



## SMARTMESH® IA-510

# PM2511

### Industrial

**PRODUCT DESCRIPTION** > The PM2511 embedded network manager combines Dust Networks' robust Intelligent Networking Platform and industry-leading low-power radio technology in an easy-to-integrate embedded subsystem. The network-ready embedded manager enables customers to integrate advanced wireless sensor networking intelligence into monitoring and control solutions with low risk and rapid time-to-market.

The PM2511 is designed for use in line-powered gateways and controllers, and enables customers to integrate a standards-based wireless sensor network that provides scalable bidirectional communications. Sophisticated network management algorithms deliver dynamic network optimization and intelligent routing to achieve high reliability, low latency, and deterministic power management. Additionally, the embedded network manager offers a comprehensive set of APIs for easy software development.

**ABOUT SMARTMESH IA-510** > Dust Networks' SmartMesh® IA-510 is an industry-leading wireless networking solution designed for critical monitoring and control applications. IA-510 serves a wide range of applications from renewable energy generation, such as solar and wind power, to factory machine health monitoring and data center HVAC energy management. The SmartMesh IA-510 system delivers dynamic network optimization and intelligent routing to achieve unsurpassed levels of wireless network scalability, system-wide reliability and low latency, coupled with industrial-class security. Additionally, ultra-low power operation permits even greater deployment flexibility for wire-free applications.

### KEY FEATURES

#### INTELLIGENT NETWORK MANAGEMENT

- ❑ Dynamic network optimization maintains network health and enables greater than 99.99% network reliability even in the most challenging environments
- ❑ Deterministic power management ensures system-wide optimization to avoid early or frequent battery changes
- ❑ Intelligent routing lowers latency, reduces network power consumption and eliminates in-network collisions

#### BANDWIDTH FLEXIBILITY

- ❑ Bandwidth flexibility accommodates the range of network latency and throughput needs of monitoring and control applications
- ❑ Dynamic bandwidth assigns different levels of bandwidth on a per-mote basis to satisfy unique device throughput requirements

#### ROBUST SECURITY

- ❑ Industry-proven security meets standards for critical infrastructure
- ❑ 128-bit AES encryption ensures secure data transmission
- ❑ Access control lists ensure that only authorized devices can join a network
- ❑ Dynamic encryption key distribution eliminates manual intervention

#### FAST AND LOW RISK INTEGRATION

- ❑ Comprehensive APIs provide rich and flexible functionality to ease software development and device integration
- ❑ Fully integrated and certified RF capabilities

#### GLOBAL MARKET SOLUTION

- ❑ Wireless network operates on 2.4 GHz global license-free band, providing customers with a single product for world-wide use
- ❑ Modular 2.4GHz band RF certifications for FCC, IC and CE dramatically reduce cost and complexity of wireless device certification

## NORMAL OPERATING CONDITIONS

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Operational supply voltage range	4.0	5.0	5.5	V	
Operating temperature range	-40		85	°C	
Operating relative humidity	10		90	%RH	Non-condensing

## DETAILED RADIO SPECIFICATIONS

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
Operating frequency	2.4000		2.4835	GHz	
Number of channels		15			
Channel separation		5		MHz	
Occupied channel bandwidth		2.7		MHz	At -20 dBc
Modulation					IEEE 802.15.4 direct sequence spread spectrum (DSSS)
Raw data rate		250		kbps	
Receiver sensitivity		-90		dBm	At 1% PER, 25° C
Output power, EIRP					25° C, assumes +2 dBi antenna
PA enabled		10		dBm	
PA disabled		0		dBm	
Range*					
PA enabled:					
Indoor		100		m	
Outdoor		300		m	
PA disabled:					
Indoor		25		m	
Outdoor		200		m	

\* Actual performance varies depending on the specific installation environment.

## DATA PORTS

PORT	SPECIFICATIONS
Ethernet	IEEE 802.3 standard 10Base-T MAC/PHY

## COMPREHENSIVE API

- ▣ Provides full control of mesh network, including bandwidth control, network configuration, security administration, network status and performance statistics
- ▣ XML-API—self-documenting, hierarchical, tag-based programming interface
- ▣ Serial-API—packet-based interface ideal for resource-constrained systems
- ▣ Embedded command line interface for debugging and field troubleshooting

## FULL DEVELOPMENT SUPPORT

- ▣ OEM development kit:
  - ▣ Rich library of application notes
  - ▣ Reference designs
  - ▣ Sample code
  - ▣ Software debug utilities

## INNOVATIVE RADIO TECHNOLOGY

- ▣ IEEE 802.15.4-compliant radio
- ▣ Integrated access point seamlessly bridges wireless network to wireline infrastructure
- ▣ Network-wide sub-millisecond time synchronization
- ▣ Direct Sequence Spread Spectrum (DSSS)
- ▣ Time-synchronized channel hopping operation

