

Registration number: W6M22207-21977-C-7
FCC ID: GX9HSGWGEN2

3.2 Equivalent isotropic radiated power (EIRP)

FCC Rule: 15.247(b)(3)

2.4 GHz WiFi

EIRP = max. conducted output power + antenna gain

EIRP = 15.90 dBm + (7.9629 dBi [antenna gain claimed by manufacturer]) = 23.86 dBm = 243.22 mW

Zigbee

EIRP = max. conducted output power + antenna gain

EIRP = 13.15 dBm + (6.25 dBi [antenna gain claimed by manufacturer]) = 19.40 dBm = 87.10 mW

3.3 Exemption Limits for Routine Evaluation

according to 47 CFR FCC Part 2 Subpart J, section 2.1091

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

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 levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20 cm normally can be maintained between the user and the device.

MPE Calculation Method

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

f = frequency in MHz

*Plane-wave equivalent power density

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E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

mW/cm².

Established separation distance is 20 cm.

Band	Mode	Channel	Conducted Power with DF		Combine (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
			Antenna 1 (dBm)	Antenna 2 (dBm)					
2.4GHz	802.11b	Ch 1 : 2412 MHz	15.90	16.48	-	ANT1: 7.9629	0.0484	1	ANT1 : 0.0484
		Ch 6 : 2437 MHz	13.06	13.94	-	-	-	-	-
		Ch 11 : 2462 MHz	11.81	13.79	-	-	-	-	-
	802.11g	Ch 1 : 2412 MHz	13.15	11.91	-	ANT1: 7.9629	0.0258	1	ANT1 : 0.0258
		Ch 6 : 2437 MHz	13.00	11.97	-	-	-	-	-
		Ch 11 : 2462 MHz	12.73	11.47	-	-	-	-	-
	802.11n 20M	Ch 1 : 2412 MHz	8.52	9.60	12.10	Combine: 9.6	0.0294	1	Combine: 0.0294
		Ch 6 : 2437 MHz	8.41	9.53	12.01	-	-	-	-
		Ch 11 : 2462 MHz	8.16	8.95	11.58	-	-	-	-
	802.11n 40M	Ch 1 : 2422 MHz	3.65	4.61	7.17	Combine: 9.6	0.0094	1	Combine: 0.0094
		Ch 4 : 2437 MHz	3.62	4.58	7.13	-	-	-	-
		Ch 7 : 2452 MHz	3.69	4.34	7.04	-	-	-	-

	Channel	Conducted Power with DF (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
2.4GHz Zigbee	Ch 11 : 2405 MHz	12.05	-	-	-	-
	Ch 18 : 2440 MHz	9.56	-	-	-	-
	Ch 25 : 2475 MHz	13.15	6.25	0.0174	1	0.0174

Simultaneous evaluation-

$$0.0484 \text{ (2.4G WLAN)} + 0.0174 \text{ (Zigbee)} + 0.0544 \text{ (5G WLAN)} = 0.1202 < 1$$



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3.6 Automatic Discontinuation of transmission, FCC 15.407 (c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure.

This function will be declared by manufacturer.

3.7 Reserved, FCC 15.407 (d)

3.8 Indoor Operation Restriction, FCC 15.407 (e)

Within the 5.15–5.25 GHz band, U- NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations. This equipment has to be declared by manufacturer of the final product as content of the user manual.

3.9 Equivalent isotropic radiated power, FCC 15.407 (f)

FCC Rule: 15.407(b)(3)

Band 1

Test exclusion = max. conducted output power + antenna gain

Test exclusion = 13.91dBm+(10.46 dBi [antenna gain claimed by manufacturer] = 24.37 dBm
= 273.53 mW

Band 2

Test exclusion = max. conducted output power + antenna gain

Test exclusion = 14.07 dBm+(9.72 dBi [antenna gain claimed by manufacturer] = 23.79 dBm
= 239.33 mW

Band 3

Test exclusion = max. conducted output power + antenna gain

Test exclusion = 13.08 dBm+(10.01 dBi [antenna gain claimed by manufacturer] = 23.09 dBm
= 203.70 mW

Band 4

Test exclusion = max. conducted output power + antenna gain e

Test exclusion = 12.88 dBm+(10 dBi [antenna gain claimed by manufacturer] = 22.88 dBm
= 194.09 mW

Test equipment used: ETSTW-RE 055



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3.10 Exemption Limits for Routine Evaluation according to 47 CFR FCC Part 2 Subpart J, section 2.1091

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case”onservative prediction.

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 levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20 cm normally can be maintained between the user and the device.

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

f = frequency in MHz

*Plane-wave equivalent power density

E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to mW/m².

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



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Established separation distance is 20 cm.

Band	Mode	Channel	Conducted power with DF		Combine (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
			Antenna 1 (dBm)	Antenna 2 (dBm)					
NII-1	802.11a	Ch 36 : 5180 MHz	11.99	10.97	-	-	-	-	-
		Ch 44 : 5220 MHz	12.32	11.42	-	-	-	-	-
		Ch 48 : 5240 MHz	12.49	12.20	-	Antenna 1: 8.61651	Antenna 1: 0.0256	1	0.0256
	802.11n 20M	Ch 36 : 5180 MHz	10.65	9.57	13.15	-	-	-	-
		Ch 44 : 5220 MHz	10.73	10.11	13.44	-	-	-	-
		Ch 48 : 5240 MHz	11.18	10.61	13.91	Combine: 10.46	Combine: 0.0544	1	0.0544
	802.11n 40M	Ch 38 : 5190 MHz	8.62	7.58	11.14	-	-	-	-
		Ch 46 : 5230 MHz	8.82	8.16	11.51	Combine: 10.46	Combine: 0.0314	1	0.0314
	802.11ac	Ch 42 : 5210 MHz	6.07	5.27	8.70	Combine: 7.69	Combine: 0.0097	1	0.0097
NII-2A	802.11a	Ch 52 : 5260 MHz	12.20	12.15	-	Antenna 1: 8.02024	Antenna 1: 0.0209	1	0.0209
		Ch 60 : 5300 MHz	11.97	11.77	-	-	-	-	-
		Ch 64 : 5320 MHz	11.81	11.37	-	-	-	-	-
	802.11n 20M	Ch 52 : 5260 MHz	11.05	11.06	14.07	Combine: 9.72	Combine: 0.0476	1	0.0476
		Ch 60 : 5300 MHz	10.83	10.57	13.71	-	-	-	-
		Ch 64 : 5320 MHz	10.54	10.21	13.39	-	-	-	-
	802.11n 40M	Ch 54 : 5270 MHz	9.09	9.19	12.15	Combine: 9.72	Combine: 0.0306	1	0.0306
		Ch 62 : 5310 MHz	8.65	8.59	11.63	-	-	-	-
	802.11ac	Ch 58 : 5210 MHz	6.22	6.11	9.18	Combine: 9.72	Combine: 0.0155	1	0.0155
NII-2C	802.11a	Ch 100 : 5500 MHz	11.50	11.30	-	Antenna 1: 8.53213	Antenna 1: 0.02	1	0.02
		Ch 116 : 5580 MHz	11.24	11.54	-	-	-	-	-
		Ch 140 : 5700 MHz	11.17	11.34	-	-	-	-	-
	802.11n 20M	Ch 100 : 5500 MHz	10.10	10.00	13.06	-	-	-	-
		Ch 116 : 5580 MHz	9.93	10.21	13.08	Combine: 10.01	Combine: 0.0405	1	0.0405
		Ch 140 : 5700 MHz	9.84	10.14	13.00	-	-	-	-
	802.11n 40M	Ch 102 : 5510 MHz	8.14	7.92	11.04	-	-	-	-
		Ch 110 : 5550 MHz	7.96	8.48	11.24	-	-	-	-
		Ch 134 : 5670 MHz	8.36	8.45	11.41	Combine: 10.01	Combine: 0.0275	1	0.0275
NII-3	802.11a	Ch 106 : 5530 MHz	5.87	5.32	8.61	-	-	-	-
		Ch 122 : 5610 MHz	6.03	5.86	8.95	-	-	-	-
		Ch 149 : 5745 MHz	11.01	11.36	-	Antenna 1: 7.77541	Antenna 1: 0.015	1	0.015
	802.11a	Ch 157 : 5785 MHz	10.85	11.40	-	-	-	-	-
		Ch 165 : 5825 MHz	10.56	11.35	-	-	-	-	-



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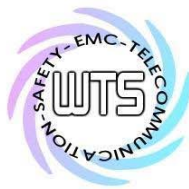
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	802.11n 20M	Ch 149 : 5745 MHz	9.54	10.17	12.88	Combine: 10	Combine: 0.0386	1	0.0386
		Ch 157 : 5785 MHz	9.29	10.18	12.77	-	-	-	-
		Ch 165 : 5825 MHz	9.15	9.90	12.55	-	-	-	-
	802.11n 40M	Ch 151 : 5755 MHz	7.61	7.95	10.80	Combine: 10	Combine: 0.0239	1	0.0239
		Ch 159 : 5795 MHz	7.33	8.01	10.69	-	-	-	-
	802.11ac	Ch 155: 5775 MHz	4.96	5.06	8.02	Combine: 10	Combine: 0.0125	1	0.0125

Simultaneous evaluation-

0.0484 (2.4G WLAN)+0.0174 (Zigbee)+0.0544 (5G WLAN)=0.1202 < 1



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10 Maximum Permissible Exposure

10.1 Exemption Limits for Routine Evaluation according to 47 CFR FCC Part 2 Subpart J, section 2.1091

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MPE Calculation Method

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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

f = frequency in MHz

*Plane-wave equivalent power density

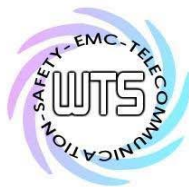
E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

The formula can be changed to

mW/cm².



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Band	Frequency (MHz)	Max output power		Antenna Gain	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
		(dBm)	(W)				
WCDMA Band 2	1852.4	22.49	0.1774	3.33	0.0760	1	0.0760
WCDMA Band 5	826.4	23.15	0.2065	1.85	0.0629	0.5509	0.1142
LTE Band 2	1855	22.81	0.1910	3.33	0.0818	1	0.0818
LTE Band 4	1720	22.73	0.1875	2.28	0.0631	1	0.0631
LTE Band 5	847.5	23.40	0.2188	1.58	0.0626	0.5650	0.1108
LTE Band 7	2507.5	21.90	0.1549	3.56	0.0699	1	0.0699

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2 m, as well as the gain of the used antenna, the RF power density can be obtained.