

Appendix E. RF Exposure Evaluation

The BT/WiFi AX201D2W (FCC ID: PD9AX201D2) and 60GHz module (EJE-KST001) are also integrated in this host, when the host insert to the 60GHz charging cradle (FCC ID: EJE-KSC001), the 60GHz function 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 of the WWAN, 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-EM7455D5.

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	1850.0	3.20	24.00	27.200	0.525	524.807	0.104460	1.000	0.104460
WCDMA Band 4	1710.0	2.86	24.00	26.860	0.485	485.289	0.096594	1.000	0.096594
WCDMA Band 5	824.0	0.26	24.00	24.260	0.267	266.686	0.053082	0.549	0.096631
LTE Band 2	1850.0	3.20	24.00	27.200	0.525	524.807	0.104460	1.000	0.104460
LTE Band 4	1710.0	2.86	24.00	26.860	0.485	485.289	0.096594	1.000	0.096594
LTE Band 5	824.0	0.26	24.00	24.260	0.267	266.686	0.053082	0.549	0.096631
LTE Band 7	2500.0	-1.01	23.00	21.990	0.158	158.125	0.031474	1.000	0.031474
LTE Band 12	699.0	-2.77	24.00	21.230	0.133	132.739	0.026421	0.466	0.056698
LTE Band 13	777.0	0.05	24.00	24.050	0.254	254.097	0.050577	0.518	0.097638
LTE Band 25	1850.0	3.20	24.00	27.200	0.525	524.807	0.104460	1.000	0.104460
LTE Band 26	814.0	0.26	24.00	24.260	0.267	266.686	0.053082	0.543	0.097818
LTE Band 41	2496.0	-0.39	23.00	22.610	0.182	182.390	0.036304	1.000	0.036304

2.2 Standalone Power Density Calculations for FCC ID: PD9AX201D2.

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	2400.0	2.20	15.00	17.200	0.052	52.481	0.010446	1.000	0.010446
5GHz WLAN	5150.0	2.94	13.50	16.440	0.044	44.055	0.008769	1.000	0.008769
Bluetooth	2400.0	1.99	10.46	12.450	0.018	17.579	0.003499	1.000	0.003499

2.3 Standalone Power Density Calculations for FCC ID: EJE-KST001.

Band	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
60GHz	-13.860	0.000	0.041	0.000008	1.000	0.000008

2.4 Standalone Power Density Calculations for FCC ID : EJE-KSC001.

Band	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
60GHz	-20.140	0.000	0.010	0.000002	1.000	0.000002

2.5 Collocated Power Density Calculation

FCC ID: EJE-EM7455D5	FCC ID: PD9AX201D2		FCC ID: EJE-KST001	FCC ID : EJE-KSC001	Σ (Power Density / Limit)
WWAN Maximum Power Density / Limit	Bluetooth Power Density / Limit	2.4GHz / 5GHz WLAN Maximum Power Density / Limit	60GHz Power Density / Limit	60GHz Power Density / Limit	
0.104460	0.003499	0.010446	0.000008	0.000002	0.118415

Note:

- For FCC ID: EJE-EM7455D5:
 - WWAN,Bluetooth,2.4GHz WLAN and 60GHz can transmit simultaneously
 - WWAN,Bluetooth,5GHz WLAN and 60GHz 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.