High Performance Wireless Networks

고성능 WI-FI 솔루션 소개

2013.11

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XIRRUS 회사 소개

Founded:	2004, volume shipments 2007
Headquarters:	Thousand Oaks, California
Employees:	150+
Management:	Ex-Xircom, Juniper, 3Com, CA
Investors:	August Capital, Canaan Partners, InterWest, QuestMark Partners, US Venture Partners
Technology:	30+ patents pending
Customers:	Proven in over 3000 installations
Manufacturing:	Made in the U.S.A.

Xirrus 제품의 특징

Wi-Fi Array architecture 를 사용 하여 고성능 Wi-Fi 를 보장

- **Wi-Fi 도달영역 (4X more)**
- **Bandwidth (8X more)**
- **사용자 수용력 (8X more)**

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스마트 혁명 시대, 미디어 환경의 새로운 변화

Application Drivers

- Cloud computing

    Pushes traffic deeper into the network

- Mobile Apps

    Over 1 million in 4 years

- Video

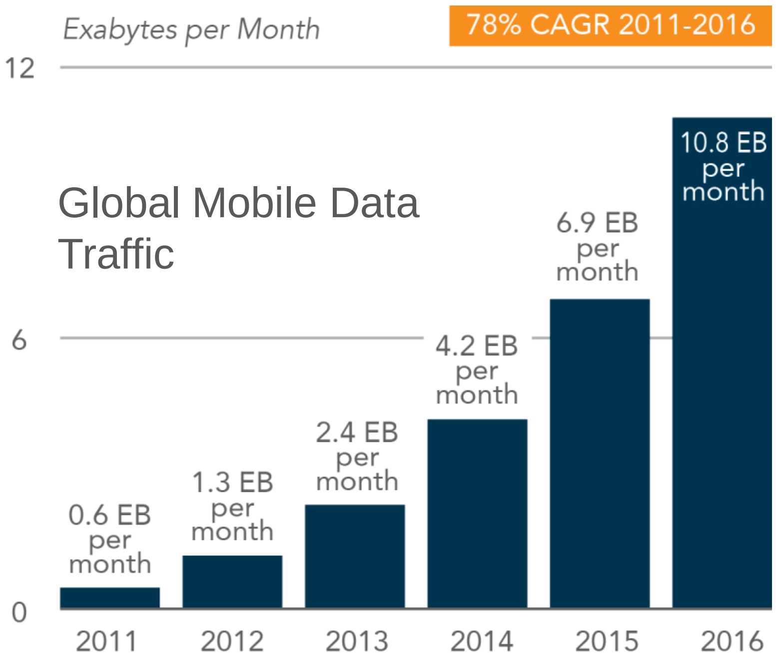
    Half of all Internet traffic by 2015

- Social networks

    Increasing mobile data usage

Source: Jeffries, 2011

무선 네트워크 사용의 폭발적 증가



Source: Cisco VNI Mobile, 2012

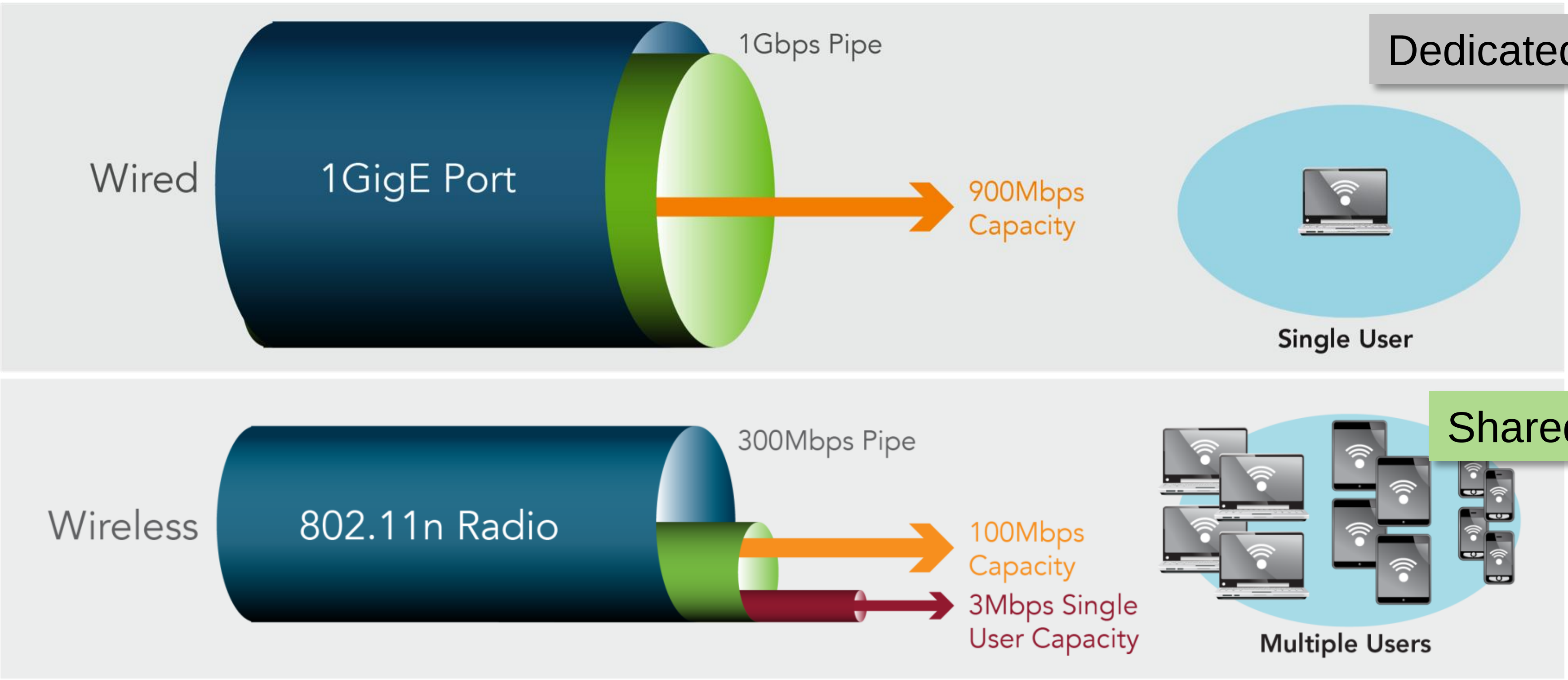
"By 2015, 80% of newly installed wireless networks will be obsolete because of a lack of proper planning."

Top Wireless Issues That May Derail Your Mobile Strategy.
Paul DeBeasi, October 2011

Gartner

The average smartphone will generate 2.6 GB of traffic per month in 2016, a 17-fold increase over the 2011 average of 150 MB per month.
Source: Evercore partners

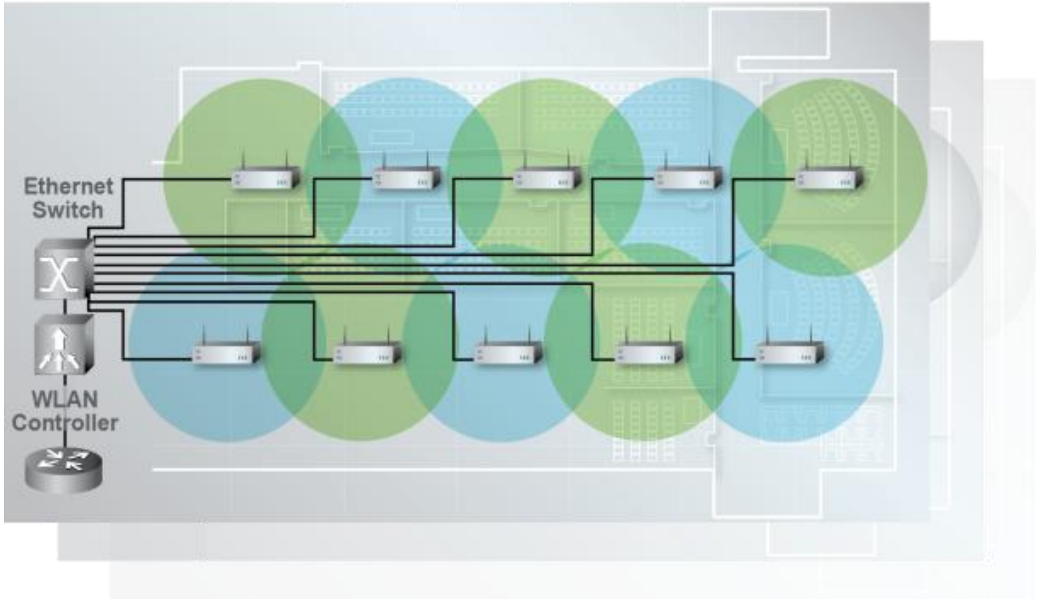
사용자 입장에서의 유선랜과 무선랜의 차이



Wireless user capacity is reduced since the pipe is shared by multiple users and by protocol overhead

전형적인 무선랜 구성의 약점

Conventional APs + Central Controller



< 특성 >

셀당 도달영역 : Low
셀당 : 라디오 1-2
중앙관리
셀당 용량 : 600Mbps
설치위치 갯수 : High

Limited Scalability	→	Adding more and more APs is not the answer
Fixed Configurations	→	1 x 2.4G and 1 x 5G radio per AP, no flexibility
Short Lifespan	→	No upgrade path with throwaway APs
Controller Bottleneck	→	Potential choke point and single point of failure

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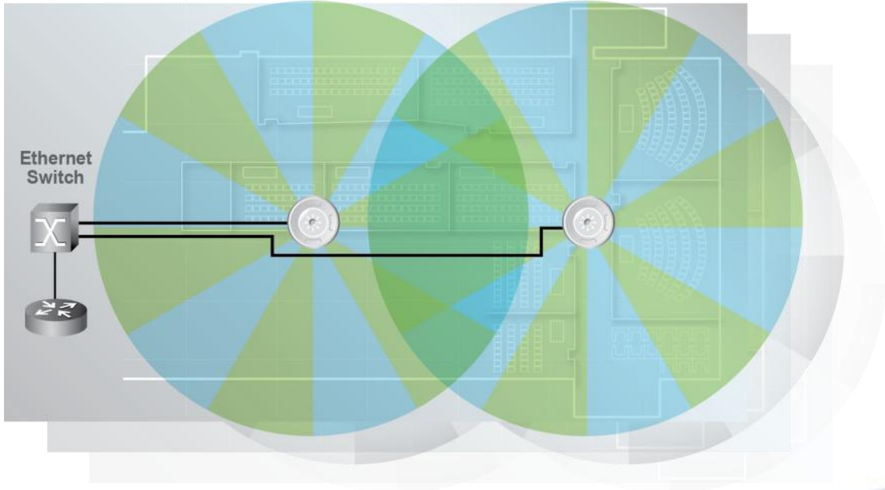
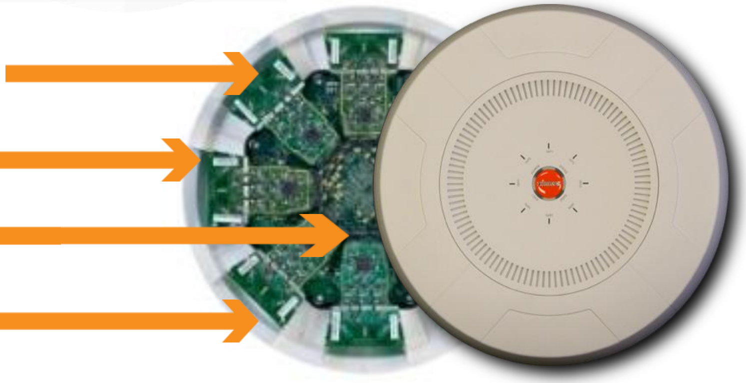
XIRRUS 장비 특징 (XIRRUS ARRAY)

Wireless Array



1. Multiple radios (2 to 16 per Array)
2. Directional Antennas
3. Integrated Controller
4. Modular Chassis-based Design



- Wi-Fi Array 는 장비 하나에 Controller, Switch, Firewall , Spectrum analyzer 를 포함하는 다수의 방향성 Access Point 를 집적한 솔루션
- Wi-Fi 구현을 단순화 하여 시간과 예산을 절감

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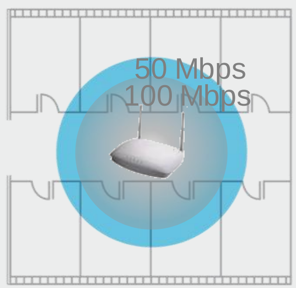
XIRRUS 장비의 장점 : CAPACITY AND COVERAGE

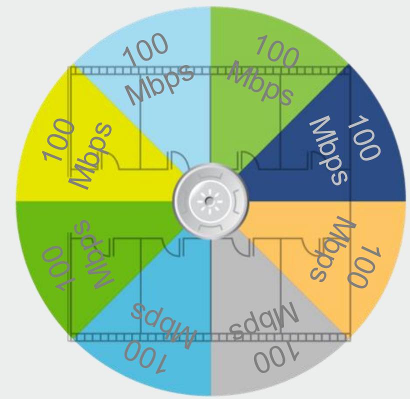
2-Radio Access Point
low-gain omni-directional antennas
(150Mbps capacity)



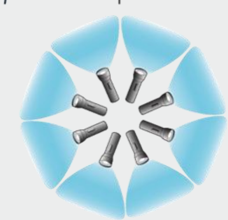
Example: Light Bulb

VS

8-Radio Wireless Array
high-gain directional antennas
(800Mbps capacity)



Example: Multiple Flashlights



Array 장비는 플래쉬라이트 처럼 동작함. 기존 AP 대비 4배의 서비스 면적 , 5배의 트래픽 성능 (라디오 8개 모델 기준)

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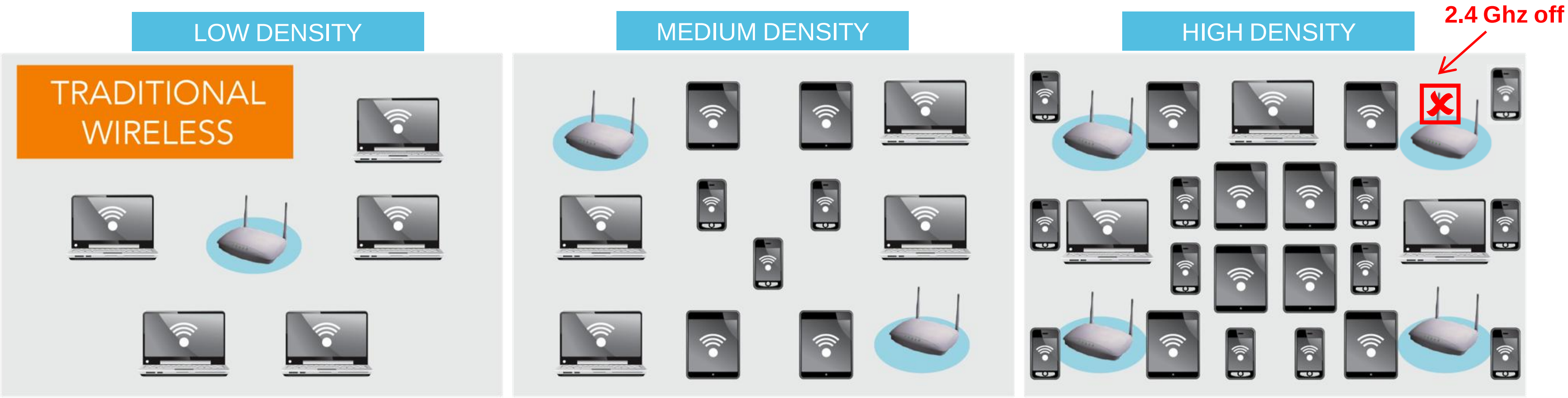
XIRRUS 장비의 장점 : SEAMLESS SCALABILITY

Adding more and more APs is expensive and creates interference



Add capacity without more network equipment or interference

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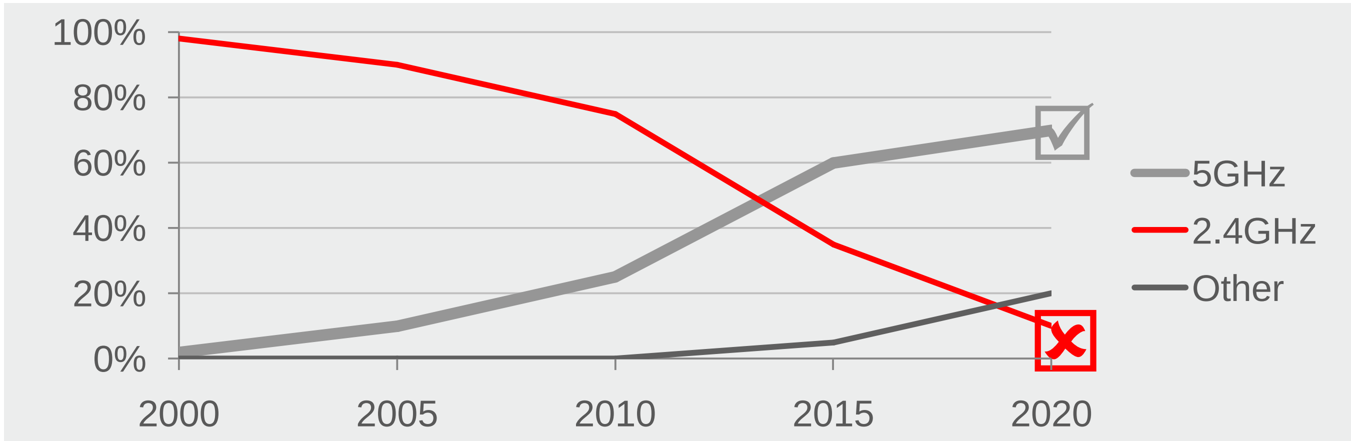
XIRRUS 장비의 장점 : 5GHZ 사용

Wi-Fi SPECTRUM MIGRATION



Fixed configuration APs will not support the shift to 5GHz+ bands

TRADITIONAL WIRELESS

Fixed: **(1) 2.4GHz radio + (1) 5GHz radio**

Multi-state radio Arrays dynamically adjust to match clients

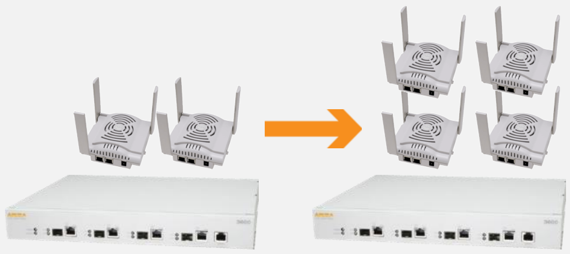
XIRRUS

Flexible: **All radios support 2.4GHz or 5GHz**

XIRRUS 장비의 장점 : UPGRADABILITY

Conventional fixed APs require new equipment

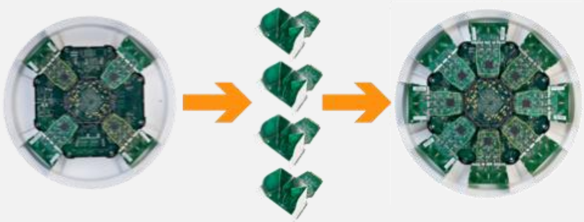
Add capacity



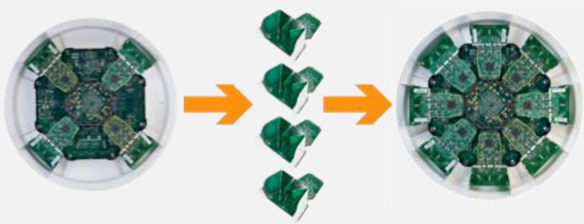
Upgrade to 11ac or 11ad

Xirrus modular Arrays enable simple capacity and technology upgrades

Add capacity
2.4GHz or 5GHz



Upgrade to 11ac or 11ad



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XIRRUS 장비의 장점 : 다양한 PORTFOLIO

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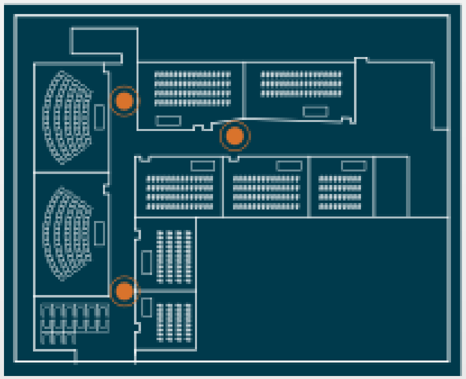
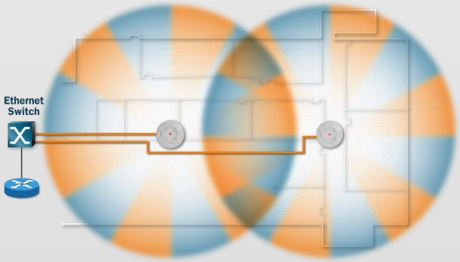
XIRRUS 장비의 장점 : 설치시

Xirrus

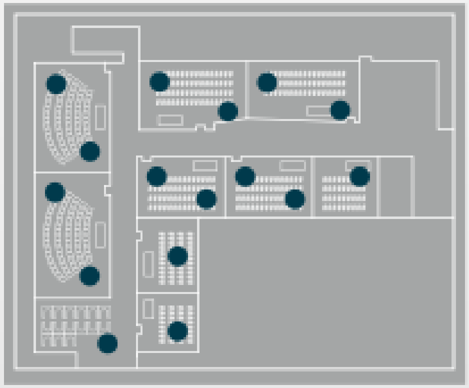


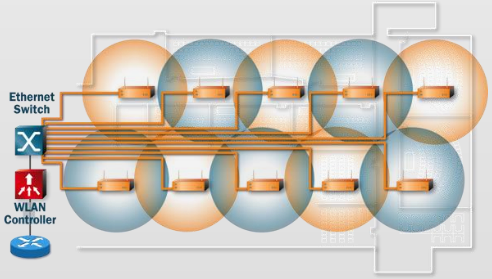


관리 포인트의 감소
설치시 비용 및 시간 절감

VS

일반 AP





여러개 설치로 인한 관리 포인트 증가

XIRRUS PATENTED NEW ARCHITECTURE

Electronic Device Housing

US00D526973S

(12) **United States Design Patent**
Gates et al.

(10) **Patent No.:** **US D526,973 S**
(45) **Date of Patent:** ** **Aug. 22, 2006**

(54) **ELECTRONIC DEVICE HOUSING**

(75) Inventors: **Dirk Ion Gates**, Westlake Village, CA (US); **Ian Andrew Laity**, San Diego, CA (US)

(73) Assignee: **Xirrus, Inc.**, Westlake Village, CA (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/217,531**

(22) Filed: **Nov. 17, 2004**

(51) **LOC (8) Cl.** **13-03**
(52) **U.S. Cl.** **D13/184**; D3/168
(58) **Field of Classification Search** D13/158, D13/168, 184; D10/104, 106; D14/358, 137, D14/149, 218, 240; D21/324; 174/48, 50, 174/52.1, 58; 340/825.72; 341/176; 343/770; 370/328, 329, 334, 338; 455/426.1, 426.2, 455/561, 562.1, 575.1
See application file for complete search history.

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Primary Examiner—Selina Sikder
(74) *Attorney, Agent, or Firm*—The Eclipse Group LLP

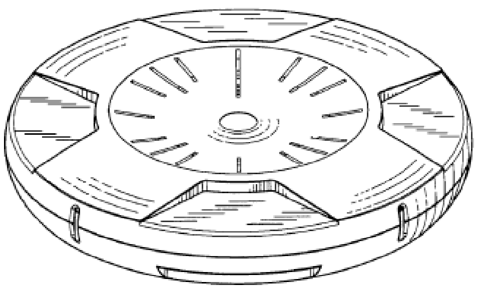
(57) **CLAIM**

The ornamental design for an electronic device housing, as shown.

DESCRIPTION

FIG. **1** is a perspective view of the front side of the electronic device housing.
FIG. **2** is a perspective view of the rear side of the electronic device housing.
FIG. **3** is a plan view of the front of the electronic device housing.
FIG. **4** is a plan view of the rear of the electronic device housing.
FIG. **5** is a side view of the electronic device housing illustrated with front side positioned upward.
FIG. **6** is a side view of the electronic device housing illustrated with the rear side positioned upward.
FIG. **7** is a side view the electronic device housing illustrated positioned on its side; and,
FIG. **8** is a side view of the opposing side of the electronic device housing illustrated in FIG. 7.

1 Claim, 4 Drawing Sheets



Patent # US D526,973 S

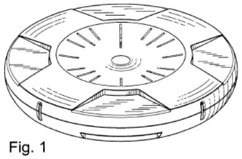


Fig. 1

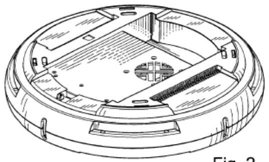


Fig. 2

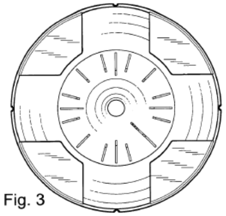


Fig. 3

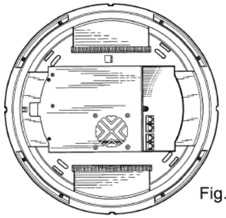
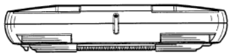


Fig. 4

Fig. 5



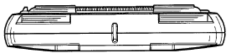


Fig. 6

Fig. 7

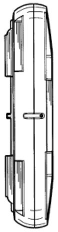
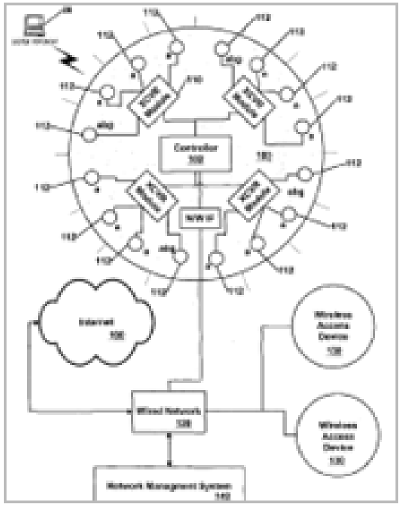


Fig. 8



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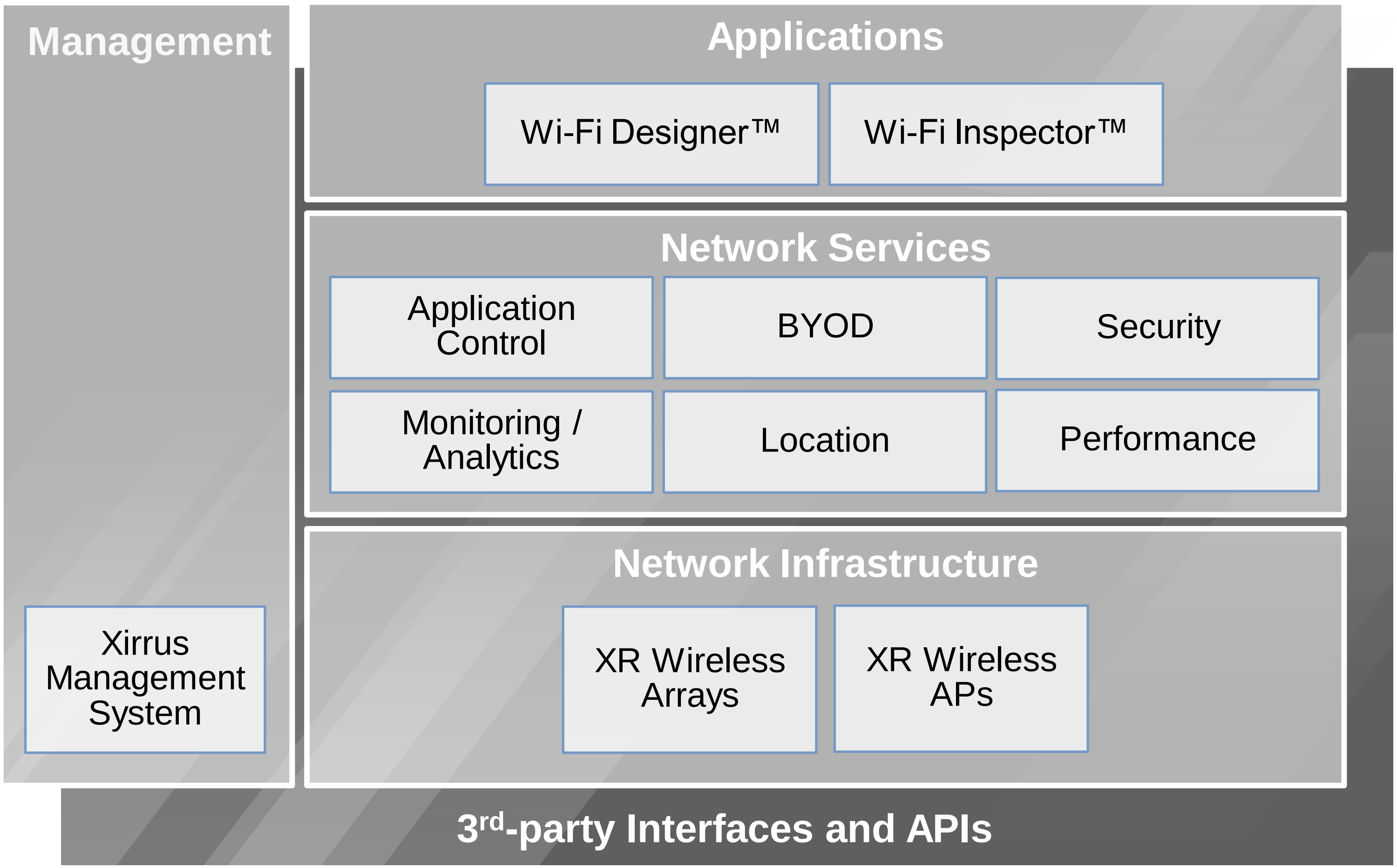
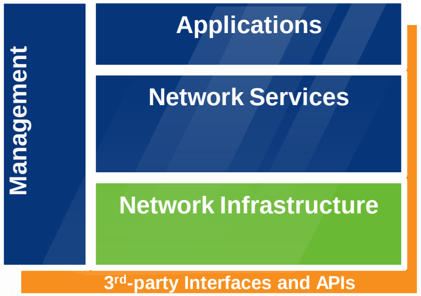
XIRRUS 장비소개

XIRRUS PORTFOLIO



THE XR WIRELESS ARRAY



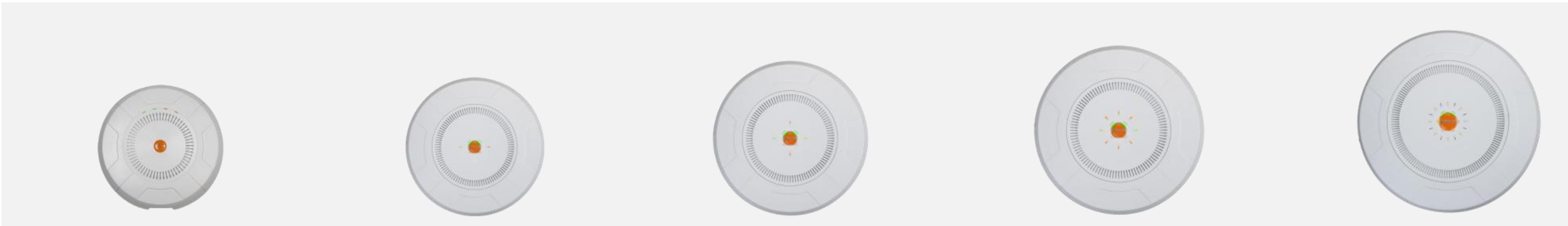
Industry's Only Modular Wireless Switch

1. Dense radios (2 to 16 per Array)
2. Directional, high gain antennas
3. Distributed Intelligence

75% Less
- Equipment
- Cable pulls
- Switch ports

THE XR ARRAY PORTFOLIO

사용 유형별 다양한 제품 선택 가능



XR-500	XR-1000	XR-2000	XR-4000	XR-6000
AP	Array	Array	Array	Array
Fixed	Modular Chassis	Modular Chassis	Modular Chassis	Modular Chassis
2 Radios	2 Radios	2 or 4 Radios	4 or 8 Radios	8, 12, 16 Radios
NA	2 Total Slots	4 Total Slots	8 Total Slots	16 Total Slots

COMMON ADVANCED FEATURE SET

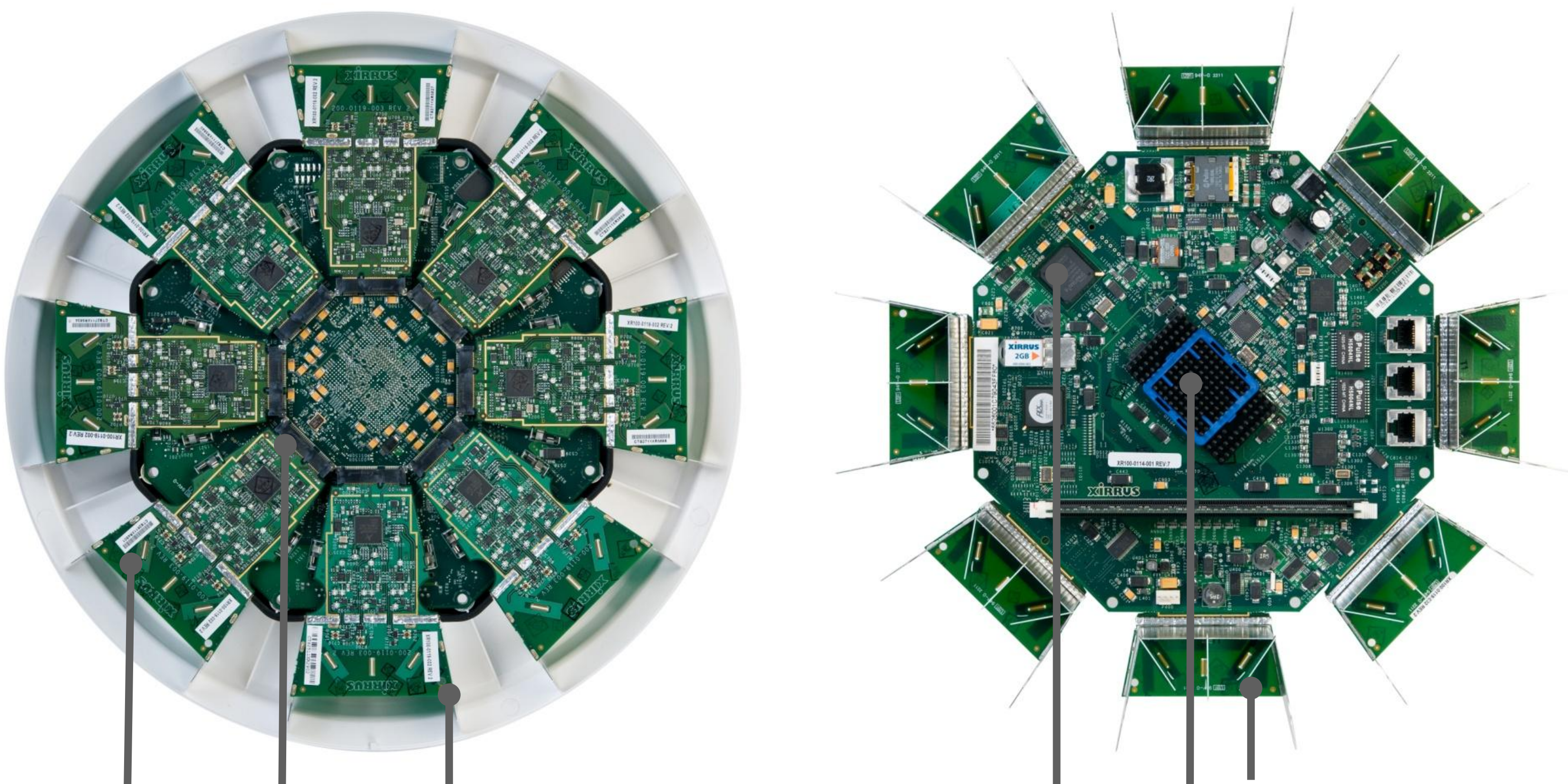
- Integrated Controller
- Application Control
- Zero Touch Provisioning
- On Premise or Cloud Management

XR WIRELESS ARRAY FAMILY

SPECIFICATIONS	XR-500	XR-500H	XR-1000H	XR-1000	XR-2000	XR-2000H	XR-4000	XR-6000
Deployment	Indoor	Outdoor	Outdoor	Indoor	Indoor	Outdoor	Indoor	Indoor
Diameter (inches)	8”	9.875x 10.125”	8”	8”	10”	**11.4x11.8x4.2” (WxDxH)**	13”	17”
Controller	Integrated	Integrated	Integrated	Integrated	Integrated	**Integrated**	Integrated	Integrated
Modular APs	2 (fixed)	2	2	2	2 or 4	**4**	4 or 8	8, 12, or 16
Modular AP Expansion Slots	0	0	0	0	0 or 2	**0**	0 or 4	0, 4, or 8
Available AP Types	300Mbps	300Mbps	450Mbps	300 & 450Mbps	300 & 450Mbps	**300Mbps**	300 & 450Mbps	300 & 450Mbps
Max Total Wi-Fi Bandwidth	600Mbps	600Mbps	900Mbps	900Mbps	1.8Gbps	**1.2Gbps**	3.6Gbps	7.2Gbps
Dedicated Threat Sensor	Yes	Yes	Yes	Yes	Yes	**Yes**	Yes	Yes
Integrated Antennas	4	External	External	Up to 6	Up to 12	**External**	Up to 24	Up to 48
Max Wi-Fi Backhaul Link	300Mbps	300Mbps	450Mbps	450Mbps	1.35Gbps	**900Mbps**	1.35Gbps	1.35Gbps
GigE Uplink Ports	1	1	1	1	**1**	**2**	2	4 + 10GigE
Max Associated Users	240	240	480	480	960	**960**	1920	1792

XR-4000 UNDER THE HOOD

8-slot XR-4000, sold with 4 or 8 modular APs populated



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XR CHASSIS FAMILY

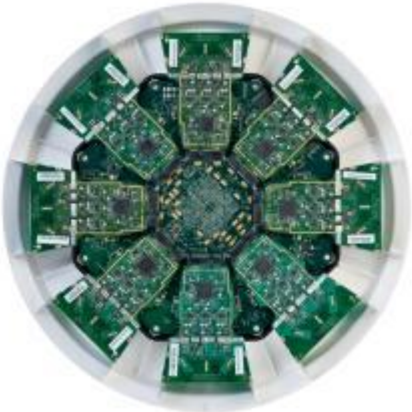
2 to 16 modular AP slots per chassis

XR-1000

2 slots

XR-2000

4 slots



XR-4000

8 slots

XR-6000

16 slots

XR COVERAGE FLEXIBILITY

Pluggable modules enable custom RF coverage designs

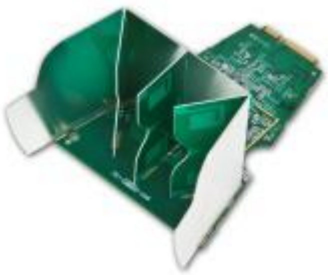
Omni (Default)

Side / Wall

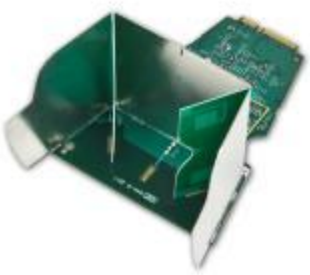
Lengthwise / Hallway

XR MODULAR APS

- Two versions
  - 450Mbps (3x3) modular AP (XI-N450)
  - 300Mbps (2x2) modular AP (XI-N300)
- Multi-function
  - Same AP modules operate across all XR platforms
  - Support both 2.4GHz and 5GHz
  - Dedicated monitor mode
    - IDS/IPS
    - Spectrum analysis
    - Packet capture
- Directional Antennas
  - Enhanced metal reflectors
  - Polarized for optimal coverage
  - 120 degree beam width
  - 50dB interference rejection



450Mbps



300Mbps

XR 중요 장점

Fully Upgradable

Modular AP upgradeable

Multi-state APs (2.4G/5G)

Common components

802.11ac/11ad ready

Highest Performance

Greatest Device **Density**
- 500+ devices per Array

Highest **Capacity**
- Multi-gigabit capacity

Broadest **Coverage**
- 4X coverage

Lowest TCO

Less **equipment**

Fewer **cables/switches**

No **controller**

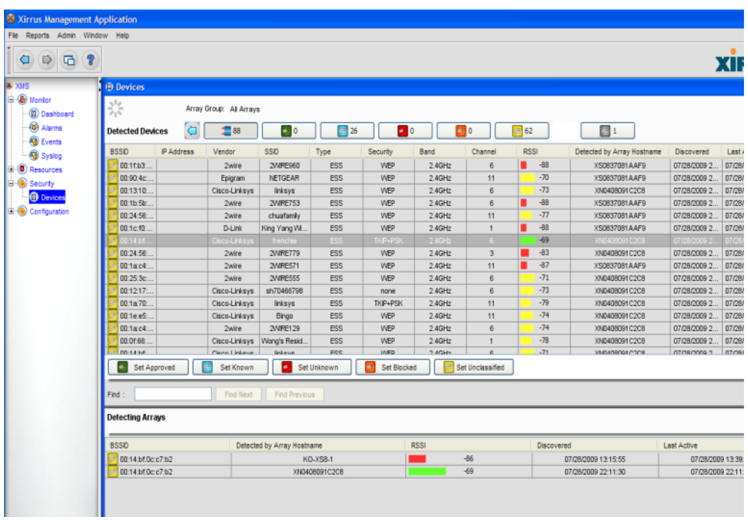
Lower **maintenance**

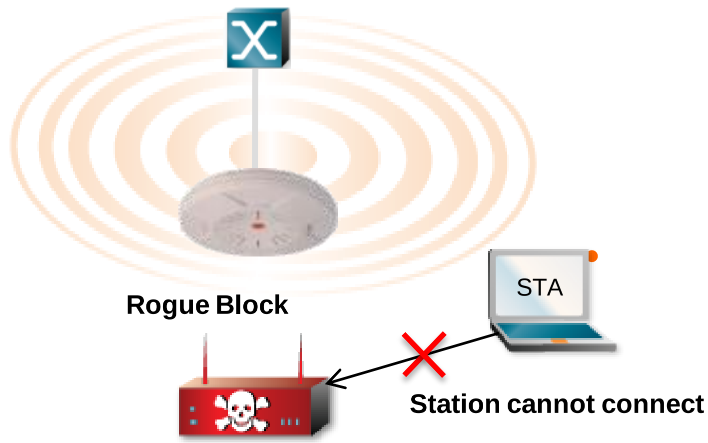
Complete line of products from 2 to 16 modular APs

RF SECURITY - WIPS

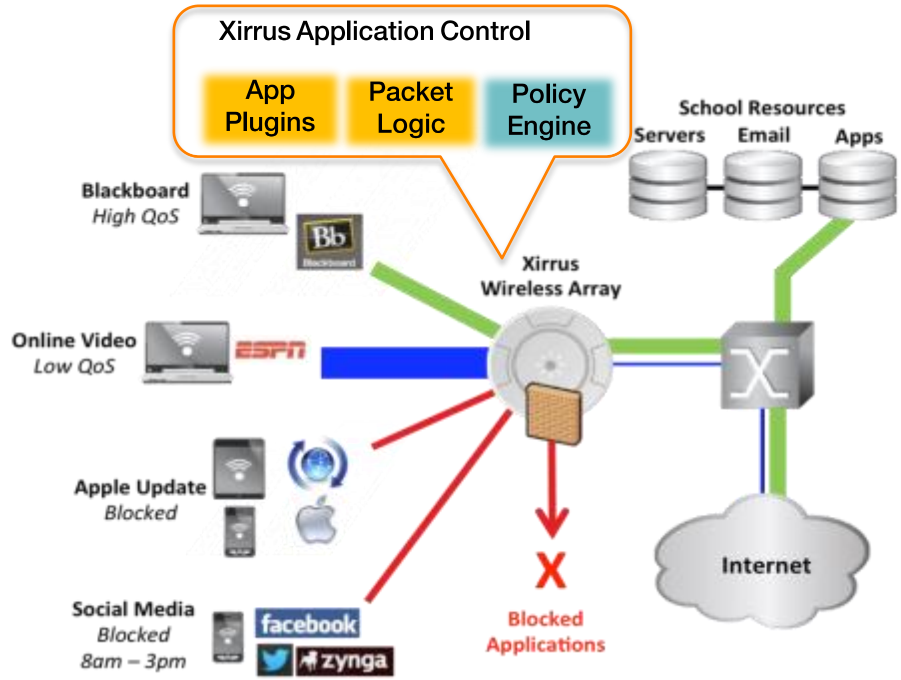
WIPS 기능 (Wireless IPS) - RF security

- 전용 라디오 (24/7 RF scanning)
- 불법(Rogue) AP 탐지 및 알람기능
- 불법 AP 차단기능 – automated or manual
- Spectrum Analyzer channel monitoring
- 비인가 사용자 모니터링





APPLICATION CONTROL



Xirrus 의 Application Control 기능을 적용하면 DPI (Deep Packet Inspection) Full function 을 사용하게 됨

- 약 1000 개의 애플리 케이션 인식
- Traffic Permit , Prioitize , Throttle , Block 기능 을 수행
- 사용자의 엣지 위치에서 수행을 하는 구조로 트래픽 관리 우수

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POWER OVER ETHERNET (POE)

Run Data and Power Over a Single Ethernet Cable Pulled to Array

PoE Product Support for the Entire Array Product Line

1-Port, 2-Port and 8-Port solutions with optional SNMP/Web management





Specifications	XP1-MSI-33	XP1-MSI-75	XP1-MSI-75M	XP2-MSI-95M	XP8-MSI-70M
Number of Ports	1	1	1	2	8
Power Per Port	33W	75W	75W	95W	70W
SNMP Manageable	No	No	Yes	Yes	Yes

XIRRUS MANAGEMENT SYSTEM (XMS)

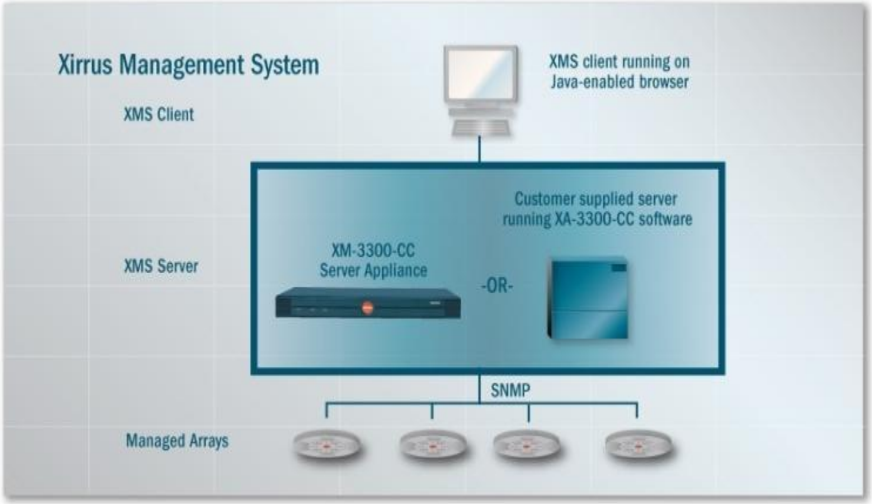
- **Xirrus Management System (XMS)**

- **Xirrus Wi-Fi Network 중앙 관리**

- **Data-path 에 있지 않으며 Array network 구축시 옵션 사항임**

- **주요기능**

  Wi-Fi network 상태와 성능 모니터링
  Array 장비들의 control 및 configuration 관리
  Troubleshoot network issues

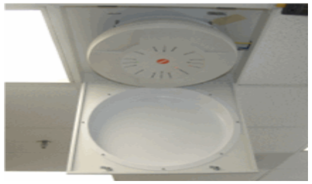
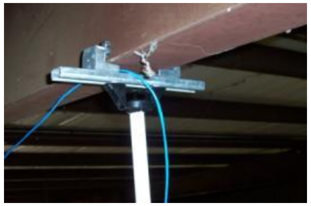


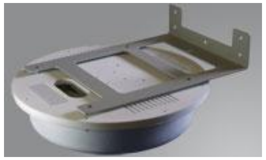
INDOOR ENCLOSURE PRODUCTS

Indoor Enclosure

- **Snap-on cover (XE-25XX series)**
  - XN4 (XE-2500) and XN8/16 (XE-2520)
  - Flat profile
  - White color (paintable)
- **Factory Rated Enclosure (XE-2220)**
  - Dust proof option
  - Easily mounts to I-Beams
- **Indoor Enclosure (XE-2020)**
  - Ceiling Tile Drop in or Surface mount
  - Lockable door
- **I-Beam Bracket (XE-21xx Series)**
  - XN4 (XE-2100) and XN8/16 (XE-2120)
  - XE-2520 snap-on cover separately if required
- **Wall Mount Kit**
  - Standard wall mount (XS-BKT-WALL)
  - Protective Indoor (XE-2150/XE-2170)



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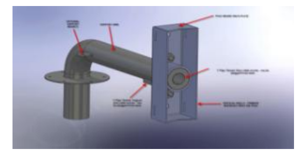
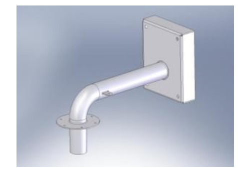
OUTDOOR ENCLOSURE PRODUCTS

Outdoor Enclosure

- **Outdoor Enclosure (XE-4000)**
  - Fan, Heater
  - Lightning Protection
  - AC or PoGE Option
- **Pole Mount (XE-4005-Pole)**
  - Specific back plate for Pole
  - Universal support arm
    Supports any pole 3”+
- **Ceiling (XE-4000 series)**
  - Various length poles available for ceiling mount
  - Ideal for mounting under overhangs
- **Wall Mount (XE-4005-WALL)**
  - Specific back plate for Wall
  - Universal support arm Wall mount








RAPID DEPLOYMENT KITS (RDK)

- 간편한 설치로 High-Capacity Wi-Fi 서비스 구현
- 이벤트 , 공연장
- 응급상황 시
- 행사장
- 입시전형 창구 (대학교)

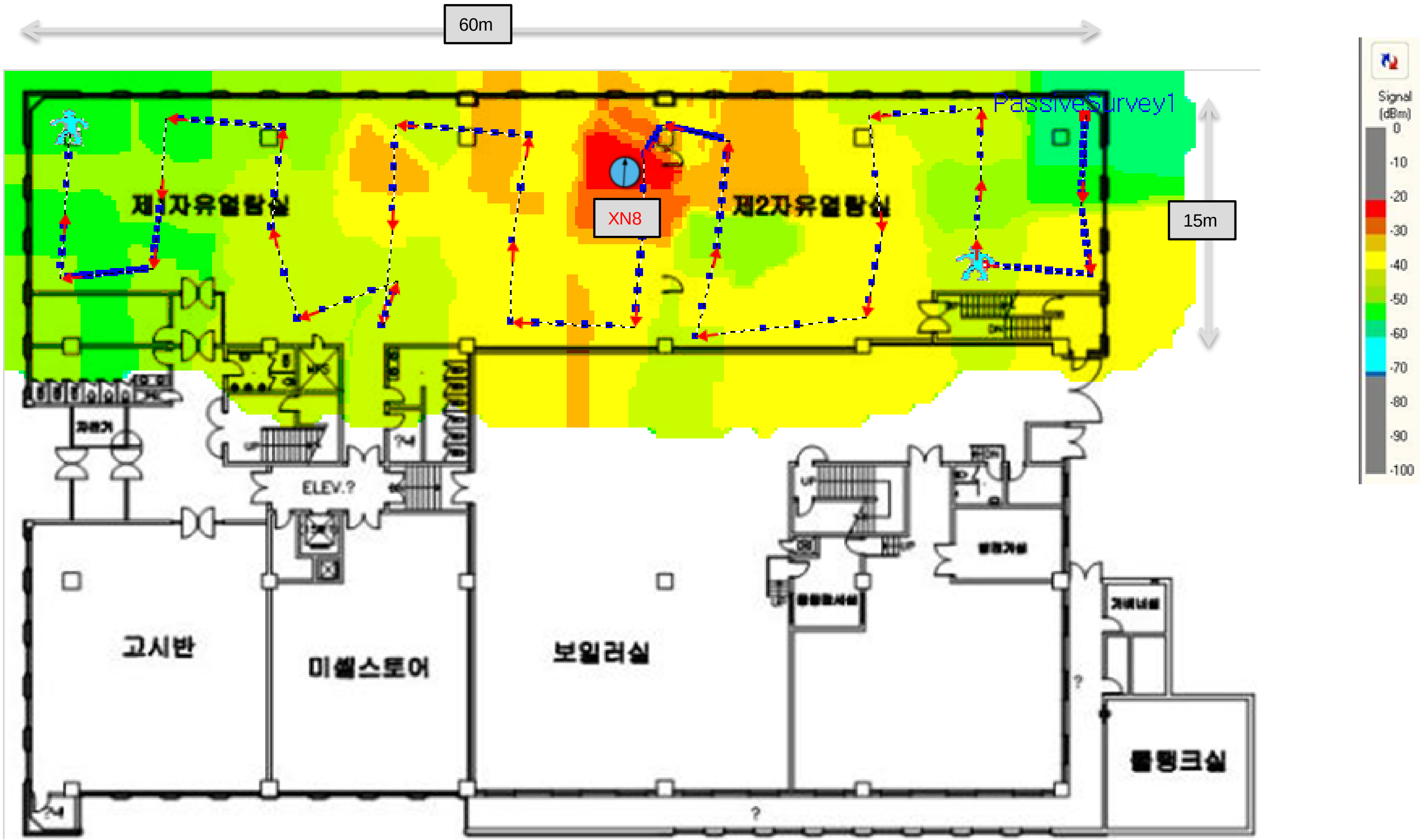
한양여대 도서관 세미나 지원 2011년2월11일

해외: Microsoft Event 2010년
(Professional Developer's Conferences)

동시접속 7000명 이상 수용
장소 : LA Convention Center

XIRRUS 신호 강도

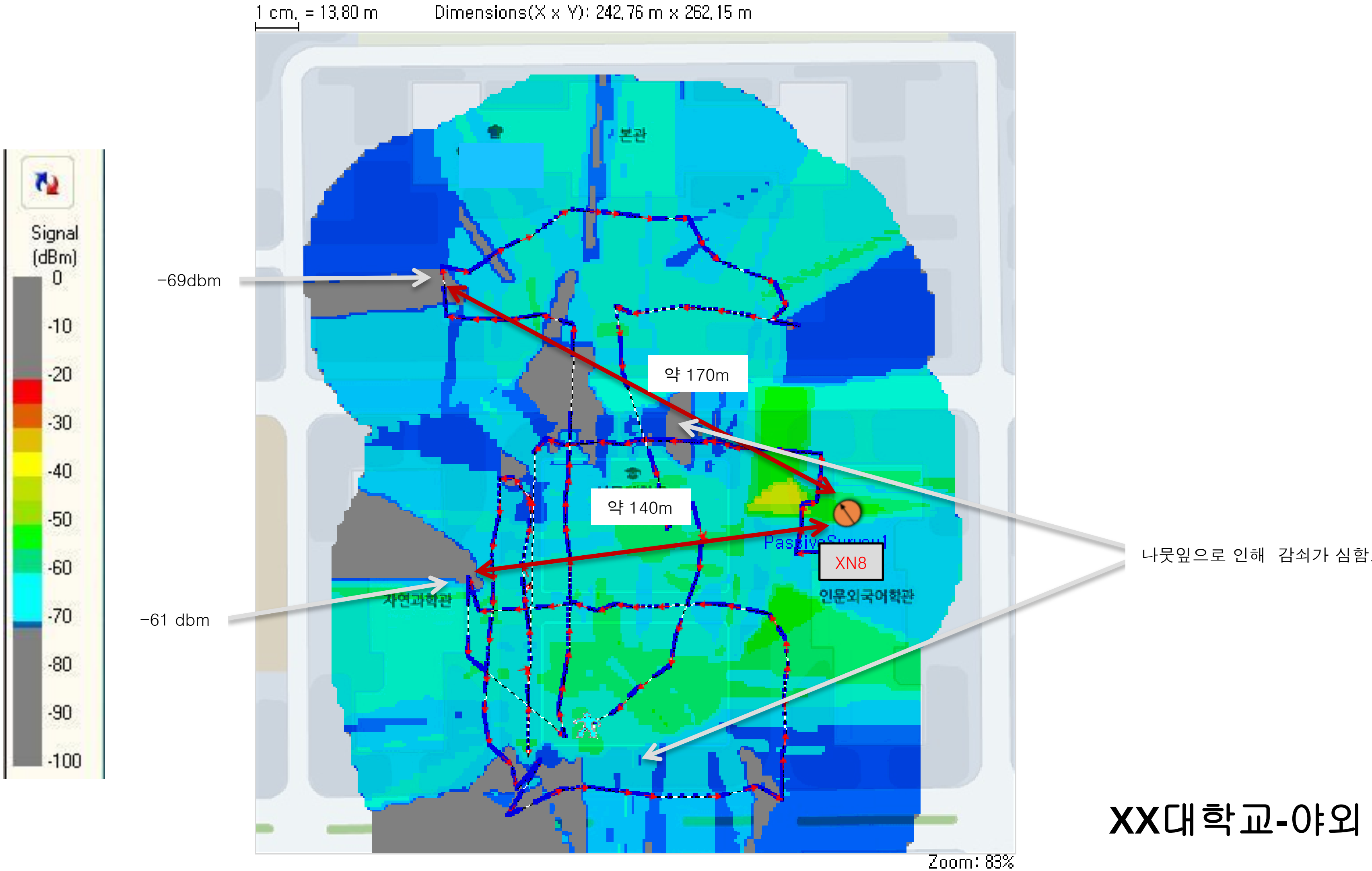
SURVEY 결과 및 ARRAY 위치



XX대학교-열람실

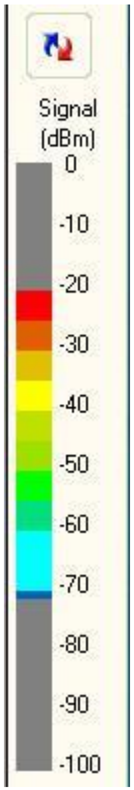
Tivoli C&C

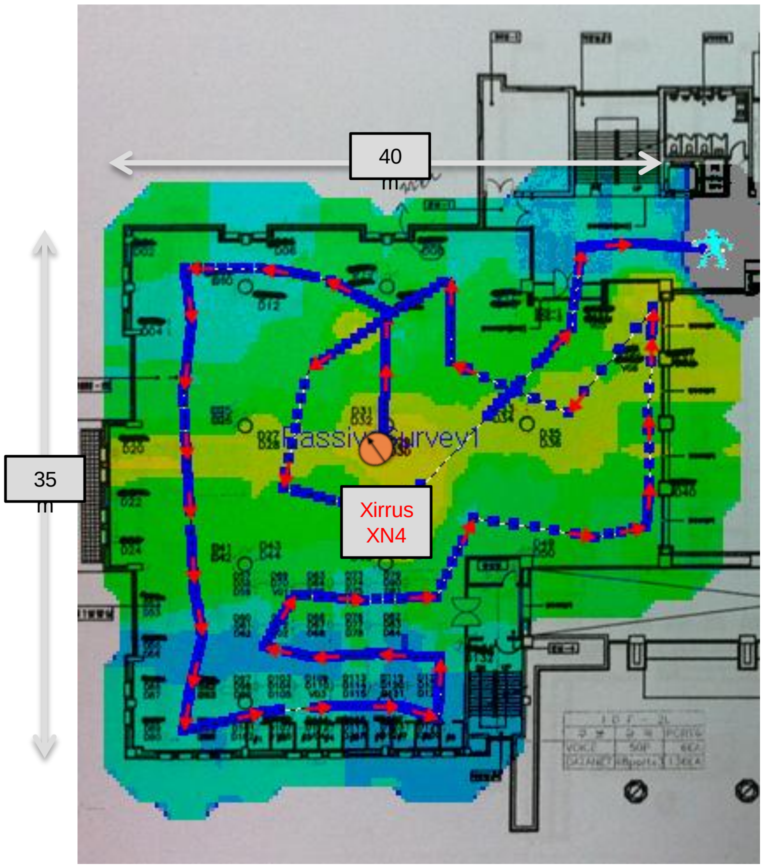
SURVEY 결과 및 ARRAY 위치

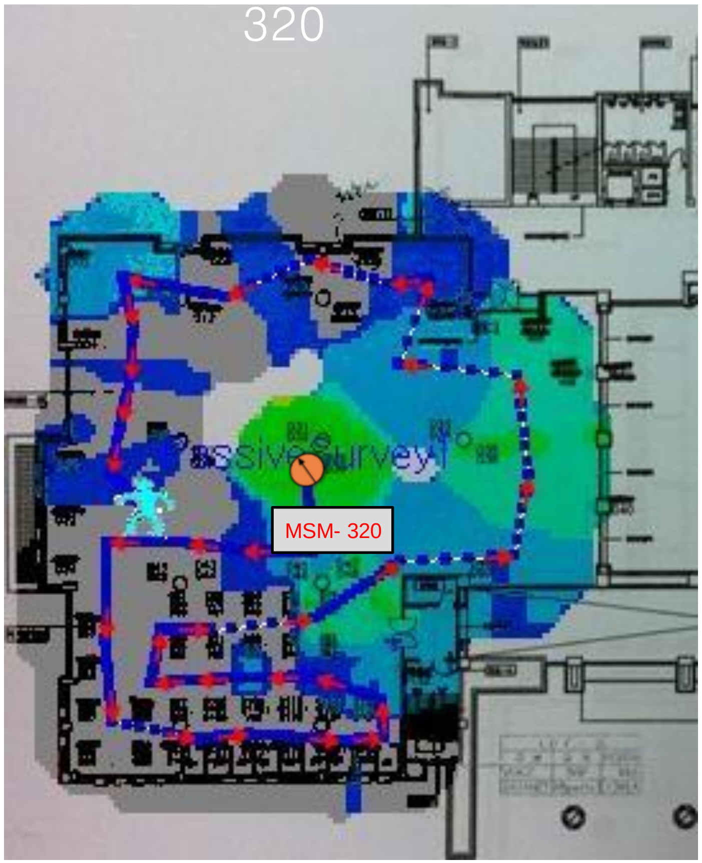


XX대학교-야외

전파 세기 비교







• 서고의 책장으로 인한 전파 간섭이 매우 심함.
• 기존 Cisco AP 4대로 운영

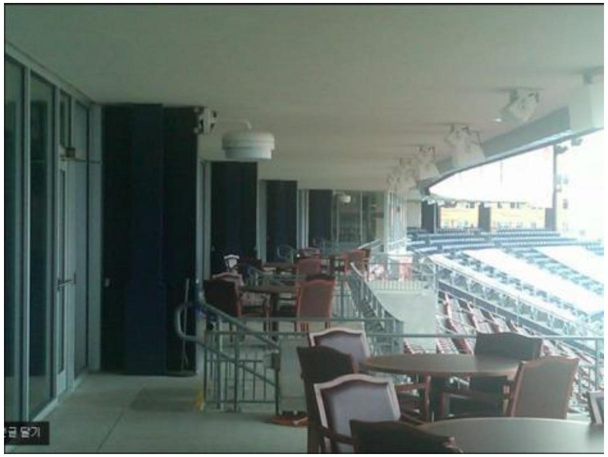
XX대학교-도서관

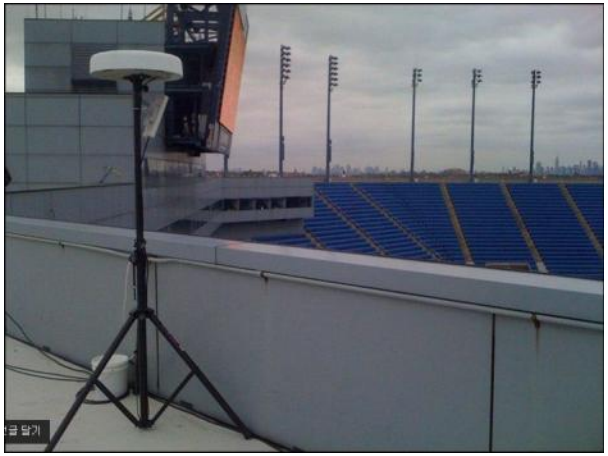
XIRRUS 사례 사진

해외 사례

2010 IBM event – 동시접속 7000명

해외 사례



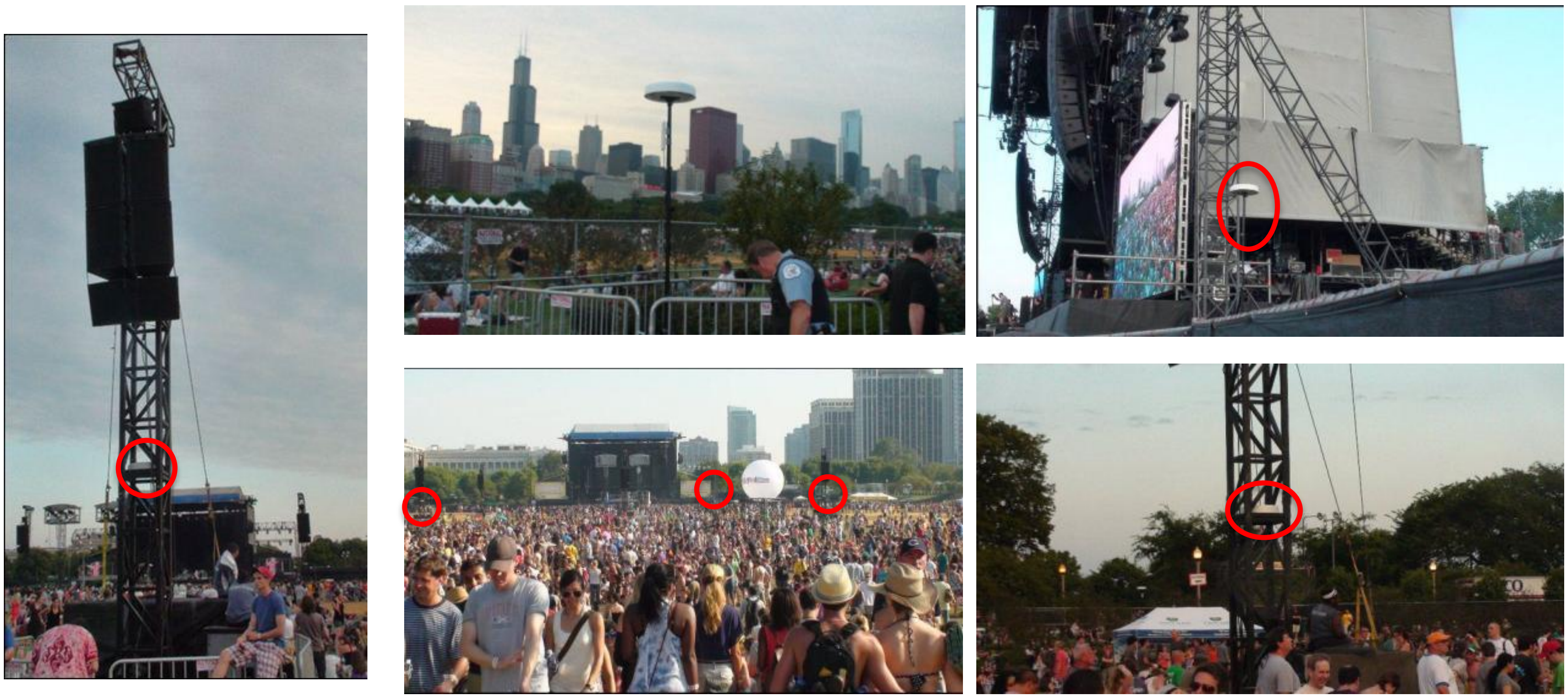


Gillette Stadium- Home of the New England Patriots

해외 사례

the Lincoln Memorial

해외 사례



Lollapalooza Festival 2010

해외 사례

Barack Obama Press Conference

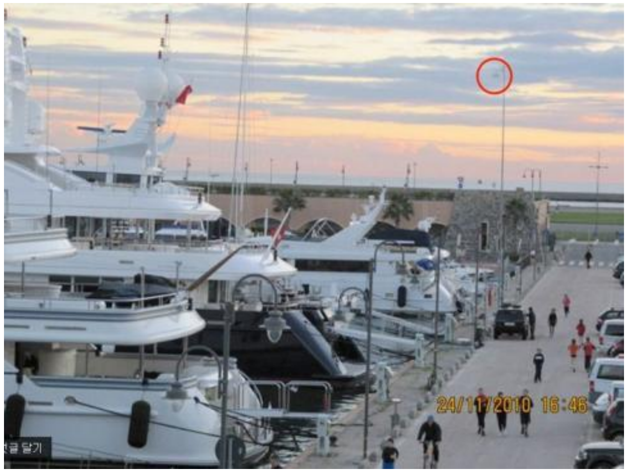
Florida Street

the Gulf Coast

US ARMY

Tivoli C&C

해외 사례




the Marina di Genova

국내 사례

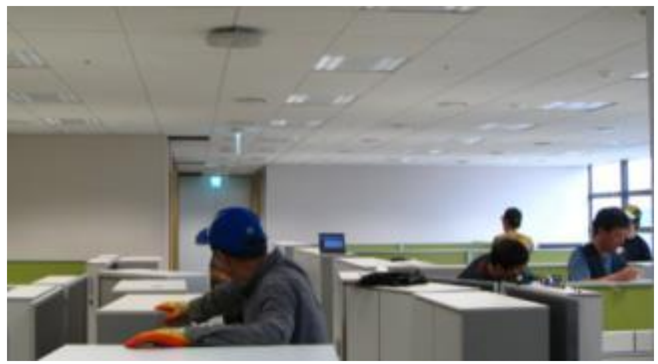
도서관 협회

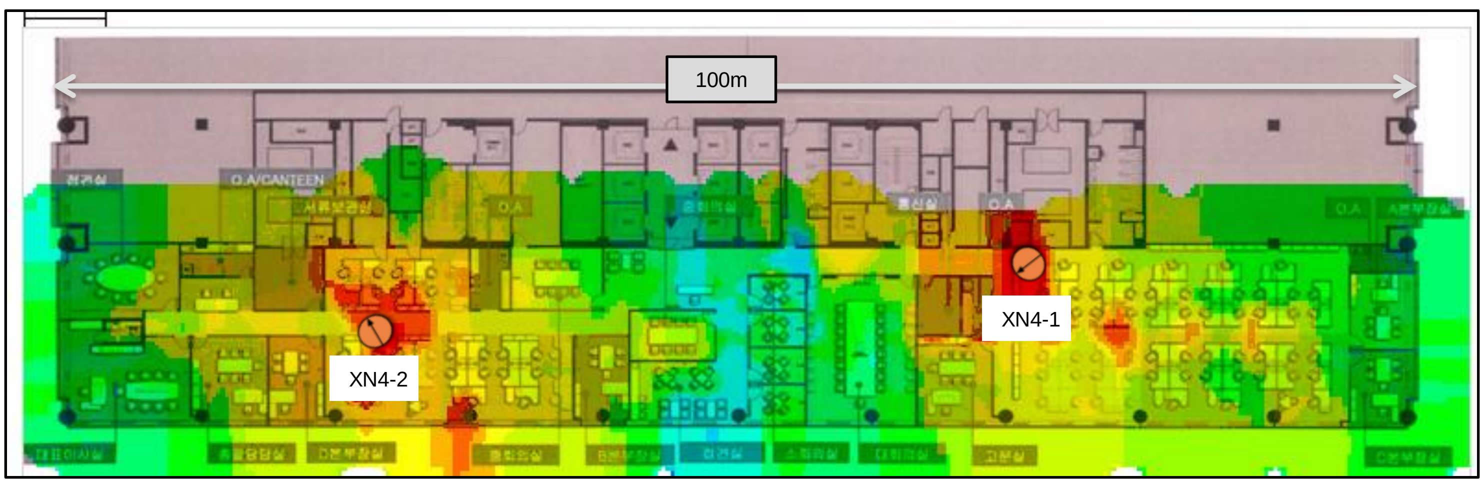
대한성결교회 105주년 총회

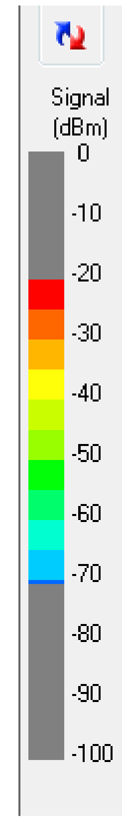
코엑스 태평양 홀

국내 사례

SBS 미디어 리서치 (200석)





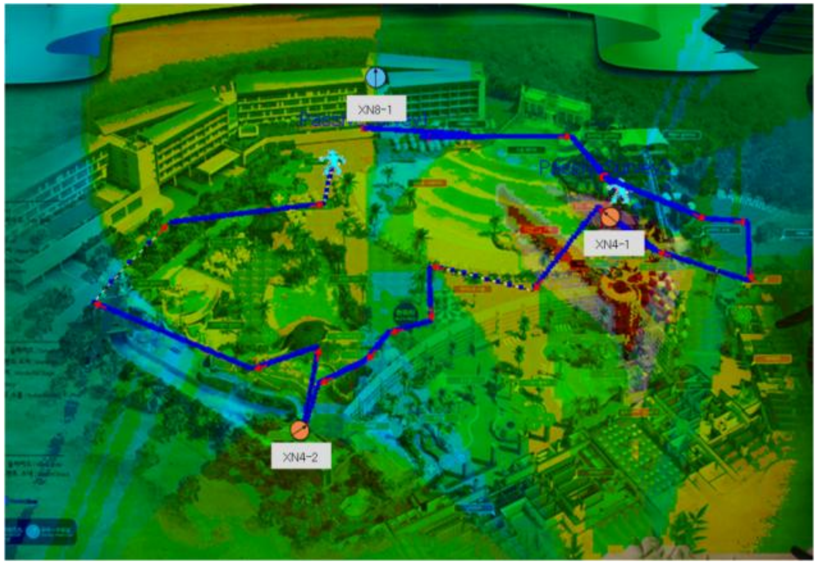


국내 사례

- **김포대학교 , 경인여대**

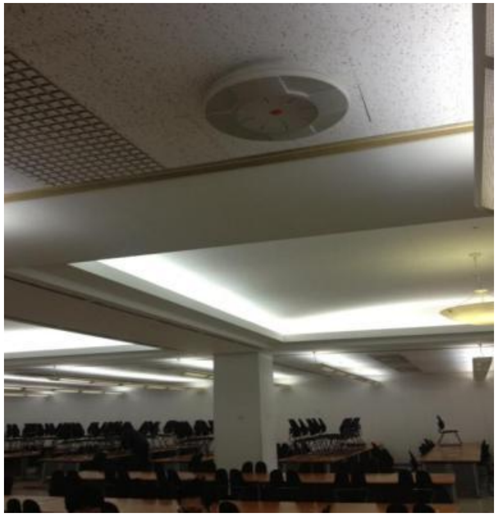
국내 사례

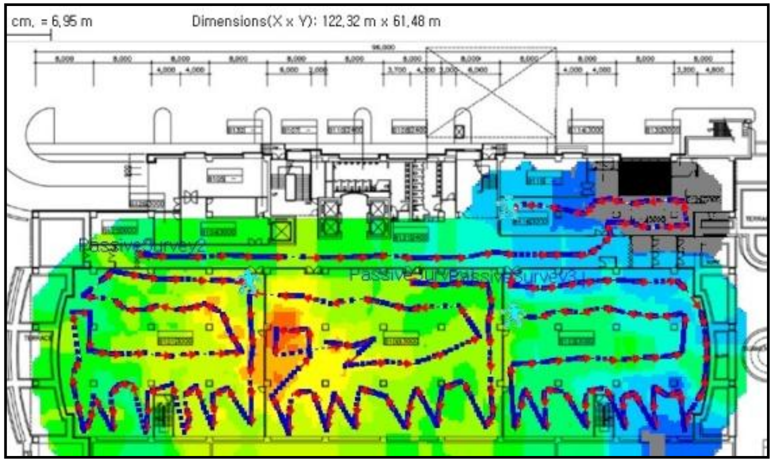
- 블루원 워터파크

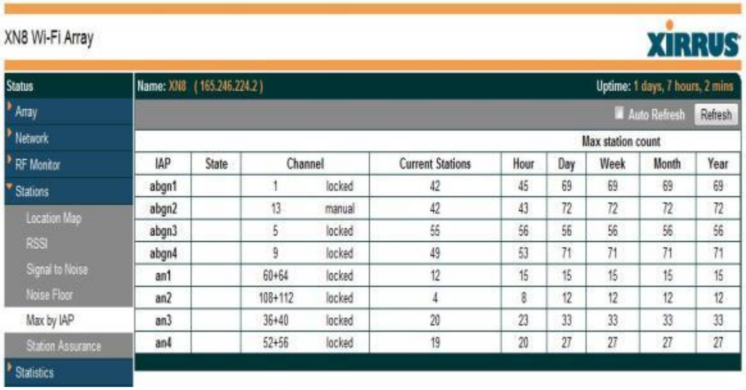


국내 사례

- **인하대학교 학술정보관 열람실(1300석)**






XN8 Wi-Fi Array

XIRRUS

Status
Array
Network
RF Monitor
Stations
Location Map
RSSI
Signal to Noise
Noise Floor
Max by IAP
Station Assurance
Statistics

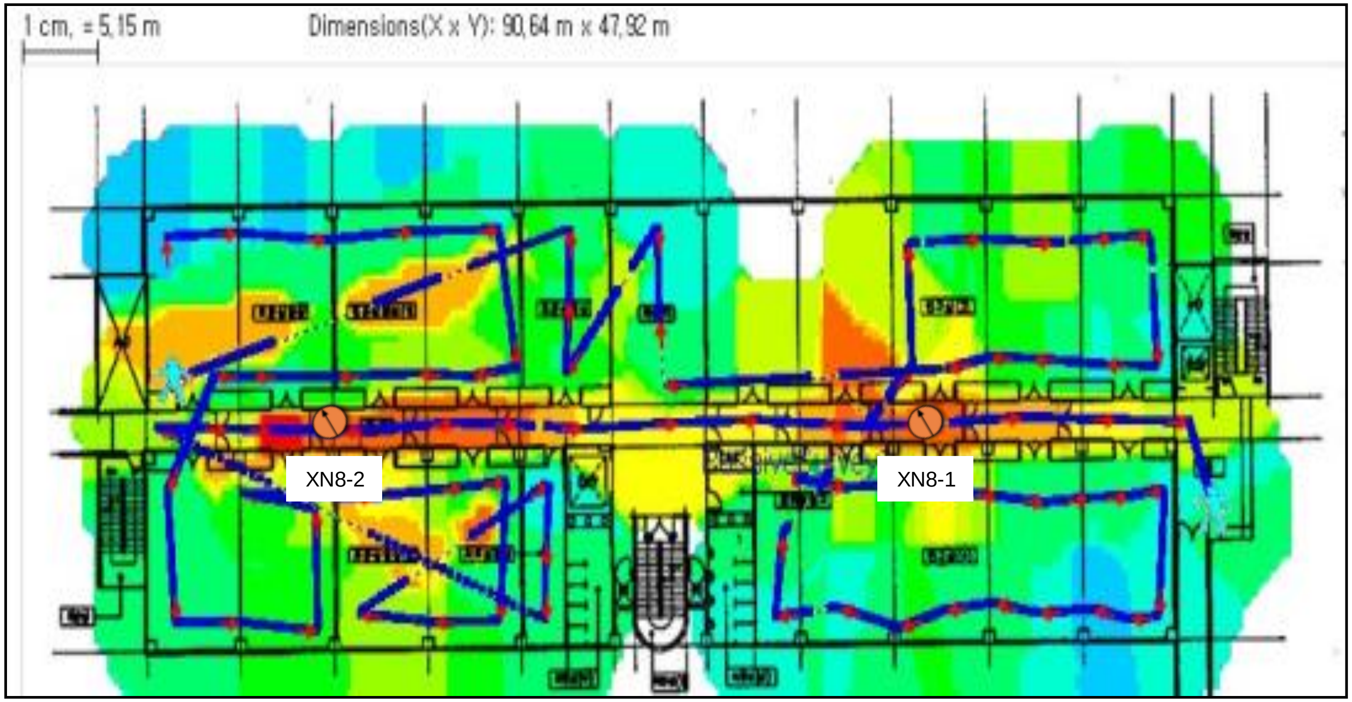
Name: XN8 (165.246.224.2)
Uptime: 1 days, 7 hours, 2 mins

Auto Refresh
Refresh

					Max station count				
IAP	State	Channel		Current Stations	Hour	Day	Week	Month	Year
abgn1		1	locked	42	45	69	69	69	69
abgn2		13	manual	42	43	72	72	72	72
abgn3		5	locked	55	56	56	56	56	56
abgn4		9	locked	49	53	71	71	71	71
an1		60+64	locked	12	15	15	15	15	15
an2		108+112	locked	4	8	12	12	12	12
an3		36+40	locked	20	23	33	33	33	33
an4		52+56	locked	19	20	27	27	27	27

국내 사례

- **대상그룹 인재개발원 (1000석)**



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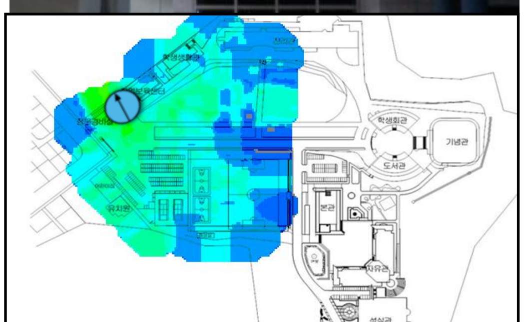
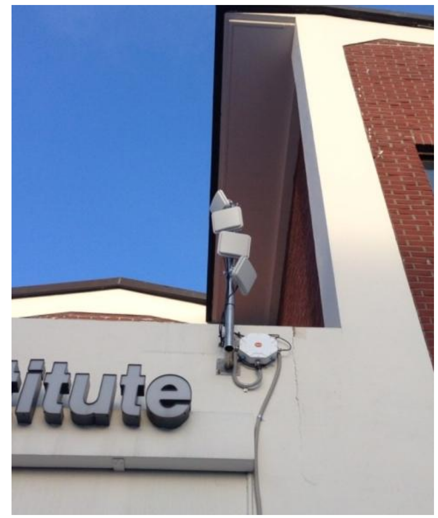
국내 사례

- **야외 설치 사진**





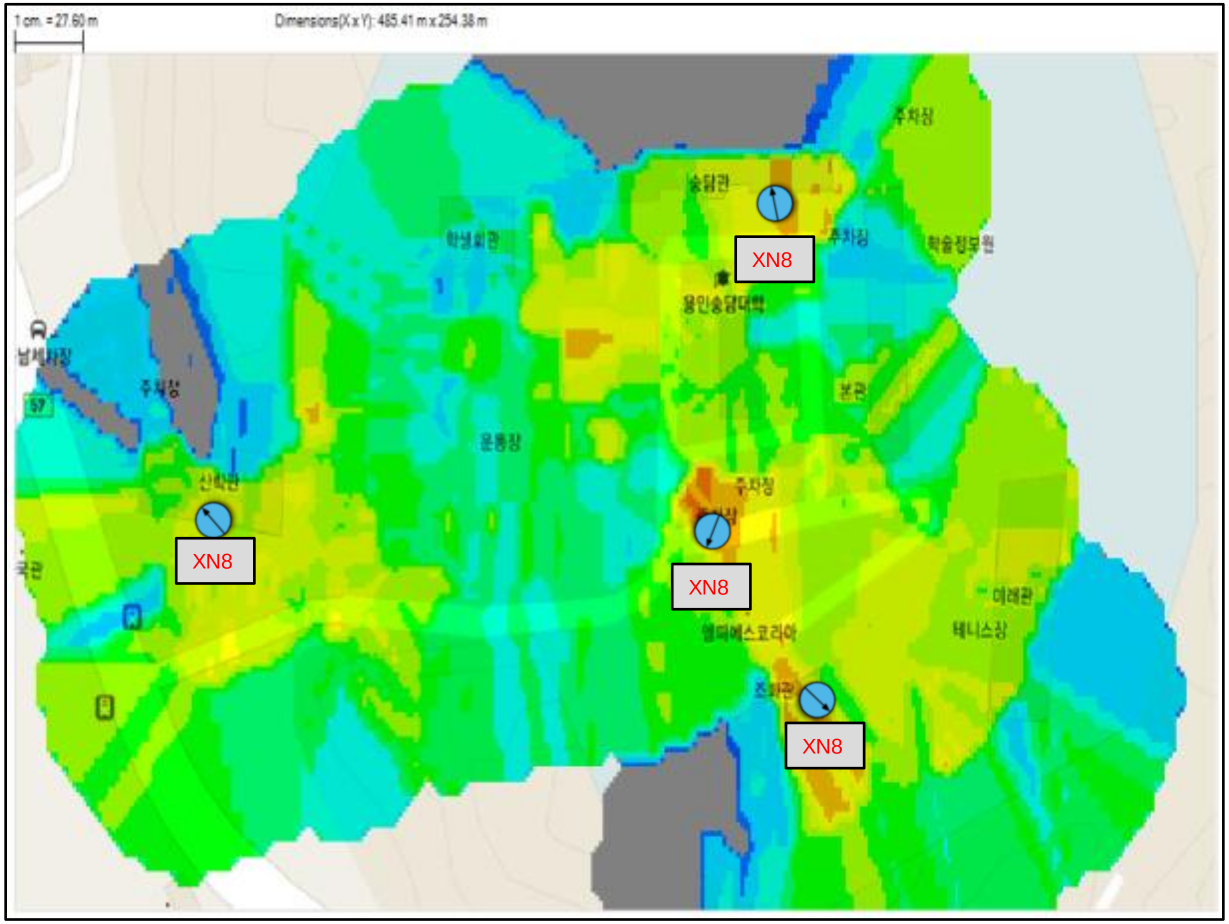
XR-1230H

XN4+함체

XN8+함체

국내 사례

- 용인송담대학교 - 옥외용 설치 사진



레퍼런스

- 교육기관

- 기타

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