



AMSAT-UK

Spectrum Forum Meeting – Saturday 9th July 2005

Amateur Satellite Service VHF Allocations – Discussion Paper

The Amateur Satellite Service has in IARU Region 1 band plans only a very narrow allocation of 145.8 – 146 MHz.

Current Use

It is used for both for satellite uplinks and downlinks. It is the most popular of the Amateur Satellite allocations for the following reasons:

- It is the only band between 30 MHz and 24 GHz that we have exclusive use and hence some control. The 435 MHz, 1.26, 2.4, 5, 10 GHz bands are all shared with either high power users (radars) or large numbers of consumer devices which raise the noise floor.
- 144 MHz is the best band for amateur satellite downlinks due to ease of on board RF power generation and efficiency thereof, reduced path loss, reduced need for antenna pointing accuracy on satellite.
- Receiving equipment is widely available; this is an important consideration in “Third World” countries where Amateur Satellites are seen as an important tool in encouraging young people to pursue technical self-training.
- Ready availability of launch opportunity where size constraints would mean Attitude Control would not be possible. The lack of attitude control mandates the use of simple omni-directional antennas. This in turn means the use of VHF due to the lower path losses.

Future Use

An area that has been growing rapidly has been the development of Amateur Satellites by university students. Already large numbers of students have been involved in developing Amateur Satellites; this is beneficial to both the students and the wider Amateur community.

The trend in university student satellites is towards using a Linear Transponder for CW/SSB use with a bandwidth of 40-50 kHz. The uplink is on 435 MHz and the downlink on 144 MHz.

144.8 – 146 is very heavily used by Amateur Satellites. In addition on the International Space Station there is an Amateur Packet Repeater and Voice operation from the Amateurs onboard are also taking place in this narrow segment.

Requirement

The need is for an additional Satellite segment at 144 MHz that could be used for linear transponder downlinks for CW/SSB operation. Given that these transponders have a bandwidth of 50 kHz an allocation of a segment 60 kHz wide would be required to cater for Doppler shift, which can be as high as +/- 5 kHz.

The much-reduced levels of terrestrial CW/SSB activity in recent years may provide a solution. The segment between 144.340 and 144.400 MHz is hardly ever used. Even in major VHF contests it is rare to find stations calling in this section.

Amateur Satellite CW/SSB linear transponders operating in this section of the band would have the additional benefit of helping to stimulate terrestrial CW/SSB operation.

Other Options

There is the possibility of the use of other Amateur VHF bands by the Amateur Satellite Service.

The 70 MHz band is very narrow and only available in a few countries on a shared basis.

The 50 MHz band is more widely available and a worldwide Amateur Satellite Service allocation would be desirable here. However, there are significant obstacles to this and getting an Amateur Satellite Service allocation approved by the ITU could take 10 or more years.

50 MHz also has the drawback that the antenna would need to be 3 times larger than that for 144 MHz. This is an important consideration for the university satellites that have been kept to a very small size in order to make use of free or low cost shared launch opportunities.

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