



User Manual
Copper Certification Testing

WX Series, (WX4500, WX500)



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CAUTION

A **CAUTION** notice denotes a hazard.

It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

Operating procedure, practice, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

General Safety Information

WARNING

Do not use the device if it is damaged. Before you use the device, inspect the casing. Look for cracks or missing plastic. Do not operate the device around explosive gas, vapor, or dust.

Always use the device with the cables provided.

Observe all markings on the device before establishing any connection.

Turn off the device and application system power before connecting to the I/O terminals.

When servicing the device, use only the specified replacement parts.

Do not operate the device with the cover removed or loosened.

Use only the power adapter provided by the manufacturer to avoid any unexpected hazards.

CAUTION

If the device is used in a manner not specified by the manufacturer, the device protection may be impaired.

Always use dry cloth to clean the device. Do not use ethyl alcohol or any other volatile liquid to clean the device.

Do not permit any blockage of the ventilation holes of the device.

Environmental Conditions

This instrument is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument

Environmental conditions	Requirements
Operating Temperature	0 °C to 40 °C
Operating humidity	20% to 85% RH non-condensing
Relative humidity	10% to 80%

NOTE

The WX4500, WX500 complies with the following Safety and Regulatory requirements.

DIN EN 55024, Edition:2003-10 (IEC/CISPR 24:1997, modified + A1:2001 + A2:2002); EN 55024:1998 + A1:2001 + A2:2003

DIN EN 55022; VDE 0878-22:2008-05 (IEC/CISPR 22:2005, modified + A1:2005); EN 55022:2006 + A1:2007

Regulatory Markings

The CE mark is a registered trademark of the European Community. This CE mark shows that the product complies with all the relevant European Legal Directives.

Declaration of Conformity



Manufacturer's Name	Psiber Data Pte. Ltd
Manufacturer's Address	3 Science Park Drive #03-08, The Franklin Singapore Science Park 1, Singapore 118223

Declares under sole responsibility that the product as originally delivered

Model Number	WireXpert, WX4500-FA, WX500
Description	Cable Certification Tester Kit
Equipment	Cable Certifier

Complies with the essential requirements of the following applicable European Directives and carries the CE marking accordingly:

DIN EN 55024, Edition:2003-10 (IEC/CISPR 24:1997, modified + A1:2001 + A2:2002); EN 55024:1998 + A1:2001 + A2:2003

DIN EN 55022;
VDE 0878-22:2008-05 (IEC/CISPR 22:2005, modified + A1:2005);
EN 55022:2006 + A1:2007

Signature	Arvind C Patel Quality Management Psiber Data Pte. Ltd. www.psiberdata.com
Date :	December 14, 2010

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Chapter 1: Getting Started

Unpacking the box (WX4500-FA/WX500-FA)



Soft case
(WX_AC_SOFTCASE)



WireXpert WX4500 or
WireXpert WX500
(Local and Remote)



Calibration Certificate
& USB Flash Drive



Power Adapters -
Input: 100-240VAC/0.8A
Output: 12VDC/3.0A
(WX_AC_PWRAD)



Talk-set headphones
(WX_AC_TALKSET1)



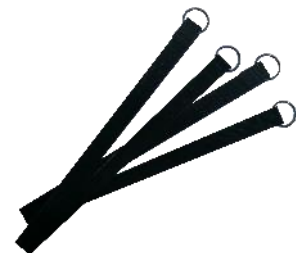
LCD Protective Cover
(WX_LCD_COVER)



CAT 6A Channel
adapters
(WX_AD_6ACH2)



Permanent Link
adapters & cords
(WX_AD_6ALKIT2)



Straps

Key differences between WX4500 and WX500

Feature	WX4500	WX500
Frequency of measurement	2500 MHz	500 MHz
Accuracy Specification	Level 2G	Level IIIe
Fiber Testing option	Yes	No
Class FA/CAT 8 options	Yes	No
Patch Cord Test adapters	Yes	Yes


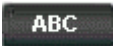





For Users of WireXpert Software 6.x and Earlier

The software on WireXpert since version 7.x features notable changes on the interface. These improvements have been made emphasizing on loading time, responsiveness and stability. The main functions from the previous version remains unchanged.

The new interface is clean and simple, providing quick settings selection and distinct identification between the Local and Remote units. Booting up is faster and hardware remains compatible.

Main changes from previous version:

Status bar

1.  Units can now be identified by the background colours on boot up.
2.  Device name function is removed.
3. Connection between devices can now be identified by the Talk set icons.
 -  Devices are not connected.
 -  Devices are connected. Press icon to activate "Talk set Mode"
 -  Devices are connected in "Talk set Mode". Use headset provided in kit.
4.  Available storage can now be found in System Settings > Settings 2 > Storage
5.  Battery information can now be found System Settings > Settings 2 > Battery

SETUP > Test Settings

1. Quick Setup can now be found in the main SETUP page
2. Site and Label Source can now be found in Project Settings

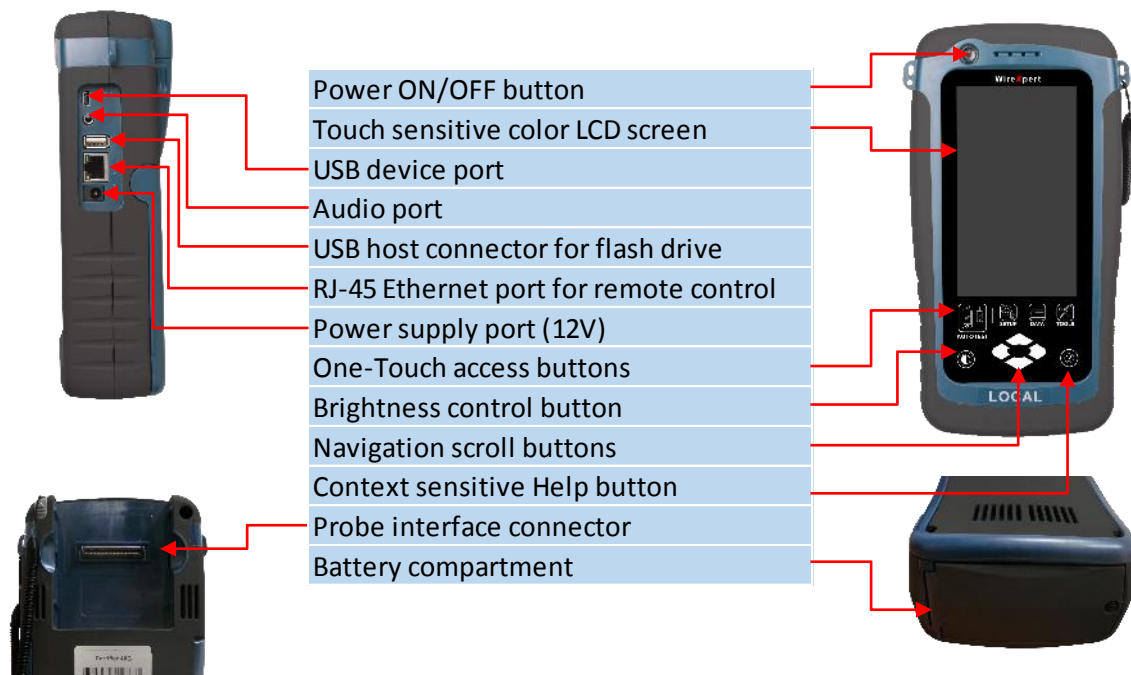
SETUP > System Settings

1. Operator and Auto Save Results can now be found in Project Settings

SETUP > Device Info

1. Device Info can now be found in System Settings > Settings 2 > Device Info

WireXpert Overview



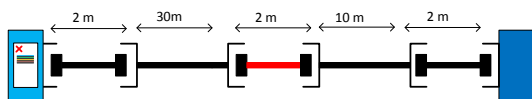
Item	Functionality
Power ON/OFF Button	<p>To turn on the device, press the power button for 5 seconds.</p> <p>To turn off the device, press the power button, and select OK on the power off dialog box. Alternately, press and hold the power button for 10 seconds (not recommended). The LED in the power button turns green if the unit is turned on.</p> <p>The LED on the power button turns red when the device is charging in stand-by mode, orange if it's turned on.</p>
Touch Sensitive LCD screen	Performs test executions and viewing of results.
USB device port	Enables remote connection to the PC for remote control update and exporting saved results.
Audio port	Enables vocal communication between Local and Remote units when connected to talk set headphones (WX_AC_TALKSET).
USB Host port	<p>Enables results to be exported and firmware upgrade via USB flash drive.</p> <p>Enables loading of custom limits and labels for list based testing.</p>

RJ-45 Ethernet port	Enables communication between two sets of WireXpert for Alien Crosstalk testing.
Power Supply port	Performs charging of device when connected to power adapter shipped with WireXpert. (WX_AC_PWRAD)
One-touch access buttons	Main functional buttons AUTOTEST, SETUP, DATA and TOOLS for WireXpert. Enables quick AUTOTEST and results viewing in a single click.
Brightness Control	Adjusts the brightness level of the LCD display.
Navigation scroll buttons	Performs navigation in long lists.
Context sensitive help	Provides simple explanation relevant to the functionality on the current screen (available in future version).
Probe interface connector	When connected with different probe adapters (e.g. CAT6A channel or Permanent Link), WireXpert will enable specified certification test to be conducted.
Battery compartment	Battery storage compartment. Unscrew to replace battery (WX_AC_BAT1).

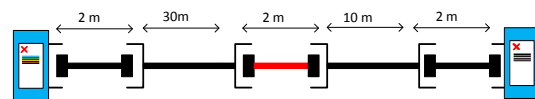
Dual Control System (DCS)

WireXpert consists of two identical devices, Local and Remote, for dual-end testing and certification. Both devices utilise easy to use LCD touch-screen technology and graphical user interface. The DCS ensures the same graphical data on the Local units are received on the Remote unit real-time, improving efficiency and productivity significantly as test data and settings can be viewed from Remote and Local side.

In the event of a wire map failure, the DCS will enable the operator on the far-end to visually identify which pair of wires is causing the error, instead of just a LED indication on traditional testers.



Traditional tester with single display screen, usually on Local unit only



WireXpert with LCD screens display on both Local and Remote units

WireXpert Adapters

All test adapters are designed to fit onto every WireXpert units. The device automatically detects adapters when connected and prompts to change in the matching interface depending on the type of adapter. Via SETUP > “Quick Setup”, the matching limit can be selected automatically to the type of adapter.

Link and Channel Adapters

Every standard WireXpert kit includes adapters for testing copper cablings in Permanent Link and Channel configurations.

Channel adapters connect to the patch cords at the wall plates and telecommunication panels. WireXpert software compensates for the adapter’s transmission characteristics to ensure test results’ accuracy.

Permanent Link adapters connect to the wall plates and telecommunication panel jacks. WireXpert software compensates for the adapter’s transmission characteristics to ensure test results will not be affected.

WireXpert’s Permanent Link adapters’ high precision interface reduces the degrading issue between the RJ-45 jack and link cord, providing highly accurate and repeatable measurements, and cost efficient method of replacing the link cords instead of the expensive link adapters.

Adapter Configuration Warnings

WireXpert will display a warning a potential conflict is detected between the adapter and the test settings. It is important to use the appropriate adapters as accuracy of measurements will be affected.

Cabling Certification and Testing

Certification testing with WireXpert is highly intuitive and simple. The AUTOTEST function performs a series of measurements between the Local and Remote devices and analyses the results to determine if the cabling run passes or fails the selected standards.

Copper Cable Certification Testing

Test at both ends of structured twisted pair cables for the worst case performance are required in accordance to the ISO/TIA standards. All certification testing requires a two-part test consisting of a main and remote unit, both bearing similar test capabilities. The test would be conducted with one end from the telecommunication closet, and the other at the outlet.

There are two primary considerations regarding the test method:

- Whether the user patch cords are included in the cabling run during the test.
 - > If so, channel test configuration is required.
 - > If not, link test configuration is required.
- Which standard – TIA or ISO should be used (Category or Class)

Permanent Link Configuration Tests

The Permanent Link configuration is generally used in facilities still under construction and does not include user patch cords. As the link configuration does not include the two additional connections of the patch cords, performance standards are more stringent. Special link adapters are used on both local and remote units for links that are under test.

Channel Configuration Tests

User patch cords are included for the Channel configuration. The pass/fail limits for this configuration allows performance degradation inherent in the two additional patch cords included in the measurements, thus are less stringent. Special channel adapters are used on both local and remote units for channels that are under test.

Memory

1 Gigabyte internal flash memory.

External USB Flash Drive included allows for flexible data management and storage.

Memory Requirements

The amount of memory that each test result takes up depends on the options that is configured before starting the test. If plots are saved with each test, file size of test results will be generally larger than one that has plots option omitted.

WireXpert allocates approximately 1 GB of internal flash memory for test result storage.

Battery Information

WireXpert units are powered by Lithium Ion rechargeable batteries. These batteries contain circuitry that reports their state of charge to WireXpert. The units can be powered by external AC/DC power adapters.

A fully charged battery can operate WireXpert for five to eight hours before requiring recharging. Reducing the screen brightness and enabling the sleep function allows WireXpert to run longer on a charge.

WARNING

Do not set reference or operate WireXpert while the battery is hot immediately after charging.

Make sure that the WireXpert is always operated within the allowed temperature range from 0-40°C. If a significant increase or decrease of the temperature is discovered, repeat the set reference procedure to remain the instrument's accuracy.

CAUTION

Use only the supplied power supplies with the WireXpert kit. Using other powers may damage the tester and void its warranty.

Battery Safety

1. To avoid the risk of fire, burns or damage to your battery pack, do not allow metal objects to touch the battery contacts.
2. The battery pack is suitable for use only with compatible WireXpert devices.
3. Do not disassemble the battery pack. There are no user serviceable parts inside. Do not dispose the battery pack in fire or water.
4. Handle a damaged or leaking battery with extreme care. If you come into contact with the electrolyte, wash the exposed area with soap and water. If the electrolyte contacts the eye, flush the eye with water for 15 minutes and seek medical attention.
5. Do not expose the battery pack to high storage temperatures (above 55°C).
6. When discarding a battery pack, contact your local waste disposal provider regarding local restrictions on the disposal or recycling of Lithium Ion batteries.
7. To obtain a replacement battery (part number WX_AC_BAT1), contact your local dealer.
8. Do not charge the battery pack if the ambient temperature is above 40°C.

Replacing Battery

The batteries are located and secured at the bottom of the WireXpert units for safety reasons.

To replace the batteries;

1. Switch off WireXpert and disconnect external power supplies.
2. Unscrew the battery compartment and remove the cover.
3. Remove and replace a new battery into the compartment.
4. Close, fasten and secure the screw onto the compartment cover.



Power Supply

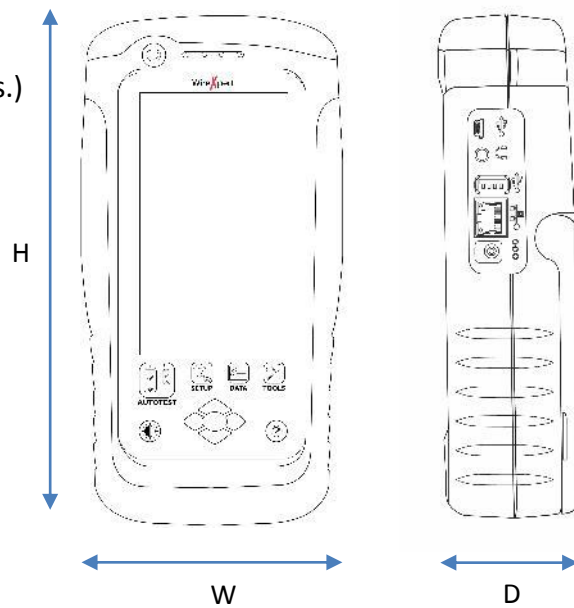
- Removable/rechargeable Li-Ion batteries provide more than 8 hours of continuous operation.
- AC power: 100~240V AC plugs directly into the battery. Alternatively, the batteries can be recharged using an external charging kit that can be ordered separately (WX_AC_CHARGER).

Dimension

- Size: 220mmH x 110mmW x 53mmD
- Weight: approx. 1.0 kg (approx. 2.2 lbs.)

Environmental Conditions

- Operating temperature: 0°C to 40°C
- Storage Temperature: 20°C to 60°C
- Relative humidity: 10% to 80%



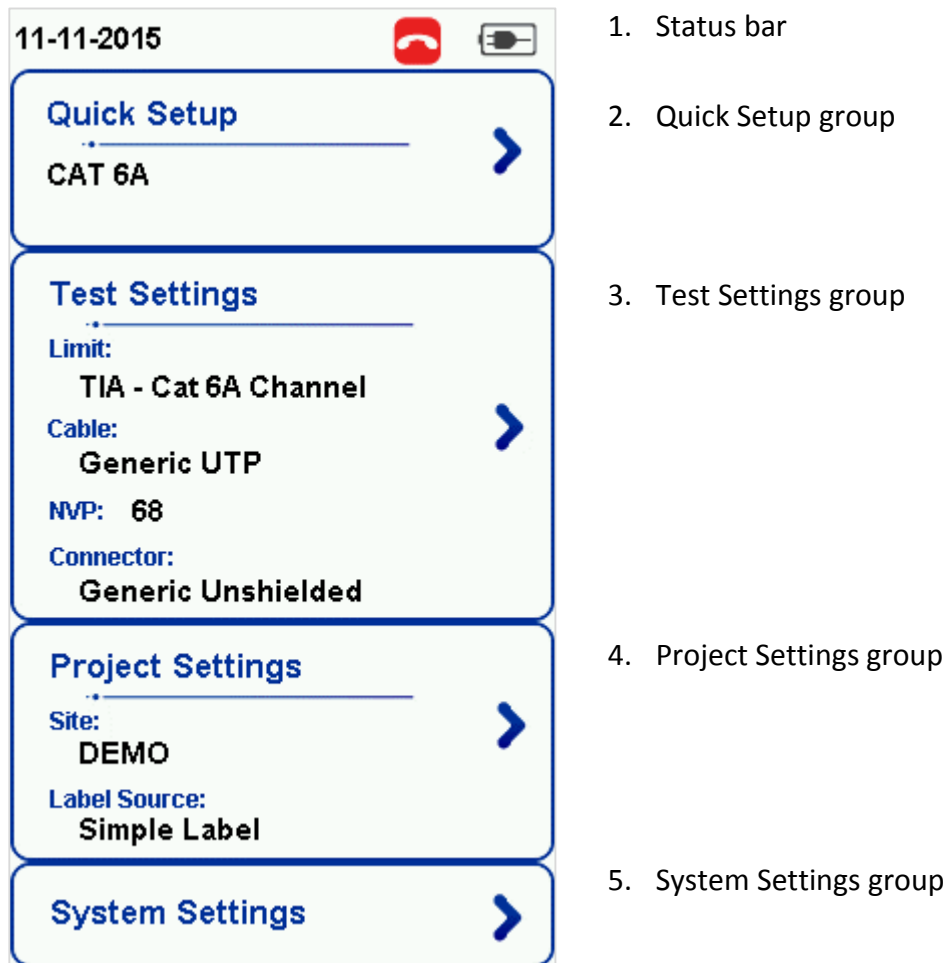
Chapter 2: Configuring WireXpert

WireXpert User Interface

Touch Screen Layout

The Graphical User Interface (GUI) in version 7.0's firmware has been updated with a more responsive system and quick-access menus.

WireXpert boots up to the SETUP screen. It is categorised into 5 groups:



1. The **Status bar** displays the current date and time, talk set and battery level. Tap icons to change/view setting.
2. The **Quick Setup** group provides quick selection with predefined configurations.
3. The **Test Settings** group provides results oriented configurations necessary to perform an AUTOTEST.
4. The **Project Settings** group provides non-results oriented configurations before performing an AUTOTEST.
5. The **System Settings** group settings provides device, time, localization and device related configurations.

The One Touch Access Buttons



The fundamental philosophy behind the WireXpert User Interface is simplicity in its ease of use. The main functions of the One-Touch access buttons as follows:





AUTOTEST



The “**AUTOTEST**” button will perform an immediate certification test on the last configured settings. If no settings were configured, default settings will be used.

Test results will be generated automatically after the test is completed.

You will receive any of the following 4 results after the “AUTOTEST”:

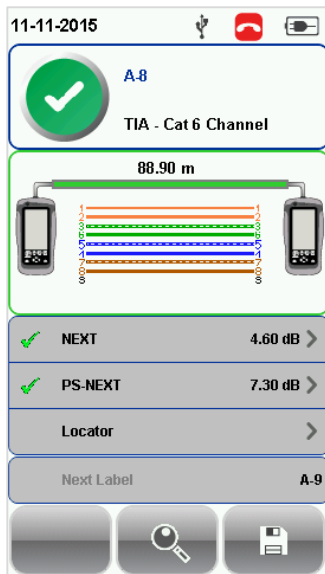
- 
 - Green “PASS” – Good test result in accordance to pre-defined settings
- 
 - Green “PASS*” – “PASS” result with one or more test parameters that have margin in the range of uncertainty of the tester.
- 
 - Red “FAIL” – Unacceptable results with severe disturbance on one or more test parameters.
- 
 - Red “FAIL*” – “FAIL” result with one or more test parameters that have negative margin in the range of uncertainty of the tester.

Note: Marginal Pass/Fail is enabled by default. Press the “SETUP” button >Test Settings > Test Options > Lab > Marginal Pass/Fail to change the presentation of the test result to clear “PASS” or “FAIL” results. Uncertainty of the tester is then not taken into account. Contact Psiber Data for more information.

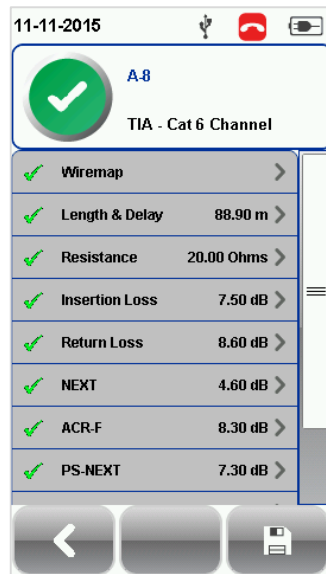
You will be given the following option after performing an AUTOTEST:

- “Retest” can be conducted on a PASS or FAIL result (if list based testing labelling scheme is selected).
- “View” details will display additional test parameters and plots.
- “Save” test results to device

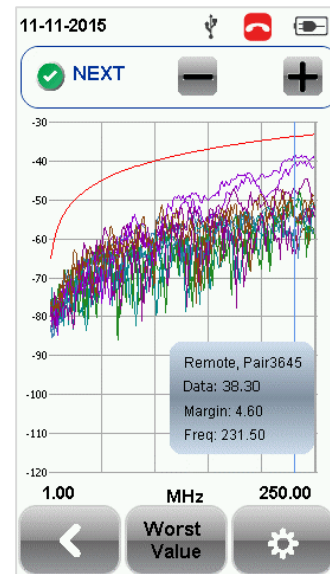
An “AUTOTEST” will fail in the event of missing connection between the Local and Remote units, wrong settings configured or if setting reference is required. WireXpert will perform an initial wire map test before testing other parameters. Disable wire map test at Test Settings > Test Options > Lab > Wire map to bypass this test.



AUTOTEST results



"View" detail results



Plots

Two worst tested parameters will be displayed on the result summary screen. Press the "View" button to view detailed results.

The type of results will differ depending on the Test Limits and type of cable.

SETUP

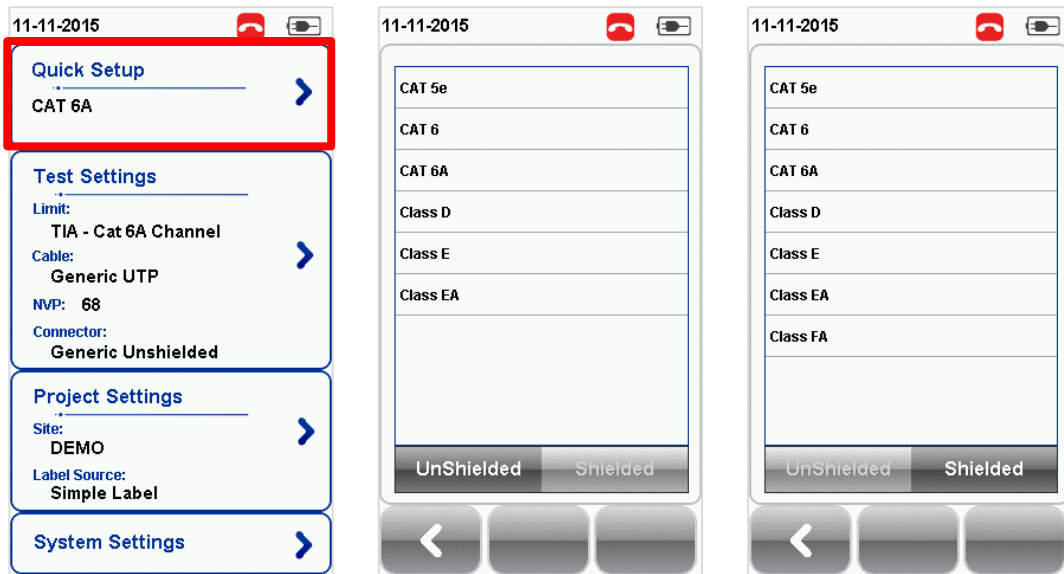


The "SETUP" button provides setting options necessary to conduct an AUTOTEST and configure the device.

These options include –

Quick Settings

Quick Settings provides quick selection using predefined TIA (CAT 5e/6/6A) and ISO (Class D/E/EA/FA) configurations for UTP/FTP cables. WireXpert will detect if Channel or Permanent Link adapter is used and changes its test limits automatically.



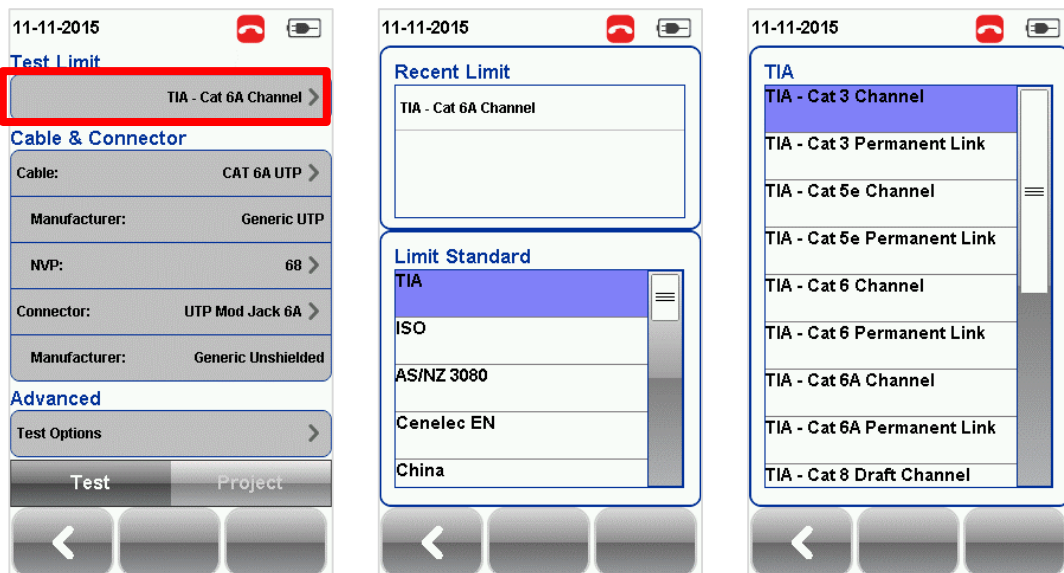
Test Settings

Test Settings provides results oriented configurations necessary to perform an AUTOTEST.

Test Limit

Choose from a list of standards to determine the performance criteria in a given category or class. Three of the most commonly used limits will be listed in the “Recent Limit” list.

Press the SETUP button > Test Settings > Test Limits to choose from a list of commonly used limits. Three recently used limits will be on top of the list.



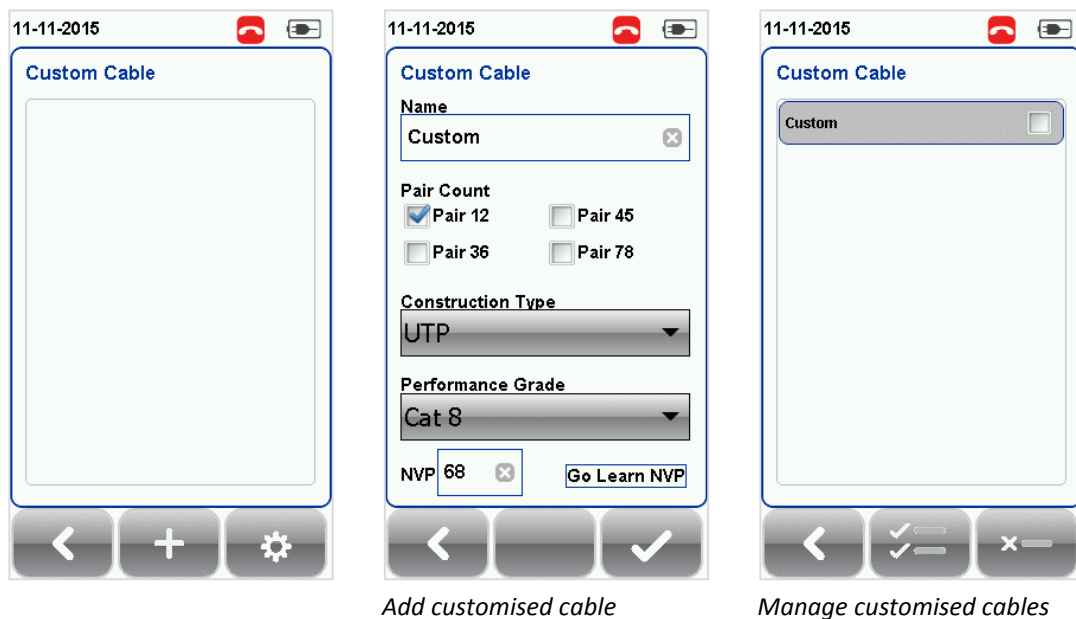
Cable

Choose from a list of cable manufacturer for more specific test parameters. If unsure of manufacturer, choose “Generic UTP” or “Generic Shielded”, or “Customized Cable” to create custom cable.


Press the SETUP button > Test Settings > Cable Manufacturer to choose from a list of cable manufacturers. If unsure of manufacturer, choose “Generic UTP” or “Generic Shielded”, or “Customised Cable” to create custom cable.

Customized Cable

Click “Add” to add or “Delete” to remove customized cable(s) from the customised cable list.



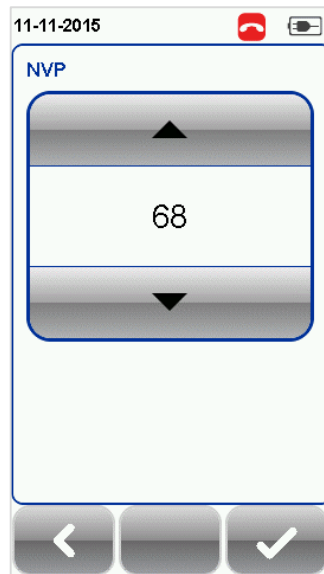
When creating customised cable, determining the cable name, number of pairs, construction type, performance grade(S/FTP) and cable’s NVP is required.

 WireXpert introduces the “**Manage**” button on version 7.0 firmware. “Manage” enables multiple saved items such as sites, operators, customized cables, customized connectors and results to be selected and deleted simultaneously.

NVP

Determine the Nominal Velocity of Propagation (NVP) value of the cable. The NVP factor is required to determine the accurate length of the cable run to be measured. Based on this constant value, the WireXpert performs its TDR calculations. Please see the cable’s data sheet for the specific value of the cable type in use.

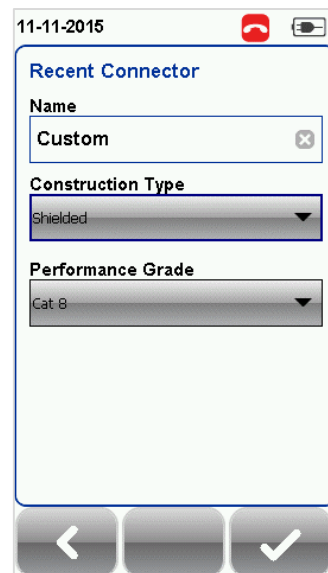
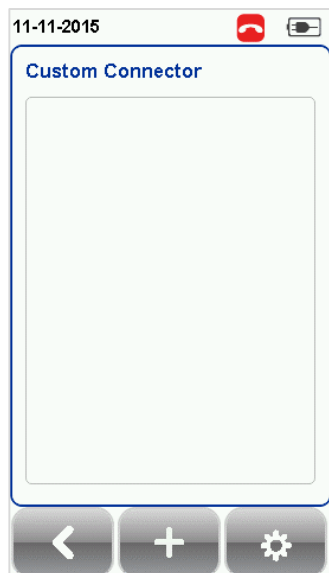
If the specific NVP value is unknown, go to TOOLS > “Learn NVP” to determine the value using the predefined cable run of at least 30 meters or 100 feet.



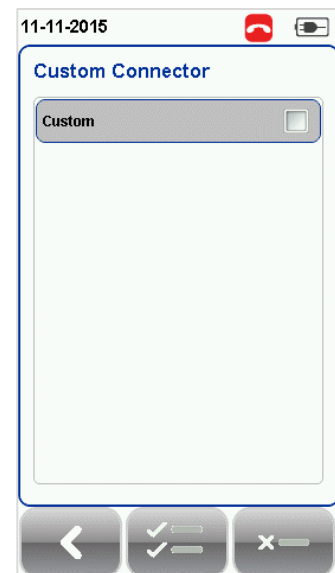
Connector

Press the SETUP button > Test Settings > Connector Manufacturer to choose from a list of connector manufacturers. If unsure of manufacturer, choose “Generic UTP” or “Generic Shielded”, or “Customised Connector” to create custom connector.

Click “Add” to add or “Delete” to remove customised connector(s) from the customised connector list.



Add customized cable



Manage customized cables

Advanced Test Options

Advanced Test Options determines how the test will be conducted and results will be displayed.

General

- Locator – If enabled, WireXpert will display NEXT and Return Loss (RL) fault information in an AUTOTEST result. Disabled by default.
- Cable Pairing Type – Choose T568A or T568B copper cable wiring standard. “B” selected by default.
- Start AUTOTEST On Connection – If enabled, WireXpert will perform AUTOTEST as soon as a connection between Local and Remote is established. Disabled by default.
- Direct Attach – If enabled, WireXpert will perform Direct Attach copper installation test. Attach Permanent Link adapter to the Local and Patch Cord adapter to the Remote unit to perform this test. Connect Local unit to patch panel and Remote to field terminated end. Disabled by default.
- AC Wire map – If enabled, WireXpert is able to measure test runs with Power over Ethernet (PoE) midspan devices in between. The WireXpert supports cable runs with IEEE 802.3 af and 802.3 at injectors. Disabled by default.

Lab

Laboratory use only. Please contact your local WireXpert Vendor for more information.

- WireMap Test – If enabled, WireXpert will not ignore failed wire maps during test. Enabled by default.
- Marginal Pass/Fail – If enabled, WireXpert will display marginal pass (PASS*) and marginal fail (FAIL*) results. Enabled by default.
- Save Phase Data – If enabled, WireXpert will generate information for phase data plot generation. Export saved results to CSV format using eXport software to obtain phase data. Impedance plot will be displayed on eXport. Disabled by default.
- 3/4 dB Rule – If enabled, WireXpert will ignore RL failures if Insertion Loss (IL) is <3dB and NEXT failures if IL is <4dB. Disabled by default.

Project Settings

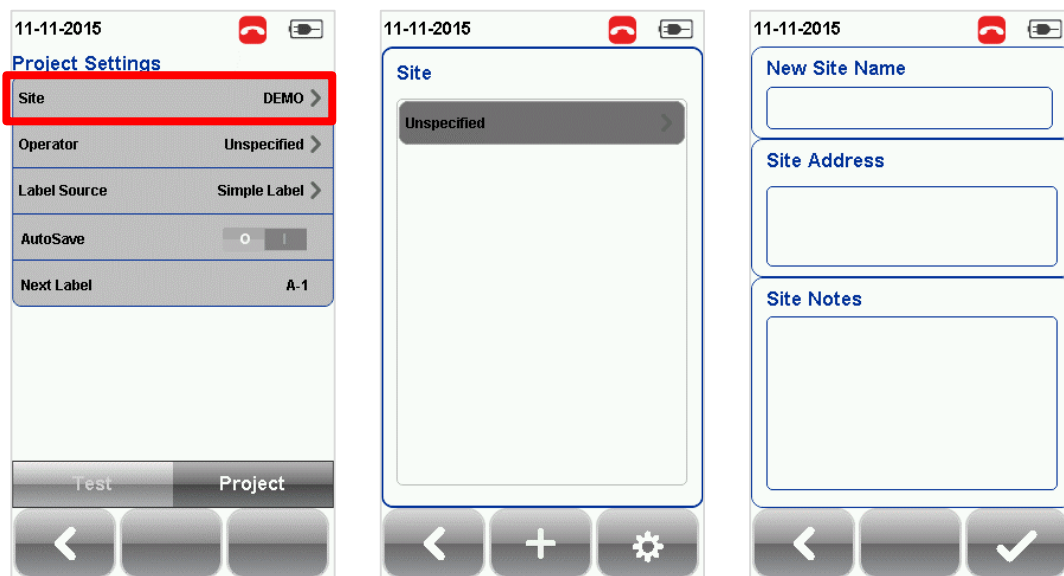
Project Settings provides non-results oriented configurations before performing an AUTOTEST.

Site

To add a site,


1. Press the SETUP button > Project Settings > Site to begin adding a new site.
2. Click the “Add” button to add a new site.
3. Enter a Site Name. Site Name is a required field. Test results and label source will be saved under the created Site.
4. Site Address and Site Notes are optional fields, but they provide additional information of the site.
5. Press “OK” to save site and proceed.

By default, WireXpert creates an “UNSPECIFIED” site for default saving as long as new sites are not created.



To delete a saved site,

1. Press the “Manage” button.
2. Select site(s) and press the “Delete” to delete site(s).

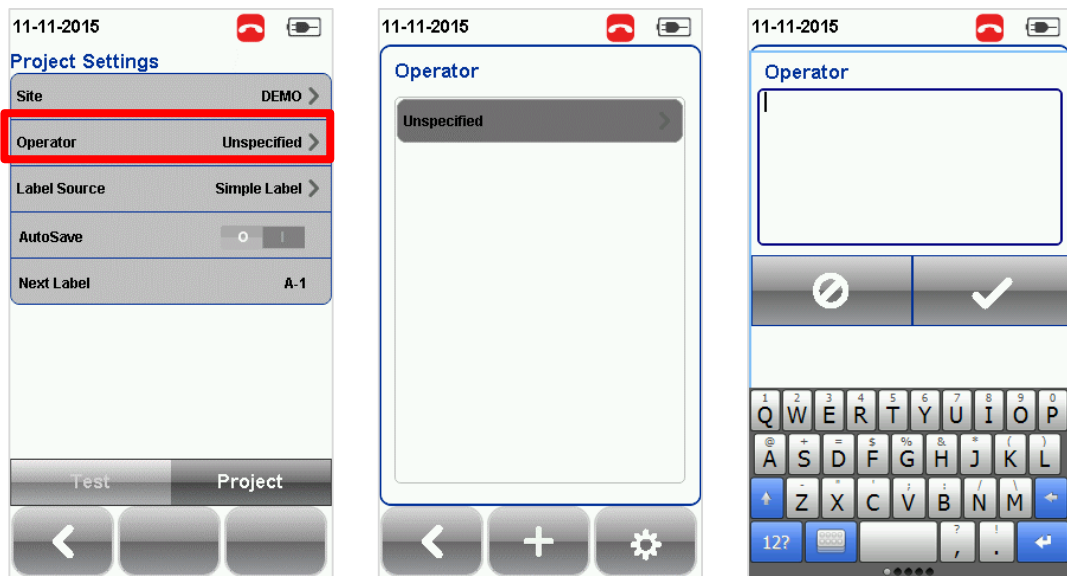
 WireXpert introduces the “**Manage**” button on version 7.0 firmware. “Manage” enables multiple saved items such as sites, operators, customized cables, customised connectors and results to be selected and deleted simultaneously.

Operator

To add a site,

1. Press the SETUP button > Project Settings > Operator to begin adding an operator.
2. Click the “Add” button to add a new operator.
3. Enter Operator Name.
4. Press “OK” to save site and proceed.

By default, WireXpert creates an “UNSPECIFIED” operator for default saving if new operators are not created.

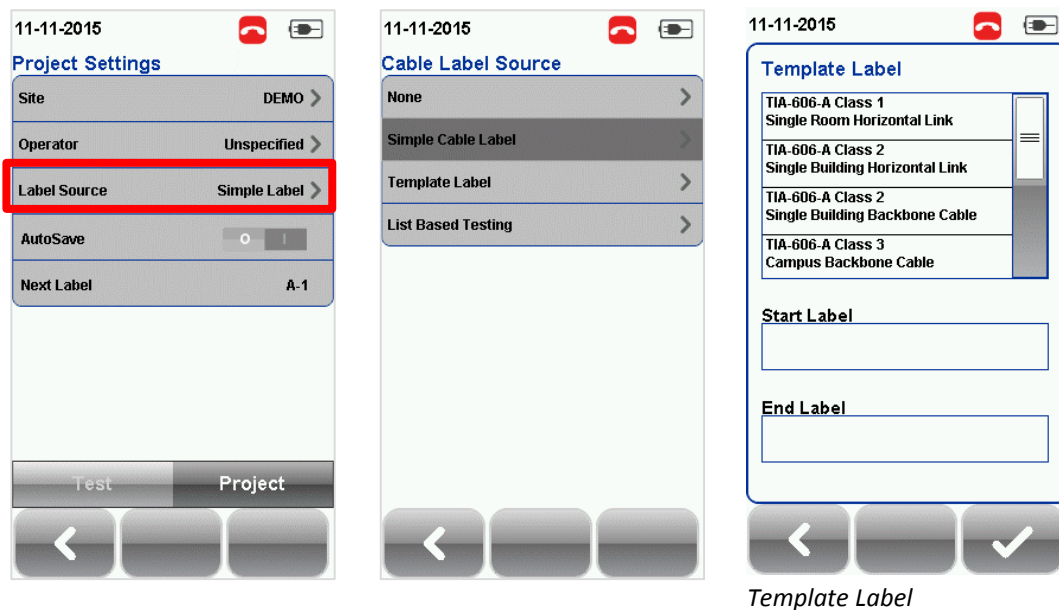


To delete a saved operator,

3. Press the “Manage” button.
4. Select operator(s) and press the “Delete” to delete operator(s).

Label Source

Press the SETUP button > Test Settings > Label Source to choose from a list of scheme.



Template Label

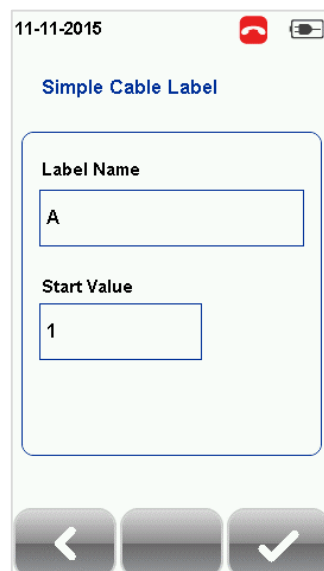
None

Manual input of label names is required for every saving of result.

Simple Label

Provides simple numeric increments to a prefix. To configure the simple label scheme:

1. Enter desired Prefix (e.g. Office, Company X)
The prefix will remain unchanged by every result.
2. Set a numeric start value (e.g. 1, 33, 245)
The counting value will raise one number with every test made.



Template Label

TIA-606-A Class 1 (Single Room Horizontal Link)

TIA-606-A Class 1 standard labelling scheme mainly used to support labelling for a building or premises that is served in a single equipment room or a horizontal cross-connect.

The default “1A-A1” generally refers to “Floor + Tel Room – Panel + Port”.

TIA-606-A Class 2 (Single Building Horizontal/Single Building Backbone Cable)

TIA-606-A Class 2 standard labelling scheme, mainly used to support labelling of infrastructure with one or more telecommunication spaces in a single building.

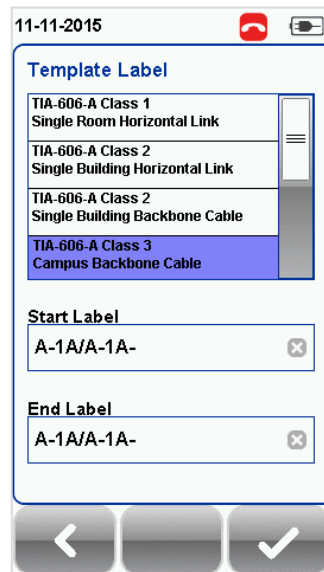
The default “1A-A1” for Horizontal Link generally refers to “(1) Floor + (A) Tel Room – (A) Panel + (1) Port”.

The default “1A/1B-” for Backbone Cable generally refers to “(1)Tel Room 1 Floor + (A)Tel Room 1 Name / (1)Tel Room 1 Floor + (B)Tel Room 2 Name” followed by - “Backbone Cable . Cable”

TIA-606-A Class 3 (Campus Backbone Cable)

TIA-606-A Class3 standard labelling scheme, mainly used to support labelling for multiple buildings in a single site.

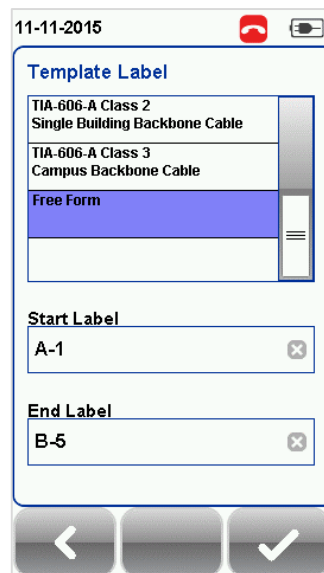
The default “A-1A/A-1A-” generally refers to “(A)Building 1 Name - (1)Tel Room 1 Floor + (A)Tel Room 1 Name / (A)Building 2 Name – (1)Tel Room 2 Floor + (A) Tel Room 2 Name” followed by - “Backbone Cable . Cable”



Free Form

Free Form provides simple numeric increments to 2 or more prefix.

The default start “A-1” and end “B-5” labels will generate labels “A1 to A5 and B1 to B5”.

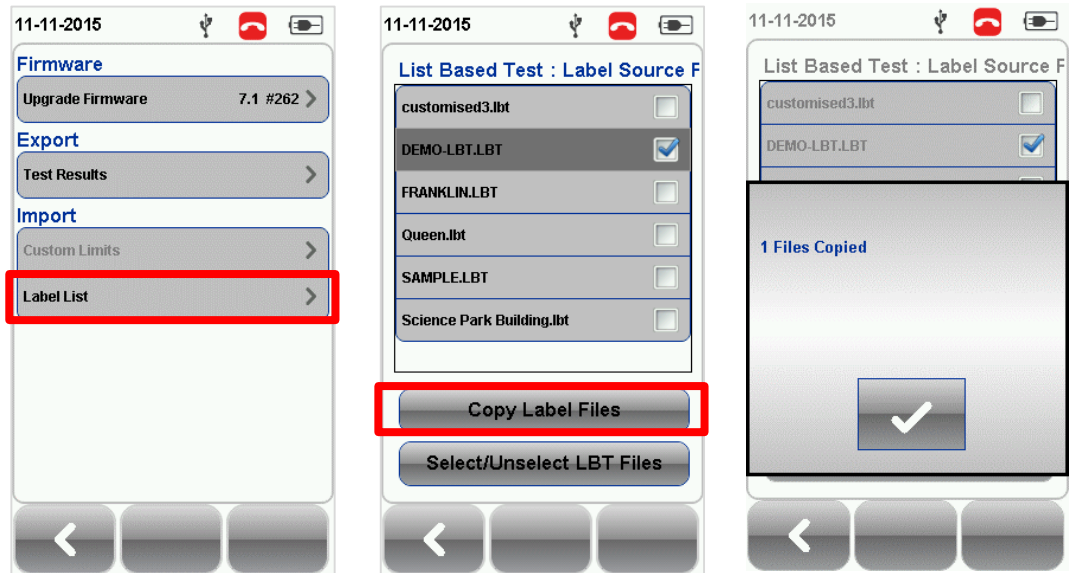


List Based Testing

List based testing allows creation of label list in the eXport software on PC and then bring the list to WireXpert. It further allows easy selection of labels from the list to help technician select the cables to be tested quickly. This testing method is carefully optimized for typical test work-flow, and it significantly improves productivity.

1. Insert USB flash drive to USB port on WireXpert.

2. Device will automatically detect USB flash drive.
3. Select “Label List”.
4. Select the custom label list(s) to be copied from the USB flash drive.
5. Press “Copy label files from USB” to proceed.
6. Click “OK”.



7. Press the “SETUP” button > Project Settings > Label Source > List Based Testing
8. Select label source file and click “OK” to continue.



Refer *User Manual – eXport* for more information on generating list based labels.

9. Press the AUTOTEST button to display the loaded cable list.
10. Select label from list to begin AUTOTEST.
11. WireXpert will automatically save a PASS result and return to the list, or allows you to save or conduct a re-test for a FAIL result manually.

12. Select a tested label to view the results. A green result indicates a PASS and a red result indicates a FAIL test. A re-test can be conducted by pressing "Retest".
13. Press the AUTOTEST button to return to the list.

AutoSave



Enable option for WireXpert to auto save every PASS result. Option will be enabled for List Based Testing.

System Settings

Length Unit



Press the SETUP button > System Settings > Settings 1 > Device Settings > Length Unit to select the preferred length unit to be displayed. Feet (FT) and Meters (M) are available.

Plot Y-axis Direction



Press the SETUP button > System Settings > Settings 1 > Device Settings > Plot Y-axis Direction to select the how the plot's Y-axis will be display. Normal and Inverted Y-axis are available.

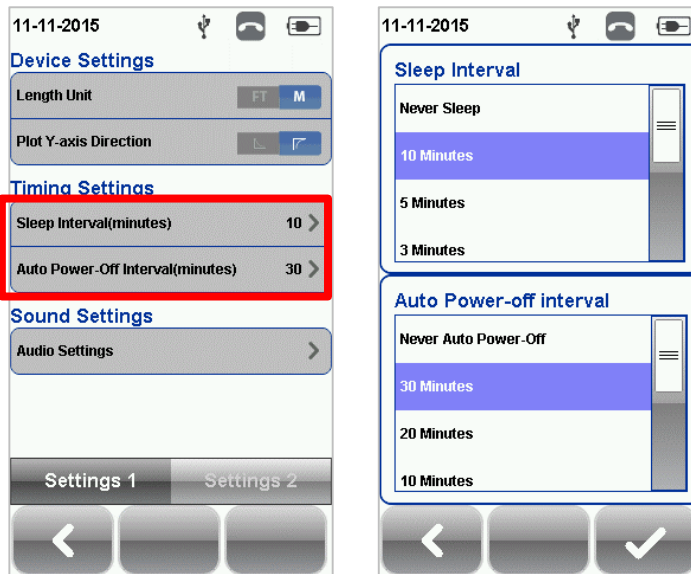
Sleep and Auto Power-off Interval

For Sleep Interval,

Press the SETUP button > System Settings > Settings 1 > Sleep Interval to select the idle duration before WireXpert enters the sleep (power saving) mode.

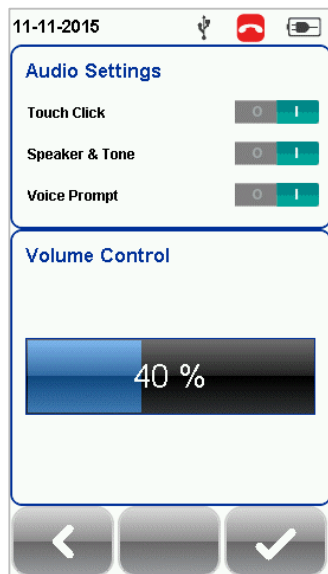
For Auto Power-off Interval,

Press the SETUP button > System Settings > Settings 1 > Auto Power-Off Interval to select the idle duration before WireXpert performs an automatic shutdown.



Audio Settings

Press the SETUP button > System Settings > Settings 1 > Audio Settings to configure various audio options for WireXpert.



Touch Click – Enable option to trigger clicking sound options on screen touch.

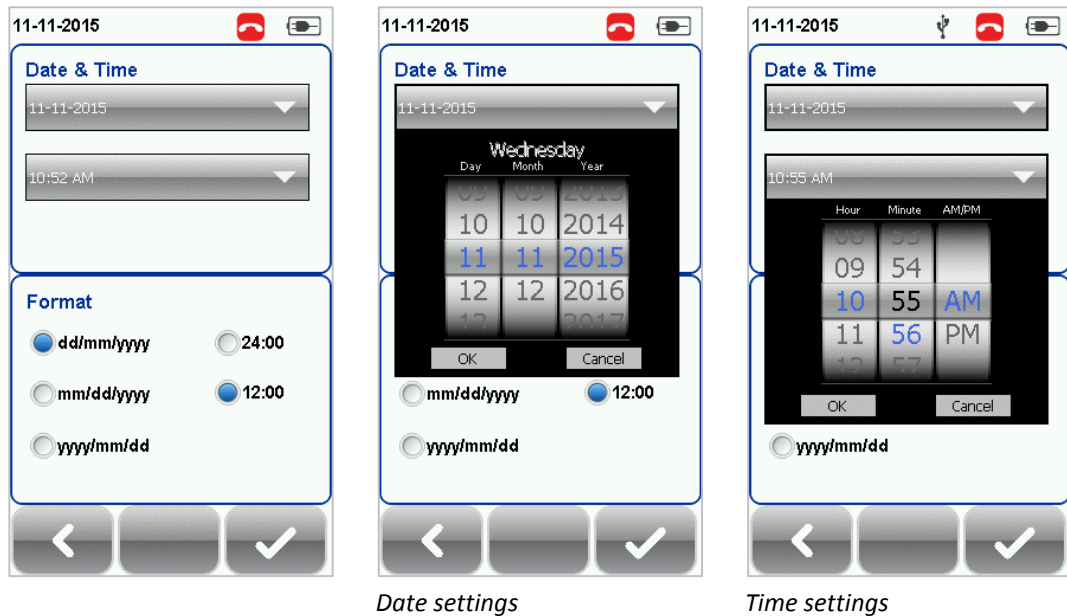
Speaker & Tone – Enable option to trigger system sound options, e.g., boot up.

Voice Prompt – Enable option to trigger system vocal notifications on action.

Volume Control – Adjust for audio loudness.

Date and Time

Press the SETUP button > System Settings > Settings 2 > “Date & Time to configure date, time and display format.



Date settings

Time settings

Language

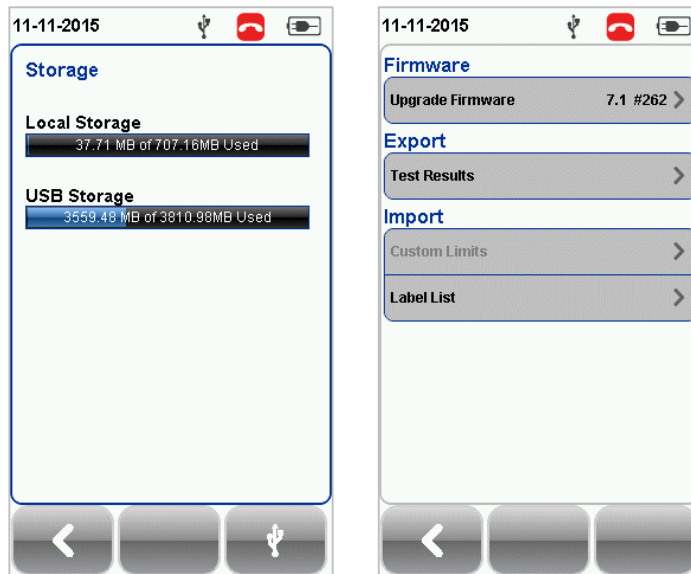
Press the SETUP button > System Settings 2 > Language to select preferred display language.



Storage

Press the SETUP button > System Settings > Settings 2 > Storage to view available storage space on WireXpert and USB flash drive if inserted.

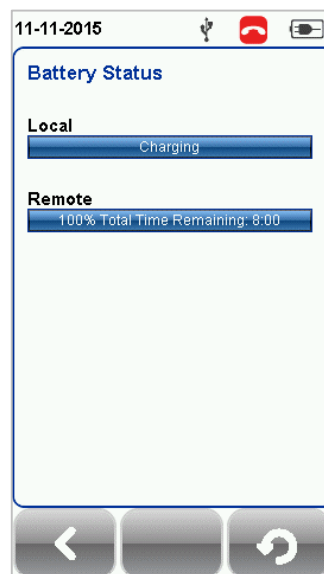
Read USB flash drive by clicking the USB icon if prompt did not appear or closed after inserting USB flash drive.



Read USB flash drive

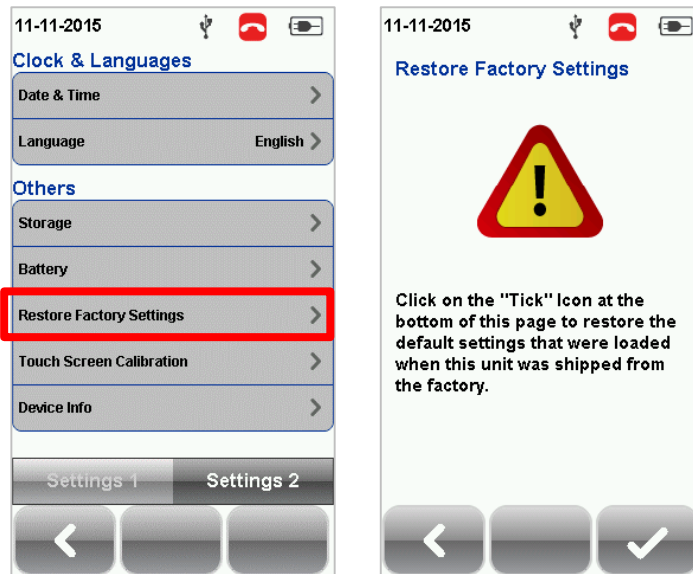
Battery

Press the SETUP button > System Settings > Settings 2 > Battery to view battery level. Battery levels of Local and Remote will be displayed if units are connected



Restore Factory Settings

Press the SETUP button > System Settings 2 > Settings 2 > Restore Default Settings to restore WireXpert to factory settings. Click "OK" to begin restoration.

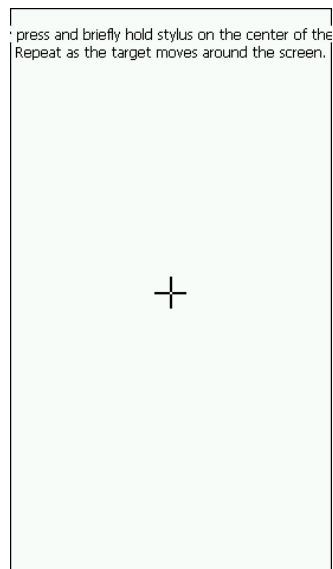


CAUTION

Restoring WireXpert to default settings is an irreversible action. All user defined settings and stored test results will be erased and cannot be recovered.

Touch Screen Calibration

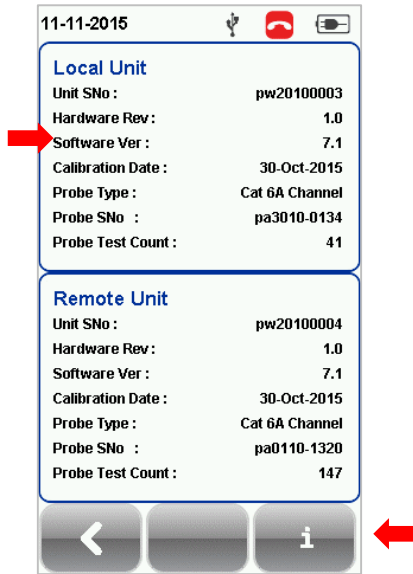
Press the SETUP button > System Settings > Settings 2 > Touch Screen Calibration to re-adjust mechanical alignments of the touch screen. Follow on-screen instructions to begin calibration.



Device Info

Press the SETUP button > System Settings > Settings 2 > Device Information to check the device and probe serial numbers, software and hardware version numbers, device last calibrated date and probe test count.

Click on the "Info" button for more information on the firmware.

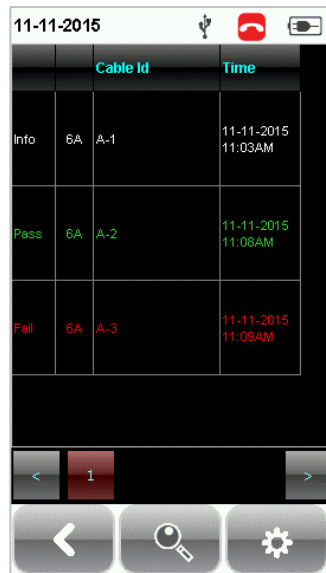
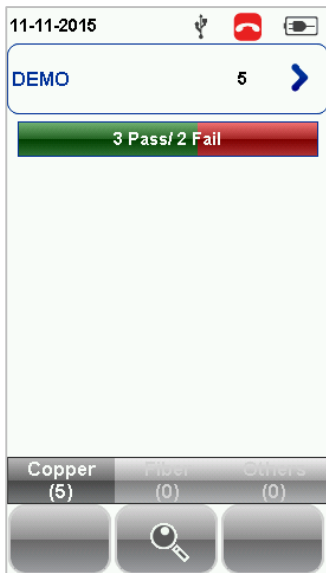


CAUTION
 To ensure accurate test results, it is recommended to have WireXpert units calibrated every year. Contact vendor for more information.

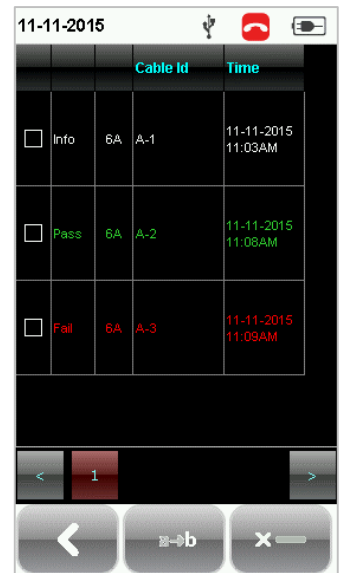
DATA



The “**DATA**” button provides archive and data management ability to saved sites and test results. Saved test results can be renamed or deleted in this option.



View results



Manage results

Note: Deleting a site will also delete its containing test results.

TOOLS



The “**TOOLS**” button provides advanced options for in-depth troubleshooting and expert WireXpert users. These options include-



Requires:
Local and Remote

Set Reference – Performs loss compensation through calculation from setting of referencing point.



Requires:
Local or Remote

Length & Delay – Performs a test to determine the length and propagation delay of each pair using the NVP value programmed by the user.



Requires:
Local and Remote

Wiremap – Verifies end-to-end wire mapping of cable.



Requires:
Local and Remote

Learn NVP – Performs a test to determine the NVP of the cable using the length value programmed by the user



Requires:
Local or Remote

Reset Probe – Resets Perm. Link adapter usage count once a new link cord is in place



About – Displays worldwide contact information for Psiber Data and Softing.

Note: 30 meters (100 feet) cable length is at least required to get a valid NVP value!

WireXpert Firmware

Adapter Detection

WireXpert firmware detects which adapters are connected to the Local and Remote units and configures the testing program to match these adapters. Test limits are automatically changed to the type of adapter (Channel or Permanent Link) upon a Quick Setup selection. For instance, if a Channel adapter is attached and a CAT6 profile is selected the limit is automatically configured for CAT6 Channel Testing.

Digital Fault Finding

WireXpert software automatically pinpoints cable fault locations and causes, speeding problem resolution and increasing operator productivity.

Applications

WX4500 provides complete certification solutions to major copper cabling and fiber optic installations. Depending on requirements, separate kits, components or customised adapters can be purchased to provide more specialised tests and certifications.

WX500 provides the best cost efficient solution for installers who wish to certify only up to Cat6A. WX500 runs on the same hardware and firmware as WX4500, but is calibrated to test only up to 500MHz.

For a list of available adapters, please visit www.psiberdata.com.

Data Management

WireXpert data management software, *eXport*, enables management of saved results such as finding, renaming, deleting, printing and creating custom labels. Please refer to *User Manual – eXport* for more information.

Adapter Configuration

WireXpert uses different adapters to test and certify different cabling runs. The device automatically detects which adapters are attached and selects matching test parameters.

Adapter Insertion Counts

Every WireXpert adapter can keep track of the number of tests performed. This data ensures up to date information on the adapter's lifespan. WireXpert will indicate a warning when the adapter insertion counts has expired the specified insertion counts lifespan. This can be checked by pressing the "SETUP" button > System Settings 2 > Device Info > Probe Test Count

Upgrading the firmware

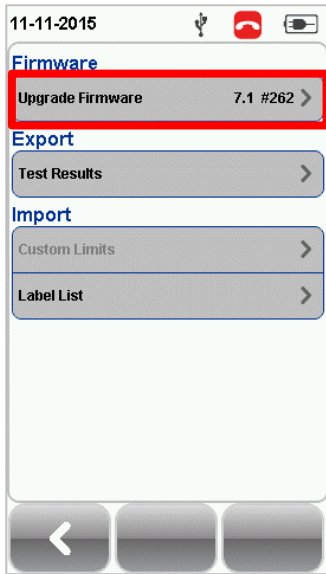
Upgrade WireXpert firmware to ensure latest test standards and device features are up to date. To upgrade WireXpert's firmware,

- Download and install the latest build of eXport software from psiberdata.com
- Export the firmware using an USB flash drive
- Backup the test results in the device
- Insert the flash drive to the USB port on WireXpert
- Choose the upgrade firmware option and click "Yes" to begin upgrade

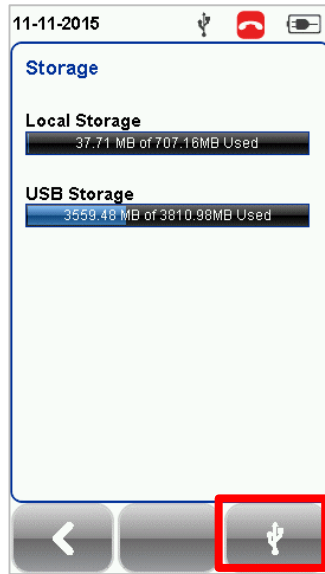
If the upgrade prompt do not appear after inserting the USB flash drive, press the SETUP button > System Settings 2 > Storage > USB and select "Upgrade Firmware".

Upgrading from an older version (< v7.0.0)

Upgrading from older version is possible by following the same procedures. WireXpert will detect the firmware from the USB flash drive and upgrade the firmware.



Upgrade prompt



If the Upgrade prompt did not appear, press SETUP button > System Settings 2 > Storage and click the USB button to launch the prompt manually

CAUTION

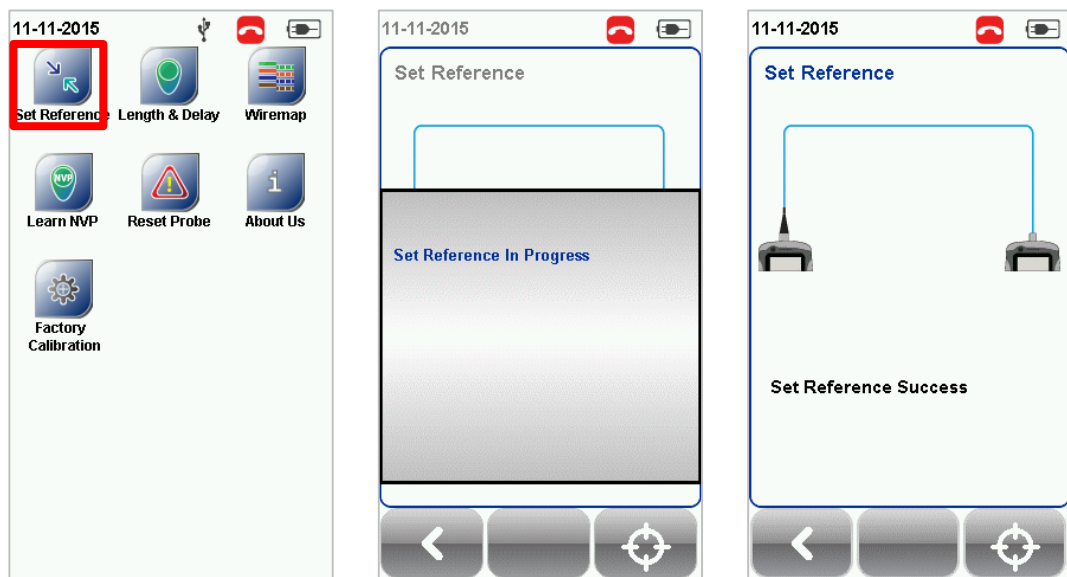
Test results and custom data in the device will be permanently removed during firmware upgrade. Please export all results and data to USB flash drive before proceeding.

Chapter 3: Setting Reference

It is necessary to perform a set reference measurement if the Local and Remote units are being paired for the first time. If there is a mismatch in firmware versions or a set reference has not been performed, AUTOTEST will be denied, until these conditions are corrected. Please also verify before testing that calibrations are not expired.

To set reference,

1. Connect a Permanent Link adapter to the Local unit.
2. Connect a Channel adapter to the Remote unit.
3. Connect the 2 units together using the patch cord provided in the kit.
4. Press the TOOLS button > Set Reference

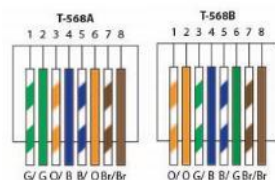


5. Set Reference will fail in the event of-
 - Adapter probe mismatch, i.e., two channel or permanent link adapters
 - Firmware version mismatch between Local and Remote units
 - No connection between Local and Remote units

Chapter 4: Configuring an AUTOTEST

After configuring the system settings, follow these steps to set up an AUTOTEST.

1. Press the SETUP button > Project Settings
 - a. Site – Create or select a Site
 - b. Operator – Create or select an Operator
 - c. Label Source – Select cable labelling scheme. Load labels from USB flash drive if using List Based Testing (LBT).
 - d. AutoSave – Enable option for WireXpert to auto save every PASS result.
2. Press the SETUP button > Quick Setup to select pre-defined test limit settings using matching generic UTP/FTP cable and FTP connector.
3. Manual Setup – Press the SETUP button > Test Settings
 - a. Test Limit – Select a test limit
 - b. Cable – Create a custom or select cable from list. Select “Generic” if unsure.
 - c. Connector - Create a custom or select connector from list. Select “Generic” if unsure.
 - d. Test Options > General
 - i. **Locator** – Enable option to display the worst NEXT and Return Loss (RL) fault information in an AUTOTEST result. Default has been set to OFF.
 - ii. **Cable Pairing Type** – Select if cable under test is paired using the T568-A or T568-B standard.



- iii. **Auto Test on Connection** – Enable option to perform AUTOTEST on, i.e, as soon as the connection between Local and Remote units is established. Default option has been set to OFF.
- iv. **Direct Attach** – Enable option only if performing Direct Attach installation test. Default option has been set to OFF.
- v. **AC Wire map** – Enable option to bypass testing DC parameters. Default option has been set to OFF.

Please ensure you have the following components before conducting the test;

- WireXpert, Local & Remote units (WX4500)
Permanent Link Testing
- 2 x Permanent Link Adapter (WX_AD_6APL2)
- 2 x Patch Cord (WX_AC_6ALCORD2)
Channel Testing
- 2 x Channel Adapter (WX_AD_6ACH2)



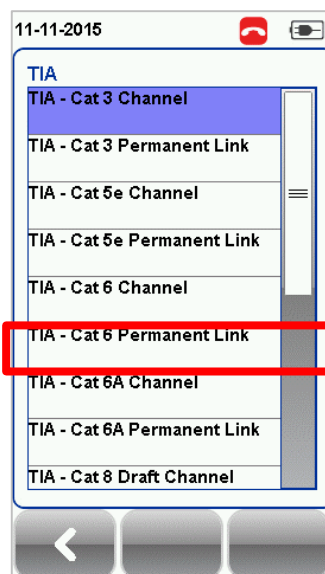
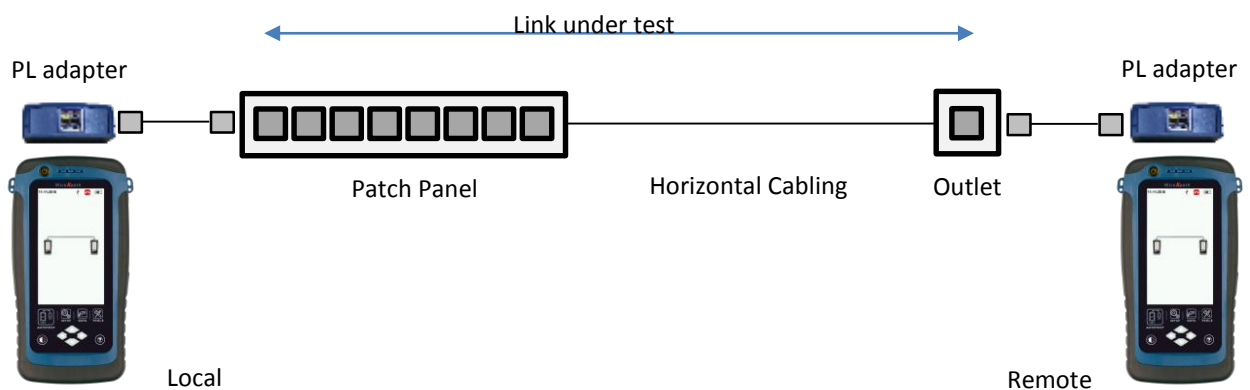
CAUTION

Do not connect WireXpert to a voltage source such as an active telephone jack. Excessive voltage will damage the units and the adapter and void the warranty.

Testing Guide for Permanent Link Testing

Permanent Link (PL) test is comprised of the connection from a patch panel to a telecommunication outlet (horizontal cabling) using Permanent Link test adapters at each end of the link under test.

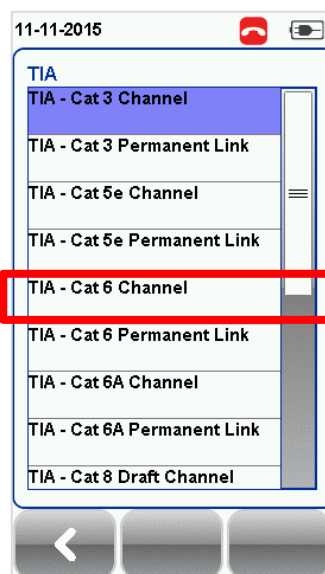
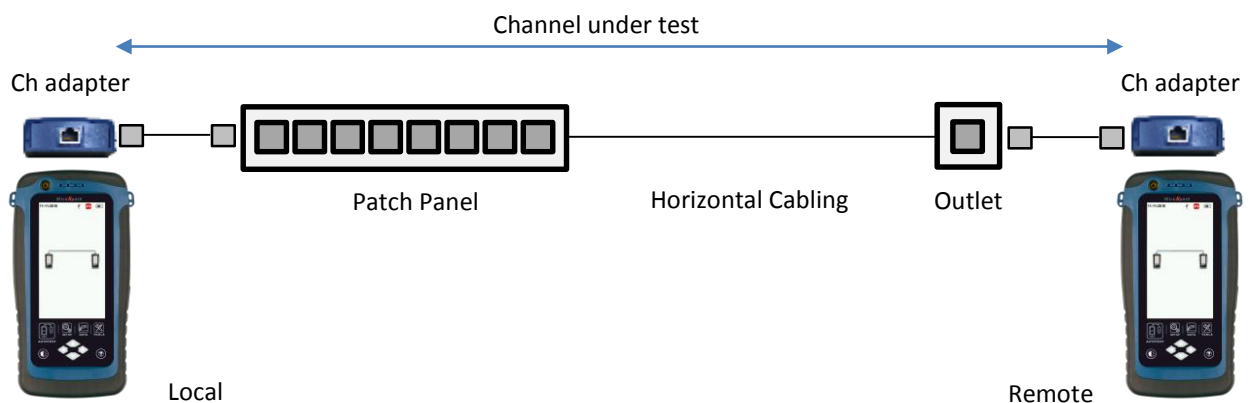
1. Insert the Permanent Link adapters into the Local and Remote units of the WireXpert.
2. Power ON WireXpert. Check that WireXpert is in Copper testing mode.
3. Set reference is required if the units are being paired for the first time. Refer to Chapter 2 on how to set reference.
4. Choose the Permanent Link limits and configure other settings if necessary.
5. Connect the Local unit to the patch panel and Remote unit to the outlet using the patch cord provided.
6. Press the AUTOTEST button to begin AUTOTEST.



Testing Guide for Channel Testing

Channel (Ch) test is comprised of the connection from an active device (egg. Router) in a data rack, a telecommunication outlet (horizontal cabling) and the connecting patch cords at both ends using Channel test adapters at each end of the link under test. The recommended length for the patch cord from the patch panel and the outlet is 5m.

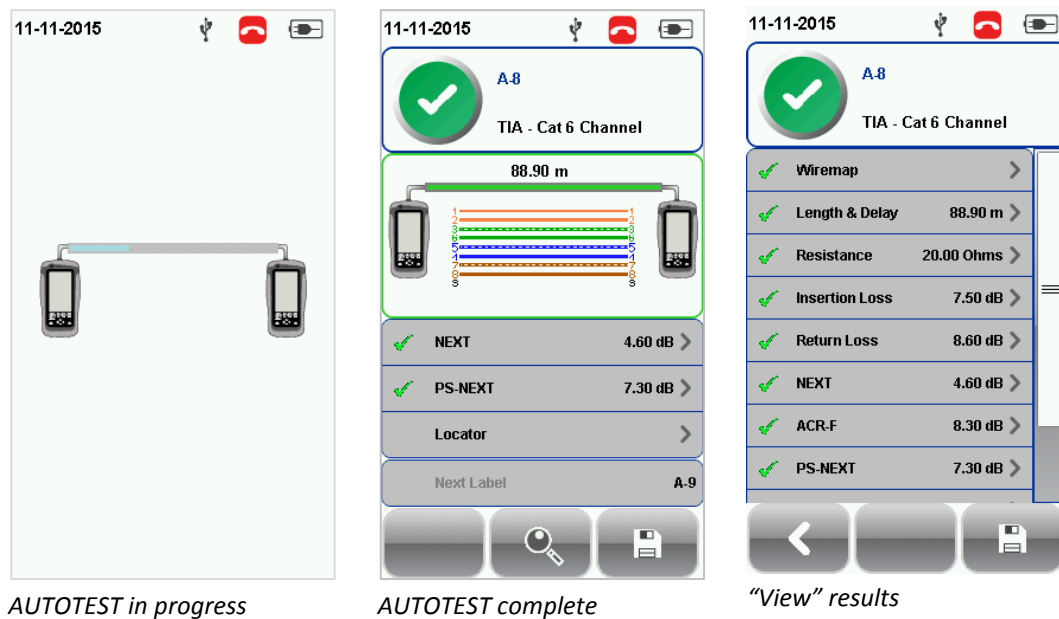
1. Insert the Channel adapters into the Local and Remote units of the WireXpert.
2. Power ON WireXpert. Check that WireXpert is in Copper testing mode.
3. Set reference is required if the units are being paired for the first time. Refer to Chapter 2 on how to set reference.
4. Choose the Channel limits and configure other settings if necessary.
5. Connect the Local unit to the patch panel and Remote unit to the outlet using the patch cord connected to be used.
6. Press the AUTOTEST button to begin AUTOTEST.



Chapter 5: Performing an AUTOTEST

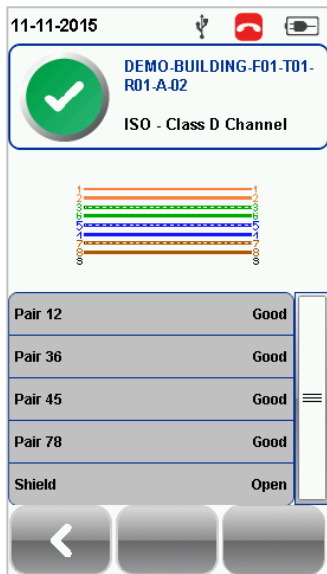
Press the AUTOTEST button once settings and limits have been selected. WireXpert will use the last configuration or factory settings to perform the AUTOTEST if new settings are not configured.

WireXpert will display summarized result with PASS or FAIL once AUTOTEST is completed. Press the “View” details button to view the comprehensive result or the “Save” button to save the results.

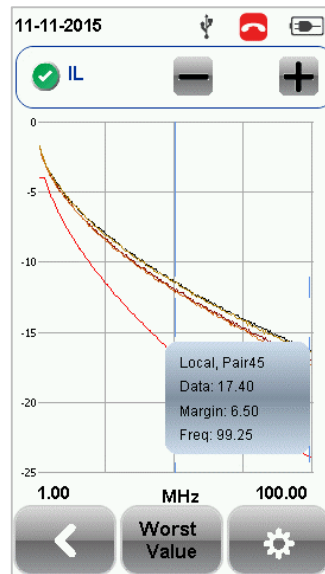


Click on the parameter to display a more comprehensive individual result.

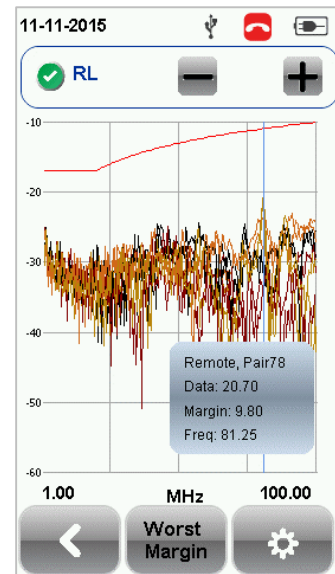
In plot view, press the “Worst Margin” button to view the worst margin. Press again to view the “Worst Value” or press the “Manage” button for more options.



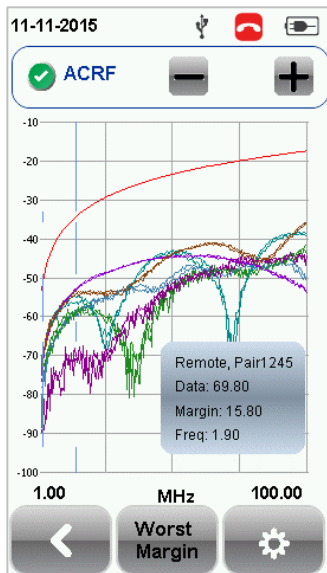
Wire map



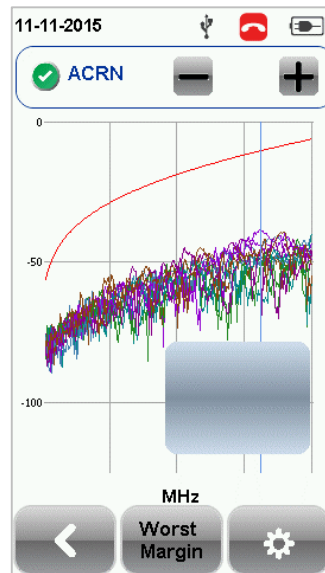
Insertion Loss



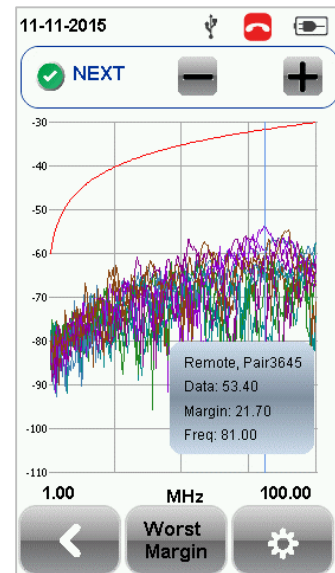
Return Loss



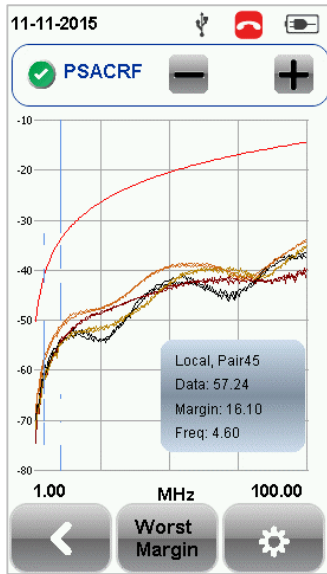
Attenuation to Crosstalk Ratio, Far-end



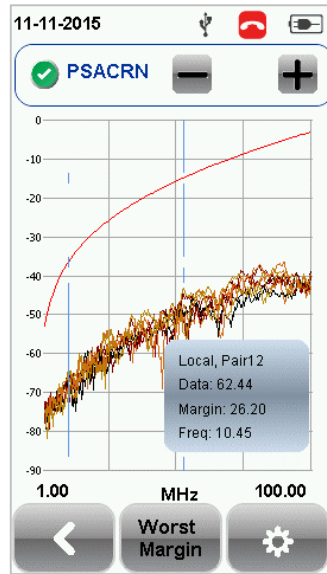
Attenuation to Crosstalk Ratio, Near-end (ISO only)



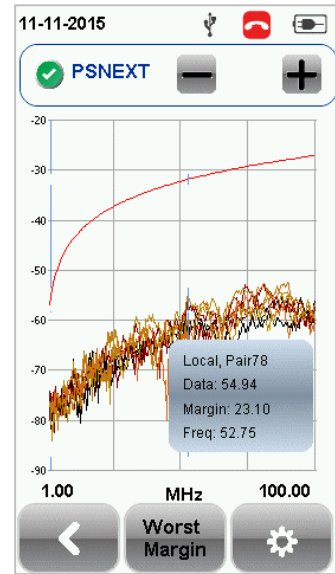
Near-end Crosstalk



Power-sum ACRF



Power-sum ACRN (ISO only)



Power-sum NEXT

Manage plots

Pairs	Resistance
Pair 12	3.60 Ohms
Pair 36	6.80 Ohms
Pair 45	8.00 Ohms
Pair 78	6.80 Ohms
Δ	4.40 Ohms

Resistance

Pairs	Length(m)	Delay
Pair 12	89.00	447
Pair 36	92.50	464
Pair 45	93.50	469
Pair 78	89.70	450
OverAll	89.00	
Delay Skew		22

Length & Delay

NEXT and RL Fault Locating

If the Locator option is enabled in the Test Settings > Test Options, WireXpert will display extremely critical troubleshooting information in the form of a Time Domain Reflection plot for NEXT and Return Loss.

Near-End Crosstalk (NEXT) is an undesired effect of interference between two pairs in a cable measured at the same end of the cable as the interfering transmitter. In crosstalk, the signals traveling through adjacent pairs of wire in twisted-pair cabling interfere with each other. Cross talk is undesirable.

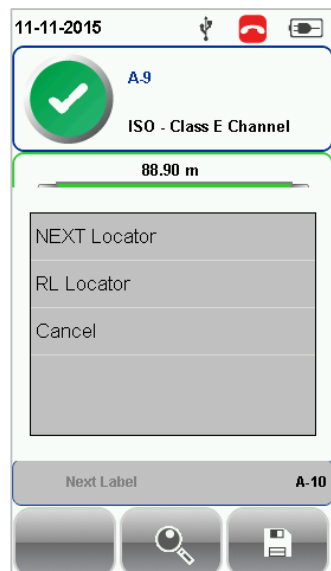
The NEXT Locator displays the locations where crosstalk is excessive in the cable and indicate the exact location in meters or feet from the Local unit of where high crosstalk issue is seen.

View individual plot by selecting/deselecting cable pairs. Each two pairs of cables that have been tested for crosstalk are represented by different colour in the plot.

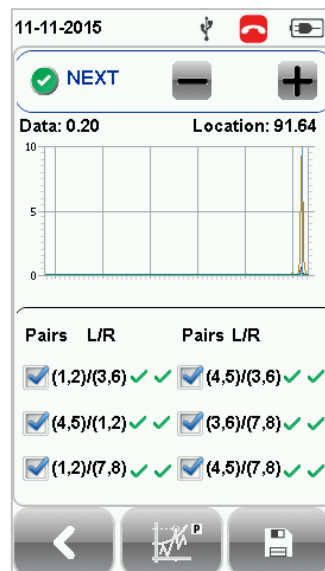
Return Loss (RL) is the measurement (in dB) of the amount of signal that is reflected back toward the transmitter. Impedance mismatches and discontinuities caused by terminations to plugs or jacks and within the plug/jack connection itself contributes to RL. Excessive bends and damaged cable will also contribute to RL. The greater the variation in impedance, the greater the return loss reading.

The RL Locator displays the locations where return loss occurred during an AUTOTEST and indicates the exact location of where the highest return loss occurs. View individual plot by selecting/deselecting cable pair. Each pair of cables that has been tested is represented by different colour in the plot.

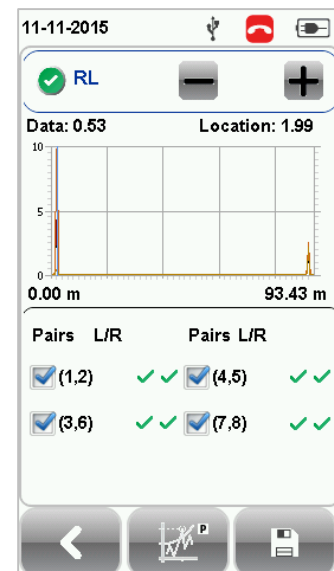
Each peak result in NEXT and RL Locator could represent a new joint connection, rarely a coupler and not necessary a bad cable that requires replacement.



Locator – To enable, press the “SETUP” button > Test Settings > Test Options > Locator



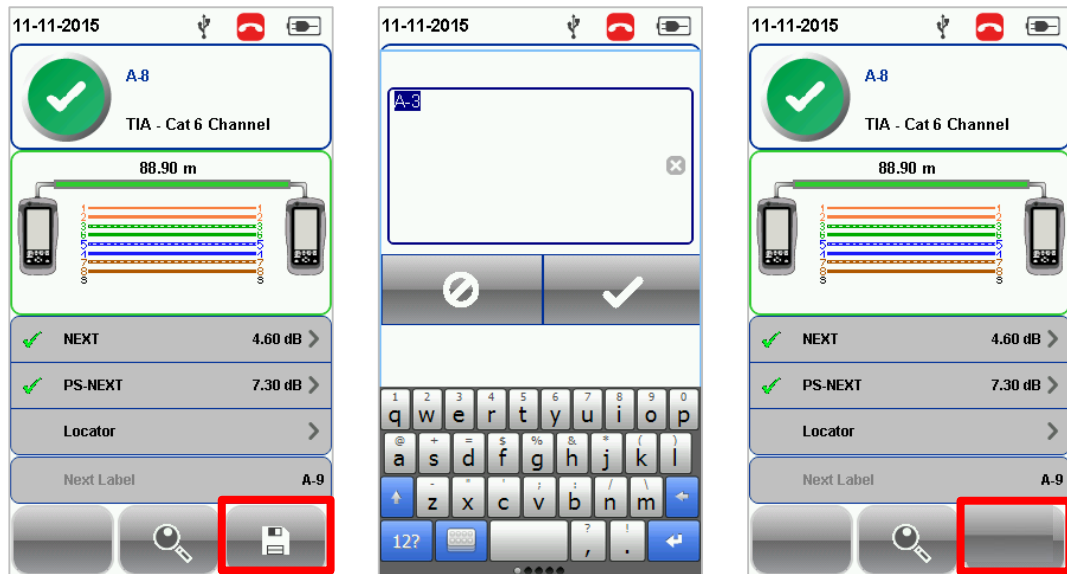
NEXT Locator



Return Loss Locator

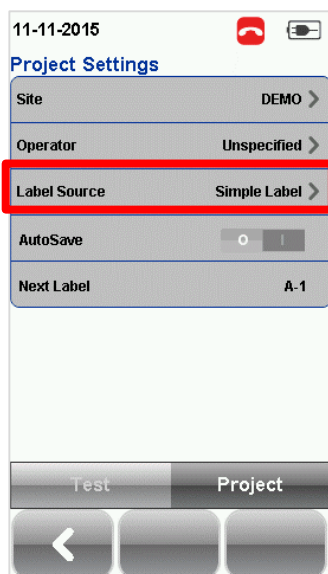
Managing test result(s)

Test results can be manually saved by pressing the “Save” button after an AUTOTEST is completed. When prompted, enter label name and click “OK” to save.



The “Save” icon will disappear once saving is completed.

Pass test results will be automatically saved with reference to the selected Label Source (SETUP > Project Settings > Label Source) when AUTOTEST is completed.



To view saved results,

1. Press the “DATA” button.
2. Select “Copper” or “Fiber” and press the “View” button.
3. Select the test results click “View” to view results.
4. Select the next page for more results.

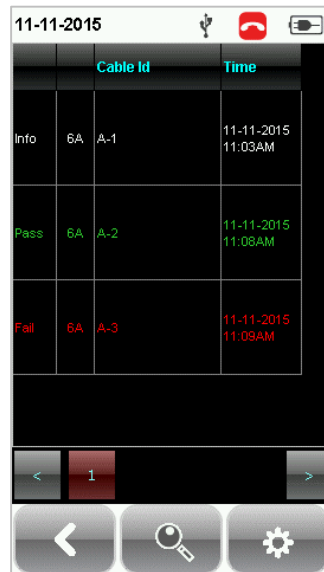
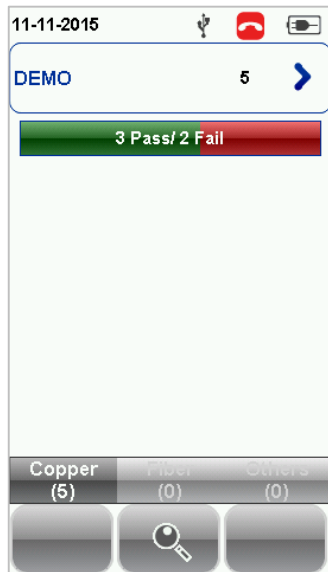
To delete a saved result,

1. Press the “DATA” button.
2. Select “Copper” or “Fiber” and press the “View” button.

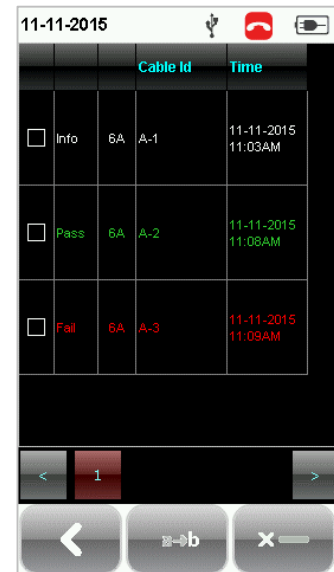
3. Press the “Manage” button.
4. Select result(s) and press the “Delete” to delete result(s).

To rename a saved result,

1. Press the “DATA” button.
2. Select “Copper” or “Fiber” and press the “View” button.
3. Press the “Manage” button.
4. Select result and press the “Rename” to rename result.



View results



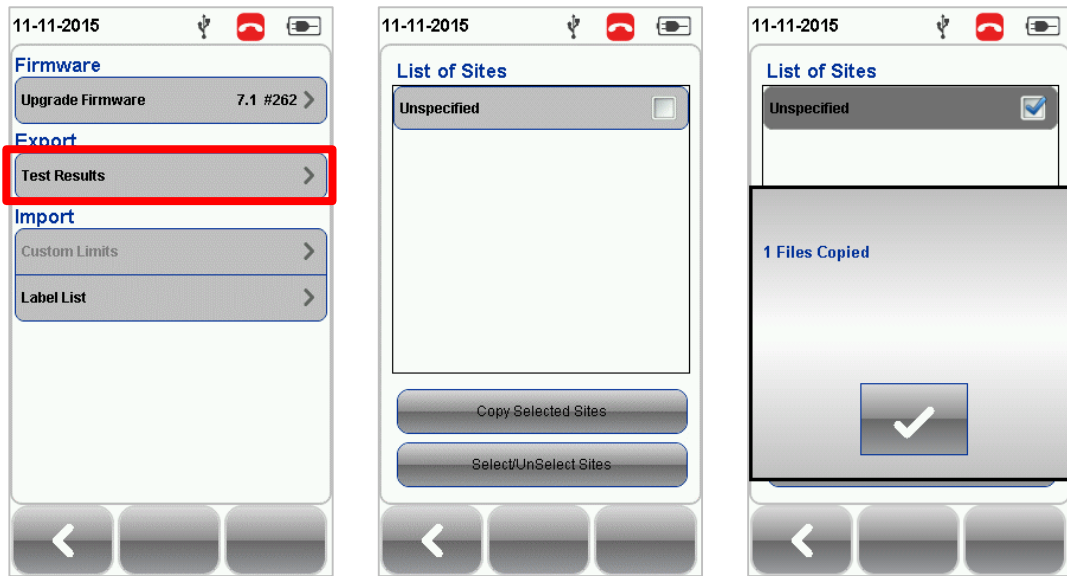
Manage results

Exporting test results into eXport PC Software

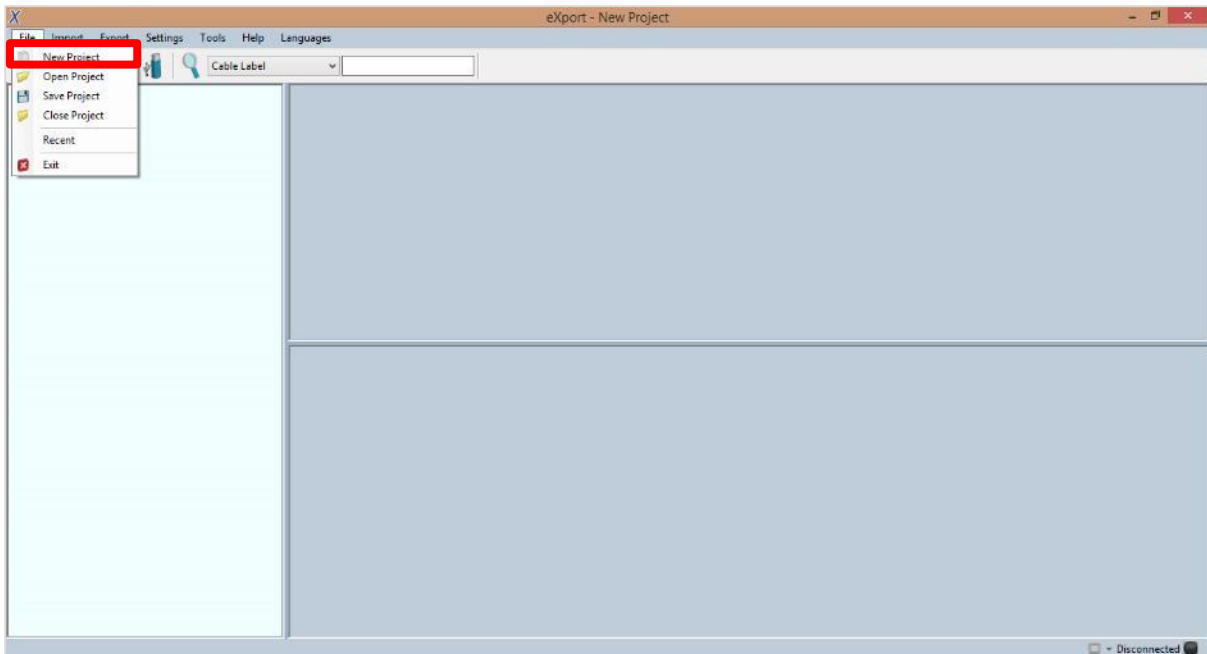
eXport is a data management software designed to work seamlessly with WireXpert. Saved results can be exported using the following methods;

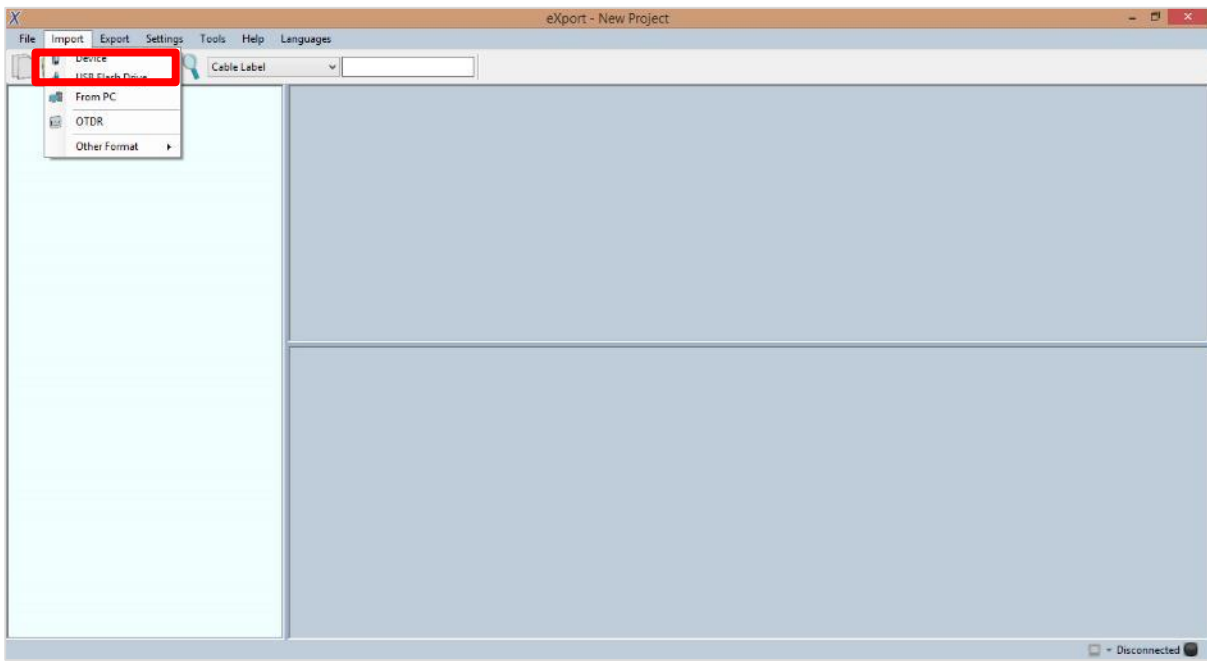
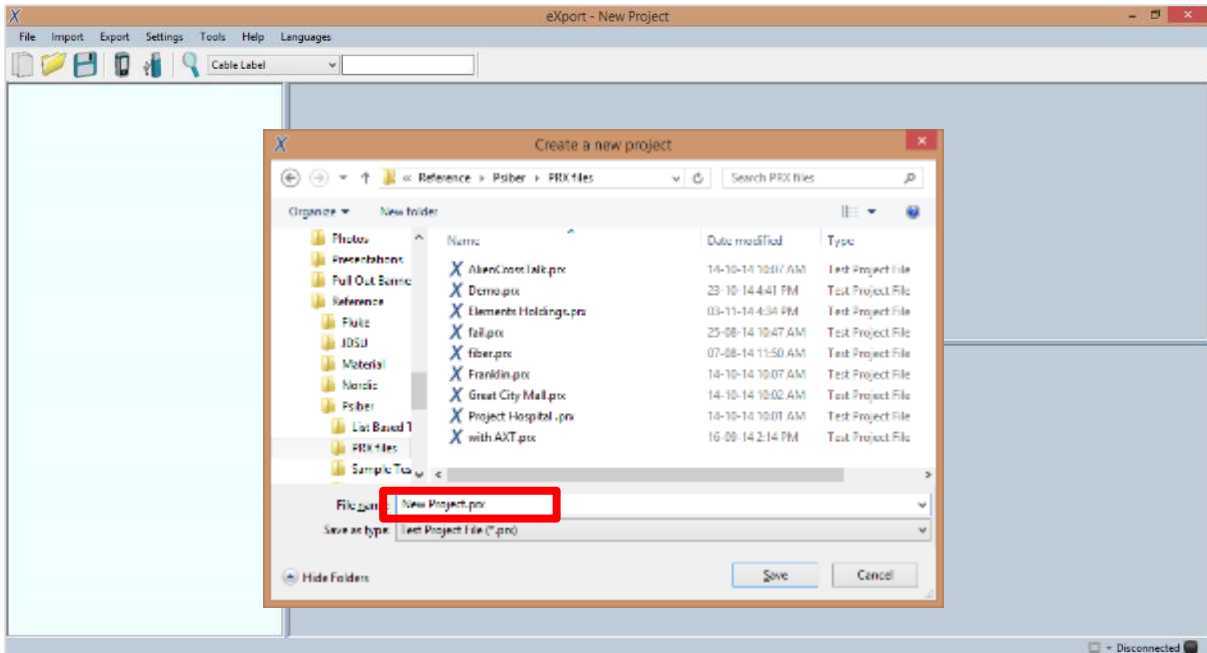
USB Flash Drive

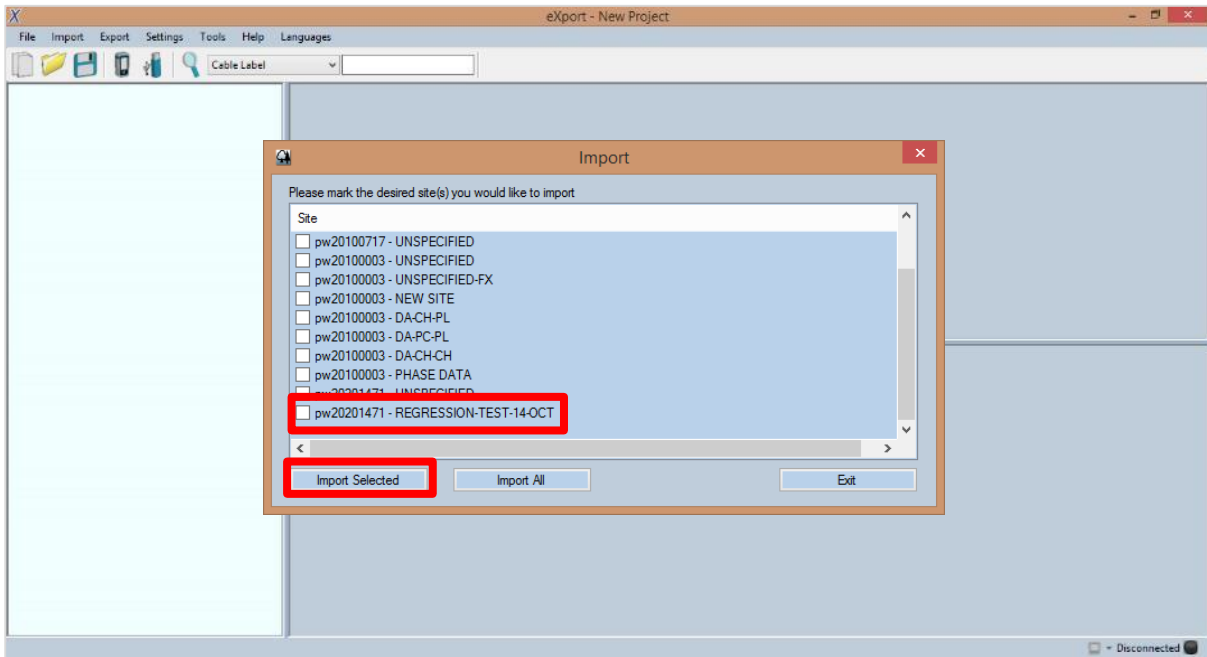
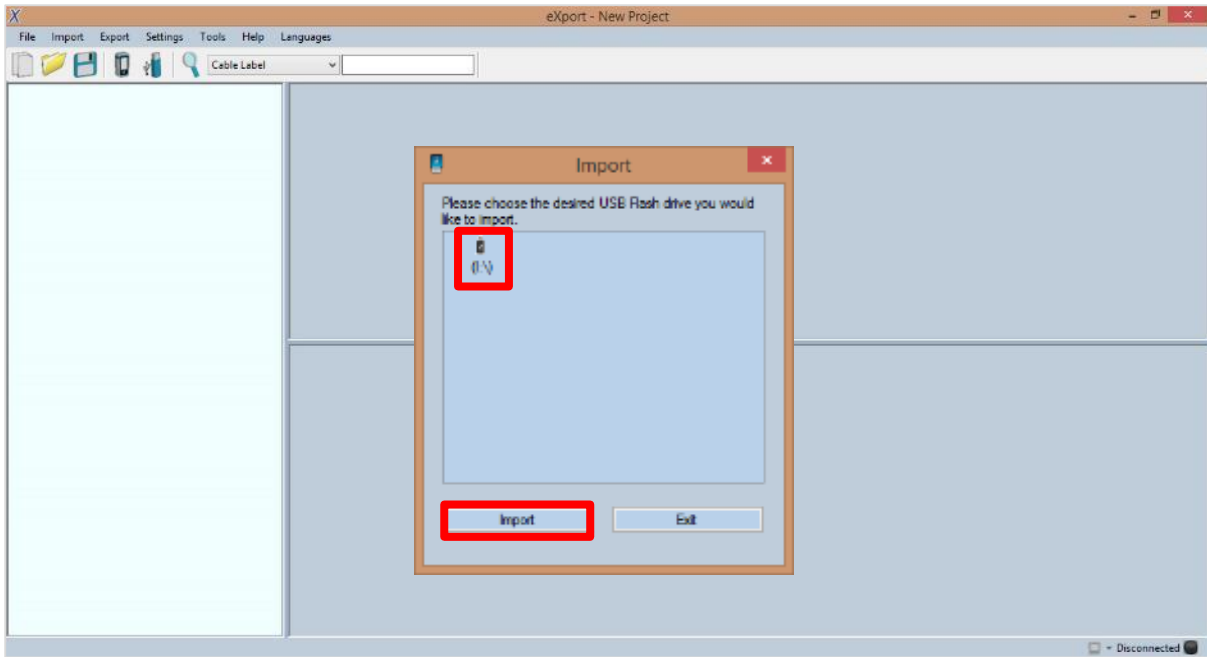
1. Insert USB flash drive to USB port on WireXpert.
2. Device will automatically detect flash drive.
3. Otherwise, press the “SETUP” button > System Settings 2 > Storage > USB
4. Select “Test Results”.
5. Click “OK” to proceed.



6. Launch eXport software.
7. Go to File > Create New Project to create new project space.
8. Go to Import > USB Flash Drive and select the flash drive. Click “Import”.
9. Select database and click “Import Selected” to import or click “Import All” for all databases.







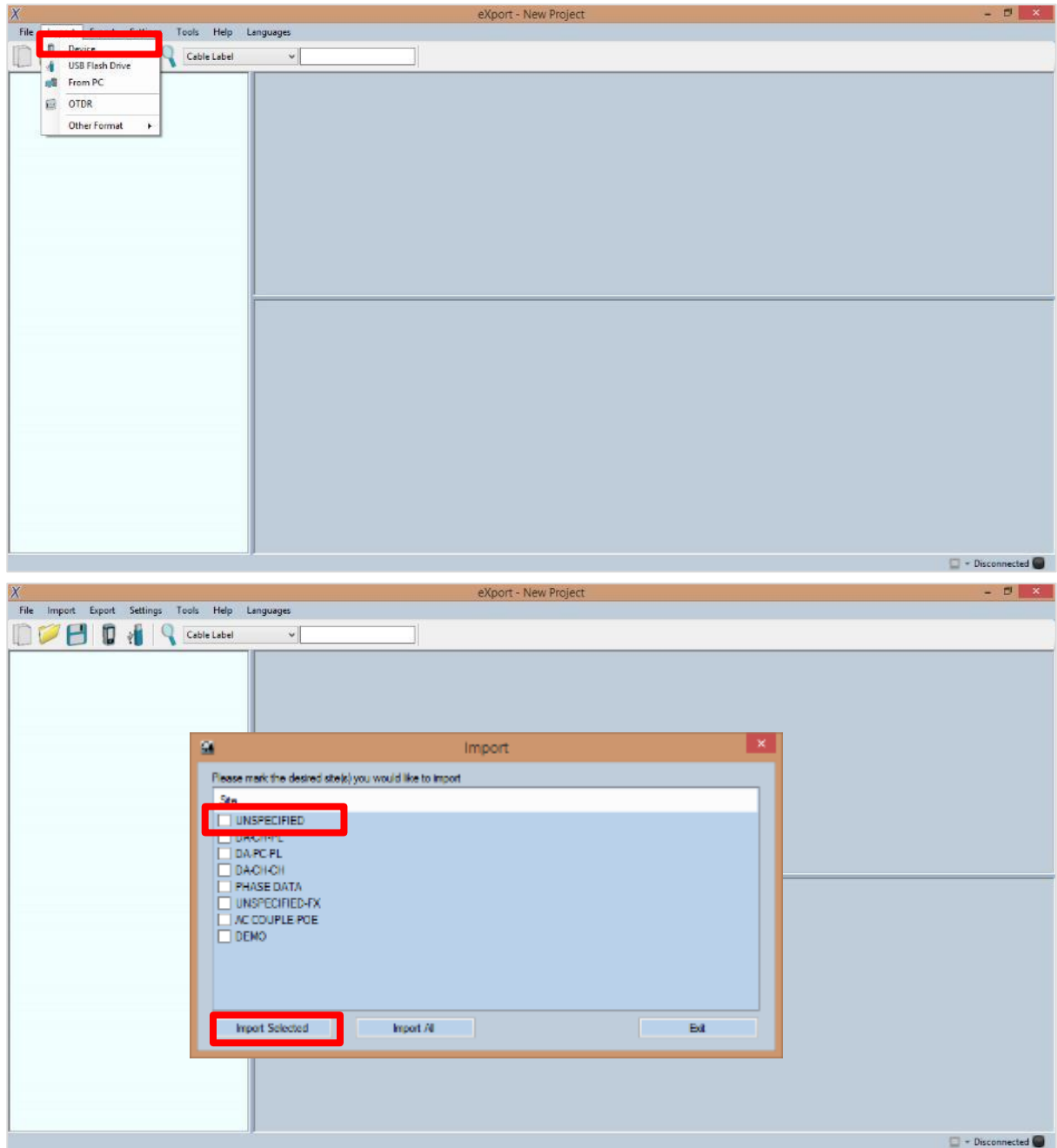
The screenshot shows the eXport software interface with a table of test results. The table has the following columns: Test Type, Device Type, Cable Label, Overall Result, Limit Type, Overall Length (m), NEXT Margin (dB), RL Margin (dB), and Time Stamp. The data is as follows:

Test Type	Device Type	Cable Label	Overall Result	Limit Type	Overall Length (m)	NEXT Margin (dB)	RL Margin (dB)	Time Stamp
Copper	Wx-4500	Science Park Building III_1_A	✓	ISO - Class D Channel	0.3	19.2	9.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_1_B	✗	ISO - Class D Channel	0.8	19.2	9.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_1_C	✗	ISO - Class D Channel	0	19.2	9.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_1_D	✓	ISO - Class D Channel	0.3	13.5	9.0	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_2_A	✓	ISO - Class D Channel	16.4	11.5	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_2_B	✗	ISO - Class D Channel	17.2	11.5	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_2_C	✗	ISO - Class D Channel	0.5	11.5	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_2_D	✓	ISO - Class D Channel	0.2	12.8	9.1	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_3_A	✓	ISO - Class D Channel	16.4	11.6	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_3_B	✗	ISO - Class D Channel	17.8	11.6	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_3_C	✓	ISO - Class D Channel	16.4	11.5	5.2	18-05-2015 02:...
Copper	Wx-4500	Science Park Building III_3_D	✓	ISO - Class D Channel	0.2	12.8	9.1	18-05-2015 02:...

Total Records: 12 Selected Record No: 1

Direct connection via USB cable

1. Connect WireXpert to your PC using a mini USB cable.
2. Launch eXport software.
3. Go to File > Create New Project to create new project space.
4. Go to Import > Device.
5. Select database and click “Import Selected” to import or click “Import All” for all databases.


















The screenshot shows the eXport - eXport700 software interface. The main window displays a table of test results for Science Park Building III. The table has the following columns: Test Type, Device Type, Cable Label, Overall Result, Limit Type, Overall Length (in), NEXT Margin (dB), RL Margin (dB), and Time Stamp. The data is as follows:








Test Type	Device Type	Cable Label	Overall Result	Limit Type	Overall Length (in)	NEXT Margin (dB)	RL Margin (dB)	Time Stamp	
1	Copper	Wx-4500	Science Park Building III_1_A	✓	ISO - Class D Channel	0.3	19.2	9.2	18-05-2015 02...
2	Copper	Wx-4500	Science Park Building III_1_B	✗	ISO - Class D Channel	0.8	19.2	9.2	18-05-2015 02...
3	Copper	Wx-4500	Science Park Building III_1_C	✗	ISO - Class D Channel	0	19.2	9.2	18-05-2015 02...
4	Copper	Wx-4500	Science Park Building III_1_D	✓	ISO - Class D Channel	0.3	13.5	9.0	18-05-2015 02...
5	Copper	Wx-4500	Science Park Building III_2_A	✓	ISO - Class D Channel	16.4	11.5	5.2	18-05-2015 02...
6	Copper	Wx-4500	Science Park Building III_2_B	✗	ISO - Class D Channel	17.2	11.5	5.2	18-05-2015 02...
7	Copper	Wx-4500	Science Park Building III_2_C	✗	ISO - Class D Channel	0.5	11.5	5.2	18-05-2015 02...
8	Copper	Wx-4500	Science Park Building III_2_D	✓	ISO - Class D Channel	0.2	12.8	9.1	18-05-2015 02...
9	Copper	Wx-4500	Science Park Building III_3_A	✓	ISO - Class D Channel	16.4	11.6	5.2	18-05-2015 02...
10	Copper	Wx-4500	Science Park Building III_3_B	✗	ISO - Class D Channel	17.8	11.5	5.2	18-05-2015 02...
11	Copper	Wx-4500	Science Park Building III_3_C	✓	ISO - Class D Channel	16.4	11.5	5.2	18-05-2015 02...
12	Copper	Wx-4500	Science Park Building III_3_D	✓	ISO - Class D Channel	0.2	12.8	9.1	18-05-2015 02...

The interface also shows a left sidebar with a tree view containing 'Science Park Building III'. At the bottom, it indicates 'Total Records: 12 Selected Record No.: 1' and a 'Connected' status with a green dot.

Refer *User Manual – eXport* for more information on how to use the software.

Appendix A: Icons Glossary

 <p>Add – Adds a site, operator or customised cable, connector to the database.</p>	 <p>Retest – Performs an AUTOTEST on selected result on List-Based Testing.</p>	 <p>Back – Returns to previous screen. Unsaved options will be discarded.</p>
 <p>Cancel – Discards option.</p>	 <p>Delete – Deletes a site, operator or customised cable, connector from the database.</p>	 <p>Details – View selected result.</p>
 <p>Manage – Enables “Rename” and “Select all” option.</p>	 <p>Format, Reset – Performs non-reversible setting/data restoration to factory defaults.</p>	 <p>Forward – Proceed to the next screen.</p>
 <p>Device info – Displays device firmware build information.</p>	 <p>Okay – Confirms and saves current option.</p>	 <p>Rename – Renames saved test result in the DATA menu.</p>
 <p>Restart – Restarts current procedure.</p>	 <p>Save – Saves current test result. Icon will disappear after a successful save.</p>	 <p>USB – Reads USB flash drive to perform upgrade firmware, test result export or custom limit and label list import</p>

 <p>Select all – Selects all data on screen.</p>	 <p>Next pair – View next pair of plots of the current result.</p>	 <p>Fibermap – Displays mapping of fiber being tested.</p>
 <p>MPO chart, grid – Toggles between displaying of power loss in bar chart or grid format for fiber testing.</p>	 <p>Scope live, test – Toggles between ‘Live’ and ‘Test’ mode when inspecting a SM/MM fiber with the inspection scope.</p>	 <p>Set Reference – Performs result referencing between the Local and Remote units.</p>
 <p>Transmit ON/OFF – Toggles between enabling and disabling of light source on the Remote unit.</p>		

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