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- Global mobile Suppliers Association –
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Licensing of Mobile Services on Expiry of Existing
Licences for Second Generation Mobile Services
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About GSA

GSA - the **Global mobile Suppliers Association** - is the forum for, and represents, the leading GSM/3G suppliers worldwide, and represents over 80% of GSM/3G market share globally. The GSA Executive Committee comprises of the leading GSM/EDGE/WCDMA suppliers - Alcatel, Ericsson, Lucent Technologies, Nokia and Siemens.

GSA plays a significant and expanding role in promoting GSM/EDGE/WCDMA worldwide for the best user experience of mobile voice and advanced mobile data services. Adding value through focused global and regional programs, GSA's reports, research papers, events, seminars and discussion form a contribution to the continuing success of the wireless industry. Current focus areas include the Global Mobile Dialogue™ for information exchange, market updates, industry news and newsletters, organising the GSM Evolution Forum® as a unique opportunity for high-level interaction between GSM/EDGE/WCDMA network operators, administrations/regulators, and GSA Members, and briefings for the media and analysts in all regions.

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A OPENING REMARKS

GSA expresses its perspectives through this submission, on how the mobile data market potential in Hong Kong can be maximized, based on experiences from dozens of advanced mobile markets globally. The information and views presented herein develop on the discussion between GSA and OFTA which took place on 26 April 2004 in Hong Kong.

Hong Kong is one of the most competitive mobile markets in the world with 6 operators. As a result, mobile penetration exceeds 106% (source: OFTA) and voice tariffs are among the lowest in the world. This has resulted in very high mobile voice services usage. These achievements provide a sound basis on which to further develop the market. Now is the right time to enable Hong Kong to become a leading market also in the adoption of mobile data services.

B THE MARKET SITUATION IN HONG KONG

With 12 networks currently in operation, Hong Kong may have the most competitive voice tariffs in the world, as a result of intense price campaigns between competing operators. Hong Kong's operators have succeeded in developing the market through sustained investment in outdoor and indoor coverage, network quality and services. This has been necessary to ensure the necessary capacity to deliver exploding Minutes of Usage as charges have tumbled.

Automatic international roaming which is enabled by GSM has been a key factor in the success of mobile communications in Hong Kong, due in particular to Hong Kong's position as the business centre of Asia. Users rely totally on this fundamental international roaming service which only GSM provides automatically and unilaterally, and which brings important revenues for the business plans of the GSM operators.

It is clear in Hong Kong as elsewhere in the world, that new revenue growth must, and will come from non-voice i.e. data services including so-called third generation services. Operators in Hong Kong have acted on this by early deployment of a wide range of non-voice services to an enthusiastic market, including 3G services. This requires new business models and partnerships, especially with content providers and applications developers, innovation in marketing and technology, and risk taking to ensure competitive advantage and fastest time to market. The technical and market leadership demonstrated by the operators in Hong Kong, especially those deploying GSM/3G technology, is amongst the most advanced in the world. International roaming for data services is also expected by the users, as is enjoyed historically for voice and SMS, and is a basic market requirement.

Some Hong Kong operators have invested in 3G licenses, to ensure access to additional (IMT-2000) spectrum to support increased voice capacity and the highest data speeds, with improved spectral efficiency. Additional investment and risk-taking are necessary to fully exploit these licences. Business plans of operators would easily be disturbed in an uncertain investment environment. Ensuring a favourable climate for investment, in particular through maintenance of a consistent and fair regulatory environment, is an essential requirement, without which there would be concerns which would discourage investment.

The justification for introducing another competitor to the Hong Kong market is not clearly evident from the information and argument contained in the consultation paper, especially given the excellent progress by current players in the already highly-competitive Hong Kong market.

Neither does there appear to be any technical or business reasons, taking account of commercial experiences in many markets, to justify the deployment of a specific technology. The OFTA consultation document discusses cdma 2000 as an enabler for data services market development in Hong Kong. GSA would point out that a paradigm shift in market drivers has taken place. Creating competition by technology does not work in today's world, where services are the drivers of the market. In the old mobile voice market, the driver was digital mobile technology availability, which enabled the vast growth in the mobile industry. In the new world, it is openness and interoperability, amongst other factors, which are the enablers of development, instead of technology attributes alone. Therefore adding any new technology in a highly competitive market (like Hong Kong) does not guarantee the creation of competition and thereby consequential benefits to the market and end-users. Competition between services should be facilitated in a modern mobile services market; technologies which support this development best will inevitably be selected into use by operators targeting a healthy and long term business case.

To facilitate the introduction of a new competitor by recovering existing operators' 2G spectrum, which OFTA considers to be under-utilised, would appear to be unprecedented. Rather, the widespread practice is for Administrations to renew operating licenses, recognising that mobile telecommunications is a long-term business, and where flexibility is crucial for success and sustainability in the market.

As highlighted earlier in this submission, a fair and stable regulatory environment is essential for encouraging investment, and in serving consumers' interests. Basic elements include knowing the number of operators in any given market, and ensuring transparency in licence obligations. The mobile network operators who committed to develop their networks in Hong Kong and who are now introducing 3G services, recognising some invested additionally in acquiring new 3G spectrum, sites and technology, etc., did so with the understanding of the opportunity and business risk. Their assessments could not have pre-supposed market entry by an additional competitor, since OFTA had not signalled its thinking on this aspect at that time.

C PERSPECTIVES ON STIMULATING THE HONG KONG MOBILE DATA MARKET

There are various aspects that stakeholders in the market should take into consideration; however, we consider the following enablers as the most important in making mobile data a success.

1. **Open, globally standardized and adopted, service standards** ensure the ***highest terminal versatility, consumer adoption, and usage levels***. An alternative, proprietary data service middleware approach, supplied by a single country or company, would lead to a reduced market potential as a result of fragmentation.
 - a. The ***versatility in terminals is many times higher*** with a globally accepted service platform, as compared to any proprietary service middleware standard. GSM is universally deployed today in Hong Kong and in over 205 markets globally. There are today over 700 different terminals from over 50 manufacturers, with approximately 100+ models supporting MMS. In the near future a variety of hundreds of terminals can be expected also in WCDMA. All of the GSM family terminals can be made available in the Hong Kong market, as they are type-approved for global distribution and use.

With any proprietary service middleware standard the variety in terminals is inevitably smaller and unit costs higher, especially in a market of Hong Kong's size. As an

example, CDMA operators in Asia-Pacific, excluding the large markets of Korea, Japan and China, typically offer between just 3 and 10 different cdma2000-1x terminal models (source: operators' web sites). This is because with non-standardized platforms each terminal model requires a substantial market-specific development and testing effort. In conclusion, with any proprietary standard only a few manufacturers with a few models can in practice afford a market presence, as the number of potential users across which to amortise re-development and testing costs is small.

Handsets using cdma technology which support the Chinese language and Hong Kong tastes will therefore be limited. Reliance on products sourced only from the Korean or Japanese handset suppliers for example, would be a major problem in view of Hong Kong market needs, and given the propensity for the Hong Kong consumer for changing handsets.

- b. ***Interoperability with other operators for all services is a prerequisite for data take-up***, and can only be achieved using the open, standardised GSM/3G platform. Each service standard has different signalling protocols, charging mechanisms, picture/video/audio formats, and Quality of Service management tools. Any fragmentation in the service domain would result in substantially lower overall data market take-up potential. According to Metcalf's Law (Metcalf was founder of 3Com), a community of 500,000 people using a common standard for e.g. video-sharing feature, has *25 times more potential connections* i.e. business transactions, than a separate community of 100,000 users using a proprietary video-sharing feature.

The globally standardised and adopted GSM platform shows the impact of Metcalf's Law in practice. *Among the top 25 mobile data operators globally, 21 use the GSM platform (a combination of GSM, GPRS, EDGE, WCDMA), two use a PDC/WCDMA platform, in Japan, and one uses the CDMA platform, in Japan (source: EMC).*

It is interesting to note that today there are over 200 GSM operators offering 3GPP-standardised MMS service, while there are approximately 10 CDMA operators who offer picture messaging service using various different formats, and without interoperability with each other. It is plain to see that GSM is leading the data services market evolution.

- c. The ***required diversity of locally-relevant applications*** can only be enabled with an open standardised service platform. There are *thousands of application developers in Hong Kong and millions globally*, which utilise the open OMA-standardised development tools. This broad-based community is able to produce any service that is demanded from various consumer segments also in Hong Kong. In comparison, there are virtually *no local developers* for any single proprietary service standard, and only a maximum of a few thousands for each globally. Catering fully to the diverse and evolving consumer demands in Hong Kong using a proprietary platform would not be possible in practice, due to the prohibitive cost and time to recruit and maintain a proprietary developer community.
- d. Hong Kong ***consumers' access to local, and global, content is maximised*** with the service platform that has widest global acceptance. The reason is simple: market power. As the content market is very competitive, many content providers cannot afford the time and cost of content adaptation and charging mechanisms for multiple standards. As a result, the largest standard is the one that always tends to be selected, while content providers may select other standards only occasionally. Particularly in Hong Kong, it is easy to foresee that a market of 7 million consumers

using the GSM family would be a more lucrative market from any content owners' viewpoint, compared to the much smaller user base of a proprietary standard. Also the Korean and Japanese developers generally (especially in gaming) have established GSM markets as their export priority, as the accessible market is a multiple many times larger among the GSM user base.

- e. **Service roaming** can only be delivered using a globally adopted standard, which uniquely is the GSM technology family. The role of roaming, both incoming and outgoing, in Hong Kong is larger than almost anywhere in the world. A service provider who cannot provide automatic roaming facilities is not able to meet one of the basic demands of potential mobile data users, and thus the overall offering is unlikely to be appealing for many consumers. For example, in the case of an operator using the cdma2000 platform, each major operator will have its own specific service standard. Even basic automatic voice roaming is impossible between all the different CDMA networks. As a result of this fragmentation, data roaming is virtually non-existent among CDMA operators. It is technically possible to build a multimode handset supporting both CDMA and GSM evolution steps for roaming purposes. However, there is a significant form-factor and cost-penalty (both due to technology complexities and low volumes), which would mean that such products if ever coming to market will remain only a niche offering.
- f. Similar service standards among all operators keep **interoperability testing reasonable**. Adding a service standard, which is different for incumbent operators, would dramatically increase the required interoperability testing among all operators, and would lead to delayed service availability. We estimate that adding a new operator in Hong Kong, irrespective of technology, would add 40% to the overall required interoperability testing. In the case where a new operator would use a totally different platform, an increase of 50%-100% is more likely, which would inevitably lead to a slower and more costly service introduction, and would thus reduce market potential and not be in the interests of Hong Kong's consumers and enterprise users.

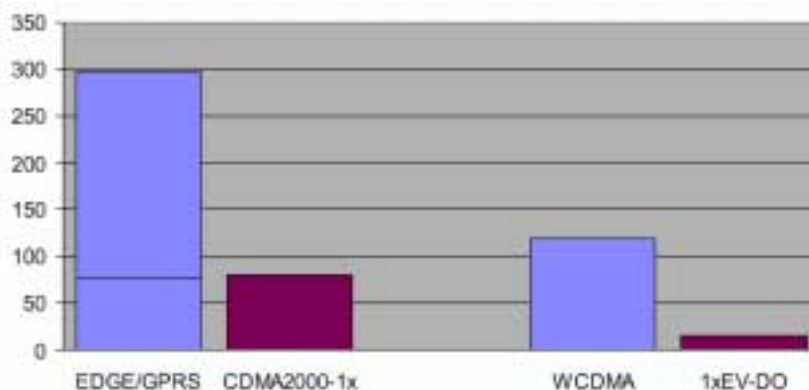


Figure 1: Number of operators per technology deployed globally (April 2004)

- 2. **The GSM technology family offers the highest efficiency** in delivering mobile services, both from consumer-experience and cost viewpoints. No other platform would be able to provide any incremental value to consumers or operators. The GSM roadmap is also much more widely accepted in the operator community than any other standard, which ensures sustainable economies-of-scale benefits for the future.

- a. EDGE (Enhanced Data rates for Global Evolution) produces end-user bit rates and spectral efficiency which are about 50% higher than the corresponding CDMA technology step, cdma2000-1x (both are available now). This is widely demonstrated in the commercial EDGE and cdma2000-1x networks.
- b. Both WCDMA and cdma2000-1x/EV-DO provide typical bit rates of around 300-350 kbps in commercial networks, based on live network measurements. However, only WCDMA supports *QoS management, bit rate guarantee and low latency*, and thus WCDMA supports virtually any data service. EV-DO provides radio bearers only on a *best-effort basis*, and thus only non-real time services can be delivered for the mass market. For example, there are no standardized bearers in EV-DO which are available for video-telephony or streaming, which means that offering such services with a reliable Grade of Service requires some 50 - 150% over-dimensioning, adding to costs which would then need to be recovered, ultimately from the users of the services.

This lack of QoS management, bit rate guarantees, etc. in the cdma2000 systems would mean that its deployment would not satisfy the requirements stated in paragraph 40 of the consultation, from which it can be seen that OFTA requires **more stringent licence conditions, especially on quality and variety of services.** Such requirements, if confirmed, can only be met with the evolved GSM technologies of GPRS/EDGE/WCDMA/HSDPA.

A further consideration is that operators can justify a substantially broader coverage build with WCDMA, as compared to EV-DO. The reason is that WCDMA is also a highly efficient voice platform, and thus the investment is amortised by *both data and voice usage and users*. 1xEV-DO supports only data, and thus operators would be less able to justify coverage investments.

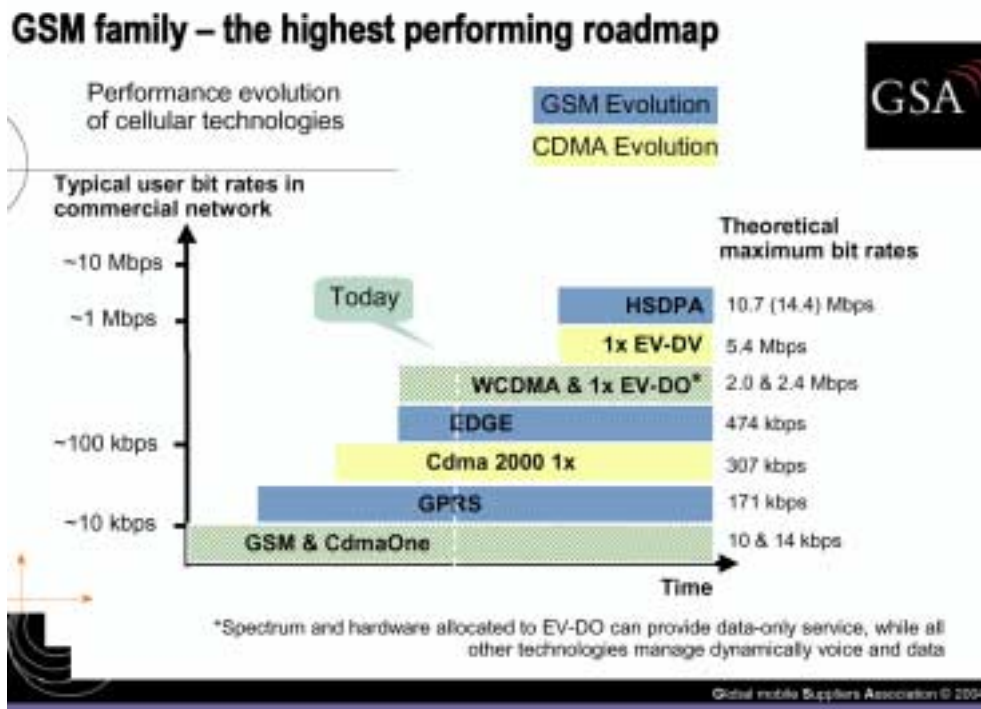


Figure 2: GSM family – the highest performing roadmap

- c. HSDPA (High Speed Downlink Packet Access, commercially available 2005), which is an enhancement to WCDMA (as EDGE is an enhancement to GPRS), and cdma2000-1x/EV-DV (Evolution Data and Voice, available 2005) provide significant improvements to the respective GSM and CDMA technology evolution path and are standardized by 3GPP and 3GPP2, respectively. HSDPA provides a clearly outstanding performance in comparison to any other cellular technology. The typical average bit rates range between 1.0-3.0 Mbps in commercial networks, with peak bit rates up to 10.7 Mbps. Both peak and typical bit rates are 2-3 times higher in HSDPA, compared to 1x/EV-DV (or to the future enhancements of 1x/EV-DO). HSDPA and EV-DV technologies are in certain respects similar, and employ some of the same modulation and error correction mechanisms. The main difference is that HSDPA takes advantage of the wideband (5 MHz) signal, as opposed to the narrowband (1.25 MHz) signal in EV-DV, and thus is able to deliver higher bit rates and efficiency. All WCDMA operators are expected to evolve to HSDPA.
- d. In each technology evolution step the acceptance among the operators is substantially broader for the GSM roadmap. The following numbers illustrate the situation.
- There are today **over 1 billion GSM users**. The operators who are in the GSM technology roadmap (but still have e.g. TDMA, PDC and CDMA users) had a combined user base of approximately 1.15 billion in April 2004, or over 80% of all mobile users (source: EMC April 7, 2004). In comparison, there are **188 million CDMA users** in total, including all CDMA evolution steps. (source: CDG, April 7, 2004). The gap between the numbers of GSM subscribers and CDMA is accelerating.
 - There are **close to 300** operators using GPRS, of which **81 in 55** countries have announced support also for EDGE (source: GSA June 14, 2004). In the equivalent CDMA step, there are 80 operators supporting cdma2000-1x (source CDG Apr 7, 2004).
 - There are **120 operators** which have a WCDMA frequency license and announced plans to build network. These 120 operators had a subscriber-base of over 500 Million in April 2004, which ensures that rapid WCDMA technology adoption will occur in the near future. In the equivalent CDMA step there are **15 operators** with announced support for 1x/EV-DO (source CDG Apr 7, 2004).
 - It is widely expected that all WCDMA operators will implement HSDPA, to enable data rates up to 10.7 Mbps. The upgrade path from WCDMA to HSDPA is easy, as the base stations only require a software upgrade. The result is that today's scale economies of GSM will be available in HSDPA in the coming years. In comparison, the EV-DV step requires a hardware upgrade, both from cdma2000-1x and from 1x/EV-DO. Due to this many operators evolve directly from 1x to EV-DV, while some others evolve from 1x to EV-DO. The result is that substantial technology fragmentation will remain in the coming years among the CDMA operators, making it yet more difficult to achieve adequate scale economies for each technology step.

As a result of all the above factors, GSA strongly believes that Hong Kong mobile data user numbers and usage levels can develop to the full potential with the open GSM family of technologies. Data services are already introduced in Hong Kong. GSM/GPRS-enabled services are widely available and enjoyed. International roaming is working well and highly appreciated by users, alongside voice roaming. (Hong Kong CSL Limited was the first

operator in Asia to launch EDGE services, enabled by impressive 3G data speeds today. Together with AIS in Thailand, CSL was also the first operator in the world to launch commercial international roaming for EDGE-enabled data services.

The market acceptance for GPRS and EDGE-enabled data services in Hong Kong is highly encouraging. It is also understood that China Resources Peoples Telephone Company Limited are planning to launch EDGE capabilities on its GSM network later this year which will increase demand. Already we see in Hong Kong that data services are growing beginning with SMS and GPRS, with over 13% of all mobile subscribers in Hong Kong using GPRS services today, according to operator sources.

3 The GSM technology family offers the highest efficiency in delivering mobile services, both from consumer-experience and cost viewpoints. No other platform would be able to provide any incremental value to consumers or operators. The GSM roadmap is also much more widely accepted in the operator community than any other standard, which ensures sustainable economies-of-scale benefits for the future.

4 Block "A" spectrum

Administrations around the world endeavour to achieve spectral efficiencies for optimum investment conditions and the best user experience. The mixing of technologies which is discussed in the OFTA consultation document, seriously undermines these goals.

Furthermore, the consultation paper does not adequately recognise the potential for deployment of GSM/3G in the 850 MHz spectrum, which is market reality in the Americas today, supported by several handsets and data devices from many leading manufacturers. The statements concerning the lack of (efficient) use of the existing 2G licenses for TDMA and CDMA do not appear to adequately take account of the recent development and deployment of GSM/EDGE in 850 MHz in markets such as North and Latin America. Indeed, the availability of a commercial option for high speed data with GSM/EDGE in existing 2G 850 MHz spectrum has stimulated additional investment in GSM/EDGE overlays to both TDMA and CDMA (IS-95) systems. Furthermore, the availability of commercial "quad band" GSM terminals provides further incentive to expanding deployment of evolved-GSM in all existing bands including 850 MHz.

GSA believes that the current spectrum owners should be allowed the opportunity to use this spectrum as part of an integrated approach, being the more likely approach for boosting data services take up and ensuring access to the greatest number of consumers. This means a common GSM core network supporting a variety of standardised radio access options (GSM products are shipping globally in the four main cellular bands i.e. 850, 900, 1800, and 1900 MHz) according to market needs and network capacity/quality considerations. As described in the current updated IMT-2000 standards recommendations, EDGE as the data component of the TDMA-SC RSPC option is a viable data option for all TDMA and GSM operators in current 2G bands and is the most spectrally efficient of all 3G standards to support data services requiring ~100 kb/s throughput. Recent announcements of GSM/EDGE/WCDMA terminals becoming available in 4Q 2004 augur well for even more flexible end-user data services and network transparency.

D Conclusions

- 1) The introduction of GSM services in Hong Kong has been the catalyst for delivering maximum competitive choice and value for consumers. The shift to data including 3G services is well underway with most of the world's operators committed to 3G

services delivery using WCDMA and EDGE. Both EDGE and WCDMA are mature and open technologies. An increasing number of operators are committing to deploying a combination of both (examples include CSL, AT&T Wireless, and TeleNor. TIM in Italy was the world's first operator to commercially launch 3G services enabled by an integrated EDGE/WCDMA network.

- 2) Data services are already offered and promoted in Hong Kong with strong demand and market acceptance for advanced services amply demonstrated. Operators in Hong Kong are fully in step with the leading players globally in their introduction of advanced 3G services enabled by EDGE and WCDMA.
- 3) 850 MHz is one of the four globally recognised cellular bands for which GSM is standardised and fully commercialized. Market volumes are growing substantially, driven initially by the North American market where most TDMA operators, and a number of cdma operators, have migrated to the GSM/GPRS/EDGE technology path to leverage its competitive benefits for their respective markets. This migration trend to GSM from TDMA and cdma is now sweeping through Latin America. This is due to GSM's openness, vast widespread market acceptance globally, unparalleled economies of scale, unequalled developers' community, and automatic international roaming for voice and data services.
- 4) The GSM evolution to 3G using EDGE/WCDMA/HSDPA is defined, stable and rapidly maturing, and continues the openness philosophy with the backing of over 85% of the world's mobile operators.
- 5) Recovery of spectrum from 2G operators who are in licence compliance has no precedent anywhere in the world.
- 6) There is no justification for introduction of a new mobile operator in a market already acclaimed as amongst the most competitive in the world, with amongst the lowest tariffs. A new player, far from stimulating competition, would most probably hinder market development in Hong Kong.
- 7) Implementation of a system technology other than the GSM family does not provide any guarantee of data services market success or quality of performance.
- 8) Automatic International roaming is a basic market requirement for all services – voice and data, particularly in Hong Kong due to Hong Kong's position as the business centre of Asia.

We trust that the above comments will assist OFTA in its deliberations and policy decisions. We would be pleased to provide further clarifications if requested, and contribute to future discussions as required.

Sincerely,

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