric keypad to enter 1.
10. Press Set to fix the value.

■ Example of programming by remote control

```
PSETDEFGTWY 192,168,0,1
```

6.2 Selecting Measurement Application to be Activated

Measurement applications can be switched faster by activating the measurement applications installed in the MT8815A/MT8820A in advance. Up to three measurement applications can be selected for each phone.

6.2.1 Opening Standard Load screen

[Procedure]

1. Press Screen to open the Select Screen pop-up window.
2. Turn the rotary control to move the cursor onto "Standard Load."
3. Press the rotary control to open the Standard Load screen.

The Standard Load screen can also be opened by the screen switching function of user menu.

6.2.2 Viewing Standard Load screen

Fig. 6.2.2-1 Standard Load screen

(1) Standard Load Window

Select a measurement application (software) to be loaded to the Phone-1 (or Phone-2). Up to three applications can be set (Standard 1 through Standard 3).

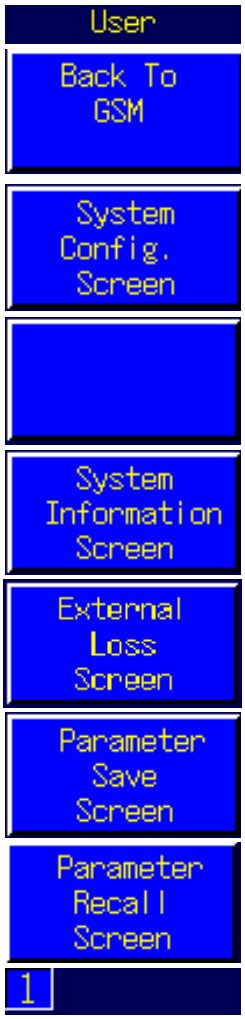
Note:

The software operates the same, irrespective of the Standard in which the software is loaded.

(2) Software List Window

Displays a list of applications installed in the MT8815A/MT8820A.

User menu



U1	Returns to the measurement screen displayed before switching to the common function screen. The display varies depending on the measurement software.
U2	Opens the System Configuration screen.
U3	None
U4	Opens the System Information screen.
U5	Opens the Common External Loss screen.
U6	Opens the Parameter Save screen.
U7	Opens the Parameter Recall screen.

6.2.3 Phone switching operation

Switches the Phone to be displayed on the LCD or to be operated by the panel.

[Procedure]

1. Press Shift + Screen.

When Phone-1 is displayed, it is switched to Phone-2. When Phone-2 is displayed, it is switched to Phone-1.

■ Example of programming by remote control

This operation cannot be controlled by remote.

6.2.4 Loading measurement application

Select measurement applications from those installed in the MT8815A/MT8820A in advance, so that the switching among the measurement applications can be executed faster. Up to three measurement applications can be selected for each phone measurement set.

The following shows the procedure to load measurement application.

[Procedure]

1. Display the Standard Load screen. Refer to Section 6.2.1 "Opening Standard Load screen" for setting method.
2. Turn the rotary control to move the cursor onto "Standard1."
3. Press Set to select the measurement application to be loaded.

Note:

Even if software has already been loaded in the selected Standard, it is possible to load other software in that Standard by overwriting the existing one.

■ Example of programming by remote control

```
STDLOAD 1,GSM          /*Loads GSM to Standard1*/
```

6.2.5 Unloading measurement application

This section describes how to unload the measurement application.

[Procedure]

1. Display the Standard Load screen. By referring to the section 6.2.1 "Opening Standard Load screen."
2. Turn the rotary control to move the cursor onto "Standard1."
3. Press F7 "Unload" to open the pop-up window for verification.
4. Turn the rotary control to move the cursor onto "OK", and Press Set.

■ Example of programming by remote control

```
STDUNLOAD 1            /*Unloads Standard1 software*/
```

6.3 Displaying System Information

Version information and serial number about software that composes MT8815A/MT8820A can be displayed on the screen. All the system information is displayed on the System Information screen.

6.3.1 Opening System Information screen

[Procedure]

1. Press Screen to open the Select Screen pop-up window.
2. Turn the rotary control to move the cursor onto "System Information."
3. Press the rotary control to open the System Information screen.

The System Information screen can also be opened by the screen switching function of user menu.

6.3.2 Viewing System Information screen

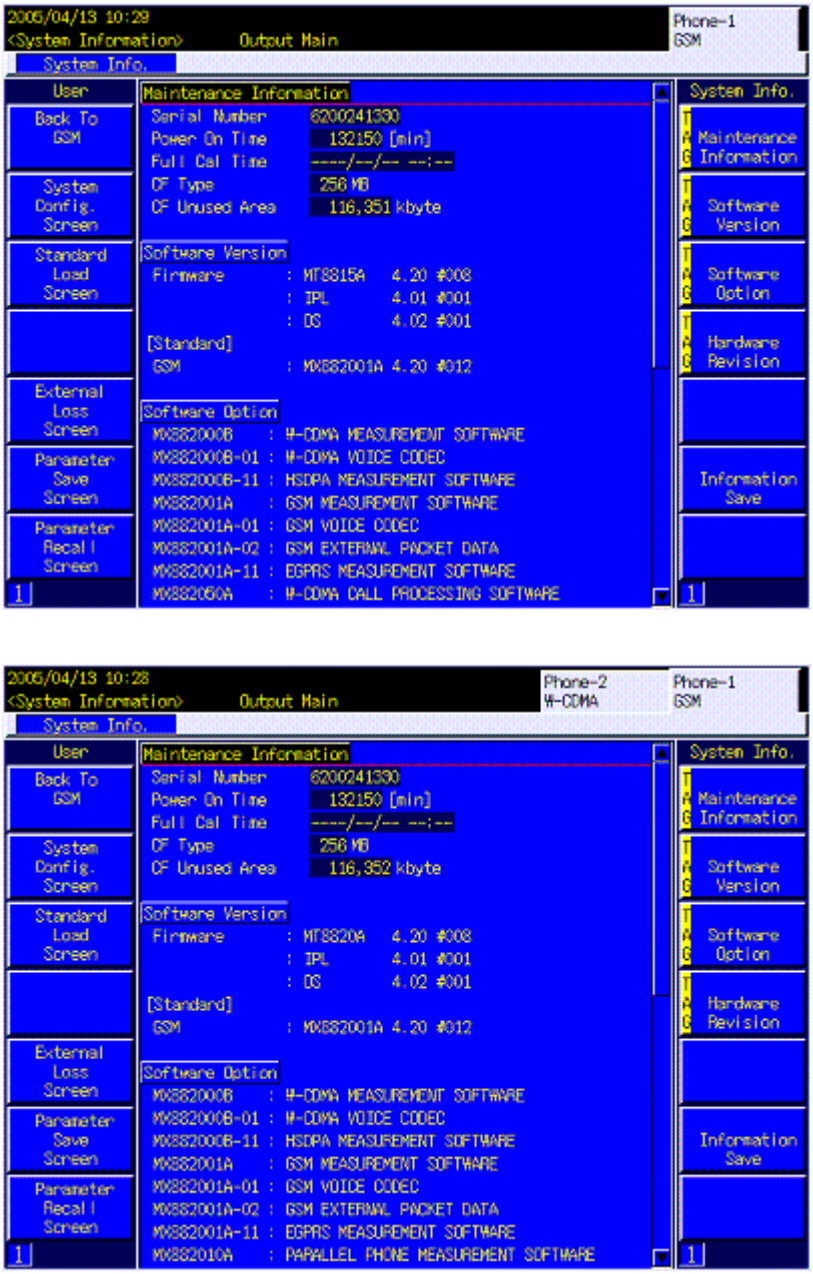


Fig. 6.3.2-1 System Information screen (upper: MT8815A, lower: MT8820A)

(1) Maintenance Information

(a) Serial Number
The serial number of the MT8815A/MT8820A

(b) Power On Time
The accumulated time (total power-on time) for the MT8815A/MT8820A

(c) Full Cal Time
The date and time when Full Calibration was last executed

(d) CF Type
The size of the internal CF card

(e) CF Unused Area
The free space size in the software installation area

(2) Software Version

(a) Firmware

(i) MT8815A/MT820A
The version of the firmware installed in the MT8815A/MT8820A

(ii) IPL
The version of the IPL installed in the MT8815A/MT8820A

(iii) OS
The version of the OS installed in the MT8815A/MT8820A

(b) Standard
The version of the software loaded in the MT8815A/MT8820A

(3) Software Option
The list of the software options installed in the MT8815A/MT8820A

(4) Hardware Revision
The information about the hardware installed in the MT8815A/MT8820A is displayed.

(a) Main CPU
The ID and revision number of the main CPU are displayed.

(b) TDMA COM
The ID, revision number, and CoreFPGA version of the TDMA COM are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, TDMA COM1 is displayed for Phone-1 and TDMA COM2 is displayed for Phone-2.

(c) CDMA2000 COM

The ID, revision number, and CoreFPGA version of the CDMA2000 COM are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, CDMA2000 COM1 is displayed for Phone-1 and CDMA2000 COM2 is displayed for Phone-2.

(d) 1xEV-DO COM

The ID and revision number of the 1xEV-DO COM are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, 1xEV-DO COM1 is displayed for Phone-1 and 1xEV-DO COM2 is displayed for Phone-2.

(e) W-CDMA COM

The ID and revision number of the W-CDMA COM are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, W-CDMA COM1 is displayed for Phone-1 and W-CDMA COM2 is displayed for Phone-2.

(f) W-CDMA BB

The ID, revision number, and CoreFPGA version of the W-CDMA BB are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, W-CDMA BB1 is displayed for Phone-1 and W-CDMA BB2 is displayed for Phone-2.

(g) Measure DSP

The ID, revision number, and CoreFPGA version of the Measure DSP are displayed.

Note:

When the MT8820A Parallel Phone Measurement Hardware is installed, Measure DSP1 is displayed for Phone-1 and Measure DSP2 is displayed for Phone-2.

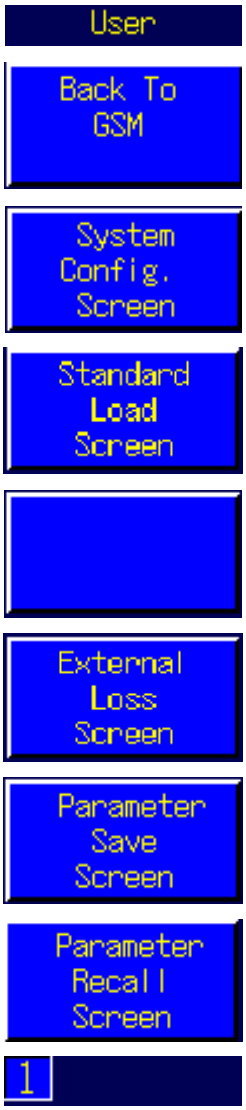
(h) DAC/ADC

The ID and revision number of the DAC/ADC are displayed.

(i) Audio

The CoreFPGA version of the Audio is displayed.

User menu



Function menu

F1 Displays Maintenance Information and activates the tag.

F2 Displays Software Version and activates the tag.

F3 Displays Software Option and activates the tag.

F4 Displays Hardware Revision and activates the tag.

F5 None

F6 Executes Information Save.

F7 None

6.3.3 Checking Maintenance Information

The following gives an explanation about how to check Maintenance Information in the System Information screen.

[Procedure]

1. Open the System Information screen.
2. Press F1 "Maintenance Information" to display and check Maintenance Information.

6.3.4 Checking Software Version

The following gives an explanation about how to check Software Version in the System Information screen.

[Procedure]

1. Open the System Information screen.
2. Press F2 "Software Version" to display and check Software Version.

6.3.5 Checking Software Option

The following gives an explanation about how to check Software Option in the System Information screen.

[Procedure]

1. Open the System Information screen.
2. Press F3 "Software Option" to display and check Software Option.

6.3.6 Checking Hardware Revision

The following gives an explanation about how to check Hardware Revision in the System Information screen.

[Procedure]

1. Open the System Information screen.
2. Press F4 "Hardware Revision" to display and check Hardware Revision.

6.3.7 Outputting System Information parameters

Various parameters displayed in the System Information screen can be output (saved) to a memory card in text format.

[Procedure]

1. Insert a memory card in the memory card slot on the front panel of the MT8815A/MT8820A.
2. Press F6 "Information Save" to save the parameters displayed in the System Information screen to the memory card.

Table 6.3.7-1 Parameters in System Information screen to be saved

Parameters	Description
File Date	Date when Information Save was executed
Serial Number	Serial number of MT8815A/MT8820A
Time Information	Power On Time
Phone1 Time	Full Cal Time (Phone1)
Phone2 Time	Full Cal Time (Phone2)
CF Information	CF Type and CF Unused Area
Installed Software	Information about all installed measurement software applications
Load Software	Information about the loaded software
Software Option	Information about all the installed options
Hardware Revision	Information about the installed hardware

Notes:

1. Phone2 Time is displayed only when the Parallel Phone Measurement Hardware is installed in the MT8820A.

2. The parameters are saved in a text-formatted file with the fixed file name "SysInfo.txt." If this file already exits when saving, it is overwritten.

3. For the MT8820A, the file output destination is "/MT8820A" in the memory card.

■ Example of programming by remote control

```
SYSINFOSAVE
```

6.4 Setting Common Cable Loss

The Common Cable Loss setting screen consists of the Common Cable Loss List and the Common Cable Loss Graph window and enables you to set the common cable loss that can be used in common between the systems.

Setting common cable loss is enabled when the External Loss is set to Common for all the systems.

Example:

To set the External Loss to "Common" by GSM:

[Procedure]

1. Press Screen to open the Select Screen pop-up window.
2. Turn the rotary control to move the cursor onto "Fundamental Measurement."
3. Press the rotary control to open the Fundamental Measurement screen.
4. Press Focus several times until the Parameter window is activated.
5. Press F1 "Common" to move the cursor onto "External Loss."
6. Press the rotary control to display the pop-up window.
7. Turn the rotary control to move the cursor to "Common."
8. Press the rotary control to fix the value.

6.4.1 Opening Common Cable Loss

[Procedure]

1. Press Screen to open the Select Screen pop-up window.
2. Turn the rotary control to move the cursor onto "Common External Loss."
3. Press the rotary control to open the Common External Loss screen.

Other than the above, there is the method to use the screen switching function in the user menu.

6.4.2 Viewing Common Cable Loss

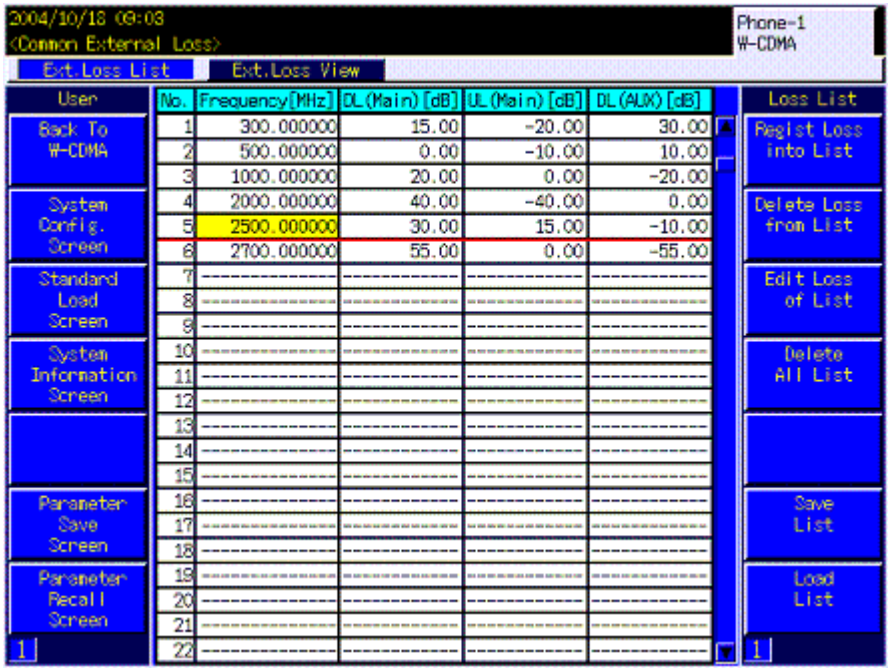


Fig. 6.4.2-1 Ext. Loss List screen

(1) Frequency

Sets the frequency of the Common Cable Loss List.

- Range 0.4 to 2700 MHz
- Setting unit Hz/kHz/MHz/GHz
- Initial value —
- Resolution 10 Hz

(2) DL (Main)

Sets Downlink of Main in the Common Cable Loss List.

- Range –55.00 to +55.00 dB
- Setting unit dB
- Initial value —
- Resolution 0.01 dB

(3) UL (Main)

Sets Uplink of Main in the Common Cable Loss List.

- Range –55.00 to +55.00 dB
- Setting unit dB
- Initial value —
- Resolution 0.01 dB

(4) DL (AUX)

Sets Downlink of AUX in the Common Cable Loss List.

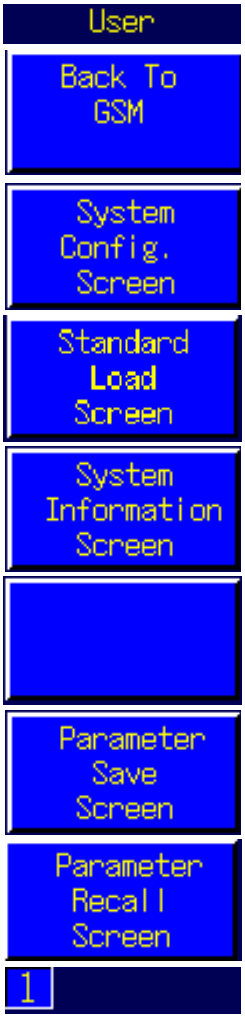
- Range –55.00 to +55.00 dB
- Setting unit dB
- Initial value —
- Resolution 0.01 dB

Notes:

1. The common cable list always displays 100 lists and the values of the lists for only the registered data are displayed.

2. One of values displayed in the list is further added at the time of registering Frequency value.

User menu



U1	Returns to the measurement screen displayed before switching to the common function screen. The display varies depending on the measurement software.
U2	Opens the System Configuration screen.
U3	Opens Standard Load screen.
U4	Opens the System Information screen.
U5	None
U6	Opens the Parameter Save screen.
U7	Opens the Parameter Recall screen.

Function menu

F1	Opens the Regist Loss into List menu.
F2	Opens the Delete Loss from List menu.
F3	Opens the Edit Loss of List menu.
F4	Opens the Delete All List menu.
F5	None
F6	Opens the Save List menu.
F7	Opens the Load List menu.

6.4.3 Setting Common Cable Loss List

The following gives an explanation about how to set the values of the common cable loss.

Example:

To set the common cable loss list to the value of "2500.000000, 30.00, 15.00, –10.00":

[Procedure]

1. Press [F1] "Regist Loss into List" to open the Regist Loss into List menu.
2. Press the numeric keypad to enter 2500.000000. Entering an 11-digit number moves the cursor automatically to "DL (Main)."
3. Press the numeric keypad to enter 30.00.
4. Press [>] to move the cursor to "UL (Main)."
5. Press the numeric keypad to enter 15.00.
6. Press [>] to move the cursor to "DL (AUX)."
7. Press the numeric keypad to enter –10.00.
8. Press [Set] to fix the value.

If the same value as the already registered Frequency is set, the overwrite confirmation pop-up window opens. However, for remote control, it is overwritten without condition.

Notes:

1. The common cable loss list can be also directly entered for the list: the value is directly entered at the position where a cursor exists.

2. When the Regist Loss into List is set or a frequency is set by the direct entry, automatic sorting of No. is performed.

* Automatic sorting is to sort lists in ascending order for a frequency.

■ Example of programming by remote control

```
LOSSTBLVAL 2500.000000MHz,30.00,15.00,-10.00
```

6.4.4 Deleting Common Cable Loss List

The following gives an explanation about how to delete the values of the common cable loss.

Example:

To delete Nos. 3 to 5 of the common cable loss list:

[Procedure]

1. Press [F2] "Delete Loss From List" to open the Delete Loss From List menu.
2. Press the numeric keypad to enter 3.
3. Press [>] to move the cursor.
4. Press the numeric keypad to enter 5.
5. Press [Set] to fix the value.

Notes:

1. Using [F4] "Delete All List" enables all to be deleted.
2. To delete only one list, specify only the left entry box.

■ Example of programming by remote control

```
DELLOSSTBL 3,5        /*To delete Nos. 3 to 5 of the common cable loss
                      list*/
DELLOSSTBL            /*To delete all of the common cable loss list*/
```

6.4.5 Editing Common Cable Loss List

The following gives an explanation about how to edit the values of the common cable loss.

Example:

To edit the registered common cable loss list to the value of "2600.000000, 30.00, –25.00, –10.00":

[Procedure]

1. Turn the rotary control to move the cursor to the list that you want to edit.
2. Press [F3] "Edit Loss of List" to open the Edit Loss of List menu.
3. Press [BS] to delete already entered characters.
4. Press the numeric keypad to enter 2600.000000.
5. Press [>] to move the cursor to the UL (Main).
6. Press [BS] to delete already entered characters.

7. Press the numeric keypad to enter –25.00.
8. Press [Set] to fix the value.

If the same value as the already registered Frequency is set, the overwrite confirmation pop-up window opens. However, for remote control, it is overwritten without condition.

6.4.6 Saving Common Cable Loss List

The following gives an explanation about how to save the common cable loss list on a memory card by specifying any file name.

Note:

During saving, do not remove a memory card or not turn the power off.

Example:

To save the common cable loss list with a file named "SAMPLE.LSS":

[Procedure]

1. Insert a memory card into the memory card slot on the front panel of the MT8815A/MT8820A.
2. Press [F6] "Save List" to open the Save List menu.
3. Turn the rotary control to move the cursor to "S" on the character pallet.
4. Press the rotary control to enter "S" in the "File Name" column.
5. Also, enter "A", "M", "P", "L", and "E" in the "File Name" column in the same way.
6. Press [Set] to save the file.

If a file of the same name exists, the overwrite confirmation pop-up window opens. To overwrite, press "OK." To change the file name, place the cursor onto "Cancel" and press the rotary control.

Note:

During remote control, overwrite-confirmation and other operations are not performed. To prevent important data from being overwritten, be careful about file management for remote control.

■ Example of programming by remote control

```
SVLOSSTBL sample
```

6.4.7 Recalling Common Cable Loss List

The following gives an explanation about how to recall the common cable loss list from the memory card by specifying any file name.

Note:

During saving, do not remove a memory card or not turn the power off.

Example:

To recall the common cable loss list with a file named "SAMPLE.LSS":

[Procedure]

1. Insert a memory card into the memory card slot on the front panel of the MT8815A/MT8820A.
2. Press F7 "Load List" to open the Load List menu.
3. Turn the rotary control to select "SAMPLE.LSS."
4. Press Set to load the file.

Note:

The common cable loss list can be also loaded for a user-created file in csv format of separation by "," (comma).

Example:

When it is created with data of "2500.000000, 30.00, 15.00, –10.00" and "2600.000000, 30.00, –25.00, –10.00", remake data in a text file as shown below, and save it as the extension of ".lss."

```
1,2500.000000,30.00,15.00,–10.00
2,2600.000000,30.00,–25.00,–10.00
```

■ Example of programming by remote control

```
RLLOSSTBL sample
```

6.4.8 Opening Common cable Loss Graph

[Procedure]

1. Open the Common External Loss screen.
2. Press Focus to activate the Ext. Loss View.

6.4.9 Viewing Common Cable Loss Graph window

The Common Cable Loss window enables you to confirm the entire loss value simply by graphing the common cable loss list. When the common cable loss is not registered, the initial value becomes 0 dB.

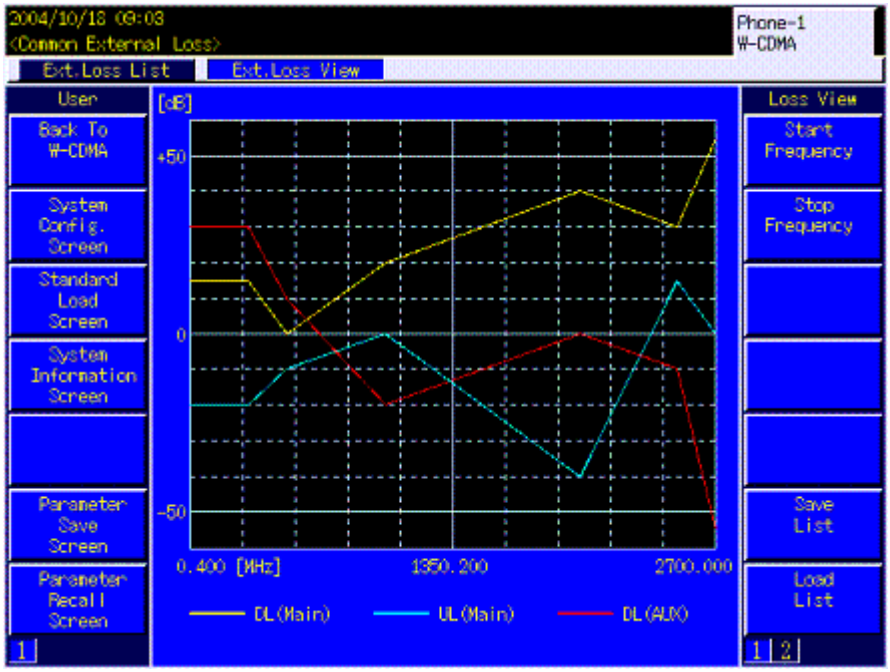


Fig. 6.4.9-1 Ext. Loss View screen

Notes:

1. The dashed line on the horizontal axis is always divided into 10 sections and the values are displayed on the both sides and center.

2. The common cable loss value between the setting frequencies is compensated in linearity.

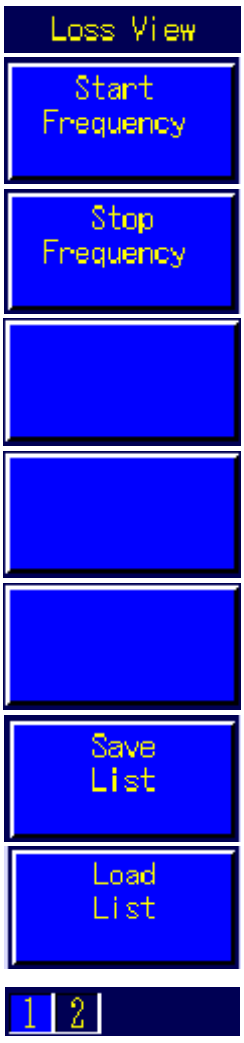
Example:

When 20 dB is set at a frequency of 1000 MHz and 40 dB at 2000 MHz for the DL (Main) respectively, 30 dB is automatically compensated at 1500 MHz. In addition, 20 dB is set at 1000 MHz or less, and 40 dB at 2000 MHz or more. It is also set for UL (Main) and DL (AUX) in the same way.

Function menu

(1) The first page

The menu on the first page is the selection menu of all the common cable loss graph window. Pressing the function key displays the corresponding menu, activating the tag.



F1 Opens the Start Frequency menu.

F2 Opens the Stop Frequency menu.

F3 None

F4 None

F5 None

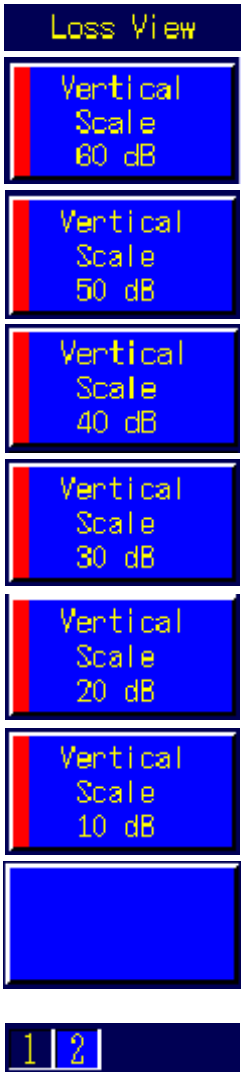
F6 Opens the Save List menu.

F7 Opens the Load List menu.

This indicates that the first page is open.
To open the second page, press Next.

(2) The second page

For the menu on the second page, the vertical axis scale of the common cable loss graph menu can be set.



F1 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±60 dB and display an additional line in 10-dB steps.

F2 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±50 dB and display an additional line in 10-dB steps.

F3 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±40 dB and display an additional line in 10-dB steps.

F4 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±30 dB and display an additional line in 10-dB steps.

F5 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±20 dB and display an additional line in 5-dB steps.

F6 A key to set the vertical axis scale on the graph of the common cable loss graph window to ±10 dB and display an additional line in 5-dB steps.

F7 None

This indicates that the second page is open.

To open the first page, press Next.

6.4.10 Setting the start frequency of Common Cable Loss Graph

The following gives an explanation about how to set the start frequency on the horizontal axis.

Example:

To set the start frequency of the common cable loss graph to "100.0 MHz."

[Procedure]

1. Press [F1] "Start Frequency" to open the Start Frequency menu.
2. Press the numeric keypad to enter 100.0.
3. Press [MHz] unit key to fix the value.

Start Frequency

- Range 0.4 to 2700.0 MHz
- Setting unit Hz/kHz/MHz/GHz
- Initial value 0.4 MHz
- Resolution 0.1 MHz

Note:

Cannot set the value larger than the value of the Stop Frequency.

■ Example of programming by remote control

```
LOSSVIEW_STAFREQ 100.0MHz
```

6.4.11 Setting the stop frequency of Common Cable Loss Graph

The following gives an explanation about how to set the stop frequency on the horizontal axis.

Example:

To set the stop frequency of the common cable loss graph to "2500.0 MHz."

[Procedure]

1. Press [F2] "Stop Frequency" to open the Stop Frequency menu.
2. Press the numeric keypad to enter 2500.0.
3. Press [MHz] unit key to fix the value.

Stop Frequency

- Range 0.4 to 2700.0 MHz
- Setting unit Hz/kHz/MHz/GHz
- Initial value 0.4 MHz
- Resolution 0.1 MHz

Note:

Cannot set the value smaller than the value of the Start Frequency.

■ Example of programming by remote control

```
LOSSVIEW_STPFREQ 2500.0MHz
```

6.4.12 Setting the scale on the vertical axis of Common Cable Loss Graph

The following gives an explanation about how to set the scale of the vertical axis.

Example:

To set the scale of the vertical axis to ±30 dB:

[Procedure]

1. Press Next to switch the function menu.
2. Press F4 "Vertical Scale 30 dB."

Vertical Scale

- Range 10, 20, 30, 40, 50, 60
- Initial value 50 dB

■ Example of programming by remote control

```
LOSSVIEW_VSCALE 30
```

6.5 Saving Parameters

6.5.1 Parameter saving function

Parameter saving function can save the set value for measurement parameter as a parameter file. Measurement parameters that can be saved are all the measurement parameters for the activated measurement software (used for the phone under measurement).

Saved parameter files can be recalled by the parameter recalling function. By recalling the parameter file, set value for the measurement parameter can be returned the status when the file is saved.

By using parameter saving and recalling function, parameter setting operation can be complete by only one recalling and no repetition is required for every measurement. Preparing several parameter setting files eliminates the need for setting parameters again and can increase the efficiency of operation and measurement.

6.5.2 Saving destination of parameter file

Parameter file is saved in the directory of the memory card. Directory path for the saving destination is specific for each measurement software.

Up to 1000 files can be saved onto one memory card. An attempt made to save 1001 or more files causes an error.

Notes:

1. Check that the memory card is correctly inserted in the memory card slot on the front panel before saving a parameter file.

2. Do not exit the memory card during the parameter saving. Doing so may cause not only the interruption for saving but also destruction of other files in the memory card.

3. Take a back-up data for a file saved in the memory card to other media. Anritsu is not liable for the data loss of a memory card.

6.5.3 Parameter saving method

Parameters saving methods are described below.

(1) Quick saving
Saves the parameter in any screen. Only a file number to identify a file can be specified.

(2) Saving on the Parameter Save screen
Saves on the Parameter Save screen. Any file name can be specified.

6.5.4 Quick saving

Quick saving means that any screen other than the Parameter Save screen is used to save a parameter setting file. The file can be saved with easily without opening the Parameter Save screen.

For quick saving, file name is made up of WCAPR and a file number. Only a file number that identifies each file can be specified. The smallest unused number will be used as the file number.

[Procedure]

1. Press Shift + Recall to display the entry area. the smallest unused number is displayed in the entry area.

Fig. 6.5.4-1 Entry area for the Quick saving

2. Press Set to start saving.

■ Example of programming by remote control

```
PRMSAVE
```

6.5.5 Quick saving with specified number

Any number can be specified for a file number in quick saving.

Example:

To save parameter file with file number 005.

[Procedure]

1. Press [Shift] + [Recall] to display the entry area. the smallest unused number is displayed in the entry area.
2. Press [5].
3. Press [Set] to start saving.

■ Example of programming by remote control

```
PRMSAVE 5
```

If a file of the same name exists, the overwrite confirmation pop-up window opens. To overwrite, press "OK." To change the file name, move the cursor onto "Cancel" and press the rotary control.

Note:

During remote control, overwrite confirmation and other operations are not performed. To prevent important data from being overwritten, use the default file name for saving under remote control.

6.5.6 Opening Parameter Save screen

Use the Parameter Save screen to save the parameter setting by specifying any file name.

Method for opening the Parameter Save screen is as follows.

[Procedure]

1. Press [Screen] to open the Screen Select pop-up window.
2. Turn the rotary control to move the cursor onto "Parameter Save."
3. Press the rotary control to open the Parameter Save screen.

Instead of the above procedure, the screen switch function from the user menu can be used to open the Parameter Save screen.

6.5.7 Viewing Parameter Save screen

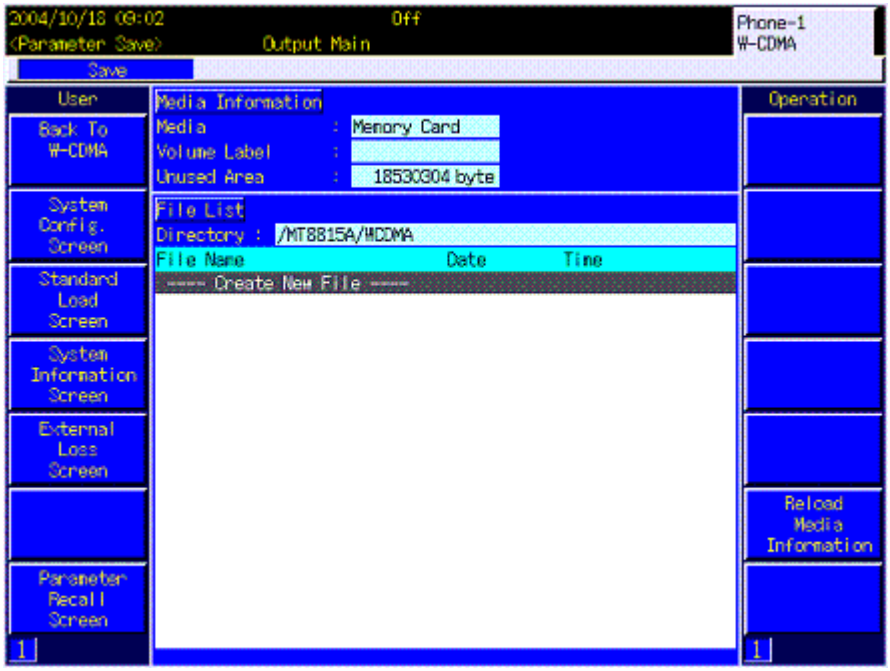


Fig. 6.5.7-1 The Parameter Save screen

(1) Media Information

1. Media
   Storage media type for the parameter file saving destination.
2. Volume Label
   Volume label for a storage medium.
3. Unused Area
   Unused area capacity of a storage medium is displayed in the byte unit.

(2) File List

File List displays directory contents for parameter file saving in a storage medium. A directory path for parameter saving is specified for each measurement software.

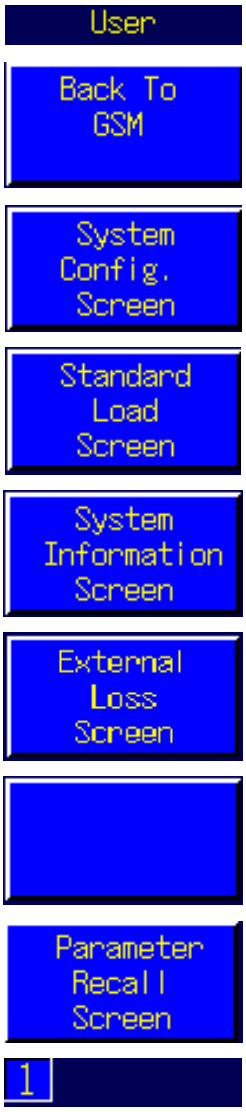
4. Directory
   Directory path for parameter saving.
   When using MT8820A, "/MT8820A/measurement application" is displayed.
5. File Name
   File name in the directory for parameter saving.
6. Date, Time
   Last update date/time of a file.

7. Create New File
   Move the cursor and press the rotary control or [Set] to open the pop-up window for newly saving the parameter file.

Note:

To display the parameter file on the Parameter Save screen, parameter file must be in the default directory (specific for each measurement software). To display a parameter file saved in other media, move the file to the default directory in the medium using external devices such as PC.

User menu



[U1] Returns to the measurement screen displayed before switching to the common function screen. The display varies depending on the measurement software.

[U2] Opens the System Configuration screen.

[U3] Opens the Standard Load screen.

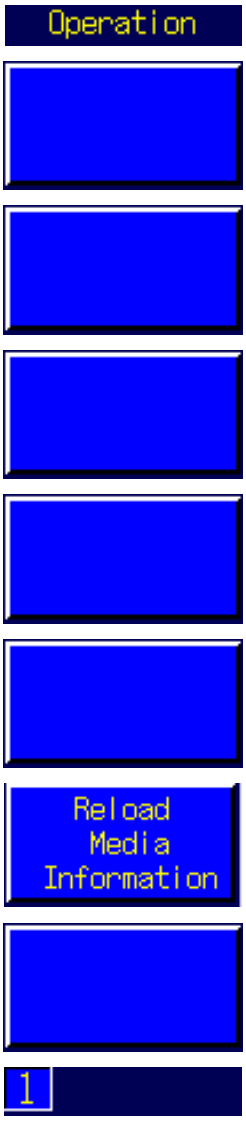
[U4] Opens the System Information screen.

[U5] Opens the Common External Loss screen.

[U6] None

[U7] Opens the Parameter Recall Screen.

Function menu



F1 None

F2 None

F3 None

F4 None

F5 None

F6 Reloads the storage media information to update the display.

F7 None

6.5.8 Saving file with specified file name

Use the Parameter Save screen to save the parameter setting by specifying any file name.

Example:

To save parameter information to the new file named “Example”:

[Procedure]

1. Press [Screen] to open the Screen Select pop-up window
2. Turn the rotary control to move the cursor onto “Parameter Save.”
3. Press the rotary control to open the Parameter Save screen.
4. Turn the rotary control to move the cursor in the file list onto “Create New File.”
5. Press the rotary control to open the pop-up window for entering a new file name.
6. Turn the rotary control to move the cursor onto “E.”
7. Press the rotary control to enter “E” in the “File Name” column.
8. Also, enter “x”, “a”, “m”, “p”, “l”, and “e” in the same way.
9. Press [Set] to start saving.

■ Example of programming by remote control

```
PRMSAVENAME "Example"
```

If a file of the same name exists, the overwrite confirmation pop-up window opens. To overwrite, press “OK.” To change the file name, place the cursor onto “Cancel” and press the rotary control.

Note:

During remote control, overwrite confirmation and other operations are not performed. To prevent important data from being overwritten, use the default file name for saving under remote control.

6.5.9 Overwrite saving

A setting file can be overwritten to an existing file. The overwrite saving methods are as follows:

(1) Specify the number of the name of the file to be overwritten by quick saving, and select "OK" from the overwrite saving confirmation pop-up window.

(2) Place the cursor to the name of the file to be overwritten on the Parameter Save screen to execute saving, and select "OK" from the overwrite saving confirmation pop-up window.

The procedure for saving the file by placing the cursor onto the file name to be overwritten on the Parameter Save screen for is shown below:

[Procedure]

1. Press [Screen] to open the Screen Select pop-up window.
2. Turn the rotary control to move the cursor onto "Parameter Save."
3. Press the rotary control to open the Parameter Save screen. In the file list, the already saved setting files appear.
4. Turn the rotary control to move the cursor onto the name of the file to be overwritten.
5. Press the rotary control to open the overwrite confirmation pop-up window.
6. Turn the rotary control to move the cursor onto "OK."
7. Press the rotary control to start saving.

6.5.10 Updating media information

"File List" on the Parameter Save list displays file list of saving destination for parameter files. To update media information that is displayed in the file list on the Parameter Save screen, execute Reload Media Information from the function menu.

[Procedure]

Press [F6] "Reload Media Information" on the Parameter Save screen.

6.6 Recalling Parameters

6.6.1 Parameter recalling function

Parameter recalling function can recall a parameter file saved in parameter saving function and return all the parameters of activated measurement software to the status when it is saved.

6.6.2 Parameter recalling destination

A parameter file is recalled from the fixed directory. The directory path for the recalling destination is specific for each measurement software.

Notes:

1. Check that the memory card is correctly inserted in the memory card slot before recalling a parameter file.

2. Do not exit the memory card during the parameter saving. Doing so may cause not only the interruption for saving but also destruction of other files in the memory card.

6.6.3 Parameter recalling method

The procedure for parameter recalling is shown below.

(1) Quick recalling
Recalls on any screen. Only the number that identifies a file can be specified.

(2) Recalling with a file name specified
Recalling on the Parameter Recall screen. Any file name can be specified.

6.6.4 Quick recalling

Quick recalling means that any screen other than the Parameter Recall screen is used to recall a parameter setting file. The file can be saved by an easy operation without opening the Parameter Recall screen. For quick recalling, file name is made up of WCAPR and a file number. Only a file number that identifies each file can be specified. It is therefore impossible to recall files saved with an optional name.

Example:

To recall the file of the file number 001

[Procedure]

1. Press [Recall] to display the entry area in the lower part of the screen. In the entry area, a file number appears.
2. Press [1] on the numeric keypad to enter the file number.
3. Press the rotary control to recall the file.

■ Example of programming by remote control

```
PRMRECALL 001
```

6.6.5 Opening Parameter Recall screen

When the Parameter Save screen has been used to save a parameter settings with any file name, the Parameter Recall screen is used to recall the file.

The procedures for opening the Parameter Recall screen are shown below.

[Procedure]

1. Press [Screen] to open the screen selection window.
2. Turn the rotary control to move the cursor onto “Parameter Recall.”
3. Press the rotary control to open the Parameter Recall screen.

Instead of the above procedure, the screen switch function from the user menu can be used to open the Parameter Recall screen.

6.6.6 Viewing Parameter Recall screen

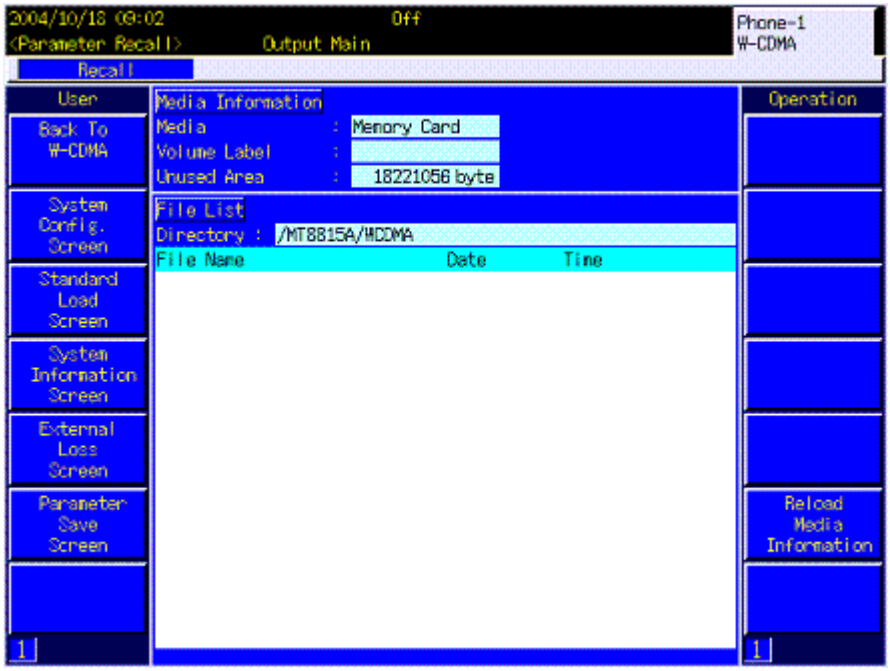


Fig. 6.6.6-1 The Parameter Recall screen

(1) Media Information

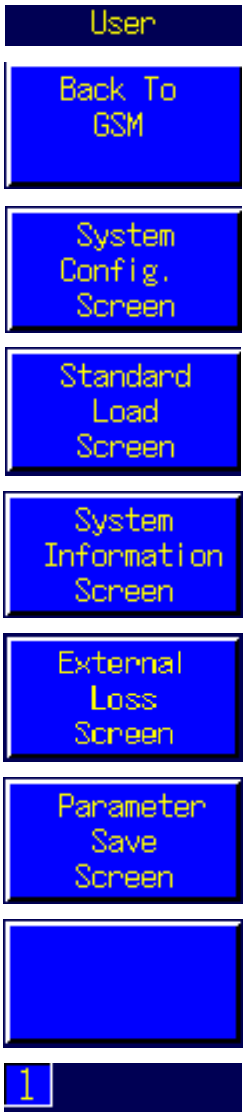
1. Media
   Storage media type for the parameter file recalling destination.
2. Volume Label
   Volume label for a storage medium.
3. Unused Area
   Unused area capacity of a storage medium is displayed in the byte unit.

(2) File List

File List displays directory contents for parameter file recalling in a storage medium. A directory path for parameter recalling is specified for each measurement software.

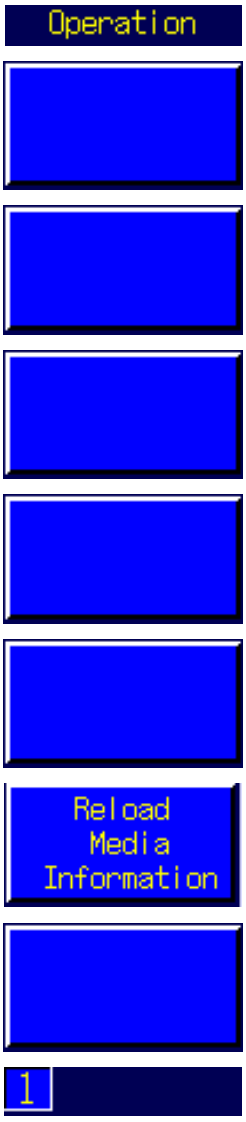
4. Directory
   Directory path for parameter recalling.
   When using MT8820A, "/MT8820A/measurement application" is displayed.
5. File Name
   File name in the directory for parameter recalling.
6. Date, Time
   Last update date/time of a file.

User menu



U1	Returns to the measurement screen displayed before switching to the common function screen. The display varies depending on the measurement software.
U2	Opens the System Configuration screen.
U3	Opens the Standard Load screen.
U4	Opens the System Information screen.
U5	Opens the Common External Loss screen.
U6	Opens the Parameter Save screen.
U7	None

Function menu



F1 None

F2 None

F3 None

F4 None

F5 None

F6 Reloads the storage media information to update the display.

F7 None

6.6.7 Recalling with file name specified

When the Parameter Save screen has been used to save a parameter settings with any file name, the Parameter Recall screen is used to recall the file.

Example:

To recall the parameter setting file named "Example":

[Procedure]

1. Press [Screen] to open the screen selection window.
2. Turn the rotary control to move the cursor onto "Parameter Recall."
3. Press the rotary control to open the Parameter Recall screen. In the file list, the saved setting files appear.
4. Turn the rotary control to move the cursor onto the file name to be recalled.
5. Press the rotary control to open the execution confirmation pop-up window.
6. Turn the rotary control to move the cursor onto "OK."
7. Press the rotary control to recall the file.

■ Example of programming by remote control

```
PRMRECALLNAME "Example"
```

6.6.8 Reloading media information

To reload media information that is displayed in the file list, execute Reload Media Information on the function menu.

[Procedure]

On the Parameter Recall screen, press [F6] "Reload Media Information."

Section 7 Remote Control Using PC

This section describes setting up the remote control and control method of the MT8815A/MT8820A using a command.

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7.1 Remote Control

Remote control refers to controlling the MT8815A/MT8820A with a PC connected. Most of the functions of the MT8815A/MT8820A can be controlled from a PC, except some functions such as the power switch.

7.1.1 What remote control can do

The following operation can be performed by remote control.

(1) Computer-based operation implements automatic measurement and automatic analysis of measurement data.

(2) A measurement system can be configured in combination with a computer and other measuring instruments.

7.1.2 Operation in remote control mode

While the Remote lamp on the front panel is on, MT8815A/MT8820A is operating in the remote control mode. All the panel keys except for the power switch and Local are disabled.

Fig. 7.1.2-1 Remote lamp on

Note:

When the Parallelphone Measurement Software is installed in MT8820A, the display for Phone-1 and Phone-2 can be switched by pressing Shift + Screen even if the MT8820A is operating in the remote control mode.

7.1.3 Operation in manual operation mode

While the Remote lamp on the front panel is Off, MT8815A/MT8820A is operating in the manual operation (local control) mode. In the manual operation mode, MT8815A/MT8820A is operated by pressing keys arranged on the front/rear panels.

Fig. 7.1.3-1 Remote lamp Off

7.1.4 Interface

MT8815A/MT8820A uses the IEEE488.2-compliant GPIB interface for remote control. Serial (RS-232C) interface can be used only with the MT8815A. However, GPIB and Serial interfaces cannot be used at the same time. When using the GPIB interface, variety of measurement systems may be configured by using other GPIB devices in combination. The GPIB connectors are located on the rear panel of the MT8815A/MT8820A.

Note:

Refer to Section 6.1.2 (1) (e) "Interface" for switching between GPIB and Serial on the MT8815A.

7.1.5 Difference between manual operation and remote control

Differences between manual operation (local control) and remote control are described below.

(1) Single functions of the following panel keys cannot be used in the remote control mode:

- Power switch
- Cursor keys
- Rotary control
- Set
- Cancel
- Enter
- Shift
- Next

(2) While parameters to be set are selected using the rotary control to start changing the parameters in the local control mode, commands are sent to directly change the parameters in the remote control mode.

(3) To read set values and measurement results on the screen, a query command is sent and read the responded value.

(4) Cursor movement, screen scroll, page expansion of menu, etc. are available only in the local control mode.

(5) Setting and reading of GPIB address are available only in the local control mode.

(6) Setting of the interface (settings of status byte, IEEE488.2, etc.) is available only in the remote control mode.

(7) Displayed unit on the screen may differ from the response unit for remote control. In the remote control mode, a value is always returned in a predetermined remote control unit.

7.1.6 Switching between control modes

(1) Switching from the remote control mode to the local control mode

To switch MT8815A/MT8820A from the remote control mode to the local control mode, press Local on the front panel. Pressing Local turns the Remote lamp Off, and switches MT8815A/MT8820A into the local control mode. Send the GTL command for the Remote control.

Note:

When the Parallelphone Measurement Software is installed, pressing Local switches only the displayed Phone into the local control mode. For Remote control, sending a GTL command to GPIB-1 changes Phone-1 into the local control mode, and sending a GTL command to GPIB-2 changes Phone-2 into the local control mode.

(2) Switching from the local control mode to the remote control mode

To switch MT8815A/MT8820A from the local control mode to the remote control mode, send a remote control command via GPIB or Serial interface. Sending a command turns the Remote lamp On and switches MT8815A/MT8820A into the remote control mode.

Note:

When the Parallelphone Measurement Software is installed, sending a remote control command to GPIB-1 turns the Remote lamp On while Phone-1 is displayed. Sending a remote control command to GPIB-2 turns the Remote lamp On while Phone-2 is displayed.

7.2 GPIB Interface

The GPIB is an interface standardized by IEEE488.1 and IEEE488.2 that is in widespread use to control measuring instruments and peripherals by computer.

7.2.1 Device

GPIB equipment connected via the GPIB interface bus is called a device. Such devices include measuring instruments, computer as controller, and peripherals. MT8815A/MT8820A is also a device.

7.2.2 Communications between devices

Communications between devices are performed by exchanging device messages and interface messages.

The device message is also called data or data message that contains information on the device such as an instruction to a device, measurement results and device status.

The interface command controls the GPIB bus. Bus control includes initialization of the bus, setting/canceling a device address, and setting of local control or remote control.

In this manual, device messages and interface commands are generically called “remote control commands” or simply “commands”.

7.2.3 Talker and Listener

When devices exchange device messages, the device that sends a device message is called a “talker” and the device that receives the message is called a “listener.” However, a device may be neither of them (sleep status).

7.2.4 Controller

The controller controls the bus by performing talker/listener addressing and by sending interface messages to the interface bus.

In the computer-based control, the computer is a controller. Any other device having the control function can act as a controller that controls other devices.

MT8815A/MT8820A is not equipped with a control function. Therefore, a device that has at least one controller on the GPIB bus is required.

7.2.5 Program message and response message

The device message is classified into the program message and the response message.

The program message is instruction data to the controlled device. The message operates the device, or queries the measurement results and device status.

The response message is data indicating measurement results or device status. In this manual, the response message is simply denoted as response.

7.2.6 Programming command and query

The program message is further classified into the programming command and the query.

The programming command is a message for operating a device. In this manual, the programming command is simply denoted as the command.

The query is a message to query for measurement results and device status.

7.2.7 Overlap command

The GPIB command is classified into the overlap command and the sequential command depending on the way of being processed.

For the overlap command, multiple commands are simultaneously processed. For the sequential command, the next command is waited in a queue while one command is being processed.

MT8815A/MT8820A does not support the overlap command. All commands are processed as the sequential command. That is, the remote control commands transmitted to the MT8815A/MT8820A are processed in the transmitted order.

7.2.8 Command notations in this manual

This operation manual classifies the device messages used for the MT8815A/MT8820A into three categories, shown below:

(1) Command
A command executes a specific MT8815A/MT8820A function or changes the setting.

(2) Query
A query makes an inquiry about the setting of MT8815A/MT8820A or information on the MT8815A/MT8820A status.

(3) Response
On receiving a query, MT8815A/MT8820A returns the specified information as a response to the computer.

Relationship between command types and notations in this manual are shown in Fig. 7.2.8-1.

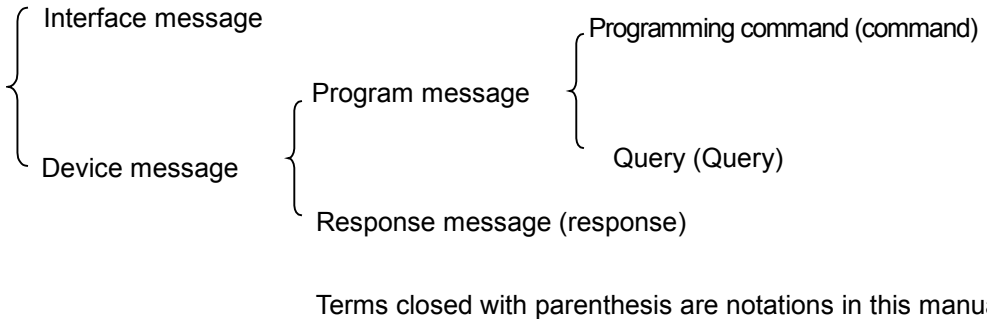

Fig. 7.2.8-1 Command types and notations in this manual

7.2.9 Communication flow between devices

The flow of communications between devices using remote control commands is shown below.

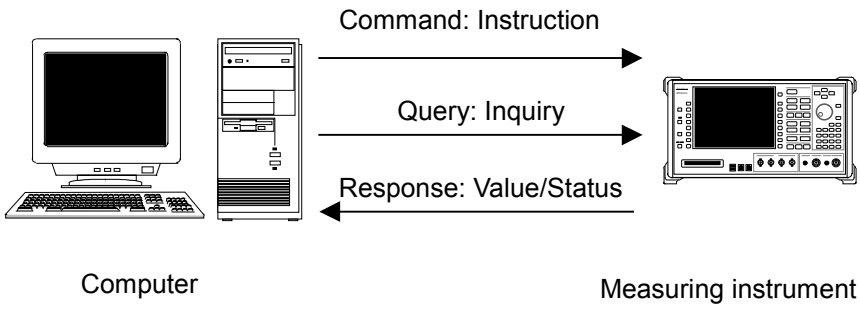

Fig. 7.2.9-1 Communication flow between devices

7.3 Setup of GPIB

This section describes how to set up the GPIB for remote control. The setup procedures are as follows:

[Procedure]

1. Set up the computer and GPIB board.
   Refer to the manual for your GPIB board and computer.
2. Connect MT8815A/MT8820A to the computer by using GPIB cable
   Refer to Section 2.3.5 “Connecting GPIB cable.”
3. Set the GPIB address of MT8815A/MT8820A.
   Select the System Configuration screen and set GPIB Address for the Phone-1 (or Phone-2) tag. Refer to Section 6.1.11 “Setting GPIB address.”
4. Activate the GPIB communication program of the computer and set GPIB address in conformance with the MT8815A/MT8820A.

Refer to the operation manual for your measurement software.

7.3.1 Network configuration

Devices connected with the GPIB interface may have the network configuration of serial connection or star connection as shown in the figure below.

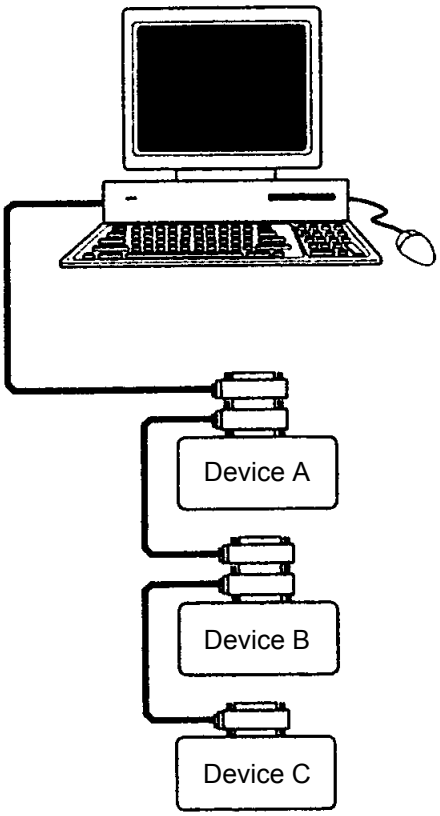

Fig. 7.3.1-1 Serial connection

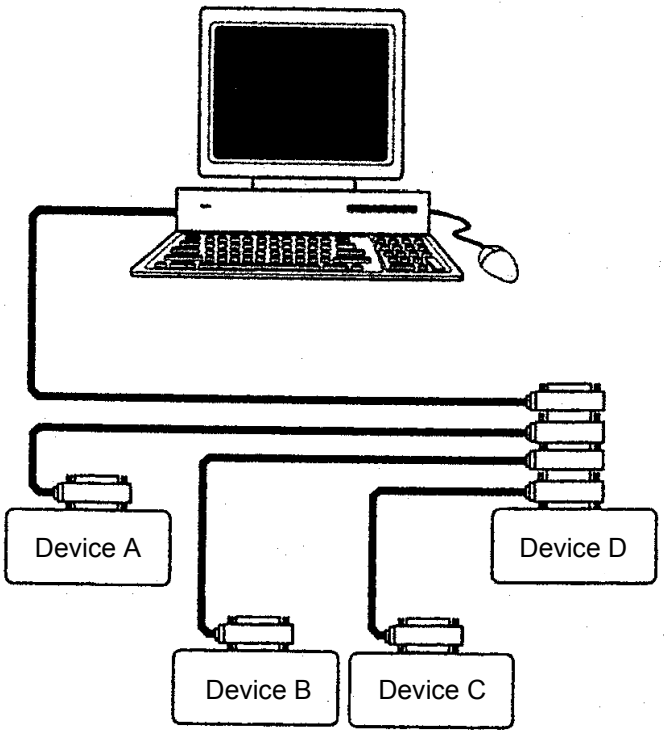

Fig. 7.3.1-2 Star connection

7.3.2 Conditions for network configuration

The GPIB interface has the following restrictions in order to secure the inter-device communications. Configure the network within these restrictions.

(1) Length of a cable between devices shall be 4 m or shorter. Average distance between devices connected to the bus shall be 2 m or shorter.

(2) The entire length of the cables shall be 20 m or shorter. Number of devices that can be connected to a bus is 15 or below, two thirds or above of which shall be powered on.

7.4 Serial Interface

The Serial interface is compliant with RS-232C standards. It is widely used to control measuring instruments from a computer.

Note:

The remote control using the serial interface functions for only the MT8815A.
It cannot be used for the MT8820A.

7.4.1 Serial (RS-232C) standards

The standards for the Serial port (RS-232C) on the MT8815A are shown in Table 7.4.1-1.

Table 7.4.1-1 Standards

Item	Standard value
Function	Control from an external controller (except power switch)
Communication method	Asynchronous (start-stop sync.), half duplex
Communication control method	None
Baud rate	4800
Data bit	8 bits
Parity	None (NON)
Start bit	1 bit
Stop bit	1 bit
Flow control	Xon/Xoff
Connector	D-Sub 9-pin, male

7.4.2 Program message and response message

The device message is classified into the program message and the response message.

The program message is instruction data to the controlled device. The message operates the device, or queries the measurement results and device status.

The response message is data indicating measurement results or device status. In this manual, the response message is simply denoted as response.

7.4.3 Programming command and query

The program message is further classified into the programming command and the query.

The programming command is a message for operating a device. In this manual, the programming command is simply denoted as the command.

The query is a message to query for measurement results and device status.

7.4.4 Overlap commands

The remote control command is classified into the overlap command and the sequential command depending on the way of being processed.

For the overlap command, multiple commands are simultaneously processed. For the sequential command, the next command is waited in a queue while one command is being processed.

MT8815A/MT8820A does not support the overlap command. All commands are processed as the sequential command. That is, the remote control commands transmitted to the MT8815A/MT8820A are processed in the transmitted order.

7.4.5 Command notations in this manual

This operation manual classifies the device messages used for the MT8815A/MT8820A into three categories, shown below:

(1) Command
A command executes a specific MT8815A/MT8820A function or changes the setting.

(2) Query
A query makes an inquiry about the setting of MT8815A/MT8820A or information on the MT8815A/MT8820A status.

(3) Response
On receiving a query, MT8815A/MT8820A returns the specified information as a response to the computer.

Relationship between command types and notations in this manual are shown in Fig. 7.4.5-1.

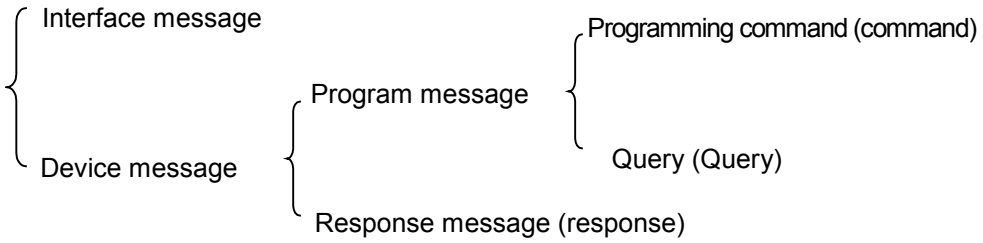

Fig. 7.4.5-1 Command types and notations in this manual

7.4.6 Communication flow between devices

The flow of communications between devices using remote control commands is shown below.

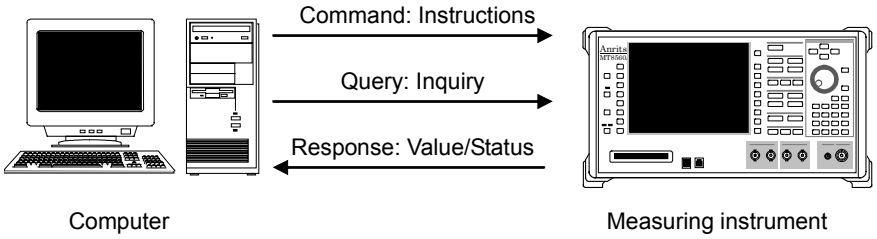

Fig. 7.4.6-1 Communication flow between devices

7.5 Command Syntax

7.5.1 Elements of command syntax

The command is a character string composed of alphabets, numeric values and symbols, which include a header and a parameter as character strings to determine command function, and syntax elements of command such as a question mark (?) and a space.

- Header
- Parameter
- ? (question mark)
- , (comma)
- □ (space)
- ; (semi-colon)
- * (asterisk)
- " (double quotation mark)
- ' (quotation mark)

Note:

Parameter values that can be used in the MT8815A/MT8820A are integer number (NR1) and fixed decimal point (NR2). For alphabets, both capitals and lower cases are available.

(1) Header

Name of a command that is always placed at the beginning of a command. The header may function by itself. A question mark (?) at the end indicates that the command is a query. An asterisk (*) at the beginning indicates that the command is an IEEE488.2 common command.

Example:

```
SNGLS
FREQ?
*RST
```

(2) Parameter

Indicates the set value or query conditions on the header. Arranged following the header with a space in between, substitutes alphabets and numeric values.

Plural arguments can be specified by using a comma (,) as a delimiter. Some arguments can be omitted.

Example:

```
FREQ 1920HZ
TXPWR? WATT
DATE 2001,07,23
```

(3) ? (question mark)

Appending "?" (question mark) to the end of a command creates a command (query) that queries the device status.

(4) , (comma)

Delimits multiple parameters

(5) □ (space)

Divides the header from a parameter.

(6) ; (semi-colon)

Connects two commands to process them as a single command.

Example:

```
SCRSEL SYSCFG;DATEMODE DMY
```

(7) * (asterisk)

Indicates that the command is an *IEEE488.2 common command.

Example:

```
*IDN?
```

(8) " (double quotation mark), ' (quotation mark)

Appended at the beginning and the end of a character string when the character string is specified as a parameter.

Example:

```
TITLE 'TOTAL TEST'
```

7.5.2 Setting parameters with unit specified

To specify the unit of parameter in a command, append a character string called a "suffix code" at the end of a parameter. The suffix code may be omitted. If omitted, setting is made in the predetermined response unit.

Example:

Setting the frequency to 1922 MHz (by a command from W-CDMA measurement software)

```
TFREQ 1922MHZ        /*with suffix code (set in MHz)*/
TFREQ 1922000000     /*without suffix code (set in Hz)*/
```

Table 7.5.2-1 shows suffix codes available for the MT8815A/MT8820A:

Table 7.5.2-1 Suffix code list

Classification	Unit	Suffix code
Frequency	GHz	GHZ
		GZ
	MHz	MHZ
		MZ
	kHz	KHZ
		KZ
	Hz	HZ
		None
Time	second	S
	msecond	MS
	μsecond	US
	Command-specific	None
Level (dB)	dB	DB
	dBm	DBM
		DM
	dBc	DBC
	dBμ	DBU
	Pre-specified unit	None
Level (W)	W	W
	mW	MW
	μW	UW
		None
	nW	NW
Level (V)	V	V
		None
	mV	MV
	μV	UV

7.5.3 Response unit

When a response is read by a query, the response unit may differ from the value of unit displayed on the MT8815A/MT8820A. This is because the grade of the response unit is determined by the unit system, not by the display unit. Care should be taken in command programming.

The following table shows response units for the MT8815A/MT8820A:

Table 7.5.3-1 Response unit

Classification	Display unit	Response unit
Frequency	GHz, MHz, kHz, Hz	Hz
Time	s, ms, µs	Command-specific
Level (dB)	dB	dB
	dBm	dBm
	dBc	dBc
	dBµ	dBµ
Level (W)	W, mW, µW, nW	W
Level (V)	V, mV, µV	V

Example:

When display is 1922 MHz: (the command is fictional)

Query `FREQ?`

Response `1922000000`

A frequency is always read in Hz unit.

Note:

Response unit is the same unit as that when the suffix code is not specified.

7.6 Command Programming Guide

To write an efficient measurement program, pay attention to the following points:

(1) Initialization

To avoid influence by the previous setting, initialize MT8815A/MT8820A before starting measurement. Select an initialization level according to the measurement.

(2) Use manual operation procedure as a reference for command transmission order

Take care of the command sending order when creating a remote control program. Command sending order is basically the same as that in the manual operation procedure. Thus understand the operation flow of the program to be created by manual operation. Especially in case measurement results are read after measurement, no commands other than query commands should be sent until all the results are read out.

(3) Pay attention to the command syntax

Avoid interruption of a command caused by a command syntax error. Especially, pay attention to the presence/absence of a space as well as comma and parameter setting method.

(4) Pay attention to the response unit.

When reading measurement results during remote control, the response unit is always returned in pre-specified unit. Note that the response unit differs from the unit of displayed notation.

(5) To enhance measurement throughput

To enhance measurement throughput, the following methods are available:

- Understand the initial value and change the required parameters only.
- Avoid sending commands not directly related to measurement.
- Make the number of screen switchovers to the minimum.
- Turn the Screen Off (send the SCREEN OFF command).

Note:

When executing queries consecutively while the Parallelphone Measurement Software is installed, the operation of the other Phone may be slow. To prevent this, insert a wait with several ms between queries.

7.7 Status Report

The IEEE488.2 provides common commands available to all the GPIB devices. Some of them can also be used with the Serial interface (some commands are not supported). The common commands are classified as device message, and report the device status.

Informing a device status is called a status report. Status model is also standardized in IEEE488.2 and referred to as a standard status model. That is, the status of any IEEE488.2-compliant device can be read by using a common command, regardless of the kind of devices.

7.7.1 Standard status model

Standard status models specified in IEEE488.2 are as follows:

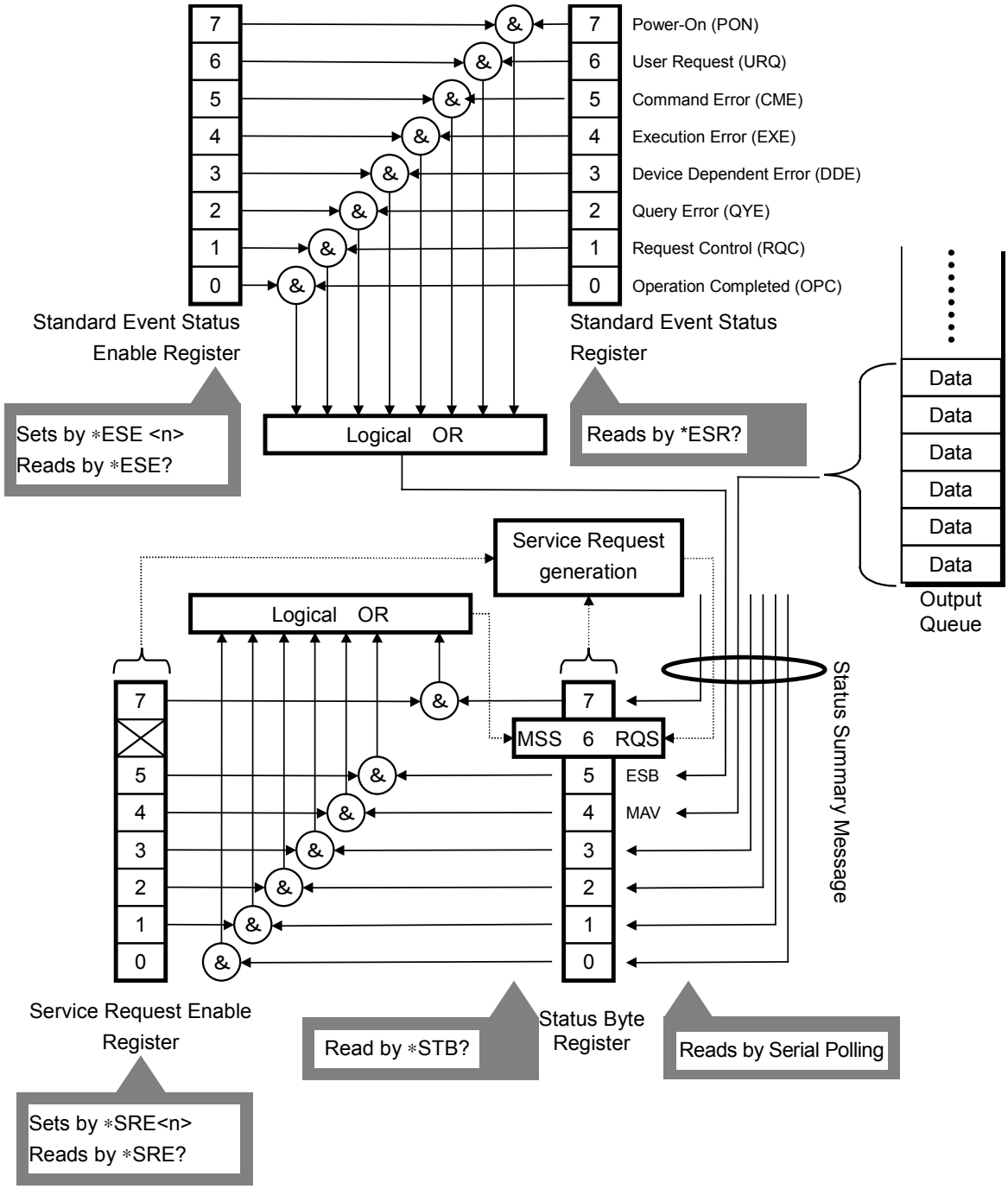

Fig. 7.7.1-1 Standard status model

Note:

Bit 3 (ERR) and bit 2 (END) of the status byte register are event summary bits specific to the MT8815A/MT8820A.

7.7.2 Standard event status register

SESR: Standard Event Status Register is a register consisting of eight bits. Each bit is respectively assigned to a standard event. When the MT8815A/MT8820A enters a standard event status, the corresponding bit becomes 1 (true).

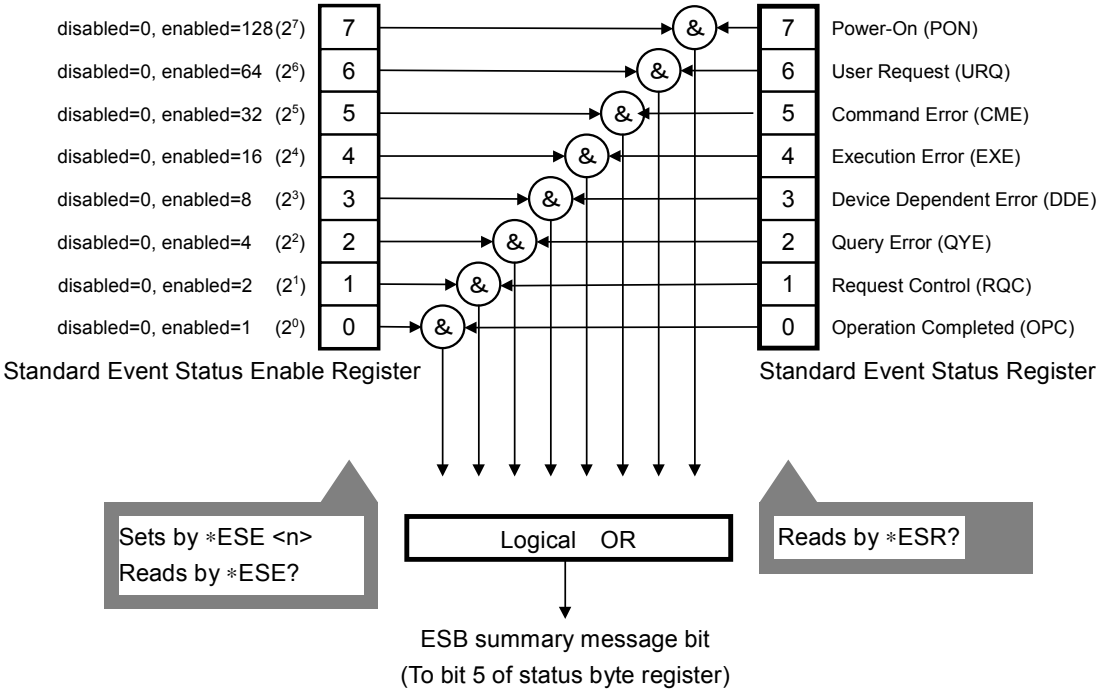

Fig. 7.7.2-1 Standard event status register

Table 7.7.2-1 Description of each bit of standard event status register

Bit	Name	Description
7	PON	Power On Indicates that the power is turned on.
6	URQ	User Request Not used in the MT8815A/MT8820A. Always 0.
5	CME	Command Error Indicates that an error has occurred during analysis of a command or a query received by the MT8815A/MT8820A.
4	EXE	Execution Error Indicates that an error has occurred during execution of a command or a query by the MT8815A/MT8820A.
3	DDE	Device Dependent Error Indicates that a device specific error has occurred.
2	QYE	Query Error Indicates that the data in the output queue is absent or data is lost. Cannot be used with Serial interface. Always 0.
1	RQC	Request Control Not used in the MT8815A/MT8820A. Always 0.
0	OPC	Operation Complete Indicates that all the outstanding operations have been completed. This bit is set only by the `*OPC` command.

■ Query

Query the standard event status using the `*ESR?` query. Response is the decimal number converted from the sum of the value obtained by binary-weighing the bit number of the occurred event. When readout is successful, the contents of the register are cleared.

Example :

Query `*ESR?`

Response `32`

($32 = 2^5$ A bit 5 command error has occurred.)

■ Clear The following methods are available to clear the standard event status register:

- Transmit the `*CLS` command
- Read the status register by using the `*ESR?` query

7.7.3 Standard event status enable register

Each bit of the standard event status enable register corresponds to each bit of the standard event status register. Logical OR of the bits is output to bit 5 of the status byte register.

That is, when any status specified by the standard event status enable register has occurred, bit 5 of the status byte register becomes 1 (true).

■ Setting

Set the standard event status enable register by using the `*ESE` command. The parameter is the decimal number converted from the sum of the values obtained by binary-weighting the specified bits.

Example:

Setting bit 5 of the status byte register to 1 (true) for command error (bit 5) and execution error (bit 4):

```
*ESE 48                    /*2^4 + 2^5 = 48*/
```

■ Query

Query using the `*ESE?` query. Response is the decimal number converted from the sum of the values obtained by binary-weighing the specified bits.

■ Clear

The following methods are available to clear the standard event status enable register:

- Send the `*ESE 0` command
- Turn the power On.

7.7.4 Status byte register

SBR (Status Byte Register) is an eight-bit register representing a service request, an event status bit etc. When the MT8815A/MT8820A enters the status set for each bit, the corresponding bit becomes 1 (true).

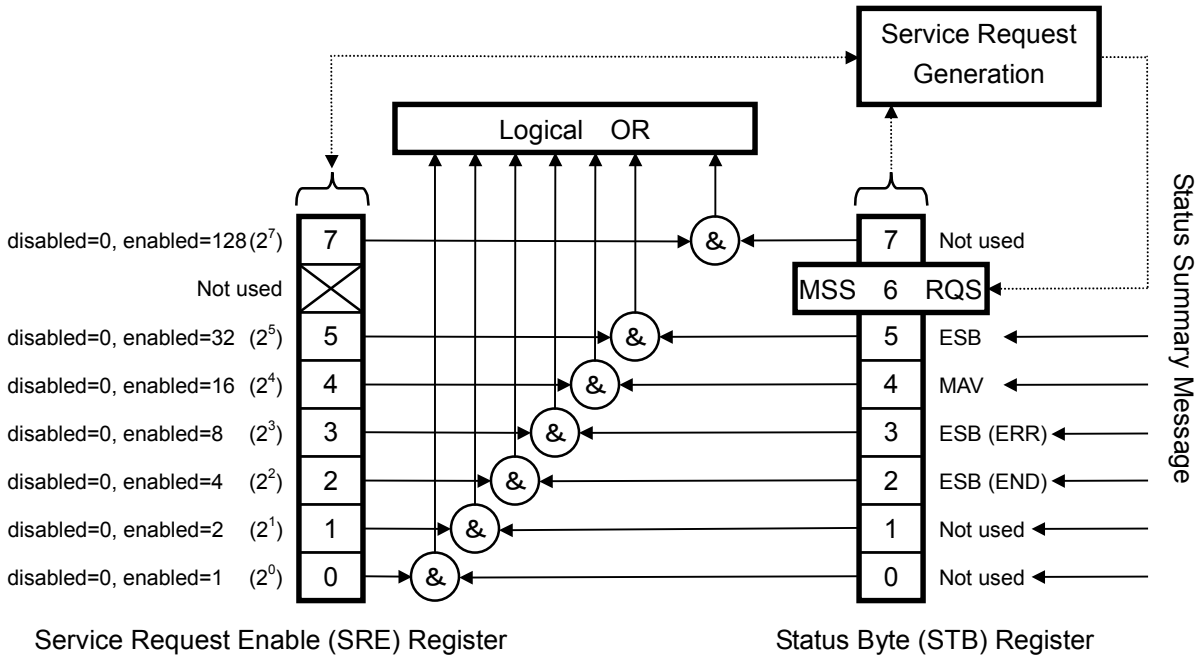

Fig. 7.7.4-1 Status byte register

Table 7.7.4-1 Description of each bit of status byte register

Bit	Name	Description
7	---	Not used
6	MSS	Master Summary Status Indicates that ESB (bit 5), MAV (bit 4), ERR (bit 3) or END (bit 2) of the status byte register is set. Read using the `*STB?` query.
	RQS	Service Request Indicates that the device is requesting a service to the controller. Read by serial polling. Cannot be used with Serial interface. Always 0.
5	ESB	Event Status Bit Indicates that a standard event specified by the standard event status enable register has occurred.
4	MAV	Message Available Indicates that data is present in the output queue. When data is present, 1 is set. When data is absent, 0 is set. Cannot be used with Serial interface. Always 0.
3	ERR	Error Event Status (specific to the MT8815A/MT8820A) Indicates that an event (error) specified by the ERR event status enable register has occurred.
2	END	End Event Status (specific to the MT8815A/MT8820A) Indicates that an event (operation completed) specified by the END event status enable register has occurred.
1	---	Not used
0	---	Not used

■ Query

The status byte register can be read using the `*STB?` query or by serial poll. Reading by serial poll causes bit 6 to be the RQS (service request) bit. Reading with the `*STB?` query causes bit 6 to be the MSS (Master Status Summary) bit. Response is the decimal number converted from the sum of the values obtained by binary-weighting the events that has occurred.

Example:

Query `*STB?`

Response `96`

($96 = 2^5 + 2^6$ Bit 5 and bit 6 are set to 1→

Events specified by the standard event status enable register have occurred.)

■ Clear

To clear the status byte register, send the `*CLS` command

7.7.5 Service request enable register

The service request enable register sets the contents of which bit of the status byte register occurs, to set MSS (bit 6) of the status byte (to 1).

Each bit of the service request enable register corresponds to contents of each bit of the status byte register (however, bit 6 is not used.)

■ Setting

Set the service request enable register by using the `*SRE` command. The parameter is the decimal value converted from the sum of the values obtained by binary-weighing the specified event.

Example:

To set MSS bit to 1 when ERR event has occurred:

```
*SRE 8                    /*2^3 = 8 is set because ERR is bit 3*/
```

■ Query

Read using the `*SRE?` query. Response is the decimal value converted from the sum of the values obtained by binary-weighing the specified bits.

■ Clear

The following methods are available to clear the service request enable register:

- Send the `*SRE 0` command
- Turn the power On

7.7.6 END event status register

The END event status register is an extended event status register specific to the MT8815A/MT8820A for detecting an event concerning completion of operation. When the MT8815A/MT8820A enters the status set for each bit, the corresponding bit becomes 1 (true).

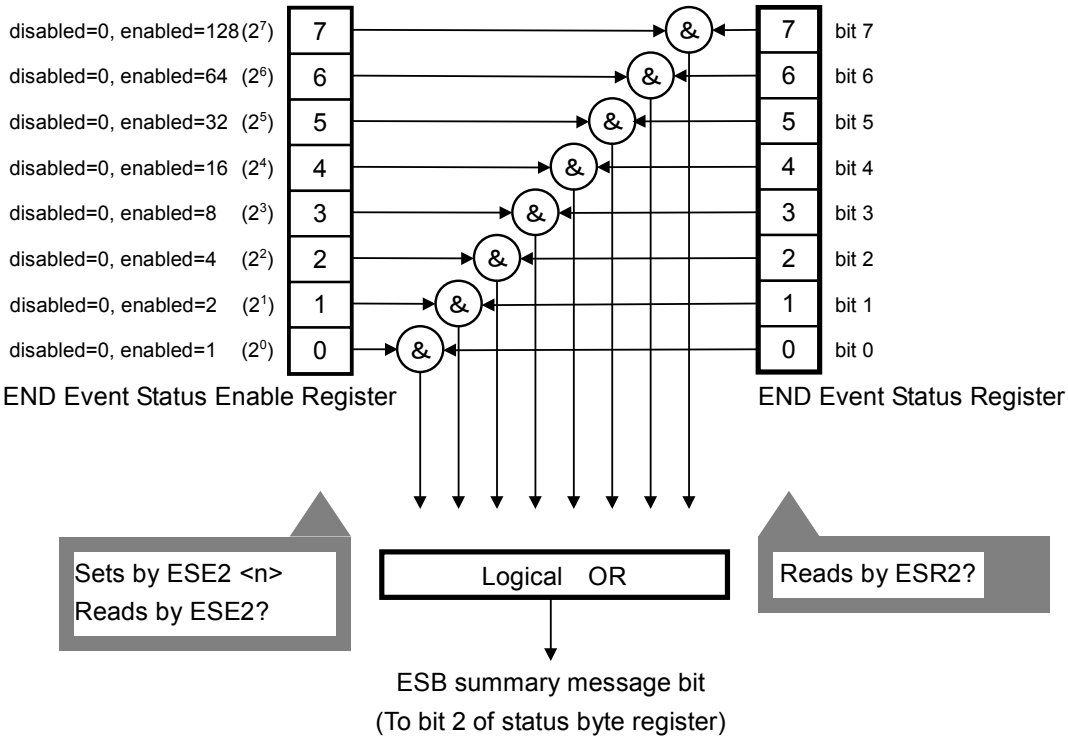

Fig. 7.7.6-1 END event status register

Table 7.7.6-1 Description of each bit of END event status register
When using W-CDMA or GSM measurement software

Bit	Description
7	Not used
6	Not used
5	Not used
4	Indicates that Audio measurements have been completed.
3	Indicates that transmission measurements on the Fundamental Measurement screen have been completed.
2	Indicates that reception measurements on the Fundamental Measurement screen have been completed.
1	Not used
0	Measurement/Sweep Completed Occurs when measurement or sweep has been completed.

Table 7.7.6-2 Description of each bit of END event status register When using CDMA2000, 1xEV-DO or CDMA2000WAT measurement software

Bit	Description
7	Not used
6	Not used
5	Not used
4	Indicates that Audio measurement has been completed.
3	Indicates that transmission measurements on the Fundamental Measurement screen have been completed, except for Access Probe Power.
2	Indicates that reception measurements on the Fundamental Measurement screen have been completed.
1	Indicates that the measurement for Access Probe Power on the Fundamental Measurement screen has been completed.
0	Indicates that measurements for all selected items have been completed.

Table 7.7.6-3 Description of each bit of END event status register When using PDC measurement software

Bit	Description
7	Not used
6	Not used
5	Not used
4	Not used
3	Indicates that transmission measurements on the Fundamental Measurement screen have been completed.
2	Indicates that reception measurements on the Fundamental Measurement screen have been completed.
1	Not used
0	Measurement/Sweep Completed Occurs when measurement or sweep has been completed.

Table 7.7.6-4 Description of each bit of END event status register When using PHS measurement software

Bit	Description
7	Indicates that synchronization has been established by entering the external trigger.
6	Indicates that output level settings have been completed.
5	Indicates that calibration has been completed.
4	Not used
3	Indicates that transmission measurements on the Fundamental Measurement screen have been completed.
2	Indicates that reception measurements on the Fundamental Measurement screen have been completed.
1	Not used
0	Measurement/Sweep Completed Occurs when measurement or sweep has been completed.

■ Query

Read using the `ESR2?` query. When readout is successful, the contents of the register are cleared.

Example:

Query `ESR2?`

Response `1`

(1 = 2^0 bit0: Measurement/sweep is completed)

■ Clear

The following methods are available to clear the END status register.

- Read the status using the `ESR2?` query
- Send the `*CLS` command
- Turn the power On.

7.7.7 END event status enable register

Each bit of the END event status enable register corresponds to each bit of the END status register. Logical OR of the bits is output to bit 2 of the status byte register.

That is, when any status specified by the END event status enable register has occurred, bit 2 of the status byte register becomes 1 (true).

■ Setting

Set the END event status enable register by using the `ESE2` command. The parameter is the decimal number converted from the sum of the values obtained by binary-weighing the specified bits.

Example:

To set bit 2 of the status byte register to 1 when measurement has been completed:

```
ESE2 1          /*Measurement completion is bit 0, so 2^0 = 1 is set.*/
```

■ Query

Read using the `ESE2?` query. Response is the decimal number converted from the sum of the values obtained by binary-weighing the specified bits.

■ Clear

The following methods are available to clear the END event status enable register:

- Send the `ESE2 0` command

7.7.8 ERR event status register

The ERR (error) Event Status Register is an extended event status register specific to the MT8815A/MT8820A for detecting an event concerning errors. When the MT8815A/MT8820A enters the status set for each bit, the corresponding bit becomes 1 (true).

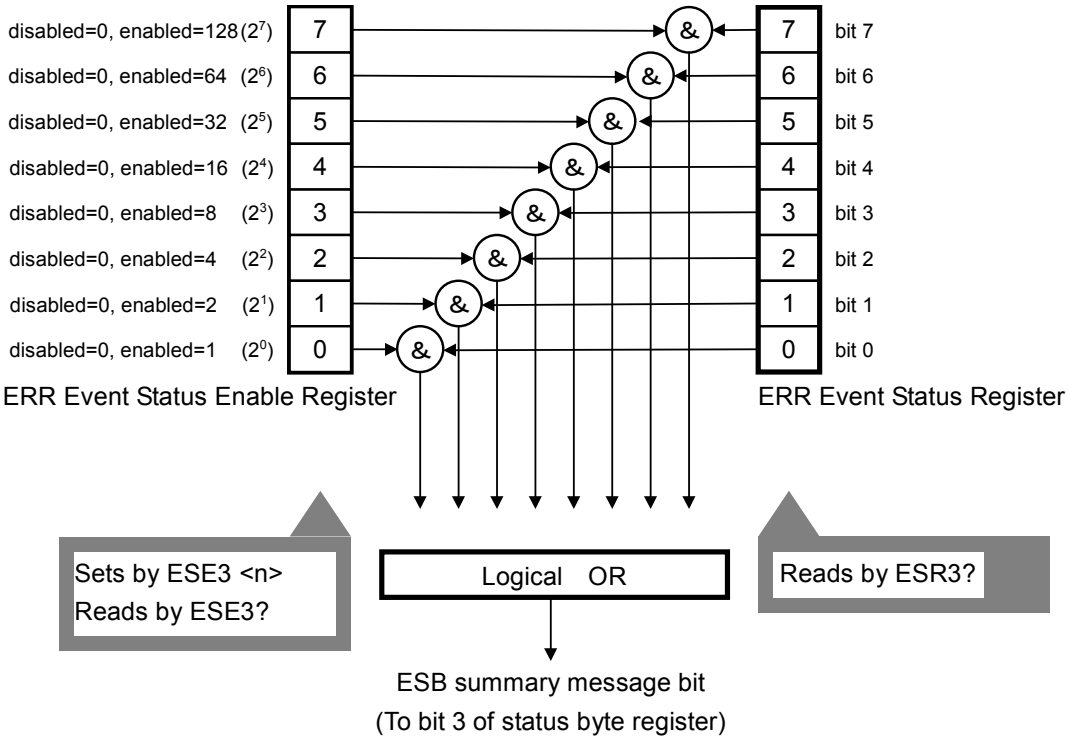

Fig. 7.7.8-1 ERR event status register

Table 7.7.8-1 Description of each bit of ERR event status register When using W-CDMA, GSM, PDC or PHS measurement software

Bit	Description
7	Not used
6	Call Drop Error Occurs when the MT8815A/MT8820A cannot demodulate signal of phone.
5	Not used
4	Call Processing Error Indicates that an error has occurred during call processing.
3	Reception Measurement Error Indicates that an error has occurred during reception measurement.
2	Transmission Measurement Error Indicates that an error has occurred during transmission measurement.
1	Not used
0	Sync Loss (Bit Error Rate Measurement) Indicates that synchronization is lost during bit error rate measurement.

Table 7.7.8-2 Description of each bit of ERR event status register When using CDMA2000, 1xEV-DO or CDMA2000WAT measurement software

Bit	Description
7	Not used
6	Call Drop Error (* Except for 1xEV-DO) Occurs when the MT8815A/MT8820A cannot demodulate signal of phone.
5	Not used
4	Call Processing Error Indicates that an error has occurred during call processing.
3	Reception Measurement Error (* Except for CDMA2000WAT) Indicates that an error has occurred during reception measurement.
2	Transmission Measurement Error (* Except for CDMA2000WAT) Indicates that an error has occurred during transmission measurement, except for Access Probe Power.
1	Access Probe Power Measurement Error Indicates that an error has occurred during measurement for Access Probe Power on the Fundamental Measurement screen.
0	Not used

■ Query

Read using the ESR3? query. When readout is successful, the contents of the register are cleared.

Example:

Query ESR3?

Response 80

(80 = 2^4 + 2^6: bit 4 and bit 6 errors have occurred)

■ Clear

The following methods are available to clear the ERR status register:

- Read the status using the ESR3? query
- Send the *CLS command
- Turn the power On

7.7.9 ERR event status enable register

The ERR event status enable register is a register consisting of eight bits.

Each bit of the ERR event status enable register corresponds to that of the ERR status register. Logical OR of the bits is output to bit 3 of the status byte register.

That is, when any status specified by the ERR event status enable register has occurred, bit 3 of the status byte register becomes 1 (true).

■ Setting

Set the END event status enable register by using the ESE3 command. The parameter is the decimal number converted from the sum of the values obtained by binary-weighing the specified bits.

Example:

To set bit 3 of the status byte register to 1 when both the sending measurement error and receiving measurement error have occurred:

```
ESE3 12    /*Errors correspond to bit 2 and bit 3, so 2^2 + 2^3 = 12 is set.*/
```

■ Query

Read using the `ESE3?` query. Response is the decimal number converted from the sum of the values obtained by binary-weighing the specified bits.

■ Clear

The following methods are available to clear the ERR event status enable register:

- Send the `ESE3 0` command

7.8 Establishing Synchronization

This section describes how to establish synchronization between commands transmitted from the computer with the operation of the MT8815A/MT8820A.

7.8.1 Difference of synchronization depending on measurement start command

When measurement is started using the SNGLS command, command processing is assumed to have been completed even when the actual measurement has not yet. That is, next command is executed even if measurement is being executed. The SNGLS command is effective when a measured value during measurement is read, and effective in measurement where measurement is endless, such as bit error rate measurement.

In most measurements, it is necessary to read the measurement results after the measurement has been completed. In this case, use SWP as a measurement start command. Starting measurement using the SWP command puts the next command in wait status until current measurement has been completed. Thus it is not necessary to provide special processing for waiting for current measurement to be completed.

7.8.2 Establishing synchronization with *OPC? query

Sending the *OPC? query to MT8815A/MT8820A provides synchronization, as below.

When the response to *OPC? is 1, it indicates that the immediately preceding command was completed.

7.8.3 Establishing synchronization corresponding to status register status

Sending the *STB?, *ESR?, ESR2? or ESR3? to MT8815A/MT8820A provides synchronization. Thus, synchronization is established by waiting for the response to be the expected value. Event status register must be reset just before occurring the expected register. In addition, the *OPC command must be sent before sending the target command when using the *ESR? query.

Section 8 Remote Control Commands

This section describes the remote control commands related to the common functions and the IEEE488.2 common commands. All commands described in this section can be executed in all measurement software operating on MT8815A/MT8820A.

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8.1 Command List by Function

The following list classifies the commands executable in all the measurement software operating on MT8815A/MT8820A by function. For details of individual commands, refer to Section 8.2 "Command Specifications in Alphabetical Order." For the commands to execute the functions of measurement software, refer to the operation manual of each measurement software.

Note:

When the Parallelphone Measurement Software is installed in MT8820A, send a remote control command to GPIB-1 or GPIB-2 to remotely control Phone-1 or Phone-2, respectively (except for some common parameters).

8.1.1 IEEE488.2 common commands

The common commands defined in IEEE488.2 available in the MT8815A/MT8820A are listed in the table below. The commands are available on all screens.

Table 8.1.1-1 IEEE488.2 common commands

Function	Command	Query	Response	Remarks
System Data				
Identification Query	-----	*IDN?	MT8815A: ANRITSU,MT8815A, serial,firm MT8820A: ANRITSU,MT8820A, serial,firm,phone	serial Serial Number firm Firmware Version phone Phone Number
Internal Operations				
Reset (Instrument Initial)	*RST	-----	-----	
Self-Test Query	-----	*TST?	test_result	
Synchronization				
Operation Complete Command	*OPC	-----	-----	
Operation Complete Query	-----	*OPC?	1	
Wait-to-Continue Command	*WAI	-----	-----	
Status & Event				
Clear Status Command	*CLS	-----	-----	
Standard Event Status Enable Command	*ESE register	-----	-----	
Standard Event Status Enable Query	-----	*ESE?	register	
Standard Event Status Register Query	-----	*ESR?	register	
Service Request Enable Command	*SRE register	-----	-----	
Service Request Enable Query	-----	*SRE?	register	
Read Status Byte Query	-----	*STB?	register	
Trigger				
Trigger Command	*TRG	-----	------	

8.1.2 Extended event status commands

The status report commands specific to MT8815A/MT8820A are listed in the table below. The commands are available on all screens.

Table 8.1.2-1 Extended event status commands

Function	Command	Query	Response	Remarks
End Event Status Enable Register Command	ESE2 register	-----	-----	
End Event Status Enable Register Query	-----	ESE2?	register	
End Event Status Register Query	-----	ESR2?	register	
Error Event Status Enable Register Command	ESE3 register	-----	-----	
Error Event Status Enable Register Query	-----	ESE3?	register	
Error Event Status Register Query	-----	ESR3?	register	

8.1.3 Initialization commands

The commands for initializing MT8815A/MT8820A are listed in the table below. The commands are available on all the screens except for the Standard Load screen. The *RST command is, however, available on the Standard Load screen.

Table 8.1.3-1 Initialization commands

Function	Command	Query	Response	Remarks
Preset	PRESET	-----	-----	
	*RST	-----	-----	
	PRE	-----	-----	
	IP	-----	-----	
	INI	-----	-----	

8.1.4 Measurement software selection commands

Table 8.1.4-1 Measurement software selection commands

Function		Command	Query	Response	Remarks
Measurement Software	W-CDMA	STDSEL WCDMA	STDSEL?	WCDMA	
	GSM	STDSEL GSM		GSM	
	CDMA2000/1xEV-DO	STDSEL CDMA2K		CDMA2K	
	PDC	STDSEL PDC		PDC	
	PHS	STDSEL PHS		PHS	
	CDMA2000WAT	STDSEL CDMA2KWAT		CDMA2KWAT	
Load Software	W-CDMA	STDLOAD n,WCDMA	-----	-----	n = Standard number (1 to 3)
	GSM	STDLOAD n,GSM	-----	-----	
	CDMA2000/1xEV-DO	STDLOAD n,CDMA2K	-----	-----	
	PDC	STDLOAD n,PDC	-----	-----	
	PHS	STDLOAD n,PHS	-----	-----	
	CDMA2000WAT	STDLOAD n,CDMA2KWAT	-----	-----	
Unload Software		STDUNLOAD n	-----	-----	n = Standard number (1 to 3)

8.1.5 Screen selection commands

The commands for selecting common function screens of Common External Loss screen, Parameter Save screen, Parameter Recall screen, etc. are listed in the table below.

Table 8.1.5-1 Screen selection commands

Function		Command	Query	Response	Remarks
Select Screen	Parameter Save	SCRSEL PRMSAVE	SCRSEL?	PRMSAVE	
	Parameter Recall	SCRSEL PRMRCL		PRMRCL	
	System Configuration	SCRSEL SYSCFG		SYSCFG	
	System Information	SCRSEL SYSINFO		SYSINFO	
	Common External Loss	SCRSEL CEXTLOSS		CEXTLOSS	
	Standard Load	SCRSEL STDLOAD		STDLOAD	
Active Window	Ext. Loss List	SCRACT LOSSLIST	SCRACT?	LOSSLIST	
	Ext. Loss View	SCRACT LOSSVIEW		LOSSVIEW	
	Standard Load	SCRACT STDLOAD		STDLOAD	
	Softlist	SCRACT SOFTLIST		SOFTLIST	
Window Size	100%	WINSIZE 100	WINSIZE?	100	
	70%	WINSIZE 70		70	
	50%	WINSIZE 50		50	
	30%	WINSIZE 30		30	

8.1.6 Measurement commands

The commands for starting and stopping measurement are listed in the table below. Measurement cannot be started from common function screens.

Table 8.1.6-1 Measurement commands

Function	Command	Query	Response	Remarks
Single	SNGLS	-----	-----	
	S2	-----	-----	
Single (Sync)	SWP	-----	-----	
	TS	-----	-----	
Continuous	CONTS	-----	-----	
	S1	-----	-----	
Current Status	-----	SWP?	status	status 0: Done 1: Measuring
Stop Measure	MEASSTOP	-----	-----	

8.1.7 Calibration execution commands

The commands for executing calibration before starting measurement are listed in the table below. The commands are available on all measurement screens.

Table 8.1.7-1 Calibration execution commands

Function	Command	Query	Response	Remarks
Full Calibration	FULLCAL	-----	-----	
Band Calibration	BANDCAL	-----	-----	

8.1.8 System screen tag selecting commands

The commands for selecting a tag on the system screen are listed in the table below. The commands are available on the screens in which the corresponding tag is displayed.

Table 8.1.8-1 Tag selecting commands

Function		Command	Query	Response	Remarks
Select Tag					
System Configuration	Common	TAGSEL SYSCFG,COMMON	TAGSEL? SYSCFG	COMMON	
	Phone-1	TAGSEL SYSCFG,PHONE1		PHONE1	
	Phone-2	TAGSEL SYSCFG,PHONE2		PHONE2	Only for MT8820A
System Information	Maintenance Information	TAGSEL SYSINFO,MAINTE	TAGSEL? SYSINFO	MAINTE	
	Software Version	TAGSEL SYSINFO,SOFT		SOFT	
	Software Option	TAGSEL SYSINFO,OPTION		OPTION	
	Hardware Revision	TAGSEL SYSINFO,HARD		HARD	

8.1.9 System setting commands

The commands for setting the MT8815A/MT8820A systems and interfaces on the System Configuration screen are listed in the table below. The commands are available on all screens.

Table 8.1.9-1 System setting commands

Function		Command	Query	Response	Remarks
Frequency					
Reference Frequency *	Internal 10MHz	REF 10MHZINT	REF?	10MHZINT	
	External 10MHz	REF 10MHZEXT		10MHZEXT	
	External 13MHz	REF 13MHZEXT		13MHZEXT	
Display					
Display Title *	User Define	TTL USER	TTL?	USER	
	Date / Time	TTL DATE		DATE	
	Off	TTL OFF		OFF	
Title *		TITLE char	TITLE?	char	
Date Format *	YYYY / MM / DD	DATEMODE YMD	DATEMODE?	YMD	
	MM / DD / YYYY	DATEMODE MDY		MDY	
	DD / MM / YYYY	DATEMODE DMY		DMY	
Date (Year/Month/Day) *		DATE year, month, day	DATE?	year, month, day	year = 2001 to 2030 month = 1 to 12 day = 1 to 31
Time (Hour:Minute:Second) *		TIME hour, min, sec	TIME?	hour, min, sec	hour = 0 to 23 min = 0 to 59 sec = 0 to 59
Beep Sound *	On	ALARM ON	ALARM?	ON	
		BEP 1	-----	-----	
		BEP ON	-----	-----	
	Off	ALARM OFF	ALARM?	OFF	
		BEP 0	-----	-----	
		BEP OFF	-----	-----	
Sound Buzzer		BZR	-----	-----	
RF Output	Main	RFOUT MAIN	RFOUT?	MAIN	
	AUX	RFOUT AUX		AUX	

Table 8.1.9-1 System setting commands (cont.)

Function		Command	Query	Response	Remarks
Baud Rate	38400 bps	BAUD 38400	BAUD?	38400	Only for MT8815A
	19200 bps	BAUD 19200		19200	
	9600 bps	BAUD 9600		9600	
	4800 bps	BAUD 4800		4800	
	2400 bps	BAUD 2400		2400	
	1200 bps	BAUD 1200		1200	
Parity Bit	EVEN	PRTY EVEN	PRTY?	EVEN	Only for MT8815A
	ODD	PRTY ODD		ODD	
	OFF	PRTY OFF		OFF	
Data Bit	7 Bit	DTAB 7	DTAB?	7	Only for MT8815A
	8 Bit	DTAB 8		8	
Stop Bit	1 Bit	STPB 1	STPB?	1	Only for MT8815A
	2 Bit	STPB 2		2	
10Base-T-1 (10Base-T-2)	IP Address	PSETIPADDR n1,n2,n3,n4	PSETIPADDR?	n1,n2,n3,n4	n1,n2,n3,n4 = 0 to 255
	Subnet Mask	PSETSNM n1,n2,n3,n4	PSETSNM?	n1,n2,n3,n4	n1,n2,n3,n4 = 0 to 255
	Default Gateway	PSETDEFGTWY n1,n2,n3,n4	PSETDEFGTWY?	n1,n2,n3,n4	n1,n2,n3,n4 = 0 to 255

*: When the Parallelphone Measurement Software is installed in the MT8820A, setting via either the GPIB-1 or GPIB-2 connector applies a common setting value to both Phone-1 and Phone-2.

8.1.10 System information query commands

The commands for reading the system information (displayed in the System Information screen) of the hardware and software, which configure the MT8815A/MT8820A, are listed in the table below. The commands are available on all screens.

Table 8.1.10-1 System information query commands

Function	Command	Query	Response	Remarks
Maintenance Information				
Serial Number	-----	SERIAL?	serial_number	
Power On Time	-----	TMCNT?	time	Unit = min
Full Cal Time	-----	FULLCAL_TM?	year,month,day,hour, min	year = 2001 to 2030 month = 1 to 12 day = 1 to 31 hour = 0 to 23 min = 0 to 59
CF Type	-----	MCCF?	a,b	a = CF Type b = CF Unused Area
Load Software Version	-----	MCMSV? [n]	std,version	n = Standard Number std = Standard Name
Software Version				
Firmware Version	-----	MCIV?	version	version = IPL version
	-----	MCOV?	version	version = OS version
	-----	MCFV?	version	version = Firmware version

Table 8.1.10-1 System information query commands (cont.)

Function	Command	Query	Response	Remarks
Hardware Revision *	-----	MCHV?	maid,marev,mafpga, tdid1,tdrev1,tdfpga1, cdid1,cdrev1,cdfpga1, evid1,evrev1,evfpga1, wcid1,wcrev1,wcfpga1, wbid1,wbrev1,wbfpga1, mdid1,mdrev1,mdfpga1, daid,darev,dafpga, tdid2,tdrev2,tdfpga2, cdid2,cdrev2,cdfpga2, evid2,evrev2,evfpga2, wcid2,wcrev2,wcfpga2, wbid2,wbrev2,wbfpga2, mdid2,mdrev2,mdfpga2, auid,aurev,aufpga	maid: Main CPU ID marev: Main CPU Rev. mafpga: Main CPU FPGA tdid1: TDMA COM1 ID tdrev1: TDMA COM1 Rev. tdfpga1: TDMA COM1 FPGA cdid1: CDMA2000 COM1 ID cdrev1: CDMA2000 COM1 Rev. cdfpga1: CDMA2000 COM1 FPGA evid1: 1xEV-DO COM1 ID evrev1: 1xEV-DO COM1 Rev. evfpga1: 1xEV-DO COM1 FPGA wcid1: W-CDMA COM1 ID wcrev1: W-CDMA COM1 Rev. wcfpga1: W-CDMA COM1 FPGA wbid1: W-CDMA BB1 ID wbrev1: W-CDMA BB1 Rev. wbfcpga1: W-CDMA BB1 FPGA mdid1: Measure DSP1 ID mdrev1: Measure DSP1 Rev. mdfpga1: Measure DSP1 FPGA daid: DAC/ADC ID darev: DAC/ADC Rev. dafpga: DAC/ADC FPGA tdid2: TDMA COM2 ID tdrev2: TDMA COM2 Rev. tdfpga2: TDMA COM2 FPGA cdid2: CDMA2000 COM2 ID cdrev2: CDMA2000 COM2 Rev. cdfpga2: CDMA2000 COM2 FPGA evid2: 1xEV-DO COM2 ID evrev2: 1xEV-DO COM2 Rev. evfpga2: 1xEV-DO COM2 FPGA

Table 8.1.10-1 System information query commands (cont.)

Function	Command	Query	Response	Remarks
Hardware Revision *				wcid2: W-CDMA COM2 ID wcrev2: W-CDMA COM2 Rev. wcfpga2: W-CDMA COM2 FPGA wbid2: W-CDMA BB2 ID wbrev2: W-CDMA BB2 Rev. wbfpga2: W-CDMA BB2 FPGA mdid2: Measure DSP2 ID mdrev2: Measure DSP2 Rev. mdfpga2: Measure DSP2 FPGA auid: Audio ID aurev: Audio Rev. aufpga: Audio FPGA
Option Number	-----	MCOPT? a	n,n1,n2,...	a = Type Name of Option n = Count n1,n2... = Option Number
Type Name of Option	-----	MCSOPT?	n,a1,a2,...	n = Count a1,a2... = Type Name of Option
Version Information of Option Module Software	-----	MCSV? a	version	a = Type Name of Option
Information Save	SYSINFOSAVE	-----	-----	File name: SysInfo.txt

*: Responses for Phone-2 are displayed when the Parallelphone Measurement Software is installed in the MT8820A.

8.1.11 Common cable loss setting commands

The commands that can be set on the Common External Loss screen are listed in the table below.

Table 8.1.11-1 Common cable loss setting commands

Function	Command	Query	Response	Remarks
Regist Loss into List	LOSSTBLVAL f,l1,l2,l3	LOSSTBLVAL? n	f,l1,l2,l3	n = 1 to 100 f = 0.4 to 2700.0 [MHz] l1 = –55.00 to 55.00 [dB] l2 = –55.00 to 55.00 [dB] l3 = –55.00 to 55.00 [dB]
Number of External Loss Common Table	-----	LOSSTBLSAMPLE?	n	n = 0 to 100
Delete Loss From List	DELLOSSTBL a,b	-----	-----	a,b = Specifies the deleted range. If not specified, all is deleted.
Save List	SVLOSSTBL file	-----	-----	file Save File Name
Load List	RLLOSSTBL file	-----	-----	file Recall File Name
Start Frequency	LOSSVIEW_STAFREQ f	LOSSVIEW_STAFREQ?	f	f = 0.4 to 2700.0 [MHz]
Stop Frequency	LOSSVIEW_STPFREQ f	LOSSVIEW_STPFREQ?	f	f = 0.4 to 2700.0 [MHz]
Vertical Scale	LOSSVIEW_VSCALE mode	LOSSVIEW_VSCALE?	mode	mode = 10, 20, 30, 40, 50, 60

8.1.12 Parameter save commands

The commands for saving parameter settings are listed in the table below. The measurement screen of an activated phone can be saved. This command is available on all screens.

Table 8.1.12-1 Parameter save commands

Function		Command	Query	Response	Remarks
Directory Path		-----	SVCD?	dir_path	
File List		-----	SVFLIST?	num,a1,name1,a2,name2,...,a(num),name(num)	num File Number a Attribute 0: No File 1: Archive or 2: Read Only name Object Name
Save Parameter	Default Name	PRMSAVE	-----	-----	
	File Name	PRMSAVENAME fname	-----	-----	fname File Name
	File Number	PRMSAVE fnumber	-----	-----	fnumber File Number
Default File Name Query		-----	SVDEFFILE?	fname	fname File Name

8.1.13 Parameter read commands

The commands for reading files saved with parameter save commands are listed in the table below. This command is available on all screens.

Table 8.1.13-1 Parameter read commands

Function		Command	Query	Response	Remarks
Directory Path		-----	RLCD?	dir_path	
File List		-----	RLFLIST?	num,a1,name1,a2,name2,...,a(num),name(num)	num File Number a Attribute 1: Archive or 2: Read Only name Object Name
Recall Parameter	File Name	PRMRECALLNAME fname	-----	-----	fname File Name
	File Number	PRMRECALL fnumber	-----	-----	fnumber File Number

8.1.14 Special commands

The commands for performance test and functions executable only in the remote control. The commands are available on all screens.

Table 8.1.14-1 Special commands

Function		Command	Query	Response	Remarks
Drawing	On	SCREEN ON	-----	-----	
	Off	SCREEN OFF		-----	
Panel Display Power *	On	DISPL ON	DISPL?	ON	
	Off	DISPL OFF		OFF	
Modulation for the performance test	Modulation (Normal)	MOD ON	MOD?	ON	
	Non Modulation (Test Mode)	MOD OFF		OFF	
Remote Control Display Mode	Normal	REMDISP NORMAL	REMDISP?	NORMAL	
	Remain	REMDISP REMAIN		REMAIN	
	Stop	REMDISP STOP		STOP	
Go to local		GTL	-----	-----	
Delimiter	LF	DELM 0	DELM?	0	Only for MT8815A
	CR/LF	DELM 1		1	Only for MT8815A
Terminator	LF	TRM 0	TRM?	0	
	CR/LF	TRM 1		1	

*: When the Parallelphone Measurement Software is installed to MT8820A, setting via either the GPIB-1 or GPIB-2 connector applies a common setting value to both the Phone-1 and Phone-2.

8.2 Command Specifications in Alphabetical Order

This section describes executable commands in all the measurement software operating on MT8815A/MT8820A in alphabetical order. For the commands to execute the functions of measurement software, refer to the separate operation manual of each measurement software.

■ How to view the command list

EX ..... Command name (header)

Example ..... Command function name

Explains how to view the command specifications
..... Function outline

Function ..... Command function

Command ..... Programming command syntax

Query ..... Query syntax

Response ..... Response syntax

Parameters ..... Parameter definition

Description ..... Command restriction item, etc

Sample programming ..... Example for command use

Related command ..... Introduction for related command

*CLS

Clear Status Command
Clearing status

Function

Clears the standard event status register and the status byte register (except the output queue and MAV bits)

Command

`*CLS`

Query

None

Response

None

Description

Sending `*CLS` command after a program message terminator or before a query message unit causes all status byte registers to be cleared.

Sample programming

To clear the standard event status register and the status byte register (except the output queue and MAV bits):

```
*CLS
```

*ESE

Standard Event Status Enable Command
Setting standard event status enable register

Function

Sets the standard event status enable register. When the set event occurs, the end summary bit (ESB, bit 5) of the status byte register becomes "1" (true).

Command

```
*ESE register
```

Query

```
*ESE?
```

Response

```
register
```

Parameters

`register` Standard event status enable register

Value = bit0 + bit1 + ... + bit7

bit0 = 2^0 = 1 : Operation complete
bit1 = 2^1 = 2 : Request control
bit2 = 2^2 = 4 : Query error
bit3 = 2^3 = 8 : Device error
bit4 = 2^4 = 16 : Execution error
bit5 = 2^5 = 32 : Command error
bit6 = 2^6 = 64 : User request
bit7 = 2^7 = 128 : Power On

Description

From among the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the standard event status enable register; the sum of values of bits to be enabled becomes the parameter.

Sample programming

To enable the execution error event:

```
*ESE 16
```

*ESR?

Standard Event Status Register Query
Querying the standard event status register

Function

Queries the standard event status register. The event that occurred can be identified depending on the read value.

Command

None

Query

```
*ESR?
```

Response

```
register
```

Parameters

`register` Standard event status register

Value = bit0 + bit1 + ... + bit7

bit0 = 2^0 = 1 : Operation complete
bit1 = 2^1 = 2 : Request control
bit2 = 2^2 = 4 : Query error
bit3 = 2^3 = 8 : Device error
bit4 = 2^4 = 16 : Execution error
bit5 = 2^5 = 32 : Command error
bit6 = 2^6 = 64 : User request
bit7 = 2^7 = 128 : Power On

Description

The parameter is the sum of the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the standard event status register. When the response is read, the standard event status register is cleared.

Sample programming

To read the standard event status register:

```
*ESR?
```

*IDN?

Identification Query
Querying identification queries

Function

Inquires the identification information of the device on the GPIB bus.

Command

None

Query

```
*IDN?
```

Response

```
ANRITSU,MT8815A,serial,firm (for MT8815A)
ANRITSU,MT8820A,serial,firm,phone (for MT8820A)
```

Parameters

`ANRITSU`	: Company name (Anritsu Corporation)
`MT8820A`	: Model name of device (varies depending on the model)
`serial`	: Serial number (unique to each MT8815A/MT8820A unit)
`firm`	: Firmware revision
`phone`	: Phone number (1 for Phone-1, and 2 for Phone-2) (Phone number is omitted for the MT8815A because it is for single phone measurement)

Sample programming

To query the identification information of MT8815A/MT8820A:

```
*IDN?
```

*OPC

Operation Complete
Setting the operation complete flag

Function

Sending the *OPC command sets bit 0 (operation complete) of the standard event status register when all of the selected pending device operations have been completed.

When all of the selected pending operations have been completed, the *OPC? command sets "1" in the output queue and waits until MAV occurs.

Command

```
*OPC
```

Query

```
*OPC?
```

Response

```
operation
```

Parameters

`operation`	Operation complete flag
`1`	: Operation complete

Sample programming

To query operation completion:

```
*OPC?
```

*RST

Preset
Executing initialization (level: Instrument Initial)

Function

Executes initialization.

Command

```
*RST
```

Query

None

Response

None

Sample programming

To initialize at the Instrument Initial level:

```
*RST
```

Related commands

`PRESET`	Same function as `*RST`
`PRE`	Same function as `*RST`
`IP`	Same function as `*RST`
`INI`	Same function as `*RST`

Description

Initialization cannot be executed on the Standard Load screen. When an initialization command other than `*RST` is executed on the Standard Load screen, an error occurs.
Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

*SRE

Service Request Enable Command
Setting service request enable register

Function

Sets the service request enable register. When the event set in the service request enable register occurs, the MSS bit (bit 6) of the status byte register becomes "1" (true).

Command

```
*SRE register
```

Query

```
*SRE?
```

Response

```
register
```

Parameters

`register` Service request enable register

Value = bit0 + bit1 + ... + bit7

bit0 = 2^0 = 1	: Not used
bit1 = 2^1 = 2	: Not used
bit2 = 2^2 = 4	: END event status register
bit3 = 2^3 = 8	: ERR event status register
bit4 = 2^4 = 16	: MAV
bit5 = 2^5 = 32	: ESB
bit6 = 2^6 = 64	: Not used
bit7 = 2^7 = 128	: Not used

Description

From among the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the service request enable register; the sum of values of bits desired to be enabled becomes the parameter.

Sample programming

To set MSS bit to "1" (true) when an end event occurs:

```
*SRE 4
```

*STB?

Status Byte Register
Querying the status byte register

Function

Queries the status byte register value. Bit 6 of the status byte register is read out as MSS (master summary status).

Command

None

Query

```
*STB?
```

Response

```
register
```

Parameters

`register` Status byte register

Value = bit0 + bit1 + ... + bit7

bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : END event status register
bit3 = 2^3 = 8 : ERR event status register
bit4 = 2^4 = 16 : MAV
bit5 = 2^5 = 32 : ESB
bit6 = 2^6 = 64 : MSS
bit7 = 2^7 = 128 : Not used

Sample programming

To read the status byte register value:

```
*STB?
```

*TRG

Trigger
Triggering

Function

None

Command

`*TRG`

Query

None

Response

None

*TST?

Self Test
Querying the self test result

Function

Queries the self-diagnosis result.

Command

None

Query

```
*TST?
```

Response

```
test_result
```

Parameters

`test_result`	Self-diagnosis result
`0`	: Normal end

Sample programming

To query the self-diagnosis result:

```
*TST?
```

*WAI

Wait to Continue
Waiting for command execution

Function

During command execution, puts the next command in waiting status.

Command

`*WAI`

Query

None

Response

None

Description

The `*WAI` command executes overlapped commands as sequential commands. This command is meaningless because MT8815A/MT8820A does not support overlapped commands.

Sample programming

To put the next command in waiting status:

```
*WAI
```

ALARM

Beep Sound
Setting beep sound

Function

Sets whether or not to sound the beep when an error occurs or for other conditions.

Command

```
ALARM on_off
```

Query

```
ALARM?
```

Response

```
on_off
```

Parameters

`on_off`		Sets the beep sound.
	`ON`	: Sounds the beep.
	`OFF`	: Does not sound the beep.
	Initial value	: `ON` (not initialized by Preset)

Sample programming

To set not to sound the beep:

```
ALARM OFF
```

Related Command

`BEP` : Same function as `ALARM` (no query function)

BANDCAL

Band Calibration

Executing calibration within all bands of communication system supported by measurement software

Function

Executes calibration within all the bands of the communication system supported by the measurement software.

Command

`BANDCAL`

Query

None

Response

None

Parameters

None

Sample programming

To execute calibration within all the bands of the communication system supported by the measurement software:

```
BANDCAL
```

BAUD

Baud Rate

Setting communication speed of the RS-232C communication port

Function

Sets the communication speed of the communication port used for RS-232C.

Command

```
BAUD baud
```

Query

```
BAUD?
```

Response

```
baud
```

Parameters

`baud` Communication speed (baud rate)

Range = 38400, 19200, 9600, 4800, 2400, 1200

Initial value: 4800

Description

Available only for MT8815A GPIB control. The query "`BAUD?`", however, is available for serial (RS-232C) communication.

Sample programming

To set the communication speed to 9600 bps:

```
BAUD 9600
```

BEP

Beep Sound
Setting beep sound

Function

Sets whether or not to sound the beep when an error occurs or for other conditions.

Command

```
BEP on_off
```

Query

None

Response

None

Parameters

`on_off`		Setting the beep sound.
	`ON`	: Sounds the beep.
	`OFF`	: Does not sound the beep.
	`1`	: Sounds the beep.
	`0`	: Does not sound the beep.
	Initial value	: `ON` (not initialized by Preset)

Description

The beep sound setting can be inquired using the `ALARM?` query.

Sample programming

To set not to sound the beep:

```
BEP 0
```

Related commands

`ALARM` : Same function as `BEP` (with query function).

BZR

Sound Buzzer
Sounding the buzzer

Function

Sounds the buzzer.

Command

BZR

Query

None

Response

None

Description

This function is available only for remote control.

Sample programming

To sound the buzzer:

```
BZR
```

CONTS

Continuous Measure
Starting measurement in continuous mode

Function

Starts measurement in continuous mode, that is, performs another measurement when one has completes.

Command

`CONTS`

Query

None

Response

None

Description

When MT8815A/MT8820A receives the next command during measurement started with the `CONTS` command, the measurement stops and processing for that command starts. When command processing is completed, the measurement restarts.

Sample programming

To start measurement in continuous mode:
`CONTS`

Related commands

`S1` : Same function as `CONTS`

DATE

Date
Setting the date

Function

Sets the date. Query inquires the current date.

Command

```
DATE year,month,day
```

Query

```
DATE?
```

Response

```
year,month,day
```

Parameters

`year` Year
Range = 2001 to 2030

`month` Month
Range = 1 to 12

`day` Day
Range = 1 to 31

Sample programming

To set the date to December 1, 2003:

```
DATE 2003,12,01
```

DATEMODE

Date Format
Setting the date format

Function

Sets the display format for the date.

Command

```
DATEMODE format
```

Query

```
DATEMODE?
```

Response

```
format
```

Parameters

`format`		Display format for the date
	`YMD`	yyyy / mm / dd
	`MDY`	mm / dd / yyyy
	`DMY`	dd / mm / yyyy
	Initial value	`YMD` (not initialized by Preset)

Where, yyyy: year, mm: month, dd: day.

Sample programming

To display the date in dd/mm/yyyy format:

```
DATEMODE DMY
```

DELLOSSTBL

Delete Loss From List
Deleting the value from the Common Cable Loss List

Function

Deletes the value from the common cable loss list.

Command

```
DELLOSSTBL a,b
```

Query

None

Response

None

Parameters

`a,b` Specifies the deleted range.
Sets the range to be deleted: corresponding to No. of the registered common cable loss.

Description

If No. is not specified, the values of the common cable loss list are all deleted.

Sample programming

```
DELLOSSTBL 3,5  /*To delete Nos. 3 to 5 of the common cable loss list*/
DELLOSSTBL      /*To delete all the values of the common cable loss list*/
```

DELM

Delimiter

Setting delimiter type added to RS-232C messages

Function

Sets the type of delimiter to be added to a RS-232C messages.

Command

```
DELM delimiter
```

Query

```
DELM?
```

Response

```
delimiter
```

Parameters

`delimiter`	Delimiter type	
`0`		LF
`1`		CR/LF
Initial value	`0`	

Description

This function is only for remote control.

Sample programming

To set the delimiter to LF:

```
DELM 0
```

DISPL

Panel Display Power
Setting the power switch of the LCD panel

Function

Sets the power switch on the LCD panel to On/Off. Under full remote control, setting the LCD panel power to Off enables power-saving operation.

Command

```
DISPL on_off
```

Query

```
DISPL?
```

Response

```
on_off
```

Parameters

`on_off`		LCD panel power
	`ON`	: LCD panel power On (normal display)
	`OFF`	: LCD panel power Off
	At power-on	: `ON` (not initialized by Preset)

Description

This function is available only for remote control.

Sample programming

To set the LCD panel power to Off:

```
DISPL OFF
```

DTAB

Data Bit

Setting bit length of the RS-232C communication port

Function

Sets the bit length of the communication port used for RS-232C.

Command

```
DTAB data
```

Query

```
DTAB?
```

Response

```
data
```

Parameters

`data`		Bit length
	Range	7, 8
	Initial value	8 bits

Description

Available only for MT8815A GPIB control. The query "`DTAB?`", however, is available for serial (RS-232C) communication.

Sample programming

To set the bit length to 7 bits:

```
DTAB 7
```

ESE2

END Event Status Enable Register
Setting end event status enable register

Function

Sets the end event status enable register. When the set end-event occurs, the end summary bit (ESB, bit 2) of the status byte register becomes "1" (true).

Command

```
ESE2 register
```

Query

```
ESE2?
```

Response

```
register
```

Parameters

`register` End event status enable register

Value = bit0 + bit1 + ... + bit7

When using W-CDMA or GSM measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Audio measurement complete
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using CDMA2000 or 1xEV-DO measurement software
bit0 = 2^0 = 1 : All measurements complete
bit1 = 2^1 = 2 : Access Probe Power measurement complete
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete (excepting Access Probe Power)
bit4 = 2^4 = 16 : Audio measurement complete
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using PDC measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using PHS measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Calibration complete
bit6 = 2^6 = 64 : Output level setting complete
bit7 = 2^7 = 128 : External trigger synchronization complete

When using CDMA2000 WAT measurement software
bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Not used
bit3 = 2^3 = 8 : Not used
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

Description

From among the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the end event status enable register; the sum of values of bits desired to be enabled becomes the parameter.

Sample programming

To enable the measurement/sweep end event:

```
ESE2 1          /*2^0 = 1*/
```

ESE3

ERR Event Status Enable Register
Setting error event status enable register

Function

Sets the error event status enable register. When the set error-event occurs, the end summary bit (ESB, bit 3) of the status byte register becomes "1" (true)

Command

```
ESE3 register
```

Query

```
ESE3?
```

Response

```
register
```

Parameters

`register` Error event status enable register

Value = bit0 + bit1 + ... + bit7

When using W-CDMA, GSM, PDC or PHS measurement software
bit0 = 2^0 = 1 : Synchronization loss (bit error rate measurement)
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Transmission measurement error
bit3 = 2^3 = 8 : Reception measurement error
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error
bit7 = 2^7 = 128 : Not used

When using CDMA2000 or 1xEV-DO measurement software
bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Access Probe Power measurement error
bit2 = 2^2 = 4 : Transmission measurement error
bit3 = 2^3 = 8 : Reception measurement error
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error (for CDMA2000 only)
bit7 = 2^7 = 128 : Not used

When using CDMA2000 WAT measurement software

bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Not used
bit3 = 2^3 = 8 : Not used
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error
bit7 = 2^7 = 128 : Not used

Description

From among the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the error event status enable register; the sum of values of bits desired to be enabled becomes the parameter.

Sample programming

To enable transmission measurement error and reception measurement error events:

```
ESE3 12        /*Transmission error (2^2 = 4) + reception error (2^3 = 8)*/
```

ESR2?

END Event Status Register Query
Reading end event status register

Function

Reads the end event status register. The event that occurred can be identified with the read value.

Command

None

Query

```
ESR2?
```

Response

```
register
```

Parameters

`register` End event status register

Value = bit0 + bit1 + ... + bit7

When using W-CDMA or GSM measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Audio measurement complete
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using CDMA2000 or 1xEV-DO measurement software
bit0 = 2^0 = 1 : All measurements complete
bit1 = 2^1 = 2 : Access Probe Power measurement complete
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete (excepting Access Probe Power)
bit4 = 2^4 = 16 : Audio measurement complete
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using PDC measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

When using PHS measurement software
bit0 = 2^0 = 1 : Measurement/sweep complete
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Reception measurement complete
bit3 = 2^3 = 8 : Transmission measurement complete
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Calibration complete
bit6 = 2^6 = 64 : Output level setting complete
bit7 = 2^7 = 128 : External trigger synchronization complete

When using CDMA2000 WAT measurement software
bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Not used
bit3 = 2^3 = 8 : Not used
bit4 = 2^4 = 16 : Not used
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Not used
bit7 = 2^7 = 128 : Not used

Description

The parameter is the sum of the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the end event status enable register. When the response is read, the end event status register is cleared.

Sample programming

To read end event status register:

```
ESR2?
```

ESR3?

Standard Event Status Register Query
Reading the error event status register

Function

Reads the error event status register. The event that occurred can be identified with the read value.

Command

None

Query

```
ESR3?
```

Response

```
register
```

Parameters

`register` Error event status register

Value = bit0 + bit1 + ... + bit7

When using W-CDMA, GSM, PDC or PHS measurement software
bit0 = 2^0 = 1 : Synchronization loss (bit error rate measurement)
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Transmission measurement error
bit3 = 2^3 = 8 : Reception measurement error
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error
bit7 = 2^7 = 128 : Not used

When using CDMA2000 or 1xEV-DO measurement software
bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Access Probe Power measurement error
bit2 = 2^2 = 4 : Transmission measurement error (excepting Access Probe Power)
bit3 = 2^3 = 8 : Reception measurement error
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error
bit7 = 2^7 = 128 : Not used

When using CDMA2000 WAT measurement software
bit0 = 2^0 = 1 : Not used
bit1 = 2^1 = 2 : Not used
bit2 = 2^2 = 4 : Not used
bit3 = 2^3 = 8 : Not used
bit4 = 2^4 = 16 : Call processing error
bit5 = 2^5 = 32 : Not used
bit6 = 2^6 = 64 : Call drop error
bit7 = 2^7 = 128 : Not used

Description

The parameter is the sum of the values 2^0 = 1, 2^1 = 2, 2^2 = 4, 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, and 2^7 = 128, which correspond to bits 1, 2, 3, 4, 5, 6 and 7 of the error event status enable register. When the Response is read, the error event status register is cleared.

Sample programming

To read the end event status register:

```
ESR3?
```

FULLCAL

Full Calibration
Executing calibration for all input/output bands of MT8815A/MT8820A

Function

Executes calibration for all the input/output bands of the MT8815A/MT8820A.

Command

```
FULLCAL
```

Query

None

Response

None

Parameters

None

Sample programming

To execute calibration for all the input/output bands of the MT8815A/MT8820A:

```
FULLCAL
```

FULLCAL_TM?

Full Cal Time

Querying the time for the last Full Calibration

Function

Queries the time for the last Full Calibration.

Command

None

Query

`FULLCAL_TM?`

Response

`year,month,day,hour,min`

Parameters

`year`	year	(2001 to 2030)
`month`	month	(1 to 12)
`day`	day	(1 to 31)
`hour`	hour	(0 to 23)
`min`	minutes	(0 to 59)

Sample programming

To query the time for the last Full Calibration:

```
FULLCAL_TM?
```

GTL

Go to Local
Changing to the local control

Function

Changes the remote control to the local control.

Command

```
GTL
```

Query

None

Response

None

Parameters

None

Sample programming

To return to local control during remote control:

```
GTL
```

INI

Preset
Executing initialization

Function

Executes initialization.

Command

`INI`

Query

None

Response

None

Description

Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

Sample programming

To execute initialization:
`INI`

Related commands

`*RST`	Same function as `INI`
`PRESET`	Same function as `INI`
`PRE`	Same function as `INI`
`IP`	Same function as `INI`

IP

Preset
Executing initialization

Function

Executes initialization.

Command

```
IP
```

Query

None

Response

None

Description

Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

Sample programming

To execute initialization:

```
IP
```

Related commands

`*RST`	Same function as `IP`
`PRESET`	Same function as `IP`
`PRE`	Same function as `IP`
`INI`	Same function as `IP`

LOSSTBLSAMPLE?

Number of External Loss Common Table
Recalling the number of the lists that are set in the Common Cable Loss List

Function

Recalls the number of the lists that are set in the common cable loss list.

Command

None

Query

`LOSSTBLSAMPLE?`

Response

n

Parameter

n Number of lists
Range = 0 to 100

Sample programming

To recall the number of the lists that are set to the common cable loss list:
`LOSSTBLSAMPLE?`

LOSSTBLVAL

Regist Loss into List
Setting the value in the Common Cable List

Function

Sets the value in the common cable loss list. If the same frequency exists in the table, it is overwritten.

Command

```
LOSSTBLVAL f,l1,l2,l3
```

Query

```
LOSSTBLVAL? n
```

Response

```
f,l1,l2,l3
```

Parameters

`n` Table position
Range = 1 to 100
`f` Frequency
Range = 0.4 to 2700.0 [MHz]
Resolution 10 Hz
`l1` External Loss value of DL (Main)
Range = –55.00 to 55.00 [dB]
Resolution 0.01 dB
`l2` External Loss value of UL (Main)
Range = –55.00 to 55.00 [dB]
Resolution 0.01 dB
`l3` External Loss value of DL (AUX)
Range = –55.00 to 55.00 [dB]
Resolution 0.01 dB

Sample programming

To set the common cable loss list to 2500.000000 MHz, 30.00 dB, 15.00 dB, –10.00 dB:

```
LOSSTBLVAL 2500000000,30.00,15.00,-10.00
```

LOSSVIEW_STAFREQ

Start Frequency
Setting the start frequency of the Common Cable Loss Graph

Function

Sets the start frequency on the horizontal axis of the common cable loss graph.

Command

```
LOSSVIEW_STAFREQ f
```

Query

```
LOSSVIEW_STAFREQ?
```

Response

```
f
```

Parameters

`f` Frequency
Range = 0.4 to 2700.0 [MHz]
Initial value 0.4 [MHz]
Resolution 0.1 MHz

Description

The upper limit of parameters cannot be set to the value larger than the value of the Stop Frequency.

Sample programming

To set 100.0 MHz for the start frequency on the horizontal axis of the common cable loss graph:

```
LOSSVIEW_STAFREQ 100.0MHz
```

Related commands

`LOSSVIEW_STPFREQ` Sets the stop frequency of the common cable loss.

LOSSVIEW_STPFREQ

Stop Frequency
Setting the stop frequency of the common cable loss graph

Function

Sets the stop frequency on the horizontal axis of the common cable loss graph.

Command

```
LOSSVIEW_STPFREQ f
```

Query

```
LOSSVIEW_STPFREQ?
```

Response

```
f
```

Parameters

`f` Frequency
Range = 0.4 to 2700 [MHz]
Initial value 0.4 [MHz]
Resolution 0.1 MHz

Description

The lower limit of parameters cannot be set to the value smaller than the value of the Start Frequency.

Sample programming

To set 2500.0 MHz for the stop frequency on the horizontal axis of the common cable loss graph:

```
LOSSVIEW_STPFREQ 2500.0MHz
```

Related commands

`LOSSVIEW_STAFREQ` Sets the start frequency of the common cable loss.

LOSSVIEW_VSCALE

Vertical Scale
Setting the scale of the Common Cable Loss Graph

Function

Sets the scale on the horizontal axis of the common cable loss graph.

Command

```
LOSSVIEW_VSCALE mode
```

Query

```
LOSSVIEW_VSCALE?
```

Response

```
mode
```

Parameters

`mode` Scale

Range = 10, 20, 30, 40, 50, 60

Initial value 50

Sample programming

To set ±30 dB for the vertical axis on the common cable loss graph:

```
LOSSVIEW_VSCALE 30
```

MCCF?

Compact Flash
Querying the Compact Flash size

Function

Queries the size of Compact Flash inside the MT8815A/MT8820A.

Command

None

Query

```
MCCF?
```

Response

```
a,b
```

Parameters

a	CF Type
b	CF Unused Area

Sample programming

To query the CF size and unused area:

```
MCCF?
```

MCFV?

Firmware Version
Querying the firmware version

Function

Queries the firmware version used on MT8815A/MT8820A.

Command

None

Query

`MCFV?`

Response

`version`

Parameters

`version` Firmware version

Sample programming

To query the version of the main firmware:
`MCFV?`

MCHV?

Hardware Revision

Querying the revision number of the hardware installed in the MT8815A/8820A

Function

Queries the revision number of the hardware installed in the MT8815A/MT8820A.

Command

None

Query

```
MCHV?
```

Response

```
maid,marev,mafpga,tdid1,tdrev1,tdfpga1,cdid1,cdrev1,
cdfpga1,evid1,evrev1,evfpga1,wcid1,wcrev1,wcfpga1,wbid1,
wbrev1,wbfpga1,mdid1,mdrev1,mdfpga1,daid,darev,dafpga,
tdid2,tdrev2,tdfpga2,cdid2,cdrev2,cdfpga2,evid2,evrev2,
evfpga2,wcid2,wcrev2,wcfpga2,wbid2,wbrev2,wbfpga2,mdid2,
mdrev2,mdfpga2,auid,aurev,aufpga
```

Parameters

Main CPU	
maid	Main CPU ID number
marev	Main CPU hardware revision number
mafpga	Main CPU CoreFPGA version number
TDMA COM1	
tdid1	TDMA COM1 ID number
tdrev1	TDMA COM1 hardware revision number
tdfpga1	TDMA COM1 CoreFPGA version number
CDMA2000 COM1	
cdid1	CDMA2000 COM1 ID number
cdrev1	CDMA2000 COM1 hardware revision number
cdfpga1	CDMA2000 COM1 CoreFPGA version number
1xEV-DO COM1	
evid1	1xEV-DO COM1 ID number
evrev1	1xEV-DO COM1 hardware revision number
evfpga1	1xEV-DO COM1 CoreFPGA version number
W-CDMA COM1	
wcid1	W-CDMA COM1 ID number
wcrev1	W-CDMA COM1 hardware revision number
wcfpga1	W-CDMA COM1 CoreFPGA version number

W-CDMA BB1	
wbid1	W-CDMA BB1 ID number
wbrev1	W-CDMA BB1 hardware revision number
wbfpga1	W-CDMA BB1 CoreFPGA version number
Measure DSP1	
mdid1	Measure DSP1 ID number
mdrev1	Measure DSP1 hardware revision number
mdfpga1	Measure DSP1 CoreFPGA version number
DAC/ADC	
daid	DAC/ADC ID number
darev	DAC/ADC hardware revision number
dafpga	DAC/ADC CoreFPGA version number
TDMA COM2	
tdid2	TDMA COM2 ID number
tdrev2	TDMA COM2 hardware revision number
tdfpga2	TDMA COM2 CoreFPGA version number
CDMA2000 COM2	
cdid2	CDMA2000 COM2 ID number
cdrev2	CDMA2000 COM2 hardware revision number
cdfpga2	CDMA2000 COM2 CoreFPGA version number
1xEV-DO COM2	
evid2	1xEV-DO COM2 ID number
evrev2	1xEV-DO COM2 hardware revision number
evfpga2	1xEV-DO COM2 CoreFPGA version number
W-CDMA COM2	
wcid2	W-CDMA COM2 ID number
wcrev2	W-CDMA COM2 hardware revision number
wcfpga2	W-CDMA COM2 CoreFPGA version number
W-CDMA BB2	
wbid2	W-CDMA BB2 ID number
wbrev2	W-CDMA BB2 hardware revision number
wbfpga2	W-CDMA BB2 CoreFPGA version number
Measure DSP2	
mdid2	Measure DSP2 ID number
mdrev2	Measure DSP2 hardware revision number
mdfpga2	Measure DSP2 CoreFPGA version number
Audio	
auid	Audio ID number
aurev	Audio hardware revision number
aufpga	Audio CoreFPGA version number

Description

Responses for Phone-2 are displayed when the Parallelphone Measurement Software is installed in the MT8820A.

Sample programming

To query the version of the hardware installed in the MT8815A/MT8820A:

```
MCHV?
```

MCIV?

IPL Version
Querying the IPL version

Function

Queries the version of the IPL used on the MT8815A/MT8820A.

Command

None

Query

```
MCIV?
```

Response

```
a
```

Parameters

`a` Version

Sample programming

To query the version of the IPL:

```
MCIV?
```

MCMSV?

Software Version
Querying the software version

Function

Queries the version of the software that is used on the MT8815A/MT8820A and is loaded.

Command

None

Query

```
MCMSV? [n]
```

Response

```
std,version
```

Parameters

`n` Standard number
1 through 3

`std` Measurement software (Standard)

`WCDMA`	MX882000B W-CDMA Measurement Software
`GSM`	MX882001A GSM Measurement Software
`CDMA2K`	MX882002A/MX882003A CDMA2000 Measurement Software/1xEV-DO Measurement Software
`PDC`	MX882004A PDC Measurement Software
`PHS`	MX882005A PHS Measurement Software
`CDMA2KWAT`	MX882022A CDMA2K Wireless Application Test Software

`version` Software version

Description

When parameter n is omitted, the versions of all the software registered to Standard 1 through 3 are queried.

Sample programming

To query the software version of the Standard1:

```
MCMSV? 1
```

MCOPT?

Option Number
Querying the software option number

Function

Queries the software option number.

Command

None

Query

```
MCOPT? a
```

Response

```
n,n1,n2,…
```

Parameters

`a`	Option name
`n`	count
`n1,n2,…`	Option number

Description

The option number is the number following the hyphen (-) in the model name. For example, in MX882001A-02, “02” is the option number.
The option number indicates the function of that option.
Example)
`1`: GSM voice codec
`2`: GSM external packet data
… and so on

Sample programming

To query the option number of the installed option (software) MX882001A:

```
MCOPT? MX882001A
```

Response example)
When the GSM measurement software, GSM voice codec (MX882001A-01) and GSM external packet data (MX882001A-02) have been installed:

```
2,1,2
```

MCOV?

OS Version
Querying the OS version

Function

Queries the version of the OS used on the MT8815A/MT8820A.

Command

None

Query

```
MCOV?
```

Response

```
a
```

Parameters

`a` Version

Sample programming

To query the version of the OS:

```
MCOV?
```

MCSOPT?

Type Name of Option
Querying the type name of the installed option

Function

Queries the type name of the installed option.

Command

None

Query

`MCSOPT?`

Response

`n,a1,a2,a3,…`

Parameters

`n`	The number of installed options
`a1,a2,a3,…`	Type name of option

Sample programming

To query the type name of the installed option:
`MCSOPT?`

Response example)
When the W-CDMA, FOMA Scenario, GSM and CDMA2000 have been installed:
`4,MX8820000B,MX882051A,MX882001A,MX882002A`

MCSV?

Version Information of Option module Software
Querying the software option version

Function

Queries the version of the software option.

Command

None

Query

```
MCSV? a
```

Response

```
v
```

Parameters

a	Option name
v	Version data

Sample programming

To query the version of the W-CDMA measurement software:

```
MCSV? MX882000B
```

Response example)
When the version is 3.10 #001:

```
V3.10 #001
```

MEASSTOP

Measure Stop
Stopping measurement

Function

Stops the measurement currently being performed.

Command

`MEASSTOP`

Query

None

Response

None

Description

Measurement started with the `SWP` or `TS` command cannot be stopped until measurement is completed, and thus this MEASSTOP command is not effective. To stop the measurement halfway, measurement must have been started with the `SNGLS`, `S2` or `CONTS`, `S1` command.

Sample programming

To stop measurement halfway:

```
SNGLS       /*Starts measurement*/
MEASSTOP    /*Starts measurement*/
```

MOD

Modulation On/Off
Setting modulation/non-modulation for output signals

Function

Sets modulation/non-modulation for output signals.

Command

```
MOD on_off
```

Query

```
MOD?
```

Response

on_off		Sets modulation/non-modulation
	ON	Outputs modulation signals.
	OFF	Outputs non-modulation signals.
	Initial value	ON

Description

Sets modulation/non-modulation for RF signals output from the MT8815A/MT8820A.

Sample programming

To set non-modulation for output signals:

```
MOD OFF      /*Non-modulation*/
```

PRE

Preset
Executing initialization

Function

Executes initialization.

Command

`PRE`

Query

None

Response

None

Description

Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

Sample programming

To execute initialization:

```
PRE
```

Related commands

`*RST`	Same function as `PRE`
`PRESET`	Same function as `PRE`
`IP`	Same function as `PRE`
`INI`	Same function as `PRE`

PRESET

Preset
Executing initialization

Function

Executes initialization.

Command

```
PRESET
```

Query

None

Response

None

Parameters

None

Description

Initialization may not be performed depending on the connection status with the mobile terminal. For details, refer to the description concerning initialization in the operation manual of each system.

Sample programming

To execute initialization:

```
PRESET
```

Related commands

`*RST`	: Same function as `PRESET`
`PRE`	: Same function as `PRESET`
`IP`	: Same function as `PRESET`
`INI`	: Same function as `PRESET`

PRMRECALL

Recall Parameter
Reading settings (file number specified)

Function

Reads the parameter file and reflects the settings at MT8815A/MT8820A.

Command

```
PRMRECALL fnumber
```

Query

None

Response

None

Parameters

`fnumber` File number
Range = 0 to 999

Description

This command can only read a file whose saved file name is in the format of “default file name + file number.” The default file name varies depending on the measurement software.

Sample programming

To read settings of parameter file number 10:

```
PRMRECALL 10
```

Related commands

`PRMRECALLNAME` : Reading the file of a specified file name

PRMRECALLNAME

Recall Parameter
Reading settings (name specified)

Function

Reads the parameter file and reflects the settings at MT8815A/ MT8820A.

Command

```
PRMRECALLNAME fname
```

Query

None

Response

None

Parameters

`fname` File name (up to 8 characters)

Sample programming

To read settings of parameter file name TEST:

```
PRMRECALLNAME "TEST"
```

Related Command

`PRMRECALL` : Reading the file of a specified file number

PRMSAVE

Save Parameter
Saving parameter settings (file number specified)

Function

Saves parameter settings as a file.

Command

```
PRMSAVE fnumber
```

Query

None

Response

None

Parameters

`fnumber` File number (optional)
Range = 0 to 999
When omitted, the file is saved with the smallest number of those unused.

Description

The file saved with this command is assigned a name in the format of "default file name + file number." The default file name varies depending on the measurement software.

Sample programming

To save a file with parameter file number 12:

```
PRMSAVE 12
```

PRMSAVENAME

Save Parameter
Saving parameter settings (name specified)

Function

Saves the parameter settings as a file.

Command

```
PRMSAVENAME fname
```

Query

None

Response

None

Parameters

`fname` File name (maximum 8 characters)
Available characters A to Z, 0 to 9, #, -, _

Sample programming

To save the settings with parameter file name “TEST”:

```
PRMSAVENAME "TEST"
```

PRTY

Parity Bit
Setting parity check of RS-232C communication port

Function

Sets parity check in the communication port used for RS-232C.

Command

```
PRTY parity
```

Query

```
PRTY?
```

Response

```
parity
```

Parameters

`parity`	Parity
`EVEN`	Even parity
`ODD`	Odd parity
`OFF`	No parity
Initial value	`OFF`

Description

Available only for MT8815A GPIB control. The query "`PRTY?`", however, is available for serial (RS-232C) communication.

Sample programming

To set even parity:

```
PRTY EVEN
```

PSETDEFGTWY

10BaseT - Default Gateway
Setting default gateway

Function

Sets the default gateway for the 10Base-T port on the MT8815A/ MT8820A.

Command

```
PSETDEFGTWY n1,n2,n3,n4
```

Query

```
PSETDEFGTWY?
```

Response

```
n1,n2,n3,n4
```

Parameters

`n1,n2,n3,n4` Default Gateway

Range = 0,0,0,0 to 255,255,255,255	
Resolution	1
Suffix code	None
Initial value	192,168,20,1 (not initialized by Preset)

Sample programming.

To set the default gateway for the 10Base-T port on the MT8815A/ MT8820A to 192.168.0.1:

```
PSETDEFGTWY 192,168,0,1
```

PSETIPADDR

10BaseT - IP Address
Setting IP Address

Function

Sets the IP Address for the 10Base-T port on the MT8815A/MT8820A.

Command

```
PSETIPADDR n1,n2,n3,n4
```

Query

```
PSETIPADDR?
```

Response

```
n1,n2,n3,n4
```

Parameters

`n1,n2,n3,n4`		IP address
	Range = 0,0,0,0 to 255,255,255,255	
	Resolution	1
	Suffix code	None
	Initial value	192,168,20,2 (not initialized by Preset)

Sample programming

To set the IP Address for the 10Base-T port on the MT8815A/MT8820A to 192.168.0.55:

```
PSETIPADDR 192,168,0,55
```

PSETSNM

10BaseT - Subnet Mask
Setting subnet mask

Function

Sets the subnet mask for the 10Base-T port on the MT8815A/MT8820A.

Command

```
PSETSNM n1,n2,n3,n4
```

Query

```
PSETSNM?
```

Response

```
n1,n2,n3,n4
```

Parameters

`n1,n2,n3,n4`	Subnet Mask	
Range = 0,0,0,0 to 255,255,255,255		
Resolution	1	
Suffix code	none	
Initial value	255,255,255,0 (not initialized by Preset)	

Sample programming

To set the subnet mask for the 10Base-T port on the MT8815A/MT8820A to 255.255.255.1:

```
PSETSNM 255,255,255,1
```

REF

Reference Frequency
Setting reference frequency

Function

Sets the reference frequency.

Command

```
REF ref_freq
```

Query

```
REF?
```

Response

```
ref_freq
```

Parameters

`ref_freq`		Reference frequency
	`10MHZINT`	: Internal reference frequency oscillator: 10 MHz
	`10MHZEXT`	: External input reference frequency: 10 MHz
	`13MHZEXT`	: External input reference frequency: 13 MHz
	Initial value	: `10MHZINT`

Sample programming

To set external input reference frequency (13MHz) as the reference frequency to be used:

```
REF 13MHZEXT
```

REMDISP

Remote Control Display Mode
Setting error processing

Function

Sets error* processing mode during remote control.

* Indicates the errors that are displayed in the pop-up window. Measurement errors and call processing errors are not included.

Command

```
REMDISP mode
```

Query

```
REMDISP?
```

Response

```
mode
```

Parameter

mode		Error processing mode during remote control
	NORMAL	Normal mode When an error occurs, it ignores it and continues the subsequent command processing. The pop-up window for the error is displayed when the error occurs, it then disappears when the subsequent command is processed.
	REMAIN	Error remain mode Displays the pop-up window for an error until another error occurs. When an error occurs by processing the subsequent command, a pop-up window for the error is displayed.
	STOP	Stop mode When an error occurs, it displays a pop-up window for it and stops processing the subsequent command.
	Initial value	NORMAL (not initialized by Preset)

Description

This function is available only for remote control.

Sample programming

To stop processing when an error occurs during remote control:

```
REMDISP STOP
```

RFOUT

RF Output
Setting the RF signal output connector

Function

Sets the RF signal output connector.

Command

```
RFOUT out
```

Query

```
RFOUT?
```

Response

```
out
```

Parameters

`out`		RF signal output connector
	`MAIN`	: Main input/output connector
	`AUX`	: Auxiliary output connector
	Initial value	: `MAIN` (not initialized by Preset)

Sample programming

To set the auxiliary output connector as the output destination for Phone:

```
RFOUT AUX
```

RLCD?

Directory Pass
Querying a path to the reading directory

Function

Queries the absolute path to the directory in which the parameter set file to be read. If the memory card is not inserted, an error message will be displayed.

Command

None

Query

```
RLCD?
```

Response

```
dir_path
```

Parameters

`dir_path` Path to the reading directory

Sample programming

To query the path to the reading directory:

```
RLCD?
```

RLFLIST?

File List

Reading out the file stored in reading directory

Function

In reading the parameter file, queries the name and attribute of the file saved in the reading directory of the memory card. If there are no files, an error will be displayed.

Command

None

Query

`RLFLIST?`

Response

`num,a1,name1,a2,name2,...,a(num),name(num)`

Parameters

`num`		Total number of files (including directory)
`a(x)`		Attribute of x'th file
	`1`	: Archive file (including files with no attribute)
	`2`	: Read-only file
`name(x)`		Parameter setting file name (maximum 255 characters)

Sample programming

To query a list of parameter setting files in the reading directory:

```
RLFLIST?
```

RLLOSSTBL

Load List

Recalling the Common Cable Loss List from the memory card

Function

Recalls the common cable loss list from the memory card.

Command

```
RLLOSSTBL file
```

Query

None

Response

None

Parameters

`file` File name

Sample programming

To recall the common cable loss list from the memory card using the file named SAMPLE:

```
RLLOSSTBL SAMPLE
```

S1

Measure - Continuous
Starting measurement in continuous mode

Function

Starts measurement in continuous mode, that is, performs another measurement when one has completed.

Command

`S1`

Query

None

Response

None

Description

When MT8815A/MT8820A receives the next command during measurement started with the `S1` command, the measurement stops and processing for that command starts. When command processing is completed, the measurement restarts.

Sample programming

To start measurement in continuous mode:

```
S1
```

Related commands

`CONTS`	Same function as `S1`.

S2

Measure - Single
Starting measurement in single mode

Function

Starts measurement in single mode.

Command

S2

Query

None

Response

None

Description

When MT8815A/MT8820A receives the next command during measurement (started with the S2 command), the measurement stops and processing for the next command starts. To allow processing for the next command after measurement is over; use the SWP command, instead of S2 command.

Sample programming

To start measurement in single mode:

```
S2
```

Related commands

SNGLS : Same function as S2
SWP : Starting measurement in synchronous single mode
TS : Starting measurement in synchronous single mode

SCRACT

Change Active Window
Changing active window

Function

Switches the active window. To use this command, the screen that the window belongs must be opened.

Command

```
SCRACT window
```

Query

```
SCRACT?
```

Response

```
window
```

Parameters

`window`		Window name
	`LOSSLIST`:	Ext. Loss List window (common cable loss list window)
	`LOSSVIEW`:	Ext. Loss View window (common cable loss graph window)
	`STDLOAD`:	Standard Load window (setup window)
	`SOFTLIST`:	Software List window (list display window)

Description

In the remote control mode, it is not necessary to change the window active when performing an operation for items on that window. For example, when setting the measurement application on the Standard Load screen, the setup is performed directly by the remote control command even if the Software list window is active.

Refer to the separate manual of each measurement software for selecting a window on a measurement screen.

Sample programming

To make the Standard Load window on the Standard Load screen active:

```
SCRSEL STDLOAD      /*Opens the Standard Load screen*/
SCRACT STDLOAD      /*Makes the Standard Load window active*/
```

SCREEN

Drawing
Setting drawing operation

Function

Sets whether or not to perform drawing on the screen. In a remote control mode, setting SCREEN OFF improves the measurement throughput. If drawing is set to Off, the screen displays "Screen Off."

Command

```
SCREEN on_off
```

Query

None

Response

```
on_off
```

Parameters

`on_off`		Drawing on screen
	`ON`	: Draw (normal display)
	`OFF`	: Does not draw (normal display)
	At power-on	: `ON` (not initialized by Preset)

Description

This command is available only for remote control.

Sample programming

To set drawing to Off:

```
SCREEN OFF
```

SCRSEL

Select Screen
Selecting a screen

Function

Selects a screen.

Command

```
SCRSEL screen
```

Query

```
SCRSEL?
```

Response

```
screen
```

Parameters

`screen`	Screen name
`PRMSAVE`	Parameter Save screen
`PRMRCL`	Parameter Recall screen
`SYSCFG`	System Configuration screen
`SYSINFO`	System Information screen
`CEXTLOSS`	Common External Loss screen
`STDLOAD`	Standard Load screen

Description

For selecting the measurement screen, refer to the separate operation manual for the measurement software.

Sample programming

To select the System Configuration screen:

```
SCRSEL SYSCFG
```

SERIAL?

Serial Number
Querying a serial Number

Function

Inquires the serial number specific to MT8815A/MT8820A.

Command

None

Query

```
SERIAL?
```

Response

```
serial_number
```

Parameters

`serial_number`	Serial number

Sample programming

To query the serial number:

```
SERIAL?
```

SNGLS

Measure - Single
Starting a measurement in the single mode

Function

Starts a measurement in the single mode.

Command

`SNGLS`

Query

None

Response

None

Description

When the measurement is started with the `SNGLS` command and MT8815A/MT8820A receives the next command during measurement, the measurement stops and processing for the next command starts. Pressing Local during measurement changes the mode to local control. To allow processing the next command after measurement is over; use the `SWP` command.

Sample programming

To start measurement in the single mode:

```
SNGLS
```

Related commands

`S2`	Same function as `SNGLS`
`SWP`	Starting measurement in synchronous single mode
`TS`	Starting measurement in synchronous single mode

STDLOAD

Load Standard
Loading measurement software

Function

Activates measurement software. Each measurement software is optional. To use this command, measurement software must be installed in advance.

Command

```
STDLOAD n,std
```

Query

None

Response

None

Parameters

`n` Standard number
1 through 3

`std` Measurement software (Standard)

`WCDMA`	MX882000B W-CDMA Measurement Software
`GSM`	MX882001A GSM Measurement Software
`CDMA2K`	MX882002A/MX882003A CDMA2000 Measurement Software/1xEV-DO Measurement Software
`PDC`	MX882004A PDC Measurement Software
`PHS`	MX882005A PHS Measurement Software
`CDMA2KWAT`	MX882022A CDMA2K Wireless Application Test Software

Description

This command is valid only on the Standard Load screen. An error occurs if the software to be loaded to MT8815A/MT8820A has already been loaded in the target Phone.

Sample programming

To load GSM measurement software to the Standard1:

```
STDLOAD 1,GSM
```

STDSEL

Select Standard
Selecting the measurement software

Function

Selects the measurement software. Measurement software is optional. To use this command, measurement software must be loaded in advance.

Command

```
STDSEL std
```

Query

```
STDSEL?
```

Response

```
std
```

Parameters

`std` Measurement software (Standard)

`WCDMA`	MX882000B W-CDMA Measurement Software
`GSM`	MX882001A GSM Measurement Software
`CDMA2K`	MX882002A/MX882003A CDMA2000 Measurement Software/1xEV-DO Measurement Software
`PDC`	MX882004A PDC Measurement Software
`PHS`	MX882005A PHS Measurement Software
`CDMA2KWAT`	MX882022A CDMA2K Wireless Application Test Software

Sample programming

To select GSM for the measurement software to be used:

```
STDSEL GSM
```

STDUNLOAD

Unload Standard
Unloading measurement software

Function

Unloads measurement software.

Command

```
STDUNLOAD n
```

Query

None

Response

None

Parameters

n Standard number
1 through 3

Description

This command is valid only on the Standard Load screen.

Sample programming

To unload the measurement software applied to the Standard1:

```
STDUNLOAD 1
```

STPB

Stop Bit
Setting stop bit of RS-232C communication port

Function

Sets the stop bit of the communication port used for RS-232C.

Command

```
STPB stp
```

Query

```
STPB?
```

Response

```
stp
```

Parameters

`stp`		Stop bit
	Range	1, 2
	Initial value	1 bit

Description

Available only for MT8815A GPIB control. The query "`STPB?`", however, is available for serial (RS-232C) communication.

Sample programming

To set the stop bit to bit 2:

```
STPB 2
```

SVCD?

Save Directory Path
Querying the path to the parameter save directory

Function

Queries the path to the directory where the parameter file is saved. If the memory card is not inserted, an error message will be displayed.

Command

None

Query

```
SVCD?
```

Response

```
dir_path
```

Parameter

`dir_path` Path to the save directory

Sample program

To read the path to the save directory:

```
SVCD?
```

SVDEFFILE?

Default File Name
Querying the default name for parameter file

Function

Queries the file name to be automatically created when saving the setting parameters.

Command

None

Query

`SVDEFFILE?`

Response

`fname`

Parameters

`fname` Saving file name

Sample programming

To query the default name for saving file:
`SVDEFFILE?`

SVFLIST?

File List

Querying the file stored in the parameter saving directory

Function

Queries the name and attribute of the file saved in the directory where the memory card parameter is saved.

Command

None

Query

```
SVFLIST?
```

Response

```
num,a1,name1,a2,name2,...,a(num),name(num)
```

Parameters

`num`		Total number of files (including the directory)
`a(x)`		File attribute
	`0`	: No file
	`1`	: Archive file (including files without attributes)
	`2`	: Read-only file
`name(x)`		Parameter file name (maximum of 255 characters)

Sample programming

To query a list of parameter files:

```
SVFLIST?
```

SVLOSSTBL

Save List

Saving the Common Cable Loss List on the memory card

Function

Saves the common cable loss list on the memory card.

Command

```
SVLOSSTBL file
```

Query

None

Response

None

Parameters

`file` File name

Sample programming

To save the common cable loss list on the memory card:

```
SVLOSSTBL sample
```

SWP

Measure - Single (Synchronization)
Starting a measurement in the synchronous single mode

Function

Starts a measurement in the single mode. Processing for the next command does not start before completion of the measurement, allowing synchronization between MT8815A/MT8820A and controller.

Query inquires whether or not the measurement has been completed.

Command

```
SWP
```

Query

```
SWP?
```

Response

```
status
```

Parameters

`status`	Measurement status
`0`	: Measurement completed
`1`	: Measurement being performed

Description

When measurement is performed by the SWP command, pressing Local stops the measurement.

Sample programming

To start measurement in synchronous single mode:

```
SWP
```

Related commands

`TS`	: Same function as `SWP` (no query)
`SNGLS`	: Starting measurement in the single mode
`S2`	: Starting measurement in the single mode

SYSINFOSAVE

Information Save
Outputting (saving) the parameters displayed on the System Information screen to a memory card

Function

Outputs the parameters displayed on the System Information screen to a memory card in a text-formatted file.

Command

`SYSINFOSAVE`

Query

None

Response

None

Description

The parameters are saved in a text-formatted file with the fixed file name "SysInfo.txt." If this file already exits when saving, it is overwritten.
For the MT8820A, the file output destination is "/MT8820A" in the memory card.

Sample programming

To output the parameters displayed on the System Information screen to a memory card:

```
SYSINFOSAVE
```

TAGSEL

Select TAG
Selecting a tag

Function

Selects and turns a tag to be activated and displays it at the top of the window.

Command

```
TAGSEL screen,tag
```

Query

```
TAGSEL? screen
```

Response

```
tag
```

Parameters

`screen` Screen name

`SYSCFG`	System Configuration screen
`SYSINFO`	System Information screen

`tag` Tag

When `screen` is `SYSCFG`

`COMMON`	Common tag
`PHONE1`	Phone-1 tag (for Phone-1)
`PHONE2`	Phone-2 tag (for Phone-2)

When `screen` is `SYSINFO`

`MAINTE`	Maintenance Information tag
`SOFT`	Software Version tag
`OPTION`	Software Option tag
`HARD`	Hardware Revision tag

Description

For measurement screens, refer to the separated operation manual for the measurement software. Using the Phone-2 tag with the MT8815A results in an error.

Sample programming

To display the Phone-1 tag at the top of the System Configuration screen:

```
TAGSEL SYSCFG,PHONE1
```

To display the Software Version tag at the top of the System Information screen:

```
TAGSEL SYSINFO,SOFT
```

TIME

Time

Setting the time

Function

Sets the time. Query inquires the current time.

Command

```
TIME hour,minute,second
```

Query

```
TIME?
```

Response

```
hour,minute,second
```

Parameters

`hour` Hour

Range = 0 to 23

`minute` Minute

Range = 0 to 59

`second` Second

Range = 0 to 59

Sample programming

To set the time to 14:00:00:

```
TIME 14,00,00
```

TITLE

Title

Setting a user-defined character string displayed in the title

Function

Sets the user-defined character string displayed in the title section.

Command

```
TITLE title
```

Query

```
TITLE?
```

Response

```
title
```

Parameters

`title`	User-defined character string (maximum 25 characters)
Initial value	: `"MT8820A"` (not initialized by Preset) (varies depending on the model)

Sample programming

To display "FIRST TEST":

```
TITLE "FIRST TEST"  /*Setting character string*/
TTL USER            /*Displaying user-defined character string*/
```

TMCNT?

Power On Time
Querying the accumulated power-On time

Function

Queries the accumulated power-on time.

Command

None

Query

`TMCNT?`

Response

`time`

Parameters

`time` Accumulated time
Response unit : min (minute)
Resolution :10

Sample programming

To query the accumulated time:
`TMCNT?`

TRM

GPIB Terminator
Setting the GPIB terminator

Function

Sets the code to be added at the end of a response message.

Command

```
TRM terminator
```

Query

```
TRM?
```

Response

```
terminator
```

Parameters

`terminator`		GPIB terminator
	`0`	LF
	`1`	CR/LF
	Initial value	: 0 (not initialized by Preset)

Description

This function is available only for remote control.

Sample programming

To set the GPIB terminator for Phone to CR/LF:

```
TRM 1
```

TS

Measure - Single (Synchronization)
Starting a measurement in the synchronous single mode

Function

Starts a measurement in the synchronous single mode. Processing for the next command does not start before completion of the measurement, allowing synchronization between MT8815A/MT8820A and controller.

Command

`TS`

Query

None

Response

None

Description

When measurement is performed by the `TS` command, pressing Local stops the measurement.

Sample programming

To start measurement in synchronous single mode:

```
TS
```

Related commands

`SWP`	: Same function as `TS` (with query)
`SNGLS`	: Starting measurement in single mode
`S2`	: Starting measurement in single mode

TTL

Display Title
Setting the title display type

Function

Sets the type of information to be displayed in the title display field.

Command

```
TTL title_type
```

Query

```
TTL?
```

Response

```
title_type
```

Parameters

`title_type`		Title display type
	`USER`	: User-defined character string
	`DATE`	: Date and time
	`OFF`	: No display
	Initial value	: `DATE` (not initialized by Preset)

Sample programming

To display a user-defined character string in the title display field:

```
TTL USER
```

WINSIZE

Window Size
Changing window size

Function

Change the active window size.

Command

```
WINSIZE ratio
```

Query

```
WINSIZE?
```

Response

```
ratio
```

Parameters

`ratio`	Window size
`100`	Full window
`70`	70%
`50`	50%
`30`	30%

Sample programming

To set the active window size to 50%:

```
WINSIZE 50          /*Setting the active window size to 50%*/
```

Section 9 Maintenance

This section describes the maintenance procedures such as cleaning. Keeping the MT8815A/MT8820A in optimum conditions assures accurate measurements.

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9.1 Performance Test

9.1.1 Purpose and implementation timing

Implement the performance test to check the performance after reception testing, periodical testing or repair, or to maintain the performance of MT8815A/MT8820A within the specification through periodical test. It is recommended to perform the performance test once or twice a year. If any items are found to be outside if the specifications, contact the Anritsu service department.

9.1.2 Performance test items

This manual describes the following test items.

(1) Frequency stability for reference oscillator
(2) VSWR value for Main input/output connector
(3) VSWR value for AUX output connector
(4) Output frequency for RF signal generator
(5) Output level accuracy for RF signal generator
(6) Non-harmonic spurious
(7) Harmonics

Note:

When the Parallelphone Measurement Software is installed, perform a similar test for Main 2 and Aux 2. Since the procedures and setup figures in this section are provided for Phone-1, read Phone-1 as Phone-2 when performing a test for Phone-2.

9.1.3 Required measurement equipment

Measurement equipment necessary for a performance test is listed in Table 9.1.3-1.

CAUTION ⚠

Warm-up the equipment to be measured and measurement equipment for at least 30 minutes unless specifically mentioned and wait until it become stable enough before starting the performance test. To demonstrate the highest measurement accuracy, implementation of the test is required at room temperature, little change in AC power voltage, and no trouble with noise, oscillation, dust or humidity.

Table 9.1.3-1 Device List for Performance Test

Performance test item	Recommended device name (Anritsu model name)	Performance required for device*
Frequency stability for reference oscillator	Frequency counter (MF2412B)	30 MHz to 2.7 GHz Resolution: 0.1 Hz External reference input (10 MHz)
	Frequency standard device	Frequency: 10 MHz Stability: $\pm 1 \times 10^{-8}$ or less
VSWR value for Main input/output connector	Network analyzer (MS4622A)	30 MHz to 2.7 GHz
	50 Ω, N-type calibration kit (3753)	DC to 3 GHz
VSWR value for AUX output connector	Network analyzer (MS4622A)	30 MHz to 2.7 GHz
	50 Ω, N- type calibration kit (3750)	DC to 2.7 GHz
Output frequency for RF signal generator	Frequency counter (MF2412B)	30 MHz to 2.7 GHz Resolution: 0.1 Hz External reference input (10 MHz)
Output level accuracy for RF signal generator	Receiver for calibration (ML2530A)	Frequency range: 30 MHz to 2.7 GHz Resolution: 1 Hz Measured electricity range: –140 to +20 dBm Measurement accuracy: ±0.05dB External reference input (10MHz)
	Power meter (ML2437A)	Main unit accuracy: ±0.02 dB Frequency range: 30 MHz to 2.7 GHz Resolution: 0.01 dB
	Power sensor (MA2472A)	Frequency range: 30 MHz to 2.7 GHz Measured electricity range: –30 to +20 dBm Input connector: N-type
Signal purity Non-harmonic spurious/harmonic	Spectrum analyzer (MS2683A)	100 kHz to 2.7 GHz

*: Some performances that cover the measurement range of test items are extracted.

9.1.4 Frequency stability for reference oscillator

This section describes test method for frequency stability of the 10 MHz crystal oscillator the reference oscillator of MT8815A/MT8820A. For frequency stability, measure the frequency change at 24 hours after turning the power On and at the ambient temperatures of 0°C and 50°C.

(1) Test object specifications

Table 9.1.4-1 Specifications for reference oscillator

Item	Specifications
Frequency	10 MHz
Activation characteristics	$\leq 5\times10^{-8}$ (At 10 minutes after power-On, references the 24 hours after power-On)
Aging rate	$\leq 2\times10^{-8}$/day (Referencing the 24 hours after power-on)
Temperature stability	$\leq 5\times10^{-8}$ (0 to 50°C, referencing 25°C)

(2) Setup

Connect the equipment as shown in the figure below. Connect 10 MHz Buff Out to 10 MHz reference input connector of frequency counter on the MT8815A/MT8820A rear panel.

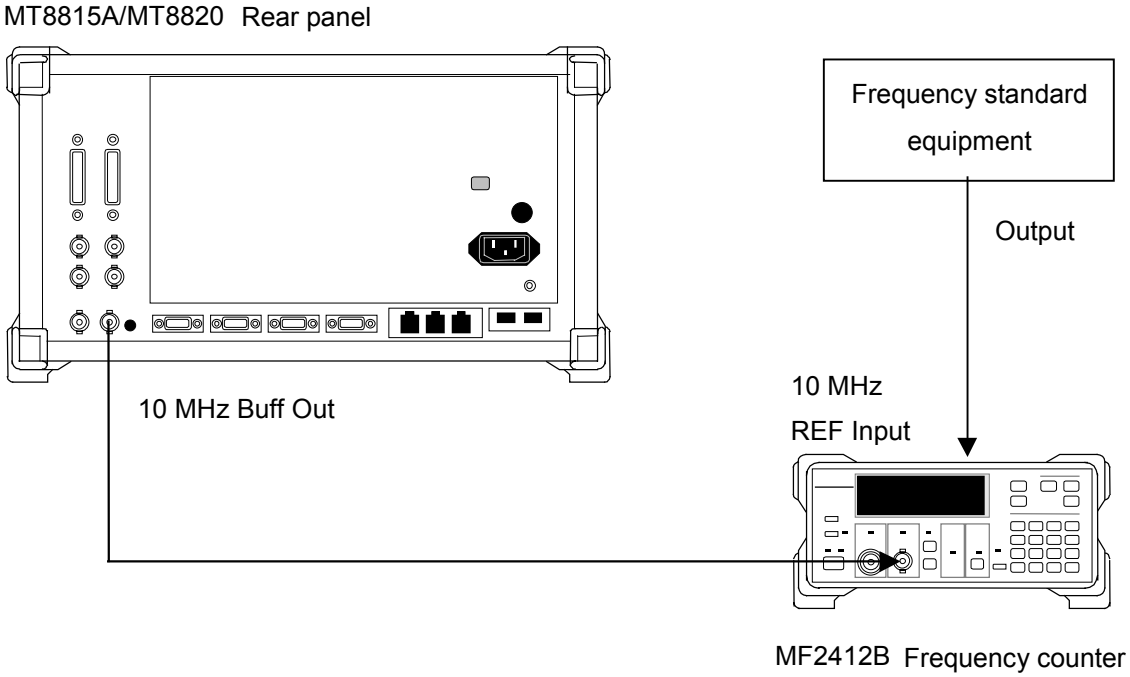

Fig. 9.1.4-1 Setting up the frequency stability test for reference oscillator

(3) Activation characteristics test

Note:

Perform this test on a location where the ambient temperature change is within ±2°C and no oscillation occurs.

[Procedure]

1. Set the frequency counter to use the external frequency standard device.
2. When 24 hours have passed after turning the MT8815A/MT8820A On, measure output frequency from the 10 MHz Buff Out of MT8815A/MT8820A using the frequency counter. The value is read to the 0.1 Hz digit (hereafter, read the value in the same manner).
3. Turn the power Off after 12 hours, and restart MT8815A/MT8820A.
4. After 10 minutes, measure the output frequency from 10 MHz Buff Out of MT8815A/MT8820A using the frequency counter.
5. Calculate the stability with the following formula.

$$\text{Frequency stability} = \frac{(\text{Second frequency counter value}) - (\text{First frequency counter value})}{(\text{First frequency counter value})}$$

(4) Aging rate test

Note:

Perform this test on a location where the ambient temperature change is within ±2°C and no oscillation occurs.

[Procedure]

1. Set the frequency counter to use the external frequency standard device.
2. When 24 hours have passed MT8815A/MT8820A On, measure output frequency from the 10 MHz Buff Out of MT8815A/MT8820A using the frequency counter. The value is read to the 0.1 Hz digit (hereafter, read the value in the same manner).
3. After 24 hours, measure the output frequency from 10 MHz Buff Out of MT8815A/MT8820A using the frequency counter again.
4. Calculate the stability with the following formula.

$$\text{Frequency stability} = \frac{(\text{Second frequency counter value}) - (\text{First frequency counter value})}{(\text{First frequency counter value})}$$

(5) Temperature stability test

Note:

Use a thermostat with no oscillation to perform this test.

[Procedure]

1. In the connection diagram, Fig. 9.1.4-1, install MT8815A/MT8820A in the thermostat and set its temperature at 25°C.
2. Turn MT8815A/MT8820A On and wait until internal temperature, become stable (it takes about 1.5 hours after internal temperature of the thermostat become stable).
3. After internal temperature is stable, measure the output frequency from 10 MHz Buff Out of MT8815A/MT8820A using the frequency counter. The value is read to the 0.1 Hz digit (hereafter, read the value in the same manner).
4. Set the internal temperature of the thermostat to 50°C.
5. After the internal temperatures of the thermostat and MT8815A/MT8820A are stable, measure the output frequency from 10 MHz Buff Out of MT8815A/MT8820A.
6. Calculate the stability with the following formula.

$$\text{Frequency stability} = \frac{(\text{Frequency counter value at } 50°C) - (\text{Frequency counter value at } 25°C)}{(\text{Frequency counter value at } 25°C)}$$

7. Set the internal temperature of the thermostat to 0°C.
8. After the internal temperatures of the thermostat and MT8815A/MT8820A are stable, measure the output frequency from 10 MHz Buff Out of MT8815A/MT8820A.
9. Calculate the stability with the following formula.

$$\text{Frequency stability} = \frac{(\text{Frequency counter value at } 0°C) - (\text{Frequency counter value at } 25°C)}{(\text{Frequency counter value at } 25°C)}$$

9.1.5 VSWR value for Main input/output connector

The test on VSWR value for Main input/output connector is described here.

(1) Test object specifications

Table 9.1.5-1 Specification of VSWR value for Main input/output connector

Item	Specification
VSWR	≤1.2 (Frequency ≤ 1.6 GHz) ≤1.25 (1.6 GHz ≤ frequency ≤ 2.2 GHz) ≤1.3 (Frequency > 2.2 GHz)

(2) Setup

Connect the equipment as shown in Fig. 9.1.5-1.

Note:

Confirm that the MT8815A/MT8820A RF signal output connector is set to the Main input/output connector. Settings for RF signal output connector can be checked in RF Output on the System Configuration screen.

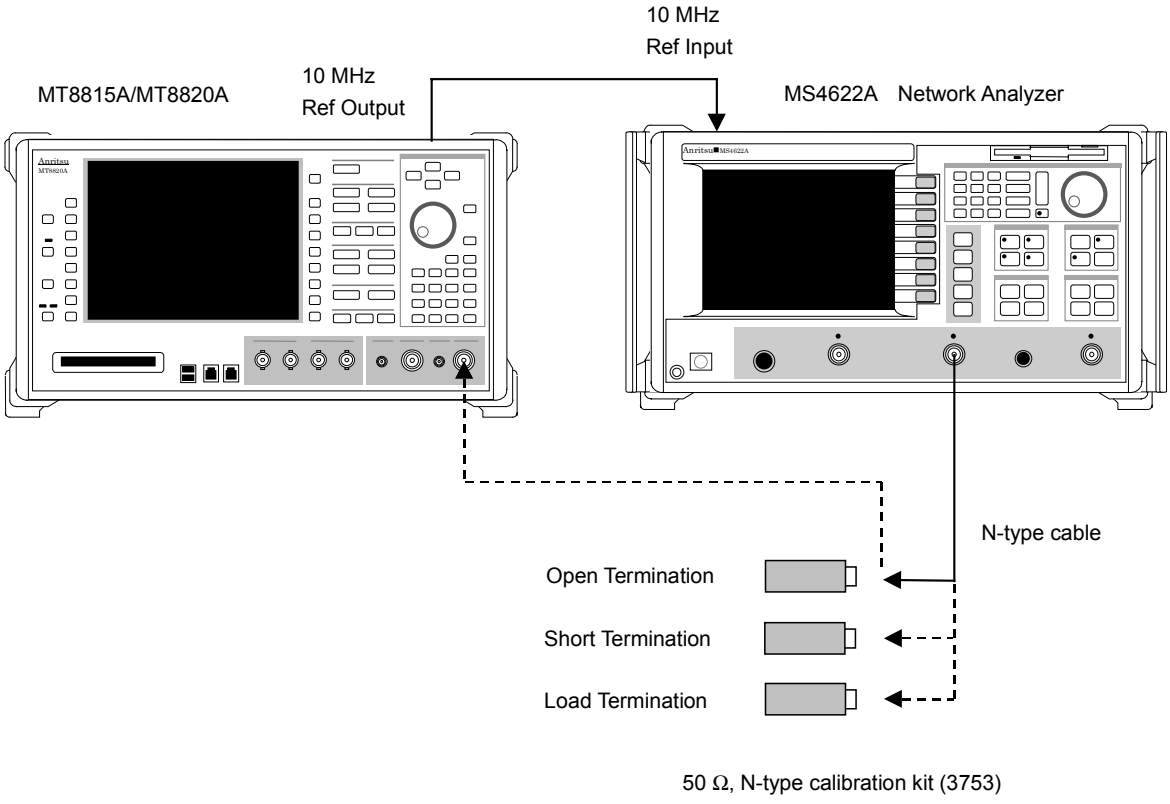

Fig. 9.1.5-1 Main input/output connector setup for VSWR value test

(3) Test method

[Procedure]

1. Connect the N-type cable to the network analyzer for connecting with the MT8815A/MT8820A.
2. Set the start frequency of the network analyzer to 30 MHz and stop frequency to 3 GHz.
3. At the top of N-type cable, perform calibration using Open, Short and Load termination.
4. Connect N-type cable to the Main1 Input/Output of MT8815A/ MT8820A.
5. Set the MT8815A/MT8820A reference level (input level) to –65 dBm. To set the reference level, refer to the operation manual for the measurement software.
6. Perform VSWR measurement, then check if the specification is satisfied.

9.1.6 VSWR value for AUX output connector

The test on VSWR value for AUX output connector is described here.

(1) Test object specifications

Table 9.1.6-1 Specification of VSWR value for AUX output connector Main input/output connector

Item	Specification
VSWR	≤1.3 (at SG output level ≤–10 dBm)

(2) Setup

Connect the equipment as shown in Fig. 9.1.6-1.

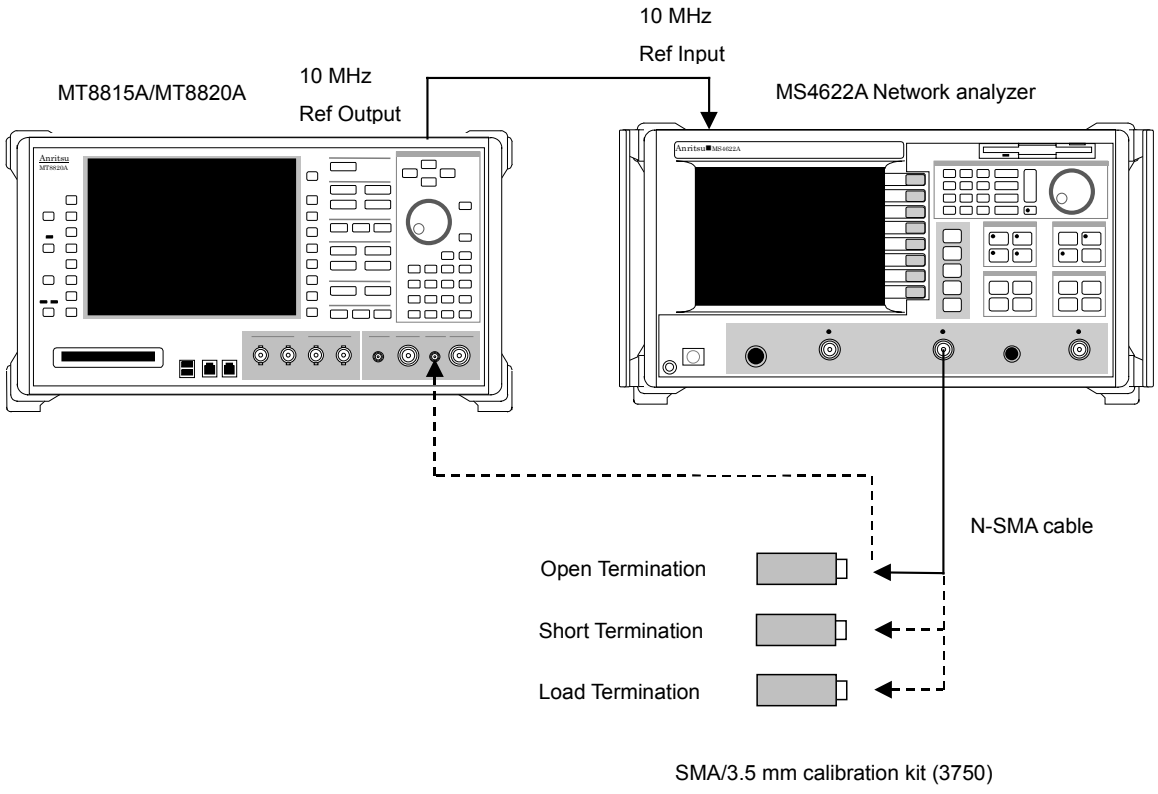

Fig. 9.1.6-1 Setting up for VSWR value test of AUX output connector

Note:

Confirm that MT8815A/MT8820A RF signal output connector is set to the AUX auxiliary output connector. Setting for RF signal output connector can be checked in RF Output on the System Configuration screen

(3) Test method

[Procedure]

1. Connect the N-SMA cable to network analyzer for connecting with MT8815A/MT8820A.
2. Set the start frequency of the network analyzer to 30 MHz and stop frequency to 3 GHz.
3. At the top of N-SMA cable, perform calibration using Open, Short and Load termination.
4. Connect SMA type cable to the AUX Output of MT8815A/ MT8820A.
5. Set the MT8815A/MT8820A output level to –10 dBm to reach a state where all the internal attenuators are off. In addition, set the output frequency at 0.4 MHz, outside the band. To set the output level and output frequency, refer to the operation manual for the measurement software.
6. Perform VSWR measurement, then check if the specification is satisfied.

9.1.7 Output frequency of the RF signal generator

The test on output frequency of RF signal generator is described here. This item is a function test.

(1) Test object specification

Table 9.1.7-1 Output frequency range

Item	Specification
Output frequency range	30 to 2700 MHz

(2) Setup

Connect as shown in Fig. 9.1.7-1. Setup the PC to enable to control MT8815A/MT8820A via GPIB interface.

Note:

Confirm that MT8815A/MT8820A reference signal is set to 10 MHz of the external output. Settings for reference signal can be checked in Ref.Frequency on the System Configuration screen.

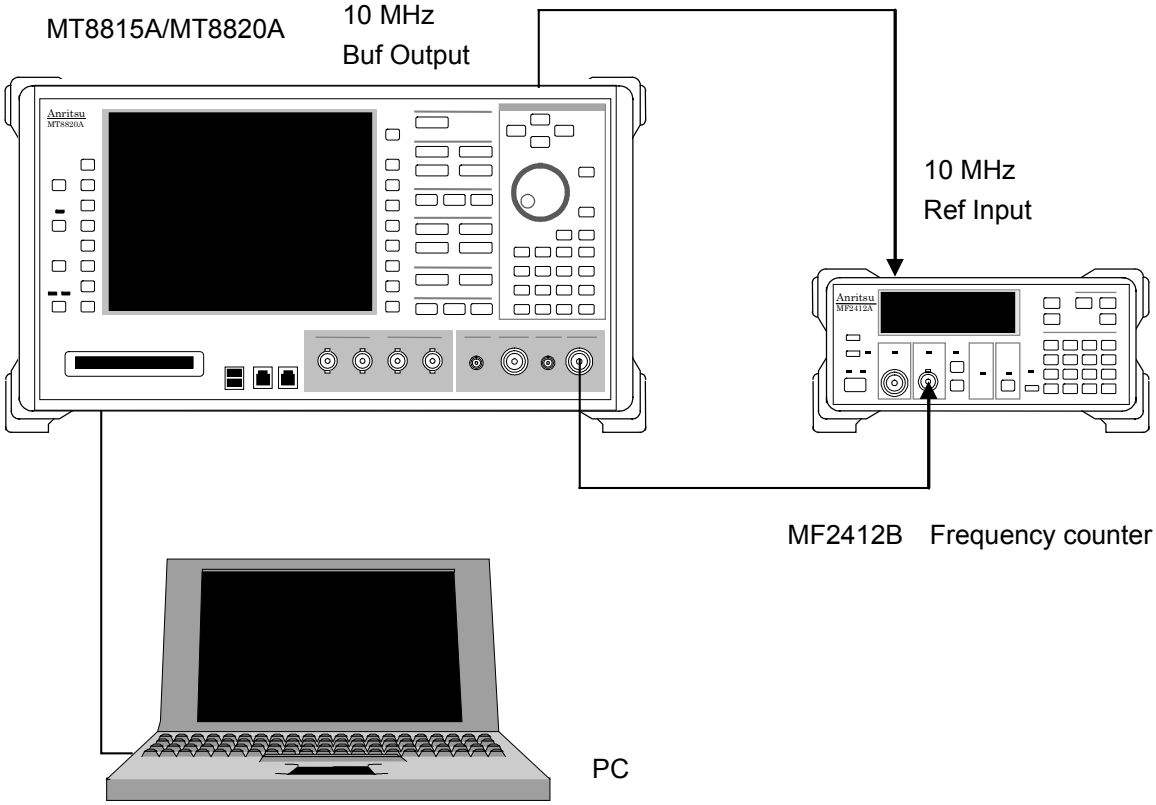

Fig. 9.1.7-1 Setting up for the output frequency test

(3) Test method

[Procedure]

1. Connect 10 MHz Buff Out of MT8815A/MT8820A to Ref Input of frequency counter.
2. Set the measurement resolution of frequency counter to 100 MHz.
3. Transmit GPIB command from PC to set the MT8815A/MT8820A output level to –10 dBm (refer to the operation manual of the measurement software for command), non-modulation CW output (command: MOD OFF).
4. Set MT8815A/MT8820A output frequency to 30 MHz.
5. Measure the MT8815A/MT8820A output frequency using the frequency counter and check if the result is 30 MHz.
6. In the same operation with the steps 4. and 5., set the output frequency at any value within the setting range. Then repeat the measurement. Refer to the Example of the performance test result record sheet for the frequency to be set.

Notes:

1. Frequency counter input connector may differ depending on the set frequency.
2. Indication of the frequency counter contains ±1 count error .

9.1.8 Output level accuracy of RF signal generator

The test on the frequency characteristics and output level accuracy of RF signal generator is described here.

(1) Test object specification

Table 9.1.8-1 Specification of output level accuracy for RF signal generator

Item	Specification
Main1 Level accuracy	±1.0 dB (–120 to –10 dBm, after Cal)
AUX1 Level accuracy	±1.0 dB (–110 to 0 dBm, after Cal)
Output frequency range	30 to 2700 MHz
Main1 output level range	–140 to –10 dBm
AUX1 output level range	–130 to 0 dBm

(2) Setup

Setup differs depending on the test contents. Fig. 9.1.8-1 is a setup example for the frequency characteristics test.

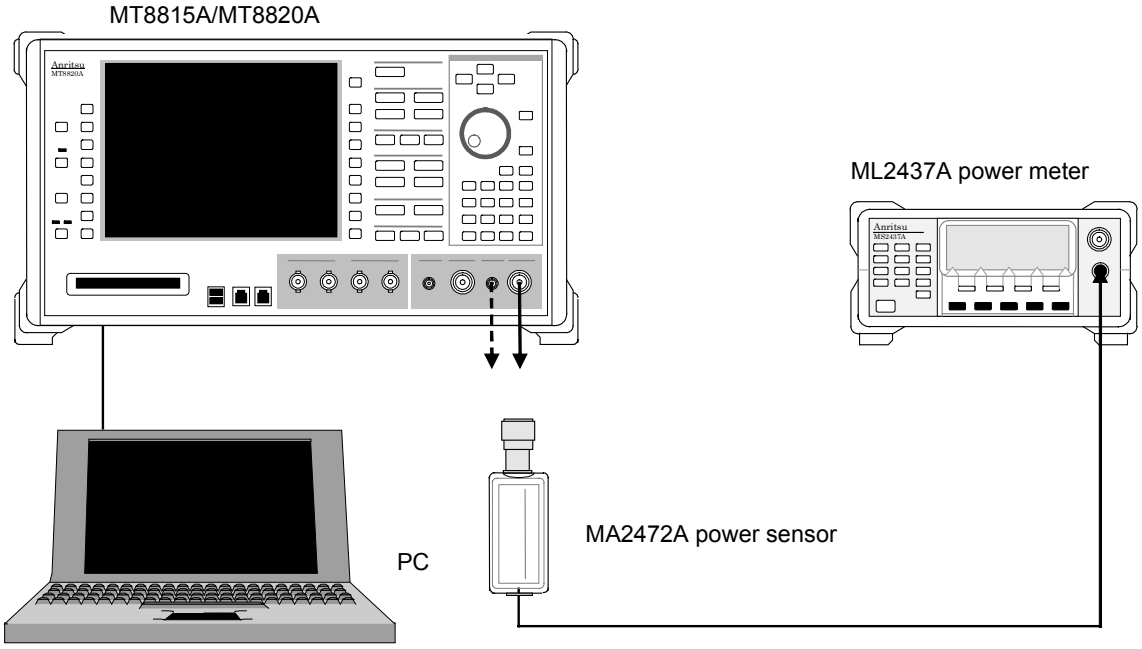

Fig. 9.1.8-1 Setting up the frequency characteristics test for RF signal generator

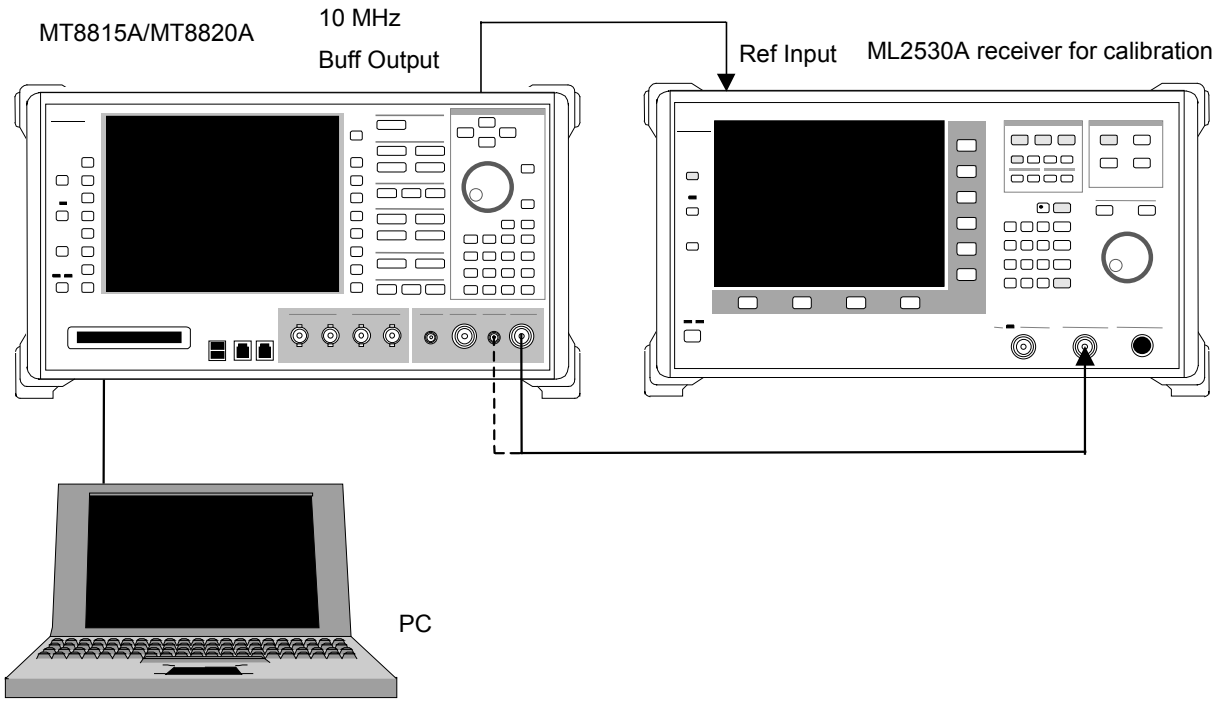

Fig. 9.1.8-2 Setting up for the level accuracy test of RF signal generator

Fig. 9.1.8-2 shows a setup example for the output level accuracy test. Setup the PC to enable control of the MT8815A/MT8820A via GPIB interface.

Notes:

1. Confirm that the MT8815A/MT8820A RF signal output connector (Main or AUX) of measuring object. Setting for RF signal output connector can be checked in RF Output on the System Configuration screen.
2. Perform the tests (3) and (4) at the same temperature setting.

(3) Frequency characteristics test

[Procedure]

1. Setup the equipment as shown in Fig. 9.1.8-1.
2. Set MT8815A/MT8820A to the non-modulation CW output (command: `MOD OFF`) through GPIB control from PC.
3. Perform sensor calibration (for zero point and sensitivity) of the power sensor.
4. Execute Full Calibration of MT8815A/MT8820A.
5. Connect the power sensor directly to the MT8815A/MT8820A Main1 Input/Output.

6. Set MT8815A/MT8820A output level to –10 dBm.
7. Set the frequency for MT8815A/MT8820A to30 MHz and the power sensor correction coefficient in the measurement frequency for the power meter.
8. Measure the output level using power meter and record the result.
9. Change the frequency and repeat the operations in steps 7. and 8.

(4) Output level accuracy test

[Procedure]

1. Setup the equipment as shown in Fig. 9.1.8-2.
2. Connect MT8815A/MT8820A 10 MHz Buff Out to the external reference input of receiver for calibration and perform the frequency synchronization.
3. Set the resolution band width of the receiver for calibration to 1 Hz and perform the calibration (error between the ranges) for receiver on each measurement frequency beforehand.
4. Set the frequency of MT8815A/MT8820A and receiver for calibration to 30 MHz.
5. Set the MT8815A/MT8820A output level to –10 dBm and measure the level using the measurement device for calibration.
6. Add the variation with level measurement value when output level of MT8815A/MT8820A is –10 dBm to the value recorded in the output level frequency characteristics test.

   [Level error] = [Level measurement value] – [Level measurement value at –10 dBm] + [Recorded value in the above-mentioned output level frequency characteristics test at identical frequency]
7. Change the output level and repeat the operations in steps 5. to 6.
8. Change the frequency and repeat the operations in steps 3. to 6.

Note:

On the performance test for AUX1; change the connection destination to AUX1, and RF Output of MT8815A/MT8820A to AUX using System Config. Then, perform the frequency characteristics measurement, and output level accuracy measurement.
At that time, set the initial value of MT8815A/MT8820A output level to 0 dBm.
Calculation formula is as follows:

[Level error] = [Level measurement value] – [Level measurement value at 0 dBm] + [Recorded value of output level frequency characteristics test at identical frequency]

9.1.9 Non-harmonic spurious

The test for non-harmonic spurious is described here.

(1) Test object specification

Table 9.1.9-1 Specification for non-harmonic spurious

Item	Specification
Non-harmonic spurious	≤–50 dBc (at offset frequency of 100 kHz or more, except for [up frequency – down frequency + 4.1825 GHz]) ≤–40 dBc (in ≥2.1 GHz, spurious at [4.8 GHz – down frequency GHz])

(2) Setup

Connect the equipment as shown in Table 9.1.9-1. Setup the PC to enable control of MT8815A/MT8820A via GPIB interface.

Note:

Confirm that the MT8815A/MT8820A RF signal output connector is set to the Main input/output connector. Settings for RF signal output connector can be checked in RF Output on the System Configuration screen.

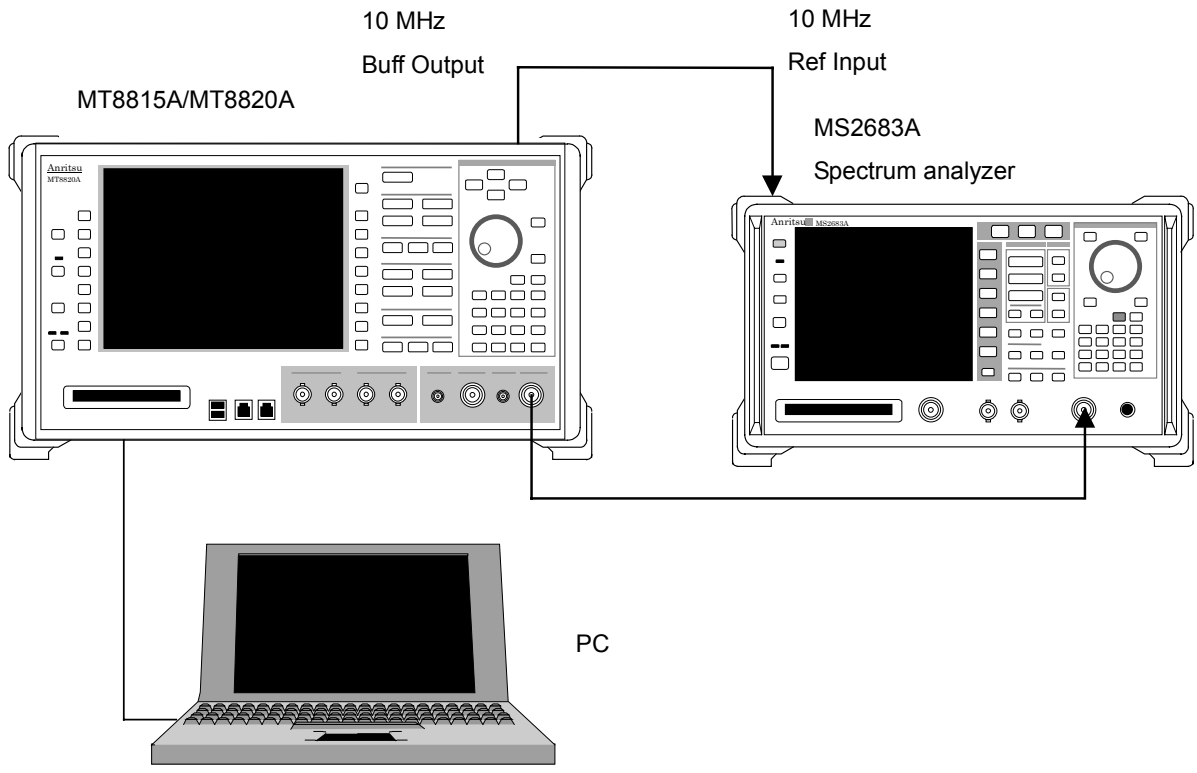

Fig. 9.1.9-1 Setting up the non-harmonic spurious test

(3) Test method

[Procedure]

1. Set MT8815A/MT8820A to the non-modulation CW output (command: `MOD OFF`) through GPIB control from PC.
2. Set the output level for fundamental wave and the measurement frequency to MT8815A/MT8820A.
3. Adjust the reference level to the fundamental wave as shown in the figure below.

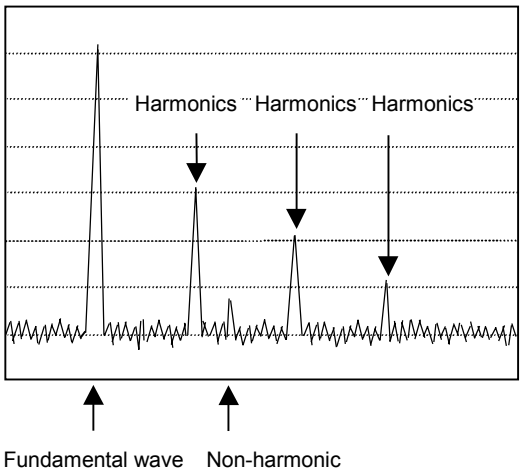

Fig. 9.1.9-2 Fundamental wave level

4. Set the spectrum analyzer to the delta marker mode and move the current marker to the highest-level non-harmonics over 100 kHz of the offset frequency and perform pass/fail evaluation with the level difference.

9.1.10 Harmonics

The test for harmonics is described here.

(1) Test object specification

Table 9.1.10-1 Specification of the Harmonics

Item	Specification
Harmonics	≤–25 dBc

(2) Setup

Connect the equipment as shown in Table 9.1.9-1. Setup the PC to enable control of MT8815A/MT8820A via GPIB interface.

(3) Test method

[Procedure]

1. Connect MT8815A/MT8820A to the non-modulation CW output (command: `MOD OFF`) through GPIB control from PC.
2. Set the output level for fundamental wave and the measurement frequency to MT8815A/MT8820A.
3. Set the frequency range of the spectrum analyzer from 0Hz to the value of measurement frequency × 3.5.
4. Adjust the reference level to the fundamental wave as shown in Fig. 9.1.10-1.
5. Measure the level variation of the 2nd harmonics and 3rd harmonics to the fundamental wave and perform pass/fail evaluation.
6. Repeat the operations in steps 2. to 5. in the range up to 2700 MHz of measurement frequency.

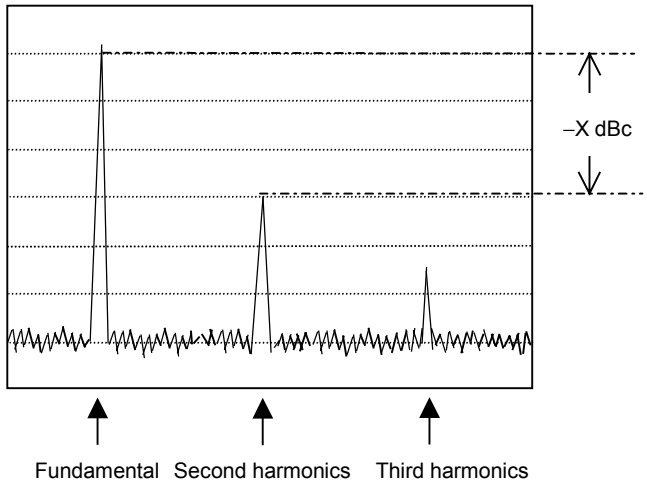

Fig. 9.1.10-1 Harmonics

9.1.11 Example of performance test result record sheet

An example of the sheet to record and summarize the performance test result is provided here. Copy and use this sheet when executing the performance test.

Test location _____ Report NO. _____
Date _____
Person-in-charge _____

Device name: MT8815A/MT8820A Radio communication analyzer

Product NO. _____ Ambient temperature _____ °C
Power frequency _____ Hz Relative humidity _____ %

Remarks _____

■ Reference oscillator frequency stability

Item	Valid lower limit	Stability	Valid upper limit	Measurement inaccuracy
Activation characteristics	-5.0×10^{-8}		$+5.0\times10^{-8}$	$\pm1\times10^{-9}$
Aging rate	-2.0×10^{-8}		$+2.0\times10^{-8}$	
Temperature stability (50°C)	-5.0×10^{-8}		$+5.0\times10^{-8}$	
Temperature stability (0°C)				

■ VSWR value for Main1 input/output connector

Connector	Frequency	VSWR measurement value	Specified max. value	Measurement inaccuracy
Main1	Frequency ≤ 1.6 GHz		1.2	0.02
	1.6 GHz ≤ frequency ≤ 2.2 GHz		1.25	0.03
	Frequency > 2.2 GHz		1.3	0.02

■ VSWR value for AUX1 connector

Connector	VSWR measurement value	Specified max. value	Measurement inaccuracy
AUX1		1.3	0.02

■ Output frequency of RF signal generator

Setting	Result	
30 MHz	☐ OK	☐ NG
100 MHz	☐ OK	☐ NG
300 MHz	☐ OK	☐ NG
600 MHz	☐ OK	☐ NG
1000 MHz	☐ OK	☐ NG
1500 MHz	☐ OK	☐ NG
2000 MHz	☐ OK	☐ NG
2500 MHz	☐ OK	☐ NG
2700 MHz	☐ OK	☐ NG
Optional setting value _____MHz	☐ OK	☐ NG
Optional setting value _____MHz	☐ OK	☐ NG
Optional setting value _____MHz	☐ OK	☐ NG

■ Output level accuracy of RF signal generator (Main1)

Output level frequency characteristics

Setting		Result	Measurement inaccuracy
Frequency	Output level		
30 MHz	−10 dBm		±0.12 dB
1000 MHz			
2000 MHz			
2700 MHz			

Output level	Specified min. value	Result				Specified max. value	Measurement inaccuracy
		30 MHz		1000 MHz			
		Level measurement	Level error	Level measurement	Level error		
–10 dBm	–1.0 dB					+1.0 dB	±0.3 dB
–15 dBm							
–20 dBm							
–25 dBm							
–30 dBm							
–35 dBm							
–40 dBm							
–45 dBm							
–50 dBm							
–55 dBm							
–60 dBm							
–65 dBm							
–70 dBm							
–75 dBm							
–80 dBm							
–85 dBm							
–90 dBm							
–95 dBm							
–100 dBm							
–105 dBm							
–110 dBm							
–115 dBm							
–120 dBm							

Output level	Specified min. value	Result				Specified max. value	Measurement inaccuracy
		2000 MHz		2700 MHz			
		Level measurement	Level error	Level measurement	Level error		
–10 dBm	–1.0 dB					+1.0 dB	±0.3 dB
–15 dBm							
–20 dBm							
–25 dBm							
–30 dBm							
–35 dBm							
–40 dBm							
–45 dBm							
–50 dBm							
–55 dBm							
–60 dBm							
–65 dBm							
–70 dBm							
–75 dBm							
–80 dBm							
–85 dBm							
–90 dBm							
–95 dBm							
–100 dBm							
–105 dBm							
–110 dBm							
–115 dBm							
–120 dBm							

[Level error] = [Level measurement value] – [Level measurement value at –10 dBm]
+ [Recorded value of output level frequency characteristics test at identical frequency]

■ Output level accuracy of RF signal generator (AUX1)

Output level frequency characteristics

Setting		Result	Measurement inaccuracy
Frequency	Output level		
30 MHz	0 dBm		±0.12 dB
1000 MHz			
2000 MHz			
2700 MHz			

Output level	Specified min. value	Result				Specified max. value	Measurement inaccuracy
		30 MHz		1000 MHz			
		Level measurement	Level error	Level measurement	Level error		
0 dBm	–1.0 dB					+1.0 dB	±0.3 dB
–5 dBm							
–10 dBm							
–15 dBm							
–20 dBm							
–25 dBm							
–30 dBm							
–35 dBm							
–40 dBm							
–45 dBm							
–50 dBm							
–55 dBm							
–60 dBm							
–65 dBm							
–70 dBm							
–75 dBm							
–80 dBm							
–85 dBm							
–90 dBm							
–95 dBm							
–100 dBm							
–105 dBm							
–110 dBm							

Output level	Specified min. value	Result				Specified max. value	Measurement inaccuracy
		2000 MHz		2700 MHz			
		Level measurement	Level error	Level measurement	Level error		
0 dBm	–1.0 dB					+1.0 dB	±0.3 dB
–5 dBm							
–10 dBm							
–15 dBm							
–20 dBm							
–25 dBm							
–30 dBm							
–35 dBm							
–40 dBm							
–45 dBm							
–50 dBm							
–55 dBm							
–60 dBm							
–65 dBm							
–70 dBm							
–75 dBm							
–80 dBm							
–85 dBm							
–90 dBm							
–95 dBm							
–100 dBm							
–105 dBm							
–110 dBm							

[Level error] = [Level measurement value] – [Level measurement value at 0 dBm]
+ [Recorded value of output level frequency characteristics test at identical frequency]

■ Non-harmonics spurious

Setting		Result	Specified max. value	Measurement inaccuracy
Frequency	Fundamental wave output level	Non-harmonics		
30 MHz	_____dBm		≤–50 dBc (at offset frequency of 100 kHz or more, except for [up frequency – down frequency + 4.1825 GHz]) ≤–40 dBc (in ≥2.1 GHz, spurious at [4.8 GHz – down frequency GHz])	±3.0 dB
100 MHz				
300 MHz				
600 MHz				
1000 MHz				
1500 MHz				
2000 MHz				
2500 MHz				
2700 MHz				

■Harmonics

Setting		Result		Specified max. value	Measurement inaccuracy
Frequency	Fundamental wave output level	2nd harmonics	3rd harmonics		
30 MHz	_____dBm			–25 dBc	±5.0 dB
100 MHz					
300 MHz					
600 MHz					
1000 MHz					
1350 MHz			----------		

9.2 Calibration

9.2.1 Purpose and implementation timing

Perform calibration periodically to prevent MT8815A/MT8820A from deteriorating. Perform calibration once or twice a year. If the specifications are not satisfied even after the calibration, contact the Anritsu service department.

9.2.2 Required measurement device

Measurement devices required for the performance test are shown in Table 9.2.2-1.

CAUTION ⚠

Warm-up the equipment to be measured and measurement equipment for at least 30 minutes unless specifically mentioned and wait until it become stable enough before starting the performance test. To demonstrate the highest measurement accuracy, implementation of the test is required at room temperature, little change in AC power voltage, and no troubles with noise, oscillation, dust or humidity.

Table 9.2.2-1 Device list for calibration

Calibration item	Recommended device name (Anritsu model name)	Performance required for device*
Calibration for reference oscillator frequency	Frequency counter (MF2412B)	Set range: 100 kHz to 3 GHz Resolution: 0.1 Hz External reference input: 10 MHz
	Frequency standard device	Frequency: 10 MHz Stability: $\pm 1 \times 10^{-9}$ or less
	PC	Ability for controlling GPIB command

*: Some parts of the performance covering the measurement range of the calibration items are extracted.

9.2.3 Calibration of reference oscillator frequency

The calibration method of the reference oscillator frequency using the frequency counter is described. 10 MHz reference oscillator stability of MT8815A/MT8820A is 2×10^{-8}/ day. As a frequency standard device, use a standard signal generator that receives standard radio waves or sub-carrier (signal locked to the rubidium atom standard device) of higher stability and generates a signal locked to the radio waves or sub-carrier.

(1) Calibration specification

Table 9.2.3-1 Specifications for reference oscillator

Item	Specification
Frequency	10 MHz
Activation characteristics	$\leq5\times10^{-8}$ (At 10minutes after power-On, references the 24 hours after power-On)
Aging rate	$\leq2\times10^{-8}$/day (References the 24 hours after power-On)
Temperature stability	$\leq5\times10^{-8}$ (0 to 50°C, references 25°C)

(2) Setup

Connect the equipment as shown in Table 9.2.3-1. Setup the PC to enable control of MT8815A/MT8820A via GPIB interface.

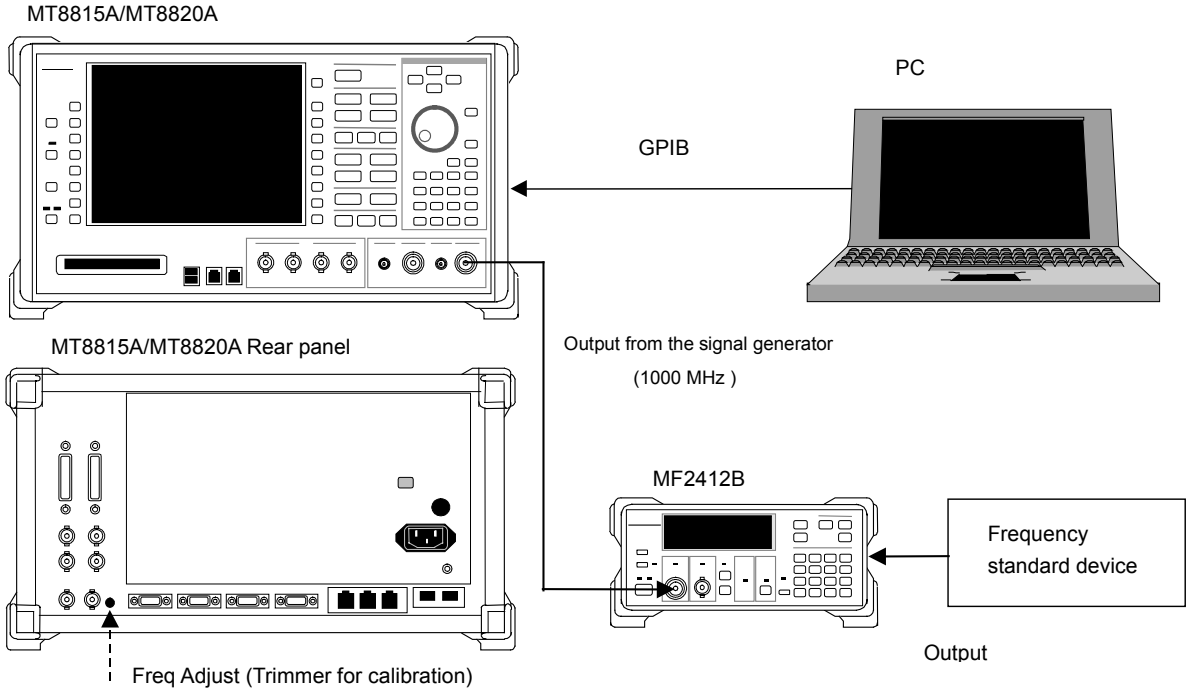

Fig. 9.2.3-1 Setting up for reference oscillator calibration

(3) Calibration method

[Procedure]

1. Warm up the reference oscillator by setting the MT8815A/MT8820A to the standby status for 24 hours.
2. After 24 hours, turn MT8815A/MT8820A On.
3. Input the standard frequency to the external reference input of the frequency counter.
4. Set MT8815A/MT8820A to the reference oscillator frequency calibration mode with GPIB control.
5. Set MT8815A/MT8820A as in the following table

Item	Specification
Signal generator frequency	1000.000000 MHz
Output level	–10 dBm
Modulation	Off

6. Adjust the trimmer for calibration (Freq Adjust on the MT8815A/MT8820A rear panel) so that frequency counter indicates the value 1000.000000 MHz±10 Hz.

9.3 Cleaning

Before starting to clean the MT8815A/MT8820A, be sure to turn the main power switch on the rear panel Off and disconnect the power plug from the power source.

9.3.1 Cleaning the cabinet

Clean the cabinet surface, as follows:

(1) Wipe the cabinet surface with a clean, soft, dry cloth.

(2) When the cabinet is severely stained with dust or particles or is to be stored for a long time, wipe its surface with a cloth moistened with thinned neutral detergent and then wipe with a clean, soft, dry cloth.

(3) If any screws anchoring the components are loosened, tighten them using the specified tool (s).

CAUTION ⚠

For cabinet cleaning, do not use benzene, thinner, or alcohol. They may damage the cabinet painting or cause cabinet deformation or discoloration.

9.3.2 Cleaning others

Avoid dust or particles from accumulating on the MT8815A/MT8820A and its surroundings. If water drops, etc. from on the power plug or connector, turn the main power switch (on rear panel) Off and wipe the power plug or connector with a dry cloth.

WARNING ⚠

1. **Remove dust, etc. accumulated on the outlet periodically. Accumulated dust on the electrodes may cause tracking phenomena resulting in fire.**

2. **Remove dust, etc. around the fan so as not to obstruct ventilation holes. Obstructed ventilation holes may cause the internal temperature to rise, resulting in fire.**

9.4 Storage and Transportation

9.4.1 Packing

When packing the MT8815A/MT8820A, use of the original packing materials at shipment. If you use any other cushioning materials, perform the following steps:

[Procedures]

1. Wrap MT8815A/MT8820A in a plastic bag.
2. Prepare a corrugated cardboard box, wooden box or aluminum case large enough to put the cushioning materials on each side of MT8815A/MT8820A.
3. Put the cushioning materials around MT8815A/MT8820A. Check that MT8815A/MT8820A is horizontally positioned with no space to move inside the box.
4. Anchor the box with packing rope, adhesive tape, or belt, etc.

9.4.2 Precautions on storage and transportation

When storing or transporting the MT8815A/MT8820A, satisfy the following environmental conditions:

○ Little vibration
○ Temperature: 0 to 30°C
○ Humidity: 40 to 80%
○ Little temperature/humidity changes throughout the day

Avoid storing or transporting the MT8815A/MT8820A in any of the following environmental conditions:

× Where it is exposed to strong vibration
× Where it is exposed to direct sunlight
× Where it is exposed to dust
× Where the temperature falls out of the –20 to +60°C range
× Where the humidity is 85% or more
× Where condensation may occur due to high humidity
× Where it is exposed to active gases
× Where the components may be oxidized

Note:

Store the MT8815A/MT8820A after cleaning the dust, finger prints, stains and other accumulated dirt.

CAUTION ⚠

1. **Do not move the MT8815A/MT8820A with the power turned On. This may damage the internal circuits and result in fire, electric shock and/or failure.**

2. **Carry the MT8815A/MT8820A with the grips provided on both sides of it, and keep it in a horizontal position while you are transporting it. Carrying the MT8815A/MT8820A with only one of the grips while inclining it, may cause excessive force on the internal precision parts, which may be damaged as a result.**

3. **The MT8815A/MT8820A should be carried by two or more persons or placed on a cart. The MT8815A/MT8820A is too heavy for one person to carry. Doing so burdens the waist, and may result in an injury. Avoid strong vibrations when loading the MT8815A/MT8820A onto a cart.**

9.5 Troubleshooting

Refer to this section if the MT8815A/MT8820A does not work properly. When your trouble is not described in this section or not solved even if an action is taken, contact Anritsu Service and Sales offices at the address at the end of paper-edition manual or the separate file of CD-edition manual. For measurement, refer to the operation manual for the measurement software or optional device.

Phenomenon	Probable cause	Action
The power is not turned on.	The power cord is not connected properly, or pulled out of the plug or inlet.	Connect the power cord correctly.
	The main power switch on the rear panel is not On.	Press the main power switch to turn On.
	The power switch is not pressed properly.	Press the power switch for more than one second.
When 2 minutes or more lapsed after the power was turned On, the initialization screen does not change.		Turn the power Off once and turn it On again. If the same error recurs, turn the power Off and contact an Anritsu service center.
Nothing is displayed on the LCD.	A command to turn Off the LCD power is transmitted by the remote control.	Transmit a command to turn LCD power On.
A parameter cannot be set.	The setting window is not activated.	Press Focus to activate the setting window.
	Outside of the parameter setting range.	Specify the value within the parameter setting range.
	The setting conditions are not satisfied.	Check the parameter setting range.
A window is not displayed.	A window is not activated.	Press Focus to activate the window to be displayed.
	A common screen is displayed.	A window is not displayed on the common screen.
A function menu cannot be found.	A function menu is displayed on other menu page.	Switch the page by pressing Next.
	The displayed screen or window is not correct.	Open a screen or window that can display a menu.

Phenomenon	Probable cause	Action
• A parameter file cannot be saved or read out. • Hard copy cannot be taken. • Software cannot be Installation.	A memory card is not inserted or wrongly inserted.	Correctly insert the memory card to the memory card slot.
	The memory card is not formatted.	Format a memory card to MS-DOS format at PC or other devices beforehand to use.
	A file to be overwritten is a read-only file.	Release read-only attribute of the file to be overwritten at PC or other devices.
	1000 files already exist in the directory of save destination.	Delete unnecessary files at PC or other devices.
	The attached memory card is not used.	Please use an attached memory card.
A saved parameter file is not displayed on the screen.		Execute F6 "Reload Media Information" in the function menu
A call cannot be connected.	RF signal output connector is wrong.	Check if the setting of RF Output on the System Configuration screen is in conformance with the connector being used.
	The parameter setting for MT8815A/MT8820A is wrong.	Refer to the operation manual of the measurement software.
	A phone is not ready.	Refer to the operation manual of the phone for connection.
The panel key is not operated.	MT8815A/MT8820A is in the remote control mode.	Press Local to return to the manual control mode.
A message, "Out of range" is displayed when attempting to set a parameter.	The parameter is out of specified range.	Set the parameter to the value within the range.
A message, "Prohibited when *Parameter* is *X*" is displayed when attempting to set a parameter.	The Parameter cannot be set when the value is *X*.	Check the setting condition and set the Parameter value to other than *X*.
A message, "Call has dropped" is displayed.	The status does not allow demodulation a signal of the phone.	Check the parameter setting or measurement signal status.

Phenomenon	Probable cause	Action
Remote control mode cannot be set.	GPIB address is wrong.	Perform the same setting for GPIB Address on the System Configuration screen and the controller.
	GPIB cable or serial cable is not correctly connected.	Connect the cable correctly based on the network conditions.
	GPIB board for PC is not correctly set up.	Refer to the operation manual of the GPIB board being used.
	The remote interface is wrong (MT8815A only).	Check if the setting of Connect to Controller on the System Configuration screen is in conformance with the remote interface being used.
The displayed value is different from the response value.	Response unit is different from the display unit.	Check the response unit.
A message, “Undefined command” is displayed and an error occurs for transmitted command.	The transmitted command is undefined.	Check if the character string of the command header part is correct.
A message, “Invalid numeric data” is displayed and an error occurs for transmitted command.	A character string is assigned to the parameter for a numeric value to be assigned.	Assign correct numeric values in the parameter.
A message, “Invalid string data” is displayed and an error occurs for transmitted command.	Undefined numeric value or character string is assigned to the parameter for a reserved word to be assigned.	Assign a corrected reserved word in the parameter.
A message, “Invalid unit” is displayed and an error occurs for transmitted command.	The specified unit is invalid.	Check the unit.
A message, “Insufficient data” is displayed and an error occurs for transmitted command.	A parameter that cannot be omitted is omitted.	Specify the parameter.
A message, “Out of range” is displayed and an error occurs for transmitted command.	The specified parameter is out of specified range.	Check the parameter range.
An error occurs for transmitted command.	Parameter setting conditions are not satisfied.	Check the parameter setting conditions.

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