1. Zero footprint, fully outdoor and cost-effective solution
2. QoS (Quality of Service) based on port, VLAN ID/Priority, DSCP for traffic prioritization
3. Scalable bandwidths (ETSI up to 112 MHz, FCC up to 80MHz) and flexible modulation schemes (QPSK-4096QAM) to secure best link performance
4. Advanced multilevel LDPC and RS FEC
5. Up to 4Gbps capacity with Hitless Automatic Adaptive Coding and Modulation (HAACM)
6. The capacity can be up to 4Gbps by 2-radios aggregation
7. Power supply with coaxial cable or 2-wire cable
8. Multi-GE ports with 2-10 Gb
9. High availability and reliability based on licensed frequencies 5~44G
10. Jumbo frame up to 10240 bytes
11. Layer-2 switching, auto MDI/MDXI, VLAN, QoS, QinQ, STP/RSTP, LACP
12. 16K Mac Table Entries
13. RF and digital loopback capability
14. Adaptive digital Pre-distortion feature
15. Head compression to increase the capacity
16. Built-in Bit Error Rate (BER) monitoring and spectrum scan
17. Small and attractive profile, Low latency and low power consumption, wide operating temperature range fits all weather conditions
18. Management capability as well as SNMP and Https call
19. Support Local and Remote loopback for Line checking
20. System Log for alarm, events, configuration.

RESILIENT
PROGRESSIVE TECHNOLOGY

Multiwave Pro Radio

A compact all-outdoor packet radio solution, combining the advantages of an all-outdoor profile with carrier-grade performance of Multiwave Family, generates significant CAPEX and OPEX savings.

Multiwave 2T2R Pro Radio is the innovative packet radio which is the perfect replacement of optical fiber cable and FSO.

Robust and durable single-box structure withstands harsh weather conditions and can be easily mounted on towers, rooftops, lamp posts, traffic light poles and small outdoor mobile cell-sites.

Enhanced spectrum utilization, low-latency traffic and comprehensive synchronization solution.

Software-scalable bandwidths (ETSI up to 112 MHz, FCC up to 80MHz) and adaptive modulation schemes (QPSK-4096QAM) provide traffic with more flexibility and strong adaptability to various application environments.

Multiwave 2T2R Pro Radio is compliant with the IEEE 802.1/3 and RFC standards for various Ethernet functionalities.

User-friendly Management- Telnet, WEB GUI, NMS, SNMP Manager. Software and firmware online upgradeable.

Applications

4G and 5G mobile Backhaul

Multiwave 2T2R Pro Radio is a perfect fit for 3G/4G/5G base station backhaul to replace optical fiber and FSO, ideally for new all-packet base station, and caters to various connection needs: voice, data, management and control. With SynE synchronization, Multiwave 2T2R Pro could meet any RAN network requirement. With external PWE3 interface unit, Smart Packet could provide up to 8E1 and more Ethernet interfaces for 2G/3G/4/5G co-site scenario.

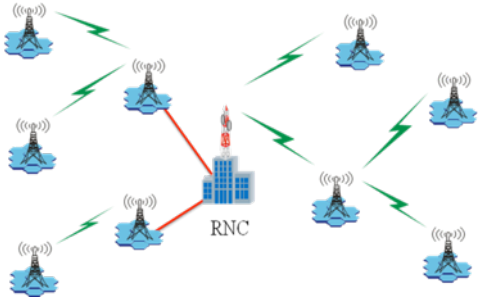


Figure 1 – Cellular Backhaul

ISP Backhaul

Multiwave 2T2R Pro Radio allows ISPs, who own no land lines, to quickly establish a backhaul without quality compromises. ISPs can grow up their profits by delivering services with guaranteed SLA or reaching distant clients from their PTP using radios with similar cost at licensed frequencies to avoid spectrum congestion.

Figure 2 – ISP Backhaul

Broadband Access

Multiwave 2T2R Pro Radio is an affordable medium capacity radio solution for enterprises that need private lines and broadband Ethernet traffic.

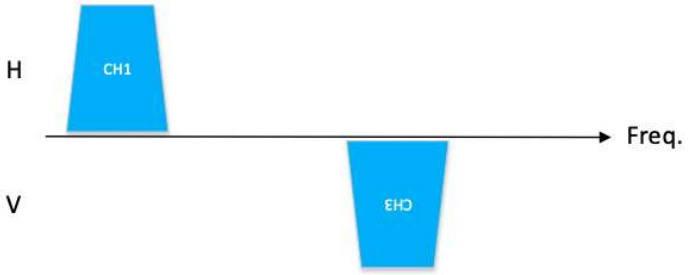
It offers solutions with fine combination of cost effectiveness & short commission time for the following applications:

* DSLAM backhaul
* No right-of-way
* Extending network from a fiber POP
* Private Communication networks

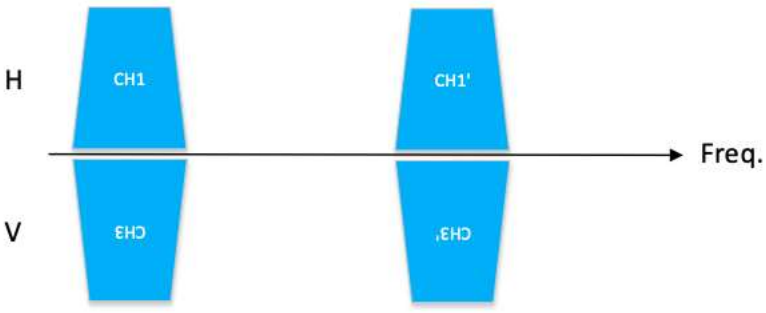
Channel configuration

* Single-channels in each subband using dual-polarization (XPIC)
* Single-channels in different subband using dual-polarization
* Single-channels with east/west and Add/drop feature
* 4+0 by using 2 radios

Dual-channels in each subband using dual polarization (XPIC) with OMT



Dual-channels in different subband using dual-polarization with OMT



4+0 by using 2 radios with OMT plus combiner

Specifications

Frequency			2.2 GHz	3.7~4.2 GHz	4.4~5.0 GHz	5.9~6.4 GHz	6.4~7.1 GHz	7.7~8.2 GHz	11/13/15 GHz	17.7~19.7 GHz	21.2~23.6 GHz
Standard			ETSI/ITU or customer specified								
RF Output Power/per channel (dBm-Max)		4096QAM	25	26	23	25	25	25	21	20	20
		2048QAM	26	27	23	25	25	25	21	20	20
		1024QAM	27	28	24	26	26	26	22	21	21
		512QAM	28	30	25	27	27	27	23	22	22
		256QAM	28	30	26	27	27	27	23	22	22
		128QAM	28	31	26	27	27	27	23	22	22
		64QAM	29	31	27	28	28	28	24	23	23
		32QAM	29	32	27	28	28	28	24	23	23
		16QAM	30	32	28	28	28	28	24	23	23
		QPSK	30	33	28	28	28	28	24	23	23
RF Output Power(dBm- Min)			0								
Tuning Increment (dB)			1								
Accuracy (dB)			±2								
RX at BER=10-6 (dBm)	112MHz	4096QAM	N/A	N/A	-49.1	-49.1	-49.1	-49.1	-48.6	-48.1	-48.1
		2048QAM	N/A	N/A	-53.0	-53.0	-53.0	-53.0	-52.5	-52.0	-52.0
		1024QAM	N/A	N/A	-56.1	-56.1	-56.1	-56.1	-55.6	-55.1	-55.1
		512QAM	N/A	N/A	-59.3	-59.3	-59.3	-59.3	-58.8	-58.3	-58.3
		256QAM	N/A	N/A	-62.3	-62.3	-62.3	-62.3	-61.8	-61.3	-61.3
		128QAM	N/A	N/A	-65.4	-65.4	-65.4	-65.4	-64.9	-64.4	-64.4
		64QAM	N/A	N/A	-68.3	-68.3	-68.3	-68.3	-67.8	-67.3	-67.3
		32QAM	N/A	N/A	-70.6	-70.6	-70.6	-70.6	-70.1	-69.6	-69.6
		16QAM	N/A	N/A	-73.7	-73.7	-73.7	-73.7	-73.2	-72.7	-72.7
		QPSK	N/A	N/A	-80.1	-80.1	-80.1	-80.1	-79.6	-79.1	-79.1
	80MHz	4096QAM	N/A	-50.5	-50.5	-50.5	-50.5	-50.5	-50.0	-49.5	-49.5
		2048QAM	N/A	-54.4	-54.4	-54.4	-54.4	-54.4	-53.9	-53.4	-53.4
		1024QAM	N/A	-57.6	-57.6	-57.6	-57.6	-57.6	-57.1	-56.6	-56.6
		512QAM	N/A	-60.7	-60.7	-60.7	-60.7	-60.7	-60.2	-59.7	-59.7
		256QAM	N/A	-63.8	-63.8	-63.8	-63.8	-63.8	-63.3	-62.8	-62.8
		128QAM	N/A	-66.9	-66.9	-66.9	-66.9	-66.9	-66.4	-65.9	-65.9
		64QAM	N/A	-69.7	-69.7	-69.7	-69.7	-69.7	-69.2	-68.7	-68.7
		32QAM	N/A	-72.1	-72.1	-72.1	-72.1	-72.1	-71.6	-71.1	-71.1
		16QAM	N/A	-75.2	-75.2	-75.2	-75.2	-75.2	-74.7	-74.2	-74.2
		QPSK	N/A	-81.7	-81.7	-81.7	-81.7	-81.7	-81.2	-80.2	-80.2
	56MHz	4096QAM	-51.9	-51.9	-51.9	-51.9	-51.9	-51.9	-51.4	-50.9	-50.9
		2048QAM	-55.8	-55.8	-55.8	-55.8	-55.8	-55.8	-55.3	-54.8	-54.8
		1024QAM	-59.1	-59.1	-59.1	-59.1	-59.1	-59.1	-58.6	-58.1	-58.1
		512QAM	-62.3	-62.3	-62.3	-62.3	-62.3	-62.3	-61.8	-61.3	-61.3
		256QAM	-65.4	-65.4	-65.4	-65.4	-65.4	-65.4	-64.9	-64.4	-64.4
		128QAM	-68.4	-68.4	-68.4	-68.4	-68.4	-68.4	-67.9	-67.4	-67.4
		64QAM	-71.2	-71.2	-71.2	-71.2	-71.2	-71.2	-70.7	-70.3	-70.3
		32QAM	-73.7	-73.7	-73.7	-73.7	-73.7	-73.7	-73.2	-72.7	-72.7
		16QAM	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8	-76.3	-75.8	-75.8
		QPSK	-83.2	-83.2	-83.2	-83.2	-83.2	-83.2	-82.7	-82.2	-82.2
	40MHz	4096QAM	-53.3	-53.3	-53.3	-53.3	-53.3	-53.3	-52.8	-52.3	-52.3
		2048QAM	-57.2	-57.2	-57.2	-57.2	-57.2	-57.2	-56.7	-56.2	-56.2
		1024QAM	-60.6	-60.6	-60.6	-60.6	-60.6	-60.6	-60.1	-59.6	-59.6
		512QAM	-63.8	-63.8	-63.8	-63.8	-63.8	-63.8	-63.3	-62.8	-62.8
		256QAM	-67.0	-67.0	-67.0	-67.0	-67.0	-67.0	-66.5	-66.0	-66.0
		128QAM	-69.8	-69.8	-69.8	-69.8	-69.8	-69.8	-69.3	-68.8	-68.8
		64QAM	-72.6	-72.6	-72.6	-72.6	-72.6	-72.6	-72.1	-71.6	-71.6
		32QAM	-75.2	-75.2	-75.2	-75.2	-75.2	-75.2	-74.7	-74.2	-74.2
		16QAM	-78.4	-78.4	-78.4	-78.4	-78.4	-78.4	-77.9	-77.4	-77.4
		QPSK	-84.7	-84.7	-84.7	-84.7	-84.7	-84.7	-84.2	-83.7	-83.7
	28MHz	4096QAM	-54.6	-54.6	-54.6	-54.6	-54.6	-54.6	-54.1	-53.6	-53.6
		2048QAM	-58.6	-58.6	-58.6	-58.6	-58.6	-58.6	-58.1	-57.6	-57.6
		1024QAM	-62.1	-62.1	-62.1	-62.1	-62.1	-62.1	-61.6	-61.1	-61.1
		512QAM	-65.4	-65.4	-65.4	-65.4	-65.4	-65.4	-64.9	-64.4	-64.4
		256QAM	-68.5	-68.5	-68.5	-68.5	-68.5	-68.5	-68.0	-67.5	-67.5
		128QAM	-71.3	-71.3	-71.3	-71.3	-71.3	-71.3	-70.8	-70.3	-70.3
		64QAM	-74.1	-74.1	-74.1	-74.1	-74.1	-74.1	-73.6	-73.1	-73.1
		32QAM	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8	-76.3	-75.8	-75.8
		16QAM	-79.9	-79.9	-79.9	-79.9	-79.9	-79.9	-79.4	-78.9	-78.9
		QPSK	-86.2	-86.2	-86.2	-86.2	-86.2	-86.2	-85.7	-85.2	-85.2
Flange			N-Type	N-Type	N-Type	N-Type	UBR84	UBR84	UBR140	UBR220	UBR220
RSSI			Output voltage vs. RSL: 0 ~ 1.4V vs. -90 ~ -20dBm(10dB/200mV)								
RSL Accuracy			±2 dB@-80~-30dBm, ±3 dB@-90~-80dBm or -30~-20dBm								
Frequency Stability			±5ppm								
Frequency Source			Synthesizer								
Max Input Level Without Damage			0dBm								
Modulation			QPSK~4096QAM								
ACM switching			Hitless								

Throughput (single channel)/Mbps	Up to 1400Mbps@2*80MHz (anatel) ， 2Gbps@2*112MHz		
Switch type	10GE Layer 2	**QoS**	802.1p
Max frame size	10240 bytes	**QoS queuing**	Yes
MAC table	16k entries, auto learning & aging	**VLAN support**	802.1Q, **QinQ**
Packet buffer	8Mbit;non-blocking store & forward	**Spanning tree protocol**	802.1D-1998 STP&RSTP
Flow control	802.3x	**Synchronization**	N/A
SNMP	SNMP traps, MIB,SNMP v1/v2c/v3,		
EMS	Web based HTTP, SNMP, https call		
Interface	2-10GE optical, Single-mode 10G SFP		
NMS Interface	Ethernet(in-band)		
RSSI	Mini-BNC		
Power	Coaxial cable with N-type connector		
Power Supply	-48V±20%		
Power Consumption	< 100W		
Ambient Temperature	-35~ +55 ℃		
Weight &Dimension (kg/mm)	TBD		
Humidity	All weather		
Elevation	15,000ft / 4572 m,IP65		

Notes: *All Specifications are typical values and subject to change without prior notice.*

Capacity (Mbps)											
BW	Mod	QPSK	16QAM	32QAM	64QAM	128QAM	256QAM	512QAM	1024QAM	2048QAM	4096QAM
28MHz	2+0	91.9	183.6	224.6	276.5	322.6	368.5	415.7	461.0	501.8	531.7
	4+0	182.8	367.2	449.2	553.1	645.2	737.1	831.4	922.0	1003.6	1063.4
29.65MHz	2+0	97.4	194.4	237.8	292.8	341.6	390.2	440.2	488.2	531.4	563.0
	4+0	194.8	388.8	475.6	585.6	683.2	780.4	880.4	976.4	1062.9	1126.1
40MHz	2+0	130.0	260.1	320.2	396.1	462.2	528.4	594.0	662.0	720.0	768.0
	4+0	260.0	520.0	640.0	792.0	924.0	1056.0	1188.0	1324.0	1440.0	1536.0
56MHz	2+0	183.8	367.2	449.2	553	645.2	737	831.4	922	1003.6	1063.4
	4+0	365.6	734.4	898.4	1106.2	1290.4	1474.2	1662.8	1844	2007.2	2126.8
59.3MHz	2+0	189.6	372.1	462.0	570.2	666.3	755.5	847.5	949.9	1024.0	1064.6
	4+0	379.1	744.1	923.9	1140.3	1332.6	1510.9	1694.9	1899.7	2047.9	2129.2
80MHz	2+0	244.35	478.0	596.8	734.5	858.8	969.75	1086.8	1221.7	1311.4	1406
	4+0	488.7	956.0	1193.6	1469.0	1717.6	1939.5	2173.6	2443.4	2622.8	2812.0
112MHz	2+0	367.6	734.4	898.4	1106	1290.4	1474	1662.8	1844	2007.2	2126.8
	4+0	731.2	1468.8	1796.8	2212.4	2580.8	2948.4	3325.6	3688	4014.4	4253.6

Note: *All Specifications are typical values and subject to change without prior notice*