HOW FAR CAN I GET ON 10 WATTS?

1. Variables Involved: "How far?" is a question that the newcomer to the hobby often asks. It's quite a difficult question to answer because of the number of variables involved. These include:

- The propagation conditions at the time you transmit;
- The radiation efficiency of your antenna system;
- The power matching between the transmitter and the antenna;
- The quality of the antenna feeder system;
- The sensitivity of your receiver;
- Your patience and ability as an operator.

2. There is a branch of amateur radio (QRP) that has a passionate and devoted following. QRP stands for "Low Power". (Strictly it stands for "Reduced Power".) Within QRP circles operators attempt to communicate using the ***least power possible***. Generally the ***upper*** limits on radiated power are:

single side band (ssb) [Speech] :	10 Watts.
carrier wave (cw) [Morse]:	5 Watts.

Certainly you can work Australia on less than 5 Watts when using cw and, under favourable propagation conditions, you can work Australia on 10 Watts ssb.

3. A significant part of successful operating is to ensure that your station is operating correctly. Under QRP conditions you want to be certain that your antenna is working efficiently and that as much as possible of your 10 Watts of RF is being radiated. You do this by following good operating practice. This includes:

- Rigging your antenna as high as possible;
- Keeping your antenna away from obstructions (particularly metal);
- Using the best quality antenna feeder and connectors that you can;
- Keeping all external cable / feeder / antenna joints free from moisture;
- Matching the antenna to the transmitter (or use a mono-band antenna);
- Reducing noise pick-up (use a balanced antenna);
- Practicing listening to and working weak stations.

4. **S-Meter and Power Levels:** Your receiver will have a signal strength meter. This will be calibrated S1 to S9 and then in decibels above S9. (Usually 10, 20 and 30 db). These S-units indicate the strength of the incoming signal. By convention these numbers are interpreted as:

- S1 Faint signals which are barely perceptible
- S2 Very weak signals
- S3 Weak signals
- S4 Fair signals
- S5 Fairly good signals
- S6 Good signals
- S7 Moderately strong signals
- S8 Strong signals
- S9 Extremely strong signals

5. For reliable communications anything above S5 is readable. S3 and S4 signals are workable but with some difficulty. (NB. Not all S-meters are identical in their sensitivity.) Each S-point on the scale represents a four-fold change in the strength of the incoming signal. This is a 6db change in signal level. So if the distant station increases (decreases) its power by a factor of 4 then your S-meter should show an increase (decrease) of one S-point.

6. If we take a received signal strength of S4 as the lowest, workable signal level and equate that to a power output of 1 Watt at the distant, transmitting station then we can draw up a simple, albeit rough, table as follows.

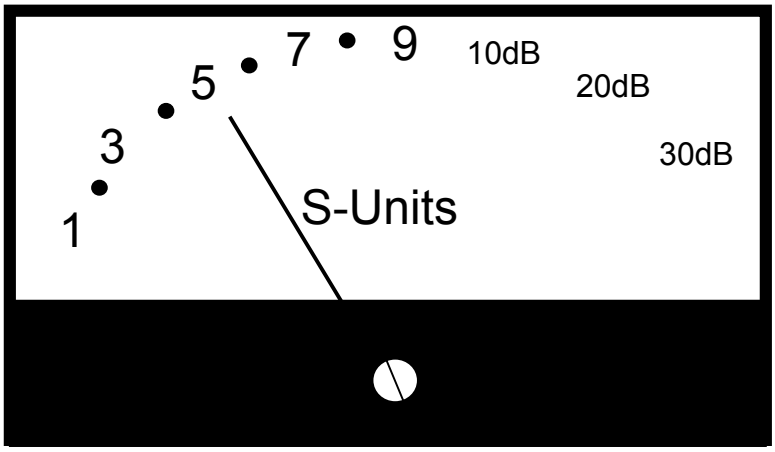
S-Units At Receiver	Power Output From Distant Station (Approx)
S9	1012 watts
S8	256 Watts
S7	64 Watts
S6	16 Watts
S5	4 Watts
S4	1 Watt

S-units are logarithmic as the response of the human ear is more logarithmic than linear. What this table indicates is that if the distant station reduces its power from 1012 Watts to 64 Watts *[For simplicity let's call this 1000 Watts to 60 watts]* or from, say, 100 Watts to 6 Watts, or from 10 Watts to 0.6 Watts etc. , then the received signal – say originally at S9 - will drop only two S-points to S7. (Or two S-points from whatever was the original level.)

So, if you are receiving at S9 (extremely strong signals) you will start to receive signals at S7 (moderately strong signals) if the distant station reduces from 100 Watts to 6 Watts. This is often overlooked by lots of operators who run at power levels which are many times higher than they need to be for a successful, intelligible contact.

7. Now, obviously, life is rarely this straightforward! The above is a theoretical analysis. However, it's good enough (and it's robust enough) to be a useful, empirical rule. What it shows is that pushing out lots of power is not necessarily the answer to long distance communications in every instance. Making a DX contact at QRP is more satisfying than a similar DX contact at higher power levels because you know your station is operating well.

8. **Conclusion:** You *can* work the world on 10 Watts – but with a *bit* of effort.



S-Meter showing a reading of S5