

# MOTOROLA WIRELESS BROADBAND



*Licensed 802.16e  
Point-to-Multipoint  
Cost Effective  
Wireless Broadband*

## ***Point-to-Multipoint (PMP) 320***

# PMP 320 Capabilities



- Low Cost Infrastructure
- Optimized for Fixed Outdoor Applications
- Simple Installation for Rapid Deployment
- Licensed Spectrum Ranges
  - 3.3-3.4 GHz; 3.4-3.6 GHz; 3.6-3.8 GHz
- 802.16e WiMAX CPE Interoperability
- Support for standard QoS profiles
- All-outdoor, integrated radio
  - Low Total Cost of Ownership (TCO)
  - High Reliability and Fast Repair Time



## ***Standards-based Features:***

- 802.16e Interoperates with WiMAX CPE's
- RADIUS/AAA authentication
- DHCP interface based on WiMAX profiles
- QoS service flows and traffic prioritization
- MIMO Matrix A and B support

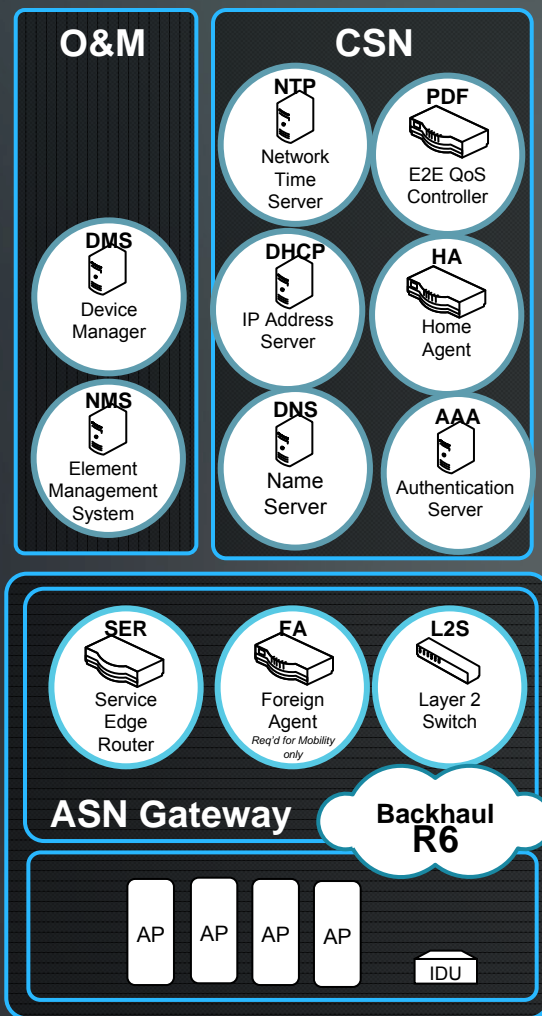
## ***Differentiating Features:***

- No ASN-GW or specialized servers required
  - low-cost, low-complexity, low-maintenance infrastructure
- Peer-to-peer traffic stays at the tower
  - reduces backhaul traffic
- Capability for stand-alone enterprise applications

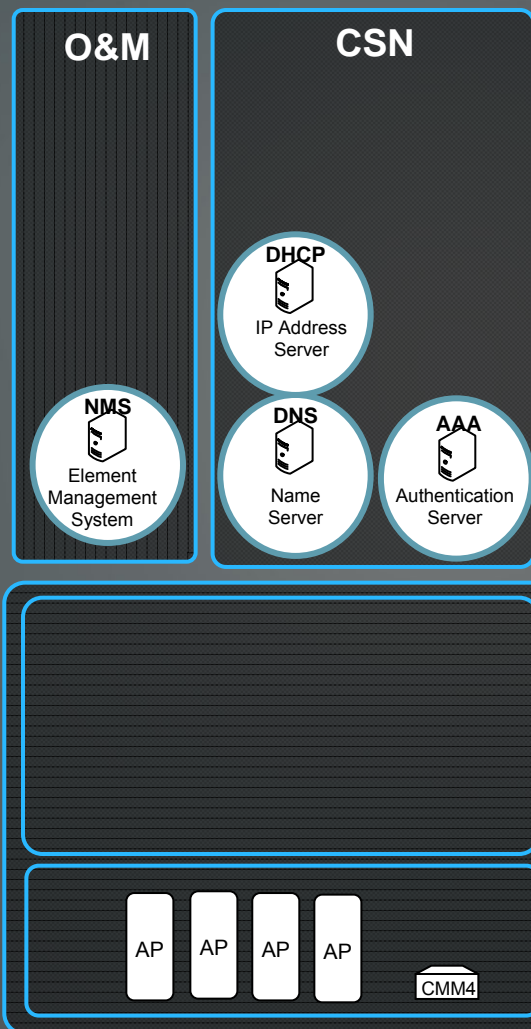
# WiMAX Network Architectures – Service Provider



## Full 802.16e Mobile Network



## Motorola Fixed 802.16e Service Provider Network



## • Benefits

- Centralized configuration/management of QoS, bandwidth and radio access
- Leverages commonly used server platforms typically already in place
- No ASN-Gateway Required

## • Authentication

- Support for standard RADIUS AAA Servers
- Username/Password Required at initial CPE installation (EAP-TTLS/PKMv2)

## • IP Management

- Support for standard DHCP and DNS servers

## • Network Management

- Wireless Manager v2.2
- Web Interface
- SNMP v2c

# Service Provider Applications



<b>Green Field</b>	<b>Extend coverage into new areas that are currently unserved</b>
<b>Leverage Existing License</b>	<b>Maintain operator license by offering connectivity in the licensed band</b>
<b>Network Edge</b>	<b>Extend coverage into low density areas on the edge of mobile WiMAX connectivity</b>



# Point-to-Multipoint 320 Components



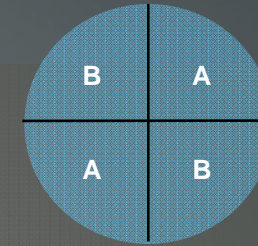
<b>Access Point (CAP 320)</b>	<ul style="list-style-type: none"><li>• Interoperates with 802.16e CPE</li><li>• Connectorized</li><li>• Optional dual-polarity 16.5 dBi Antenna</li><li>• Zero Footprint</li><li>• Four 90 degree sector configuration</li><li>• Tower Throughput: 180 Mbps (4 x 45 Mbps)</li><li>• Up to 200 SMs per sector</li></ul>
<b>Subscriber Module (CSM 320)</b>	<ul style="list-style-type: none"><li>• Integrated 14.5 dBi antenna</li><li>• Power over Ethernet</li><li>• Simple Installation</li></ul>
<b>Authentication and Provisioning</b>	<ul style="list-style-type: none"><li>• Standard RADIUS AAA and DHCP servers - provided by customer</li></ul>
<b>Network Management</b>	<ul style="list-style-type: none"><li>• Wireless Manager Software</li></ul>
<b>Cluster Management Module</b>	<ul style="list-style-type: none"><li>• GPS synchronization</li><li>• Power over Ethernet</li><li>• Layer 2 Switching</li></ul>



# PMP 320 Specifications



Maximum Aggregate Throughput	23 Mbps Maximum (MIMO A) and up to 45 Mbps (MIMO B)
Frequency Range	<ul style="list-style-type: none"><li>• 3.3 to 3.4 GHz (33320)</li><li>• 3.4 to 3.6 GHz (35320)</li><li>• 3.6 to 3.8 GHz (36320)</li></ul>
Transmit Power	2 x 25 dBm
Channel Width	<ul style="list-style-type: none"><li>• 5 MHz</li><li>• 7 MHz</li><li>• 10 MHz</li></ul>
2x2 MIMO	Matrix A and B
Maximum LOS Range	Up to 40 km with extended range feature
Encryption	FIPS 197 Certified AES
Power Consumption	<25 W per sector



Each tower can be equipped with 4 sectors using 2 channels



# PMP 320 System Specifications - continued



Management	<ul style="list-style-type: none"><li>• Motorola Wireless Manager v2.2</li><li>• Web Interface (AP and SM)</li><li>• SNMP v2c</li></ul>
QoS	<ul style="list-style-type: none"><li>• WiMAX QoS profiles (BE, UGS, rtPS, ertPS, nrtPS)</li></ul>
Encryption	<ul style="list-style-type: none"><li>• EAP-TTLS, PKMv2</li><li>• 128-bit AES</li></ul>



# CAP and CSM 320 Performance



	Channel Width (75% DL / 25% UL)		
	5 MHz	7 MHz	10 MHz
Downlink Throughput	21.6 Mbps	26 Mbps	43 Mbps
Uplink Throughput	2.4 Mbps	3.3 Mbps	5 Mbps
Maximum Line of Sight Range	11km	16km	11km
	40km w/ extended range feature		
Packets per Second	65K		

*Throughput is per-sector maximum aggregate throughput.  
All specifications are subject to change*

# Link Budget Calculation Data



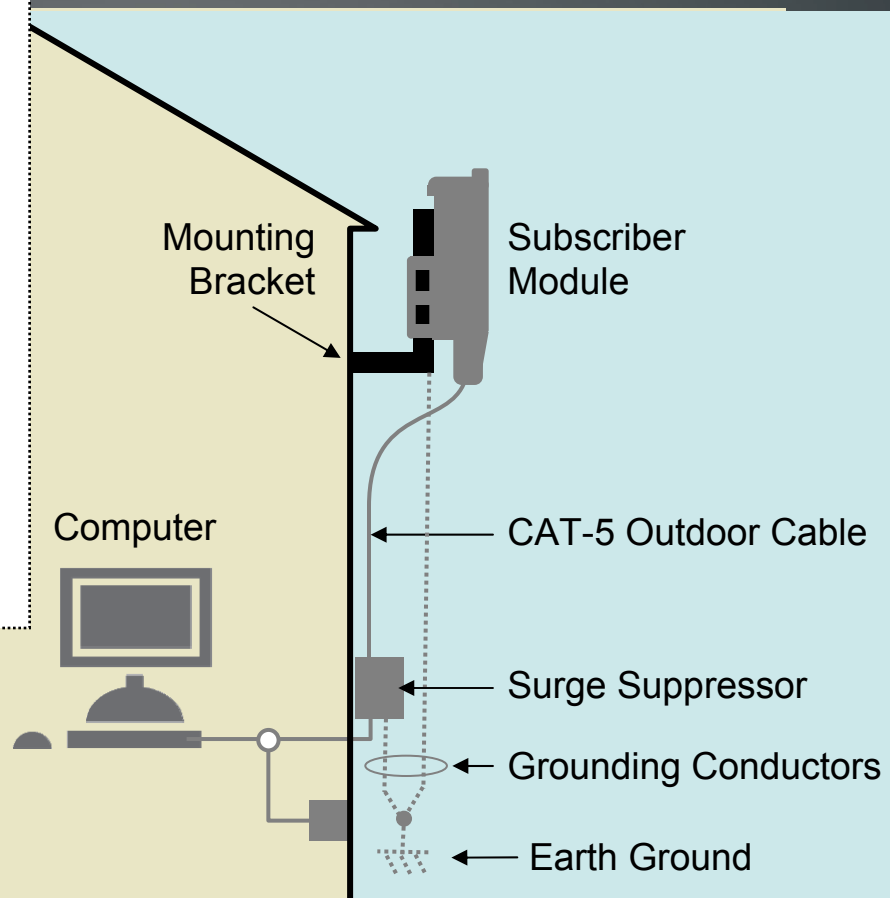
<u>Parameter</u>	<u>Integrated Access Point</u>	<u>Subscriber Module</u>
Receiver Sensitivity	QPSK: -103 dBm 16QAM: -101 dBm	QPSK: -91 dBm 16QAM: -85 dBm 64QAM: -80 dBm
Antenna Gain	16.5 dBi	14.5 dBi
Transmit Power	2 x 25 dBm	27 dBm

All specifications are subject to change

# Customer Site Implementation



- » Subscriber Module (CSM) can be mounted directly or via bracket to an outdoor face of the premises
- » PoE to the SM via CAT-5 cable
- » The CAT-5 cable is routed to the interior via a surge suppressor
- » Inside the premises, the CAT-5 cable connects to the end-user device via a wall-mounted DC power adaptor
- » The DC power adaptor requires standard 90-264 VAC, 50/60 Hz input
- » For multi-user implementation the SM may be connected to an Ethernet switch



# PMP 320 Access Point Product List



Component	Part Number
<b>3.3 – 3.4 GHz (CAP 33320)</b> CAP 33320 Connectorized 2 x N-type (order antenna below)	<b>3530APC</b>
<b>3.4 – 3.6 GHz (CAP 35320)</b> CAP 35320 Connectorized 2 x N-type (order antenna below)	
<b>3.6 – 3.8 GHz (CAP 36320)</b> CAP 36320 Connectorized 2 x N-type (order antenna below)	<b>3630APC</b>
Antenna	Part Number
Access Point Antenna Dual-Slant Polarized 16.5dBi gain Covers 90 degree sector	<b>85010090001</b>

# PMP 320 Subscriber Module Product List



Component	Part Number
<b>3.3 – 3.4 GHz (CSM 33320)</b> CSM 35320 Integrated 14.5dBi dual-slant polarized antenna. Includes mounting bracket and indoor PoE power supply. Order line cord separately.	<b>3530SM</b>
<b>3.4 – 3.6 GHz (CSM 35320)</b> CSM 35320 Integrated 14.5dBi dual-slant polarized antenna. Includes mounting bracket and indoor PoE power supply. Order line cord separately.	
<b>3.6 – 3.8 GHz (CSM 36320)</b> CSM 36320 Integrated 14.5dBi dual-slant polarized antenna. Includes mounting bracket and indoor PoE power supply. Order line cord separately.	<b>3630SM</b>
SM Mounting Bracket	<b>Included in part number above</b>
SM Power Supply	<b>Included in part numbers above</b>

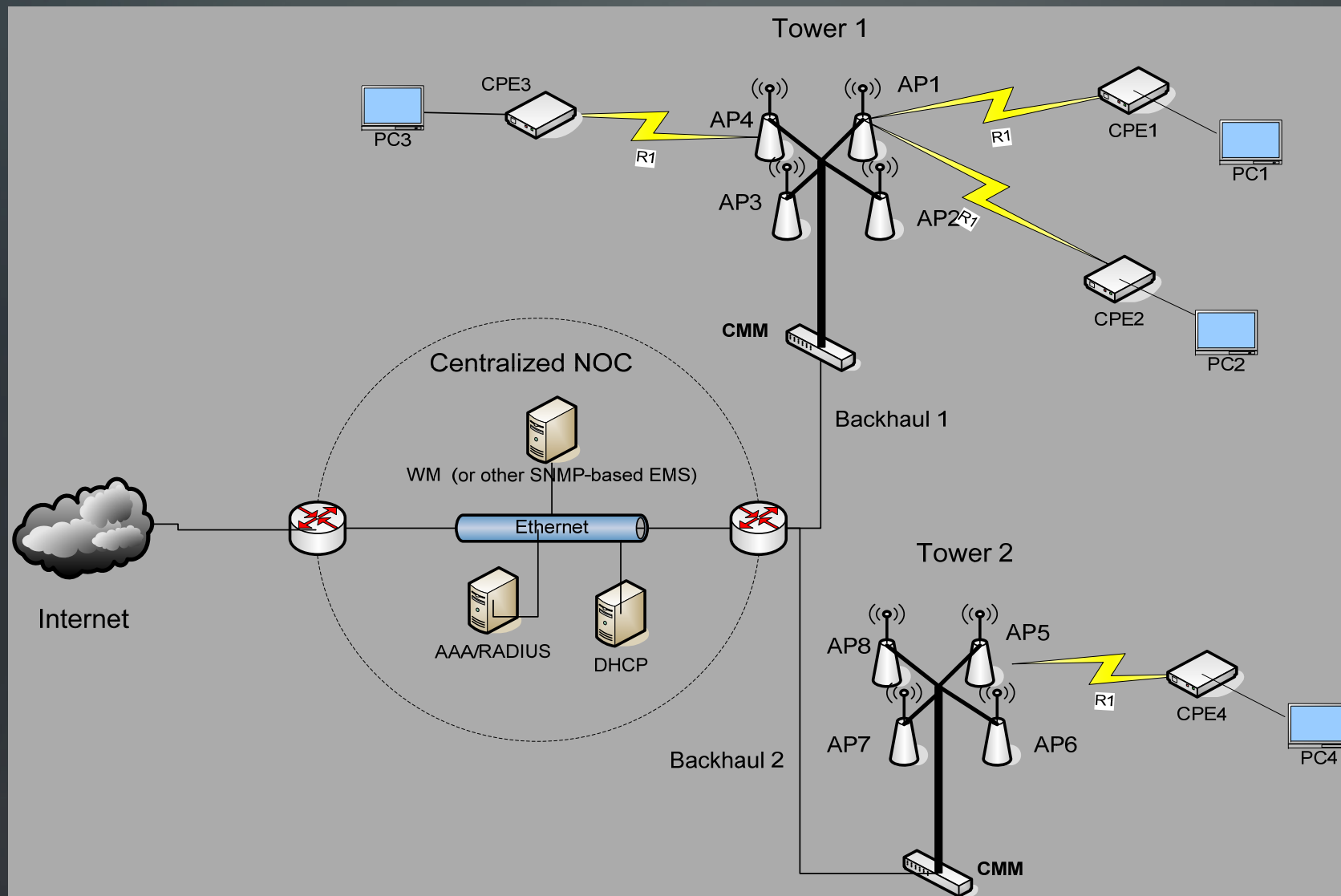
# Product Configuration - Accessories



<b>Cluster Management Module (CMM4)</b> <ul style="list-style-type: none"><li>• Processor card / PoE for APs</li><li>• Managed 14 port switch</li><li>• Mechanical Assembly for outdoor mounting</li><li>• GPS antenna and mounting bracket</li></ul>	<b>1090CKBA</b>
<b>CMM4 Power Supply</b> <ul style="list-style-type: none"><li>• 56 VDC Power Supply</li><li>• Power Supply Line Cord must be ordered separately</li></ul>	<b>SGPN4076</b>
<b>CSM Power Supply Line Cord</b> <ul style="list-style-type: none"><li>• USA, Canada and Mexico</li><li>• EU</li><li>• UK</li></ul>	
<b>Surge Suppressors (Access Point, CMM, SM)</b> <ul style="list-style-type: none"><li>• Surge Suppressor</li></ul>	<b>600SSD</b>



# PMP 320 System Architecture



# Multipoint Frequencies



	100 Series	320 Series	400 Series
900 MHz	●		
2.4 GHz	●		
3.3 GHz		Launching	
3.5 GHz		Launching	
3.6 GHz		Launching	
4.9 GHz			●
5.1 GHz	●		
5.2 GHz	●		
5.4 GHz	●		●
5.7 GHz	●		○
6.05 GHz	●		



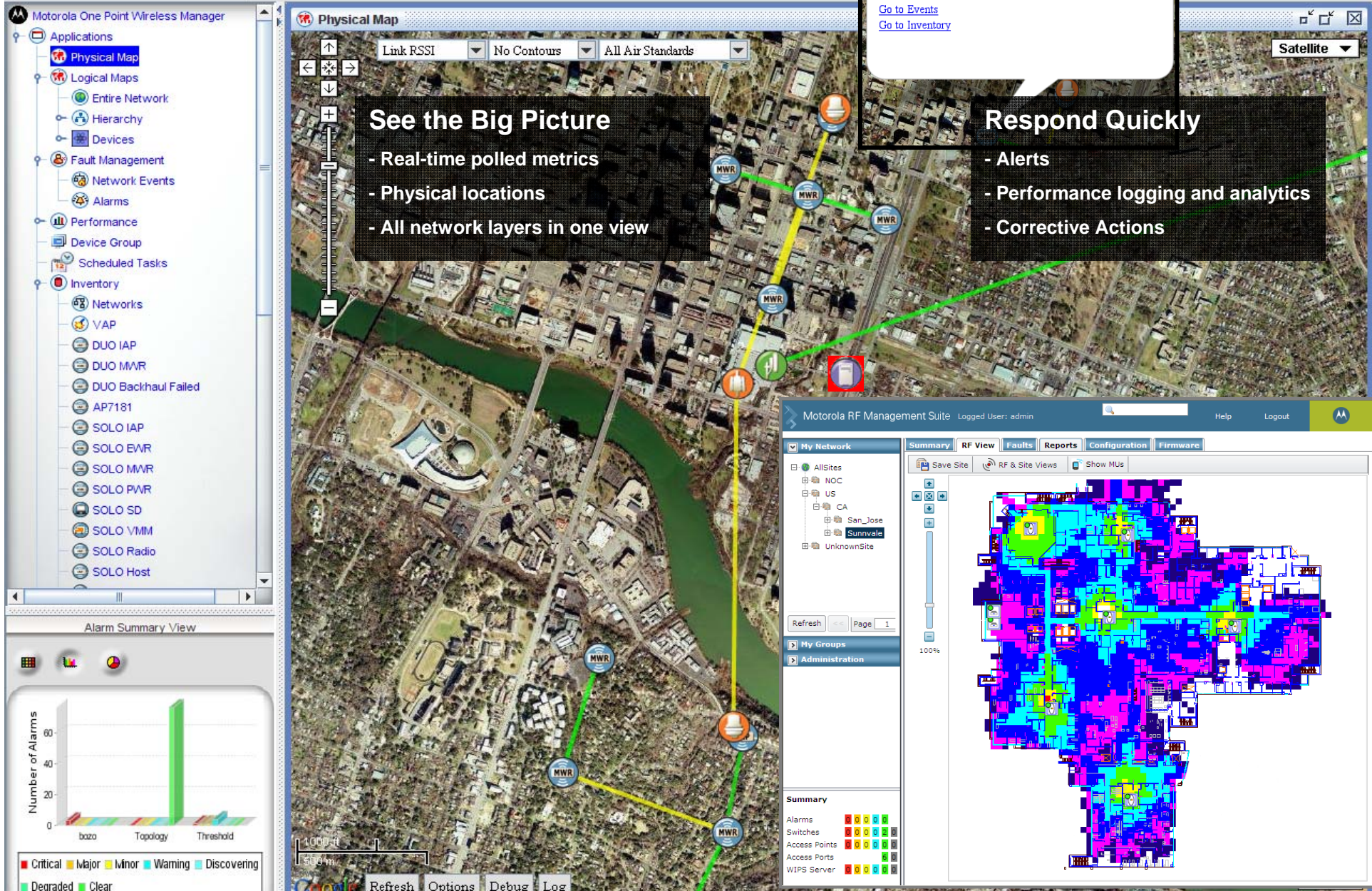
## Point-to-Multipoint (PMP)

	Unlicensed	Licensed	Speed Mbps	NLOS
<b>320 Series</b>		Y	45	Y
<b>400 Series</b>	Y	Y	21	Y
<b>100 Series</b>	Y		7 / 14	



# Managing The Network

## A Holistic Approach – Unified Management





# Motorola PMP Superior Design



Built From the Ground-up for Broadband Access in Outdoor Environments

***Line-of-Sight or Non Line-of-Sight***

***Synchronization For Best Signal and Throughput Reliability***

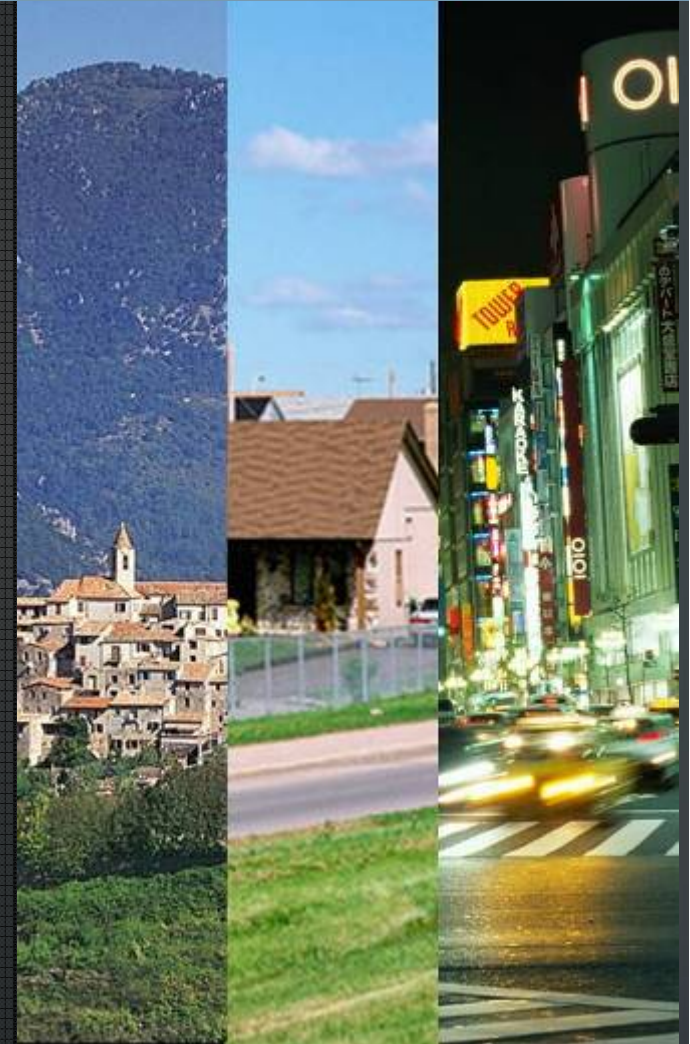
***Robust Security***

***“Zero Footprint” Design for Rapid, Low Cost Access Point Installation***

***Fast, Simple Deployment***

***Reliable Hardware Performance***

***Attractive Total Cost of Ownership***



# Industry Awards



*Respected by the Industry for Innovation, Leadership and Reliability*

<b>2008</b>	<b>RuraliTIC Award for Rural Connectivity</b> <b>The Queen's Award for Enterprise in Innovation</b> <b>Network Products Guide 2008 Product Innovation Award</b>
<b>2007</b>	<b>WiMAX World Europe – Innovation Award for WiMAX CPEi200/300</b> <b>NXTComm Award for Innovation</b> <b>Wireless Broadband Innovation Award</b> <b>The Queen's Award for Enterprise in Innovation</b> <b>NXTComm Award for Network Design/Services</b>
<b>2006</b>	<b>Network Computing Well-Connected Award</b> <b>CTIA Innovation Contest Runner Up</b>
<b>2005</b>	<b>TIA SUPERQuest Award</b> <b>Network Computing Editor's Choice Award For Best Fixed Wireless System</b> <b>America's Network Best of WiMAX World</b>
<b>2004</b>	<b>PART15.ORG Manufacturer of the Year</b>





***Thank You***

[motorola.com/wirelessbroadband](http://motorola.com/wirelessbroadband)