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/cm^2 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/cm^2**

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

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/cm^2 uncontrolled exposure limit. The Friis formula used was:

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

Where

P = 3.60 mW (Maximum peak output power)
G = 1.558 Numerical Antenna gain; equal to 1.927dBi
r = 20 cm (Separation distance)

Power Density Result S = **0.00112 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/cm^2 uncontrolled exposure limit. The Friis formula used was:

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

Where

P = 2.75 mW (Maximum peak output power)
G = 1.558 Numerical Antenna gain; equal to 1.927dBi
r = 20 cm (Separation distance)

Power Density Result S = **0.00085 mW/cm^2**

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

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

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

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124