



**USER MANUAL**



## **VePAL TX300S**

**Ethernet, OTN, SDH/SONET,  
PDH/DSn and Fibre Channel**

Please direct all questions to your local VeEX Sales Office, Representative, or Distributor. Or, contact VeEX technical support at [www.veexinc.com](http://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 you successfully use the features and capabilities of the test platform. It is assumed that you have 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. web site at [www.veexinc.com](http://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. Please go to the Basic Operations section for details on locating the unit serial number in the menus or locate the serial number on the back of the chassis. Please provide this number when contacting VeEX customer service.

### Customer Care:

Phone: + 1 510 651 0500

E-mail: [customercare@veexinc.com](mailto:customercare@veexinc.com)

Website: [www.veexinc.com](http://www.veexinc.com)

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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 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 patchcords.
2. Never look directly into an optical patchcord or an optical interface (e.g. CFP, CFP2, CFP4, QSFP+, SFP+, SFP, OTDR, LS, VFL) while the laser is enabled. Even though 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 low level signals.

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## 3.0 Introduction to TX300S Series

VeEX® TX300S series test sets are the industry's smallest portable test solutions for Core, Transport, Metro and Access Networks carrying Data, Voice, and Video.

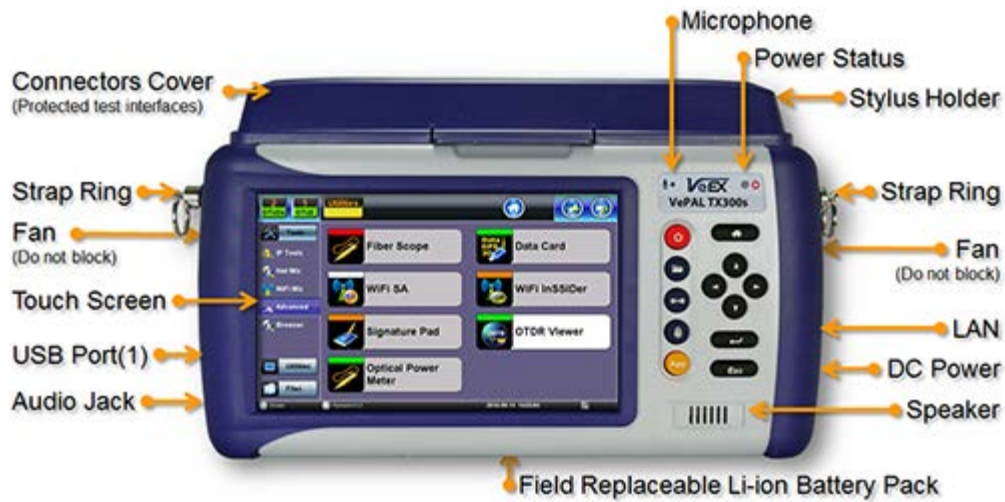
The units are lightweight, rugged and weather resistant, featuring the following test ports:

- OTN
- SDH/SONET
- Ethernet
- SyncE
- 1588v2 PTP
- Fibre Channel
- CPRI
- OBSAI and
- Fiber Optics

The TX300, TX300e, TX300M and TX300S are part of the TX product family.

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### 3.1 TX300S Overview



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### 3.2 Front Panel Buttons



- **Power:** Press for 2 seconds to turn the test set ON or OFF (prevents accidental ON/OFF)
- **Save Test Results:** Saves the current Test Results with customized or auto naming (yyyymmdd-hhmmss format). The F1 key on standard keyboards can be used when controlled via VNC.
- **Clear History:** Resets blinking LED reminders of past Errors or Alarms. Test results are not affected. The F2 key on standard keyboards can be used when controlled via VNC.
- **Lock/Unlock Touch Screen:** Can also be programmed to capture Screen Shots (>Utilities >Settings >Global >Save Settings). Use the F3 in standard keyboards.
- **Test Application Selector:** Quickly switches back-and-forth between two active test applications
- **Home:** Quickly bring users back to the Main Menu
- **Cursor Keys:** Application dependent May offer alternative GUI Navigation to touch screen (e.g. while wearing gloves in cold weather)
- **Enter:** Application dependent
- **Escape:** Application dependent

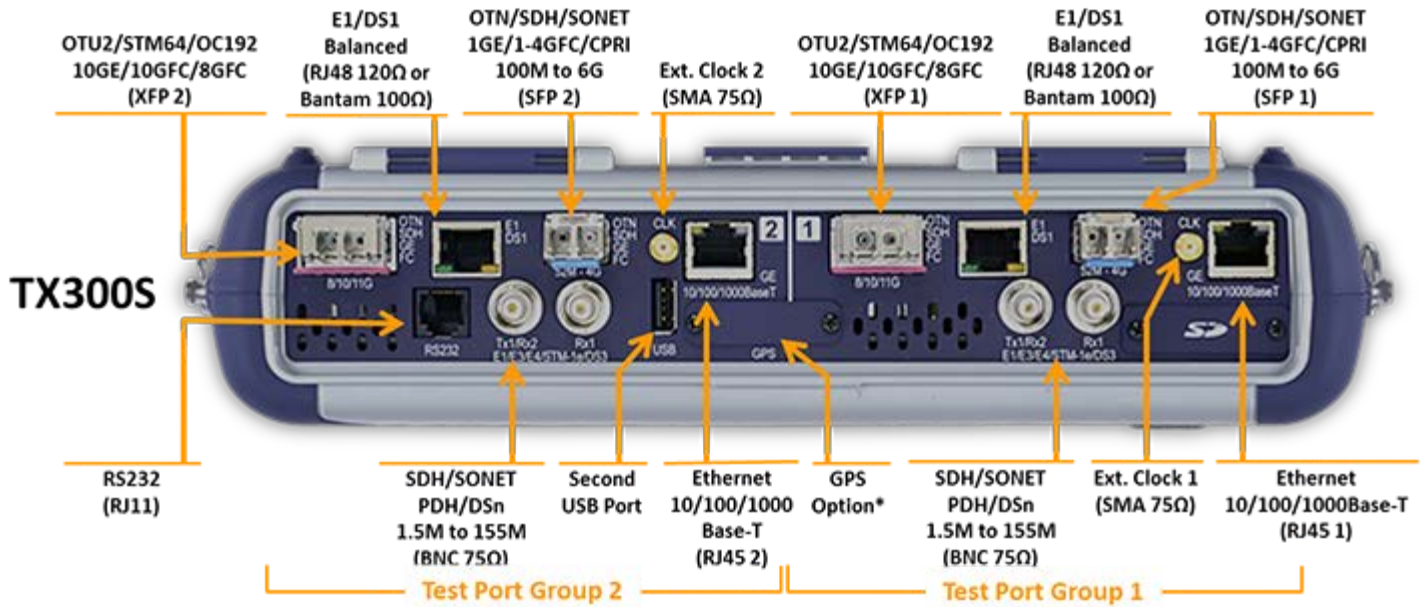
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### 3.3 Hardware Configurations

#### Two 300SM Modules - Two Single Port Groups

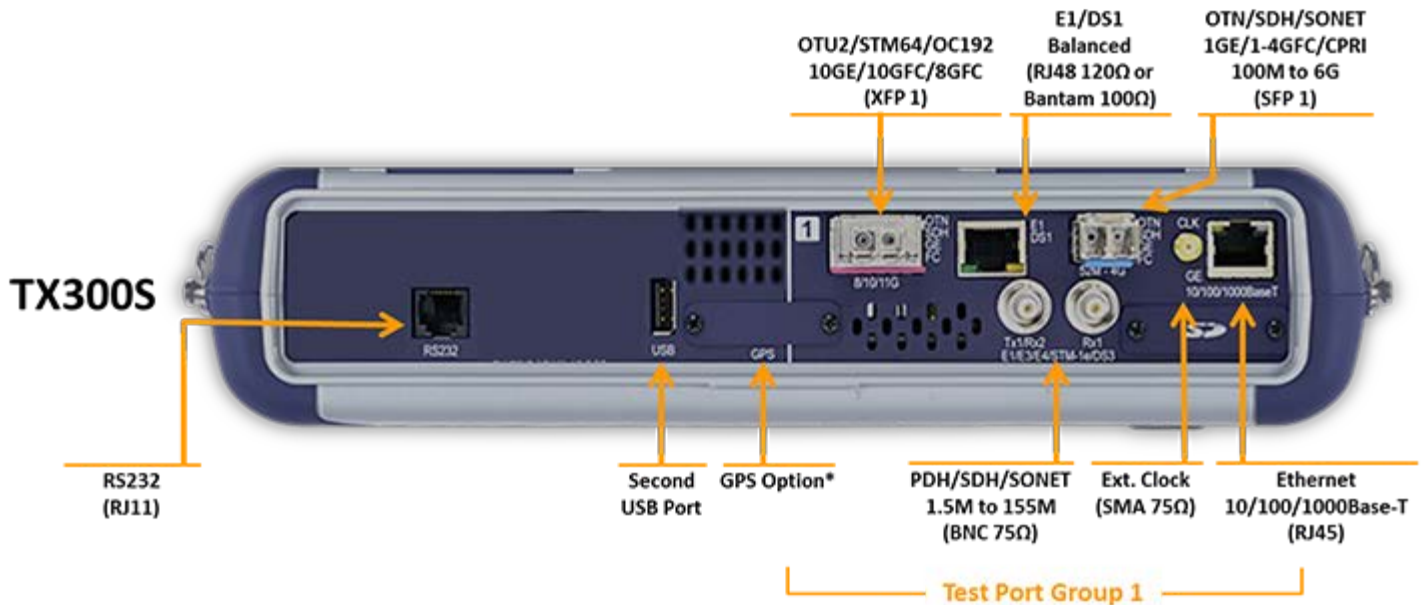
- Configurable as Fully-Loaded Dual Port Group (Allows independent Dual Tests)

- Universal multi-service test modules offer OTN/SDH/SONET/PDH/DSn, Carrier Ethernet, MPLS, Fibre Channel, CPRI/OBSAI, Synchronization and more
- Additional Technologies, Rates and Test Features can be added later, via SW licenses



**One 300SM Module - Single Port Group**

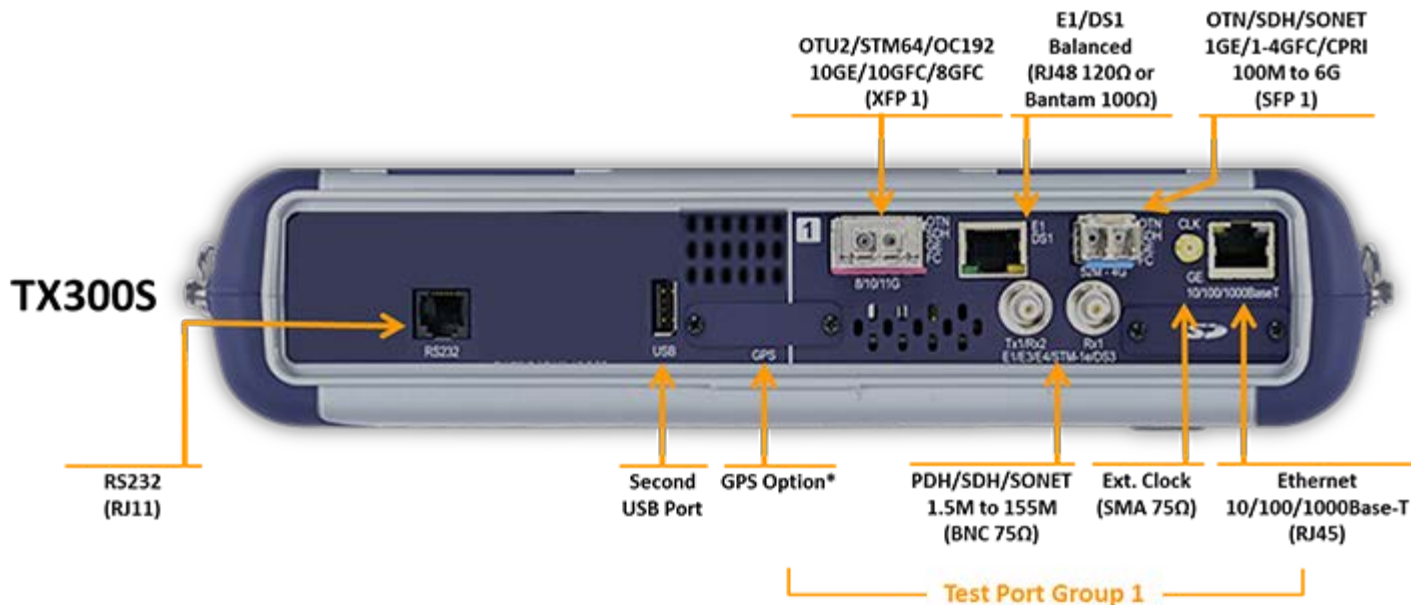
- Configurable as an economical Single Port Group (Single Test)
- Universal multi-service test module offers OTN/SDH/SONET/PDH/DSn, Carrier Ethernet, MPLS, Fibre Channel, CPRI/OBSAI, Synchronization and more
- Additional Technologies, Rates and Test Features can be added later, via SW licenses



**One 320SM Module - Dual Port Group**

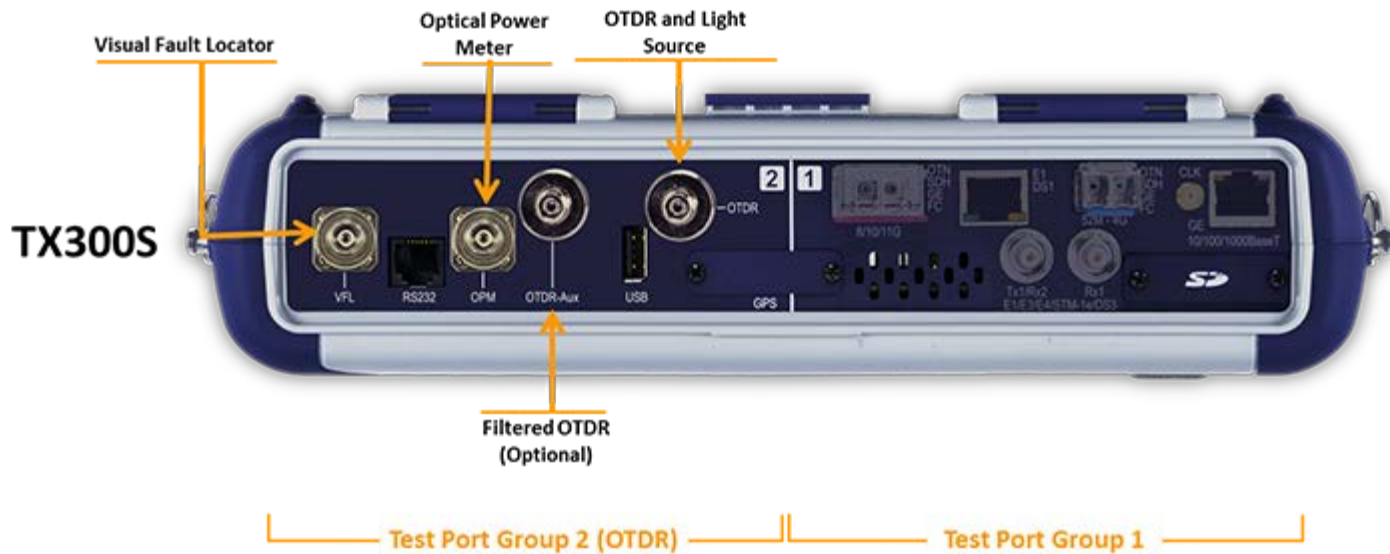
- Configurable as an economical Single-Group Dual-Port option (Dual Tests)
- Universal multi-service test module offers OTN/SDH/SONET/PDH/DSn, Carrier Ethernet, MPLS, Fibre Channel, CPRI/OBSAI, Synchronization and more
- Additional Technologies, Rates and Test Features can be added later, via SW licenses Perfect companion to the OTDR hardware option





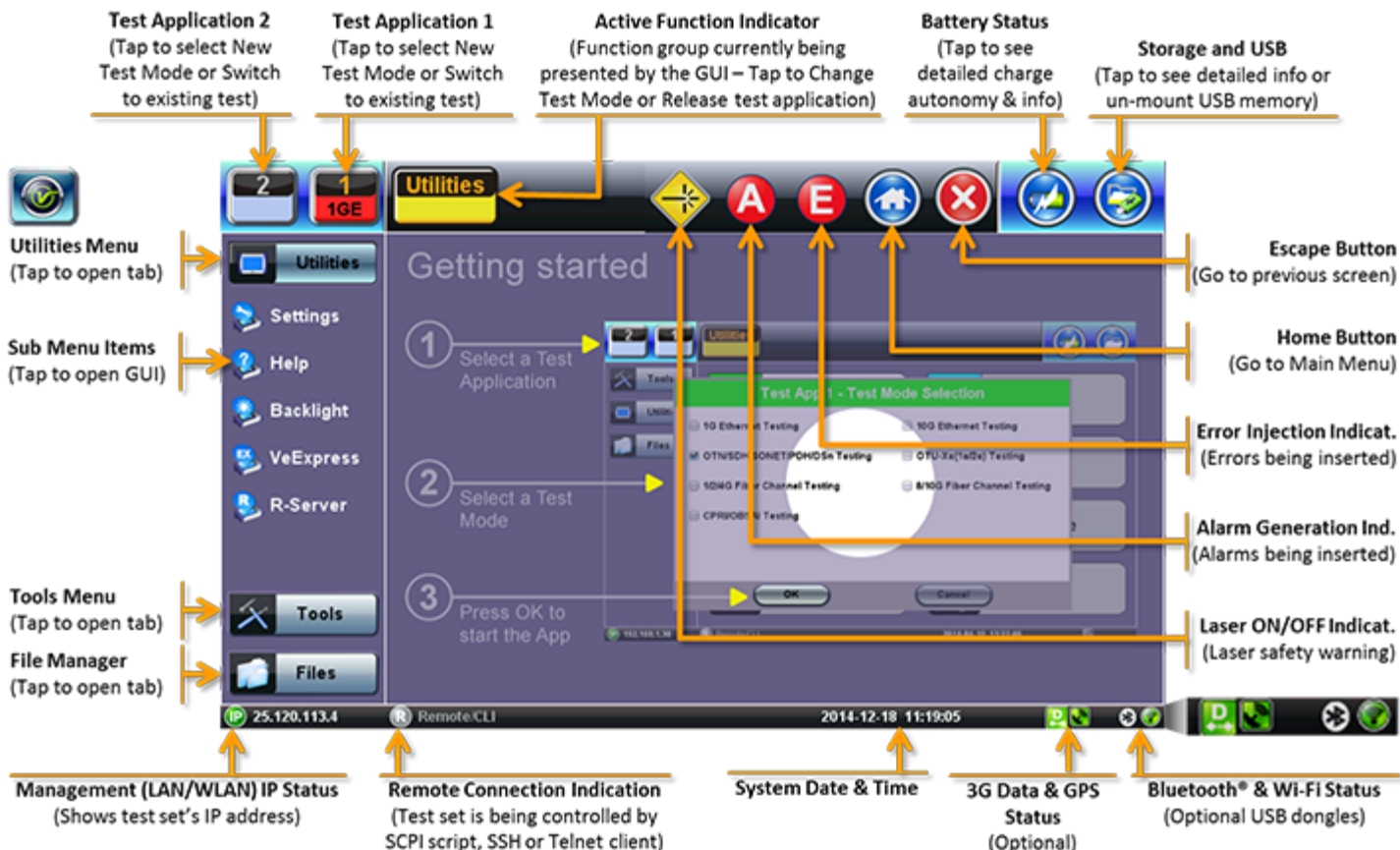
### OTDR Module

- Fiber Optics, Transport and Service Verification, Testing & Troubleshooting
- OTDR: Standard (+7dBm), High-power (+23 dBm) and PON (+23 dBm) versions
- OTDR, OPM and VFL ports with interchangeable optical bulkhead connectors
- This factory-installed option can be combined with any of the multi-service modules



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### 3.4 Home Screen



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### 3.5 Quick Access Menu

This multi-tasking section provides convenient and immediate access to system features, connectivity, accessories, results, etc., always at your fingertip. Those features are always available, independently of whether tests are running or not.



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## 4.0 Getting Started - TX300S

### 4.1 Launching Test Applications

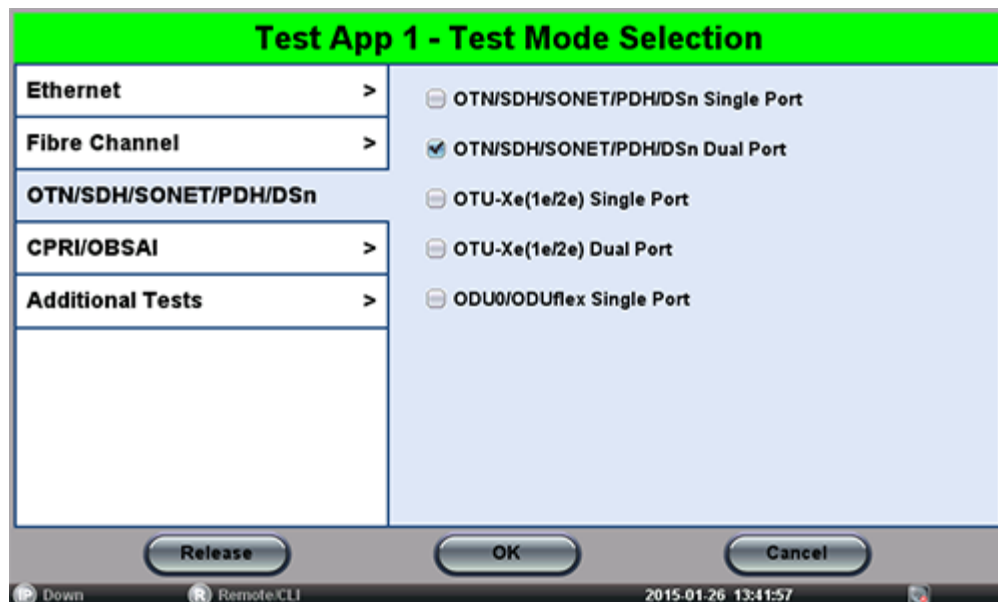
A Quick Guide is always presented in the Home screen after boot up.

**Note:** This procedure can be started at any time, from any screen or menu



1. Select an empty Test App button

- Up to two independent tests can run simultaneously
- Some test applications use the two port groups (e.g. router wrap-around test)



2. Select the Technology Group

3. Select the desired Test Mode based on the application to be tested

4. Tap on the OK button to confirm

The test port group is assigned to the selected test application.

Required software/firmware is loaded.

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## 4.2 Understanding Test Application GUI



### 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

### 5.1 Platform Settings

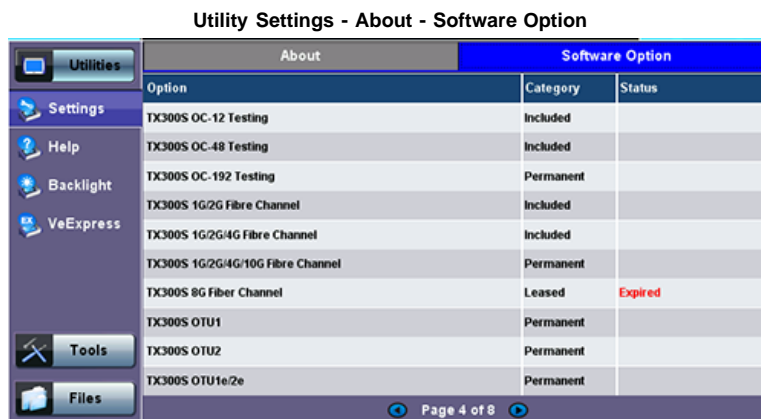
This section provides settings for the global parameters of the test set or platform (system settings).



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#### 5.1.1 About

This section provides information about the software version, serial number, and MAC address of the management port of the unit, as well as a list of software licenses (optional test features) currently loaded in the test set.



**Activating New Licenses:** Features and options marked as 'Expired' (not currently loaded into the test set) can be purchased at any time and activated via VeExpress using an internet connection. Upon confirmation, connect the test set to the internet via LAN or Wi-Fi, go to >Utilities >VeExpress and press the Check button. The test set will download all newly added features and options from VeExpress servers and install them automatically.

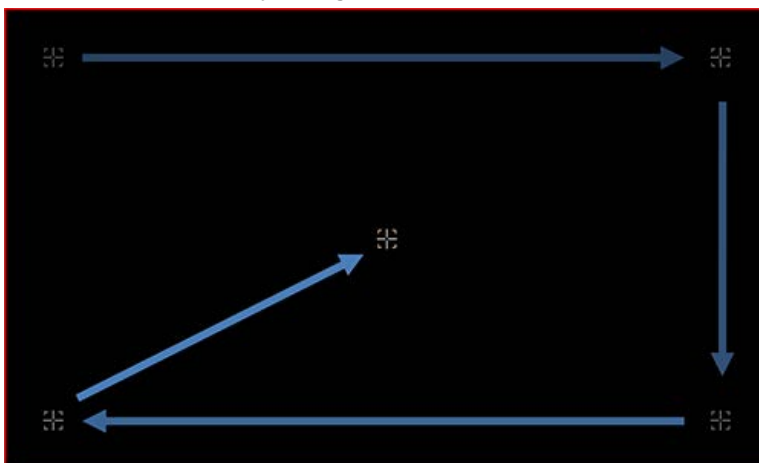
If company policy doesn't allow access to the public internet or the test sets are used within a secured network, users can request License Keys for manual activation. License keys must be requested at the time new options are purchased. To activate new features, tap on the expired item and enter the Activation Code that you received from VeEX, VeEX partner or your manager. Press Activate to complete the licensing process. Each activation code is specific to a test set and a feature. If multiple features are ordered you would receive individual activation codes for each of them. Manually activated features are specific to a test set and can't be shared with other test sets.

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#### 5.1.2 Screen Calibration

Go to this section to calibrate the touch screen.

#### Utility Settings - Screen Calibration



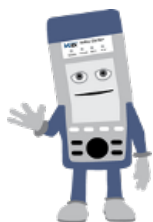
Follow the instructions and tap on the center of the five targets displayed at all four corners. A message displays when calibration is complete. If the touch screen is miscalibrated by mistake, please use the cursor and enter keys to start the calibration feature and repeat the procedure.

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#### 5.1.3 Bluetooth

VeEX products support a micro USB Bluetooth adaptor offering wireless connectivity up to 10 meters (30 feet). Ultra compact and portable, the adaptor provides an untethered connection between the tester and other Bluetooth compatible devices such as a Notebook PC or cell phone, so the user can transfer test result files quickly and easily without having to hassle with memory sticks or Ethernet connections.

An overview of the application is shown below.



#### Bluetooth Adaptors - Compatibility

Not all Bluetooth adaptors on the market are supported by the V300 product series. Please use adaptors that have been tested and supplied by VeEX only to ensure compatibility and correct operation.

#### Bluetooth Setup

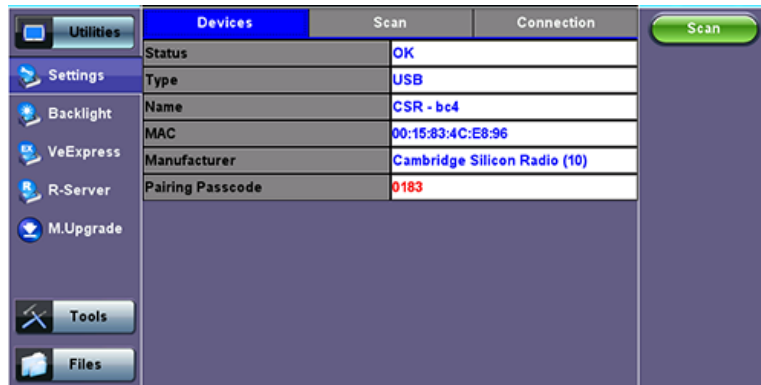
Insert the Bluetooth adaptor into the USB port on the side of unit. If you are using more than one USB device, use an external USB hub to connect additional devices.

Once detected, a **Bluetooth** icon  is displayed on screen.

## Devices

The test platform will automatically detect the Bluetooth adaptor once plugged into the USB port. Details of the Bluetooth adaptor will be displayed including the MAC address of the device and the last 4 digits of the serial # of the V300 test set. The last 4 digits of the V300 series test set will be the pairing code between the unit and the external device. Press the **Connection** tab to view the passcode.

Bluetooth - Devices Tab



Utilities	Devices	Scan	Connection	Scan
Settings	Status	OK		
Backlight	Type	USB		
VeExpress	Name	CSR - bc4		
R-Server	MAC	00:15:83:4C:E8:96		
M.Upgrade	Manufacturer	Cambridge Silicon Radio (10)		
Tools	Pairing Passcode	0183		
Files				

Bluetooth - Devices Tab



Utilities	Devices	Scan	Connection	Scan
Settings	Scan Status : Finished			
Backlight	Device Name	Device Address		
VeExpress	VeEX Tablet GalaxyTab4	E4:F8:EF:42:C3:24		
R-Server	Unpaired			
M.Upgrade				
Tools				
Files				

Bluetooth - Connection - Passcode



Utilities	Devices	Scan	Connection	Unpair
Settings	Pairing Status: In Progress...			
Backlight	Local Device Address			
VeExpress	Remote Device Name			
R-Server	Remote Device Address			
M.Upgrade	Remote Service Number			
Tools	<p>If requested from your pairing device, please use the following passcode:</p> <p style="text-align: center;"><b>0183</b></p>			
Files	Page 1 of 1			

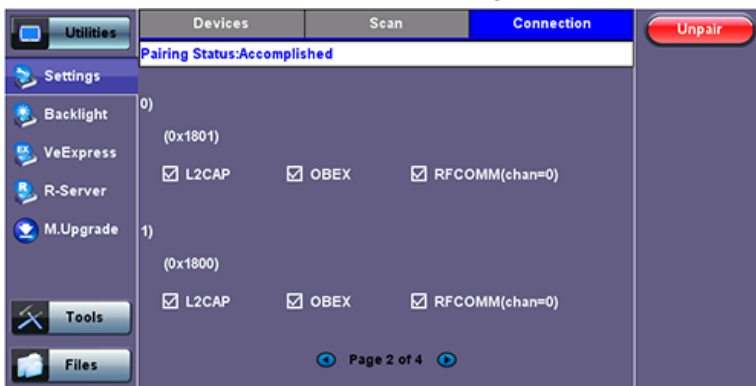
## Setup

- Press **Scan** to check for available bluetooth devices. Once scanning is complete, a list of discovered Bluetooth devices will be listed. Please ensure the peripheral device is set to **Discoverable** during Scanning and Pairing operation.
- Press **Pair BT** to begin the pairing process. During the pairing operation, you will be prompted to enter a code on the peripheral device (PC or Mobile Phone) in order to pair successfully. Enter the last 4 digits of the V300 serial number as shown in the **Connection** tab.
- Once paired, click the **Services** button at the bottom of the screen to check the service attributes. To upload test results via Bluetooth and Mobile phone to a UMTS or 3G network, full data upload service will be required.

## Bluetooth - Connection Established



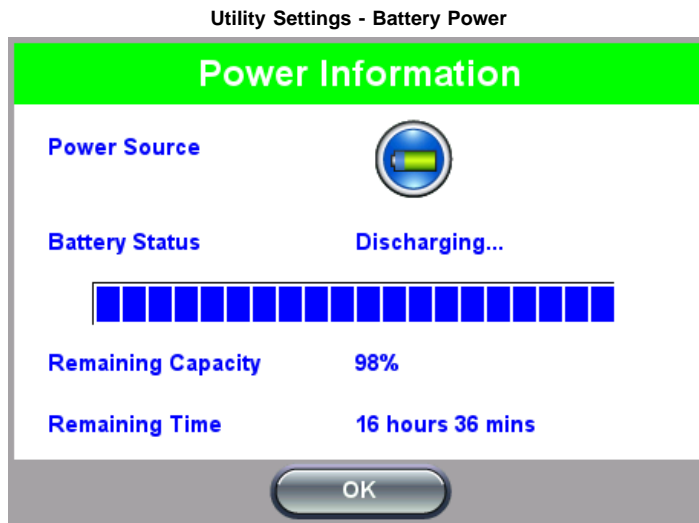
Bluetooth - Connection Page 2



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**5.1.4 Power**

This section provides information about current power source and information about the battery gauge. Tap on the battery icon, on the top bar, to bring battery charge and estimated autonomy information.



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**5.1.5 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**



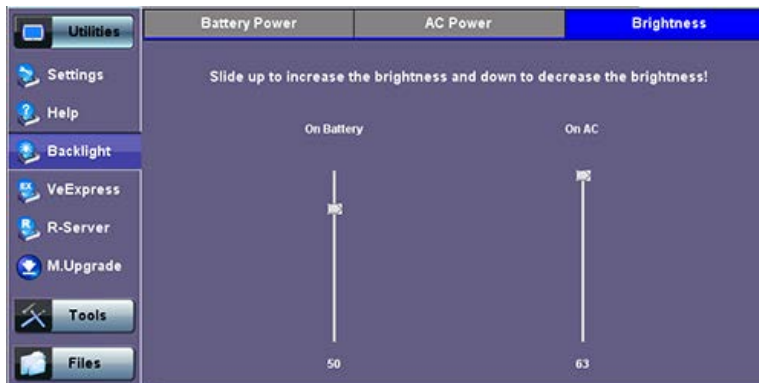


Backlight - AC Power



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

Backlight - Brightness



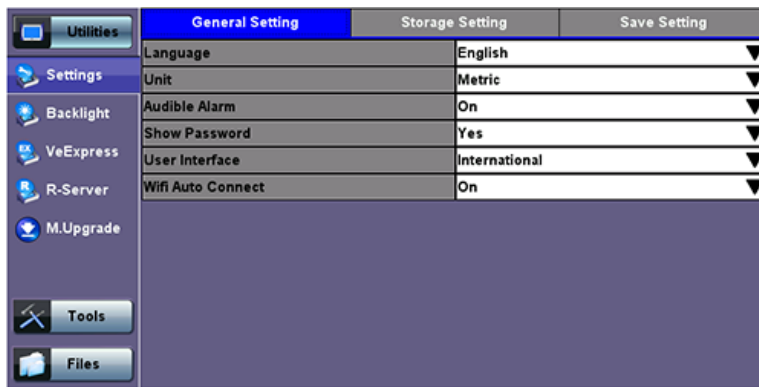
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### 5.1.6 Global Settings

#### General Setting

- **Language:** An alternative language for the user interface
- **Units:** Measurement system (English - feet or Metric - meter)
- **Audible Alarm:** When enabled, the test set's buzzer will sound (beep) when alarms and errors are being detected.
- **Show Password:** Hides/unhides username and password information associated with FTP and related IP functions
- **User Interface:** The USA user interface version presents SONET/DSn application-oriented menus, while the International setting is more open to all settings.

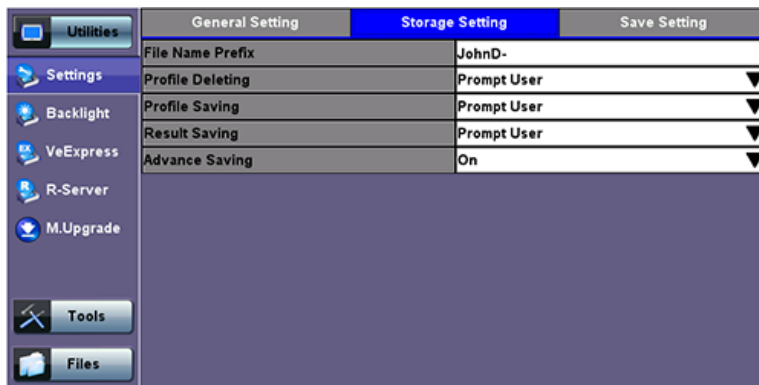
#### Utility Settings - General Setting



### Storage Setting

- **File Name Prefix:** Tap on the box to enter the file name prefix using the pop up alphanumeric keypad
- **Profile Deleting:** Auto Delete or Prompt User
- **Profile Saving:** Auto Overwrite or Prompt User
- **Result Saving:** Manual or Prompt User
- **Advanced Saving:** On/Off. Allow users to add extra information to the results file to be uploaded to a centralized R300 Server. Requires Advanced Management Option.

### Utility Settings - Storage Setting



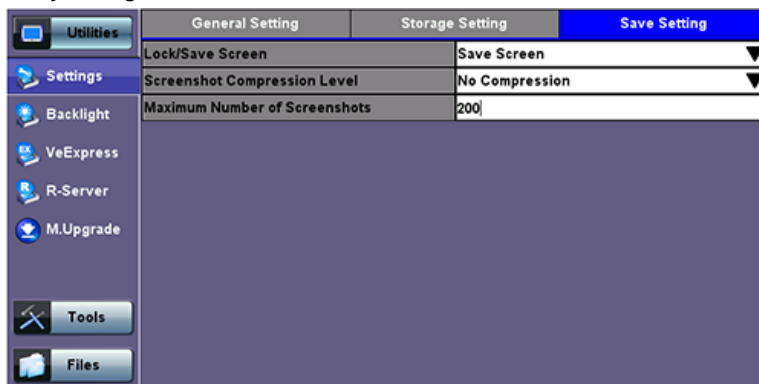
### Save Screen Settings

**Save Screen** tab: Helps control the behavior of the Lock key on the keypad. The Lock key can be set to do the following:

- **Lock/unlock** the unit's screen to prevent accidental interruption during a long term test.
- **Save Screen Shots:** The following configurations can also be done:
  - The compression level of the screen picture
  - Maximum number of screenshots that can be saved.

Each time user presses the lock key from the key pad a screen shot will be saved in memory. The screen shots can be recovered under Files>Saved.

### Utility Settings - Lock/Save Screen



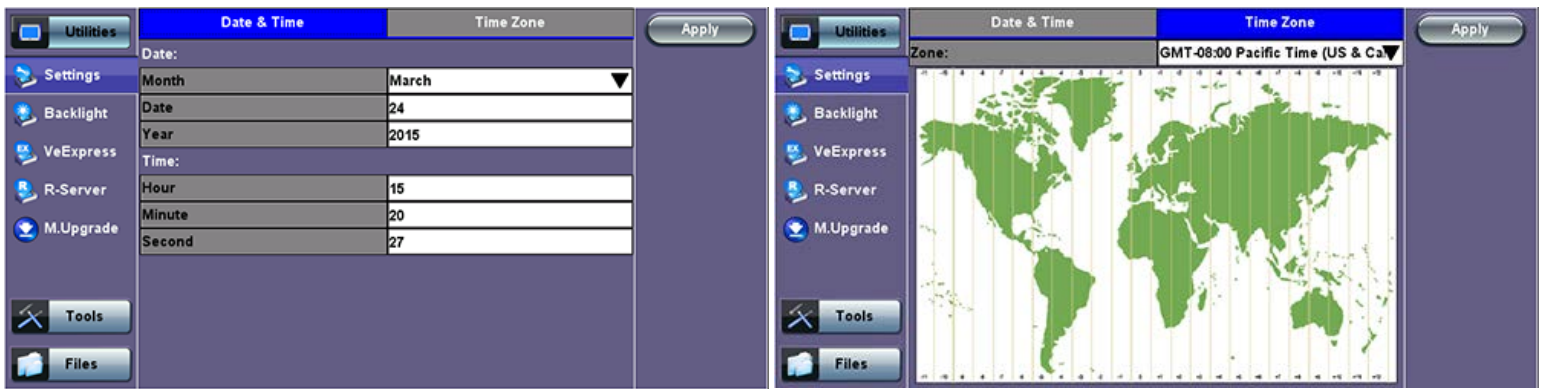
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### 5.1.7 Date and Time

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.

**Date Setup**

**Time Zone Setup**



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### 5.1.8 Remote Access

There are different ways to control or access the test set and the information it contains, from a local (LAN) or remote (WAN) connected PC:

- ReVeal PC software
- VNC Client
- Web Browser
- VeEX SCPI Remote & Command Reference Tool (PC software, requires separate licensing)
- Using command line interface (CLI) scripts via SSH connection

#### ReVeal RXTS PC software

This VeEX application allows users to connect to the test set, using the platform's IP address. ReVeal intuitive user interface offers the following functions:

- Test Profiles Management: Create, Edit, upload and download complex Ethernet and Fibre Channel test profiles (BERT, Throughput, RFC2544, Y1564 SAM, Scan, IP, Ping/Trace, Packet Capture, etc)
- Test Results Management: Download results from the test set, manage local test results (PC HDD), generate detailed test reports, export to CSV or PDF, and print.
- View software options, licenses, serial numbers, perform remote software updates

ReVeal is a Windows® application that can be downloaded free of charge from [www.veexinc.com](http://www.veexinc.com).

Users are able to connect remotely from a desktop PC via ReVeal tool software or through Remote Access on the test set. To proceed with remote access, make sure that remote control software is installed on the PC device. The user is able to configure the Profile, VNC Server Service, Web Service, VNC and Web passwords on the Remote Access page. Input the test set IP address and specified user password when prompted by the software to initiate Remote Access.

#### Remote access with VNC Server/Viewer:

The test set VNC service can be managed in >Utilities >Settings >More >Remote Access menu, to enable or disable the VNC server and assign remote access passwords.

- **Super User Password:** Allows remote VNC clients to view and control the user interface via mouse
- **Regular User Password:** Allows remote VNC users (guests) to view what's currently on the test set screen, but no interactions with the GUI are allowed.

Although the test set 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. Such feature can certainly be used for training purposes, but it is not recommended for multi-user or multi-test environments.

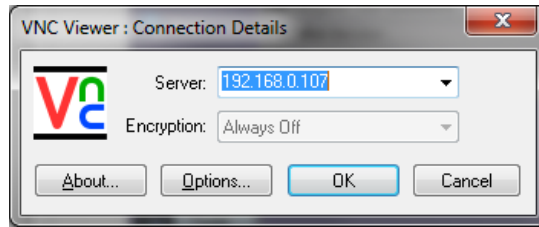
VNC clients, such as RealVNC®, are readily available for download for different platforms and form factors, including Windows®, Mac OS®, Linux, iOS, Android.

- **VNC Service:** Enable or disable the remote access to remote VNC clients running on PCs, Macs, tablets or smart phones.
- **VNC Super User Password:** Defines the password for users allowed to control the test set via standard VNC clients
- **VNC Regular User Password:** Defines the password given to users who are only allowed to view the test set current screen via standard VNC clients, but not make any changes to test or test set.

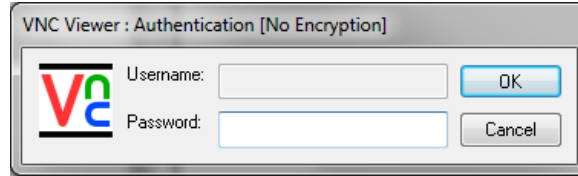
After configuring these settings in the Remote Access menu, run VNC on the PC. A message box will prompt the user to enter a Server number, which is the test set IP address. Enter the VNC Super/Regular password when prompted by the message box for a password.



VNC Viewer - Enter Server Address



VNC Viewer - Password Prompt

**Remote access via web browser:**

Java-enabled web browsers, such as Internet Explorer™, Chrome™, FireFox™ or Safari™ can be used to manage the test set, access information and remotely control it. This useful feature doesn't require the installation of any remote clients, other than the standard web browser. Just enter the test set's IP address in the browser address/search field and the web GUI will launch.

The following features are supported:

**Profiles**

Use this function View, Download, Delete, Filter and convert saved Test Profiles to PDF

**Manuals**

Access soft copies of the UX400 platform and modules manuals for quick reference.

**Results**

Use this function 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.

**Remote Control (Screen Mirroring)**

It is similar to using VNC, but in this case no VNC client installation is required. It uses standard Java-based web browser as a client. It mirror the screen, mouse inputs and the rubber buttons available in the front panel of the test set.

- **VNC Web Service:** Enable or disable the remote access through remote web-browser clients running on PCs, Macs or certain tablets. The web browser must support Java (tm)
- **Web Super User Password:** Defines the password for users allowed to control the test set via standard web browser clients
- **Web Regular User Password:** Defines the password given to users who are only allowed to view the test set current screen via standard web browser clients, but not make any changes to test or test set.

Type in the test set IP address in the web browser. Click on vnc-home.html and type in the Super/Regular password when prompted for a password. Use the buttons and icons on the right to navigate the test set remotely.

**Test Set IP Address in Web Browser**

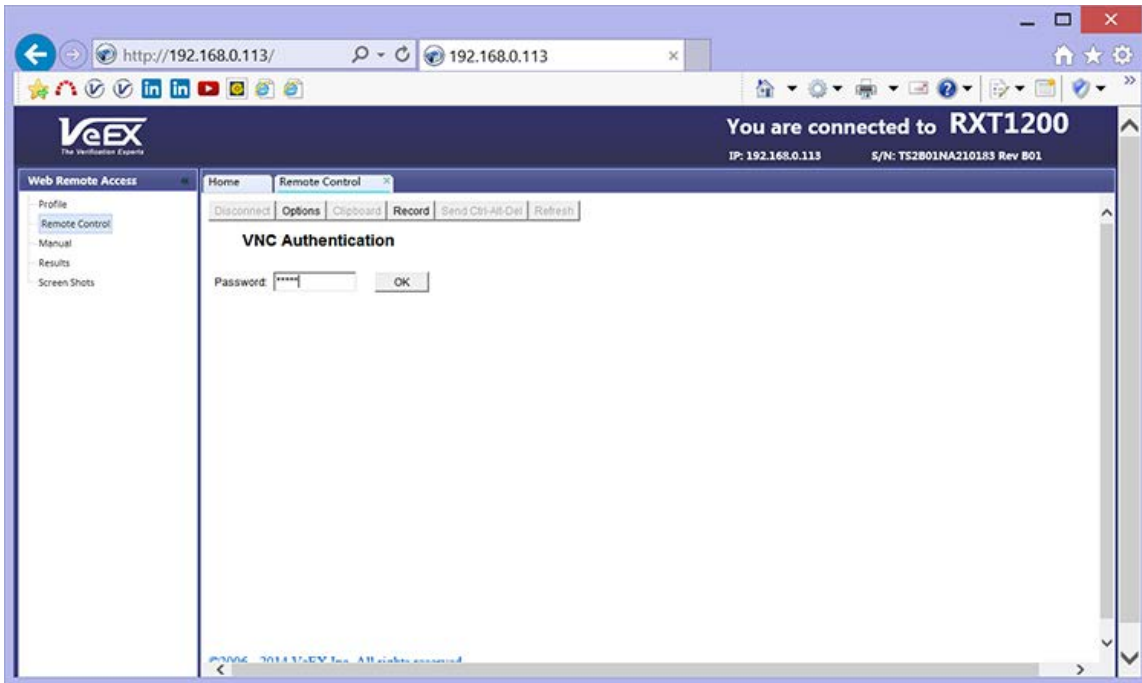
The top screenshot shows the VeEX RXT1200 interface with a table of test results. The table has columns for Name, Mode, Test, Module, Date, and Type. The bottom screenshot shows the same interface with a support information page displayed.

Name	Mode	Test	Module	Date	Type
20150324_151807		Screen		2015-03-24 15:18:07	
20150324_150814		Screen		2015-03-24 15:08:14	
20150324_150950		Screen		2015-03-24 15:09:51	
20150324_152027		Screen		2015-03-24 15:20:28	
20150324_152144		Screen		2015-03-24 15:21:44	
20150324_151029		Screen		2015-03-24 15:10:30	
20150324_151236		Screen		2015-03-24 15:12:36	
20150324_152143		Screen		2015-03-24 15:21:43	
20150324_150958		Screen		2015-03-24 15:09:59	
20150324_150930		Screen		2015-03-24 15:09:31	
20150324_151235		Screen		2015-03-24 15:12:35	
20150324_150810		Screen		2015-03-24 15:08:10	
20150324_151115		Screen		2015-03-24 15:11:15	
20150324_150924		Screen		2015-03-24 15:09:25	
20150324_150810		Screen		2015-03-24 15:08:10	
20150324_152321		Screen		2015-03-24 15:23:21	

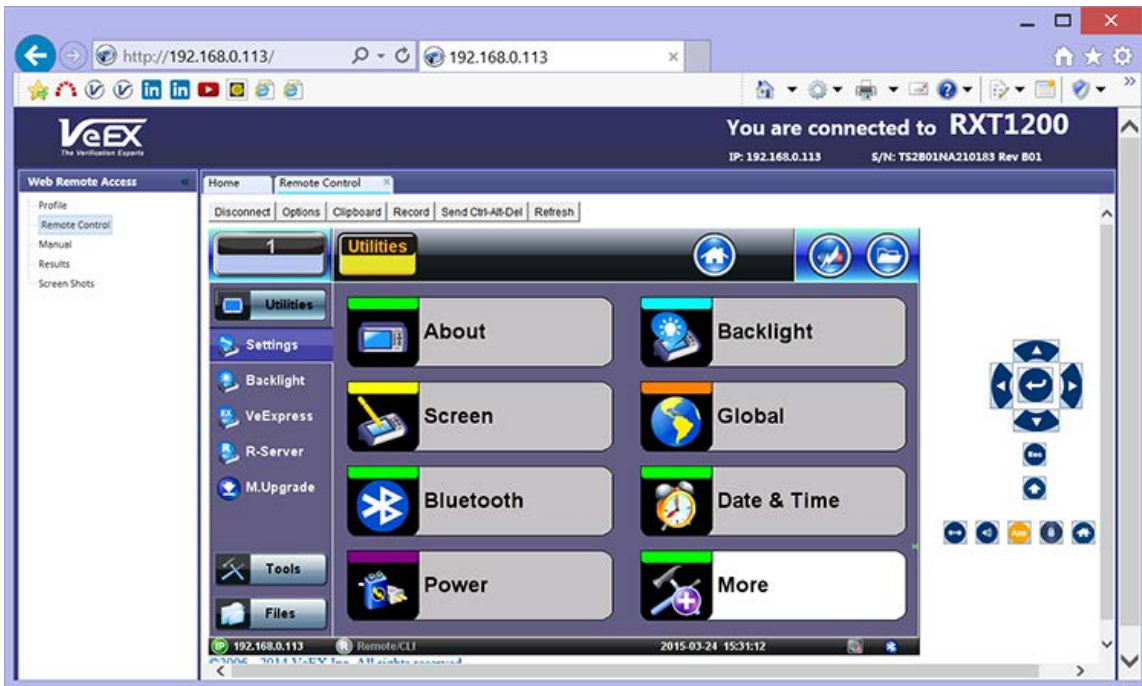
The bottom screenshot shows the support information page with the following details:

- WebSite Support: [www.veexinc.com](http://www.veexinc.com)
- Customer Service Number: TEL: +1 510 651 0500
- Software Version Number: RXT1200-02.00.0025-1
- Management MAC: 00:18:63:01:10:E8
- Serial Number: TS2B01NA210183 Rev B01
- RXT1200 Barcode: VV57B00NB110235

Web Browser - Password Prompt



Web Browser - Remote Access Menu



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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 screenshot displays the GPS settings menu. On the left is a navigation pane with categories: Utilities, Settings, Backlight, VeExpress, R-Server, M.Upgrade, Tools, and Files. The main area is titled 'GPS' and contains the following settings:

- GPS: ON
- Time Standard: UTC
- Time Zone, GMT: GMT-08:00 Pacific T

At the bottom of the settings area are three buttons: 'Sync ToD', 'Reset GPS', and 'Log'. To the right of the settings is a section titled 'Atomic Clock' which displays real-time data:

GPS Status			Lock		
Satellites			12		
Ch	SAT	dBHz	Ch	SAT	dBHz
01	30	30	07	10	25
02	07	34	08	20	24
03	28	31	09	13	23
04	09	30	10	11	23
05	19	31	11	27	29
06	05	28	12	23	19

Below the satellite table, the current time and position are shown:

-----Time(UTC)-----  
Date: 2015/03/25  
Time: 23:42:38

-----Position-----  
Latitude: 37°28'15" N  
Longitude: 121°55'56" W  
Altitude: 6.0 M

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 test set system real time clock. This time stamp is used for reports and events, but not for time-sensitive testing.

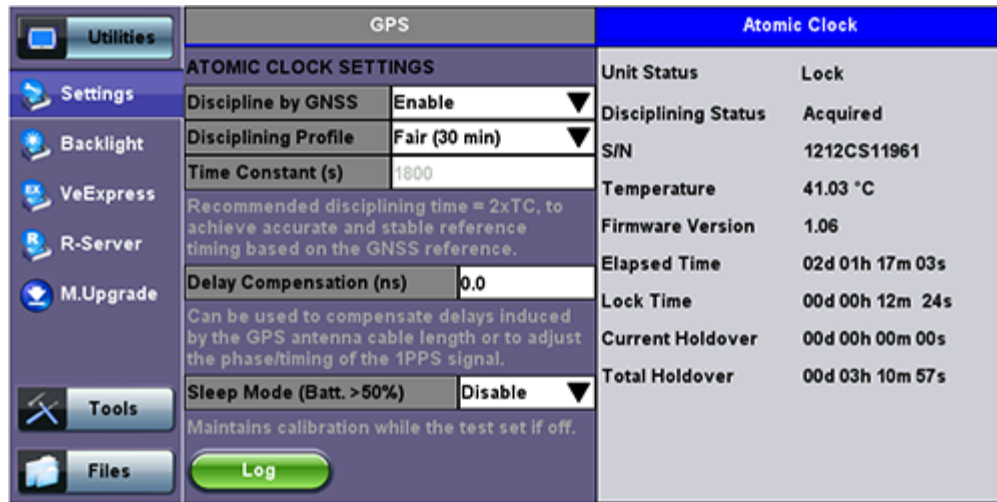
GPS ToD is also used in One-Way-Delay (OWD) measurements and time is applied directly to each test set before the test starts, so they all have accurate time.

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 uses 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  $\geq 60$  minutes ( $TC \geq 1800$  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 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.

When enabled, the low power Sleep Mode keeps the atomic clock powered up when the test set is turned off. This way it maintains its last calibration by drawing little current from the batteries. In this state, the test set will only cut the power to the atomic clock if the battery charge reaches a level less than 50% of charge, to conserve battery. The Elapsed Time counts the time since its first initialization, including the time the test set has been off. If disabled, the atomic clock is shut down with the test set and will require full initialization the next time it is powered up.

### Atomic Clock Relative Phase Monitoring

VeEX test sets equipped with GPS receiver and Chip Scale Atomic Clock options 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. 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**



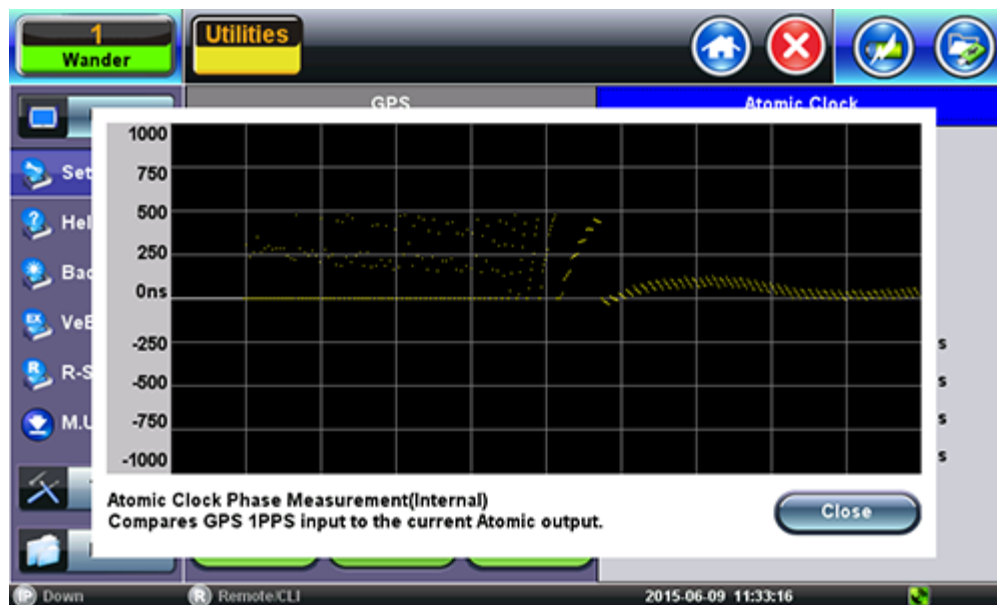


Relative phase measurements are more useful when monitored at the beginning of the disciplining process, to track the phase alignment between the oscillator's output (Atomic 1PPS) and its input (GPS 1PPS). Since the oscillator filters the raw 1PPS noise and fine tunes its frequency to align its own 1PPS 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 >More >High Precision Clock Source >Atomic Clock

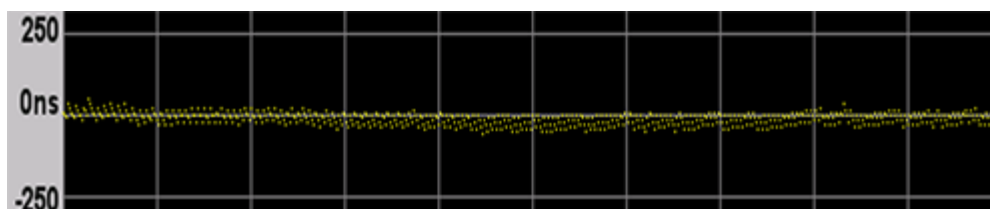
#### Example of GPS-disciplined Atomic relative phase convergence graph



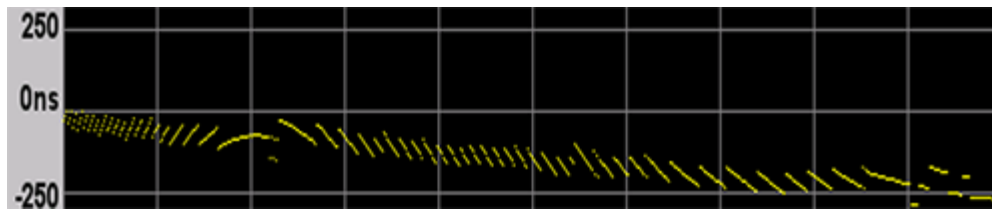
- Yellow dots indicate valid relative phase measurements (output - input).
- Scattered yellow dots could indicate bad GPS signal, which in turn provides bad timing accuracy, or that the oscillator trying to compensate for large phase differences.
- White dots (line) at zero indicates loss of GPS 1PPS.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



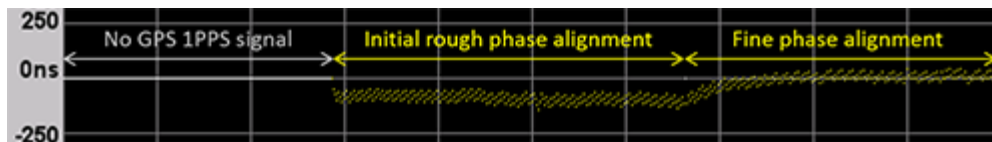
Not so good phase alignment



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  $\pm 100$  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.

**Note:** 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.

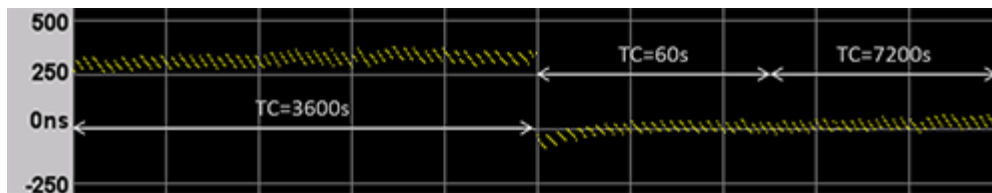
#### Example of initial phase alignment



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

**Tip:** 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 adjust 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 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  $\pm X.XXX$  ppb frequency offset would result in a cumulative time error of  $\pm X.XXX$  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  $\pm 150$ ns 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  $\neq$  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 \More \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 \More \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 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 Help**

Help provides an online help related to the operation of the test set and the measurements performed. The user can access the table of contents, and hyperlinks. Use the scroll bars to navigate help content.

**Table of Contents**

- [1.0 About This User Manual](#)
- [2.0 Introduction](#)
- [3.0 Safety Information](#)
- [4.0 Basic Operations](#)
  - [4.1 Compact Platform Overview](#)
  - [4.2 Keypad](#)
  - [4.3 Touch Screen Display](#)
  - [4.4 Battery](#)

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## 5.4 VeExpress

VeExpress is a cloud-based asset management system. VeEX VeExpress cloud services is included with every test set. It allows the following services / functions:

- Delivers Software/Firmware Updates and Upgrades directly to the test set.
- Makes any new Purchased or Rented licenses (new functions) assigned to the test set immediately available for testing.
- Allow Managers to Share (float) purchased or rented test options among deployed test sets (fleet). Licenses can be temporarily assigned to the test set that needs it, for specific jobs, and later recalled to pass it on to the next test set.
- Allows users to rent optional test features (licenses) for the required amount of days. Adds the flexibility required for special jobs or those new technologies or services that are not yet commonly deployed. Rented options are automatically released when lease time elapses (no need to connect to the server).

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### 5.4.1 Built-in VeExpress Client

- Lets users connect to VeExpress Cloud directly from the test set, from the field, using any available internet connection (e.g. LAN, Wi-Fi, Modem, CPE, Smartphone hot-spot, Cellular Data Card, etc.)
- View test features currently assigned to the test set and licenses available in the pool
- Activates new licenses and let users perform software (firmware) updates

#### Connecting VeExpress:



1. Connect theRXT-1200 to the Internet
  - Use LAN, WLAN or Cellular Data Card
2. Go to >Utilities >VeExpress: The URL is: www.v-express.com
3. Tap on the Check button
  - Any tests must be stopped and released
  - Confirm the Release of any active Test Application
  - It gets the latest information related to the test set, directly from VeExpress Cloud
  - Enables any new licenses assigned
  - Releases any recalled shared licenses
4. Wait for the Confirmation message: "Registered and Authorized"
  - All Licenses have been updated and any new features should be ready to use

#### Options Enabled (in the Test Set)

ID	Description	Category	Remain (DD:HH)
499-05-563	TX300S 8G Fiber Channel	Permanent	
499-05-050	DS1 (1.5Mbps) Pulse Mask Analysis	Permanent	
499-05-051	DS3 (45Mbps) Pulse Mask Analysis	Permanent	
499-05-549	TX300S OC-192 Testing	Permanent	
499-05-552	TX300S 10/100/1000Base-T	Permanent	
499-05-553	TX300S 100Base-FX/1000Base-X	Permanent	
499-05-554	TX300S 10GE LANWAN	Permanent	
499-05-558	TX300S VoIP Call Expert	Permanent	
499-05-199	Service Level Ethernet OAM, IEEE 802.1ag and ITU-T Y.1731	Permanent	

- Up-to-date list of licenses assigned
- Permanent = Purchased, owned (users can still share permanent licenses by releasing the option from one test set and assign it to another)
- Leased = Rented, temporary
  - Displays remaining time (Days and Hours)
  - Countdown starts upon first assignment
- Both permanent & leased can be shared

#### Options Available (in the Cloud)

- Lists all options, permanent or leased, currently available in the company's or group's VeExpress account
- Users can check availability before requesting assignment of new function(s) to their VeExpress Managers

#### Software Upgrade

- Checks if newer version is available

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#### 5.4.2 Software Upgrade Procedure – Full Version

1. Open the Software Upgrade tab
  - Larger Full Upgrade package is shown if the test set has not been updated for a while, when major new features are introduced or an OS update is required
2. Attach the DC charger to the test set
3. Insert a FAT32 USB Memory Stick into the left-side USB port (>300MB free)
4. Confirm IP connection (IP address)
5. Check the new software version box
6. Tap on the Download button
  1. Wait until the download process finishes. Install package is in the memory stick.
  2. Power the test set OFF
  3. Leave the USB memory stick attached
7. Initiate Software Upgrade process
  1. Simultaneously press the App, and Power buttons, until it beeps
  2. Let the upgrade process finish (it could take a few minutes)
  3. The test set reboots itself at the end
8. The test set is now up-to-date

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#### 5.4.3 Software Upgrade Procedure – Delta Version

1. Open the Software Upgrade tab

Smaller Delta Update package is often made available between consecutive versions (e.g. from 1.2.5 to 1.2.6) for easier and faster field firmware update

2. Attach the DC charger to the test set
3. Confirm IP connection (IP address)
4. Check the new software version box
5. Tap on the Download button
  1. Wait until the download process finishes
  2. The install package is in internal memory
  3. Turn the test set OFF
6. Power the test set ON
7. The test set software is now up-to-date

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## 5.5 R300 Server (Advanced Management)

The R-Server is a centralized server repository for test results. Technicians in the field can register their test set on the R-Server and upload test results directly to the server.

To enter the R-Server result upload function, there must be an IP connection established, otherwise a reminder message will pop up.

### Register

Register	Upload
Profile	Default
Server Address/URL	192.168.8.33
Tech ID	123
Tech Name	bob
Company	
Supervisor ID	

Register  
UnRegister  
Check

1. Enter the IP address of the server

A test set must register to an R-Server before it can upload results to the server.

Register	Upload
Profile	Default
Server Address/URL	
Tech ID	
Tech Name	
Company	
Supervisor ID	

Registration complete. Waiting for authorization !

OK

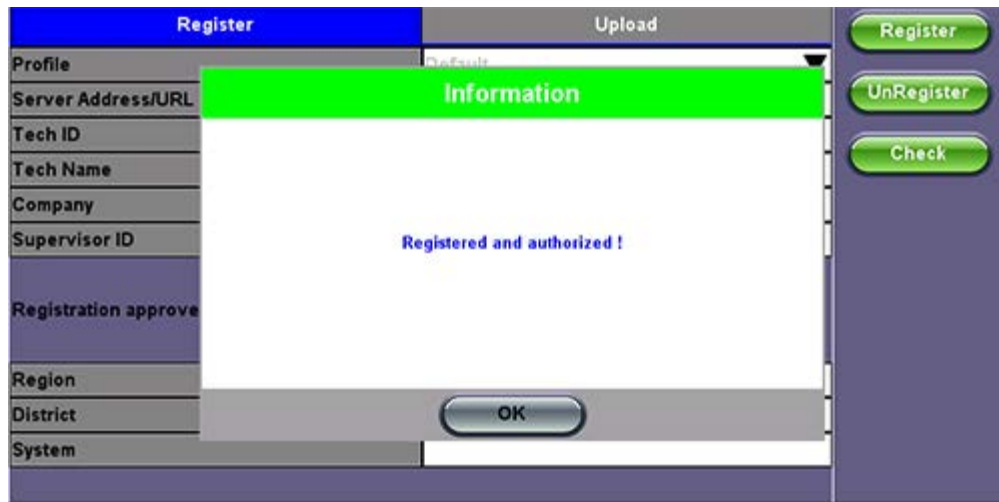
Register  
UnRegister  
Check

2. Press the Register Key to register your test set on the R-Server.

Note that if your test set has already been registered, you don't need to perform this step.

The Registration has to be approved by the R-Server manager in order to allow access.





3. When the test set registration is complete and approved by the R-Server manager you can select Check function key to verify that your test set is authorized.

Once your test set is authorized, you can proceed to Upload.

## Upload

The screenshot shows the 'Upload' tab of the mobile application. It features a table with columns for Name, Size, Type, and Date. Each row has a checkbox in the first column. On the right side, there are two buttons: 'Upload' and 'Upload&Del'. At the bottom, there is a page indicator 'Page 2 of 2' with navigation arrows.

<input type="checkbox"/>	Name	Size	Type	Date
<input type="checkbox"/>	20150326_130447	46.91 K	Screen	2015-03-26 13:04:48
<input type="checkbox"/>	20150326_130448	46.91 K	Screen	2015-03-26 13:04:48
<input type="checkbox"/>	20150326_140348	58.02 K	Screen	2015-03-26 14:03:49
<input type="checkbox"/>	20150319_113854	13.49 K	CPRI/BSAI	2015-03-19 11:38:56
<input type="checkbox"/>	20150326_120746	102.55 K	RFC2544	2015-03-26 12:07:52
<input type="checkbox"/>	20150326_121402	102.76 K	RFC2544	2015-03-26 12:14:18

To upload result files to the R-Server, tap the Upload tab and select the desired files. Tap on Upload or Upload&Del.

**Upload:** Transfer the selected result file(s) and keep the file(s) in the test set.

**Upload&Del:** Delete the file(s) from the test set after uploading.

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## 5.6 Software Upgrade

TX300S Platform includes the bootloader, OS and system-wide (common) features. Its software update package can be identified as tx300s-veex.tar.gz.

The TX300S Platform uses the traditional V300 upgrade procedure to update the System. The software upgrade packages can be downloaded from [www.veexinc.com](http://www.veexinc.com), or using the test set's built-in VeExpress client.

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### 5.6.1 Platform Software Upgrade Procedure

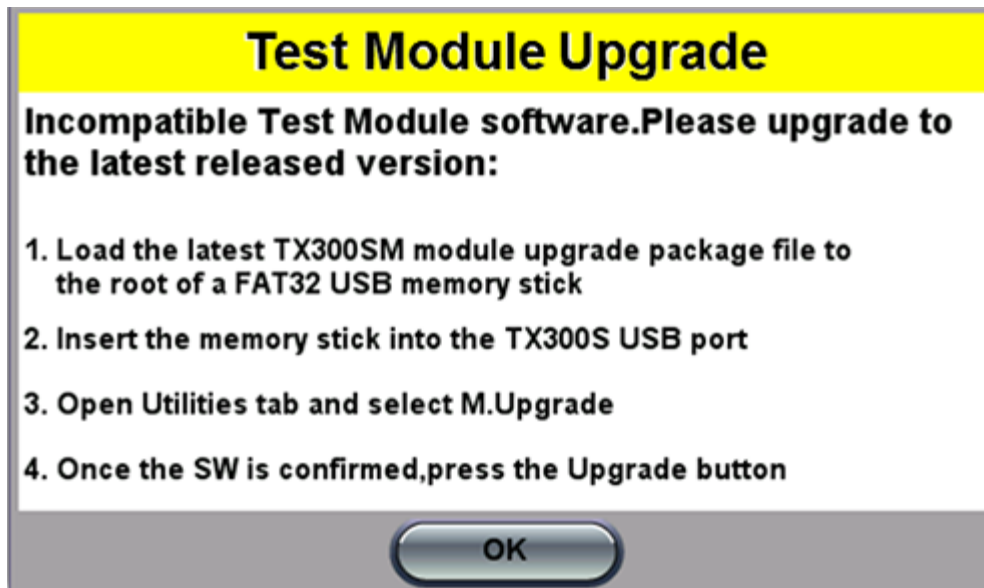
1. Obtain the tx300s-veex.tar.gz system upgrade package.
  - o Download it from [www.veexinc.com](http://www.veexinc.com), [www.v-express.com](http://www.v-express.com), a link provided or by using the built-in VeExpress client
  - o Unzip the file and copy to the root of a FAT32 USB memory stick if necessary
2. Insert the memory stick to the USB port located on the left-side of the unit
3. Initiate Software Upgrade process.
  - o Simultaneously press the App, and Power buttons, until it beeps
  - o Let the upgrade process finish
  - o It could take a few minutes
  - o The test set reboots itself at the end



4. The test set is now up-to-date.

#### Notes:

- After the System upgrade, the following pop-up message may appear if a module upgrade is required. Follow the module update procedure.



- The built-in VeExpress client downloads the uncompressed tx300s-veex.tar.gz upgrade package directly to the root of the memory stick attached to the test set, so the System software upgrade process can be started right away.

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### 5.6.2 Module Software Upgrade Procedure



1. Obtain the required tx300s-300sm.tar.gz, tx300s-320sm.tar.gz and/or tx300s-OTDR.tar.gz, upgrade files
  - Download them from www.veexinc.com, www.v-express.com, a link provided or by using the built-in VeExpress client
  - Unzip the files and copy to the root of a FAT32 USB memory stick if necessary
2. Insert the memory stick to the USB port located on the left-side of the unit
3. Initiate Software Upgrade process
  - Open the Utilities section Go to >Utilities >M.Upgrade
  - Select new version and press Upgrade
  - The test set turns itself OFF at the end
4. The test applications are up-to-date.

#### Notes:

- The built-in VeExpress client downloads the uncompressed tx300s-xxxx.tar.gz upgrade packages directly to the root of the memory stick attached to the test set, so the M.Upgrade process can be started right away
- The process may need to be repeated if two different blade types are loaded.

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## 6.0 File Management

### V300 Style File Manager



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### 6.1 File Manager: Working with Saved Results, Profiles, Images

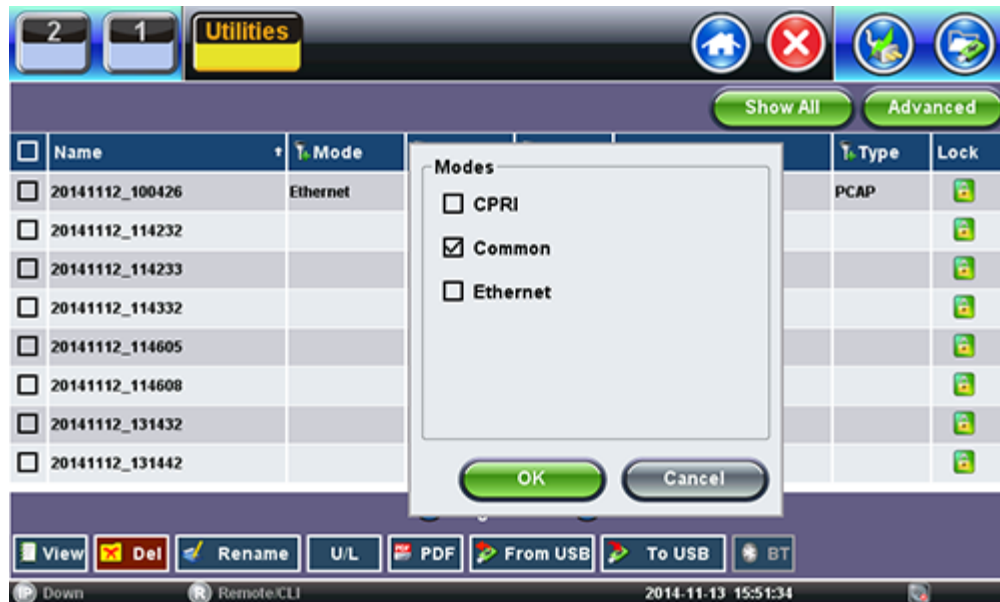
- From Utilities go to >Files >Saved
  - Displays all results stored in the test set
- Use the check box to select the desired files.
- Tap on any column header to sort by that specific parameter.
  - Tap again to change the sorting order
- The U/L button lock and unlock files to prevent accidental deletion.
- PDF button converts all selected files to PDF format
  - Requires FAT32 USB Memory stick



- Backup and Restore (USB Memory stick):
  - To USB copies all selected files to stick
  - From USB restores all files from the stick

## BT (Bluetooth®) File Transfer

- Requires compatible USB dongle
- File Filters



- Makes it easier to isolate desired types of results from all other test results stored in the test set
- Reduces the number of pages displayed
- Activate Filters
  - Use the stylus to tap on the Y+ icon
  - Check mark the desired attributes
  - Filters parameters can be combined
- Reset Filters
  - Press the Show All button
- Sorting
  - Tap on a header to sort by that field's type, in ascending or descending order
  - Makes finding desired test Results or Reports even easier

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## 6.2 USB Memory Browser

### USB Tool



The USB tool can be found in the Utilities section, under >Files >USB.

It provides users with basic memory stick management tools, to browse and interact with its contents without the need of a PC:

- **Reload:** Refreshes the USB stick info
- **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 certain file types

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

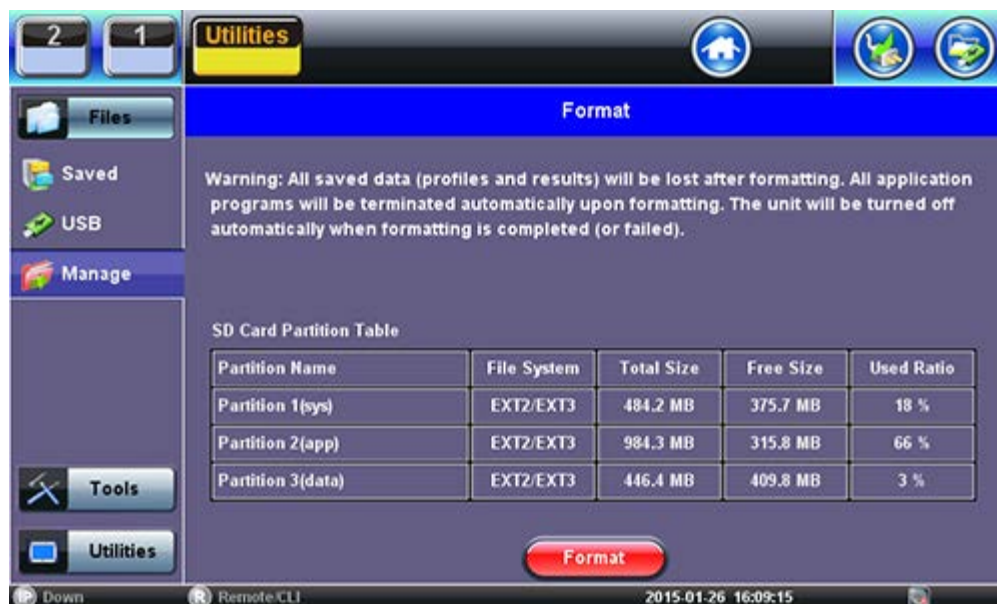
The following file types are supported:

- **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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## 6.3 Manage SD Card

### Internal SD Card Format



The Files >Manage tool under utilities provides SD card's partition capacity information.

All the user information, such as test results, profiles, screenshots, protocol capture, etc., are stored in the Data partition (3). Use the >Files >Saved >To USB backup utility or Delete function if the Data partition is nearly full.

The Format function is exclusively a maintenance tool. Use ONLY when instructed by a VeEX Customer Care representative. It erases all the information stored in the test set.

#### Notes:

- The internal 2GB SD Card contains the System OS, all the Test Applications (Apps) and user's data
- Only the Data partition is accessible to users, through the test set's functions
- Do not remove or reformat the SD Card outside of the test set

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## 7.0 Tools

### 7.1 IP Tools

The 10/100BaseT management port is located on the right hand side of the unit. This port can be used to connect to the unit for management purposes (results retrieval, software upgrade, remote connectivity ...).

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

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#### 7.1.1 Setup

By default 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

Network	
Port	Management Port
Profile	Last configuration
IP Address	DHCP
Gateway and DNS	Enable

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

Tools		Setup	Status	Ping	Trace Route
Network					
IP Tools		Port	Management Port		
Net Wiz		Profile	Last configuration		
WiFi Wiz		IP Address	Static		
Advanced		Local IP	192.168.0.126		
Browser		Subnet	255.255.255.0		
Utilities		Gateway and DNS	Enable		
Files		Gateway	ON	192.168.0.1	
		DNS	Primary	68.94.156.1	

**Connect**

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#### 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

Tools		Setup	Status	Ping	Trace Route
IP Tools		Local IP	192.168.0.126		
Net Wiz		Subnet Mask	255.255.255.0		
WiFi Wiz		Gateway	192.168.0.1		
Advanced		DNS IP	68.94.156.1	Second IP	68.94.157.1
Browser		IP:	PASS		
Utilities		Gateway	PASS		
Files		DHCP:	PASS		
		DNS:	DNS1(PASS) DNS2(PASS)		

**Disconnect**

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#### 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.
  - **Note:** 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

Tools	Setup	Status	Ping	Trace Route
		Setup		Result
IP Tools	Profile	Default		
Net Wiz	Destination	www.veexinc.com		
WiFi Wiz	Number of Pings	<input type="checkbox"/> Continuous Ping		
Advanced	Length	64	Pings/Sec	1
Browser	Time Out (ms)	1000		
Utilities				
Files				

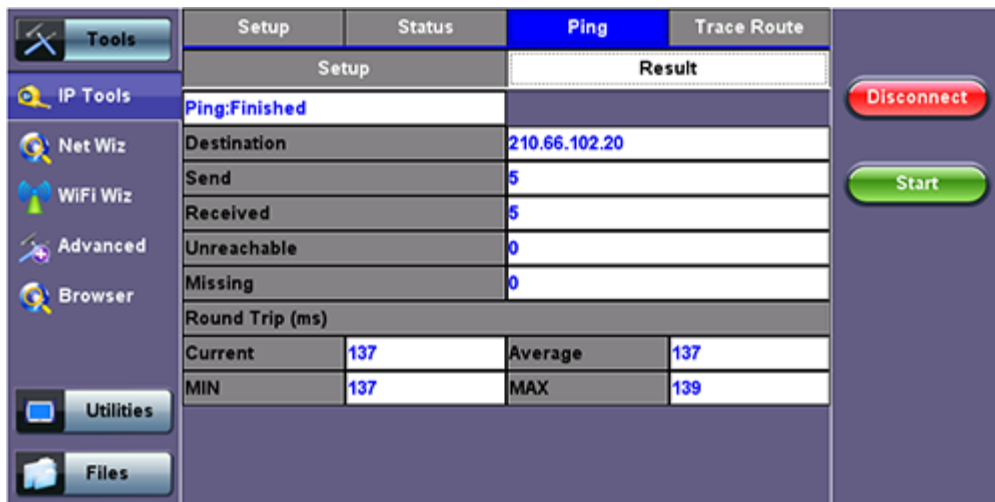
Disconnect  
Start

## 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, unreach or missing. A Ping is counted missing if no response is received before timeout. A Ping is counted unreach 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



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#### 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.

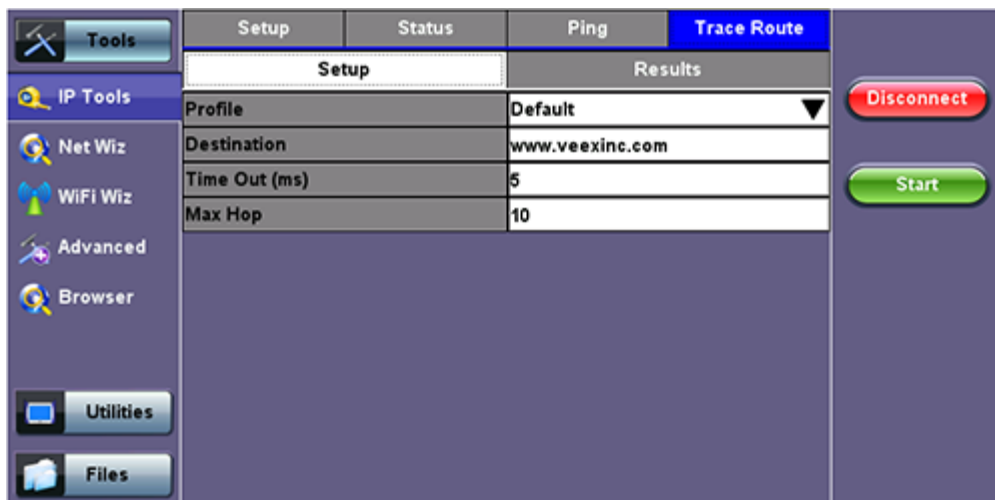
##### Trace Route setup tab:

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

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

### Trace Route Result

The screenshot shows a software interface for network diagnostics. On the left is a vertical menu with icons and labels: Tools, IP Tools, Net Wiz, WiFi Wiz, Advanced, Browser, Utilities, and Files. The main area has four tabs: Setup, Status, Ping, and Trace Route (which is selected). Below the tabs are sub-sections for Setup and Results. The Results section displays 'Traceroute:Finished' and a table with three columns: Hop, TTL(ms), and Address. The table contains five rows of data. To the right of the table are two buttons: 'Disconnect' (red) and 'Start' (green). At the bottom of the table area, there is a pagination indicator 'Page 1 of 3' with left and right arrow icons.

Hop	TTL(ms)	Address
1	0	192.168.0.1
2	0	207.141.64.129
3	6	12.251.100.245
4	8	12.122.114.22
5	8	12.122.1.117

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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

Discovery	
Setup	Results
Profile	Default
Begin IP	192.168.0.1
End IP	192.168.0.100
<input checked="" type="checkbox"/> ARP	<input type="checkbox"/> Ping

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### 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

Discovery	
Setup	Results
Summary	Devices Networks
Discovery:Pass	
Tx Frames	99
Rx Frames	41
Rx Errors	0
Speed Advert.	100M
Duplex Advert.	FULL_DUPLEX
Device Found	41



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

Tools	Discovery		Start	
	Setup	Results		
	Summary	Devices		Networks
	Global	Detail		
IP Tools				
Net Wiz				
WiFi Wiz	Total Devices	41		
Advanced	Server	41		
Browser	Host	41		
Utilities				
Files				

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

### Net Wiz Results - Devices - Detail

Tools	Discovery			Start
	Setup	Results		
	Summary	Devices	Networks	
	Global	Detail		
IP Tools				
Net Wiz				
WiFi Wiz	IP	MAC	Ping	
Advanced	192.168.0.1	10:56:ca:07:3d:f8	OK	
Browser	192.168.0.2	00:15:17:f6:9c:7d	OK	
	192.168.0.3	00:02:3b:00:16:69	OK	
	192.168.0.4	00:14:38:92:7b:10	OK	
	192.168.0.5	00:21:9b:fb:3f:34	OK	
Utilities	192.168.0.6	c4:04:15:0c:79:83	OK	
Files	192.168.0.7	00:23:7d:33:77:84	OK	
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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.



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

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### 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.
  - **Note:** 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

Ping	Trace Route	ARPWiz			
Scan	Connect	Network			
AP List					
WiFi Scan Finished					
ESSID	BSSID	Protocol	Rates	Channel	
CG3000DV200 Protected via WPA2	10:0D:7F:D4:18:27	802.11bgn	144Mb/s	1	🔒 📶
VeEX-Sales Protected via WPA2	CA:3D:C7:A4:7D:EE	802.11bgn	300Mb/s	3	🔒 📶
VeEX@Cable-Tec Protected via WPA2	84:1B:5E:69:F1:1A	802.11bgn	144Mb/s	4	🔒 📶
UXF00 Protected via WPA2	00:22:75:53:BD:7E	802.11bg	54Mb/s	6	🔒 📶
TradeLeaves Protected via WPA2	00:1D:70:5B:32:92	802.11bg	54Mb/s	1	🔒 📶
Page 1 of 2					

#### 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.

- **Note:** 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**)
  - **Note:** Passwords are case sensitive.

Hit **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 automatically connect to the AP after hitting Apply.

### WiFi Wiz - AP Encryption Settings

Ping	Trace Route	ARPWiz
Scan	Connect	Network
VeEX Office		
Connection Status		
ESSID		
BSSID		
Channel		
Encryption	Encryption Type WPA2	
Mode	Password	
Signal		
Link Quality		
Bit Rates		
Protocol		

Buttons on the right: Scan, Connect AP, Edit Settings

Buttons at the bottom: Apply, Cancel

### Connect

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

### WiFi Wiz Connection Setup

Ping	Trace Route	ARPWiz
Scan	Connect	Network
Setup		Status
Profile	Default ▼	
ESSID	VeEX Office	
Encryption Type	WPA2 ▼	
Password	*****	
Show Password	<input type="checkbox"/>	

Scan

Disc. AP

Connect Net

Edit Settings

## 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

Ping	Trace Route	ARPWiz
Scan	Connect	Network
Setup		Status
Connection Status	Completed	
ESSID	VeEX Office	
BSSID	C4:04:15:0C:79:83	
Channel	6	
Encryption	WPA2	
Mode	Master	
Signal	-35dBm	
Link Quality	34	
Bit Rates	144Mb/s	
Protocol	802.11bgn	

Scan

Disc. AP

Connect Net

Edit Settings

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

Ping	Trace Route	ARPWiz
Scan	Connect	<b>Network</b>
Setup		Status
<b>Request Status: Successful</b>		
Local IP	192.168.88.161	
Gateway	192.168.88.1	
Serverip	192.168.88.1	
Lease (sec)	39315	
DNS1	192.168.88.1	
DNS2	N/A	

Scan

Disc. AP

Disc. Net

Edit Settings

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## 7.4 Advanced Tools

### Advanced Tools



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### 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.

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#### 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.

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#### 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 Pass/Fail analysis

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#### 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.

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#### 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.

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#### 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

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#### 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)

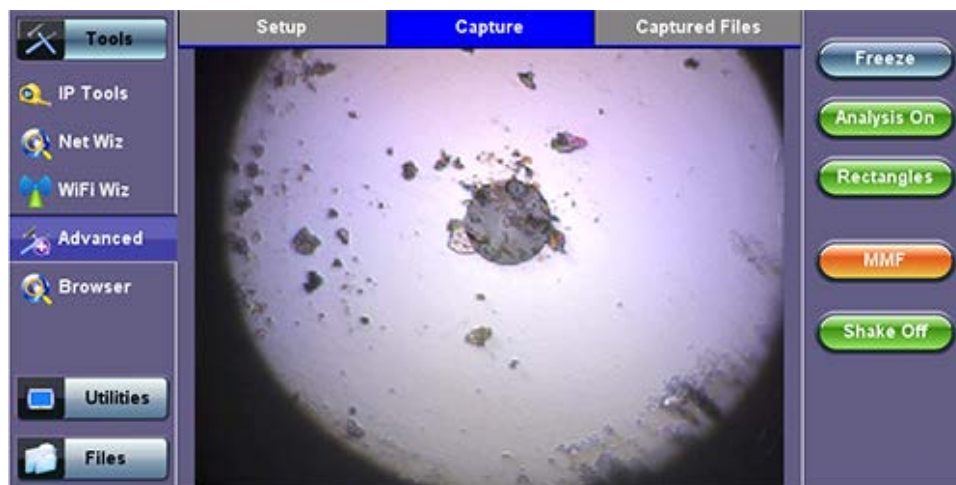
**Scope Mode:** Use Local for USB fiber inspection scopes that directly attached to the test set. Use Remote if the probe is attached to a wireless transmitter using Wi-Fi connection.

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#### 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



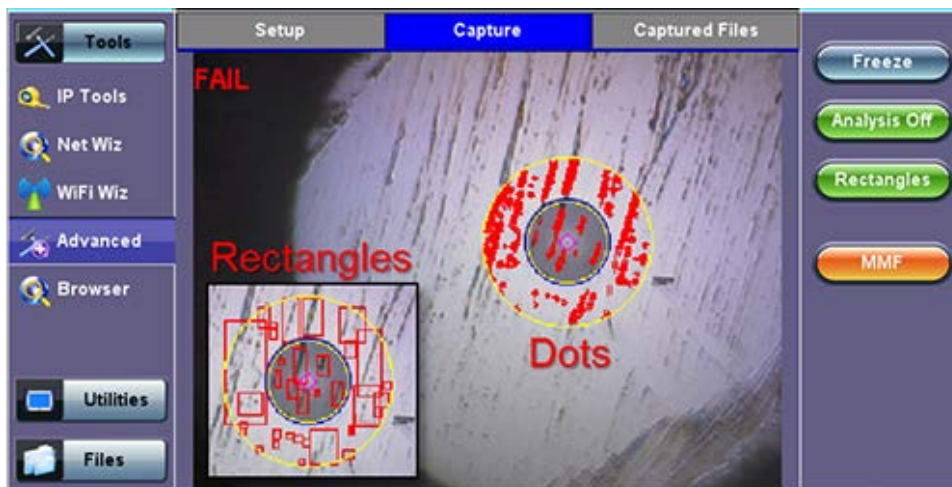
**Important!** The soft buttons in the action bar (right side of the screen) do not indicate the current state or setting, they indicate the action that would take place if pressed. For example, if user taps on the “Analysis OFF” button, the analysis function is turned OFF and the button toggles to show “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 or the Pass/Fail results; they are just operator's choice.

**Save:** The Save button appears after freezing an image. It 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.



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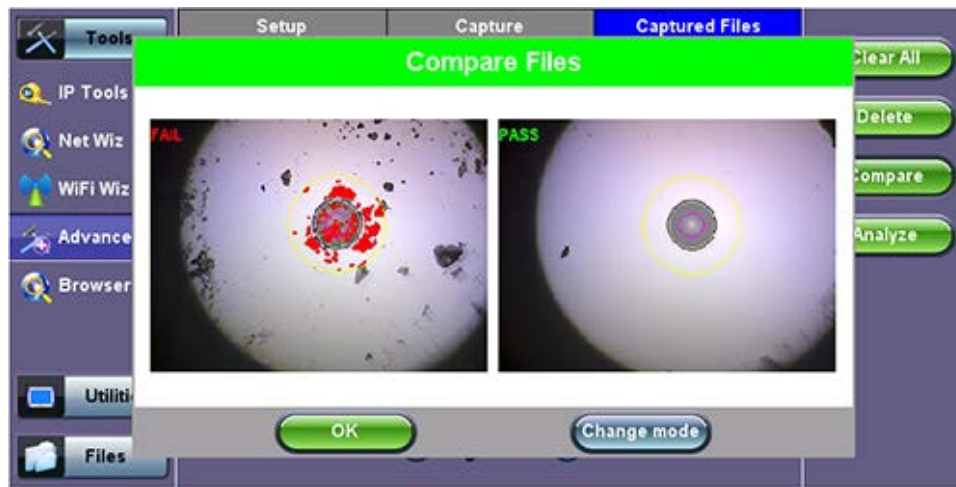
#### 7.4.1.8 Captured Files Tab

This section of the user interface lists all the connectors' end face images that have been captured with the fiber inspection microscope. Users can add "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 selected files from the Captured Files list. Use the check-boxes to select

**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.

Analysis Report:

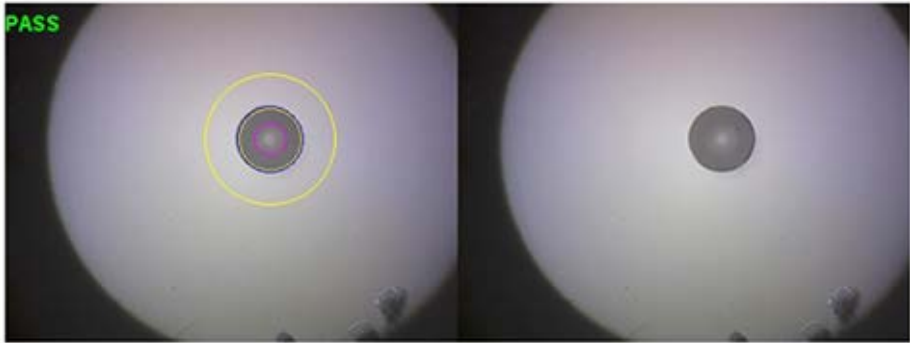
Setup

Parameter	Test Data
Fiber From	FremontHQ
Fiber To	ACME Telecom Inc. Hub
Comments	Outbound 100GE

Analysis Result

Zones	Scrathes			Defects		
	Criteria(um)	Thresholds	Count	Criteria(um)	Thresholds	Count
A:Core 0-65 um	[3;inf)	0	0	[0;5) [5;inf)	4 0	0 0
B:Cladding 65-120 um	[5;inf)	0	0	[2;5) [5;inf)	5 0	0 0
C:Adhesive 120-130 um	-	-	-	-	-	-
D:Contact 130-250 um	-	-	-	[10;inf)	0	0

Result



- **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.

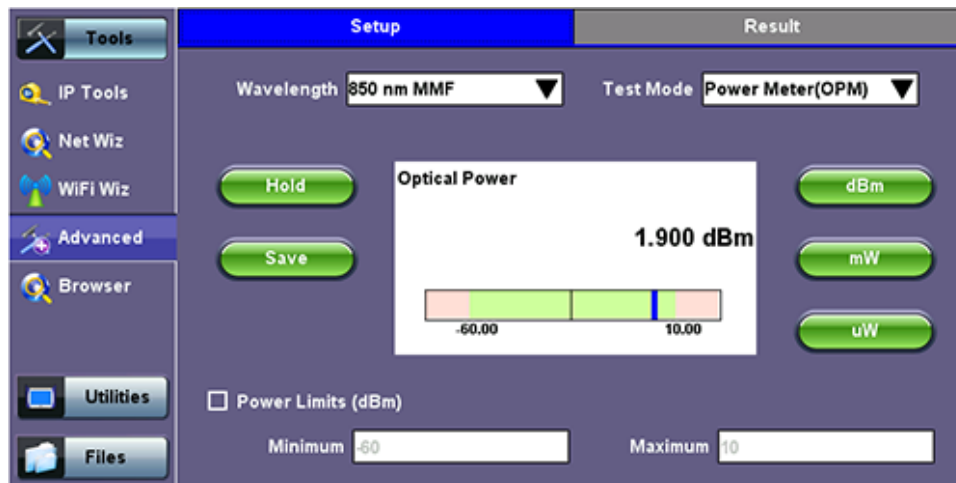
Image/Report	Scrathes			Defects		
	Criteria(μm)	Thresholds	Count	Criteria(μm)	Thresholds	Count
A:Core 0-65 μm	[3;∞)	0	0	[0;5) [5;∞)	4 0	0 6
B:Cladding 65-120 μm	[5;∞)	0	0	[2;5) [5;∞)	5 0	0 6
C:Adhesive 120-130 μm	-	-	-	-	-	-
D:Contact 130-250 μm	-	-	-	[10;∞)	0	17



## 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 the 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.



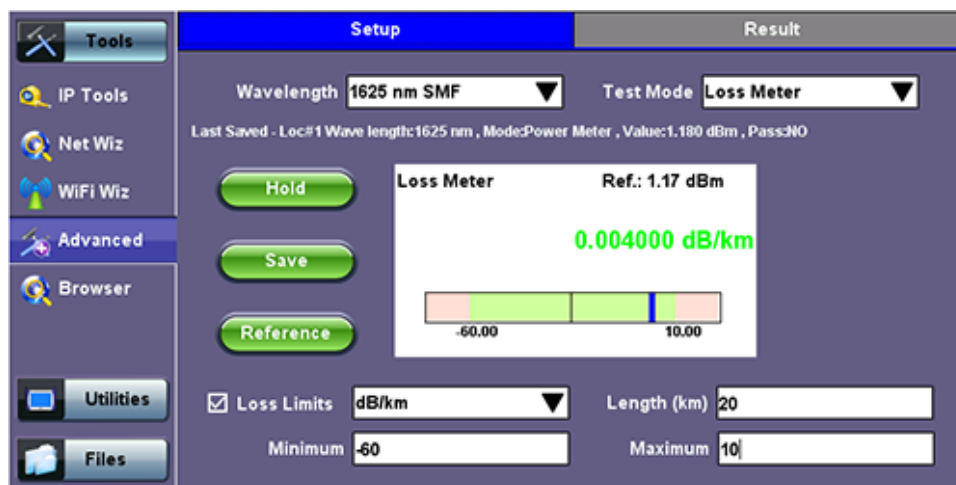
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### 7.4.2.1 Setting Pass/Fail Limits

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.



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### 7.4.3 WiFi Spectrum Analyzer

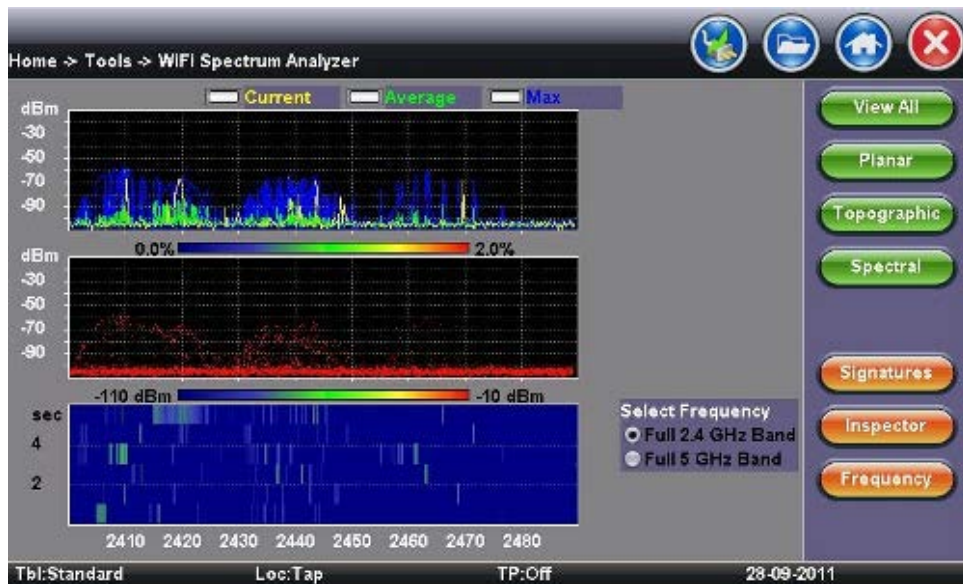
WiFi SA is a portable spectrum analyzer on a USB dongle that displays all RF activity in the WiFi bands (e.g., wireless networks, cordless phones, microwave ovens, Bluetooth devices, etc.). It offers the following capabilities:

- 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	

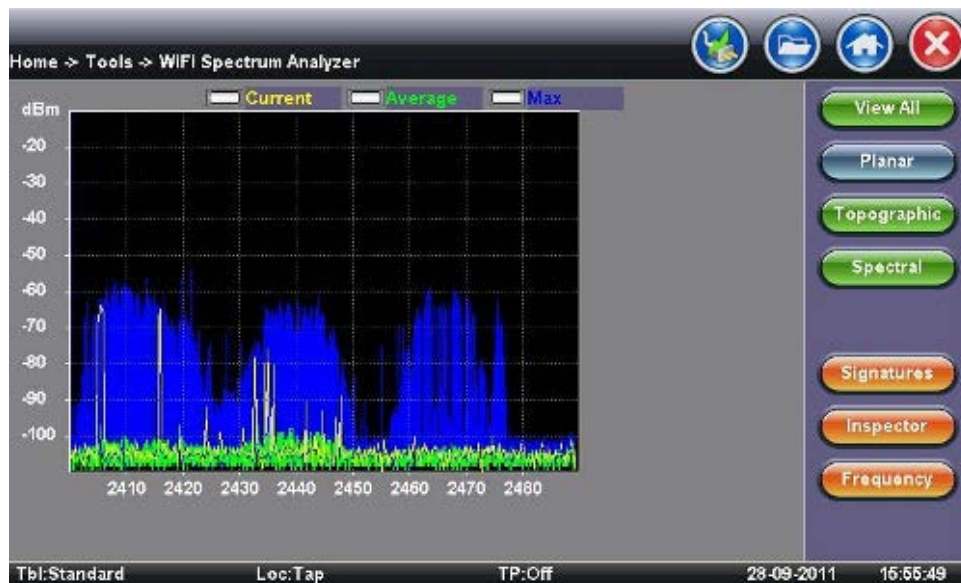
- Supports 802.11a/b/g/n networks
- Supports both 2.4 GHz and 5 GHz bands
- Equipped with RP-SMA antenna jack
  - Allows user to replace standard external Omnidirectional antenna with a higher gain or directional antenna as needed
- The WiFi Analyzer is a compact and portable USB dongle that plugs into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



### 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

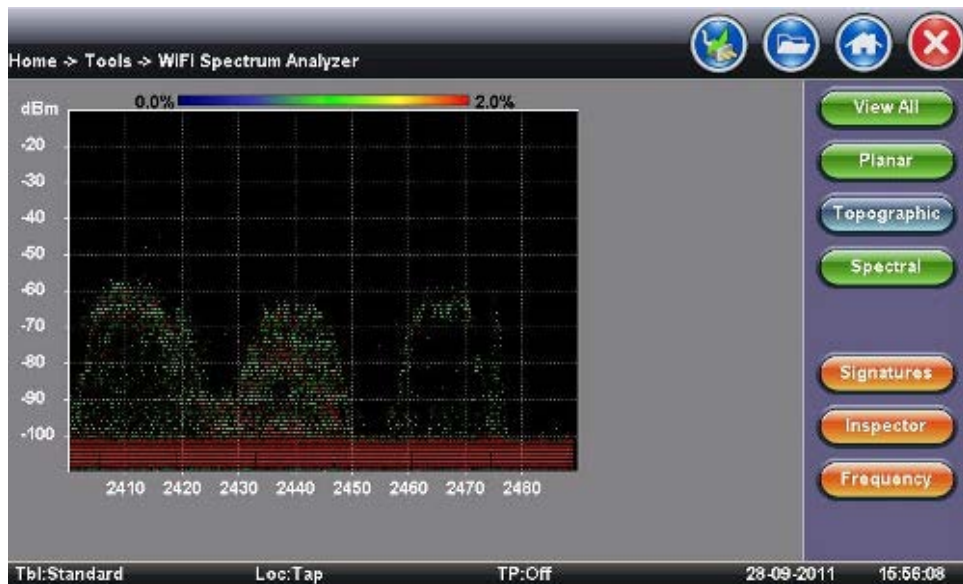


### Planar View

- 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

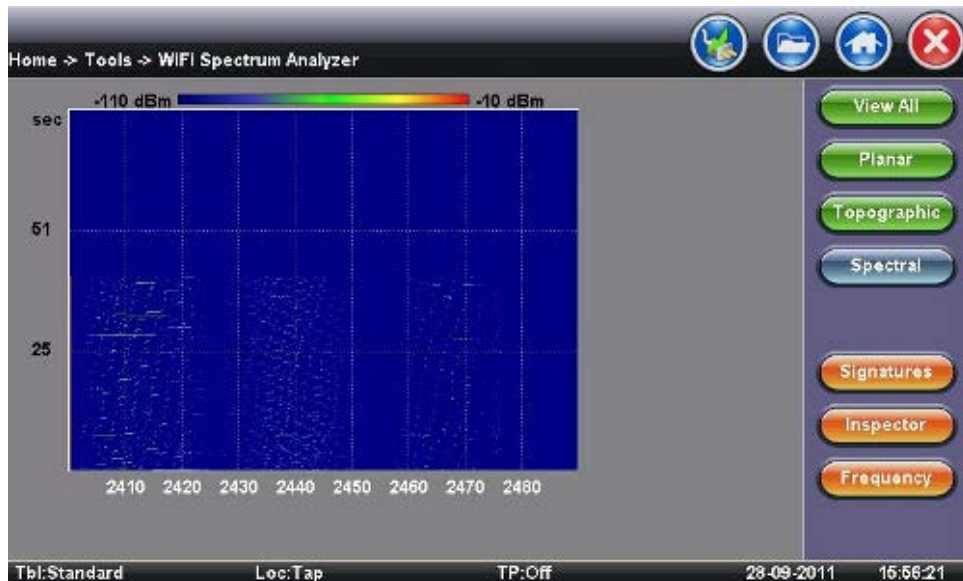




### Topographic View

- 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

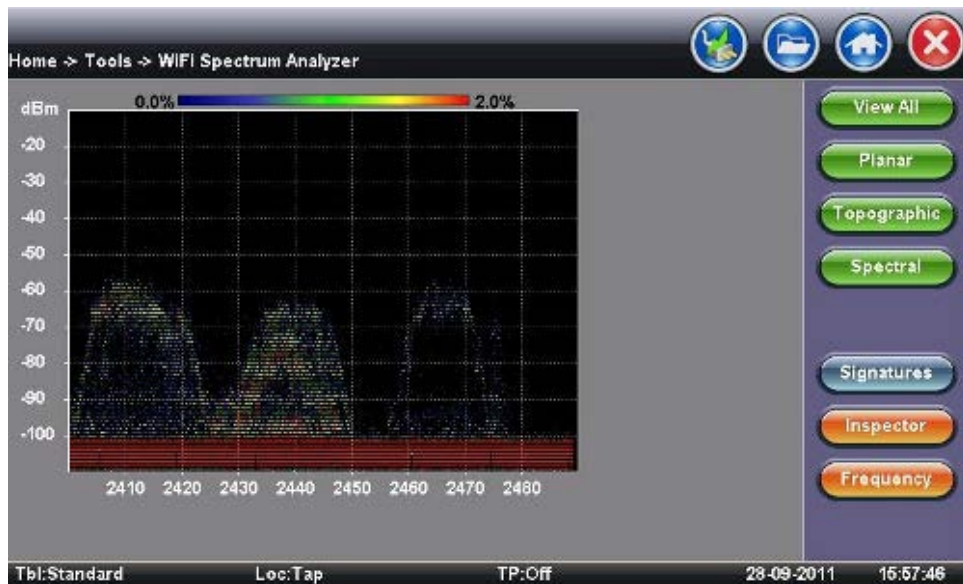
### WiFi SA - Spectral View



### 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

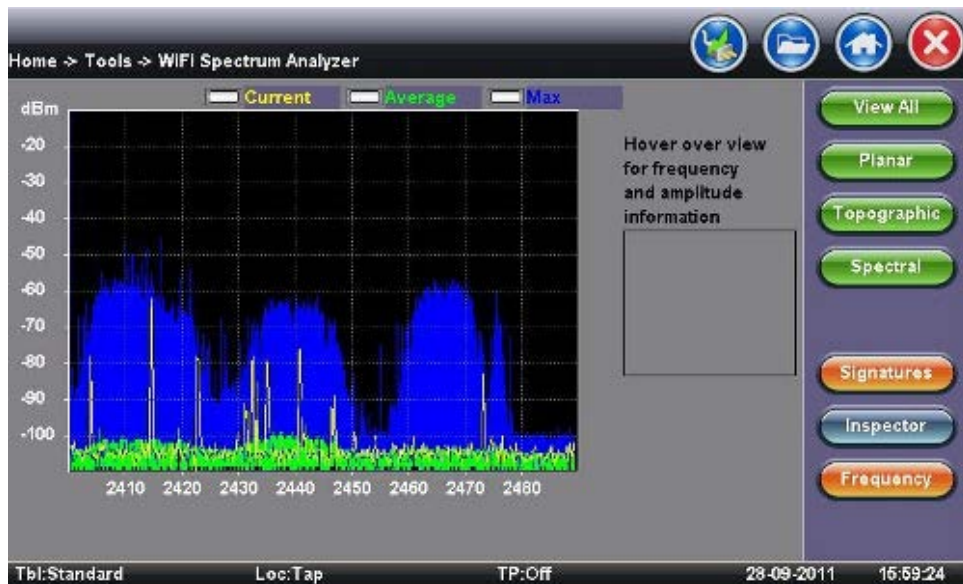
### WiFi SA - Signatures



## 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

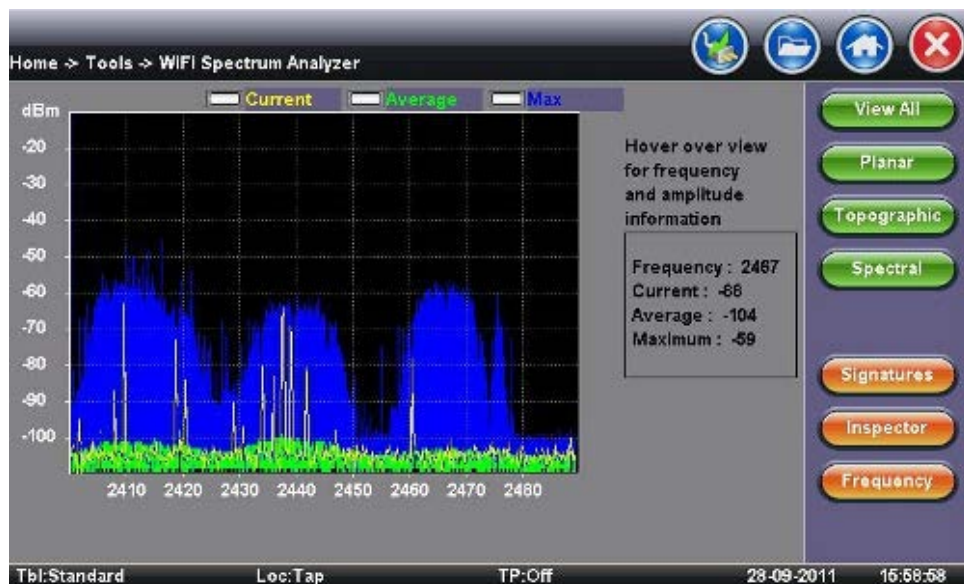
## WiFi SA - Inspector



## 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

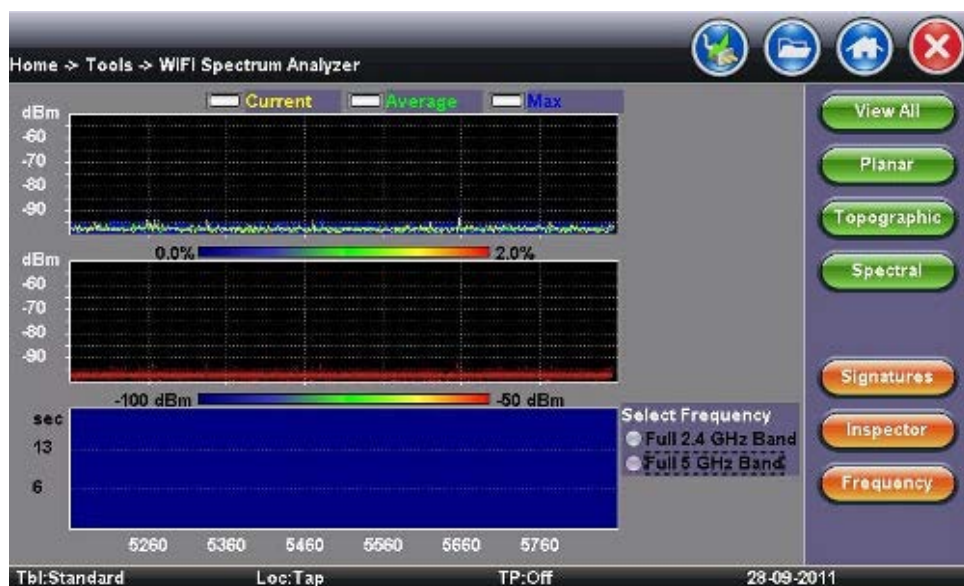
## WiFi SA - Inspector - Result



### 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

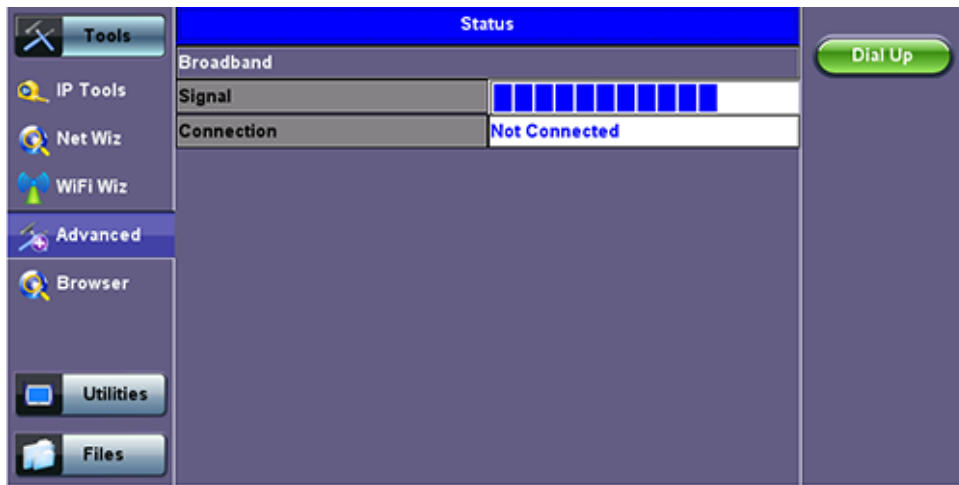
- This button allows the user to select frequency band for testing

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### 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.

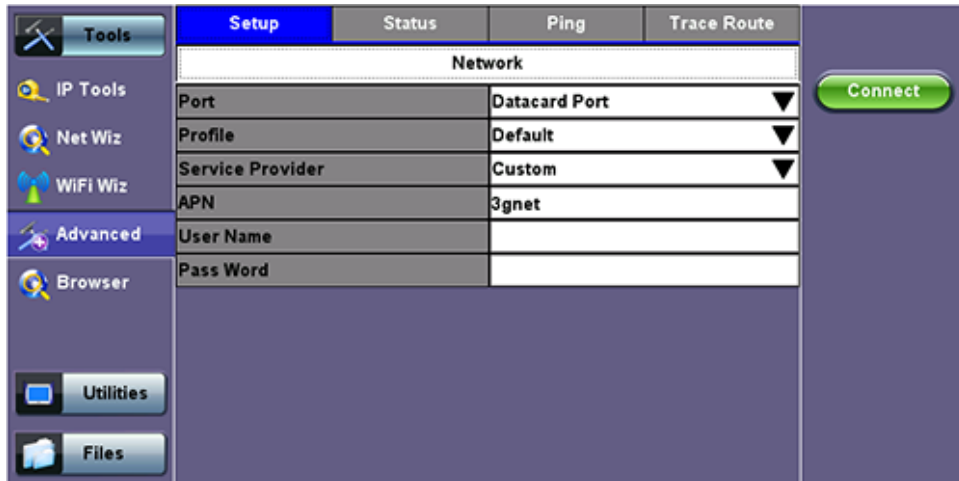
### Data Card - Setup




Press the **Dial Up** key.

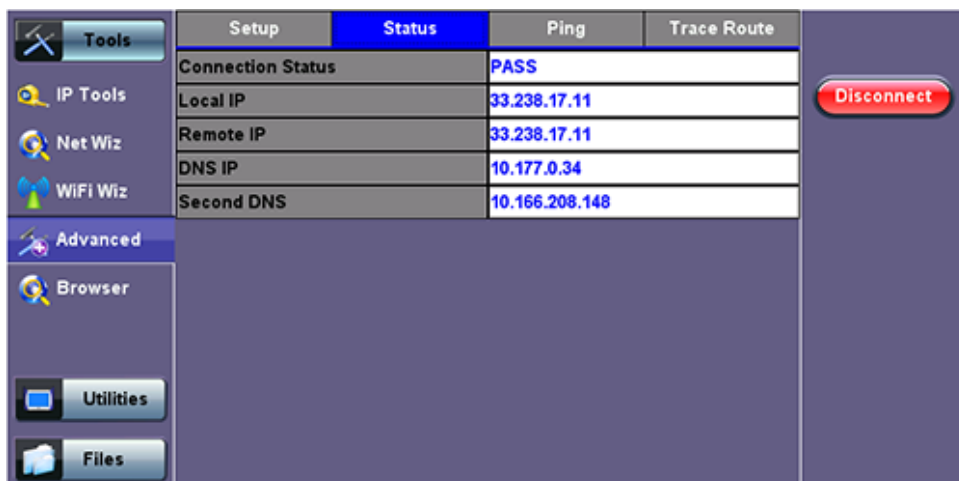
In the IP Tools Setup menu, the Port will be displayed as "Datacard Port." The D for Data icon in the bar on the lower end of the screen will have a red cross to show that datacard is not connected - .

Select the **configuration parameters**, then press **Connect**.



Now that a connection has been established:

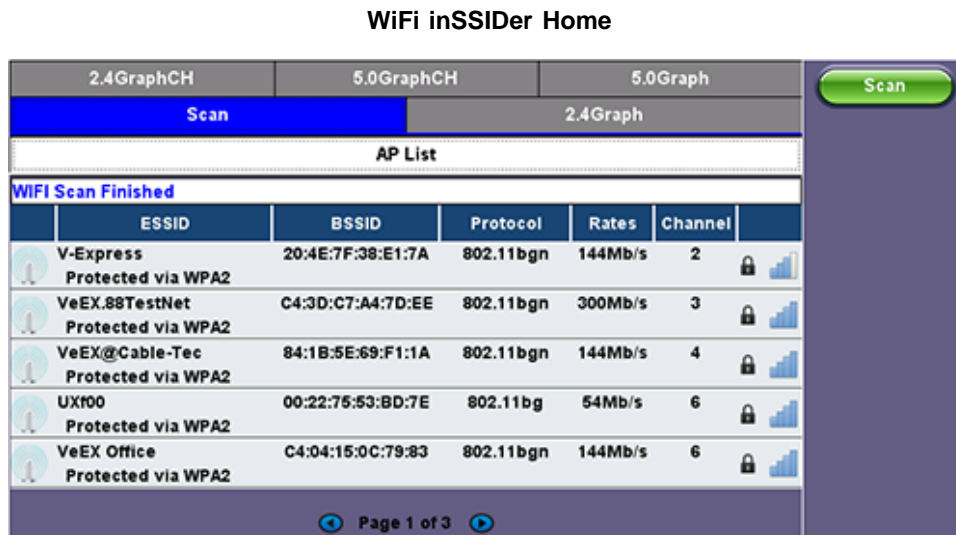
- The **D** for Data in the icon turns green .
- The connection details are displayed in the IP Tools Status tab (shown below)
- It will automatically reconnect if the test set is powered off/on and you are in a good reception area
- It will automatically reconnect if you enter a bad cell area and return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





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## 7.4.5 WiFi inSSIDer



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.

- **Note:** 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

Scan			2.4Graph
2.4GraphCH		5.0GraphCH	5.0Graph
Channel	AP	Best Signal	Best Signal Bar
1	2	100%	100%
6	2	100%	100%
3	2	79%	79%
4	1	78%	78%
2	1	74%	74%
11	3	47%	47%
7	0	0%	0%
8	0	0%	0%
9	0	0%	0%

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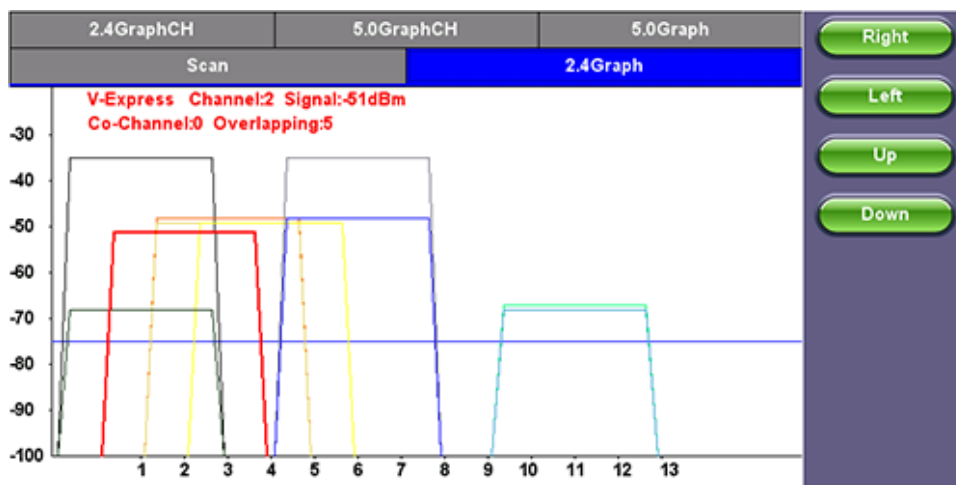
### 5GHZ Channel

Scan			2.4Graph
2.4GraphCH		5.0GraphCH	5.0Graph
Channel	AP	Best Signal	Best Signal Bar
153	1	-35dBm	100%
40	0	null	0%
44	0	null	0%
48	0	null	0%
149	0	null	0%
36	0	null	0%
157	0	null	0%
161	0	null	0%
165	0	null	0%

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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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#### **7.4.6 OTDR Viewer**

This functionality allows the test platform to open and analyze standard OTDR .SOR files created by the TX300S-OTDR, RXT-4100 OTDR, FX300 OTDR or SunLite OTDR test sets. It can also be used to control the wireless OPX BOX OTDR via Bluetooth or USB connection, offering full-featured OTDR functionality.

Please refer to the OTDR manual for further details about its operation.

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## 7.5 Web Browser

A web browser is available in the >Utilities >Tools > Browser menu and can be used as a convenience (browse the web) or to quickly verify Internet connectivity.

The built in web browser uses the management port IP connection.

An active IP connection can be established either through Ethernet, WiFi or datacard ports.

The web browser defaults to VeEX's website. Use the Web browser's navigation bar to enter the name of the website you wish to reach.

### Web Browser



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## 8.0 Warranty and Software

**Warranty Period:** The warranty period for hardware, software and firmware is three (3) years 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



Declaration of Conformity



ROHS Statement

### 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.

[Click here](#) for ROHS Statement relating to VeEX products

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## 10.0 About VeEX

VeEX Inc., the Verification EXperts, is an innovative designer and manufacturer of test and measurement solutions addressing numerous technologies. Global presence through a worldwide distribution channel provides uncompromised product support.

Visit us online at [www.veexinc.com](http://www.veexinc.com) for latest updates and additional documentation.

VeEX Incorporated  
2827 Lakeview Court  
Fremont, CA 94538  
USA  
Tel: +1 510 651 0500  
Fax: +1 510 651 0505

### Customer Care

Tel: + 1 510 651 0500  
Email: [customercare@veexinc.com](mailto:customercare@veexinc.com)

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