

Unikátní mikrovlnné spoje 80 GHz

RAY

RAY3-80 je dalším členem rodiny vysokorychlostních mikrovlnných p-t-p spojů pro nejnáročnější podmínky. Design vychází z koncepce dlouhodobě ověřené v pásmech 10, 17, 18 a 24 GHz, dochází však k podstatnému navýšení rychlosti z 1 Gb/s na 10 Gb/s.



Přednosti

- Minimální spotřeba 35 – 45W
- Kompaktní rozměry, hmotnost 2,8 kg
- 1× ETH, 1× SFP+, PoE, DC
- Wifi management, mobilní aplikace

Parametry

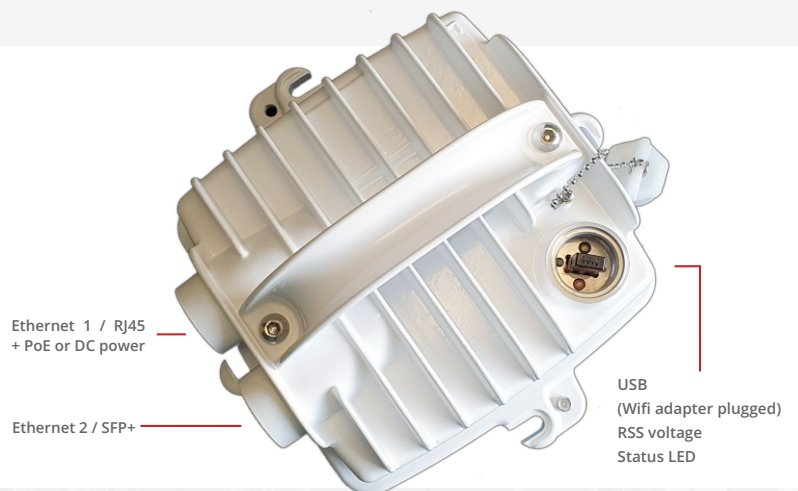
- 10 Gb/s FDD
- 250 MHz – 2 GHz kanály
- 2PSK – 128QAM
- -6 až +20 dBm

Využití spektra

- Flexibilní duplexní odstup
- Úzké kanály
- Vestavěný analyzátor spektra
- Optimální využití pásma

Spolehlivost

- Robustní HW a FW
- Vysoká citlivost, Hitless ACMB a ATPC
- Ochrana proti přepětí 4 kV, ESD 8 kV
- Každá jednotka testována v klimatické komoře



Technické parametry

| | | | |
|--|---|---------------------------------------|---|
| 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

