1 Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Report Number JP23VU3C 004 : **Test Specification** Test item : Car Audio Identification / Type No. : P2301 FCC ID : AX2P2301 419C-P2301 IC: Test standard : CFR47 FCC Part 2: Section 2.1091 CFR47 FCC Part 1: Section 1.1310 FCC KDB Publication 447498 D01 v06 FCC KDB Publication 865664 D02 v01r02 RSS-102 Issue 6 December 2023

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1.1.1.1 RF Exposure Compliance Requirement for FCC

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

Max -0.40 dBi for Bluetooth Max -1.15 dBi for 2.4GHz Wi-Fi Max -0.35 dBi for 5.8GHz Wi-Fi

> Radio Frequency Exposure Limit

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)
300-1,500			f/1500
1,500-100,000			1.0

> Radio Frequency Exposure Calculation Formula

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where: EIRP = equivalent (or effective) isotropically radiated power

a) RF Exposure Evaluation standalone operations (worse case)

Mode	*Measured RF Output Power (dBm)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm²)	FCC Limit (mW/cm ²)
Bluetooth	2.01	1.71	20	0.0003	1.0
2.4G Wi-Fi	19.21	18.06	20	0.0127	1.0
5.8 G Wi-Fi	9.64	9.29	20	0.0017	1.0

Note:

1. 2.4GHz Band RF Output Power: Refer to JP23VU3C 001& JP23VU3C 002.

2. 5.8GHz Band RF Output Power: Refer to JP23VU3C 003.

b) Simultaneous Transmission operation mode

Mode	Sum Radio	Limit
Bluetooth+5.8 G Wi-Fi	0.002	<1
Bluetooth+2.4 G Wi-Fi	0.013	<1

Note:

1. The 2.4GHz Wi-Fi and 5.8G Wi-Fi of EUT cannot transmitting sync.

> Conclusion

Therefore, the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.

1.1.1.2 RF Exposure Compliance Requirement for IC

The EUT shall comply with the requirement of RSS-102 section 5.3.2 Electric field strength levels, magnetic field strength levels and power density levels (10 MHz to 300 GHz)

The electric and magnetic field strength reference levels, power density reference levels, and associated reference period for devices employed by the general public (uncontrolled environment) and controlled-use devices (controlled environment) are specified in below table. Note that the power density limits specified in these tables apply to whole body exposure conditions.

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	58.07 /f ^{0.25}	0.1540 /f ^{0.25}	8.944 /f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142f ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/f ^{1.2}
150000-300000	0.158f ^{0.5}	4.21×10 ⁻⁴ f ^{0.5}	6.67×10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz.

a) RF Exposure Calculations for ISED, Stand-alone mode

Mode	*Measured RF Output Power (dBm)	EIRP (dBm)	Distance (cm)	Power Density (W/m²)	IC Limit (W/m²)
Bluetooth	2.01	1.71	20	0.0003	5.35
2.4G Wi-Fi	19.21	18.06	20	0.0127	5.35
5.8 G Wi-Fi	9.64	9.29	20	0.0017	9.77
Note: 1. 2.4GHz Band RF Output Power: Refer to JP23VU3C 001& JP23VU3C 002.					

2. 5.8GHz Band RF Output Power: Refer to JP23VU3C 003.

b) Simultaneous Transmission operation mode

Mode	Sum Radio	Limit
Bluetooth+5.8 G Wi-Fi	0.0022	<1
Bluetooth+2.4 G Wi-Fi	0.0024	<1

Note:

1. The 2.4GHz Wi-Fi and 5.8G Wi-Fi of EUT cannot transmitting sync.

> Conclusion

"RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons."