BEHIND THE SCENES

In delivering leading
mmWave technology

Siklu

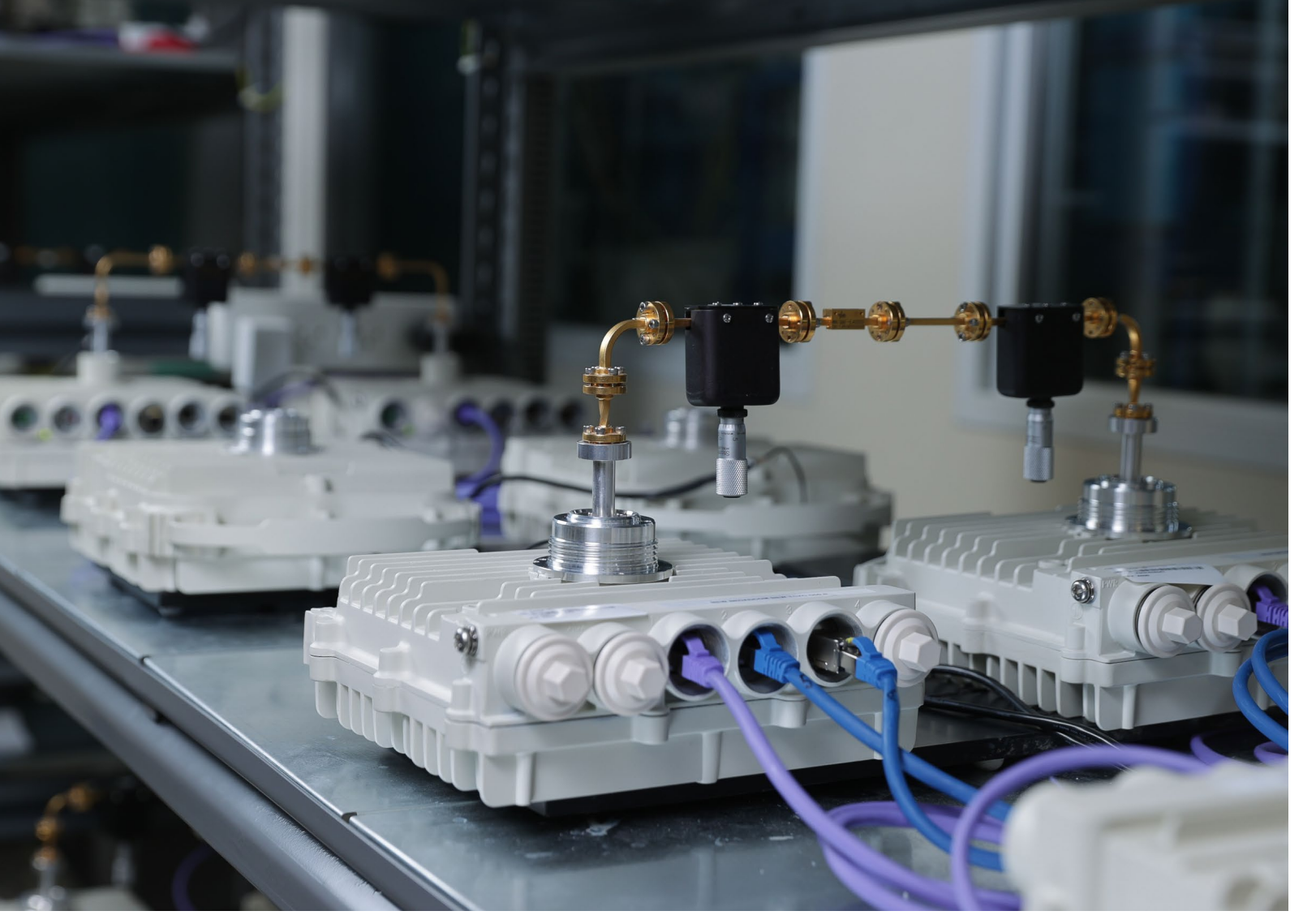
Best in Class mmWave

(and how we got there)

Siklu as the leader in mmWave systems in the 60GHz (V Band) and 70/80GHz (E Band) frequencies has a reputation for rock solid products that operate flawlessly for years.

It started with our first point to point EtherHaul™ products, the EH-1200 and EH-2200 and continues with our 10Gbps EH-8010. When we added point to multipoint to our portfolio with the MultiHaul™ system, once again customer feedback referenced the reliability of the BUs and TUs.

Delivering world class products to the market entails many steps, but perhaps none is as important as thorough and rigorous testing during the product development phase. The product must be tested at both the subsystem level including networking engines, modems, rf front end and antenna, and as a final, fully functional product.



Development Testing
by Product Line

EtherHaul™

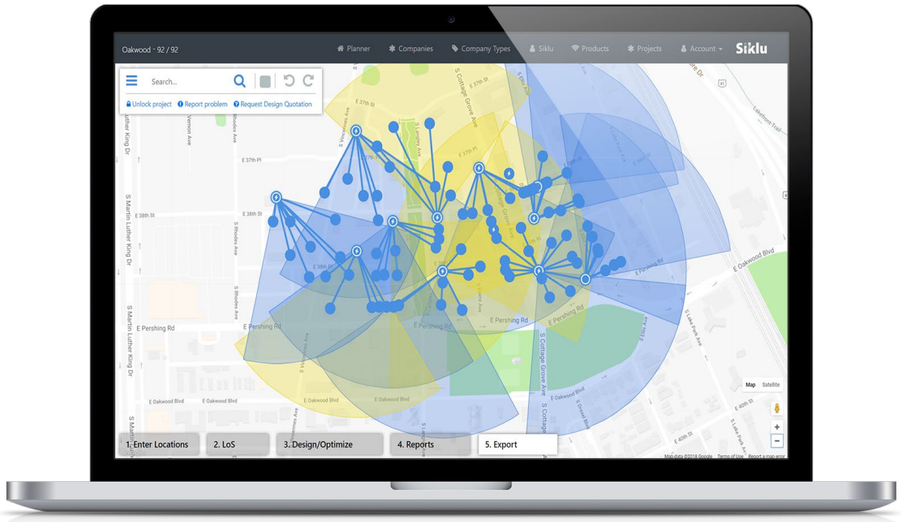
When Siklu was strictly a ptp manufacturer, test and verification was a straight forward affair. The radios were bench tested using wave guides instead of antennas offering a simple yet powerful design validation tool.

Once bench testing was complete, fully assembled EtherHaul™ systems with antennas were tested in an outdoor network to validate performance and quality.

MultiHaul™

When the MultiHaul™ was introduced testing became an order of magnitude more difficult. Not only do you now have up to 8 TUs talking to a single BU at once, but you also had to test how BUs worked next to each other for those instances where customers were looking for 360-degree coverage. Bench testing the MultiHaul™ (without antennas) had many more possible configurations when multiple BUs are considered and automated test scripts became a requirement.

While certainly more complicated than the EtherHaul™ bench testing, PtMP is fairly common in other frequencies and hence methods to address the additional complexity are well understood.



MultiHaul™ TG

As the MultiHaul™ is an order of magnitude more complex than the EtherHaul™ in terms of testing during development, the same can be said about the MultiHaul™ TG with its mesh topologies when compared to the PtMP MultiHaul™.

With the tremendous promise of mesh systems comes almost infinite variations in potential topologies. Because of this deep and thorough product testing during development becomes extremely difficult.

MultiHaul™ TG consists of Distribution Nodes (DN) and Terminal Units (TU) of various flavors. With DNs (Siklu's N366) talking to other N366 units as well as TUs at the same time how do you fully characterize and validate the product for any potential customer deployment?

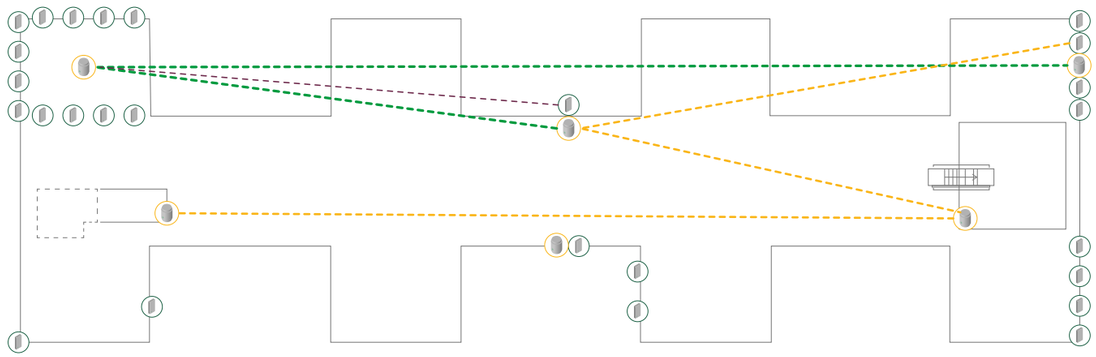
Each network will be unique. Adding to the challenge is the fact that the R&D team will need multiple test set ups to speed development. Hardware, software and QA each need several test beds to do their work.

The Siklu Way - Products must be of the highest quality and perform 100% per specification without fail for years. For the MultiHaul™ TG this pushed Siklu's ingenuity to become creative in ways we had never considered before.

Introducing the Spider, Siklu's rack mounted MultiHaul™ TG test environment capable of simulating a fully meshed configuration while connecting to the maximum combination of 15 TUs and DNs

In the lower portion of the rack the four circular plates each represent one sector of a DN, with each sector having a total of 18 RF connections out of which 15 are supported at any one time. This means the setup is capable of 15 total connections between additional DNs and TUs.
By interconnecting one plate to the other we are replicating a DN to DN or self-backhaul link.

MultiHaul™ TG Outdoor Test Setup



POP-DN TU

The 1RU modules above consist of either a 2 TU module each with its own RF cables to connect to the DNs, or a simpler 1RU DN capable of connecting to just 4 additional devices.

For the TU module, each TU has 4 RF connectors. While a TU can only connect to one DN at a time, the multiple connectors allow additional testing scenarios such as what happens when a TU-DN connection is lost and the TU has to connect with a second DN. A very real world scenario supported with this setup.

This system not only gives developers a network in a rack that can be configured in a variety of 'topologies' but it tests the complete system minus antennas. A meshed network bench validation environment.

When you add in programmable, variable attenuators on each rf cable, the ability to simulate different distances between any two elements is supported.

However as good as this is, and as much as it enables rapid development and automated testing, at some point the entire product including antennas must be validated.

When beam steering capabilities are part of the mesh solution this test bed becomes even more important – and complicated.

In order to fully characterize and validate the MultiHaul™ TG system an Over the Air (OTA) test network has to be deployed.

While not as flexible in configurations this test bed is the final piece before taking the system out for Alpha trials with live users. At Siklu we have installed this network on the rooftop of a large building allowing us to implement several DN, several tens TU configuration.

With this test bed it is easy to modify and test different configurations or topologies quickly.

This approach to product development and testing is at the core of why Siklu is known worldwide for exceptional product quality. As mmWave mesh products push us to be smarter in how we verify design, there is no doubt in the future new features and capabilities will challenge us again. With a commitment to excellence and the implementation of the Spider test bed, Siklu will remain where it has been for over a decade – best in class.

hello@siklu.com | www.siklu.com