



## **MiMOMax 900MHz TORNADO**

The MiMOMax Tornado is a full-duplex, software flexible, ultra spectrally efficient, long range point-to-multipoint remote radio unit with built-in intelligent network features for Critical Network Infrastructure. With scalable data rates and an efficient random access protocol, it can provide near real-time access to a large number of remote sites with very high reliability and low latency. The MiMOMax Tornado is fully compatible with all MiMOMax products and provides economical SCADA and Telemetry solutions to remote sites in the Power, Gas and Water acquisition and distribution industries.

### **BENEFITS    KEY FEATURES**

**SERIOUSLY SMART**

- ▶ Point-to-Multipoint
- ▶ Linux Application Engine

**SCALABLE**

- ▶ Ultra Spectrally Efficient
- ▶ Scalable Data Throughput Rates

**VERY ECONOMICAL**

- ▶ SCADA, Telemetry & Data Solutions

**HIGHLY EFFICIENT**

- ▶ Software Flexible & Intelligent
- ▶ Very Low Latency

**COMPATIBLE**

- ▶ Very Low Power Consumption

**ROBUST**

- ▶ Full-duplex
- ▶ Capacity to Simultaneously Operate in Poll and Interrupt Modes

**EXCLUSIVE TO USER**

- ▶ UHF Licensed Spectrum
- ▶ Ethernet, Serial & USB Interfaces

**FUTURE DEFENSIVE**

- ▶ IP Data Encryption & Firewall Security

**ENVIRONMENTALLY SOUND**

- ▶ Advanced Software Features
- ▶ User Settable Frequency
- ▶ User Programmable Power
- ▶ Indoor & Outdoor Mountable

# 900MHz TORNADO PRODUCT SPECIFICATIONS

General		
Gross Data Rates	50 kHz	160/320/480/640kb/s Uplink and/or downlink 320/640/960/1280kb/s Full-duplex
	25 kHz	80/160/240/320kb/s Uplink and/or downlink 160/320/480/640kb/s Full-duplex
	12.5 kHz	40/80/120/160kb/s Uplink and/or downlink 80/160/240/320kb/s 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 <sup>(1)</sup>	-30°C (-40°C) <sup>(1)</sup> to +60°C (+70°C) <sup>(2)</sup>	
Mounting	1U High Rack Mount	
	Pole Mount	
	Wall Mount	
	DIN Rail Mount	
Dimensions (L x W x H)	180 x 270 x 44mm	
Weight	2 kg radio unit only, excl. mounts	
Receiver		
Modulation	QPSK/16/64/256QAM	
Number of MIMO receivers	2	
Symbol Rate	2x40k symbols/sec (50kHz)	
	2x20k symbols/sec (25kHz)	
	2x10k symbols/sec (12.5kHz)	
Modulation <sup>(3)</sup> Sensitivity <sup>(4)</sup> for 10 <sup>-4</sup> BER	50 kHz	<-111/-103/-97/-91dBm
	25 kHz	<-113/-106/-100/-94dBm
	12.5 kHz	<-116/-109/-102/-96dBm
Modulation <sup>(3)</sup> Sensitivity <sup>(4)</sup> for 10 <sup>-7</sup> BER	50 kHz	<-109/-102/-96/-89dBm
	25 kHz	<-112/-105/-99/-92dBm
	12.5 kHz	<-116/-108/-102/-96dBm
<i>Measurements via duplexer at antenna port</i>		
Frequency Range	806 to 960 MHz other frequencies available on request	
Frequency Step Size	5 kHz & 6.25 kHz selectable	
Frequency Accuracy and Stability	better than +/- 1 ppm	
Nominal Channel Bandwidth	12.5 kHz, 25 kHz, 50 kHz	
Transmitter		
Number of MIMO transmitters	2	
Modulation	QPSK/16/64/256QAM	
Symbol Rate	2x40k symbols/sec (50 kHz)	
	2x20k symbols/sec (25 kHz)	
	2x10k symbols/sec (12.5 kHz)	
RF Power Output <sup>(5)</sup>	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	

Transmitter (Continued)	
Frequency Range	806 to 960 MHz
Frequency Step Size	5kHz & 6.25 kHz selectable
Frequency Accuracy and Stability	Better than +/- 1.5ppm
Nominal Channel Bandwidth	12.5 kHz, 25 kHz 50 kHz

Duplexer (Internal)	
Type	Bandpass
Tx / Rx Split	9 MHz minimum
Frequency Range	806 to 960 MHz other frequencies available on request
Duplexer Sub Bands	806-869 MHz
	852-933 MHz
	896-960 MHz
Stop Band Attenuation	>60 dB @ >9 MHz from centre
Pass Band Bandwidth <sup>(6)</sup>	4 MHz (-0.5dB)

Duplexer (External)	
Type	Bandpass
Tx / Rx Split	6 MHz minimum
Frequency Range	806-960 MHz
Insertion Loss	< 1.5 dB
Stop Band Attenuation	>70 dB
Pass Band Bandwidth	tunable, 1 MHz min
Mounting	1 U High Mount Rack

Interfaces (Digital & Analogue)	
ETHERNET	Dual 10BaseT/100BaseT
Connectors	2 x RJ45
ASYNCHRONOUS SERIAL (Other data interfaces available via external media converters <sup>(7)</sup> )	
Format	Dual RS232
Connectors	2 x RJ45
Baud Rate	300 - 115,200 baud
USB	High speed USB 2.0
Connectors	Type A and mini B
ALARM	1 set of volt-free change over contacts
GPIO <i>Analogue/Digital</i>	4 x s/w configurable I/O ports
FREQUENCY REFERENCE <i>Input/Output</i>	isolated differential pair

Compliances	
Radio Performance	FCC 47CFR part 101
	IC Canada <i>RSS-119</i>
	AS/NZS 4295 : 2015
EMC	FCC 47CFR part 15
Environmental	60950-22 Outdoor Safety <sup>(8)</sup>
Safety	IEC 60950-1: 2005, Am 1 : 2009

**Important:** Specifications are subject to change without prior notice  
 (1) -40°C for continuous operation.  
 (2) +70°C for RRU-T with 25% duty cycle.  
 (3) Systems employing modulation swapping will automatically reduce the modulation order at a signal level higher than the specified sensitivity level.  
 (4) Sensitivity as specified includes forward error correction and internal duplexer loss.  
 (5) Tornado RF output remains constant at all modulations.  
 (6) The maximum acceptable frequency shift without retuning the duplexer is also subject to stop band performance.  
 (7) Contact MiMOMax Wireless for more information.  
 (8) Designed to meet.