



MiMOMAX 700MHz TORNADO

The MiMOMax Tornado is a full-duplex, software flexible, ultra spectrally efficient, long range point-to-multipoint and point-to-point radio unit with built-in intelligent network features for Critical Network Infrastructure. With scalable data rates and an efficient 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

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|------------------------------|--|
| SERIOUSLY SMART | ▶ Point-to-Multipoint, Point-to-Point |
| SCALABLE | ▶ Linux Application Engine |
| VERY ECONOMICAL | ▶ Ultra Spectrally Efficient |
| HIGHLY EFFICIENT | ▶ Scalable Data Throughput Rates |
| COMPATIBLE | ▶ SCADA, Telemetry & Data Solutions |
| ROBUST | ▶ Software Flexible & Intelligent |
| EXCLUSIVE TO USER | ▶ Very Low Latency |
| FUTURE DEFENSIVE | ▶ Very Low Power Consumption |
| ENVIRONMENTALLY SOUND | ▶ Full-duplex |
| | ▶ Capacity to Simultaneously Operate in Poll and Interrupt Modes |
| | ▶ 700MHz Licensed Spectrum |
| | ▶ Ethernet, Serial & USB Interfaces |
| | ▶ IP Data Encryption & Firewall Security |
| | ▶ Advanced Software Features |
| | ▶ User Settable Frequency |
| | ▶ User Programmable Power |
| | ▶ Indoor & Outdoor Mountable |

700MHz 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	-30°C (-40°C) ⁽¹⁾ to +60°C (+70°C) ⁽²⁾	
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 <i>radio unit only, excl. mounts</i>	

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 ⁽³⁾ Sensitivity ⁽⁴⁾ for 10 ⁻⁴ BER	50 kHz	< -111/-104/-98/-92dBm
	25 kHz	< -114/-107/-101/-95dBm
	12.5 kHz	< -117/-110/-104/-97dBm
Modulation ⁽³⁾ Sensitivity ⁽⁴⁾ for 10 ⁻⁷ 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	757-758 & 787-788 MHz other frequencies available on request	
Frequency Step Size	5kHz & 6.25kHz 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 (12.5kHz)

Transmitter (Continued)	
RF Power Output ⁽⁵⁾	Avg. before duplexer 2x26dBm Avg. after duplexer 2x24dBm Peak before duplexer 2x34dBm Peak after duplexer 2x32dBm
RF Power Control Range	>20dB
Frequency Range	757-758 to 787-788 MHz
Frequency Step Size	5 kHz & 6.25 kHz selectable
Duplexer (Internal)	
Type	Bandpass
Tx / Rx Split	30 MHz
Frequency Range	757-758 to 787-788 MHz other frequencies available on request
Stop Band Attenuation	>75 dB
Pass Band Bandwidth ⁽⁶⁾	3 MHz (-0.5dB)

Interfaces (Digital & Analogue)	
ETHERNET	Dual 10BaseT/100BaseT
Connectors	2 x RJ45
ASYNCHRONOUS SERIAL (Other data interfaces available via external media converters ⁽⁷⁾)	
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 27
EMC	FCC 47CFR part 15
Environmental	60950-22 Outdoor Safety ⁽⁸⁾
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 the stop band performance.
- (7) Available via external media converter.
- (8) Designed to meet.