



CRITICAL WIRELESS CONNECTIVITY

A PRACTICAL GUIDE FOR SELECTING MOBILE DEVICES THAT KEEP YOUR WORKERS CONNECTED



RELIABLE WIRELESS CONNECTIVITY

Businesses with mobile workforces rely on wireless connectivity to communicate with headquarters, colleagues, customers, sensors and other data processing devices. Where many mobile devices fail is in reliably maintaining these connections, especially for those employees who work in extreme environments. These workers may encounter dead

spots or signal interference in warehouses or experience spotty coverage while transporting goods through remote areas or racing to an emergency location that crosses networks. This guide is designed to help you evaluate and select mobile devices that can stand up to rugged workplace conditions and help keep you connected.

EIGHT WIRELESS CONNECTIVITY CONSIDERATIONS

Your connectivity needs are most likely complex and varied, but success comes down to two things: device reliability and connectivity reach. Panasonic has developed a relationship with Verizon so TOUGHBOOK® mobile devices can deliver this one-two punch for businesses in nearly any type of rugged environment.

Consider the following when you evaluate connectivity performance for mobile devices that will be used in harsh environments.

1. A layered approach to connectivity

Given the critical nature of the work, many organizations using ruggedized mobile devices depend on several layers of connectivity enhancements to keep teams linked to applications and headquarters. Panasonic TOUGHBOOK devices support this multilayered approach, and are designed and manufactured to:

- Deliver on high-speed connectivity needs by using high-performing wireless modules and antenna systems.
- Make network handoffs smooth and secure by enabling seamless connections between cell sites and Wi-Fi access points.

2. Reliable connectivity

Organizations that want to connect their mobile workforce wirelessly have the flexibility to do so with any TOUGHBOOK mobile device. All Panasonic devices have been certified to operate with Verizon,

allowing them to connect securely and reliably. The long-standing relationship integrates the carrier's flexible wireless technology with the launch and support of the Panasonic TOUGHBOOK devices. In addition, Panasonic can assist in facilitating the device activations with Verizon either on an account base or by each worker providing the right solutions for your business needs.

3. Connectivity components with interference protection

A dedicated team of wireless engineers at Panasonic custom selects the wireless modules, and then designs and tests the placement of the antenna in the device to make sure the connectivity performance meets or exceeds the leading carriers' wireless network requirements. Our experience in wireless design has led to innovative antenna placement and wiring path design, enabling us to optimize performance and protect against internal and external interference. Radio frequency interference (RFI) and electromagnetic interference (EMI), both caused by the noise and heat





coming from a device's CPU or other internal components, are common culprits that can negatively impact performance and slow transmission speeds. Heat can also create frequency shifts, causing communication drops and poor connectivity, as well as internal device degradation over time.

The design of the device and the quality of its wireless components affect the amount of interference experienced. Many mobile computing device manufacturers use USB modems, making them vulnerable to bumps, disconnects and other damage. Additionally, USB modems are more susceptible to environmental interference in a transmission area, resulting in poor reception. Instead, Panasonic uses advanced, integrated wireless technology and embedded antennae to minimize, if not eliminate, interference problems in TOUGHBOOK® devices. Panasonic-embedded antennae are located next to the LCD screen and away from internal components to shield against internal interference caused by noise and heat and to help ensure unblocked wireless transmissions. In addition, the antenna does not rely on an external PC Card—which is susceptible to damage and interference and can result in poor connection performance.



4. Proven wireless performance testing

Panasonic performs rigorous testing of its embedded wireless modules and their antennae, operating one of the industry's largest anechoic chambers for testing. This yields a number of benefits:

- The state-of-the-art chamber blocks unwanted radio signals and interference, producing a controlled environment for testing RFI signals on TOUGHBOOK wireless products.
- By precisely measuring the amount of electromagnetic radiation produced by TOUGHBOOK mobile computers, anechoic chamber testing enables engineers to maximize wireless performance.
- Over-the-air (OTA) tests are also performed in the chamber, including tests for total isotropic sensitivity (TIS) and total radiated power (TRP), which help to improve antennae performance.
- Testing is performed in heat, cold, rain and other real-world conditions, helping test engineers to evaluate wireless driver performance, connection manager software performance, and variable environmental and network conditions that users commonly encounter while traveling.

The results of these tests help Panasonic RF (radio frequency) engineers isolate and address problem areas before the final design is approved for manufacturing. These tests also help ensure that customers have access to robust, consistent connections across a wide range of industries and environmental settings.



5. Rugged reliability

Panasonic TOUGHBOOK® laptops have an average failure rate of 2.5 percent, far outpacing the 11 percent industry-average failure rate of consumer devices, and twice as dependable as the 4 to 6 percent failure rate of other rugged devices.

But Panasonic reliability goes beyond the device, providing peace of mind through comprehensive warranty plans and technical support. Panasonic's standard warranty protects your TOUGHBOOK rugged laptops and tablets from manufacturing defects for three years and includes a priority parts exchange program and repair service at no cost. This service plan also provides:

- Lifetime access to U.S.-based technical support
- Online access to drivers, first-aid disks, BIOS updates, tools, utilities and manuals
- Free overnight delivery of customer-replaceable parts and repaired units
- Access to Panasonic field service personnel
- Optional extended warranty coverage and protection services

6. Secure wireless connections

Panasonic supplies rugged industries with highly reliable wireless devices that also enable secure access to data through secure connections on Wi-Fi, Bluetooth® and mobile broadband. Panasonic TOUGHBOOK devices with wireless service from Verizon ensure that customers are supported by a network that is available when they need it.

Verizon works to help protect its network against outside attacks, tampering, malicious activity and network events that may disrupt or degrade customers' ability to use Verizon's solutions. Every day, Verizon seeks to maintain the highest levels of network reliability and performance.

Panasonic can also provide data and device protection through the partnership with Absolute Software. Absolute Persistence software is embedded in the device firmware and provides self-healing, two-way connections for endpoint visibility and control, defense against threats, guaranteed connections on or off network, and remediation of events. Easy-to-deploy Absolute for Android™ software is available for all Android devices and offers similar protections, assessing vulnerabilities and providing proof of compliance.

7. Presales support and field-testing services

The industry-leading Panasonic Connect ProServices team is a U.S.-based network of knowledgeable experts with deep industry experience. Panasonic can work with you to help design your solution and choose a device, software and services fine-tuned to your business applications. Our field engineers can help test and streamline your deployment to make sure you have the right mobile solution to keep workers connected and productive.

8. Future outlook

Next-generation wireless technologies are constantly evolving, so it is critical that your mobility partner is ahead of the connectivity curve. Panasonic can help you transition to new capabilities as they come onto the market.

To keep ahead of new demands for connectivity and communication, we are always closely watching and testing new technologies:

- As customers add more devices and find more ways to use them, Verizon is constantly adapting its networks to meet customer needs. Verizon's multi-purpose network is grounded on strong spectrum position, extensive fiber ownership, and the incorporation of advanced technologies deployed from the core to the edge of Verizon's award-winning network. This network-building formula enables a reliable, robust, secure, and high performing network for innovation that can accommodate a variety of use cases including mobility, private 5G solutions, and fixed wireless access broadband.
- Field operations demand reliability and robust connectivity nationwide. Verizon networks help keep personnel connected. As new network capabilities continue to roll out, Panasonic

is working closely with Verizon to help organizations make the most of their technology investment while helping them connect reliably to the Verizon network.

- Verizon's ultra-fast, reliable 5G Ultra Wideband service is now available to more than 200 million people, or roughly two out of every three Americans. Customers across the continental United States can experience the power and performance of Verizon's 5G Ultra Wideband with fast download speeds and the capacity to support data-heavy actions.
- IoT, augmented reality and streaming video capabilities are becoming more important in some industries and require high-performance computing power and reliable, connectivity.



EVALUATION CHECKLIST

Use this checklist to help you evaluate connectivity capabilities for mobile workers in rugged environments.

- ✓ Look for mobile laptops and tablets that are tested and have third-party validations of meeting the MIL-STD-810H claims.
- ✓ Make sure the device supports reliable connections in all types of environments and gives users the ability to easily switch communication modes.
- ✓ Devices should be wirelessly enabled with a carrier that provides both the communication reliability and security required for mobile workers to effectively do their job.
- ✓ Approach security as a multifaceted attribute. Look for security that protects connectivity as well as device access and the data stored on the device.
- ✓ Check with the manufacturer to review their failure rates and wireless testing results. The dependability of wireless and GPS capabilities is perhaps the most important criterion for judging a rugged mobile device.
- ✓ Look closely at the manufacturer's warranty plan. What are the service levels and guidelines for repairs and replacement parts, availability of a technical support hotline and next-level field service personnel?
- ✓ Keep an eye on the future.
 - Can the device support new technologies that you may adopt in your organization in the near future?
 - Does the device manufacturer have plans for integrating network services like 5G and other new technologies into their product roadmap?
 - Will the manufacturer's timelines align with the carrier's technology rollout?
- ✓ Seek a manufacturer that offers both technical and industry expertise and can provide services to help you select, test and deploy your mobile solution.

For more information on Panasonic Connect mobility:
us.panasonic.com/toughbook | toughbook@us.panasonic.com | 1-888-245-6344

For more information on Verizon:
verizon.com/business | Customer service: 1-888-350-1766

