

## General Information – The U.K. Radio Control Bands

### Introduction

This Technical Note provides information relating to the use of low power transmitting and receiving apparatus for the control of models.

It gives details of the frequency bands allocated for this purpose and, for each, provides a listing of the individual channels. The intended usage of each band and the maximum permitted transmitter power is also given.

In addition to the frequency band details some warnings are given regarding likely interference from other users and there are short sections on licensing and telemetry.

### Frequency Bands

There are 4 frequency bands licensed for use in the U.K. for radio controlled modeling purposes. Three of these bands are located in the VHF region and are known as the 27MHz, the 35MHz and the 40MHz bands. The fourth is located in the UHF part of the spectrum and is referred to as the 459MHz band. Compared to the 3 VHF bands the 459MHz band is rarely used due, at least in part, to the relatively high cost of equipment.

In order to prevent unnecessary interference with other users in the same locality each band has a limit on the maximum permitted signal strength and some of the bands have been allocated to a specific type of model, as given in Table 1 below.

Band	Max. Power	Usage
27MHz	100mW	General Use
35MHz	100mW	Aircraft Only
40MHz	100mW	Boats/Buggies
459MHz	100mW	General Use

Table 1

The specific usage in the 35MHz and the 40MHz bands is to prevent accidents due to interference, particularly to aircraft by surface modelers.

### The 27MHz Band

The 27MHz band was the first to be allocated for radio controlled modeling and has been in use for many years. Originally the band was exclusively for modeling usage but the availability of Citizens Band equipment in the 1970s, which shared the same part of the frequency spectrum, was the cause of much interference and consequently its use has declined in recent years. Equipment can still be purchased, some of it at very reasonable prices, but it tends to be at the low end of the market.

The channel spacing on the 27MHz band is nominally 25kHz and the 13 individual channels are identified by colours, rather than numbers. A transmitter in use will normally have a coloured pennant attached to its aerial denoting the channel in operation.

The channel and colour details are given in Table 2 below.

Channel	Frequency	Colour
1	26.975MHz	Black
2	26.995MHz	Brown
3	27.020MHz	Brown/Red
4	27.045MHz	Red
5	27.070MHz	Red/Orange
6	27.095MHz	Orange
7	27.120MHz	Orange/Yellow
8	27.145MHz	Yellow
9	27.170MHz	Yellow/Green
10	27.195MHz	Green
11	27.220MHz	Green/Blue
12	27.245MHz	Blue
13	27.270MHz	Blue/Grey (White)

Table 2

### The 35MHz Band

The 35MHz band is allocated for use by aircraft only and was introduced to provide an interference free band for aero-modeling after the introduction of CB radio caused problems on the 27MHz band.

The channel spacing on the 35MHz band is 10kHz and the 36 individual channels are identified by numbers. A transmitter in use will normally have an orange pennant, inscribed with the channel number, attached to its aerial denoting the channel in operation.

Crystals are often only marked with their operating frequency, e.g. 35.140. To calculate the channel number just subtract 3440 from the first four digits. In the example given above subtracting 3440 from the '3514' of 35.140 gives channel 74.

The channel number and centre frequency details are given in Table 3 below.

Ch. No.	Freq.	Ch. No.	Freq.
55	34.950MHz	73	35.130MHz
56	34.960MHz	74	35.140MHz
57	34.970MHz	75	35.150MHz
58	34.980MHz	76	35.160MHz
59	34.990MHz	77	35.170MHz
60	35.000MHz	78	35.180MHz
61	35.010MHz	79	35.190MHz
62	35.020MHz	80	35.200MHz
63	35.030MHz	81	35.210MHz
64	35.040MHz	82	35.220MHz
65	35.050MHz	83	35.230MHz
66	35.060MHz	84	35.240MHz
67	35.070MHz	85	35.250MHz
68	35.080MHz	86	35.260MHz
69	35.090MHz	87	35.270MHz
70	35.100MHz	88	35.280MHz
71	35.110MHz	89	35.290MHz
72	35.120MHz	90	35.300MHz

Table 3

### The 40MHz Band

The 40MHz band is allocated for use by surface craft only, e.g. boats and buggies. Like the 35MHz band it was made available to provide an interference free band after the introduction of CB.

The channel spacing on the 40MHz band is 10kHz and the 34 individual channels are identified by numbers. A transmitter in use will normally have a green pennant, inscribed with the channel number, attached to its aerial denoting the channel in use.

The channels are identified, in relation to their actual frequency, by using the three numbers after the decimal place. For example a crystal marked with 40.775 will operate on channel 775.

The channel number and centre frequency details are given in Table 4 below.

Ch. No.	Freq.	Ch. No.	Freq.
665	40.665MHz	835	40.835MHz
675	40.675MHz	845	40.845MHz
685	40.685MHz	855	40.855MHz
695	40.695MHz	865	40.865MHz
705	40.705MHz	875	40.875MHz
715	40.715MHz	885	40.885MHz
725	40.725MHz	895	40.895MHz
735	40.735MHz	905	40.905MHz
745	40.745MHz	915	40.915MHz
755	40.755MHz	925	40.925MHz
765	40.765MHz	935	40.935MHz
775	40.775MHz	945	40.945MHz
785	40.785MHz	955	40.955MHz
795	40.795MHz	965	40.965MHz
805	40.805MHz	975	40.975MHz
815	40.815MHz	985	40.985MHz
825	40.825MHz	995	40.995MHz

Table 4

**The 459MHz Band**

The 459MHz band is allocated for general use by both aircraft and surface craft.

The channel spacing on the 459MHz band is 25kHz and the 39 individual channels are identified by numbers.

The channel number and centre frequency details are given in Table 5 below.

Ch. No.	Freq.	Ch. No.	Freq.
1	458.525MHz	21	459.025MHz
2	458.550MHz	22	459.050MHz
3	458.575MHz	23	459.075MHz
4	458.600MHz	24	459.100MHz
5	458.625MHz	25	459.125MHz
6	458.650MHz	26	459.150MHz
7	458.675MHz	27	459.175MHz
8	458.700MHz	28	459.200MHz
9	458.725MHz	29	459.225MHz
10	458.750MHz	30	459.250MHz
11	458.775MHz	31	459.275MHz
12	458.800MHz	32	459.300MHz
13	458.825MHz	33	459.325MHz
14	458.850MHz	34	459.350MHz
15	458.875MHz	35	459.375MHz
16	458.900MHz	36	459.400MHz
17	458.925MHz	37	459.425MHz
18	458.950MHz	38	459.450MHz
19	458.975MHz	39	459.475MHz
20	459.000MHz		

Table 5

**Interference From Other Users**

Because sections of both the 27MHz and the 459MHz bands are allocated to other uses there is the risk of interference from nearby transmitters.

**27MHz Band Interference**

Citizens Band radios are the most likely cause of problems in the 27MHz band as the licensed CB band extends from slightly below channel 1 to well above channel 13. There are, however, a number of the R/C channels that are not allocated to CB channels as listed in Table 6 below.

Channel	Frequency	Colour
2	26.995MHz	Brown
4	27.045MHz	Red
6	27.095MHz	Orange
8	27.145MHz	Yellow
10	27.195MHz	Green

Table 6

**459MHz Band Interference**

Telemetry transmissions are the main source of potential interference in the 459MHz band but, as most of these operate at low radiated powers, the likelihood of a channel usage conflict is small. The best channels to use are given in Table 7 below.

Ch. No.	Freq.	Ch. No.	Freq.
25	459.125MHz	33	459.325MHz
26	459.150MHz	34	459.350MHz
27	459.175MHz	35	459.375MHz
28	459.200MHz	36	459.400MHz
29	459.225MHz	37	459.425MHz
30	459.250MHz	38	459.450MHz
31	459.275MHz	39	459.475MHz
32	459.300MHz		

Table 7

## Licensing

The operation of equipment meeting the required technical standards in relation to operating frequency and transmitted output power does not require the user to hold a license in the U.K.

It is very likely that any equipment that has not been modified and was produced by a reputable manufacturer will meet the technical requirements and thus may be legally used.

## Telemetry

Telemetry is the process of transferring information, typically measurement data, between two places which, in the context of R/C modeling, would usually be the model itself and a ground based data-collection system.

Telemetry is legally permitted in both directions between a model and a base station and has been allocated non-exclusive use of a small part of the UHF frequency spectrum. Channel spacing is set at 25kHz and the lowest frequency that may be used is 433.050MHz. The upper limit is 434.790MHz. and the radiated RF power, on any channel, must not exceed 10mW.

## Acknowledgement

Some of the information presented in this Technical Note was obtained from the web-site of the Radio Communications Agency. For more information visit:-

<http://www.radio.gov.uk>

## Notes

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