

RF Exposure / MPE Calculation

No.	15486544S
Customer	ALPS ALPINE CO., LTD.
Description of EUT	Vehicle equipment
Model Number of EUT	AH00CDC
FCC ID	A269ZUA174

ALPS ALPINE CO., LTD. declares that Model: AH00CDC 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 "AH00CDC" as calculated from (II) Limits for General Population / Uncontrolled Exposure of TABLE 1- LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) of §1.1310 Radiofrequency radiation exposure limits.

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:

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

[WLAN 2.4 GHz band part]

Where

$P =$ 35.48 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.

$G =$ 0.676 Numerical Antenna gain; equal to -1.7dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00477 \text{ mW/cm}^2$

[WLAN 5 GHz band part]

Where

$P =$ 5.01 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.

$G =$ 2.138 Numerical Antenna gain; equal to 3.3dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00213 \text{ mW/cm}^2$

[WLAN 6 GHz band part]

Where

$P =$ 0.13 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.

$G =$ 2.931 Numerical Antenna gain; equal to 4.67dBi

$r =$ 20 cm (Separation distance)

Power Density Result $S = 0.00008 \text{ mW/cm}^2$

[Bluetooth (LE) part]

Where

 $P = 2.51 \text{ mW}$ (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. $G = 0.676$ Numerical Antenna gain; equal to -1.7dBi $r = 20 \text{ cm}$ (Separation distance)**Power Density Result $S = 0.00034 \text{ mW/cm}^2$** **[Bluetooth (BR / EDR) part]**

Where

 $P = 2.51 \text{ mW}$ (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. $G = 0.676$ Numerical Antenna gain; equal to -1.7dBi $r = 20 \text{ cm}$ (Separation distance)**Power Density Result $S = 0.00034 \text{ mW/cm}^2$**

Therefore, if [WLAN 5 GHz and Bluetooth part] transmit simultaneously,

$$\begin{aligned} S &= 0.00213 \text{ mW/cm}^2 + 0.00034 \text{ mW/cm}^2 \\ &= 0.00247 \text{ mW/cm}^2 \end{aligned}$$

Therefore, if [WLAN 6 GHz and Bluetooth part] transmit simultaneously,

$$\begin{aligned} S &= 0.00008 \text{ mW/cm}^2 + 0.00034 \text{ mW/cm}^2 \\ &= 0.00042 \text{ mW/cm}^2 \end{aligned}$$

Therefore, if [WLAN 2.4 GHz and WLAN 5 GHz] transmit simultaneously,

$$\begin{aligned} S &= 0.00477 \text{ mW/cm}^2 + 0.00213 \text{ mW/cm}^2 \\ &= 0.0069 \text{ mW/cm}^2 \end{aligned}$$

Therefore, if [WLAN 2.4 GHz and WLAN 6 GHz] transmit simultaneously,

$$\begin{aligned} S &= 0.00477 \text{ mW/cm}^2 + 0.00008 \text{ mW/cm}^2 \\ &= 0.00485 \text{ mW/cm}^2 \end{aligned}$$