



## **Brief: Securing Spectrum Authorization**

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## Findings

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*Rotoiti interviewed several spectrum management experts. This brief summarizes the complexities of securing spectrum authorization and the need to plan accordingly. The process described below is general; in practice, details vary depending on the satellite system.*

**Securing radiofrequency spectrum authorization is critical for satellite systems.** In order to use spectrum to communicate in national governments' jurisdictional areas, satellites and ground infrastructure need authorization from those governments. And in order for satellites to generate value, it is almost always necessary for them to use spectrum to communicate in at least some national jurisdictions. This means that spectrum authorization from national governments is a fundamentally important asset; securing it is not a simple administrative task. A satellite system's prospects critically depend on its status in terms of spectrum authorization. Without a strategy in place to secure authorization, a system's value is severely undermined.

- In most countries, the radiofrequency spectrum is seen as a valuable resource which governments must regulate by segmenting users in terms of time, location, and frequency. Managing the spectrum in this way helps avoid signal interference and thus ensures that various users can depend on the spectrum for communication purposes.

**Securing spectrum authorization can be a lengthy, complex, and costly process; it is necessary to employ relevant expertise in order to navigate this process effectively.** As described in the below paragraphs, satellite systems must be filed with the International Telecommunications Union, assigned the right to use certain frequencies, and then finally authorized by national governments to use those frequencies. Understanding this process requires legal and business expertise, familiarity with radiofrequency technologies, and awareness of domestic and international politics. Many larger firms employ in-house experts. Smaller firms more commonly hire outside consultants to assist them. "Regulatory engineering" and "spectrum management" are two terms which indicate that professionals have relevant expertise.

**In order to secure spectrum authorization from national governments, satellite systems must first be filed via a national government with the International Telecommunications Union (ITU).** An ITU filing provides technical characteristics of a planned system (e.g. the intended orbits and frequencies used by satellites). Firms do not submit filings directly to the ITU. This is rather done by organizations appointed by national governments of ITU member states. In the United States, for instance, the organization is the Federal Communications Commission (FCC).

- The ITU is an agency of the United Nations. ITU membership is open to all UN member states, and all UN member states except the Republic of Palau are ITU members.

**National governments vary in terms of what they require in order to support an ITU filing.** Some governments simply require the same information which the ITU requires. Other governments require significantly more information (e.g. orbital debris management plans).

Governments also differ in terms of preferences for the sorts of filings which they support; they may, for example, prefer filings that involve certain levels of local economic benefit. Another difference regards disclosure; more or less information about ITU filings is publicly disclosed.

- Larger countries are better positioned to require more information to support a filing. This is because firms developing satellite systems often want to access larger markets, and they are thus willing to provide more information if doing so helps with market access. (Note that filing via a government does not necessarily ensure the later authorization necessary for market access, but filing often facilitates authorizations; filing via a government, in other words, may help secure access to a national market.)

**Once a satellite system has been filed, it must be coordinated with other systems to address potential interferences.** The ITU identifies other systems with which there may be interference issues. It is then typically left to the filing firm, not the ITU or filing governments, to coordinate with other systems by refining the technical characteristics of the various systems.

Representatives from the various systems have meetings which are usually bilateral; it is unlikely that a representative of a satellite system, in other words, will convene a group meeting with representatives of all of the other systems with which there may be interference.

- Informally, filing firms prioritize which potential interferences to address. Highest priority usually goes to earlier filings that are likely to actually become active, since the ITU obligates later filings to protect earlier filings. Filing firms may have insight which leads them to ignore coordinating with some other systems – they may, for instance, know that some of the other identified systems are unlikely to ever become active.
- The ITU has mechanisms to try to ensure intent behind filings. These mechanisms are designed to prevent firms from “warehousing” spectrum – filing without intent to activate satellite systems, solely to protect frequencies from other parties.

**If a satellite system is coordinated and activated within seven years, the ITU assigns the system the right to use certain frequencies, paving the way for national authorizations.** After filing with the ITU, satellite systems have seven years to coordinate with other systems and to be activated; activation means they must start to be put into use, and this is defined differently for different types of systems. If coordination and activation happen within seven years, a frequency range for the system is assigned in the ITU’s Master International Frequency Register (MIFR). National authorizations are based on MIFR assignments; if the MIFR assignment is in a certain band, for instance, then the national authorization (if awarded) will let the system communicate in that band. If a system is not activated within seven years, its filing is cancelled.

**Spectrum authorizations from national governments vary by country; regardless of which government was involved in the ITU filing, it is necessary to engage with all relevant governments to secure authorizations in national jurisdictions where a system will operate.** If a satellite system plans to use spectrum in two countries, for instance, it must secure authorization from each government. The process for securing authorization varies across

countries. There are, for instance, no universal types of spectrum authorizations that all governments offer, nor are there even universal naming conventions. Associated costs also vary greatly. There is furthermore variation in terms of which parties must secure which authorizations. There are moreover sometimes spectrum uses for which no authorizations are necessary. That being said, there are three general categories of authorizations commonly mentioned as relevant for satellites (note there are many exceptions to these descriptions):

- One common group of authorizations is often called “landing rights”, which allow satellites (or “space stations” in industry parlance) to transmit data down to ground infrastructure; it is usually satellite operators which must secure landing rights.
- Another common group of authorizations is often called “spectrum licenses”, which allow operation of ground infrastructure. Parties which must secure spectrum licenses can variously be satellite operators, ground station operators, or service providers.
- A third common group of authorizations is often called “service licenses”, which allow selling data to end users; service providers usually must secure these licenses.

**The three parts of the process described above – filing with the ITU via a national government, being assigned frequency by the ITU, and securing national authorization – do not necessarily occur sequentially.** In practice, the chronological order varies, or the steps may be concurrent or interconnected. Depending on the national government, for instance, certain elements of authorization can be secured before ITU coordination or assignation are complete. Some governments’ pre-ITU information requirements, on the other hand, essentially serve as a guarantee of national authorization, pending completion of phases of the ITU filing process.

**Firms should consider participating in World Radiocommunication Conference (WRC) deliberations in order to more effectively strategize how to secure spectrum authorization.**

The WRC regularly revises the Radio Regulations (RR), and revisions ultimately affect national spectrum authorizations. The RR are an international treaty which governs spectrum use and which defines a global table of frequency allocations. This table in turn defines frequency assignments for satellite systems in the ITU’s MIFR. National spectrum authorizations in turn accord with the MIFR. By participating in WRC deliberations, firms can thus be better informed about which frequencies they should plan to secure for satellite systems, and potentially they can influence frequency allocations to their benefit.

- Potential agenda items for WRC deliberations are set several years in advance, and it is thus possible to anticipate which parts of the frequency allocation table may change.
- RR revisions result from highly complex negotiations involving many parties – national governments, private firms, and various organizations representing collections of other actors. Participating in this opaque process is resource-intensive, which poses a barrier to entry for smaller firms. For smaller firms, therefore, it may be worth pooling resources in order to better participate in the WRC process.