Global BWA Activities in ITU

Regional Seminar on Broadband Wireless Access for rural and remote areas for the Americas

Brasilia
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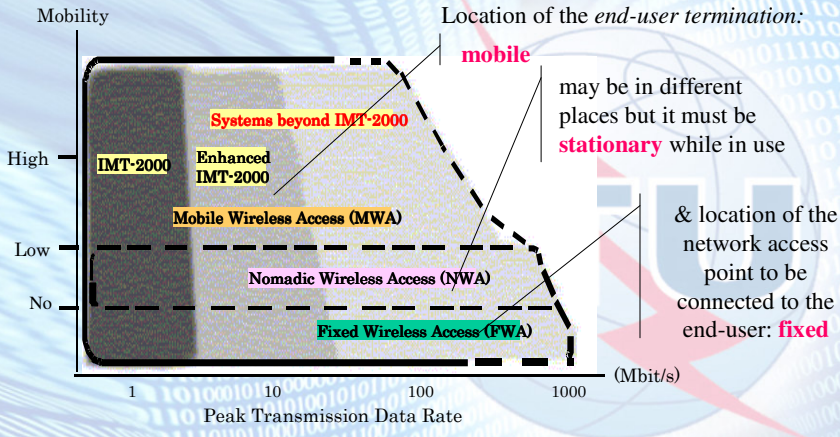
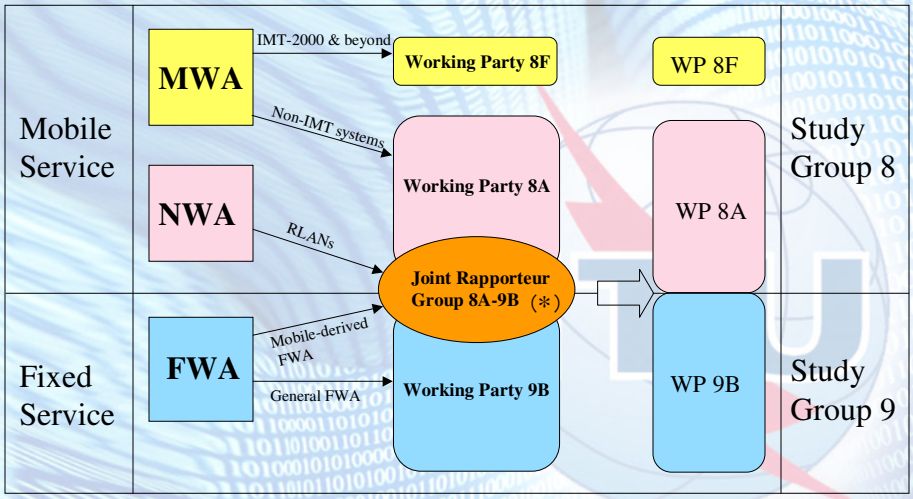
Mapping of Wireless Access

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



Source: Recommendation ITU-R M.1645.

Studies on Wireless Access in ITU-R



(*) JRG 8A-9B was disbanded in November 2003 .

ITU-R Recommendations recently developed for FWA systems

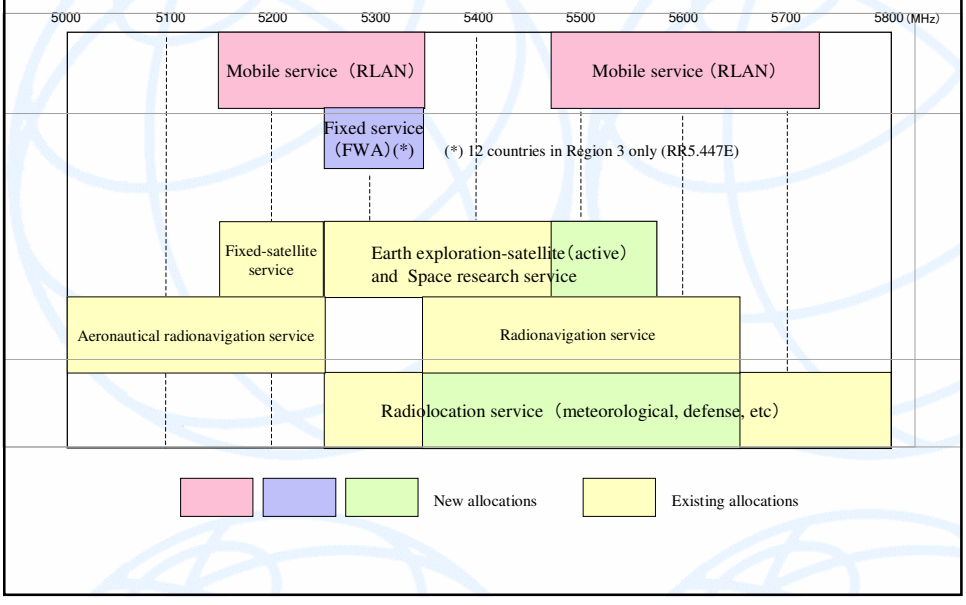
	Rec. ITU-R	Short title
Terminology	F.1399	Vocabulary of terms for wireless access
Performance & Availability	F. 757	Basic system requirements and performance objectives for FWA using mobile-derived technologies
	F.1400	Performance and availability objectives for FWA to PSTN
Characteristics	F.1490	Generic requirements for fixed wireless access (FWA) systems
	F.1499	Radio transmission systems for fixed BWA based on cable modem standards
Radio frequency arrangement	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
Others	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 fiber	・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 fiber ・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	-		

New 5 GHz frequency allocations approved at WRC-03



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

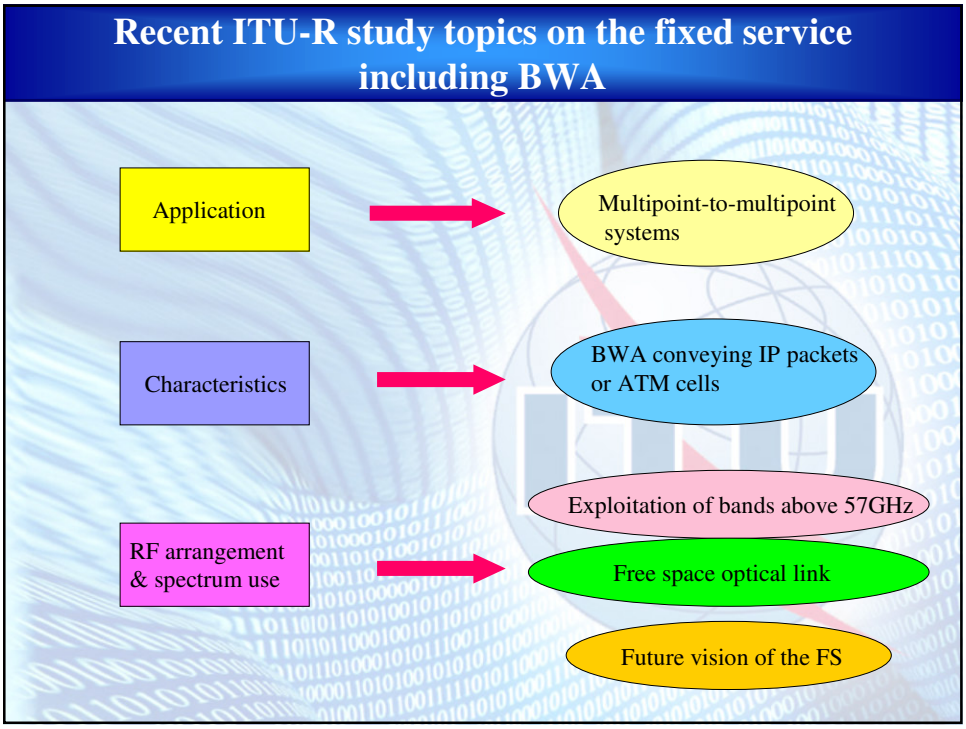
Frequency band	Maximum Equivalent Isotropically Radiated Power (EIRP)	Operational restriction	Mitigation measures
5 150-5 250 MHz	200 mW (10 mW/MHz, 0.25 mW/25 kHz)	Indoor use only	No specification
5 250-5 350 MHz	200 mW (10 mW/MHz) or subject to the elevation angle mask specified in Rec.ITU-R M.1653	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

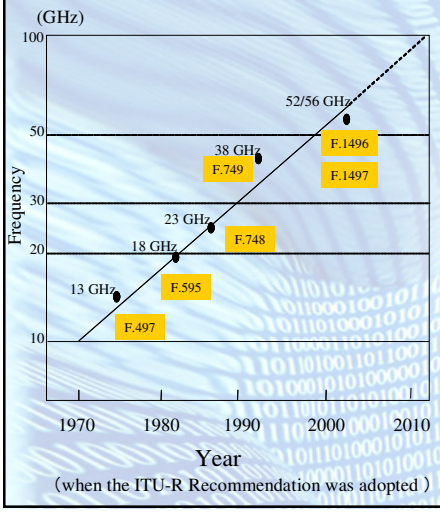
Recent ITU-R study topics on the fixed service including BWA



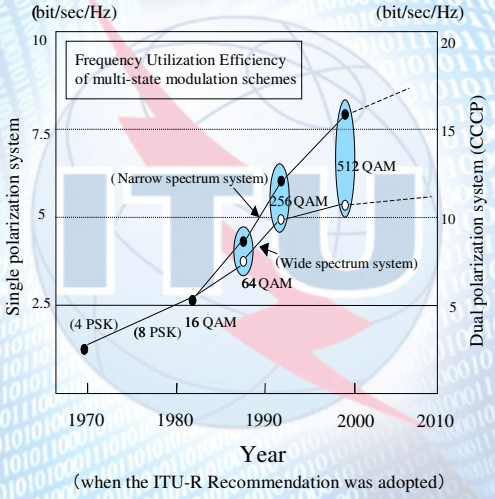
Technology developments and application trends in the FS (1)

Source: Report ITU-R F.2047

Exploitation of high frequency bands

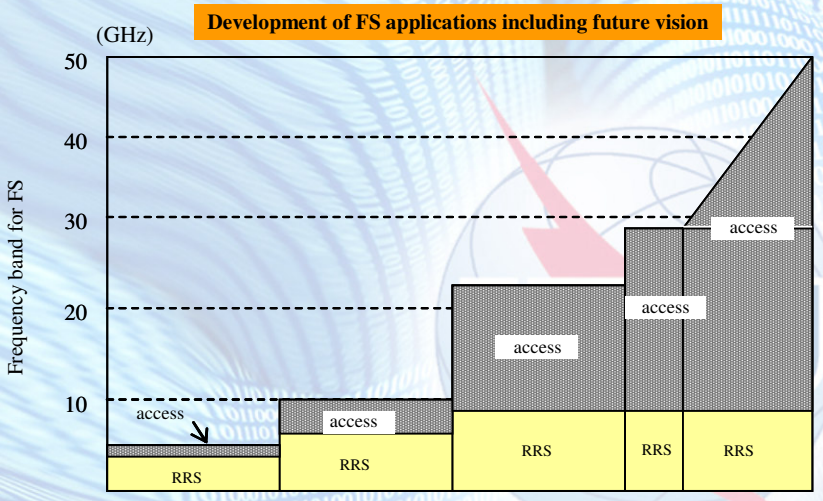


Increase of frequency utilization efficiency



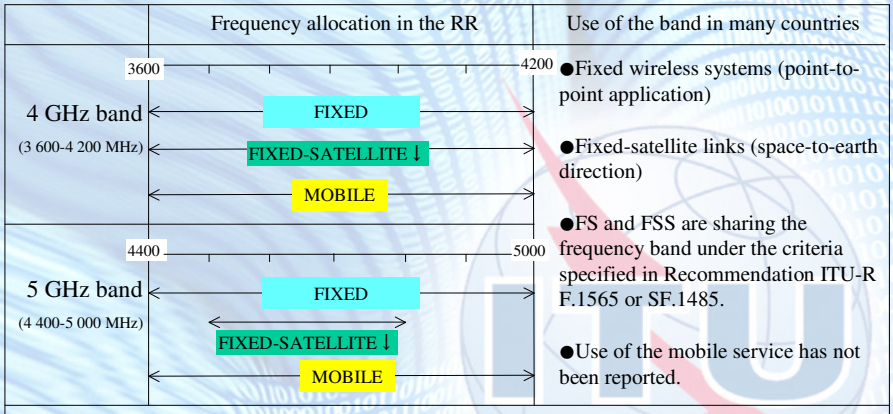
Technology developments and application trends in the FS (2)

Development of FS applications including future vision



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

Toward Refarming of 4 & 5 GHz Bands (Example)

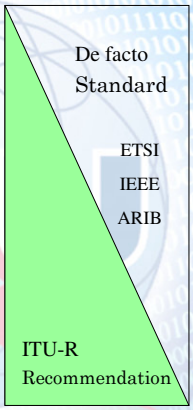


Source: Report ITU-R F.2047

Note: One administration has reported that in its network use of 4 and 5 GHz frequency bands by radio-relay systems will be terminated by 2012 with a view to utilize these bands for terrestrial wireless systems for access networks including systems beyond IMT-2000.

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



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

Recommendation on fixed BWA

Recommendation ITU-R F.1499 （approved in 2000）

Radio transmission systems for fixed broadband wireless access based on cable modem standards (ITU-T Recommendation J.112, Annex B）

- Complementary Recommendation

BWA specifications	PHY Layer	ITU-R F.1499
	MAC Layer and above	ITU-T J.116

- CONTENTS

1. General system requirements
2. Functional assumptions
3. Communication protocols
4. PMD sublayear specifications
5. Downstream transmission convergence sublayer

New ITU-R Recommendation on 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:

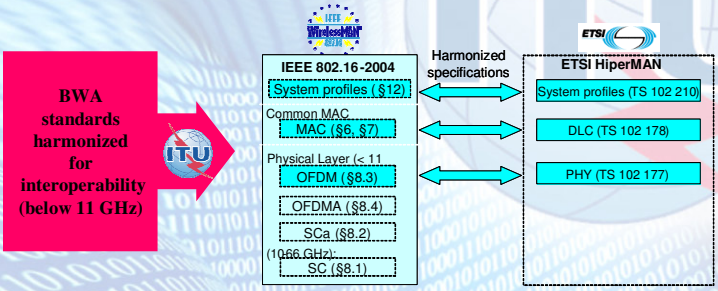
		PHY Layer	MAC Layer
IEEE 802.16		IEEE Std. Part 16-2004	Air interface for fixed BWA
ETSI BRAN	HiperMAN	ETSI TS 102 177	ETSI TS 102 178
	HiperAccess	ETSI TS 101 999	ETSI TS 102 000

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

Draft new Recommendation ITU-R F.[Doc. 9/51]

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.
It provides references to the standards for interoperability between BWA systems.
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:



ITU & BWA

Radiocommunications

✓Frequency spectrum (harmonization) → RR

✓Radio interface specifications → ITU-R Recommendation

✓Collaboration with external organizations → IEEE 802.16 WG, ETSI Project BRAN, …

Strategy & Policy

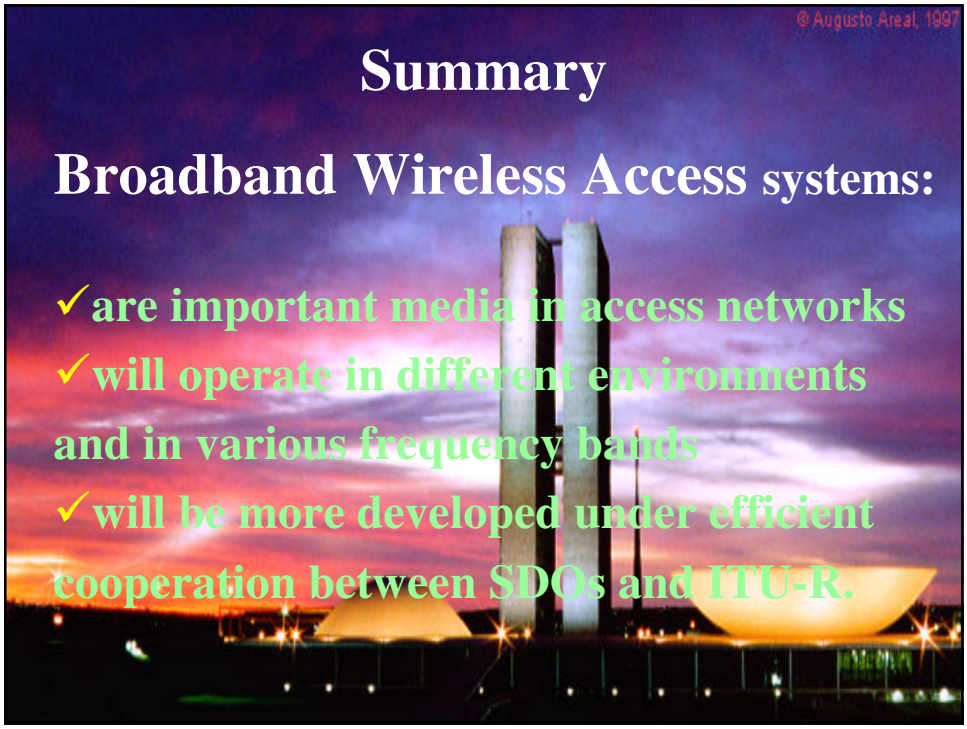
✓Workshops & publications → *Promoting Broadband*, *The Birth of Broadband* & country case studies

Telecom development

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

✓Seminars on BWA

Visit: http://www.itu.int/ITU-R/study-groups/was/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Summary
Broadband Wireless Access systems:
✓are important media in access networks
✓will operate in different environments and in various frequency bands
✓will be more developed under efficient cooperation between SDOs and ITU-R.