



## 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 **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, 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 - MIMOMAX WIRELESS



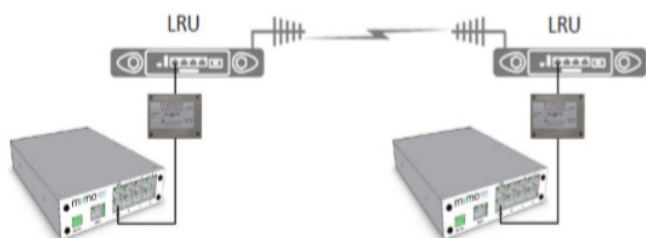


Figure 1 : Mimomax Tornado Analog Simulcast System Diagram

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), 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

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. Mimomax solutions are 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 Mimomax Simulcast?

**EFFICIENT QOS SYSTEM** – allows Mimomax to have a high priority queue and maintain the criticality 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  $1 \times 10^{-10}$  in a Point to Point configuration. Tornado radios use technological advancement to ensure a synchronized mobile radio base stations and maintain 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 Mimomax to support up to 25 P25, 30 DMR, and 6 E&M Analog channels, with having residual bandwidth.