

RAy3 - Microwave Link



- **1 Gbps, 24 GHz**
- **3.5 – 112 MHz channels**
- **Asymmetric channels**
- **AES 256, Sync Eth, PTP**
- **1x ETH, 1x SFP, 1x USB**
- **Solar ready - 22W**
- **Each unit tested -30 to +55°C**
- **Full outdoor, easy installation**
- **Interference & obstacles tolerant**
- **Wifi management**

PRODUCT APPLICATION:

RAy3 is a high-speed point-to-point microwave link, ideal for establishing robust links in the most challenging conditions.

This Full Outdoor Software Defined Radio with Linux OS, is designed for high performance links with maximum reliability, exceptional system gain and resistance to disturbances. All relevant state-of-the-art concepts have been carefully implemented without compromise.

RAy3 is well proven within the market since 2009 in thousands of installations in tens of countries from the poles to the equator.

Product Specification



RAy3 Technical Parameters

| Radio Parameters | | | |
|----------------------------------|--|--------------------|---------------------|
| Frequency range | 24.00 – 24.25 GHz | | |
| Channel Spacing | 3.5, 5, 7, 10, 14, 20, 28, 40, 56, 80, 100, 112 MHz | | |
| Channel duplex spacing | Flexible, min.18 MHz between channel edges | | |
| Gross data rate | 2.7 – 1002 Mbps | | |
| FEC (Forward Error Correction) | LDPC, RS | | |
| Modulation / Speed / Sensitivity | 3.5 MHz | 56 MHz | 112 MHz |
| QPSK_S | 3 Mbps / -99 dBm | 48 Mbps / -88 dBm | 97 Mbps / -85 dBm |
| QPSK | 5 Mbps / -95 dBm | 81 Mbps / -85 dBm | 161 Mbps / -82 dBm |
| 16 QAM | 10 Mbps / -89 dBm | 168 Mbps / -78 dBm | 334 Mbps / -75 dBm |
| 32 QAM | 11 Mbps / -85 dBm | 213 Mbps / -74 dBm | 426 Mbps / -71 dBm |
| 64 QAM | 15 Mbps / -82 dBm | 267 Mbps / -71 dBm | 536 Mbps / -68 dBm |
| 128 QAM | 17 Mbps / -79 dBm | 319 Mbps / -68 dBm | 636 Mbps / -65 dBm |
| 256 QAM | 19 Mbps / -76 dBm | 366 Mbps / -65 dBm | 730 Mbps / -62 dBm |
| 512 QAM | 22 Mbps / -73 dBm | 413 Mbps / -62 dBm | 823 Mbps / -59 dBm |
| 1024 QAM | 23 Mbps / -70 dBm | 459 Mbps / -59 dBm | 918 Mbps / -56 dBm |
| 2048 QAM (7-112 MHz) | - | 501 Mbps / -56 dBm | 1002 Mbps / -53 dBm |
| 4096 QAM (14-56 MHz) | - | 540 Mbps / -53 dBm | - |
| ACM | Hitless | | |
| RF Output Power | -30 to +10 dBm | | |
| ATPC | Yes | | |
| MTU | 10240 B | | |
| Latency (RFC 2544) | 268 μ s (64B/366 Mbps); 313 μ s (1518 B/366 Mbps) 173 μ s (64B/1002 Mbps); 198 μ s (1518 B/1002 Mbps) | | |
| Synchronization | Synchronous Ethernet; 1588v2 transparent clock | | |
| Electrical | | | |
| Primary power | PoE active 37 – 60 VDC, IEEE 802.3at; PoE passive 20 – 60 VDC; DC 20 – 60 VDC; floating | | |
| Power Consumption | typ. 22.5 W (w/o SFP) | | |
| Interfaces | | | |
| Ethernet | 1× 10/100/1000 Base-T Auto MDI/MDIX / RJ45 | | |
| SFP | 1× 10/100/1000 Base-T/1000Base-SX/1000Base-LX (power max. 1.25 W) | | |
| USB | USB 2.0 / Host A | | |
| RSS voltage | Two contact sockets | | |
| Indication LED | SYS | | |
| Environmental | | | |
| IP Code (Ingress Protection) | IP66 | | |
| MTBF (Mean Time Between Failure) | > 750.000 hours (> 85 years) | | |

Product Specification

| | |
|-----------------------|---|
| 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 acc. EN 61000-4-5 |
| ESD resistance | 8 kV acc. EN 61000-4-2 |

Mechanical

| | |
|----------|---|
| Casing | Rugged die-cast aluminium |
| Size | 160 H x 245 W x 245 D mm (6.3 x 9.6 x 9.6 in) |
| Weight | 2.6 kg (5.7 lbs) |
| Mounting | FOD, direct mounting to antenna |

Diagnostic

| | |
|----------------------|---|
| Real time monitoring | RSS, MSE, BER |
| Diagnostic tools | Spectrum analyzer, Pinger, Constellation diagram |
| History charts | Temperature, Power voltage, RSS, MSE, BER, Data rate, RF Output power |
| Statistics | RMON counters for all interfaces |
| Antenna alignment | RSS voltage, RAY Tools, web |
| SNMP | v2c including configurable TRAPs |

Security

| | |
|-----------------|--|
| Management | HTTP, HTTPS, SSH, Telnet, RAYTools App |
| Access Accounts | 3 levels (Guest, Admin, Super) |
| Encryption | AES256, 192, 128 |

Standards

| | |
|------------------|--|
| CE, FCC, RoHS | |
| Radio parameters | ETSI EN 300 440 V 2.1.1 ETSI EN 302 217-2 V 3.1.1 |
| EMC | ETSI EN 301 489-1 V1.9.2 ETSI EN 301 489-4 V2.2.1 |
| Safety | EN 62368-1:2014 |
| FCC | CFR 47 part 15 |

| | RAY3 |
|---------------------|-------------------------------|
| Max. Speed | 1 Gbps 2048 QAM 112 MHz |
| Speed / 56MHz | 540 Mbps 4096 QAM |
| Bands | 24 GHz |
| Asymmetric channels | Yes |
| Channel size | 3.5-112 MHz |
| Modulations | QPSK 16 - 4096 QAM |
| AES 256 | Yes |
| Sync Eth, PTP | Yes |
| ESD | 8 kV |
| Surge immunity | 4 kV |

