

Consultation Document:
Third Generation (3G) Mobile Telephony

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1 Executive Summary

The advent of mobile telecommunications has caused a profound change in the method and frequency of how people communicate. The technological basis for this phenomenon has been digital mobile telephony networks, known as the second generation or 2G, following on from the first – analogue - generation. However certain technical limitations coupled with customer expectations for new and exciting value-added services have resulted in the development of a third generation (3G) of mobile technology. 3G networks will in time replace the existing 2G systems and become the *de facto* standard for future mobile communications. These 3G systems will provide in particular higher speed access to data services as well as more efficient voice calls. In Europe it is expected that the prevalent 3G technology will be the Universal Mobile Telecommunications System (UMTS).

Overseas deployments of 3G networks have already begun in earnest, and it is clear that local operators will have to investigate the options they may have in relation to the eventual utilisation of such technologies. Topics covered include allocation methodology, pricing, authorisation, timeframes and procedures. To this effect, this consultative paper outlines proposals leading to the development of a supply-side regulatory framework that would support the successful deployment of next generation mobile telephony in Malta. It is the intention of this paper to provide as much clarity as possible to interested parties and these are invited to comment accordingly.

2 Overview

2.1 What is UMTS?

UMTS (Universal Mobile Telecommunication System) is one of the flavours of third generation mobile phone technologies, of which there are several. UMTS is currently the predominant technology for delivering 3G services. It is capable of transmitting both voice and data at higher transmission rates, thus allowing new and innovative services like video messaging and internet browsing from new 3G mobile handsets. This is the natural evolutionary choice for operators of GSM networks, which currently representing a customer base of more than 1 billion end users in 195 countries and representing over 70% of today's digital wireless market.

From an operator viewpoint, UMTS can build on investments in the current GSM network by retaining a significant amount of the core 2G network. Once implemented it gives operators additional capacity to support more subscribers than 2G at greater speeds and provided more and enhanced services. The greatest cost is related to the deployment of radio access network equipment that uses the new 3G standards. Average revenue per subscriber from UMTS is expected to increase in the medium to long term as both new services and mass adoption take place.

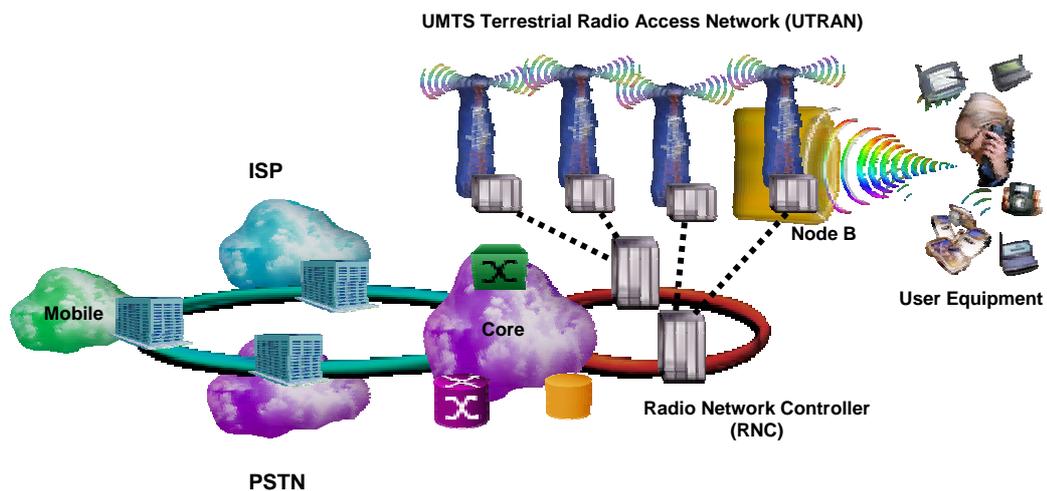


Figure 1. Typical UMTS Architecture

The typical UMTS architecture is shown in Figure 1. Here a user terminal such as a phone handset, PDA or notebook personal computer with UMTS capability can connect to the mobile operator's radio network much in the same way as with existing technology. All the "base stations" or "Node Bs" will connect to a radio network controller or RNC. These in turn will be connected to the operator's core network consisting of the necessary voice switches, data routers and management and provisioning servers. The mobile operator's network will in turn be linked to other operators and service providers to ensure interconnectivity to fixed telephony and Internet services.

2.2 UMTS Radio Spectrum Overview

The deployment and roll-out of UMTS is wholly dependent on the availability and use of the appropriate radio spectrum. In most cases the spectrum is made available for commercial use to interested operators via auction or beauty contests, with bands being allocated to the highest bidders.

Auctions for UMTS spectrum held in the UK and Germany in 2000 raised significant revenues for governments however this was partly due to the somewhat speculative nature of the market which was at a very early stage of development. The telecommunication sector downturn has since seen spectrum pricing being significantly revised downwards and in certain cases, (e.g. Italy and France), there have been licenses returned and retrospective changes made to granted licenses to reduce the impact of costs associated with network rollout. These developments, together with the possibility of disruptive technologies such as Wireless LANs potentially eroding the business case for 3G, play an important role in the determining the real economic worth of spectrum.

Evidence shows that the correct treatment of spectrum allocation is a critical aspect in establishing an effective framework for ensuring a successful 3G introduction. If spectrum prices are set too high, operators may be unable to recoup the investment in 3G, while if set too low it may deprive economies from attaining an appropriate return from the lease of a vital public resource.

UMTS promises significant improvements over current generation mobile networks, offering better reliability, speed, ease-of use and cost effectiveness. Nevertheless, original launch timeframes and revenue estimates have been pushed back and revised to take into account the effect of the global economic downturn and technology jitters, which placed constraints on operators' financial plans and limited access to new capital.

Despite this however, most countries have now completed 3G spectrum allocation via auctions or other instruments and there are currently over 2 million 3G subscribers worldwide. More are expected as operators currently conducting

trials launch their services commercially. The move towards 3G has begun in earnest and will continue to gain momentum as users become accustomed to the new features it offers and make it as ubiquitous in use as current mobile phones.

3 International Situation

3.1 Spectrum allocation methodologies

The process of allotting 3G spectrum in other jurisdictions can roughly be categorised into

- Competitive Auction or
- Beauty Contest.

Reasons for selecting one or the other was driven primarily by openness and revenue maximisation in the case of auctions and optimal citizen and consumer benefit in the case of beauty contests. Auctions by their nature are market force driven and despite the large upfront payment, they reduce the level of uncertainty to the operator, as costs are known. Auctions tend to favour larger operators who are able to finance the process more effectively than smaller organisations since they are usually able to tap financing more readily. In some respects this may constitute a barrier to entry. Nevertheless, given their reliance on market forces they are viewed as the most competitive, fair, open and transparent mechanism for spectrum allocation.

Beauty Contests in contrast are planned and controlled environments where a set of parameters for compliance are outlined. Interested undertakings then submit a binding proposal as to how they intend to address and comply with these parameters. Of course, since the selection criteria are subjective and not based solely on financial criteria, there is always the possibility of the process being considered flawed. This may lead to situations where network roll-outs are not necessarily deployed based on market needs and economic business sense.

3.2 Spectrum Allocation Pricing

In analysing data relating to countries of a similar size to Malta, it is apparent that both the costs charged and methods used were different in all cases, implying that local market factors play a significant role in spectrum allocation.

| Country | Date | Number | Cost (E) | Method |
|---------------|-------|--------|----------|------------|
| Estonia | 2003 | 4 | 3.2m | B/Contest |
| Finland | Mar99 | 4 | Free | B/Contest |
| Hong Kong | Sep01 | 4 | % T'over | Hybrid |
| Japan | Jun00 | 3 | Free | N/A |
| Latvia | 2003 | 3 | 10.0m | Automatic |
| Liechtenstein | Feb00 | 3 | Free | Automatic |
| Luxembourg | May02 | 3 | 0.26m | B/Contest |
| Monaco | Jun00 | 1 | ? | Automatic |
| Slovakia | Jun02 | 3 | 35.0m | Auction |
| Slovenia | Nov01 | 1 | 99.5m | Auction(?) |
| Sweden | Dec00 | 4 | 11.2m | B/Contest |

Table 1 – Indicative small country comparison of UMTS lease grants (Japan is special case)

From a cost perspective, empirical data shows that the average (mean) revenue per license across all current UMTS sold spectrum was in the range of US\$ 10.2 per license / per head of population (see Table 2). In Maltese Lira equivalent terms, this would place the average market price for a license of UMTS spectrum across all EU countries in the range of Lm 3.4m.¹ (This is based on the assumption that 2 spectrum leases are available for allocation).

| Measures of central tendency | System types | Total sums paid for spectrum (US\$) | S/carrier/pop |
|------------------------------|----------------|-------------------------------------|---------------|
| Mean | Auction | 7,273,954,615 | 10.8 |
| | Beauty contest | 4,891,646,923 | 9.6 |
| Median | Auction | 610,000,000 | 4.6 |
| | Beauty contest | 459,250,000 | 6.5 |

Table 2 – Mean / Median Indicative spectrum lease costs across comparisons between allocation methodology. Note: Mean refers to the average of all sums paid.

Median refers to the actual middle point of the total number of all sums paid.

\$/Carrier/Pop'n – Total \$ / Number of operators / Total population.

¹ Bornshten & Schejter 2003

To further refine and validate this rate, similar data was further broken down and segmented into differing groups of countries, including Accession Countries only. On this basis the market price for Spectrum leases in LM terms is LM 2.5m

| | Benchmark | When related to Maltese population | | | | |
|-------------------|--------------|------------------------------------|--------------|-------------|---------------|-----------------------------------|
| | Avg €/cap/pa | €per annum | Lm per annum | €for 15 yrs | Lm for 15 yrs | per annum charge (5.1% risk free) |
| all countries | 1.33 | 522,690 | 223,812 | 7,840,350 | 3,357,177 | 325,628 |
| all excl Os, D&UK | 1.04 | 408,720 | 175,011 | 6,130,800 | 2,625,161 | 254,626 |
| EU only | 1.60 | 628,800 | 269,247 | 9,432,000 | 4,038,709 | 391,733 |
| EU excl Os, D&UK | 1.18 | 463,740 | 198,570 | 6,956,100 | 2,978,548 | 288,903 |
| Accession Ctr | 1.02 | 400,860 | 171,645 | 6,012,900 | 2,574,677 | 249,730 |

Table 3 – Indicative international benchmark spectrum cost normalised against local market size. Note:
 All countries = All Countries where spectrum was granted and fee known.
 All Excl Os, D & UK = All countries excl Germany, UK and countries where spectrum was given free.
 EU = European Union only countries.
 EU Excl Os, D & UK = All EU countries excl Germany, UK and countries where spectrum was given free.

It is therefore prudent to infer that the average competitive market price that is expected to be realised on sale of a UMTS spectrum leases in LM terms lies in the range of 2.5m – 3.5m per lease. (Assuming that the lease is granted for 15 years). This value could be used as a guide to establish the floor price in a spectrum auction or beauty contest.

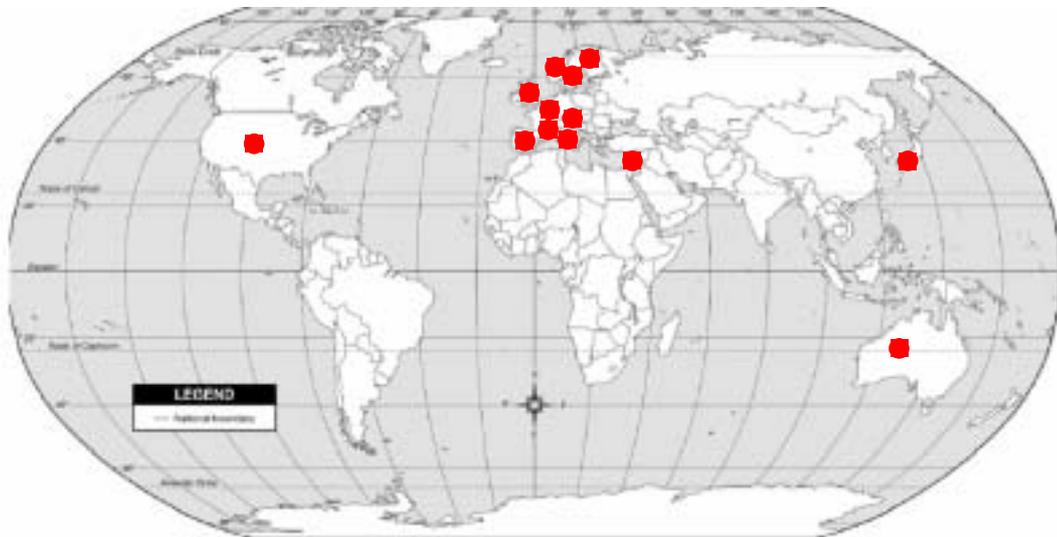
In summary therefore, international experience in terms of UMTS spectrum allocation was characterised by:

1. Auctions used as the best method of using market driven forces to fix the cost of spectrum. This generally resulted in significantly higher returns than those using other methods.
2. Payment for spectrum was typically via a one-time lump sum payment on granting of the spectrum or lease.
3. There were typically no subsequent fees placed upon operators to utilise the spectrum other than this one time payment.
4. Lease terms ranged from 12-20 years
5. Once allocated, rollout obligations were usually imposed, however in the majority of cases it was left up to the operator to determine best use of the spectrum allocated in terms of technology.

6. No concessions were typically made for current 2G operators wishing to enter the 3G market, and no barriers were imposed on operators wishing to only offer 3G services.

3.3 UMTS rollouts

To date several countries, led mainly by the UK, the Scandinavian countries, Italy, Australia and Japan have rolled out 3G networks and have more than 2 million paying subscribers using their services. All EU member states (including the new ones) have by now completed the spectrum allocation process.



■ *Denotes commercial service launch*

Figure 2: Known 3G Commercial Launches Q104

Although in its infancy, and in line with revised expectations of consumer take up and revenue per subscriber, it appears that there has been tacit adoption of the technology. Several operators are expected to launch commercial 3G services in 2004.

The relative delay in 3G rollouts has allowed competition from other technologies to emerge. Wireless LAN based on Ethernet solutions (WiFi) and new enhancements to enhance existing 2G networks via GPRS and EDGE all add pressure to the future potential success of 3G.

Nevertheless, 3G deployment and adoption has begun, and the main question now, is not if 3G will occur, but ensuring that 3G delivers what it has promised,

and that it is accepted as the new standard mobile communication medium by subscribers worldwide.

4 Local Situation

There are many valuable lessons that can be learned from evaluating the experiences of other countries' implementation of 3G spectrum allocation and eventual network deployment. However in determining and developing an effective local UMTS Policy, it is critical to be mindful of local market nuances and conditions which may have an impact on the formulation of the final policy format and which takes equally into account the interests of operators, consumers and the general public.

4.1 Policy Objectives

The development and adoption of a Local UMTS policy will take into consideration the following

4.1.1 Compliance with Accession Obligations and eEurope 2005 Action Plan

The EU regards the mobile industry as a key driver of competitiveness and growth of the EU economy as whole. Consequently, UMTS rollouts are seen as a required complimentary technology to fulfil the requirements of the eEurope 2005 strategy of widespread availability and adoption of broadband access across all member states.

In a report on Mobile Communication and Technology Platform submitted to the EU by major mobile operators in January 2004, it was re-affirmed that it was still the EU's belief that, "3G will build on the proven benefits of GSM and contribute to the achievement of the goal of making the EU the most competitive and dynamic knowledge-based economy, with improved employment and social cohesion by 2010."

In developing a national UMTS strategy, the EU regarded interoperability of new generation networks, both within the mobile platform and between mobile and other end-user devices as a barrier to effective adoption and is seeking to ensure that member states encourage and monitor the openness of interface standards. The report also commented on the problems faced with the physical roll-out of 3G especially in regard to fears over EMF radiation on base stations. It encouraged member states to co-ordinate substantive scientific research to provide information to enable a robust risk communication programme.

Although there are currently no agreements or standards among member states or operators as to how spectrum should be allocated and utilised or as to consensus in regards to the adoption of spectrum trading, there has been a growing request to raise debate and provide resolution on this issue. It is recognised that a uniform approach to spectrum management would significantly increase the effective utilisation of this scarce resource.

The development and adoption of a local UMTS strategy must therefore be cognisant of the above requirements as fulfilment of the obligations Malta now has as a member of the EU.

4.1.2 Ensuring market sustainability

Policy development should ensure that any implementation of UMTS locally would be sustainable in the long term and viable in the context of the economies of the local market.

4.1.3 Enhancing competition & customer choice

It is important that any policy adopted would ensure that free market forces are allowed to operate in as far as they provide an environment of enhanced competition in which consumer choice based on price and quality flourishes.

4.1.4 Maximising economic welfare

Adoption of a new UMTS policy should also ensure that any indirect opportunities made available by implementation of the technology be addressed. In particular the multiplier effects on other sectors in the economy should not be underestimated. Opportunities for growth in retail and service sectors arising from the adoption of UMTS should be taken into consideration, as should the business and social benefits that the technology could provide for Malta as a whole.

4.1.5 Defining rollout obligations

Once defined, the policy will clearly articulate the obligations for the rollout of UMTS, so as to set an environment in which operators can make confident

investment decisions. Clarity in obligations should help reduce impediments and delays in time to market.

4.2 Environmental Analysis

| | |
|---|---|
| <p><u>Strengths:</u></p> <ul style="list-style-type: none"> High mobile penetration Attractive technology Mobile telephony expertise Advanced services | <p><u>Weaknesses:</u></p> <ul style="list-style-type: none"> Small market Limited resources Lack of certain technical skills Vulnerability to external pressures |
| <p><u>Opportunities:</u></p> <ul style="list-style-type: none"> Mistakes avoided Can learn from others Centre of excellence Revenue generation | <p><u>Threats:</u></p> <ul style="list-style-type: none"> Delayed roll-outs Other countries better placed Environmental Opposition Lost time/opportunities |

Assessing the relative overall local market conditions, the local market is well positioned to take advantage of the adoption of UMTS. The major market strength lies in the current usage and adoption of current mobile services. Saturation is high in the current market and given the propensity and desire for enhanced communications it is perceived to be a ripe market for adoption of UMTS, provided that, the pricing and enhanced services offered by UMTS operators is accepted as providing an enhanced service at reasonable value. Given the price sensitive nature of the market, adoption of UMTS through the migration of current 2G subscribers, is dependant on the provision of the correct mix of value added service at the appropriate price. Examining other launched 3G services worldwide and learning from their experiences can mitigate this risk. It is clear that more realistic expectations of revenue generation are now being accepted in the early years of adoption, however it is still believed that as both migration volumes increase and subscribers begin to adopt new services offered by 3G as commodity items, average revenues per user are expected to be higher than those currently being realised from existing usage patterns.

The main limitations of the local market is its size. Given this, market saturation levels quickly become a barrier to entry in terms of the number of operators that can adequately compete and operate in this market. It is therefore imperative that sustainability of the market be the key tenet of any policy in regards to the deployment of UMTS. Although lack of early adoption of technology is not necessarily seen as a weakness, loss of opportunities through delay in roll out and launches is. It is critical that once spectrum has been allocated, adherence to service delivery timeframes is critical in ensuring confidence in both consumer and ancillary support services and industries. Policy should ensure that appropriate economic disincentives are placed on operators to ensure roll-out in accordance with agreed timeframes. Deployment obstacles regarding the placement of transmission infrastructure due to perceived health issues must also be addressed. Closer communication between relevant government authorities needs to be undertaken in order to provide a consistent approach to approving deployment of required infrastructure. Furthermore, credible and scientific research regarding concerns over health issues arising from transmission should be strongly communicated to the community so as to allay unnecessary concerns.

On balance, it is believed that the underlying local market conditions are appropriate for the uptake and adoption of UMTS.

4.3 Political and Economic Analysis

| | |
|---|---|
| <p><u>Political:</u></p> <p>EU Accession & Compliance</p> <p>Strategic importance of Go / Maltacom</p> <p>Government revenues</p> <p>European conformity</p> | <p><u>Economic:</u></p> <p>Financial cost for "Malta Inc"</p> <p>Market sustainability</p> <p>Operators' financial resources</p> <p>Increasing cost of telecoms</p> <p>Pull for new services</p> |
| <p><u>Social:</u></p> <p>Tourism & business aspects</p> <p>Status symbol</p> <p>Competition & consumer benefits</p> <p>Environmental concerns</p> | <p><u>Technological:</u></p> <p>Service availability & desirability</p> <p>Handset availability & price</p> <p>Slow take up of WAP, 2.5G</p> <p>Competition from Wi-Fi/GPRS</p> |

Assessing the political and economic factors surrounding the adoption of UMTS in context of the local environment, it is clear that the main driving political impetus to implementation of UMTS is due to Malta's obligations to the EU as a member country. UMTS adoption is an integral part of the EU's 2005 eEurope strategy and is seen as critical in underpinning Europe's economic viability and competitiveness. Domestically, adoption of UMTS will present the government with new incremental revenues from an otherwise un-realised source. Revenues from spectrum auctions overseas have returned tidy returns to government coffers and it is expected that the same will hold true for the sale of UMTS leases locally. The balanced view must dictate that despite the requirement to ensure the best return on sale, it must be evaluated within the context of the available financial resources of local operators in the current market. Prudent policy in this instance will ensure that sustainability of the market as a whole is granted the best chance of success.

From a technological aspect, the deployment of 3G technologies is by no means mature. The requirements for the manufacture and sale of new handsets, together with the final service offerings and price all have a significant impact on the adoption of UMTS. Furthermore if delays in overall worldwide adoption of UMTS continue, there is greater risk of competing or new alternative technologies,(eg WiFi), becoming accepted by the market as preferred alternatives to 3G.

In evaluating the Political and Economic impetus for implementing UMTS, it is clear that compliance with EU accession obligations are the driving force. In doing so however, the government will realise windfall gains through the sale of an otherwise intangible asset. It is clear however that ensuring sustainability of the market as a whole, in terms of appropriate pricing methodologies from both regulator and operators, are critical in ensuring the optimal take up of UMTS.

4.4 Pricing and Payment

Under the extant legal environment, mobile operators are still currently regulated by LN151/2000 in terms of system and service operation and by the Wireless Telegraphy ordinance for spectrum. Under these regulations, operators are currently subject to payment of :

1. Public mobile telecommunications systems and services - Fixed amount + 1% of gross revenues annually
2. Spectrum Usage - Fixed amount + 2% of gross revenues annually.

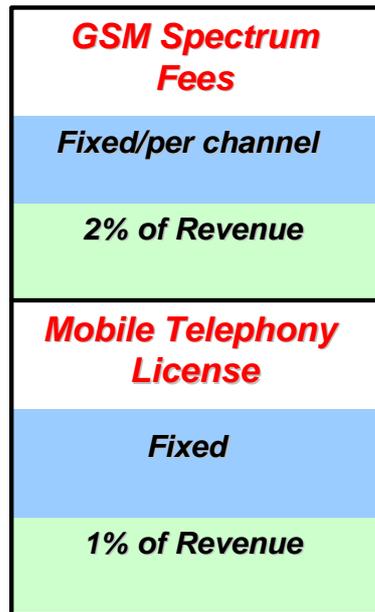


Figure 3. Current License Fee Structure

The current legislation is sufficiently technologically independent to take into consideration the adoption of UMTS, however, this legislation is to be superseded by new subsidiary legislation required for accession.

It is proposed that under this new subsidiary legislation, (Electronic Communication Network and Services (General) Regulation 2004), which is being released concurrently for consultation, existing fee structures will be amended to :

1. **GSM Spectrum Fee**
 - Fixed Amount LM 1,500 per channel
 - 2.5% of gross revenues per annum.
 - (Part B of the Eleventh Schedule)*
2. **Fee for Infrastructure Implementation**
 - Fixed amount of Lm 20k per annum
 - (Part A of the Eleventh Schedule)*
3. **Fee for providing Publicly Available Telephony Services**
 - Fixed amount of Lm 20k per annum.
 - Sliding Scale of 1.5% on first Lm 10M of gross revenue, 1% on second Lm10M of gross revenue and 0.5% of the remainder of total revenues

(Part A of the Eleventh Schedule)

4. **Fees for Numbers**

- Lm0.15c per individual number allocated, plus Lm100 per block of 10,000 numbers.

(Part C of the Eleventh Schedule)

| | |
|--------------------------|--------------------------|
| GSM Spectrum Fee | GSM Spectrum Fee |
| 1.5k per chn Fixed | |
| 2.5% of Revenue | |
| Infrastructure | Infrastructure |
| 20k Fixed | 20k Fixed |
| Services | Services |
| 20k Fixed | 20k Fixed |
| % of Revenue | % of Revenue |
| UMTS Spectrum Fee | UMTS Spectrum Fee |
| Staggered + 2.5% Rev | Staggered + 2.5% Rev |
| Numbers | Numbers |
| 15c Per number | 15c Per number |

Figure 4: Authorisation fees proposed (2G + 3G left, 3G only right)

Given the current regulatory environment, it is therefore apparent that existing operators may have to bear the additional costs of 3G fees for as long as they operate both 2G and 3G networks concurrently. The additional cost of simultaneously running both networks is a factor that will be taken into consideration when formulating appropriate policy for spectrum allocation.

4.6 Third (or more) operator/s

The mobile telephony market currently consists of two operators, Vodafone Malta Ltd. and Mobisile Communications Ltd. (go mobile). These organisations share a duopoly, providing a range of competing 2G services with similar pricing. The opportunity of allowing entry of a third operator within this segment to date has been restricted by Regulation 5 (6), of Legal Notice 151/2000. Government could consider the addition of a 3rd operator in 2003 and a third operator could therefore be in place after the 1st of January 2005. From a technical aspect, there is sufficient spectrum to support a third operator even within the GSM bands. However, given the state of technological progression it does not seem to make sense to authorize an additional operator using 2G technology. New investment should utilize the more efficient 3G technology in order to provide customers with leading edge services and better value. Nevertheless, the use of 2G could ultimately be possible due to the principle of technology neutrality.

The business case for a third operator to offer UMTS also appears stronger than that for one using legacy technology. Without facing the burden of also maintaining a legacy network, new entrants can offer new 3G services to consumers, including potentially cheaper voice services. Of course, rolling out a nationwide radio network will take a considerable amount of time and it could be possible that a new entrant could consider requesting national roaming capabilities from existing operators during this phase.

The initial cost of network deployment and rollout cannot be discounted, and would be seen as itself a significant barrier to entry in an otherwise closely contested market. However it will be left to interested parties to determine the associated risk and return of entering the market. If a sustainable business plan is justified, a successful new entrant would completely re-model the existing competitive scenario and the outcome should benefit consumers via increased competition, greater choice and arguably lower prices.

It is being proposed that an additional public mobile telephony operator be authorised under the applicable authorisation, bringing the total of operators up to three.

5 Implementation Strategy

Taking into consideration the objectives of a UMTS policy, with due consideration to local economic and market nuances, the following proposals have been formulated.

5.1 Allocation Method

The allocation of spectrum is the initial critical aspect leading to the introduction of UMTS. The format of the allocation will have significant bearing upon the way both existing operators and new entrants behave and adapt to the changing circumstances.

The available spectrum designated for use by UMTS systems is internationally harmonised and well known. This spectrum can accommodate several operators. So ultimately, spectrum availability will not be an issue. Instead, economic factors related to the size of the local market and the sustainability of the market will be the limiting factors for authorisation of additional operators.

An auction process uses market forces to drive the value of spectrum based on economic theory. It is viewed as the most transparent, fair and competitive mechanism by which this scarce resource can be allocated. On average, given the competitive nature of auctions, revenue earned from sale of spectrum has tended to be higher than that received via other allocation processes.

A benefit of utilising an auction for allocating spectrum is that the process involved should be relatively straightforward process. The greatest effort relates to the determination of, and managing, the process required to track bids from interested parties. Leveraging of experience from other countries that have employed similar processes however can mitigate this effort and cost. It is intended to automate the process through the use of online and software solutions.

It is proposed that auction participants will pay a "Participation Fee" levied at the outset of the auction. This will have the aim of covering the auction costs and making the entire process cost neutral. A "Floor" price will be set as the starting price for bidding, and hence operators will bid against each other to secure required spectrum from this point. The number of auction stages is as yet unknown and this would most likely depend on the number of parties that wish to participate.

Auctions therefore, provide for a relatively straightforward process, which provides an impartial and objective method as to which undertaking a spectrum band is allotted to. It also provides the best medium to maximise economic welfare.

5.2 Payment and Pricing Options

It is clear from the outgoing legal regime covering authorisation of telecommunications systems and services, that operators holding licenses for mobile telephony will automatically be granted an opportunity to acquire 3G spectrum. In view of this, the two current mobile telephony operators – Vodafone Malta Ltd and Mobisle Communications Ltd – will be offered the opportunity, at the commencement of the allocation process, to each purchase one of the UMTS bands at the price of Lm 2.5 million.

Should one of the existing operators not exercise its right to acquire a band decline to purchase it, this will be made available to other interested parties. Remaining UMTS spectrum band leases (up to a maximum of three) will be auctioned off to interested parties, with the minimum price for the lease being LM 2.5 million, the same base amount at which spectrum was offered to existing operators. This base price was determined based on the results of a detailed financial analysis study and international benchmarks as outlined previously.

Once spectrum is granted, two pricing options are being proposed in order to effect payment. These payment options will be made available to both current and new operators.

Payment Option 1 – “Cash In Hand”

1. Payment of Lm 2.5 million on grant of UMTS spectrum band.in the case of existing operators. If an auction process is required for additional operators, the ultimate highest bid will form the upfront amount payable.
2. Other authorisation fees as outlined previously.

Payment Option 2 – “Enlightened”

1. Shaped payment profile of approximately Lm 3.7 million in the case of existing operators payable in adherence to the proposed payment profile indicated below over the 15 year term of the spectrum. The amount will consist of the upfront fee of Lm 2.5 million described in Option 1 plus the relevant “interest” charged at the risk free rate that would amount to approximately an additional Lm 1.2 million when calculated over the payment profile and time horizon.

2. For additional operators, assuming an auction process, the amount due under this option would consist of the highest bid value plus associated relevant interest charges shaped over the same profile and time horizon.
3. Other authorisation fees as outlined previously.

The difference between the two options is primarily the differences in payment options made available to operators. Option 1, pre-supposes the ability of the operator to pay upfront for the spectrum, however Option 2 is engineered to ensure market sustainability by allowing a relatively low entry payment on spectrum allocation in early years with large outlay payments timed with commercial launch to lessen cashflow impact for operators. This option allows for trial, testing and planning with low initial outlay and accounts for the sensitivities and fragility of current operators in light of high capital expenditure requirements to support network rollout in an uncertain market conditions..

The proposed payment profile in percentage terms for both principal and interest components under Option 2 over the life of the lease is as follows:

| | Yr 1 | Yr 2 | Yr 3 | Yr 4 | Yr 5 | Yr 6 | Yr 7 | Yr 8 | Yr 9 | Yr 10 | Yr 11 | Yr 12 | Yr 13 | Yr 14 | Yr 15 | Total |
|-----------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Payment Profile | 6% | 6% | 40% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 4% | 100% |

To compensate for the deferred payments under Option 2, the total interest charged is calculated based on the present value of the cost of the spectrum over its granted life at the risk free rate. The total interest is then charged in accordance with the payment profile percentages outlined above. The risk free rate was chosen in calculation to reflect the risk free nature of the asset in possession. The rate used is that published by the Central Bank of Malta for 15yr bonds.

In the case of an additional operator, if the highest bid price at auction is greater than the established floor price of Lm 2.5m, and the “enlightened option” is sought, the new principal amount and interest will be recalculated as indicated above, and deferred over the same payment % profile.

5.3 Spectrum lease duration

Spectrum leases are to be assigned for a period of 15 years, after which, ownership will revert to the government. Extensions and associated conditions will be considered 12 years into the lease duration.

5.4 Rollout obligations

Implicitly associated with the granting of spectrum, is the associated rollout obligations for operators. It is proposed that operators would have the following coverage obligations for UMTS network roll-out from the date of spectrum grant:

| <i>Territory Coverage</i> | <i>Timeframe (from grant)</i> |
|----------------------------------|--------------------------------------|
| 25% | 18 months |
| 50% | 30 months |
| 99% | 42 months |

National territory is defined in terms of local council boundaries and not absolute physical population or geographic coverage.

5.4.1 Roll – Out Penalties

In order to ensure compliance, the maximum penalties that may be imposed on operators failing to meet the roll-out requirements.

1. If actual coverage is less than 50% of that required by rollout conditions above:

Forfeit of Lease

2. If actual coverage is between 50% and 99% of required rollout conditions

Lm 1,000 per day until roll-out % obligation has been reached.

Note:

If an operator is in default in one coverage period, it does not mitigate their requirements to meet the obligations as per next period's roll out coverage. (ie Delay in rollout will result in a cumulative obligation the following year not simply a deferring of obligation.)

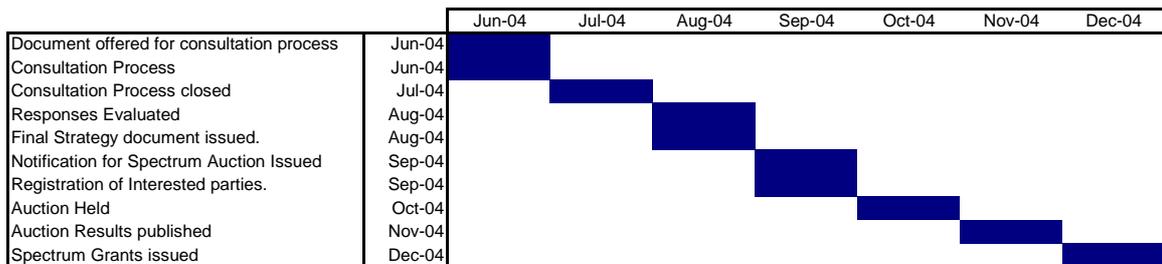
5.5 Infrastructure sharing

Infrastructure sharing relates to the ability of competing operators to utilise common infrastructure to offer competing services. The ability to house equipment in one shared location results in a reduction in the cost of the infrastructure.

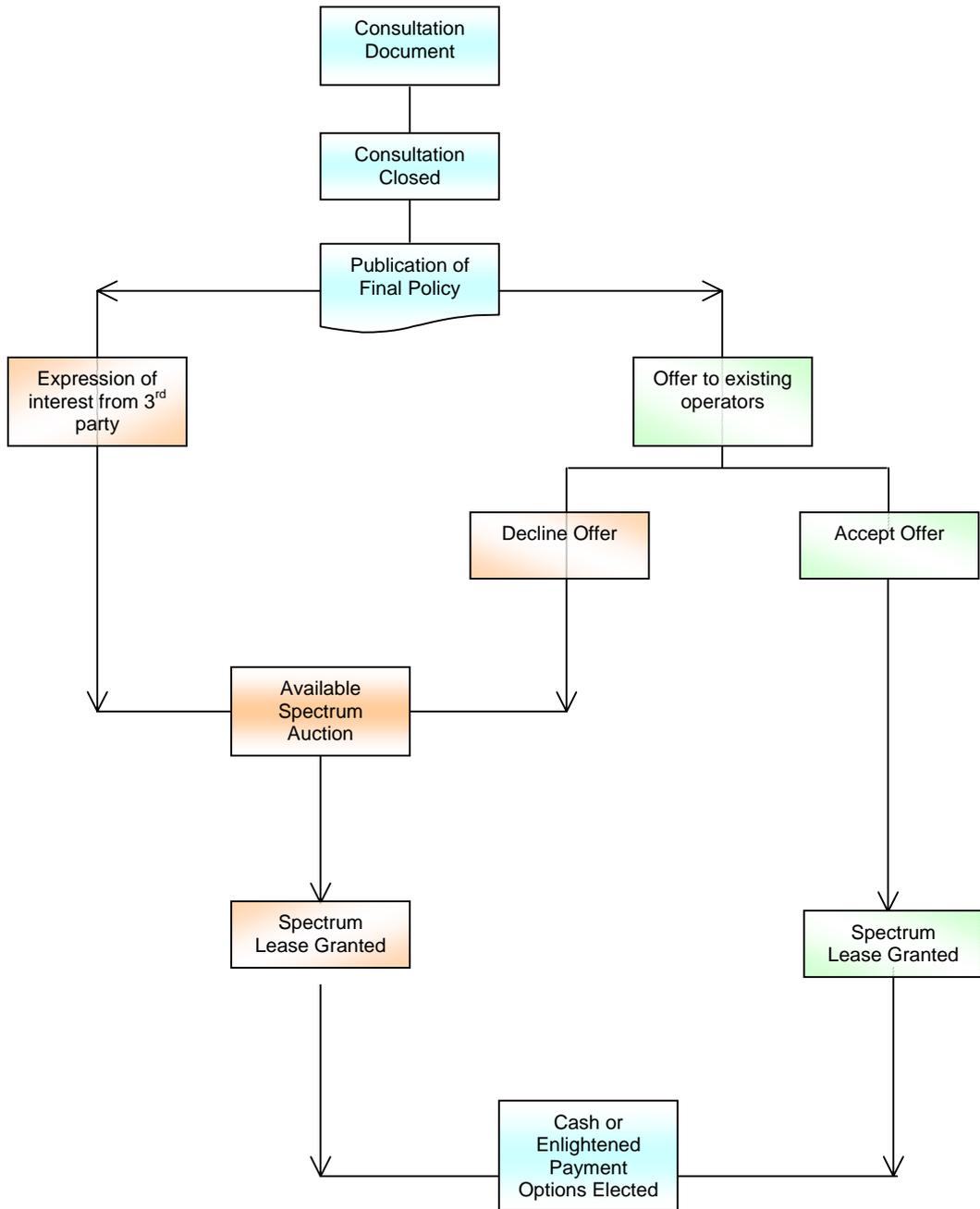
The decision to allow co-location and facility sharing should be market driven and will not be imposed on operators. However, there may be market conditions that may cause a revision of this policy and where Government will encourage operators to implement infrastructure sharing to the most effective degree possible. In such an eventuality all relevant regulatory authorities will work together to ensure that an effective planning framework and process is in place to assist such a shared arrangement.

5.6 Timing and Allocation Process

The following is an indicative timeframe illustrating key milestones in the process leading to spectrum grant for UMTS



Allocation Process



6 Conclusion

It now appears clear that most UMTS spectrum allocations in other countries happened too soon and at a stage where the technological maturity did not yet justify that kind of investment. In Malta, we are now at a stage where the technology is stable and where commercial UMTS rollouts are now increasingly common. It is therefore the right time to consider the most appropriate way to introduce this exciting new technological breakthrough that will serve to strengthen the already well developed local mobile telephony market, permit the deployment of new networks and services while also allowing for the potential market entrance of new players.

This paper outlined the salient points associated with the process that is to be followed in putting together an appropriate supply-side framework that will enable interested parties to evaluate the options open to them and consider their next steps in relation to a 3G deployment. Such points include

- Economic realities of the local market and the number of mobile telephony operators that this could support.
- The treatment of existing operators in terms of allocation of 3G spectrum
- The process and methodology for granting access to 3G spectrum to a new operator
- The price that will have to be paid for the lease of UMTS spectrum and the ways that payment could be made.
- All the conditions associated with rollout of 3G services.

The roll-out of UMTS locally will, if implemented and adopted appropriately, return benefits in numerous areas. Financially, Government will be able to exploit a valuable asset that so far has been unutilised. Here, Government has sought to find an equitable solution that balances public interest considerations with establishing a moderate and reasonable investment criterion. Mobile operators will gain access to a medium that promises new revenue streams in comparison to compensate for any with plateau in incomes from GSM. Socially, UMTS offers enhanced and enriched ways of enabling people to communicate. Furthermore there are envisaged multiplier effects in terms of ancillary and support services ranging from the purchases of new handsets, the provision of technological training and support, software development, value added service integration, improved efficiencies and infrastructure installation. Taken together these will have an important positive impact on the economy, stimulating new high value investment and attracting employment for highly skilled personnel.