CelPlan Design Solutions

CDMA 2000

1xRTT 1xEVD0

CDMA One S-95 A/B/C

IIMR

MMDS/LMDS

PMR/LMR

TETRA



BACKHAUI

LTE/WIMAX/WLAN

SPECIALIZED STUDIES

Radar Wind Farm

Universal Integrated Wireless Planning, Optimization and Performance Software

Built-in GIS Capabilities

WCDMA (UMTS) HDSPA/HSUPA/HSPA/

GSM/GPRS/EDGE/EDGE-E

DIGITAL TV

DVB-SH T-DMB ISDB-T

- Simultaneous use of multi-resolution databases for topography and morphology
- ◆ 2D and 3D visualization over tool accessed web satellite imagery
- Unique site visit feature, providing 360° view with antenna tilt consideration

Superior RF Predictions

- Includes traditional and advanced propagation models with fractional morphology consideration along the path
- Superior propagation models including Korowajczuk 2D and 3D
- Simultaneous predictions for multiple receiver heights

Detailed Multi-Technology Emulation

- Adaptive Modulation and Coding Schemes
- MIMO for different antenna correlations
- Unique fading prediction per pixel
- SNIR margin per pixel according to predicted fading and BER

- Providing solutions to the wireless industry since 1992
- Employee owned
- 500+ employees
- Leader in 3G / 4G designs and solutions
- Innovative software applications and value added consultancy.
- Published technical experience and methodologies
- Highly experienced staff
- Hundreds of implemented designs
- Headquarters in Reston, VA, USA
- Other global offices in North America, South America, Europe, Africa and Middle East



CelPlan has rapidly established itself as an innovative leader in providing the most advanced engineering solutions for the wireless industry. CelPlan brings a powerful and sophisticated portfolio of engineering capabilities to bear on the design and development of 3G and 4G networks



WCDMA (UMTS)/ HDSPA/ HSUPA/ HSPA/ HSPA+

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INDEPENDENCE

MENTORING

Automatic Cell Planning And Location

◆ Automatic cell location based on traffic, backhaul, cost and ROI

Cell Footprint Enhancement

- Footprint optimization considers interference, traffic and handoff constraints
- Optimization based in adjustments of antenna type, height, azimuth, tilt, and transmit power level.

Cell Resource Optimization

 Automated optimization of neighbor list, handover threshold/ hysteresis, frequency channels and resource codes

Network Performance Evaluation

- Calculation of area and traffic KPIs per service class
- Comparison of SLAs and KPIs

Advanced Backhaul Design

- Integrated solution with planning tool
- Complies to latest ITU specifications

Stand Alone and Enterprise Solution

- Flexible solution allows for stand-alone usage or integration with enterprise RDBs
- Multiple Processors multi-threading

Self Organizing Network Capability (SON)

Solution Customizable for SON applications

Unrivalled R&D Capability

- In-depth technology knowledge
- Extensive research for tool specifications published in technical books

GSM/GPRS/EDGE/EDGE-E

- Multiple Band Networks
- Hierarchical Cell Structure
- Frequency hopping
- DTX, AMR
- Multi-layer outage based Interference Matrix
- Channel, HSN, MAIO, MAL planning
- ◆ QoS Performance
- Unique Dynamic Traffic Simulation
- WCDMA (UMTS)/HDSPA/HSUPA/HSPA/HSPA+
- Multi band and multi carrier support
- Multi service class modeling (voice and data)
- User profiles
- User Terminal
 - Environment
 - Multi height traffic distribution
 - Detailed Service specification
 - Eb/No per data rate, fading type and BLER

- Supports all releases from R99
- Automatic footprint planning
- Unique dynamic traffic simulation
- RRM emulation
- Scheduler emulation
- Detailed traffic simulation statistics
- ◆ TD-SCDMA

SUPPORT

TRAINING

LTE

- ◆ OFDMA (DL) SC-FDMA (UL)
- TDD and FDD
- ◆ SU-MIMO, MU-MIMO, AMS
- Detailed data traffic characterization
 - Traffic per terminal type and application
- Unique dynamic traffic simulation
 - RRM emulation
 - Scheduler emulation

- Detailed traffic simulation statistics
- Key Performance Indicators per class
- Fractional frequency reuse planning
- Subscriber database and simulation
- Multi-height raster traffic per service class

User simulation

Indoor

simulation

planning

Outdoor

Multiple heights

• Unique dynamic traffic

RRM emulation

Neighbor and PN-offset

Automatic footprint

enhancement

Scheduler emulation

 SNIR margin per pixel according to fading and BER

CDMA One/CDMA2000 1-xRTT/1xEVDO

- ◆ IS-95, IS-2000 1xRTT
- ◆ IS-2000 EVD0 Rev 0/A/B
- ◆ TD-SCDMA
- Multicarrier and Multiband operation
- Multiple radio configurations
- Multi technology planning
- Voice and several data traffic classes

WLAN

- ◆ WI-FI support
- General OFDM module





CDMA One/CDMA2000 1-xRTT/1xEVD0







PMR/LMR



MMDS/LMDS



Published Books





WIMAX

- OFDM (802.16d), OFDMA (802.16e)
- ◆ 1.75, 3.5, 5, 7, 8, 8.75, 10, 14, 15, 20 MHz
- Permutation support: PUSC, FUSC, OPUSC,
- ◆ OFUSC, TUSC, AMC
- Fractional reuse through Zone support
- ◆ All MIMO schemes supported
- Radio Performance considers
 - Multiple modulations and FEC
 - Mobility
 - Symbol permutations schemes
 - HARQ

PMR/LMR

- More than 20 radio types supported (APC025, TETRA)
- Interference analysis and optimization

MMDS/LMDS

- Regulatory footprint analysis
- Maximum height analysis

Digital TV

- ◆ S- DVBH
- ◆ ISDB

Backhaul

 Updated to the latest ITU standards
Fully integrated with

cellular networks

Specialized Studies

- Radar studies
- Wind Farm interference
- R&D in general
- Airport RF interference
- Airplane coverage from ground



- BER required per service
- Latency required per service
- MIMO
 - Spatial multiplexing
 - RX/ TX diversity (Alamouti)
 - UL collaborative MIMO
- Beam-forming (AAS)
- KPI calculations (area and traffic)
- More than 20 performance predictions

CEPlan - Antenna 3d



CelPlan Technologies, Inc. Reston, VA 20191. For more information contact +1-703-259-4020 sales@celplan.com or visit www.celplan.com