Planning Tools for Frequency Coordination and Spectrum Management Tasks

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Regional Seminar on evolving network infrastructures to NGN and related Planning Strategies and Tools, for the CEE, CIS and Baltic States

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Agenda

1. Brief Company Introduction
2. Product Portfolio/Relevant Markets
3. Why Frequency Coordination is Required?
4. Keys for Efficient Frequency Coordination
5. International Frequency Coordination Agreements
6. Frequency Coordination and Spectrum Management Solutions
1. Company Introduction

- Headquarters
  - Lichtenau/Germany

- Approximately 100 Employees Worldwide

- International Subsidiaries
  - LS China - Shanghai
  - LS Hungary - Budapest
  - LS South Africa – Johannesburg
  - Spectrocan - Ottawa/Canada

- Overall Sales of 9.6 Million Euro in 2003/2004

- Export Share almost 90%

2. Product Portfolio

LS telcom Provides Superior Software and Consulting Solutions Covering Frequency Planning/Coordination and Spectrum Management

Addressing the Needs and Requirements of

- Regulation Authorities
- Air Traffic Control Centers
- Military Organizations
- Broadcast Operators
- System Suppliers
- Telecom Operators
3. Why is Frequency Coordination Required?

Coordination with neighbors is essential for a long term interference free situation. Only on this basis the huge infrastructure investments for modern networks can be rectified and preserved.

It is also a modern type of country protection: Loosing frequency space is a loss of resources which may not be usable for one generation or more. As a result, loss of revenue for the operators and less fees for the regulators will occur.

4. Keys for Efficient Frequency Coordination

- Good and Up-to-Date Database
  - Transmitter Data, Receiver Data, Digital Terrain Data, …

- Technical Analysis Tools
  - Automated, Computerized Coordination Processing

- Appropriate Administrative Response Times
  - Quick Response Times Required from Involved Parties

- Management of Coordination Records
  - Storing of Coordination Details for Later Usage

- Coordination Database is Source for Radiomonitoring Purposes in Case of Disturbance
5. International Frequency Coordination Agreements

Radio Service Specific Coordination Agreements

- Coordination of Landmobile and Fixed Service
- Coordination of Broadcasting Services
- Coordination of Other Services like Satellite Services, Aeronautical Services, …

5. Coordination of Landmobile and Fixed Services

Berlin Agreement – 17 member countries
Coordination of frequencies between 29.7 MHz and 39.5 GHz for the fixed service and the land mobile service.

Technical and Administrative Procedures are Specified in Terms of
- Calculation Algorithm (HCM) and DTM
- Data Exchange Format
- Response Times
- …

Bilateral/Multilateral, Country Specific Agreements
5. Coordination of Landmobile Services

- Foreign Requests:
  - Protect you Border Area
  - Protect your Stations
  - Evaluate the Situation
  - Agree or Reject

- Domestic / Foreign Stations:
  - Pre- Check the Situation
  - Protect your Receiving Stations
  - If Necessary Apply for Coordination
  - Exchange Data with Neighboring Countries

5. Coordination of Landmobile Services: Part of Spectrum Management

- Application for a license of a service in the Land Mobile service range
- National Administration
- New license for one or more frequencies
- Land Mobile frequency pool
  - Division into user groups
  - Frequency assignment
  - Coordination procedure
- Coordination agreed for selected frequency?
- Yes
- No

- Frequency Management
- Frequency assignment
- Coordination procedure
- Bi- or multilateral agreements
- User group table for definition of frequency band, standard power and antenna height
- HCM module for compatibility calculation
- 4 assignment methods:
  - From planned frequency
  - Foremost priority (I+II)
  - Application whole country
- Consideration of preferential rights
- Calculations against foreign stations
- Time guarding system for important deadlines
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5. Coordination of Broadcasting Services

Geneva 84 Plan
FM Radio Services

Stockholm 61 Plan /Geneva 89 Plan
Analogue Television Services

Wiesbaden 95/Bonn 96/Maastricht 2002
T-DAB Services (VHF/L-Band)

Chester 97/RRC 04-06 Plan
T-DAB (VHF) and DVB-T Services

Geneva 75 Plan
Long and Medium Wave Services

5. RRC 04/06 for Digital Broadcasting

- Initial Session was held in May 2004
- Data of National Digital Network Requirements to Be Submitted to the ITU by End of February 2005
- First Planning Exercise by the ITU before IPG Meeting in July 2005
- Deadline for Last Data Submission is End of October 2005
- Second Planning Exercise Beginning in 2006 Will Produce Draft Plan
- Second Session to Be Held in May/June 2006
5. Coordination of Other Services

Satellite Services

AP 7 – Global Application
Coordination of earth stations via ITU.

AP 8 – Global Application
Coordination of satellite networks via ITU.

Aeronautical Services
Being Coordinated through ICAO.

6. Frequency Coordination and Spectrum Management Solutions
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Central Spectrum Management Database Including Frequency Coordination Data

- Application and License Processing
- Strategic Spectrum Planning
- Technical Frequency Management
- Spectrum Monitoring Interface

MULTIlink
- Planning / Coordination of Microwave Services

CHIRplus_LM
- Planning / Coordination of Landmobile Services

SPECTRAemc
- EMC Analysis Tool (9kHz – 100GHz)

CHIRplus_BC
- Planning / Coordination of Broadcasting Services

MONITORplus
- Interface to Radiomonitoring Systems
- Analysis of Monitoring Result Files

SPECTRAplan
- Spectrum Planning
- Frequency Allocation Plan
- Channel Processing
- ITU Notification

SPECTRAplus_db
- Central Spectrum Management Database Containing all Relevant License Data
- System Administration
- Data Security Management
- Backup

SPECTRAweb
- License Data Entry via Internet
- Generation of Reports
- Display of Statistics
Exemplary Workflow (3)

Approval of License (by Administrator) → Printing of License (by Secretary) → Regular Invoicing (by Accountant) → Expiry of License (by Administrator) →

Invoice (to Client) → Payment (from Client) → Reminder (in kind)

European References / Regulation Authorities

ANACOM

BA K O M

NEW

ELEKTRONISKO SAKARU

DIRE

KCIJA

NEW
Application and License Processing – SPECTRAplus

- Radio Service Specific License Processing
- Workflow Management via Action Control
- User Role Management
- Deadline Management
- Generation of Reports and Statistics
- Printing of Client Specific Documents
- E-Licensing via Internet
Strategic Spectrum Planning – SPECTRAplan

- Generation and Administration of Frequency Plans, Allocations and Channel Allotments
- Management of International Frequency Plans (WRC 2000/2003, CEPT, ...)
- Comparison of Frequency Plans
- Graphical Display of Frequency Allocations

Technical Frequency Management

- Frequency Planning/Coordination Tools for Regulating Authorities
- Technical Frequency Management
  - SPECTRAmc
  - CHIRplus_BC
  - CHIRplus_LM
  - CHIRplus_SAT
  - MULTIlink
  - Others
- Frequency/Network Planning Tools for Network Operators
Technical Frequency Management – SPECTRAemc

Electromagnetic Compatibility Tool

- Wave Propagation from 9KHz to 100GHz
- Contour and Area Calculations
- Interference Analysis including Intermodulation
- Fully Automated Macro Functions

NEW

Technical Frequency Management - CHIRplus_LM/MULTIlink

Coordination Tools for Fixed and Landmobile Services

- Fully Integrated Harmonized Calculation Module (HCM)
- Guidance Through Frequency Coordination Process
- Time Guarding System Managing Response Times
- Support of Data Exchange Format
Technical Frequency Management -
CHIRplus_SAT

Coordination Tools for Satellite Communication Services

- Coordination for Earth Stations and Satellite Networks
- Support in the Notification Process of Space Services
- Database 100% Compatible to ITU Database
- Direct Access to ITU SRS CD-ROM

Technical Frequency Management -
CHIRplus_BC

Coordination Tools for Broadcasting Services

- Interface to BR IFIC CD-ROM
- Support of T01/02/03 Forms and Electronic Notification Format ITU TerRaSys
- Fully Integrated Coordination Macros According to International Agreements
- Stating Whether Coordination Is Possible
- Guidance/Proposal How to Solve it
Coordination Solutions for Broadcasting Services

Preparatory Workshop for Regional Radiocommunications Conference 04/06

- Individual workshop for each interested country!
- Review of the sets of data issued initially by 28th February 2005
- Review of the DVB-T plan of the country
- Generating the modified input data for submission
- Filling up the frequency coordination data forms which should be sent to the neighbouring countries

Radiomonitoring Interface – MONITORplus

- Generation of Monitoring Orders
- Import of Monitoring Data
- Comparison and Linking of Monitoring Data with License Data
- Detection of Unlicensed Transmitters