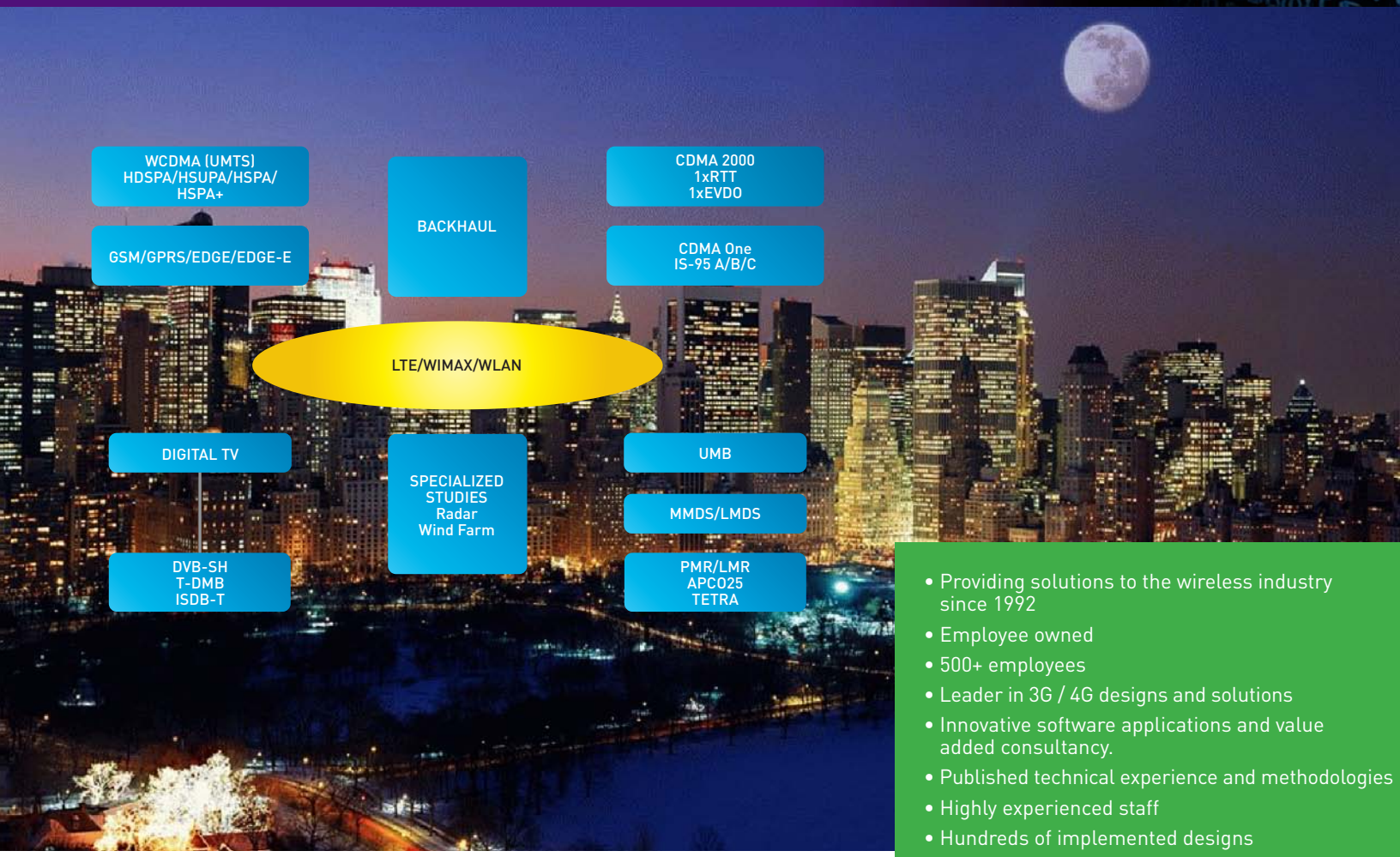
CelPlan Design Solutions



- 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

Universal Integrated Wireless Planning, Optimization and Performance Software

Built-in GIS Capabilities

- 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

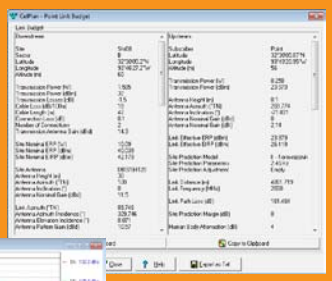
Detailed Multi-Technology Emulation

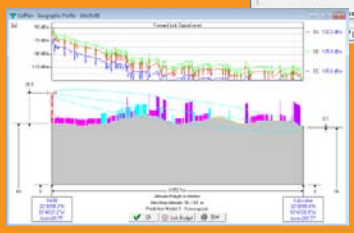
- Adaptive Modulation and Coding Schemes
- MIMO for different antenna correlations
- Unique fading prediction per pixel
- SNIR margin per pixel according to predicted fading and BER

CelPlan®
Wireless Global Solutions

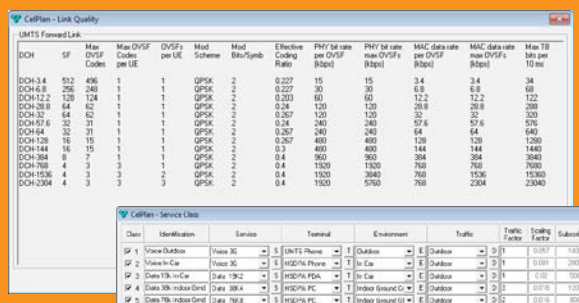
CelPlan has rapidly established itself as an innovative leader in providing the most advanced engineering solutions for the wireless industry. CelPlan brings a powerful and sophisticated portfolio of engineering capabilities to bear on the design and development of 3G and 4G networks

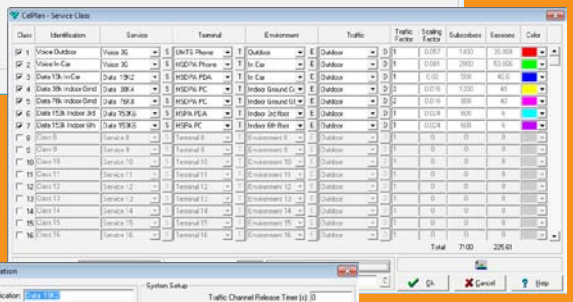
GSM/GPRS/
EDGE/EDGE-E

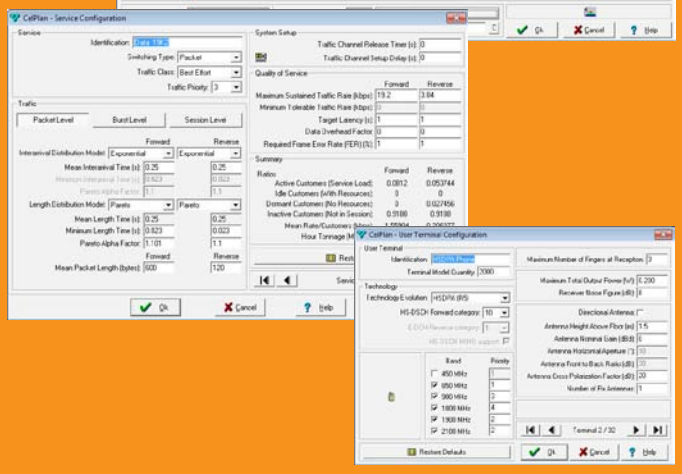




WCDMA (UMTS)/ HDSPA/
HSUPA/ HSPA/ HSPA+







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

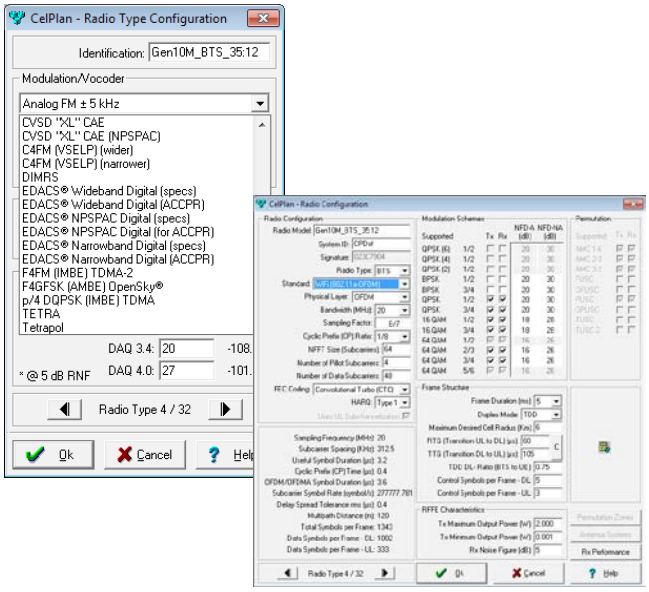
- OFDMA (DL) SC-FDMA (UL)
- TDD and FDD
- SU-MIMO, MU-MIMO, AMS
- Detailed data traffic characterization
  - Traffic per terminal type and application
- Unique dynamic traffic simulation
  - RRM emulation
  - Scheduler emulation
- Detailed traffic simulation statistics
- Key Performance Indicators per class
- Fractional frequency reuse planning
- Subscriber database and simulation
- Multi-height raster traffic per service class
- SNIR margin per pixel according to fading and BER

CDMA One/CDMA2000 1-xRTT/1xEVDO

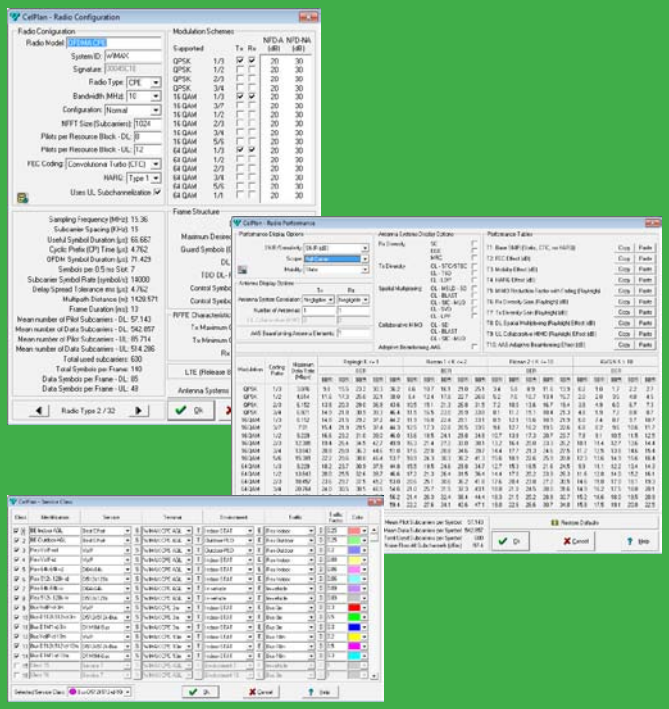
- IS-95, IS-2000 1xRTT
- IS-2000 EVDO Rev 0/A/B
- TD-SCDMA
- Multicarrier and Multiband operation
- Multiple radio configurations
- Multi technology planning
- Voice and several data traffic classes
- User simulation
  - Indoor
  - Outdoor
  - Multiple heights
- Unique dynamic traffic simulation
  - RRM emulation
  - Scheduler emulation
- Neighbor and PN-offset planning
- Automatic footprint enhancement

WLAN

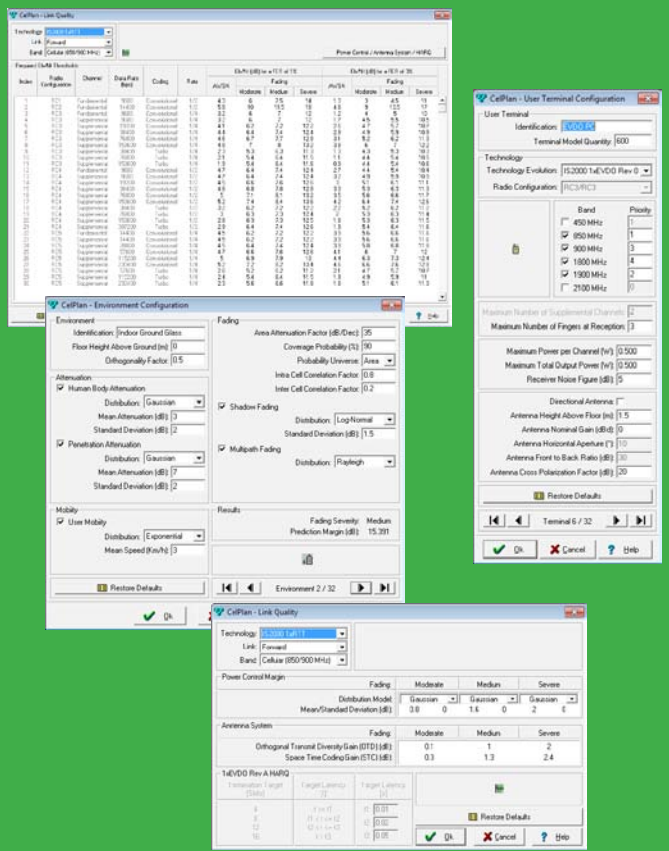
- WI-FI support
- General OFDM module



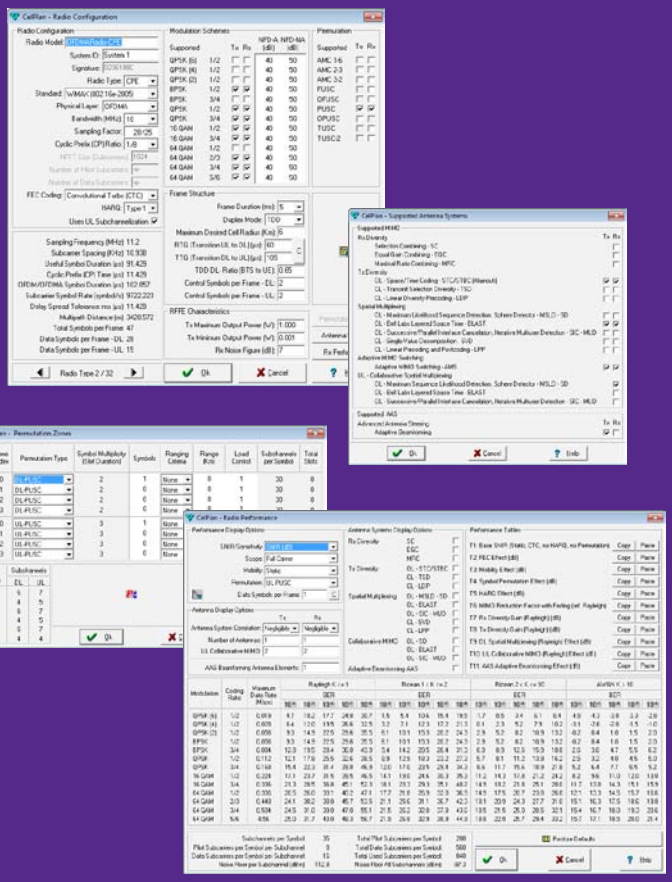
LTE



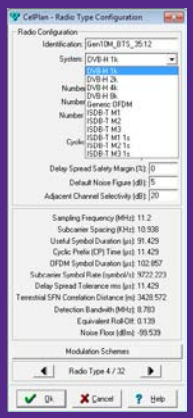
CDMA One/CDMA2000 1-xRTT/1xEVDO



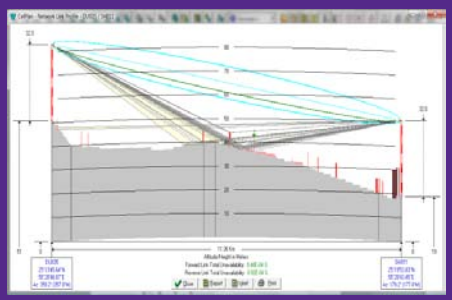
WIMAX



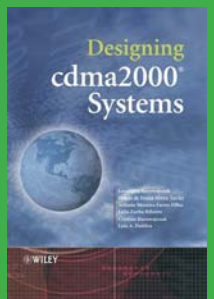
PMR/LMR

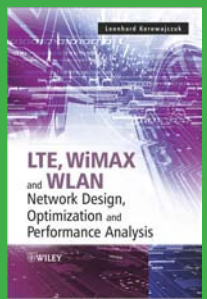


MMDS/LMDS



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
  - Fading calculation per pixel
  - 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

PMR/LMR

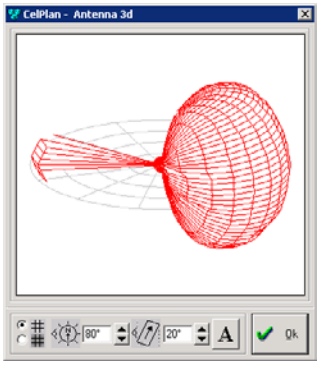
- More than 20 radio types supported (APCO25, TETRA)
- Interference analysis and optimization

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

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