

RF Exposure evaluation

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Refer Standard: KDB 447498 D01 General RF Exposure Guidance v06

FCC Part 2 §2.1091

FCC ID: 2AY2I-2130XI

1. Reference

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

KDB447498 D01: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

F=frequency in MHz

*=Plane-wave equivalent power density

BLE								
Freq. (MHz)	Output Power (dBm)	Target power W/ tolerance (dBm)	Max tune up power tolerance (dBm)	Output power to antenna (mW)	Ant Gain (dBi)	Power Density at R=20cm (mW/cm2)	Limit (mW/c m2)	Result
1M								
2402	4.074	4±1.0	5	3.162	2.15	0.00103	1	Pass
2441	5.224	5±1.0	6	3.981	2.15	0.00130	1	Pass
2480	6.221	6±1.0	7	5.012	2.15	0.00164	1	Pass
2M								

2402	4.133	4±1.0	5	3.162	2.15	0.00103	1	Pass
2441	5.326	5±1.0	6	3.981	2.15	0.00130	1	Pass
2480	6.301	6±1.0	7	5.012	2.15	0.00164	1	Pass

WIFI 2.4G

Freq. (MHz)	Output Power (dBm)	Target power W/ tolerance (dBm)	Max tune up power tolerance (dBm)	Output power to antenna (mW)	Ant Gain (dBi)	Power Density at R=20cm (mW/cm ²)	Limit (mW/c m ²)	Result
802.11b								
2412	15.13	15±1.0	16	39.811	2.15	0.01299	1	Pass
2437	15.66	16±1.0	17	50.119	2.15	0.01636	1	Pass
2462	16.10	16±1.0	17	50.119	2.15	0.01636	1	Pass
802.11g								
2412	20.62	21±1.0	22	158.489	2.15	0.05173	1	Pass
2437	20.79	21±1.0	22	158.489	2.15	0.05173	1	Pass
2462	21.62	22±1.0	23	199.526	2.15	0.06512	1	Pass
802.11n HT20								
2412	20.00	20±1.0	21	125.893	2.15	0.04109	1	Pass
2437	20.27	20±1.0	21	125.893	2.15	0.04109	1	Pass
2462	20.55	21±1.0	22	158.489	2.15	0.05173	1	Pass

WIFI 5G

Freq. (MHz)	Output Power (dBm)	Target power W/ tolerance (dBm)	Max tune up power tolerance (dBm)	Output power to antenna (mW)	Ant Gain (dBi)	Power Density at R=20cm (mW/cm ²)	Limit (mW/c m ²)	Result
802.11a								
5180	11.78	12±1.0	13	19.953	4.77	0.01190	1	Pass
5200	10.23	10±1.0	11	12.589	4.77	0.00751	1	Pass
5240	10.48	10±1.0	11	12.589	4.77	0.00751	1	Pass
5260	11.35	11±1.0	12	15.849	4.77	0.00946	1	Pass
5280	10.44	10±1.0	11	12.589	4.77	0.00751	1	Pass
5320	10.07	10±1.0	11	12.589	4.77	0.00751	1	Pass
5500	11.28	11±1.0	12	15.849	4.77	0.00946	1	Pass
5580	10.38	10±1.0	11	12.589	4.77	0.00751	1	Pass
5700	10.33	10±1.0	11	12.589	4.77	0.00751	1	Pass
5745	10.43	10±1.0	11	12.589	4.77	0.00751	1	Pass
5785	10.29	10±1.0	11	12.589	4.77	0.00751	1	Pass
5825	10.14	10±1.0	11	12.589	4.77	0.00751	1	Pass
802.11n20								
5180	10.35	10±1.0	11	12.589	4.77	0.00751	1	Pass
5200	10.11	10±1.0	11	12.589	4.77	0.00751	1	Pass
5240	10.24	10±1.0	11	12.589	4.77	0.00751	1	Pass
5260	10.41	10±1.0	11	12.589	4.77	0.00751	1	Pass
5280	10.51	11±1.0	12	15.849	4.77	0.00946	1	Pass
5320	10.42	10±1.0	11	12.589	4.77	0.00751	1	Pass

5500	10.81	11±1.0	12	15.849	4.77	0.00946	1	Pass
5580	10.53	11±1.0	12	15.849	4.77	0.00946	1	Pass
5700	10.63	11±1.0	12	15.849	4.77	0.00946	1	Pass
5745	10.41	10±1.0	11	12.589	4.77	0.00751	1	Pass
5785	10.35	10±1.0	11	12.589	4.77	0.00751	1	Pass
5825	10.16	10±1.0	11	12.589	4.77	0.00751	1	Pass
802.11n40								
5190	9.23	9±1.0	10	10.000	4.77	0.00597	1	Pass
5230	9.04	9±1.0	10	10.000	4.77	0.00597	1	Pass
5270	9.25	9±1.0	10	10.000	4.77	0.00597	1	Pass
5310	9.42	11±1.0	12	15.849	4.77	0.00946	1	Pass
5510	9.14	11±1.0	12	15.849	4.77	0.00946	1	Pass
5670	9.75	10±1.0	11	12.589	4.77	0.00704	1	Pass
5755	9.36	11±1.0	12	15.849	4.77	0.00946	1	Pass
5795	9.14	11±1.0	12	15.849	4.77	0.00946	1	Pass
802.11ac 20								
5180	9.81	10±1.0	11	12.589	4.77	0.00751	1	Pass
5200	10.46	10±1.0	11	12.589	4.77	0.00751	1	Pass
5240	10.47	10±1.0	11	12.589	4.77	0.00751	1	Pass
5260	10.21	10±1.0	11	12.589	4.77	0.00751	1	Pass
5280	10.39	10±1.0	11	12.589	4.77	0.00751	1	Pass
5320	10.37	10±1.0	11	12.589	4.77	0.00751	1	Pass
5500	10.59	11±1.0	12	15.849	4.77	0.00946	1	Pass
5580	10.12	10±1.0	11	12.589	4.77	0.00751	1	Pass
5700	10.62	11±1.0	12	15.849	4.77	0.00946	1	Pass
5745	10.53	11±1.0	12	15.849	4.77	0.00946	1	Pass
5785	10.34	10±1.0	11	12.589	4.77	0.00751	1	Pass
5825	10.16	10±1.0	11	12.589	4.77	0.00751	1	Pass
802.11ac40								
5190	9.37	9±1.0	10	10.000	4.77	0.00597	1	Pass
5230	9.97	10±1.0	11	12.589	4.77	0.00751	1	Pass
5270	9.27	9±1.0	10	10.000	4.77	0.00597	1	Pass
5310	9.14	9±1.0	10	10.000	4.77	0.00597	1	Pass
5510	9.94	10±1.0	11	12.589	4.77	0.00751	1	Pass
5670	9.89	10±1.0	11	12.589	4.77	0.00751	1	Pass
5755	9.63	10±1.0	11	12.589	4.77	0.00751	1	Pass
5795	9.43	9±1.0	10	10.000	4.77	0.00597	1	Pass
802.11ac80								
5210	9.83	10±1.0	11	12.589	4.77	0.00751	1	Pass
5290	9.51	10±1.0	11	12.589	4.77	0.00751	1	Pass
5530	9.49	10±1.0	11	12.589	4.77	0.00751	1	Pass
5775	9.37	9±1.0	10	10.000	4.77	0.00597	1	Pass

Note: The estimation distance is 20cm, BT and 5G WIFI cannot be transmitted simultaneously.

5. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

