Do buckets with salt water dampen radio frequency radiation?

We tested whether four five-gallon (20 liter) buckets of saline absorbed RF radiation in a small room. It did not.

Keywords: shielding, absorbing, radio frequency, transmitter, Wi-Fi, cellular, salt water, saline

Introduction

Radio frequency radiation from wireless networks, mobile phones, cordless phones and their base stations are a threat to people who are electrically sensitive and possibly to all humanity. Various people, including alternative health practitioners, have suggested placing buckets or large glass bottles in the corners of a room to absorb the radiation and help these people.

Salt water is known to absorb radio waves. This is the reason submarines have to go near the surface and raise their antenna above the water to communicate with their base (or use extremely low frequency signaling while submerged).

But is salt water sufficiently absorbent to be used in a house without turning it into an aquarium?

The test setup

We used a small room (11 x 10½ x 8 ft; 3.5 x 3.4 x 2.5 m) for the experiments. A larger room would probably need more salt water to show an effect.

The room was shielded with aluminum foil on ceiling, floor and all four walls. The door was of steel with a steel frame. The window was shielded with an aluminum frame, metal-coated glass ("low-E") and fully covered with stainless steel mesh shielding. Using a shielded room prevented outside sources to interfere with the result.

In a previous test we found that placing a radio frequency source inside a metallic room dramatically raised the radiation level since the radio waves kept bouncing around inside. This bouncing (reflection) may also have enhanced the absorption effect by the water, as some waves passed through the water multiple times as they were reflected back and forth.

We placed five-gallon plastic buckets in each corner of the room. The buckets were either empty, filled with water or filled with salt water. The salt water was created by adding ordinary sea salt (without iodide) to each bucket. Each bucket received about 75 g (less than 3 oz) of sea salt.

The RF source as a 1.9 GHz base for a cordless phone. It was chosen because it transmits continuously at a frequency similar to common transmitters such as Wi-Fi, 3G/4G mobile phones, smart meters, etc. The cordless phone base was placed against one wall, halfway between two buckets. The cordless phone itself was not used.

The transmitter was turned on remotely for about 10 seconds, using the circuit breaker for the room. The door and window were closed and nobody was inside the room during each test.

The measurements were done using two RF meters that were fixed to a wooden chair in the center of the room. In such a highly reflective environment the readings can vary dramatically if the instrument is moved just a little, so they were fixed in place.

The RF meters were set to record the highest (MAX) value. Meter1 was a Cornet ED85EXS model with an added HAKA brand external whip antenna (5 dB gain). Meter2 was a Tenmar TM-185.

Both meters were consumer grade meters and not as accurate as much more expensive professional models.

The extra antenna on Meter1 increased the sensitivity (nominally by 5 dB or 3.2 times). The radiation level can also vary dramatically within such a highly reflective room. The readings of the two meters can thus not be directly compared with each other.

The results

The five test scenarios were:

1. Buckets empty
2. Buckets filled with water
3. Buckets filled with salt water
4. Buckets removed (i.e. same as 1)
5. Buckets filled with salt water (i.e. same as 3)

Three or four measurements were taken for each test scenario. The mean value for each scenario and meter is shown in the table below. All numbers are in mW/m^2.

Scenario	1. buckets empty	2. Buckets w/water	3. buckets w/saline	4. no buckets	5. buckets w/saline
Meter 1	283	310	224	258	240
Meter 2	29	26	28	39	30

For the reasons already discussed (location variance, 5 dB gain antenna) the results for Meter1 and Meter2 cannot be directly compared to each other. It was expected that the Meter1 readings were higher than the Meter2 readings, due to the extra antenna.

What is of interest is comparing the results of the various scenarios for each meter.

The readings did vary some across the scenarios. The variation is within the uncertainty of the meters, as can be seen when comparing the readings for the identical scenarios (scenario 1 and 4; scenario 3 and 5).

Conclusion

If there was any absorption of the RF radiation by the buckets, it was too little to be detected and thus too little to be of any value to protect human health.

As RF effects on humans appears to be logarithmic (just as light and sound is) any effects less than a factor of ten (10 dB) would not have any real value, and even that would be very limited if at all.

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