



Zap Checker 270

By Bob Grove W8JHD

Radio frequency (RF) field strength meters have been around for the better part of a century, but more recently these have evolved from simple detectors to active circuitry. The growing presence of wireless systems has resulted in the extension of the frequency ranges of these useful devices well into the microwave spectrum.

❖ A little primer

So just what is a field strength meter, and how is it used? In its simplest form, it is nothing more than a diode connected to a meter; the diode rectifies the signal voltage being received from a nearby emitter, and the resulting current is used to deflect the meter. The closer the meter, or the stronger the RF field, the more the needle on the meter is deflected.

More sophisticated units use solid-state circuitry to amplify the signal, as well as utilizing tuned circuitry for wider frequency range, and even offer audible and visual alarms for signal presence or high levels of RF energy.

Uses for such a small, versatile instrument are considerable: Detection of hidden transmitters (“bugs”); finding wireless surveillance cameras in countermeasures assignments; screening electronic equipment including microwave ovens for RF leakage; locating sources of RF interference to receiving systems and wireless networks; adjusting transmitter and antenna systems for maximum output; notification of an unauthorized radiat-

ing device (CB, walkie-talkie, cell phone, etc.) in an RF-quiet zone, and more.

❖ Enter the ZAP 270

Several years ago, the Alan Broadband Company, a California entrepreneurial company, developed their initial entry into this field, the ZAP 180, still a very popular field-strength device. But climbing upper-frequency limits have required the availability of detection and measurement equipment with higher sensitivity and directivity; thus, the ZAP 270.

The model 270, as shown here, draws its operating power from two AA alkaline cells (included) with an operational lifetime exceeding 60 hours – That’s efficient use of power. Its two-inch analog meter is boldly printed for easy reading and is calibrated in a simple 0-100 arbitrary scale for quick reference.

A red-green LED pair gives further indication of signal presence during dim-light or nighttime conditions. A thumbwheel sensitivity control allows quick adjustment of the meter for low background (green). As the instrument is swept over a suspect area, the meter advances and the green light extinguishes as the red comes on, indicating RF presence.

For unobtrusive operations, an internal vibrator alarm can be switched on, alerting the operator so he doesn’t have to continually watch the instrument during the sweep. The vibration intensifies as the source is approached.

The contoured shape provides comfortable and secure grip, and the compact size – more like a pocket flashlight – makes the instrument easy to use and easy to store. Only 5 inches long and weighing a mere 5 ounces, the 270 is easy to pack anywhere.

❖ So, what’s different?

So far, the model 270 sounds much like its basic brother, the 180; both offer 10 MHz to 4.5 GHz frequency coverage and high sensitivity (covert “bug” and cell phone detection at 20 feet or more). But this is where the similarity ends – the upscale 270 includes an external antenna option for directivity.

An optional log-periodic dipole array provides some directivity and a little forward gain in the 1.8-4.5 GHz range; the antenna itself is actually capable of performance through 6.4 GHz, limited only by the upper bandwidth of the 270. Alternatively, the user

may wish to provide his own SMA-connected antenna for any frequency range in the spectrum of the agile 270.

❖ Our field test

The ZAP 270 is a breeze to use. Operation is intuitive, with clear labeling and few controls. The meter is large enough to see and the imprinting is bold black and white; the LEDs are large and bright; and the thumbwheel on/off sensitivity control is ergonomically positioned for right- or left-handed users.

A LOG/MID/LINEAR switch permits the user to select meter response from logarithmic change of strength of 1000:1 amplitude ratio, to an intermediate range of the weakest 20 dB signals, to the sensitive linear mode for signals of a 3:1 ratio in strength.

A walk-through of our home with the 270 revealed a symphony of signals, from computers and wireless networking to TVs and cordless phones. Our microwave oven was a transmitter of its own, with clearly-detectable signals 20 or more feet away.

Other, more powerful signal sources like my two-meter ham transmitter and FRS transceiver really made the 270 dance, and from considerably greater distances.

Since the microwave operates in the same 2.4 GHz spectrum as our wireless computer network, we decided try the optional antenna – a miniature, planar-array of log-periodic dipole elements etched on a printed circuit board. It is affixed to the 270 by its SMA connector.

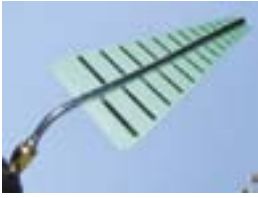
The side switch on the 270 was moved from the internal position to the SMA position and the microwave oven switched on. Sure enough, with the 270 adjusted to a threshold sensitivity (barely lighting the LED), I could move the hand-held radio direction finder around and it always favored the position of the oven. Without the antenna, the 270 was far more omni-directional.

❖ Does this replace the spectrum analyzer?

At first glance, it would seem that an agile field-strength meter like the ZAP 270 might be substituted for a far-more-expensive spectrum analyzer for certain applications like locating surreptitious transmitting devices.

While the field-strength meter does, indeed, respond to such devices, it is a broadband





device which also responds to anything in its frequency range, like computer microprocessors, power-line harmonics and digital circuitry

in consumer appliances. This can be confusing to the user unfamiliar with such properties.

Spectrum analyzers, on the other hand, are frequency-specific; they display on their

screen the discrete signal spikes from emitters throughout the spectrum, enabling their individual identification. Spectrum analyzers are also more sensitive, showing signal presence from many miles away, much like a radio receiver, which, in fact, they are.

But this is not to short-sell the field-strength meter. Properly applied as a screening device, they are effective RF-energy finders, and particularly models like the Alan Broad-band "ZAP" series with their inherent high sensitivity, extremely wide frequency coverage, and simplicity of use.

❖ The bottom line

With the limitations of any field-strength meter fully understood, the ZAP270 is sure to please. Its extraordinary wide frequency response, high sensitivity, flexibility, rugged construction, battery economy and ease of use make it a first-class choice in its field.

The ZAP 270 is available from Grove Enterprises for \$ \$259.95; the 270 with the optional 1.8-6.4 GHz antenna is \$319.95.

The Versatile Eton E10

By Gayle Van Horn

The Eton E10 is a recent entry in Eton's new Elite series of portable digital radios. This versatile model covers AM, FM and shortwave in a lightweight compact radio, perfect for travel or office use.

The E10 receives all 14 international shortwave bands (shortwave tuning coverage from 1.711-29.999 MHz), AM broadcast band (520-1710 kHz), and the FM broadcast band. A built-in telescopic antenna is used for shortwave and FM, and an internal ferrite bar antenna is used for the AM broadcast band. A mini plug jack on the side of the radio facilitates connection of an external FM or long wire shortwave antenna.

The various tuning aids in the E10 include a direct keypad frequency entry, scroll wheel, and up-down tuning buttons. You can select fast or slow for manual tuning. The up-down buttons allow you to band scan, automatically stopping on the next station encountered. Shortwave stations can be tuned in 1-kHz or 5-kHz increments. Mediumwave tuning is selectable between 9kHz/10kHz.

The bandwidth button is used when listening to SW or AM stations, to minimize interference. When shortwave listening, the SW IF SET button can shift the intermediate frequency to help minimize interference. For extra "matching" of the antenna to the radio, the E10 includes an Antenna Trimmer Control knob to optimize the model's telescopic antenna when listening to shortwave.

An added feature is the ten pages of memory, each page holding 50 frequencies. This enables storing of 500 frequencies in memory for scanning. The factory presets a memory bank, which may be used or reset using a direct entry of the numeric keypad for your personal listening needs. I found the Memory Auto-Scan especially helpful when checking for preset favorite stations.

Frequencies are displayed in a large backlit LCD, while signal strength is indicated via a five-level graph bar. The radio's back stand proved helpful for

table top or "hand-held" listening. The interval speaker provided a rich audio tone with loud, crisp and good audio levels. A set of ear buds are included for private listening and stereo reception in the FM mode.

In recent testing and monitoring, I discovered an above average radio with a dynamic range for a low end portable. FM reception was exceptional, as well as medium wave reception from foreign station in the Caribbean and Mexico.

Shortwave reception among the international power-houses and tropical band stations proved impressive for this portable radio. Though not a "DX-machine," it proved impressive in monitoring stations with good to very good signal strengths at levels comparable to a lower-cost table top receiver. Band scans in the 41, 31, 25, 49, 19, 22 and 16 meter bands indicated better than average signal strengths for general program listening.

Other features of the E10 include a 12/24 built-in clock, which may be set for either format, and the snooze feature to wake you up to a preset station or the last one tuned. Other refinements found on the side of the radio include a DX-local switch, tone button, and FM/SW external antenna jack. The E10 operates from four rechargeable 1100 mAh Ni-MH AA batteries that may be charged inside the radio with the supplied AC wall charger.

For the FM, AM or shortwave listener



seeking an affordable portable digital radio, the new E10 is just what you're looking for. Whether for travel, the office, bedside or carry-along, this is a terrific radio. The complete product kit includes a protective case, wind-up antenna, owners manual, four AA batteries and product booklet.

The E10 is available for \$130.00 USD via the Eton website <http://www.etoncorp.com>. For additional information about the E10 or other Eton products, call 1-800-872-2228.

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