

MPE Calculation for FCC Uncontrolled Environment

Formula for calculating Maximum Power Density in Fresnel and far-field region:

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

where: S = power density
P = power input to the antenna
G = far-field gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Source Based Time Averaged Duty Cycle is 100% in calculation below

All Power values are Average Power

Cellular Technology:	5G					
Mobile Band:	n02/n25	n05	n07/n41	n12/n71	n66	n77/n78
Prediction frequency (MHz):	1940	880	2630	630	2120	3500
Maximum output power (dBm):	30.00	30.00	30.00	30.00	30.00	32.00
Maximum output power (W):	1.00	1.00	1.00	1.00	1.00	1.58
Antenna Gain (dBi):	11.00	11.00	11.00	11.00	11.00	8.00
Numerical Antenna Gain:	12.59	12.59	12.59	12.59	12.59	6.31
Prediction distance (cm):	60	60	60	60	60	60
Power density at prediction frequency (W/m ²):	2.78	2.78	2.78	2.78	2.78	2.21
MPE limit at prediction frequency (W/m ²):	10.00	5.87	10.00	4.20	10.00	10.00
Ratio of Compliance (PD/MPE Limit):	0.278	0.474	0.278	0.663	0.278	0.221

	WiFi Module 1			WiFi Module 2	
	FCC ID: PD98265NG			FCC ID: RYK-WUBR508N	
	Ref Intel Test Report No 160321-0			REF MRT Test Report No 2005RSU029-U3	
Technology:	WiFi 2.4	WiFi 5G	BT/BLE	WiFi 2.4	WiFi 5G
Prediction frequency (MHz):	2400	5500	2400	2400	5500
Maximum output power (dBm):	20.30	20.30	10.40	19.00	18.50
Maximum output power (W):	0.11	0.107	0.011	0.079	0.071
Antenna Gain (dBi):	2.00	2.00	2.00	2.00	2.00
Numerical Antenna Gain:	1.58	1.58	1.58	1.58	1.58
Prediction distance (cm):	20	20	20	20	20
Power density at prediction frequency (W/m ²):	0.34	0.34	0.03	0.25	0.22
MPE limit at prediction frequency (W/m ²):	10.00	10.00	10.00	10.00	10.00
Ratio of Compliance (PD/MPE Limit):	0.034	0.034	0.003	0.025	0.022

Worst Case Total Compliance Ratio:

5G n71: 0.663
Module 1 WiFi 2.4 or 5 GHz: 0.034
Module 2 WiFi 2.4 GHz: 0.025
Total Ratio of Compliance: 0.721
Verdict: Pass

Calculations assume the specified antenna distances are kept
Requirement: Total Ratio of Compliance must be Less than 1