Beyond Licenced vs. Unlicenced: Spectrum Access Rights Continua

ITU Workshop on

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Problem – or paradigm-shift?

"A lack of consistency among national spectrum policies – particularly on unlicenced 'commons' models – is becoming an issue..."

---*ITU News*, issue 2 (March 2006)

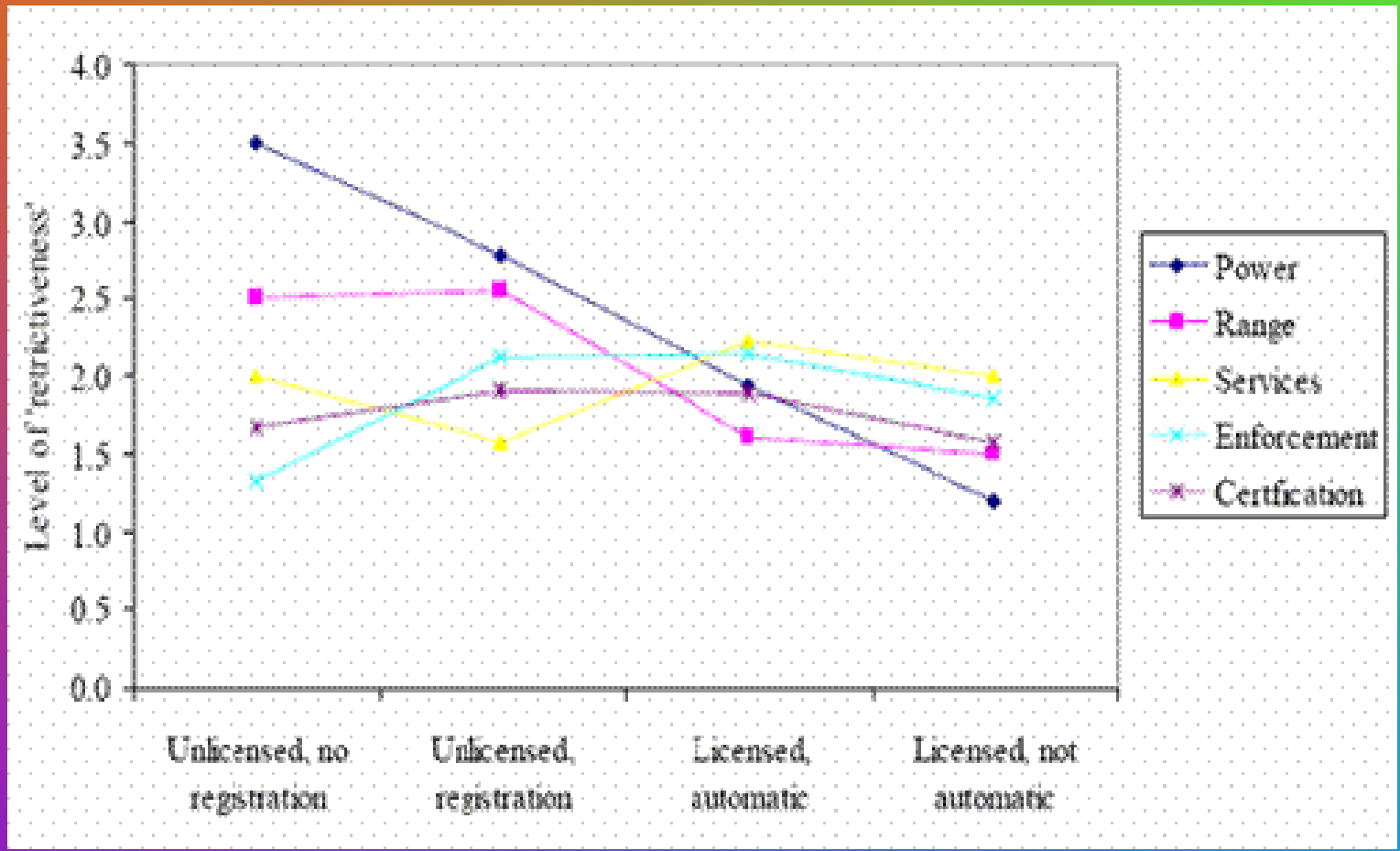
Licence-exempt is different *in principle*

from the administratively determined and tradable/market-oriented approaches

Principle is important

but so are rules for implementation and attached conditions. They can amplify or counteract the underlying principles.

Restrictiveness of conditions attached to licenced & licence-exempt bands in Africa



Wireless Networks for the Developing World: The Regulation and Use of Licence-Exempt Radio Bands in Africa (Isabel Neto, 2004)

Licence-exempt might not mean a freer environment

"...more relaxed licensing regimes have, on average, more restrictive conditions placed on power and range. This is an important result, since it suggests that the African countries that use unlicenced regulation tend to place a burden on the conditions for use. It further indicates that should unlicenced bands be perceived as less successful, the reason could simply be the fact that the associated restrictions are higher…"

---Neto, 2004

Licenced *VERSUS* unlicenced?

Conditions attached to licencing *and* to exemption from licencing.

Rules determine how a band is used *with or without* licencing: *unlicenced doesn't mean unregulated.*

Global survey of WiFi regulations shows a continuum of spectrum access rights.

- Indoor vs. outdoor use
- Self-use vs. public service
- Integral vs. external antenna
- Commercial vs. unpaid use ....etc.

Use of "class" licences to approximate exemption

Class licencing found mainly in countries whose laws forbid unlicenced use of radio.

Such countries seem to have adapted International Radio Regulation S18.1 without preserving the interpretations that allow licence exemption.

Draft Question for Study: Technical conditions in which exemption from radio licencing is appropriate

Considering

a) Recommendation ITU-R SM.1538 (2003), which says, “There is a general agreement that when the efficient use of the frequency spectrum is not at risk and as long as harmful interference is unlikely, the installation and use of radio equipment may be exempt from a general licence or an individual licence...”

Draft Question for Study: Technical conditions in which exemption from radio licencing is appropriate (2)

(considering)

b) that the ITU's survey of *Trends in Telecommunication Reform* (2004) found that "more and more policy-makers are questioning the utility of licencing and demanding that licences be adapted to achieve policy goals without hindering market development and technological advancement...";

Draft Question for Study: Technical conditions in which exemption from radio licencing is appropriate (3)

(considering)

c) that the 2004 Global Symposium for Regulators unanimously endorsed "Best Practice Guidelines for the Promotion of Low Cost Broadband and Internet Connectivity" which "encourage innovative approaches to managing the spectrum resource such as... allocating on a licence-exempt non-interference basis..."

Draft Question for Study: Technical conditions in which exemption from radio licencing is appropriate (4)

recognising

a) that Radio Regulation S18.1 says: "No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject..."

Draft Question for Study: Technical conditions in which exemption from radio licencing is appropriate (7)

decides that the following Question should be studied:

1 How can RR S18.1 be reconciled with the growing acceptance of licence exemption as a regulatory "best practice" under certain conditions?

WiFi Survey Highlights

Detailed results at http://www.openspectrum.info

WiFi is licence exempt - or nearly so - in 83 territories (~50% of those profiled)

Licences required for individual networks in 14 countries. In a few, conditions are so restrictive that WiFi is all but prohibited.

Restrictive rules seem designed to inhibit Internet access, protect telecom monopoly or prevent interference to military systems.

WiFi manufacturers can manage

Continuum does not force them to produce dozens of variants to meet local rules.

- Rule variations apply to *where and how devices are used*, not how they are built.
- Since the same frequency span and emission mask are authorised in nearly all countries, "software switches" are enough to bring all devices into conformance with rules in the countries that are exceptions.

Continuum is virtual... but real

A transnational composite - but no less real than national regulations, from equipment producers' perspective, due to globalised market for consumer electronics.

Only a few increments in any one country – that reduces complexity to manageable levels for regulators and users.

Continuum is a spontaneous development

Result of national autonomy in spectrum policy combined with globalised equipment market.

Would there be any benefit in creating an access rights continuum *intentionally* at the national level?

US DoD's Spectrum Scorecard Initiative

Proposal by Kontson and O'Hehir at last spring's ISART:

"...a regulatory model that rewards the implementation and deployment of spectrum-efficient technologies by offering incentives in the form of progressively expanded tiers of spectrum access rights in proportion to device performance."

US DoD's Spectrum Scorecard Initiative

Spectrum rights based on device's "scorecard" - a refinement of today's process of equipment testing and type acceptance.

Instead of a binary judgment – approved or not approved – a "standard set of metrics and tools [used] to assess the worthiness of individual devices to reap rewards for good spectrum behavior, and restrict bad behavior."

Score not just the total, but a matrix.

Marianna Goldhamer's proposal

"Question for Study" proposed at ITU Workshop on Radio Spectrum Management for a Converging World" (Geneva, 17 February 2004):

> how to define new rules for the co-existence of different classes of equipment whose power levels are determined by their "co-existence capabilities"?

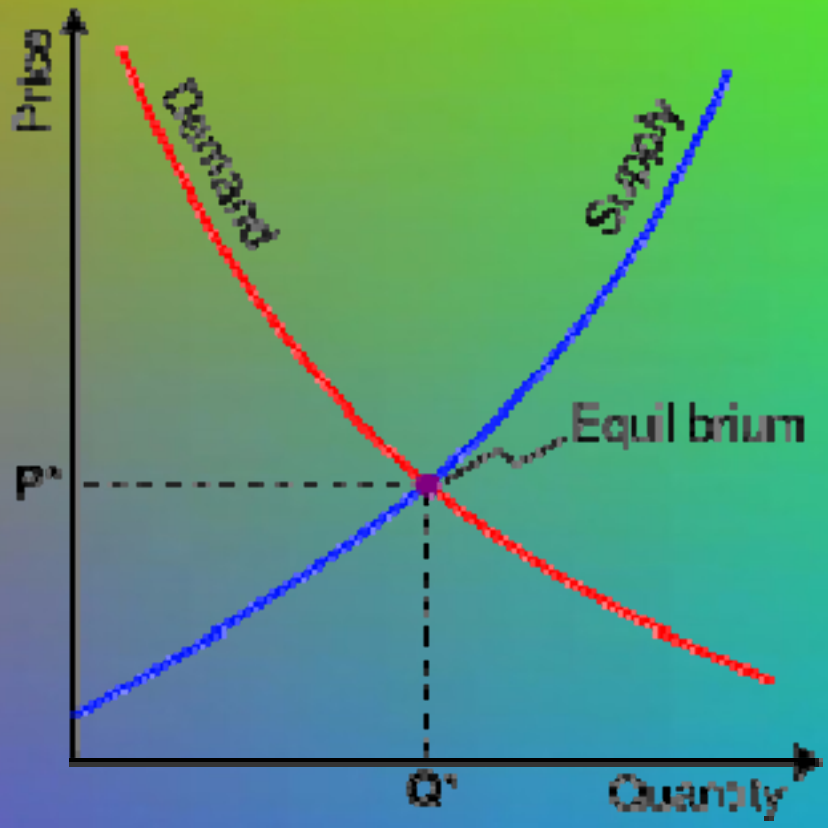
(Goldhamer chairs IEEE 802.16h Licence Exempt Task Group)

Kwerel/Williams proposal (2004)

Put licence-holders in charge: let them "charge manufacturers a fee for the right to produce and market devices to operate in [a given] band. Such contracts could provide different grades of access for different fees, thus providing for a wider range of uses than are possible under the current rules."

A spectrum access rights continuum is implicit in tradable/ flexible/market-oriented bands –

if supply can be represented as a line.



Buying access rights vs. earning them with "good behaviour"

The Kontson-O'Hehir approach is not compatible with tradable spectrum as now understood...

...but could be implemented in bands without trading - e.g. licence exempt commons – where non-monetary incentives for conserving spectrum are needed.

Multidimensional auctions

Econometric research on this topic started in early 1990s - geared toward government procurement and natural resource extraction.

Bids typically combine performance/quality and price offers, with performance/quality represented on a scorecard.

Obvious relevance to spectrum but not explored much since before first FCC auction.

Suggests it may be possible to combine Kontson-O'Hehir approach with spectrum trading.

Economic thinking brings more to spectrum management than income from auctions

Market theory explains why users should be allowed to make spectrum decisions based on their own assessments of need - which they know better than regulators.

But self-assessment of need does not actually have to be monetised: any system of quantifiable incentives and disincentives provide a rational decision calculus.

Money is just a shared scoring method – too simplistic for a multivalent good like spectrum?

Poor people & small corporations disadvantaged in any cash-for-access system

Is there another rational way to distribute spectrum access rights which empowers users, maximises benefits to society and advances the art of radio without creating entry barriers that can only be surmounted with cash?

Can economic mechanisms be distilled into a targeted system of incentives and disincentives which produce desirable real-world results without relying on a metric that has a negative impact on social equity?

Goal of regulation should be to maximise social benefits and encourage improvements in radio communication while minimising interference - not to prevent the poor from sending and receiving information.

That implies a strategy different from the liberalisation now influencing spectrum policy – liberalisation defined as licence-trading and after-markets.

True liberalisation would be permitting anything that is not specifically forbidden, rather than forbidding everything not specifically authorised.

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