RF Exposure / MPE Calculation

No.	:	12786766H
Applicant	:	Panasonic Corporation
Type of Equipment	:	WiFi Module
Model No.	:	WL17A
FCC ID	:	ACJ9TGWL17A

Panasonic Corporation declares that Model: WL17A 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 "WL17A" 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.

[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 = 44.67 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 = 1.291 Numerical Antenna gain; equal to 1.11dBi

r = 20 cm (Separation distance)

Power Density Result S = **0.01147 mW/cm^2**

[5 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 = 39.81 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 = 1.862 Numerical Antenna gain; equal to 2.7dBi

r = 20 cm (Separation distance)

Power Density Result S = **0.01475 mW/cm^2**

FZ-55 contains certified wireless module (FCC ID: ACJ9TGWL18A).
The WiFi module and the Wireless module both transmit simultaneously.
Compliance for simultaneous transmission are shown by the following calculations.

Reference:

[WL18A module WLAN (SISO) part highest value]

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 = 100.00 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 = 1.660 Numerical Antenna gain; equal to 2.2 dBi

r = 20 cm (Separation distance)

Power Density Result S = **0.03302 mW/cm^2**

[WL18A module WLAN (MIMO) part highest value]

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 = 125.89 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 = 1.660 Numerical Antenna gain; equal to 2.2 dBi

r = 20 cm (Separation distance)

Power Density Result S = **0.04157 mW/cm^2**

Reference:

[WL18A module Bluetooth part highest value]

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 = 8.91 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 = 1.524 Numerical Antenna gain; equal to 1.83 dBi

r = 20 cm (Separation distance)

Power Density Result S = **0.00270 mW/cm^2**

Therefore, if WLAN (WL17A), WLAN and Bluetooth (WL18A) transmit simultaneously, the combination to be the maximum is as follows;

< WLAN (WL17A) + WLAN(SISO) + Bluetooth (WL18A) >

S = 0.01475 mW/cm^2 + 0.03302 mW/cm^2 + 0.00270 mW/cm^2

= 0.05047 mW/cm^2

< WLAN (WL17A) + WLAN(MIMO) >

S = 0.01475 mW/cm^2 + 0.04157 mW/cm^2

= 0.05632 mW/cm^2

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