CHRIS DEMARTINO | Technology Editor

5G's Impact on the Test Arena

Philippe Garreau, chairman of the Microwave Vision Group (MVG), discusses why over-the-air testing will be needed for 5G.

First, can you tell us about over-the-air (OTA) testing and why it will be needed for 5G?

Garreau: 5G lays the foundation for a connected society in the near future—a world where everything that benefits from being connected will be connected. The internet will move out from computer screens and smartphones and into the physical world, where objects will communicate directly with each other. Examples range from automated factories with production and logistics efficiencies reaching new heights to self-driving cars and services, farming, medical services, consumer electronics, smart homes, smart cities, etc. In short, this is the next digitalization phase of the world. Completely new businesses will be built on this opportunity. It is a movement that will impact all industries, across all markets around the world.

Philippe Garreau

There are three major cornerstones of 5G: increased bandwidth and capacity for mobile data able to handle the ever-increasing amounts of wireless data traffic; ultra-reliability and low latency for mission critical services for real-time critical connections such as in self-driving cars, robotics, automated factories, and medical applications; and reduced overhead for massive-scale Internet of Things (IoT) applications—for example, sensor networks consuming very little bandwidth and power. All this backed up by the cloud through the 5G networks, enabling a multitude of services to be efficiently rolled out. There is quite a broad spectrum of ways 5G standards can be adapted to handle all the application cases of the connected world.

What is critical for enabling all of this to work as expected is the wireless link. Radio performance is the parameter that is most difficult to control, as this performance is heavily device- and installation-dependent. It is of paramount importance to be able to accurately secure the desired wireless performance in the products and services rolled out on the market, in order to fulfill the expectations of the service. The promise of 5G is based on lab results in ideal conditions, while the performance achieved in real life will depend on how well the radio performance actually works. This needs to be tested for each device and application.

From a technical perspective, the architecture in 5G devices will require radio performance parameters, traditionally tested through coaxial cables in RF labs, to be tested OTA, as there won't be any physical connectors available in the devices. The consequence of this is that not only antenna performance needs to be tested OTA. In addition to antenna testing, all other RF system performances and radio resource management parameters need to be tested OTA instead of through a cable. As a result, the amount of OTA test cases will increase significantly. In combination with the obligation to verify the radio and antenna performance in 5G, this puts high demands on the capacity and capabilities of OTA testing in product development, production, and aftermarket support.

How close are we to achieving the OTA test capability that 5G will require?

Garreau: We identified the needs and challenges posed by 5G at an early stage, and have been preparing a portfolio of test solutions positioned to efficiently handle 5G testing. This includes all stages of a product lifecycle, from early R&D testing through calibration and production testing to what we call scenarios: how a product performs in a real dynamic RF environment.

This said, the 5G is an evolving standard, and most importantly, the amount of applications and use cases are

expected to increase over time as 5G is deployed in new industries and markets. This will drive a continuous need for new test solutions, as well as adaptations of existing solutions to be introduced.

One of the bigger challenges in the 5G markets is the test capacity increase needed for 5G product development, as tests will be done OTA instead of through cables. We are already seeing now that companies are starting to transform their labs from purely conducted test labs to OTA-based test labs.

Another challenge on the market is that companies that have never created wireless products before now need to become capable of performing wireless testing in R&D in order to stay competitive. Wireless connectivity will be as natural as internet is today—and this is a big change.

Our first multi-probe system to measure frequencies above 18 GHz, the StarLab 50 GHz, will cover the 18-to-50-GHz frequency band. It will be launched end of June. The feedback we are receiving from potential customers is already highly promising.

How is MVG positioning itself for 5G?

Garreau: MVG is positioning itself at the forefront of 5G connectivity!

5G is a huge opportunity for MVG to be of added value to its markets, as the needs for OTA testing increase. It is one of our main strategic focus areas right now, and we have recently launched new products optimized for 5G testing.

Our ambition is to be at the leading edge of what the market needs in terms of 5G testing. We are active in 5G standardization committees, as well as other 5G-related industry initiatives such as in the automotive industry. However, we don't just follow. We actively contribute to 5G development by offering the tools and systems needed to achieve best-in-class 5G performance.

The company will benefit from 5G technology, as our technological expertise is a trusted asset to both the telecom and aerospace & defense markets. Technologies traditionally applied in our products mainly used in A&D markets can be used for high-frequency 5G applications, bringing efficiency and fast time-to-market for our customers. In combination with our state-of-the-art multi-probe technology and advanced software applications for data processing and analysis, we are optimizing our technologies for 5G applications.

As 5G is emerging into new industries and applications, we need to be flexible to rapidly respond to what would be beneficial for the markets. We work closely together with customers across the world to align our product roadmap with their product visions and needs, proactively driving our development of competitive test solutions.

We believe that with MVG as a one-stop shop for wireless connectivity testing products and services, we enable our customers to improve their competitiveness. In delivering turnkey systems, our customers can focus on the activities that add the most value to their organizations. The scale of our product portfolio and technologies allows us to flexibly handle changing needs of our customers both today and in the future.