Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) RF Exposure

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

Calculation for Part 90 (450 - 470 MHz)

Highest conducted power = 39.55 *dBm*, therefore, **Limit for UnControlled Exposure: 0.313 mW/cm^2** (worst case)

1. EUT antenna gain (model AA202C/F) = 10 *dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (10 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[90160/4\pi 0.313]} = 152$ cm

2. EUT antenna gain (model AA19C) = 2*dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (1.58 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[14245/4\pi 0.313]} = 60$ cm

3. EUT antenna gain (model AA20C.1) = 4.5*dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (2.81 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[25334.96/4\pi 0.313]} = 80.25$ cm

4. EUT antenna gain (model AA19M) = 0 *dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (1 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[9016/4\pi 0.313]} = 48$ cm

5. EUT antenna gain (model AA20M) = 5.15 *dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (3.27 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[29482.32/4\pi 0.313]} = 87$ cm

6. EUT antenna gain (model AA202M) = 10.15 *dBi.*

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (0.313 mW/cm2)
P = Power Input to antenna (9016 mW)
G = Antenna Gain (10 numeric)
R. = Measurement distance

$R = \sqrt{PG / 4\pi S} = \sqrt{[90160/4\pi 0.313]} = 152$ cm