



Cable loss/VSWR
Measurement Software
Rev. A00

Rev. 0, Jan 2006

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1 Operating environment

System requirements

OS:	Microsoft Windows 98, 2000, XP
PC:	DOS/V recommend Pentium 400MHz or faster
Main Memory:	recommend 64MB or more
Display:	Super VGA (800 × 600) or higher-resolution monitor with 256 colors
Interface:	National Instruments Ltd. GPIB I/F Card
HDD	Free capacity of 700 k Bytes

The Software will not operate without installing the English version of LabVIEW runtime engine 6.1. Installation is as follows

- (1) FTP site of National Instruments Ltd.
<ftp://ftp.ni.com/support/labview/runtime/windows/6.1/>
- (2) Download LVRunTimeEng.exe
LVRunTimeEng.exe is 14.5MByte.

Run LVRunTimeEng.exe to install the English version of LabVIEW runtime engine 6.1. The LabVIEW runtime engine requires 8Mbyte.

Measurement equipment requirements

U3751/71/72: Software revision B00 or later
TG option (OPT74)

Distribution form

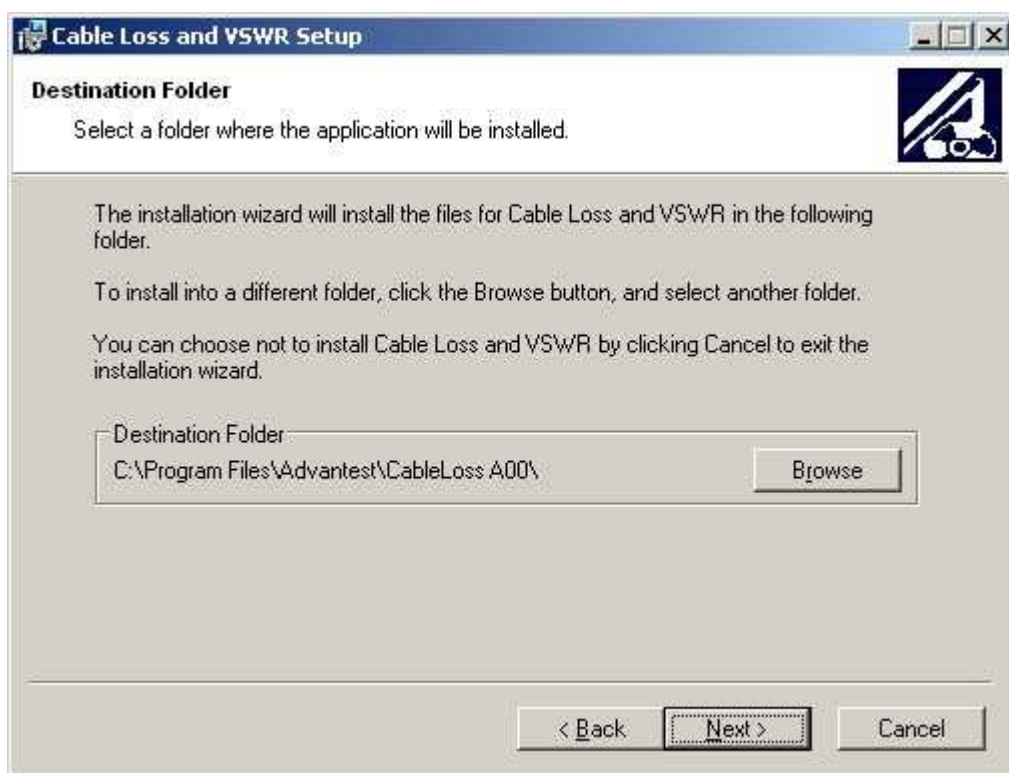
CD-Rom, USB memory (or download)

How to Install

- (1) Copy all of the files for installation to a directory on PC
- (2) Run setup.exe in a directory to start installation.



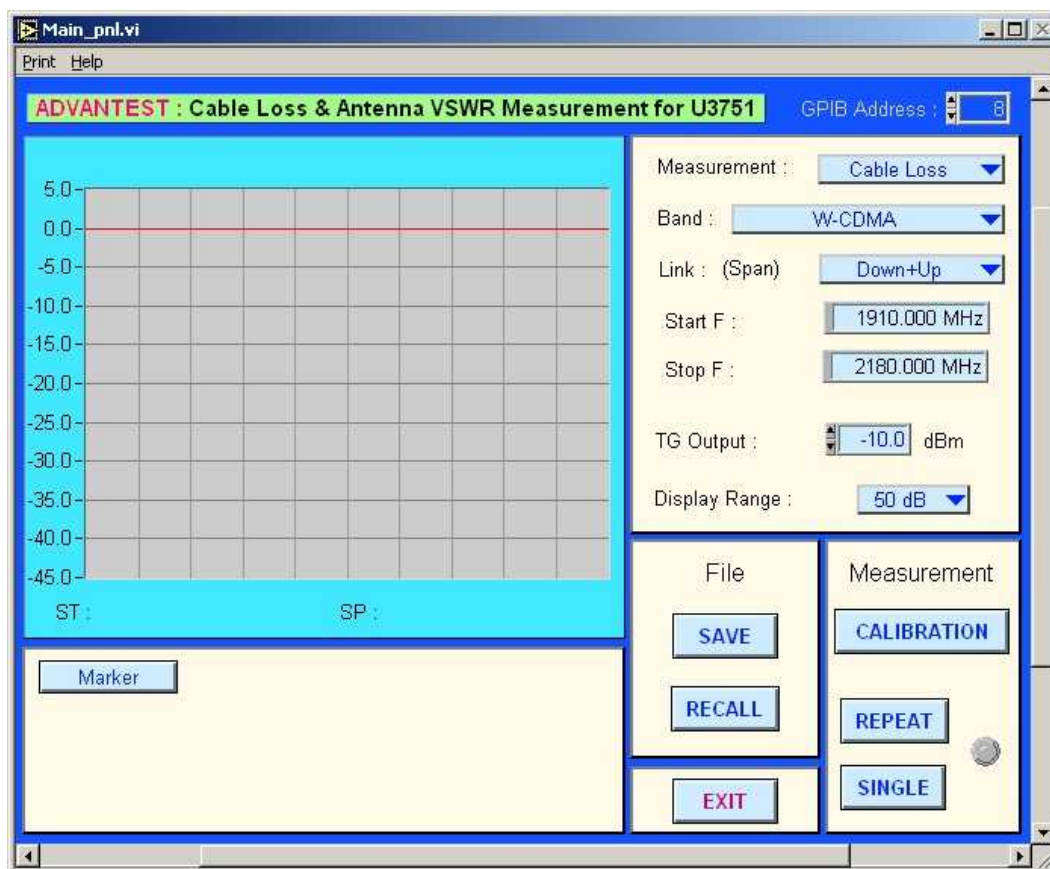
Choose next.



Determine the installation folder. The default will use or create the Advantest folder.



After the installation, the temporary files used for installation may be removed.
Select Programs->ADVANTEST->Cable loss A00 from Start Menu



2 Overview

The software measures cable loss and VSWR of an antenna in selected frequency range over the GPIB interface, controlling TG of U3751/71/72 and normalize function.

2 Operation panel

2-1 Overview of application panel

When the application is running, the panel in fig. 3 is displayed. The content is shown in fig.1

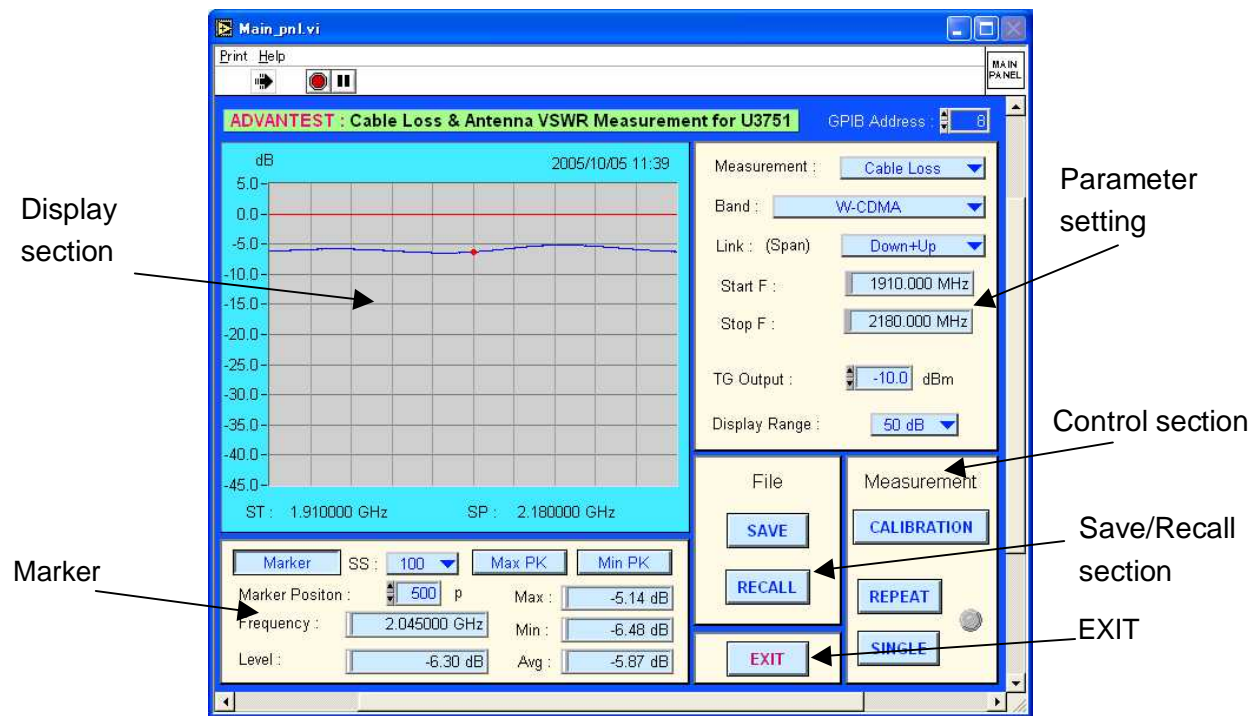


Figure 3. Application panel

Item		Contents
Display section		Cable loss or antenna SWR in selected frequency range is displayed
Control section	Parameter settings	Set signal band (or frequency range) of device under test, output level of TG and display range of level
	Measurement control section	Controls execution of normalization and measurement type: repeat/single
	Save/Recall section	Save and recall contents of parameter setting and measured data.
	EXIT	Close application
Marker display		Controls marker display. The marker displays the level in operational frequency, VSWR value, A continuous search of largest and smallest values.

Table 1 Contents main panel

2-2 Control

Control is showed in fig. 4, the context in table 2

Measurement : Cable Loss ; Cable Loss or Antenna VSWR Selection

Band : W-CDMA ; Measurement band

Link : (Span) Down+Up ; When USER Band is not selected, specifies Span according to band and Link..

Start F : 1910.000 MHz

Stop F : 2180.000 MHz

TG Output : -10.0 dBm ; Output level of TG: 0.0 to -30.0dBm (resolution 0.1dBm)

Display Range : 50 dB ; Select display range from 10, 20, 50, 100 dB

File

SAVE

RECALL

EXIT

Measurement

CALIBRATION ; Execute normalization required for measurement.

REPEAT

SINGLE

Execute repeated or single sweep measurement. If calibration has not been performed or parameters are changed, the application will require the calibration be performed before any measurements can be made.

Figure 4. Control

Item	Function
CALIBRATION	When this key is pressed, the application will lead the user through the calibration procedure for the measurement chosen. If at any point in the calibration the cancel key is pressed, the calibration will be aborted and the user returned to the application panel. No calibration will be performed and measurements will not be possible.
REPEAT	Run selected measurement in menu <Measurement> repeatedly.
SINGLE	Run selected measurement in menu <Measurement> once.
SAVE	Record setting parameter and trace data to text file in CSV format
RECALL	Display panel for selected file using stored setting parameters and trace data
EXIT	Close application

Table 2 context of control

Frequency range under test is set by Band and Link direction (If the Band is set in USER, it is set by Start Frequency, Stop Frequency). When Band is not USER, Start and Stop F are set approx. 10% wider than the frequency range as specified in the standard. Frequency Band specified by the standard of each and the range of the software are as follows:

Band	Standard F (MHz)		Setting F (MHz)		Span
	Start	Stop	Start	Stop	
GSM 450	450.40	467.60	449.00	469.00	20.00
GSM 480	478.80	496.00	477.00	497.00	20.00
GSM 850	824.00	894.00	820.00	898.00	78.00
GSM 900	876.00	960.00	871.00	965.00	94.00
DCS 1800	1710.00	1880.00	1700.00	1890.00	190.00
DCS 1900	1850.00	1990.00	1840.00	2000.00	160.00
IS-136 800	824.00	894.00	820.00	898.00	78.00
IS-136 1900	1850.00	1990.00	1840.00	2000.00	160.00
W-CDMA	1920.00	2170.00	1910.00	2180.00	270.00
cdma2000 BC-0	824.04	893.97	820.00	898.00	78.00
cdma2000 BC-1	1850.00	1989.95	1840.00	2000.00	160.00

(* Uplink + Downlink)

Frequency range defined in standard and measurement range of the software

2-3 Save/Recall

Save and recall the following contents in text file in CSV format

- (1) The title of the software: Cable Loss and Antenna VSWR for U3751/71/72
- (2) Software revision: A00
- (3) Measurement: Cable Loss/Antenna VSWR
- (4) Setting for the measurement
 - (4-1) Band: GSM 450,USER etc
 - (4-2) Link: Down +Up, Wide Span
 - (4-3) Start frequency
 - (4-4) Stop frequency
 - (4-5) TG output level
 - (4-6) Display range
- (5) Recorded data for each measurement items
 - (5-1) Time required in obtaining data
 - (5-2) Trace data

An example of saved file is shown in fig. 5

	A	B	C	D	E
1	Cable Loss and Antenna VSWR for U3751/71/72				
2					
3	Application Version A00			User's Comment	This is Test.
4					
5	Measurement	Antenna VSWR			
6					
7					
8	Cable Loss			Antenna VSWR	
9					
10	Band	W-CDMA		Band	W-CDMA
11	Link	Down + Up		Link	Down +Up
12	Start F	1910.000 MHz		Start F	1910.000 MHz
13	Stop F	2180.000 MHz		Stop F	2180.000 MHz
14	RF Output	-10.0 dBm		RF Output	-10.0 dBm
15	Display Range	50 dB		Display Range	50 dB
16					
17	Date and Time	2005/10/5 13:29		Date and Time	2005/10/5 13:30
17	Graph Data	-4.953125		Graph Data	-20.75
19		-4.945312			-20.699219
20		-4.9375			-20.746094
21		-4.925781			-20.78125
22		-4.925781			-20.726562
23		-4.921875			-20.777344

Figure 5. A saved file example

2-4 Marker display

Marker display in fig 6 is shown after acquisition of measurement data and selection of marker.

In addition to the information (frequency, level and VSWR) of marker location, the Max, Min and Average is displayed

The Max Pk and Min PK buttons are switches that when they are depressed continuously search for largest or smallest value. Only one can be active. When neither is active the marker data is displayed.

SS (Step Size) determines the amount of marker movement of marker movement and can be selected to 1,10,100 points. This is used move Marker Position using the up and down keys.

Figure 6. Marker display

Item	Function
Marker ON / Marker OFF	Control display of marker on graph
Max PK	Search continuously for the largest value among those displayed When Max PK is ON, Min PK is OFF
Min PK	Search continuously for the smallest value among those displayed When Min PK is ON, Max PK is OFF
Marker Position	Set the position of marker. Setting range is from 0 to 1000. Max PK and Min PK must be OFF in order to change the marker position.
SS	Select size for changing Marker Position with up down key. It can be selected from 1, 10 and 100
Frequency	Frequency value of marker is displayed
Level	Level value of marker is displayed
Max	Largest value in waveform of the 1001 points displayed
Min	Smallest value in waveform of the 1001 points displayed
Avg	Average value of the 1001 points displayed

Table 4 context of maker display

3. Cable loss measurement

Connect the GPIB cable between the PC and the spectrum analyzer. Run the cable loss application and set the GPIB address.

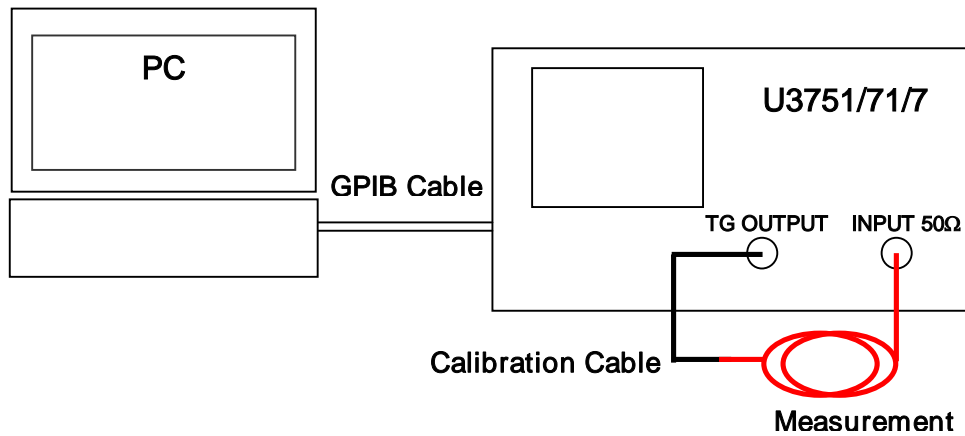
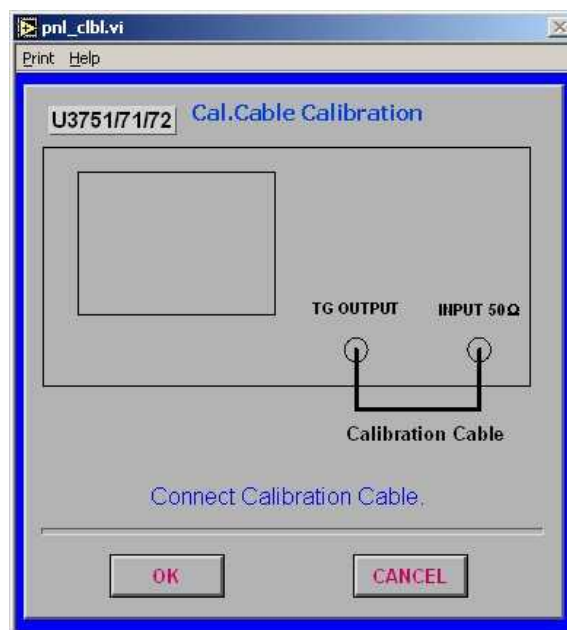


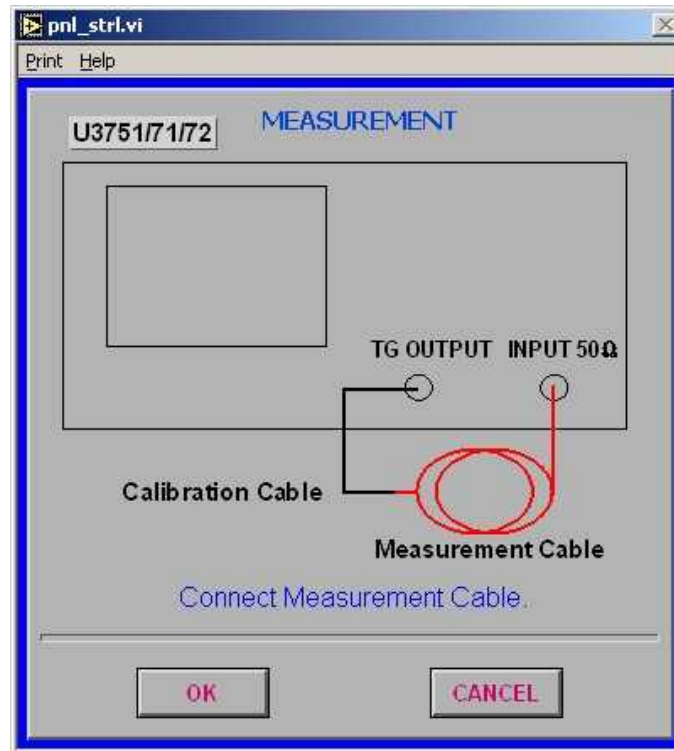
Diagram of cable loss measurement setup

Cable loss is measured as follows

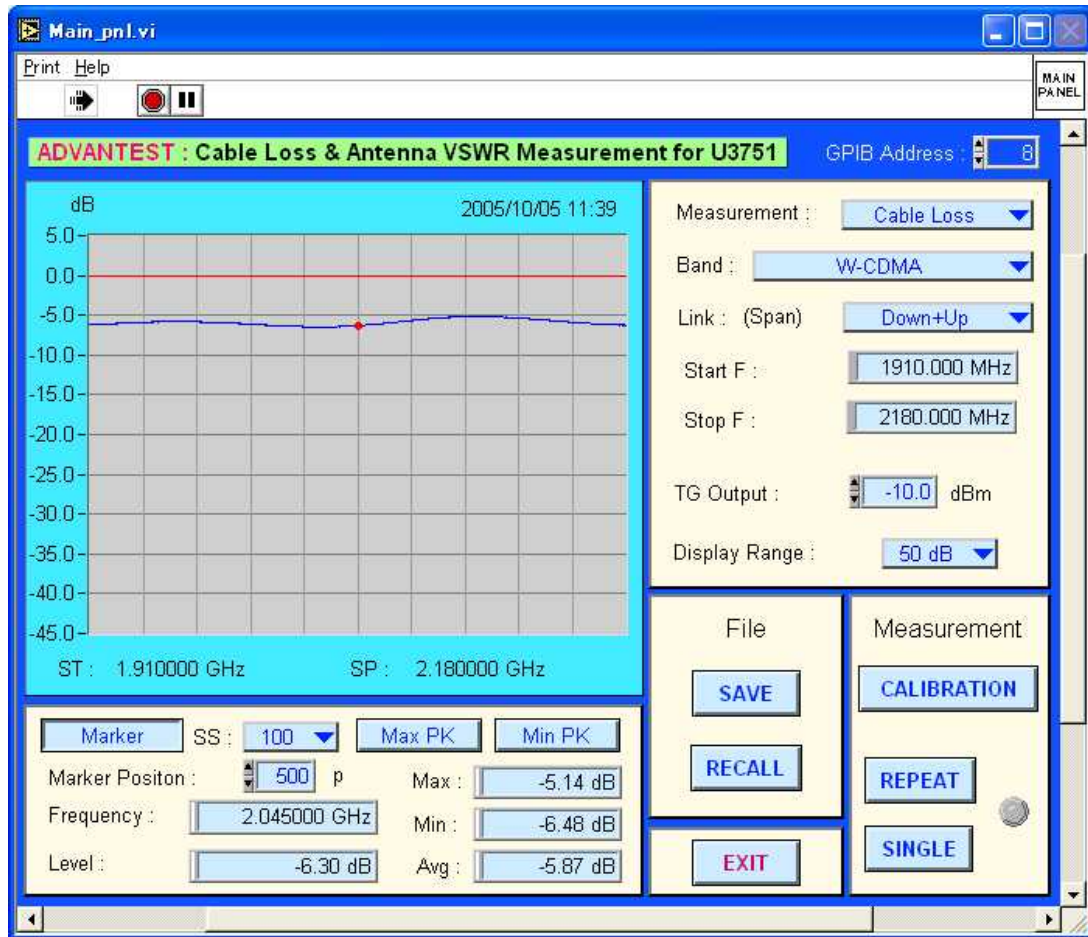
- (1) In the application set frequency range of U3751/71/72
- (2) Connect calibration cable between Input connector of U3751/71/72 and output connector of the TG.
- (3) Before pressing the CALIBRATION key, it is necessary to configure U3751/71/72 and to start from a know state of the spectrum analyzer.
 - Preset the U3751/71/72
 - Select start and stop frequency by either choosing the predefined Band and Link, or by choosing USER and entering the start and stop frequencies.
 - Set the display range
 - Set the tracking generator output.
- (4) Run Calibration from the application and follow the instructions as they appear on the screen.



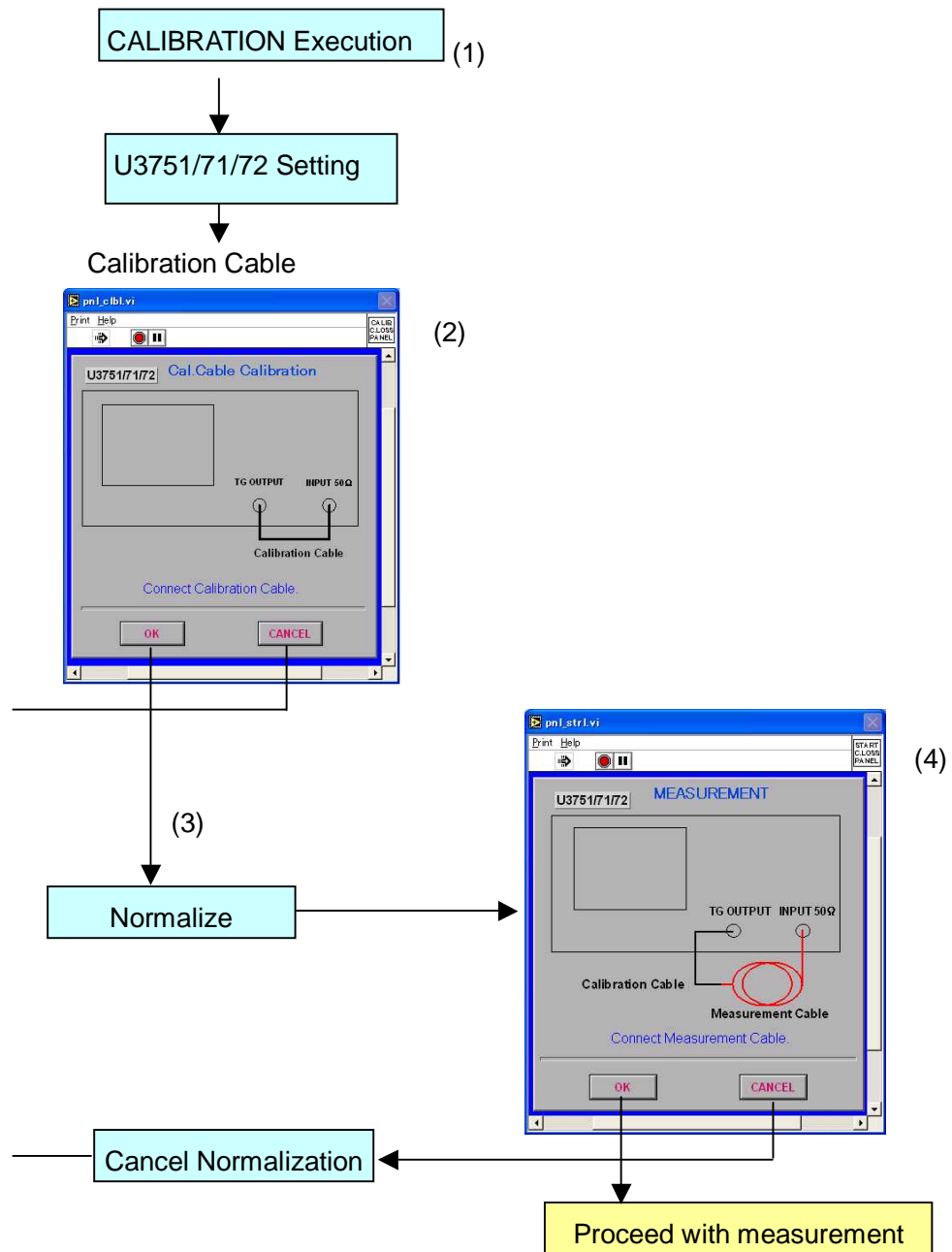
Choose "ok". The software will normalize the display data.



(3) Connect in series, the calibration cable and cable under test to the position between Input terminal of U3751/71/72 and output terminal of the TG. Choose "ok". The dialog box will close and return to the application.



To measure the cable loss property of cable under test, choose “single” or “repeat”.



Flow chart Cable loss CALIBRATION

4 VSWR measurement

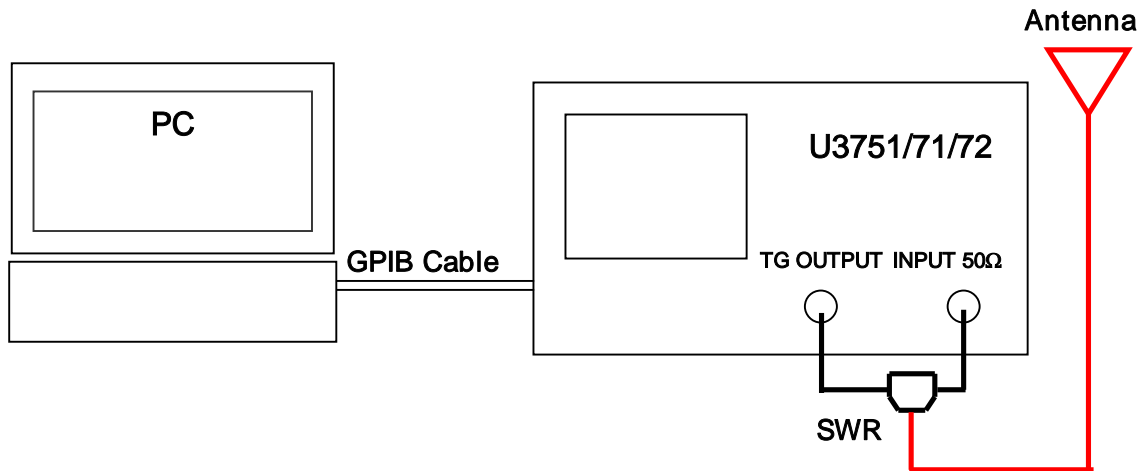
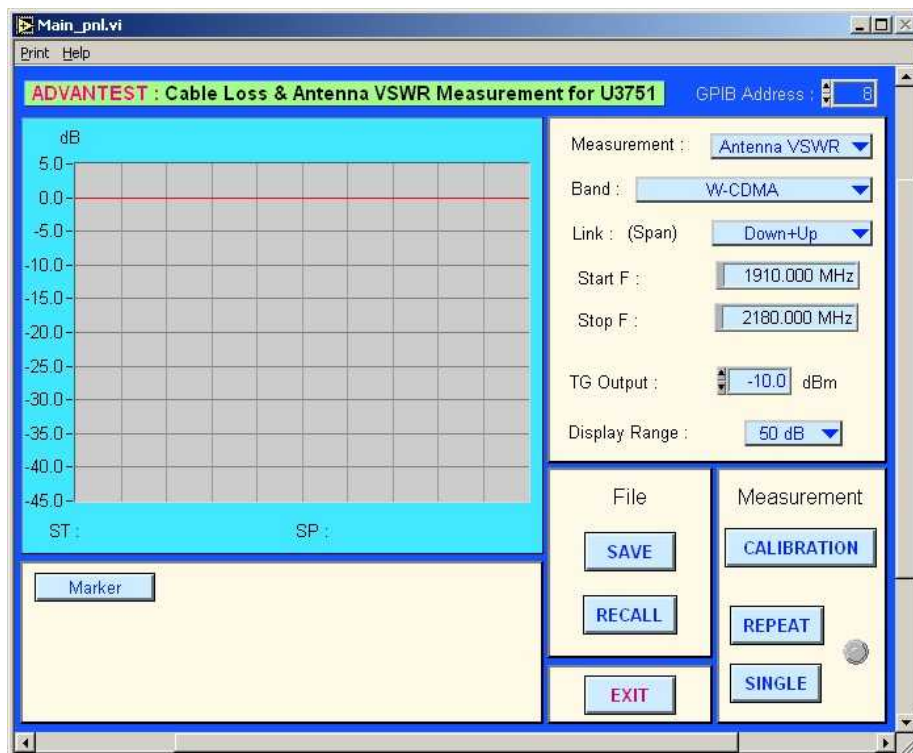
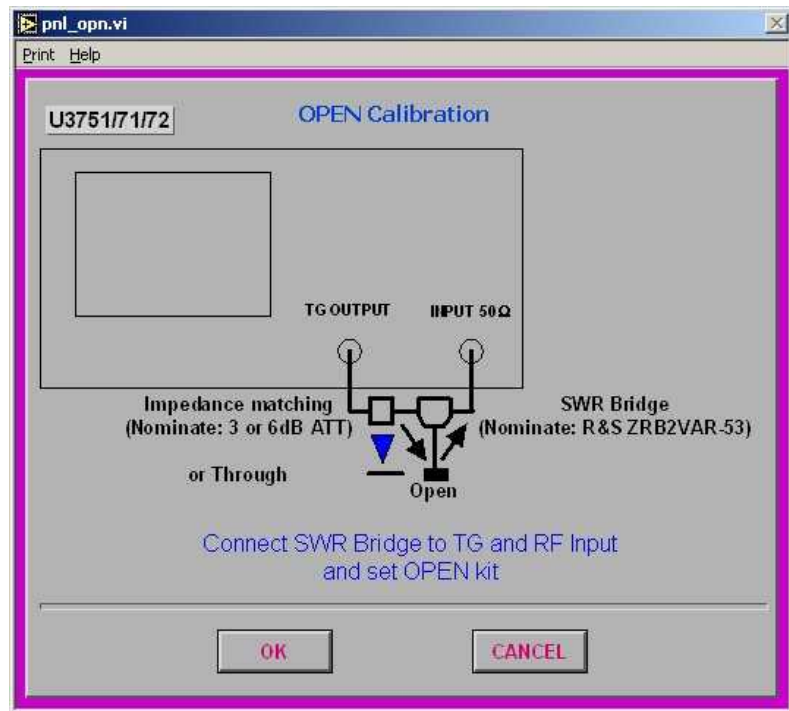


Figure 2. Diagram of antenna VSWR measurement setup

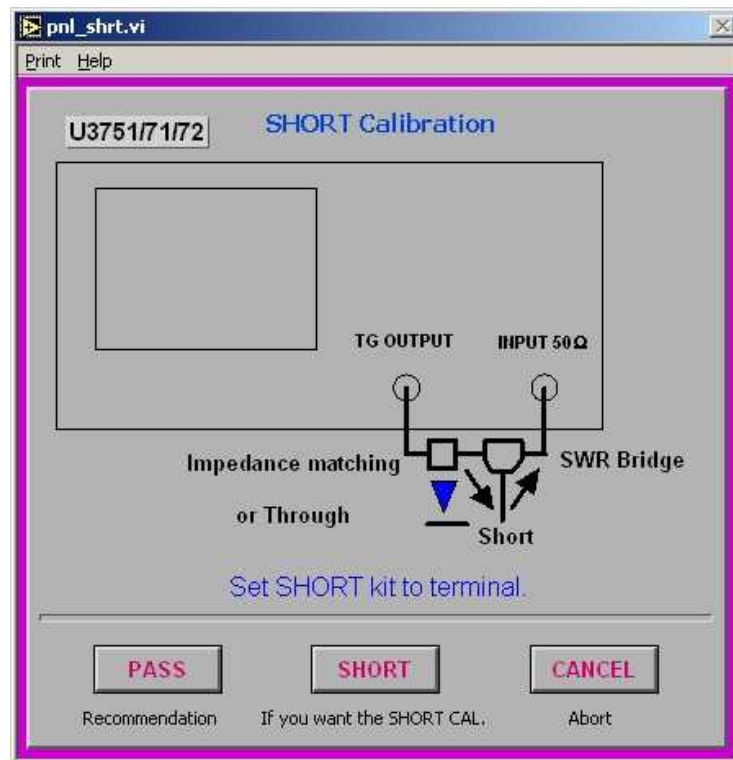
Measuring the SWR of an antenna, making use of a SWR bridge and the tracking generator.



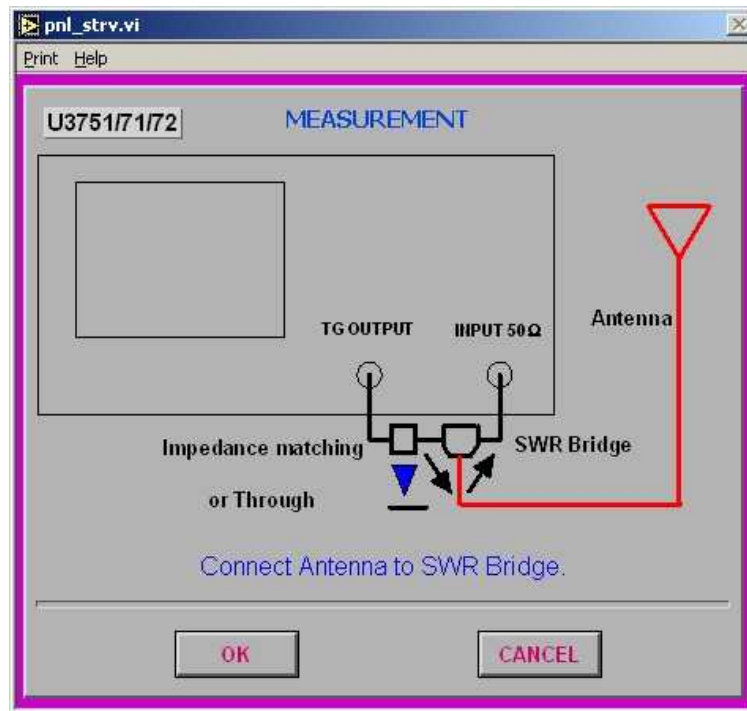
- (1) Select "Antenna VSWR"
- (2) Set frequency range of U3751/71/72
- (3) Connect SWR bridge to the position between Input terminal of U3751/71/72 and output terminal of TG
- (4) Run Calibration from the application and follow the instructions as they appear on the screen.



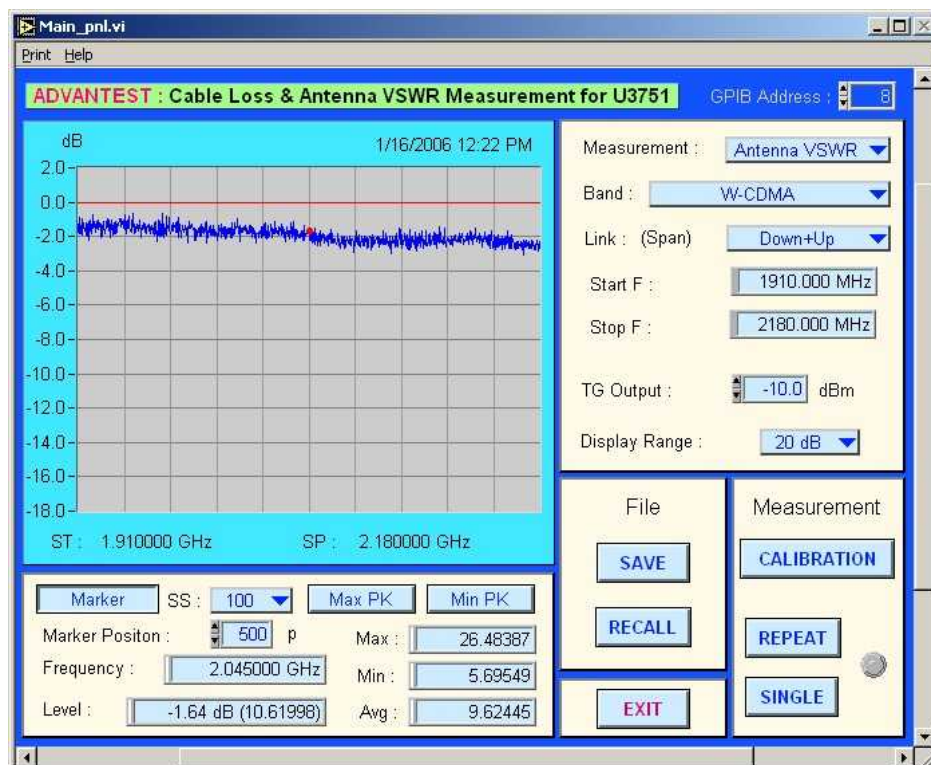
- (5) Connect a open to the test port of the SWR bridge and choose “ok”



- (6) To use the open and short correction data for normalization, connect a short to the test port of the SWR Bridge and choose “short”. To perform testing with only the open calibration choose “pass”. To perform the SHORT calibration attach a short and press short.

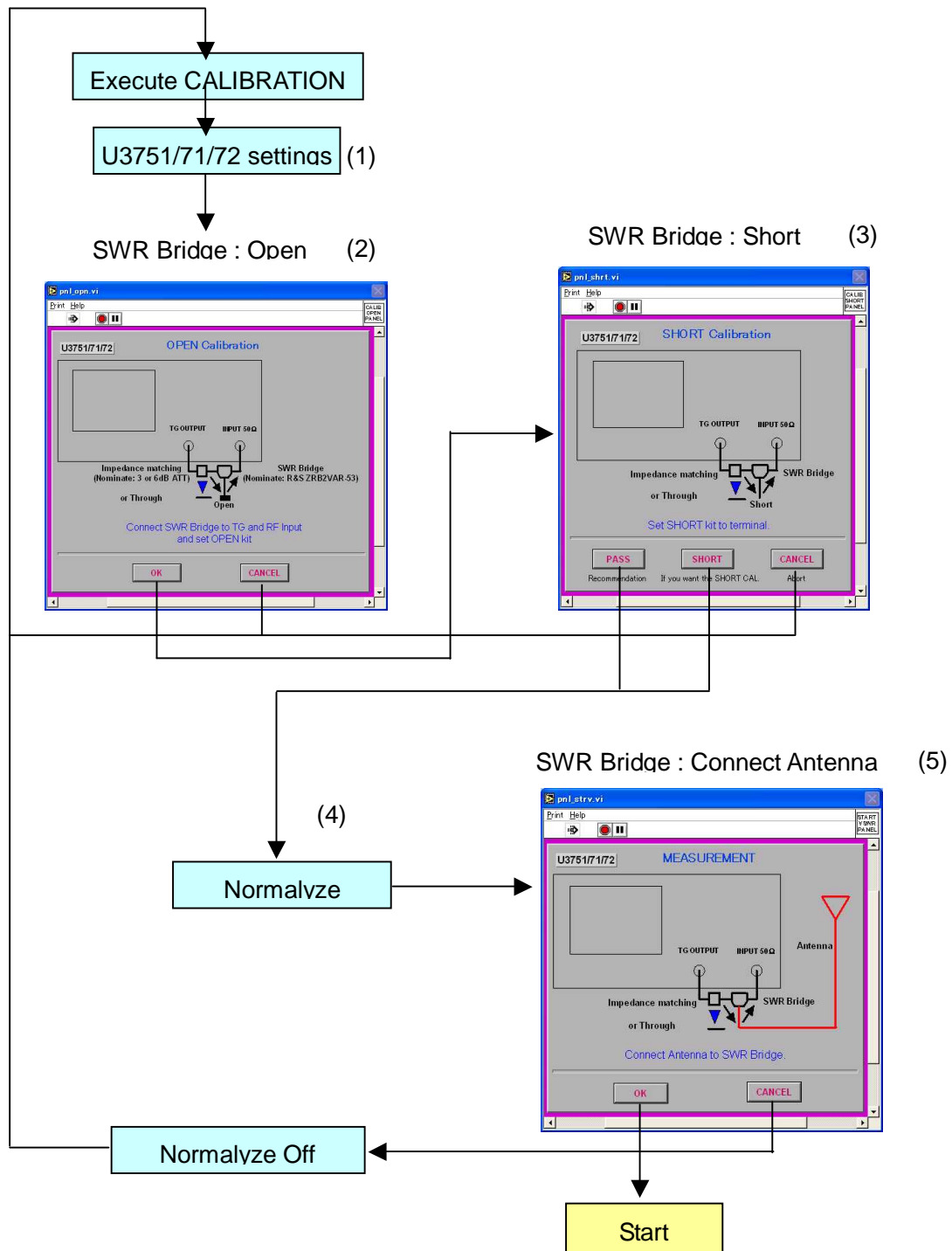


- (7) Connect the antenna to the test port of the SWR Bridge and choose “ok”. This will return you to the application.



Measurement result.

- (8) Choose “sing” or “repeat” to make the measurement.



Flow chart of execution CALIBRATION in antenna VSWR measurement

Notes: The relation between Loss(dB) and VSWR value read from U3751/71/72 is as follows. r is value converted dB to voltage ratio against correction data for normalization

$$\text{Loss} = 20.0 \times \log r$$

$$\text{VSWR} = (1+r) / (1-r)$$



Your Local Representative

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