

Unique Microwave links

80 GHz

RAY

RAY3-80 is a member of high-speed p-t-p microwave link platform for the most challenging conditions. The design is based on a concept proven for a long time in the 10, 17, 18 and 24 GHz bands, but there is a substantial increase of speed from 1 Gb/s to 10 Gb/s.



Market leader

- Solar ready 35 – 45 W
- Compact size, Light weight 2.8 kg
- 1× ETH, 1× SFP+, PoE, DC
- Wifi management, Mobile App

Performance

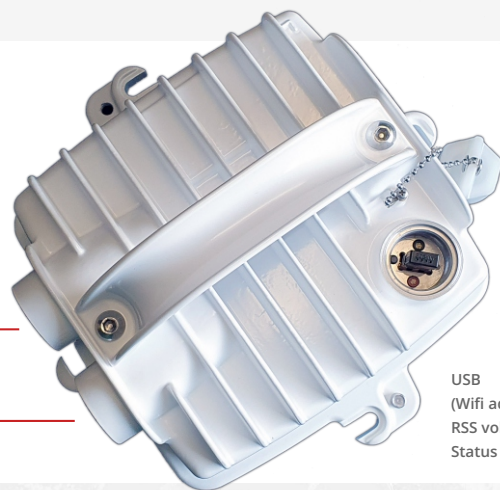
- 10 Gb/s FDD
- 62 MHz – 2 GHz channels
- 2PSK – 128QAM
- -6 to +20 dBm

Spectral efficiency

- Flexible duplex spacing
- Many channel options
- Built-in spectrum analyzer
- Optimal bandwidth usage

Reliability

- Robust HW and FW, MTBF > 100 years
- High sensitivity, Hitless ACMB and ATPC
- Surge immunity 4 kV, ESD 8 kV
- Each unit tested in climatic chamber



Ethernet 1 / RJ45
+ PoE or DC power

Ethernet 2 / SFP+

USB
(Wifi adapter plugged)
RSS voltage
Status LED

Technical parameters

Radio parameters		Ray3-80	
Frequency range	71 – 86 GHz (E-band)		
	Lower (unit L) 71.000 – 76.000 GHz	Upper (unit U) 81.000 – 86.000 GHz	
Type of duplex traffic	FDD (Frequency division duplex)		
Speed (each direction)	up to 10 Gb/s		
Channel bandwidth	250, 500, 750, 1000, 1250, 1500, 1750, 2000 MHz (62.5 and 125 MHz only available for ACMB)		
Duplex spacing	flexible; typ 10 GHz, min 5 GHz, max 15 GHz		
Modulations	2PSK, 4PSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM		
ACMB	Hitless - including bandwidth reduction to 1/2 or 1/4 and stronger FEC		
FEC	LDPC		
Sensitivity, BER 10 ⁻⁶	-82 dBm (25 Mb/s) -72 dBm (200 Mb/s)	-65 dBm (1 Gb/s) -56 dBm (4 Gb/s)	-50 dBm (7 Gb/s) -43.5 dBm (10 Gb/s)
RF Output power	-6 to +20 dBm (+17 dBm @ 32QAM; +16 dBm @ 64QAM; +14 dBm @ 128QAM)		
ATPC	Yes (range 26 dB)		
Range with different antennas			
Speed	1 Gb/s	4 Gb/s	10 Gb/s
Availability	99.95% / 99.99%	99.95% / 99.99%	99.95% / 99.99%
Antenna 20 cm (41 dBi)	4.2 km / 2.1 km	2.8 km / 1.5 km	0.9 km / 0.5 km
Antenna 38 - 40 cm (47 dBi)	6.6 km / 3.3 km	4.7 km / 2.4 km	2.0 km / 1.1 km
Antenna 65 - 68 cm (51 dBi)	8.5 km / 4.3 km	6.4 km / 3.2 km	3.0 km / 1.6 km
Ethernet (user data & management)			
RJ45	1 Gb Eth. 10/100/1000BASE-T Auto MDI/MDIX (recommended cable S/FTP Cat.6, Cat.7)		
SFP (user exchangeable)	10 Gb Eth. SFP+ slot for 1000/2500/5000/10000 BASE-T; 1000/10000 BASE-SX; 1000/10000 BASE-LX (power max. 3 W)		
Throughput L1 (RFC 2544)	10000 Mb/s (64-128 B frames); 9512 Mb/s (1518 B frames)		
Latency L1 @ 10 Gb/s (RFC 2544, one way)	12.9 µs (64 B frames); 23.5 µs (1518 B frames)		
MTU (max packet length)	10240 Bytes		
Synchronization	Synchronous Ethernet*; PTP (IEEE-1588v2 transparent clock)		
Electrical			
Primary power	PoE active IEEE 802.3bt (POE++); PoE passive 37– 60 VDC; DC 37 – 60 VDC; floating		
Power consumption (typ.)	35 W @ channel ≤ 500 MHz; 37 W @ 1000 MHz; 42 W @ 2000 MHz; max 45 W (with SFP+)		
System interfaces			
USB	USB 2.0, Host A; USB / WiFi; USB / ETH		
RSS voltage	Two contact sockets		
Indication LED	System status (multicolor)		
System button	Default settings, Configuration restore from internal backup		
Environmental			
Ingress Protection	IP66		
MTBF (Mean Time Between Failure)	> 1 000 000 hours (> 114 years) projected		
Operating temperature	- 30 to + 55°C (ETSI EN 300019-1-4, class 4.1.)		
Operating humidity	5 to 95% non-condensing		
Surge immunity	4 kV (EN 61000-4-5)		
ESD resistance	8 kV (EN 61000-4-2)		
Mechanical			
Design & Mounting	FOD (Full Outdoor), direct mounting to antenna		
Unit types	Specific units for Lower (L) and Upper (U) part of the band		
Casing	Rugged die-cast aluminium		
Size	H×W×D: 160×245×245 mm (6.3×9.6×9.6 in)		
Weight	2.8 kg (6.1 lbs)		
Diagnostics & Monitoring			
Real time monitoring	RSS, MSE, BER		
Diagnostic tools	Spectrum analyzer*, Pinger		
History charts	Temperature, Power voltage, RSS, MSE, BER, Data rate, RF Output power		
Statistics	RMON counters for all interfaces*		
Antenna alignment	RSS voltage, Smartphone app (RayTools), Web		
SNMP	SNMP v2c including configurable TRAPs*		
Security			
Management	Web (HTTP, HTTPS), CLI (SSH, Telnet), Smartphone app (RayTools)		
Access accounts	3 levels (Guest, Admin, Super)		
WiFi	Passphrase; HW/SW enable/disable; active only during air-link loss		
Standards			
Approvals	CE (RED), FCC*, IC*		

* Pending

