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INTRODUCTION

This Operating Manual represents design, specifications, overview of functions, and detailed operation procedure of A334M VSWR Analyzer, to ensure effective and safe use of the technical capabilities of the instrument by the user.

A334M VSWR Analyzer operation and maintenance should be performed by qualified engineers with initial experience in operating of microwave circuits and PC.

The following abbreviations are used in this Manual:

PC – Personal Computer
DUT – Device Under Test
SWR – Standing Wave Ratio
SAFETY INSTRUCTIONS

Carefully read through the following safety instructions before putting the analyzer into operation. Observe all the precautions and warnings provided in this Manual for all the phases of operation, service, and repair of the analyzer.

The analyzer must be used only by skilled and specialized staff or thoroughly trained personnel with the required skills and knowledge of safety precautions.

A334M is tested in stand-alone condition or in combination with the accessories supplied by GS INSTRUMENTS CO., LTD. against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

Never operate the analyzer in the environment containing inflammable gasses or fumes.

Operators must not remove the cover or part of the housing. The analyzer must not be repaired by the operator. Component replacement or internal adjustment must be performed by qualified maintenance personnel only.

Never operate the analyzer if the power cable is damaged.

Never connect the test terminals to mains.

Electrostatic discharge can damage your product when connected or disconnected from the DUT. Static charge can build up on your body and damage the sensitive circuits of internal components of both the product and the DUT. To avoid damage from electric discharge, observe the following:

- Always use a desktop anti-static mat under the DUT.
- Always wear a grounding wrist strap connected to the desktop anti-static mat via daisy-chained 1 MΩ resistor.

Observe all the general safety precautions related to operation of equipment powered by mains.
The definitions of safety symbols used on the instrument or in the Manual are listed below.

![Safety Symbol]

- Refers to the Manual if the instrument is marked with this symbol.
- Alternating current.
- Direct current.

---

**WARNING**

This sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in injury or death to personnel.

**CAUTION**

This sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in damage to or destruction of part or the entire product.

**NOTICE**

This sign denotes important information. It calls attention to a procedure, practice, or condition that is essential for the user to understand.

---

**Cleaning**

- This section provides the cleaning instructions required for maintaining the proper operation of the analyzer.
- To remove contamination from parts other than test ports and any connectors of the analyzer, wipe them gently with a soft cloth that is dry or wetted with a small amount of water and wrung tightly.
- It is essential to keep the test ports always clean as any dust or stains on them
can significantly affect the measurement capabilities of the analyzer. To clean the test ports (as well as other connectors of the analyzer), use the following procedure:

- Using compressed air remove or loosen the contamination particles;
- Clean the connectors using a lint-free cleaning cloth wetted with a small amount of ethanol and isopropyl alcohol (when cleaning a female connector, avoid snagging the cloth on the center conductor contact fingers by using short strokes);
- Dry the connector with low-pressure compressed air.

- Always completely dry a connector before using it.
- Never use water or abrasives for cleaning any connectors of the analyzer.
- Do not allow contact of alcohol to the surface of the insulators of the connectors.

**WARNING**

Never perform cleaning of the product if the power cable is connected to the power outlet.

Never clean the internal components of the product.

**Storage**

Before first use store your equipment in the factory package at environment temperature from 0 to +50°C and relative humidity up to 95% (at 25°C).

After you have removed the factory package store the equipment at environment temperature from +10 to +35°C and relative humidity up to 80% (at 25°C). Ensure to keep the storage facilities free from dust, fumes of acids and alkalies, aggressive gases, and other chemicals, which can cause corrosion.
1 GENERAL OVERVIEW

1.1 Description

The Protek A334M is multi-port VSWR analyzer with a frequency range of 5MHz to 4GHz.

The Protek A334M is suitable for multi-port VSWR analysis in a factory line for mass production of antenna, cable and etc. This equipment is designed to support up to 6 ports for VSWR analysis.

The Protek A334M has VSWR measurement function necessary to accurately verify the antenna, cable and etc.

The Protek A334M is connected through an Ethernet cable to an external personal computer which GUI software program is installed.

The GUI software program allows the user to easily analyze measurements and generate comprehensive reports.
1.2 Specifications

1.2.1 Basic Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Sub Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td>Max Input Power</td>
<td>+25dBm Damage level</td>
</tr>
<tr>
<td></td>
<td>Frequency Range</td>
<td>5MHz - 4GHz</td>
</tr>
<tr>
<td></td>
<td>Frequency Accuracy</td>
<td>&lt; ±3ppm @ 25°C</td>
</tr>
<tr>
<td></td>
<td>Frequency Resolution</td>
<td>10kHz</td>
</tr>
<tr>
<td></td>
<td>Impedance</td>
<td>50Ω</td>
</tr>
<tr>
<td></td>
<td>Scan Speed</td>
<td>&lt; 1 msec /data point</td>
</tr>
<tr>
<td></td>
<td>Test port</td>
<td>N Female</td>
</tr>
<tr>
<td><strong>VSWR</strong></td>
<td>Number of data points</td>
<td>126, 251, 501, 1001, 2001</td>
</tr>
<tr>
<td></td>
<td>VSWR Range</td>
<td>1 ~ 65 (Resolution : 0.01dB)</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td>Dimension</td>
<td>470X178X324 mm</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>14kg</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>Operating Temperature</td>
<td>0°C ~ +50°C</td>
</tr>
<tr>
<td></td>
<td>Storage Temperature</td>
<td>-40°C ~ +80°C (-40°F ~ +176°F)</td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
<td>95% NO Condensation</td>
</tr>
</tbody>
</table>

Table 1.1 Basic Specifications

1.2.2 Key Measurements

- High resolution VSWR Measurements

1.2.3 Key Features

- Up to 2001 data points
- User friendly GUI software menu structure
- Remote firmware upgrade capability
## 1.3 Ordering Information

### 1.3.1 Standard Accessories

The standard accessories supplied with the A334M VSWR Analyzer are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Picture</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Power Cord</td>
<td><img src="image1.png" alt="Picture" /></td>
<td>6FT(1.8MM) 220V BLACK</td>
</tr>
<tr>
<td>LAN Cable</td>
<td><img src="image2.png" alt="Picture" /></td>
<td>CAT.5E UTP Direct Cable</td>
</tr>
<tr>
<td>USB Flash Drive</td>
<td><img src="image3.png" alt="Picture" /></td>
<td>USB2.0(Manual, Software)</td>
</tr>
</tbody>
</table>

Table 1.2  A334M Accessories
2 PREPARATION FOR USE

2.1 General Information

Unpack the Analyzer and other accessories. Check the contents of the package against the list specified in section 1.4.1. Connect your A334M to AC power source by means of the AC Power Cord supplied with the equipment.

Warm-up the Analyzer for 20 minutes after turning the power on.

Assemble the test setup using cables, connectors and etc, which allow DUT connection to the Analyzer.

Perform calibration of the Analyzer. Calibration procedure is described in section 4.1.3.

2.2 Front Panel

The front view of A334M is represented in figure 2.1. The front panel is equipped with the following parts:

![A334M Front Panel](image)

Figure 2.1  A334M Front Panel

2.2.1 Power Switch

Switches the initial condition power supply of the Analyzer on and off.
CAUTION

Do not disconnect the power cable from the mains when the Analyzer is operating. This can damage the Analyzer software.

2.2.2 TEST Ports (Port 1 ~ Port 6)

The type-N 50Ω test port 1 to 6 are intended for DUT connection.

+25dBm 50VDC Max (50Ω Port1 ~ Port6)

CAUTION

Do not exceed the maximum allowed power of the input RF signal (or maximum DC voltage) indicated on the front panel. This may damage your Analyzer.

2.3 Rear Panel

The rear view of A334M is represented in figure 2.2. The rear panel is equipped with the following parts:

Figure 2.2 A334M Rear Panel

2.3.1 AC Socket

Provides input for the AC power source via an AC Socket
In case of emergency, to avoid danger of electric shock or the like, pull the power cable out of the power outlet or the AC power socket of the Analyzer.

- 100-120VAC / 3.0A
- 200-240VAC / 2.0A
- 50/60 Hz

### 2.3.2 Ethernet Port

Ethernet port allows the user to connect the Analyzer to a LAN (Local Area Network). This connection enables the user to control the Analyzer using an external PC. Used for upgrading the Analyzer’s firmware.

- 10BASE-T & 100BASE-TX support
- CAT5e UTP Cable uses
3 PC GUI Program Installation

A334M comes with PC based User interface program(GUI). To install the GUI, PC and A334M shall be connected by Ethernet cable. GUI enables to display VSWR measurement DATA.
Checking prompt VSWR measurement will help user to speed up factory automation process for quick measurement.

3.1 System Requirement

Before install GUI, it is recommendable to check specification of computer. Following specifications are basically recommended.

<table>
<thead>
<tr>
<th>Recommendable system specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS</strong></td>
</tr>
<tr>
<td><strong>CPU</strong></td>
</tr>
<tr>
<td><strong>Memory</strong></td>
</tr>
<tr>
<td><strong>Size of file</strong></td>
</tr>
<tr>
<td><strong>Display</strong></td>
</tr>
<tr>
<td><strong>Mandatory</strong></td>
</tr>
</tbody>
</table>

Table 3.1  System Recommendable specification
3.2 Install Process

3.2.1 Running the Installation File

Open and execute «Setup.exe» or i A334M.msi

![Figure 3.1  Installation Process 1](image)

**Execute a install File**

**NOTICE**

Both A334M.msi and Setup.exe files shall be located at same folder..
3.2.2 Proceed to install

Take following steps for installation process.

Figure 3.2 Installation Process 2

Upon execution of set up file, User account control message will be popped up. (Equal or higher version than Window Vista) Please click “Yes” button to make progress.

Figure 3.3 Installation Process 3

Above screen shot will guide you to installation. Please click «Next». 
Above screen shot shows choice of installation path. It is not recommendable to change default path. Please click «Next».

Above screen shot shows that everything is properly ready to install. Please
click «Next».

Figure 3.6  Installation Process 6

Progress

Figure 3.7  Installation Process 7
Upon successful installation, above screen shot will be displayed. Please click «Close» button to complete installation.

![Installation Process 8](image)

Once GUI is installed successful, A334M.exe icon (short cut) will be showed at Desktop.

**Side by Side Error**

**NOTICE**

Error message might be popped up during installation or execution of GUI. This kind of error is caused by lackness of Run time configuration element, which is essential to configure Microsoft Visual C++library. To clear the
error, following address will lead you to download ‘Microsoft Visual C++ 2008 SP1’

4 Operation

4.1 Preparation for use

4.1.1 IP Address Setting

A334M PC GUI is communicated with A334M by Ethernet, and every single port of A334M is set with individual IP address. Therefore, the PC IP address has to be changed for the communication between PC and A334M.

<table>
<thead>
<tr>
<th>IP address of each port</th>
<th>Port 1</th>
<th>192.168.0.81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 2</td>
<td>192.168.0.82</td>
<td></td>
</tr>
<tr>
<td>Port 3</td>
<td>192.168.0.83</td>
<td></td>
</tr>
<tr>
<td>Port 4</td>
<td>192.168.0.84</td>
<td></td>
</tr>
<tr>
<td>Port 5</td>
<td>192.168.0.85</td>
<td></td>
</tr>
<tr>
<td>Port 6</td>
<td>192.168.0.86</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1 IP address of each port

For the communication between PC and A334M, IP address of 192.168.0.xxx must be set except from 192.168.0.81 to 192.168.0.86 because the IP address of each port is from 192.168.0.81 to 192.168.0.86. The instructions for IP address setting is following.

1. As you see below, please click and enter to ‘Network and sharing center’

![Network and Sharing center icon](image)

Figure 4.1 “Network and Sharing center” icon at yellow box.

2. Please click “Network and Sharing Center’ -> “View your active networks” -> Local area connection
3. Follow the sequence as shown in the following figure, and type the IP address in the IP address input window. Revise the IP address and Default gateway.
4.1.2 Connection with Instrument

After change IP address at PC, please wire PC and A334M via Ethernet cable. After all, GUI is ready to use.

Figure 4.4 Ethernet connection between PC and A334M
4.2 Main Window

A334M GUI support 6-Port Multi View and One-Port Single View. Below screenshot display on-port single view at main window.

Figure 4.5 One port Single View at GUI
### A334M PC GUI Program Main Window Description

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1   | Top Menu Bar                  | Setting file management, Equipment update support, program information etc.  
Ref  
ferred  
as  
☞  
4.3  
Top  
Menu  
Bar       |
| 2   | Right Side Button Menu       | Actual control functions are gathered in the menu  
Referred  
as  
☞  
4.4  
Right  
Side  
Button  
Menu   |
| 3   | Trace Number/Scale Div.      | Checking number trace and division of Scale  
Referred  
☞  
4.4.3  
Amplitude    |
| 4   | Cal Status                   | Calibration Status shall be checked by On/Off  
Referred  
☞  
4.4.2  
Frequency  
/ 4.4.5  
Marker  
Measure  
/ 4.4.7  
Limit  
Measure   |
| 5   | Port No.                     | Single View provide one signal port number of measurement  
Referred  
☞  
4.4.2  
Frequency  
/ 4.4.5  
Marker  
Measure  
/ 4.4.7  
Limit  
Measure   |
| 6   | Scale                        | Current setting value of Scale.  
Referred  
☞  
4.4.3  
Amplitude    |
| 7   | Start Freq.                  | Current setting value of Start Frequency  
Referred  
☞  
4.4.2  
Frequency  
/ 4.4.5  
Marker  
Measure  
/ 4.4.7  
Limit  
Measure   |
| 8   | Trace Point                  | Current setting value of Trace Point (126 / 251 / 501 / 1001 / 2001)  
Referred  
☞  
4.4.2  
Frequency   |
| 9   | Stop Freq.                   | Current setting value of Stop Frequency  
Referred  
☞  
4.4.2  
Frequency  
/ 4.4.5  
Marker  
Measure  
/ 4.4.7  
Limit  
Measure   |

Table 4.2  A334M PC GUI Program Main Window Description
Main Window 6-Port Multi View

NOTICE

Basic display of A334M PC GUI Program is 6-Port Multi View as shown above. User may select every single screen shot to view by Single View mode.
4.3 Top Menu Bar

4.3.1 File

File menu consists of following table.

<table>
<thead>
<tr>
<th>File Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Config</strong></td>
<td>Opening previously saved Config File</td>
</tr>
<tr>
<td><strong>Open</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Config</strong></td>
<td>Current Configuration information will be save as File.</td>
</tr>
<tr>
<td><strong>Save</strong></td>
<td>Config File will save Calibration Data / Trace Point Frequency / Amplitude</td>
</tr>
<tr>
<td></td>
<td>/ Marker Measure / setting value of Limit Measure.</td>
</tr>
<tr>
<td><strong>Exit</strong></td>
<td>Close the UI program</td>
</tr>
</tbody>
</table>

Table 4.3  File Menu Description

4.3.2 Button View

Button View menu will set display of Right Side Button.

<table>
<thead>
<tr>
<th>Button View</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On / Off</strong></td>
<td></td>
</tr>
<tr>
<td><strong>On</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OFF</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4  Button View Description
4.3.3 Firmware Update

Firmware Update menu support firmware update function. Firstly, please check current version of firmware by click «Menu->Update->Firmware update». As you see below, current version of firmware will be displayed.

Figure 4.6 Firmware Update Window Loading

When you complete to open F/W Version, firmware download window will be popped up. Following tables are function of F/W update window.
Figure 4.7  Firmware Update Window Description

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Port Check Box</td>
<td>Choice of the port that user want to Update. Checking «All port» means user want to update all ports.</td>
</tr>
<tr>
<td>2</td>
<td>Update File Open</td>
<td>When update File Open is active, user shall select update file at folder name «Update». This folder is located at GUI installation path.</td>
</tr>
<tr>
<td>3</td>
<td>Update Download</td>
<td>When user open update file, download button shall be active. User may click download button to update firmware.</td>
</tr>
<tr>
<td>4</td>
<td>Progress Bar</td>
<td>Showing update progress of each Port</td>
</tr>
<tr>
<td>5</td>
<td>Progress Message</td>
<td>Before update, current firmware of the port is displayed. During Update, warning message is coming up.</td>
</tr>
<tr>
<td>6</td>
<td>Close</td>
<td>Close F/W Download window</td>
</tr>
</tbody>
</table>

Table 4.5  Firmware Update Window Features Description
Firmware Update Error

CAUTION

Please do not download any other file than Update File. Moreover, please do not either un-plug the ethernet cable or turn off the AC power. It will cause damage to equipment.

4.3.4 Help

Help window shows program version, serial number of the products, customer support and contact information.

<table>
<thead>
<tr>
<th>Help Window</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>About</strong></td>
</tr>
<tr>
<td><img src="image" alt="A334M About" /></td>
</tr>
</tbody>
</table>

Table 4.6 Help Window
### 4.4 Right Side Button Menu

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Adjust Start Frequency and stop frequency as far as 5MHz ~ 4000MHz range. Trace Point is also adjustable among 126 / 251 / 501 / 1001 / 2001</td>
</tr>
<tr>
<td>Amplitude</td>
<td>Adjust Port scale as far as 1 ~ 65. Auto scale function is available.</td>
</tr>
<tr>
<td>Calibration</td>
<td>Open, Short, Load Calibration of every single port.</td>
</tr>
<tr>
<td>Marker Measure</td>
<td>Assigning Marker maximum 8 points and measure the value at each marker point.</td>
</tr>
<tr>
<td>Limit Measure</td>
<td>Limit Measure supports maximum 10 limit line, and Max, Min, Single Pointer Mode.</td>
</tr>
<tr>
<td>Measure Off</td>
<td>Erase the Marker at Marker Measure or delete marker point or limit line at the window.</td>
</tr>
<tr>
<td>Preset</td>
<td>Reset to default setting value per each port.</td>
</tr>
</tbody>
</table>

Table 4.7 Right Side Button Menu

#### 4.4.1 Common Features

Common features are contained at Frequency / Amplitude / Marker Measure / Limit Measure. Description of the functions will be explained based on Frequency Window.
**Common Features Description**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Port Apply</td>
<td>Selecting port, which user would like to change its default setting. Once user checked box at the port, deactive setting display will be active.</td>
</tr>
<tr>
<td>2</td>
<td>Ref. Select</td>
<td>Selecting Reference Port, specified by no. 3 Ref. Port Copy function</td>
</tr>
<tr>
<td>3</td>
<td>Ref. Port Copy</td>
<td>Copy and paste Reference port setting value specified by no. 2, to the other port.</td>
</tr>
<tr>
<td>4</td>
<td>Load Current Set.</td>
<td>Return to the default setting value, which did not apply yet.</td>
</tr>
</tbody>
</table>

Table 4.8 Common Features Description

**4.4.2 Frequency**

Frequency range of the each port at A334M can be changed at Frequency Window. Start Frequency and Stop Frequency value can be changed.. Variable range is between 5MHz ~ 4000MH. Trace point is also available to select at Frequency Window. A334M supports 126 / 251 / 501 / 1001 / 2001 Trace Points and default setting value of the Tracing Point is 501 Point.
1 GENERAL OVERVIEW

3.3

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Figure 4.9  Frequency Window Description

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Port Apply</td>
<td>Refered at Common Features . (4.4.1)</td>
</tr>
<tr>
<td>2</td>
<td>Copy Ref. Port</td>
<td>Set.</td>
</tr>
<tr>
<td>3</td>
<td>Load Current Set.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Trace Point Set.</td>
<td>Trace Point is selective.. Trace Point can be individually set by each Port.</td>
</tr>
<tr>
<td>5</td>
<td>Freq. Text Window</td>
<td>Freq. Text Window is only active as limited as selected port specified by no. 1 and user shall input desirable setting value to Text Window. Once the input range is beside the point of variable range, or Start frequency is input higher than Stop frequency, waring message shall be generated as specified by No. 7.</td>
</tr>
<tr>
<td>6</td>
<td>Ref. Port Check box</td>
<td>Referred at Common Features (4.4.1)</td>
</tr>
<tr>
<td>7</td>
<td>Short Message box</td>
<td>It generates waring Message or Apply Message.</td>
</tr>
</tbody>
</table>

Table 4.9  Frequency Window Description

4.4.3 Amplitude

Scalable range of the each port shall be chagned at Amplitude Window. Scale means vertical axis of each port display. Top and bottom value of Scale shall be
applied to modify to the user setting value. Moreover, Auto Scale function, which enables to display current scale of Trace, shall be selective automatically.

Figure 4.10  Amplitude Window Description
<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Port Apply</td>
<td>Referred at Common Features (4.4.1)</td>
</tr>
<tr>
<td>2</td>
<td>Copy Ref. Port Set.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Load Current Set.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ref. Port Check box</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Short Message Box</td>
<td>It generates warning Message or Apply Message.</td>
</tr>
<tr>
<td>6</td>
<td>Amp. Text Window</td>
<td>Text Window is only active as limited as selected port specified by no. 1 and user shall input desirable setting value to Text Window. Once the input range is beside the point of variable range, or bottom scale input is higher than top, warning message shall be generated as specified by No. 5.</td>
</tr>
<tr>
<td>7</td>
<td>Auto Scale</td>
<td>Auto Scale function, which enables to display current scale of Trace shall be selective automatically.</td>
</tr>
</tbody>
</table>

Table 4.10 Amplitude Window Description
4.4.4 Calibration

O.S.L Calibration of each single port shall be performed at Calibration Window. To complete Calibration, Open -> Short -> Load calibration shall be done in properly. Unless user completed every step, Calibration will not be applied.

Figure 4.11 Calibration Window

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cal. Progress Bar</td>
<td>It shows progress of current Calibration process.</td>
</tr>
<tr>
<td>2</td>
<td>Cal. Start Button</td>
<td>It starts Calibration process.</td>
</tr>
<tr>
<td>3</td>
<td>Short Message Box</td>
<td>It generates applicable message of completion or cancel of each calibration process.</td>
</tr>
</tbody>
</table>

Table 4.11 Calibration Window Description
4.4.5 Marker Measure

Marker Measure Window enables to measure amplitude of Trace at desirable frequency by usage of maximum 8 markers per individual port. Upon user setting value of Low, High Limit, measured value would make user check pass or failure immediately. Such a measured value can be imported to Microsoft Excel File.

Figure 4.12 Marker Measure Window

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Common Features</td>
<td>Referred at Common Features (4.4.1)</td>
</tr>
<tr>
<td>2</td>
<td>User Info. For Excel</td>
<td>List of basic information, which can be imported to Excel File.</td>
</tr>
<tr>
<td>3</td>
<td>Configuration File</td>
<td>Management of default setting value, such as Calibration data, Marker List, etc.</td>
</tr>
<tr>
<td>4</td>
<td>Marker List</td>
<td>Upon setting frequency range per each port, maximum 8 additional marker points can be added. Marker numbers, Marker frequency, Low / High limit value can be set in Marker List. Add / Delete / Delete All button enables Markers to</td>
</tr>
<tr>
<td>5</td>
<td>Short Message Box</td>
<td>Error message to be popped up in case of wrong Marker information input such as out of range input value.</td>
</tr>
<tr>
<td>---</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 6 | Button List       | ✓ **Apply**  
It applies marker in accordance with setting value to Marker List.  
✓ **Excel Setup**  
Excel file set up based on setting value to Marker List.  
Once Excel file is open, Measurement button will become active, but Marker Measure Window including Marker List will be deactivated to prevent from any further change of setting value.  
✓ **Measurement**  
User would save result of checking Pass or Failure status by click Measurement button.  
✓ **Reset**  
Reset button enables to save Excel File and makes Marker Measure Window back to active. |

Table 4.12 Marker Measure Window Description
Instruction to display Marker at Trace Window.

➔ Input appropriate Marker List value at Marker Measure Window

➔ Click Apply button
Figure 4.14  Excel Setup

Figure 4.15  Marker Measure Data in Excel File
Instruction to import Excel file

- Setting appropriate Marker list value at Marker Measure Window
- Input Model name and tester at Setup frame.
- Click Excel Setup button to input DATA at Excel File.
- Click Measurement button (It will be active upon Excel set up.)
- Measure performance. Result of pass / failure will be immediately showed and would be saved as well as Excel file.

4.4.6 Limit Measure

Limit Measure Window provides maximum 10 Limit Line per each port. There are three types of Limit Line; Max.; Min.; Single. It displays user desirable frequency and Limit Line at Trace Window. Moreover, Each type of the Limit Line shall measure pass or failure by its own method of each different Max.; Min; Single Point. Result of measurement can be saves as Microsoft Excel File as same as Marker Measure.
### Limit Measure Window Description

<table>
<thead>
<tr>
<th>NO.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Common Features</td>
<td>Referred at Common Features. (4.4.1)</td>
</tr>
<tr>
<td>2</td>
<td>User Info. For Excel</td>
<td>Basic information to be saved as Excel File.</td>
</tr>
<tr>
<td>3</td>
<td>Configuration File</td>
<td>Management of default setting value, such as Calibration data, Limit List, etc.</td>
</tr>
<tr>
<td>4</td>
<td>Limit List</td>
<td>Upon frequency setting, maximum 10 Limit Lines are available to set per each port. Limit Line number, type of Limit Line, start frequency, end frequency, Limit value are available to set. Once user clicked raw of «Type» at Limit List, type of limit line can be selective through Combo Box List.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Add / Delete / Delete All button enables Limit Line to be added or deleted.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>Short Message Box</td>
<td>Error message to be popped up in case of wrong Limit Line information input such as out of range input value.</td>
</tr>
</tbody>
</table>
| 6 | Button List | **6-1 Apply**  
It applies marker in accordance with setting value to Marker List.  
**6-2 Excel Setup**  
Excel file set up based on setting value to Limit List. Once Excel file is open, Measurement button will become active, but Limit Measure Window including Marker List will be deactivated to prevent from any further change of setting value.  
**6-3 Measurement**  
User would save result of checking Pass or Failure status by click Measurement button. The result can be classified by three types of Limit Line.  
**6-4 Reset**  
Reset button enables to save Excel File and makes Limit Measure Window back to active. |

Table 4.13 Limit Measure Window Description
Instruction to display Limit Line at Limit Measure Window.

- Input appropriate Marker List value at Limit Measure Window
- Click Apply button
- Result of pass or failure will be displayed over Trace window.

Note) Unless setting condition is different from the types of Limit Line, Failure message will be popped up and red marker point will be displayed over trace of relevant frequency range. Please refer to the below table with regard to types of Limit line.
## Table 4.14  Limit Type Description

<table>
<thead>
<tr>
<th>Figure</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAX</td>
<td>Based on Limit Line, lower part is regarded as pass and upper part is regarded as failure.</td>
</tr>
<tr>
<td></td>
<td>MIN</td>
<td>Based on Limit Line, upper part is regarded as pass and lower part is regarded as failure.</td>
</tr>
<tr>
<td></td>
<td>Single Point</td>
<td>Single frequency input is requested without any start frequency or end frequency. Based on the input frequency, Pass or failure shall be justified by the range of Low, High, Limit value.</td>
</tr>
</tbody>
</table>

Figure 4.18  Limit Measure Data in Excel File

Instruction to import Excel file

- Setting appropriate Limit list value at Limit Measure Window
- Input Model name and tester at Setup frame.
- Click Excel Setup button to input DATA at Excel File.
- Click Measurement button (It will be active upon Excel set up.)
- Measure performance. Result of pass / failure will be immediately showed and would be saved as well as Excel file.
In case that user would like to apply Marker in a status that Limit Line has been applied, or user would like to apply Limit Line in a status that Marker has been applied, above screenshot would popped up. Above screenshot means that user shall make its choice of display either Marker or Limit Line.
4.4.7 Measure off

Measure Off has clearing function, which makes Marker or Limit Line clear at the Trace Window.

![Figure 4.19 Measure Off](image)

4.4.8 Preset

Preset initializes all the setting value back to factory default setting value including Calibration DATA, Trace Point, Frequency Span, Scale, Marker and Limit Measure. (both of A334M and User Interface program). Duly recommendable to save all the configuration before apply Preset.
Figure 4.20 Preset Window

<table>
<thead>
<tr>
<th>Preset Window Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NO.</strong></td>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>1</td>
<td>Port Select Check Box</td>
</tr>
<tr>
<td>2</td>
<td>Apply Button</td>
</tr>
</tbody>
</table>

Table 4.15 Preset Window Descriptions

**NOTICE**

The selected port is initialized while Marker or Limit Line is applied, and Marker and Limit Line of every port on the Trace Window is cleared. But, set values of the port which has not been preset are kept as they were rmeoon Marker Measure, Limit Measure Window.
5  WARRANTY INFORMATION

1. The manufacturer warrants the Network Analyzer to conform to the specifications of this Manual when used in accordance with the regulations of operation detailed in this Manual.

2. The manufacturer will repair or replace without charge, at its option, any Analyzer found defective in manufacture within the warranty period, which is two (2) years from the date of purchase. Should the user fail to submit the warranty card appropriately certified by the seller with its stamp and date of purchase the warranty period will be determined by the date of manufacture.

3. The warranty is considered void if:

   a) The defect or damage is caused by improper storage, misuse, neglect, inadequate maintenance, or accident;

   b) The product is tampered with, modified or repaired by an unauthorized party;

   c) The product's seals are tampered with;

   d) The product has mechanical damage.

4. The batteries are not included or covered by this warranty.

5. Transport risks and costs to and from the manufacturer or the authorized service centers are sustained by the buyer.

6. The manufacturer is not liable for direct or indirect damage of any kind to people or goods caused by the use of the product and/or suspension of use due to eventual repairs.
7. When returning the faulty product please include the accurate details of this product and clear description of the fault. The manufacturer reserves the right to check the product in its laboratories to verify the foundation of the claim.

**Technical Support**

Write:
GS Instruments, Co., Ltd.
70, Gilpa-ro 71beon-gil, Nam-gu, Incheon, Korea
402-854

Product Information and Technical Assistance:
www.gsi-protek.com
isale@gsinstrument.com

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