TESTPRO CV100

USER MANUAL

TestPro CV100

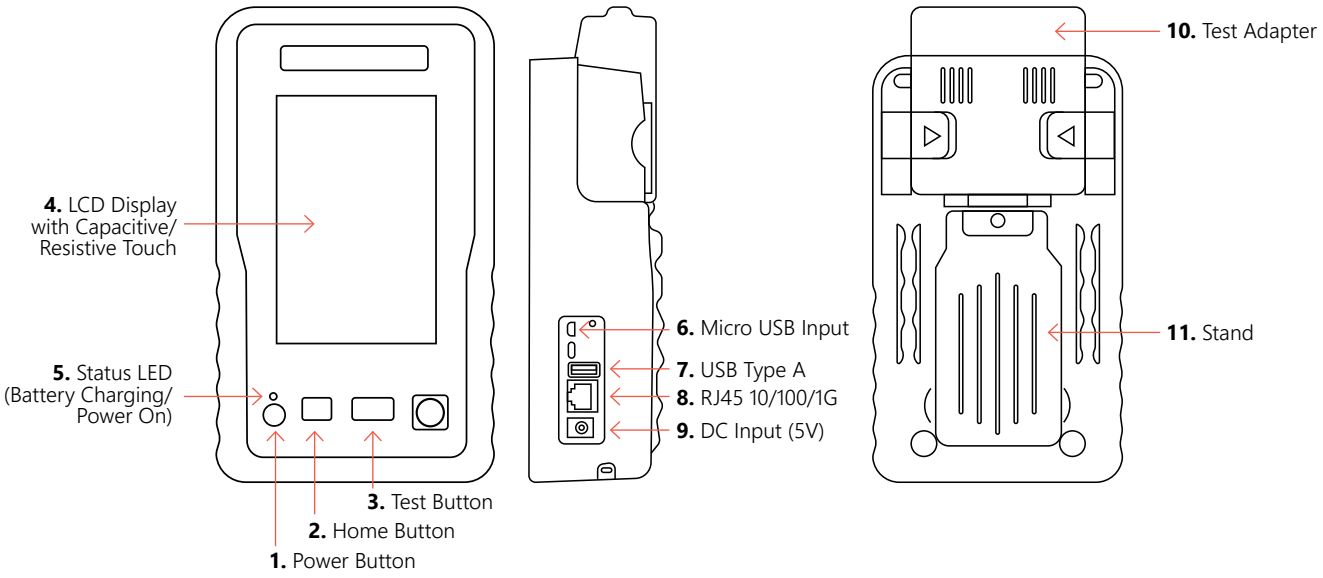
User Manual

Contents

Kit Contents

Refer to https://aem-test.com/products/testpro-cv100/ for a full list of kits available

TestPro CV100 Features



The TestPro CV100 features a touchscreen based interface. Product features include:

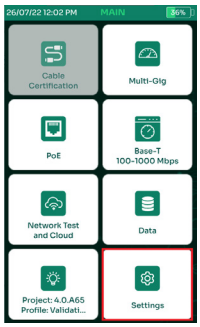
1.	POWER BUTTON	• Powering on : press for 1 second. • Powering off : press the button once and then select [Power Off] on the touchscreen. • Force shutdown : press and hold the power button for 6 seconds or longer. Note that Force Shutdown may result in loss of recent test data.
2.	HOME BUTTON	• Takes you back to home screen on the touchscreen interface.
3.	TEST BUTTON	• Starts an Autotest (Type of Autotest depends on the adapter attached to the unit.
4.	LCD DISPLAY	• Capacitive/Resistive touchscreen, with color graphical user interface to navigate the menu and to view results.

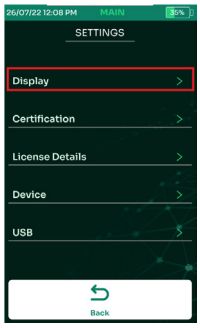
5.	STATUS LED	• Red : battery charging (when unit is off) • Amber : battery charging (when unit is on) • Green : battery not charging (when unit is on)
6.	MICRO USB INPUT	• Establishes a USB-based wired link between the TestPro CV100 unit and a personal computer. Test results can be transferred to PC software (TestDataPro) via this connection.
7.	USB TYPE A	• USB flash drive connection to store test results and for software updates.
8.	RJ4510/100/1G	• For validation testing of cables up to 1G (functionality is built into the basic TestPro CV100 kit).
9.	DC INPUT	• Connection for 5V DC supply (WARNING : Do not connect to any power supply other than the power adapter supplied by AEM).
10.	TEST ADAPTER	• A variety of plug and play adapters can be used to change the function of the TestPro CV100 modular platform.
11.	STAND	• Retract stand to place it on a table or any other flat surface, freeing you to perform other tasks while keeping an eye on the screen.

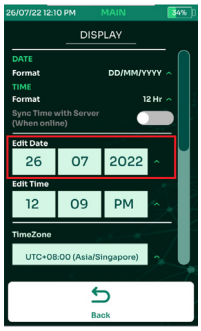
Settings

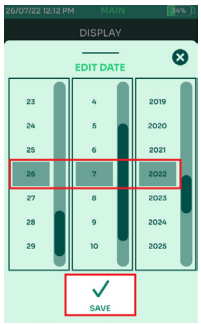
1 Settings Configurations

Configure the settings such as date/time, display brightness, audio volume, sleep mode, language and access device information by selecting .



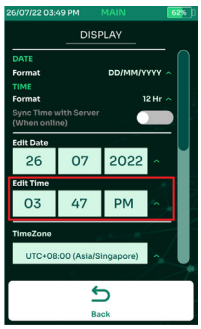


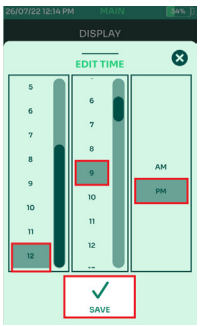




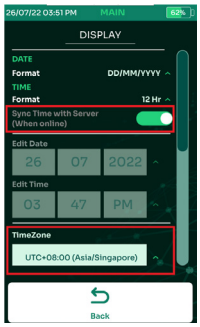
a. Date and Time

- Select [Display].
- Select Edit Date
- Scroll up/down to choose the DD, MM & YYYY. Select [Save].



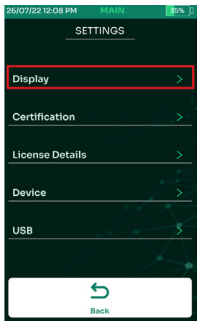


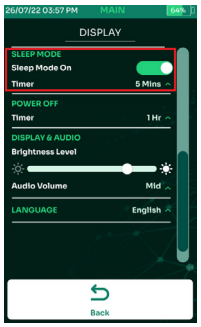
- Select Edit Time
- Scroll up/down to choose the HH, MM and AM/PM. Select [Save].
- The drop down menu to select the timezone.

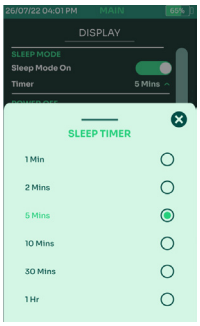


- Enable the [Sync Time with server] & use the drop-down menu to select the time zone. Note: The time zone will only sync when TestPro detects internet connectivity.

b. Sleep Mode



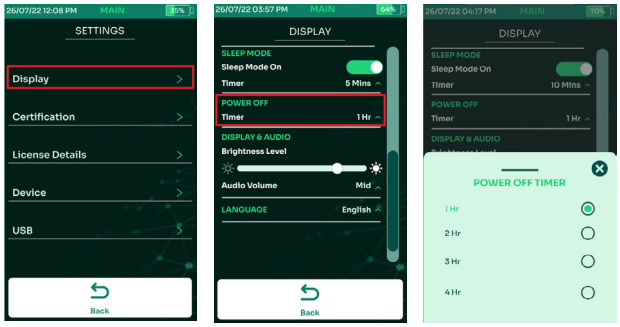




Sleep mode turns off the display after a period of inactivity to conserve battery. This is enabled by default and the timer is set to 5 minutes.

- Select [Display].
- Scroll down to the [Sleep Mode] section.
- Select the timer & choose the preferred time duration of inactivity after which the screen should turn off.

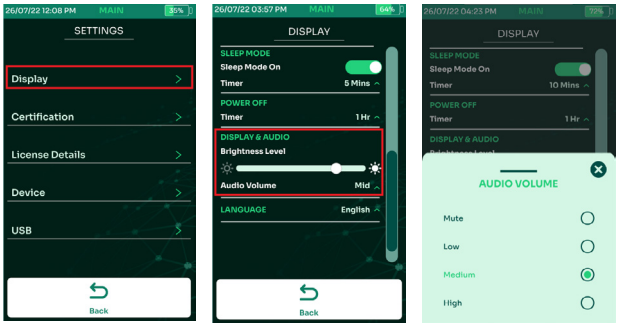
c. Power Off



Power Off timer function is only available when the TestPro is in battery mode. It is not available when the device is attached to a power supply.

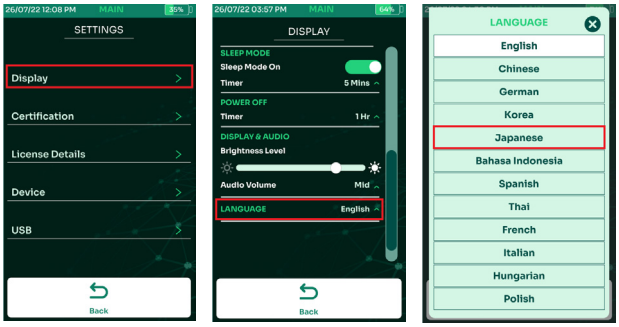
- Select [Display].
- Scroll down to the [Power Off] section.
- Select the timer & choose the preferred time duration of inactivity after which TestPro should power off.

d. Display & Audio



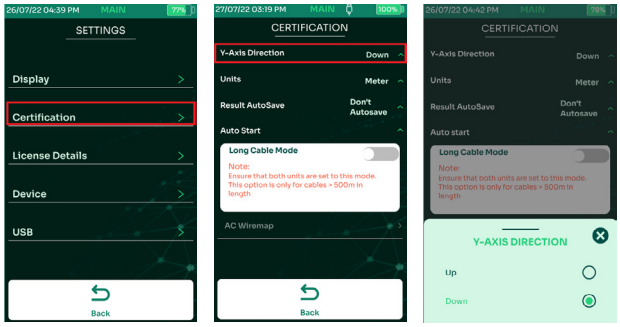
- Select [Display].
- Scroll down to [Display & Audio].
- Adjust the display brightness by dragging the brightness level bar left or right. To adjust the volume, select Audio Volume & choose Mute, Low, Medium or High.

e. Language



- Select [Display].
- Scroll down to [Language].
- Select one of the languages available and TestPro will reboot to save the settings.

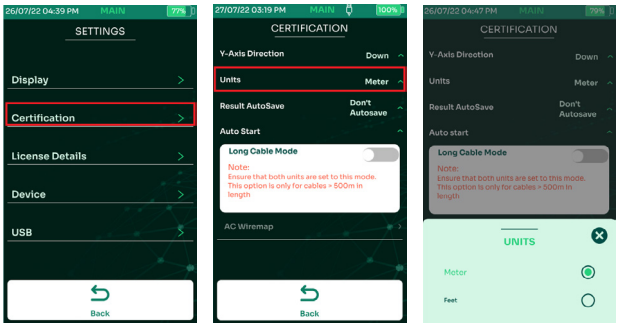
f. Y-Axis Direction



Plot Y-Axis Direction changes the graph direction of copper certification test result to either Up or Down.

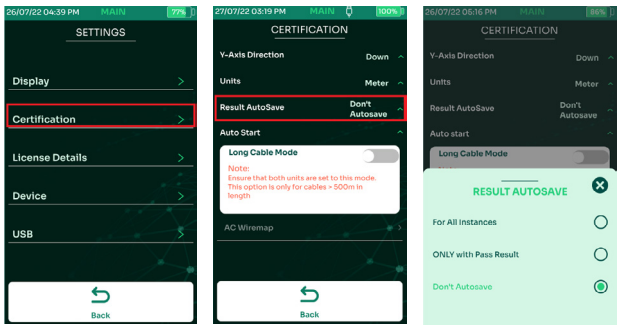
- Select [Certification].
- Select [Y-Axis Direction].
- Select Up or Down.

g. Units



- Select [Certification].
- Select [Units.]
- Select the preferred measurement standard - Metric (Meter) or US units (Feet).

h. Result AutoSave

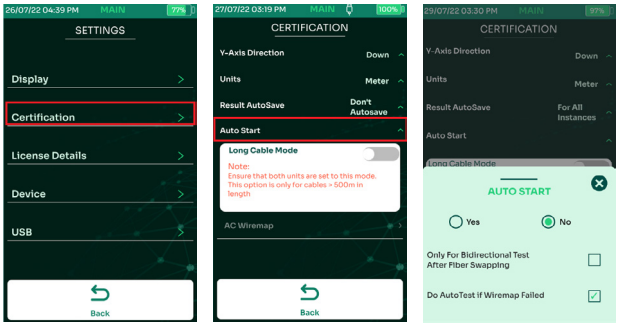


[Result AutoSave], when set to [For All Instances or Only with Pass Result] will save the test results according to the next available label name.

- Select [Certification].
- Select [Result AutoSave].
- Select [For All Instances, Only with Pass Result or Don't AutoSave]

For All Instances – TestPro will save all test result
Only with Pass Result – TestPro will save only when the test result is a Pass
Don't AutoSave – no AutoSave of any test result

i. Auto Start

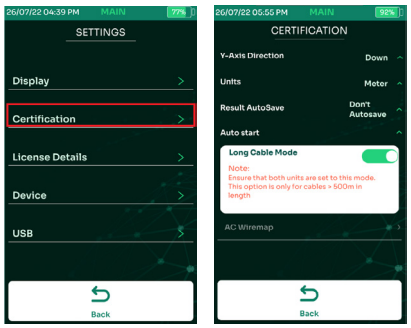


- Select [Certification].
- Select [Auto Start].
- Select [Yes] or [No].

If [Yes], TestPro will automatically start the Autotest when the cable under test is connected to the device port.
When [Only for Bidirectional Test After Fiber Swapping] is enabled, the Autotest will continue after successfully swapping the fiber cable during a dual-ended bi-directional test.

When [Do Autotest if Wiremap Failed] is enabled, the Autotest will perform a Autotest when any of the 4 pairs fails the Wiremap.

j. Long Cable

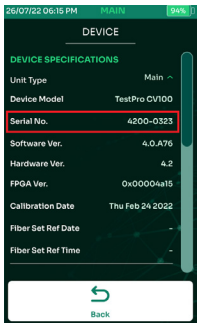


Long Cable supports the testing of cables between 500 and 1000 meters.

- Select [Certification].
- Enable [Long Cable].

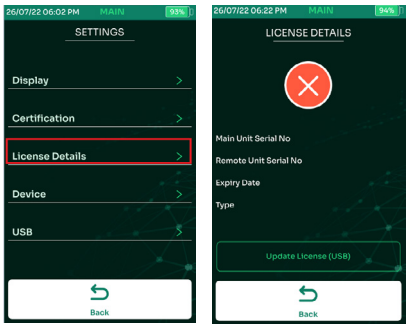
Note that the long cable options in the main and remote devices should be enabled. This feature is automatically disabled when devices are restarted.

k. License Details



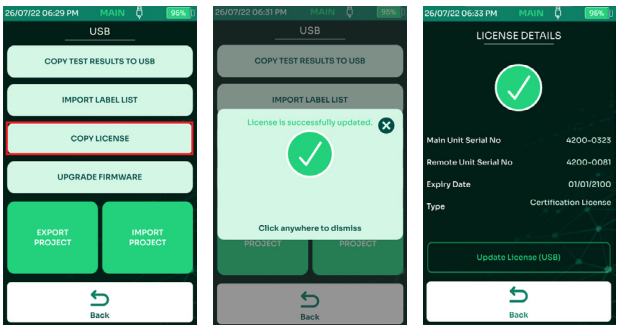
Customers who purchased the K05 and K30 kits will need a certification License to save the test result when using the AD-CAT6A-CH adapter.
Users with K05 and K30 kits who purchased the fiber kits will not require a license to perform fiber certification test as the license is included with the purchase of the fiber adapter.

To determine if TestPro need a license to perform copper certification tests, go to Main Menu>Settings>Device. TestPro with serial numbers beginning with 4 (i.e. 4200-0000) require a certification license.



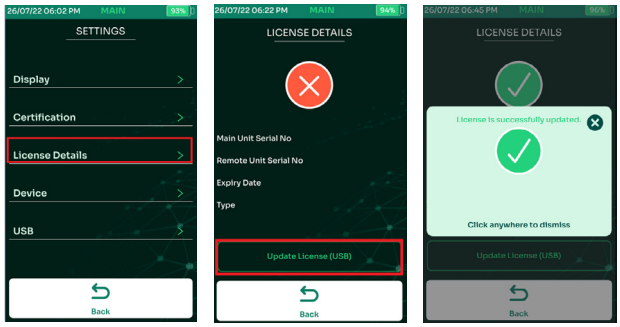
- The [License Details] section displays the current license installed in your TestPro. To check the license, go to Settings>License Details.

A screen showing the serial numbers of the main and remote units, the expiry date of the license and the license type. If this information is empty, it means there is no license installed in the device.
Email customerservice@aem-test.com to check the licenses available for your TestPro.



To update a license from a USB, follow these steps:

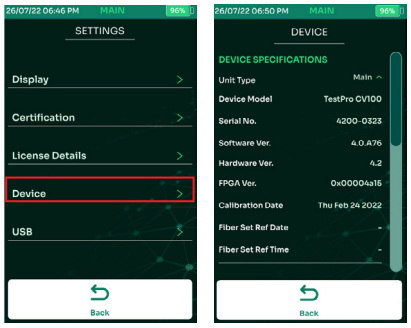
- Save testpro.lic to the USB flash drive > Power on TestPro and insert the USB flash drive > Select [Copy License].
- A [License successfully updated] window will confirm that the license has been updated. Select close to exit the window.
- Check the license info in [License Details].



Another way to update the license

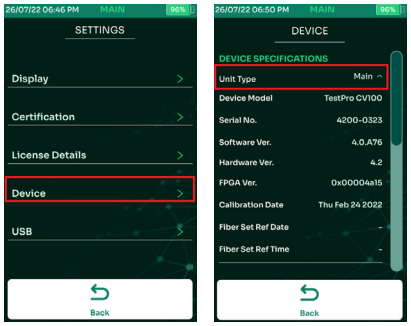
- Save testpro.lic to the USB flash drive
- Go to Settings > License Details > Update License (USB)
- A [License successfully updated] window will confirm that the license has been updated. Select close to exit the window.

l. Device Specifications

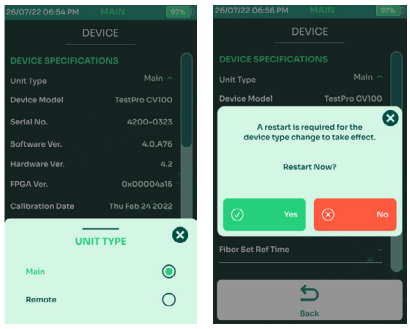


- Click [Settings] on the home screen, then [Device].

m. Unit Type

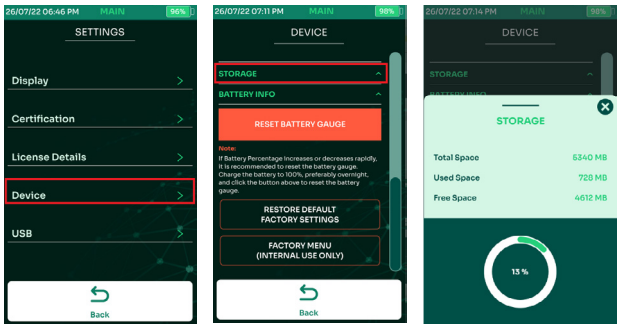


- Click [Settings] on the home screen, then [Device].
- Click [Unit Type].



- Select either [Main] or [Remote].
- Select Yes to reboot the device for changes to take effect.

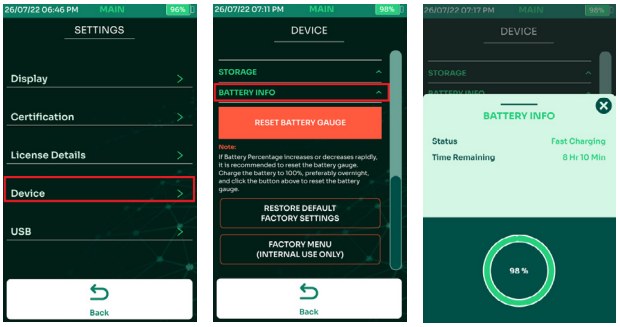
n. Storage



Storage displays the Total, Used and Free space on the TestPro.

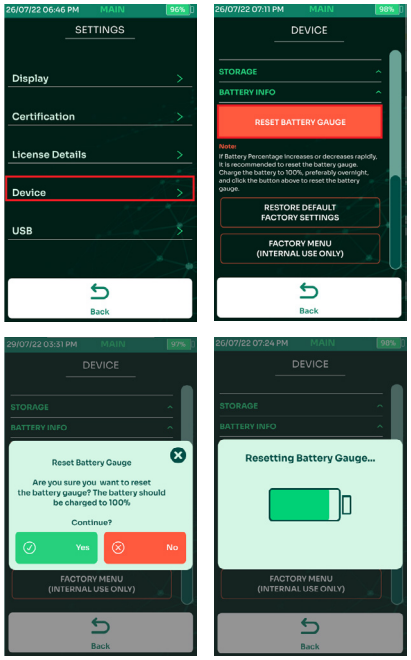
- Click [Settings] on the home screen, then [Device].
- Click [Storage].

o. Battery Info



- Select [Settings] on the home screen, then [Device] and then [Battery Info].
- User will be brought to a screen showing the Charging status and Time remaining.

p. Reset Battery Gauge



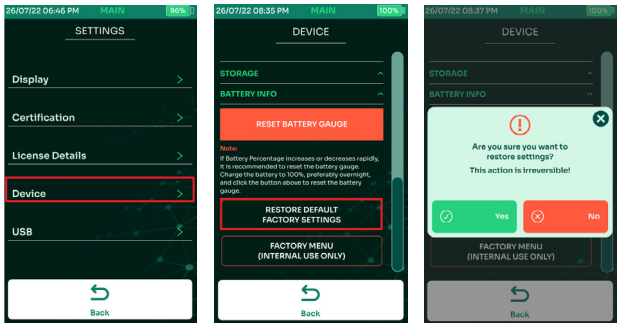
Reset Battery Gauge will recalibrate discrepancies in the battery reading. Use this feature only when the battery percentage is fluctuating.

- Select [Settings] on the home screen, then [Device]
- Select [Reset Battery Gauge].
- Click Yes on the pop-up confirmation.
- Wait for Resetting Battery Gauge to be completed.

Note :

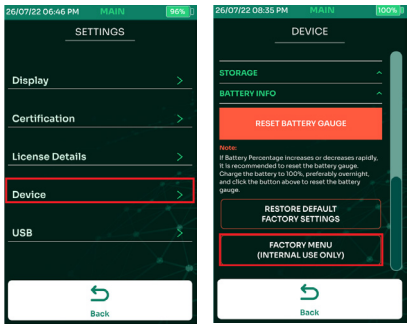
I. Ensure that the battery is fully charged to 100%. AEM recommends to charge the battery overnight.
II. Select [Reset Battery Gauge].
III. TestPro will apply the changes and reset the battery registers.

q. Restore Default Factory Settings



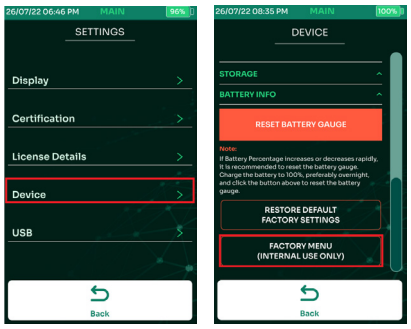
- Select [Settings] on the home screen, then [Device]
- Select [Restore Default Factory Settings].
- On the popup, select Yes to restore TestPro to default factory settings. The device will restart.

r. Factory Menu



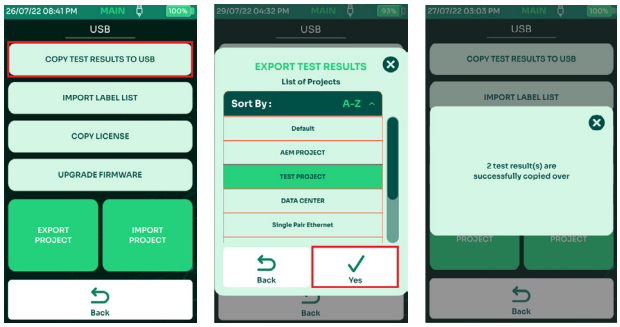
Factory Menu is for manufacturer's internal use only. Access to this function is not available to users.

s. USB



When a USB flash drive is inserted to the TestPro USB port, device offers multiple functions i.e. Copy Test Results to USB, Import Label List, Copy License , Upgrade Firmware, Export Project and Import Project. Refer to the steps required for each of these features in the TestPro User Guide. To access the USB menu again, click Settings > USB.

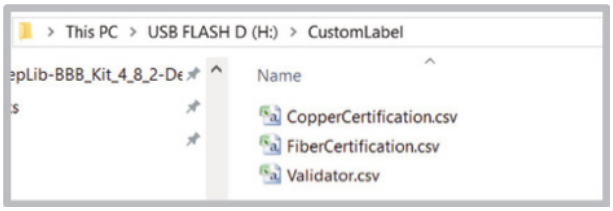
i: Copy Test Results to USB

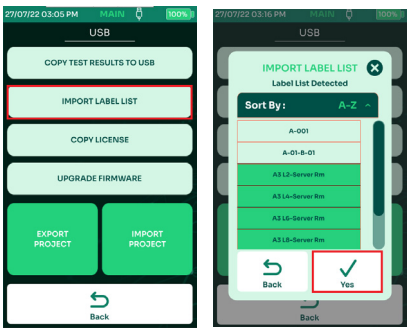


Copy Test Result to USB will export all the test results saved inside TestPro to the USB flash drive under TestData folder.

- Select [Copy Test Results to USB]
- Select from a list of projects to be exported to USB i.e. TEST PROJECT and click Yes
- TestPro will pop up a message on the number of test results copied.

ii: Import Label List



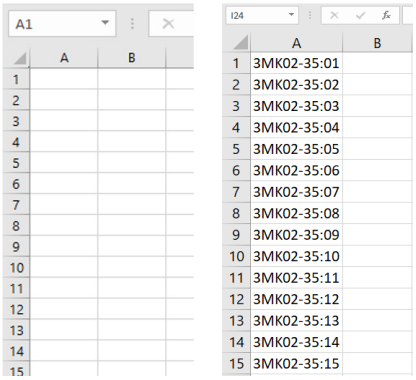


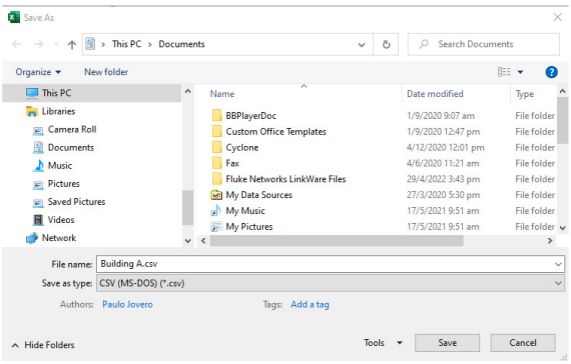
The Import Label List feature provides an easy way to create labels from a computer & copy these labels onto the device.

- On the USB flash drive, create a folder "CustomLabel" (Without the "") and copy all the labels that are to be imported.

- Insert USB flash drive to the TestPro USB port and select [Import Label List].
- Select from a list of CustomLabel to be imported and click Yes.

iii: Creating CustomLabel





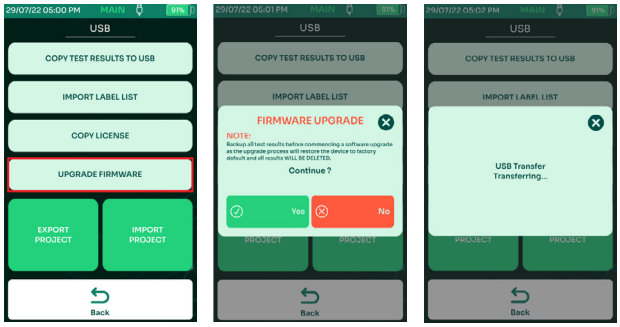
Custom label allows users to add labels in csv format and import to TestPro.

- Launch Microsoft Excel.
- In column A, type the labels to be imported to the device.
- Click file > Save as > Filename: enter any name. Save as type CSV (MS-DOS)(*csv). Location is USB flash drive root directory under [CustomLabel] folder.

iv: Copy License

Refer to k. License Details for more information about the Copy License feature

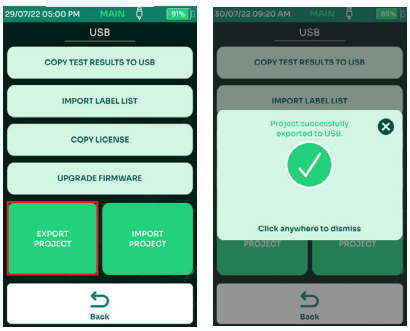
v: Upgrade Firmware



TestPro's firmware can be upgraded using the USB flash drive. The firmware version should be 2.4 or later to support USB zip upgrade.

- Go to www.aem-test.com/myaccount, log in to your account (create account for new users) and download the latest firmware under [Downloads].
- Save the OSUpgrade.zip to a USB Flash drive (formatted as FAT32).
- Attach the DC power supply to the TestPro and power on the device.
- Insert the USB flash drive. The USB menu will appear. Select [Upgrade firmware].
- TestPro will warn the users to back up test results and the upgrade will reset the device to factory settings. Select [Yes] to accept and [No] to cancel.
- The device will reboot multiple times. The entire process will take at least 15 minutes to complete.

vi: Export Project

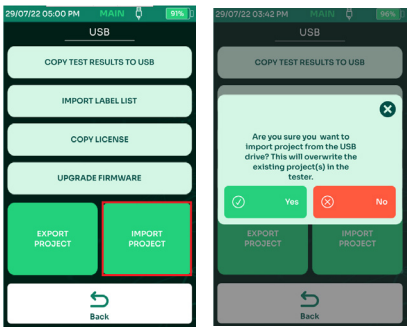


TestPro allows testers to collaborate better by sharing projects with ease. Project files can be transferred from one TestPro unit to another, using a USB flash drive. They can also be emailed to testers in other locations. This saves them in having to recreate a project/use case from scratch.

To export project(s):

- Power on the TestPro and insert a USB flash drive (formatted as FAT32).
- TestPro will detect the USB flash drive and open the USB Menu.
- Select [Export Project]. TestPro will copy the project files from the tester to the USB flash drive.
- A dialog box will confirm successful export.

vii: Import Project



To import a project from a USB flash drive to a TestPro device:

- Power on TestPro and insert a USB flash drive containing the project.dat file.
- A [USB] menu will come up.
- Select [Import Project].
- A dialog box comes up asking to confirm the project import. Click Yes
- [Project Imported from USB Reboot is required] message will appear. Select to reboot the device.

2 Cable Certification Test

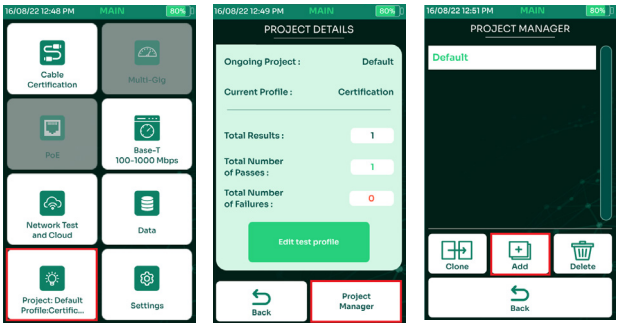
The TestPro CV100 platform features the most sophisticated RF measurement engine available in any handheld tester. Capable of supporting up to 3Ghz frequency range, and testing all mode combination parameters (including TCL, ELTCTL, DC Resistance Unbalance), the TestPro CV100 exceeds level 2G accuracy specifications for copper certification testing.

Currently available adapters provide CAT5e to CAT8 certification. The capability of the TestPro CV100 platform makes it ideal for Fiber and Coax certification as well.

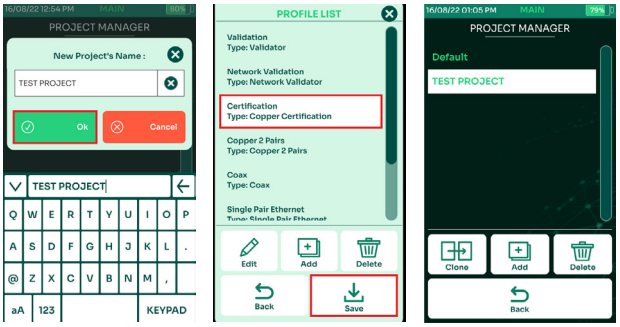
a. Project & Profile

The TestPro CV100 supports customer workflows through projects and profile descriptions. [Project] is an identifier of the customer site/location, whereas [Profile] refers to specific test configurations.

i: Create Project & Profile



- Select [Project]/[Profile] on the home screen to create or edit a project. Once a project is selected, subsequent Autotest results will be saved there.
- Select [Project Manager] to choose a project, create a new project or to delete an existing project.
- Select [Add] to create a new project.



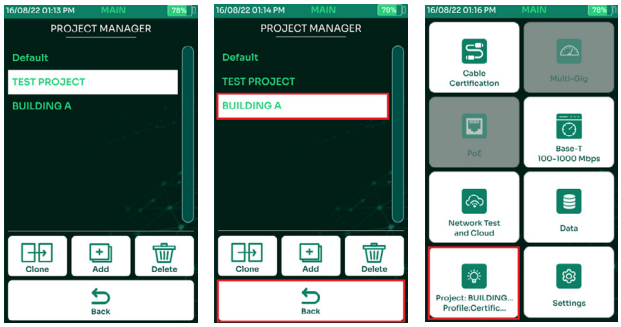
- Key in the project name and select [Ok].
- A dialog box will appear confirming the TEST PROJECT to be used as a current project. Select [Yes] and TestPro will show various profiles. Select a profile and Save.

a. [Certification] for Copper Cable Certification.
b. [Validation] for Multi-Gig and BASE-T tests.
c. [Network Validation] for Network Autotest.
d. [Copper 2 Pairs] for 2 pair Copper Cable Certification

e. [Coax] for 50 Ohm and 75 Ohm coax tests.
f. [Single Pair Ethernet] for Copper Cable Certification with less than 4 pairs.
g. [MM Fiber] for Multimode Fiber.
h. [SM Fiber] for Singlemode Fiber

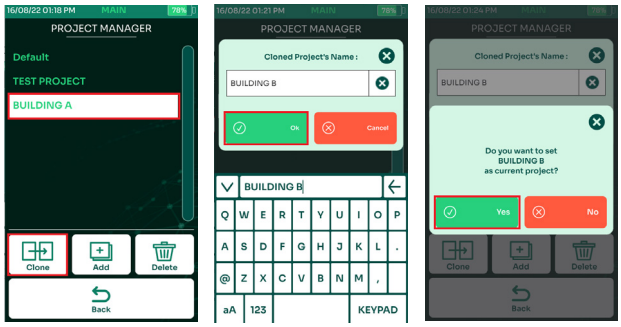
- Project Manager shows the recently created project and the Default project.

ii: Switch Projects



- To switch projects, open [Project/Profile] in the main menu and choose [Project Manager].
- Select the project i.e. Building A, this project and profile will be activated. All succeeding test results will be saved in "Building A" project.
- Click back or press the home button to return to the main menu.

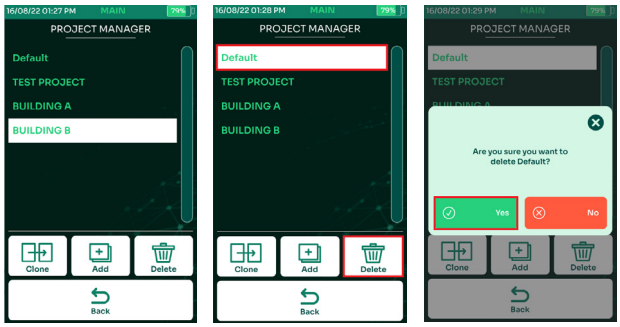
iii: Clone A Projects



TestPro offers an easy way to duplicate a project that uses the same limit, cable, connector & labels through project cloning.

- To clone a project open [Project/Profile] in the main menu and choose [Project Manager]. Select the project to be cloned i.e., Building A and select Clone.
- Key in the cloned project name & select [Ok].
- Choose [Yes] to set the cloned project "Building B" as the current project. All succeeding test results will be saved in "Building B" project.

iv: Delete A Project

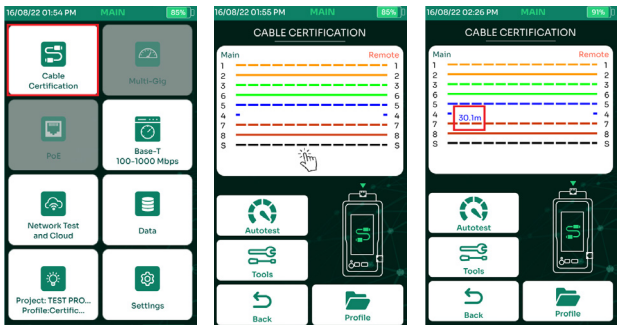


- To delete a project from TestPro, open [Project/Profile] in the main menu and choose [Project Manager].
- Select the project to be deleted i.e., Default and select Delete.
- Select [Yes] to delete the "Default" project. All test results saved in "Default" project will be deleted and moved to Recycle Bin.

b. LiveWiremap

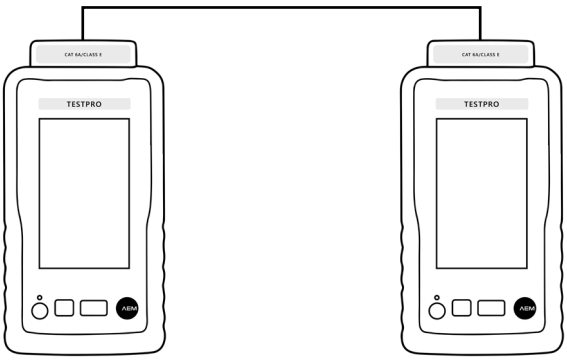
TestPro's LiveWiremap detects cable fault in real time as soon as the cable is inserted into the RJ45 port of the main and remote unit's channel port. AD-NET-CABLE, Permanent Link and Channel adapters supports this feature. Start LiveWiremap diagnostics by pressing the Wiremap screen. TestPro will start diagnosing the cable and will determine the location of the fault, using its distance to fault measurement.

Connect the RJ45 cable to the channel adapter of the TestPro main unit RJ45 port and the other end of the cable to the remote unit's channel adapter RJ45 port.



- On the TestPro main screen, select [Cable Certification].
- The wiremap will show pin 4 to be in disconnected state. Select either [Autotest] or the wiremap screen to start LiveWiremap.
- LiveWiremap will display the distance to fault measurement.

c. Cable Set Reference

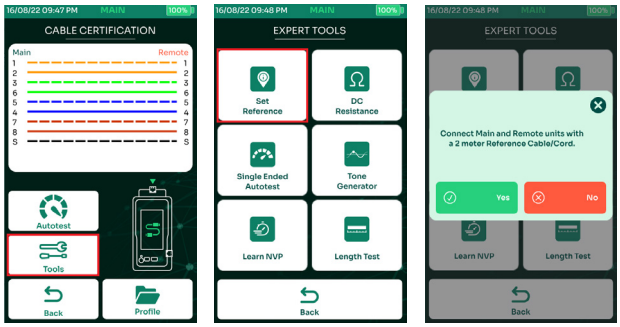


Set reference is necessary for accurate measurement of resistance, delay and insertion loss. It must be performed when a main TestPro unit is paired with a remote TestPro unit for the first time or when one or more adapters are replaced with a new one. If a copper Autotest yields results with unusually high resistance measurements, this is often an indication that a set reference is required.

Attach a CAT6A permanent link adapter to the remote TestPro unit with one end of the cable connected to it, and the other end of the RJ45 jack of the CAT6A channel adapter attached to the main TestPro unit to perform set reference.

Note: If the cable is faulty, set reference and measurement results will be affected. Set Reference using an AD-NET-CABLE adapter, or a patch cord adapter should be avoided.

Set reference has already been performed before shipping the product, therefore it is not necessary to perform it again when the product is received.



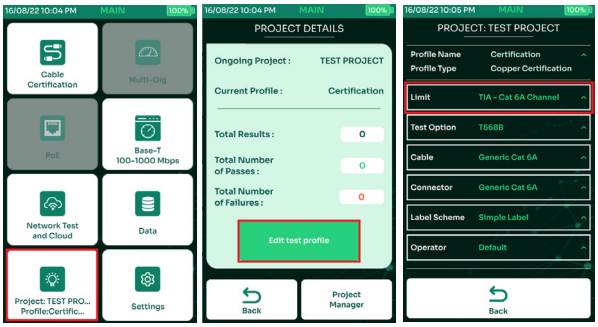
- The set reference utility can be accessed through [Tools]. Select [Tools] to perform the task.
- Select [Set Reference].
- A dialog box will confirm that a 2-meter reference cable/cord is attached to main and remote devices. Select [Yes].

  Note: It is not required to perform set reference every day as TestPro is designed to ensure measurement stability. However, if it is the company's best practice to do so, user can choose to do so.

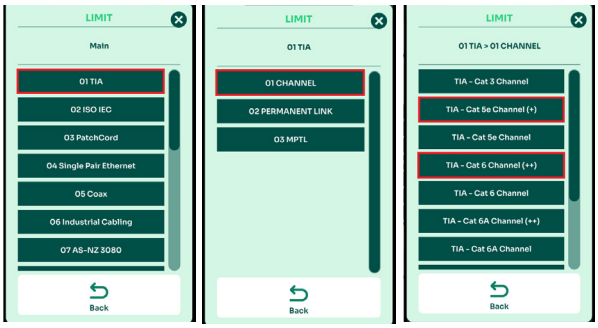
d. Cable Test Limit

Choosing the test limit is a very important step to copper cable certification. It determines the cable standards used, cable type and the adapter used during testing. ISO IEC and TIA are the widely used standard limits. Users can create customized limits and upload these limits to the device. Contact AEM support at customercare@aem-test.com for assistance in creating a custom limit.

i: Select Test Limit



- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to update the test profile.
- Select [Limit] to change the test limit.

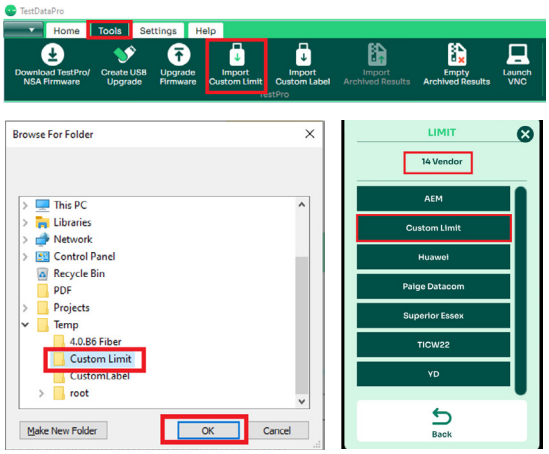


- Select [01 TIA].
- Select [01 CHANNEL]. Choose Channel when channel adapters are being used and choose Permanent Link if permanent link adapters are being used.
- Select the limit to be used for testing.

  Notice the + and ++ signs after some of the test limits? + means DC Resistance measurements such as Loop, Pair to Pair and In Pair are included in the Pass/Fail criteria of the test. Otherwise only DC Loop Resistance is included and Pair to Pair and In Pair are for information only.

  ++ means DC Resistance, TCL and ELTCTL measurements are included in the Pass/Fail criteria of the test. Otherwise, these measurements are for information only. Use these limits when certifying cables that is needed to be used for PoE applications.

ii: Custom Test Limit



Some users may prefer to use customized limits to fit their testing needs. TestPro provides a way to import these limits using TestDataPro PC Software.

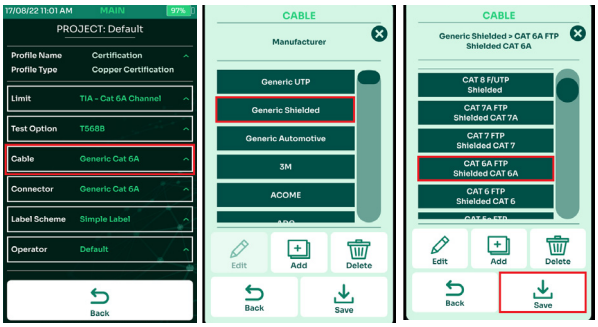
For more information about importing Custom Limits, refer to the TestDataPro User Guide or you may reach AEM Support @ customercare@aem-test.com.

- Launch TestDataPro PC Software and click [Tools] then click Import Custom Limit
- Browse to the folder where the custom limit is located. Select the folder and click [Ok].
- In TestPro, the custom limits are located inside [Profile] then [Limit] scroll down to [Vendor] and finally, the Custom Limit folder.

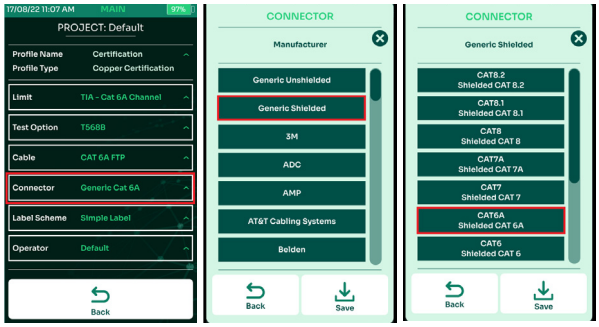
e. Cables & Connectors

It is important to document the cables and connectors for the purpose of good reporting. Each cable has its assigned NVP value or Nominal Velocity Propagation that calculates the length of the cable under test. Choosing the correct cable and connector is necessary for accurate testing and measurements.

i: Select A Cable & Connector



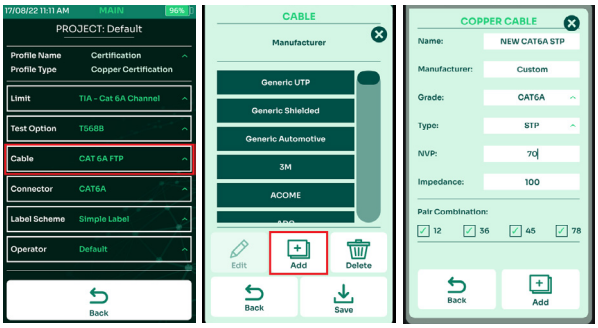
- Select [Cable: Generic Cat 6A].
- If unsure of the type of cable, select [Generic UTP] for unshielded cable &[Generic Shielded] for shielded cable.
- Choose the specific type of cable i.e.. CAT6A FTP and select [Save].



Follow a similar process for choosing connectors:

- Select [Connector: Generic Cat 6A].
- Select [Generic Shielded].
- Select [CAT 6A].

ii: Add New Cable



There are cases that the cable being used to test is not yet available in AEM TestPro cable database. In this case, users can add a cable in the database to be used for testing & certification. To add new cable part number to the TestPro's database, contact AEM support @ customercare@aem-test.com

- Select [Cable: Generic Cat 6A].
- Select [Add].

  Name – name or part number of the new cable

  Manufacturer – manufacturer name of the cable. The new cable will be saved under this name in the database.

  Grade – cable grade (CAT3 to CAT8)

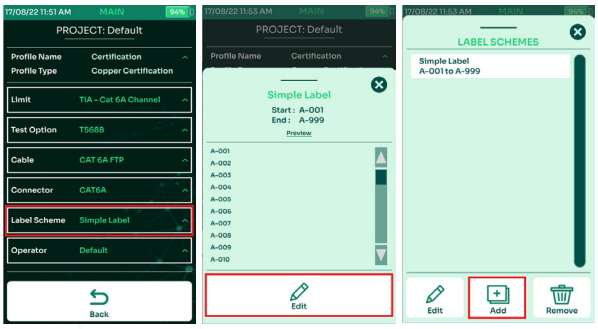
  Type – UTP, STP, FTP, etc.Impedance: 100 Ohms

  Pair Combination: all pairs enabled by default
- When all fields are completed, select [Add] to save the new cable in the database.

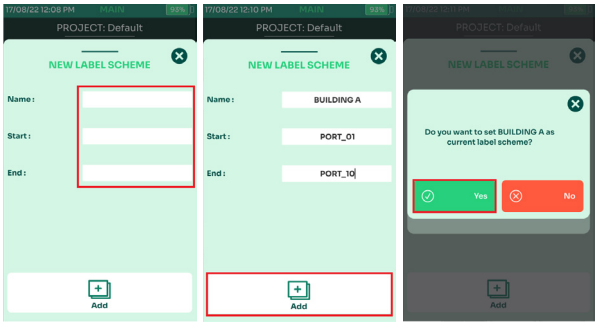
f. Label Schemes

Labeling allows user to identify the associated physical locations (i.e., building, room, cabinet, rack ,port, etc.). These labels will be used to save the test results to the TestPro.

i: Create New Label



- Select [Label Scheme: Simple Label]. A preview of the simple labels will be displayed.
- Select [Edit] to view or to add to the list of label schemes.
- Select [Add] to create a new label.



- Key in the desired label name as well as the descriptions for [Start] and [End].
- Select [Add] to finish creating the label.
- Select [Yes] to the dialog box confirming the new label as the current label scheme.

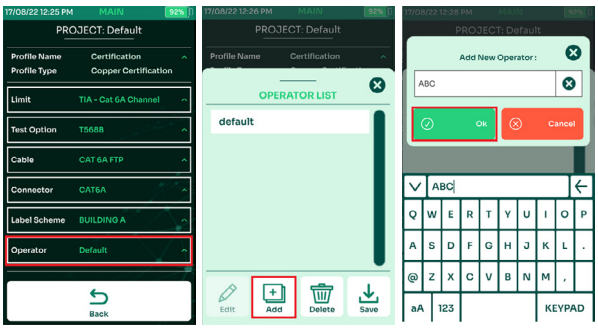
  Note: The text in Start label should be lower than the End label i.e., 01 against 10. The text should match as well i.e., first 4 characters are alphabet the end label should also start with alphabet.

ii: Import Custom Label

Refer this section to s. USB ii: Import Label List

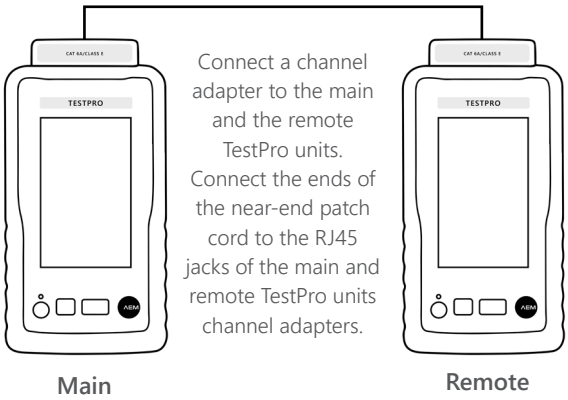
g. Operator

Adding Operator name in a project and profile is another important step in documenting the test result. When test reports are generated it includes the operator name to identify who conducted the certification test.

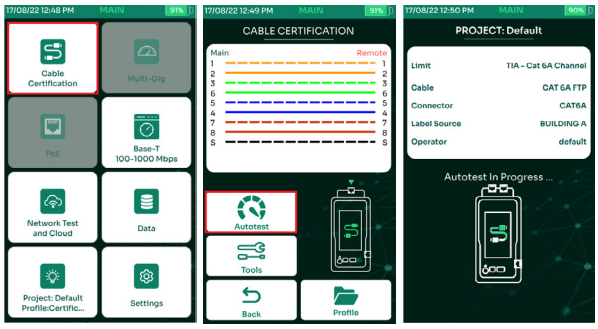


- Select [Operator: Default]. A preview of the operators saved in Testpro will be displayed.
- Select [Add] to add new operator.
- Key in the operator's name or initials and select [Ok].

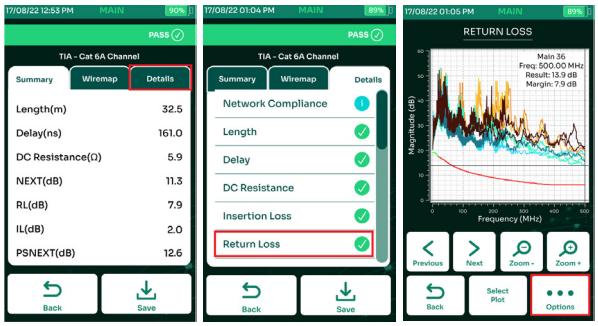
h. Performing Cable Autotest



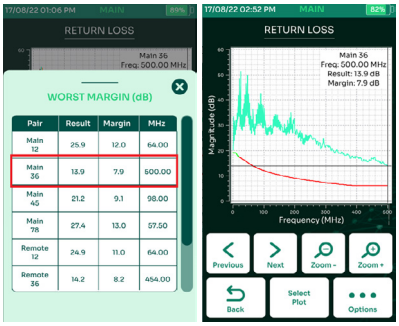
Connect Channel or Permanent Link adapter to the main and remote TestPro units. Connect both ends of the cable-under-test to the main and remote channel adapter or Permanent Link adapter RJ45 jack.



- Select [Cable Certification].
- Once a cable-under-test is attached to the main and remote units, a LiveWiremap status will be displayed on both ends of the screen. Start a full certification Autotest by selecting [Autotest] on this screen.
- Autotest commences.

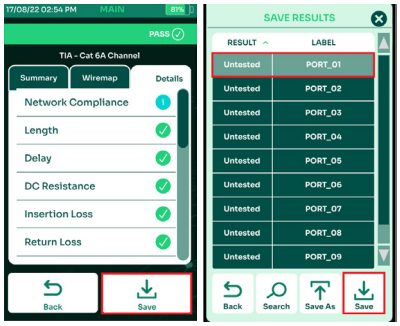


- To view the Autotest results for each parameter, select [Details].
- Select [Return Loss].
- The return loss graph will be displayed. Select [Options].

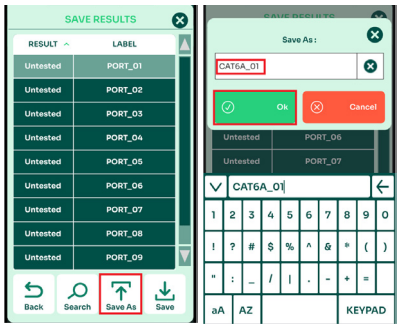


- The worst margins for return loss will be displayed.
- To view the measurement of a Pair, just select the pair and the graph will display the selected pair against the margin.

i. Save Autotest Results

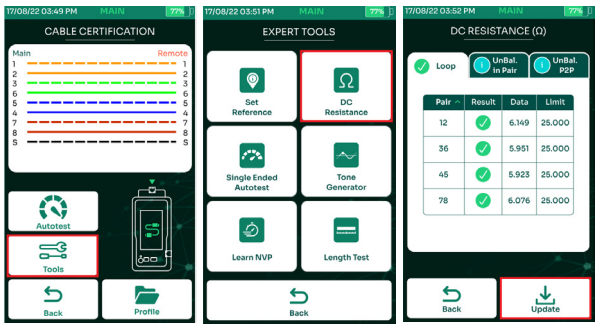


- After Autotest completes. TestPro will show the test results. To save the results, select [Save].
- A list of labels will show up. Choose the label and select [Save]. A dialog box will confirm that the results are being saved.



- If the label list runs out or the cable under test is not listed in the label list, click [Save As].
- Key in the label name and select [Ok].

j. DC Resistance

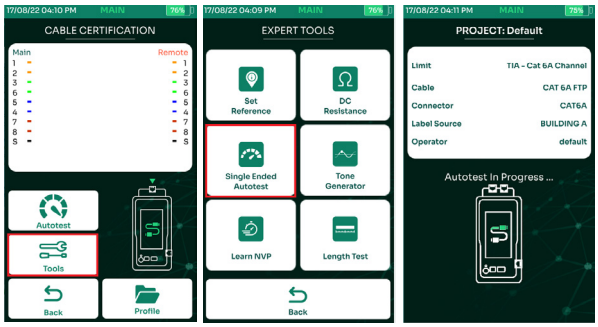


Measure the DC resistance and resistance unbalance of the cable under test by connecting the cable ends to the Channel or Permanent Link adapter port. If using AD-NET-CABLE adapter, use the "CAT 6A/Class EA" ports on the main and the remote TestPro units, respectively.

- Open [Cable Certification] and select [Tools].
- Select [DC Resistance].
- DC Resistance test starts and displays the results. To retest select [Update].

  (Note: Perform set reference before testing the DC resistance for the first time. Use a patch cord (recommended length: 2 meters) and perform set reference before performing the DC resistance test.

k. Single Ended Autotest



It is desirable to attach both ends of the cable to a main and remote TestPro units to get the full test result.

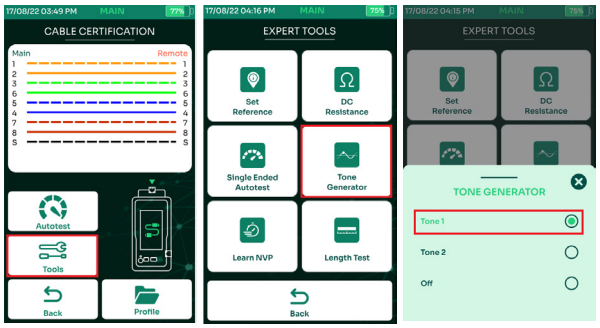
While not as comprehensive as testing a cable fully attached to the TestPro remote unit, single-ended testing is a basic test to verify a cable connected only on one end by evaluating the overall RL, NEXT, PSNEXT values as the frequencies used for data transmission will show plenty of margin if the cable is good.

Typical set up will use custom limits for this type of laboratory testing. A failure in NEXT or return loss in single ended Autotest indicates that either the cable is mislabeled or has poor performance. Single ended Autotest is not intended to be used in field testing at all. It is used for laboratory/production testing application. It is mainly used when testing a master reel of cable. To do this, each of the 8 conductors in the 4 pair cable must be terminated with 50 ohms to ground.

- Open [Cable Certification] and select [Tools].
- Select [Single Ended Autotest].
- Autotest commences and display the test results.

  Note: Wiremap and Length measurements are not available in Single Ended Autotest

l. Tone Generator



The TestPro unit's tone generator helps technicians locate the cable-under-test from a bunch of cables by sending a tone signal to all 8 wires. An amplifier probe will be used to detect the tone.

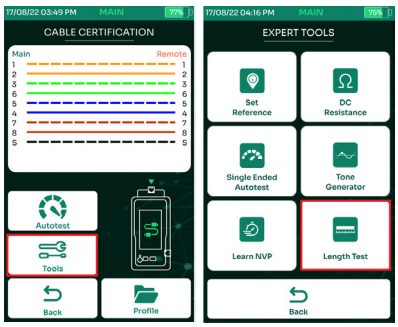
- Open [Cable Certification] and select [Tools].
- Select [Tone Generator].
- Select [Tone 1]. Closing the Tone Generator screen will turn off Tone 1.

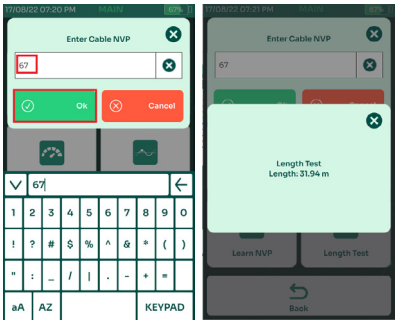
m. Learn NVP

Nominal velocity of propagation (NVP) is a process used by handheld testers to determine the length of the cable. TestPro unit's Learn NVP feature helps users to determine the NVP value of a cable by keying in its cable length. The NVP value can then be used in Certification. To use Learn NVP tool, connect TestPro main and remote unit via Channel or Permanent Link adapter to the cable that needs NVP to be measured.

- Open [Cable Certification] and select [Tools].
- Select [Learn NVP].
- Key in the cable length between 10m and 100m then select [Ok].
- TestPro displays the NVP value of the cable.

n. Length Test

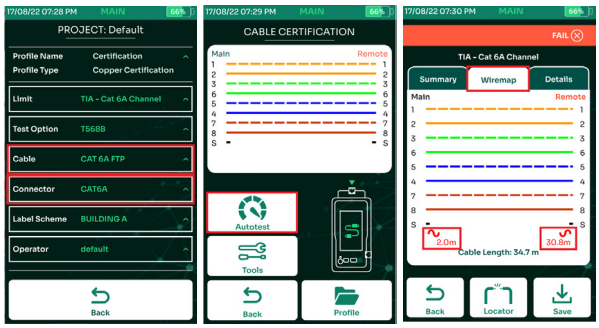




Length Test using TestPro can determine the length of the cable based on the NVP value keyed-in. To use Length Test tool, connect TestPro main and remote unit via Channel or Permanent Link adapter to the cable that needs NVP to be measured.

- Open [Cable Certification] and select [Tools].
- Select [Length Test].
- Key in the cable NVP value and then select [Ok].
- TestPro displays the length of the cable.

o. Shield Discontinuity Test



TestPro's shield discontinuity feature is used to test the integrity of the shielded cable. If there are issues with the shield, TestPro will detect it and display the distance to where the shield issue is located in the wiremap screen.

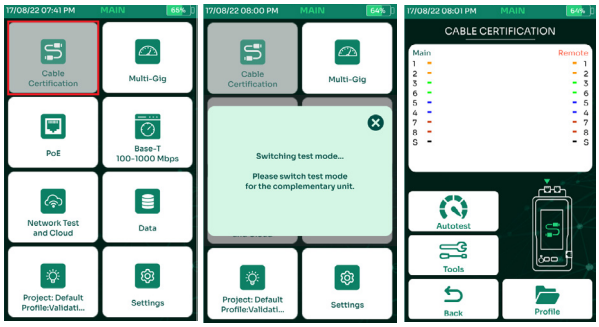
- Set the [Cable] and [Connector] to use Shielded Cable and Shielded Connector.
- Select [Autotest].
- Once Autotest is complete, select the Wiremap tab.

  Example above: the total cable length is 34.7 meters of which TestPro detected shield discontinuity at 2.0 meters away from the main unit and 30.8 meters away from the TestPro remote unit.

p. AD-NET-CABLE Certification Test

AEM's AD-NET-CABLE adapter is a multi-purpose adapter that can be used for Multi-Gig SNR measurements, PoE reading, Network Test Tools and CAT6A Cable Certification. This adapter has two modes, Validation and Certification mode. To use this adapter for CAT6A cable certification, the adapter has to be switched to certification mode.

i: Switch Test Mode

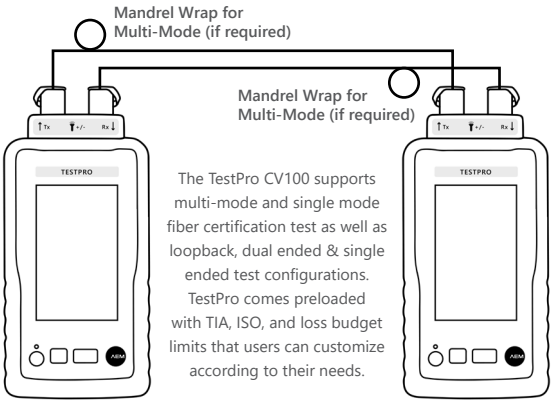


To perform cable certification using AD-NET-CABLE adapter, attach these adapters to TestPro main & remote and connect both ends of the cable to be tested to the TestPro main & remote units CAT6A/Class EA channel port.

- Notice that the [Cable Certification] is gray? It means that the device is in Validation Mode (Multi-Gig mode). To switch to Cable Certification mode, simply select [Cable Certification] on the main screen.
- A dialog box message will confirm the request.
- TestPro is in cable certification mode when the Multi-Gig and PoE buttons are grayed out. To switch back to Multi-Gig, just select the [Multi-Gig] menu in the main screen.

Note: This feature is available with the K60 and K61 kits. K50 and K51 kits needs to purchase AD-NET-CABLE adapter. For other TestPro kits/units, a certification license will be required to fully utilize this feature. Please send an email to customercare@aem-test.com with the device serial numbers to purchase or check for the certification license eligibility.

3 Fiber Certification Test



The TestPro CV100 supports multi-mode and single mode fiber certification test as well as loopback, dual ended & single ended test configurations. TestPro comes preloaded with TIA, ISO, and loss budget limits that users can customize according to their needs.

Fiber Certification Test is used to evaluate the performance of fiber optic components against TIA and ISO standards. These components include fiber optic cable, adapters and splices. TestPro supports Multi-mode and Single-mode Fiber.

a. Multimode Launch Verification

In the field, launch conditions for Multimode Fiber Adapters can be verified though the Higher Order Mode Loss (HOML) test. This test - a multimode fiber adapter encircled flux launch condition verification in field - can be readily created in the field to gauge and adjust launch conditions through the supplied reference-grade launch cord. The HOML qualification of the source and launch cord combination involves the use of a launch cord with and without applied mandrel wrap.

Mandrel diameter prescriptions per TIA-526-14-C

Fiber nominal core diameter [µm]	900µm buffered fiber [mm (in)]	1.6mm jacketed cordage [mm (in)]	2.0mm jacketed cordage [mm (in)]	2.4mm jacketed cordage [mm (in)]	3.0mm jacketed cordage [mm (in)]
50	25 (0.98)	24 (0.94)	23 (0.91)	23 (0.91)	22 (0.87)
62.5	20 (0.79)	19 (0.75)	18 (0.71)	18 (0.71)	17 (0.67)

Note: The mandrel diameters are based on nominal values of 20 mm (0.79in) and 25mm (0.98in) reduced by the cordage diameter and rounded up. Mandrel prescriptions apply to 850nm and 1300 nm sources.

Take the following steps to measure the HOML of the light source and launch cord combination:

1. Attach the reference launch cord to the light source.
2. Deploy the launch cord in a manner free of bends smaller than 75 mm (3 inches) in radius.
3. Using the Light Source / Power Meter Mode, measure and record the output power level, P0, in dBm.
4. Without disconnecting the launch cord from the source or mechanically disturbing the connection to the source, wrap and secure the launch cord in five non-overlapping adjacent turns around the mandrel.
5. Measure & record the output power level, P1, in dBm.
6. Calculate HOML using equation, HOML [dB] = P0 [dBm] - P1[dBm]. The HOML of the source and launch cord combination determines if and how the source and launch cord are to be used for subsequent cable plant loss measurements, as per the below table.

HOML [dB]	SOURCE AND LAUNCH CORD QUALIFICATION
>0.6	Measure cable plant with HOML test mandrel wrap left in place on launch cord
0.1-0.6	Measure cable plant with HOML test mandrel wrap removed from launch cord
<0.1	Source and launch cord combination disqualified for measuring cable plant loss

b. Fiber Set Reference

It is important to perform set reference before starting an Autotest to ensure the accuracy of the test results. A 2-meter set reference cord is included in the fiber kit. Make sure that the reference cord is cleaned and not degraded before performing the set reference.

Perform set reference only after:

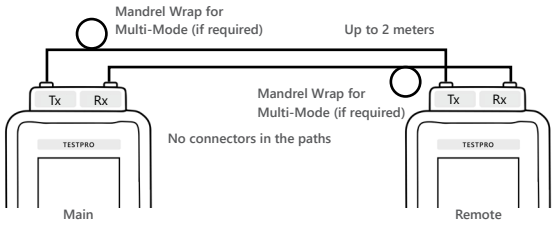
- Powering off and then powering on the TestPro unit.
- Disconnecting and then reconnecting the fiber adapter.
- Replacing reference cords in either the TestPro main or remote unit.
- Changing the configuration from loopback to dual ended and vice versa.

AEM recommendations:

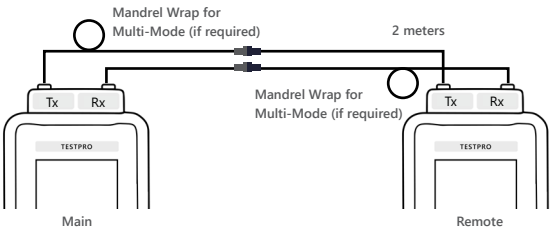
- Wait for 5 minutes after powering up the fiber adapters before performing set reference, so that they are properly warmed up and the temperature has stabilized.
- Perform one jumper set reference.
- Do not disconnect the reference cord in the fiber adapter TX port after performing set reference.

i: One/Two/Three Jumper Method

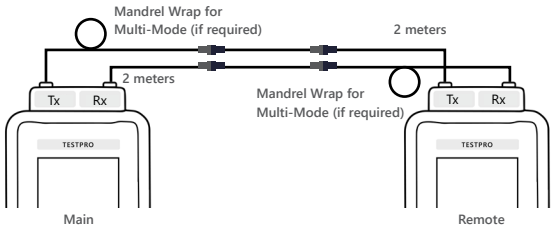
One Jumper Set Reference



Two Jumper Set Reference

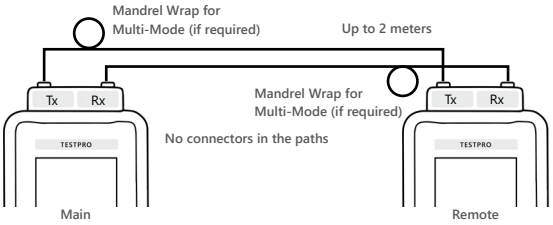


Three Jumper Set Reference

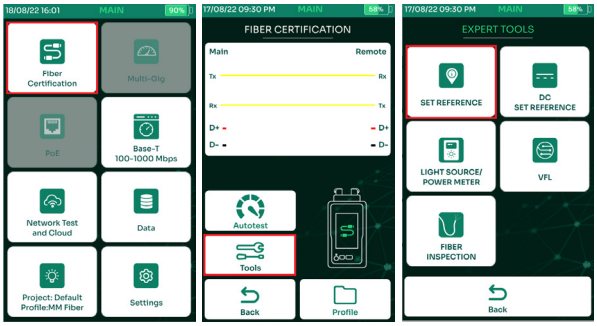


1. One Jumper Set Reference – connect 2 meter reference cords from main to remote
2. Two Jumper Set Reference – connect 2 meter reference cords from main to fiber connector and another 2 meter reference cords to remote.
3. Three Jumper Set Reference – connect 2 meter reference cords from main to fiber connector, then 2 meter reference cords to another fiber connector and another 2 meter reference cords to remote.

ii: Fiber Dual Ended Set Reference

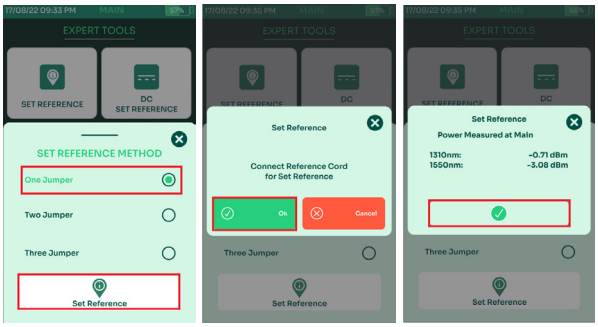


- Attach the single mode or multi mode fiber adapter to the TestPro main and remote units.
- Connect one end of a 2-meter reference cord to the TestPro main unit's Tx port and connect the other end of that cord to the TestPro remote unit's Rx port.
- Connect another 2-meter reference cord to the TestPro main unit's RX port, and the other end of that cord to the TestPro remote unit's Tx port.



- On the TestPro main screen select [Fiber Certification].
- Select [Tools].
- Select [Set Reference].

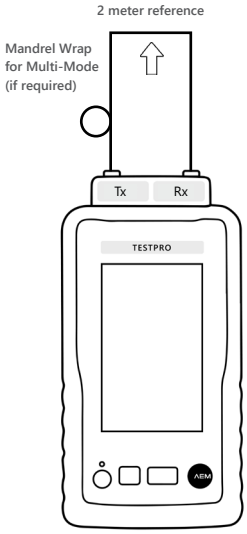
  Note: Wait for 5 minutes for the fiber components to warm up before performing the set reference. Doing this will help to produce more stable & consistent results.



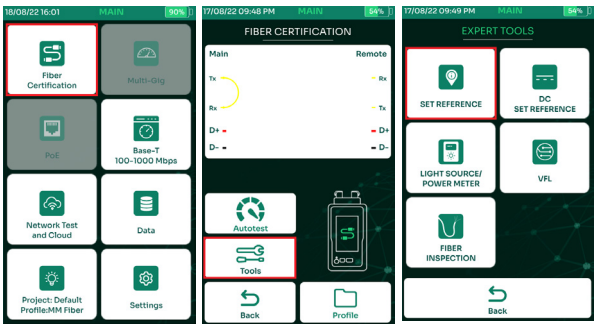
- Select [One Jumper] and then select [Set Reference].
- Select [Ok] on the dialog box.
- TestPro will start the set reference process. Once it is complete, the set reference values will be displayed. Select [Accept] to continue.

  Note: For multimode the acceptable value is -24dBm and higher and for single mode the acceptable value is -4dBm and higher.

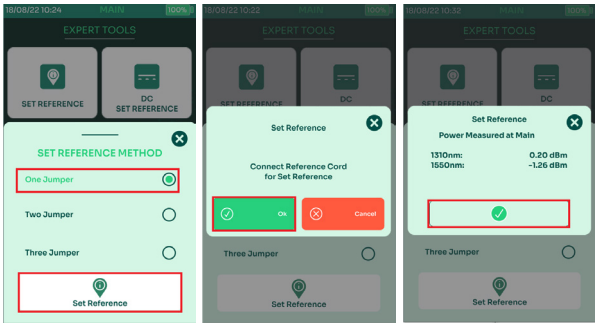
iii: Fiber Loopback Set Reference



- Attach the single mode or multi mode fiber adapter to the TestPro main unit.
- Connect one end of a 2-meter reference cord to the TestPro main unit's Tx port and connect the other end of that cord to the TestPro main unit's Rx port forming a loopback connection.



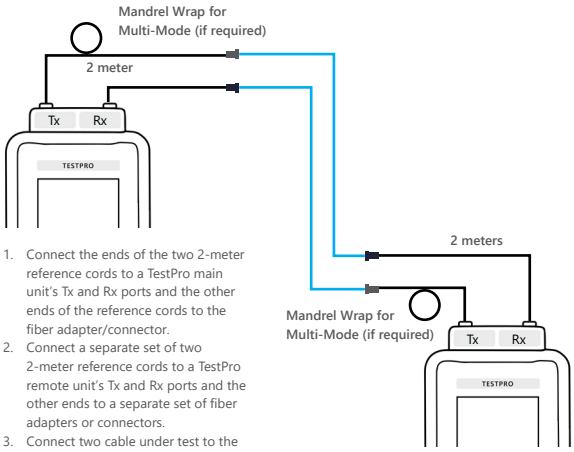
- On the TestPro main screen select [Fiber Certification].
- Select [Tools].
- Select [Set Reference].



- Select [One Jumper] and then select [Set Reference].
- Select [Ok] on the dialog box.
- TestPro will start the set reference process. Once it is complete, the set reference values will be displayed. Select [Accept] to continue.

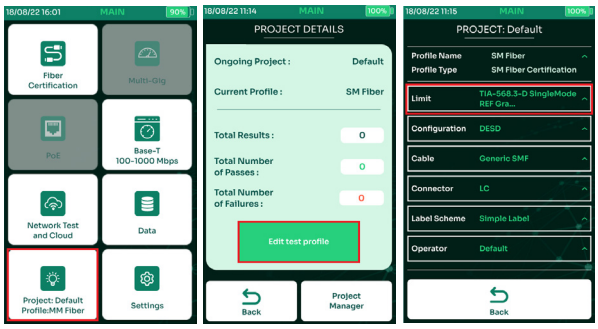
  Note: For multimode the acceptable value is -24dBm and higher and for single mode the acceptable value is -4dBm and higher.

c. Fiber Test Setup

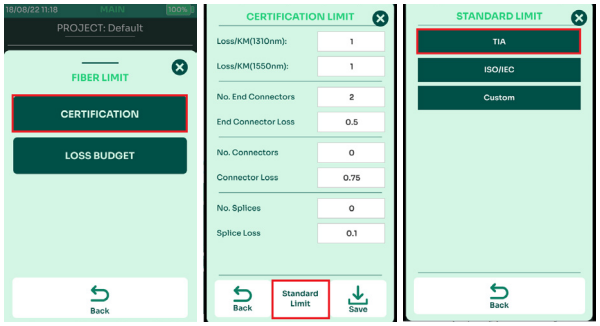


1. Connect the ends of the two 2-meter reference cords to a TestPro main unit's Tx and Rx ports and the other ends of the reference cords to the fiber adapter/connector.
2. Connect a separate set of two 2-meter reference cords to a TestPro remote unit's Tx and Rx ports and the other ends to a separate set of fiber adapters or connectors.
3. Connect two cable under test to the fiber adapters/connectors.

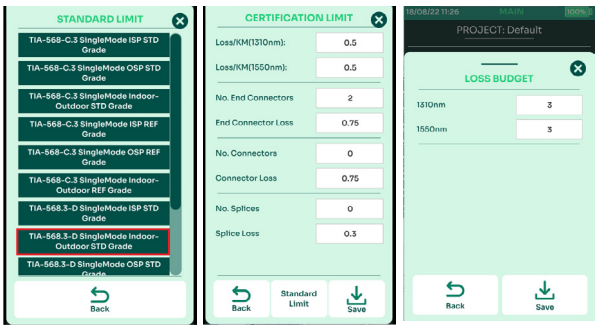
d. Fiber Test Limit



- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to select or update the test profile.
- Select [Limit] to change the test limit.



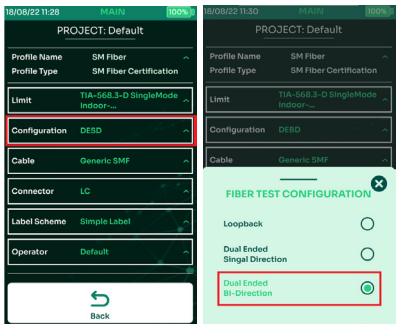
- Select either [Certification] or [Loss Budget].
- A preview of the current limit used will be displayed. To accept this limit, select [Save] . To change the limit, select [Standard Limit].
- Select the appropriate standard -[TIA], [ISO/IEC] or [Custom].



- Select the desired TIA Limit - [STD Grade] or [REF Grade]. Use [Ref Grade] if testing reference grade fiber cable and [STD Grade] if testing standard grade fiber cable.
- When [STD Grade] or [REF Grade] is selected, the default values will be populated in the [Certification Limit] screen, allowing users to modify the values.
- When [Loss Budget] is selected, users will be required to enter the loss budget in decibels (dB). Default value is 10 dB for Multimode and 3 dB for Single-mode.

Note: For Loss/KM, End Connector Loss, Connector Loss and Splice Loss, TestPro will only accept values that are equal to or lower (stricter) than the standards specified in the [Certification Limit] screen.

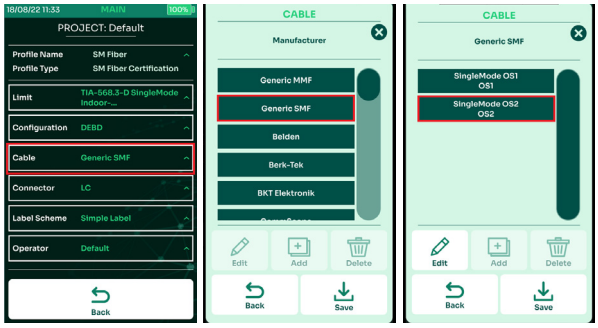
e. Fiber Configuration



TestPro supports loopback, dual ended single directional (DESD) and dual ended bi-directional test (DEBD) configurations.

- Select [Configuration].
- Select from one of the three configuration options [Loopback], [Dual Ended Single Bi-directional] or [Dual ended Bi-directional]. Changes to the configuration is automatically saved.

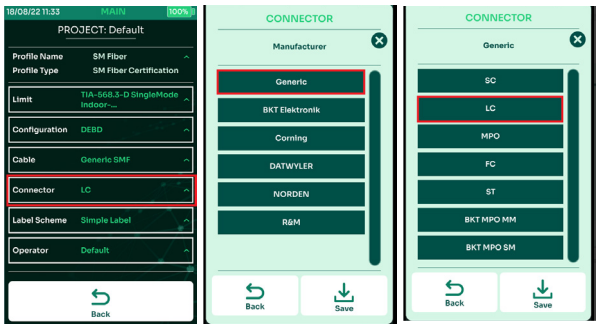
f. Fiber Cable



TestPro supports a wide range of fiber cable vendors. If unsure of the cable manufacturer, select [Generic MMF] for multi-mode and [Generic SMF] for single mode. To add a manufacturer's cable to our database, please email to: customercare@aem-test.com

- Select [Cable].
- Select from the list of fiber cable manufacturers or [Generic SMF].
- Select the required cable type and select [Save].

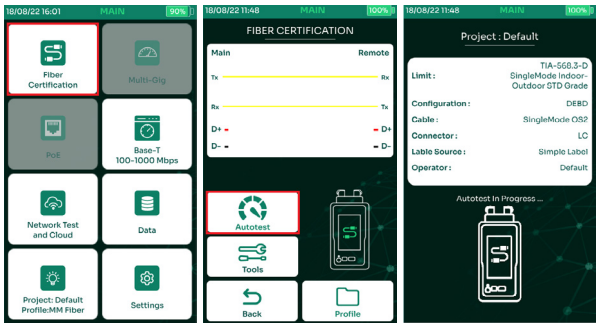
g. Fiber Connector



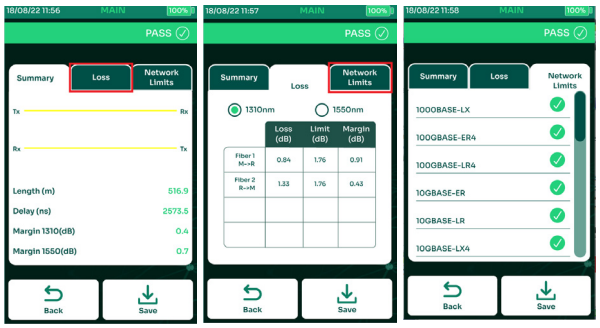
TestPro supports a different kinds of fiber connectors. To add a manufacturer's cable to our database, please email to: customercare@aem-test.com

- Select [Connector].
- Select [Generic].
- Select the connector type. Changes are automatically saved.

h. Performing Fiber Autotest



- In the main screen, select [Fiber Certification].
- Select [Autotest].
- TestPro will confirm that autotest is in progress.



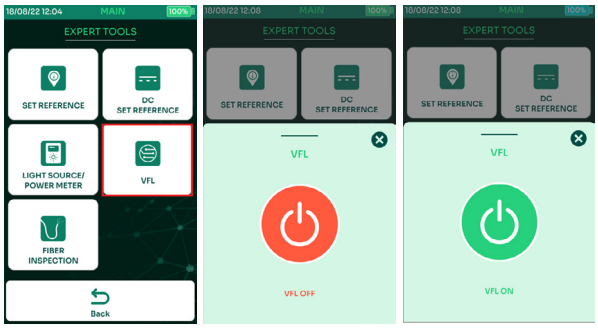
- Once the Autotest is complete, TestPro will display a summary.

- Select the [Loss] tab to view the loss and margin at 850nm/1300nm for multimode and 1310nm/1550nm for single-mode.
- Select [Network Limits] to view the various limits that the fiber-under-test can support.

i. Save Autotest Results

Saving a fiber Autotest result is the same as saving a cable test result. Refer to 2 Cable Certification Test i. Save Autotest Results.

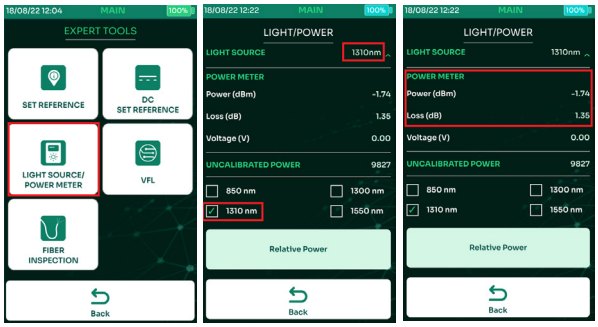
j. Visual Fault Locator (VFL)



Visual Fault Locator (VFL) is used to detect fiber cable bends and breaks, bad splices and a faulty connector. A powerful, bright, XXXnm wavelength (red) signal will shine through the fiber's cladding, indicating where a break or kink may have occurred.

- To access VFL, select [Fiber Certification]. Select [Tools]. Select [VFL].
- Select turn ON icon to turn on VFL. Connect the fiber-undertest to the VFL port of the TestPro. When the icon turns green the VFL power is on.
- To turn off VFL, the turn OFF icon or exit the VFL screen. When the icon turns red , the power is off.

k. Light Source & Power Meter

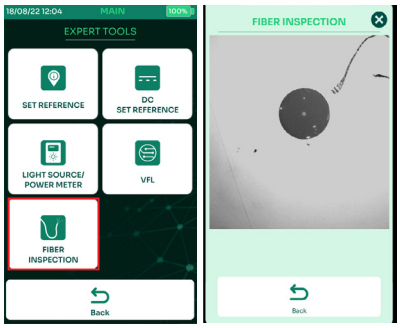


- On the main menu, select [Fiber Certification]. Select [Tools]. Open [Light Source/Power Meter].
- Choose the desired light source i.e., 1310nm and the same for power meter 1310nm.
- In the [Power Meter] section, the power readings will start to show.
- Selecting [Back] will turn off the light source/power meter function.

  Note: Like set reference, connect a 2-meter fiber reference cable from TestPro main unit's Tx port to the TestPro remote unit's Rx port and another similar cable from the TestPro main unit's Rx port to the TestPro remote unit's Tx port (if performing a dual ended test) and select [Relative Power] to set the loss (dB) to 0 before attaching the fiber-under-test.

  Note: It is important to perform Loopback Set Reference before using the light source/power meter. For loopback configuration, connect a 2-meter fiber cable from the TestPro main unit's Tx & Rx port and connect the other end to the fiber-under-test via fiber connector.

l. Fiber Inspection



Dirty fiber components like fiber cable and connectors are one of the major problems in fiber optics, causing high connector loss and reflectance. The fiber inspection feature of TestPro allows user to check the fiber connectors for dirt before testing and installation. TestPro has built-in USB Video Class (UVC) drivers to support any fiber.

- On the main menu, select [Fiber Certification]. Select [Tools]. Select [Fiber Inspection].
- TestPro will automatically detect the fiber inspection probe and display the view of the fiber cable in TestPro screen. In this example, the dirt can be seen in the fiber inspection probe.

Connecting a fiber inspection scope:
Power on TestPro, attach SM or MM Fiber adapter and insert the fiber inspection scope into the TestPro unit's USB slot, located on the right side of the device. TestPro will auto detect the fiber inspection scope and install the relevant UVC built in drivers.

m. Hybrid Power & Fiber Certification Test

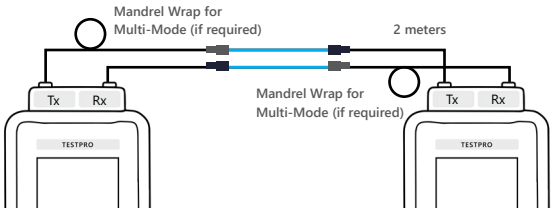
A powered fiber cable system combines hybrid optical fiber and copper cabling plus electronics to provide a complete indoor/outdoor solution for both powering and communicating with HD Cameras, Wi-Fi access points, small cells, and other PoE devices. It is also known as a hybrid cable system as it is composed of a fiber optic cable which carries the data and two unshielded twisted pair (UTP) cables attached to a power source.

The powered fiber cable system improves speed and simplifies installation, powering, and communication of network devices -at 30x the distance of traditional CAT cable systems.

Deployment of HD cameras, Wi-Fi access points, optical network terminals, small cells, and other network-access devices can be challenging, especially a PoE input for power and communications,
but distance limitations, power availability, and device placement throw a wrench into network planning.

Testing of Powered Fiber Cables

Refer to and follow steps under 3 Fiber Certification Test to perform the fiber one-jumper set reference followed by steps below.



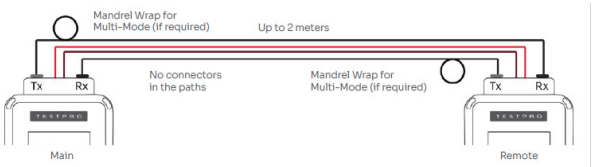
1. Attach fiber cables to test both ends of the reference cables.
2. Attach a PoE test cable to the power port of the fiber adapter.

3. Clip the 'crocodile clip' of the POF cable to the open Ethernet cable pair that carries the voltage i.e. pair 3 and 6. (Note: Ensure that the pairs and the Ethernet cable are cut open to access these pairs.)
4. Connect the other end of the cable to a power source equipment (POE switch, extender or midspan).
5. Power on the TestPro unit and select [Fiber Certification]. The PSE voltage reading should be displayed below the FiberMap.

n. Fiber PoE DC Resistance Test

Installing a copper cable with less resistance measurement is the key to powering POE-enabled devices and ensuring optimum operation and performance. TestPro units, using a multi-mode or single-mode adapter support the measurement of copper cable DC resistance in a powered fiber cable system (also known as hybrid fiber, were fiber and copper cables are combined), using the DC connector that comes with the fiber kit.

i: Fiber PoE DC Set Reference



Just like Copper and Fiber Certification tests, it is important to perform set reference to the TestPro main and remote devices before doing the measurement to get accurate DC Resistance test results. It is recommended that the measurement is performed within 10 min of doing "set reference". To perform Fiber DC set reference:

- Attach the single mode or multi mode fiber adapter to the TestPro main and remote units.

- Connect one end of a 2-meter reference cable to the TestPro main unit's Tx port and connect the other end to the TestPro remote unit's Rx port. Connect another 2-meter reference cable to the TestPro remote unit's Tx port, and the other end of that cable to the TestPro main unit's Rx port.
- Connect one end of the DC Resistance reference cable to the TestPro main unit's DC port and connect the other end to the TestPro remote unit's DC port.

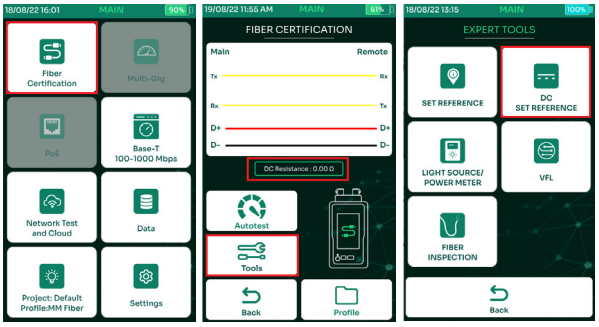
Perform Fiber DC set reference only after:

- Powering off and then powering on the TestPro unit.
- Disconnecting & then reconnecting the fiber adapter.
- Replacing DC reference cord.

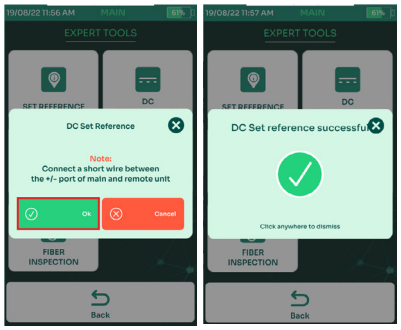
AEM recommendations for Fiber DC set reference:

- Use the DC resistance cable that came with the fiber kit.

Click here for more information on Fiber Set Reference.

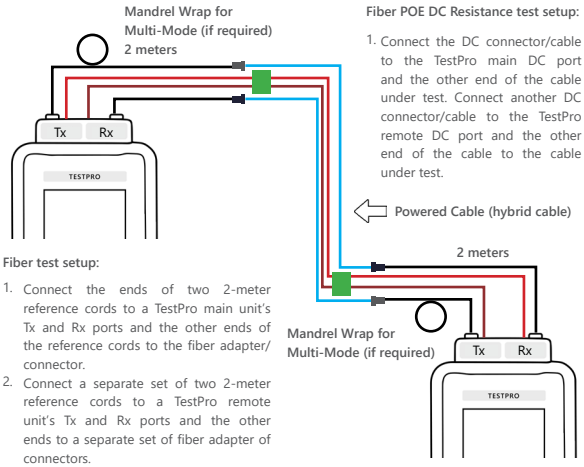


- On the TestPro main screen, select [Fiber Certification].
- Select [Tools].
- Select [DC Set Reference].



- Select [Ok] to continue. Make sure the DC reference cable is attached to TestPro main & remote unit's DC port.
- DC set Reference successful dialog box comes up.

ii: Fiber PoE DC Resistance Test

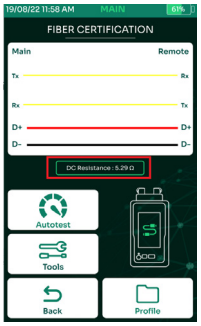


Fiber POE DC Resistance test setup:

1. Connect the DC connector/cable to the TestPro main DC port and the other end of the cable under test. Connect another DC connector/cable to the TestPro remote DC port and the other end of the cable to the cable under test.

Fiber test setup:

1. Connect the ends of two 2-meter reference cords to a TestPro main unit's Tx and Rx ports and the other ends of the reference cords to the fiber adapter/ connector.
2. Connect a separate set of two 2-meter reference cords to a TestPro remote unit's Tx and Rx ports and the other ends to a separate set of fiber adapter of connectors.
3. Connect two cables under test to the fiber adapters/connectors.

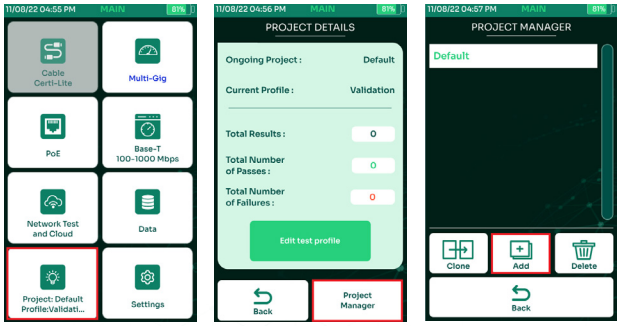


Fiber POE DC measurements automatically appear in the Fiber Certification Screen.

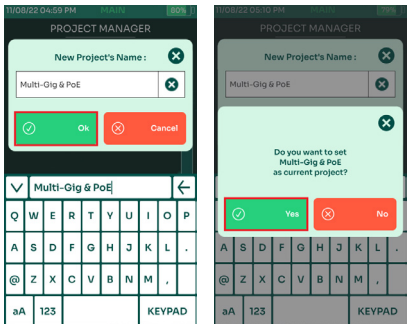
4 Multi-Gig, PoE and BASE-T Test

a. Creating Project/Profile

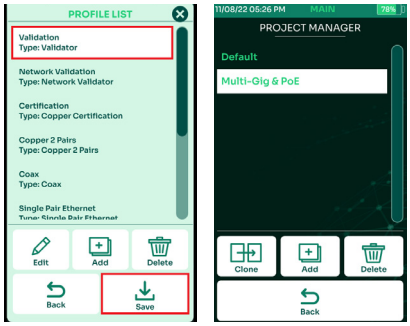
The TestPro supports customer workflows through projects and profile descriptions. [Project] is an identifier of the customer site/location, whereas [Profile] refers to specific test configurations.



- Select [Project]/[Profile] on the home screen to create/edit a project. Once a project is selected, subsequent Autotest results will be saved in that project.
- Select [Project Manager] to choose or create a different project or to delete an existing project.
- Choose from one of the already defined projects or create a new project by selecting [Add].

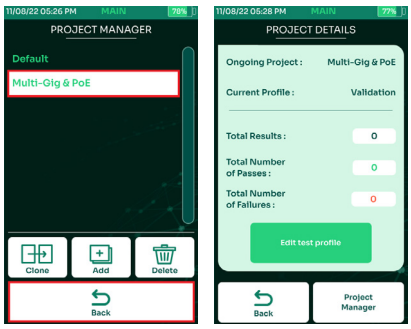


- Key in a project name and select Ok .
- Click Yes on the dialog box "Do you want to set Multi-Gig & PoE as current project?



- Choose a profile from the list and click Save. Valid profiles for TestPro are listed below:
  a. [Validation] for Multi-Gig tests
  b. [Certification] for Copper Cable Certification
  c. [Single Pair Ethernet] for Copper Cable Certification with less than 4 pairs
  d. [MM Fiber] to Multimode Fiber
  e. [SM Fiber] for Singlemode Fiber
  f. [Network Validation] for Network Autotest
  g. [Coax] for Coax Certification
  h. [Copper 2 Pairs] for Copper Cable Certification using 2 pairs

- Choose an appropriate profile, eg. [Validation] for multi-gig validation and select [Save].



- To select an already created project, select that from the [Projects] menu.
- Back will bring you back to the previous screen or main menu.

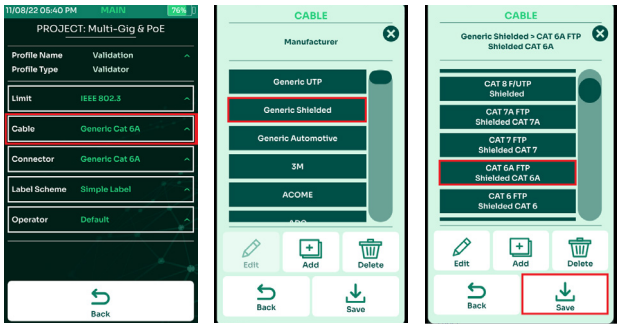
b. Adjusting Test Limits

- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to update the current test profile.
- In the validation profile, [Limit] allows you to choose the minimum SNR required for different network speeds (note: keep the SNR limit at 0 dB if in doubt. If SNR is positive, then the corresponding network speed is functioning properly for the cable under test).
- In this example, the limit is set at 10G -> 2dB (which means TestPro will fail cables having less than a 2dB margin for 10GBASE-T). Press [Back] to go back to the main menu.

  Note : Pressing [Back] in any of the screens will accept changes and take user back to the home screen.

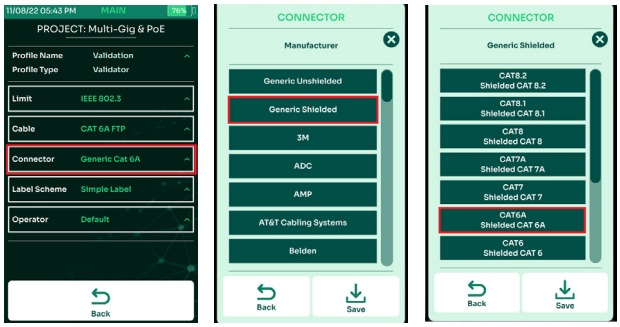
c. Selecting Cable/Connector

It is important to document the cables and connectors for the purpose of good reporting.



- Select [Cable: Generic Cat 6A].
- If unsure of the type of cable,select [Generic UTP] for unshielded cable & [Generic Shielded] for shielded cable.
- Choose the specific type of cable.

Follow a similar process for choosing connectors:



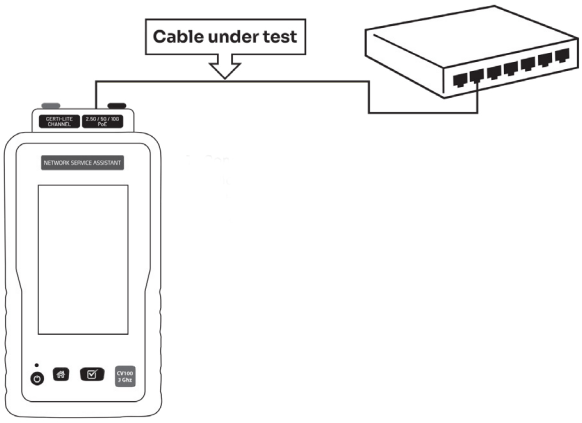
- Select [Connector: Generic Cat 6A].
- Select [Generic Shielded].
- Select [CAT 6A].

d. Validation Test Options

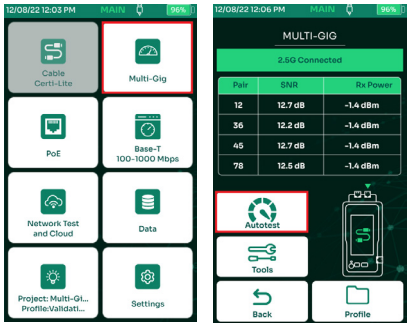
i: Multi-Gig Validation

This function allows for Multi-Gigabit link validation and PoE characterization. It will quickly confirm the suitability of a cabling link to support 2.5Gbps, 5Gbps, and 10Gbps data rates, and validate PoE performances up to the highest power level specifications of 90W.

To validate support for 2.5Gbps/5Gbps/10Gbps link speeds, the TestPro needs to be connected via the Ethernet cable under test to a router, switch, PoE or any network enabled device.



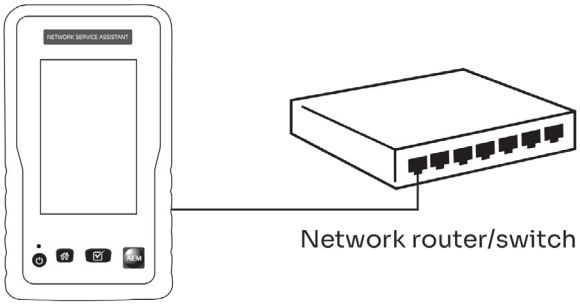
- Connect the first end of the cable to-be validated to the Multi-Gig (2.5G/5G/10G/PoE) port of the AD-TestPro adapter, attached to the TestPro unit.
- Connect the second end of the cable to a network device i.e., network switch/router.



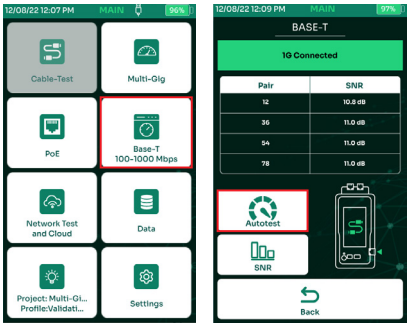
- Once the test setup is ready and TestPro is connected, start Multi-Gig validation test by selecting [Multi-Gig] on the TestPro. As a convenient quick test, the TestPro will attempt to connect at 2.5Gbps. If it successfully connects, it will show SNR and received power on each cable pair for this network speed.
- To conduct a comprehensive Multi-Gig validation test, select [Autotest].

ii: BASE-T

Multi-Gig tests require the TestPro adapter. However, all TestPro units are capable of performing simple 10/100/1G validation tests using the 1G Ethernet port on the side of the unit.



Performing a BASE-T Autotest is similar to performing a Multi-Gig Autotest.



- Select [BASE-T 100/1000Mbps] on the home screen of the TestPro.
- Select [Autotest].

iii: PoE Test with PoE enabled Router/Switches

TestPro supports PoE tests for all PoE-enabled switches, routers and midspan, commonly referred to as power source equipment (PSE). It tests measurements for link speed, SNR, and PoE. Internal and external load tests check if the link can support 2.5Gbps/5Gbps/10Gbps when voltage is injected to it continuously.

TestPro will also check that the cable installation meets the minimum required power to turn on a PoE device. Specifically, TestPro supports the following types of basic measurements:

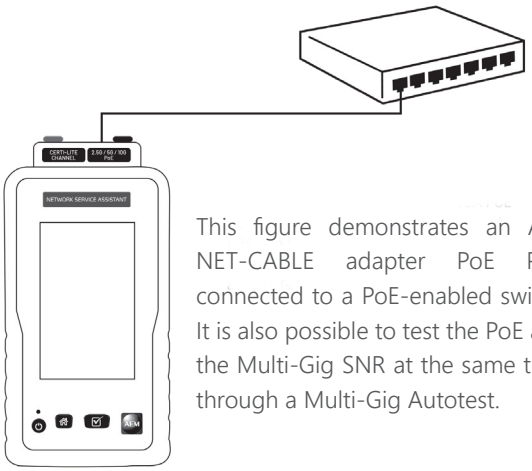
- PSE Detected: Yes or blank.
- Voltage: Voltage drawn by the PD.
- PSE Type: 1-2, 2, 3-4, & 4 - different types have different allocated power.
- PD Class: 0 to 8 - different classes have different allocated power
- PoE Cable Pairs: Cable pairs used to transmit electrical power.
- Allocated Power: Power allocated for the PD.
- Real Power: Power used when internal load is used.

Internal & External Load Tests:

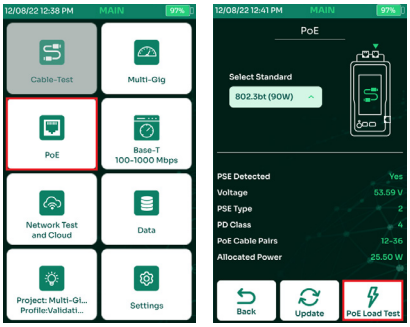
- Voltage
- Current
- Real Power: The actual power available at the RJ-45 jack that is allocated by the PSE

Commonly Used Terms:

- PSE (power source equipment) - a device that provides power on an Ethernet cable, such as a PoE network switch.
- PD (powered device) - a device powered by PSE.
- PD Class - relays information to the PSE on how much power the PD requires to operate.



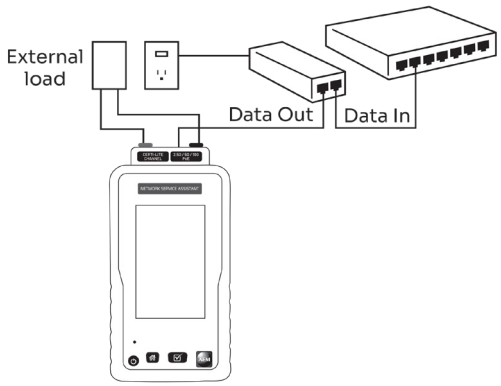
This figure demonstrates an AD-NET-CABLE adapter PoE Port connected to a PoE-enabled switch. It is also possible to test the PoE and the Multi-Gig SNR at the same time through a Multi-Gig Autotest.



- To perform a PoE test, select [POE] on the home screen of the TestPro unit.
- On the PoE test screen, choose the expected PoE standard. The PoE test screen will also list the actual PoE type, voltage and power level. The unit measures power with actual resistance load connected. PD class is automatically detected, depending on the selected PoE type. Further load tests on PoE can be conducted by selecting PoE Load Test.

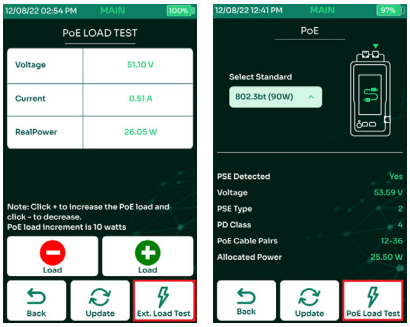
iv. PoE Load Test

- External load tests help to qualify link speeds of 2.5Gbps/5Gbps/10Gbps when there is a loaded PoE. Qualified PoE loads i.e., POE load boxes supplied by AEM that draw constant power can be connected to the banana sockets to monitor the Signal SNR in the presence of loaded POE.
  Note: Do not directly short circuit the red & black banana sockets as this can damage the equipment.



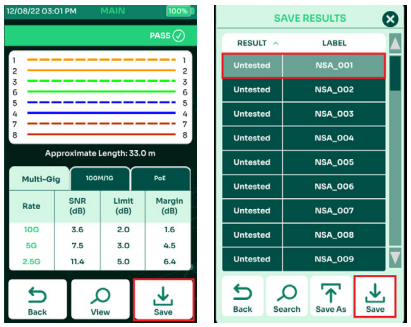
- TestPro provides an option to connect to a preferred external load for continuous loading of PSE. Simply connect the external load to the TestPro PoE positive (+) and negative (-) ports and select 

.



- Monitor the voltage, current & power levels of the PoE. For easy reference, the SNR and Rx power per pair will aslo be displayed.

e. Saving Autotest Data



- After Autotest completes, TestPro will show the test results. Select [Save].
- Choose from a list of labels and select [Save].

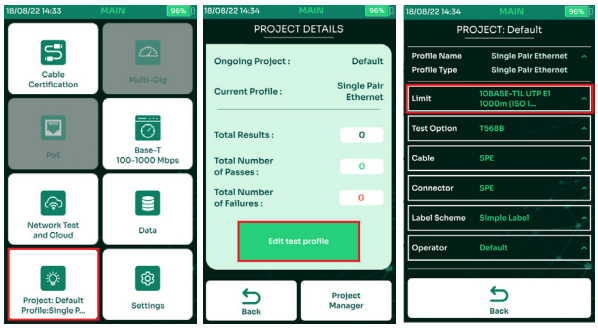
5 Single Pair Ethernet Certification Test

Single Pair Ethernet technology has been used in automotive applications for many years, due to the reduced weight, volume and low cost. In enterprise building and factory deployments, SPE is an attractive option due to lighter weight, low cost and longer distance of up to 1000 meters. SPE will follow a standardized testing methodology.

a. SPE Set Reference

Use Single Pair Ethernet or Automotive adapter with 2-meter reference cable to perform set reference.
For more information, refer to 2 Cable Certification Test c. Cable Set Reference.

b. SPE Test Limit



- Select [Project] on the home screen to choose an active test project.
- Click [Edit test profile] to update the test profile.
- Select [Limit].

- Select Single Pair Ethernet ISO & TIA limits can be used.
- Choose a limit in the list and the limit will be saved in the test profile.

  Please contact AEM support @ customercare@aem-test.com for assistance in creating a custom limit.

c. SPE Cable & Connector

To choose a cable and connector for Single Pair Ethernet (SPE), make sure that the correct SPE cable and connector is selected for proper documentation and reporting. If unsure of the cable to use, choose SPE cable and SPE connector under [Generic UTP] or [Generic Shielded] or [Generic Automotive] cable and connector database.

For more information about selecting a cable and connector, refer to: 2 Cable Certification Test e. Cables and Connectors

d. Performing SPE Autotest

Attach a Single Pair Ethernet or Automotive adapter to the main and remote TestPro units and select [Autotest].

For more information about Performing SPE Autotest, refer to: 2 Cable Certification Test h. Performing Cable Autotest

e. Save Autotest Results

aving SPE Autotest result is the same as saving a cable test result. Refer to 2 Cable Certification Test i. Save Autotest Results

6 Coax Certification Test

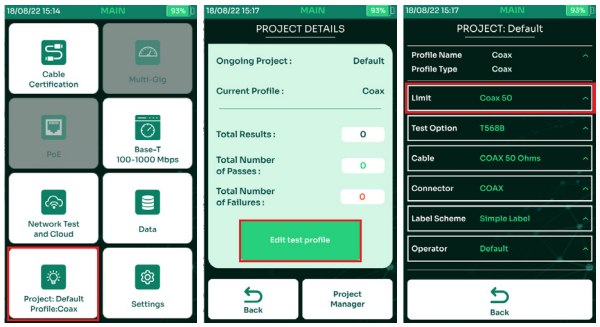
TestPro supports coax certification for both 50 Ohms and 75 Ohms coaxial cable. A coax adapter is required to certify coaxial cabling. TestPro's coaxial cable certification solution has a wide RF measurement frequency range of 1-2,400 MHz. The Autotest takesno longer than 15 seconds. Both dual-ended and single-ended testing can be performed.

a. Coax Set Reference

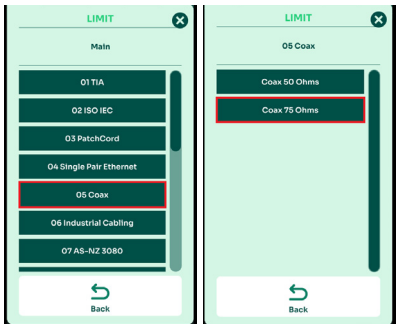
To perform coax set reference, attach the coax adapter to the TestPro main and remote units and perform set reference using a 2-meter coaxial cable.

For more information, refer to: 2 Cable Certification Test c. Cable Set Reference.

b. Coax Test Limit



- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to update the test profile.
- Select [Limit].



- Select [COAX].
- If the cable under test is COAX 50 Ohms, select [Coax 50 Ohms] limit. If the cable under test is Coax 75 Ohms, select [Coax 75 Ohms] limit. Customized limits can be created. Contact AEM support @ customercare@aem-test.com for assistance.

c. Coax Cables & Connectors

To choose a cable and connector for Coax, make sure that coax cable and coax connector are selected under Generic Shielded cable and connector.

For more information, refer to: 2 Cable Certification Test e. Cables and Connectors

d. Performing Coax Autotest

Attach a Coax adapter to TestPro main and remote units and select [Autotest].

For more information, refer to: 2 Cable Certification Test h. Performing Cable Autotest.

e. Save Autotest Results

Saving Coax Autotest result is the same as saving a cable test result. Refer to 2 Cable Certification Test i. Save Autotest Results.

7 Crossover Cable Certification Test

As a multi-function cable tester, TestPro supports copper certification using different cable wiring configuration like T568A, T568B (default selection), Crossover, 1000BASE-T Crossover and 2-Pair Crossed.

a. Crossover Set Reference

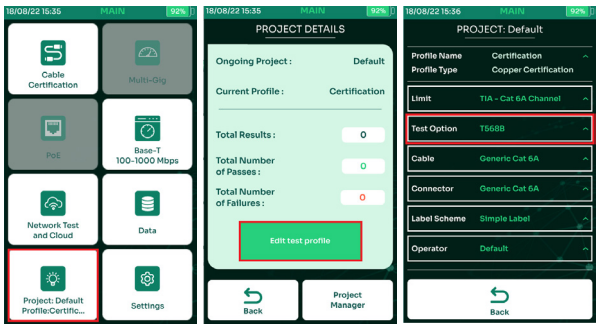
Set Reference using a crossover cable and wiring option is no longer necessary when a 4-Pair straight cable (T568A and T568B) is already completed before shipping the product. AEM recommendation is to perform set reference using T568A or T568B wiring option when the test adapter has changed or one of the TestPro units has been replaced.

For more information about Set Reference, refer to: 2 Cable Certification Test c. Cable Set Reference.

b. Cable Test Limit

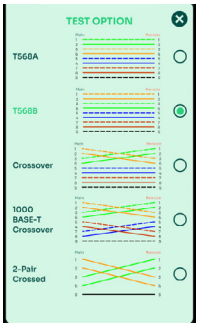
For more information about selecting a test limit, refer to: 2 Cable Certification Test d. Cable Test Limit.

c. Test Option



Setting the wiring option is critical for crossover cable testing. This section is only applicable for 2-Pair and 4-Pair twisted pair.

- Select [Project]/[Profile] on the home screen to create/ edit a project. Once a project is selected, subsequent Autotest results will be saved there.
- Select [Edit test profile] to update the test profile.
- Select [Test Option].



- Select the appropriate wiring option "Crossover" when using crossover cable. Changes are automatically saved after the selection.

  Note: Test option Crossover, 1000BASE-T Crossover, 2-Pair Crossed is only applicable for 2-Pair and 4-Pair twisted pair.

d. Performing Crossover Autotest

Attach Test Adapter in TestPro Main and Remote units. Connect the ends of the near-end and far end crossover cable to the RJ45 jacks of the main and remote TestPro units' channel adapters.

Refer to chapter 2 Cable Certification Test h. Performing Cable Autotest.

e. Save Autotest Results

Saving Crossover Autotest result is the same as saving a cable test result. Refer to 2 Cable Certification Test i. Save Autotest Results.

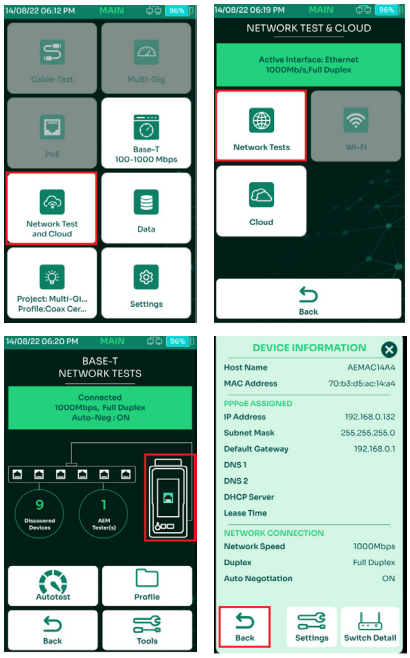
8 Network Test and Cloud

Network test is a simple way for the user to validate the network configuration & monitor for any network problems.

a. Network Test

The network test function has a network discovery feature that scans and detects stations, servers, TestPro units and other networking devices that are present in the network. It comes with network tools to aid troubleshooting and validation efforts.

Note: Connect an Ethernet cable from the TestPro side port to a live network.

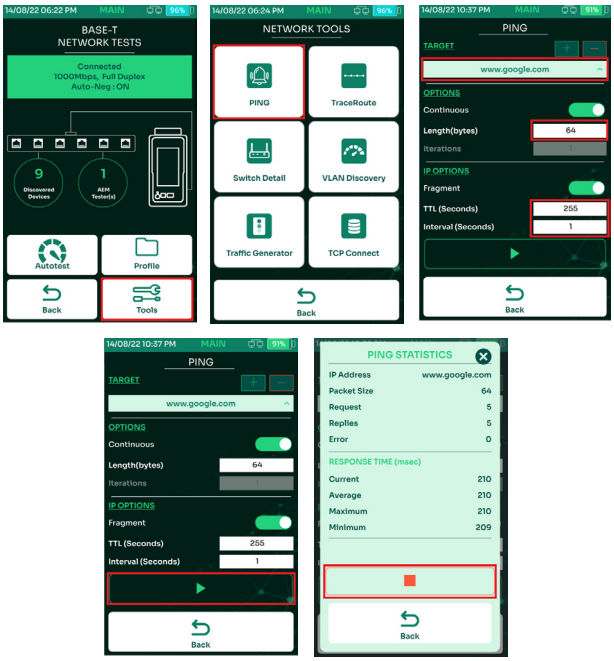


- On the main menu, select [Network Test and Cloud].
- Select [Network Test]. TestPro will start network discovery automatically and populate the screen with stations, servers, TestPro units, etc.

Note: A Wi-Fi icon will appear when a Wi-Fi dongle is attached to the TestPro's USB port. Select the TestPro icon to display the device information. Device information will display the IP address, subnet mask, default gateway, DNS server and other information. Select back to go back to the network test screen.

i. Ping

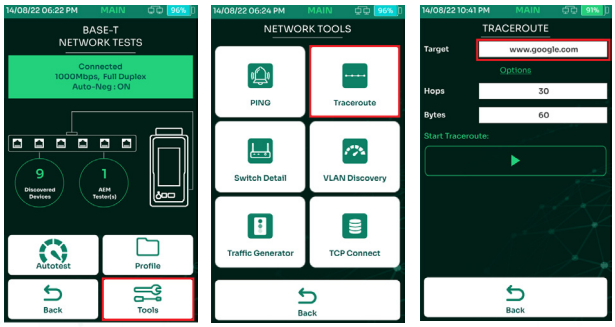
Ping is a software utility used to test the connectivity with the host on an Internet Protocol (IP) network. TestPro Ping measures the round-trip time for messages sent from the TestPro units to a destination website or IP address that are echoed back to the source.

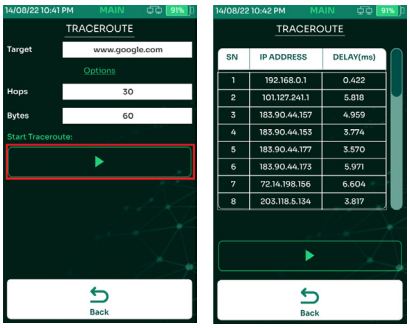


- Select [Tools].
- Select [Ping].
- On the Ping screen, choose the desired [Target] i.e. www.google.com [Length] 64 bytes, TTYL 255 sec and [Interval] 5 sec.
- Select ▶ to start the Ping test.
- A [Ping Statistics] page will display the numbers of ping requests, replies and errors. It will also display the current, average, maximum and minimum response times.

ii. Traceroute

Traceroute is used for displaying possible routes or paths and measuring transit delays of packets across an IP network. The history of the route is recorded as the round-trip times of the packets received from each successive host (remote node) in the route path or the sum of the mean times in each hop is a measure of the total time spent to establish the connection.





- Select [Tools].
- Select [Traceroute].
- Key in the website or IP address in [Target] field. By default the field will show "www.google.com", which can be changed.
- Click ▶ to start Traceroute.
- Traceroute will display the route (IP Address) and the delay in milliseconds.

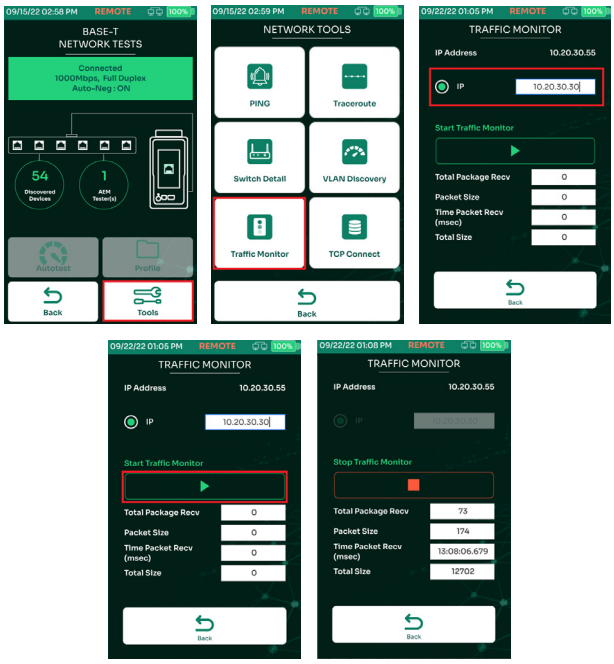
iii. Traffic Generator and Monitor

Traffic Generator on the TestPro main unit is used to generate UDP packets to be sent to the network.

Traffic Monitor on the TestPro remote unit is used to measure the number of packets received from the TestPro main unit.

- To start Traffic Generator select [Tools].
- Select [Traffic Generator]

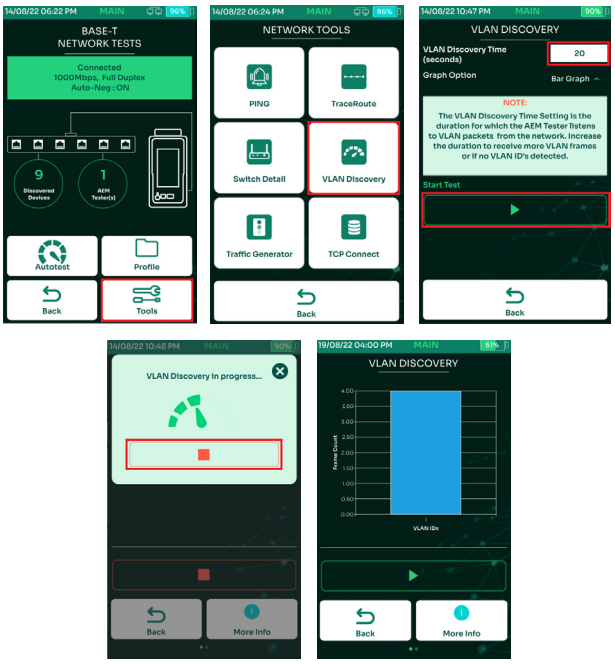
- Select either [Broadcast] or [IP]. When [Broadcast] is selected, the traffic or UDP packets will be sent to the entire network. When [IP] is selected, traffic will be sent to a specific IP on the network.
- To start Traffic Generator, select [Start Traffic Generator]
- TestPro will start generating traffic to the network. The total packets sent, packet sizes, total sizes and time packets sent will be updated.



- To Start Traffic Monitor, select [Tools].
- Select [Traffic Monitor].
- In the [Source IP] field, type in the IP address of the TestPro main unit that will generate the traffic.
- Select [Monitor Traffic].
- The TestPro remote will wait for traffic from the TestPro main unit.

iv. VLAN Discovery

A virtual local area network (VLAN) is a grouping of different hosts within a particular broadcast domain. VLANs allow a network administrator to group hosts that are connected to the same network switch to different local area networks. They also facilitate a number of advantages & functions such as ease of administration, confinement of broadcast domains, reduced broadcast traffic, & enforcement of security policies.



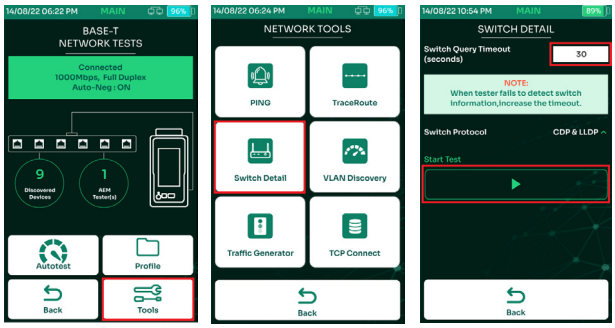
- To initiate VLAN, select [Tools].
- Select [VLAN Discovery].
- Key in the VLAN Discovery time (default is 20 seconds). To capture more VLAN packets, increase the time. Select [Start Test].
- The VLAN discovery will commence. Concurrently, the [Stop Test] button will be enabled.
- Once the VLAN discovery is complete, the results will be displayed. Select any of the VLAN IDs on the bar chart to display the results in list view.

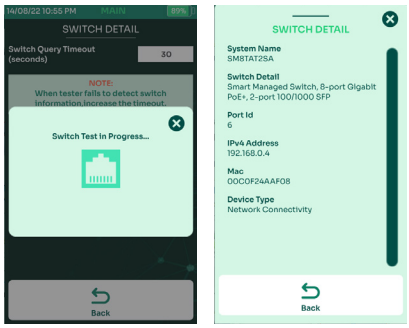
Reference:

- VLAN ID - unique identifier from 1 to 4094.
- Frames - number of frames/packets that TestPro received from the network using the VLAN ID.
- % - percentage of VLAN frames transmitted to the network, compared with other VLANs.

v. Switch Detail

TestPro's Switch Detail feature helps network professionals identify the switch name and model number to which the TestPro is connected to. Information such as port number, VLAN ID, IP address and much more are also readily available, eliminating the need to manually trace network cables, saving users time and effort when troubleshooting network related issues.

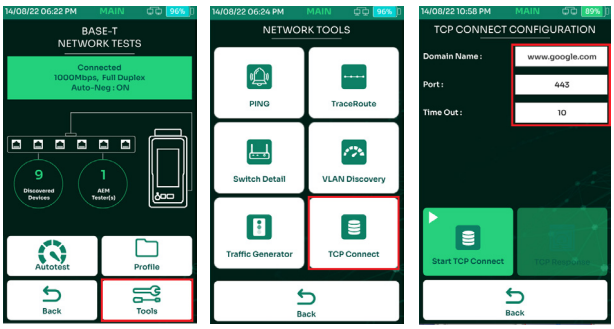




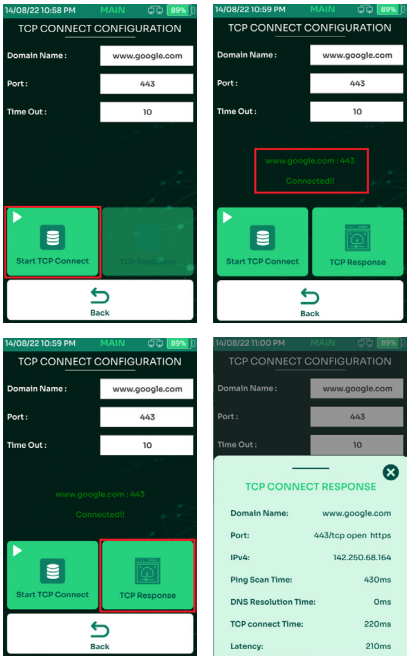
- To initiate Switch Detail, select [Tools].
- Select [Switch Detail].
- Key in the appropriate value for [Switch Query TimeOut] (default is set to 30 seconds). Increase the timeout when the tester fails to detect the switch information. Select the protocol to be used - [CDP], [LLDP] or both. Select [Start Test].
- Switch Detail commences.
- Once the Switch Detail process is complete, the results will be displayed.

vi. TCP Connect

TestPro can open a TCP connection with the selected target to test for port availability, by doing a TCP Connect test, using a 3-way handshake (SYN, SYN/ACK, ACK). The Autotest will run three times before reporting the results.



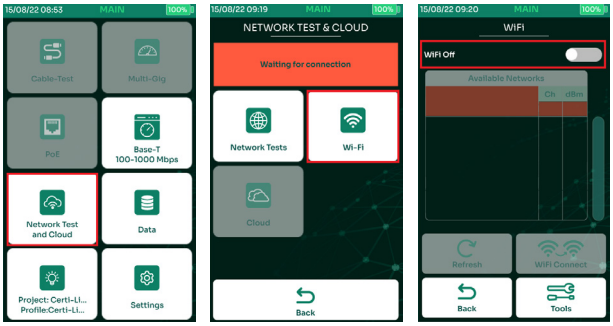
- Select [Tools].
- Select [TCP Connect].
- On the TCP Connect screen, key in the desired URL or IP address to be tested in the [Domain Name] field. Specify the port to be used and the timeout period.



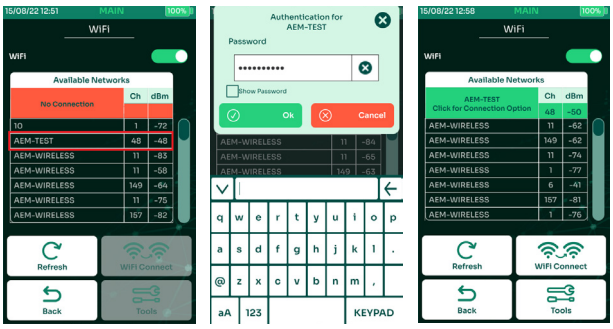
- Click [TCP Connect] to start the test.
- TCP Connect will display the status of the test as either [Connected or [Connection Refused].
- Select [Test Response] to view more details of the TCP Connect test results
- TestPro will display more details about the test such as Domain Name, Port and its status, IPv4 Address and Measurements for Ping, DNS Resolution, TCP Connect and Latency.

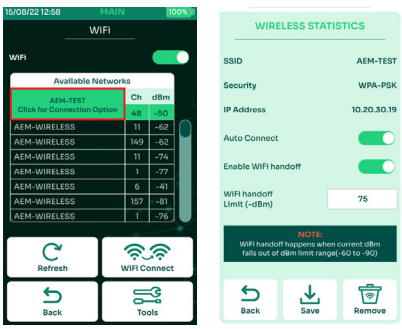
b. Wi-Fi

Please note that optional Edimax EW-7822ULC Wi-Fi USB adapter required for Wi-Fi testing. This adapter is region specific & can be purchased from Amazon or a retailer of your choice.

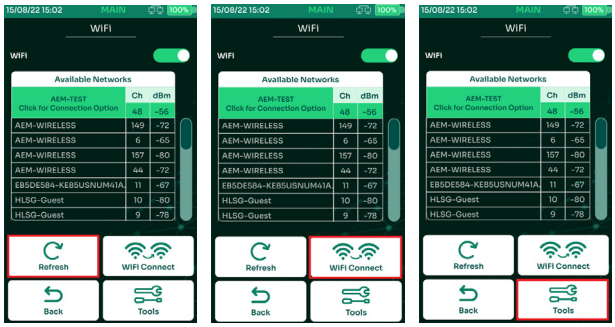


- Select [Network Test and Cloud].
- Select [WI-FI].
- Select [Turn ON WI-FI].





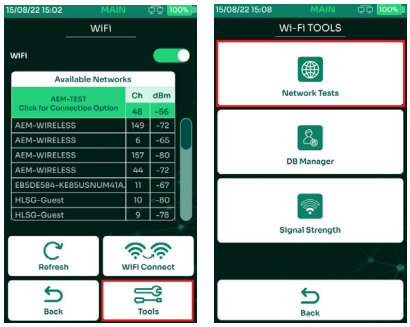
- TestPro will display the detected access points access points and their corresponding channels and dBm values. Select the correct network.
- A dialog box will request for the network password. Key in the password for the selected access points. Click to enable Wi-Fi and to cancel.
- TestPro is now connected to AEM-TEST access point with corresponding signal strength in dBm displayed.
- Select the connected SSID to open the [Wireless Statistics] page.
- [Wireless Statistics] page displays the Wi-Fi SSID, security type, TestPro Wi-Fi- IP address, autoconnect and Wi-Fi handoff details.
  Note: When [Wi-Fi Handoff] is enabled, TestPro will attempt to connect to another access point automatically with the same SSID and password when the current WI-FI dBm value goes below the limit set.



- To re-scan Wi-Fi access points, select .
- If there are multiple access points with the same SSID and password, select to force TestPro to connect to another access points with the same credentials.
- To access other Wi-Fi features and the network test select [Tools].

i. Wireless Network Test

TestPro supports network test features for both wired and wireless connectivity. Performing a TestPro wireless network test will help to validate installed access points, performance, as well as identify blind spots, access load balance and facilitate analytics and policies on network usage.

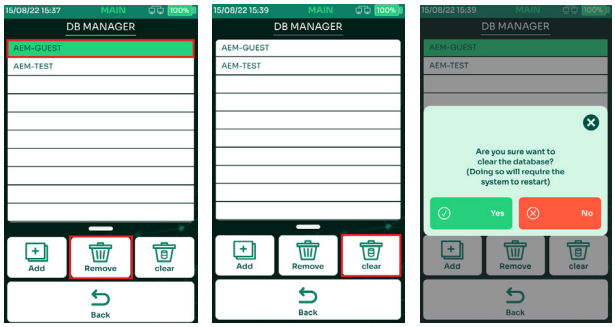


- Select [Tools].
- Select [Network Tests].

  Note: To use the network test feature refer to 8a. Network Test.

ii. DB Manager

TestPro's Database Manger for Wi-Fi allows users to add, remove and clear saved access points,. Whenever TestPro connects to an access points it automatically saves the SSID and password to the DB Manager. To access DB Manager:



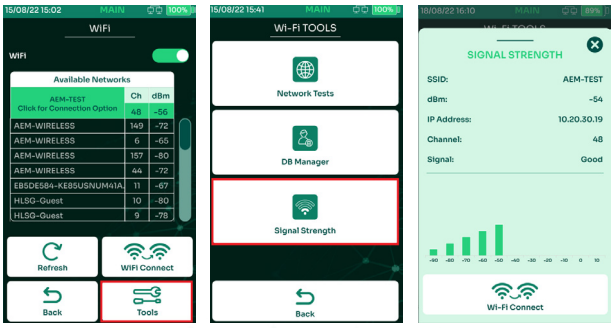
- Select [Tools].
- Select [DB Manager].
- The DB Manger screen will show a list of access points.
- To add an access points, select [Add].
- In the [access points Name] field, key in the name of the access point you are trying to connect to. In the [Security] field, choose either [Open] or [WPA-PSK]. In the [Password] field, key in the password of that access
- points.

  To connect to the new access points, select [Verify
- Network]. To save the access points select [Save].

  To delete an access points, choose the SSID name & select [Remove]. [Clear] will delete all saved access points in the DB Manager. Select [Clear].
- A dialog box requesting confirmation to delete will appear. Select as required.

iii. Signal Strength

TestPro Signal Strength Indicator is a real time Wi-Fi signal checker with a range of -90 dBm to 10 dBm, where -90 dBm is the weakest & 10 dBm is the strongest wireless signal. This is a great tool to check weak signals and blind spots after access point installation. It has WI-FI hand-off functionality to force hand-offs from one access point to another that shares the same SSID & password. To get Signal Strength:



- Select [Tools].
- Select [Signal Strength].
- The [Signal Strength] screen will display the SSID, current dBm value, IP address, channel indicator and signal indicator.

c. Network Autotest

i. Selecting Test Limit

- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to select or update the test profile.
- Select [Limit].
- [Network Discovery Mode] and [Network Discovery Time] are set to [Time Bound] and 30 seconds by default.

  Note: In Full Discovery mode, TestPro will scan the entire network. After network discovery scanning, Autotest will continue with other tests. In [Time Bound] mode, TestPro will scan the network for the specified duration.

ii. Selecting Cable/Connector

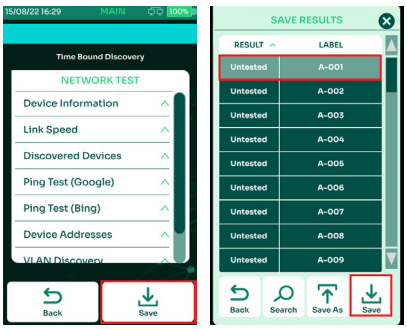
Refer to 2e i .select cable/connector section

iii. Performing Network Autotest

To perform a Network Autotest, the WI-FI dongle must be connected to the WI-FI access point or the Ethernet cable must be connected to a LAN port - either the side port of the tester or the ADNET adapter MUlti-Gig port.

- Select [Network Test and Cloud].
- Select [Network Test].
- Select [Autotest].
- Autotest will commence.
- To view the measurement results select the required parameter i.e., [Device Addresses]. A list of discovered IP & media access control (MAC) addresses will be shown.

iv. Saving Network Autotest

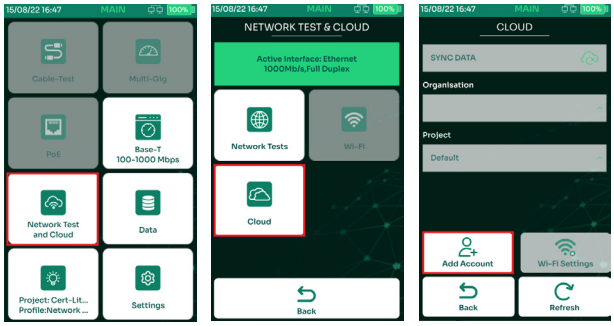


- Select [Save] to view the labels.
- To save results using label A-001, select [Save].
- A dialog box will confirm that the results are being saved.

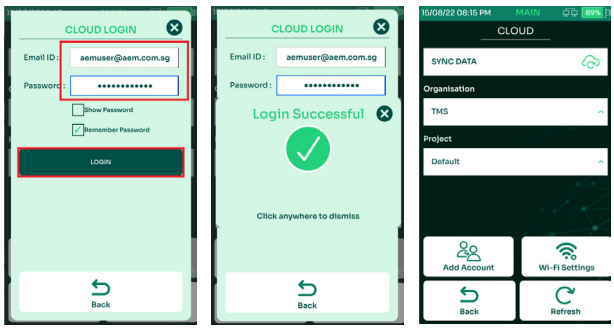
d. TestDataPro Cloud

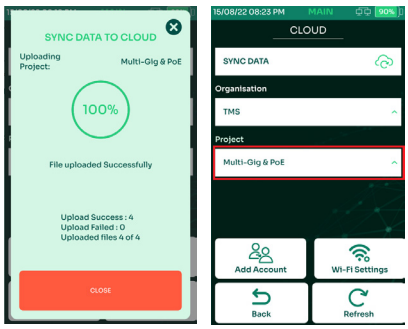
TestDataPro Cloud is a cloud-based service that allows users to upload results from a jobsite via wired network connection or wireless connection. Please note the optional Edimax EW-7822ULC Wi-Fi USB adapter is required for cloud access via WI-FI. TestDataPro Cloud allows users to view and download individual .pdf reports.

For the full test report management, which includes, recertification if incorrect test limits were used; report customization with logos; & much more, test results should be imported into the full featured PC-based TestDataPro.

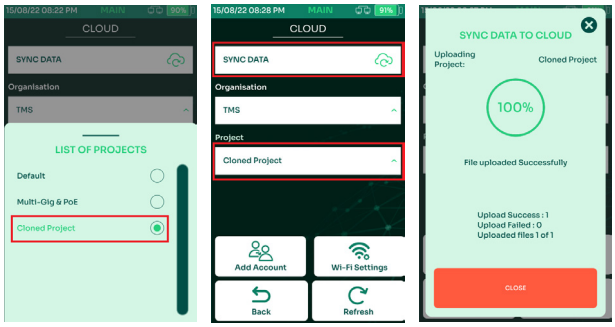


- Select [Network Test and Cloud].
- Select [Cloud]. Note: [Cloud] is only available when Ethernet cable or Wi-Fi is connected.
- Select [Add Account].





- In the [Username] field, key in the email address and password used during the tdpcloud.com registration and select [Login].
- A dialog box will confirm successful login. Click anywhere to dismiss then go back to the [Cloud] page.
- Choose the Organization to upload the test result (if applicable). Choose the project to upload in the drop down menu. Select [Sync Data]. TestPro will start uploading the project and test results data to the cloud.
- A dialog box will confirm once the upload is complete.
- Select [CLOSE] to go back to the [Cloud] page.
- To upload other projects, select from the dropdown list under [Select Project].



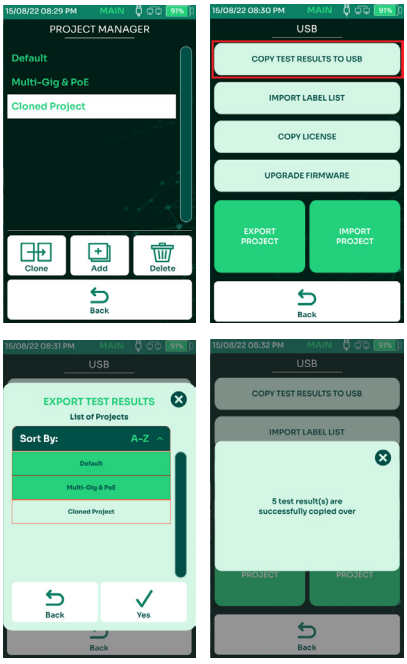
- Select the project to upload. The cloud will show the new project i.e., Cloned Project. Select [Sync Data].
- A dialog box will confirm once the sync is complete and the project has been uploaded to the cloud. Note: For more information about TestDataPro Cloud, click here.

9 Test Results Management

Test data stored in the internal storage of the TestPro unit can be retrieved by connecting a USB flash drive to it. The data can also be retrieved through a USB cable connection between the TestPro and a PC running the TestDataPro software. Results can also be retrieved through TestDataPro Cloud.

a. Transfering Test Results from TestPro

[Copy Test Result to USB] will export all the test results saved inside the device to the USB flash drive.

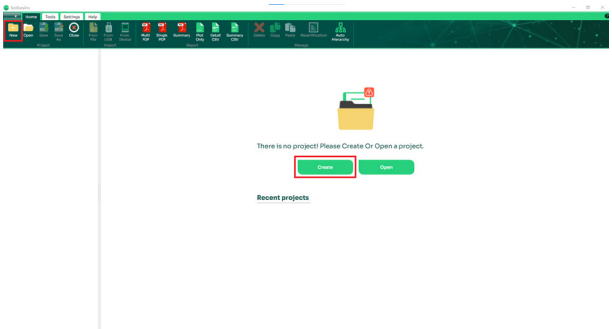


- Example: 3 projects saved in TestPro.
- Insert a USB flash drive to the TestPro USB port and select [Copy Test Results to USB].
- Choose the project(s) that needed to be exported and click Yes.
- A dialog box will confirm the number of test results exported to the USB flash drive.

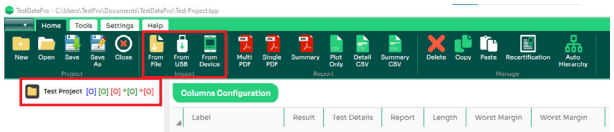
b. TestDataPro Test Management Software

TestDataPro is a test result management software allowing the user to transfer test results from a TestPro unit to a PC or laptop & then manage them according to project, building, floor, rooms, racks and/or panels. Users can also use TestDataPro to view the results or to generate PDF reports.

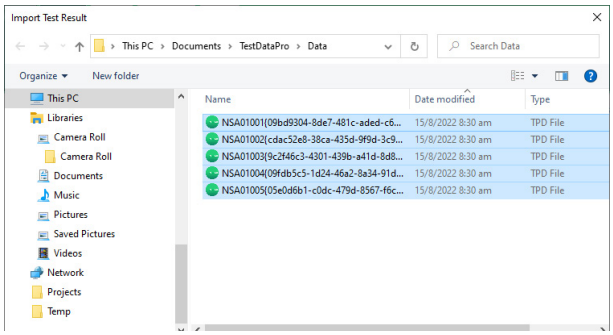
Visit www.aem.test.com/myaccount to download TestDataPro. Install the TestDataPro software and refer to the TestDataPro user guide. The procedures for importing data into TestDataPro and generating test reports are also illustrated in the following pages:



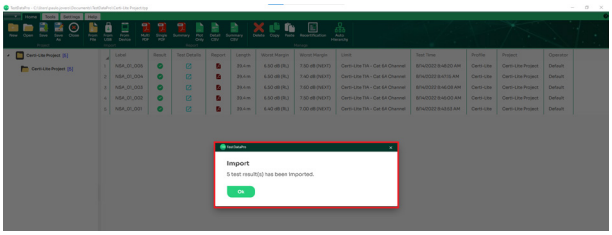
- Select [New] on the top left corner or [Create] to create a new project.



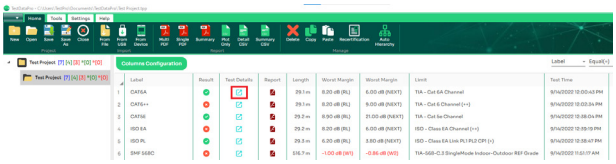
- After a new Test Project is created, select either [From File] - to import test results from any location in the PC or [From USB] - to import test results directly from USB flash drive or [From Device] - to retrieve test results from the TestPro unit.



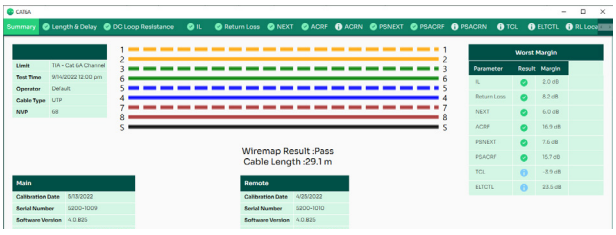
- Browse to the test result folder (i.e USB flash drive), select the tpd file and click [Open].



- To import from the USB drive, create a new project and click [From USB] >> expand the device serial number >> select the project(s) >> click OK. When importing from the device, click [From Device] the test results will automatically import and sort according to project. A dialog box will confirm once the import is complete.

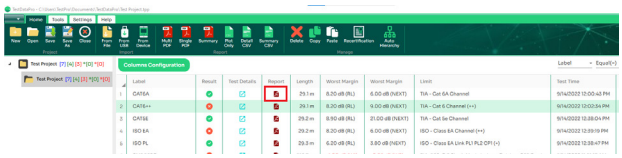


- To view any of the Test Details, click .

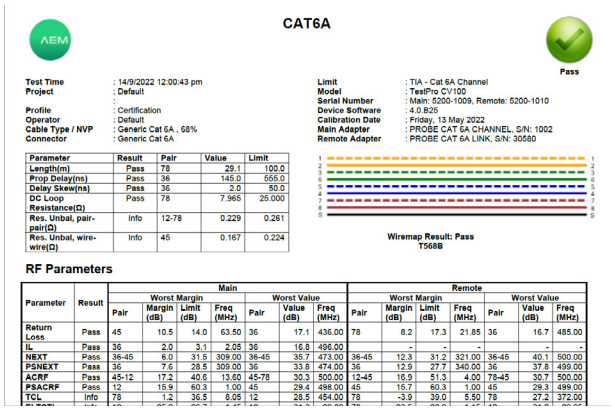


- [Summary] will show the wiremap connection and summary test data. [Length and Delay] will show the test data in each of the four pairs.

c. Generating Test Reports



- Click to generate a test report in pdf format.



CAT6A

Pass

Test Time : 14/9/2022 12:00:43 pm
Project : Default
Profile : Certification
Operator : Default
Cable Type / NVP : Generic Cat 6A , 68%
Connector : Generic Cat 6A

Limit : TIA - Cat 6A Channel
Model : TestPro CV100
Serial Number : Main: 5200-1009, Remote: 5200-1010
Device Software : 4.0.B25
Calibration Date : Friday, 13 May 2022
Main Adapter : PROBE CAT 6A CHANNEL, S/N: 1002
Remote Adapter : PROBE CAT 6A LINK, S/N: 30580

Parameter	Result	Pair	Value	Limit
Length(m)	Pass	78	29.1	100.0
Prop Delay(ns)	Pass	36	145.0	555.0
Delay Skew(ns)	Pass	36	2.0	50.0
DC Loop Resistance(Ω)	Pass	78	7.965	25.000
Res. Unbal, pair-pair(Ω)	Info	12-78	0.229	0.261
Res. Unbal, wire-wire(Ω)	Info	45	0.167	0.224

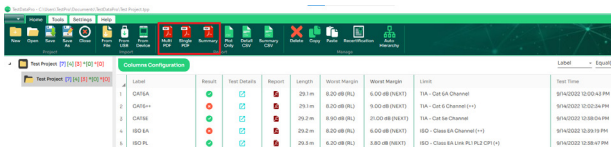
Wiremap Result: Pass
T568B

RF Parameters

Parameter	Result	Main							Remote						
		Worst Margin				Worst Value			Worst Margin				Worst Value		
		Pair	Margin (dB)	Limit (dB)	Freq (MHz)	Pair	Value (dB)	Freq (MHz)	Pair	Margin (dB)	Limit (dB)	Freq (MHz)	Pair	Value (dB)	Freq (MHz)
Return Loss	Pass	45	10.5	14.0	63.50	36	17.1	436.00	78	8.2	17.3	21.85	36	16.7	485.00
IL	Pass	36	2.0	3.1	2.05	36	16.8	496.00		-	-	-		-	-
NEXT	Pass	36-45	6.0	31.5	309.00	36-45	35.7	473.00	36-45	12.3	31.2	321.00	36-45	40.1	500.00
PSNEXT	Pass	36	7.6	28.5	309.00	36	33.8	474.00	36	12.9	27.7	340.00	36	37.8	499.00
ACRF	Pass	45-12	17.2	40.6	13.60	45-78	30.3	500.00	12-45	16.9	51.3	4.00	78-45	30.7	500.00
PSACRF	Pass	12	15.9	60.3	1.00	45	29.4	498.00	45	15.7	60.3	1.00	45	29.3	499.00
TCL	Info	78	1.2	36.5	8.05	12	28.5	454.00	78	-3.9	39.0	5.50	78	27.2	372.00

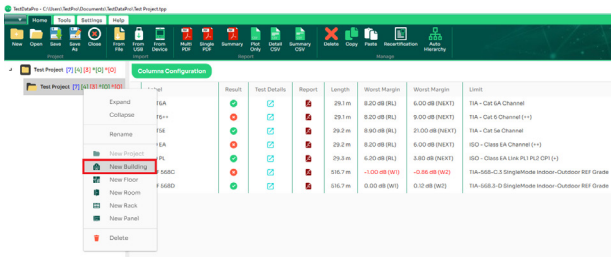
- User will be brought to a page showing the detailed test results.

d. Generating Multiple Test Reports

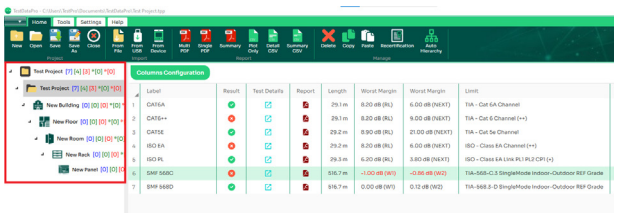


- To export multiple test reports, select all the desired test results and click [Multi PDF] if users wants to split test reports into multiple pdfs. Select [Singple PDF] if user wants to combine all test reports into a single pdf file.

e. Adding Hierarchy

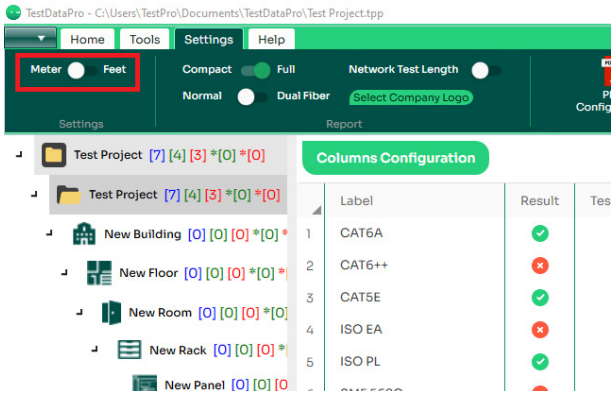


- To add new locations, right click on the project folder and select the type of location i.e., new building, floor, rack or panel.



- To select any of the locations, right click on the project folder and select any of the sub-locations i.e., new building, floor, room, rack or panel.

f. Meter to Feet

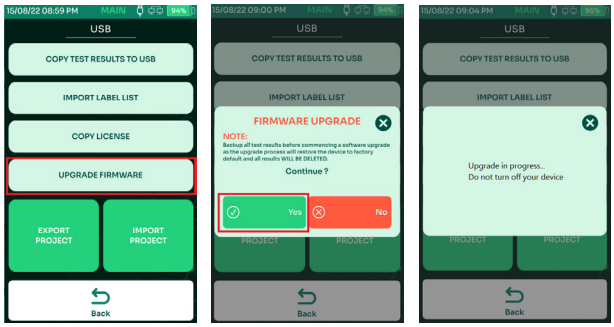


- To change the measurement stand, go to [Settings] tab & toggle between the two options - [meter] and [feet].

10 Firmware & License Updates

a. Firmware Update via USB Flash Drive with OSUpgrade.zip File

TestPro's firmware can be upgraded using the USB flash drive. TestPro firmware version should be 2.4 or later.

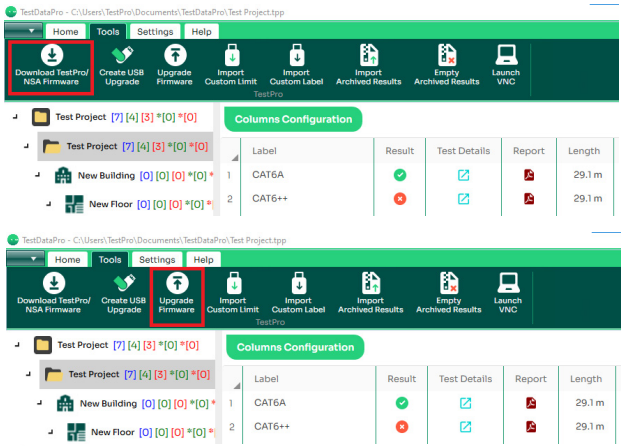


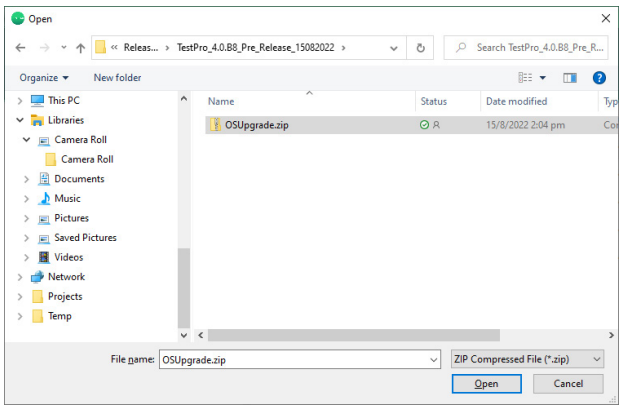
- Insert the USB flash drive. The USB menu will appear. Select [Upgrade Firmware]
- TestPro will remind users to back up test results as the upgrade resets the device to factory settings. Select Yes to accept and No to cancel.
- TestPro will reboot multiple times. The entire process will take 15 minutes to complete.

  Note: Ensure that the TestPro unit is attached to a power supply before starting the upgrade process.

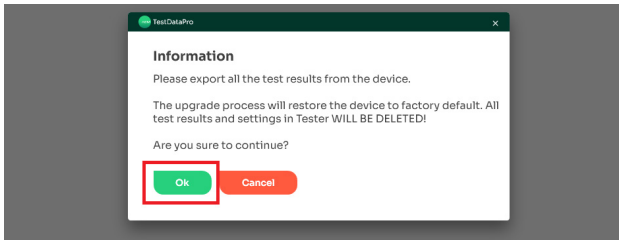
b. Firmware Upgrade using TestDataPro

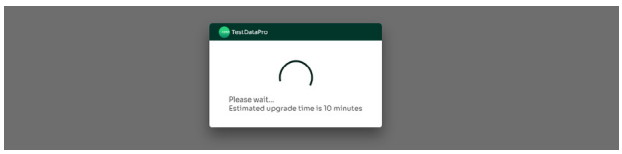
Before starting the firmware upgrade, make sure that the TestPro unit is attached to a power supply. TestPro will reboot multiple times to complete the upgrade.





- Launch TestDataPro. On the main screen, select [Tools] then [Download TesPro/NSA Firmware].
- Save the OSUpgrade.zip to any location on the computer i.e., Downloads
- Once download is complete, select [Upgrade Firmware] and browse to the location of the zip file. Select OSUpgrade.zip and click [Open].





- A dialog box will remind users to back up test results before proceeding with the firmware update. Click [OK] to continue.
- The firmware update will commence. Estimated time for the update is 15 minutes

Note:

Please note that the Edimax adapter or any other device, such as a USB memory stick, must be removed from the USB port on the tester prior to packing it up. Failure to do so could result in adapter damage during transport. In addition, the Edimax adapter will always draw power from the tester when it is plugged in.

TestPro CV100 Specifications

Battery
- Lithium ion
- 3.7V
- 13,200 mAh
- Approximate test time : 8 hrs (based on an approximate 200 test per day)
- Charging time : 7 hrs

Power Adapter
- 5V, 3A (supplied)
- 5-12V (supported)
- 2.1mm DC jack

Operating System
- Linux

RJ45 Test Ports
- 10/100/1G Test Port
- Network Connectivity Port

Adapter Interface
- 60-pin high-frequency connector rated for 5000 insertion cycles
- Hot Swappable

Test Data Management
- TestDataPro PC Software

Data Transference
- USB Flash Type A
- Micro USB
- USB Cable

If the results from the measurements are within the specified limits, then the cable-under-test will be deemed to have passed the test. If the measurement results are not within the specified limits, then it has failed the test.

The difference between the limit line and measurement result is called a margin. Users should look at the worst margin when reviewing the test results. The worst margin means that all the four pairs tested, the one with the worst result will show up in the worst margin section.

Technical Support

Live Phone Support :
Monday - Friday | 8am-5pm (Arizona,USA)
T : 480-534-1232
Toll Free : 833-572-6916

Email Monitored 24hrs
customercare@aem-test.com

For more information and details specifications, please visit: AEM-Test.com/TestPro

If you need technical assistance, please visit us at: AEM-Test.com/customer-care

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T : 480-531-1232

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Singapore 555853
T : +65 6483 1811
F: +65 6483 1822