# Operational Description

The outdoor system (OS), shown in Figures 1-1 through 1-4, is a three-way system operating in a 60MHz transmit frequency band from 1930 to 1990MHz with an instantaneous bandwidth of any 60MHz within the operating transmit band and an uplink frequency range of 1850 to 1910 MHz.
The OS has a sturdy aluminum IP55 rated cabinet with front and rear locking hinged doors equipped with Intrusion alarms. The door latches are 1/4 turn and require a 10 mm hex socket wrench or nut driver to open and close. The doors can be secured with a padlock with a 1/2 inch maximum shank diameter. The front and rear doors contain removable, washable air filters.
Bolt inserts located on the cabinet side and bottom panels are for mounting the OS to a secure fixed location. RF connections are located on the interface bulkhead plate at the bottom rear of the cabinet. External power, communications, and alarm cables are routed through access holes located adjacent to the bulkhead. Cabinet ground is also located next to the interface bulkhead.
The OS system provides three forms of alarm reporting; Form-C contact closure, ethernet (web page), and wireless modem.

Major features of the OS cabinet include the following:

## MCPA

The MCPA module, shown in Figure 1-5, is a 1900 MHz RF amplifier. The MCPAs operational features include a front panel RF OFF/ON/RESET switch and a multicolored LED indicator to display system status. MCPA faults are reported via the status alarm web page.

## RF Conditioning Unit (RFCU)

The RF Conditioning Unit (RFCU) shown in Figure 1-6 combines up to four separate BTS feeds; two duplexed and two simplexed. The RFCU combines, attenuates, and conditions the RF signals. If a critical system failure occurs, the RFCU places the system into bypass mode. The RFCU has two Low Noise Amplifier Units with adjustable gain, each located between the output and input duplexer on the RX path and the diversity RX path.

Performance of the RFCU is monitored and reported via the Ethernet web pages. Faults from the RFCU are mapped to Form-C and optional wireless modem alarms.

- ✈ Up to three MCPAs. (one per sector, up to 160W)
- ✈ Three RF Conditioning Units (RFCU).
- ✈ One Control Module
- ✈ One power system containing up to four rectifier modules.
- ✈ Two variable-speed fan assemblies, front and rear doors.

## Controller Module

The Controller Module shown in Fig. 1-7 provides control and monitoring of the OS operation through two Ethernet ports, Form-C alarms, external alarm inputs and LED status indicators. Status and configuration details are available through Ethernet web pages.

## Power System

The power system shown in Figure 1-8, contains up to four +28.5 VDC plug-in 1300 watt rectifier modules. The rectifier modules convert the system AC input power to supply +28.5 VDC to each MCPA and the Controller Module. Performance of the power system is monitored and reported via the Ethernet web pages. Power system faults are mapped to Form-C and optional wireless modem alarms

## TMA Supply

The two Rx channels per sector provide DC power via Bias-Ts to external Tower Mounted Amplifier (TMA) modules. Each channel is programmable via the Ethernet web pages. The Control Module monitors and reports DC current. Loss of current or excessive current generates a fault and disables the channel. All fault modes are continuously monitored for fault auto recovery. TMA power is provided independent of the bypass status.

## Fans

The system is cooled by two variable speed DC fans, located on the front and rear doors, providing air flow through the booster cabinet. The fans draw ambient air through a filter mounted in the front panel vents and send heated air out the filter mounted in the rear panel. The variable speed fans are dependant on the MCPA, power system, Controller Module temperature sensors, and door intrusion status. Fan operation is disabled when any door opens. Pulling out the door intrusion switch plunger emulates a door closure and activates the fan operation. The variable speed fans maintain adequate cooling by operating at the slowest possible speed. All temperature sensors are monitored by the Control Module and the hottest device controls the fan speed. Fan speed increases or decreases by one step per one minute.

## Ethernet Web Pages

The Ethernet web pages are accessible via the front panel Ethernet port on the Controller Module. Use a web browser to view the following pages:

## Form-C Alarms

The Form-C method includes four alarm levels detailing alarm severity as follows:

- Status/Static - Displays current firmware and user controllable configurations.
- Status/Dynamic - Displays the operator performance of the system in real time.
- Status/Alarm - Displays the status of all the individual alarm parameters.
- User - Displays Unique I.D. about this system and password entries.
- System/Configuration - Displays and allows modification to system configurations.
- System/Download - Firmware related interface.
- Minor - System requires maintenance.
- Major - System operating but not at optimum performance.
- Critical (one per sector, three total)- System disabled and bypass active due to a loss of Tx or Rx.