MPE Calculation / RF Exposure

Product: iiRcade Game Console Bartop
Applicant: IIRCADE, INC.
Model: IRORO1-128C19OGA
Address: No.A-627, 338 GwanggyoJungang-Ro, Suji-Gu, Yongin-Si, Gyeonggi-Do, 16942, Republic of KOREA
FCC ID: 2AXRR-IRORO1

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.

▣BT

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.

Max. tune-up power(dBm)

BDR(GFSK)	EDR(π/4DQPSK)	EDR(8DPSK)	Tune-up tolerance
5.00	5.00	5.00	±1 dB

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

Where S = Power density
EIRP = Effective Isotropically Radiated Power
R = distance to the centre of radiation of the antenna

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(BDR/EDR) = 6.00 dBm (3.98 mW) : measured maximum output power
G = Antenna gain = 6 dBi (3.981 in linear terms)
EIRP = PT x G
R = 20 cm

Calculation EIRP(BDR/EDR) = 3.98 x 3.981 = 15.849 mW
S(BDR/EDR) = 15.84/12.56 x $(20)^2$ = 15.84/5024
S(BDR/EDR**) = 0.00315 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

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.

Max. tune-up power(dBm)

802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	Tune-up tolerance
18.00	18.00	18.00	**18.00**	±1 dB

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

Where S = Power density

EIRP = Effective Isotropically Radiated Power

R = distance to the centre of radiation of the antenna

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 = 19.00 dBm (79.43 mW) : measured maximum output power

G = Antenna gain = 6 dBi (3.981 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation EIRP = 79.43 x 3.981 = 316.228 mW

S = 316.22/12.56 x (20)^2 = 316.22/5024

S = 0.06294 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

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.

Max. tune-up power(dBm)

802.11a	802.11n(HT20)	802.11n(HT40)	802.11ac(VHT20)	802.11ac(VHT40)	802.11ac(VHT80)	Tune-up tolerance
19.00	19.00	19.00	16.00	16.00	16.00	±1 dB

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

Where S = Power density

EIRP = Effective Isotropically Radiated Power

R = distance to the centre of radiation of the antenna

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 = 20.00 dBm (100.00 mW) : measured maximum output power

G = Antenna gain = 6 dBi (3.981 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation EIRP = 100.00 x 3.981 = 398.107 mW

S = 398.10/12.56 x (20)^2 = 398.10/5024

S = 0.07923 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.**

▣ Simultaneously MPE

Simultaneously MPE = PSD1/Limit1 + PSD2/Limit2

BT + WLAN5 GHz

Simultaneously MPE = (0.003 15 mW/cm^2 / 1) + (0.079 23 mW/cm^2 / 1)

= 0.082 38

Note: WLAN2.4 GHz and WLAN5 GHz do not transmit simultaneously with each other.