

# Xeta9 Series 900 MHz

## 10 kbps – 4.4 Mbps

### Unlicensed & Licensed Software Defined Radio

The **Xeta9** series is a dual band ISM/MAS 902 – 960 MHz software defined radio that features **Dynamic Modulation**, flexible configuration options and multi-layer Ethernet capabilities including VLAN and Routing.

The **Xeta9** selectively switches modulation based on link quality and environmental noise. This **Dynamic Modulation** allows for data rates from 57 kbps – 4.4 Mbps in the unlicensed ISM band using 76 kHz – 1.2 MHz channel sizes and power output from 50 mW – 1 W. MAS operation offers 10 – 210 kbps data rates using 12.5/25/50 kHz channels and power output of 50 mW – 4 W.

With built-in support for **MultiSpeed MultiPoint™** networks, the **Xeta9** enables both high and low speed remotes to operate on the same network with a single access point. This new capability empowers wireless network planners to add video cameras and other higher data-rate monitoring systems to their SCADA infrastructure without the need to build separate radio networks for these devices.

**Multi-Master Sync (MMS) network synchronization** precisely controls the transmission timing within a multiple Master network to eliminate self-interference.

**Seamless Serial** allows serial remotes to communicate over-the-air with an Ethernet access point, while also improving data capacity when using 12.5 kHz MAS.

Based on its patent pending **Dual Decode Digital Architecture™**, XetaWave's technology platform offers performance second to none in the commercial market today.



### Technology Differentiators

**High Speed** 10 kbps – 4.4 Mbps over-the-air data rates. XetaWave's proprietary DSM technology offers the industry's highest data rate in a 12.5 kHz channel (57kbps). The **Xeta-XX** offers **8.8 Mbps** data rate.

**Dual Band** 902 – 928 / 928 – 960 MHz frequency support enables both ISM unlicensed and MAS licensed applications with a single radio.

**Dual Radio** Support for optional 2<sup>nd</sup> RF Module (of any Xeta Series) in a single enclosure provides enhanced repeater functionality, higher throughput rates and multi-band / multi-frequency operations.

**Link Adaptation** Dynamic data rate automatically adapts communication parameters to achieve optimal link performance.

**Multi-Speed Multi-Point** Unique to XetaWave, a *single* radio can have multi-logical data channels with different speeds, providing configuration and installation flexibility such that long range or high speed can be prioritized.

**Ethernet Switch** The **Xeta9-EL** acts like a switch, making more efficient use of RF bandwidth when compared to other "bridge" products. Two independent Ethernet ports and up to two RF Modules, each with full VLAN support, allow multiple logical networks to exist within the same physical system.

**IP Routing** Layer 3 Static Routing provides Ethernet traffic management over the RF links, especially useful when mixing ISM DTS with narrowband MAS networks.

**Serial Services** Enables integration of hybrid networks utilizing both Ethernet and legacy Serial devices through TCP Terminal Server, TCP Terminal Client, UDP Terminal, and Modbus RTU Server capabilities.

**IO Services** Enables integration of Digital / Analog inputs and outputs with control and monitoring via Modbus TCP with ASCII/RTU support.

**Onboard Diagnostics** Built-in diagnostic support with tools such as RF Ping, RF Throughput, and Neighbor List in combination with SNMP.

**3 Watts** Adjustable power output from 10 mW – 3 W (10 – 34.8 dBm)

### Industry Applications

#### Oil & Gas

- Increased bandwidth for expanding IP-based control systems & video monitoring.
- Unified serial and IP/Ethernet infrastructure
- Licensed option for congested unlicensed areas.

#### Energy

- 100% testing over full -40°C to +75°C ISM & -40°C to +60°C MAS operating range ensures reliable communications across the harshest environments. *Contact XetaWave for lower temperature operation.*

#### Industrial Controls

- Optional I/O allows seamless integration of ModBus RTU, ModBus TCP, and DNP3 protocols into a unified wireless network.

#### Electric Power

- Distribution Automation
- Substation Automation
- SCADA
- Grid Sensors
- Voltage Optimization

#### Water & Wastewater

- Multi-Megabit data rates allows for more frequent polling and the ability to add video monitoring in critical locations.
- Standard AES 256 bit encryption support secures critical communications channels from unauthorized use and interception.

## Technical Specifications

Transmitter	ISM	MAS
Frequency Range	- 902 – 928 MHz: FHSS & DTS	928 – 960 MHz
Output Power	- 50 mW – 1 W (17 – 30 dBm)	50 mW – 3 W (17 – 34.8 dBm)
Modulations	- MSK 2FSK BPSK QPSK 8PSK 16PSK 16QAM 32QAM	MSK 4FSK QPSK 8PSK 16QAM 32QAM 64QAM
RF Data Rate	- 57 kbps – 4.4 Mbps	10 kbps – 210 kbps
Occupied Bandwidth	- FHSS: 76 / 154 / 207 / 310 kHz DTS: 600 / 900 / 1200 kHz	12.5 / 25 / 50 kHz
Frequency Stability	- 1.0 ppm	1.0 ppm
Duty Cycle	- Continuous	Continuous
Output Impedance	- 50 Ohms	50 Ohms
Range	- 70+ miles	70+ miles

Receiver	ISM	MAS	
Sensitivity	<u>FHSS (Channel Size)</u>		
	-110 @ MSK 57 kbps (76.45 kHz)	-115 @ MSK 10 kbps	
	-107 @ MSK 114 kbps (154.29 kHz)	-102 @ 4FSK 19 kbps	
	-106 @ MSK 153 kbps (207.11 kHz)	-103 @ QPSK 23 kbps	
	-103 @ MSK 229 kbps (309.97 kHz)	-97 @ 8PSK 34 kbps	
		-93 @ 16QAM 45 kbps	
		-89 @ 32QAM 57 kbps	
		<u>12.5 kHz</u>	<u>25 kHz</u>
			-112 @ MSK 19 kbps
			-100 @ 4FSK 39 kbps
			-106 @ QPSK 36 kbps
			-100 @ 8PSK 52 kbps
			-97 @ 16QAM* 70 kbps
		-93 @ 32QAM* 87 kbps	
		-86 @ 64QAM* 105 kbps	
	<u>DTS (Channel Size)</u>		
	-99 @ BPSK 530 kbps (600 kHz)		
	-98 @ 2FSK 663 kbps (900 kHz)		
	-98 @ BPSK 884 kbps (1.2 MHz)		
	-97 @ QPSK 1061 kbps (600 kHz)		
	-91 @ 8PSK 1591 kbps (600 kHz)		
	-95 @ QPSK 1768 kbps (1.2 MHz)		
	-87 @ 16QAM 2121 kbps (600kHz)		
	-90 @ 8PSK 2651 kbps (1.2 MHz)		
	-81 @ 32QAM 2651 kbps (600 kHz)		
	-86 @ 16QAM 3535 kbps (1.2 MHz)		
	-83 @ 16PSK 3535 kbps (1.2 MHz)		
	-81 @ 32QAM 4419 kbps (1.2 MHz)		
		<u>50 kHz</u>	
		-109 @ MSK 39 kbps	
		-102 @ QPSK 71 kbps	
		-97 @ 8PSK 101 kbps	
		-94 @ 16QAM* 137 kbps	
		-90 @ 32QAM* 175 kbps	
		-84 @ 64QAM* 210 kbps	
		<i>* 25 KHz and 50 KHz QAM modes limited to 1W Transmit Power</i>	
RF Selectivity	- 50dB	33dB (MSK 12.5 KHz) / 30dB (MSK 25 / 50 KHz)	

## Data Transmission

Error Detection	- Up to 32-bit CRC, Retransmit on Error	Data Encryption <sup>1</sup> - AES128 / AES 256
Data Interfaces <sup>1</sup>	- Up to 2 x 10/100Mbps Ethernet Up to 2 x RS232/422/485 Serial Ports	Data Connector <sup>1</sup> - 4 x RJ45
Serial Interface Speed <sup>1</sup>	- up to 230.4 kbps	<sup>1</sup> Does not apply to Xeta9m-T RF Module

## Power / Physical

Operating Voltage	- Xeta9, Xeta9x9, Emancipator, INS and XX: 10-32VDC with reverse polarity protection to 32 VDC Xeta9m-T: 7.5VDC ± 0.5V with no reverse polarity protection
Power Consumption (average mA) @ 12VDC	
• <b>Xeta9-E/EL</b> (1W/3W)	- Transmit : 335/495 mA      Receive: 290/380 mA      Idle: 270/210 mA
• <b>Xeta9x9-E/EL</b> (1W/3W)	- Transmit : 385/580 mA      Receive: 300/421 mA      Idle: 292/293 mA
• <b>Xeta9x-E/EL</b> (1W)	- Transmit : 204 mA      Receive: 141 mA      Idle: 103 mA
RF Connector	- Enclosed: TNC      Board Level: SMA      Module: MMCX
Dimensions (L x W x H)	- Enclosed: 6.625 " x 3.45 " x 1.835 " / 16.83 cm x 8.76 cm x 4.66 cm Board Level: 5.125 " x 3.75 " x 1.000 " / 12.8 cm x 6.5 cm x 0.25 cm with optional DIN Rail Mount
Weight	- <b>Xeta9-E/EL</b> 1.54 lbs / 0.70 kg, <b>Xeta9x9-E/EL</b> 1.61 lbs / 0.73 kg, <b>Xeta9m-T</b> 0.05 lbs / 24 grams <b>Xeta9x-E/EL</b> 0.37 lbs / 0.17 kg with optional DIN Rail Mount

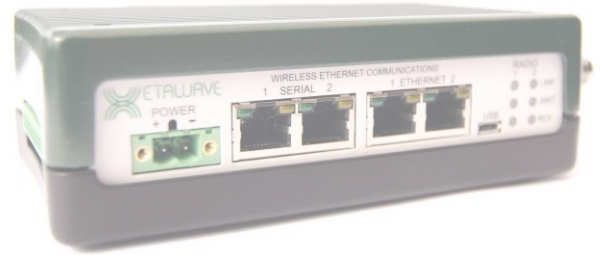
## Environmental

Operating Temp Range	- -40°C to +75°C ISM & -40°C to +60°C MAS. <i>Contact XetaWave for lower temperature operation.</i>
Humidity	- 95% operating humidity @ 40°C non-condensing.      UL Class 1 Div 2  approved

## Xeta9 Series

### Xeta9-E / Xeta9-EL

- Single RF Module
- Dual Band; ISM & MAS 902 – 960 MHz
- 57 kbps – 4.4 Mbps ISM Data Rates with 1W Max RF Xmit Power
- 10 kbps – 210 kbps MAS Data Rates with 3W Max RF Xmit Power
- uTasker or Linux Operating System
- HTTP/HTTPS
- VLANs
- IP Routing (Linux)
- Store & Forward Repeater Capabilities
- 2 x 10/100 Mbps Ethernet Ports
- 2 x RS232/422/485 Serial Ports
- TCP Terminal Server, TCP Terminal Client, UDP Terminal and Modbus RTU Server capabilities
- IO support for DI1 and External Trigger input for **MMS**
- Management; Configuration Files, Diagnostics and SNMP



Dimensions (L x W x H): 6.625 " x 3.45 " x 1.835 " / 16.83 cm x 8.76 cm x 4.66 cm  
Weight 1.54 lbs / 700 grams

### Xeta9x9-E / Xeta9x9-EL

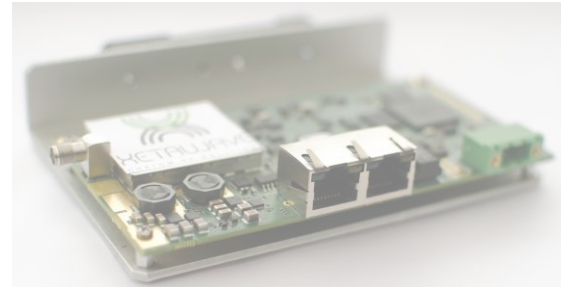
- Dual RF Module – can be installed as a Repeater or dual-AP
- Dual Band; ISM & MAS – can use both bands simultaneously
- 57 kbps – 4.4 Mbps ISM Data Rates with 1W Max RF Xmit Power
- 10 kbps – 210 kbps MAS Data Rates with 3W Max RF Xmit Power
- uTasker or Linux Operating System
- HTTP/HTTPS
- VLANs
- IP Routing (Linux)
- Back to Back AND Store & Forward Repeater Capabilities
- 2 x 10/100 Mbps Ethernet Ports
- 2 x RS232/422/485 Serial Ports
- TCP Terminal Server, TCP Terminal Client, UDP Terminal and Modbus RTU Server capabilities
- IO support for DI1 and External Trigger input for **MMS**
- Management; Configuration Files, Diagnostics and SNMP



Dimensions (L x W x H): 6.625 " x 3.45 " x 1.835 " / 16.83 cm x 8.76 cm x 4.66 cm  
Weight 1.61 lbs / 730 grams

### Xeta9x-E / Xeta9x-EL (Emancipator +)

- Board Level with optional DIN Rail Mount
- ISM only 902 – 928 MHz
- 57 kbps – 2.6 Mbps ISM Data Rates with 1W Max RF Xmit Power
- Low Power Modes; consumption down to 85mA @ 12VDC
- uTasker or Linux Operating System
- HTTP/HTTPS
- VLANs
- IP Routing (Linux)
- Store & Forward Repeater Capabilities
- 1 x 10/100 Mbps Ethernet Port
- 1 x RS232/422/485 Serial Port
- TCP Terminal Server, TCP Terminal Client, UDP Terminal and Modbus RTU Server capabilities
- No IO support
- Management; Configuration Files, Diagnostics and SNMP



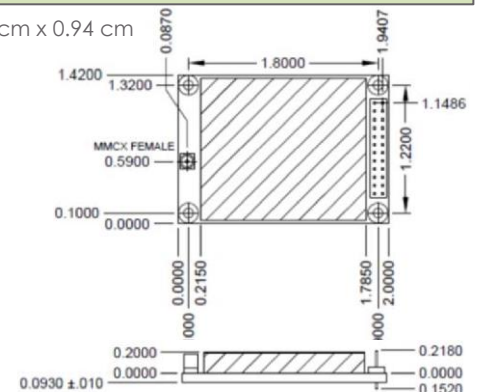
Dimensions\* (L x W x H): 5.125 " x 3.75 " x 1.000 " / 12.8 cm x 6.5 cm x 0.25 cm  
Weight\* 0.37 lbs / 170 grams

\* with optional DIN Rail Adapter

### Xeta9m-T

- OEM RF Module only
- Dual Band; ISM & MAS 902-960 MHz
- 7.5 VDC ± 0.5 V
- CMOS / RS232 Interface
- Transmit Current <1.0 A @ 7.5 VDC for 1 W RF
- Transmit Current <3.0 A @ 7.5 VDC for 3 W RF
- Receive Current <275 mA @ 7.5 VDC for 1 W RF
- Idle Current <150 mA @ 7.5 VDC
- Sleep Current <50 mA @ 7.5 VDC
- Serial Interface Speed 2 Mbps CMOS / 1 Mbps RS232
- 24-pin Samtec MTMM-112-05-L-D-159 power/data connector
- MMCX RF connector

Dimensions (L x W x H) 2.0 " x 1.4 " x 0.37 " / 5.1 cm x 3.5 cm x 0.94 cm  
Weight 0.05 lbs / 24 grams



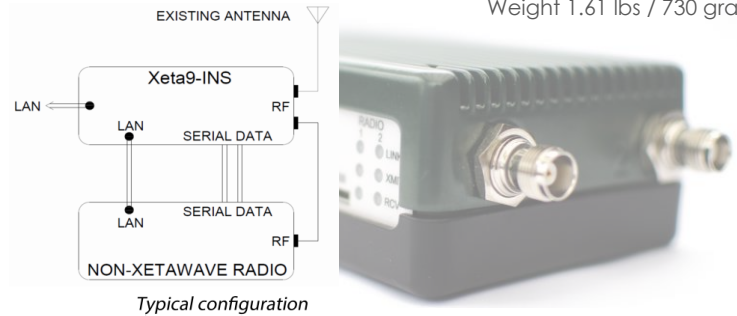


## Xeta9 Series

### Xeta9-INS

- Migration path to next generation high performance XetaWave technology. A XetaWave network can be overlaid on top of the legacy system with precisely timed transmissions to eliminate interference. End Points can then be upgraded as time and resources permit. No need to rip and replace.
- Single RF Module and Combining/Sensing Module
- Less than 2 dB insertion loss for existing non-XetaWave radios transmission
- 0 to 6 dB settable receive gain
- 40 dB + isolation between radios; uses ferrite isolators – a first for the industry
- Better than 20 dB return loss regardless of antenna VSWR
- Extremely high receive input 1 dB compression point of +10 dBm
- Operates only in DTS modes to avoid FCC restrictions on synchronization

Dimensions (L x W x H): 6.625 " x 3.45 " x 1.835 " / 16.83 cm x 8.76 cm x 4.66 cm  
Weight 1.61 lbs / 730 grams



Refer to **Xeta9-INS Data & Application Sheet** for detailed specifications

### Xeta9-XX

- Dual RF Module / Single Antenna
- ISM only 902 – 928 MHz
- 115 kbps – **8.8 Mbps** RF Data Rates
- VLANs
- Repeater Capabilities
- 2 x 10/100 Mbps Ethernet Ports
- 2 x RS232/422/485 Serial Ports
- TCP Terminal Server, TCP Terminal Client capabilities
- IO support for DI1 and External Trigger input for **MMS**
- Management; Web GUI and Diagnostics
- At the 50% interference level the user can expect the same throughput as a standard Xeta9-EL operating in an interference free band
- Where the interference level is lower the data throughput of the radio increases up to twice that of a standard Xeta9-EL

Dimensions (L x W x H): 6.625 " x 3.45 " x 1.835 " / 16.83 cm x 8.76 cm x 4.66 cm  
Weight 1.60 lbs / 720 grams

Up to 8.8 Mbps RF Data Rate



Refer to **Xeta-XX Data & Application Sheet** for detailed specifications

### Contact

For more information or to schedule a demo, please contact us at **408-642-5458** or **sales@elevatewireless.com**



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XetaWave provides an industry leading 3 year warranty on its products.

All XetaWave radios are 100% designed, manufactured, and tested at its headquarters in Louisville, Colorado, USA.

