

Survey Site: Building Surveyed
745 Seventh Avenue
New York, NY 10019

Introduction:

360°RF was retained to perform an RF survey from 10 MHz through 10 GHz at the building located at 745 W. 7th Avenue, New York, NY. The survey took place on 15 July, 2010 between approximately 10:30 am and approximately 4:00 pm, on the 35th floor walk-around balcony and again at the next-to-the highest walk-around balcony at the roof level.

Setup

360°RF utilized a Hewlett Packard model 8569A spectrum analyzer (frequency range from 10 MHz to 22 GHz) and three calibrated test antennas, covering 400 to 1000 MHz, 900 to 2600 MHz, and 2 GHz to 18 GHz. These antennas have a relatively flat response across the specified frequency ranges. A building engineer assisted our engineer by providing access to the survey sites, and setting up AC power and our field equipment.

The survey consisted of connecting the appropriate antenna to the spectrum analyzer using precision low-loss coaxial cable, then searching for the strongest RF signals within the frequency range of each antenna. We created plots of each frequency range once the strongest signals were found which are included below.

Results, 400 - 1000 MHz

This frequency range encompasses public safety and communications bands as well as UHF television channels and some cellular telephone and data bands. Since we performed a full-band sweep from 10 MHz through 1.8 GHz, we were also able to note the presence of VHF television signals from 54 to 216 MHz as well as FM broadcast signals from 88 to 108 MHz, plus aviation communications from 118 to 135 MHz and VHF public safety and other communications services operating from 148 through 174 MHz. Several high- VHF television channels were observed from 174 through 216 MHz. The range

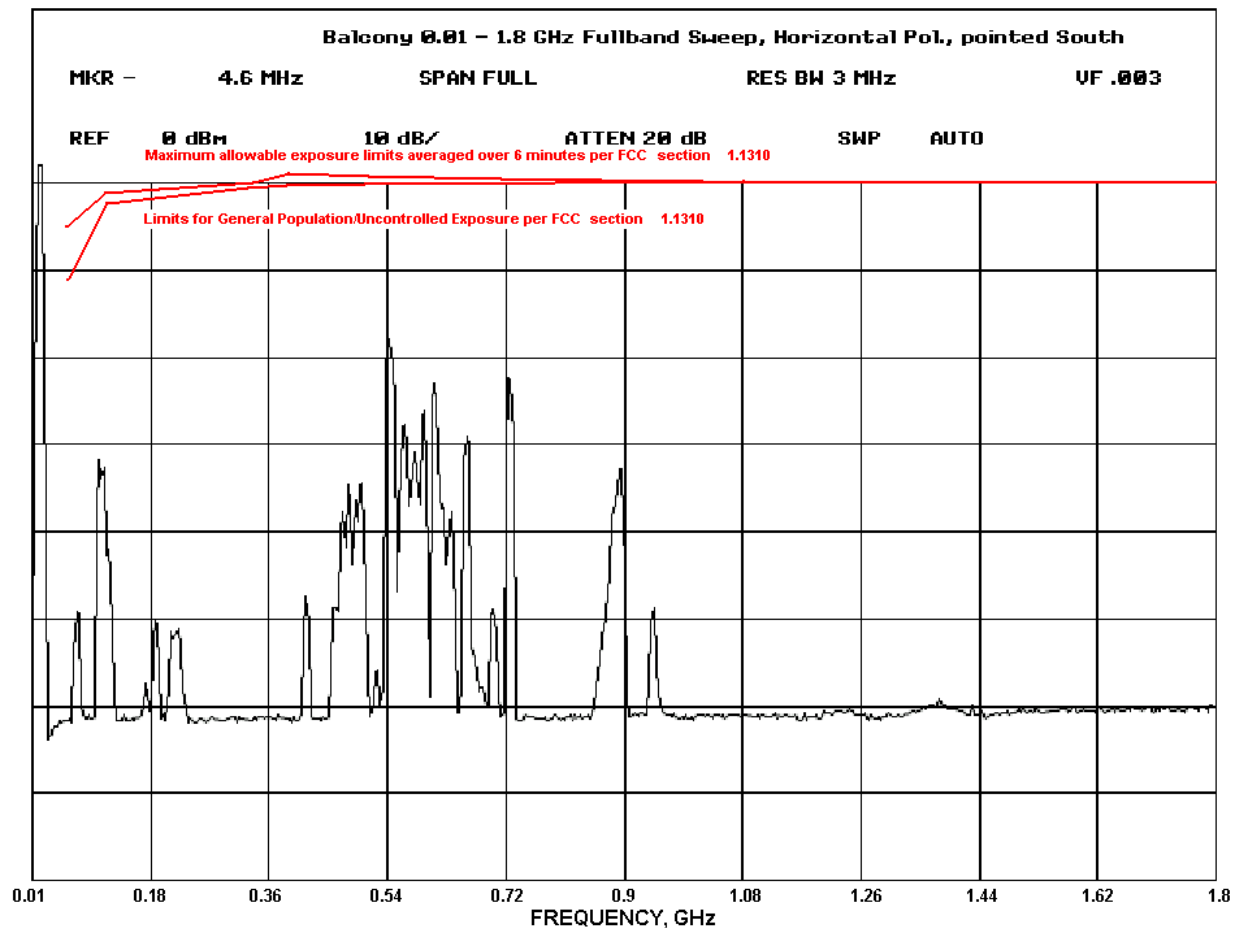


Building –
The street in the fore-ground is 7th Ave., cross street is 49th.

The black line/arrow point in the direction of the strongest RF signals. The survey began at that floor level from which the line originates, then moved up to the floor indicated by the second line.

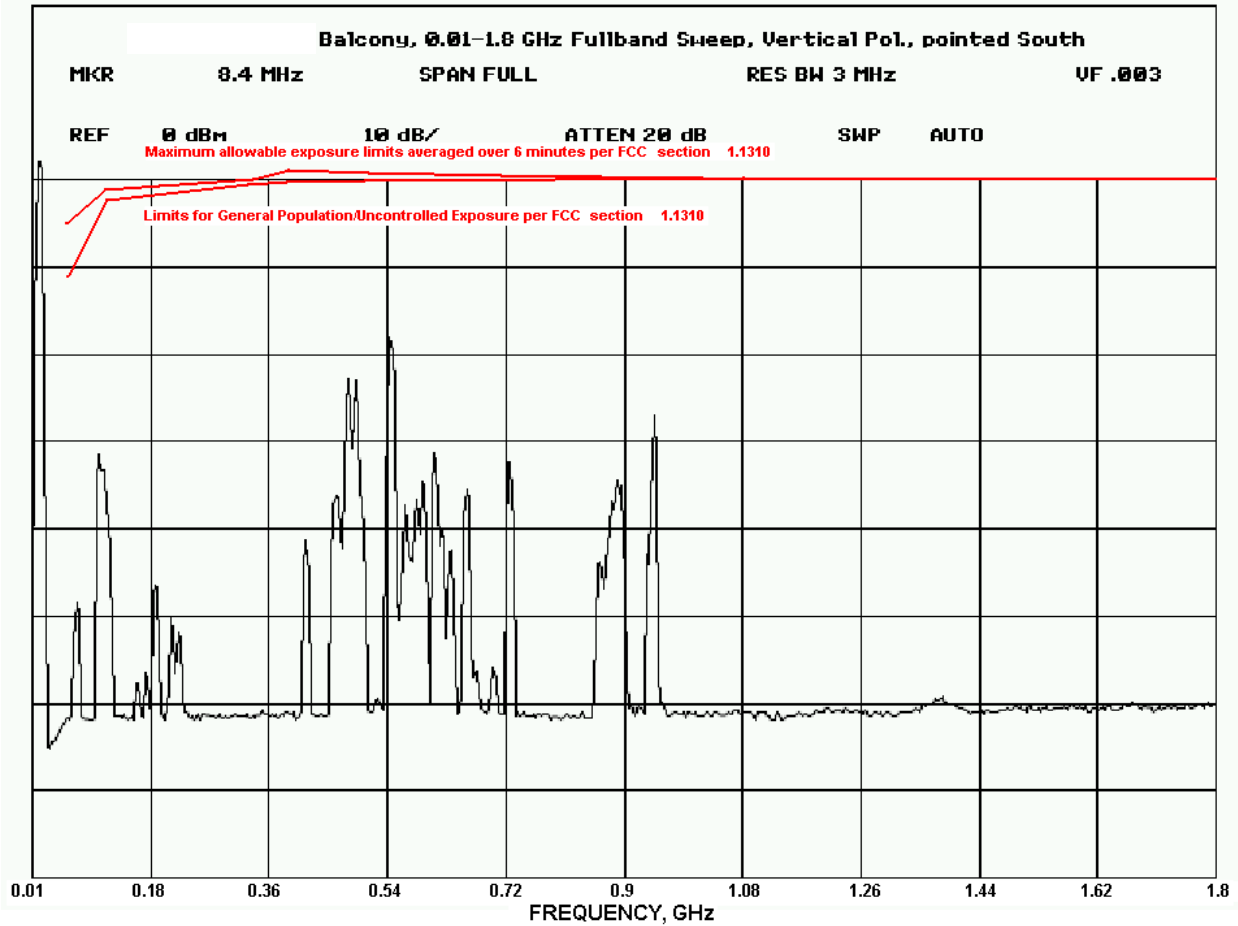
from 216 to 400 MHz is used mainly by military communications. The lower edge of the public safety communications band begins at 450 MHz, extending to the bottom of the UHF television band at 470 MHz.

The following plot shows the results of a full-band sweep from 10 MHz to 1.8 GHz. This plot was taken on the 35th floor outside the engineering spaces with the antenna pointed mainly south from the southwestern side of the surveyed building, as seen exiting from the engineering space door; see photo on page 9. The antenna was held in the horizontal polarization sense and moved around and rotated to find the highest average signal levels. A plot showing the vertical polarization plot follows. Signals were found to be the strongest in the horizontal polarization.



The red lines and points show the maximum allowable exposure rate (as averaged over 6 minutes) and the exposure limits for the general population or uncontrolled exposure, as set forth in Part 1 of the FCC's Rules and Regulations, C.F.R. 47, §1.1310. The variation in the limit lines is due to compensation factors to account for the antenna capture area, antenna gain, and coax cable loss versus frequency. As can be seen from the above plot, from this antenna location just outside the door opening onto the balcony, signal levels are considerably lower than what the FCC and other international regulatory bodies consider to be capable of causing excessive exposure.

At the page bottom is a view of the skyline from behind one of the survey antennas. The Viacom building can be seen on the far right with the Bank of America (BoA) building on the far left (also known as the Conde Nast building). On the left side of the BoA building, a portion of the Empire State building can barely be discerned. The building at the left-center with a red rectangle outlining the antennas is 4 Times Square. The building immediately to its right appears to have a triangular-shaped tower structure that might have several antennas.



The Viacom building with numerous antennas is seen to the far right. These antennas appear to include several that are possibly for the FB broadcast band, as well as numerous cellular band antennas (outlined by red rectangle).

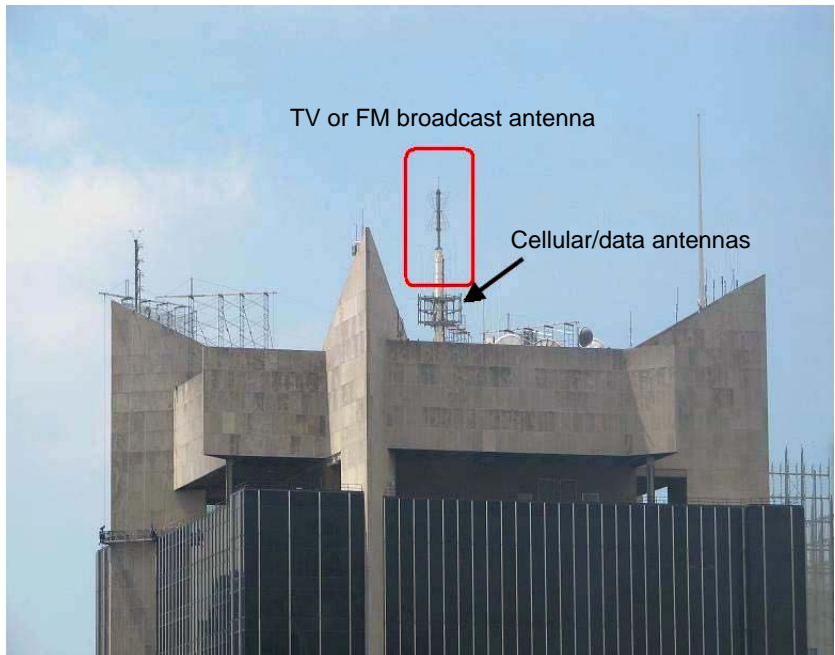
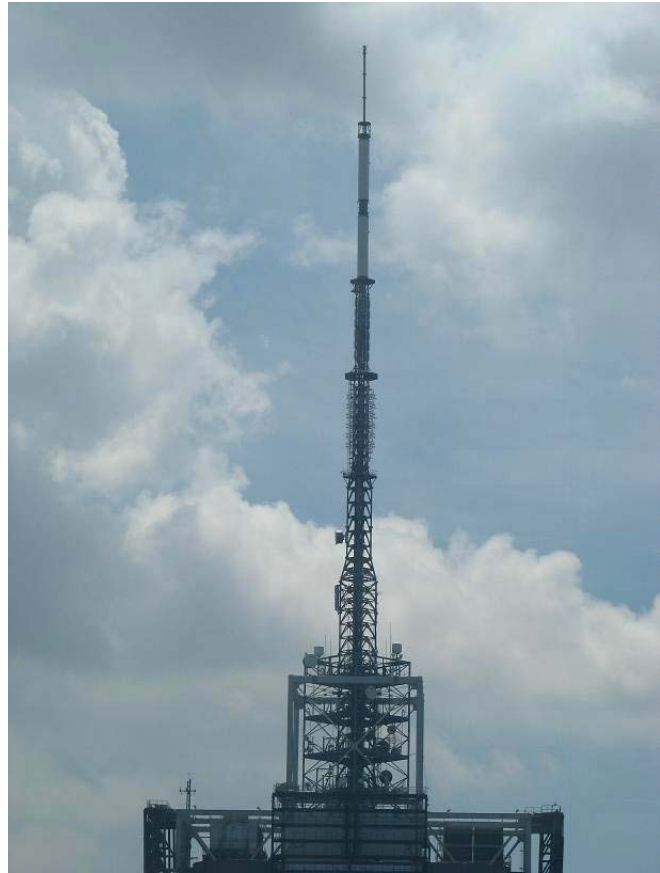
The BoA building has a tall architectural "spire" tower, but as far as we have been able to determine, there are no antennas of consequence collocated with the spire.



The photo to the right is a close-up of the antenna structure on 4 Time Square. The photo below is a close-up of the antennas on the roof of the Viacom building.

Although the antenna structure on the Times Square building appears to be one antenna, it actually comprises a number of sections, each of which covers various frequency ranges. Thus, the entire antenna assembly houses FM broadcast, VHF TV, and UHF TV antennas. In addition, special RF modules called “diplexers” allow more than one high power transmitter to transmit through the same antenna. Online references indicate that at one point following the destruction of the World Trade Center buildings and their antenna structures, replacement antennas were subsequently erected on other Manhattan and New Jersey structures that accommodated as many as six different transmitters for a single antenna assembly.

Such antennas are designed and built so that they radiate signals downward; i.e., the



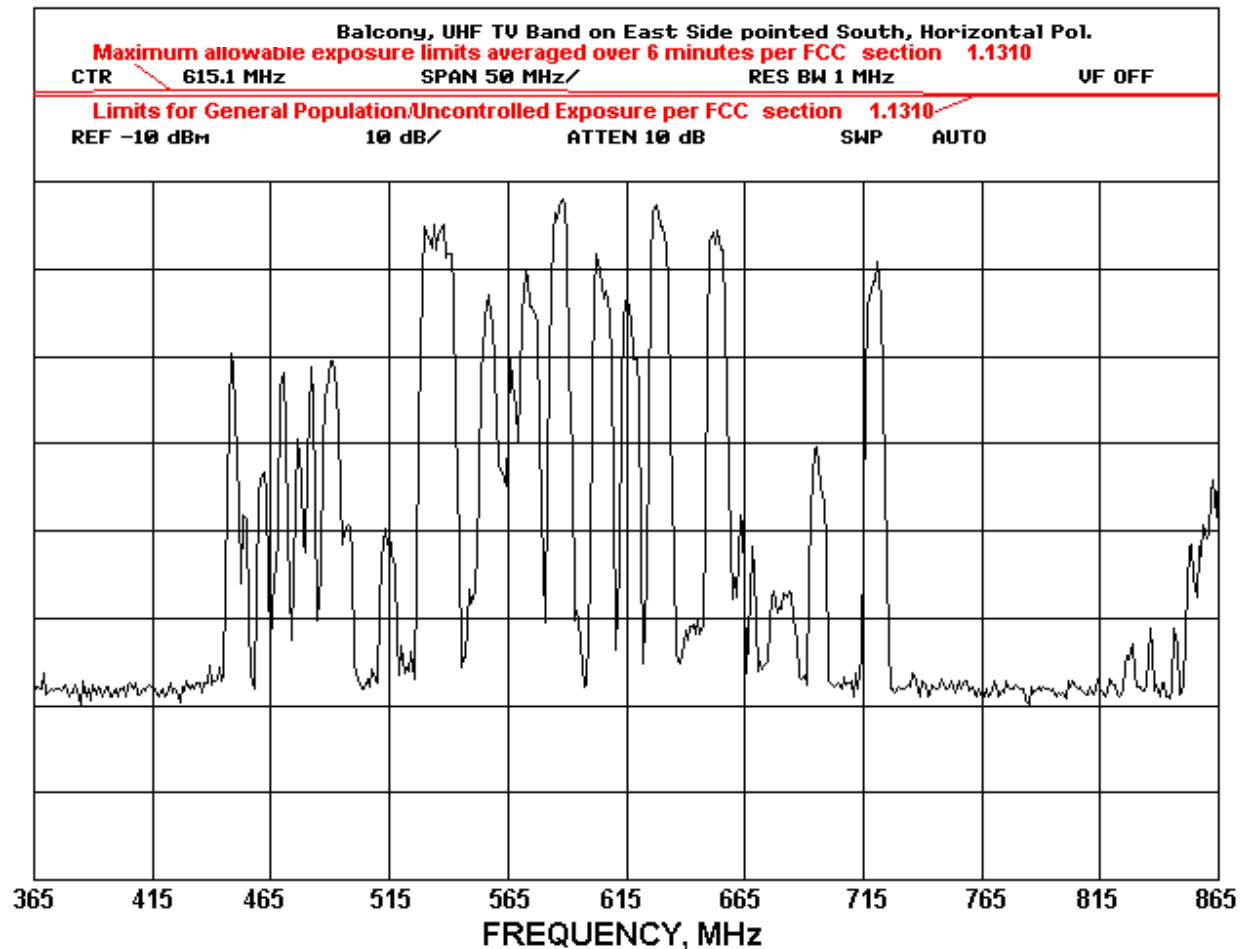
antenna patterns are optimized so that the antennas radiate more signal toward the ground than straight away from the antenna. This is so that TV and radio receivers closer to the ground within several miles of the antennas are able to have a strong direct signal, which helps prevent multipath reflections due to the signals bouncing off of buildings.

This downward antenna pattern tilt caused what had been the strongest UHF channel measured at the 35th floor, to drop by more than 10 dB when measured at the top of the surveyed building. However, another UHF TV channel, which level had been relatively modest at the 35th floor, increased by about the same amount when measured at the top floor. This level did not approach the levels measured on the 35th floor, however. In general, 360°RF found most UHF TV and FM broadcast signals to be noticeably lower in level when measured at the roof level, compared to on the 35th floor.



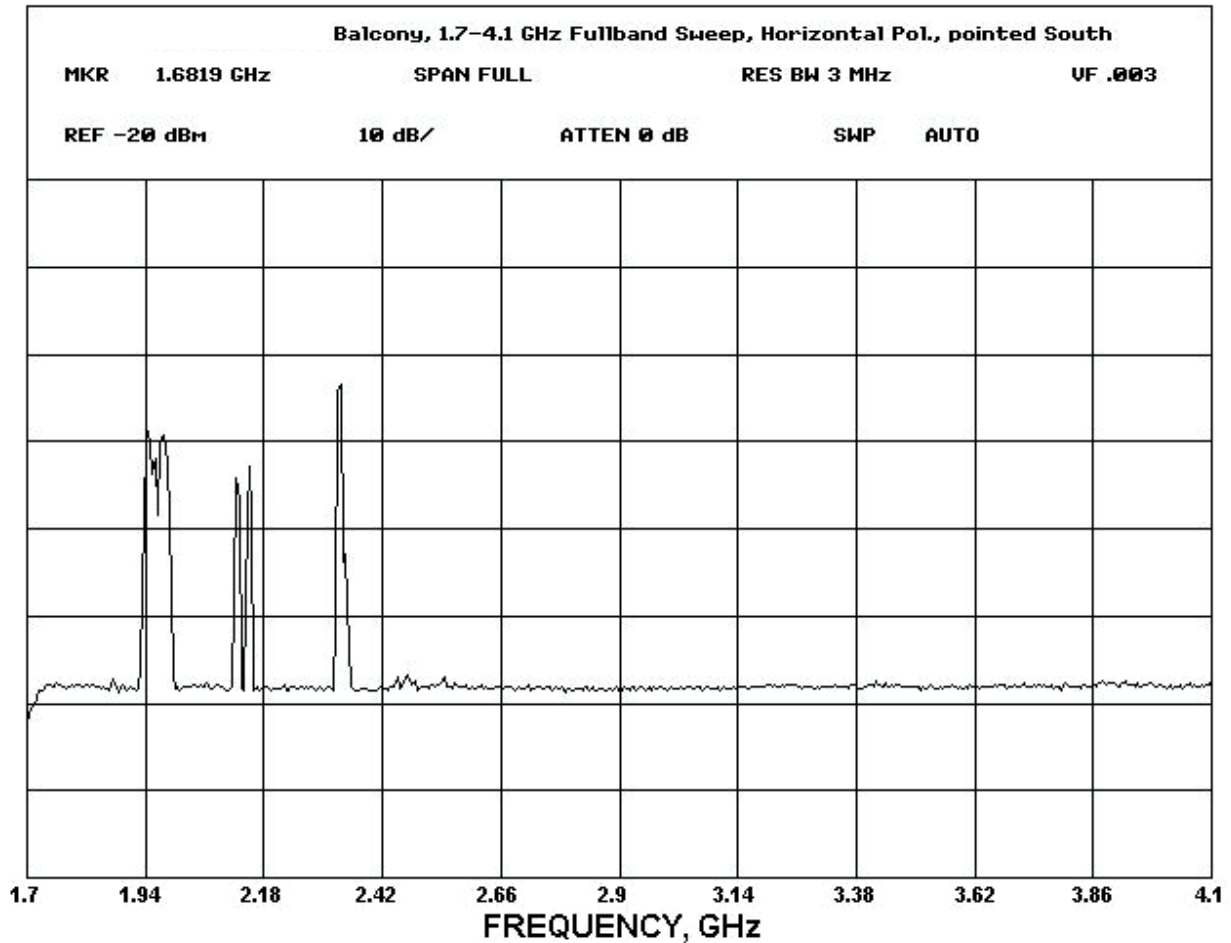
The strongest signals were not measured at our survey location on the south side of the building, however. We found that the signal levels, particularly many UHF TV signals, peaked when we placed our antenna approximately at the middle of the east side of the building then pointed the antenna toward the antennas on the 4 Times Square building; see the photo to the left. This location is often called a “hot spot”.

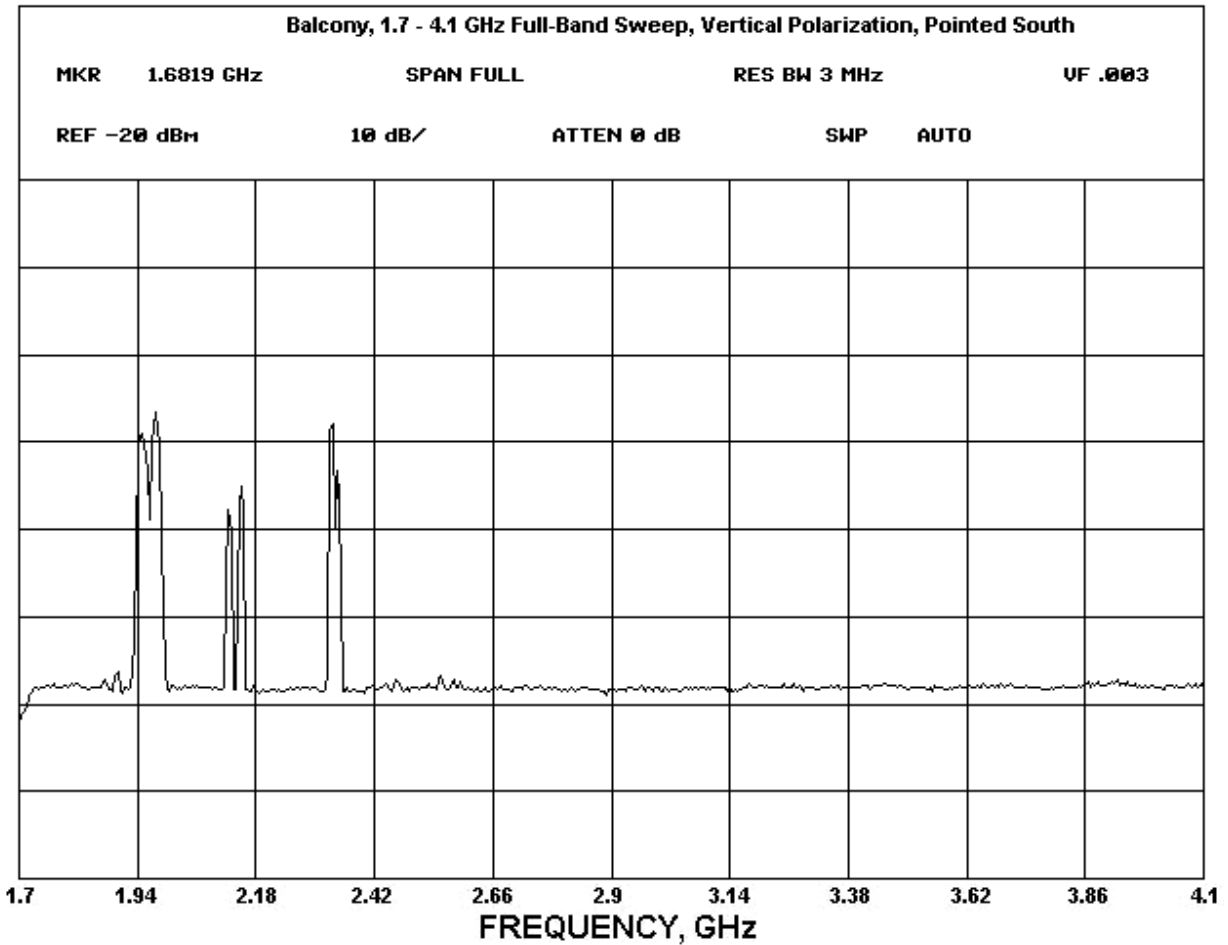
In this location, the strongest signals were what appear to be UHF TV channels 25 and 26, 536 - 542 MHz and 542 - 548 MHz, respectively. The following plot from 365 to 865 MHz shows the relative signal strengths, as well as the FCC Maximum Exposure and General Population/Uncontrolled Exposure limits. The strongest signals are more than 12 dB lower than the limits. When averaged over the UHF TV band from 465 MHz to 775 MHz, the average aggregate power level is approximately -50 dBm, far below either of the FCC’s exposure limits.



1.0 GHz to 2.6 GHz

The only signals we detected within this band were in the cellular/PCS data/telephone bands from 1.8 to 2.45 GHz; see the following plots. The FCC Maximum Allowable Exposure and General Population/Uncontrolled Exposure limits, with our antenna gain and cable loss, are some 35 to 40 dB higher than the maximum signal levels noted within this band. It is possible that there are other emitters within this frequency range but if so, they were not detectable due to their antennas not being pointed at the building.



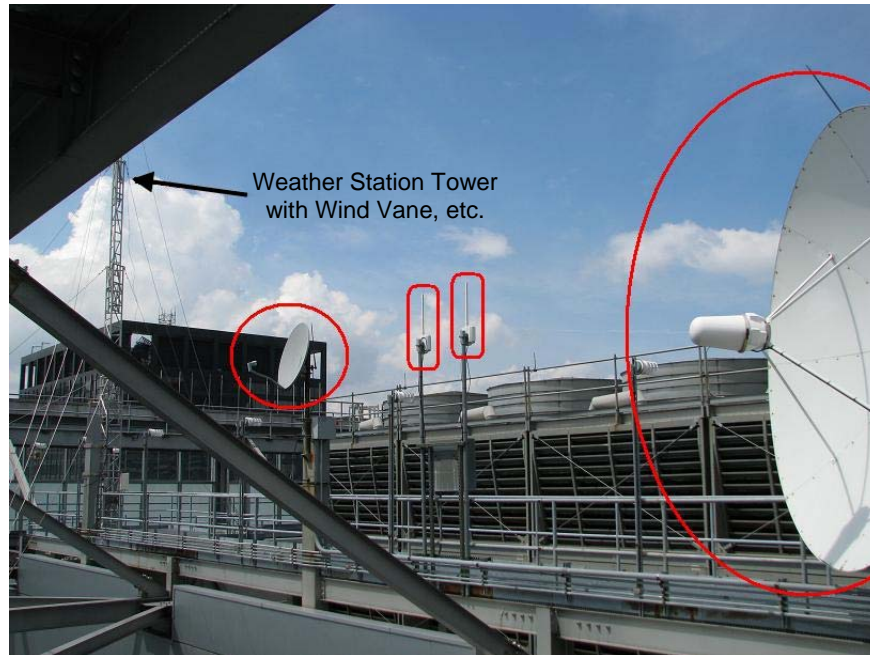


2.6 to 10.0 GHz

No signals were detected whatsoever within this frequency band. Typically, antennas for this band will be high gain and have very directional patterns, and be pointed directly toward the other point on the RF circuit. Thus, it is unlikely that such signals would be detected unless a high gain measurement antenna were pointed directly at an emitting antenna that had sidelobes sufficiently strong as to “splash” over.

Roof Top Antenna Systems on Surveyed Building

We found four or five antenna systems at the rooftop level; see the following photo.



The tower at the far left only appears to support a weather station, including a wind vane, rain gauge, etc., with possibly a small corner reflector near the top for the 2.3 or 5.8 GHz data bands. That antenna is far above the level at which a worker would be working while on the roof. 360°RF did not detect any transmissions from the antenna at any frequency. The small dish to the left of center appears to be aimed at satellites and could be for data transmission or possibly only reception. Its beam is clearly aimed upward into the sky, and during the survey period, we did not detect any transmissions from the dish or its feedhorn. The allowable power level in these bands is very low and would present no exposure risk to workmen, even on the topmost steel grated walkway.

In the center of the photo are two data radio transceivers which would also likely be operating in the same bands. Again, during the survey period, we did not detect any emissions from these radios.

A large dish is seen on the far right with a largish feedhorn assembly. This dish appears to be aimed slightly above the horizon, possibly toward the Viacom building (which appears to have numerous cellular and data antennas), but the size indicates the dish has very high gain which would be unnecessary for communications at that short distance. It's possible that this large dish is actually pointed at a satellite not far above the horizon. No transmissions were detected from this antenna.

Conclusion

The strongest RF signals measured were found to be from UHF television transmitting antennas apparently located on the roof of 4 Times Square. Signals from antennas located on the Empire State building were also very noticeable, but much weaker. Signals from antennas on the Viacom building were also weaker than from 4 Times Square, and included several FM broadcast channels. In all cases, according to FCC publications, all signals measured during the survey were found to be too low in level as to present any RF exposure risk to workers either on the 35th floor balcony, or on the upper roof level walkways.