

Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Pass

Report No.	: CN2328SA 003
Test Specification	
Test item	: Portable Mass Spectrometry System
Identification / Type No.	: C3001, MC3001
FCC ID	: 2A9POC30012023
IC	: 29937-C30012023
HVIN	: C3001, MC3001
PMN	: Portable MS System
Test standard	: CFR47 FCC Part 2: Section 2.1091 RSS-102 Issue 5

This device is mobile device, and the applicant declares that the minimum separation distance is greater than 20cm. Therefore MPE measurement or computational modelling should be used to determine compliance.

MPE Calculation is based on the conducted power, and considering maximum power and Antenna gain. The following formula is used to MPE evaluation.

$$Pd = \frac{P_{out} * G}{4R^2\pi}$$

Where

P_d = power density in mW/cm² or W/m²

P_{out} = output power to antenna in mW or W

G_{num} = Antenna gain in numeric

π = 3.14159

R = Distance between observation point and the center of radiator in cm or m

1.1.1.1 FCC Part 1.1310, Part 2.1091

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

Table 1: Test Results of RF Exposure Calculations for FCC, stand-alone mode

Operating Mode	Max. EIRP incl. tune-up (dBm)	Distance (cm)	MPE P _d (mW/cm ²)	Limit (mW/cm ²)	Verdict
900MHz RF ID	22.10	20	0.032	0.6	Pass
2.4GHz Wi-Fi	28.60	20	0.144	1.0	Pass

1. RF Output Power above: Refer to test report CN2328SA 001.
2. EIRP= Conducted power +Directional Gain

Table 2: Test Results of RF Exposure Calculations for FCC, Simultaneous mode

Operating Mode (Worst-Case)	Sum of the MPE ratios for all simultaneously	Limit	Verdict
900MHz RF ID +2.4GHz Wi-Fi	0.197, far less than limit	1.0	Pass

1.1.1.2 RSS-102 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

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 $4.49/f^{0.5}$ 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 $1.31 \times 10^{-2} f^{0.6834}$ 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.

Table 3: Test Results of RF Exposure Calculations for ISED, Stand-alone mode

Operating Mode	Max. EIRP incl. tune-up (dBm)	Distance (cm)	Maximum EIRP (W)	Threshold power (W)	Verdict
900MHz RF ID	22.10	20	0.162	1.37	Pass
2.4GHz Wi-Fi	28.60	20	0.724	2.70	Pass

Note: The maximum EIRP lower than the threshold power in section 2.5.2, thus compliant.

1. RF Output Power above: Refer to test report CN2328SA 001.
2. EIRP= Conducted power +Directional Gain

Table 4: Test Results of RF Exposure Calculations for ISED, Simultaneous mode

Operating Mode(Worst-Case)	Sum of the ratios	Limit	Verdict
900MHz RF ID +2.4GHz Wi-Fi	$0.162/1.37+0.724/2.7 < 1.0$	1.0	Pass