

**Auctions vs. Beauty Contests,
Is It the Question?
A New Look at Access and Spectrum Allocation
in France and in the US**

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■ Introduction and Background

Probably the most fundamental telecommunications policy issue today is how to achieve broad and effective competition at the access level. This problem's significance has been magnified in recent years by the combined impact of Internet and IP-related developments at the demand level and a large number of technological innovations which are transforming the segment of the telephone network that had experienced little technological change this century, the local loop.

The focus of this paper is the regulatory environment within which broadband access is evolving in the US and France. Broadband wireless access faces a business challenge, namely, how to attract capital when it has to compete with other emerging broadband access technologies, noting on the other hand that the very activities associated with the other sectors can be seen not only as substitution but also as complementarity due to a greater overall activity level which can result. It also faces considerable regulatory challenges with both the way spectrum bands are attributed and the way competing technological solutions are regulated, each of these affecting both the relative positions of the various solutions and the overall attractiveness of broadband access.

The last point is well illustrated by the FCC's October 1999 decision to relax the cable ownership rules so as to allow AT&T's acquisition of Media One ⁽¹⁾. The decision favors both landline over wireless solutions and large businesses over smaller ones to the extent that fixed wireless operators commonly found in the wireless environment tend to be much smaller than many of their wireline competitors.

At the same time, as, within the wireless sector, the efficiency of the spectrum allocation process is of concern, we review the situation in France and the US. First, we show that while both sides are ready to justify their choice and criticize the other, such positions are not based on analysis. We show then that ART's beauty contests, such as with the proposed UMTS, appear to lean away from auctions. Nevertheless such beauty contests could be easily transformed in multidimensional auctions at essentially no cost to ART "provided only that the criterion is capable of being stated explicitly and precisely" ⁽²⁾ and has been specified prior to the auction which seems to be a prescription for transparency.

Multidimensional auctions or auction-compatible beauty contests require the *ex ante* setting of transfer prices by the regulator in such a way that all candidates are able to value objectively various options. Our analysis shows that beauty contest auctions dominate monetary auctions such as those used by the FCC, i.e., that replacing monetary auctions by auction-compatible beauty contests should in theory increase efficiency through such a move. The sub-optimality of the FCC's choice seems to reflect above all the intent of minimizing subjectivity in the auction. Pushing this concern at the expense of efficiency is surprising in view of the subjective nature of much of auction design, whether carried in New Zealand, Australia, or by the FCC.

The wireless local loop is only one of four broad classes of access technologies that are competing to facilitate competitive entry, foster broadband access, and bring about greater local competition. The three others are (i) DSL (digital subscriber line) and the copper local loop, (ii) the cable modem and the HFC (hybrid fiber coax) access network, and (iii) FTTH (Fiber to the home). As these are close substitutes, regulatory intervention in any one sector has a large impact on all three sectors, hence significantly affects the WLL contribution.

(1) *InfoWorld*, "FCC's Broadband Report Backs Hand-off Approach", 15 October 1999.

(2) McMILLAN John, "Why Auction the Spectrum?", *Telecommunications Report*, 19(3), p. 193.

These access technologies are competing with one another at the deployment level, hence they are also competing for capital. One of the ways for any of these technologies to gain a competitive advantage over the others is to seek regulatory rulings that tilt the playing field in their favor. This strategy is increasingly common and it may be illustrated here through the submission of First Mark, a WLL operator, to Oftel in response of the latter's consultation on broadband unbundling. Predictably, First Mark argued against the use of local loop unbundling to achieve local competition ⁽³⁾.

In fact, wireless access is generally seen as having a special role to play in bringing about local competition. The wireless sector has the greatest potential to support multiple entrants all using their own independent access infrastructure to compete. Landline access, whether it is telephony or cable, is still largely provided through an incumbent and unbundling does not diminish the stranglehold the incumbent has on parts of the local loop and, possibly in the near future, on parts of the cable network. In and of itself, it recognizes the incumbent's dominance in most of its local franchise excluding possibly parts of the larger CBDs (central business district).

Wireless local access is a new technology and one could wonder how best to use it to compete with landline access. In fact, while this issue is at the heart of the strategy of those who intend to compete its resolution is likely to vary. At times, through the use of MMDS and LMDS-type frequencies, it will ape landline access, making it possible for many operators to use their own access infrastructure to provide highly substitutable broadband local access to offer to a good proportion of customers. At other times, it may take a different path as one expects in the case of UMTS/3G. In either case, while the frequencies are generally allocated, they still often have to be attributed to specific operators.

The FCC has been arguing for a few years that auctions should be used at the attribution stage, these auctions being in fact restricted to monetary auctions. ART on the other hand has been implementing beauty contests. While both the FCC and ART stress the relative merits of their approach, a

(3) "... The practical realities of relying on BT for various parts of the local loop (in cases of complete or partial unbundling) implies that it will take a number of years for alternative operators to successfully offer DSL-based high-bandwidth access".

FirstMark Communications Ltd, "Access to Bandwidth: Bringing higher bandwidth services to the consumer, Response to Consultation Document Issued by OFTEL", Oftel's Web Site, March 1999.

review of the literature yields very little objective and quantifiable information as to their relative merits beyond McMillan's observation that :

"any criterion used in the awarding of licenses by administrative hearings can also be used within the auction method, provided only that the criterion is capable of being stated explicitly and precisely..." (4).

In this context, one can only be surprised by ART's apparent uncritical acceptance of arguments offered in contexts such as its UMTS consultation even though they have been refuted in the economic literature years ago (5). The FCC has had a very aggressive discourse in favour of economic efficiency (6). In the light of this discourse, one can be just as surprised that the FCC's effective motivation, as we will show it, is not first economic efficiency but the result of two other distinct forces, namely, the effort to eliminate all subjectivity in the auction and the desire to generate revenues. The reluctance with respect to subjectivity is surprising when one considers the extent to which auction and hearing designs are subjective.

■ Broadband Access Competition: Technology and Regulation

Today, entrepreneurs (and increasingly end users) have the option of choosing from an array of competing access technologies. These technologies have four key characteristics. First, none of them can efficiently be used to serve all subscribers and competition among them should take us into a world in which we can expect them to all coexist. Second, none of those are a complete substitute for one another. Third, all of these technologies are in the early stage of their growth curve and constant innovation is transforming their technical characteristics as well as the way they are being used. Finally, they are all competing with one another for the

(4) McMillan John, op.cit., p. 195. It is interesting that ART notes that four stakeholders have made very similar suggestions in their response to the consultation. ART, op.cit., Points 30-33, Synthesis.

(5) E.g., the cost paid in an auction is a sunk cost which does not affect the pricing decision to the consumer. This is in contradiction, for instance, with the UMTS consultation, section II.3.2 on selection criteria: ART, *"Synthèse des contributions reçues en réponse à la consultation publique sur l'introduction de l'UMTS"*, Paris, October 1999.

Regarding the economic literature, one can find every argument raised refuted throughout the auction literature, e.g., McMillan, John, "Selling Spectrum Rights", *The Journal of Economic Perspectives*, 8(3), Summer 1994, pp. 145-162.

(6) See for instance, KWEREL Evan R. & ROSSTON Gregory L., "An Insiders' View of FCC Spectrum Auctions", *Stanford University Working Paper*, 1999.

same investments. At the same time, their combined success in transforming broadband access may be succeeding in accelerating the demand for each one of them and attracting additional investment.

The multiplicity of technologies and the resulting multiplicity of options they create give substance to the emerging vision of broadband access competition. At the same time, each of these technologies has its unique and independent regulatory history. Each of these regulatory paradigms reflects its own set of issues. In addition, these paradigms are based on fundamentally different premises and they are in conflict with one another. How these regulatory policies are going to evolve and be reconciled through time will impact their respective technological path, hence the emergence of competition. The challenge is that one cannot evaluate any more a regulatory scheme directed at one access technology in isolation. It is the entire set of access regulatory regimes that must be examined and, ideally, rationalized.

Considering these technological options one at a time, the implementation of both DSL and FTTH depends upon conventional telephony regulation and the regulator's approach to local loop regulation. One of the issues raised by DSL relates to bottleneck access and its regulation. Essentially, regulation is addressing the question of whether or not to require the incumbent operator to provide its competitors with access to today's installed copper base in the local loop and under what conditions, in other words, unbundling in any one of its many forms?

The local loop is not static. Rather, as we noted, it has become the hot bed of a technological revolution bringing about profound changes. Both DSL and FTTH raise another question, namely how to regulate technological upgrades and innovation in a regulated local loop bottleneck. In other words, the regulator must decide whether the incumbent's market power is a source of such a competitive advantage in an increasingly competitive market that it has to also ensure access not only to the local loop already in place but also to the one the incumbent is building for the future. The added regulatory complexity comes from the question of whether to regulate some of the incumbent's innovative activities as reflected by the incumbent's deployment of a DSL overlay or a new local loop infrastructure as with FTTH/FTTC and, if so, to what extent and for how long.

These diverse access technologies have already impacted and transformed the old bottleneck. After all, we already know that in countries

such as Finland, mobile penetration has already passed wireline penetration ⁽⁷⁾. Yet, at the same time, we also know that a cellular or a PCS is not quite the same service as wireline access. As we saw from First Mark's comments, what is happening in one sector affects other sectors.

The cable modem is the first broadband access technology to reach substantial commercial deployment in the US at least and, in terms of number of modems deployed, it is still far ahead of its closest competitor, DSL. The regulatory issues the cable modem raises in North America center on whether a cable operator providing broadband access to a proprietary Internet gateway such as @home or RoadRunner should be required to provide some level of open access to competitors, e.g., since this is the most concrete example in the US, whether Time Warner who bundles today RoadRunner and its cable modem should be required to give its subscribers the option to choose other ISPs ⁽⁸⁾ or, on its own RoadRunner physical gateway, AOL's content gateway. More generally, the issue is the extent to which the cable infrastructure should be opened the way it was done in telephony ⁽⁹⁾.

As regulators and cable operators push for open infrastructure and as Internet and technology fill up the vacuum between telephony and cable and, in particular, as cable operators are beginning to offer telephony, many similarities in the regulatory regimes are beginning to emerge: open access and unbundling for instance. Convergence between broadcasting-type regulation with cable and telephony-type regulation is at the center of the regulatory challenge.

The third dimension of the access issue is the WLL or, more generally, wireless access. While we will look at the issue in greater detail below, convergence is very much a reality and very much a regulatory concern. In Europe, the European Commission has chosen to look much more closely at the rules associated with significant market power in the mobile sector, rules which have been applied routinely in the landline environment. Effectively, this may result in a new principle, namely, the gradual undermining of asymmetric regulations between landline and wireless networks.

(7) NORTON Kate, "Mobile Poses Challenge to Europe's Traditional Phone Companies", *Bloomberg News, Global Telecom*, <http://www.totaltele.com/view.asp?ArticleID=24194&pub=tt&categoryid=625>, 11 October 1999

(8) See the "Open Access Propaganda web site" created by a coalition of the Center for Media Education, the Consumers Union, the Media Access Project and the Consumer Project, <http://www.nogatekeepers.org>.

(9) See for instance, AOL, "Access to bandwidth, Comments of AOL CompuServe Europe", OfTel's web site, 1999.

While the European Commission appears to respond to inconsistencies in regulatory frameworks by designing what could become the early benchmarks of some new super-framework, the path adopted in the US is quite different with the FCC taking, it would seem, a more pragmatic approach. Rather than adopting the European Commission's conceptual regulatory approach of some level of convergence in regulatory rules, the FCC appears to favor a relaxation of its sector (telephony vs. cable vs. wireless) specific rules with the intent to foster competition through intersectorial competition ⁽¹⁰⁾. The latest decision regarding AT&T and Media One is a relaxation which the FCC sees as required if it is to accept mergers such as the SBC-Ameritech merger or the Bell Atlantic-GTE merger.

■ Spectrum Attribution: Beauty Contests vs. Auctions

The attribution and management of spectrum licenses is one of the regulatory actions with the most far-reaching impact on wireless. It is to the sector what bottleneck regulation is to telephony and content regulation is to cable. Its significance highlights the importance, in a world in which technologies are competing and wireless access has the potential to effectively challenge much of the bottleneck monopoly. To that end it is essential to select the most efficient approach to the attribution of licenses. The efficiency objective has bought about, in the nineties, a unique focus on auctions.

Effectively, formal auctions to date have been monetary auctions and the question which arises is whether one should use auctions or beauty contests. In practice beauty contests are still primarily administrative procedures with limited transparency, i.e., selection criteria which are not clearly specified and quantified *ex ante*. For instance, while the justification for the selection of the third cellular license was documented by the government ⁽¹¹⁾, McMillan notes that according to the *Financial Times*, the decision was political, taken by the Prime Minister, implying an *ex post* justification ⁽¹²⁾.

(10) "FCC'S Broadband Report Backs Hands-Off Approach", <http://www.infoworld.com/cgi-bin/displayStory.pl?991014.enfcc.htm>, InfoWorld, 15 October, 1999.

(11) *Direction Générale des Postes et Télécommunications*, "Rapport d'instruction des dossiers de candidature", Ministère de l'Industrie, des Postes et Télécommunications et du Commerce Extérieur, Paris, August, 1994.

(12) McMILLAN (1995), op. cit., p. 194.

Effectively, the debate regarding the relative merits of auctions and beauty contests hides what should properly be two distinct debates, on the one hand, between auction-compatible beauty contests and monetary auctions and, on the other hand, between auction-compatible beauty contests and administrative beauty contests.

Critics of auctions have offered an array of arguments against them. For some of the critics, the European Commission notes:

"the costs involved with auctions will reduce the readiness to invest in networks and lead to higher consumer prices" (13).

Most of the arguments reported in the *Green Paper* by critics of monetary auctions fare even worse. For instance, if we refer to a footnote we have already used, we learn that "for a large majority of broadcasters, telecommunications operators and equipment manufacturers, current mechanisms such as so-called "beauty contests" or comparative bidding provided the most effective way of balancing the need to ensure efficient use of frequencies and the need to avoid excessive charges for the players involved, as ultimately those charges would be passed on to the consumer" (14). The function of the charges is to identify the most efficient providers as they are the ones most able to make the best use of the spectrum. They are also the only ones who are sufficiently efficient to be able to produce under these circumstances. A lower charge could result in a less efficient provider using the spectrum band.

The lack of a serious analytical comparison between beauty contests and auctions is noteworthy. This is especially true in the light of the near unanimous support one finds for greater efficiency in spectrum allocation and attribution. Even more serious, there does not exist today a framework which could make such a comparison possible, a point we hope to begin to remedy in this paper.

Auctions were first implemented by New Zealand and then by Australia before moving to the US. In New Zealand, the government's policy is to manage the spectrum:

"in a way that maximises value, provides certainty for users, and can adapt to accommodate changing technology and user requirements" (15)

(13) *Green Paper on Radio Spectrum Policy in the Context of Communities Policies such as Telecommunications, Broadcasting, Transport, and R&D*, COM(1998)596, Brussels, 9 December, 1998, p. 19

(14) *Green Paper on Radio Spectrum Policy*, op. cit., p. 19.

(15) "A Spectrum Allocation Strategy" Discussion Paper 11, Ministry of Commerce, Wellington, May 1998.

The more basic principle is the desire to foster further economic efficiencies:

"To promote improved efficiency and competitiveness in the telecommunications sector of the New Zealand economy," quoting the first objective of the Spectrum Management Group within the Ministry ⁽¹⁶⁾.

The government's stress on economic efficiency justifies the use of auctions. However, New Zealand, just like the FCC and the other countries which have adopted auctions have further restricted their choice to monetary auctions as opposed to a broader range of auctions such as multidimensional auctions.

Monetary auctions imply that payment to the government is restricted to money. Multidimensional auctions permit optimization of the payment in terms of a vector of goods provided transfer prices have been publicized by the seller *ex ante*. The transfer prices are used to reduce a multidimensional response to a scalar in such a way that a unique winner can be determined. If the market were perfectly developed, there would not be any benefits in using a multidimensional auction since the price for each of the characteristics would be known. The need arises because many of the relevant markets are at best imperfect and often do not exist.

It is easy to see that the greater flexibility offered by multidimensional auctions means that monetary auctions will always be dominated by multidimensional auctions. But then, the FCC and, earlier, Australia and New Zealand would have adopted multidimensional auctions.

The choice of a less efficient solution, monetary auctions, may be reflecting two factors. First, contrary to their statement, these governments might not have given priority to economic efficiency but rather to some concern with subjective judgement. After all, that was the first objective of 1995 Review: "To minimise the need for subjective or discretionary decisions" ⁽¹⁷⁾, as far as New Zealand is concerned.

The other concern may be one of those the European Commission listed in the *Green Paper* when it reported reservations many had with respect to the implementation of conventional auctions "high charges were felt to often

(16) "New Zealand Radio Spectrum Licensing Regime", Ministry of Commerce, Wellington, New Zealand, 11 August, 1999.

(17) "Review of Management Policies for Broadcast Spectrum", Discussion Paper 7, Ministry of Commerce, Wellington, December 1995.

be motivated by national budgetary considerations rather than by the concern of radio spectrum efficiency" (18).

A third possibility could be that the link might not have been made. Thus McMillan in 1995, recognized the characteristics auctions and beauty contests shared but, when addressing the public policy implications, he restricted his analysis to such things as a conventional monetary auction for limited rights to a spectrum band (19).

We conclude by noting that while both proponents and opponents of auctions have very set ideas on the matter, neither have done their homework to justify their conclusion with respect to the other.

■ Wireless Access and Wireless Regulation

Spectrum allocated to telecommunications today is allocated in terms of two categories depending upon whether access and usage rights are exclusive or whether the spectrum band is treated as a "commons" using a common law concept. In recent years the exclusive allocation of frequency bands has received the bulk of the attention and resources and very few have looked at the value of spectrum bands made available to all (20). The attribution question will be addressed in the next section.

There are two primary wireless broadband options, the fixed WLL and 3G mobile. The mobile environment which will evolve from UMTS/3G is not yet emerging and, as a result, it appears still characterized by significant uncertainties as to the kind of services end users will demand. Some are building their business case around the conventional broadband access model, i.e., with a wireless access infrastructure conceived as a close replica of conventional wireline access networks. These are entrepreneurs for whom wireless communications means WLL and the replica of the landline service is best illustrated by operators such as WinStar, an early US entrant in the LMDS market. To stress the link further, WinStar has chosen to call its broadband WLL "Wireless Fiber", an expression which implies that its broadband services are at par with if not better than landline broadband services.

(18) "Green Paper on Radio Spectrum Policy", op. cit., p. 19.

(19) McMILLAN John (1995), op.cit., pp. 194-195.

(20) NOAM Eli, "Taking the Next Step Beyond Spectrum Auctions: Open Spectrum Access", *IEEE Communications*, 33(12), December 1995, pp. 66-73.

While the frequencies used for these services vary significantly, it is essentially bimodal, centering in the 2.5-5 GHz band (3.5 GHz in France) and the 25-40 GHz band. The former corresponds broadly to what is called MMDS in the US and the latter corresponds to what is called LMDS in the US. While the technology is essentially the same, the size of the cells, i.e., the maximum length for a wireless local loop, is significantly affected by the frequency. In the case of LMDS, the radius may reach 7 kms while MMDS can support radius of as much as 40 kms.

From a regulatory perspective, the story is more complex. It groups (i) operators who were resettled, primarily WinStar, ART, and Teligent, (ii) operators who saw their license modified by the FCC earlier this year when the FCC authorized the use of MMDS for two way communications, and (iii) two classes of LMDS operators, namely those who bought it "cheap" in early 1998 and those who bought it at a higher price this year. Those who held an MMDS license, early this year, saw their license gain value especially when soon after the FCC decision, Sprint and WorldCom made the strategic decision to invest in MMDS with the intention of using it to crack the local access bottleneck.

While the technology used to offer WLL access is well understood, few operators have begun to use LMDS commercially and there is only limited experience with its operational use. Nevertheless, the emerging conviction that LMDS is a commercially viable competitive alternative to the traditional local loop is well illustrated by the substantially higher LMDS valuation achieved in the US through the second round of FCC auctions.

WorldCom and Sprint's decisions this spring, to buy MMDS and the response to the German 3.5 GHz recent auction also confirm the confidence the market is demonstrating for LMDS, confidence which applies just as much to the MMDS-class of services. Once the demand picks up, it is also expected to result rapidly in much lower prices for the required antennas and other equipment.

The 3G's blueprint is not yet developed but it is expected to focus on the emerging mobile access to data and Internet and, as a result, to be far more innovative in its effort to merge mobility with broadband than LMDS & MMDS-type access services ⁽²¹⁾. This may be required to compensate for the lower bandwidth 3G is expected to support relative to LMDS and MMDS.

(21) See nevertheless, CARLSON Caron, "NextWave Twist: Offer Broadband", *Wireless Week*, 18 October, 1999, pp. 1 and 50.

■ Auctions, Monetary Auctions and Beauty Contests

When one refers to an auction, one simply means that whatever is auctioned is attributed to whomever offers the most for it. To give meaning to the concept of "whomever offers the most", one generally has in mind a process which is fair and open. This typically means one in which the auction has been sufficiently publicized to imply open entry. In this paper, we restrict our attention to auctions that are transparent and objective. This does not exclude the possibility that, even if there are a lot of candidates, few qualify. It only means that the criteria were generally considered acceptable by most applicants.

The attribution method used in the US, the UK, Australia, and other countries is clearly an auction in as much as a license goes to whoever makes the highest bid. The question however is whether others, for example, many of the options which are being discussed by ART, have adopted an assignment approach which can be called an auction.

On one hand, ART might argue that its approach is an auction since it is legally required to attribute among all eligible candidates the license to those who make the best offers. This means that, unless it sets selection criteria which cannot be met by all but one of the eligible candidates, all the other eligible candidates have had the option to submit a bid made up of some premium in addition to the winning offer.

On the other hand, while ART specifies the criteria with respect to which submissions are to be evaluated, it does not specify transfer prices which means that the candidates can only guess the valuation of any submission they prepare. In fact, even if they saw all the other submissions, they would not be able to prepare a submission which was marginally better than the best submission which means, for instance, that it could not be run as an English auction (open outcry) since the bidders would not be able to establish the value of their bids.

It follows that the problem with the kind of process ART has set is not the beauty contest but ART's failure to provide transfer prices, i.e., the means for all eligible candidates to assess their submissions and establish its value to ART.

In light of the way we have defined an auction, namely, the requirement that all parties can assess independently and uniquely all bids, we conclude that, while most beauty contests can be designed as auctions, ART's beauty contests up to this point are not auctions.

ART could transform its assignment approach into an auction-compatible beauty contest ⁽²²⁾ by:

1. Identifying each objective it is targetting through the assignment,
2. Formulating a metric for each of them to evaluate and rank submissions, and
3. Specifying transfer prices to inform candidates of the relative weight it gives to its various objectives.

Since transparency and objectivity means that ART has already specified those same measures when candidates file their proposals, ART would only need to make them available to all candidates to have an auction-compatible beauty contest.

(22) For Laffont and Tirole, this is the normal model which reflects the natural multiplicity of policy objectives governments are faced with: LAFFONT Jean-Jacques & Jean TIROLE (1993), *A Theory of Incentives in Procurement and regulation*, MIT Press, Cambridge, MA.

