



# WX150

## WiFi Air Expert Test Set

The WX150 test set is a compact and lightweight addition to the WiFi Air Expert family. It provides all the tools necessary for WiFi networks discovery, survey, optimization, performance testing and troubleshooting in a compact form factor.



With countless deployments including residential, private and public Hotspots, managed SMBs and hospitality services, WiFi is both a source of great opportunities and challenges for carriers. Customer expectations are high but they have very limited knowledge of the technologies' environmental limitations or best practices, leading to numerous service calls.

VeEX's WiFi Air Expert provides the tools for reliable, repeatable install procedures that go beyond RF layer analysis. It provides complete performance testing that measures end user's experience under traffic load.

Service calls and end user frustration can often be traced to the common complaint of a "slow network." The Air Expert's V-Perf test can help to unequivocally prove the WiFi network's capacity. With configurable data transmission rate and Pass/Fail threshold, technicians can quickly establish whether the achieved upload and download rates meet SLA requirements and readiness for high bandwidth traffic like audio and video streaming.

## Platform Highlights

- Supports detection and connection to 802.11a/b/g/n/ac devices
- Discovers networks and lists Access Points, Clients and Channels in table and graphical format
- AP detailed capabilities discovery including SSID, BSSID, channels, security, supported data rates, signal and noise levels, co-channel and adjacent APs and associated clients
- Survey coverage problems with signal and noise levels tracking
- Analyze Channel usage by utilization and number of APs
- Discover associated and non-associated WiFi Clients present in the network
- One button Auto-Test evaluates the health of the WiFi network with analysis of security, coverage, interference, top talkers and connectivity with configurable AP list
- Connectivity testing with DHCP connection to APs, Ping, Trace Route and ARPWiz
- Verify network performance with dual ended V-Perf Upload/Download throughput testing
- Ethernet 10/100/1000-T and 1000-X ports to verify end-to-end throughput performance
- Ethernet connectivity and PoE testing
- Optional dual band 2.4 GHz and 5 GHz spectrum analyzer to easily discover and identify WiFi and non-WiFi interference

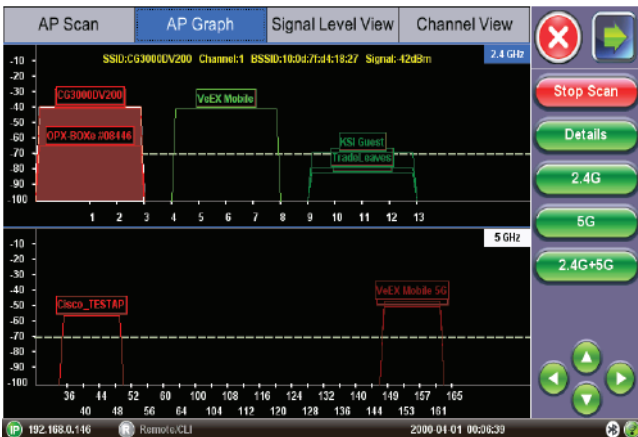
## Key Features

### Discover your Network

The Air Expert automatically scans the WiFi network for 802.11 a/b/g/n/ac APs and Clients. Results are provided in table and graphical format.

#### AP Discovery

AP Scan	AP Graph	Signal Level View	Channel View
SSID	BSSID	PHY	Max Rate
CG3000DV200	10:0d:7f:d4:18:27	b,g,n	216Mb/s
Cisco_TESTAP	8e:15:44:a8:d1:5d	b,g,n,ac	260Mb/s
VeEX Office	e4:04:15:0c:79:83	b,g,n	216Mb/s
VeEX Mobile	e4:04:15:1b:df:c2	b,g,n	216Mb/s
Cisco_TESTAP	8e:15:54:a8:d1:5d	a,n,ac	1299Mb/s
VeEX Mobile 5G	e4:04:15:1b:df:c1	a,n,ac	1299Mb/s
VeEX Office 5G	e4:04:15:0c:79:82	a,n,ac	1299Mb/s
TradeLeaves	00:21:d8:7d:84:92	b,g	54Mb/s
kstokmead	00:21:d8:7d:84:90	b,g	54Mb/s
XSI Guest	00:21:d8:7d:84:91	b,g	54Mb/s
XFINITY	e0:7c:d1:5e:db:cb	b,g,n	216Mb/s



Scan results include AP detailed capabilities: SSID, BSSID, channels, security, supported data rates, signal and noise levels, SNR, co-channel and adjacent channels AP, BSS load, associated clients. Warning signs alert technicians about AP configuration issues as well as if any measurements go beyond user configurable thresholds. The table view can be filtered by any field in order to help in troubleshooting, while the graphical view provides an easy to understand picture of co-channel and adjacent channel interferers.

#### Clients Discovery

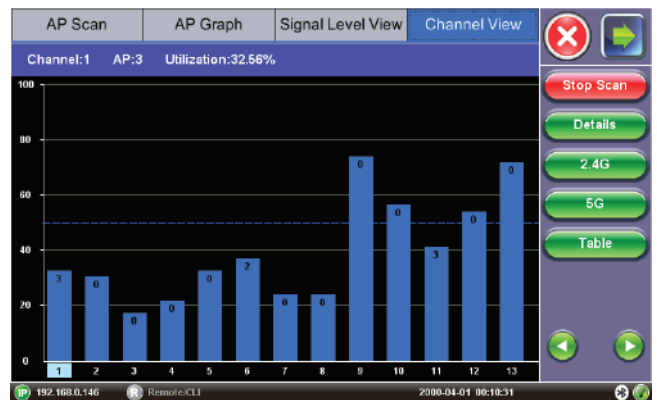
MAC	Associated AP SSID	Max AP Rate	Channel
8a:15:64:a8:d1:5d	(not associated)	N/A	N/A
44:1c:a8:37:54:df	(not associated)	N/A	N/A
b8:27:eb:9d:84:c4	(not associated)	N/A	N/A
28:39:5e:51:60:14	(not associated)	N/A	N/A
d8:c7:9c:0c:18:82	VeEX Office	216Mb/s	6
e4:c8:01:7a:0a:d7	VeEX Office	216Mb/s	6
a0:2c:06:49:27:06	VeEX Office	216Mb/s	6
fc:a6:87:46:5a:13	VeEX Office	216Mb/s	6
20:ab:37:d6:aa:ea	VeEX Office	216Mb/s	6
dc:a9:04:94:0a:bb	VeEX Office	216Mb/s	6
a0:2c:36:3c:7f:40	VeEX Office	216Mb/s	6
54:35:00:d3:8e:39	VeEX Office	216Mb/s	6

The Air Expert Client scan function monitors all WiFi channels to detect WiFi clients with the SSID they are associated to, as well as non-associated clients (clients not connected to an AP). Network administrators can ensure that the devices are authorized on the network by checking against their MAC address and manufacturer information as well as monitor the client's activity.

#### Channel Utilization Discovery

With WiFi as a shared medium, all devices on the same channel share air time. An AP located on a channel with active co-channel APs or adjacent channel APs will lead to lower performance as they are competing for the same available air time.

The Air Expert Channel scan function provides a view of channel utilization in graphical and table format to quickly identify channels with high utilization.

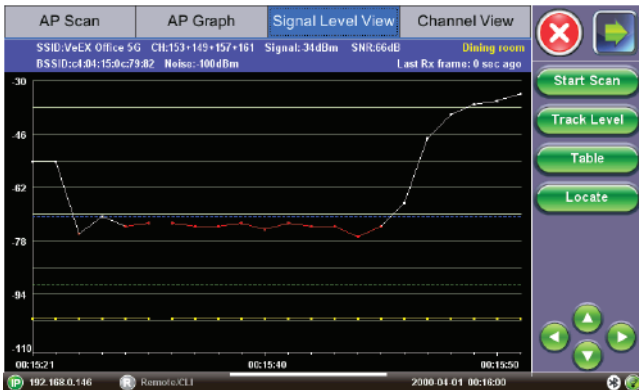


Detailed channel measurements can be sorted by any field including utilization %, number of APs, number of co-channel APs and strongest signal. This information is crucial as technicians need to identify if performance issues are linked to high channel utilization and must quickly decide if reconfiguring the AP to a new channel is advisable.

## Survey Your Network

### Level Tracking

A required step for any installation is to survey the facility for proper coverage with a site walk through. The Air Expert Level tracking function facilitates this step by providing Signal and Noise levels tracking in graphical and table format.



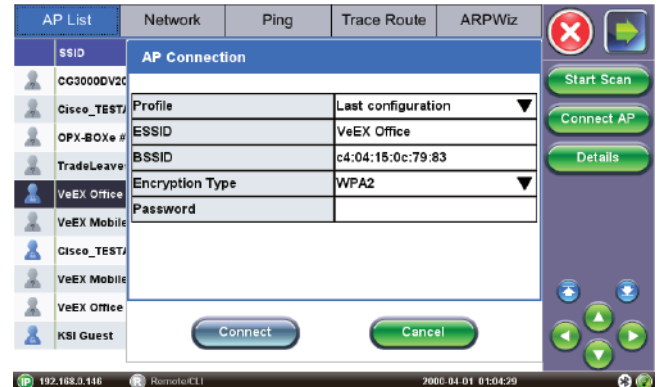
With user configurable thresholds, it is easy to pinpoint where the Signal or Noise levels fall below acceptable quality and ensure site readiness. With a set of pre-configured and configurable location labels, add location information to your measurements to create a full record of the facility walk through.

The screenshot shows the 'Table' view of the level tracking data. The table has the following columns: Time, Location, Signal Level, Noise Level, and SNR. The data points are as follows:

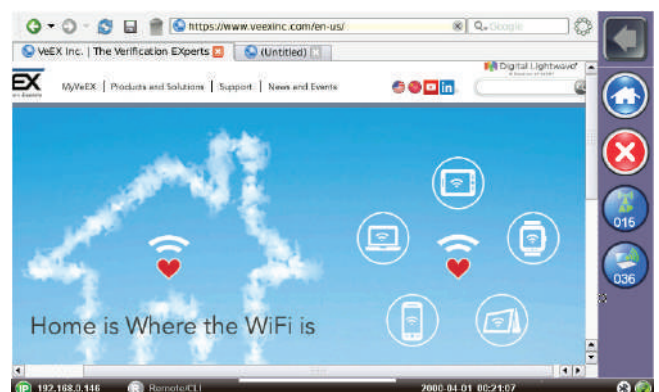
Time	Location	Signal Level	Noise Level	SNR
00:15:23	Family room	-75	-100	25
00:15:24	Family room	-70	-100	30
00:15:25	Family room	-73	-100	27
00:15:26	Family room	-72	-100	28
00:15:36	Dining room	-72	-100	28
00:15:37	Dining room	-73	-100	27
00:15:38	Dining room	-73	-100	27
00:15:39	Dining room	-72	-100	28
00:15:40	Dining room	-74	-100	26
00:15:41	Dining room	-72	-100	28
00:15:42	Dining room	-73	-100	27

### Connectivity Testing

To ensure that network connectivity is available, the Air Expert emulates a client and connects to an AP with customer credentials. Supported security protocols include WEP, WPA and WPA2 as well as Splash page/Captive portal webpage login. The interface allows the technician to review association and authentication status, and provides detailed information about network parameters: assigned IP address, Gateway, DHCP server and DNS server addresses.



Network troubleshooting tools Ping and Traceroute verify connectivity to the internet while the ARPWiz application discovers the local network.



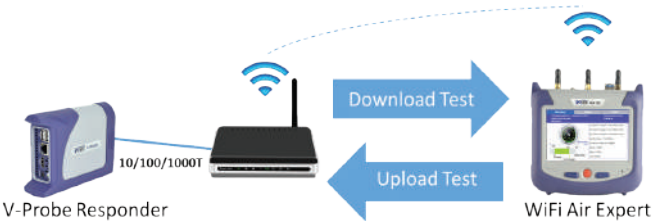
## Optimize your Network

### V-Perf Throughput Testing

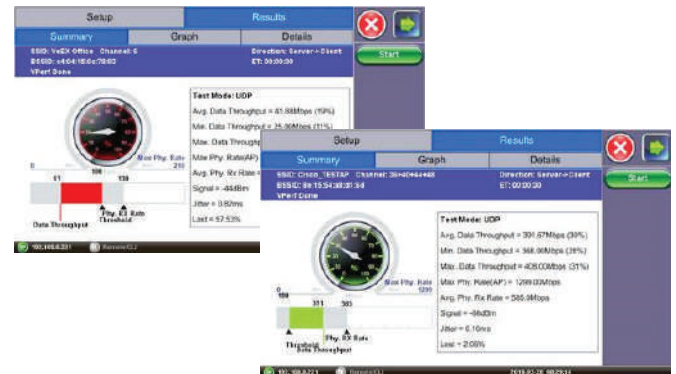
Surveying the RF environment is a good first step for any installation to determine network performance in terms of coverage and connectivity. But real time and bandwidth-hungry applications like video and audio streaming, place a traffic load strain on the network that cannot be properly assessed with RF metrics alone. The customer's true Quality of Experience (QoE) can only be measured with traffic loads simulating an end user's application data traffic. The Air Expert V-Perf dual-ended upload and download traffic test evaluates the network's performance under load and measures QoE parameters from an end user's point of view.

Technicians can quickly establish whether the achieved upload and download rates meet SLA requirements and readiness for high bandwidth traffic like audio and video streaming, with pre-configured profiles for common applications (Netflix, YouTube, Skype, VoIP....).

V-Perf dual-ended test is compatible with iPerf3 servers, Air Expert or companion V-Probe responders, connected directly on the back of the AP 10/100/1000T to perform WiFi to Ethernet data throughput tests. The test can also be performed to a cloud-based server, qualifying WiFi and Broadband access bandwidth in one step.

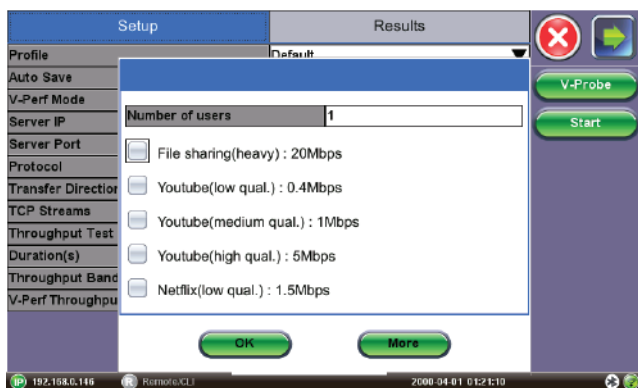


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### V-Probe Responder

The V-Probe Responder is a companion accessory for the Air Expert, and can be used as a V-Perf TCP/UDP test responder on the 10/100/1000BaseT interface. Quick to setup, V-Probe is discovered, controlled and configured directly from the Air Expert user interface. This allows technicians to quickly qualify the air interface performance through the customer's WiFi Access Point.



## Troubleshoot your Network

### WiFi Spectrum Analyzer

With the 2.4 GHz and 5 GHz RF frequency bands open for unlicensed use, WiFi's frequency bands are available for anyone to use. The 2.4 GHz frequency band is especially popular and crowded. It is used by many common RF emitting devices including cordless phones, Bluetooth, Zigbee, baby monitors, wireless audio or security systems. All of these devices constitute sources of non-WiFi interference. They emit frequencies either on a single narrow frequency range like Zigbee, or frequency hopping across the entire spectrum, like Bluetooth, or continuously emitting across the entire spectrum, like a microwave oven. These interferers do not follow WiFi protocol rules, so interference can start while WiFi devices are in the middle of a transmission and last for an unknown duration. In some cases, WiFi will attempt to continue operation in the presence of RF interference by automatically switching to a lower data rate, which slows the use of wireless applications. In the worst case, if the interference source is strong and constant, the WiFi devices will hold communications until the interfering signal goes away completely.

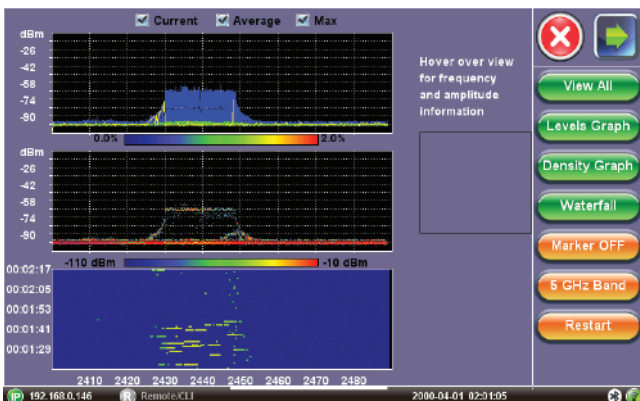
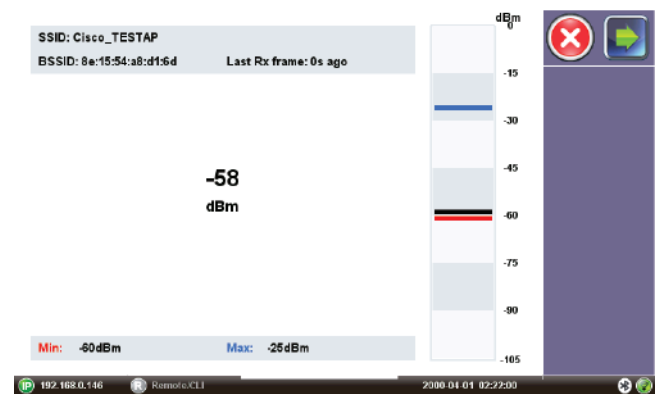
Many highly disruptive and intermittent WiFi performance issues can be traced to non-WiFi interferers. But unless technicians are armed with a specialized spectrum analyzer, they will be powerless in detecting these interference sources since traditional WiFi network scanning tools can only discover 802.11 WiFi devices.

The Air Expert offers a dedicated spectrum analyzer that displays all RF activity – WiFi and non-WiFi interferers – in the 2.4 GHz and 5 GHz bands. The Spectrum Analyzer view allows technicians to visualize interference sources overlapping with the AP under test. The WiFi interference library can also be used to identify interference signatures against a list of known interferers (Cordless phones, Zigbee, Bluetooth, etc.)

## Secure your Network

### WiFi Locate Function

If suspected rogue APs or Clients are present on the network, the Air Expert locate function can be used to track the physical location of the device. The function monitors the strength of the signal, and reports progress.



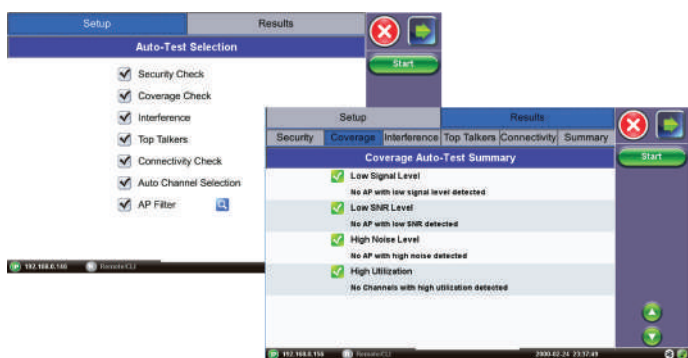
## Automate Testing

### Auto Test Function

WiFi performance is highly dependent on environmental factors. RF signals can be attenuated or blocked by physical obstacles like large metallic objects or concrete walls, neighboring APs with high traffic load can reduce performance, and non-WiFi interference sources, like cordless phones, video cameras or baby monitors, can disrupt WiFi transmission.

Since environmental factors will vary from location to location, no two installs will face the same challenges. Yet it is important to follow a repeatable install procedure to ensure consistency in the service level provided to the end user.

The Air Expert Auto Test function provides an automated, reliable and repeatable installation routine. With configurable test profiles for consistency, and test results clearly marked with Pass, Fail or Warning status, technicians are provided with an easy-to-use and comprehensive site assessment routine.



## Test your Wired Network

### Test Interfaces

The Air Expert is optionally fitted with an RJ45 10/100/1000BaseT Ethernet interface and an SFP 1000Base-X interface. This allows technicians to verify or troubleshoot the wired access network and broadband access.

### IP Tools

Provides Ethernet and Internet connectivity verification and troubleshooting tools, supports: IPv4 (Static, DHCP) and VLAN. Network troubleshooting tools Ping and Traceroute verify connectivity to the internet while the ARPWiz application discovers the local network.

### PoE Test

The Power over Ethernet test function supports emulation of Powered Device and allows technicians to identify the pairs used. This function also measures PoE voltage.

### V-Perf Throughput Testing

V-Perf dual ended test is compatible with iPerf3 servers, or an Air Expert test set connected on the WiFi interface to run Ethernet to WiFi data throughput test. The test can also be performed to a cloud-based server, to qualify WiFi and Broadband access bandwidth in one step.

With configurable data transmission rate and Pass/Fail threshold, technicians can quickly establish whether the achieved upload and download rates meet SLA requirements and readiness for high bandwidth traffic like audio and video streaming.

## Document your Network

### Remote Access

The WX150 offers multiple ways for Remote Control or access to the information remotely (i.e. test results, test profiles, etc.).

The test set can be reached via:

- ReVeal PC software
- Web browser (Web Remote Control)
- VNC® Client
- Management Port Connectivity: Wi-Fi 802.11 b/g/n

### Report generation

Test results generation in PDF format

Export test results and profiles via USB memory, Bluetooth, web browser, Data Card or ReVeal companion PC software

### Advanced Management

This option allow users to append work order information to test results (i.e. Job ID, account, location, comments)

- Compatible with R300 Productivity Server (R-Server)
- Authorized test sets can register with specific VeSion R300 Server
- Test results can be uploaded via Bluetooth or WiFi

*\*Requires optional WiFi USB adapter*

## Specifications

### General

#### Wireless Standards

- 802.11 a, b, g, n, ac

#### WiFi data rates

- 802.11 a: up to 54 Mbps
- 802.11 b: up to 11 Mbps
- 802.11 g: up to 54 Mbps
- 802.11 n: up to 450 Mbps
  - BPSK, QPSK,16-QAM, 64-QAM
  - MCS 0-7
  - HT20/40
- 802.11 ac: up to 1.3 Gbps
  - BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
  - MCS 0-9
  - VHT20/40/80

#### Operating frequencies

- ISM: 2.400 GHz to 2.4835 GHz
- UNII: 5.170 GHz to 5.825 GHz

#### MIMO channels

- 3x3:3

#### WiFi security standards

- WEP
- WPA/WPA2 Personal
- WPA/WPA2 Enterprise
- Splash page/Captive portal webpage login

#### Output Power

- 802.11a: 15 dBm @ 54 Mbps
- 802.11b: 18 dBm @ 11 Mbps
- 802.11g: 15 dBm @ 54 Mbps
- 802.11gn HT20: 13 dBm @ MCS7
- 802.11gn HT40: 13 dBm @ MCS7
- 802.11an HT20: 13 dBm @ MCS7
- 802.11an HT40: 12 dBm @ MCS7
- 802.11ac VHT80: 10 dBm @ MCS9

#### Receiver Sensitivity

- 802.11a: ≤ -65 dBm @ 54 Mbps
- 802.11b: ≤ -76 dBm @ 11 Mbps
- 802.11g: ≤ -65 dBm @ 54 Mbps
- 802.11gn HT20: ≤ -64 dBm @ MCS7
- 802.11gn HT40: ≤ -61 dBm @ MCS7
- 802.11an HT20: ≤ -64 dBm @ MCS7
- 802.11an HT40: ≤ -61 dBm @ MCS7
- 802.11ac VHT80: ≤ -51 dBm @ MCS9

#### Wi-Fi Antennas

- Antennas (3)
  - Configurable operation with 1, 2, or 3 antennas
  - Frequency range: 2.4 to 2.5 GHz, 4.9 to 5.875 GHz
  - Gain: 2.1 dBi (2.45 GHz), 2.4 dBi (4.9 GHz), 2.6 dBi (5.25 GHz), 3.4 dBi (5.875 GHz)
  - Radiation: Omnidirectional
  - Polarization: Vertical

#### WiFi Spectrum Analyzer (Optional)

- Frequency Range: 2400 MHz to 2484 MHz and 5000 MHz to 6000 MHz
- Amplitude Range: -100 to -6.5 dBm
- Reverse polarity SMA : 50 Ohms
- Absolute max input power : +10 dBm (over this it can damage the unit)

#### 802.3 Ethernet test ports

- RJ45 10/100/1000Base-T
- SFP 1000Base-X

#### PoE Testing

- Emulation of Powered Device
- Detect pairs used
- PoE voltage measurement

### General Specifications

Size	150 x 150 x 80 mm (5.9 x 5.9 x 3.1")
Weight	1.1 kg (2.4 lbs)
Battery	Lithium-ion battery, 56 Wh with low voltage indication
AC Adapter	Input: 100-240 VAC, 50-60 Hz Output: 15 VDC, 5A
Operating Time	8 hours typical operation
Operating Temperature	-10°C to 45°C (14°F to 113°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	5% to 95% non-condensing
Display	5" WVGA 800x480 TFT color LCD touchscreen
Ruggedness	Survives 2m (6 ft) drop to concrete on all sides
Water resistance	May be used in light rain
Interfaces	Micro-USB with On The Go (OTG) support RJ45 10/100/1000 BT
Connectivity	WiFi 802.11 b/g/n, Bluetooth
Languages	Multiple languages can be supported
Certifications	CE & ROHS compliant
Safety Standards	AC adaptor - IEC 61010-1, Class II (GOST 12.2.091)



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