The politics of connectivity:
Digital divide, internet governance and cyberwar in the 2020s

The Medium: Frequencies

Illy Yeh (Chi-Ni Yeh) / 7324279 / PS. Dept.

Hypotheses

A redefined role, not a loss of control

The shift from “telecommunications” to “connectivity” reflects government moving from controller to market designer and facilitator, not losing control outright

Public interest, not just interference

Historically, safeguarding the public interest , not interference avoidance or efficiency alone, has driven the major turning points in spectrum governance.

Success depends on accidental alignment

Successful unlicensed-access regimes such as Wi-Fi depend on an alignment between private commercial objectives and public regulatory objectives — often an unplanned one.

Loose ends persist even in success

Even a successful commons regime faces persistent collective-action problems, illustrating this seminar’s theme of unresolved “loose ends.”

? Why Frequencies Matter

- The radio spectrum is the physical medium underneath every wireless service.

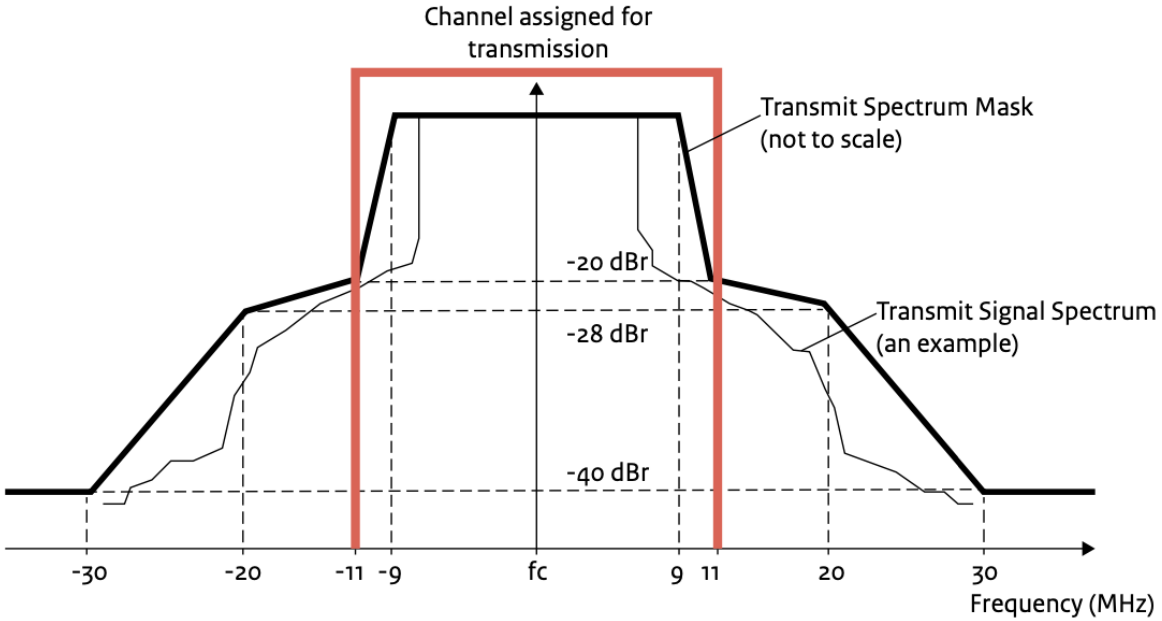


Figure I-1 In-band and adjacent channel transmission of a typical signal (adapted from IEEE Standard 802.11-2007).[294]

The Old Regime And Its Limits

01

Low occupancy

Measurements consistently show large parts of allocated spectrum sit unused at any given time and place.

02

Slow to adapt

New technologies must wait for incumbents to move first, let the regime is structurally biased toward the status quo.

From Open Pasture to “Supreme Coordinator”

1900 — Marconi's ship to shore radiotelegraphy becomes a private monopoly

1903/06 — Berlin conferences: first international rules to prevent monopoly and interference.

1912 — Titanic disaster — London Conference strengthens safety of life at sea rules.

1927 — Washington Conference: government becomes “supreme coordinator” of a multi use resource.

Policy, Strategy, and Regulation

Policy

Provide a brief overview of A statement of intent that guides and constrains later decisions and actions, also delegates authority and tasks to specific actors.

Strategy

A plan for deploying resources :where, how, when . Just as much about what will deliberately not be done.

Regulation

Binding secondary legislation that puts a policy's intent into force through specific, enforceable rules for the regulator and the actors it regulates.

Objectives

The fundamental policy basis for the whole spectrum management program, which ultimately meant to achieve.

Principles

Guidance for achieving those objectives through daily management of the spectrum resource.

Features of good policy (ITU)

- Integrated with other government goals and institutions, not designed in isolation.
- Founded on a realistic assessment of actual circumstances, not aspiration alone.
- Clear accountability: who is responsible: the Ministry, the NRA, or the private sector.
- Built with the full range of stakeholders, through consultation.

The Role of Policy Maker

Ministry

- Establishes the policy framework, priorities, and targets
- Consults on implementation and planning
- Coordinates with other government agencies and stakeholders

National Regulatory Authority (NRA)

- Legal authority: licensing terms, qualifications, appeals
- Regulates licenses and spectrum authorizations
- Regulates competition and scarce resource allocation

-> The ITU's own guidance warns against fragmenting spectrum management across too many agencies with conflicting objectives — exactly the kind of coordination problem this seminar keeps returning to.

What Good Spectrum Policy Looks Like

highest-Value Allocation

Allocate spectrum to uses that create the greatest economic or social value.

Adaptive Reallocation

Allow spectrum to move toward higher-value uses over time.

Proportionate Regulation

Use the least costly and least restrictive policy tools.

Certainty and Flexibility

Provide stable rules while adapting to technological change.

Efficient Interference Management

Control interference while maximizing overall spectrum use.

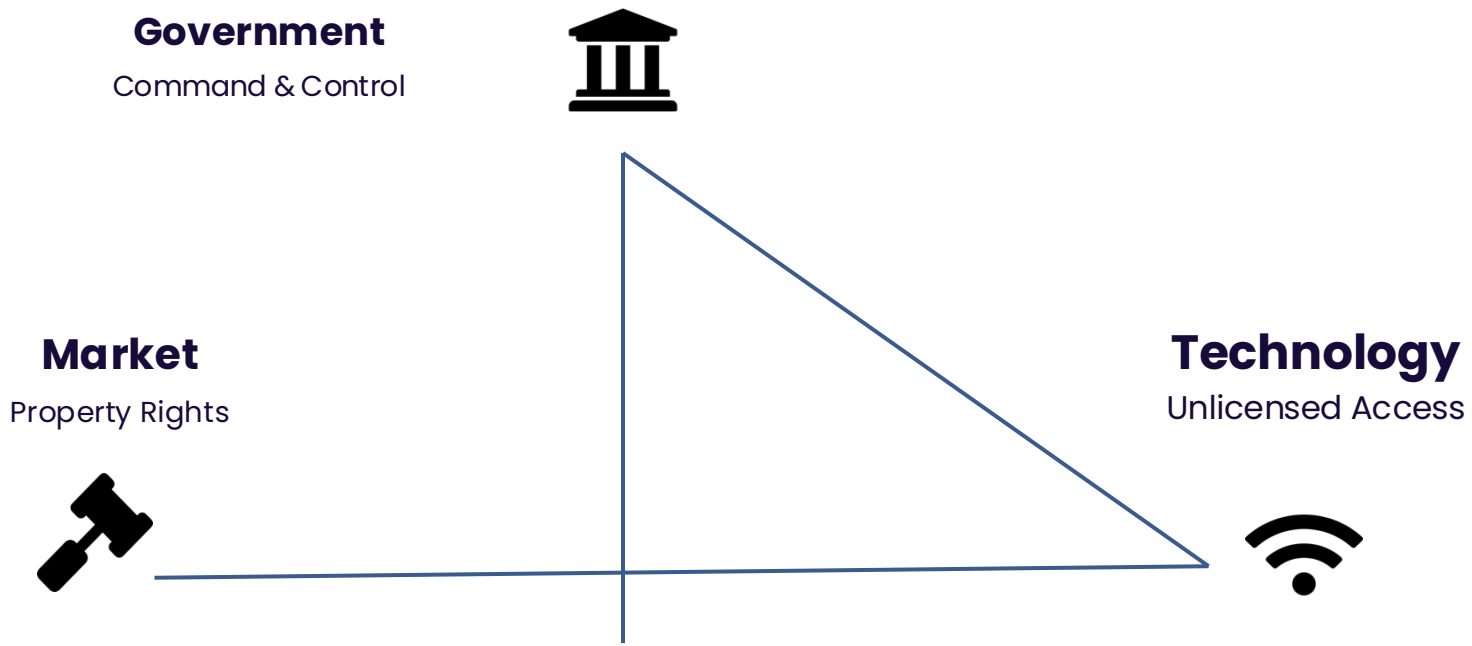
Transparent Allocation

Keep allocation and assignment procedures open and accountable.

The Goal of Spectrum Policy

- Plan ahead and monitor utilization against public policy objectives.
- Guarantee spectrum for vital public services — safety, security, defense.
- Improve efficient, optimal use through better allocation and licensing.
- Maintain effective competition; prevent excessive accumulation by a few operators.
- Stay flexible and adaptable as technology and markets evolve.
- Balance national interest with global harmonization under ITU treaty obligations and promote innovation.

Three Ways to Grant Access to Spectrum



Anker's three axes of coordination (2018), mapped onto the ITU's own “authorizations and methods for assignment.”

Wi-Fi: Spectrum Commons in Action

1985 FCC opens the ISM bands for unlicensed use, for reasons unrelated to networking.

1987 NCR's Utrecht team builds “WaveLAN” to solve a retail cash register wiring problem.

1997 IEEE 802.11 is published — coordination moves to a private standards body.

1999 Apple builds Wi-Fi into the iBook, then mass market adoption follows.

But not a complete success:

the 5 GHz band offers far more capacity than the congested 2.4 GHz band, yet adoption has lagged for years — whoever upgrades first bears the cost while everyone else free rides. Even Wi-Fi has loose ends.

The Regulator's Own List of Unresolved Problems

01 Limited financial and human resources for effective management.

02 Institutions struggling to keep pace with fast evolving wireless technology

03 Lack of central coordination across spectrum management functions.

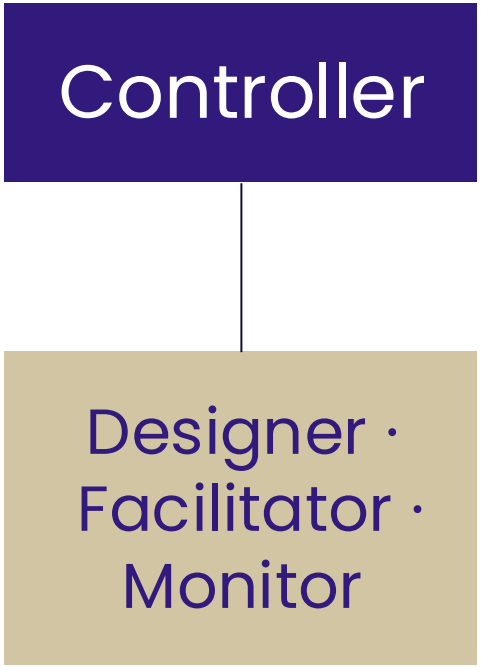
04 Inconsistent legal and regulatory frameworks across countries

05 Difficulty coordinating interference issues with neighboring countries.

06 Wide diversity and complexity in spectrum pricing regimes

From Telecommunications to Connectivity

- Government's role genuinely shifts but does not disappear.
- New “loose ends” emerge: who is included in private coordination? Who bears the cost when it fails?
- Equity, security, and accountability questions move from treaty rooms into standards bodies and corporate boardrooms.



Conclusion & Discussion

A redefined role, not a loss of control.

Public interest, not just interference, drives change

Wi-Fi's success rests on an accidental alignment.

Loose ends persist even in a successful commons.

Discussion Questions

1. Has the shift from telecommunications to connectivity reduced government control, or has it simply changed the way governments exercise control?
2. Should spectrum policy prioritize economic efficiency and innovation, or public interests such as equality, security, and access?
3. What problems might arise when communication infrastructure is increasingly coordinated by private companies and technical organizations?

Thanks!