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MobileAccess
Wireless Solutions

Overview of CMA Platforms

June 2014

About Us

CMA | Ranked Top IBW Provider
By ABI Research



Common Head End Efficient Power Advanced Cabling

Total DAS Solutions Portfolio

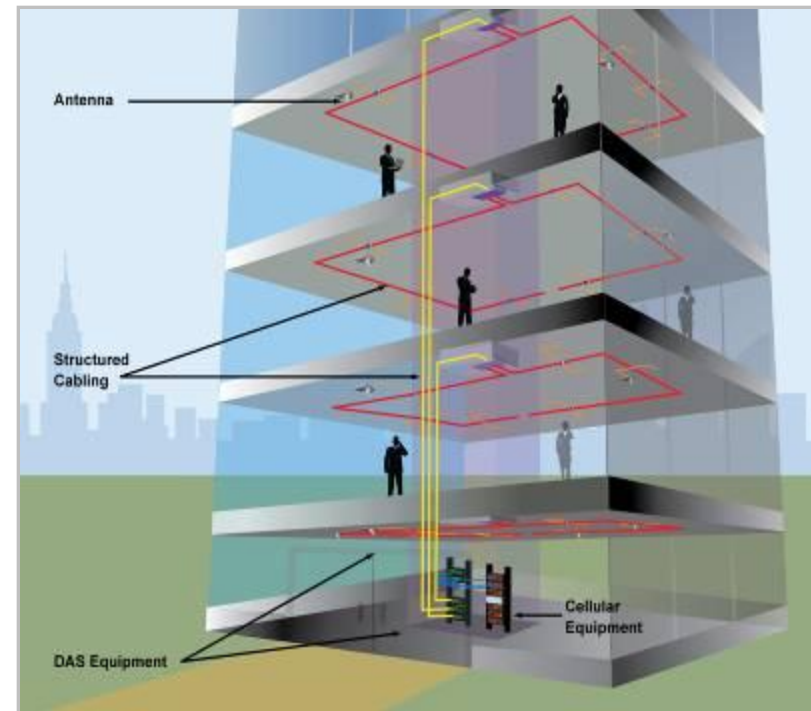


Public Safety, WLAN and WMTS Applications

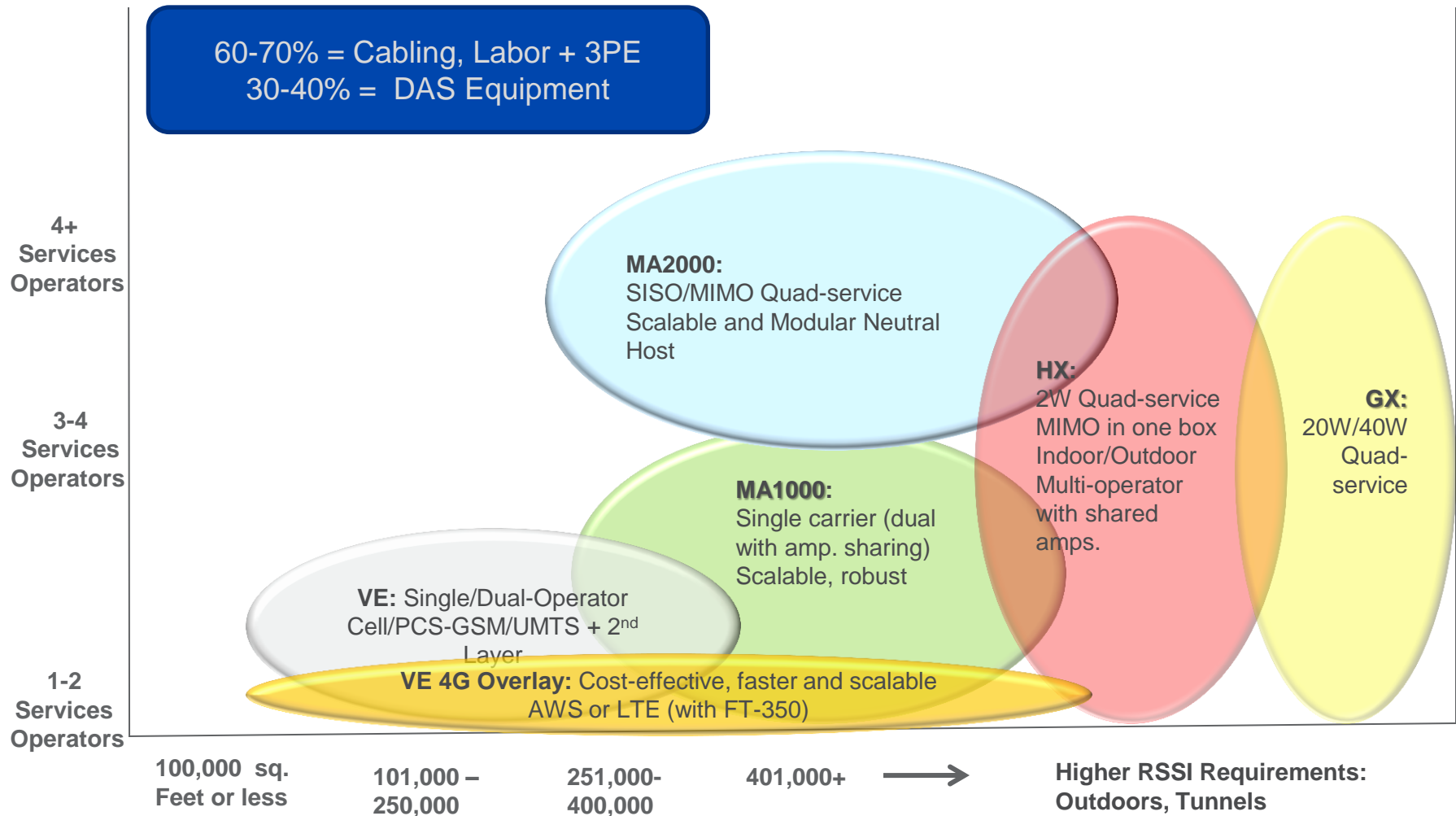
Distributed Antenna Systems

- **Challenge:** With indoor DAS becoming a strategic and first-line network element, DAS solutions must meet the rapidly evolving wireless network requirements in a cost effective, scalable, and future ready manner.
- **Solution:** A portfolio of advanced fiber and hybrid fiber/copper cabling solutions to meet current and evolving requirements.

Fiber	Bend enhanced fibers
Cable	Rugged and flexible offerings Hybrid fiber/copper
Connector	Multi-fiber for high density, plug and play, and ease of install/mgmt
Hardware	“Stubbed” and Plug-N-Play hardware for rapid deployment
“Active”	Multi-band, multi-operator, multi-service solutions



Portfolio Overview



CMA Partial Selected Sites Deployments





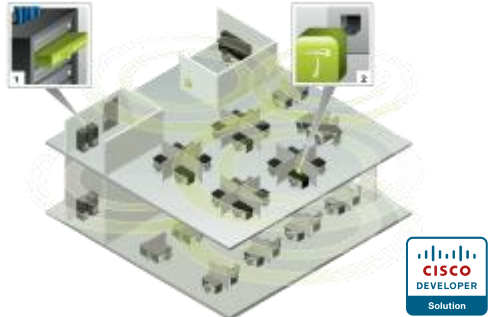
Stadiums & Airports	Hospitals	Malls & Enterprise	Conv. Centers, Hotels, Casinos, Universities
<ul style="list-style-type: none"> • Ravens • Lucas Oil • Reliant • Ford Field • Clemson University Stadium • Stanford Stadium • Manchester • Providence • Orlando • Indianapolis • Busch Stadium • Melbourne airport • Miami Airport • Ben Gurion Airport 	<ul style="list-style-type: none"> • Clarion Methodist • Metro Health 2500 • Northside Forsyth • Degraff Hospital • Fanny Allen Hospital • Clarian IU-Riley • Beaumont-Royal Oak • Women & Children's • Global Heart & Vascular Institute • Fletcher Allen Hospital • Inova Fairfax • Beaumont • Womack Medical • Overlook Hospital 	<ul style="list-style-type: none"> • Forum Shoppes Vegas • US Senate • US House of Reps. • Sony NY • Exxon • Disney • Revel Entertainment • Blue Cross Blue Shield 	<ul style="list-style-type: none"> • Indianapolis CC • Las Vegas Convention • Baltimore CC • Caesar Palace Hotel • Gaylord Hotel Orlando • Bally's • Flamingo Las Vegas • Paris Vegas • University of Rochester • Princeton • Marina bay sands • Intercontinental hotel Kiev • Hilton Kiev

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Product Overview

Best Fit Platforms & Solutions

DAS Platforms	MA1000	MA2000	MobileAccessVE
			
Features & Benefits	<ul style="list-style-type: none"> ▶ Robust and broadband (fiber/coax) single operator, multi-frequency (US and International flavors) coverage and capacity. 	<ul style="list-style-type: none"> ▶ Multi-operator 400MHz to 6GHz + patient monitoring WMTS + 4G MIMO with higher power remote options. ▶ Wire-It-Once architecture with maximum scalability through modular upgrades over future-proof broadband cabling. 	<ul style="list-style-type: none"> ▶ Dual-operator voice coverage + 4G MIMO data enhancement ▶ Cost-effective 'Cellular-over-LAN' architecture re-uses existing Ethernet cabling for pay-as-you-grow flexibility, shorter installs and less disruption. ▶ Cisco-compatible platform
Target Markets	<ul style="list-style-type: none"> ▶ Operators ▶ 250Ksqft+ 	<ul style="list-style-type: none"> ▶ Operators, VARs to enterprise (CIO, Engineering Consultants) ▶ Healthcare, Public Venue, Campus ▶ Large facilities 250Ksqft+ 	<ul style="list-style-type: none"> ▶ Operators (LTE overlay), Cisco VARs to enterprise (CIO, Dir. IT, Eng. Consultants) ▶ Hospitality, Office Buildings, Lg. SMBs (200+ emp.) ▶ 100Ksqft+

*Avg. price estimates only.

Best Fit Use Cases: DAS Remotes



	VE	TSX/QSX/QX	HX	GX
Optimal Deployment	<ul style="list-style-type: none"> Dedicated 	<ul style="list-style-type: none"> Dedicated 	<ul style="list-style-type: none"> Dedicated/Shared 	<ul style="list-style-type: none"> Dedicated/Shared
Best Fit Venues	<ul style="list-style-type: none"> Classrooms Hospitality Enterprise/Office 	<ul style="list-style-type: none"> Stadiums, Healthcare, Convention Centers, Enterprise Buildings 	<ul style="list-style-type: none"> Malls, Parking Garage, Airport, High-Rises, Hospitality 	<ul style="list-style-type: none"> Campus, large open areas (parking lots) Tunnels, underground Subway/metro.
Why?	<ul style="list-style-type: none"> Easy install, use existing Cat 5e/6 Lowest, fastest way to deploy 4G overlay Cellular Over LAN capability 	<ul style="list-style-type: none"> Dedicated amps allows operators to control their own capacity and eliminates impact when others join the system. Mitigates SHO. Easy sectorization WLAN and WMTS 	<ul style="list-style-type: none"> Drives more antennas per remote. Reduces overall equipment Ideal for limited IDF closets 	<ul style="list-style-type: none"> Multi-operator support for enhanced capacity. Flexible RF configurations Multi-port outside terminal distribution system (OptiSheath®).
Product Competitive Key Differentiators	<ul style="list-style-type: none"> Cisco backed only DAS product certified. Uses same Cisco bracket 	<ul style="list-style-type: none"> Dedicated or Shared amps across common infrastructure. Active WMTS and WLAN Support 	<ul style="list-style-type: none"> Indoor/Outdoor Optional Dedicated/ Shared amps. MIMO in a single enclosure 	<ul style="list-style-type: none"> Common Head End Industry leading OptiTap® 46 dBm per band/port Low Noise figure

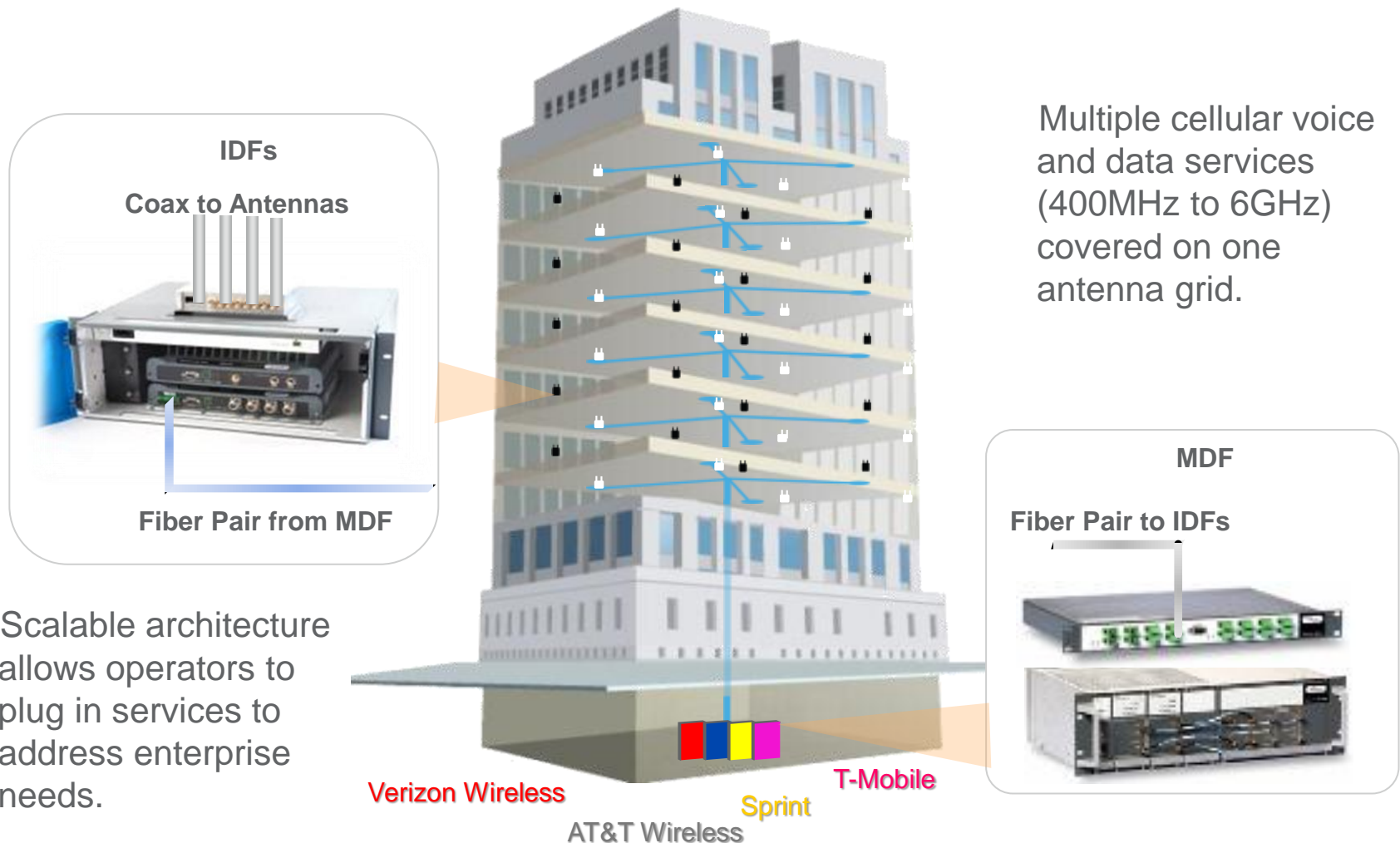
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MobileAccess2000

Wire-it-Once Flexibility & Scalability

'Wire-it-Once' Infrastructure Investment



MA2000 -TSX/QSX Value Proposition

- Modular, self contained service packs lower the cost threshold for neutral operator, multi-service deployments (20dBm considered low power)
- Lower 1st and 2nd carrier system costs
 - Reduced 1st carrier entry costs (without larger MRC chassis)
 - Single SKU (carrier package) simplifies ordering

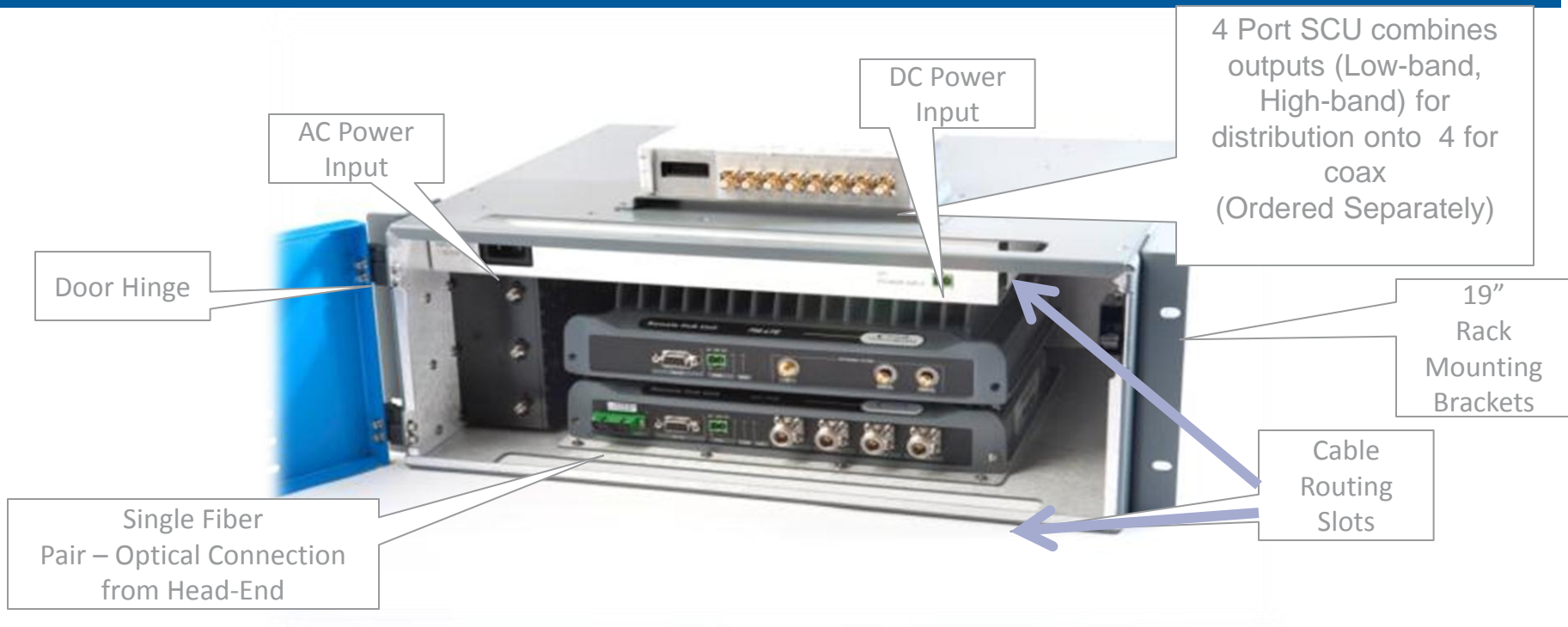
Eliminates need to externally mount the MA2000 remote equipment

Simplified Ordering and Improved Ease of Installation:

- Pre-configured service packs support up to 4 RF services and includes applicable power supplies, cables, filters, etc. for standard 19" rack mounting
- Simplified ordering with single part number



MA2000 TSX Remote w/ SCU



- Supports all existing MA2000 services and up to 3 RF services per MA2000 TSX
- Compatible with all existing MA2000 head-end, management platform, MA860 and WMTS solutions

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MobileAccessVE

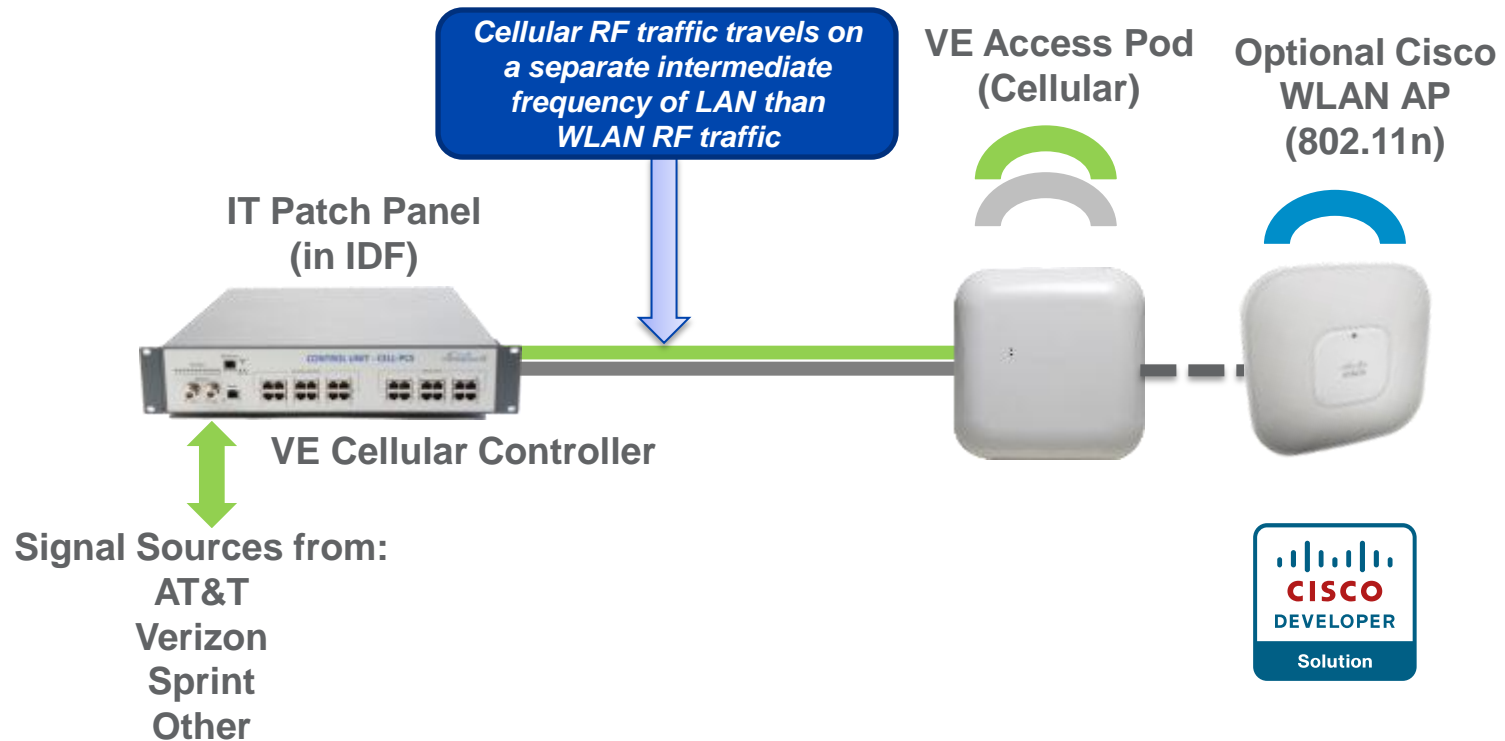
Wireless Simplified
with Cellular-over-LAN

MobileAccessVE: Cellular-over-LAN

- Fastest, Simplest Cellular Solution
 - Uses existing CAT 5e/6 for cellular signal delivery
 - Installed in days vs. weeks
 - Eliminates costly reconstruction of ceilings
 - Scalable fiber solution for large installations
 - Cable re-use cuts costs in high labor rate markets
- Lowest Cost 4G Overlay, even with MIMO
 - Delivers 2X2 MIMO on 1 existing CAT 5e/6 cable
 - Non-invasive installations
 - Operator-grade coverage
- Cisco-backed, tested and validated:
 - CELL + 802.11a/b/g/n + Wired Network
 - Tested for security and interoperability



MobileAccessVE Architecture



**14dBm composite
output power**

**Ethernet LAN +
PoE
pass-through with
100% transparency**

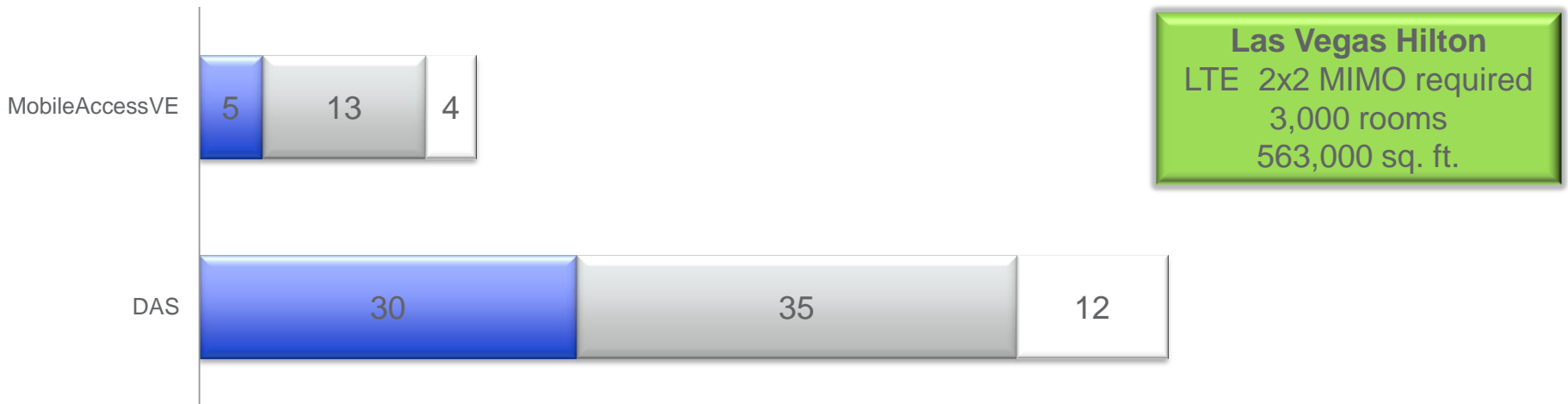
**Uses existing
CAT 5e/6
UTP cabling plant
via patch panel**

**Shared existing
Ethernet LAN cabling
is passive to optional
WLAN AP (RF)**

**Separate MIMO RF
Streams
transported over
1 cable**

Simpler & Faster Design and Deployment

MobileAccessVE vs. Conventional DAS Deployment (22 Days vs. 77 Days)



■ Planning, Design & Procurement

RF site and installation survey, budgetary BOMs, RF propagation survey, cabling design, etc..

■ Installation

Space and power plan, inter-building cabling and installation plan, core drilling, installation, grounding cable installation, cellular equipment installation, etc...

■ Testing

End-to-end internal coax testing (DTF, VSWR), fiber testing (OTDR, IL), copper power testing, CW RF test, RF source commissioning and WSP integration, DAS equipment testing and turn-up

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MobileAccessHX

2W SISO Outdoors and MIMO Indoors

MobileAccessHX Value Proposition

- Simple, cost-effective higher power (33dBm) remote optimizes and reduces the number of antennas/coax runs
- Supports CELL/PCS/AWS/LTE in a single enclosure
- Provides RF coverage in large scale public venues and mixed topologies (open and closed spaces)
- **Indoor unit offers SISO and MIMO configurations**
- Outdoor unit: IP65 / NEMA rated
- Shares a common head end with TSX/QSX remotes and proactive end-to-end monitoring system
- Ability to support multi-carriers and 4 services in a single enclosure (via shared amplifier approach)



Indoor Unit
SISO/MIMO



Outdoor Unit

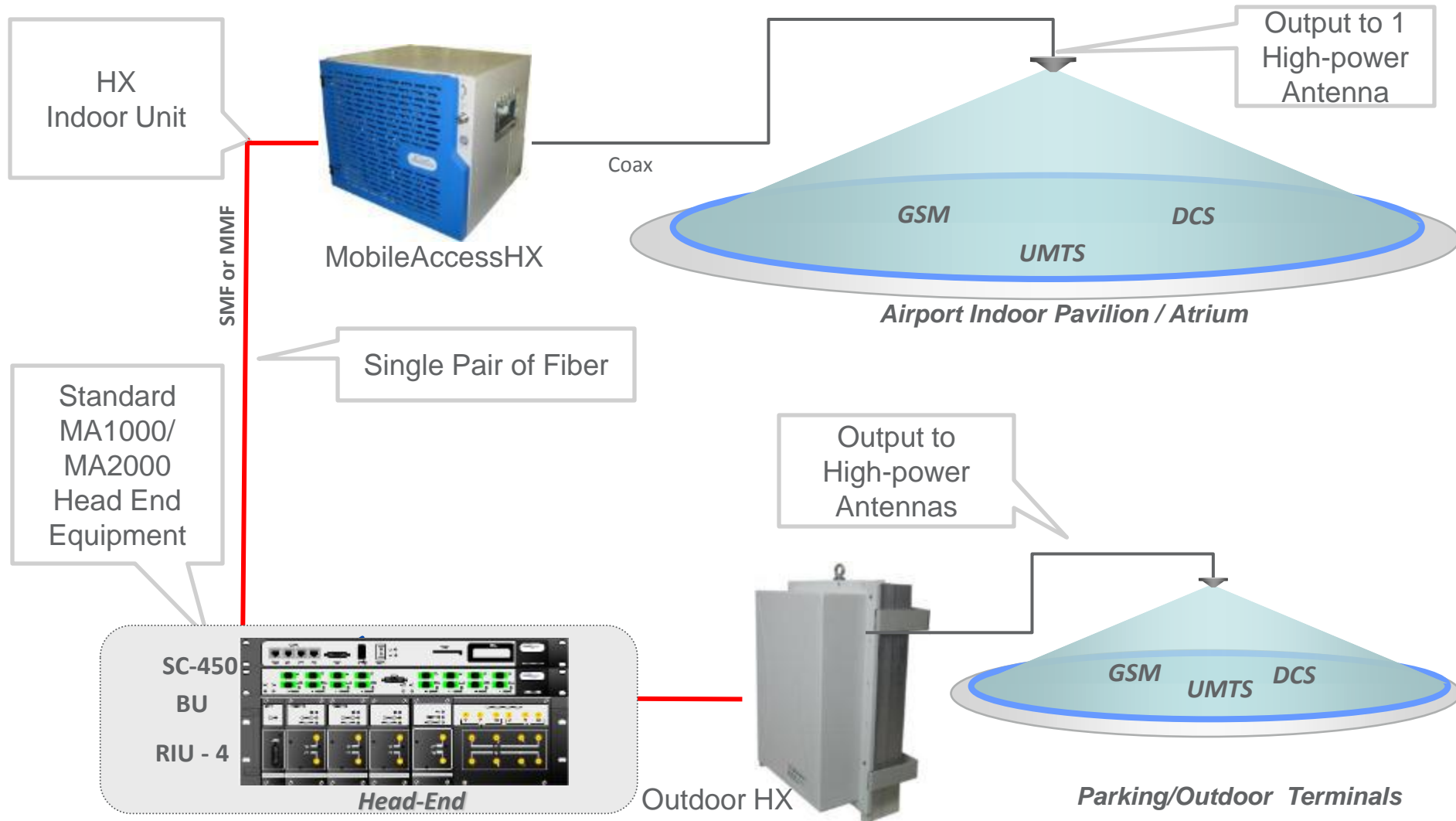
MobileAccessHX: Best Fit Venues

Standalone or in combination with MobileAccess1000/MobileAccess2000
where open and dense/semi-dense topologies exist:

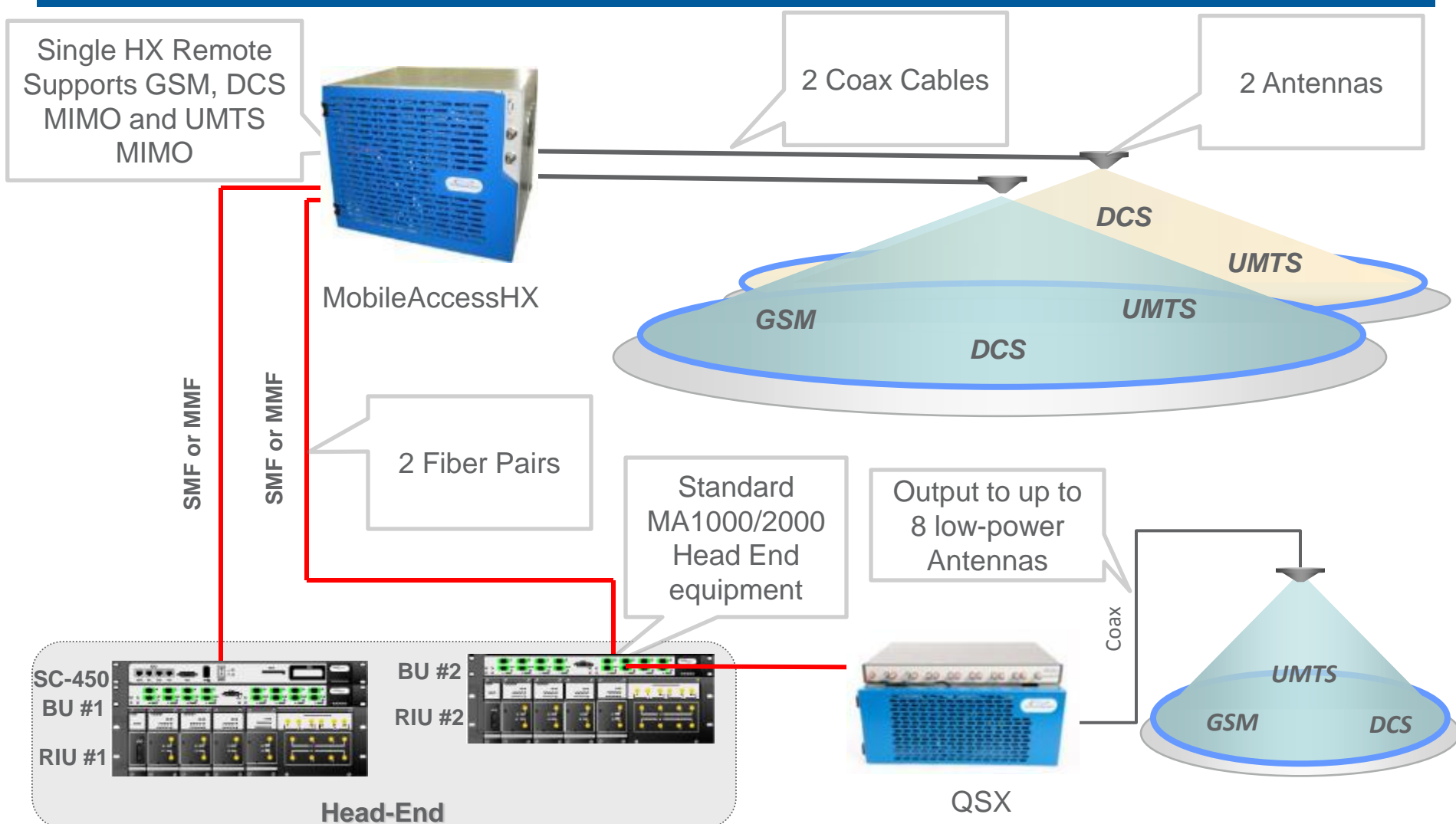


Environment Characteristics	Stadiums	Airports	Shopping Malls	Convention Centers	Campus	Enterprise
<i>Open / Mixed Topologies</i>	HX (Parking Lot, Field)	HX (Terminal)	HX (Common Areas)	HX (Banquet Auditorium)	HX (Malls/Quads)	
<i>Semi- Dense Environment</i>	MA1000 / MA2000 (Gates, Food Court)	HX (Concourse)		MA1000 / MA2000 (Lobby)		HX (Metro High-rise)
<i>Dense Environment</i>	MA1000 / MA2000 (Catwalks, Back Office)	MA1000 / MA2000 (Back Office)	MA1000 / MA2000 (Service Corridors)	MA1000 / MA2000 (Meeting Rooms, Suites)	MA1000 / MA2000 (Classrooms/ Libraries/ Student Center)	MA1000 / MA2000 (Hallways, Conference Rooms)

MobileAccessHX: Indoor/Outdoor SISO Deployment



MobileAccessHX Hybrid: Indoor MIMO with MA2000 Deployment



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MobileAccessGX

20W/40W of High Power Outdoors

MobileAccessGX – Value Proposition

- **Value Proposition**

- **Cost-effective operator-grade performance.**
20W/40W of composite power *per band* ensures performance in transitional/adjacent areas between macro and indoors.
- **Scalable Multi-Frequency RF Transport.**
Three bands and ports per enclosure.
Expandable up to six bands.
- **MIMO support:** 2x2 MIMO configuration for LTE700, AWS or LTE2600
- **Common head end architecture:** Can be deployed in combination with TSX/QSX and HX indoor/outdoor remotes (via OCH)
- **Ruggedized for harsh environments** - Fully sealed RU. *Compliant to IP65/NEMA 4 rated*
- **Industry Leading OptiTap™**– Flush mount adapter. Reduces install time up to 70%.*



20W/40 W Unit

GX: Best Fit Use Cases

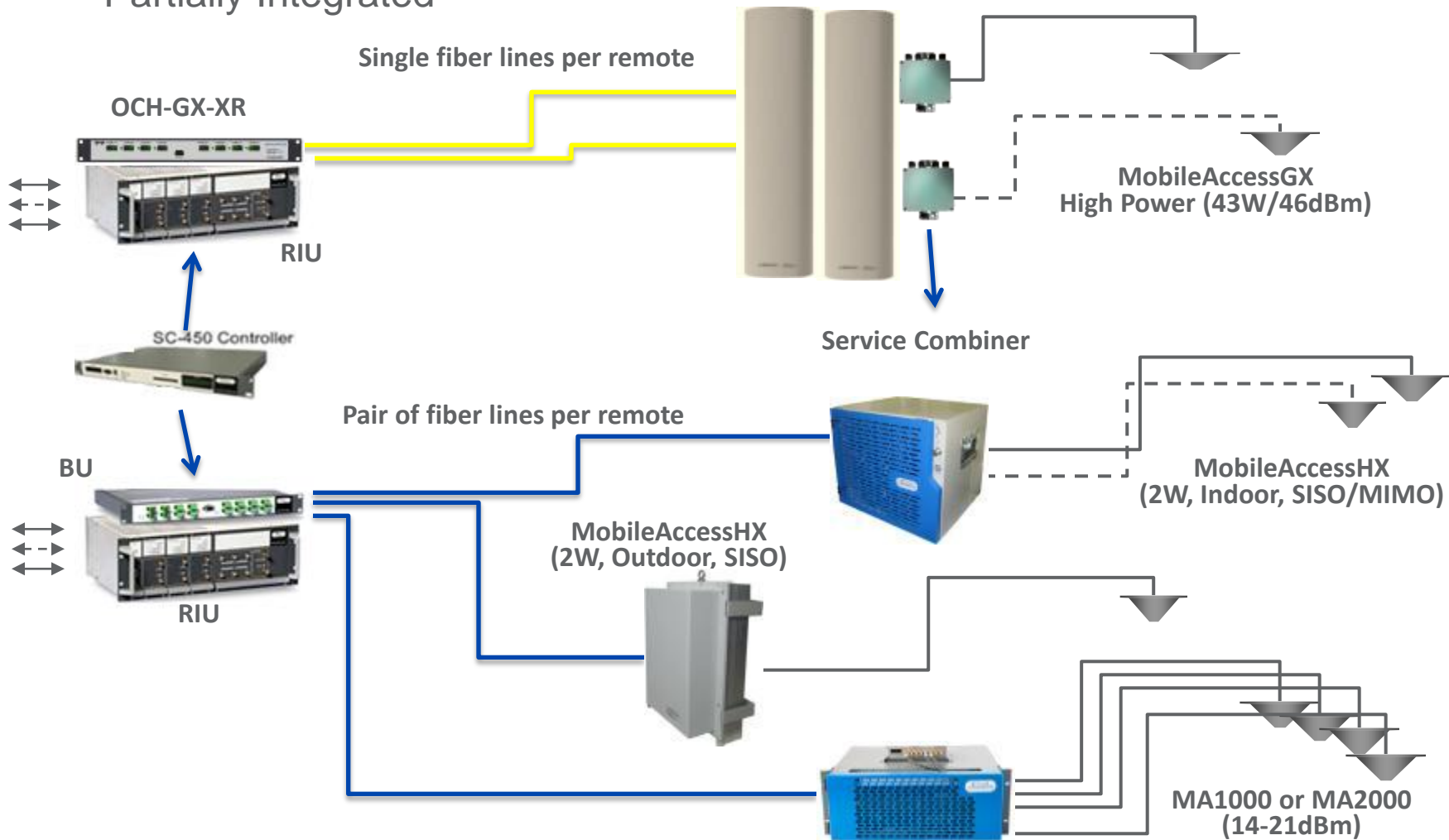
- In combination with **MobileAccess1000/MobileAccess2000** where *large adjacent* open topologies or for underground areas such as subway or tunnels



Environment Characteristics	Stadiums	Airports	Shopping Malls	Convention Centers	Campus	Enterprise
Underground/ Open Areas	GX (Parking Lot)				GX (Large open)	
Open / Mixed Topologies		HX (Terminal)	HX (Common Areas)	HX (Banquet Auditorium)	HX (Malls/Quads)	
Semi- Dense Environment	MA1000 / MA2000 (Gates, Food Court)	HX (Concourse)		MA1000 / MA2000 (Lobby)		HX (Metro High-rise)
Dense Environment	MA1000 / MA2000 (Catwalks, Back Office)	MA1000 / MA2000 (Back Office)	MA1000 / MA2000 (Service Corridors)	MA1000 / MA2000 (Meeting Rooms, Suites)	MA1000 / MA2000 (Classrooms/ Dorms, Library)	MA1000 / MA2000 (Hallways, Conf. Rooms)

GX System Architecture

Partially Integrated



Thank You!

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