

Antenna separation

900 MHz Antenna PCB trace

Bluetooth Antenna PCB trace



FCC Requirements

Unlicensed transmitter that transmits simultaneously with another transmitter, the maximum output power, $P_{Ref} = \frac{1}{2} * 60/f(\text{GHz})$.

Maximum permitted values of P_{Ref} are therefore:

$$\begin{aligned} \text{900 MHz radio, } P_{Ref} &= \frac{1}{2} * 60 / 0.921 \\ &= 32.57 \text{ mW} \\ &= 32.57 / 0.2125 \text{ (allowing for duty cycle}^1\text{)} \\ &= 153.3 \text{ mW} \end{aligned}$$

$$\begin{aligned} \text{Bluetooth radio, } P_{Ref} &= \frac{1}{2} * 60 / 2.48 \\ &= 12.1 \text{ mW} \end{aligned}$$

¹ The duty cycle of the 900 MHz radio is $6.8\text{ms} / 32\text{ms} = 0.2125$

CPED RF exposure consideration

Where antenna separation is > 5cm, as in the CPED, each transmitter may transmit at $2 * P_{Ref}^2$

Radio Transmitter	Maximum permitted transmit power to be $2 * P_{Ref}$ (mW)	Maximum actual transmitted power (mW)	Device exempt from routine evaluation
900 MHz	306.6	31.6 ³	Yes
Bluetooth	24.2	10.5 ⁴	

Industry Canada Requirements

RSS 210 section 2.5.1 specifies maximum permitted transmit powers for the 2 radios as:

- 200mW for 900 MHz radio
- 20mW for the Bluetooth radio.

RSS 210 section 3.1.2 states that "Compliance of devices with multiple transmitters capable of simultaneous transmission shall be assessed using internationally recognized methods proven to provide a conservative estimate of the SAR value."

Referencing the accepted FCC method above, the maximum permitted power is half the stated value when two transmitters operate simultaneously, but this can be doubled back up when the antennas are > 5cm from each other. The maximum permitted TX power for each transmitter shall therefore be the value stated in section 2.5.2.

Radio Transmitter	Maximum transmit power as per section 2.5.2 (mW)	Maximum transmitted power (mW)	Device exempt from routine evaluation
900 MHz	200.0	31.6	Yes
Bluetooth	20.0	11.0	

² FCC KDB 648474D01 V01r05

³ 14.98 dBm conducted power – report "SC_TR_053_A"

⁴ 10.2 dBm conducted power – report "G0M21008-3623-P-15-FCC15.247-PAN1315_Complete"