1 Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT: **Pass**

Test Specification		
Test item	:	WiFi & BT Platform Module
Identification / Type No.	:	AP72598V
FCC ID	:	APIAP72598V
IC	:	6132A-AP72598V
HVIN	:	AP72598V
HMN	:	MA710, MA7100HP, MA9100HP
FVIN	:	V1.44
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

Remark:

1. This is a C2PC(FCC) or C4PC(IC) application to evaluate the antenna(s) used for the module: AP72598V transmit simultaneously with Bluetooth module: QCC5181 in specific hosts (Model No.: MA710, MA7100HP, MA9100HP).
2. The Bluetooth function of module AP72598V will be disabled via software.
3. Electrically identical in RF signal characteristics in transmitting singly. So only re-test radiated emissions transmitting simultaneously.

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.

- **Radio Frequency Exposure Limit**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)
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/cm^2)
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)

Module	Mode	*Measured RF Output Power (dBm)	Antenna Gain(dBi)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm^2)	FCC Limit (mW/cm^2)
AP72598V	2.4G WiFi	23.80	2.53	26.33	20	0.085	1.0
	5G WiFi	20.44	3.75	24.19	20	0.052	1.0
QCC5181	Bluetooth	8.7	1.24	9.94	20	0.002	1.0

Note:
1. *RF Output Power: Refer to 220201028SHA-001, 220201028SHA-002, CN23BV1T 001 and CN23BV1T 002.
2. EIRP= Conducted power +Directional Gain.

b) RF Exposure Evaluation Simultaneous transmission

Module	Mode	Sum of MPE Ratios	Limit	Verdict
AP72598V+QCC 5181	2.4G WiFi+Bluetooth	0.087	1.0	Pass
	5G WiFi+Bluetooth	0.054	1.0	Pass

Note:
1 The 2.4GHz WiFi and 5GHz WiFi of EUT cannot transmitting simultaneously.

1.1.1.2 RF Exposure Compliance Requirement for IC

The EUT shall comply with the requirement of RSS-102 section 6.6.
RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:
• below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

• at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f0.5$ W (adjusted for tune-up tolerance), where f is in MHz;

• at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} \times f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Test Results of RF Exposure Calculations for ISED, Stand-alone mode

Module	**Mode**	**Max. EIRP incl. tune-up (dBm)**	**Distance (cm)**	**Maximum EIRP (W)**	**Threshold power (W)**	**Verdict**
AP72598V	2.4G WiFi	26.33	20	0.430	2.71	Pass
	5G WiFi	24.19	20	0.262	4.85	Pass
QCC5181	Bluetooth	9.94	20	0.010	2.71	Pass
	Note: The maximum EIRP much lower than the threshold power in section 6.6, thus compliant.					

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   1. *RF Output Power: Refer to 220201028SHA-001, 220201028SHA-002, CN23BV1T 001 and CN23BV1T 002.
   2. EIRP= Conducted power +Directional Gain.

Test Results of RF Exposure Calculations for ISED, Simultaneous transmission

Module	Mode	Sum of MPE Ratios	Limit	Verdict
AP72598V+QCC 5181	2.4G WiFi+Bluetooth	0.162	1.0	Pass
	5G WiFi+Bluetooth	0.058	1.0	Pass

Note:
1.The 2.4GHz WiFi and 5GHz WiFi of EUT cannot transmitting simultaneously.

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