

Introduction

The submission is prepared by New World PCS Limited (NWPCS) in response to the consultation paper issued by the Office of the Telecommunications Authority entitled “Licensing Framework for Third Generation Mobile Services – An Industry Consultation Paper” dated 21 March 2000. In summary, NWPCS submits that:

- A total of 6 licences to be awarded with successful bidders granted 2 x 10 MHz spectrum irrespective of their status as incumbent or new entrants. A further 5 MHz unpaired TDD spectrum to be granted at the same time to each successful bidder to allow them to handle the asymmetrical traffic in an efficient way.
- The basis of selection should be one based on merit of individual candidates. An equal opportunity approach is preferred to allow an objective assessment of the candidates. The TA should set out specific criteria in the bid document and should include service quality, time to market, financial and technical strengths, competitiveness of tariff and in particular track record and.
- Domestic roaming between 2G and 3G network should be mandated to equate the competitiveness of incumbent and new entrants 3G operators as well as between 3G operators and 2G operators which failed to obtain a licence.
- 3G network operators should be allowed to provide network service to MVNO for resale. Such agreement should be based on commercial negotiation between the network operator and the MVNO. As the existing PNETS licence does not cover pure service resellers, a new form of licence should be introduced to properly regulate MVNO and to ensure consumer benefit is safeguarded.

The following set out NWPCS’s comments to the various issues raised in the consultation paper.

Standard Issues

With 6 existing operators operating 11 network of different standards in Hong Kong. A Technology neutral approach allows a smooth migration from the existing 2G services to 3G services in the future.

The technology neutrality approach, which is consistent with the policy adopted by OFTA in previous licensing process, also encourages operators to explore new services available under respective standards.

⇒ NWPCS therefore concurs with the TA's proposal to allow potential 3G operators to use IMT-2000 standards for deploying their 3G services.

Spectrum Issues

Band Plan for 3G Services (Paragraph 3.9 – 3.12)

The co-existence of US PCS and UTRA FDD will unavoidably introduce fragmentation and additional guard band in spectrum allocation. As indicated in appendix 2a of this submission, it is clear that US PCS downlink band overlaps with the UTRA FDD uplink band. If the two bands co-exist there will be some interference problems foreseeable.

Consider there is a US PCS band base station A which is close to a UTRA base station B. The downlink frequency of A is adjacent to the uplink frequency of B. The strong downlink signal from A will severely interfere the relatively weak uplink signal of B. As a result the quality and capacity of B will be seriously downgraded. In the extreme case base station B will be totally out of service due to the strong interfering signal from A.

On the reverse side the downlink signal of US PCS can also be interfered by the UTRA uplink signal. For example in an enclosed location (such as basement of a shopping center), the downlink signal from the US PCS base station will be very weak (assumed there is no indoor site installed, signal from outdoor penetration). If there is an UTRA mobile in the same vicinity transmitting uplink signal, there is possibility that this signal is stronger than the downlink signal of the US PCS base station. Consequently in this location it will be a dead zone for the US PCS network when there is an UTRA user transmitting signal.

Guard band has to be introduced to reduce the impact of adjacent channel interference. Spectrum fragmentation and additional guard band will not only adversely affect the spectral efficiency but also complicate the spectrum allocation.

NWPCS supports the TA's view that Hong Kong should adopt a 3G band plan that is in compliance with ITU IMT-2000 allocation.

Individual Operator's Bandwidth Requirements (Paragraph 3.13 – 3.19)

With 60 MHz of paired spectrum available, the regulator should ensure successful bidder obtain sufficient radio spectrum for the deployment of 3G mobile network while at the same time maintaining a reasonable degree of competition. To balance the 2 conflicting goal, NWPCS advocates an allocation of 10 MHz per successful applicants with both 2G operations and new entrants based on the following justifications:

Overseas precedents – the approach of granting 10 MHz of spectrum is consistent with overseas approach, e.g. UK recently auctioned 3 third-generation mobile licences with 10 MHz allocation. The UK authority clearly considers a 10 MHz allocation sufficient, even for a new entrant with no existing spectrum. The Australian working group on IMT2000 also recommends 2 x 10 MHz paired plus 5 MHz unpaired to be a minimum requirement of. Germany, who recently announced its intention to auction 3G mobile licences, also invited bids for a minimum 2 x 10 MHz. In most overseas jurisdiction NWPCS surveyed, most of them have either adopted a 2 x 15 MHz paired or 2 x 10 MHz paired plus 5 MHz unpaired allocation. A table summarizing the licensing arrangement in selected regimes is attached in appendix 1 of this submission.

Accommodates maximum number of licensees – With only 60 MHz of paired spectrum available in the short term, the allocation mechanism should ensure successful candidate to obtain sufficient spectrum for the deployment of their respective 3G mobile network while at the same time maximize competition. In the context of Hong Kong, the benefit of having more operators outweighs the technical consideration of optimal network architecture and the TA should give due consideration to this trade-off.

Promote Spectral Efficiency – A 10 MHz allocation also encourage incumbent operators to re-dimension their existing spectrum for efficient operation, thereby promoting more efficient utilization of spectral resources. As standalone PCS and Dualband operators have been assigned 10 MHz and 17.5 MHz respectively for their existing 2G operation, a 10 MHz allocation would force incumbent operators to re-dimension their existing networks to accommodate 3G service with the most efficient use of radio spectrum.

This approach is also consistent with the practice by OFTA on spectrum management on 2G spectrum where operators have to justify their utilization before granting additional spectrum. NWPCS considers the same approach should be adopted in spectrum management of 3G mobile network.

Technical Justification for 2 x 10 MHz + 5 MHz – The allocation of 10 MHz per operator is also supported by UMTS Forum in its report¹ which states that “From a purely technical point of view the minimum spectrum requirement (by definition) is 2 x 10 MHz (FDD) + 5 MHz (TDD) (scenario 4). This scenario provides sufficient capacity to carry the projected traffic for Europe and the full range of UMTS services”. The 2x15 MHz (FDD) + 5 MHz (TDD) scenario is only regarded as the ‘preferred minimum’ and in fact the actual minimum requirement is 2x10 MHz (FDD) + 5 MHz (TDD). This 2 x 15 MHz scenario only outperforms our suggested allocation slightly on the frequency assignment flexibility, which can be overcome by careful design of the radio network. Actually both of the scenarios can support all required traffic and UMTS services. The same view is also supported by the Australian authority which argued in its report² “The preferred minimum spectrum allocation for a new mobile operator with no other mobile telecommunications spectrum is 2 x 15 MHz paired, as recommended by the UMTS Forum, but there are questions about the need for 5 MHz unpaired. Alternatively, 2 x 10 MHz plus 5 MHz unpaired may be sufficient because it meets the requirements of a macro (FDD), micro (FDD) and pico (TDD) layered deployment”. From this point of view there is no need to distinguish between new 3G operator or incumbent operator from the spectrum point of view since 2x10 MHz (FDD) + 5 MHz (TDD) can satisfy the need of a single operator, no matter it is a new one or an incumbent. NWPCS suggests the TA to assign 2x10 MHz (FDD) + 5 MHz (TDD) spectrum to each successful applicant. As a result there will be totally 6 3G networks so as to maximize the market competition and the available spectrum will be more efficiently utilized.

Evolving technology allows better use of spectrum – The UMTS report also envisages by the year of 2005 techniques will be available, which will allow UMTS to exploit the spare capacity in paired channels due to traffic asymmetry. This will give an operator the required margin to continue catering for demand for some time past the year 2005.

Additional Spectrum available in near future

NWPCS understands that ITU-R has proposed in the agenda of the coming World Radio Conference (WRC-2000) later this month to avail by 2005 an additional 160 MHz of spectrum. The additional spectrum will provide continuity for the upgrading path for bandwidth growth for 3G services. As 3G network will require a ramp up

¹ “Minimum spectrum demand per public terrestrial UMTS operator in the initial phase” – Report # 5 from the UMTS Forum, 8 September 1998.

period for both infrastructure and terminals and is foreseeable to be ready only by 2002, the network requires time to build to its maturity. In addition, the take up rate for wireless multimedia / internet related service will take time to ramping in the for early phase of the 3G service launch, there is no need to hand out in the initial period more than enough spectrum for 3G operators, irrespective of whether it is for new or incumbent.

TDD Spectrum – It is understood that the TA intend to allocate 5 MHz of TDD spectrum to each successful candidate. The TDD spectrum to be allocated could supplement the FDD and allow successful 3G candidates to operate a 3-layer network based on 10 MHz allocation.

A suggested spectrum allocation under a scenario of 6 licensees with 2 x 10 MHz plus 5 MHz each is attached in appendix 2b of this submission. There are two main concerns in this allocation. The first one is guard band between FDD and TDD allocation. This consideration is important since the TDD carrier can be used as the downlink carrier for some time but it is adjacent to the uplink of the FDD carrier. It is similar to the case mentioned in the previous section about adjacent channel interference between US PCS and UTRA FDD which can cause serious interference problem. As a result in our suggestion a 0.4 MHz guard band between the FDD and TDD allocation is added. This guard band is achieved by squeezing 3 of the 6 FDD sub-band from 10 MHz to 9.8 MHz. The UKTAG Guard Band Sub-Group issued a report mentioning the UTRA carrier spacing consideration [2]. In that report simulation results are shown on the effect of different carrier spacing on capacity. Different service rate, site configuration, uplink and downlink had also been considered. The report concluded that carrier spacing greater than 5 MHz will have little gain on the overall capacity compared with that of 5 MHz spacing. Furthermore the capacity will drop rapidly if the carrier spacing is below 4.5 MHz. It concluded that it is wise to have carrier spacing greater than 4.5 MHz. Our proposed carrier spacing satisfies this requirement.

The second concern is the allocation of the adjacent TDD and FDD block has to be assigned to the same operator for easier frequency coordination. In our proposed allocation these adjacent carriers are assigned to the same operator.

We see a similar approach in the frequency allocation in UK. In UK two of the licences are awarded 3 carriers for FDD operation. Instead of allocating 3x5 MHz (15MHz) to them only 14.6 MHz and 14.8 MHz are allocated to these 2 licences. The squeezed out spectrum is 0.6 MHz which serves as the guard band at the start and the end of the FDD spectrum, similar to the one we propose here. Also it is noted that the TDD carrier which is adjacent to the FDD spectrum is allocated to the same operator. In this case the TDD/FDD interference can be

² “Report of the IMT-2000 Working Group”

manipulated internally by individual operator. As a result reduces the effort on inter-operator TDD/FDD adjacent channel interference coordination.

TDD Allocation (Paragraph 3.20 – 3.21)

NWPCS welcomes the TA to reserve 5 MHz of TDD spectrum for allocation to successful candidates. As TDD spectrum is suitable for handling applications with asymmetrical upstream / downstream characteristics, e.g. broadband Internet access, it is ideal for deployment in the pico cell layer under a 3-layer architecture. Since TDD provide a useful resource to supplement the FDD, NWPCS suggests the TA to factor the TDD spectrum into consideration when determining the number of licences to be awarded. Assigning or reserving TDD spectrum to successful candidate allows the TA to better utilize the FDD spectrum, which is considered more limited in the near future. As explained in the previous section, a 2 x 10 MHz paired plus 5 MHz unpaired allocation would allow operators, including new entrant with no previously assigned spectrum, to deploy a 3G network based on a 3-layers network architecture. By factoring the TDD spectrum into consideration, the total number of operators that can accommodate would be increased to 6, thereby allowing greater competition.

To facilitate network planning by the new 3G licensees, NWPCS also recommends the TA to allocate TDD spectrum together with FDD spectrum to successful applicants when licence is granted.

Licensing Issues

New entrants and incumbent operators (Paragraph 4.1 – 4.4)

The mobile telecommunication market has become very competitive in recent years. Since the introduction of Personal Communications Services licensees in 1996, Hong Kong witnessed an increase in number of subscribers by more than 3 fold to close to 4 million. A total of 1.1 million subscribers have changed their network providers 14 months after the introduction of mobile number portability in March 1999. The increase in subscriber number is also accompanied by significant reduction in tariffs during the same period. This illustrates the highly competitive nature of the mobile industry.

With incumbent operators competing intensely in the market, it is doubtful whether the market can sustain new competitors. A case to draw upon is the licensing of PCS operators in 1996. Of the 6 licences awarded in September 1996, two of the six PCS licensees were taken

over by incumbent GSM operators in less than 1½ years. The take-over in turn triggered lay-off of employees and brought inconvenience to customers subscribing to the service. The mobile industry is undoubtedly more competitive than 2 years before and it is therefore not desirable to introduce new entrants which may fail to sustain for the sake of creating a false perception of a “competitive market”. Nevertheless, NWPCS considers that it is beneficial to the mobile industry and consumers if new entrants that can prove their track records and capability to bring in innovative services.

On the issue whether incumbent should be allowed to apply for 3G licence, NWPCS strongly support allowing incumbent to apply for 3G licence. It should be noted that in other countries where 3G licences were already awarded, the incumbents were allowed to apply for 3G licence. In fact, for those countries which have issued 3G licences so far, all incumbent 2G operators were granted 3G licence in other parts of the world under merit system. This indicates the regulator’s emphasis on allowing incumbent to further develop their network and services for the emerging broadband arena. As 3G technology is a natural evolution of 2G technology, restricting incumbent would deter their investment in existing infrastructure as they face uncertain prospect of rendered obsolescent with the emergence of 3G network few years ahead.

To better understand consumer’s perception about their existing operators, NWPCS commissioned AC Neilson in May 2000 to conduct an opinion survey of the mobile phone users in Hong Kong. A copy of the research findings is attached in appendix 3 of this submission.

The result revealed that customers put great emphasis on network coverage on choosing their 3G mobile network – 99% of the users surveyed consider it an important factor (chart 5a of appendix 3). As incumbent operators are in a better position to rollout 3G service to mass consumer in a more time-efficient manner, to restrict incumbent to apply for 3G licences essentially deprives consumer early access to innovative services available under 3G platform.

The degree of satisfaction toward their existing service provider is also high – 78% of the users surveyed replied they were satisfied with their existing service provider (chart 2 of appendix 3). More important, more than 70% of users surveyed express their preference of using 3G services provided by their existing 2G operators when it becomes available (chart 6a – 6d of appendix 3). This shows the importance of having continuity of service and once again illustrates the importance of allowing incumbent 2G operators, which own a massive customer base access to the 3G market.

As the number of mobile subscriber already topped 4 million and existing 2G users are likely going to become the future 3G users. Their opinion is thus of great value for consideration by

the TA. In fact, 59% users surveyed have heard of 3G mobile service (chart 3 of appendix 3) and 39% of the respondents indicated they are likely going to use 3G mobile service within 12 months from launch of service (chart 4 of appendix 3).

⇒ **In a nutshell, NWPCS recommends that both incumbents and new entrants should be allowed to bid for 3G licences and advocates a merit-based selection mechanism based on equal opportunity, which is addressed in greater details in following section.**

Licensing options (Paragraph 4.5 – 4.6)

As depicted in previous section, NWPCS considers that a fair licensing arrangement should be one based on the merits of respective bidders, no matter whether they are incumbents or new entrants.

NWPCS does not agree using option 3 & 4 on reserving radio spectrum for new entrants for the sake of introduce new competitor into the market. There is no evidence that new entrants are more capable than incumbent to introduce new service or more competition into the industry. With a merit-based selection arrangement, the mechanism should ensure the best candidate being selected, irrespective of whether it is incumbent operator or new entrant.

Reserving part of the spectrum also involve subjective decision by the TA on the appropriate number of new entrants rather than the merits of new entrants versus incumbents. As the merits are ignored, this may have the effect of introducing inferior competitor into the market.

With equal opportunity, both options 1 & 2 would ensure the best candidates to stand out from their competitors. Option 2 is more preferable than option 1 as it can accommodate more licensees with the 60 MHz allocation. However, as stated in previous section of this submission and supported by renowned technical experts within the area. With a 5 MHz TDD allocation to each successful candidate, a 10 MHz allocation is sufficient for the provision of a satisfactory 3-layer network hierarchy, allowing the TA to grant a total of 6 licences to a mix of new entrants and incumbents.

Selection mechanism (Paragraph 4.7 – 4.14)

NWPCS goes along with the recommendations of the TA to use a selection process by evaluation of merits of each applicant. Merit-based selection process allows the TA to consider broad selection criteria instead of merely focusing on the bid amount alone. The

same method that has been adopted by the TA in the past on awarding various telecommunication licences has proven to be successful and reliable.

On the other hand, spectrum auctioning diverts financial resources to nonproductive areas. NWPCS envisage that investment in 3G infrastructure is very significant. With limited funding available, spectrum auctioning invariably diverts financial resources to Treasury instead of being used for network expansion. In extreme cases, successful applicants exhausting all available funding would not have sufficient resources left to invest. As a result, the launch of service will be severely delayed. For example, in India where the 2G spectrum was awarded based on auctioning, some successful bidders later found it uneconomical to launch the service and decided to retreat from the market. Where a logical direction would be to encourage network operators to invest in developing new technology and infrastructure, spectrum auctioning obviously works against such objective.

The auctioning cost also increases substantially the business risk of operators bidding for the spectrum. With 3G services available in the market only after 2002, it is too early to speculate whether there would be sufficient demand to support a buoyant market. Together with the huge investment in network infrastructure, a long payback is expected. If 3G mobile operators are required to pay a significant premium before seeing any prospect from the business, that would impose an undue burden to operators bidding for a licence, especially incumbent 2G operators, in particular those which entered the market about 3 years ago and are already suffering from keen competition and still far from payback.

A merit-based selection mechanism allows mobile operators to pass on the benefit of lower cost to consumers and support a vibrant telecommunication market. This benefits not only the telecom section but also other sectors of the economy, for example, increasing popularity of mobile service would in turn stimulate the sales of handset and ancillary equipment, rental market for retail shops and advertising expenditure on marketing. Not to mention the vast number of application services providers, content providers and other e-commerce service providers that will involve in the future 3G services. With almost 4 million mobile subscribers in Hong Kong, the benefit of a blooming mobile industry ensure the benefit of competitive accrues to a wide array of public.

In the consultation paper, the TA identified several demerits of granting radio spectrum to successful bidder at nominal costs. NWPCS believes those demerits can be rectified by proper regulatory measures. For example, to address the potential concern of successful operators having less incentive to use the radio frequency in the most efficient way possible if radio spectrum is given out at modest cost, the TA can introduce proper provisions in the 3G licences. Under the licence condition, 3G mobile network operators are required to deploy the allocated frequency within a reasonable period of time in an efficient manner. The

Authority can also monitor the utilization of radio spectrum of individual 3G mobile network operators periodically. Should a particular operators fail to utilize the whole or part of the allocated spectrum effectively, the TA is empowered to relinquish the radio spectrum from the operators and re-allocate to existing or new 3G mobile operators. This mechanism ensures successful 3G bidder put the allocated spectrum to most effective use in the shortest timeframe possible.

Another drawback identified in the paper on a merit-based selection process is the possibility that successful bidders may trade their allocated spectrum for profit through sell off and / or corporate restructuring. NWPCS agrees that some bidders might take this shortcut and therefore recommends the TA to include certain licence conditions to restrict successful 3G operators to undergo any significant change in shareholding without the consent from the Authority. This would deter potential bidders who are not eager to operate 3G service but only view it as a speculative opportunity.

Finally, as in previous licensing arrangements, successful candidates are required to put in performance bond to guarantee their commitments. This could be used as an effective tool to bind successful bidders to their commitments without significantly inflates the cost structure. A more transparent licensing arrangement and the monitoring by independent agency, e.g. ICAC, can also eliminate favoritism or opportunity for corruption in the selection process.

NWPCS notes there have been media coverage supporting spectrum auctioning and consider such argument to be lack of foundation. The benefit of a windfall in the government reserves should be carefully weighted against the more long-term benefit of having a more vibrant telecommunication sector. Given economies in the Asia Pacific region, notably Singapore, is competing with Hong Kong to become the prominent telecommunications hub of Asia, a myopic view of harvesting now could effectively means surrendering the leading position of Hong Kong to its competitors within the region.

All in all, the merit-based selection process may have some drawbacks but is still considered more preferable to the alternative of selection by spectrum auctioning. With proper safeguards, the merit-based selection process could allow the Authority to select the most suitable candidate and allow successful candidate to deploy financial resource to more productive areas.

Regulatory Issues

Uniform Regulatory Framework for 2G, 3G and Fixed Telecom licensees (Paragraph 5.1 – 5.12)

NWPCS in principle agree to adopt a single regulatory framework for 3G and 2G mobile network operators. As 3G service encompasses the functional capability of 2G services and as new technology evolve, the demarcation between 3G and 2G will become increasing blur, it is logical to adopt a uniform regulatory framework for 2G and 3G mobile service licensees.

The convergence of fixed and mobile telecommunication warrants different consideration. Despite the fixed telecommunication is gradually converging with mobile telecommunications, NWPCS notes that there are still fundamental differences between the two. For example, fixed telecommunication inherited the flat rate charging structure while mobile operators adopt a usage based charging mechanism. This Calling Party Pays (CPP) versus Mobile Party Pay (MPP) convention in turn affects the interconnection regime between fixed and mobile network. In addition, despite mobile operators are vested carrier status, they are often treated by FTNS operators as retail customers and are denied the right to seek cost based interconnection. Until the interconnection regime between fixed and mobile operators is unified, Fixed and Mobile operators should be regulated under their respective licence conditions.

There is also the problem on cross-segment dominant issue. While the market for mobile telecommunications is highly competitive, the fixed telecommunications market is still higher concentrated with the incumbent controlling more than 90% of the access line. Should a uniform regime be applied to both fixed and mobile operators, it is necessary to introduce proper safeguard to ensure dominant operators in one of the market i.e. FTNS to abuse its position and restrict competition in the more competitive mobile market.

Domestic Roaming (Paragraph 5.13 – 5.14)

NWPCS views domestic roaming a useful mechanism to equate the competitiveness of new entrant 3G operators with incumbent operators having both 2G and 3G operations, especially in the early day of competition. NWPCS therefore supports the proposal to require incumbent 3G operators to open up its 2G networks for domestic roaming. Consistent with the light-handed approach adopt by the Hong Kong SAR government in the past, 3G only operators is encouraged to negotiate with incumbent 2G operators the commercial terms of domestic roaming. When the parties cannot come to a conclusion within a reasonable period of time,

either party may approach the TA for a determination under s.36A of the Telecommunication Ordinance. Since domestic roaming from 3G to 2G serves to equate the competitiveness of standalone 3G operators and therefore the mandatory requirement should only be extended to incumbent 2G operators awarded 3G licences. 2G only operators are exempted from the requirement and are allowed to provide domestic roaming to 3G only operators on a pure commercial basis.

To prevent 3G only operators to over-rely on the 2G infrastructure, NWPCS opines that mandatory domestic roaming should cover a relatively short period (e.g. 12 months). It has been proven by PCS operators entering into the market in 1996 that a new entrant can establish reasonably good network coverage within 12 months. The choice would ensure a leveled playing field between incumbent and new entrants and at the same time provide incentive for new entrants to rollout satisfactorily.

There is always a possibility that not all the 2G operators are able to obtain 3G licence, it is considered that a domestic roaming arrangement to be implemented which allow some of the incumbent 2G operators failing to obtain 3G licences to operate 3G service. NWPCS noted that there will be problem if different Mobile Network Code (MNC) is used by the 2G and 3G network operators but consider it should be left to the requesting 2G operator to decide whether to adopt such “non-optimal” roaming arrangement. The commercial terms of such roaming arrangement should be left to discuss by the respective operators and the TA can intervene if parties fail to reach agreement.

Separation of Service Provision from Network Provision (Paragraph 5.15 – 5.18)

3G mobile technology represents a breakthrough to existing technology. With its high bandwidth characteristic, it can support various multi-media applications. NWPCS foresees increasing cooperation between network providers and service / content / application providers in the provision of 3G mobile services. Licensing MVNO allows more participants to operate 3G mobile services and develop their own content to allow consumer more choices in service providers. However, in a market where there is sufficient number of network providers with substantial infrastructure investment, the value of separating service provider is not significant.

In addition, as the spectrum for 3G service is restricted to 60 MHz only, there is a limit on the number of MVNO the market can accommodate. It is thus not preferable to mandate network provider to provide services to MVNO. Instead, MVNO are encourage to approach 3G network operators for network service, where the terms and conditions for such services would be negotiated on a commercial basis. This overcomes the demerit of obliging 3G

mobile network operators to open up their network thereby reducing their incentive to invest. As 3G mobile network operators are allowed to negotiate with MVNO on a commercial basis rather than adhering to a straight “cost-based” formula. The use of alternative pricing mechanism allows the providers of 3G network services to recover its risk-adjusted cost of capital in investing in 3G infrastructure.

A potential area NWPCS like to caution the TA is the regulatory problem on service-only operators. The current licensing regime in Hong Kong is basically a facilities-based licensing regime where only operators maintaining telecommunication equipment are required to obtain licences. Since some MVNO may not maintain any telecommunication equipment, they may be able to evade the licensing requirement, putting consumers to considerable risk should the operators suddenly go out of service. NWPCS recommends the TA to consider introducing new forms of telecommunication licence after the enactment of Telecom (Amendment) Bill to regulate those service-only operators.

MNP and Numbering Requirement (Paragraph 5.19 – 5.20)

NWPCS sees it a logical requirement to extend the MNP requirement to 3G mobile network operators. As it is envisaged the 3G mobile service will gradually substitute 2G service as it gains popularity, adopting the same requirement as 2G operators on MNP would ensure customer mobility and minimize the barrier of switching to alternative service providers.

Regarding the numbering requirement on 3G mobile services, NWPCS notes that some existing operators, including NWPCS have effectively utilized the allocated numbering blocks started with prefix 9. As 3G service would become available only in 2 to 3 years, NWPCS envisage that prefix 6-digit need to be allocated to cater for our expansion in 2G services. Since MNP would become a mandatory requirement for 3G operators, the use of prefix 9 and prefix 6 would become mixed up as time progress. NWPCS sees no need to arbitrarily reserve prefix 6 for 3G service in the expense of 2G service which we still foresee significant expansion in the near future.

Conclusion

NWPCS supports a fair and transparent licensing mechanism for the benefit of the general public. Balancing technical consideration with a policy to stimulate competition, the licensing arrangement should ensure the public to have access to advance 3G service at the soonest and at affordable cost while allowing operators the flexibility to innovate.

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IMT-2000 Licensing Conditions & Status

A selected regional overview

1. JAPAN

Japan is likely to begin accepting applications for starting next-generation cell phone services in April 2000 and grant licences during summer. A total of 11 regional licences will be granted, with 3 operators per region, each having a maximum of 2x15MHz. Awards will be via beauty contest. NTT DoCoMo intends to offer the first fully-fledged 3G services by mid 2001. Japan Telecom's J-Phone group has also stated that it will apply for a license to offer services based on the W-CDMA standard, the same standard as NTT DoCoMo's. DDI has also expressed a preference for W-CDMA.

2. SOUTH KOREA

The bidders in South Korea include Korea Telecom; mobile phone operators SK Telecom Shinsegi Telecom, Hansol PCS, KT Freetel and LG Telecom; and fixed-line carriers Dacom, Onse Telecom and Hanaro Telecom. Licensing scheduled to begin from the end of 2000 and service to begin at the World Cup Soccer Games in June 2002.

3. TAIWAN

Taiwanese government has announced that it plans to release spectrum for 3G in 2003.

4. AFRICA

The Republic of South Africa's Department of Communications' own 3G consultation is now underway, with operator license awards anticipated during the first quarter of 2001. The Department of Communications presented its 3G licensing framework during the UMTS Forum's Seminar in Cape Town, November 23, 1999.

5. ARAB STATES

Arab States have recently declared they will use the core spectrum band for IMT-2000 services.

6. NORTH AMERICA

Discussions are ongoing concerning possible new spectrum bands for third generation systems. FCC intends to auction spectrum outside the harmonised ITU spectrum plan bands identified by WRC, with 12 licenses to be awarded across 6 regions. FCC intends to auction this spectrum that can also be used for 3G applications. This US auction of spectrum in the 700 MHz band is expected for the second quarter of 2000, and an auction for PCS spectrum in Canada is expected for the third quarter of 2000. *NB Spectrum policy in USA and Canada is today not service specific.*

7. SOUTH AMERICA

Discussions about using the GSM 1800 band for third generation systems are ongoing in CITELE. It is also possible to use spectrum in the PCS bands for IMT-2000. **Brazil:** consultation process currently underway by ANATEL. The Brazilian administrator is reviewing the opportunity to join the ITU world with a harmonised ITU spectrum plan for at least two 3G licenses in the IMT-2000 core band. **Chile:** Operator Entel PCS has announced plans to introduce IMT-2000 services by end 2001.

8. AUSTRALIA

Licensing in Australia will be by auction that is anticipated by the end 2000. NB Australian licenses in some urban regions in 1800MHz band are service independent i.e. for use with 3G and/or 2G systems.

9. NEW ZEALAND

New Zealand's spectrum auction starts July 10th 2000, with 2x15MHz plus 5MHz unpaired spectrum on offer per licensee, resulting in 4 licenses.

10. SINGAPORE

The regulator will release during April a second consultation paper outlining their proposed licensing and spectrum allocation framework, and aims to issue license in September 2000.

11. THAILAND

Thailand is the second country in the world to have issued 3G licenses, having awarded one license each to TOT (Telecommunication Organisation of Thailand) and CAT (Communications Authority of Thailand). However, note that a technology decision for these licensees remains "on hold" pending privatisation of these government-owned organisations. Each license award is for 2x7.5MHz in the 2GHz band.

12. EASTERN EUROPE

The Czech Republic has launched its IMT-2000 consultation process. The UMTS Forum contributed its own submission to the Czech regulator on 31.3.00.

14. EUROPE

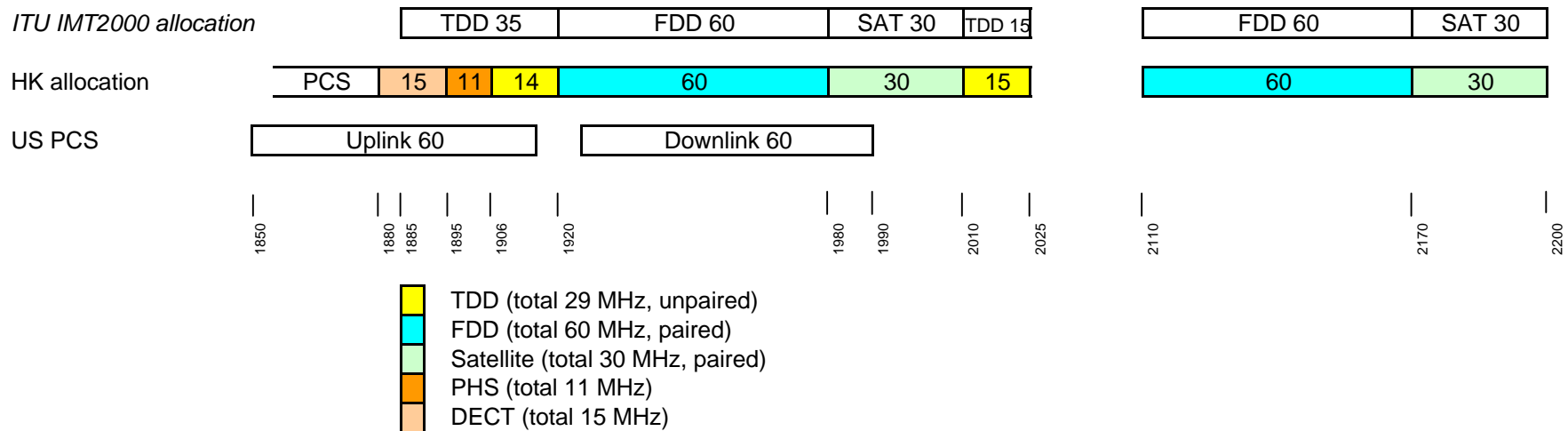
Most Western European countries are expected to meet the EU directives of 14 December 1998 to enable IMT-2000 operators to launch on January 1st 2002. Some non-EU member states (e.g. Switzerland) are also expected to be in line with the EU timeline.

Individual country details for Europe are understood to be as follows:

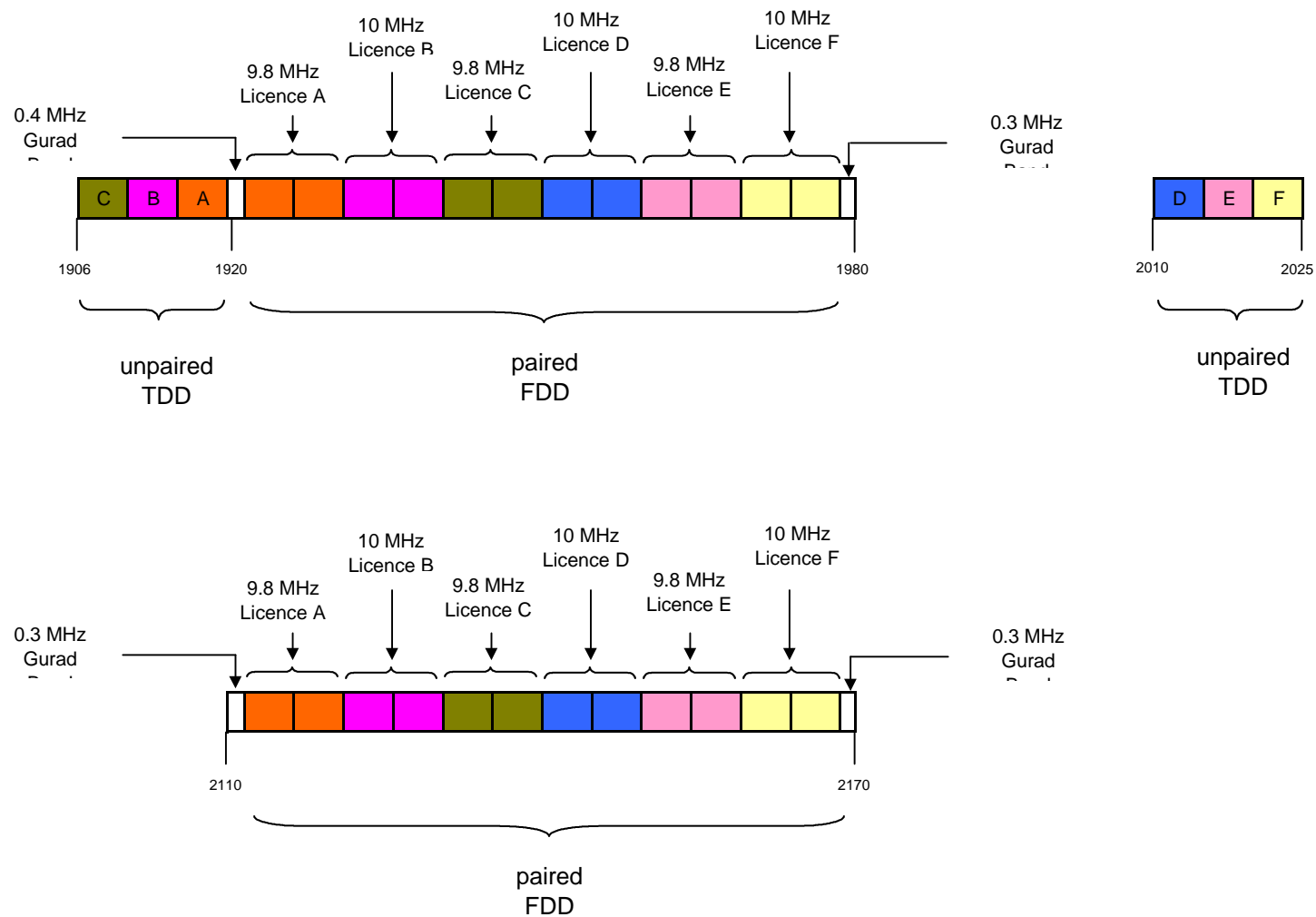
Country	Type (national/regional)	National Roaming?	Licensing process	License Award	Commercial Launch
Austria	2x60MHz to be awarded to between 4 & 6 licenses. Bidders must bid for min. of 2 and max. of 3x 5MHz blocks.	Yes	Auction	Q1 2001	Q1 2002
Belgium	Subject to consultation: Probably 4 National	Yes	Auction likely	Q4 2000	2002
Denmark	Probably 4 National	Obligation to enter into national roaming agreements if requested by other operators, on commercial basis (as for 2G)	Beauty contest	Q4 2001	2002
Finland	4 national awarded		Beauty contest	Completed March 1999	Jan 2002
France	4 National	Yes, preference for obligatory NR between 2&3G operators	Beauty contest	Earliest March 2001	Q1 2002
Germany	<ul style="list-style-type: none"> ▪ Bids invited for a minimum 2x10 MHz and maximum 2x15 MHz. ▪ Between 4 and 6 	No	Auction (simultaneous multiple-round)	? Q3 2000	2002

	<p>national licences may be issued, depending on auction outcome.</p> <ul style="list-style-type: none"> ▪ Additional 5MHz blocks are also reserved for a 2nd round auction. ▪ 10MHz unpaired is reserved for non-public usage. ▪ No spectrum will be reserved for a new entrant, who will have opportunity to roam on existing 2G networks 				
Ireland	National	Not known	Prob. mix of beauty contest & auction	2000	2002
Italy	5 National 2x10 + 5 MHz each	Yes – terms yet to be established	Beauty contest plus financial element	Q3 2000	2002
Liechtenstein	License awarded	-	-	Feb 2000	-
The Netherlands	5 National: <ul style="list-style-type: none"> ▪ Three 2x10 + 5MHz ▪ Two 2x15MHz 	Voluntary roaming, no specific regulations on NR	Auction	Q3 2000	By 1.1.2002
Poland	3 (National?)	-	-	2001	-
Portugal	4 National	Regulator has stipulated preference to bidders opening networks to roaming by 3G entrants	Beauty contest	Q1 2001	1.1.2002
Spain	4 National licenses awarded	Yes	Beauty contest	Complete 13.3.2000	1.8.2001
Sweden	5 National <ul style="list-style-type: none"> • 2x15MHz each for two new entrants • Three more licenses at 2x10MHz 	Yes, according to commercial conditions	Beauty contest	Nov/Dec 2000	2002
Switzerland	4 National	Probably for 5 years	Auction	End 2000	1.1.2002
UK	5 National licenses awarded to four incumbent GSM operators plus new entrant TIW	Yes, general (but detailed) regulatory proposals for different scenarios exist	Auction	Completed 27.4.00	1.1.2002

Available Spectrum for Allocation to 3G operators



Suggested Frequency Allocation for 3G operators in Hong Kong



Appendix 3

Project Operator – Highlights of Findings

23 May, 2000



Project Operator – Highlights of Findings

New World Mobility

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Statement of Professional Commitment

ACNielsen certifies that the information contained in this report has been compiled in accordance with sound market research methodologies developed by, or for, ACNielsen. ACNielsen believes that this report represents a fair, accurate and comprehensive analysis of the information collected, with all sampled information subject to normal statistical variance.

Business Needs Assessment

Background

The Office of the Telecommunications Authority (OFTA) of the Hong Kong Special Administrative Region has issued an industry consultation paper on the licensing framework for third generation (3G) mobile services.

The purpose of the consultation paper is to collect views from the industry on the licensing of 3G services. OFTA aims to invite applications for 3G licences towards the end of this year. Commercial services are expected to be available in 2001.

New World Mobility is planning to apply for the 3G licence to capitalise on the market potential of the future mobile broadband multi-media and e-commerce services. Before the submission of the application, New World Mobility would like to find out the choice criteria of 3G operators among the mobile phone users.

Survey Objectives

New World Mobility commissioned ACNielsen to conduct this survey with a three-fold research objective:

- To gauge the level of satisfaction among the mobile phone users on the existing mobile phone service providers in the market
- To establish the awareness of the 3G mobile phone services among the mobile phone users
- To identify the choice criteria for selecting the operators for the new services

The findings will serve as the basis of response to the OFTA consultation paper.

Continued on next page

Research Design

Survey Method	The quantitative survey approach is employed. A structured questionnaire is used to collect the information.
Interviewing Method	Telephone interviewing method is used.
Sampling Method	The probability sampling method is used with quota control on sex and age of the respondents based on the profile of the mobile phone users established from the ACNielsen Mobile Phone Syndicated Report 1999.
Sample Definition	The target respondents are individuals aged 15-44 who currently own mobile phone.
Sample Size	The target sample size is 500 and the achieved sample is 527.
Survey Period	The fieldwork is conducted between 2-8 May, 2000.
Data Projection	The findings are weighted up to the mobile phone population aged 15-44 as established in the ACNielsen Mobile Phone Syndicated Report 1999.

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Highlights of Findings

Market Overview

Length of Time Using Mobile Phone Services

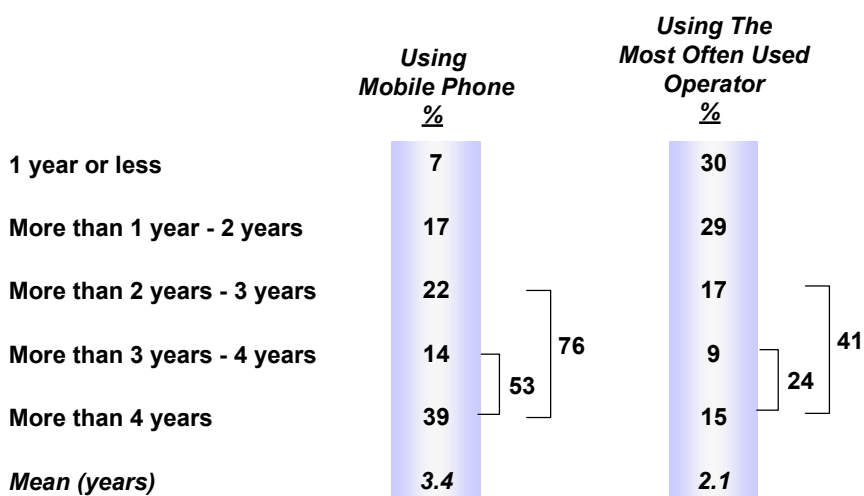
The majority of the mobile phone users have used mobile phone services for at least 2 years time with over half of them (53%) having used mobile phone for more than 3 years.

With the implementation of phone number portability on March 1, 1999 and hence the price cut among operators, some mobile phone users switched to a new operator within last year. The average length of time using the most often used mobile phone operator is therefore lower at 2.1 years when compared to the length of time using mobile phone.

(Chart 1)

Chart 1

Length of Time Using Mobile Phone Services



Base: All mobile phone users aged 15-44 (2,684,000)
Unweighted base: 527

Ref: Table 1, 4

Continued on next page

Highlights of Findings, continued

**Satisfaction
Towards
Existing Mobile
Phone
Operators**

Overall Satisfaction

Most of the mobile phone users are satisfied with the services provided by their most often used operators. Eight in ten (78%) rate the services very or quite satisfactory.

Satisfaction of Five Key Service Areas of Mobile Phone Services

To further investigate the satisfaction towards the existing operators, the performance of these operators is further divided into five key service areas:

- Clarity of call reception;
- Network coverage;
- Customer service;
- Number of shops; and
- Service fee.

At least three-quarters of the mobile phone users are satisfied with the performance of their operators on each of the first four areas above.

Relatively speaking, there are more dissatisfactions in the area of service fee with over half (56%) of the users considering the service fees charged by the existing operators very or quite satisfactory.

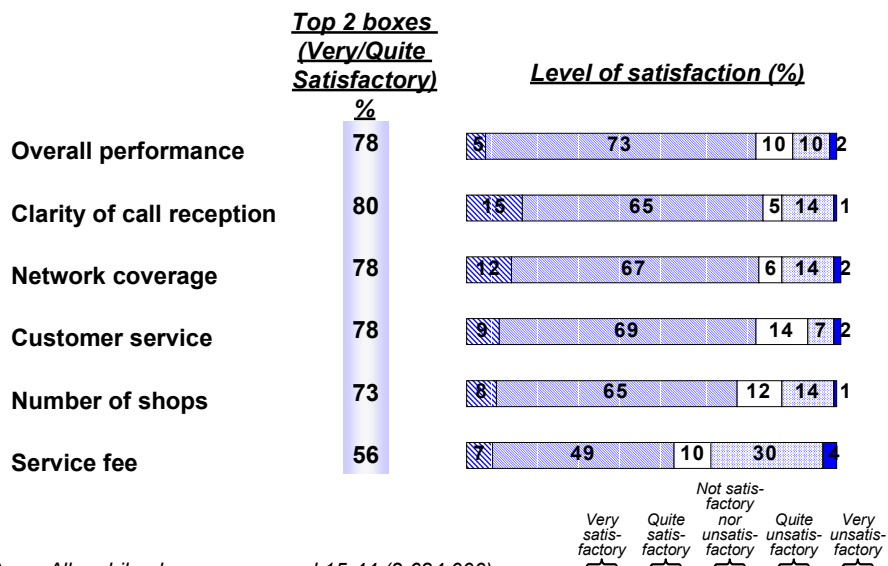
(Chart 2)

Continued on next page

Highlights of Findings, continued

Level of Satisfaction Towards The Most Often Used Operator

Chart 2



Base: All mobile phone users aged 15-44 (2,684,000)
Unweighted base: 527

Ref: Table 5-6

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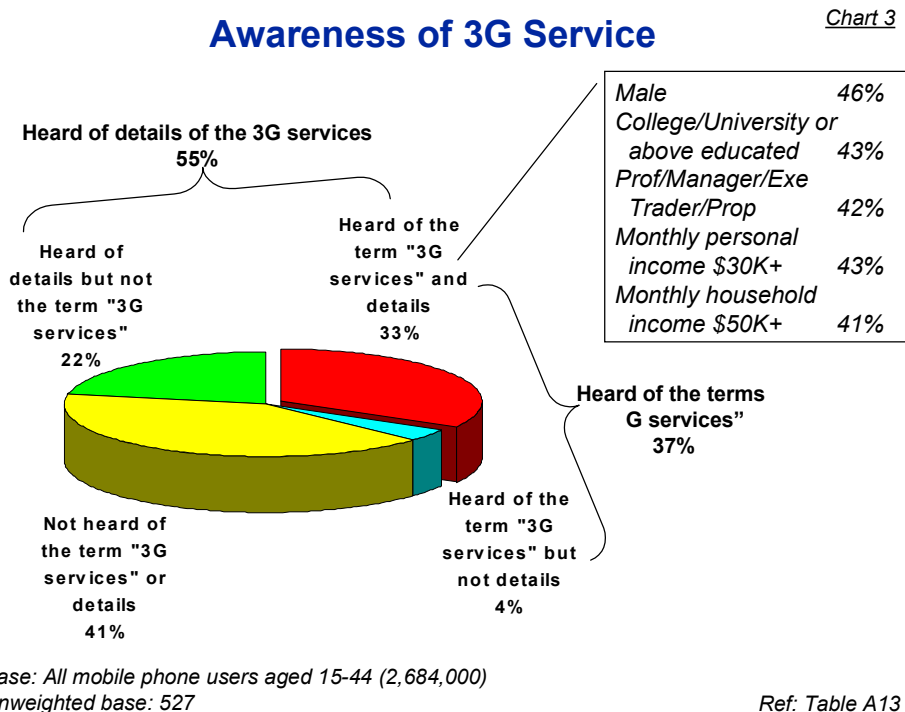
Highlights of Findings, continued

Awareness of 3G Services

More than half (55%) of the mobile phone users have heard of the details of the 3G services but only one-third (37%) of them are aware of the term “3G services.”

The awareness level is better among males, professionals/managers/executives/traders/proprietors and higher income earners.

(Chart 3)



Continued on next page

Highlights of Findings, continued

Likelihood of Using 3G Services

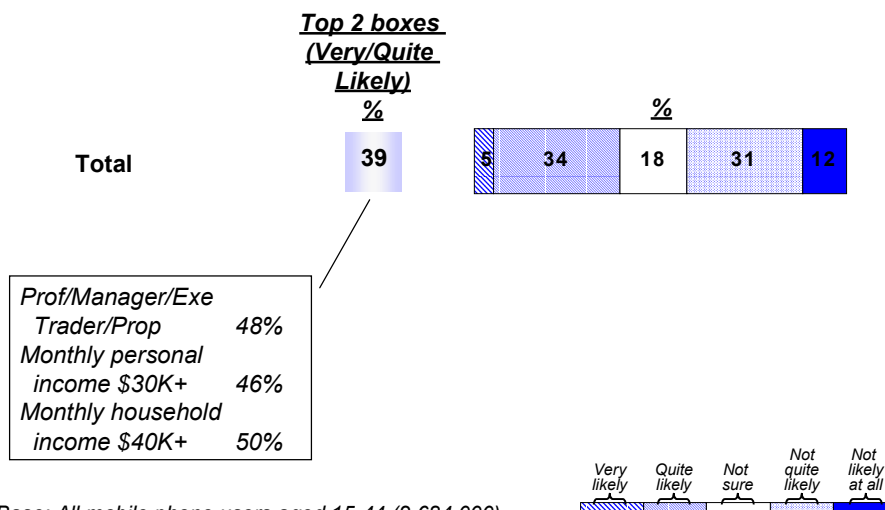
Around four in ten (39%) mobile phone users are very or quite likely to use the 3G services within 12 months after the launch in 2001.

Professionals/managers/executives/traders/proprietors and high income earners have a higher tendency to be the “pioneers” in using such new 3G services.

(Chart 4)

Likelihood of Using 3G Services Within 12 Months after the Launch in 2001

Chart 4



Base: All mobile phone users aged 15-44 (2,684,000)
Unweighted base: 527

Ref: Table 14

Continued on next page

Highlights of Findings, continued

**Choice Criteria
in Selecting 3G
Service
Operators**

The most important five criteria in choosing a 3G operator are:

- Network coverage (99% of the potential 3G users find it very or quite important);
- Service fee (96%);
- Reliability of the operator (92%);
- Advanced technology used (91%); and
- Reputation of the operator (89%).

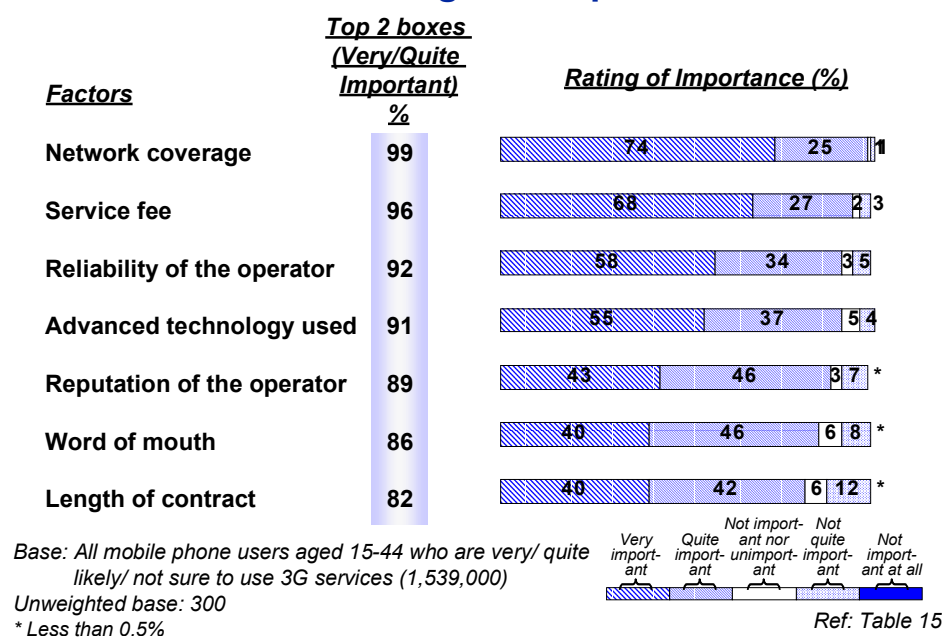
(Chart 5)

Continued on next page

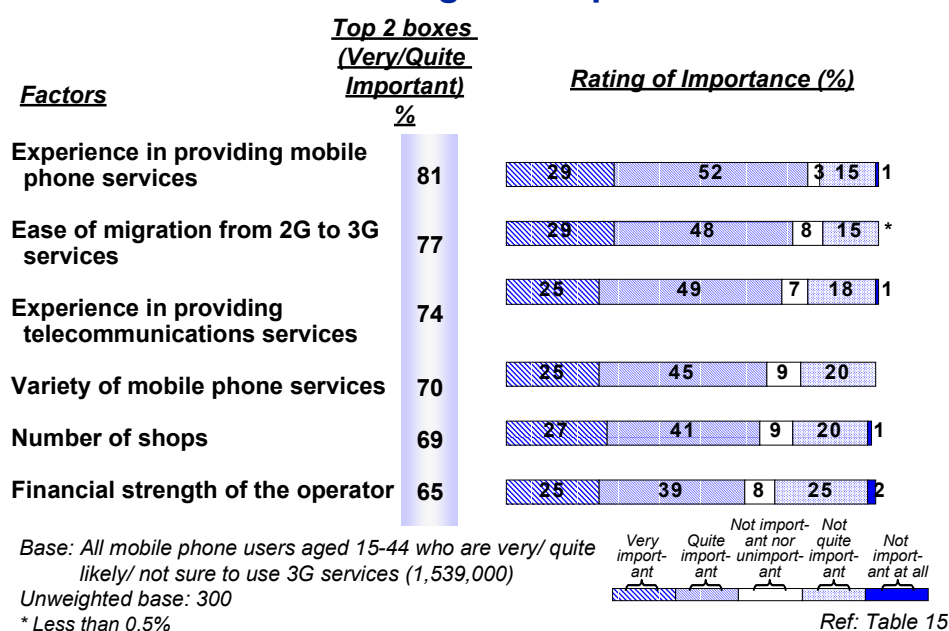
Highlights of Findings, continued

Choice Criteria
in Selecting 3G
Service
Operators,
continued

Importance on Factors to be Considered when Choosing a 3G Operator - I Chart 5a



Importance on Factors to be Considered when Choosing a 3G Operator - II Chart 5b



Continued on next page

Highlights of Findings, continued

Attitudes Towards Using 3G Services

Number of Licencee

Most of the mobile phone users (88%) prefer having more licensees for the 3G services because they believe more competition will bring better quality products and services.

Preference of Existing versus New Operators

The vast majority of the potential 3G users would continue using the 3G services provided by their existing operators as long as the prices and services offered are similar to other operators (93% strongly or somewhat agree; 37% strongly agree).

The high level of satisfaction of the bundled services provided by their current operators also contributes to the confidence on the 3G services the operators will provide in the future (81% strongly or somewhat agree; 17% strongly agree).

Other reasons of preferring to use the existing operators are:

- They know what they can expect from the existing operators (77% strongly or somewhat agree; 19% strongly agree)
- There is no need to change the setting such as phone book, call forward, etc. (72% strongly or somewhat agree; 22% strongly agree)
- They can continue using their existing telephone numbers (69% strongly or somewhat agree; 28% strongly agree)

However, the potential 3G users are likely to migrate to new operators if the services provided are good value for money (88% strongly or somewhat agree; 28% strongly agree).

(Chart 6)

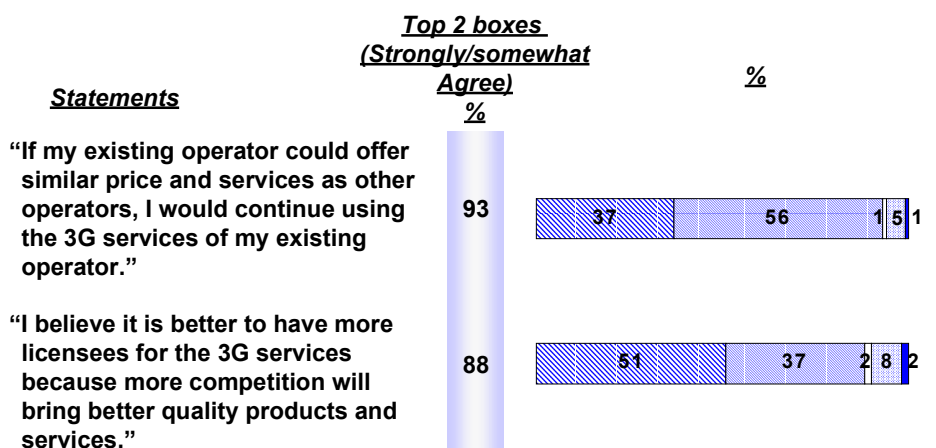
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Highlights of Findings, continued

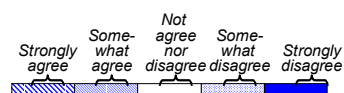
Attitudes
Towards Using
3G Services,
continued

Attitude Towards Using 3G Services - I

Chart 6a



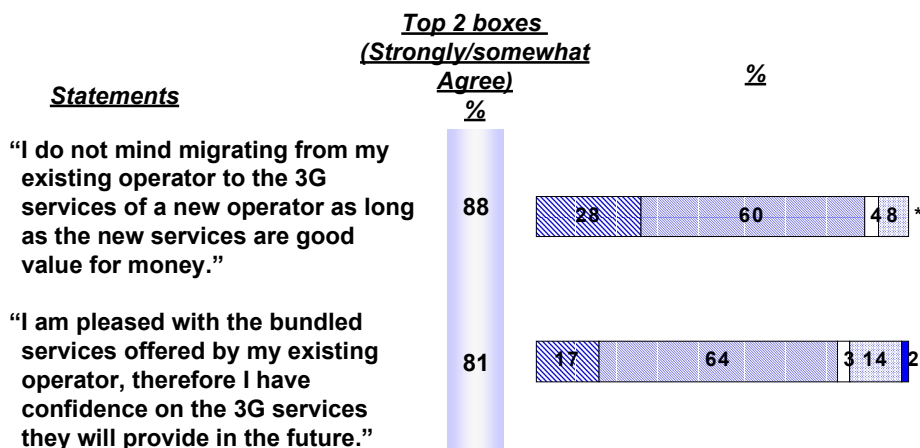
Base: All mobile phone users aged 15-44 who are likely to use 3G services (include *not sure* (1,539,000)
Unweighted base: 300



Ref: Table 29

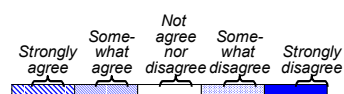
Attitude Towards Using 3G Services - II

Chart 6b



Base: All mobile phone users aged 15-44 who are likely to use 3G services (include *not sure* (1,539,000)
Unweighted base: 300

* Less than 0.5%



Ref: Table 29

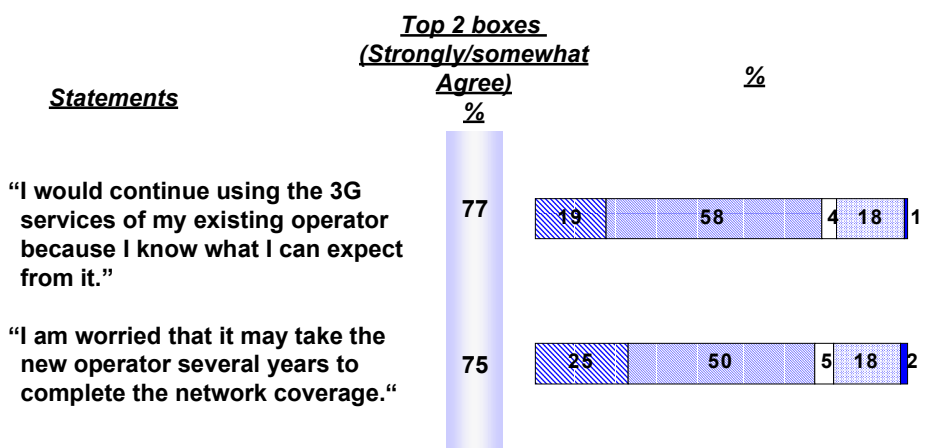
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Highlights of Findings, continued

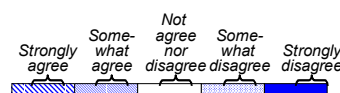
Attitudes Towards Using 3G Services, continued

Attitude Towards Using 3G Services - III

Chart 6c



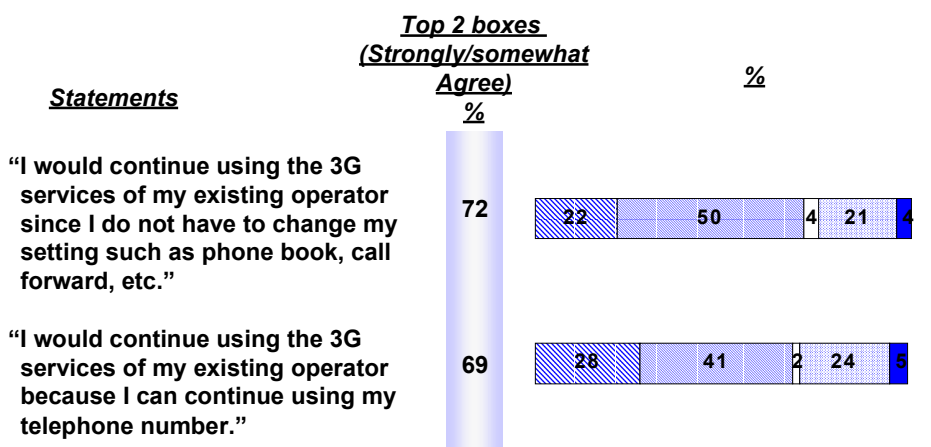
Base: All mobile phone users aged 15-44 who are likely to use 3G services (include Not sure (1,539,000)
Unweighted base: 300



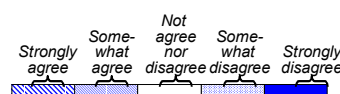
Ref: Table 29

Attitude Towards Using 3G Services - IV

Chart 6d



Base: All mobile phone users aged 15-44 who are likely to use 3G services (include Not sure (1,539,000)
Unweighted base: 300



Ref: Table 29

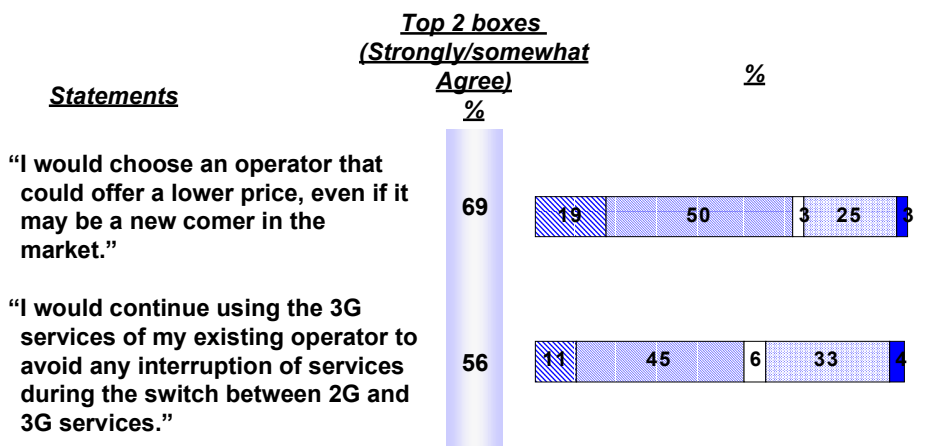
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Highlights of Findings, continued

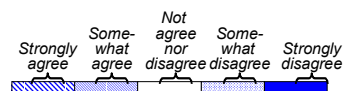
Attitudes
Towards Using
3G Services,
continued

Attitude Towards Using 3G Services - V

Chart 6e



Base: All mobile phone users aged 15-44 who are likely to use 3G services (include Not sure (1,539,000)
Unweighted base: 300



Ref: Table 29

End of Report