

# Comparative Assessment of the Licensing Regimes for 3G Mobile Communications in the European Union and their Impact on the Mobile Communications Sector



EUROPEAN COMMISSION  
Directorate-General Information Society

Annex to Final Report – Full size exhibits and comparative tables  
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The opinions expressed in this Report are those of the authors and do not necessarily reflect the views of the European Commission

**Full size  
exhibits**

# NETWORK ACCESS CONDITIONS

## Denmark – As for national roaming

- **National roaming agreements (including MVNO agreements)** are to be based on **commercial terms and conditions, negotiated between operators (...)**. However, access and prices must be based on objective, transparent and non-discriminatory terms. In addition, providers must ensure that products are made available to others on the same terms and of the same quality as made available to the party's own services (...). Pricing concerning roaming is not explicitly covered by telecommunications regulation...
- However **pricing, and the terms and conditions of national roaming agreements are subject to general competition law...**

## Germany – Obligations to services providers

- The licensee shall undertake to offer his services in such a way as to **allow providers** of publicly available telecommunications services **to market and offer to their customers these services in their own name and on their own account...** The licensee may not bind service providers exclusively or for an unreasonably long period, nor restrict them in respect of their own pricing, terms and conditions, or any other field of activity.
- He may **not offer** to service providers **any less favorable conditions than to his own** marketing organization or affiliated companies, unless this is objectively justified...

## United Kingdom – Not regulated but under scrutiny

- [The]... consideration of these factors has led to the conclusion that regulatory action to require the provision of services to MVNOs is **not justified at present.** (...) While OFTEL does not intend to act now, the mobile market is reviewed regularly

## France – Non-discriminatory service provisioning

- L'accès à ces services doit être facilité grâce au jeu d'une concurrence ouverte et loyale sur le marché des services. **Les opérateurs devront veiller, dans le cadre des accords commerciaux qu'ils concluront éventuellement avec les fournisseurs de services, à ne pas créer de discrimination entre fournisseurs de services**
- Dès lors, **les abonnés de l'opérateur doivent effectivement être en mesure de choisir** le ou les fournisseurs de services de leur choix avec lesquels l'opérateur a conclu des accords commerciaux. Ce choix ne doit pas être entravé par la mise en œuvre de mesures particulières, notamment de dispositifs techniques, visant à privilégier l'accès à certains fournisseurs de services


## Ireland – Evaluation criteria for "Type A" licenses

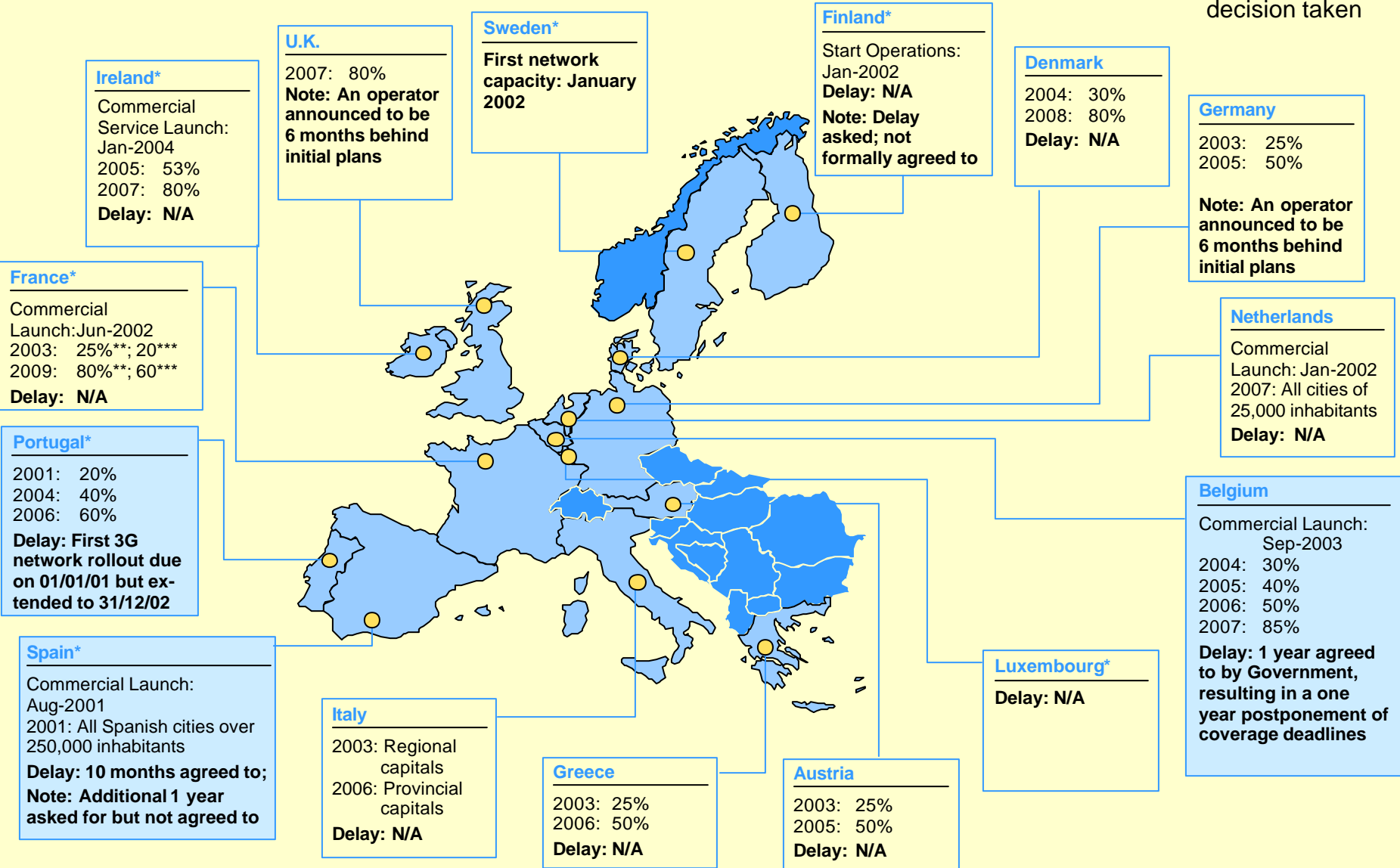
- **All applicants for the "A" license are invited to offer a voluntary binding commitment relating to the provision of access to the radio access part of their 3G mobile network** and, where applicable, any 2G mobile radio access network in which the applicant has, or might in the future have, an ownership interest ("MVNO access"), priced on a **"retail minus X"** basis

## Sweden – Obligation if available capacity


- "A license holder shall satisfy a request to provide access, on normal market terms, to network capacity ... However, such an obligation only exists to the extent that there is available capacity within the network and provided this can be done without detriment to the network or its users or the disruption of the network. The obligation does not apply in relation to other license holders who own a telecommunications network for mobile telecommunications services.
- Access provided in accordance with the first paragraph shall be provided on terms that are non-discriminatory in relation to what the license holder applies for its own activity and which are, if the access is provided for several parties, neutral as regards competition in the relationship between such parties."

# ROLLOUT STATUS IN THE EUROPEAN UNION FROM A REGULATORY PERSPECTIVE

 Formal delay decision taken



# WITH 3G LICENSING, CROSS-EUROPEAN PLAYERS BECAME AN IMPORTANT CATEGORY IN THE MOBILE MARKET

 Key areas of change

Type of player	Description	Before 3G licensing		After 3G licensing	
		Number	Company	Number	Company
<b>Pan-European</b>	<ul style="list-style-type: none"> <li>Player present on majority of the EU Member States</li> </ul>	2	<ul style="list-style-type: none"> <li>Vodafone</li> <li>FT / Orange</li> </ul>	2	<ul style="list-style-type: none"> <li>Vodafone</li> <li>FT / Orange</li> </ul>
<b>Cross-European</b>	<ul style="list-style-type: none"> <li>Players present in 4 to 6 EU Member States with 1 or 2 big markets* without any regional focus</li> </ul>	4	<ul style="list-style-type: none"> <li>DT</li> <li>BT</li> <li>Telecom Italia</li> <li>Telenor</li> </ul>	8	<ul style="list-style-type: none"> <li>DT</li> <li>BT</li> <li>Telecom Italia</li> <li>Telenor</li> <li>Hutchison</li> <li>KPN</li> <li>Sonera</li> <li>Telefonica</li> </ul>
<b>Regional</b>	<ul style="list-style-type: none"> <li>Players present on adjacent markets limited in number</li> </ul>	3	<ul style="list-style-type: none"> <li>KPN</li> <li>Tele2</li> <li>Telia</li> </ul>	2	<ul style="list-style-type: none"> <li>Tele2</li> <li>Telia</li> </ul>
<b>Local</b>	<ul style="list-style-type: none"> <li>Players present in 1 Member State only</li> </ul>	8	<ul style="list-style-type: none"> <li>Telefonica</li> <li>Sonera</li> <li>Amena</li> <li>TMN</li> <li>Bouygues</li> <li>Radiolinja</li> <li>TDC</li> <li>Telering</li> </ul>	6	<ul style="list-style-type: none"> <li>Amena</li> <li>TMN</li> <li>Bouygues</li> <li>Radiolinja</li> <li>TDC</li> <li>Telering</li> </ul>
<b>External</b>	<ul style="list-style-type: none"> <li>Player not present in EU</li> </ul>	1	<ul style="list-style-type: none"> <li>Hutchison</li> </ul>	0	<ul style="list-style-type: none"> <li>–</li> </ul>

# ASSESSMENT OF LIKELIHOOD OF THE DIFFERENT CONSOLIDATION SCENARIOS

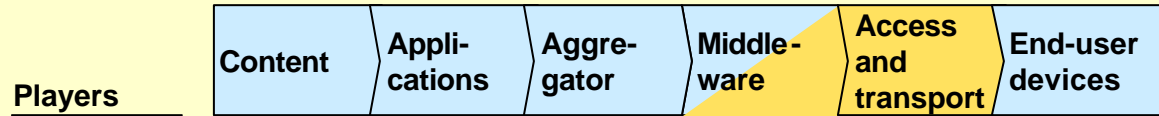


More likely scenario and major reason for consolidation

Type of player	Pan-European	Cross-European	Regional	Local
<b>Pan-European</b>	<ul style="list-style-type: none"> <li>No advantage of scale, scope or skills</li> </ul>	<ul style="list-style-type: none"> <li>–</li> </ul>	<ul style="list-style-type: none"> <li>Scale and skill gap already reached</li> <li>Main advantage in scope</li> <li>Achievability limited to a restricted number of regions being full complements to current footprint of pan-European players</li> </ul>	<ul style="list-style-type: none"> <li>Major advantage in geographic scope</li> <li>Achievability higher than with regional</li> </ul> <p><i>Complete footprint</i></p>
<b>Cross-European</b>	<ul style="list-style-type: none"> <li>–</li> </ul>	<ul style="list-style-type: none"> <li>Major advantage in scope</li> <li>Minor other advantages</li> <li>Achievability restricted due to managerial complexity to deal with much larger organizations</li> </ul>	<ul style="list-style-type: none"> <li>Major advantage in scope and to a lesser extent in skill gap</li> <li>Achievability relatively high</li> </ul>	<ul style="list-style-type: none"> <li>Minor advantage in scope and skill gap</li> <li>Achievability relatively high</li> </ul> <p><i>Become pan-European</i></p>
<b>Regional</b>			<ul style="list-style-type: none"> <li>Major advantage in scale and to a lesser extent scope</li> <li>Achievability medium to distinct areas</li> </ul>	<ul style="list-style-type: none"> <li>Major advantage in scope</li> <li>Achievability relatively high to reinforce strong regional presence (e.g., Nordic countries where such alliances are already emerging)</li> </ul> <p><i>Reinforce regional</i></p>
<b>Local</b>				<ul style="list-style-type: none"> <li>Major advantage in scope, if neighboring countries</li> <li>Resulting increase in scale might not suffice to benefit from economics</li> <li>Achievability medium</li> </ul> <p><i>Become regional</i></p>

# EXAMPLE OF PLAYERS IN THE VALUE CHAIN FOR CONSUMER M-DATA, 2000

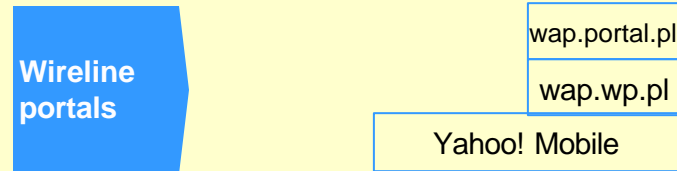
Traditional mobile operator role



**Example**



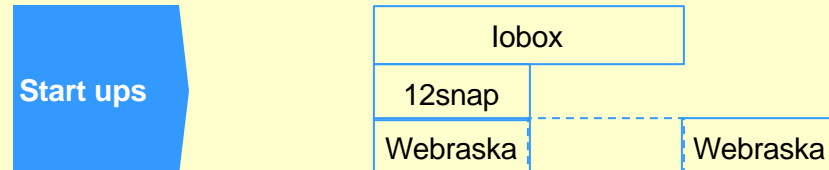
- Sonera launched 2<sup>nd</sup> portal and SmartTrust banking application
- DoCoMo launched I-mode services and handsets
- Vodafone launched Vizzavi portal and mobile internet platform



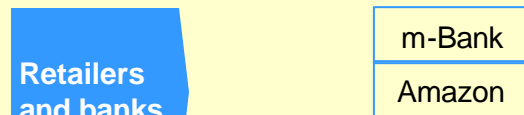
- WAP version of web portals
- Yahoo! developed, e.g., specific mobile services and WAP portal



- Financial Times and CNN customized and pushed content towards mobile users



- Iobox developed specific applications and aggregated them on a portal
- 12snap developed an auction service which it licenses to operators/portals
- Webraska developed location middleware and applications



# MATCHING 3G LICENSE CONDITIONS WITH KEY AREAS OF REGULATORY FOCUS

- ✓ Key focus
- ✓ Second-order focus

## Possible key areas of regulatory focus

- Key 3G license conditions and circumstances*
- Number of licenses
  - Award method
  - Relative timing of the award
  - More spectrum for 3G new entrant
  - Payment modalities
  - License duration
  - Spectrum size
  - Roaming rights / obligations
  - Access obligations


Industry structure	Pricing	Interconnection	Customer access	Quality of service	Rationale (focus on industry structure)
✓					On average, 3G licensing allowed for one additional mobile operator per market; Number of 3G licenses equals the number of networks build
✓	✓				Highest bidding operators were awarded a 3G license
✓					Number of interested candidates for 3G awards went down after mid-2001, in line with market expectations
✓				✓	Aimed at allowing for a level playing field for new entrant versus existing 2G operators with a 3G license
✓	✓				Modalities did not substantially affect industry structure
✓					Defines duration of 3G services provisioning on the mobile market
✓				✓	Given scarcity of 3G spectrum, increased spectrum size per operator implies less licenses
✓		✓		✓	Defines use of networks by other operators; improves overall service availability
✓		✓	✓		Defines potential for service providers in a market

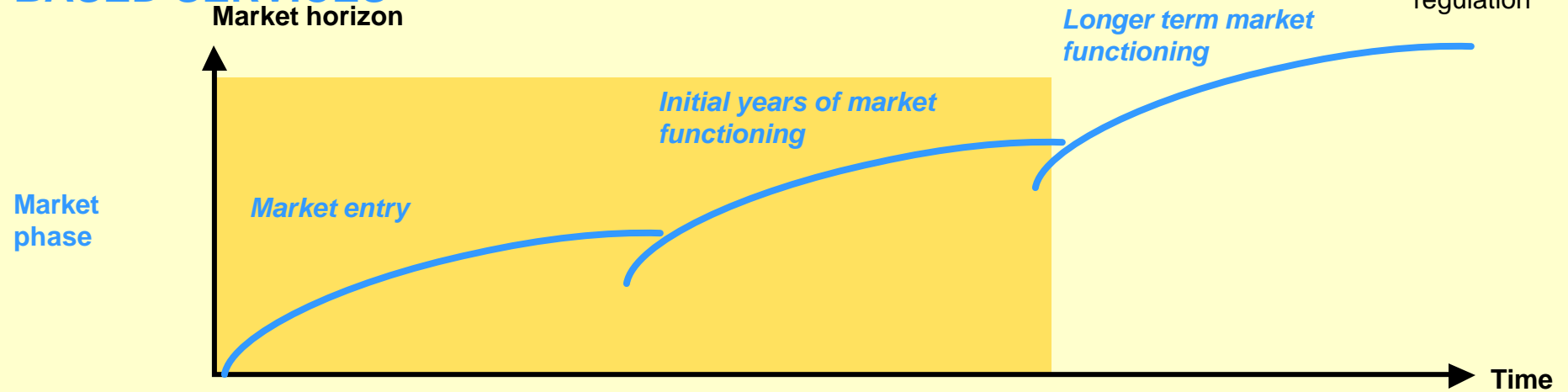
# DEGREE OF ACHIEVING 3G POLICY OBJECTIVES



<i>Key areas of UMTS decision</i>	<b>3G licensing outcome</b>	<b>Achievement of policy objectives</b>	<b>Explanation</b>
<b>Cooperation with CEPT on harmonized frequency use</b>	<ul style="list-style-type: none"> <li>All Member States used same frequency band for UMTS</li> </ul>		<ul style="list-style-type: none"> <li>The CEPT / ERC and CEPT / ECTRA were given mandates by the Commission to harmonize frequency use</li> </ul>
<b>Cooperation with ETSI on standards to use</b>	<ul style="list-style-type: none"> <li>All Member States opted for the UMTS standard</li> </ul>		<ul style="list-style-type: none"> <li>Adoption of a similar technology across Member States will facilitate interoperability and operational effectiveness</li> </ul>
<b>Rapid and coordinated introduction of UMTS networks and services</b>	<ul style="list-style-type: none"> <li>Two years after 3G assignment started, almost no 3G services available and network rollouts delayed</li> </ul>		<ul style="list-style-type: none"> <li>Uncertainty about UMTS technology, relevant applications, and market demand remains; Rollout delays in networks and services</li> </ul>
<b>Coordinated authorization approach</b>	<ul style="list-style-type: none"> <li>Differentiation between Member States in procedures and conditions of licenses</li> </ul>		<ul style="list-style-type: none"> <li>Member States chose specific award procedures, designs, and conditions to achieve the objectives</li> </ul>
<b>Cross-border roaming encouraged</b>	<ul style="list-style-type: none"> <li>No specific 3G obligations or agreements available</li> </ul>	N/A	<ul style="list-style-type: none"> <li>No cross-border roaming at present since 3G services not yet available</li> </ul>

# THREE MARKET HORIZONS FOR REGULATION OF SPECTRUM BASED SERVICES

 Key focus of spectrum regulation



## Key characteristics of the phase

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Phase prior to introduction of new technology on market</li> </ul> | <ul style="list-style-type: none"> <li>• New technology emerges on market; technology not fully stabilized</li> <li>• Demand not clearly identified</li> <li>• Predominantly market exploration; pricing schemes and product roll-out is prospective</li> </ul> | <ul style="list-style-type: none"> <li>• Market achieving critical mass</li> <li>• Technology reaches stability</li> <li>• Demand shows persistent growth of penetration</li> <li>• Increasing differentiation in pricing schemes and product</li> <li>• Increasing competition</li> </ul> |
|---|---|--|

## Key guiding principles

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Regulation based on the notion of sustainable market principle</li> <li>• Allow for gradual technology entry</li> <li>• Minimize distortions in the assignment process</li> </ul> | <ul style="list-style-type: none"> <li>• Avoid financial instability</li> <li>• Stimulate take-up of market demand</li> </ul> | <ul style="list-style-type: none"> <li>• Ensure market development and competition</li> <li>• Foster broader society objectives</li> </ul> |
|--|---|--|

Whether or not to push for a key policy principle and employ the corresponding regulatory tools available, will strongly depend upon

- The policy ambition of the authority concerned and its competences
- The market expectations at the time of the award
- The new technology that is being introduced, and its applications

# GUIDING PRINCIPLE 1: BUILD SPECTRUM ASSIGNMENT ON THE NOTION OF "SUSTAINABLE MARKET"

## Issues to explore

**Structural balance between demand and cost of supply**

**Ability to fund the introduction of the new technology**

## Rationale

- If too many licenses are awarded, a transition period, will be required (in certain cases even structural), resulting in a reduction of the cost of supply
- Mobile industry is characterized by high upfront capital expenditure, allowing only for a limited number of infrastructure providers

## Examples of regulatory tools that could be explored, within the boundaries of the existing regulation, at the time of the licensing

- Limit number of licenses in function of market sustainability, to the degree this can be implemented from a legal/regulatory perspective
- Assign licenses in several waves in line with technological evolution and market demand
- Push for measures to reduce cost of supply (e.g., network sharing, coverage requirements)
- Conduct research on sustainability of market and ways to assess this
- Conduct regular industry and broader consultations
- Develop a set of tools to be used to assess sustainability in the Member States
- Allow late/ new entrants to bid for a more limited amount of spectrum
- Initially, award licenses to late/ new entrants on market during first few years, followed by 2<sup>nd</sup> licensing wave

## GUIDING PRINCIPLE 2: ALLOW FOR THE GRADUAL INTRODUCTION OF A TECHNOLOGY AND CAPACITY

### Issues to explore

Introduction of new technology in new market

Introduction of new technology in existing market

Addition of capacity in existing market

### Rationale

- Both market and technology are emerging, implying absence of an adequate level of technological stability
- As the market already exists, the key differentiation will be, to what extent increased competition is looked for from or policy perspective
- As market and technology exist, key policy differentiation will again be, to what extent increased competition is looked for

### Examples of regulatory tools that could be explored, within the boundaries of the existing regulation, at the time of the licensing

- Allow for a competition neutral pioneer license
- Allow for a gradual assignment of licenses
- Link license strictly to corresponding technology
- When seeking increased competition
  - Allow for N+1 or 2 licenses for the new spectrum
  - Allow first move by new entrant
- When sufficient competitive players
  - Number of licenses in line with what market can bear
  - Consider spectrum as additional capacity
- When seeking increased competition
  - Allow for N+1 or 2 licenses for the new spectrum
- When sufficient competitive players
  - Consider spectrum as additional capacity

# GUIDING PRINCIPLE 3: DESIGN THE ASSIGNMENT PROCESS SO AS TO MINIMIZE DISTORTION

<i>Issues to explore</i>	<b>Rationale</b>	<b>Examples of regulatory tools that could be explored, within the boundaries of the existing regulation, at the time of the licensing</b>
<b>Evolution of market expectations over time</b>	<ul style="list-style-type: none"> <li>As market sentiment degrades over time, operators' bids and interest from candidates may decrease</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate the impact of limiting the overall duration of the awarding process across Member States, and reducing the duration between conditions' publication and license award</li> </ul>
<b>One-off character of the award</b>	<ul style="list-style-type: none"> <li>Impression may exist that mobile operators will not get a second chance to acquire spectrum for the new technology</li> </ul>	<ul style="list-style-type: none"> <li>Allow for spectrum trading</li> <li>Allow for several license waves, in case of a new technology on a new market</li> </ul>
<b>Prisoner's dilemma for incumbent operators</b>	<ul style="list-style-type: none"> <li>Existing mobile operators have the impression that, without a new license, their current operations are at risk</li> </ul>	<ul style="list-style-type: none"> <li>Allow for spectrum trading</li> <li>Allow for several license waves, in case of a new technology on a new market</li> </ul>
<b>Sequential design of the auctions, and of the award across Member States</b>	<ul style="list-style-type: none"> <li>Award design increases the impact of relative positions and bidding strategies of operators, and the outcome of previous/ following award (cf. game theory)</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate impact of reducing multi-round awards at Member State level, and of introducing simultaneous award across Member States or within a limited timeframe</li> <li>Assess impact of initiating the award process in the bigger Member States, to allow for pan-EU strategies by operators</li> </ul>

# GUIDING PRINCIPLE 4: ALIGN LICENSE CONDITIONS AND OTHER REGULATORY LEVERS TO ALLOW FOR FINANCIAL STABILITY

## Issues to explore

Limit coverage obligations in initial years

Allow for extended payment schedule

Stabilize in key value-driving regulatory levers

Consider a lenient attitude in competition matters


## Rationale

- Too high initial coverage requirements increase upfront capital expenditure, not covered by market demand
- Reduces the financial impact of the license fee during initial years, and facilitates financial coverage with revenues from the new technology
- Certain regulatory levers drive key value flows towards the substantial mobile sector; reducing those flows may degrade the financial situation of the mobile operators
- The notion of "sustainable" market is to be taken into consideration in assessing agreements and mergers in the mobile sector

## Examples of regulatory tools that could be explored, within the boundaries of the existing regulation, at the time of the licensing

- Avoid or limit coverage requirements during initial years
- Avoid area coverage requirements during initial years, focusing on population coverage
- Move bulk of license fees away from initial years through
  - Annual installments
  - Extending the duration of the payment schedule
- Levy a percentage on revenues, hereby linking payments to the actually realized new revenue streams
- Avoid additional funding problems by stabilizing regulatory levers that drive key value for the mobile sector (e.g, call termination to mobile, roaming) in case of significant market instability
- Avoid introduction of additional significant burdens (e.g., environmental, and urbanistic regulation)
- Apply notion of "sustainable market" while assessing whether e.g., agreements contribute to improve production or distribution of goods, or to promoting technical or economic progress
- Refer to notion of "sustainable market" while considering "economic efficiency" and "failing firm" doctrines in order to determine the impact of mergers and joint ventures

# OVERVIEW OF KEY VALUE-DRIVING REGULATORY LEVERS

 Focus areas for regulatory stability

Regulatory areas	Relevant telecom regulatory levers ...	... and their translation in mobile
Industry structure	<ul style="list-style-type: none"> <li>• Number of network operators</li> <li>• Ownership and control rules</li> <li>• Licensing procedures and conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Number of spectrum licenses</li> <li>• Limiting license to one per operator</li> <li>• Award method for spectrum as scarce resource</li> </ul>
Pricing	<ul style="list-style-type: none"> <li>• Controls against abusive retail pricing</li> <li>• Controls against abusive international pricing</li> <li>• Access deficit compensation applied to mobile operators</li> </ul>	<ul style="list-style-type: none"> <li>• –</li> <li>• International roaming price regulation</li> <li>• ADC applied to mobile operators</li> </ul>
Inter-connection	<ul style="list-style-type: none"> <li>• Rights and obligations to interconnect</li> <li>• Structure and level of charges</li> <li>• Collocation and infrastructure sharing</li> <li>• Requirements for national roaming</li> <li>• Special access regulation for types of service operators</li> </ul>	<ul style="list-style-type: none"> <li>• F2M tariff regulation</li> <li>• Site and network sharing</li> <li>• Roaming rights for new entrants</li> <li>• MVNO access regulation</li> </ul>
Customer access	<ul style="list-style-type: none"> <li>• Numbering plan</li> <li>• Number portability</li> <li>• Length and ease of carrier selection codes</li> </ul>	<ul style="list-style-type: none"> <li>• Rules with regard to SIM-cards</li> <li>• Mobile number portability</li> <li>• –</li> </ul>
Universal service and performance	<ul style="list-style-type: none"> <li>• Universal access and service obligation definitions</li> <li>• Universal service funding mechanism</li> <li>• Network rollout and coverage requirements</li> <li>• Service quality targets</li> </ul>	<ul style="list-style-type: none"> <li>• –</li> <li>• Including mobile operators in USO funding base</li> <li>• Coverage obligations in spectrum license</li> <li>• –</li> </ul>

## GUIDING PRINCIPLE 5: SUPPORT TAKE-UP OF MARKET DEMAND

### *Issues to explore*

**Stimulate market demand**

**Stimulate applications and service development**

### **Rationale**

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- Market demand is limited and uncertain for 3G services
- As new technology emerges on the market, there still exists unclarity with regard to technical possibilities of applications and their attractiveness

### **Examples of regulatory tools that could be explored, within the boundaries of the existing regulation, at the time of the licensing**

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- Ensure research with regard to market demand patterns
- Set best practice examples (e.g., e-Europe, e-Government initiatives in the Member States)
- Ensure research with regard to potential technological developments, and characteristics of services that could correspond to demand
- Use indirect forms of demand stimulation (e.g., subsidizing certain content that is considered to belong to the general interest)

# DETAILED MEMBER STATE COMPETENCES IN SPECTRUM ASSIGNMENT UNDER NEW REGULATORY PACKAGE

## Framework Directive

**Management of radio frequencies** (Article 9)

**Harmonization procedures** (Article 19)

### Competence of the Member State

- Ensure effective management, allocate and assign spectrum based on objective, transparent, non-discriminatory and proportionate criteria
  - Promote harmonization of radio spectrum use in accordance with the Spectrum Decision
  - Can allow for transfer rights to use radio frequencies, ensuring competition is not distorted and harmonized use of spectrum is not changed
- 
- Take utmost account of harmonization recommendations made in accordance with Articles 3 and 7 of EU Decision 1999 / 468 / EC on procedures for the exercise of implementing powers confirmed to the Commission

## Authorization Directive

**Rights of use for radio frequencies** (Article 5)

**Conditions attached to use of radio frequencies** (Article 6)

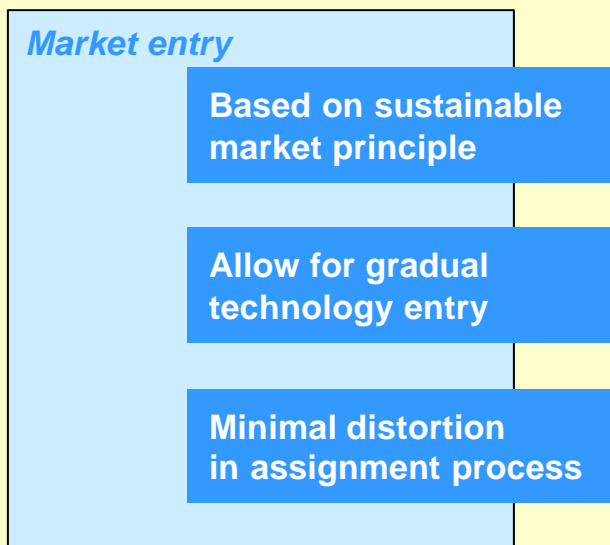
**Procedure for limiting the number of right of use for radio frequencies** (Article 7)

**Fees for rights of use** (Article 13)

- When possible use general authorization for the use of radio frequencies
  - Grand rights through open, transparent, non-discriminatory procedures
  - When allowing for transfer of rights of use of radio spectrum, specify conditions
  - Limit in time of right of usage will be appropriate for the service concerned
  - Limit of number of rights only if necessary to ensure efficient use of radio frequencies
- 
- Only apply limited list of conditions (Annex 8), i.e.,
    - Designation for the service, the spectrum is to be used
    - Efficient use of frequencies, including coverage requirements
    - Maximum duration
    - Conditions of spectrum trading
    - Usage fees
    - Player commitments made in comparative bid
- 
- Give due weight to maximizing user benefits and facilitating development of competition
  - Give interested parties opportunity to express view on limitations
  - Review limitations at reasonable intervals/ upon request
  - Limitation of rights has to be objective, transparent, non-discriminative and proportionate
  - Assignment duration fair, reasonable, open, and transparent, but no longer than eight months, for as long as four
- 
- Usage fees have to reflect the need to ensure optimal use of the radio spectrum

# COMPETENCE OF MEMBER STATES TO ADDRESS KEY GUIDING PRINCIPLES

## Spectrum assignment – key guiding principles



## Relevant Member State competencies\*

- Number of licenses can be limited, because of reasons of development of competition
- Should revisit this in a periodic way (possibility to increase/ reduce number of licenses)
- Can impose license limitations (e.g., pioneer license), if objective; possibility of periodical review (e.g., 2<sup>nd</sup> wave of licensing)
- Can allow for secondary trading
- Allocation should be objective, transparent, non-discriminate and proportionate
- License processing time can be limited where reasonable, fair and objective; not longer than 8 months



- Is part of the conditions attached to obtaining and/ or using the spectrum
- Member States have the competence to assess and correct competitive market distortions (including interconnection and roaming)
- Demand stimulation is allowed unless it would prove anti-competitive or market distortive

# COMPETENCE OF EUROPEAN COMMISSION ON KEY GUIDING PRINCIPLES

## Spectrum assignment – key guiding principles



## Relevant European Commission competencies\* (from more hands-off to more hands-on)

- Have research conducted (cf. EU Research Area)
- e-Europe initiatives in support of digital wireless services
- Take coordinating measures
- Take harmonizing measures
  - For which an advisory committee has been established
  - Taking the utmost account of committee's opinion
  - Member States take utmost account of the European Commission Recommendation and give reasoned opinion when diverting
- Propose common policy measure to the European Council and European Parliament



- Define the key components of the corresponding regulatory framework that addresses these regulatory levers (e.g., mobile call termination, mobile call origination, and international roaming)

# SCENARIO 1: MINIMAL EUROPEAN COMMISSION ROLE



Spectrum assignment – key guiding principles	Minimal potential European Commission role to explore	Evaluation of the impact of the measure considered		Potential ease of implementation for the EU
		PRO	CON	
<p><i>Market entry</i></p> <p>Based on sustainable market principle</p> <p>Allow for gradual technology entry</p> <p>Minimal distortion in assignment process</p>	<ul style="list-style-type: none"> <li>Track Member States progress on assessing sustainability of market</li> <li>Conduct EU research on relevant radio spectrum technologies</li> <li>Define the technology to be used or the process to define the technology</li> <li>Explore the impact of limiting the award time line on the efficiency of the spectrum award method</li> </ul>	<ul style="list-style-type: none"> <li>Allows to assess to what extent issues are addressed, and to take corrective measures where needed</li> <li>Increases transparency on the applicability/ functionality of the technology; Creates stability with regard to the technology to be used</li> <li>Limits impact of evolution in market expectations on the assignment outcome</li> </ul>	<ul style="list-style-type: none"> <li>Risk of inability to take corrective measures in due time, and of increasing divergence in key component in assignment outcome</li> <li>High exposure of mobile industry in case of technology with too low degree of stability</li> <li>Difficulty to sufficiently limit the corresponding time frame; No assurance that one-off character and prisoner's dilemma are addressed</li> </ul>	  
<p><i>Initial years of market functioning</i></p> <p>Avoid financial instability</p> <p>Support take-up of market demand</p>	<ul style="list-style-type: none"> <li>Keep regulatory levers that impact key value for the mobile sector stable in the coming years (e.g., definition of relevant mobile markets), and evaluate potential impact on the award price</li> <li>Launch EU Research Area and take e-Europe type initiatives in support of digital wireless services</li> </ul>	<ul style="list-style-type: none"> <li>Anticipated cash flows with initial years of high capital investments are not further burdened</li> <li>Research and initiatives with regard to applications and services is boosted</li> </ul>	<ul style="list-style-type: none"> <li>Might be difficult for the European Commission, given other EU policy considerations; Other components such as coverage requirements and license payments are left up to the Member States to address</li> <li>No assurance that best practices might be disseminated between the Member States, and roll out delays in line with market take up is left to Member States</li> </ul>	 

# SCENARIO 2: MORE PRO-ACTIVE ROLE FOR THE EUROPEAN COMMISSION



## Spectrum assignment – key guiding principles

### Increment in potential European Commission role to explore

### Evaluation of incremental measures that can be considered

		PRO	CON	Potential ease of implementation for the EU
<b>Market entry</b> Based on sustainable market principle  Allow for gradual technology entry  Minimal distortion in assignment process	<ul style="list-style-type: none"> <li>Conduct research on technology, alternatives, market demand factors</li> <li>Publish key analysis and findings on sustainability</li> <li>Define guidelines on assessment of market sustainability by Member States (including consultation)</li> <li>Harmonize infrastructure sharing conditions</li> </ul>	<ul style="list-style-type: none"> <li>Stronger and steeper learning curve in the EU and alignment in the way to assess sustainability and to improve network investment efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Still risk that number of licenses might lead to transition issues in initial years</li> </ul>	
	<ul style="list-style-type: none"> <li>Harmonize initial licensing in case of high uncertainty about technology (e.g., pioneer license)</li> </ul>	<ul style="list-style-type: none"> <li>Limit negative impact on mobile industry in case technology defaults</li> </ul>	<ul style="list-style-type: none"> <li>Would be strong precedent in EU experience with regard to spectrum assignment, normally falling within the Member State competence</li> </ul>	
	<ul style="list-style-type: none"> <li>Publish key analysis and findings on award mechanisms</li> <li>Harmonize introduction and conditions on secondary trading and/ or set timeline for several assignment waves</li> </ul>	<ul style="list-style-type: none"> <li>Assuring similar introduction of spectrum trading, which is key to (partially) offset the one-off character and the prisoner's dilemma</li> </ul>	<ul style="list-style-type: none"> <li>License procedure conditions increase impact of strategies and award outcomes (cf. game theory)</li> </ul>	
<b>Initial years of market functioning</b> Avoid financial instability  Support take-up of market demand	<ul style="list-style-type: none"> <li>Harmonize license fee payments, moving the bulk of payments away from the initial years</li> <li>Harmonize limitation coverage requirements, especially during the initial years</li> </ul>	<ul style="list-style-type: none"> <li>Financial impact of the two key capital expenditure drivers in the initial years is limited</li> </ul>	<ul style="list-style-type: none"> <li>Is again strong precedent, in particular with regard to coverage requirements, as this can be a component in a Member State policy objective of quality of services</li> </ul>	
	<ul style="list-style-type: none"> <li>Increase EU Research Area and e-Europe type initiatives in support of digital wireless services</li> <li>Ensure rapid and transparent dissemination of best practices in technology and applications</li> <li>Harmonize network roll out delays in line with market demand take up</li> </ul>	<ul style="list-style-type: none"> <li>Stronger and steeper learning curve in the EU and alignment in the roll out delays to avoid distortion</li> </ul>	<ul style="list-style-type: none"> <li>Might still take a number of years before market demand really takes up because lack of direct stimulation; Some resentment on increasing EU budget for wireless applications</li> </ul>	

# FRAMEWORK TO DETERMINE RIGHT LEVEL OF POLICY BY THE EUROPEAN COMMISSION

Spectrum assignment – key guiding principles	Key issues for EU spectrum assignment policy	How far should the European Commission consider to go?			Rationale	
		Coordination	Harmonization	Common measure		
<b>Market entry</b>	Based on sustainable market principle	Ensure assessment of market sustainability in the Member States		✓	Market assessment has to be done at Member State level because of particularities in the markets	
		Publish key issues and findings (incl. consultation)			✓	EU can take a leading role in disseminating key learnings and key issues
	Allow for gradual technology entry	Ensure number of licenses based on market sustainability; Publish key issues and findings on award mechanisms		✓	✓	Development at EU level hampered if inadequate number of licenses in several key markets; EU can take a leading role in disseminating key learnings and key issues
		Ensure limited number of licenses (e.g., 1 <sup>st</sup> wave or pioneer license) in case of (highly) uncertain technology		✓		Development at EU level hampered if in several key markets significantly different approaches are taken
	Minimal distortion in assignment process	Ensure additional technological research (incl. applications)	✓		✓	Initiatives can be taken, both at Member State and EU level
		Limit the impact of evolution in market expectation during the assignment processes in each State and across Member States			✓	Allowing too strong role of market expectation evolution had cross-Member State impact
<b>Initial years of market functioning</b>	Avoid financial instability	Neutralize on-off character and prisoner's dilemma		✓	Development at EU level hampered if in key markets, license waves would differ substantially	
		Reduce negative consequences of sequential bidding	✓	✓	Development at EU level limited by reducing cross-Member State award process time	
	Support take-up of market demand	Key regulatory levers that impact key value for the mobile sector stable during initial years (cf. i.a., definition of relevant mobile markets)		✓	✓	Requires formal position by both EU (definition of markets) and Member States (NRA competence)
EU Research Area and e-Europe initiatives in support of digital wireless services		✓		✓	Development at EU level limited if high impact of license fees and coverage requirements in key markets	
	Ensure roll out delays in function of demand take up	✓			Initiatives can be taken at Member State and EU level	
					Market assessment has to be done at Member State level; coverage requirements can be component of Member State policy regarding quality of service	

# KEY DRIVERS FOR THE COST OF SUPPLY

## Key drivers for cost of supply

Key drivers for cost of supply	Value / range	Rationale										
<b>Licenses costs</b>	<ul style="list-style-type: none"> <li>All fixed license fee payments</li> </ul>	<ul style="list-style-type: none"> <li>Including one-off license fee, annual installments, annual administrative and spectrum fee (e.g., Spain), excluding percentage of revenue payments</li> <li>Based on Aegis Spectrum Engineering Report and press releases</li> </ul>										
<b>Cost per BTS EUR Thousands</b>	<ul style="list-style-type: none"> <li>3 transceivers BTS                             <ul style="list-style-type: none"> <li>Rural (low capacity): 125</li> <li>Urban (high capacity): 170</li> </ul> </li> <li>9 transceivers BTS (full)                             <ul style="list-style-type: none"> <li>Rural (low capacity): 220</li> <li>Urban (high capacity): 350</li> </ul> </li> <li>50% antenna masts cost reduction for DCS1800 operator: 30</li> </ul>	<ul style="list-style-type: none"> <li>Rural BTS require lower transceiver capacity (3 of 9 potential transceivers) because of lower usage</li> <li>As usage increases, BTS capacity needs to be enlarged</li> <li>DCS 1800 operator will enable to reuse part of its existing DCS 1800 antenna masts</li> <li>Based on Nokia and Ericsson inputs; Interviews with operators and McKinsey analysis</li> </ul>										
<b>Number of BTS</b>	<table border="1"> <thead> <tr> <th>Density (people/km<sup>2</sup>)</th> <th>Km<sup>2</sup>/BTS</th> </tr> </thead> <tbody> <tr> <td>&gt;2000</td> <td>1.66</td> </tr> <tr> <td>500-2000</td> <td>5.11</td> </tr> <tr> <td>250-500</td> <td>12.58</td> </tr> <tr> <td>&lt;250</td> <td>26.62</td> </tr> </tbody> </table>	Density (people/km <sup>2</sup> )	Km <sup>2</sup> /BTS	>2000	1.66	500-2000	5.11	250-500	12.58	<250	26.62	<ul style="list-style-type: none"> <li>Depending upon population density, BTS footprint and corresponding coverage will differ</li> <li>Based on Eurostat and McKinsey analysis</li> </ul>
Density (people/km <sup>2</sup> )	Km <sup>2</sup> /BTS											
>2000	1.66											
500-2000	5.11											
250-500	12.58											
<250	26.62											
<b>BTS roll-out</b>	<ul style="list-style-type: none"> <li>Constant # BTS/year</li> <li>Higher # BTS if coverage requirements are not met</li> <li>Increase of capacity when rolled out, linear over time to reach full capacity by 2015</li> </ul>	<ul style="list-style-type: none"> <li>Operators will gradually build out BTS, first focusing on urban areas and subsequently on rural areas</li> <li>Coverage obligations impact BTS rollout</li> <li>Operators initially go for coverage and only as demand takes up, will increase capacity over time</li> <li>Based on NRA documents and operators' inputs</li> </ul>										
<b>Population coverage by 2010</b>	<ul style="list-style-type: none"> <li>80%</li> <li>Higher coverage if obligation</li> </ul>	<ul style="list-style-type: none"> <li>Coverage increase over an average 80% will exponentially increase number of BTS and corresponding cost (on average covering the last 20% increase BTS cost by 100 to 200% depending on country)</li> <li>Coverage requirements or commitments in comparative bids (e.g., 99.9% by operator in Sweden)</li> <li>Based on NRA documents and operators inputs</li> </ul>										
<b>Replacement costs</b>	<ul style="list-style-type: none"> <li>8.7% of cumulative investments</li> </ul>	<ul style="list-style-type: none"> <li>Based on McKinsey industry comparison</li> </ul>										

# **Comparative tables**

Use A3 page format to increase font size

## Licencing process data

	Decision on licensing taken	Deadline for submission	End of licensing process	Method of assignment	Number of licences offered (eg 3+1 is 1 reserved for new entrant + 3)	Duration of licence in years	Is the license extendable?
Austria		September 13, 2000	November 20, 2000	Auction	4 to 6 (determined by the auction) - applicants can bid for 2 to 3 packages in first stage and 1 or 2 packages in second stage	20	The licensee has a legal claim to have the licence renewed if he has exercised the licence in accordance with the law and the frequencies used can be allocated once more.
Belgium	February 8, 2001		March, 2001	Auction	3+1	20	Extendable for another 5 years
Denmark	June, 2001	September 5, 2001	October, 2001	Auction	4	20	
Finland	December 14, 1998	February, 1999	March 18, 1999 (national licences), September 1999 (regional licences)	Comparative bid	4 nation wide, 4 regional	20	
France		January 31, 2001	May, 2001	Comparative bid	4	15, revisable to 20 years. (Comment: changed to 20 in year 2001).	
Germany	February, 2000	April 28, 2000	August, 2000	Auction	4 to 6	20	
<b>Greece</b>		July 11, 2001	July 16, 2001	Auction	up to a maximum of 4	20	
Ireland	December 18, 2001	March 27, 2002 (expected)	End June 2002 (expected)	Comparative bid	1 licence A (invited MVNO offerings) + 3 licence B	20	
Italy	December, 1999	September 11, 2000	October, 2000	Hybrid	Up to a maximum of 5	15 starting from January 2002 (Comment: Procedures for changing it to 20 are in progress).	It is renewable, starting six months before expiry date
<b>Luxembourg</b>	January, 2002	March 29, 2002	May 24, 2002	Comparative bid	4	15 from the day of the licensing	Extendable for another 5 years
<b>Netherlands</b>	April 2000 (official publication)	June, 2000	July, 2000	Auction	5	15 starting from 01/01/2002	not automatic but possible
Portugal	December, 1999	September 29, 2000	December, 2000	Comparative bid	4	15	Licence renewal may be authorised for equal periods (15 years), after request of the licensed entity with an advanced notice of at least 3 years before the term of the respective effectiveness period.
Spain	November, 1999	January, 2000	March, 2000	Comparative bid	3+1	20 since the end of the comparative bid	extendable for another 10 years when asked by licensee
Sweden	January 4, 2000	September 1, 2000	December 16, 2000	Comparative bid	4	15	The licenses are extendable. For how many years is decided individually
UK	December 20, 1999	January 12, 2000	April 27,2000	Auction	4+1	Until the 31st December 2021 (20)	No.

	Payments										Penalties for non-compliance
Topic	Fee for applying in the auction	Deposit	Spectrum fee per licence	Payment method	Statement of reimbursement of payment	Payment ("reserve price")	Bank guarantee	Annual license management fee	Annual fee for making frequencies available	Fixed vs. variable part of license price	Penalties for non-compliance to licence terms
Description	Fee paid for application	Payment for participation in the auctioning	none	Upfront, installments, number of installments		minimum price to be paid for getting a license					non-compliance item coupled with penalty
Austria	0	0	please look at <a href="http://www.rtr.at/web.nsf/deutsch/Tel%20kommunikation-Frequenzvergabe-B">http://www.rtr.at/web.nsf/deutsch/Tel%20kommunikation-Frequenzvergabe-B</a>	100% of the spectrum fee to be paid within 6 weeks	Euro 29.719,48 for each of the licensees	50.9 M EUR for 2x5 and 25.4 M EUR for 1x5	The reserve price of the frequency packages the bidder applied for during the	ca. 0.1 - 0.2 % of turnover	The Ministry of Traffic, Innovation and Technology is in charge of prescribing these fees.	100 % fixed	Penalty of up to 20 Mio EUR if not complied with 25% coverage by 2003 Penalty of up to 20 Mio EUR if not complied with 50% coverage by 2005
Belgium	12 500 EUR	75 Million EUR			Payment not reimbursable in any case; Deposit reimbursable	At least 150 Million EUR		250 000 EUR	125 000 EUR/MHz	100%fixed	Financial penalties
Denmark	13.4 Million EUR to be splitted among the winners	27 million EUR/bidder might be deducted from licence price	none	25% upfront; remainder in ten annual equal instalments	Deposit reimbursable for unsuccessful bidders.	67 million EUR	Equal to the instalment to be paid in the next 36 months			100%fixed	Financial penalties, licence may be revoked
Finland	Free of charge		-160000 € /operator/ first year			-			Only spectrum fee		In case the operations are not commenced within the time limit, the Ministry has the right to change the area of operation granted in the licence or to revoke it
France		none	Installments through an elaborated plan: 25% during 2001, 25% during 2002.				ins (less than 400 000 EUR)	See price of competitive bid	619MEUR+ 1% fee on revenues	Licence may be revoked	
Germany	Covered by auction price	10.226 m EUR			Deposit reimbursable for unsuccessful bidders.		204m EUR for 2X10 in stage 1; 306 for 2X 15 in stage 1; 52 for unpaired in stage	Ins (cost based after 3 years of licence issue)			Licence may be revoked
Greece				upfront payment of either 40% of value of bid (if 4 licenses are awarded), 70% (3 licenses) or 100% (2 licenses) Deferred payment in equal annual instalments starting in 2005 (remainder )			1.47m EUR + 25% of amount of bid			In addition to license price, 2% of 3G revenues must be paid as of 2005	Licences may be recalled, suspended or revoked
Ireland	where less than 3 licences are offered, the administrative fee will be set at	see application fees	total nominal fee of €114.3m for a "B" licence and €50.7 for an "A" licence	Application fees upfront, spectrum access fees in phased payments as follows: Class A (€12.7m upfront, remaining payments annually from years 6 to 15) - Class B (€44.4 m upfront, remaining payments annually from years 4 to 15)	Unsuccessful bidders are reimbursed of their application fees.	Total spectrum fees at 50.7 m EUR Class A and 114.3 m EUR Class B nominal fees (not annual fees)	the applicant shall no later than 15 days after notification of the Director's intention		2.22 m EUR/operator		Bidders are invited to provide commitments backed by performance guarantees.
Italy	None	2.5m EUR	none	2 options: (1) 100% upfront or (2) 2B EUR upfront and 10 further payments with interest	The "reserve price" and the bank guarantee will not be refunded if the obligations subsequent to adjudication are violated and the licence is not awarded.	2 B EUR Additional spectrum was reserved to new entrants at a reserve price of 800 M EUR	2 B EUR	Around 60000 EUR per year	None	The fee of 15 billion Lire + VAT due to the members of the advisors of the	Should the licensee fail to comply with any of the conditions set out in the individual licences, the NRA may suspend, modify or revoke the individual licence or impose, in a proportionate manner, specific measures to guarantee compliance with the said conditions.
Luxembourg	60.000 Eur		0.2% of sales with minimum of 200.000 Euro per 3G licence					24.000 Eur per MHz paired and 12.000 Eur per MHz unpaired, payable every year			Licences may be suspended or revoked
Netherlands		9 000 EUR (20.000 FL)		100% up front	Deposit refundable	45 m EURO per block			Radio Agency fee 282000 gulden yearly		No financial guarantees or penalties but licence may be revoked or altered
Portugal		0.4 m EUR for participating in the contest to be increased up to 2.5 M EUR when granted a licence (but operator gets 1/3 back if he complies with coverage requirements)	100 M EUR in one off up front payable tax	increase in deposit to be done within 10 days after the decision of the beauty contest	up to 1/3 of the deposit when coverage requirements are complied with		€ 2.493.989.49	€ 9.976		fixed	Not getting 1/3 of the deposit back, Withdrawal of the licence Loss of the complete deposit
Spain	1.5 m EUR for costs (all the costs of conducting the beauty contest)	27.078 EUR	129.5 m EUR up front + 1.5 m EUR	partly up front, partly in annual instalments			1.383.529.864 EUR	1,5 per thousand of the gross exploitation income from that license	Competence of the Ministry of Ciencia y Tecnología, Dirección General de Telecomunicaciones		The license can be withdrawn.Losing the bank guarantee.
Sweden	100000 SEK		none		Normally not repaid, but a decision on any repayment of the application fee is done by a special procedure. Repayment may come into question for example in the event of a timely			A license fee is set according to the turnover of the company and there is also an annual			In the event of inadequate compliance with the licence conditions decided, PTS may order the licence holder, subject to a default fine, to comply with the licence conditions. Under certain circumstances PTS can also revoke the licence.
UK		50m GBP (or double if bid is higher than 16 m GBP during first round and 400 m GBP during second), which will be offset against payment for the WT Act Licence or refunded if the bidder fails to prequalify, or following the end of the Auction Stage. No refund if the bidder fails to	none	Choice between 2 methods: - 100% upfront at licence issue date - 50% on licence issue date, 5 instalments as of Year 6.	No refund of payment if licence is revoked, varied or surrendered.	In the first phase (Determines which members of each group of associated bidders, i.e. bidders who are closely related to each other through common shareholdings will be taken through to the second phase) the reserve price is expressed on a per MHz basis, and	If a bidder chooses to utilise the deferred payments option, the bidder must provide a	None.	In addition to the WT Act Licence, a bidder must have a T Act licence, which costs 40 000 GBP for the grant of the licence plus an annual fee based on their turnover (Minimum	N/A	Breach of Licence conditions on coverage requirements could result in licence revocation.

Network obligations										
	Coverage requirement	Voluntary coverage obligation	Network sharing obligation	Network capacity rental obligation	National roaming	Timing for service launch	Deadlines met	Type of service offering required	Number portability	Quality of service obligations
	Legal requirement before voluntary commitments	Have licensees made voluntary coverage commitments?	Site sharing, other	To service providers, MVNOs	Obligation of roaming on 2G? If yes what players are obliged and at what price?		Have all deadlines so far been met by licensees? Have deadlines been postponed?	Not mentioned		
Austria	By self-operating network: 25% of resident population by 31/12/2003 50% of resident population by 31/12/2005	No	There is a sharing obligation for antenna masts, power line masts and other infrastructure required for operation to other holders of a licence. There is no obligation for shared use of antennas or cabling.	This will depend on the (new) legal framework. No license obligation.	A new 3G player without 2G network is entitled to roam on existing 2G networks for max 4 years if he covers at least 20% of population. A new 3G player with 2G network is obliged to give roaming access on his network to a new 3G player, if this new player has at least 20% of pop covered. 3G	December 31, 2003	So far there haven't been any deadline	According to the decision Nr. 1999/128/EG: Concerning areas covered by the coverage obligations a bearer service with at least 140 kbit/s must be provided.		No Quality of service obligations
Belgium	Licence grant+3 years >30% of pop. Licence grant+4 years >40%, Licence grant+5 years >50%, Licence grant+6 years >85%	No	Site sharing		An 2G operator with a 3G licence must provide national roaming to 3G operators, based on mutual agreement. This obligation applies only when the 3G operator has reached 20% 3G coverage.	September, 2003		Not mentioned	Yes from September 2002	Not more than 5% connection failures during peak hours
Denmark	30% of pop by end 2004 80% of pop by end 2008	No	Site sharing encouraged, other sharing allowed as long as coverage obligations are met.	Roaming costs should be non-discriminatory and objective. MVNOs are considered to be national roaming. Obligation to agree on national roaming.	An operator must provide national roaming to 3G operators.	Licence condition 4 require the operations to be commenced by January 1, 2002. The Ministry of transport and communications can extend this deadline by application.		Not mentioned		
Finland	No coverage requirement. The NRA can however intervene with the construction of the network based on art.8 in the Act, or on the basis that frequencies must be used efficiently.	Yes, the licence holders have given indication of their intended coverage year by year during the licencing process and during follow-up process taking place every 6 months.	Mast sharing on reasonable request.	No obligation. Based on mutual agreement. The Ministry of Transport and Communication can however give additional orders, if required by the development of the markets.	Mandatory if certain conditions are met. Charges according to the ordinary "list price".	Networks operational (according to the licence 1.1.2002), commercial service launch based on the availability of terminals.	Regional licences (4) were awarded for the Åland Islands. The deadline to start the operation has been shifted by one year (1.1.2003) on 3 licences.	Voice, Internet access, data services, location based services, Virtual Home Environment. Voluntary obligations expected.		
France	2 years after licensing 25% population coverage for voice, 20% for 144kbits/s, 8 years after licensing 80% pop coverage for voice, 60% for 144kbits/s	Yes	Site sharing encouraged	Should be non discriminatory, Commitment of SFR to have an offer towards MVNO	An 2G operator with a 3G licence must provide national roaming to 3G operators.	Each licensee can choose when to enter the market provided he follows coverage req., Commitments of Orange France (june 2002) and SFR (march 2002), provided the equipments are available		Voluntary commitments	Yes from the begin	More than 90% of the calls have to succeed on the first attempt.
Germany	25% pop by end 2003 50% pop by end 2005	No	Site sharing encouraged	To service providers	An 2G operator with a 3G licence is allowed to provide national roaming to 3G operators.	Not mentioned	Not mentioned			
Greece	25% pop by end 2003 50% by end 2006 at minimum 144 kbits/s for downlink and 64 kbits/s for uplink	No	After case by case consultation, infrastructure sharing allowed as long as coverage obligations are met.		An operator must provide national roaming to 3G operators.	Required at Jan 2004 at the latest	Not mentioned	Under development		
Ireland	Class A (min 53% pop end 2005, 80% end 2007); Class B (min 33% June 2006, 53% June 2008))	Yes (expected)	infrastructure sharing, with the exception of site sharing, will only be permissible when each operator concerned has established a 3G mobile radio access network infrastructure capable of serving at least 20% of the Irish population.	Class A licence is invited to provide MVNO access. MVNO must have a physical infrastructure (mobile switching centre, hlr, authentication centre, own SIM, etc.)	All existing 2G operators or members of their group who apply for either an "A" or "B" licence must accept an obligation to provide national roaming to a new market entrant. Obligation falls after a period of 5 years after licencing. Obligation becomes effective for a new market entrant when it	the applicant will have to commit to launch of commercial services no later than January 1st 2004 in order to be considered for a "B" or "A" licence.	Not applicable.	Every licensee shall "assure all the essential services and the emergency services" are available. Beyond that voluntary commitments are expected	Not considered	QoS voluntary obligations expected.
Italy	Starting January 2002 - Within 30 months: regional capitals - Within an additional 30 months: provincial capitals	Yes, some of them	Site sharing obligation for incumbents towards new entrants	MVNO are not allowed, at the moment, in the Italian regulation framework. Enhanced Service Provider are allowed on commercial terms	An 2G operator with a 3G licence must provide national roaming to 3G operators. Contract must be agreed between parts. NRA can solve disputes	"January 2002". New entrants could have started at earliest by July 1, 01, based on roaming only. None applied	Yes (first question) - No (second question)	Compliant to international standard	Subject to further regulation by NRA, still in progress. Experimental	Blocking probability less than 0.02. Availability of connections must
Luxembourg	None	Yes (expected)	Yes, site sharing is obliged under conditions. A 2G player with a 3G licence that installs 3G equipment on his 2G sites has to grant access to any 3G licensee for the installment of 3G equipment on that site.		a 2G operator with 3G licence is obliged to let another 3G player roam on his 2G network.					
Netherlands	By Jan 1, 2007: - within cities of 25,000 or more - on all main connecting routes - along highways to BE and GE - along 3 main airports	No	site sharing is mandatory within technical constraints		National legislation on "Bijzondere toegang" already stipulates that players with SMP are obliged to allow "reasonable" roaming on their networks. Other national roaming is made on voluntary basis only.	none	no			
Portugal	- After 1 year: 20% pop - After 3 years: 40% pop - After 5 years: 60% pop but operators individually committed to more	Yes, including a percentage of population and area to be covered within the first five years after the licences have been issued.	No obligation imposed.	No obligation imposed.	Bids that allow at least 5 years of national 2G-3G roaming get priority. Nat. roaming ceases to be binding in the case of SMP.	Only when the minimal coverage is reached, at the latest at 1/8/2001	The Portuguese Government decided to postpone the commercial launch of UMTS services until December 31st 2002 due to the proven inexistence of terminal and network infrastructure equipment in the market.	Voluntary commitments	Yes	
Spain	August 2001: all spanish cities over 250.000 inhabitants. (It has been postponed until 1st june 2002)	Yes	Infrastructure sharing because of public interest, environmental reasons or essential resources	None, there is a normative project	An 2G operator with a 3G licence must provide national roaming to 3G operators. No 3G-3G roaming is permitted.	Voluntary obligations expected Postponed until 1st june 2002. Could be extended if necessary		Can be specified in the individual licence conditions.	Yes	
Sweden	None	Yes, the four licenses were given to the companies which had the highest commitments of coverage and roll-out speed	Network sharing is allowed up to 70%. Site sharing encouraged.	Yes, there is an obligation to negotiate capacity rental on commercial terms, according to existing Telecom Act.	An 2G operator with a 3G licence must provide national roaming to 3G operators. Allowed as means of coverage requirement up to 70% of the population coverage.	Not mentioned	No	Some obligations (e.g. directory, emergency call, connection, international conveyance services) apply both to mobile and fixed operators according to the T Act.	Yes. (Stated in the T Act).	
UK	80% of the UK population needs to be covered by 31 December 2007	No	Site and mast sharing is encouraged. However any agreements between operators need to satisfy themselves that such agreements do not fall foul of general competition law (Chapter I). See OfTel press release of 1st May 2001.	BT Cellnet and Vodafone are currently designated as having "Market Influence" (MI) in their UK T. Act licences. This obliges them to supply wholesale airtime to independent services providers. This designation also brings with a prohibition on undue discrimination and unfair cross subsidy, as well as price publication and accounting separation obligations. OfTel is currently consulting on a proposal to remove MI from these licences. BT Cellnet and Vodafone are currently designated as having Significant Market Power (SMP) in the mobile market under the Interconnection Directive. They are obliged to supply indirect access as this is designated an interconnection service by OfTel.	New 3G entrant can request Director General for Telecommunications to determine terms and conditions for roaming on second generation networks of BT Cellnet or Vodafone if cannot reach commercial agreement. New entrant needs 20% population coverage to request, and sunset clause of 31st December 2009. This obligation is included in the licences of BT Cellnet and Vodafone and was accepted voluntarily by them prior to the 3G auction. The new 3G entrant, Hutchison 3G, has agreed commercial roaming terms with BT Cellnet and OfTel has not had to make any determination. If OfTel had made a determination, the price would have been on a retail minus basis	For commercial discretion of operator - no licence condition on date of service launch.	No deadlines missed or postponed	Not mentioned	Yes as a requirement of all mobile PTO licence holders.	

	Spectrum related conditions				Conditions related to change in licence holder				Miscellaneous			
	Allocation of spectrum	Total amount of spectrum made available	Spectrum reserved for the future	Refarming	Change of ownership of operator effect on licence	Handing back to authorities	Transfer of licence to other parties	Special conditions for incumbent/attackers	Area covered by the licence	Other requirements	Has any of the mentioned points (on all worksheets) been changed or reviewed after the licensing process? If yes what is current status	
	Paired, unpaired, amount of spectrum, e.g. 2x(2x15MHz) 3x(2x10+5MHz)			Use of spectrum for other than intended use		Can the license be handed back to national authorities and if so at what cost			Regional, national or both			
Austria	12 x (2x5)paired and 5x 5 unpaired	145 MHz		2010-2020 MHz is set aside for unlicensed operation	Change in ownership to be approved to Telekom control Commission	The licence expires as a result of waiver, revocation, expiry of the period for which it was granted, death or termination of the legal personality of the licensee, though not in the case	No, currently not permitted		national		No	
Belgium	4x(2x15+ 5)	155 MHz				Not foreseen	No				Postponement of coverage deadlines	
Denmark	4x(2x15+ 5)		Identified.	Refarm 2G spectrum and give it to 3G. Further 3G spectrum identified.	Changes should be notified. Regulator has discretion on the measures to take.	Yes. 22,5%of the licence price, or if payment of a smaller amount of the licence is outstanding, then such smaller amount. Payments already paid shall not be refunded	Yes, but transfer requires licensor approval.	None	National	Licence terms regarding coverage: Population coverage of 30% by the end of the year 2003, and 80% by the end of the year 2008.	No	
Finland	4x(2x15+5 MHz)	140 MHz for public operators, 10 MHz for self-provided applications according to the	5 MHz	Fixed link operation can continue in those geographical areas where	No restrictions on the ownership.	The licence can be handed back.	No, not allowed. Allowed in a marginal situation ie. only within a group of companies between the parent company and its subsidiary.		National. (Regional licences were awarded for the Åland Islands.)		There is a review process taking place in every 6 months. No changes have been made so far.	
France	4x(2x15+ 5)		None	None	None due to the 'intuitu personae' characteristics of the licence		No, cannot be transferred (eg "intuitu personae")	None	National		fees and duration	
Germany	12 blocks of 2x5MHz (paired) and 5 blocks of 1x5MHz (unpaired)	145 MHz	None		Changes should be notified. RegTP will verify that conditions are still followed.		No, transfer of spectrum not allowed.		national			
<b>Greece</b>	phase 1: allocation of pairs 2X10; phase 2: additional 5MHz	140 MHz			Changes in ownership must be notified.		Yes, but transfer requires licensor approval.		national			
Ireland			possibly in 1800 MHz and/or 2500 MHz bands	Not considered	the current Irish Licensing regime for mobile operators might apply to 3G: the licensee shall not issue or transfer or redeem shares such as would give rise to a change of control of the	the current Irish Licensing regime for mobile operators might apply to 3G: if the licensee proposes to cease to provide the Licensed Mobile Services, it shall give notice in writing	Yes, the current Irish Licensing regime for mobile operators might apply to 3G: the licensee shall not transfer its licence without the prior consent of the Director.		national		Not applicable	
Italy	5x(2x10+ 5) + an additional 2x(2x5)MHz which is reserved for new entrants and	145 MHz	None	Not allowed at the moment	Changes are allowed during the application phase prior to the submission of the plans.	Any time, no refund is forecast	Yes, but licences cannot be transferred to third parties for at least 48 months following their issue. Cases of "force majeure" will be treated separately	Spectrum having a width of 2x5 MHz is reserved for new entrants. Two such portions are available.	National	A license could be transferred not before 48 months and subject to Ministry of Communication approval		
<b>Luxembourg</b>	4 licenses of 2X15+5	140 MHz			Modification of shareholder structure has to be announced to ministry, who can oppose.		No, a license is personal and non-transferable		national			
<b>Netherlands</b>	2 licenses at 2X15 + 5; 3 licenses at 2X10 +5	145 MHz		2010-2020 MHz is set aside for unlicensed operation	Need Telecom minister consent and could be rejected if the effect on competition or on spectrum efficiency is negative	Not foreseen in legislation	One transfer of license already occurred. 3G Blue transferred the ownership of the license to Ben.	None. There is no legal basis for excluding one of the incumbents from bidding on a licence, except in case of a dominant position, which was not the case	national		None but a document on network sharing was issued in 2001	
Portugal	4 licenses of 2X15+5	140 MHz	15 MHz TDD		No licensed operator can have more than 10% share in another licensed operator, on penalty of having his license revoked.	Licences can be handed back to authorities. No cost is involved.	Transfer of UMTS licences is allowed. Since UMTS licences were granted within the scope of a public tender, it is the responsibility of the member of the Government responsible for the communications area to authorise the transfer of licences. The entity to which the	None.	All the UMTS licences awarded have nation-wide coverage.	Other requirements relates to 1) the installation of a minimum number of Control Centres (RNC's) and Base Stations (Node's B) within a certain	No.	
Spain	4x(2x15+ 5)		It is competence of the Ministry of Ciencia y Tecnología, Dirección General de Telecomunicaciones	It is competence of the Ministry of Ciencia y Tecnología, Dirección General	None	Yes, but the licensee would lose the bank guarantees and the amounts of money that have been given because the auction process	Yes, the license can be sold to another operator after 4 years, with the Ministry authorization and if there is no problems of capital concentration.		national		Timing for service launch. It has been postponed until the 1st of June 2002	
Sweden	4 licenses of 2X15+5	2x60 + 20	No reserved spectrum decided. However there are ongoing discussions regarding the 2,5 - 2,7 Ghz band and possible future refarming is in the GSM-1800 band	The armed forces are allowed to use the parts of the spectrum that the licensees will not	The Swedish Telecom legislation does not prohibit purchase of a company that holds a UMTS-license. However, all changes in ownership for a UMTS-license must immediately be notified	The license may be handed back without cost.	No, transfer of licence may only be permitted if the terminating company is 100% owned by the originating company.	A UMTS-license holder is entitled to demand national roaming in a particular GSM-network if that GSM-network is owned by another UMTS licenseholder.	All four UMTS-licenses are national licenses.			
UK	1 A licence: 2X15+5 1 B licence: 2X15 3 C-F licences: 2X10+5	140 MHz	None	Air interface defined in spectrum licence.	Details of ownership structure must be provided. If two or several applicants are closely related, it is only possible to grant one of them a licence.	Licences may be surrendered. Although licences do contain provision for refund of licence fees this is unlikely if licence is being voluntarily surrendered by operator.	Not allowed at current state. Spectrum trading might in the future become allowed. UK likely to implement some form of spectrum trading once EU framework directive allows, and implemented in UK.	Largest licence reserved for the attacker	National (Regional licences for the Channel Islands awarded separately by the authorities on these.)	Bidders must be single body corporates but need not to be telecommunication companies	Change of ownership after initial assignment by auction subject to competition regulation.	