In 2008, Atoll was the first LTE network planning software available on the market. Atoll is being used by a number of the largest LTE operators worldwide. Atoll 3.2 is a comprehensive framework for operators who need to plan evolution towards LTE and LTE-Advanced. It allows planning and analysing integrated GSM/UMTS/LTE and CDMA2000/LTE networks.

Atoll 3.2 includes unified multi-technology GSM/UMTS/LTE (3GPP) and CDMA/LTE (3GPP2) traffic models, Monte Carlo simulators and ACP (Automatic Cell Planning) module, as well as support for the latest technology trends such as HetNets and small cells.

**Network Modelling**

- Support of all E-UTRA frequency bands and carrier configurations
- Comprehensive support of FD- and TD-LTE
- Support for multi-layer HetNet deployment scenarios
- Support of intra- and inter-band carrier aggregation
- Support of multiple modulation types and coding schemes
- MIMO: transmit/receive diversity, SU-MIMO, MU-MIMO, adaptive MIMO switching (AMS)
- Beamforming smart antenna modelling

**Traffic Modelling**

- Modelling of voice and data services with different QCIIs
- Modelling of UE categories
- Multi-service 2D & 3D traffic demand maps generated from multiple sources: vector, raster, and live traffic data
- Fixed subscriber traffic modelling
Simulation and Analysis

- LTE Monte Carlo simulator including power control, IoT control and advanced RRM and scheduling algorithms
- Support of carrier aggregation and multi-layer (HetNet) traffic balancing
- Support of frequency-domain as well as time-domain inter-cell interference coordination (ICIC): FFR, SFR, eICIC, etc.
- Generation of prediction plots, based on simulation results or on user-defined cell load figures including:
  - Cell and network coverage analysis
  - Effective service area analysis
  - Uplink and downlink interference analysis
  - Uplink and downlink bearer coverage predictions
  - Uplink and downlink throughput coverage predictions
  - Uplink and downlink quality indicator prediction plot
  - Aggregate throughput prediction plot
  - Physical cell ID, PSS ID, SSS ID collision plot
- Network capacity planning considering S1 interface (backhaul) constraints

Neighbour Planning

- Manual and automatic neighbour planning
- Inter-frequency and intra-frequency neighbor planning

Multi-RAT Network Planning

- Integrated planning and optimisation for 3GPP (GSM/UMTS/LTE) and 3GPP2 (CDMA/LTE) technologies:
  - Unified network databases with site and antenna sharing
  - Unified multi-service traffic model
  - Combined Monte Carlo simulator
  - Simultaneous display and analysis of network layers
- Inter-technology handover modelling
- Inter-technology interference analysis

Automatic Frequency Planning - AFP (option)

- Generation, import, edition, storage, and use of interference matrices
- User-definable constraints and editable cost function
- Allocation of carriers and fractional frequency planning (FFP)
- Automatic physical cell ID planning considering PSS, SSS, RS, UL DMRS, and PCFICH collisions
- Automatic PRACH RSI planning

Automatic Cell Planning - ACP (option)
- Automatic optimisation of network parameters to increase coverage & capacity
- Site selection and activation for greenfield and densification scenarios
- Antenna selection & parameter optimisation (height, azimuth & tilt)

**Automatic Site Positionning - ASP (option)**

- Automatically creation of new site locations according to surface-wise, traffic-oriented and population-based coverage objectives
- Site deployment in multiple zones (urban, suburban, rural etc.), along roads and railways
- Intelligent implementation plan with the selection of the best sites to deploy