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Evidence
that informs

Approaches to spectrum pricing

An overview of approaches taken by international regulators

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Research approach, caveats and limitations

Research approach

We reviewed publicly available policy documents, fee schedules, consultation papers, and regulator guidance for each jurisdiction. We also synthesised the source material into a comparable summary of pricing approaches. Microsoft Copilot Notebooks was used as a research aid. Relevant policy documents and other source material were uploaded to the Notebooks environment and interrogated through queries. This allowed the analysis to be undertaken within a contained environment.

Caveats and limitations

The level of publicly available detail on jurisdictional approaches varies, and the presentation reflects that inconsistency. Findings are based on publicly available sources and may not capture unpublished practice or regulator discretion. Some non-English materials were translated into English (via Google Translate), which may affect nuance or terminology. Google Translate processes whole sentences rather than individual words, which can lead to technical terms being translated literally rather than in their policy-specific sense. A small number of interpretive assumptions were required where policy language was ambiguous. These are signposted using phrases such as 'this suggests'.

A note on language

Regulators use different terms to describe similar conditions and practices. For example, contested, congested, in-demand, excess demand, high-value, scarce are terms often used interchangeably. There is no standard terminology across regulators. Most regulators tend to rely on one or two preferred terms. These terms describe a scenario where spectrum availability is constrained, and regulatory choices must be made about access and price. This lack of consistent terminology can make cross-country comparisons of pricing policy challenging and requires careful interpretation.

Administrative pricing does not always imply cost recovery. In several jurisdictions, regulators adjust administrative fees to reflect opportunity cost, scarcity or demand, particularly where auctions are not used. Other regulators restrict administrative fees to recovering regulatory costs only, although this distinction is not always clear in practice. Administrative pricing describes who sets the fee, not what the fee recovers or how it is set. Administrative fees may be limited to cost recovery or set above cost recovery to manage congestion, reflect opportunity cost, or promote efficient use.

Cross-country comparison table

Country	Spectrum regulator	Acronym	Pricing approaches
United Kingdom	Office of Communications	Ofcom	Auctions for initial assignment; Administered Incentive Pricing (AIP) based on opportunity cost when excess demand; Cost-recovery fees for low-demand bands.
New Zealand	Radio Spectrum Management	RSM	Auctions used in some high-value commercial bands; Administrative fees set on a cost-recovery basis.
Canada	Innovation, Science and Economic Development Canada	ISED	Auctions for high-demand bands; Administrative fees for non-auctioned bands can reflect market value if it aids spectrum management.
Lebanon	Telecommunications Regulatory Authority	TRA	Administrative fees set as cost-recovery that can include a congestion factor; Auctions also a potential allocation tool.
Hong Kong	Communications Authority	CA	Auctions can apply for competitive bands; Administrative fees apply if there is congestion (band >75% occupied).
Singapore	Infocomm Media Development Authority	IMDA	Market-based assignment for contested bands; Cost-recovery based administrative fees apply for low-demand bands.
Finland	Finnish Transport and Communications Agency	Traficom	Formula-based administrative frequency fees designed to guide users towards bands with less traffic.
Sweden	Swedish Post and Telecom Authority	PTS	Pricing and assignment approach linked to the level of spectrum scarcity; Administrative fees apply where scarcity is low and more competitive allocation methods where scarcity is high.

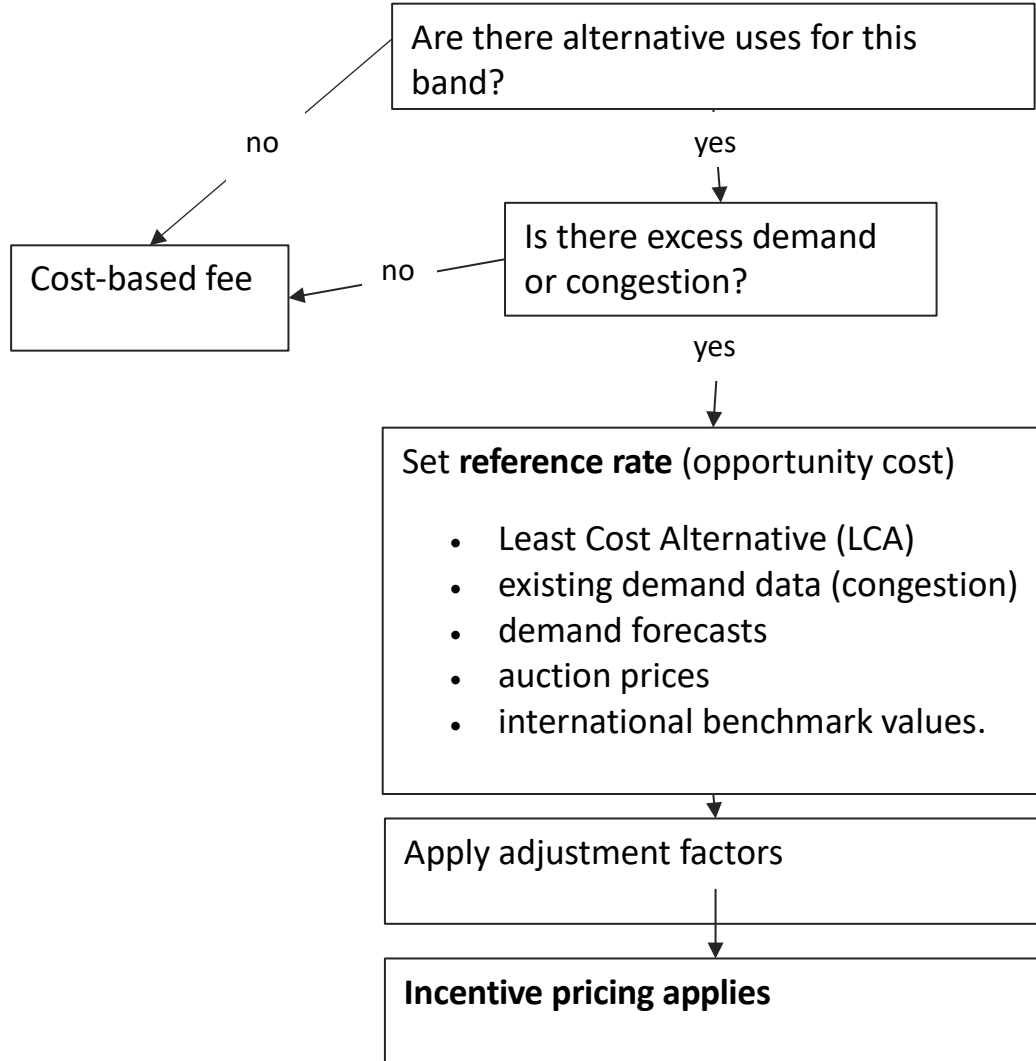
South Korea	Ministry of Science and ICT	MSIT	Auctions for high-demand spectrum; Administrative cost-recovery fees for low-demand bands.
United States	Federal Communications Commission	FCC	Auctions when more than one bidder; Administrative fees for low-demand bands are explicitly cost-recovery.

Ofcom (UK)

How Ofcom decides when to use incentive pricing

- The [Revised Framework for Spectrum Pricing](#) (the framework) established that many license types would transition from cost-recovery to Administered Incentive Pricing (AIP).
- AIP fees are based on opportunity cost, not administrative cost.
- That said, incentive pricing is not universal across all spectrum categories. Ofcom uses cost recovery pricing when incentive pricing is not appropriate.
- Cost-recovery fees currently apply to DAB radio and local TV, because there is no excess demand. (See [A framework for setting cost-based fees](#)).
- Ofcom must first assess if incentive pricing should apply. To do so it must first consider if there is current or potential future excess demand.
- This may involve assessing future sectors and use cases. Stakeholder feedback and consulting reports are important inputs in assessing future excess demand (see decision paper [page 5](#)).

Figure 1: Flowchart of Ofcom’s pricing decision making process



How Ofcom calculates incentive prices

Once Ofcom determines incentive pricing should apply, it then calculates a price. Ofcom does not use a single fixed equation or set of decision rules for all bands. However, calculating an incentive price usually involves estimating:

- **A reference rate:** the baseline £/MHz (or equivalent) value of a band that reflects its opportunity cost (the value of spectrum based on the cost of the next-best alternative).
- Occasionally, **geographic / population-density factors** are incorporated given congestion can vary by region.
- **Band factors** are multipliers often applied to the reference rate to adjust for different opportunity cost across frequency bands. E.g. 0.4 for Q/V bands (37.5–52.4 GHz) and 0.15 for E-band (≥70 GHz).

- A **NGSO factor** increases price for NGSO gateways due to wide ‘sterilisation’ footprint (see [NGSO gateway AIP consultation](#)).

Ofcom may diverge from its principles and methodology set out in the framework in specific sectors but is required to explain and consult.

Ofcom has noted *‘estimating the market value may involve an exercise of regulatory judgment’*.

Ofcom **does not run** engineering congestion modelling (e.g., channel occupancy) to set the reference rate. Instead, it estimates opportunity cost using the Least Cost Alternative (LCA) method (for value in existing use) and/or market benchmarks (for value in alternative use). Decisions also consider whether there would be excess demand at cost-based fees. None of these require measuring technical congestion. The reference rate is often triangulated using:

- Existing demand data, such as the volume of fixed links.
- Forecasts of demand growth for current and emerging uses (e.g., satellite broadband, smart grids).
- Market benchmark data, including spectrum auction prices.
- Economic modelling, such as assessments of substitutability across adjacent bands.
- International benchmarks, including comparable markets with similar propagation and usage characteristics.
- Engineering assessments, especially relating to technical substitutability, interference risk, and capacity constraints.

This overall methodology is described in detail in the framework. Consulting reports often provide input into these calculations.

Examples of pricing in practice

In Ofcom’s 2025 [decision](#) to lower values for 900 MHz and 1800 MHz, and a small upward correction for 2100 MHz, Ofcom relied on:

- **New international auction** results, showing that prices for mobile spectrum in many countries have fallen in the 5G era.
- **Economic evidence from stakeholders**, including analysis showing a multi-year decline in spectrum values worldwide since 2016.
- **Updated Ofcom modelling inputs**, including new benchmarks and an EBITDA model update, giving a more accurate picture of operators’ financials and market conditions (all model are made [public](#)).
- **Consultation feedback** that highlighted the risk of over-charging and its impact on investment.

Communications Authority (Hong Kong)

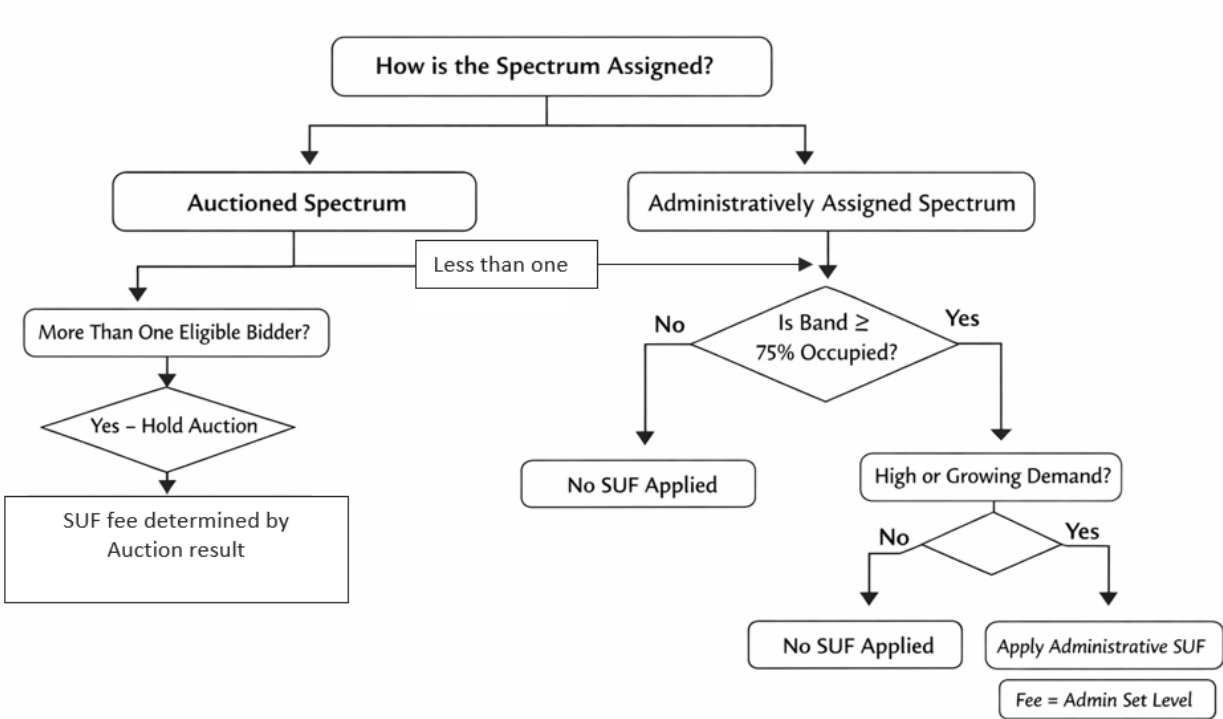
Hong Kong’s pricing approach

Pricing mechanisms

Hong Kong’s Communications Authority uses 2 approaches to determine its spectrum fees, known as spectrum utilisation fees (SUFs).

- Where demand is expected to be competitive, spectrum SUFs are determined through auction.
- If spectrum is not suitable for competitive bidding, it is assigned administratively. A 75% **congestion** test determines whether SUFs apply (see flow chart) in these cases. More about the regulator’s decision-making processes can be found in the flowchart:

Figure 2: Hong Kong Spectrum Utilisation fee decision tree



Auction-based pricing

- The [Method for Spectrum Utilization Fees \(2025\)](#) sets out how spectrum utilisation fees (SUFs) are determined in Hong Kong when spectrum is assigned by auction.
- The method establishes a market-based approach, relying on auctions to determine SUFs for specified frequency bands.
- The regulator consults publicly and then issues an Information Memorandum setting auction rules and licence terms.
- Where there is more than one eligible bidder, SUFs are determined by competitive bidding.

- SUFs for an auction are often determined by reference to a minimum fee (commonly referred to as a reserve price) specified by the Secretary
- If there is only one eligible bidder, no auction is held and the SUF is set administratively, if there is only one eligible bidder, no auction is held and, in accordance with the SUF Auction Regulation, the spectrum utilisation fee is specified by the Secretary, often at the reserve price.
- Spectrum caps and rules on connected bidders aim to limit excessive concentration of spectrum holdings.

Administrative pricing

- [Review of Charging Scheme for Spectrum Utilization Fee](#) (2023) reviews the spectrum utilisation fee (SUF) framework for spectrum assigned administratively (rather than by auction).
- It considers whether existing arrangements remain appropriate and how SUFs should be applied.
- Unlike auctioned spectrum, the review uses an explicit **congestion** measure to determine whether an SUF should apply:
 - A SUF applies if 'the frequency band is currently **congested**, the threshold of which being at least 75% occupied' (p 7).
 - The 75% threshold is measured using assigned spectrum capacity, based on licensing and coordination records.
 - **Congestion** measures must be accompanied by expected growth in demand over the next 3 to 5 years, or high potential demand for alternative uses.
- The review also notes that 'For spectrum not released through auction or other market mechanisms, SUF may be set to reflect the opportunity costs of the spectrum' (p 1). This implies that administrative fees are a substitute for market pricing in congested bands.
- A statement on the review was published in December [2023](#).

Other approaches to spectrum pricing

New Zealand's pricing approach

- New Zealand uses a comparatively simple, 2 track system for managing spectrum under the *Radiocommunications Act 1989*.
- The Act allows both market-based and administrative allocation methods but does not mandate which method must be used.
- Most annual licence fees are set on a cost-recovery basis.
- [Recent fee reviews](#) were undertaken to return the system to full cost recovery after a period of under-recovery.
- Spectrum has been transferred to the Management Rights Regime where demand for spectrum was expected to exceed its availability. A [competitive market allocation process](#) is seen as the most appropriate way to ensure that spectrum achieves its highest value use, and to promote competition in the downstream market in which it is used
- Radio Spectrum Management has used auctions for AM/FM broadcasting, wireless broadband rights in the 2300 and 2500/2600 MHz ranges, and [cellular management rights](#).
- New Zealand does not appear to measure congestion or utilisation for the purpose of pricing.

Canada's pricing approach

- Canada does not use an AIP-style annual opportunity-cost pricing system like Ofcom.
- When demand for a band is not expected to exceed supply, Canada uses administrative fees.
- When demand is expected to exceed supply, the regulator uses [competitive auctions](#) to set prices.
- Nothing in the Canadian framework requires measuring traffic loads or calculating congestion. The demand test is qualitative, not based on numerical measurements.
- Demand is determined as a judgement based 'policy test' to assess if a competitive licensing process should apply. This judgement is based on:
 - Number of potential bidders and market competitors.
 - Future uses and new services.
 - Consultation with industry.
- Canada uses auctions for high-demand commercial mobile and broadband bands.

Lebanon's pricing approach

Pricing mechanisms

- Lebanon's Telecommunications Regulatory Authority (TRA) sets spectrum prices through administratively determined 'right-to-use' licence fees.

- A [TRA 2010 consultation paper](#)¹ suggests a cost-recovery model. The fees are based on the capital and operating costs of-managing spectrum.
- The [ITU notes \(p 28 pricing methodology report\)](#) the ‘development of a set of **congestion** factors that are applied to different ranges of bands and change over time. The concept is straight forward – over time as demand in certain bands increases, the effort and costs required to make new non-interfering assignments increases.’
- This suggests Lebanon links higher occupancy to a higher **congestion** factor, which raises fees to reflect the additional coordination and monitoring effort required in congested bands.
- In 2025 Lebanon released a Spectrum Management and Licensing policy document [Decision 11](#). This document outlines a cost-recovery model, while allowing auctions where high demand is expected.

Singapore’s pricing approach

The Infocom Media Development Authority (IMDA) uses [2 approaches](#).

Administrative pricing:

- Used where spectrum can be shared or where spectrum is not considered scarce or can be efficiently shared.
- Spectrum charges are set out in published schedules and vary according to how spectrum is used (bandwidth, service type, exclusive vs shared, and time).
- Fees are framed as covering IMDA’s assessment and ongoing management and safeguarding work.

Market-based pricing:

- Market-based mechanisms are chosen to resolve competing demand rather than to administer spectrum through comparative assessment alone.
- IMDA uses auctions or calls for proposal to ensure transparent and objective assignment.
- This approach has been used for 2G, 3G and 4G, and the first wave of 5G.

Finland’s pricing approach

Pricing mechanisms

- Administrative fees are set through formulas by Traficom, which are available in its [Fees Guide](#). The guide outlines a standardised numerical formula that takes account of:
 - spectrum availability (or congestion)
 - spectrum usability
 - the number of frequencies included in the licence.
- More specifically the formula includes a [frequency band coefficient](#), a [population coefficient](#), a [system coefficient](#), [relative band width](#), [basic fee coefficient](#) and [basic fee](#).

¹ Please note that the linked source documentation from Lebanon is written in Arabic. See ‘caveats and limitations’ for more information.

- These coefficients are intended to steer users toward **less congested** bands, rather than simply recover costs.
- Finland has also used auctions for a small number of high-demand spectrum [bands](#).
- A [Sustainable Spectrum Pricing](#) consultant report notes that Finland has a clear policy of minimising spectrum fees and seeks to incentivise operators to invest in the network. The report also notes the annualised cost of spectrum in Finland was 1.2% of mobile operator revenue in 2019.

Sweden’s pricing approach

Pricing mechanisms

The Swedish Post & Telecom (PTS) Authority’s [Spectrum Policy](#) frames pricing decisions according to the degree of scarcity:

High scarcity

- Where scarcity is high, PTS may limit the number of licences. Assignment methods include auctions, comparative selection processes (‘beauty contests’), or a combination of both.
- In comparative selection processes, commitments such as coverage obligations are treated as an indirect expression of willingness to pay.
- PTS notes that comparative selection involves a degree of subjectivity in the assessments.

Low scarcity

- Where scarcity is low, frequencies are assigned on a first-come, first-served basis, or as licence-exempt. Administrative and processing fees apply.
- PTS also notes even where scarcity is low, annual fees may be used to encourage socioeconomically efficient spectrum use by allowing demand and willingness to pay to play a greater role.

South Korea’s pricing approach

Pricing mechanisms

- South Korea’s regulator (MSIT) uses both [administrative fee and auctions](#) to set prices:
- MSIT uses cost-recovery for its non-scarce spectrum bands while auctions are used for bands that are in high demand.

Auctions

- **Congestion** can influence whether a band should be auctioned.
- MSIT assesses demand through a combination of existing volume, current demand, as well as predicted growth trends tied to bandwidth, traffic, and future service requirements.

Administrative pricing

- Where spectrum is assigned administratively, fees can include cost-recovery elements.
- However, administrative fees often exceed pure administrative costs and are influenced by policy goals. For example, reallocation fees can be benchmarked against previous auction prices and adjusted for market conditions.

United States' pricing approach

Market-based pricing

- The Communications Act requires the FCC to [use auctions](#) where there is competing demand for commercial spectrum.
- Since 1994, the FCC has held more than 100 spectrum auctions, raising over US\$233 billion for the U.S. [Treasury](#).
- The FCC's authority to run spectrum auctions expired in March 2023 and was restored in July 2025.
- The FCC uses several [auction formats](#).

Administrative pricing

- Spectrum is assigned administratively only where auctions are exempted, such as for public safety or non-commercial uses.
- Administrative licence fees are used to recover the FCC's [regulatory costs](#).
- The FCC does not use **congestion thresholds** to determine pricing method; the presence of competing demand determines whether auctions apply.
 - Under the [Communications Act](#), the FCC must use an auction to grant an initial spectrum licence when there are 2 or more mutually exclusive applicants.