



RADWIN 2000 E



Best-in-class, sub 7 GHz, 2.5Gbps Point-to-Point

802.11ax solution for unbeatable backhaul & access performance

RADWIN 2000 E is a best-in-class, ultra-capacity, Point-to-Point (PtP) solution that delivers up to 2.5Gbps over the 5GHz and 6GHz unlicensed bands. This solution is second-to-none when addressing high capacity backhaul requirements, business access needs, and a variety of mission critical connectivity applications in private networks.

RADWIN 2000 E leverages upon the cutting edge 802.11ax technology, building upon the techniques of the market proven RADWIN 2000 PtP family to push performance to a new level. With an ability to squeeze more bits per frequency channel and uniquely support channels of up to 160MHz, RADWIN 2000 E offers greater capacity and range than any other 5GHz PtP solution. When selecting RADWIN 2000 E, there are two options to choose from: A superior 24dBi unit with an integrated antenna or a connectorized unit with an external antenna of up to 36dBi.



RADWIN 2000 E unique values include:



Unmatched capacity:

The industry's highest capacity, supporting up to 2.5Gbps @160MHz and 1.25Gbps @ 80MHz.



Robust radio interference mitigation:

The low sidelobe levels of RADWIN 2000 E integrated antenna, combined with the dynamic channel bandwidth selection capabilities, ensure best interference mitigation for maximum throughput in congested spectrum.



Radio collocation capabilities:

With a built-in GPS, RADWIN 2000 E enables radio collocation, saving upon hub tower space when deployed in a hub site.



High packet switching capabilities:

Facilitating powerful packet switching performance of 800K PPS, for jitter-free and guaranteed packet transfer even under high traffic for demanding applications like IIoT, VoIP, instant messaging, online-gaming. Great for providing service tiers with SLA requirements.



Enhanced security:

Leveraging upon the industry-leading encryption scheme of AES 256, RADWIN 2000 E ensures top level security for mission critical applications.



High durability:

IP 67 compliant, RADWIN 2000 E is a highly durable unit that withstands the toughest environmental conditions.

Product highlights:

- » 4.9-7.1 GHz
- » Up to 2.5Gbps @ 160MHz, 1.25Gbps @ 80MHz
- » Up to 120 km / 75 miles
- » 4096 QAM enabling 15.6 bps/Hz
- » Dynamic Channel bandwidth: 20-40-80-160MHz
- » 8 queues for QoS
- » Built in GPS for radio collocation
- » About 800K PPS
- » AES 256 encryption
- » 2.5GbE PoE, 1Gbps full duplex SFP Interface
- » High durability via IP 67 compliancy
- » Integrated antenna & connectorized unit
- » Regulation: FCC, IC, MII, UNI, ETSI

Applications:

- » PtMP base-stations backhaul
- » 4G and 5G mobile backhaul
- » Backup or gap filler for fiber networks
- » Business customer access
- » Private network connectivity (e.g., Campuses, critical infrastructure etc.)
- » Smart City connectivity (surveillance, ITS, ALPR, IoT, emergency services, building-to-building, digital inclusion, etc)



Product Specifications:

Configuration		
Architecture	Outdoor unit, with an integrated antenna or 2 x N-Type connectors	
Data interfaces	100/1000/2500Mbps RJ45 PoE, 1000Mbps SFP	
Radio		
Max throughput	2.5Gbps net aggregate throughput	
Range	Up to 120 km / 75 miles	
Frequency range	4.9-7.1 GHz - 3 models available: 4.9-6.0 GHz, 4.9-6.4 GHz and 5.9-7.1 GHz	
Channel bandwidth	Configurable: 20, 40, 80, 160 MHz ²	
Dynamic channel BW selection	Supported	
Modulation	OFDM (from BPSK up to 4096QAM)	
Duplex technology	TDD	
Antenna modes	MIMO 2x2, adaptive spatial multiplexing/diversity	
Max TX power	26 dBm ¹ per chain	
Encryption	AES256	
TDD intra/inter site sync	built-in GPS	
Uplink/downlink ratio	Configurable: 50%/50%, 25%/75%, 75%/25%	
Packets per second	800Kpps	
AFC	Supported – 5 Years AFC Service Access included	
RFD (Radio Frame Duration)	2.5msec	
Networking		
User Authentication	User list or RADIUS	
QoS	Packet classification to 8 priority queues according to 802.1P or DiffServ	
VLAN support	802.1q, QinQ1, VLAN tagging	
ODU management	IPv4/IPv6 dual stack; SNMPv1, SNMPv3; HTTP/HTTPS	
Layer 2 bridge	Supported	
Integrated Antenna		
Gain	24 dBi (typical)	
Sidelobes level	-22 dB (typical)	
Mechanical		
Dimension connectorized	258 x 125 x 107 mm / 10.1 x 4.9 x 4.2 Inch	
Dimension integrated	373 x 370 x 98 mm / 14.7 x 14.6 x 3.9 Inch	
Weight	Connectorized: 1.2 Kg / 2.7 lbs	Integrated: 2.6 Kg / 5.7 lbs
Power		
Power consumption	Up to 30W	
PoE	CAT5e PoE cable, 42.5–57.0 V. standard 802.3at	
Environmental		
Operating temperature	-40°C to 60°C / -40°F to 140°F	
Humidity	100% condensing	
Enclosure protection	IP 67 per EN/IEC 60529, NEMA Type 4/4X Enclosure	

¹ Subject to regulation



Ordering information

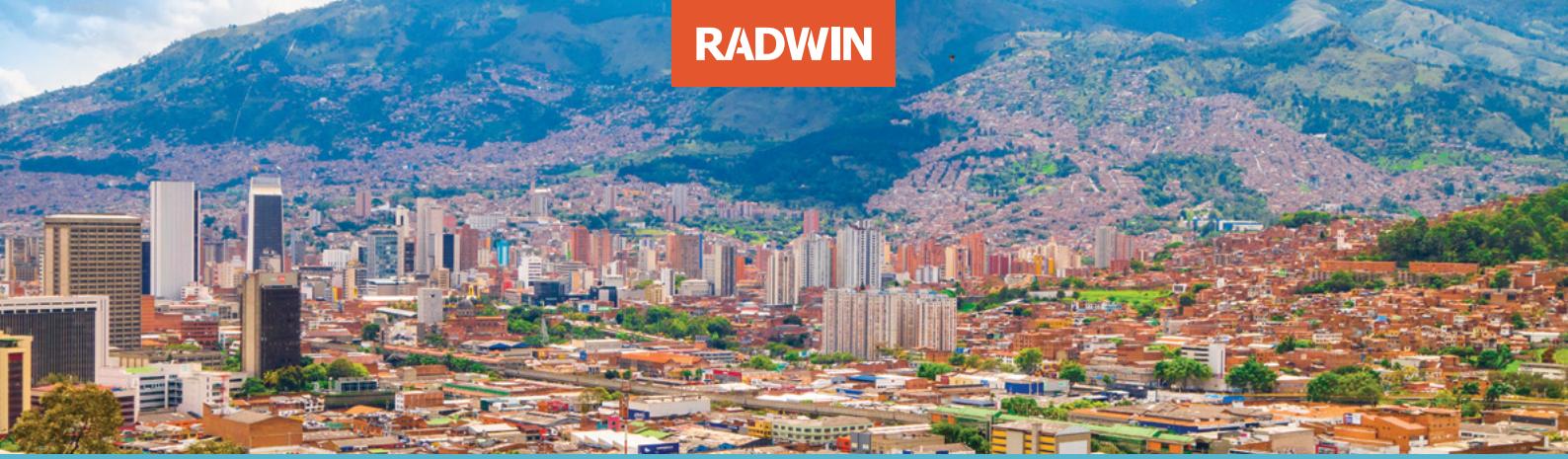
Part number	Product name	Part description
RW-2U50-E1MM	RW2000/ODU/E/F50/WW/INT	Integrated radio unit 4.9-6 GHz, for all regulations
RW-2U50-E2MM	RW2000/ODU/E/F50/WW/EXT	Connectorized radio unit 4.9-6.4 GHz, for all regulations
RW-2U60-E2MM	RW2000/ODU/E/F60/WW/EXT	Connectorized radio unit 5.9-7.1 GHz, for all regulations
RW-2U5X-E1MM	RW2000/ODU/E/F5X/WW/INT	Integrated radio unit 4.9-6.4 GHz, for all regulations

RADWIN is a global provider of broadband wireless solutions that deliver fast broadband with unparalleled reliability. RADWIN solutions have been deployed in more than 180 countries and have a proven track record of delivering connectivity for mission-critical applications in industries such as transportation, mining, ports, and public safety, as well as backhaul, access and private network connectivity. With over 25 years of experience, RADWIN is the go-to-choice for dependable broadband solutions.

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RADWIN 2000 Alpha PRO

Point-to-Point & Point-to-MultiPoint Subscriber Unit Series 500 Mbps Carrier Class Solution

Evolving from the RADWIN 2000 Alpha and SU PRO, the RADWIN Alpha PRO redefines wireless connectivity by seamlessly integrating PtP and SU capabilities into a singular, high-performance solution. Designed for today's networks, it simplifies setup and allows for easy switching between roles. Using a uniform part number and providing the option to scale from 50Mbps to 500Mbps via a software upgrade, the Alpha PRO seamlessly grows according to your network needs.

Leveraging RADWIN's distinct, field-tested air-interface, the Alpha PRO ensures reliable performance in unlicensed spectrums at a market-competitive price, making it the ideal choice for high-speed wireless access and durable backhaul for applications like video surveillance.

Alpha PRO Highlights

- » 50Mbps or 500Mbps aggregated PtP or SU radio unit
- » Integrated or connectorized
- » 4.9-6.0 GHz
- » Up to 120 km / 75 miles
- » Built-in GPS¹
- » Dying gasp¹
- » AES 128/ 256²
- » Dynamic channel bandwidth
- » Highly durable - IP 67

Applications

- » Wireless enterprise access
- » Video surveillance backhaul
- » Leased line replacements
- » Building to building connectivity

RADWIN Alpha PRO Benefits:

- » High capacity guaranteed for short packets (350K PPS).
- » Built-in GPS supports multiple radio co-location, reducing external equipment costs and eliminating a single point of failure for TDD synchronization.
- » The dying gasp feature sends alerts on local power failures, minimizing unnecessary maintenance.
- » Maintains reliable links in congested spectrums and challenging conditions.
- » Offers unmatched performance with the lowest total cost of ownership (TCO)
- » Adheres to various location-based regulations via GPS.



Note 1: Applicable for 4.9-6.0 GHz only

Note 2: AES 256 applicable only for PtP or PtMP with 5000L

Product Specifications

EU / Int., FCC	
Architecture	Outdoor connectorized or outdoor with integrated antenna
PoE to ODU Interface	Outdoor CAT-5e; Maximum cable length: 100m for 10/100BaseT and 75m for 1000BaseT
Radio	
Capacity	50Mbps net aggregate throughput. Upgradeable by license key up to 5000Mbps.
Range	120 Km for PtP. 40 Km for PtMP SU.
Frequency Band	4.9 – 6.0GHz
Channel Bandwidth	Configurable: 10, 20, 40, 80 MHz (for the default band); Dynamic Channel BW selection (20/40/80 MHz)
Modulation	MIMO-OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)
Adaptive Modulation & Coding	Supported
Automatic Channel Selection	Supported upon power up
Regulation	FCC, ETSI, Canada, MII, ACMA
Encryption	PtP mode: AES 256 SU mode: AES 128 (AES 256 by license, if BS supports AES 256)
Uplink / Downlink Allocation	Configurable: Symmetric or Asymmetric
QoS	Packet classification to 4 priority queues according to 802.1P or Diffserv
VLAN Support	802.1Q, QinQ, 4094 VLANs
TDD Intra/Inter Site Synchronization	Supported via built-in GPS receiver
ODU Management	IPv4/IPv6 dual stack; DHCP client for SU (IPv4 only); SNMPv1, SNMPv3; HTTP/HTTPS using web browser;
SU mode supported capabilities	Non PPPoE filtering, DHCP Filter, IGMP snooping, Nomadic, DHCP Option 82
Dying gasp	**Supported (PoE voltage must be >= 55v)
Mechanical	
ODU Dimensions	19.5(w) x 12.5(h) x 4.0(d) cm
ODU Weight	0.5 kg / 1.10 lbs.
Power	
Power Consumption	<13W
Environmental	
Operating Temperatures	-35°C to 60°C / -31°F to 140°F
Humidity	100% condensing, IP67 (total protected against dust and immersion in water up to 1m)
Certificates	
Safety	EU / Int., FCC
EMC	FCC, ETSI, CANADA, AS/NZS

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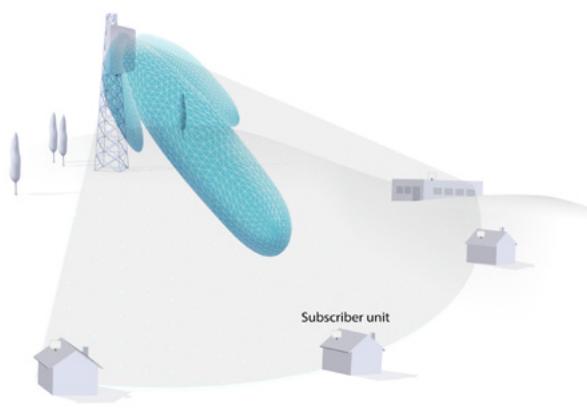
RADWIN JET SERIES

RADWIN JET series features a range of unique sub 6 GHz Point-to-MultiPoint base stations, each equipped with a superior beamforming antenna to provide unmatched connectivity, even in the highly congested unlicensed 5GHz band

JET series beamforming antenna is exceptionally narrow and electronically steered, covering a sector width of up to 90° and capable of radio interference rejection by more than 100 times (20dB). JET eliminates the need to deploy many radios with narrow beam antennas on a tower to achieve a wide sector with interference-free transmission.

JET base station series facilitates the deployment of large and scalable networks, providing ultra-high capacity for up to 1000 customers per tower. It is ideal for a range of applications, including fixed wireless access for enterprise and residential customers, Mission critical applications in private networks and everyday data connectivity and surveillance applications. JET series is the ultimate solution to achieve reliable connectivity similar to Point-to-Point at economical budget.

The JET series utilizes RADWIN's cloud-based holistic OSS (Operational System Support) for cost-performance radio planning, seamless customer acquisition and efficient mass deployment to facilitate rapid network growth and high-quality service.



JET series - beamforming base station

JET series highlights

- » Superior beamforming antenna
- » Single carrier (radio) per unit, up to 750 Mbps
- » Dual carrier (radio) per unit, up to 1.5 Gbps
- » Industry-leading interference immunity
- » Excellent spectrum utilization:
 - › Full network deployment using only 2 frequency channels.
 - › A frequency channel can be reused up to 4⁽¹⁾ times in a site
 - › Up to 36⁽¹⁾ bps/Hz/cell
- » Dynamic⁽¹⁾ carrier selection per subscriber unit
- » SLA⁽¹⁾ (CIR) and Best-Effort service level
- » Fixed latency and low Jitter
- » Built-in GPS for TDD network synchronization
- » WAN connectivity over SFP or PoE
- » 5 GHz, 3.5 GHz band

Note 1: product dependent

The JET series offers two distinct base station categories, each tailored to specific deployment scenarios. The first is designed for high-end applications, while the second offers the best price- performance ratio.

HIGH-END BEAMFORMING BASE STATION SERIES

For SLA enterprise customers or mission-critical data connectivity & surveillance

JET PRO

A high-end single carrier base station with superior beamforming capabilities, delivering 750 Mbps over a 90° sector with SLA (CIR) or best-effort service levels. Available in the 5 GHz and 3.5 GHz bands.



JET DUO 5 GHz

A high-end dual carrier base station with a superior beamforming antenna, offering 1.5 Gbps to 128 customers with SLA or best-effort service levels over a configurable 90°, 45° or 60° sector width. JET DUO enables ultra-site capacity of up to 12 Gbps with exceptional frequency efficiency of 36 bps/Hz/cell and frequency reuse of up to 4 times per site. JET DUO's unique PrimeCarrier feature further improves service reliability and availability.



JET DUO 3.5 GHz

A high-end, dual band, 3.5 GHz and 5 GHz Point-to-MultiPoint base station with a superior beamforming antenna, assuring reliable connectivity in both frequency bands. JET DUO 3.5 GHz delivers up to 1.5 Gbps with SLA or best-effort service levels.

BEST PRICE-PERFORMANCE BEAMFORMING BASE STATION SERIES

For residential customers or every everyday data connectivity & surveillance

JET AIR

A best price performance, single carrier base station with a superior beamforming antenna, delivering 750 Mbps over a 90° sector and available only in the 5 GHz band.



JET AIR DUO

A best price performance, dual-carrier base station with a superior beamforming antenna. Its unique PrimeCarrier feature further improves service reliability and availability. JET AIR DUO delivers up to 1.5 Gbps over a 90° sector and is available only in the 5 GHz band.

The following table outlines the main features supported by each product in the JET series.

Future	JET DUO	JET DUO	JET PRO	JET AIR DUO	JET AIR
Carrier bands	3.5+5 GHz	5+5 GHz	3.5 GHz, 5 GHz	5+5 GHz	5 GHz
Maximum unit capacity	1.5 Gbps	1.5 Gbps	750 Mbps	1.5 Gbps	750 Mbps
Maximum number of SUs per unit	128	128	64	128	64
Maximum site capacity (@ 4 x 80MHz)	6 Gbps	12Gbps	6Gbps	6Gbps	6Gbps
Maximum number of SUs per site (@ 4 x 80MHz)	512	1024	512	512	512
Superior beamforming & industry best interference mitigation	●	●	●	●	●
Dual carrier base station	●	●		●	
Frequency reuse 2 per site and multi sites network	●	●	●	●	●
CIR (Committed Information Rate) per SU, Jumbo Frame (9600 bytes)	●	●	●		
Software Define Sector (SDS) – Configurable sector width		●			
Ultra base station site capacity using ultra spectrum efficiency		●			
PrimeCarrier (dynamic selection of carrier per SU)		●		●	
Built-in GPS and TDD synchronization	●	●	●	●	●
Dynamic channel bandwidth	●	●	●	●	●
SFP & POE	●	●	●	●	●
Max customer peak capacity @ 40 MHz -350 Mbps	●	●	●	●	●

RADWIN Subscriber Units (SUs)

Outdoor radio units with low visual impact, delivering up to 500 Mbps.

RADWIN Subscriber Units are compact, lightweight, and powerful. Available in the 5 GHz and 3.5 GHz bands, they are equipped with either an integrated antenna or N-type connectors²

RADWIN SUs have impressive packet switching power that ensures maximum capacity, regardless of traffic packet size.

Adhering to the IP 67 standard, the RADWIN SUs are highly durable and can be provided with marine grade coat.

Fully interoperable with RADWIN's entire range of base stations, the SU provides unparalleled flexibility for network deployments.



RADWIN offers two types of SUs:

SU PRO

For bandwidth-demanding enterprise and mission critical applications. The unit supports SLA (CIR) or best-effort service levels.

SU AIR

For residential access, data connectivity and surveillance. The unit supports a best-effort service level only.

SU automated installation

RADWIN SU installation is automated using the WINTouch mobile application. This application handles work order reception, SU antenna alignment, configuration, installation validation, documentation upload, and more.



Android & iOS

The SU supports effortless installation through zero-touch service activation, with or without RADIUS, minimizing installation efforts.

Note 2 : Only in 5GHz

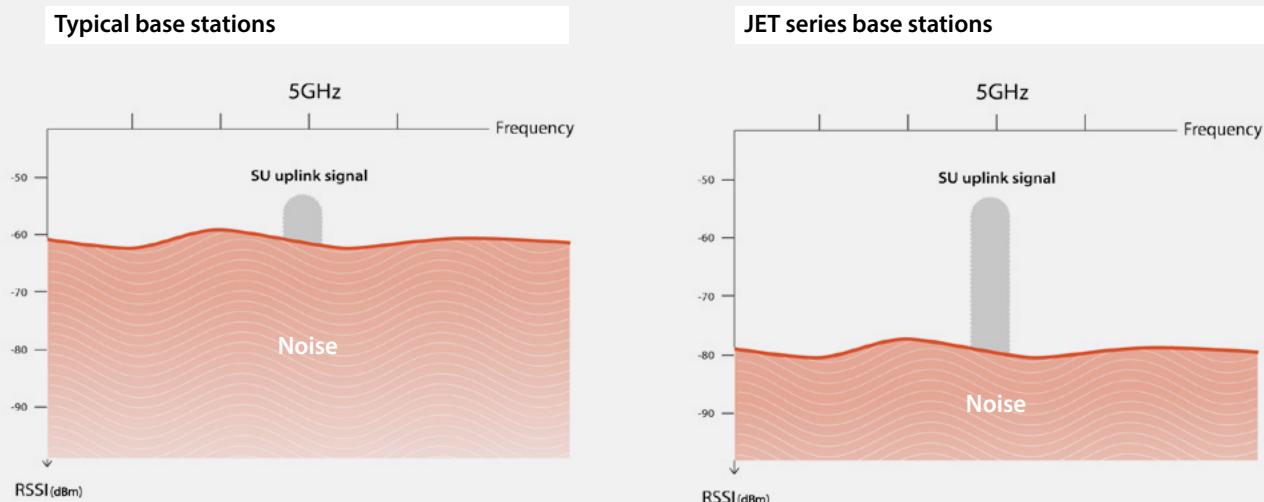


The value of JET base station series

Reliable & consistent uplink connectivity

Rejecting interference by 20 dB or more, JET beamforming antenna dramatically improves signal reception in locations with congested spectrum to assure higher capacity and wider coverage than any passive antenna.

Base station performance in congested spectrum



Low capacity link

In congested spectrum a base station with a typical wide antenna, receives the remote SUs with low signal-to-interference ratio, resulting in reduced capacity links.

High capacity link

In congested spectrum, JET base station mitigates the interference and receives the remote SUs signal with a high signal-to-interference ratio, resulting in high-capacity links.

Consider that your network is experiencing an interference level of -60 dBm. However, thanks to the beamforming antenna, the transmission performs as though the interference level is -80 dBm.

Reduced network Total Cost of Ownership (TCO)

- » Less towers are needed for a given coverage requirement, thanks to beamforming interference mitigation.
- » Inventory burden is eliminated as SUs can be used across all RADWIN base stations.
- » No SU rip and replacement is required when adding or switching base stations to accommodate dynamic network requirements.
- » Less help-desk calls and customer churn thanks to reliable connectivity.
- » Optimal radio planning for minimal infrastructure and efficient SUs mass deployment process is assured by RADWIN holistic cloud-based OSS (Operational Support System)

Secured SLA

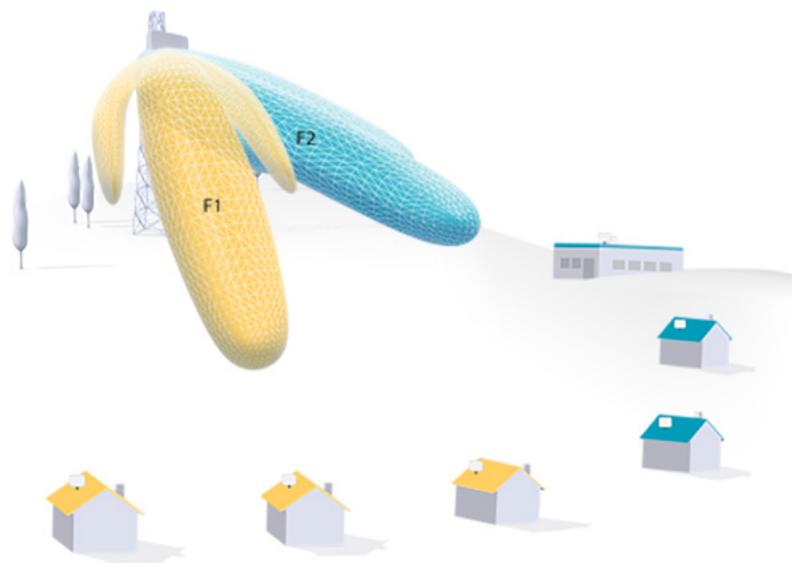
RADWIN's air interface enables a Committed Information Rate (CIR) for bandwidth demanding applications.

Dual carrier base stations for increased unit capacity and reliability

Equipped with dual radios, both JET DUO, and JET AIR DUO provide double the capacity per unit, saving upon tower space and rental costs.

Leveraging the dual carrier topology, RADWIN PrimeCarrier dynamically selects the best carrier per Subscriber Unit, to maintain highest possible downlink capacity and availability, in case of the following adverse scenarios:

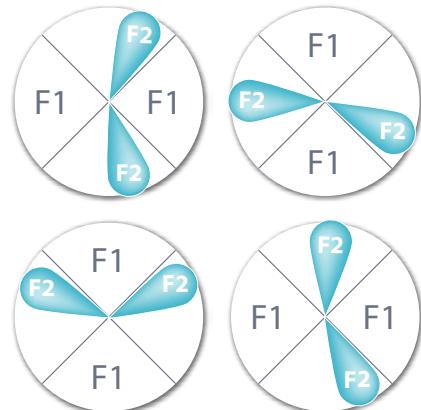
-  Downlink capacity deterioration
-  Downlink traffic carrier overload
-  RADAR detection



Increased capacity with minimum spectrum usage

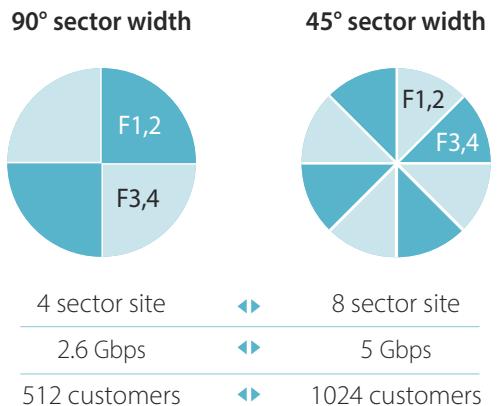
Less spectrum is required to achieve network capacity, due to Frequency reuse 2.

Only two frequency channels per carrier are required for multi-tower deployments, enabling greater network capacity per available spectrum.



Software Define Sector for ultra capacity and spectrum efficiency

JET DUO 5 GHz offers network owners the flexibility to reconfigure the sector width from 90° to 60° or 45°, effectively doubling tower capacity up to 12 Gbps and accommodating as many as 1024 customers. This capacity increase is achieved through greater frequency reuse; allowing use of the same channel up to four times on a single tower, resulting in spectrum efficiency of 36 bps/Hz/cell.



JET DUO site capacity @ 4 Channels of 40 MHz

F1, F2, F3, F4 - Frequency Channels

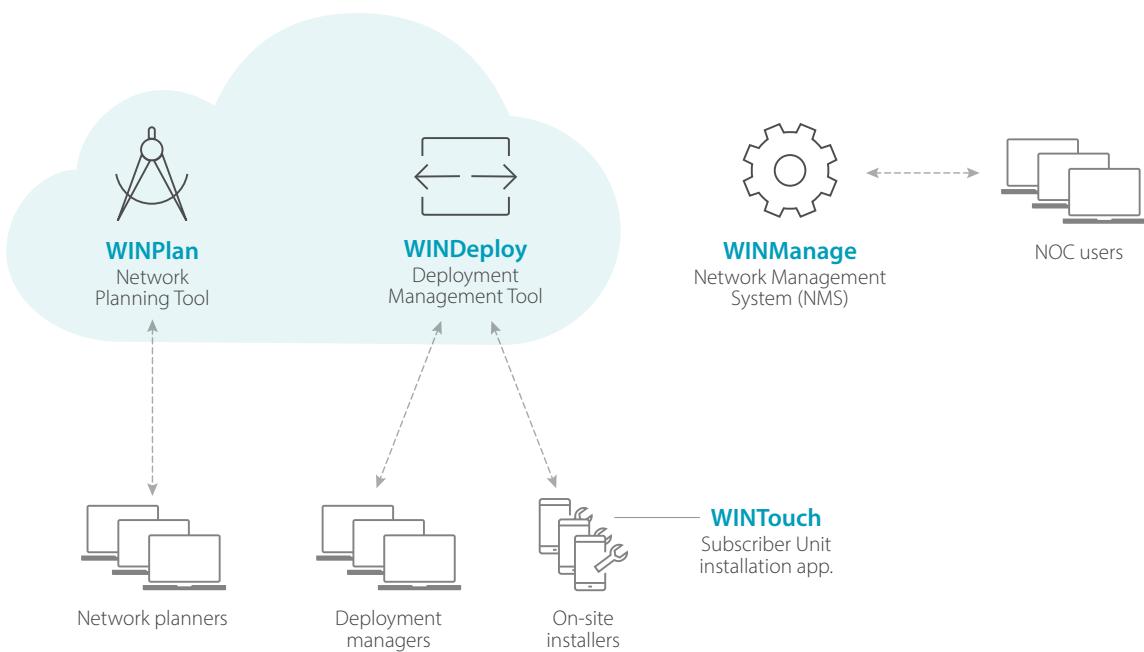
Simplified operation, facilitated by RADWIN OSS

RADWIN's OSS provides a set of cloud-based tools that support all operational aspects of the network lifecycle, such as radio planning, mass deployment management and SU installations.

Service commissioning, network management and maintenance are provided through a powerful and scalable on-premises NMS.

Main OSS benefits:

- » Secure network performance while minimizing capital expenditure with RADWIN's advanced planning tool.
- » Facilitate efficient mass deployment while securing installation quality and assuring a maintenance free network



Product specifications:

	JET Base Station					Subscriber unit														
	DUO	DUO	AIR DUO	PRO	AIR	Integrated		Connectorized												
	5 GHz	3.5 GHz	5 GHz	5 GHz/3.5 GHz	5 GHz	SU AIR ¹	SU PRO	SU AIR ¹	SU PRO											
Architecture	Outdoor Unit with smart beamforming integrated antenna and built-in GPS					Outdoor unit with Integrated antenna		Outdoor unit with 2 N-type connectors												
Max net aggregate capacity	1.5 Gbps		750 Mbps		500 Mbps ²		500 Mbps ²													
Data interfaces	100/1000 Mbps RJ45 PoE, 1Gbps Full duplex SFP					100/1000 Mbps RJ 45 PoE														
Radio																				
Subscriber Units support	Up to 128			Up to 64																
Range	Up to 40 km / 25 miles																			
Modulation	OFDM (BPSK / QPSK / 16 QAM / 64 QAM / 256 QAM)																			
Antenna modes	MIMO 2x2, diversity, adaptive MIMO/diversity per SU																			
Duplex Technology	TDD, Configurable Symmetric or Asymmetric																			
TDD Inter & Intra site Sync.	Supported via built-in GPS receiver																			
Encryption	AES 128																			
Channel Bandwidth	Configurable: 10, 20, 40, 80 MHz																			
Dynamic bandwidth selection	20, 40, 80 MHz																			
Sector width	Configurable 90°,60°,45°					90°														
Max Tx Power per port 5GHz	25 dBm	25 dBm	24 dBm	25 dbm	24 dbm	26 dBm														
Max Tx Power per port 3.5GHz		28 dBm		28 dbm																
Antenna gain 5GHz	19 dBi	19 dBi	18 dBi	20 dBi	18 dBi	22 dBi														
Antenna gain 3.5GHz		16 dBi		17 dBi		19 dBi														
DFS	Supported																			
Networking																				
Sub convergence layer	Layer 2, Bridging learning of 8K MAC addresses																			
QoS	Packet classification for 4 priority queues according to 802.1p or Diffserv																			
VLAN Support	802.1q, QinQ, 4094 VLANs																			
MTU	JET PRO, JET DUO, SU PRO: 9600 bytes. Other: 2047 bytes.																			
Management																				
ODU Management	IPv4/IPv6 dual stack; SNMPv1, SNMPv3; HTTP/HTTPS using web browser																			
NMS Applications	RADWIN NMS (WINManage) or integration with 3rd party NMS system via standard MIBs																			
Power																				
Power feeding	Provided over PoE / RADWIN PoE switch					Provided over PoE-ODU														
Max Power consumption	55w			30w	35w	13w	13w													
Mechanical																				
ODU Weight	4.9Kg	4.5lbs	3.6 kg	3.6kg		2Kg	0.5Kg													
	10.8lbs	9.9lbs	7.9 lbs	7.9lbs		4.4lbs	1.1lbs													
Environmental																				
Operating Temperature	-35°C to 60°C			-40°C to 60°C																
	-31°F to 140°F			-40°F to 140°F																
Humidity	100% condensing																			
Safety	EN/IEC, UL/CSA, CTUVus																			
EMC	ETSI/EN, FCC, ICES																			

Please refer to the product data-sheets to obtain detailed information and committed specs per product.

Note 1: Available only in 5GHz | Note 2: 100Mbps in 3.5GHz

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