The information below is my best shot at a guide based on my personal experience. This article may be corrected or updated at any time. If you find a mistake or a better way of doing any of this please let me know.

This article specifically applies to 2.4 GHz systems although much is common with other frequency bands.

Why Do Range Checks?

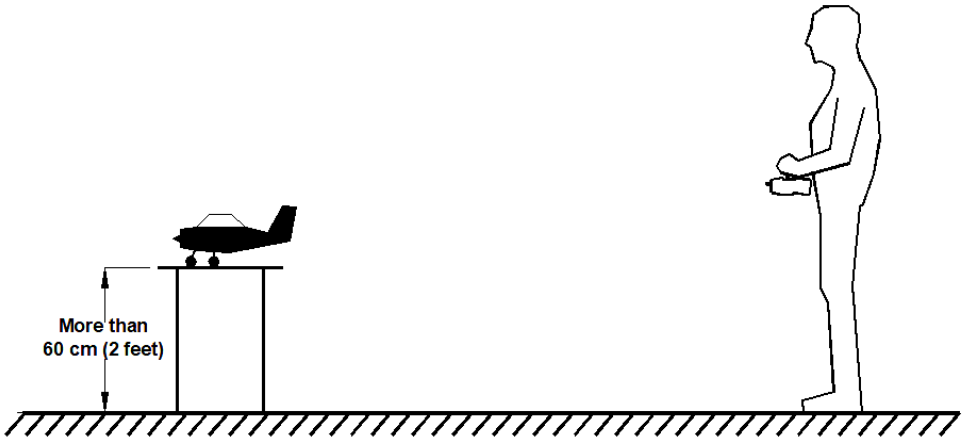
On the whole modern radio equipment is very reliable and effective. However it is dependent on each part of the system being installed and functioning properly. The only proper test of the overall system is a range check.

Read The Instructions!

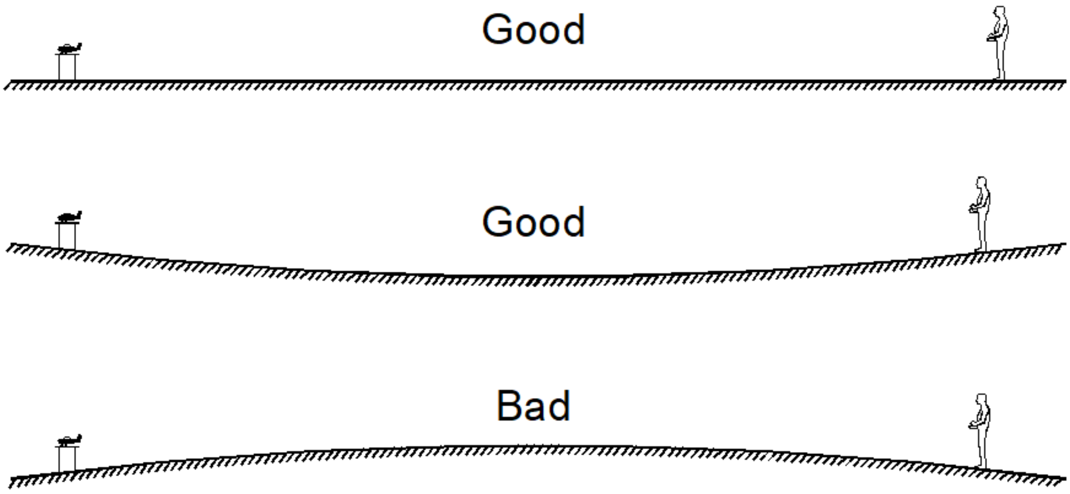
The methods below are only a guide. Details will vary according to the type of radio you are using and agonising though modern manuals are, you must read them. There should be a means of setting your transmitter to reduced power so that range checking can be done over a practical distance. On my system the range on low power is claimed to be 1/30th of the range at full power, supposedly 2000m. That makes the low power range about 65m which seems about right from the tests I have done. Your system may be different.

Setting Up

2.4 GHz radio signals work principally on line of sight. The ground absorbs radio energy and a signal skimming the ground will be significantly weakened. For our tests the model needs to be more than 60cm (2 feet) off the ground on a non conducting (not metal) surface.



Human bodies absorb radio energy, so if, instead, the model is being held by someone they should hold it away from themselves and keep their body from the path of the signal. Take care others do not stand between yourself and the model. Make sure the ground is flat or has a dip over the area you are using. Even a shallow hump can obstruct the signal.



We have said that the body absorbs radio energy and obstructs the signal. When doing the test you must face the model. Walking backwards across a field is often not a good idea so I normally walk about ten paces at a time before turning to check operation then count my steps when walking back to the model once the limit is reached. I know my stride is about a yard (90 cm), and consistent enough for such tests. You will need to check your own stride length.

<u>Orientation Of The Model</u>

It could be that a particular installation obstructs the received signal in certain directions. Depending on the complexity or compromises of your radio installation you might want to repeat the range check with the model pointing in different directions. I have not investigated this on my fairly straightforward models.

<u>RSSI - Received Signal Strength Indicator</u>

If you have telemetry sending information back to your transmitter you may have an RSSI reading available. This is an indication of the strength of the signal arriving at the receiver. The units of measurement are Decibels (dB), but we must remember that this is not an absolute measurement and the actual numbers may be different between manufacturers. Sometimes even between different sets from the same manufacturer. There will be an RSSI level below which control will start to fail. My system gives audible warnings of “RF Low” and “RF Critical” if the RSSI drops below certain levels. You may find RSSI useful in a range check or for checking how the orientation of the model affects reception.

<u>VFR - Verified Frames Received</u>

The received signal is demodulated (decoded) into digital data which comes in lumps called “frames”. Usually about 50 frames per second. The validity of each frame is “verified”. i.e. checked by a checksum or similar and rejected if it is corrupted. If it is OK it is decoded and sent to the servo outputs. VFR on my system is the percentage of good (verified) frames in a period of 1 second. A reading of the lowest VFR during a flight can usually be obtained on the transmitter. VFR is not so useful in a range test.

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