A Tale of Two Signals

Installing converged fiber and 5G wireless networks in the same MDU or MTU building is challenging, but new equipment makes it feasible.

By Kevin Morgan / *Clearfield*

As the classic literary work says, "It was the best of times, it was the worst of times." 5G is coming, and so are the headaches and deployment challenges. Providing traditional broadband services for customers in multiple-dwelling-unit (MDU) and multi-tenant-unit (MTU) properties has now converged with providing 5G wireless services. Designers and installers need to meet that challenge. The good news is that new products can help.

Because greenfield and brownfield MDU/MTU broadband deployments are unique and represent a huge market opportunity for providers, the convergence of wired systems with 5G is nearly inevitable. Because a robust 5G network depends on a strong fiber backbone network, this convergence seems ideal for achieving a seamless network experience. However, achieving this experience sometimes sounds much easier than it is in reality.

MDUs pose physical challenges in both greenfield and brownfield deployments, although greenfield is somewhat less challenging in most cases. To address these deployments, manufacturers such as Clearfield have developed specialized tools for designers and installers. Notably, the introduction of robust microducts and pushable fiber, coupled with a preconnectorized fiber solution, has made the greatest impact on in-building wiring since the advent of twisted-pair wire.

When 5G is added, the challenges multiply. In a traditional MDU build, a provider services only the tenants of that particular building. But with the introduction of 5G, the building network will be part of an overarching 5G ecosystem. With this expanded scope, the designer and installer need to ensure that the new network is robust (in terms of data rates and coverage) and physically protected. The design must also allow for quick restoration in case any damage occurs to a network component.

DESIGNING THE MICRODUCT

Taking all this into account, designing a microduct infrastructure inside the building and providing a pathway within it for 5G network components is a critical first step. With independent pathways, the designer can tailor the deployment to suit the needs of the particular MDU/MTU. This infrastructure allows the pathways to converge in a common equipment location and sets the groundwork for subsequent technology innovations – preconnectorized fiber in single and multiple counts and scalable connectivity locations that allow for growth and deployment of multiple services within the same frame.

DEPLOYING FIBER FOR FTTU AND 5G

Now that the microduct pathway provides a route and physical protection, the next logical step is to deploy fibers for resident use and for the 5G network elements. In most cases, one or two fibers can serve all the bandwidth needs for an MDU resident, and a small microduct, such as a 10/6mm size (outer diameter/inner diameter), will do just fine. When multiple fibers are needed, something

like a 14/10mm microduct is a better fit. Both microducts provide the same level of physical protection, but the larger diameter allows the use of a preterminated multiple-fiber push-on (MPO) fiber connector.

The choice of fiber is based on three considerations: the need to store slack; the distance between aggregation points; and route considerations, such as bends, pull points and obstacles. For example, Clearfield's FieldShield StrongFiber installed on a drop wheel and cradle assembly is one choice that covers most residential needs. Duct comes preinstalled with a pull string in it already. When it comes time to deploy the fiber, a technician simply ties the fiber on the pull string and brings the fiber to the customer's unit. Because the drop wheel is a reel design, all the slack can be stored on the reel itself, allowing a neat installation and protecting the fiber. The need for splicing is eliminated because the fiber is connectorized on both ends. As the fibers are connectorized in a controlled factory environment, the technician error factor is virtually eliminated.

For the 5G elements, a similar approach is needed – but with some differences, such as higher fiber counts.

> A cassette-based frame is useful for terminating two networks (FTTU and 5G) in the same frame. The cassettes can be housed together even if they are configured to different technologies.

When multiple fiber connections are needed, two methods can work. The traditional method was to fan out and connectorize the fiber cable. This created a problem, especially in brownfield deployments, because of the physical size. Twelve fibers, fanned out and connectorized, make a bundle about 1¼ inches in diameter. That means the designer needs to find a pathway through the building that these large bundles can fit through. Often, multiple cables are needed. So, over time, this space requirement grows immensely.

A better way is to use a pushable MPO assembly. This 12-fiber, preconnectorized solution is about as big around as an adult's little finger and fits inside a 14/10mm microduct. After the fiber is pulled to the equipment destination, the MPO simply plugs into the equipment itself (if it is MPO equipped) or into a fan-out assembly that matches the equipment needs. The real charm is that the designer or installer can choose the fan-out type based on specific equipment needs.

TERMINATING THE NETWORKS

Terminating different technologies in the same space has always been a point of contention. However, the need to have fiber available for 5G in the MDU/MTU environment causes providers to look at this issue differently. The key is to use a device or frame that will accept a fiber cable that may have different technologies terminating each buffer tube or even each fiber.

That's where a scalable, cassette-based frame or panel assembly can help. For example, Clearfield's FieldSmart panels using the Clearview Cassette allow for using a different technology for each buffer tube. Each cassette can be configured to a different technology, such as PON, active Ethernet or NGPON2, though all cassettes are housed in a common chassis or frame. For the designer, this means space savings, fast installs, fiber protection and the elimination of most splices. That's a tall order – but today, it is certainly doable.

With the advent of robust microducts, preterminated fibers in single and multiple counts with small footprints, and scalable points of connectivity, those "worst of times" don't seem so bad. ❖

Clearfield drop wheels simplify fiber management in an MDU.

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