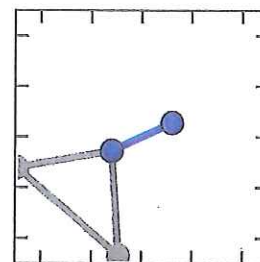




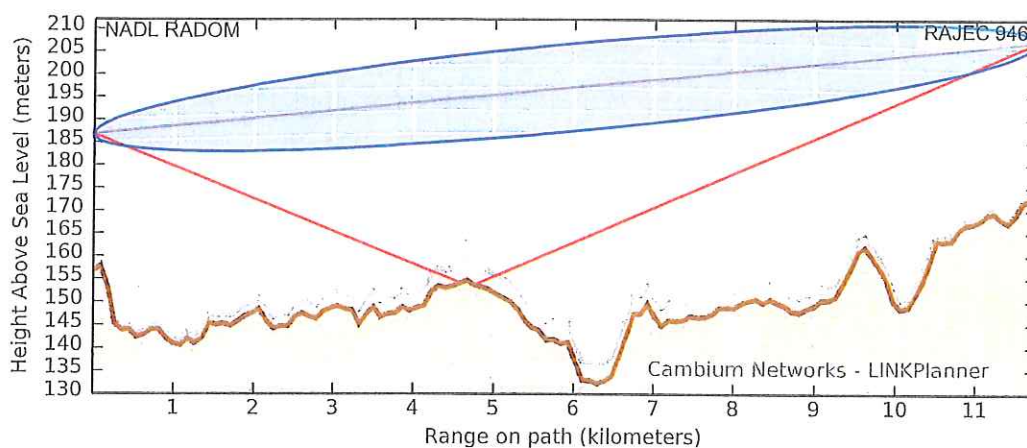
NADL RADOM to RAJEC 946



Equipment: Cambium Networks PTP650 Full Integrated

Cambium Networks Integrated Dual Polar Antenna
@ 30 m

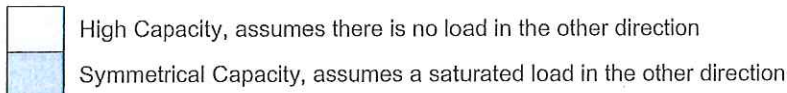
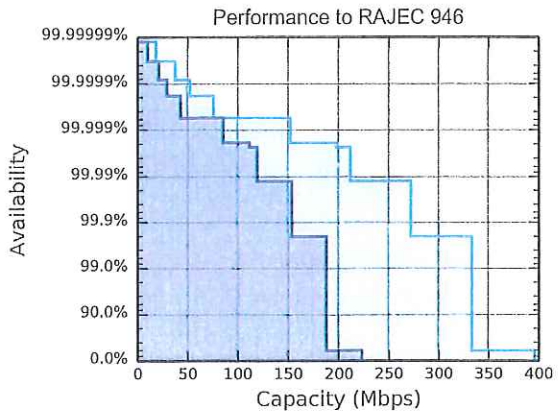
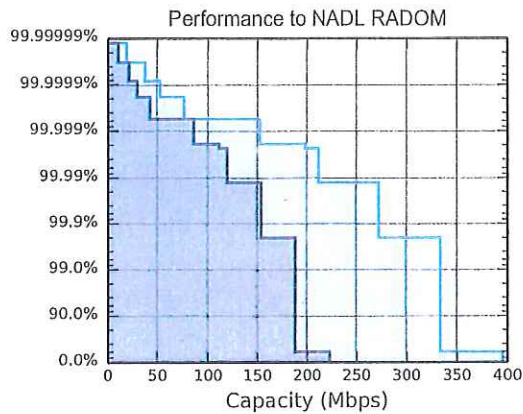
Cambium Networks Integrated Dual Polar Antenna
@ 35 m



	Performance to NADL RADOM	Performance to RAJEC 946
Mean IP	202.0 Mbps	202.0 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	11.768 km	System Gain	161.28 dB
Band	5.8 GHz	System Gain Margin	32.05 dB
Regulation	Argentina (Private)	Mean Aggregate Data Rate	403.9 Mbps
Modulation	Adaptive	Annual Link Availability	100.0000 %
Bandwidth	45 MHz	Annual Link Unavailability	4 secs/year
Total Path Loss	129.22 dB	Prediction Model	ITU-R

Performance Charts



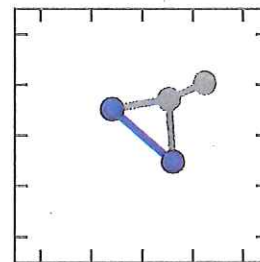
Climatic Factors, Losses and Standards

dN/dH not exceeded for 1% of time	-267.13 N units/km	Link Type	Line-of-Sight
Area roughness 110x110km	53.94 metre	Excess Path Loss	0.00 dB
Geoclimatic factor	1.49e-04	Atmospheric Gasses	ITU-R P.676-7, ITU-R P.835-4
Fade Occurrence Factor (P0)	1.60e-03	Diffraction Loss	ITU-R P.526-10
Path inclination	1.72 mr	Propagation	ITU-R P.530-12
0.01% Rain rate	33.69 mm/hr	Rain Rate	ITU-R P.837-5
Free Space Path Loss	129.11 dB	Refractivity Index	ITU-R P.453-9
Gaseous Absorption Loss	0.11 dB		

Part Number	Qty	Description
01010419001	6	Coaxial Cable Grounding Kits for 1/4" and 3/8" Cable
C000065K022	2	PTP 650 Lite (Up to 125Mbps) to Full (Up to 450Mbps) Link Capacity upgrade license per ODU
C000065L007	2	PTP 650 LPU and Grounding Kit (1 kit per ODU)
C050065H033	2	PTP 650 Integrated END with AC+DC Enhanced Supply (RoW - U.S. Line Cord). Kit includes ODU, power supply, mounting bracket and US line cord
WB3176	1	328 ft (100 m) Reel Outdoor Copper Clad CAT5E (Recommended for PTP)



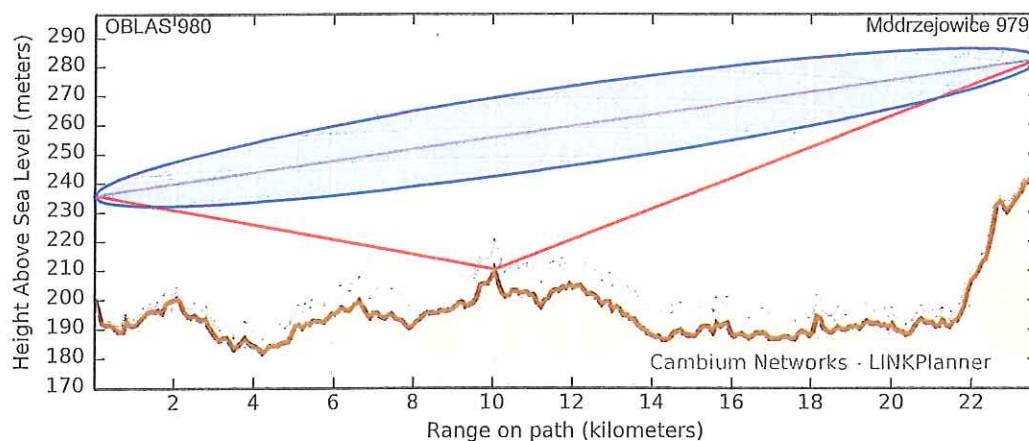
OBLAS 980 to Modrzejowice 979



Equipment: Cambium Networks PTP650 Full Integrated

Cambium Networks Integrated Dual Polar Antenna
@ 35 m

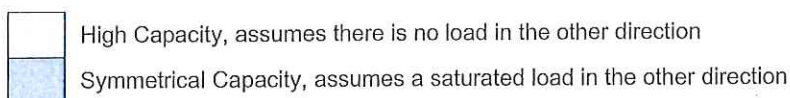
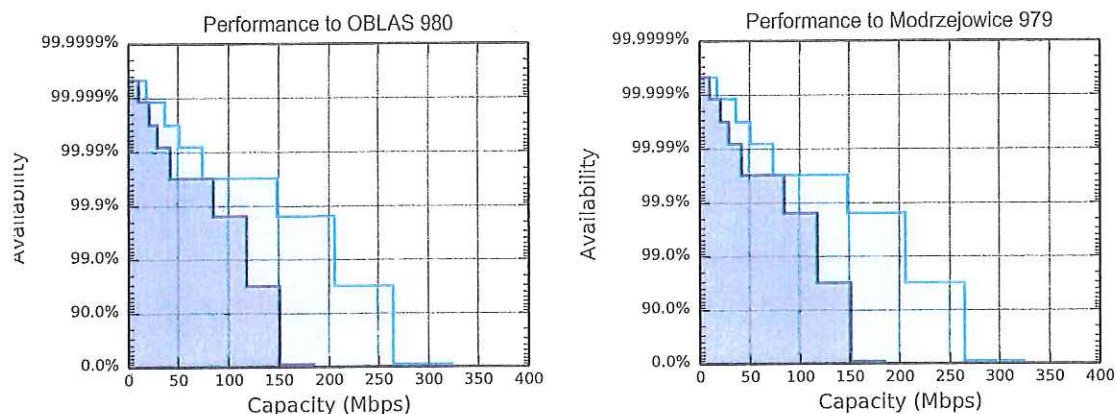
Cambium Networks Integrated Dual Polar Antenna
@ 35 m



	Performance to OBLAS 980	Performance to Modrzejowice 979
Mean IP	153.4 Mbps	153.4 Mbps
IP Availability	99.9995 % for 1.0 Mbps	99.9995 % for 1.0 Mbps

Link Summary			
Link Length	23.686 km	System Gain	161.28 dB
Band	5.8 GHz	System Gain Margin	25.87 dB
Regulation	Argentina (Private)	Mean Aggregate Data Rate	306.8 Mbps
Modulation	Adaptive	Annual Link Availability	99.9995 %
Bandwidth	45 MHz	Annual Link Unavailability	2.4 mins/year
Total Path Loss	135.41 dB	Prediction Model	ITU-R

Performance Charts



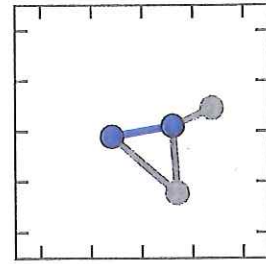
Climatic Factors, Losses and Standards

dN/dH not exceeded for 1% of time	-269.09 N units/km	Link Type	Line-of-Sight
Area roughness 110x110km	60.82 metre	Excess Path Loss	0.00 dB
Geoclimatic factor	1.44e-04	Atmospheric Gasses	ITU-R P.676-7, ITU-R P.835-4
Fade Occurrence Factor (P0)	1.21e-02	Diffraction Loss	ITU-R P.526-10
Path inclination	1.97 mr	Propagation	ITU-R P.530-12
0.01% Rain rate	33.77 mm/hr	Rain Rate	ITU-R P.837-5
Free Space Path Loss	135.19 dB	Refractivity Index	ITU-R P.453-9
Gaseous Absorption Loss	0.22 dB		

Part Number	Qty	Description
01010419001	6	Coaxial Cable Grounding Kits for 1/4" and 3/8" Cable
C000065K022	2	PTP 650 Lite (Up to 125Mbps) to Full (Up to 450Mbps) Link Capacity upgrade license per ODU
C000065L007	2	PTP 650 LPU and Grounding Kit (1 kit per ODU)
C050065H033	2	PTP 650 Integrated END with AC+DC Enhanced Supply (RoW - U.S. Line Cord). Kit includes ODU, power supply, mounting bracket and US line cord
WB3176	1	328 ft (100 m) Reel Outdoor Copper Clad CAT5E (Recommended for PTP)



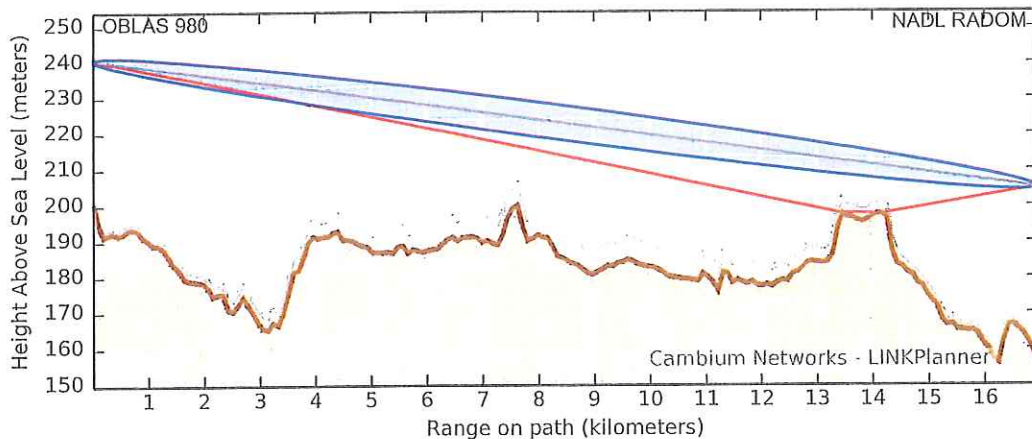
OBLAS 980 to NADL RADOM



Equipment: Cambium Networks PTP32800 with ODU-A - 1+0

Cambium Networks 2ft HP Antenna 85010089037 -
Direct @ 40 m

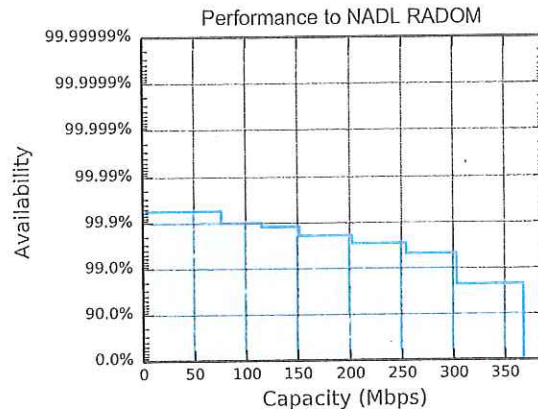
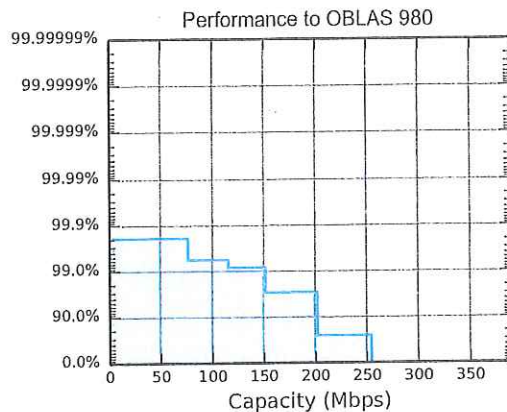
Cambium Networks 1ft HP Antenna 85010089036 -
Direct @ 48 m



	Performance to OBLAS 980	Performance to NADL RADOM
Mean IP	240.2 Mbps	366.6 Mbps
IP Availability	99.8115 % for 1.0 Mbps	99.9451 % for 1.0 Mbps

Link Summary			
Link Length	16.940 km	System Gain	165.62 dB
Band	32 GHz	System Gain Margin	16.99 dB
Regulation	ETSI	Mean Aggregate Data Rate	606.8 Mbps
Modulation	Adaptive	Annual Link Availability	99.8027 %
Bandwidth	56 MHz	Annual Link Unavailability	17.3 hrs/year
Total Path Loss	148.63 dB	Prediction Model	ITU-R

Performance Charts



Climatic Factors, Losses and Standards

dN/dH not exceeded for 1% of time	-268.89 N units/km	Annual 2-way Availability	99.9912 %
Area roughness 110x110km	56.79 metre	Annual 2-way Unavailability	46.2 mins/year
Geoclimatic factor	1.48e-04	Rain Availability	99.8115 %
Fade Occurrence Factor (P0)	3.10e-02	Rain Unavailability	16.5 hrs/year
Path inclination	2.13 mr	Atmospheric Gasses	ITU-R P.676-7, ITU-R P.835-4
0.01% Rain rate	33.62 mm/hr	Diffraction Loss	ITU-R P.526-10
Free Space Path Loss	147.29 dB	Propagation	ITU-R P.530-12
Gaseous Absorption Loss	1.34 dB	Rain Rate	ITU-R P.837-5
Link Type	Line-of-Sight	Refractivity Index	ITU-R P.453-9
Excess Path Loss	0.00 dB		

Part Number	Qty	Description
(no part number)	2	Unspecified 32 GHz ODU (invalid TX frequency selection). Please select a TX frequency
(no part number)	2	Unspecified Mains Lead (set the region in the Bill of Materials options)
01010419001	3	Coaxial Cable Grounding Kits for 1/4" and 3/8" Cable
07009304001	2	Hoisting Grip for CNT-400 cable
30010194001	2	50 Ohm Braided Coaxial Cable - 75 meter
85010089036	1	1' HP Antenna, 31.80 ~ 33.40 GHz, Single Pol, Mot Interface
85010089037	1	2' HP Antenna, 31.80 ~ 33.40 GHz, Single Pol, Mot Interface
WB3480	2	PTP800 Modem 1000/100BaseT with Capacity CAP 10 Mbps
WB3546	2	PTP800/PTP810 Modem Capacity CAP - 400 Mbps (per Unit)
WB3616	2	Coaxial Cable Installation Assembly Kit (W/O LPU End Kit)

(continued)

Part Number	Qty	Description
WB3622	2	AC-DC Power Supply Converter (no lead cable included). Converts 110/230V to 48V.
WB3657	2	LPU END KIT PTP800 (1 kit required per Coaxial cable)

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