



2200/2240 Path Align-R™

pendulum
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Test Set for Microwave Antenna Alignment

- **Battery-powered antenna alignment trceiver test set (pair)**
- **Continuous voice communication with included headsets**
- **Tuneable operating bands: 1.8 to 19.4 GHz (2200) or 1.8 to 23.5 GHz (2240/2241)**
- **Available with Record-R™ GPS Data Logging (model 2241)**
- **Tone ranging provides variable pitch indication of path loss**
- **Path loss displayed in dB, updated every 300 ms**



The Path Align-R™ test set is a high performance, complete test solution designed to quickly and accurately optimize the transmission path between two microwave antenna sites. The Path Align-R directly drives the site's antennas, allowing the optimization process to be done without the need for on-site radios, complex test equipment, ground technicians, on-site AC power, cell phones, or two-way radios.

Antenna Alignment Test Set

Each Path Align-R is a tuneable, synthesized signal source and a narrow-band receiver. The transmitter's fixed output level (0 dBm) is powerful enough for long path lengths, yet low enough to virtually eliminate the possibility of interference to adjacent links. The receiver's sensitivity and narrow bandwidth allow for accurate measurement of the received signal while providing a very high rejection of adjacent signals. Front panel thumbwheel switches provide tuning within the frequency bands to a resolution of 1 MHz. Both test sets transmit to and receive from one another continuously.

Four Frequency Bands Available

The Path Align-R Model 2200 comes ready to use with four frequency bands. The 2400 extends the ranges of these bands. Models ending in "A" (e.g. 2200A, 2240A, etc.) are custom configured for at least one or more frequency band options. Each

test set of two is delivered in custom designed, weather-resistant instrument backpacks that include pockets for carrying the headset, cable, waveguide-to-coax adapters, and a spare battery. The backpack also contains a large "D" ring to facilitate attaching the test set to the tower using a carabineer and nylon runner, sling or lanyard.

Record-R™ Internal Data Logging (Model 2241)

The results of the antenna path alignment are logged into the internally installed Record-R. The Record-R contains an embedded GPS receiver, which provides accurate date/time and position information to be added to the frequency and path loss data. This logged data is saved in non-volatile memory for later transfer to a PC. A single front panel pushbutton activates the logging process. Up to 250 separate data records can be saved in the field for later download. Access to stored records is provided via USB or RS-232 connectors located on the rear panel. The Log View-R™ software utility is provided for interface between a PC and the instrument.



Transmitter

Transmission:
Full-duplex (simultaneous transmission and reception)

Transmitter Output Power:
0 dBm, nominal

Transmitter Stability:
5.1x10⁻⁹/day (aging) + 1 x 10⁻⁶ (temperature 0°C to 50°C)

Tuneable Frequency Bands Standard Bands 2200/2200A

- Band 1 1.8-2.5 GHz
 - Band 2 5.8-6.6 GHz
 - Band 3 11.0-12.0 GHz
 - Band 4 18.1-19.4 GHz
- Resolution: 1.0 MHz

Extended Bands 2240/2240A/2241/2241A

- Band 1 1.8-2.5 GHz
 - Band 2 3.5-5.0 & 5.8-6.6 GHz
 - Band 3 7.5-10.0 & 11.0-12.0 GHz
 - Band 4 15 & 18.1-19.4 & 22.0-23.5 GHz
- Resolution: 1.0 MHz

Deviation: 50-100 kHz

Transmit/Receive Offset:
39 MHz (Transmit offset: switch to "Master" = +20 MHz; "Slave" = -19 MHz of thumbwheel frequency setting)

Modulation: FM (voice)

Modulation Input/Output:
Headset with 10-foot coiled cord, terminated in a 3.5 mm plug (mic and earpiece)

Receiver

Receiver Sensitivity:
100 dBm nom. (1.8-2.5 GHz); -95 dBm nom. (3.5-6.6 GHz); -90 dBm nom. (7.5-12.0 GHz); -90 dBm nom. (18.1-23.5 GHz)

Receiver Bandwidth:
100 kHz, nom.

Receiver Overload Point:
-30 dBm (damage level: +10 dBm)

Receiver Readout: LCD direct path loss in dB (equivalent to signal input level in dBm), 0.1 dB resolution, updated every 300 ms

External Readout:
External readout of path loss with DVM (0-2 VDC), BNC connector, rear panel

Variable Alignment Tone:
600 Hz to 6 kHz, varies with signal strength, switch selectable

Internal Speaker Output:
350 mW max., variable, behind front panel

Earpiece Output:
250 mW max., variable, 3.5 mm front panel jack

Speaker/Earpiece Control:
Variable

Record-R™

(Models 2241/2241A)
Data Recorded: Each record contains: model no., serial no., date, time (UTC), longitude, latitude, frequency, and path loss

Data Record Time:
20 ms nominal

Max. Number of Records:
250 stored in memory
Format: CSV (comma-separated variable)

Download: Records are downloaded with RS-232-C or USB "B" rear panel connectors, Rate: 9600 Baud

Software (included):
Log View-R™ Data Log utility software for Windows 95/98/2000/XP operating systems. Allows a PC to download, display, save, print, and clear data records.

GPS

Frequency: L1 (1575.42 MHz), C/A code (SPS), 8-channel cont. tracking, 32 correlators

Accuracy Position:
±2 meters CEP (50%)

Accuracy Timing: ±95 ns.

Position Fix Update: 1 second

Time to Lock:
Cold start: <130 seconds (90%);
Warm start: <45 seconds (90%);
Hot start: <20 seconds (90%)

Reacquisition Time: <2 seconds (90%) after loss of signal

Environmental Data
Designed to meet MIL-T-28800D Type III, Class 5 or 6, Style E and EN 61010-1

Operating Temperature:
-10°C to 40°C (14°F to 104°F)

Storage Temperature:
-40°C to 71°C (-40°F to 160°F)

Relative Humidity: -95%±5% 10°C to 30°C; 75%±5% to 40°C; 45%±5% > 40°C

Burn In: Failure-free burn in of no less than 100 hours at 40°C

Pollution Degree:
1 (no pollution) (EN 61010-1/3.7)

Transient Overvoltage:
Installation Category II(EN 61010-1/J)

Power

- Self-contained 12V, 2.3 Ah, rechargeable sealed lead-acid camcorder battery
- 4-5 hours continuous operation @ 25°C
- Low battery indicator ON when approx. 15 min. operating time remains.
- Charge time: approx. 3 hours

Mechanical Data

Weight: Less than 3.2 kg (7 lbs) incl. instrument backpack and battery

Dimensions (H x W x D):
89mm x 213mm x 333mm (3.5in x 8.375in x 13.1 in)

Connectors (RF in/out):
Super SMA male sparkplug (front panel), field replaceable

Supplemental Specs

Warranty:
One year limited warranty

CE (European Union):
EN 55011: 1998 w/A1: 1999 Group 1 Class B (emissions); EN 61326-1: 1997 w/A1: 1998 (immunity)

Ordering Information

- Basic Models**
- 2200 Path Align-R
 - 2200A Path Align-R
 - 2240 Expanded Path Align-R
 - 2240A Expanded Path Align-R
 - 2241 Path Align-R with Record-R
 - 2241A Path Align-R with Record-R

Included with Instrument
Each Path Align-R set of two comes with (1 per each instrument):

- Headset (mic and earpiece) with 10ft cord
- Coax cable assembly (SMA(m) to SMA(m), 3 meters)
- Battery (12 VDC/2.3 Ah rechargeable sealed lead/acid)
- Battery charger (AC MAINS powered 90-264 VAC/47-63 Hz with IEC-320 input)
- AC MAINS Power Cord (IEC-320 to NEMA type 5-15p plug)
- Weather-resistant instrument backpack
- Operating manual and user card

Models ending in "A" must be ordered with at least one frequency band option.

Band Options for Models 2200/2200A

- Opt 01 1.8-2.5 GHz
- Opt 02 5.8-6.6 GHz
- Opt 03 11.0-12.0 GHz
- Opt 04 18.1-19.4 GHz

Band Options for Models 2240(A) and 2241(A)

- Opt 01 1.8-2.5 GHz
- Opt 02 3.5-5.0 & 5.8-6.6 GHz
- Opt 03 7.5-10.0 & 11.0-12.0 GHz
- Opt 04 15 & 18.1-19.4 & 22.0-23.5 GHz

Accessories

Spectracom offers various optional accessories, such as waveguide adaptors, cables, carrying cases, spare batteries and more. See our Path Align-R Accessories data sheet for more information.