

RF Exposure / MPE Calculation

No.	14337815S
Customer	Panasonic Automotive Systems Co., Ltd.
Description of EUT	AV Control Unit for In-Vehicle Infotainment
Model Number of EUT	AM2201
FCC ID	ACJ932AM2201

Panasonic Automotive Systems Co., Ltd. declares that Model: AM2201 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 “AM2201” 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/cm² uncontrolled exposure limit. The Friis formula used was:

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

Where

$P =$ 4.00 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.

$G =$ 1.585 Numerical Antenna gain; equal to 2 dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00126 \text{ mW/cm}^2$

[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/cm² uncontrolled exposure limit. The Friis formula used was:

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

Where

$P =$ 16.48 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.

$G =$ 1.585 Numerical Antenna gain; equal to 2 dBi

$r =$ 20 cm (Separation distance)

$$\text{Power Density Result } S = 0.00520 \text{ mW/cm}^2$$

[WLAN 5 GHz band 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

$P =$ 3.17 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.

$G =$ 3.162 Numerical Antenna gain; equal to 5 dBi

$r =$ 20 cm (Separation distance)

$$\text{Power Density Result } S = 0.00199 \text{ mW/cm}^2$$

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

$$\begin{aligned} S &= 0.00520 \text{ mW/cm}^2 + 0.00126 \text{ mW/cm}^2 \\ &= 0.00646 \text{ mW/cm}^2 \end{aligned}$$

Therefore, if WLAN (5 GHz band) and Bluetooth (BR/EDR) transmit simultaneously,

$$\begin{aligned} S &= 0.00199 \text{ mW/cm}^2 + 0.00126 \text{ mW/cm}^2 \\ &= 0.00325 \text{ mW/cm}^2 \end{aligned}$$