# RF Exposure / MPE Calculation

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|---|---|
| No. | 14033198S |
| Customer | Panasonic Automotive Systems Co., Ltd. |
| Description of EUT | Car Navigation |
| Model Number of EUT | AT2107 |
| FCC ID | ACJ932AT2107 |

Panasonic Automotive Systems Co., Ltd. declares that Model: AT2107 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 "AT2107" 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.

**[Bluetooth 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* = 3.29 mW (Maximum average output power)

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

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

*G* = 1.614 Numerical Antenna gain; equal to 2.08 dBi

*r* = 20 cm (Separation distance)

***Power Density Result S =* 0.00106 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* = 2.61 mW (Maximum average output power)

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

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

*G* = 1.614 Numerical Antenna gain; equal to 2.08 dBi

*r* = 20 cm (Separation distance)

***Power Density Result S =*** **0.00084 mW/cm$^2$**

## [WLAN 2.4 GHz band part]

This calculation is based on the highest EIRP possible from the system,
considering maximum power and antenna gain, and considering a 1 mW/cm^2 uncontrolled exposure limit. The Friis formula used was:

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

Where

*P* = 17.50 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* = 2.535 Numerical Antenna gain; equal to 4.04 dBi

*r* = 20 cm (Separation distance)

***Power Density Result S =*** **0.00883 mW/cm$^2$**

Therefore, if Bluetooth (BR/EDR) and WLAN (2.4 GHz band) transmit simultaneously,

**S= 0.00106 mW/cm$^2$ + 0.00883 mW/cm$^2$**

**= 0.00989 mW/cm$^2$**