



Appendix E. RF Exposure Evaluation

1. The (FCC ID: EJE-WB0104) can be used with (FCC ID : EJE-SBC001), the following MPE analysis was performed on (FCC ID: EJE-WB0104) collocation with (FCC ID : EJE-SBC001).

1. RF Exposure Limit Introduction

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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



2. RF Exposure Evaluation

2.1 Standalone Power Density Calculations for FCC ID: EJE-WB0104.

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
Bluetooth	-0.73	11.50	10.77	0.01194	11.939881	0.002377	1	0.002377
2.4GHz WLAN	1.18	18.00	19.18	0.08279	82.794216	0.016480	1	0.016480
5GHz WLAN	2.18	16.50	18.68	0.07379	73.790423	0.014688	1	0.014688
60GHz WLAN			-1.08	0.00078	0.779830	0.000155	1	0.000155

2.2 Standalone Power Density Calculations for FCC ID : EJE-SBC001.

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
60GHz WLAN			-2.65	0.000543	0.543250	0.000108	1	0.000108

2.3 Collocated Power Density Calculation

FCC ID: EJE-WB0104			FCC ID : EJE-SBC001		Σ (Power Density / Limit)
Bluetooth Power Density / Limit	2.4GHz / 5GHz WLAN Maximum Power Density / Limit	60GHz WLAN Power Density / Limit	60GHz WLAN Power Density / Limit		
0.002377	0.016480	0.000155	0.000108		0.01912

Note:

- For FCC ID: EJE-WB0104:
 - Bluetooth, 2.4GHz WLAN and 60 GHz WLAN can transmit simultaneously
 - Bluetooth, 5GHz WLAN and 60 GHz WLAN can transmit simultaneously
- Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)], for (Bluetooth + 2.4GHz/5GHz WLAN + 60GHz WLAN) of (FCC ID : EJE-WB0104) with 60GHz WLAN of (FCC ID : EJE-SBC001).
- Considering all antenna collocation of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of all collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.