



BOARD OF SUPERVISORS AGENDA ITEM REPORT
CONTRACTS / AWARDS / GRANTS

Award Contract Grant

Requested Board Meeting Date: September 5, 2017

* = Mandatory, information must be provided

or Procurement Director Award

***Contractor/Vendor Name/Grantor (DBA):**
Sprocket Communications, LLC

***Project Title/Description:**
Rooftop License Agreement, Amendment #4

***Purpose:**
To renew Contract CTN-IT-12*065 for an additional five (5) years, pursuant to the provisions of Section 12.

***Procurement Method:**
Other Non-Procurement Contract D29.4

***Program Goals/Predicted Outcomes:**
Monthly revenue payments to Pima County.

***Public Benefit:**
Sprocket, LLC is a Wireless Internet Service Provider delivering broadband services to constituents and businesses.

***Metrics Available to Measure Performance:**
Timely monthly payment of fee assigned to Sprocket, LLC., for use of the 33 N. Stone rooftop and shelter space.

***Retroactive:**
Yes: change in ownership delayed contract extension. Non-approval will result in removal of equipment, loss of services to constituents and businesses, and loss of revenue to Pima County.

Contract / Award Information

Document Type: _____ Department Code: _____ Contract Number (i.e., 15-123): _____

Effective Date: _____ Termination Date: _____ Prior Contract Number (Synergen/CMS): _____

Expense Amount: \$* _____ Revenue Amount: \$ _____

***Funding Source(s) required:**

Funding from General Fund? Yes No If Yes \$ _____ % _____

Contract is fully or partially funded with Federal Funds? Yes No

***Is the Contract to a vendor or subrecipient?**

Were insurance or indemnity clauses modified? Yes No

If Yes, attach Risk's approval

Vendor is using a Social Security Number? Yes No

If Yes, attach the required form per Administrative Procedure 22-73.

Amendment / Revised Award Information

Document Type: CTN Department Code: IT Contract Number (i.e., 15-123): 12-065

Amendment No.: 4 AMS Version No.: _____

Effective Date: September 1, 2016 New Termination Date: August 31, 2021

Prior Contract No. (Synergen/CMS): _____

Expense or Revenue Increase Decrease Amount This Amendment: \$ 70,221.72

Is there revenue included? Yes No If Yes \$ _____

***Funding Source(s) required:** Information - Infrastructure - Transport Unit

Funding from General Fund? Yes No If Yes \$ _____ % _____

Grant/Amendment Information (for grants acceptance and awards) Award Amendment

Document Type: _____ Department Code: _____ Grant Number (i.e., 15-123): _____

Effective Date: _____ Termination Date: _____ Amendment Number: _____

Match Amount: \$ _____ Revenue Amount: \$ _____

***All Funding Source(s) required:**

*Match funding from General Fund? Yes No If Yes \$ _____ % _____

*Match funding from other sources? Yes No If Yes \$ _____ % _____

*Funding Source: _____

***If Federal funds are received, is funding coming directly from the Federal government or passed through other organization(s)?**

Contact: Jay Hogan

Department: Information Technology Dept. Telephone: 724-2316

Department Director Signature/Date: [Signature] 8/17/17

Deputy County Administrator Signature/Date: [Signature] 8-22-17

County Administrator Signature/Date: [Signature] 8/23/17
(Required for Board Agenda/Addendum Items)

PIMA COUNTY DEPARTMENT OF INFORMATION TECHNOLOGY PROJECT: License Agreement LICENSEE: Sprocket Communications, LLC CONTRACT NO.: CTN-IT-1200000000000000065 CONTRACT AMENDMENT NO.: Four (#04)	<table border="1"> <tr> <td colspan="2" style="text-align: center;">CONTRACT</td> </tr> <tr> <td>NO.</td> <td><u>CTN-IT-12-065</u></td> </tr> <tr> <td>AMENDMENT NO.</td> <td><u>04</u></td> </tr> <tr> <td colspan="2"> This number must appear on all Invoices, correspondence and documents pertaining to this contract. </td> </tr> </table>	CONTRACT		NO.	<u>CTN-IT-12-065</u>	AMENDMENT NO.	<u>04</u>	This number must appear on all Invoices, correspondence and documents pertaining to this contract.	
CONTRACT									
NO.	<u>CTN-IT-12-065</u>								
AMENDMENT NO.	<u>04</u>								
This number must appear on all Invoices, correspondence and documents pertaining to this contract.									

ORIG. CONTRACT TERM: 01 SEPT 2011 – 31 AUG 2016
TERMINATION DATE PRIOR AMENDMENT: N/A
TERMINATION THIS AMENDMENT: 31 AUG 2021

ORIG. CONTRACT AMOUNT: \$48,404.53
PRIOR AMENDMENTS: \$52,236.00
AMOUNT THIS AMENDMENT: \$70,221.72
REVISED CONTRACT AMOUNT: \$170,862.25

ROOFTOP LICENSE AMENDMENT

WHEREAS, COUNTY and LICENSEE entered into an Agreement as referenced above; and

WHEREAS, COUNTY and LICENSEE, pursuant to Section 11, have agreed to extend the License for a period of five (5) years to grant non-exclusive permission to Licensee to install, maintain, operate, and remove certain communications equipment on the rooftop of the building located at 33 North Stone Avenue (Bank of America Building), Tucson, Arizona.

NOW, THEREFORE, it is agreed as follows:

1. The term is hereby extended through August 31, 2021.
2. **Exhibit A** – Communications Equipment on Rooftop Facility replaces current Exhibit A.
3. **Exhibit D** – License Fee Schedule replaces current Exhibit D.
4. **Exhibit E** – Bank of America Rooftop Drawing replaces current Exhibit E.
5. **Exhibit G** – Equipment Specification Sheets replaces current Exhibit G.
6. All other provisions of the License Agreement shall remain in effect and continue to be binding upon the parties.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

IN WITNESS WHEREOF, the parties have affixed their signatures to this Amendment on the dates written below.

PIMA COUNTY:

Sharon Bronson, Chair
Board of Supervisors

Date

ATTEST:

Clerk of Board

Date

APPROVED AS TO FORM:

Tobin Rosen, by Regina Lass

Tobin Rosen, Deputy County Attorney
8/18/17

Date

APPROVED AS TO CONTENT:

Jesse Rodriguez

Jesse Rodriguez, Chief Information Officer
8/17/17

Date

SPROCKET COMMUNICATIONS, LLC:

Brian Petho

Signature

BRIAN PETHO MEMBER

Print Name and Title

8/17/17

Date

EXHIBIT D

LICENSE FEE SCHEDULE

Site ID	Location	Type	Monthly Fee
Bank of America	33 N Stone Avenue	*Antennas	\$ 460.00
		Shelter B Space, 10SF	\$ 270.00
TOTAL MONTHLY			** \$ 730.00

MONTHLY PAYMENTS DUE

09/01/2011 - 08/31/2012	\$730.00	
09/01/2012 - 08/31/2013	\$766.50	(\$730.00 plus 5%)
*** 09/01/2013 - 08/31/2014	\$804.83	(\$766.50 plus 5%)
09/01/2014 - 08/31/2015	\$960.57	(\$914.83 plus 5%)
09/01/2015 - 08/31/2016	\$1,008.60	(\$960.57 plus 5%)
**** 09/01/2016 - 08/31/2017	\$1,059.03	(\$1,008.60 plus 5%)
09/01/2017 - 08/31/2018	\$1,111.98	(\$1,059.03 plus 5%)
09/01/2018 - 08/31/2019	\$1,167.58	(\$1,111.98 plus 5%)
09/01/2019 - 08/31/2020	\$1,225.96	(\$1,167.58 plus 5%)
09/01/2020 - 08/31/2021	\$1,287.26	(\$1,225.96 plus 5%)

* Rooftop monthly charge - Basic Rates effective 09/01/2011

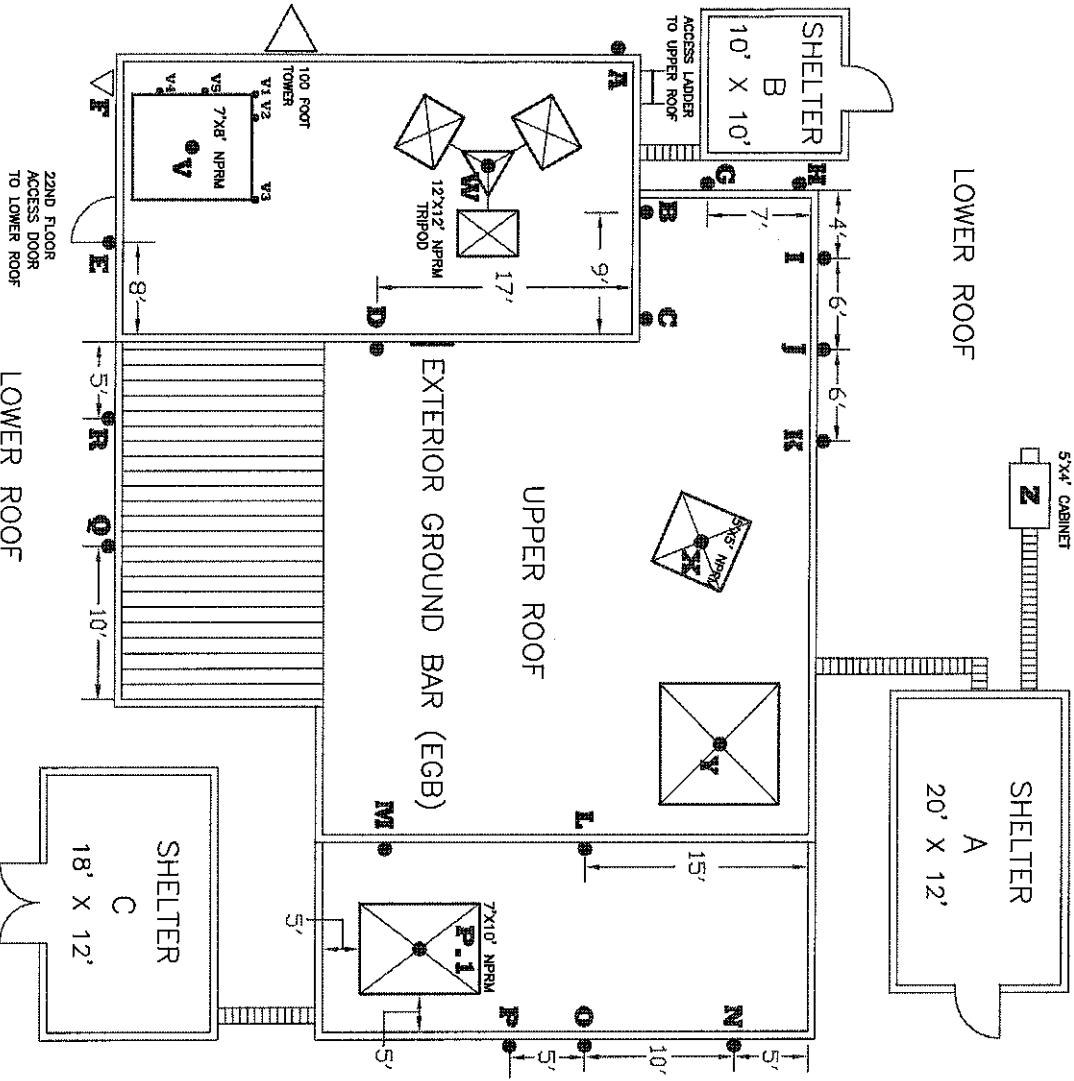
(4) RP-5AC-Gen2 @ \$100.00	=	\$ 400.00 / month
(1) CFIP-11-LUMINA 3' Dish @ 60.00	=	\$ 60.00 / month
Antenna Height - 0'	=	<u>\$ 0.00</u>
Total	=	\$ 460.00 / month

** Does not include Shelter B monthly electrical charges, which will be billed via Pima County Facilities Management on a monthly basis, separately from the above monthly fee.

*** Monthly fee from Amendment #3 effective date through August 31, 2014 is \$914.83 due to the addition of two (2) 2-foot antennas @ \$55.00.


**** Monthly fee for the 5 year Agreement Extension, Amendment 4, effective through **August 31, 2021**, with a 5% annual increase per Section 12 of the License Agreement.

EXHIBIT E



- GENERAL NOTES:**
1. CABLES SHALL FOLLOW CABLE PATH AND BE RUN ON BLOCKS WITH RUBBER INSULATION. CABLE SHALL BE SECURED.
 2. NPPRM's SHALL BE SET ON A RUBBER MAT TO PROTECT MEMBRANE.
 3. ALL NPPRM's SHALL BE BONDED TO THE EGB.
 4. ALL MASTS WITH ACTIVE EQUIPMENT SHALL BE BONDED TO THE EGB.
 5. ALL SURGE SUPPRESSORS SHALL BE BONDED TO THE SHELTER EGB.
- SYMBOLS:**
- NPPRM NON-PENETRATING ROOF MOUNT

LOC.	MOUNT	TENANT-SHELTER	DESCRIPTION
A	1.5" PIPE	SPROCKET-B	2 RP-5AC-Gen2 PANELS
B	4" PIPE	DAKOTIAPRO-B	1 PANEL W/REFLECTOR
C	2" PIPE	VACANT	
D	2" PIPE	VACANT	
E	2" PIPE	VACANT	
F	4" TOWER	VACANT	
G	2" PIPE	VACANT	
H	4" PIPE	DAKOTIAPRO-B	3" DISH
I	1.5" PIPE	VACANT	
J	1.5" PIPE	DEM-A	PANEL
K	1.5" PIPE	SIMPLY BITS	2" DISH
L	1.5" PIPE	SPROCKET-B	2 RP-5AC-Gen2 PANELS
M	1.5" PIPE	DAKOTIAPRO-B	2-24" DISHES
N	1.5" PIPE	SIMPLY BITS	1-2" DISH & 1-PANEL
O	1.5" PIPE	VACANT	
P	1.5" PIPE	DEM-A	PANEL
P.1	7" DISH NPPRM	DEM-A	4" DISH
Q	1.5" PIPE	DEM-A	PANEL
R	1.5" PIPE	VACANT	
V	7/8" NPPRM	DAKOTIAPRO-B	SLED W/4 PIPE MOUNTS
V1	1.5" PIPE	DAKOTIAPRO-B	3 PANELS W/REFLECTOR
V2	1.5" PIPE	DAKOTIAPRO-B	24" DISH
V3	1.5" PIPE	DAKOTIAPRO-B	3 PANELS W/REFLECTOR
V4	4" PIPE	DAKOTIAPRO-B	4" DISH
V5	4" PIPE	DAKOTIAPRO-B	24" DISH
W	1.5" PIPE	VACANT	
X	2" PIPE	VACANT	
Y	2" PIPE	SPROCKET-B	3" DISH & 2 AF-24HD PARABOLICS
Z	CABINET	VACANT	

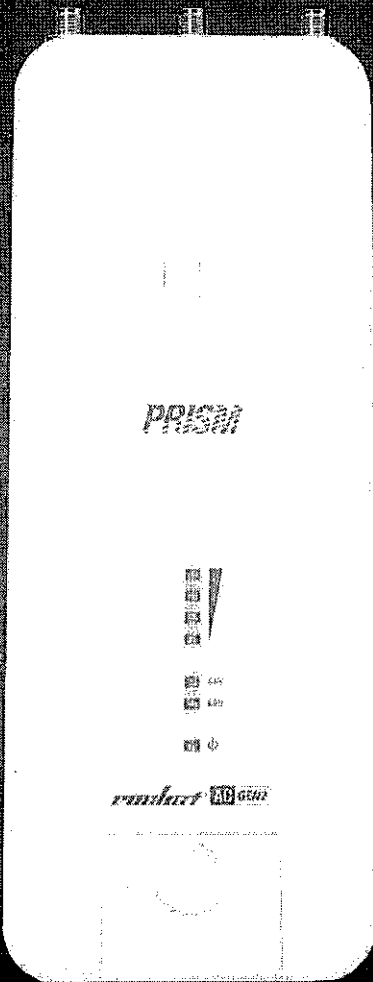


NORTH

ISSUED BY: JH
REVISION: B
CHECKED BY: B
DESIGNED BY: B

DATE: 12/17/17
SCALE: AS SHOWN
PROJECT: 7 020117
REV: 7 020117
SHEET: 1 OF 1

TRIA OF AMERICA ROOFTOP
EVAN STONE
SPROCKET RENEWAL



rocket
PRISM AC GEN2

5 GHz airMAX[®] ac Radio
BaseStation with airPrism[®]
Active RF Filtering Technology

Model: RP-5AC-Gen2

5 GHz Wide Band Operating Frequency

Custom Ubiquiti[®] airMAX ac Processor

Dedicated Wi-Fi Radio for Management



Specifications

RP-5AC-Gen2

Dimensions	88 x 40 x 230 mm (3.47 x 1.58 x 9.06")				
Weight	400 g (14.11 oz)				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	2412 - 2462 5150 - 5875 MHz	5150 - 5250 MHz	5250 - 5350 MHz	5470 - 5725 MHz	5725 - 5850 MHz
Networking Interface	(1) 10/100/1000 Ethernet Port				
RF Connectors	(2) RP-SMA (Waterproof), (1) GPS* (Waterproof)				
LEDs	(4) Signal Strength, GPS*, Power, LAN				
Enclosure	Die-Cast Aluminum with White Powder Coating				
Max. Power Consumption	9.5W				
Power Supply	24V, 0.5A Gigabit PoE Adapter (Included)				
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)				
Processor Specs	Atheros MIPS 74Kc				
Memory	128 MB DDR2 SDRAM				
Supported Voltage Range	18-26VDC				
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels				
Channel Sizes	PTP Mode		PTMP Mode		
	10/20/30/40/50/60/80 MHz		10/20/30/40 MHz		
ESD/EMP Protection	± 24 kV Contact / Air for Ethernet				
Operating Temperature	-40 to 80° C (-40 to 176° F)				
Operating Humidity	5 to 95% Noncondensing				
RoHS Compliance	Yes				
Shock and Vibration	ETSI300-019-1.4				
Modes	Access Point, Station				
Services	Web Server, SNMP, SSH Server, Telnet, Ping, Watchdog, DHCP, NAT, Bridging, Routing				
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test				
Distance Adjustment	Dynamic Ack and Ackless Mode				
Power Adjustment	Software Adjustable UI or CLI				
Security	WPA2 AES Only				
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low				
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate				
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 256QAM, GPS*, TX Filter				
Ubiquiti Specific Features	30/50/60 MHz Channels, airMAX ac Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode				
Certifications	CE, FCC, IC				

* Reserved for future use

TX Power Specifications

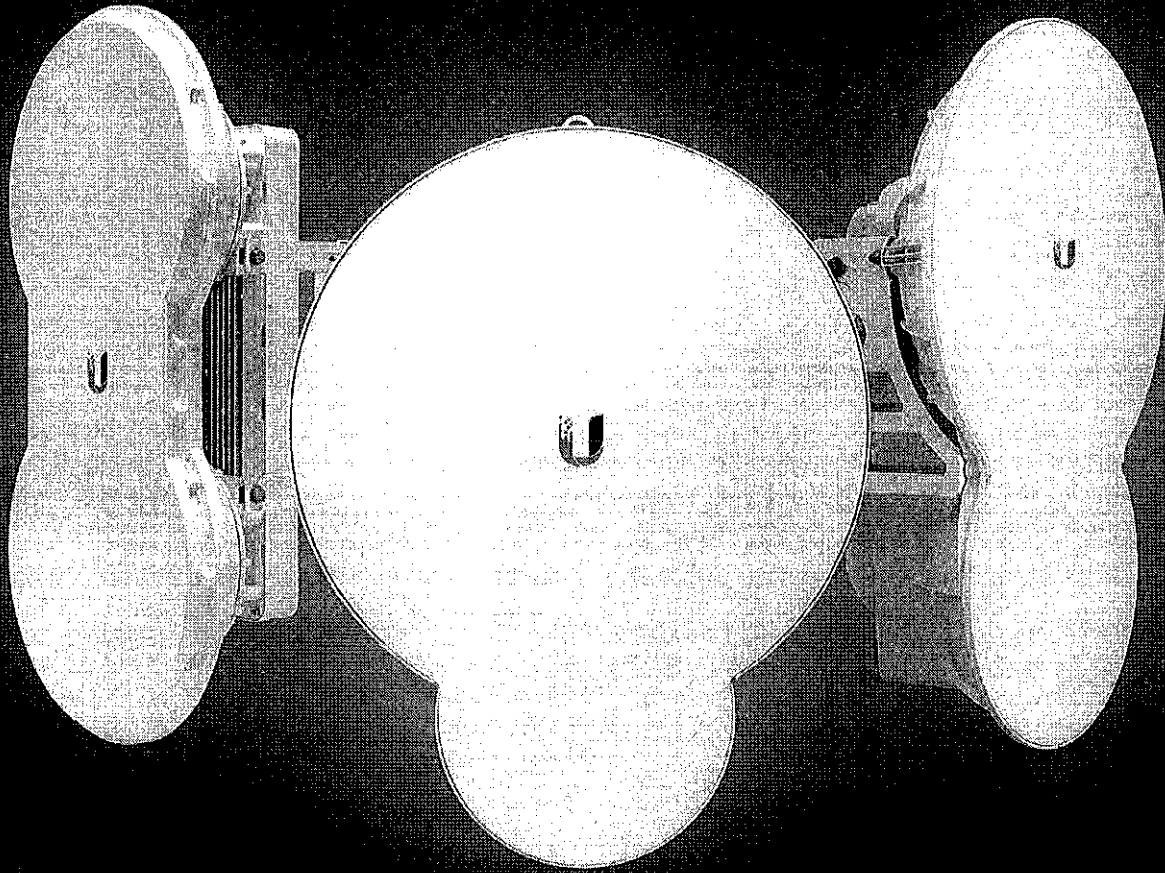
Modulation	Data Rate	Avg. TX	Tolerance
airMAX ac	1x BPSK (1/2)	28 dBm	± 2 dB
	2x QPSK (1/2)	28 dBm	± 2 dB
	2x QPSK (3/4)	28 dBm	± 2 dB
	4x 16QAM (1/2)	28 dBm	± 2 dB
	4x 16QAM (3/4)	28 dBm	± 2 dB
	6x 64QAM (1/2)	28 dBm	± 2 dB
	6x 64QAM (3/4)	27 dBm	± 2 dB
	6x 64QAM (5/6)	26 dBm	± 2 dB
	8x 256QAM (1/2)	24 dBm	± 2 dB
	8x 256QAM (3/4)	22 dBm	± 2 dB

RX Power Specifications

Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (1/2)	-96 dBm	± 2 dB
	2x QPSK (1/2)	-95 dBm	± 2 dB
	2x QPSK (3/4)	-92 dBm	± 2 dB
	4x 16QAM (1/2)	-90 dBm	± 2 dB
	4x 16QAM (3/4)	-86 dBm	± 2 dB
	6x 64QAM (1/2)	-83 dBm	± 2 dB
	6x 64QAM (3/4)	-77 dBm	± 2 dB
	6x 64QAM (5/6)	-74 dBm	± 2 dB
	8x 256QAM (1/2)	-69 dBm	± 2 dB
	8x 256QAM (3/4)	-65 dBm	± 2 dB

DATASHEET

RUCKUS PPTP AC GEN2



*air*Fiber®

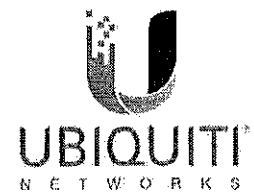
Full-Duplex, Point-to-Point
Gigabit Radio

Models: AF-24, AF-24HD, AF-5, AF-5U

High Performance Wireless Backhaul

Extreme, Long-Range Links

Worldwide License-Free Operation



airFiber® 24 HD

Best-in-Class Performance and Range

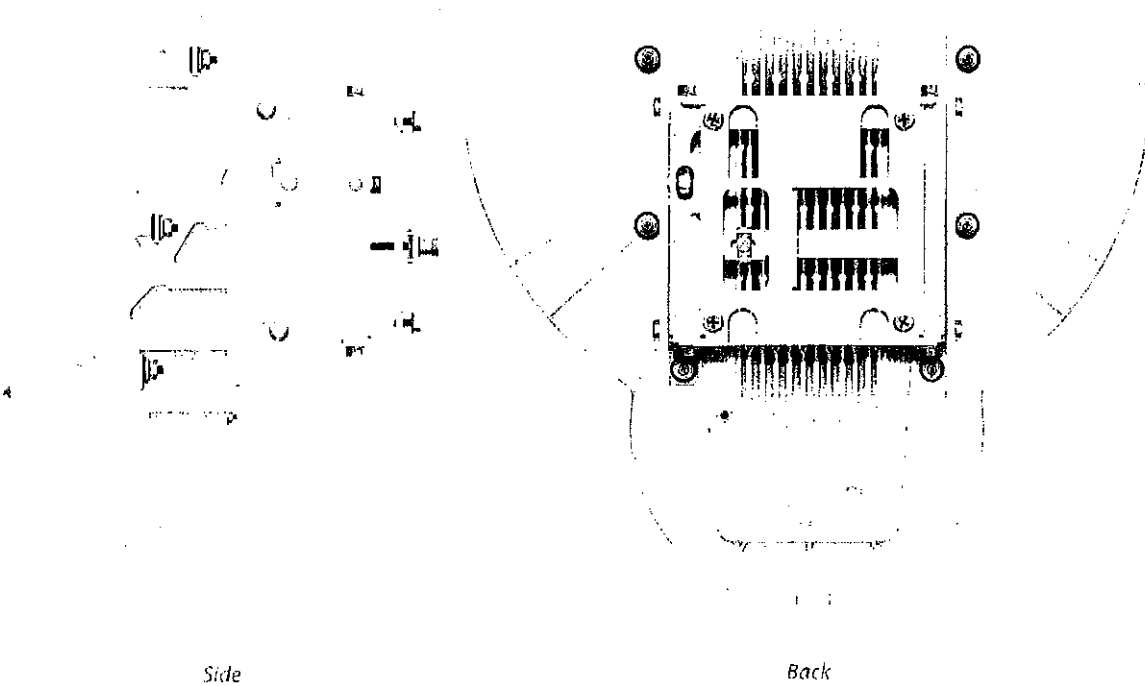
Our INVICTUS custom silicon dramatically improves wireless performance. The AF-24HD model supports the dense modulation rates, up to 256QAM, that are required for high data rates, up to 2 Gbps.

The airFiber AF-24/AF-24HD features the most powerful automatic compensation for path loss degradation due to rain fade, so it provides the best range among 24 GHz products and allows for constellation threshold extension.

Robust Mechanical Assembly

An independent lab has tested the airFiber mechanical assembly to meet MIL-STD-810G, a rigorous United States MIL-STD (Military Standard) that defines a variety of challenging environmental conditions.

The mechanical assembly has also undergone vibration testing using an extended version of IEC 60068-2-6, an environmental standard of the IEC (International Electrotechnical Commission).



2 Gbps
Real Data Throughput

24 GHz
License-Free

20+ km
Extreme Range

HDD
TDD FDD

Specifications

10G-700-20HP	
Operating Frequency	24.05 – 24.25 GHz
Dimensions	593 x 768 x 370 mm (23.35 x 30.24 x 14.57")
Weight	17.3 kg (38.14 lb) Mount Included
Max. Power Consumption	50 W
Power Supply	50V, 1.2A PoE GigE Adapter (Included)
Power Method	Passive Power over Ethernet
Supported Voltage Range	47-58VDC
Certifications	CE, FCC, IC
Wind Loading	770 N @ 200 km/hr (170 lbf @ 125 mph)
Wind Survivability	200 km/hr (125 mph)
Mounting	Pole Mount Kit (Included)
Operating Temperature	-40 to 55° C (-40 to 131° F)
LEDs	(8) Status LEDs: Data Port Speed Data Port Link/Activity Configuration Port Speed Configuration Port Link/Activity GPS Synchronization Modulation Mode Master/Slave RF Status (1) Two-Digit LED Display Calibrated in dBm
Interface	
Data Port	(1) 10/100/1000 Ethernet Port
Configuration Port	(1) 10/100 Ethernet Port
Auxiliary Port	(1) RJ-12, Alignment Tone Port
System	
Maximum Throughput	2 Gbps
Maximum Range	20+ km
Packets per Second	> 1 Million
Encryption	128-Bit AES
Uplink/Downlink Ratio	50% Fixed

10G-700-20HP			
Modulation	Sensitivity	FDD Capacity*	TDD Capacity*
256QAM	-60 dBm	2000 Mbps	1074 Mbps
64QAM	-66 dBm	1500 Mbps	760 Mbps
16QAM	-72 dBm	1000 Mbps	507 Mbps
QPSK MIMO	-78 dBm	500 Mbps	253 Mbps
QPSK SISO	-80 dBm	250 Mbps	127 Mbps
Max QPSK SISO	-87 dBm	62.5 Mbps	31.7 Mbps

* FDD Capacity: Maximum Downlink Capacity. TDD Capacity: Maximum Downlink Capacity.

AirFiber 24.1/24.2 GHz Radio Frequency

GPS	GPS Clock Synchronization
Transceiver	
EIRP	-33 dBm (FCC/IC), -20 dBm (CE)
Frequency Accuracy	±2.5 ppm without GPS Synchronization ±0.2 ppm with GPS Synchronization
Channel Bandwidth	100 MHz
Operating Channels	24.1 GHz, 24.2 GHz
Modulation	256QAM MIMO 64QAM MIMO 16QAM MIMO QPSK MIMO QPSK SISO 1/2x QPSK SISO
Integrated Split Antenna	
TX Gain	33 dBi
RX Gain	40 dBi
Beamwidth	< 3.5°
Front-to-Back Ratio	70 dB
Polarity	Dual Slant Polarization
Cross-Polarity Isolation	> 28 dB

Datasheet

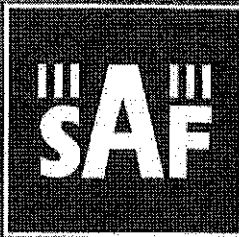
airFiber

All specifications in this document are subject to change without notice.

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Customized Microwave Solutions™ 

Point-to-Point
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SAF Tehnika

SAF Tehnika is among the world's top microwave carrier-class point-to-point radio manufacturers, publicly traded in NASDAQ, ISO certified, with R&D and complete production in Europe, covering spectrum 1.4-38 GHz and licence-free 24 GHz with capacities up to 366 Mbps full-duplex (per radio).

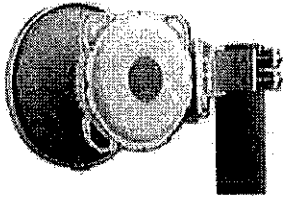
The company offers 2 main product lines:

CFIP series

- 1.4 GHz Marathon FIDU (long haul),
- 366 Mbps Lumina FODU (Optical&Electrical Gigabit Ethernet),
- CFIP-108 FODU (Fast Ethernet),
- 363 Mbps CFIP-Phoenix Hybrid Split Mount System.

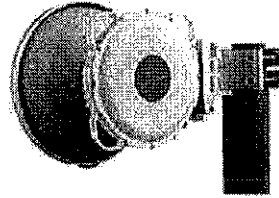
SAF FreeMile

- 100 Mbps full duplex licence-free FODU.



CFIP - 108 FODU

CFIP-108 is primarily designed for IP networks and provides Fast Ethernet interface with capacities from 8 Mbps up to full duplex 100Mbps Fast Ethernet. In addition to that, CFIP-108 has a 4xE1 port for legacy equipment connectivity and for use in hybrid TDM/IP networks.



CFIP Lumina FODU

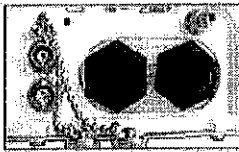
CFIP Lumina systems are intended for Gigabit Ethernet backbone applications delivering up to 366 Mbps per radio. 2+0 aggregation is available for higher bandwidth users. Both single or dual, electrical and fibre optical interface versions are available, as well as hybrid version with 1 optical and 1 electrical port.

CFIP FODU Technical Specification

Radio & Modem	Full outdoor system with built in radio, modem and traffic interfaces	
Product name	CFIP-108 FODU	CFIP Lumina FODU
Frequency Bands	6, 7, 8, 10, 11, 13, 15, 18, 23, 24, 26, 38 GHz	
Capacity	Up to 108 Mbps	Up to 366 Mbps
Channel bandwidth	7/14/28 MHz	28/40/56 MHz
Modulation	QPSK, 16APSK, 32APSK, 64QAM; for 14MHz bw only: 128QAM	QPSK, 16APSK, 32APSK, 64QAM, 128QAM, 256QAM (for all bw)
Protection Switching	1+0 Ring/Mesh (with STP)	1+0, Ring/Mesh (with RSTP/MSTP), 1+1 HSB switch
Aggregation		2+0 (Ethernet Aggregation)
ACM switching		Hitless
Interfaces		
Ethernet port	1xRJ-45 (electrical)	1 or 2 RJ-45 (electrical) or 1 or 2 ODC (fiber optical) hybrid: 1 RJ-45 (electrical) & 1 ODC (optical)
E1	4xE1 (18-pin connector)	none
Power	PoE+ (not IEEE standard)	Outdoor power connector, PoE with surge arrester solution
RSSI port		BNC
Serial Port		Dual-BNC
Connection to antenna	Standard flange according to frequency	
Management		
Management ports	RJ-45 (same as traffic port)	RJ-45 (electrical) or ODC (optical)
Management	In-band	In-band (traffic port) or VLAN port separated
SNMP	SNMP traps, MIB, SNMP v1/v2c, RMON	
EMS	Web based HTTP, Telnet, FTP, Terminal	
Performance graphs	Uptime, Rx level, Tx level, System temperature, Radial MSE, LDPC decoder stress, constellation diagram, equalizer graph	
Ethernet performance	Per port Ethernet counters, Enhanced radio Ethernet statistics	
Loopbacks	E1, modem	

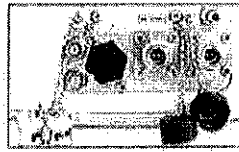
Ethernet		
Switch Type	Managed Fast Ethernet Layer 2	Managed Gigabit Ethernet Layer 2
Max frame size	1916 bytes	9728 bytes
MAC table	1K entries; automatic learning and aging	4K entries; automatic learning and aging
Packet buffer	32KB; non-blocking store&forward	128KB; non-blocking store&forward
Flow Control	802.3x	
QinQ (Double Tagging)	Yes; 802.1ad (Providing Bridging Technique)	
QoS	64 level DiffServ (DSCP) or 8 level 802.1p mapped in 4 prioritization queues with VLAN support	
QoS queuing	Yes	Fixed or weighted (configurable ratio)
VLAN support	802.1Q (up to 15 concurrent traffic VLAN)	802.1Q (up to 4K VLAN entries)
Spanning Tree Protocol	802.1D-2004 STP, 802.1D-2004 RSTP	802.1D-2004 RSTP, 802.1Q-2005 MSTP
MEF	MEF 9; MEF 14	
Mechanical & Electrical		
Power consumption	25 - 33 W (SP) 38 - 45 W (HP)	27 - 40 W (SP) 44 - 52 W (HP)
Weight	3.5 kg	3.9 kg
Temperature Range	-33°C to +55°C	
Dimensions: HxWxD, mm	288x288x80	
Operational use	EN 300 019 Class 4.1, IP65	ODU: EN 300 019 Class 4.1, IP65

CFIP FODU Ports



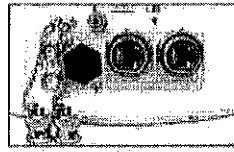
CFIP-108

- RJ-45
- 18-pin (balanced E1)
- BNC (RSSI)
- Twin BNC (Serial)



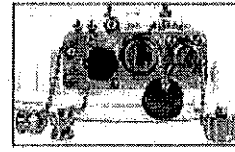
CFIP Lumina (Optical)

- 1 or 2 optical ODC (Eth)
- 48V DC (Power)
- BNC (RSSI)
- Twin BNC (Serial)



CFIP Lumina (Electrical)

- 1 or 2 electrical RJ-45 (Eth)
- 48V DC (Power)
- BNC (RSSI)
- Twin BNC (Serial)



CFIP Lumina (Hybrid version)

- 1 electrical RJ-45 & 1 optical ODC (Eth)
- 48V DC (Power)
- BNC (RSSI)
- Twin BNC (Serial)

CFIP-108 and CFIP Lumina FODU total payload capacity (Mbps)

Modulation	Channel bandwidths (MHz)					
	CFIP-108 FODU			CFIP Lumina FODU		
	7	14	28	28	40	56
QPSK	8	17	35	35	49	72
16APSK	16	34	69	69	98	135
32APSK	21	43	100-108	88	127	185
64QAM	28-30	57	-	115	163	241
128QAM	-	68-74	-	138	196	289
256QAM	-	-	-	162-175	229-245	337-366