

22 May 2000

Office of the Telecommunications Authority
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Wan Chai
Hong Kong

Attn: Senior Telecommunications Controller (Competitive Services)

Introduction

Lucent Technologies Asia Pacific Ltd is pleased to submit a response to TA's industry consultation paper on "Licensing Framework for Third Generation Mobile Services".

The response to this paper outlines Lucent's view on the future of the 3G for Hong Kong:

Section 2.9: ***3G Standards in Hong Kong***

Section 3.8: ***3G Services in 2G Spectrum***

Section 3.12: ***Band Plan for 3G Services***

Section 3.19: ***Individual Operator's Bandwidth Requirements***

Section 4.3 and 4.4: ***Licensing Issues for new entrants and incumbent operators***

Section 4.14: ***Selection of 3G licensees by evaluation based on merit***

Section 5.14: ***Roaming from 2G networks to 3G networks***

In regard to:

Section 5.7: Measures on preserving effective competition in the 3G market

Section 5.12: Maintaining a regulatory distinction between the fixed services and the mobile services

Section 5.13: Domestic roaming obligation between 2G and 3G networks

Section 5.18: Separation of service provision from network operation

Section 5.19: Mobile number portability

We are not in a position to comment as these sections are more appropriately relevant to an operator.

Section 2.9

3G Standards in Hong Kong – Single or Multi-standards

Lucent fully agrees with TA's views on:

- Adoption of open and non-proprietary standards
- Adoption of standards as recommended by the ITU
- Technology neutrality, ie no mandate for a single standard for 3G
- Roaming compatibility between networks

We would like to present our view with regard to the proposal to ensure that mobile users can easily switch from one network to another to obtain similar services and to maximise convenience in using roaming services without having to change the mobile terminals.

As in current 2G systems, for a user to change from one supplier of mobile services to another, there is no requirement to change the handset. This applies equally for GSM and CDMA. Of course, in Hong Kong there is currently only one CDMA operator. However, if a 3G user wants to change from one technology to another, at least for the foreseeable future, the situation, as now, would require a change of handset

It is our belief that theoretically, it is possible for global roaming to occur in the future on 3G networks. One of the objectives of ITU spectrum specification is to pave the way for a true global network. But, in reality, this is not the case. As we see in the current 2G technologies, global roaming is limited to within the same technology. Initially this will be the case for 3G.

Spectrum commonality is only one of the issues in global roaming that ITU tries to solve. Given the current situation, roaming across different standards has not been possible, even when the spectrum is the same. There are four areas of contention that will need to be resolved before 3G gives full interoperability:

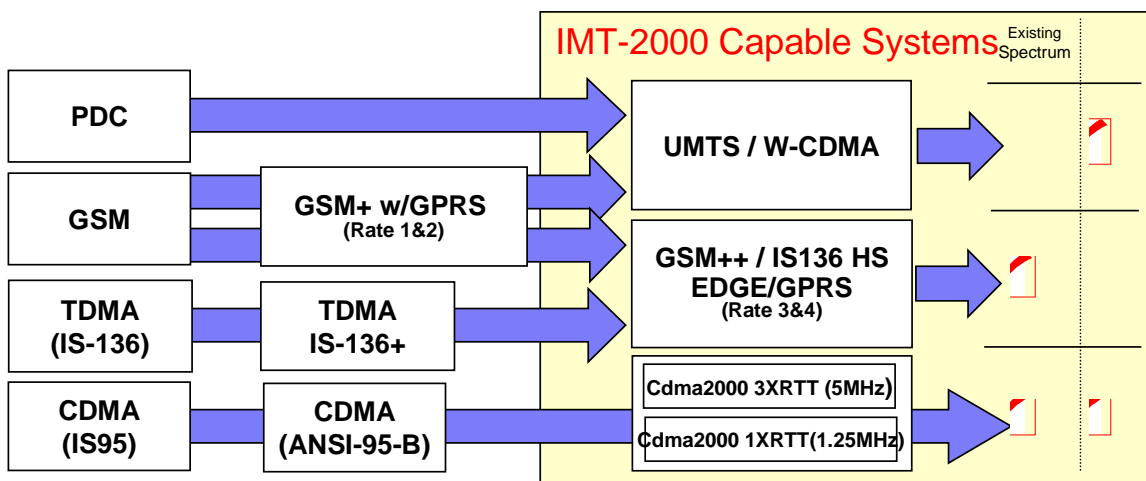
- Network to Network Interface - For inter-working between different core networks. The inter-working between two different core network standards will be critical to enable smooth access to billing, customer care, network management and Intelligent Network (service creation) functions.
- User Identity Module (UIM) - This is like the current GSM SIM card. It allows for "plastic" roaming, ie a WCDMA customer can roam on a cdma2000 network or vice versa by just plugging in the UIM card. This would enable over the air programming of services and applications.
- Radio (Air) Interface - Currently, GSM 2G is not able to roam across to cdmaOne 2G. For roaming to occur over different air interfaces, one solution could be in having a dual-mode handset. As of today, there is no concrete release date of a dual-mode phone. Realistically, this issue will not go away until a 'world standard' phone which can globally roam in both dedicated and idle modes is available with battery power and size to match. The software radio approach in theory is one solution but this could still lead to downtime on transitions.
- Compliance to ITU's spectrum allocation - Global roaming will depend whether the allocated 3G spectrum in different regions bridges the same frequency bands. For example, in the US, we know that the new PCS licensed operators have used the upper band frequency ranges that were allocated to 3G technology by ITU. We would like to stress that incompatibility issues between the two major radio interface standards (GSM and CDMA) are more significant than the actual spectrum range.

Dual and even triple mode handsets today can easily address the different spectrum ranges.

Section 3.8 3G Services in 2G Spectrum

ITU, through the World Administrative Radio Conference of 1992, has identified a worldwide allocation of 230 MHz of spectrum in the bands 1885 - 2025 MHz and 2110 – 2200 MHz for IMT-2000.

Although the reason for this specification was mainly to produce a unified standard, this did not happen. Instead we see a family of standards emerging.



- **Lucent supporting multiple 3G Standards (Time Division and Code Division)**
 - UMTS / W-CDMA
 - cdma2000
 - UWC-136 / EDGE
- **Committed to the evolution all current Second Generation Systems**
 - CDMA (IS95), GSM, TDMA (IS136)

As the chart above clearly illustrates, the GSM migration path has no alternative but to move to a new spectrum range (for full 3G) as it is fundamentally a different technology.

However, for the cdmaOne system, there is no requirement to acquire IMT-2000 spectrum. Motivation to acquire new spectrum comes from general spectrum limitations and requirements.

In our belief that 3G services should not be restricted to a particular spectrum band. Despite what many regulatory bodies are predicting for the mass availability of 3G technology on the 2.1 GHz band, true 3G services can be provided on lower spectrum frequency, ie 800 or 1900 MHz. for CDMA and 2.5G services for GSM frequencies.

Therefore, Lucent strongly supports TA's proposal to allow existing 2G operators to use any IMT-2000 standards within their assigned 2G frequency bands for 3G mobile services.

Section 3.12 Band Plan for 3G Services

Lucent fully supports Hong Kong in adopting a 3G band plan that is in compliance with the ITU IMT-2000 allocation.

Section 3.19 Individual Operator's Bandwidth Requirements

In UMTS #5 report on 8 Sep 1998, the UMTS Forum recommended 2x15 MHz (paired) + 5 MHz (unpaired) as the preferred minimum spectrum requirement per UMTS operator in the initial phase. The allocation of unpaired spectrum is foreseen to handle asymmetric traffic in an optimized way.

Here's a technical summary of the UMTS recommendation:

- 2x5 MHz will allow a single layer only; a hierarchical cell structure is not feasible in this case.
- 2x10 MHz gives room for a two-layer structure, eg a macro cell layer together with either a micro cell layer or pico-cell.
- 2x15 MHz allows the deployment of a complete hierarchical cell structure where the traffic demand is high or a mix of layers such as one macro cell and two micro cells.
- 2x20 MHz allows increased flexibility and additional capacity.

It is Lucent's view that 15MHz provides sufficient spectrum for an operator. In TA's paper it is proposed that existing 2G operators will need less 3G spectrum as they can upgrade their current systems to provide next generation services. For Hong Kong, given its size and concentration of population, an islands of coverage scenario, may not be the best solution suggesting full 3G coverage at or near launch. This may mean only 10MHz paired is not enough, but the actual requirement for spectrum will be dependent on the future voice/data traffic mix, the kinds of applications available, and the densities of users.

In the UK, the regulator awarded several licenses of 10MHz paired, with additional capacity being provided through 5MHz unpaired experience will show whether this is sufficient.

TA's proposal to withhold additional spectrum for potential unpaired use according to the future requirement of operators is a sensible approach.

Section 4.3 & 4.4

Licensing Issues for new entrants and incumbent operators

Lucent fully supports TA's view on the need for new entrants in 3G market. Looking at the current telecommunications trend worldwide, we see big players merging or forming alliances and consortiums to better compete in this highly competitive environment.

We believe that there will be new players with the necessary technical capability and market savvy to be key players in the 3G market and to ensure optimal use of the technology and meet the sophisticated needs of HK mobile users. And HK economy will stand to gain from new innovations and developments that new entrants bring to the market.

At the same time, the recommendation for new entrants should be balanced against the needs of existing operators and 2.5G technologies will not be equivalent substitutes for 3G licenses

Hence, although we would like TA to allocate at least one license for a new entrant for the 3G market, we believe that for both new and existing operators, setting aside adequate spectrum for future growth is critical.

Section 4.14

Selection of 3G licensees by evaluation based on merit

The decision on method of award of spectrum is entirely TA's, however Lucent ***supports TA's view on evaluation based on merit, and we strongly favour a solution which enables operators to succeed in the market and offer 3G services to consumers at affordable prices.***

Section 5.14

Roaming from 2G networks to 3G networks

Regardless of inter-operator roaming issues, where a handover occurs from one network to another, ie 2G to 3G, it should be anticipated that quality and range of services may vary initially. Also an ubiquitous continuous service may not be possible until the network matures sufficiently or complex software algorithms allocate a dedicated set of resources which would be difficult to implement across network boundaries.

Beyond these 2G to 3G inter networking issues, the scenario of one operator roaming across another's 3G network, does not present further technical issues, other than the obvious commercial ones. The same issue arises when it comes to international roaming between 2G and 3G networks i.e. a non HK consumer roaming in Hong Kong.

In Lucent's experience, the key issue for new technology is interoperability between the network and the handset, hence our significant interworking development in this area.

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