Cellular Expert Enterprise module features

Tasks	Features
Network data management	Site, sector, construction, customer, repeater management: • Add • Edit • Move • Copy • Delete • Site re-use patterns for nominal planning
Point-to-point analysis	Free space path loss: ITU-R P.525-2 Fresnel zone ellipsoids: ITU-R P.526-11 Path clearance: ITU-R P.530-13 Specific attenuation: ITU-R P.676-8 using input from ITU-R P.837-5, ITU-R P.838-3 and ITU-R P.839-3 Rain attenuation: ITU-R P.530-13 Diffraction algorithms: • Single knife-edge (ITU-R P.526-11) • Deygout (ITU-R P.526-11) • Average (ITU-R P.530-13) Path loss models: • Line-of-sight • Hata • Diffraction • Macro Adaptive • SUI Reflection analysis Multipath analysis Anti-correlation analysis Antenna height optimization Reporting
Radio equipment data management	Antenna, feeders, combiners, modulation performance tables, carriers, radios, spectrum masks management: • Add • Edit • Copy • Delete • Create/Edit antenna pattern • Vertical antenna pattern every 1° • Horizontal antenna pattern every 1° • 3D pattern creation, display, export

	• Import/Export of antennas Parabolic and sector antenna editors: • Tabular radiation pattern representation with inplace editing • Graphical radiation pattern representation in linear and logarithmic scales • Modulation performance editor • Tabular and graphical representations of the BER vs. signal-to-noise ratio dependencies, approximation by formula • Defined curves for BPSK, QPSK, DQPSK, M-FSK, M-QAM modulations • Carriers list editor • Frequency plans for simplex and duplex channels • Tabular and graphical representations of frequency carriers • Spectrum mask editor • Spectrum density mask editing • Automatic mask generation for predefined bandwidth • Tabular and graphical representations of spectrum masks • MIMO configuration
Radio link management	Creating Editing Deleting Visualization
Radio link budget analysis	Point-to-point systems radio relay lines Point-to-multipoint systems: • Fixed WiMAX • LMDS • MMDS • WLL
Radio link performance analysis	ITU-T G.821 recommendation targets Parameters: ESR, SESR, unavailable time ratio; Local grade portion (ITU-R F.697-2) Medium grade portion (ITU-R F.696-2) High grade portion (ITU-R F.557-4) ITU-T G.826 recommendation targets Parameters: ESR, SESR, BBER National portion (ITU-R F.1189-1): • Access network • Short haul network • Long haul network International portion (ITU-R F.1092-1): • Terminating countries • Intermediate countries ITU-T G.827 recommendation targets Parameters: UATR

Radio Links Interference Analysis	• Interference level prediction • Net filter discrimination • C/I protection ratios for co- and adjacent-channels • Fade margin loss objectives
Automatic Radio Link Frequency Planning	Selects the minimum number of carriers required to serve selected radio links within given interference threshold
Visibility calculation	Line of Sight Path clearance Fresnel zone clearance Minimum antenna height
Propagation Models: HATA	Basic algorithm: Okumura-Hata equitation Type: Point-to-multipoint Frequency: ~ 150 MHz - 2 GHz Distance: up to 100 km Hata Model Parameters: • Standard (ETR 364, COST 231 and ITU-R P.529-3) • Macro Model • 9999 Model (Ericsson) Effective Antenna Height methods: • Absolute • Profile • Average • Relative • Slope Diffraction • Single knife-edge (ITU-R P.526-11) • Deygout (ITU-R P.526-11) • Spherical Earth (ITU-R P.526-11) • Average (ITU-R P.530-13)
Line of Sight	Basic algorithm: ITU-R P.452-14 Type: Point-to-point and Point-to-multipoint Frequency: about 700 MHz - 40 GHz Distance: up to 100 - 150 km Percentage of Time: 0.001 to 50. Specific attenuation: ITU-R P.676-8 using input from ITU-R P.837-5, ITU-R P.838-3 and ITU-R P.839-3. Diffraction: Deygout method of ITU-R P.526-11 Rain attenuation: ITU-R P.530-13
Walfish-Ikegami	Basic algorithm: COST 231 Model (ETR 364, COST 231 Final Report)

	Type: Point-to-area (multipoint) Frequency: about 800 MHz - 2 GHz Distance: up to 5 km
SUI	Basic algorithm: IEEE 802.16 Type: Point-to-area (multipoint) Frequency: about 2 GHz - 5 GHz Distance: up to 70 km
Best Server calculation	N best servers coverage, number of servers coverage N best servers field strength coverage
Prediction Model tuning	Evaluation of prediction accuracy Hata model: • 9999 model parameters adjustment • Macro model parameters adjustment • Clutter loss offset determination for each type of clutter Walfish – Ikegami model tuning SUI model tuning Line of sight model: • One slope model tuning • Dual slope model tuning
Network Analysis: Territory Coverage Statistic	Coverage statistic and condition calculation for specified area
Traffic Analysis	Traffic spreading by best server coverage Traffic spreading using clutter weights
Drive-test analysis	Import formats: Ericsson TEMS, Motorola, iFTA, NEMO, ASCII files Drive-test post-processing: • Statistical analysis • Filtering • Averaging Drive test decomposition Prediction update with drive test data Measurements to serving cell connection Drive test data player
3D Analysis	3D antenna pattern visualization Hata or free space loss algorithms for field strength calculation Ability to optimize antenna parameters (tilt, azimuth, etc.)

Coverage probability	Coverage probability percentage and fade margin prediction due to shadowing
3G+ features	
UMTS coverage	RSCP calculation RSSI calculation Pilot signal prediction Traffic channel coverage
HSDPA coverage prediction	HS-DSCH SINR raster HSDPA data rate raster
Monte Carlo Traffic simulation	UMTS, HSDPA and LTE technology support Networks capacity calculation Average throughput per mobile user calculation
CDMA Network Dimensioning Calculator	BS capacity and coverage requirements analysis Cell overload estimation Cell range dependence for UL and DL on the number of users
LTE functionality	LTE coverage prediction for RSRP, RSRQ, RS-SINR, coverage probability and average data rate MIMO antenna support OFDM and fractional frequency reuse
WiMAX features:	
Adaptive modulation	Adaptive modulation raster DL and UL throughput raster DL and UL bitrate raster
WiMAX system calculator	Bitrate calculation Throughput calculation Spectral efficiency calculation Link budget calculation Signal-to-noise + interference ratio calculation Frequency reuse
Monte Carlo Traffic simulation	Networks capacity calculation Average throughput per mobile user calculation
Frequency planning	Nominal channel groups creation for nominal planning Quick interference checking between two sectors Labeling tool for frequency visualization

	Co-channel(C/I) interference: • Separate C/I raster for each channel • Total C/I raster for all channels • Separate and combined C/I raster for hopping and non-hopping cells • Carrier and interferer ID raster Adjacent channel (C/A) interference: • Separate C/A raster for each channel • Total C/A raster for all channels • Carrier and interferer id raster
Automated frequency planning	Neighborhood/Impact matrix calculation Automatic channel release Automatic channel assignment
Network optimization	Visibility/Site Matrix: • Line-of-sight visibility matrix between selected or all base stations and customers • Signal field strength matrix between selected or all base stations and customers Site optimization: • Suitable base station points from primary defined base station points • Number of sectors assigned to base stations • Antenna type (omni-directional, directional) • Sector power • Antenna height • Antenna tilt (for directional antennas) • Antenna azimuth range (for directional antennas) • Automated site candidate selection • Automated cell planning
DVB-T planning	• Network data configuration • SFN coverage • Signal delay • Coverage probability • Population coverage statistics • Service area and SIR, SINR
Automation	• Automated task processing • Parallel calculations on multicore processors