

OVERCROWDING OF THE TWO METRE SATELLITE BAND

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The International Amateur Radio Union

Since 1925, the Federation of National Amateur Radio Societies
Representing the Interests of Two-Way Amateur Radio Communication

IARU BANDPLAN

- Coordinated Band plans in all three regions, with small regional variations, maximise usage and minimise interference between various types of operation
- 144-145 MHz is a world wide allocation
- 145,800 – 146,000 MHz is allocated to satellite operation
- 144.00 – 144.025 MHz new satellite up link

THE TWO METRE AMATEUR BAND

The band 144-146 MHz is allocated to the amateur service and the amateur-satellite service world-wide on a primary basis

This most used of all VHF amateur bands. It accommodates:

- Weak signal terrestrial and moon-bounce operation
- packet radios systems including APRS,
- propagation beacons,
- repeater systems, and
- satellite communications.

TOO MANY SATELLITES – too few frequencies

- CubeSats have developed as a low cost entry into space for experimentation, putting further pressure on the 145,800 – 146,000 MHz satellite band.
- The combination of low cost amateur and commercial radios along with free IARU frequency coordination, have made this band very attractive to universities and commercial experimenters.

ITU REGULATIONS

- RES757(g) notes that, “currently, many nanosatellites and picosatellites use spectrum allocated to the amateur satellite service ... in the frequency range 30-3000 MHz *although their missions are potentially inconsistent with these services.*
- Essentially, RES757 recognises that many missions appear to be *inconsistent* with definitions of the amateur service and amateur-satellite service – RR1.56 and RR-1.57.

- **RR 1.56** *amateur service*: A *radiocommunication service* for the purpose of selftraining, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.
- **RR 1.57** *amateur-satellite service*: A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *amateur service*.

- Some administrations, most notably the USA administration, decided that licensing of many university and commercial research missions in the amateur-satellite service does not comport with the definitions of the amateur services.
- Instead, licensing is provided as experimental stations in accordance with ART27, despite their having no status with regard to causing or receiving harmful interference.

IARU TO THE RESCUE

- When the USA administration changed licensing policy in November 2012, many CubeSats, originally coordinated as amateur-satellite stations, were already built, manifested for launch, and already mounted on a launch vehicle.
- They would have been denied their launch opportunity without cooperation from IARU.
- After consulting widely a set of terms and conditions to accommodate experimental stations on a *temporary* basis was devised.

CURRENT SITUATION

- IARU continues to hold the view that non-amateur satellites, that are satellites with missions inconsistent with RR1.56 and RR1.57, should not be coordinated in amateur service and amateur-satellite service frequency bands.
- Therefore, IARU recommends that these CubeSat builders look to bands allocated to existing services appropriate for their missions, rather than the two-metre band.

Way forward

- Beginning 1 July 2014, IARU will no longer be able accept frequency coordination requests for experimental stations in the two-metre band.
- However the IARU will continue to coordinate frequencies in the two metre band for satellites that carry true amateur radio payloads

Way Forward

- As an interim solution, non-amateur CubeSat uplinks could be coordinated in the 1260-1270 MHz band.
- It is not envisioned that limited frequency coordination will set any precedent for future use of the amateur and amateur satellite bands by non-amateur licensed satellites.
- IARU is actively participating in discussion to find a solution to this problem.

Way Forward

- IARU intends to provide coordination in the two-metre band to the best of its ability for experimental CubeSats that are already designed and being built.

Terms and Conditions

- The International Amateur Radio Union (IARU) will make best efforts to coordinate frequencies for use by experimental stations and issue a coordination letter provided
- (1) that the frequency coordination application form is fully completed and signed by the licensee or authorized representative for the experimental license and provided

Terms and Conditions 2

- (2) that the licensee agrees to the following terms and conditions.
- Experimental stations must accept harmful interference from all stations operating in accordance with the Table of Frequency Allocations and, in the event that the experimental station causes harmful interference, must cease operation immediately upon request from the IARU Satellite Advisor or order by their licensing administration.

Terms and Conditions 3

- All space stations must be capable of being turned off immediately by telecommand from associated Earth stations. See: RR 22.1.
- 22.1 §1 Space stations shall be fitted with devices to ensure immediate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of these Regulations.

Terms and Condition 4

- Sufficient Earth stations must be established and identified to the IARU Satellite Advisor at least 30 days before launch to assure the ability to turn off all space stations immediately upon request, otherwise coordination may be withdrawn.

NOTE: If communicating with stations licensed by another administration, project teams shall make certain BEFORE LAUNCH that the licensing administration has communicated with them appropriately. See: RR 27.1 and 27.2.

27.1 §1 1) An experimental station may enter into communication with an experimental station of another country only after it has been authorized to do so by its administration. Each administration shall notify other administrations concerned when such authorizations are issued.

27.2 2) The administrations concerned determine by special arrangement the conditions under which communications may be established.

Terms and Conditions 5

- IARU will make best efforts to coordinate frequencies to help the licensee's project succeed. However, the Satellite Advisor may decline coordination if a frequency in a requested band is likely to cause harmful interference either to amateur or amateur-satellite stations or to an experimental station already coordinated.
- Frequencies in the amateur and amateur-satellite services are shared and, therefore, cannot be coordinated on an exclusive basis.

Terms and Condition 6

- Coordination of a frequency for a mission does not guarantee that the same frequency will be available for follow-on missions.
- Licensee agrees to notify the IARU Satellite Advisor of the following events, whenever they occur:
 - Experimental station license expiration.
 - Launch failure.
 - Mission termination.
 - Launch date in the coordination request passes without the launch occurring.

IARU Satellite Forum

- Join us on Sunday at 08:45 for a discussion on QB50 project
- Open discussion on Non-amateur CubeSats

Thank You

IARU working with National
Societies in the interest of
Amateur Radio



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