

RF Exposure / MPE Calculation

No. : 13329061H-R2
Applicant : Pioneer Corporation
Type of Equipment : Car Audio with Bluetooth / WLAN
Model No. : SA211
FCC ID : AJDK114

Pioneer Corporation declares that Model: SA211 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 "SA211" 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 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

$P =$ 54.08 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.

$G =$ 0.271 Numerical Antenna gain; equal to -5.67dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00292 \text{ mW/cm}^2$

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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

$P =$ 2.77 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.

$G =$ 0.290 Numerical Antenna gain; equal to -5.38 dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00016 \text{ mW/cm}^2$

Therefore, if WLAN and Bluetooth transmit simultaneously,

$$S = 0.00292 \text{ mW/cm}^2 + 0.00016 \text{ mW/cm}^2 = 0.00308 \text{ mW/cm}^2$$

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

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