

FCC MPE Report

RF EXPOSURE REPORT

Applicant	CARPLAY TECHNOLOGY (CHINA) LIMITED
Address	ROOMS 1318-19, 13/F, HOLLYWOOD PLAZA, 610 NATHAN ROAD, MONGKOK, KOWLOON, HONG KONG
Manufacturer or Supplier	CARPLAY TECHNOLOGY (CHINA) LIMITED
Address	ROOMS 1318-19, 13/F, HOLLYWOOD PLAZA, 610 NATHAN ROAD, MONGKOK, KOWLOON, HONG KONG
Product	Wireless CarPlay / Android Auto Kits
Trade Mark	CarPlayKits
Model	Cp2, Cp4, Cp6, Cp8, Cp10, Cp12, Cp14, Cp16, Cp18, Cp20, Cp22, Cp24, Cp26, Cp28, Cp30, Cp32, Cp34, Cp36, Cp38, Cp40
Additional Model & Model Difference	These models of PCB boards, structures, and interiors are the same, Just the appearance and shell are different
Date of tests	June 04~26, 2024
☒ FCC Part 2 (Section 2.1093) ☒ KDB447498 D01 V06 ☒ IEEE C95.1	
CONCLUSION: The submitted sample was found to <u>COMPLY</u> with the test requirement	

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1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied.

These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.

To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures.

When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion.

When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions.

- a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR,}$$
where

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds* in step b) below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

- b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):

- 1) $\{[\text{Power allowed at } \textit{numeric threshold} \text{ for } 50 \text{ mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\}$ mW, for 100 MHz to 1500 MHz

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- 2) $\{[\text{Power allowed at } \textit{numeric threshold} \text{ for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$ mW, for $> 1500 \text{ MHz}$ and $\leq 6 \text{ GHz}$
- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):
 - 1) For test separation distances $> 50 \text{ mm}$ and $< 200 \text{ mm}$, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$
 - 2) For test separation distances $\leq 50 \text{ mm}$, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
 - 3) SAR measurement procedures are not established below 100 MHz.

When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any SAR test results below 100 MHz to be acceptable.

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2. PORTABLE DEVICE EVALUATION METHOD AND LIMIT

Following FCC KDB 447498 D01 "General SAR test exclusion guidance" The corresponding SAR ExclusionThreshold condition, listed below:

1)The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances <50mm are determined by:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \left(\frac{f(\text{GHz})}{3.0} \right)^2$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where $f(\text{GHz})$ is the RF channel transmit frequency in GHz.

Power and distance are rounded to the nearest mW and mm before calculation.

The result is rounded to one decimal place for comparison. The test exclusions are applicable only when the minimum test separation distance is 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2)At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

a) $\left[\text{Threshold at 50 mm in step 1} + \left(\frac{\text{test separation distance} - 50 \text{ mm}}{50 \text{ mm}} \right) \times \left(\frac{f(\text{MHz})^2}{150} \right) \right] \text{ mW}$, at 100 MHz to 1500 MHz;

b) $\left[\text{Threshold at 50 mm in step 1} + \left(\frac{\text{test separation distance} - 50 \text{ mm}}{50 \text{ mm}} \right) \times 10 \right] \text{ mW}$ at > 1500 MHz and < 6 GHz;

3)At frequencies below 100 MHz, the following may be considered for SAR test exclusion.

a)The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $(1 + \log(100/f(\text{MHz})))$ for test separation distances > 50 mm and < 200 mm.

b)The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by 1/2 for test separation distances 50 mm or less.

c)SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

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3. MOBILE DEVICE EVALUATION METHOD AND LIMIT

Human exposure to RF emissions from mobile devices (47 CFR S2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons

LIMITS FOR GENERAL POPULATION UNCONTROLLED EXPOSURE

Frequency Range (MHz)	E-field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (Minutes)
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	f/1500	30
1500 – 100,000	--	--	1.0	30

*Note:

1. f= Frequency in MHz * Plane-wave Equivalent Power Density
2. The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters. See 47 CFR SS2.1091 and 2.1093 on source-based time-averaging requirement for mobile and portable transmitters.

$$S = PG / 4\pi R^2$$

Where:

S=power density

P=power input to antenna

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

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4. SAR Test Exclusion Thresholds

We use 5mm as separation distance to calculated.

Antenna gain:-1.17dBi

5GWIFI :

Transmit Frequency (GHz)	Mode	Measured Power (dBm)	Tune-up power (dBm)	Max tune-up	Result	1g SAR
				power(dBm)	calculation	
5180	11A	5.01	5±1	6	1.8122	3
5200		4.90	5±1	6	1.8156	3
5240		6.05	6±1	7	2.2945	3
5745		4.66	4±1	5	1.5159	3
5785		3.72	3±1	4	1.2083	3
5825		4.15	5±1	6	1.9217	3
5180	11N20	4.88	4±1	5	1.4394	3
5200		4.57	4±1	5	1.4422	3
5240		4.97	4±1	5	1.4478	3
5745		6.15	6±1	7	2.4026	3
5785		4.66	4±1	5	1.5212	3
5825		3.79	3±1	4	1.2125	3
5190	11N40	5.50	5±1	6	1.8139	3
5230		6.58	6±1	7	2.2923	3
5755		6.34	6±1	7	2.4047	3
5795		4.35	4±1	5	1.5225	3

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Antenna gain: -4.39 dBi

Bluetooth DSSS:

Transmit Frequency (GHz)	Mode	Measured Power (dBm)	Tune-up power (dBm)	Max tune-up	Result	1g SAR
				power(dBm)	calculation	
2.402	GFSK	5.83	5±1	6	1.2340	3
2.441		6.13	6±1	7	1.5661	3
2.480		5.56	5±1	6	1.2539	3
2.402	π/4-DQPSK	7.41	7±1	8	1.9558	3
2.441		7.35	7±1	8	1.9716	3
2.480		6.85	6±1	7	1.5785	3
2.402	8DPSK	7.73	7±1	8	1.9558	3
2.441		7.70	7±1	8	1.9716	3
2.480		7.32	7±1	8	1.9873	3

BT, WLAN 5.2G, and WLAN 5.8G cannot be transmitted simultaneously

5. Conclusion:

For the max result: $2.7074 \leq 3.0$ for 1g SAR, No SAR is required.