EX1 test and monitoring solution

SIMPLE, MULTIPURPOSE AND CARRIER-GRADE

Feature(s) of this product is/are protected by one or more of: US design patent(s) pending.

EXFO's EX1 is an industry first: a pocket-sized test solution that evolves with your network, from validating bandwidth speed up to full line rate Gigabit Ethernet and complete WiFi testing to monitoring residential and business customers' quality of experience.

SPEC SHEET

KEY FEATURES AND BENEFITS

Gigabit and WiFi tester

Full line rate capable gigabit tester powered by the industry-leading Speedtest® by Ookla® algorithm

Wireless interface (WiFi) for both Speedtest by Ookla®and WiF channel map capabilities

Support of 2.4 GHz and 5.0 GHz WiFi frequency bands

Latency, download and upload throughput performance metrics with adjustable pass/fail thresholds based on subscribers' purchased plans

Controlled entirely through Android™ or iOS® smart devices offering a completely "untethered experience" for setup, testing, birth certificate generation and cloud-enabled firmware upgrades

Free and clear testing of challenging or harsh test environments with Bluetooth® low-energy technology for a connection range up to 100 ft (30 m)

Electrical, WiFi and optical* interface ready

Efficient job closeout with best-in-class birth certificate generation—reports generated in PDF or CSV formats can be sent by email, text, cloud, Skype, etc. directly to the subscriber or stored in the cloud for the provider's future reference

Carrier-grade quality hardware including onboard FPGA muscle—delivering repeatable and reliable metrics each time

Rechargeable Li-ion battery operated

Active Verifier

Scalable platform capable of hosting EXFO's Active Verifier VNF for service and application performance assurance

Complete visibility of L3 to L7 performance through a suite of 140 performance tests

Centralized management and control via EXFO Worx, with support for template-driven testing and automation from extensive API support

* Future capability

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The EX1, paired with an Android or iOS smart device, is a one-of-a-kind Ethernet tester designed to qualify broadband connections and monitor residential and business customers' quality of experience (QoE). The pocket-sized EX1 solution enables communication service providers and MSOs to validate delivery of full line rate Gigabit Ethernet services and WiFi to their subscribers. The advantage of the EX1 is threefold: it includes FPGA-powered hardware, built-in dedicated WiFi chipset and the world-leading Speedtest® by Ookla® algorithm, delivering repeatable and reliable metrics, every time.

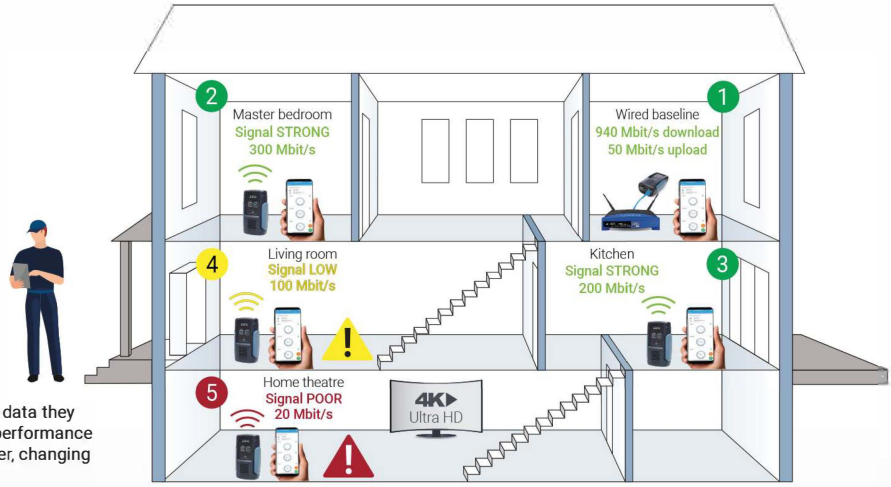
Ethernet speed and latency measurements can be performed on both electrical (RJ45) or wireless interfaces (WiFi 802.11 ac/a/b/g/n) making the EX1 the ideal tool for generating birth certificates of Ethernet services during the provisioning phase. Moreover, field technicians can easily execute a WiFi channel map analysis (2.4 GHz and 5 GHz frequency bands) and, as a result, help determine the best placement for access points at the customer's location. The EX1 is therefore a must-have tool for troubleshooting activities that are expedited with the use of its unique graphical views and features enabled by the WiFi channel map analysis function.

The EX1 does not require a screen. Instead, its ultra-intuitive application runs directly on a field technician's smart device, displaying all tasks performed, including connection, setup, result gathering, report generation and cloud-enabled firmware upgrades.

GIGABIT ETHERNET AND WiFi TESTING

Internet service providers (ISPs) and multiple system operators (MSOs) often receive calls and complaints related to the speed and the latency measured by their customers. These complaints are often unresolved and result in substantial customer churn. Customer expectations are not always met, and service providers are not necessarily equipped with the right tools to define expectations with customers when deploying new services. The EX1 was designed with this in mind and allows installers to provide a complete birth certificate for newly deployed services.

1. Get the wired baseline values
2. Verify master bedroom WiFi
3. Verify kitchen WiFi
4. Verify living room WiFi
5. Verify home theater WiFi



Field technicians are now equipped with the data they need to quickly resolve residential network performance issues — whether that means moving a router, changing WiFi channels or adding extenders.

The figure above outlines the typical steps for installing a residential gigabit broadband service using the EX1.

- **Step 1:** The technician validates the wired download/upload speeds and latency at the entry point of the house. This step will confirm that the ISP or MSO has delivered the expected metrics according to the customer's chosen package. This first step can be used as the benchmark for the rest of the residential analysis.
- **Step 2 and 3:** The technician can now start the analysis of WiFi performance. Family members regularly make use of an assortment of internet services from different locations: over-the-top video, music streaming, email, etc. It's up to the technician to confirm that these services are operating optimally in all locations of the residence. In this scenario, services in the master bedroom and kitchen are performing well, with a strong signal level and high throughput.
- **Step 4:** The technician sees a drop in the WiFi signal and notices that the Speedtest throughput has reached a point where certain internet services could be affected, especially if multiple users are using the WiFi.
- **Step 5:** The technician moves to the home theater where there is a brand-new TV using WiFi to stream 4K ultra high definition (UHD) broadcasts. The signal is very low and the throughput level is not sufficient for a typical 4K UHD stream.

In sum, by using the EX1 for both wired and wireless installations, the field techs can gain complete insight on how to remedy any given situation. They can move the router, change the WiFi channels or add extenders. The EX1 guarantees the job is done right the first time, drastically reducing any future WiFi-related complaints.

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WiFi CHANNEL MAP

The EX1's WiFi channel map will report all access points found within the vicinity of the location under test. The access point connected to the EX1 will always show up at the top of the list, accompanied by a house icon. Field techs can filter results for 2.4 GHz and 5 GHz frequency bands by signal strength and channel. The channel map will return the access point name, BSSID, channel, channel frequency, signal strength and manufacturer.

The EX1's channel map and the Speedtest over WiFi are key troubleshooting features. Subscribers can see the tests performed by the service provider's technicians and receive reports showing the exact status of their purchased service.

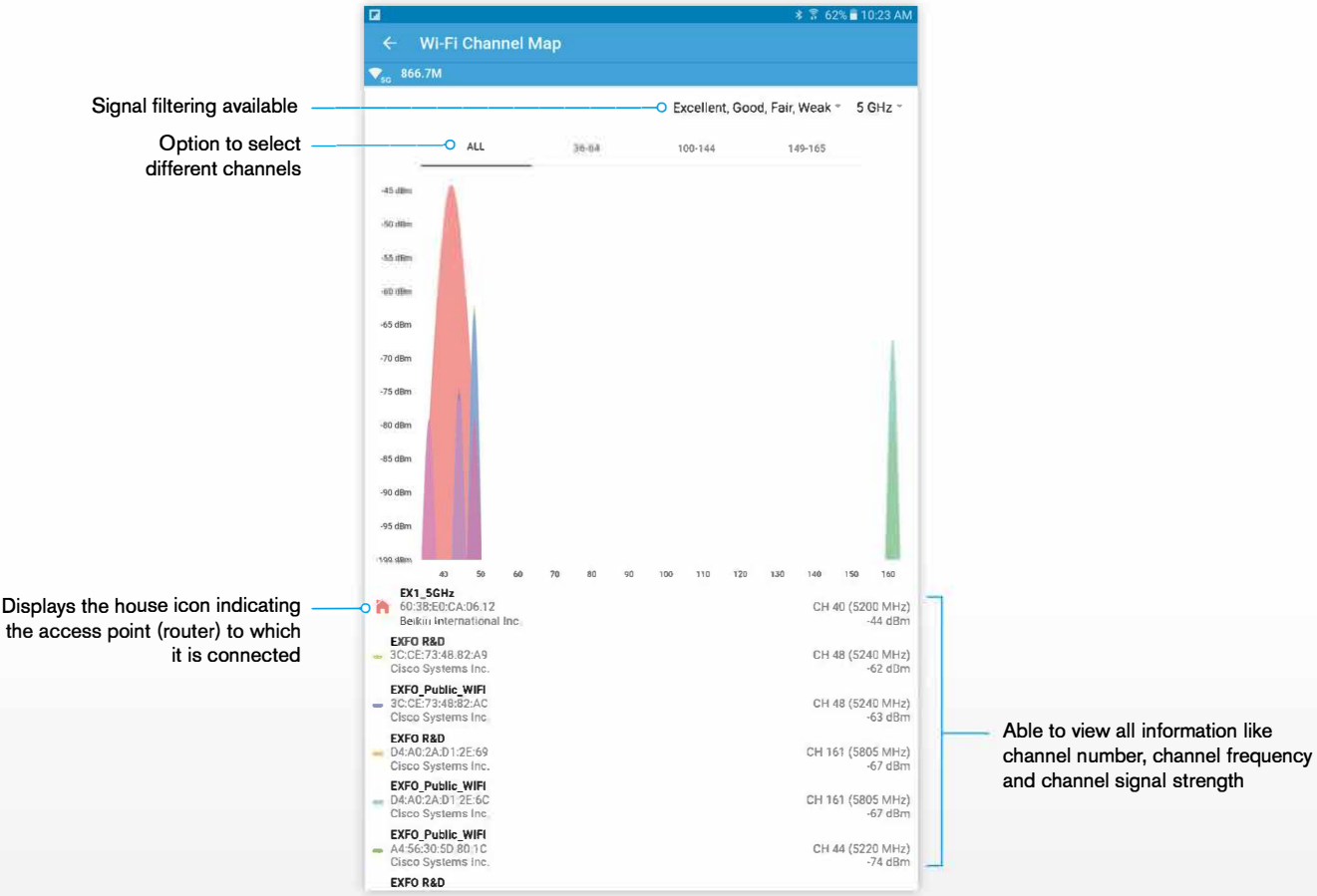
The EX1 is ideal not only for residential use but also a wide range of other settings:

› Public transportation networks can evaluate the WiFi services offered to their customers throughout bus, train or subway routes

› Smart cities

› Stadiums and conference centers

› Hotels



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ACTIVE VERIFIER (EX1-V)

A flexible platform that evolves with your network, the EX1 can also host EXFO's Active Verifier agent (EVA). When equipped with the EVA, the EX1 is referred to as an EX1-V, delivering a complete level 3 to level 7 service assurance solution.

The EX1-V leverages a full suite of more than 140 performance tests to commission, assure and troubleshoot service performance and service delivery across multiple layers. The current test catalog delivers complete visibility of L2 to L7 performance and includes tests such as: Y.1564 SAM; IP connectivity tests; VoIP qualification; internet experience; infrastructure assurance—all designed to help users assure the configuration and delivery of highly differentiated services.

*IPTV support is a roadmap feature for EX1.

The EX1-V can be left onsite for temporary troubleshooting or permanently deployed as a fixed performance endpoint that continuously reports on network and service performance. It can also leverage the full capabilities of the EXFO Worx management system to facilitate test creation, aggregate performance results, and integrate into any existing OSS/BSS as a data source.

The EX1-V is fully interoperable with both physical and virtual active probes, delivering superior performance and visibility. EX1-V can partition network segments, isolate access and end-to-end service level agreements (SLAs) directly from subscriber environments. In addition, it can measure end-to-end service delivery, in conjunction with other verifiers or directly to an application.

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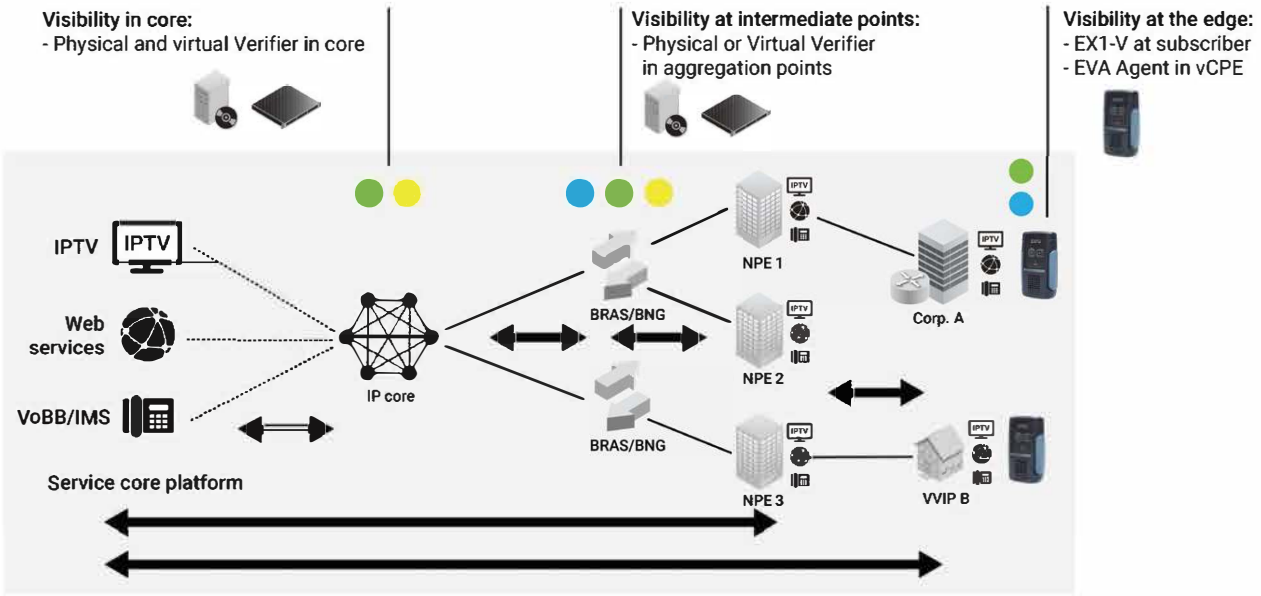

EX1-V can be used in a variety of use cases:

- **Subscriber's on-premise verifier**: Operators are under increased pressure to deliver superior quality of service (QoS) and ultimately deliver a drastically improved quality of experience (QoE) to their users. Having clear visibility of end-to-end performance and quality, directly from the subscriber location can be a significant advantage for operators as they deliver that expected, high-quality subscriber experience. Strategically placed EX1-V verifiers in select subscriber locations, can deliver the in-depth visibility that is required while capturing connectivity issues, transport layer performance (delay, loss, delay variation), and service quality (internet performance, internet infrastructure assurance)—all leading to significantly improved subscriber QoE for their VoIP, Video MOS, and internet services.
- **WiFi performance**: WiFi is a popular access technology and used by operators for cell data offload, value-added services and even businesses grade connectivity services. However, WiFi is also a connectivity technology which can be plagued by interference, congestion, and infrastructure pressure which can ultimately lead to a diminished user experience. EX1-V can leverage its built-in WiFi interface as a test interface and provide a deep level visibility into the WiFi internet service quality.
- **On-demand troubleshooting**: Technician time is precious, and truck rolls can be a costly aspect of operating a network. EX1-V facilitates and accelerates the troubleshooting process by leveraging its on-demand capability to enable true remote control. Deployment of the EX1-V can be simplified to a simple ship-and-connect where customers simply plug the device into their network. Technicians can then remotely take control and execute a suite of tests to understand, isolate and troubleshoot issues through the EXFO Worx management platform. This greatly accelerates troubleshooting time, eliminates a truck roll, and delivers a more efficient resolution of tickets at a fraction of the cost. The rugged EX1-V can be shipped by standard methods, preprogrammed with connectivity parameters and automatically detected and managed when powered up and connected to the network. The entire process can be fully automated to produce true zero-touch troubleshooting through the EXFO Worx API suite.

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SPECIFICATIONS

GENERAL SPECIFICATIONS	
Size (H x W x D)	125 mm x 75 mm x 45 mm (5 in x 3 in x 1 ¾ in)
Weight	0.45 kg (1 lb)
Temperature	
Operating	0 °C to 40 °C (32 °F to 104 °F)
Storage With battery (short term < 1 month)	−10 °C to 40 °C (14 °F to 104 °F)
Relative humidity range	≤ 93 %, non-condensing

INTERFACES	
Electrical RJ45 test port	10/100/1000 Mbit/s
Optical SFP test port [a]	Optical 1GE SFP
USB port	USB 3.0 type-C port
Bluetooth and WiFi	Bluetooth v4.2 and WiFi 802.11 ac/a/b/g/n
Processor	ARM dual cortex-A53 ARMv8 1.0 GHz
Memory	1 GB
Storage	8 GB

BATTERY/POWER SUPPLY	
Type	Rechargeable Li-ion smart battery
Battery autonomy	One full day of customer visits (i.e., average of 10 residential broadband customer visits)
Charging time	3.5 h using supplied wall charger
AC/DC adapter/charger	Input: 100–240 VAC; 50/60 Hz; 1.0 A max, output: 5 V; 2.4 A

SMART DEVICE REQUIREMENTS	
Smart device supported	Android OS and iOS based devices
OS version	Android 6.0 Marshmallow and higher, iOS 10 and higher
Bluetooth support	Bluetooth low energy technology (version 4.0 and higher) [b]

Notes

a. Future capability.

b. Many Android phones and tablets support Bluetooth low energy technology, especially if the device was purchased recently. To verify if supported, please check if Bluetooth low energy technology (version 4) compatibility is listed in the technical specifications of smart devices in question.

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GIGABIT ETHERNET TESTING CAPABILITIES

Speedtest by Ookla® (electrical and WiFi interfaces)	› Latency › Download speed › Upload speed › Server information › Client WAN IP	› Automatic/manual server selection › Pass/fail verdict based on thresholds › Configurable job information › PDF/CSV automatically generated reports

WiFi TESTING CAPABILITIES

Channel map	› Support of 802.11ac/a/b/g/n › Support of 2.4 GHz and 5 GHz frequency bands › Visualization of WiFi channel map analysis › Channel map filtering based on signal level: Excellent, Good, Fair, Weak › Channel map filtering: 5 GHz channels can be filtered by all, 36–64, 100–144, 149–165 channels › Information per access point: BSSID, manufacturer, channel #, frequency and RSSI › Graphical selection of access points for clarity and in-depth troubleshooting

VERIFIER CAPABILITY

Turn-up tests	› Y.1564 SAM › iPerf
Layer 3 to Layer 7 active tests	› Ping/traceroute › One-way IP performance › Two-way active measurement protocol (TWAMP) › TCP/UDP echo › TCP/UDP bandwidth measurements › SIP VoIP signaling and media performance › IPTV assurance › Web quality and infrastructure › Full suite of more than 140 performance tests available

ORDERING INFORMATION

EX1

Model

EX1 = Full line rate gigabit Ethernet testing capability
Speedtest by Ookla® over LAN/RJ45 and WiFi
WiFi channel stats

BV-EX1-V

Model

BV-EX1-V = EX1 platform preconfigured with EVA software[a]

Note

a. Requires EXFO Worx and EVA feature licenses to operate

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