

Appendix E. RF Exposure Evaluation

The BT/WiFi 9560D2W and 60GHz SNAP (FCC ID: EJE-WB0110) are also integrated in this host (FCC ID: EJE-EM7455D4), when the host insert to the 60GHz charging cradle (FCC ID: EJE-SBC001), the 60GHz feather of host device will be turn on and transmission, in such users scenarios which the device will keep away 20cm distance from human body. Therefore, additional evaluate MPE for BT/WiFi and 60GHz simultaneous transmission analysis is necessary.

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-EM7455D4.

Band	Frequency (MHz)	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
WCDMA Band 2	1852.4	0.91	24.00	24.910	0.309742	309.741930	0.061652	1.000000	0.061652
WCDMA Band 4	1712.4	1.00	24.00	25.000	0.316228	316.227766	0.062943	1.000000	0.062943
WCDMA Band 5	826.4	-2.93	24.00	21.070	0.127938	127.938130	0.025465	0.550933	0.046222
LTE Band 2	1850.7	0.91	24.00	24.910	0.309742	309.741930	0.061652	1.000000	0.061652
LTE Band 4	1710.7	1.00	24.00	25.000	0.316228	316.227766	0.062943	1.000000	0.062943
LTE Band 5	824.7	-2.93	24.00	21.070	0.127938	127.938130	0.025465	0.549800	0.046318
LTE Band 7	2502.5	1.40	23.00	24.400	0.275423	275.422870	0.054821	1.000000	0.054821
LTE Band 12	699.7	-4.37	24.00	19.630	0.091833	91.833260	0.018279	0.466467	0.039186
LTE Band 13	779.5	-3.29	24.00	20.710	0.117761	117.760597	0.023440	0.519667	0.045105
LTE Band 25	1850.7	0.91	24.00	24.910	0.309742	309.741930	0.061652	1.000000	0.061652
LTE Band 26	814.7	-2.93	24.00	21.070	0.127938	127.938130	0.025465	0.543133	0.046886
LTE Band 41	2498.5	2.52	23.00	25.520	0.356451	356.451133	0.070950	1.000000	0.070950

2.2 Standalone Power Density Calculations for FCC ID: EJE-WB0110.

Band	Frequency (MHz)	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
2.4GHz WLAN	2412.0	1.87	18.00	19.870	0.097051	97.050997	0.019317	1	0.019317
5GHz WLAN	5180.0	2.58	16.50	19.080	0.080910	80.909590	0.016105	1	0.016105
Bluetooth	2402.0	1.87	10.70	12.570	0.018072	18.071741	0.003597	1	0.003597
SNAP	60480.0			-1.40	0.000724	0.724436	0.000144	1	0.000144

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

Band	Frequency (MHz)	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
SNAP	60480.0			-2.650	0.000543	0.543250	0.000108	1	0.000108

**2.3 Collocated Power Density Calculation**

FCC ID: EJE-EM7455D4	FCC ID: EJE-WB0110			FCC ID : EJE-SBC001	Σ (Power Density / Limit)
WWAN Maximum Power Density / Limit	Bluetooth Power Density / Limit	2.4GHz / 5GHz WLAN Maximum Power Density / Limit	SNAP Power Density / Limit	SNAP Power Density / Limit	
0.070950	0.003597	0.019317	0.000144	0.000108	0.094116

Note:

- For FCC ID: EJE-EM7455D4
 - Bluetooth, 2.4GHz WLAN and SNAP can transmit simultaneously
 - Bluetooth, 5GHz WLAN and SNAP 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)].
- 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.