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[dB to Watt Table & Limits](#)**dBm to Watt Conversion Table**

dBm	Watts	dBm	Watts	dBm	Watts
0	1.0 mW	16	40 mW	32	1.6 W
1	1.3 mW	17	50 mW	33	2.0 W
2	1.6 mW	18	63 mW	34	2.5 W
3	2.0 mW	19	79 mW	35	3.2 W
4	2.5 mW	20	100 mW	36	4.0 W
5	3.2 mW	21	126 mW	37	5.0 W
6	4 mW	22	158 mW	38	6.3 W
7	5 mW	23	200 mW	39	8.0 W
8	6 mW	24	250 mW	40	10 W
9	8 mW	25	316 mW	41	13 W
10	10 mW	26	398 mW	42	16 W
11	13 mW	27	500 mW	43	20 W
12	16 mW	28	630 mW	44	25 W
13	20 mW	29	800 mW	45	32 W
14	25 mW	30	1.0 W	46	40 W
15	32 mW	31	1.3 W	47	50 W

Usage and Maximum Power Limit Guidelines in the US under FCC regulations

Before we can go on, first we need to separate the two different classes of users for Spread Spectrum devices that exist and set some guidelines of some of the specs.

Consumers and IT Professionals Operating Spread Spectrum (DSSS) gear:

- Users operate under FCC Part 15 rules and regulations.
- Frequencies include 902-928 MHz, 2400-2483.5 and 5725-5850 MHz.
- Maximum Transmitter Power Output (TPO) is 1.0 watt or 30dBm.
- The formula for converting antennas from dBi to dBd is $\text{dBi} - 2.2 = \text{dBd}$.

There are two different classifications for operation. You'll commonly hear these modes referred to as Point to Point (PTP) and Point to Multipoint (PTMP). PTP is when two sites talk only to themselves. PTMP is when many sites talk to a single core site. Each of these modes have different EIRP (Effective Isotropic Radiated Power) limitations.

Point to MultiPoint:

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- The maximum EIRP power allowed is 36dBm (4 watts).
- Maximum transmitter power versus largest antenna table for PTMP:

Transmitter RF power	Antenna Gain	EIRP in watts
30dBm 1W	6dBi	3.98
27dBm 500mW	9dBi	3.98
24dBm 250mW	12dBi	3.98
20dBm 100mW	15dBi	3.98
17dBm 50mW	18dBi	3.98
14dBm 25mW	21dBi	3.98
10dBm 10mW	24dBi	3.98

- Losses from the transmitter via cabling, lightning suppression, filtration can be removed from the transmitted power dBm figure. An example here would be say a 30dBm 1 watt amplifier with 100ft of LMR400 (at 6.7dB of loss) brings transmitter power down to 23.3dBm, allowing a 12dBi antenna.

Point to Point:

- Higher EIRP is allowed if the antennas are directional in nature.
 - Systems operating in a point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum output power of the transmitter is reduced by 1 dB for every 3 dB that the directional gain of the antenna that exceeds 6 dBi.
- Maximum transmitter power versus largest antenna table for PTP:

Transmitter RF power	Antenna Gain	EIRP in watts
30dBm 1W	6dBi	3.98
29dBm 800mW	9dBi	6.35
28dBm 630mW	12dBi	10.14
27dBm 500mW	15dBi	15.81
26dBm 398mW	18dBi	25.23
25dBm 316mW	21dBi	40.28
24dBm 250mW	24dBi	62.79
23dBm 200mW	27dBi	100.2

This information is provided as a guideline. If you are not a professional installer we highly recommend that you read the FCC Part 15 rules and understand them before attempting installations.

Amateur Radio Operators operating under licensed spectrum:

- Users operate under FCC Part 97 rules and regulations.
- Frequencies usable from over-the-counter consumer gear include the 33cm 902-928 MHz band, the 13cm 2390-2450 MHz band and the 5cm 5650-5925Mhz band.
- In the 13cm band, 802.11b/g channels 1 thru 6 are the only channels in the 2390-2450 MHz bandplan.
- Maximum Transmitter Power Output (TPO) is 100 watt or 50dBm.
- You must enable broadcasting of your SSID, which has to include your callsign.
- Encryption is *not* currently permitted.

- . Only authorized licensed operators should be able to access Part 97 installed hardware, so care should be taken to prevent unauthorized users from utilizing said hardware.**

It's highly suggested for Amateurs visit the ARRL website and participate in the HSMM (high speed multimedia) working group. The HSMM group only deals with working on high speed data via Amateur radio. This group is producing proposed rule making changes to be submitted to the FCC that would make operating simpler and allow more reasonable usage of for example encryption. The author of this document, Dave Anderson is a licensed amateur radio operator (KG4YZY) and is on the ARRL HSMM Working group and a founding member of ARBA, the Amateur Radio Broadband Alliance.

Have any Questions? Send us an [E-mail](#)
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