The WiMAX Forum and its Regulatory Working Group:
An overview of objectives, structure, and key activities

ITU/BDT Regional Seminar on Mobile and Fixed Wireless Access for Broadband Applications for the Arab Region Algiers, 19-22 June 2006

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On behalf of the WiMAX Forum RWG

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Outline

- WiMAX Forum Overview
- WiMAX Forum Structure
  - mandate of Working Groups (WGs)
- Regulatory WG
  - Mandate
  - Structure
  - Major Work Areas
- Summary

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WiMAX Technology

- WiMAX is standards-based technology enabling the delivery of last mile wireless broadband access as an alternative to cable and DSL.
    - WiMAX will provide **fixed**, nomadic, **portable** and, **mobile** wireless broadband connectivity without the need for direct line-of-sight with a base station
    - In a typical cell radius deployment of 3 to 10 km, anticipate WiMAX can deliver up to 40 Mb/s **per channel**, for fixed and portable access applications
    - Mobile network deployments expected to provide up to 15 Mb/s within a typical cell radius of up to 3 km
    - Expecting WiMAX technology will be incorporated in laptops and PDAs by 2007, allowing for urban areas and cities to become "metro zones" for portable outdoor broadband wireless access

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The WiMAX Forum

- The WiMAX Forum™ is an industry-led, non-profit corporation founded in April 2001 by equipment and component suppliers to promote and certify compatibility and interoperability of broadband wireless access equipment based on the IEEE 802.16 standard.
- WiMAX Forum member companies support the industry-wide acceptance of the IEEE 802.16 and ETSI HiperMAN wireless MAN standards.

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WiMAX Forum Vision

- Create a global mass market for deployment of broadband wireless networks that will enable fixed, portable and mobile users to maintain high-speed connectivity wherever they go.
- To lead the "access anywhere" revolution supporting delivery of data, voice and video applications at home, in the office and on the go.

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WiMAX Forum Charter

- Promote and accelerate WiMAX deployments to achieve global wireless broadband market leadership
- Develop a framework for a high performance end-to-end IP network architecture supporting stationary, portable, and mobile users
- Deliver a trusted certification process
- Promote viable business models, including favourable IPR policy
- Foster a thriving ecosystem

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WiMAX Forum Principles

- The WiMAX Forum is comprised of industry leaders who are committed to the open interoperability of all products used for broadband wireless access:
  - Support IEEE 802.16 standard
  - Propose and promote access profiles for their IEEE 802.16 standard
  - Certify interoperability levels both in the network and the cell
  - Achieve global acceptance
  - Promote use of broadband wireless access overall

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Why Create the WiMAX Forum?

- The WiMAX Forum is the only organization bringing compliance and interoperability to the wireless broadband industry with its testing and certification program, "WiMAX Forum Certified™"
  - CETECOM Spain began validation of certification scripts in July 2005 and product testing for WiMAX Forum Certification began in January 2006.

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Why WiMAX Forum Certified?

- Every piece of WiMAX Forum Certified equipment will be interoperable with other WiMAX Forum Certified equipment, avoiding the problems of custom and non-interoperable solutions.
  - WiMAX Forum Certified means a service provider can buy equipment from more than one company and be confident everything works together
  - WiMAX Forum Certified means a more competitive industry
  - WiMAX Forum Certified means lower costs
  - WiMAX Forum Certified means faster growth for broadband wireless – everywhere around the globe

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356 WiMAX Forum Members

- 86 Ecosystem/Applications/Content
- 121 Service Providers
- 71 System Vendors
- 78 Silicon/Component Suppliers

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Spring 2004

1Q 2006

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WiMAX Forum Organization

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                    ┌─────────────────┐
                    │  WiMAX Forum    │
                    │     Board       │
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Marketing Working Group	Service Provider Working Group	Technical Working Group	Certification Working Group

Networking Working Group	Applications Working Group	Regulatory Working Group

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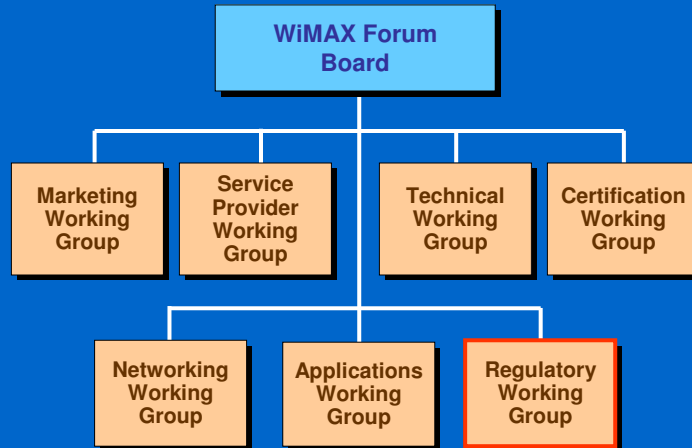
Marketing Working Group

Charter:

- Build awareness of BWA (Broadband Wireless Access) and preference for WiMAX Forum Certified products worldwide
- Re-establish credibility of BWA as valid last mile solution
- Launch WiMAX Forum Certified program
- Establish WiMAX Forum as the leader of the wireless broadband industry

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Service Provider Working Group

Charter:
- Establish a platform for service providers to provide feedback to all the other Working Groups within the WiMAX Forum
- Responsibilities:
  – Define requirements for network architecture beyond the IEEE 802.16 standard
  – Develop business models for WiMAX Forum Certified products
  – Define functional specifications for future IEEE 802.16 standards

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Technical Working Group

Charter:
- Promote global conformance and interoperability of WiMAX Forum Certified products and markets
- Development of conformance and interoperability specifications based on global standards
- Establish a Test and Certification infrastructure for WiMAX Forum member vendors
- Work co-operatively with international standards bodies
- Foster co-operation among WiMAX Forum membership

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Certification Working Group

Charter:

- Evaluation of testing options
- Recommendation for test lab(s) selection
- Manage test lab(s) relationship
- Manage WiMAX Forum Certified program
- Maintain open process for WiMAX Forum Certified program
- Work closely with TWG
    - TWG provides System Profiles, PICS, TSS&TP
    - If TSS&TP outsourced to test lab, assist TWG to manage relationship

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Networking Working Group

Charter:

- The purpose of the Network Working Group (NWG) is to create higher level networking specifications for fixed, nomadic, portable and mobile WiMAX systems, beyond what is defined in the scope of 802.16. The specific objective for the NWG is to deliver a reference architecture model and required specification(s) based on harmonized requirements from the Service Provider Working Group (SPWG) and profiles to be approved by the WiMAX Forum.

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Applications Working Group

Charter:

- Characterize and demonstrate best practice solutions across classes of user friendly applications and ensure various applications are competitive with existing technologies and also exploit unique WiMAX capabilities.

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Regulatory Working Group

Charter:

- Ensure availability and global harmonization of "WiMAX-friendly" spectrum worldwide
- Encourage uniform adoption of specific frequency bands to realize the greatest economies of scale and the most cost efficient manufacturing
- Work with regulators to develop flexible and technology neutral regulatory frameworks that allow usage models to evolve as the BWA market matures and enable service providers to deploy the most appropriate solutions for their markets

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The Current RWG Charter

- Create a global regulatory environment to:
- Harmonize existing and new spectrum
  - Make it "WiMAX friendly"
- Ensure cost effective equipment
  - Harmonization of RF specs: economies of scale
- Deliver consistent end user experiences
  - Easy access to a "proper broadband" experience
  - High value proposition for wireless Broadband
  - Quality of Service for voice (VoIP) and video
- Enable global roaming for nomadic & mobile WiMAX devices
  - Ability to connect WiMAX-enabled devices via local service providers

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RWG Organisation (15th Apr '06)

Chair: Tim Hewitt
BT

Vice Chair **Rob Kubik** Motorola	Vice Chair **Barry Lewis** Redline Communications	Vice Chair, operations **Jayne Stancavage** Intel

Secretary **Graham Macdonald** Intel	Programme Manager **Alan Chisholm** WiMAX Forum

Standing Task Groups

North America	Europe	ITU	Asia-Pacific	Latin America & Caribbean	Middle East & Africa

Ad-hoc sub-teams

Ultra Wide band	FDD/TDD Compatibility	SPWG/ TWG Liaison	MWG Liaison	RF Parameters / Sharing	Spectrum/ regulatory database	Spectrum opportunities <1GHz	"Non-radio" Reg. Issues

Regulator outreach	Compatibility with Satellite Services					Consultation response drafting groups (if not covered via task groups)

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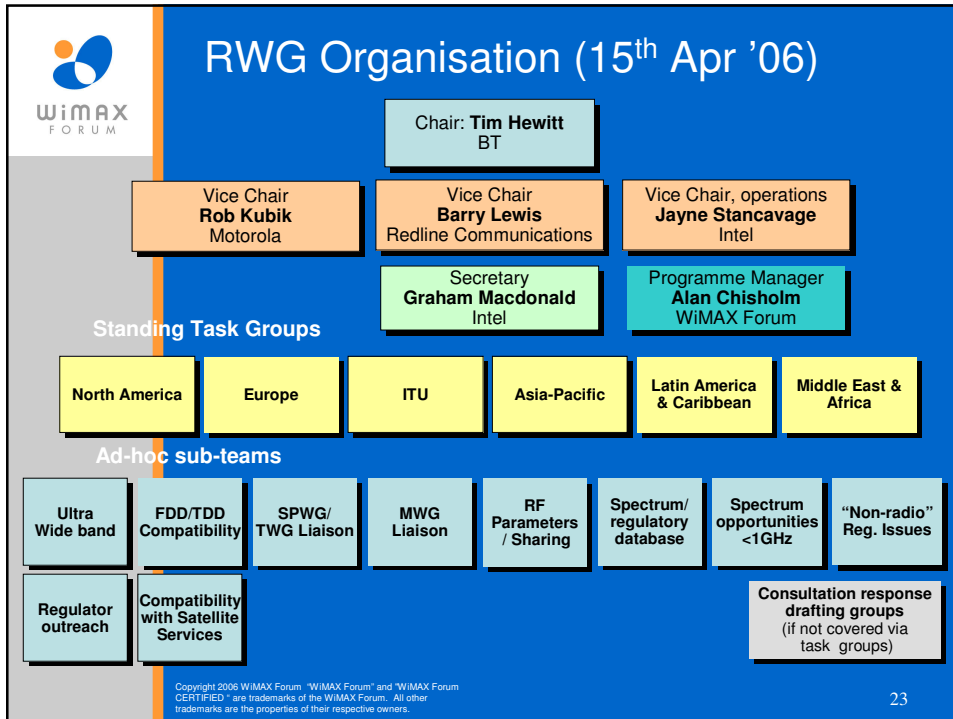
Regulation is a national prerogative ...

- Every nation has the sovereign right to regulate the use of spectrum within its territory according to its own needs and circumstances
  - ITU-R is the global spectrum allocation entity and much energy and hard discussion is needed to reach consensus
  - Historically, nations and regions have tended to go their own way to varying degrees for rationales that were compelling at the time
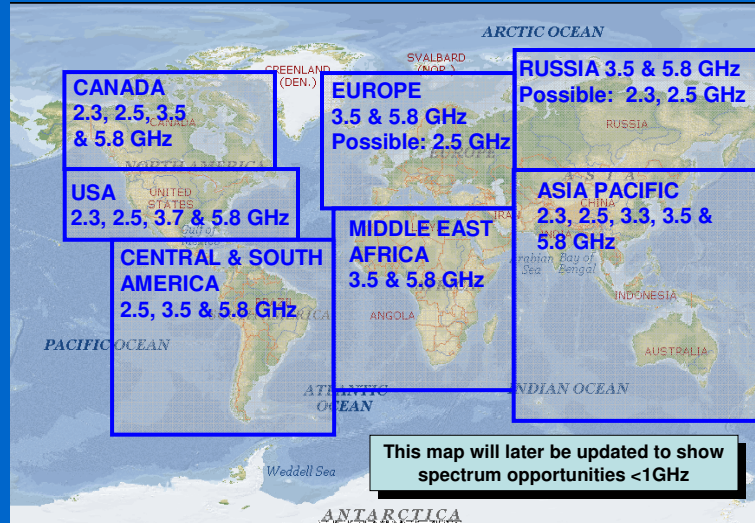
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... but global harmonization has significant advantages

- It is in every nation's interests to harmonize its spectrum policies and allocations with the global community
  - Economies of scale are realized through commonality
  - Leads to interoperability, ease of interconnection and, for mobile services, global roaming
  - Manufacturers do not have the capacity to provide unique yet cost effective solutions for every market

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RWG Standing Task Groups

- Task Groups recognize variations in Regional regulations and perspectives, need to be sensitive to local cultural considerations
  - North America
  - Europe
  - Asia-Pacific
  - Caribbean and Latin America
  - Middle East and Africa
- Tasks
  - Engage local regulators
  - Aim: find spectrum allocations, other relevant regulations that are as consistent as possible worldwide

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Spectrum by Region

CANADA
2.3, 2.5, 3.5 & 5.8 GHz

EUROPE
3.5 & 5.8 GHz
Possible: 2.5 GHz

RUSSIA 3.5 & 5.8 GHz
Possible: 2.3, 2.5 GHz

USA
2.3, 2.5, 3.7 & 5.8 GHz

CENTRAL & SOUTH AMERICA
2.5, 3.5 & 5.8 GHz

MIDDLE EAST AFRICA
3.5 & 5.8 GHz

ASIA PACIFIC
2.3, 2.5, 3.3, 3.5 & 5.8 GHz

This map will later be updated to show spectrum opportunities <1GHz

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WF Spectrum policy principles: FLEXIBLE access to spectrum

- Support for evolution of usage models
  - Fixed / Nomadic / Mobile convergence
- Technology neutral non-discriminatory licensing
  - Allow operators to deploy the best solution for their market as long as it adheres to the regulatory rules and co-exists effectively with its "neighbours"
  - Support for both FDD & TDD
  - Avoidance of unnecessary technical constraints
- Support for secondary spectrum markets and spectrum liberalisation
  - Allow operators to efficiently acquire sufficient spectrum for "true" broadband services

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WiMAX Spectrum Objectives

- Flexible, global, spectrum to enable volume deployment of WiMAX Forum Certified products
  - Two licensed band ranges
    - 3.3–3.8 GHz
    - 2.3–2.7 GHz
  - One license-exempt band range
    - 5.725–5.85 GHz
- Additional spectrum significantly below the 2.5 GHz band for Mobile broadband

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ITU Standing Task Group

- Seeking recognition of IEEE 802.16 standards within ITU-R
  - Draft new ITU-R Rec. M.BWA "Radio interface standards for broadband wireless access systems, including mobile and nomadic applications, in the mobile service operating below 6 GHz"
    - Includes IEEE 802.16e (mobile WiMAX)
    - Objective: finalize in Sept. 2006 meeting of WP 8A
  - Companion to ITU-R Rec. F.1763, "Radio interface standards for broadband wireless access systems in the fixed service operating below 66 GHz"
    - Points to IEEE 802.16-2004 (fixed/nomadic WiMAX)
  - Recognition of IEEE 802.16 in ITU work on new IMT spectrum

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Ad Hoc Sub Teams (1/4)

Multiple focused teams to address specific technical areas

- Ultra Wideband
  - A technology that has significant potential in certain circumstances through operating near the "noise floor"
  - Essential to ensure UWB influence on noise floor does not adversely affect WiMAX (or IMT-2000)
- FDD/TDD Coexistence
  - Promoting technology independent regulation but leads to potential for interference between technologies
  - Group addresses interference mitigation techniques

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Ad Hoc Sub Teams (2/4)

- SPWG/TWG, MWG Liaison Teams
  - Handle interaction with Service Providers and Technical WGs
  - Review their work for regulatory aspects; provide regulatory guidance
  - Need good market view to support interaction with regulators
- RF Parameters / Sharing
  - Spectrum masks, EIRP levels to support frequency sharing analyses, spectrum & guard band requirements, interoperability
- Spectrum / regulatory database
  - Need to understand differences in national regulation
  - CETECOM awarded contract

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Ad Hoc Sub Teams (3/4)

- Spectrum opportunities <1GHz
  - Focus has been on 3.5, 2.5 and 5.8 GHz
  - Transition to digital TV offers opportunity to reallocate spectrum (e.g., US "700MHz", Europe 470-862MHz)
  - Frequencies attractive for propagation characteristics to serve less dense subscriber markets
- "Non-radio" Regulatory Issues
  - Covers non-spectrum issues such as "911", Lawful Intercept, Number Portability, RF exposure, etc.
- Consultation response drafting groups
  - Respond to specific consultations (e.g., Sweden, Pakistan, Saudi Arabia, Israel, etc.)
  - Regulators have diverse views on spectrum WiMAX might need, what it should have access to

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Ad Hoc Sub Teams (4/4)

- Regulator Outreach
  - Works to provide consistent message to regulators in regions
  - Works in conjunction with Standing Task Groups to take account of local technical and cultural factors
- Compatibility with Satellite Services
  - Fixed Satellite Service widely used in some regions
  - Sensitivity to potential for interference from WiMAX
  - Working closely with interested parties to ensure appropriate rules are in place to ensure mutual compatibility

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Summary

- WiMAX offers cost effective BWA
  - High speed telecommunications to supplement urban markets, address underserved markets
- IEEE 802.16 standards for WiMAX are in place
- WiMAX Forum defines profiles
  - Profiles provide basis for promoting and certifying compatibility and interoperability of BWA equipment based on the IEEE 802.16 standards
- WiMAX Forum structured in 7 Working Groups
- Regulatory WG provides critical function
  - Availability and global harmonization of "WiMAX-friendly" spectrum worldwide for market success
  - Encourage uniformity for economies of scale

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Thank you for your attention!

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Acronyms

AWP	Application Working Group	MAN	Metropolitan Area Network
BWA	Broadband Wireless Access	MWG	Marketing Working Group
DSL	Digital Subscriber Line	NWG	Network Working Group
EIRP	Effective Isotropic Radiated Power	PDA	Personal Digital Assistant
FDD	Frequency Division Multiplexing	Rec.	Recommendation
		RF	Radio Frequency
HiperMAN	High Performance Radio Metropolitan Area Network	RWG	Regulatory Working Group
HyperLAN	High Performance Radio Local Area Network	SPWG	Service Provider Working Group
		TDD	Time Division Multiplexing
IEEE	Institute of Electrical and Electronics Engineers	TWG	Technical Working Group
IP	Internet Protocol		
ITU	International Telecommunication Union	VoIP	Voice over IP
		WG	Working Group

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