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Fixed – Mobile Convergence and Guidelines on the smooth transition of existing mobile networks to IMT-2000 for Developing Countries

Transition Path to IMT-2000 in Serbia

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AGENDA

PART ONE

- GSM/EDGE/WCDMA Seamless Network
- Serbia&Montenegro Country Information
- Serbia&Montenegro Telecom Market

PART TWO

- Mobile Operator Mobtel
- UMTS/WCDMA Pilot Precommercial Network
- Future Plans for Mobtel Network Development

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Mobile Market Segmentation in Europe

- Well Developed GSM operators in Europe going WCDMA
- GSM operators still building out coverage

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Well Developed GSM operators going WCDMA

The GSM and WCDMA evolution raises several critical questions for the operator:

- How can operators maximize and reuse current GSM assets?
- How can they deploy WCDMA while maintaining profitability in GSM?
- How do they best allocate investments between GSM and WCDMA infrastructures?
- How will users experience the new combined GSM and WCDMA services?

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Well Developed GSM operators going WCDMA

Seamless Network - Ericsson's view on how existing GSM networks will evolve and interwork with WCDMA

- The evolution scenarios, operator needs and suggested solutions
- System evolution for GSM, the introduction of third-generation (3G) services and the integration of GSM and WCDMA to form a seamless network
- The key lies in the evolution of GSM and WCDMA networks as a single, unified seamless network that shares core, transmission, radio and application resources.
- Effectively combining GSM, EDGE and WCDMA technologies provides full coverage for voice, data, multimedia or any combination of these services. The seamless network automatically selects the best technology or combination of technologies to meet subscribers' particular needs during any given period of time. Users receive the best possible quality of service while operators are assured that the network selects the most costeffective method of delivering these services.
- The seamless network ensures the most efficient use of GSM and WCDMA
- Seamless user experience – transparency of services to users
- Ensures operator's investment protection in GSM/GPRS and re-use of 2G/2.5G equipment for WCDMA networks

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Well Developed GSM Operators Going WCDMA

3G Service Continuity

Challenges:

- Make Applications adaptive
- Surviving handover between two Network Technologies

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Well Developed GSM Operators Not Going WCDMA in Near Time Roll-Out Options

- Start Building EDGE coverage in dense areas
- Use GPRS as fallback initially
- Be competetive if WCDMA is available in other networks
- Handsets available in volumes
- Low entry market segments

Rural Sub-urban Urban Sub-urban Rural

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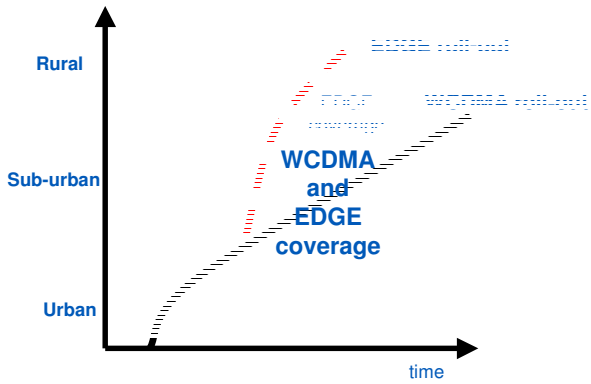
Well Developed GSM Operators Going WCDMA Roll-Out Options – Time-To-Market by Fast Roll Out

One EDGE TRU per cell for coverage

RBSs EDGE enabled



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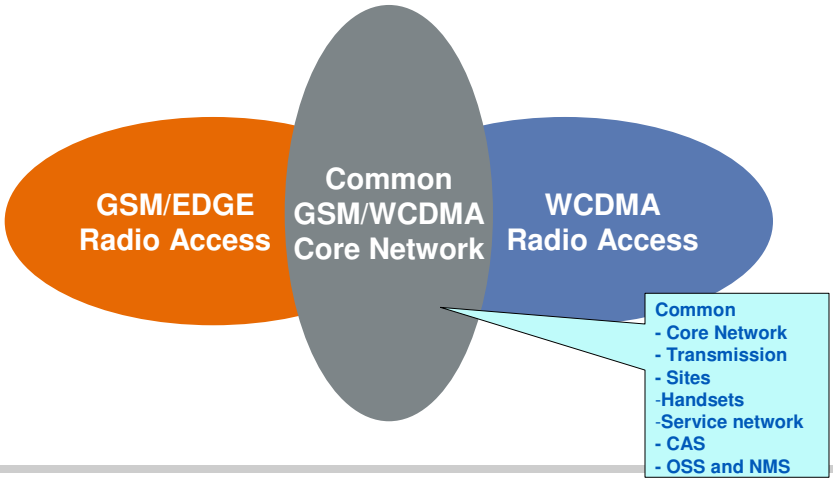
Well Developed GSM Operators Going WCDMA
Seamless Network



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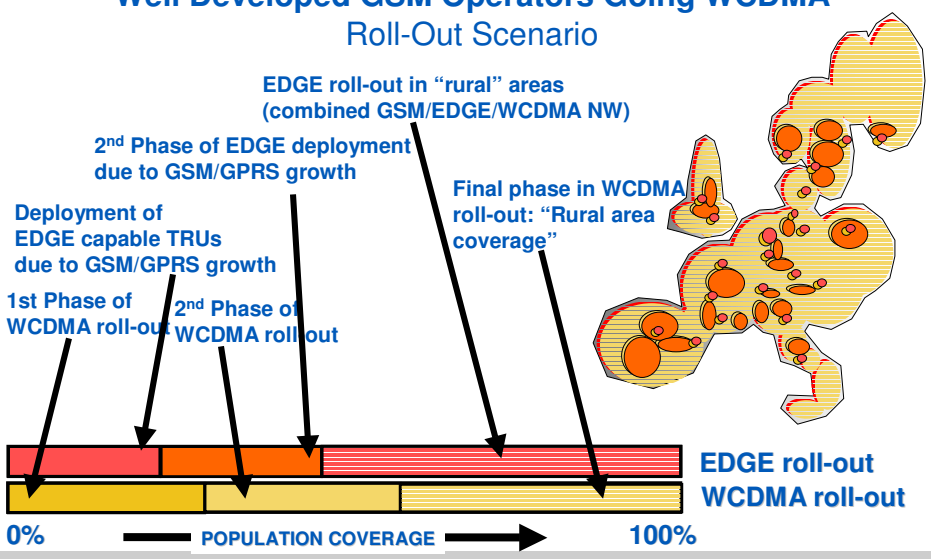
Well Developed GSM Operators Going WCDMA
Roll-Out Scenario



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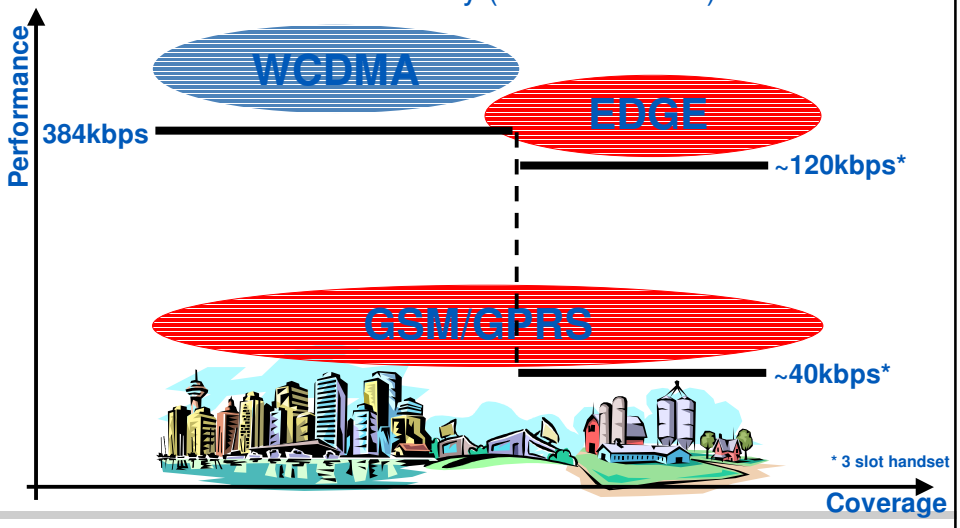
Well Developed GSM Operators Going WCDMA

Service Continuity (GSM-WCDMA)



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Well Developed GSM Operators Going WCDMA

Seamless Network - Benefits Introduced

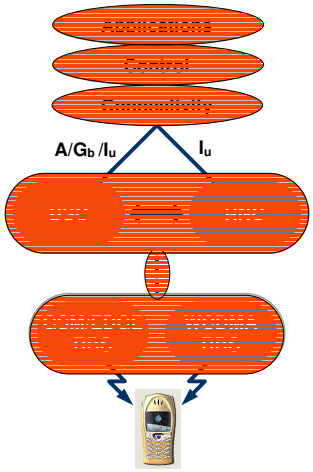
Common Network Management

100% node reuse

50% spectrum gain

50% transmission savings

80% co-siting



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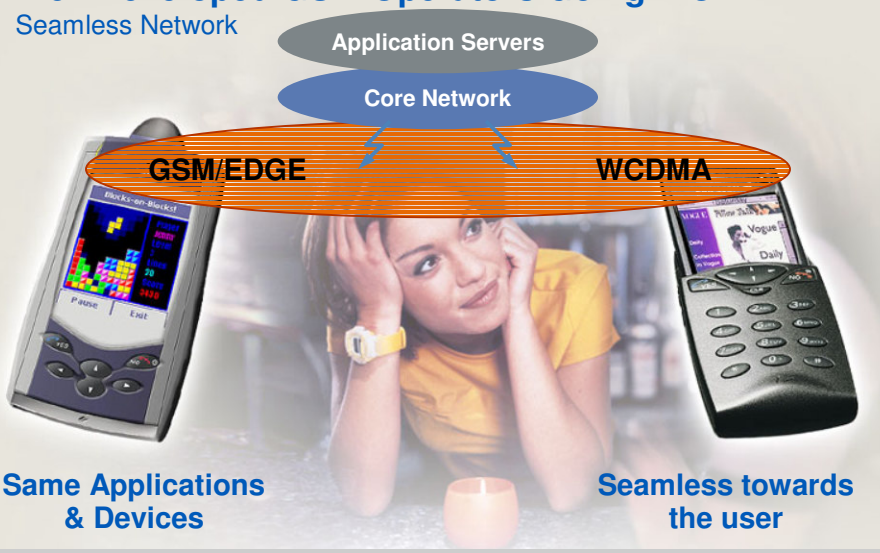
Well Developed GSM Operators Going WCDMA

Seamless Network



Same Applications & Devices

Seamless towards the user

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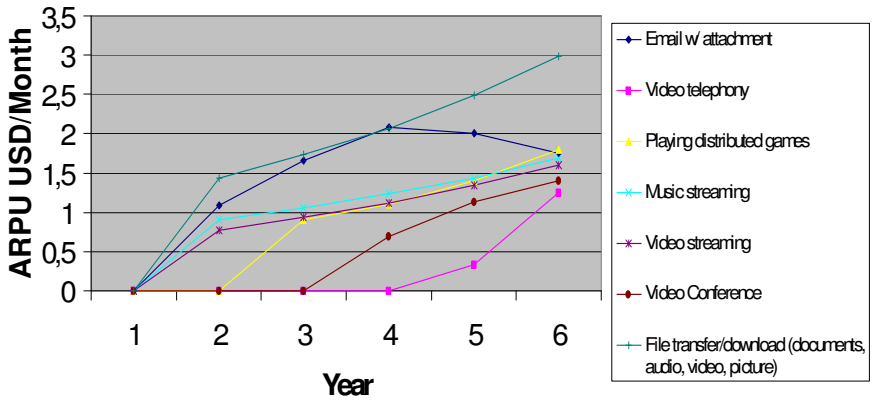
Well Developed GSM Operators Going WCDMA

ARPU per Service



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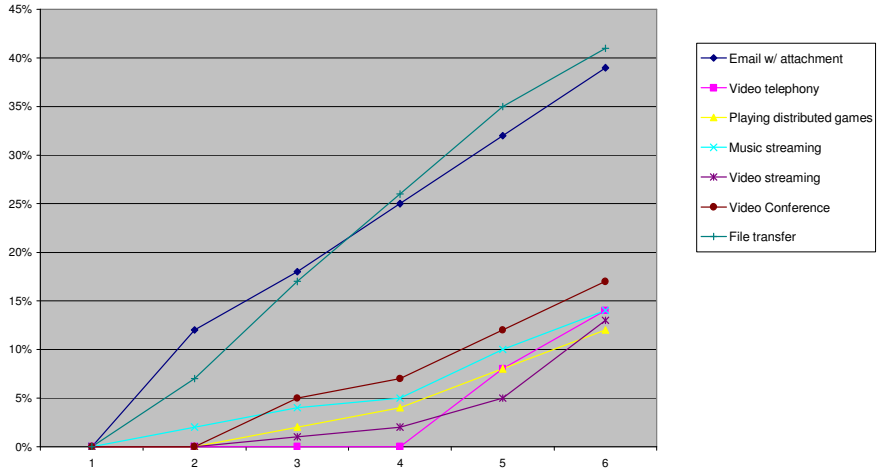
Well Developed GSM Operators Going WCDMA

Penetration of mobile users per service



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Serbia and Montenegro (former Yugoslavia)

The Republic of Serbia :

- Territory: 88.361 sq.km
- Population:
  - 7.5 mil. with 110 inh./sq.km
  - Belgrade with 2 mil.citizens
- GDP per capita 3000$ (2004)
- GDP yearly increase 13%

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Mobile operators status in Serbia

- 063 MOBTEL SRBIJA, Mobile Telecommunications "Srbija" BK-PTT, operates as a joint-venture company by :
  1. "BK Trade", Moscow (51% shares – *private capital*)
  2. *PTT* "Srbija" (49 % shares – *state capital*)
- 064 TELEKOM, Mobile Telecommunications of Srbija, operates as a joint-venture company by:
  1. *PTT* "Srbija" (80% shares – *state capital*)
  2. OTE Greece (20% shares – *private capital*)

*Cross ownership of the two operators by **PTT !***

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Mobile market in Serbia

GSM 900/1800 operators :

1. 063 MOBTEL (launched in 1996)
2. 064 Telekom Srbija (launched in 1998)

Total mobile subscribers: 4,7 millions (60% penetration)

Market share: 47/53 % (Mobtel/Telekom)

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Regulation in Serbia

- *Competion* market, increasing the benefits in terms of price and QoS, is not yet regulated completely.
- New Telecom Act is approved in April, 2003, designed on the basis of EU legislation *(licensing, interconnection, transparent, objective and no-discriminatory basis, open network provision on all hierarchical level, competion for the open market).*
- New Act is not yet put into force, since the management board of NRA is not yet approved by the Parliament.
- TELEKOM (incumbent) operates public fixed network and mobile network as well, with monopoly for fixed telephony until June, 2005. → *liberalization allowing new players!*
- No official anouncement has been issued for the *IMT-2000 license*, frequency bands are still *occupied* by other users.

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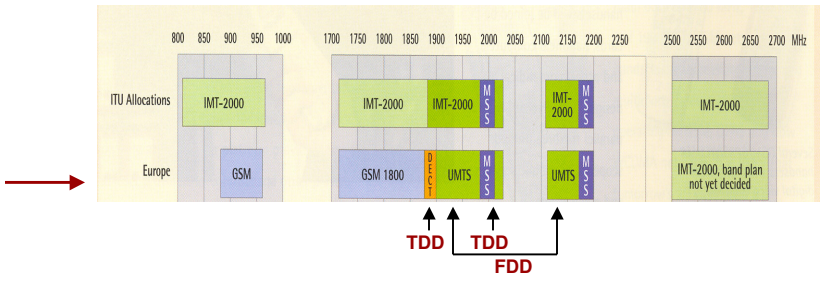
Frequency bands for UTRA (*UMTS Terrestrial Radio Access*)



1. 60 MHz x 2 for FDD = 1920-1980/2110-2170 MHz (up/down link)
2. 20 + 15 MHz for TDD = 1900-1920 + 2010-2025 MHz (up+down link)

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Frequency bands allocated in Serbia

- *Frequency Plan is adopted by the Authority in Serbia, quite fully in accordance with WARC/ITU and CEPT/ECC/ERC decisions and recommendations.*
- *Bands allocated for the UMTS/IMT-2000 network are:*

1.	1900 – 1939 MHz	UMTS TDD/FDD
2.	1930 – 1980 MHz	
3.	1980 – 2010 MHz	(mobile satellite component)
4.	2010 – 2025 MHz	UMTS TDD
5.	2110 – 2120 MHz	UMTS
6.	2120 – 2170 MHz	
7.	2170 – 2200 MHz	(mobile satellite component)
8.	2500 – 2520 MHz	
9.	2520 – 2655 MHz	UMTS
10.	2655 – 2670 MHz	
11.	2670 – 2690 MHz	

- *All bands are currently occupied and a negotiations with the User should be finalised before the licensing procedure start.*

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REGULATORY AGENCY

- **Set-up future requirements in the overall telecom sector regulation process**
- **Analyse the data from mobile market survey and define needs and demands**
- **Put into force the new Telecom Act → ASAP!**
- **Main priority is to remove measures that restrict competion**
- **Free the frequency bands for the IMT-2000 (UMTS) development**
- **Define the principles and methods for the licensing**
- **Define the preconditions of the licenses**
- **Define obligations related to the universal services**
- **Define the number of licenses, based on market potential**
- **Proceed with the licensing process!**

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Some key questions for 3G evolution/migration

- Licensing
- 2GHz frequency band occupied
- Transmission network evolution both for core and access network to meet requirements for increased flexibility, capacity and availability
- Terminals availability covering GSM/GPRS/EDGE/WCDMA (handsets and PCMCI cards)
- Readiness of operator's organizations for 3G (resources, competencies...)
- Evolution vs. migration
- CS & PS handovers
- Role of IMT-2000 in Corporate Social Responsibility:

The responsibility of the state/government, vendors, operators and regulators to support new technologies bringing new dimension of communications. Preparing for the Information Society inclusion. Mute&deaf people using video calls.

- Pilot 3G Network for Mobtel and Telekom Srbija

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Purpose of the Ericsson's Pre-Commercial WCDMA/UMTS System in Mobtel's Network

- Use of WCDMA/UMTS pre-commercial trial for different kinds of load and interoperability testing in order to prepare the operator's network for the fast 3G launch
- To give the opportunity to operators to:
  - Build up competence and get hands on experience of IMT-2000 networks and services
  - Implement and test end-to-end solution for a 3G system in compliance with 3GPP R99 specs
  - Look into integration issues, e.g. billing and customer care
  - Prepare for an early IMT-2000 launch - immediate transition to commercially ready-for-launch network
  - Hold market events

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WCDMA/UMTS Trial

Responsibilities:

Ericsson:

- 3G System:
  - Hardware
  - Software
  - Implementation services
  - Operation & Maintenance
  - Support

Mobtel:

- Licenses
- USIMs
- Terminals
- Transmission
- Floor Space
- Power Supply (except for RBSs)

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PART TWO

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Some key figures for Mobtel's network (March,05)

- **Standard**: GSM 900/1800, Phase 2+
- **Network size**: 7 MSC+1 TSC, 710 BTS
- **Release**: R10
- **GPRS**: in the whole network for post&prepaid, with roaming possibilities
- **EDGE**: in major cities and hot-spots
- **Vendor**: **ERICSSON** (*NSS, BSS, IN, PPS, WAP, MVPN, GPRS, MMS, MPS*)
  Comverse (*SMS, VMS*), **SIEMENS** *(BSS)*
- **Transport** network: MW (*PDH* Ericsson and Siemens, *SDH* Marconi)
- **VAS**: SMS-email, MMS, Internet, Intranet, GSM Pro, LBS, etc.
- **VMNO**: Astra Simit (company as service and applications provider)
- **Roaming**: 250 GSM and 73 GPRS commercial agreements
- **Billing**: BSCS Camel for roamers (**ATOS** Origin)
- **UMTS**: trial (**ERICSSON**)

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Mobile market in Mobtel's network (March, 2005)

Coverage by Mobtel's network	March 2005
territory coverage	***70%***
population coverage	***90%***

Mobile users	March 2005
Total *(HLR)*	2.250.000
Post-paid	350.000 *15.5 %*
Prepaid	1.900.000 *84.4%*
GPRS users *(in HLR)*	335.000
GPRS users *with active PDP in BH*	2.500
GPRS total traffic in BH	150 MB up + 400 MB dw = 550 MB
MMS *active* users	300.000
MMS/day	40.000

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Type of the Services and Applications available

- Mobile telephony with all the value-added applications,
- Voice Mail (VMS),
- Text messages transmission (SMS),
- Fax messages transmission,
- Data transmission over the GSM system,
- Direct access to Internet over WAP servers or over the GGSN/GPRS servers,
- Mobile virtual private networks (MVPN),
- e-mail messages transmission within the WEB and WAP neighborhood,
- SMS to email,
- GSM Professional, Mobile Positioning System,
- GPRS system supported transmission of the data of the flow up to 144 kbit/s,
- Multimedia messages (MMS) transmission over the GPRS system,
- Transmission of the voice and data over the EDGE system,
- Interactive services over the IVR machines,
- a number of other applications based on the sub-systems constructed.

➢ *All of the above listed services are available in both the Post-paid and Pre-paid system, including Roaming.*

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New services forecast till 2006.

Service	Year		
	2004	2005	2006
02	03	04	05
ISP			
WLAN			
EDGE			
M commerce			
VoIP International Traffic			
UMTS			
Connecting to Internet & Intranet			
Messaging : electronic mail & multimedia services			
Downloading Various Applications			
On-line Games			
Video Conferencing			
Location Tracking			
Video Streaming			
Video Surveillance			
Digital TV			
TV On Demand			
End-User IP Telephony			
WLAN Integration with the 3G network			

Test - Phase Promotional period Comercial operation

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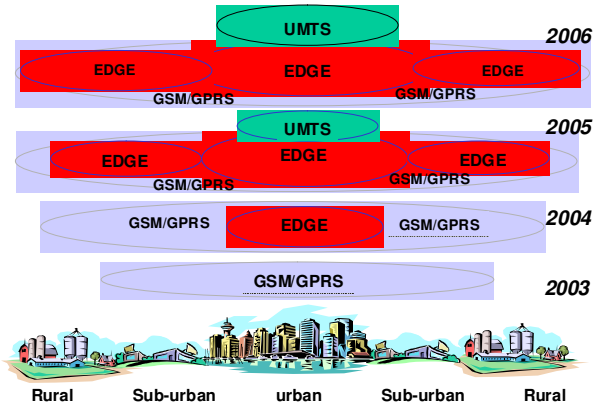
Mobtel's Business Plan with Gradual Introduction of the UMTS Relative to the GSM/EDGE



- *EDGE used as a complement to WCDMA*
- *Service Continuity*
- *Seamless Network*
- *Business aspects for rural areas*

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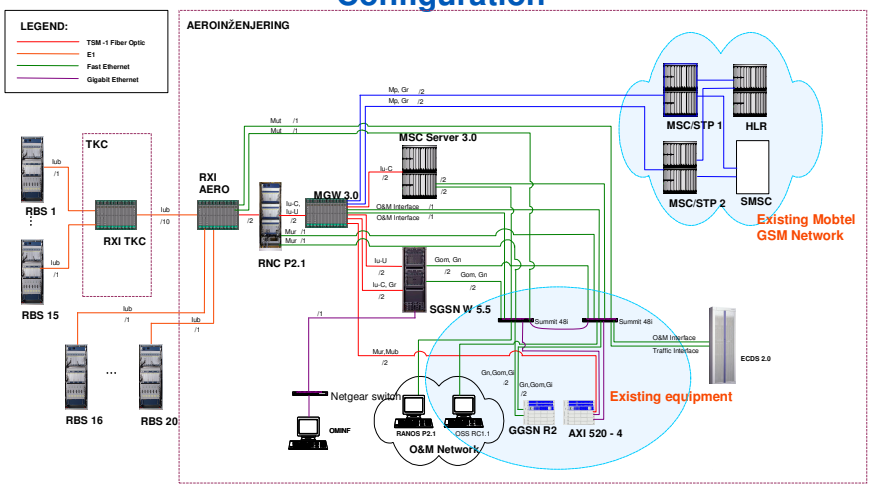
Mobtel – Ericsson 3G Network Diagram – Trial Configuration



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End-user services that could be offered

Basic Services	Voice
	SMS
	MMS
	Browsing
	Gaming
Video Services	Video/Music Streaming
	Mobile TV
	Video Download
Videocall	
"Rich Call" *	

* Possibility to use multimedia services during a voice call

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RAN Functionalities

Radio Access Bearers Supported:

Conversational RAB for AMR speech 12.2 kbps

Conversational RAB for 64 kbps multimedia

Interactive RAB, RB 64/64 kbps (UL/DL)

Interactive RAB, RB 64/128 kbps (UL/DL)

Interactive RAB, RB 64/384 kbps (UL/DL)

Streaming RAB for non-transparent Circuit Switched data, 57.6 kbps

Speech and Packet data RAB combination

GSM Handover:

UMTS to GSM Handover (Cell Re-selection, Voice, PS Data, MultiRab)

GSM to UMTS Handover (Cell Re-selection, Voice, PS Data)

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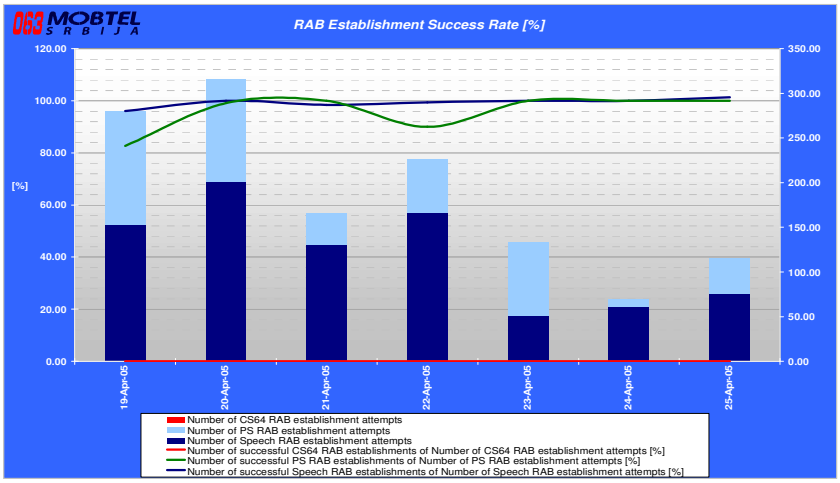
RNC Statistics Data in Trial UMTS on a Daily Bases
Succses of Establishment and Total Number of Attempts
CS & PS RAB



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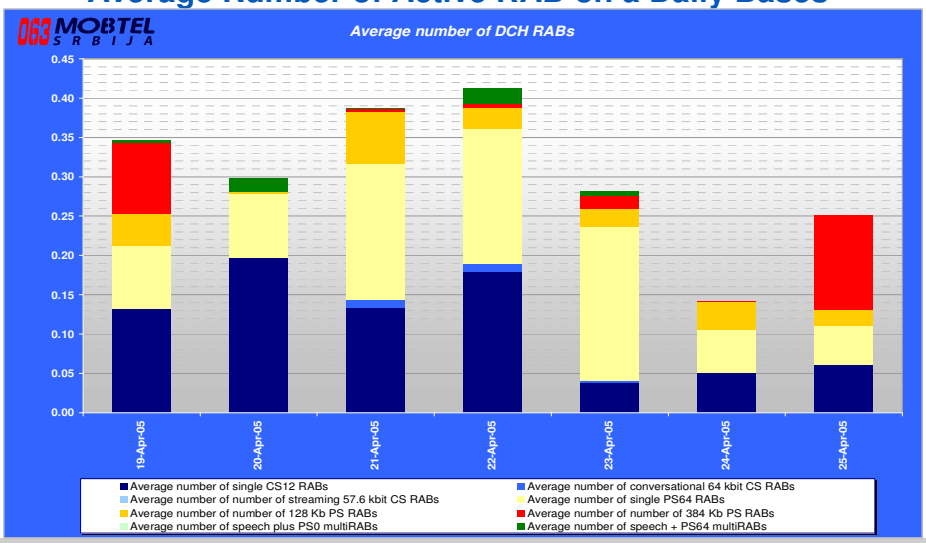
RNC Statistics Data in Trial UMTS
Average Number of Active RAB on a Daily Bases



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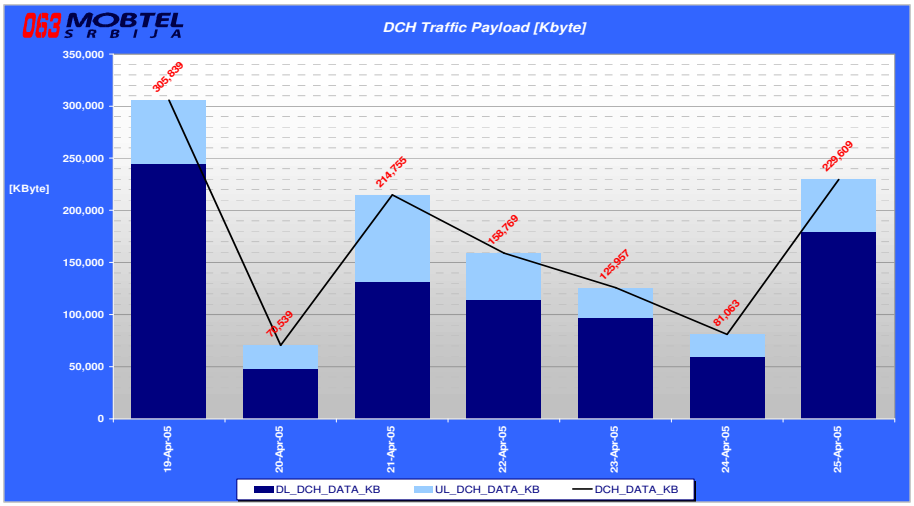
RNC Statistics Data in Trial UMTS on a Daily Bases DCH Channels - Uplink, Downlink and Total (UL+DL)



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Convergence Fixed and Mobile Service in MOBTEL

- Operators plan to combine wireless solutions with fixed telecoms and broadband,
- The path to fixed-mobile convergence is the concept's most aggressive proponent, using various technologies → time to trial,
- Based on a new core network architecture, like IP Multimedia System or all-IP technology,
- Mobtel realised IP-based fixed/mobile network integration: connecting company's PBX to a local softswitch to enable "on net" calls and treating ordinary extensions as a cellphones.

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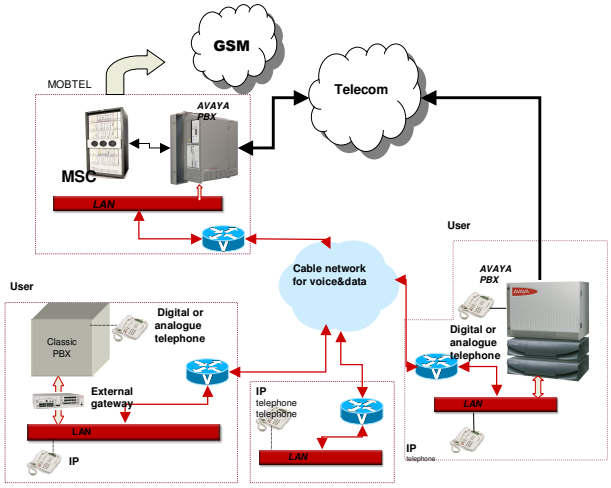
Convergence Fixed/IP Telephony and Mobile in MOBTEL experimental network



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MOBTEL's MISSION

Development of the Company and
its network with IT support
goes in direction of providing
the best possible quality support
to the Mobtel Company's end-users
by offering them the communication options based
on the latest-technology
including multimedia applications.

Technological innovations in the mobile telecoms sector are becoming a great challange, hard to cope with in developing countries !

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Thank you for your attention !
ASANTE SANA!

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