USER MANUAL


# UX400 Platform

## Common Features & Functions

Please direct all questions to your local VeEX Sales Office, Representative, or Distributor. Or, contact VeEX technical support at www.veexinc.com.

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# 1.0 About This User Manual

This user manual is suitable for novice, intermediate, and experienced users and is intended to help in successfully using the features and capabilities of the test platform. It is assumed that the user has basic computer experience and skills, and are familiar with IP and telecommunication concepts, terminology, and safety.

Every effort was made to ensure that the information contained in this manual is accurate. However, information is subject to change without notice. We accept no responsibility for any errors or omissions. In case of discrepancy, the web version takes precedence over any printed literature.



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For more technical resources, visit the VeEX Inc. website at www.veexinc.com.

For assistance or questions related to the use of this product, call or e-mail our Customer Care department for customer support. Before contacting our Customer Care department, have the product serial number and software version ready. Locate the serial number for a test platform on the back of the chassis. For more information on locating the product serial number and software version, see *About*. Please provide this information when contacting VeEX customer service.

**Customer Care:**

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# 2.0 Safety Information


Safety precautions should be observed during all phases of operation of this instrument. The instrument has been designed to ensure safe operation; however, please observe all safety markings and instructions. Do not operate the instrument in the presence of flammable gases or fumes or any other combustible environment. VeEX Inc. assumes no liability for the customer's failure to comply with safety precautions and requirements.

**Optical Connectors**

The test set platform displays a laser warning icon when the laser source is active to alert the user about a potentially dangerous situation. It is recommended to:

1. Deactivate the laser before connecting or disconnecting optical cables or patch cords.
2. Never look directly into an optical patch cord or an XFP's or SFP's connector interface while the laser is enabled. Even though XFP and SFP optical transceivers are typically fitted with Class 1 lasers, which are considered eye safe, optical radiation for an extended period can cause irreparable damage to the eyes.
3. Never use a fiber microscope to check the optical connectors when the laser source is active.

**Electrical Connectors**

Telephone lines may carry dangerous voltages. Always connect the electrical test ports to known test interfaces which carry lowlevel signals.

**Safe Module Handling**

While replacing test modules, all work on the open panel must be performed only by suitably qualified personnel who are familiar with the dangers both to people and to the instrument itself.

- Modules are not hot swappable. The platform must be turned off and unplugged from VAC mains when removing or inserting test modules.
- For safety and EMC (Electromagnetic Compatibility), empty module slots must be properly covered with blank panel covers.
- Prevent foreign objects from entering the UX400, before, during and after module exchange or re-configuration process. They could create short circuits or damage internal fans.
- Always store test modules by themselves in individual ESD protected packaging (with no loose elements, like screws or tools).

**Lithium-ion Battery Precautions**

Lithium-ion (Li-ion) battery packs are compact and offer high capacity and autonomy, which make them ideal for demanding applications, like providing long lasting power to portable test equipment. For safety reasons, due to their high energy concentration, these battery packs and products containing them must be used, charged, handled, and stored properly, according to the manufacturer's recommendations.

Li-ion battery packs contain individual Li-ion cells as well as battery monitoring and protection circuitry, sealed in their plastic container that must not be disassembled or serviced.

The test set unit's battery pack is also fitted with a safety connector to prevent accidental short circuits and reverse polarity.

- Always charge the unit's battery pack inside the test platform battery bay using the AC/DC adapter supplied by VeEX.

- Do not charge or use the battery pack if any mechanical damage is suspected (shock, impact, puncture, crack, etc).
- Do not continue charging the battery if it does not recharge within the expected charging time
- Storage: For long term storage, the battery pack should be stored at 20°C/68°F (room temperature), charged to about 30 to 50% of its capacity. Spare battery packs should be charged and used at least once a year to prevent over-discharge (rotate them regularly).
- It is recommended to charge and use battery packs at least every three months. Battery packs must not go without recharging (reconditioning) for more than six months.
- After extended storage, battery packs may reach a deep discharge state or enter into sleep mode. For safety reasons, Li-ion batteries in deep discharge state may limit the initial charging current (pre-recharge) before starting their regular fast charging cycle. The pre-charging state may take several hours.
- Air transportation of Li-ion batteries is regulated by United Nations' International Air Transportation Association (IATA) Dangerous Goods Regulations and by country-specific regulations. Please check local regulations and with common carriers before shipping Li-ion battery packs or products containing relatively large Li-ion battery packs.

**Electrical Connectors**

Telephone lines may carry dangerous voltages. Always connect the electrical test ports to known test interfaces which carry low level signals.

**ESD: Electrostatic Discharge Sensitive Equipment**

Test modules could be affected by electrostatic discharge. To minimize the risk of damage when replacing or handling test modules, make sure to follow proper ESD procedures and dissipate any electrostatic charge from your body and tools and use proper grounding gear.

- Perform all work at a workplace that is protected against electrostatic build-up and discharging.
- Never touch any exposed contacts, printed circuit boards or electronic components.
- Always store test modules in ESD protected packaging.
- Wear ESD protection and grounding gear when:
    - Inserting, extracting, or handling test modules.
    - Inserting or removing SFPs, XFPs, QSFPs, or CFPs from the platform.
    - Connecting or disconnecting cables from modules or platform.

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# 3.0 Introduction to VePAL® UX400

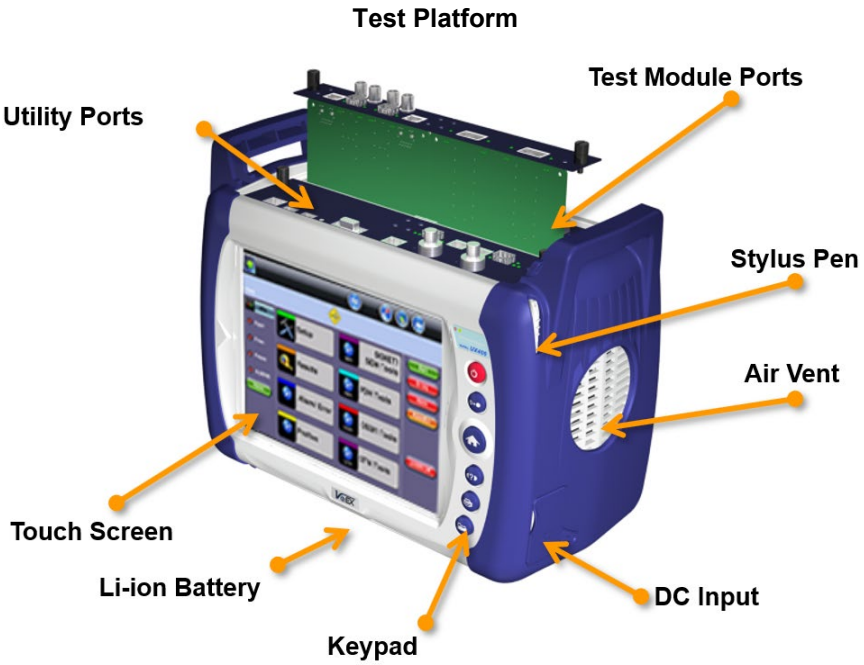
The UX400 is the smallest multi-service transport test solution to offer test capabilities ranging from DS1/E1 all the way up to 600G traffic generation, supporting the latest 100G/40G optical pluggable form factors (CFP4, CFP2, CFP, QSFP28, QSFP+). Its modular architecture allows for up to six independent test modules and up to twelve concurrent tests or combinations of tests, including legacy PDH/DSn, SDH/SONET, OTN, Ethernet, Fibre Channel, CPRI/OBSAI, C/DWDM spectrum analysis and more. The platform's software architecture has been developed so that multiple users are able to access and operate different test modules at the same time, maximizing the use of resources. A battery backup option is available for the portable UX400 platform. Test modules can also operate in a standard 19" rack - the UX400R, when portability or battery operation is not needed.

**Key Features of UX400:**

- Intuitive Multi-user graphical user interface (GUI) with touch screen control
- Multi-test - up to 12 independent cancurrent tests, allowing virtually any combination of technologies and rates
- Robust, portable chassis packed with powerful and flexible features for demanding environments and test conditions
- SCPI scripting/remote control and VNC® support
- Browser-based multi-user client for remote access
- Fast and efficient test result transfer to USB memory stick or FTP upload
- Built-in GPS receiver for system clock synchronization
- Built-in Atomic clock which can be disciplined and calibrated by the GPS signal
- Solid state storage with up to 32G capacity
- High-capacity Li-ion battery pack for uninterrupted testing and added portability
- Rack mount version available
- Built-in VGA monitor port for external monitor or projector connection (requires reboot)
- Operate with USB mouse and keyboard
- Maintain instrument software, manage test configurations, process measurement results and generate customized test reports using included ReVeal™ software

The UX400 and UX400R are part of the UX product family.

## 3.1 Platform Overview

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## 3.2 Front Panel Buttons

### 3.2.1 LEDs

**Power LED:** A single LED indicates the power state of the unit.

- The LED is off when the unit is powered off.
- The LED is green when the unit is powered on.
- The LED is orange when the unit is connected to the AC Mains and powered off (charging).

**Soft LEDs:** Each tests module offers detailed soft LEDs and indicators in its test application. For more information, see the module's manual.

### 3.2.2 Key Pad

**Quick Keys**

- **Power**: Press for 3-5 seconds to turn the unit on. To turn off the unit, press again for at least 2 seconds. If the unit does not respond, press for more than 10 seconds to force the unit to switch off.

  *No results or configurations are saved during an emergency shutdown.*

- **Backlight**: Press to turn the backlight off and on. If the backlight is on a timer, the timer restarts.
- **Summary**: Press to display a summary of all tests. Press again to close the summary screen and return to the previous screen. Pressing this key does not interrupt operations or tests in progress. (This function is application dependent and may not be available.)
- **Help**: Press to display online help. Press again to close the help screen and return to the previous screen. Pressing this key does not interrupt operations or tests in progress.
- **File**: Press to save test results to the unit's memory. The unit names and time stamps the test result files automatically. If a measurement is in progress, the unit saves a current snapshot of the results. Press again to cancel the save operation in progress.
- **Lock**: Press to lock the front panel buttons or capture a screenshot, depending on the configuration.

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### 3.2.3 Touch Screen

The LCD supports touch screen operation. To operate the touch screen to navigate the menus and tabs, use the stylus located on the right side of the unit. Please observe the following precautions:

- Never use excessive pressure on the touch screen as this may damage its functionality.
- Never use sharp objects such as a pen, screwdriver, etc., as this may damage the surface.
- Clean the surface of the touch screen using a soft cloth and mild detergent only. Do not use alcohol.

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## 3.3 Battery

The test set platform is equipped with a smart Li-ion rechargeable battery pack, which is located on the rear of the unit. The battery will be partially charged upon delivery, so it is recommended to fully charge the battery before use. Please charge the battery at room temperature to preserve its life and to obtain maximum charge. The battery is charged during operation, provided the unit is connected to the AC Mains using the supplied AC adapter. Removing the battery while the unit is powered on is not recommended - this may result in damage. Remove the rubber cover on the right side to connect the AC Main adapter to the unit.

*Make sure that the key is aligned while plugging in the AC adapter to the unit. If it is not aligned, the plug will not connect to the unit and using force will damage the connector.*

**Battery Charging time**
The total charging time depends on the remaining battery capacity percentage and the actual current load in the UX400. An idle

UX400 (no test modules selected or tests running) would recharge faster than an active one.

**Attention!**

- For safety reasons, the battery charging time is always limited to a maximum of three hours
- If the UX400 is being used while charging and a full charge (100% capacity) cannot be achieved within three hours, the charging will automatically stop.
- To resume charging, unplug the AC/DC adapter and let the UX400 work on battery power for a minute or two and plug the AC/DC back in. This will reset the charging circuitry.

**Warning!**

- DO NOT disconnect the AC/DC power supply when the UX400 is running under heavy load conditions (greater than the battery's current ratings), such as certain multi-module multi-test applications.
- If the current required is too high, but still within the battery's limits, a warning message would be displayed when the AC/DC adapter is unplugged, while all the tests are properly closed and UX400 shuts down.
- Under overload conditions, the battery may not be able to supply enough current to keep the test scenario running and its safety mechanisms may shut the battery down without warning and test results may be lost.

**Battery Safety precautions**
For more information on safety precautions for batteries, see *Lithium-ion Battery Precautions*.

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### 3.3.1 Using the Built-in Battery Backup System

The internal battery pack option provides uninterrupted operation during short power outages and time-saving convenience when moving the test set from one point to another, without having to cycle power.

Use caution when planning to rely on battery operation or backup power availability. Due to its flexibility and scalability, the capacity of the platform may exceed its battery rating. Independent of how many modules or module combinations are loaded, if the total power required by the active test modules exceeds 95W, the battery operation will be disabled for safety reasons and to protect the battery pack.

**Before entering extended battery operation**

1. Make sure the battery is fully charged.
2. Release any unused test modules to assure that the total power consumption is less than 95W. If moving the test platform to a different location (e.g. between workstations, benches, racks, equipment rooms), release the test modules as their test cables are disconnected to assure a hitless transition. After moving the unit, reactivate the modules quickly by assigning them to a test application and recalling its previous configuration (profile) as the test cables are reconnected. Rebooting the unit is not necessary.
3. Use the power gauge information (battery icon) for an estimate on the autonomy time, which is based on the actual power consumption.

Inactive modules, those not assigned to a test application, do not consume power. When working in battery-only mode, the unit displays a notification when the maximum battery capacity has been reached or when the capacity is not enough to support the new module being activated. Activate a test module by assigning one of its test ports to a test application; otherwise, it remains inactive with little or no power consumption.

The test platform itself consumes 20 Watts of power. This leaves 95 Watts of battery power available for active test modules. Use the information in the modules' data sheets to calculate the maximum power consumption for any desired test scenario.

**Battery Power Capacity**

Total Battery Power: 115 Watts

- UX400 Platform test platform: 20 Watts
- Up to 95 Watts are available to any combination of active test modules.

*The sum of active test modules cannot exceed the 95W power budget available.*

**AC/DC Power Supply**

When using the AC/DC power supply adapter, the total power capacity provided is 245 Watts. This leaves 220 Watts of maximum power available to support any combination of active test modules.

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### 3.3.2 Battery Overdraw Protection

When battery capacity declines to 10%, an audible alarm and pop-up warning displays a notification to plug in the A/C adapter or shut down the unit. If this warning is ignored and the battery capacity is allowed to decline to under 5%, the unit will initiate a shutdown to protect the battery from damage and for safety.

If an event, such as the AC/DC adapter being unplugged, a power interruption occurs or some other event triggers the power load to exceed the 95W battery limit, the unit will initiate an emergency shutdown to protect the battery from damage and for safety.

*During an emergency shutdown all modules power is switched off. No test files (results or configurations) are saved.*

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## 3.4 Hardware Configurations

The following are examples of some test modules available for the UX400 platform. Please refer to their individual datasheets and manuals for furtherdetails. For an up-to-date list of modules available, please visit www.veexinc.com/UX400

**40G/100G Test Modules**

- Up to 600G traffic generation using 6x 100G CFP4, CFP2 and/or QSFP28 modules
- Up to two CFP 100G or 40G modules
- Up to six QSFP+ for 40GE and OTU3
- Supports STL256.4 and STM-256/OC-768
- Full 100G/40G bidirectional testing
- SCPI-based remote control and scripting commands
- Web-based multi-user multi-test remote access and remote control


**40G Test Module**

- Single-slot test module
- UX400 platform supports two UX400-40G modules operating simultaneously
- Built-in 40G optical port
- SCPI-based remote control and scripting commands
- OTN testing for OTU3 client interfaces
- SDH/SONET testing for STM-256/OC-768 client interfaces
- Single BERT
- Optical power and frequency measurement
- Service Disruption and APS measurements
- Round trip delay measurements

- Path trace and pointer generation and analysis
- Overhead monitoring and byte decoding
- Tandem Connection Monitoring
- SDH/SONET mapping down to VC12/VT2 and VC11/VT1.5
- Transmit frequency offset
- SDH/SONET Payload through and monitoring modes


**10G Test Module**

- Single-slot test module
- Dual XFP optical ports
- Up to two independent tests per module
- SCPI-based remote control and scripting commands


**2.5G Test Module**

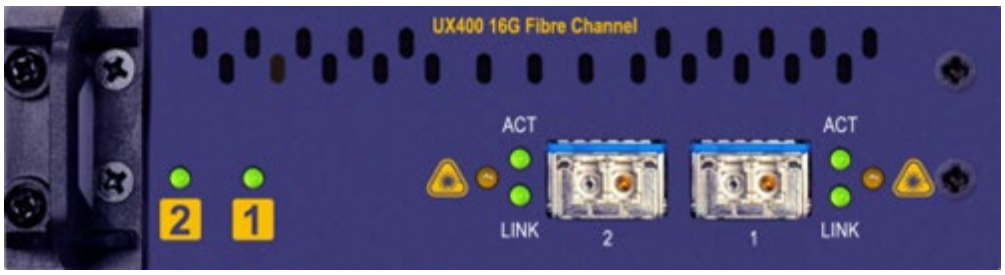
- Dual SFP optical ports supporting OTU1, STM-0/1/4/16, OC-1/3/12/48 bit rates
- Dual unbalanced ports (BNC) for E1, E3, E4, DS1, DS3, STS-1, STM-0e and STM-1e
- Dual balanced ports (RJ48 or Bantam) for E1 and DS1
- Single or dual BERT capabilities
- Each port can be independently configured and operated
- Coupled or independent Tx and Rx
- Flexible wavelength and bit rate options using industry standard SFPs
- Optical power, level and frequency measurements
- Payload mapping according to ITU-T G.707 rec.
- Concatenated payloads
- Full rate E1, DS1, fractional N/M x 64 kbps or 56 kbps testing
- PDH analysis with Sa bit generation
- Non-intrusive pulse mask analysis at E1, E3, DS1, DS3 bit rates
- Bit error and performance analysis per ITU standards
- Error and alarm generation and analysis
- Section and path overhead monitoring, byte decoding
- Path trace generatoin and analysis
- Tandem Connection Monitoring
- Pointer generation and analysis
- Service disruption testing and APS
- Histogram and event analysis for errors and alarms
- Round trip delay on all interfaces and payload mappings
- Jitter/Wander Analysis (E1, E3, DS1, DS3 and STM-1o, OC-3)


**1GE Module**

- Dual 10/100/1000Base-T RJ45 ports, Dual 100Base-FX/1000Base-X SFP ports
- Throughput, latency, jitter, frame loss, and back-to-back measurements per industry-standard RFC2544
- V-SAM test suite compliant with ITU-T Y.1564 standard
- IPv4 and IPv6 traffic generation
- Q-in-Q (VLAN stacking) and multiple MPLS tag support
- MAC flooding and VLAN flooding
- BER testing at Layer 2, Layer 3 and Layer 4, with or without VLAN and MPLS tags
- Multiple stream traffic generation and analysis for end-to-end QoS verification of multiple services
- Intelligent device discovery mode; discover other VeEX Ethernet testers or loopback devices on the network for quick and easy loopback control configuration
- Peer-to-peer symmetrical or asymmetrical test to a remote VePal test set with measurements at each end
- Smart Loop mode for Layer 1, Layer 2, Layer 3, and Layer 4 with all key measurements on received traffic provided on the loopback port
- VLAN Scan
- Line rate packet capture with Wireshark™ decode

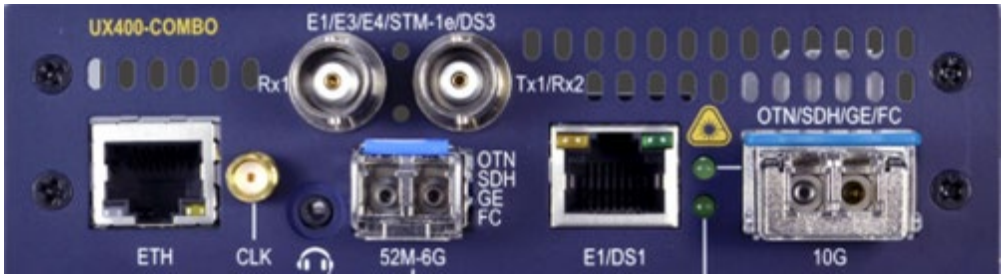

**16G Fibre Channel Module**

- Single-slot test module
- Dual SFP+ optical ports
- Up to two coupled or independent tests per module
- SCPI-based remote control and scripting commands




**UX400-Combo**

- All-in-One test module reduces CAPEX
- Optimized for engineers or technicians installing and maintaining OTN, SDH/SONET, and Carrier Ethernet networks transporting legacy and next generation Mobile Backhaul networks
- Flexible Software platform allows for multiple test applications running simultaneously
- User defined test profiles and thresholds




**OSA Module**

- Precise measurement of WDM wavelengths
- Wide wavelength range
- High wavelength accuracy and resolution
- Built-in wavelength reference
- High power sensitivity
- Excellent power accuracy
- Compact, light-weight, 1 slot module
- Rugged, reliable design - No moving parts
- Superior shock resistance
- Periodic calibration not required
- Ultra-low power consumption
- Low temperature sensitivity
- Intuitive operation with dedicated test functions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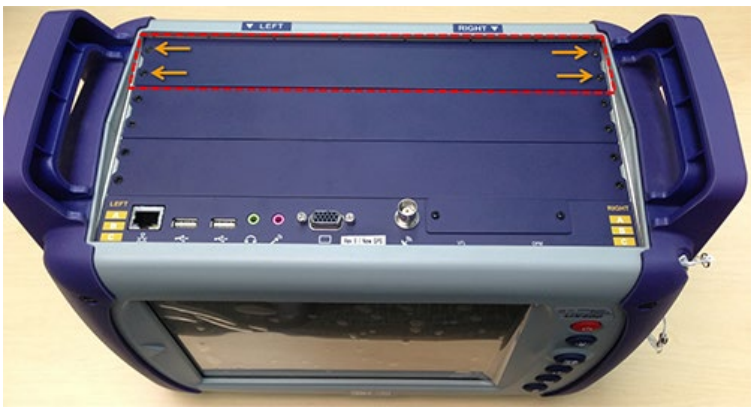
### 3.4.1 Inserting-Removing Test Modules

Turn the UX400 Platform **OFF**. Disconnect the DC power cord and **ALL** other cables and attachments (Fiber patch cords, Ethernet cables, BNC cables, Loopbacks, USB memory sticks, Wi-Fi or Bluetooth® transceivers, Fiber inspection scope, etc.) before inserting or removing test modules into and from the test platform chassis.

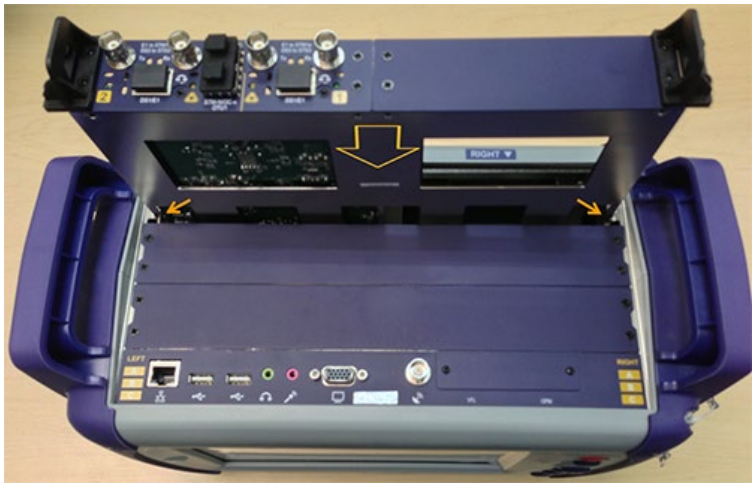
*Always keep the new module box and ESD packaging material in case this or any other module needs to be returned or stored properly.*

**To insert a module into the chassis**
*Each of the three bays holds two test modules, so up to six can be installed in the unit.*



**Step 1:** Loosen and remove the screws on the right and left sides of the module bay cover panel. **Keep the screws or any other foreign objects from falling into the module bay while it is exposed.**

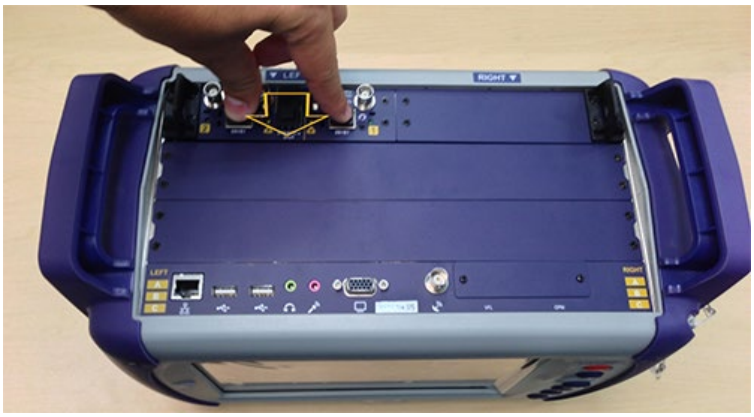
**Step 2:** Remove the module bay cover panel. Store the blank panel and screws in the new module box for future use.

**Step 3:** Identify the module rails inside the module bay and align the module blade with the rails.

**Step 4:** Align the module blade with the rails in the module bay slot and carefully insert the new module as shown. **DO NOT let the module fall into place!**

***Caution:*** *When installing* ***40G/100G CFP modules****, use the B and C bay slots first to keep the modules better cooled. Up to six UX400-100G CFP2, CFP4 or QSFP28 modules can be installed in any of the available slots.*



**Step 5:** Gently push the module down to guarantee full contact with the backplane connector.

**Step 6:** Hand tighten the four captive screws to avoid overtightening them.

*Electric screw drivers are not recommended. If an electric screw driver is used, only use one with a torque limiter and set it to the lowest torque setting to avoid damaging or breaking the screws.*

**Step 7:** After verifying that everything fits correctly, restore all connections and power on the unit. If the firmware has not already

been updated for the newly installed module, the unit may perform one automatically and powers off after completing the update. If the new module has never been used before, the new module's software must be installed first. (Download the software from www.veexinc.com and follow the software upgrade procedure as described in *System Firmware/Software Updates*.)

**Step 8:** Power on the UX400. The newly installed test module is displayed in the panel view and ready to use.

**To remove a test module from the chassis**

1. By hand, loosen (do not remove) the the four captive screws.

   *Electric screw drivers are not recommended. If an electric screw driver is used, only use one with a torque limiter and set it to the lowest torque setting to avoid damaging or breaking the screws.*

2. Use the plastic handles to carefully extract the module.
3. Insert another module into the chassis.
   or
   Replace the module cover, and then hand tighten the four screws. **Keep the screws or any other foreign objects from falling into the bay while it is exposed.**

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### 3.4.2 Utility Ports

The Ethernet and USB ports are located on the top of the unit.

**RJ45, 10/100/1000Base-T Ethernet Port**

Ethernet applications include:

- Monitors network
- Tests IP connections
- Transfer files to and from a computer using ReVeal software, including:
  - Test profiles and measurements results
  - Software updates
  - Software to control the unit remotely

**USB Port**

The USB 2.0 port supports:

- Tests WiFi connections
- Memory stick dongles for file storage
- Connections to:
  - Fiber inspection scopes
  - Optical power (loss) meters
  - WiFi spectrum analyzers
  - Cellular Data cards (3G/4G)

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# 4.0 Getting Started

## 4.1 Platform Home Screen

When powered on, the UX400 unit shows an image of all test modules installed on the unit. Up to six tests can be assigned at any given time to be run on the unit.

### 4.1.1 Platform Buttons

The following buttons at the top of the touch screen are available to assist in navigating the platform software and hardware options installed.

**Utilities:** Tap to enter the System Settings and Tools screen.

**Test Ports Management:** Tap to display, select, or release test modules and/or test ports installed.

**Home:** Tap to display the home screen of a Test Application assigned to one of the tabs on the bottom of the screen.

**Exit:** Tap to close the current screen.

Displays when the unit is powered by external AC power and battery charging level.

Displays when the unit is powered by internal Li-ion battery. Tap to display the battery charge and autonomy status. The icon itself shows the charge level.

**Storage Status:** Indicates the size and current capacity of the internal SSD storage.

**Storage Status:** USB memory stick detected. Indicates the size and current capacity of the internal SSD storage and the memory stick inserted in the unit. Use this to safely unmount (release) the USB drive.

Displays that the WiFi dongle has been detected and it is connected.

Displays that the WiFi dongle has been detected, but is disconnected.

Displays GPS receiver is installed and active.

Displays GPS receiver is not installed.

Displays that the cellular data card is physically connected to the unit.

Displays that the cellular data card is attempting to connect to a network.

Displays that the cellular data card has established an IP connection.

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## 4.2 Test Modules

Depending on the type of test module (single or dual port), assign one or two test tabs to a test module. Dual port test modules usually allow two fully independent tests (e.g. one 10GE test in port 1 and another SONET/SDH test on port 2) or dual port applications.

### 4.2.1 Assign and release test modules

*Tap the **Test Port Management i**con to assign a module or test port to a test application button, or to release a module or test port. This procedure may be started at any time from any screen or menu.*

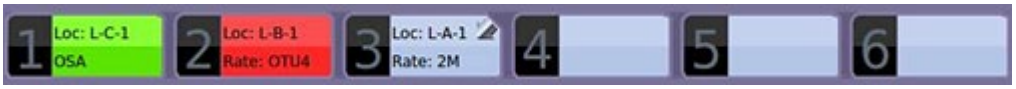
UX400 can run up to six tests simultaneously using the user interface on the screen (up to 12 tests using SCPI scripting). When assigning a test module, that module appears in one of the six Test Application tabs at the bottom of the unit's screen. Some tests may require two ports.

**To assign a test module and launch a test application for measurement**

1. At the bottom of the Platform Home screen, tap any available Test Application tab. An arrow appears in the tab to indicate it has been selected. Test Application tabs and modules can be selected and released in any order.


2. The Module/Port selection panel is displayed on the screen. Select the desired port from any applicable module. Modules marked with a red arrow indicate that they have already been assigned to a test application (number shown in red).
3. The Test Mode selection menu shows up to allow the selection of the technology or rate to be tested. Refer to the module's manual for details.
4. After a test mode has been assigned to the Test Application tab, it will show the basic details, such as module location, port and data rate (or interface). The module location uses the X-Y-Z notation to indicate: X (Left/Right), Y (A, B or C slot), Z (port number). For example, L-A-1.
5. The tab will also change color to display the test status. This is helpful when that particular test is running in the background (user is currently working on another test) as it calls the user's attention to quickly switch applications and check.

    - Red: Indicates that at least one alarm/error is present during the test.
    - Yellow: Indicates History - Use the **History** button on the left side of the screen to acknowledge the status and reset the history indication.
    - Green: Indicates no error or alarm condition.




**To return to the module selection screen**

Tap an **unassigned** tab to start a new test application.

or

Tap the **Test Module Status** icon  .

**To release a test module**

1. Tap the **desired** test application tab to release. Then, tap the **Test Ports Management** icon  .

2. Tap the **Release** button .

**To switch between test application screens**

- Tap the **desired** test tab at the bottom of the screen and the GUI will update immediately.

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### 4.2.2 Test Module home screen

Each test module may have multiple home screens, depending on the test application and test mode selected. For example, see the 40G Test Module home screen below.

**40G Test Module home screen**


### 4.2.3 Test Module Icons

The following icons, in addition to the platform and hardware option buttons, appear at the top of the the test module software.

 Displays that the optical transmitter is switched on.

 Displays that the optical transmitter is switched off.

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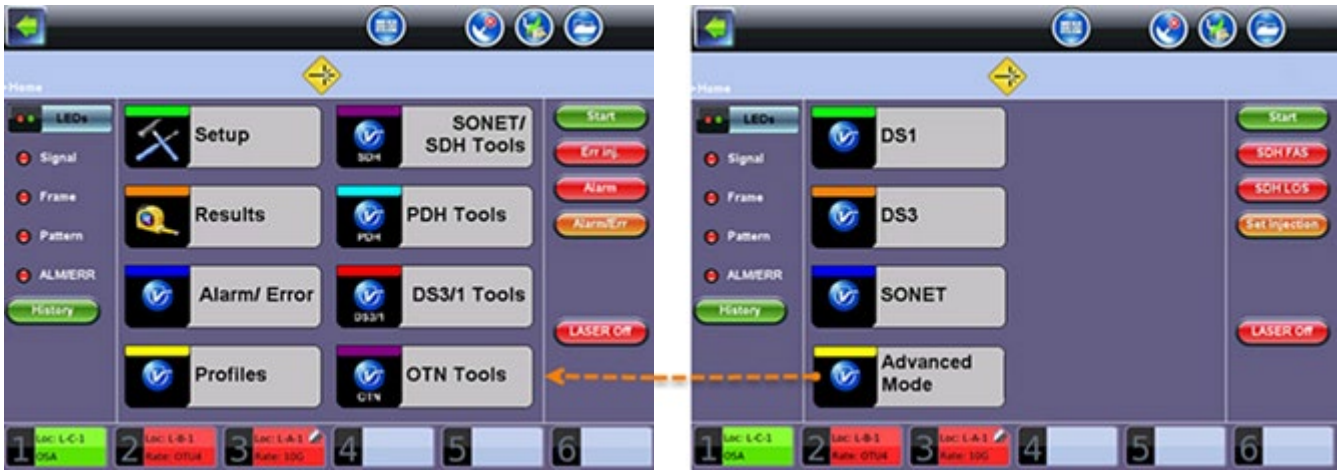
## 4.3 Initial Settings

### 4.3.1 Change language and user interface style

Before using the platform, set the language and user interface style as needed. By default, the user interface style is set to USA if the unit is shipped to North America and to International if the unit is shipped to outside North America.

**International user interface style** **USA Interface style**




**To change the GUI language and user interface style**

1. Tap **Utilities**, and then tap **Settings**.
2. Tap the **Global** option.
3. Select the language from the **Language** drop-down list box.
4. Select the user interface style from the **User Interface** drop-down list box.
    - **International:** Provides layer-based SDH/PDH configuration menus with access to detailed settings
    - **USA:** Provides simplified application-based SONET/DSn menu with more automation. The **Advanced Mode** option displays the configuration menu for additional settings.

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### 4.3.2 Change the time zone and current time

**To manually change the Date & Time**

1. Tap **Utilities**, and then tap **Settings**.
2. Tap the **Date & Time** option.
3. Select the date and current time from the drop-down list boxes.
4. Tap **Apply**.

**To synchronize the time with an NTP server**

1. On the **Date & Time** settings screen, tap the **Synchronize with NTP Server** checkbox to enable it.
2. Select the server from the drop-down list box or tap **Add** to add the desired server name. Then, tap **Apply**. The test set will synchronize the time with the NTP server automatically. (Internet connection is required.)

**To synchronize the time to the GPS**

The GPS receiver hardware option must be installed. For more information on the atomic clock and relative phase monitoring, see High Precision Clock Sources.

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### 4.3.3 Change other settings

For more information on changing other global settings, such as units of measurement, profile and results save preferences, password, etc., see Utilities.

### 4.3.4 Launching Test Applications


**A. Background Test Application**

- Tap this button to bring its GUI forward
- Or press the App rubber button to toggle

**B. Active Test Application GUI**

- Shows the Test Port Group being used and the Test App ID (Rate / Technology)

- Tap on this button to release the Test App or change its Test Mode

**C. Test Application Menu**

- Lists all test Functions, Applications and Tools available for the selected test mode
- Setup = Port and Test Signal configuration

**D. LEDs** - Test Signal Status

**E. History** - Clears past events reminder (blinking)

**F.** Current test interface line rates

**G.** Action buttons section

- This vertical section displays direct access functions applicable to each specific Test Mode, such as Start/Stop test, Laser control, Error and Alarm injection, Start protocol capture, etc.

- Most of these buttons offer immediate action. A few open a configuration menu.

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# 5.0 Utilities

Use the System Utilities button  , on the top left corner of the screen, to access the **Utilities** submenu. Use the platform sidebar to access settings for the test platform.

## 5.1 Settings

**Utilities Settings**


### 5.1.1 About

The **About** option displays:

- The version of software on the unit.
- Contact information for customer service.
- The serial number for the unit.
- The MAC address for the management port.
- Global add-on options installed and activated on the unit.
- Details for each of the test modules installed and activated on the unit.

Click the right and left arrows, at the bottom, to navigate and view the information.

**Utility Settings - About**


**Utility Settings - About - Software Option**


**Utility Settings - About - Software Option**


**To return to the Settings options**

- Click the red exit button  .

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### 5.1.2 Backlight

This section provides backlight control of the unit.

**Power:** There are two settings -- one for Battery power and another for AC power.

- The user has the option to select a timer to turn off the backlight if the unit is not in use. This function helps improve the battery autonomy and preserve LCD life.
- To enable the timer, check "Turn off backlight if device is not used for" and with the drop-down menu, adjust the duration of the idle time before the backlight is turned off.
- Once the timer is active and the backlight turned off, any action on the test set (touch screen, keypad) will turn on the backlight again.

**Backlight - Battery Power**


**Backlight - AC Power**


**Brightness**: The user can select the brightness level for Battery and AC operation modes.

**Backlight - Brightness**


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### 5.1.3 Remote Access

Use the **Remote Access** menu to enable or disable the different ways the test set can be accessed remotely and assign customized passwords.

The test platform offers different ways to be accessed remotely, including providing access to the information stored in it (e.g. images, test results), or to control it (entirely) or one of its test applications.

- VNC® Client (remote platform control via screen, keyboard and mouse mirroring)
- Web Browser (access to files, test profiles, screen shots, user administration, etc.)
    - Platform Remote control via web browser
    - Independent multi-user test sessions via web browser
- Using command line interface (CLI) scripts via SSH or telnet connection

**Remote Access Settings**


- **Profile:** Select or create (save) a profile for the remote access configuration.
- **CLI Service:** Enable or disable command line interface.
- **CLI Admin Password:** Master password to be used to log on to the test platform. It applies to CLI/SCPI and as web remote access administrator credentials. (The default password is "admin".)
- **VNC Service:** Enable or disable the VNC server to be used by client remote access running on PCs, Macs, tablets or smart phones.
- **VNC Super User Password:** Enter a password to allow viewing and control of the test platform via VNC.
- **VNC Regular User Password:** Enter a password to allow viewing only of the test platform via VNC.
- **SSH Service:** Enable or disable the SSH service. This may affect CLI and scripting.
- **SSH Password:** Enter a password for SSH service.
- **Web Remote ID (Alias/Location):** Enter a name to uniquely identify the test platform. Use this to differentiate between multiple units when shared via remote control or remote test sessions. The use of location labels is a common way to identify them (e.g. "Fremont-Lab").
- **Network Host Name:** Enter the DHCP host name of the test platform, to be identified when connected to the network. To access the test platform, using a web browser, users may enter its IP address or the host name in the browser's address bar. The main advantage of using a host name is that it does not change over time, as new IP addressed are dynamically assigned to the test platform.

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#### 5.1.3.1 Use VNC to remotely access test platforms

VNC clients, such as RealVNC®, are readily available for download for different platforms and form factors, including Windows®. Mac OS®, Linux, iOS, Android.

*Although the test platform VNC services allows multiple users to be connected simultaneously, it is a screen mirroring service, so all users would be seeing and interacting with the same GUI. It is not recommended to be used for multi-user or multi-test environments, only for single-user or training purposes.*

**To access the test platform via VNC**

1. Run VNC.
2. In the **Connection Details** dialog box, enter the IP address for the desired test platform on the network, followed by the port number:

   `:6900`

3. Click **OK** to connect with the test platform.
4. In the **Authentication** dialog box, enter the VNC password designated in the Remote Access settings of the UX400.
5. Use the test set in the same way as it is used with its built-in touch screen.

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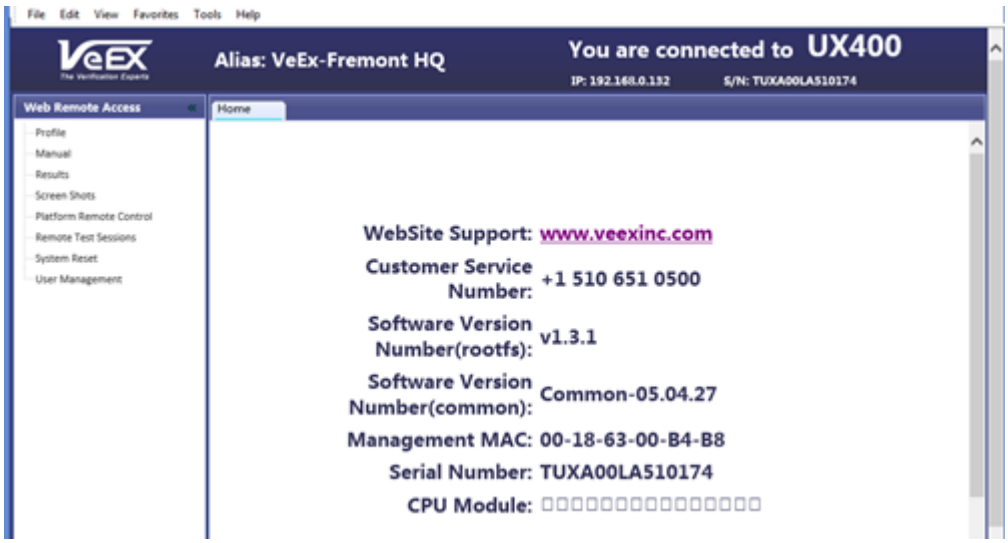
### 5.1.3.2 Use web browser to remotely access test platform

No client installation other than a standard web browser (Javascript capable) is required to access and control the test platform via the web browser. The web remote control option mirrors the test platform screen, mouse inputs, and keypad buttons. In addition to controlling the test platform by mirroring it, test set data can be accessed via the Web Remote Access landing page. The UX400 multi-user functionality allows each remote user to view different screens simultaneously via the Remote Test Sessions option.

**To access the test platform via web browser**

- In the browser **Address** bar, enter the IP address or Host name for the test platform, and then press **Enter**.
- Enter the **Super/Regular password** when prompted.

**Web Browser - Remote Access Landing page**




The following features are supported:

- **Profile:** View, download, delete, filter, and convert saved Test Profiles to PDF.
- **Manual:** Access soft copies of the UX400 platform and modules manuals for quick reference.
- **Results:** View, download, delete, filter, and convert saved Test Results to PDF.
- **Screen Shots:** View, download (PNG format), copy, delete and convert to PDF any screens captured using the UX400 Lock button.
- **Platform Remote Control (Screen Mirroring):** It is similar to using VNC to get a copy of what is currently being displayed on the unit's LCD screen, but in this case no VNC client installation is required. It uses a standard web browser as a client. It mirrors the screen, mouse/touch, keyboard, and the rubber buttons available on the front panel of the UX400 platform.
- **Remote Test Sessions:** (Independent multi-user, multi-test environment.) This function allows multiple users to run multiple tests concurrently and independently. Different from VNC or Web Remote Control, this option allows each user to control their own test applications (one or multiple), each with its own GUI and without interfering with other users.
- **System Reset:** Remotely reboots the test platform. (Requires administrator privileges.)
- **User Management:** Create and delete User and Guest accounts to be used in the multi-user environment.

### Platform Remote Control (Screen Mirroring)

Access the test platform and remotely control it by selecting **Platform Remote Control** on the **Web Remote Access** left sidebar menu, and then entering the user password at the prompt.

Use the buttons and icons on the right to navigate the test set remotely. F-key shortcuts shown on the menu (while in remote control) replace the physical buttons on the test platform.

**Web Browser - Platform Remote Control**


### Remote Test Sessions

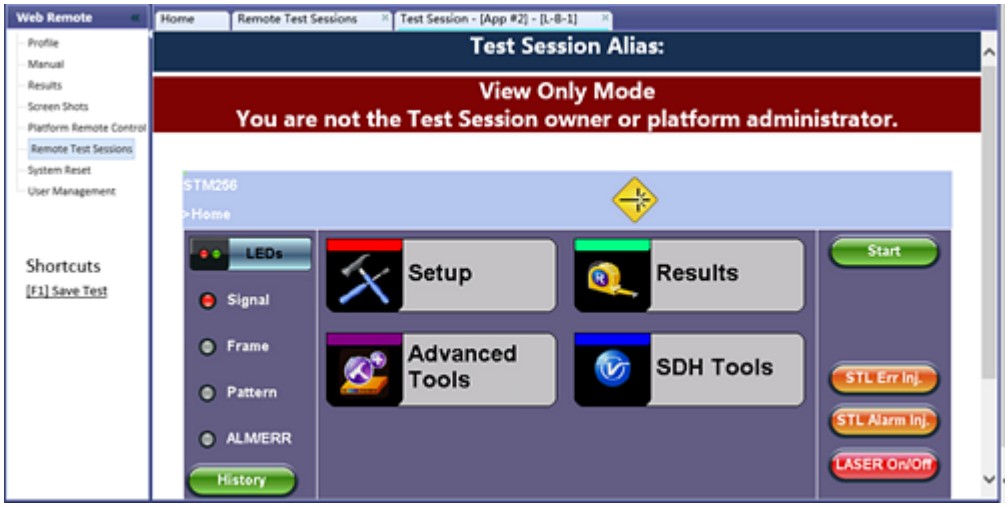
Unlike the Platform Remote Control (Screen Mirroring), where remote users see a copy of what is on the test platform screen, Remote Test Sessions allow each remote user to see a different screen and to perform tests. This is a true multi-user, multi-test environment and requires an additional login to access.

Enter a Remote Test Session by selecting **Remote Test Sessions** on the **Web Remote Access** left sidebar menu, and then entering the user account and password at the prompt.

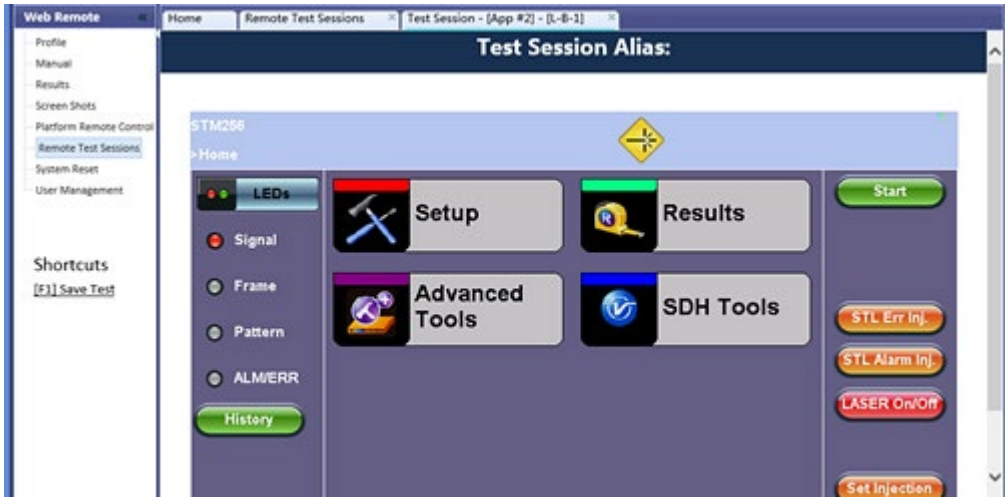
**Web Browser - Remote Test Sessions**


The level of user access (view only or view/operate) is configured in the User Management option.

**Web Browser - Remote Test Sessions (View Only)**




**Web Browser - Remote Test Sessions (Full Access)**




To log out of the Remote Test Sessions option, click **Logout** at the top, above the tabs.

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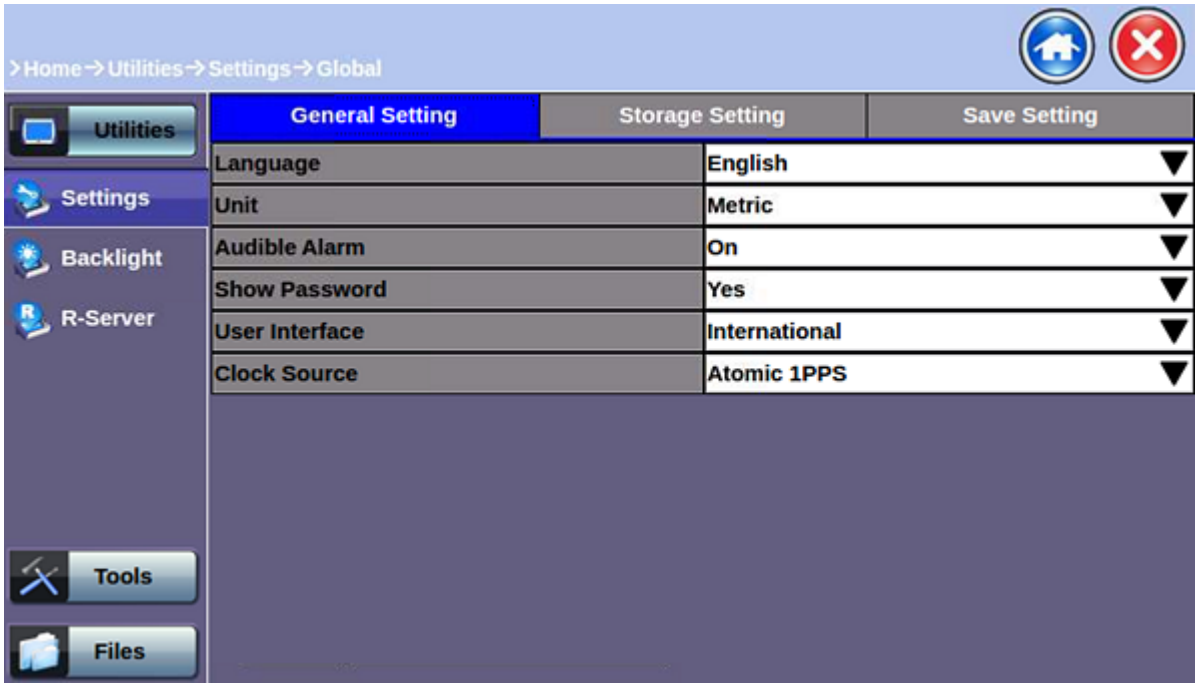
### 5.1.4 Global

Use the **Global** option to configure common functions of the test platform.

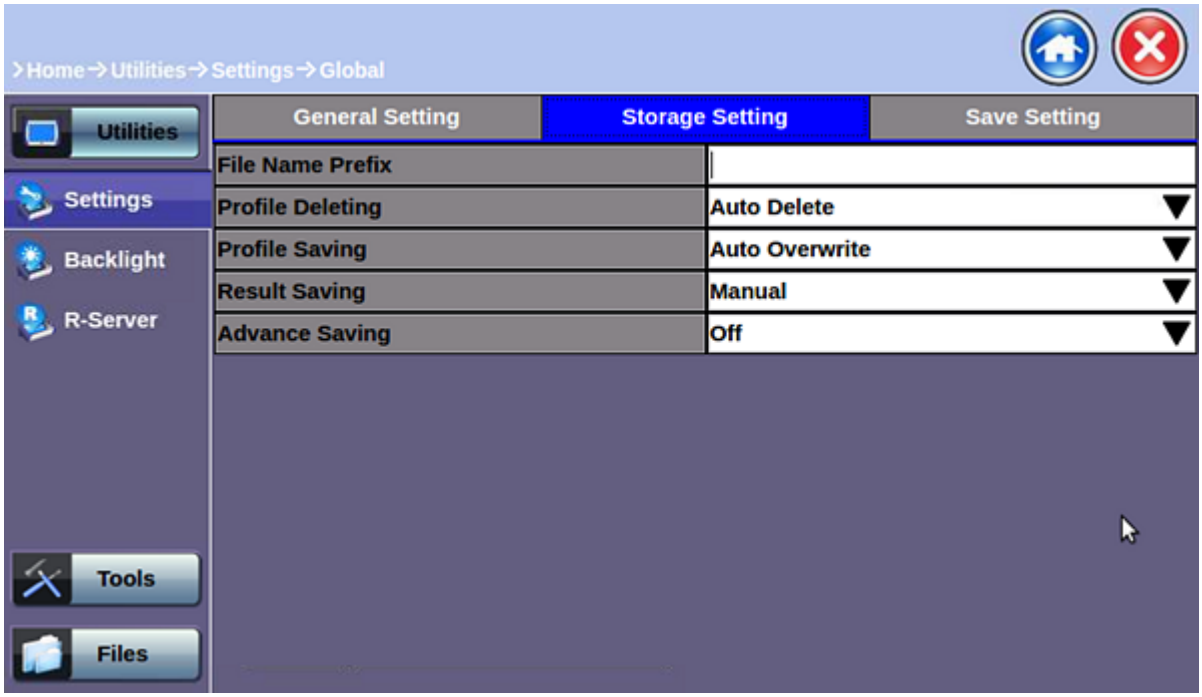
**Global General Settings**




- **Language:** Select the language to display on the unit. Not all languages may be available for certain test modules.
- **Unit:** Select the unit of measurement to display on the unit. (Test module dependent)
- **Audible Alarm:** Select On or Off to turn on or off the alarm sound. (Test module dependent)
- **Show Password:** Select to choose whether to show passwords upon entry.
- **User Interface:** Select to change the GUI menu style (USA for North America and International for the rest of the world. Test module dependent)
- **Clock Source:** Select the System master reference clock source for all test applications.

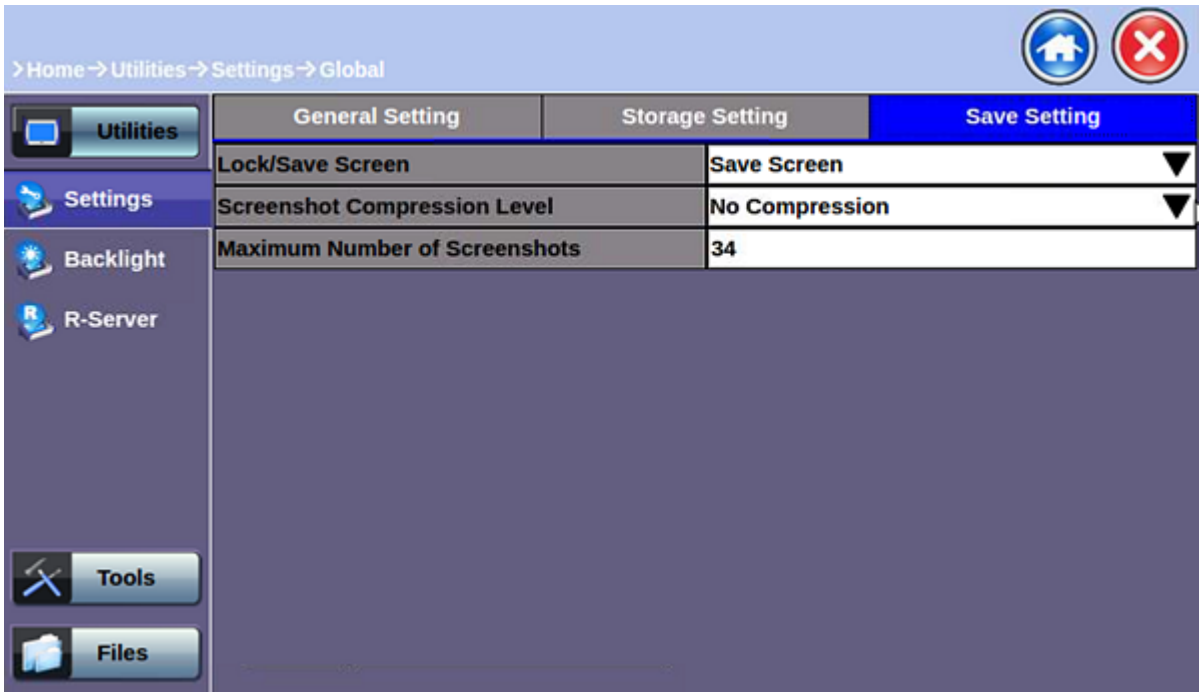
The **Global Storage Setting** screen has selections for how the system should work while performing operations that deal with the storage of files and data.

**Global Storage Settings**




- **File Name Prefix:** Enter a prefix to be added to all filenames when saved. This can be used to identify a site, user, case, shelf, card, etc. when multiple tests are being run and stored, so they are easy to identify, sort or group.
- **Profile Deleting:** Select option to delete profiles manually or automatically.
- **Profile Saving:** Select option to overwrite profiles when saving manually or automatically.
- **Result Saving:** Select option to save results manually or automatically. The automatic option saves the results immediately after a test is stopped.
- **Advance Saving:** Must be turned on to collect extra data when saving results. This should only be used with the Advanced Management option and the R-Server connection.

**Global Save Settings**



- **Lock/Save Screen:** Select Lock Screen to configure the Lock button on the keypad to lock the touch screen when pressed. Select Save Screen to configure the Lock button on the keypad to take a screenshot when pressed.
- **Screenshot Compression Level:** When Save Screen is selected, choose the compression of screenshot files to keep the size small or higher quality.
- **Maximum Number of Screenshots:** When Save Screen selected, enter the total number to limit the amount of screenshots that may be taken.

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#### 5.1.5 Power

The **Power** option displays:

- The current power source for the unit:
  - Battery  .
  - AC  .
- Battery status and estimated remaining capacity before battery pack is fully discharged.

**Battery Calibration Function Key**

Before charging the test unit's battery pack, it must be recalibrated.

**To calibrate the battery pack**

- Only when instructed by VeEX support personnel, click the **Batt.Cal.** button on the **Power** screen. The unit detects the battery pack and recalibrates it automatically, if needed.

For more information about the battery pack, see Battery and *Lithium-ion Battery Precautions*.

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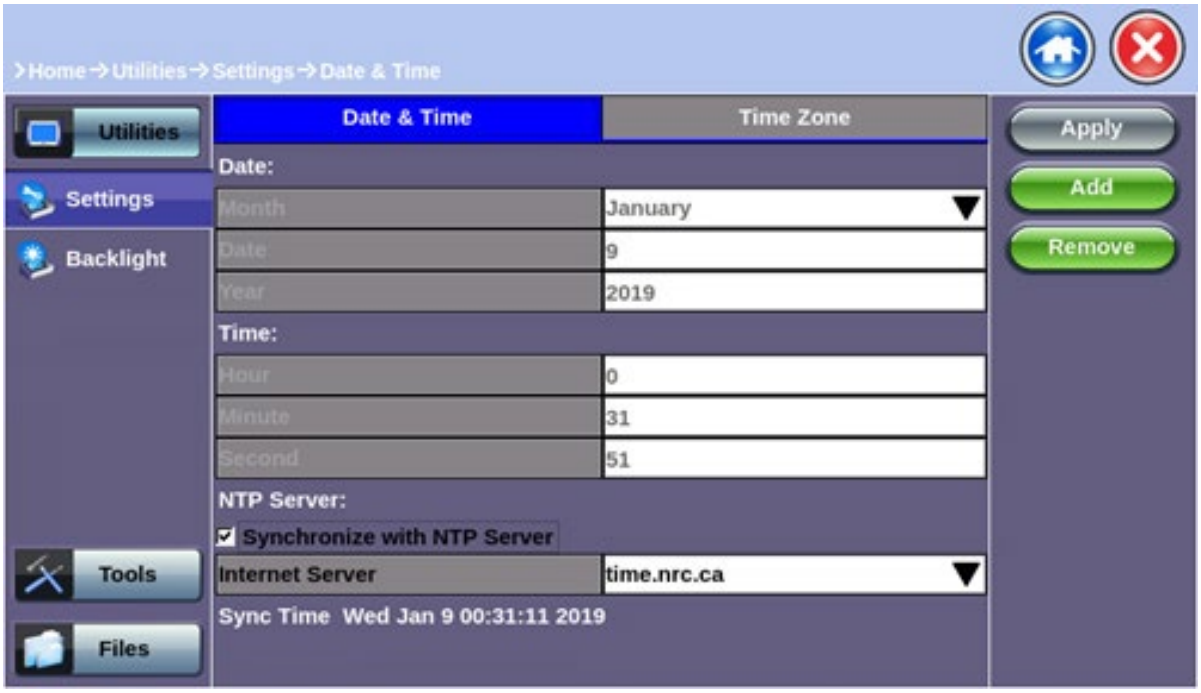
#### 5.1.6 Date & Time

This screen allows the user to set the date and time according to time zone or user requirement. Daylight savings are automatically enabled in the utility.

*Daylight savings are enabled automatically, if available in the time zone profile.*

**Date & Time Settings**




- **Date:** Enter current date and tap **Apply** to set the system time of day (ToD) clock.
- **Time:** Enter current time and tap **Apply** to set the system time of day (ToD) clock.
- **NTP Server:** Check the box to allow the test platform to automatically set the ToD correctly by contacting an Internet time server of your choosing. Once connected to the server and the ToD has been properly synchronized, a confirmation message will apply below the field. Time Zone must be properly configured to apply any local time correction.

**To add a new NTP server**

- Use the **Add** button to enter new (local) servers and tap **Apply**.

**Date & Time Settings: Time Zone**


- **Zone:** Select the current location (continent, region, country, city) using the search box to identify the closest time zone that

applies. Select the time zone and tap **OK**. Automatic daylight savings time (DST) may be available for some of the countries or regions.

- **Offset:** Shows the time correction associated with the selected time zone. UTC (Coordinated Universal Time) is the standard time.

*If the test platform is equipped with a GPS receiver, the local time can also be programmed by using the **Sync ToD** button in **>Utilities>Settings>High Precision Clock Source>GPS**.*

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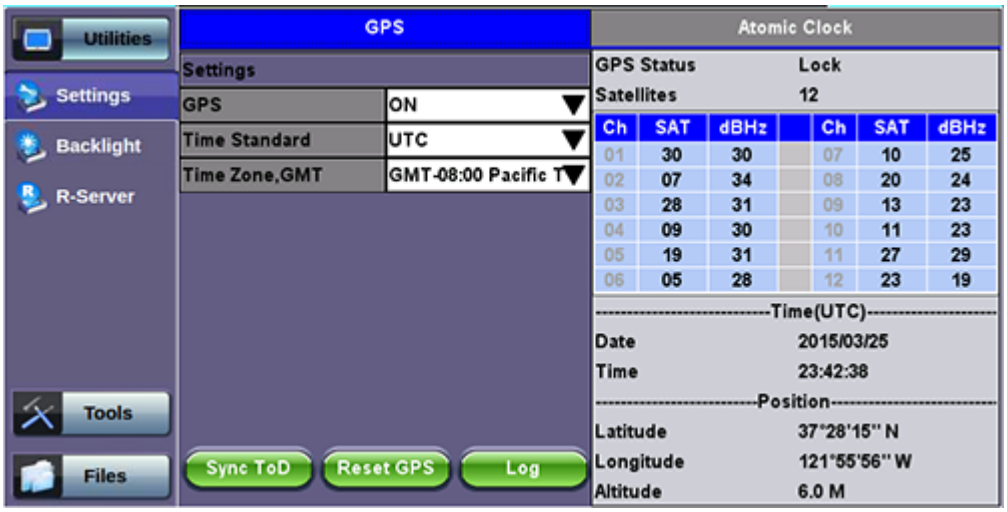
# 5.2 High Precision Clock Sources

**Precision Clock References**

**GPS Receiver (HW Option)**
The optional high-sensitivity GPS module (built-in) provides accurate Phase alignment and Coordinated Universal Time (UTC) synchronization to the test set, in the form of internal pulse-per-second (1PPS) clock synchronized to the standard second and time stamps. This is used to assure that two or more geographically-distributed test sets have the exact same time and can calculate delays. One example is the One-Way-Delay (Latency) tests used to identify asymmetry between each direction of a link.



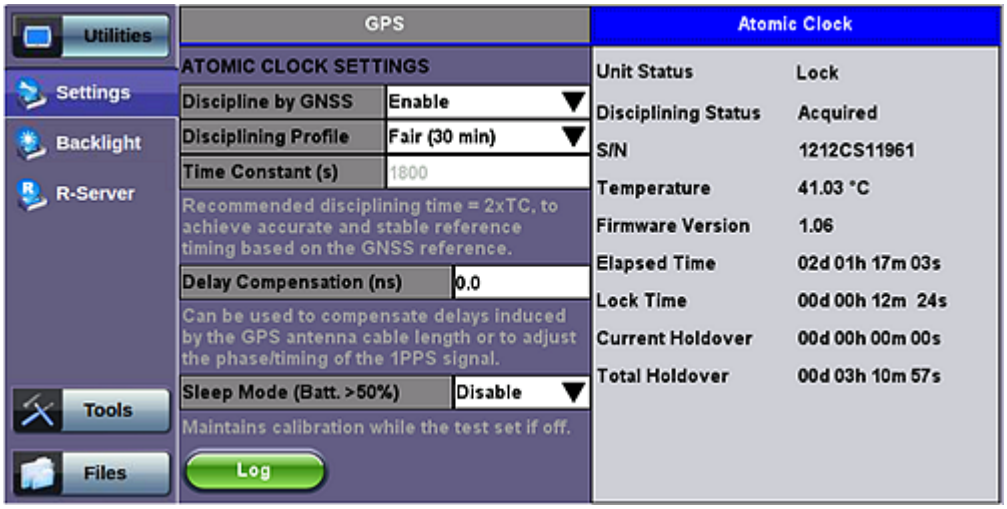

The GPS Time of Day (ToD) can also be used to precisely set the local date and time in the test set, using the Sync ToD function, which will apply the local time zone correction before applying it to the system real time clock. This time stamp is used for reports and events, but not for time-sensitive testing.

GPS ToD is also used in One-Way-Delay (OWD) measurements and time is applied directly to each test set before the test starts, so they all have accurate time.

The GPS receiver can be turned OFF if not used, to save battery power.

A satellite table, showing satellites in view, satellites being used and signal to noise ratio, is provided for information only, so the correct antenna installation can be verified.  Geographical coordinates are also provide for information only and it could be used in the future to geo-tag some position-sensitive results. The GPS antenna must have direct view to the sky. At least four satellites with SNR of 34 dBHz or better are recommended for accurate testing.

**Atomic Clock (HW Option-Factory installed)**
The optional built-in chip-scale Atomic Clock module provides a highly stable clock source to the test set, in the form of a highly accurate and stable internal 10 MHz frequency reference. This reference can be used to drive PDH/DSn, SDH/SONET/OTN, 1588v2 PTP, or SyncE Master transmitters or be used as a reference for Frequency and Wander measurements. Its main function is to serve as a precision reference to measure wander (clock stability), even in places where there is no reference clock signals available that can be traced back to a Primary Reference Clock (PRC).




**GPS-Disciplined Clock**

When GPS and Atomic Clock options are installed and enabled, the Atomic Clock can use the GPS signal to calibrate its frequency (10 MHz) and timing references (1PPS), to improve their accuracy and stability. The Atomic Clock 1PPS phase is disciplined to the UTC to align it with the standard second. The raising edge of the 1PPS pulse indicates the beginning of a new second all over the world.

Disciplining can be disabled or enabled. When disabled, the atomic clock runs at its natural frequency (free-running), providing a very stable frequency source. When disciplining is Enabled, the atomic clock will use the GPS accuracy to correct its frequency and align its phase.

The Disciplining Profile sets a time window the atomic clock's dynamic control loop, to filter any short term frequency and phase variations coming from the GPS receiver, this is called Time Constant. The longer the time constant, the more accurate and stable the atomic clock output can be. The Disciplining Profile field provide suggested options for the minimum disciplining times and sets the equivalent Time Constant. The selection varies with applications and location, so some experimentation may be required by users to select their own default value. For quick field Wander or Phase measurements a disciplining time of ≥60 minutes (TC ≥1800 seconds) is recommended. Users can also enter a customized time constant in seconds.

**Holdover**

In case of GPS signal loss (e.g. indoor testing) the high stability  of the Atomic Clock can maintain synchronization for a few hours allowing users to perform Wander and Absolute Phase Error measurements in conditions that were not possible before. This is called holdover mode.

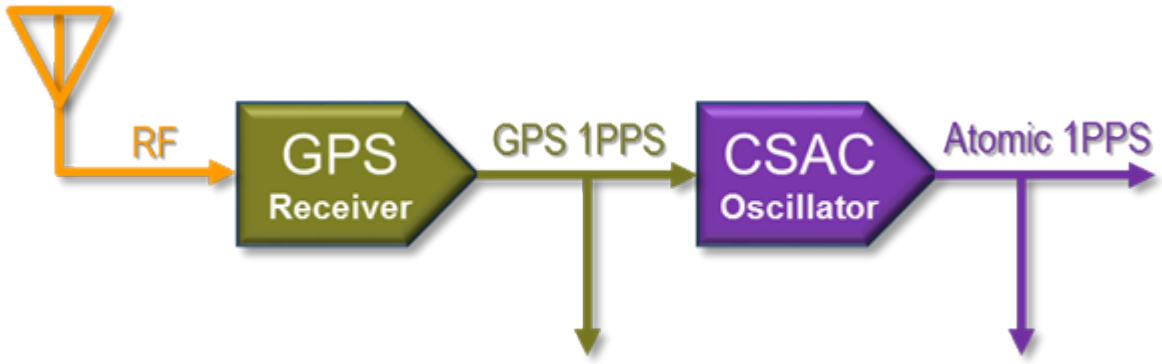
Delay Compensation can be used to perform minor adjustments to the 1PPS phase, to align it to a specific reference or to compensate for short cable delays.

**Atomic Clock Phase Monitoring**

Certain VeEX test sets equipped with GPS receiver and Chip Scale Atomic Clock options may include a relative phase monitoring tool that can be used for the Relative Phase Measurements that provide a bit more visibility into the disciplining process.

In the absence of another traceable frequency source or timing reference, users have to rely on relative phase measurements to get an idea of the test set's internal synchronization process. It is a direct comparison between the GPS receiver's "raw" 1PPS signal being fed to the high-precision oscillator (CSAC) and the filtered (stabilized) 1PPS output from the oscillator, which ultimately would be the reference signal to be used by the test set for Wander, Absolute Time Error (Phase) and One-Way Delay (link symmetry) measurements. Since the disciplined output combines the short-term stability of the precision oscillator and the long-term accuracy of the GPS it provides the best of both worlds, so it can be used to measure the internal GPS receiver output to verify they are in agreement.

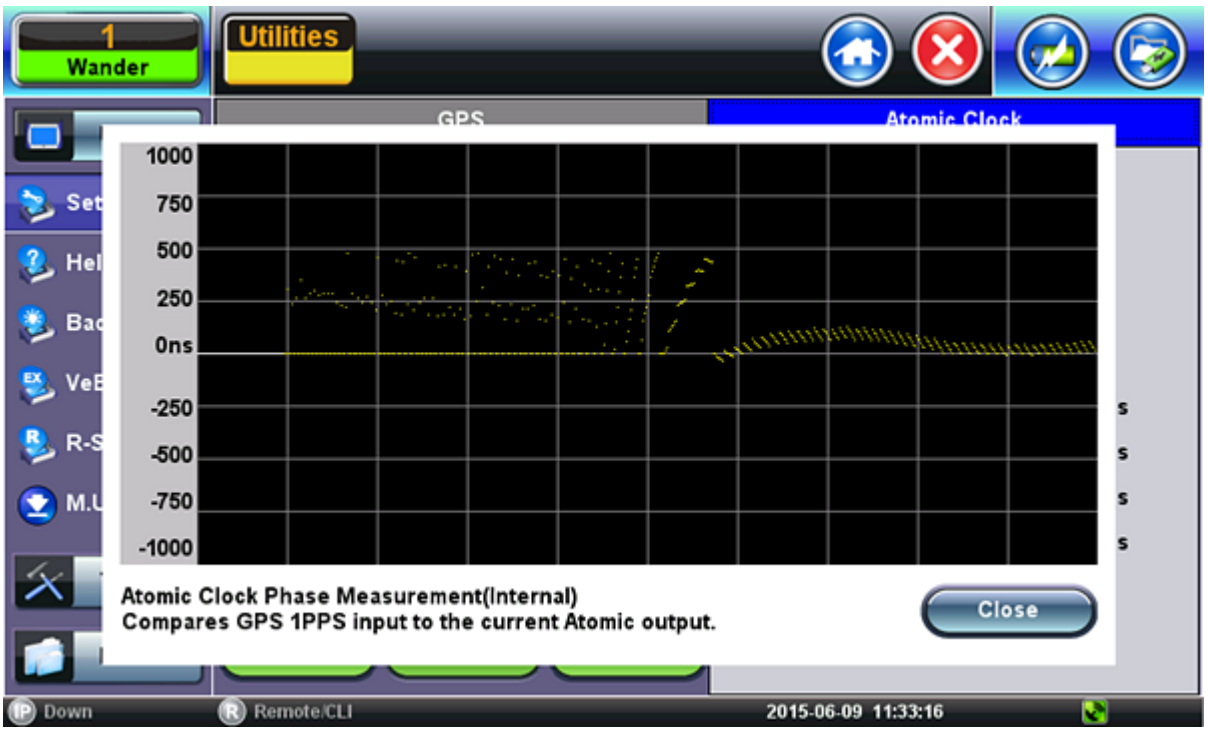
**Relative phase compares disciplined Atomic 1PPS vs. GPS 1PPS**




Relative phase measurements are more useful when monitored at the beginning of the disciplining process, to track the phase alignment between the oscillator's output (Atomic 1PPS) and its input (GPS 1PPS). Since the oscillator filters the raw 1PPS noise and fine tunes its frequency to align its own 1PPS to true time, the input vs output differential graph can become a very useful tool to monitor and verify that the convergence process is going as expected.

Phase Graph The Atomic Phase Graph can be found in the Atomic Clock settings and status screen at ***>Utilities >Settings >High Precision Clock Source >Atomic Clock***.

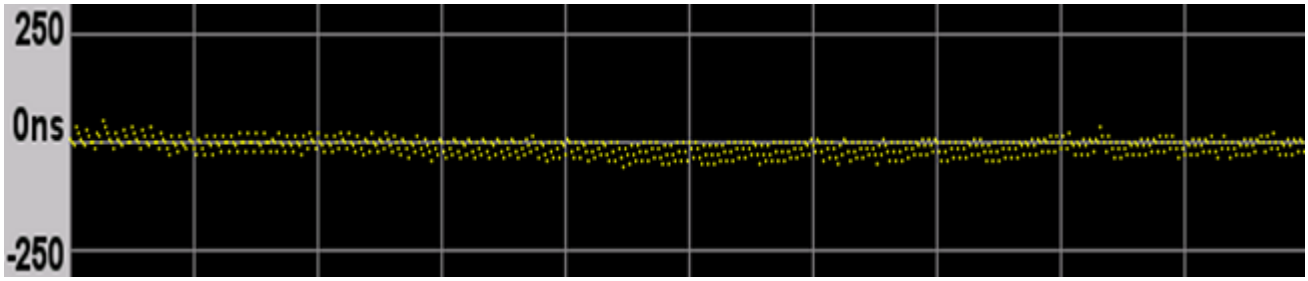
**Example of GPS-disciplined Atomic relative phase convergence graph**



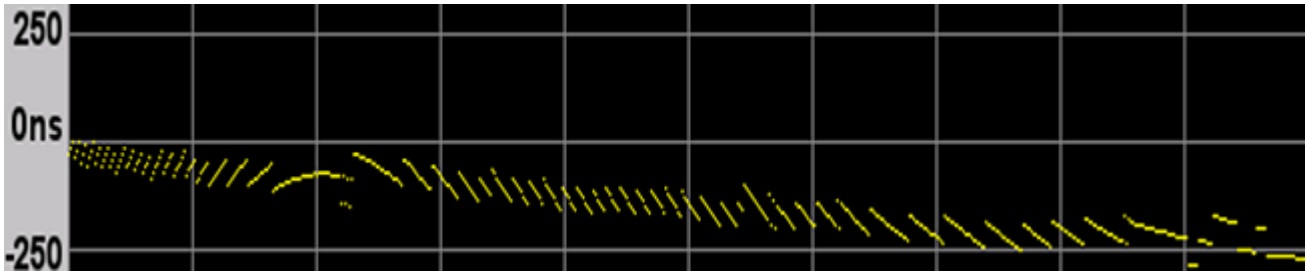

- Yellow dots indicate valid relative phase measurements (output - input).
- Scattered yellow dots could indicate bad GPS signal, which in turn provides bad timing accuracy, or that the oscillator trying to compensate for large phase differences.
- White dots (line) at zero indicates loss of GPS 1PPS. It basically indicates holdover periods.

What you want to see in this graph is a tight bundle of differential phase measurements forming a line converging to zero and staying at zero. Since the Atomic Clock output is very stable, it will slowly try to infer the true (accurate) time alignment out of the GPS 1PPS output and maintain it. The less disperse the individual measurements (dots) are, the better the GPS timing signal is. So, you want to see a straight line formed by not-so dispersed group of dots.

**Example of proper (converged and stable) phase alignment**



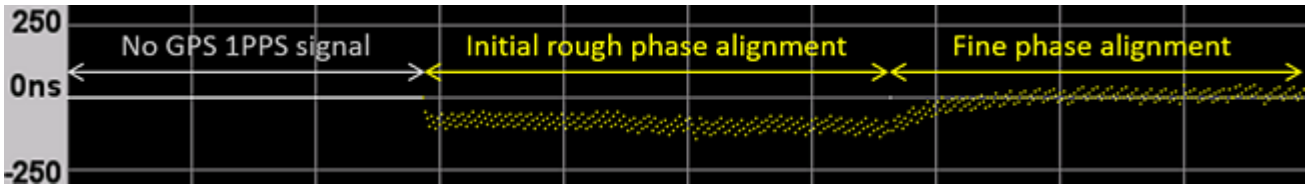

**Not so good phase alignment**




The chip scale atomic clock oscillator uses its 10 MHz frequency source for the disciplining process. Its 1PPS phase is initially aligned to the 10 MHz phase, so it should be within ±100 ns (one 10 MHz cycle). Then the CSAC would start steering its frequency to finely align its 1PPS output within a few nanoseconds to the "average" 1PPS input coming from the GPS receiver.

*In the context of this document the term "GPS Receiver" is not considered a synonym of "GPS Clock" or "GPS-disciplined Clock". A GPS Clock is considered a combination of a GPS receiver and a highly stable precision oscillator.*

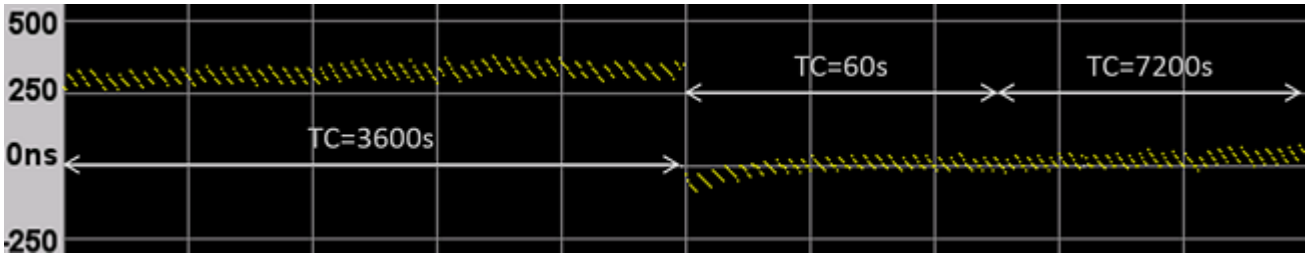
**Example of initial phase alignment**




Although the relative phase alignment may converge rather fast in many occasions, users must still observe the minimum recommended disciplining time.

*If the disciplining time constant (TC) is changed in the middle of the process, from one long value to another, the phase may take long time to converge to zero or could display a somewhat erratic behavior for a while. In this scenario, if users need to change the TC, it may be worth temporarily changing it to a short TC (e.g. 60s) for faster steering and then change it to the desired value. (Note that although the Sync 1PPS button could also be used to force alignment of the Atomic 1PPS output, it does not adjusts the required disciplining or steering parameters.)*

**Using short TC to force quicker phase convergence to zero**

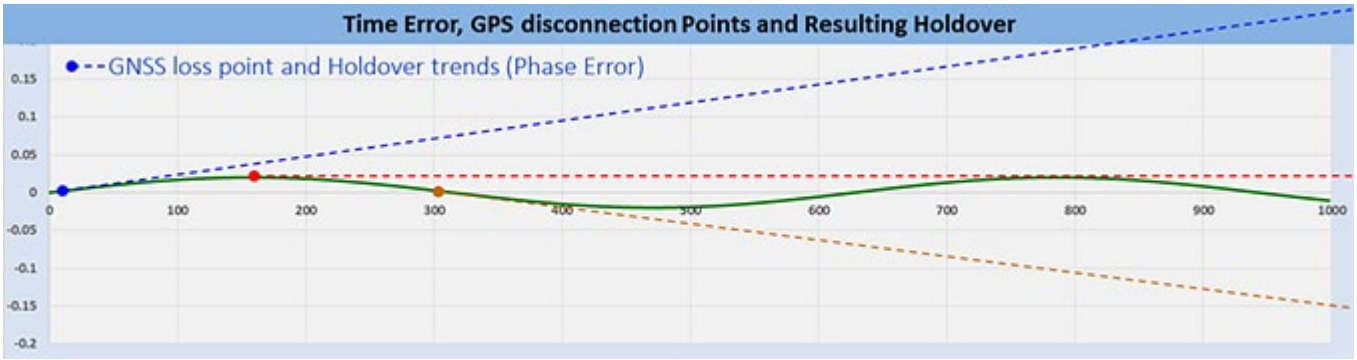



**Phase Alignment and Holdover**
Knowing whether the oscillator is still steering (changing) its frequency to correct the 1PPS output's phase has a big impact in deciding when to force the test set into holdover for indoors testing. The Phase Graph can help in identifying when the disciplining process has stabilized.

A disciplined oscillator will continuously adjust its frequency to keep the 1PPS aligned to the standard second, but those offset adjustments are usually small fractions of ppb (parts per billion, 1E-9) when proper disciplining has been achieved.

Upon the loss of the GPS 1PPS reference, the oscillator enters holdover mode. This means that the precision oscillator will hold its last frequency and the phase error will continue its trend. That means, you want the instantaneous frequency to be as accurate as possible at the moment when the GPS receiver is turned off. Keep in mind that any ±X.XXX ppb frequency offset would result in a cumulative time error of ±X.XXX ns per second and that would impact the resulting usable holdover time, by reaching the defined error tolerance faster or slower.

**Illustrative examples of what would happen if GPS 1PPS is lost during different steering stages**




**Limitations:** This method of determining proper 1PPS phase disciplining convergence would only work at the beginning of the disciplining process, which is what would be needed in the field.

Long-term, especially when long time constants are used, the oscillator will become hard to steer as it would be trying to hold what it “believes” is true time alignment, based on a long learning process. In this case, if the GPS receiver starts to wander and becomes somewhat inaccurate, the graph would show such discrepancy, but the oscillator's 1PPS output would still be stable and accurate.

GPS instant accuracy could change within ±150ns during the course of a day depending on atmospheric conditions and satellites visibility. The job of the atomic clock is to filter those slow variations, so in the long term it is normal to see the GPS and CSAC phases temporarily disagree (relative phase ≠ zero).

**Warm Up Times**
All precision reference sources require a "warm up" time to achieve high accuracy and stability. The warm up term is being used loosely because it is not just about attaining the right temperature. It also includes disciplining of a local oscillator, negotiating and stabilizing a clock through protocol messages, etc. Each of the tasks involved takes time to stabilize before it can be used for testing.

**Operational Temperature**
It is still a major player in the warm-up waiting time and it all depends on the ambient temperature and the initial temperature of the test set. For example, a test set left in the trunk of a car in a winter night will take longer to reach operational temperature.

**Atomic Clock Warm Up**
If fitted with a chip-scale atomic clock, they are housed in a miniature oven to maintain its internal temperature constant in spite

variations in ambient temperatures and it can take up to five minutes to warm up and should not be used until its status shows "Locked". The atomic clock temperature and status can be monitored at ***>Utilities>Settings>High Precision Clock Source>Atomic Clock***. The chip-scale atomic clock is oven-controlled and temperature-compensated to minimize the effects of ambient temperature variations.

Beside temperature, users must be aware of other factors that require time to settle, before accurate measurements can be made.

**GPS Lock**
The time to get an stable clock output varies depending on the conditions, antenna type and installation, sky visibility and whether or not the test set has changed position. Using the test set for the first time on a new site (different geographical position) would increment the time to its first satellite lock. Users can follow the different stages (Searching, Sync 1PPS, and Lock) by checking the GPS status GUI at ***>Utilities>Settings>High Precision Clock Source>GPS***.

**Disciplining Time**
Disciplining the atomic clock means using the accurate GPS timing signal to correct or align the atomic clock output signals. GPS are known for their high long-term accuracy as they are traceable to the universal time standard (UTC). Atomic Clocks are known for their great stability. So, the combination of GPS + Atomic Clock = Highly Accurate and Stable clock source. Achieving such levels of precision takes time. The total time to stable output depends on the precision required. The disciplining time can be programmed in the Atomic Clock settings and users must add it to the total "warm-up" time, before starting measurements.

**Precision Timing Protocol**
PTP, like IEEE 1588v2, require some time for the two ends (master and slave) to agree on the current time. This protocol "warm-up" time is dependent on the link conditions (traffic, latency, delay variations, PTP settings, etc.). Tests shall not be started until the protocol has stabilized and the recovered clock has achieved its maximum accuracy and stability. This is sometimes referred as "Convergence" or "Sync PDV" convergence. Users can use the long tail of the 1588v2 Sync PDV graph as an indication the PTP has reached synchronous state.

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## 5.3 System Firmware/Software Updates

### 5.3.1 Obtaining the Latest Software (Firmware) Versions

Depending on the types of modules installed, the UX400 may require two or more software components to be updated. Basically the Platform System's (Rootfs), the Common functions and one for each installed test module (e.g. Combo, 1GE, 2.5G, 10G, 40/100G, etc.).

Using a (PC) web browser, go to http://veexinc.com/en-us/Products/UX400, open the Software download window and click on the links to get the latest UX400 Rootfs and Common SW upgrade package for the Platform (no need to login). Then select the applicable modules' pages and download the individual Module's software. Unzip and copy all the resulting *ux400-xxx.tar.gz* files to the root of a FAT32 USB memory stick.

*If installed in your PC, some file compression agents (applications) may show the resulting ux400-xxx.tar.gz as a compressed folder, but there is no need to expand the file any more.*

It is recommended to make a backup copy if all test results, test profiles and images stored in the test set before performing a system upgrade.

### 5.3.2 Updating the UX400 software

Once you have obtained and uncompressed the software update packages to obtain the ux400-xxx.tar.gz files, the software update process (also known as firmware upgrade) can be performed:

- Via USB Drive, by copying all the uncompressed files to the root of an empty FAT32 USB memory stick and then plugging it into one of the UX400 USB ports.
- Turn the UX400 power OFF.
- Press the **Backlight** and **Power** buttons simultaneously. Release the Power button once you hear a short confirmation tone (beep) and it starts to boot up. Keep pressing the Backlight button for about 30 more seconds, until another beep is heard. Release the backlight button.

**Power and Backlight buttons**

- The unit should now show the software update GUI and highlight in red the new software packages available in the USB memory stick. Verify the version numbers and make sure all the desired packages are check-marked. (You should only downgrade to a previous version when instructed when instructed by our Customer Care team.)
- Press the **Upgrade** button, then wait for the files to be copied and the UX400 turns itself off.

- Restart the UX400 using the **Power** button and wait for the upgrade process to take place.
- A message will appear on the screen indicating that the upgrade is in progress. This may take several minutes to complete, depending on the number of modules that need to be updated.

UX400 must be connected to AC/DC charger at all times during the whole upgrade process. DO NOT turn it off at any time; the upgrade process may take several minutes and the UX400 will turn itself off at the end.

To verify the current software version number installed in the unit, open the **Utilities** section, select **Settings**, and open **About**.

#### 5.3.3 Test Profiles and Test Results Backup Procedure

The UX400 File Management system offers backup [**To USB**] and restore [**From USB**] functions. They can be found in the **>Utilities >Files >Saved**, on the left side of the screen.

To enable the [**To USB**] and [**From USB**] functions, insert a FAT32 USB Memory stick into any of the USB ports. Wait for the USB memory to be recognized (the folder icon will change appearance with a green USB memory icon).

Select the desired test results, test profiles, screen capture and protocol capture files to be saved, using the individual checkboxes. For a full backup, check the master box on the header and all files will be marked.

Tap the [**To USB**] button to initiate the file transfer procedure and wait for the progress bar to finish. Original files won't be deleted from the test set.

When all files have been copied to the USB, you may tap the folder icon (top-right corner) and select "Remove USB Drive" to make sure all cached data is transferred to the USB drive, especially when transferring small files.

It is highly recommended to select all important test profiles and results, and make a backup copy to a USB drive, before upgrading the unit's software. The software upgrade process cleans up all the data stored in the unit. After the unit has been updated, use the [**From USB**] function to restore the data back to the test set.

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# 6.0 File Management

Use the **Files** submenu in **>Utilities>Files>Saved** to view test results and screen captures saved on the unit's internal storage. Results are stored until manually deleted, the unit's software is upgraded or it's internal memory is reformatted.

## 6.1 Save Test Results

Test results can be saved at any time while a test is running or after completed.

**Save test results**


**To save test results to a file**

1. On the **Results** screen of the active test application, press the **Save** button on the keypad.
2. Enter a filename, then tap **Apply**.

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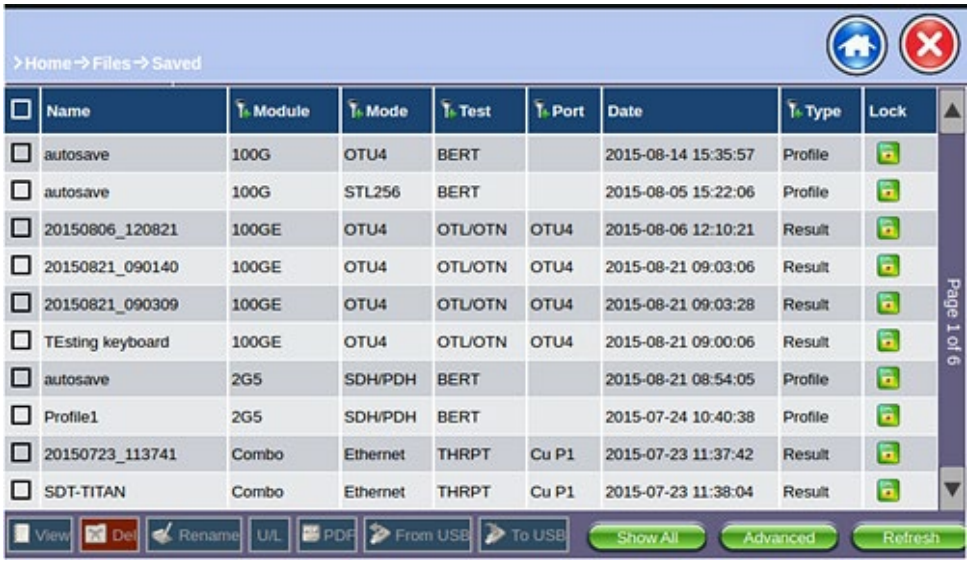
## 6.2 Access and navigate saved files

To access test results and screen captures saved to the test platform

- Tap **Files**, then tap **Saved**.

**Saved files screen**




The following file information is displayed on the Saved files screen:

- **Name:** Name of file (If not specified at time of saving, a default name appears.)
- **Module:** Test module used to perform the test
- **Mode:** Test mode in which the test was conducted
- **Test:** Type of test conducted
- **Port:** Port on which the test was performed
- **Date:** Date file was saved
- **Type:** File type (test result or profile)
- **Lock:** Indicates if the file is locked from being deleted or renamed

### Navigating and locating test results and profiles

To sort files by column, tap the column header. A small arrow will appear next to the column heading to indicate that the list displayed is sorted by that column.

To change the order of the sorting, ascending or descending order, tap the column again.

To filter the results so that only those with the options selected are displayed, tap the funnel next to the column header.

Select the checkbox at the top of the checkbox column to select all files.

### Saved files action toolbar


Use the toolbar to perform the following actions.

- **View**: Open the highlighted file for viewing.
- **Del:** Delete the file (only if unlocked).
- **Rename:** Rename the file (only if unlocked).
- **U/L:** Unlock or lock a file.
- **PDF:** Generate and transfer a PDF of the results file to a USB memory drive (only enabled when a USB memory

stick is connected to the unit and a file is selected).
- **From USB:** Transfer files from a USB memory drive to the unit's saved files (only enabled when a USB memory stick is connected to the unit).
- **To USB:** Transfer files to a USB memory drive (only enabled when a USB memory stick is connected to the unit).
- **Show All:** Reset the screen and remove filters.
- **Advanced:** Set advanced search options.
- **Refresh:** Reloads the screen.

*The **View**, **Delete**, **Rename**, and **U/L** options at the bottom will not become available until a file is selected.*

### 6.2.1 Viewing files saved to test platform

**To view a saved profile**

- Select the checkbox next to the file, and then tap **View**.

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To close the file and return to the file list, tap **Close**.

### 6.2.2 Deleting files saved to test platform

**To delete a saved file**

- Select the checkbox next to the file(s) to be deleted, and then tap **Delete**.

*If the Delete option is unavailable, check to see if the file is locked. Only unlocked files can be deleted.*

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### 6.2.3 Renaming a file

**To rename a file**

1. Select the checkbox next to the file to be renamed, and then tap **Rename**.
2. Enter the new name, and then tap **Rename**.

*If the Rename option is unavailable, check to see if the file is locked. Only unlocked files can be renamed.*

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### 6.2.4 Locking and unlocking files

**To lock or unlock a file**

- Select the checkbox next to the desired file(s) to lock or unlock, and then tap **U/L**.

  In the **Lock** column:

   indicates the file is locked.

 indicates the file is unlocked.

*After locking a file, it cannot be deleted or renamed.*

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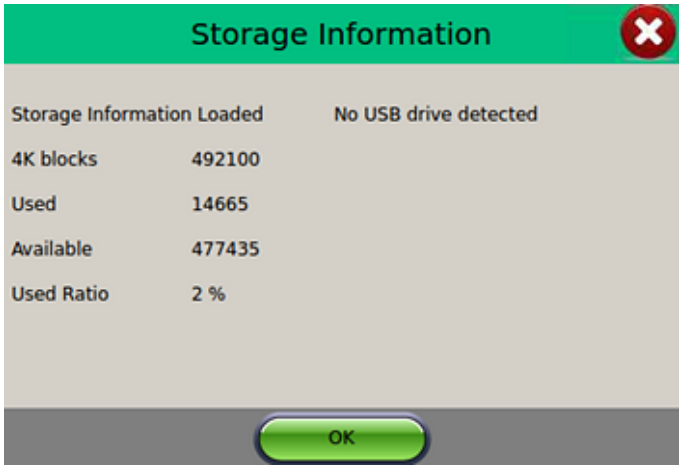
### 6.2.5 Viewing file storage information (memory capacity)

**To view memory capacity information**

- Tap the **Files** icon  at the top.

The **Storage Information** screen displays the current file capacity and current memory utilization percentage.

**Files - Storage Information**

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## 6.3 View USB Files

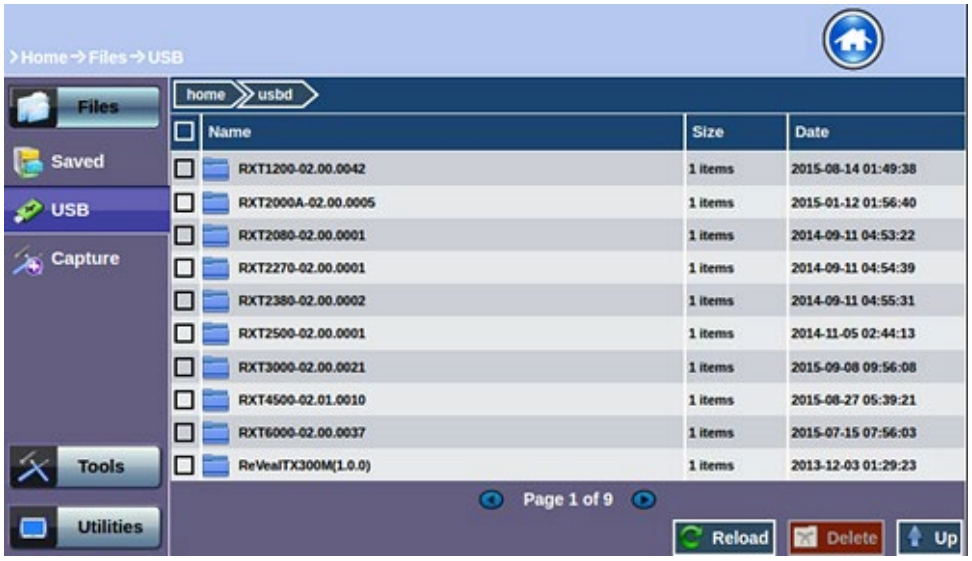
Under the **Files** submenu option, view files saved on an attached USB memory stick.

*The USB tool supports one USB memory stick. It displays the first memory stick that is recognized, from any of the two ports.*

**To access test results and screen captures saved to a USB stick**

- Tap **Files**, then tap **USB**.

**Viewing files on USB**




Use the bottom toolbar to perform the following actions:

- **Reload:** Refreshes the USB stick information.
- **Delete:** Erases the selected files or folders.
- **Up:** Exits the current folder and moves up to a higher folder in the file tree hierarchy. The current folder structure is shown in the top bar.
- **Open:** Opens the following file types
  - **HTML:** Launches the browser to display its content
  - **TXT:** Launches a basic text viewer to display its content
  - **PCAP:** Launches the built-in Wireshark® protocol analyzer
  - **MTIE:** Launches the optional built-in Wander Analysis tool

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## 6.4 View Screen Capture Files

Under the **Files** submenu option to view screen capture files.

**To access test results and screen captures saved to a USB stick**

- Tap **Files**, then tap **Capture**.

Click the right and left arrows to navigate the file list pages.

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## 6.5 File Transfer

The test result files are saved in a proprietary format. To archive, print or generate test reports, please export or transfer the files using one of the following methods:

- USB Memory Device via USB interface
- Open results from PC Web browser

*The files can also be converted to PDF and saved to a USB stick.*

### 6.5.1 Exporting files to USB stick

Test results can be transferred to a USB stick in either HTML format or as a PDF file.

**To transfer results and profiles to a USB stick**

1. Insert the USB stick in the USB port of the unit. This enables the **From USB** and **To USB** buttons.
2. Select the file(s) to be transferred to the USB stick. This enables the **PDF** button.
3. Do one of the following:
   - To transfer the file(s) in their current HTML format, tap the **To USB** button 

.

     or

   - To generate and transfer a PDF of the file(s), tap the **PDF** button 

.

     The transfer process may take several minutes depending on the number and size of the files that are transferring.
4. After the transfer completes, safely remove the USB stick by tapping the **Files** icon  , and then tapping **Remove USB Drive**. Safely removing the USB drive helps prevent damage.

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### 6.5.2 Importing files from USB drive

Files can also be imported from the USB drive to the unit.

**To transfer results and profiles from a USB drive**

1. Insert the USB stick in the USB port of the unit.
2. Tap the **From USB** button 

. All compatible files transfer to the unit automatically.

To view the files that transferred from the USB drive, tap **Saved**.

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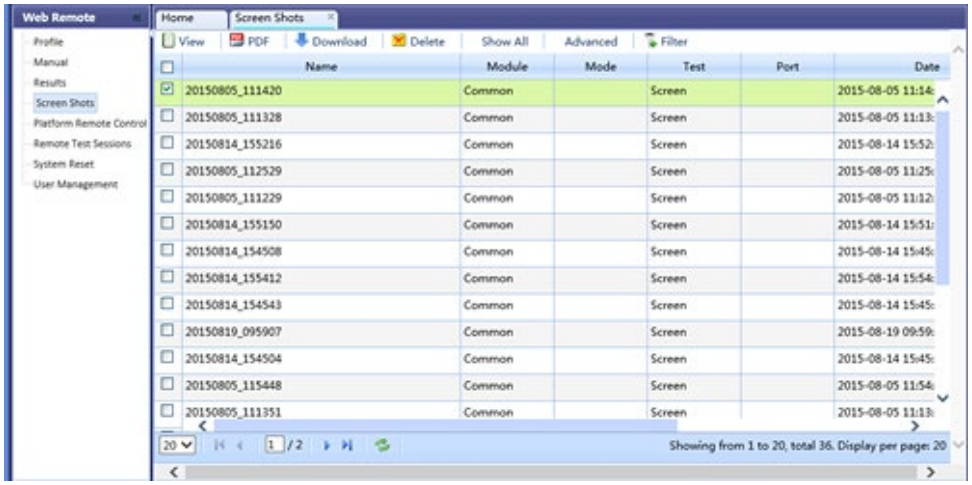
### 6.5.3 Opening and saving files using a web browser

The Remote Access feature allows access to test set data via the Web Remote Access landing page. For more information on accessing the test platform remotely, see Remote Access.

To view and save test results using a web browser, access the test platform and then select **Screenshots** on the **Web Remote** left sidebar panel.

**Web Browser - Test Results**




To save test results to your PC, select the checkbox next to the file(s) and click **Download**. A pdf file of the test results can also be generated and downloaded by selecting the file(s) and clicking **PDF**.

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# 7.0 Tools

## 7.1 IP Tools

ThThe RJ45, 10/100/1000BaseT management port is located on the top the unit. Use this port to connect to the unit for management purposes (results retrieval, remote connectivity). By default, the network configuration is set to use DHCP. When an Ethernet cable is physically connected to the unit, it attempts to connect to the network automatically.

You can access the management port configuration on the **Tools > IP Tools** menu.

### 7.1.1 setup

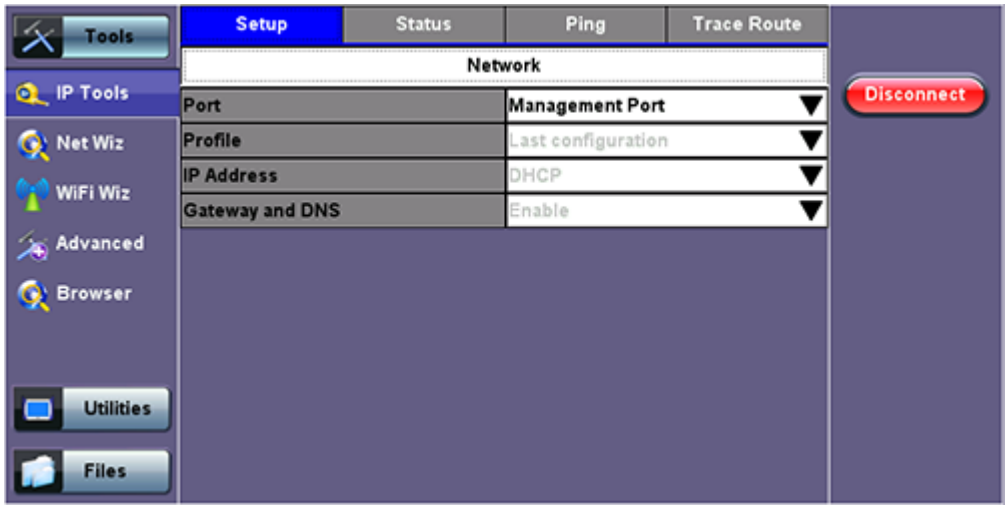
By detault the IP configuration is set to DHCP and the unit will automatically attempt to connect.

For IP configuration, the following fields are required. Additional fields vary depending on Static or DHCP connection.

- **Port:** Select Management Port from the drop-down menu
- **Profile:** Default, Delete, Save, Save as..., Default, or Last configuration
- **IP Address:** Select from Static or DHCP
  - **Static:** If Static is selected, the user will manually enter the IP address parameters (local IP, Gateway IP and DNS server IP)
  - **DHCP:** If DHCP is selected, the unit will obtain IP address parameters from the DHCP server
- **Gateway and DNS:** Enable or Disable
  - **Enabled:** If enabled, enter the IPv4 address of the Gateway and DNS server in Static mode, or use the IP address provided by the DHCP server in DHCP mode
  - **Disabled:** If disabled, no Gateway or DNS server will be used for the tests

Enter all parameters then press **Connect** to start the test.

**DHCP Setup**



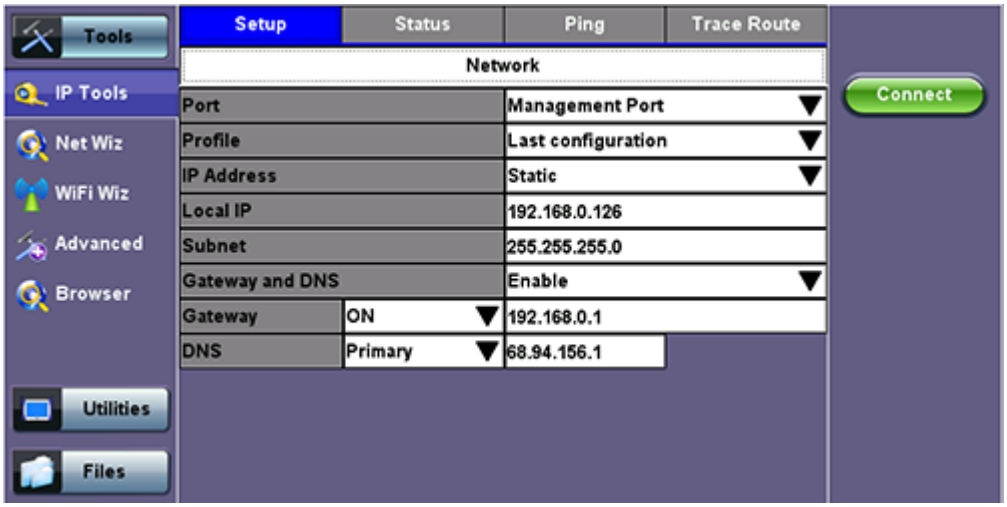

For **Static** type connection, these additional fields are required:

**Static:** The user is required to enter a Local IP, Gateway address (if Gateway and DNS are set to Enable), and Subnet. All Static fields can be filled by tapping on the section to access an alphanumeric keypad.

- **Local IP:** IPv4 address of the test set
- **Subnet:** Enter the subnet mask
- **Gateway and DNS:** Enable or Disable. If set to enable, Gateway and DNS fields become available
  - **Gateway:** Off or On. IPv4 address of the network gateway
  - **DNS:** Off, Primary, or Primary & Secondary. If set to Primary or Primary & Secondary, a DNS IP is required in order to use the URL as a destination

Enter all parameters then press **Connect** to start the test.

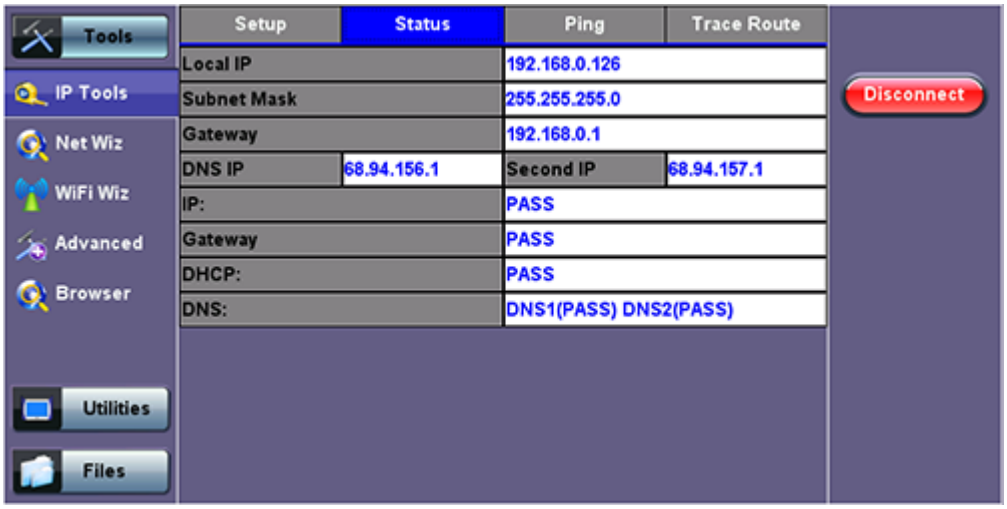
**Static Setup**




### 7.1.2 IP Connection Status

- Ensure the Status is PASS before continuing with any IP tests.
- If the connection fails, go back to the setup screen to verify that the parameters are entered correctly. Verify that the Ethernet cable is properly connected on the management port.
- **DHCP:** PASS indicates that an IP address has successfully been assigned.
- **IP:** PASS indicates that the IP address assigned has been verified to be unique in the network.
- **Gateway:** PASS indicates that the gateway IP address is valid.
- **DNS:** PASS indicates that the DNS IP address is valid.

**IP Connection Status**




### 7.1.3 Ping

The Ping Result provides the number of Sent, Received, Unreach, Missing, and the Round Trip delay.

**Ping Testing**

Ping is a popular computer network tool used to test whether a particular host is reachable across an IP network. A ping is performed by sending an echo request or ICMP (Internet Control Message Protocol) to the echo response replies.

**Ping Setup**

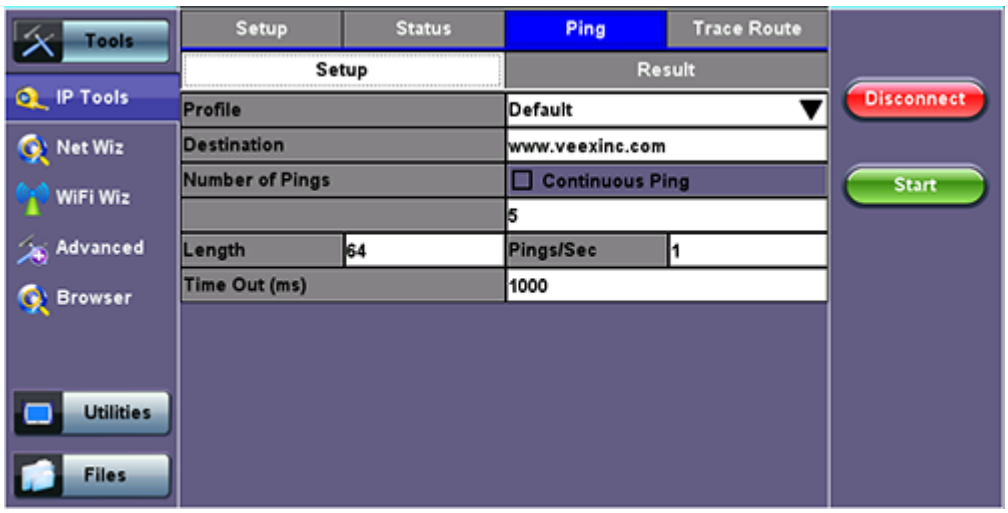
- **Profile:** Delete, Save, Save as..., or Default.

**Destination:** Enter the destination IP address or URL to ping.

- **Number of Pings:** Press the field and use the alphanumeric keypad to enter the number of ping attempts that will be performed to reach the network device.
    - If Continuous Ping is selected, the user is not required to enter the number of pings. The test set will continuously ping the target host until the user presses **Stop**.
- **Length:** Use the alphanumeric keypad to enter the length of the ICMP echo request packet transmitted.
- **Ping/Sec:** Use the alphanumeric keypad to enter the Ping repetition rate (Ping/second) up to 10 pings per second.
- **Time Out:** Time-to-Live (TTL) in milliseconds. Use the alphanumeric keypad to enter the maximum time allowed (in ms, up to 99999ms) between an ICMP ping and echo response.

Once the parameters are configured, press **Start** to begin the test.

**Ping Setup**

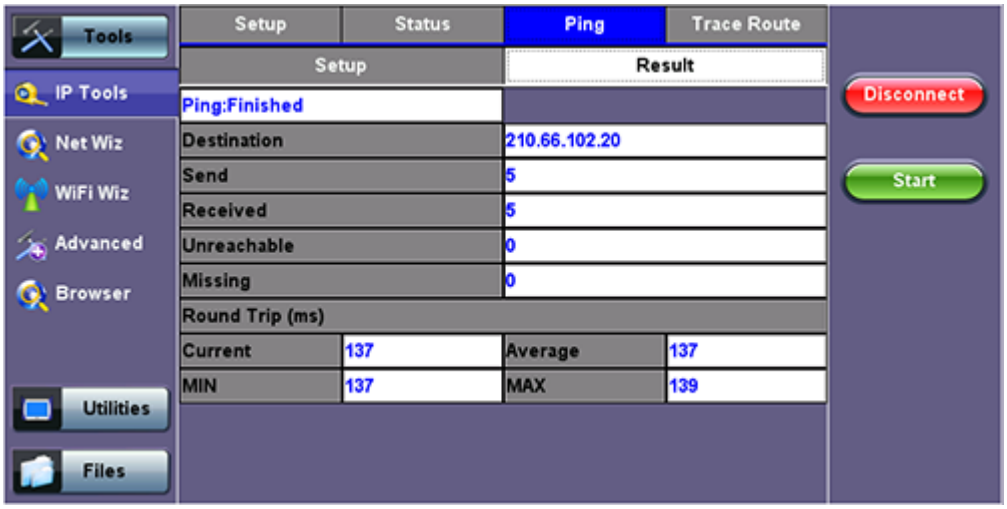



**Ping Results**

Pressing Ping will take you to the Result tab and start the Ping test.

- **Destination:** Indicates the destination IP address
- **Ping status:** In Progress, PASS, or FAIL
- **Sent, Received, Unreach, Missing:** Number of pings sent, received, unreached or missing. A Ping is counted missing if no response is received before timeout. A Ping is counted unreached if an echo response is received with host unreachable set.
- PING also estimates the round-trip time in milliseconds
    - **Current:** The current time for a Ping request to be answered
    - **Average:** The average time recorded for a Ping request to be answered
    - **Max:** The maximum time recorded for a Ping request to be answered
    - **Min:** The minimum time recorded for a Ping request to be answered

**Ping Result**




### 7.1.4 Trace Route

Trace Route is a common method used to find the route to the destination IP address or URL. It is often used to identify routing problems and unreachable destinations. All the remote IP addresses and their response times are displayed indicating possible network congestion points.

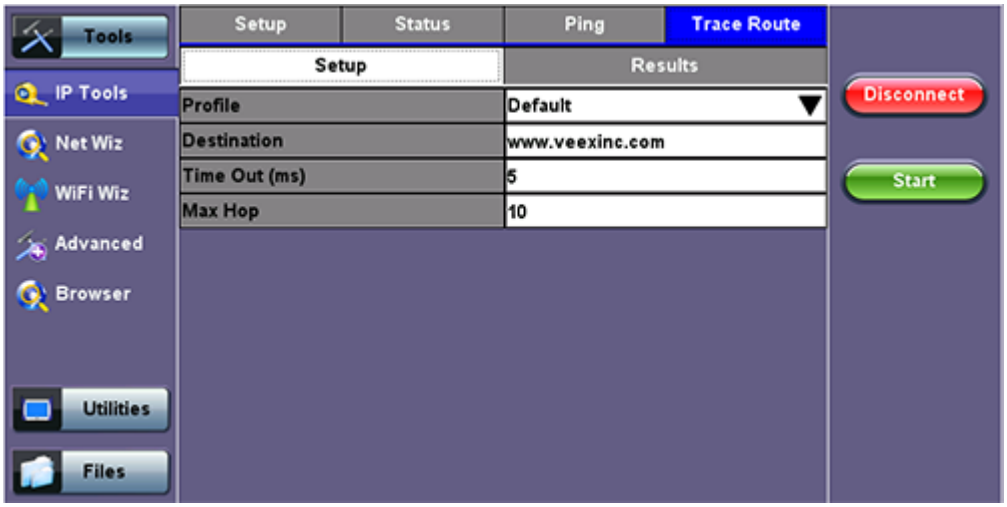
**Trace Route setup tab:**

The following setup selections are available:

- **Profile:** Delete, Save, Save as..., Default. Select Default to recall a trace route file or create a new test
- **Destination:** Enter the IP address or URL of the network device to be detected
- **Time Out:** Enter the maximum time allowed between an ICMP echo and response at each hop
- **Max Hop:** Enter the maximum number of network devices the packet is allowed to transit

Once the parameters are configured, press **Start** to begin the test.

**Trace Route Setup**

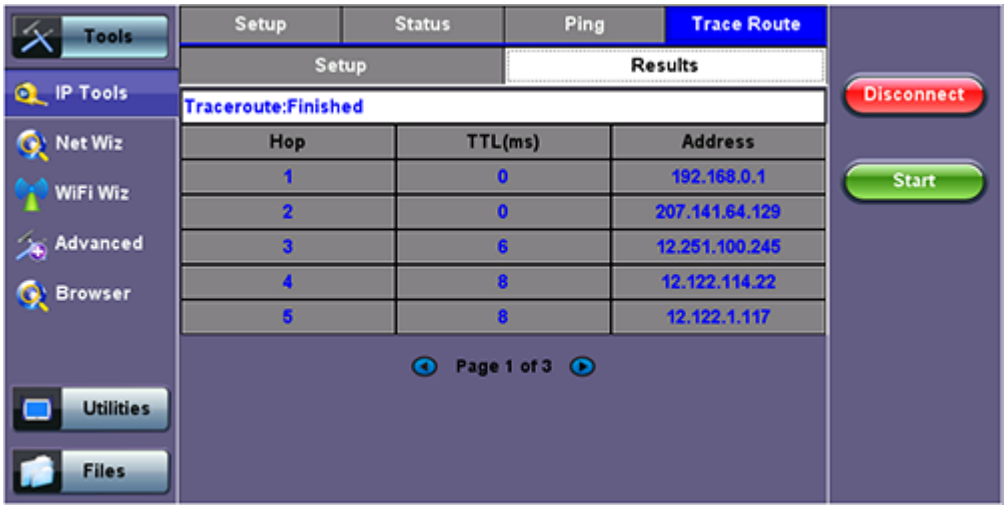



**Results**:

- **Hop:** Order of the routers on the route
- **TTL:** Time to reach each router on the route
- **Address:** Address of each router on the route

If there is no response from a particular hop, an asterisk will be displayed.

**Trace Route Result**

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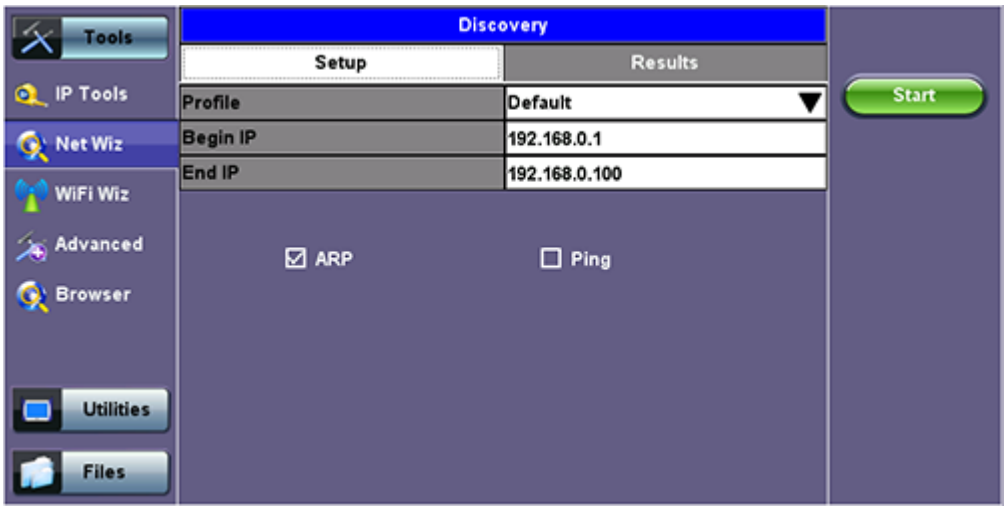
## 7.2 Net Wiz

Net Wiz verifies the status of each IP address in the user selected range, by using ARP (Address Resolution Protocol) and ICMP test.

### 7.2.1 Net Wiz Setup

- **Profile:** Drop-down selections are Default, Delete, Save, Save As...
- **Begin IP:** Set the start address for the desired IP range using the numeric keypad
- **End IP:** Set the end address for the desired IP range using the numeric keypad
- Select the test by placing a check mark in the corresponding box of any of the following: ARP, Ping

**Net Wiz Setup**

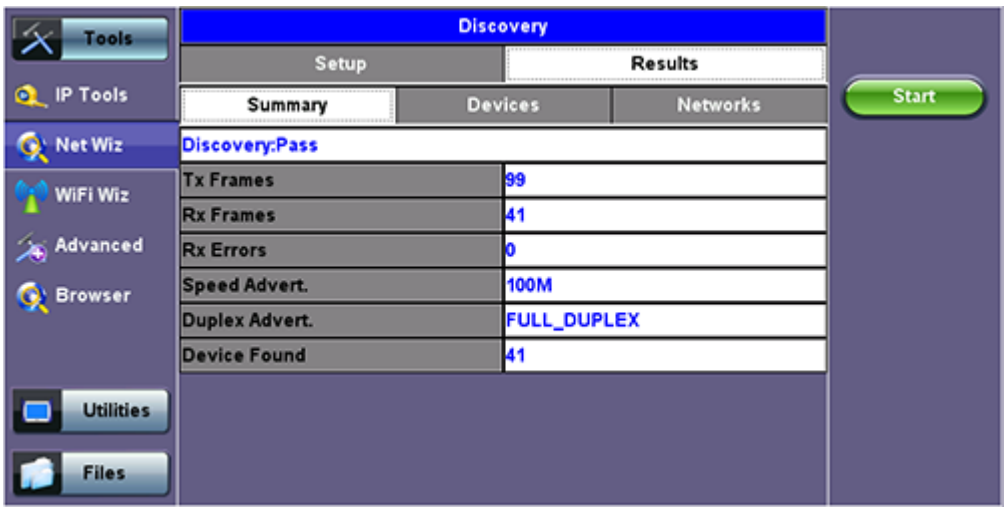



### 7.2.2 Net Wiz Results

**Summary** indicates the test status and reports:

- **TX/RX Frames:** Total number of TX (transmitted) and RX (received) frames
- **RX Errors:** Received frames in error
- **Speed Advert:** Speed advertised
- **Duplex Advert:** Duplex mode advertised
- Total number of Devices and Networks found

**Net Wiz Results Summary**

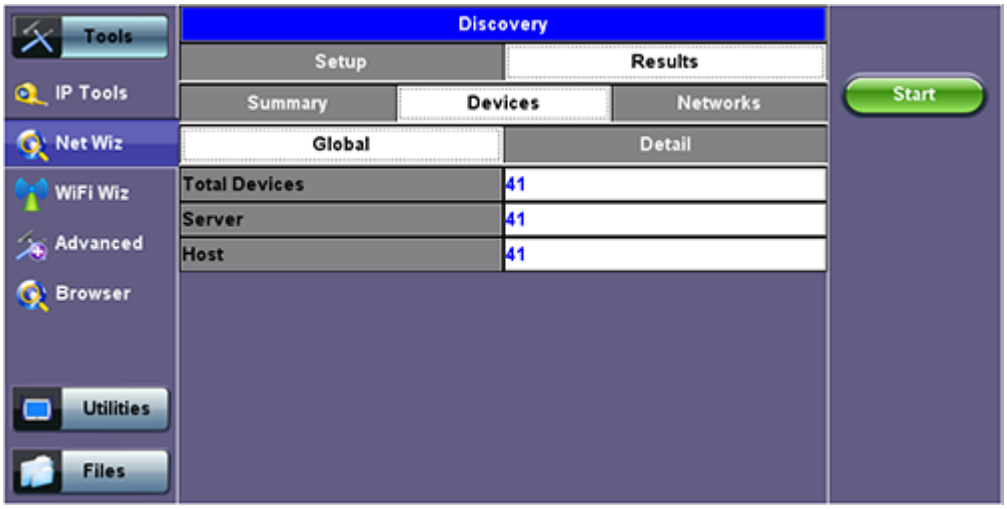



The **Devices** tab reports global and detailed device information.

**Global** reports:

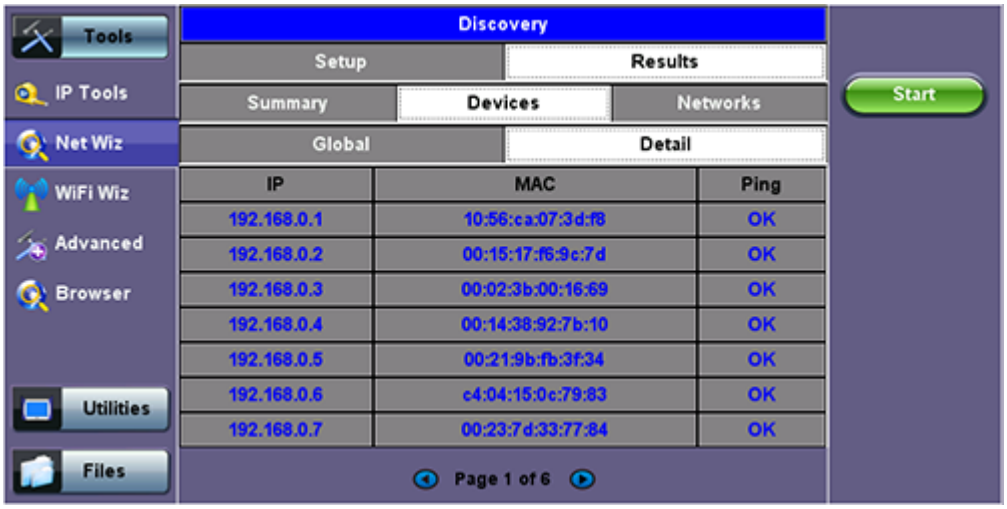
- Total number of devices found
- Number of devices (Routers, Servers, Hosts)

**Net Wiz Results - Devices - Global**




**Detail** displays the Attribute, MAC and IP Addresses, and Ping test results of each device discovered.

**Net Wiz Results - Devices - Detail**

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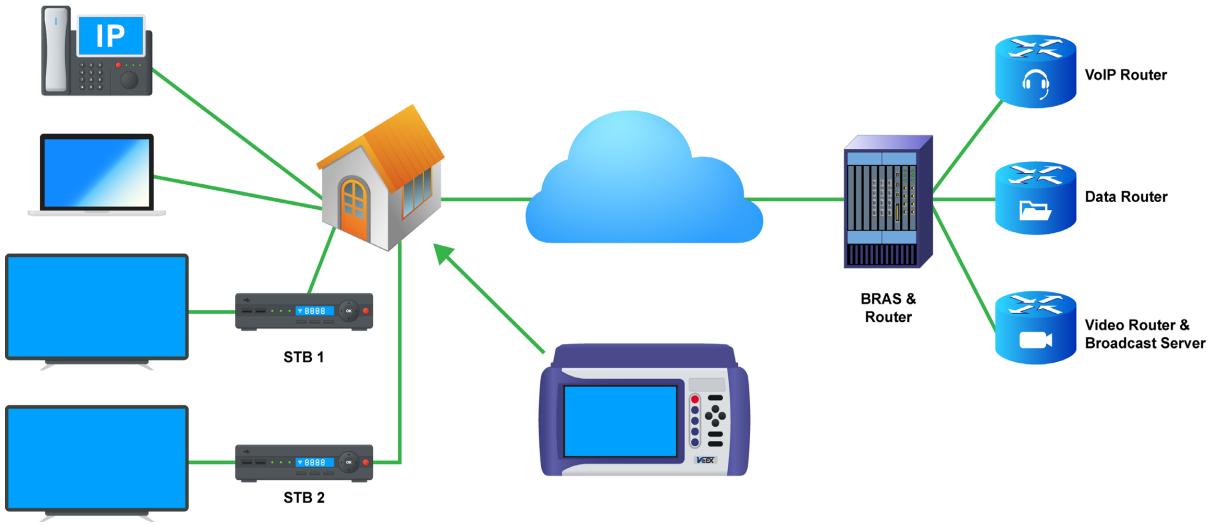
## 7.3 WiFi Wiz

This function allows you to test wireless WiFi 802.11a,b,g,n,ac networks (based on capabilities supported by Wifi USB adaptor provided by VeEX). A typical application is shown below.

**Typical WiFi Wiz Application**




The WiFi Wiz function supports:

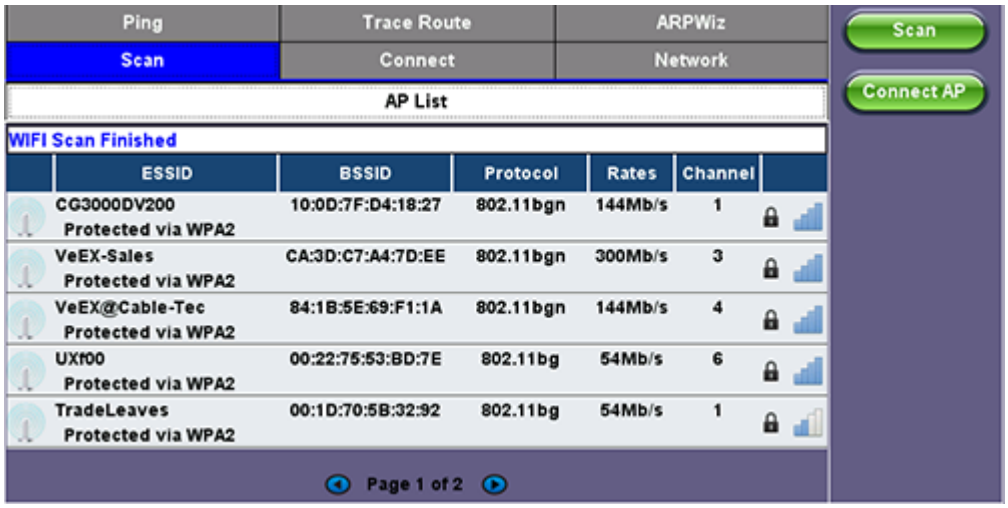
- 802.11 a/b/g/n/ac standards (refer to WiFi USB adaptor provided by VeEX)
- WEP, WPA, WPA2 Encryption
- Scanning
- SSID broadcasting and report
- Signal Strength
- IP Connection and Ping Test

### 7.3.1 WiFi Procedure

- Plug the WiFi adaptor into the USB port. Allow at least 30-45 seconds for the unit to detect the wireless adaptor and for the software driver to load.

  *Products support USB wireless adaptors supplied by VeEX only and have the necessary software driver built into the test set.*
- Tap on the **Scan** tab once the test set has detected the wireless USB adaptor.

**WiFi Wiz - AP List**



**AP List**

The following information is displayed for each AP:

- SSID name of the AP
- BSSID (MAC address) of the AP
- 802.11 protocol version supported by the AP
- Max data rate supported by the AP
- AP's radio channel number
- Lock symbol indicates if security is set on the AP (WEP, WPA or WPA2). When the AP is unsecured, no lock symbol is displayed
- Signal strength of the AP

Select one of the Access Points (AP) to start a connection. If the AP is locked, a network key is required to complete the connection. The key can either be 10 characters or 26 characters.

*If the user enters the wrong network key, the test set will still connect to the Access Point, but will not be able to connect to the web or perform the Ping test.*

Once selected, an **Edit Settings** function key appears on the right hand side bar.

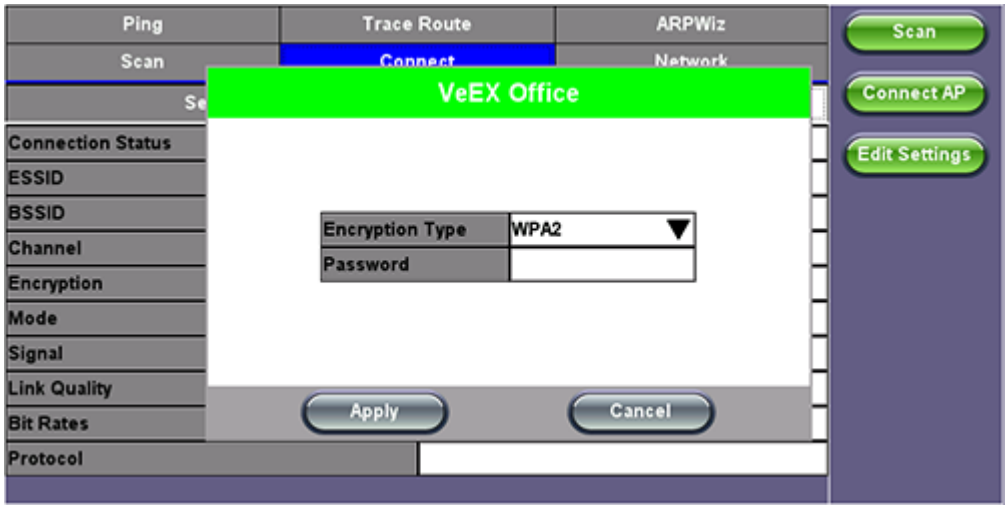
Tap on **Edit Settings** or **Connect AP** to change the Encryption Type and enter the WiFi Key.

- **Encryption Type:** Supported encryption types include WEP, WPA, and WPA2.
- **Key:** Security phrase or password necessary to access SSID and network. Tap the **Key** field to enter the AP password on the pop-up keypad.
  - ASCII formatting supported
  - The password/phrase can be hidden (**Global Settings** > **Show Password** > **Yes/No**)

*Passwords are case sensitive.*

Press **Apply** after selecting the Encryption Type and entering the Key. If the encryption menu was accessed via **Edit Settings**, press **Connect AP** to connect to the AP. If the encryption menu was accessed via **Connect AP**, the test set will connect to the AP automatically after pressing Apply.

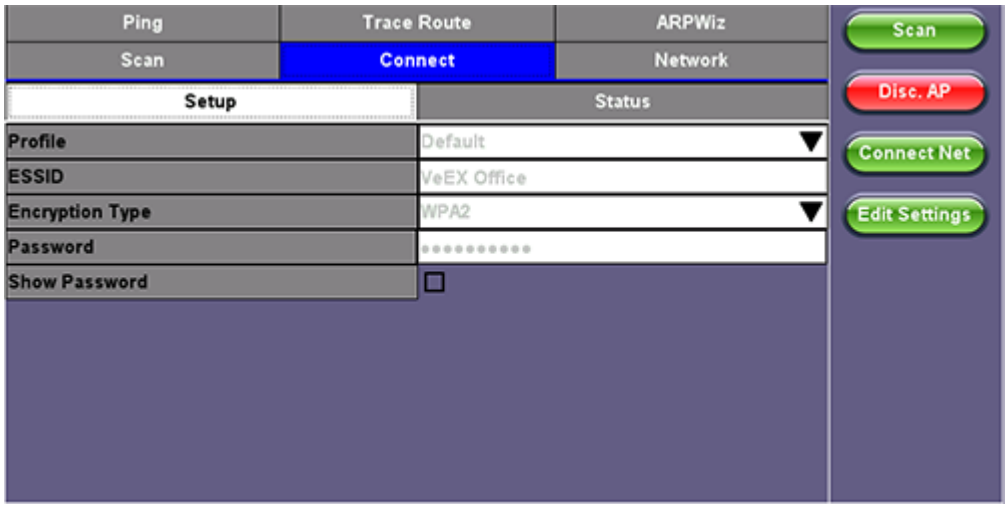
**WiFi Wiz - AP Encryption Settings**




**Connect**

The **Setup** Tab displays the Profile, ESSID, Encryption Type and Password.

**WiFi Wiz Connection Setup**

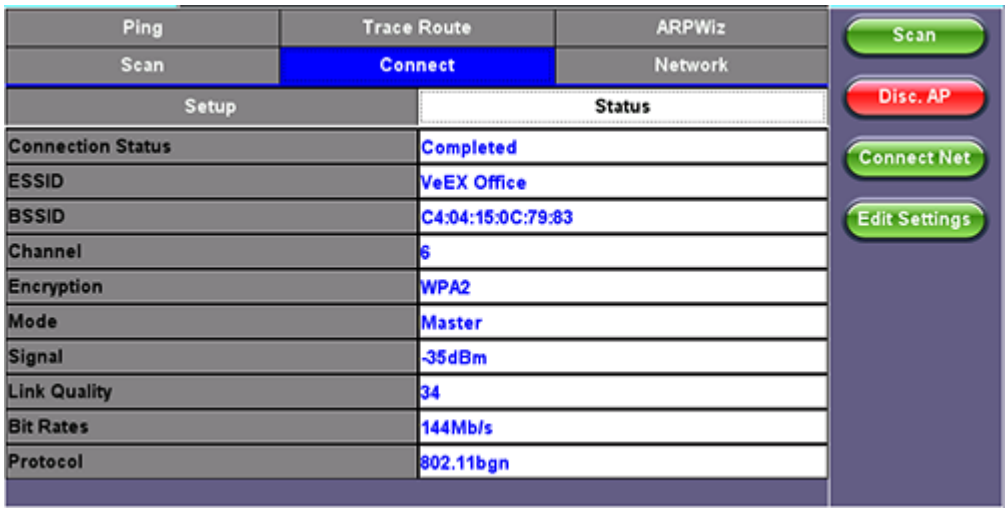



**Status**

The Status Tab displays the following information on the connection:

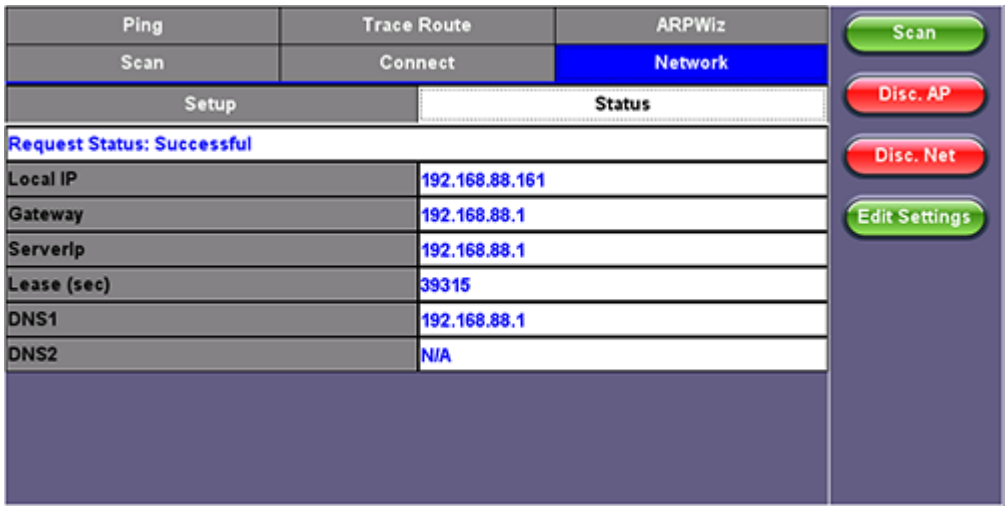
- **Connection Status**
- **ESSiD:** Name connected to
- **BSSiD:** MAC address of wireless router/device connected to
- **Channel:** WiFi Channel # connected to
- **Encryption:** Encryption type
- **Mode**
- **Signal:**
  - Radio signal level (dBm)
  - Link quality score
  - Max data rate
  - 802.11 protocols supported

**WiFi Wiz Connection Status**




After a successful connection to the Access Point press Connect IP to obtain an IP address and access the additional IP tests like Ping, Trace Route etc.

**WiFi Wiz Connect IP**

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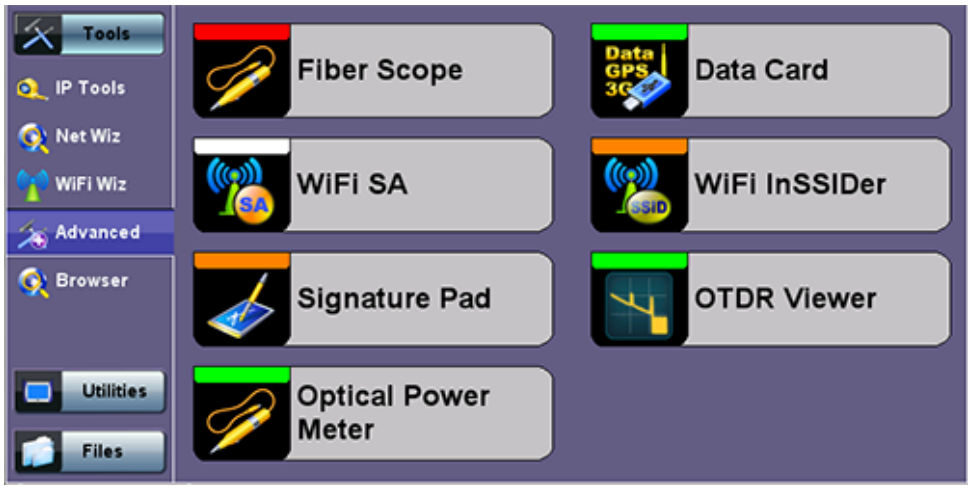
## 7.4 Advanced Tools

**Advanced Tools**




### 7.4.1 Fiber Scope

The Fiber Scope Inspector is an ideal tool for checking fiber optic connectors for dirt and end face quality. The handheld probe design enables easy inspection of patch cords and difficult to reach bulkhead or patch panel connectors. Clear images are displayed on the V300 products for immediate analysis and can be saved for record keeping.

**Fiber Scope**


Key features include:

- Optical connector end face inspection
- Easy to change adaptor tips
- Multi mode and single mode fiber patch cords
- Sharp images displayed on VeEX V300 products
- Visual comparison mode of saved image

The ISO/IEC 14763-3 standard for Testing Optical Fiber Cabling specifies visual standards for connector end face inspection with a fiber microscope. The ISO-related standards and general industry practices recommend the following:

- Markings on the core or damage to the cladding close to the core are unacceptable
- Slight scratches and small pits on the cladding away from the core are, however, acceptable
- Cracks are not permitted in neither core nor cladding

Equipped with 400x magnification, the VeEX Fiber Scope Inspector is well suited for general installation and maintenance checks on both single mode and multi mode fiber types. Contamination or damage that cannot be viewed at this magnification is unlikely to impact practical connector performance; thus, it is an ideal tool for patch cord inspection, optical laboratory or field test applications.

Lightweight construction and the ergonomic positioning of the rotary focus dial enables one-handed operation and fast viewing, leaving one's hand free to move the connector under test as needed. Interchangeable screw-on adaptors are available for most modern optical connectors, while the probe design blocks any hazardous infrared light from reaching the operator, resulting in completely eye-safe operation.

#### 7.4.1.1 Automatic Focus Detection and Analysis

In the past, fiber connector end-face inspection not only required a good Fiber Microscope (Fiber Scope), but certain amount of knowledge and hand-eye dexterity from the user. Results were prone to inconsistencies, subject to interpretation and PCs were required for post analysis against the criteria set forth by the IEC 61300-3-35 Sect 5.4 standard.
VeEX has made the task easier, faster and foolproof, with the introduction of its patent-pending revolutionary Automatic Focus Detection technology. Turning ordinary digital fiber scopes, like DI-1000, into accurate semi-automated inspection systems. All with the help of TX300S, FX300, RXT-1200 or SunLite OTDR test sets.

Instead of adding the extra complexity, fragility, cost, size and weight of other electromechanical focusing systems currently available in the market, VeEX's auto focus detection technology still relies on the incredible fast response and finesse of human hands, but leave the focus assessment, image capturing and analysis to the test set. Users could even try with their eyes closed and still achieve a perfectly focused image of the connector end-face in a few seconds. Moreover, users would still remain in control during non-trivial scenarios requiring the irreplaceable human dexterity and ingenuity.

#### 7.4.1.2 Main Advantages of Automatic Focus Detection

- Investment protection (no need to replace existing scopes, like DI-1000, with a more expensive ones)
- It's a simple software option upgrade to the test set
- Much faster focus, acquisition and analysis, compared to slow electro-mechanical auto-focusing scopes
- Robustness: Less moving parts and no internal motors makes a better choice for field applications
- No training necessary, yet get it right every time
- Smaller scope size
- Report generation (html and PDF)
- The test set detects when the image has reached optimal focus level, automatically freezes the picture, captures the image and runs the IEC 61300-3-35 analysis
- No need to move hands or press any buttons (movement and vibration are common causes of focus loss)
- No PC required for image acquisition or Pall/Fail analysis

#### 7.4.1.3 The Importance of Fiber Connector Inspection

Dirty or scratched connectors introduce loss, increase ORL and/or damage other connectors (Loss becomes more critical at higher data rates). End-face contamination is a leading cause of fiber link failures in data centers, corporate networks, MSOs and Telecom environments.

Fiber Inspection Scopes provide a magnified image of the fiber optics connector's End Face, focusing on the contact areas (prone to loss or damage by mating). Images, visual inspection and automated tools are often used to grade the health and cleanliness of connectors, after polishing or cleaning and before being used.

#### 7.4.1.4 Fiber Connectors and Test Gear Vulnerabilities

Opposed to the permanent or semi-permanent connections often found in network environments, "promiscuous" Test Equipment and their patch cords connect to multiple devices on a daily basis, increasing the chances to damage or get damaged. Extra care must be taken, not only to avoid potentially expensive damage, but to make sure that any tests and their results remain valid. Bad fiber or dirty/damaged connectors can result in false anomalies, defects or errors, even expensive repairs.

#### 7.4.1.5 About the DI-1000 Fiber Inspection Scope

- Digital Fiber Inspection Probe
- Native USB 2.0 (no adapters required, no image degradation)
- Compatible with existing UX400, TX300S, FX300, RXT-1200 and SunLite OTDR
- Precise and stable single-finger focus knob for one hand operation
- Blue light source for better contrast
- 400X magnification
- Interchangeable tips – Most commonly used tips are available (FC, SC, LC, ST, MTP, E2000, including PC, APC, 60° angled tips, among others)
- Compatible with VeEX test sets offering built-in Auto Focus-Detection & Analysis
- Ergonomic design

#### 7.4.1.6 Fiber Connector Inspection Setup

The Setup tab allows basic settings:

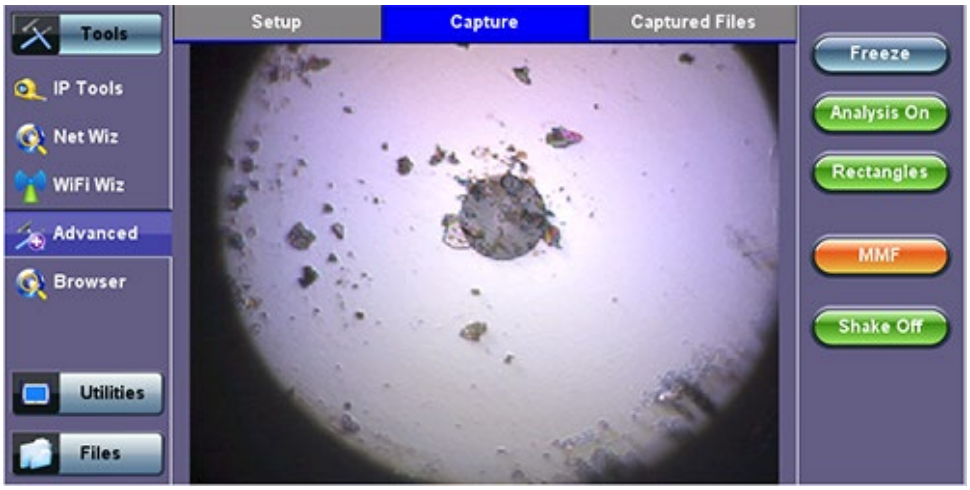
**File Prefix:** String of alphanumeric characters to be appended at the beginning of the file name, every time the results are saved. For

example Fiber0239-
**Starting #:** Every time a result is saved, this suffix number will automatically increment. Users can manually enter the initial value here.
**Auto Freeze:** This is amount of time the optional Auto Focus Detection feature will look for a stable in-focus image before automatically freezing the image and starting an analysis. Select Never, if manual capture or real-time analysis is desired. Auto freeze comes handy when both hands are tied (e.g. one holding the connector and the other holding the probe, or working on a pole)
**Scope Mode:** Use Local for USB fiber inspection scopes that directly attached to the test set. Use Remote if the probe is attached to a wireless transmitter using Wi-Fi connection.

#### 7.4.1.7 Capture Tab (View)

The Capture tab is the main user interface for the connectors' face inspection and analysis. It presents a real-time view of the connector's end face allowing users to align and focus.

**Fiber Scope - Capture tab**



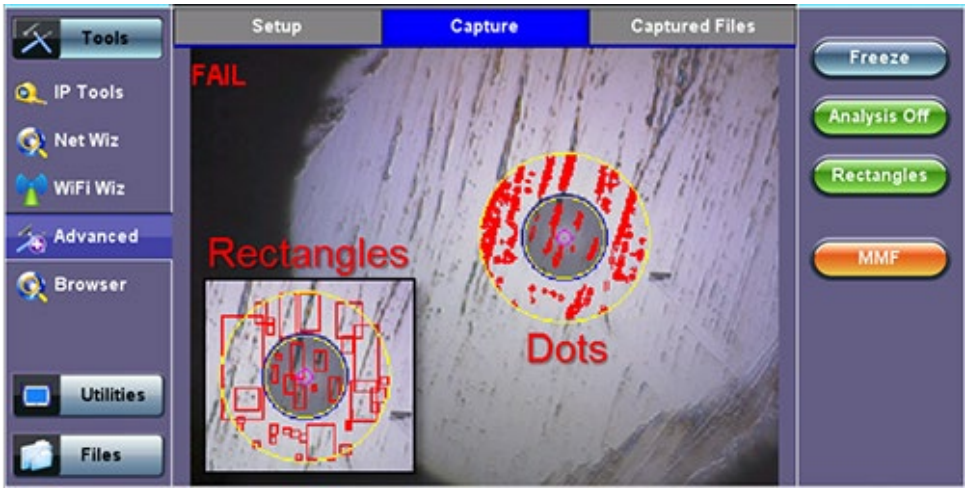

**Important!** The soft buttons in the action bar (right side of the screen) do not indicate the current state or setting, they indicate the action that would take place if pressed. For example, if user taps on the "Analysis OFF" button, the analysis function is turned OFF and the button toggles to show "Analysis ON". These soft buttons should be interpreted as "Go to…"

**Freeze:** Allows users to manually freeze the image in the desired view. If the optional Auto Focus Detection feature is enabled, the test set will automatically freeze the image when the image comes into focus. Once the image is frozen, users can tap on the image to save it.

**Analysis ON/OFF:** Turns the optional auto-analysis feature ON and OFF. If turned ON, the test set automatically analyzed the image in real time. If the markers get in the way of seeing the picture details, users can turn this feature OFF and perform manual analysis.

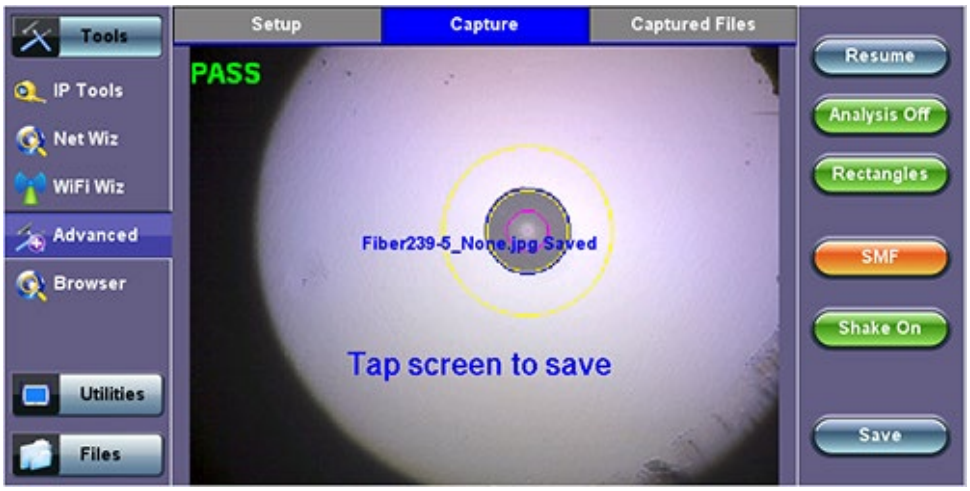
**Dots/Rectangles:** They are two ways of highlighting the different impurities found in the face of the connector. The dots tightly contour each individual anomaly, capturing its area. In some cases users may want to see impurities or scratches that are otherwise covered by the dots, so rectangles are used in this case to highlight the anomaly and still keep them visible. The selection between dots or rectangles does not affect the area calculation r the Pass/Fail results; they are just operator's choice.

**Save:** The Save button appears after freezing an image. I performs the same action as tapping on the screen to save the current image. Use the **>Utilities >Files** function to View the report, export to PDF format and copy to USB.




**MMF/SMF:** Selects the type of connector/fiber to be analyzed and loads the correct Pass/Fail mask. Please note that the label in the button DOES NOT indicate the current mask type. It indicates that the mask would be changed to if activated.

**Shake ON/OFF:** Turning the Shake ON may help in situations when the image is not very stable, such as inspecting a female connector or bulkhead.



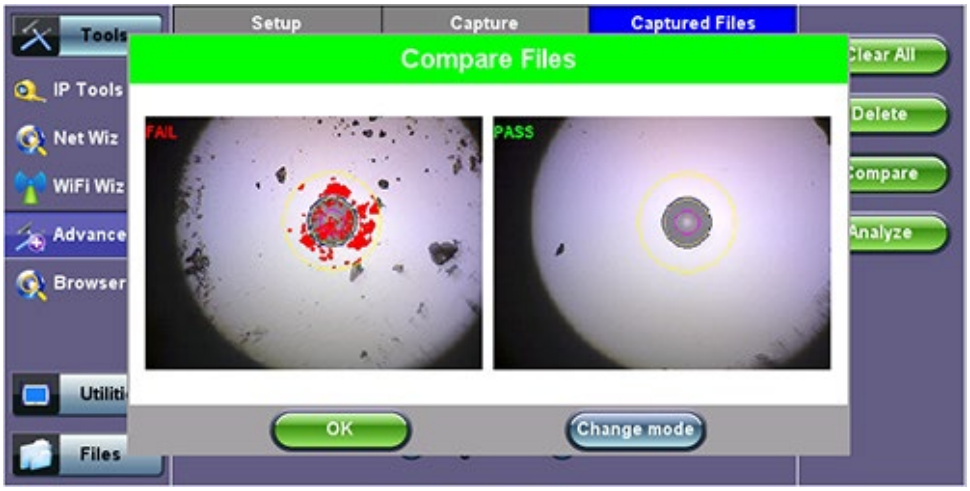

#### 7.4.1.8 Captured Files Tab

This section of the user interface lists all the connectors' end face images that have been captured with the fiber inspection microscope. Users can and "Before" and "After" identifiers or remainders when comparing images before or after cleaning or polishing.

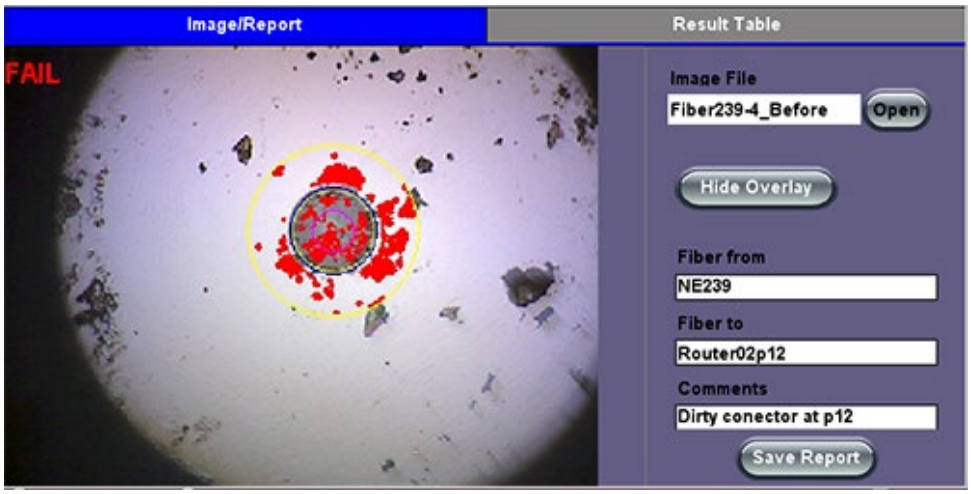
**Clear All:** Deletes all the image files in the Captured Files list

**Delete:** Deletes any check-box selected files from the Captured File list

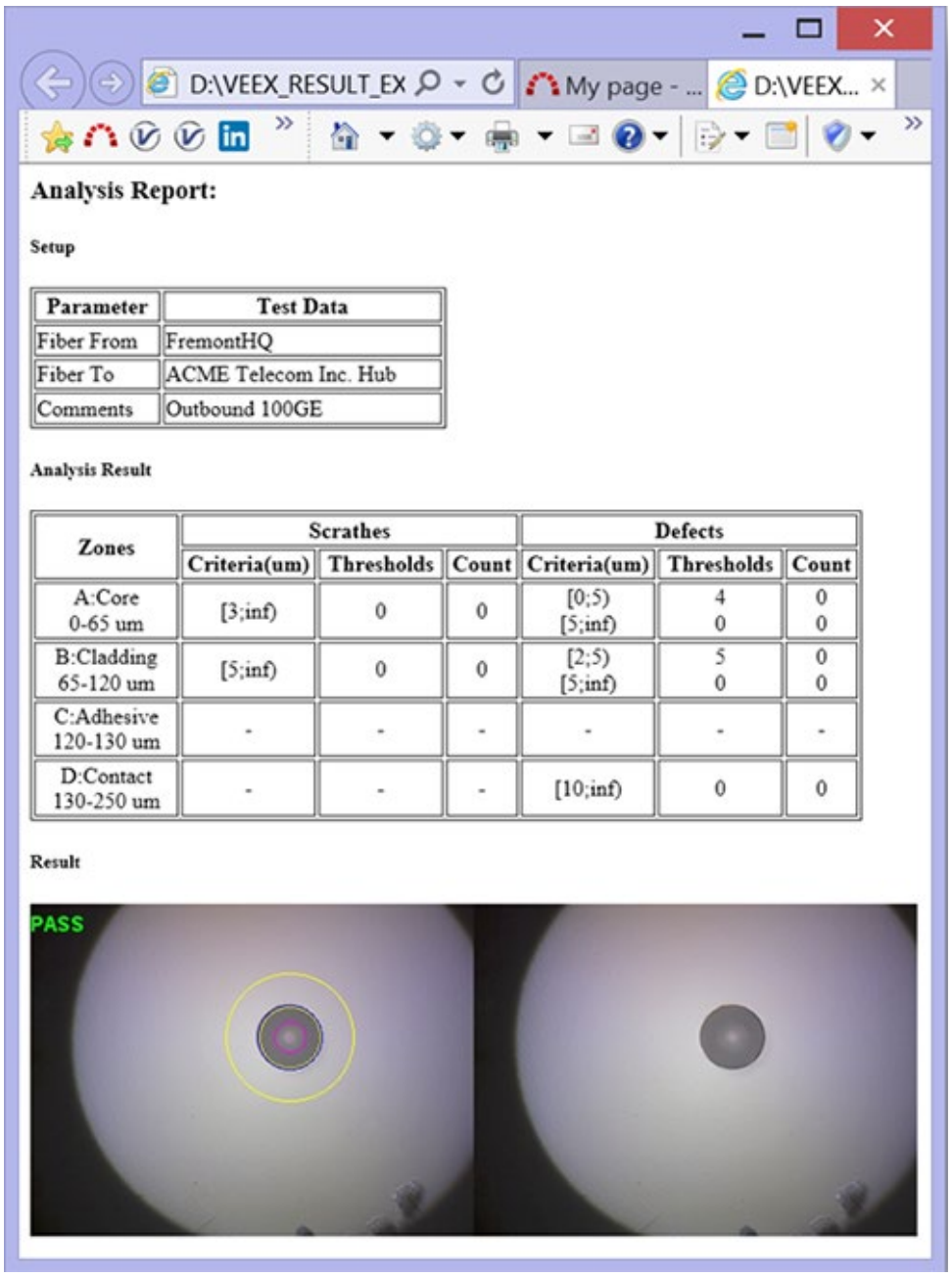
**Compare:** Compares two images, for example, ones taken before and after cleaning. Use the check-boxes to select any two image files and then tap on the Compare soft button. Use the Change Mode button on the comparison window to enable and disable the analysis overlay.



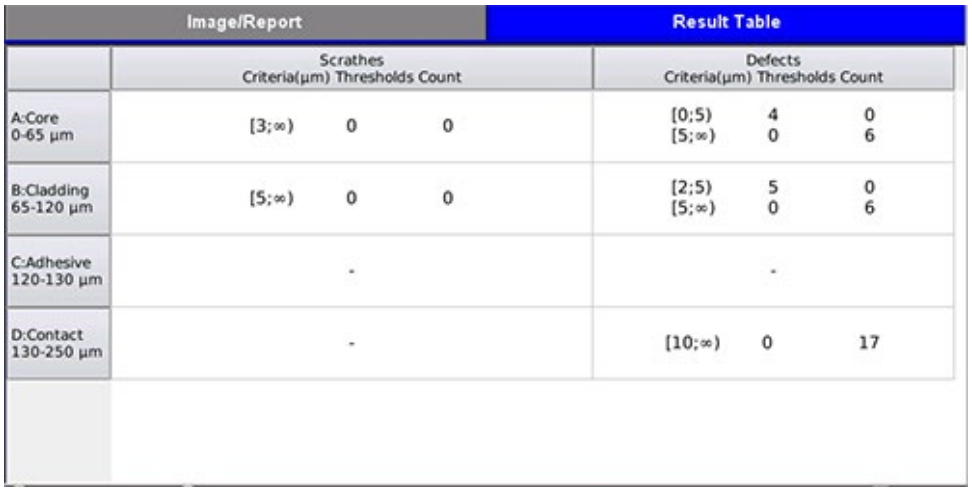

**Analyze:** This soft button opens a more detailed analysis and report generation. Use the check boxes to select the images to be analyzed




- **Image File:** Shows the name of the picture currently being displayed. Use the Open button to navigate, select and load any other file.
- **Show/Hide Overlay:** Enables or disables the mask, anomalies identification and analysis.
- **Finer From/To:** User customizable labels to identify the fiber under test
- **Save Report:** Generates a full report including a table with measurements and images. Use the **>Utilities >Files** function to View the report, export to PDF format and copy to USB.



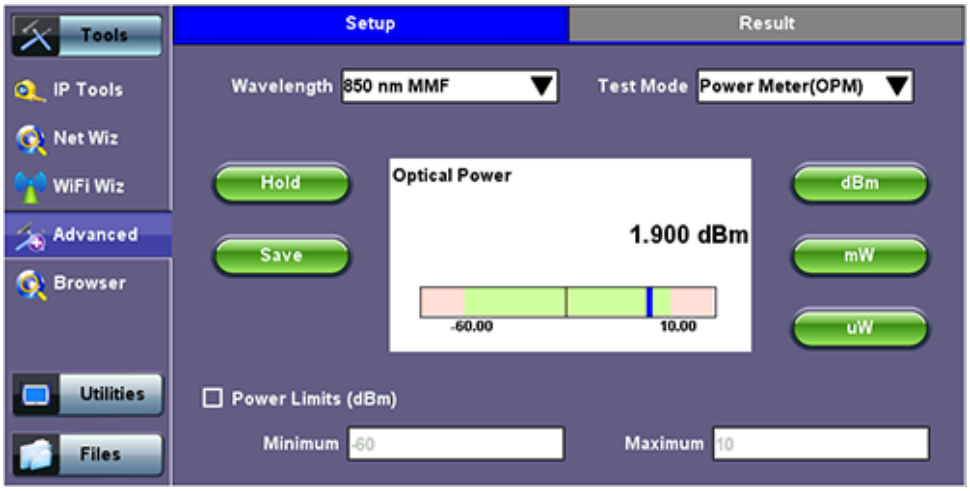

- **Results Table:** Shows the defects and scratches count by sizes and position, used for the evaluation of the Pass/Fail criteria, according to the IEC 61300-3-35 standard.



### 7.4.2 Optical Power Meter (OPM)

This function works in conjunction with Optical Power Meter dongles (USB), such the optional UPM-100.

Insert the OPM dongle to on of the test set's USB port before launching this application.




**Optical Power and Loss Measurements**

**Wavelength:** This pull-down menu provides a list of calibrated wavelengths to match the signal being measured.

**Test Mode:** Allows users to select between Power or Loss measurements.

- In Power Meter mode the test set presents the direct power readings, which are displayed in dBm, mW or uW units. Users can perform he conversions by using the button on the right side of the reading
- In Loss Meter mode the test set reports the difference in power readings between the Laser Source (LS) output being used and what is currently present at the connector after being attenuated by the fiber. The results are presented in dB. Loss meter requires to be referenced (calibrated) to the Laser Source output. You must connect the LS to the OPM dongle using a short patch cord and tap on the Reference button to record the 0dB point. Then that LS can be connected to the far-end of the fiber to measure the loss.

**Hold:** Freezes the last power or loss reading on the screen

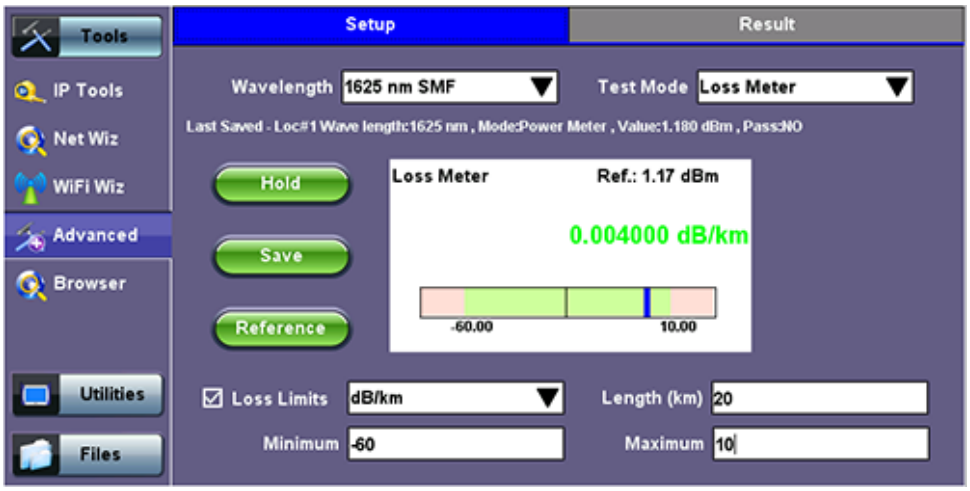
**Save:** Records instantaneous power or loss readings in the Result's tab. This is useful when measuring multiple fibers or testing one fiber with multiple wavelengths. Up to 12 measurements can be logged in the Results tab. You must use the 1 button to save these results.


#### 7.4.2.1 Setting Pass/Fail Limits

Whether measuring optical power or loss, there are always power input limits (saturation and Loss) or attenuation allowances that determine whether the fiber cable meets the requirements for the desired application or network elements.

**Power Limits (dBm):** When check-box is ticked, users can enter the Minimum and Maximum power levels allowed for the application (e.g. in line with the transceiver's dynamic range). If the power reading falls beyond those limits, the power measurement reading will turn red.

**Loss Limits:** Similar to power limits, user can set Minimum and Maximum amounts of optical power loss that are acceptable for the application or specified for the cable or installation. User can simply specify the total amount of attenuation in dB. Alternatively, user can select the dB/km or dB/mi if the results are being compared against cable specifications. In this case, enter the length of the cable under test for the test set to make the conversion.




### 7.4.3 WiFi Spectrum Analyzer

WiFi SA is a portable spectrum analyzer on a USB dongle that displays all RF activity in the WiFi bands (e.g.,s wireless networks, cordless phones, microwave ovens, Bluetooth devices, etc.). It offers the following capabilities:

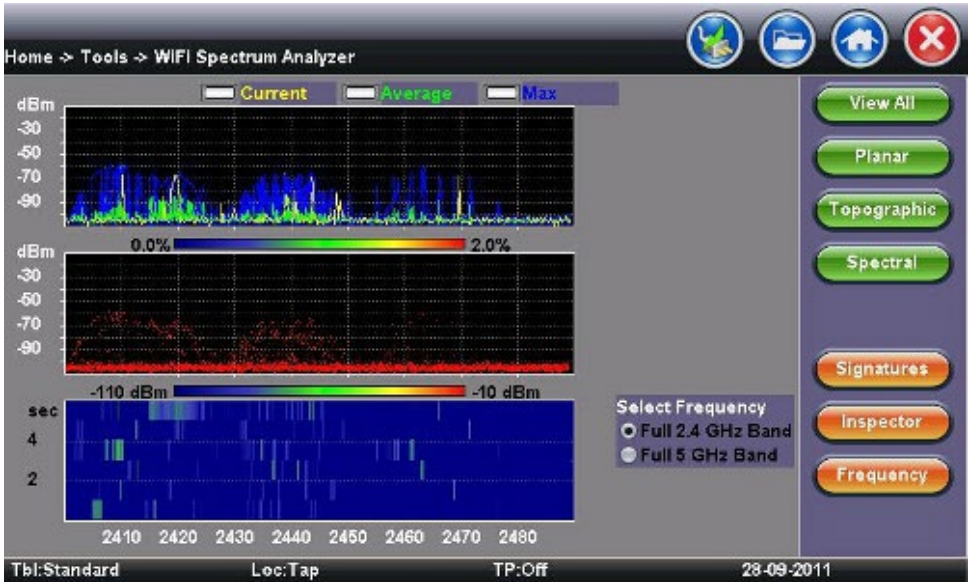
- Helps determine the best available WLAN channels quickly for optimal performance
- Helps to visualize and locate RF signals in the 2.4GHz and 5GHz spectrums
- Discover and remedy competing access points
- Optimize WLAN networks by locating and eliminating interference sources

**WiFi SA Specifications**

| Parameter | 2.4 GHz | 5 GHz |
|---|---|---|
| Frequency range | 2.4 to 2.495 GHz | 5.15 to 5.85 GHz |
| Frequency resolution | 26 kHz to 3 MHz | 24 kHz to 3 MHz |
| Filter bandwidth | 58 to 650 kHz | 54 to 600 kHz |
| Antenna type | RP-SMA | |
| Amplitude range | -100 dBM to -6.5 dBM | |
| Amplitude resolution | 0.5 dBM | |

- Supports 802.11a/b/g/n networks
- Supports both 2.4 GHz and 5 GHz bands
- Equipped with RP-SMA antenna jack
    - Allows user to replace standard external Omnidirectional antenna with a higher gain or directional antenna as needed
- The WiFi Analyzer is a compact and portable USB dongle that plugs into the USB 2.0 port of the V300 series
- The WiFi SA test application menu is located in the Tools/Advanced Tools menu

**WiFi SA Display Summary**

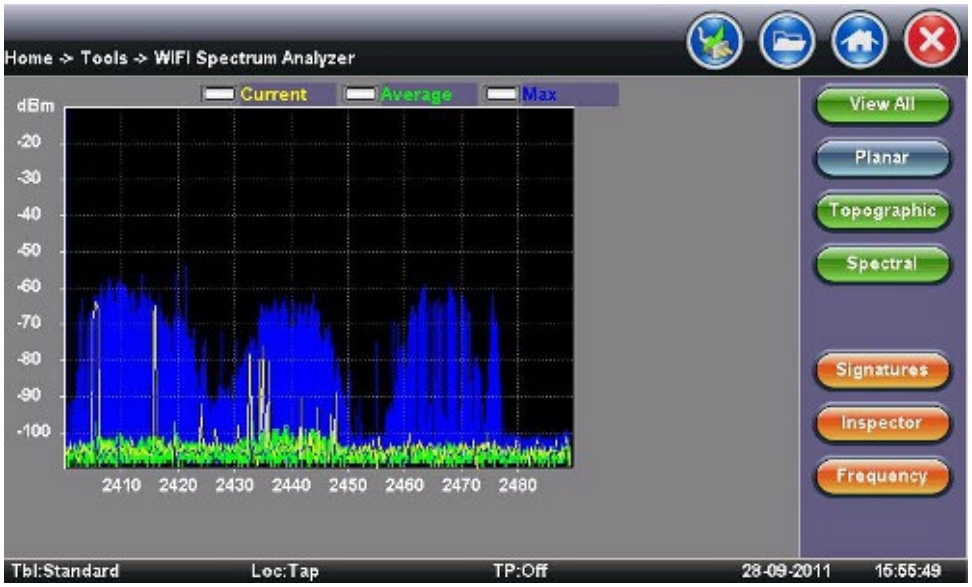



**WiFi Analyzer USB dongle**


**Display Summary**

- **Planar view:** Reports current, average, and maximum signal amplitude for each wireless frequency
- **Topographic view:** Emphasizes which frequencies are the busiest across the entire spectrum
- **Spectral view:** Historical view of wireless spectrum use at a point in time

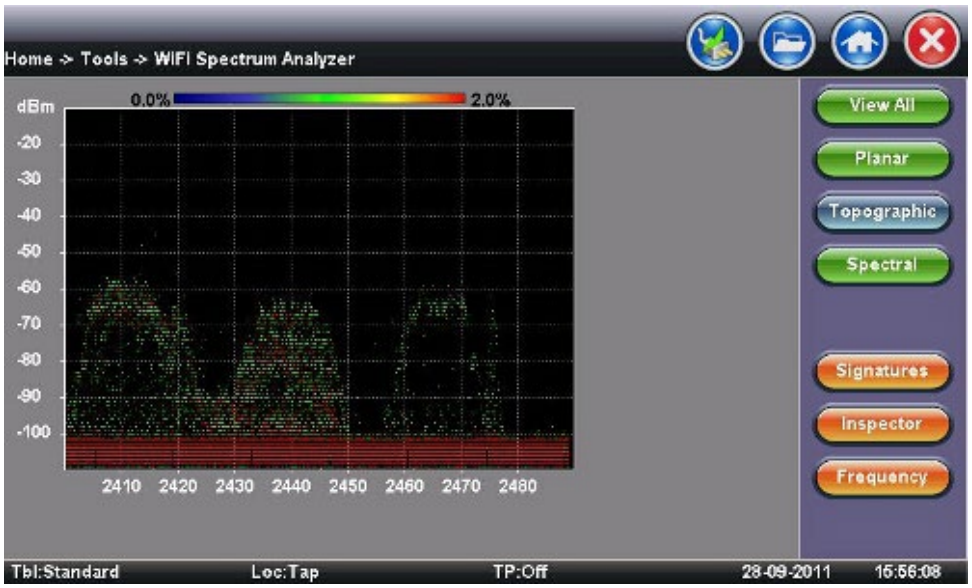
**WiFi SA - Planar View**




**Planar View**

- Traditional Spectrum Analyzer view with Max, Average, and Current results
- Displays RF activity in real time and tracks average and max values over a given period

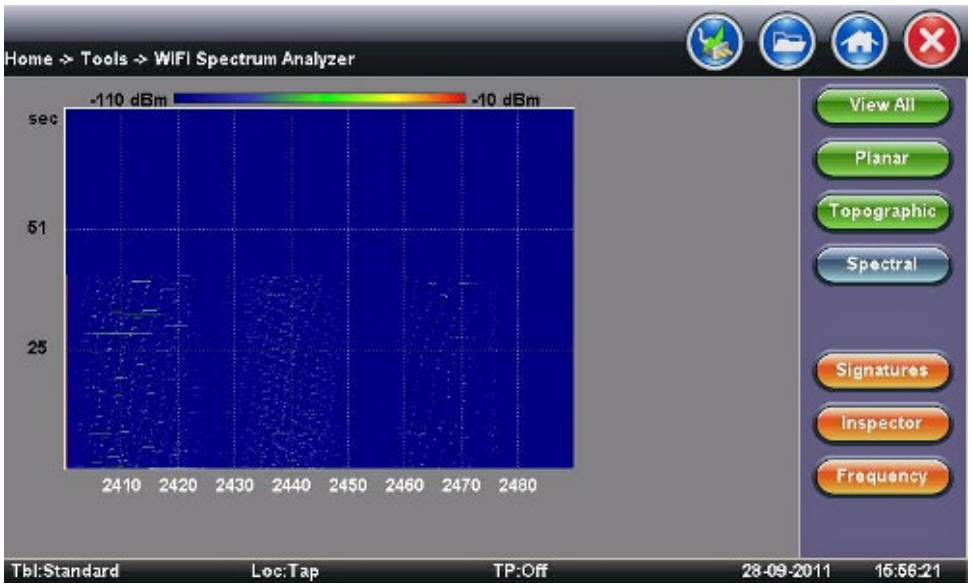
**WiFi SA - Topographic View**




**Topographic View**

- Similar to a density map - plots frequency versus amplitude
- Uses a special color scheme to assign colors to frequency amplitude points and to identify how often a particular coordinate is recorded
- Great resource for identifying devices with very low duty cycles
- Leaving it running will give a good indication of the typical local network conditions

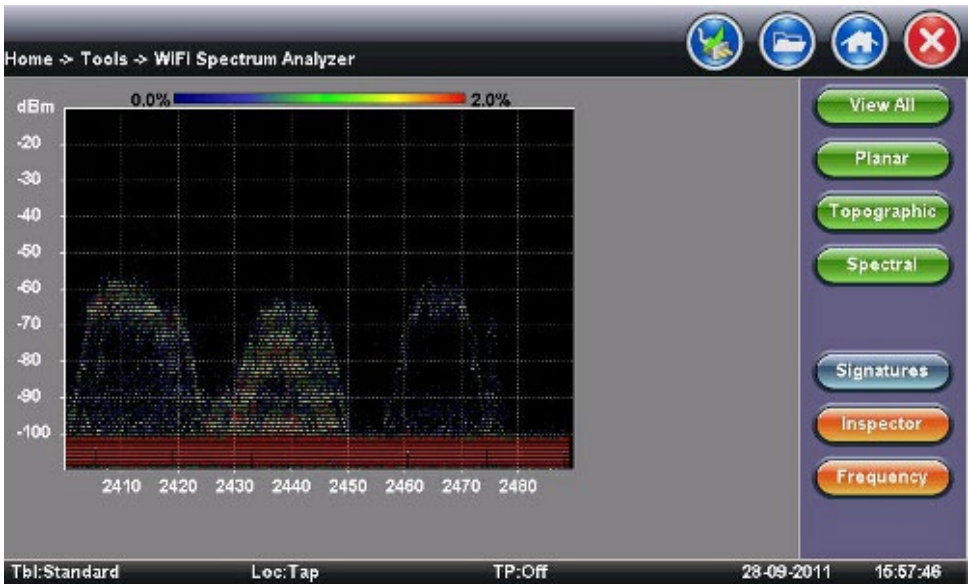
**WiFi SA - Spectral View**




**Spectral View**

- Waterfall type view across the whole band - graphs amplitude levels over time
- Uses color to pick out the relative signal strength at each point in time
- Great tool for troubleshooting intermittent problems, since it highlights devices that are perhaps emitting only short bursts of noise
    - For example - discover microwave oven in the kitchen interfering with WLAN

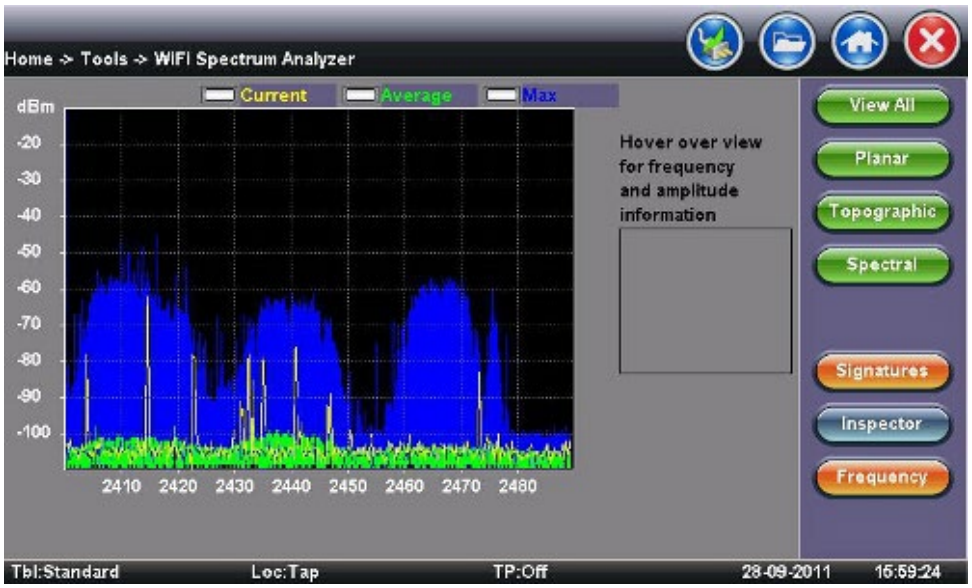
**WiFi SA - Signatures**




**Signatures**

- The Signatures button presets are available to identify unknown sources of RF activity (e.g., microwave oven)
- Select a device in the sidebar and click the pattern in the Topographic view to identify a device

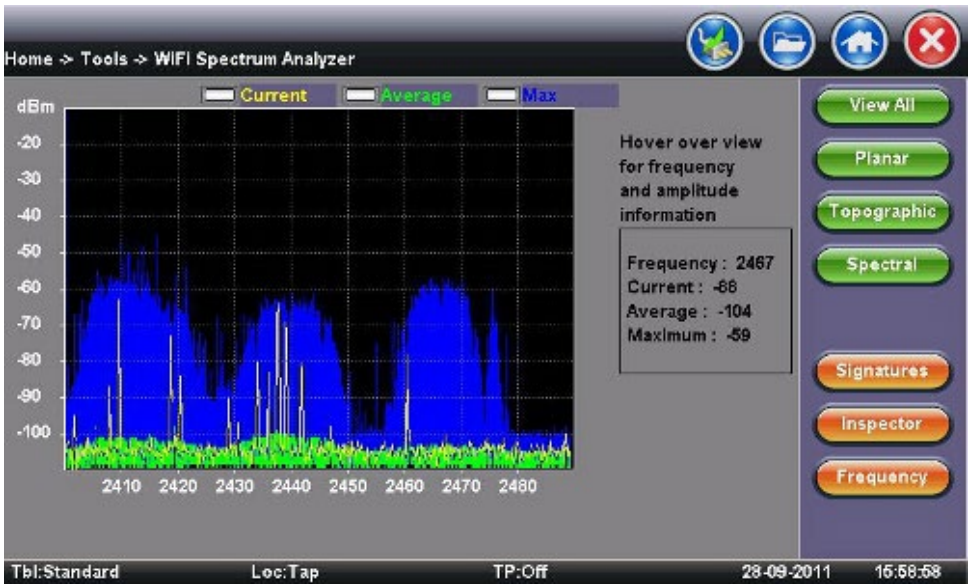
**WiFi SA - Inspector**




**Inspector**

- The Inspector button setup allows the user to measure the frequency of the RF activity or interference of interest
- When selected, a prompt and result box appears

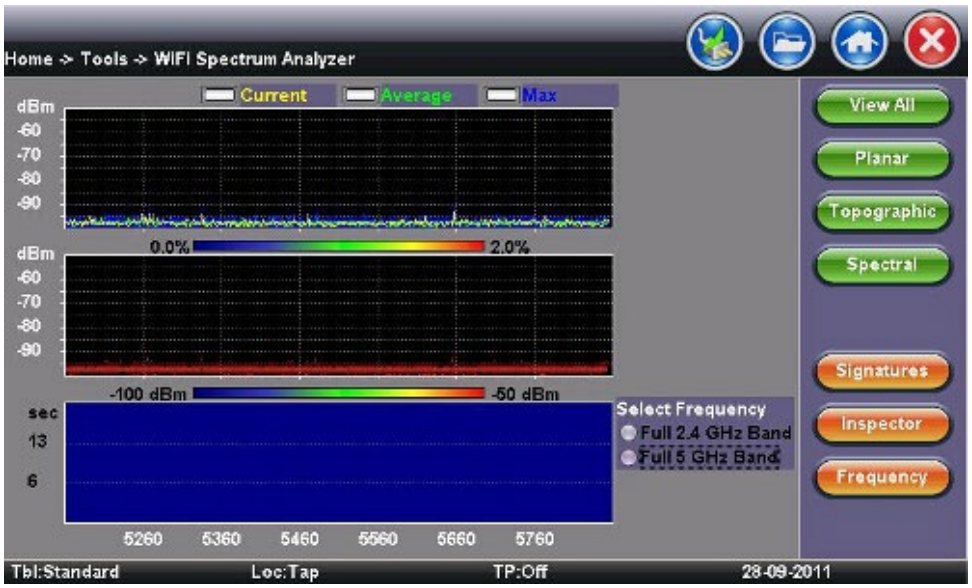
**WiFi SA - Inspector - Result**




**Inspector Button - Result**

- Identifies frequency and amplitude
- Current, Average, and Maximum amplitude values provide an indication of level fluctuation over measurement period

**WiFi SA - Frequency**



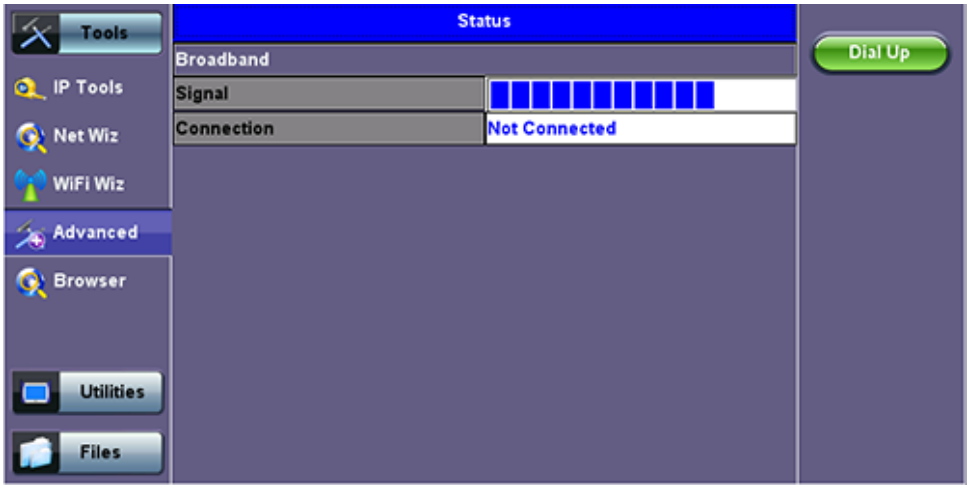

**Frequency**

- This button allows the user to select frequency band for testing

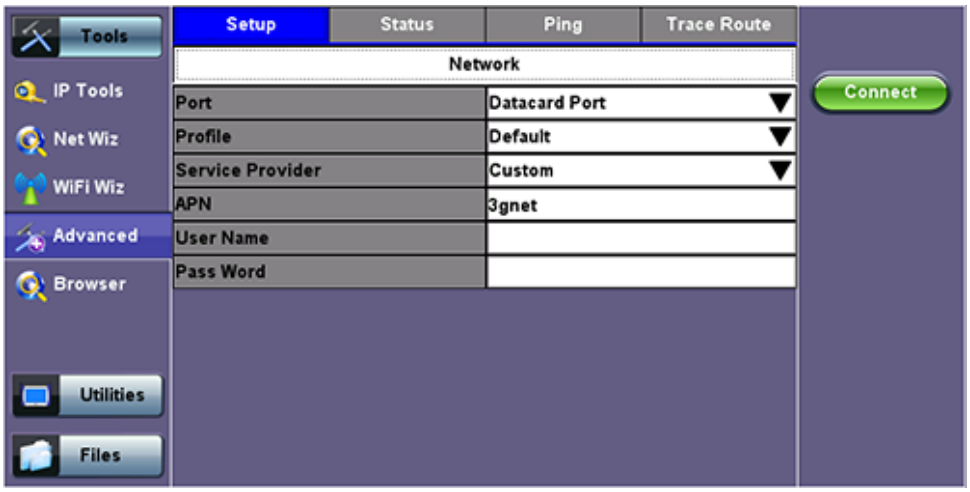
### 7.4.4 Data Card

To establish an IP connection using a data card, please make sure that the data card is connected on the USB port. Note that only datacards provided by VeEX are supported and have the driver necessary for connection. The **Data Card** icon, as shown below, will appear at the bottom of the screen.

**Data Card - Setup**

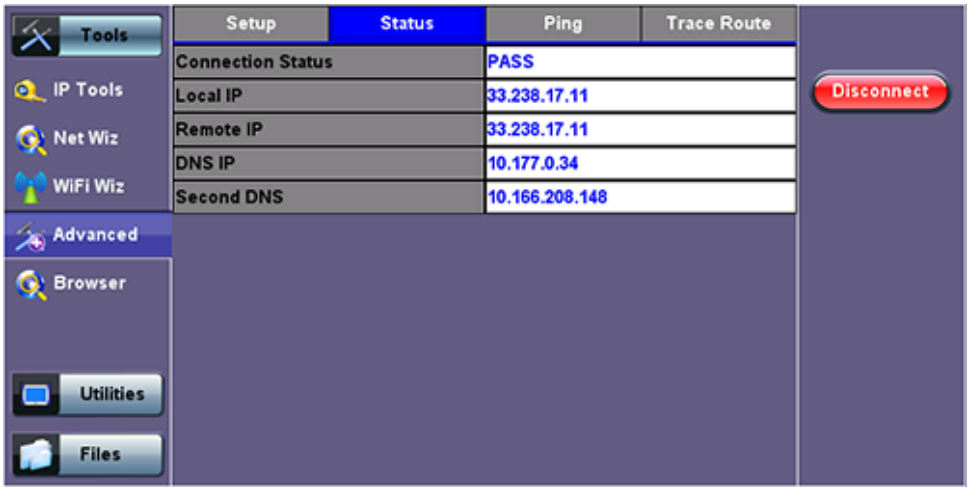



1. Press the **Dial Up** key
2. In the IP Tools Setup menu, the Port will be displayed as "Datacard Port." The D for Data icon in the bar on the lower end of the screen will have a red cross to show that datacard is not connected -  .
   Select the **configuration parameters**, then press **Connect**.



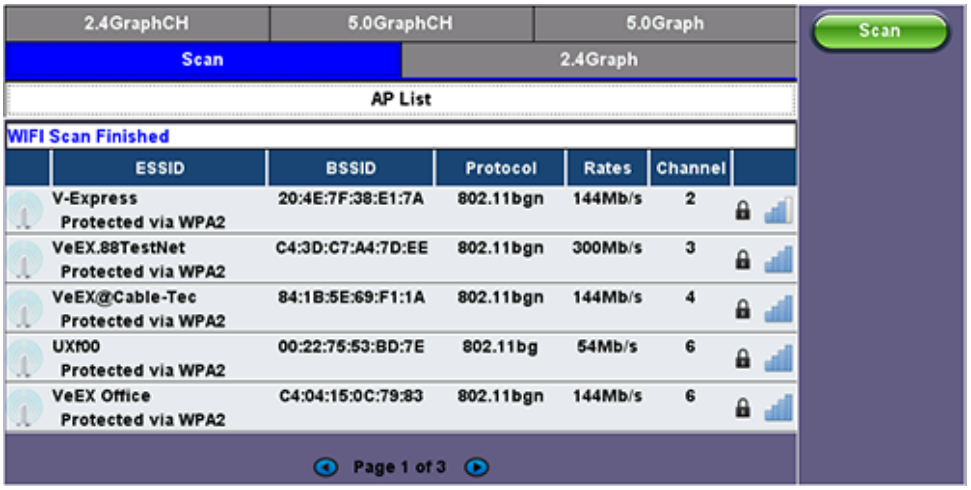

Once a connection has been established:

- The **D** for Data in the icon turns green  .
- The connection details are displayed in the IP Tools Status tab (shown below)
- It will automatically reconnect if the test set is powered off/on and you are in a good reception area
- It will automatically reconnect if you enter a bad cell area and return to a good one




### 7.4.5 Wifi inSSIDer

**WiFi inSSIDer Home**




1. Plug the WiFi adaptor into the USB port. Allow at least 30-45 seconds for the unit to detect the wireless adaptor and for the software driver to load.

*Products support USB wireless adaptors supplied by VeEX only and have the necessary software driver built into the test set.*

The WiFi InSSider supports 2.4GHz and 5.0GHz Bands. The home screen has tabs to display test results for both frequency bands and also for graphical presentation of results for both.

2. Tap the **Scan** button on the right side of the screen.

After the scan is completed, the unit displays the list of access points (AP) detected in the 2.4 GHz and 5GHz bands.

The following information is displayed for each AP:

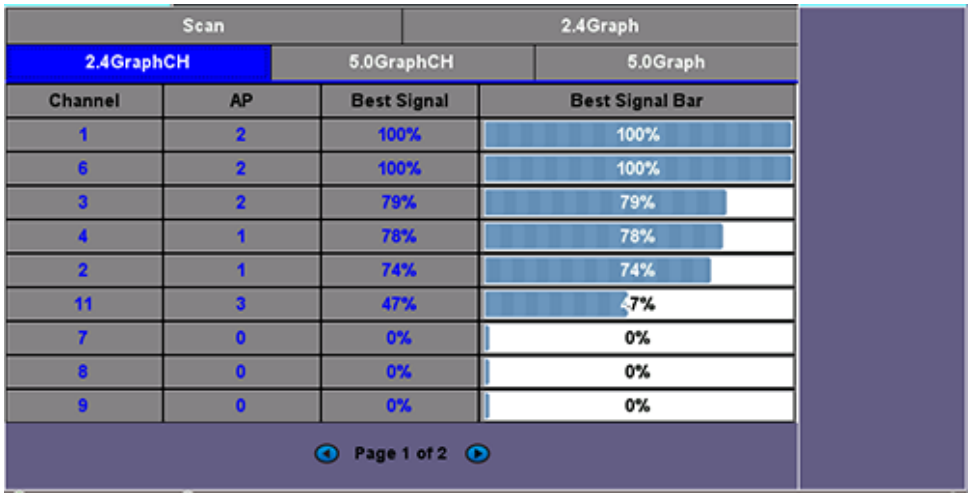
- SSID name of the AP
- BSSID (MAC address) of the AP
- 802.11 protocol version supported by the AP
- Max data rate supported by the AP
- AP's radio channel number
- Lock symbol indicates if security is set on the AP (WEP, WPA or WPA2).
  When the AP is unsecured, no lock symbol is displayed
- Signal strength of the AP

Access Points in the 5.0GHZ spectrum can only be displayed if the VeEX USB Wifi adapter supports 802.11a/n or 802.11 a/n/ac. Refer to the USB Wifi adapter specifications.

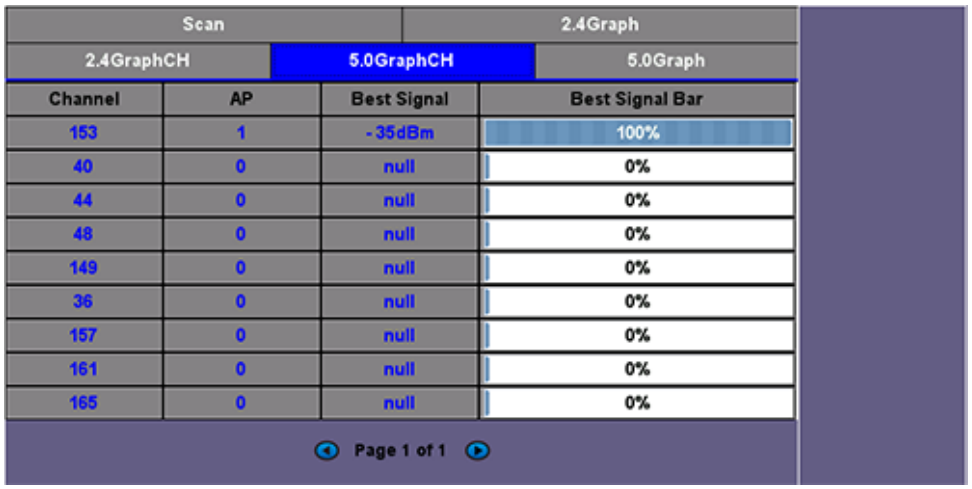
3. Use the 2.4GHz GraphCH and 5.0GraphCH tabs to view the number of Access Points detected for each channel in the 2.4GHz and

5GH bands and the strength of the strongest AP's signal for each channel.

**2.4GHZ Channel**

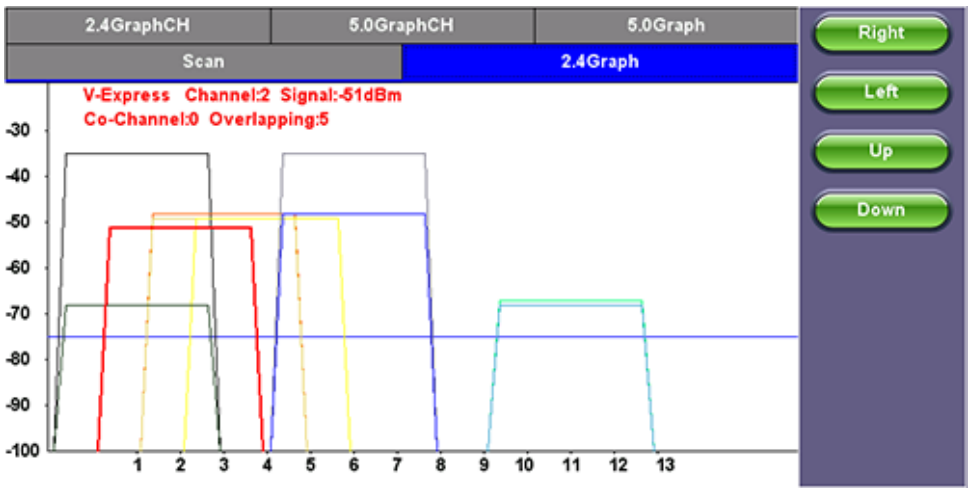



**5GHZ Channel**




4. Tap the **Graph** tab of the respective Channel to view the results in a graphical presentation.

**Graph**




Use the **Right/Left/Up/Down** function keys or the **arrow** keys on the unit's keypad to navigate the graph and get additional information for the access points. Detailed information for each Access Point includes:

- SSID: name of the AP

AP's radio Channel number
- Signal strength (dBm)
- Number of co-channel: Number of APs using the same radio channel
- Number of Overlapping APs: Number of APs using channels whose frequency band overlaps with the AP.

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## 7.5 VFL

Use the Visual Fault Locator (VFL) tool to check end-to-end continuity. Use this visible red light to trace the fiber to instantly identify fiber strands, connectors, breaks, bends and other potential problems or anomalies on events.

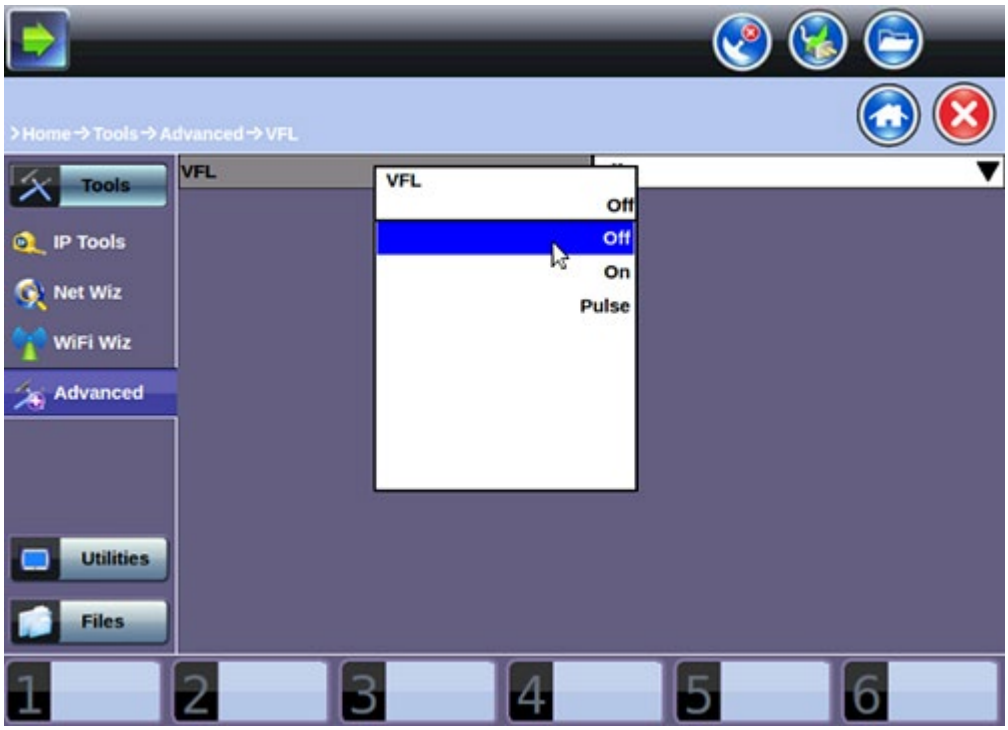
**Continuous Option**

To turn on the VFL continually to check for faults, select **On**.

**Pulse Option**

In certain cases, intermittent light pulses are easier to identify (than continuous light). It can also be used with audible detectors (toners) that can identify faint light or in well-lit (bright) environments. Select **Pulse**.

**VFL screen**

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# 8.0 Warranty and Software

**Warranty Period:** The warranty period for hardware, software and firmware is from the date of shipment to the customer. The warranty period for battery pack, LCD, LCD touch panel, LCD protective cover, and accessories (including but not limited to patch cords, AC adaptor, SFP, USB adaptors, carrying case, carrying pouch) is limited to one (1) year.

**Hardware Coverage:** VeEX Inc. warrants hardware products against defects in materials and workmanship. During the warranty period, VeEX will, at its sole discretion, either

- Repair the products
- Replace hardware which proves to be defective

provided that the products that the customer elects to replace is returned to VeEX Inc. by the customer along with proof of purchase within thirty (30) days of the request by the customer, freight prepaid.

**Software Coverage:** VeEX Inc. warrants software and firmware materials against defects in materials and workmanship. During the warranty period, VeEX will, at its sole discretion, either

- Repair the products
- Replace the software and/or firmware which prove to be defective

provided that the products that the customer elects to replace is returned to VeEX Inc. by the customer along with proof of purchase within thirty (30) days of the request by the customer, freight prepaid.

Additionally, during the warranty period, VeEX Inc. will provide, without charge to the customer, all fixes, patches and enhancements to the purchased software, firmware and software options. VeEX Inc. does not warrant that all software or firmware defects will be corrected. New enhancements attached to a software option require the option to be purchased (at the time of order or the time of upgrade) in order to benefit from such enhancements.

**Limitations:** The warranty is only for the benefit of the customer and not for the benefit of any subsequent purchaser or licensee of any merchandise (hardware, software, firmware and/or accessories).

**Revoking the warranty:** VeEX Inc. does not guarantee or warrant that the operation of the hardware, software or firmware will be uninterrupted or error-free. The warranty will not apply in any of the following cases:

- Improper or inadequate maintenance by the customer
- Damage due to software installed by the customer on the unit without prior authorization (written) from VeEX Inc.
- Unauthorized alteration or misuse
- Damage occurred from operating the unit from outside of the environmental specifications for the product
- Improper installation by the customer

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# 9.0 Certifications and Declarations


**What is CE?**

The CE marking is a mandatory European marking for certain product groups to indicate conformity with the essential health and safety requirements set out in European Directives. To permit the use of a CE mark on a product, proof that the item meets the relevant requirements must be documented.
Use of this logo implies that the unit conforms to requirements of European Union and European Free Trade Association (EFTA). EN61010-1

**For a copy of the CE Declaration of Conformity relating to VeEX products, please contact VeEX customer service.**


**What is RoHS?**

RoHS is the acronym for Restriction of Hazardous Substances. Also known as Directive 2002/95/EC, it originated in the European Union and restricts the use of specific hazardous materials found in electrical and electronic products. All applicable products imported into the EU market after **July 1, 2006** must pass RoHS compliance.

For more information about RoHS as it relates to VeEX Inc, go to the VeEX web site at www.veexinc.com/RoHS.

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# 10.0 About VeEX

VeEX Inc., an innovative, customer-focused communications test and measurement company, develops next generation test and monitoring solutions for telecommunication networks and services. With a blend of advanced technologies and vast technical expertise, VeEX's products diligently address all stages of network deployment, maintenance, field service turn-up, and integrate service verification features across DSL, Fiber Optics, CATV/DOCSIS, Mobile backhaul and fronthaul (CPRI/OBSAI), next generation Transport Network, Fibre Channel, Carrier & Metro Ethernet technologies, WLAN and Synchronization.

Visit us online at www.veexinc.com for latest updates and additional documentation.

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