Deployment Steps for a Successful UMTS Launch

Example of Orange France Network

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Agenda

- Main principles of phase 1 UMTS
  From GSM to GSM/UMTS
- Technical process for the roll out of the Orange France UMTS network
- Services provided by the Orange France UMTS network
- Next steps

Main principles of phase 1 UMTS

From GSM to GSM/UMTS

UMTS Phase 1

General points

- UMTS phase 1 :

  The Core Network is an evolution of the GSM/GPRS Core Network : a MSC is used for the circuit services; SGSN and GGSN are used for the packet services

  The radio system is entirely new; it includes two modes

  > WCDMA, Frequency Division Duplex (FDD) for the paired spectrum
  > TD-CDMA, Time Division Duplex (TDD) for the unpaired spectrum

  MAP is common to GSM and UMTS, this allows the GSM/UMTS roaming

- 3GPP defined one standard common to UMTS phase 1 Core Network and to GSM Release 99 Core Network

  As a consequence the advantages of GSM (services, SIM card, interfaces …) have been kept for UMTS

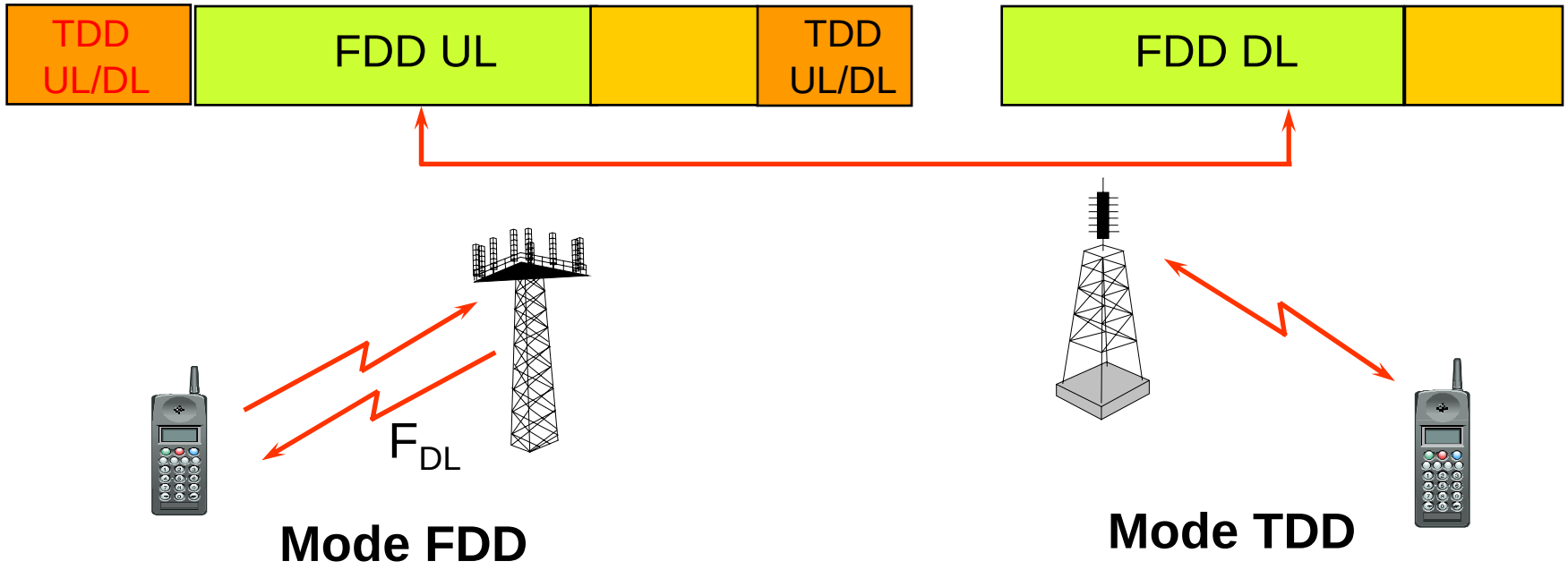
UMTS Radio Access 1/2

- New throughputs at the radio interface : 8 kb/s, 64 kb/s, 128 kb/s, 384 kb/s
- WCDMA uses the following radio resources: 1920-1980 MHz and 2110-2170 MHz.

  15 Mhz duplex (three carriers) are used by Orange France for WCDMA

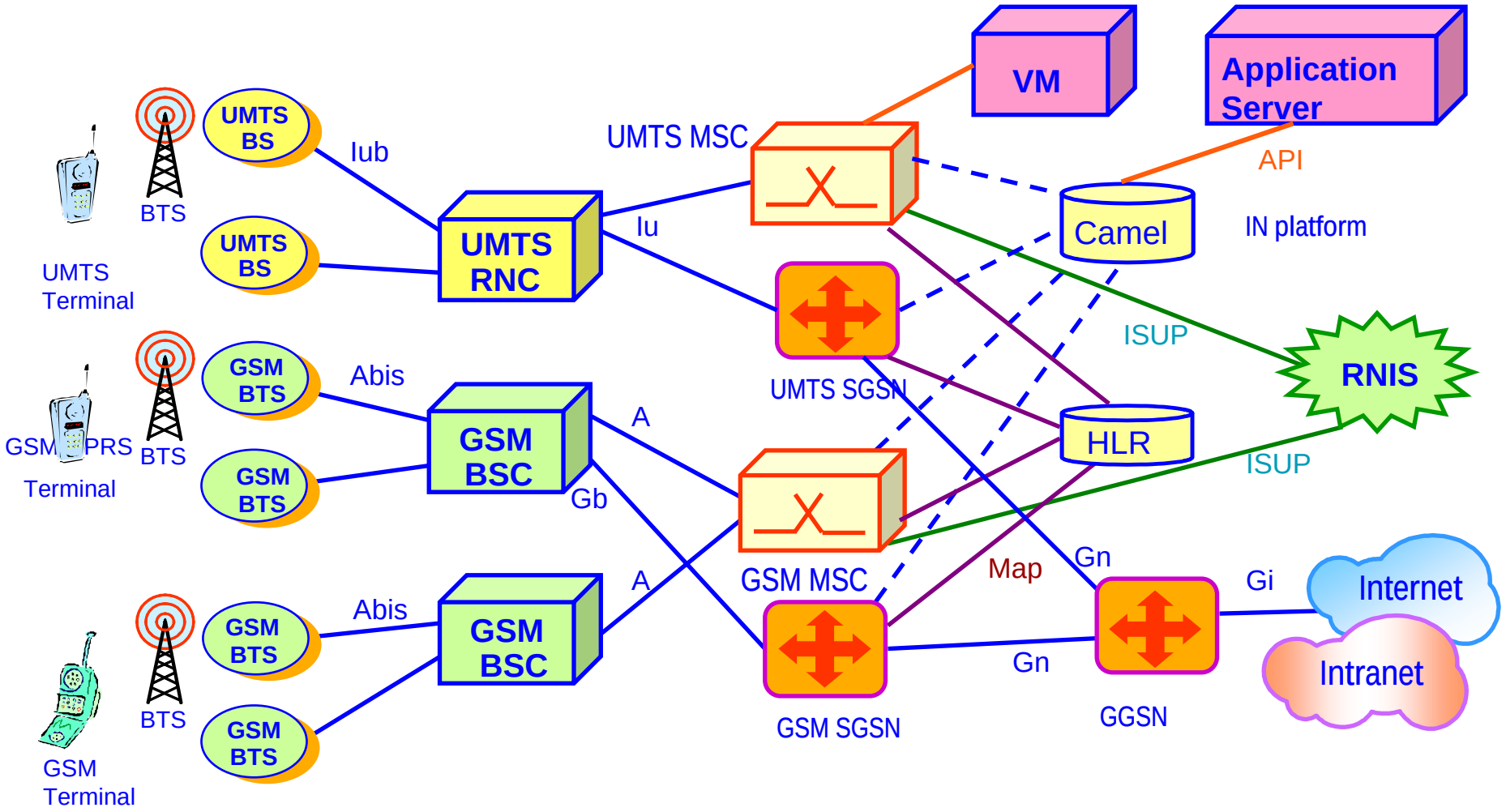
  UMTS provides new radio resources allowing to accommodate higher traffic demands

UMTS Radio Access 2/2



- W-CDMA, FDD mode (Frequency Domain Duplex) in the paired bands (2x60 MHz)
- TD-CDMA TDD mode (Time Domain Duplex) in the unpaired bands (35MHz)

The Architecture of UMTS Phase 1



The architecture of a R99 UMTS network is similar to the one of a GSM network. In a first phase the two Core Network are separated. Then we will migrate towards an architecture where the Core Network is common to GSM and UMTS radio accesses. Most of our value added services are already common to GSM and UMTS

Four facts about UMTS

- Core Network common to GSM and UMTS
- The radio system is completely new, therefore new equipments shall be rolled out
- UMTS provides a continuous coverage, this is a cellular coverage comparable to a GSM coverage
- UMTS allows new radio resources for the operators

From GSM to GSM/UMTS

The efficient path to 3G

- For the GSM operators UMTS allows a smooth migration from 2G to 2G and 3G
  - Dual mode mobile stations
  - Core Network common to GSM and UMTS
  - Reuse of 2G services
- As MAP is common to GSM and UMTS, the success of GSM roaming can be kept and extended
  - UMTS subscribers will benefit from the GSM foot print + Japan + Korea

Technical process for the roll out of the Orange France UMTS network

Some characteristics of the Orange France Radio deployment

- When UMTS service is offered in a city, the UMTS radio coverage is provided as well in the surroundings of this city meaning that suburban areas and rural areas around this city are covered as well
  - The definition of this marketing areas relies on the experience that we deduce from the behaviour of our GSM subscribers.

- Most of the existing GSM sites should be reused, they should be turned in GSM/UMTS sites (GSM/UMTS cositing)
  - When the existing GSM grid is not sufficient to provide the throughputs necessary in a given area, some pure UMTS sites are added.

- As we use GSM/UMTS cositing we had to verify that the two radio systems can coexist
  - In order to guarantee that, we performed tests in September 2001 on three sites of our UMTS trial network which were as well sites of our GSM commercial network.
  - Both the analysis of the counters and the different measurements showed that the UMTS equipment do not cause any quality degradation on the service provided by the collocated GSM equipment.

General process deduced from our studies, our technical tests and services trials

- The different IOT shall be ensured

  on the network side

  > With our different trials we ensured the interworking between Alcatel UTRAN and Ericsson CN, between Nokia UTRAN and Ericsson CN, between Nortel UTRAN and Ericsson CN

  > We ensured the 3G/2G handovers between radio infrastructures from different manufacturers, after that it is necessary to optimise the compressed mode parameters

  and

  between the network and the terminals

  > We use the GCF certification. In addition we perform some complementary tests

- After the network is rolled out in a given area, the following steps shall be performed :

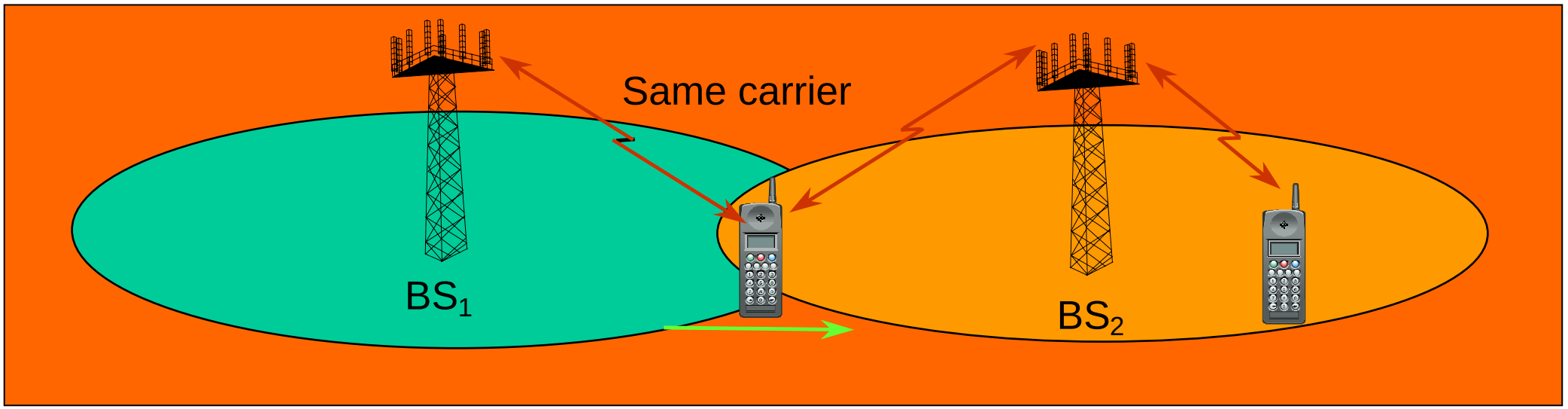
  Radio optimisation

  Test of the radio optimisation

  Test of the end to end Quality of Service

Soft Handover

- On the cell border an MS establishes more than one radio link, this improves coverage and capacity

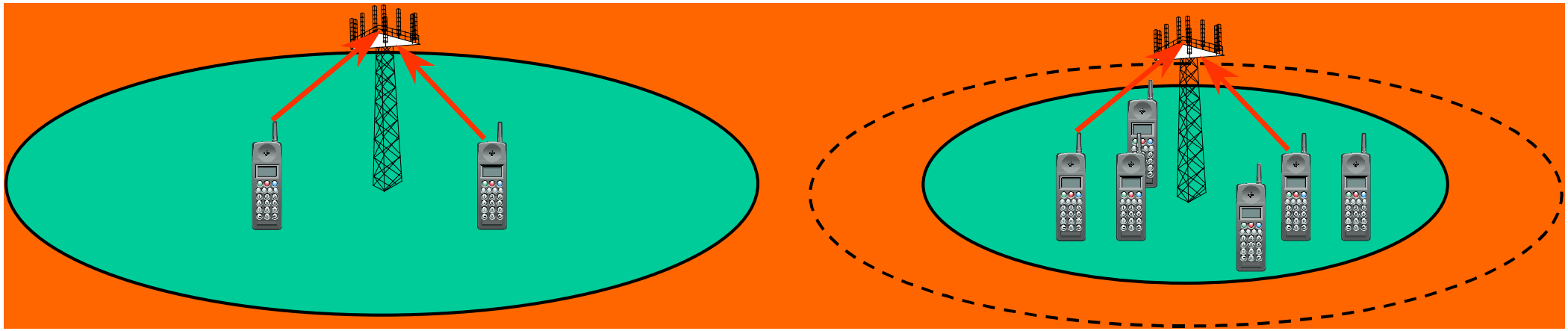


Coverage and capacity

- The coverage may reduce when the traffic increases
  « Cell Breathing »

- Power Control
  Transmitted power shall vary in order to reach the desired radio quality
  It shall be minimum in order to minimise the global interference

- Load control



Main steps of the Radio optimisation process

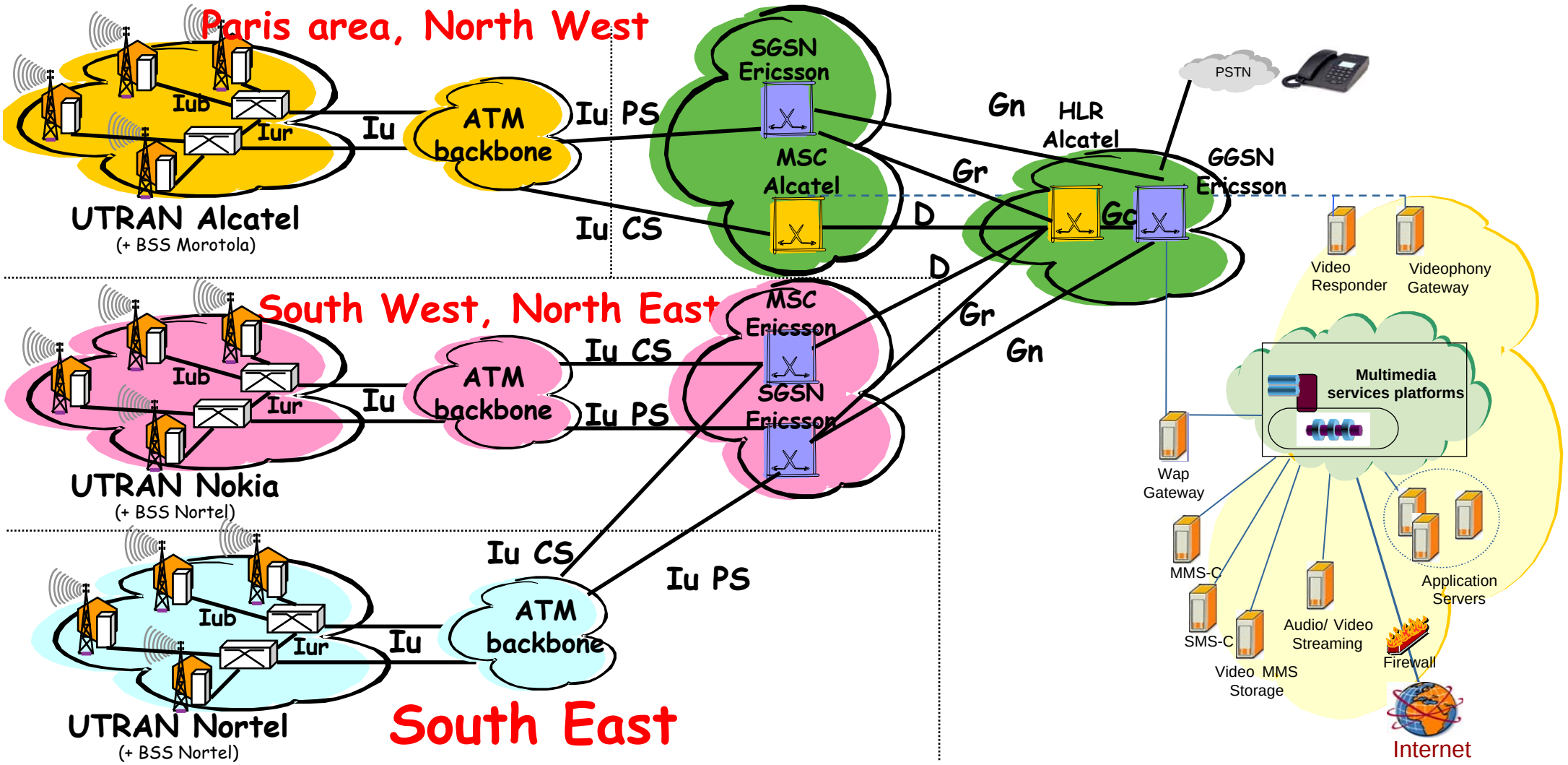
- First step of the radio optimisation : antenna tuning
  Antenna tilts, antenna azimuths …
- Further steps : parameters tuning
  Power transmitted by the common channels, handover algorithms
- Then an audit of the radio optimisation shall be performed
  Measurements are performed in both loaded and unloaded conditions
  Measurements are performed in outdoor conditions and in indoor conditions

The QoS Indicators

- Orange based their contractual KPIs on measurements which describe the customer perception

- Circuit switched domain
  - Success rate of voice calls connections
  - Success rate of visiophony calls connections
  - Success rate of voice calls maintained during X minute(s)
  - Success rate of visiophony calls maintained during X minute(s)
  - Success rate of voice calls presenting a correct voice quality
  - Voice calls connections times
  - Visiophony calls connections times
  - All the performance are measured in MO, MTC and MTM cases
- Packet switched domain
  - Success rate of internet connections
  - Internet connections times
  - Downloading times of an HTML pages
  - E-mail transmission times
  - E-mail reception times
  - Throughputs measurements; the purpose of these indicators is to ensure that the actual throughputs are close to theoretical values (e.g. 64UL/128DL, 64UL/384DL, 128UL/384 DL …)

The Orange France manufacturers



Feature and services in the Orange France Network

- GSM and GPRS services have been implemented in the Orange France UMTS network

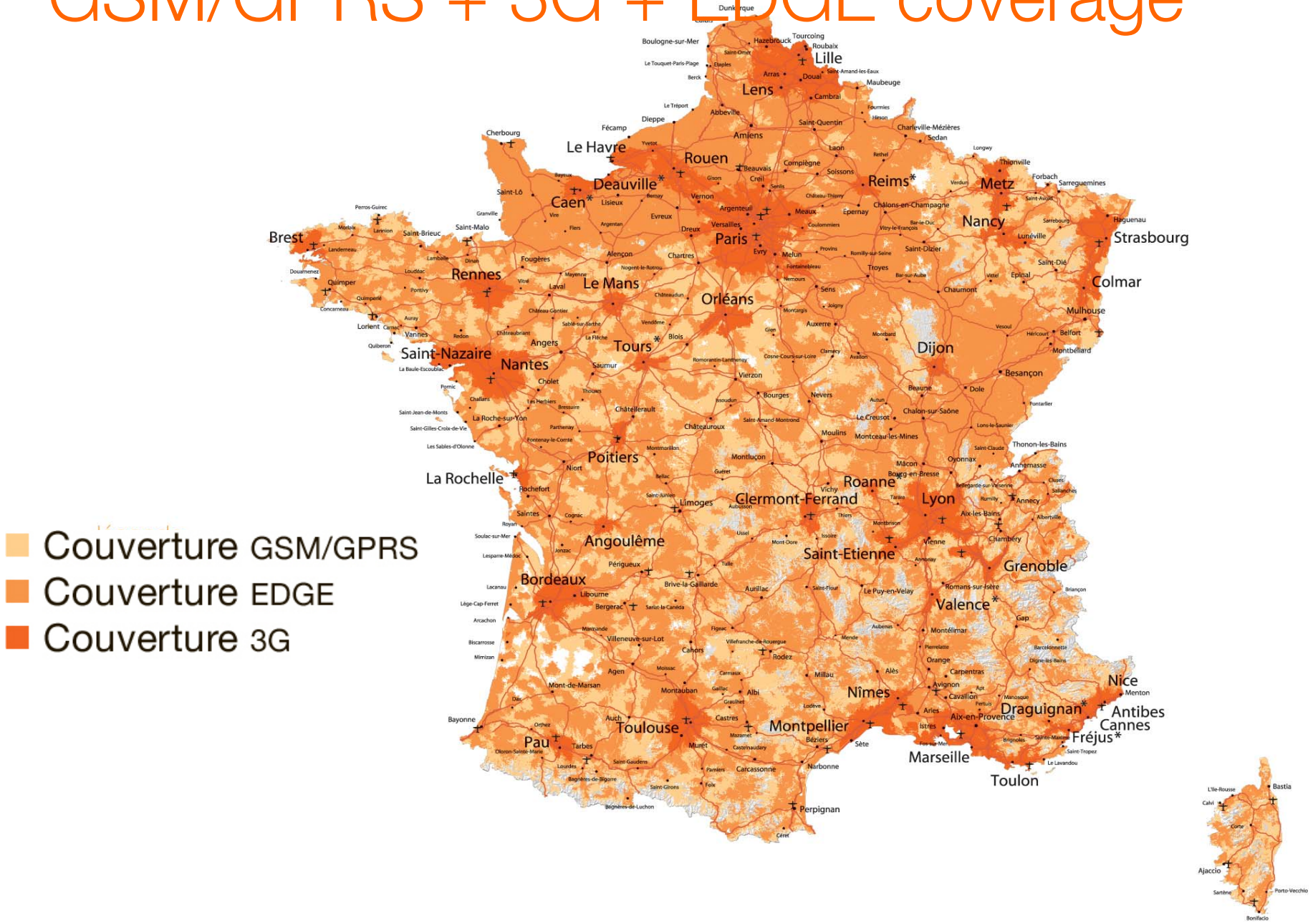
  Speech, SMS, Voice Mail, supplementary services, CAMEL features, SIM toolkit, MMS, WAP services, WEB browsing, data transfer.

- Some of these services will be improved by the use of the high throughputs provided by UMTS

- In addition we provide innovative services

  Video telephony
  Live TV
  Audio/video streaming
  Download of multimedia content (including video)
  Infotainment (WAP pull; MMS push)
  Off-line games, on line games
  Video messaging via MMS
  Live sport Event
  Video responder
  Presence
  Email

GSM/GPRS + 3G + EDGE coverage



Continuity of service

- GSM/UMTS dual mode features (selection/reselection and handover) are implemented in both the infrastructures and the terminals. Services fallbacks are implemented in order that the UMTS subscribers can benefit from the GSM coverage

- For speech the GSM/UMTS handover ensures the continuity of service in both directions with terminals compliant to Release 99

- Packet on DCH, from UMTS to EDGE/GPRS
  The service may continue on EDGE/GPRS but the throughput will evidently be lower

- In R99, as specified in TS24.008, fallback from digital (UDI) H.324 call to speech (video call) **is not supported** A H.324-M (UDI/RDI multimedia) video call between two mobiles cannot continue on GSM.
  This fallback may be possible with release R5

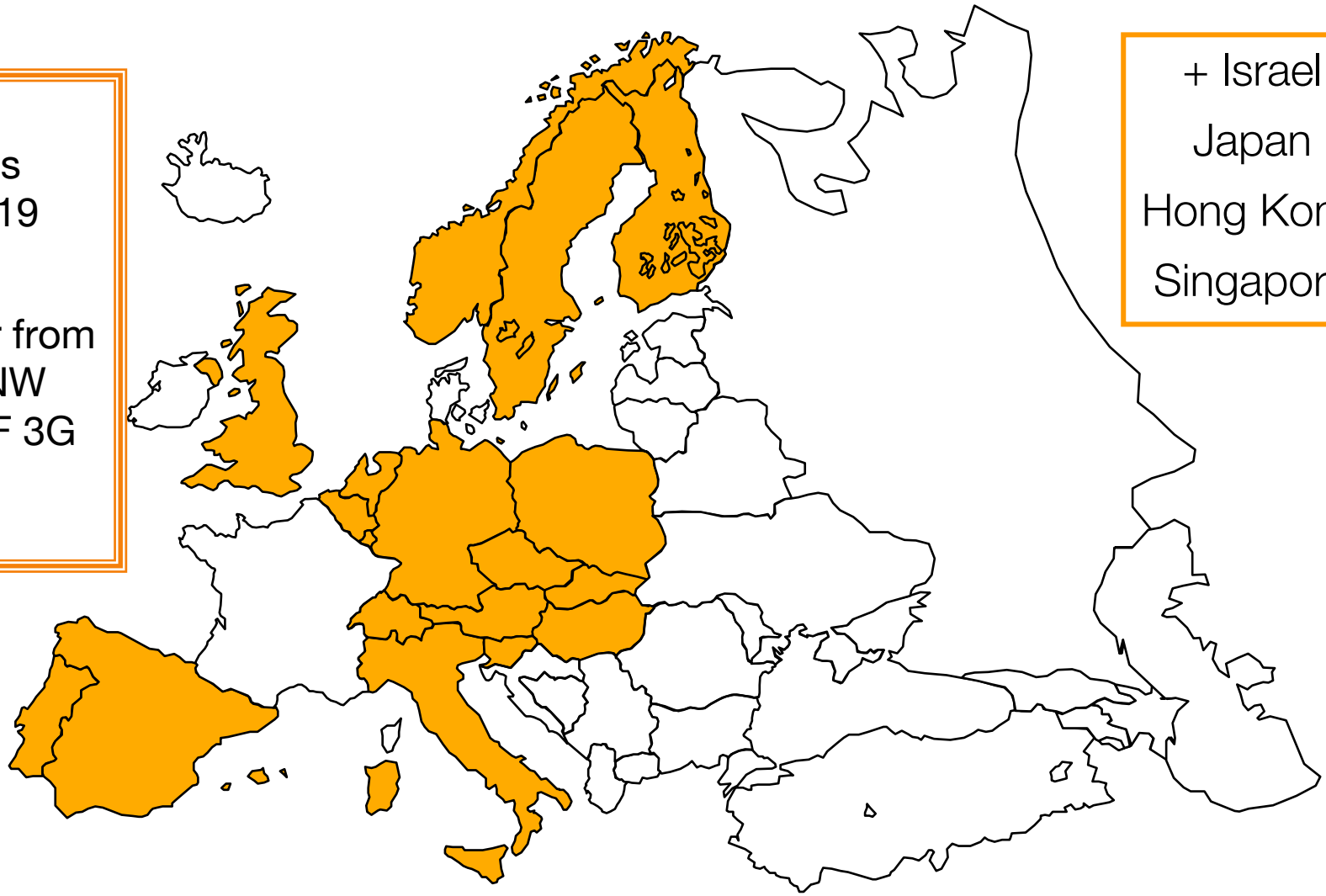
Roaming

- When using a GSM/UMTS terminal, the UMTS subscribers of OrangeFrance are offered a world coverage
  - They benefit from the present GSM roaming agreements concluded between OrangeFrance and the GSM operators
  - This is possible because the MAP protocol is common to GSM and UMTS
- Roaming agreements have been concluded with other UMTS networks

Roaming 3G footprint

27 3G commercials roaming agreements with 27 partners in 19 countries

3G Inbound roamer from some non partner NW are refused from OF 3G NW (cause#15 is activated)



+ Israel

Japan

Hong Kong

Singapore

Services provided by the Orange France UMTS network

More images for the best customer experience

2001 | 2002 | 2003 | 2004 / 2005

Black & white

-- Orange.fr--

Evénements
Chercher …
Gallery>>
Chat/Mail (✉ 1)
Sonneries/Logos
Jeux/Musique
Actu/Météo
Sport
Cinéma/Sorties

Colour

Rich media

Video **TV** **Music**

Combined with 3G, the Orange World Video portal has multiplied by 20 the number of video sessions.

Live TV - 50 channels, largest offer on the market

Orange exclusive

Other channels

An all in image portal

Portal Richness and animation

9 themes

More than 45 programmes

300 new videos per week

HP refresh

- **many times a day to push the right content at the right time**
- **video programmes and pushes are managed like TV or radio channels do**

Feature and Services for the business market

- For the internet access we feature up to 128 kb/s uplink and 384 kb/s downlink
  These throughputs are available both with a UMTS/GPRS PCMCIA card and with a classical handset
- Innovative and efficient services relying on high throughputs at the radio interface
  - Intranet access, email with attachments
  - Access to the personal environment (mail, agenda)
  - Multimedia messaging with picture and video
  - web conferencing
  - Videotelephony towards fixed and mobile terminals

Example of Orange France Network

New Orange Intense handsets – Retail prices from 69 to 399 €

EDGE

Samsung D500E

- 1, 3 Mpixels
- MP3
- Bluetooth

Samsung E350

- MP3
- Bluetooth

Samsung E360

- MP3
- Bluetooth

3G EDGE

Nokia 6630

- 1, 3 Mpixels
- MP3
- VT Craddle
- Bluetooth

Nokia 6680

- 1,3 Mpixels
- MP3
- VT
- Bluetooth

3G

Samsung Z500

- 1, 3 Mpixels
- MP3
- VT
- Bluetooth

LG L 8210

- 1, 3 Mpixels
- MP3
- VT
- Bluetooth

Motorola A1000

- 1st 3G Smartphone
- 1, 3 Mpixels
- MP3
- VT
- Bluetooth

Additional Edge, 3G/Edge and 3G handsets will extend the range in Q3/Q4

Next steps

HSDPA, HSUPA, All IP architecture, spectrum issues …

HSDPA

- Main characteristics of HSDPA
  - Better radio resource efficiency on the downlink
  - High peak rate per carrier, up to 14 Mbps theoretically
  - Flexible sharing of resources between the MSs
- Smooth Introduction in the Network
  - No impact on the HW (except impact due to traffic increase)
  - HSDPA on a dedicated carrier for already highly loaded cells for best user experience… possibly on a mixed carrier otherwise
  - Require the right set of feature for Iub transmission
- High speed **Downlink** Packet Access, then …
  - High Speed **Uplink** Packet Access will come soon
  - Combination of HSDPA and HSUPA

Spectrum to improve coverage

- UMTS/IMT-2000 remains to be introduced in many markets including the largest developing countries
  - In these markets, the introduction will be facilitated by the availability of the appropriate frequency spectrum in the lower bands
- RRC-06 and WRC-07 offer a unique opportunity to harmonise spectrum in the 500 MHz range for mobile service
  - The transition from analogue to digital broadcasting is expected to set free some spectrum, so called ‘digital dividend’
  - This ‘digital dividend’ or parts of it could be allocated to Mobile Service and identified for IMT-2000 by WRC-07 e.g. 470 – 600 MHz
- Mobile communication could contribute to the development of lower population density areas provided that
  - they benefit from an enabling regulatory environment and globally harmonised spectrum within 470-600 MHz band


gracias
grazie
tak
merci
danke
thank you
obrigado
orange™