OneExpert™ DSL

Modular Test Platform

Consistently achieve high-performance results when deploying fast broadband service to the home.

OneExpert DSL helps field technicians fix problems right—the first time. A multitouch, user-friendly interface and OneCheck™ automated tests ease complex tasks with clear pass/fail results. And, its future-proof modules ensure years of use supporting access and home networks.

VDSL
ADSL
Copper
TDR
Spectral
Fiber
WiFi
Coax
Wiring
Web
Video
OneCheck
Mobile
StrataSync

StrataSync™ ENABLED

Features and Benefits

- Easy-to-use SmartGain™ TDR ensures every technician can locate copper faults
- OneCheck™ automates field tests and simplifies copper results
- Reduce OpEx by turning all results (including external) into smart data to proactively manage network and workgroup performance
- StrataSync™ cloud-enabled asset and test data management reduces administrative support time with an at-a-glance interface
- Modular platform scales for new WiFi, fiber, and VDSL technologies
- Mobile-connectivity iOS app provides remote control, job management, data enhancements, and technical support content, including tutorials

Open Design

With the advent of cloud-based applications, touch screen interfaces, and always-on, always-connected smartphones and tablets, instrument users have high expectations not only for usability, but also for seamless integration between their devices and the back office. OneExpert design takes all this into consideration and provides a test platform that helps technicians perform more efficiently and fix problems faster. It lets service providers invest in a long-term, open platform.

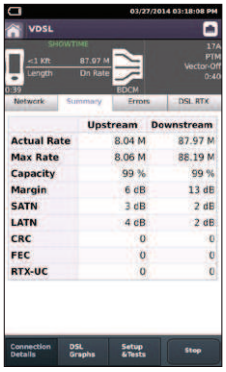
Table 1. OneExpert design highlights

OneExpert Feature	What It Does	Why It Is Needed
Modular hardware	Ensures tester can be updated in line with technology and market advancements	Future-proofs your investment
Remote software upgrades	Software can be enhanced and upgraded in the field	Keeps hardware updated with the latest best-practice test applications
Multitouch user interface	Includes pinch-to-zoom, scrolling, flick, and more	Enhances ease-of use by leveraging a user's mobile and tablet experience
Large screen	Complete graphs appear on a single screen	Improved ergonomics, particularly with TDR trace reading
Bluetooth®/WiFi-ready connectivity	Optional wireless connectivity	Easy communication with mobile devices
OneCheck	Automated JDSU suite of tests, many with pass/fail results	Leverages best practices to make complex tasks easy
StrataSync	Cloud-based solution manages JDSU instrument assets and field data results	Plug-and-play back-office integration

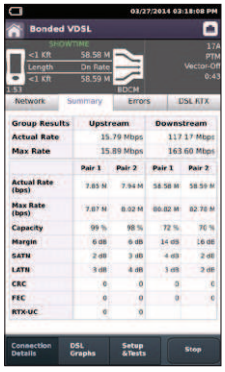
ADSL2+ / VDSL2

A common DSL sync test is performed at every dispatch because it is essential in helping field technicians understand DSL link quality (bandwidth rates, margins, errors, and likelihood for errors). This same test also helps to determine whether issues are coming from the equipment (CPE or DSLAM ports) or from the profile settings.

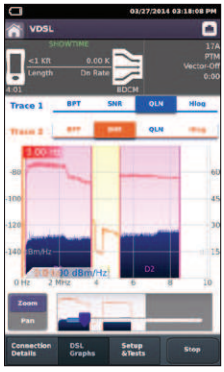
OneExpert DSL supports ADSL/2/2+ Annex A and VDSL2 on single-line (up to 30a) and 2-pair bonded ports up to profile 17a. It supports vectoring on both single-line and bonded VDSL connections up to profile 17a along with DSL physical layer retransmission (DSL RTX/G.INP). It is easy to use and shows most critical results on a single DSL summary screen page.



DSL summary



Signal to noise ratio (SNR) vs. bits per tone (BPT) graph



Quiet line noise (QLN) vs. BPT graph

Table 2. Typical tests technicians must perform

DSL Test	What It Does	Why It Is Needed
Synchronization test	Synchronization in auto mode or with a dedicated profile	Connection and provisioning problems
Profile	Current profile set	Mismatch between DSLAM profile, CPE settings, and customer's expectations
Margins and attenuation	SNR ratio margins and loop attenuations	Copper loops are exposed to external noise. Adequate noise margins maintain DSL connection quality. Higher attenuation results in lower SNR.
DSL errors	CRC, FEC, LOS, LOF, and LOP	DSL errors will transfer to application layers such as IP video
DSL RTX (G.INP)	DSL retransmission: status, retransmitted DTUs, corrected DTUs, uncorrected DTUs, INP REIN	DSL RTX support to match CPE and statistics to highlight DSL lines at risk, already using retransmission
BPT graph	Number of BPT identifies disturbers/interferers	Number of BPT identifies disturbers/interferers.
Hlog graph	Loop attenuation component of the channel transfer function (during the modem training phase)	Can detect bridged taps, degraded contacts, and bad joints
QLN graph	External noise floor of the DSL line	Shows frequency of potential disturbers/ interferers on the DSL line

Single Test-Lead Connection

When connecting copper test leads, technicians will try to reduce the expense of multiple test cables as well the incidence of errors resulting from using the wrong lead. It is critical to get a proper connection with a good ground, or risk rendering meaningless test results. However, swapping between DSL testing and copper testing during troubleshooting adds time and risks losing test-lead connection quality.

OneExpert DSL lets technicians focus on test leads once, regardless of the number of DSL and copper tests that follow, saving time and, more importantly, avoiding misleading or incorrect results.

Table 3. Single test-lead connections

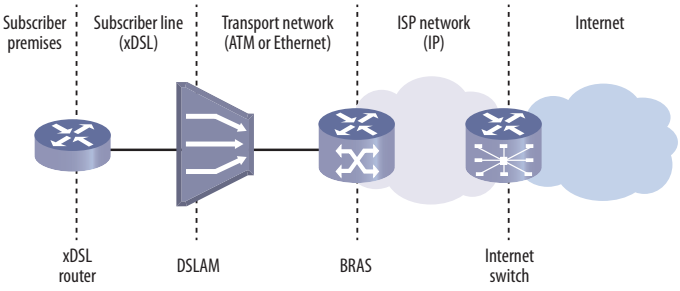
Single Test-Lead Connection	What It Tests	Why It Is Needed
All tests are conducted from a single test-lead connection	DSL and copper thru a single test-lead connection	Reduces the risk of misleading results from bad test lead connections

IP Data — Web and Speed Testing

Internet subscribers demand reliable connectivity and new applications require higher data throughput and network-delay time performance. DSL error protection using interleave delay and error recovery mechanisms, like those for IP video, counteract time-sensitive data throughput using TCP/IP with acknowledgment and retransmission. The OneExpert DSL tester allows technicians to quickly test internet connectivity using the built-in web browser. It tests the data rates provided by VDSL vectoring with FTP/HTTP throughput as key reference tests for TCP/IP applications. Mature tests like IP ping delay are still necessary, especially for real–time applications, such as online gaming.

Table 4. IP data tests

IP Data Test	What It Tests	Why It Is Needed
User authentication	IPoE, PPPoE, IPv4, and IPv6	Customer service turn-up
Web browser	Connection to any website	Differentiates between network problems and web-server downtimes and isolates customer PC or mobile devices as points of failure
IP ping	Delay time through the network	Network delay is crucial, especially with high-interaction applications such as gaming
FTP/HTTP throughput	Upload and download rates	DSL profile parameters, such as INP, delay, and network aggregation issues, determine user-experienced data speeds



Single test-lead connection enhanced IP data — Web and SpeedTest bonding

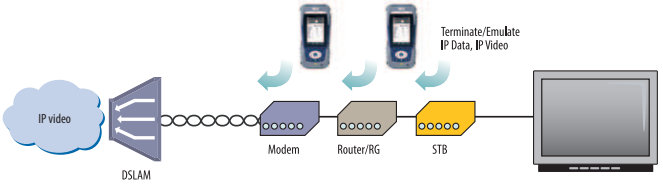
IP Video

OneExpert DSL can test multiple standard and high-definition television (SDTV/HDTV) streams regardless of compression format (MPEG-2, MPEG-4p10/H.264, VC-1, and others) and automatically detects the stream type with the Broadcast Auto feature. The OneExpert DSL IP Video application allows for termination of the IP video stream anywhere in the access network using the DSL or Ethernet interface.

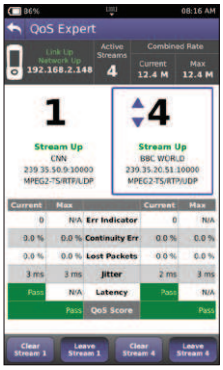
Key performance indicators for real-time protocol (RTP) lets the OneExpert DSL precisely measure network QoS and QoE.

Table 5. IP video tests

IP Video Test	What It Tests	Why It Is Needed
IP video stream availability	Access to one or more SDTV or HDTV streams	Content might come from different sources; possible bandwidth limitations if more than one stream is active
Quality of service	Key IP video performance indicators such as jitter, loss, latency, error indicator; includes QoS Expert to compare performance between two streams	Easy-to-understand pass/fail metrics if IP video is of good quality
Packet loss analysis	Minimum distance, maximum period, RTP loss and errors	Detailed analysis on on Quality of Experience impact
Rates analysis	Video, audio, and data substream rates	Bandwidth consumption in relation to total available rates.
PID map	PID for video, audio, data	Availability of all stream components



IP Video QoS testing



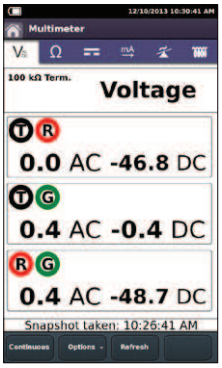
OneExpert DSL IP Video — QoS Expert

OneCheck Copper

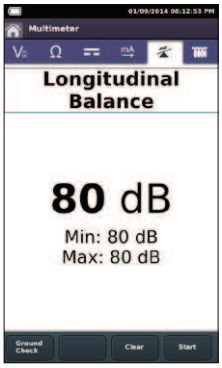
It is critical to test the copper prior to turning up DSL. What may have worked for POTS or lower-speed DSL may not work for VDSL or as the plant degrades. OneExpert DSL's OneCheck Copper function simplifies copper testing for field technicians with repeatable pass/fail results.

Table 6. Typical copper pair tests

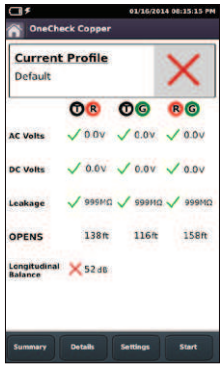
Copper Tests	What It Tests	Why It Is Needed
Voltage	Foreign voltages	Safety and identifies cross-battery impairments
Resistance	Insulation between tip-A and ring-B and between tip-A, ring-B, and ground-E	Leakage resistance affects DSL sync and performance
Opens (capacitance)	Loop length and capacitive balance	Cable damage, one side open, loop length must be acceptable for DSL
Balance	Longitudinal balance, resistive balance, capacitive balance	Robustness against noise, otherwise reduced BPT
Load coil	Presence of load coils	Load coils act as low-pass filters and must be removed for DSL to work properly
Ground check	Ground connection check for balance	Poor or lack of ground leads to incorrect results, hides possible impairments



Voltage

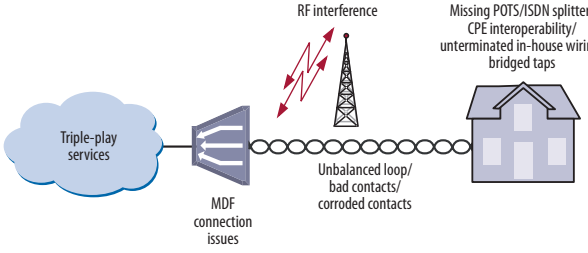


Balance



OneCheck Copper

Inexperienced technicians often will call in a copper expert as soon as they are unable to find a fix, even without being sure the copper is faulty, extending repair times and increasing OpEx. OneCheck Copper lets any tier-1 technician assess copper-pair health automatically by testing the copper circuit as a single-ended line test (SELT) to rule out foreign voltages, opens, shorts, or load coils are on the line. It also tests whether the line is balanced enough for noise rejection so that it does not interfere with the DSL signal.



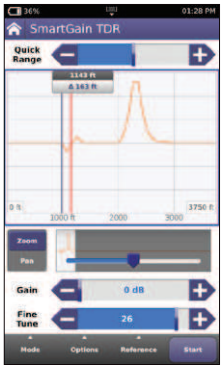
Copper-loop issues such as foreign voltage, opens shorts, and load coils can impact DSL and triple-play performance

TDR

OneExpert DSL TDR test functionality is a powerful tool for identifying cable faults that can impair broadband service. It addresses TDR instrument operation for simplicity and accuracy—not one or the other, as with most TDRs—avoiding incorrect settings and false TDR readings. The automated SmartGain TDR mode's patented time varying gain (TVG) and adaptive pulse width technologies precisely locate faults in access copper loops and inside home networks.

Table 7. TDR tests

TDR Test	What It Tests	Why It Is Needed
Loop length	Location of the cable end	VDSL requires shorter loop lengths than ADSL2+; loop lengths must be acceptable for the technology used.
Bridged taps	Length of bridged taps	Bridged taps cause unwanted reflections at the splice point and tap ends. The reflected signal, or circuit noise, degrades DSL performance. Also, bridged taps can act as an antenna picking up external noise along the tap. Bridged taps should be removed when possible to improve DSL performance.
Opens, shorts	Opens and shorts	Cable damage.
Corroded contacts	Presence of corroded contracts	Corroded contacts act as resistive (imbalance) or capacitive (opens) faults that especially impact the pair's continuity and overall balance making it more susceptible to noise, thus degrading DSL performance.
Bad splices	Presence of bad splices	Bad splices cause unwanted reflections similar to resistive faults that impact the pair's overall balance making it more susceptible to noise, thus degrading DSL performance.
Battery cross	Hard battery crosses: for example, a low resistance battery cross	Battery cross is physical contact with a working pair that creates noise and mismatched impedance issues.
Load coil	Location of load coils	Load coils act as low-pass filters and must be removed for DSL to work.
Wet sections	Location and length of a wet section	Wet sections contain increased capacitance causing impedance variations that result in significant DSL signal attenuation.



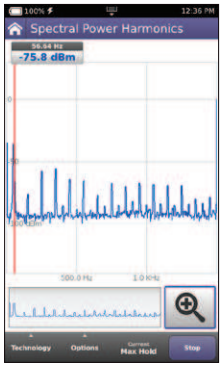
Standard TDR

Copper Impairments

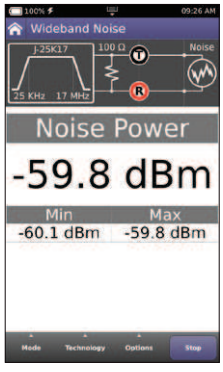
A pristine copper plant guarantees error free service and high data rates. With OneExpert DSL, technicians can qualify the severity of copper impairments and locate copper faults.

Table 8. Copper tests

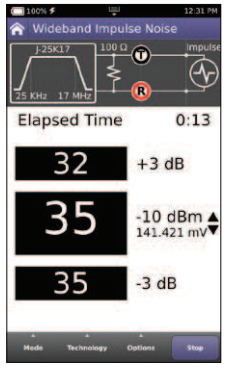
Copper Test	What It Tests	Why It Is Needed
Spectral	Identifies precise amplitude and frequency of disturbers; includes technology selection for ADSL2+/VDSL2 and power harmonics; max hold or actual values	Noise disturbers can impact DSL performance
WB noise	Quickly identifies if noise across band with predefined or custom definable filter settings is an issue	Crosstalk and noise can impact DSL performance
WB impulse noise	Impulse noise across filter band based on technology selection; counts impulse noise disturbers; shows impulse noise disturber signature in frequency and time domain	Impulse noise disturbers might not be recoverable and can cause intermittent DSL failures
WB receive tones	Receive power levels	DSL performance is depending on loop length
Resistive fault locator (RFL)	Resistive path from either wire in a pair to battery or ground or across the pair; distance to fault; includes UFED support	Resistive faults impact DSL performance by upsetting pair balance or subjecting the pair directly to increased noise; lowers SNR; fewer bits per tone
K-test	Pairs with a fault on both wires (double-sided resistive fault); distance to faults; includes UFED support	Resistive faults impact DSL performance by upsetting pair balance or subjecting the pair directly to increased noise; lowers SNR; fewer bits per tone



Spectral Power Harmonics



Wideband Noise



Wideband Impulse Noise

POTS Dialer

OneExpert DSL reduces the number of test tools a technician needs to carry by providing an integrated butt set. Technicians can use the POTS dialer to verify a line's continuity to the exchange and that it works without conflicting with the customer's broadband equipment due to an eventual missing or defective POTS splitter.

Table 9. POTS tests

Copper Test	What It Tests	Why It Is Needed
POTS	DTMF and pulse POTS calls, caller ID	Connectivity to exchange and determining if POTS is available, dial test line facilities in an exchange

POTS Dialer

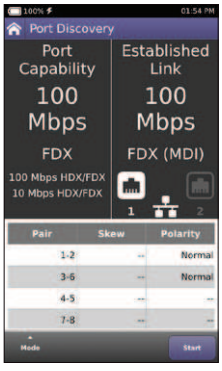
Wiring Tools

Where available, Ethernet cabling is typically preferred for home networks because it delivers optimal data rates and quality of service. OneExpert DSL wiring tools allow for Ethernet CAT5/6/7 or phone-wiring CAT3 testing. Technicians can quickly set up a home network using the Wire Mapping Smart Remote and resistive IDs as remote probes. Further, OneExpert DSL supports Hub Flash, port discovery and a ping tool against multiple targets including gateway, DNS and target host/IP addresses.

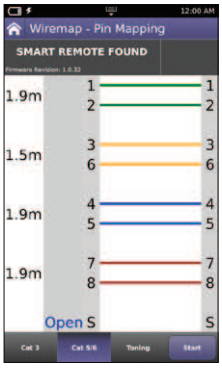
Table 10. Testing Ethernet and wire-mapping twisted pair

Wiring Tool	What It Tests	Why It Is Needed
Wire mapping	Uses the Wire Mapping Smart Remote to test for physical-layer issues	Locate improper wire connections
Loop length	Loop length per pair	Verify cable run lengths
Opens, shorts	Location of opens, shorts	Cable damage, splices, or port connections
Cable identification	Cable run identification with resistive IDs	Multiple cable runs in the wired home network
Hub flash	Determine to which port the cable is connected	Ports at residential gateways (RG) might have different functional assignments
Port discovery	Identifies an Ethernet connection and reports speed of link, signal to noise ration, skew	Ethernet port configuration or cable wiring might limit the port capabilities within a range of 10, 100, 1000 Mbps, half- or full duplex.
Ping tool	Connectivity to various network resources such as the gateway, DSN, and selected IP addresses	Network connectivity segmentation – home network versus Internet

Wire Mapping Smart Remote



Port discovery



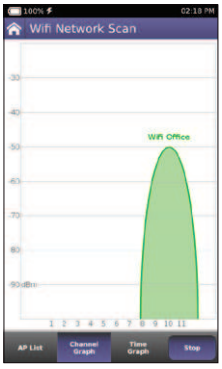
Wire mapping

WiFi

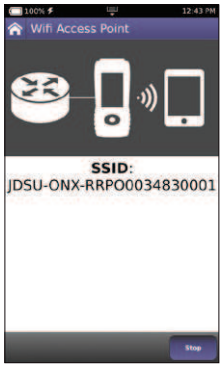
The use of wireless devices and networks is becoming a common part of every household. With the OneExpert DSL WiFi Scan, technicians are equipped with wireless 802.11b/g/n (2.4 GHz) testing capability to show the signal strength, secure set identification (SSID), configured channel, security, MAC address, and 802.11 protocol at the test location of each wireless 802.11b/g/n network in the area. It also indicates whether a network is secure or vulnerable to security threats.

Table 11. WiFi Test

WiFi Test	What It Tests	Why It Is Needed
WiFi scan	WiFi access point (AP) station scan	Discover potential interfering networks (which could cause slow data transfer speeds), and locate weak spots in the WiFi signal to suggest a better location of the router
WiFi AP	Connect OneExpert DSL via Ethrnet cable to a router or residential gateway to configure as a WiFi AP (Ethernet bridge to WiFi)	Verify Internet connectivity, configure CPE, and run tests from mobile devices



WiFi Network Scan



OneExpert DSL providing WiFi access point

Fiber

Broadband DSL networks and broadband triple-play services often rely on fiber networks. Examples are fiber-to-the-cabinet (FTTC) or fiber-to-the-distribution-point (FTTdp) that bring the DSLAM closer to the customer for greater VDSL bandwidth. The DSLAM is served with fiber back to the exchange to carry broadband signals. Another example is business customers connected to their service providers via ADSL2+/VDSL and via fiber. This drives the need for field technicians who work in these environments to have both DSL and fiber test capabilities.

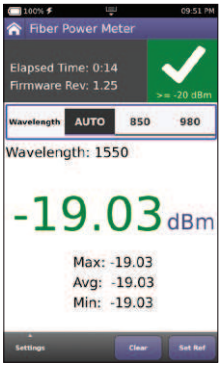
For point-to-point fiber installations such as FTTC or business connections, field technicians can use the OneExpert DSL together with the JDSU MP-60 or MP-80 USB optical power meter (OPM) to ensure that fiber cable attenuation meets system requirement performance and is ready to survive network aging and environmental impacts.

In combination with a JDSU SmartPocket optical laser source (OLS), the OneExpert DSL equipped with an MP-60 or MP-80 OPM can automatically perform optical link loss measurement at different wavelengths—resulting in a faster and more comprehensive fiber test.

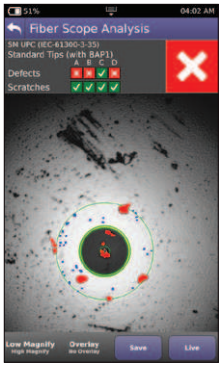
Using the P5000i optical fiber scope, technicians can test the #1 cause for troubleshooting in optical networks—contaminated fiber connectors. The P5000i provides pass/fail analysis based on user-selectable acceptance profiles.

Table 12. Verifying the coax network

Fiber Test	What It Tests	Why It Is Needed
Optical fiber scope	Pass/fail against predefined profile; includes dual magnification	Contaminated fiber connectors are the #1 cause for troubleshooting in optical networks
Optical power level	Optical power level with pass/fail and reference values	Optical loss must be within budget at ONU site



Fiber Power Meter



Fiber Scope Analysis

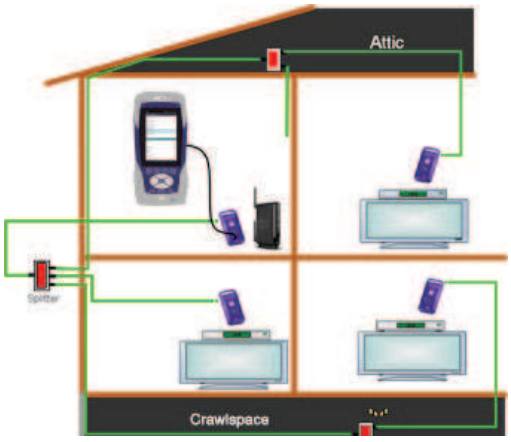
MP-60 optical power meter

P5000i optical fiber scope

Coax

Problematic coax cable accounts for most repeat calls as well as video, voice, data, and multiroom DVR installation problems. Most home coax has never even been tested at the frequency ranges that support these services so problems become more apparent after service installation.

The powerful OneExpert DSL in conjunction with the optional JDSU SmartID coax probes can verify in-home coax (quality and topology) and service distribution to quickly display and certify subscriber coax topology. It immediately identifies and locates physical-layer impairments that affect both triple-play and multiroom DVR services saving valuable troubleshooting time and eliminating the need for repeatedly segmenting the network, making changes, and then retesting. Technicians use the information the device provides to determine whether they can quickly fix the drop, replace it with a new one, or use an alternative means to supply service to the location.



Coax home network under test with SmartIDs

After completing physical-layer testing with SmartIDs, technicians can use the HPNA test to verify the coax network with CPE.

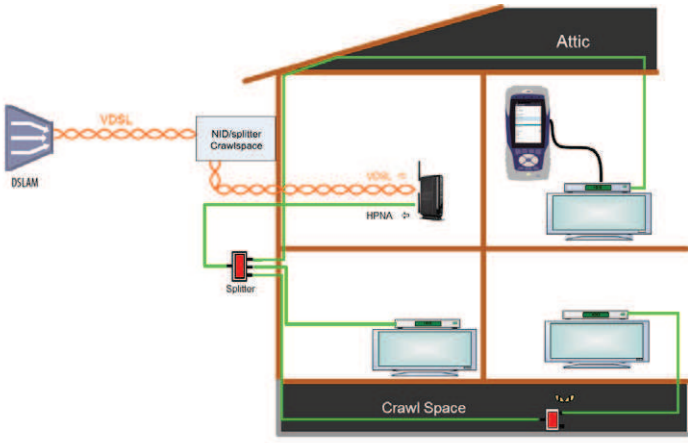
Table 13. Verifying the coax network

Smart ID Coax Test Sequence	What It Tests	Why It Is Needed
Bidirectional FDR	Events that cause excessive loss or reflectance	Locates bad splitters and connectors in the network
HPNA frequency sweep	All legs and in both directions	Ensures services like whole-home DVR will work
Noise ingress measurements	Each endpoint in the home	Identifies HPNA interferers

HPNA

The HPNA technology standard developed by the Home Phoneline Network Alliance (HomePNA™) builds on Ethernet to connect and integrate all the home network components over an unpredictable wiring topology. The HPNA communication is used to pass information around a home to other HPNA-connected devices.

In the HPNA test, OneExpert DSL connects to the HPNA network via CPE and communicates with the HPNA network host to initiate the test. Each communication path between all HPNA network nodes will be tested, letting users segment problem node paths, node-to-node communication issues, and verify that the whole network is functioning correctly. OneExpert DSL can verify that HPNA networks are operating within expected service quality metrics and users can set up pass/fail limits to help simplify testing.



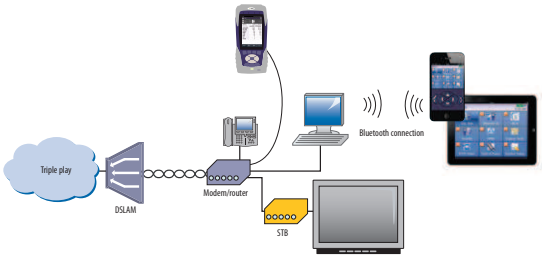
Mobile App

Testing with the OneExpert mobile iOS app is quicker and more efficient because technicians can leave the test set plugged in at one location and run tests remotely using the mobile app. Also, they can easily manage job files and export completed jobs to a server.

Providers are increasingly looking for back-office integration to expand the benefits of collecting everyday updated test results from the field. However, it may be difficult if not impossible for field technicians to connect their test instruments to their intranet. This mobile app leverages smartphones or tablets to link to the internal database.

Table 14. Testing with mobile apps

Mobile Device Integration	What It Does	Why It Is Needed
Job manager	Helps manage and enrich test results	Back-office integration
Remote access	Lets users remotely control the unit from a mobile device	Inconvenient test set access or several locations to fix between the test point and the fault
Extra information	Delivers tutorials, manuals, photos of all part numbers	Helps technicians in the field



StrataSync

Field operation groups face a challenge keeping track of their test equipment inventory: types of instruments, firmware versions, options, and automated test configurations that match standardized methods and procedures. The challenge increases every time a change must be deployed. Without a means to collect and analyze test data, valuable information about network health is missed.

StrataSync is a hosted, cloud-based solution that manages assets, configurations, and test data for JDSU instruments to ensure they are all equipped with the latest software and installed options. It manages inventory, test results, and performance data from anywhere with browser-based ease improving both technician and instrument efficiency. StrataSync manages and tracks test instruments and collects data from the entire network that can be leveraged for results analysis, and informs and trains the workforce.

Table 15. Managing assets and informing the workforce

StrataSync	What It Does	Why It Is Needed
Asset management	Manages and tracks test instruments by displaying assets, modules, versions, and locations. Maintains accurate instrument configuration and setup. Provides visibility into instrument utilization.	Save time by eliminating time wasted on instrument setup. Reduce repeats with correctly configured instruments. Improve results and reduce operating costs.
Data-result management	Collects and analyzes results with centralized collection and storage, secure visibility from anywhere, and consolidated test data/ metrics.	Access more data with centrally collected results for better use. Speed problem resolution by sharing data for faster troubleshooting. Drive compliance by tracking and comparing technician performance.
Updates the workforce	Informs and trains the workforce through alerts, release notes and manuals, and a comprehensive product-knowledge library.	Inform the workforce using a single source for instrument status, new capabilities, and educational content. Improve performance with quick access to training and troubleshooting information.Stay current with alerts for expiring warranties and overdue calibrations.

Consistently achieve high performance results

Specifications

DSL Modem	
Test Interface	
Replaceable test module; ADSL2+/VDSL2, test access over copper test leads (tip A, ring B leads for single channel; T/A, R/B, T1/A1, R1/B1 for bonding) or 8-pin modular (RJ45 type) with pin assignments 4 and 5 for DSL single pair and 3, 4, 5, 6 for DSL bonding.	
Modem Chipset and Version	
Catalog #	ONX-BDCM-DSL-BONDED
Chipset	Broadcom 63168
Configuration	OneExpert DSL Broadcom 63168 (Bonded) Test Module
VDSL Standard Compliance	
Standard compliance as supported by the Broadcom 63168 chipset	
ITU-T G.993.2 — VDSL2	
ITU-T-G.998.1 — ATM bonding	
ITU-T-G.998.2 — PTM bonding	
ITU-T-G.993.5 — Self-FEXT cancellation (vectoring)	
ITU-T-G.998.4 — Improved impulse noise protection for DSL transceivers	
Single-pair profiles: 8a/8b/8c/8d, 12a/12b, 17a, 30a	
Dual-pair profiles: 8a/8b/8c/8d, 12a/12b, 17a	
Vectoring profiles single-pair: 8a/8b/8c/8d, 12a/12b, 17a	
Vectoring profiles dual-pair: 8a/8b/8c/8d, 12a/12b, 17a	
Band plan 997 and 998, U0 band	
ITU G.993.2 Annex Y vector-friendly mode	
ADSL Standard Compliance	
Standard compliance as supported by the Broadcom 63168 chipset	
ITU-T G.992.1 Annex A, (ADSL)	
ITU-T G.992.3 Annex A, L (ADSL2)	
ITU-T G.992.5 Annex A, M (ADSL2+)	
ITU-T-G.998.1 ATM bonding	
ITU-T-G.998.2 PTM bonding	
ANSI T1.413-1998, Issue 2	
ITU-T G.992.5 INP Amendment 3	
General Settings and Features	
Auto sync	
DSL technology modes ADSL, VDSL, auto	
PTM mode for ADSL2+ and VDSL2	
ATM mode for ADSL2+ and VDSL	
Auto, ATM, PTM modes configurable	
Vectoring for VDSL2	
Bonded vectoring support for VDSL2	
Vectoring, vector-friendly, vectoring off modes configurable	
DSL RTX (G.INP) configurable for upstream/downstream	
PhyR configurable for upstream/downstream	
Seamless rate adaption (SRA) on/off	

Bitswapping on/off
Configurable V.43 carrier set
24 k interleaving depth on/off
Modem Status and General Information
Modem state — synchronization status
Training time
Synchronization time
ADSL mode, VDSL profile
Transport ATM/PTM/auto
Single-pair or bonding status
Vectoring status information
Estimated loop length
Download rate
Modem Summary Results
Actual rate per pair
Maximum attainable bit rate per pair
Group actual rate for DSL bonding
Group maximum attainable bit rate for DSL bonding
Line capacity per pair
SNR margin
CRC errors and FEC errors
RTX-UC
LATN (line attenuation)
SATN (signal attenuation)
Graphical Results
Signal-to-noise ratio per tone (SNR)
Bits per tone (BPT)
Quiet-line noise per tone (QLN)
Hlog
Two traces comparable
DSL Errors
Forward error correction (FEC)
Forward error correction errors per minute (FEC/min)
Cyclic redundancy check errors per minute (CRC)
Cyclic redundancy check (CRC/min)
Errored seconds (ES)
Severely errored seconds (SES)
Unavailable seconds (UAS)
Loss-of-frame alarm seconds (LOF)
Loss-of-signal alarm seconds (LOS)
Loss-of-margin alarm seconds (LOM)
DSL RTX (G.INP)
Retransmitted DTUs (RTX-TX)
Corrected DTUs (RTX-C)
Uncorrected DTUs (RTX-UC)
DSL Signal
Sync count
Time in synchronization state (uptime)
1 MHz ATN
Vectoring status
Interleaving status (path)
Interleave delay
Actual INP
Signal attenuation (SATN)
Line attenuation (LATN)
TX power
Per Band VDSL2 Statistics
Loop attenuation (LATN)
Signal attenuation (SATN)
SNR margin
Tx power
DSL Identity
Hardware type (chipset)
Hardware revision (chipset revision)
Vendor code
Vendor revision
Vendor software revision
Vendor PHY revision
10/100/1000 Ethernet TE
Test Interface
10/100/1000 Ethernet, RJ45
2 ports
Test Results
Link status, speed, duplex
Network
Test Interface
ADSL2+/VDSL2 modem
Ethernet 10/100/1000 (ports 1 and 2; non-blocking switching between ports)
Network Types
DSL terminate
DSL through-bridge
Ethernet terminate
Data Mode
IPoE, PPPoE, multi-VLAN, data off
IP Mode
IPv4, IPv6, IPv4/IPv6 dual stack
MAC Setting
Factory default, user-defined
PPP/IP Connectivity
BRAS: PAP/CHAP, IPCP
RFCs 2516, 1483, 2684
VLAN Setting
Tag on/off
VLAN interface count 1 to 6

ID selection 0-4095
Priority selection 0-7
IP Setup and Status
WAN/LAN status
Gateway/DNS
Static or DHCP
DHCP user class
DHCP vendor class
IP release/renew
DNS support WAN and LAN
IPV6 mode manual, stateless, DHCPv6 stateful
DHCPv6 option IA_PD, IA_NA
IPv6 global address
Local address mode: manual, automatic
Local IPv6 address
Subnet prefix length
IPv6 gateway
DNS server
Network Results
Network status, IP address, net mask, gateway, DNS, MAC address
Packet statistics rate, bytes, frames, errors, drops, collisions
Skew and polarity per pair
IP Data
Test Interface
ADSL2+/VDSL2, RJ45 and copper test leads
Ethernet 10/100/1000, RJ45
IP Ping
IP ping mode: IPv4, IPv6
Echoes sent/received, ping delay (cur/average/max/min)
Lost count/percentage, packet size
Supports IP address or DNS name destination
File Transfer Throughput Test — Speedtest
Transfer rate, bytes transferred, transfer status
Transfer protocols FTP, HTTP
Transfer direction download, upload
HTTP authentication type none, basic, digist
Concurrent download disabled, 1, 2, 3
Auto repeat disabled, enabled
Web Browser
Web connectivity through browser
IP Video Option
Test Interface
ADSL2+/VDSL2, RJ45 and copper test leads
Ethernet 10/100/1000, RJ45
Modes
Terminate

Set-Top Box Emulation
IGMPv2 and v3 emulation client
RTSP emulation client
Service Selection
Broadcast auto
Broadcast MPEG2-TS/UDP
Broadcast MPEG2-TS/RTP/UDP
Broadcast RTP/UDP
Broadcast rolling stream
Broadcast TTS/UDP
Broadcast TTS/RTP/UDP
RTSP MPEG2-TS/(RTP)/UDP
RTSP MPEG2-TS/(RTP)/TCP
RTSP RTP/UDP
RTSP RTP/TCP
Video Settings
IPv4 IGMP Version 2, 3
RTSP port
RTSP interoperability normal, Oracle, Siemens
IPv6 MLD version 2, 3
Video Source Address Selection
IP address and port number
IP address, port number, and VoD URL extension
RTSP port select
RTSP vendor select
Video Analysis Per Video Stream
Simultaneous stream support
6 terminate
Number of active streams
Combined rate, current/max
QoS
Error indicator current/score
IGMP latency current/score
RTSP latency current/max/score
PCR jitter current/max/score/history
RTP packet Jitter current/max/score/history
RTP lost current/max/score/history
Continuity error lost current/max/score/history
Overall current/max/score/history
Packet Loss Statistics
RTP loss distance errors current/max/total
RTP loss period errors current/max/total
Minimum RTP loss distance
Maximum RTP loss period
RTP packets lost count
RTP OOS count

RTP errors count
Continuity errors count
Ethernet RX errors, RX drops count
Video Stream Data Results
Total current/min/max/average
IP current/min/max/average
Video current/min/max/average
Audio current/min/max/average
Data current/min/max/average
Unknown current/min/max/average
Transport Stream Statistics
Error indicator count
Continuity errors count
Sync errors count
PAT errors count
PMT errors count
PID timeouts count
Service name
Program name
QoS Expert
Compare two streams for error indicator, lost packets, jitter, latency
PID Analysis (each stream)
PID number
PID type (video, audio, data, unknown)
PID description
Layer Correlation
Combined result view for Ethernet RX errors, RX dropped, video continuity error, video RTP lost, video loss distance total, video loss period total
Standards
RFC 2236, IGMP
RFC 2326, RTSP
ISO (IEC 13818), video transport stream and analysis
ETSI TR 10-290 V2.1, video measurements
TFC 1483, RFC-2684, ATM AAL5
Wiring Tools
Test Interface
RJ45 and RJ11 (Wire Mapping)
Tests
Wire mapping with Wire Mapping Smart Remote
Locate cable runs with resistive IDs
Hub flash
Port discovery
Ping tool
Wire Mapping Results
Pin assignment mapping
Loop length per pair
Opens
Shorts
Resistive ID Results
Label ID number
Pin pairs
Resistance value
Auto-detect interface RJ11 or RJ45
Hub Flash Results
Remote Ethernet port flash for 10/100/1000 Mbps Ethernet ports
Port Discovery Results
Port capability, duplex, established link, skew and polarity per pair
Ping Tool Results
Ping reply and delay to Gateway, DNS, Host/IP
WiFi
Test Interface
802.11 b/g/n (2.4 GHz)
Tests
WiFi scan
WiFi access point
WiFi Scan Results
SSID (secure set identification)
Channel
Security setting
Power level
MAC address
WiFi Scan Modes
AP List (Access Point)
Channel graph
Time graph
WiFi Access Point
Configure OneExpert DSL as WiFi access point (Ethernet to WiFi bridge)
Coaxial Cable Testing
Test Interface
Coax using SmartID or SmartID Plus
Test Probes (near end)
SmartID, SmartID Plus
Settings
Supports any cable coax type with configurable velocity of propagation (VOP) and cable compensation
Tests
Locate cable runs with active RFIDs (requires SmartID Plus)
Single-ended coax map (SECM)
Tests Using SmartIDs as Remote Probes
Locate cable runs with SmartIDs
Dual-ended coax map (DECM)
VDSL home-run check tests home coax runs for VDSL service use
Whole-home check tests the entire coax network physical layer prior to HPNA test

Test Results	
Noise ingress and frequency sweep test summary with pass/fail results	
Mapped overview of coax network	
Detailed view of cable lengths, faults, splitters, filters, amplifiers	
Graphically depicts frequency sweep data	
HPNA Network Test	
Test Interface	
Ethernet RJ45 interface to CPE	
Tests	
Quick and chronic test	
Settings	
Configurable minimum PHY rate	12 – 256
Configurable SNR	0 – 40
Configurable max packet loss	0 – 99 (quick)
	0 – 9,999 (chronic)
Payload length size	6 – 1482
Number of packets to send	0 – 5,000 (quick)
	0 – 5000,000 (chronic)
General Connection Status	
Station list including indication of the host	
Device ID number	
Device MAC address	
Device HPNA CopperGate® chipset firmware and version identification	
HPNA Network Results	
Segment specific rate, constellation, and baud	
Segment specific packet error rate (PER)	
Segment specific SNR	
Segment specific receive power	
Segment MAC addresses	
Fiber Test	
Optical Fiber Power Meter	
USB optical power meter	MP-60, MP-80
Min/max/average optical power level and wavelength	dBm, mW
Connector input	Universal 2.5 and 1.25 mm connectors
Power source	USB port
Selectable pass/fail threshold	
Signal QoS	
Reference value	
Optical Fiber Scope	
USB optical fiber scope	P5000i
Results for zone defects	Pass/fail
Results for zone scratches	Pass/fail
Low mag field-of-view (FOV)	Horizontal 740 µm, vertical 550 µm
High mag field-of-view (FOV)	Horizontal 370 µm, vertical 275 µm
Particle size detection	<1 µm
Power source	USB port

Setting for profile, tip, focus meter, button action		
Actions for live mode, test mode, high magnification		
Probe model, serial, firmware		
Copper Test - DVOM		
Test Interface		
Tip/A – ring/B – ground/earth		
Range	***Resolution***	***Accuracy***
AC Volts		
0 – 300 V peak	1 V	2% ±1 V
DC Volts		
0 – 300 V	1 V	2% ±1 V
Resistance		
0 – 999 Ω	1 Ω	2% ±2.5 Ω
1 – 9.99 kΩ	10 Ω	2%
10 – 99.9 kΩ	100 Ω	2%
100 – 999 kΩ	1 kΩ	2%
1.0 – 9.9 MΩ	10 kΩ	2%
10.0 – 100 MΩ	100 kΩ	2%
Range	***Resolution***	***Accuracy***
Leakage		
0 – 49.99 Ω	1 Ω	2% ±2.5 Ω
50 – 999 Ω	1 Ω	2%
1.0 – 9.99 kΩ	10 Ω	2%
10.0 – 99.9 kΩ	100 Ω	2%
100 – 999 kΩ	1 kΩ	2%
1.0 – 9.9 MΩ	10 kΩ	5%
10 – 99.9 MΩ	100 kΩ	10%
100 – 999MΩ	1 MΩ	15%
Distance to Short (conversion from resistance measurement depending on cable setup)		
0 – 30 k ft (0 – 10 km)		
Capacitance/Opens (conversion from capacitance measurement depending on cable setup)		
0 – 47.1 nF	1% ±15 pF	
47.1 nF – 157 nF	2% ±15 pF	
157 nf – 1.57 uF	2%	
0 – 3 k ft (0 – 999 m)	1 ft (1 m)	
3 – 10 k ft (1 – 3.3 km)	10 ft (1 m)	
10 –100 k ft (1 – 33.3 km)	100 ft (10 m)	
DC Current		
0 – 110 mA		
Longitudinal Balance		
28 – 70 dB	1 dB	±2 dB
70 – 120 dB	1 dB	Indication only
Load Coil Counter		
up to 5 ±1		

TDR	
Test Interface	
Tip A – ring B	
Range	***Accuracy***
0 to 30 k ft (0 to 10 km)	0.5% of distance
Test Modes	
Standard	
SmartGain TDR	
In-home	
Features	
World view	
Peak hold	
QuickRange	
Reference trace set, show, save, load	
Stress TDR	
Typical Test Case	
500 ft (150 m) bridged tap visible at 18 k ft (5500 m) on a 20 k ft (6000 m)	
24 AWG cable/0.5 mm cable	
Short Range	

Range	***Resolution***	***Accuracy***
0 to 1000 ft (0 to 305 m)	0.3 ft (0.1 m)	1 ft (0.3 m)
TDR at VOP = 0.67 (AWG=24 or 0.5 mm)		
UFED		
TDR helper		

POTS	
Test Interface	
RJ11, tip A – ring B	
POTS Dialer	
DTMF or pulse-dial mode	
Ring detect	
Caller ID (Bellcore Telcordia TR-TSY-000030)	
Call log (last 10 calls)	
Phonebook (quick dial)	

Copper TIMS Option		
Wideband Characteristics		
Range	***Resolution***	***Accuracy***
Frequency		
10 kHz to 30 MHz		50 ppm
Amplitude		
–80 to +10 dBm	0.1 dB	±2 dB
Termination 100 Ω, 120 Ω, 135 Ω		
Narrowband (VF) Characteristics		
Range	***Resolution***	***Accuracy***
Frequency		
200 Hz to 10 kHz		50 ppm
Amplitude		
–40 to +10 dBm	0.1 dB	±0.5 dB
50 dBr n to 100 dBr m	0.1 dB	±0.5 dB
Termination 100 Ω, 120 Ω, 135 Ω		

Technology Filter Selection		
Custom, ADSL, ADSL2+, VDSL 8 MHz, VDSL 12 MHz, VDSL 12 MHz ISDN, VDSL 17 MHz, VDSL 17 MHz ISDN, HDSL, G-filter, G2-filter, J-25K8, J-138K8, J25K12, J-138K12, J-25K17, J-138K17, E-filter, F-filter, E1, no filter, power influence		
Spectral Test		
Technology filter selection		
Spectral Power Influence test		
Set reference, show reference		
Max hold		
Configurable external bridge		
Power spectral density		dBm, dBm / Hz, dBrn

Span Selection	***Range***	***Resolution***	***Accuracy***
Narrowband Frequency Range			
Power influence	0 Hz to 1.5 kHz	1.9 Hz	50 ppm
POTS	200 Hz to 10 kHz	2.9 Hz	50 ppm
Wideband Frequency Range			
ADSL2+	0 kHz to 2.2 MHz	1.078 KHz	50 ppm
VDSL 8 MHz	0 kHz to 7.5 MHz	2.156 KHz	50 ppm
VDSL 17 MHz	0 kHz to 17.3 MHz	4.3125 KHz	50 ppm
VDSL 30 MHz	0 kHz to 30 MHz	8.625 KHz	50 ppm
Amplitude			
	–80 dBm to 0 dBm	0.1 dB	±2 dB
	–130 dBm/Hz to –40 dBm/Hz	0.1 dB	±2 dB
Viewable range			
	–130 dBm to 30 dBm		
	–160 dBm/Hz to –20 dBm/Hz		

Wideband RX Tones and Loss	
Meter and list view	
Configurable External Bridge	
Power level	dBm, dBrn
Wideband Noise	
Technology filter selection	
Configurable external bridge	
Custom filter	
Noise power actual/min/max	dBm, dBrn
Wideband Impulse Noise	
Technology filter selection	
Elapsed Time counter	

Threshold, +3 dB threshold, -3 dB threshold		
Configurable external bridge		
Configurable dead time		
Timeline view	dBm, dBrn, mV	
Counter view	dBm, dBrn, mV	
Wideband Impulse Noise Capture		
Technology filter selection		
Single and continuous capture		
Trigger threshold		
Time and frequency domain capture	dBm, dBrn	
Capture display	10%, 50%, 90%	
RFL Test Option		
Resistive Fault Locator		
Single and multiple gauge selection		
Temperature adjustment		
UFED support		
Results for distance to short (DTS), distance to fault (DTF), distance short to fault (DSTF), resistance to short (RTS), resistance to fault (RTF), fault resistance		
	Range	***Accuracy***
Fault resistance (RF)	0 to 20 MΩ	
Loop resistance	0 to 7 kΩ	
Resistance to Fault (RTF)	RTS 1 Ω to 99 Ω	0.1% RTS ±0.1Ω ±RF/10MΩ
	RTS 100 Ω to 999 Ω	0.2% RTS ±0.1Ω ±RF/5MΩ
K-Test		
Two-sided fault test		
Results include fault resistance 1, fault resistance 2		
UFED support		
	Range	***Accuracy***
Fault resistance (RF)	0 to 20 MΩ	
Loop resistance	0 to 7 kΩ	
Resistance to fault (RTF)	RTS 100 Ω to 999 Ω	3% of Resistance to strap (RTS)
Mobile Device Application		
iOS Support		
7.0 to 8.1		
StrataSync		
Asset management		
Data management		
General		
Power Supply		
Battery	LiOn internal rechargeable, 7.4 V nominal voltage, 6600 mAh	
Operating time > 4 hours for typical use cases		
Auto power down (adjustable)		
AC line operation via external adapter/car charger		

Connector	
DSL test module	8-pin modular (RJ45 type)
Ethernet	2 x 8-pin modular (RJ45)
T/A, R/B, T1/A1, R1/B1 and ground/Earth	2 mm recessed banana
POTS	8-pin modular (RJ45) and tip A – ring B
USB	2 x USB 2.0 client ports
Connectivity	
USB flash drive	
Remote operation	
Mobile device application	
Bluetooth	
Standard	Bluetooth 2.1 + EDR, Bluetooth 4.0 ready
WiFi	
Standard	802.11 b/g/n (2.4 GHz)
Audio Support	
Speaker/microphone	
Bluetooth headset	
USB headset	
Permissible Ambient Temperature	
Nominal range of use	0 to 50°C (32 to 122°F)
Storage and transport	–10 to 60°C (14 to 140°F)
Humidity	
Operating humidity	10 to 90%
Display	
127 mm (5 in) diagonal color WVGA (800 x 480 pixels) backlit LCD with projected capacitive multitouch screen	
Physical	
Size (L x W x H)	250 x 119 x 82.4 mm (9.8 x 4.68 x 3.2 in)
Weight including batteries	1.9 kg (4.05 lb)
Compliance	
CE marked	

Ordering Information

The OneExpert DSL can be ordered fully configured for high-end ADSL2+/VDSL2 and copper test demands or scaled for specific needs and applications.

Included Test Applications
Copper
DVOM
Opens
Longitudinal balance
Load coil
POTS
TDR

Ordering Information

Included Test Applications	
Wiring Tools	
Wire map	
Hub flash	
Port discovery	
Ping tool	
IP Data Tests	
Web browser	
IP ping	
FTP/HTTP speed test	
WiFi	
Scan	
Access point	
Coax — SmartID[1]	
Locate IDs	
Single-ended coax map	
Dual-ended coax map	
Whole home check	
StrataSync	
1-year asset management	
Description	**Part Number**
Mainframe	
OneExpert DSL; ONX-580[2]	ONX-580
Battery	ONX580-BATTERY-48WH
AC universal power adapter	AC-CHARGER
Module	
OneExpert DSL Broadcom 63168 (bonded ready) test module	ONX580-BDCM-DSL-BONDED
Software Options	
ADSL/VDSL bonding option for module ONX580-BDCM-DSL-BONDED	ONX580-BONDED
Apple device connectivity software option	ONX580-APPLE-001
Bluetooth software option	ONX580-BLUETOOTH
HPNA software option	ONX580-HPNA
IP video software option	ONX580-IPVIDEO
Resistive fault locator software option	ONX580-RFL
Transmission impairments software option[3]	ONX580-TIMS
Cables	
CAT5 cable, shielded, RJ45	CB-016994
Lineman dual pair DSL/Copper, bed of nails clips	CB-008502
Lineman dual pair DSL/Copper, telco clips	CB-008501
Single pair DSL/copper, T/R/GND – A/B/Earth, bed of nails clips	CB-PAIR1-BON-GND
Description	**Part Number**
Single pair DSL/copper, T1/R1 – A1/B1, bed of nails	HSTDVOM-BON-YW-BL
Spectral monitor cable	CB-SPE-MON
SmartID USB cable 6 ft	SMARTID-USBCABLE-6FT
SmartID USB cable 3 ft	SMARTID-USBCABLE-3FT
Accessories	
Large carrying case	CC-034601
Small carrying case	CC-CARRYING-CASE-SMALL
Soft glove	AC-GLOVE
Strand hook	HST-000-098-01
Hand strap	AC-HANDSTRAP
Shoulder strap	AC-005101
Car adapter	AC-CAR-CHARGER
USB headset	CUSB-HEADSET
Bluetooth headset — Plantronics M25	AC-BLUETOOTH-HEADSET
SmartID Plus incl. micro USB cable	SMARTID-PLUS-1PC-TELCO
SmartID Plus 1 unit	SMARTID_PLUS_1PC
SmartID, 6 units	SMARTID-6PC-TELCO-KIT
SmartID accessory kit	SMARTID-ACCKIT-TELCO
Resistive IDs, set of eight, RJ-11	AC-RESISTIVE-ID-8X-RJ11
Resistive IDs, set of eight, RJ-45	AC-RESISTIVE-ID-8X-RJ45
Wire mapping smart remote; RJ11, RJ45	AC-WIREMAP-REMOTE
MP-60 – USB optical power meter	MP-60
MP-80 – USB optical power meter	MP-80
P5000i – USB fiber scope	FBP-P5000Pi
StrataSync	
Asset management, 1 year	SS-ONX-DSL-MF-AM-01
Asset management, 2 years	SS-ONX-DSL-MF-AM-02
Asset management, 3 years	SS-ONX-DSL-MF-AM-03
Test data management, 1 year	SS-ONX-DSL-MF-TDM-01
Test data management, 2 years	SS-ONX-DSL-MF-TDM-02
Test data management, 3 years	SS-ONX-DSL-MF-TDM-03

1. Requires SmartID and SmartID Plus to be ordered separately.
2. Includes test applications as specified above. Requires selection of battery, AC universal power adapter, power cord, and test module.
3. Enables copper RX tones, spectral, WB noise, wideband impulse noise, wideband impulse noise capture.

JDSU

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