NETWORK SERVICE ASSISTANT

USER MANUAL

NSA

User Manual

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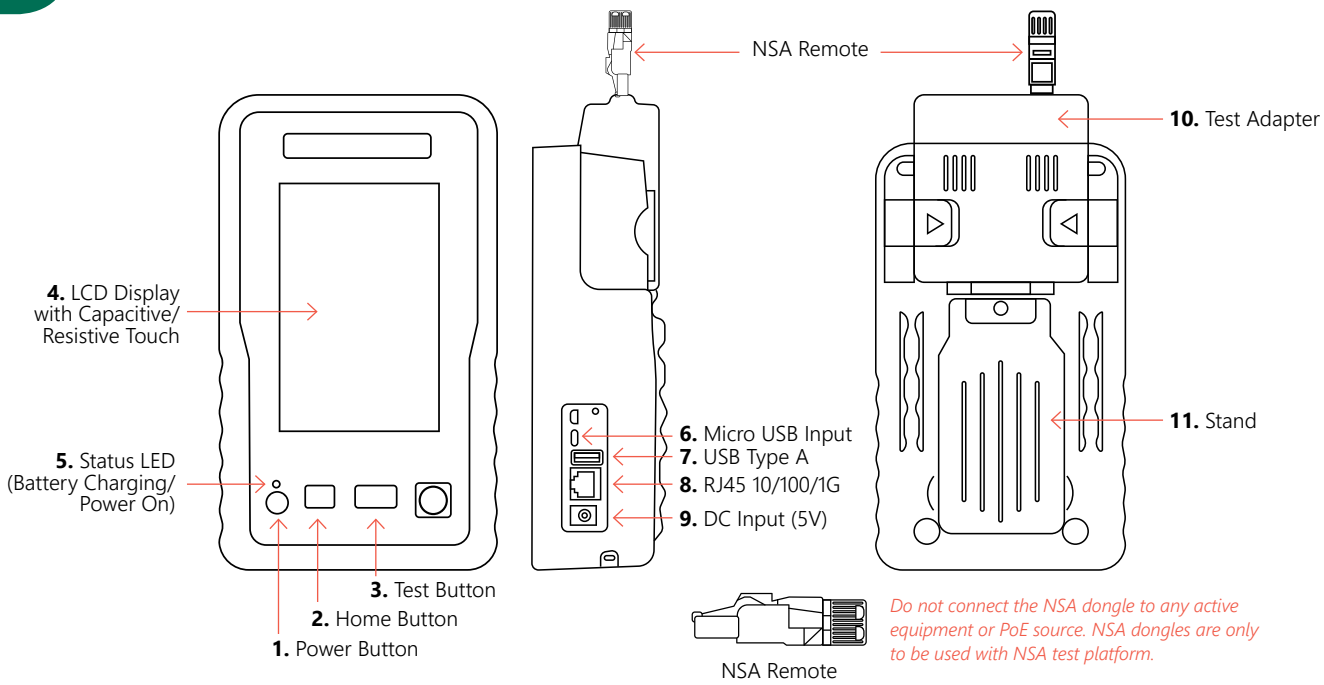
Kit Contents

Refer to https://aem-test.com/products/network-service-assistant for a full list of kits available.

Network Service Assistant (NSA) Features



Do not connect the NSA dongle to any active equipment or PoE source. NSA dongles are only to be used with NSA test platform.

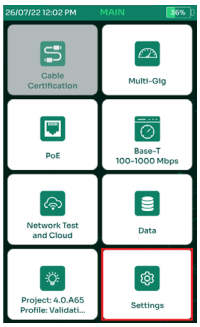
The NSA features a touchscreen based interface. Product features include:

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.

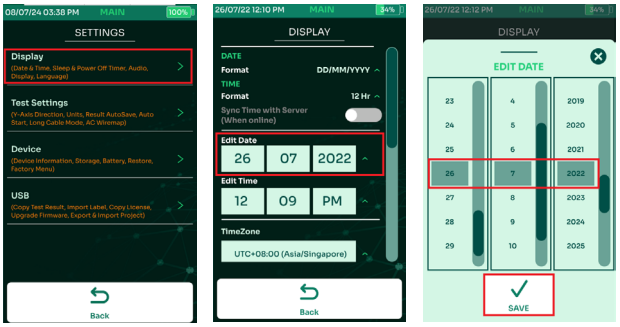
5.	STATUS LED	• Red : battery charging (when unit is off) • Amber : battery charging (when unit is on) • Green : battery not charging (when unit is on) • Alternating Amber/Green: battery charging paused to regulate temperature
6.	MICRO USB INPUT	• Establishes a USB-based wired link between the NSA unit 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 NSA 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 NSA 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.

1 Settings Configurations

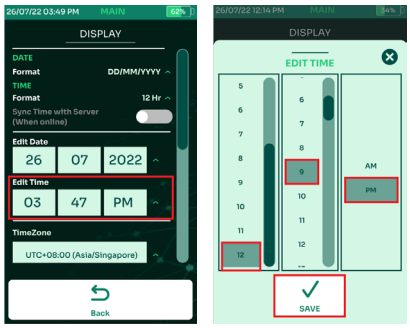
Configure the settings such as date/time, display brightness, audio volume, sleep mode, language and access device information by selecting .



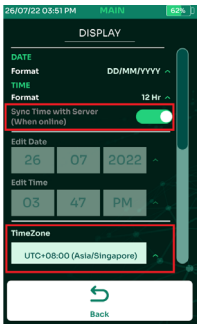
a. Date and Time



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

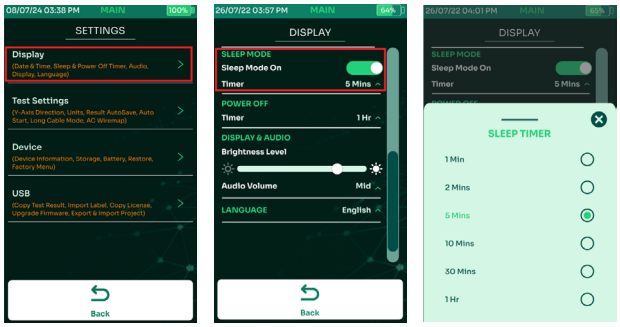


- Select Edit Time
- Scroll up/down to choose the HH, MM & AM/PM. Select [Save].



- Enable the checkbox [Sync Time with server] and Select the drop-down menu to select the time zone. Note: The time zone will only sync when NSA detects Internet connectivity.

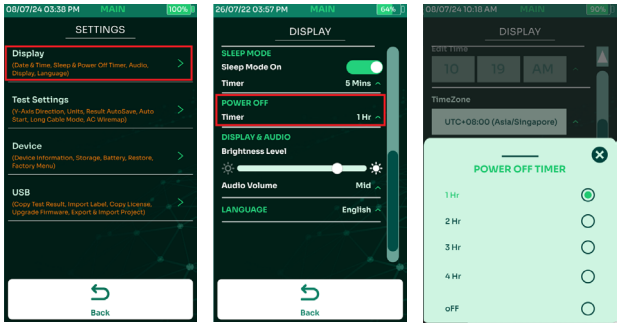
b. Sleep Mode



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 and choose the preferred time duration of inactivity after which the screen should turn off.

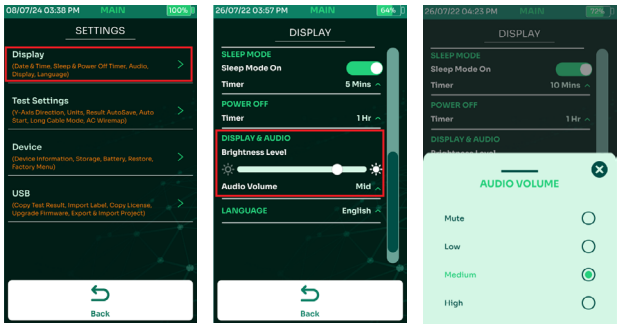
c. Power Off



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

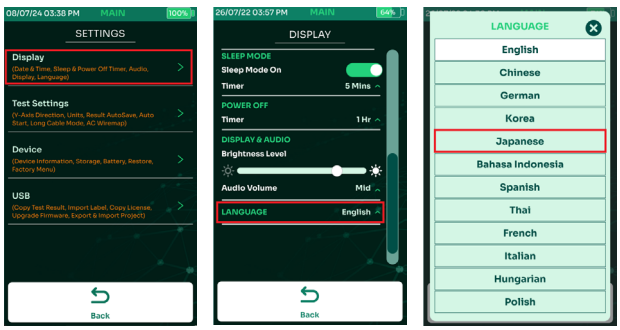
- Select [Display].
- Scroll down to the [Power Off] section.
- Select the timer and choose the preferred time duration of inactivity after which NSA should power off.

d. Display & Audio



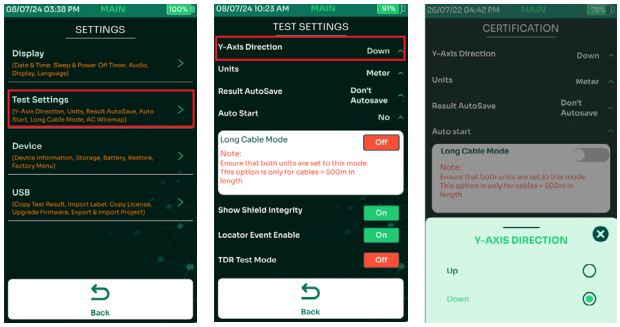
- Select [Display].
- Scroll down to [Display & Audio].
- Adjust the display brightness by dragging the brightness level bar left or right. To adjust the volume, select Audio Volume & choose Mute, Low, Medium or High.

e. Language



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

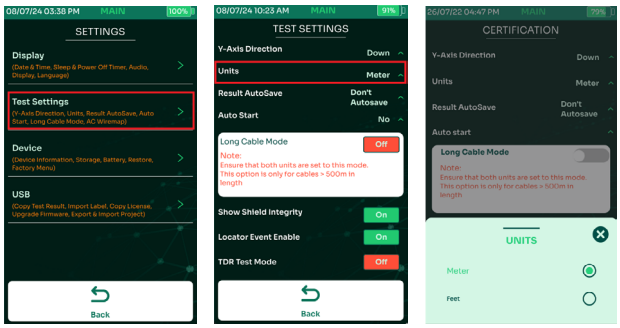
f. Y-Axis Direction



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

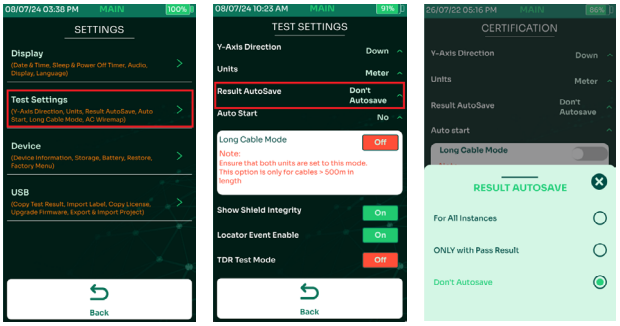
- Select [Test Settings].
- Select [Y-Axis Direction].
- Select Up or Down.

g. Units



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

h. Result AutoSave

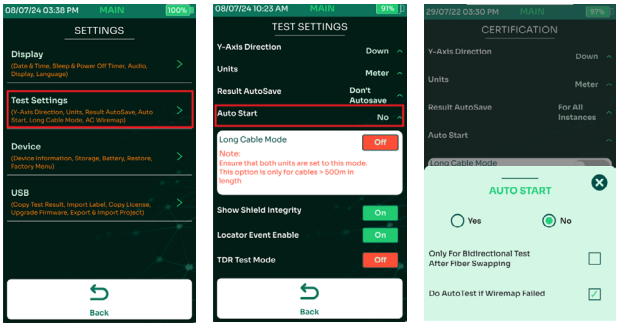


[Result AutoSave], when set to [For All Instances or Only with Pass Result] will save the test results according to the next available label name.

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

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

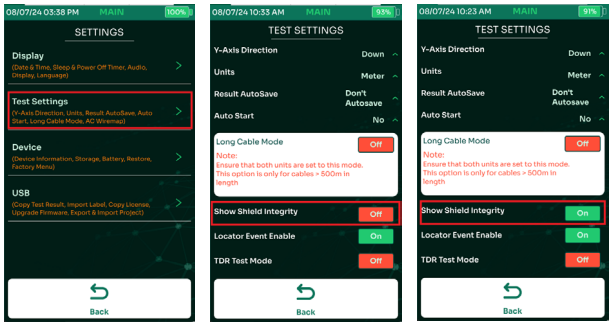
i. Auto Start



- Select [Test Settings].
- Select [Auto Start].
- Select [Yes] or [No].

If [Yes], NSA 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.

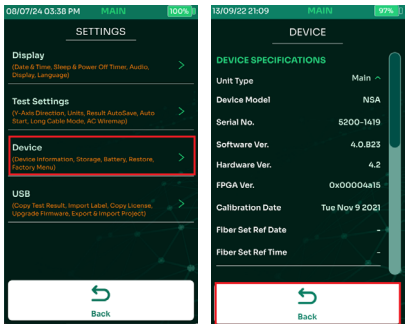
j. Show Shield Integrity



- Select [Test Settings].
- Select [Show Shield Integrity].
- Toggle [Off] to [On].

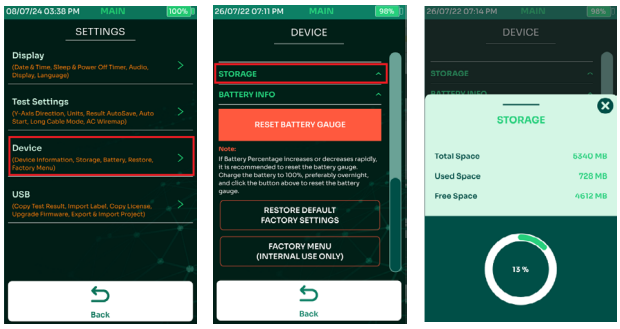
For detailed description about Shield Integrity, refer l. Shield Integrity Test

k. Device Specifications



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

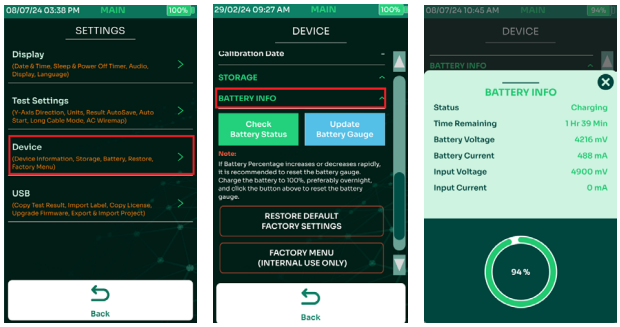
l. Storage



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

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

m. 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.

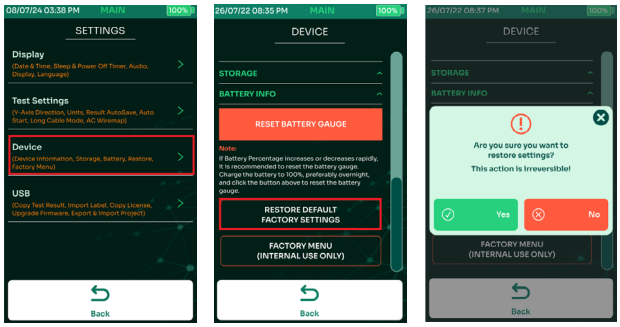
n. Check Battery Status and Reset Battery Gauge

The Check Battery Status reads the current battery values, checks for any inconsistencies on the battery and displays the values in the screen. When there are incorrect battery values, the device will display a red X right next to the battery reading. Some of the symptoms of incorrect battery values are incorrect battery percentage and battery percentage is fluctuating up/down. To calibrate the battery values, Reset Battery Gauge or Update Battery Gauge will reset the values to AEM recommended settings. To do this:

- Select [Settings] on the home screen, then [Device].
- Select [Check Battery Status].
- Device will read the battery gauge and display the values with Pass/Fail status on the right side marked by Red X or Green tick mark.
- Select [Reset Battery Gauge].
- Click Yes on the pop-up confirmation.
- Wait for Resetting Battery Gauge to update the battery values. Green tick marks should be displayed, and the device will automatically reboot.

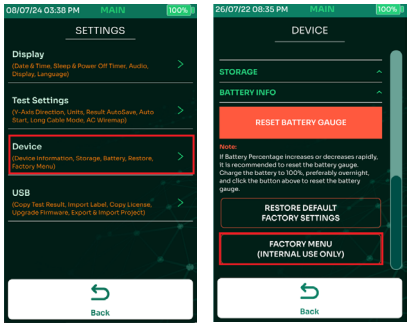
Note: Fuel Gauge will be correctly calibrated after a few cycles of Charge/Discharge. Units must be FULLY charged before doing Fuel Gauge Reset.

o. Restore Default Factory Settings



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

p. Factory Menu

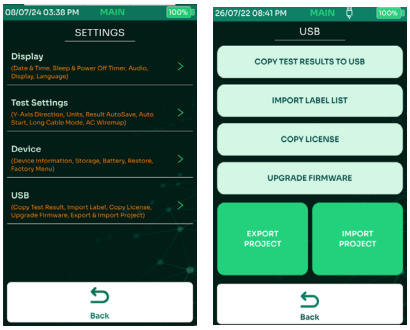


Factory Menu is for manufacturer's internal use only. Access to this function is not available to users.

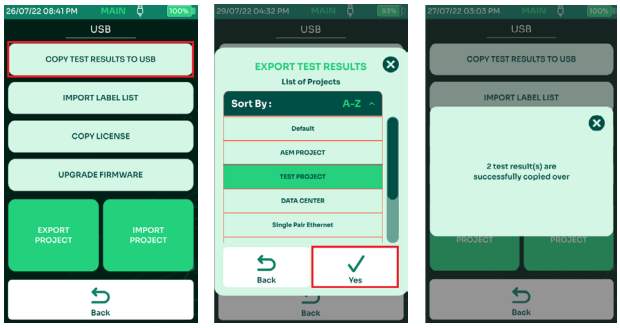
q. USB

When a USB flash drive is inserted to the NSA 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 NSA User Guide.

To access the USB menu again, click Settings > USB.



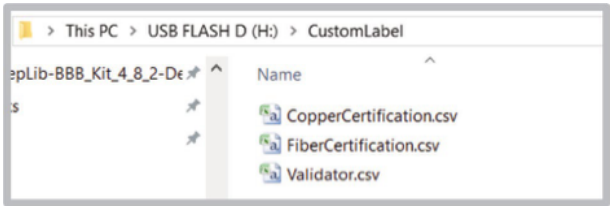
i: Copy Test Results to USB

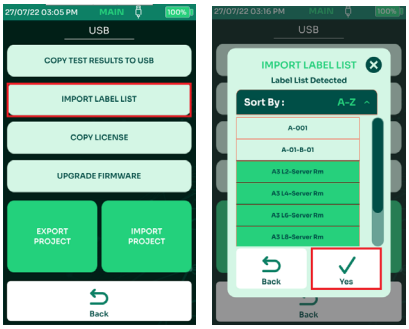


Copy Test Result to USB will export all the test results saved inside NSA to the USB flash drive under TestData folder.

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

ii: Import Label List

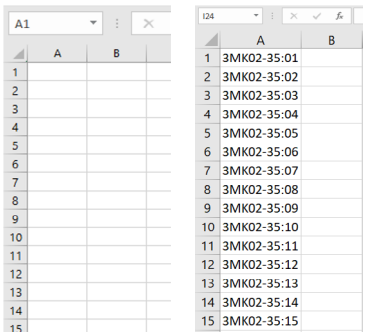


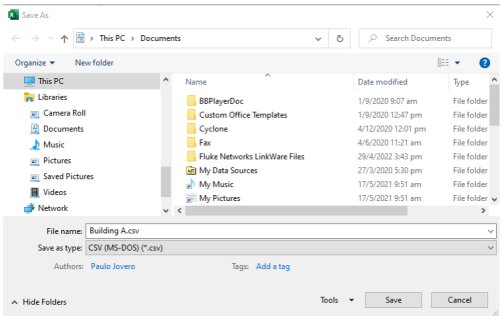


The Import Label List feature provides an easy way to create labels from a computer & copy these labels onto the device.

- On the USB flash drive, create a folder "CustomLabel" (Without the "") & copy all the labels that are to be imported.
- Insert USB flash drive to the NSA USB port and select [Import Label List].
- Select from a list of CustomLabel to be imported & click Yes.

iii: Creating CustomLabel

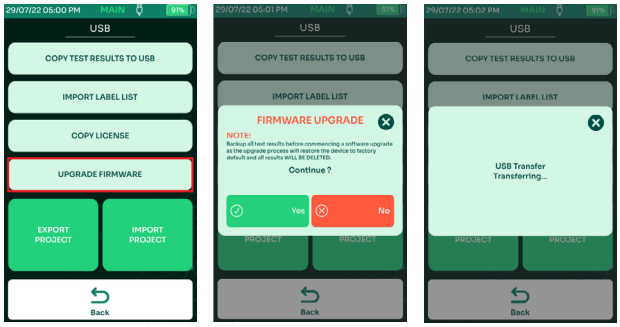




Custom label allows users to add labels in csv format and import to NSA.

- 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.

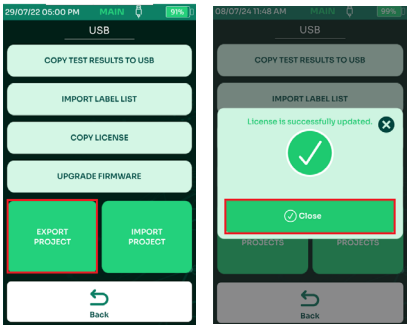
iv: Upgrade Firmware



NSA'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 NSA and power on the device.
- Insert the USB flash drive. The USB menu will appear.
- Select [Upgrade firmware].
- NSA 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.

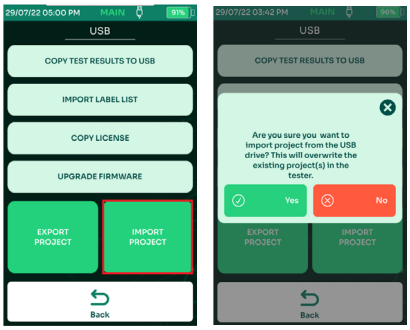
v: Export Project



NSA allows testers to collaborate better by sharing projects with ease. Project files can be transferred from one NSA 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 NSA and insert a USB flash drive (formatted as FAT32).
- NSA will detect the USB flash drive and open the USB Menu.
- Select [Export Project]. NSA will copy the project files from the tester to the USB flash drive.
- A dialog box will confirm successful export.

vi: Import Project

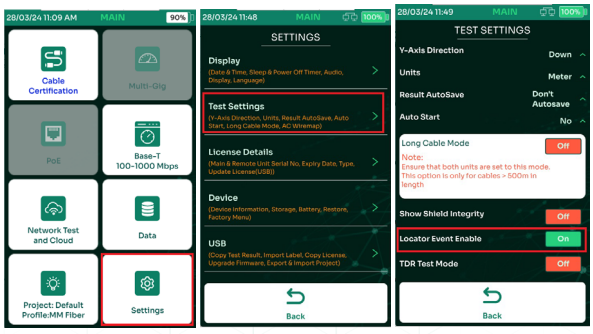


To import a project from a USB flash drive to a NSA device:

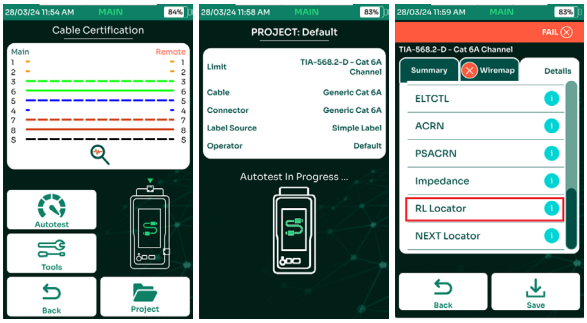
- Power on NSA and insert a USB flash drive containing the project.dat file.
- A [USB] menu will come up.
- Select [Import Project].
- A dialog box comes up asking to confirm the project import. Click Yes.
- A dialog box comes up confirming the import project. Select Yes and NSA will reboot to apply the changes.

r. Locator Event

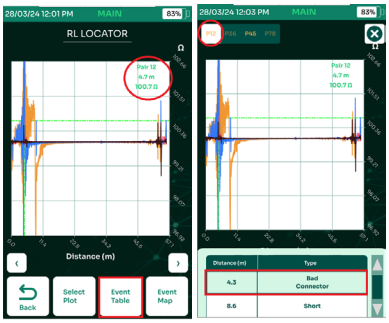
Introducing the Return Loss Locator Event which checks for optimal signal integrity in copper-based communication networks. This feature empowers technicians and engineers to accurately identify and mitigate signal loss issues within copper cabling systems. Designed to meet the demands of modern telecommunications, the RL locator event utilizes cutting-edge technology to swiftly detect and quantify signal reflections and losses along copper cables. Its high-performance capabilities enable users to pinpoint impedance mismatches, discontinuities, and other potential sources of signal degradation with unparalleled accuracy. Equipped with a user-friendly interface streamlines the troubleshooting process, allowing technicians to quickly assess the health of copper cables and take corrective action as needed.



- In the main menu, go to Settings.
- Select Test Settings.
- Turn On the [Locator Event Enable].



- Go to the main menu and choose [Copper Certification]. From the example, notice that Pair 1,2 and 4 are disconnected.
- Start Autotest.
- Select [Details} tab and scroll down to [RL Locator].



- Large spike at 4.7 meter distance which indicates an issue at that location. Select [Event Table].
- From all the 4 pairs, only P12 and P45 are enabled as only these 2 pairs are exhibiting issues. The tester displays the graph for P12 and identified bad connector and short issues .

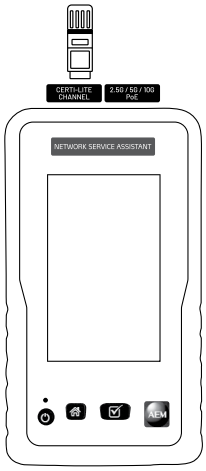
2 Certi-Lite with NSA Remote

NSA Cable Certi-Lite is also known as Single Ended Autotest. This feature uses an AD-NSA adapter and the remote end is terminated by an NSA remote with ID 1 to 8. Certi-Lite supports comprehensive features and measurements such as LiveWiremap, Touch TDR, Length, Delay, Return Loss, NEXT and many other functions. To use Cable Certi-Lite, attach an AD-NSA adapter. NSA will automatically detect the adapter.

NSA Remote with different IDs can be used to identify cables that are mixed up, no label or which are mislabeled. When an NSA Remote is connected to NSA, the corresponding ID for it will be automatically detected and displayed.

Do not connect the NSA dongle to any active equipment or PoE source. NSA dongles are only to be used with NSA test platform.

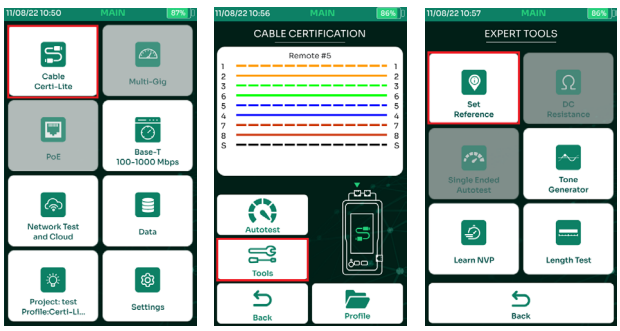
a. Set Reference



It is important to perform a set reference using NSA Remote IDs 1 to 8 before using it for the Autotest when the AD-NSA adapter is attached to the NSA for the first time. Failure to do so will result in incorrect DC resistance measurements.

To perform set reference, attach an AD-NSA adapter to the NSA and one of the 8 NSA Remote to the Cert-Lite Channel port of the AD-NSA adapter. Do set reference to all 8 NSA Remote units one by one before using.

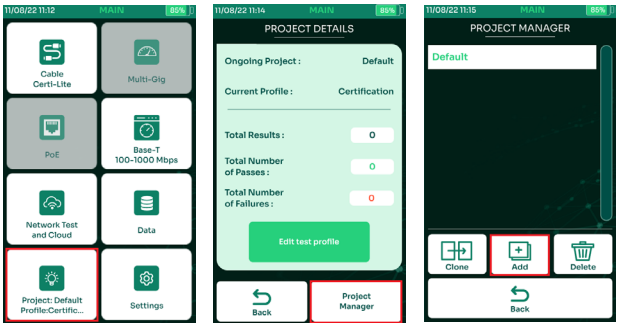
Note: Set reference will already have been performed before shipping the product, therefore it is not necessary to perform it again when the product is received.



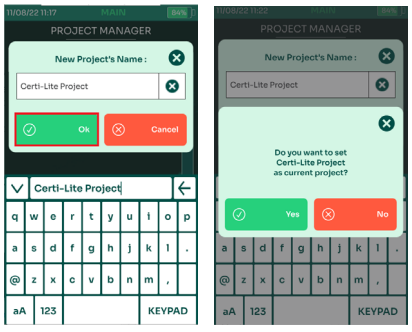
- On the NSA main screen, select [Cable Certi-Lite].
- NSA will identify the NSA Remote ID attached - i.e. Remote #5. Select [Tools].
- Select [Set Reference].
- The dialog box [Connect NSA Remote to the cable test port of the AD-NSA adapter] will appear.
- Select Yes .
  Note: Repeat the set reference process using all the 8 NSA Remote units.

b. Creating Certi-Lite Project/Profile

NSA supports customer workflows through project and profile descriptions. [Project] is an identifier of the customer site/ location, while [Profile] refers to specific test configurations.

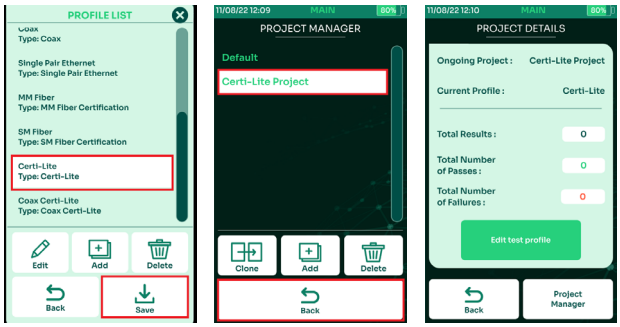


- Select [Project]/[Profile] on the home screen to create/ edit a project. Once a project is selected, subsequent Autotest results will be saved there.
- Select [Project Manager] to choose or create a different project or to delete an existing project.
- Choose from one of the already defined projects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



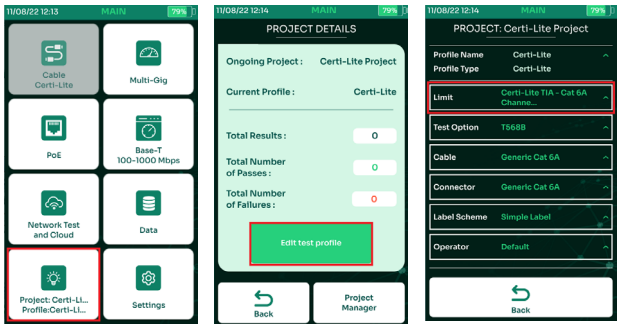
- Key in a project name & select Ok to save the project.
- Choose a profile from the list and click Save. Valid profiles for NSA are listed below:

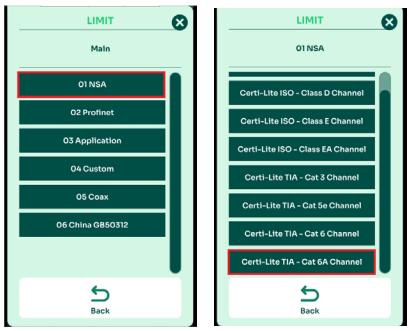
a. [Certi-Lite] for NSA Remote
b. [Validation] for BASE-T and Multi-Gig tests
c. [Single Pair Ethernet] for Copper Cable Certification with less than 4 pairs
d. [MM Fiber NSA] for Multimode Fiber
e. [SM Fiber NSA] for Singlemode Fiber
f. [Network Validation] for Network Autotest
g. [Coax Certi-Lite] for NSA with Coax Remote Termination



- Select Certi-Lite, then 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.

c. Selecting Test Limit

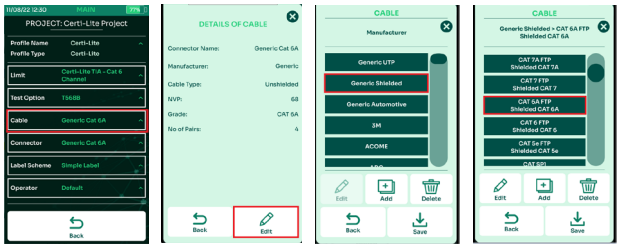




- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to update the current profile.
- Select [Limit].
- Select [01 NSA]. ISO and TIA are the widely used standard limits. Customized limits are not supported in AD-NSA Remote testing.

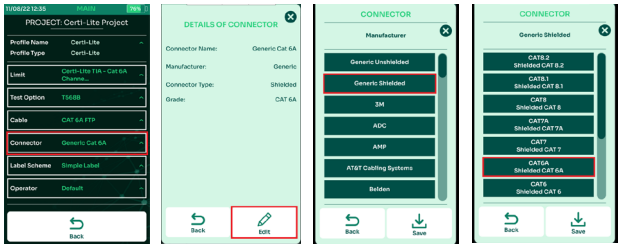
d. Selecting Cable/Connector

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



- Select [Cable: Generic Cat 6A].
- Details of the current copper cable being used will be displayed. Select [Edit].
- If unsure of the type of cable, select [Generic UTP] for unshielded cable and [Generic Shielded] for shielded cable.
- Choose the specific type of cable.

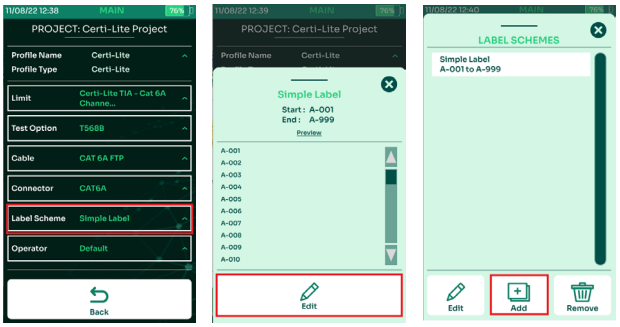
Follow a similar process for choosing connectors:



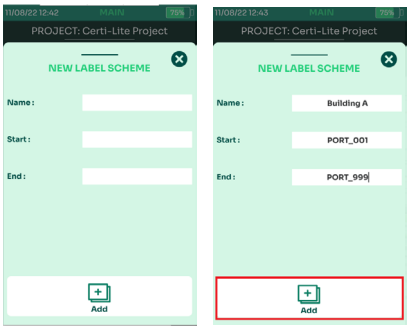
- Select [Connector: Generic Cat 6A].
- Details of the current copper connector being used will be displayed. Select [Edit].
- Select [Generic Shielded].
- Select [CAT 6A].

e. Creating New Label

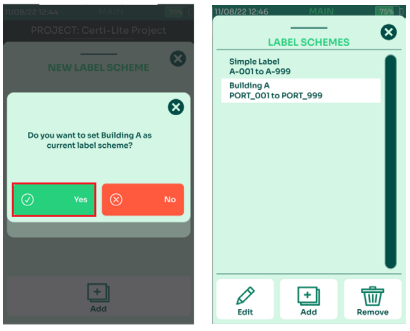
Labeling allows users to identify the associated physical locations (i.e., building , room, cabinet, rack, port, etc.)



- 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].



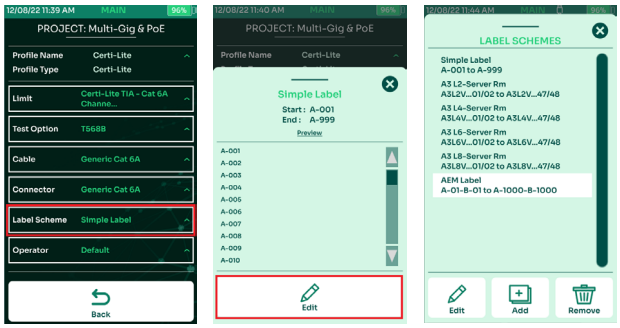
- Key in the desired label name as well as the descriptions for [Start] and [End].
- Select [Add] to finish creating the label.



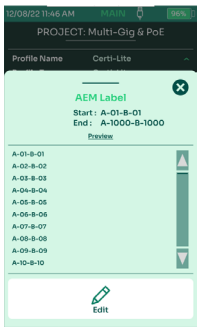
- Select Yes to set the selected label scheme as the current label scheme.
- Select ⊗ to go back to the home screen.

i: Choosing Custom Label

Custom labels are predefined labels created in Microsoft Excel and saved in CSV format.



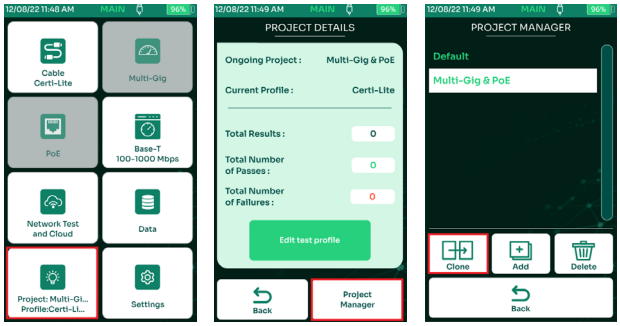
- Select [Label Scheme: Simple Label].
- A preview of the simple labels will be displayed. Select [Edit] to view or to add to the list of label schemes Select the desired label i.e., AEM Label.
- Select [Save].
  In [Label Scheme], the selected custom label will be displayed.
- Select [⊗].

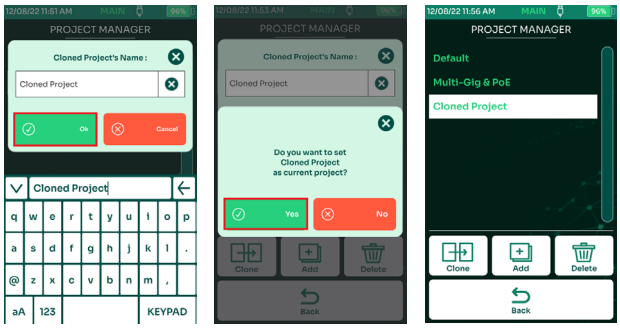


For information on how to create & copy a custom label, refer to p. USB ii. Import Label List & p. USB iii. Creating CustomLabel.

ii: Cloning a project

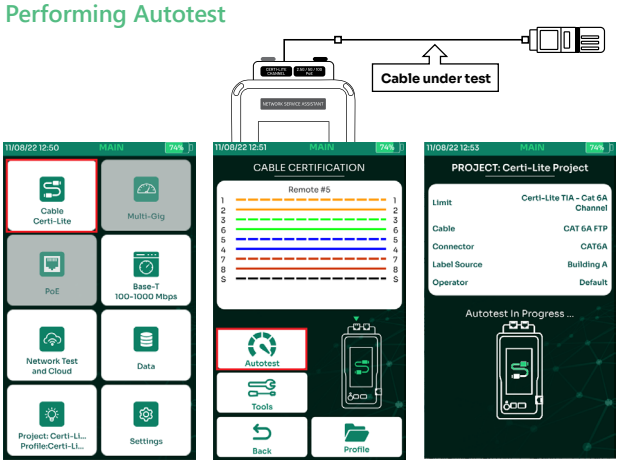
NSA offers an easy way to duplicate a project that uses the same limit, cable, connector & labels, through project cloning.



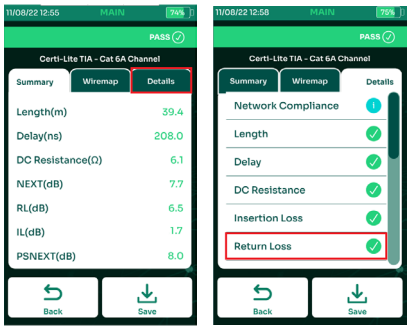


- On the NSA main screen, select [Project/Profile]. Select [Project Manager].
- Select a project to be cloned and then select [Clone].
- A [Clone Project] dialog box will appear. Enter the name of the new project and select ⊘ Ok .
- Click Yes to the dialogue box confirming to set the "Cloned Project" as the default project.
- The newly cloned project will be shown together with other projects saved in the NSA.

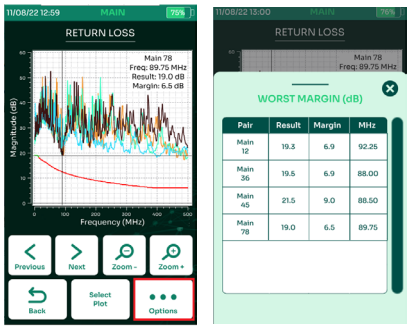
f. Performing Autotest



- Select [Cable Certi-Lite].
- LiveWiremap comes up when the cable-under-test is attached to the Certi-Lite Channel port and the other end of the cable is connected to NSA Remote. NSA will display the NSA Remote ID number in the wiremap screen i.e Remote #5. User can start a full Certi-Lite Autotest by selecting [Autotest] on this screen.
- Autotest commences.

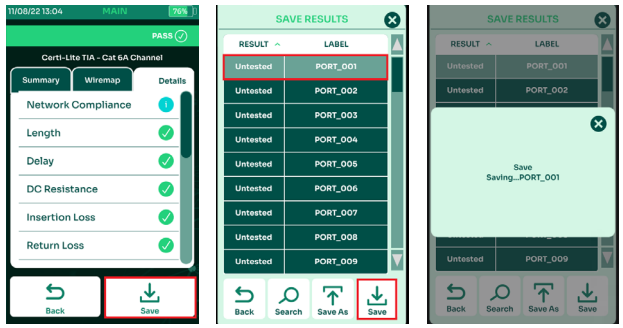


- To view the Autotest results for each parameter, select [Details].
- Select [Return Loss]



- The return loss graph will be displayed. Select Options .
- The worst margins for return loss will be displayed.

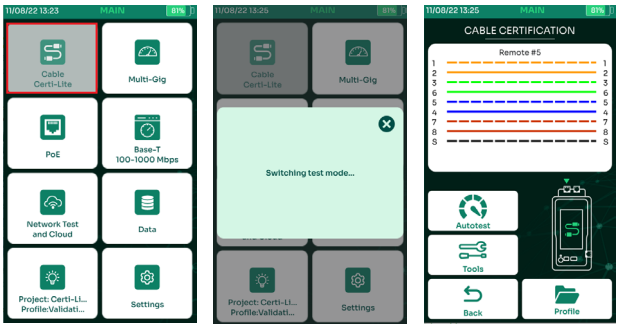
g. Saving Test Data



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

h. Switching Modes under NSA

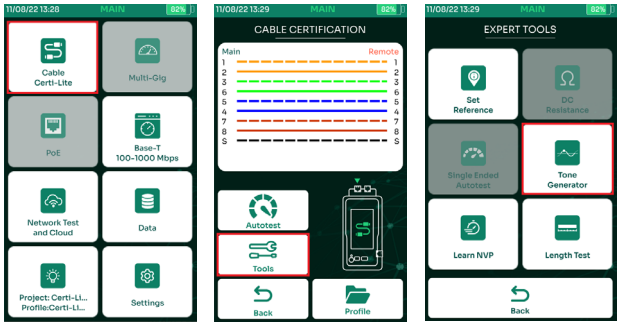
When AD-NSA adapter is attached to the NSA, the default mode is Multi-Gig Validation. To perform Cable Certi-Lite, use the Certi-Lite channel port of the AD-NSA Adapter.



- Select [Cable Certi-Lite] on the main screen.
- A dialog box message will confirm the request.
- NSA is in Cable Certi-Lite mode when the Multi-Gig and PoE buttons are grayed out.

i. Tone Generator

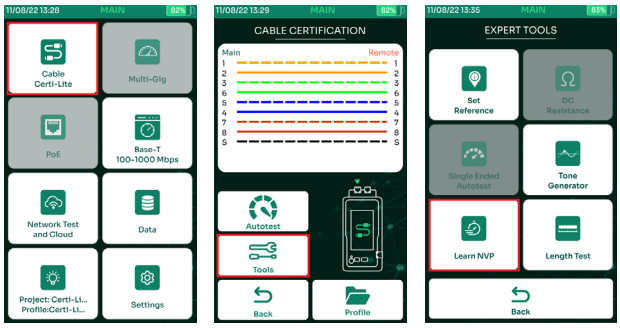
The NSA unit's tone generator helps technicians locate the cable-under-test in a bunch of cables by sending a tone signal to all 8 wires. An amplifier probe will be used to detect the tone.



- Select [Cable Certi-Lite].
- Select [Tools].
- Select [Tone Generator].
- Select [Tone 1].
- Selecting ⊗ will turn off the Tone Generator.

j. Learn NVP

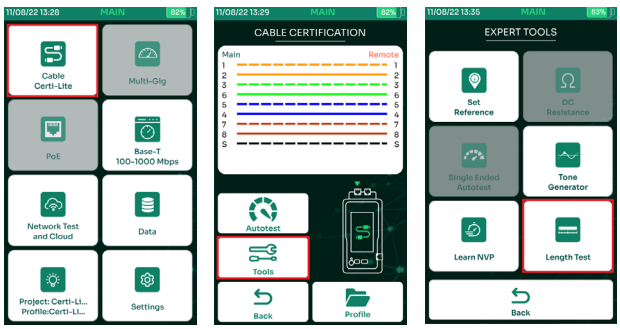
Nominal velocity of propagation (NVP) is a process used by handheld testers to determine the length of the cable. NSA's Learn NVP feature helps users to determine the NVP value of a cable by keying in its cable length. The NVP value can then be used in Certi-Lite tests.

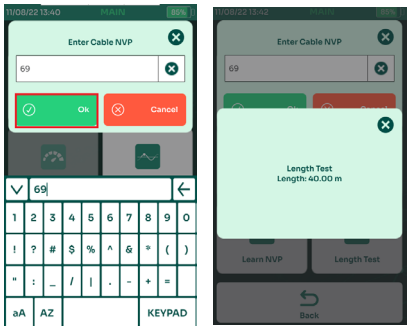


- Select [Cable Certi-Lite].
- Select [Tools].
- Select [Learn NVP].
- Key in the cable length and select Ok.
- NSA will calculate the NVP and display the result.

k. Length Test

[Length Test] allows NSA users to determine the length of the cable, based on the NVP value keyed-in.

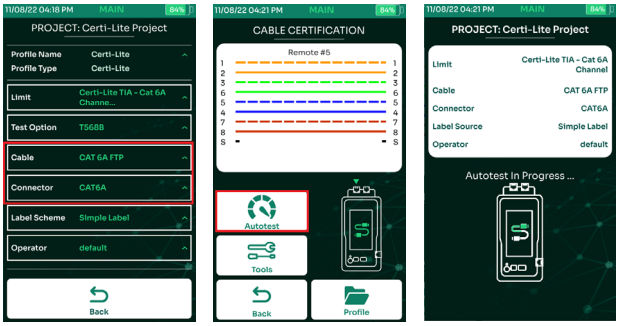


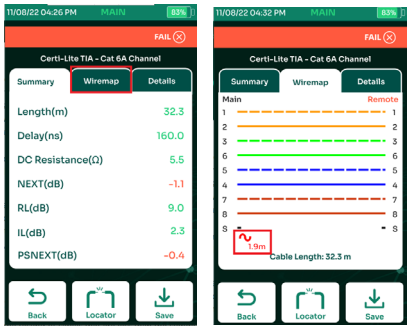


- Select [Cable Certi-Lite].
- Select [Tools].
- Select [Length Test].
- Key in the NVP value and select Ok.
- NSA will calculate the cable length (depending on the cable type used) and display the results.

l. Shield Integrity Test

NSA's shield integrity feature allows users to test the integrity of the shielded cable. If there are issues with the shield, NSA will detect it & inform the user where the issue is.





- Set the [Cable] and [Connector] to Shielded Cable and Shielded Connector.
- NSA will automatically detect the attached Remote ID. Select [Autotest].
- The Autotest will commence.
- Example on the right: The wiremap has failed. Select [Wiremap].

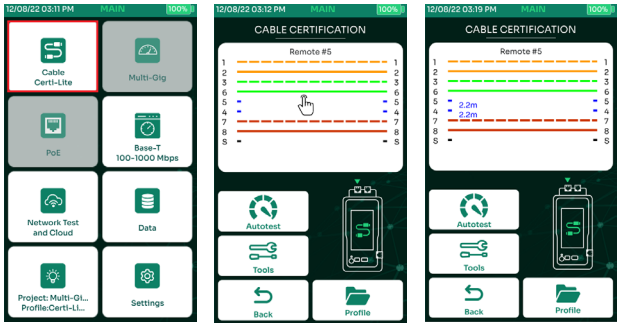
- Example on the right: the total cable length is 32.3 meters of which NSA detected 1.9 meters of shield discontinuity.

Note: The cable and connector in NSA Project/Profile must be set to shielded to use the Shield Continuity Test. To learn more about setting the cable and connector, refer to: 2d. Cable Certi-Lite with NSA Remote – Selecting Cable/Connector.

m. LiveWiremap

NSA's LiveWiremap detects a cable fault as soon as a cable is inserted into the RJ45 port of the AD-NSA adapter and NSA Remote. Start LiveWiremap diagnostics by selecting LiveWiremap. NSA will then be able to determine the location of the fault, using its distance to fault measurement.

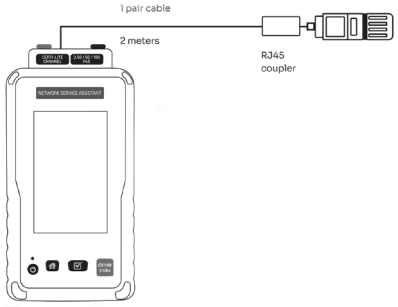
Connect the RJ45 cable to the Certi-Lite Channel port of the AD-NSA adapter and the other end of the cable to the NSA Remote.



3 Single Pair Ethernet with NSA Remote Terminated Plug

The NSA supports the testing of cables that are less than the standard 4 pairs i.e., 1 pair, 2 pair and 3 pair cables connected to the NSA device and terminated by the NSA Remote. A comprehensive range of measurements such as Length, Loop Resistance, Insertion Loss, Return Loss, NEXT, PSNEXT, ACRF and much more are supported.

a. Set Reference



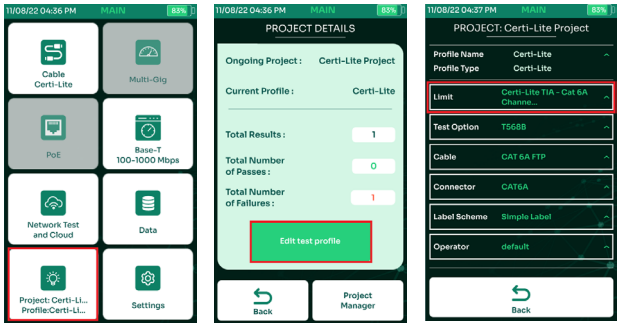
When testing a cable that is less than 4 pairs using the AD-NSA adapter and NSA Remote it is important to perform set reference before running an Autotest, to ensure accurate DC resistance measurements.

To perform set reference:

1. Attach an AD-NSA adapter to the NSA unit
2. Connect the short patch cord that is less than 4 pairs from the AD-NSA adapter to the NSA Remote using an RJ45 coupler (if needed).
3. Perform Set Reference.

AEM Recommendation: Do not disconnect the patch cord attached to the AD-NSA adapter after completing Set Reference.

b. Selecting Test Limit



- Select [Project/Profile] on the home screen to choose an active test project.
- [Edit test profile] to update the current profile.
- Select [Limit].
- ISO & TIA are the widely used standard limits. For Single Pair Ethernet, choose 02 Profinet limit. Customized limits are not supported by the AD-NSA Remote.

c. Selecting Cable/Connector

To choose a cable and connector for Single Pair Ethernet (SPE), make sure that the correct SPE cable and connector are 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] cables and connectors database.

For more information, refer to: 2d. Certi-Lite with NSA Remote – Selecting Cable/Connector.

d. Performing Autotest

1. Leave the short patch cord used in Set Reference attached to AD-NSA adapter.
2. Connect the cable under test via an RJ45 coupler.
3. Connect the NSA Remote to the other end of the cable under test (optional: via RJ45 coupler).
4. Start Autotest.
   For more information, refer to: 2f. Certi-Lite with NSA Remote – Performing Autotest.

e. Saving Test Data

The process for saving the results for Single Pair Ethernet testing is the same as for all other tests. For more information, refer to: 2g. Certi-Lite with NSA Remote – Saving Test Data

4 NSA Cable Identification

NSA provides an easy way for customers to identify and locate cables that are not yet labeled. By using the NSA Remote IDs 1 to 8, users attach the NSA Remote to the far end of the cable and connect the near end it to the NSA device and adapter. NSA will display the NSA Remote ID as “Remote #1” – “Remote #8” in the LiveWiremap screen. If there is no NSA Remote attached to the far end or NSA Remote is unidentifiable due to certain wiremap issues of the cable under test, NSA will display the NSA Remote ID as “Remote ID Unknown”.

To start NSA Cable Identification:

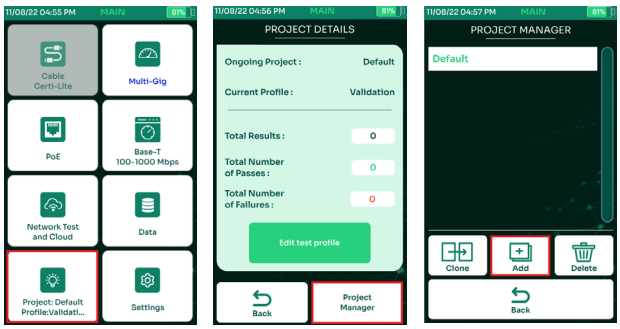
1. Attach the AD-NSA adapter to the NSA device.
2. Perform Set Reference to each of the 8 NSA Remote units. For more information about Set Reference, refer to 2a. Certi-Lite with NSA Remote – Set Reference.

5 BASE-T, Multi-Gig and PoE Testing

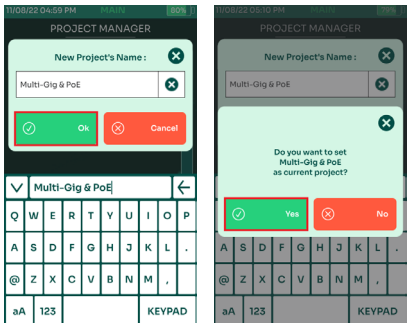
NSA is capable of executing network performance test using BASE-T for 10M/100M/1G and Multi-Gig2.5G/5G/10G link speeds while also consuming power via Power over Ethernet (PoE). Performing this test is a direct confirmation that the PoE system actually works.

a. Creating Project/Profile

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

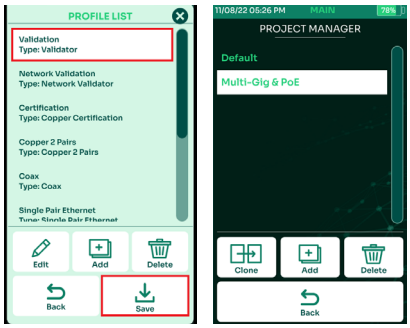


- Select [Project]/[Profile] on the home screen to create/edit a project. Once a project is selected, subsequent Autotest results will be saved in that project.
- Select [Project Manager] to choose or create a different project or to delete an existing project.
- Choose from one of the already defined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

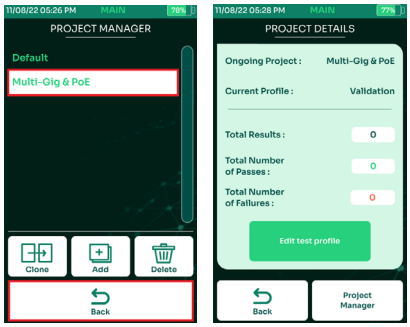


- Key in a project name and select

.
- Click Yes on the dialog box “Do you want to set Multi-Gig & PoE as current project?

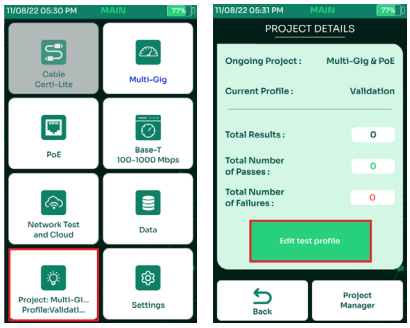


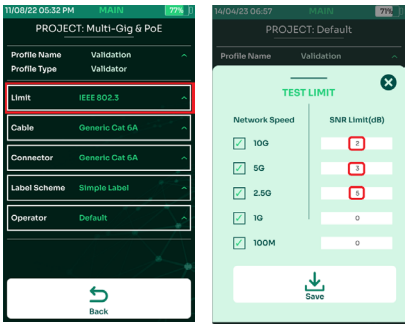
- Choose a profile from the list and click Save. Valid profiles for NSA are listed below:
  a. [Validation] for Multi-Gig tests
  b. [Certi-Lite] for NSA Remote
  c. [Single Pair Ethernet] for Copper Cable Certification with less than 4 pairs
  d. [MM Fiber NSA] to Multimode Fiber
  e. [SM Fiber NSA] for Singlemode Fiber
  f. [Network Validation] for Network Autotest
  g. [Coax Certi-Lite] for NSA with Coax Remote Termination
- Choose an appropriate profile, e.g. [Validation] for multi-gig validation and sele .



- 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



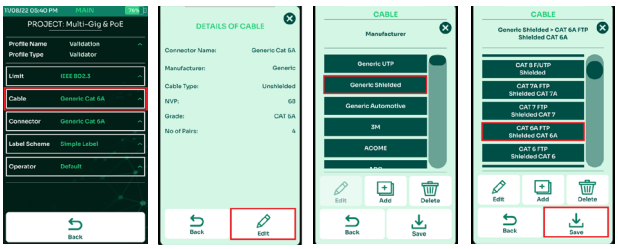


- Select [Project] on the home screen to choose an active test project.
- Select [Edit test profile] to update the current test profile.
- In the validation profile, [Limit] key in the minimum SNR required for different network speeds (note: keep the SNR limit at 0 dB if in doubt. If SNR is positive, 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 NSA 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.

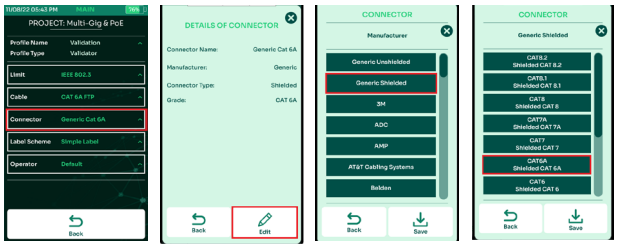
c. Selecting Cable/Connector

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



- Select [Cable: Generic Cat 6A].
- Details of the current copper cable being used will be displayed. Select [Edit].
- 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:



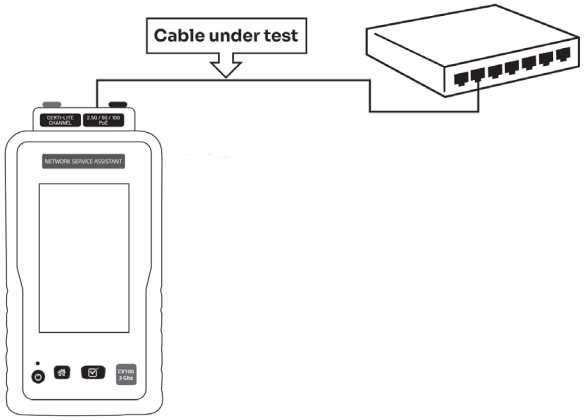
- Select [Connector: Generic Cat 6A].
- Details of the current copper connector being used will be displayed. Select [Edit].
- Select [Generic Shielded].
- Select [CAT 6A].

d. Validation Test Options

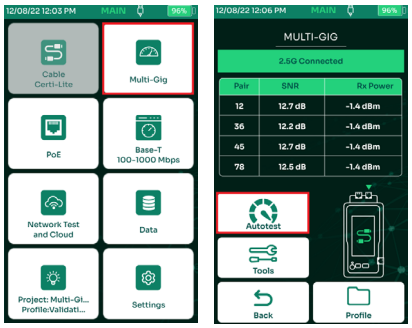
i: Multi-Gig Validation

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 NSA needs to be connected via the Ethernet cable under test to a router, switch, PoE or any network enabled device.



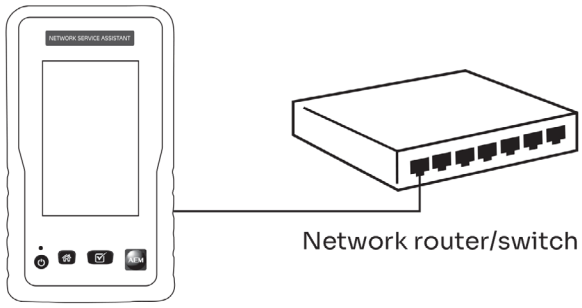
- Connect the first end of the cable to-be validated to the Multi-Gig (2.5G/5G/10G/PoE) port of the AD-NSA adapter, attached to the NSA unit.
- Connect the second end of the cable to a network device i.e., network switch/router.



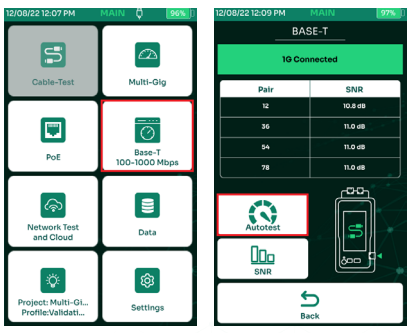
- Once the test setup is ready and NSA is connected, start Multi-Gig validation test by selecting [Multi-Gig] on the NSA. As a convenient quick test, the NSA will attempt to connect at 2.5Gbps. If it successfully connects, it will show SNR and received power on each cable pair for this network speed.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

ii: BASE-T

Multi-Gig tests require the NSA adapter. However, all NSA units are capable of performing simple 10M/100M/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 NSA.
- Select [Autotest].

iii: PoE Test with PoE enabled Router/Switches

NSA 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.

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

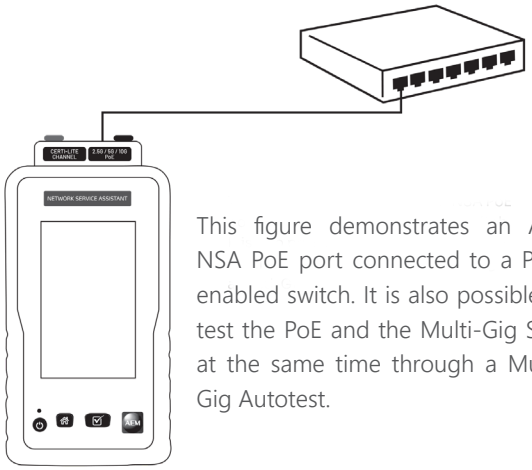
- PSE Detected: Yes or blank.
- Voltage: Voltage drawn by the PD.
- PSE Type: 1-2, 2, 3-4, & 4 - different types have different allocated power.
- PD Class: 0 to 8 - different classes have different allocated power
- PoE Cable Pairs: Cable pairs used to transmit electrical power.
- Allocated Power: Power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

Internal & External Load Tests:

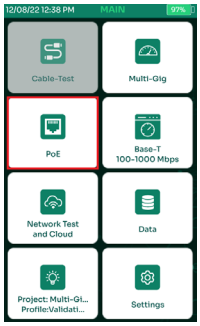
- Voltage
- Current
- Real Power: The actual power available at the RJ-45 jack that is allocated by the PSE

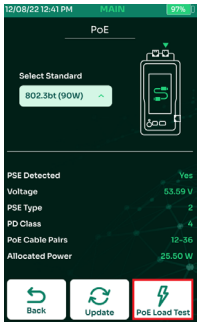
Commonly Used Terms:

- 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-NSA 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.

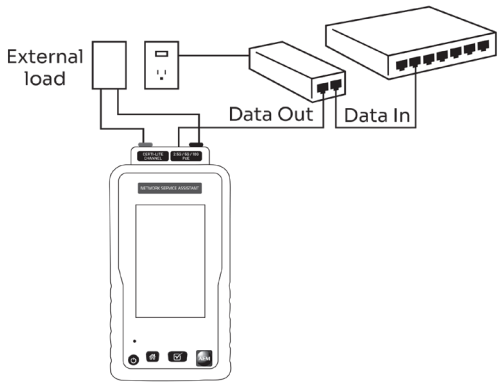




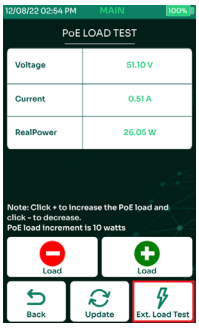
- To perform a PoE test, select [POE] on the home screen of the NSA unit.
- On the PoE test screen, choose the expected PoE standard. The PoE test screen will also list the actual PoE type, voltage and power level. The unit measures power with actual resistance load connected. PD class is automatically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

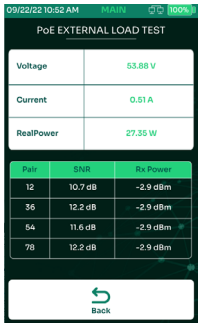
iv. PoE Load Test

- 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.



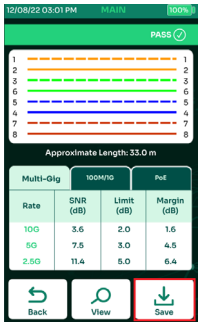
- NSA provides an option to connect to a preferred external load for continuous loading of PSE. Simply connect the external load to the NSA PoE positive (+) and negative (-) ports and select [PoE Load Test].

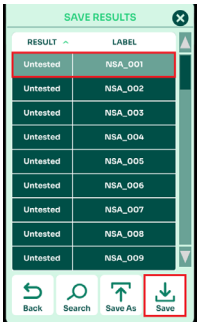




- Monitor the voltage, current and power levels of the PoE.
  For easy reference, the SNR and Rx power per pair will also be displayed.

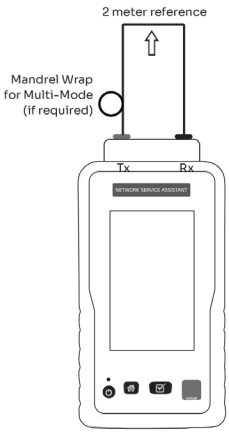
e. Saving Autotest Data





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

6 Fiber Certification Test



NSA supports multi-mode and single mode fiber certification in loopback configuration. NSA comes preloaded with TIA, ISO and loss budget limits that users can customize according to their needs.

WARNING: Fiber laser in use. Do not stare into the beam.
Use proper protective equipment and follow safety procedures.

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 qualifications 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]	900 µm buffered fiber [mm (in)]	1.6 mm jacketed cordage [mm (in)]	2.0 mm jacketed cordage [mm (in)]	2.4 mm jacketed cordage [mm (in)]	3.0 mm 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 LSPM 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 and 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

i. Loopback Set Reference

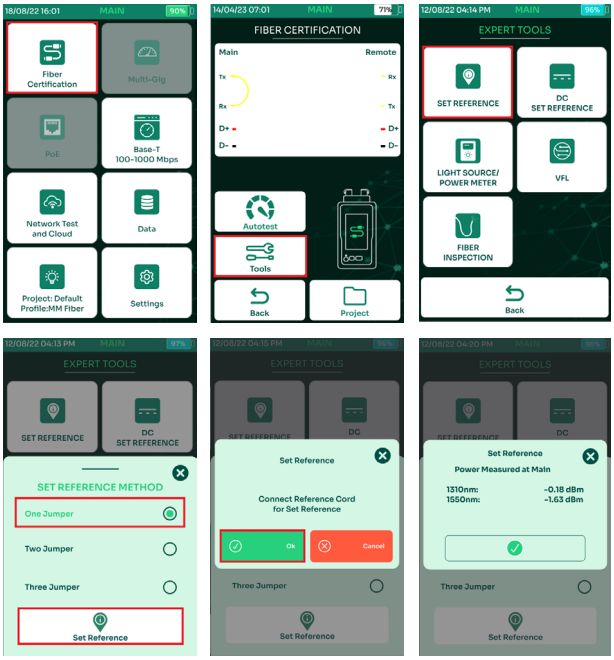
It is important to perform set reference before starting an Autotest to ensure the accuracy of the test results. A 2-meter set reference cord is included in the fiber kit. Make sure that the reference cord is cleaned and not degraded before performing the set reference.

Perform set reference only after:

1. Powering off and then powering on the NSA unit.
2. Disconnecting & then reconnecting the fiber adapter.
3. Replacing reference cords.

AEM recommendations:

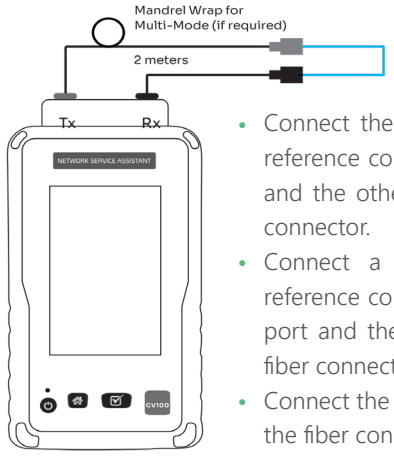
1. Wait for 5 minutes after powering up the fiber adapters before performing set reference, so that they are properly warmed up and the temperature has stabilized.
2. Perform one jumper set reference
3. Do not disconnect the reference cord in the fiber adapter TX port after performing set reference.



- In the main screen, select [Fiber Certification].
- Select [Tools].
- Select [Set Reference].
- Select Ok to continue, Cancel to cancel.

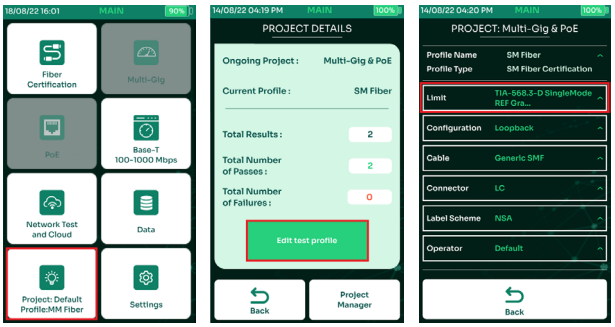
Tip: Make sure the 2-meter fiber cable is cleaned before performing set reference for optimal results. Once the set reference is complete a dialog box will display the power measured on the NSA unit.

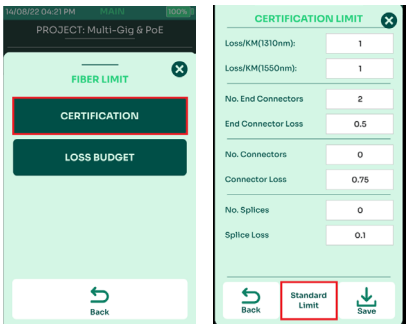
ii. Fiber Test Setup



- Connect the end of a 2-meter reference cord to NSA's Tx port and the other end to the fiber connector.
- Connect a separate 2-meter reference cord to NSA unit's Rx port and the other end to the fiber connector.
- Connect the cable under test to the fiber connectors.

c. Select Test Limit





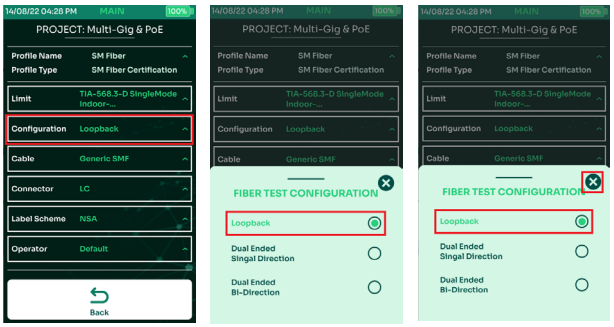
To specify a test limit:

- In the main screen, select [Project].
- Select [Edit test profile].
- Select [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] or [ISO/IEC].
- 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 choosing [STD Grade] or [REF Grade], the default values will be populated in the [Certification Limit] screen, allowing users to modify the values.
  Note: For Loss/KM, End Connector Loss, Connector Loss and Splice Loss, NSA will only accept values that are equal to or lower (stricter) than the standards specified in the [Certification Limit] screen.
- [Loss Budget] enter the loss budget in decibels (dB). Default value is 10 dB for Multi-mode and 3 dB for Single-mode.

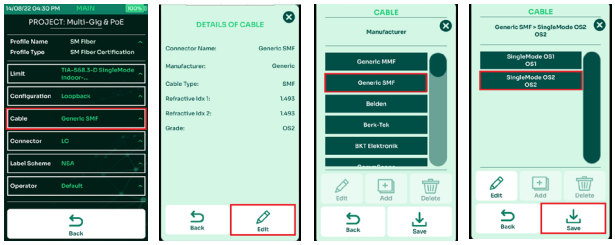
d. Choosing a Configuration



- Select [Configuration].
- Select [Loopback]. Note: NSA does not support dual ended tests.
- Select ⊗ to save the changes.

e. Selecting Fiber Cable

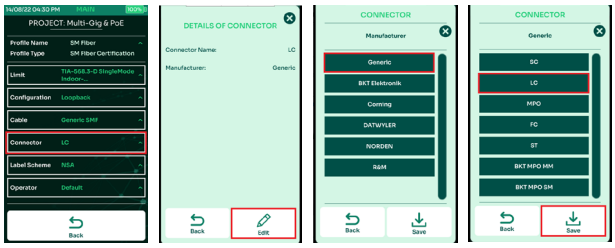
NSA supports a wide range of fiber cable vendors. If unsure of the cable manufacturer, select [Generic MMF] for multimode and [Generic SMF] for single mode.
To add a manufacturer's cable to our database, please email: customercare@aem-test.com.



- Select [Cable].
- Details of the current fiber cable being used will be displayed. Select [Edit].
- Select from the list of fiber cable manufacturers or [Generic SMF] .
- Select the required cable type and then [Save].

f. Fiber Connector

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



- Select [Connector].
- Details of the current fiber connector being used will be displayed. Select [Edit].
- Select [Generic connector] .
- Select the connector type and then [Save].

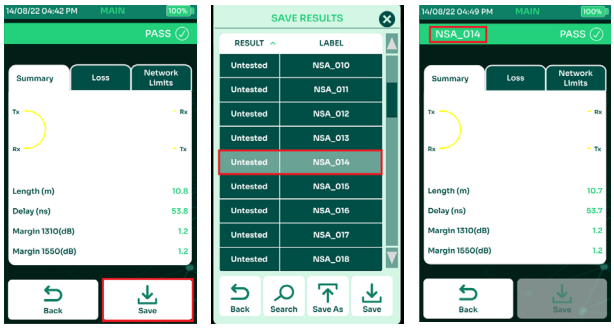
g. Performing Fiber Autotest

Connect a fiber multi-mode or single mode adapter to the NSA unit. Connect the end of the fiber cable to the NSA fiber connector.

- In the main screen, select [Fiber Certification]
- Select [Autotest].
- NSA will confirm that Autotest is in progress.
- Once the Autotest is complete, NSA will display a summary.
- Select the [Loss] tab to view the loss and margin at 850nm/1300nm for Multi-mode and 1310nm/1550nm for Single-mode.
- Select [Network Limits] to view the various limits that the fiber-under-test can support.

Note: When performing a fiber loopback test, the measured length of the fiber optic cable is halved.

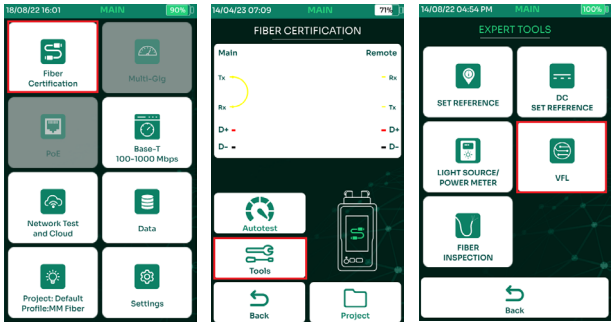
h. Save Test Data

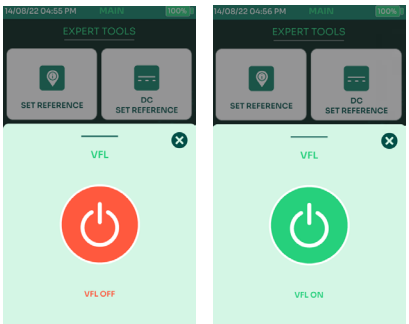


- Select Save to show the label list.
- Choose a label from the list, and then select [Save].
- The test result shows the label ID it is saved.

i. 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 red light will shine through the fiber's cladding, indicating where a break or kink may have occurred.





- Select [Fiber Certification].
- Select [Tools].
- Select [VFL].
- Select to turn on VFL. Connect the fiber-under-test to the VFL port of the NSA. When the icon turns green : , the power is on.
- To turn off VFL, select .When the icon turns red: , the power is off.

j. Light Source/Power Meter

Light Source is a device that emits light through an optical Fiber that can be used in various applications including telecommunications and industrial settings while the Power Meter measures the optical power or intensity of light signals transmitted through a fiber optic cable. It helps assess signal strength ensuring optimal performance and identifying potential issues in the fiber optic network. TestPro has a built in Light Source and Power Meter function that can be advantageous in the field when installing or troubleshooting a fiber cable.

a. Set Reference

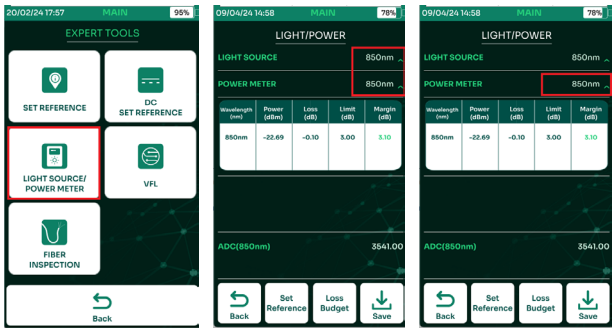
In any fiber measurement, it is important to perform set reference first.

Connect a 2-meter fiber reference cable from NSA Tx port to the Rx port and select [Set Reference] to set the loss (dB) to 0 before attaching the fiber-under-test.

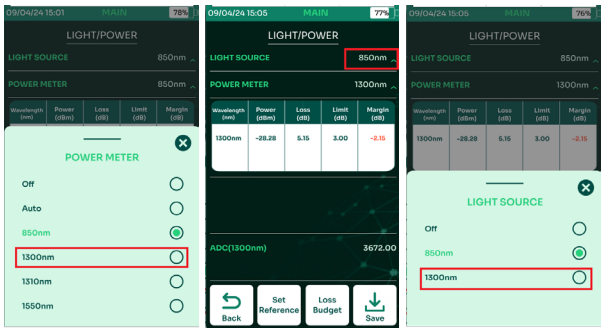
Refer to b. Fiber Set Reference for more information about Set Reference.

b. Single Wavelength Test

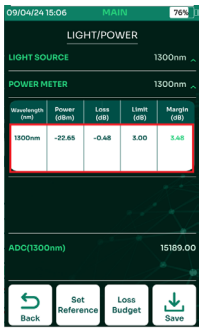
Connect the fiber-under-test via a patch cord cable. Refer to ii. Fiber Test Setup on how to connect the fiber cable and patch cords for Light source and Power Meter test.



- On the main menu, select [Fiber Certification]. Select [Tools]. Open [Light Source/Power Meter].
- By default, light source with wavelength 850nm for multi-mode or 1310nm for single-mode are automatically selected. The same wavelengths are selected for power meter in both main and remote devices.
- To change the power meter, select [Power Meter].



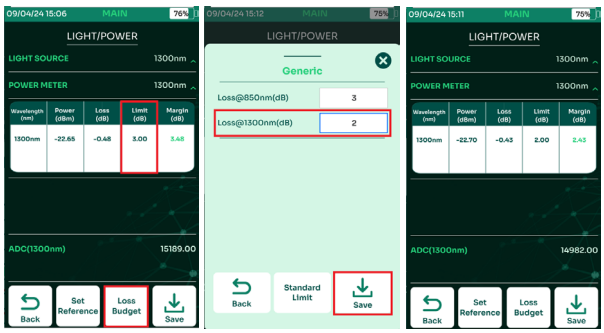
- Select the desired power meter in the pop-up menu [1300nm].
- To change the light source, select the [Light Source].
- Select the desired light source in the pop-up menu [1300nm].



- Power meter measurements for 1300nm wavelength like Power and Loss starts to populate.

c. Power Meter Limit

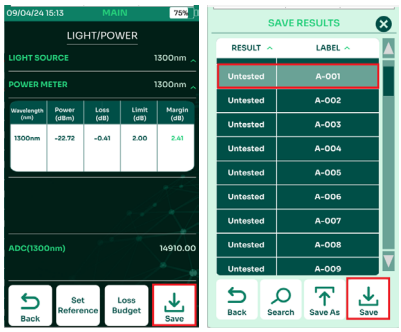
AEM Tester provides users to loosen or tighten the power meter limit to meet the individual's unique requirement.



- Select Loss Budget.
  Change the Loss value i.e. from 3 dB to 2 dB and
- select [Save].
- Power meter adjusts the limit value and calculates the margin for 1300nm accordingly.

d. Save Power Meter Result

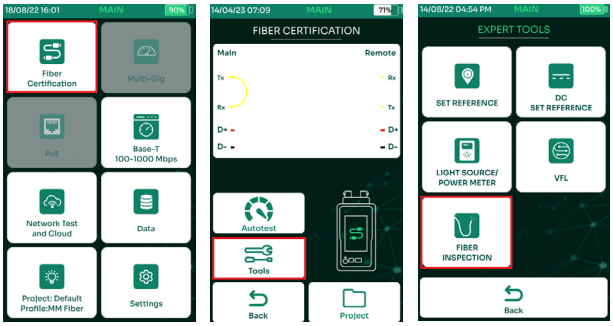
Like other tests like Fiber and Copper Certification, the AEM Tester also provides a way for user to save the Power meter test results which can then be imported to TestDataPro for further analysis or report submission.



- Select [Save].
- Select a label from the list and select [Save]. The test result will be saved as A-001.

k. Fiber Inspection

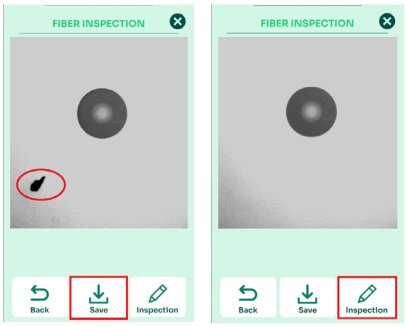
Dirty connectors are one of the major problems in fiber optics, causing high connector loss & reflectance. The fiber-inspection feature of NSA allows users to check the fiber connectors for dirt before testing and installation. NSA has built-in USB Video Class (UVC) drivers to support any fiber inspection scope or fiber microscope that uses a UVC driver.



- On the main menu, select [Fiber Certification].
- Select [Tools].
- Select [Fiber Inspection]. NSA will automatically detect the fiber inspection probe and display the view of the fiber cable on the NSA's screen.

Connecting a fiber inspection scope:

1. Insert the fiber inspection scope into the NSA's USB slot, located on the right side of the device.
2. NSA will auto detect the fiber inspection scope and install the relevant UVC built in drivers.



- The save feature allows users to compare before and after cleaning the fiber cable. To save the current image being displayed, Select [Save].
- To compare the saved image and the current image displayed, select [Inspection]. This will retrieve the last image saved. Go back to live image, select [Live].

Powered Fiber

Powered Fiber Certification Testing

A powered fiber cable system combines hybrid optical fiber and copper cabling with 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.

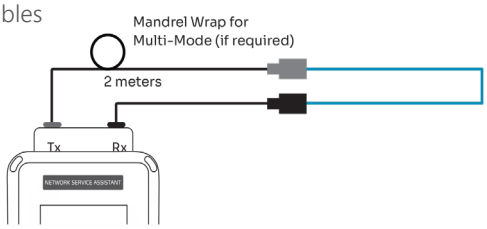
Deployment of HD cameras, Wi-Fi access points, optical network terminals, small cells, and other network-access devices can be challenging, especially in outdoor environments. Many of these devices accept a PoE input for power and communications, but distance limitations, power availability, and device placement can pose challenges for network planning.

Testing of Powered Fiber Cables

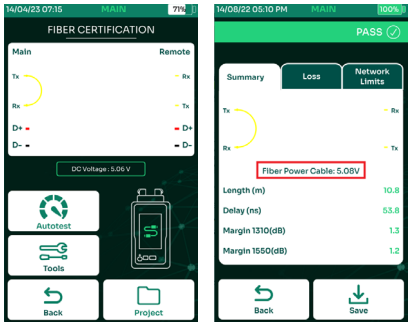
Refer to and follow steps a.to e. under 4. Fiber Certification Test to perform the fiber one-jumper set reference followed by the steps below.

Connect the cables

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., pairs 3 and 6. (Note: Ensure that the pairs & the Ethernet Cable are cut open.)
4. Connect the other end of the cable to a power source equipment (PoE switch, extender or midspan) Power on the NSA unit and select [Fiber Certification].
5. The PSE voltage reading should be displayed below the FiberMap.

7 Coax Certi-Lite

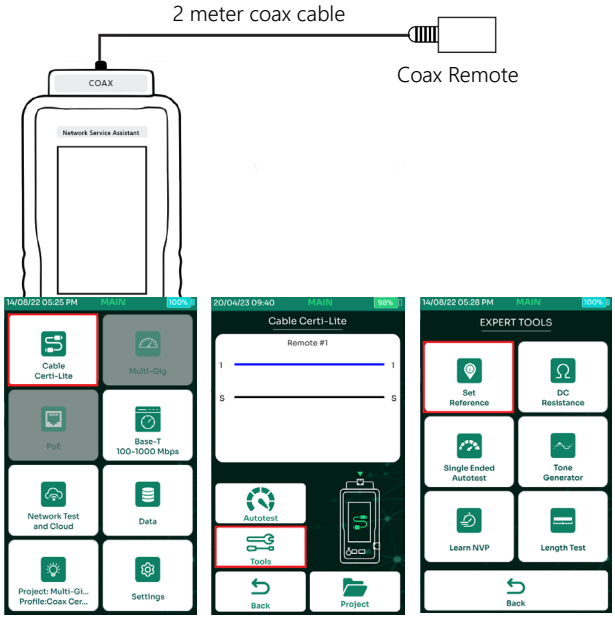
NSA supports coax cable test for 75 Ohms coaxial cable. Coax adapter and coax remote terminator are required to perform the test using NSA. NSA's coaxial cable test solution has a wide RF measurement frequency range of 1-2,400 MHz. The Autotest takes no longer than 15 seconds.

a. Coax Set Reference

Set reference is necessary for accurate measurements of DC Resistance, Delay and Insertion Loss. It must be performed when the adapter is attached to the NSA for the first time or when adapters are replaced. If a copper Autotest yields results with unusually high resistance measurements, this is often an indication that a set reference is required.

To perform set reference using NSA Coax adapter and Coax Remote, attach the adapter to the NSA, connect a 2-meter coaxial cable to the Coax adapter and connect the other end of the cable to Coax Remote.

Notes:
Set reference will already have been performed before shipping the product, therefore it is not necessary to perform it again when the product is received. If the reference cable is faulty, set reference and measurement results will be affected.



- On the NSA main screen, select [Cable Certi-Lite].
- Select [Tools].
- Select [Set Reference]. The dialog box [Connect NSA to NSA Remote Terminator or 2-meter coax cable to Coax Remote Terminator] will appear.
- Select Yes .

b. Creating Coax Certi-Lite Project/Profile

NSA supports customer workflows through project and profile descriptions. [Project] is an identifier of the customer site/ location, while [Profile] refers to specific test configurations.
Refer to chapter 2, section b Creating Certi-Lite Project/Profile.

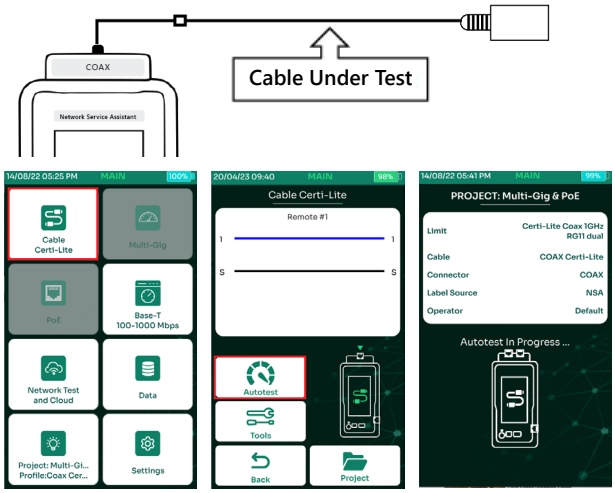
c. Selecting Coax Test Limit

Refer to chapter 2 section c Selecting Test Limit.

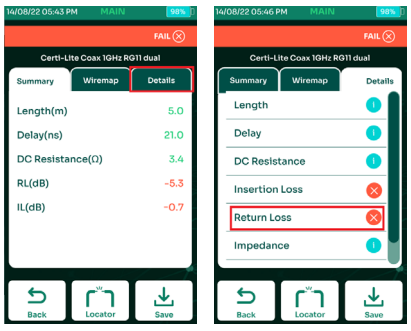
d. Selecting Coax Cable/Connector

Refer to chapter 2 section d Selecting Cable/Connector.

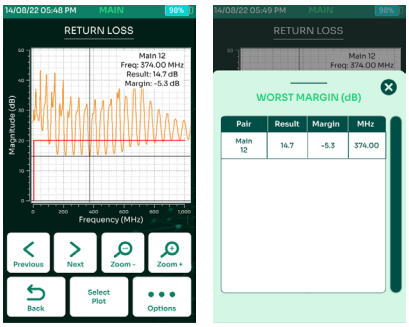
e. Performing Coax Autotest



- Select [Cable Certi-Lite].
- LiveWiremap comes up when the cable-under-test is attached to the Coax Certi-Lite port and the other end of the cable is connected to Coax Remote. User can start a Coax Certi-Lite 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
- The worst margins for return loss will be displayed

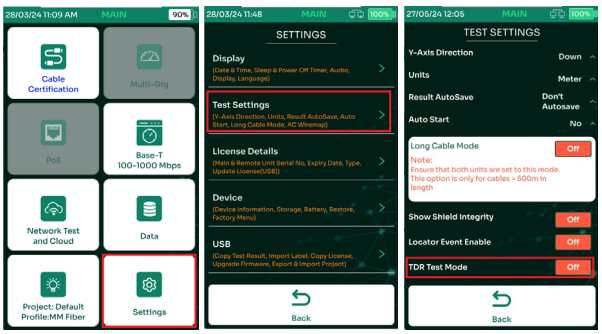
f. Saving Test Data

Refer to chapter 2 section g Saving Test Data.

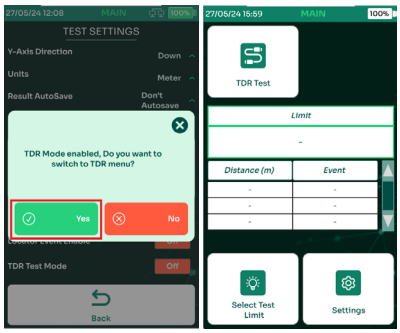
8 TDR Test Mode

Time Domain Reflectometry (TDR) is a powerful technique widely used in various industries for testing and analyzing the integrity of transmission lines and cables. By sending short pulses of electrical energy down a cable and measuring the reflected signals, TDR provides valuable insights into the condition of the cable, including impedance variations, cable discontinuities, and cable faults. Its also a great tool foe quality control in manufacturing sector.

i: Launching TDR Test

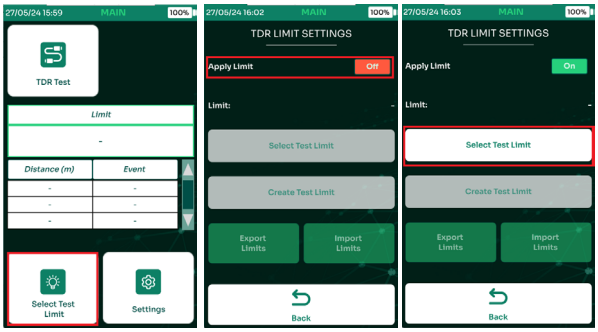


- In the main menu, go to Settings.
- Select Test Settings.
- Turn On the [TDR Test Mode].

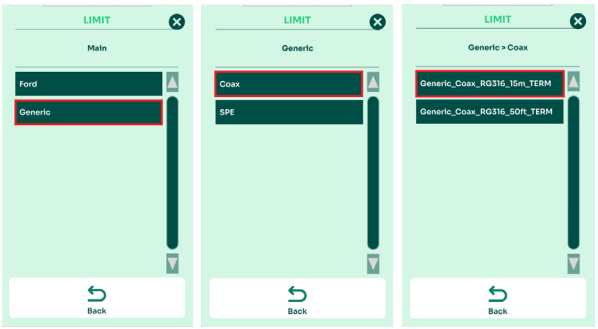


- Select 'Yes' on the dialog box, and the device will automatically switch to TDR Test Mode.

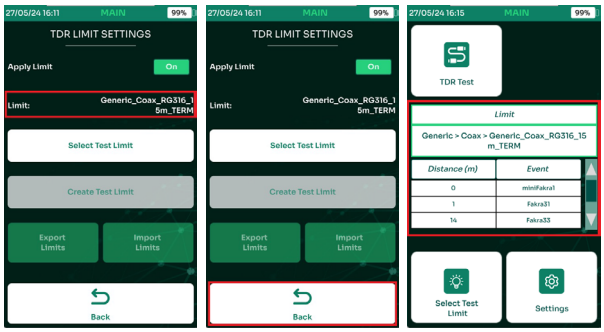
ii: Select TDR Test Limit



- Click [Select Test Limit].
- Turn on the [Apply Limit].
- Choose [Select Test Limit].



- A Ford or Generic limit can be selected. Choose
- [Generic].
- Select [Coax].
  Choose any limit. In this case [Generic_Coax_RG316_15m_TERM}.

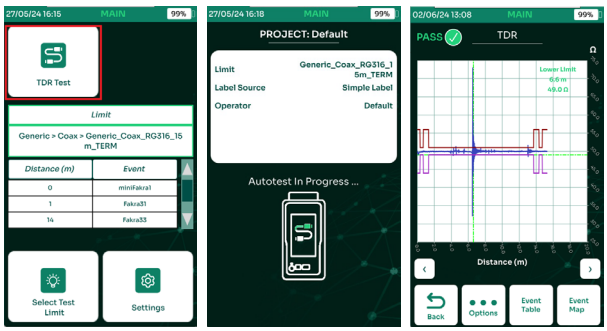


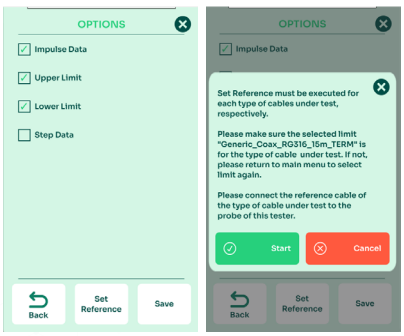
- The selected limit is now loaded to the TDR tester
- and TDR test can start.
- Select the back button.
  The limit name currently in use will be displayed on the screen, together with limit values such as distance (in meters or feet) and the events.

iii: Set Reference of TDR Test

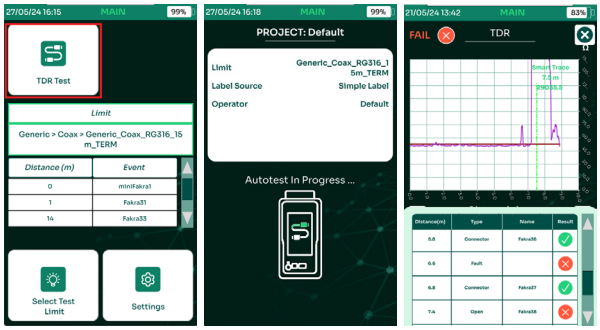
TDR Test Set Reference should be done with a good reference cable, which should be the same type of the cable under test. With set reference, the TDR test is able to detect very small difference between the reference cable and cable under test, e.g. a kink of the cable under test.

User can click TDR Test button to start test. After test is complete, please go to Option menu, click Set Reference button, then click Start to complete the set reference.

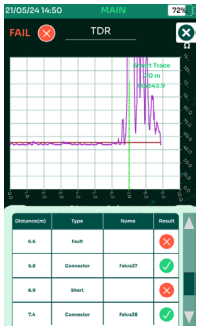




iii: Start TDR Test



- There are 2 ways to start TDR Test (1) Select TDR Test in Main screen and (2) Press the test hard button.
- Autotest starts.
- In this example, the cable under test failed the TDR Test due to an OPEN cable. Choose [Event Table]. An open fault event was detected at 7.4 meters, which corresponds to the location of connector Fakra 38. Meanwhile, a kink fault was also detected at 6.6 meters.
- In another example, a short fault event was detected at 6.9 meters, which is located between connectors Fakra 37 and 38. Meanwhile, a kink fault was also detected at 6.6 meters.



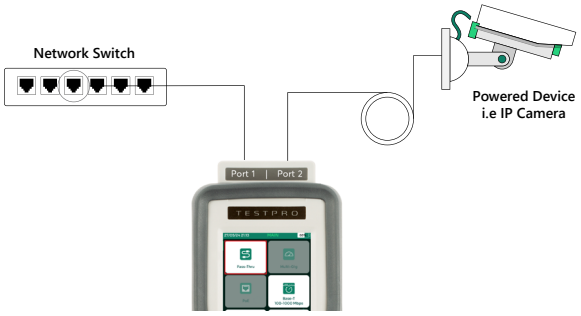
For detailed information about TDR Test Mode, refer to TestPro Automotive user guide here: https://helpcenter.aem-test.com/hubfs/Software%20and%20Firmware%20Updates/Current%20Release/TestPro%20Automotive%20User%20Guide.pdf

9 Pass-Thru Test

The AEM Pass-Thru test is a revolutionary tool that simplifies network testing and troubleshooting. This versatile tool enables users to test various aspects of the network connection, ensuring optimal performance and reliability. The Pass-Thru Test will streamline network testing and troubleshooting, identify and resolve issues quickly, ensure optimal network performance and reliability and support PoE-enabled devices. The compact and portable design for easy use in the field.

i: Pass-Thru Test Setup

Connect Port 1 of the Pass-Thru adapter to a network router or switch. Next, connect Port 2 of the Pass-Thru adapter to a network client device, such as IP camera, Laptop, Game console (e.g. PlayStation, Xbox), Home entertainment system (e.g. smart TV, streaming device).



TestPro with
Pass-Thru Adapter

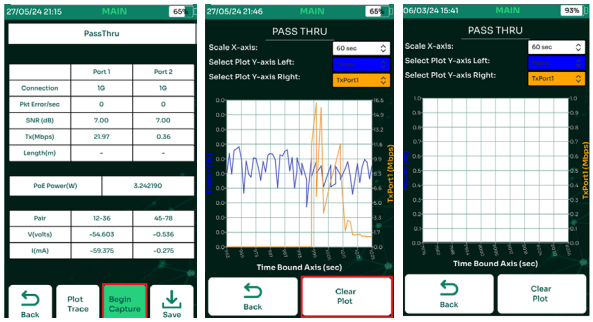
ii: Pass-Thru Measurements

- With the Pass-Thru adapter firmly attached to the test platform, navigate to the tester's main screen and select the 'Pass-Thru' option. This will activate the adapter's pass-through functionality.
- Pass-Thru initiates the measurements and real-time monitoring of the network connection, providing you with accurate and reliable test results.

Measurements:

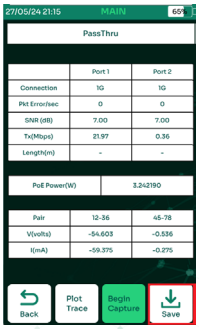
1. Connection: Displays the connection speed of the network example 1G/100M/10M.
2. Packet Error Rate (PER): Measure packet errors per second to identify signal quality issues.
3. Signal-to-Noise Ratio (SNR): Assess the strength of your signal and detect potential interference.
4. Transmit Rate: Determine the speed of your data transmission.
5. Length: Measure the distance of your network cables.
6. PoE (Power over Ethernet): Measures the power, voltage, and current being consumed by the powered device, such as Power (Watts), Voltage (Volts) and Current (Amps).

- Select [Log Trace]. This feature displays the power and transmit rates in a graphical format, providing a visual representation of the data. This allows you to easily monitor and analyze the power and transmit rates over time, helping you to iIdentify trends and patterns, detect anomalies and issues, optimize network performance and troubleshoot problems. The graphical display makes it easy to understand complex data and gain valuable insights into your network's behavior.



- The Capture Start/Stop feature logs all measurements and saves them in a convenient CSV format, allowing for easy data analysis and reporting. To access the logged data, simply follow these steps:
  - Go to TestDataPro >> Help
  - Select 'Copy Logs'
  - Retrieve the CSV file containing all the logged measurements
- The 'Clear Plot' button cleans up the existing graphs and starts a new one, providing a fresh canvas for your data visualization.

iii: Save Pass-Thru Measurements



- To save your Pass-Thru test results, follow these steps:
  1. In the Pass-Thru screen, click on the 'Save' button.
  2. Choose a label or enter a new one to identify your test results.
  3. Click 'Save' again to confirm and store your test data.

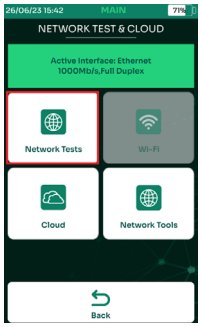
10 Network Test and Cloud

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

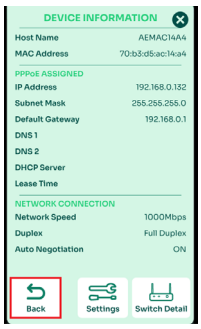
a. Network Test

The network test function has a network discovery feature that scans and detects stations, servers, NSA 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 NSA side port to a live network.



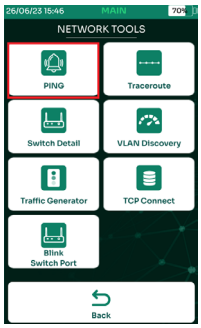
- On the main menu, select [Network Test and Cloud].
- Select [Network Test]. NSA will start network discovery automatically and populate the screen with stations, servers, NSA units, etc.

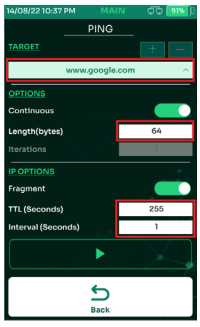


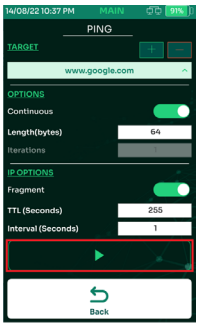
Note: A Wi-Fi icon will appear when a Wi-Fi dongle is attached to the NSA's USB port. Select the NSA icon to display the device information. Device information will display the IP address, subnet mask, default gateway, DNS server and other information. Select back to go back to the network test screen.

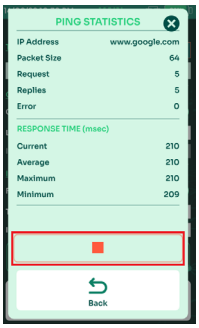
i. Ping

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





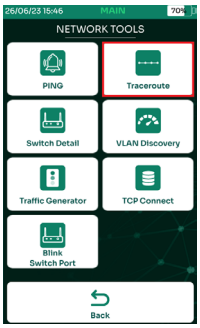


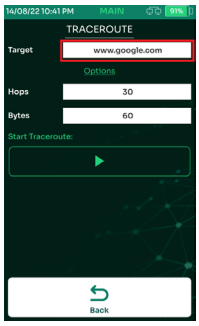


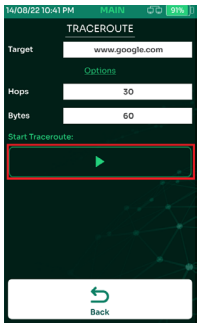
- Select [Tools].
- Select [Ping].
- On the Ping screen, choose the desired [Target] i.e., www.google.com [Length] 64 bytes, TTYL 255 sec and [Interval] 5 sec.
- Select ▶ to start the Ping test.
- A [Ping Statistics] page will display the numbers of ping requests, replies and errors. It will also display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

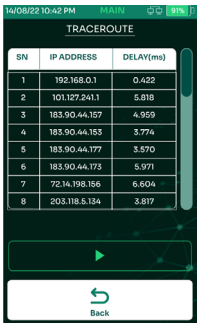
ii. Traceroute

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.





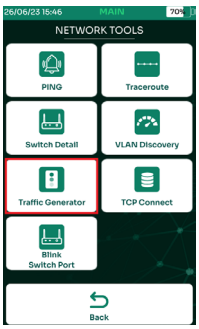


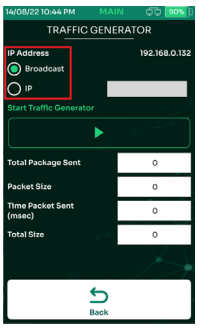


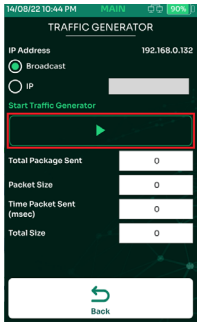
- Select [Tools].
- Select [Traceroute].
- Key in the website or IP address in [Target] field. By default the field will show "www.google.com", which can be changed.
- Click ▶ to start Traceroute.
- Traceroute will display the route (IP Address) and the delay in milliseconds.

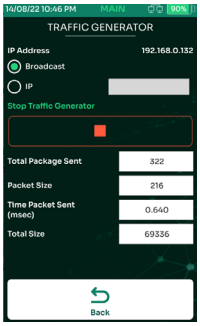
iii. Traffic Generator

Traffic Generator on the NSA is used to generate UDP packets to be sent to the network.





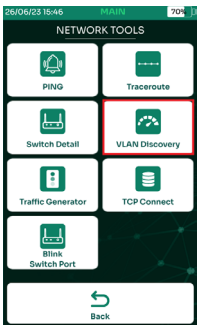


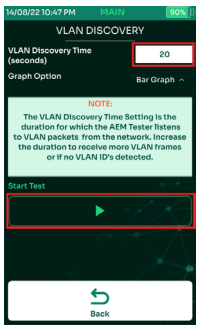


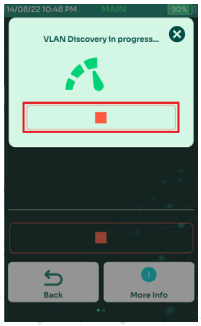
- To start Traffic Generator select [Tools].
- Select [Traffic Generator]
- Select either [Broadcast] or [IP]. When [Broadcast] is selected, the traffic or UDP packets will be sent to the entire network. When [IP] is selected, traffic will be sent to a specific IP on the network.
- To start Traffic Generator,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

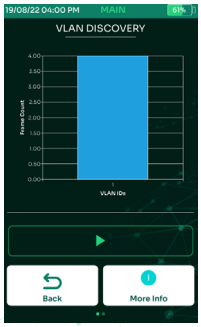
iv. VLAN Discovery

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.









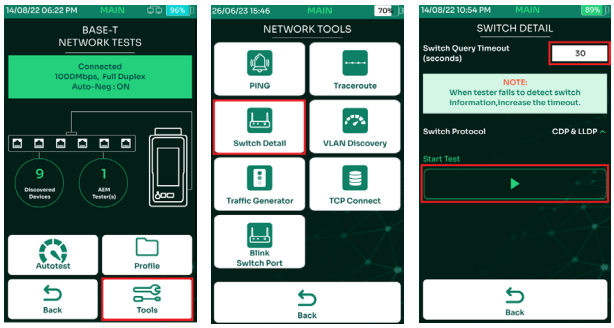
- To initiate VLAN, select [Tools].
- Select [VLAN Discovery].
- Key in the VLAN Discovery time (default is 20 seconds). To capture more VLAN packets, increase the time. Select [Start Test].
- The VLAN discovery will commence. Concurrently, the [Stop Test] button will be enabled.
- Once the VLAN discovery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

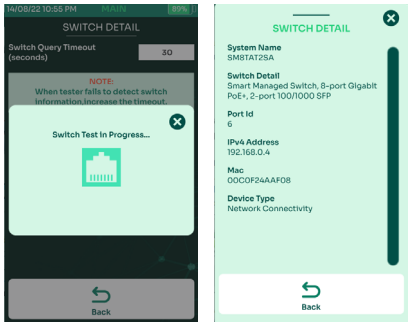
Reference:

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

v. Switch Detail

NSA's Switch Detail feature helps network professionals identify the switch name and model number to which the Certi-Lite 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.

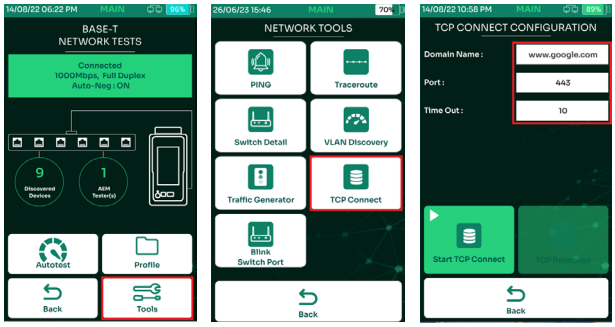




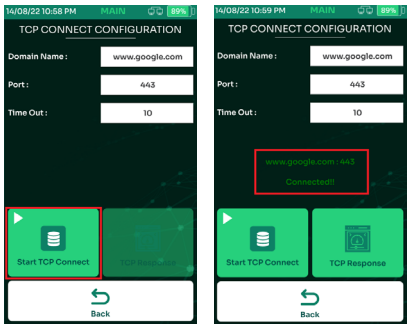
- To initiate Switch Detail, select [Tools].
- Select [Switch Detail].
- Key in the appropriate value for [Switch Query TimeOut] (default is set to 30 seconds). Increase the timeout when the tester fails to detect the switch information. Select the protocol to be used - [CDP], [LLDP] or both. Select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

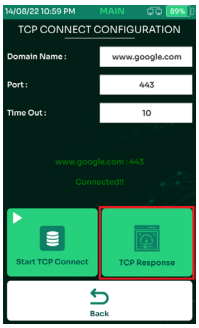
vi. TCP Connect

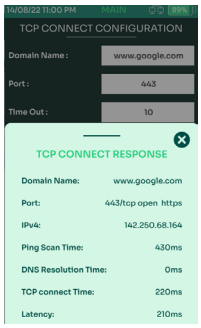
NSA can open a TCP connection with the selected target to test for port availability, by doing a TCP Connect test, using a 3-way handshake (SYN, SYN/ACK, ACK). The Autotest will run three times before reporting the results.



- 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.



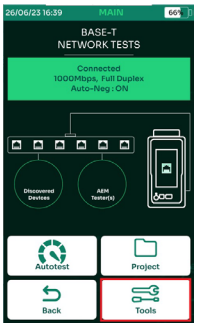


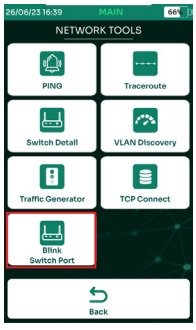


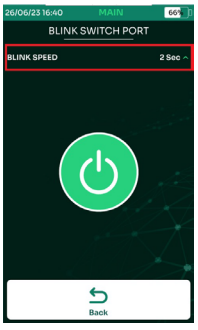
- Click [TCP Connect] to start the test.
- TCP Connect will display the status of the test as either [Connected or [Connection Refused].
- Select [Test Response] to view more details of the TCP Connect test results
- NSA will display more details about the test such as Domain Name, Port and its status,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

vii. Blink Switch Port

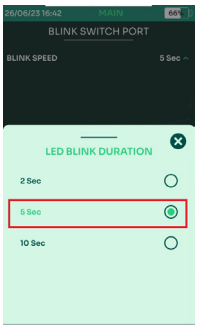
Locating a single switch port out of hundreds or thousands of switch ports can be a daunting task for an IT personnel. The AEM multi-function tester offers multiple ways to do this. Switch Detail feature will scan and locate a specific port of a managed switch by listening to LLDP and CDP packets. Another feature is called Blink Switch Port where users can define how fast or how slow the LED in the switch port blinks. The AEM test platform comes with 2 seconds, 5 seconds and 10 seconds blink interval. Connect the Ethernet cable to the Ethernet port located on the side of the tester.

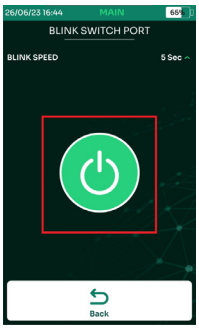






- To initiate Blink Switch Port, select [Tools].
- Select [Blink Switch Port].
- To choose a different speed, select [BLINK SPEED].

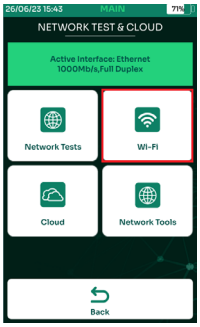


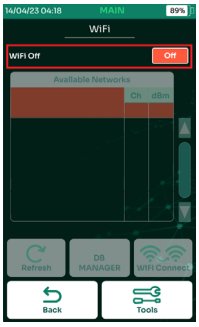


- Choose either 2 sec, 5 sec or 10 sec
- Select start.
- Switch port should blink every 5 seconds interval. To stop simply click Back or the stop button.

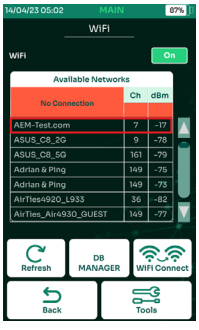
b. Wi-Fi

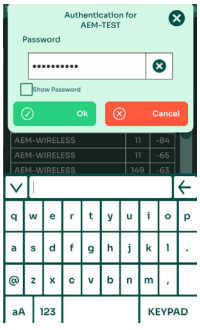
Please note that optional Edimax EW-7822ULC Wi-Fi USB adapter required for Wi-Fi testing. This adapter is region specific and can be purchased from Amazon or a retailer of your choice.

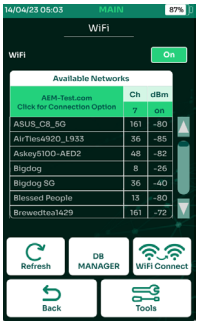


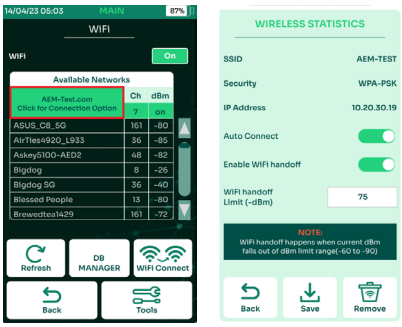


- Select [Network Test and Cloud].
- Select [Wi-Fi].
- Select [Turn ON Wi-Fi].

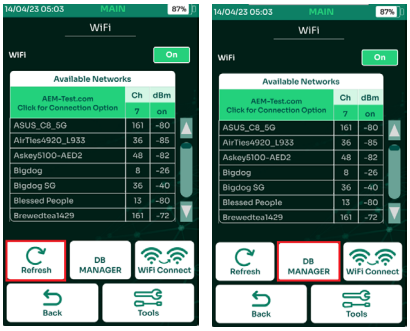


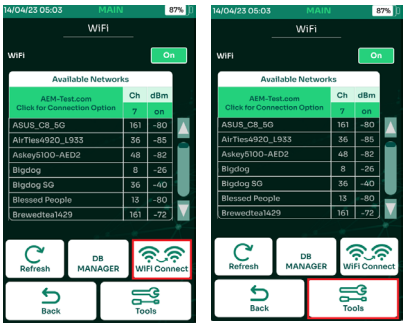






- NSA will display the detected access points and their corresponding channels and dBm values. Select the correct network.
- A dialog box will request for the network password. Key in the password for the selected access points. Click Ok to continue or Cancel to abort connecting to the selected access point.
- NSA 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, NSA Wi-Fi- IP address, auto connect and Wi-Fi handoff details.
  Note: When [Wi-Fi Handoff] is enabled, NSA 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 [Refresh].
- To add, remove and clear saved access points, select [DB Manager].
- If there are multiple access points with the same SSID and password, select [WiFi Connect] to force NSA 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

NSA supports network test features for both wired & wireless connectivity. Performing a NSA 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

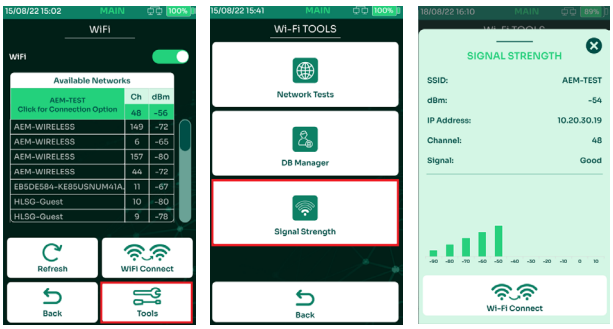
NSA's Database Manger for Wi-Fi allows users to add, remove and clear saved access points. Whenever NSA connects to an access points it automatically saves the SSID & password to the DB Manager. To access DB Manager:

- 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 points 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 and 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

NSA 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.

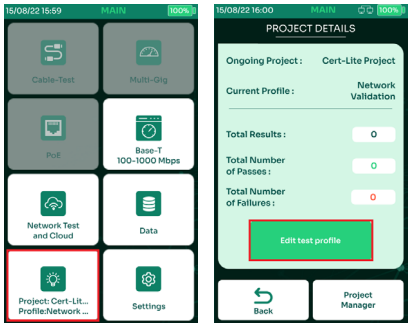
To get Signal Strength:

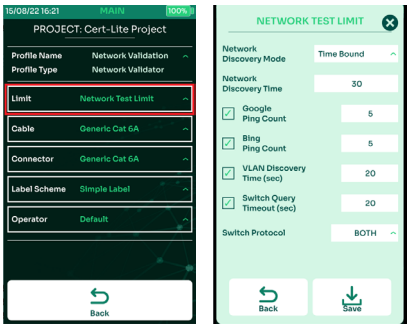


- Select [Tools].
- Select [Signal Strength].
- The [Signal Strength] screen will display the SSID, current dBm value, IP address, channel indicator and signal indicator.

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.

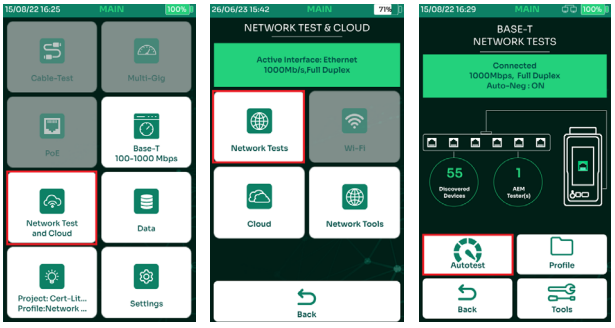
  Note: In Full Discovery mode, NSA will scan the entire network. After network discovery scanning, Autotest will continue with other tests. In [Time Bound] mode, NSA will scan the network for the specified duration.

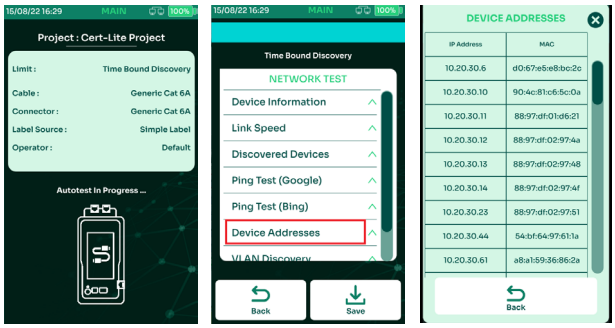
ii. Selecting Cable/Connector

Refer to 2d.select cable/connector section

iii. Performing Network Autotest

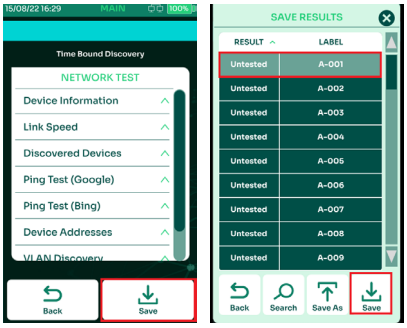
To perform a Network Autotest, the Wi-Fi dongle must be connected to the Wi-Fi access point or the Ethernet cable must be connected to a LAN port - either the side port of the tester or the ADNET adapter Multi-Gig port.





- 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

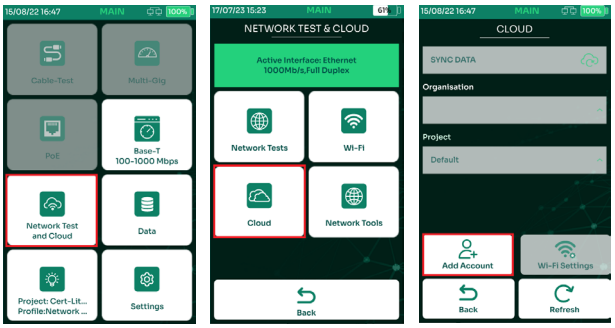


- Select [Save] to view the labels.
- To save results using label A-001, select [Save].
- A dialog box will confirm that the results are being saved.

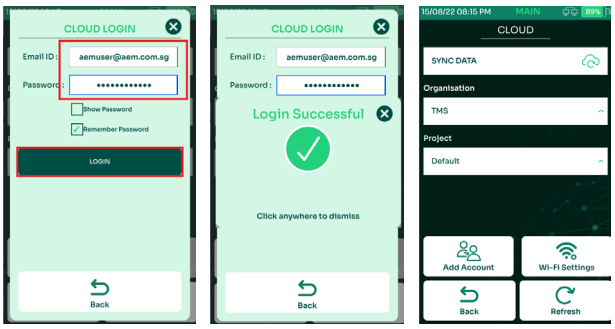
d. TestDataPro Cloud

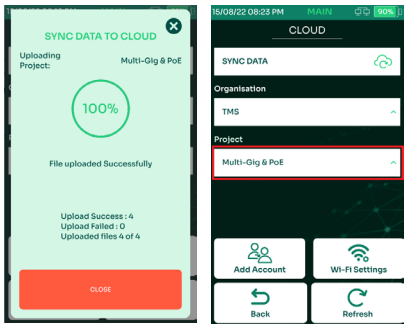
TestDataPro Cloud is a cloud-based service that allows users to upload results from a jobsite via wired network connection or wireless connection. Please note the optional Edimax EW-7822ULC Wi-Fi USB adapter is required for cloud access via Wi-Fi. TestDataPro Cloud allows users to view and download individual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

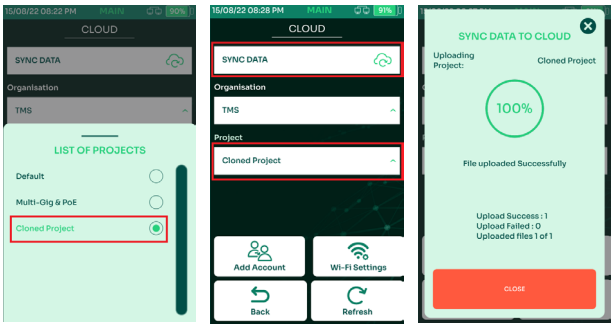


- Select [Network Test and Cloud].
- Select [Cloud]. Note: [Cloud] is only available when Ethernet cable or Wi-Fi is connected.
- Select [Add Account].





- 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]. NSA 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].



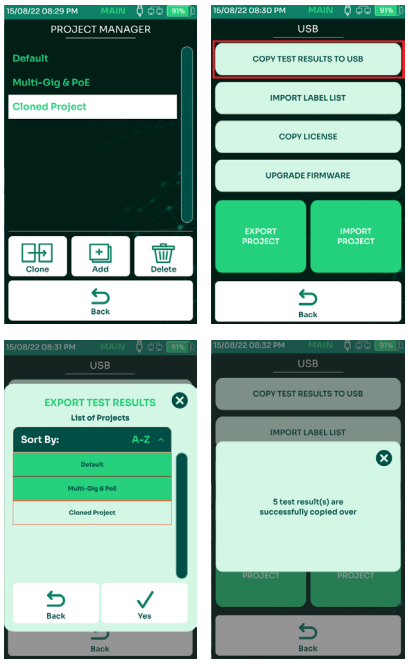
- Select the project to upload. The cloud will show the new project i.e., Cloned Project. Select [Sync Data].
- A dialog box will confirm once the sync is complete and the project has been uploaded to the cloud. Note: For more information about TestDataPro Cloud, click here.

11 Test Results Management

Test data stored in the internal storage of the NSA 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 NSA and a PC running the TestDataPro software. Results can also be retrieved through TestDataPro Cloud.

a. Transferring Test Results from NSA

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

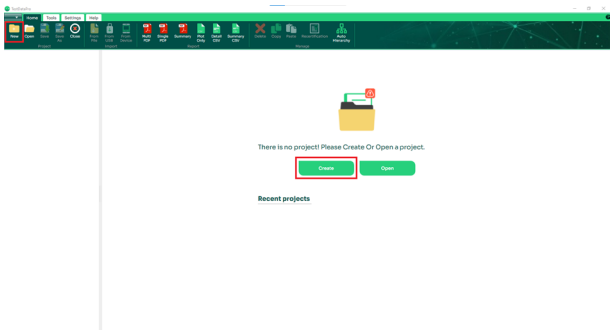


- Example: 3 projects saved in NSA.
- Insert a USB flash drive to the NSA USB port and select [Copy Test Results to USB].
- Choose the project(s) that needed to be exported and click Yes.
- A dialog box will confirm the number of test results exported to the USB flash drive.

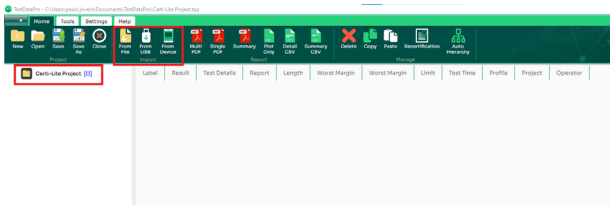
b. TestDataPro Test Management Software

TestDataPro is a test result management software allowing the user to transfer test results from a NSA 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:

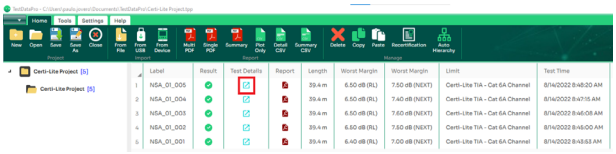


- Select [New] on the top left corner or [Create] to create a new project.

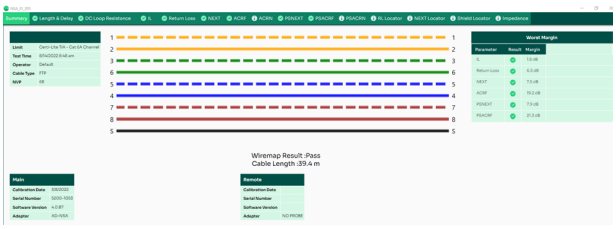


- After a new Certi-Lite project is created, select either [From File] - to import test results from any location in the PC or [From USB] - to import test results directly from USB flash drive or [From Device] - to retrieve test results from the NSA unit.

- 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.

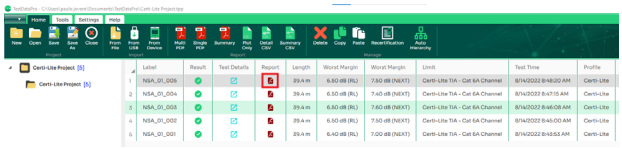


- To view any of the Test Details, click .

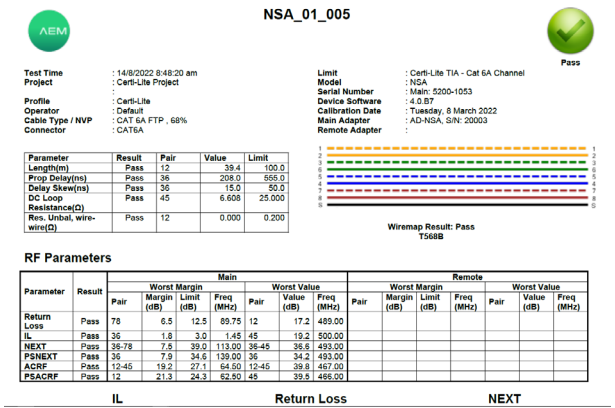


- [Summary] will show the wiremap connection and summary test data. [Length and Delay] will show the test data in each of the four pairs.

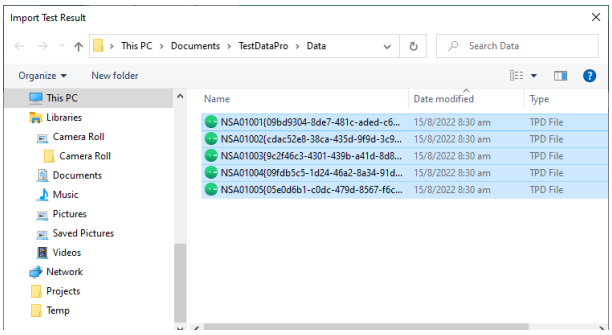
c. Generating Test Reports



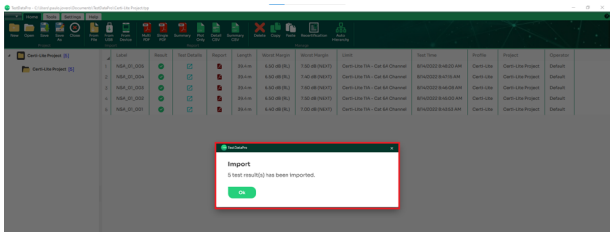
- Click to generate a test report in pdf format.



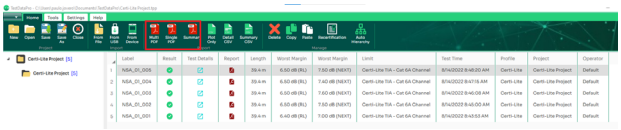
- User will be brought to a page showing the detailed test results.



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

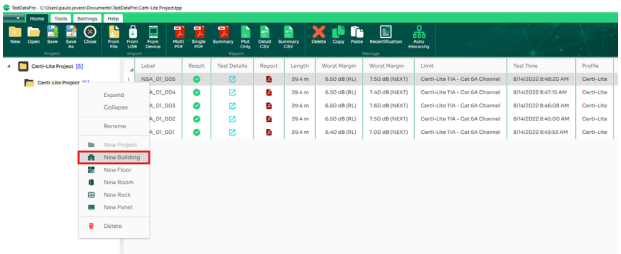


d. Generating Multiple Test Reports

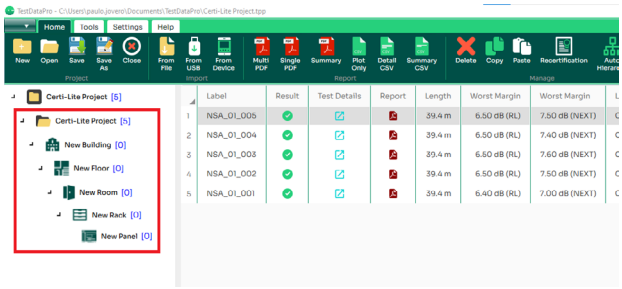


- To export multiple test reports, select all the desired test results and click [Multi PDF] if users wants to split test reports into multiple pdfs. Select [Single PDF] if user wants to combine all test reports into a single pdf file.

e. Adding Hierarchy

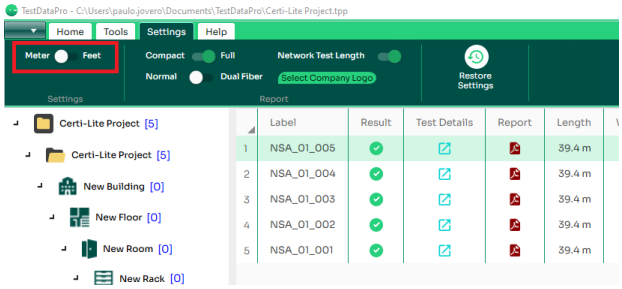


- To add new locations, right click on the project folder and select the type of location i.e., new building, floor, rack or panel.



- 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

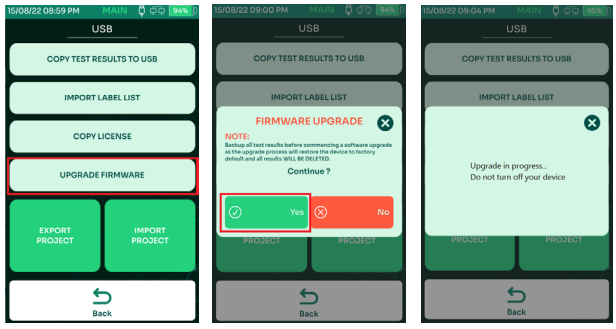


- To change the measurement stand, go to [Settings] tab & toggle between the two options - [meter] and [feet].

12 Firmware Updates

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

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

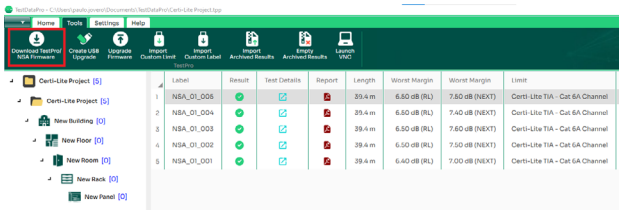


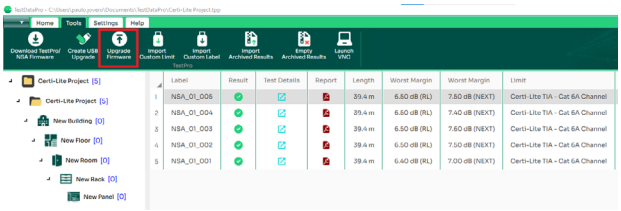
- Insert the USB flash drive. The USB menu will appear. Select [Upgrade Firmware]
- NSA will remind users to back up test results as the upgrade resets the device to factory settings. Select Yes to accept and No to cancel.
- NSA will reboot multiple times. The entire process will take 15 minutes to complete.

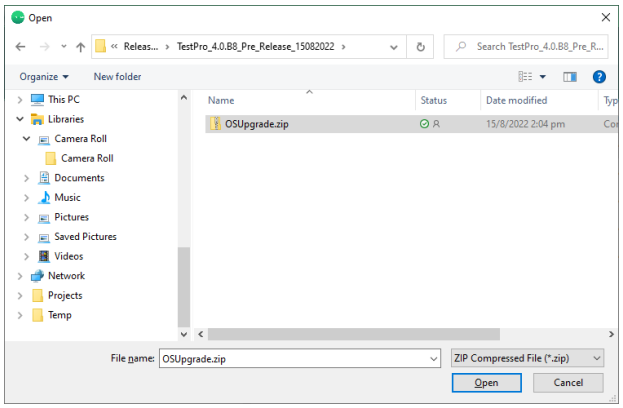
Note: Ensure that the NSA unit is attached to a power supply before starting the upgrade process.

b. Firmware Upgrade using TestDataPro

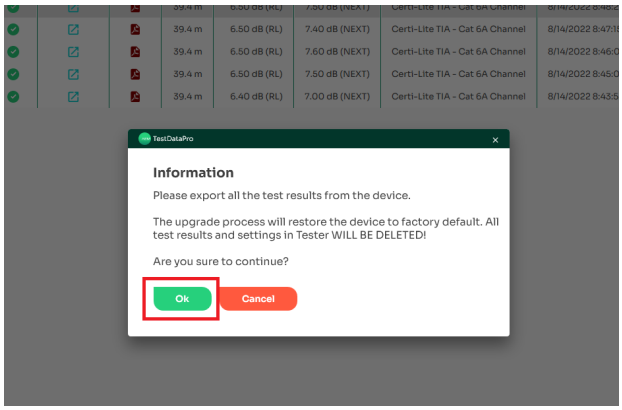
Before starting the firmware upgrade, make sure that the NSA unit is attached to a power supply. NSA will reboot multiple times to complete the upgrade.

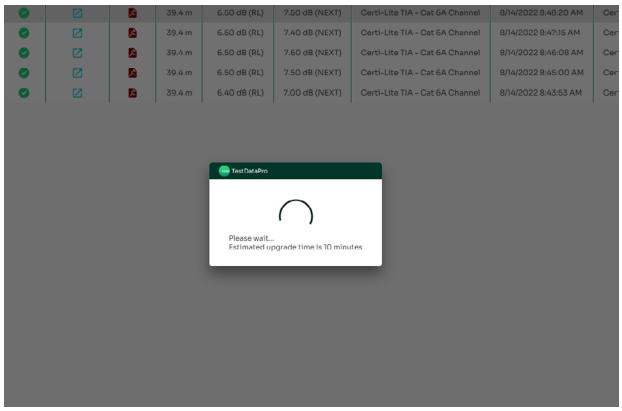






- Launch TestDataPro. On the main screen, select .. Tools .. Download TestPro/NSA Firmware.
- Save the OSUpgrade.zip to any location on the computer i.e., Downloads
- Once download is complete, select [Upgrade Firmware] and browse to the location of the zip file. Select OSUpgrade.zip and click [Open].





- 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.

Network Service Assistant 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/NSA

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

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