
# Digital & Analog Simulcast Solutions

## Need to replace backhaul linking for an existing simulcast LMR system?

Simulcast is an ideal option for non-urban areas where coverage is required over a large area but without a large number of users. Offering multiple land mobile radio base stations on the same frequency with overlapping coverage, simulcast is a cost-effective solution to cover rural locations with few users. Key advantages include:

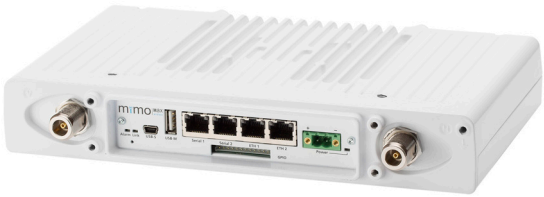
- ***SPECTRALLY EFFICIENT*** *– by re-using the same frequency to transmit on the network.*
- ***SEAMLESS OPERATIONS*** *– reducing channel switch within a simulcast territory.*
- ***EASY EXPANSION*** *– reducing the time needed to expand the network with additional licensing coordination.*

High-performance **Ubiik Mimomax Tornado radios** with 4-Wire Audio Interface provide **ultra low latency**, **low jitter**, **high throughput capacity**, and **our reliability**. Simulcast system (analog/digital) can efficiently cover a wide range of areas in a single full duplex frequency. With the combination of MIMO, Full-Duplex and High Order Modulation, Ubiik Mimomax Tornado radios ensure the highest possible simulcast performance.

This solution is ideal for upgrading or replacing existing simulcast backhaul or installing a new analog system using existing frequency licenses.

**"Analog simulcast is a tricky application and successfully deploying such a system requires the land mobile radio base stations to be very well-synchronized. Therefore, our focus with this project has been on avoiding any variation in latency. The tests we have carried out with one of our key customers have provided excellent results and we're pleased to be able to bring this solution to the market."**

JAMES DOWLE | DEVELOPMENT MANAGER - UBIIK MIMOMAX



# Digital & Analog Simulcast Linking Solutions

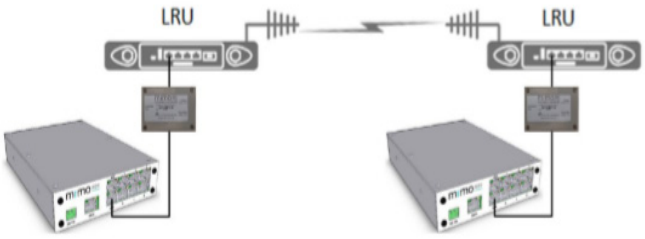



*Figure 1 : Ubiik Mimomax Tornado Analog Simulcast System Diagram*

| Ubiik Mimomax Tornado Latency Table One Way | | | |
|---|---|---|---|
| | Modulations | 25kHz | 50kHz |
| IP | QPSK | 17.5 | 9 |
| | 16QAM | 12 | 5.5 |
| | 64QAM | 8 | 4 |
| | 256QAM | 6.5 | 3.5 |
| Analog | QPSK | 15 | 11 |
| | 16QAM | 12 | 9 |
| | 64QAM | 10 | 8 |
| | 256QAM | 10 | 8 |

## BUILT-IN IP SIMULCAST

With an advanced Quality of Service (QoS), Ubiik Mimomax Tornado solutions are able to provide a high priority queue to support the IP/digital Simulcast application natively in the radio. Ultra-low latency of sub 10ms in a Point-to-Point configuration and high throughput capacity to support up to 25 x P25 and 30 x DMR channels ensures a highly efficient connectivity over a digital simulcast system.

## ANALOG SIMULCAST

Ubiik Mimomax Tornado radios support analog simulcast via an optimized version of our 4-Wire Audio Interface which provides the highly stable audio latency required for simulcast linking. Our solution is able to support up to 6 analog channels with E&M signalling with an ultra-low latency of typically sub 10ms in 50kHz.

## 4-WIRE AUDIO SIMULCAST OPTIMIZED

Using a sophisticated clock synchronization system to ensure the consistency of jitter between a link, our 4-Wire Audio Simulcast Optimized variant ensures the highly stable audio latency for analog simulcast operations.

*Contact us to learn more about our 4-Wire Audio Interface.*

## DESIGNING SIMULCAST BACKHAUL SYSTEM

Designing a backhaul system for Simulcast operations can be challenging. Our in-house engineering team can assist you and your customers to provide the support you need from pre-sales engineering to full-deployment. **For a free preliminary study to validate your link, please contact one of our regional sales managers or inquire on our website.**

## Why Ubiik Mimomax Simulcast?

**EFFICIENT QOS SYSTEM** – allows Ubiik Mimomax to have a high priority queue and maintain the criticallity of voice communications. In addition, the serial 4-Wire audio connections placed at a guaranteed bandwidth to ensure the radios can transport data efficiently.

**ULTRA STABLE LATENCY AND JITTER** – with latency of sub 10ms, low jitter of 50 ns and achievable Bit Error Rate (BER) of 1 x $10^{-10}$ in a Point to Point configuration. Tornado radios use technological advancement to ensure a synchronized mobile radio base stations and mantain highly stable latency rates.

**HIGHEST CAPACITY** – using a combination of MIMO, Full-Duplex, and High Order Modulation, Tornado radios provide the highest throughput capacity in the narrowband market. This technological advancement allow Ubiik Mimomax to support up to 25 P25, 30 DMR, and 6 E&M Analog channels, with having