



Connecting rural communities with Non-Line-of-Sight wireless broadband

# RADWIN Outland™

A PtMP TVWS solution

TV White Space (TVWS) paves the way for service providers to connect unserved rural customers to the digital world using reliable, Non-Line-Of-Sight (NLoS) broadband wireless that can penetrate trees, foliage, and challenging terrains. TVWS, a part of the UHF spectrum, is the ultimate frequency band for removing the digital divide in rural areas where wireline and high frequency solutions remain unaffordable.

Using TVWS, service providers can expand their network footprint beyond the existing infrastructure to grow their customer base and subsequently service revenues. Rural communities can tap into value-added broadband services to significantly improve their lifestyle and increase productivity by accessing an unlimited array of online services from healthcare, education, commercial, entertainment and more.

# RADWIN Outland, a new TVWS band solution

RADWIN Outland is a next-generation, Point-to-MultiPoint solution operating over the TVWS band (470-698MHz) to facilitate NLoS broadband connectivity.

Leveraging upon a field proven air-interface and comprehensive operational tools, Outland, together with RADWIN's extensive PtMP portfolio, enables service providers to deliver best-of-breed wide area broadband services while assuring lowest TCO.

## RADWIN Outland highlights:

- » Sector capacity of up to 300Mbps<sup>(1)</sup> and subscriber capacity of up to 150Mbps
- » A dual-carrier base station with two noncontiguous carriers, of up to 24MHz each
- » Excellent interference mitigation
- » Performance predictability using dedicated planning tools and processes
- » Fast and simple radio installation process
- » Managed by WINManage NMS, a unified management system for RADWIN portfolio
- » Co-existence with RADWIN's Sub 6GHz networks



**Outland Base Station (BS)** is a small and compact outdoor unit that transmits two independent carriers which serve two groups of subscriber units, hence providing double the capacity of a typical single carrier base station. Each carrier delivers up to 150Mbps by bonding 4 contiguous FCC (or 3 ETSI) TVWS channels.

The BS is deployed with an external MIMO 2x2 antenna and connected to the network through a GbE POE or SFP interface.

It includes an embedded GPS with an integrated GPS antenna or an optional external antenna.

The base station supports on-line communication with TVWS authorized Data Bases for channel management and it is already inter-operable with USA and UK Data Bases. Integration with further Data Bases are planned as well.



**Outland Subscriber Unit (SU)** delivers up to 150Mbps over a single carrier and includes a directional integrated flat panel antenna for quick and easy installation. Ruggedized and IP-67 compliant, Outland SU is highly robust, a mandatory requirement for maintaining low operational costs in remote rural networks.

Outland SU incorporates an embedded GPS, enabling it to report its Geo-location to the TVWS authorized Data Base for channel management.

(1) Actual capacity depends on the available TVWS channels, the range and topography.

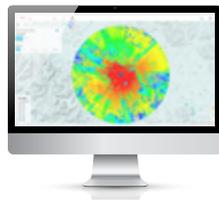
# Performance predictability for greater deployment success

TVWS transmission channels are selected in coordination with nearby TV broadcasters through an authorized Data Base to prevent TVWS systems from interfering with TV channels.

However, channels indicated as available by the TVWS authorized Data Base may be highly interfered by the high-power signals of TV broadcasters. This can either deteriorate the quality of the TVWS service, or totally prevent it.

To assure successful TVWS deployments with minimal labor, RADWIN enables service providers to predict the potential service level per customer, using RADWIN's clutter-based radio planner. The planner estimates the actual coverage and service capacity by taking into consideration the terrain and vegetation in the area using true-to-life interference levels, measured by RADWIN's automated spectrum survey tool, an integral part of the Outland base station.

## Service prediction using RADWIN's clutter-based planner and automated spectrum survey tool



Clutter based coverage estimation



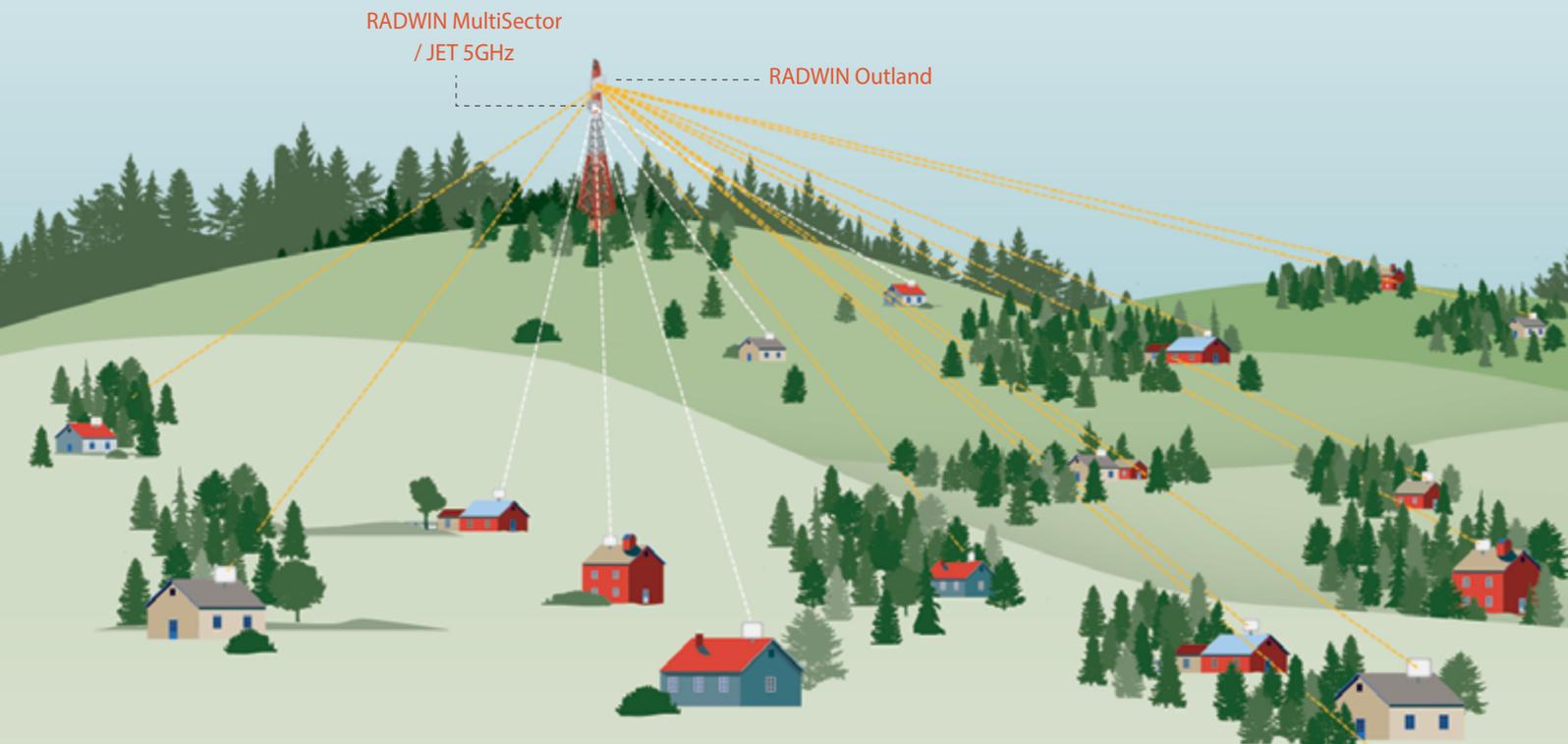
Automated spectrum survey



Service prediction per SU according to clutter and spectrum availability

## Extend your broadband reach through collocation of TVWS with existing 5GHz infrastructure

RADWIN Outland can utilize the same 5GHz deployment infrastructure including towers, backhaul, electricity and switches as well as RADWIN WINManage management application, to address a larger area and more customers at a lower cost.



# Solution Specifications

	Outland™ TVWS Base Station	Outland™ TVWS Subscriber Unit
<b>Service</b>		
Max capacity (net aggregate)	Dual carrier: 2x150 Mbps	Single carrier: up to 150 Mbps
Subscriber Units (SU) support	Up to 64 Subscriber Units	-
<b>Configuration &amp; Interfaces</b>		
Antenna configuration	Connectorized outdoor unit (2 x N-type)	Outdoor Unit with an integrated 8 dBi antenna
Data Interfaces	1000BaseT, SFP 1GbE	10/100/1000BaseT
PoE supported	RADWIN PoE	RADWIN PoE
PoE to ODU Interface	Outdoor CAT-5e; 10/100/1000BaseT	
<b>Radio</b>		
TVWS band	470 – 698MHz	
Carrier Bandwidth	1,2,4 contiguous 6MHz TVWS FCC channels or up to 3 contiguous 8MHz ETSI channels, per carrier	
Adaptive Modulation & Coding	MIMO-OFDM, BPSK- QAM256	
Max Tx Power	25 dBm	23 dBm
TDD synchronization	Built-in GPS	
Encryption	AES 128	
<b>Networking</b>		
Layer 2	Bridging learning of 5K MAC addresses	HUB Mode
QoS	4 priority queues, 802.1P or Diffserv	
VLAN Support	802.1Q, QinQ, 4094 VLANs	
ODU Management	IPv4/IPv6 dual stack; SNMP v1 and v3; HTTP using web browser	
<b>Environment &amp; Regulations</b>		
Operating Temperatures	-40°C to 60°C / -40°F to 140°F	
Enclosure	IP 67 compliant	
Regulations supported	FCC, ETSI	
<b>Dimensions and Power</b>		
ODU Dimensions (w) x (h) x (d)	24.8 x 25.5 x 7.5 cm	32.5 x 32.5 x 11.4 cm
ODU Weight	4.5 kg / 9.9 lbs.	2.3kg / 4.85s lbs.
Power Consumption	<65W	<27W

RADWIN is a leading provider of broadband wireless access solutions that deliver superior performance due to innovative and advanced wireless technologies. RADWIN focuses on developing reliable, high quality solutions together with powerful operational tools that simplify network planning, deployment and operation to assure network rollout with the lowest TCO.

With more than 1 million radios installed in over 170 countries, RADWIN's solutions provide high quality broadband connectivity to home and office customers, city streets, suburban neighborhoods, rural villages and rail and metro trains.

## **RADWIN**

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