RF Exposure / MPE Calculation

No.	16194649S
Customer	ALPS ALPINE CO., LTD.
Description of EUT	Vehicle equipment
Model Number of EUT	AH00CDC 3
FCC ID	A269ZUA175

ALPS ALPINE CO., LTD. declares that Model: AH00CDC 3 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 3“ 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/cm^2 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 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 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 mW/cm^2**

[Bluetooth (LE) part]

Where

P = 2.51 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* = 0.00034 mW/cm^2**

[Bluetooth (BR / EDR) part]

Where

P = 2.51 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* = 0.00034 mW/cm^2**

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

S= 0.00213 mW/cm^2 + 0.00034 mW/cm^2

= 0.00247 mW/cm^2

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

S= 0.00008 mW/cm^2 + 0.00034 mW/cm^2

= 0.00042 mW/cm^2

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

S= 0.00477 mW/cm^2 + 0.00213 mW/cm^2

= 0.0069 mW/cm^2

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

S= 0.00477 mW/cm^2 + 0.00008 mW/cm^2

= 0.00485 mW/cm^2