How to Future-Proof Your Investments in 5G

Contents

Overview

In the coming years, massive change will be driven by advances in fields ranging from 5G communications, the Internet of Things and industrial automation to artificial intelligence, cognitive computing and cloud robotics. Soon, we are likely to see more innovation and discovery than we have ever seen before.

What does this mean for me?

To speed the pace of innovation, create market-leading products, and get to market faster, companies need the right tools, including modern test equipment and partners that can provide real competitive advantage. Today's challenges include:

- Ever-tightening R&D budgets
- The evolving landscape of 5G and IoT
- Rapidly-shrinking time-to-market

Those involved in 5G and IoT testing need to be sure they are getting the most from their investments. Leading companies gain leverage by:

- Reducing Capital Cost and Ongoing Expenses
- Optimizing Test Equipment Sourcing
- Improving R&D Test Equipment Utilization
- Increasing Speed to Market
- Examining True Cost of Ownership

With 5G supporting the Internet of Things (IoT), the proliferation of connected devices looks certain to accelerate.

#1. Reduce Capital Cost and Ongoing Expenses

Many R&D managers cite cost-of-test as one of their biggest concerns.

Many studies, including those from industry analyst Frost & Sullivan and companies that manage test equipment, show that many assets are purchased each year to satisfy current needs without considering future requirements. Companies then find themselves with a surplus of expensive equipment that doesn't fit requirements and is costly to track and maintain.

Studies have found that many test assets are underutilized. In many cases, the outright purchase of test assets constricts funding that may be needed elsewhere. Asset ownership represents a long-term commitment that may become challenging if testing standards or protocols change, or if equipment needs evolve—as may be the case with 5G.

Studies have found that many test assets are underutilized. Asset ownership represents a long-term commitment that may become challenging if conditions or testing requirements change, as may be the case with 5G.

Asset ownership involves costs that occur over time and are sometimes overlooked. These include:

- Time and labor for procurement and purchasing
- Cost of capital, financing, and interest
- Asset tracking, logistics, security and storage
- Calibration, maintenance, repair and downtime
- Property and sales tax
- Under-optimized equipment utilization
- Technological obsolescence
- End-of-life disposal

To remain competitive, leading companies are reconsidering how to optimize their spending on equipment when there may be other, more cost-effective ways to achieve the same outcome.

#2. Optimize Test Equipment Sourcing

To increase profitability, market leaders are using smart sourcing techniques.

Although some initial 5G standards are set, most technical protocols have not been finalized. In December 2017, 3GPP completed the first 5G NR specifications in the first phase of the global 5G standard. Even in the absence of a complete set of technical standards, innovation and testing of 5G products must continue.

Below are a few of the sourcing challenges typically encountered:

- Gaining a global view of all test equipment assets
- Sorting through more than 100,000 products from 300 manufacturers
- Determining how to obtain equipment and whether to rent, buy, or lease
- Choosing new, used, or pre-owned test equipment
- Estimating ownership expenses
- Arranging for asset management, calibration, repair, etc.
- End-of-life disposal

To protect themselves, companies use smart sourcing techniques to get what they need when they need it—and only for as long as they need it. Having the right test equipment at the right time means projects get done quickly—on-time and under budget.

The consumer appetite for new technology is practically unlimited and the rewards of being first-to-market are substantial. The risk is that 5G testing methodologies or project requirements may change along the way.

Smart sourcing features a combination of product acquisition methods to lower costs with the flexibility to return, exchange, or upgrade should conditions change. Leading companies use this to mitigate risk and:

- Save time and money
- Shorten procurement cycles
- Increase labor utilization
- Avoid unnecessary spending

For long-term projects where no changes are expected, a purchase or long-term lease might work best. For short-term projects where testing protocols or requirements could change, such as 5G, renting might be an ideal solution. With renting, you

pay only for what you use, return it when you no longer need it, and avoid long-term ownership costs for calibration, repair, downtime and taxes. Renting also allows you to try before you buy.

Consider a mix of acquisition methods to accomplish your testing objectives. By leveraging the right product and sourcing information, R&D managers and test engineers can choose the best combination of equipment and sourcing methods on a case-by-case basis—without the need for compromise.

With smart sourcing techniques, R&D managers and test engineers can choose the best combination of equipment and sourcing methods on a case-by-case basis—without the need for compromise.

#3. Improve R&D Test Equipment Utilization

To reduce R&D test spending, consider asset management services.

With significant investment and financial support, R&D spending is coming under increased scrutiny and pressure. Performance metrics are now being used to evaluate and improve ROI and the most important among these are throughput and utilization.

If engineers and R&D managers are not spending time on core duties, they are not being utilized to the highest level. Sometimes they get bogged down in lengthy sourcing activities that don't represent the best use of their time.

To increase utilization, many companies today employ asset management services provided by third parties. These services help engineering and R&D teams track, reserve and schedule test assets and allocate costs to projects. They also provide advance notification when calibrations are due and track calibration certificates.

Since studies find that much test equipment is underutilized, asset management solutions help teams understand how, where, and how often assets are being used. There is a high likelihood that assets can be rented instead, saving time, up-front cost, recurring expenses and hassle.

#4. Increase Speed to Market

Get the test equipment you need—when and where you need it—for as long as you need it.

5G may be the catalyst that accelerates widespread change across industries and society. From connected cars, self-driving vehicles and automated manufacturing to smart homes, buildings and cities, the interconnectedness of society is set to increase exponentially. In 2017, there were an estimated 8.4 billion connected devices. By 2020, Gartner predicts that there will be more than 20 billion connected devices.

The improved connectivity and speed of 5G will give rise to applications that were previously considered impossible. Theoretical maximum speeds of 10Gbps and an expected 10-year battery life for low-power, machine-type devices mean that a massive wealth of data can be collected, processed and acted upon. In the era of 5G and IoT, a flood of new products will need to be verified and tested, increasing the time burden on R&D teams and test equipment.

To ensure that R&D departments have the right equipment at the right time to accelerate innovation and speed market introduction, leading companies leverage asset management solutions.

Asset management solutions:

- Can help unlock capital from underutilized or unused test assets
- Generate data that drives critical insights and informed decision-making
- Reduce testing costs, optimize processes and reduce time-to-market

Many leading technology companies find that actively managing this process makes a difference to their profitability. However, too many companies still incur unnecessary costs by not doing so. The real penalty, however, is that these inefficiencies slow innovation and decrease time-to-market.

#5. Examine True Cost of Ownership

Ask the right questions to determine the best sourcing method.

There are a variety of acquisition methods to consider. Depending upon needs, there may be more than one procurement option to meet company objectives. Many organizations mitigate procurement risk and uncertainty by considering some simple, but essential questions prior to making decisions.

Knowing the answers to these questions can lead to smart choices. In fact, making informed sourcing decisions can be just as critical as technical equipment specifications.

Below are some questions to consider:

- **What is the estimated use timeline?**
  - How long will the equipment be needed?
  - Is it for sporadic use or continuous use?
  - Is it for a specific project or initiative?
  - Is there guaranteed use beyond the intended period?

- **What is the product lifecycle?**
  - Is it a new product with likelihood of change or an established product?
  - What is the risk of obsolescence?
  - Are there frequent upgrades?

- **What are the financial priorities?**
  - Is capital limited?
  - How important is cash-flow?
  - What is the cost of borrowing or internal rate of return?

- **What is the likelihood of change?**
  - Is the environment dynamic?
  - Do you need flexibility to respond to changing market conditions?

- **How will equipment be tracked, calibrated, and maintained?**
  - Will regular calibration and maintenance be performed? By whom?

  - If there are multiple units in operation at different sites, who will manage the logistics?

- **How will asset disposal be managed at end of life?**
  - How will you dispose of unwanted or obsolete equipment?
  - Can you free cash for new investments by selling obsolete equipment?

In many cases, the true cost of ownership is simply overlooked. It is only later, when audits are undertaken, that it becomes apparent that money was spent unnecessarily. To understand the true cost of test equipment, consider all the expenses involved, including:

- Up-front costs, including capital
- Annual expenses
- Recurring costs for calibration, maintenance and repair

The reality is that the up-front price is only half the story. When you consider all costs, the reality becomes apparent.

- Consider the cost of capital and financing, as well as sales and property taxes
- Annual costs for asset management, including sourcing, procurement, tracking, inventory control, logistics, security and storage
- Costs for calibration, maintenance, repair and downtime
- If the equipment no longer meets requirements, funds may be needed to upgrade or buy another unit

When you take these factors into account, the real cost of ownership is often far higher than the original purchase price.

Conclusion

As technologies like 5G and IoT evolve, market requirements and testing standards may change. To mitigate this risk and reduce up-front and ongoing or recurring costs, leading companies are using smart sourcing techniques that allow their R&D groups and engineers to get what they need, when they need it, at the lowest cost.

Many companies purchase test equipment assets only to find out later that the machine has become outdated or that testing requirements have changed. To become more competitive and profitable, leading companies are reconsidering the way they source test equipment.

There are many new ways to acquire, manage, and optimize investments in test equipment and leading organizations have benefited from this approach. With more than 50 years of experience, Electro Rent is well positioned to provide advice and recommendations to help users make more informed decisions regarding product selection, acquisition method and asset management and optimization.

Electro Rent offers an array of sourcing options to manage assets across the entire project lifecycle, from concept to prototyping, development and full-scale production. Instrumentation can be sourced via short-term renting, longer-term leasing, rent-to-buy, buy new or certified pre-owned programs.

Renting means that there is no risk of equipment becoming obsolete or outdated. It is also an easy way to “try before you buy”. It can help you avoid making substantial financial commitments in leading 5G testing technology until you are certain that the equipment meets your needs.

If a project ends, or new technology calls for different instrumentation, rented items can be sent back or replaced with newer units. This reduces costs and provides flexibility to upgrade equipment or technology as needed.

Electro Rent is well positioned to provide advice and recommendations to help users make more informed decisions regarding product selection, acquisition method, and financing alternatives. This reduces testing costs and provides flexibility to upgrade equipment or technology as needed.

With renting, equipment incurs a charge only for as long as you have it. If a project ends, or new technology means that different instrumentation is required, the rented items can be sent back or replaced with newer units featuring the latest technology.

Purchased equipment—whether bought new or certified pre-owned—can be resold, making funds available for additional equipment. Once we understand your situation, we can provide a solution that considers both short and long-term needs, CAPEX and OPEX priorities, and other considerations to achieve the greatest savings and cost efficiencies.

Our goal is to lower the cost of test by helping clients deploy equipment when and where it's needed in the most cost efficient way.

Contact Us Today

Contact us today to learn more about our complete portfolio of cross-industry 5G testing products.

You can reach us by phone at **1.800.553.2255** or email **5G@electrorent.com**. Our 5G experts are available to assist with your product testing and financing needs.

Examples of Leading Edge 5G Testing Products

5G Signal Creation - Keysight

Keysight M9383A PXIe Microwave Signal Generator
1 MHz to 44 GHz

Electro Rent Part No. KT-M9383A-F44

The M9383A is a modular microwave signal generator test solution for design validation. It can be efficiently leveraged into a manufacturing environment with the flexibility to solve today's pre-5G LTE Advanced requirements and can be upgraded to your future test needs.

Applications

- Modular test solution for design validation that can be efficiently leveraged into manufacturing
- Flexibility to solve your immediate test needs, but upgradable for what comes next – whether that's more frequency coverage or a rapid shift to high volume production.
- Pre-5G signal confidence you need with 1% EVM @ 28 GHz, 800 MHz bandwidth

Features

- Single side band phase noise typ. -137dBc @1GHz, 20kHz carrier offset
- High output power @1GHz, -90 to +19dBm
- Analog and digital modulation
- Cellular modulation formats from 2G to Pre-5G LTE Advanced

Keysight E8267D PSG Vector Signal Generator
100kHz to 44GHz

Electro Rent Part No. KT-E8267D-544

The E8267D vector signal generator is used to test advanced receivers, with realistic wideband radar, EV, Satcom, and 5G applications. It offers up to 2GHz of bandwidth (with external AWG), allowing you to simulate complex electromagnetic environments and reduce complex signal creation times.

Applications

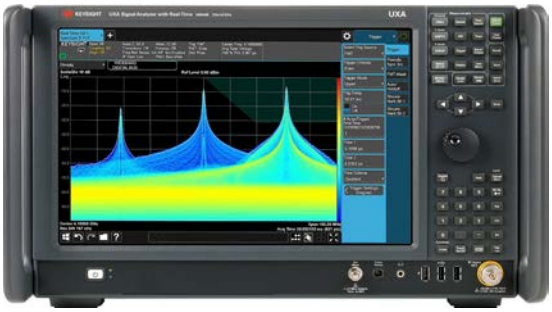
- Waveform playback and real-time
- Antenna Array Testing - Conducted and Over-the-Air
- 5G Waveform Creation with signal studio application
- Signal optimizer with K3101A

Features

- Single-side-band phase noise typ. -143dBc @1GHz, 20kHz carrier offset
- High output power @1GHz, -130 to +21dBm
- Analog and digital modulation
- Cellular modulation formats from 2G to Pre-5G LTE Advanced

5G Signal Analysis - Keysight

Keysight N9040B UXA Signal Analyzer, Multi-touch
2 Hz to 50 GHz



Electro Rent Part No. KT-N9040B-550

The N9040B signal analyzer offers real-time spectrum performance analysis up to 1GHz for deeper views of complex and challenging 5G signals. Clean spectral purity with leading phase noise measurements. Extendable frequency range to 110GHz with external smart mixers.

Applications

- Utilize application measurements that range from parametric to wireless measurements including 5G LTE Advanced, WCDMA, phase noise, noise figure, analog demodulations
- 5G Waveform analysis and vector analysis with VSA software 89601B
- Satellite, radar, EW, fast-hopping signal analysis

Features

- Analysis bandwidth – 25MHz standard, upgradable to 1GHz
- Real-time bandwidth optional to 510MHz
- Displayed average noise level (DANL) +174dBm at 1GHz (1Hz resolution)
- SSB phase noise at 10kHz offset -136dBc
- Cellular modulation analysis from 2G to Pre-5G LTE Advanced
- 5G NR (new radio) with N9085EMOE application software

5G Signal Creation - Rohde & Schwarz

Rohde & Schwarz SMW200A Vector Signal Generator
100kHz to 40GHz

Electro Rent Part No. RS-SMW200A-40

The SMW200A is a vector signal generator for 5G applications. It offers flexibility for generating complex, digitally-modulated signals of high quality for 5G LTE Advanced to 2G applications.

Applications

- Pre-5G NR Signal Generation
- Antenna Array Testing - Conducted and Over-the-Air
- 5G Waveform Candidates

Features

- Single side band phase noise typ. -135dBc @1GHz, 20kHz carrier offset
- High output power up to +18dBm (PEP)
- Analog and digital modulation
- Cellular modulations

5G Signal Analysis - Rohde & Schwarz

Rohde & Schwarz FSW43 Signal and Spectrum Analyzer 2Hz to 43.5GHz

Electro Rent Part No. RS-FSW43

The FSW43 signal and spectrum analyzer is designed with 5G measurement analysis in mind. It offers low phase noise, wide analysis bandwidth (2GHz) for complex LTE Advanced applications, with an easy to use GUI.

Applications

- Used in aerospace and defense applications (ASD)
- Wideband communication systems for military and commercial use
- 5G Waveform analysis
- Development of oscillators for radar systems and complex LTE Advanced applications

Features

- Analysis bandwidth – 10MHz standard, upgradable to 2GHz
- Displayed average noise level (DANL) +154dBm at 2GHz (1Hz resolution)
- SSB phase noise at 10kHz offset -134dBc
- Cellular modulation analysis from 2G to Pre-5G LTE Advanced

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