*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.

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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		