

Now with up to  
4 times the  
transmit power  
with the new  
'HE' option!

# Airmux-200

Wireless Broadband Multiplexer



Point-to-point  
radio solution for  
combined TDM and  
Ethernet traffic over  
license-free  
frequencies

- Cost effective point-to-point broadband encrypted wireless multiplexer
- Transmission range of up to 80 km (50 miles)
- Operates at 5.3/5.4/5.8 GHz, 4.9 GHz, and 2.4 GHz unlicensed bands
- Air data rate of up to 48 Mbps
- High reliability and availability based on robust air interface protocol
- "HE" option provides an additional 7 dBm of transmit power
- Built-in support for synchronized co-located units (Hub-Site-Synchronization)

# Airmux-200

## Wireless Broadband Multiplexer

### MODELS

**Airmux-200** is a carrier-class, 48 Mbps capacity, cost effective point-to-point broadband wireless transmission system. It combines legacy TDM and Ethernet services for transmission over 5.x GHz, 4.9 GHz, and 2.4 GHz unlicensed bands, and is suitable for deployment in FCC-regulated countries.

Airmux-200 provides high performance and reliability. The interface ensures low BER, as well as low latency, and full compliance with E1/T1 interface jitter and wander requirements.

Transmission range of up to 80 km (50 miles) is available with an external antenna.

### SECURITY

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

### HUB SITE SYNCHRONIZATION

Exclusive feature of Airmux 200 that enables up to eight hub-site radios to co-locate without causing interference.

### ADAPTIVE MODULATION

Airmux-200 adaptively changes the modulation according to air conditions, targeting maximum rate while maintaining link stability. The rate drops temporarily after encountering interference, then automatically returns to the highest possible rate.

### QUALITY OF SERVICE

When the link quality is out of limits, Airmux-200 automatically searches for a clear channel within a pre-selected list of frequencies.

### 5 MHZ AND 10 MHZ CHANNEL BANDWIDTH

Airmux-200 offers additional channel bandwidth options to the 20 MHz channel bandwidth already supported. Narrow channel bandwidth improves immunity to disturbances and enables deployment in high-interference environments, with enhanced channel allocation flexibility and improved sensitivity (see *Ordering*).

### INCREASED FRAME SIZE

Airmux-200 supports larger frames (1536 bytes for IDU, 1800 bytes for POE) to improve Ethernet traffic efficiency and reduce the overall overhead.

### SHORT TIME-TO-SERVICE

Because Airmux-200 operates in license-exempt frequencies, it can be deployed in record time, eliminating the costs and delays involved in leasing lines or trenching fiber.

### MANAGEMENT

Factory settings can be restored at any time for each ODU.

Information on links and management can be collected and analyzed via a single action.

External events trigger alarms via the dry-contact alarm inputs.

### PHYSICAL CONFIGURATIONS

Airmux multiplexers consist of an outdoor unit (ODU) and an indoor unit (IDU or IDU-E).

The outdoor unit is suitable for mast or wall installation. Mounting brackets are supplied with the unit.

ODU-HE (high-end) enables support of synchronized, collocated units and supplies a higher output power of 23 dBm.

Two AC power supply options are available for IDU-E: a single fixed power supply or two modular power supplies

Table 1. Radio Regulatory Compliance and Maximum Transmit Power

USA and Canada			Europe (ETSI)	
Frequency [GHz]	Regulation	Max. Tx Power [dBm]	Regulation	Max. Tx Power [dBm]
5.725 – 5.850	47CFR Part 15 Subpart C, RSS-210	16/23	N/A	N/A
5.470 – 5.725	N/A	N/A	EN 300 216 V1.2.1, EN 301 893 V1.2.3	8 EIRP ≤ 30
5.250 – 5.350	47CFR Part 15 Subpart E, RSS-210	8	N/A	N/A
4.940 – 4.990	47CFR Part 15 Subpart B	15	N/A	N/A
2.400 – 2.4835	47CFR Part 15 Subpart C, RSS-210	11	EN 300 328	-4 EIRP ≤ 20

## APPLICATIONS

### Cellular Backhauling

Airmux-200 connects between cellular base stations and controllers. This solution meets the requirements of cellular backhauling applications by providing four E1/T1 interfaces and Ethernet traffic for maintenance and control.

### Hot-Spot Backhauling

Airmux-200 provides a robust alternative to the last mile connection between the WLAN access point and the data network, compared with the often used expensive E1/T1 leased lines.

### Broadband Access

Airmux-200 provides broadband Ethernet and leased line services, to Small and Medium Enterprises (SME).

### Wireless ISP Backhaul

Wireless Internet Service Providers (WISP) backhaul their Point of Presence (POP) traffic to the network operation center. With Airmux-200, WISPs achieve higher capacity, and can offer bundled connectivity, with a range of up to 80 km (50 miles).

### Remote Site Connectivity

Airmux-200 is also offered to enterprises with multiple sites that require a transparent connection of LAN and PBX systems across their various campuses.

## Specifications

### RADIO

#### Frequency Bands

5.8 GHz (5.725–5.850 GHz)  
5.4 GHz (5.470–5.725 GHz)  
5.3 GHz (5.150–5.350 GHz)  
4.9 GHz (4.940–4.990 GHz)  
2.4 GHz (2.400–2.4835 GHz)

#### Data Rate

Up to 48 Mbps, user-configurable

#### Channel Bandwidth

20 MHz 10 MHz 5 MHz

#### Duplex Technique

TDD

#### Modulation

OFDM - BPSK, QPSK,  
16 QAM, 64 QAM

#### Transmit Power

See *Table 1*

#### RF Dynamic Range

More than 50 dB

### LAN INTERFACE

#### Number of Ports

IDU: 1  
IDU-E: 2

#### Type

10/100BaseT, autonegotiation

#### Framing/Coding

IEEE 802.3u

#### Bridging

Up to 2048 MAC addresses self-learning

#### Traffic Handling

MAC layer bridging, self-learning

#### Latency

3 msec (typical)

#### Line Impedance

100Ω

#### VLAN Support

Transparent

#### Connector

RJ-45

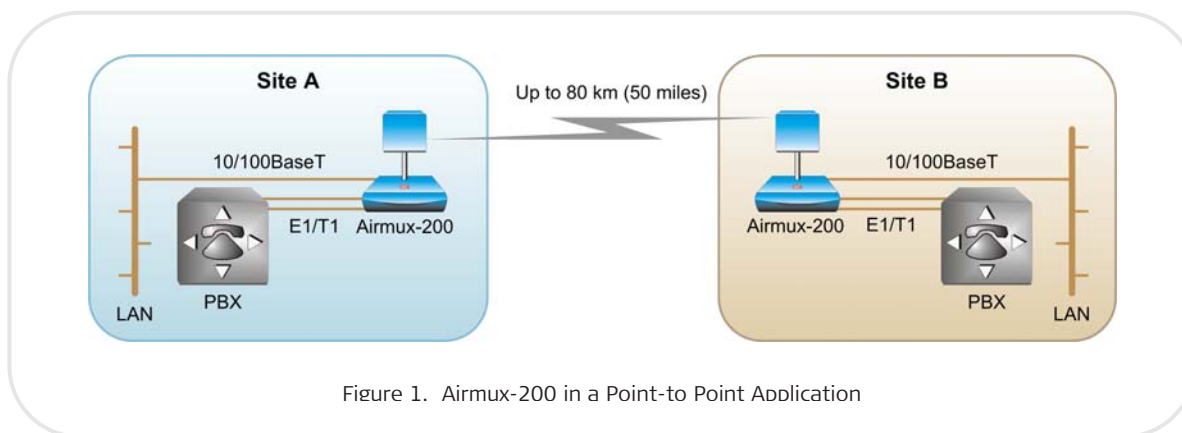


Figure 1. Airmux-200 in a Point-to Point Application

**E1/T1 INTERFACE****Number of Ports**

IDU: 1 or 2

IDU-E: 4

**Framing**

Unframed

**Timing**

Plesiochronous (independent Tx and Rx timing)

**Line Code**

E1: HDB3

T1: B8ZS, AMI

**Latency**

8 msec

**Line Impedance**

E1: 120Ω, balanced

T1: 100Ω, balanced

**Connector**

RJ-45

**Jitter and Wander**

As per G.823, G.824

**MANAGEMENT****Network Management and Protocol**

SNMPc-based

**Management Interface**

10/100BaseT

**Connector**

RJ-45

**Upgrade Capabilities**

Local and over-the-air software download

**ANTENNA****Characteristics**See *Table 2***GENERAL****Diagnostics**

Local and remote loopbacks

**IDU-to-ODU Connection**

Outdoor Cat.5e cable,

100m (328 ft) max. length

**Power**

DC: -48, 24 VDC

AC: 100–240 VAC

**Power Consumption**

ODU with IDU: 10W max

ODU with IDU-E: 14W max

**Indicators**

PWR (green) – Power status

IDU (green) – IDU status

ODU (green/red) – ODU-to-IDU link status

AIR I/F (green/red) – Air Interface status

SERVICE (green/red) – E1/T1 signal status

**Environment**

Outdoor unit and external antenna:

Enclosure: IP67 all-weather case

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

Indoor units:

Temperature: 0° to 50°C (32° to 122°F)

Humidity: Up to 90%, non-condensing

Table 2. Airmux-200 Antenna Options

Frequency	Antenna Type	Gain [dBi]	Typical Range [km]	Typical Range [mi]	Beam [degrees]	Dimensions [mm]	Dimensions [in]	Weight [kg]	Weight [lb]	Connector	Lightning Protection
5.8, 5.4, 5.3 GHz	Integrated Flat panel	22	40	25	9.0	305×305×58	12×12×2.3	0.5	1.1	NR	Yes
5.3 GHz	External Flat panel	28	80	50	4.5	600×600×51	23.6×23.6×2	5.0	11.0	N-type	No
5.8 GHz	External Dish	32.5	80	50	4.5	Dia 900	Dia 35.4	10	22	N-type	No
4.9 GHz	External Flat panel	21	24	15	9.0	305×305×58	12×12×2.3	0.5	1.1	N-type	Yes
	External Dish	27	80	50	5	Dia 600	Dia 23.6	5.0	11.0	N-type	Yes
2.4 GHz	Integrated Flat panel	17	40	25	20	305×305×58	12×12×2.3	0.5	1.1	NR	Yes
	External Grid	24	80	50	7.5	600×997×380	23.5×39.2×15	2.0	4.4	N-type	No

**Note:** The range of the system depends on the system configuration. For further information, please contact the RAD distributor nearest you or one of RAD's offices worldwide.

# Airmux-200

## Wireless Broadband Multiplexer

### Physical

ODU (with integrated antenna):

Height: 305 mm (12.0 in)

Width: 305 mm (12.0 in)

Depth: 58 mm (2.3 in)

Weight: 1.5 kg (3.3 lb)

IDU:

Height: 44 mm (1.7 in)

Width: 237 mm (9.3 in)

Depth: 165 mm (6.5 in)

Weight: 0.5 kg (1.1 lb)

IDU-E:

Height: 44 mm (1.7 in)

Width: 430 mm (17.0 in)

Depth: 290 mm (11.4 in)

Weight: 1.5 kg (3.3 lb)

### Ordering

#### Airmux-200/IDU/~~/UTP/\*

Indoor unit

#### Airmux-200/IDUE/~~/2UTP/\*

Extended indoor unit with optional redundant power supply

#### Airmux-200/=~/POE

Outdoor unit with POE device with integrated antenna

#### Airmux-200/+~/EXT/POE

Outdoor unit with POE device for external antenna

#### Airmux-200/ODU/#/^

Outdoor unit

#### Airmux-200/ODU-HE/F58F

Outdoor unit, high-end, 5.7–5.8 GHz frequency, FCC regulation

#### Airmux-200/ODU-HE/F58F/EXT

Outdoor unit, high-end, for external antenna connection, 5.7–5.8 GHz frequency, FCC regulation

#### Airmux-200/#/^~/UTP\*/KIT

A system comprising two indoor units and two outdoor units

#### Airmux-200E/#/^~/~/2UTP\*/KIT

A system comprising two extended indoor units and two outdoor units

*Note: Kits are supplied without the cable.*

*Note: All Airmux 200 products support the narrow channel bandwidth, in addition to 20 MHz, except for the following that support 20MHz only:*

- ODU with the frequencies 4.9F, 5.3E, 5.3F, 5.4E, 5.4E-HG, 5.4E-LG, 5.4IC, 5.8UK
- POE with frequencies 4.9FP, 5.3E, 5.4E, 5.4E-HG, 5.4E-LG

## Airmux-200

## Wireless Broadband Multiplexer

**Legend**

Power supply type:

**115** 115 VAC power supply

**230** 230 VAC power supply

IDU-E only:

**48** -48 VDC power supply

**24** 24 VDC power supply

**Note:** The Airmux-200 IDU-E may be ordered with two AC modular removable power supplies.

The power supply of the single power supply option is not removable.

For IDU operation via -48 VDC, order either AC version.

Frequency band and regulation:

**F24F** 2.400–2.4835 GHz, FCC

**F58F** 5.725–5.850 GHz FCC

Frequency band and regulation:

**F24F** 2.400–2.4835 GHz, FCC

**F49FP** 4.940–4.990 GHz, FCC

**F53F** 5.150–5.350 GHz, FCC

**F58F** 5.725–5.850 GHz FCC

Frequency band and regulation:

**F24F** 2.400–2.4835 GHz, FCC

**F58F** 5.725–5.850 GHz FCC

Frequency band and regulation:

**F24E** 2.400–2.4835 GHz, ETSI

**F24E-LG** low-gain F24E

**F24F** 2.400–2.4835 GHz, FCC

**F49F** 4.940–4.990 GHz, FCC

**F53F** 5.150–5.350 GHz, FCC

**F54IC** F54 Canada

**F58** 5.725–5.850 GHz

**Note:** F49F is available with external antenna only.

Interface type IDU:

**E1** E1 interface

**T1** T1 interface

**2E1** 2 x E1 interfaces

**2T1** 2 x T1 interfaces

**ETH** Ethernet interface only

Interface type IDU-E:

**4E1** 4 x E1 interfaces

**4T1** 4 x T1 interfaces

**^** **EXT** for outdoor unit with dedicated connector for external antenna connection

**Note:** If EXT is not specified, Airmux-200/ODU is supplied with an integrated antenna.

**OPTIONAL ACCESSORIES****Airmux-ANT/\$**

External antenna supplied with 1m (3.3 ft) cable

**Legend**

**\$** External antenna type, where

**grid** is a grid antenna,

**fp** is a flat panel antenna, and **dish**

is a dish antenna:

**21/4.9/db/fp** 21 dBi, 4.9 GHz

**22/5.3/db/fp** 22 dBi, 5.3 GHz

**22/5.4/db/fp** 22 dBi, 5.4 GHz

**22/5.8/db/fp** 22 dBi, 5.8 GHz

**24/2.4/db/grid** 24 dBi, 2.4 GHz

**27/4.9/db/dish** 27 dBi, 4.9 GHz

**28/5.3/db/fp** 28 dBi, 5.3 GHz

**28/5.4/db/fp** 28 dBi, 5.4 GHz

**28/5.8/db/fp** 28 dBi, 5.8 GHz

**29/5.8/db/dish** 29 dBi, 5.8 GHz

**32/5.3/db/dish** 32.5 dBi, 5.3 GHz

**32/5.4/db/dish** 32.5 dBi, 5.4 GHz

**32/5.8/db/dish** 32.5 dBi, 5.8 GHz

**CBL-Airmux-UTP/@**

Assembled cable for permanent connection between indoor and outdoor units

**Legend**

**@** Cable length:

**25** 25m (82 ft) cable

**50** 50m (164 ft) cable

**75** 75m (246 ft) cable

**100** 100m (328 ft) cable

**RM-33**

Hardware kit for mounting one IDU in a 19-inch rack