Wireless techupdate Februar 2014

Ib Hansen:ibhansen@cisco.com

Februar 4 – 6 2014

Agenda

- Software Guidance
- 7.6 Hardware
  - 3700
  - 702W
  - 1532
- 7.6 Software
  - HDX
  - MSE promotion
  - Prime 1.4 eller 2.0
- Roadmap
  - IOS XE 3.3 / 3.6 / 3.7
  - 8.0
    - AVC Bonjour
- Meraki gennemgang
  - Do and donts

Software Guidance

Software guidance

Table 1. Cisco Wireless LAN Controller Software Release Description

Software Release	Description	Benefit
Maintenance Deployment (MD) releases	Software releases that provide bug-fix support and ongoing software maintenance. These releases are categorized as Maintenance Deployment (MD) and may be part of the Assure Wave program. These are long-lived releases with ongoing software maintenance.	Provides customers with a software release that offers stability and long support duration with periodic maintenance releases (MRs).
Early Deployment (ED) releases	Software releases that provide new features and new hardware platform support in addition to bug fixes. These releases are categorized as Early Deployment (ED). These are short-lived releases.	Allows a customer to deploy the latest features and new hardware platforms or modules.

http://www.cisco.com/en/US/prod/collateral/wireless/ps6302/ps8322/ps12722/bulletin-c25-730741_ps2706_Products_Bulletin.html

Software guidance

Table 2. Cisco Wireless LAN Controller Software MD and ED Release Recommendations

Software Release	Deployed Release	Recommended Release
Maintenance Deployment (MD) release	7.0 MD release train	7.4 MD release train
Early Deployment (ED) releases for pre-802.11ac deployments	7.2 ED releases 7.3 ED releases	7.4 MD release train (7.4.121.0 is the minimum recommended release)
Early Deployment (ED) releases for 802.11ac deployments	7.5 ED release	7.6 ED release

Software guidance

Table 3. Detailed Software Release Guidance

Software Release	Upcoming Releases	Recommended Release
Release 7.0 (MD release train)	1 additional MR planned in Q1CY14[1]	• 7.4 MD release train • 8.0 MD release train (2HCY14)[1]
Release 7.2	1 additional MR[1] only if required for Federal Information Processing Standards [FIPS] updates	• 802.11ac deployments to 7.6 ED • Non-802.11ac deployments to 7.4 MD release train • FIPS customers: 8.0 MD release train (2HCY14)[1]
Release 7.3	No more MRs planned	• 802.11ac deployments to 7.6 ED • Non-802.11ac deployments to 7.4 MD release train
Release 7.4 (MD release train)	MR3 (Q2CY14)[1] MR4 (Q4CY14)[1]	• 802.11ac deployments to 7.6 ED • 8.0 MD release train (2HCY14)[1]
Release 7.5	No more MRs planned	• 802.11ac deployments to 7.6 ED • 8.0 MD release train (2HCY14)[1]
Release 7.6	MR1 (Q2CY14)[1]	• 8.0 MD release train (2HCY14)[1]

[1] Represents the current plan for upcoming releases. This roadmap is subject to change at the sole discretion of Cisco, and Cisco will have no liability for delay in the delivery or failure to deliver any of the products or features set forth in this document.

AP EOL Plans

Aironet AP Series	End Of Sale Announcement	End of Sale Date	HW End of Support	Software Release Support	Recommended Aironet 802.11n G2 Series
Indoor					
1130, 1240❖	Jan 2013	Jul 2013	Jul 2018	8.0.x	1600
1250❖	Aug 2011	Jan 2012	Jan 2017	8.0.x	2600
1040, 1140, 1260❖	Apr 2013 Apr 2013	Oct 2013 Oct 2013	Sep 2018 Oct 2018	8.0.x IOS XE 3.6 (Amur)	1600 2600
1040, 1140 for EU/ETSI❖♯	Aug 2012	Dec 2012	Sep 2018	8.0.x IOS XE 3.6 (Amur)	1600 2600
3500	No plans currently	No plans currently	No plans currently	Beyond 8.0	3600
Outdoor					
1310	Jul 2012	Jan 2013	Q1 CY18	7.0.x	1530
1520❖	Oct 2011	Mar 2012	Q1 CY17	8.0.x	1550
1524SB❖♯	Mar 2013	Jun 2013	Q2 CY18	8.0.x	1530

❖ Only hardware support in 8.0 for 1130,1240, 1250 and 1520. New features introduced in 8.0 will not be supported.

♯ Earlier EOS timeline for EU/ETSI due to new DFS rules starting 2013

❖ Request extended support – decision on a case by case basis: http://wwwin.cisco.com/ops/ee/eol/support_extended.shtml

7.6 Hardware Update

Cisco Aironet Indoor Access Point
Industry's Best 802.11n and 802.11ac Series

Mission Specific
600 & 700 NEW

- Up to 600 Mbps
- 702w: Wall Plate AP
  - Dorms, hospitality
- 702i: Compact Mid-market AP
- 600: Teleworker

Enterprise Class
1600

- Up to 600 Mbps
- CleanAir Express*
- ClientLink 2.0
- VideoStream

Mission Critical
2600

- Up to 900 Mbps
- High Client Scalability
- CleanAir
- ClientLink 2.0
- VideoStream

Best in Class
3700 NEW

- Over 1 Gbps, 802.11ac support
- High Density Experience
- CleanAir 80 MHz, ClientLink 3.0, VideoStream
- Future proof modularity: Security, 3G Small Cell or Wave 2 802.11ac

Flexibility → **Enterprise** → **Mission Critical** → **Best In Class**

Cisco Aironet Outdoor Access Point

Industry's Most Comprehensive Outdoor Offerings

Ultra Low Profile Flexible

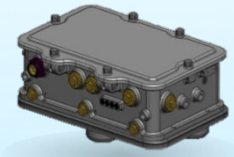
1532I

1532E

- Sleek design
- Int./Ext. antennas
- Value

Internal Antenna

1552I

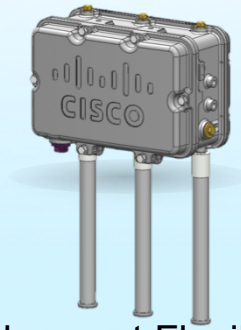


- Seamless Connectivity
- GPS
- CleanAir, ClientLink

Versatile

1552E

1552EU

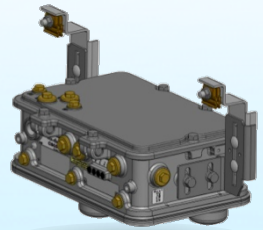


- Deployment Flexibility
- Fiber SPF / Battery
- PoE Out
- GPS
- CleanAir, ClientLink

MSO / Cable

1552C

1552CU



- Integrated DOCSIS 3.0 Cable Modem
- Cable Plant Powered
- GPS
- CleanAir, ClientLink

Industrial

1552H

1552S

- Haz Loc Certified Class 1/Div 2/Zone 2
- Integrated Honeywell Sensor Gateway (S)
- CleanAir, ClientLink

Compact | Enterprise and Carrier Class | MSO | Internet of Things

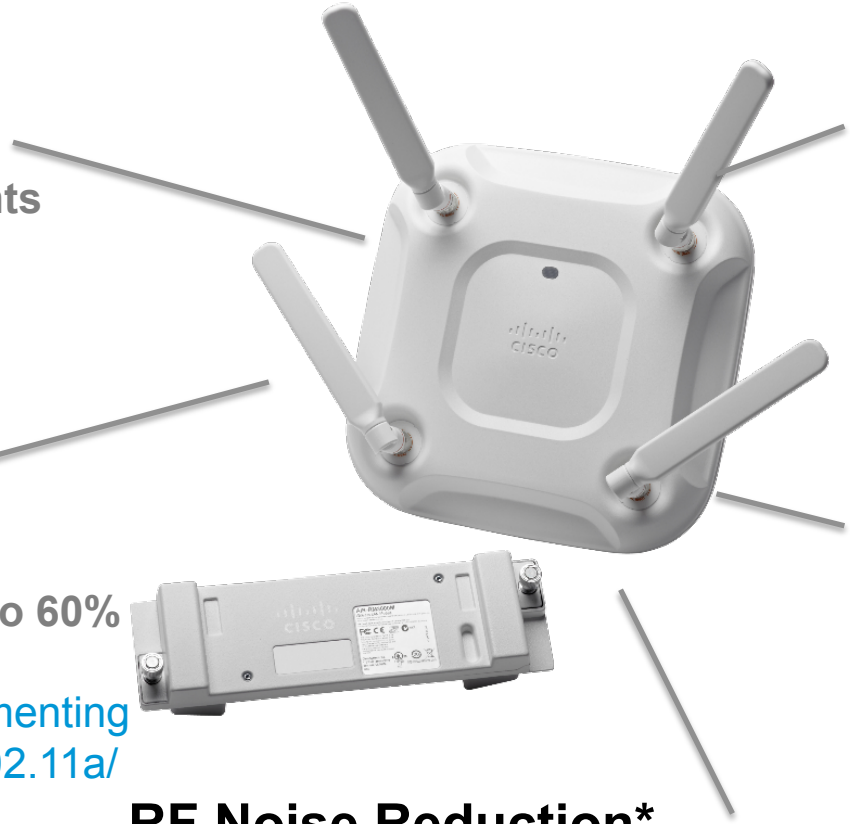
AP-3700

Cisco Aironet 3700 Access Point Series
Best-in-Class 802.11ac

- Industry's first 4x4 MIMO:3 SS 802.11ac AP
- 3X performance of 802.11n 5Ghz WiFi
  - higher performance at a greater distance
- RF Excellence enabled in hardware
- High Density Experience Technology
  - Client density scale and performance
- Future proof,
  - Modular Architecture = investment protection
  - Security, 3G Small Cell or Wave 2 802.11ac module options

Cisco High Density Experience Technology

Performance, Mitigation, Scalability and Roaming Optimized for high Client Density Networks



CleanAir 80 MHz

Optimal performance for high throughput, high density environments

RF interference detection & mitigation optimized for 802.11ac's wider channel bandwidths

RF Turbo Performance

Support highly dense clients without performance degradation

Scale seamlessly to 60+ 802.11ac clients using interactive video and multimedia traffic with no performance degradation.

ClientLink 3.0

Increase performance & range by up to 60%

Cisco patented implicit beamforming technology for 802.11ac clients, complementing Explicit BF. Also extend capabilities to 802.11a/g/n clients.

Smart Roam

Intelligently assist client roaming based on configurable attributes

Right size WiFi cell to better assist client handoff in a dense network

RF Noise Reduction*

Enables higher density AP deployments to support client density and increased bandwidth

Increase spectrum usage efficiency to improve co-channel performance

***Available post-FCS**

AP-3700 comparing to AP-3600

physical front on the AP-3700

AP-3702P version also coming for outdoor deployments

AP-3700

AP-3600e

(Same Backside)

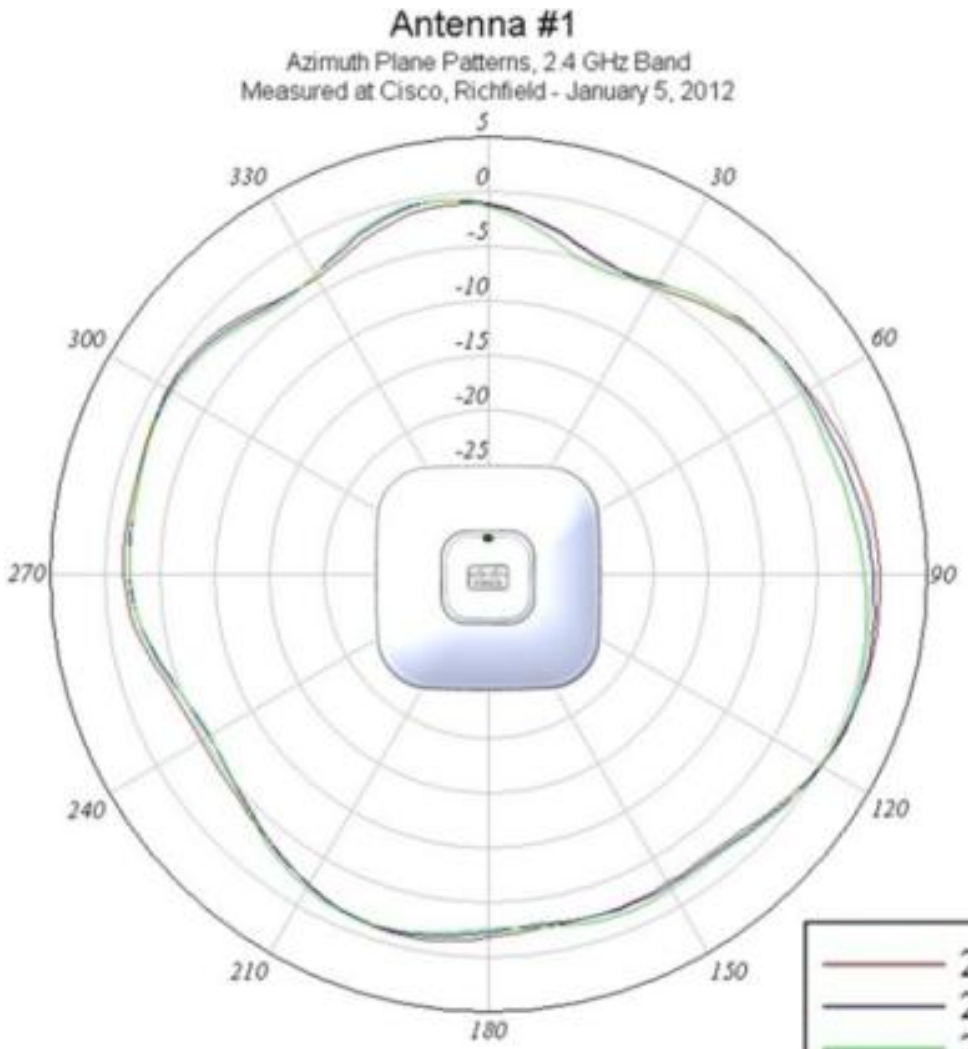
AP-3700 Let's take a peek inside…

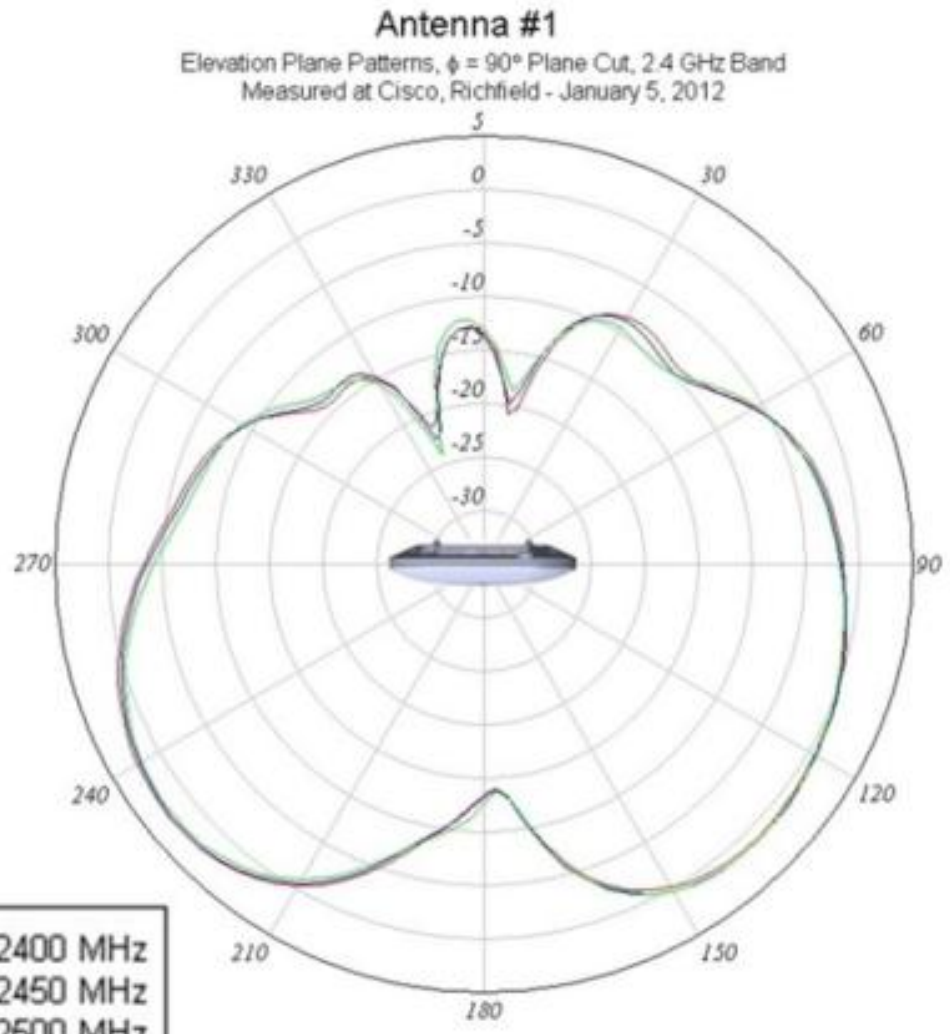
Freescale P1023 with Cisco IP for data plane HW acceleration.

Running at 800 MHz
w/512 Ram and a Purpose Built Custom ASIC with CLIENT LINK 3.0

DRE – Dual Radiating Element antennas

Radiation Patterns @ 2.4 GHz for 2600 and 3700 Series

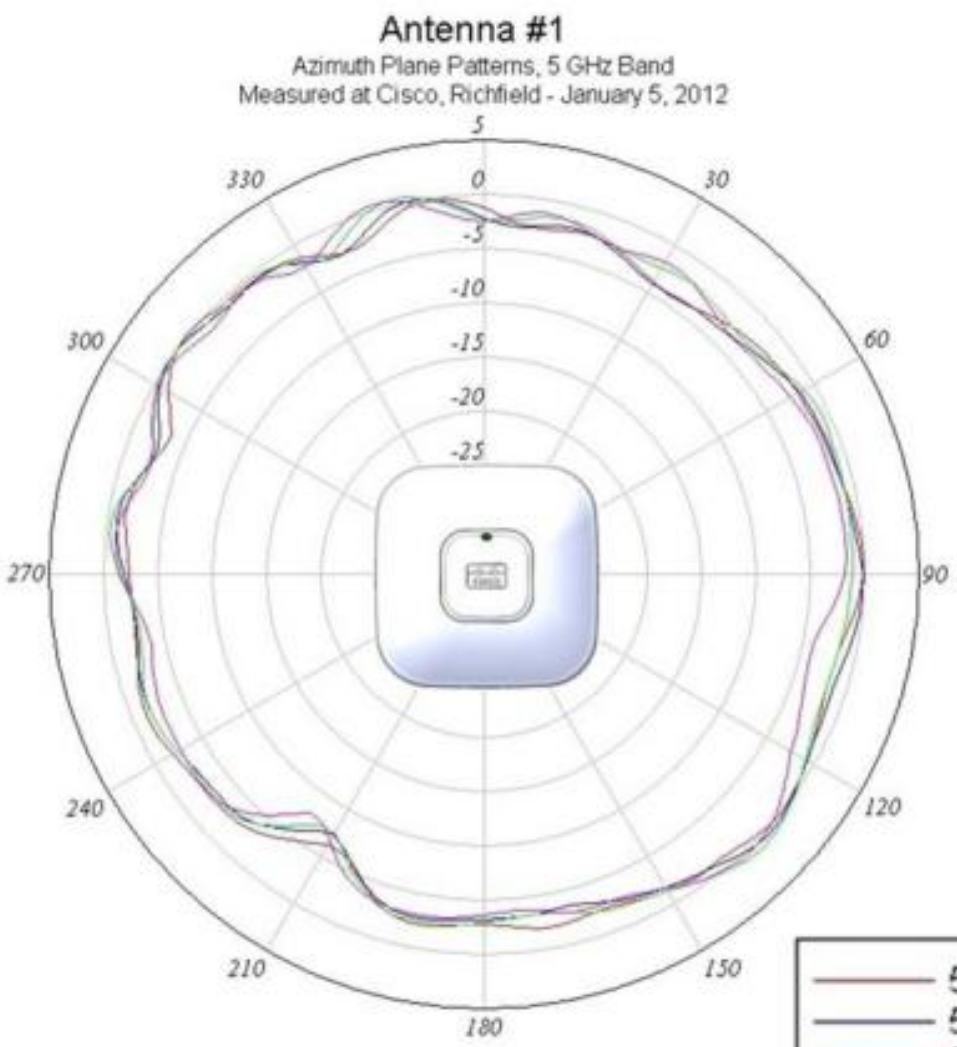




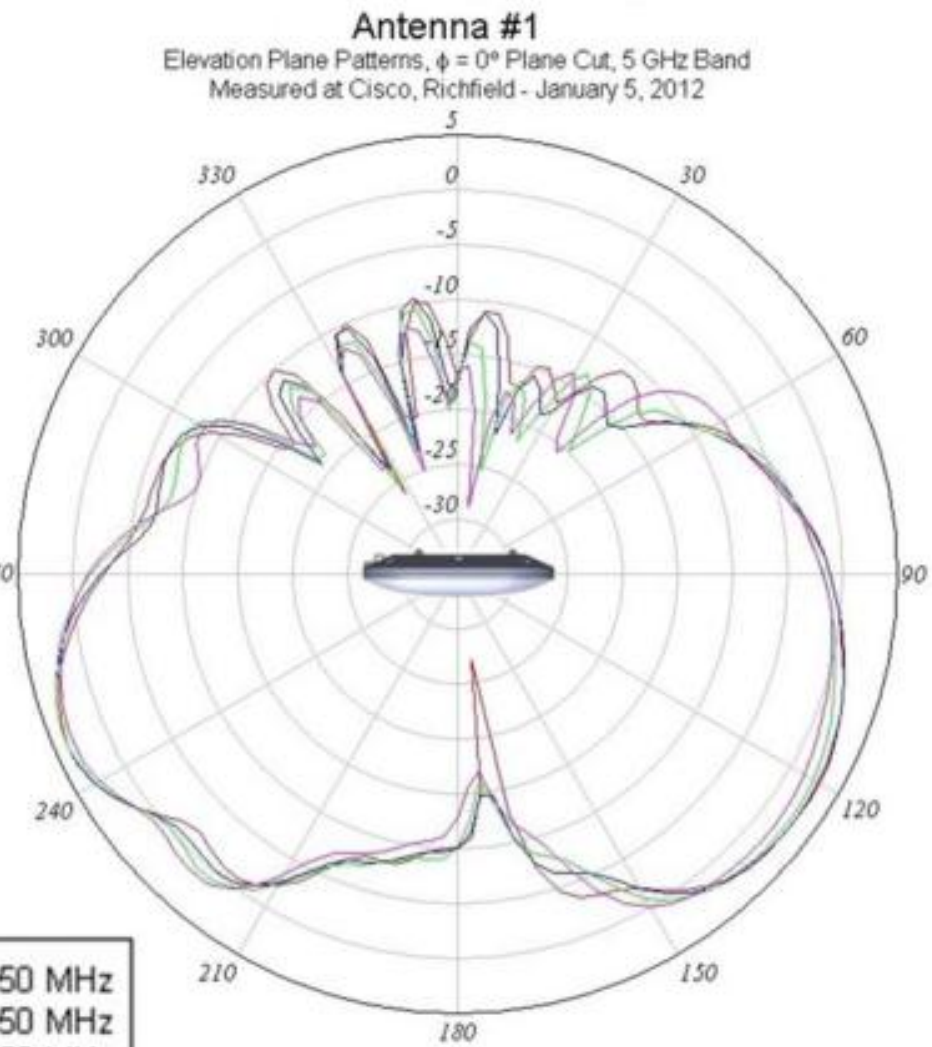
Azimuth Plane 2.4 GHz

Elevation Plane 2.4 GHz

Radiation Patterns @ 5 GHz for 2600 and 3700 Series



Azimuth Plane 5 GHz

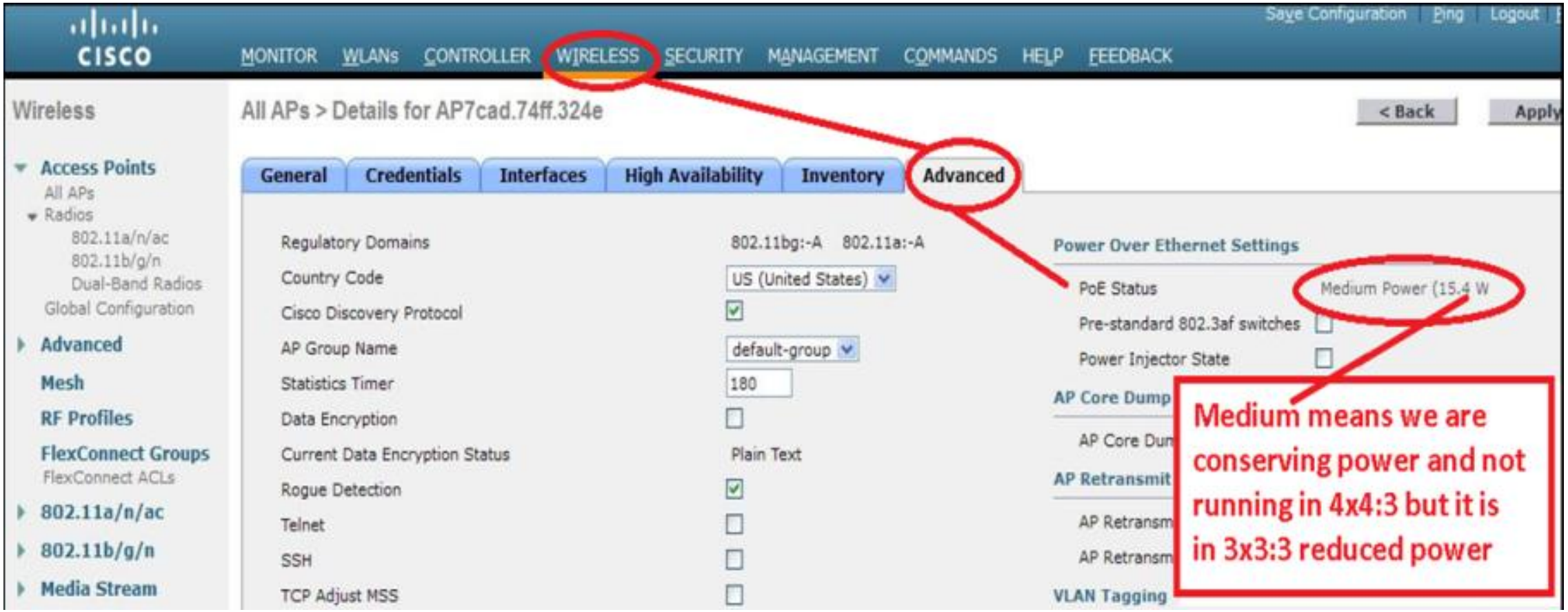


Elevation Plane 5 GHz

5150 MHz
5350 MHz
5550 MHz
5800 MHz

Understanding PoE with AP-3700 using 15.4W (802.3af)

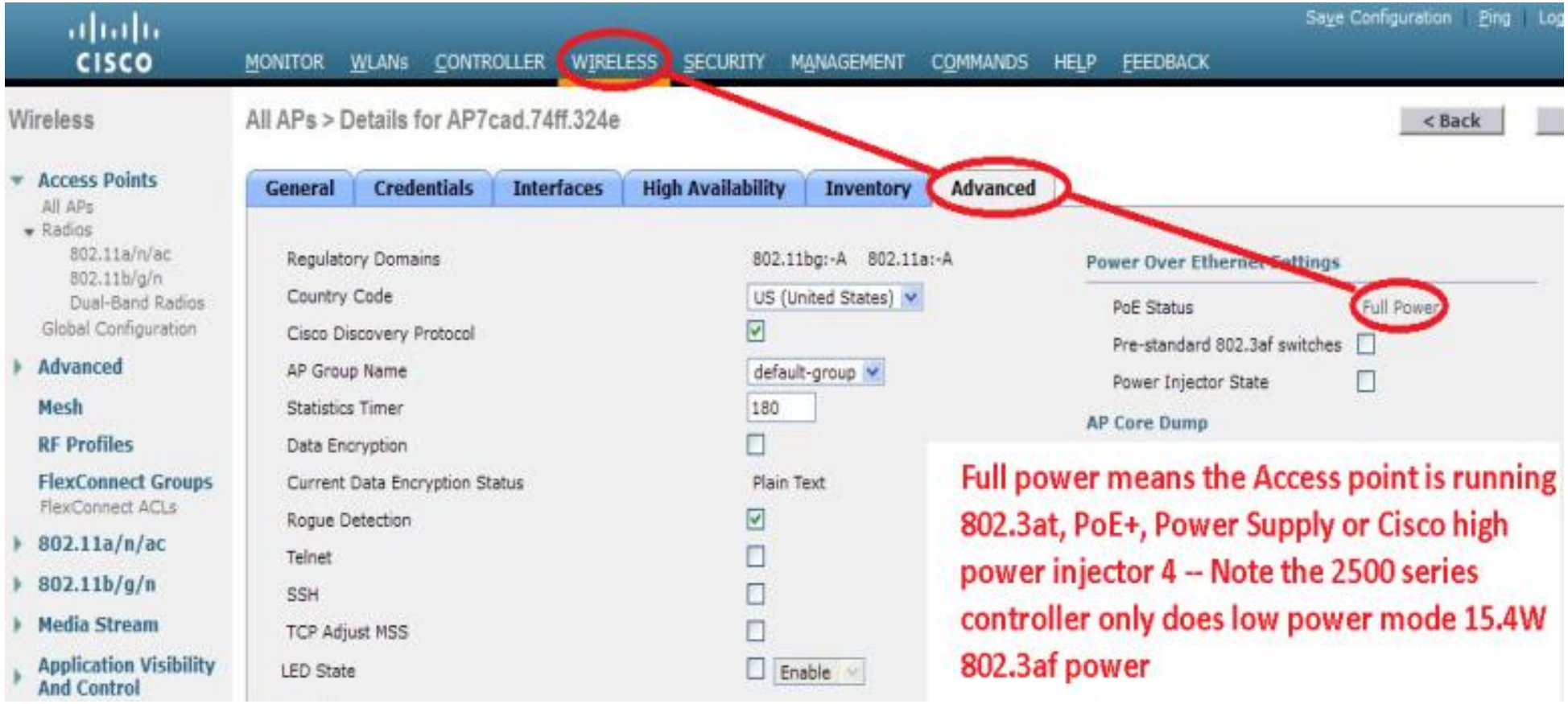
3700 supports full 3x3:3 using the lower 15.4 Watt (802.3af) PoE and 2x2:2 with WSSI module



Cisco 2500 Series controllers only provide PoE at 15.4W (.3af) so AP will come up in 3x3:3 mode Unless you use local power, injector or a switch that can provide PoE+ (802.3at)

Understanding PoE with AP-3700 using PoE+ (802.3at)

3700 supports full 4x4:3 using higher power (802.3at), Local Power supply or the AIR-PWRINJ-4 injector.



QUICK AT A GLANCE 3600 vs. 3700

- AP3700 with Integrated 802.11ac Wave 1
- Same Dual Radio Dual Band
- Same Leading 4x4:3 RF architecture
- 3700 carries forward the 3600 modular architecture
- 1.3 Gbps Max Data Rate via
  - AP3600 with 802.11ac Module (5 GHz)
  - AP3700 and integrated 5 GHz radio
- Shared Modules
  - WSSI
  - Cisco 3G Small Cell
  - 802.11ac Wave 2

	3600	3700
Max Data Rate	**450 Mbps 1.3 Gbps – 11ac Module**	**1.3 Gbps**
Radios	**Dual Radio, 2.4 and 5 GHz**	**Dual Radio, 2.4 and 5 GHz**
RF Design (MIMO:SS)	**4x4:3 – Integrated Radios 3x3:3 – 11ac Module**	**4x4:3**
Power Draw	**4x4:3 + 3x3:3 = 802.3at 5 GHz only = 802.3af**	**4x4:3 = 802.3at 3x3:3 = 802.3af**
Client Count	**200 - per integrated radio 50 – 11ac Module**	**200 - per integrated radio**
Beamforming	**ClientLink 2.0 a/g/n - AP ECBF with 11ac – Module**	**ClientLink 3.0 a/g/n/ac and ECBF with 11ac**
Beamforming Client Count	**128 - per integrated radio 7 – 11ac Module**	**128 - per integrated radio**
Spectrum Intelligence	**CleanAir**	**CleanAir**
RRM	**✔**	**✔**
Modules	**WSSI 802.11ac Wave 1 3G Small Cell 802.11ac Wave 2**	**WSSI 3G Small Cell 802.11ac Wave 2**
List Price (Integrated Ant.)	**$1495 – AP $500 – 11ac Module**	**$1495**

3700 Series AP : Modules At A Glance

Module	WSSI (Security Module)	Cisco 3G Small Cell Module	802.11ac Wave 2
Benefits	Full comprehensive wireless security posture with off channel scan for WIPS, Rogue Detection, Context Aware, CleanAir, and RRM	Provides extended 3G cellular infrastructure coverage where cell tower signals cannot go (carpet areas in high rises, MDUs)	Support new 802.11ac data clients and Smartphones, up to 1Gbps+ wireless speeds
Target Markets	All Enterprise, Retail (PCI), Healthcare, Manufacturing	All Enterprise	All Enterprise
List Price	$500	TBD	TBD
Availability	Now	Q4CY13 – Band I Q1CY14 – Band II/V	CY2015 (Target)

AP-3700 – Supports Client Link 3.0

So why Client Link 3.0?

- ClientLink's beamforming capability unlike the standard improves the SNR for all clients including legacy clients.
- Because this technology does not depend on any client-side hardware or software capabilities, it works with mixed-client networks seamlessly with 802.11ac and 802.11a/n clients that co-exist on the same Access Point
- Standards based beamforming only works with .11ac clients and most of them do not support it at this time.

Cisco ClientLink Comparison

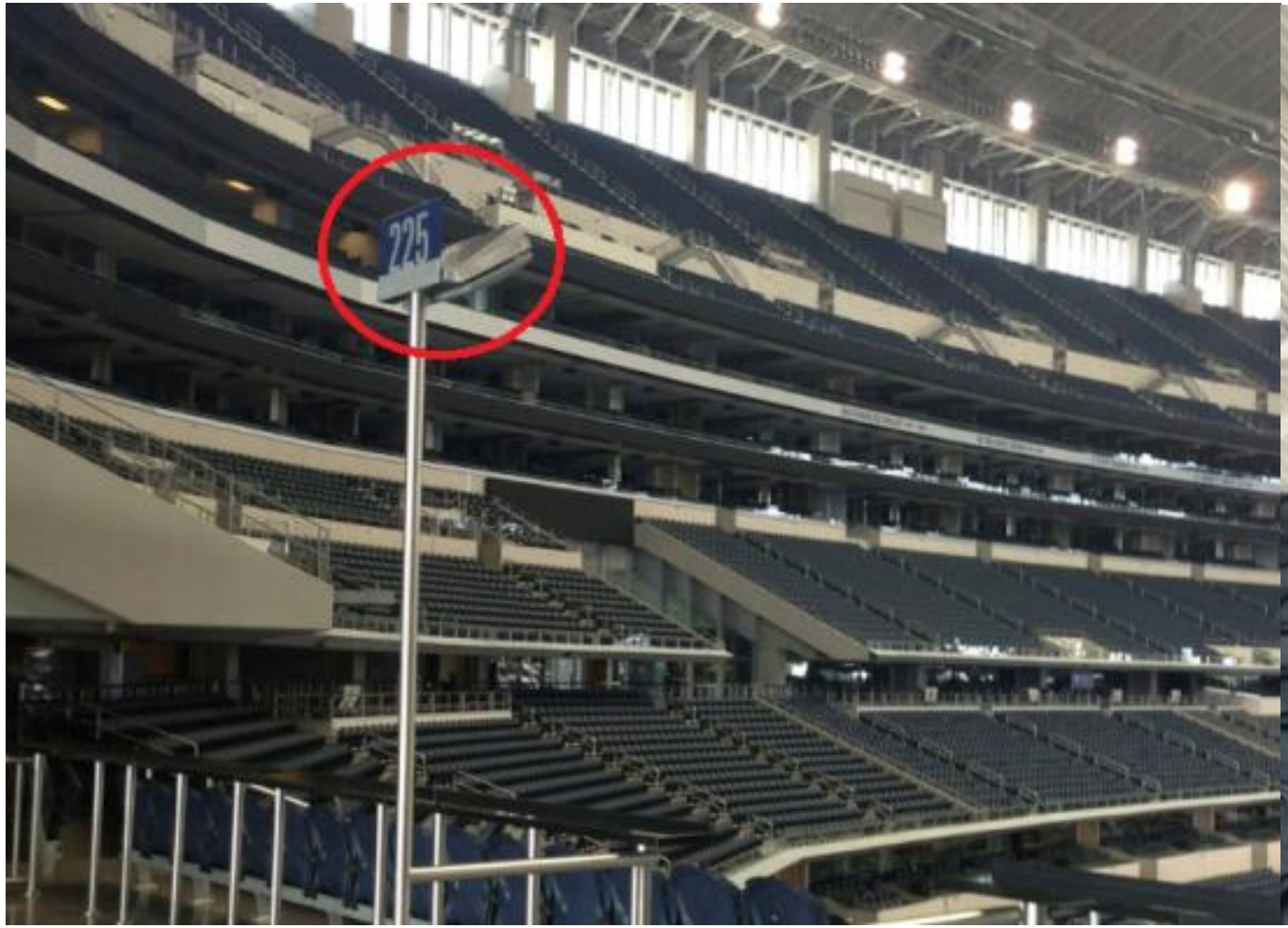
	Competitors	ClientLink 1.0	ClientLink 2.0	ClientLink 3.0
Beamforming Type	Standards	Beyond Standards	Standards and Beyond Standards	Standards and Beyond Standards
Access Points Supported	Most 802.11n	1140, 1260, 3500	3600, 2600, 1600	3700
No. of Transmitters to Improve Reliability for Downlink Traffic	2-3	2	3-4	4
Clients Supported	802.11n	802.11a/g	802.11a/g/n	802.11 a/g/n/ac
No. of Clients Supported (per Radio)	-	15	128 (1600 = 32*)	128
Optimized for iPhone, iPads (1x1:1SS, 11n or 11ac)	No	No	Yes	Yes
Optimized for Newer Laptops from Apple. Dell, Lenovo, HP - (3x3:3SS, 11n) Upcoming 802.11ac 2x2 and 3x3 Noteboks	No	No	Yes (2600, 3600)	Yes
Ready for Mobile Devices Influx (BYOD)	No	No	Yes	Yes
Optimizes AP Resources for Higher Client Density Support	No	Yes (Limited)	Yes (2600, 3600)	Yes
Client Performance and Coverage Improvements				

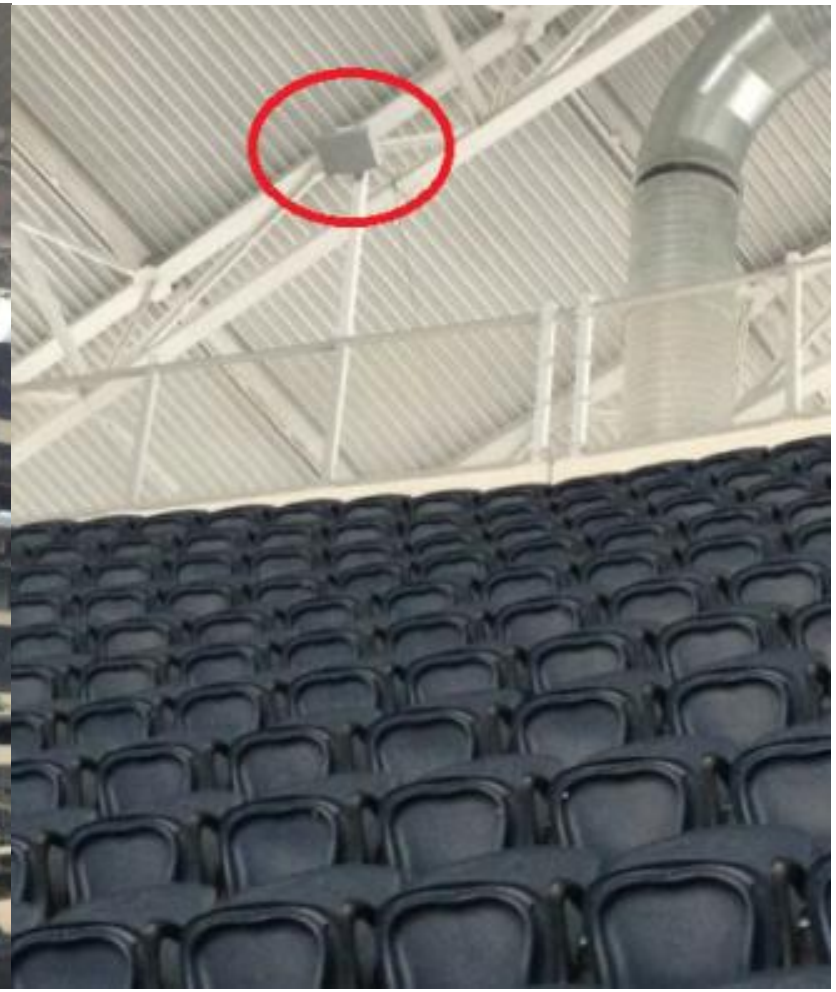
Stadium Antenna – AIR-ANT2513P4M-N

- Antenna designed for outdoor (stadium) operation to be paired with the AP-3702P
- Antenna unit has 2 vertically polarized and 2 horizontally polarized ports
- Articulating mount, included for use with flat surfaces and masts, permits ease of adjustment in both horizontal and vertical planes
- Radome is paintable using commonly available non-conductive spray paints like Krylon® or Rust-Oleum®
- Note: Antenna not FCC approved for the AP-3602P which is limited to 6 dBi in US

Parameter	Performance	
Cisco P/N	AIR-ANT2513P4M-N	
Cisco Mfg Number	07-1284-01	
Frequency	2400-2500 MHz	5150-5900MHz
Azimuth Plane 3-dB Beamwidth (Typical)	31°	31°
Elevation Plane 3-dB Beamwidth (Typical)	33°	27°
Polarization	Dual Polarization(H, V)	
F/B Ratio	35dB	
Impedance	50Ω	
Power	1 Watt	
RF Connector	Type N, Female	
Radome	Polycarbonate Color: Medium Gray #GY5B048	
Operating Temperature	-30° C to +70° C	
Storage Temperature	-40° C to +85° C	
Water/Foreign Body Ingress	IP-67	
Antenna Weight (No Brackets)	2.3 kg	

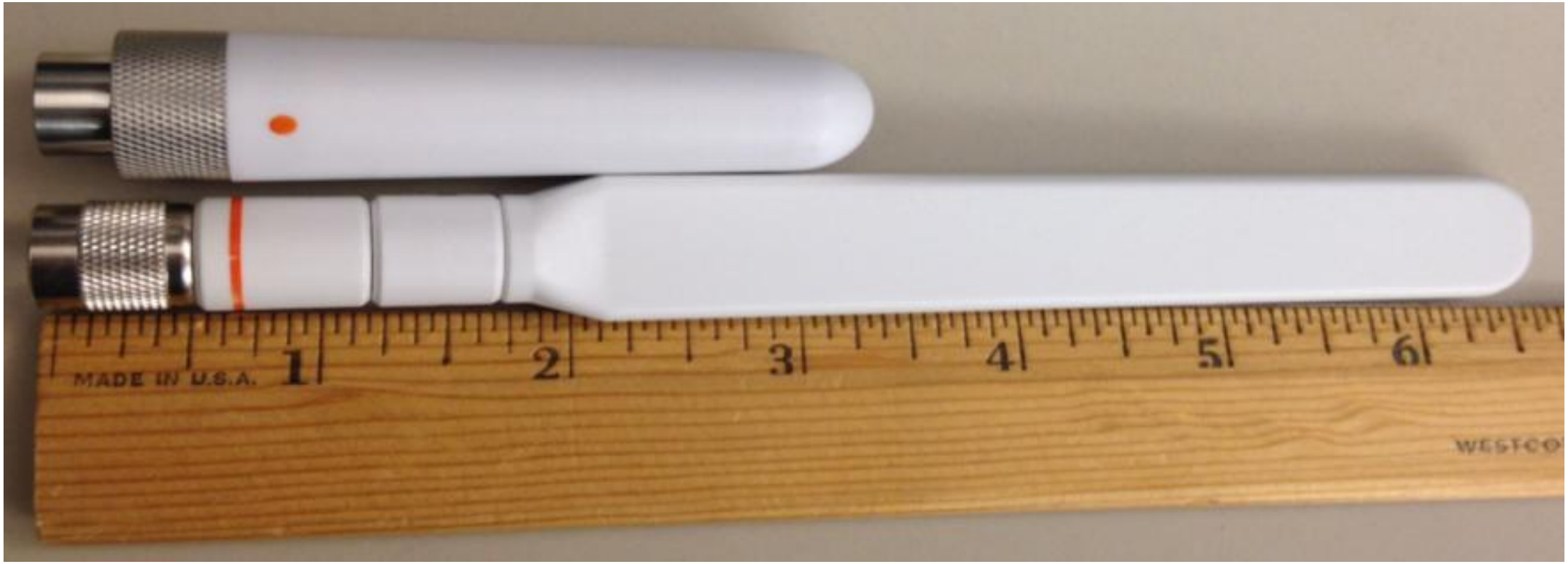
AIR-ANT2513P4M-N Deployment pictures…





New Antenna – New Stubby Dipole

It is shorter than the “stock” dipole but does not bend



AP702W

Cisco Aironet 700W Access Point Series
Wall Mount, Dual Radio with 4 (four) integrated GbE ports

New Q1 2014

- Target Hospitality, Dorm, Multi Dwelling
- Enterprise class RF performance, integrated antennas, Dual Radio 2x2:2
- 4x GbE local ports with 1x PoE out
- Sleek design in a small form factor (6 x 4 x 1.5 in)
- Purpose-built bracket for ease of mounting to numerous wall-box standards
- Physical security enhancements: Torx screw or Kensington lock

Cisco Aironet Wall Mount Access Point

This AP will be supported using 8.0 code

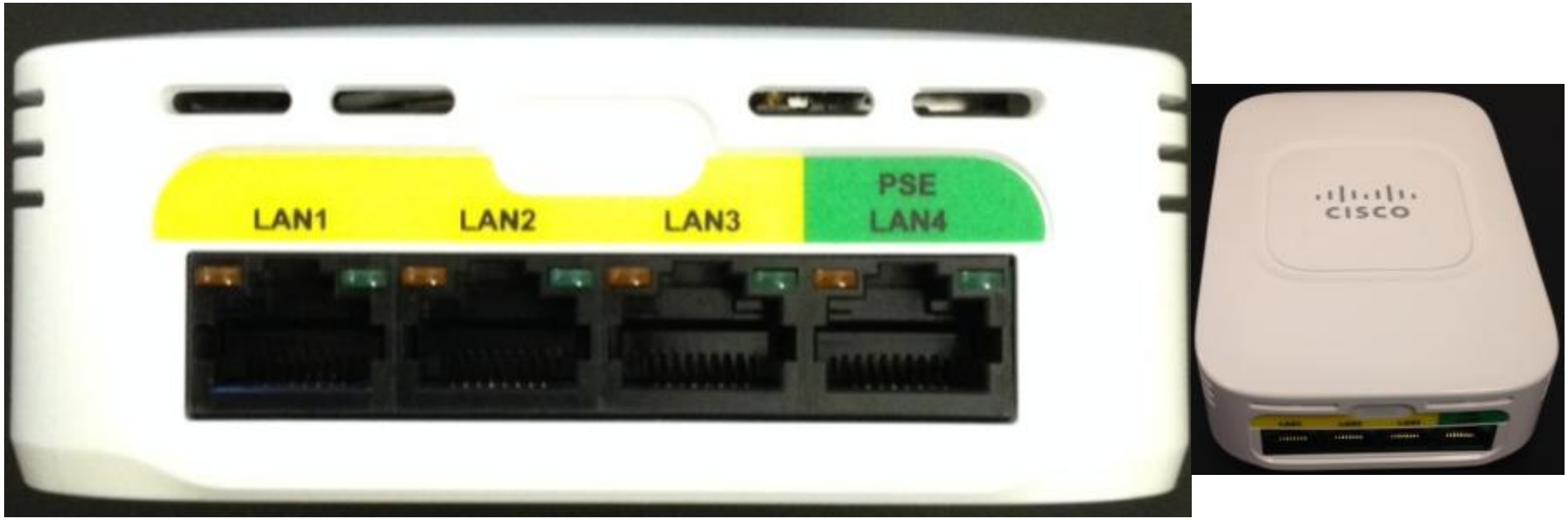
- Cisco Aironet Wall Mount AP is targeted for Multi Dwelling Unit (MDU), Hospitality, and K-12 Deployments seeking a high-performance in-room Wireless + Wired Access Device
- Designed for ease of mounting to numerous global wall-box standards
- Robust enterprise-class design and RF performance
- Simultaneous, Dual Radio, Dual Band with Integrated Antennas
- 4x GE Ethernet Ports, 1x WAN GE port
- Dimensions: 15x10x3 cm (6x4x1.5 in)

Cisco Aironet 702W Series	
Max Data Rate	300 Mbps per radio
Radio Design MIMO: Spatial Streams	Dual-Radio, 2x2:2
Local Ethernet Ports	4 x GE
Powering Capability	1 x GE port PoE out
Max No. Clients	200
BandSelect	✔
VideoStream	✔
Rogue AP Detection	✔
Adaptive wIPS	✔
Monitor Mode	✔
FlexConnect	✔
Converged Access	(Future)
Autonomous	(Future)
Data Uplink (Mbps)	10/100/1000
Power	802.3af/at, AC Adapter
Security lock	Torx screw, Kensignton lock
Temperature Range	0 – 40° C

AP-702W (Wall Plate AP)

New higher current Local supply needed For PoE out Port 4

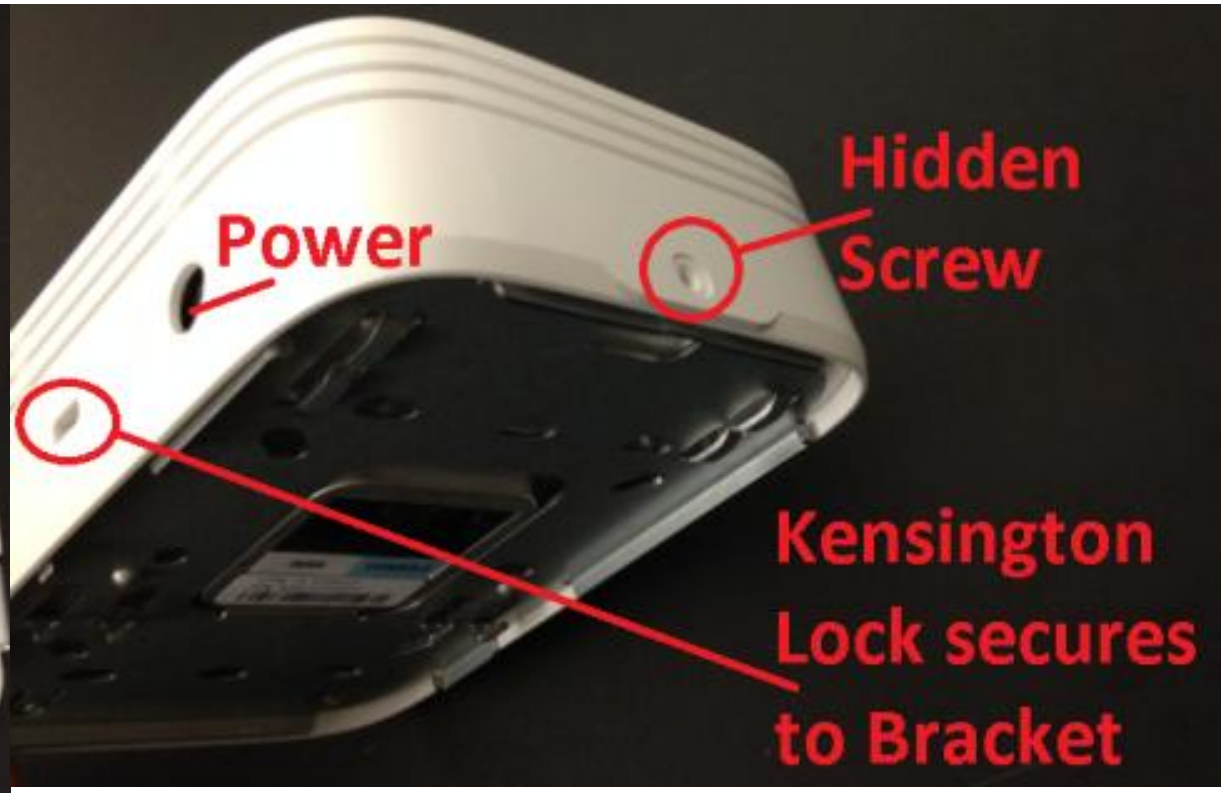
AP-702W (Wall Plate AP)



Four LAN ports (Green PoE) .3af 15.4W

AP-702W (Wall Plate AP)

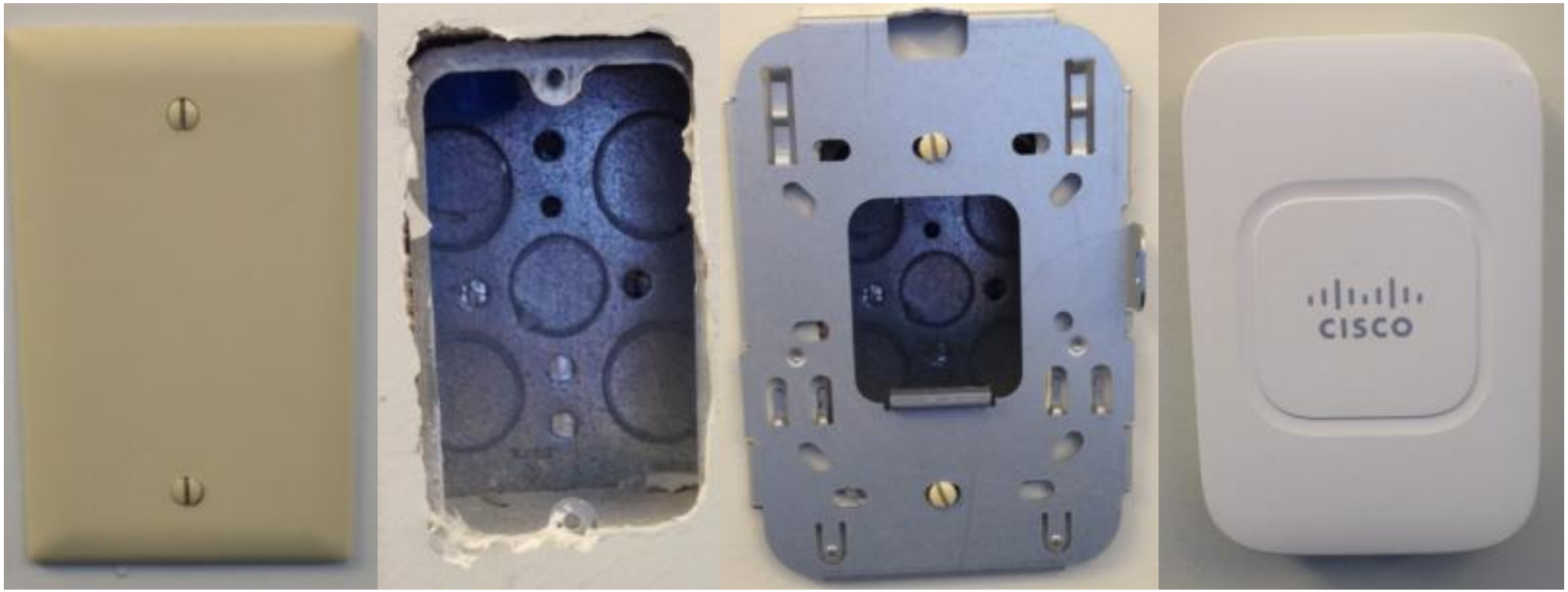
Unique Bracket custom to the AP-702W



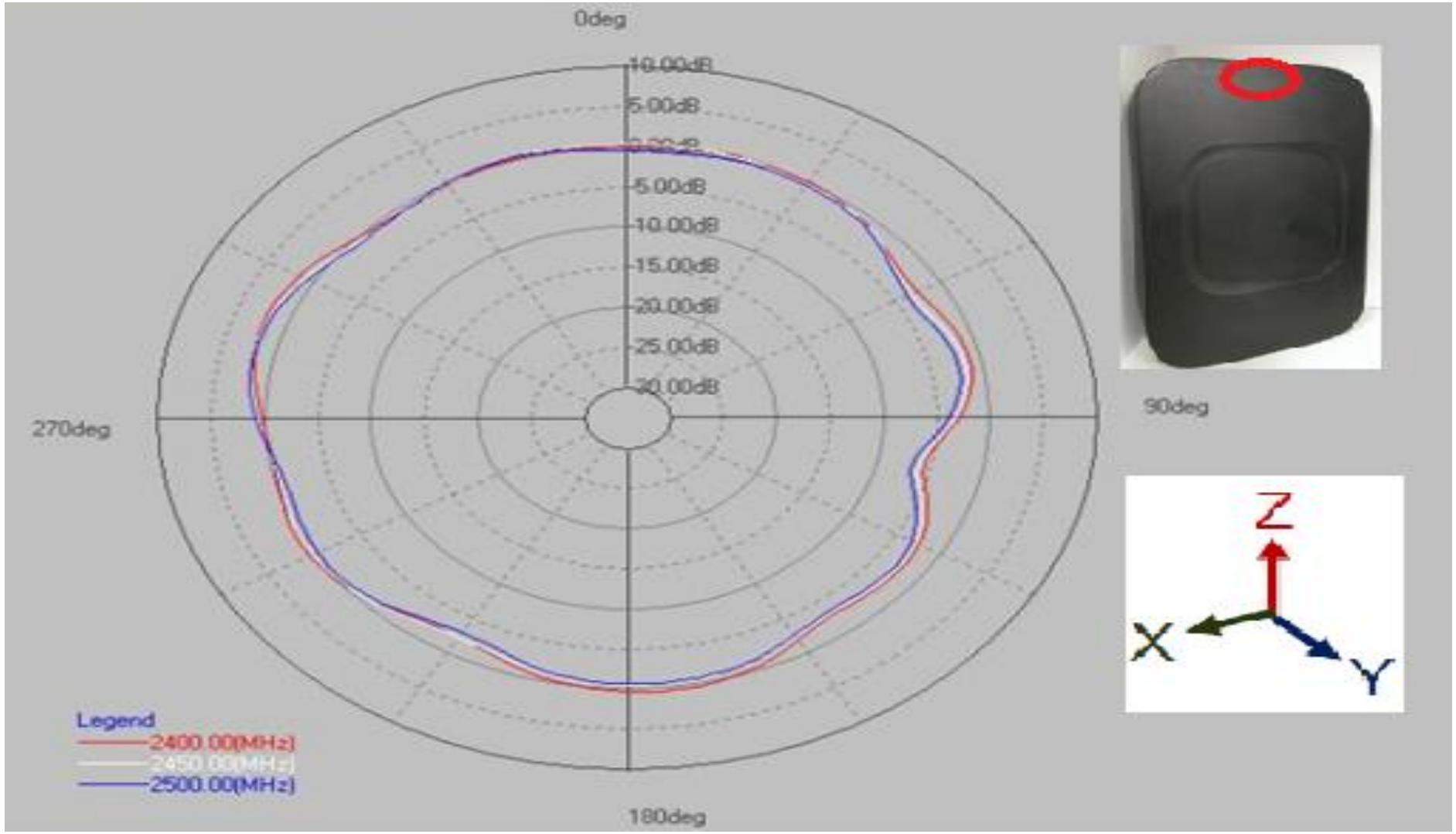
Hidden screw is covered by a supplied sticker

AP-702W (Wall Plate AP)

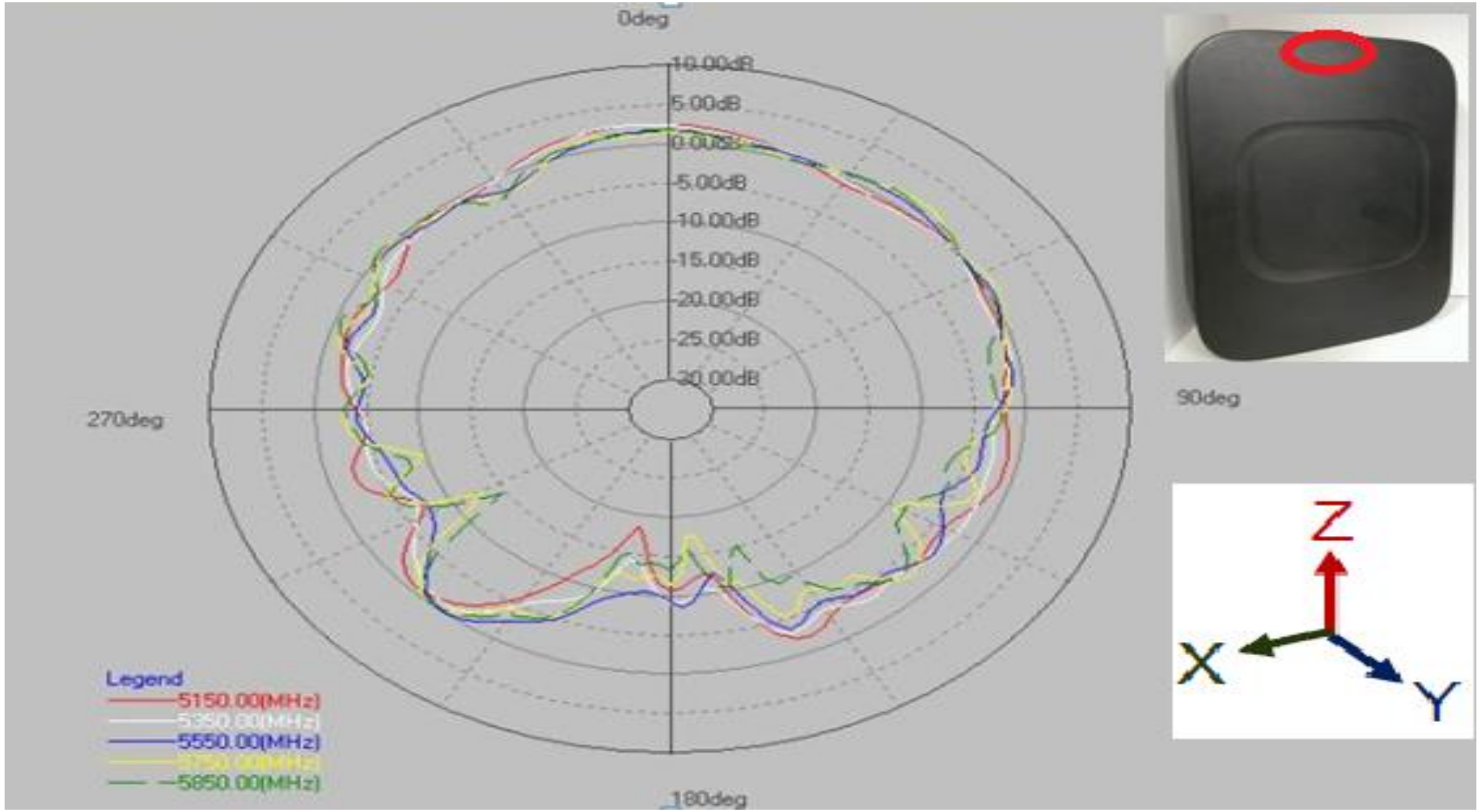
1 Screwdriver and in less than 1 Minute and you are done…..



Antenna Radiation Pattern @ 2.4 GHz



Antenna Radiation Pattern @ 5 GHz



AP1532

Cisco Aironet 1530 Outdoor Access Point Series

Ultra Compact and Flexible for Enterprise and Service Provider

New Q4 2013

- Small and ruggedized IP67 design for outdoors
- Blends into the environment
- Innovative flexible port architecture: dual or single band external antenna configuration via software
- Flexible deployment modes: centralized, standalone, bridge, mesh, or daisy chain

AP1532

- **Ultra Low-Profile, Outdoor-AP**
- **802.11n Dual-band (2.4 & 5 GHz)**
- **Models: Internal (1532I) or External (1532E) Antenna**

  Flexible Antenna Port – SW configure ports for single-band or dual-band antennas
- **Unified or Autonomous modes**

  New boot logic allows AP to boot Unified or Autonomous from same HW PID
- **Supports Bridging on 2.4 or 5 GHz**

  Point-to-point or point-to-multipoint topology
- **Supports Daisy Chaining**

  Serial backhaul or enhanced universal access

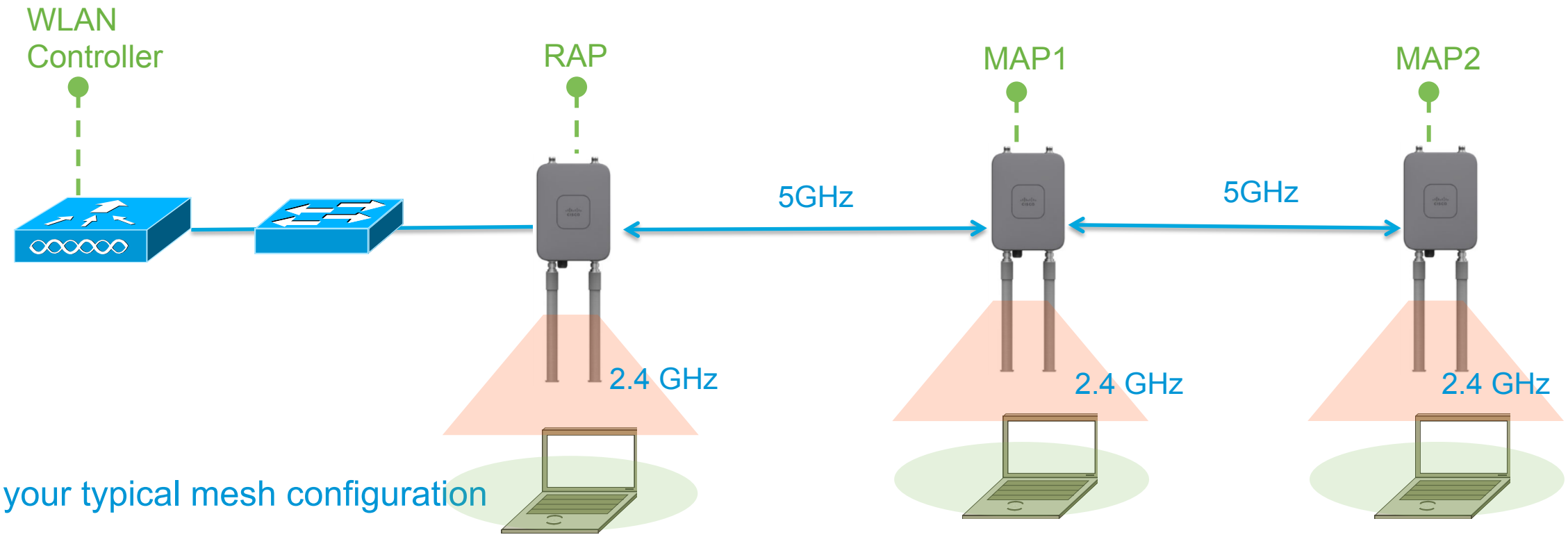
WNG Outdoor Access Points	1532I	1532E	1552I	1552E/EU	1552C/CU
Type	Internal antennas	External antenna	Internal antennas	External antennas	Cable modem
Antennas	Internal	Flexible Antenna Port (dual-band or single band)	Internal	E: Ext. dual-band EU: Ext. single band	C: Internal CU: Ext. single-band
Fiber SPF optics				■	
PoE out (802.3af)	LAN port, (no PoE)	LAN port, (no PoE)		■	
Cable modem					■
Battery backup option				■	
Power options	PoE (UPoE / 802.3at*) 24-57 VDC	PoE (802.3at) 24-57 VDC	AC, 12 VDC	AC, 12 VDC, PoE	40-90V cable plant 12VDC
Data rate (2.4 / 5 G)	215 / 300 Mbps	145 / 300 Mbps	145 / 300 Mbps	145 / 300 Mbps	145 / 300 Mbps
Radio design Tx-Rx:SS	3x3:3 (2.4 GHz) 2x3:2 (5 GHz)	2x2:2 (2.4 GHz) 2x2:2 (5 GHz)	2x3:2	2x3:2	2x3:2
Clients per radio	100	100	200	200	200
CleanAir			■	■	■
ClientLink			■	■	■
BandSelect	■	■	■	■	■
VideoStream	■	■	■	■	■
Rogue AP detection	■	■	■	■	■
FlexConnect	■	■	■	■	■
Wireless mesh	■	■	■	■	■
Temperature range °C	-30 to 65	-30 to 65	-40 to 55	-40 to 55	-40 to 55

1550 Remains Flagship Outdoor AP

1550 supports many options not available on the 1530

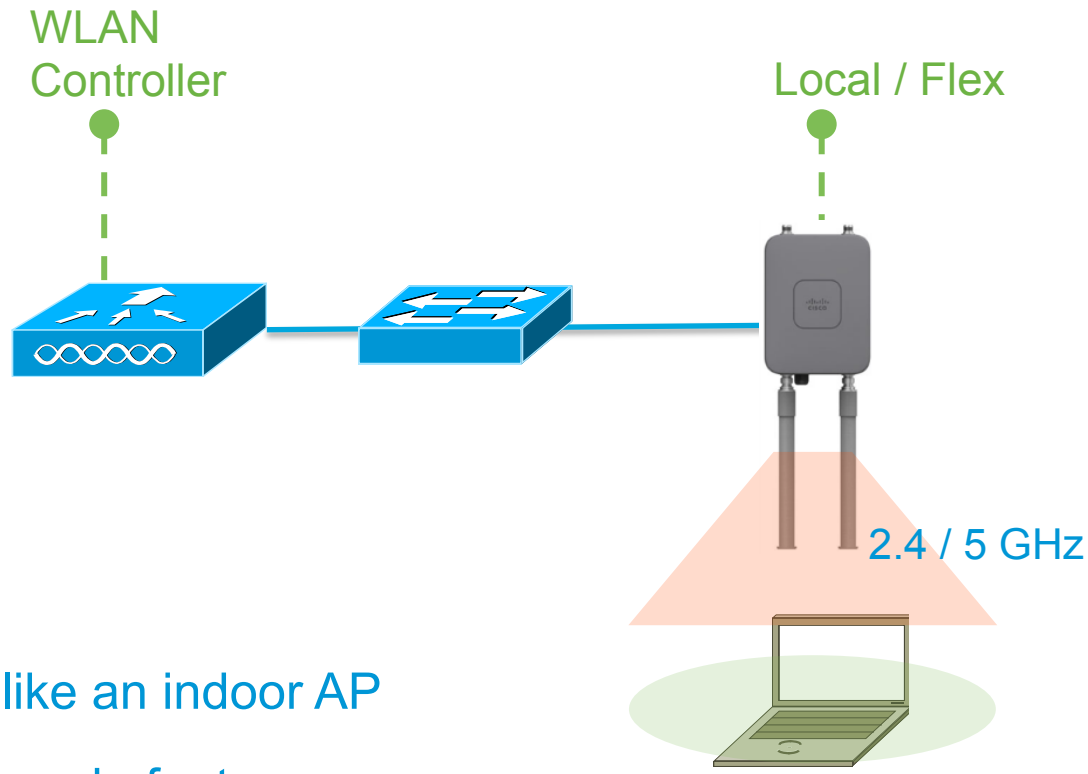
1550	Parameter	1530
✓	SFP backhaul	X
✓	Cable backhaul	X
✓	CleanAir	X
✓	ClientLink	X
✓ ✓	Direct AC power input	X
✓	PoE Out	X
✓	GPS	X
✓	Battery Backup	X
	Haz Loc version	X

1532 in Unified Bridge Mode (Mesh)



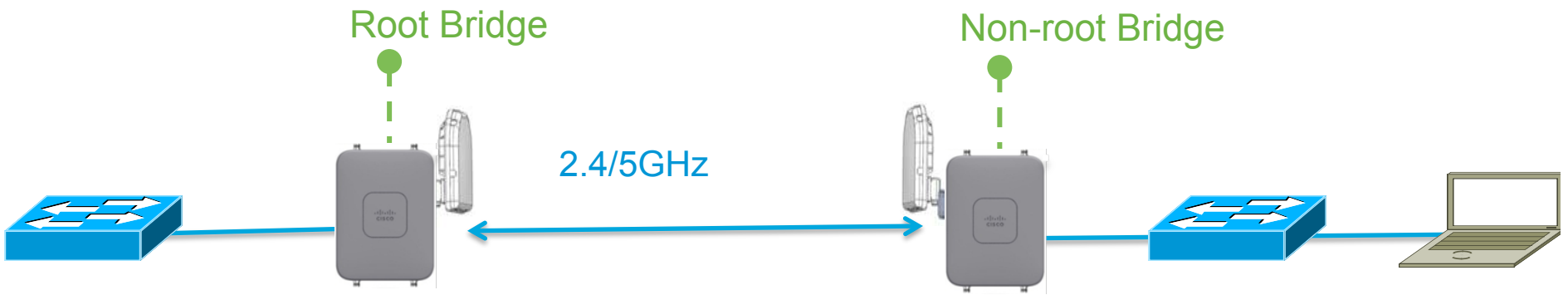
- This is your typical mesh configuration
- Recommendations are:
  - 40MHz backhaul channels
  - Backhaul Data rate set to auto
  - No more than 4 Mesh hops,
  - To maximize backhaul data rates, client access only of 5GHz

1532 in Unified Local / Flexconnect Mode



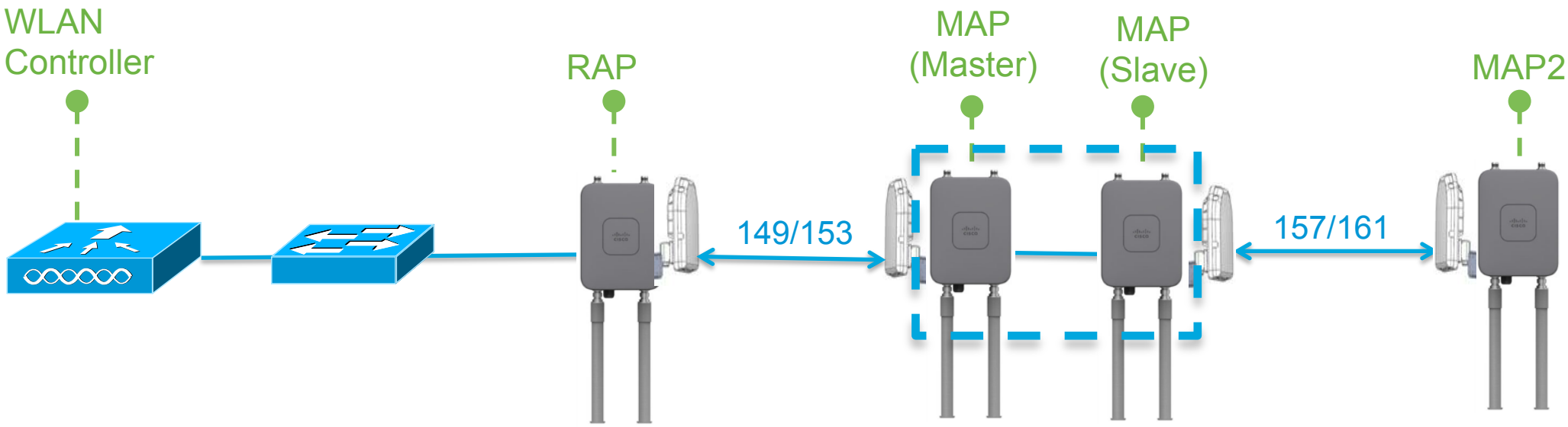
- Use the AP1532 like an indoor AP
- Support for local mode features:
  - RRM on both 2.4GHz and 5GHz bands
  - AP SSO
  - CAC support for VoIP

1532 as a Point to Point Bridge



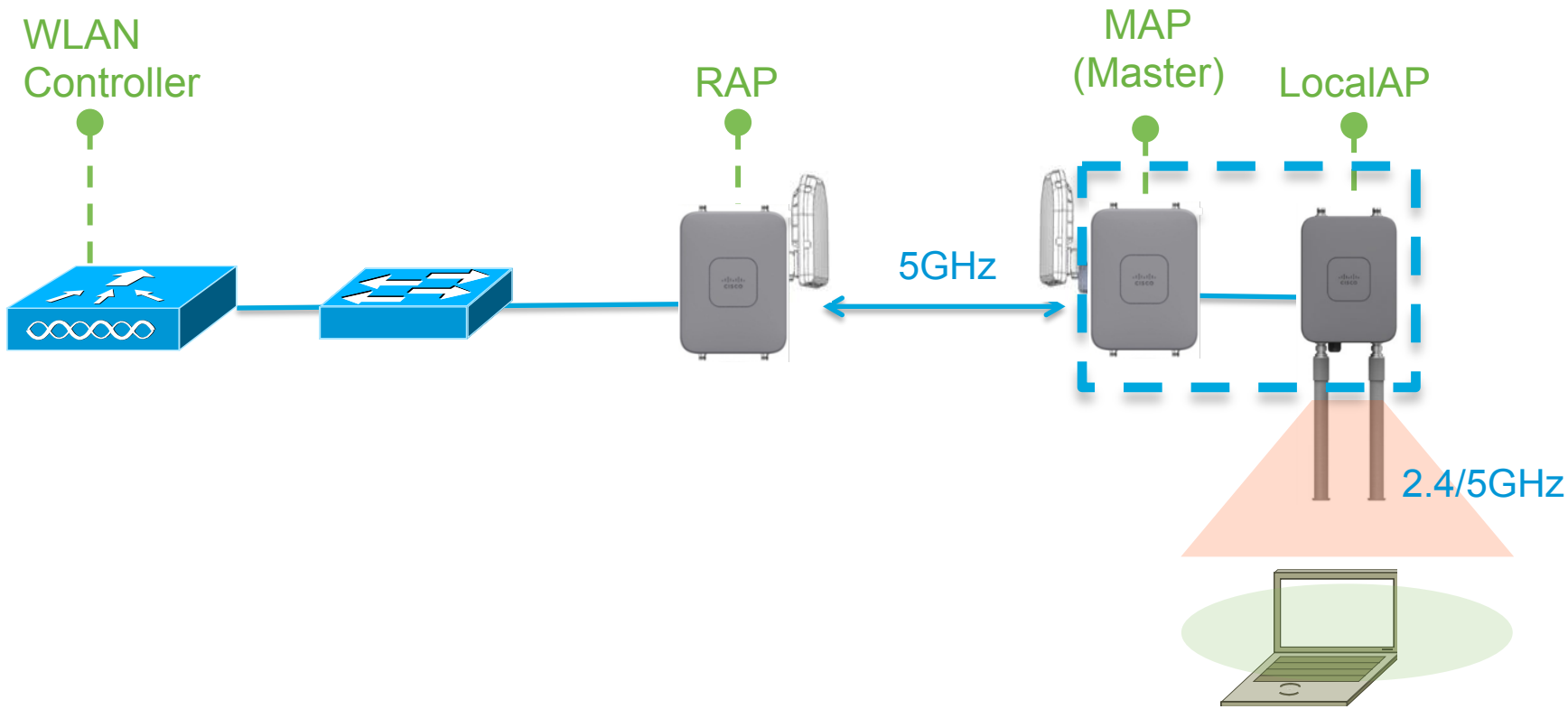
- 1532 are point to point bridging replacements for 1310/1410
- Root Bridges/Non-root Bridges can bridge on either the 2.4GHz radio or the 5GHz radio
- Directional antennas should be used to maximize bridging distance
- New Install mode that flashes the LEDs to denote link quality

Daisy-chaining:1532 as a Serial Backhaul



- Only 1532s in Bridge Mode can utilize this configuration
- Master MAP & Slave MAP are operating on different 5GHz channels to maximize throughput across the mesh link
- BGN configuration and the Preferred Parent command are recommended to maintain the mesh tree
- Slave MAP must be configured in RAP Mode

Daisy-chaining:1532 as a Dedicated Client Access Device



- Only 1532s in Bridge Mode can utilize this configuration
- LocalAP is dedicated for Client Access, while Master MAP will provide the mesh backhaul link
- In this configuration, LocalAP should be in local mode or flex-connect mode

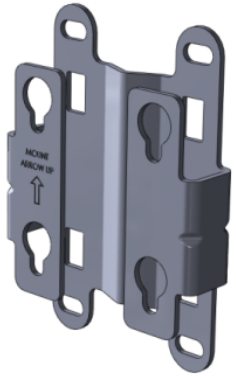
Range Recommendations

1 meter = 3.28 ft	1 sq-meter = 10.7 sq-ft
1 mile = 1.61 km	1 sq-mile = 2.6 sq-km

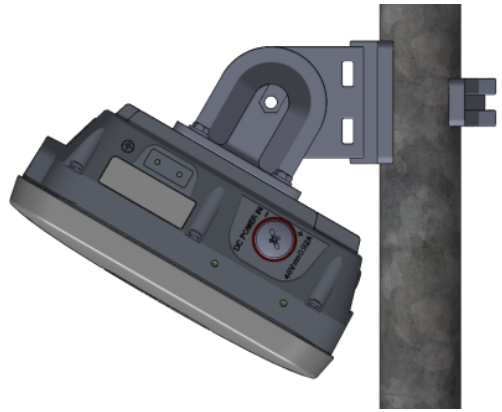
Access Point (Domain specific)	AP – Client @2.4 GHz	AP to AP = 2 x (AP to Client)
1532I (-A)	800ft/200m	1600ft/400m
1532E (-A)	1000 ft/250m	2000ft/500m
1532I (-E)	600ft/180m	1200ft/360m
1532E (-E)	600ft/180m	1200ft/360m

Comparing the 1532I to the 1532E with AIR-ANT2547V-N dual band antennas

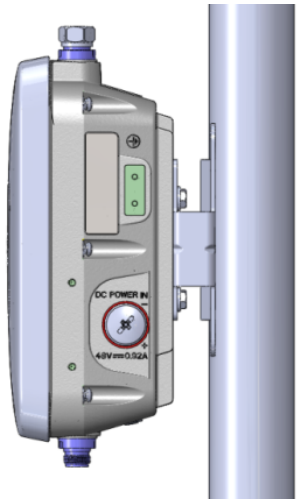
1530 Wall/Pole Mount Brackets (AIR-ACC1530-PMK1, PMK2)

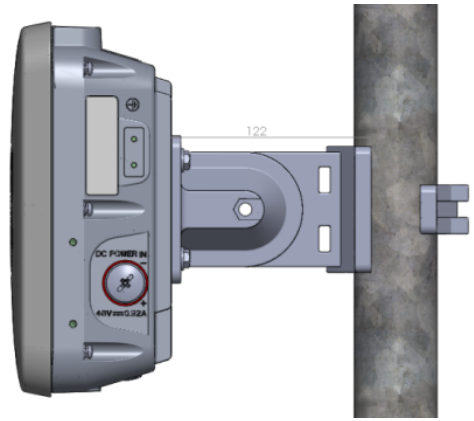


AIR-ACC1530-PMK1

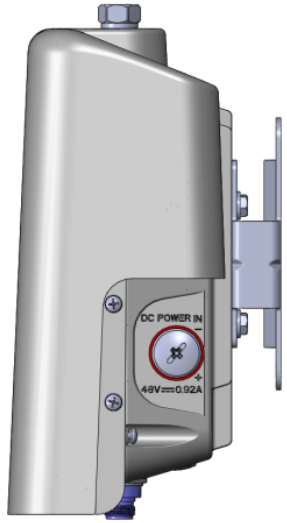


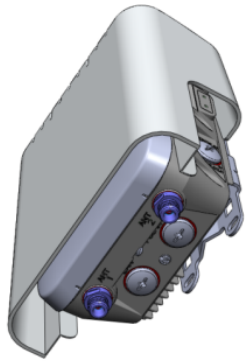
AIR-ACC1530-PMK2





1530 Cover / Solar Shield (AIR-ACC1530-CVR=)





- **Cover can be painted to blend with background**
- **No Cisco logo**

AP1530 Power Matrix

Model	Configuration	Regulatory domain	Switch power	AIR-PWRINJ1500-2=	AIR-PWRINJ 4=	AC/DC power adapter AIR-PWRADPT-1530 =
1532I	3x3:3 (2.4 GHz) 2x3:2 (5 GHz)	A, D, F, K, N, Q, T, Z	UPoE	✔		✔
	one Tx disabled* 2x3:2 (2.4 GHz) 2x3:2 (5 GHz)	A, D, F, K, N, Q, T, Z	802.3at PoE+	N/A	✔	N/A
	3x3:3 (2.4 GHz) 2x3:2 (5 GHz)	C, E, H, M, R, S	802.3at PoE+	✔	✔	✔
1532E	2x2:2 (2.4 GHz) 2x2:2 (5 GHz)	all	802.3at PoE+	✔	✔	✔

* Not user configurable. AP will automatically disable one of the 2.4 GHz Tx if it detects only 802.3at power input.

1530 Power Injectors

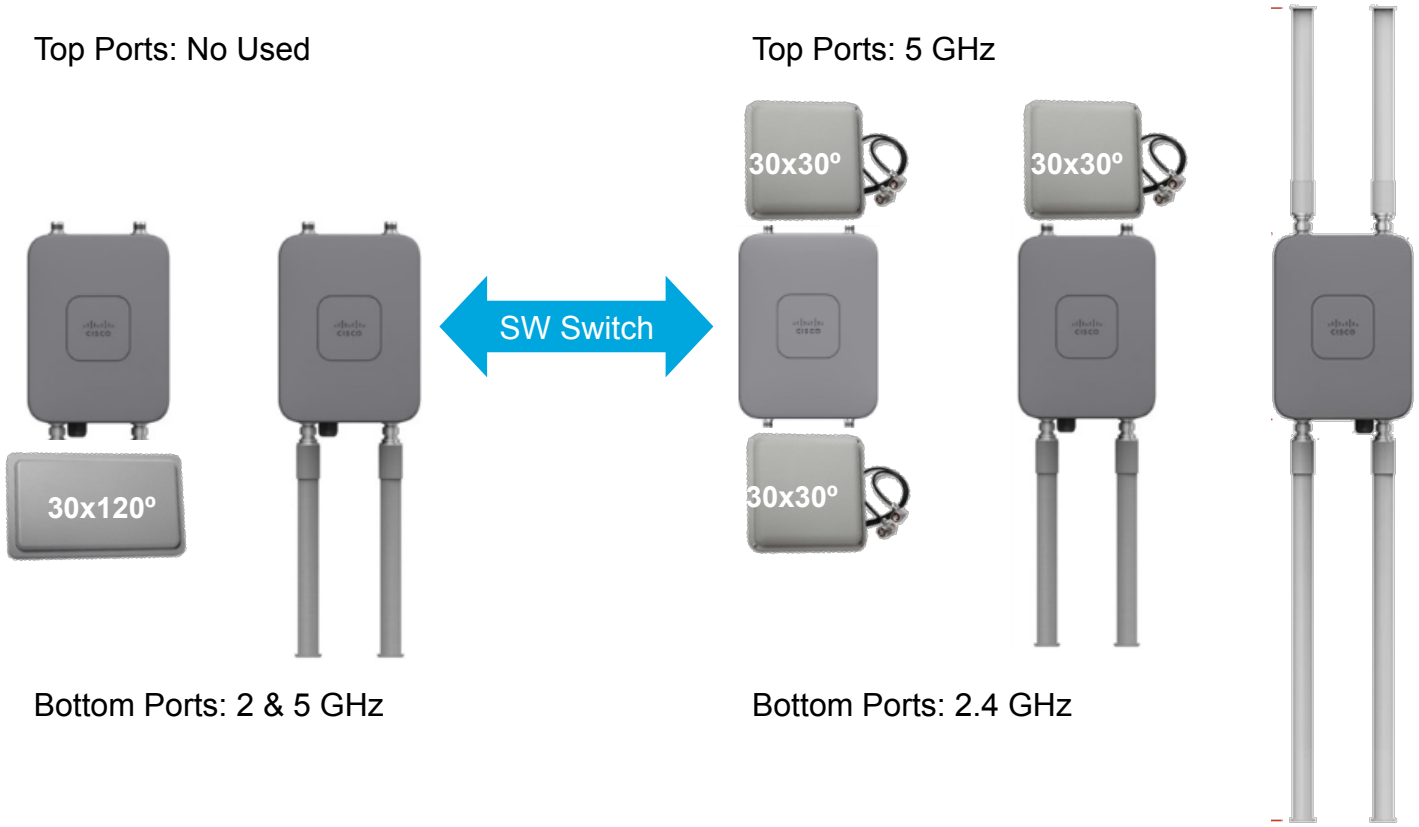
- **AIR-PWRINJ1500-2=**
  - Power injector used: 1520/1550
  - 100-240 VAC input, 80W
  - Indoor use only

- **AIR-PWRINJ4=**
  - Power injector used on 1250 /3600
  - 100-240 VAC input, 25W
  - Indoor use only

1530 vs. comp
Better Performance, Superior Functionality, Lower Price

1530 Advantages include:

- Longer Range ≈ 25%
  - Higher Tx Power
  - Higher Ant. gain
- Internal/External Antennas
- Flexible Antenna port
- Easier to install
- Low Profile
  - Smaller
  - Darker
  - Closer to Wall/Pole
  - Paintable Cover
- Lower Price



6/9 dBi “DRE” Omnidirectional Antenna

2.4 GHz & 5 GHz (preliminary data)
This antenna will have an “N” Style Connector
(Intended to be used with outdoor products)

Parameter	Performance
Vendor Part Number	Cisco High Gain Dual Band
Antenna Type	Omnidirectional
Operating Frequency Range	2400 - 2500 MHz
VSWR Max	1.4:1
Maximum Gain (dBi)	7.5
Phi = 0° Co-Polar Beam Width (deg)	22°
Ripple	1.5
Polarization	Vertical

Parameter	Performance
Vendor Part Number	Cisco High Gain Dual Band
Antenna Type	Omnidirectional
Operating Frequency Range	5150 - 5600 MHz
Operating Frequency Range	5650 - 5900 MHz
VSWR Max	1.4:1
Maximum Gain (dBi)	8.9
Phi = 0° Co-Polar Beam Width (deg)	12°

7.6 Software

Roadmap – WLAN Infrastructure

AireOS Controllers

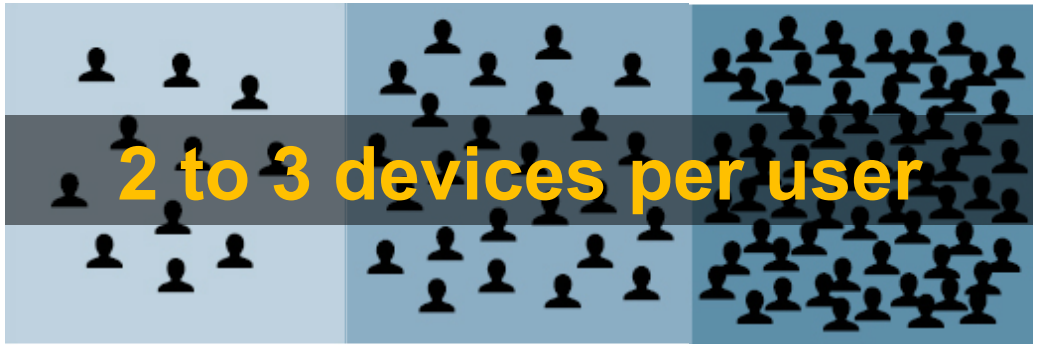
Committed

	Aug 2013	Q4CY13
s/w release	7.5	7.6
Unified Access – WLAN Infrastructure	Interop with MSE 7.5 ISE 1.1.x, 1.2 CPI 1.4	Interop with MSE 7.6 ISE 1.2 CPI 1.4.x
	AP3600 11ac - Wave 1 module	AP3700 - Modular AP Integrated 11ac – Wave 1
	AP700	Outdoor AP1532 (also Bridge with Autonomous s/w)
	OEAP 600 Split Tunneling	
	OEAP support on vWLC	AP1552 with integrated Emerson WiHART
	CT2500 HA SKU, N:1	
	Wireless Device Profiling and Policy Classification Engine	3G small cell module for AP3600 and AP3700
	Guest Anchor on CT8500	
	Controller Resiliency Client SSO Over any L2 connection	3702P (Stadium Antenna)
	Bonjour Services Directory Phase 2	FQDN Pre-Auth ACL for onboarding
	FlexConnect Additions: PEAP / EAP-TLS AAA ACL and QoS 802.11w	HD Experience Ph-1

Cisco HDX

Why High Density Wi-Fi?

- Wireless has become the preferred access technology -- and in many cases the only practical one
- The need for high density started with stadiums and auditoriums – but has reached every network
- The explosion of smart devices and increasing connection counts per seat are everywhere
- Application demands are increasing
- Even with advances - wireless is still a shared half-duplex medium and requires efficient use to succeed.



What are Some Typical Challenges?

- Interference from other WiFi networks in the venue
- Interference from non-WiFi systems operating in the same band
- Co-channel interference: Many APs in the venue, but effectively no more capacity
- Clients operating at low data rates (ex. 802.11b) pull down the performance of the network
- Clients mistakenly choose a 2.4 GHz radio (louder signal) instead of 5 GHz (less load)
- Sticky Clients: Clients mistakenly stay on the same AP, even when person has moved from one end of the venue to another
- Limitations on mounting assets. Hard to put APs where you want them
- Probe storms: 2.4 GHz clients probe on all 11 overlapping channels
- Ad Hoc Viruses: Clients forming bogus ad hoc networks such as “Free Public WiFi”

HD Wi-Fi -- Best Practices

Solid RF Design

- Constrain RF
  - Directional Antennas, Down-Tilt
- Good RF Layout/Design:
  - Channels, Tx Power
- Eliminate Interference
  - Rogues and Non-Wi-Fi Interference

Basic Tuning

- Minimize SSIDs
- Disable Low Data Rates
  - Helps with Sticky Clients, Improves capacity
- Band Steering
  - Push dual-band clients to 5 GHz
- RF Profiles

Advanced

- Rx-SOP Tuning
  - Greatly improves capacity by reducing co-channel impact
  - Also reduces sticky clients
- Optimized Multicast Video

Cisco High Density Experiences

CLEAN AIR

Spectrum Intelligence

CLIENT LINK

Optimizes Wireless Client Performance

Performance

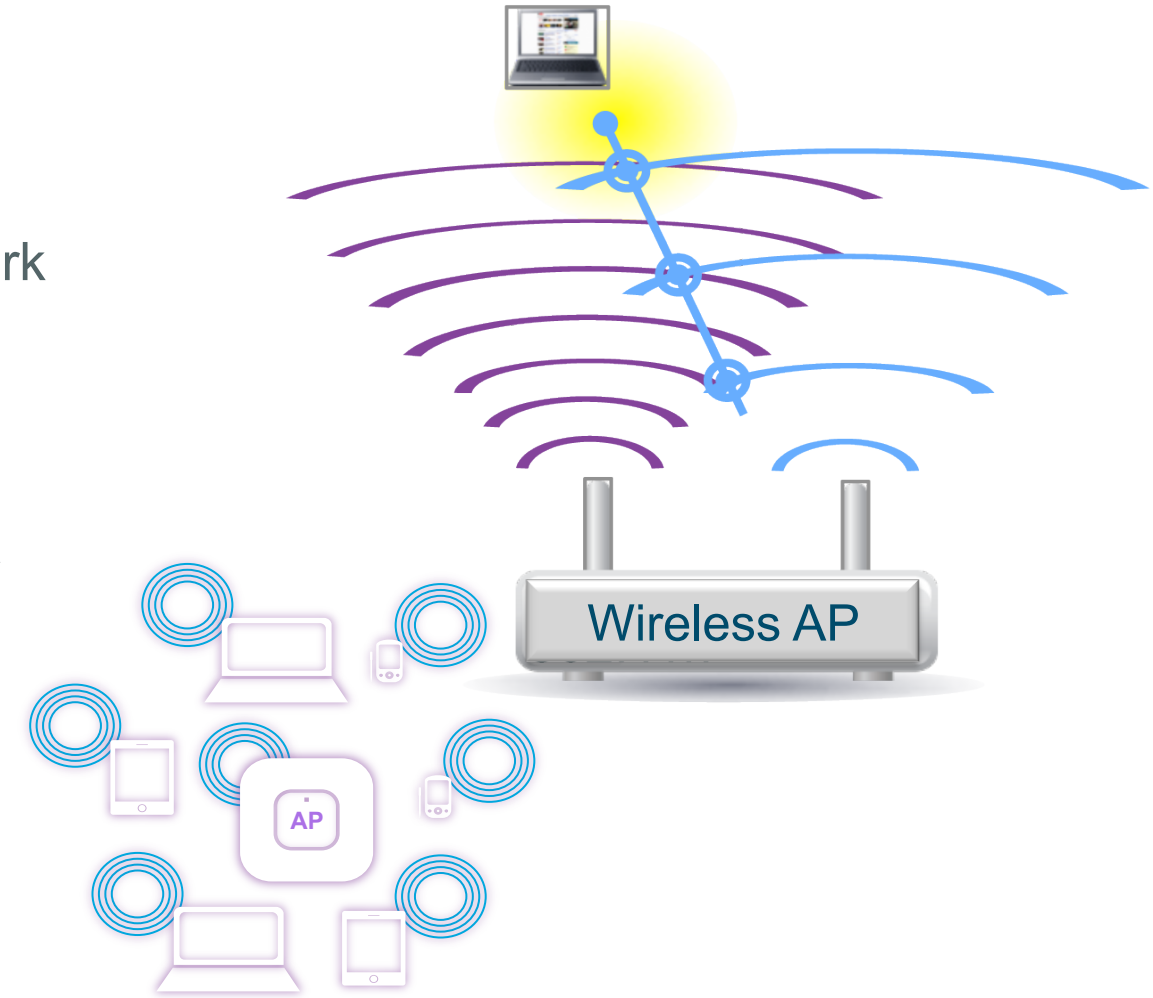
Multi-Client Performance

Smart Roaming

Seamless Roaming Experience

Client Link 3.0

- ClientLink uses multiple transmit antennas to focus transmissions in the direction of the client
- In the mixed-client networks, optimizes overall network capacity by helping ensure that 802.11a/n and 802.11ac clients operate at the best possible rates, especially when they are near cell boundaries.
- Client agnostic since Multiple Antennas Design Work for All Clients



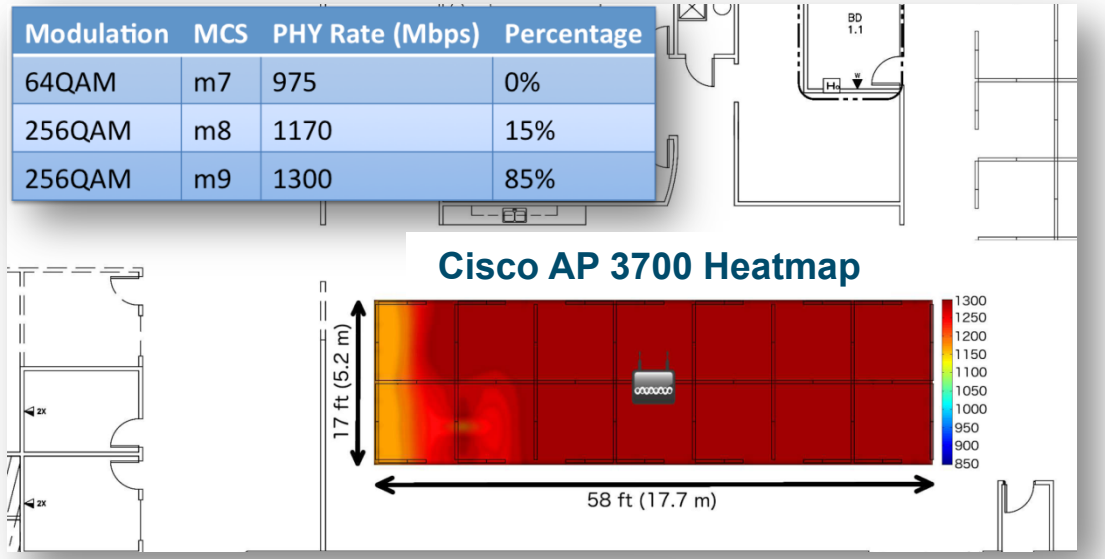
http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps11983/at_a_glance_c45-691984.pdf

256QAM Heat Map: Cisco 3702i vs. Competition

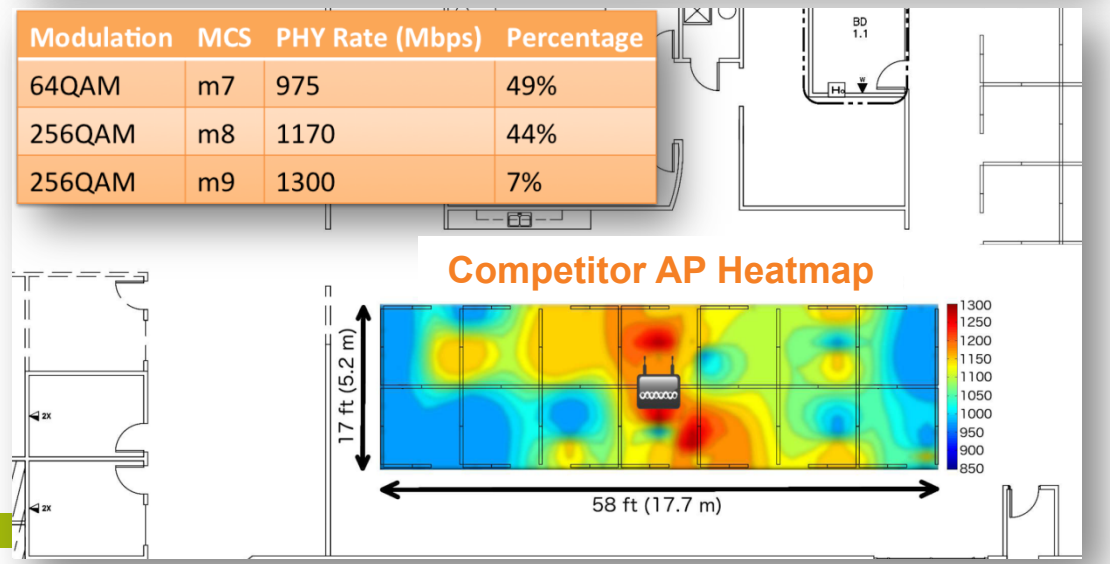
- ClientLink 3.0 helps the 3700 achieve 256 QAM with m9 rate
- AP 3700 has a significant 256 QAM advantage over the competition 11ac AP
- The Test:

  Use a MacBook Pro (3ss) and record the data rate in 40+ locations in a cubicle environment while running traffic to the client.

Modulation	MCS	PHY Rate (Mbps)	Percentage
64QAM	m7	975	0%
256QAM	m8	1170	15%
256QAM	m9	1300	85%



Modulation	MCS	PHY Rate (Mbps)	Percentage
64QAM	m7	975	49%
256QAM	m8	1170	44%
256QAM	m9	1300	7%

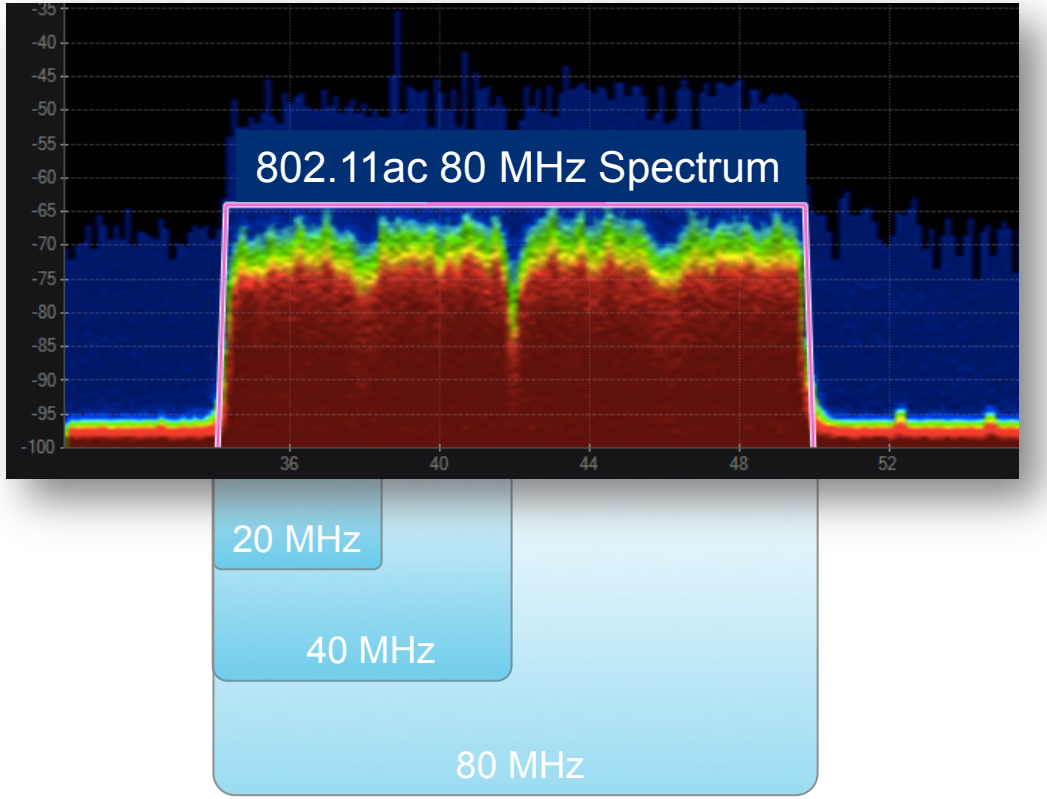


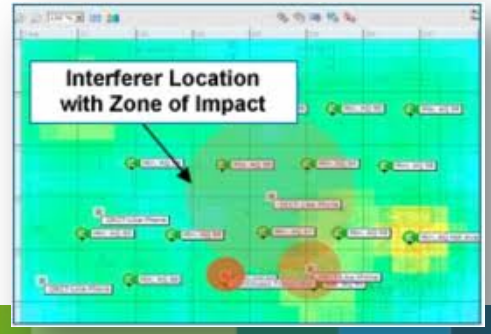
ClientLink 3.0 YouTube video:

http://www.youtube.com/watch?v=0q_shbSpOIA

Clean Air

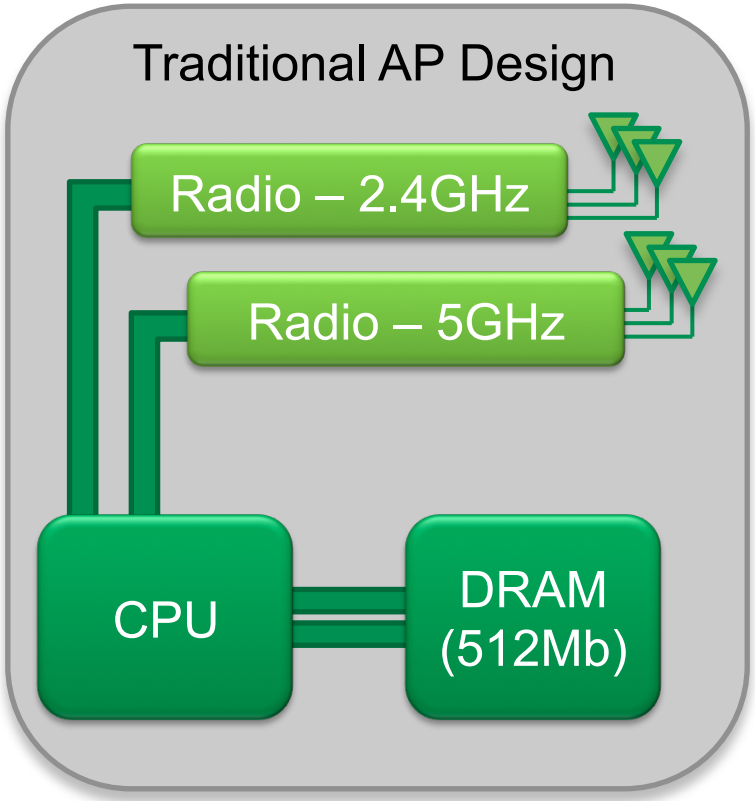
- Provides continual, system-wide discovery without performance impact
- Accurately identifies source, location, and scope of interference
- Takes automatic action to avoid current and future interference, with full history reporting
- Cisco AP 3700 provides complete visibility over 80 MHz 11ac spectrum

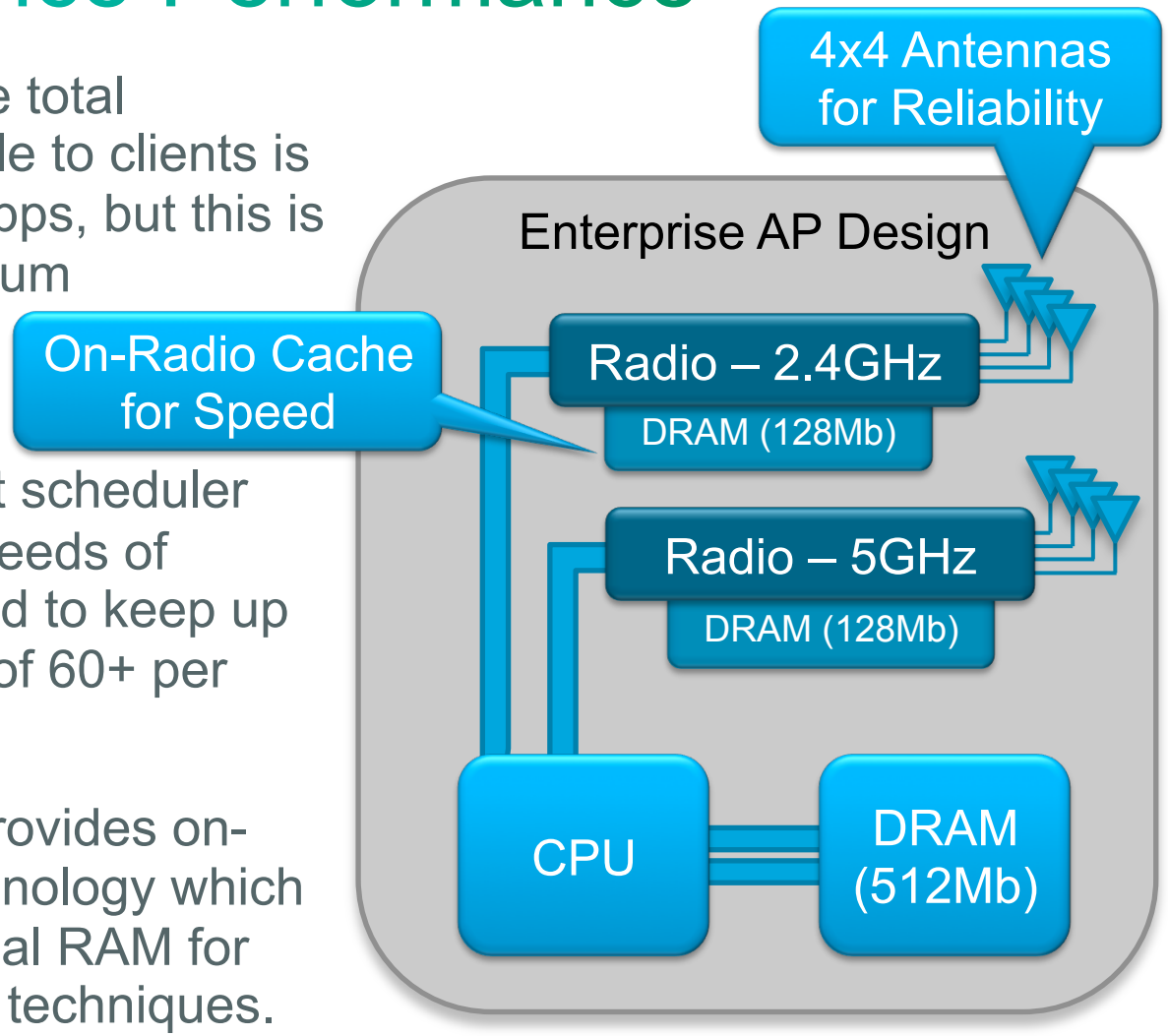




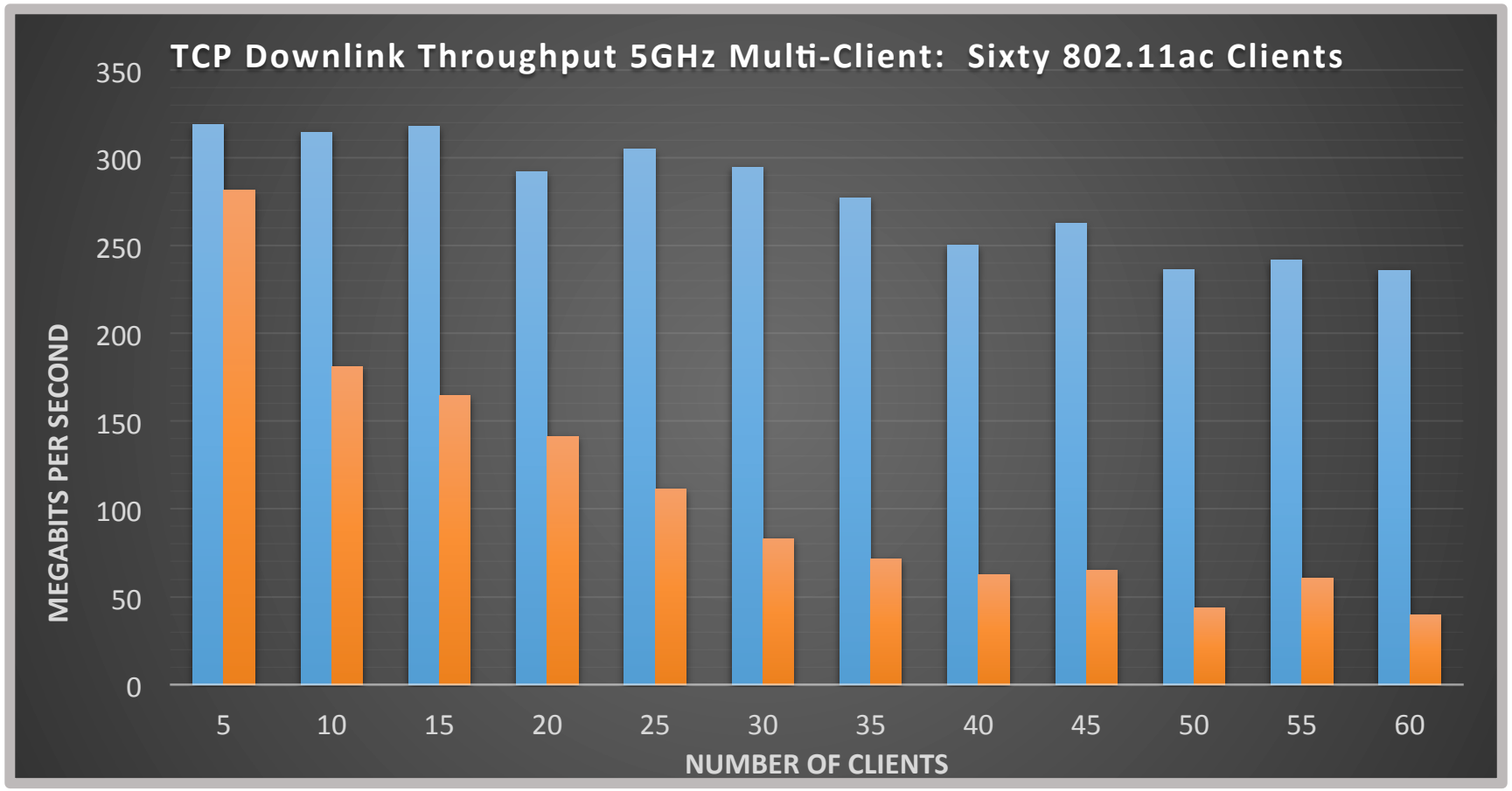
Multi-Client Performance Performance

- With 802.11ac, the total bandwidth available to clients is increased to 1.3Gbps, but this is still a shared medium technology.
- An efficient packet scheduler designed for the needs of 802.11ac is needed to keep up with client counts of 60+ per radio.
- Cisco's AP3700 provides on-radio caching technology which leverages additional RAM for per-client queuing techniques.





Multi-Client Performance Results

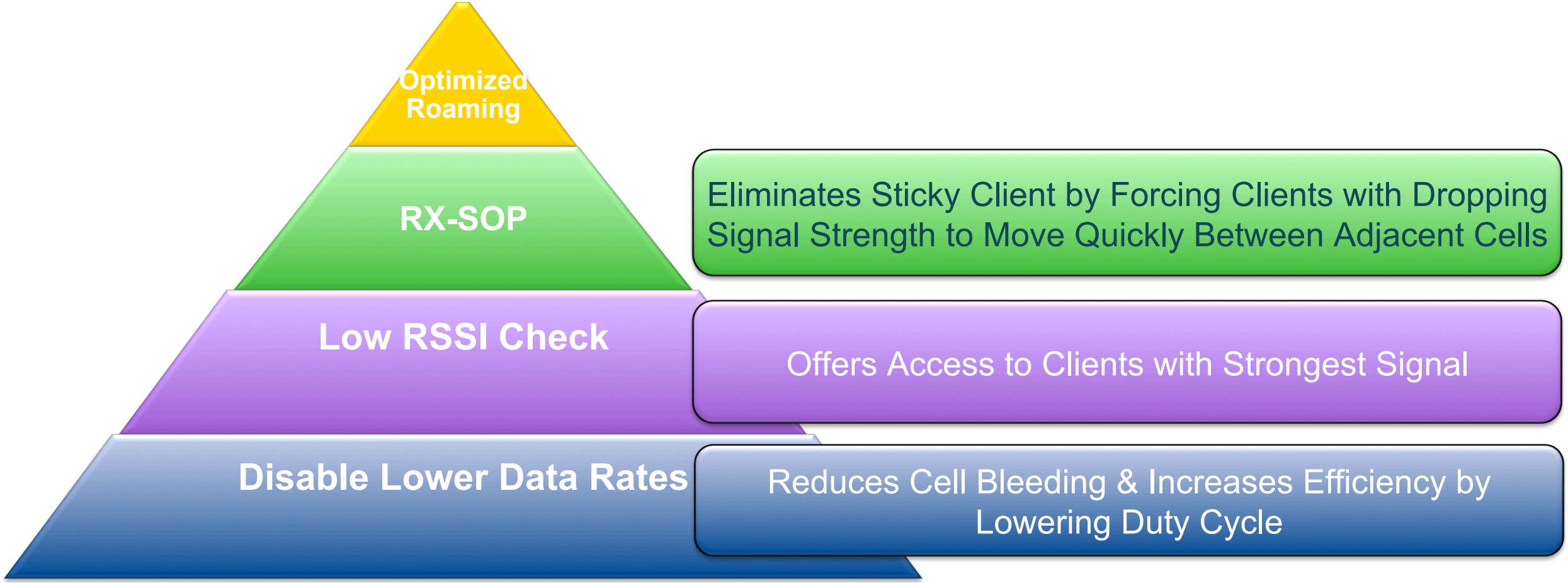


HDX Multi-Client YouTube video:

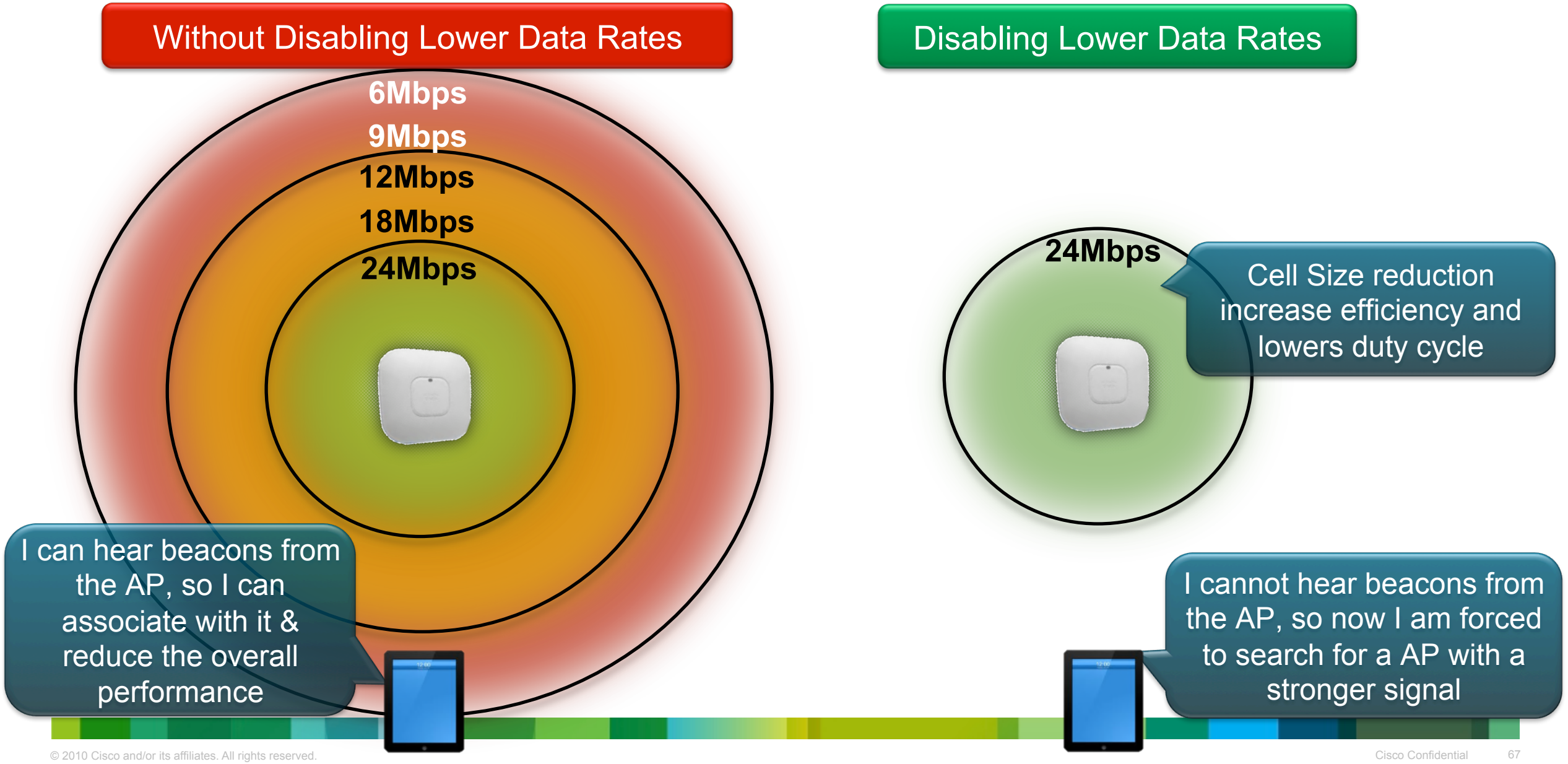
http://www.youtube.com/watch?v=C8gfnCVm-3o&

Cisco Optimized Roaming

How do we provide optimized roaming experience?

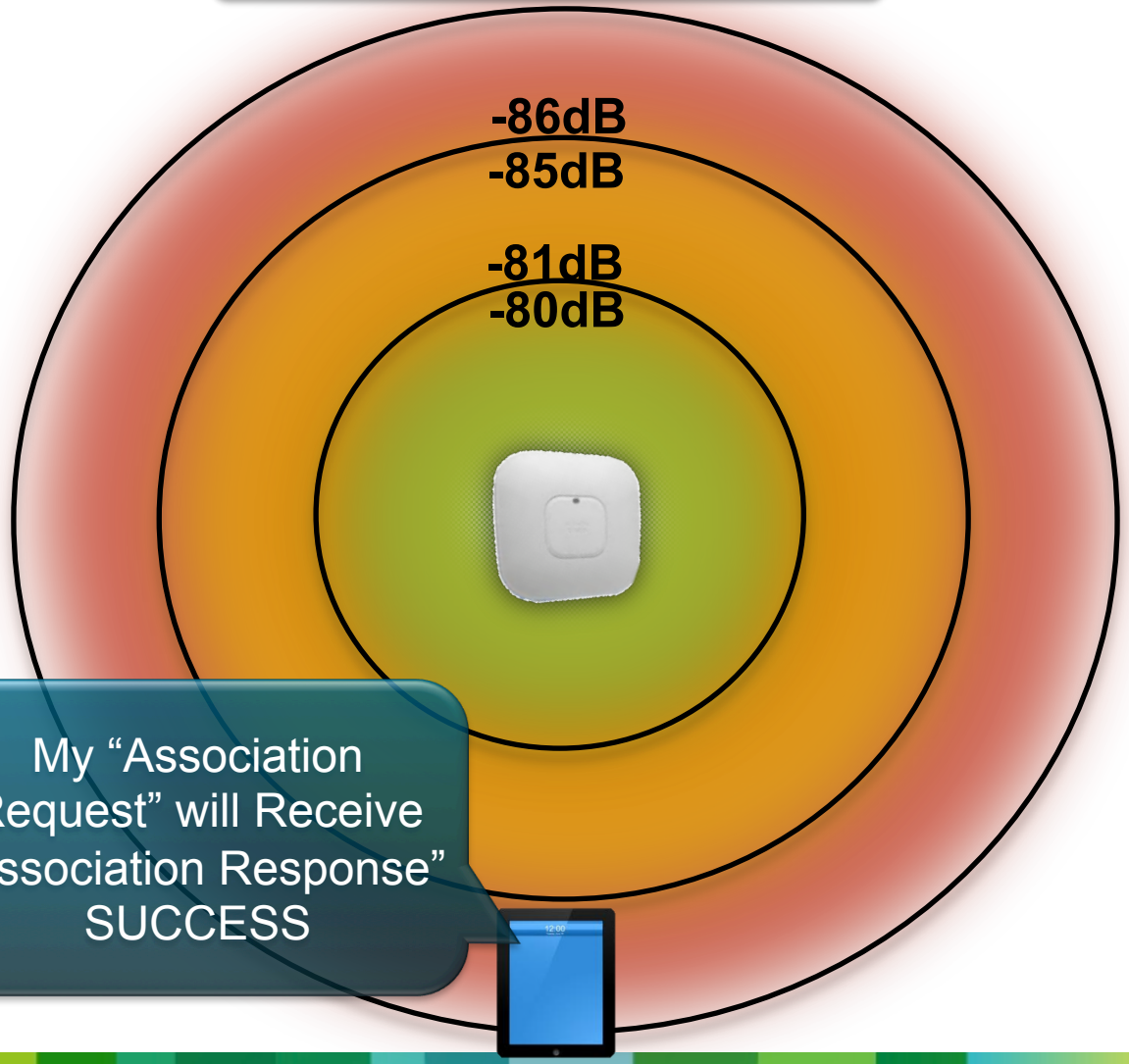


Disable Mandatory Lower Data Rates



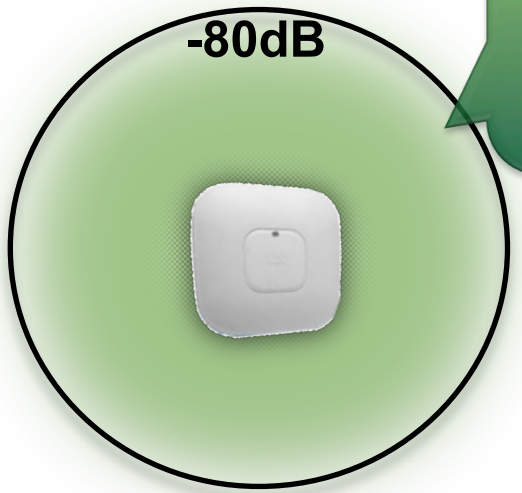
Low RSSI Check

Without Low RSSI Check



My “Association Request” will Receive “Association Response” SUCCESS

With Low RSSI Check Set to -80dBm (Default)

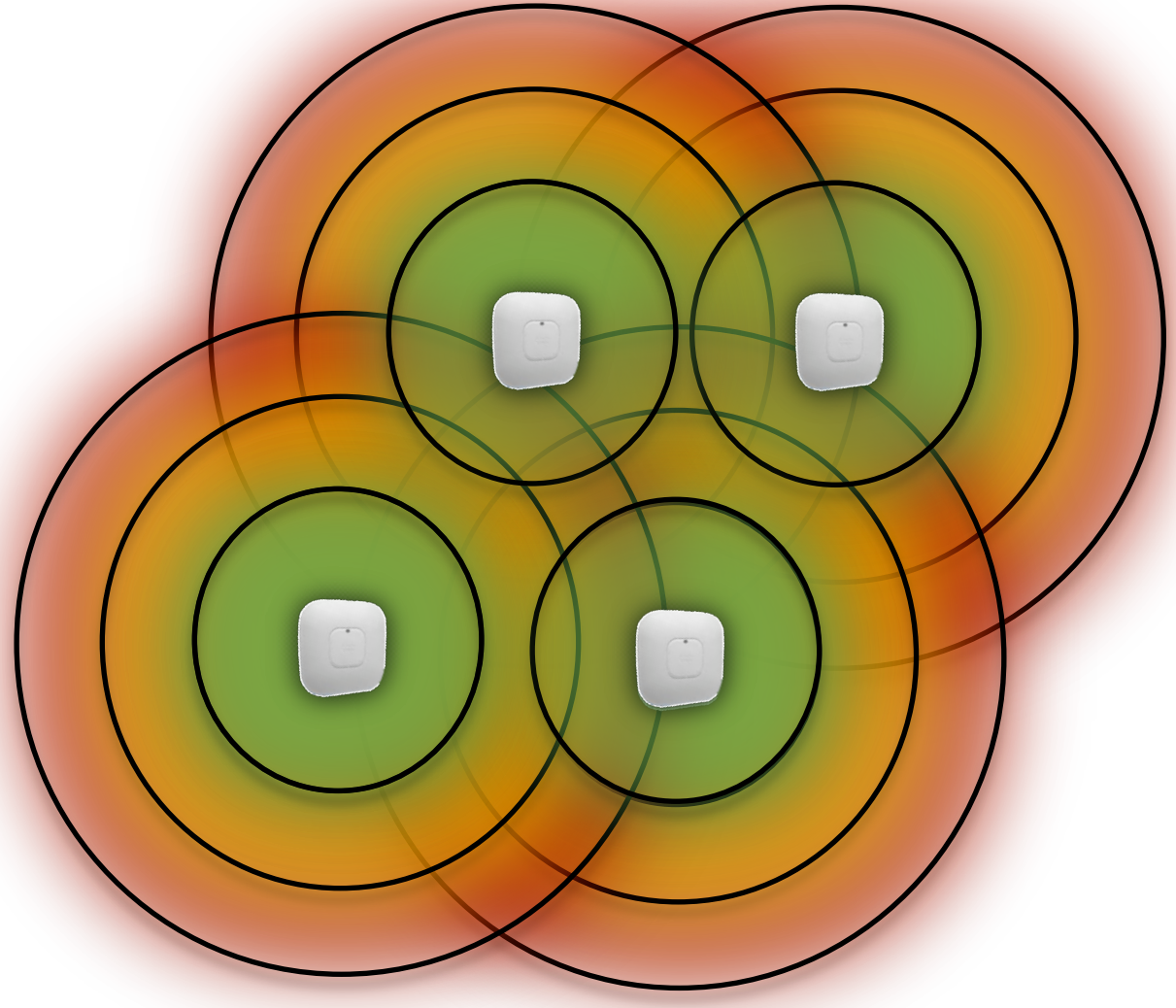


“Association Response” SUCCESS is restricted to clients within CELL range better than -80dBm

My “Association Request” will Receive “Association Response” REJECT – Poor Channel

Rx-Sop

- Rx Sop is radio's receiver sensitivity – How well AP can hear clients
- Decreasing Rx-SOP to lower level (-95 dBm), increases cell size
- Raising Rx-SOP to higher level (-75 dBm), reduces the cell size, which provides much better spatial re-use
- Smaller cell size and efficient re-use of spectrum is key in the High Density



Higher Rx-Sop Threshold = Smaller Cell Size = Better spectrum re-use

Case Studies

Cisco Live Orlando 2013

Over 20,000 attendees

Over 600 access points

Cisco Prime for Management

Cisco MSE for Analytics

Network reliability: 99.999%

http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps11983/case_study_c36-729140.html

Super Bowl XLVII (2013)

Over 30,000 simultaneous connections

Over 600 access point

Over 370 GB of data transfer over Wi-Fi

Always ON wireless network

http://arstechnica.com/information-technology/2013/02/super-bowl-plans-to-handle-30000-wi-fi-users-at-once-and-sniff-out-rogue-devices/

MSE Promotion

MSE\CMX License Promotion

What?

Base Location Licenses: free

CMX Licenses: ~33% discount

When?

October 2013 until end of April 2014

Why?

To enable customers to deploy location based services in their venues

MSE\CMX License Promotion

Promotion Pricing Details

	Regular SKU	Regular List price	Regular Price per AP	**Promotion SKU**	Promotion List Price	Promotion Price per AP
Base Location License	L-LS-1AP	$95	$95	**PRO-L-LS-1AP**	$0	$0
	L-LS-100AP	$8,495	$85	**PRO-L-LS-100AP**	$0	$0
	L-LS-1000AP	$74,995	$75	**PRO-L-LS-1000AP**	$0	$0
CMX License	L-AD-LS-1AP	$195	$195	**PRO-L-AD-LS-1AP**	$120	$120
	L-AD-LS-100AP	$16,995	$170	**PRO-L-AD-LS-100AP**	$11,000	$110
	L-AD-LS-1000AP	$149,995	$150	**PRO-L-AD-LS-1000AP**	$100,000	$100

- Upgrade SKU (L-UPG-LS-1AP) non orderable
- Activation License still required for vMSE
- vMSE Activation License = $4,995
- MSE 3355 = $21,995

Prime 1.4 eller 2.0 ?

Roadmap – WLAN Infrastructure

AireOS Controllers

Committed

	Aug 2013	Q4CY13
s/w release	7.5	7.6
Unified Access – WLAN Infrastructure	Interop with MSE 7.5 ISE 1.1.x, 1.2 CPI 1.4	Interop with MSE 7.6 ISE 1.2 CPI 1.4.x
	AP3600 11ac - Wave 1 module	AP3700 - Modular AP Integrated 11ac – Wave 1
	AP700	Outdoor AP1532 (also Bridge with Autonomous s/w)
		AP1552 with integrated Emerson WiHART

PI 1.4 hvis I vil anvende 7.5 eller 7.6 software features.

PI 1.4 eller 2.0

Table 4 Cisco Prime Infrastructure and Cisco Wireless Release Compatibility Matrix

Cisco Prime Infrastructure	Cisco WLC	Cisco MSE	ISE	Remarks
2.0	7.4.110.0 7.4.100.60 7.4.100.0 7.3.112.0 7.3.101.0 7.2.115.2 7.2.111.3 7.2.110.0 7.2.103.0 7.0.240.0 7.0.235.3 7.0.235.0 7.0.230.0 7.1.91.0 7.0.220.0 7.0.116.0 7.0.98.218 7.0.98.0	7.4.110.0 7.4.100.0 7.3.101.0 7.2.110.0 7.2.103.0 7.0.240.0 7.0.230.0 7.0.220.0 7.0.201.204 7.0.112.0 7.0.105.0	1.0 1.1 1.2	Cisco Prime Infrastructure 2.0 enables you to manage Cisco WLC 7.5.102.0 with the features of Cisco WLC 7.4.110.0 and earlier releases. Prime Infrastructure 2.0 does not support any features that are introduced in Cisco WLC 7.5.102.0 or later releases including the new access point platforms. Cisco Prime Infrastructure 2.0 enables you to manage 7.5.102.101 or later releases of Cisco MSE with features of Cisco MSE Release 7.4.110.0 and earlier releases. Prime Infrastructure 2.0 does not support any features that are introduced in Cisco MSE 7.5.102.101 or later releases.
Update 1 for 1.4.0.45	7.5.102.0 7.4.121.0 7.4.110.0 7.4.100.60 7.4.100.0 7.3.112.0 7.3.101.0 7.2.115.2	7.6.100.0 7.5.102.101 7.4.121.0 7.4.110.0 7.4.100.0 7.3.101.0 7.2.110.0 7.2.103.0	1.0 1.1	The Update 1 for Cisco Prime Infrastructure 1.4.0.45 enables you to manage Cisco WLC 7.6.100.0 with the features of Cisco WLC 7.5.102.0 and earlier releases. This release does not support any new features of Cisco WLC 7.6.100.0 including the new access point platforms.

http://www.cisco.com/en/US/partner/docs/wireless/controller/5500/tech_notes/Wireless_Software_Compatibility_Matrix.html#wp122281

Microsoft Lync 2013

Lync 2013

Networking for Lync Server 2010 and 2013

Listed below are the network infrastructure solutions that have been tested by these partners and reviewed by Microsoft to meet Lync Server 2010 requirements. It is recommended that you visit the partner's web site for the latest information regarding product specifications, capacity, country support and documentation including release notes and known issues. Please contact the listed partner for more information on these products.

Additional information on networking with Microsoft Lync Server 2010, including Planning, QoS, Call Admission Control and Security can be found on the Lync Server Network Infrastructure Roadmap.

For more information on optimizing Wi-Fi networks with Microsoft Lync, please see the white paper Delivering Lync Real-Time Communications over Wi-Fi.

Wi-Fi

Vendor	Qualified Device	Firmware Version Tested
Aruba Networks, Inc.	Mobility Controllers and AP-104/105/134/135 Access Points	AOS 6.1.3.2 and higher
Cisco Systems	AIR-CT5508-K9 and AIR-CAP 3602E-A-K9, with SW 7.5.102.2	V01

Thank you.