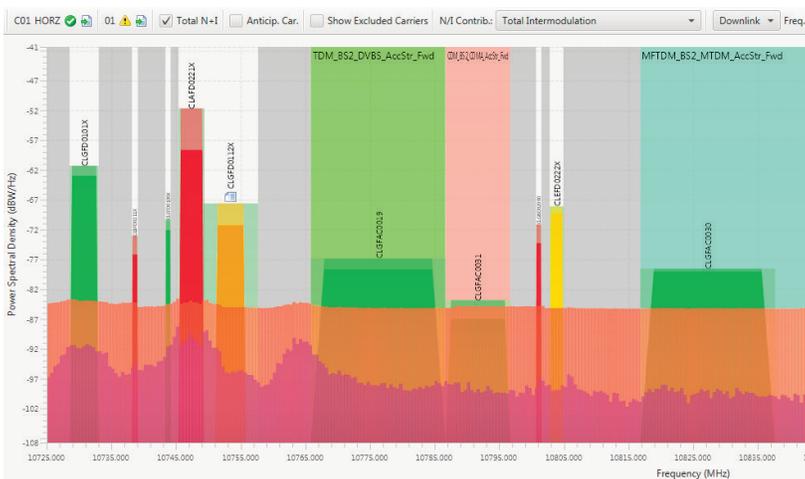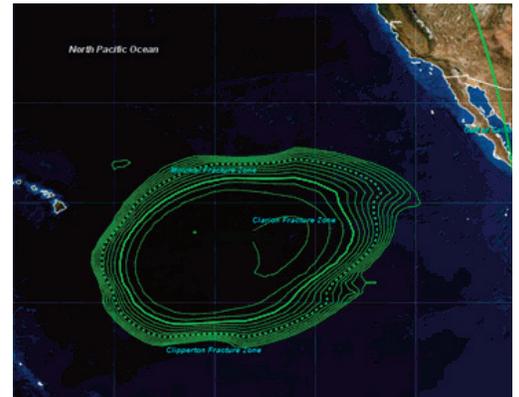# Planning & Management Systems
for Satellite Communications

The SED Satellite Capacity Management System (SCMS) is an advanced software system used by satellite operators and satellite service providers for planning and managing the use of satellite capacity including link budget analysis, multiple planning modes, and transponder loading analysis.

Highlights

- Advanced link budget analysis
- The latest ITU-R weather models - ideal for Ka-band satellites
- Plan for thousands of carriers on hundreds of transponders
- Visualize and modify carriers via interactive spectrum bars
- Design complex multi-carrier configurations
- Support high throughput and multi-beam satellites
- Model overlapping beam coverage, frequency reuse, and interference between beams
- Trade-off earth station location, equipment, and waveforms
- Support separate operational and planning workspaces
- Export frequency plans for use in other system
- Interface with the SED CSM and Monics CSM

Carrier ID	C00001	MODCOD	QPSK 1/2
Satellite ID	M1	Allocated Bandwidth	32.8125 kHz
Date	2015-03-03 11:49:25	Channel Bandwidth Occupancy	0.017 %
Workspace ID	Main	Uplink Center Frequency	27.45 GHz
Version ID	101	Uplink Polarization	LHCP
Customer	CLA	Downlink Center Frequency	19.95 GHz
Direction	FORWARD	Downlink Polarization	LHCP
Planning State	Preliminary	Required CNIR	5.215 dB
Ticket Number		Uplink EIRP	29.01 dBW
Terminal	Terminal 1	Channel Power Occupancy	0.066 %
User Beam	B-04	Carrier Power at LNA	-146.701 dBW
Gateway Beam	RPC	N_o at LNA	-199.041 dBW/Hz
Channel	06RF	I_o at LNA	-205.023 dBW/Hz
Access Structure Type	SCPC	Im_o at LNA	-9999.9 dBW/Hz
Multi-Party Service Structure Type	Simplex	Actual Total CNIR	6.415 dB
Service Description	Conversational Voice	Info Rate	25 kbps
Total Availability	99.5 %	Required Bit Error Rate	1.2E-4
Actual Margin	1.2 dB		

Technical Specifications

Carrier Planning Scenarios

- Support SCPC, TDM/A, FDM/A, and CDM/A
- Plan simplex, duplex, and broadcast carriers
- Plan carriers and terminals while sizing user terminal equipment
- Identify power/bandwidth constrained carriers
- Determine data rates for required availability and clear-sky
- Plan with multiple combinations of fixed EIRP, availability and MODCOD
- Plan carriers for clear sky and required availability conditions
- Consider uplink power control and gateway site diversity
- Balance uplink and downlink availability to minimize satellite power load
- Flag carriers with inadequate link margin
- Override interference levels for planning carriers
- Plan carriers in multiple, independent workspaces
- Verify transmitted off-axis EIRP regulatory limits
- Verify transmitted PFD at earth surface limits
- Detailed and summary reports (PDF and HTML)

Transponder Loading

- Support multi-carrier scenarios
- Balance transponder power and bandwidth
- Determine transponder operating point (IBO/OBO)
- Fixed-IBO synthesizes a nominal carrier load
- Free-IBO mode for complete loading analysis
- Model filtering effects, non-linearity, FGM/ALC
- Account for small signal suppression
- Redundancy switching of key payload units

Propagation	
Attenuation due to Atmospheric Gases	ITU-R P.676-10
Rain Attenuation, Scintillation, Depolarization due to Hydrometeors	ITU-R P.618-11
Rainfall Rate Maps	ITU-R P.837-6
Attenuation due to Clouds and Fog	ITU-R P.840-6
Site Diversity Improvement	ITU-R P.618-8
Earth Mean Surface Temperature	ITU-R P.1510-0
Specific attenuation model for Rain	ITU-R P.838-3

Beam Coverage

- Support global, regional, and narrow beams
- Support switchable and steerable antennas
- Either theoretical or measured
- Detailed analysis based on satellite antenna radiation patterns
- Beam contour generation and visualization
- Beam EOC advantage calculations for specified locations
- Interactive 2D and 3D world maps
- Import SatSoft antenna pattern files

Noise Models

- Satellite and earth station thermal noise
- Adjacent carrier and co-channel interference (ACI/CCI)
- Adjacent satellite interference (ASI)
- Cross-polarization interference (XPI)
- Man-made terrestrial interference
- Transponder intermodulation noise (I3M/I5M)

Expansion

- Add new satellite and transponders
- Add new earth station types
- Add custom waveforms: modulation, coding, BER, roll-off, and shaping filters parameters
- Interface to customer relationship databases
- Open APIs for integrating with 3rd-party systems

System Requirements

- Client-server architecture
- Windows 7 Client
- RHEL, CentOS, Scientific Linux 7 Server
- Secure multi-user design
- Support for PostgreSQL and Oracle databases

SED
a division of CALIAN Ltd.

www.sedsystems.ca