§ 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.

M25 Radio:

MPE Limit Calculation: EUT's operating frequency is 2412 - 2462 MHz and 5745 – 5825 MHz;.

2.4 GHz 802.11 g mode:

Highest conducted power = 207.5 mW (i.e. 23.17 dBm). Therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2.**

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

$$S = P G / 4\pi R^2$$

where,

S = Power Density mW/m^2
P = Power (mW)
R = Distance to the center of radiation of the antenna
G = Maximum antenna gain

Maximum antenna gain for EUT = 9 dBi = 7.94

P = 207.5 mW
R = 20 cm
G = 7.94

$$S1 = 207.5*7.94 / 4(3.1416)(20)^2$$

$$S1 = 0.33 \text{ mW/cm}^2$$

Therefore, EUT meets the Uncontrolled Exposure limit at 20cm.

5.8 GHz 802.11 a mode:

Highest conducted power = 216.3 mW (i.e. 23.35 dBm). Therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2.**

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

$$S = P G / 4\pi R^2$$

where,

S = Power Density mW/m^2
P = Power (mW)
R = Distance to the center of radiation of the antenna
G = Maximum antenna gain

Maximum antenna gain for EUT = 9 dBi = 7.94

P = 216.3 mW
R = 20 cm
G = 7.94

$$S2 = 216.3*7.94 / 4(3.1416)(20)^2$$

$$S2 = 0.34 \text{ mW/cm}^2$$

Therefore, EUT meets the Uncontrolled Exposure limit at 20cm

M5 Radio:

EUT's operating frequency is 5745 - 5825 MHz;. Highest conducted power = 475.3 mW (i.e. 26.76 dBm). Therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2.**

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

$$S = P G / 4\pi R^2$$

where,

S = Power Density mW/m^2
P = Power (mW)
R = Distance to the center of radiation of the antenna
G = Maximum antenna gain

Maximum antenna gain for EUT = 9 dBi = 7.94

P = 475.3 mW
R = **22 cm**
G = 7.94

$$S3 = 475.3*7.94 / 4(3.1416)(22)^2$$

$$S3 = 0.62 \text{ mW/cm}^2$$

Therefore, EUT meets the Uncontrolled Exposure limit at 22cm

Co-location:

S	Power density (mW/cm²)	General Population Limit (mW/cm²)	S as a fraction of the limit (%)
S1	0.33	1	33
S3	0.62	1	62

S	Power density (mW/cm²)	General Population Limit (mW/cm²)	S as a fraction of the limit (%)
S2	0.34	1	34
S3	0.48	1	48

The total percentages do not exceed 100 % per OET 65 requirements when the spectral power density is calculated at least **22cm** away from the unit.