



***AP-7131:
NEXT GENERATION
802.11n ACCESS POINT***

802.11n Overview

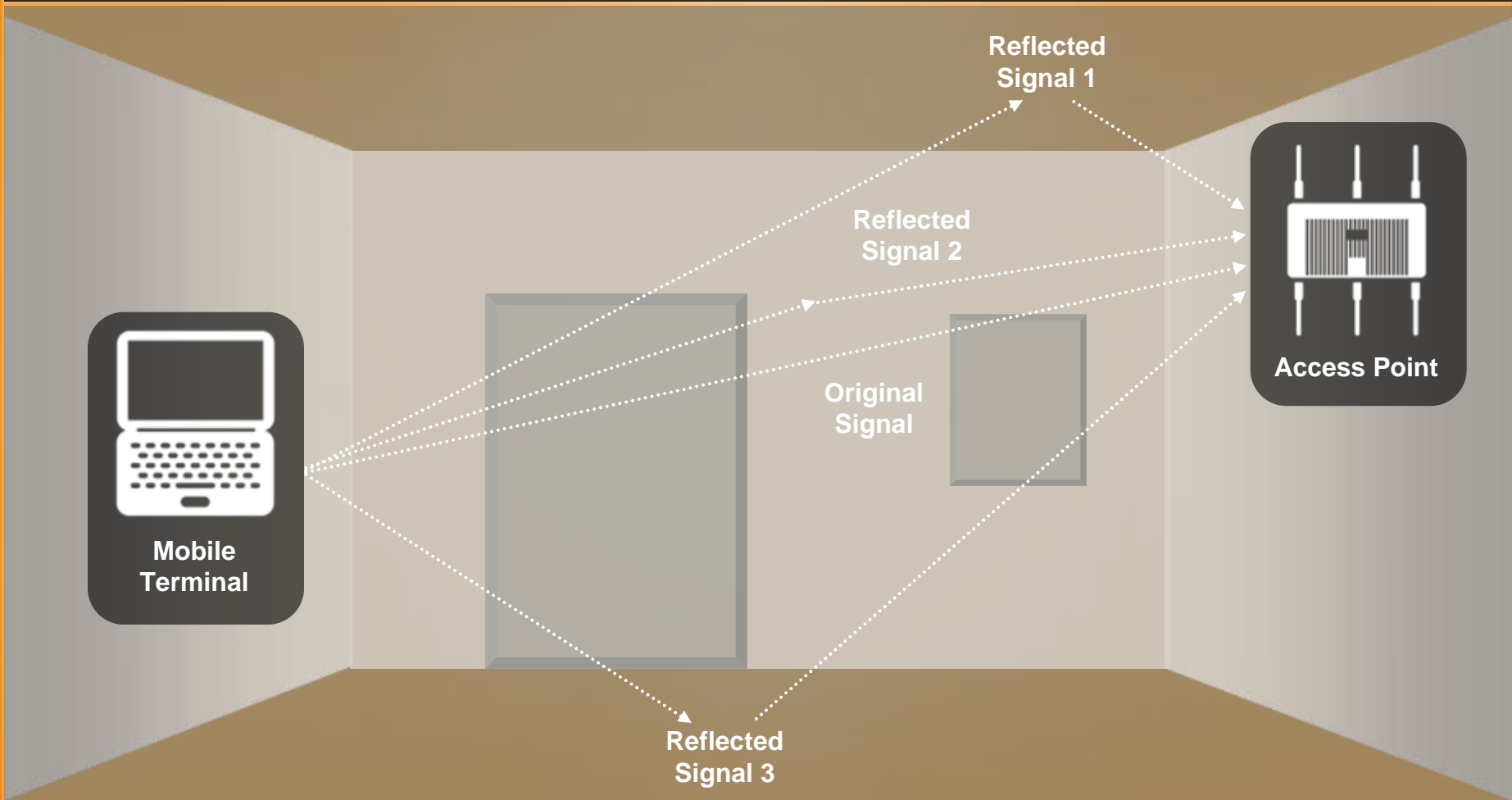


- **Next Generation Wireless Networking Technology**
- **Improves Throughput, Range & Reliability of 802.11 systems**
- **Currently in IEEE Ratification Process**
 - Products based on IEEE 802.11n Draft 2.0
 - Final ratification expected by June 2009
 - Most products should be software upgradeable to be fully compliant
- **Key Enhancements**
 - **Spatial OFDM: More efficient modulation technique**
 - **Wider 40 Mhz channels: Doubles transmission bandwidth**
 - **Multiple Input Multiple Output (MIMO)**
 - **Frame Aggregation: Reduces transmission overhead**
- **2 Modes of Operation**
 - **2.4 GHz 802.11bgn mode**
 - **5GHz 802.11 an**
 - **Fully backwards compliant with existing clients**

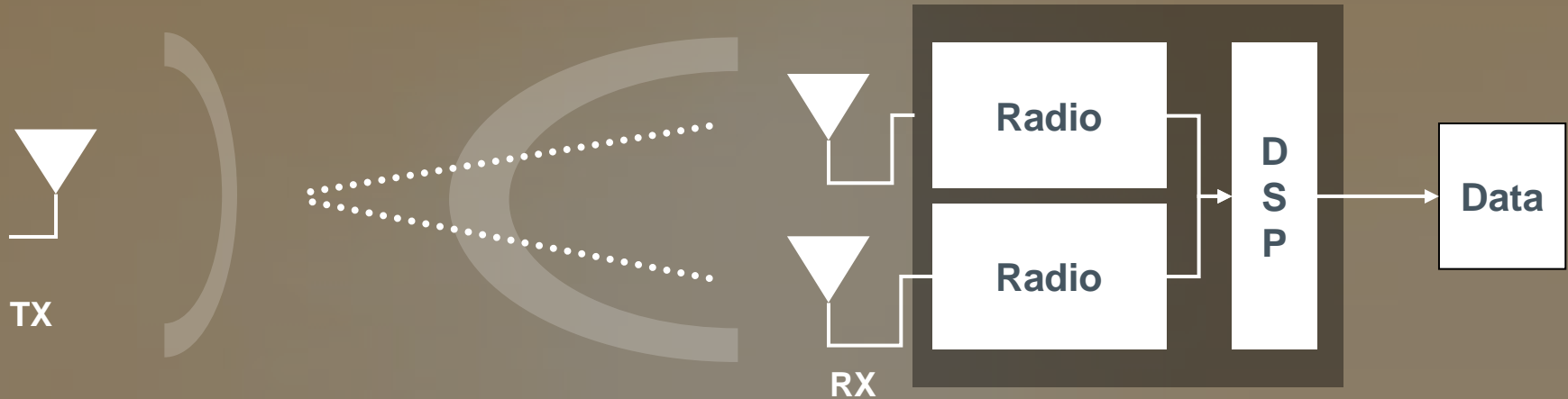
Understanding MIMO



Multipath Problem



Multiple Receiver - MRC



Maximal Ratio Combining (N Spatial Stream(s) Received Over N+1 Antennas)

Receive Side Application

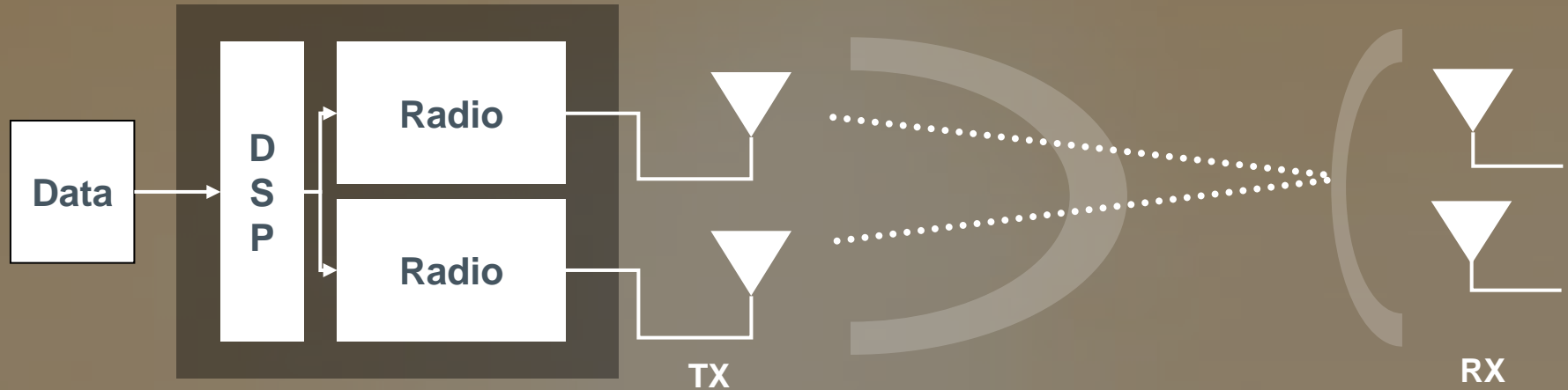
Multiple Receive Antennas

In Play When a N Spatial Stream(s) Received Over N+1 Antennas

Increases Effective Receiver Sensitivity

Even ABG Clients Benefit

Multiple Transmit - Beamforming



Transmit Beamforming (2 Spatial Streams on 2 Antennas)

Transmit Side Application

Uses Multiple Transmitters & Antennas

Puts More Signal on the Air

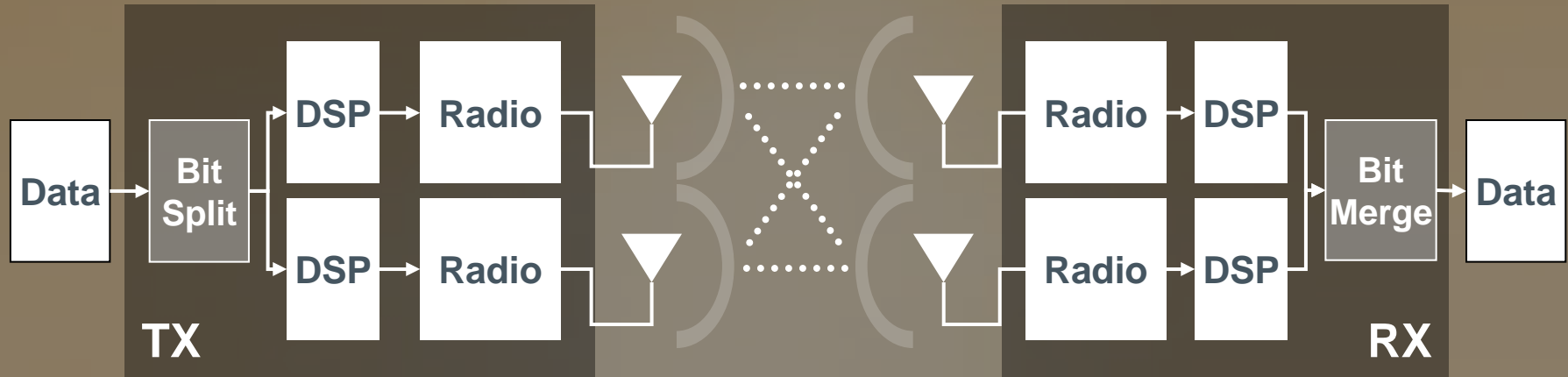
Focuses Radio Power Towards Receiver

Increases Transmit Power

Works for MIMO Clients only

Multiple Transmit Multiple Receive

Spatial Multiplexing



Spatial Multiplexing (TxR: N)

Transmit & Receive Side Participation

Multiple Data Streams Multiplexed over Multiple Spatial Channels

Receiver Demultiplexes

Requires MIMO AP & MIMO Client

Highest Performance

802.11n PHY Enhancements



- **Spatial OFDM**
 - 108 Sub carriers
- **Wider Channel Width**
 - 20/ 40 MHz
- **Short Guard Interval**
 - 400ns

	One Spatial Stream (MCS 0-7)			Two Spatial Streams (MCS 8-15)		
802.11a/g Rates	802.11n Mandatory Rates (20 MHz channel)	802.11n Mandatory Rates (40MHz channel)	With Short Guard	Two Spatial Streams	802.11n Mandatory Rates (40MHz channel)	With Short Guard
6	6.5	13.5	15	13	27	30
9	13	27	30	26	54	60
12	19.5	40.5	45	39	81	90
18	26	54	60	52	108	120
24	39	81	90	78	162	180
36	52	108	120	104	216	240
48	58.5	121.5	135	117	243	270
54	65	135	150	130	270	300

802.11n MAC Enhancements



- A-MSDU Aggregation
- A-MPDU Aggregation with Block Ack's
- Reduced Interframe Spacing - RIFS
- 802.11n MCS specifies Data Rates

Packet	Source	Destination	BSSID	Size	Channel	Data...	Protocol	Summary
10159	N Client	N AP	N AP	3076	1	270.0	802.11 A-MSDU	FC=I....., SN=1514, FN= 0
10160	N AP	N Client		14	1	24.0	802.11 Ack	FC=...
10161	N Client	N AP	N AP	3076	1	270.0	802.11 A-MSDU	FC=I....., FN= 0
10162	N Client	N AP	N AP	3076	1	270.0	802.11 A-MSDU	FC=I....., FN= 0
10163	N AP	N Client		14	1	24.0	802.11 Ack	FC=.....
10164		N AP		14	1	11.0	802.11 CTS	FC=.....
10165	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10166	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10167	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10168	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10169	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10170	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10171	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10172	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10173	Server IP	Client IP	N AP	84	1	270.0	CIFS	Src= 445, Dst= 2232, ..A....
10174	N Client	N AP		32	1	24.0	802.11 BA	FC=.....

A-MSDU Aggregation

A-MPDU Aggregation

The Wireless Enterprise Evolution



Performance

450 Mbps

300 Mbps

54 Mbps

11 Mbps

1 Mbps

Siloed Vertical Applications

Opportunistic Wireless:
Enhance Employee
Productivity

All Wireless
Enterprise:
Primary Network,
Runs Critical
Business Processes,
Delivers ROI.

1997

2000 - 2006

2008 & Beyond

Where to sell 802.11n



Retail

- Better coverage in tough multipath environments like warehouses, stores for 802.11abg handheld devices

- Store of the Future Applications like Smart Carts with Location based advt. streaming

- Multimedia Kiosks

- Wireless Digital Signage

- Video Surveillance



Business

- Wireless enabled e-business applications

- Video conferencing in meeting rooms

- Fixed Mobile Convergence (FMC)

- Point-to-Point bridging between buildings

- Better coverage in across offices.

- Wired LAN Replacement



Education

- Wireless access in high density areas like classrooms and libraries with fewer access points

- Video streaming of on-demand courses

- E-Text Books and other digital media downloads.

- Point-to-Point bridging between buildings

- Hotspots: Student Internet access



Healthcare

- Wireless access to medical imaging and patient records

- Coverage improvement in high multipath areas

- Point-to-Point bridging between buildings

- Fixed Mobile Convergence

- Hotspots: Internet access in high density areas like waiting rooms



Manufacturing

- Wireless sensor networks

- Coverage improvement in high multipath areas

- Point-to-Point bridging between buildings

- Fixed Mobile Convergence

- Video Surveillance



Public Safety

- DVR downloads from Police Cars

- Video Surveillance

- Fixed Mobile Convergence

Introducing AP-7131



Industry's First Tri Radio 11n Access Point

Radio 1

Client Access in
2.4GHz or 5 GHz

Radio 2

Client Access or
MESH or
Dual Band WIPS
Sensor

Radio 3*

Dual Band WIPS
Sensor,
Spectrum
Analyzer or
3G/ WiMax

Faster ROI: \$300 - \$400 cost savings per Sensor AP

*Expansion slot allows integration of future RF technologies like 3G/ Wi-Max. Available Q2 2009

AP-7131 Platform

Independent Access Point, Adaptive 11n Access Point



Fully DFS Compliant Draft 2.0 802.11n Chipset

Designed for Speed

MIPS Network Processor
H/W Based Encryption
Increased Memory
2 Gigabit Ethernet Interfaces

Expansion Slot

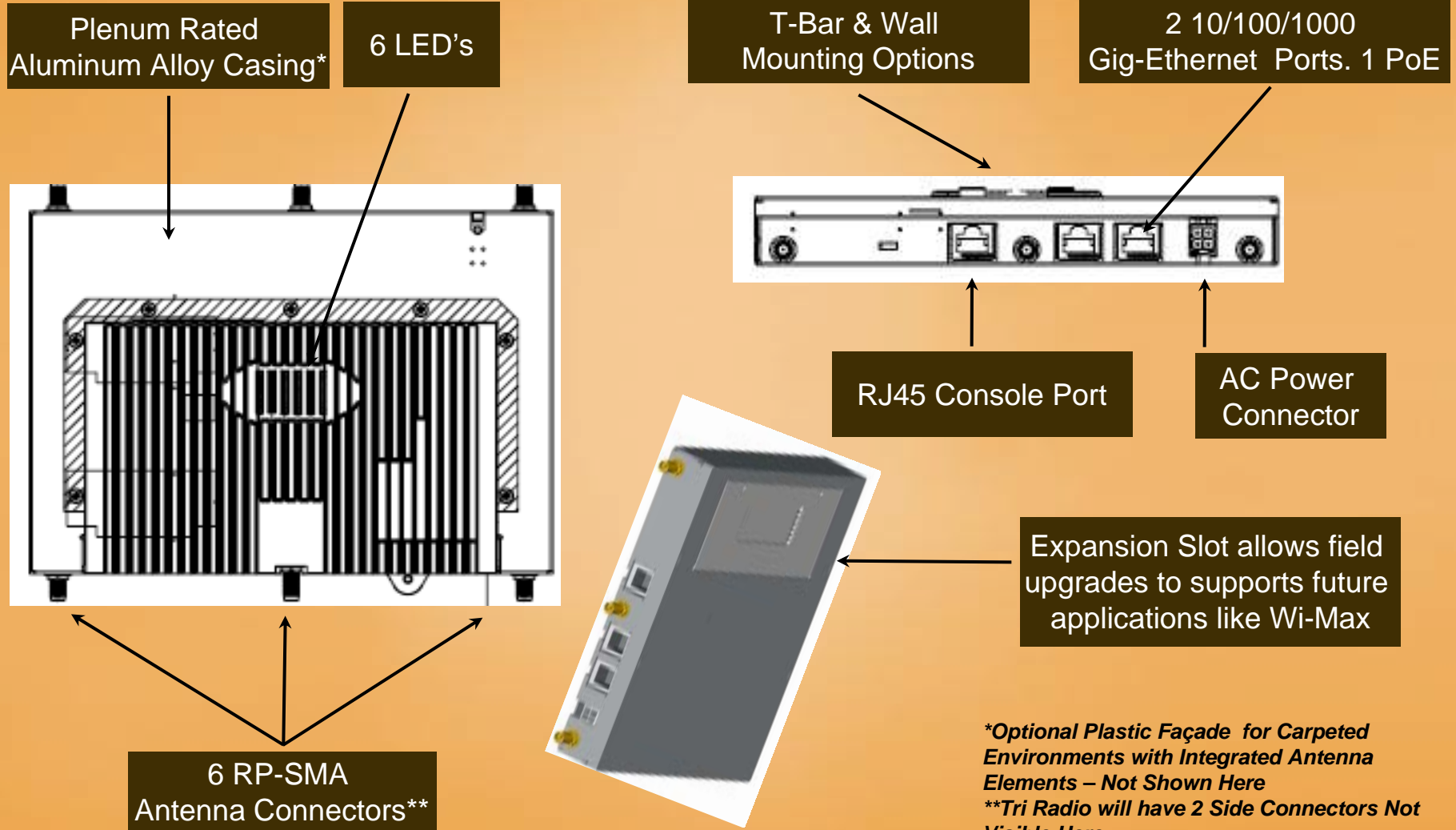
Integrates a 3rd Radio for Non Data Applications
Future Wi-Max / Cellular Backhaul (Field Upgradeable)

Dynamic Dual Mode Operation with the Same Firmware Image

Standalone Access Point (Mesh Enabled)
Adaptive Access Point: Switch Adopted Mode



AP-7131: Mechanical Design



AP-7131 Key Features



Positioning

Office-in-a-box for Single Cell Sites (SMB Positioning)
Adaptive Access Point (for Distributed Enterprises & Campus)

Core Features

Router – Wireless Router with 2 GigE Ports
Stateful Firewall, WPA2 Support (PCI Compliance)
Integrated WIPS Sensor* (saves \$\$ for extra cabling & Sensor HW)
Integrated DHCP, AAA Radius Server, Hotspot Gateway
802.1q Trunking – VLAN Support
Site-to-Site IPsec VPN – Secure Backhaul to Corporate
Wireless MESH (for hard to wire areas)
WMM QOS
Dual Band DFS Compliant 802.11n Radios
Multi BSSID, 16 WLAN's
Bandwidth Allocation per WLAN
Adaptive AP Mode (can be managed from Wireless Switch)*

Management

Zero Touch Auto Install with DHCP Options
Web-GUI, CLI, Telnet & SNMP v1/v2/v3
RF Management Suite 3.0 with LAN Planner 11n Edition



802.11n Core Features



MIMO

3x3 MIMO with 2 Spatial Streams
Spatial Multiplexing, MRC

Wider Channel Width

20 MHz
20/ 40 MHz Channels

MAC Efficiency

Frame Aggregation (MPDU with Block Acks , MSDU)
Reduced Interframe Spacing (RIFS)

MIMO Power Save (PS)

Static or Dynamic Mode PS
Single Spatial Stream Transmission to save Power

Enhanced Throughput & Improved Reliability

300Mbps Data Rates per Radio
Increased Capacity per AP & Faster Application Response
Fewer retries & coverage holes (for both MIMO & Legacy Clients)



AP-7131 Power Options



Power Over Ethernet

GE1 Port of AP-7131 supports PoE in (802.3af or 802.3af draft)
RFS6000 Supports 4 802.3af+ Ports
Other PoE Switches Can Be Manually Configured

High Power Injector

New 802.3af+ (30W) Power Injector Being Introduced
AP-PSBIAS-1P3-AFR

Power Supply

AP-7131 AC Power Supply
AC Input 48-56V DC Output
- *50-14000-247R*

Intelligent Power Detect – CPLD

Multiple Power Detection Modes
AP Can Self Configure Based on Available Power



802.11n

Wireless Enterprise Solution Portfolio



AP-7131 Tri Radio 802.11n Access Point

Independent Access Point
Access Port Mode*
Adaptive AP (All Modes
Support Mesh)



AP7131



AP7131
(with Façade)

802.11n Ready WiNG Switches

Large Enterprise – Corporate
RFS7000
Medium-Large Enterprise
RFS6000



RFS7000



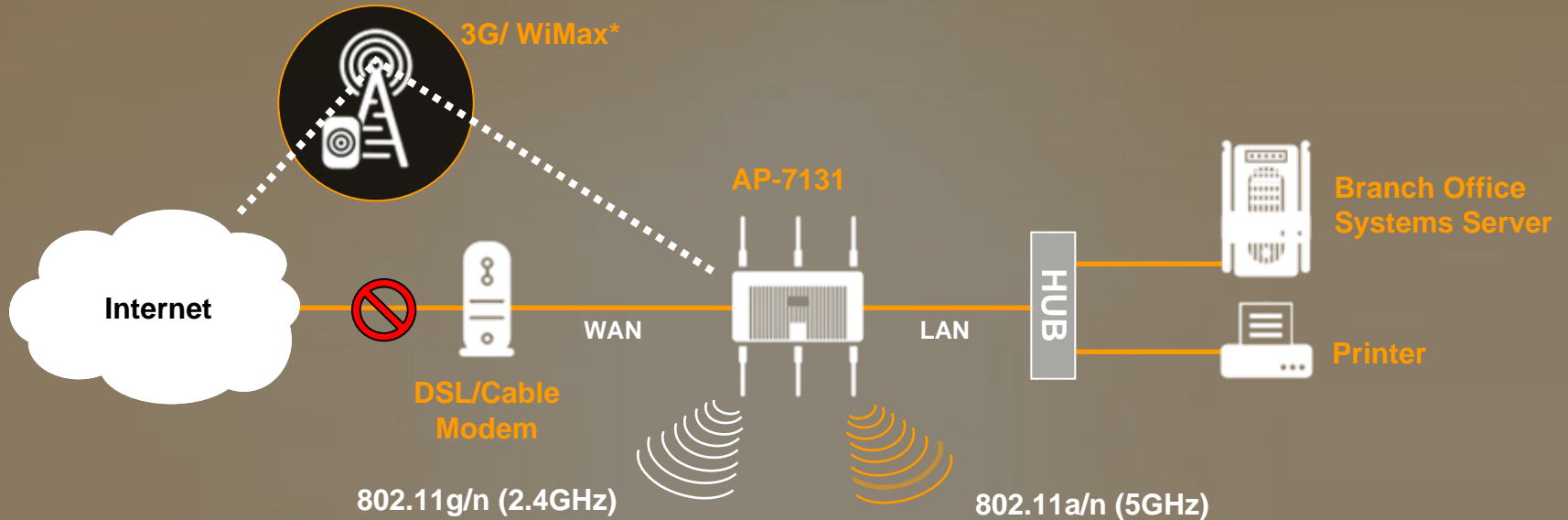
RFS6000

RF Management Suite: 802.11n Edition

Planning: Network Design,
Site Survey
Deployment Configuration
RF Management
Wireless Intrusion Prevention



AP-7131 for the SME



**Initial Prototype Q2 2009*

WLAN 1

Inventory App. 802.11b/g
Terminals (TKIP Security)



WLAN 2

Public Hotspot 802.11b/g
Laptops (Open Security)



WLAN 3

Voice/ Video Conference
802.11n Laptops (WPA2)

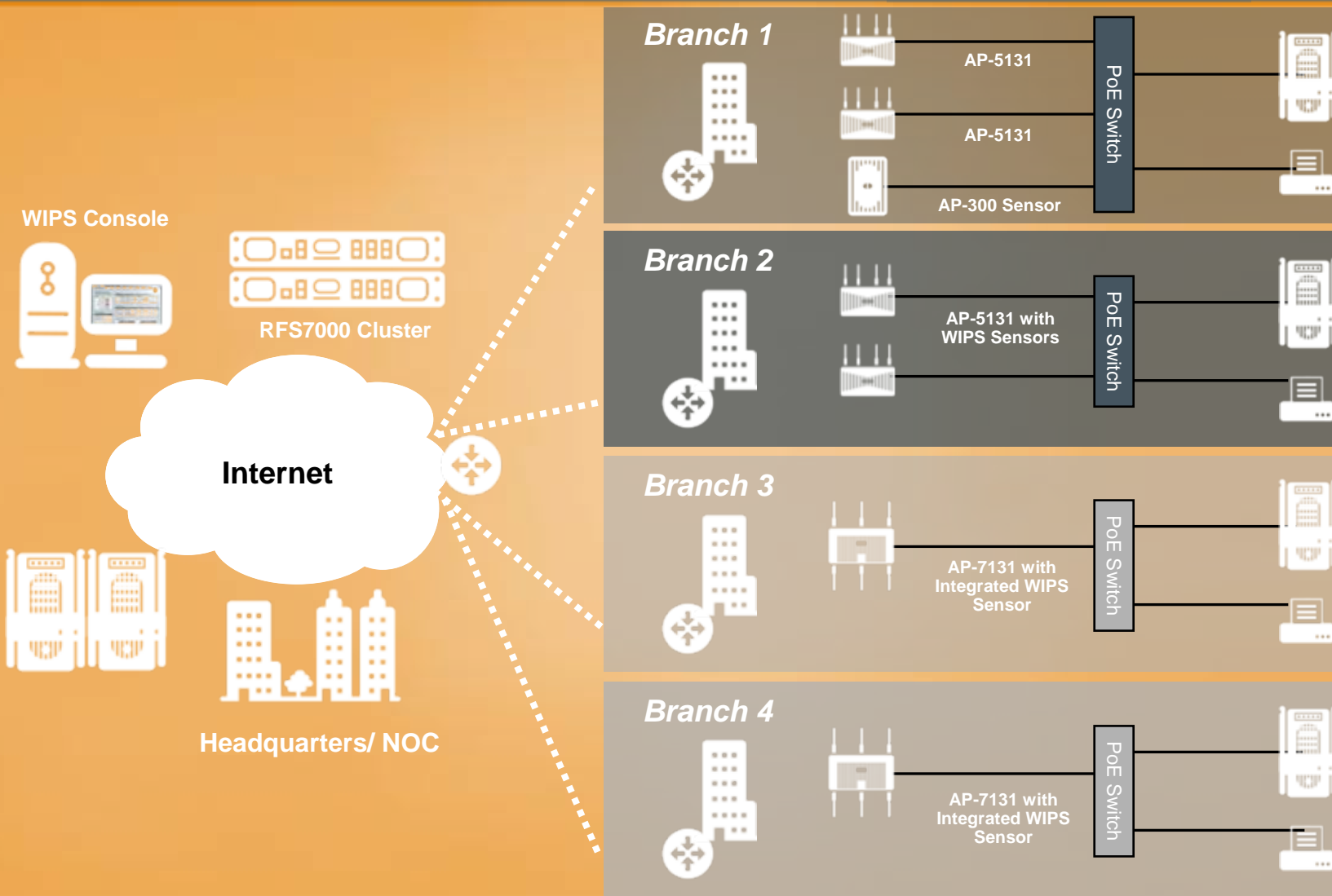


WLAN 4

802.11n Multimedia Kiosk
App. (AES Security)



AP-7131 for the Distributed Enterprise



Secure Campus Deployments Today



RFS7000 Cluster



Campus Network / LAN



AP300



AP300



AP300



AP300



AP300
Sensor



AP300



AP300



AP300



AP300

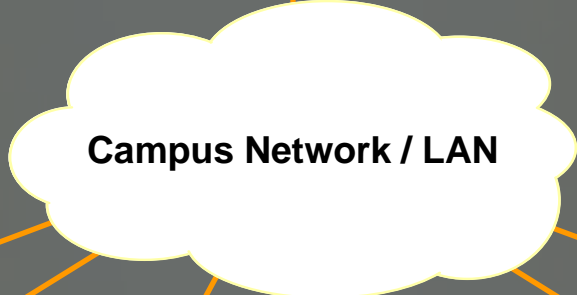


AP300
Sensor

AP-7131 for the Campus



RFS7000 Cluster



Campus Network / LAN



AP-7131



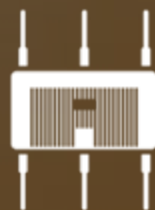
AP-7131



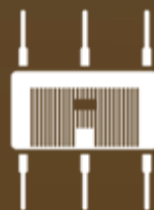
AP-7131



AP-7131
with Integrated Sensor



AP-7131



AP-7131

LAN Planner (AP-7131 Support)



Accurate 2D/3D Heat-Maps for
11n Coverage

Recommended AP Placement

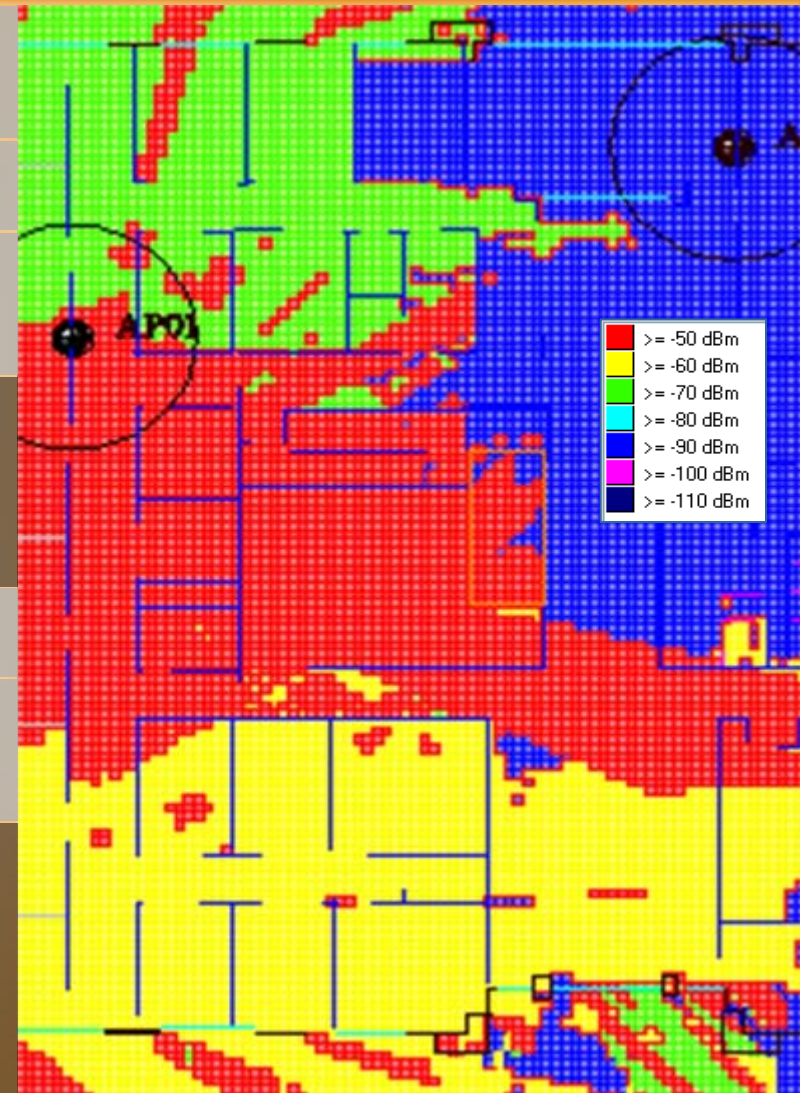
Predictions Offer Actual Data Rate
Not RSSI

Guard Interval
Channel Width
Spatial Streams
MCS (Modulation)

Migration Simulation

Automated Migration Wizard,
Allows User to:

View Mixed Mode Coverage
View AP-7131 Performance Maps
Specify Total # of AP-7131's Allowed in Final Recommendation
Specify Migration Path (e.g. Restricting .11n Upgrades to Only 5GHz
Bands, Restricting .11n / Legacy Channel Selection, etc.)
View AP-7131 Placements



AP-7131 Product Pricing & Availability



Part Number	Description	List Price	Discount Category
AP-7131-60020-WR	APN Single Radio 802.11n Access Point, Plastic Facade, with QIG	\$ 1099	1A
AP-7131-60028-WR	APN Single Radio 802.11n Access Point, 6 element Façade antenna Module, with QIG	\$ 1149	1A
AP-7131-66040-WR	APN Dual Radio 802.11n Access Point, Plastic Facade, with QIG	\$ 1249	1A
AP-7131-66048-WR	APN Dual Radio 802.11n Access Point, 6 element Façade antenna Module, with QIG	\$ 1299	1A
50-14000-247R	AP-7131 PWR SPLY: 100- 240VAC,48.0VDC, 0.75A, EPS	\$ 59	1A
AP-PSBIAS-1P3-AFR	Single Port PoE Injector - High Power Gigabit	\$ 99	1A
ML-2452-PTA3M3-036	3 Port MIMO Antenna	\$ 149	1A
ML-2452-PTA2M3X3-1	Façade with 6 element antenna Module	\$ 99	1A

Availability:

- All SKUs are Open for Bookings & Shipment

AP-7131 Façade



- **AP-7131 Façade is designed to provide an Aesthetic option for carpeted deployments.**
- **Façade is a removable attachment**
- **Façade is a non plenum rated accessory**
- **Façade comes with 2 options**
 - With Integrated Antennas and connector
 - Without Antennas
- **2 AP-7131 SKUs ship with the Façade without Antennas**
 - Order Antennas separately for these AP's
- **2 AP-7131 SKUs ship with the Façade with Integrated Antennas**
- **Façade with Integrated Antennas is also separately orderable**
- **Façade without Integrated Antennas is currently not a separately orderable accessory.**
 - Ships for free with AP-7131-60020-WR and AP-7131-66040-WR until December 2008.
 - Will need to be separately ordered starting Jan 2009.

AP-7131 Pictures



*AP-7131 Base AP
(Plenum Rated)*



*AP-7131 with Façade
SKU's:
AP-7131-60020-WR
AP-7131-60020-WR*



*AP-7131 + Façade with Integrated Antennas
SKUs: AP-7131-60028-WR, AP-7131-60048-WR*



AP-7131 with Façade detached

Competitive Snapshot



	Cisco AP1252	Motorola AP-7131
List Price	\$1249 for Single Radio \$1299 for Dual Radio	\$1099 for Single Radio \$1249 for Dual Radio
Tri Radio Design with Built-in WIPS Sensor	No. AP1252 ships as Single or Dual Radio only.	Yes. AP-7131 features dual band radios that can be software converted to operate as an AirDefense WIPS Sensor.
MIMO Design	2X3:2 MIMO (2 Transmit Antennas, 3 Receive Antennas, 2 Spatial Streams)	3X3:2 MIMO (3 Transmit Antennas, 3 Receive Antennas, 2 Spatial Streams). Results in better RF performance.
Gigabit Ethernet Ports	1	2
3G/Wimax wireless backhaul capability	No	Yes. 3G support in the future.
Independent or Dependent Mode operation with same firmware	No. Independent Mode is IOS based. Controller based AP's use LWAPP	Yes. AP-7131 supports dynamic dual-mode operation using the same firmware. Site Survivability Features in Adaptive AP Mode.
Systems Memory	64MB	128MB. Increased memory results in higher throughput performance.
Integrated antenna option	No	Yes. AP-7131 can be ordered with an aesthetically designed façade with antennas. Same access point can be adapted for carpeted or industrial deployments.
802.11n RF Planning Software	Not available	Industry leading LAN Planner will support AP-7131 based on custom radio characterization.
MESH	Not supported	Supported
Intelligent Power Detect	Not available. Dual radio AP-142 will not boot up under 803.2af. Requires manual power reconfiguration.	Intelligent CPLD allows AP-7131 to automatically self configure based on available power. Eases deployments.



Thank You