

# 500 Series AP and SM CAP 35500 and CSM 35500

**Licensed, Reliable Wireless Connectivity**



***MOTOROLA WIRELESS BROADBAND***

# *Reliable, Cost Effective Connectivity*

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- **3.5 GHz Licensed Band**
- **OFDM nLOS and NLOS Connectivity**
- **High Downlink AND Uplink Speeds**
- **Low Latency for VoIP and Video Applications**
- **Path to WiMAX Interoperability**
- **Proven Motorola Reliability**

# Why Motorola 500 Series

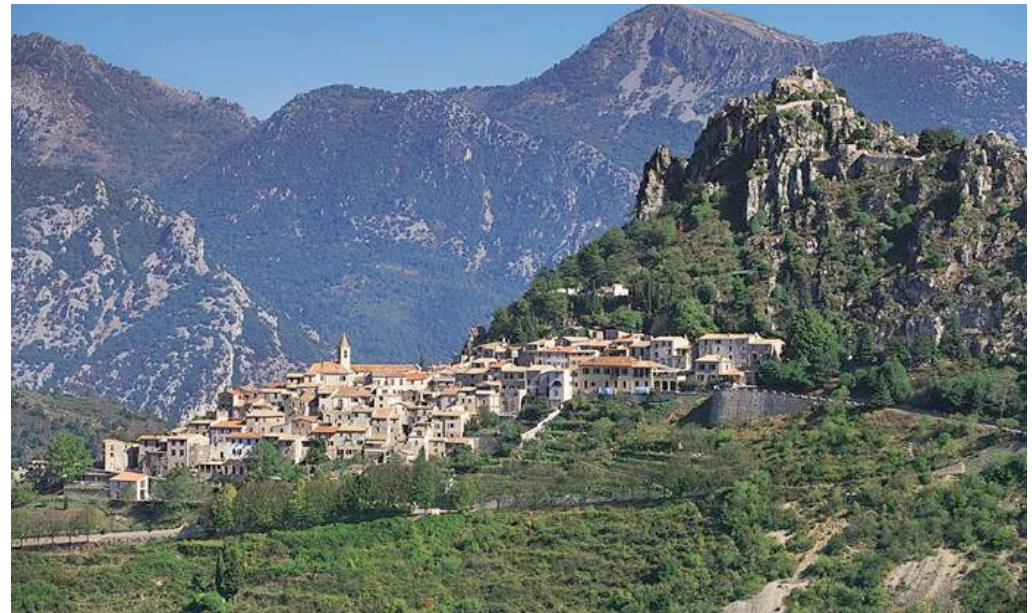


	<b>802.16d WiMAX Licensed</b>	<b>PMP 500 Series</b>
<b>Upgrade Path to 802.16e compatibility</b>	<b>No</b>	<b>Yes</b>
<b>Latency – Important for Video and Gaming</b>	<b>~20 msec</b>	<b>&lt;15 msec</b>
<b>Symmetrical Uplink speed – Important for Video</b>	<b>High speed uplink not supported</b>	<b>64QAM Uplink throughput</b>
<b>Security</b>	<b>Multi Level Password</b>	<b>Optional Authentication Manager plus Multi Level Password</b>
<b>Tools for Designing, Installing and Managing Network</b>	<b>No</b>	<b>Yes</b>

# Reliable Service



- **Environmentally Rugged**
- **Low Field Failure Rates**
- **Scalable to Sustain Performance as the Network Grows**
- **Applications:**
  - **Video Surveillance**
  - **Data Transfer**
  - **Voice over IP**



# Cost Effective Connectivity



- **Residential Connectivity**
  - 18 to 24 months ROI
- **T1 / E1 Connectivity**
  - 6 month ROI
  - Primary Service
  - Backup Service
- **Municipal Networks**
  - Public Safety
  - Public Works

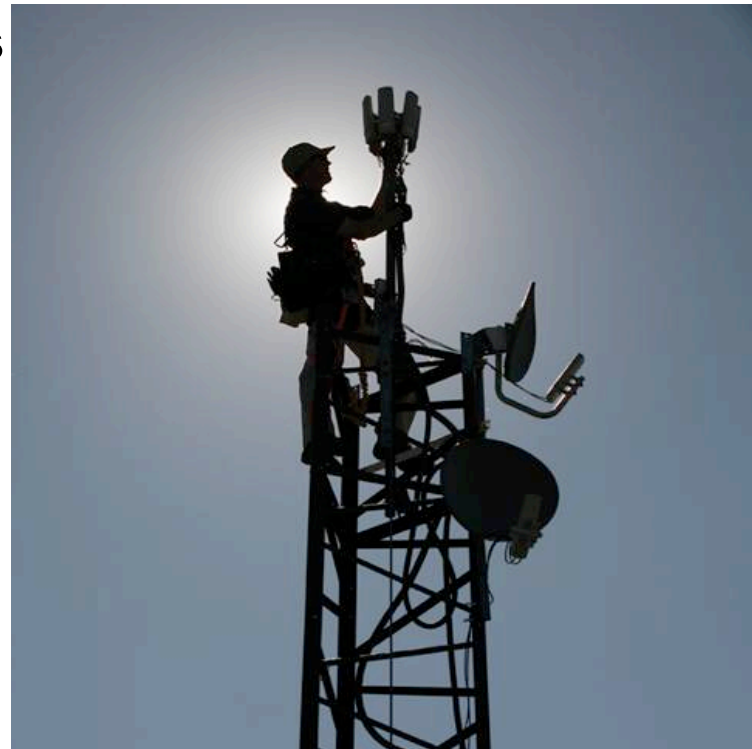


# *Proven Performance*

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- **Deployed in More than 4,000 networks**
- **More than 120 Case Studies**
- **Operating in 120+ Countries**
- **Reliable in Harsh Conditions**
- **Less than 1% Field Failure Rates**



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# *Licensed Reliability, Wireless Flexibility*



**Extend Networks into New Markets**



**Increase Video Surveillance Coverage**



**High Throughput Enterprise Applications**

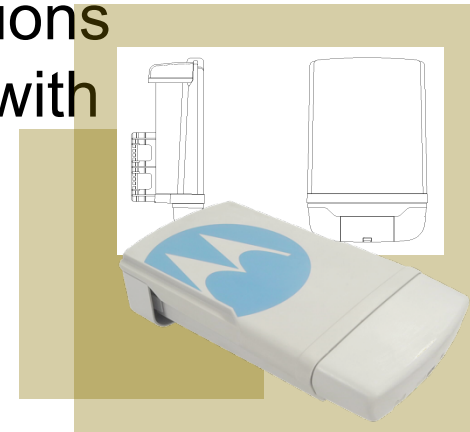
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# Network Operator Benefits



- Reliable connectivity in licensed spectrum
- High Downlink and Uplink speeds
- Low total cost of ownership
- Lower tower density and infrastructure cost required to deliver high throughput services across a large area
- nLoS and NLoS performance
- Low latency for VoIP and video applications
- CPE's are upgradeable to interoperate with 802.16e compliant Motorola APs



Deliver Video, Voice and Data Connectivity to New Locations

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# Motorola 500 Series Advantages



## Feature

## Benefit

nLOS and NLOS coverage

**Expand broadband coverage into areas where foliage or obstructions limited wireless broadband deployment**

High Throughput

**13.5 Mbps of Total Aggregate throughput provides more capacity for video, voice and data applications**

Long Range

**Symmetrical 42dBm EIRP links provide greater coverage from AP location, reducing the number of towers required**

GPS Synchronization

**Reduction in self interference enables the network to scale from small to large deployments.**

Simple Installation

**Access Points and Subscriber Modules can be deployed in hours, reducing the cost and delay of service**

**Higher Performance with Proven Reliability**

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# PMP 500 Series

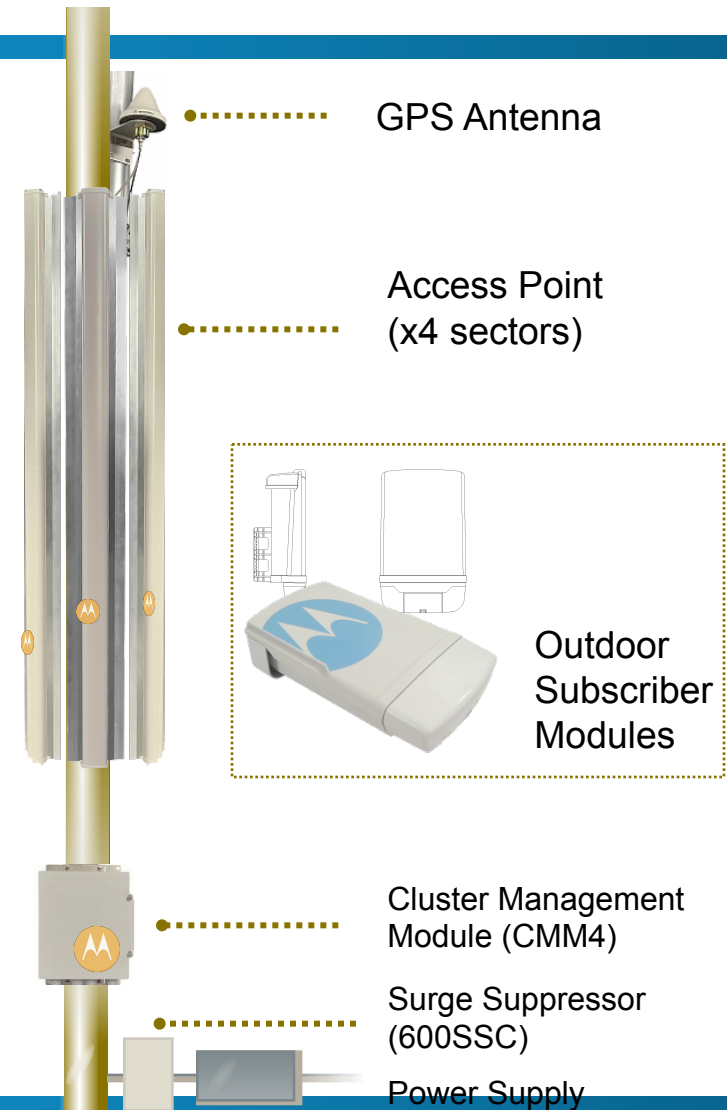


## System Elements:

- » Access Points (One to Four 90 degree sectors)
- » Subscriber Modules (Fixed, Outdoor)
- » Cluster Management Module (CMM4)
- » GPS Antenna
- » Power Supplies, Surge Suppressor, Mounting Brackets
- » Prizm Element Management System

## Key Specifications

- » 3.4 – 3.6GHz
- » 7.0MHz channel  
(with future options for 3.5MHz and 10MHz)
- » Up to 13.5 Mbps aggregate per sector in 7.0MHz channel
- » < 15ms latency roundtrip time
- » 42dBm EIRP (25dBm transmit power plus 17dBi antenna)
- » Up to 200 subscribers per sector



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# PMP 500 Series Throughput & Coverage

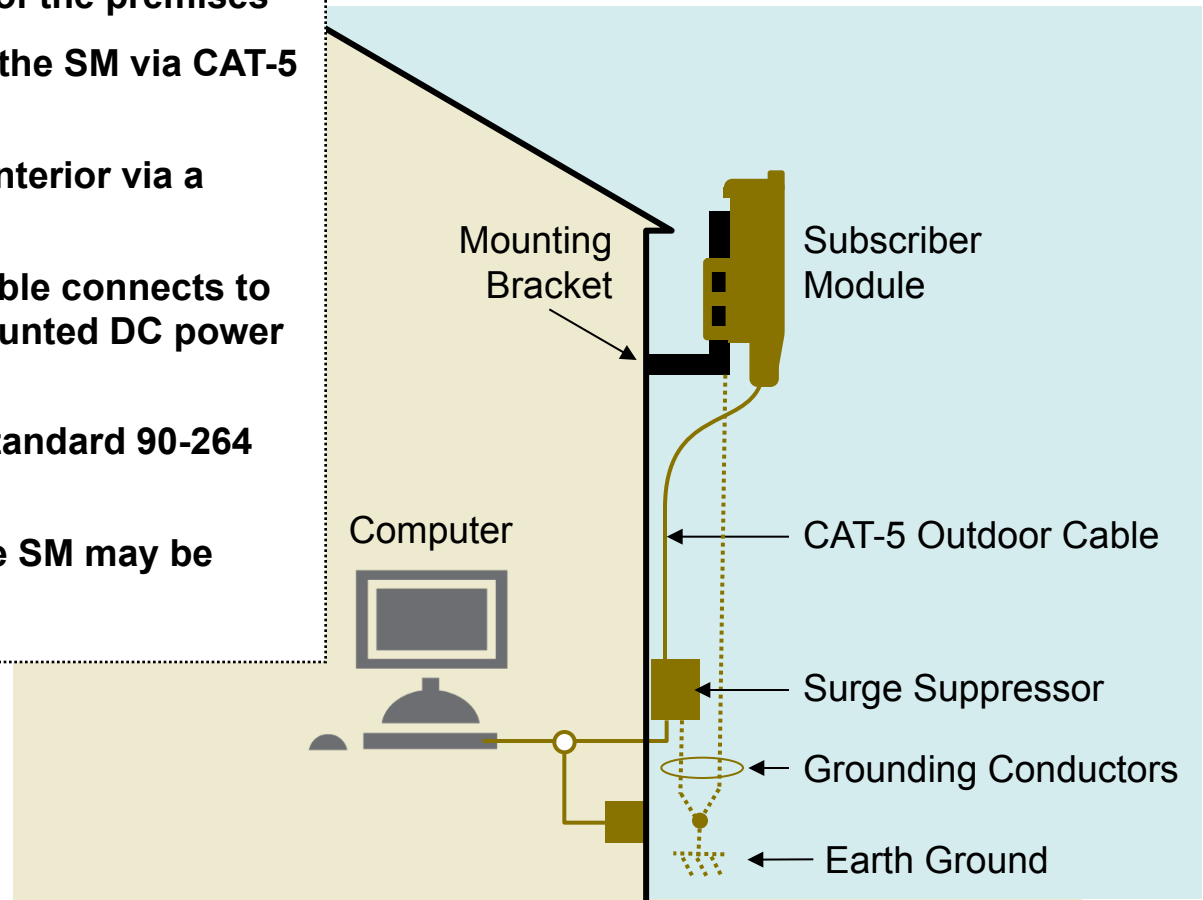


Typical Range, Max Range and Aggregate Throughput (7 MHz channels)				Roundtrip Latency
Frequency Band	1X (QPSK) Operation	2X (16 QAM) Operation	3X (64 QAM) Operation	
3.5 GHz	7-10 km <i>up to 160 km for clear LoS</i> <b>4.5 Mbps</b>	5-7 km <i>up to 50 km for clear LoS</i> <b>9.0 Mbps</b>	2-3 km <i>up to 25 km for clear LoS</i> <b>13.5 Mbps</b>	< 15 ms
Rx Sensitivity Typical	-90 dBm	-80 dBm	-72 dBm	

# Customer Site Implementation



- » **Subscriber Module (SM) can be mounted directly or via bracket to an outdoor face of the premises**
- » **PoE conductivity are provided 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**



# Product Positioning and Market



Market	Key Selling Points
Government	<ul style="list-style-type: none"><li>•Reliability of using 3.5 GHz spectrum</li><li>•Cost effective fixed solution</li></ul>
Enterprise	<ul style="list-style-type: none"><li>•Long range and low latency performance</li><li>•PMP applications</li></ul>
Service Provider	<ul style="list-style-type: none"><li>•Video surveillance</li><li>•E1 replacements</li><li>•Campus coverage</li><li>•Path to 802.16e interoperability</li></ul>

# Motorola 500 Series Characteristics



- Point to Multi-point fixed outdoor application
- Subscriber Module and 90-degree sector Access Point
- OFDM PHY(256FFT)
- nLoS and NLoS capability
- Up to 200 subscribers per sector
- 3.4GHz – 3.6GHz operating frequency



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# Motorola 500 Series Performance



- 13.5 Mbps aggregate throughput in 7MHz channel
- >10km outdoor coverage at highest modulation (64QAM) with LoS conditions
- System EIRP of 42dBm (25dBm transmitter output power + 17dBi antenna)
- 7.0 MHz channel width (N=2 re-use) (Hardware supports future options for 3.5MHz and 10MHz channels)
- >5,500 packets per second
- <15 ms latency (ICMP roundtrip time)
- GPS Synchronization
- QPSK, 16QAM, 64QAM modulation with  $\frac{3}{4}$  coding options
- DES encryption



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# Motorola 500 Series Elements



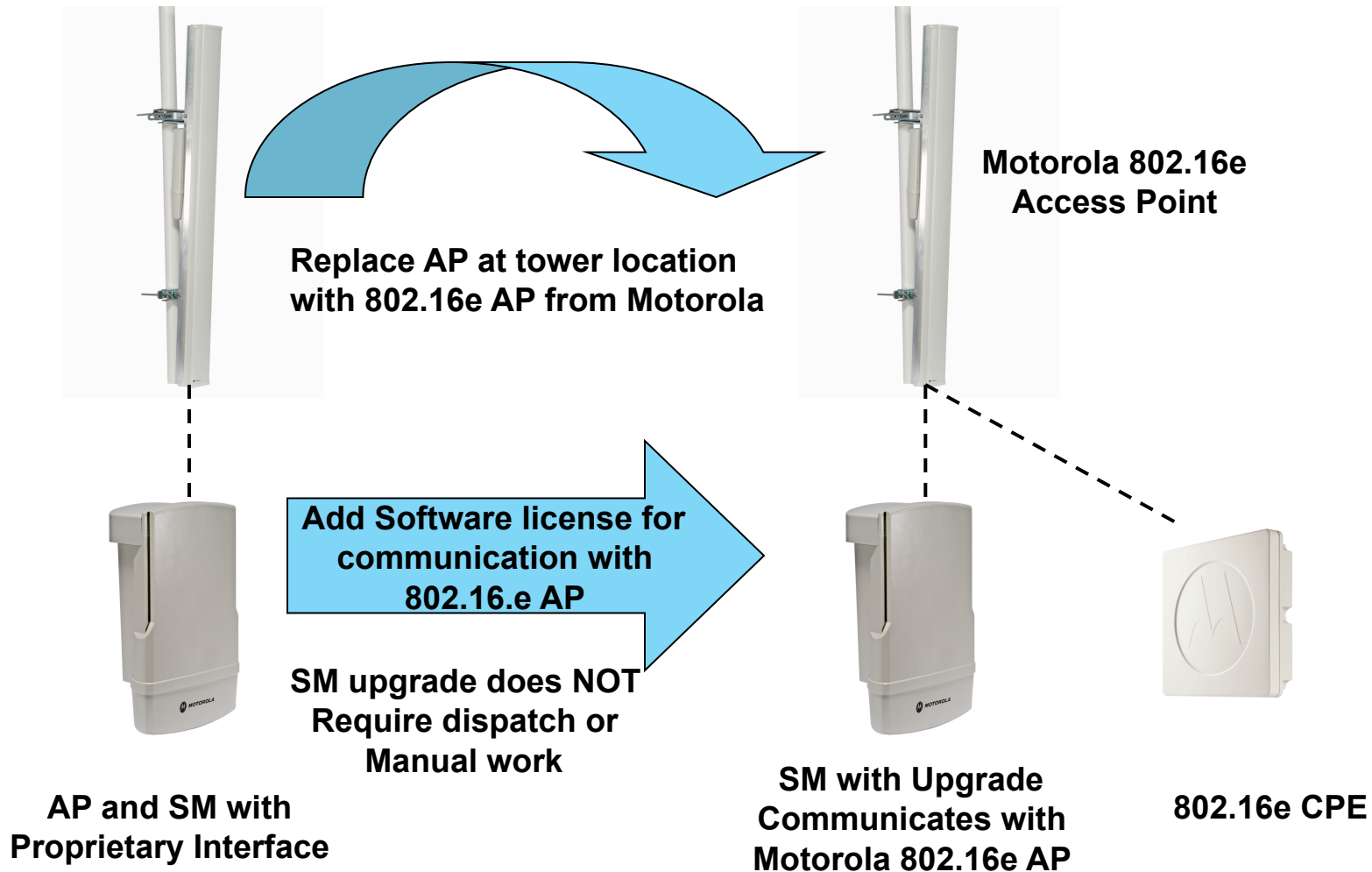
- AP electronics tower-mountable - uses CMM4 with 56V supplies
  - QoS features
  - Bandwidth setting
  - VLAN management
  - Security/authentication
  - Centrally manageable by Prizm EMS
- Environmentally rugged -40° C to +55° C (-40° F to +131° F)
- Weight 7.5kg for AP including external sector antenna; 2.5kg for SM



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# 802.16e Upgrade Strategy



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# Motorola Wireless Broadband Multipoint Access Points



Access Points				
	Unlicensed	Licensed	Speed Mbps	NLOS
<b>CAP 500 Series</b>		Y	14	Y
<b>CAP 400 Series</b>	Y		21	Y
<b>CAP 200 Series (Advantage)</b>	Y		14	
<b>CAP 100 Series (Canopy)</b>	Y		7	

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# Multipoint Frequencies



	100 Series	200 Series	400 Series	500 Series
900 MHz	●			
2.4 GHz	●	●		
3.5 GHz				●
5.1 GHz	●	●		
5.2 GHz	●	●		
5.4 GHz	●	●	●	
5.7 GHz	●	●	○	
5.9 GHz	●	●		

# Network Management & Tools



## Design

Network simulation  
Network planning



## Install

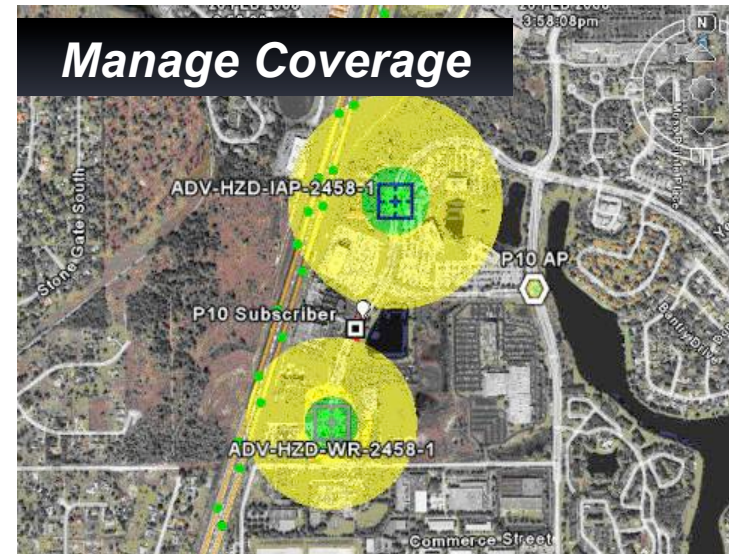
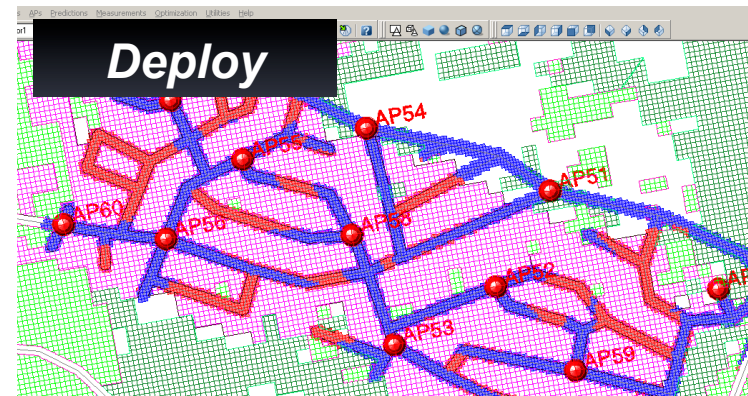
Installation automation  
Installation verification



## Manage

Performance monitoring  
Element management

# RF Design & Management



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# Services to Deliver Coverage



## Integration Services

Planning & Design

Installation, Commissioning

Turnkey Services

Program Management



## Support Services

Training

Maintenance

Network Management

Optimization



## Managed Services

Out-Tasking

Out-Sourcing

Build, Operate, Manage/Transfer

Hosting Services



## Application Services

Application Delivery Framework

End-User Applications

Hosting Services

MVNO

# Industry Awards



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

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

# *Experience the Motorola Advantage*

A photograph of a middle-aged man with glasses, wearing a dark pinstriped suit, white shirt, and dark tie. He is holding a mobile phone to his ear and looking towards the right. The background shows a city skyline with a prominent curved building under a blue sky with light clouds.

*Heritage in Wireless Technology*

*Globally Proven Coverage Solutions*

*Broad Array of Technology Choices*

*Rich Portfolio of Service Solutions*

*Relentless Focus on Quality*

# ***MOTOROLA WIRELESS BROADBAND***



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