

RF Exposure Evaluation Report

1 RF EXPOSURE

Product Name: Powered Bluetooth BookShelf Speakers
 Model No.: AT-SP3X
 FCC ID: JFZ-ATSP3X

2. RF Exposure Evaluation

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

2.1 LIMITS

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
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
300–1,500			f/300	<6
1,500–100,000			5	<6
(ii) 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
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

F= Frequency in MHz Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$ Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$P_i = 3.1416$

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2 EUT RF EXPOSURE EVALUATION

BT ANT1: 2.34dBi;

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.7 in linear scale.

The Max Conducted Peak Output Power data refer to report Report No.: POCE240222002RF001

Test channel (MHz)	Conducted Power (dBm)	Tune-up (dbm)	Maximum tune-up Power (dbm)	Maximum tune-up Power (mW)	Calculated value (mW/cm ²)	Limit (mW/cm ²)
2402	5.54	6±1.0	7.0	5.012	0.00171	1.0
2440	5.37	6±1.0	7.0	5.012	0.00171	1.0
2480	5.64	6±1.0	7.0	5.012	0.00171	1.0

Remark:

$$1. P_d = (P_{out} * G) / (4 * P_i * R^2) = (5.012 * 1.714) / (4 * 3.1416 * 20^2) = 0.00171, \quad G = 10^{gain/10} = 1.714$$

2. EUT BT module is more than 20cm away from the human body.

2.3 Conclusion

Calculated value is less than the limit value of 1.0mW/cm², so there is no sar requirement.