# Dutch RFID Interference Study Is a Worst-Case Test

A recent study published in *The Journal of the American Medical Association* (*JAMA*) found that RFID systems in hospitals can cause “potentially hazardous incidents in medical devices.” But while these findings have sparked a flurry of media attention and panic regarding the safety of

RFID, there might not be as much to fear as initially thought.

When you digest the full contents of the study (see Researchers Warn RFID May Disrupt Medical Equipment), you will find the research—though carefully and thoughtfully completed—is not in line with the reality of most current hospital RFID deployments. Unfortunately, the report ignores mainstream passive RFID in favor of technology that not only misrepresents the vast majority of today's deployments, but also poses the highest risk and probability of generating electromagnetic interference (EMI) in adjacent devices. Although I see the study as a good warning for future RFID deployments based on ultrahigh-frequency (UHF) tags, the research team did not examine high-frequency (HF) tags, which is important for two main reasons.

First, the reader power employed in the test conditions exceeds what would presently be used and seen in embedded UHF applications for medical environments. Most UHF deployments call for a 1-watt (30 dBm) reader or less, because this power level provides up to 10 meters (32.8 feet) of read range. The study utilized 3-watt readers, which are far more powerful than interrogators typically found in existing hospital RFID deployments, as they were designed for supply chain applications.

What's more, when you combine the conducted wattage (3 watts) of the UHF interrogator employed in the study (most likely Feig Electronic's ID ISC.LRMU2000 Fixed UHF Long Range Reader)

with the gain of the antenna used, it is highly unlikely the study was in compliance with FCC regulations. An HF RFID reader typically operates at lower power levels (usually 200 milliwatts) than UHF, and an HF reader and tag utilize the magnetic portion of the radio wave to communicate with each other. These characteristics make HF much less susceptible to EMI with adjacent devices than UHF. This is the same technology used for security badge access to offices and buildings.

The second point to consider is that the most common frequency currently in use in hospitals for consumables authentication, patient management and drug tracking is 13.56 MHz, which is not mentioned in the study. HF tags require a close proximity to a reader in order to function; as such, they do not have the long read range that UHF tags provide. The maximum distance between a reader and a tag in a hospital environment is typically 17.4 centimeters (6.9 inches), concurrent with HF capabilities. In the study, however, the UHF tag was attached to the reader, and the tests had a starting point of 200 centimeters (6.6 feet) between the RFID hardware (the tag and interrogator) and the medical device. Therefore, this is not an accurate gauge of the potential for interference, as it does not reflect the reality of most current deployments.

On the plus side, the study certainly serves as a valid warning for hospitals and RFID technology providers regarding potential future issues as UHF deployments increase. In certain scenarios, for instance—such as tracking equipment during surgery to ensure no materials are left inside a patient, or tagging hospital beds to be sure the proper medicine is administered to the correct patient—UHF is required for its long read-range capabilities. In such cases, the risk of interference must be closely examined. The study also illustrates the need for standards in relation to RFID usage in hospitals, which is important and beneficial for the embedded RFID industry in particular.

However, the research is academic in nature and not necessarily applicable to real-world implementations. The key takeaway is that we not panic over radio frequency identification. RFID is a general term encompassing many frequencies, power-levels and applications. Failing in one very specific—and worst-case—test of RFID does not mean the technology's death across the board, or the end of its usefulness in the health-care industry.

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