

# RadioResource™

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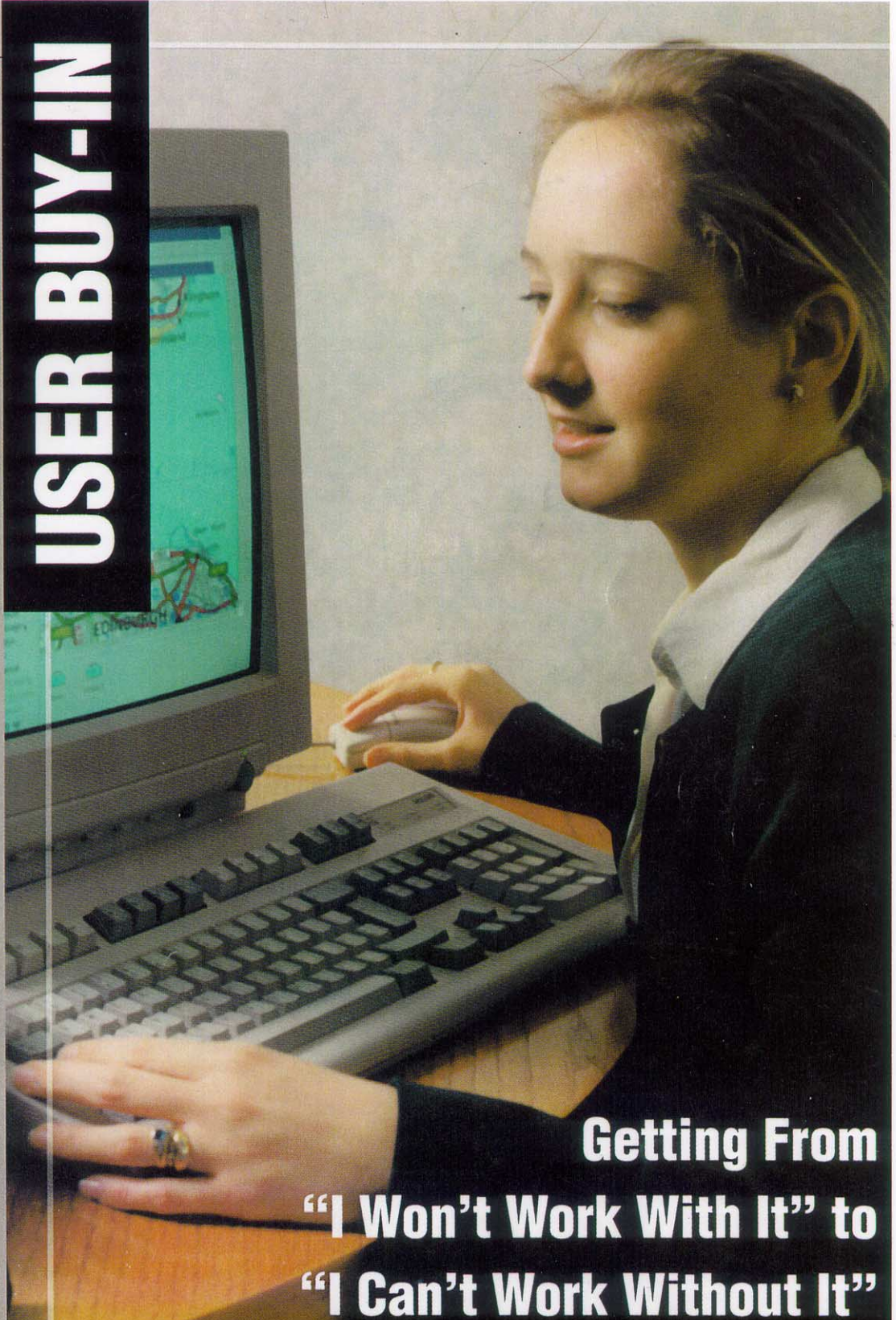
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## USER BUY-IN



Getting From  
"I Won't Work With It" to  
"I Can't Work Without It"



# RF Exposure

*RF radiation, RF emissions, electromagnetic energy — whatever you choose to call it — is a hot subject today. While most people involved in the operation of wireless communications systems know to avoid harmful RF exposure, recent FCC regulations and increased attention from OSHA have caught many organizations by surprise.*

*By Richard Strickland*

**I**t is important to remind everyone that RF radiation (also called non-ionizing radiation) is not to be confused with the far more dangerous ionizing radiation generated by X-rays and radioactive materials associated with nuclear technology. Quite simply, non-ionizing radiation, which is based on radio and light frequencies, can overheat your body in the same way that a microwave oven cooks food. There are some reasonable regulations based on well-documented hazards to protect those who may encounter sources of

# RF Exposure

non-ionizing radiation, particularly in a work environment.

In an important shift, concern over RF radiation exposure is no longer limited to electronics and telecommunications industry workers. The proliferation of wireless services and the location of antenna systems on rooftops have changed all that. Radio transmitters — the primary source of RF emission — can be found on government, commercial, and private buildings including houses.

While powerful broadcast TV and radio transmitters have extensive physical security and signage to ensure public safety, two-way and other wireless antennas — which operate at much lower power than broadcast systems — may be situated in more accessible locations and may lack appropriate signage. They represent a potential hazard because people can get very close to the source of radiation without realizing it. Rooftops with multiple antennas, and there are many of them, are even more likely to contain areas where



Personal RF monitor

RF levels exceed FCC regulations.

If you stand 15 or 20 feet from the highest-power wireless or two-way system antennas, you are below the maximum permissible exposure (MPE) levels defined in the FCC regulations. But exposure levels increase dramatically as you get closer; the exposure level is four times higher if you cut the distance in half. At one-fourth the distance, the exposure level is 16 times higher, and at one-tenth the distance, the levels are 100 times higher.

When antennas are placed on towers,



Ceiling-mount RF monitor

it is easy to restrict access. The bigger problem is rooftops, since many people require access there. Think about who

might need access to your building's rooftop: HVAC and elevator repair people, exterminators, painting contractors, window washers, building maintenance and security staff, property managers, etc. Most of these individuals have little or no knowledge of RF radiation.

What is the potential result of overexposure to RF radiation? Under certain conditions, it is possible to become ill, or even worse, suffer prolonged health effects. In today's litigious society, employers, system operators, and site owners may face lawsuits even when there is no proof of permanent biological damage.

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Just having someone claim that they were exposed to RF field levels that exceed the FCC regulations may be more than enough to fuel costly legal battles. Ironically, the very invisibility that shielded non-ionizing radiation from public knowledge can become a weapon for litigation.

Some simple actions will significantly reduce the likelihood that someone might be overexposed, as well as reduce the risk that someone would seek legal remedy for an exposure claim. First, and most important, you must develop a RF safety plan and implement it. That means a written plan. If it isn't written, it is useless. Inspectors from federal, state, or local agencies will invariably ask if you have a plan. If you answer yes, they want to see a copy. Your plan does not need to be complicated. All health and safety plans have the same basic components. The following ingredients offer the framework for a complete RF safety program.

- *Written documentation of the program.* If it isn't in writing, you do not have a safety program.
- *Management support.* A safety program must have the full backing of management if it is going to work.
- *Education and communication.* The safety program must be related to your employees so they understand the work rules, procedures, and policies they are expected to follow. For rooftops, the simplest training is to have first-time visitors watch a 20-minute video and a handful of slides that explain the rules specific to the site, then have them sign a document that states that they understand and agree to follow the rules. Attorneys will use more

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safety program.***

precise language, but this is essentially what you are after. Only after signing the document should employees be authorized to go onto a rooftop.

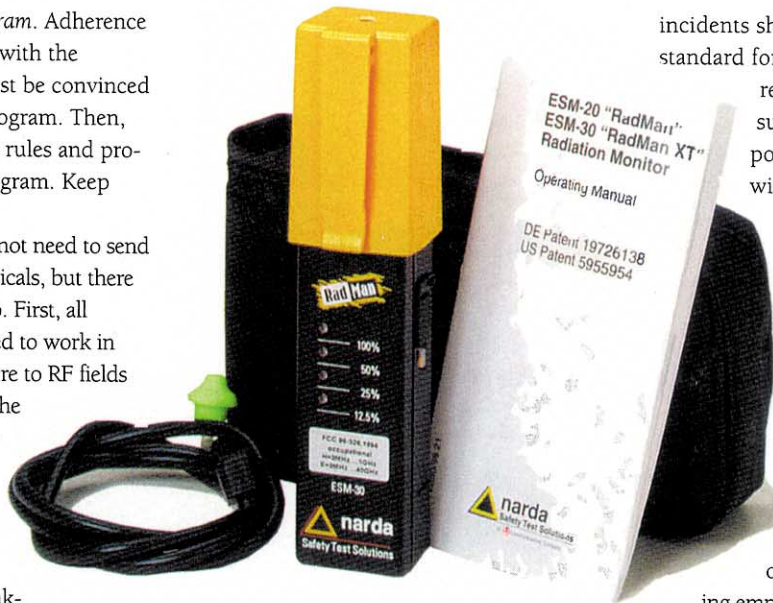
- *Enforce your safety program.* A safety program filed away in a drawer is not a safety program. You must use it.
- *Identification of hazard areas.* You should have a reasonable idea where the field strengths may exceed the MPE levels for occupational/controlled areas and for general population/uncontrolled areas. However, this is not always practical, since conditions can change. Today, most operators insist that everyone who works on or visits a rooftop area must wear an RF personal monitor.
- *Marking and control of hazard areas.* Once potential hazard areas have been identified (i.e., by measurements), they must be marked. Signs and perhaps physical barriers, such as chains and fences, are needed. If you require RF personal monitors, a sign can be placed at the point(s) of access. This sign basically states that certain areas of the rooftop may exceed FCC guidelines and that only authorized visitors wearing the proper safety equipment are allowed.
- *Controls and/or work practices.* Establish work practices. For example, require that visitors and employees wear RF personal monitors whenever they are on the roof, or install area monitors that notify personnel in a given area that RF levels are approaching or exceeding FCC limits. Both groups must understand how to react to an alarm condition. A short video that informs them of what to expect and how to respond will prevent overreaction. For example, if a monitor starts to beep they should not panic because biological problems do not happen instantly; in fact, exposure is typically averaged over six minutes since the problem is heat-based.
- *Employee involvement in the structure and*

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operation of the safety program. Adherence to a safety program starts with the employees. First, they must be convinced of the need for a safety program. Then, they must understand the rules and procedures of your safety program. Keep them involved.

- *Medical program.* You do not need to send employees for routine physicals, but there are two things you must do. First, all employees who are expected to work in areas with potential exposure to RF fields above a modest level (i.e., the general population/uncontrolled MPE levels) should be screened to identify those with medical implants that contain electronic circuitry. Pacemakers are only one type of the many implant devices routinely used today. Unfortunately, there is a substantial risk that devices will malfunction at field strengths far below the FCC MPE limits. Such people need to know that their potential exposure risks are greater, not from a purely biological response, but for electromagnetic compatibility (EMC), which may result in erratic functioning of their implant.

Second, the safety program must have provisions to handle overexposure incidents, whether real or ultimately found to be unsubstantiated. Severe situations will require a physical exam. All



**Safety programs should be reviewed annually so that deficiencies can be identified and resolved.**

incidents should be documented using a standard form that helps quantify and record the level of the exposure. Often, a reported overexposure is found to be fully within the FCC regulations, once the elements of whole body averaging and time averaging are considered.

- *Schedule reviews of your safety program.* Safety programs should be reviewed annually so that deficiencies can be identified and resolved. In some cases, such reviews may lead to procedural changes that improve operations without compromising employee safety. A review of all incident report forms is crucial.

- *Assignment of responsibility.* Someone in your organization must be clearly identified as the RF safety person. This individual will normally have other duties, but must have the necessary authority and resources to implement and enforce all aspects of the safety program. ■

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*Richard Strickland, a nationally recognized authority on RF safety, is director of business development for Narda Safety Test Solutions in Hauppauge, N.Y. You may contact him by phone at (631) 231-1700 or by e-mail at [richard.strickland@l-3com.com](mailto:richard.strickland@l-3com.com).*