

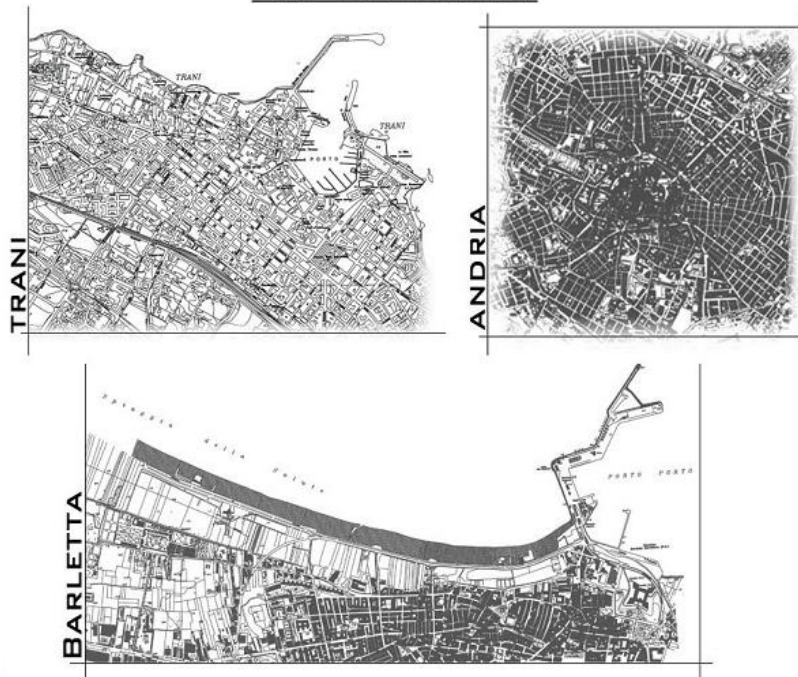


PATTI PER LE CITTÀ'
PPA PO FESR 2007-2013 - PAC
ASSE I - LINEA D'INTERVENTO 1.5 - AZIONE 1.5.2

“BAT innovation”

**Progetto per il
Miglioramento della
Vivibilità, Sicurezza e Tutela
dei Centri Storici dei
Comuni di Andria, Barletta
e Trani.**

BAT INNOVATION



PROGETTO ESECUTIVO

Il Progettista	Responsabile del Procedimento
RTP (Raggruppamento Temporaneo di Professionisti) : Ing. Giuseppe Perillo (Mandatario) Italiantech S.r.l. [D. T. Ing. P. Del Sorbo] (Mandante) Ing. Giampietro Massarelli (Mandante - Giovane Professionista)	Dott. Savino Filannino

ELABORATO	DESCRIZIONE	REV.	DATA
B.005	Relazione di Verifica Link Hiperlan (Comune di Andria)	1	23/03/2021

Il progettista si riserva la proprietà del documento vietandone la riproduzione e la divulgazione senza autorizzazione ai sensi delle vigenti leggi

Table of Contents

1. Project Summary	3
2. HOP_001 direzione HOP_002	7
3. HOP_002 direzione Municipio - CED	9
4. HOP_003 direzione P_008	11
5. HOP_004 direzione P_011 - W_14	13
6. HOP_005 to HOP_002	15
7. HOP_006 direzione P_013 - W_10	17
8. HOP_007 direzione HOP_002	19
9. LoRaWAN direzione HOP_006	21
10. P_001 - W_02 direzione P_002 - W_09	23
11. P_002 - W_09 direzione P_003	25
12. P_003 direzione HOP_002	27
13. P_004 - W_04 direzione P_003	29
14. P_005 - W_03 direzione P_004 - W_04	31
15. P_006 - W_06 direzione HOP_001	33
16. P_007 - W_08 direzione P_008	35
17. P_008 direzione P_010	37
18. P_009 - W_07 direzione P_002 - W_09	39
19. P_010 direzione P_009 - W_07	41
20. P_011 - W_14 direzione HOP_003	43
21. P_012 - W_12 direzione P_005 - W_03	45
22. P_013 - W_10 direzione HOP_004	47
23. P_014 - W_13 direzione P_013 - W_10	49
24. P_015 - W_11 direzione P_014 - W_13	51
25. P_017 - W_01 direzione HOP_005	53
26. P_018 - W_05 direzione P_005 - W_03	55
27. W_16 direzione HOP_007	57
28. W_17 direzione HOP_007	59
Disclaimer	61

1. Project Summary

Project: Andria_Progetto_Radio

General Information	
Customer Name	Andria_Progetto_Radio
Company Name	
Address	
Phone	
Cell Phone	
Email	

Link name	Product	Local antenna	Remote antenna	Max aggregate IP throughput
HOP_001 direzione HOP_002	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.84 Mbps
HOP_002 direzione Municipio - CED	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.91 Mbps
HOP_003 direzione P_008	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
HOP_004 direzione P_011 - W_14	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
HOP_005 to HOP_002	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.72 Mbps
HOP_006 direzione P_013 - W_10	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
HOP_007 direzione HOP_002	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.79 Mbps
LoRaWAN direzione HOP_006	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_001 - W_02 direzione P_002 - W_09	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.91 Mbps
P_002 - W_09 direzione P_003	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_003 direzione HOP_002	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.91 Mbps
P_004 - W_04 direzione P_003	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_005 - W_03 direzione P_004 - W_04	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_006 - W_06 direzione HOP_001	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_007 - W_08 direzione P_008	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_008 direzione P_010	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	163.84 Mbps
P_009 - W_07 direzione P_002 - W_09	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.91 Mbps

(continued)

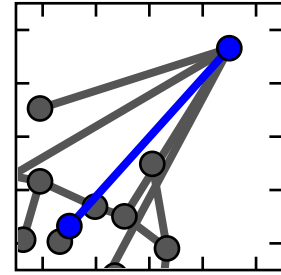
Link name	Product	Local antenna	Remote antenna	Max aggregate IP throughput
P_010 direzione P_009 - W_07	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_011 - W_14 direzione HOP_003	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_012 - W_12 direzione P_005 - W_03	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.91 Mbps
P_013 - W_10 direzione HOP_004	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	272.53 Mbps
P_014 - W_13 direzione P_013 - W_10	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
P_015 - W_11 direzione P_014 - W_13	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	163.84 Mbps
P_017 - W_01 direzione HOP_005	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	272.53 Mbps
P_018 - W_05 direzione P_005 - W_03	ePMP Force 200	Cambium Networks ePMP Force 200	Cambium Networks ePMP Force 200	276.96 Mbps
W_16 direzione HOP_007	ePMP Force 130	Cambium Networks 1ft ePMP Force 130	Cambium Networks 1ft ePMP Force 130	81.92 Mbps
W_17 direzione HOP_007	ePMP Force 130	Cambium Networks 1ft ePMP Force 130	Cambium Networks 1ft ePMP Force 130	190.00 Mbps

Bill of Materials : PTP Network

Part Number	Qty	Description
600SS	4	SURGE SUPPRESSOR
C000000L065	50	Gigabit Surge Suppressor (30V)
C050900C063	50	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
C050900C502	4	ePMP 5GHz Force 130 SM (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	50	ePMP Force 200 Extended Warranty, 2 Addl Years



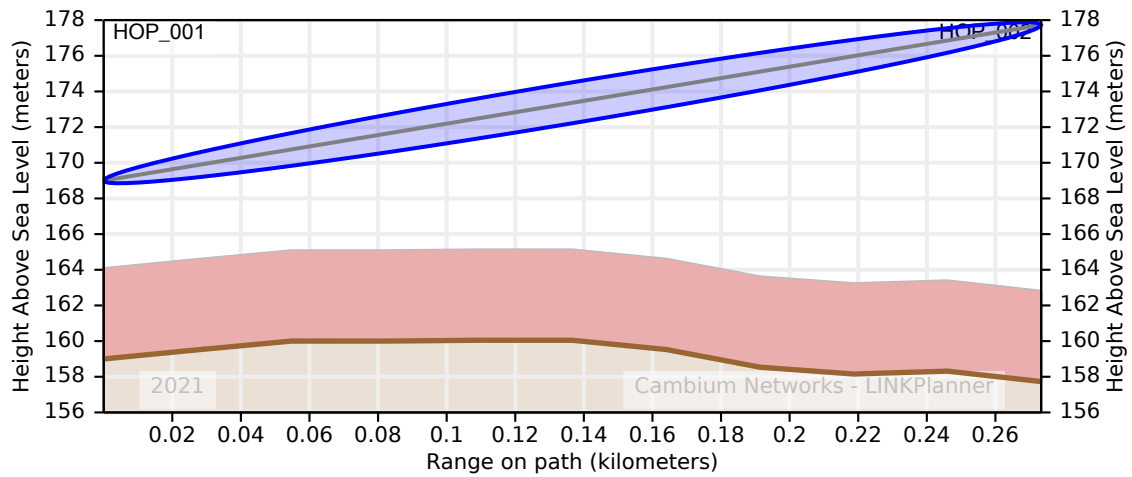
HOP_001 direzione HOP_002



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 10 m

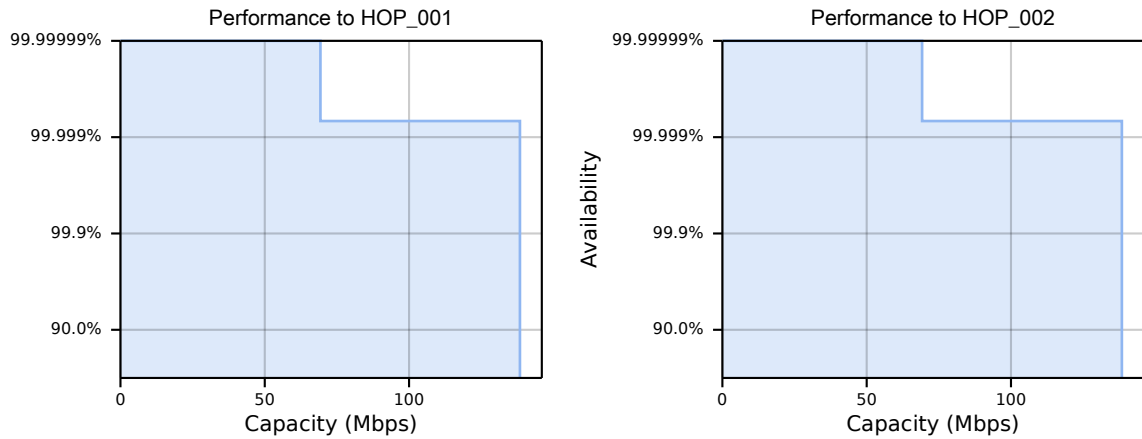
Cambium Networks ePMP Force 200 @ 20 m



	Performance to HOP_001	Performance to HOP_002
Mean IP	138.42 Mbps	138.42 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.273 km	System Gain Margin	39.04 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.84 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	96.14 dB	Prediction Model	ITU-R P.530-17
System Gain	135.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

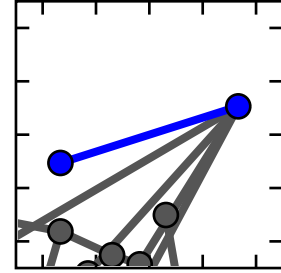
dN/dH not exceeded for 1% of time	-348.76 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.45 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	2.86e-10	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	31.94 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	96.14 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



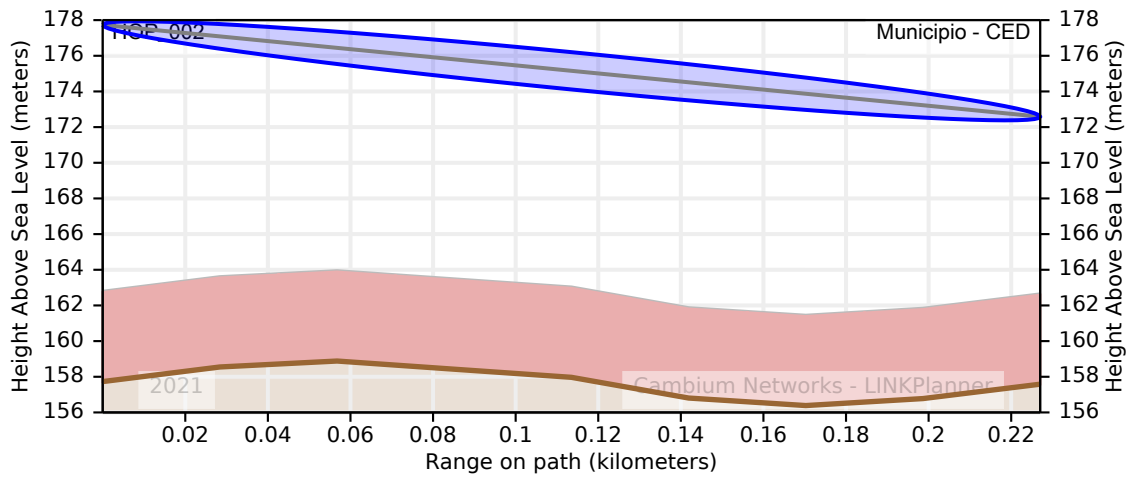
HOP_002 direzione Municipio - CED



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 20 m

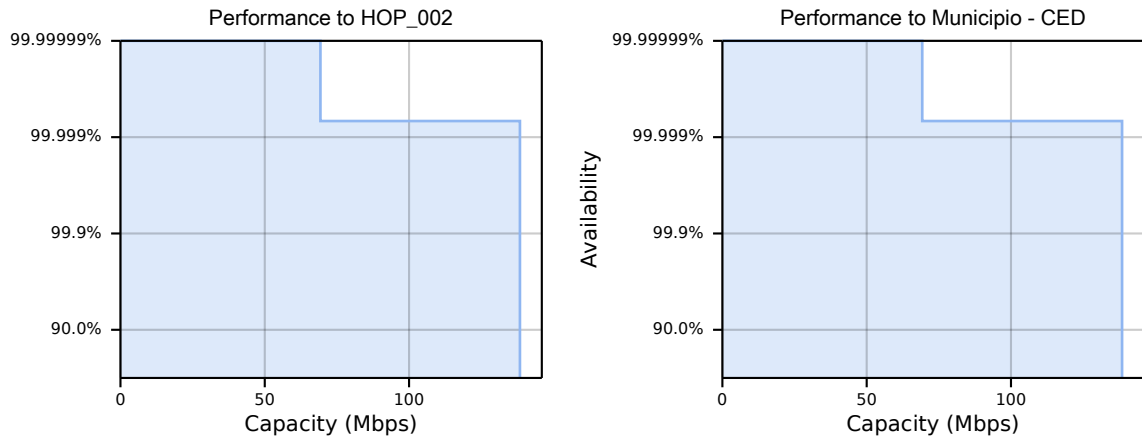
Cambium Networks ePMP Force 200 @ 15 m



	Performance to HOP_002	Performance to Municipio - CED
Mean IP	138.42 Mbps	138.49 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.227 km	System Gain Margin	40.65 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.91 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	94.53 dB	Prediction Model	ITU-R P.530-17
System Gain	135.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

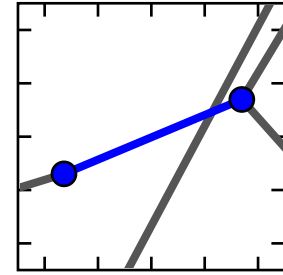
dN/dH not exceeded for 1% of time	-348.77 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.38 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.92e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	2.12e-10	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	22.67 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	94.53 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



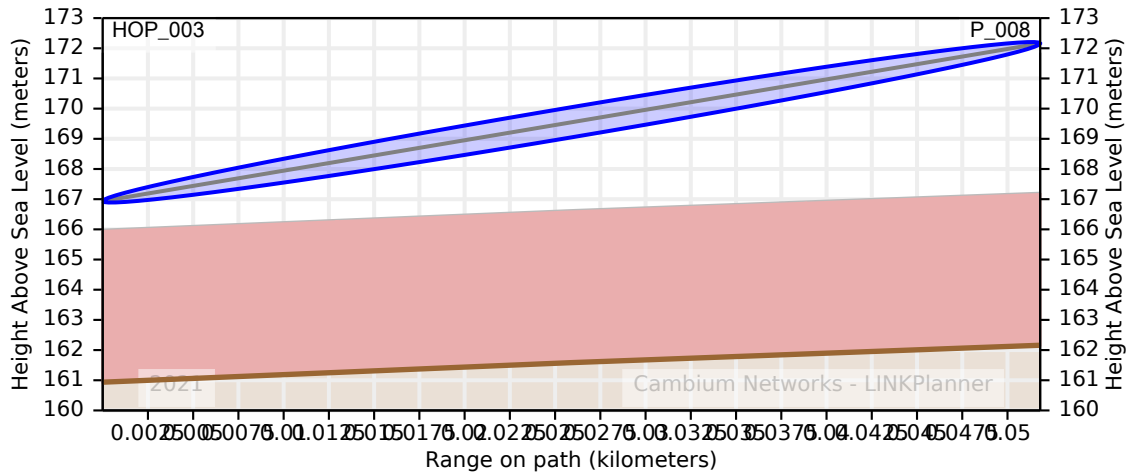
HOP_003 direzione P_008



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

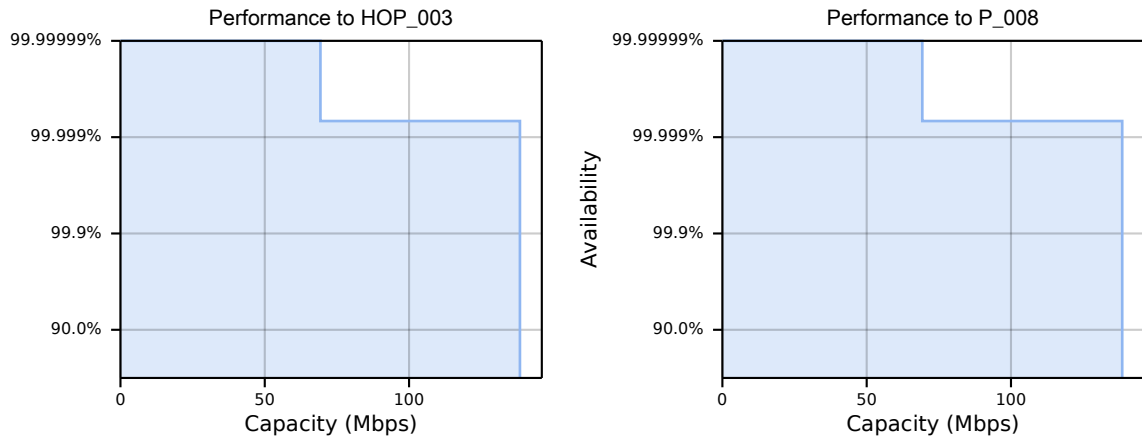
Cambium Networks ePMP Force 200 @ 10 m



	Performance to HOP_003	Performance to P_008
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.052 km	System Gain Margin	41.48 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	81.70 dB	Prediction Model	ITU-R P.530-17
System Gain	123.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

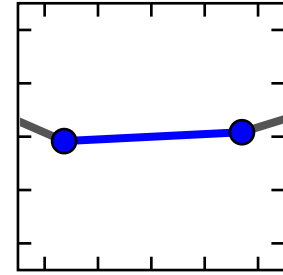
dN/dH not exceeded for 1% of time	-348.67 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.82 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	3.14e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	100.84 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	81.70 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



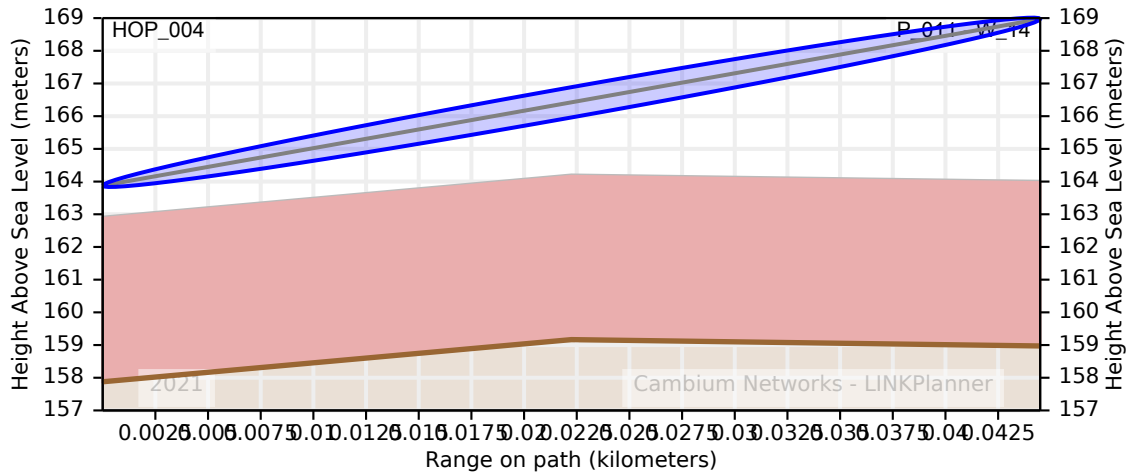
HOP_004 direzione P_011 - W_14



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

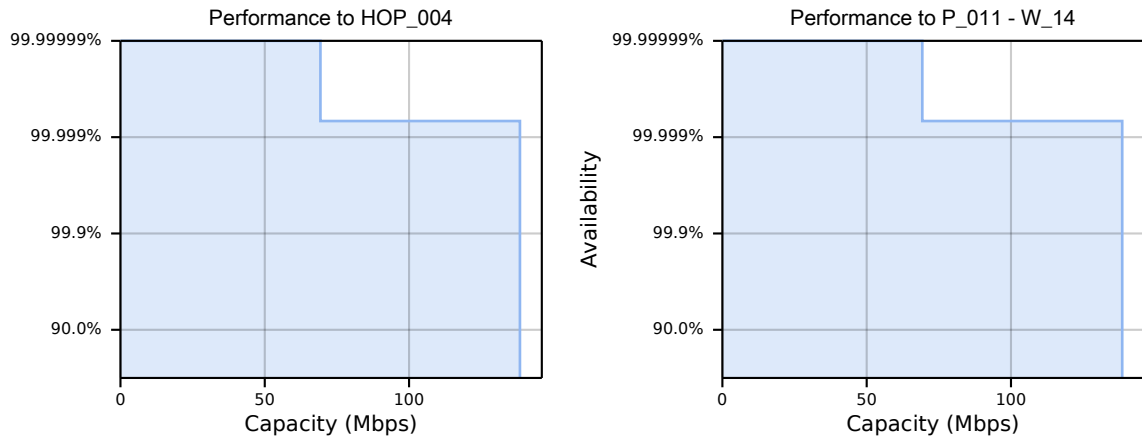
Cambium Networks ePMP Force 200 @ 10 m



	Performance to HOP_004	Performance to P_011 - W_14
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.044 km	System Gain Margin	41.81 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	80.37 dB	Prediction Model	ITU-R P.530-17
System Gain	122.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

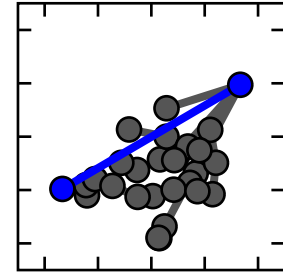
dN/dH not exceeded for 1% of time	-348.62 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.00 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.65e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	114.52 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	80.37 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



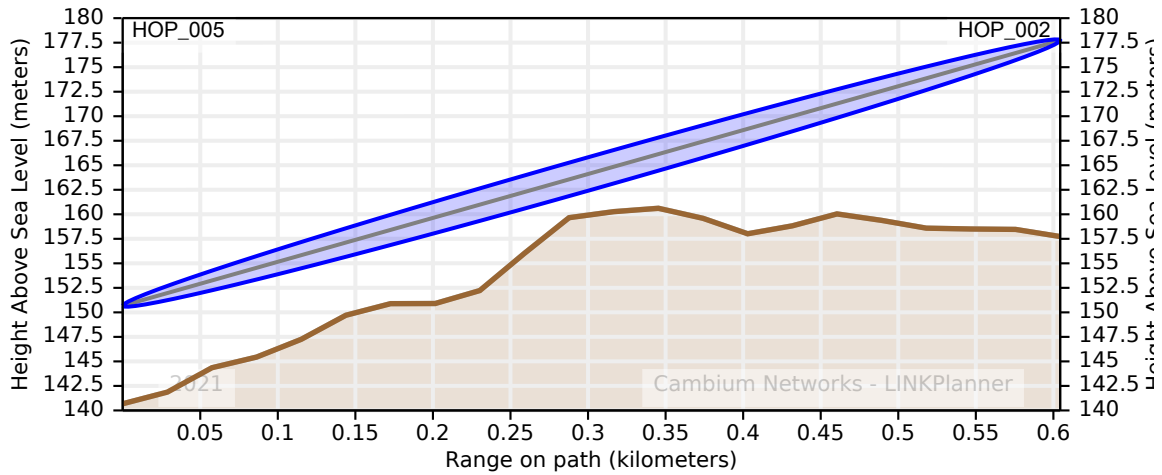
HOP_005 to HOP_002



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 10 m

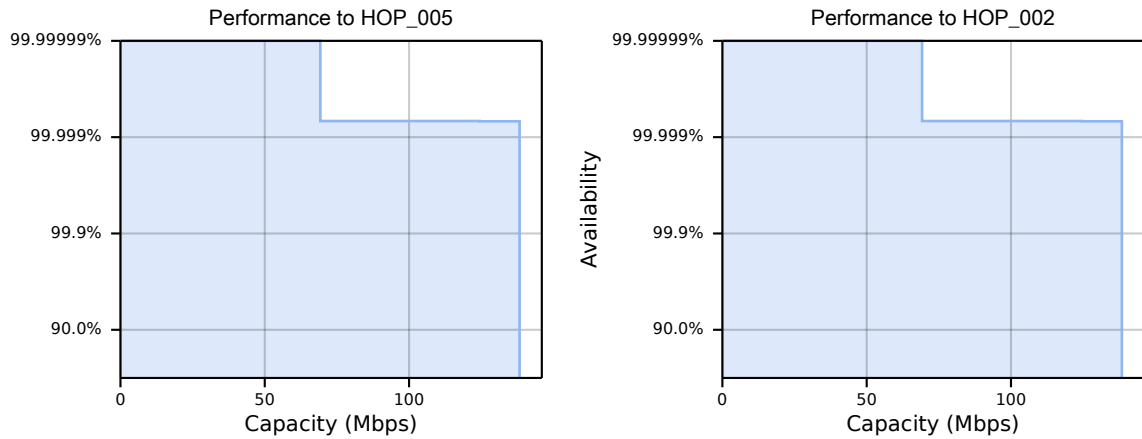
Cambium Networks ePMP Force 200 @ 20 m



	Performance to HOP_005	Performance to HOP_002
Mean IP	138.30 Mbps	138.42 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.604 km	System Gain Margin	32.14 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.72 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	103.04 dB	Prediction Model	ITU-R P.530-17
System Gain	135.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

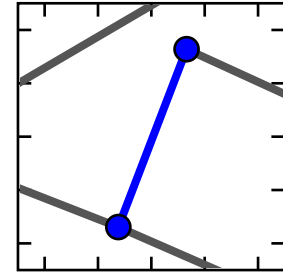
dN/dH not exceeded for 1% of time	-348.68 N units/km	Gaseous Absorption Loss	0.01 dB
Area roughness 110x110km	209.74 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	3.12e-09	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	44.76 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	103.03 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



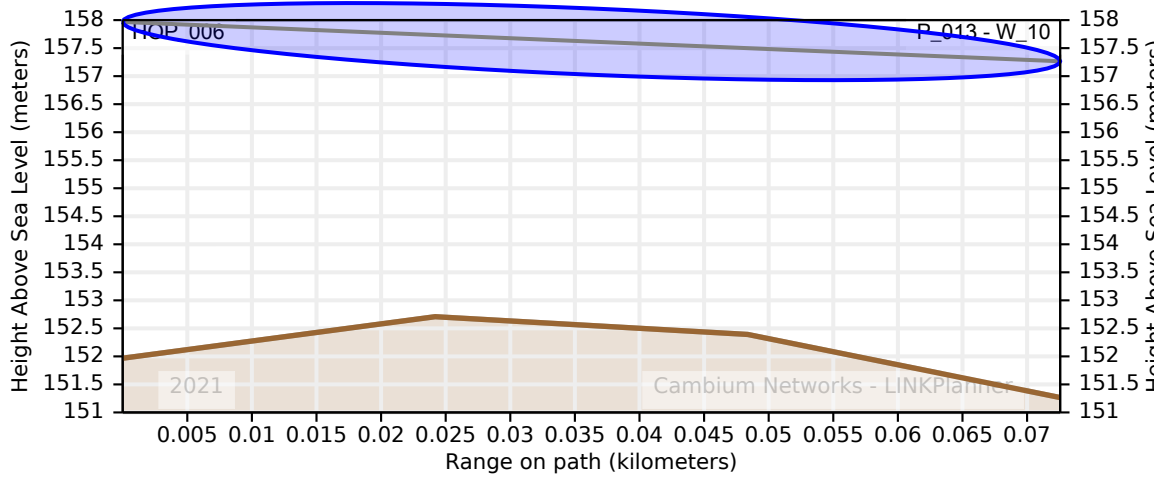
HOP_006 direzione P_013 - W_10



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

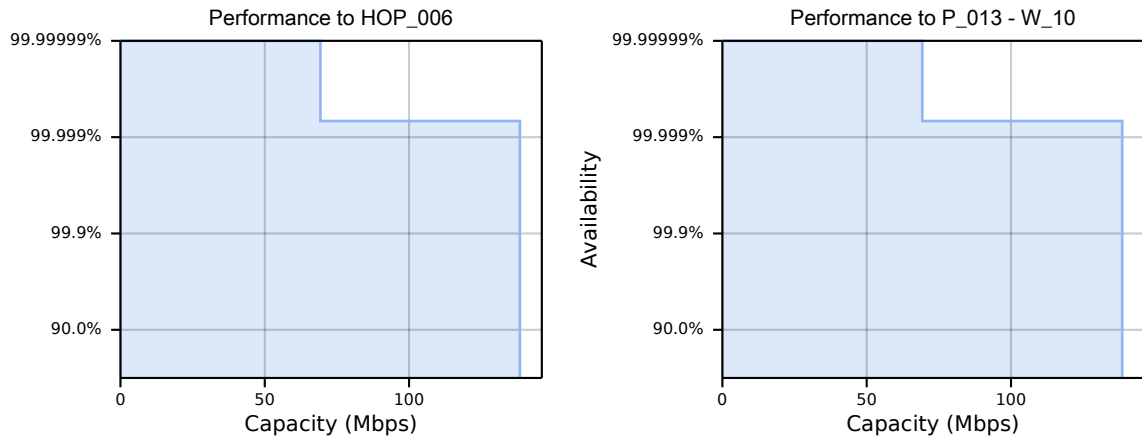
Cambium Networks ePMP Force 200 @ 6 m



	Performance to HOP_006	Performance to P_013 - W_10
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.073 km	System Gain Margin	41.56 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	84.62 dB	Prediction Model	ITU-R P.530-17
System Gain	126.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

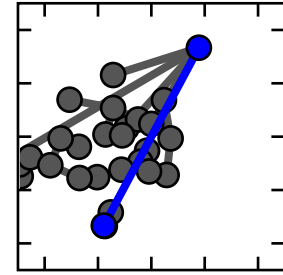
dN/dH not exceeded for 1% of time	-348.61 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.02 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.02e-11	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	9.67 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	84.62 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



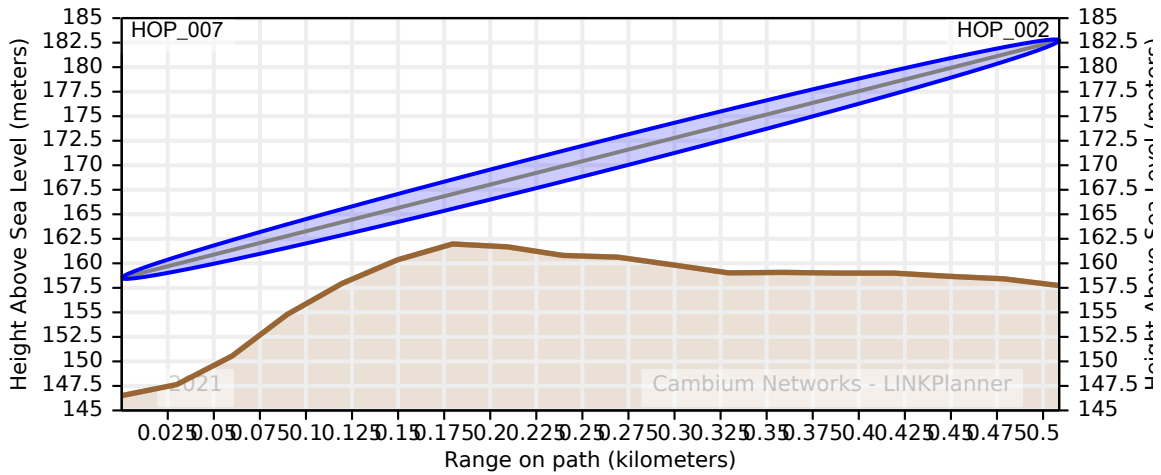
HOP_007 direzione HOP_002



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 12 m

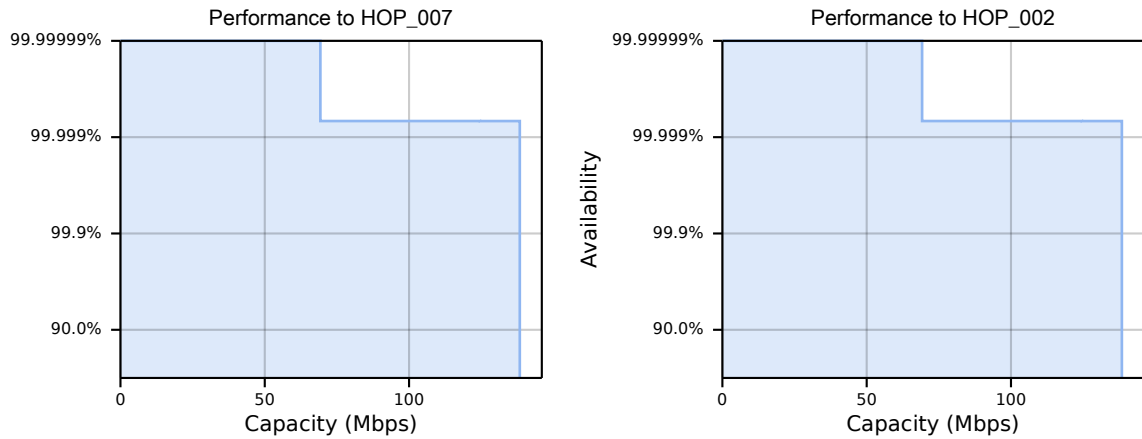
Cambium Networks ePMP Force 200 @ 25 m



	Performance to HOP_007	Performance to HOP_002
Mean IP	138.37 Mbps	138.42 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.509 km	System Gain Margin	33.64 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.79 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	101.54 dB	Prediction Model	ITU-R P.530-17
System Gain	135.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

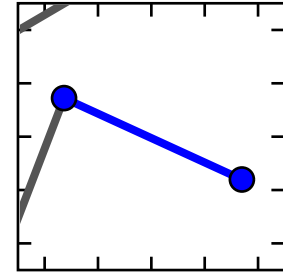
dN/dH not exceeded for 1% of time	-348.71 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.65 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.61e-09	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	47.61 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	101.54 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



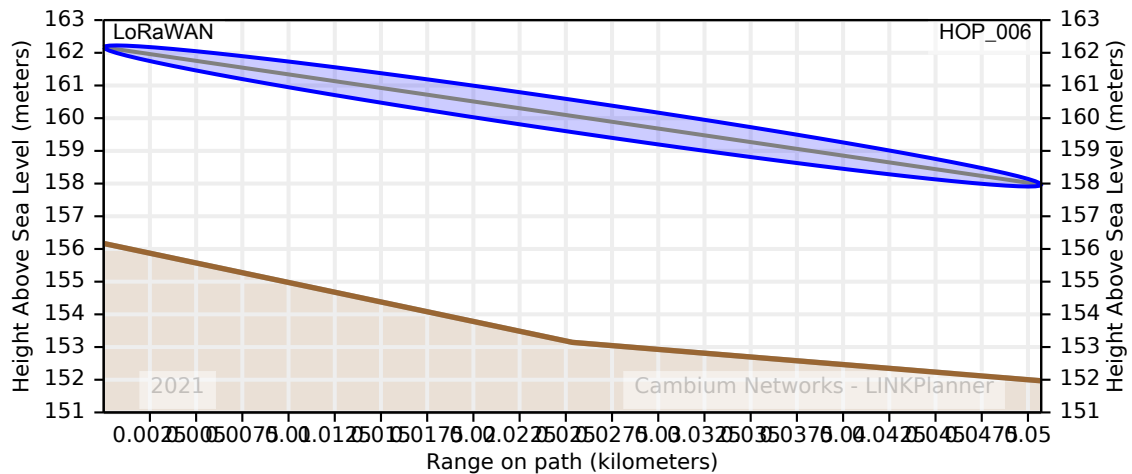
LoRaWAN direzione HOP_006



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

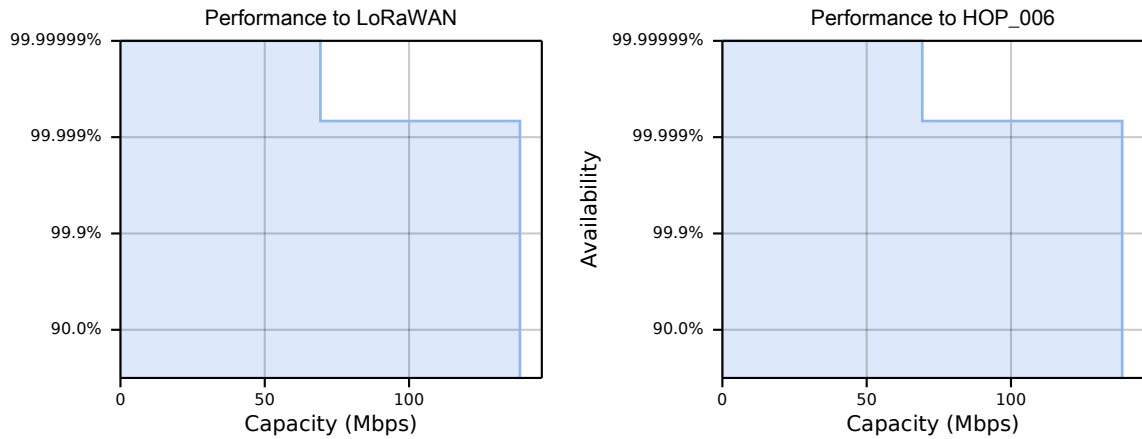
Cambium Networks ePMP Force 200 @ 6 m



	Performance to LoRaWAN	Performance to HOP_006
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.051 km	System Gain Margin	41.67 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	81.51 dB	Prediction Model	ITU-R P.530-17
System Gain	123.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

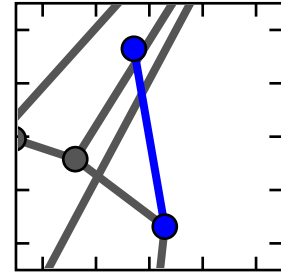
dN/dH not exceeded for 1% of time	-348.63 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.94 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	3.62e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	82.83 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	81.51 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



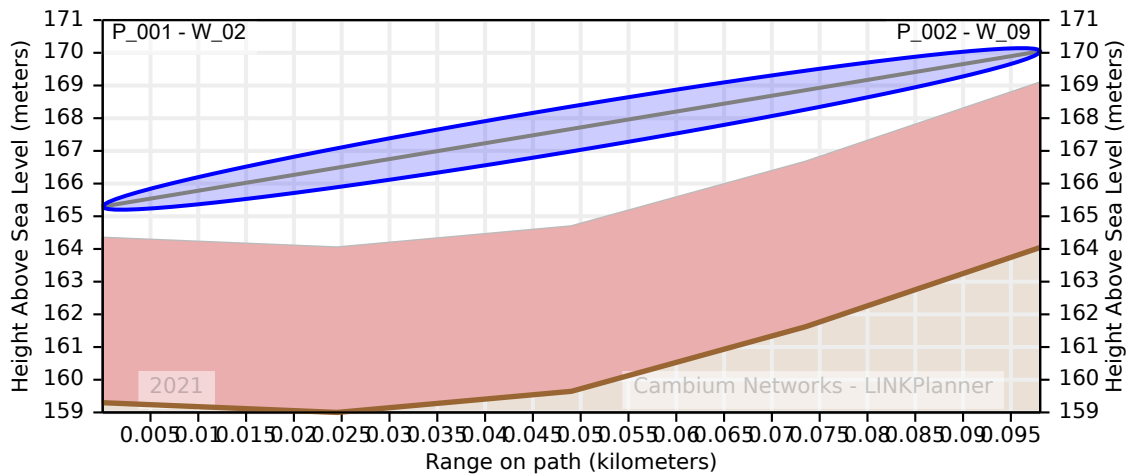
P_001 - W_02 direzione
P_002 - W_09



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

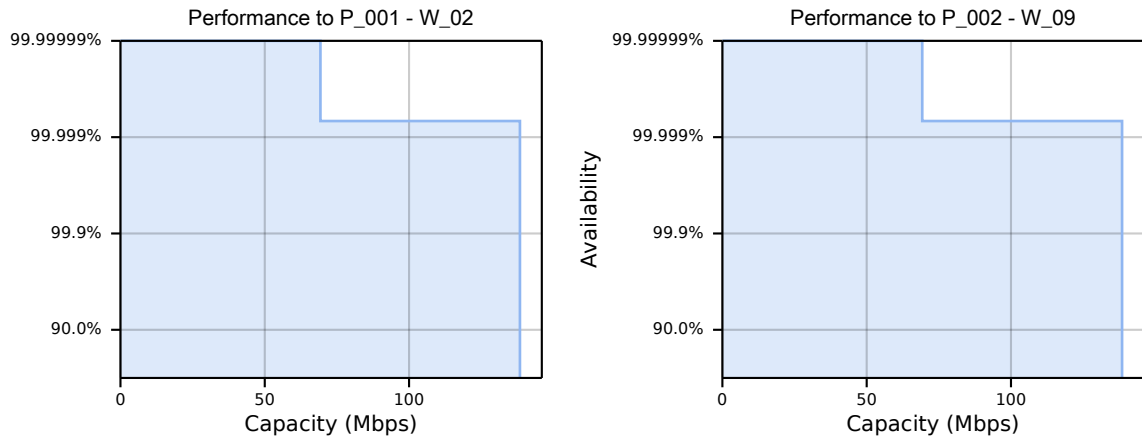
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_001 - W_02	Performance to P_002 - W_09
Mean IP	138.42 Mbps	138.49 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.098 km	System Gain Margin	41.94 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.91 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	87.24 dB	Prediction Model	ITU-R P.530-17
System Gain	129.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

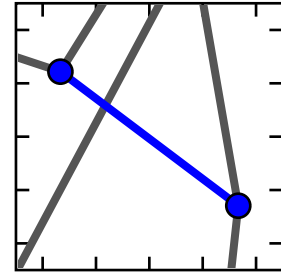
dN/dH not exceeded for 1% of time	-348.74 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.54 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	5.80e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	48.41 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	87.24 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



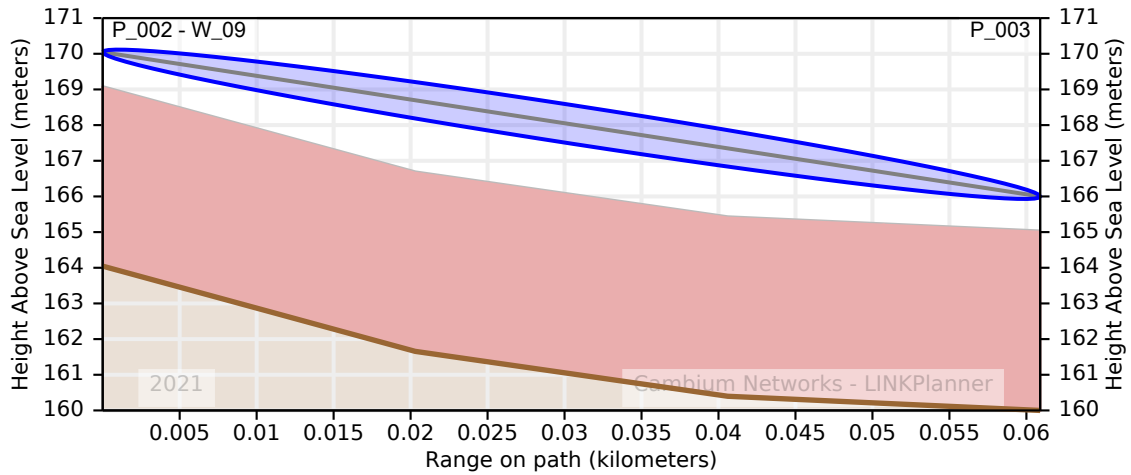
P_002 - W_09 direzione P_003



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

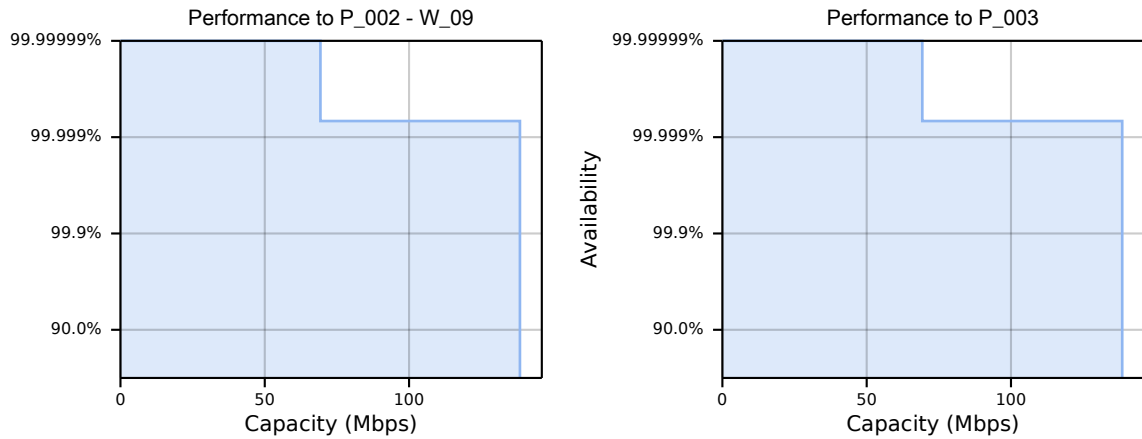
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_002 - W_09	Performance to P_003
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.061 km	System Gain Margin	41.08 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	83.10 dB	Prediction Model	ITU-R P.530-17
System Gain	124.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

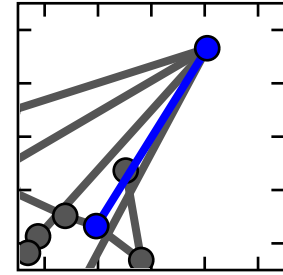
dN/dH not exceeded for 1% of time	-348.73 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.60 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	8.33e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	66.43 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	83.10 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



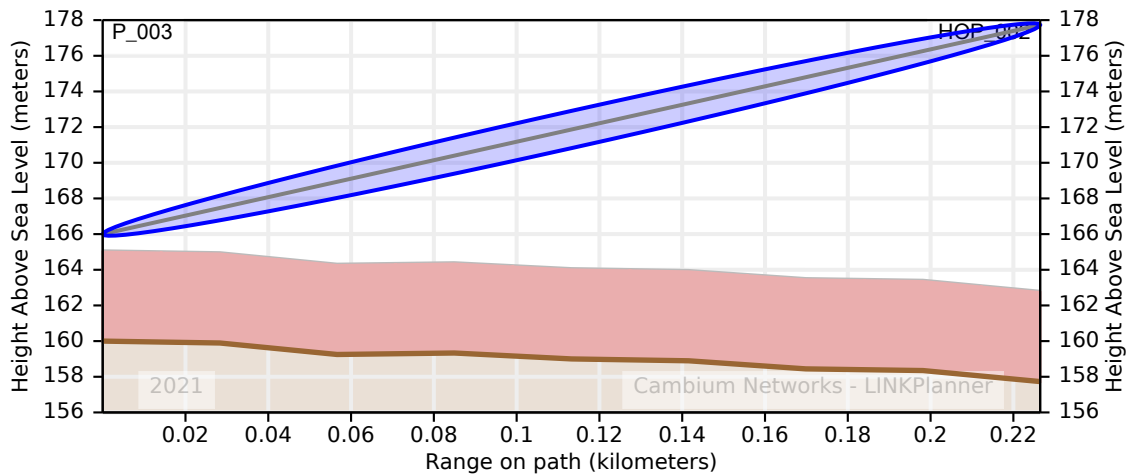
P_003 direzione HOP_002



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

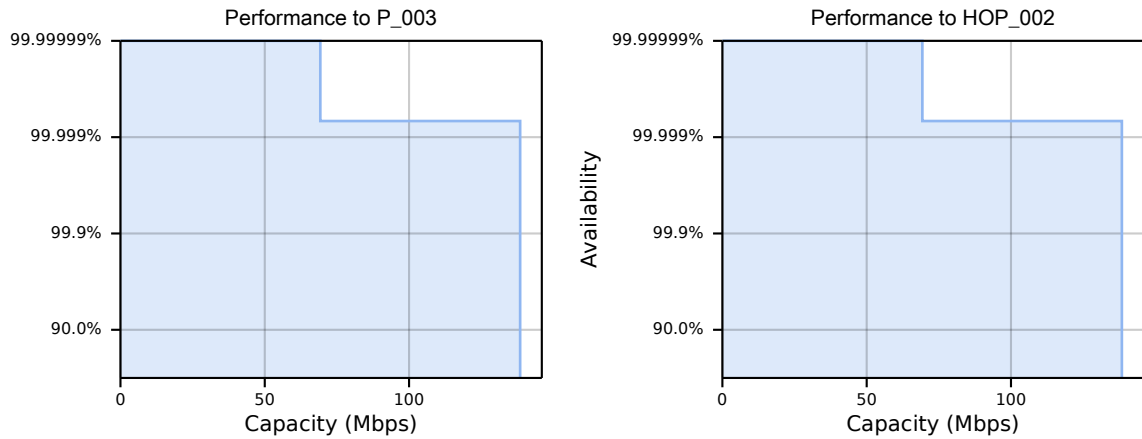
Cambium Networks ePMP Force 200 @ 20 m



	Performance to P_003	Performance to HOP_002
Mean IP	138.49 Mbps	138.42 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.226 km	System Gain Margin	40.67 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.91 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	94.51 dB	Prediction Model	ITU-R P.530-17
System Gain	135.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

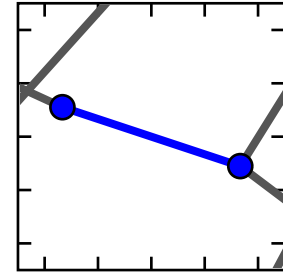
dN/dH not exceeded for 1% of time	-348.77 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.40 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.92e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	9.33e-11	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	51.80 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	94.51 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



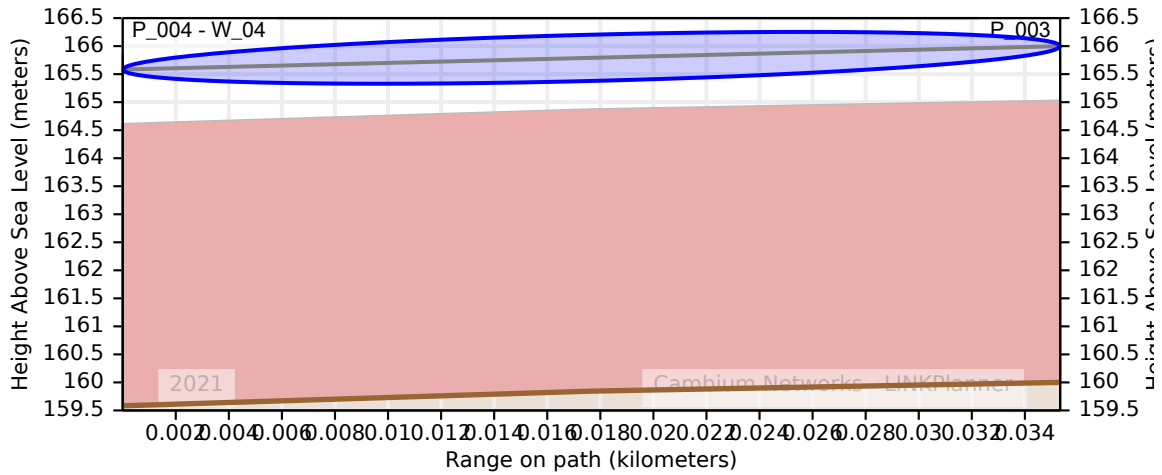
P_004 - W_04 direzione P_003



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

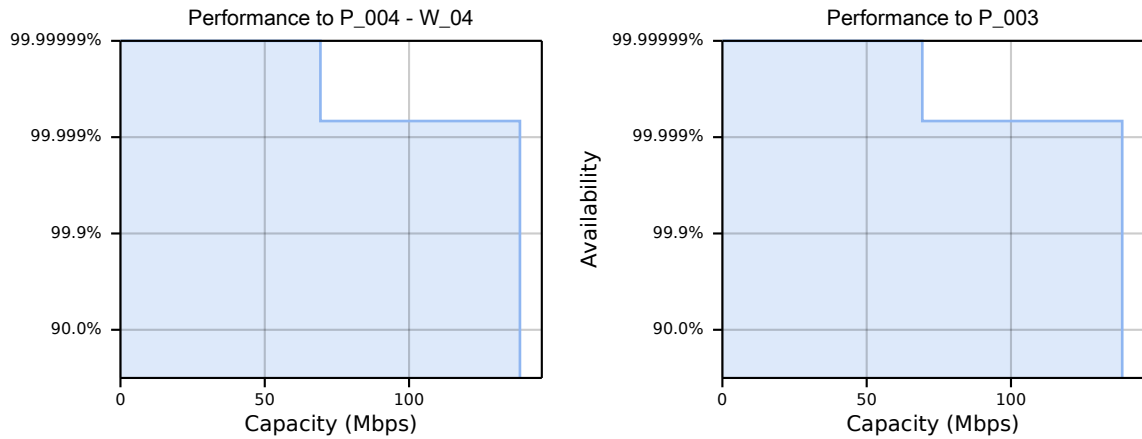
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_004 - W_04	Performance to P_003
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.035 km	System Gain Margin	41.81 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	78.37 dB	Prediction Model	ITU-R P.530-17
System Gain	120.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

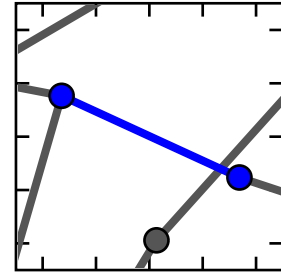
dN/dH not exceeded for 1% of time	-348.72 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.62 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	7.23e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	11.82 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	78.37 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



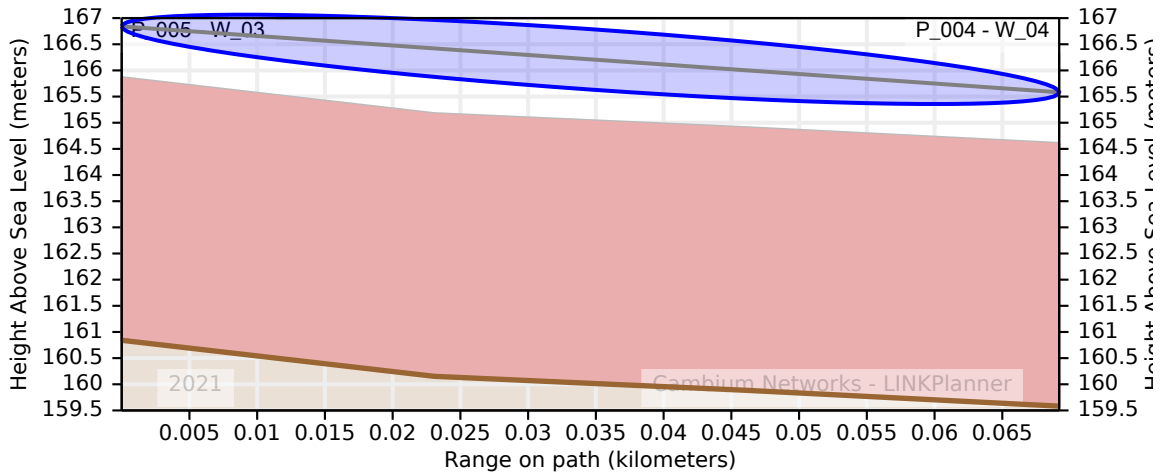
P_005 - W_03 direzione
P_004 - W_04



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

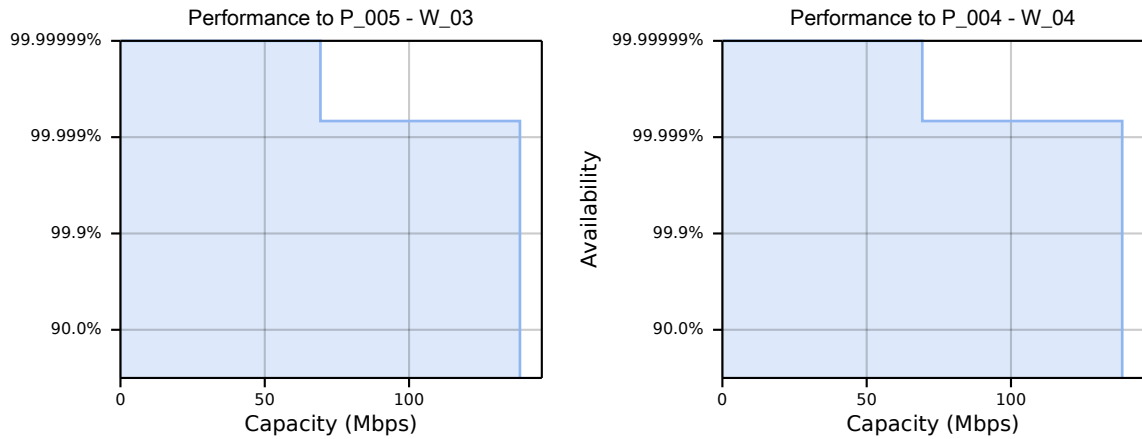
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_005 - W_03	Performance to P_004 - W_04
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.069 km	System Gain Margin	41.97 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	84.21 dB	Prediction Model	ITU-R P.530-17
System Gain	126.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

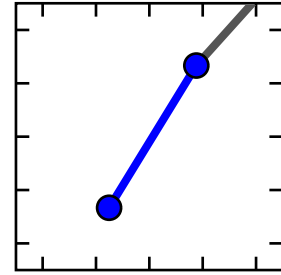
dN/dH not exceeded for 1% of time	-348.70 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.66 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	4.70e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	18.18 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	84.21 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



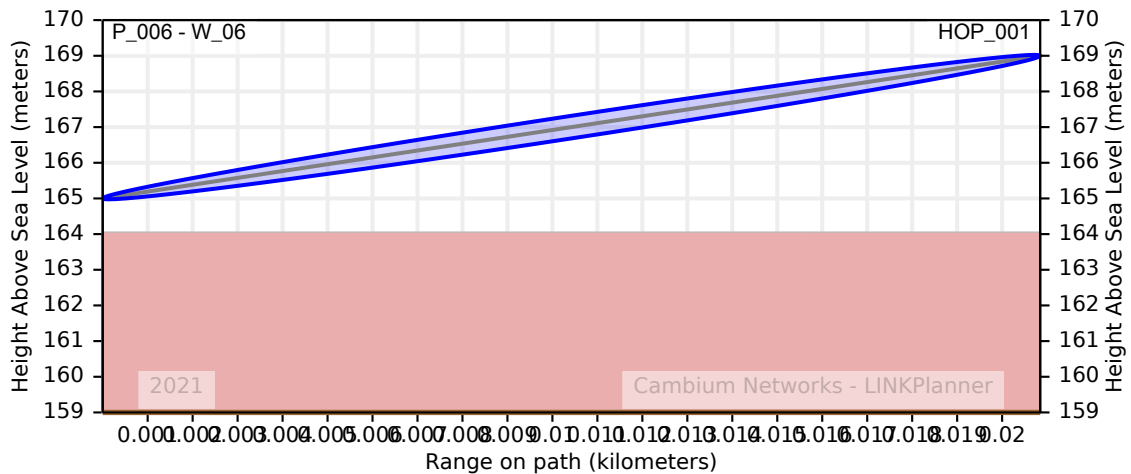
P_006 - W_06 direzione HOP_001



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

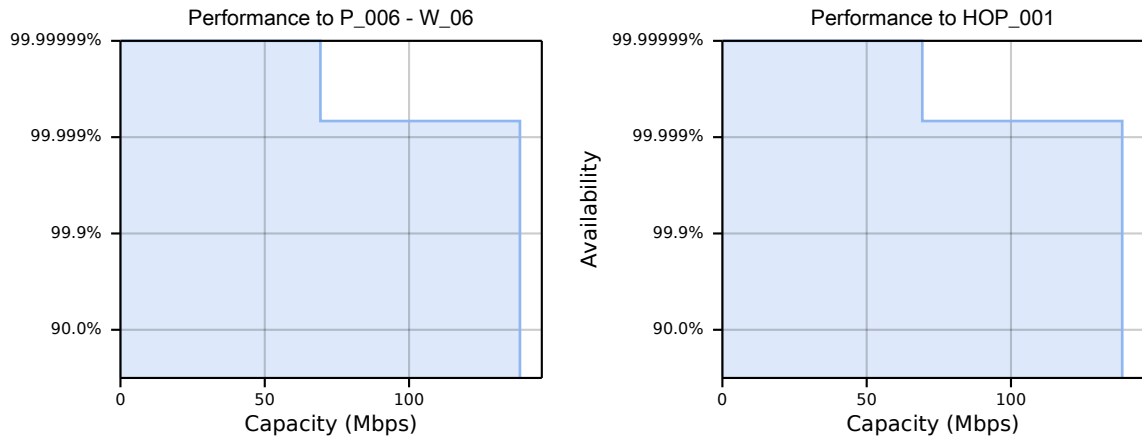
Cambium Networks ePMP Force 200 @ 10 m



	Performance to P_006 - W_06	Performance to HOP_001
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.021 km	System Gain Margin	41.39 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	73.79 dB	Prediction Model	ITU-R P.530-17
System Gain	115.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

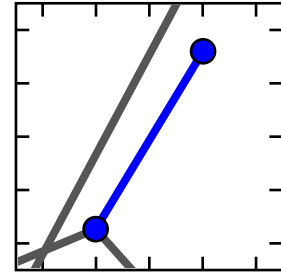
dN/dH not exceeded for 1% of time	-348.69 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.73 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	7.38e-15	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	191.88 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	73.79 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



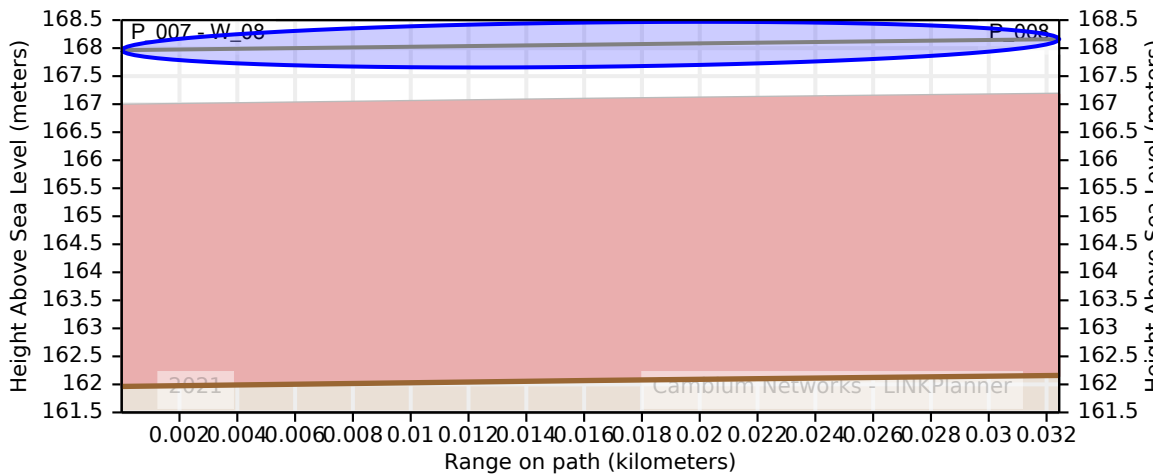
P_007 - W_08 direzione P_008



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

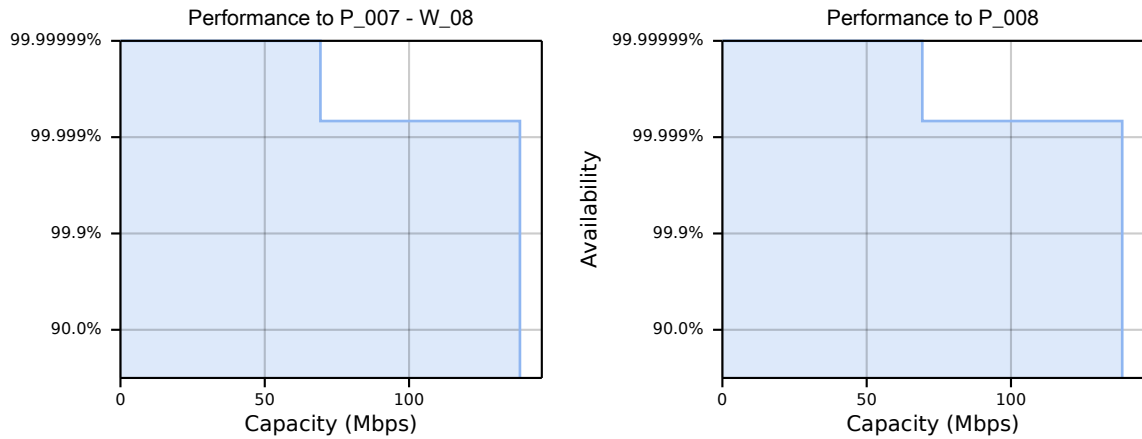
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_007 - W_08	Performance to P_008
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.032 km	System Gain Margin	41.55 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	77.63 dB	Prediction Model	ITU-R P.530-17
System Gain	119.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

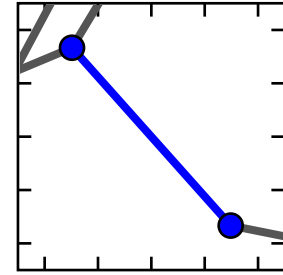
dN/dH not exceeded for 1% of time	-348.69 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.74 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	9.98e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	6.04 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	77.63 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



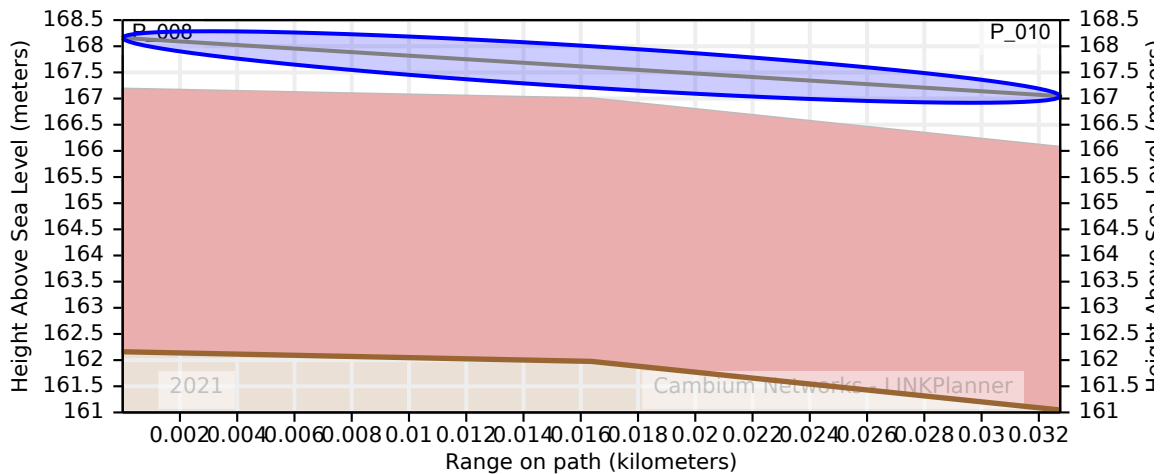
P_008 direzione P_010



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

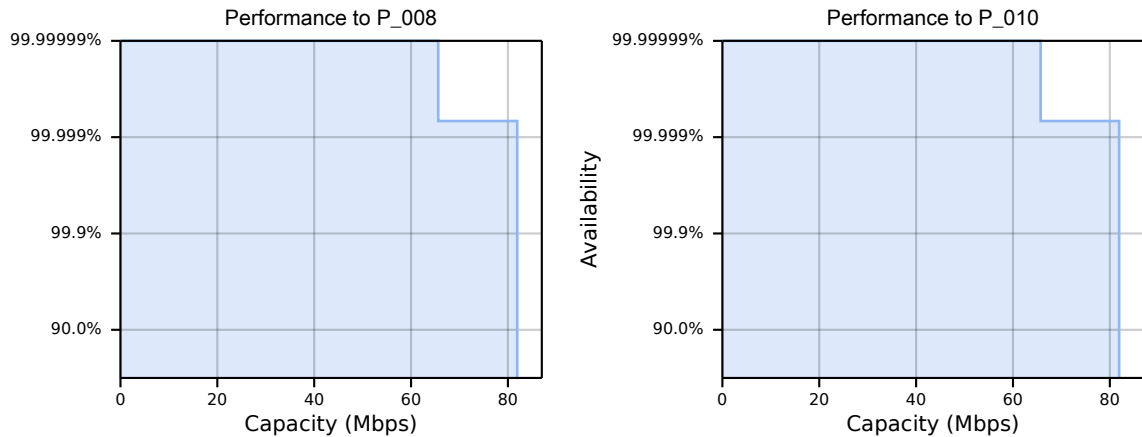
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_008	Performance to P_010
Mean IP	81.92 Mbps	81.92 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.033 km	System Gain Margin	41.47 dB
Band	5.4 GHz	Mean Aggregate Data Rate	163.84 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	512 Bytes
Total Path Loss	77.71 dB	Prediction Model	ITU-R P.530-17
System Gain	119.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

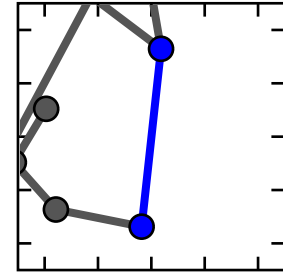
dN/dH not exceeded for 1% of time	-348.69 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.77 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.98e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	34.00 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	77.71 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



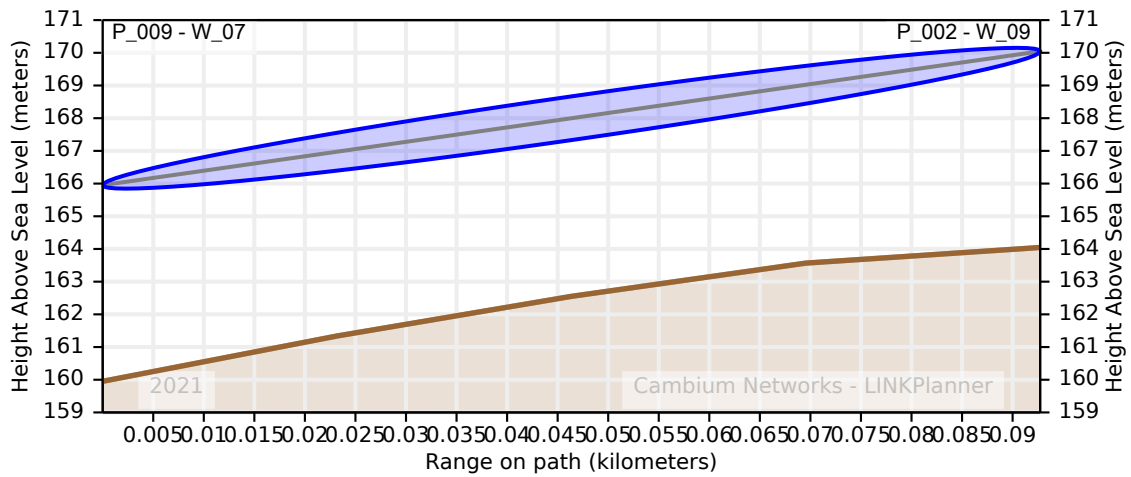
P_009 - W_07 direzione
P_002 - W_09



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

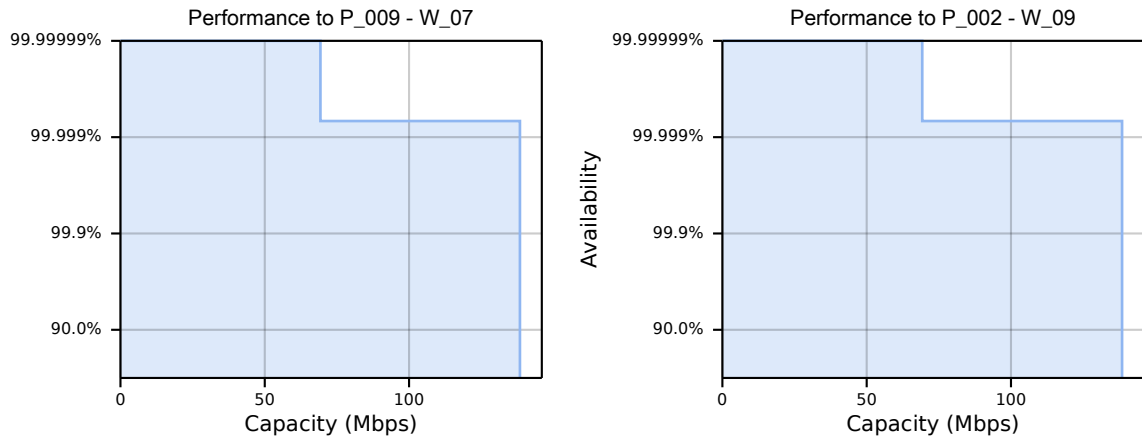
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_009 - W_07	Performance to P_002 - W_09
Mean IP	138.42 Mbps	138.49 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.093 km	System Gain Margin	41.43 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.91 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	86.75 dB	Prediction Model	ITU-R P.530-17
System Gain	128.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

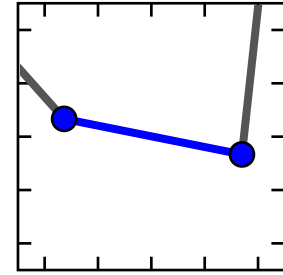
dN/dH not exceeded for 1% of time	-348.72 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.66 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	5.26e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	44.14 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.74 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	86.75 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



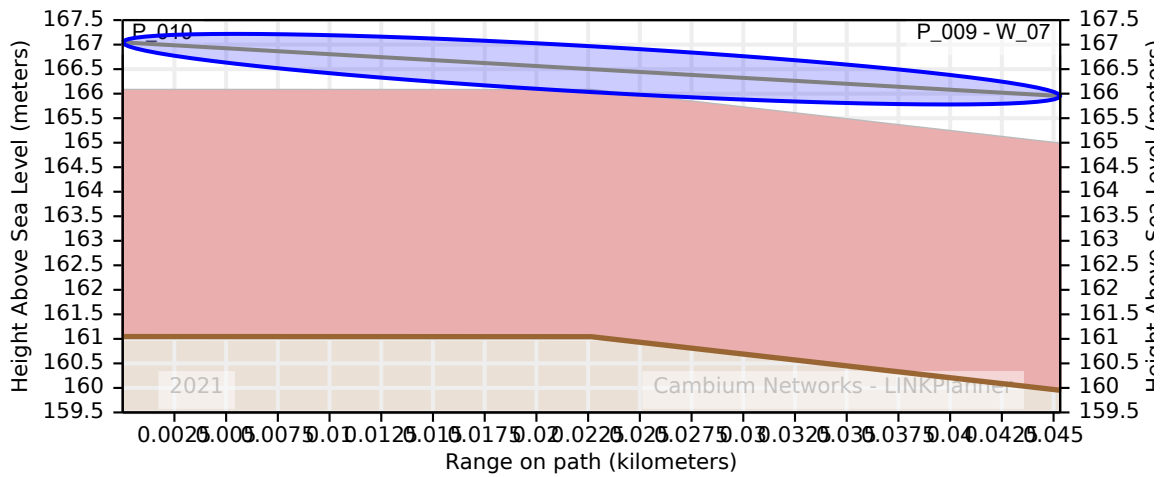
P_010 direzione P_009 - W_07



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

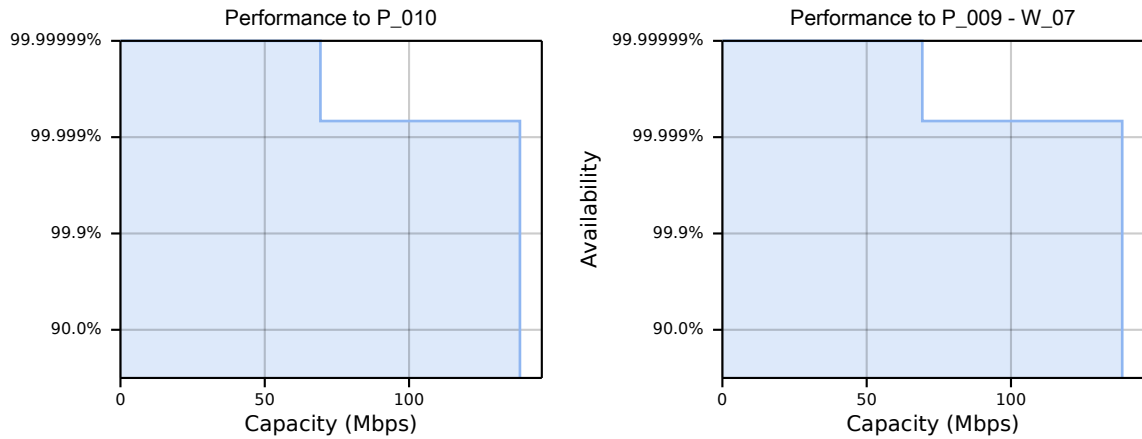
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_010	Performance to P_009 - W_07
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.045 km	System Gain Margin	41.65 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	80.53 dB	Prediction Model	ITU-R P.530-17
System Gain	122.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

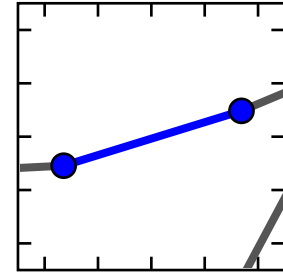
dN/dH not exceeded for 1% of time	-348.69 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.75 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	8.42e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	24.15 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	80.53 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



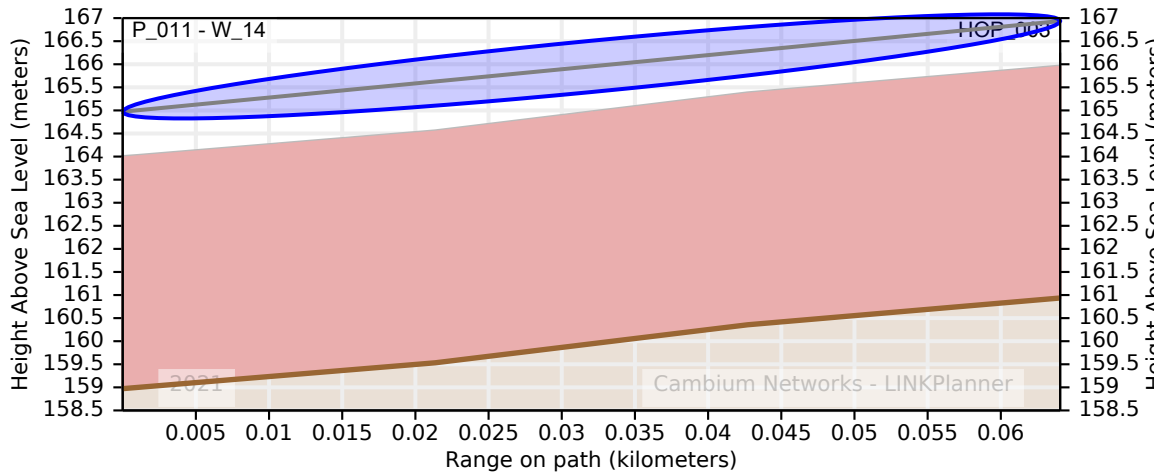
P_011 - W_14 direzione HOP_003



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

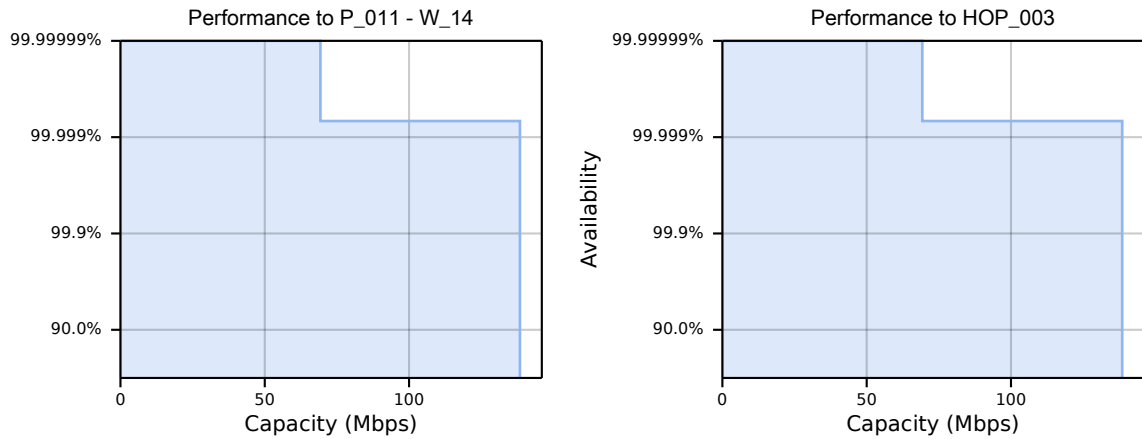
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_011 - W_14	Performance to HOP_003
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.064 km	System Gain Margin	41.64 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	83.54 dB	Prediction Model	ITU-R P.530-17
System Gain	125.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

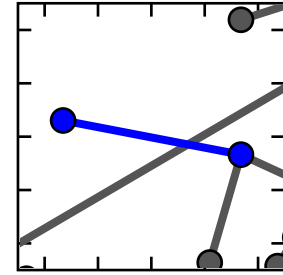
dN/dH not exceeded for 1% of time	-348.65 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.92 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	2.16e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	30.66 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	83.54 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



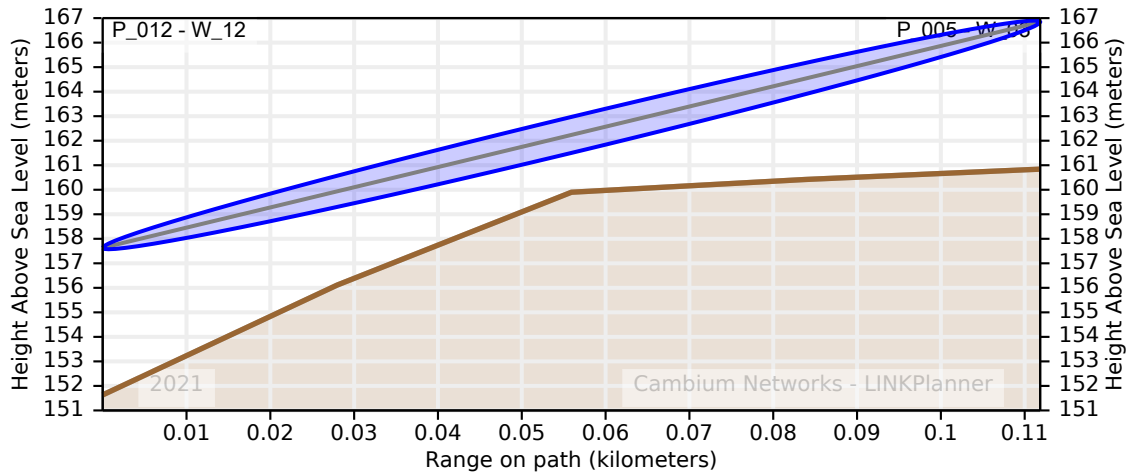
P_012 - W_12 direzione
P_005 - W_03



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

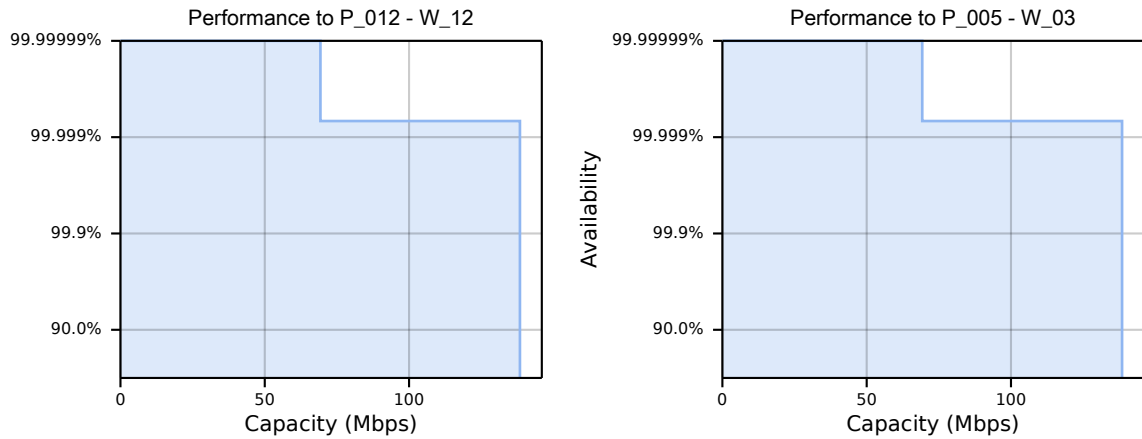
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_012 - W_12	Performance to P_005 - W_03
Mean IP	138.42 Mbps	138.49 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.112 km	System Gain Margin	41.80 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.91 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	88.38 dB	Prediction Model	ITU-R P.530-17
System Gain	130.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

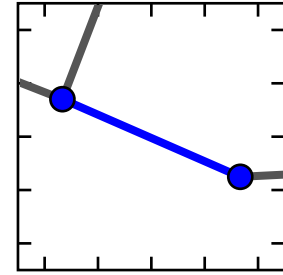
dN/dH not exceeded for 1% of time	-348.68 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.74 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	5.37e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	82.33 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	88.38 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



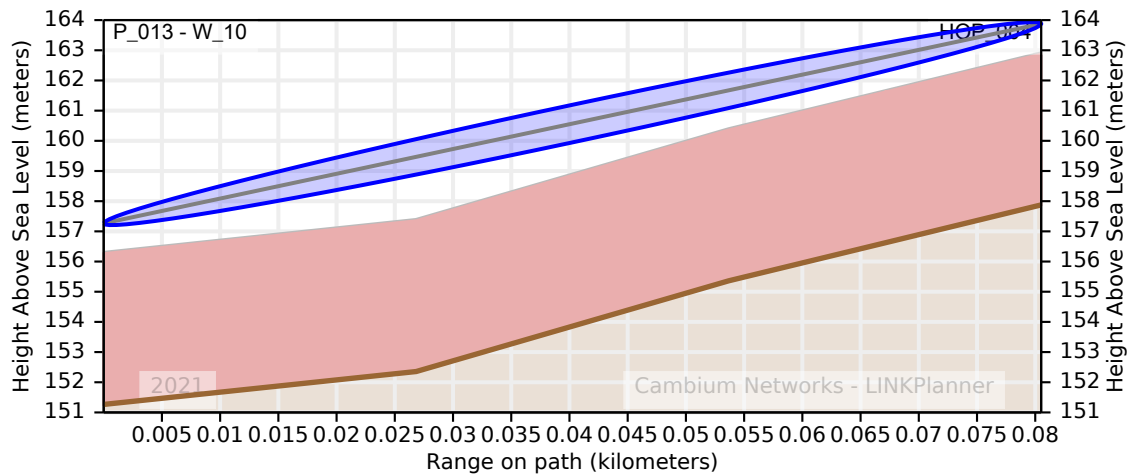
P_013 - W_10 direzione HOP_004



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

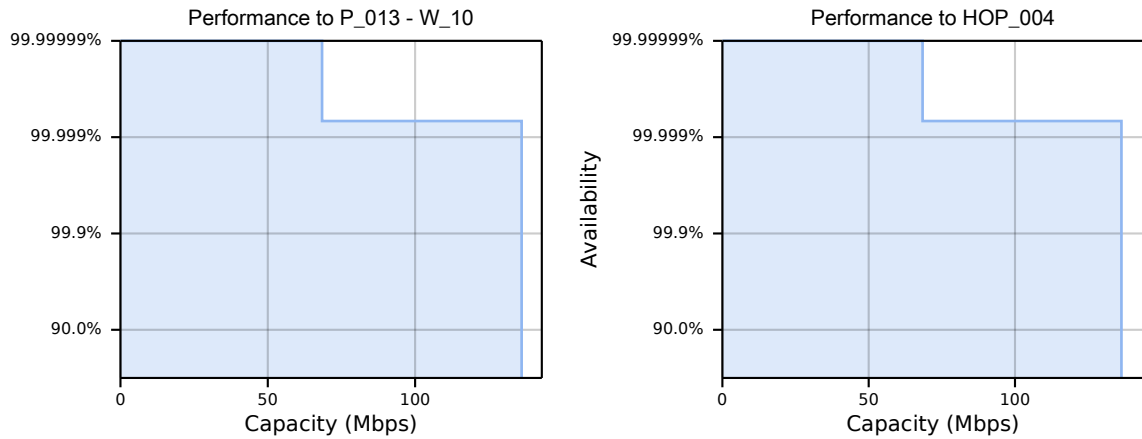
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_013 - W_10	Performance to HOP_004
Mean IP	136.15 Mbps	136.38 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.081 km	System Gain Margin	41.65 dB
Band	5.4 GHz	Mean Aggregate Data Rate	272.53 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1024 Bytes
Total Path Loss	85.53 dB	Prediction Model	ITU-R P.530-17
System Gain	127.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

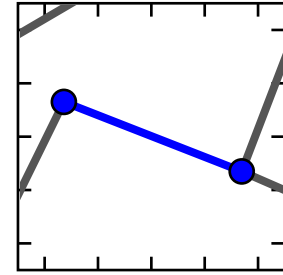
dN/dH not exceeded for 1% of time	-348.60 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.06 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.76e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	82.12 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	85.52 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



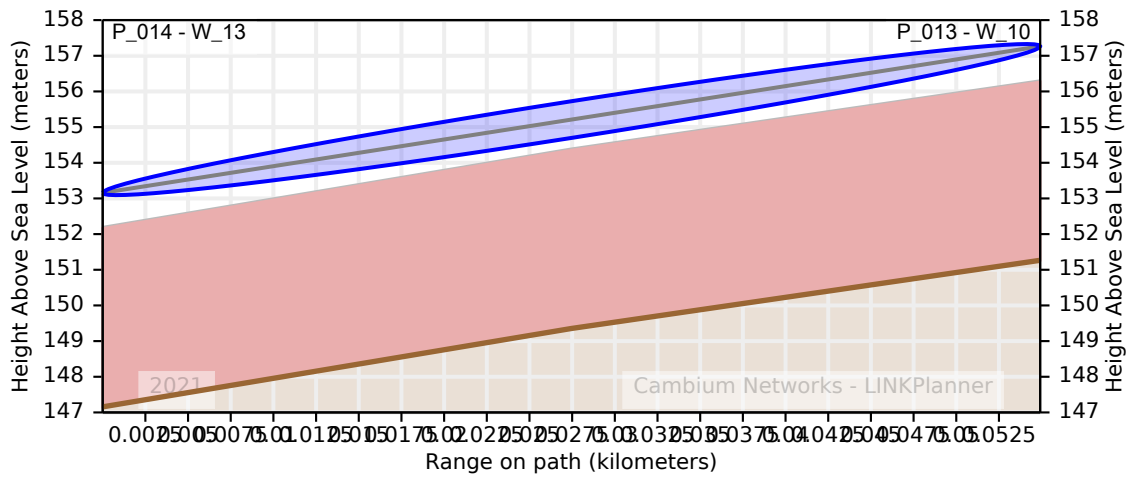
P_014 - W_13 direzione P_013 - W_10



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

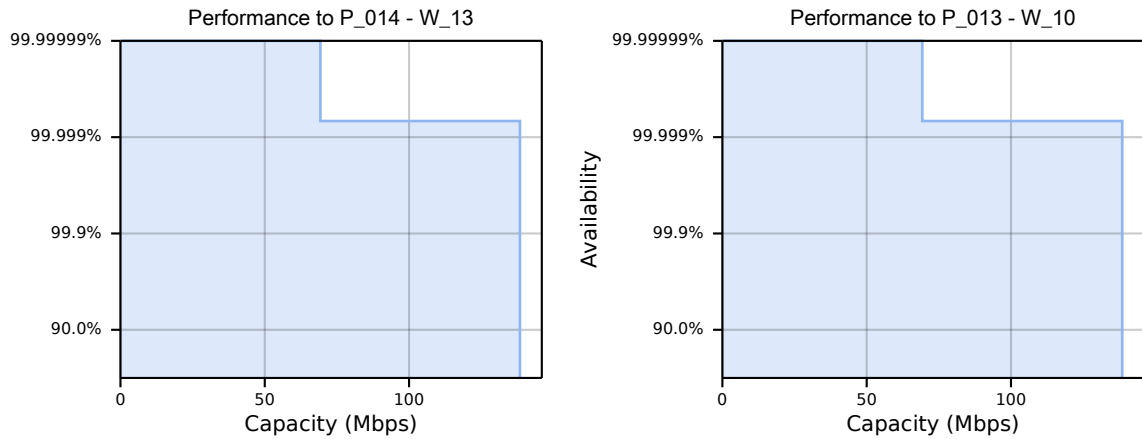
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_014 - W_13	Performance to P_013 - W_10
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.055 km	System Gain Margin	41.98 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	82.20 dB	Prediction Model	ITU-R P.530-17
System Gain	124.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

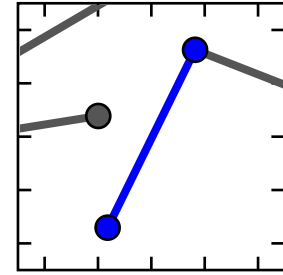
dN/dH not exceeded for 1% of time	-348.58 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.11 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	5.30e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	74.82 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	82.20 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



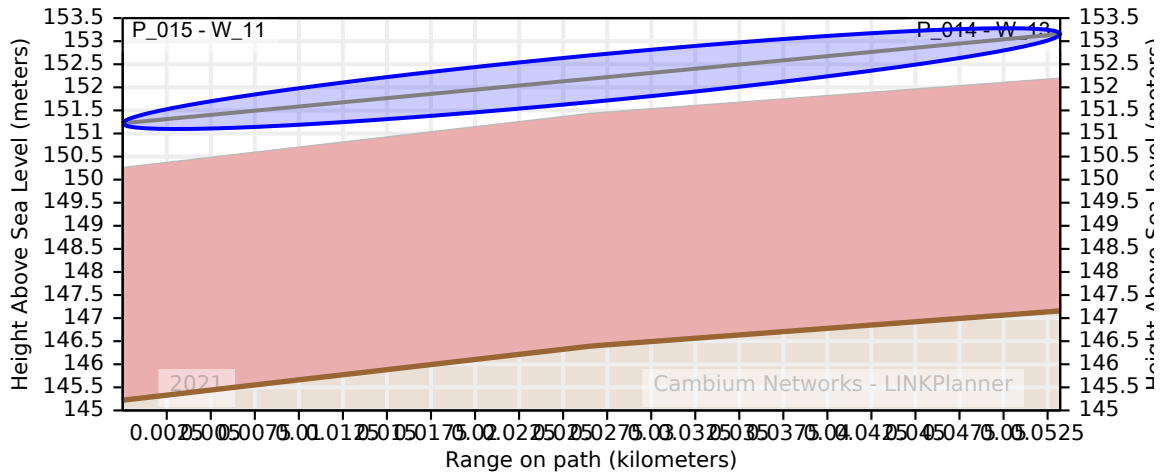
P_015 - W_11 direzione P_014 - W_13



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

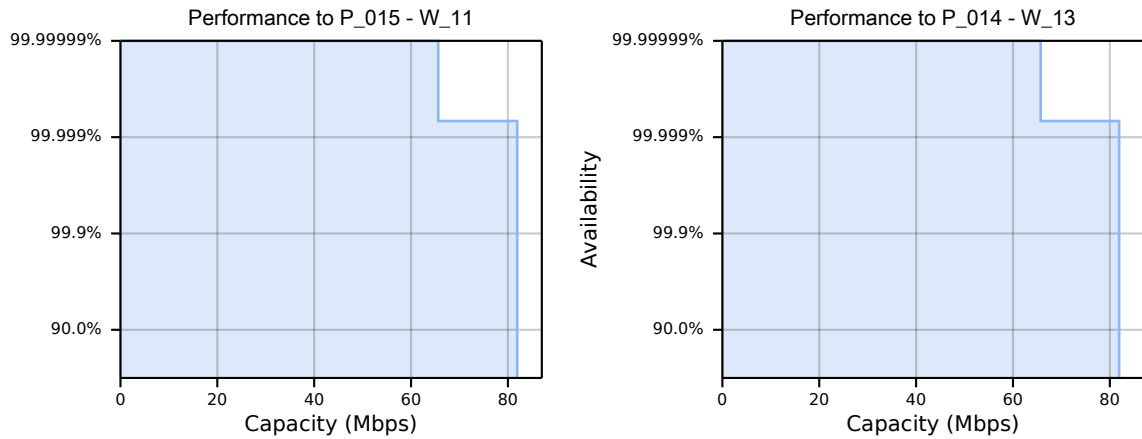
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_015 - W_11	Performance to P_014 - W_13
Mean IP	81.92 Mbps	81.92 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.053 km	System Gain Margin	41.25 dB
Band	5.4 GHz	Mean Aggregate Data Rate	163.84 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	512 Bytes
Total Path Loss	81.93 dB	Prediction Model	ITU-R P.530-17
System Gain	123.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

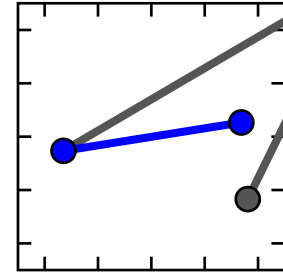
dN/dH not exceeded for 1% of time	-348.57 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.18 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	9.90e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	36.37 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	81.93 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



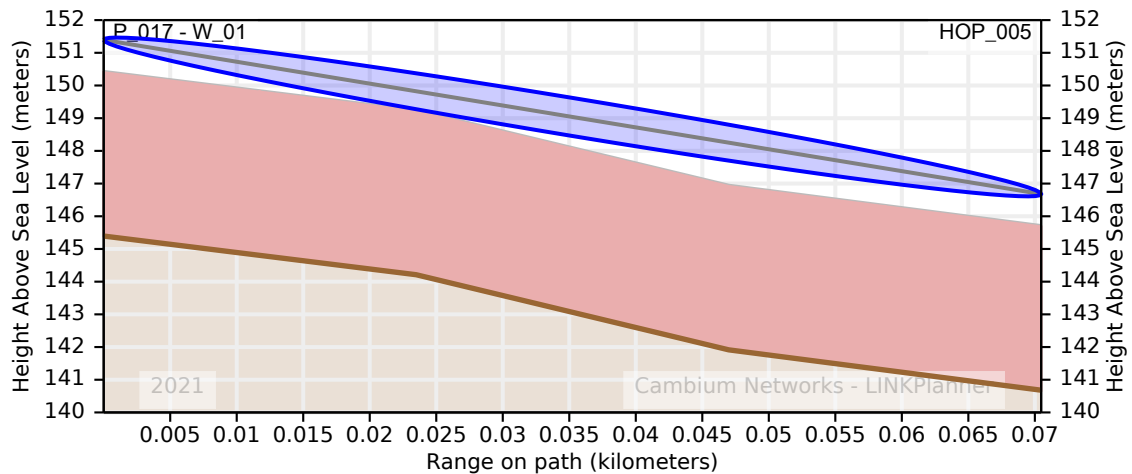
P_017 - W_01 direzione HOP_005



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

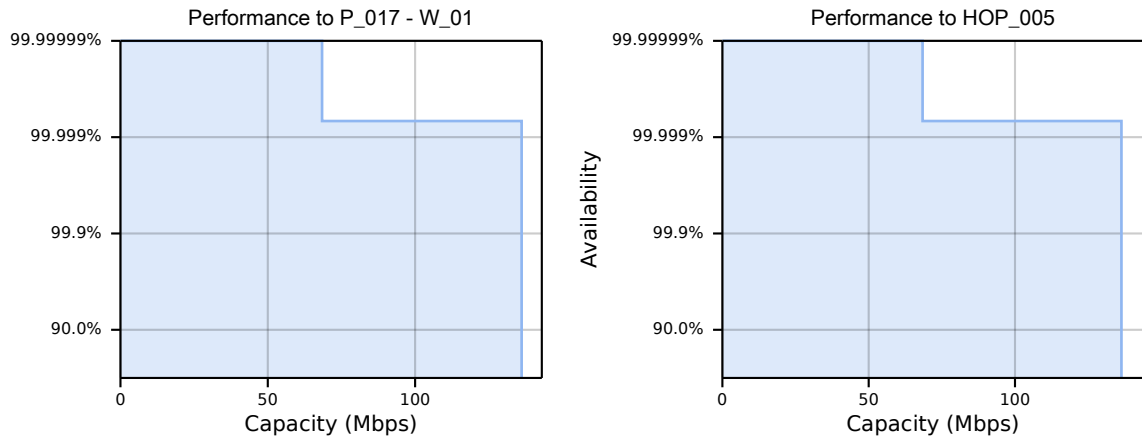
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_017 - W_01	Performance to HOP_005
Mean IP	136.15 Mbps	136.38 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.070 km	System Gain Margin	41.81 dB
Band	5.4 GHz	Mean Aggregate Data Rate	272.53 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1024 Bytes
Total Path Loss	84.37 dB	Prediction Model	ITU-R P.530-17
System Gain	126.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

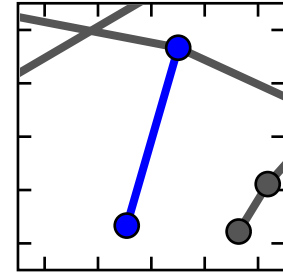
dN/dH not exceeded for 1% of time	-348.55 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.24 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	1.40e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	66.91 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	84.37 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



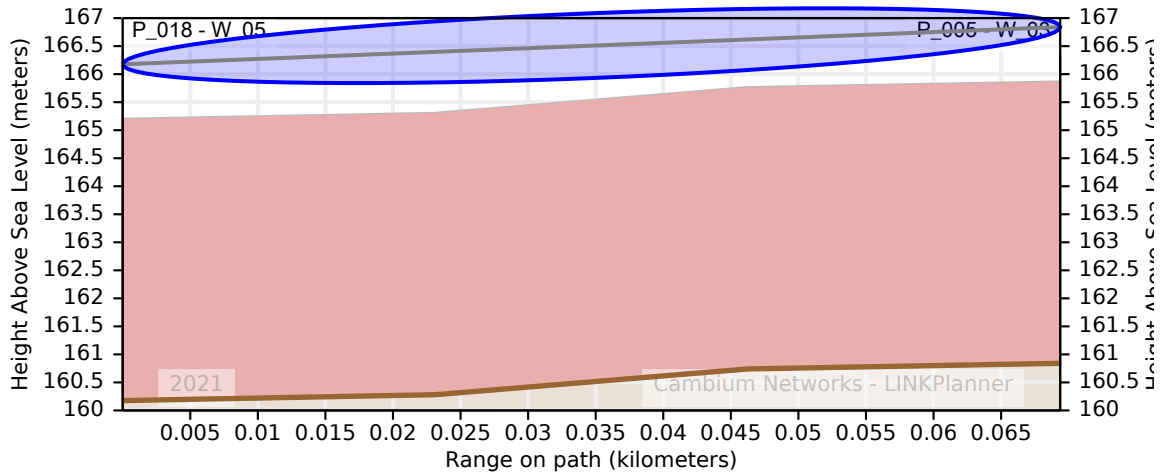
P_018 - W_05 direzione
P_005 - W_03



Equipment: Cambium Networks ePMP Force 200 Integrated

Cambium Networks ePMP Force 200 @ 6 m

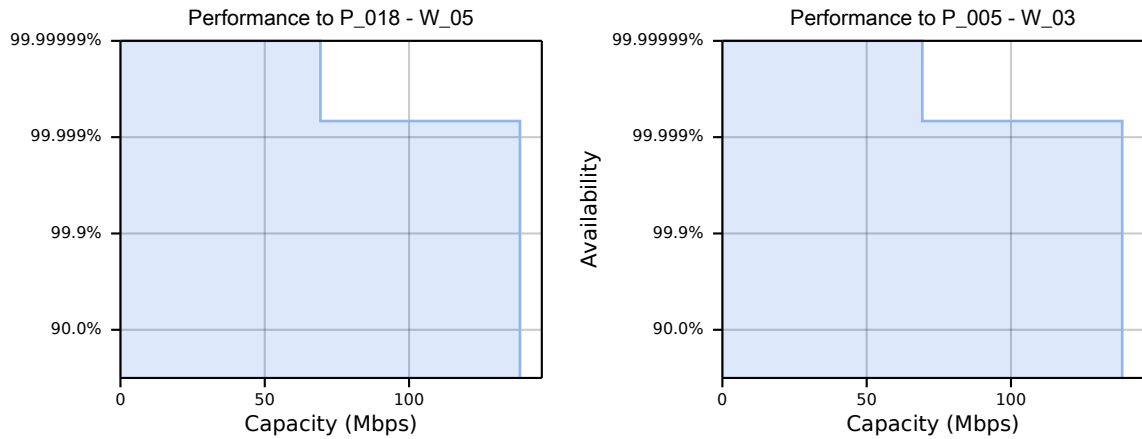
Cambium Networks ePMP Force 200 @ 6 m



	Performance to P_018 - W_05	Performance to P_005 - W_03
Mean IP	138.42 Mbps	138.54 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.069 km	System Gain Margin	41.95 dB
Band	5.4 GHz	Mean Aggregate Data Rate	276.96 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	84.23 dB	Prediction Model	ITU-R P.530-17
System Gain	126.18 dB		

Performance Charts



Climatic Factors, Losses and Standards

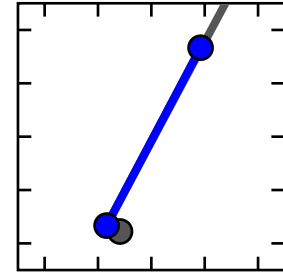
dN/dH not exceeded for 1% of time	-348.68 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	209.74 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	8.72e-12	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	9.59 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.73 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	84.23 dB		

Bill of Materials

Part Number	Qty	Description
C000000L065	2	Gigabit Surge Suppressor (30V)
C050900C063	2	ePMP 1000: 5 GHz Force 200AR5-25 High Gain Radio (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket
EW-E2EPF200-WW	2	ePMP Force 200 Extended Warranty, 2 Addl Years



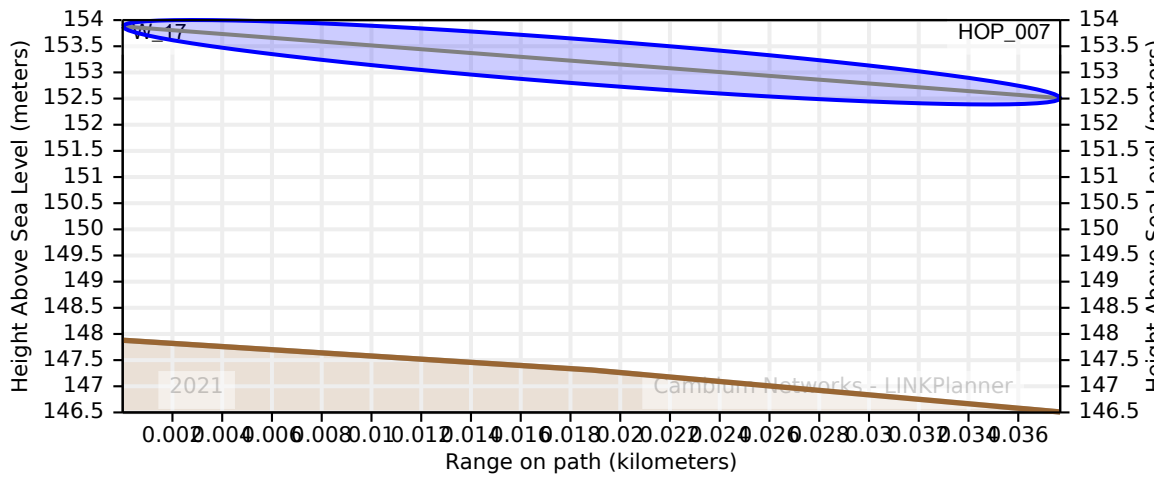
W_16 direzione HOP_007



Equipment: Cambium Networks ePMP Force 130 Integrated

Cambium Networks 1ft ePMP Force 130 @ 6 m

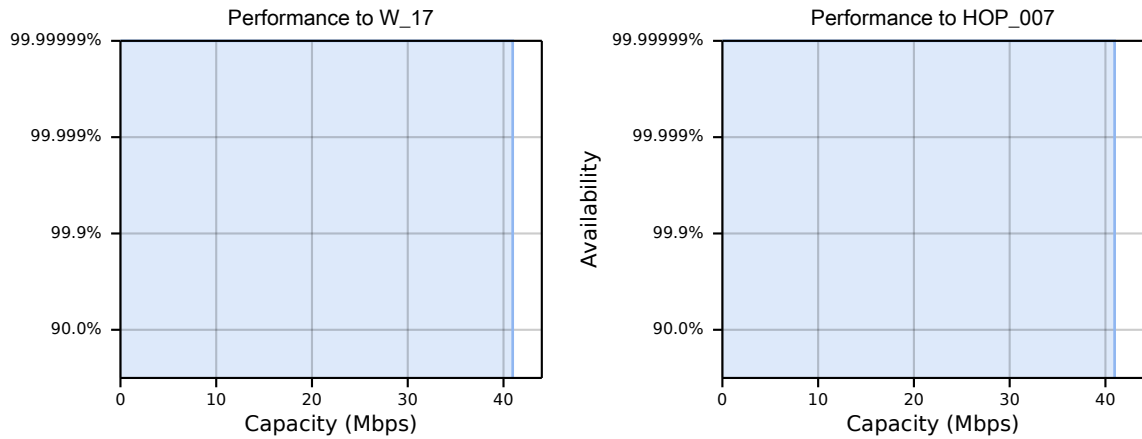
Cambium Networks 1ft ePMP Force 130 @ 6 m



	Performance to W_17	Performance to HOP_007
Mean IP	40.96 Mbps	40.96 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.038 km	System Gain Margin	42.05 dB
Band	5.4 GHz	Mean Aggregate Data Rate	81.92 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	256 Bytes
Total Path Loss	78.93 dB	Prediction Model	ITU-R P.530-17
System Gain	120.98 dB		

Performance Charts



Climatic Factors, Losses and Standards

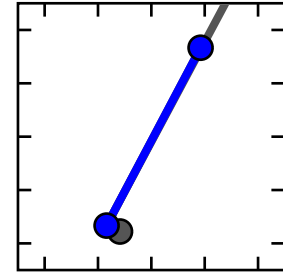
dN/dH not exceeded for 1% of time	-348.61 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.08 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	3.06e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	36.38 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	78.93 dB		

Bill of Materials

Part Number	Qty	Description
600SS	2	SURGE SUPPRESSOR
C050900C502	2	ePMP 5GHz Force 130 SM (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket



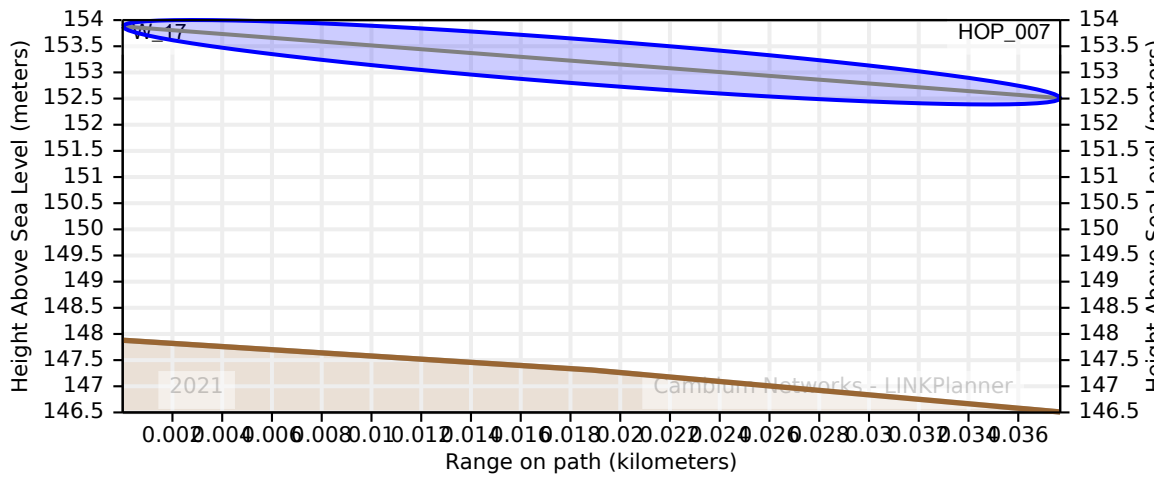
W_17 direzione HOP_007



Equipment: Cambium Networks ePMP Force 130 Integrated

Cambium Networks 1ft ePMP Force 130 @ 6 m

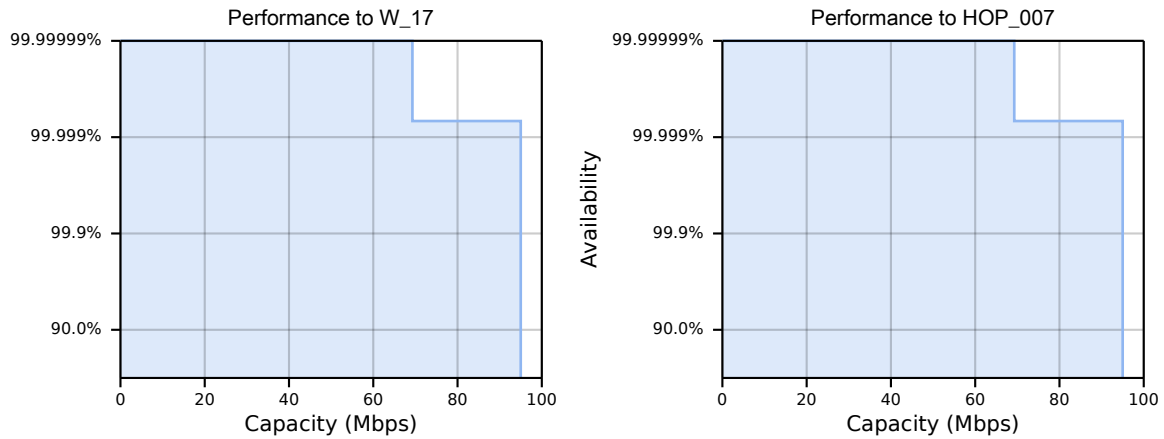
Cambium Networks 1ft ePMP Force 130 @ 6 m



	Performance to W_17	Performance to HOP_007
Mean IP	95.00 Mbps	95.00 Mbps
IP Availability	100.0000 % for 1.0 Mbps	100.0000 % for 1.0 Mbps

Link Summary			
Link Length	0.038 km	System Gain Margin	42.05 dB
Band	5.4 GHz	Mean Aggregate Data Rate	190.00 Mbps
Regulation	Italy	Annual Link Availability	100.0000 %
Modulation	Adaptive	Annual Link Unavailability	1 secs/year
Bandwidth	40 MHz	Frame Size	1518 Bytes
Total Path Loss	78.93 dB	Prediction Model	ITU-R P.530-17
System Gain	120.98 dB		

Performance Charts



Climatic Factors, Losses and Standards

dN/dH not exceeded for 1% of time	-348.61 N units/km	Gaseous Absorption Loss	0.00 dB
Area roughness 110x110km	210.08 metre	Link Type	Line-of-Sight
Geoclimatic factor	2.91e-05	Excess Path Loss	0.00 dB
Fade Occurrence Factor (P0)	3.06e-13	Atmospheric Gasses	ITU-R P.676-12, ITU-R P.835-6
Path inclination	36.38 mr	Diffraction Loss	ITU-R P.526-15
Value of K Exceeded for 99.99% (ke)	0.40	Propagation	ITU-R P.530-17
Excess Path Loss at ke	0.00 dB	Rain Rate	ITU-R P.837-7
0.01% Rain rate	30.72 mm/hr	Refractivity Index	ITU-R P.453-14
Free Space Path Loss	78.93 dB		

Bill of Materials

Part Number	Qty	Description
600SS	2	SURGE SUPPRESSOR
C050900C502	2	ePMP 5GHz Force 130 SM (EU) (EU cord). Kit includes radio with antenna, power supply, line cord and mounting bracket

Disclaimer

Cambium Networks assumes no responsibility for the accuracy of the information produced by the Cambium LINKPlanner. Reference to products or services which are not provided by Cambium Networks is for information purposes only and constitutes neither an endorsement nor a recommendation. All information provided by the Cambium LINKPlanner is provided without warranty of any kind, either expressed or implied.

All product or service names are the property of their respective owners. © Cambium Networks. 2021