

RADIO FREQUENCY EXPOSURE (HAZARD) INFORMATION

Testing was performed in accordance with the requirements of FCC Part 15.247(b)(5)

Spread spectrum transmitters operating in the 2400 - 2483.5 MHz bands are required to be operated in a manner that ensures that the public is not exposed to RF energy levels in accordance with CFR 47, Section 1.1307(b)(1).

In accordance with this section and also section 2.1091 this device has been defined as a mobile device whereby a distance of 20 cm normally can be maintained between the user and the device.

In accordance with Section 1.1310, the Maximum Permissible Exposure (MPE) limit for the General Population/Uncontrolled Exposure of 1.0 has been applied, i.e 1mW/cm².

Friis transmission formula: $P_d = (P \cdot G) / (4 \cdot \pi \cdot r^2)$

where: P_d = power density (mW/cm²)

P = power input to the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of the antenna (cm)

The result was extracted from section 3.0 of EMC Technologies Report No: M040765_Cert_Onion2_BT_Cal2_11abg (Bluetooth):

Maximum peak output power = 10.41dBm = 11.0 mW

Antenna (Monopole Ceramic Chip) gain (typical) = 2.08 dBi = 1.61 numeric

Prediction distance = 20 cm

Prediction frequency = 2402 MHz

MPE limit for uncontrolled exposure at prediction frequency = 1 mW/cm²

Therefore, the power density at prediction frequency (P_d) = 0.0035mW/cm²

The result was extracted from section 3.0 of EMC Technologies Report No: M040765_Cert_Onion2_Cal2_11abg_DTS_BT (WLAN Module):

Maximum peak output power = 19.2dBm = 83.2mW

Antenna (Monopole Ceramic Chip) gain (typical) = 1.28 dBi = 1.34 numeric

Prediction distance = 20 cm

Prediction frequency = 2437 MHz

MPE limit for uncontrolled exposure at prediction frequency = 1 mW/cm²

Therefore, the power density at prediction frequency (P_d) = 0.0222 mW/cm²

The total power density (TPd) for WLAN and Bluetooth transmitters continuously operated:

$TP_d = 0.0222 \text{ (WLAN)} + 0.0035 \text{ (Bluetooth)} = 0.026\text{mW/cm}^2$

Calculations show that this device with described antenna does meet the MPE requirements for portable devices falling below the 20 cm clearance required.

Results: Complies

