



GSMA Response to IDA Singapore consultation on the proposed framework for the reallocation of 900 and 1800 MHz frequency bands

Summary

The GSMA welcomes the chance to respond to this important consultation the proposed framework for the reallocation of 900 and 1800 MHz frequency bands.

GSM is by far the most widely used mobile technology in the world with some 2.5 billion connections worldwide, over 80% of the market. 3GSM (WCDMA) is set to build on this success with a rapidly growing market share and now has over 130 million subscribers worldwide. In Singapore 3GSM now has just over 25% of the market, and HSPA (the 3GSM upgrade that delivers ADSL speed mobile broadband) is now coming on-line.

Mobile operators in Singapore have relied on GSM and 3GM technologies and this has delivered mobile penetration in Singapore of nearly 140%¹, one of the highest rates in Asia Pacific. This has been helped by a competitive market that has allowed three operators to vigorously compete on price, coverage, and quality. Many observers consider this to be a major achievement, in such a small market of only a few million inhabitants. This adds to Singapore's reputation as a dynamic market economy with world-class infrastructure.

The GSMA has some concerns however with the proposed allocation framework, and the suggested use of "Greenfield" allocation (ie no preference to the incumbent operators). Whilst the GSMA does not have an objection to this in principle, there are certain local circumstance in the Singapore market that means this may not be the best way to achieve the IDA's stated policy objectives; of using

¹ Source : www.wirelessintelligence.com

spectrum efficiently and promoting a vibrant infocomm industry in Singapore, whilst ensuring continuity of service.

The GSMA believes that the 7 year licence period for the existing operators is probably too short, and that given the current highly competitive market and high penetration, preference to the existing operators might be the best solution. The concern is that 7 years is a very short licence period compared to what has been done internationally, and that the nature of mobile investments (with large upfront costs) may distort future economically efficient investment decisions.

The GSMA notes that GSM operators with spectrum licences in Singapore also require an FBO licence, for the provision of public cellular mobile telecommunications services. These FBO licences were issued with a 17 year term. Such a licence term for spectrum might be more appropriate in Singapore for spectrum also.

The GSMA believes also the IDA may have underestimated the impact on service continuity if mobile operators lose some or all of their spectrum following a "Greenfield" allocation. This could well lead to service disruption for Singapore consumers and international visitors.

Whilst it might be argued that this is normal business risk, and that mobile operators have factored the possibility of such a "Greenfield" award process taking place, this is more than offset by the potential harm from service disruption, and the problems of markets efficiently costing regulatory uncertainty, and undergoing periodic "corrections"².

According to the IDA, "Greenfield" allocation will allow an economically efficient redistribution of spectrum to new entrants and incumbents, and will ensure the most economically efficient use of spectrum. These policy objectives could be had by allowing for some form of spectrum trading, and by making existing 2G and 3G spectrum available (that has not yet been awarded). That would seem to offer the most proportionate and objectively justifiable solution to the IDA's policy concerns. Indeed one might argue that this allows for a dynamic efficiency that periodic awards (even if they are every 7 years) cannot match.

The GSMA's response to the specific IDA questions is contained in Annex A. This gives more detail on the arguments presented above.

² As has been shown by the impact of the US sub-prime mortgage market on world market valuations of risk and debt.

About the GSM Association

Founded in 1987, The GSM Association (GSMA) is a global trade association representing more than 700 GSM mobile phone operators across 213 territories and countries of the world. In addition, more than 160 manufacturers and suppliers support the Association's initiatives as associate members.

The primary goals of the GSMA are to ensure mobile phones and wireless services work globally and are easily accessible, enhancing their value to individual customers and national economies, while creating new business opportunities for operators and their suppliers. The Association's members serve more than 2.5 billion customers – about 80% of the world's mobile phone users.

The GSMA believe that the promotion of open, competitive market conditions is fundamental to extending the benefits of mobile communications to all, from the most developed Western European and North American markets to remote areas in Developing Countries. Mobile has a critical role to play in improving health, wealth, education and social mobility. To this end the GSMA launched its "Emerging Market Handset Programme" to produce low cost handsets (below \$30 US).

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Annex A

Question 1

IDA invites views and comments on whether there are any other potential technologies and services that may be deployed in the 900 MHz and/or the 1800 MHz frequency bands in the near term (1 – 5 years), and whether there is demand for low power GSM in Singapore.

GSM is by far the most widely used mobile technology in the world with some 2.5 billion connections worldwide, over 80% of the market. 3GSM (WCDMA) is set to build on this success with a rapidly growing market share, and now has over 130 million subscribers worldwide. In Singapore 3GSM now has just over 25% of the market, and HSPA (the 3GSM upgrade that delivers ADSL speed mobile broadband) is now coming on-line.

Mobile operators in Singapore have relied on GSM and 3GM technologies, and this has delivered mobile penetration in Singapore of nearly 140%, one of the highest rates in Asia Pacific. This has been helped by a competitive market that has allowed three operators to vigorously compete on price, coverage and quality. Many observers consider this to be a major achievement, in such a small market of only a few million inhabitants.

In such a market it would appear that the commercial incentive for other operators to enter and to deploy other technologies (as opposed to GSM/3GSM) is low, at least to offer wide area mobile services with contiguous coverage. Also, given the amount of investment that has been made into GSM/3GSM and HSPA, it seems most unlikely that another technology would be deployed in the bands currently used by the mobile operators. It is possible that operators would seek to deploy 3GSM/WCDMA in 900 and 1800 MHz bands, but given the topography and demographics of Singapore this might not be a commercial imperative in the short term.

As the GSMA understands it the current operators have meet very challenging 3G coverage obligations using their current 3G spectrum (at 2100 MHz). However the GSMA believes that lower frequency bands are very important for providing economically efficient coverage in rural areas, and for promoting better in-building coverage. 3GSM is also a very efficient way of handling voice as well as data traffic. The results of a study on this issue undertaken by the GSMA are discussed below.

Low power GSM

There was an award last April in the UK of 12 low power licences (in the so called "GSM/DECT guardband" at 1800 MHz). There has been little (if any) activity by the UK operators since their licences were awarded – as far as the GSMA is aware³. Some of the licences went for little more than the reserve price (£50k), others much more. Given the level of interest before the auction, one would have expected that the operators would have begun to launch commercial services by now. One of the main business opportunities seems to have been to rely on small GSM cells (nano cells) used as a cordless PABX (office switch or exchange), using ADSL as a backhaul option. The business case in Singapore may be different due to the much larger percentage of the urban population, which might mean that low power (and hence smaller cells) would try to offer a wide area or localised coverage.

The GSMA has done no detailed business modelling to work-out the viability of such a venture, but the IDA should be wary of potential new operators purchasing what are in effect options for spectrum, with no real detailed plan to deploy services.

Question 2

IDA invites views and comments on the proposal to allow the 900 MHz and 1800 MHz frequency bands to be used for the provision of nationwide PCMTS using 2G or 3G technologies and other technologies which share a similar platform and allow higher speed data services, such as GPRS, EDGE or HSDPA/HSUPA/HSPA, and whether IDA should allow other services or technologies to be deployed, and the implications of doing so.

A study commissioned by the GSMA⁴ showed the boost in profitability and penetration from using the 900 MHz bands for 3GSM. For example in urban areas in Asia Pacific (table 4.12) the saving on network spend might be around 40%. However given the dense population distribution in Singapore, the economic case for refarming is probably much less than this in Singapore. Indeed as far as the GSMA is aware the operators in Singapore have met their coverage requirements using 3G spectrum at 2100 MHz. So there is much less commercial incentive to deploy 3GSM at 900 or 1800 MHz in the short term. However if operators were allowed to refarm they would be able to introduce such new technologies as and when the market required them to do so.

³ According to UK Ofcom there has been some activity see by a company called "Teleware":

http://www.ofcom.org.uk/about/accoun/reports_plans/annrep0607/annualrpt0607.pdf

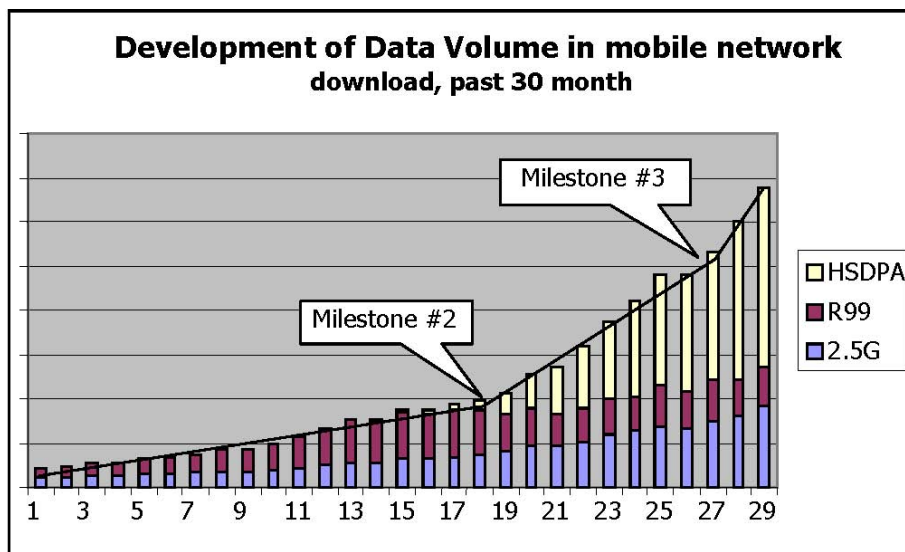
⁴ http://www.gsmworld.com/news/press_2007/press07_43.shtml

Given that GSM has been extensively deployed in the 900 and 1800 MHz bands, it seems unlikely that there is any commercial demand to deploy anything in the 900/1800 bands currently used, other than 3GSM/HSPA as and when local demand for data exhausts the current 3G band's capacity.

IDA also invites views on the traffic patterns for 3G services going forward, eg. whether traffic is likely to be more data-centric in future. Based on these projections, would the 3G spectrum rights issued in 2001 be sufficient if not, when would there be a need for additional spectrum for 3G services?

The GSMA is not in a position to say exactly how much spectrum individual operators in Singapore would need. The GSMA believes that the introduction of HSPA and tariff structures similar to fixed ADSL (ie flat rate) will lead to the exponential growth in use of mobile data services

The graph below shows the impact of the introduction of HSDPA onto a network (milestone #2) and then the impact of more flexible billing packages, eg more similar to fixed ADSL flat rate, (milestone #3).



The above graph shows the uptake of mobile data for undisclosed European operator.

The experience of operators in Europe is that one can expect exponential demand for mobile data traffic with the introduction of HSPA and flexible billing packages. HSPA is currently running at less than 1% of connections in Singapore, this suggests that exponential growth in data can be expected once HSPA penetration increases. The experience of the fixed world also suggests that consumers also highly

value these new data services. In the UK fixed markets, around 40% of homes and small businesses have broadband and this generates around 20% of revenue compared to calls and access⁵.

Question 3

IDA seeks views and comments on whether the spectrum should be allocated in lots of paired 5 MHz spectrum per lot.

No comment.

Question 4

IDA invites views and comments on the potential demand for spectrum in the 900 MHz and 1800 MHz frequency bands in the next 7 years. In particular, IDA seeks views on:

- (i) the amount of spectrum that existing 2G operators would require for continuity of 2G services or other value-added services;*
- (ii) whether existing 3G operators would require spectrum in these bands for 3G expansion or other value-added services, and if so, the amount of spectrum likely required; and*
- (iii) whether there is potential for new players to enter the market by obtaining spectrum in these bands, and if so, the minimum amount of spectrum required by a new entrant.*

For each of the responses in this question, please provide IDA with the assumptions made to calculate the amount of spectrum.

No comment.

Question 5

IDA seeks views and comments on the minimum size of the guard band required in cases where 2G networks co-exist with 3G networks and/or other services or technologies such as WiMax, in order to ensure minimal risk of interference among networks. IDA also seeks views and comments on the proposed arrangement for the provision of guard bands.

The size of guard bands depends on detailed studies of the equipment to be used and the likely interference scenarios. While this is well understood for GSM and WCDMA/HSPA, it is not well understood for newer technologies such as WiMax. To carry out such a study would need data on things like emission masks, which are still not set according to the debate being carried out in the ITU SG8. What is

⁵ http://www.ofcom.org.uk/research/cm/tables/q3_2006/q3_2006.pdf and http://www.ofcom.org.uk/research/cm/broadband_rpt/

clear is that very large guard bands are required between FDD and TDD systems.

Question 6

IDA seeks views and comments on the pros and cons for both new entrants and existing rights holders of a 'greenfield' allocation of the spectrum. IDA also seeks comments on how the concerns set out in paragraphs 22(a), (b) and (c) can be adequately addressed if a 'greenfield' allocation of spectrum approach is not pursued.

In principle the GSMA does not have an objection to operators bidding for spectrum on the same basis as potential new entrants (once their licences have expired). However there are certain local circumstance in the Singapore market that means this may not be the best way to achieve the IDA's policy objectives of using spectrum efficiently and promoting a vibrant infocomm industry in Singapore, whilst ensuring continuity of service.

A theoretical advantage of a Greenfield operator is that they may bring added competition to a market and may introduce more innovative services. However this needs to be weighed against the current competitive structure in Singapore. There are 3 operators currently in the market with two on around 30% market share and one with around 40%. The current total market penetration is well over 100% in Singapore, given the relatively small size of Singapore (with less than 5 million population) this is a remarkable achievement. This is even more remarkable given that in Singapore there is a called mobile party pays regime (ie consumers pay to receive calls). This would normally be expected to reduce market take-up. However operators in Singapore have come-up with the innovative solution of having bundled incoming call packages.

The GSMA also notes that 6 wireless broadband network licences were granted in Singapore in 2005. The number of competitors in the Singapore market would seem to re-enforce how competitive the market is.

Given all this it is not clear how much benefit a new entrant could provide in terms of innovation and competition. Indeed how likely it would be that a new entrant would enter the market and make the large up-front investments required to offer wide area mobile coverage is not clear. However if there are potential new entrants, then there is unused spectrum that could be made available to them.

There is always a trade-off between the economies of scale and scope offered by larger operators, and the number of players a market can support. Mobile networks also have very high upfront fixed costs that need to be recovered. Generally the smaller the market (all other

things being equal) the fewer the operators that can be supported, where there are economies of scale and or large fixed costs.

In a normal market this would not be determined by operators having to compete in an auction every seven years for the right to stay in the market. This introduces much uncertainty into a business cycle. With spectrum trading operators would face the opportunity cost of their spectrum (ie if they could they sell it in part or totally to someone else). The GSMA suggest that it may be possible to address the concerns without a "Greenfield" award process. One that would allowing interested buyers to access spectrum, resolve legacy issues, and ensure dynamic spectrum efficiency, and minimise the risks of disruption to existing users.

This could be achieved by :

1. Allowing the existing operators to trade their spectrum for 2G or 3G use (subject to interference concerns and maintaining required coverage obligations). This would allow the market to determine who had access to spectrum for mobile services; each operator would face the opportunity cost of holding spectrum. If there was no change of use the interference issues will be much easier to resolve than with pure technology neutral property rights;
2. Creating a new licence from EGSM and GSM1800 spectrum that is currently not used, and or using un-used 3G spectrum. This would allow for new market entry; and
3. Allowing the incumbent operators the right of first refusal on their current spectrum⁶ bands (given the short duration of the original licence).

The GSMA believes that these steps would offer the most pragmatic solution, which will ultimately serve end users best. As far as the GSMA is aware no operationally active incumbent has had to bid to maintain access to their current GSM spectrum.

A right of first refusal would mean that the spectrum licences currently held by the incumbents would be extended (perhaps to make them concurrent with their FBO licences).

The issue of spectrum efficiency is dealt with by allowing operators to buy and sell (trade) spectrum. In the absence of a market failure this is the most efficient way of ensuring dynamic spectrum efficiency (as opposed to a static snapshot every 7 years). This would also remove the need to use spectrum fees to ensure efficiency. In a competitive market operators have every incentive to use all their assets efficiently, to stay ahead of competition. For example in a free market

⁶ the existing licensees will be entitled to having their spectrum license extended or renewed as long as the mobile licensee agreed with the conditions and wishes to exercise this right.

one would not propose a special fee on staff numbers to ensure that businesses do not hire too many people (in markets where there are labour shortages say).

If the concern is that the market is not competitive enough then the GSMA also notes that there is EGSM spectrum and GSM1800 spectrum available which could be made available to a new entrant (as well as 3G spectrum). It may be that auctioning off unused mobile spectrum to a new operator would achieve the required objective with as few distortions as possible to investment decisions. Awarding unused spectrum in the EGSM band may also be away of addressing legacy imbalances.

Allowing the incumbents the first right of refusal would mean that the significant problem of operators having a perverse incentive not to invest in the last couple of years of the 7 year cycle would be much reduced (ie not happen as often with longer licences). If an existing operator lost some or all of its spectrum the need to replan networks and negotiate the use of base station sites (or the building of new ones) could be a major problem. It would appear that the opportunity for services to consumers to suffer disruption would be high. This is not necessarily a reason not to go through the process of making operators bid for spectrum they currently use; but it does mean that there must be clear benefits that outweigh the costs, and that the benefits cannot be achieved in some other, easier way.

The GSMA concludes that the method suggested here (that may mean incumbent operators have to bid in an auction for spectrum they already use) may not serve the particular conditions of the Singapore market or consumers best.

Question 7

IDA seeks operators' feedback on the implications of such network adjustment, and how IDA can mitigate such network adjustment and minimise disruption to end users, bearing in mind IDA's policy objective of ensuring efficient use of the spectrum. In particular, IDA seeks operators' feedback on the timeframe and processes of cutting over from the operators' existing frequency bands to its new frequency bands, whether additional temporary use frequencies are required for such cut over, and if so, the minimum amount of temporary use spectrum required.

The GSMA believes that to minimise disruption to consumers, and to increase spectrum efficiency, the incumbent operators should have the right of first refusal on their current bands, and that spectrum should be tradable within use. This would then allow operators to make decisions over a longer time frame, as to when to shift spectrum

between them (or to a new entrant), and for this to be done using dynamic market incentives.

The IDA needs to think very carefully about the possible negative impact network disruption will have on the Singapore economy, and consumers. With over 9 million visitors last year⁷ (many of whom will rely on mobile phones during their visit) the negative impact on Singapore's international reputation for first class infrastructure may be damaged. Such a policy of not offering the first right of refusal to operators might lead to a reduction in infrastructure investment until the award process is completed.

To the GSMA the large downsides of this process do not seem to be counterbalanced by any strong positive argument. Such a policy would seem more at home in markets where one had a single monopoly and scope for more competitors bringing benefits to consumers.

Question 8

IDA seeks views and comments on whether operators should be allowed to indicate interest for specific spectrum lots, as opposed to anonymous spectrum lots.

No comment.

Question 9

IDA seeks views and comments on whether a 7 year duration for the new spectrum rights is reasonable.

Seven years would seem to be a very short licence term compared to what is applied in other countries, for example the US has 10 year renewable licences for PCS850 and 1900 bands. In Europe licences vary in length from 15 years to 20 years (or more). For example in Germany they are 17 years, Italy 19 years. In Australia most spectrum for GSM was awarded for 15 years, in New Zealand for 20 years, Brazil 15 years.

Of course the fact that other countries have awarded longer licences does not mean that shorter lengths are not possible, but it does mean that the IDA is moving into "unchartered territory".

The danger is that short licence lengths mean that operators cannot recover economically efficient investments, that would otherwise have been made. It also increases the frequency with which investors and markets must face the uncertainty of going through a licence renewal process. Given that the economic life of mobile network assets, such as switches and base sites, is much longer than 7 years, this gives rise to problems associated with stranded assets, as the second-hand value of such investments is low compared to their cost. Indeed most of the

⁷ <http://www.singstat.gov.sg/pubn/reference/yos/statsT-tourism.pdf>

cost of a network is in base station sites, where the majority of the cost is in civil engineering (masts, power, access etc).

Of course the Singapore market is different from many others, in that most of the population lives in urban areas. However it would need detailed cost modelling (specifically for Singapore) to determine what the payback period of any mobile business is, which the GSMA has not undertaken. Even if the payback period were less than 7 years, it is likely that much of asset values used in setting up a mobile network would be stranded if an incumbent did not win a licence renewal.

The net impact would be to undermine economically efficient investment and to increase the cost of capital or the returns required to make investments. For example an operator might put a moratorium on all new investment after 5 years until the licence process result was known. It might be argued that an auction would tend to favour those who valued the spectrum most, and that would be the incumbents who had made such investments. But that would be to overlook the fact that markets in general and auctions in particular may not always lead to economically efficient results, and there is always the possibility that potential new entrants will overbid.

One might see possible game play scenarios where potential new entrants drive-up the auction fees paid to weaken incumbents and make them more open to possible take-over bids. Even if such things do not happen, the fear that they might could have an impact on economically efficient investment decisions.

One must ask what is the policy imperative to have such short licence lengths. Would it not be simpler to have longer licences and to allow operators to trade spectrum? The downside of short licence lengths is that investment in new technology, capacity, and quality are severely constrained; as well as continuity of service issues.

Markets are not well suited to deal with regulatory uncertainty and may place a premium on the cost of capital used in such ventures. The net result will be more expensive services to end users and a restricted supply. The GSMA believes that there are much better ways to allow potential new entrants to access spectrum (or for efficient incumbents to access more spectrum), by allowing operators to trade spectrum and by making unused GSM and 3G spectrum available to the market. That would appear to be the rational solution to the IDA policy objectives of encouraging competition and innovation, and ensuring the continuity of services.

Question 10

IDA seeks views and comments on the proposed fee structure for successful bidders of the new 900 MHz and 1800 MHz spectrum rights.

No comment.

Question 11

IDA seeks views and comments on the proposed approach, and suggestions on alternative approaches, to differentiate services provided over the existing 3G spectrum rights from those provided over other spectrum bands like the 900 MHz or 1800 MHz bands for the purposes of licence fee collection.

The GSMA believes that the proposed approach is not the best one and opens the market and consumers up to significant risks that are not necessary to ensure continued economic efficiency. Given the importance of mobile services to the economy as a whole, and as a strategic infrastructure and enabler, makes the downside of the proposed approach even more problematic. The GSMA believes that allowing mobile operators to trade spectrum (which controls interference and that maintains coverage requirements) , and making unused spectrum available to the market would be a better approach. It would allow for dynamic economic efficiency, and mitigate continuity of service issues.