



## **RADWIN 2000 PORTFOLIO BUILT FOR BACKHAUL**

RADWIN 2000 CARRIER-CLASS SUB-6 GHZ POINT-TO-POINT PORTFOLIO IS IDEAL FOR CARRIERS AND A VARIETY OF VERTICAL MARKETS THAT REQUIRE HIGH CAPACITY TRANSPORT

# RADWIN 2000 PORTFOLIO BUILT FOR BACKHAUL

**The RADWIN 2000 portfolio offers Sub 6GHz licensed and license-exempt wireless broadband products that deliver high throughput of up to 200 Mbps, long range and unmatched robustness.** Supported bands include 2.3-2.7 GHz, 3.3-3.8 GHz and 4.8-6.0 GHz. Compact and robust, RADWIN 2000 products provide Ethernet and native TDM (up to 16 E1s/T1s), thus enabling seamless migration from TDM to all-IP networks.

RADWIN 2000 radios support multiple frequency bands on the same platform, providing operators with the flexibility to select the optimal transmission band. Systems incorporate state-of-the-art technologies including MIMO and OFDM. Unique air interface capabilities secure performance optimization, enabling high spectral efficiency and robust performance in dense radio environments and multipath conditions. In addition, RADWIN 2000 radios support advanced networking capabilities such as QoS, VLAN Tagging / Un-Tagging and Q in Q.

RADWIN 2000 radios can be deployed in point-to-point and multiple point-to-point topologies, employing TDD synchronization between co-located links and GPS based synchronization between remote links. To ensure maximum service availability in case of equipment failure or link drop, RADWIN radios incorporate built-in 1+1 redundancy and ring protection functionality.

RADWIN's 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**

- » Up to 200 Mbps net aggregate throughput
- » Native TDM (up to 16 E1s/T1s) + Ethernet
- » Long range - up to 120 km/75 miles
- » Telco-grade, extremely robust in harsh conditions
- » Advanced OFDM & MIMO technologies, operating in nLOS and dense radio environments
- » Multi-band radio supporting multiple frequency bands on same platform
- » QoS and VLAN capabilities
- » Ethernet service protection through 1+1 and ring topologies
- » TDM service protection
- » GBE support
- » Extremely simple to install and maintain

## HIGH-CAPACITY RADIOS FOR IP & TDM BACKHAUL

### RADWIN 2000 C-Series

Delivering up to 200 Mbps net aggregate throughput and up to 16 E1s/T1s.

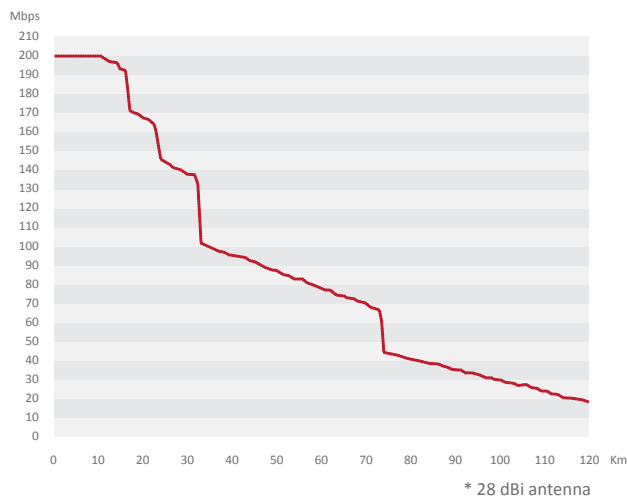
### RADWIN 2000 B-Series

Delivering up to 50 Mbps net aggregate throughput and up to 8 E1s / T1s.

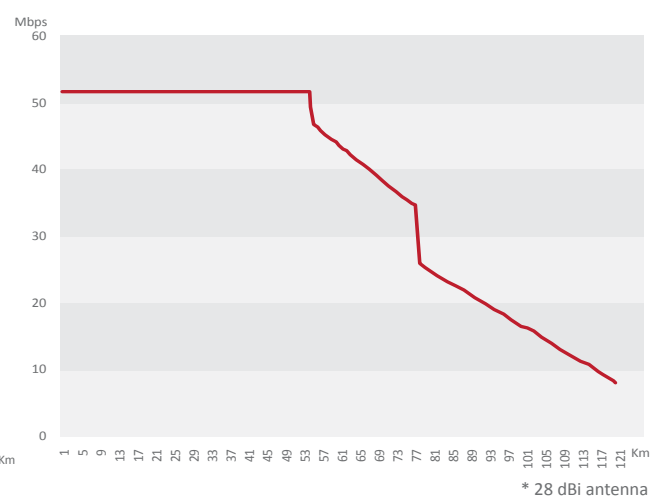
Delivering IP and TDM over the same link make these solutions ideal for today and tomorrow, enabling seamless migration from legacy TDM to all-IP networks.

RADWIN 2000 C-Series and RADWIN 2000 B-Series deliver IP with end-to-end QoS. The solutions operate in symmetric and adaptive asymmetric modes whereby uplink and downlink capacity is dynamically allocated based on traffic loads and air-interface conditions. Extremely simple to install and maintain, these solutions operate flawlessly in the most challenging surroundings, including non line-of-sight scenarios, dense radio environments and extreme temperatures. For operators who want to break the capacity barrier and meet the sky rocketing demand for broadband, RADWIN 2000 is the right choice.

RADWIN 2000 C-Series Total Throughput  
@ 40 MHz Channel BW



RADWIN 2000 B-Series Total Throughput  
@ 20 MHz Channel BW



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

- » 50-200 Mbps net aggregate throughput
- » Native TDM (up to 16 E1s/T1s) + Ethernet
- » Long range - up to 120 km/75 miles
- » Asymmetric capacity; fixed or dynamic channel allocation
- » Extremely robust in harsh weather conditions
- » Operating in nLOS and dense environments
- » Telco-grade, with advanced OFDM & MIMO technologies
- » QoS and VLAN capabilities
- » Ethernet service protection through 1+1 and ring topology
- » Single radio supporting embedded small form factor antenna and connectors for external antenna (in RADWIN 2000 B-Series)
- » GBE support (in C-Series)
- » Low (typical) Latency < 3msec
- » Extremely simple to install and maintain

ODU with Integrated Antenna



IDU-E



IDU-C



*“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**

*“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 L-Series for IP & TDM Symmetric Applications

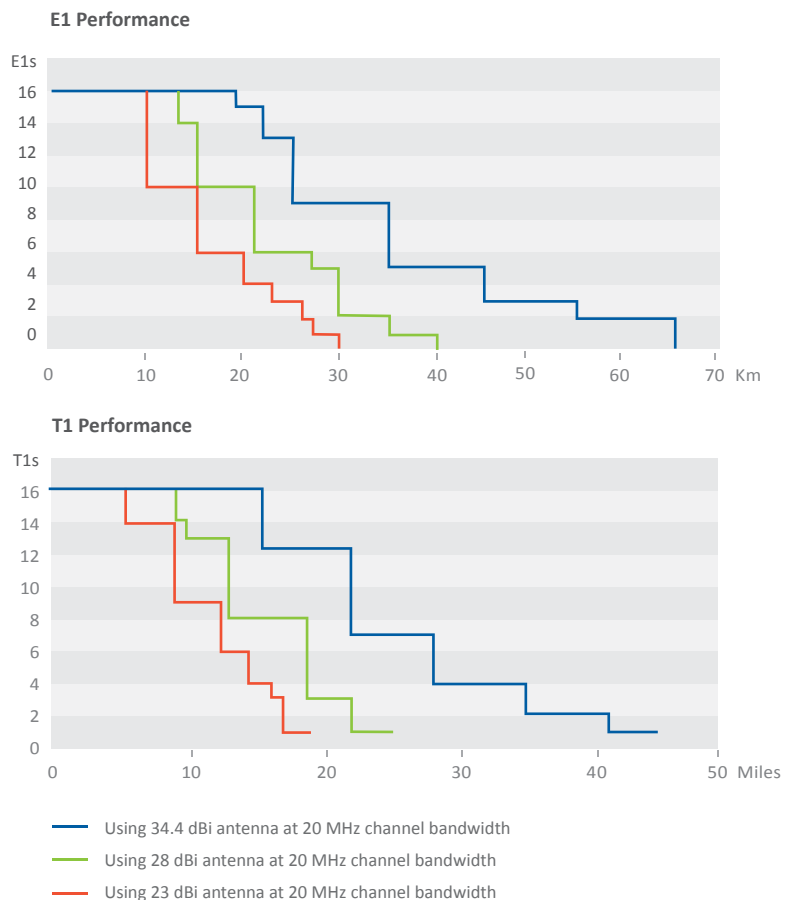
RADWIN 2000 L-Series delivers up to 50 Mbps symmetric throughput and a flexible combination of native TDM (up to 16 E1s/T1s) and Ethernet to cost-effectively support IP and TDM networks. These radios fit a broad range of cellular & IP backhaul applications and provide broadband connectivity to large corporations and high capacity for private networks.

### RADWIN 2000 PDH Series Optimized for TDM Based Cellular Backhaul

The industry’s first sub 6-GHz microwave PDH system delivering up to 16 E1s/T1s + 10 Mbps symmetric Ethernet.

Designed to address carriers’ cellular backhaul requirements, RADWIN 2000 PDH Series provides high-end performance, capacity and range. RADWIN 2000 PDH Series is built for legacy TDM-based cellular backhaul networks (2G & 2.5G). It is the optimal solution for expanding networks to rural areas, providing enhanced coverage in the city and enabling operation in non line-of-sight environments. For carriers who want to extend their networks rapidly and realize fast return on investment (ROI), RADWIN 2000 PDH Series is the natural choice.

#### RADWIN 2000 TDM Performance



## RADWIN 2000 Specifications

### Configuration

Architecture	ODU: Outdoor Unit with Integrated Antenna or Connectorized Unit for External Antenna IDU: Indoor Unit or PoE device
IDU to ODU Interface	Outdoor CAT-5e cable; Maximum cable length: 100m for 100BaseT and 75m for 1000BaseT

### Max Throughput

	Total Throughput	TDM Ports
RADWIN 2000 C-Series	200 Mbps Aggregated	16
RADWIN 2000 B-Series	50 Mbps Aggregated	8
RADWIN 2000 L-Series	50 Mbps Symmetric	16
RADWIN 2000 PDH Series	10 Mbps Symmetric	16

### Radio

Range	Up to 120 Km/75 miles			
Frequency Bands	C-Series	B-Series	L-Series	PDH Series
	2.302-2.472 GHz 2.496-2.700 GHz 3.300-3.800 GHz 4.800-6.060 GHz	4.900-6.060 GHz	2.302-2.472 GHz 4.800-6.060 GHz	2.302-2.472 GHz 4.800-6.060 GHz
Channel Bandwidth	C-Series	B-Series	L-Series	PDH Series
	5/10/20/40 MHz	5/10/20 MHz	10/20 MHz	10/20 MHz
Maximum Tx Power	25 dBm @ 2.49-2.7 GHz, 3.3-3.8 GHz, 4.8-6.06 GHz 26 dBm @ 2.3-2.47 GHz			
Adaptive Modulation & Coding	Supported			
Automatic Channel Selection	Supported			
Bandwidth Allocation	Symmetric or Asymmetric (C-Series and B-Series)			
Diversity	Polarization and Spatial diversity supported			
Spectrum View	Built-in spectrum analyzer (C-Series and B-Series)			
Duplex Technology	TDD			
Radio Modes	MIMO/Diversity/Single			
Encryption	AES 128			
TDD Synchronization	Intra-site and inter-site (GPS based)			
Maximum Information Rate	Configurable in steps of 1Kbps			

### Radio Parameters at 20 MHz Channel Bandwidth

Modulation	2x2 MIMO-OFDM							
	BPSK	QPSK		16QAM		64QAM		
Forward Error Correction (FEC) Rate	1/2	1/2	3/4	1/2	3/4	2/3	3/4	5/6
Air Rate [Mbps]	13	26	39	52	78	104	117	130
Sensitivity (dBm) @ BER <10E-11, 20MHz Chbw	-88	-86	-83	-81	-80	-72	-70	-67

## RADWIN 2000 Specifications

### Ethernet Interface

Number of Ports	IDU-C and IDU-E: 2 ports 10/100BaseT and 10/100/1000BaseT in IDU-C E0 PoE Device: 1 port 10/100BaseT or 10/100/1000BaseT
Connector	RJ-45
SFP Port	Supported in IDU-C type FE
Service Protection	Built in support: 1+1 and Ring topology

### Ethernet Bridging

VLAN	802.1Q, 802.1P and QinQ Tagging
QoS	4 levels supported in RADWIN 2000 C-Series & RADWIN 2000 B-Series
Maximum Frame Size	2048 bytes
Latency	< 3msec

### TDM Interface

Number of Ports	Up to 16 E1s/T1s in IDU-C; 2 E1s/T1s in IDU-E
Type	E1/T1 configurable by RADWIN Manager
Framing	Unframed (transparent)
Timing	Independent timing per port, Tx and Rx
Connector	RJ-45
Standards Compliance	ITU-T G.703, G.826
Line Code	E1: HDB3 @ 2.048 Mbps; T1: B8ZS/AMI @ 1.544 Mbps
Latency	Configurable: 5-20 msec (default: 8 msec)
Impedance	E1: 120Ω, balanced; T1: 100Ω, balanced
Jitter & Wander	According to ITU-T G.823, G.824
Service Protection	Monitored Hot Standby (MHS) 1+1 (using IDU-C)

### Management

Link Management Application	RADWIN Manager
Protocol	SNMP and Telnet
NMS Application	RADWIN NMS (RNMS)
Web-based Management	Web access via browser

### Mechanical

Dimensions and Weight	ODU with Integrated Antenna: 37.1cm(w) x 37.1cm(h) x 11cm(d); 3.5 kg / 7 lbs ODU Connectorized (Embedded antenna – B-Series only): 19.5cm(w) x 27.0cm(h) x 8.0cm(d); 1.8 kg / 3.6 lbs IDU-C: 43.6cm(w) x 4.4cm(h) x 21cm(d); 1.5 kg / 3.3 lbs IDU-E: 22cm(w) x 4.4cm(h) x 17cm(d); 0.5kg / 1.1 lbs
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### Power

Power Feeding	-20 to -60 VDC (dual feed in IDU-C); 100-240 VAC, 50/60 Hz
Power Consumption	20-35W (ODU+IDU); 5-15W (ODU+PoE device)

### Environmental

Operating Temperatures	ODU: -35°C to 60°C / -31°F to 140°F; IDU: 0°C to 50°C / 32°F to 122°F
Humidity	ODU: 100% condensing, IP67 (totally protected against dust and immersion up to 1m); IDU-C: 90% non-condensing
Shock and Vibration	EN 300 019-2-4 IEC 60068-2 Class4M5

### Radio Regulations

FCC	47CFR, Part 15 Subparts C&E; Part 90 Subpart Y 47CFR, Part 27
IC (Canada)	RSS-210, RSS-111 RSS 192, issue-3
EN (ETSI)	300 328; 301 893; 302 502, 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 Class B, Part15, Subpart B
ETSI	EN 300 386, EN 301 489-1, EN 301 489-4
CAN/CSA	CISPR 22-04 Class B
AS/NZS	CISPR 22:2004 Class B

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