

*G. J. Ash*

## Electronic snake oil for worried consumers



*"Lemme tell ya what I'm gonna do. For a limited time, and a limited time only, you can protect your loved ones against the dreaded microwave peril for the paltry sum of twenty bucks. That's right folks, you can't see, smell, or feel it, but at this very moment those harmful microwave rays are piercing your body, clouding your eyes, and scrambling your cells. But now, thanks to the miracle of modern science, you can detect the invisible demon with our Magic Wand. For a mere double sawbuck, you can spot the microwave menace before it fries the little ones or paralyzes Pop's pacemaker. Step right up, friends, buy a Magic Wand and fear no more!"*

If microwave ovens were around at the turn of the century, leak detectors might have been hawked at carnivals, right alongside the garlic necklaces. The barker would have used a spiel like the one above. Contemporary marketers use a different forum, of course, but the angle is the same: first you scare 'em, then you sell 'em.

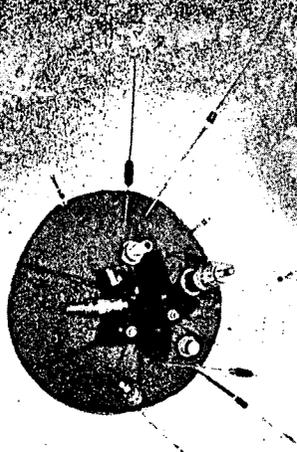
Dozens of newsstand magazines carry classified ads for low-cost "scientific instruments" designed to measure oven leakage. The ads typically warn of "invisible danger," suggest "birth defects, infertility, and cataracts," then advise that an economical detector can discriminate between safe and harmful radiation levels. Fact is, a recent Bureau of Radiological Health study (see p. 15) points out that many cheap detectors now on the market simply aren't effective. Don't confuse these mail-order products with quantitative service meters manufactured by companies such as Narda, Simpson, General Microwave, and Holaday Industries. The "yes/no" indicators tested by BRH are plastic baubles—electronic snake oil for the owners of 8 million microwave ovens.

The question of whether or not an oven might be leaking seems valid from the viewpoint of the consumer. Ovens sold in the US are well-engineered, with extremely tight RF gaskets, and many engineers will dispute the fundamental need for low-cost monitors, even if they are accurate! Unless a door is severely damaged, an RF leak is highly unlikely. In addition, the health hazard of a leak—minor or major—is not really known. In the marketplace, however, these are moot points. The demand for in-home testers, like the demand for so many consumer products, is not created by necessity, but by less logical factors, such as emotion. People naturally fear what they can't see and don't understand.

Surely, an effective indicator can be designed to sell to the mass market for under \$50. Likewise, a sound product could be merchandised responsibly, without intimidating innuendo. Is there an individual or company in the microwave industry ready to take the challenge? Or, will consumer demand be left to non-technical interlopers? Opportunity knocks. Can you answer?

*Stacy Beause*  
Editor

**pick a  
PIN....**



From our complete line of passivated silicon PIN and NIP switching diodes and chips.

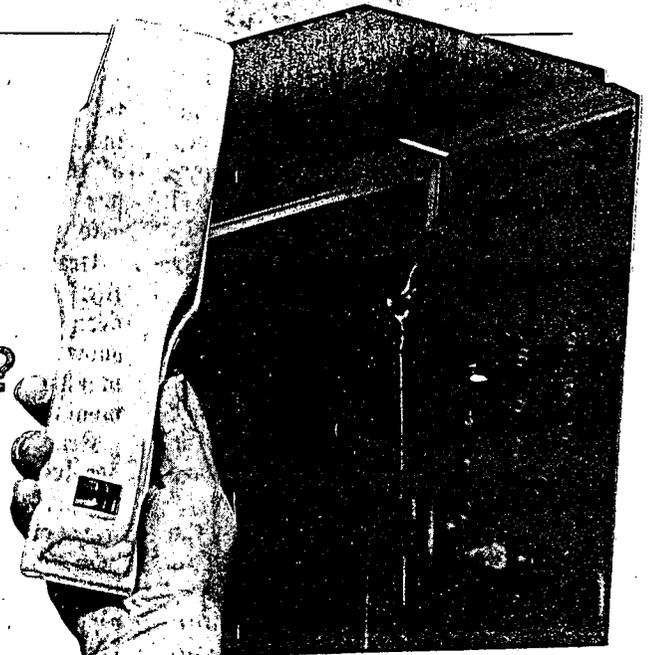
- Breakdown Voltage,  $V_B$   
Up to 1000 V
- Switching Time,  $t_s$   
2.5 to 600 ns
- Capacitance,  $C_T$   
0.05pf to 2.0pf
- Series Resistance,  $R_S$   
0.25 to 2.0 ohms
- Minority Carrier Lifetime,  
 $T_I$  75 ns to 5  $\mu$ sec
- Maximum  $R_S$  vs.  $I_F$
- High Reliability to  
MIL-S-19500
- Frequency Range  
5 MHz to 18.0 GHz

**PARAMETRIC** 

Industries Inc.  
742 Main St.  
Winchester, MA 01890  
Tel: (617)729-7333 Telex 94-9421

READER SERVICE NUMBER 32

# Oven testers: Ineffective instruments or a potential consumer-sales gold mine?



1. *The Guard-Rod (\$19.95) was one of the units tested by the BRH. Investigators found that it would fail to warn of emissions "ten times greater than allowable limits."*

A recent government study uncovered some disturbing inaccuracies in "inexpensive microwave survey instruments." The results of the study focus attention on the technical feasibility of the devices, and their potential in the consumer market.

The instruments, all introduced within the last year, are intended for use by consumers "as an initial check for potentially dangerous leakage from microwave ovens," according to one manufacturer. Some of the detectors have battery-operated circuitry, but most feed the output of a detecting diode or diodes to a meter or LED indicator. The devices are being marketed for under \$50, with the majority in the \$15 to \$25 range.

### Serious questions raised

According to a report issued by the Bureau of Radiological Health (BRH), "there are serious questions about the ability of these devices to distinguish oven leakage levels which exceed [government standards] from lower levels which do not."

The BRH, a section of the Food and Drug Administration, sets and enforces levels for microwave oven emissions. These standards allow 1 mW/cm<sup>2</sup> leakage at the time of manufacture and 5 mW/cm<sup>2</sup> after use. The measurements are made with 5 cm between the point of leakage and the detector.

BRH investigators used a slot radiator under controlled laboratory conditions to check instrument calibration and the effects of sig-

### The Sorry Facts: BRH faults existing units

The BRH report, "Inexpensive Microwave Survey Instruments: An Evaluation," was authored by William A. Herman and Donald M. Witters, Jr., of the Bureau's Division of Electronic Products. The Herman and Witters study was conducted because of the interest by repairpersons and consumers in the low-cost detectors.

The four sample devices were tested in front of a slot radiator by comparison to calibrated reference survey meters. Data was collected over several test parameters including:

**Calibration**—the ability of the instrument to give a warning indication above 5 mW/cm<sup>2</sup> and a safe indication below this level. (Measured using CW radiation.)

**Polarization ellipticity**—the effect of device orientation on its sensitivity and its likely performance in areas of cross-polarization, such as near the corner of an oven door.

**AM response**—the effect of amplitude modulation (5:1 peak-to-average) on calibration. (Ovens can emit considerable AM radiation.)

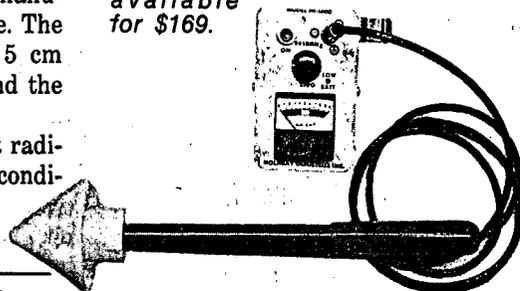
### Test results: Effects on instrument sensitivity

Instrument	CW calibration level	AM sensitivity	Polarization ellipticity
Micromate	1.9 mW/cm <sup>2</sup>	+3.4 dB	+5 dB
Guard-Rod end surface	5 mW/cm <sup>2</sup>	-4.5 dB	+3 dB
Guard-Rod back surface	37 mW/cm <sup>2</sup>	-1 dB	+9 dB
Interceptor	3.6 mW/cm <sup>2</sup>	+7 dB*	-∞**
Microscan	4.4 mW/cm <sup>2</sup>	+7 dB*	-∞**

\*peak detectors      \*\*linearly polarized

nal polarization, modulation, and level on the devices. Four units received BRH scrutiny: the Micromate (Prince-

2. *Holiday's HI-1800 is intended for use in servicing microwave ovens. It's available for \$169.*



ton Microwave & Testing, Inc., Princeton, NJ), the Guard-Rod (Tanray Associates, Inc., Elberon, NJ), the Interceptor (Electrobits Pty., Ltd., Australia) and the Microscan (Birene Medical Supplies Pty., Ltd., Australia).

The BRH reports that the Micromate yielded warnings at levels as low as 0.6 mW/cm<sup>2</sup>. Other units, such as the Microscan, did not indicate excessive levels until emissions reached 7 to 9 mW/cm<sup>2</sup>. This unit also failed to give any warning between 28 and 52 mW/cm<sup>2</sup>. (See "The Sorry Facts" for a partial summary of the test results.)

(continued on next page)

Walter J. Bojsza, Associate Editor

**Oven testers** (continued from p. 15)

According to Samuel Sperling, information chief at the BRH, the agency would question the need for the low-cost devices, even if the tests had shown 100-percent accuracy. In Sperling's view, the BRH has carefully set the existing standards and enforces them adequately with periodic inspections of manufacturing facilities. Since the inspections are often random and unannounced, he told *MicroWaves*: "We are confident that the standards are being met and that microwave ovens pose no danger to the consumer."

This confidence contrasts with the language used to promote the low-cost

**"We are confident that the standards are being met and that microwave ovens pose no danger to the consumer."**

detectors. According to a publicity release for the *Guard-Rod* (Fig. 1), one of the units tested by the BRH, "severe doubts exist concerning the stringency of the Bureau of Radiological Health regulations."

This statement is attributed to Kirk Ray, general manager, Tanray Associates, Inc., Elberon, NJ, who is further quoted as saying: "Experts have held that there is ample evidence to show that microwaves are responsible for cataracts, infertility, birth defects, and psychological problems."

Sperling, at BRH, counters these "severe doubts" by saying, "We have no record of any health damage caused by microwave ovens other than simple heat burns from hot platters."

(Although questioning existing standards seems to be one of the principal marketing tactics for the low-cost detectors, all are said to warn of leakage levels of 5 mW/cm<sup>2</sup> or more, the precise level set by the BRH.)

**Established firms comment**

The detectors studied by the BRH are manufactured and marketed by firms which have little previous exposure in microwave instrumentation. Established firms in this field have contrasting opinions of the quality and marketability of these devices.

Burton Gran, vice president of Holaday Industries, Edina, MN, a firm that makes instruments for oven manufacturers and repairpersons, says that consumers should not be concerned with microwave leakage. Gran con-

tends that, since manufacturers must include the "worst-case" inaccuracies of their measurement equipment in any reading, an oven's certification of safety will always be accurate.

Gran echoed a statement by the BRH's Sperling that any microwave oven with excessive leakage would show obvious mechanical damage, making consumer leakage measurement unnecessary.

Gran's major concern is that the inexpensive devices might be used by repairpersons to diagnose and fix microwave ovens. (Interest in the instruments by "repair shops" is also mentioned in the introduction to the BRH report). Gran stated that Holaday's HI-1800 (Fig. 2), at \$169, represents the lowest-priced survey instrument that can be manufactured within the required degree of accuracy. The firm has no plans for a low-cost detector.

**How safe is safe?**

Holaday's rejection of the usefulness and marketability of inexpensive microwave detectors is not shared by at least one major microwave manufacturer. Jerry Hausner, chief engineer for the Narda Microwave Corporation, Plainview, NY, expressed a contrasting view.

Although Hausner agrees with the BRH that the existing designs are not effective, he does not concede that consumers need not measure microwave oven leakage. "I think everyone in the industry agrees that microwave ovens will have no adverse effect on health in the long or short term," he says, "but the consumer is staking his life on the probability."

In Hausner's opinion, it causes no

**3. Metrifast is making a special pitch for its detector to the restaurant trade. Model 749 sells for about \$25.**



harm to be conservative on the safety issue, especially since the effects of radiation appear after a long time. When asked if a microwave oven leaking excessively would show obvious physical damage, Hausner pointed out the subjective nature and inherent unreliability of this kind of observation. In other words, the only true way to determine leakage is to measure it.

Narda's least-expensive microwave survey instrument is the Model 8201, at about \$395. Although Narda has no plans for the near-term release of a consumer-oriented detector, Hausner said he has a "hunch" that the market for these devices might be a good one. He also feels that an accurate, low-cost detector could be made.

**The low-cost detector market**

The market for these devices is illustrated by the experience of Metrifast, a New Hyde Park, NY, firm that sells the *Metrifast Microwave Radiation Leak Detector* (Fig. 3). Two models of the detector, which was not included in the BRH study, are available at prices between \$15 and \$25.

**"Many employees have read about the possible safety hazards and are concerned."**

According to Herbert Arum, marketing manager, Metrifast does not manufacture the detector, but obtains it from Micro Safe Pty., Ltd., an Australian firm. (Coincidentally, two of the devices tested by the BRH, although not of the same design, were also made in Australia.) Arum said that Metrifast tested samples of the devices before marketing them.

Arum's firm has sold about 1,000 of the detectors and lists the device in several safety equipment catalogs. In addition to a direct consumer appeal, Metrifast also markets the device through wholesalers in the restaurant trade. "Many employees have read of the possible safety hazards and are concerned," Arum said. "We're telling restaurant owners that it's good management to demonstrate the safety of their ovens by using the detector."

Although *MicroWaves* attempted to reach other manufacturers and distributors of low-cost detectors, either telephone listings for these firms could not be found or spokespersons were not available for comment.\*\*