ITU radio frequency coordination - What should be done before launching

Infostellar

Copyright and Distribution Terms

Launch!

Ready!

3 months.

ITU Frequency Coordination
12 months.
(possibly shorter or longer…)

Earth Station Radio License
6 months.
(possibly shorter or longer…)

3 months???
Domestic coordination,
Prepare API filing, etc.

Launch!

Ready!
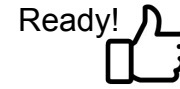
3 months.

6 months.

12 months.

3 months.

Total 2 years journey!

…..When do you plan to launch?

| BR7a/BR7b Group id. | 121626204 | BR1 Date of receipt 10.03.2021 | C2c RR No. 4.4 | BR97 No. 11.43A | BR98 For use in accordance with Res 163/164 |

A2a Date of bringing into use 27.09.2021   A2b Period of valid. 30   A3a Op. agency 502   A3b Adm. resp. B   BR16 Value of type C8b

BR62 Expiry date for bringing into use 13.08.2027   BR63 Confirmed date of bringing into use 27.09.2021   BR64 Date of receipt of 1st Res49

BR14 Special Section

C4a Class of station EW   **Service Area**   Assigned freq. band 64   C5a Noise temperature 288   B4b5 Peak of pfd

C4b Nature of service CO   C6a Polarization type C   C6b Polarization angle

Frequency   C11a1 Service area no.   C11a2 Service area ATA   NOR   USA   C11a3 Service area diagram

A5/A6 Coordinations/Agreements

C2a1 Assigned frequency   **RF specifications**

2101.618   MHz

A13 Ref. to Special Sections	C7a Design. of emission	C8a1/C8b1 Max. peak pwr	C8a2/C8b2 Max. pwr dens.	C8c1 Min. peak pwr	C8c2 Attch.	C8c3 Min. pwr dens.	C8c4 Attch.	C8e1 C/N ratio	C8e2 Attch.
API/A/12636	1 64K0G1D--	23	-25.1	23		-25.1		28	

Bandwidth, Modulation

A   A1a Sat. Network LANDSAT-9   A1f1 Notif. adm. USA   A1f3 Inter. sat. org.   BR1 Date of receipt 10.03.2021   BR20/BR21 BR IFIC no./part 2968/2

BR6a/BR6b Id. no. 121500017   BR3a/BR3b Provision reference 11.2   N   BR2 Adm. serial no. NS-2104   B1   R

Ground Station

2101.618   MHz

C7b Carrier frequency of the emissions (64K0G1D--)

C10b1 Assoc. earth station id.	C10b2 Type	C10c1 Geographical coord.	C10c2 Ctry	C10d1/C10d2 Cls. / Nat.	C10d3 Max. iso. gain	C10d4 Bmwdth	C10d7 Ant. diameter	C8g1 Max. aggr. pwr.	C8g2 Aggr. bandwidth	C8g3 Transp. bandwidth = Aggr. bandwidth
SIOUX FALLS SD	S	096W37 21 43N44 10	USA	1 TW CO	45	1.05	10	23	64	
WALLOPS ISLAND VA	S	075W28 35 37N55 30	USA	1 TW CO	47	0.71	11	23	64	
MCMURDO	S	166E40 01 77S50 21	ATA	1 TW CO	45	1.05	10	23	64	
SVALBARD	S	015E24 40 78N13 54	NOR	1 TW CO	47	0.71	11.3	23	64	

C10d5a Co-polar antenna pattern						
C10b1 Assoc. earth station id.	Co-polar ref. pattern	Coef. A	Coef. B	Coef. C	Coef. D	Phi1	Co-polar rad. diag.
SIOUX FALLS SD	REC-465-6-E						
WALLOPS ISLAND VA	REC-465-6-E						
MCMURDO	REC-465-6-E						
SVALBARD	REC-465-6-E						

Filing API for coordination

Before the filing API for satellite, the following parameters and considerations are needed to be studied:
- Modulation Type
  - Correct modulation type needs to be filed
- Frequency Range/Bandwidth
  - The Wider the frequency range and/or bandwidth, the greater the number of countries required for coordination, which will consume greater time
  - If the frequency range is set to too narrow, it may introduce difficulty in interference coordination with existing radio services / stations locally
  - Only allow to alter the frequency within the range filed
  - Care should be taken when decides frequency range
- Type of Service
  - Type of service should match with the one defined in ITU frequency allocation on designated region
- Ground Station Coordination
  - API filing should include technical information of ground station to be used for service
  - Separate filing should take in place for ground station frequency coordination with affecting foreign radio regulatories where ground station will be located (RR9.15, 9.17)

Q: If ITU filing doesn't include a country or Ground Station to be used?
A: Most probably Earth Station licensing process cannot be started.

Q: Should I include service area countries or Ground Stations as many as possible?
A: If you have more included, coordination may take longer. However, any country or ground station needs to be included if there is a chance to be used.

Q: Which country is easy to get a license?
A: Case-by-case. Your satellite mission and frequency to be used are mostly affected parameters.

Satellite operator need to decide which Ground Station to be included in your ITU filing.
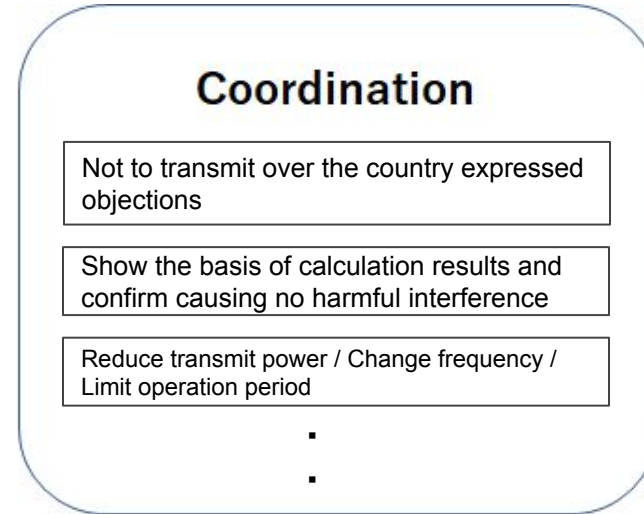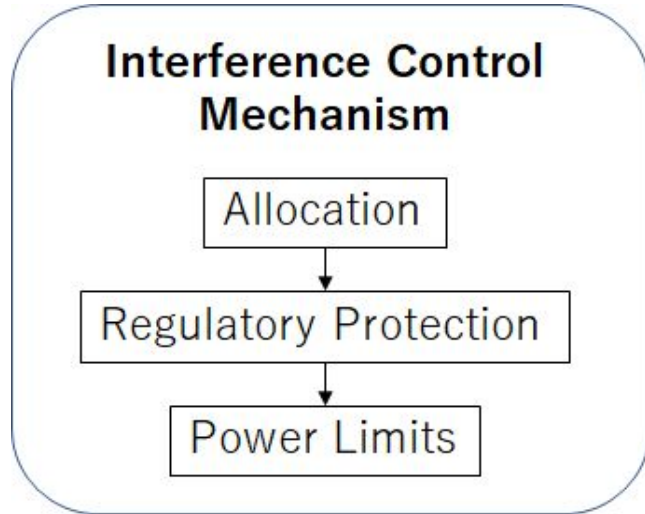
More Details…

Frequency Coordination Service

- Radio frequencies and orbits are considered as limited natural resources
- Any service operator using radio spectrum needs to limit the spectrum used to the bare minimum to provide their necessary services
- Any new frequency allocation, any frequency change, or any other basic characteristic of an existing assignment must avoid causing harmful interference to other services

Interference Control Mechanism

Allocation

↓

Regulatory Protection

↓

Power Limits

Coordination

Not to transmit over the country expressed objections

Show the basis of calculation results and confirm causing no harmful interference

Reduce transmit power / Change frequency / Limit operation period

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Coordination data file (API or CR) has to be created to follow the interference control mechanism

Allocation

Frequency are allocated based on the type of services:

- ○ Each frequency band may includes one or more types of radio services
- ○ For the services do not fall into predefined categories are subject of rejection even before the frequency coordination
- ○ The world is divided into three regions, also called ITU regions, and each region has different frequency allocations

Regulatory Protection

Special regulatory protections are applied for specific applications.
Example

- `Geostationary-satellite is given priority over non-geostationary-satellite`
  Non-geostationary-satellite shall not cause unacceptable interference to and shall not claim protection from geostationary-satellite networks. (Summarized from RR Volume 1, Article 22, 22.2)

- `Data collection systems (DCS) need to have stable regulatory certainty for long-term continuity for its operation`
  The establishment of power limits for earth stations is necessary. (Summarized from RR Volume 3, RESOLUTION 765 and 766 (WRC-15))

Domestic Radio License - Different condition per country

Example - Japan
- Licensing required per transmitting radio station
  - One license could include several communication ends
  - One satellite license could include multiple ground stations
- Inspection required at beginning but also after defined period of time
- One ground license could include several satellites
- For ground station license,
  - receiving only station does not required to get license
  - ITU coordination is still required on Satellite side targeted to receiving only stations, however
  - The satellite owner/operator and the ground station licensee do not need to be under the same company / individual
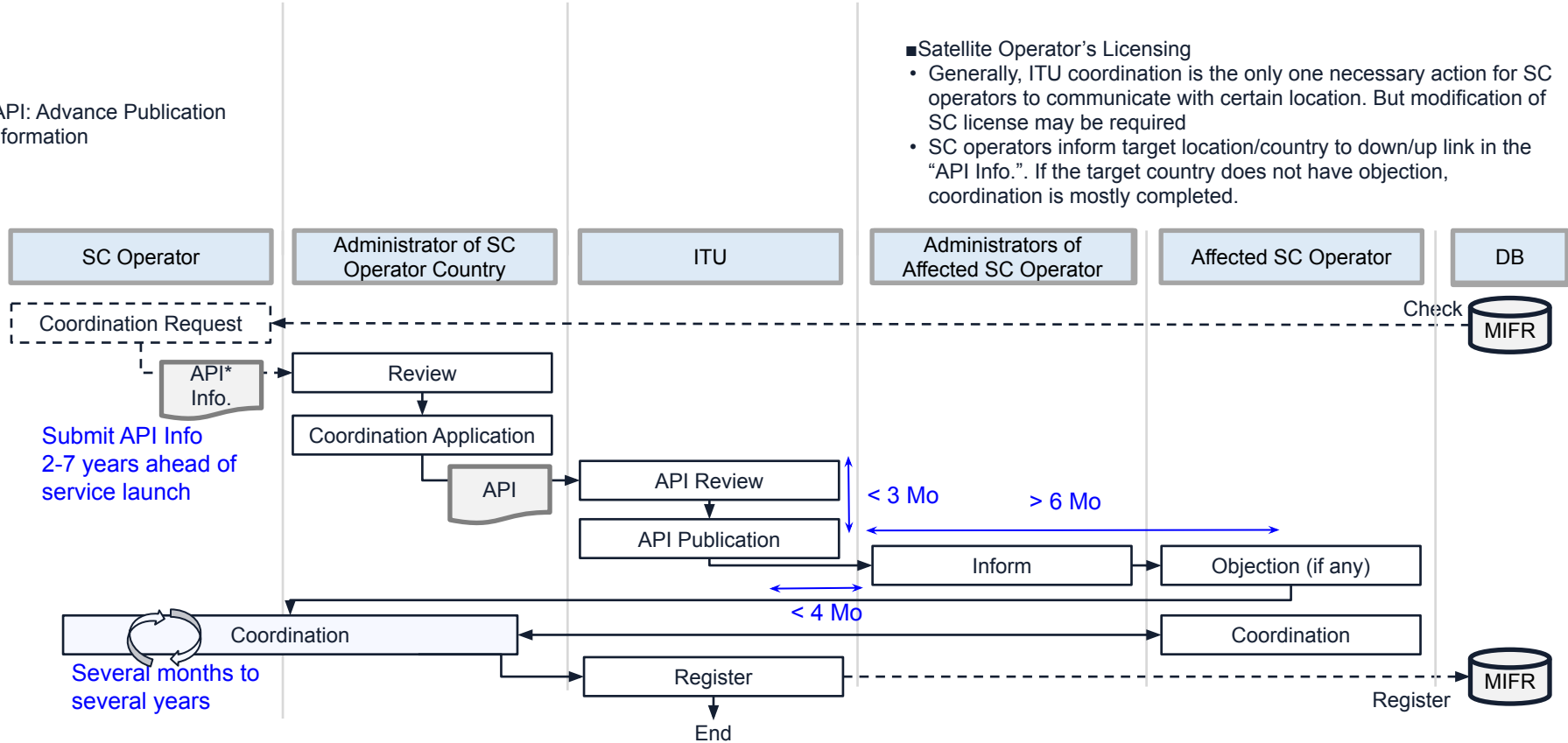
General ITU Coordination Process

*API: Advance Publication Information

■Satellite Operator's Licensing
• Generally, ITU coordination is the only one necessary action for SC operators to communicate with certain location. But modification of SC license may be required
• SC operators inform target location/country to down/up link in the "API Info.". If the target country does not have objection, coordination is mostly completed.

ITU Coordination

| SC Operator | Administrator of SC Operator Country | ITU | Administrators of Affected SC Operator | Affected SC Operator | DB |

Check — MIFR

Coordination Request

API* Info. → Review

Submit API Info 2-7 years ahead of service launch

Coordination Application

API → API Review

< 3 Mo   > 6 Mo

API Publication

Inform → Objection (if any)

< 4 Mo

Coordination

Several months to several years

Coordination

Register ---- Register — MIFR

End

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Frequency Coordination Service

Thank you
& Please contact
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https://www.infostellar.net/