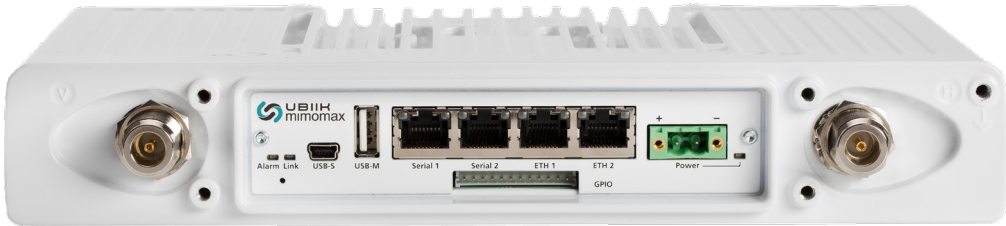


# UBIIK MIMOMAX TORNADO

## OPTIMIZED PROTECTION VARIANT (OPV)

Radio Spec Sheet



The Ubiik Mimomax Tornado is a full-duplex, software flexible, ultra spectrally efficient, long range point-to-multipoint and point-to-point linking radio unit with built-in intelligent network features for Critical Network Infrastructure. The Optimized Protection Variant (OPV) offers the lowest latency rates available in narrowband channels, making it the ideal solution for applications with stringent latency demands such as Teleprotection.

### LATENCY RATES PER MODULATION USING C37.94 INTERFACE

Bandwidth	Modulation	C37.94
200kHz*	16QAM	1.0ms
	64QAM	0.9ms
	256QAM	0.8ms
100kHz*	16QAM	1.8ms
	64QAM	1.5ms
	256QAM	1.3ms
75kHz	16QAM	2.2ms
	64QAM	1.9ms
	256QAM	1.6ms
50kHz	16QAM	3.1ms
	64QAM	2.5ms
	256QAM	2.2ms
25kHz	16QAM	5.6ms
	64QAM	4.4ms
	256QAM	3.9ms
12.5kHz	16QAM	10.8ms
	64QAM	8.7ms
	256QAM	7.4ms

\* These rates are only available with the Tornado X 900MHz.

### C37.94 MM CONVERTER SPECIFICATIONS (MULTI MODE)

Converter Model Number	INT-TMC-C37-000
Interfaces Supported	C37.94 MM
Connector Type	ST (IEC 61754-2)
User Bit Rate	64kbps
Wavelength	850nm (multi-mode)
Fiber Tx Power	-17dBm
Fiber Rx Sensitivity	-38dBm
Typical maximum link distance	6km (assuming loss of 3dB/km)

Note: C37.94 Single mode and G703, X21 and RS422 are also available. Please reach out to [info@ubiik.com](mailto:info@ubiik.com) for information on the full range of serial interfaces available.

TORNADO RADIO SPECIFICATIONS				
		400MHz	700MHz	900MHz
Gross Data Rates	75kHz 50kHz 25kHz 12.5kHz	240/480/720/960kbps Uplink and/or downlink   480/960/1440/1920kbps Full-duplex (available at 900MHz) 160/320/480/640kbps Uplink and/or downlink   320/640/960/1280kbps Full-duplex 80/160/240/320kbps Uplink and/or downlink   160/320/480/640kbps Full-duplex 40/80/120/160kbps Uplink and/or downlink   80/160/240/320kbps Full-duplex		
Configuration	2 x 2 Full Duplex MIMO			
Supply Voltage	10.5v DC to 60V DC			
Maximum Power Consumption	26W (at 13.8V) 20W typical			
Standby Power Consumption	<6W typical			
Ambient Temperature Range	-30°C (-40°C) to +60°C (+70°C)			
Mounting	1U High Rack Mount   Pole Mount   Wall Mount   DIN Rail Mount			
Dimensions (L x W x H)	173 x 266 x 43mm			
Weight	2 kg radio unit only, excl. mounts			
RECEIVER				
Modulation	QPSK/16/64/256QAM			
Number of MIMO receivers	2			
Symbol Rate	75kHz 50kHz 25kHz 12.5kHz	- 2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec	- 2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec	2x60k symbols/sec 2x40k symbols/sec 2x20k symbols/sec 2x10k symbols/sec
Modulation <sup>(3)</sup> Sensitivity for 10 <sup>-4</sup> BER	75kHz 50kHz 25kHz 12.5kHz	- <-109.5/103/97/91dBm <-112.5/-106/-100/-93.5dBm <-115.5/-109/-103/-96dBm	- <-110.5/-104/-98/-92dBm <-113.5/-107/-101/-94.5dBm <-116.5/-110/-104/-97dBm	<-107.5/-101/-95/-89dBm <-109.5/103/97/91dBm <-112.5/-106/-100/-93.5dBm <-115.5/-109/-103/-96dBm
Modulation <sup>(3)</sup> Sensitivity for 10 <sup>-6</sup> BER	75kHz 50kHz 25kHz 12.5kHz	- <-108.5/-102/-96/-89.5dBm <-111.5/-105/-99/-92dBm <-114.5/-108/-102/-94.5dBm	- <-109.5/-103/-97/-90.5dBm <-112.5/-106/-100/-93dBm <-115.5/-109/-103/-95.5dBm	<-106.5/-100/-94/-87.5dBm <-108.5/-102/-96/-89.5dBm <-111.5/-105/-99/-92dBm <-114.5/-108/-102/-94.5dBm
Frequency Range	400-430MHz   420-450MHz   440-470MHz		757-758 and 787-788MHz	806-869MHz   852-933MHz   896-960MHz
Frequency Step Size	5 kHz & 6.25 kHz selectable			
Frequency Accuracy and Stability	better than +/- 1ppm			
Nominal Channel Bandwidth	12.5 kHz, 25 kHz, 50kHz (75kHz is software upgradeable at 900MHz)			
TRANSMITTER				
RF Power Output	Avg. before duplexer 2 x 26dBm, Avg. after duplexer 2 x 24dBm Peak before duplexer 2 x 34dBm, Peak after duplexer 2 x 32dBm			
RF Power Control Range	>20 dB			
Other Details	Modulation, Number of MIMO receivers, Symbol Rates, Frequency Range, Frequency Step Size, Frequency Accuracy and Stability are the same as Receiver			
DUPLEXER (INTERNAL)				
Type	Bandpass			
Tx / Rx Split	5 MHz minimum	30 MHz	9 MHz minimum	
Frequency Range	400 to 470 MHz	757-758 & 787-788 MHz	806 to 960 MHz	
Duplexer Sub Bands	400-430 MHz   440-450 MHz   450-470 MHz	757-758 to 787-788 MHz	806-869 MHz   852-933 MHz   896-960 MHz	
Stop Band Attenuation	>60 dB @ >5 MHz from centre	>75 dB	>60 dB @ >9 MHz from centre	
Pass Band Bandwidth	1 MHz min	3 MHz (-0.5dB)	4 MHz (-0.5dB)	
DUPLEXER (EXTERNAL)				
Type	Bandpass	Available on request	Bandpass	
Tx / Rx Split	4.5 MHz		6 MHz minimum	
Frequency Range	400 to 470 MHz		806 to 960 MHz	
Insertion Loss	<1.75 dB		<1.5 dB	
Stop Band Attenuation	>70 dB		>70 dB	
Pass Band Bandwidth	2 MHz (-0.5dB)		tunable, 1 MHz min	
Mounting	2U High Rack Mount		1U High Rack Mount	
INTERFACE (DIGITAL & ANALOGUE)				
ETHERNET	Dual 10BaseT/100BaseT   Connector: 2 x RJ45			
ASYNCHRONOUS SERIAL	Format: Dual RS232   Connector: 2 x RJ45   Baud Rate: 300 - 115,200 baud			
USB	High speed USB 2.0   Connector: Type A and mini B			
ALARM	1 set of volt-free change over contacts			
GPIO Analogue/Digital	4 x s/w configurable I/O ports			
FREQUENCY REFERENCE Input/Output	isolated differential pair			

**Important:** Specifications are subject to change without prior notice. Please visit [ubiikmimomax.com](http://ubiikmimomax.com) for more info, or email us at [info@ubiik.com](mailto:info@ubiik.com).