

Y-PACKET 2

INNOVATING OUTDOOR MICROWAVE RADIO

Y-PACKET 2 is the high capacity **Full-Ethernet** point-to-point microwave radio: it carries up to **590 Mbps** of traffic, full-duplex. It is designed to enable service providers and enterprise network operators to deliver voice and premium data services. As a high capacity solution, it helps to eliminate backhaul bottlenecks and significantly reduce costs, while facilitating the transition to full-packet networks. Conceived with full-outdoor approach, it covers frequency range from **6 GHz** to **38 GHz**, in both Licensed & Unlicensed (**17 GHz** and **24 GHz**) bands. Y-Packet 2 has been developed with an aim to be easy to configure, manage and monitor.

Radio, Modem and System Types

Y-Packet 2 implements state-of-the-art technologies, such as **XPIC** and **Radio Link Aggregation**. In this configuration it provides capacity up to **1.2 Gbps** at **60 MHz** bandwidth and **1024 QAM**. Y-Packet 2 can be configured as **1+1 HSB** for link protection, **XPIC** with Radio Link Aggregation or **Repeater**. All system configurations are fully outdoor, meaning no requirement of any indoor unit.

Easy to configure

Y-Packet 2 offers the unique and innovative **Touchless Configuration**. Using its **NFC** receiver, configuration can be set by just putting a smartphone close to it, while the equipment isn't even powered! It provides intuitive Web Management Interface. It supports both **IPv4** and **IPv6** stacks, for connection over **HTTP/HTTPS** and **SNMP** protocols. Y-Packet 2 also supports **Double IPv4** stack feature, where two independent IP stacks can be used for Primary and Secondary Management.

Full-Ethernet Solution

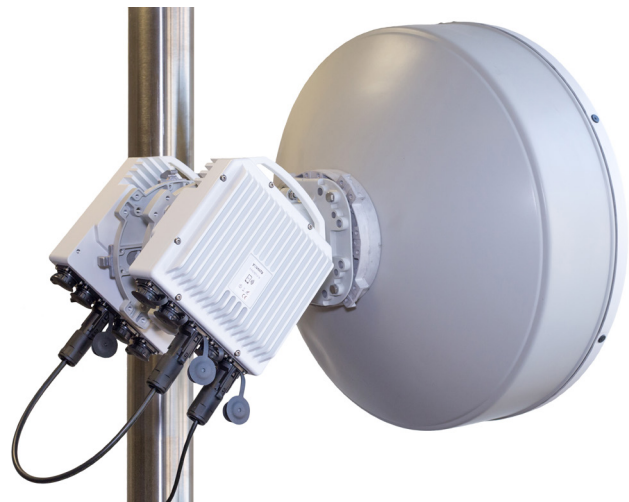
Y-Packet 2 provides support for **VLAN 802.1Q** Access, Trunk and Transparent mode. For optimal performance over the Radio interface, **QoS** can be configured to classify data and management traffic according to two basic classifiers: **IEEE 802.1p** or **IPv4 DSCP**. Y-Packet 2 output scheduler can operate either in **WRR** or **Strict Priority**. Y-Packet 2 also features **Shaper** on all Ethernet ports, **Flow Control** IEEE 802.3x and **Jumbo** frames up to 10240 bytes.

High Power for Longer Distances

For extremely long distances, a **High Power** variant is available. Thanks to digital **pre-distorter**, Y-Packet 2 can also enhance Tx power, thus allowing coverage of longer distances. Y-Packet 2 implements **ATPC**, ensuring maximum level of modulation, i.e. highest throughput, and lowest Tx power at the same time. The typical power consumption is **40 W** for Standard Power, **60 W** for High Power.

Security

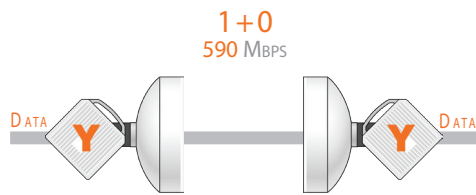
Anti-theft: to secure installation sites, the **GPS** records equipment position, and is able to lock transmission in case it is removed from site without authorization. **Secure Access**: you can ask for a **remote assistance** session with the click of a button. A secure tunnel will be established with **zero config** efforts! Y-Packet 2 can be managed over secure protocols, like **HTTPS** and **SSH**. User authentication and authorization can be done on local database or against a remote **RADIUS** server.



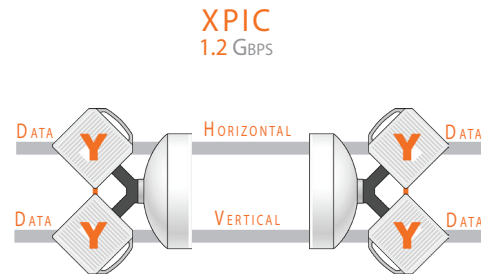
System Types

Supported System Types

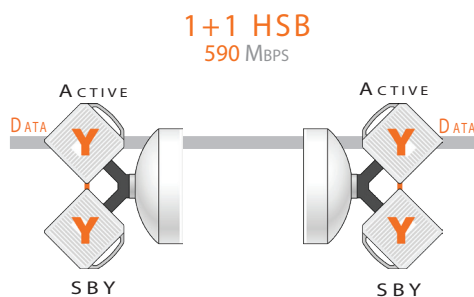
1+0, 2+0 XPIC and/or Radio Link Aggregation, Repeater, 1+1 HSB



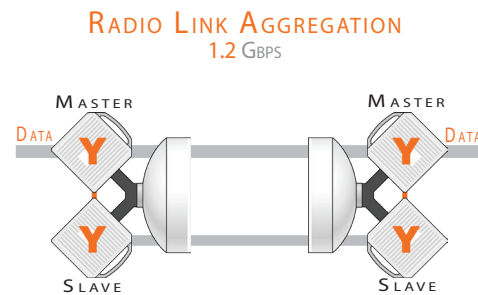
The 1+0 unprotected is the simplest configuration. It can carry up to 590 Mbps of L1 data, full duplex, over the radio interface.



The XPIC system allows to double radio spectrum efficiency. Opposite polarized signals are cancelled out at receiver side. The two channels H and V are independent, reaching a maximum of 590 Mbps each at 60 MHz/1024QAM.



In 1+1 HSB, only the Active transmitting unit is switched on. Upon failure on this unit, the Stand-by takes over, switching on its own transmitter, enabling data to flow through the protection branch.



Radio Link Aggregation is a mechanism that optimize traffic load balance on the two radio channels. The Master splits traffic proportionally to the master and slave modulations. The two radios can be either XPIC or 2*(1+0) on different frequencies.

Quality of Service & Flow Control

Classifiers	IEEE 802.1p & IPv4 DSCP
Shaper	Shaper in Steps of 2 Mbps
Number of Queues	8, per port
Scheduler	WRR & Strict Priority
Flow Control	IEEE 802.1x

Management & GUI

Configuration	Web GUI, Android Mobile App
Application Protocols	HTTP, HTTPS, SSH & SNMPv2
Network Protocols	IPv4 & IPv6
Tagging on Management	C-TAG and/or S-TAG
SNMP	Up to 10 Managers, Standard MIB

Ethernet, Timing&Sync

VLAN Mode	Transparent, Access & Trunk
Frame size	64÷10240 Bytes
Learning Mode	Independent VLAN Learning
Synchronization	SyncE, 1588v2 Transparent, PPS, ToD
Timing	3 NTP Servers

Security

Site security	GPS controlled position
Anti-theft	Stops data flowing if removed from site
User Classes	Admin, Read-Write & Read-Only
Firewall	On SSH and ICMP
User Authentication	Local or RADIUS

Sensitivity Typical [dBm] Vs Frequency Band, Bandwidth & Modulation

		6L/U GHz	7GHz	8 GHz	10.5GHz	11 GHz	13 GHz	15 GHz	17GHz	18GHz	23 GHz	24 GHz	32 GHz	38 GHz
7 MHz	4 QAM	-94	-94	-94	-94	-94	-94	-94	-93	-94	-94	-92	-92	-92
	16 QAM	-86	-86	-86	-86	-86	-86	-86	-85	-86	-86	-84	-84	-84
	32 QAM	-83	-83	-83	-83	-83	-83	-83	-82	-83	-83	-81	-81	-81
	64 QAM	-79	-79	-79	-79	-79	-79	-79	-78	-79	-79	-77	-77	-77
	128 QAM	-76	-76	-76	-75	-75	-75	-75	-74	-75	-75	-73	-73	-73
	256 QAM	-72	-72	-72	-71	-71	-71	-71	-70	-71	-71	-69	-69	-69
14 MHz	4 QAM	-92	-92	-92	-92	-92	-92	-92	-91	-92	-92	-90	-90	-90
	16 QAM	-84	-84	-84	-83	-83	-83	-83	-82	-83	-83	-81	-81	-81
	32 QAM	-81	-81	-81	-80	-80	-80	-80	-79	-80	-80	-78	-78	-78
	64 QAM	-78	-78	-78	-77	-77	-77	-77	-76	-77	-77	-75	-75	-75
	128 QAM	-74	-74	-74	-73	-73	-73	-73	-72	-73	-73	-71	-71	-71
	256 QAM	-70	-70	-70	-69	-69	-69	-69	-68	-69	-69	-67	-67	-67
28 MHz	4 QAM	-90	-90	-90	-89	-89	-89	-89	-88	-89	-89	-87	-87	-87
	16 QAM	-82	-82	-82	-81	-81	-81	-81	-80	-81	-81	-79	-79	-79
	32 QAM	-79	-79	-79	-78	-78	-78	-78	-77	-78	-78	-76	-76	-76
	64 QAM	-75	-75	-75	-74	-74	-74	-74	-73	-74	-74	-72	-72	-72
	128 QAM	-72	-72	-72	-71	-71	-71	-71	-70	-71	-71	-69	-69	-69
	256 QAM	-68	-68	-68	-67	-67	-67	-67	-66	-67	-67	-65	-65	-65
	512 QAM	-65	-65	-65	-63	-63	-63	-63	-62	-63	-63	-61	-61	-61
	1024 QAM	-62	-62	-62	-60	-60	-60	-60	-59	-60	-60	-58	-58	-58
56 MHz	4 QAM	-86	-86	-86	-86	-86	-86	-86	-85	-86	-86	-84	-84	-84
	16 QAM	-78	-78	-78	-77	-77	-77	-77	-76	-77	-77	-75	-75	-75
	32 QAM	-75	-75	-75	-75	-75	-75	-75	-74	-75	-75	-73	-73	-73
	64 QAM	-72	-72	-72	-71	-71	-71	-71	-70	-71	-71	-69	-69	-69
	128 QAM	-69	-69	-69	-68	-68	-68	-68	-67	-68	-68	-66	-66	-66
	256 QAM	-65	-65	-65	-65	-65	-65	-65	-64	-65	-65	-63	-63	-63
	512 QAM	-62	-62	-62	-61	-61	-61	-61	-60	-61	-61	-59	-59	-59
	1024 QAM	-59	-59	-59	-58	-58	-58	-58	-57	-58	-58	-56	-56	-56
60 MHz	4 QAM	-86	-86	-86	-86	-86	-86	-86	-85	-86	-86	-84	-84	-84
	16 QAM	-78	-78	-78	-77	-77	-77	-77	-76	-77	-77	-75	-75	-75
	32 QAM	-75	-75	-75	-75	-75	-75	-75	-74	-75	-75	-73	-73	-73
	64 QAM	-72	-72	-72	-71	-71	-71	-71	-70	-71	-71	-69	-69	-69
	128 QAM	-69	-69	-69	-68	-68	-68	-68	-67	-68	-68	-66	-66	-66
	256 QAM	-65	-65	-65	-65	-65	-65	-65	-64	-65	-65	-63	-63	-63
	512 QAM	-62	-62	-62	-61	-61	-61	-61	-60	-61	-61	-59	-59	-59
	1024 QAM	-59	-59	-59	-58	-58	-58	-58	-57	-58	-58	-56	-56	-56

* @ Antenna port & BER=10⁻⁶

UNLICENSED

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Maximum Output Power[‡] [dBm] Vs Frequency Band & Modulation

	6L/U GHz	7GHz	8GHz	10.5GHz	11GHz	13GHz	15GHz	17GHz	18GHz	23GHz	24GHz	32GHz	38GHz
4 QAM	32	32	34	26	26	26	26	16	25	25	16	23	23
16 QAM	31	31	32	24	24	24	24	16	24	23	16	20	20
32 QAM	30	30	31	24	24	24	24	16	23	23	16	20	20
64 QAM	29	29	30	23	23	23	23	16	22	22	16	19	19
128 QAM	29	29	30	22	22	22	22	16	21	21	16	18	18
256 QAM	29	29	29	22	22	22	22	16	21	21	16	18	18
512 QAM	29	29	29	21	21	21	21	16	20	20	16	17	17
1024 QAM	28	28	28	21	21	21	21	16	20	20	16	17	17
ATPC Range	5÷32	5÷32	5÷34	0÷26	0÷26	0÷26	0÷26	-15÷16	0÷25	0÷25	-15÷16	0÷23	0÷23
								UNLICENSED			UNLICENSED		

[‡] @ Antenna port

Frequency Bands, Modulations & Capacity

Frequency Bands	Licensed	6L/U, 7, 8, 10.5, 11, 13, 15, 18, 23, 32, 38 GHz
	Unlicensed	17, 24 GHz
Modulations	Manual Mode	4, 16, 32, 64, 128, 256, 512, 1024 QAM
	Adaptive Mode	4, 16, 64, 256, 1024 QAM
Channel Bandwidths [‡]	ETSI/FCC	7, 14, 28, 40, 56, 60 MHz 10, 20, 30, 40, 50, 60 MHz
Capacity	L1 Gross bit rate	Up to 590 Mbps in (1+0) & up to 1.2 Gbps in (2+0)

[‡] Channels available depending on the ETSI/FCC Standard

Ports & Connectors

Data & Management	1 PoE RJ45 GE, 1 SFP GE
ODU-ODU Connection	1 RJ45
Direct Power Feed	-48 V DC Bipolar
RSSI	Jack
Antenna Port	Standard IEC rectangular/square waveguide
Antenna Mounting	Integrated proprietary mount from 0.3 to 1.8 m Non-Integrated via flexi/elliptical/rectangular waveguide

RF Specifications

Transmitter/Receiver source	Synthesized
Frequency Stability	± 5 ppm
Transmitter Mute	<-50 dBm
Synthesizer Resolution	0.05/0.25 MHz
XPD Improvement	20 dB
RX Max Input Level	-10 dBm
Residual (Background) Bit Error Rate	< 10 ⁻¹²
RSSI Accuracy	± 3 dB

[‡] Depending on ETSI/FCC Standard

Standard Compliance

EMI/EMC	ENI 301 489-1 and ENI 301 489-4, EN 300 330, EN 303 413
Operation	EN 300 019-2-4, Class 4.1
Transportation/Storage	EN 300 019-1-2, Class 2.3 / EN 300 019-1-1, Class 1.2
Safety	EN 60950-1, EN 60950-22, EN 50385
RF Performances	EN 302 217-2, EN 300 440
Protection Degree	IP65, EN 60529
Lightning Protection	Surge 4 kV – 10/700 µs ITU-T k.45 for Ethernet Port
RoHS	According to 2002/65/EU

Electrical & Mechanical

Power Consumption (Max/Typical-SP/HP)	45/40-65/60 W
Size	6-8 GHz 225 x 230 x 115 mm ³ , 10.5-38 GHz 225 x 210 x 100 mm ³
Weight [‡]	4.9÷5.8 kg

[‡] Weight depends on Frequency Band

Environmental

Operating Temperature (Still Air)	Guaranteed	-33÷ +55 °C
	Extended	-50÷ +55 °C
Humidity		100%
Altitude		5000 m

Contacts

Web: www.youngta.com
 Mail: contact@youngta.com
 Phone: +39 395973710

Office

Centro Direzionale Colleoni
 Via Paracelso 20
 Palazzo Andromeda
 20864 Agrate brianza (MB)
 Italy

