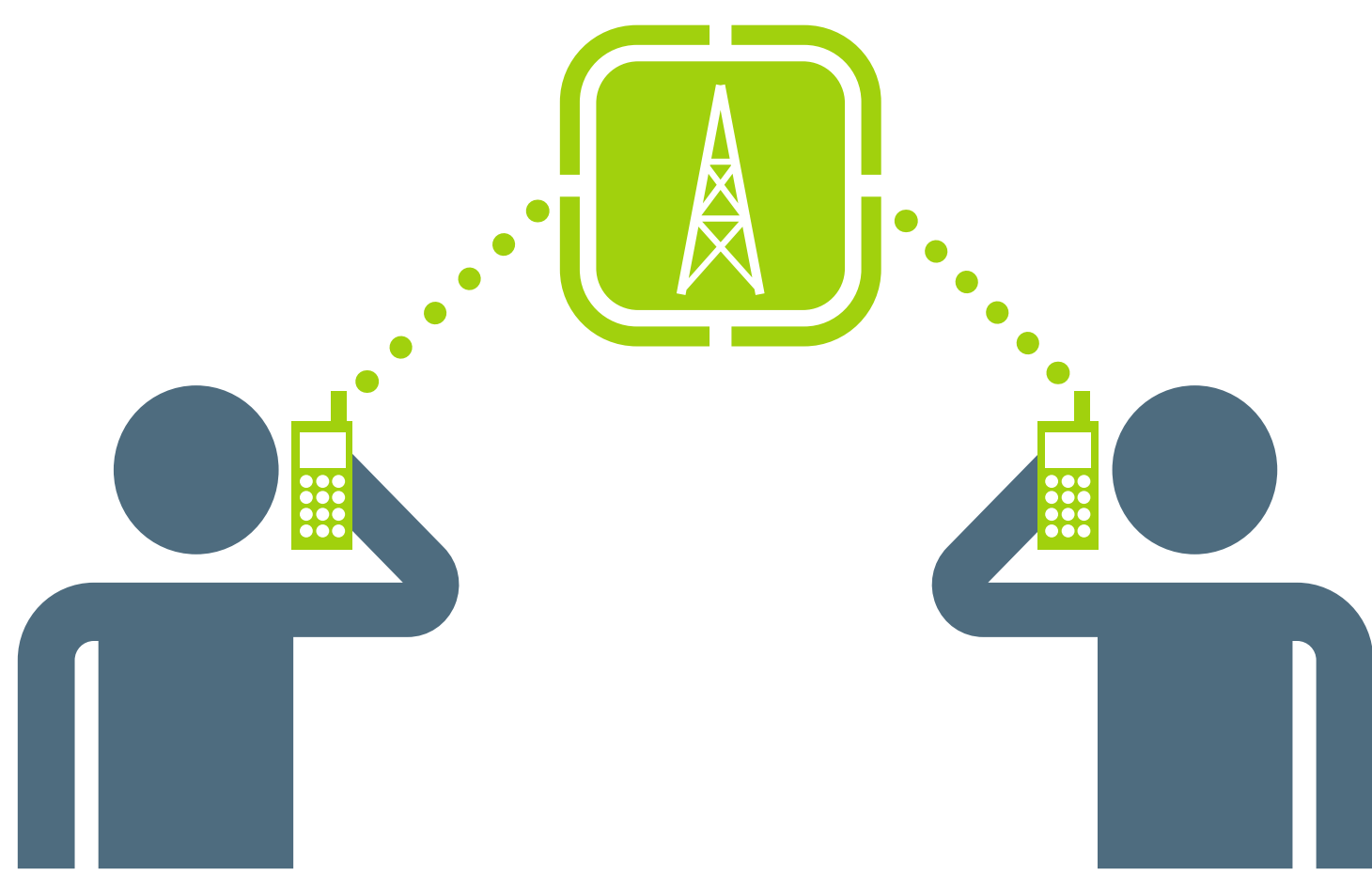


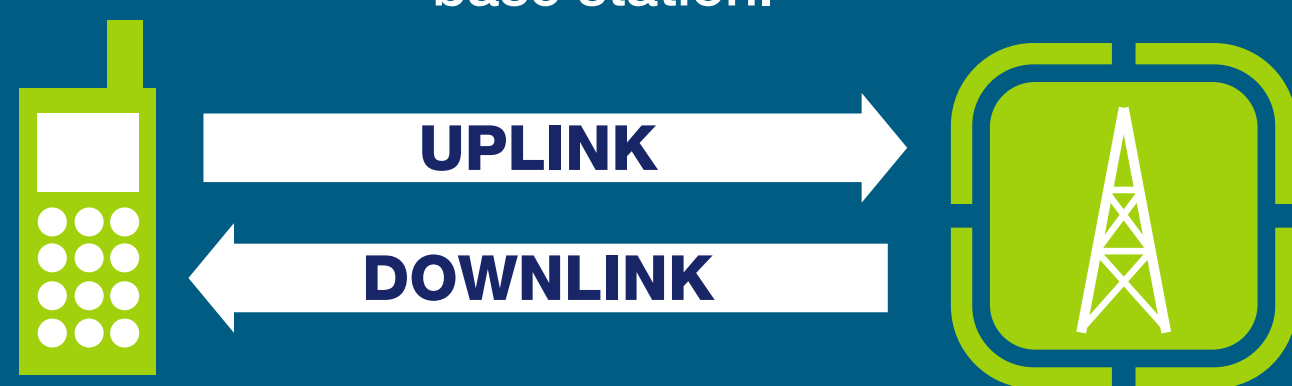
POWER AT YOUR FINGERTIPS: THE TRUTH ABOUT WATTS IN PMR RADIOS

Radio output power is a big consideration when specifying **walkie-talkie radios**. That's because they need the power to transmit and receive signals between radios without any network being involved.



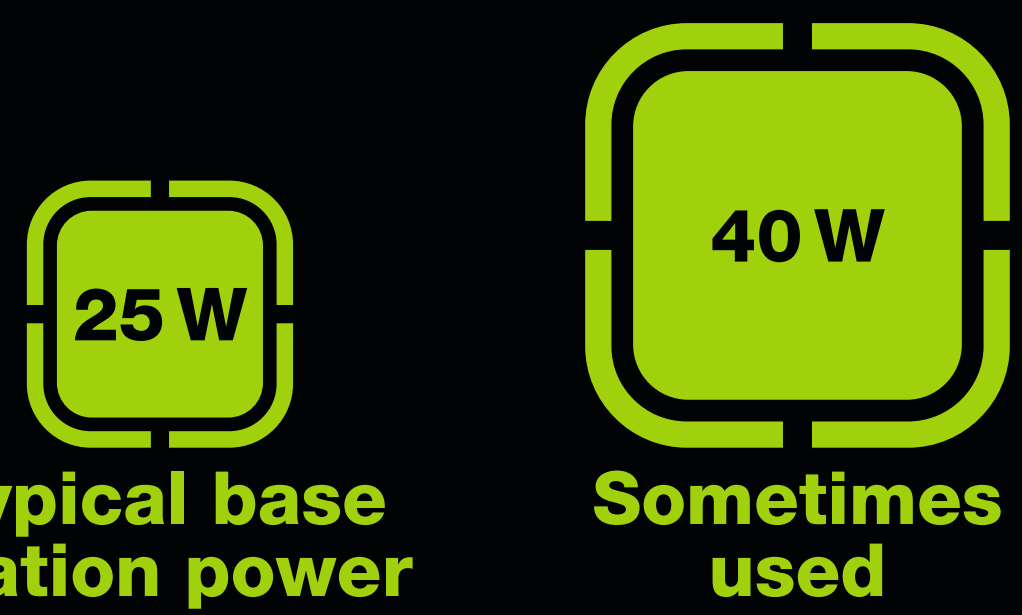
But **PMR radios** work completely differently, making high output power far less significant. PMR radios only need to link to a nearby base station in the network – they simply don't need high power to punch through to another terminal directly. The only exception is when they are switched to Direct Mode (DMO), which is relatively rarely used in practice.

Communication between PMR radios and base stations is two-way. There is the downlink – transmission from the base station to the radio and the uplink – transmission from the radio to the base station.



The radio network planner must balance the uplink and downlink, because there is no benefit in one being stronger than the other.

The TETRA radio network usually provides coverage using base stations which transmit at 25 W power. Some vendors can set up 40 Watt base stations for sites that do not need to provide a lot of capacity.

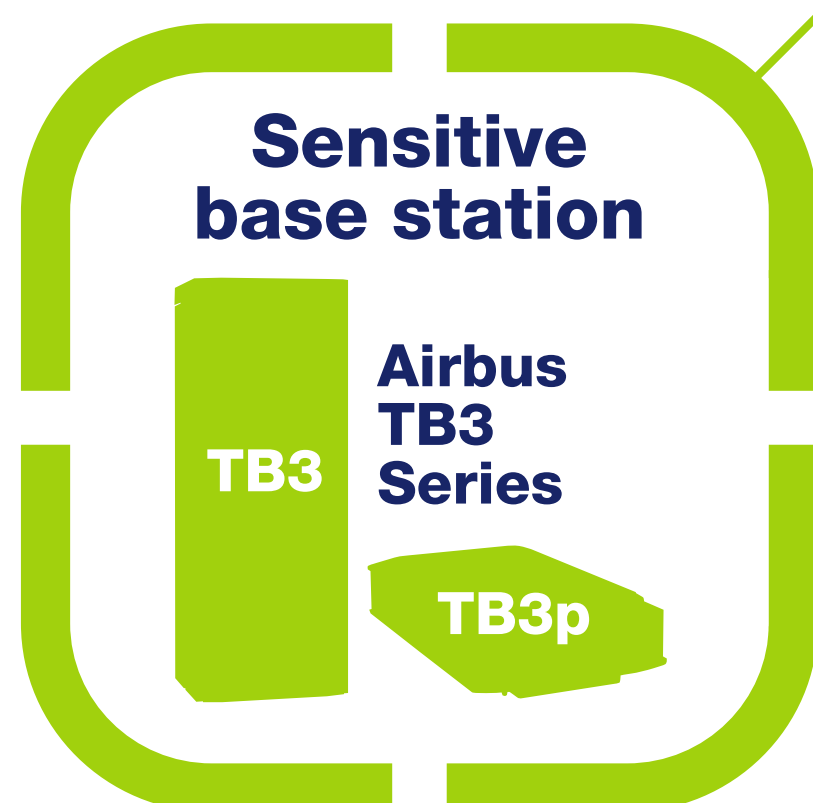


Fixed base station sites can employ diversity, using multiple receivers to improve the uplink.



TB3 base stations from Airbus Defence and Space are very sensitive.

They can “hear” the radios better for three reasons:



MORE RECEIVERS. This improves the signal-to-noise ratio, particularly important in weak signal conditions.

SPECIAL ANTENNA SOLUTIONS further improve sensitivity and signal-to-noise ratio.

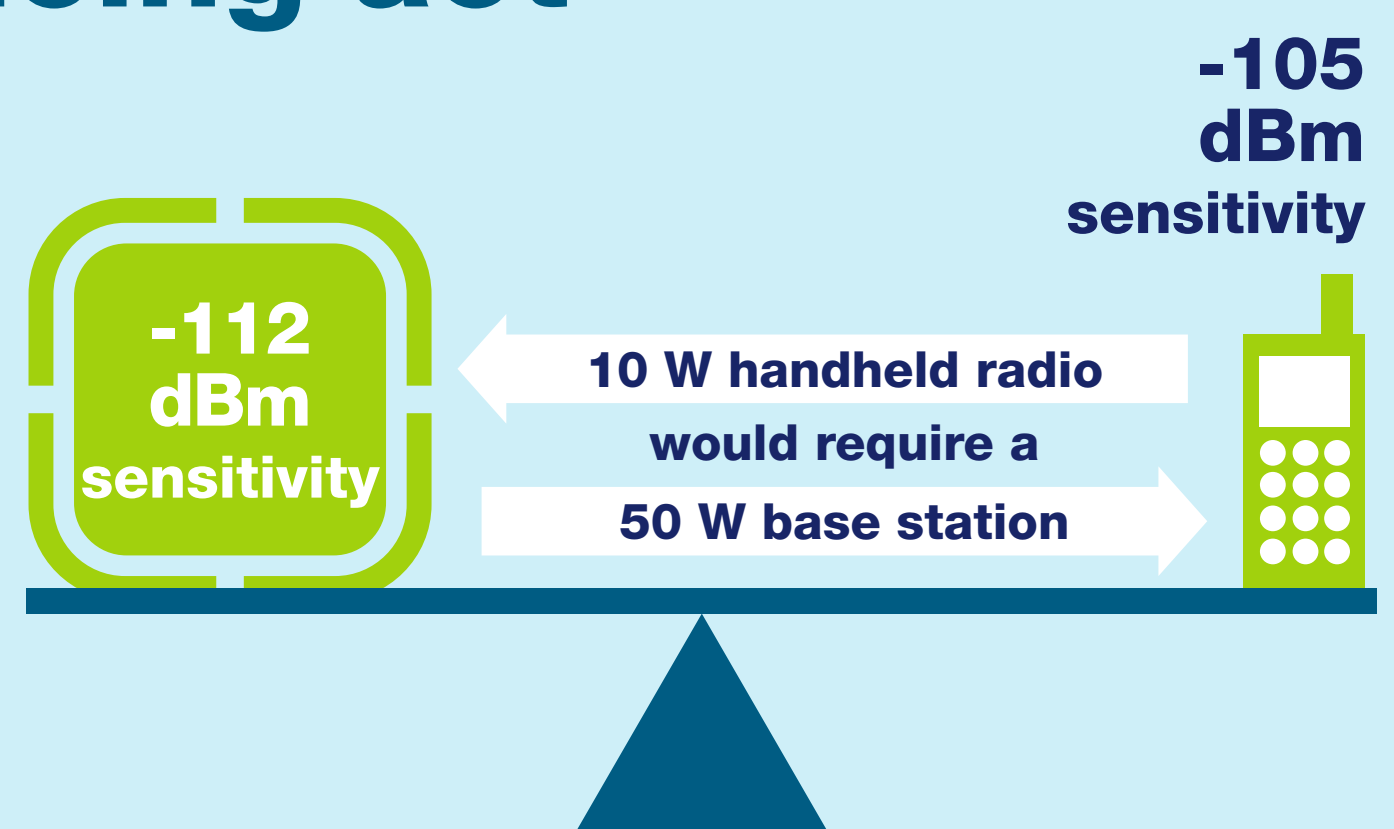
Base station receivers use sophisticated **DIGITAL SIGNAL PROCESSING**, which can pick the strongest signal for actual reception.

Mobile base station sites with a single antenna cannot use diversity, but they are usually less powerful in general, such as the TB3hp which has a 15 W transmission power.

The balancing act

The radio terminal power required will vary depending on the network power. If the radio has -105 dBm sensitivity and the base station has -112 dBm sensitivity, we can show what terminal power is required for different antenna layouts

For a single antenna base station, a 10 Watt mobile/handheld radio would require a 50 Watt base station to balance uplink and downlink. No vendor has such a base station in their portfolio.



The typical 25 Watt base station with diversity and panel antennas for uplink requires the device to transmit at 1 Watt. This guarantees maximum coverage. Any more power in the radio brings no benefit except when the radio is used without the network, in DMO.



With the ultimate coverage engine, the TB3 base station employing 6 Rx diversity (High Gain virtual Omni), **a 0.8 Watt radio is enough** for uplink/downlink balance.

With this base station, a more than 1 W radio terminal brings no benefit when used in network coverage