# *cn*Reach™ N500 220 MHz Radio

For outdoor critical infrastructure operations, *cn*Reach transports process monitoring and control data from the remote sensor back to the operations center supporting real-time automated decision making and on-going analytics. Covering large geographic areas, hard to reach terrain and challenging spectrum environments, *cn*Reach delivers reliable, secure connectivity to the petrochemical, electric utility, water/wastewater/stormwater and transportation industries. *cn*Reach eases the migration to modern networks by combining legacy serial and analog/digital I/O with TCP/IP and Ethernet connectivity.


*cnReach N500 220 MHz Radio*

Fully integrated into a 'single pane-of-glass' management platform (*cn*Maestro™) *cn*Reach helps bridge the IT/OT sides of complex organizations. Combining *cn*Reach's licensed and unlicensed narrow-band radios with Cambium Networks' broadband technologies, industrial organizations are delivering end-to-end Industrial Internet of Things solutions today.

- Licensed 220 MHz (217 - 222 MHz / FCC Part 80 and Part 90)
- Up to 5W transmit (37 dBm); (limited to 2W in 217 to 220 MHz per FCC)
- Point-to-point, Point-to-multipoint and Relay configurations in same hardware
- Secure communications with AES 128/256-bit encryption and password authentication
- Highly reliable communications with access point synchronization and adaptive modulation
- Single and dual radio configurations for advanced back-to-back relay topologies.
- Extensive I/O capabilities easing the transition from serial to all-IP networks with multiple serial ports, Ethernet ports and analog/digital I/O built-in.
- Sophisticated network planning with LINKPlanner, a no-charge planning tool enabling network designers to predict both capacity and availability of networks crossing all of Cambium's technologies.
- Supported by cnMaestro software for monitoring the status of entire networks carrying traffic across sensors

| PRODUCT | PRODUCT DESCRIPTION | MODEL NUMBERS (only available in U.S.) |
|---|---|---|
| | N500 220 MHz Single | NB-N500210A-US |
| | N500 220 MHz Single with IO | NB-N500211A-US |
| | N500 220 MHz Dual | NB-N500220A-US |
| | N500 220 MHz Dual with IO | NB-N500221A-US |
| | N500 IO Expander | NB-N500001A-US |
| **DEPLOYMENT TOPOLOGIES** | | |
| | Point to Point (PTP) | |
| | Point to Multipoint (PMP) | |
| | Back to Back Repeater (BTB) - Dual Radio | |
| | Stand-alone IO Expander | |

# Specifications



## RADIO PERFORMANCE

| | |
|---|---|
| Frequency Range | 217 - 222 MHz (FCC Part 90: 217-220 Mhz; FCC Part 90: 220-222 MHz; FCC Part 80: 217-218 and 219-220 MHz) |
| Output Power | Up to 5W (37 dBm); FCC Part 90: 217-220 MHz = 2W; FCC Part 90: 220-222 MHz up to 5W depending on channel size; FCC Part 80: 2W |
| Step Size | 10 mW starting at 100 mW |
| Modulations | MSK / QPSK / 8PSK / 16QAM / 32QAM |
| Capacity* | 7.4 kbps to 689 kbps UDP throughput (see tables below) |
| Channel Bandwidths | 12.5 / 15 / 25 / 50 / 100 kHz (available regulations and license permitting) |
| Range | Up to 70 miles |

| RECEIVE SENSITIVITY FCC PART 90 217 to 220 MHz | 12.5 kHz CHANNEL | | 25 kHz CHANNEL | | 50 kHz CHANNEL | |
|---|---|---|---|---|---|---|
| | Rx Sensitivity (dBm) | Capacity (kbps) | Rx Sensitivity (dBm) | Capacity (kbps) | Rx Sensitivity (dBm) | Capacity (kbps) |
| MSK- 2W | -117 | 7.4 | -115 | 14 | -108 | 24 |
| QPSK - 5W | -112 | 13 | -111 | 22 | -108 | 49 |
| 8PSK - 5W | -106 | 19 | -105 | 24 | -101 | 73 |
| 16QAM - 5W | -103 | 24 | -101 | 24 | -98 | 97 |
| 32QAM - 5W | -100 | 24 | -97 | 49 | -94 | 97 |

| RECEIVE SENSITIVITY FCC Part 90 220 - 222 MHz | 15 kHz CHANNEL | | 50 kHz CHANNEL | |
|---|---|---|---|---|
| | Rx Sensitivity (dBm) | Capacity (kbps) | Rx Sensitivity (dBm) | Capacity (kbps) |
| MSK - 2W | -116 | 7 | -107 | 24 |
| QPSK - 5W | -104 | 13 | -104 | 49 |
| 8PSK - 5W | -98 | 19 | -98 | 73 |
| 16QAM - 5W | -95 | 24 | -92 | 97 |
| 32QAM - 5W | -91 | 24 | -89 | 97 |

| RECEIVE SENSITIVITY FCC Part 80 217-218 219-220 MHz | 100 kHZ CHANNEL | |
|---|---|---|
| | Rx Sensitivity (dBm) | Capacity (kbps) |
| MSK - 2W | -106 | 49 |
| QPSK - 2W | -106 | 97 |
| 8PSK - 2W | -95 | 146 |
| 16QAM - 2W | -96 | 295 |
| 32QAM - 2W | -91 | 361 |

## DATA CAPABILITIES

| | |
|---|---|
| Packet handling | Layer 2 bridge |
| | Layer 3 static routes |
| | VLAN support |
| Error Correction | Up to 32-bit CRC, Retransmit on error |
| Data Encryption | 128/256-bit AES |
| I/O and Serial Data Access | Optional I/O allows seamless integration of Modbus RTU and Modbus TCP protocols |

* Capacity values are provided in usable UDP throughput which are typically 60% of the over-the-air rate.

# Specifications



| | |
|---|---|
| **MANAGEMENT** | Web-based Interface via HTTP/HTTPS |
| | LINKPlanner integration (capacity and availability planning) |
| | Remote Management via SNMP |
| | *cn*Maestro integration (roadmap) |
| | Support for configuration files, remote software upgrades |
| | Built-in diagnostic tools via web interface such as RF Ping and RF Throughput |

| | | | |
|---|---|---|---|
| **INTERFACES** | | | |
| Ethernet Interfaces | 2 x RJ-45 | | |
| | 10/100BaseT, Full Duplex, rate auto negotiated (802.3 compliant) | | |
| Serial Interfaces | 2 x RJ-45 | | |
| | RS-232/422/485, up to 230.4 kbps | | |
| Analog/Digital I/O (optional) | 8 pins for analog input/output and digital input/output | | |
| RF / Antenna | TNC RF connectors (1 or 2 depending on single or dual-radio configuration) | | |
| **POWER** | | | |
| Input | 10-32VDC with reverse polarity protection | | |
| Power Consumption (12VDC) | 2W Tx Output / Highest Modulation | | |
| | | Active (50% duty cycle) | Idle |
| Single Radio Configuration (mA) | | 523 | 224 |
| IO Expander (mA) | 293 mA | | |
| **PHYSICAL** | | | |
| Dimensions | 6.625" x 3.45" x 1.835" (168 mm x 876 mm x 466 mm) | | |
| Weight | Single Radio Configuration | | 1.54 lbs. (0.70 kg) |
| | Dual Radio Configuration | | 1.61 lbs. (0.73 kg) |
| DIN Rail Mount | optional | | |
| **ENVIRONMENTAL** | | | |
| Operating Temperature | -40C to +60C | | |
| Humidity | 95% operating humidity @ 40C non-condensing | | |
| HAZLOC | UL-Approved to Class 1 / Div 2 | | |
| **REGULATORY** | | | |
| UL | Approved | | |
| FCC ID | Z8H89FT0040 | | |