MPE Calculation / RF Exposure

Product: HUB
Applicant: SAM JIN CO., LTD.
Model: STH-ETH-300
Address: (Anyang-dong) 81, Anyangcheonseo-ro, Manan-gu Anyang-si, Gyeonggi-do, Korea
FCC ID: 2AF4S-STH-ETH-300
IC: 20753-STHETH300

The FCC requires that the calculated MPE be equal to or less than a given limit dependent on frequency at a distance of 20 cm from the device to the body of the user. According to §2.1091, §2.1093 and §1.1307(b), 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 level in excess of the Commission's guidelines.

Classfication The antenna of this product is at least 20 cm away from the body of the user. So this product is classified as mobile device.

$$S = EIRP/4 \pi R^2$$

Where S = Power density

EIRP = Effective Isotropically Radiated Power

R = distance to the centre of radiation of the antenna

BT

Values S = 1.0 mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

P_T(LE) = -18.08 dBm (0.016 mW) : measured maximum output power

G = Antenna gain = 1.66 dBi (1.47 in linear terms)

EIRP = P_T x G

R = 20 cm

Calculation EIRP(LE) = 0.016 x 1.47 = 0.02 mW

S(LE) = 0.02/12.56 x (20)^2 = 0.02/5024

S(LE) = 0.000005 mW/cm^2

Conclusion **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 20 cm operation.**

Thread

Values   S = 1.0 mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

PT(Thread) = 9.27 dBm (8.45 mW) : measured maximum output power

G = Antenna gain = 2.53 dBi (1.79 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation   EIRP(Thread) = 8.45 x 1.79 = 15.14 mW

S(Thread) = 15.14/12.56 x (20)^2 = 15.14/5024

S(Thread) = 0.00301 mW/cm^2

Conclusion   **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 20 cm operation.**

Zigbee

Values   S = 1.0 mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

PT(Zigbee) = 9.68 dBm (9.29 mW) : measured maximum output power

G = Antenna gain = 2.29 dBi (1.69 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation   EIRP(Zigbee) = 9.29 x 1.69 = 15.74 mW

S(Zigbee) = 15.74/12.56 x (20)^2 = 15.74/5024

S(Zigbee) = 0.00313 mW/cm^2

Conclusion   **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 20 cm operation.**

WLAN2.4GHz

Values $S = 1.0$ mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

PT(WLAN2.4GHz) = 13.12 dBm (20.512 mW) : measured maximum output power

G = Antenna gain = 4.82 dBi (3.03 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation   EIRP(WLAN2.4GHz) = 20.512 x 3.03 = 62.23 mW

S(WLAN2.4GHz) = 62.23/12.56 x (20)^2 = 62.23/5024

S(WLAN2.4GHz) = 0.01238 mW/cm^2

Conclusion   **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 20 cm operation.**

WLAN5GHz

Values $S = 1.0$ mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

PT(WLAN5GHz Band1) = 14.11 dBm (25.763 mW) : measured maximum output power

PT(WLAN5GHz Band4) = 9.49 dBm (8.892 mW) : measured maximum output power

G(WLAN5GHz Band1) = Antenna gain = 5.36 dBi (3.44 in linear terms)

G(WLAN5GHz Band4) = Antenna gain = 3.17 dBi (2.07 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation   EIRP(WLAN5GHz Band1) = 25.763 x 3.44 = 88.51 mW

S(WLAN5GHz Band1) = 88.51/12.56 x (20)^2 = 88.51/5024

S(WLAN5GHz Band1) = 0.01761 mW/cm^2

EIRP(WLAN5GHz Band4) = 8.892 x 2.07 = 18.45 mW

S(WLAN5GHz Band4) = 18.45/12.56 x (20)^2 = 18.45/5024

S(WLAN5GHz Band4) = 0.00367 mW/cm^2

Conclusion   **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 20 cm operation.**