

Regional workshop on guidelines on the smooth transition of existing mobile networks to IMT-2000

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Topic: Bridging the digital divide in Africa using 3G and IMT 2000

(A) Challenges to the access Networks in Africa

The majority of access networks in Africa are still based on copper. A very small fraction of access network uses fibre and wireless. Although the wireless technologies such as CDMA 450, CDMA 2000, and Broadband wireless technologies are readily available in the world market, the implementation of these systems in Africa has been very slow. The internet penetration is equally hindered by this lack of last mile connectivity to the users. Moreover, the access network is also prone to manmade challenges such as vandalism, destruction by bush fires, lightning strikes, strong storms and rains, and damage by cyclones along the coasts. As a result school children in Africa still do not have access to the internet and telephones. Distant education through the internet is a mere dream in most countries. Telemedicine and e-health is not available for physicians and patients in the rural areas of Africa where the average distance between the referral hospital and the district hospital is over 100 kilometres. Wireless technologies could therefore solve some of Africa's problems in the access network. Some measures have to be taken in order to implement some of these initiatives such as the IMT 2000 initiative of the ITU.

(B) Status of candidate IMT 2000 frequencies in the 400, 600 and 800 MHz in Africa.

Radio frequency spectrum is a very important that should be used by all citizens for communication in a regulated manner. However, in many African countries there are no proper databases for licensed radio frequency users. There are also several illegal operators that are using radio and satellite equipment especially in the countries where there have been civil unrest. As a result of this the whole radio spectrum in some countries are fully occupied by licensed and unlicensed operators. This has resulted in electromagnetic interference and jamming of weak radio signals by those operators that are transmitting excessively high power. There are also cases where some people in Africa use long range cordless telephones especially the road contractors. The paper will highlight how the 400, 600 and 800n MHz is being used in

Africa. It will also analyse technologies that could be easily used by operators in Africa to implement 3G systems in Africa for the benefit of the users.

(C) Deficiencies in frequency licensing models used in Africa

The issue of frequency licensing in Africa is an issue that must be addressed. Many potential investors and operators are unable to rollout networks in Africa due to prohibitive fees and bureaucratic red tape. This has resulted in slow growth of mobile telephone and Internet. The models and procedure used for licensing new operators does not favour the new comers rather the incumbent operator has the upper hand. The paper shall show some new models of licensing and charging of radio operators.

(D) Competing 3G technologies

It is important to emphasise that there are available technologies that can be used by operators in Africa and other developing countries to provide access to the citizens in the towns and rural areas at an affordable cost. Some of the competing field proven carrier class 3G technologies are:

1. CDMA
 - CDMA 450 FWA with limited mobility
 - CDMA 2000 1x
 - CDMA 2000 1x EV-DO
 - CDMA 2000 1x EV-DV
2. 3G/UMTS
3. GSM /GPRS
4. HSDPA/ HSUPA
5. IP as transport protocol in RAN for end- to end IP network
6. OFDMA and WLAN; WiFi, WiMax, UWB
7. IP Multimedia Sub System IMS

VERSION	CDMA 2001X	CDMA 2000 1XEV-DO
PEAK DATA RATE	144 TO 153 KBPS	3.01 MBPS
AVERAGE THROUGHPUT	60 TO 100 KBPS	300 TO 600 KBPS
ADVANCED SERVICES	Web browsing Video and audio downloads TV broadcasting Multimedia messaging Push to talk Location based services Entertainment Enterprise solutions m-commerce	Web browsing Video and audio downloads TV broadcasting Multimedia messaging Push to talk Location based services Entertainment Enterprise solutions m-commerce
Device availability	712 models	138 models
Manufacturers	61	
Operators	119	
Due to deploy	22	

Subscribers worldwide	160,000,000
Average growth rate	5 million subscribers per month
Operators in Africa	Algerie Telecom, Cell communications Nigeria, Intercellular Nigeria Multi Links Nigeria, Reliance telecom Nigeria, Starcomms Nigerai, Movitel Angola, Telkom Kenya, MTN Uganda

Source: CDMA Development Group

2. 3 G UMTS

Customers (2004)	16 million
Networks	60
Technology	WCDMA
Countries	25
Licences awarded	More than 125

3. GSM/GPRS

Subscribers worldwide	1,200,000
Networks	Over 600 in 200 countries
Technology	TDMA
Migration path to 3g	UMTS

(E) Transition paths for African countries

Facts about Africa:2005

Technology	TDMA/GSM	CDMA IS 95
Percentage of Mobile	95%	5%
Percentage of fixed	90%	10%
Next step	?	?
2nd step	?	?
3rd step	?	?

Exercise for participants:

Fill this table for your country:

Country name :

Network type	TDMA	GSM/GPRS	CDMA IS 95	CDMA 2000 1X RTT
Fixed line Subscribers				
Fixed WLL with limited mobility				
Mobile cellular				
Total	T1	T2	T3	T4
Percentage of Grand Total $GT=(T1 + T2 + T3 + T4)$				

Network Solutions:

- 1. Migration Path 3G/UMTS:**
T1 + T2 greater than T3 + T4
- 2. Migration Path to CDMA 1X EV-DO/1X EV-DV:**
T3 + T4 greater than T1 + T2
- 3. Migrate to EDGE and WCDMA:**
T1 greater than T2 greater than T3 and T4

What is the solution for your country?

(F) Non conducive regulatory Policies.

Most of the regulatory authorities in Africa are government departments. This means they are not autonomous at all. As a result, the politicians and the government have the final word on matters appertaining to frequency spectrum, licensing and usage of the radio networks in the country. Some governments are insensitive to the needs of the citizens as far as universal service obligations are concerned. Some regulators are also not transparent to all the stake holders in the communication industry. Some regulators favour certain technologies and certain standards. The regulatory framework in some countries does not promote investment in the communication sector; rather they hinder investment and growth of the sector by introducing laws and policies that discourage potential local and international investors. Worse still some countries in Africa do not even have national ICT policy documents. The regulators also charge very high license fees and annual frequency fees that some operators can hardly afford.

G. Conclusion and way forward for IMT 2000 in Africa.

Finally the paper shall make some recommendations and the way forward for a seamless transition from 2 G to 3G and IMT 2000 initiative of the ITU/BDT.

- Expansion of access network with fixed wireless systems
- Frequency allocation for IMT 2000
- Review of frequency licensing models
- Selecting the most appropriate technology for rural and urban areas in Africa
- Select the transition path to follow taking into consideration existing systems

Thank you.