
Siklu
OVERBUILD
Painless Capacity
Upgrade +Redundancy
For Your Existing
Microwave Link

Siklu Application Note:

2 Gigabit Capacity Boost of Your Microwave Network

Siklu offers an overbuild solution that allows you to deliver 2 Gigabit throughput over interference-free millimeter-waves at distances of 8 miles and even more.

Introduction

Delivering 2 Gigabit capacity over a few miles has till now seemed impossible – too expensive, associated with a negative ROI, and always takes too long to deploy. But all that's about to change. Siklu offers the Overbuild – a capacity boosting solution that can easily boost your existing microwave radios and enables you to deliver 2 Gigabit throughput over interference-free millimeter waves for a distance of 8 miles and even more.

How it works

Simply combine a Siklu EtherHaul-2500FX 70/80GHz radio with your microwave radio (for example: 11GHz, 18GHz, 23GHz or 24GHz radios), and an Ethernet port which includes Siklu's advanced networking capabilities. With a single click it becomes possible to turn the two radios into a capacity-boosted link solution that delivers the capacity you need to utilize your install base.

What's in it for you?

EtherHaul's powerful, integrated networking engine does everything you need:

- 2 Gigabit throughput over long distances
- Increased service capacity
- Enhanced reach leveraging existing microwave link
- Easy, single click configuration
- Flexible choice between capacity, range and uptime requirements
- Enhanced availability over long distances
- No additional networking equipment is needed

Why Siklu's Overbuild?

Siklu's wireless solution provides cost-effective, fiber-like transmission with:

- 2 Gigabit throughput
- Ease of deployment – within days:
  - Simplified FCC coordination
  - Smallest form factor and weight
  - Minimal cabling
  - Installer-friendly commissioning procedures
- Predicted performance enabled by unique combination of narrow beams, wide abundant spectrum and carrier grade link planning tools

The E-Band spectrum is well suited for last mile short haul applications, as rain is a principal factor affecting attenuation. While light rain affects link performance marginally, heavy rain can degrade link performance significantly. The greater the distance of the link, the greater the degree of attenuation.

Your existing microwave links contribute to the solution:

- Rain tolerance - appropriate for long-distance applications.
- Typical limited capacity of ~200Mbps, due to limited spectrum available in lower frequencies.

Combining an EtherHaul-2500FX E-Band radio with your existing microwave allows you to benefit from 2 Gigabit capacity, and high availability over longer distances.

The following tables present the expected performance of the Overbuild solution in difference parts of the World.

Table 1: EH-2500FX performance with 1ft. antenna

	2000 Mbps	Microwave	2000 Mbps	Microwave	2000 Mbps	Microwave
Los Angeles	364d 7h 19m	0d 16h 41m	362d 8h 43m	2d 15h 17m	360d 13h 30m	4d 10h 30m
New York	363d 3h 38m	1d 20h 22m	357d 17h 25m	7d 6h 35m	352d 3h 22m	12d 20h 38m
Miami	363d 2h 34m	1d 21h 26m	361d 10h 20m	3d 13h 40m	359d 13h 23m	5d 10h 37m
London	364d 2h 4m	0d 21h 56m	361d 7h 47m	3d 16h 13m	358d 11h 21m	6d 12h 39m
Sydney	363d 16h 21m	1d 7h 39m	360d 14h 32m	4d 9h 28m	357d 5h 29m	7d 18h 31m
Range	5 mi.		8 mi.		10 mi.	

Table 2: EH-2500FX performance with 2ft. antenna

	2000 Mbps	Microwave	2000 Mbps	Microwave	2000 Mbps	Microwave
Los Angeles	364d 19h 24m	0d 4h 36m	364d 8h 52m	0d 15h 8m	363d 21h 20m	1d 2h 40m
New York	364d 12h 10m	0d 11h 50m	363d 10h 10m	1d 13h 50m	362d 5h 16m	2d 18h 44m
Miami	363d 23h 8m	1d 0h 52m	363d 8h 29m	1d 15h 31m	362d 22h 43m	2d 1h 17m
London	364d 17h 53m	0d 6h 7m	364d 3h 6m	0d 20h 54m	363d 10h 26m	1d 13h 34m
Sydney	364d 12h 56m	0d 11h 4m	363d 19h 23m	1d 4h 37m	363d 1h 52m	1d 22h 8m
Range	5 mi.		8 mi.		10 mi.	

How does it work?

Siklu's Overbuild combines a Siklu EtherHaul-2500FX millimeter wave radio with a microwave radio to create a high-availability, all-weather, extended range connection. A single click in the EtherHaul management GUI turns the two radios into a single high-performance long-distance 2 Gigabit link.

2 Gbps will be available over the interference-free millimeter wave EtherHaul link, while your microwave radio will be in stand-by mode, ready to be activated for the rare occasions during the year when the link is not available.

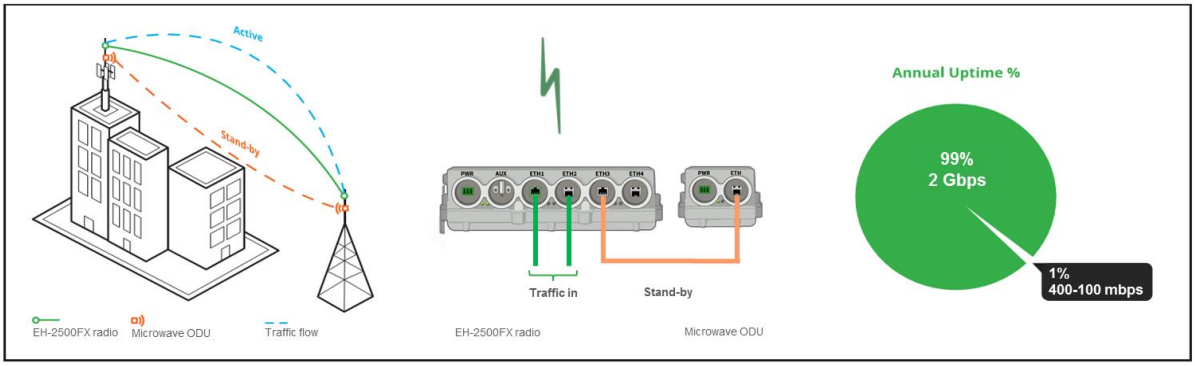

Figure 1: Siklu's Overbuild operation in regular conditions (microwave radio in stand-by mode)

When a significant rain event takes place, the Overbuild solution automatically switches the high priority traffic (hitless) from the primary EtherHaul path to the microwave radio path. When the rain cell passes, the link immediately returns to Gigabit speed. No additional networking equipment is needed. The EtherHaul's powerful, integrated networking engine provides everything you need.

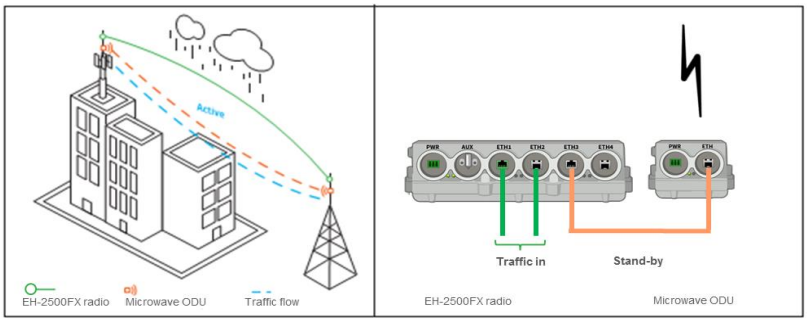

Figure 2: Siklu's Overbuild in a significant rain event (microwave radio in active mode)

Adaptive modulation and advanced QoS

As the capacity of the microwave radio is lower than the 2 Gbps capacity of the EtherHaul, the Siklu Overbuild leverages the EtherHaul's traffic prioritization capabilities to extend the availability of high priority traffic. When a significant rain event occurs, the adaptive capabilities of the EtherHaul are activated. When the EtherHaul capacity reaches a configured threshold, high priority traffic is forwarded to the lower frequency radio. Switching the traffic routing to the microwave radio is achieved hitlessly by the EtherHaul integrated networking engine. When the rain cell has moved on, and the EtherHaul can restore capacity to a higher level than the configured threshold, the traffic is routed hitlessly back to the EtherHaul.

Siklu's Overbuild solution is based on the ITU-T G.8032 Ethernet Ring Protection switching standard. This standard uses advanced and fast networking capabilities to detect main link failures (or capacity drops) and to route the traffic seamlessly to the backup path and back.

Minimum Requirements from your microwave radio

Siklu's Overbuild solution operates with any microwave radio which supports an Ethernet transparent bridge mode that can transport any type of layer 2 broadcast or multicast traffic.

Deploying and activating Siklu's Overbuild

To deploy and activate the Siklu Overbuild, mount the EtherHaul and establish reliable connectivity. Make sure that your microwave radio is up and running. Connect the traffic cables to the EtherHaul ports (Eth1 & Eth 2). Connect the microwave radio to the EtherHaul port (Eth 3).

Siklu's Overbuild is easily and quickly activated using the web GUI.

1. Login to the link web GUI via your web browser (https://192.168.0.1 is the default address. If your link has a different address, login with it)
2. Activate the ExtendMM EH-OPT-EXTENDMM feature option license key.
3. Click "Advance Config" [1]
4. Click "ExtendMM" [2]
5. Click "ExtendMM Enable" [3]
6. Click "Copy to Remote" [4]
7. Click "Apply" [5]

The Siklu Overbuild will operate with the default parameters in the majority of the cases. The default parameters may be configured as below – if required:

- Role: the EtherHaul radio on one side of the link functions as the "master" while the other is the "slave".
- Backup Port: the Ethernet port in the EtherHaul to which the lower frequency radio is connected to. (Default: Eth2)
- VID: VLAN ID used for the backup signaling (G.8032). (Default: 1)
- Capacity Threshold [Mbps]: the capacity for which below it, the traffic is routed to the lower frequency radio. (Default: 20 Mbps)
- Main Path: status of the EtherHaul main path link.
- Backup Path: status of the lower frequency radio backup path link.

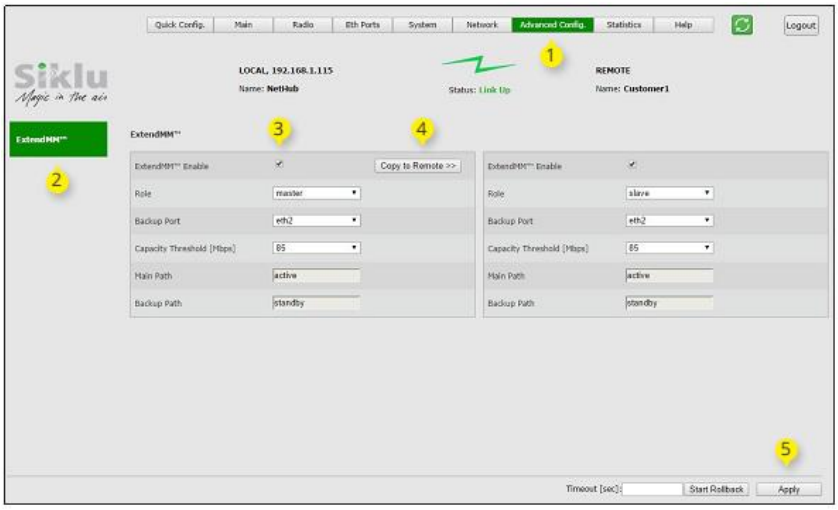

Figure 3: Siklu's Overbuild activation web GUI window

About Siklu

Siklu delivers multigigabit capacity millimeter wave wireless backhaul solutions operating in the 60, 70 and 80 GHz bands, ideal for dense, capacity-hungry urban networks. The most deployed millimeter wave radios in the world, thousands of units are delivering carrier grade performance in varying weather conditions around the world.

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