Regional Development Forum 2008

"Bridging the Standardization Gap in Developing Countries"

Brasília, 19-20 May 2008

ITU Radiocommunication Standardization Activities

Fabio Leite
Deputy Director
ITU Radiocommunication Bureau

International
Telecommunication
Union

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ITU Radiocommunication Standardization Activities

- **Radio standardization gap**
  - ➤ Facts
- **ITU radio standardization activities**
  - ➤ Participation
  - ➤ Radio Regulations & Standards
- **Standards making**
  - ➤ Processes & practices
  - ➤ New directions
- **Radio standardization gap**
  - ➤ Way forward

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RESOLUTION 123 (Rev. Antalya, 2006): Bridging the standardization gap between developing and developed countries

recognizes

- the continued shortage of human resources in the standardization field in developing countries, resulting in a low level of developing-country participation in ITU-T and ITU-R meetings and, consequently, in the standards-making process, leading to difficulties when interpreting ITU-T and ITU-R recommendations;

- the ongoing challenges relating to capacity building, in particular for developing countries, in the light of rapid technological innovation and increased convergence,

- that developing countries could benefit from improved capability in the application and development of standards;

- that ITU-T and ITU-R activities and the ICT market could also benefit from better involvement of developing countries in standard-making and standards application.

Advantages of radio standardization:

> interoperability (harmonized spectrum & equipment interfaces)

> lower costs (economy of scale)

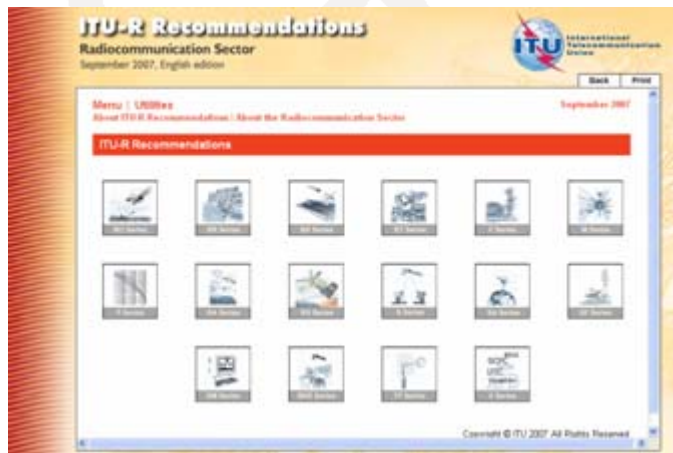> interchangeable equipment (multi-vendors)

> use of established best-practices

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Objectives of ITU-R Study Groups

Develop technical bases
for radio conferences

→ **CPM process
for WRCs**

Establish Recommendations

International voluntary *standards* on:
- **spectrum management**
- **system characteristics and operation**

**ITU-R represents:
International focal point for
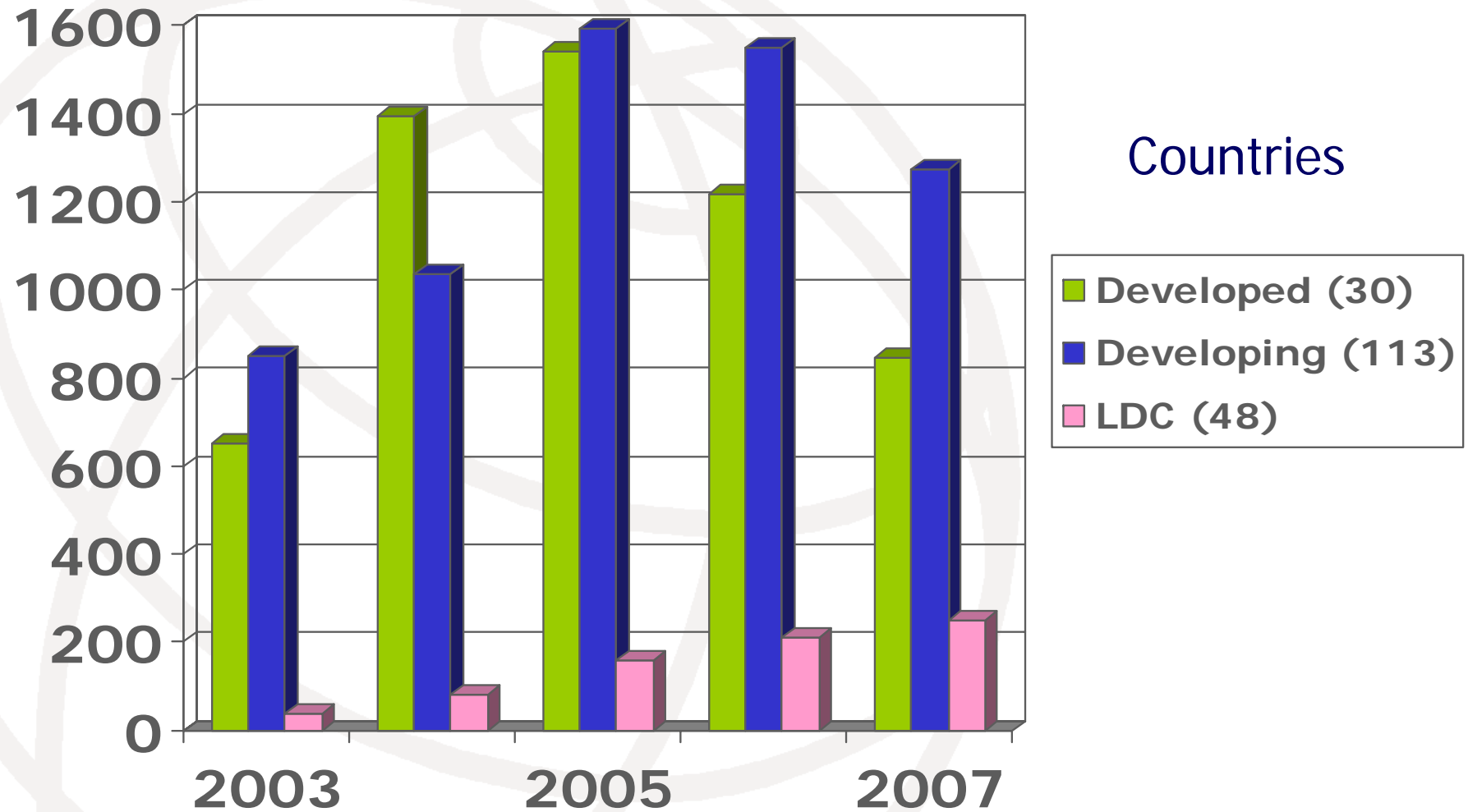standardization of wireless systems**

Compile Reports and Handbooks

Participation

Delegates in ITU-R Study Group meetings

Countries

- Developed (30)
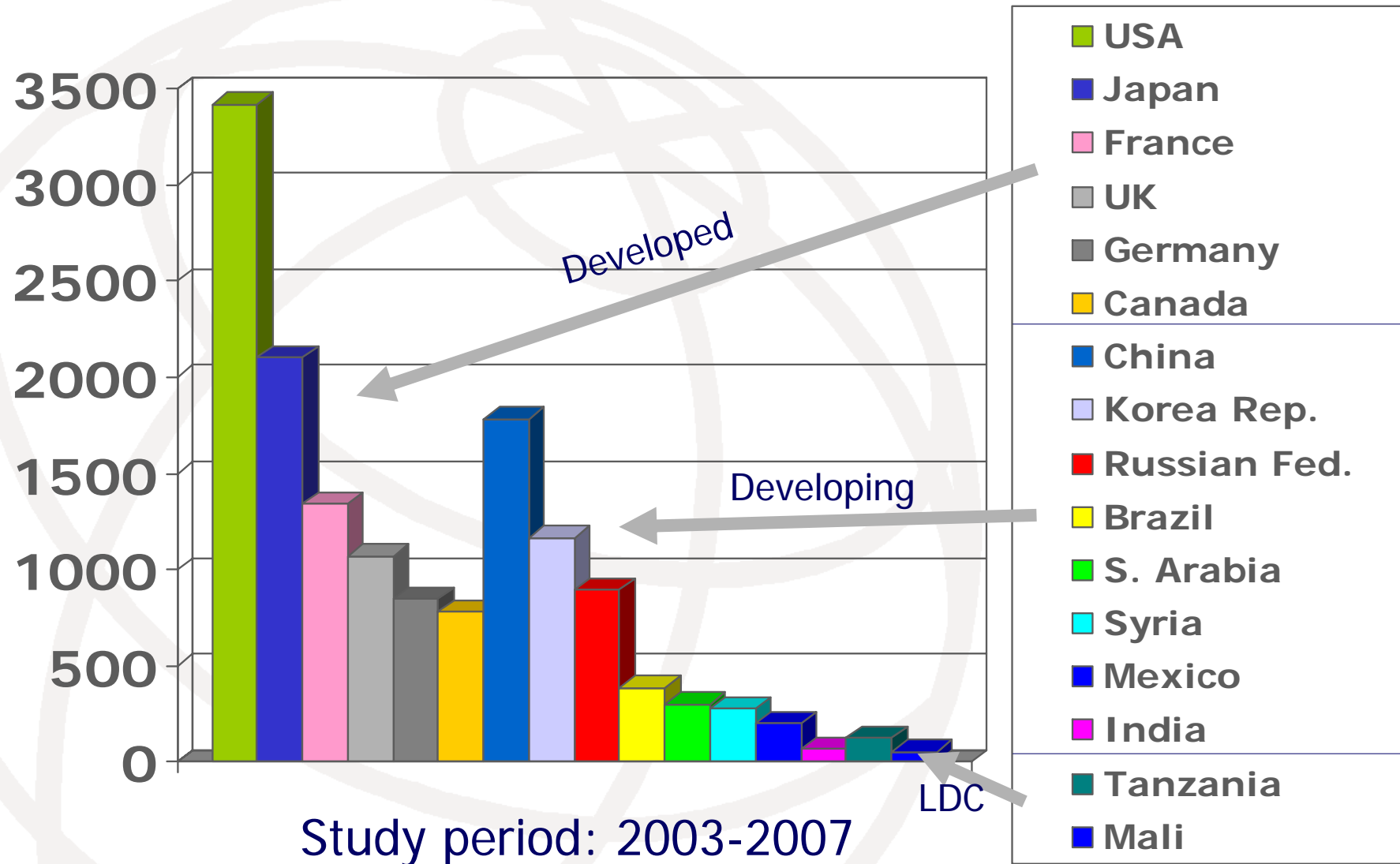- Developing (113)
- LDC (48)

Participation

Delegates in ITU-R Study Group meetings

Developed

Developing

LDC

Study period: 2003-2007

Legend:
- USA
- Japan
- France
- UK
- Germany
- Canada
- China
- Korea Rep.
- Russian Fed.
- Brazil
- S. Arabia
- Syria
- Mexico
- India
- Tanzania
- Mali
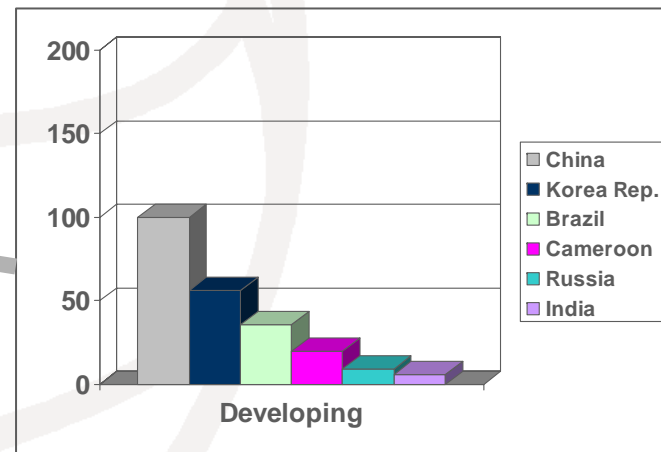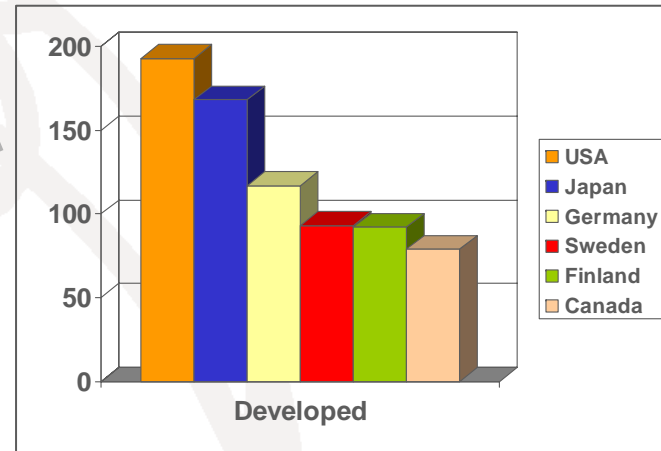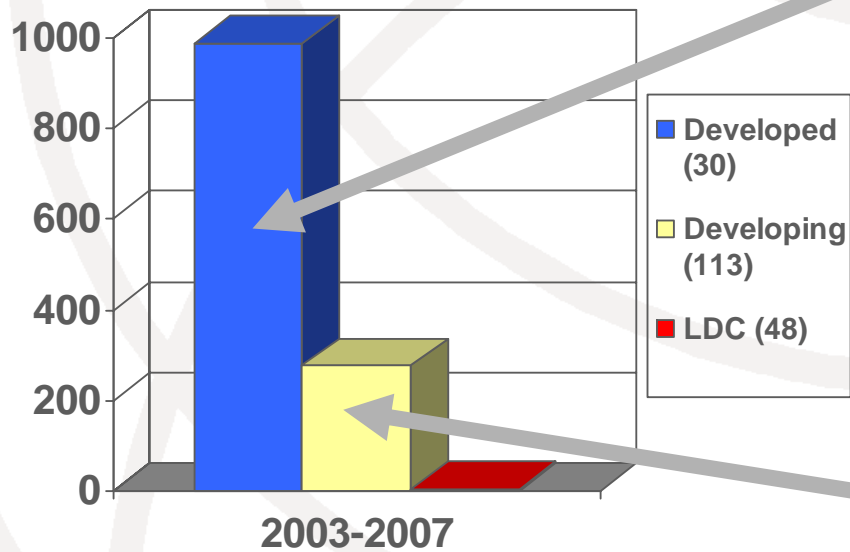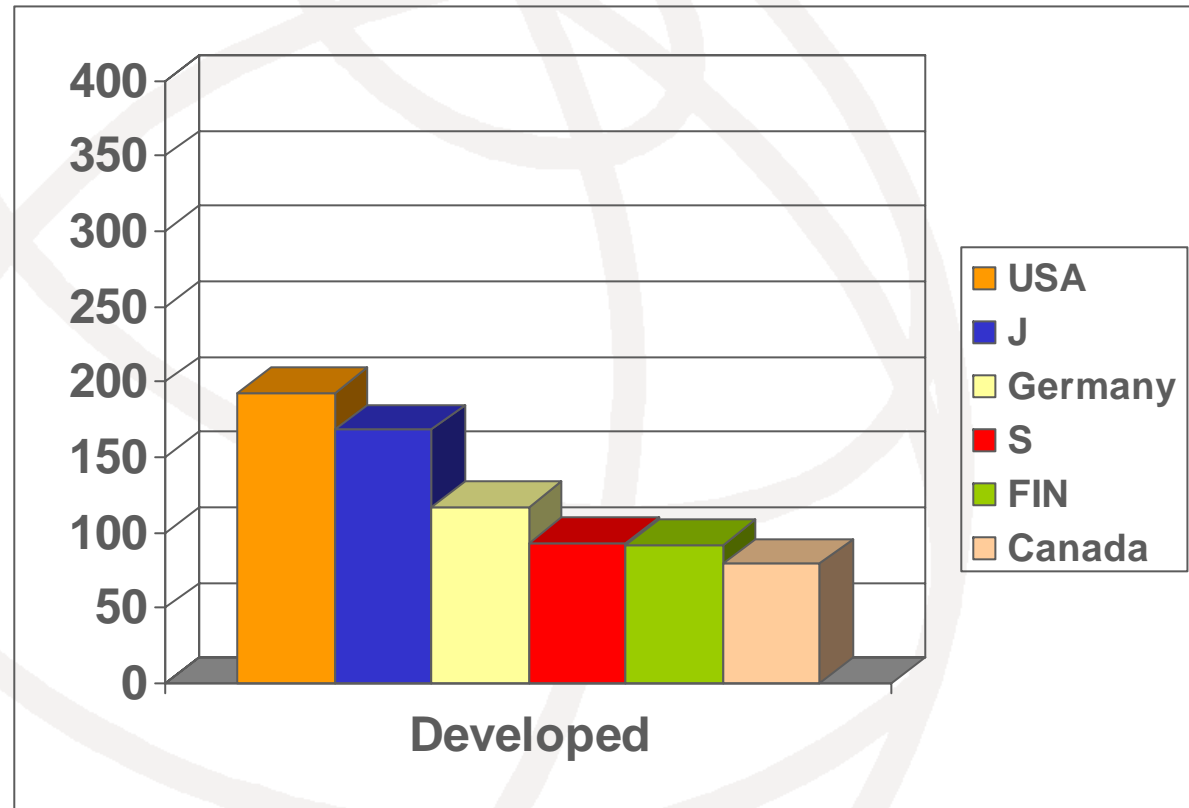
ITU-R Sector members

Operators (130)   Manufacturers (74)   Regulators (4)

Full list at: http://www.itu.int/cgi-bin/htsh/mm/scripts/mm.list?_search=SEC&_languageid=1

Radio Regulations (RR)

The **Radio Regulations** (*treaty status*) incorporates the decisions of the World Radiocommunication Conferences, including all Appendices, Resolutions, Recommendations and ITU-R Recommendations incorporated by reference.

➤ Frequency block **allocations** to defined radio services (Article 5)

➤ Mandatory or voluntary **regulatory procedures** (coordination, plan modification, notification, recording) that are adapted to the allocation structure

ITU Member States

Revisions to the
Radio Regulations

RA

Final
Acts

Rec

CPM
Report

WRC

CPM-2

Director

**Radiocommunication
Bureau**

RRB

WRC
Resolu-

SC and Study Groups:
SG-1: Spectrum management
SG-3: Radiowave propagation
SG-4: Satellite services
SG-5: Terrestrial services
SG-6: Broadcasting service
SG-7: Science services

CPM-1

ITU-R Recommendations
Radiocommunication Sector
September 2007, English edition

Menu | Utilities

ITU-R Recommendations

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CPM:	**Conference Preparatory Meeting**
Rec:	**ITU-R Recommendation**
RoP:	**Rules of Procedure**
RR:	**Radio Regulations (treaty status)**

RRB	**Rad**
SGs:	**Rad**
SC:	**Spec**
RA:	**Rad**
WRC:	**World Radiocommunication Conference**

Council

RR & ITU-R Recommendations
(Principle of "incorporation by reference" of Res. 27 (Rev. WRC-07))

5.447F   In the band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU−R M.1638 and ITU−R RS.1632. (WRC-03)

M.1638: Characteristics of and protection criteria for sharing studies for radiolocation, aeronautical radionavigation and meteorological radars operating in the frequency bands between 5 250 and 5 850 MHz

RS.1632: Sharing in the band 5 250-5 350 MHz between the Earth exploration-satellite service (active) and wireless access systems (including radio local area networks) in the mobile service

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✓ **Mobile (cellular) communications**
- IMT (IMT-2000 & IMT-Advanced)
- Intelligent Transportation Systems (ITS)

✓ **Broadband Wireless Access (BWA)**
- fixed & mobile (terrestrial) & satellite

✓ **Digital Broadcasting**
- Mobile TV

✓ **Spectrum management**
- Software-Defined/Cognitive Radios

✓ **Emergency communications**
- Climate Change

Software-Defined Radio

A radio is considered to be a SDR if some or all of the baseband or RF/IF signal processing is accomplished through the use of digital signal processing software and can be modified post manufacturing.
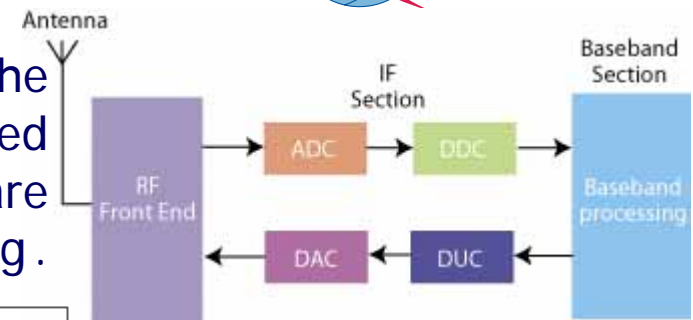
Report ITU-R M.2117 "Software defined radio in the land mobile, amateur and amateur satellite services"

Resolution 956 (WRC-07)
"Regulatory measures and their relevance to enable the introduction of software-defined radio and cognitive radio systems"

WRC-11 Agenda Item 1.19: consider regulatory measures and their relevance in order to enable the introduction of SDR/CRS.
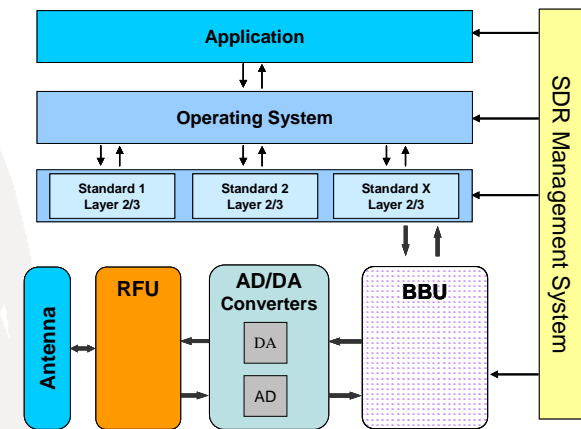
Baseband unit (BBU), Analogue-to-Digital/Digital-to-Analogue (AD/DA) converter unit, Radio Frequency Unit (RFU) and the antenna system.

IMT-2000 framework

✓ Legal

- • Spectrum identification in the ITU Radio Regulations: lower (450-470 & 698-960 MHz), medium (1 710-1 885, 1 885-2 025, 2 110-2 200, 2 300-2 400, 2 500-2 690 MHz) plus satellite component global bands; higher (3 400-3 600 MHz, some countries & with sharing constraints)

✓ Technical

- • Recommendation ITU-R M.1457 - Detailed specifications of the radio interfaces of IMT-2000
- • Recommendations ITU-R M.1580 & ITU-R M.1581 - Generic unwanted emission characteristics of base & mobile stations using the terrestrial radio interfaces of IMT 2000

✓ Operational

- • Recommendation ITU-R M.1308 – Evolution of land mobile systems towards IMT-2000
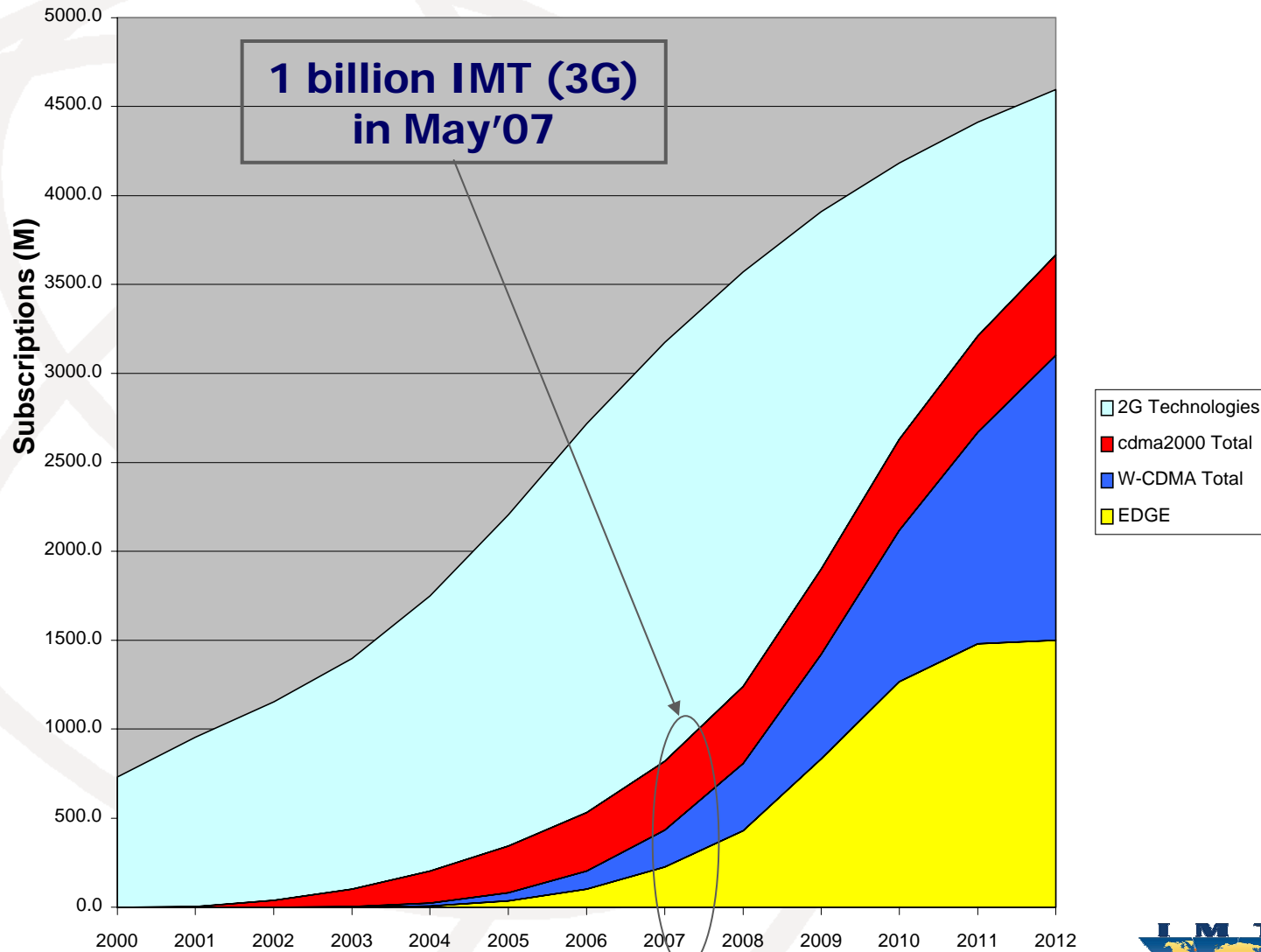- • Handbook - Migration to IMT-2000 Systems

IMT-Advanced schedule
for the development of radio interface Recommendations

WP 5D meetings

2008			2009			2010			2011
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10

Step 1 and 2
(0)   (20 months)

Step 3
(8 months)   (1)

Step 4
(16 months)   (2)

Step 5, 6 and 7
(20 months)   (3)

Step 8
(12 months)   (4)
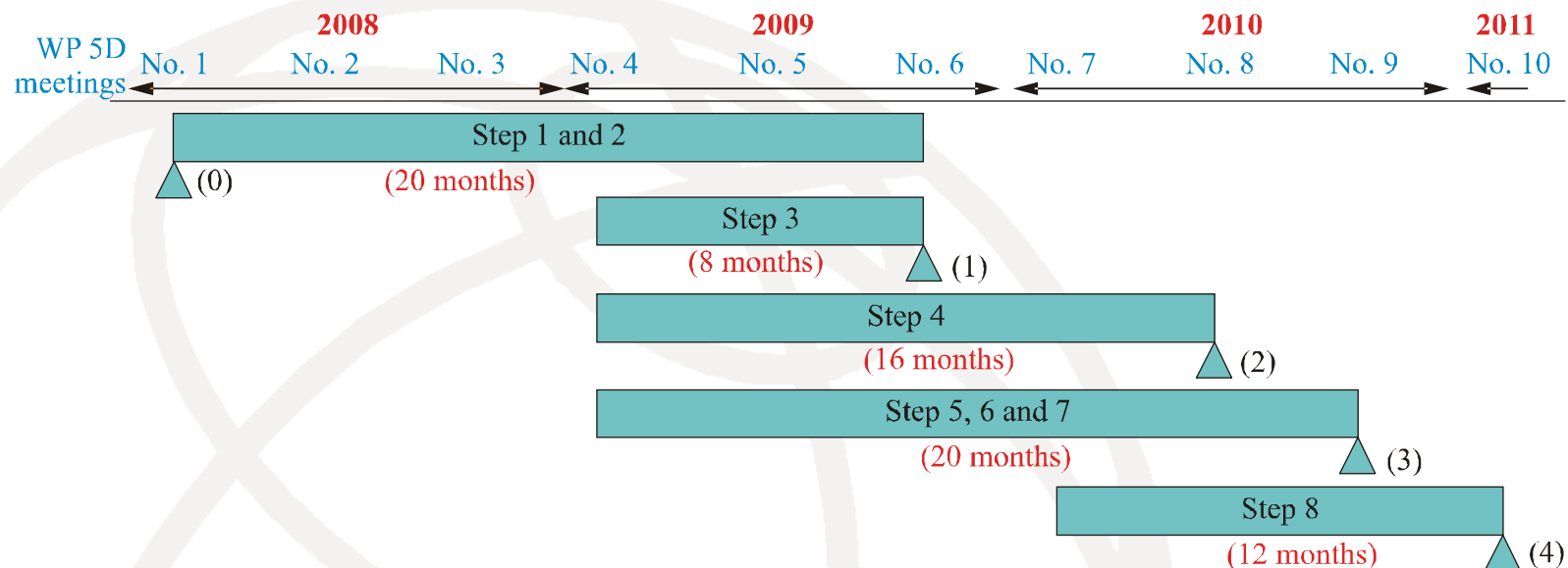
Steps in radio interface development process:

Step 1: Issuance of the circular letter
Step 2: Development of candidate RITs and SRITs
Step 3: Reception of the RIT and SRIT submissions and acknowledgement of receipt
Step 4: Evaluation of candidate RITs and SRITs by evaluation groups

Step 5: Review and coordination of outside evaluation activities
Step 6: Review to assess compliance with minimum requirements
Step 7: Consideration of evaluation results, consensus building and decision
Step 8: Development of radio interface Recommendation(s)

Critical milestones in radio interface development process:

(0): issue an invitation to propose RITs	March 2008	(2): Cut off for evaluation report to ITU	June 2010
(1): ITU proposed cut off for submission of candidate RIT proposals	October 2009	(3): WP 5D decides framework and key characteristics of IMT-Advanced RITs and SRITs	October 2010
		(4): WP 5D completes development of radio interface specification Recommendations	February 2011

RADIO SERVICES

– *Broadcast*: point-to-multipoint one way transmission.

– *DSRC*: one way or two-way short-range communications (e.g. RFID).

– *Short-range radar*:

  – Short-range vehicle-to-vehiclecommunications.

  – Short-range continuous communications (e.g., LCX, etc.).

– *Wide area*: mobile two-way communications using networks of terrestrial base stations (e.g., cellular) or using satellites.

– *GPS*: for location-based services such as AVL
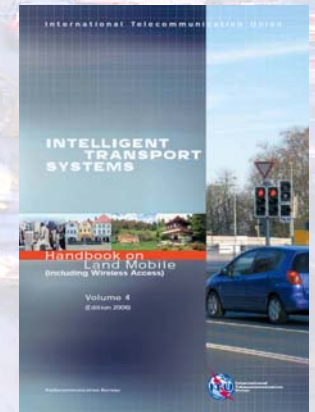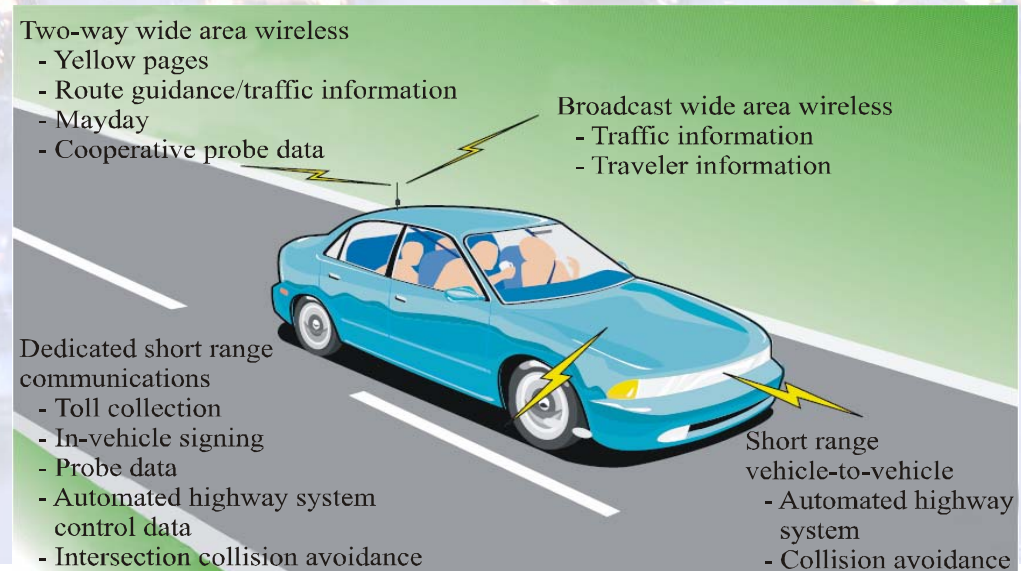
one way communication.

FIGURE 4

Vehicle communications in the future

Resolution 646 (WRC-03) – Public protection and disaster relief

"*considering h)* that continuing development of new technologies such as IMT-2000 and systems beyond IMT-2000 and Intelligent Transportation Systems (ITS) may be able to support or supplement advanced public protection and disaster relief applications;"

"*resolves* 6   that administrations may encourage agencies and organizations to use advanced wireless solutions taking into account *considering h)* and *i)* for providing complementary support to public protection and disaster relief;"

Two-way wide area wireless
- Yellow pages
- Route guidance/traffic information
- Mayday
- Cooperative probe data

Broadcast wide area wireless
- Traffic information
- Traveler information

Dedicated short range communications
- Toll collection
- In-vehicle signing
- Probe data
- Automated highway system control data
- Intersection collision avoidance

Short range vehicle-to-vehicle
- Automated highway system
- Collision avoidance

LandMobV4-04

Recommendations ITU-R M.1310 (Objectives & requirements) (1997), M.1452 (60 & 76 GHz) (2000), M.1453 (5.8 GHz) (2005), M.; Handbook (2006).
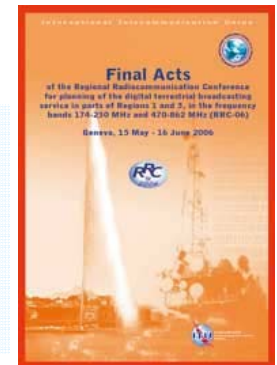
Digital Broadcasting

Terrestrial digital broadcasting carries many advantages over the analogue system:
- Expanded services
- Higher quality video and audio
- Greater variety and faster rates of data transmission
- Consistency of data flows over long distances
- More spectrum efficiency means more channels

Video: **Recommendation ITU-R BT.1306** (2006)
Audio: **Recommendation ITU-R BS.1114** (2007)
Satellite: **Recommendation ITU-R BO.1408** (2002)

ITU's Regional Radiocommunication Conference (RRC-06) established the GE06 treaty agreement heralding the development of 'all-digital' terrestrial broadcast services for sound and television. The digitalization of broadcasting in Europe, Africa, Middle East and the Islamic Republic of Iran by 2015 represents a major landmark towards establishing a more equitable, just and people-centred Information Society. The digital switchover will leapfrog existing technologies to connect the unconnected in underserved and remote communities and close the digital divide.

→ **Report ITU-R BT.XXX** (2008): Transition from analogue to digital terrestrial broadcasting (Overview of broadcasting technologies; application and implementation of digital broadcasting; transition issues; case studies)

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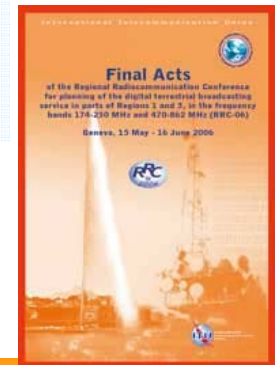
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Mobile TV

FIGURE 3

An example of enhanced handheld receivers for digital BSS (sound)

Rap 2049-03

ITU-R studies:

✓user requirements

✓system characteristics

✓data transmission mechanisms

✓content formats

✓interoperability

Recommendation ITU-R BT.1833: **Broadcasting of multimedia and data applications for mobile reception by handheld receivers**

Current systems:
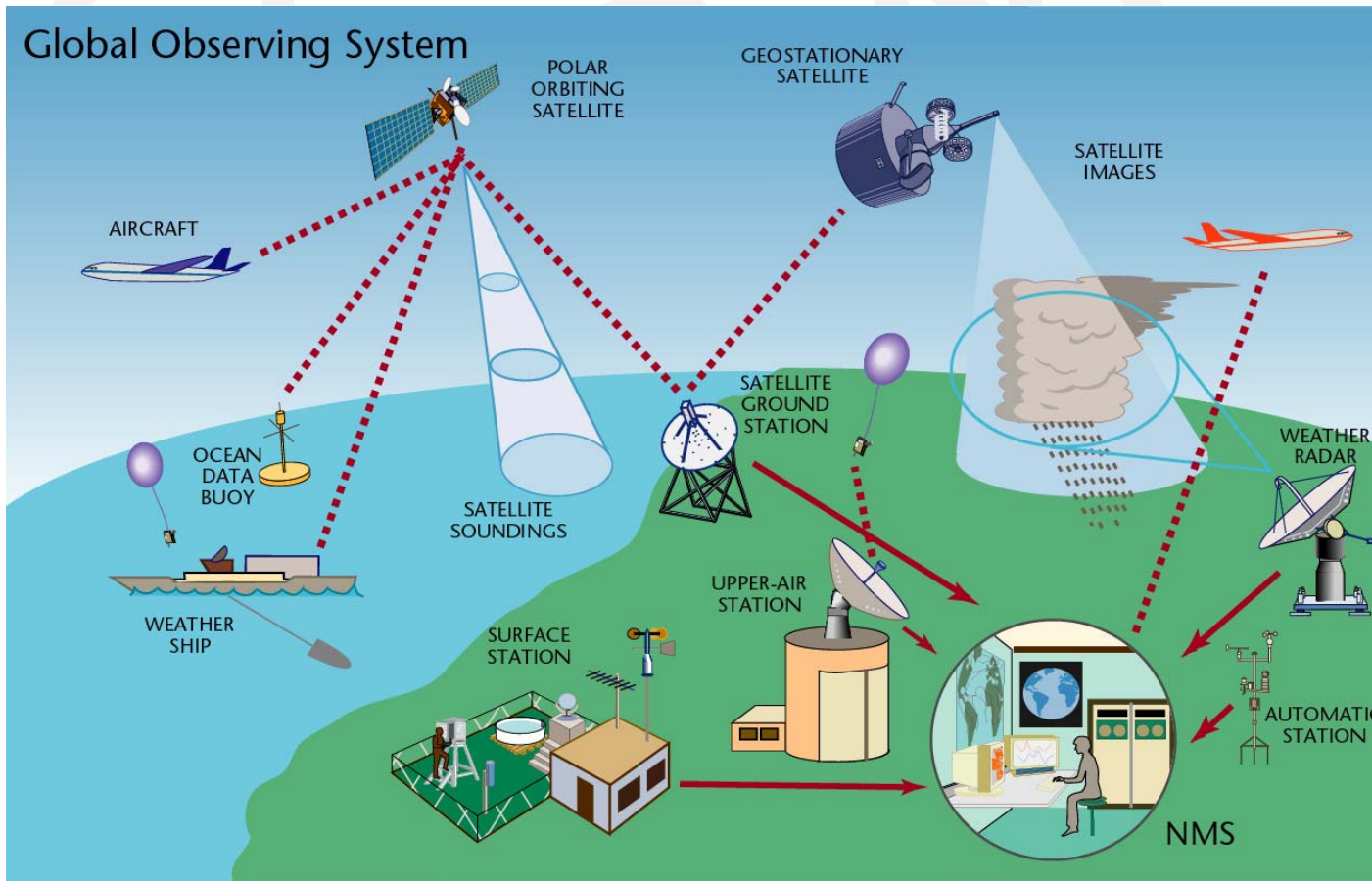- ISDB-T (Japan)
- T-DMB (Rep. Korea)
- DVB-H (Europe)
- AVIS (Russia)
- FLO (US)

Remote sensing

World Weather Watch System
(World Meteorological Organization - WMO)

spectrum

coordination

ICT

Standards making processes

Ways that standards get set in practice:

- *De facto* **standards**, i.e., standards set primarily by the market. These standards are often proprietary.
  - ➤ **Voluntary industry agreements**, where standards are often jointly developed. These standards are typically open standards, that is, they are not proprietary.

- *De jure* **standards,** i.e., standards **imposed** by national standards bodies, **or agreed** upon by regional or international standards development organizations (SDOs)

Wireless standards

De facto → Bluetooth®

Industry → IEEE 802   Wi Fi   WiMAX FORUM

De jure → IMT

Worldwide shipments of wireless products (US$ Millions)

	Proprietary	802.11 Standards	802.15.4 Standards	Other Standards
2007	339.9	210.4	23.6	41.6
2012	634.7	535.5	171.4	119.0

Wi Fi

Z ZigBee Alliance

■ 2007
□ 2012
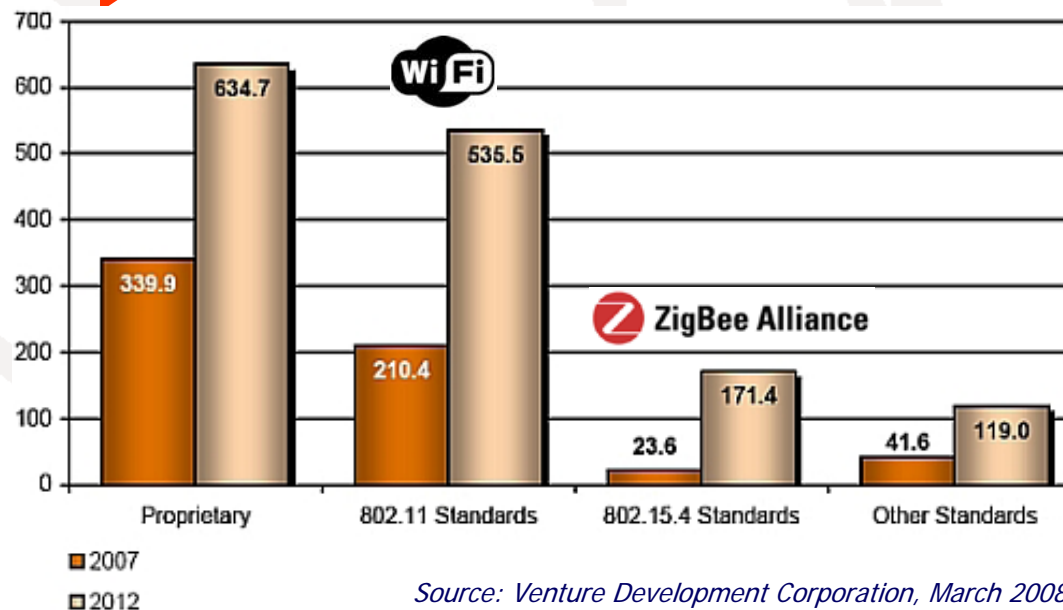
Source: Venture Development Corporation, March 2008

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ITU — International Telecommunication Union

Source : Telecommunications Technology Associations 2007.6

Red circles : Fora in China   Yellow circles : Fora in Japan   Green circles : Fora in Korea

Radio standardization - reducing the gap

International
Telecommunication
Union

RESOLUTION 47 (Doha, 2006): Enhancement of knowledge and effective application of ITU Recommendations in developing countries

noting

- the difficulties in understanding ITU Recommendations and related international standards to apply new technology to the network appropriately and effectively;

- the lack of practical information on the application of ITU Recommendations and related standards of other countries, and the lack of guidelines on applying these technical documents,

➡️ *ITU is instructed*

- to promote participation in training courses and workshops on best-practice application of ITU Recommendations for developing countries;

- to establish a database containing information on new technologies that are standardized and develop guidelines on applying ITU Recommendations.

➡️ *Administrations are encouraged*

 to establish and maintain active national structures to provide for coordination of internal preparation and follow-up, and coordination of participation in external regional and international standardization bodies (e.g., ITU-R), to protect their government & industry interests.