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Tachyon Networks

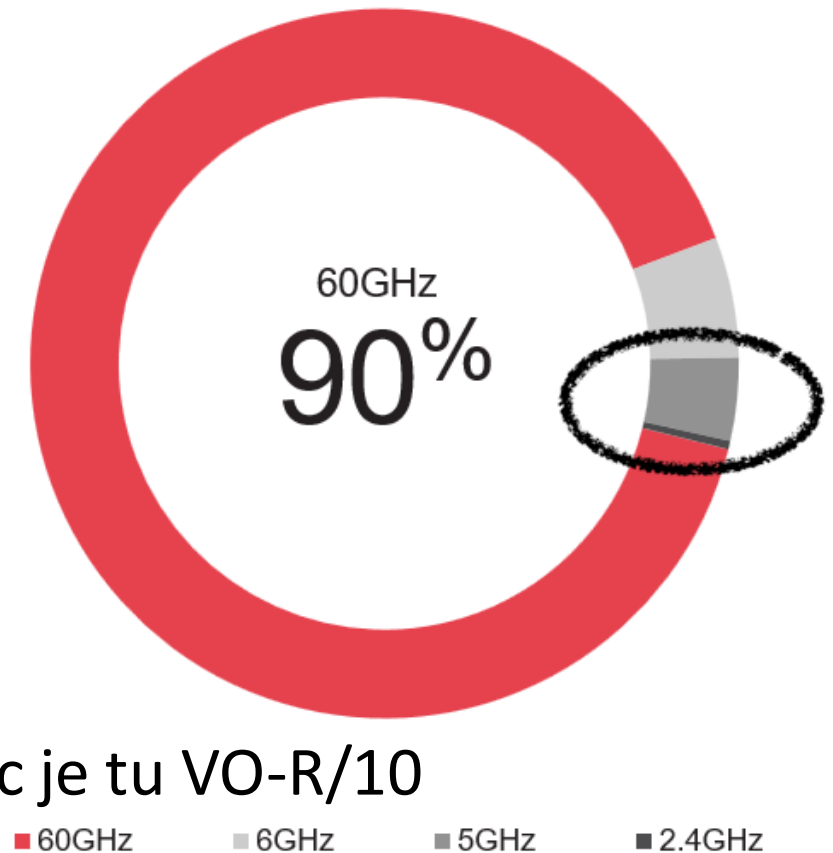
Technologie pro gigabitový bezdrát Tachyon Networks

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- Pásmo 56-71 GHz
- Kanály typicky 1080 / **2160** / 4320 MHz
- Představuje 90% frekvenčního přidělu pro freeband PtMP
- Reálné dosažení Gigabit rychlostí dle VHCCN
- Registrace jen pro část pásma dle VO-R/12, navíc je tu VO-R/10
 - 57–64 GHz SRD s 20 dB EIRP (EN 305 550)

Pásmo 60 GHz



Pásmo 60 GHz | normy

- ETSI EN 302 217
 - Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Digital systems operating in frequency bands from 1 GHz to 86 GHz
- ETSI EN 302 567
 - Multiple-Gigabit/s radio equipment operating in the 60 GHz band (57-66 GHz)
- **ETSI EN 303 722**
 - Wideband Data Transmission Systems (WDTS) for Fixed Network Radio Equipment operating in the 57 GHz to 71 GHz band
- ETSI EN 303 753
 - Wideband Data Transmission Systems (WDTS) for **Mobile** and Fixed Radio Equipment operating in the 57 - 71 GHz band

Tachyon Networks

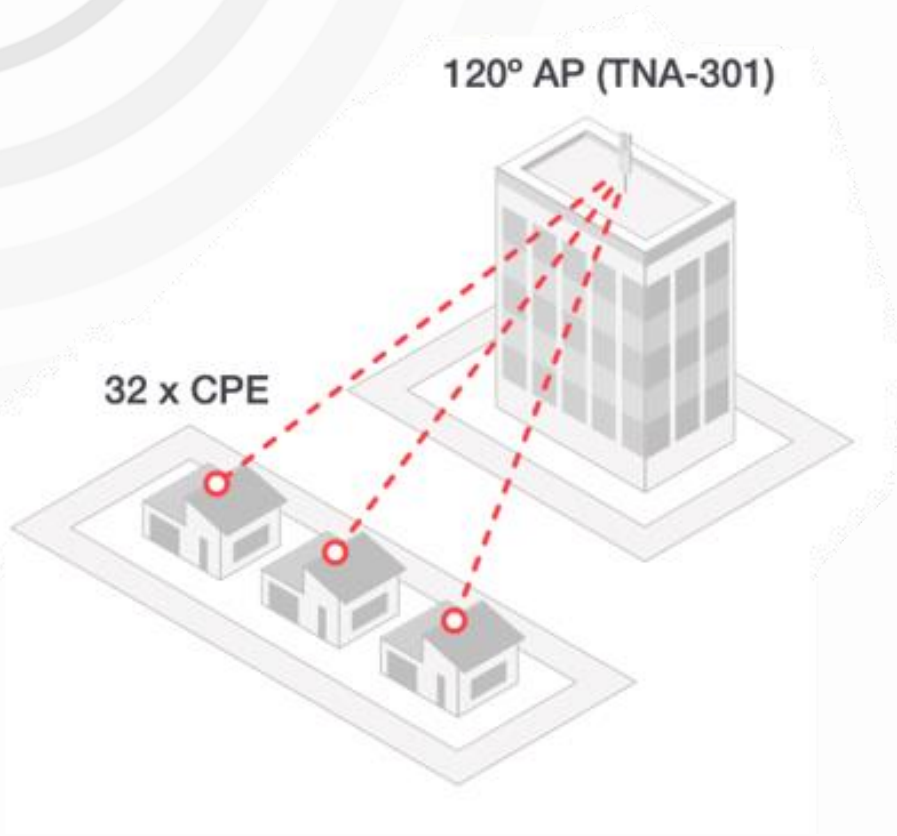
- EU vývoj a výroba (Litva)
- Certifikace EN 303 722, **1-6 kanál**
- Revoluční modulární anténní systém
- Dynamický TDMA protokol nad 802.11ad,
- 2,5 Gbps rádiová kapacita
- **2,5G Eth PoE in + 1G Eth PoE out (failover, kamera,...) port**
- **32 klientů na AP**





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TNA-301 a TNA-302



TNA-301

- 120° x 50° beamforming anténa
- 20 dBi antenna gain
- 1x 2.5Gbps + 1x 1Gbps + 1x DC



TNA-302

- 40° x 40° beamforming anténa
- 22 dBi antenna gain
- 1x 2.5Gbps + 1x 1Gbps + 1x DC



TNA-303X

- 90° x 40° beamforming anténa
- 16dBi antenna gain
- 1x 2.5Gbps + 1x 1Gbps



AK-100

- 33 dBi zisk
- 6° x 6° beamsteering



AK-150

- 37 dBi zisk
- 4° x 4° beamsteering



AK-300

- 42 dBi zisk
- 2° x 2° beamsteering



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TNA-303X

- 90° x 40° beamforming anténa
- 16dBi antenna gain
- 1x 2.5Gbps + 1x 1Gbps

TNA-303X | AP



AK-S-45

- 30 dBi zisk
- 45° x 10° beamsteering



AK-S-90

- 30 dBi zisk
- 90° x 10° beamsteering

TNA-303X | AP

d3	57–71 GHz	40 dBm e.i.r.p. ⁸⁾	23 dBm/MHz, výkon přivedený do antény je max. 27 dBm
d4	57–71 GHz	55 dBm e.i.r.p. ⁸⁾	38 dBm/MHz, zisk antény je min. 30 dBi
d5	57–64 GHz	55 dBm e.i.r.p.	výkon přivedený do antény je max. 10 dBm, zisk antény je min. 30 dBi
d6	64–66 GHz		



AK-S-45

- 30 dBi zisk
- 45° x 10° beamsteering



AK-S-90


- 30 dBi zisk
- 90° x 10° beamsteering

Tachyon Link Calculators

- Výpočet pro konkrétní kanál, modulaci/MSC a rain zone
- Reálné citlivosti, reálné výsledky

> RAIN RATE TO ATTENUATION

Rain rate (mm/hr) [Help me choose](#)

 Heavy rain

Results: Attenuation by channel (dB/km)

Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6
9	9	10	10	10	10

> SIGNAL BUDGET TO RAIN RATE

Link budget (dB) Distance (m)

Results: Rain rate by channel (mm/hr)

Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6
137	134	131	129	127	125

Link Type Point-to-Multipoint Point-to-Point

Access Point Model:

Station Model:

Access Point Antenna Kit:

Station Antenna Kit:

Channel:

Target Modulation: MCS1 (300 Mbps) MCS4 (900 Mbps) MCS8 (1750 Mbps) MCS10 (2300 Mbps)


Loss due to O² at 69120 MHz: **LOWEST**

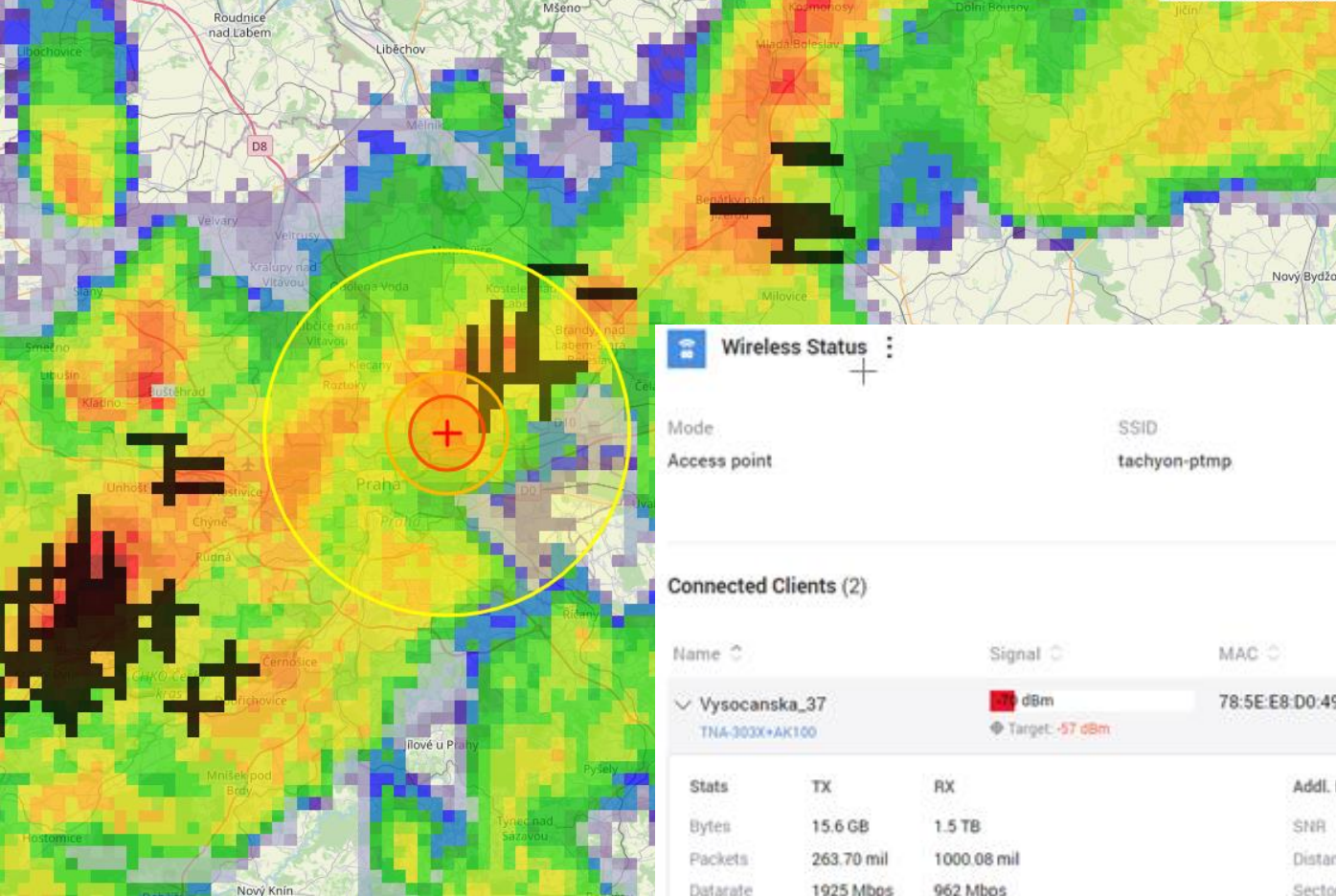
Target distance (m):

> Results

⊕ This link is possible in dry conditions, and has a signal budget of 7 dB for rain fade.

Rx Sensitivity	Expected RSSI	Total Signal Budget	Coverage Area
-64 dBm	-57 dBm	7 dB	2.4 km ²

 At the lowest modulation, MCS1, this link can withstand heavy rain (20 mm/hr), or max pathloss of 8.7 dB/km, given the selected distance and channel.



Wireless Status

Mode	SSID	MAC	78:5E:E8:D0:3E:63	Tx Power	40 dBm EIRP
Access point	tachyon-ptmp	Security	WPA2-PSK (GCMP)	Tx Bytes	4.4 TB
		Channel	6 (69120) @ 2160 MHz	Rx Bytes	51.0 GB

Connected Clients (2)

Name	Signal	MAC	IP Address	Connected	MCS (Tx/Rx)	Upload	Download
Vysocanska_37 TNA-303X+AK100	dBm Target: -57 dBm	78:5E:E8:D0:49:28	10.200.97.75	9 days 5 hours	MCS 7 / MCS 3	895 bps	14 kbps 1.12.0.54500

Stats	TX	RX	Addl. Link Data		Packets / MCS Datarate	Packets / TX Retry Bucket
Bytes	15.6 GB	1.5 TB	SNR	9		
Packets	263.70 mil	1000.08 mil	Distance	674 meters		
Datarate	1925 Mbps	962 Mbps	Sector	14 / 14		
☀️ At MCS1, this link can withstand no rain at 0 mm/hc or a max pathloss of 0 dB/km.			TX Speedtest	0 Mbps <input type="button" value="Run"/>		
			RX Speedtest	0 Mbps <input type="button" value="Run"/>		

Vysocanska_67 TNA-303X+AK100	dBm Target: -51 dBm	78:5E:E8:D0:47:45	10.200.97.76	9 days 5 hours	MCS 8 / MCS 4	895 bps	13 kbps 1.12.0.54500
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Stats	TX	RX	Addl. Link Data		Packets / MCS Datarate	Packets / TX Retry Bucket
Bytes	16.1 GB	1.5 TB	SNR	9		
Packets	270.03 mil	993.40 mil	Distance	376 meters		
Datarate	2310 Mbps	1155 Mbps	Sector	6 / 6		
☀️ At MCS1, this link can withstand no rain at 0 mm/hc or a max pathloss of 0 dB/km.			TX Speedtest	0 Mbps <input type="button" value="Run"/>		
			RX Speedtest	0 Mbps <input type="button" value="Run"/>		

AK-S-90 AP vs AK-300 klient

Wireless Status

Status Throughput

Station Connection Status

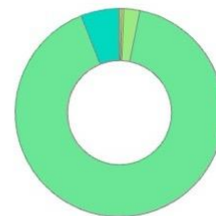
Signal
-58 dBm

Connection Time
00:00:48

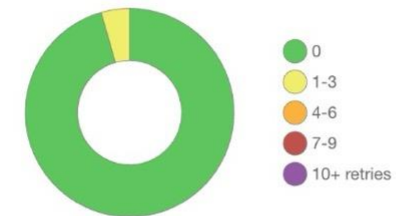
SSID
tachyon-outdoor

Distance
2378 meters

Packets / MCS Datarate



Packets / TX Retry Bucket



TX Speedtest 2138 Mbps

RX Speedtest 2116 Mbps

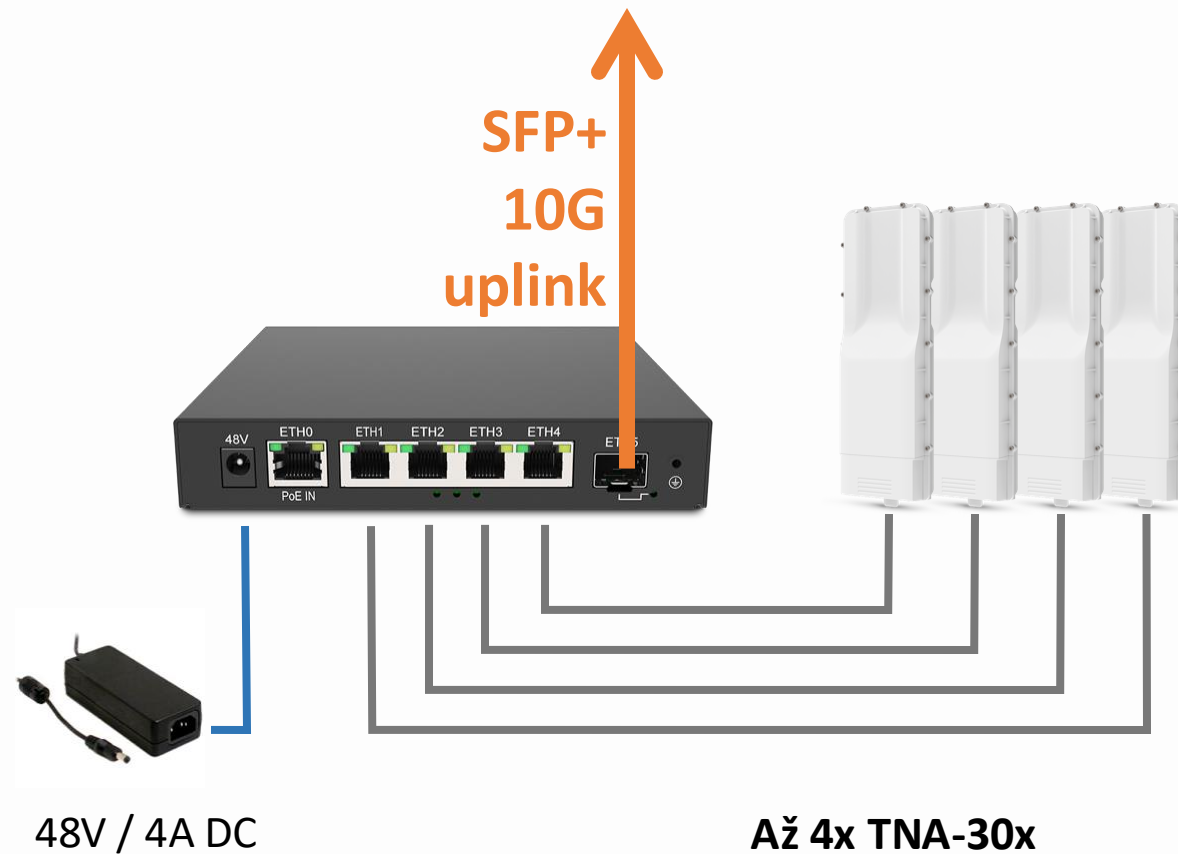


At the lowest modulation, this link can withstand medium rain (9 mm/hr), or max pathloss of 5 dB/km for this distance and channel.

AP Name	tna-303x-ntp-m	Security	WPA2-PSK (GCMP)	MCS (Tx/Rx)	MCS 9 / MCS 9
AP IP Addr	192.168.1.1	Channel	5 (66960) @ 2160 MHz	Datarate (Tx/Rx)	2502 / 2502 Mbps
AP BSSID	78:5E:E8:D0:38:18	Link SNR	17	Bytes (Tx/Rx)	550.6 MB / 782.0 MB
STA MAC	78:5E:E8:D0:38:21	Sector (Tx/Rx)	3 / 3	Packets (Tx/Rx)	526 k / 1.40 mil

- 5x Multi-gigabit port (2.5Gbps)
- 4x Passive PoE-out, 1x PoE-in
- Podpora VLAN
- DIN Rail mounting
- Easy, Intuitive Management

TNS-100



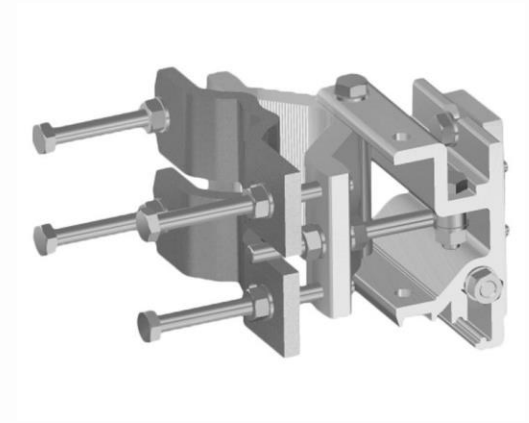
RMA rate

00034427	MikroTik RouterBOARD LHGG-60adkit, Wireless Wire Dish, 60 GHz, L3 - samostatná jednotka	MikroTik	0,8
00070131	MikroTik CubeG-5ac60ad, Cube 60G ac (Předkonfigurovaná samostatná jednotka)	MikroTik	5
00070180	MikroTik Wireless Wire nRAY 60 GHz, samostatná jednotka	MikroTik	2,6
00070386	MikroTik CubeG-5ac60ad, Cube 60G ac	MikroTik	2,7
00071855	MikroTik Cube 60Pro ac, 60 GHz	MikroTik	1,1
00071857	MikroTik CubeSA 60Pro ac, 60 GHz	MikroTik	0,9
00071858	MikroTik Cube 60Pro ac, 60 GHz (předkonfigurovaná samostatná jednotka)	MikroTik	1,8
00073742	Tachyon TNA-301, 60 GHz přístupový bod 120°	Tachyon Networks	0,4
00073744	Tachyon TNA-303X, 60 GHz modulární přístupový bod/klient	Tachyon Networks	0,2



- TNA-405X - Integrovaná 5-7 GHz záloha
- TNA-??? - Levnější varianta 1G porty
- Precizní držák Jirous

- Podpora 802.1ad (Q-in-Q; Ethertype 0x88a8)
- Routovací režim
- ISP Admin integrace



Co dál..



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Děkuji za pozornost

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www.wifishop.cz