

RF Exposure / MPE Calculation

No. : 12751991H-A
Applicant : Roland Corporation
Type of Equipment : Musical Keyboard
Model No. : GO-61P-A
FCC ID : SOP421401A

Roland Corporation declares that Model: GO-61P-A complies with FCC radiation exposure requirement specified in the FCC Rule 2.1091 (for mobile).

RF Exposure Calculations:

The following information provides the minimum separation distance for the highest gain antenna provided with the "GO-61P-A" as calculated from (B) Limits for General Population / Uncontrolled Exposure of TABLE 1- LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) of §1.1310 Radiofrequency radiation exposure limits.

[WLAN (2.4 GHz) part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm² uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$

Where

$P =$ 21.33 mW (Maximum average output power)

Time average was used for the above value in consideration of 6-minutes time-averaging

Burst power average was used for the above value in consideration of worst condition.

$G =$ 2.291 Numerical Antenna gain; equal to 3.6dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S =$ 0.00972 mW/cm²

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GO-61P-A contains certified Bluetooth module (FCC ID: A8TBM62S2).
The WLAN (2.4 GHz) and the Bluetooth transmit simultaneously.
Compliance for simultaneous transmission are shown by the following calculations.

Reference:

[Bluetooth (BR/EDR) part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm² uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$

Where

$$\begin{aligned} P &= 3.60 \text{ mW (Maximum peak output power)} \\ G &= 1.558 \text{ Numerical Antenna gain; equal to 1.927dBi} \\ r &= 20 \text{ cm (Separation distance)} \end{aligned}$$

$$\text{Power Density Result } S = 0.00112 \text{ mW/cm}^2$$

[Bluetooth (Low Energy) part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm² uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$

Where

$$\begin{aligned} P &= 2.75 \text{ mW (Maximum peak output power)} \\ G &= 1.558 \text{ Numerical Antenna gain; equal to 1.927dBi} \\ r &= 20 \text{ cm (Separation distance)} \end{aligned}$$

$$\text{Power Density Result } S = 0.00085 \text{ mW/cm}^2$$

Therefore, if WLAN 2.4GHz and Bluetooth (BR/EDR) transmit simultaneously,
 $S=0.00972 \text{ mW/cm}^2+0.00112 \text{ mW/cm}^2$
 $=0.01084 \text{ mW/cm}^2$

Therefore, if WLAN 2.4GHz and Bluetooth (Low Energy) transmit simultaneously,
 $S=0.00972 \text{ mW/cm}^2 + 0.00085 \text{ mW/cm}^2$
 $=0.01057 \text{ mW/cm}^2$

Even taking into account the tolerance, this device can be satisfied with the limits.

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