LINK ANALYSIS PROGRAM (LINK)™

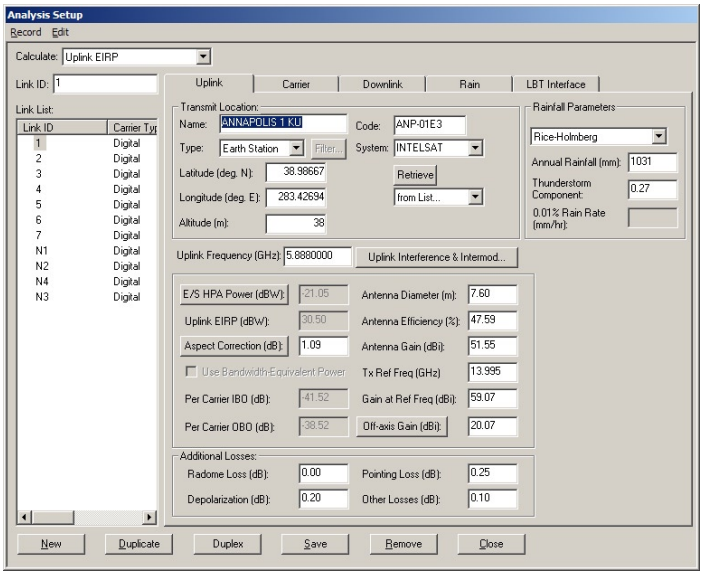
PREDICTS OVERALL PERFORMANCE OF A SATELLITE COMMUNICATIONS LINK

The Link Analysis Program (LINK) is a general-purpose tool for analyzing a communications link between two earth stations via a satellite in any orbit. It takes into account the signal gains and losses in order to determine an overall characterization of the performance of the link.

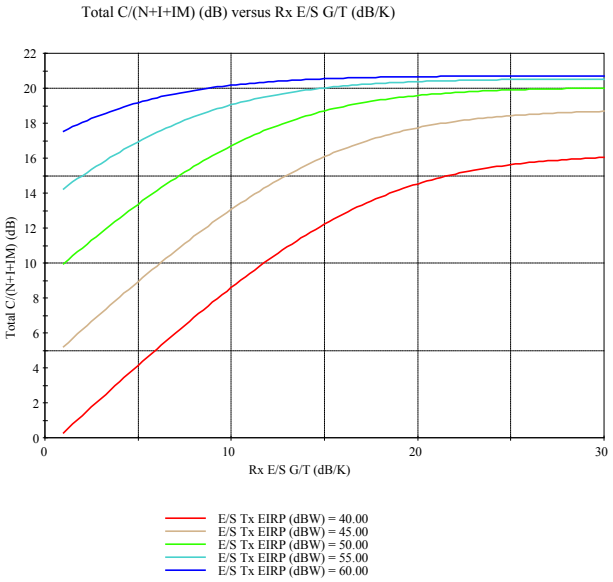
The user specifies the relevant parameters for a single communications link, including information on transmit earth station, satellite transponder, carrier, and receive earth station. LINK then determines the link performance (e.g., required carrier-to-noise ratio (C/N)) or transmit EIRP.

FEATURES

- Analyze multiple digital or analog links simultaneously.
- Calculate total carrier-to-noise ratio (C/N) or transmit EIRP for a specified link.
- Compute bandwidth utilized per carrier and power-equivalent bandwidth (PEB).
- Assign bandwidth-equivalent power to carriers.
- Predict signal-to-noise ratio (S/N) for an analog signal and energy per bit to noise-power density ratio (Eb/No) for a digital carrier.

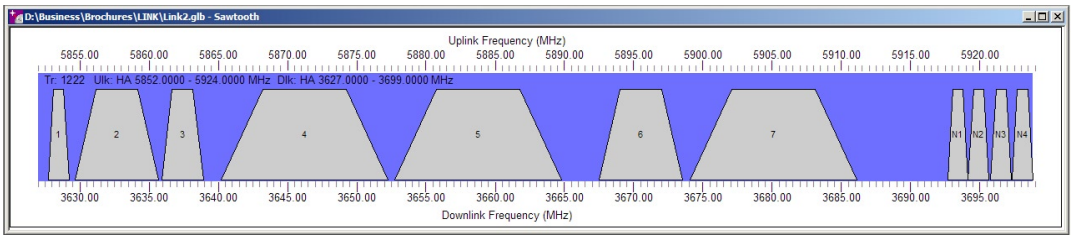


ANALYSIS SETUP SCREEN: DEFINE UPLINK, DOWNLINK, AND CARRIER PARAMETERS



PARAMETRIC ANALYSIS PLOT IN LINK (TOTAL LINK C/N VS. RECEIVE TERMINAL G/T FOR DIFFERENT UPLINK EIRP VALUES)

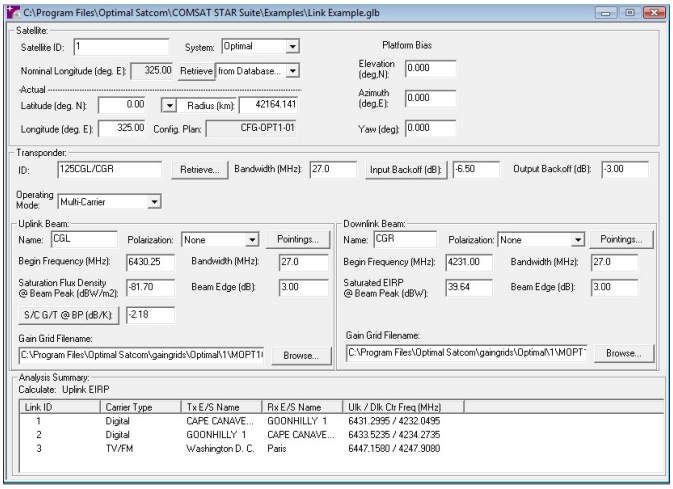
- Select from six available propagation models (including COMSAT PAP, COMSAT DAH, Crane, and the ITU model). Modeled impairments include rain attenuation, gaseous absorption, tropospheric scintillation, cloud attenuation, melting layer attenuation, and downlink G/T degradation. Climatic data and zone maps are included to allow automatic computation of impairments based on latitude, longitude, and altitude.
- Compute margins to determine if the proposed link complies with ITU criteria for off-axis EIRP emission and maximum power flux density arriving at earth's surface.
- Six types of reports available: Three ASCII formats – Summary, Detailed, and LST format (Intelsat standard); and three Microsoft Excel® formats – summary, detailed, and transponder parameters. Excel report formats are user-modifiable.
- Generate parametric analysis plots - select the parameters for the X and Y axes, and then optionally specify a third parameter to produce a family of curves. As an example, see the plot of total link C/N vs. receive terminal G/T for different uplink EIRPs above.
- Generate report of transponder parameters towards a list of cities in a spreadsheet.
- Specify amplifier transfer curve to automatically determine per-carrier output back-off.
- Specify modem curve to automatically convert between C/N or E_b/N_o and BER.
- Specify uplink and downlink antenna pattern files to automati-



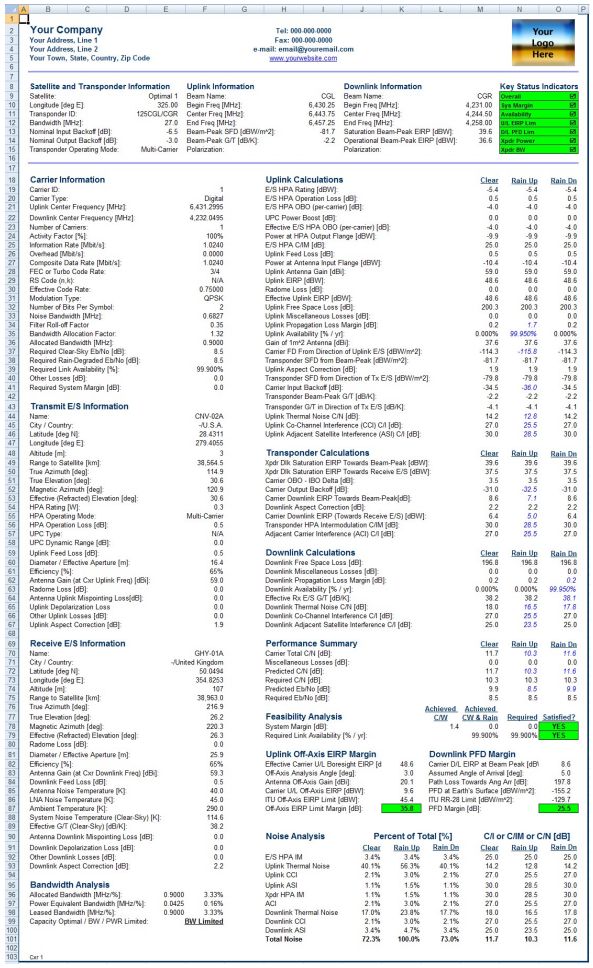
FREQUENCY PLAN (SAWTOOTH) – VISUALLY DISPLAYS CARRIER FREQUENCY ASSIGNMENTS AND AVAILABLE BANDWIDTH

cally compute the aspect correction of the satellite antennas in the direction of the transmit and receive earth station.

- Generate maps of required uplink earth station HPA power, or receive earth station G/T. (Maps are computed by Link and displayed in the Antenna Coverage Program (ACP). ACP is sold separately, or together as part of COMSAT STAR Suite.
- List Manager application to enable sharing data with other Optimal Satcom™ software products like the Antenna Coverage Program (ACP) and Propagation Analysis Program.
- Can operate in two modes - either as a stand-alone application, or integrated as a component of COMSAT STAR® software suite.
- When used as part of COMSAT STAR®, LINK can retrieve satellite and earth-station data directly from the Satellite System Database (SSDB) making it even easier to use. The SSDB is a part of COMSAT STAR® and supports both Oracle® and Sybase® databases.



MAIN SCREEN: DEFINE SATELLITE AND TRANSPONDER SPECIFICATIONS



OUTPUT REPORT: DETAILED LINK BUDGET

Your Company
Your Address, Line 1
Your Address, Line 2
Your Town, State, Country, Zip Code

Tel: 000-000-0000
Fax: 000-000-0000
e-mail: email@youremail.com
www.yourwebsite.com

Your Logo Here

Satellite and Transponder Information

Name	1
Longitude (deg E)	325.00
Transponder ID	125CGL/CGR
Operating Mode	Multi-Carrier
Nominal IBO (dB)	-6.5
Nominal OBO (dB)	-3.0

Uplink Information

Beam	CGL
Center Frequency (MHz)	6,443.75
Polarization	
Beam-Peak Gain (dBi)	20.1
Bm-Pk SFD (dBW/m^2)	-81.7
Bm-Pk G/T (dB/K)	-2.2

Downlink Information

Beam	CGR
Center Frequency (MHz)	4,244.50
Polarization	
Beam-Peak Gain (dBi)	20.1
Bm-Pk Saturated EIRP (dBW)	39.6

	Location					Satellite Pointing Data						Satellite Uplink Parameters				Satellite Downlink		
Index	**City**	**Country**	**Latitude**	**Longitude**	**Altitude**	**True Elevation**	**Effective Elevation (Refracted)**	**True Azimuth**	**Magnetic Azimuth / Compass Bearing**	**Range to Satellite**	**Pol. Tilt**	**Gain**	**G/T**	**Saturation Flux Density**	**Operating Flux Density (at Nominal Xpdr IBO)**	**Gain**	**Saturated EIRP**	**Operating EIRP (at Nominal Xpdr OBO)**
			[deg E]	**[deg N]**	**[m]**	**[deg]**	**[deg]**	**[deg]**	**[deg]**	**[km]**	**[deg]**	**[dBi]**	**[dB/K]**	**[dBW/m^2]**	**[dBW/m^2]**	**[dBi]**	**[dBW]**	**[dBW]**
1	Kabul	Afghanistan	34.52	69.18	0	-19.84	-19.84	278.11	275.43	43,898.9	55.11	[5]				[5]		
2	Tirana	Albania	41.33	19.82	0	17.43	17.48	245.12	241.80	39,816.1	43.40	17.7	-4.5	-79.3	-85.8	17.6	37.2	34.2
3	Algiers	Algeria	36.76	3.05	0	31.85	31.88	232.72	232.66	38,453.6	39.95	18.2	-4.0	-79.8	-86.3	18.2	37.7	34.7
4	Oran	Algeria	35.69	359.36	0	35.12	35.15	229.65	230.50	38,175.6	38.56	18.4	-3.9	-80.0	-86.5	18.3	37.8	34.8
5	Andorra la Vella	Andorra	42.50	1.52	0	28.87	28.89	227.73	228.17	38,719.3	33.41	18.1	-4.2	-79.7	-86.2	18.0	37.6	34.6
6	Luanda	Angola	-8.84	13.23	0	33.96	33.99	277.76	282.93	38,268.2	101.61	18.3	-4.0	-79.9	-86.4	18.3	37.8	34.8
7	The Valley	Anguilla	18.22	296.95	0	51.63	51.65	120.25	134.30	36,978.8	55.31	19.1	-3.2	-80.7	-87.2	19.1	38.6	35.6
8	Saint John's	Antigua and Barbuda	17.12	298.15	0	53.38	53.39	120.02	134.49	36,874.4	56.00	19.2	-3.1	-80.8	-87.3	19.2	38.7	35.7

OUTPUT REPORT: TRANSPONDER PARAMETERS BY LOCATION

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