Global BWA Activities in ITU

ITU-BDT Regional Seminar on Fixed Mobile Convergence and new network architecture for the Arab Region

Tunis
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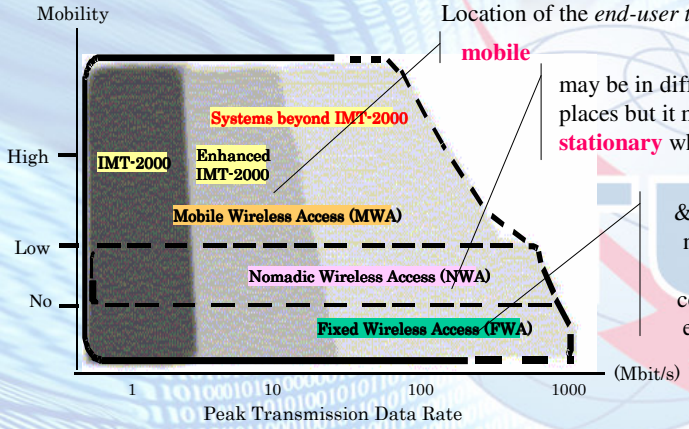
Global BWA Activities in ITU

- Concept of Wireless Access (WAS)
- Studies on WAS in ITU-R
- Trends towards Broadband Wireless Access (BWA)
- Spectrum issues
- Summary

Mapping of Wireless Access

Mobility and capacity (bit rate) of 3 types of wireless access



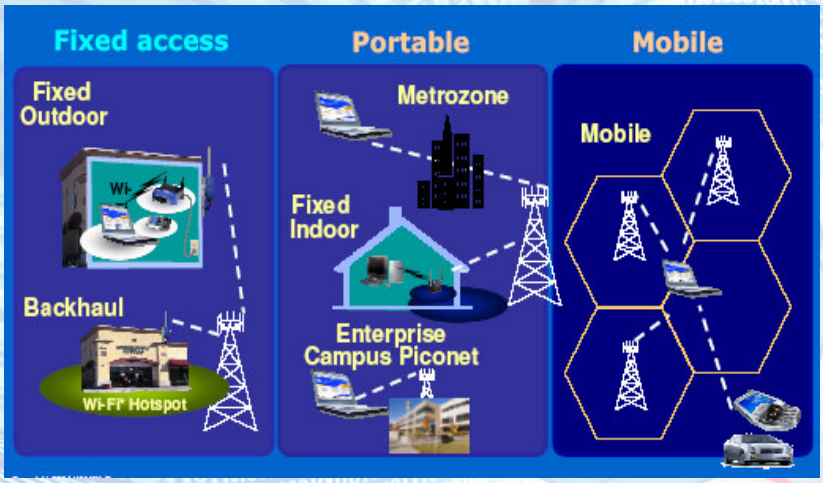
Location of the *end-user termination:*

mobile may be in different places but it must be **stationary** while in use

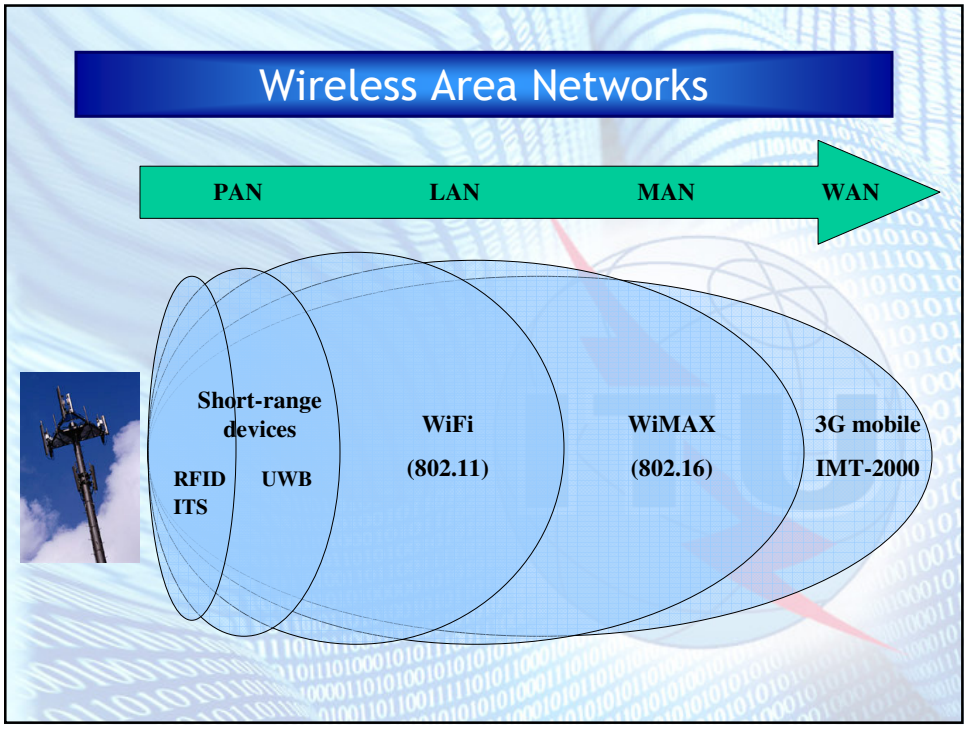
& location of the network access point to be connected to the end-user: **fixed**

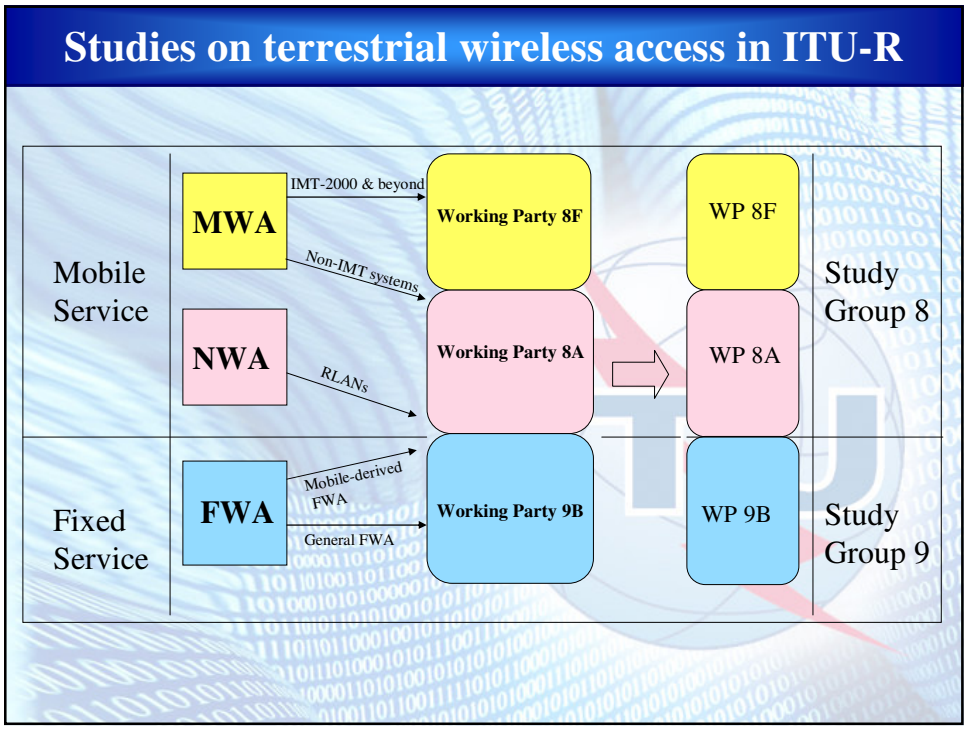
Source: Recommendation ITU-R M.1645.

Wireless Access Concept

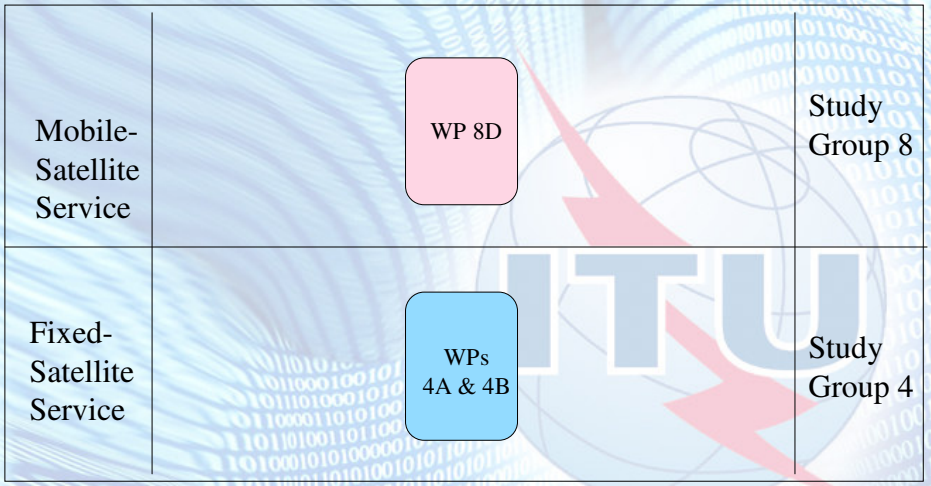


Source: WiMAX Forum


Wireless Area Networks
PAN
LAN
MAN
WAN
Short-range devices
RFID
ITS
UWB
WiFi
(802.11)
WiMAX
(802.16)
3G mobile
IMT-2000


Studies on terrestrial wireless access in ITU-R
Mobile Service
Fixed Service
MWA
NWA
FWA
IMT-2000 & beyond
Non-IMT systems
RLANs
Mobile-derived FWA
General FWA
Working Party 8F
Working Party 8A
Working Party 9B
WP 8F
WP 8A
WP 9B
Study Group 8
Study Group 9

Studies on satellite wireless access in ITU-R



ITU-R Studies on BWA

Service	Fixed	Mobile		Satellite
Study Question	236/9 (Fixed wireless systems for BWA)	212/8 (Wireless Access including RLAN)	229/8 (IMT-2000) and systems beyond	269/4 (Global broadband satellite)
Scope	•Specifications	•Specifications •Sharing •Spectrum	•Objectives •Specifications •Spectrum •Migration •Global circulation	•Specifications •Spectrum
ITU-R Rec.	DNR ITU-R F.[Doc. 9/51] (under approval)	M.1450 (RLANs) + Preliminary DNRs	M.1457, …. (IMT-2000) M.1645 (vision)	S.1709 (approved in April 2005)

ITU-R Recommendations recently developed for FWA systems

	Rec. ITU-R	Short title
Terminology	F.1399	Vocabulary of terms for wireless access
Performance & Availability Characteristics	F. 757	Basic system requirements and performance objectives for FWA using mobile-derived technologies
	F.1400	Performance and availability objectives for FWA to PSTN
	F.1490	Generic requirements for fixed wireless access (FWA) systems
	F.1499	Radio transmission systems for fixed BWA based on cable modem standards
Radio frequency arrangements	F.1401	Considerations for the identification of possible frequency bands for fixed wireless access and related sharing studies
	F.1488	Frequency block arrangements for FWA systems in the range 3 400-3 800 MHz
	F.1496	Radio-frequency channel arrangements for fixed wireless systems operating in the band 51.4-52.6 GHz
	F.1497	Radio-frequency channel arrangements for fixed wireless systems operating in the band 55.78-59 GHz
	F.1519	Guidance on frequency arrangements based on frequency blocks for systems in the fixed service
	F.1567	RF channel arrangement for digital fixed wireless systems operating in the frequency band 406.1 to 450 MHz
	F.1568	RF block arrangements for FWA systems in the range 10.15-10.3/10.5-10.65 GHz
Sharing & Compatibility	F.1402	Frequency sharing criteria between a land MWA system and a FWA system using the same equipment type as the MWA system
	F.1489	A methodology for assessing the level of operational compatibility between FWA and radar systems when sharing the band 3.4-3.7 GHz
	F.1613	Operational and deployment requirements for FWA systems in Region 3 to ensure the protection of systems in the EESS (active) and the SRS (active) in the band 5 250−5 350 MHz
Other	F.1671	Guidelines for a process to address the deployment of area-licensed fixed wireless systems operating in neighbouring countries

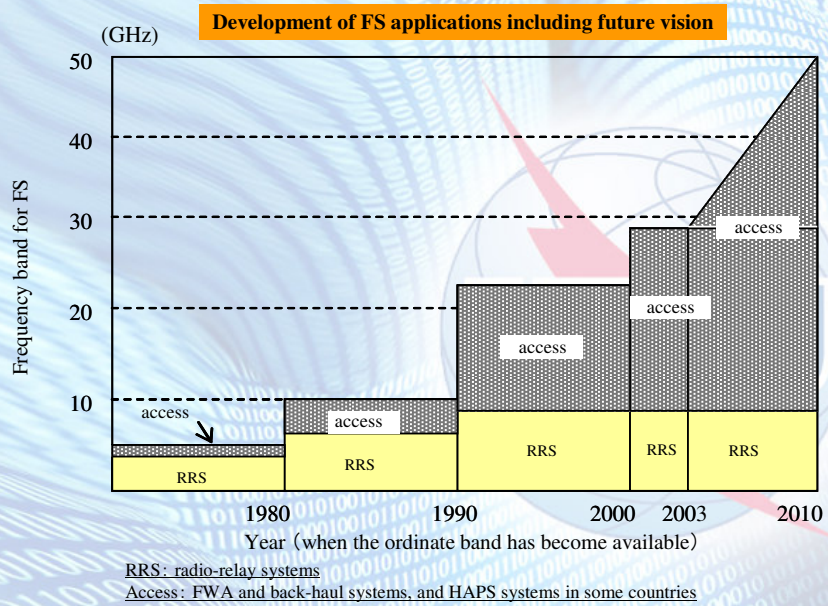
Note: Application of some Recommendations include short range back-haul systems.

Development of FWA systems in different environments

FWA application	Preferred frequency bands		ITU-R REC	Other access media	Factors to be considered
Urban area FWA **(Last-1000 m connection)**	**Upper SHF**	10.5 GHz	F.1568	Optical fibre	・High-density deployment ・Sharing with space services
		18 GHz	F. 595		
		26-28 GHz	F. 748		
		38 GHz	F.749		
Residential area FWA **(Last-100m connection)**	**Lower SHF**	2.4 GHz	-	・Optical fibre ・DSL ・Wireless LAN	・Compatibility with ISM application ・Line-of-sight condition ・License-exempt use of nomadic wireless access systems for FWA
		3.4 GHz	F.1488		
		5.3 GHz	-		
		5.5-5.7GHz	-		
Rural area FWA	**UHF**	450 MHz	F.1567	Cellular phone	・Line-of-sight condition ・Sharing/compatibility with other radio services
		Below 1 GHz	-		

Application trends in the FS

Development of FS applications including future vision



RRS: radio-relay systems
Access: FWA and back-haul systems, and HAPS systems in some countries

Fixed BWA

ITU-R Study Group 9（Working Party 9B）has developed a draft new Recommendation on BWA in the fixed service (ITU-R Doc. 9/51), whose specifications are based on the standards agreed at regional standards development organizations (SDOs).

Referenced specifications for the radio interface in the Recommendation:

		PHY Layer	MAC Layer
IEEE 802.16		IEEE Std. Part 16-2004	Air interface for fixed BWA
ETSI BRAN	HiperMAN	ETSI TS 102 177	ETSI TS 102 178
	HiperAccess	ETSI TS 101 999	ETSI TS 102 000

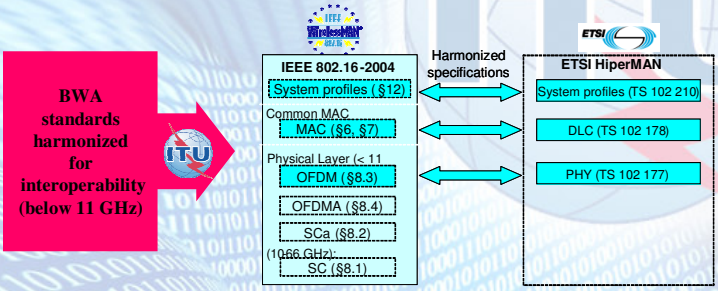
Note: These specifications in this Recommendation are available electronically through the website.

Fixed BWA

Radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz

The Recommendation identifies specific radio interface standards for BWA systems in the FS, addressing profiles for the recommended interoperability standards.

The **interoperability** standards referenced in the Recommendation include the following specifications: system profiles; PHY layer parameters, i.e. channelization, modulation scheme, data rates; MAC layer messages and header fields; conformance testing methods:



Scope of BWA Standardization

Protocol stack		Specified items
Higher Layer	Application	–
	TCP	
Network layer (IP)		・Network routing ・Mobility management
Data Link Layer	DLC Sub-layer	・Send-receive flow control ・ARQ control ・QoS control
	MAC Sub-layer	・Medium access control ・Error detection & correction
Physical Layer (PHY)		・Radio frequency arrangement ・Modulation/Demodulation ・Transmission bit rate ・Necessary bandwidth ・Frequency sharing criteria

3GPP's
ETSI
IEEE
ARIB
Etc.

ITU-R Recommendation

TCP : Transmission Control Protocol IP : Internet Protocol
MAC : Media Access Control DLC : Data Link Control

Mobile BWA

ITU-R Study Group 8 (Working Party 8A) is developing a draft new Recommendation on BWA in the mobile service operating below 6 GHz, whose specifications are based on the standards agreed at recognized standards development organizations (SDOs).

Referenced specifications
for the radio interface in the Recommendation:

Draft IEEE 802.16e

IMT-2000 and BWA

ITU-R Study Group 8 (Working Party 8F) developed Recommendation ITU-R M.1457 - Detailed specifications of the radio interfaces of International Mobile Telecommunications-2000 (IMT-2000), based on specifications developed within the 3GPPs and regional and national standards development organizations.

- Also >30 Recommendations on frequency arrangements, sharing, global circulation, …

The framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 have also been detailed in Recommendation ITU-R M.1645 – including consideration of requirements for BWA

Global Satellite BWA

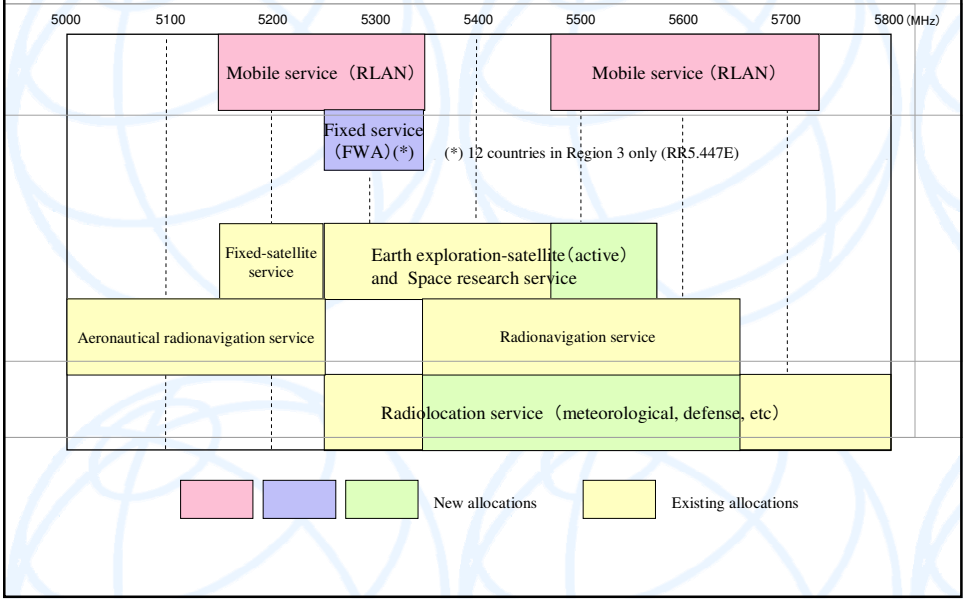
Recommendation ITU-R S.1709:
Technical characteristics of air interfaces for global broadband satellite systems

Specifications for a generic satellite network architecture and protocol structures, and for satellite & earth stations air interfaces based on the following standards:

TIA-1008: Internet Protocol over Satellite (IPoS)

ETSI EN 301 790 V.1.3.1: Interactive Channel for Satellite Distribution Systems & ETSI BSM/RSM-A: Air interface specifications for global broadband communications between earth stations and regenerative satellites

New 5 GHz frequency allocations approved at WRC-03



Requirements for RLANs specified in Resolution 229 (WRC-03)

Frequency band	Maximum Equivalent Isotropically Radiated Power (EIRP)	Operational restriction	Mitigation measures
5 150-5 250 MHz	200 mW (10 mW/MHz, 0.25 mW/25 kHz)	Indoor use only	No specification
5 250-5 350 MHz	200 mW (10 mW/MHz) or subject to the elevation angle mask specified in Rec.ITU-R M.1653	Basically indoor use*1 EIRP must be in accordance with the mask for outdoor use	TPC*2 and DFS are required
	2W for FWA*3	Deployment restriction is subject to Rec. ITU-R F.1613	
5 470-5 725 MHz	1W (50 mW/MHz)	Indoor / outdoor use	

*1 Each country is requested to take appropriate measures so that the predominant number of RLAN terminals are used indoors.

*2 EIRP is reduced by 3 dB if not equipped with TPC.

*3 12 countries in Region 3

BWA & ITU
World Radiocommunication Conference 2007

Agenda Item 1.4:

To consider frequency-related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies …;

Agenda Item 1.19:

To consider the results of the ITU-R studies regarding spectrum requirement for global broadband satellite systems in order to identify possible global harmonized FSS frequency bands for the use of Internet applications, and consider the appropriate regulatory/technical provisions, ….

ITU & BWA

Radiocommunications

✓Frequency spectrum (harmonization) → RR

✓Radio interface specifications → ITU-R Recommendation
Sharing and interworking studies

Telecommunications

✓Network aspects

Strategy & Policy

✓Workshops & publications → Promoting broadband,
The Birth of Broadband & country case studies

Telecom development

✓Report on Broadband Technologies (ITU-D Q.20/2)

✓Seminars on BWA

Visit: http://www.itu.int/ITU-R/study-groups/was/