

METHODS OF MEASURING RADIATION LEVELS

Our wireless radiation measurements were taken in April 2023–April 2024 with the Safe and Sound Pro II Meter outside the main entrances. They represent a rough approximation of the environmental radiation in that area (before accounting for the radiation inside). They were conducted by Rachael Stephens. These are informal, preliminary measurements and are simply meant to offer a preliminary overview of the radiation levels across Greater Hartford.



Still, we took various steps to protect their reliability, including:

- **Standardizing the location of the meter**
 - To conduct the measurements, we stood on the sidewalk outside the main entrance (or an approximate distance) and pointed the meter towards the main door. We held the meter at head-, waist-, and foot-levels for a total duration of at least one minute and typically more than 4 minutes.
- **Removing personal wireless devices**
 - When conducting measurements, we left all wireless-enabled (including WiFi, Bluetooth, cell data, and satellite) devices in the “turned-off” or “airplane” position and in our parked vehicle (which was also turned off). To verify that our personal devices were off and not distorting the measurement, we compared measurements while standing immediately next to the car and then a few yards away from it.
- **Routinely verifying that the meter was responding properly**
 - We did this by introducing and removing known sources of wireless radiation (e.g., turning cell phones on and off).
- **Repeating measurements on different days of the week and at different times**
 - To ensure reliability, we took a second set of measurements for more than half of the spaces. The measurements for all but two of these spaces were commensurate with our first set of measurements.
 - Whenever the measurement showed any kind of variability (e.g., not consistently within one category, a significant difference depending on where the meter was pointed or placed, etc.), we conducted measurements of that space on multiple occasions and then took the average of those measurements.
- **Filming measurements with a DSLR camera that did not have wireless capability**
 - While conducting measurements, we used a Canon T-9 DSLR camera to record the screen of the meter as well as the surroundings.
- **Not compiling or analyzing results until after all the data was completed.**
 - This protected against further biasing the space selection process (which was relatively random but likely biased in favor of more densely populated areas as measurements were frequently conducted while traveling throughout the region for other purposes).
 - The downside of this approach is that it wasn't until after analyzing the data that we realized it would have been helpful to measure levels at spaces that are farther from macro cell towers, particularly within suburban municipalities where the few spaces we did measure were “extreme” (e.g. Farmington, Manchester, Windsor). Controlling for distance to cell towers, however, was not feasible as there is no centralized, public database locating macro cell towers.



We did not control for the following variables and suggest addressing these matters in future endeavors:

- **Standardizing the amount of time measurements are collected at each location**
 - This is especially important when accounting for the max, peak, and average power density.
- **Standardizing multiple time periods during which measurements are collected for each locale.**
 - While we diversified the days and times we collected measurements, we did not hold this variable constant across the different spaces.
- **Standardizing the precise locations of the measurements.**
 - This is especially important in terms of the distance from the building to the meter.
- **Diversifying for distance to macro cell towers.**
 - This was deemed unfeasible as there is no centralized, public database locating macro cell towers. We initially tried to use public databases like antennasearch.com but quickly learned that many macro cell towers are not included and that there is a lack of consistency between what is classified as an “antenna” and what is classified as a “tower.” When we tried to access

municipal and state records but found that every government branch we reached out to said they did not have any database of tower/antenna locations and that we would have to try to request permits individually. The act of requesting that which one does not yet know exists is, of course, a challenge. Ultimately, we were able to confirm the presence of macro cell towers that we could see, but we do not have any way to confirm the absence of macro towers, particularly due to the increasing use of “stealth” towers. This limitation reveals yet another complication created by the lack of federal regulation.



While this methodology is not fully controlled, we believe that it is sufficient for drawing public attention to: (i) the need for legislation that better protects our communities, and (ii) the socio-spatial distribution of wireless radiation.

Importantly, the levels of wireless radiation outside and inside Greater Hartford public buildings are likely higher than our measurements even indicate.

1. Our measurements do not account for the radiation inside school buildings, including that which is produced by WiFi routers, personal cellular/wireless/Bluetooth devices (cell phones, laptops, etc), and more.
2. While most EMR (electromagnetic radiation) experts consider the Safe and Sound Pro II Meter as the “gold standard” for RF radiation measurements, it is not certified for the frequencies of 5G radiation (above 1800 Hz). The meter that is certified for measuring the frequencies involved in 5G is prohibitively expensive and was not available when we initially started this project.

