

MODEL AERONAUTICAL ASSOCIATION OF AUSTRALIA



FREQUENCY SYNTHESISED EQUIPMENT POLICY

MOP053

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Shading of text identifies changes to the previous version.

FREQUENCY SYNTHESISED EQUIPMENT POLICY

1. INTRODUCTION

The use of frequency synthesised equipment is becoming common for the control of model aircraft. Because both a synthesised transmitter and receiver can be set up to operate on a wide range of frequencies the accepted practice for crystal controlled equipment has to be amended. Without this there is the potential to radiate and cause interference on frequencies which have not been identified in advance.

This procedure details the certification and operational processes to follow to ensure that the high standard of safe operation of radio equipment advocated by the M.A.A.A. is maintained for synthesised equipment.

2. MANDATORY REQUIREMENTS

- (a) The M.A.A.A. supports the use of frequency synthesised radio control equipment in Australia provided that it conforms to the current M.A.A.A. Frequency Directive (MOP013) together with some special requirements. These are needed because of the ability of the equipment to operate at frequencies that are selectable within the equipment. These requirements are detailed in the following paragraphs.
- (b) Transmitters shall only transmit radio signals after the operator has identified the frequency on which transmission will occur and after he/she has then complied with frequency control system in use at the field of operation. The operator shall ensure that there is no other operator using or intending to use that frequency.
- (c) Different models of transmitters will select their operating frequency in different ways and it is not possible to give step by step instructions for each type. However, these will broadly fall into two types. The frequency is either set up mechanically, such as by switches, or it is selected within the software of the transmitter.
 - (1) Where the frequency is set mechanically then the operator must physically check, and if necessary select, the frequency that the transmitter will operate on prior to being switched on.
 - (2) Where the frequency is set within the software there shall be a two stage switch on process. The first stage is that the transmitter is switched to activate the software but it shall not transmit on any frequency. The operator shall then check, and if necessary select, the frequency that the set will ultimately transmit on.
 - (3) Other variations may be available and the operator shall adapt the principles to that transmitter. In the event of any doubt the operator shall consult a technical authority for guidance prior to use.
- (d) This procedure enables the operator firstly to select the frequency of operation without causing interference to other operators and then secondly to obtain clearance to transmit from the site frequency control system. The transmission frequency must be one of those specified in the M.A.A.A. Frequency Directive (MOP013) as allowable for model aircraft.

- (e) After identifying the frequency that the transmitter will transmit on, the frequency key, of the appropriate width for the bandwidth of the equipment and marked in accordance with the M.A.A.A. Frequency Directive (MOP013), must be inserted into the correct frequency slot of the Silverstone© Keyboard. If an alternative frequency control system is in use the equivalent procedure must be followed.
- (f) Once the operator has completed the procedure to reserve the operating frequency of the synthesised equipment, then the transmitter can either be switched on in the case of the frequency being mechanically selected or allowed to transmit a radio signal in accordance with the manufacturer's instructions in the case of being software selected.
- (g) Frequency Synthesised equipment has to be bandwidth tested in accordance with the M.A.A.A. Frequency Directive (MOP013) using the same procedure as equipment whose frequency is controlled by the selection of crystals.
 - 1) Because synthesised equipment can operate on many frequencies the testing station is required to test that the equipment achieves the appropriate M.A.A.A. specification at 3 different frequencies. The first two are either the highest and lowest frequencies that the equipment will operate on, or alternatively those at the top and bottom of the frequency bands that are authorised for model aircraft use if these are within the operating band of the equipment. The third frequency is approximately mid way between the other two.
 - 2) In the event that either only the transmitter or only the receiver is synthesised the following shall apply. A synthesised transmitter, when tested with a fixed frequency receiver still has to be tested in accordance with 2.g.1. A synthesised receiver when tested with a fixed frequency transmitter is allowed to be only tested on the frequency of the transmitter. In this case the receiver is certified for that frequency only
 - 3) The bandwidth sticker applied to the equipment is that appropriate to the test results on the frequency that requires the widest frequency bandwidth for each item of equipment tested. Instead of the normal channel sticker the testing station will apply a yellow square label carrying the letter S in black to equipment passing test 2.g.1, signifying that the equipment is synthesised and has been certified for multiple frequency use.

3. GUIDANCE

Whilst not part of the M.A.A.A. requirements, the following information is provided to assist users of this class of equipment.

- (a) Synthesised frequency equipment will give you much greater flexibility in your frequency selection but it also has more opportunities for errors and you should take great care if you use such equipment. Remember that many people you are flying with will not have the same facilities and your operations must fit in with what is accepted as normal operating procedures.
- (b) You should have a separate frequency key, marked with your name for every frequency that you are prepared to use when you change frequencies.

- (c) You must take extra care when using the frequency control system, as your opportunities to reserve the wrong frequency will be much greater.
- (d) Until use of this type of equipment becomes even more common, you may find that the ability of your transmitter to select any frequency will be viewed with suspicion by some and, in the event of interference being suspected you could find that you are the first person checked. The only way to avoid problems is to be scrupulously careful in your operations. If there is a suspicion that you might transmit on the wrong frequency, a procedure to consider would be to get another club member to double check each time the frequency is changed.
- (e) Although synthesised sets have the potential in the long term to be more reliable and cheaper to produce than plug-in crystal sets, remember that they still use a fixed crystal in the transmitter module and the receiver and that any crystal can drift in frequency over time. You will still need to have your radio equipment checked in accordance with the M.A.A.A. Frequency Directive (MOP013), as a master crystal drifting will affect all the other frequencies synthesised from it. Curing the problem will be a job for the technician/importer/manufacture and will not be as simple as just plugging in a new crystal.