# *FREE*way

## License-free 5.3/5.8 GHz Point-to-point DS3/Ethernet Microwave Radio

### Reduce operating capital expenses with cost-effective, license-free radios

*FREE*way is a fully hardened, self-contained point-to-point microwave radio. The architecture is designed for either indoor or outdoor use, and is a carrier-class design supporting 99.999% availability. *FREE*way's TDM and packet based feature set combined with a robust resistance to RF interference make it an ideal solution for cellular/PCS.

Two configurations are available, each for operation in either the 5.3GHz UNII or 5.8GHz ISM bands. A dual DS3/Ethernet configuration supports both a full duplex 45 Mbps DS3 channel and a 1 Mbps Ethernet wayside channel. An Ethernet-only configuration supports 45 Mbps of full duplex transmission.

Unlike competitive solutions that require 50 Mhz of spectrum and only support a single sub-band for each radio path, *FREE*way utilizes very narrow 16 MHz RF channel bandwidth. When combined with Frequency Division Duplex (FDD) operation and very low latency, these advanced technical design attributes make *FREE*way extremely resistant to RF interference. Installations in even harsh, dense urban environments are feasible.

*FREE*way uses an external antenna connection, and supports applications up to 40 miles.

Maintaining Carrier Access' product design focus on advanced remote control and diagnostics, *FREE*way supports SNMP, Telnet, or web browser based management connectivity. Remote configuration and diagnostics is supported including built-in utilities for bit error rate testing (BERT) and loopbacks for both network and RF interfaces.

With carrier-class design and performance, Carrier Access' *FREE*way family of radios is the ideal high-capacity solution for mobile wireless service providers, wireless ISPs, carriers, and private enterprises that are looking to upgrade and expand their networks.

### What makes *FREE*way different?

- License free operation eliminates cost and complexity of alternative wireline or licensed microwave solutions
- Flexible design supports both TDM and packet based networking
- Advanced RF transmission design makes deployment feasible in dense urban environments
- Extremely price competitive compared to other industry solutions

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## Key Features:

- License-free operation in the 5.8 GHz ISM band or 5.3 GHz UNII band
- DS3/Ethernet or Ethernet-only configuration
- Advanced design is extremely resistant to interference
  - Remote, software controlled dual sub-band frequency peration
  - Very narrow RF channel bandwidth (16 MHz)
- Environmentally hardened single unit design for indoor or outdoor installation
- External antenna
- SNMP, Telnet, and web browser management
- Integrated, remote controlled path diagnostics and troubleshooting utilities

## Technical Specifications for the *FREE*way License-free 5.3/5.8 GHz Point-to-point DS3/Ethernet Microwave Radio

### General:
- Frequency bands
  - UNII: 5.250–5.350 GHz per FCC CFR47, Part 15.407
  - ISM: 5.725–5.825 GHz per FCC CFR47, Part 15.247
- Capacity options:
  - 1 x DS3 payload and 2 x 10/100Base-T Ethernet (switched) or 2 x 10/100Base-T Ethernet payload (switched)
- Channel Bandwidth:  16 MHz

### DS3/Ethernet Version:
- Type:  1 DS3 per GR-499-CORE and 2 x Ethernet per IEEE 802.3
- Over-the-air DS3 Channel Data Rate:  44.736 Mbps full duplex
- Wayside Ethernet Channel Data Rate:  1 Mbps, full duplex
- DS3 Line Code:
  - B3ZS, framed and clear channel applications supported
- DS3 Interface:  75 ohms unbalanced
- Ethernet Interfaces:
  - 2 x 10/100 auto-negotiate, switched

### Ethernet-only Version:
- Ethernet interfaces:  2 x 10/100 auto-negotiate, switched
- Over-the-air Data Rate:  45 Mbps full duplex

### Transmitter:
- Output Power (adjustable):  16 dBm (maximum)
- Automatic Transmit Power Control (ATPC):  User selectable
- Transmit attenuation:  1 - 30 dB adjustable below maximum power
- Frequency stability:  ± 5 ppm
- Modulation:  16 QAM

### Receiver:
- Type:  Double heterodyne
- Sensitivity:  BER $10^{-6}$, -78 dBm or better, including Forward Error Correction (FEC)
- Maximum RF Input Level:  -35 dBm
- Unfaded BER     Typically better than BER $10^{-12}$
- Frequency Stability:  +/-5 ppm
- Adjacent Channel Rejection:  Greater than or equal to 40 dB (RF bandwidth of less than or equal to 16 MHz)

### Network Management:
- SNMP:  MIB-II support and private *FREE*way functions
- Craft Interface:  RS-232 Command Line Interface (CLI)
- Integrated HTTP server and web browser user interface

### Status Indicators/Diagnostics:
- External LED indicators:
  - Power/local alarm, RF link, DS3 input, Ethernet connectivity
- Alarms:
  - DS3 LOS, AIS, radio TX, radio RX, BER threshold
- Status:
  - NMS IP addresses, BER, TX power, receive signal level, loopback test status, DS3 input, Ethernet input
- Configuration Commands:
  - NMS IP address, TX power, TX mute, Automatic Transmit Power Control (ATPC), frequency, RSL, BER alarm, loopback tests, BER tests
- Diagnostic testing features:  Bit Error Rate (BER) and local/remote/RF loopback
- Performance monitoring:  Receive Signal Strength Indicator (RSSI) connector and spectrum analyzer mode for interference coordination

### Power:
- Input Voltage Range:  ±21 to 60 VDC (100 - 240 VAC with external power supply)
- Power Consumption:  30 watts maximum

### Physical:
- Dimensions:
  - 12 in (H) x 12 in (W) x 4 in (D)
  - 30.5 cm (H) x 30.5 cm (W) x 10.2 cm (D)
- Weight:  11 lbs (5 kg)

### Environmental:
- Operating Temperature:  14 °F to 149 °F (-33 °C to 60 °C)
- Altitude:  15,000 feet (4,500 meters)
- Relative humidity:  Outdoor, all-weather enclosure

### FCC Information (US only):
- 5.3 Ghz (low band):  OEWCX-DS3-53G
  - Certification: FCC Part 15.407,  Subpart E (UNII certification)
- 5.8 GHz (high band):  OEWCX-DS3-58G
  - Certification:  FCC Part 15.247,  Subpart C (ISM certification)

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