

Cellular Expert Standard module features

Tasks	Features
Network data management	Site, sector, construction, customer, repeater management: <ul style="list-style-type: none"> • 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

<p>Radio equipment data management</p>	<p>Antenna, feeders, combiners, modulation performance tables, carriers, radios, spectrum masks management:</p> <ul style="list-style-type: none"> • 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 <p>Parabolic and sector antenna editors:</p> <ul style="list-style-type: none"> • 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 •
<p>Visibility calculation</p>	<p>Line of Sight</p> <p>Path clearance</p> <p>Fresnel zone clearance</p> <p>Minimum antenna height</p>
<p>Prediction Model tuning</p>	<p>Evaluation of prediction accuracy</p> <p>Hata model:</p> <ul style="list-style-type: none"> • 9999 model parameters adjustment • Macro model parameters adjustment • Clutter loss offset determination for each type of clutter <p>Walfish – Ikegami model tuning</p> <p>SUI model tuning</p>

	<p>Line of sight model:</p> <ul style="list-style-type: none"> • One slope model tuning • Dual slope model tuning
<p>Propagation Models:</p> <p>HATA</p>	<p>Basic algorithm: Okumura-Hata equitation Type: Point-to-multipoint Frequency: ~ 150 MHz - 2 GHz Distance: up to 100 km</p> <p>Hata Model Parameters:</p> <ul style="list-style-type: none"> • Standard (ETR 364, COST 231 and ITU-R P.529-3) • Macro Model • 9999 Model (Ericsson) <p>Effective Antenna Height methods:</p> <ul style="list-style-type: none"> • Absolute • Profile • Average • Relative • Slope <p>Diffraction</p> <ul style="list-style-type: none"> • 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)
<p>Line of Sight</p>	<p>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</p>
<p>Walfish-Ikegami</p>	<p>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</p>
<p>SUI</p>	<p>Basic algorithm: IEEE 802.16 Type: Point-to-area (multipoint) Frequency: about 2 GHz - 5 GHz Distance: up to 70 km</p>

<p>Best Server calculation</p>	<p>Nth best servers coverage, number of servers coverage Nth best servers field strength coverage</p>
<p>Network Analysis:</p> <p>Territory Coverage Statistic</p> <p>Traffic Analysis</p> <p>Drive-test analysis</p> <p>3D Analysis</p> <p>Coverage probability</p>	<p>Coverage statistic and condition calculation for specified area</p> <p>Traffic spreading by best server coverage</p> <p>Traffic spreading using clutter weights</p> <p>Import formats: Ericsson TEMS, Motorola, iFTA, NEMO, ASCII files Drive-test post-processing:</p> <ul style="list-style-type: none"> • Statistical analysis • Filtering • Averaging <p>Drive test decomposition</p> <p>Prediction update with drive test data</p> <p>Measurements to serving cell connection</p> <p>Drive test data player</p> <p>3D antenna pattern visualization Hata or free space loss algorithms for field strength calculation Ability to optimize antenna parameters (tilt, azimuth, etc.)</p> <p>Coverage probability percentage and fade margin prediction due to shadowing</p>
<p>Frequency planning</p>	<p>Nominal channel groups creation for nominal planning Quick interference checking between two sectors Labeling tool for frequency visualization</p> <p>Co-channel(C/I) interference:</p> <ul style="list-style-type: none"> • 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 <p>Adjacent channel (C/A) interference:</p> <ul style="list-style-type: none"> • Separate C/A raster for each channel • Total C/A raster for all channels • Carrier and interferer id raster

Automated frequency planning	<p>Neighborhood/Impact matrix calculation</p> <p>Automatic channel release</p> <p>Automatic channel assignment</p>
Network optimization	<p>Visibility/Site Matrix:</p> <ul style="list-style-type: none"> • 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 <p>Site optimization:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Network data configuration • SFN coverage • Signal delay • Coverage probability • Population coverage statistics • Service area and SIR, SINR
Automation	<ul style="list-style-type: none"> • Automated task processing • Parallel calculations on multicore processors