



Comprometida para conectar el mundo

La UIT es la organización de las Naciones Unidas para las tecnologías de la información y la comunicación

Conferencia a la comunidad académica de CUDI

*(Instituto Politécnico Nacional,
Ciudad de Mexico, 17 de abril 2012)*

La banda ancha y temas relacionados con las radiocomunicaciones

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La UIT es la organización de las Naciones Unidas para las tecnologías de la información y la comunicación

✓ Fundada el 17 de mayo 1865



5 Funcionarios elegidos

- ✓ 193 Estados miembros, >700 Miembros del Sector, Asociados & Instituciones Académicas
- ✓ 750 funcionarios & >100 nacionalidades
- ✓ Presupuesto annual= US\$ 180,000,000

<http://www.itu.int>

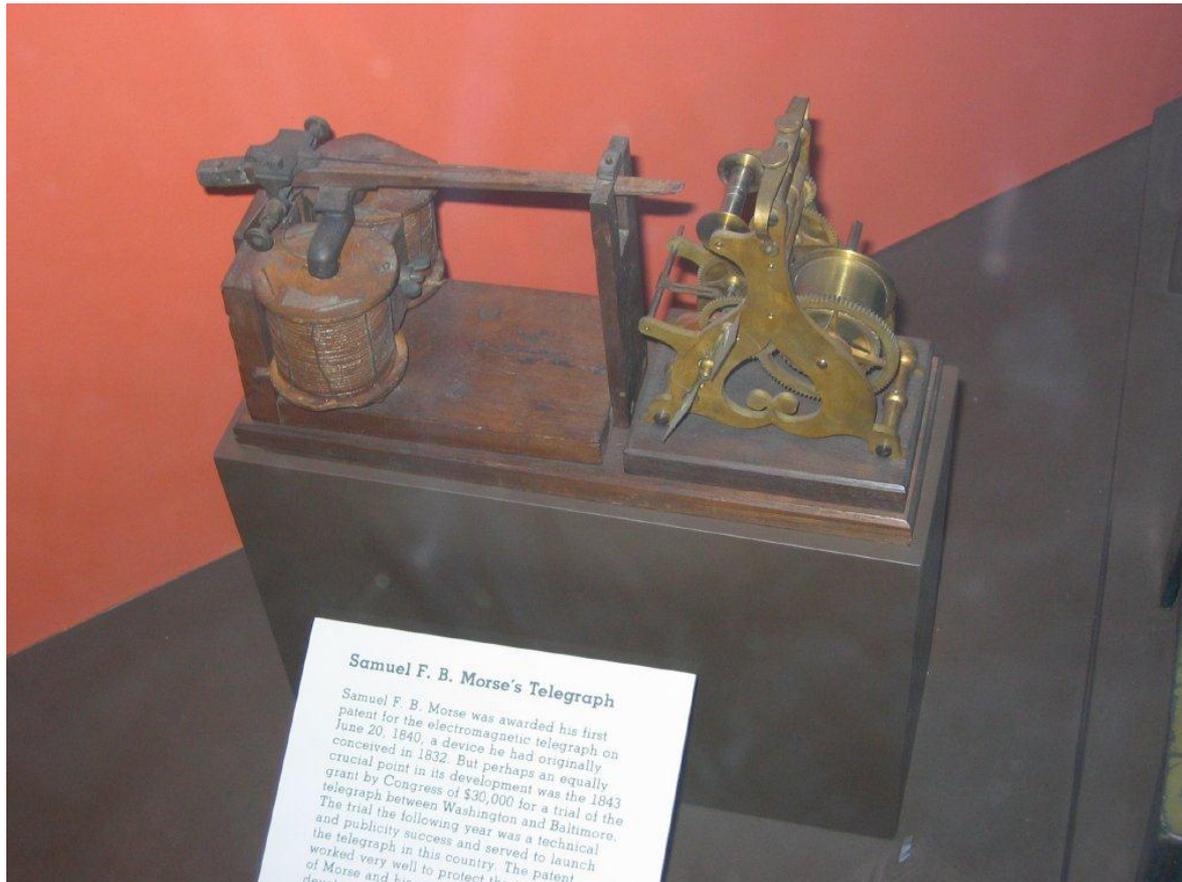
Principal agencia de Naciones Unidas para las TICs



4 oficinas regionales,
8 oficinas de area
Sede en Ginebra, Suiza



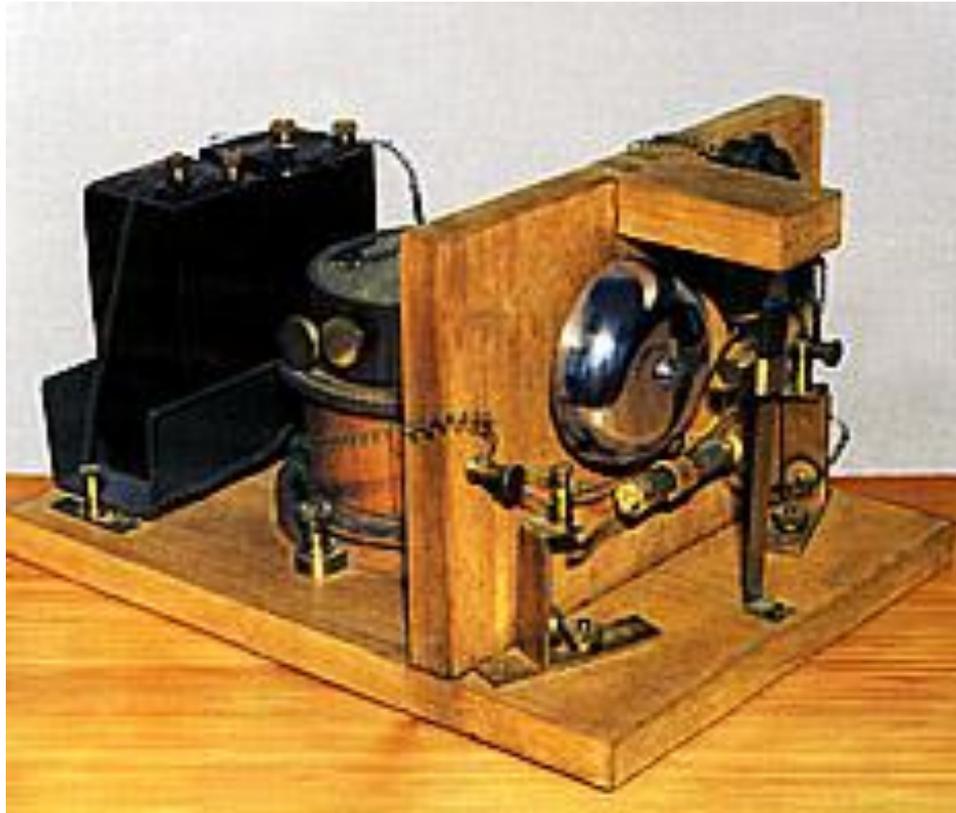
1837: La invención del telégrafo eléctrico



"... El invento más perfecto de los tiempos modernos ..."

"... as anything more perfect than this is scarcely conceivable, and we really begin to wonder what will be left for the next generation, upon which to expend the restless energies of the human mind." -- an Australian newspaper, 1853

1895: Invención de la radio



RECEPTOR DE RADIO DE POPOV



Alexander Popov

1924: Invención de la telefonía móvil



1956: El primer teléfono móvil moderno

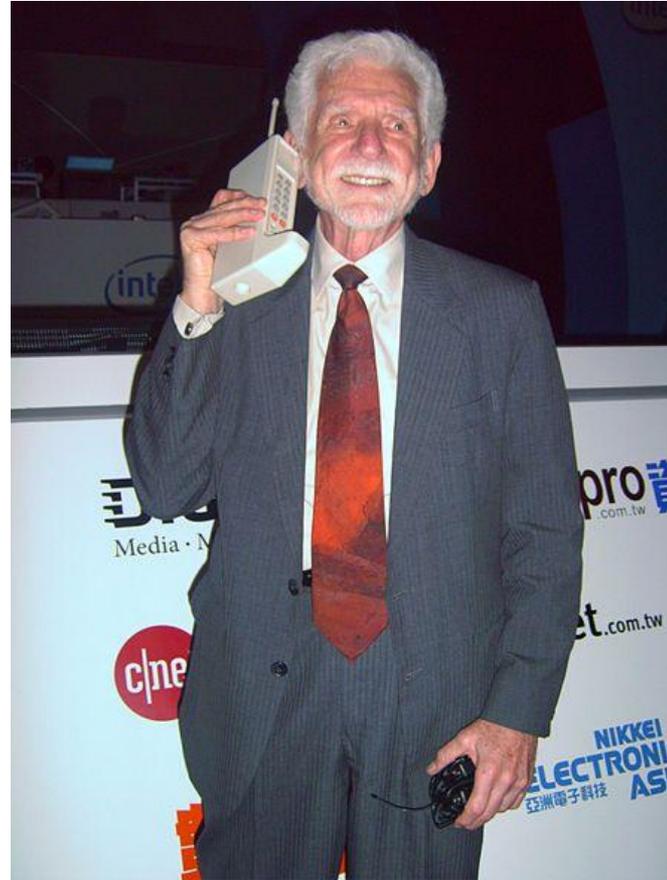


1956: The original mobile phone from SRA in (MTA system).

Commercially released in Sweden in 1956, the MTA (Mobile Telephone system A) was the first fully automatic mobile phone system. Weighing a back breaking 88lbs., this was the first system that didn't require any kind of manual control.

Source: <http://www.cnbc.com/id/19170266/?photo=4>

1973: Los primeros teléfonos celulares de mano



US\$ 4,000 & 1 kg



2007: Los primeros *smartphones* de pantalla táctil



2007 APPLE IPHONE

2007: Apple iPhone

The most anticipated cellphone to date launched June 29, 2007. However, it didn't have a numeric keypad like other phones - it features a touch-sensitive screen. In addition to that feature, it includes a 2-megapixel camera, the ability to sync your iTunes collection to the phone and it runs Mac OS X.

Source: <http://www.cnbc.com/id/19170266/?photo=4>

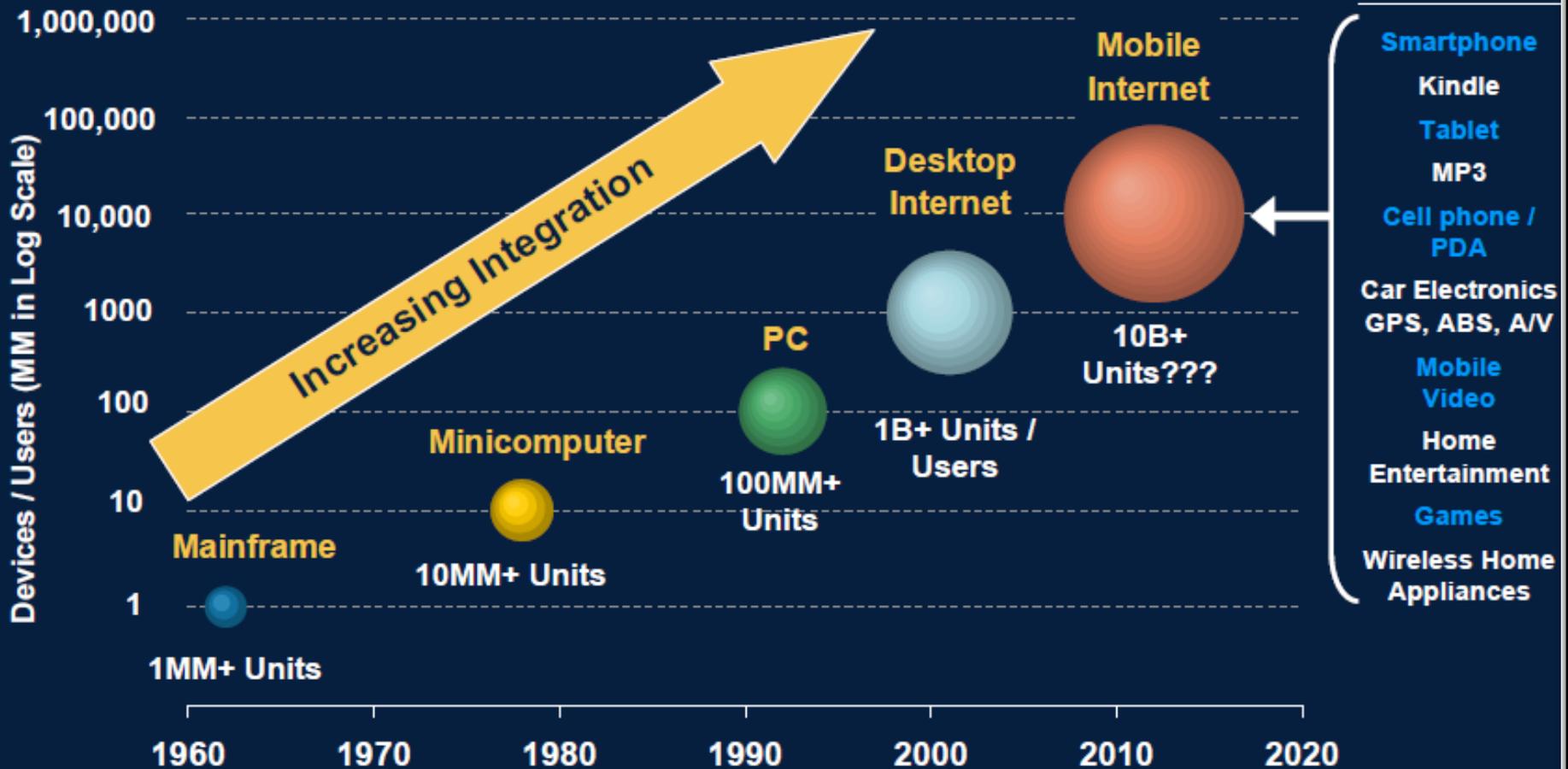
2010+: Aparatos de banda ancha móviles



New Computing Cycle Characteristics

Reduce Usage Friction Via Better Processing Power + Improved User Interface + Smaller Form Factor + Lower Prices + Expanded Services = 10x More Devices

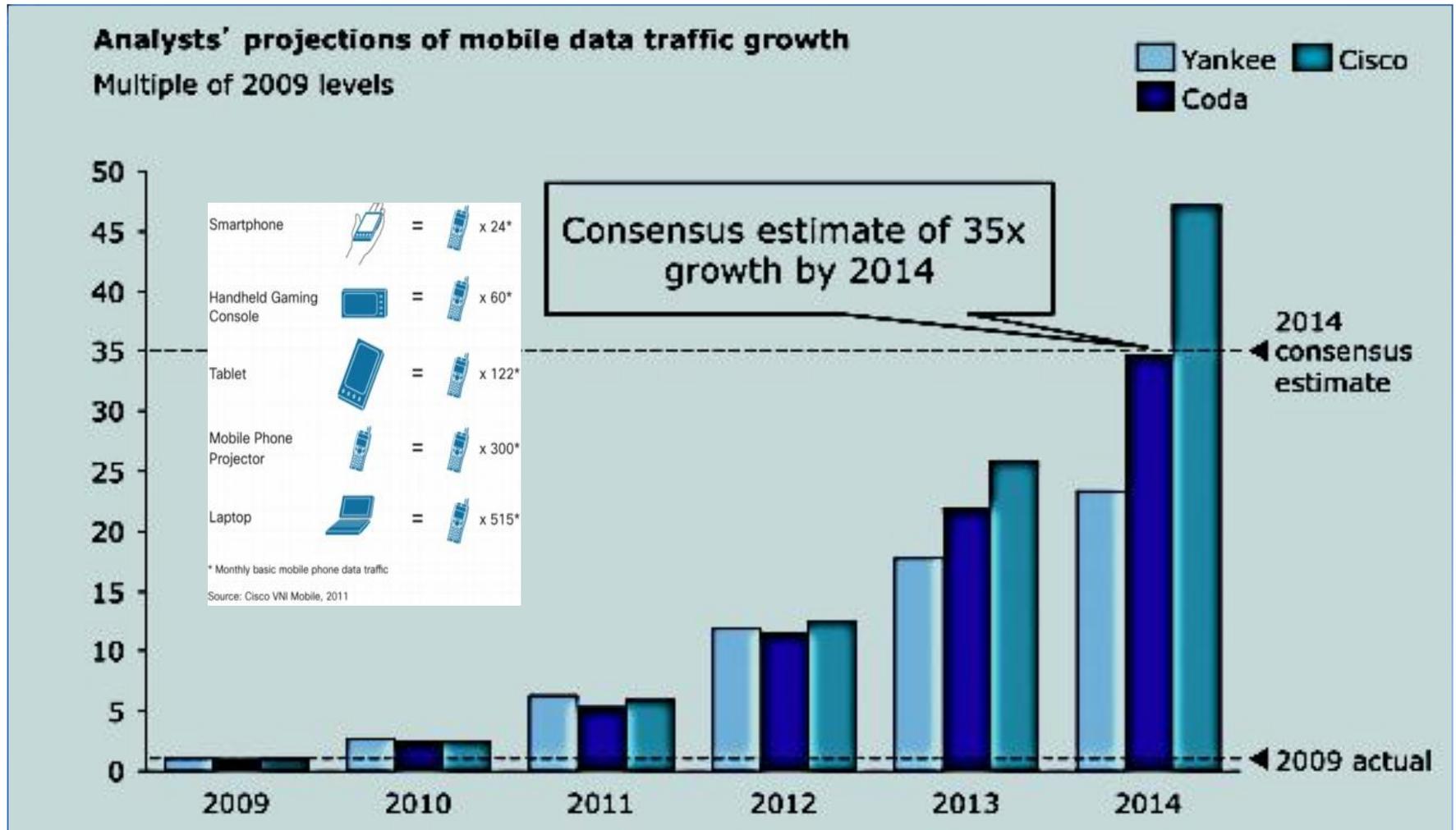
Computing Growth Drivers Over Time, 1960 – 2020E



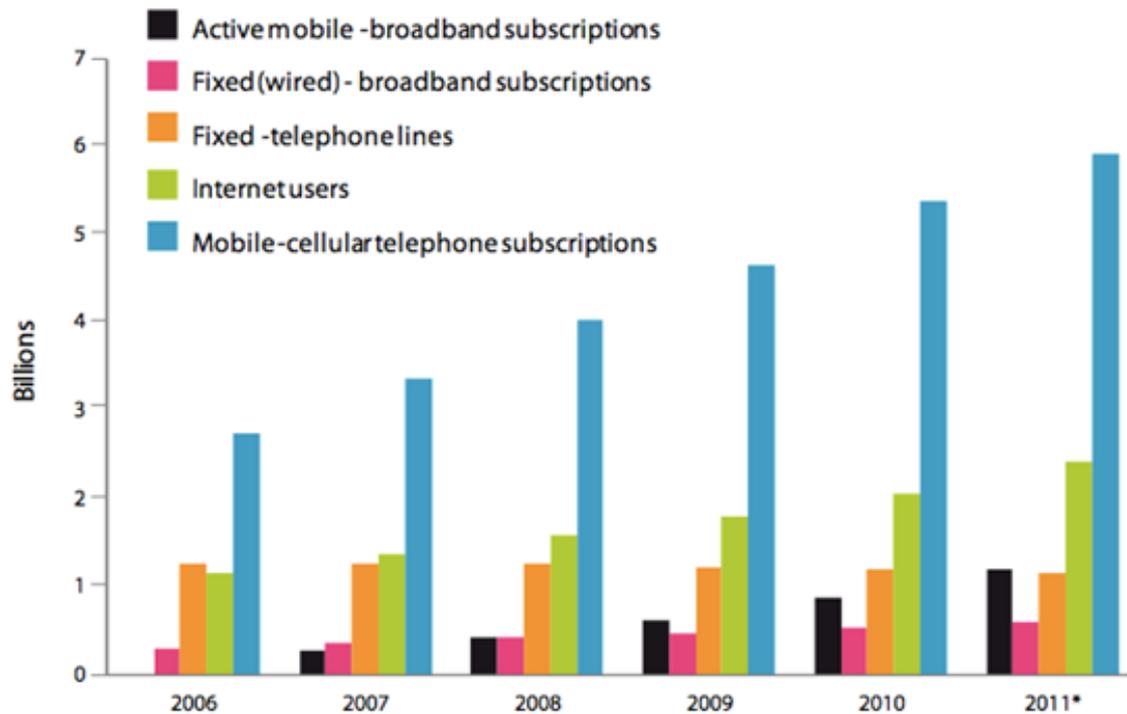
Note: PC installed base reached 100MM in 1993, cellphone / Internet users reached 1B in 2002 / 2005 respectively; Source: ITU, Mark Lipacis, Morgan Stanley Research.

Mobile data growth

Smart phones represent only 13 % of total global handsets in use today, but they represent over 78 % of total global handset traffic. In 2010, the typical smart phone generated 24 times more mobile data traffic (79 MB per month) than the typical basic-feature cell phone (which generated only 3.3 MB per month of mobile data traffic).



Challenges of the ICT mass market



Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

- With 5.9 billion mobile-cellular subscriptions, global penetration reaches 87%, and 79% in the developing world.
- Mobile-broadband subscriptions have grown 45% annually over the last four years and today there are twice as many mobile-broadband as fixed-broadband subscriptions.



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Roles of ITU Radiocommunication Sector



international **regulations**

global **standards**
& **guidelines**

assistance to administrations

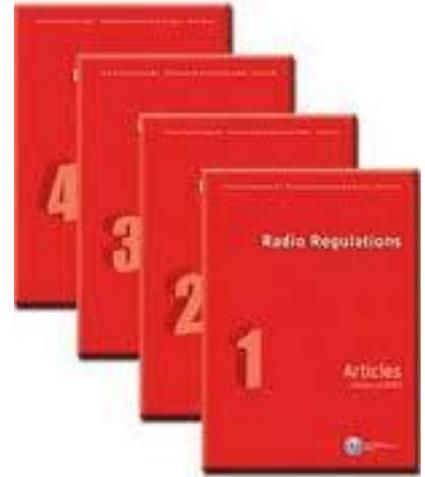
- ✓ Rights of access to the spectrum
- ✓ Efficient use of spectrum
- ✓ Operation free from interference
- ✓ Economies of scale
- ✓ Interoperability and roaming
- ✓ Global harmonization
- ✓ Guidelines for national & regional regulations

**GOOD QUALITY
AND LESS COSTLY EQUIPMENT**

**MORE FAVORABLE INVESTMENT
ENVIRONMENT (CLEAR & STABLE)**

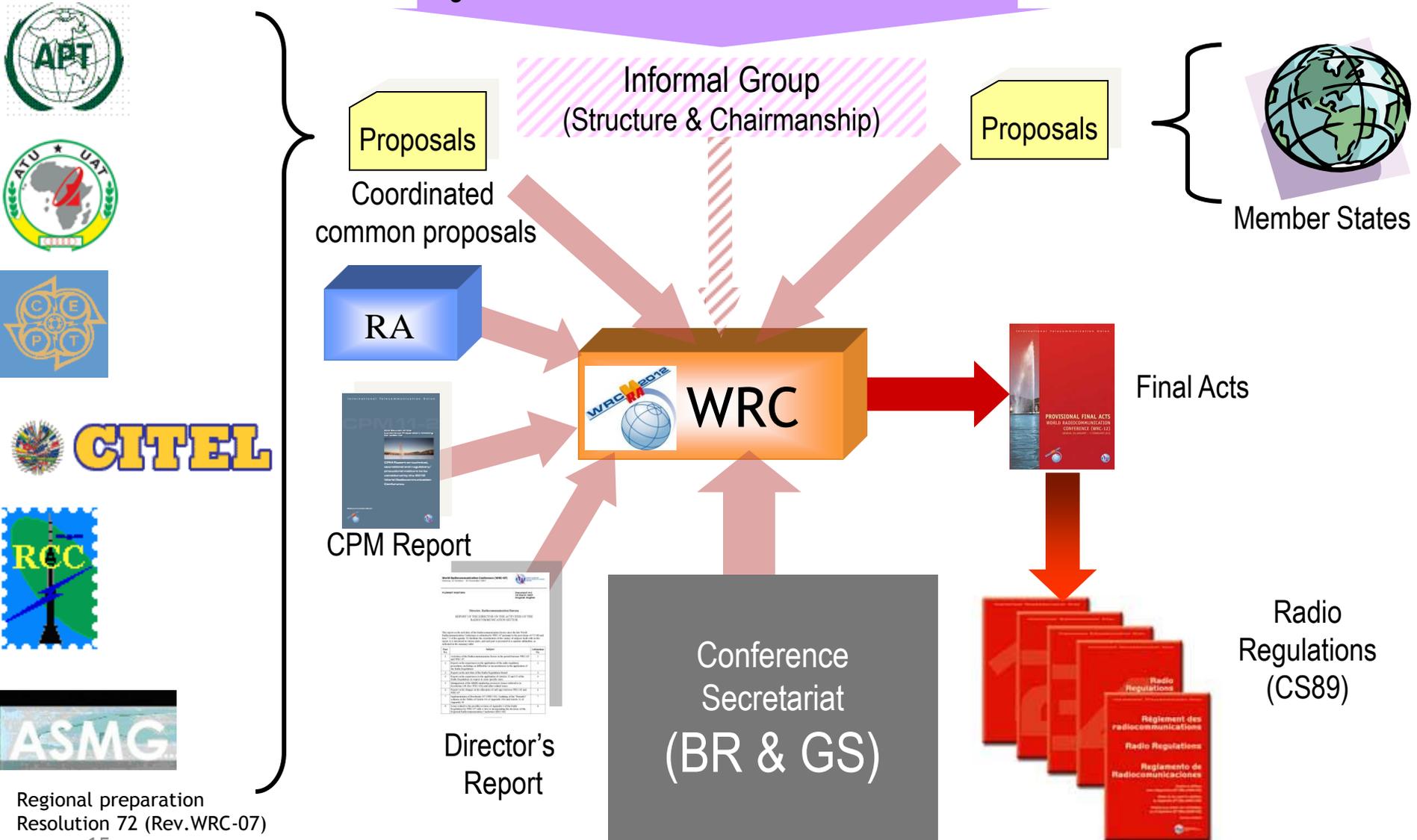
Reglamento de Radiocomunicaciones

- Tratado intergubernamental que abarca tanto las disposiciones legales, operativas y técnicas, y sirve como un instrumento supranacional para la óptima gestión internacional del espectro radioeléctrico
- Define los derechos y obligaciones de los Estados miembros de la UIT cuanto al acceso al espectro
- Actualizado cada 3 a 4 años



The WRC Process

Agenda: draft in WRC Res & final in Council Res



Regional preparation
Resolution 72 (Rev.WRC-07)

Some WRC success stories



Radio Determination Satellite Service (RDSS) (e.g., *Geostar Corp.*, began in 1983)

↳ WARC (MOB-87): allocation of 1610-1626.5 (↑) / 2483.5-2500 MHz (↓) to RDSS



International Mobile Telecommunications (IMT) (e.g., UMTS, began in 1985)

↳ WARC-92: identification of 1885-2025 / 2110-2200 MHz MS bands to IMT-2000



Global Mobile Personal Communication by Satellite (GMPCS) (e.g., *Iridium*, *Globalstar*, began in the '80's)

↳ WARC-92: allocation of 1610-1626.5 (↑) / 2483.5-2500 MHz (↓) to MSS



Constellation of low-Earth orbit satellites in Ka-Band (e.g., *Teledesic* began in the '90's)

↳ WARC-95: allocation of 18.6-19.3 (↓) / 28.6-29.1 GHz (↑) to FSS



Global Navigation Satellite System (GNSS) (e.g., *Galileo* began in late '90's)

↳ WRC-2000: allocation of additional spectrum in L-band and 5 GHz to RDSS



WLAN additional spectrum (e.g., *WiFi 802.11a*)

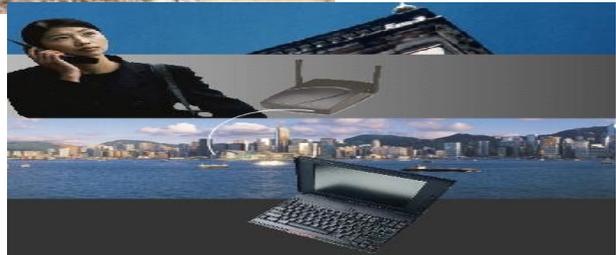
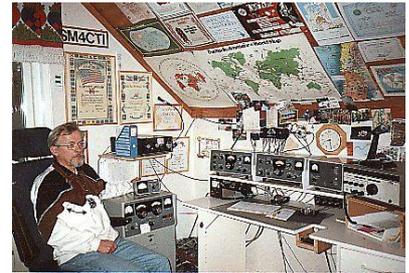
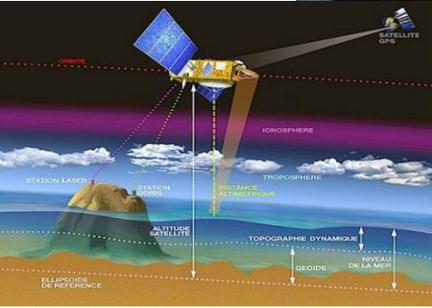
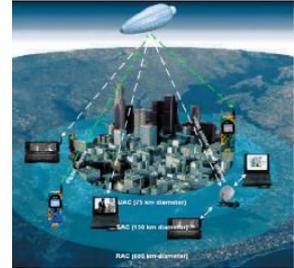
↳ WRC-2003: allocation of the 5 GHz on a global basis



IMT additional spectrum (e.g., mobile broadband)

↳ WRC-2007: allocation of 450 and 700/800 MHz, 2.35 and 3.5 GHz bands

WRC-12





Participants: 3000+
Countries: 160+
Companies: 100+
Proposals: 3000+





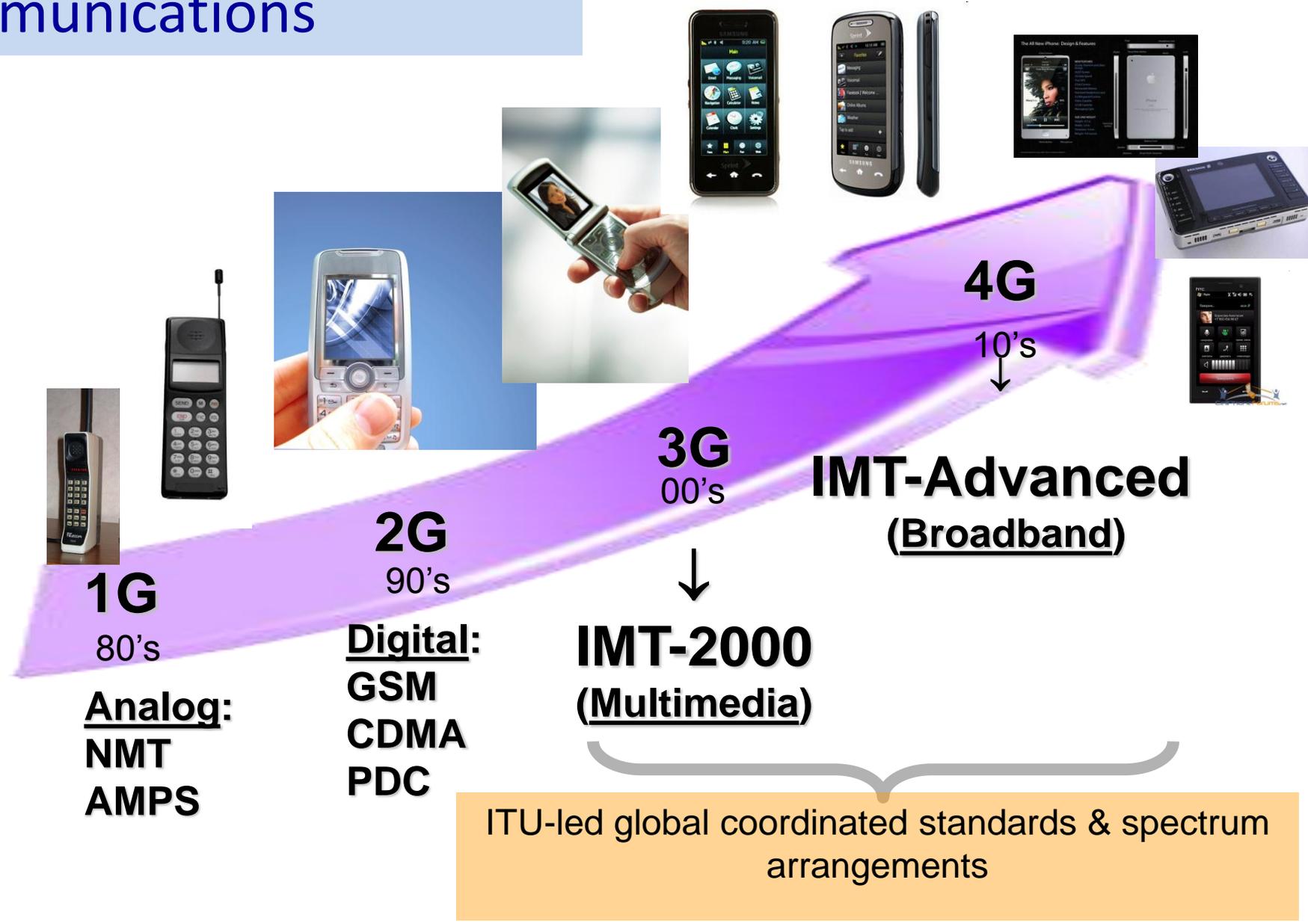
The three good news from WRC-12

Mobile broadband/IMT spectrum

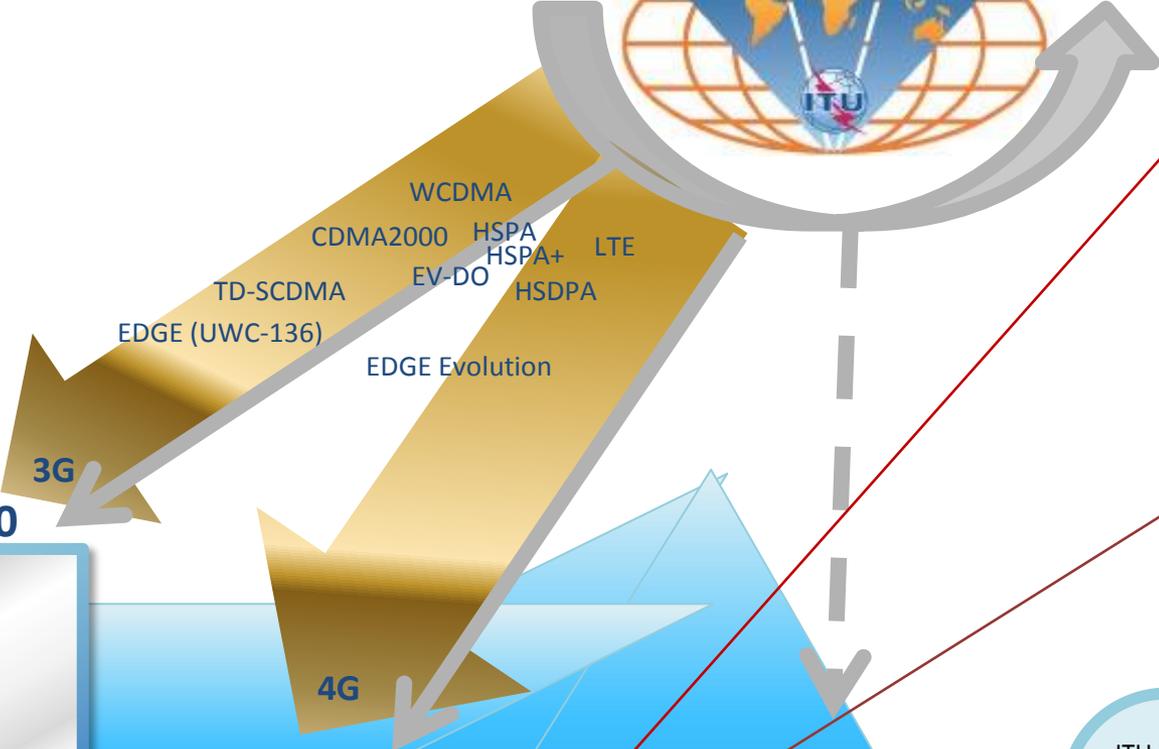
- ✓ **800 MHz:** sharing problems resolved
- ✓ **700 MHz:** allocation to mobile service globally available from 2015
- ✓ **Additional spectrum:** to be considered by WRC-15



Generations of mobile communications



IMT Standards Evolution



IMT-2000

- CDMA-DS,
- CDMA-MC
- CDMA-TDD
- TDMA-SC
- FDMA-TDMA
- OFDMA-TDD
- WMAN

IMT-Advanced

- LTE-Advanced
- WirelessMAN-Advanced

IMT-Next Decade

IMT-Advanced is the next generation set of standards in the International Mobile Telecommunications (IMT) framework for global wireless broadband communications.

Following a detailed evaluation against stringent technical and operational criteria, ITU has determined that "LTE-Advanced" and "WirelessMAN-Advanced" were accorded the official designation of IMT-Advanced.

ITU is holding a series of workshops on "IMT for the Next Decade" focusing on the assessment of the current perspectives of the future needs of mobile broadband wireless to be supported by IMT for the decade 2012-2022, the consideration of the evolution of the IMT-Advanced technologies and a view of future traffic forecasts. Studies are underway to harmonize the existing spectrum identified for IMT and to determine the additional spectrum required to support the burgeoning demand for mobile broadband





Standards



LTE-Advanced

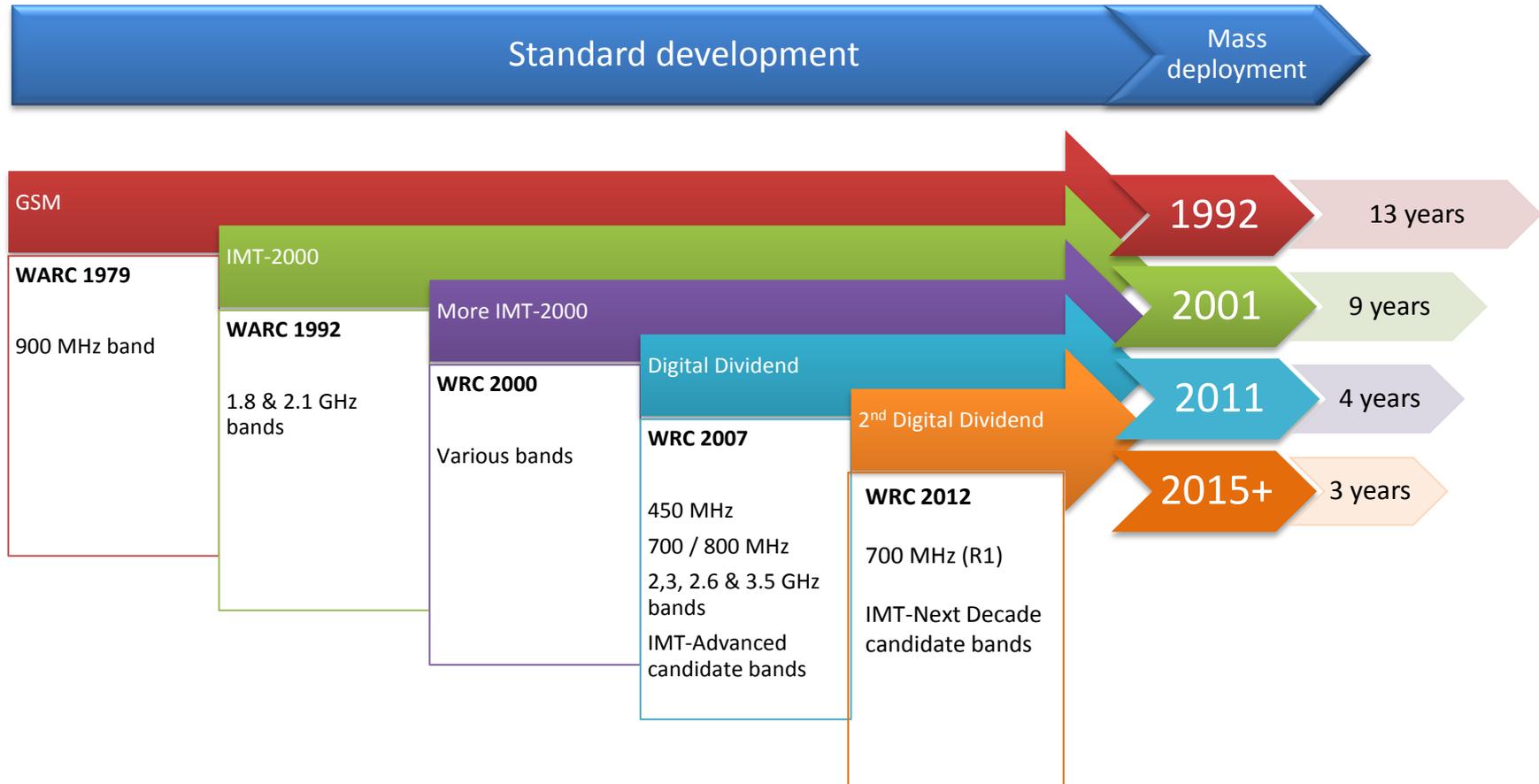


and

WirelessMAN-Advanced technologies were each determined to have successfully met all of the criteria established by ITU-R for the first release of IMT-Advanced.



Global harmonization for mobile spectrum

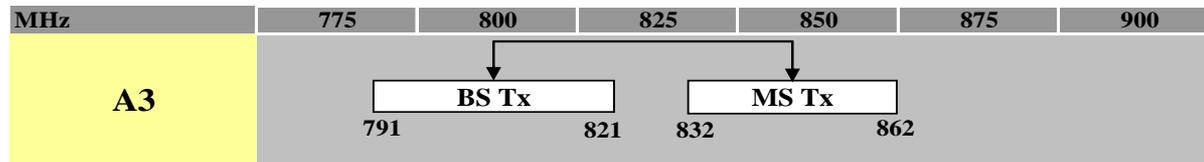




Spectrum Harmonization

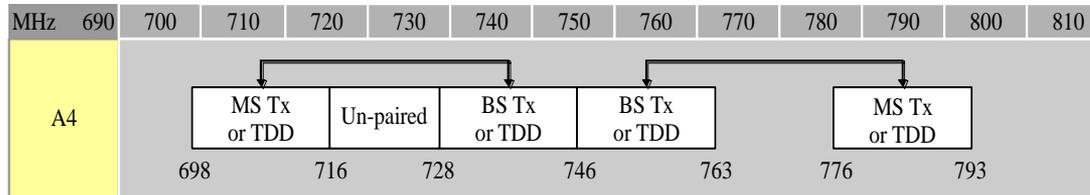
800 MHz

CEPT band plan (FDD)



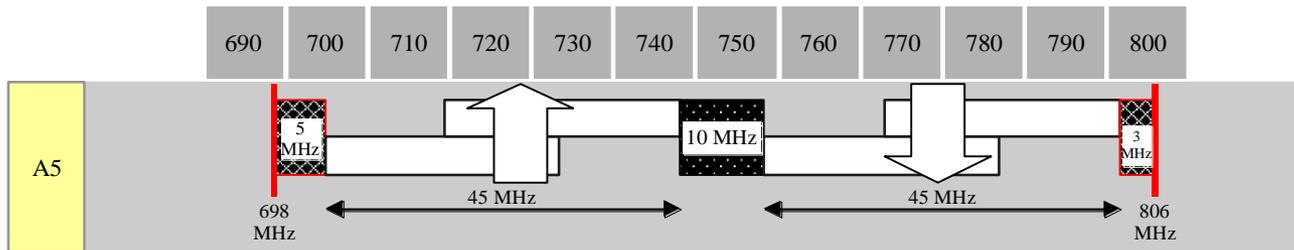
700 MHz

USA band plan (FDD & TDD)



M.1036-03-Ann2

APT FDD



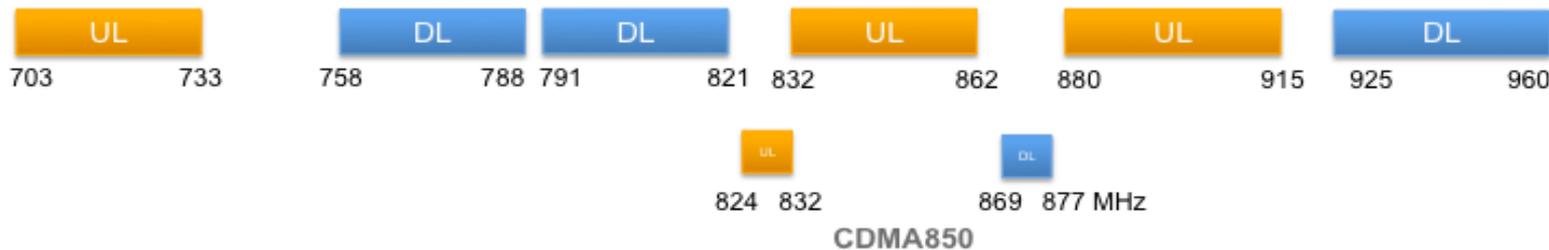
M.1036-04-Ann2

700 MHz APT lower duplex Plan

800 MHz CEPT Plan

900 MHz 2G/3G Plan

700/800 MHz



Banda ancha móvil

- ✓ Las características de propagación favorables de la banda 470-806/862 MHz pueden proporcionar soluciones económicas para la cobertura de amplias zonas con baja densidad de población;
- ✓ la transición a la televisión digital puede dar lugar a oportunidades de aprovechamiento del espectro para nuevas aplicaciones.

700 MHz

La UIT informa y ayuda a sus Miembros a comprender mejor los desafíos que enfrentan en el desarrollo de las comunicaciones de banda ancha móvil, en particular respecto de poner a disposición el espectro adecuado (por ex., talleres subregionales).

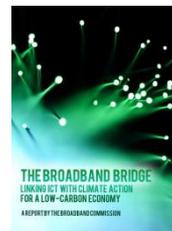
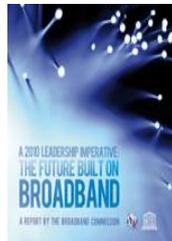
La intención es aumentar el nivel de cooperación entre países vecinos con el fin de lograr la armonización subregional sobre el uso del espectro, por lo tanto, evitar las interferencias perjudiciales en las zonas fronterizas entre los futuros sistemas de banda ancha móvil y otros posibles usuarios del espectro.

Esta armonización a escala internacional es particularmente importante en la banda de 700 MHz a fin de que los países se beneficien plenamente de las ventajas de equipos ampliamente disponibles y la facilidad de itinerancia internacional.

BROADBAND COMMISSION

FOR DIGITAL DEVELOPMENT

The *Broadband Commission* for Digital Development believes that high-speed, high-capacity broadband connections to the Internet are an essential element in modern society, with wide economic and social benefits. Its mission is to promote the adoption of broadband-friendly practice and policies so that the entire world can take advantage of the benefits broadband can offer.



Special attention must be paid to increasing the availability and affordability of radio frequency spectrum as a critical enabler for wireless broadband growth.

Wireless broadband in particular also provides a platform for reliable communications in the event of natural disasters, when terrestrial communication networks are often damaged or destroyed.

Development of radio

