



Uptc

Universidad Pedagógica y
Tecnológica de Colombia

W INVITACIÓN PÚBLICA No 019 DE 2015 O

FOR LA ACADEMIA, LA CALIDAD
Y LA RESPONSABILIDAD SOCIAL
UNIVERSITARIA

INVITACIÓN PÚBLICA No. 019 DE 2015

**CONTRATAR LA PRESTACIÓN DE SERVICIOS DE TELECOMUNICACIONES Y
COMPLEMENTARIOS (INTERNET Y DATOS) REQUERIDOS POR LA
UNIVERSIDAD PEDAGÓGICA Y TECNOLÓGICA DE COLOMBIA PARA LAS
VIGENCIAS FISCALES 2016 Y 2017**

**OBSERVACIONES Y ESCRITOS DE SUBSANACIÓN AL INFORME DE
EVALUACIÓN**

RECTORIA

COMITÉ DE CONTRATACIÓN

UNIVERSIDAD PEDAGÓGICA Y TECNOLÓGICA DE COLOMBIA

TUNJA, NUEVE (09) DE DICIEMBRE DE 2015 (5:30 P.M.)



ACREDITACIÓN INSTITUCIONAL
DE ALTA CALIDAD
MULTICAMPUS

RESOLUCIÓN 3910 DE 2015 MEN

Avenida Central del Norte
PBX 7405626 Tunja

Pereira, Diciembre 7 de 2015

Doctor
FAUSTO ANDRÉS CASTELBLANCO TORRES
 Coordinador Grupo Bienes y Suministros e Inventarios
 Ciudad.

Asunto: INVITACIÓN PÚBLICA No 019 de 2015

Respetado Doctor

De acuerdo a los resultados de Evaluación de los documentos técnicos mínimos, nos permitimos presentar los soportes necesarios para la respectiva habilitación de la propuesta presentada por **MEDIA COMMERCE PARTNERS S.A.S.** Nit: 819.006.966-8:

1. Presentamos la Descripción técnica requerida en el numeral 4.3.6 de los pliegos definitivos, detallada en el Anexo No. 1.
 - El Anexo No. 1 incluye la descripción de los equipos a instalar como última milla y demás que hacen parte de la propuesta en las Sedes Seccionales, Cread, Museos y Sede Central. (Marca, referencia, capacidad de procesamiento, memoria, disponibilidad de puertos, versión de sistema operativo.)

Adicionalmente, se adjunta ficha técnica de los equipos PMP 430 y Wipair 1000 a instalar en la sede Satélite Granja Tunguavita, los Cread de Barrancabermeja y Soatá y el Museo Arqueológico de Villa de Leyva las cuales se entregarán en tecnología Radio Enlace.

DESCRIPCION TECNICA EQUIPOS DE ULTIMA MILLA RADIO							
MARCA	REFERENCIA	FRECUENCIA DE OPERACIÓN	ANCHO DE BANDA ESPECTRAL	VELOCIDAD DE CONEXIÓN	LATENCIA	Encriptacion	Sedes
Cambium Network	PMP 430	5 GHZ	20 Mhz	10/100 Mbps	5 a 7 ms	56-bit DES, 128-bit AES Optional	3
WAVE IP	Wipair 1000	5 GHZ	40 Mhz	10/100 Mbps	1 a 5 ms	128-bit AES encryption & MAC level authentication	1

Se adjunta descripción técnica de la última milla para los enlaces que se entregarán en Fibra Óptica detallada en el Anexo 2 y ficha Técnica de los transiver.

**DESCRIPCION TECNICA EQUIPOS DE
 ULTIMA MILLA TRANSIVER**

MARCA	REFERENCIA
V-KOM	VKD-100-25

- La solución en la Sede Central y los equipos a instalar como última milla y demás que hacen parte de la propuesta, cumplen con el protocolo enrutable en sus versiones IPV4 e IPV6. Se garantiza el manejo de los protocolos IPV4 e IPV6 en los equipos de comunicaciones.
- Se detalla y se identifican los Equipos de Seguridad que se van a utilizar en la solución completa de última milla:
 - ✓ Equipos de Firewall
 - ✓ UTM
 - ✓ Administrador Ancho de Banda

Especificaciones equipo de seguridad: UTM, Firewall Y ADMINISTRADOR ANCHO DE BANDA						
MARCA	REFERENCIA	CAPACIDAD DE PROCESAMIENTO (Mbps)	MEMORIA	Fuente Redundante	DISPOINIBILIDAD DE PUERTOS	VERSION SISTEMA OPERATIVO
FORTINET	Fortigate - 1500D	4.3 Gbps	2 x120GB SSD Onboard storage	dual AC Power Supplies	8 x 10GE SFP+slot, 16 x GE SFP, 18 GE x RJ45 Port (Including 16 Port, 2x management/HA ports),	FORTI-OS

Especificaciones equipo forticache					
MARCA	REFERENCIA	CAPACIDAD DE PROCESAMIENTO (Mbps)	MEMORIA	DISPOINIBILIDAD DE PUERTOS	VERSION SISTEMA OPERATIVO
FORTINET	FORTICACHE 400C	80 Mbps	1X 1 TB hard Disk Drive	4x 1 GE RJ 45	FORTI-OS

Especificaciones 2 Servidores WEB					
MARCA	REFERENCIA	PROCESADOR	MEMORIA	DISPOINIBILIDAD DE PUERTOS	CAPACIDAD DE ALMACENAMIENTO
DELL	PowerEdge T130 Server	INTEL Xeon E3-1200 V5 3.0 Ghz	16 GB UDIMM 2.133 MT/S-ECC		4 TB 7.2K RPM - SATA 6Gbps 3.5 hdd
DELL	PowerEdge T130 Server	INTEL Xeon E3-1200 V5 3.0 Ghz	16 GB UDIMM 2.133 MT/S-ECC		4 TB 7.2K RPM - SATA 6Gbps 3.5 hdd

2. Especificación de la solución de seguridad según requerimiento técnico del numeral 4.3.15 del pliego definitivo

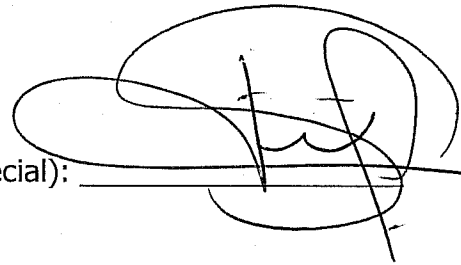
- Especificación FORTINET FORTIANALYZER 300D. Equipo que cuenta con Analizador de Logs, que permite registrar cada movimiento y transacción de la plataforma de seguridad para identificar cualquier informe emitido por algún log o registro de la solución de seguridad del perímetro de la red. Esta solución ofrece las capacidades suficientes para recibir y almacenar los log diarios que se generan por un período mínimo de 30 días de las transacciones en la solución. Este equipo se instalará en la Sede Central – Tunja.

Se adjunta ficha técnica de Fortianalyzer 300D.

Especificaciones equipo ANALIZADOR DE LOGS					
MARCA	REFERENCIA	CAPACIDAD DE PROCESAMIENTO (Mbps)	MEMORIA	DISPOINIBILIDAD DE PUERTOS	VERSION SISTEMA OPERATIVO
FORTINET	Fortigate	15 Gb/Day of	4 TB de	4x1GbE	FORTI-OS

Gracias por la atención prestada.

Atentamente,



FIRMA DEL REPRESENTANTE LEGAL (Apoderado Especial):
 NOMBRE: Julián Andrés Gallego Tangarife
 DOCUMENTO DE IDENTIDAD: 9.865.164
 Apoderado Especial

GRUPO BIENES Y SUMINISTROS
 U.P.T.C.

DIA 9 MES 12 AÑO 15

Sendo...

ANEXO No. 1 - Equipos a Instalar

Punto A	CIUDAD	Medio UK	Tecnología MPLS/MetroEthernet/Vpls	Internet	Datos	MARCA	REFERENCIA	CAPACIDAD DE PROCESAMIENTO (Mbps)	MEMORIA	MEMORIA FLASH (EXTERNAL)	DISPONIBILIDAD DE PUERTO	VERSION SISTEMA OPERATIVO
AV CARACAS CL 45	Bogota	Fibra Optica	MPLS/METROETHE RNET	40 Mbps		CISCO	CISCO2921/K 9	80 Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	4 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CALLE 20 N. 8 - 52	Tunjia	Fibra Optica	VPLS	NA	35 Mbps	CISCO	CISCO2921/K 9	80 Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	4 PUERTOS FISICOS	(UNIVERSAL IP BASE)
Transversal 9 A N° 29 - 05 UPTC EMISORA	Tunjia	Fibra Optica	VPLS	NA	8 Mbps	CISCO	CISCO1941/K 9	20Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CALLE 17 N. 10 - 63 BIBLIOTECA JUAN DE VARGAS	Tunjia	Fibra Optica	VPLS	NA	8 Mbps	CISCO	CISCO1941/K 9	20Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
UPTC SEDE CHIQUINQUIRA CALLE 14a NO 2-37	Chiquinquirá	Fibra Optica	MPLS/METROETHE RNET	60 Mbps	10 Mbps	CISCO	CISCO2921/K 9	80 Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	4 PUERTOS FISICOS	(UNIVERSAL IP BASE)
UPTC SEDE SOGAMOSO CALLE 4 SUR N. 15 - 134	Sogamoso	Fibra Optica	MPLS/METROETHE RNET	100 Mbps	12 Mbps	CISCO	CISCO3925/K 9	180 Mbps	Memory DDR2 ECC DRAM 1024 MB	256 MB	5 puertos fisicos	(UNIVERSAL IP BASE)
UPTC SEDE DUITAMA CARRERA 18 CON CALLE 22	Duitama	Fibra Optica	MPLS/METROETHE RNET	100 Mbps	12 Mbps	CISCO	CISCO3925/K 9	180 Mbps	Memory DDR2 ECC DRAM 1024 MB	256 MB	5 puertos fisicos	(UNIVERSAL IP BASE)
CONSULTORIO JURIDICO	Tunjia	Fibra Optica	VPLS	NA	6 Mbps	CISCO	CISCO1941/K 9	20 Mbps	Memory DDR2 ECC DRAM 512 MB	256 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)

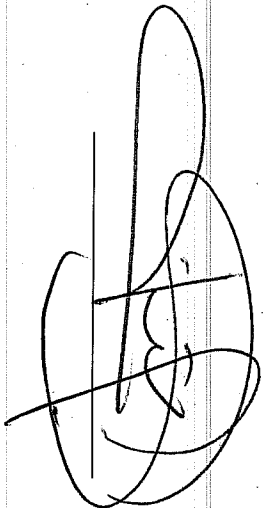
Avenida Central del Norte 39-115	Tunja	Fibra Optica	MPLS/METROETHE RNET/VPLS	260 Mbps	100 Mbps	CISCO	CISCO3945E-SEC/K9 / L-FL-39E-HSEC-K9	450 Mbps	Memory DDR2 ECC DRAM 1024 MB	256 MB	6 PUERTOS FISICOS	(UNIVERSAL IP BASE)
GRANJA TUNGUAVITA (OB)	Paipa	Radio Punto a Punto	CONTENIDO INTERNET IP/ SOPORTA TECNOLOGIA METROETHERNET/ MPLS	4 Mbps	NA	CISCO	Cisco1841-HSEC	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
UBICADA DENTRO DE LA SEDE CENTRAL	Incitema	Fibra Optica	MPLS/METROETHE RNET/VPLS	6 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CENTRO CALLE 17 N. 23-60	Yopal	Fibra Optica	CONTENIDO INTERNET IP	9 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CENTRO CALLE 19 N. 15 - 60 BIBLIOTECA MUNICIPAL	Monterrey	Fibra Optica	CONTENIDO INTERNET IP	7 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CENTRO CRA 6 N. 6-02 INSTITUTO TÉCNICO INDUSTRIAL	Fusagasuga	Fibra Optica	CONTENIDO INTERNET IP	5 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
CRA 706 N. 74-13 INSTITUTO HENAO Y ARRUBLA	Bogota	Fibra Optica	CONTENIDO INTERNET IP	9 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
BUENAVIDA DIAGONAL 58 N. 18-12 B NORMAL SUPERIOR CRISTO REV	Barrancabermeja	Radio Punto a Punto	CONTENIDO INTERNET IP	5 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
Normal Superior Santa Teresita Quetame	Quetame	Fibra Optica	CONTENIDO INTERNET IP	5 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
Alcaldia Municipal	Chiscas	Fibra Optica	CONTENIDO INTERNET IP	4 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
B. Simón Bolívar Cra 6 No. 8-47	Soata	Radio Punto a Punto	CONTENIDO INTERNET IP	7 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
Sede UPTC calle 16 No. 12-18	Garagoa	Fibra Optica	CONTENIDO INTERNET IP	5 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)

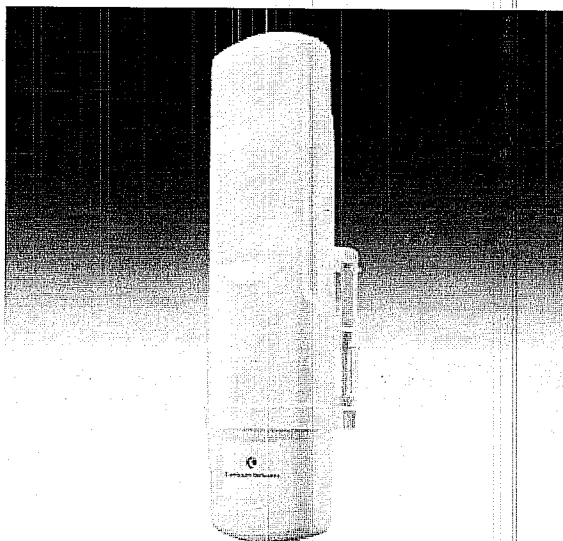
Punto A	Nombre Nodo Enrutamiento	Medio UK	Tecnología MPLS/MetroEthernet/Vpls	Internet	Datos	MARCA	REFERENCIA	CAPACIDAD DE PROCESAMIENTO (Mbps)	MEMORIA	MEMORIA FLASH (EXTERNAL)	DISPONIBILIDAD DE PUERTO	VERSION SISTEMA OPERATIVO
Museo Arqueológico Calle 9 A N° 6 2 45	Sogamoso	Fibra Optica	CONTENIDO INTERNET IP	2 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)
Vereda Monquirá, 6 kilómetros de Villa de Leyva MUSEO	Villa de Leyva	Radio Punto a Punto	CONTENIDO INTERNET IP	1 Mbps	NA	CISCO	Cisco1841	20Mbps	Memory DDR2 ECC DRAM 256 MB	64 MB	2 PUERTOS FISICOS	(UNIVERSAL IP BASE)

Se firma en Pereira a los Siete (7) de 2015

Atentamente,

FIRMA DEL REPRESENTANTE LEGAL (Apoderado Especial):
 NOMBRE: Julián Andrés Gallego Tangarife
 DOCUMENTO DE IDENTIDAD: 9.865.164
 Apoderado Especial





PMP 430 Subscriber Module (5.4GHz)

The Cambium Point-to-Multipoint (PMP) 430 Access Point and Subscriber Module is the ideal solution for developing, enhancing and extending advanced broadband networks with more than 50 Mbps of total aggregate throughput for data transfer, voice and video applications. Based on OFDM technology, the PMP 430 offers robust performance, even in near or non line-of-sight (nLOS or NLOS) conditions. Cambium Networks products combine field-proven toughness with exceptional performance, security, ease-of-use and cost effectiveness.

Because of GPS Synchronization, Access Points can be co-located on the same tower location with other Cambium PMP. Subscriber Modules can be purchased with throughputs of 4, 10, 20 or Uncapped Mbps and throughput can be enhanced to existing modules via a fixed software license.

Cambium Networks provides exceptional wireless broadband connectivity solutions. With more than 3 million modules deployed in thousands of networks around the world, Cambium solutions are proven to provide cost effective, reliable data, voice and video connectivity.

SPECIFICATIONS

PRODUCT	
MODEL NUMBER	5490SM4, 5490SM10, 5490SM20, 5490SM40
SPECTRUM	
CHANNEL SPACING	Configurable on 2.5 MHz increments for 5 MHz Channel Configurable on 5 MHz increments for 10 and 20 MHz Channels
FREQUENCY RANGE	5470-5725 MHz
CHANNEL WIDTH	5 MHz, 10 MHz or 20 MHz
INTERFACE	
PHYSICAL LAYER	OFDM 256FFT
MAC (MEDIA ACCESS CONTROL) LAYER	Cambium Proprietary
ETHERNET INTERFACE	10/100BaseT, half/full duplex, rate auto negotiated (802.3 compliant)
PROTOCOLS USED	IPv4, UDP, TCP, IP, ICMP, Telnet, SNMP, HTTP, FTP
NETWORK MANAGEMENT	HTTP, Telnet, FTP, SNMPv2c Prizm 3.3 and One Point Wireless Manager 2.2
VLAN	802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority, dynamic port VID
PERFORMANCE	
CYCLIC PREFIX	1/4, 1/8 or 1/16 fixed
ARQ	Yes
COLLOCATION WITH PMP 58100	Yes, 10MHz guard band required or 5MHz with 3 ft vertical required; synchronization required
COLLOCATION WITH PMP 54100	Yes, 10MHz guard band separation or 5MHz with 3 ft vertical required; synchronization required
COLLOCATION WITH PMP 52100	YES
MODULATION LEVELS (ADAPTIVE)	1X=QPSK, 2X=16QAM, 3X=64QAM
LATENCY	5 - 7 ms

SPECIFICATIONS

FORWARD ERROR CORRECTION	3/4 Reed-Solomon block coding
PACKETS PER SECOND	4,800
GPS SYNCHRONIZATION	Yes
QUALITY OF SERVICE	DiffServ QoS
MAX. AGGREGATE THROUGHPUT PER SECTOR (@20MHZ CHANNEL)	1X: 16.5 Mbps, 2X: 32 Mbps, 3X: >50 Mbps
MAX. AGGREGATE THROUGHPUT PER SECTOR (@10MHZ CHANNEL)	1X: 8 Mbps, 2X: 16.5Mbps, 3X: 24.5Mbps
MAX. AGGREGATE THROUGHPUT PER SECTOR (@5 MHZ CHANNEL)	1X: 3.5 Mbps, 2X: 7 Mbps, 3X: 10.5 Mbps

ANTENNA

ANTENNA BEAM WIDTH	55° azimuth, 55° elevation (3 dB antenna pattern)
TRANSMIT POWER	-30 to +19 dBm (to EIRP limit by region) (1dBm interval)
ANTENNA GAIN	10 dBi
MAXIMUM TRANSMIT POWER	19 dBm
EIRP	30 dBm FCC, ETSI (20 MHz Channel) 27 dBm FCC, ETSI (10 MHz Channel)
TYPICAL LOS RANGE	1X: 11 mi. (18 km), 2X: 5 mi. (8 km), 3X: 2.25 mi. (3.6 km)
REFLECTOR GAIN	+ 15 dBi
LENS GAIN	+ 6 dBi

PHYSICAL

WIND LOADING	90 lbs.
ANTENNA CONNECTION	N/A - Integrated Antenna
MEAN TIME BETWEEN FAILURE	> 90 Years
ENVIRONMENTAL	IP55
TEMPERATURE	-40°C to +55°C (-40°F to +131°F) 0% - 95% relative humidity, non-condensing
WEIGHT	0.45kg (1 lb.)
WIND SURVIVAL	190 km/hour (118 mi/hour)
DIMENSIONS (HxWxD)	30 x 9 x 9 cm (11.75" x 3.4" x 3.4")
MAXIMUM POWER CONSUMPTION	10W
INPUT VOLTAGE	24 to 30V

SECURITY

ENCRYPTION	56-bit DES, 128-bit AES Optional
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CERTIFICATIONS

CE	EN301 893 v1.6.1
FCC ID	Z8H89FT7638
INDUSTRY CANADA CERT	109W-5490G





WipAir Series

Superior Point-to-Point & Point-to-Multipoint Wireless Bridge

WaveIP's WipAir series is an advanced high performance Point-to-Point & Point-to-Multipoint wireless solution in 700 MHz – 6 GHz.

WipAir carrier-grade solution sets a benchmark of unrivaled performance, reliability, capacity, latency and RF robustness at the most competitive price in the market.

WipAir Exceptional Highlights

High Performance Radio

- High net throughput – up to **135 Mbps**
- **Dynamic asymmetric capacity**
- Best latency – **1ms** typical
- More than **100,000 PPS** (Packets Per Second)
- Configurable channel bandwidth – 5/10/20/40 MHz
- 128-bit AES encryption & MAC level authentication

RF Interference Robustness

- **AIS** (Automatic Interference Sensibility) – unique technology that makes WipAir the most stable wireless solution in the market
- **Time Synchronization** eliminates self interference and allows frequency reuse
- **Hitless ACM** – Adaptive Coding & Modulation
- Fastest ARQ – Automatic Retransmit reQuest
- ACS – Automatic Channel Selection
- DFS – Dynamic Frequency Selection
- ATPC – Automatic Transmit Power Control
- FEC – Forward Error Correction

Advanced Networking

- **Point-to-Point & Point-to-Multipoint** modes
- WEB, EMS, SNMP and Telnet management
- QoS based on 802.1q & 802.1p
- VLAN tagging/stripping
- Up/downstream bandwidth control
- Packet filtering – based on broadcast, VLAN & IP
- Over the air remote management

Typical Applications

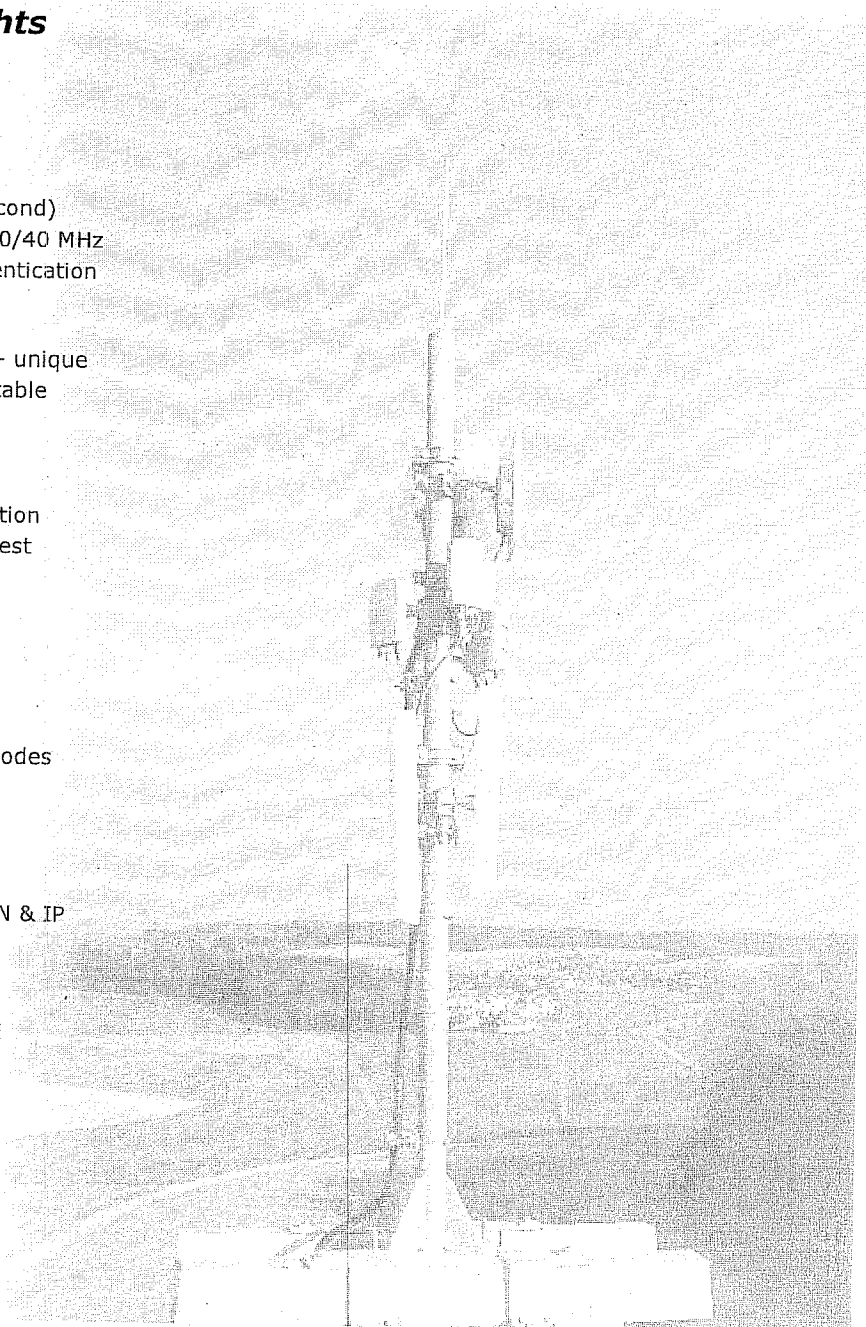
- IP data backhaul for Cellular, WiMAX & LTE
- Backbone for Metro WiFi Networks
- Video surveillance in HLS and safe-city
- Multiple backhaul solutions
- Rural/Suburban or remote Locations
- High bandwidth campus solutions
- Temporary & Emergency systems

WipAir Series

- WipAir 3000 – 135 Mbps net throughput
- WipAir 2000 – 40 Mbps net throughput
- WipAir 1000 – 20 Mbps net throughput

Build as you grow

Software upgrades between WipAir models:
WipAir 1000 → WipAir 2000 → WipAir 3000





WipAir Series

Specifications

Radio

Radio Frequency	700MHz, 900 MHz, 2.0-2.3 GHz, 2.3-2.7 GHz, 3.3-3.8 GHz, 4.9 GHz, 5.x GHz							
Net Throughput	20, 40, 135 Mbps							
PPS	>100,000 Packets Per Second							
Range	More than 130 Km							
Channel Size	Configurable – 5 / 10 / 20 / 40 MHz							
Waveform	Advanced OFDM							
Output Power	Configurable up to 26 dBm, 40 dB dynamic range							
Handling Interference	AIS – Automatic Interference Sensibility Hitless ACM – Adaptive Coding & Modulation ACS – Automatic Channel Selection FEC – Forward Error Correction, k = 1/2, 2/3, 3/4, 5/6 Fast ARQ – Automatic Retransmit reQuest							
Encryption & Security	128-bit AES & MAC level authentication							
Modulation	BPSK	QPSK		16QAM		64QAM		
FEC	1/2	1/2	3/4	1/2	3/4	2/3	3/4	5/6
Data Rate @ 5 MHz (Mbps)	1.625	3.25	4.875	6.5	9.75	13	14.625	16.25
Data Rate @ 10 MHz (Mbps)	3.25	6.5	9.75	13	19.5	26	29.25	32.5
Data Rate @ 20 MHz (Mbps)	6.5	13	19.5	26	39	52	58.5	65
Data Rate @ 40 MHz (Mbps)	15	30	45	60	90	120	135	150
Sensitivity @ 20 MHz (dBm)	-87	-85	-83	-80	-78	-72	-70	-67

Networking and Management

Topology	Point-to-Point (PTP), Point-to-Multipoint (PTMP)
Access Technology	Time Division Duplex (TDD) – Dynamic or Symmetric
Data Latency	1ms typical
Network modes	Layer 2 Bridge, VLAN, VLAN / broadcast / IP filters
VLAN	Transparent, VLAN filter, tagging/stripping
QoS	8 priority queues based on 802.1q & 802.1p
Traffic shaping	SLA (Service Level Agreement) provisioning for uplink and downlink independently
Management	WEB, EMS, SNMP, Telnet, Built in throughput test and RF Analyzer tools

Physical and Environmental

Physical Interface	2x 10/100 Base-T (ODU)
Connector Type	RJ-45
Mechanical	19 x 19 x 4 cm (external antenna port)
PoE Adapter:	
• Input Power	100-240 VAC, 47-63 Hz
• Mechanical	10 x 5 x 2.5 cm
Mounting	Wall or pole
Power Consumption	<6Watt
Operating Temperature	-30°C to 55°C
Operating Humidity	100% non condensing (Rainproof)
Power	Power over Ethernet (PoE) – 48 VDC



Teradion Industrial Park, Misgav 20179, Israel
 Tel: +972-4-902-7000 Fax: +972-4-999-0324
 Email: info@waveip.com www.waveip.com

ANEXO 2 - Descripción Técnica Última Milla en Fibra Óptica

DISEÑO Y CONSTRUCCIÓN DE LA RED DE FIBRA ÓPTICA

Los diseños de la red de fibra óptica de MEDIA COMMERCE PARTNERS se definen a partir de la proyección del potencial mercado de operadores de telecomunicaciones y clientes corporativos ubicados en áreas Urbanas o Cabeceras Municipales.

Una importante porción de la red de MEDIA COMMERCE PARTNERS está construida sobre topologías anilladas, tanto en las troncales interurbanas como en las redes metropolitanas, con lo cual se garantiza la redundancia en la conectividad y el incremento de los niveles de disponibilidad de la red.

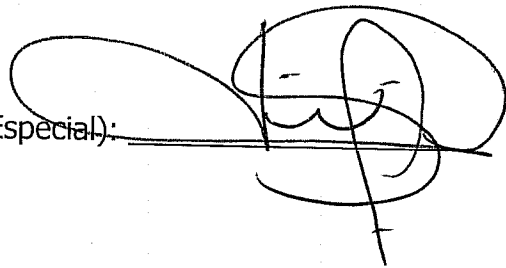
Los tendidos de la red de fibra óptica de MEDIA COMMERCE PARTNERS son tanto aéreos como canalizados y están soportados sobre infraestructura eléctrica de baja, media y alta tensión, propiedad de las electrificadoras, infraestructura de telecomunicaciones aérea de 8, 10, 12 y 18 metros y un importante porcentaje de infraestructura canalizada, ductos y recamaras especialmente en trayectos urbanos donde la implementación de la red lo hace necesario y los planes de ordenamiento territorial así lo exigen, en algunas regiones MEDIA COMMERCE PARTNERS cuenta con infraestructura propia.

Las redes de fibra óptica de MEDIA COMMERCE PARTNERS están conformadas por cables de entre 12 y 96 hilos, típicamente las troncales y las redes ubicadas en zonas con alto desarrollo comercial e industrial tienen la mayor capacidad de hilos, con el fin de que estos puedan ser utilizados de forma escalable y respondan a la demanda y el desarrollo de las telecomunicaciones en el territorio colombiano.

De acuerdo a lo anterior las instalaciones en Fibra Óptica para las sedes de la Universidad Pedagógica de Colombia se realizarán en tendidos de última milla en 12 hilos F.O. ADSS Span 100 sobre infraestructura de las electrificadoras locales con las que actualmente contamos con contratos de uso.

Se firma en Pereira a los siete (7) días del mes de Diciembre de 2015.

FIRMA DEL REPRESENTANTE LEGAL (Apoderado Especial):
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Apoderado Especial



CONVERSORES DE MEDIO (TRANSCEIVER)

10/100/1000 BASET a FL SC, ST, LC, FC.

MULTIMODO: 2 Kms. MONOMODO: 25Kms. 40Kms. 60Kms. 80Kms. 120Kms.
DUAL FIBER - MONOFIBRA WDM BI-DI una sola fibra.

Features:

Supporting Full duplex and half-duplex transmission and capable of automatic negotiation. efficient built in switching core to implement flow control and reduce broadcast packets.

Supporting The transmission of extra-long packets over VLAN

10/100/1000M intelligent adaptive rack type media converter series.

Product brief:

VK100 and VK1100 series are a kind of 10/100/1000Mbps intelligent adaptive fast Ethernet media converter. It can implement data transmission between twisted pair electrical signals and optical signals which are the two type of network connection media. This type of media converter can extend the transmission distance of a network from 100M over copper wires to 120KM in which there is no help of any other converter. It should be installed in 16 rack media converter chassis when used.

Elucidation:

Supporting Full duplex and half-duplex transmission and capable of automatic negotiation. efficient built in switching core to implement flow control and reduce broadcast packets.

Supporting The transmission of extra-long packets over VLAN

Supporting The selection of multiple types of fiber ports such as dual-fiber multi-mode, dual-fiber single-mode and single-fiber single-mode, to satisfy the extended requirements of users.

Technical specifications:

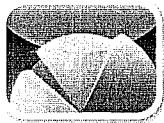
Parameter

Specifications

Access mode:	10/100/1000Mbps
Standard:	IEEE802.3 10Base-T Ethernet, IEEE802.3u, 100Base-TX/FX Fast Ethernet, IEEE802.3x Flow control, IEEE802.1q VLAN, IEEE802.1p QoS, IEEE802.1d Spanning Tree
Wavelength:	50nm/1310nm/1550nm
Transmission distance:	Dual-fiber multi-mode: 2Km; dual-fiber single-mode: 25/40/60/80/100/120Km; single-fiber single-mode 25/40/60/80/100Km Category-5 twisted-pair: 100m
Port:	One RJ45 connector, connected to STP/UTP category-5 twisted pair One fiber port: Multi-mode - SC or ST (fiber size: 50.62.5/125µm) Single mode - SC/FC fiber port (fiber size: 9/125µm) Single-fiber single-mode - SC/FC fiber port (fiber size: 9/125µm)
Conversion model:	Medium conversion, storing and forwarding Z
MAC address table:	1K
Buffer space:	1Mbit
Flow control:	Full duplex state: flow control; half duplex state: back pressure mode
Delay :	9.6us
Bit error rate:	<1/1000000000
MTBF:	100,000 hours
LED:	Power, TX link (fiber link action), TP LINK1000, TP LINK100, TP ACT) FDX (FX full duplex mode), FX100 (Fiber, with a transmission rate of 100M) TP 1/2/3/4 LINK/ACT (1/2/3/4-port twisted pairs connection action) TP 1/2/3/4 100 (1/2/3/4-port twisted pairs, with a transmission rate of 100M) AC 80 a 240 0.5A/PC-48(bulltin)
Power:	
Power consumption:	5W
Operating temperature:	-10~55°C
Operating humidity:	5%~90%
Storage temperature:	-40~70°C
Storage humidity:	5%~90% (non-condensing)
Dimensions:	140mm * 111 * 30mm(in) 95 * 70 * 26mm(out)

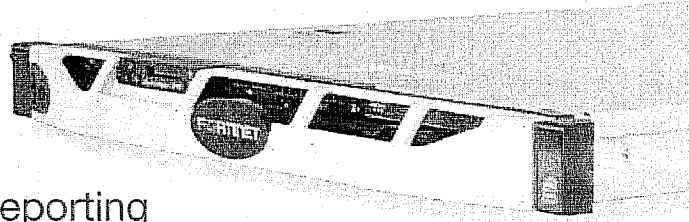
V-Kom





FortiAnalyzer™

Centralized logging, analysis and reporting



Comprehensive Visualization of Your Network

FortiAnalyzer platforms integrate network logging, analysis, and reporting into a single system, delivering increased knowledge of security events throughout your network. The FortiAnalyzer family minimizes the effort required to monitor and maintain acceptable use policies, as well as identify attack patterns to help you fine tune your policies. Organizations of any size will benefit from centralized security event logging, forensic research, reporting, content archiving, data mining and malicious file quarantining.

You can deploy FortiAnalyzer physical or virtual appliances to collect, correlate, and analyze geographically and chronologically diverse security data. Aggregate alerts and log information from Fortinet appliances and third-party devices in a single location, providing a simplified, consolidated view of your security posture. In addition, FortiAnalyzer platforms provide detailed data capture for forensic purposes to comply with policies regarding privacy and disclosure of information security breaches.

Key Features & Benefits

Graphical Summary Reports	Provides network-wide reporting of events, activities and trends occurring on FortiGate® and third party devices.
Network Event Correlation	Allows IT administrators to quickly identify and react to network security threats across the network.
Scalable Performance and Capacity	FortiAnalyzer family models support thousands of FortiGate and FortiClient™ agents, and can dynamically scale storage based on retention/compliance requirements.
Centralized Logging of Multiple Record Types	Including traffic activity, system events, viruses, attacks, Web filtering events, and email filtering.
Seamless Integration with the Fortinet Product Portfolio	Tight integration allows FortiAnalyzer resources to be managed from FortiGate or FortiManager™ user interfaces.
Choice of Standalone, Collector or Analyzer mode	Can be deployed as an individual unit or optimized for a specific operation (such as Store & Forward or Analytics).
Virtual and Physical Appliance Form Factors	Available for VMware, Hyper-V and multiple hardware appliance form factors.

Fortinet's Versatile Management Solution

Networks are constantly evolving due to threats, organizational growth or new regulatory/business requirements. Traditional analysis products focus on recording and identifying company-wide threats through logging, analysis and reporting over time.

FortiAnalyzer offers enterprise class features to identify these threats, but also provides flexibility to evolve along with your ever-changing network. FortiAnalyzer can generate highly customized reports for your business requirements while aggregating logs in a hierarchical, tiered logging topology.

Key tenets of Fortinet's management versatility:

- Diversity of form factors
- Architectural flexibility
- Highly customizable
- Simple licensing



FortiCare

Worldwide 24x7 Support
support@fortinet.com



FortiGuard

Threat Research & Response
www.fortiguard.com

SPECIFICATIONS

	FORTIANALYZER-200D	FORTIANALYZER-300D	FORTIANALYZER-1000C	FORTIANALYZER-2000B	FORTIANALYZER-3000D	FORTIANALYZER-4000B
Capacity and Performance						
GB/Day of Logs	5	15	25	75	250	Unlimited*
Sessions/Day	18 M	55 M	85 M	260 M	850 M	Unlimited*
Maximum Log Rate (Standalone Mode)	350	625	1,000	3,000	10,000	Unlimited*
Average Retention at 5 GB Logs/Day	3 months	1 year	2 years	3 years	4 years	6 years
Devices/ADOMs/VDOMs Supported (Max)	150	200	2,000	2,000	2,000	2,000
Hardware Specification						
Security Hardened Platform	Yes	Yes	Yes	Yes	Yes	Yes
Total Interfaces	4x GbE	4x GbE	4x GbE	6x GbE	4x GbE, 2x GbE SFP	2x GbE, 2x GbE SFP
Number of Hard Drives	1	2	1 (4 Drives Max)	2 (6 Drives Max)	8	6 (24 Drives Max)
Removable Hard Drives	No	No	Yes	Yes	Yes	Yes
Storage Capacity	1x 1 TB	2x 2 TB (4 TB Max)	1x 2 TB (8 TB Max)	2x 2 TB (12 TB Max)	8x 2 TB (16 TB Max)	6x 1 TB (24 TB Max)
RAID Storage Management	No	Yes (0, 1)	No (Yes with Optional Drives 0, 1, 10)	Yes (0, 1, 5, 10, 50)	Yes (0, 1, 5, 10, 50, 60)	Yes (0, 1, 5, 6, 10, 50, 60)
Redundant Hot Swap Power Supplies	No	No	No	Yes	Yes	Yes
Dimensions						
Height x Width x Length (in)	1.8 x 17.1 x 13.9 in	1.7 x 17.1 x 14.3 in	1.7 x 17.1 x 24.7 in	3.4 x 17.4 x 26.8 in	3.4 x 20 x 29.7 in	6.9 x 19.1 x 27.2 in
Height x Width x Length (cm)	4.5 x 43.3 x 35.2 cm	4.4 x 43.5 x 36.4 cm	4.3 x 43.4 x 62.7 cm	8.6 x 44.3 x 68.1 cm	8.7 x 48.2 x 75.5 cm	17.5 x 48.5 x 69.0 cm
Weight	13.4 lbs (6.1 kg)	15.9 lbs (7.2 kg)	35.0 lbs (15.9 kg)	63 lbs (28.6 kg)	71.5 lbs (32.5 kg)	94.5 lbs (43 kg)
Form Factor	Rack mount, 1 RU	Rack mount, 1 RU	Rack mount, 1 RU	Rack mount, 2 RU	Rack mount, 2 RU	Rack mount, 3 RU
Environment						
AC Power Supply	100-240 VAC, 50-60 Hz, 6 Amp Max	100-240 VAC, 50-60 Hz, 4 Amp Max	100-240 VAC, 50-60 Hz, 7.5 Amp Max	100-240 VAC, 50-60 Hz, 9 Amp Max	100-240 VAC, 50-60 Hz, 9 Amp Max	100-240 VAC, 50-60 Hz, 11.5 Amp Max
Power Consumption (AVG)	60 W	182 W	189 W	200 W	393 W	420 W for 6 HDD
Heat Dissipation	205 BTU/h	666 BTU/h	643.6 BTU/h	519 BTU/h	2153 BTU/h	1433.7 BTU/h (6 drives) 2034.6 BTU/h (12 drives)
Operating Temperature	32-104°F (0-40°C)	50-95°F (10-35°C)	32-95°F (0-35°C)	50-95°F (10-35°C)	50-95°F (10-35°C)	32-104°F (0-40°C)
Storage Temperature	-13-158°F (-35-70°C)	-40-158°F (-40-70°C)	-40-149°F (-40-65°C)	-40-149°F (-40-65°C)	-40-149°F (-40-65°C)	-13-158°F (-25-70°C)
Humidity	5-95% non-condensing	8-90% non-condensing	5-95% non-condensing	5-95% non-condensing	20-90% non-condensing	5-95% non-condensing
Compliance						
Safety Certifications	FCC Part 15 Class A, C-Tick, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, C-Tick, VCCI, CE, UL/ cUL, CB	FCC Part 15 Class A, C-Tick, VCCI, CE, BSMI, UL/cUL, CB, NOM, GOST	FCC Part 15 Class A, C-Tick, VCCI, CE, BSMI, KC, UL/cUL, CB, GOST	FCC Part 15 Class A, C-Tick, VCCI, CE, BSMI, KC, UL/cUL, CB, GOST	FCC Part 15 Class A, C-Tick, VCCI, CE, BSMI, UL/cUL, CB

	FAZ-VM-BASE	FAZ-VM-GB1	FAZ-VM-GB5	FAZ-VM-GB25	FAZ-VM-GB100
Capacity and Performance					
GB/Day of Logs	1 incl.	+1	+5	+25	+100
Sessions/Day	3.5 M	3.5 M	18 M	85 M	360 M
Device Quota	200 GB	+200 GB	+1 TB	+8 TB	+16 TB
Devices/ADOMs/VDOMs Supported (Max)	10,000	10,000	10,000	10,000	10,000
Hypervisor Support	Vmware ESX/ESXi 4.0/4.1/5.0/5.1, Microsoft Hyper-V 2008 R2 / 2012				
Network Interface Support (Min / Max)	1 / 4				
vCPUs (Min / Max)	1 / Unlimited				
Memory Support (Min / Max)	1 GB / Unlimited				

* Only restricted to the hardware platform performance (e.g. there are no software licensing limitations)



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