THE IMPACT OF WRC-2000 ON WIRELESS SERVICES AND HOW YOU CAN ACTIVELY PARTICIPATE IN THE WRC PROCESS

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TOPICS

ITU Radio Regulations

World Radio Conference (Istanbul, 2000): WRC-2000

Selected WRC-2000 agenda items

- **IMT-2000 third generation mobile systems**
- **High-density fixed systems**
- **Radionavigation-satellite systems**
- **Sharing between GSO and NGSO systems**
- **Re-planning of the Broadcasting Satellite Service**

Opportunities for participation in the WRC process

Acknowledgements

A selection of viewgraphs from two presentations by ITU officials are used in this presentation, which the authors kindly made available for this purpose:

Michel R. Giroux
Deputy Director, ITU-R
“Main Results of WRC-2000”
August 2000

Stephen M. Blust
Chair, ITU-R Working Party 8F
“Wireless Standards Development – A New Paradigm”
June 2000

THE INTERNATIONAL TELECOMMUNICATION UNION (ITU)

ITU consists of three Sectors:

- **Telecommunication Standardization Sector (ITU-T)**
- **Radiocommunication Sector (ITU-R)**
- **Telecommunication Development Sector (ITU-D)**

THE AIM OF ITU-R IS TO ASSURE RATIONAL, EQUITABLE, EFFICIENT AND ECONOMICAL USE OF THE RADIO-FREQUENCY SPECTRUM AND SATELLITE ORBITS.

ITU-R ACHIEVES ITS AIM BY:

- **holding World and Regional Radiocommunication Conferences to develop and adopt Radio Regulations And Regional Agreements**
- **establishing ITU-R Recommendations on the technical characteristics and operational procedures for radiocommunication services and systems**
- **coordinating efforts to eliminate harmful interference between radio stations of different countries**
- **maintaining the Master International Frequency Register**
- **providing tools, information and seminars to assist national radio-frequency spectrum management**

ITU RADIO REGULATIONS

The Radio Regulations constitute an international treaty on radiocommunications covering the use of the radio-frequency spectrum by radiocommunication services.

World Radiocommunication Conferences (WRCs) may:

- **revise the Radio Regulations and any associated Frequency Assignment and Allotment Plans**
- **address any related matter of worldwide character**
- **in preparation for future WRCs, determine Questions for study by the Radiocommunication Assembly and its Study Groups**

WRC FRAMEWORK

- **A World Radio Conference (WRC) is held every two to three years in order to update the RRs**
- **The regulatory matters to be addressed by a future WRC are listed in an agenda that is agreed upon in advance**
- **A Conference Preparatory meeting (CPM) develops the technical, operational and regulatory bases for a WRC**
- **The CPM Report draws on the studies performed by the ITU-R Study Groups**

ITU-R STUDY GROUPS

SG 1 **Spectrum Management**

SG 3 **Radiowave propagation**

SG 4 **Fixed-satellite service**

SG 6 **Broadcasting service**

SG 7 **Science services**

SG 8 **Mobile, radiotetermination, amateur and related satellite services**

SG 9 **Fixed service**

THE ITU-R STUDY GROUPS:

- **draft the technical bases for Radiocommunication Conferences**

- **develop Draft ITU-R Recommendations on the technical characteristics of, and operational procedures for, radiocommunication services and systems**

- **compile Handbooks on spectrum management and emerging radiocommunication services and systems**

The draft ITU-R Recommendations may be approved either by correspondence or by the next Radiocommunication Assembly.

THE RADIOCOMMUNICATION ASSEMBLIES:

- **assign conference preparatory work and other questions to Study Groups**
- **respond to other requests from ITU conferences**
- **suggest suitable topics for the agenda of a future WRC**
- **approve and issue ITU-R Recommendations and Questions developed by Study Groups**
- **set the work program for Study Groups and disband or establish Study Groups according to need**

RELEVANT ITU ASPECTS

- **Specialized Agency of the United Nations**
- **Consensus building instead of voting**
- **Two membership categories: administrations (countries) and Sector members (corporations)**
- **Participation of related international organizations**
- **Participation of regional standards organizations**

As a result, ITU's regulatory activities take into account the interrelated engineering, economical, and political matters.

WRC-2000

Statistics

Selected WRC-2000 agenda items

- **IMT-2000 third generation mobile systems**
- **High-density fixed systems**
- **Radionavigation-satellite systems**
- **Sharing between GSO and NGSO systems**
- **Re-planning of the Broadcasting Satellite Service**

NOTE: This portion of the presentation will be based on the talk "Main results of WRC-2000" by Michel R. Giroux, Deputy Director, ITU-R, who kindly made his viewgraphs available for this purpose.

ADDITIONAL FREQUENCY BANDS FOR IMT-2000

NOTE: The talk "Wireless Standards Development - A New Paradigm" by Stephen M. Blust, Chair, ITU-R Working Party 8F, is a most useful reference in this matter. He kindly made available his viewgraphs for our use.

Detailed WRC-2000 results are contained in the handout excerpts from the Provisional Final Acts, WRC-2000:

- **new frequency bands listed in RR Article S5**
- **Resolution [COM5/24] (WRC-2000)**

SOME BASIC IMT-2000 ISSUES CONCERNING ADDITIONAL FREQUENCY BANDS

- **How realistic are the current spectrum demand predictions?**
- **The apparent open ended nature of Resolution [COM5/24] seems to point toward increasing worldwide diversity of IMT-2000 instead of convergence to the initial basic objective of a single global standard. Does it matter?**
- **Since Annex 1 to Resolution [COM5/24] (WRC-2000) seems to indicate that much more remains to be resolved than has been achieved, so far, what progress can be realistically expected at WRC-02/03?**

SOME BASIC IMT-2000 ISSUES CONCERNING ADDITIONAL FREQUENCY BANDS (continued)

- **What is the real importance of global roaming?**
- **What are the prospects of fixed wireless access (FWA) using IMT-2000 technologies?**
- **To what extent can IMT-2000 satisfy the needs of developing countries?**
- **To what extent can further technological progress (e.g. multimode handsets, software defined radio) help the coexistence of mobile systems using different standards?**

HIGH-DENSITY FIXED SYSTEMS (HDFS)

- **Mobile infrastructure applications and direct-to-user broadband wireless access in the 38 GHz band stimulated the introduction of WRC-97 agenda item 1.9.6 on "the identification of suitable frequency bands above 30 GHz for use by the fixed service for high-density applications".**

- **Resolved at WRC-2000 in Footnote S5.547 to Article S5: "The bands 31.8 – 33.4 GHz, 37 – 40 GHz, 40.5 – 43.5 GHz, 51.4 – 52.6 GHz, 55.78 – 59 GHz and 64 – 66 GHz are available for high-density applications in the fixed service …"**

  [Caution - restrictions may apply!]

HIGH-DENSITY FIXED SYSTEMS (HDFS) (continued)

- **The applicable restrictions consist in frequency band sharing between the fixed service (FS) and other services, notably the fixed-satellite service (FSS) which may use geostationary (GSO) and/or non-geostationary (NGSO) systems.**

- **The most difficult band sharing problem is in the 37.5 – 42.5 GHz range, in which both services have primary allocations. Resolution [COM5/28] (WRC-2000) invites ITU-R to study possible sharing approaches and to "take into account the need to ensure a proper balance in terms of the impact on both the fixed service and space services sharing the same band."**

HIGH-DENSITY FIXED SYSTEMS (HDFS) (continued)

- **The key sharing problem in this frequency range is that high-density FS deployment is already established, and high-density FSS deployment is being planned, and both are intent on serving the same potential user base.**

- **Resolution [COM5/28] (WRC-2000) recognizes that "sharing may in practice become difficult when high geographic densities of such stations are deployed in bands heavily used by either service", but nevertheless pursues band sharing without restrictions that may critically impair the viability of either service, or both.**

- **Is this realistic? Is there an alternative?**

RADIONAVIGATION-SATELLITE SERVICE (RNSS)

The additional spectrum makes it possible for the two existing systems, USA's Global Positioning System (GPS) and Russia's Global Navigation Satellite System (GLONASS) to progress into second-generation systems while providing room for Europe's new system, Galileo.

A brochure made available at WRC-2000 differentiates Galileo in the following way:

- **a global navigation satellite system under civil control**
- **plays a major role in the European economy and provides Europe sovereignty in future traffic management and telematics infrastructure**

OPPORTUNITIES FOR PARTICIPATION IN THE WRC PROCESS

The opportunities of primary interest to engineers are in ITU-R studies, either in response to WRC Resolutions, or toward generic recommendations. Some possible levels of participation:

- **contributing information on system characteristics needed in sharing studies**
- **developing interference protection criteria for sharing studies**
- **drafting recommendation and/or conference texts**

OPPORTUNITIES FOR PARTICIPATION IN THE WRC PROCESS (continued)

- such participation requires attending meetings of U.S. ITU-R Study Groups and/or Working Parties, either in person or over the phone, whereas attendance of international meetings is optional and may be subject to obtaining U.S. delegate status

- corporations interested in systematic participation at a more exposed level may want to consider applying for ITU-R Sector membership

- for more information access ***www.itu.int*** and contact the Chair of the specific U.S. Study Group or Working Party