

Radiofrequency Exposure Study
CBS Broadcasting Inc.
Earth Station E950004 New York, New York

CBS Broadcasting Inc. (“CBS”) seeks to modify Earth Station E950004 (the “Station”), a fixed Ku-Band satellite uplink located on the rooftop of the CBS Broadcast Center in Manhattan. The results of this study demonstrate that the proposed facility meets the FCC’s maximum permissible radiofrequency (“RF”) electromagnetic field exposure limits.

The operation was evaluated using the procedures outlined in FCC OET Bulletin No. 65 (“OET 65”), which describes a method of determining whether a proposed facility meets the RF guidelines specified in §1.1310 of the Rules. Under Commission policy, a facility is presumed to comply with the limits in §1.1310 if it satisfies the exposure criteria set forth in OET 65.

As shown below, RF attributable to the uplink antenna will not exceed the FCC general population and uncontrolled RF exposure limit at publicly accessible locations.¹ To achieve compliance, the antenna will only be utilized when the main beam is aimed at least five-degrees off-axis or 2.4 meters beyond publicly accessible areas. The vicinity of the antenna itself will be restricted by RF exposure warning signs to control access in areas known to exceed the FCC’s general population uncontrolled MPE limit. These areas may be further defined by measurements conducted by qualified, on-site personnel.

The following parameters were used in this Study:

Antenna Manufacturer	Andrew
Antenna Model	ES24VS-1
Center Transmit Frequency	14,250 MHz
Wavelength at Center Frequency	0.021 meters
Max Average Antenna Input Power	50.0 Watts
Antenna Diameter	2.4 meters
Antenna Gain	49.4 dBi
Antenna Gain Ratio	87096.3
Antenna Aperture Efficiency	0.678

¹ The general population/uncontrolled maximum permissible exposure (“MPE”) limit of 1 mW/cm² for 14,250 MHz is specified in §1.1310 of the Rules.

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The vicinity of the antenna (within 68.4 meters) defined as the “near field region”, is where the antenna directional characteristics have not fully formed. Because antenna manufacturer pattern specifications cannot be utilized to determine RF exposure in this region, OET 65 provides a methodology (Equation 13) for calculating worst case RF exposure. OET 65 also specifies that the worst case power density would be reduced 20 dB at locations beyond one antenna diameter (2.4 meters) off-axis from the main beam of the antenna. For the proposed system, the predicted off-axis, near field exposure level is 0.030 mW/cm² or 3.0 percent of the general population/uncontrolled limit. Off-axis predicted fields are further reduced at greater distances from the antenna.

In the “far field region” (164.3 meters or more from the antenna), directional characteristics have formed and the off-axis power density can be readily calculated using antenna pattern specifications. Locations greater than five degrees off-axis from the main beam have a minimum side-lobe attenuation of at least 37.8 dB. Using OET 65 methodology, this off-axis attenuation is predicted to result in a RF power density of 0.0002 mW/cm², or 0.02 percent of the general population/uncontrolled limit. Thus, by maintaining a main-beam aiming separation of at least one dish-diameter or five-degrees to publicly accessible areas, RF exposure levels can be maintained well below the FCC’s general population/uncontrolled limit.

As described previously, the maximum predicted off-axis, “near field” power density is 0.03 mW/cm², which is 0.6 percent of the controlled limit. With respect to worker safety, excessive exposure would not occur provided that adequate physical separation is maintained. Access to the vicinity of the antenna will be limited and restricted to authorized, trained personnel. An RF exposure policy is employed protecting those workers from excessive exposure when work must be performed where high RF levels may be present on the rooftop or near the antenna. Such protective measures may include, but will not be limited to, restriction of access to areas where levels in excess of the guidelines may be expected or the shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines

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would otherwise be exceeded. On-site RF exposure measurements may also be undertaken to further establish the bounds of safe working areas.

As demonstrated above, excessive levels of RF will not be caused at publicly accessible areas. Occupational areas will be protected by the restricted and controlled access of the building rooftop along with RFR warning signs and an overall RF exposure policy.