



# RADWIN 2000 PORTFOLIO CARRIER-CLASS POINT-TO-POINT SOLUTIONS

**RADWIN 2000  
D+ series  
Now supporting  
750 Mbps**

RADWIN 2000 sub-6 GHz point-to-point portfolio delivers 10 to 750 Mbps and is ideal for carriers and vertical markets that require high capacity backhaul and access connectivity.

# RADWIN 2000 PORTFOLIO CARRIER-CLASS POINT-TO-POINT SOLUTIONS

The RADWIN 2000 portfolio offers sub-6 GHz licensed and unlicensed wireless broadband solutions that deliver high throughput of up to 750 Mbps and operate for extensive range. Supported bands include 2.3-2.4 GHz, 3.3-3.8 / 3.65 GHz, 4.4-6.0 GHz and 5.7-6.4 GHz. Compact and robust, RADWIN 2000 products provide Ethernet and native TDM (up to 16 E1s/T1s), thus facilitating seamless migration from TDM to all-IP networks.

RADWIN 2000 radios incorporate state-of-the-art technologies such as MIMO, OFDM and high modulation schemes including QAM 256. Unique air interface capabilities ensure optimal performance and high spectral efficiency in dense radio environments and multipath conditions. RADWIN 2000 radios also support QoS and advanced networking features such as VLAN and Q-in-Q.

RADWIN 2000 radios can be deployed in point-to-point and multiple point-to-point topologies and support intra-site and inter-site TDD synchronization to maximize network capacity. The radios incorporate built-in 1+1 redundancy and ring protection functionality to maximize service availability.

RADWIN 2000 products comply with worldwide regulations and standards and are deployed globally by leading carriers, service providers and public and private networks requiring high-capacity connectivity.





**WIN**

### **RADWIN 2000 Portfolio Highlights**

#### High capacity & long range

- » 10 to 750 Mbps net aggregate throughput
- » Pay as you grow capacity
- » Long range - up to 120 Km/75 miles
- » Native TDM (up to 16 E1s/T1s) + Ethernet

#### Robust operation

- » Telco-grade, operates in harsh conditions
- » Unmatched performance in dense radio environments
- » Field proven operation in nLOS / NLOS
- » Inter & Intra site TDD synchronization to maximize network capacity
- » Ethernet service protection via 1+1 and ring topologies

#### Easy to install & maintain

- » Multi-band radio supports multiple frequency bands on same platform
- » QoS and VLAN capabilities

RW 2000 D+ Series - up to 750 Mbps

RW 2000 C Series - up to 200 Mbps +16E1s/T1s

RW 2000 B Series - up to 50 Mbps +8 E1s/T1s, upgradable to 200 Mbps

RW 2000 A Series - 10/25/50 Mbps + 2 to 8E1s/T1s, upgradable to 100 Mbps

## HIGH-CAPACITY RADIOS FOR IP & TDM BACKHAUL

### RADWIN 2000 D+ Series

Delivering up to 750 Mbps Ethernet throughput, RADWIN 2000 D+ series is ideal for IP backhaul applications. RADWIN 2000 D+ series provides high spectrum efficiency by employing a QAM 256 modulation scheme.

RADWIN 2000 D+ Series radios deliver high performance even in a highly congested spectrum by utilizing RADWIN's enhanced interference mitigation techniques and D-CBS (Dynamic Channel Bandwidth Selection). D-CBS is a unique feature that selects the widest channel bandwidth (up to 80 MHz) yet with minimal interference to maximize link throughput.

RADWIN 2000 D+ radios deliver 350 Mbps in 40 MHz and support 20 and 10 MHz channel bandwidth. The solutions build on RADWIN's extensive experience in designing systems that commercially operate in nLOS/NLOS environments and overcome severe multipath conditions.

### RADWIN 2000 C Series

Delivering up to 200 Mbps net aggregate throughput and up to 16 E1s/T1s this radio unit is ideal for operators seeking a carrier-class solution for IP and TDM backhaul with guaranteed QoS. Delivering IP and TDM over the same link enables seamless migration from legacy TDM to all-IP networks.

### RADWIN 2000 B Series

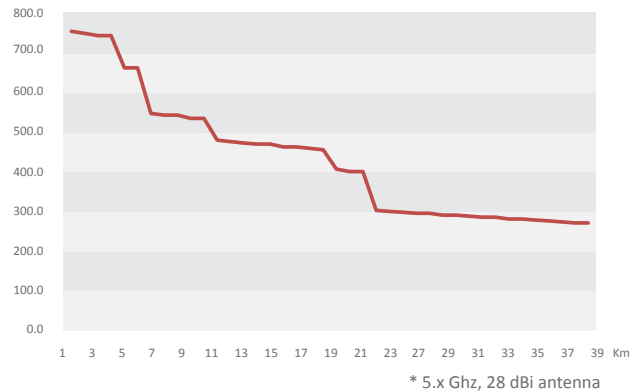
Delivering up to 50 Mbps net aggregate throughput and up to 8 E1s/T1s, this radio is upgradable to 100 and 200 Mbps via a software key. The radio unit is available with a 23dbi antenna or with a small form factor antenna and built-in connectors for an optional external antenna. This unique configuration assures greater installation flexibility while reducing inventory burden. The radio unit is ideal for carrier-class IP and TDM access and backhaul applications that require high availability and guaranteed QoS.

RADWIN PtP radios operate in symmetric and asymmetric modes: RADWIN 2000 B & C Series uplink and downlink capacities are dynamically allocated based on traffic load and air-interface conditions, while in RADWIN 2000 D+ the ratio between the uplink and downlink capacity is configurable.

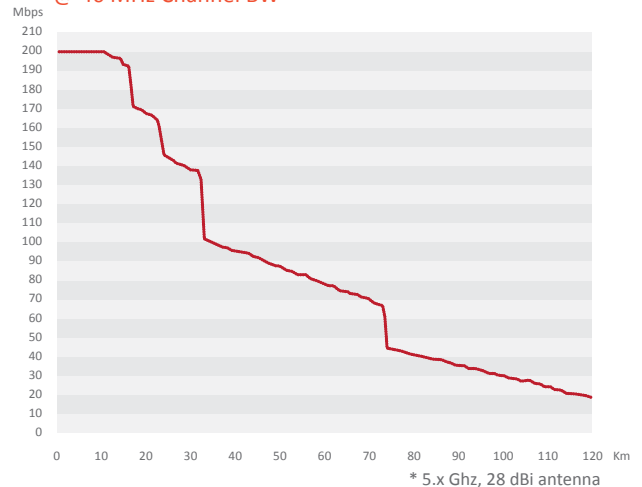
Extremely simple to install and maintain, RADWIN's solutions operate flawlessly in the most challenging surroundings, including non-line-of-sight scenarios, dense urban environments and extreme temperatures.

For operators who want to break the capacity barrier and meet the skyrocketing demand for broadband, RADWIN's radios are the right choice.

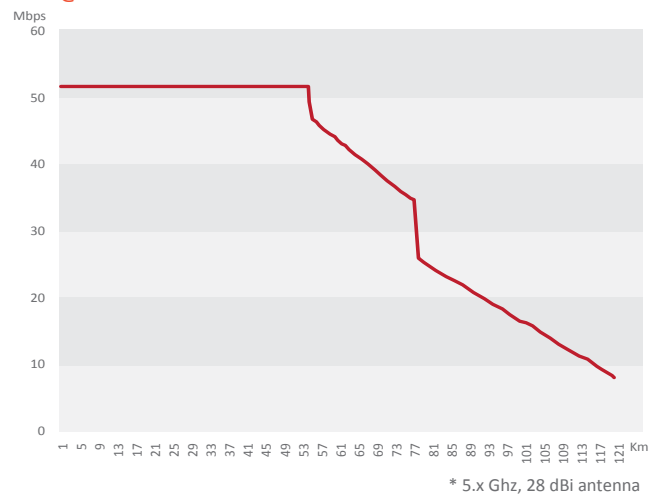
RADWIN 2000 D+ Series Total Throughput @ 80 MHz Channel BW



RADWIN 2000 C Series Total Throughput @ 40 MHz Channel BW



RADWIN 2000 B Series Total Throughput @ 20 MHz Channel BW



### RADWIN 2000 D+ Series Highlights

- Up to 750 Mbps Ethernet throughput
- Range of up to 40 Km/25 miles
- D-CBS maximizing link capacity in congested spectrum
- Configurable asymmetric capacity
- Auto selection between MIMO and Diversity modes for optimal NLOS performance

### RADWIN 2000 C Series & RADWIN 2000 B Series Highlights

- » 50 to 200 Mbps net aggregate throughput
- » Pay as you grow capacity
- » Native TDM (up to 16 E1s/T1s) + Ethernet
- » Long range - up to 120 Km/75 miles
- » Fixed or dynamic asymmetric capacity
- » Ethernet service protection through 1+1 and ring topology

ODU with Integrated Antenna



IDU-H



Ethernet aggregation unit for 6 ODUs

IDU-E



Ethernet + 2 E1s/T1s indoor unit

IDU-C



Ethernet + 4, 8, 16 E1s/T1s indoor unit

*“RADWIN 2000 is robust and durable enough to withstand the toughest outdoor conditions, and is very simple to install and maintain.”*

Jim Makepeace  
Director of Network Engineering  
**Revol Wireless**  
USA

*“RADWIN’s links have exceeded our expectations in terms of capacity, security and robustness.*

*The bandwidth provided by the wireless network has been phenomenal and we are able to transfer massive amounts of data files and x-ray images in seconds.”*

Dr I Hansrod  
Medical Director  
**Jackpersad Radiology Center**  
South Africa

**WIN**

## RADWIN 2000 A SERIES FOR IP & TDM ACCESS

RADWIN 2000 A Series radios are available in three models:

- Supporting 50 Mbps net Ethernet throughput and up to 8 E1s/ T1s
- Supporting 25 Mbps net Ethernet throughput and up to 4 E1s/T1s
- Supporting 10 Mbps net Ethernet throughput and up to 2 E1s/T1s

Ethernet capacity can easily be upgraded up to 100 Mbps via a software key. This assures a low initial investment while securing future capacity growth. RADWIN 2000 A Series is available with 17 or 23dbi integrated antenna or as a connectorized unit.

RADWIN 2000 A Series radios are ideal for carrier access applications that require SLAs and for private networks seeking carrier-class solutions. Incorporating the RADWIN 2000 advanced features, RADWIN 2000 A Series radios enable optimal spectrum utilization using MIMO and OFDM technologies, combined with RADWIN's field-proven interference mitigation techniques critical for operation in dense urban environments.

Housed in compact, extremely small form factor units, the RADWIN 2000 A Series radios are ideal for deployments where a small equipment footprint is required.

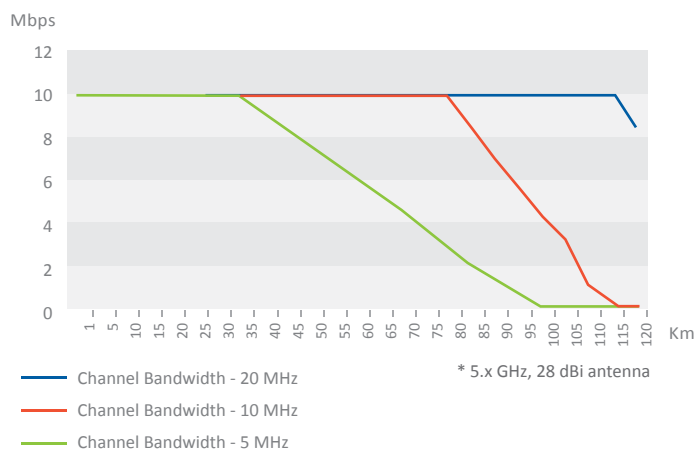
*"We chose RADWIN 2000 because we liked the throughput of 100 Mbps which was the perfect fit for our requirements. The installation was easy and fast, and connectivity was easily achieved even in a difficult 5.8 GHz band where the spectrum is very tight."*

Kevin Kluge  
Planning Engineer  
**Bug Tussel Wireless Carrier**  
Wisconsin, USA

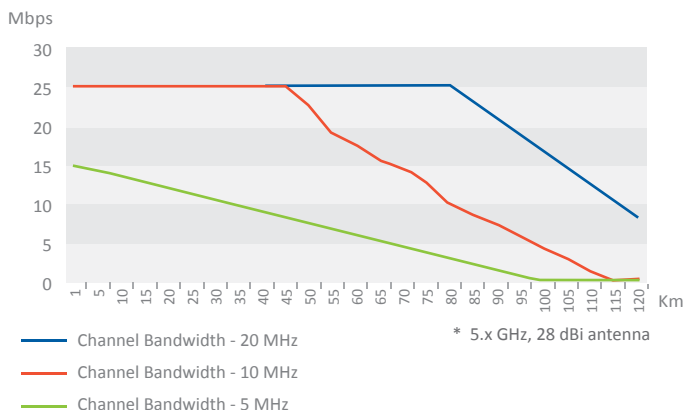
*"What really sets RADWIN's systems apart is that they are exceptionally robust and transmit video from mega-pixel cameras with crystalline image quality. Thanks to RADWIN's surveillance network, the Maserà municipality is providing a safe city environment for its citizens."*

Lorenzo Zanfardin  
Director  
**SAIV (SI)**  
Italy

RADWIN 2000 A Series 10 Mbps - Total Throughput



RADWIN 2000 A Series 25 Mbps - Total Throughput



## RADWIN 2000 Specifications

### Configuration

|              |  |
|--------------|--|
| Architecture | ODU: Outdoor Unit with Integrated Antenna, Embedded Antenna or Connectorized Unit for External Antenna<br>IDU: Indoor Unit or PoE device |
|--------------|--|

### Outdoor Units (ODUs)

|  | D+ Series | <sup>1</sup> C-Series | B-Series | A-Series |
|--|-----------|-----------------------|----------|----------|
|--|-----------|-----------------------|----------|----------|

### Max Throughput

|                    |         |         |                              |   |
|--------------------|---------|---------|------------------------------|---|
| Ethernet           | 750Mbps | 200Mbps | 50Mbps upgradable to 200Mbps | 10Mbps, 25Mbps, 50Mbps, upgradable to 100Mbps |
| TDM E1 / T1 Trunks |         | 16      | 8                            | 2      4      8                               |

### Radio

|                              |  |  |   |                                    |
|------------------------------|--|--|---|------------------------------------|
| Range                        | Up to 40km / 25 miles                                  | Up to 120km/75 miles   |   |                                    |
|                              | 5.145-6.090 GHz  | 2.297-2.482 GHz<br>3.300-3.800 / 3.65 GHz<br>4.390-5.010 GHz<br>4.900-6.060 GHz<br>5.890-6.410 GHz | 2.297-2.482 GHz<br>4.900-6.060 GHz<br>5.890-6.410 GHz | 2.297-2.482 GHz<br>4.890-5.960 GHz |
| Channel Bandwidth            | 10/20/40/80 MHz  | 5/10/20/40 MHz   | 5/10/20/40 MHz  | 5/10/20 MHz                        |
| Maximum Tx Power             | 25 dBm @ 3.3-3.8 GHz, 4.9-6.4GHz, 26 dBm @ 2.3-2.5 GHz |  |   |                                    |
| Adaptive Modulation & Coding | 10 levels: BPSK to 256QAM                              | 8 levels: BPSK to 64QAM  |   |                                    |
| Radio Access Scheme          | MIMO 2x2 - OFDM  |  |   |                                    |
| Duplex Technology            | TDD  |  |   |                                    |
| Asymmetric TDD               | Configurable   | Adaptive   |   |                                    |
| Dynamic Channel BW Selection | 20/40/80MHz or 20/40MHz                                |  |   |                                    |
| DFS / ACS                    | Supported  |  |   |                                    |
| Diversity                    | Polarization and Spatial Diversity supported           |  |   |                                    |
| Spectrum View                | Built-in Spectrum Analyzer                             |  |   |                                    |
| TDD Synchronization          | Intra-site and inter-site using GPS                    |  |   |                                    |
| Encryption, US Security      | AES128, FIPS197  |  |   |                                    |
| Maximum Information Rate     | Supported  |  |   |                                    |
| Service Protection           |  | Built in support: 1+1 and Ring topology  |   |                                    |
| QoS                          | 4 levels supported, Strict priority, TTL               | 4 levels supported   |   |                                    |
| Maximum Frame Size           | 2048 bytes   |  |   |                                    |
| Latency                      | < 3msec  |  |   |                                    |

### Management

|                       |                                 |
|-----------------------|---------------------------------|
| Link Management       | Application RADWIN Manager      |
| Protocol              | SNMPv1, SNMPv3, Telnet and HTTP |
| NMS Application       | RADWIN NMS (RNMS)               |
| Web- based Management | Web access via browser          |

### Dimensions and Weight

|                               |                                      |   |
|-------------------------------|--------------------------------------|---|
| Integrated ODU (w)x(h)x(d) Cm | 30 x 30 x 10; 2.9 kg / 6.4 lbs       | With 23dbi Antenna:<br>30x30x10; 2.9kg / 6.4lbs<br>With 17dbi Antenna:<br>17x21x7; 1.2kg / 2.65 lbs |
| Connectorized ODU (w)x(h)x(d) | 19.5 x 28.0 x 8.0; 2.4 kg / 5.29 lbs | 17x21x7; 1.2kg / 2.65 lbs   |

### Power

|                   |                               |  |
|-------------------|-------------------------------|--|
| Power Feeding     | Via Indoor Unit or PoE device |  |
| Power Consumption | 25W (ODU + POE)               | 22W (ODU+ IDU);<br>12W (ODU+ PoE device) |

### Environmental

|                        |   |
|------------------------|---|
| Operating Temperatures | -35°C to 60°C / -31°F to 140°F; For -55°C / -67°F advise local RADWIN REP     |
| Humidity               | 100% condensing, IP67 (totally protected against dust and immersion up to 1m) |
| Shock and Vibration    | EN 300 019-2-4 IEC 60068-2 Class4M5   |

## Radio Regulations

|             |  |
|-------------|--|
| FCC         | 47CFR Part 15 Subpart C;<br>47CFR Part 15 Subpart E (D-Plus Series is pending FCC certification in 5.3 GHz and 5.4 GHz band ,due in May/2015);<br>47CFR Part 90 Subpart Y;<br>47CFR Part 90 Subpart Z UCBP |
| IC (Canada) | RSS-210 (D-Plus Series is pending IC certification in 5.3 GHz and 5.4 GHz band, due in May/2015. Band 5.1 GHz is not supported);<br>RSS-111<br>RSS 192<br>RSS 197 UCBP                                     |
| ETSI        | EN 300 328; EN 301 893; EN 302 502, EN 302 326-2   |
| WPC (India) | GSR-38   |
| MII (China) | 5.8 GHz Band Regulation  |

## Safety

|                 |  |
|-----------------|--|
| FCC/IC (cTUVus) | UL 60950-1, UL 60950-22, CAN/CSA C22.2 60950-1, CAN/CSA C22.2 60950-22 |
| ETSI            | EN/IEC 60950-1, EN/IEC 60950-22  |

## EMC

|         |                                 |
|---------|---------------------------------|
| FCC     | 47CFR Part15 Subpart B, Class B |
| ETSI    | EN 301 489-1, EN 301 489-4      |
| CAN/CSA | CISPR 22Class B                 |
| AS/NZS  | CISPR 22Class B                 |

## Indoor units (IDUs)

### Ethernet Interface

| Ports | PoE                 | IDU-H                    |                                     | IDU-C                         | IDU-C EO                            | IDU-E | IDU-EO          |
|-------|---------------------|--------------------------|-------------------------------------|-------------------------------|-------------------------------------|-------|-----------------|
|       |                     | WAN                      | LAN                                 |                               |                                     |       |                 |
|       | 1x 10/100/1000BaseT | 6 x PoE-10/100/1000BaseT | 2 x 10/100/1000BaseT<br>2 x SFP GbE | 2 x 10/100BaseT<br>1 x SFP FE | 2 x 10/100/1000BaseT<br>1 x SFP GbE |       | 2 x 10/100BaseT |

### TDM Interface

|                          |  |          |  |   |  |
|--------------------------|--|----------|--|---|--|
| Number of E1s/ T1s Ports |  | Up to 16 |  | 2 |  |
| Framing                  | Unframed (transparent)                         |          |  |   |  |
| Timing                   | Independent timing per port, Tx and Rx         |          |  |   |  |
| Standards Compliance     | ITU-T G.703, G.826                             |          |  |   |  |
| Latency                  | Configurable: 5-20 msec (default: 8 msec)      |          |  |   |  |
| Jitter & Wander          | According to ITU-T G.823, G.824                |          |  |   |  |
| Service Protection       | Monitored Hot Standby (MHS) 1+1 (using IDU-C ) |          |  |   |  |

### Dimensions and Weight

|                           |   |                                |                   |  |                  |
|---------------------------|---|--------------------------------|-------------------|--|------------------|
| Dimensions (w)x(h)x(d) Cm |   |                                |                   |  |                  |
| Weight                    |   | 1U Half 19" width, 22 x 5 x 21 | 44 x 5 x 21;      |  | 22 x 4.5 x 18;   |
| Power                     |   | 1.5kg / 3.3 lbs                | 1.2 kg / 2.65 lbs |  | 0.45kg / 1.0 lbs |
| Power Feeding             | -20 to -60 VDC (dual feed in IDU-C); 100-240 VAC, 50/60 Hz; -45 to -55 VDC (dual redundant power feeding for IDU-H) |                                |                   |  |                  |

### Environmental

|                        |                             |
|------------------------|-----------------------------|
| Operating Temperatures | 0°C to 50°C / 32°F to 122°F |
| Humidity               | 90% non-condensing          |

### Safety

|     |   |
|-----|---|
| TUV | IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60590-1 |
|-----|---|

### EMC

|         |  |
|---------|--|
| FCC     | Class B Part 15 Subpart B              |
| ETSI    | EN 300 386, EN 301 489-1, EN 301 489-4 |
| CAN/CSA | ICES 003 CISPR 22 Class B              |
| AS/NZS  | CISPR22 Class B                        |

<sup>1</sup> 250Mbps capacity is available in 3.300-3.800/3.65GHz & 4.900-5.150GHz using RADWIN 2000 C+. For data sheet please contact RADWIN local Rep.