RF Exposure Calculations: FCC ID PEJ-93829283-MSD9

The MPE (Maximum Permissible Exposure) distance was calculated based on the limits for a General Population/Uncontrolled Exposure, 900 MHz frequency band.[1] It was calculated for the worst case scenario – a 100% transmit duty cycle.

For an isotropic radiator, the surface area of a sphere can be used to determine the area over which the transceiver's energy is radiated. Surface Area Of A Sphere = $4 * \pi * \text{radius}^2$

In the case where there is an antenna gain, the worst case energy density is increased by the antenna gain factor. In this case, the exposure level for an uncontrolled environment can be calculated as follows:

MPE Distance = (Output Power * Duty Cycle Factor * 10 * (Antenna Gain / 10)) / ($4 * \pi$ * Exposure Limit))$^{1/2}$

Where Output Power = 5000mW
Duty Cycle Factor = 1 (worst case scenario when transmitter's duty cycle is 100%),
Antenna Gain = 6 dBi.
Exposure Limit = 0.6 mW/cm^2 (from the § 1.1310, Table 1).[3]

After applying all of the numbers listed above, we have:
MPE Distance = ((5000mW * 1 * 3.98) / (4 * 3.14 * 0.6))$^{1/2}$ = 51.4 cm.

Where Output Power = 5000mW
Duty Cycle Factor = 1 (worst case scenario when transmitter's duty cycle is 100%),
Antenna Gain = 12 dBi.
Exposure Limit = 0.6 mW/cm^2 (from the § 1.1310, Table 1).[3]

After applying all of the numbers listed above, we have:
MPE Distance = ((5000mW * 1 * 15.85) / (4 * 3.14 * 0.6))$^{1/2}$ = 102.5 cm.

WARNING

In order to comply with the FCC adopted RF exposure requirements, this transmitter system will be installed by the manufacturer's reseller professional. Installation of all antennas must be performed in a manner that will provide at least the MPE Distance from the front radiated aperture, to any user or member of the public.

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[1] FCC Rules and Regulations, 47CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure.
[2] FCC Rules and Regulations, 47CFR § 15.247(b)(2).
[3] FCC Rules and Regulations, 47CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure.

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For an isotropic radiator, the surface area of a sphere can be used to determine the area over which the transceiver's energy is radiated. Surface Area Of A Sphere = $4 * \pi * \text{radius}^2$

In the case where there is an antenna gain, the worst case energy density is increased by the antenna gain factor. In this case, the exposure level for an uncontrolled environment can be calculated as follows:

MPE Distance = (Output Power * Duty Cycle Factor * 10 * (Antenna Gain / 10)) / (4 * π * Exposure Limit))$^{1/2}$

Where Output Power = 1000mW
Duty Cycle Factor = 1 (worst case scenario when transmitter's duty cycle is 100%),
Antenna Gain = 6 dBi.
Exposure Limit = 0.6 mW/cm^2 (from the § 1.1310, Table 1).[3]

After applying all of the numbers listed above, we have:
MPE Distance = ((1000mW * 1 * 3.98) / (4 * 3.14 * 0.6))$^{1/2}$ = 23.0 cm.

Where Output Power = 1000mW
Duty Cycle Factor = 1 (worst case scenario when transmitter's duty cycle is 100%),
Antenna Gain = 12 dBi.
Exposure Limit = 0.6 mW/cm^2 (from the § 1.1310, Table 1).[3]

After applying all of the numbers listed above, we have:
MPE Distance = ((1000mW * 1 * 15.85) / (4 * 3.14 * 0.6))$^{1/2}$ = 45.8 cm.

WARNING

In order to comply with the FCC adopted RF exposure requirements, this transmitter system will be installed by the manufacturer's reseller professional. Installation of all antennas must be performed in a manner that will provide at least the MPE Distance from the front radiated aperture, to any user or member of the public.

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[1] FCC Rules and Regulations, 47CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure.
[2] FCC Rules and Regulations, 47CFR § 15.247(b)(2).
[3] FCC Rules and Regulations, 47CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure.