FRAMEWORK FOR THIRD GENERATION (3G) CELLULAR NETWROK DEPLOYMENT AND SERVICES OFFERING IN SINGAPORE

RESPONSE FROM ALCATEL

1. Alcatel Singapore welcomes IDA (TAS)'s open invitation for comments on the 3G deployment and service offering in Singapore. We, on behalf of our colleagues at the HQ who support us, congratulation IDA for the high quality and forward-looking strength of your analysis in the document. Obviously, IDA is already well informed and has a very healthy attitude towards regulation.

2. Alcatel Singapore is pleased to forward to you in Annex 1, "Alcatel Mobile Internet Story - 3G-EDGE-IMT200" for your perusal. This paper addresses questions:
   a) An assessment of the development of 3G cellular technology, the likely services being developed and the potential demand from business and consumers.
   b) The potential of 3G technology and the scope of 3G license.

3. For question c) the spectrum allocation mechanism and the spectrum requirements per operator:

   1) FREQUENCY ASSIGNMENT METHOD
   Given the considerable cost of building a 3G network, Alcatel is against measures that would reduce 3G operators' capacity to invest. Straightforward auctioning for example, can represent an excess burden that could, in some cases, cause a 3G project to fail financially (especially risky for new entrants). Administrative "beauty contests", followed, only if need be, by a closely controlled auction, should be preferred.

   2) SEPARATE REGULATION OF SERVICES AND INFRASTRUCTURE
   Minimal regulation on competitive value added services like 3G BBMM, should be kept separate from infrastructure regulation. The wider scope of such "mobile BroadBand MultiMedia services", rather than "cellular mobile telephone services" is a welcomed improvement to 3G licensing - we believe service definitions should remain as open as possible to avoid hindering constantly enhanced service evolution.

   3) 3G SATELLITE SYSTEMS
   Frequency spectrum management should properly take into account future satellite mobile service (SMS) requirements in order to facilitate introduction of the space segment into the 3G infrastructures of the next phase, as planned by ITU's WRC2000.
   Alcatel's multimedia Internet project, SkyBridge, is a typical example.

4. For question d) The optimal number of operators to license:
   Other than the consideration of physical spectrum availability and requirements per operators, the answer to the number of license question need also take into account of interest of consumer choices, incumbent Singapore based providers needs, and introduction of foreign competition. Physical deployment efforts required to cover the entire Singapore should also be taken into consideration. Based on these additional considerations, it is our view that perhaps three (3) licenses for infrastructure will be

adequate for Singapore. But, for services, as stated in point 3.2) above, we should be as liberal as possible.

5. For question e) the approach for licensing additional 3G providers:
    Alcatel supports the progressive approach as described in the consultation document by IDA (TAS) option (iv).

6. For question f) how existing mobile phone operators should be treated;
    Alcatel reserves our comment on this question due to our on-going business relationship with existing mobile operators.

7. For question g) the timing for award of 3G licenses and services launch dates.
    We believe license within 12 months and services launch - starting perhaps with EDGE - starting mid 2001 will be realistic and adequate to keep Singapore in the leadership position in the region.

8. In addition, we would like to make following notes:

    a) EDGE EVOLUTION
    We invite IDA (TAS) to note that work in both UWCC and ETSI is ongoing to enhance the EDGE/IMT-SC maximum bit rate to reach the symbolic multimedia speed of 2Mbs.

    b) 3G DATA RATES
    Please note that 2Mbps, 384kbps and 144kbps are "nominal" 3G data rates and not "minimum" as noted in Consultation Document footnote 1 on page 2/7.

9. We forward also our confidential study on the European Approach to 3G as Annex 2. Please kindly contact us if you need to quote or publish any of the content in this Annex.

Alcatel Mobile Internet Story

3G – EDGE – IMT2000

- Alcatel's objective is to support the quickest and surest way leading to high speed access for Mobile Internet

- Migration to 3G will be progressive, using GPRS then EDGE technologies to prepare the IMT2000 market

ALCATEL

**SUMMARY OF KEY MESSAGES TO
INFOCOMMUNICATIONS DEVELOPMENT AUTHORITY
(TELECOM AUTHORITY OF SINGAPORE)**

1. Mobile market growth will continue to be strong and early mobile data users will initially need **moderate** bandwidth services.

2. The best market-driven way to 3G is to follow an **evolutionary path** from voice (GSM), to low speed data (GPRS), to high speed data (EDGE), then to full multimedia (UMTS).

3. Mobile operators should be allowed to **use spectrum independently** of the technology used.

4. EDGE[1] will become the **major worldwide standard** for first phase 3G mobile.

5. We fully support the IDA (TAS) position to allow for 3G operators to open their networks based on **any component** of the IMT2000 family.

ARGUMENTS

1. Mobile market growth will continue to be strong and early mobile data users will initially need moderate bandwidth services

Voice will remain a strong market segment with much of the 3G spectrum being used for voice and most 3G revenues (over 2/3) still coming from voice.

The mobile data market will take time to expand due to:
- Need for defining an entirely <u>new business model</u> (including data services)
- The amount of investment required to deploy data services, terminals
- the need for pricing scenarios to be tested (to determine feasible end user prices).

Data revenues will initially come from moderate bandwidth services:

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[1] EDGE originated in Europe as an ETSI-based GSM Phase2+ enhancement. Adopted by the UWC Consortium in the USA, it was proposed and accepted as 3G technology in the IMT2000 family under the name "IMT SC –Single Carrier"

- E-mail, banking and finance services and location-specific services such as train timetables and reservations, are potential killer applications.
- Sophisticated corporate solutions will come later, corporate users will want national or international coverage and guaranteed service levels, furthermore these IT/Telecom solutions may take years to implement.
- Revenues from transactions and advertising will be small compared to traffic revenues.

2. **The best market-driven way to 3G is to follow an evolutionary path from voice (GSM) to low speed data (GPRS), to high speed data (EDGE), then to full multimedia (UMTS).**

The basic necessity to maintain interoperability of 2G with all new services – including 3G – justifies the evolutionary approach.
- New investors in 3G will be mainly existing operators or incumbents entering new markets.
- The commercial success of GPRS/WAP will be a prerequisite for 3G success.

UMTS remains the ultimate goal for 3G.
- UMTS has a sounder technological case when compared with other solutions (eg: much higher speed data and spectrum efficiency especially for data traffic).

UMTS represents a longer term investment:
- The economic model and available UMTS business plans show that UMTS will provide very slow ROI (8 years for 2G operators, to 11 years for newcomers).
- UMTS is a new service architecture that will enable multimedia services depending on availability of a totally new handset.

3. **Mobile operators should be allowed to use spectrum independently of the technology used.**

Mobile operators focus on consolidating market positions, viability of the business case (3G is often still considered "too expensive"), compatibility and evolutivity of installed base (eg 3G as an extension of GSM).

3G could also be a requirement for installed mobile operators who want to protect their marketing image, in spite of potential low profitability forecasts.

Depending on the targeted market segment:
- mobile operators will need new spectrum in order to offer low speed data services at cheaper rates than 3G services
- early 3G could even have to "compete" with the tariffs and enhancements made available in installed networks such as GSM+.

4. **EDGE will become the major worldwide standard for first phase 3G mobile.**

The global trend in standards now shows that:
- Standards bodies have included EDGE into the IMT2000 standards family (ref. IMT-SC)
- Standards activities, particularly in Europe, are following "convergence" of TDMA and GSM data services (through GPRS followed by EDGE)

- Technology-wise, all current standardization efforts are aiming at full IP (eg both EDGE and ETSI "UMTS R'00").

EDGE strong points are:
- That it is to date the most economical solution for enabling high speed data in mobile in the foreseeable future.
- It offers smooth 3G evolution and will be a viable early alternative for IMT2000 services (more capacity, but more expensive).

5. We fully support the IDA (TAS) position to allow 3G operators to open their networks based on any component of the IMT2000 family.

FCC has fought against any European countries position not opening licenses to all IMT 2000 standards.
- US lobbies succeeded in putting political pressure (largely justified) on the European Commission to dissociate 3G licensing from any particular standard, technology (in line with Alcatel regulatory positions)

The most probable scenario in Europe for 3G technology is both GSM+EDGE (eg in cities) and UMTS (for business and densely populated areas).
- Mobile operators need a maximum level of flexibility in deploying 3G technology (eg: 30% coverage of densely populated areas by EDGE till 2004, extendable to other IMT2000 services by 2006).
- The IMT2000 spectrum (1920-2170) must also be opened to GSM-based technology (eg EDGE or IMT-SC equivalent).

- end of report to IDA (TAS) -

3G MOBILE GLOSSSARY

2G	Second generation mobile system – services (GSM…)
3G	Third generation mobile system – services (UMTS…)
3GPP	3G Partnership Project
ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BSC	Base Station Controller
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CAMEL	Customised Application for Mobile Enhanced Logic
CCBS	Customer Care and Billing System
CN	Core Network (the NSS of UMTS)
CTS	Cordless Telecom System
FDD	Frequency Division Duplex
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
HBS	Home Base Station
HLR	Home Location Register
IMT	International Mobile Telecommunication
IN	Intelligent Network
MExE	Mobile Execution Environment
MSC	Mobile Services Switching Centre
MSS	Mobile Satellite System
Node B	the BTS of UMTS
PCS	Personal Communications Services
PSTN	Public Switched Telecommunication/Telephone Network
RNC	Radio Network Controller
SCP	Service Control Point
SGSN	Serving GPRS Support Node
SIM	Subscriber Identity Module
TDD	Time Division Duplex
TINA	Telecommunications Information Networking Architecture
UMTS	Universal System telecommunication Mobile
UTRAN	UMTS Terrestrial Radio Access Network
VHE	Virtual Home Environment
VLR	Visitor Location Register
WAP	Wireless Access Protocol
WLL	Wireless Local Loop