

# Airmux-5000

High Capacity Point-to-Multipoint Wireless System



Carrier-class broadband  
point-to-multipoint  
radio solution for  
Ethernet traffic

- Carrier-class cost-effective broadband wireless radio system with Layer-2 Ethernet capabilities
- Up to 200 Mbps point-to-multipoint solution for enterprise, residential, private and video surveillance networks that demand assured performance with guaranteed bandwidth for Ethernet services
- Multiband operation over 3.3 to 3.8 GHz\* and 4.8 to 6 GHz frequencies
- Guaranteed SLA and capacity per Subscriber Unit
- High reliability and availability based on robust air interface protocol

**AIRMUX**  
**ACCESS+**

Airmux-5000 is a carrier-class, cost-effective point-to-multipoint broadband wireless system. It includes Base Stations (BS) and Subscriber Units (SU) for transmitting over an extensive range of frequency bands: 3.3 to 3.8 GHz\* and 4.8 to 6 GHz bands.

The system is suitable for deployment in FCC, IC and ETSI-regulated countries.

Ensuring the highest spectrum efficiency available in the market, Airmux-5000 delivers greater throughput over smaller channel bandwidth.

\* Available starting from version 3.2.

**RAD**

data communications

The Access Company

## Airmux-5000

### High Capacity Point-to-Multipoint Wireless System

High spectrum efficiency results in additional network revenue, reduced spectrum license fees and increased flexibility in frequency planning.

Airmux-5000 is the ideal wireless system for business access users demanding high-capacity throughput and Ethernet SLA assurance.

The Airmux product line is part of RAD's Access+ portfolio for Multiservice Access Platform and First Mile solutions. The portfolio combines extensive support for legacy services with future-proof Ethernet capabilities to address the challenges faced by utilities, transportation networks, carriers, and mobile operators in migrating to next-generation networks and services with flexibility, efficiency and carrier-class reliability.

#### MARKET SEGMENTS AND TYPICAL APPLICATIONS

The most common wireless applications are described below:

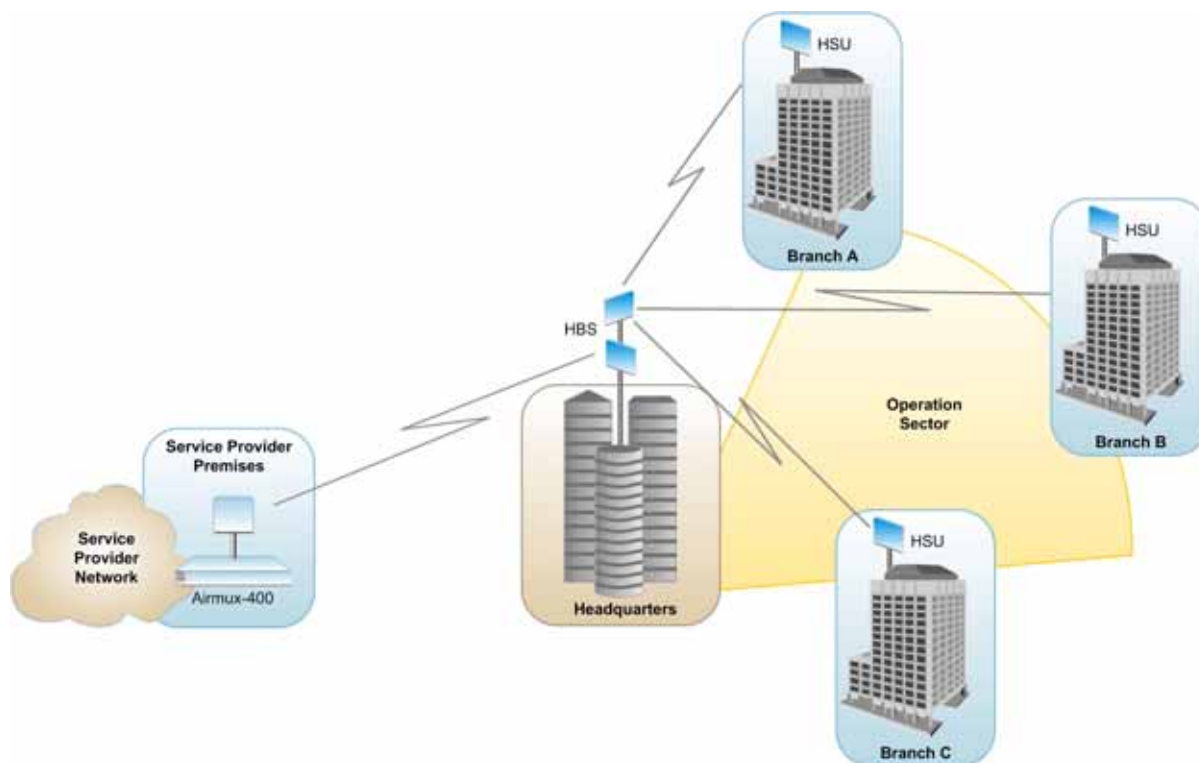


Figure 1. High Capacity Corporate Access

### Service Providers and ISPs

Providing IP backhaul of 4G/broadband services in point-to-multipoint topologies, Airmux-5000 offers broadband access for remote, rural and underserved communities:

- nLOS (no line of sight) in urban environment
- Long haul in rural setting.

Large corporate clients can build their networks to eliminate the recurring fee of incumbent leased line services, while maintaining a secured dedicated capacity per site.

### Private Networks

Airmux-5000 can be used in high-capacity interbranch connectivity applications for university campuses, health care organizations, government institutions, large enterprises and public establishments with high traffic requirements.

### Security and Surveillance

Aggregation and backhaul of traffic from multiple collocated megapixel video cameras, make Airmux-5000 suitable for homeland security applications, municipal 'safe city' projects, and border control installations.

### PHYSICAL CONFIGURATIONS

Airmux multiplexers consist of a mast- or wall-mountable High-Capacity Base Station (HBS) operating at multiple frequencies of 5.x GHz, and PoE devices. Each HBS supports up to 16 remote High-Capacity Subscriber Units (HSUs) with aggregated throughputs of 10, 20 and 50 Mbps.

### SUPERIOR SPECTRAL EFFICIENCY

Built on advanced MIMO and OFDM technologies, the Airmux-5000 system provides a high-capacity link at channel bandwidth of 10\*, 20, or 40\* MHz. This guarantees a robust air interface able to withstand strong RF interference and harsh ambient conditions.

### SECURITY

Data transmitted over the air interface is encrypted using Advanced Encryption System (AES) with a 128-bit encryption key.

### AIR LINK QUALITY OF SERVICE

When the link quality is low, Airmux-5000 automatically searches for a clear channel within a pre-selected list of frequencies.

### SHORT TIME-TO-SERVICE

Because Airmux-5000 operates at license-exempt frequencies, it can be deployed in record time, eliminating the costs and delays involved in leasing lines or trenching fiber.

### SITE SYNCHRONIZATION

Hub Site Synchronization (HSS) enables collocating multiple radios by reducing the interference that normally occurs when several radios transmit and receive in close proximity to one another. HSS provides a complex radio environment of mixed services and channel bandwidth frequencies. The collocation feature requires ordering the HSS unit, as well as its synchronization cables.

\* Available starting from version 3.2.

**Note:** Like any other RF deployment, the wireless operation is highly dependent on factors such as available frequencies, the physical space between radios, other interfering radios.

HSS does not eliminate the need for careful RF planning to ensure the design will work as required.

For long distance coverage, synchronization can be obtained using a GPS Synchronization Unit (GSU). The GSU reduces the interference between the collocated radios, by providing a GPS signal simultaneously to ODU's at all locations.

### DIVERSITY\*

Airmux-5000 uses of dual bipolar antennas to transmit the same data through both radio links. This ensures data transmission integrity under harsh conditions.

### MANAGEMENT

A single SNMP-based network management application (Airmux Manager) is used to control the Airmux-5000 system.

RADview-EMS, RAD's SNMP-based management software provides access to the Airmux Manager via its topology map.

The Airmux Manager Spectrum View utility\* is an RF survey tool enabling link installation prior to full link service activation. It provides comprehensive and clear spectral measurement information for easier installations.

\*\* Available starting from version 3.15.

# Airmux-5000

## High Capacity Point-to-Multipoint Wireless System

### Specifications

#### RADIO

##### Net Aggregate Capacity

HBS: 100 Mbps (20 MHz),  
200 Mbps (40 MHz)\*

HSU: 10, 20, 50 Mbps

*Note: For a full list of supported bands and frequency ranges see Table 1.*

##### Subscriber Units Supported

Up to 16

##### Range

Up to 40 km (25 miles)

##### Channel Bandwidth

10\*, 20, 40\* MHz

##### Duplex Technique

TDD

##### Modulation

2x2 MIMO-OFDM,

##### Error Correction

FEC, k = 1/2, 2/3, 3/4, 5/6,

##### Encryption

AES 128

##### Max Tx Power

25 dBm

#### ETHERNET INTERFACE

##### Type

HBS: 10/100/1000BaseT (via indoor PoE device)

HSU: 10/100BaseT

##### Framing/Coding

IEEE 802.3u

##### Bridging

Up to 4000 MAC addresses self-learning

##### Latency

4 to 10 msec (typical under full sector load)

##### Line Impedance

100Ω

##### QoS\*

4-queue traffic prioritization

##### VLAN Support

802.1p & Q, QinQ, layer-2 VPN\*\*

\* Available starting from version 3.2.

\*\* Available starting from version 3.15.

#### MANAGEMENT

##### Protocol

SNMP, Telnet

##### Interface

10/100BaseT

##### Connector

RJ-45

##### Upgrade Capabilities

Local and over-the-air software download

#### GENERAL

##### PoE Cable Connection

Outdoor Cat.5e cable

Max. length: 100m (328 ft) for 100BaseT  
75m (246 ft) for 1000BaseT

##### Grounding and Lightning Protection

Individual grounding for each HBS and HSU

##### Power

PoE via external device: 100–240 VAC

##### Power Consumption

HBS: 20W max

HSU: 25W max

##### Indicators

IDU (green/orange/red): IDU status

ODU (green/red): ODU status

AIR I/F (green/orange/red): Air link status

HSS (green/orange/red): HSS status

STBY (green/orange/red): MHS status

LINK (yellow): Ethernet link status

ACT (green): Ethernet activity status

##### Environment

Enclosure: IP67 all-weather case

Temperature: -35° to 60°C (-31° to 140°F)

Humidity: 100%, condensing

##### Physical

HBS/HSU (with external/small form-factor antenna):

Height: 270 mm (10.6 in)

Width: 195 mm (7.6 in)

Depth: 80 mm (3.1 in)

Weight 1.8 kg (3.6 lb)

HSU (with integrated antenna):




Height: 371 mm (14.6 in)

Width: 371 mm (14.6 in)

Depth: 110 mm (4.3 in)

Weight 3.5 kg (7 lb)

Table 1. Airmux Family Product Comparison

	Module	Topology	Bandwidth (Mbps)	Services	HSS
 <p>Airmux-200 (Ver. 1.9.3)</p>	Airmux-200	Point-to-point, multiple point-to-point	18	2 Ethernet + 1, 2, 4 E1/T1	✓
	Airmux-200L/LC	Point-to-point, multiple point-to-point	2	1 Ethernet	✓
	Airmux-200VS	Point-to-point, multiple point-to-point	5/2	1 Ethernet	✓
 <p>Airmux-400 (Ver. 2.5)</p>	Airmux-400/10	Point-to-point, multiple point-to-point	10 Ethernet max + TDM	Up to 3 Ethernet + up to 16 E1/T1	✓
	Airmux-400/50	Point-to-point, multiple point-to-point	50 total (Ethernet + TDM)	Up to 3 Ethernet + up to 16 E1/T1	✓
	Airmux-400/100	Point-to-point multiple point-to-point	100 total (Ethernet + TDM)	Up to 3 Ethernet + up to 16 E1/T1	✓
 <p>Airmux-5000 (Ver. 3.1)</p>	Airmux-5000	Point-to-multipoint	200	1 Ethernet port via PoE	✓

## Airmux-5000

### High Capacity Point-to-Multipoint Wireless System

Table 2. Supported Bands and Frequency Ranges

Band	Frequency Range [Ghz]	Regulation
<b>FCC, MII</b>		
5.8 GHz FCC/IC	5.725–5.850	FCC 47CFR, Part 15, Subpart C and IC RSS-210
5.8 GHz MII	5.730–5.845	MI I for 5.8 GHz
5.4 GHz FCC	5.480–5.715	FCC 47CFR, Part 15, Subpart E
5.4 GHz IC	5.480–5.715	IC RSS-210
5.3 GHz FCC/IC	5.260–5.340	FCC 47CFR, Part 15, Subpart E and IC RSS-210
4.9 GHz FCC/IC	4.940–4.990	FCC 47CFR, Part 90, Subpart Y and IC RSS-111
3.65 GHz FCC	3.650–3.675	FCC 47CFR, Part 90- Restricted mode
3.5 GHz IC	3.450–3.650	ICC RSS 192, issue-3
<b>ETSI</b>		
5.8 GHz ETSI	5.735–5.865	ETSI EN 302 502
5.4 GHz ETSI	5.480–5.715	ETSI EN 301 893
5.3 GHz ETSI	5.160–5.340	ETSI EN 301 893
3.4-3.7 GHz ETSI	3.403–3.710	EN 302 326-2 v1.2.2
<b>WPC</b>		
5.8 GHz WPC India	5.825–5.875	WPC GSR-38
<b>UNIVERSAL</b>		
4.8-6.0 GHz	4.800–6.060	Universal
3.3-3.8 GHz	3.300–3.800	Universal

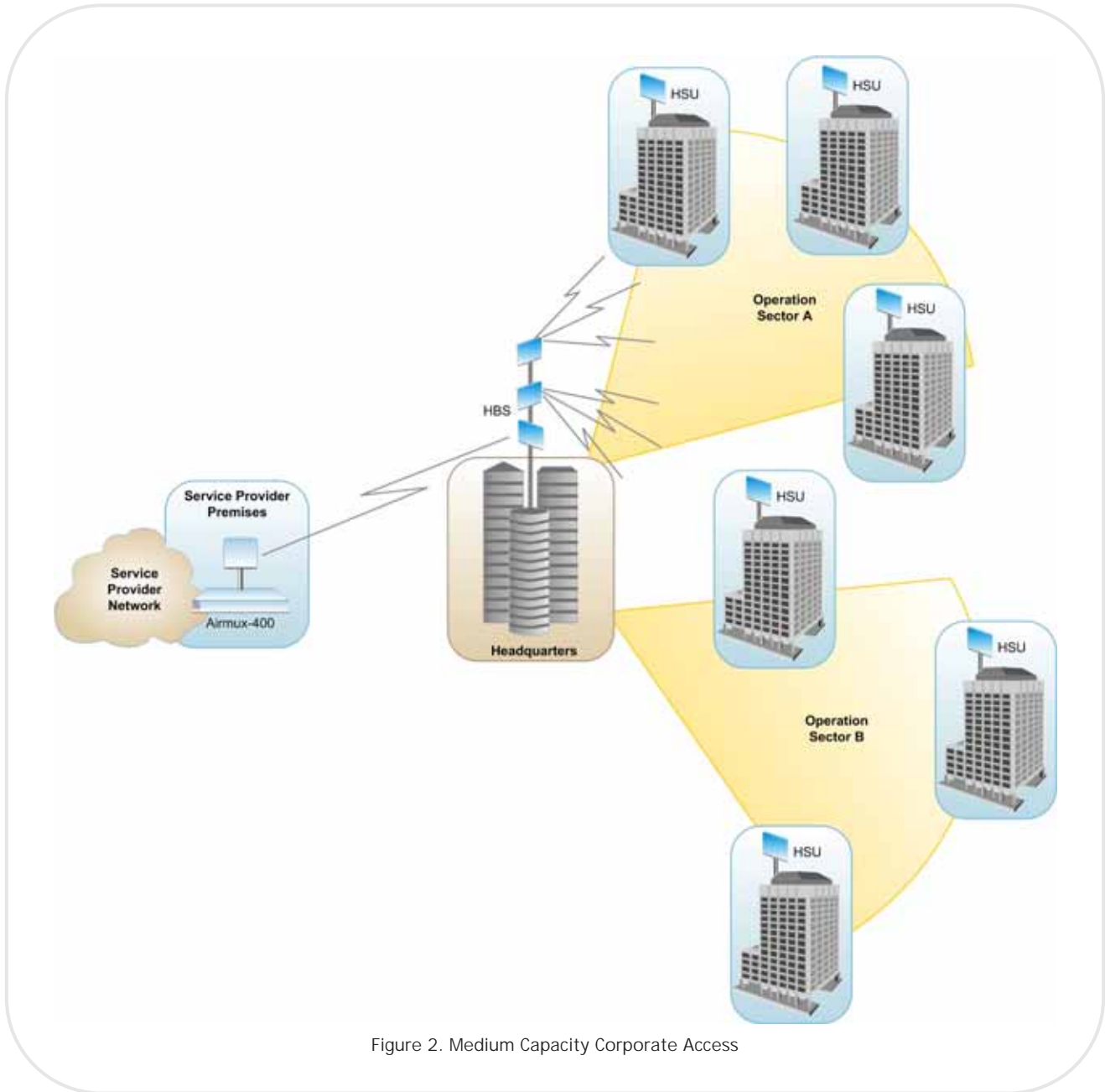


Figure 2. Medium Capacity Corporate Access

# Airmux-5000

## High Capacity Point-to-Multipoint Wireless System

### Ordering

#### STANDARD CONFIGURATIONS

##### Airmux 200M- Base Station

Airmux-5000/BS/F58F/200M/EXT  
Airmux-5000/BS/F54E/200M/EXT

##### Airmux 50M- Subscriber Unit

Airmux-5000/SU/F58F/50M/EXT  
Airmux-5000/SU/F58F/50M/INT

##### Airmux 20M- Subscriber Unit

Airmux-5000/SU/F58F/20M/EMB  
Airmux-5000/SU/F58F/20M/INT

##### Airmux 10M- Subscriber Unit

Airmux-5000/SU/F58F/10M/EMB  
Airmux-5000/SU/F54E/10M/EMB

##### Airmux-5000/BS/#/200M/EXT

Base station (BS), connectorized for external antenna

#### Legend

# Frequency band and regulation:  
**F58F** 5.x GHz, FCC/IC  
**F54E** 5.x GHz, ETSI  
**F54U** 5.x GHz, universal

##### Airmux-5000/SU/#/%/&

Subscriber unit (SU)

#### Legend

# Frequency band and regulation:  
**F58F** 5.x GHz, FCC/IC  
**F54E** 5.x GHz, ETSI  
**F54U** 5.x GHz, universal

##### % Aggregate throughput:

**10M** 10 Mbps  
**20M** 20 Mbps  
**50M** 50 Mbps

##### & Antenna:

**EMB** Embedded integrated antenna, connectorized for external antenna  
**INT** Integrated antenna  
**EXT** Connectorized for external antenna

The following restrictions apply when ordering SUs:

- Connectorized SUs without integrated antenna (**EXT** option) have 50-Mbps throughput only.
- SUs with 10-Mbps throughput can be ordered with embedded antenna only (**EMB** option).
- F54U SUs with 20- and 50-Mbps throughputs can be ordered with integrated antenna only (**INT** option).

#### OPTIONAL ACCESSORIES

##### External Antennas

BS and SU devices are available with external antennas for increased range and throughput

##### Airmux-5000/BS-ANT/\$

External antennas for BS

#### Legend

\$ External antenna:  
**14/4959/fp** 14 dBi, 4.90–5.950 GHz bands, 90°  
**15/4959/fp** 15 dBi, 4.90–5.950 GHz bands, 60°

*Note: fp stands for a flat panel antenna.*

##### Airmux-400-ANT/\$

External antennas for SU

#### Legend

\$ External antenna:  
**23/4958/fp** 23 dBi, 4.90–5.80 GHz, 4.9, 5.3, 5.4 GHz bands  
**32/4958/dish** 23 dBi, 4.90–5.80 GHz, 4.9, 5.3, 5.4 GHz bands  
**28/5260/dish** 28 dBi, 4.90–6.06 GHz, 5.3, 5.4, 5.8, 5.9, 6.0 GHz bands

*Note: fp stands for a flat panel antenna, and dish – a dish antenna.*

##### Power-over-Ethernet (PoE) Devices

BS and SU devices receive power and Ethernet traffic via PoE units

##### Airmux/PoE/GbE/a

PoE device 100/1000BaseT interface for BS

##### a Power cable with matching plug:

**ACEU** Europe  
**ACUS** US  
**ACUK** UK  
**ACIDA** India  
**ACAU** Australia/China  
**ACOC** Open-ended connector  
**ACAR** Argentina  
**ACSA** South Africa  
**DC** -20 to -60 VDC

##### Airmux/POE-DC

PoE device with wide range DC power supply (-20 to -60 VDC) for SU

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