

Resonance Frequency Tester T8200PRO-G

Operation Manual

Testram Co., Ltd.

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1. Precautions

Make sure to read the following precautions carefully before using this product.

- This product generates electronic signals in the frequency range of LF to HF band to perform measurements. When using this product, do not use equipment that generates electromagnetic waves, such as transceivers, mobile phones, smartphones, microwaves, signal generators, etc. We do not guarantee the measurement results obtained with such conditions.
- Do not disassemble, modify, or open the product. It may cause equipment failures.
- Do not subject this product to excessive shock or vibration, such as hitting an object or dropping it. It may cause equipment failures.
- This product is not waterproof. Be careful not to expose it to water or moisture. Failure to do so may cause excessive heat, ignition, or fire.
- Do not plug or unplug each of the cables, such as USB, during operation. It may cause failures or malfunctions.
- This product is not dust-proof. Use the product indoors.
- Do not store the product in high humidity or direct sunlight.
- Do not store the product in high-temperature areas such as in the car.
- Do not use the product near any fire, heat or other sources of combustion.
- If you experience any abnormality, such as abnormal sounds, heat, smoke, etc., turn off the power immediately and stop using the product.

European Union Directives

This equipment complies with the relevant provisions of the Electromagnetic Compatibility Directive (2014/30/EU) and the RoHS Directive (2011/65/EU).

Federal Communications Commission (FCC) Emissions Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna. — Increase the separation between the equipment and receiver. — Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. — Consult the dealer or an experienced radio/TV technician for help.

2. Product Overview

This manual describes how to use the supplied software to operate **T8200PRO-G**.

Table 1 Software Specification

Item	Description
Functions	Set test items, PASS/FAIL limits Perform tests and save in log files Perform resonance test Perform communication (ID reading) test
Operation Modes	Manual operation Digital I/O (DIO) operation (Option: DIO) External software control (Option: Control by External Software)
Output Files	Log file (measured values, PASS/FAIL results): txt Waveform images: jpeg Waveform data: csv
System Requirements	Windows7, Windows8.1, Windows10 (Microsoft .NET Framework 4.0 or higher) USB2.0 or higher

Specifications and screenshots are subject to change without notice.

The product options are shown in Table 2. In this document, the annotations shown in Table 2 are attached to describe the optional functions.

Table 2 Product Options

Annotation	Description
(Option: DIO)	Function to control T8200PRO-G from user's PLC using the isolated I/O interface
(Option: Control by External Software)	Function to control T8200PRO-G from user's application software via the Windows registry

3. Installing the Software and USB Driver

Before operating **T8200PRO-G**, please install the supplied software and the USB driver.

Installation Procedure

If an older version has already been installed, uninstall it, then install the latest version.

Insert the supplied CD-ROM into the drive and follow the procedure below:

- (1) Double-click "SEUTP.EXE" on the CD-ROM. Installation will start.
- (2) During the installation, the **Import Files** dialog (Figure 1) will appear. Press the **Import** button. Settings files will be copied.
- (3) When it is complete, press **Next** to close the dialog.

After installation, a folder as shown in Figure 2 will be created.

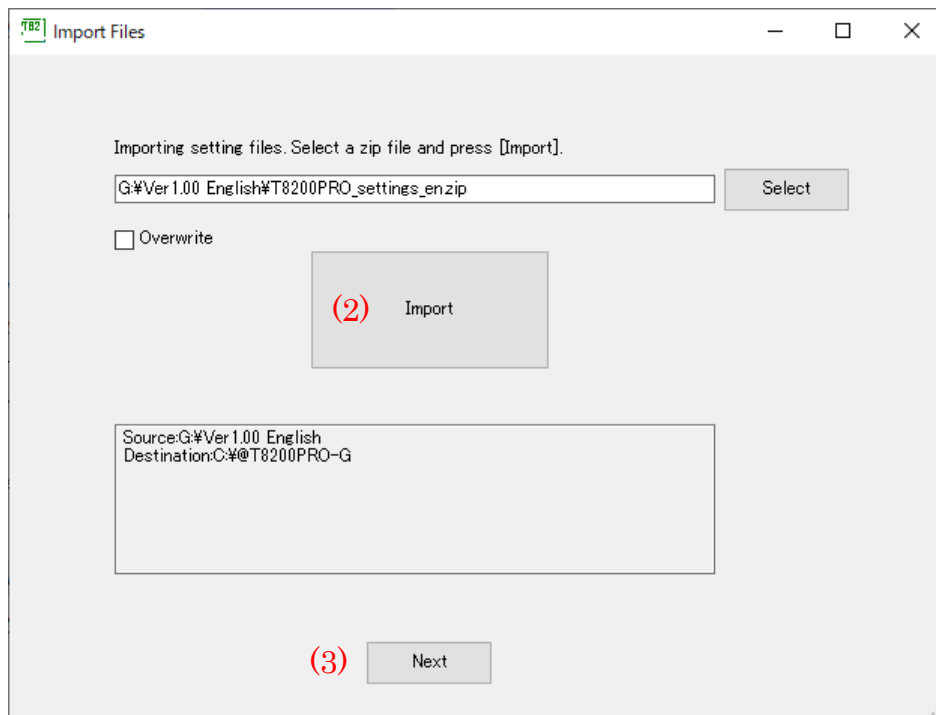


Figure 3 Import Files

USB Driver Installation

Double-click **lpc_driver_setup.exe** in the supplied CD-ROM. The installation will begin.

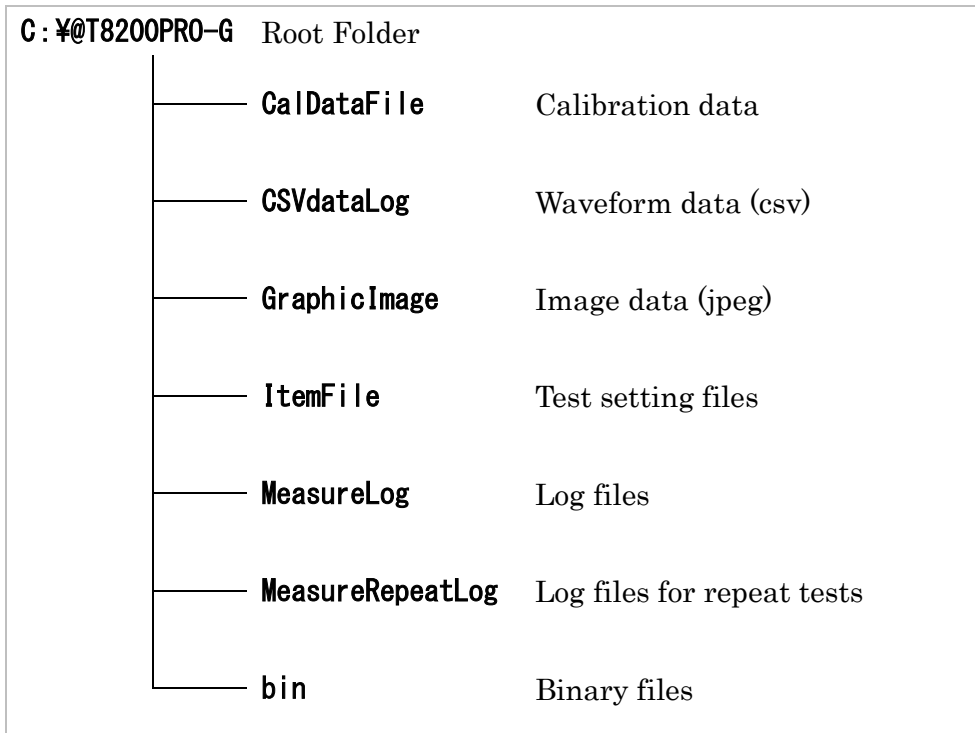


Figure 4 Folder Structure of the Supplied Software

4. Test Setup

After installing the software, connect the **T8200PRO-G** main unit to your computer with the supplied USB cable. For details, refer to the **Test Setup** section in the **T8200-G Product Specification**.

5. Setting Test Items after Installation

After installation, default test settings are loaded when you start the software for the first time. You need to set or confirm each item of Table 3 before performing tests. Once you set your test settings, the most recent settings will automatically be loaded for the second time start-up.

Table 3 Mandatory Settings

Setting Item	Page	Figure	Description
USB setting	p.7	Figure 5	Confirm that T8200PRO-G and this software are connected.
Test Settings Window	p.13, p.13	Figure 8, Figure 9	Set the test setting file(test conditions, test items, PASS/FAIL limits).
Calibration(Normalize)	p.13	Figure 8	Perform calibration (normalize) to set the reference level of the received signal. To check if the system is calibrated correctly, perform a trial test with no test target on the probe (see Checking if the system is calibrated correctly on p.22).

6. Top Menu Window

Start the **T8200PRO-G** software by double-clicking the desktop icon. The **Top Menu** (Figure 5) appears. Various windows are invoked from this menu.

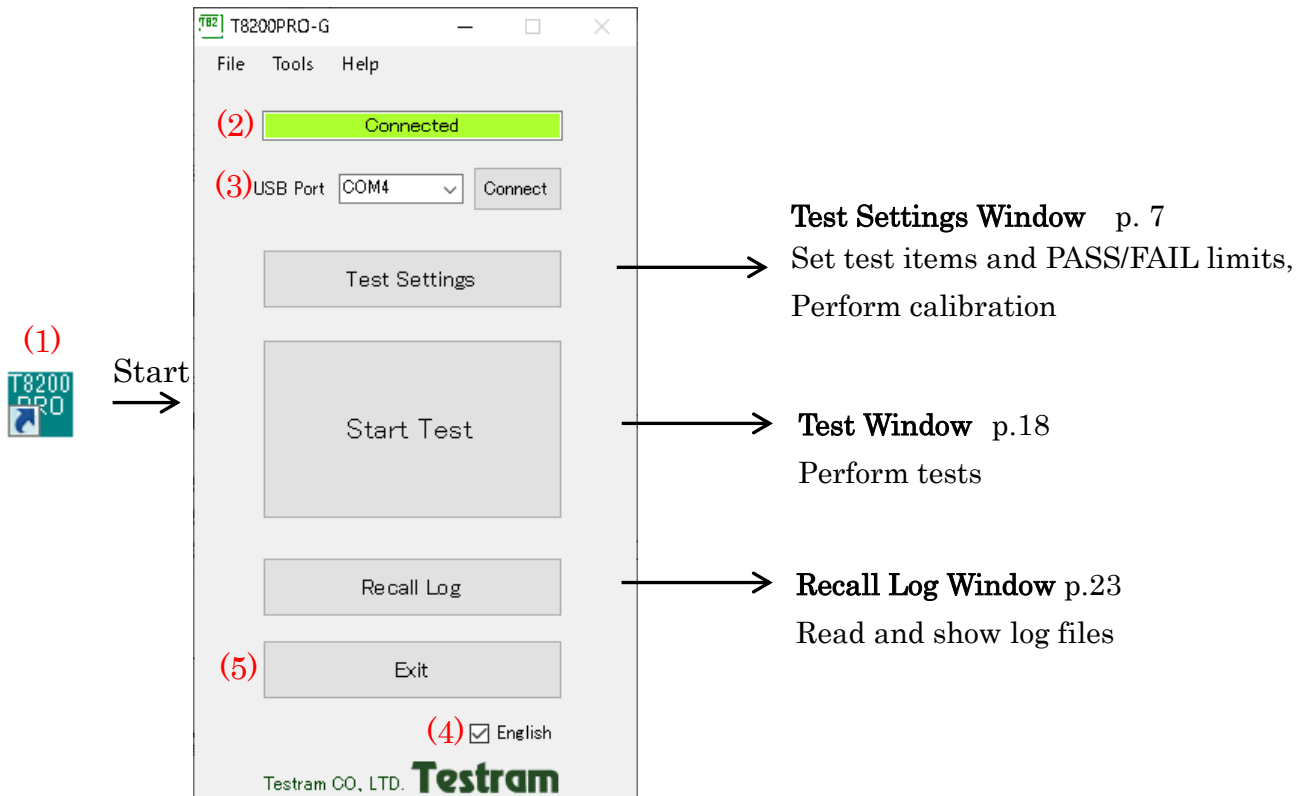


Figure 5 Top Menu Window

- (1) Start** Double-click the **T8200PRO** icon on the desktop to start the software. The **Top Menu** (Figure 5) appears.
- (2) USB Status** Confirm that **Connected**, meaning the software and **T8200PRO-G** is connected, is shown. If the connection fails, “Not connected” will be shown.
- (3) USB Port** If **Not connected**, select **Auto Select** for **USB Port**, and press the **Connect** button. If it doesn't work, confirm the following:
- The main unit and the PC are correctly connected?
 - The USB driver has been installed?
 - Unplug the USB cable, plug it again. Press the **Connect** button.
- (4) Language** Switch the language: English/ Japanese
- (5) Exit** Finish the software.

Top Menu, Menu Bar

File > Import files

Import test setting files.

File > Delete files

Delete unnecessary test setting files, log files, image files, and csv files.

Tools > Options

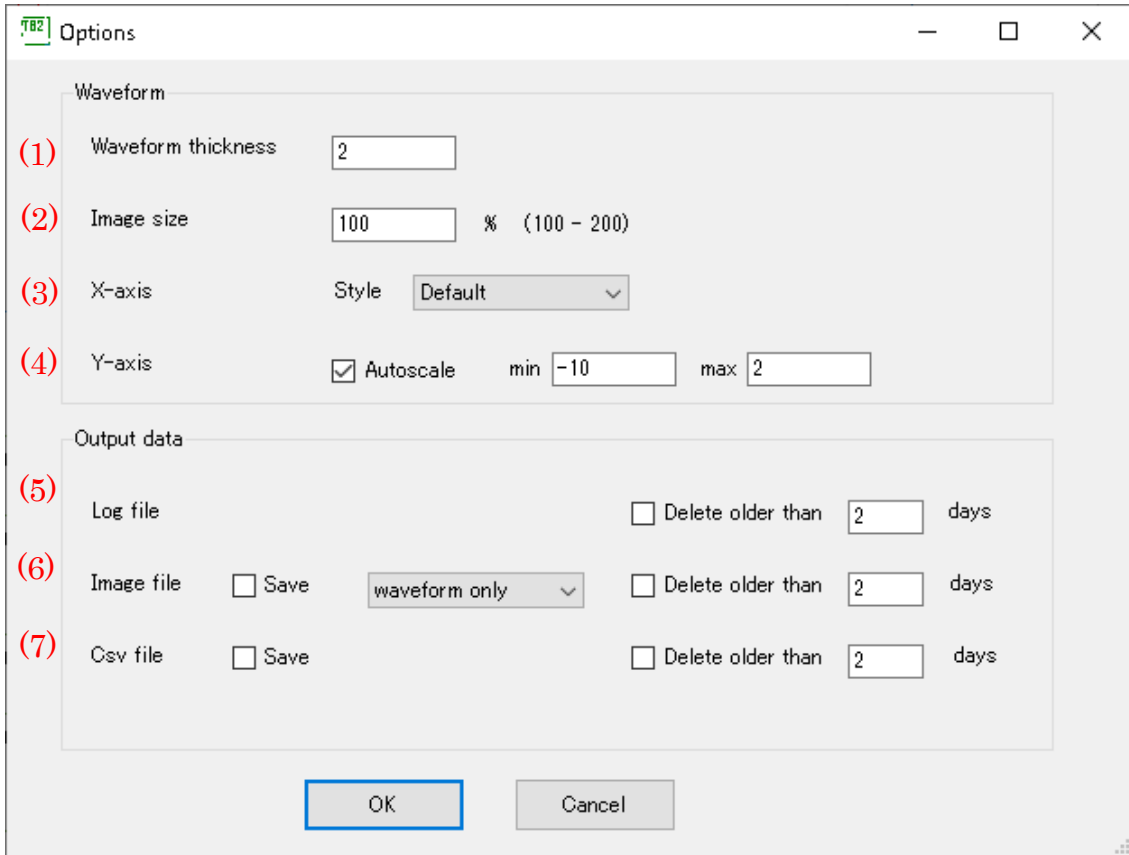


Figure 6 Options Window

(1) Waveform thickness	Waveform thickness in the Test Window .
(2) Image size	Waveforms in the Test Window will be saved with the specified size.
(3) X-axis	Specify tick style on the x-axis. Default: Default style Simple: Simple style (display only min / max values)
(4) Y-axis	Check Autoscale to autoscale the y-axis. If unchecked, the entered min and max values will be adopted.

<p>(5) Log file</p>	<p>Check and enter a retention period of saved log files. When the period expires, files will be deleted.</p>
<p>(6) Image file</p>	<p>If checked, waveforms in the Test Window will be saved as jpeg format.</p> <p style="padding-left: 40px;">Waveform only: saves waveforms only</p> <p style="padding-left: 40px;">The whole window: saves the whole window</p> <p>Check and enter a retention period of saved image files. When the period expires, files will be deleted.</p>
<p>(7) Csv file</p>	<p>If checked, waveforms in the Test Window will be saved as csv format.</p> <p>Check and enter a retention period of saved csv files. When the period expires, files will be deleted.</p>

Tools > Update firmware

Used for updating the firmware.

Help > About T8200PRO-G

The software version, the serial number of the product, applied product options are shown.



Figure 7 Product Information

7. Test Settings Window

In the **Test Settings** window (Figure 9, Figure 9), test conditions, test items and PASS / FAIL limits are set. Those are saved in a test setting file. When exiting the window, calibration (normalize) will be performed if necessary.

Calibration Tab: test conditions

In this tab, test conditions such as frequency range, RF power, etc. are set.

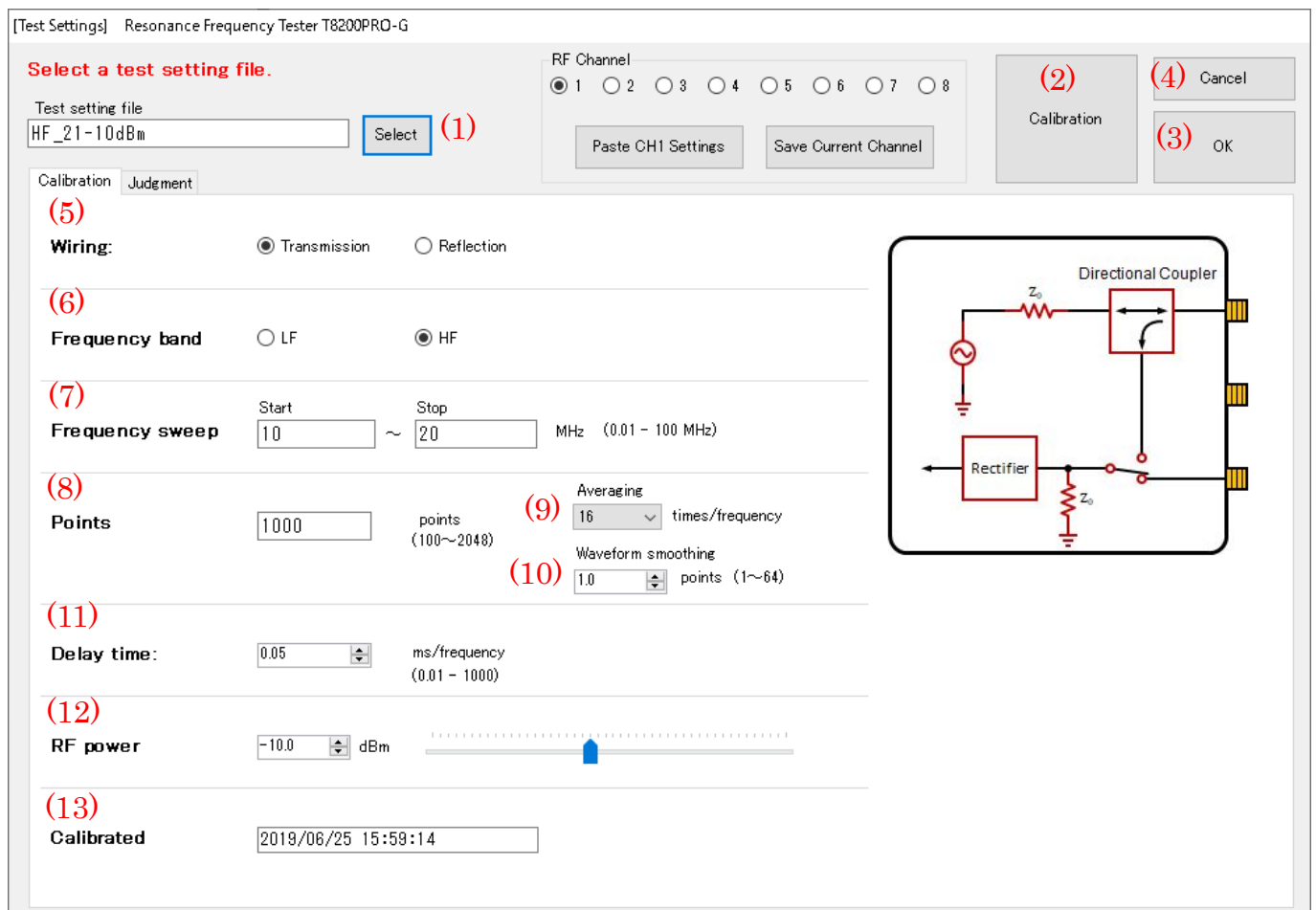


Figure 8 Test Settings Window, Calibration Tab

(1) Select

Press the **Select** button to select a test setting file. A test setting file stores test conditions and PASS/FAIL limit values.

Selecting an existing setting file

Press the **Select** button and select a setting file.

Creating a new setting file

Press the **Select** button and select any setting file as a template. Enter the filename in the textbox on the left side of the **Select** button.

Sample setting files are downloadable from Testram's homepage <http://www.testram.co.jp>

Put downloaded files in the following folder.

C:\¥@T8200PRO-G¥ItemFile

(2) Calibration

Calibration (normalization) is a process to remove the loss and variation caused by probes, cables and the internal circuitry.

Perform calibration (normalize) with the current main unit, probe (antenna) and settings.

The settings when the calibration is performed are saved in the current test setting file.

While calibrating, do not put a test target on the probe.

In the following cases, perform calibration again:

- Test conditions such as frequency range, RF power have been changed.
- When using the main unit or a probe which is different from one used when the previous calibration was performed.
- When the temperature of the installation site has changed.

Daily calibration before use is recommended.

To check if the system is calibrated correctly, perform a trial test with no test target on the probe (see **Checking if the system is calibrated correctly** on p. 11).

(3) OK

Overwrite the current settings to the test setting file and exit the window.

Calibration (normalize) will be performed automatically if test conditions have been changed.

(4) Cancel

Exit this window without saving anything.

(5) Wiring

Select a wiring configuration either transmission or reflection. The hardware switches in the main unit will be set accordingly.

You must connect your test probe properly according to the configuration selected.

Refer to **T8200PRO –G Product Specification** for details.

(6) Frequency band

Select the frequency band to test. The hardware in the main unit will be switched accordingly.

If the LF band is selected, a hardware ripple filter is enabled. If you run tests in the frequency range less than 1 MHz, select LF band to suppress ripples in waveforms.

If the LF band is selected, frequencies are shown in kHz, otherwise shown in MHz.

(7) Frequency sweep

Enter the start and stop frequencies (in MHz for HF band, in KHz for LF band)

(8) Points

Enter the number of data points for the frequency sweep.

(9) Averaging: number of iterations per frequency, times/frequency

Enter the number of measurement iterations per frequency. The higher the number, the more accurate the measurement result will be, but the measurement time will be longer.

(10) Waveform smoothing

Specify the number of data points when performing waveform smoothing by moving average. If you do not want to perform waveform smoothing, set it to "1".

(11) Delay

The delay time is the amount of time the main unit waits before measuring the data after the source signal is applied to the load at each frequency.

If the delay time is small compared to the system response time, a distorted measurement response is obtained.

Typical values may be 0.05 ms for HF band, 1 ms for LF band.

(12) RF Power

Enter the output RF power in dBm.

(13) Calibration date

The last calibration execution date is displayed. It will be blank if calibration has not been performed yet.

Judgment Tab: test items, PASS/FAIL limits

[Test Settings] Resonance Frequency Tester T8200PRO-G

Select a test setting file.

Test setting file: HF_21-10dBm

RF Channel: 1 2 3 4 5 6 7 8

Calibration:

Resonance test

(12) Enable resonance test

(13) PASS/FAIL Judgment

(14) Resonance frequency Lower: 5.000 MHz Upper: 25.000

Attenuation Lower: -30.000 dB Upper: -1.000

Q factor Lower: 1.000 Upper: 50.000

Limit Test: ?

Point1: 0.000 MHz 0.000 dB

Point2: 0.000 MHz 0.000 dB

Point3: 0.000 MHz 0.000 dB

Point4: 0.000 MHz 0.000 dB

Point5: 0.000 MHz 0.000 dB

(15) **Q factor**

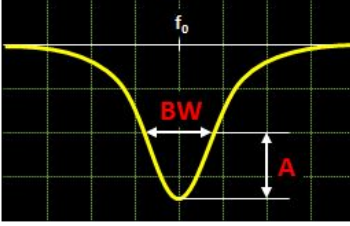
Loaded Q (QL) Unloaded Q (Qu) Coupling: Under-coupled (16)

Bandwidth level: A= 3.0 dB

A From the bottom level

B From the normalized level

C At the 1/2 level in dB unit



(19) Convex

(20) **PASS/FAIL alarm**

PASS alarm

FAIL alarm

Communication test

(17) Enable communication test

ID Read: PASS/FAIL Judgment

Protocol: ISO14443 Type A (18)

RF Power: Normal Power (19)

Figure 9 Test Settings Window, Judgment Tab

(12) Enable Resonance Test

If checked, the resonance test:

resonance frequency test, attenuation test, Q factor test, limit test will be performed.

(13) Enable PASS/FAIL judge for resonance test

If checked, the pass/fail judgment by the resonance test will be done.

(14) Test items, PASS/FAIL limits of resonance test

Set test items and the PASS/FAIL limits for the resonance test

- Resonance frequency
- Attenuation at the resonance frequency
- Q factor
- Limit values for limit test: minimum attenuation values at the specified frequencies.

Limit Test

The user can define minimum attenuation values at specified frequencies (up to 5 points). T8200PRO-G performs numeric PASS/FAIL comparisons with the defined limits at those frequencies. PASS appears if the trace falls within the defined limits, otherwise, FAIL appears (see Figure 1).

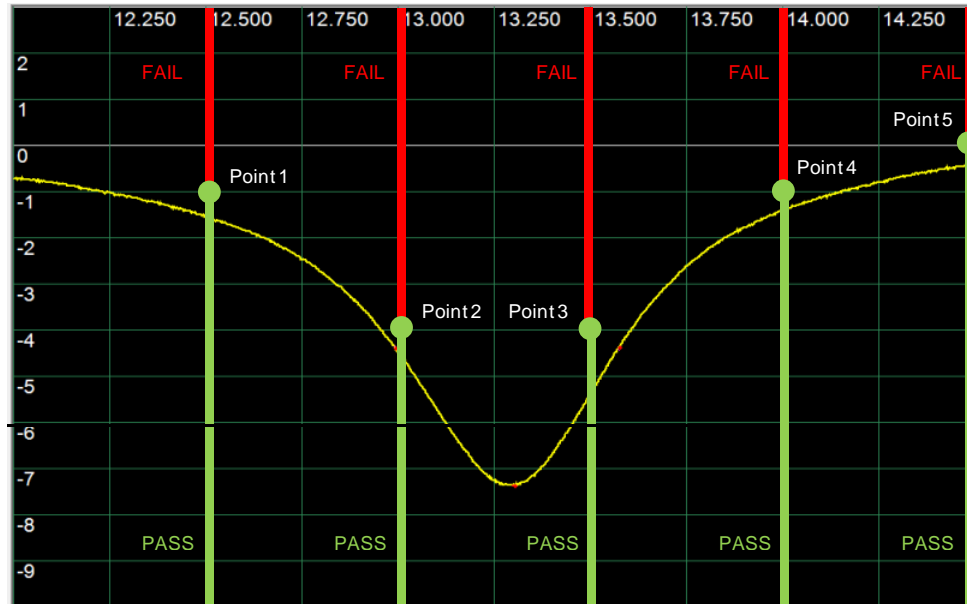


Figure 1 Limit Test

(15) Q factor

Select a Q factor calculation method.

loaded Q, Q_L The Q factor of the whole measurement system including the test target, test probe, the output resistance of the transmitter circuit and the input resistance of the receiver circuit.

unloaded Q, Q_u The derived Q factor of the test target including the probe.

When outputting unloaded Q in the reflection mode, select either under-coupled (loose coupling) or over-coupled (tight coupling).

An under-coupled system means that the input resistance of the test target at resonance frequency is less than 50 Ohms (the locus of S11 excludes the origin of the Smith Chart), while an over-coupled system means that the input resistance of the test target at resonance frequency is greater than 50 Ohms (the locus of S11 encloses the origin of the Smith Chart). Refer to **T8200PRO-G Product Specification** for details.

If the coil-type probe and test target are used, those are magnetically coupled:

Under-coupled

Select this if the magnetic field coupling between the test target and the probe is weak. This corresponds to the case where the antenna (coil) size of the target and the probe are greatly different, or the distance between them is several mm or more apart.

Over-coupled

Select this if the magnetic field coupling between the test target and the probe is strong. This corresponds to the case where the antenna (coil) of the test target is almost the same size as that of the test probe and those are placed closely.

(16) Enable communication test

If checked, communication test (the UID reading test) will be performed.

(17) Enable PASS/FAIL judge for Communication Test

If checked, pass/fail judgment by UID reading will be done.

(18) Communication Protocol

Select a protocol for the communication test.

(19) RF Power for Communication Test

Normal Power: Select as a default.

Low Power: Select this option if the RF power is too strong.

Custom: If the above two options don't work out, try this option.

(20) PASS/FAIL alarm

If checked, PASS/FAIL alarm sounds go off.

RF Channel

Up to eight RF channels can be used in one setting file. Test settings and PASS / FAIL judgment values can be set independently for each RF channel.

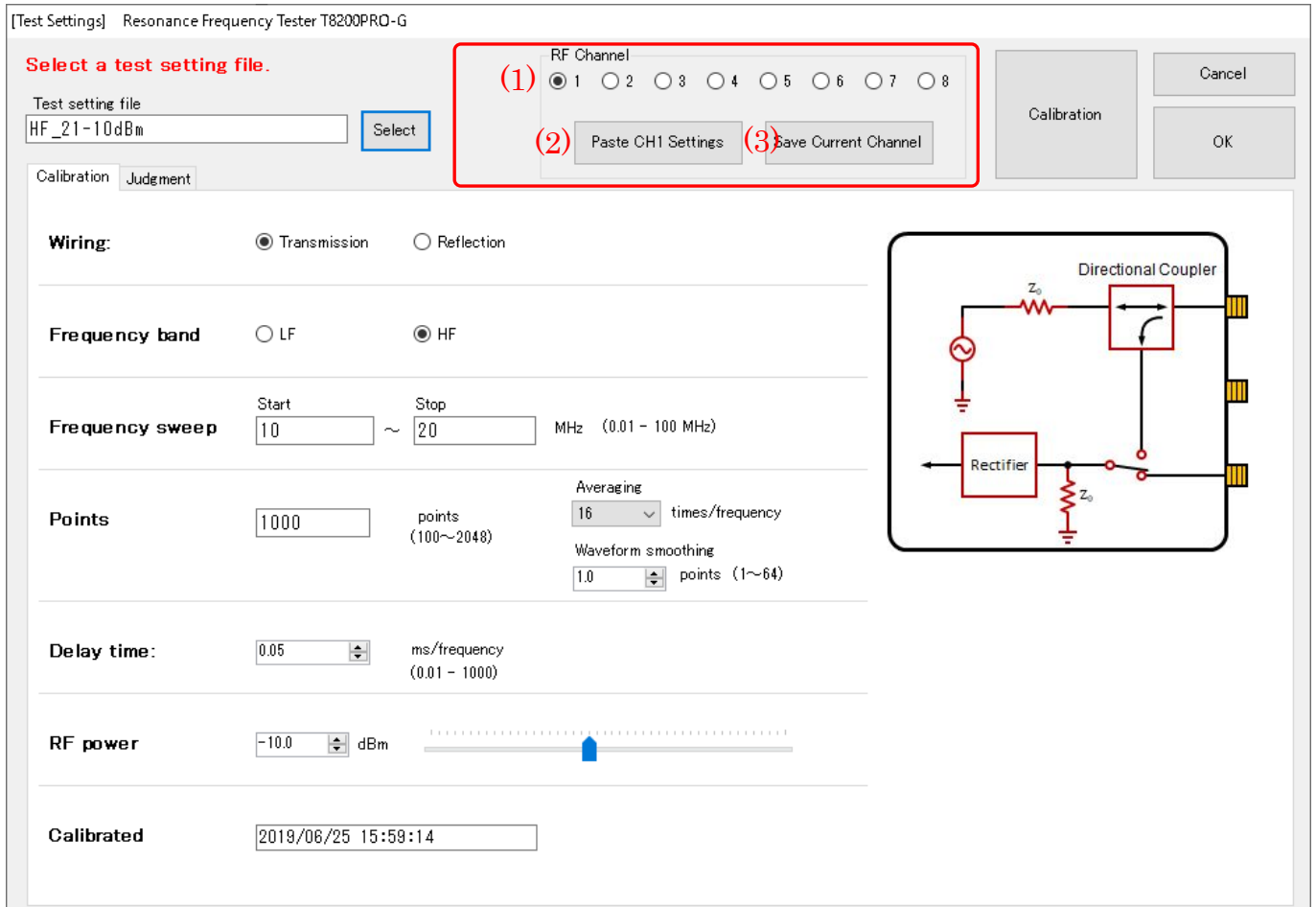


Figure 2 RF Channel

(1) RF channels

Select an RF channel to set.

(2) Paste CH1 settings

Copy the settings of channel 1 to the currently selected RF channel.

(3) Save current channel

Save the settings of the currently selected RF channel. If test conditions have been altered, calibration [normalization] will be automatically performed.

Setting Example

This example shows how to set **T8200PRO** to the following settings:

Channel 1: RF Power = -10 dBm

Channel 2: RF Power = -5 dBm

Procedure (Figure 3)

- (1) Select channel 1.
- (2) Set CH1 RF power and other test items.
- (3) Press the [Calibration] button to perform calibration of channel 1.
- (4) Select channel 2.
- (5) Click the [Paste CH1 setting] button. The settings for channel 1 are copied to channel 2.
- (6) Set CH2 RF power and other test items.
- (7) Press the [Calibration] button to perform calibration of channel 2.

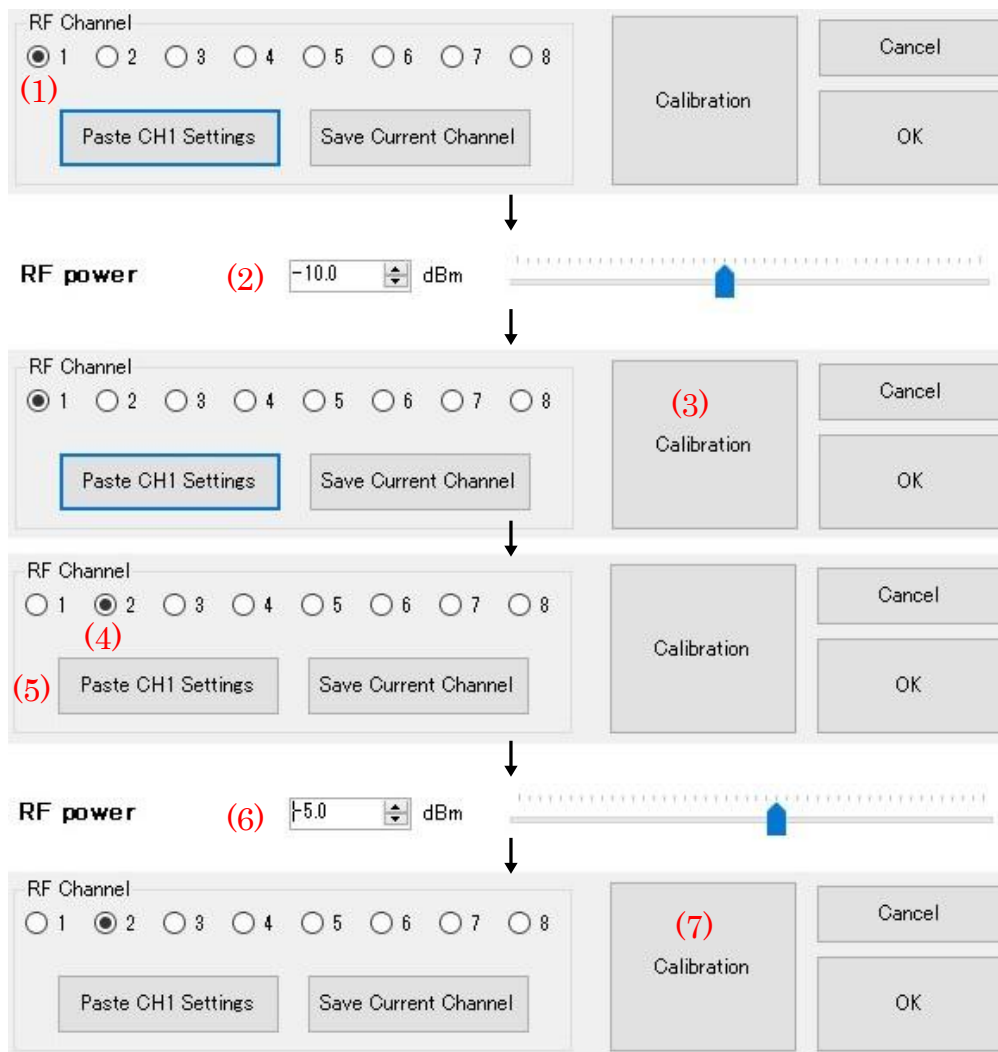


Figure 4 RF Channel setting example

8. Test Window

In the **Test Window** (Figure 5), measurements based on the current test settings are performed. Test results are displayed on the screen. Be sure to confirm that the mandatory setting items (p.18 Table 3) have been done before performing tests.

It is strongly recommended that the user perform a trial test with no test target on the probe to confirm that the system is calibrated correctly.

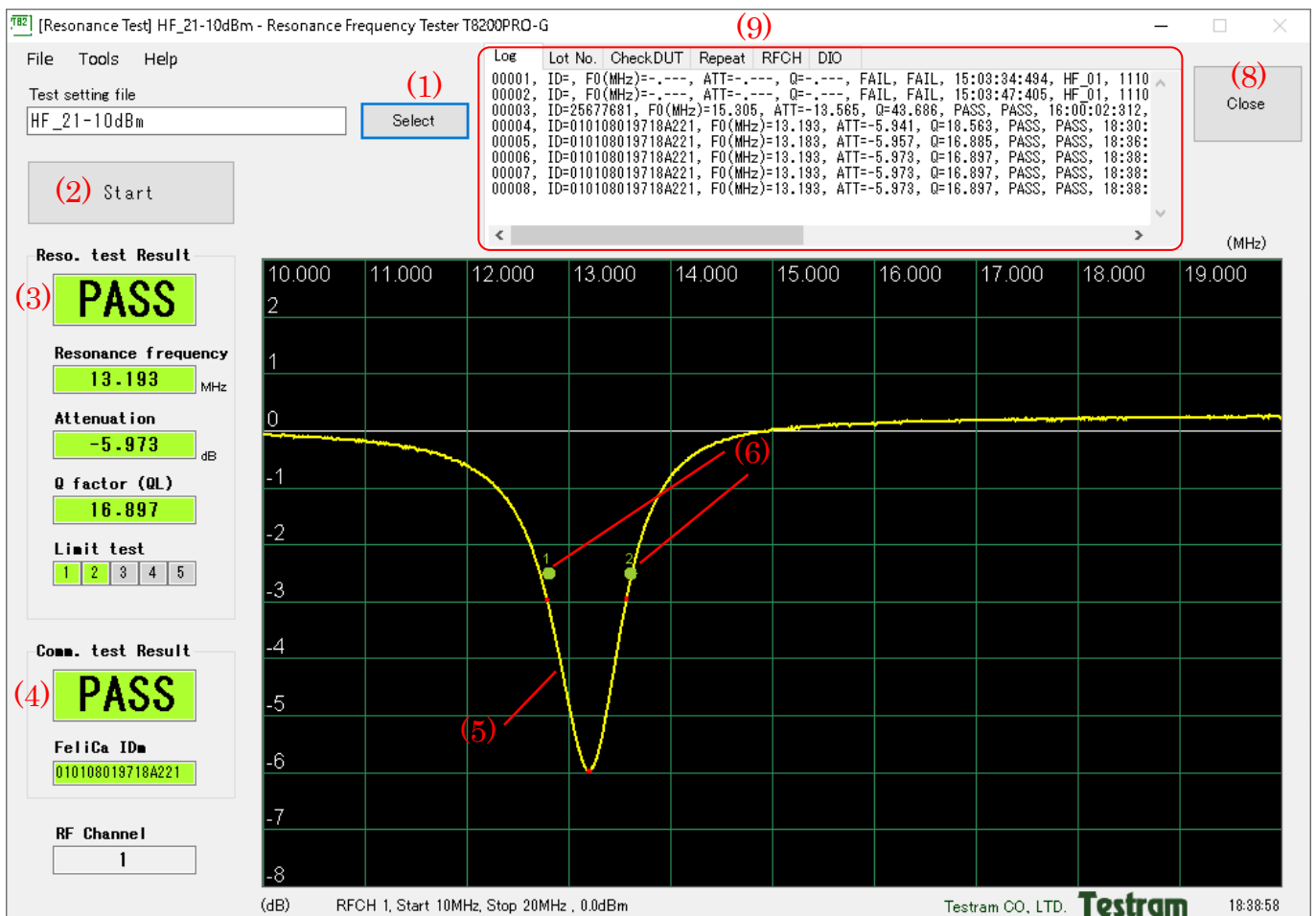


Figure 6 Test Window

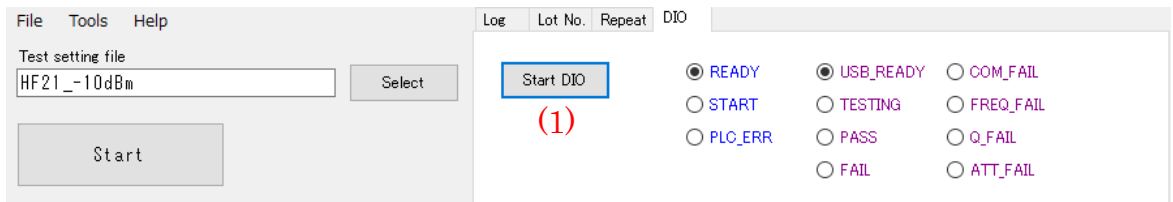
- (1) **Select** Press this button to modify the test settings, or to select another setting file. **Test Settings Window** (p.7) will be invoked.
- (2) **Start** Press this to perform the test.
- (3) **Reso. test result** PASS/FAIL result of the resonance test is shown.
- (4) **Comm. test result** PASS/FAIL result of the communication test is shown.
PASS: background color in green, FAIL: background color in red

DIO

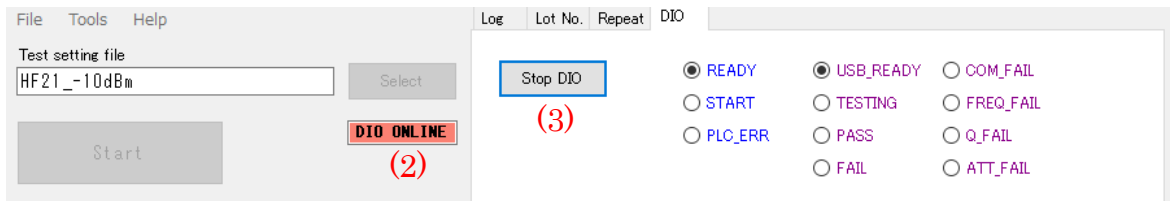
(Option: DIO)

In this tab, you can enable/disable the digital I/O (DIO) interface. Plus, you can see the current DIO status on the screen.

- When you press the **Start DIO** button (1), **DIO ONLINE** (2) on the left side appears, meaning the DIO interface is turned on. The current state of each pin is shown.
- While the DIO interface is enabled (DIO ONLINE), the **Start** and **Select** buttons are disabled.
- Press the **Stop DIO** button (3) to disable the DIO interface.



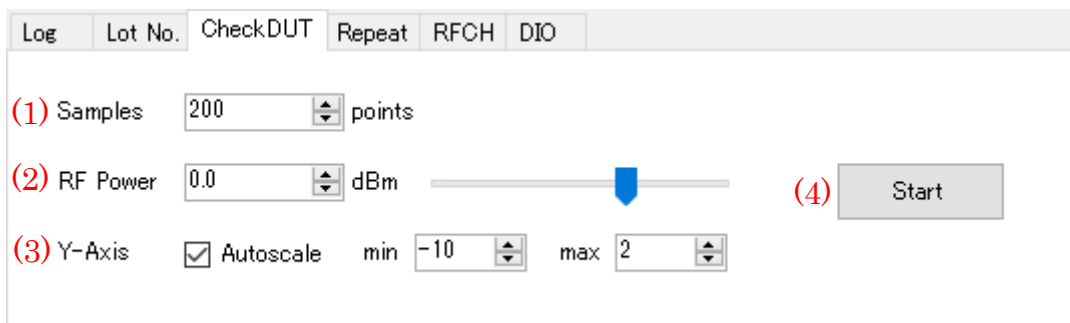
DIO interface is disabled (manual-operation mode)



DIO interface is enabled (DIO online mode)

Check DUT

This function is to check the characteristics of the device under test (DUT) repeatedly with the number of test points reduced before performing a formal test.



(1) Samples

The number of data points.

(2) RF Power

Used to alter applied power while performing continuous frequency sweep.

(3) Y-Axis

Check **Autoscale** to set y-axis min / max values automatically.

If you want to specify the min / max value of y-axis, uncheck **Autoscale** and enter the values.

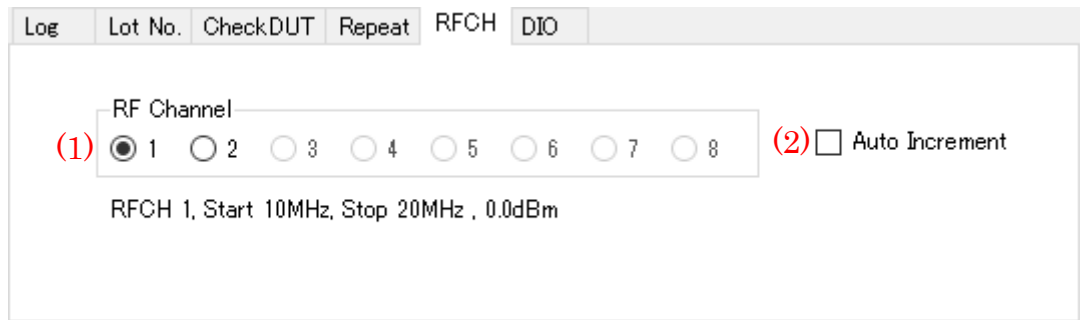
(4) Start/Stop

Start / stop continuous frequency sweep.

RFCH

Switch the RF channel (RFCH).

Only calibrated RF channels can be selected.



(1) RF Channel

Click to switch the RF channel.

Information on the selected RF channel is displayed below the button.

(2) Auto Increment

If checked, the RF channel is automatically switched to the next channel after each test is completed.

Checking if the system is calibrated correctly

Perform a test with no test target on the probe, the same condition as when the calibration was performed, to confirm that the system is calibrated correctly.

Confirm the straight line of 0 dB level with little noise (Figure 8). If it's noisy, start the calibration over.

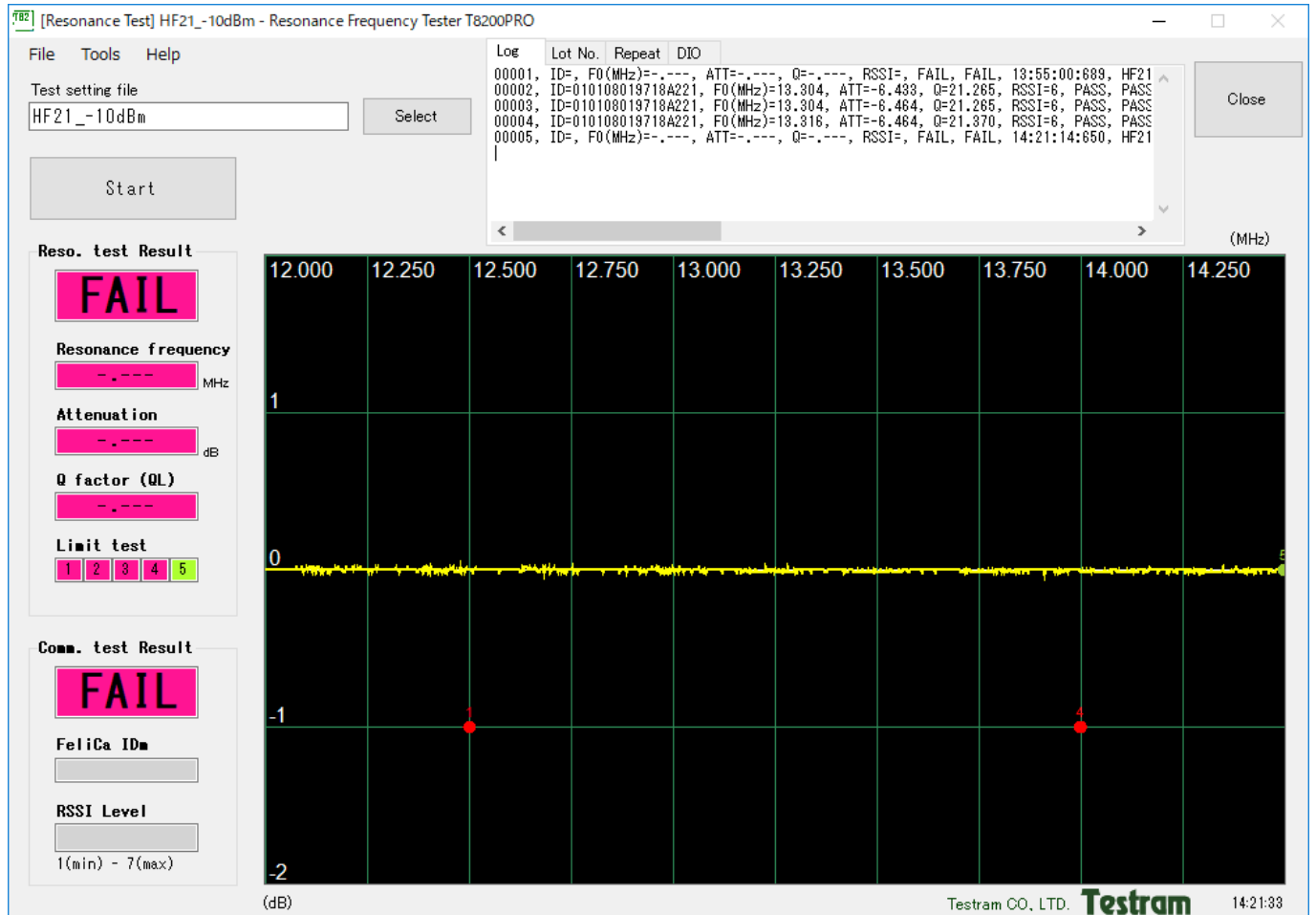


Figure 9 A Measured Result with no Test Target on the Probe

9. Recall Log Window

In the **Recall Log** window (Figure 10), you can choose a log file to show measured results again.

The screenshot shows the 'Recall Log File' window for the Resonance Frequency Tester T8200PRO-G. The window title is '[Recall Log File] Resonance Frequency Tester T8200PRO-G'. The menu bar includes 'File', 'Tools', and 'Help'. A 'Log file' field contains '2019-06-25_1' with a 'Select' button next to it. A 'Close' button is in the top right. Below the file selection is a table with 11 results. The table columns are: Seq., ID, F0, ATT, Q, Reso. Jug., Comm. Jug., Time, and Test Setting. The table data is as follows:

Seq.	ID	F0	ATT	Q	Reso. Jug.	Comm. Jug.	Time	Test Setting
00001		----	----	----	FAIL	FAIL	15:03:34.494	HF_01
00002		----	----	----	FAIL	FAIL	15:03:47.405	HF_01
00003	25677681	13.305	-13.565	43.686	PASS	PASS	16:00:02.312	HF_21-10dBm
00004	010108019718A2...	13.193	-5.941	18.563	PASS	PASS	18:30:13.458	HF_21-10dBm
00005	010108019718A2...	13.183	-5.957	16.885	PASS	PASS	18:36:29.753	HF_21-10dBm
00006	010108019718A2...	13.193	-5.973	16.897	PASS	PASS	18:38:05.275	HF_21-10dBm
00007	010108019718A2...	13.193	-5.973	16.897	PASS	PASS	18:38:26.783	HF_21-10dBm
00008	010108019718A2...	13.193	-5.973	16.897	PASS	PASS	18:38:49.349	HF_21-10dBm
00009	010108019718A2...	13.193	-6.003	17.117	PASS	PASS	19:25:32.166	HF_21-10dBm
00010	010108019718A2...	13.193	-5.988	17.117	PASS	PASS	19:26:29.555	HF_21-10dBm
00011	010108019718A2...	13.193	-5.988	17.117	PASS	PASS	19:27:05.536	HF_21-10dBm

Below the table is a waveform plot showing a resonance dip. The x-axis ranges from 10,000 to 19,000 and the y-axis from -8 to 2. A filter control panel is on the right, with a 'Filter' section containing 'Min' and 'Max' input fields, an 'Exclude' checkbox, and an 'Apply Filter' button. A search field contains 'fieldname=Seq,min=-∞,max=∞,exclude=false'. At the bottom, there are 'Reset Filter' and 'Reset All' buttons. The Testram logo and 'Testram CO., LTD.' are in the bottom right corner.

Figure 11 Recall Log Window

(1) Select

Press to select a log file.

(2) Table of test results

The contents of the selected log file are shown. Each row corresponds to one measurement.

When clicked, the waveform corresponding to the row is shown.

(3) Waveform

The waveform image is shown if the image is saved. Click it to enlarge. Click it again to show it with the original size.

(4) csv

If the waveform is saved in the csv format, this checkbox appears.

(5) Visible

If checked, the column associated with the current tab is shown. Uncheck it to make the column invisible.

(6) Filter

Enter filtering conditions and press **Apply Filter**.

(7) Applied filters

Applied filters are shown here. To reset a filter, click the checkbox.

(8) Reset Filter

Resets all the applied filters.

(9) Reset All

Resets all the applied filters, plus makes all the columns visible.

10. Output Files

Test results are saved in the following files.

Output File	Format
Log File	txt
Repeat Log File	txt
Image Data	jpeg
Csv Data	csv

Log File

Each test result is saved in a log file. If **Specify Lot No.** in the **Lot No.** tab (Figure 12) in the **Test Window** is checked, the specified lot number (= log file name) will be used. If unchecked, a default lot number (log file name) will be used.

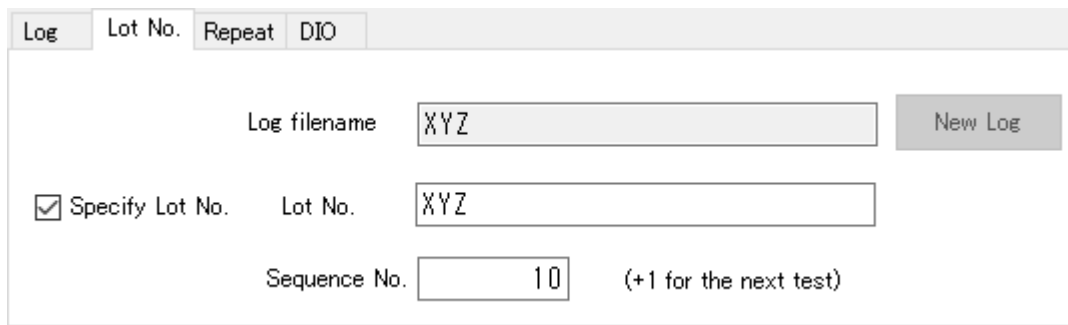


Figure 13 Lot No. tab in the Test Window

Table 4 Default Lot Number: Uncheck [Specify Lot No.]

Log filename	YYYY-MM-DD_n.txt YYYY: year, MM: month, DD: day, n: serial number(1,2,...) e.g.,) 2019-12-31_1.txt
Folder to save	C:\¥@T8200PRO-G¥MeasureLog
Log filename will be updated	When the date has changed. When the New Log button in the Test Window is pressed. The serial number of the filename will be incremented by 1. e.g.)2019-12-31_1.txt → Press New Log → 2019-12-31_2.txt
Sequence number in the log file	automatically numbered (0, 1, 2, ...)

Table 5 User-Specified Lot Number: Check **Specify Lot No.**

Log filename	[Input to Lot No.].txt e.g.) XYZ.txt
Folder to save	C:\¥@T8200PRO-G¥MeasureLog
Filename will be updated	When the input to the Lot No. is changed
Sequence number in the log file	[Input to Serial No.] + 1 for the next test Incremented by one for each test

Log File Format

Figure 14 is the content of a log file. Each line consists of the fields (columns) described in Table 6. Upon completion of each test, one line corresponding to the test result will be added.

Table 6 Log File Format

	Item	Example	Note
1	Sequence number	00001	
2	UID reading	ID=559C8A04	UID, PUPI for Type-B, IDm for Felica
3	Resonance frequency	F0=15.736	
4	Attenuation	ATT=-4.508	
5	Q factor	Q=12.378	
6	PASS/FAIL result of resonance test	PASS	
7	PASS/FAIL result of communication test	PASS	
8	Test start time	16:31:57:265	
9	Test setting file	HF_Reflection_+5.0dB	
10	PASS/FAIL result for each item of resonance test	00000000	note 1)
11	PASS/FAIL result for each item of communication test	00	note 2)
12	1st point attenuation of limit test	10.000MHz(0.000) -0.067	
13	2nd point attenuation of limit test	11.000MHz(0.000) -0.052	
14	3rd point attenuation of limit test	12.000MHz(0.000) -0.099	
15	4th point attenuation of limit test	13.000MHz(0.000) -0.163	
16	5th point attenuation of limit test	14.000MHz(0.000) -0.067	

Note 1) PASS/FAIL result for each item of a resonance test: 8 bit binary format

b7	b6	b5	b4	b3	b2	b1	b0
Resonance frequency	Attenuation	Q factor	1st point attenuation	2nd point attenuation	3rd point attenuation	4th point attenuation	5th point attenuation
0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

0: PASS, 1: FAIL

Note 2) PASS/FAIL result for each item of a communication test: 1bit binary format

b0
UID reading
0/1

0: PASS, 1: FAIL

```
00001, ID=252D8B04, F0(MHz)=14.565, ATT=-5.986, Q=17.321, RSSI=6, PASS,
00002, ID=252D8B04, F0(MHz)=14.550, ATT=-6.001, Q=17.304, RSSI=6, PASS,
00003, ID=252D8B04, F0(MHz)=14.550, ATT=-6.188, Q=18.635, RSSI=6, PASS,
00004, ID=252D8B04, F0(MHz)=14.550, ATT=-6.001, Q=17.304, RSSI=6, PASS,
00005, ID=252D8B04, F0(MHz)=14.565, ATT=-6.172, Q=18.302, RSSI=6, PASS,
00006, ID=252D8B04, F0(MHz)=14.550, ATT=-6.001, Q=17.304, RSSI=6, PASS,
00007, ID=252D8B04, F0(MHz)=14.565, ATT=-6.001, Q=17.321, RSSI=6, PASS,
00008, ID=252D8B04, F0(MHz)=14.565, ATT=-6.001, Q=17.321, RSSI=6, PASS,
00009, ID=252D8B04, F0(MHz)=14.550, ATT=-6.001, Q=17.304, RSSI=6, PASS,
00010, ID=252D8B04, F0(MHz)=14.565, ATT=-5.986, Q=17.321, RSSI=6, PASS,
00011, ID=252D8B04, F0(MHz)=14.550, ATT=-6.172, Q=18.283, RSSI=6, PASS,
00012, ID=252D8B04, F0(MHz)=14.565, ATT=-5.986, Q=17.321, RSSI=6, PASS,
00013, ID=252D8B04, F0(MHz)=14.535, ATT=-5.986, Q=17.286, RSSI=6, PASS,
```

Figure 15 A Log File

Repeat Log File

On completion of a repeat test, the result will be saved in a repeat log file. The results are also written to the log file.

Repeat log filename [log filename]_RPT.txt

Folder to Save C:\¥@T8200PRO-G¥MeasureRepeatLog

Log filename will be updated
Same as the log file

Format Same as the log file. On completion, the average values are also written.

e. g.)
 000001, ID=559C8A04, F0=15.736, ATT=-5.317, Q=15.115,
 000002, ID=559C8A05, F0=15.716, ATT=-5.317, Q=14.952,
 000003, ID=559C8A06, F0=15.716, ATT=-5.317, Q=15.096,
 *Avrg, , F0=15.723, ATT=-5.317, Q=15.054, , , , , , , , , , ,

Image Data

The image file of each frequency sweep will be saved if the checkbox in the **Options Window** is checked.

Filename [log filename]_[time].jpeg
Folder to Save C:\¥@T8200PRO-G¥GraphicImage¥[log filename]
Format JPEG

Csv Data

The csv file of each frequency sweep will be saved if the checkbox in the **Options Window** is checked.

Filename [log filename]_[time].csv
Folder to Save C:\¥@T8200PRO-G¥CSVdataLog¥[Log filename]
Format

Column	Item	Example
1	Frequency	10.000
2	Attenuation	-0.350

e. g.)
 MHz, dBm
 10.000, -0.394
 10.010, -0.394
 10.020, -0.394

11. Communication Test

The specification of communication test is shown in Table 7.

Table 7 Communication Test Specification

Item	Description
Protocol	ISO14443 TypeA(MIFARE Classic, MIFARE Ultralight) ISO14443 TypeB Felica ISO15693(Tag it HF-I Plus/Pro, I·CODE SLIX2)
Reading UID	PASS if the following can be read: <ul style="list-style-type: none"> ● ISO14443 TypeA: UID ● ISO14443 TypeB: PUPI note 1) ● Felica:IDm ● ISO15693: UID

Note 1) Since PUPI is not a card/tag specific value, the obtained value may change with each test even for the same card/tag.

12. Controlling by External Application (Option: Control by External Software)

T8200PRO can be controlled from user's application software via the Windows registry. The outline of the operation is as follows.

- (1) Start **Test Window** (Figure 16) of **T8200PRO** and the user's application software.
- (2) Turn on this function by writing "Initialize" to **RsoCommand** in the **Command** key.
- (3) Write "Start" to **RsoCommand** in the **Command** key to start a test.
- (4) When the test is complete, **RsoMachine** in the **State** key becomes "Ready."
- (5) Read the test results from each item in the **Result** key.
- (6) Write "Stop" to **RsoCommand** in the **Command** key to turn off this function.

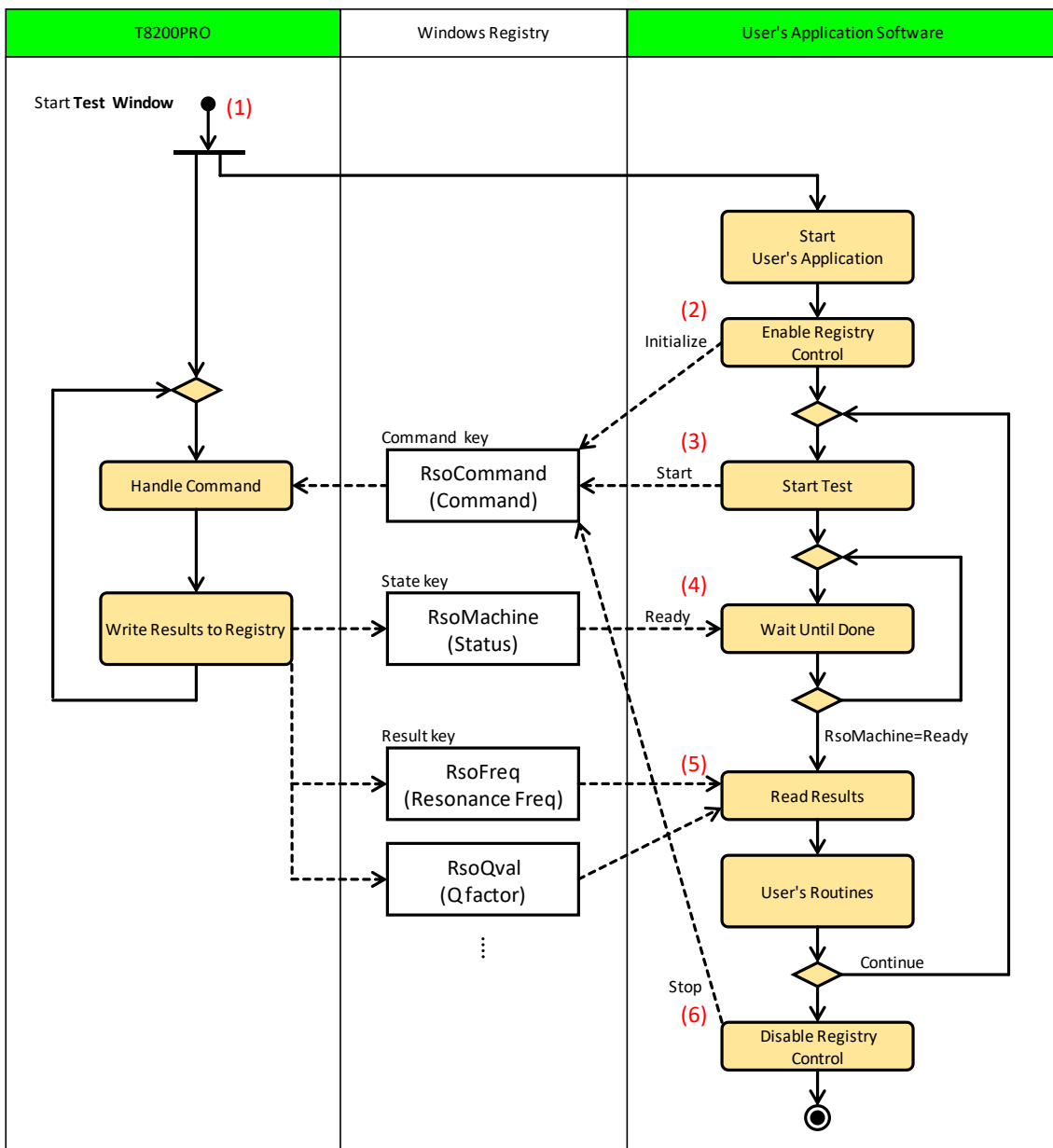


Figure 17 Activity Diagram of the Registry Control

Registry Structure

The registry structure to achieve this function is shown in Figure 18.

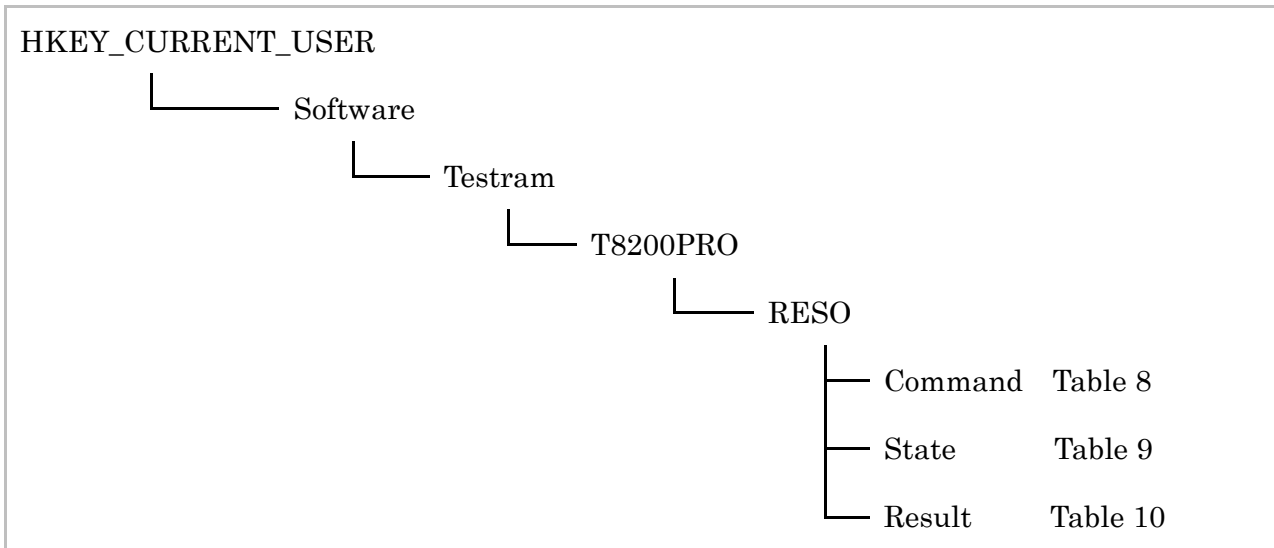


Figure 18 Registry Structure

Table 8 **Command** key items: Write a command in this item.

Item	R/W	Value	Description
RsoCommand	W	Initialize	Turns on this function: the Windows registry control is enabled. To switch test setting files, set RsoTestIni before executing this command (Figure 19). To specify your lot number, RsoLotNo should be set in advance.
		Start	Start the test.
		LotEnd	If RsoLotNo is not set, finishes the current lot. A new log file will be created for the next test. Same as the [New Log] button on the LotNo. Tab (p.31).
		Stop	Disables the registry control function.
RsoTestIni	W		Enter a test setting file
RsoLotNo	W		User-specified lot number. To apply it, set this value and execute the Initialize command. If not set, a default lot number will be used.
RsoSerialNo	W		User-specified sequence number.

			Effective if RsoLotNo is set.
--	--	--	--------------------------------------

R: Read by the user application, W: Write by the user application

Write each value as a string.

Table 9 **State** key items: The current status is shown.

Item	R/W	Value	Description
RsoMachine	R	Stop	The registry control function is disabled. Execute the Initialize command to enable it.
		Ready	The registry control function is enabled. Waiting for a command.
		Busy	Now processing a command. Wait until it becomes Ready .

R: Read by the user application, W: Write by the user application

Values are returned as strings.

Table 10 **Result** key items: The test result will be written, same format as a log file (Table 6)

Item	R/W	Value	Description
RsoNumber	R		Sequence number
RsoUid	R		UID, PUPI, IDm
RsoFreq	R		Resonance frequency
RsoLevel	R		Attenuation
RsoQval	R		Q factor
RsoResult	R		PASS/FAIL result of resonance test
RsoComResult	R		PASS/FAIL result of communication test
RsoMeasuredTime	R		Test start time
RsoTestIni	R		Test setting file
RsoDetailResult	R		PASS/FAIL result for each item of resonance test
RsoDetailComResult	R		PASS/FAIL result for each item of communication test
RsoPoint1Level	R		1st point attenuation of limit test
RsoPoint2Level	R		2nd point attenuation of limit test
RsoPoint3Level	R		3rd point attenuation of limit test
RsoPoint4Level	R		4th point attenuation of limit test
RsoPoint5Level	R		5th point attenuation of limit test

R: Read by the user application, W: Write by the user application
 Values are returned as strings.

For a sample project, please contact our customer service.

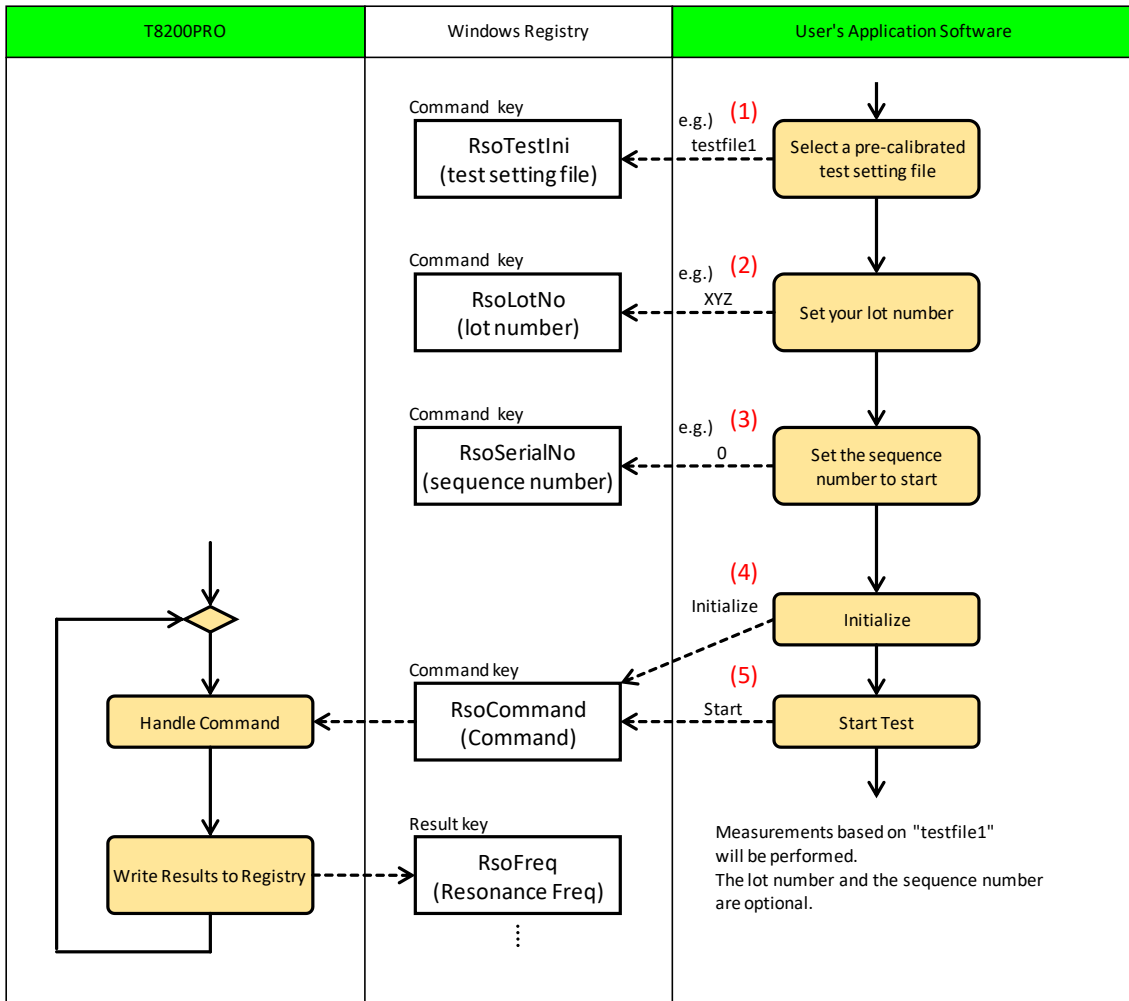


Figure 20 Switching Test Setting Files

13. Warranty

Warranty Period

Testram warrants the product to be free of defects in materials and workmanship for one year from the date of shipment. If any faults or defects found to be the responsibility of Testram occurs during use of the product within the warranty period, the product shall be repaired. Please contact our customer service below.

Testram Co., Ltd.

14-29, Higashiterauchi-cho, Toyonaka-shi, Osaka-fu 561-0871

TEL:06-6821-3557, FAX:06-6821-3561

The warranty applies only to the original purchaser.

Limitation of Warranty

The foregoing warranty does not apply to the supplied accessories such as cables, probes, connectors, antennas, etc.

Also, the warranty does not apply to defects/failures resulting from the following cases:

- Failure occurring from inappropriate storage or handling, carelessness or negligence by the user.
- Failure caused by the user's hardware or software design.
- Failure caused by unapproved modifications, etc., to the product by the user.
- Failure caused by irresistible external forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
- If the product purchased by Buyer are to be resold or delivered to a third party.

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