

## RF Monitoring Products

### 8450 SERIES CELLGUARD™ POWER / VSWR MONITORS

- Precision Power and VSWR Measurements via Integral High Directivity Coupler (35 dB typical) and Imbedded Microprocessor.
- True RMS Power Measurement over a 30 dB Dynamic Range – up to 600 watts average power with multiple frequencies.
- Prime System Power Measurement with the Accuracy and Linearity needed for Precise System Setup.
- TTL Alarms for High VSWR and Low Power (CCH channel monitor) with an Integral Form-C Relay VSWR Alarm.
- Continuous VSWR Measurements for Tracking Antenna Performance and Predicting Failures.
- Remote and Local Operation of Single and Multiple Units over the RS485 Bus – Access to all Functions and Controls with Ability to Log Power, VSWR, Alarm Status, and Temperature.
- System-Transparent with Extremely Low Residual Insertion Loss and VSWR. Extremely Low Intermodulation Products and Harmonic Generation.



#### DESCRIPTION

The Narda CellGuard family of Power/VSWR Monitors can be readily employed to monitor transmitter antennas in cellular, ESMR, SMR and Paging Applications.

#### TRANSMITTER POWER/VSWR MONITORS

Narda CellGuards are precise in-line instruments which continuously measure forward and reflected power and calculate actual VSWR. They are designed for use in analog and digital systems and employ low-loss, high-directivity couplers in conjunction with high-sensitivity

detectors and built-in microprocessors. An LCD display allows direct viewing of forward power, reflected power, and VSWR. An RS485 bus is provided for remote control and communication.

CellGuard instruments provide state-of-the-art in-line, continuous power and VSWR monitoring. Standard CellGuards are summarized in the following table. Accessories include interconnecting cables and computer/modem interface components. A 115 VAC version is available for portable power meter applications.

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### CellGuard Products

Model No.	Measurement Range	Display / Connectors (Input to Output)
8450	600 milliwatts to 600 watts	LCD / Type "N" M to F
8450MP	200 milliwatts to 200 watts	LCD / Type "N" M to F
8450LP	50 milliwatts to 50 watts	LCD/ Type "N" M to F
8450RD	600 milliwatts to 600 watts	Remote LCD Type "N" M to F
8430AC	600 milliwatts to 600 watts	Portable Model with AC adapter

### Accessories

Models No.	Description
8450ACC-6	6' Supply/Communication Cable - DB-15M and 15 wires
8450ACC-485	RS232 to RS485 Converter with CELLPRO software
8450ACC-5	5' Extension cable for RD Models
8450ACC-10	10' Extension cable for RD Models
8450ACC-15	15' Extension cable for RD Models

### STANDARD MODELS WITH LCD DISPLAY:

#### 8450/8450MP/8450LP

These three models are full-function units. Each includes all the display, alarm, and communications features of the CellGuard series. They differ only in the measurement range provided of 600 watts, 200 watts and 50 watts full scale, respectively. Complete specifications are contained in the CellGuard Operation & Maintenance Manual for the Model 8450.

### REMOTE DISPLAY MODEL: 8450RD

This model is identical to the 8450 series except that the LCD display and function switch are in a remote unit which can be panel-mounted in the equipment rack. Interface cables are available for mounting the display up to 15' from the power/VSWR measuring unit. Sold separately are cables Model No. 8450ACC-5, -10, and -15 which are the 5, 10, and 15 foot cables used for this purpose. A variety of mounting panels for single and multiple display modules are available.

### FIELD SERVICE MODEL: 8450AC

The accuracy of the CellGuard is now available in a portable model operating from a 115 VAC (60/50 Hz) supply. The 8450AC is a completely portable unit with a sturdy carrying case which holds the CellGuard 8450 with its AC adapter. The adapter comes with 10 feet of power cord and simply plugs into a wall outlet with the banana-style plug inserted into the mating jack on the 8450AC. The 8450AC is ideal for ESMR, SMR, cellular, paging, and field service personnel who need to precisely determine RF

power of complex signals. Also, the 8450AC VSWR alarm is non-latching to provide ease of use.

### MONITORING MULTIPLE ANTENNAS ON THE RS485 BUS

Up to 16 antennas at a single cell site can be monitored on the RS485 bus. Individual monitors are connected to the bus with four wires in a daisy-chain manner: two wires for the RS485 bus and two for the DC/return connections. Each unit on the bus has a unique ID and can be individually polled. The use of the RS485 bus assures precise measurement and control since it is a balanced system that eliminates errors resulting from EMI and other interference. The information retrieved can be displayed on a local PC for subsequent processing or it can be transmitted by modem to a remote location. An RS485 to RS232 converter and modem interface is provided for this purpose. The following information is provided on the bus for each antenna:

- Low Transmit Power Alarm Signal
- VSWR Alarm Signal
- Transmitted Forward Power
- Transmitter Reflected Power
- Transmitter VSWR

### CELLPRO PLUS

CELLPRO Plus software is designed to monitor multiple CellGuards on the single bus and can easily be modified to accommodate more than 16 antennas. It operates in a Windows 3.1 or Windows 95 environment. The software allows for the easy setup of each CellGuard on the bus and the continuous monitoring of each one's

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characteristics. The program is ideal for both local monitoring or remote applications and can accommodate a variety of communications interfaces. It can be installed on either a local PC interfacing with the 8450ACC-485 RS232/485 converter or on a remote PC connected to the converter via modems and a telephone line.

The program can be used to initiate a number of reactions to an alarm condition including automatic calling, paging, or sending faxes to service personnel with the latest logging data. Sample logging data taken in an operating cell site is shown below.

### RELIABILITY AND EMBEDDED SOFTWARE

Narda CellGuard antenna monitoring instruments provide high operational reliability over long time periods and offer simplified field testing. The following features are incorporated into each monitor's embedded software:

A watchdog capability to automatically reset the monitor if a power transient or other event causes its embedded software to begin running in an improper manner.

Self-check at turn-on to test the integrity of the monitor's internal program, RAM and EEPROM whenever power is applied or reapplied. When interrogated over the RS485 bus, the monitor will respond with an acknowledgment. The monitor also has remote reset capability.

The monitor supports the RS485 communications interface including check sum error detection.

Date	Time	ID	F Power	R Power	VSWR	V-ALARM	LP-ALARM	TEMP-F
09/21/94	10:44:30AM	01	69.600	1.226	1.29	OFF	OFF	75.92
09/21/94	10:44:50AM	01	63.700	0.951	1.27	OFF	OFF	75.92
09/21/94	10:45:10AM	01	54.980	0.702	1.24	OFF	OFF	75.92
Date	Time	ID	F Power	R Power	VSWR	V-ALARM	LP-ALARM	TEMP-F
09/21/94	10:45:30AM	01	142.500	1.366	1.21	OFF	OFF	75.92
09/21/94	10:45:50AM	01	47.870	1.078	1.34	OFF	OFF	75.92
09/21/94	10:46:10AM	01	63.600	1.017	1.28	OFF	OFF	76.64
Date	Time	ID	F Power	R Power	VSWR	V-ALARM	LP-ALARM	TEMP-F
09/21/94	10:46:30AM	01	152.700	1.356	1.20	OFF	OFF	76.64
09/21/94	10:46:50AM	01	66.100	1.071	1.28	OFF	OFF	76.64
09/21/94	10:47:10AM	01	48.660	1.097	1.34	OFF	OFF	76.64

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## SPECIFICATIONS

### Cellular, ESMR, SMR, and Paging CellGuard

#### ELECTRICAL

MODEL	8450 / 8450RD*	8450MP	8450LP	8450AC
FREQUENCY RANGE	820-980 MHz			
POWER MEASUREMENT RANGE	0.600 mW to 600 W CW (30 dB)	.200 mW to 200W	0.050 mW to 50 W	0.600 mW to 600 W CW (30dB)
MAX. INPUT POWER (CW)	750W (into 2.0:1 load)			
POWER MEASUREMENT ACCURACY: 23°C 0 TO 50°C	±0.30 dB max. (±0.1 dB typ.) ±0.50 dB max. (±0.3 dB typ.)			
INSERTION LOSS	0.15 dB max. (0.07 dB typ.)			
INSTRUMENT VSWR (INPUT AND OUTPUT)	1.07:1 max. (1.04:1 typ.)			
REFLECTED POWER MEASUREMENT RANGE	1.07 to 3.0:1 VSWR (30 to 6 dBr)			
ALARM THRESHOLD RANGE**	1.20 to 3.0:1 VSWR (20 to 6 dBr)			
COUPLER DIRECTIVITY	30 dB min. (35 dB typ.)			
OUTPUTS PROVIDED VIA "D" CONNECTOR	See Outline			

#### ENVIRONMENTAL

TEMPERATURE RANGE	0 to 50°C
HUMIDITY	0 to 95% RH Non-condensing
ALTITUDE	0 to 10,000 ft.

#### MECHANICAL

DISPLAY	LCD			
RF CONNECTORS*** INPUT OUTPUT	Type "N" Female Type "N" Male			
MULTI-PIN CONNECTOR	15 Pin "D" Miniature Male	15 Pin "D" Miniature Male	15 Pin "D" Miniature Male	(A) 15 Pin D, Male (B) AC/DC Power Jack
SIZE	See Outline			
WEIGHT	2.0 lb (max)			
ACCESSORIES SUPPLIED	Operation Manual	Operation Manual	Operation Manual	Operation Manual AC/DC Adapter Carrying Case

\* CEL8450RD +20 to 28 VDC @ 200 mA

\*\* The reflected power threshold accuracy is mainly limited by the internal coupler's directivity. Narda recommends at least a 10 dB margin between directivity and maximum dBr threshold.

\*\*\* Other connector types: 7/16 Male, 7/16 Female are available upon request.

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## OUTLINE DRAWINGS

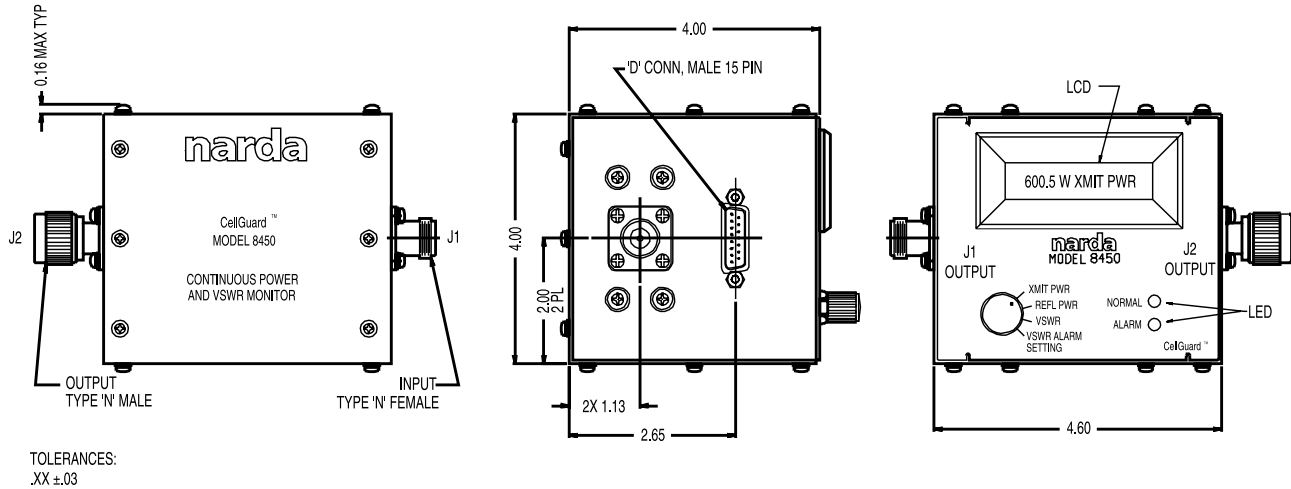
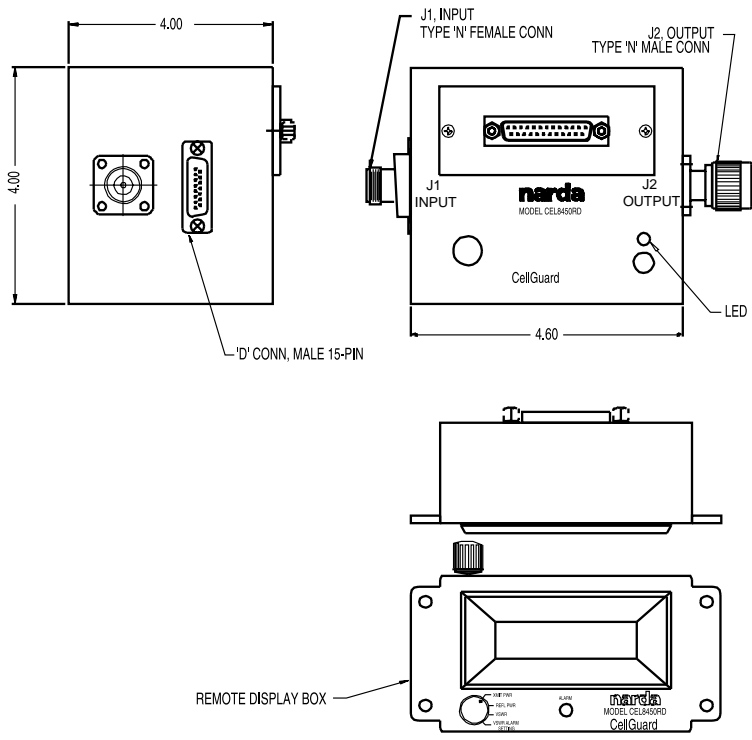
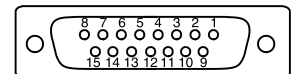


FIGURE 1 - 8450 / 8450AC



PIN NO.	SIGNAL NAME
1	NORMALLY OPEN
2	COMMON
3	ALARM #2*
4	RS485
5	REFLECTED VOLTAGE
6	STROBE* (OPTIONSL)
7	ANALOG GROUND
8	VSWR (OPTIONAL)
9	NORMALLY CLOSED
10	ALARM #1*
11	RS485
12	TRANSMIT VOLTAGE
13	+24 VDC
14	RESET
15	CHASSIS GROUND



NOTES:  
1. N/C DENOTES NO CONNECTION TO ASSEMBLY CONNECTOR PIN  
2. \* DENOTES INVERTED (NOT) SIGNAL

FIGURE 2 - 8450RD