COMMITTENTE:

COMUNE DI PORTO MANTOVANO

TITOLO ELABORATO:

SISTEMA DI VIDEOSORVEGLIANZA
PROGETTO ESECUTIVO

RIFERIMENTO ELABORATO:

CALCOLO E CERTIFICAZIONE DELLE NUOVE TRATTE WIRELESS

STUDIO TECNICO:

WEPRO
ENGINEERING & CONSULTING
Via Molino di Sopra 55/A - Nogara (VR)
E-mail: wepro@wepro.cloud - www.wepro.cloud

DIRETTORE TECNICO: Dott. Ing. Michele Bottacini
Iscrizione Ordine degli Ingegneri Verona e Provincia - N. A4910

PROJECT MANAGER: Per. Ind. Fabio Cirenga
Iscrizione Collegio Periti Industriali Firenze e Provincia - N. 2321

TECHNICAL DESIGNER: Dott. Ing. Stefano Fedi
Iscrizione Ordine degli Ingegneri Pistoia e Provincia - N. 795

DIRETTORE OPERATIVO: Per. Ind. Fabio Campani
Iscrizione Albo Nazionale Commissari di Gara ANAC - N. 688

GRAPHIC DESIGNER: Per. Ind. Devis Todeschini

A	NOVEMBRE-2018	EMISSIONE PROGETTO	FC	MB
REVISIONE	DATA	DESCRIZIONE	REDATTO	VERIFICATO

COORD. SICUREZZA IN FASE DI PROGETTAZIONE: Dott. Ing. Stefano Fedi

RESPONSABILE PROCEDIMENTO: Dott.ssa Dal Bosco Emanuela

COORD. SICUREZZA IN FASE DI ESECUZIONE:

DIRETTORE LAVORI:

DATA: NOVEMBRE 2018

ELABORATO GRAFICO: ALLEGATO N. 05

COMMESSA / CIG: Z5925EB679

NOTE:

CALCOLO E CERTIFICAZIONE DELLE NUOVE TRATTE WIRELESS

Nel presente elaborato tecnico sono riportati tutti i calcoli / certificazioni di ogni singola tratta / dorsale wireless oggetto del presente progetto di videosorveglianza sul territorio comunale.

Con riferimento ai calcoli riportati nell'elaborato progettuale, tutte le nuove tratte wireless che si andranno quindi ad installare risponderanno a caratteristiche di flessibilità ed espansibilità in modo tale da soddisfare le necessità che emergeranno nel corso del tempo, qualora fosse necessario un potenziamento dell'impianto di videosorveglianza cittadino.

COLLEGAMENTI PUNTO – PUNTO

COLLEGAMENTI PUNTO – PUNTO

CALCOLO E CERTIFICAZIONE
COLLEGAMENTI WIRELESS PUNTO – PUNTO

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 17:52:35

Project name: Comune di Porto Mantovano

Link name: Sito-16 — Sito-17

Link distance: 0.114 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.55 GHz

Channel width: 20 MHz

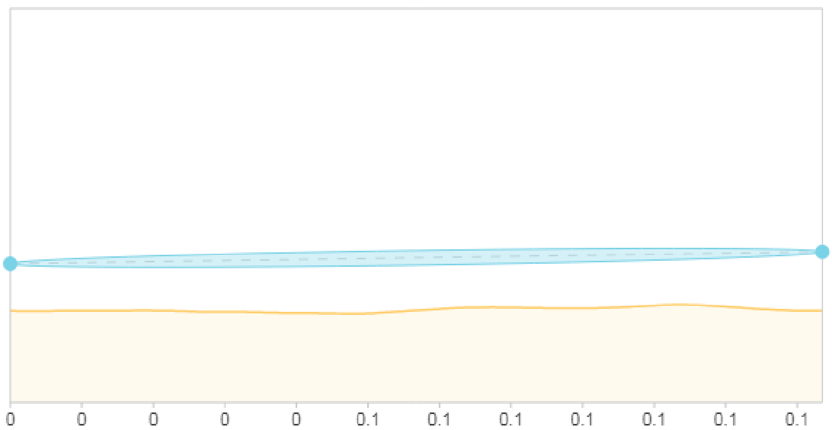
TX power limit: 11 dBm

Path Profile

Sito-16

Antenna height:

8 m



Sito-17

Antenna height:

10 m

Path profile (Clear LoS, 0.114 kilometers)

Alignment Data

Sito-16

Latitude: 45.201511

Longitude: 10.799751

Antenna height: 8 m

Antenna tilt angle: 1.01°

Bearing: 323.31°

Magnetic bearing: 320.36°

Magnetic declination: 2.95°

Sito-17

Latitude: 45.20233

Longitude: 10.798885

Antenna height: 10 m

Antenna tilt angle: -1.01°

Bearing: 143.31°

Magnetic bearing: 140.36°

Magnetic declination: 2.95°

Sito-16

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -39.5 dBm

Fade margin: 47.5 dB

Path loss: 88.5 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.114 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -39.5 dBm

Fade margin: 29.5 dB

Path loss: 88.5 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.114 km

Availability: 100% (outage: 0.3 sec/year)

Sito-17

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -39.5 dBm

Fade margin: 47.5 dB

Path loss: 88.5 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.114 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -39.5 dBm

Fade margin: 29.5 dB

Path loss: 88.5 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.114 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-16 → Sito-17

	Sito-16 → Sito-17		Sito-17 → Sito-16		Throughput		Sito-16 → Sito-17	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-39.5	47.5
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-39.5	45.5
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-39.5	43.5
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-39.5	40.5
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-39.5	37.5
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-39.5	32.5
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-39.5	31.5
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-39.5	29.5

Detailed performance report

Sito-17 → Sito-16

	Sito-17 → Sito-16		Sito-16 → Sito-17		Throughput		Sito-17 → Sito-16	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-39.5	47.5
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-39.5	45.5
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-39.5	43.5
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-39.5	40.5
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-39.5	37.5
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-39.5	32.5
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-39.5	31.5
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-39.5	29.5

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 18:01:35

Project name: Comune di Porto Mantovano

Link name: Sito-15 — Spinosa

Link distance: 1.566 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.64 GHz

Channel width: 20 MHz

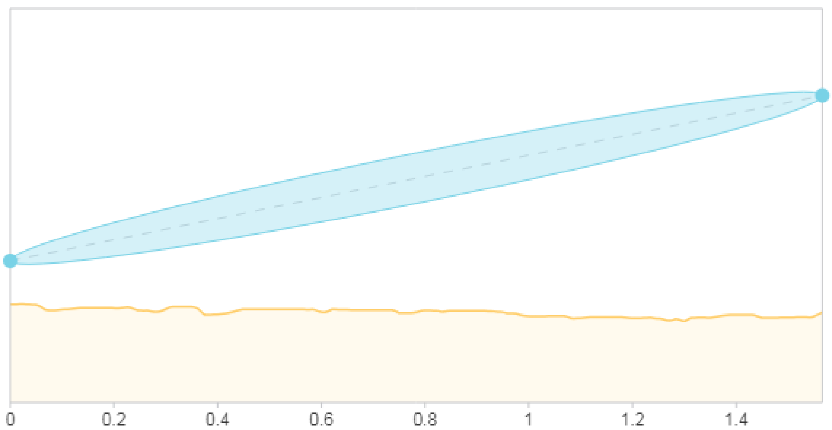
TX power limit: 7 dBm

Path Profile

Sito-15

Antenna height:

8 m



Path profile (Clear LoS, 1.566 kilometers)

Spinosa

Antenna height:

40 m

Alignment Data

Sito-15

Latitude: 45.206305

Longitude: 10.803445

Antenna height: 8 m

Antenna tilt angle: 1.11°

Bearing: 152.57°

Magnetic bearing: 149.62°

Magnetic declination: 2.95°

Spinosa

Latitude: 45.193822

Longitude: 10.812639

Antenna height: 40 m

Antenna tilt angle: -1.12°

Bearing: 332.57°

Magnetic bearing: 329.62°

Magnetic declination: 2.95°

Sito-15

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -58.4 dBm

Fade margin: 32.6 dB

Path loss: 111.4 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.566 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -58.4 dBm

Fade margin: 13.6 dB

Path loss: 111.4 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.566 km

Availability: 100% (outage: 0.3 sec/year)

Spinosa

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -58.4 dBm

Fade margin: 32.6 dB

Path loss: 111.4 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.566 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -58.4 dBm

Fade margin: 13.6 dB

Path loss: 111.4 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.566 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-15 → Spinosa

	Sito-15 → Spinosa		Spinosa → Sito-15		Throughput		Sito-15 → Spinosa	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-58.4	32.6
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-58.4	27.6
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-58.4	26.6
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-58.4	23.6
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-58.4	21.6
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.3	-58.4	17.6
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.1	112.8	-58.4	15.6
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.6	123	-58.4	13.6

Detailed performance report

Spinosa → Sito-15

	Spinosa → Sito-15		Sito-15 → Spinosa		Throughput		Spinosa → Sito-15	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-58.4	32.6
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-58.4	27.6
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-58.4	26.6
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-58.4	23.6
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-58.4	21.6
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.3	-58.4	17.6
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.1	112.8	-58.4	15.6
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.6	123	-58.4	13.6

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 17:59:13

Project name: Comune di Porto Mantovano

Link name: Slto-11 — Spinosa

Link distance: 1.703 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.5 GHz

Channel width: 20 MHz

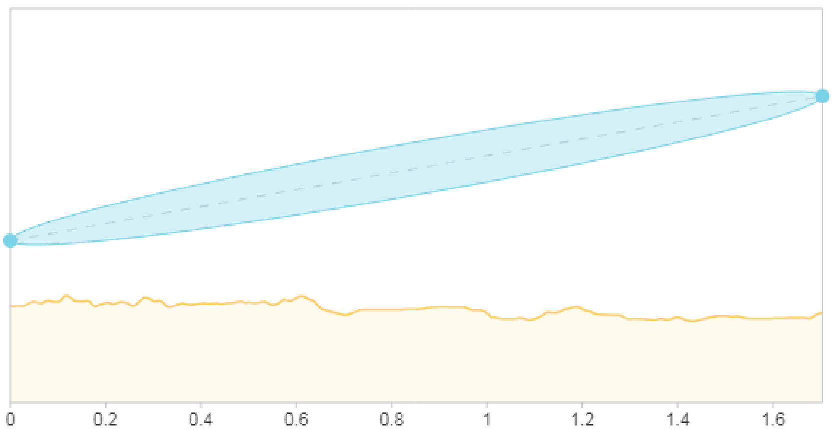
TX power limit: 7 dBm

Path Profile

Slto-11

Antenna height:

12 m



Spinosa

Antenna height:

40 m

Path profile (Clear LoS, 1.703 kilometers)

Alignment Data

Slto-11

Latitude: 45.203768

Longitude: 10.796139

Antenna height: 12 m

Antenna tilt angle: 0.89°

Bearing: 130.54°

Magnetic bearing: 127.59°

Magnetic declination: 2.95°

Spinosa

Latitude: 45.193822

Longitude: 10.812639

Antenna height: 40 m

Antenna tilt angle: -0.90°

Bearing: 310.54°

Magnetic bearing: 307.59°

Magnetic declination: 2.95°

SIto-11

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -58.9 dBm

Fade margin: 32.1 dB

Path loss: 111.9 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.703 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -58.9 dBm

Fade margin: 13.1 dB

Path loss: 111.9 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.703 km

Availability: 100% (outage: 0.5 sec/year)

Spinosa

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -58.9 dBm

Fade margin: 32.1 dB

Path loss: 111.9 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.703 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -58.9 dBm

Fade margin: 13.1 dB

Path loss: 111.9 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.703 km

Availability: 100% (outage: 0.5 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

SIto-11 → Spinosa

	SIto-11 → Spinosa		Spinosa → SIto-11		Throughput		SIto-11 → Spinosa	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-58.9	32.1
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-58.9	27.1
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-58.9	26.1
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-58.9	23.1
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-58.9	21.1
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.9	98.3	-58.9	17.1
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.1	112.8	-58.9	15.1
QAM64 5/6	100.00000	0.5 sec/year	100.00000	0.5 sec/year	118.6	123	-58.9	13.1

Detailed performance report

Spinosa → SIto-11

	Spinosa → SIto-11		SIto-11 → Spinosa		Throughput		Spinosa → SIto-11	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-58.9	32.1
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-58.9	27.1
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-58.9	26.1
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-58.9	23.1
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-58.9	21.1
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.9	98.3	-58.9	17.1
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.1	112.8	-58.9	15.1
QAM64 5/6	100.00000	0.5 sec/year	100.00000	0.5 sec/year	118.6	123	-58.9	13.1

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 15:44:59

Project name: Comune di Porto Mantovano

Link name: Sito-05 — Spinosa

Link distance: 1.094 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.45 GHz

Channel width: 20 MHz

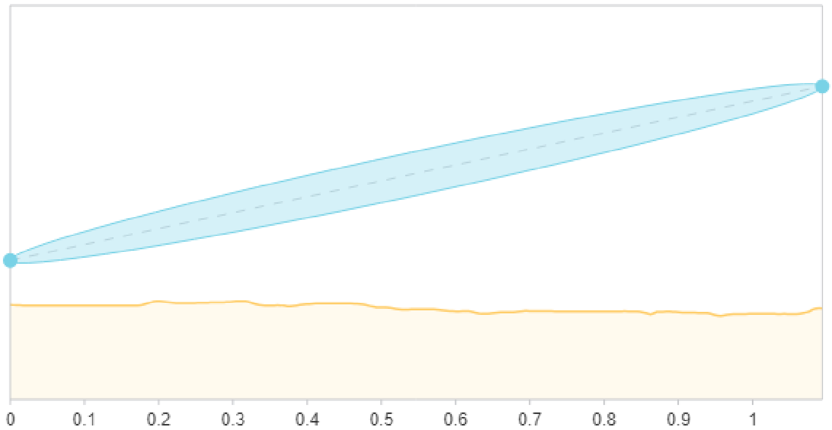
TX power limit: 7 dBm

Path Profile

Sito-05

Antenna height:

8 m



Spinosa

Antenna height:

40 m

Path profile (Clear LoS, 1.094 kilometers)

Alignment Data

Sito-05

Latitude: 45.198913

Longitude: 10.800714

Antenna height: 8 m

Antenna tilt angle: 1.64°

Bearing: 121.20°

Magnetic bearing: 118.26°

Magnetic declination: 2.95°

Spinosa

Latitude: 45.193822

Longitude: 10.812639

Antenna height: 40 m

Antenna tilt angle: -1.65°

Bearing: 301.20°

Magnetic bearing: 298.25°

Magnetic declination: 2.95°

Sito-05

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -55 dBm

Fade margin: 36 dB

Path loss: 108 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.094 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -55 dBm

Fade margin: 17 dB

Path loss: 108 dB

Unidirectional throughput, Mbps: 118.7

Bidirectional throughput, Mbps: 123.1

Distance: 1.094 km

Availability: 100% (outage: 0.3 sec/year)

Spinosa

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -55 dBm

Fade margin: 36 dB

Path loss: 108 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.094 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -55 dBm

Fade margin: 17 dB

Path loss: 108 dB

Unidirectional throughput, Mbps: 118.7

Bidirectional throughput, Mbps: 123.1

Distance: 1.094 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-05 → Spinosa

	Sito-05 → Spinosa		Spinosa → Sito-05		Throughput		Sito-05 → Spinosa	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-55	36
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-55	31
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.7	37.7	-55	30
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-55	27
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-55	25
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.4	-55	21
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.2	112.9	-55	19
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.7	123.1	-55	17

Detailed performance report

Spinosa → Sito-05

	Spinosa → Sito-05		Sito-05 → Spinosa		Throughput		Spinosa → Sito-05	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-55	36
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-55	31
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.7	37.7	-55	30
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-55	27
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-55	25
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.4	-55	21
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.2	112.9	-55	19
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.7	123.1	-55	17

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 16:19:23

Project name: Comune di Porto Mantovano

Link name: Sito-04 — Spinosa

Link distance: 1.378 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.55 GHz

Channel width: 20 MHz

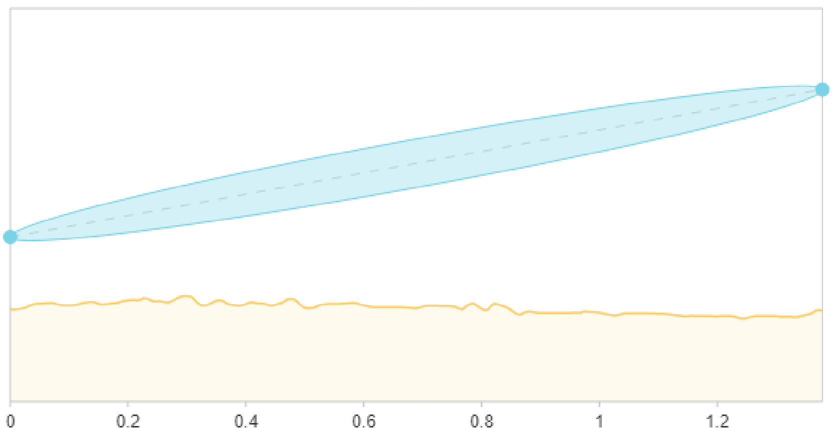
TX power limit: 7 dBm

Path Profile

Sito-04

Antenna height:

13 m



Spinosa

Antenna height:

40 m

Path profile (Clear LoS, 1.378 kilometers)

Alignment Data

Sito-04

Latitude: 45.199003

Longitude: 10.796684

Antenna height: 13 m

Antenna tilt angle: 1.10°

Bearing: 114.74°

Magnetic bearing: 111.79°

Magnetic declination: 2.95°

Spinosa

Latitude: 45.193822

Longitude: 10.812639

Antenna height: 40 m

Antenna tilt angle: -1.11°

Bearing: 294.74°

Magnetic bearing: 291.79°

Magnetic declination: 2.95°

Sito-04

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -57.1 dBm

Fade margin: 33.9 dB

Path loss: 110.1 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.378 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -57.1 dBm

Fade margin: 14.9 dB

Path loss: 110.1 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.378 km

Availability: 100% (outage: 0.3 sec/year)

Spinosa

Device family: InfiLINK 2x2 PRO

Part number: R5000-Mmx/5.300.2x500.2x23

Wired interface: 1x GigabitEthernet (RJ45)

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: BPSK 1/2

RSL: -57.1 dBm

Fade margin: 33.9 dB

Path loss: 110.1 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 1.378 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -57.1 dBm

Fade margin: 14.9 dB

Path loss: 110.1 dB

Unidirectional throughput, Mbps: 118.6

Bidirectional throughput, Mbps: 123

Distance: 1.378 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-04 → Spinosa

	Sito-04 → Spinosa		Spinosa → Sito-04		Throughput		Sito-04 → Spinosa	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-57.1	33.9
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-57.1	28.9
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-57.1	27.9
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-57.1	24.9
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-57.1	22.9
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.4	-57.1	18.9
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.2	112.8	-57.1	16.9
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.6	123	-57.1	14.9

Detailed performance report

Spinosa → Sito-04

	Spinosa → Sito-04		Sito-04 → Spinosa		Throughput		Spinosa → Sito-04	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-57.1	33.9
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	26.2	-57.1	28.9
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	37.6	37.6	-57.1	27.9
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	48.7	56.4	-57.1	24.9
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	70.9	76.7	-57.1	22.9
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94	98.4	-57.1	18.9
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	104.2	112.8	-57.1	16.9
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	118.6	123	-57.1	14.9

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 17:53:04

Project name: Comune di Porto Mantovano

Link name: Sito-03 — Sito-Esistente

Link distance: 0.119 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.55 GHz

Channel width: 20 MHz

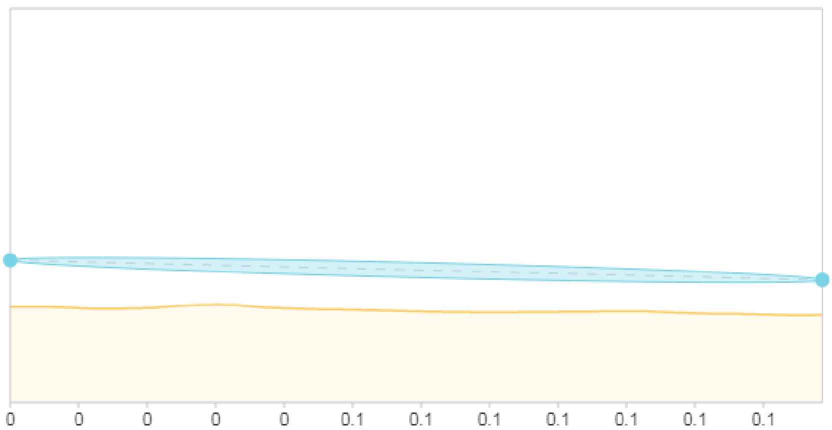
TX power limit: 11 dBm

Path Profile

Sito-03

Antenna height:

8 m



Path profile (Clear LoS, 0.119 kilometers)

Sito-Esistente

Antenna height:

6 m

Alignment Data

Sito-03

Latitude: 45.200391

Longitude: 10.796012

Antenna height: 8 m

Antenna tilt angle: -1.63°

Bearing: 141.98°

Magnetic bearing: 139.03°

Magnetic declination: 2.95°

Sito-Esistente

Latitude: 45.199552

Longitude: 10.796943

Antenna height: 6 m

Antenna tilt angle: 1.63°

Bearing: 321.98°

Magnetic bearing: 319.03°

Magnetic declination: 2.95°

Sito-03

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -39.8 dBm

Fade margin: 47.2 dB

Path loss: 88.8 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.119 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -39.8 dBm

Fade margin: 29.2 dB

Path loss: 88.8 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.119 km

Availability: 100% (outage: 0.3 sec/year)

Sito-Esistente

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -39.8 dBm

Fade margin: 47.2 dB

Path loss: 88.8 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.119 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -39.8 dBm

Fade margin: 29.2 dB

Path loss: 88.8 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.119 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-03 → Sito-Esistente

	Sito-03 → Sito-Esistente		Sito-Esistente → Sito-03		Throughput		Sito-03 → Sito-Esistente	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-39.8	47.2
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-39.8	45.2
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-39.8	43.2
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-39.8	40.2
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-39.8	37.2
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-39.8	32.2
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-39.8	31.2
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-39.8	29.2

Detailed performance report

Sito-Esistente → Sito-03

	Sito-Esistente → Sito-03		Sito-03 → Sito-Esistente		Throughput		Sito-Esistente → Sito-03	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-39.8	47.2
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-39.8	45.2
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-39.8	43.2
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-39.8	40.2
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-39.8	37.2
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-39.8	32.2
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-39.8	31.2
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-39.8	29.2

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 17:53:33

Project name: Comune di Porto Mantovano

Link name: Sito-01 — Sito-03

Link distance: 0.068 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.55 GHz

Channel width: 20 MHz

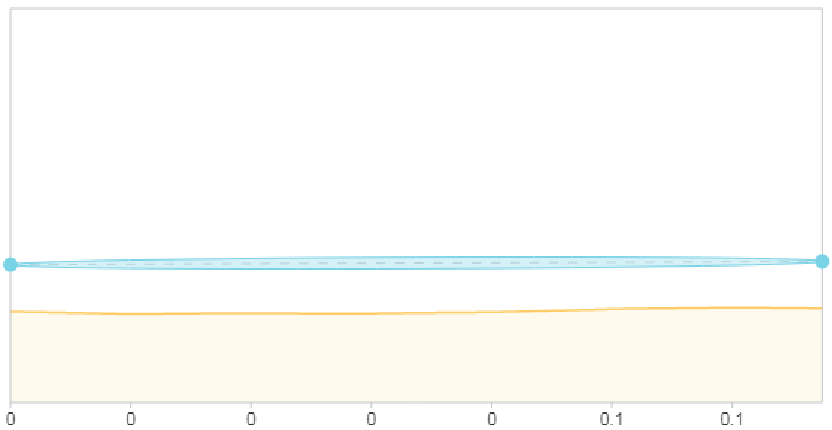
TX power limit: 11 dBm

Path Profile

Sito-01

Antenna height:

8 m



Path profile (Clear LoS, 0.068 kilometers)

Sito-03

Antenna height:

8 m

Alignment Data

Sito-01

Latitude: 45.200851

Longitude: 10.795447

Antenna height: 8 m

Antenna tilt angle: 0.48°

Bearing: 139.12°

Magnetic bearing: 136.18°

Magnetic declination: 2.95°

Sito-03

Latitude: 45.200391

Longitude: 10.796012

Antenna height: 8 m

Antenna tilt angle: -0.48°

Bearing: 319.12°

Magnetic bearing: 316.18°

Magnetic declination: 2.95°

Sito-01

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -35 dBm

Fade margin: 52 dB

Path loss: 84 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.068 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -35 dBm

Fade margin: 34 dB

Path loss: 84 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.068 km

Availability: 100% (outage: 0.3 sec/year)

Sito-03

Device family: InfiLINK 2x2 LITE

Part number: R5000-Smn/5.300.2x300.2x19

Wired interface: FastEthernet

Antenna: Integrated antenna

19 dBi, flat panel, directional, 16x16, dual-pol

Max availability: BPSK 1/2

RSL: -35 dBm

Fade margin: 52 dB

Path loss: 84 dB

Unidirectional throughput, Mbps: 14.1

Bidirectional throughput, Mbps: 18.8

Distance: 0.068 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM64 5/6

RSL: -35 dBm

Fade margin: 34 dB

Path loss: 84 dB

Unidirectional throughput, Mbps: 94.1

Bidirectional throughput, Mbps: 113.3

Distance: 0.068 km

Availability: 100% (outage: 0.3 sec/year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Sito-01 → Sito-03

	Sito-01 → Sito-03		Sito-03 → Sito-01		Throughput		Sito-01 → Sito-03	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-35	52
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-35	50
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-35	48
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-35	45
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-35	42
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-35	37
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-35	36
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-35	34

Detailed performance report

Sito-03 → Sito-01

	Sito-03 → Sito-01		Sito-01 → Sito-03		Throughput		Sito-03 → Sito-01	
Modulation	Availability, %	Outage	Availability, %	Outage	Unidirectional throughput, Mbps	Bidirectional throughput, Mbps	RSL, dBm	Fade margin, dB
BPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	14.1	18.8	-35	52
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	25.4	30.1	-35	50
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	34.8	41.4	-35	48
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	47.1	52.7	-35	45
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	65.3	73.4	-35	42
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	85.8	96	-35	37
QAM64 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	93.8	102.1	-35	36
QAM64 5/6	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.1	113.3	-35	34

InfiPLANNER P2P Installation guide

Creation date: 10/12/2018 17:56:19

Project name: Comune di Porto Mantovano

Link name: Polizia Locale — Spinosa

Link distance: 1.837 km

Link visibility: Clear LoS

Estimation mode: Geo-located

Center Frequency: 5.4 GHz

Channel width: 20 MHz

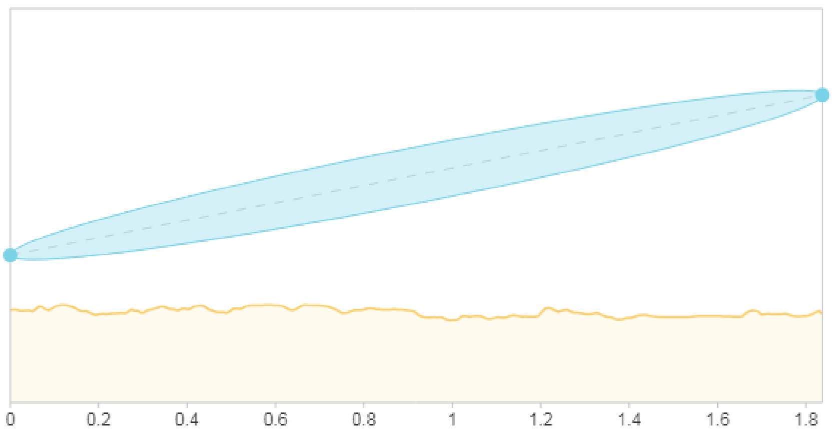
TX power limit: 7 dBm

Path Profile

Polizia Locale

Antenna height:

10 m



Path profile (Clear LoS, 1.837 kilometers)

Spinosa

Antenna height:

40 m

Alignment Data

Polizia Locale

Latitude: 45.188811

Longitude: 10.790334

Antenna height: 10 m

Antenna tilt angle: 0.91°

Bearing: 72.31°

Magnetic bearing: 69.37°

Magnetic declination: 2.95°

Spinosa

Latitude: 45.193822

Longitude: 10.812639

Antenna height: 40 m

Antenna tilt angle: -0.92°

Bearing: 252.31°

Magnetic bearing: 249.36°

Magnetic declination: 2.95°

Polizia Locale

Device family: InfiLINK XG

Part number: Xm/5.500.2x500.2x23

Wired interface: 2x GigabitEthernet, SFP

Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: QPSK 1/4

RSL: -59.4 dBm

Fade margin: 31.6 dB

Path loss: 112.4 dB

Throughput at 2 ms frame, Mbps: 13.2

Throughput at 10 ms frame, Mbps: 14.1

Distance: 1.837 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM256 30/32

RSL: -59.4 dBm

Fade margin: 3.6 dB

Path loss: 112.4 dB

Throughput at 2 ms frame, Mbps: 242.7

Throughput at 10 ms frame, Mbps: 257.6

Distance: 1.837 km

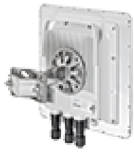
Availability: 99.97090% (outage: 2.6 hrs /year)

Spinosa

Device family: InfiLINK XG

Part number: Xm/5.500.2x500.2x23

Wired interface: 2x GigabitEthernet, SFP



Antenna: Integrated antenna

23 dBi, flat panel, directional, 10x10, dual-pol

Max availability: QPSK 1/4

RSL: -59.4 dBm

Fade margin: 31.6 dB

Path loss: 112.4 dB

Throughput at 2 ms frame, Mbps: 13.2

Throughput at 10 ms frame, Mbps: 14.1

Distance: 1.837 km

Availability: 100% (outage: 0.3 sec/year)

Max throughput: QAM256 30/32

RSL: -59.4 dBm

Fade margin: 3.6 dB

Path loss: 112.4 dB

Throughput at 2 ms frame, Mbps: 242.7

Throughput at 10 ms frame, Mbps: 257.6

Distance: 1.837 km

Availability: 99.97090% (outage: 2.6 hrs /year)

Alignment instructions

Perform the following checks during the installation (Check the deployment guide and the User Guide.)

1. During site survey and planning try to identify the sites providing sufficient clearance to keep 1st Fresnel zone unobstructed.
2. Try to avoid proximity to other transmitters separating the unit by at least 2 meters. Please also take into consideration reflecting surfaces such as metal roofing, etc.
3. Check carefully the direction to the other end of the link. Either use a corrected compass or use the GPS waypoint feature about 300 meters from the installation location.
4. When installing a unit with an external antenna, please check that Vertical polarization on the antenna is connected to V-port on the unit and vice versa.
5. Start with azimuth alignment by maximizing RSL and CINR readings and then do elevation alignment.
6. When installing high gain directional antennas avoid aligning to the side lobes. Cross check antenna patterns, direction, etc.
7. After the alignment is comple at the both sides, check actual RSL against the estimated value. If the actual RSL is significantly lower, verify the alignment and the actual link path, check the RF cables, device settings, etc.
8. Complete the configuration according to the technical user manual.

Detailed performance report

Polizia Locale → Spinosa

	Polizia Locale → Spinosa		Spinosa → Polizia Locale		Throughput		Polizia Locale → Spinosa	
Modulation	Availability, %	Outage	Availability, %	Outage	Throughput at 2 ms frame, Mbps	Throughput at 10 ms frame, Mbps	RSL, dBm	Fade margin, dB
QPSK 1/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	13.2	14.1	-59.4	31.6
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	28.8	30.5	-59.4	31.6
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	45.7	48	-59.4	28.6
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	62.6	65.6	-59.4	26.6
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.3	100.9	-59.4	22.6
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	127.8	136	-59.4	18.6
QAM64 5/6	100.00000	0.4 sec/year	100.00000	0.4 sec/year	160.7	171	-59.4	13.6
QAM256 3 /4	100.00000	0.8 sec/year	100.00000	0.8 sec/year	192.5	204.9	-59.4	12.6
QAM256 7 /8	99.99978	1.2 min /year	99.99978	1.2 min /year	225.5	240.2	-59.4	7.6
QAM256 30 /32	99.97090	2.6 hrs/year	99.97090	2.6 hrs/year	242.7	257.6	-59.4	3.6

Detailed performance report

Spinosa → Polizia Locale

	Spinosa → Polizia Locale		Polizia Locale → Spinosa		Throughput		Spinosa → Polizia Locale	
Modulation	Availability, %	Outage	Availability, %	Outage	Throughput at 2 ms frame, Mbps	Throughput at 10 ms frame, Mbps	RSL, dBm	Fade margin, dB
QPSK 1/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	13.2	14.1	-59.4	31.6
QPSK 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	28.8	30.5	-59.4	31.6
QPSK 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	45.7	48	-59.4	28.6
QAM16 1/2	100.00000	0.3 sec/year	100.00000	0.3 sec/year	62.6	65.6	-59.4	26.6
QAM16 3/4	100.00000	0.3 sec/year	100.00000	0.3 sec/year	94.3	100.9	-59.4	22.6
QAM64 2/3	100.00000	0.3 sec/year	100.00000	0.3 sec/year	127.8	136	-59.4	18.6
QAM64 5/6	100.00000	0.4 sec/year	100.00000	0.4 sec/year	160.7	171	-59.4	13.6
QAM256 3 /4	100.00000	0.8 sec/year	100.00000	0.8 sec/year	192.5	204.9	-59.4	12.6
QAM256 7 /8	99.99978	1.2 min /year	99.99978	1.2 min /year	225.5	240.2	-59.4	7.6
QAM256 30 /32	99.97090	2.6 hrs/year	99.97090	2.6 hrs/year	242.7	257.6	-59.4	3.6