

2.4GHz Operating practices and Club rules.

While 2.4GHz radio sets represent a significant step forward in model control systems, there are several aspects of the design that need some consideration. A few of these are a result of the choice of frequencies used.

The 2.4GHz band is an 'Industrial, Science and Medical' (ISM) allocation like 27MHz, 433MHz and 5.8GHz. These bands are free to any and all users with few constraints on its use.

One of the main reasons for the ISM allocation at 2.4GHz is that it excites water molecules and hence is used in Microwave ovens.

Signals at 2.4GHz are seriously attenuated by damp, moisture containing material. This could be a dew coated model, mist, people or possibly a bush or tree; all of these seriously attenuate the 2.4GHz signal.

There are currently two types of system in use, Frequency hopping systems and Spektrums DSM2 spread-spectrum. The frequency hopping systems will allow around 80 systems to be operated simultaneously, while the DSM2 spread spectrum systems use two channels for redundancy continuously and thus only allow around 40 systems to operate simultaneously.

So that the systems may reconnect if the signal suffers interference, there needs to be some free channels. Although both systems have good coping strategies if interference occurs, it has been decided that in the interests of safety some rules and operational practices are needed within the club.

Operational procedures for 2.4GHz within the Club are:

1. Transmitters must only be operated at the 'patch', as with 35MHz, and not in the car park.
2. Always keep the transmitter between you and the model.
3. When in the pilots box, ensure pilots are 'line abreast' and not obstructing the transmitters view of the model.
4. Ensure your mobile phone is off (or left in the car) – many are fitted with WiFi which also uses 2.4GHz.

These procedures are to ensure the frequency control disciplines are maintained; these are especially relevant to those operating both 35MHz and 2.4GHz and for all to show they haven't 'forgotten' a 35MHz peg. Remember S.M.A.R.T. – there have been many cases of 2.4GHz users swapping back to 35MHz and forgetting to extend the aerial – don't become one of them!

Operator guidance for 2.4GHz

The signals at 2.4GHz are absorbed by water, people and trees. They are also reflected by metal and other conducting materials such as carbon fibre, push rods, control cables and servo leads. These factors need to be taken into account in the installation into the model.

Guidance:-

1. Keep servo and battery leads clear of the short aerials of the receiver(s). Try to keep a clearance of at least 50mm/2" between them.
2. Push rods and closed-loop control cables may cause problems. As above, try to keep at least 50mm/2" clearance to the receiver aerials.
3. Carbon fibre causes shielding, in addition to spacing as above at least one aerial/remote receiver should be positioned such that no carbon fibre structure will obstruct the transmitter-receiver path. Special receivers for carbon-fibre based models are available and these should be used.
4. High vibration may cause fatigue of the short aerials if they are not supported; place the receiver in foam or tape the aerials down.
5. Check for any potential shielding if using metallic type covering e.g. litho plate or silver type heat-shrink film. Connect a receiver, battery and servo as a test rig, check it operates. Place these on a piece of the covering material and then fold the material over the receiver, servo and battery and check everything operates. Press the range test button and check the servo still operates. If the test fails the covering material is shielding the receiver and a different material or alternate installation will need to be used.
6. When binding, ensure you are not in a signal-obstructive environment and there is no WiFi transmission nearby e.g. your phone, PC/Laptop or broadband unit.
7. Always perform a range test before flying.
8. Always use an appropriate receiver – a park-fly receiver should not be used in a typical 'sport' model as it will not have enough range.
9. Dew/rain on a model may significantly reduce the range, particularly during take-off.
10. Experience has shown that some Spektrum DSM2 systems have a short, ~25 paces, range and not the expected ~30 paces during a ground range test. Feedback from Horizon Hobbies is: -

"The button disables the final amplifier stages of the transmitter. The amount of feed through power is very low and not well defined, in tests these sets have a ground range of 1.2 miles on full power so there is no need to worry unless range falls below 20 paces during the standard range check".

If there is concern about range, please discuss with a committee member and arrange to do a full power range-check with a helper.

WHMC Safety Officer