

WIS P

Wireless Internet Service Provider

CAPPI Buenos Aires 2014

Salvador Bertenbreiter
Ubiquiti Networks

Agenda

- Intro / airMax M
- EdgeMax
- airFiber 5/5U
- AirMax AC
- Preguntas



EI CPE



NanoStation -- 2008

Áreas de diseño

Uniformidad



Montaje / Alineación



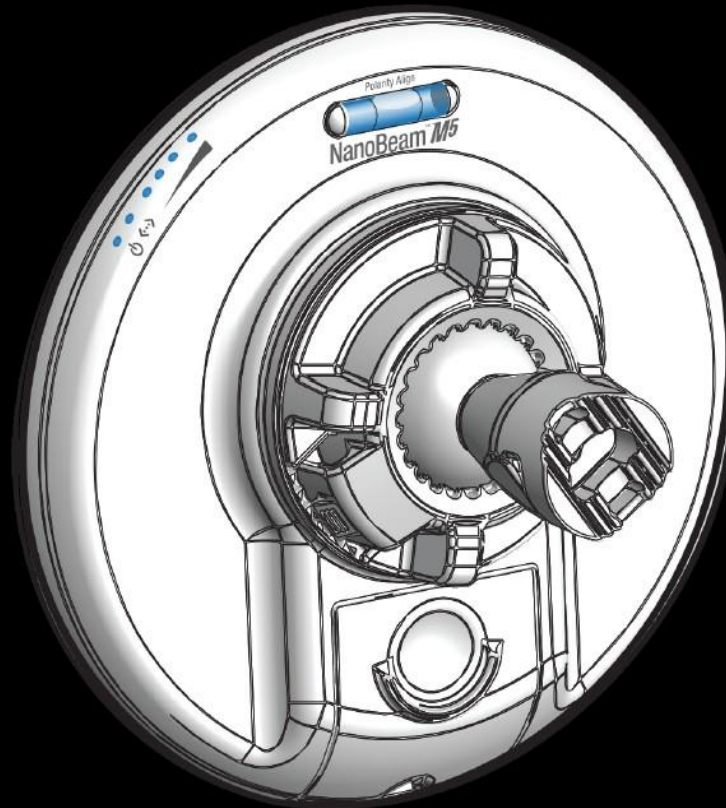
Diseño industrial



Performance



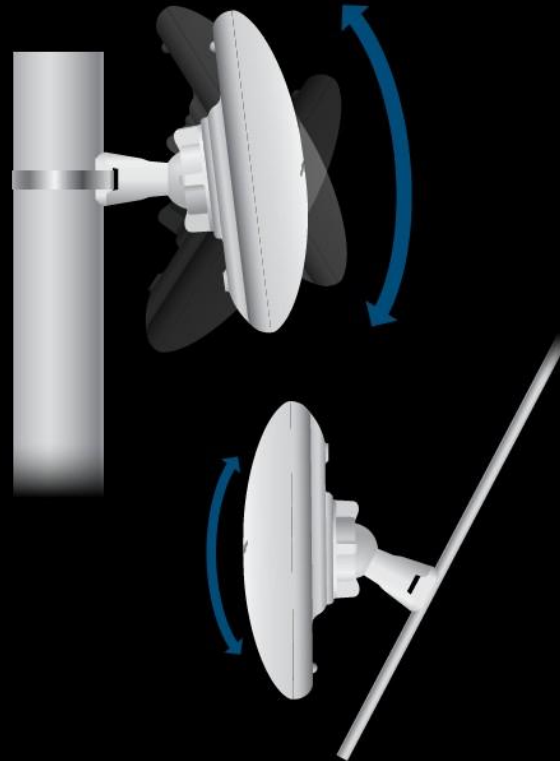
El CPE re-inventado



El CPE re-inventado



NanoBeam™ M



NanoBeam™ M



Uniformidad



NanoBeam™ M



16dBi



19dBi

PowerBeam™

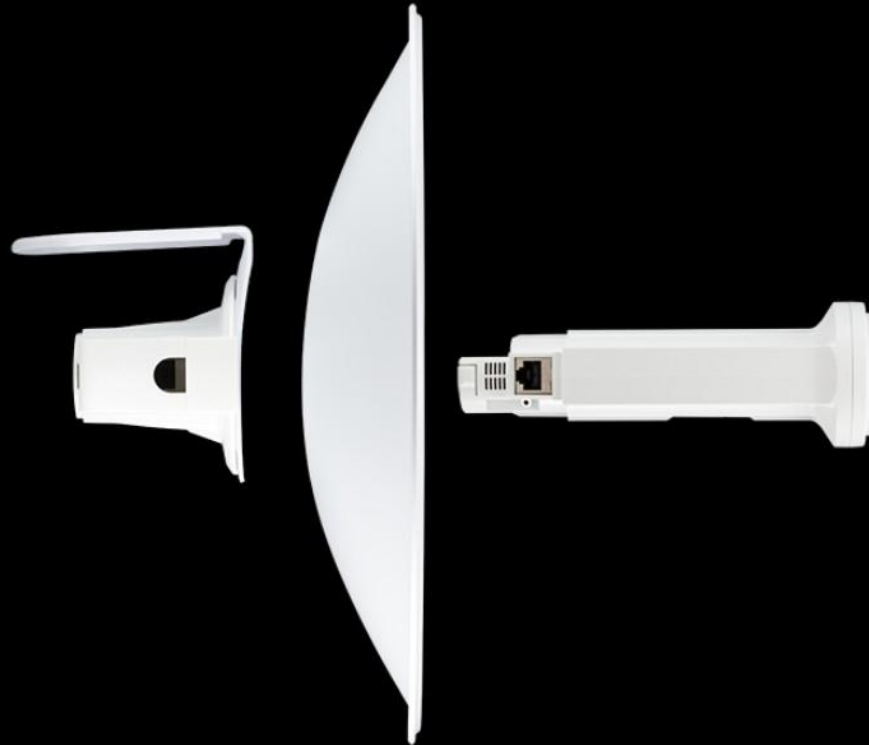


22dBi



25dBi

PowerBeam™



PowerBeam™



Casos de Éxito



NanoStation M2 airOS™

MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES | SYSTEM

Tools | Logout

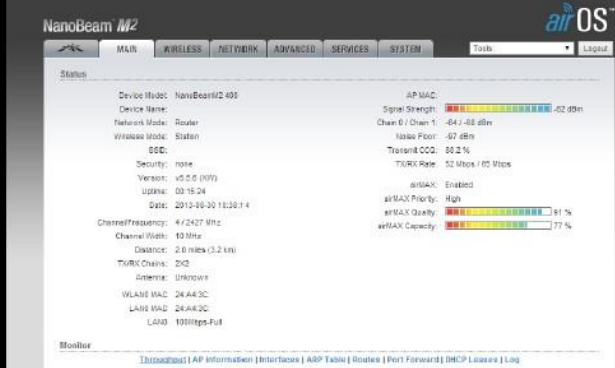
Status

Device Name: Router	AP MAC: [Progress Bar]	Signal Strength: -75 dBm
Wireless Mode: Station	Network Mode: Router	Network Channel: 75 / 75 (20 MHz)
SSID: [Redacted]	Wireless Mode: Station	Noise Floor: -90 dBm
Security: none	OSD: [Redacted]	Transmit COQ: 72.6 %
Version: v5.5.8	Security: none	TURK Rate: 6.5 Mbps / 9.75 Mbps
Uptime: 7 days 20:44:24	Version: v5.0.0 (N7)	airOSX: Enabled
Date: 2014-01-21 07:44:18	Uptime: 00:15:24	airOSX Priority: High
Channel/Frequency: 4 / 2427 MHz	Date: 2012-06-20 18:20:14	airOSX Quality: [Progress Bar] 24 %
Channel Width: 10 MHz	Channel/Frequency: 4 / 2427 MHz	airOSX Capacity: [Progress Bar] 12 %
Distance: 2.8 miles (3.2 km)	Channel Width: 10 MHz	
TURK Chain: 2x2	Distance: 2.8 miles (3.2 km)	
WLANS MAC: 80:15:8D	TURK Chain: 2x2	
LAN6 MAC: 80:15:8D	Antenna: Unknown	
LAN1 MAC: 80:15:8D	WLANS MAC: 24:A4:3C	
LARD / LAN1: 100Mbps-Full / Unplugged	LAN6 MAC: 24:A4:3C	
	LAN1 MAC: 100Mbps-Full	

Monitor

Throughput | AP Information | Interfaces | ARP Table | Routes | Port Forward | DHCP Leases | Log

WLAND | LAND



NanoBeam M2 airOS™

MAIN | WIRELESS | NETWORK | ADVANCED | SERVICES | SYSTEM

Tools | Logout

Status

Device Name: NanoBeamM2 40S	AP MAC: [Progress Bar]	Signal Strength: -82 dBm
Device Name: NanoBeamM2 40S	Network Mode: Router	Network Channel: 84 / 88 (40 MHz)
Wireless Mode: Station	Wireless Mode: Station	Noise Floor: -97 dBm
OSD: [Redacted]	OSD: [Redacted]	Transmit COQ: 89.2 %
Security: none	Security: none	TURK Rate: 52 Mbps / 65 Mbps
Version: v5.0.0 (N7)	Version: v5.0.0 (N7)	airOSX: Enabled
Uptime: 00:15:24	Uptime: 00:15:24	airOSX Priority: High
Date: 2012-06-20 18:20:14	Date: 2012-06-20 18:20:14	airOSX Quality: [Progress Bar] 81 %
Channel/Frequency: 4 / 2427 MHz	Channel/Frequency: 4 / 2427 MHz	airOSX Capacity: [Progress Bar] 77 %
Channel Width: 40 MHz	Channel Width: 40 MHz	
Distance: 2.6 miles (3.2 km)	Distance: 2.6 miles (3.2 km)	
TURK Chain: 2x2	TURK Chain: 2x2	
Antenna: Unknown	Antenna: Unknown	
WLANS MAC: 24:A4:3C	WLANS MAC: 24:A4:3C	
LAN6 MAC: 24:A4:3C	LAN6 MAC: 24:A4:3C	
LAN1 MAC: 100Mbps-Full	LAN1 MAC: 100Mbps-Full	

Monitor

Throughput | AP Information | Interfaces | ARP Table | Routes | Port Forward | DHCP Leases | Log



AT&T U-verse® TV + High Speed Internet \$49/mo. PLUS *200 in Reward Cards ONLINE ONLY

PING: 16 ms

DOWNLOAD SPEED: 1.72 Mbps

UPLOAD SPEED: 0.85 Mbps

SHARE THIS RESULT

Slow Results? Speed Up Your Business

Are you on IRIS Networks?

Take our Broadband Internet Survey!

SPEEDS UP TO 45 Mbps

SEE ALSO

Best Wireless Internet

Unlimited Wireless Internet

MegaPath



AT&T U-verse® TV + High Speed Internet \$49/mo. PLUS *200 in Reward Cards ONLINE ONLY

PING: 15 ms

DOWNLOAD SPEED: 31.51 Mbps

UPLOAD SPEED: 7.56 Mbps

SHARE THIS RESULT

Are you on IRIS Networks?

Take our Broadband Internet Survey!

SEE ALSO

Low Cost Internet Access

Cheap Cable Internet

EdgeMax



Routers y Switches L3



EdgeRouter

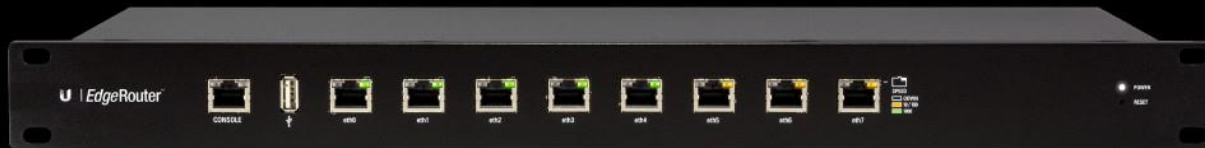
ER-Lite



ER5-POE



ER8



ER8-PRO

EdgeSwitch



ES24-250W/ES24-500W



ES48-500W/ES48-750W

EdgeSwitch

- 24 puertos
- 48 puertos
- 250W
- 500W
- 750W
- Capa 2 y 3



EdgeRouter

- 800Mbps de tráfico con 5% uso de CPU
- 2M pps
- puertos SFP



airFiber5 / 5U

- AF5 desde 5470MHz a 5950MHz
- AF5U desde 5725MHz a 6200MHz
- Hasta 47dBm EIRP
- Antenas 23dBi
- Tx power 24dBm



BackHaul re-inventado

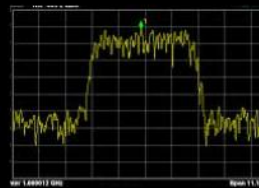
Precio



Rango



Eficiencia RF

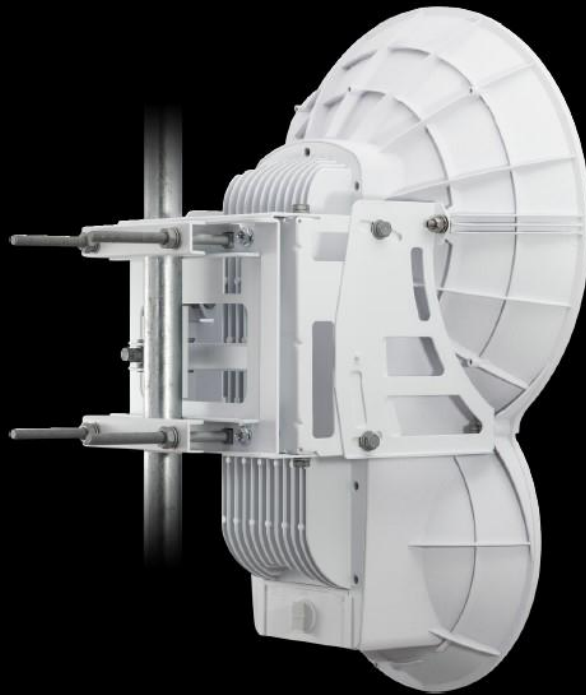


Latencia



BackHaul re-inventado

1.5Gbps+ Agregado
FDD

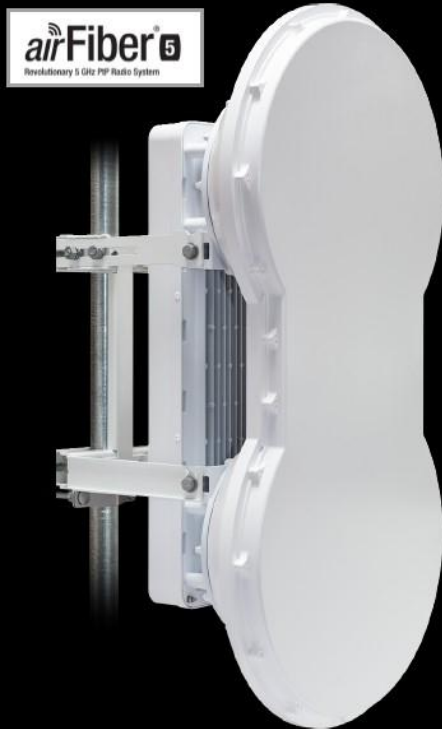


*air*Fiber® 24

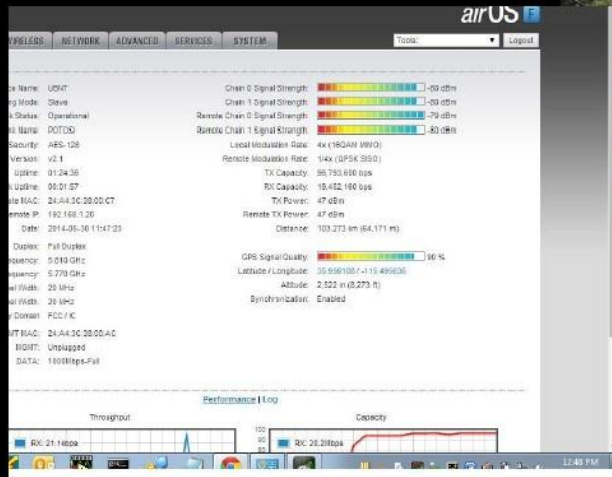
2012

Diseño BackHaul para Aplicaciones Específicas

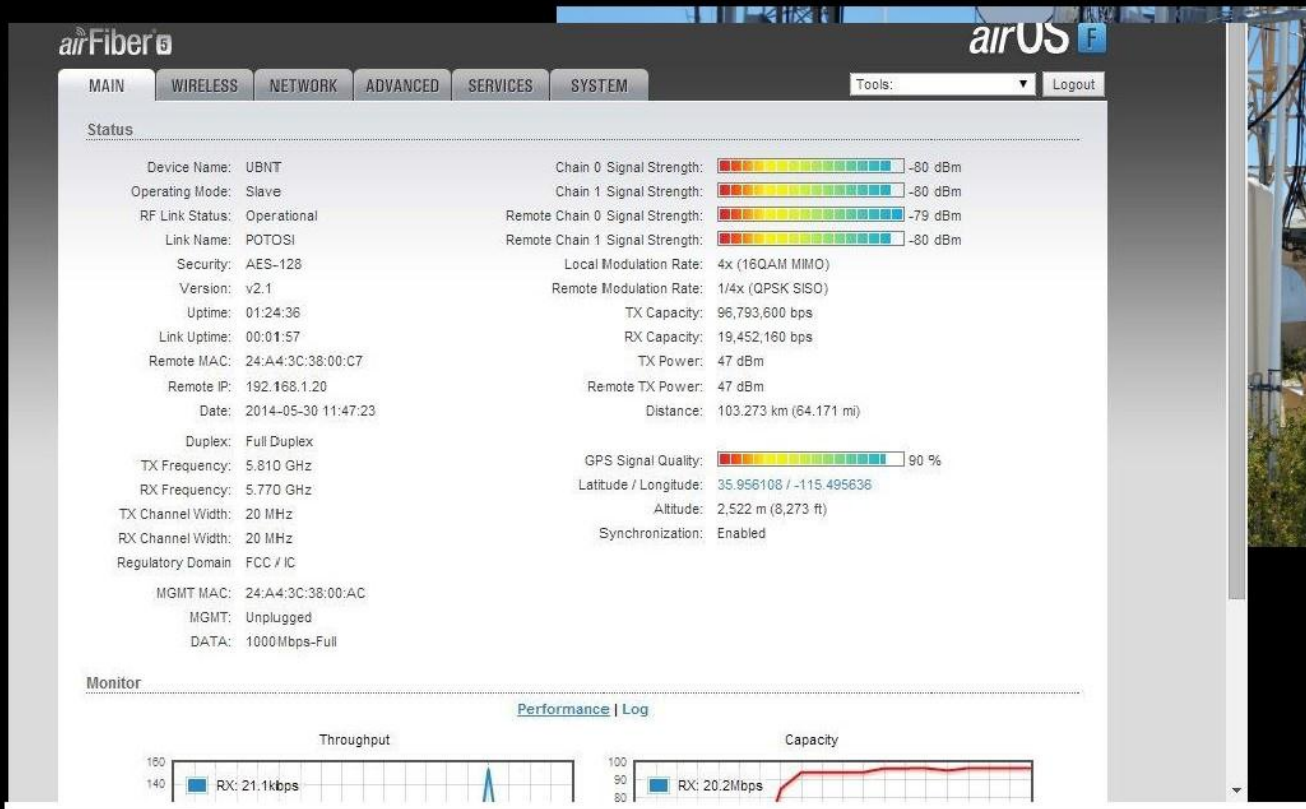
AF5/5U | Gbps+ / 50MHz, FDD y 100km+ rango



AF5 - 100KM ALTA INTERFERENCIA



AF5 - 100KM ALTA INTERFERENCIA



airFiber®

100km+ 1Gbps+ FDD



airFiber⁵
5GHz



airFiber²⁴
24GHz



60KM 20MHz 280Mbps



airFiber
airOS

MAIN
WIRELESS
NETWORK
ADVANCED
SERVICES
SYSTEM

Full
Logout

Status

Device Name: EXT PDP-Tx Master Magnet	Chain 0 Signal Strength: ■ -72 dBm	Chain 1 Signal Strength: ■ -71 dBm
Operating Mode: Master	Remote Chain 0 Signal Strength: ■ -73 dBm	Remote Chain 1 Signal Strength: ■ -72 dBm
RF Link Status: Operational	Local Modulation Rate: 6x (64QAM 192Q)	Remote Modulation Rate: 6x (64QAM 192Q)
Link Name: Aerux.com	TX Capacity: 141 010,203 kbps	RX Capacity: 139 845,122 kbps
Security: AES-128	TX Power: 47 dBm	Remote TX Power: 47 dBm
Version: 4.2-269a2.20432	Distance: 59 925 km (36 653 mi)	
Uptime: 30 69 29		
Link Speed: 30 67 48	GPS Signal Quality: ■ 100 %	
Remote MAC: 24:A4:3C:38:2A:0C	Latitude / Longitude: 35.47336 / -105.198112	
Remote IP: 38.75.224.63	Altitude: 2,620 m (8,646 ft)	
Date: 2014-08-12 09:58:06	Synchronization: Enabled	
Duplex: Full Duplex		
TX Frequency: 5.737 GHz		
RX Frequency: 5.838 GHz		
TX Channel Width: 20 MHz		
RX Channel Width: 20 MHz		
Regulatory Domain: FCC / C		

Ethernet

WG1T MAC: 24:A4:3C:38:2A:1B	DATA Pair 0 (Pins 1,2): 29 dB SNR	DATA Pair 1 (Pins 3,6): 28 dB SNR
MD1T: Unplugged	DATA Pair 2 (Pins 4,5): 29 dB SNR	DATA Pair 3 (Pins 7,8): 29 dB SNR
DATA: 100Mbps-Full		
DATA Cable Length: 96 m (314 ft)		

Monitor

Throughput

RX: 18.3Mbps
TX: 20.7Mbps

Capacity

RX: 140Mbps
TX: 148Mbps

Refresh

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airFiber 2.2

- airView en airFiber 5/5U
- Herramienta Cálculo de Enlace
- Anchos de canal independientes Tx/Rx en modo FD.
- 1024QAM
- 10/20/30/40/50MHz
- Información sobre cable y fallas

airFiber 2.2

- Filtrado de Multicast
- GIGE Carrier sigue estado link RF
- Soporte SNMP / MIBs
- Flow Control (Pause Frames)
- Mejor rendimiento en situaciones de lluvia
AF24

airView



Analizador de Espectro

Herramienta Cálculo Enlace

airFiber 5 Link Calculator

192.168.12.126/linkcalc.html

airFiber5 Link Calculator

Range miles Margin dB Min Power dB Max Power dB

TDD	FDD Transmit	FDD Receive
Channel Bandwidth: 20 MHz	Downlink Bandwidth: 10 MHz	Uplink Bandwidth: 10 MHz
Transmit Power: 34 dBm	Transmit Power: 31 dBm	Transmit Power: 31 dBm
Aggregate Capacity: 149.76 Mbps	Downlink Capacity: 69.12 Mbps	Uplink Capacity: 69.12 Mbps
Receive Power: -69.83 dBm	Receive Power: -72.83 dBm	Receive Power: -72.98 dBm
Modulation Rate: 6x <64-QAM>	Modulation Rate: 6x <64-QAM>	Modulation Rate: 6x <64-QAM>
Frequency: <input type="text" value="5800"/> MHz	Frequency: <input type="text" value="5800"/> MHz	Frequency: <input type="text" value="5900"/> MHz
Capacity: <input type="text" value="100"/> Mbps	Capacity: <input type="text" value="50"/> Mbps	Capacity: <input type="text" value="50"/> Mbps
Bandwidth: <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 20 MHz <input type="checkbox"/> 30 MHz <input checked="" type="checkbox"/> 40 MHz <input checked="" type="checkbox"/> 50 MHz	Bandwidth: <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 20 MHz <input type="checkbox"/> 30 MHz <input checked="" type="checkbox"/> 40 MHz <input checked="" type="checkbox"/> 50 MHz	Bandwidth: <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 20 MHz <input type="checkbox"/> 30 MHz <input checked="" type="checkbox"/> 40 MHz <input checked="" type="checkbox"/> 50 MHz

Calculate

Mejor eficiencia de espectro

airFiber5/5U

MAIN WIRELESS NETWORK ADVANCED SERVICES SYSTEM Tools: Logout

Status

Device Name: [REDACTED]	Chain 0 Signal Strength: [Signal Strength Bar] -69 dBm
Operating Mode: Master	Chain 1 Signal Strength: [Signal Strength Bar] -69 dBm
RF Link Status: Operational	Remote Chain 0 Signal Strength: [Signal Strength Bar] -68 dBm
Link Name: CCC103	Remote Chain 1 Signal Strength: [Signal Strength Bar] -68 dBm
Security: AES-128	Local Modulation Rate: 8x (24QAM MIMO)
Version: v2.1-beta1.21983	Remote Modulation Rate: 4x (16QAM MIMO)
Uptime: 5 days 07:35:24	TX Capacity: 319,301,120 tps
Link Uptime: 2 days 04:23:03	RX Capacity: 199,268,320 tps
Remote MAC: [REDACTED]	TX Power: 45 dBm
Remote IP: 192.168.103.20	Remote TX Power: 45 dBm
Date: 2014-05-04 19:34:20	Distance: 29.627 km (18.409 m)
Duplex: Full Duplex	GPS Signal Quality: [Signal Quality Bar]
TX Frequency: 5.823 GHz	Latitude / Longitude: [REDACTED]
RX Frequency: 5.752 GHz	Altitude: 1,303 m (4,472 ft)
TX Channel Width: 50 MHz	Synchronization: Disabled
RX Channel Width: 40 MHz	
Regulatory Domain: FCC / IC	
MGMT MAC: [REDACTED]	
MGMT: Unplugged	
DATA: 1000Mbps-Full	

Basic Wireless Settings

Wireless Mode: Master

Link Name: [REDACTED]

Country Code: 50MHz

Duplex: 40MHz

Channel Bandwidth: 30MHz

Output Power: [Slider] 47 dBm

Maximum Modulation Rate: 20MHz

10x (1024QAM MIMO) Automatic Rate Adaptation

Monitor

Performance | Log

Throughput



RX: 22.9kbps
TX: 18.3kbps

Capacity



RX: 200Mbps
TX: 289Mbps

Anchos de canal independientes Tx/Rx

CPE → BackHaul → Network



NanoBeam™ M



airFiber®

airMAX® ac

*air*MAX[®] ac

*air*OS⁷ **Nuevo sistema operativo**



Procesador dedicado airMax



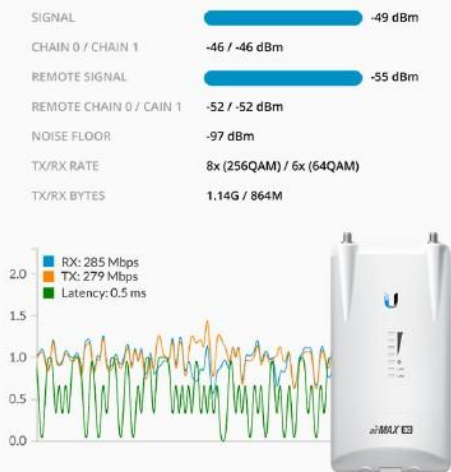
Productos



Filtro frecuencia activo

airOS 7

- Channel width 10/20/30/40/50*/60*/80*
- HTML5 cambios se aplican más rápidamente
- Optimización dispositivos móviles
- Auto ACK timeout mejorado

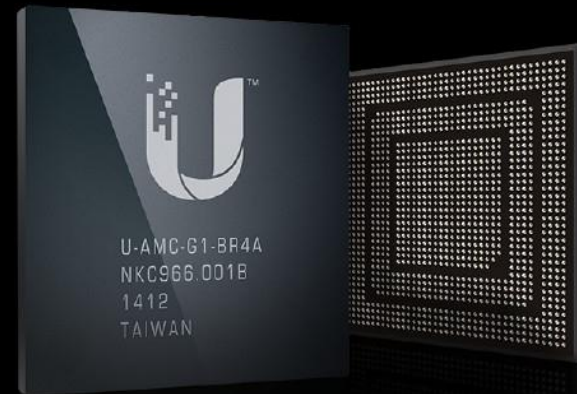


Procesador dedicado airMax

Menor latencia

Mejor performance

airView AC



Incluido en todos los productos airMax AC

PowerBeam 5AC

- PBE-5AC-500
- Hasta 450Mbps
- 27dBi
- 22dBm Tx



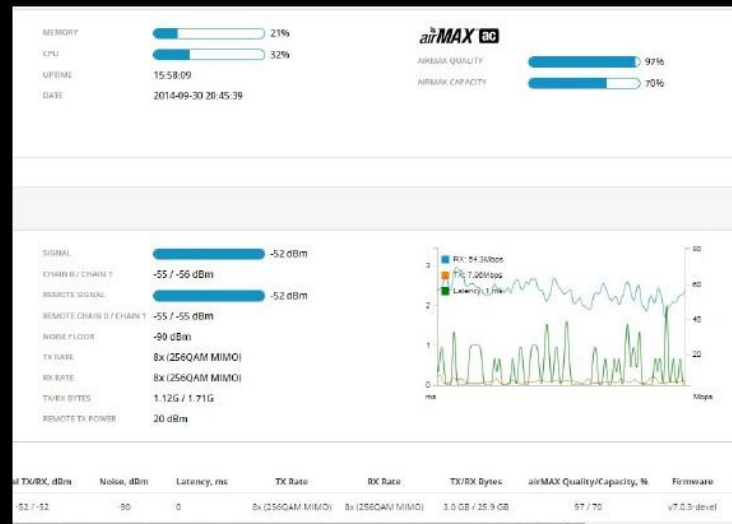
PowerBeam 5AC

- PBE-5AC-500
- Radome incluido
- Gigabit
- 24Vdc



PowerBeam 5AC

- 20MHz / 8KM



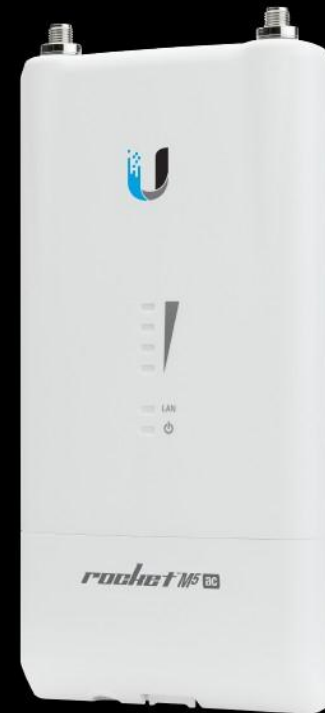
🔄 PING
7 ms

⬇️ DOWNLOAD SPEED
127.29 Mbps

⬆️ UPLOAD SPEED
103.68 Mbps

Rocket 5AC Lite

- Rocket 5AC Lite
- Hasta 450Mbps
- 27dBm Tx
- 2 x RP-SMA

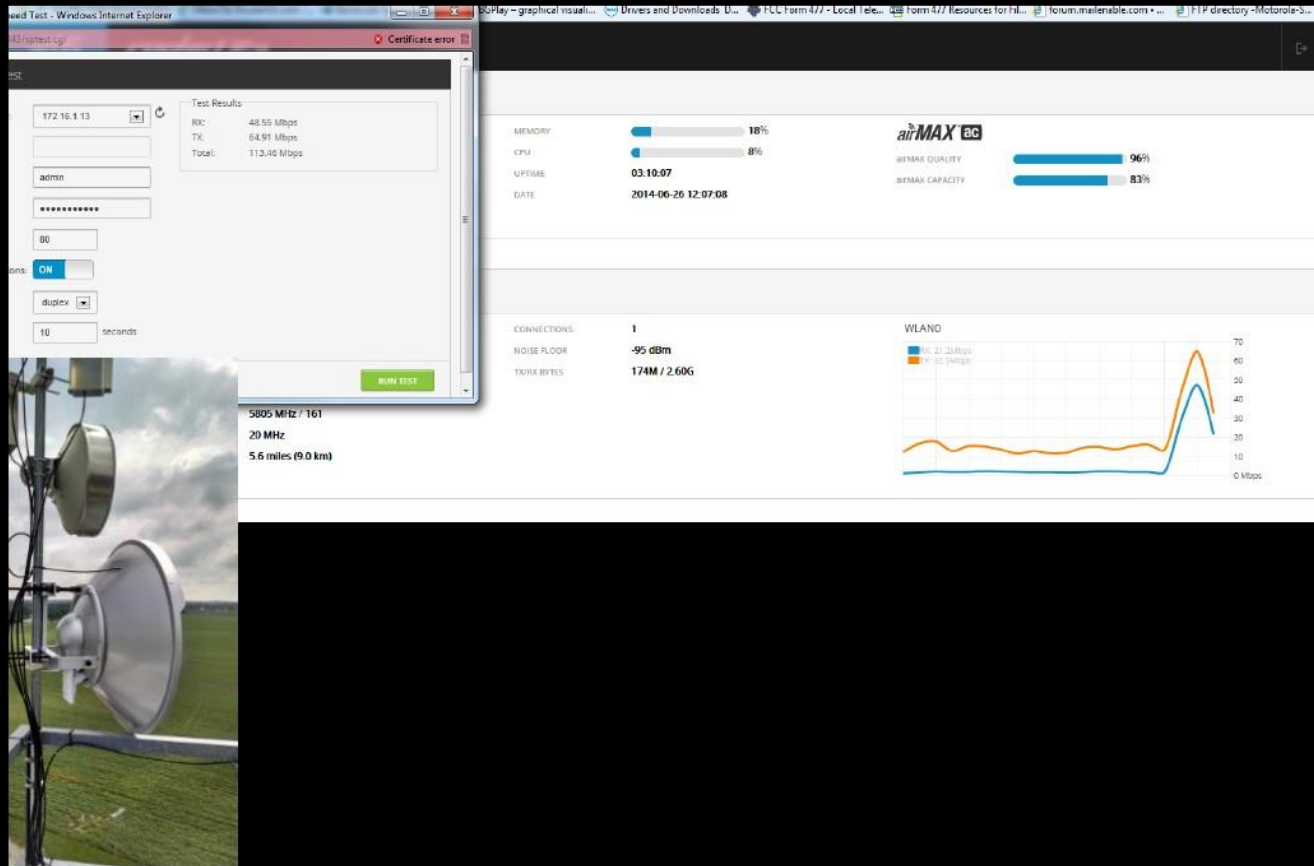


Rocket 5AC Lite

- Rocket 5AC Lite
- Gigabit
- Modo PtP
- Soporte PtMP mediante próximo firmware



Rocket 5AC Lite



The screenshot displays the Rocket 5AC Lite web interface, which includes a test window, system status, and connection details.

Test Results:

- IP: 172.16.1.13
- Username: admin
- Port: 80
- Mode: duplex
- Timeout: 10 seconds
- Test Results:
 - RX: 48.58 Mbps
 - TX: 64.91 Mbps
 - Total: 113.49 Mbps
- Button: RUN TEST

System Status:

- MEMORY: 18%
- CPU: 8%
- UPTIME: 03:10:07
- DATE: 2014-06-26 12:07:08
- airMAX 60
 - WEMAX QUALITY: 96%
 - WEMAX CAPACITY: 83%

Connections:

- CONNECTIONS: 1
- NOISE FLOOR: -95 dBm
- TOTAL BYTES: 174M / 2.60G


WLAN:

- Legend:
 - 20.212Mbps (Blue line)
 - 21.24Mbps (Orange line)
- Graph: Shows signal strength over time, with a peak reaching approximately 60 Mbps.

Physical Parameters:

- 5805 MHz / 161
- 20 MHz
- 5.6 miles (9.0 km)


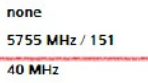
Physical View:



Rocket 5AC Lite

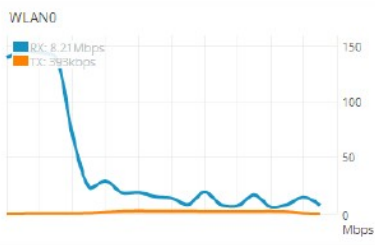
Antena normal

Wireless CONNECTED

WIRELESS MODE	Station WDS	SIGNAL	-51 dBm
SSID		CHAIN 0 / CHAIN 1	-53 / -55 dBm
WLAN0 MAC		NOISE FLOOR	-93 dBm
AP MAC		TX/RX RATE	360 Mbps / 300 Mbps
SECURITY	none	TX/RX BYTES	421M / 629M
FREQUENCY / CHANNEL	5755 MHz / 151		
CHANNEL WIDTH	40 MHz		
DISTANCE	19.8 miles (31.8 km)		

SHOW DETAILS ▶

WLAN0



Legend: TX/RX: 8.21 Mbps, TX: 8.21 Mbps

RocketDish 3 I AC

- 31 dBi
- Radome incluido
- State-of-the-art antenna
- Reducción ruido externo



RocketDish 31 AC



Antenas Sector AC

- AM-5AC22-45
 - 22dBi / 45 grad
- AM-5AC21-60
 - 21dBi / 60 grad
- Blindaje
- Rendimiento



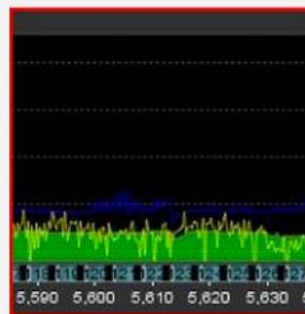
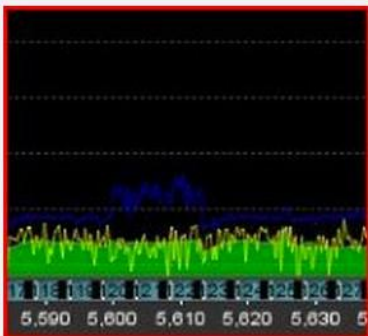
Antenas Sector AC

00:0D:67:23:83:59	xfinitywifi	NONE	-83 / -100	5.765	153
-------------------	-------------	------	------------	-------	-----

Now here's the new AirMax AC sector:

00:0D:67:23:83:59	xfinitywifi	NONE	-89 / -100	5.765	153
-------------------	-------------	------	------------	-------	-----

Here's what the Titanium sector sees on AirView And here's what the new AirMax AC sector sees



RES-Jo* (2.1mi)**

Old on AP51: 31M down, 16M up
 New on AP62: 51M down, 20M up

= **64% better down, 25% better up, 51% better total**

RES-Nath* (3.1mi)**

Old on AP51: 41M down, 20M up
 New on AP62: 45M down, 24M up

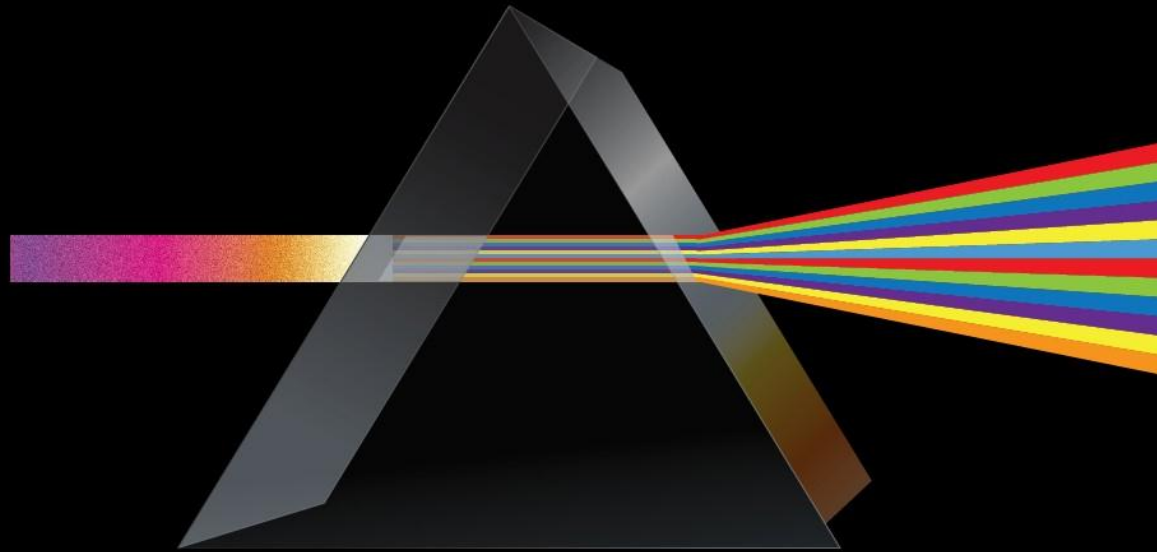
= **9% better down, 20% better up, 13% better total**

RES-Bran* (4.0mi)**

Old on AP51: 8M down, 6M up
 New on AP62: 16M down, 16M up

= **100% better down, 260% better up, 228% better total**

Filtro RF Activo

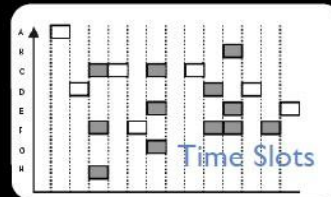


Capacidad Banda No Licenciada

Filtrado espacio



Filtrado tiempo



airMAXTM
Revolutionary MIMO TDMA Protocol System

Filtrado
Frecuencia



Ambiente RF baja energía



Ambiente RF baja energía



¿Cómo mejorar la selectividad?



Bien, pero hay 2 problemas:

1. La operación del radio queda fija en un cierto canal
2. El ancho de banda *fraccional* es demasiado pequeño! un canal de 20MHz en 5GHz tiene un ancho de banda *fraccional* de sólo .04%.

¿Qué tal si integramos un filtro activo antes del radio?

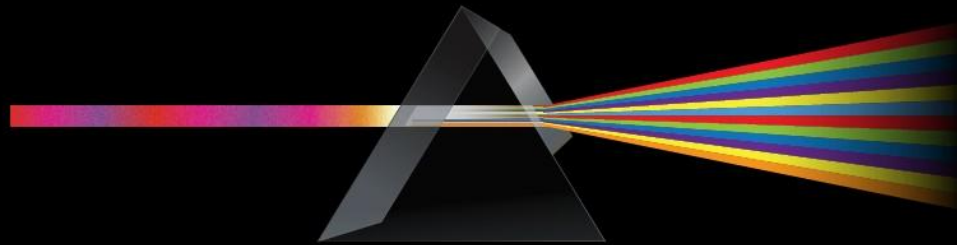
airPRISM



¡Transformado el ambiente RF!

Introduciendo

*air*PRISM

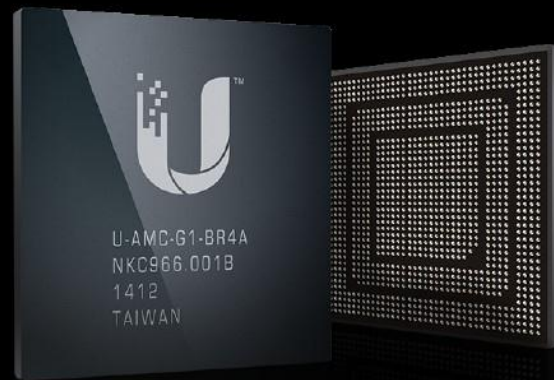


Filtrado Activo RF (HSR)

Otros productos



Gracias totales!



¿Preguntas?