Calculation: RF-Exposure for 2.4 GHz WLAN transmitter

Type identification: ODIN-W2
FCC ID: PVH0965
IC Number 5325A-0965

In accordance to the **CFR Part 47, §1.1310**

S: Limit for power density according to CFR Part 47, §1.1310:

10 W/m^2

P: 117.5 mW [WLAN 2412 – 2462 MHz] (averaged over 30 min)
P: 151 mW [WLAN 5180 – 5240 MHz] (averaged over 30 min)
P: 162 mW [WLAN 5260 – 5320 MHz] (averaged over 30 min)
P: 229 mW [WLAN 5500 – 5700 MHz] (averaged over 30 min)
P: 234 mW [WLAN 5745 – 5825 MHz] (averaged over 30 min)
P: 68 mW [Bluetooth 2402 – 2480 MHz] (averaged over 30 min)
P: 23 mW [Bluetooth LE 2402 – 2480 MHz] (averaged over 30 min)

G: 6 dBi = 4 (Highest array gain for MiMo with 2 antennas)
G: 3 dBi = 2 (Highest gain @ 2.4 and 5 GHz band)

D: Duty cycle: 100 % = 1

R: Distance in what the limit of S has to be reached: 0.2 m

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.117W \cdot 4 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.94 \frac{W}{m^2}}}$$ [WLAN 2412 – 2462 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.151W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.60 \frac{W}{m^2}}}$$ [WLAN 5180 – 5240 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.162W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.64 \frac{W}{m^2}}}$$ [WLAN 5260 – 5320 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.229W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.91 \frac{W}{m^2}}}$$ [WLAN 5500 – 5700 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.589W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.93 \frac{W}{m^2}}}$$ [WLAN 5745 – 5825 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.068W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.27 \frac{W}{m^2}}}$$ [Bluetooth 2402 – 2480 MHz]

$$S = \frac{P \cdot G \cdot D}{4 \cdot \pi \cdot R^2} \Rightarrow \underline{\underline{S}} = \frac{0.023W \cdot 2 \cdot 1}{4 \cdot \pi \cdot (0.2\,m)^2} = \underline{\underline{0.09 \frac{W}{m^2}}}$$ [Bluetooth LE 2402 – 2480 MHz]

The value for the “General population / Uncontrolled Exposure” of the power density is below the limit of CFR Part 47, §1.1310.