



**BOARD OF SUPERVISORS AGENDA ITEM REPORT
CONTRACTS / AWARDS / GRANTS**

Award Contract Grant

Requested Board Meeting Date: April 4, 2023

** = Mandatory, information must be provided*

or Procurement Director Award

***Contractor/Vendor Name/Grantor (DBA):**

NGX Tech Solutions, LLC

***Project Title/Description:**

Tower and Rooftop License Agreement for Wireless Communications Facilities

***Purpose:**

This License Agreement documents transfer of ownership from Sprocket Communications to NGX Tech Solutions, LLC and will allow NGX Tech Solutions, LLC, to install, maintain, and operate radio and microwave equipment and antennas on the rooftop and in rooftop Shelter B, at 33 North Stone Avenue.

***Procurement Method:**

Non-Procurement Contract and not subject to Procurement Rules

***Program Goals/Predicted Outcomes:**

Beginning with an initial five year term, this License Agreement provides monthly revenue payments to Pima County. Three additional five year terms are available upon mutual written agreement.

***Public Benefit:**

NGX Tech Solutions, LLC is a Wireless Internet Service Provider tenant on the rooftop of 33 N. Stone Avenue, delivering internet services to Pima County businesses and constituents.

***Metrics Available to Measure Performance:**

Timely monthly payment of fees and electrical usage assigned to NGX Tech Solutions, LLC for use of the 33 N. Stone rooftop and shelter space.

***Retroactive:**

Yes. On December 9, 2022, the Pima County Information Technology Department received a Termination Notice from Sprocket Communications, LLC, notifying the County that Sprocket Communications, LLC was acquired by NGX Tech Solutions, LLC. This agreement is retroactive December 10, 2022, to allow for a new agreement to be drafted and go through the required reviews and approvals.

*On December 14, 2022 internal reviews were completed and it was sent to NGX Tech Solutions, LLC for their review and signature. This prompted a site visit with the new vendor, which was completed January 12, 2023.

*On February 22, 2023 ITD received the signed documents back from NGX Tech Solutions, LLC. Based on the date that ITD received the agreement, and in accordance with the agenda item submittal schedule, ITD requested that this agreement be placed on the next available meeting agenda.

*An additional delay occurred when ITD realized that NGX Tech Solutions, LLC was not registered with Finance and Procurement. The final steps of this process were completed on March 15, 2023.

If this agreement is not approved, there will be a loss in revenue that would have been generated by the agreement.

To COB: 3/17/23
Vers: 1
Pgs: 53 (2)

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Contract / Award Information

Document Type: CTN Department Code: IT Contract Number (i.e., 15-123): 23-0139

Commencement Date: 12/10/2022 Termination Date: 12/09/2027 Prior Contract Number (Synergen/CMS): _____

Expense Amount: \$* _____ Revenue Amount: \$ 85,700.92

*Funding Source(s) required: N/A

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

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

If Yes, 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 22-10.

Amendment / Revised Award Information

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

Amendment No.: _____ AMS Version No.: _____

Commencement Date: _____ New Termination Date: _____

Prior Contract No. (Synergen/CMS): _____

Expense or Revenue Increase Decrease Amount This Amendment: \$ _____

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

*Funding Source(s) required: _____

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): _____

Commencement 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 / Michelle Mitchell

Department: Information Technology Telephone: 520-724-2316 / 724-9590

Department Director Signature/Date: _____ 3/16/2023

Deputy County Administrator Signature/Date: _____ 3/16/2023

County Administrator Signature/Date: _____ 17 Mar 2023
(Required for Board Agenda/Addendum Items)

Pima County Department of Information Technology

Project: Tower and Rooftop License Agreement for Wireless Communications Facilities

Contractor: NGX Tech Solutions, LLC – 1809 W Sunset Dr. Nogales Az. 85621

Amount: \$85,700.92

Contract No.: CTN-IT-23-0139

Funding: General Fund

**TOWER AND ROOFTOP LICENSE
FOR WIRELESS COMMUNICATIONS FACILITIES**

This License is between Pima County (the "County"), a political subdivision of the State of Arizona, and NGX Tech Solutions, LLC, (the "Licensee"). The parties agree as follows:

1. **License** – County hereby grants non-exclusive permission to Licensee to install, maintain, operate, and remove certain communications equipment ("the Equipment") on the tower facility and described in **Exhibit A** – 33 N. Stone Communications Equipment, **Exhibit B** – Rooftop Drawing, **Exhibit C** – Shelter Drawing, and **Exhibit D** – Data Sheets, at 33 N. Stone, Ave, Arizona ("the Site"). The Equipment will consist only of the equipment as described in Exhibits A, B, C, and D. Any modifications to Exhibits A, B, C, and D, or additions or changes made to the Equipment described in those Exhibits will be made pursuant to Paragraph 26.
2. **Term, Renewal, and Termination** – This License commences on December 10, 2022, and will terminate on December 9, 2027 unless extended or terminated as provided below. The License is renewable for an additional three five-year periods upon the mutual written agreement of the parties.

Either party may terminate this License at any time with at least 90 days' notice to the other party. In addition to any other termination provisions in this License, Licensee may terminate this License under the following circumstances by providing at least 30 days' written notice to County: (i) if the actions or equipment of a third party (*i.e.*, a party other than County, Licensee, or the agents or employees of either) cause interference that results in a measurable diminution in the quality of Licensee's transmission or reception capability and that cannot be remedied after reasonable efforts to do so have been exhausted by Licensee and such third party, (ii) if Licensee's FCC license is canceled or not renewed by the FCC through no fault of Licensee, or (iii) if there is any unreasonable change to or denial of Licensee's access to the Site for the purposes of installing, modifying, inspecting, repairing, or removing Licensee's equipment.

3. **Suitability of Site** – Licensee has visited and inspected the Site, accepts the physical condition thereof, and acknowledges that no representations or warranties have been made to Licensee by County regarding the condition of the Site and/or the building, or regarding the suitability thereof for Licensee's use. Licensee is responsible for determining the acceptability and adequacy of the Site for Licensee's use.

4. **Installations** – If the parties modify the exhibits to allow Licensee to install additional Equipment, Licensee will submit to County, for County's approval, detailed written plans and specifications as to installation of the additional Equipment. County will not unreasonably withhold such approval. Licensee will perform the installation of the Equipment in accordance with **Exhibit E - Special Conditions, Facility Rules and Regulations**. County will determine the location for installation of the Equipment. County will take into consideration of the needs of Licensee when determining the location for the Equipment. Licensee is solely responsible for ensuring that its Equipment is installed properly. County will not be unreasonable in its requirements, which will be based on good engineering practices, space utilization, and engineering quality control of the Site and the requirements of County. Licensee will utilize the existing electric circuits at the Site. If Licensee's power requirements exceed the existing capacity or power distribution, Licensee shall, with County's consent, increase such capacity according to code to meet Licensee's needs. If County does not consent to an increase in existing capacity within 30 days after the date of Licensee's request, Licensee may void this License by giving County 30 days' written notice.

5. **Third-Party Installers** – Licensee must obtain County's written consent to the use or employment of any third-party installer at the Site. County will not unreasonably withhold such consent. Any third-party installer must submit to County a certificate of insurance naming County as an additional insured and protecting itself and County against any and all claims, demands, actions, judgments, costs, expenses, and liabilities that may arise out of or result, directly or indirectly, from its installation of Licensee's equipment at the Site. Such certificate of insurance must specifically indicate that the third-party installer has insurance specifically related to tower work if such installation involves a tower. Licensee is responsible and liable for any and all actions of any third-party installer, and for ensuring that the actions and work of any third-party installer are consistent with Licensee's obligations under this License. County has the right to disapprove any third-party installer. Licensee's sole remedies in the event of such disapproval by County are (i) to seek County's consent to a different installer or subcontractor or (ii) to void this License by giving County 30 days' written notice. Any actions and work by a third-party installer must be done in conformity with all ordinances, codes, and technical standards, at Licensee's expense, and performed according to code. All third-party installer crews must have in their possession an installation form issued to them by County prior to the commencement of work at the Site. Licensee will notify County at least 24 hours prior to the commencement of work by any third-party installer. Tower climbers must be certified under the Occupational Safety and Health Administration's Construction Standards in 29 C.F.R. Part 1926.

6. **Interference** – Licensee has satisfied itself that the Equipment is of a type and frequency that will not cause damage to the Site or surrounding property, or cause damage to or interference with electronic or other equipment and/or the television or radio reception of County or of residents and tenants of the Site. In the event the Equipment causes such damage or interference, Licensee will cooperate with County in determining the source and will immediately take all steps necessary to correct and eliminate the interference. County will provide notice to Licensee of any damage or interference. If Licensee cannot eliminate the interference within 48 hours after receipt of notice from County, Licensee will discontinue use of any equipment creating the interference (the "Interfering Equipment") by temporarily disconnecting the electric power and shutting down the Interfering Equipment (except for such intermittent operation as is

necessary for the purpose of testing after the performance of any maintenance, repair, modification, replacement, or other action designed to correct such interference). If Licensee cannot pinpoint the cause of the interference to a particular piece of equipment or system, Licensee will disconnect the electric power and shut down all of its Equipment until Licensee has corrected the interference problem. If Licensee has not corrected the interference within 30 days after receipt of the notice, Licensee will remove its equipment from the Site within an additional 30-day period. This License will then terminate without further obligation by either party, except for any obligations then owing or past-due, and except as may otherwise be enumerated specifically in the License. County is not liable to Licensee for any interruption of service of Licensee or for interference with the operation of Licensee's equipment.

7. **Compliance with Statutes and Regulations** – Licensee will install, operate, and maintain Licensee's equipment in accordance with the requirements and specifications of all laws, codes, and regulations of all governmental bodies and agencies that have any jurisdiction over the Equipment, including any rules and/or orders now in effect or that subsequently issued by the Federal Communications Commission ("FCC") and the United States Environmental Protection Agency. Licensee will also comply with the relevant standards promulgated by the American National Standards Institute. Licensee must know and conform to these laws, codes, regulations, standards, and requirements, and obtain all required permits prior to the date of installation of any equipment.
8. **Services by County** – If County provides repair, technical, removal, or other services (including but not being limited to engineering services), directly or indirectly, to Licensee, Licensee will reimburse County for Licensee's reasonable proportionate share (as determined by County) of the expenses and costs incurred by County in the provision of such services.
9. **Maintenance of Licensee's Equipment** – Licensee will, at its own expense, operate and maintain any equipment that it installs at the Site in a safe condition, in good repair, and in a manner suitable to County so as not to conflict with the use of the Site or surrounding areas by County or any other authorized user.
10. **Responsibility for Licensee's Equipment** – Any equipment installed by Licensee remains the property of Licensee. Licensee agrees that County does not bear any responsibility for Licensee's equipment or services provided by Licensee. Licensee further agrees that it has no right to demand that County or its agents or employees alter, maintain, or repair the Site, Licensee's equipment, or any other property or equipment, regardless of who might own or otherwise be responsible for such property or equipment. Licensee further acknowledges and agrees that County does not bear any responsibility or liability to Licensee for construction means, techniques, sequences, or procedures in connection with any work performed on the Site or on any other property or equipment either by County or by others.
11. **Access** – Licensee will have access to the Site for the purpose of installing, operating, inspecting, servicing, maintaining, repairing, and removing its equipment between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, except in the case of emergencies, in which case access will be permitted at any time subject to the reasonable security, safety, and identification procedures required by County. Access shall be in accordance with **Exhibit F – Procedures for Access to Pima County Rooftop Facilities**. County further grants Licensee a right of access to the areas where Licensee's

connecting equipment is located for the purposes of installing, operating, maintaining, and repairing same. Only authorized engineers, employees, contractors, technicians, third-party installers, subcontractors, and agents of Licensee or the FCC, or persons under Licensee's direct supervision, will be permitted to enter the Site, and then only for the purposes of installing, operating, removing, servicing, repairing, inspecting, or maintaining Licensee's equipment.

12. **License Fee** – Licensee will pay County \$1,345.18 per month (the "License Fee") on the first day of each calendar month, commencing on December 10, 2022. Licensee shall pay the License Fee in accordance with **Exhibit G – License Fee Schedule**. County may but is not required to send monthly invoices as a courtesy to Licensee. The License Fee is based on the contents and nature of the Equipment and may be subject to change if the parties modify this License. The License fee will increase 3% annually and the first such increase will be effective on December 10, 2023. The subsequent increases will take effect annually thereafter.

All payments will be made payable to:

Attn: Pima County Treasurer
Pima County Revenue Management
33 N. Stone
Mailstop – DT-BAB6-401
Tucson, AZ 85701

13. **Additional Payments** – The License Fee in Paragraph 12 is in addition to any other sums of money, charges, or other amounts required to be paid by Licensee, whether to County or to any other entity. Such additional payments will include that portion, if any, of any tax (including excise tax), fee, or other assessment attributable to Licensee's use of the Site or to the Site generally.
14. **Excise Tax** – In addition to any other sums due under this License, Licensee will pay to County, on or before December 1 of each year during the Term, any property-lease excise tax due under A.R.S. § 42-6201, *et seq.* Licensee's failure to pay the taxes constitutes an event of default for which this License may be terminated under Section 25, and penalties and interest shall accrue as provided by law. If this License is exempt from such excise tax under A.R.S. § 42-6208, Licensee will keep the information required by A.R.S. § 42-6204. County will calculate the amount of tax on the applicable space and invoice Licensee separately in time to meet the annual payment deadline of December 1.
15. **Utilities** – County will invoice Licensee, and Licensee shall reimburse County monthly, for any costs for electricity used at the Site by Licensee's equipment. The amount of such electricity costs will be equal to the total electric utility charges attributable to all equipment located in equipment shed C and to cooling the equipment shed in the previous billing cycle, divided by the total number of licensees, tenants, or occupants with equipment located in equipment shed at any one time during that billing cycle. However, Licensee will have the option of installing, at its own cost, a separate meter to determine the electric utility charges attributable to its equipment, and of paying such costs directly to the utility company.

16. **Insurance** – Licensee shall carry adequate insurance to protect Licensee and County against any and all claims, demands, actions, judgments, costs, expenses, and liabilities that may arise out of or result, directly or indirectly, from Licensee's use of the Site, except such liability as shall arise solely from the negligence of County. Licensee must deliver to County satisfactory proof of the following insurance coverages:

Commercial General Liability insurance with coverage in an amount not less than \$2,000,000.00 per occurrence and aggregate covering the Premises and all activities thereon, endorsed to include Pima County as an additional insured. Business Automobile Liability coverage for owned, non-owned, and hired vehicles with limits in the amount of \$1,000,000 combined single limit for vehicles used in the operations at the Premises. Workers' Compensation insurance with the required statutory limits for all persons employed or hired by Licensee to work on the Premises. Policy shall include Employers' Liability coverage in an amount not less than \$1,000,000 per injury, illness, or disease. Workers' Compensation coverage is to include a waiver of subrogation.

Property Insurance – Business property insurance to include broad form property coverage for Licensee's property with the full replacement cost of all Licensee property and improvements on the Premises with County added as an additional insured. Licensee must furnish to County a Certificate of Insurance documenting proof Builder's Risk/Installation insurance that Licensee, or Licensee's contractor, has obtained. Coverage to include broad form and "all risks" builder's risk/installation policy providing insurance while contractor is installing, repairing or replacing parts on the Tower. County is to be included as an additional insured on the property policy.

Additional Insured: The General Liability and Business Automobile Liability Policies shall each be endorsed to include Pima County, its departments, districts, boards, commissions, officers, officials, agents, and employees as additional insureds with respect to liability arising out of the activities performed by or on behalf of the Contractor.

Subrogation: The General Liability, Business Automobile Liability and Workers' Compensation Policies shall each contain a waiver of subrogation endorsement in favor of Pima County, and its departments, districts, boards, commissions, officers, officials, agents, and employees for losses arising from work performed by or on behalf of the Contractor.

Primary Insurance: The Contractor's policies shall stipulate that the insurance afforded the Contractor shall be primary and that any insurance carried by Pima County, its agents, officials, or employees shall be excess and not contributory insurance.

Licensee shall, during the term of this License, including any renewals and any holding-over thereafter, provide County with current certificates of insurance evidencing that such insurance is in full force and effect, with policy endorsed to include County as an additional insured, and is non-cancelable without at least 30 days' written notice to County. The certificates of insurance as required herein must be presented to County within 10 days of the effective date of this License and on each anniversary date thereof during the term of the License, including any renewals and any holding-over thereafter.

Any modification or variation from the insurance requirements in this License shall be made by the licensing department in consultation with the Pima County Risk Management. Such modification will not require a formal License amendment, but may

be made by administrative action, and without the consent of Licensee, upon notice by County. Licensee shall supply a certificate of insurance including the modification within 10 days from the date notice of the modification is received by Licensee. Such notice will be given pursuant to the terms of the License; if the License does not specify a notice procedure, County may give notice by Certified U.S. Mail, E-Mail or Facsimile; Certified Receipt, E-Mail Receipt Confirmation or Facsimile Confirmation shall constitute proof of receipt of notice. Failure by Licensee to supply a modified certificate of insurance as required by this paragraph shall constitute material breach by Licensee and grounds for immediate termination of the License by County. Licensee further hereby consents to the addition of the modified insurance requirements to the License.

17. **Rights to Equipment** – During the term of this License, provided that Licensee is not in default hereunder, County will not claim any interest in, make claim to, or assert any right to the Equipment. Provided Licensee is not then in default of this License, Licensee may, at its election, have its Equipment removed on or before the expiration or termination of this License, provided that Licensee will repair any damage caused by the removal. In the case of damage to the Site, Licensee agrees to engage such contractor or contractors as County may require to perform the necessary repairs, and to pay for the repairs.

Any of Licensee's property remaining on the Site 30 days after the expiration or termination of this License becomes the property of County, free of any claim by Licensee or any person claiming through Licensee. At the termination or expiration of the License, Licensee agrees to restore the Site to its original condition except for reasonable wear and tear.

18. **Holding Over** – Any holding over by Licensee after the expiration of the term without County's written consent will be construed as a tenancy at sufferance, subject to all of the provisions of this License and at twice the monthly License Fee prevailing in the last month of the term (including any renewals) and increasing at the same annual rate as provided in Paragraph 12. At all times during any holdover period, County has the unilateral right to terminate this License and to remove Licensee's equipment.
19. **Indemnification** – To the fullest extent permitted by law, Licensee will indemnify, defend, and hold County and its officers, elected officials, employees, agents, and contractors harmless from any suits, claims, liabilities, damages, and expenses including, but not limited to, reasonable attorneys' fees, arising out of the injury to or death of any person, damage to any property, or infringement of any property rights, that may be alleged, charged, or otherwise asserted in connection with the installation, operation, removal, or maintenance of Licensee's equipment on or about the Site, or with any act, omission, or negligence of Licensee or Licensee's agents, employees, or contractors on or in the vicinity of the Site, except as said claims or demands may be the result of the negligence of County or its employees or agents. This indemnity survives any termination or expiration of this License.

Licensee further agrees to indemnify, hold harmless, and defend County and its officers, elected officials, employees, agents, and contractors from any suits, claims, liabilities, damages, and expenses including, but not limited to, reasonable attorneys' fees, arising out of any damage to the Site or surrounding property or out of interference with electronic or other equipment and/or the television or radio reception of County or of

residents and/or tenants of the Site. This indemnity survives any expiration or termination of this License.

Licensee further agrees to indemnify, hold harmless, and defend County and its officers, elected officials, employees, agents, and contractors from any suits, claims, liabilities, damages, and expenses including, but not limited to, reasonable attorneys' fees, arising out of any failure or alleged failure by County to alter, maintain, or repair the Site, Licensee's equipment, or any other property or equipment, regardless of who might own or otherwise be responsible for such property or equipment, or out of the construction means, techniques, sequences, or procedures used in connection with any work performed on the Site or on any other property or equipment either by County or by others. This indemnity survives any expiration or termination of this License.

Licensee further agrees to indemnify, hold harmless, and defend County and its officers, elected officials, employees, agents, and contractors from any suits, claims, liabilities, damages, and expenses including, but not limited to, reasonable attorneys' fees, arising out of any failure or alleged failure by County or Licensee to implement or to abide by any safety program or programs.

20. **Repairs** – In addition to the repairs referred to in Paragraph 17, Licensee will repair any damage to the Site that results from the use and operation of its equipment at the site and the acts or negligence of Licensee or its agents, servants, contractors, or employees. Such repairs must be accomplished in a manner and by a contractor satisfactory to County.
21. **Improvements to Premises** – County reserves the right to implement and utilize improvements in technology or management techniques that will provide for better management and use of the space and capacity of the Site, including but not limited to the use of combiners, special antennas, etc. County may require Licensee to incorporate such improvements into the systems Licensee has installed and is operating at the Site. Licensee will, within 90 days of its receipt of County's written demand to do so, will either (i) incorporate the improvements or (ii) if the cumulative cost of the required improvements exceeds \$4,000, give written notice of its intention to terminate this License 30 days after the date that County receives the notice.
22. **Coordination of Operation** – County will make reasonable efforts to give Licensee advance notice (except in the case of emergency where advance notice cannot reasonably be given) of any planned shutdowns for routine maintenance, and of any repairs, alterations, additions, or improvements to the Site that might materially affect the operation of Licensee's facilities and equipment at the Site. County will make reasonable efforts to minimize any inconvenience, loss, or expense to Licensee arising therefrom, but is not liable to Licensee or any of Licensee's customers for the inconvenience, loss, or expense suffered by Licensee and/or Licensee's customers.
23. **Casualty** – In the event there is a total destruction of the Site by fire or other casualty, and the Site cannot, in County's estimation (which shall be made within 10 days from the date of the casualty), reasonably be restored within 90 days from the date of the casualty, or if County chooses not to undertake restoration, this License will terminate automatically upon the expiration of the 10-day period following the casualty, unless the parties otherwise agree. In the event of damage to the Site by casualty comprising less than a total destruction, Licensee may terminate this License upon 30 days' written

notice to County if County (i) chooses not to undertake, (ii) has not completed, or (iii) cannot reasonably be expected to complete the restoration of the Site within three months from the date of the casualty. If any casualty occurs during the last year of the term of this License or any renewal term, Licensee may terminate the License upon 30 days' written notice to County provided the notice is given within 60 days after the date of the casualty.

24. **Condemnation** – In the event the Site or any significant portion thereof is condemned or otherwise subjected to a taking by any governmental authority exercising the power of eminent domain, this License will terminate as of the date upon which County and/or Licensee are required by the governmental authority to cease their operation(s) at the Site unless County and Licensee are permitted to continue their operations at the Site. Licensee is entitled to seek its own award against the governmental authority only if such award will not result in a diminution of County's award.
25. **Default** – In the event Licensee fails to comply with any of the provisions of this License, or defaults in any of its obligations, County may terminate this License after County has given Licensee written notice of default and Licensee has failed to cure the default within 20 days after receipt of the default notice. If, in County's sole judgment, Licensee cannot reasonably cure the default within the 20 day period, County will extend the time to cure the default for a period of time, not to exceed 60 days, provided that Licensee must proceed promptly to cure the default and pursue cure with all due diligence.

County will not, except in an emergency, undertake to cure any default by Licensee until after the expiration of Licensee's time to cure the default as provided herein. Licensee will reimburse County for any expenses incurred by County in curing any default by Licensee.

In the event the default is for non-payment of the License Fee by Licensee, County will give notice to Licensee via hand delivery, overnight mail, electronic mail, or certified United States Mail of non-receipt of payment. If Licensee fails to make full payment of the License Fee then due within 15 days from the date of delivery of the notice to Licensee, County will have the right to disconnect, remove, and store Licensee's equipment. Licensee will reimburse County for all costs and expenses incurred by County in connection with the disconnection, removal, and storage. Any reimbursement by Licensee does not relieve Licensee of its obligation to pay the License Fees in default together with any additional expenses incurred by County in connection with the collection of the License Fees. The rights and remedies of County described in this Paragraph 25 and elsewhere in this License are not exhaustive and are in addition to any other rights or remedies that may exist now or in the future, at law or equity. Licensee will indemnify, release, defend, and hold harmless County against all losses, costs, including reasonable attorneys' fees, damages, expenses, claims, demands, or liabilities arising out of or caused by, or alleged to have arisen out of or been caused by, the disconnection or removal by County of Licensee's equipment pursuant to this Paragraph 25, or for any resulting impairment to or interruption of Licensee's services or operation.

Any three defaults by Licensee within a 12-month period will be cause for termination of this License by County without the extension of any cure period to Licensee.

26. **Modifications** – Any addition, variation, or modification to this License is void unless made in writing and signed by an authorized representative of each party.
27. **Parties Bound by Agreement** – Subject to the provisions hereof, this License extends to and binds the heirs, executors, administrators, successors, and assigns of the parties hereto.
28. **Assignment** – Without County's written consent, Licensee does not have the right to assign this License, or to sublicense all or any part of its rights or obligations hereunder.
29. **Authority to Sign** – Licensee represents that the individual signing this License on behalf of Licensee has and will maintain full authority to enter into this License and to bind Licensee to the terms, rights, and obligations under this License. If any court or administrative agency determines that County does not have authority to enter into this Contract, County will not be liable to Licensee or any third party by reason of such determination or by reason of this Contract.
30. **Notices** – All notices sent under this License must be in writing and will be sent to the other party at the following addresses, either by hand delivery, overnight mail, or Certified U.S. Mail, return-receipt requested:


PIMA COUNTY
 Information Technology Department
 Attn: Contract Administrator
 33 N. Stone Ave., 14th Floor
 Tucson, Arizona 85701
 (520) 724-7100
 contract.administrator@pima.gov

NGX Tech Solutions, LLC
 Attn: Rogelio Calderon Jr.
 1809 W Sunset Drive
 Nogales Az. 85621
 (520)841 5200
 calderon.rogelio@ngx-us.com

31. **Compliance with Laws** – In the performance of its obligations under this License, Licensee will comply with all federal, state, and local laws, rules, ordinances, regulations, standards, and Executive Orders. The laws and regulations of the State of Arizona govern the rights of the parties, the performance of this License, and any disputes hereunder. Any legal action relating to this License must be filed and maintained in an Arizona Court, in Pima County, Arizona.
32. **Americans with Disabilities Act.** Contractor will comply with Title II of the Americans with Disabilities Act (Public Law 110-325, 42 U.S.C.§§ 12101-12213) and the federal regulations for Title II (28 CFR Part 35).
33. **Non-Discrimination** – Licensee shall comply with Arizona Executive Order 2009-09 which is incorporated into this License including flow down of all provisions and requirements to any subcontractors. During the term of this License, Licensee will not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin.
34. **Licensee Has no Interest or Estate** – Licensee agrees that it has no claim, interest, or estate at any time in the Site by virtue of this License or its use hereunder. Upon termination of this License, Licensee has no right of entry into or upon the Site.

35. **Cancellation for Conflict of Interest** – This Contract is subject to cancellation for conflict of interest pursuant to A.R.S. § 38-511, the pertinent provisions of which are incorporated into this Contract by reference.
36. **Force Majeure** – Without in any way limiting the foregoing, neither of the parties are responsible for damages due to delay that is the result of a contingency beyond the reasonable control of either party, including, but not limited to, acts of nature, pestilence, strikes, embargoes, lockouts, boycotts, civil disturbance and disobedience, riots, war, revolution, acts of government, world shortage of qualified materials, accidents, fires, or floods. Upon the occurrence of such an event the Party impacted by a Force Majeure Event, will give prompt notice to the other Party and take commercially practical actions to mitigate the impacts of the Force Majeure Event. The duties and obligations of the parties will be suspended for so long as the event prevents proper performance under this License. However, if such suspension continues in excess of 90 days, the parties will meet and attempt to arrive at a mutually acceptable compromise. In the absence of such compromise, this License will terminate.
37. **Entire Agreement/Severability** – This document constitutes the entire agreement between the parties, and all prior or contemporaneous agreements and understandings, oral or written, hereby are superseded. This License may be modified, amended, altered, or extended only by a written amendment signed by the parties.

If any provision of the License is deemed invalid, it will be considered deleted from this License and will not serve to invalidate the remaining provisions of this License to the fullest extent possible.



(THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK)

IN WITNESS WHEREOF, the parties have executed this License.

PIMA COUNTY

NGX Tech Solutions, LLC

Chairman
Board of Supervisors

Authorized Officer Signature

Date

Rogelio Calderon Sr.
Printed Name and Title

02/13/2023
Date

ATTEST

Melissa Manriquez, Clerk of the Board

Date

APPROVED AS TO FORM

APPROVED AS TO CONTENT

Rochelle Barr
Deputy County Attorney

Javier Baca, Director
Information Technology Department

03/02/2023
Date

3/2/2023
Date

EXHIBIT A
33 NORTH STONE AVENUE
COMMUNICATIONS EQUIPMENT

5 Ghz Equipment

6 Transmitters licensed by FCC to operate on:

5150 - 5350 MHz
5470 - 5850 MHz

6 Transmission/receiver lines connecting the transmitter/receiver and the transmit/receive antennas, 28 inches avg. height

Effective Radiated Power radiated by the transmit antennas will be
Max. Conducted TX Power 28 dBm

11 Ghz Equipment

1 Transmitters licensed by FCC to operate on:

10700 - 11700 MHz

1 Transmission/receiver lines connecting the transmitter/receiver and the transmit/receive antennas, 3 Ft in diameter

Effective Radiated Power radiated by the transmit antennas will be
Max. Conducted TX Power 30 dBm

24 Ghz Equipment

2 Transmitters licensed by FCC to operate on:

24050 - 24250 MHz

2 Transmission/receiver lines connecting the transmitter/receiver and the transmit/receive antennas, 2 Ft in diameter

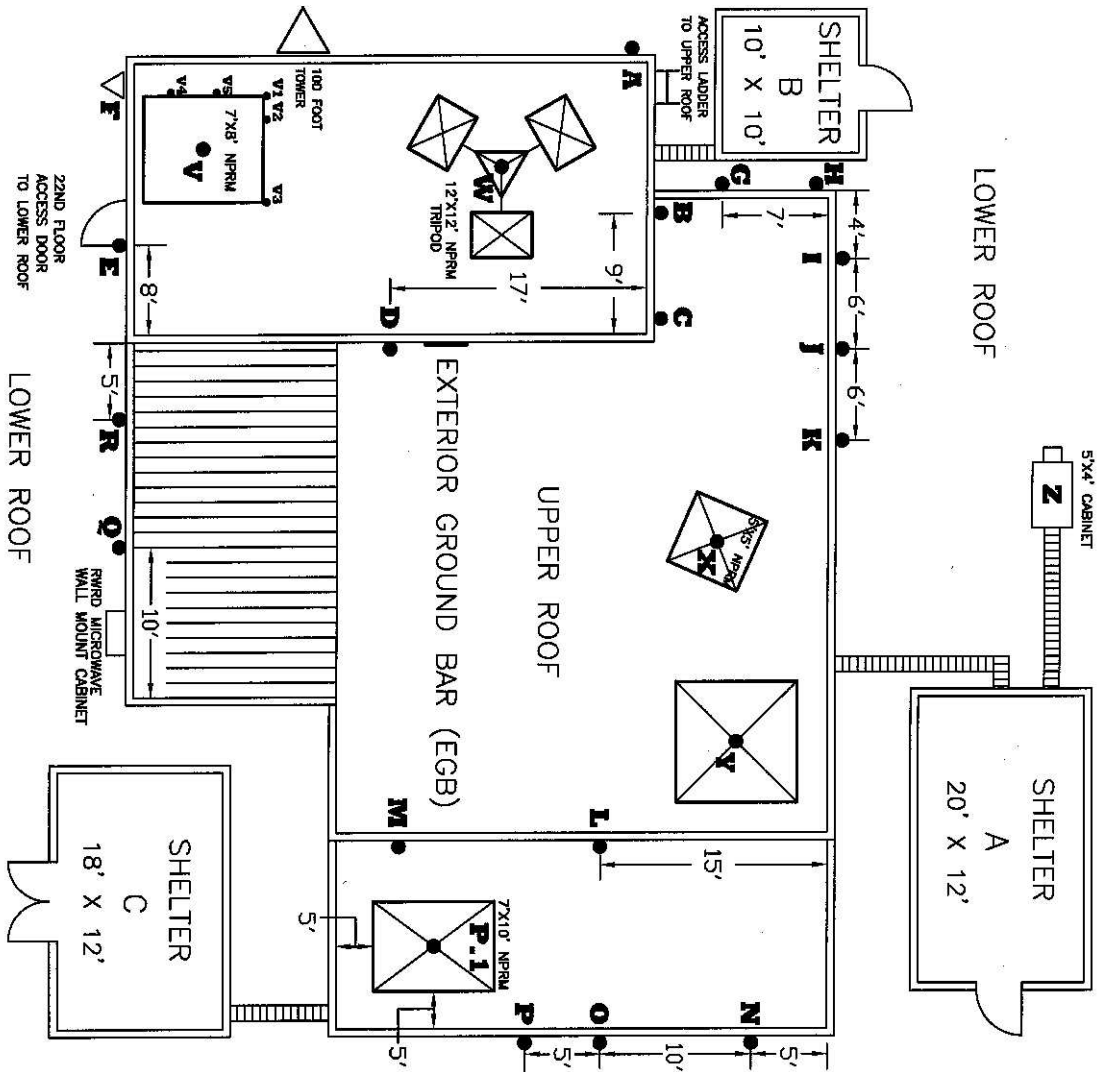
Effective Radiated Power radiated by the transmit antennas will be
Max. Conducted TX Power 33 dBm

Licensee will be installing the following antenna(s):

Quantity	Type	Make	Model No	Size	Height
1	Panel	Ubiquiti	AM-5AC22-45	29.53"	Loc. A
1	Panel	Ubiquiti	AM-5G19-120	27.55"	Loc. A
1	Dish	Ubiquiti	AF-11G35	36"	Loc. C
2	Dish	Ubiquiti	AF-24HD	24"	Loc. L
4	Panel	Ubiquiti	AM-5AC22-45	29.53"	Loc. Y



EXHIBIT B- ROOFTOP DRAWING



- GENERAL NOTES:**
1. CABLES SHALL FOLLOW CABLE PATH AND BE RUN ON BLOCKS WITH RUBBER INSULATION. CABLE SHALL BE SECURED.
 2. NPRM'S SHALL BE SET ON A RUBBER MAT TO PROTECT MEMBRANE.
 3. ALL NPRM'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.
 6. COORDINATE WITH COUNTY ENGINEER FOR USE OF EXISTING CABLE PATH.
- SYMBOLS:**
 NPRM NON-PENETRATING ROOF MOUNT

LOC.	MOUNT	TENANT-SHELTER	DESCRIPTION
A	1.5" PIPE	NOR TECH SOLUTIONS-B	(1) AM-5AC22-45 PANEL
B	4" PIPE	DAKOTAPRO-B	(1) AM-5619-120 PANEL
C	2" PIPE	NOR TECH SOLUTIONS-B	(1) AF-11G35 3' DISH
D	2" PIPE	VACANT	
E	2" PIPE	VACANT	
F	4" TOWER	VACANT	
G	2" PIPE	VACANT	
H	4" PIPE	DAKOTAPRO-B	3' DISH
I	1.5" PIPE	VACANT	
J	1.5" PIPE	OEM-A	PANEL
K	1.5" PIPE	SIMPLY BITS-C	2' DISH
L	1.5" PIPE	NOR TECH SOLUTIONS-B	(2) AF-24HD 2' DISH
M	1.5" PIPE	DAKOTAPRO-B	1-2' DISH & 1 PANEL
N	1.5" PIPE	SIMPLY BITS-C	2' DISH
O	1.5" PIPE	VACANT	
P	1.5" PIPE	OEM-A	PANEL
P-1	7x10' NPRM	DEA-A	4' DISH
Q	1.5" PIPE	OEM-A	PANEL
R	1.5" PIPE	VACANT	
V	7" W/4" W/4"	DAKOTAPRO-B	NPRM W/PIPE MOUNTS
V1	2.5" PIPE	DAKOTAPRO-B	2 PANELS & 2 OMNI
V2	2.5" PIPE	DAKOTAPRO-B	2' DISH
V3	2.5" PIPE	DAKOTAPRO-B	3 PANELS
V4	4" PIPE	DAKOTAPRO-B	4' DISH
V5	4" PIPE	DAKOTAPRO-B	VACANT
W1	7x10' NPRM	SIMPLY BITS-C	FIBERAIR 2' DISH
W2	7x10' NPRM	FBI	RADIOWAYS 2' DISH
X	5" PIPE	VACANT	
Y	5" PIPE	NOR TECH SOLUTIONS-B	(4) AM-5AC22-45 PANEL
Z	5" PIPE	VACANT	

REV	DESCRIPTION
1	11-27-2013 1ST SUBMITTAL
2	06-26-2014 REMOVE SPOCKET LOCKS A & L
3	10-16-2014 SIMPLY BITS UPGRADE AND LOCKS V & X
4	05-24-15 LOCKS B AND PANEL IDENTIFIER B
5	11-11-15 ADD PANELS LOCKS J & R & Q
6	05-26-16 ADD 200 ION LOCKS P1
7	02-01-17 REMOVE AND SPOCKET LOCKS B AND Q
8	02-15-17 ADD SURPLY BITS 10a
9	02-06-18 ADD FIB LOCK W2
10	02-08-18 SHIELD RADIOMAT
11	02-08-18 ADD 6" W/4" W/4" CABINET
12	06-13-21 REWORK COMMUNICATIONS W/4" W/4" W/4" W/4"
13	12-06-22 ADD TECH SOLUTIONS, LLC AND RADIOMAT

NORTH

PIMA COUNTY
INNOVATION TECHNOLOGY

PROJECT NO. 10
SHEET NO. 8

NOR TECH SOLUTIONS, LLC
1000 N. GILBERT AVENUE
SUITE 100
TUCSON, AZ 85719
520.733.1111

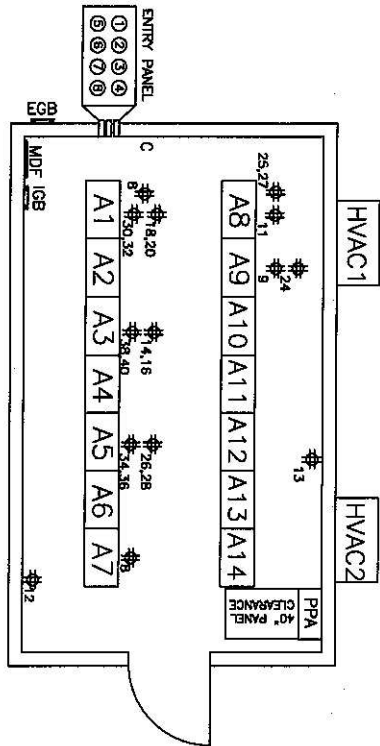
DATE: 11/27/2013
BY: [Signature]

EXHIBIT C-SHELTER DRAWING

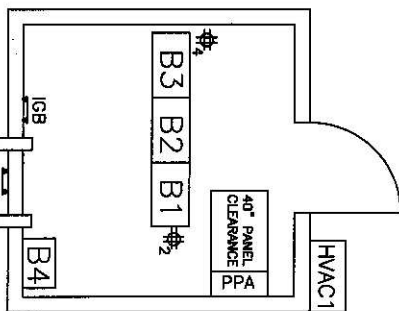
RACK	TENANT	CIRCUIT/PORT
A1	(V)	
A2	(V)	
A3	(V)	
A4	(V)	
A5	(V)	
A6	(V)	
A7	(V)	
A8	DEA	9,11/3,4,8
A9	(V)	
A10	(V)	
A11	(V)	
A12	(V)	
A13	(V)	
A14	(V)	

RACK	TENANT	CIRCUIT/PORT
B1	DAKOTAPRO	2/PORT A
B2	(V)	
B3	NGX TECH SOLUTIONS	4/PORT B
B4	DAKOTAPRO	2/PORT A

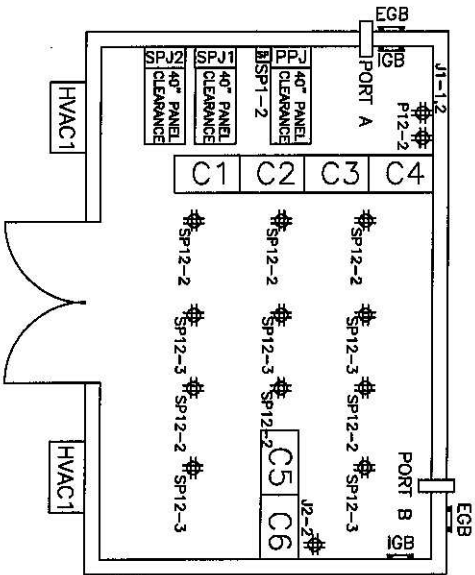
RACK	TENANT	CIRCUIT/PORT
C1	ACTION COMM	P12-2/PORT A
C2	ACTION COMM	J1-1,2/PORT A
C3	ACTION COMM	J1-1,2/PORT A
C4	ACTION COMM	J1-1,2/PORT A
C5	SIMPLY BITS	J2-2/PORT B
C6	SIMPLY BITS	J2-2/PORT B



SHELTER A



SHELTER B



SHELTER C

REV 6

- GENERAL NOTES:
1. SUPPORT ROW A RACKS FROM LADDERWAY.
 2. EACH OUTLET IS TENANT DEDICATED.
 3. RACKS SHALL BE BONDED TO IGB.

SYMBOLS:

- [BP] POWER PANEL
- [FA] FIRE ALARM ENUNCIATOR
- [Q] 20A QUADRAPLEX OUTLET W/CIRCUIT NUMBER
- [T] MDF TELEPHONE CLEC DEMARCATION POINT
- [C] THERMOSTAT
- [V] HVAC CONTROLLER
- (V) VACANT
- [EGB] EXTERIOR GROUND BAR
- [IGB] INTERIOR GROUND BAR



NIX TECH SOLUTIONS, LLC 150 NORTH STONE AVENUE PIMA COUNTY TUBACAZON, ARIZONA 85646	
PROJECT NO: J11 SHEET NO: 8 SHEET TITLE: SHEET 002 RACKS	DATE: 05-13-21 DRAWN BY: [Signature] CHECKED BY: [Signature]

REV	DESCRIPTION
1	18-02-2017
2	04-18-2019
3	04-18-2019
4	05-07-18
5	05-13-21
6	05-13-21

Handwritten mark resembling a stylized 'P' or '7'.

Exhibit D Data Sheets

DATASHEET



airFiber® X Antenna

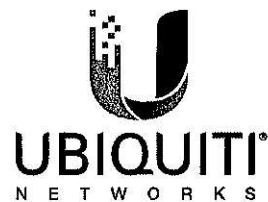
11 GHz, 35 dBi airFiber® X Antenna

Model: AF-11G35

Powerful Performance for Long-Range Links

Robust Design and Construction for Outdoor Use

Seamless Integration with airFiber AF-11FX Radio



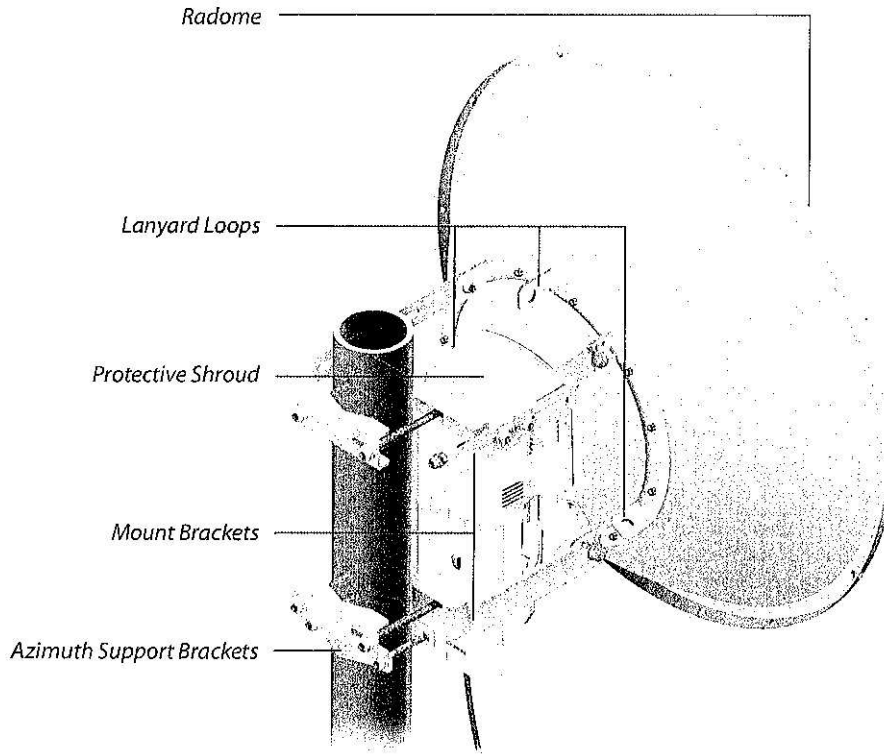
Hardware Overview

Innovative, Weatherproof Design

- **Secure Pole-Mounting** Maintains the position of the dish during harsh outdoor conditions.
- **Protective Shroud** Protects the cables and connectors from the elements.
- **Integrated Radome** Shields the radio from the environment.

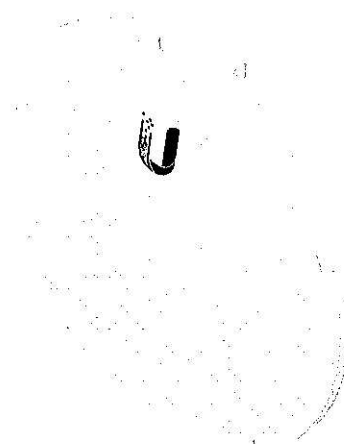
Mount Designed for Safety, Easy Upgrade

- **Lanyard Loops** Assist in safely hoisting the antenna up a tower and into place.
- **Azimuth Support Brackets** Allow the antenna to be safely supported while the azimuth is adjusted.
- **Shared AF-5/AF-5U Mount Design** Facilitates upgrade of full-duplex links from unlicensed 5 GHz to licensed 11 GHz.



airFiber X Antenna

The AF-11G35 antenna is specially designed for the AF-11FX radio, so that installation requires no special tools. The AF-11G35 comes preconfigured with V/H polarization, and can be configured to support $\pm 45^\circ$ slant polarization for improved noise immunity and Signal-to-Noise Ratio (SNR), dependent on regulatory region.



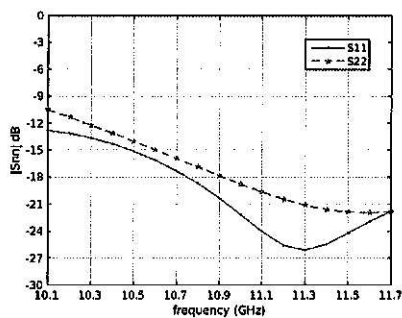
Model	Frequency	Gain	Radome
AF-11G35	10.3 - 11.7 GHz	35 dBi	Integrated

Specifications

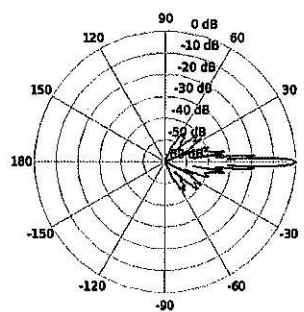
AF-11G35 Antenna Characteristics	
Dimensions	ø 811 x 460 mm (ø 31.9 x 18.1")
Weight	Mount Not Included : 7.14 kg (15.74 lb) Mount Included : 11.85 kg (26.12 lb)
Frequency Range	10.3 - 11.7 GHz
Gain	35 dBi
HPOL Beamwidth	2.5°
VPOL Beamwidth	2.5°
Front-to-Back Ratio	60 dB
Max. VSWR	2:1
Wind Survivability	200 km/h (125 mph)
Wind Loading	1538 N @ 200 km/h (346 lbf @125 mph)
Polarization	Default: H/V After Rotating OMT: ±45°
Cross-Pol Isolation	35 dB
Mounting	Uses the AF-5/AF-5U Mounting System
Pattern Regulatory	ETSI 302 217-4-2, Class 3 and FCC Cat B

AF-11G35 Antenna Information

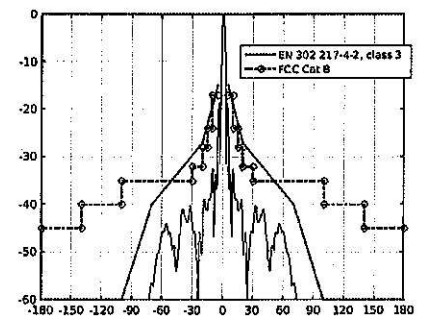
Return Loss



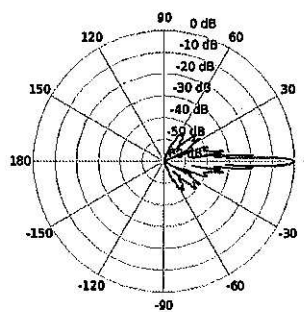
Azimuth, 11,000 MHz



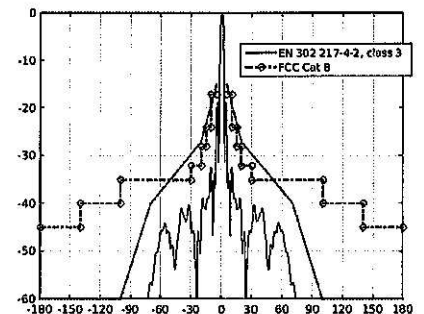
Azimuth Specs



Elevation, 11,000 MHz



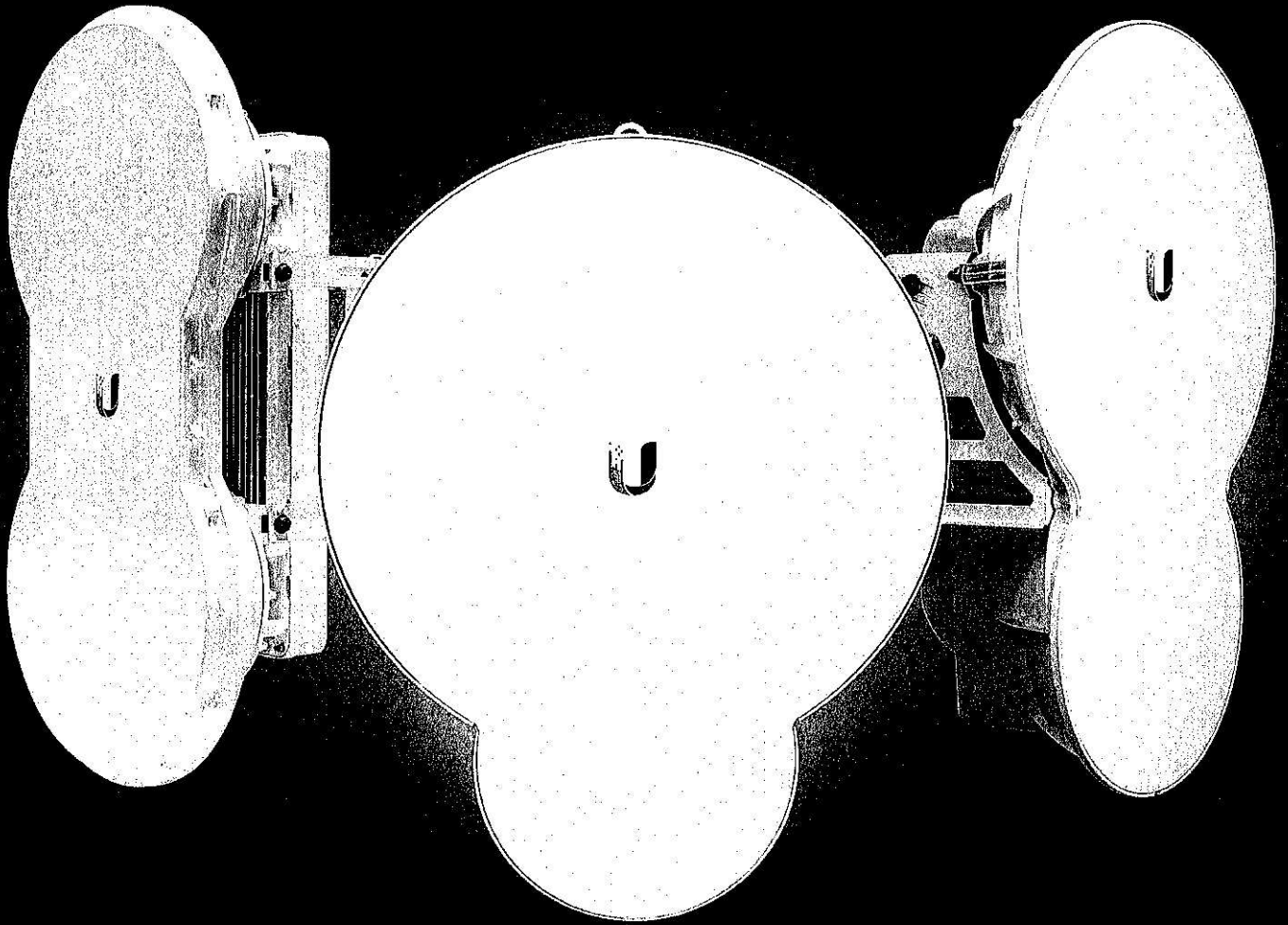
Elevation Specs



Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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www.ubnt.com



airFiber[®]

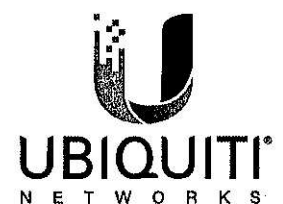
Full-Duplex, Point-to-Point
Gigabit Radio

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

High Performance Wireless Backhaul

Extreme, Long-Range Links

Worldwide License-Free Operation



airFiber®

Revolutionary Wireless Technology

Introducing airFiber®, a truly revolutionary Point-to-Point wireless platform from Ubiquiti Networks. Housed in a compact, highly efficient form factor, airFiber delivers amazing wireless gigabit+ performance, low latency, and long range. airFiber ushers in a new era in price-disruptive wireless technology ideal for carrier backhaul, building-to-building enterprise use, or public safety applications.

Efficient by Design

Every detail of airFiber was designed and engineered by the Ubiquiti R&D Team. From the silicon chip up to the innovative split-antenna architecture, the Ubiquiti R&D Team created airFiber to deliver superior throughput with efficiency. airFiber was purpose-built to create a high performance backhaul.

Plug and Play Deployment

Based on Ubiquiti's innovative and intuitive airOS®, the airFiber Configuration Interface enables quick deployment. With installation efficiency in mind, the mechanical design allows easy installation by one person. A two-person installation crew can effectively install and align an airFiber link.

To fine-tune the alignment, the received signal levels can be conveniently accessed via any of these methods:

- airFiber LED display
- airFiber Configuration Interface
- Audio tone feature

Designed for Freedom

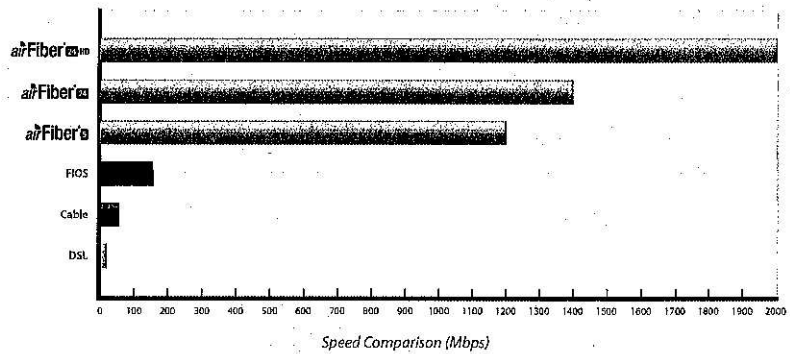
airFiber operates in worldwide, **license-free**, 24 or 5 GHz frequencies. Anyone around the world can purchase and operate airFiber without any special permits, paperwork, or added licensing costs. Users are free to locate, deploy, and operate airFiber practically anywhere they choose (subject to local country regulations).

Model	Description	Operating Frequency
AF-5	Mid-band 5 GHz frequencies	5470 - 5950 MHz
AF-5U	High-band 5 GHz frequencies	5725 - 6200 MHz
AF-24/AF-24HD	24 GHz frequencies	24.05 - 24.25 GHz

* Refer to the *Specifications* section for more information.

Built for Speed and Range

airFiber delivers gigabit performance at 1.2+ Gbps for airFiber AF-5/AF-5U, 1.5+ Gbps for airFiber AF-24, and 2 Gbps for airFiber AF-24HD. To put this in perspective, airFiber can transmit a 100 MB file in less than a second. Rivaling common broadband providers, airFiber download speed is up to 100x faster. With speed and throughput surpassing conventional wired backhails, airFiber prevails over expensive and labor-intensive wired infrastructures.



airFiber is built for long-range use: up to 13+ km for airFiber AF-24, up to 20+ km for airFiber AF-24HD, and up to 100+ km for airFiber AF-5/AF-5U, which launches the innovative xtreme Range Technology (xRT™) feature.



airFiber backhails do not share the security risks associated with wired backhails. The long distances of wired backhails are vulnerable to copper theft, fiber optic damage, vandalism, and accidental breakage. With airFiber, only the installation points of the airFiber links need to be secured.

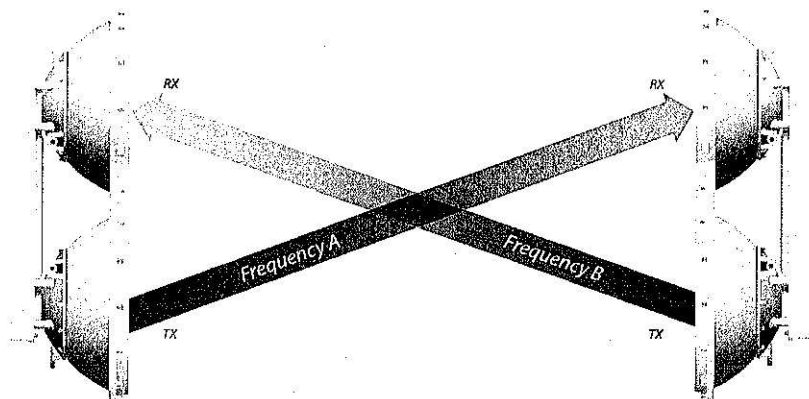
Innovative Proprietary Modem Technology

Ubiquiti's innovative proprietary modem technology was purpose-built to address the specific challenges of outdoor, PtP (Point-to-Point) bridging and high-performance network backhauls. Every aspect of the radio has been carefully simulated and designed to optimize range, speed, and latency performance in the harshest RF noise environments.

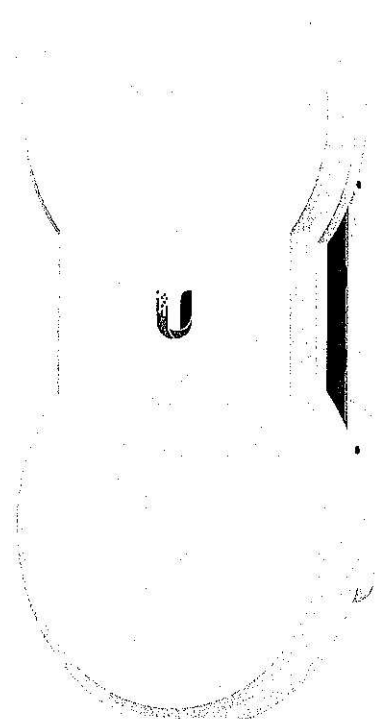
Synchronous Data Transmission and Reception

Conventional wireless standards impose a latency by having to receive a packet before a packet is transmitted. airFiber can transmit data synchronously without any wait time. airFiber features traditional TDD and FDD modes of operation in addition to the proprietary Hybrid Division Duplexing (HDD) mode, which provides a breakthrough in range and spectral efficiency performance.

Based on the ranging algorithm built into the air protocol, the airFiber radios use patent-pending HDD technology to calculate the propagation delay and know when each radio can transmit and receive, so they send packets in precise synchronization. Packet transmission latency is virtually eliminated.



airFiber AF-5/AF-5U Radios in Full-Duplex Mode



airFiber AF-5/AF-5U

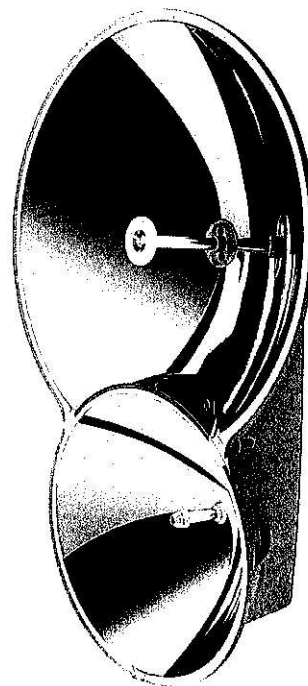
Innovative Dual-Antenna Architecture

airFiber features a dual-independent, 2x2 MIMO, high-gain reflector antenna system. Separate yet integrated transmit (TX) and receive (RX) antennas help extend link budgets by eliminating the extra RF losses caused by the switches or duplexers required in systems with common TX/RX antennas.

Network Management

airFiber supports a variety of features to help you manage your network:

- **Network management options** A choice between the greater security of out-of-band management and the convenience of in-band management.
- **SNMP support** Full SNMP support to aid in network management.
- **Local and remote airFiber status information** Available on the Main tab of the airFiber Configuration Interface.



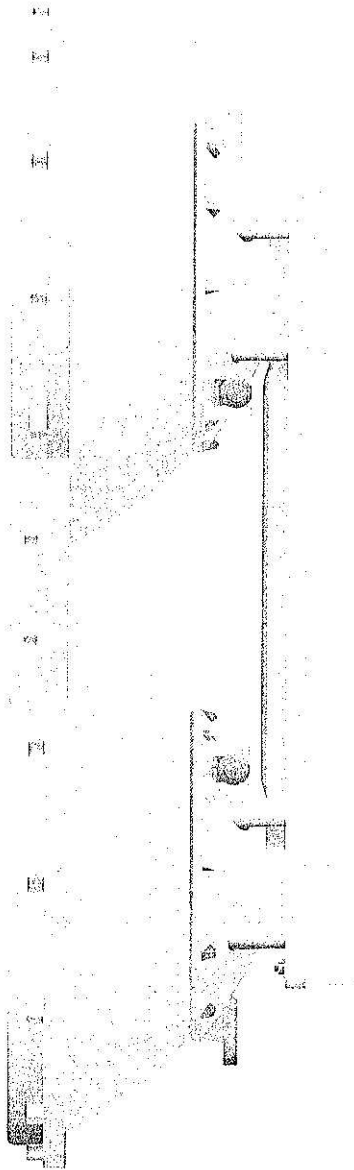
airFiber AF-24 shown without radome

airFiber[®] 5

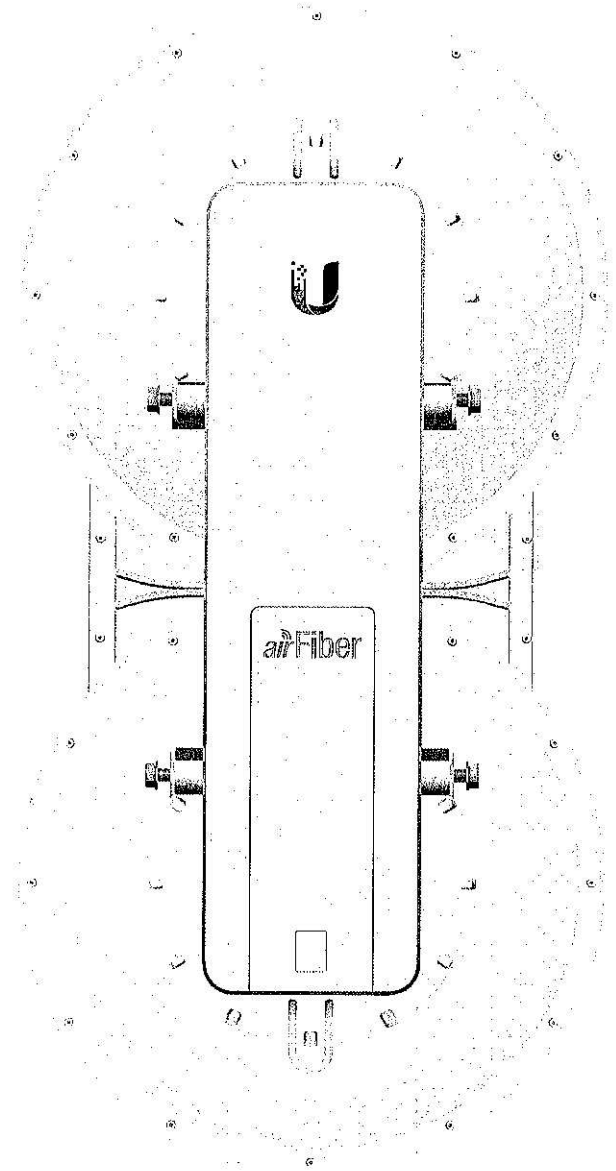
airFiber[®] 5U

There are two airFiber models available for the 5 GHz spectrum. The mid-band model, AF-5, features the popular mid-band frequencies, which are freely used in many parts of the world.

The high-band (5.7 - 6.2 GHz) model, AF-5U, has robust filtering to enable co-location with devices operating in the lower 5 GHz bands while allowing operation at a higher output power in many areas of the world.



Side



Back

1.2+ Gbps
Real Data Throughput

(((5 GHz)))

100+ km
← xRT →
xtreme Range Technology

HDD
TDD FDD

Superior Processing

Ubiquiti Networks introduces our proprietary INVICTUS™ core communications processing engine. The speed, power, and efficiency of this integrated circuit enhances the performance of the airFiber AF-5/AF-5U.

Efficient Use of 5 GHz Band

airFiber AF-5/AF-5U features 1 MHz center channel resolution with market-leading Power Envelope Tracking technology. The airFiber AF-5/AF-5U accurately and continuously controls transmit power relative to the band edge. The power level automatically tracks to optimize performance near band edges, allowing you to choose the part of the band with the least interference.

Long-Range Links

Newly developed for the airFiber AF-5/AF-5U, the patent-pending xRT feature uses an innovative, adaptive multi-channel coding scheme to enhance radio transceiver performance, thereby maximizing your link budget and spectrum utilization – while still maintaining regulatory compliance. This results in links that can span distances from 10 m up to 100+ km.

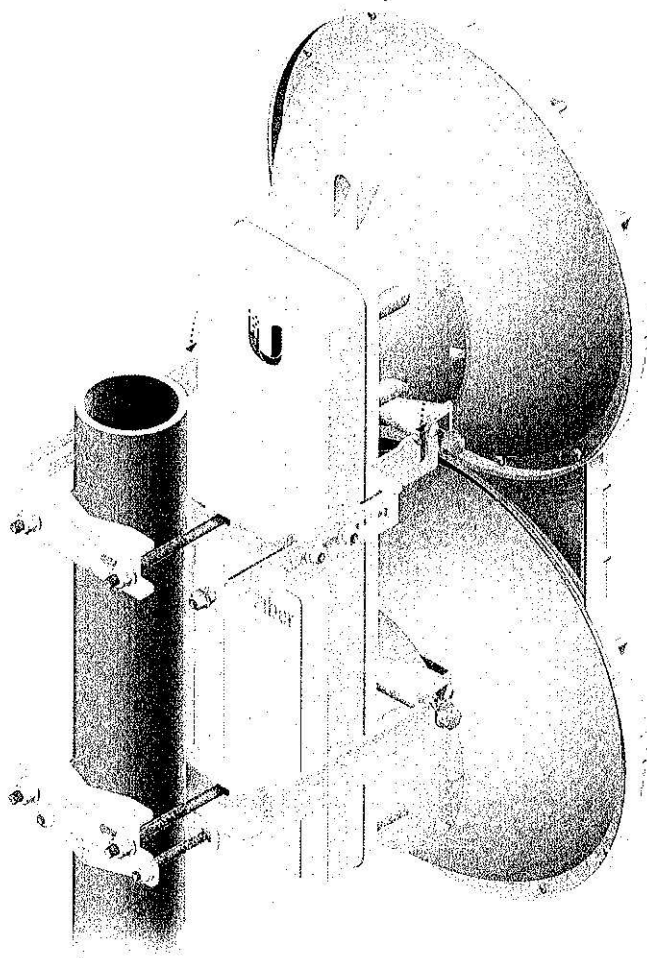
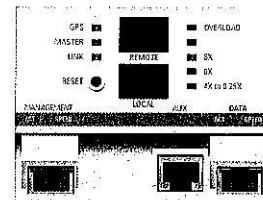
Quick and Easy Installation

The unique sliding-clamp design of the airFiber AF-5/AF-5U allows mounting hardware to be pre-assembled prior to installation – no more dropped screws at the top of the tower. As an added convenience, the drop-in cradle mount design allows the installer to attach mounting hardware to the pole without having to support the weight of the airFiber radio during installation.

Radio Alignment Display

Newly designed for the airFiber AF-5/AF-5U, the Radio Alignment Display (RAD) makes aiming quicker and easier. The dual, calibrated signal strength indicators display the actual signal strength on the local and remote airFiber radios in real time. The comprehensive array of radio status indicators display the following:

- GPS synchronization status
- Master/slave mode
- RF link status
- RF overload warning
- Current modulation mode
- Link activity and speed for wired management and data ports



Specifications

airFiber AF-5/AF-5U

Dimensions	
Radio	938.4 x 468.4 x 281.4 mm (36.94 x 18.44 x 11.08")
Box	1042 x 573 x 502 mm (41.02 x 22.56 x 19.76")
Weight	
Radio (Mount Included)	16 kg (35.27 lb)
Box	26.5 kg (58.42 lb)
Max. Power Consumption	40W
Power Supply	50V, 1.2A PoE GigE Adapter (Included)
Power Method	Passive Power over Ethernet
Supported Voltage Range	+42 to +58VDC, -48VDC
Automatic Transmit Power Control (ATPC)	Yes
Certifications	CE, FCC, IC
Mounting	Pole Mount Kit (Included)
Wind Loading	863 N @ 200 km/hr (194 lbf @ 125 mph)
Wind Survivability	200 km/hr (125 mph)
Operating Temperature	-40 to 55° C (-40 to 131°F)
LEDs	(12) Status LEDs: Data Port Link/Activity Data Port Speed Management Port Link/Activity Management Port Speed GPS Synchronization Master/Slave Link Status Modulation Mode 0.25x to 4x, 6x, 8x, 10x (Unlabeled), Overload Remote and Local Displays (Calibrated Signal Strength)
Operating Frequency	
AF-5	
FCC 15.247, 15.407, IC RSS-210	5470 - 5600 MHz, 5650 - 5850 MHz
ETSI EN 301 893, EN 302 502	5470 - 5875 MHz
Other Regions	5470 - 5950 MHz
AF-5U	
FCC 15.247, IC RSS-210	5725 - 5850 MHz
ETSI EN 302 502	5725 - 5875 MHz
Other Regions	5725 - 6200 MHz
Interface	
Data Port	(1) 10/100/1000 Ethernet Port
Management Port	(1) 10/100 Ethernet Port
Auxiliary Port	(1) RJ-12, Alignment Tone Port
System	
Maximum Throughput	1.2+ Gbps
Maximum Range	100+ km (Dependent on Regulatory Region)
Packets per Second	1+ Million
Encryption	128-Bit AES
Uplink/Downlink Ratio	50% Fixed
Latency	
Full Duplex Mode	< 200 µs at Full Throughput
Half Duplex Mode	< 2 ms at Full Throughput
Radio Frame Synchronization	GPS
Dynamic Frequency Selection	
AF-5	CE, FCC/IC
AF-5U	CE (FCC/IC Not Applicable)
MTU (Maximum Transmission Unit)	



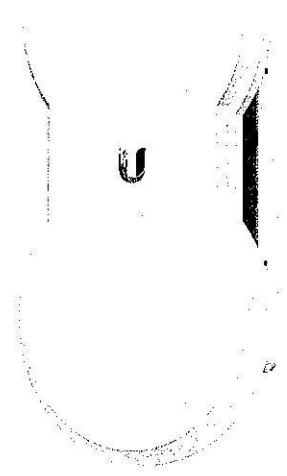
airFiber AF-5/AF-5U Suggested Max. TX Power	
10x	39 dBm
8x	43 dBm
6x	45 dBm
4x and below	47 dBm

airFiber AF-5/AF-5U Receive Sensitivity								
Rate	Modulation	Sensitivity (10 MHz)	Sensitivity (20 MHz)	Sensitivity (30 MHz)	Sensitivity (40 MHz)	Sensitivity (50 MHz)	FDD Capacity*	TDD Capacity*
10x	1024QAM	-63 dBm	-60 dBm	-59 dBm	-58 dBm	-57 dBm	1280 Mbps	640 Mbps
8x	256QAM	-70 dBm	-67 dBm	-66 dBm	-65 dBm	-64 dBm	1024 Mbps	512 Mbps
6x	64QAM	-77 dBm	-74 dBm	-73 dBm	-72 dBm	-71 dBm	768 Mbps	384 Mbps
4x	16QAM MIMO	-84 dBm	-81 dBm	-80 dBm	-79 dBm	-78 dBm	512 Mbps	256 Mbps
2x	QPSK MIMO	-90 dBm	-87 dBm	-86 dBm	-85 dBm	-84 dBm	256 Mbps	128 Mbps
1x	½ Rate QPSK xRT	-93 dBm	-90 dBm	-89 dBm	-88 dBm	-87 dBm	128 Mbps	64 Mbps
¼x	¼x QPSK xRT	-95 dBm	-93 dBm	-93 dBm	-92 dBm	-91 dBm	32 Mbps	16 Mbps

* FDD = (2) 50 MHz channels and TDD = (1) 50 MHz channel

airFiber AF-5/AF-5U Radio Frequency	
GPS	GPS Clock Synchronization
Transceiver	
EIRP	~50 dBm (Dependent on Regulatory Region and Frequency Band)
Frequency Accuracy	±2.5 ppm without GPS Synchronization ±0.2 ppm with GPS Synchronization
Channel Bandwidth	10/20/30/40/50 MHz
Modulation	1024QAM MIMO 256QAM MIMO 64QAM MIMO 16QAM MIMO QPSK MIMO ½ Rate QPSK xRT ¼ Rate QPSK xRT
Integrated Split Antenna	
TX Gain	23 dBi
RX Gain	23 dBi
Beamwidth	6°
Front-to-Back Ratio	70 dB
Polarity	Dual-Slant Polarization
Cross-Polarity Isolation	> 28 dB

airFiber AF-5/AF-5U Capacity (Mbps)						
Rate	Modulation	Channel Width (MHz)				
		10	20	30	40	50
10x	1024 QAM MIMO	256.0	512.0	768.0	1024.0	1280.0
8x	256 QAM MIMO	204.8	409.6	614.4	819.2	1024.0
6x	64 QAM MIMO	153.6	307.2	460.8	614.4	768.0
4x	16 QAM MIMO	102.4	204.8	307.2	409.6	512.0
2x	QPSK MIMO	51.2	102.4	153.6	204.8	256.0
1x	½ Rate QPSK xRT	25.6	51.2	76.8	102.4	128.0
¼x	¼ Rate QPSK xRT	6.4	12.8	19.2	25.6	32.0



Superior 24 GHz Performance

airFiber AF-24/AF-24HD provides a breakthrough in 24 GHz backhaul performance.

Systems for millimeter-wave frequencies typically experience RF losses when part of the RF is lost in the switches and filters.

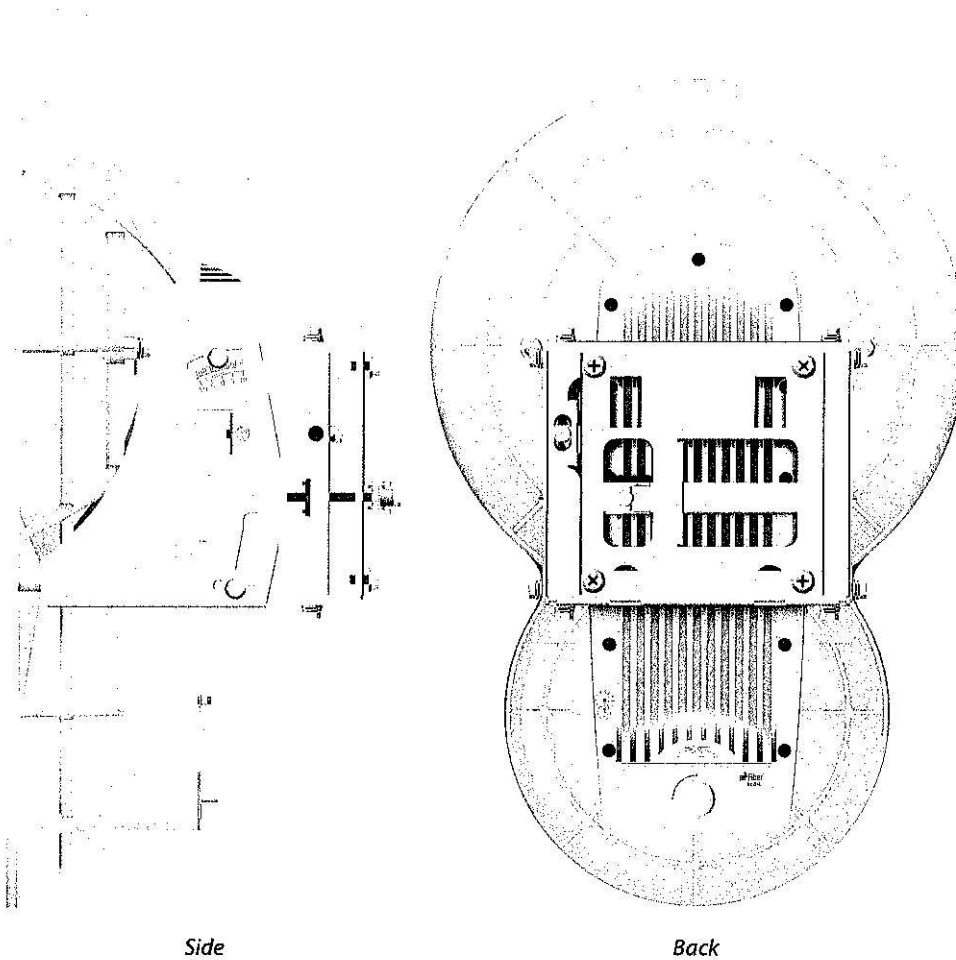
The Ubiquiti R&D team eliminated such RF losses with separate yet integrated TX and RX antennas, so the link budget is robust and the airFiber AF-24/AF-24HD has better noise figure and higher transmit power efficiency.

Two airFiber 24 GHz Models

Two models deliver superior speed with spectral efficiency in the worldwide, license-free, 24 GHz radio band.

The standard model, AF-24, delivers up to 1.5+ Gbps throughput at a range of up to 13+ km.

The heavy-duty model, AF-24HD, provides more throughput at up to 2 Gbps and increased range of up to 20+ km. It also includes a more rugged exterior with a metal reflector, to protect against nature's harshest elements.



Side

Back

1.5+ Gbps
Real Data Throughput

((24 GHz))
License-Free

13+ km
Extreme Range

HDD
TDD FDD

Specifications

airFiber AF-24	
Operating Frequency	24.05 – 24.25 GHz*
Dimensions	
Radio	649 x 426 x 303 mm (25.55 x 16.77 x 11.93")
Box	725 x 520 x 410 mm (28.54 x 20.47 x 16.14")
Weight	
Radio (Mount Included)	10.5 kg (23.15 lb)
Box	17 kg (37.48 lb)
Max. Power Consumption	50W
Power Supply	50V, 1.2A PoE GigE Adapter (Included)
Power Method	Passive Power over Ethernet
Supported Voltage Range	+42 to +58VDC, -48VDC
Certifications	CE, FCC, IC
Wind Loading	480 N @ 200 km/hr (108 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	1.5+ Gbps
Maximum Range	13+ km
Packets per Second	> 1 Million
Encryption	128-Bit AES
Uplink/Downlink Ratio	50% Fixed
Latency	
Full Duplex Mode	< 200 µs at Full Throughput
Half Duplex Mode	< 2 ms at Full Throughput
MTU (Maximum Transmission Unit)	Up to 9600

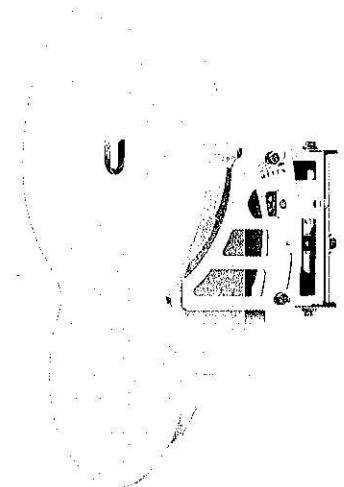
* Two 100 MHz channels are available: 24.1 GHz (24.05-24.15 GHz) and 24.2 GHz (24.15-24.25 GHz)

airFiber AF-24 Receive Sensitivity			
Modulation	Sensitivity	FDD Capacity*	TDD Capacity*
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
¼x QPSK SISO	-87 dBm	62.5 Mbps	31.7 Mbps

airFiber AF-24 Radio Frequency	
GPS	GPS Clock Synchronization
Transceiver	
EIRP	~33 dBm (FCC/IC), ~20 dBm (CE), ~40 dBm (Other Regions)
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	64QAM MIMO 16QAM MIMO QPSK MIMO QPSK SISO ¼x QPSK SISO
Integrated Split Antenna	
TX Gain	33 dBi
RX Gain	38 dBi
Beamwidth	< 3.5°
Front-to-Back Ratio	70 dB
Polarity	Dual-Slant Polarization
Cross-Polarity Isolation	> 28 dB

airFiber AF-24 Capacity (Mbps)		
Rate	Modulation	100 MHz Channel Width*
6x	64 QAM MIMO	1500.0
4x	16 QAM MIMO	1000.0
2x	QPSK MIMO	500.0
1x	QPSK SISO	250.0
¼ x	¼ QPSK SISO	62.5

* Aggregated capacity in Full-Duplex mode



airFiber® 24 HD

Best-in-Class Performance and Range

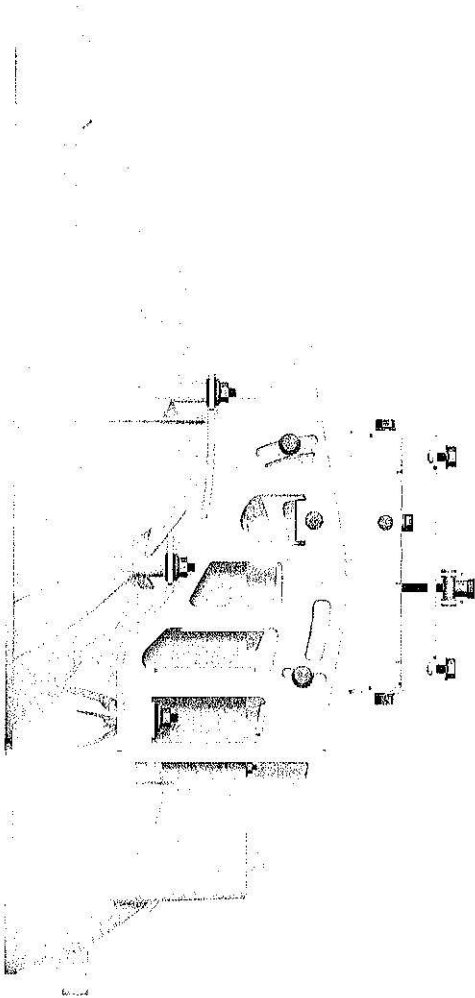
Our INVICTUS custom silicon dramatically improves wireless performance. The AF-24HD model supports the dense modulation rates, up to 256QAM, that are required for high data rates, up to 2 Gbps.

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.

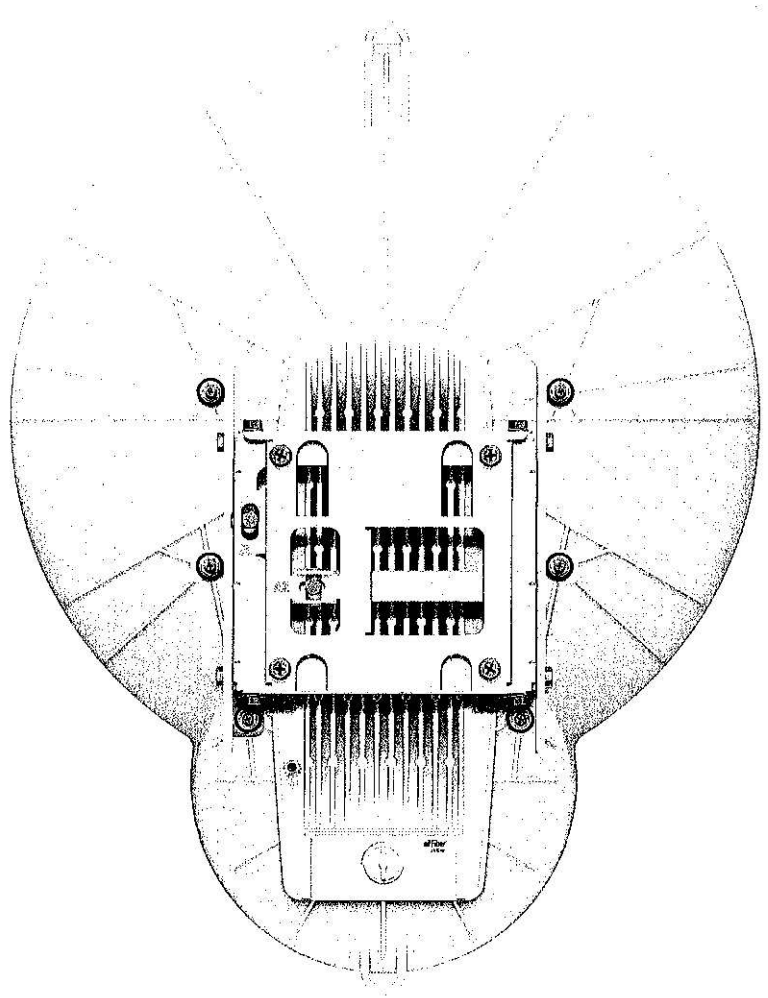
Robust Mechanical Assembly

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).



Side



Back

2 Gbps
Real Data Throughput

((24 GHz))
License-Free

20+ km
Extreme Range

HDD
TDD FDD

Specifications

airFiber AF-24HD	
Operating Frequency	24.05 – 24.25 GHz
Dimensions	
Radio	593 x 768 x 370 mm (23.35 x 30.24 x 14.57")
Box	796 x 696 x 49.5 mm (31.34 x 27.40 x 1.95")
Weight	
Radio (Mount Included)	17.3 kg (38.14 lb)
Box	25.5 kg (56.22 lb)
Max. Power Consumption	50W
Power Supply	50V, 1.2A PoE GigE Adapter (Included)
Power Method	Passive Power over Ethernet
Supported Voltage Range	+42 to +58VDC, -48VDC
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
Packets per Second	> 1 Million
Encryption	128-Bit AES = (1) 100 MHz channel
Uplink/Downlink Ratio	50% Fixed
Latency	
Full Duplex Mode	< 200 μs at Full Throughput
Half Duplex Mode	< 2 ms at Full Throughput
MTU (Maximum Transmission Unit)	Up to 9600

airFiber AF-24HD Receive Sensitivity			
Modulation	Sensitivity	FDD Capacity*	TDD Capacity*
256QAM	-60 dBm	2000 Mbps	1024 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
¼x QPSK SISO	-87 dBm	62.5 Mbps	31.7 Mbps

airFiber AF-24HD Radio Frequency	
GPS	GPS Clock Synchronization
Transceiver	
EIRP	~33 dBm (FCC/IC), ~20 dBm (CE), ~40 dBm (Other Regions)
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 ¼x 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

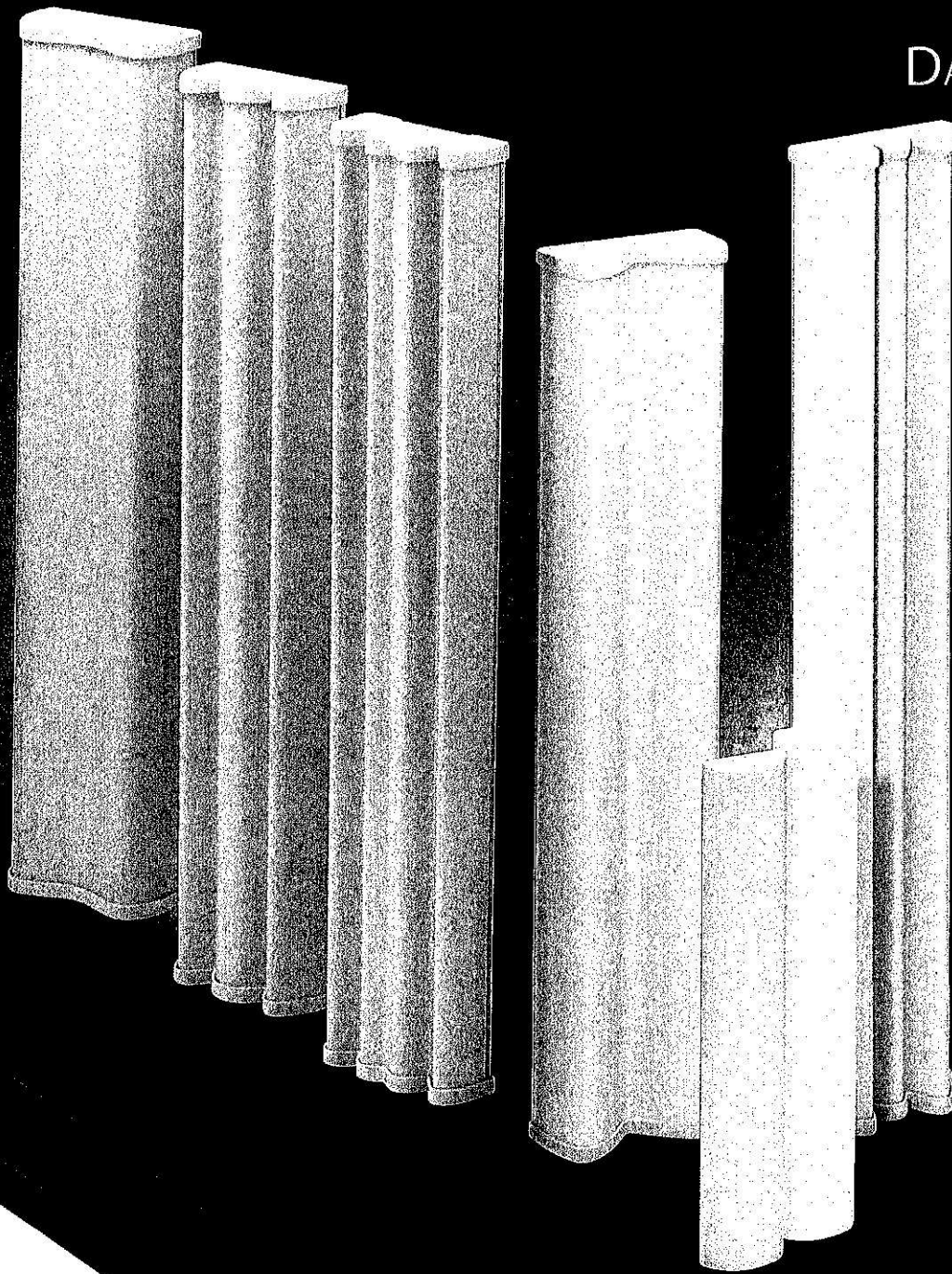
airFiber AF-24HD Capacity (Mbps)		
Rate	Modulation	100 MHz Channel Width*
8x	256 QAM MIMO	2000.0
6x	64 QAM MIMO	1500.0
4x	16 QAM MIMO	1000.0
2x	QPSK MIMO	500.0
1x	QPSK SISO	250.0
¼x	¼ QPSK SISO	62.5

* Aggregated capacity in Full-Duplex mode

Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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airMAX[®] Sector

2x2 MIMO BaseStation Sector Antenna

Models: AM-9M13, AM-2G15-120, AM-2G16-90, AM-3G18-120,
AM-5G16-120, AM-5G17-90, AM-5G19-120, AM-5G20-90

High Performance, Long Range

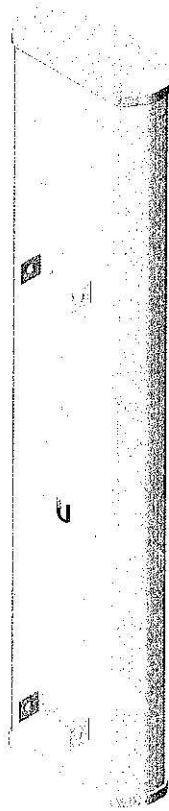
Seamlessly Integrates with Rocket[®] Radio

Excellent Cross-Polarization Isolation

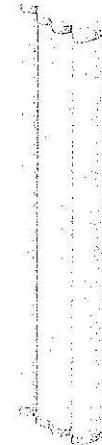


UBIQUITI[®]
NETWORKS

Model Comparison



	AM-9M13	AM-2G15-120	AM-2G16-90	AM-3G18-120
Frequency Band	900 MHz	2.4 GHz	2.4 GHz	3 GHz
Gain	13 dBi	15 dBi	16 dBi	18 dBi



	AM-5G16-120	AM-5G17-90	AM-5G19-120	AM-5G20-90
Frequency Band	5 GHz	5 GHz	5 GHz	5 GHz
Gain	16 dBi	17 dBi	19 dBi	20 dBi

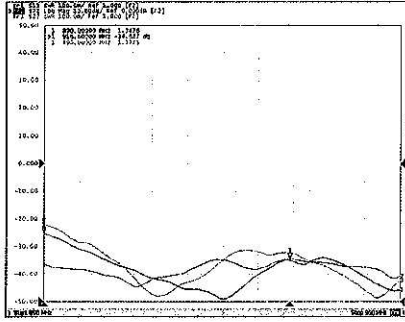
Specifications

Antenna Characteristics				
Model	AM-9M13	AM-2G15-120	AM-2G16-90	AM-3G18-120
Dimensions*	1290 x 290 x 134 mm (50.79 x 11.42 x 5.28")	700 x 145 x 93 mm (27.56 x 5.71 x 3.66")	700 x 145 x 79 mm (27.56 x 5.71 x 3.11")	735 x 144 x 78 mm (28.94 x 5.67 x 3.07")
Weight*	12.5 kg (27.56 lbs)	4.0 kg (8.82 lbs)	3.9 kg (8.6 lbs)	5.9 kg (13 lbs)
Frequency Range	902 - 928 MHz	2.3 - 2.7 GHz	2.3 - 2.7 GHz	3.3 - 3.8 GHz
Gain	13.2 - 13.8 dBi	15.0 - 16.0 dBi	16.0 - 17.0 dBi	17.3 - 18.2 dBi
HPOL Beamwidth	109° (6 dB)	123° (6 dB)	91° (6 dB)	118° (6 dB)
VPOL Beamwidth	120° (6 dB)	118° (6 dB)	90° (6 dB)	121° (6 dB)
Electrical Beamwidth	15°	9°	9°	6°
Electrical Downtilt	N/A	4°	4°	3°
Max. VSWR	1.5:1	1.5:1	1.5:1	1.5:1
Wind Survivability	200 km/h (125 mph)	200 km/h (125 mph)	200 km/h (125 mph)	200 km/h (125 mph)
Wind Loading	658.3 N @ 200 km/h (148 lbf @ 125 mph)	169 N @ 200 km/h (38 lbf @ 125 mph)	133.4 N @ 200 km/h (30 lbf @ 125 mph)	146.8 N @ 200 km/h (33 lbf @ 125 mph)
Polarization	Dual-Linear	Dual-Linear	Dual-Linear	Dual-Linear
Cross-pol Isolation	30 dB Min.	28 dB Min.	28 dB Min.	28 dB Min.
ETSI Specification	N/A	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2
Mounting	Universal Pole Mount, RocketM Bracket, and Weatherproof RF Jumpers Included			

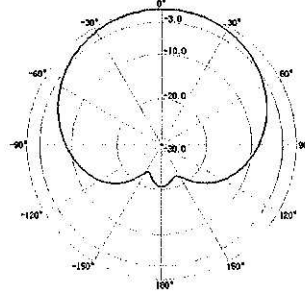
Antenna Characteristics				
Model	AM-5G16-120	AM-5G17-90	AM-5G19-120	AM-5G20-90
Dimensions*	367 x 63 x 41 mm (14.45 x 2.48 x 1.61")	367 x 63 x 41 mm (14.45 x 2.48 x 1.61")	700 x 135 x 73 mm (27.56 x 5.32 x 2.87")	700 x 135 x 70 mm (27.56 x 5.32 x 2.76")
Weight*	1.1 kg (2.43 lb)	1.1 kg (2.43 lb)	5.9 kg (13 lbs)	5.9 kg (13.01 lb)
Frequency Range	5.10 - 5.85 GHz	4.90 - 5.85 GHz	5.15 - 5.85 GHz	5.15 - 5.85 GHz
Gain	15.0 - 16.0 dBi	16.1 - 17.1 dBi	18.6 - 19.1 dBi	19.4 - 20.3 dBi
HPOL Beamwidth	137° (6 dB)	72° (6 dB)	123° (6 dB)	91° (6 dB)
VPOL Beamwidth	118° (6 dB)	93° (6 dB)	123° (6 dB)	85° (6 dB)
Electrical Beamwidth	8°	8°	4°	4°
Electrical Downtilt	4°	4°	2°	2°
Max. VSWR	1.5:1	1.5:1	1.5:1	1.5:1
Wind Survivability	200 km/h (125 mph)	200 km/h (125 mph)	200 km/h (125 mph)	200 km/h (125 mph)
Wind Loading	41.7 N @ 200 km/h (9.375 lbf @ 125 mph)	41.7 N @ 200 km/h (9.375 lbf @ 125 mph)	137.9 N @ 200 km/h (31 lbf @ 125 mph)	182 N @ 200 km/h (41 lbf @ 125 mph)
Polarization	Dual-Linear	Dual-Linear	Dual-Linear	Dual-Linear
Cross-pol Isolation	22 dB Min.	22 dB Min.	28 dB Min.	28 dB Min.
ETSI Specification	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2
Mounting	Universal Pole Mount, RocketM Bracket, and Weatherproof RF Jumpers Included			

AM-9M13 Antenna Information

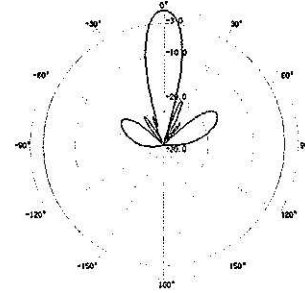
Return Loss



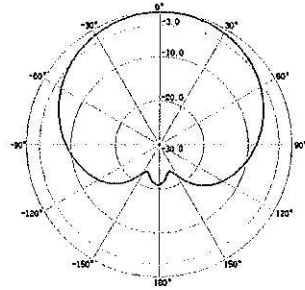
Vertical Azimuth



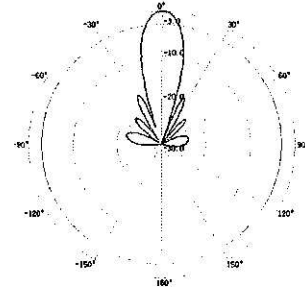
Vertical Elevation



Horizontal Azimuth

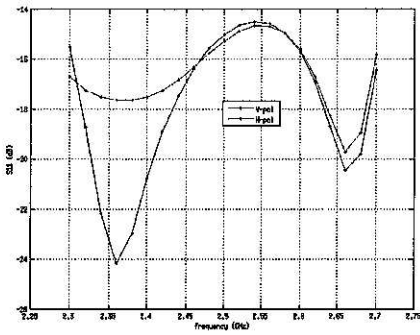


Horizontal Elevation

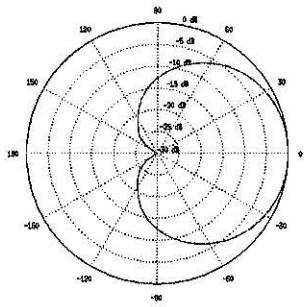


AM-2G15-120 Antenna Information

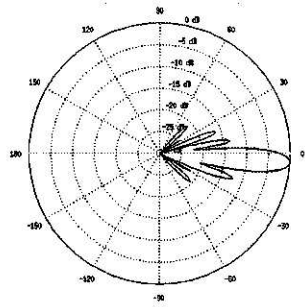
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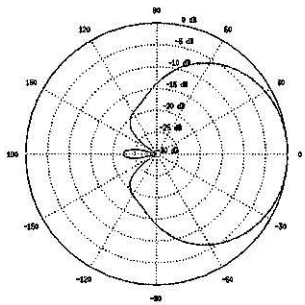
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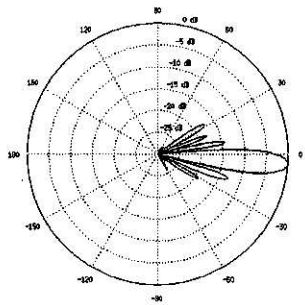
Vertical Elevation



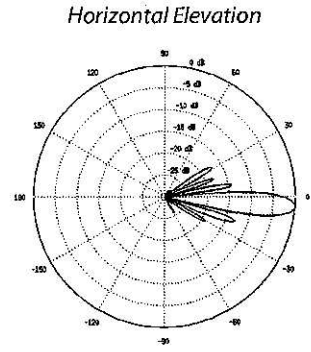
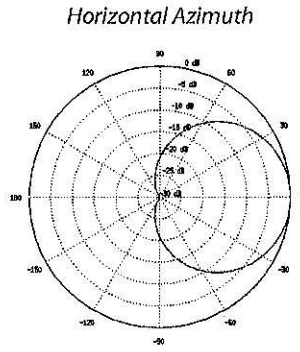
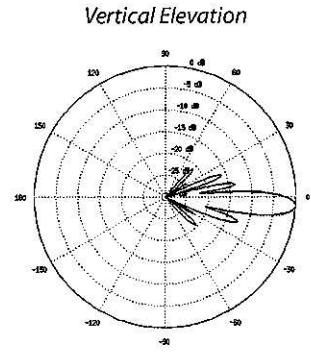
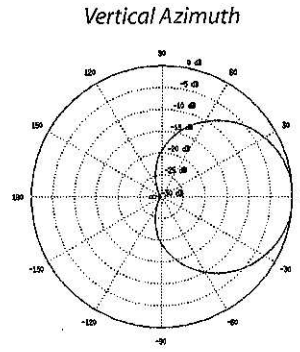
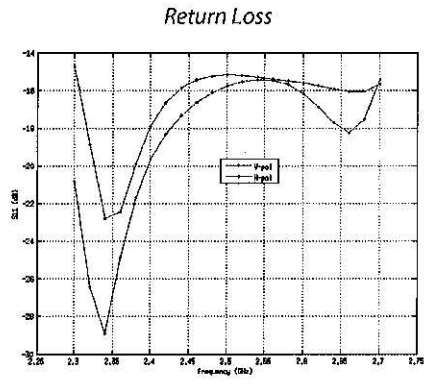
Horizontal Azimuth



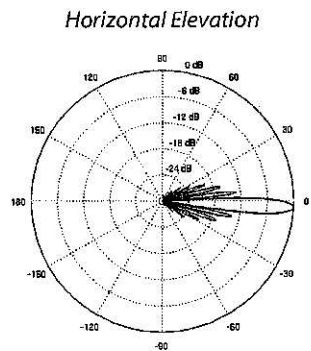
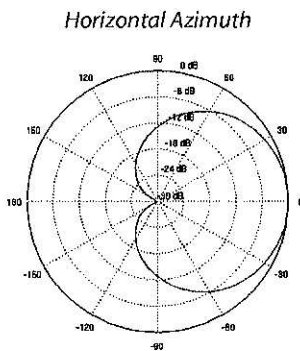
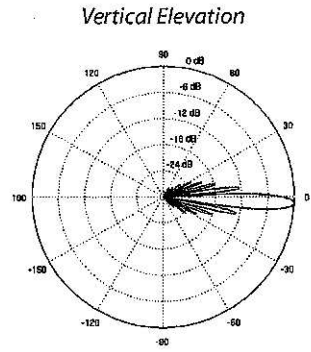
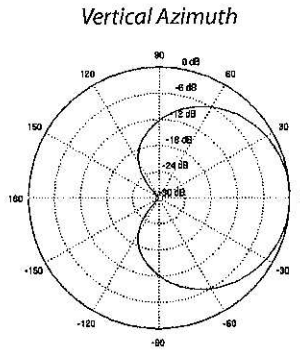
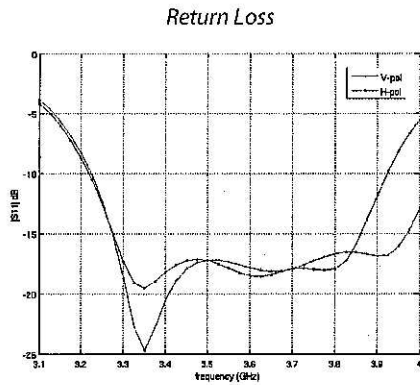
Horizontal Elevation



AM-2G16-90 Antenna Information

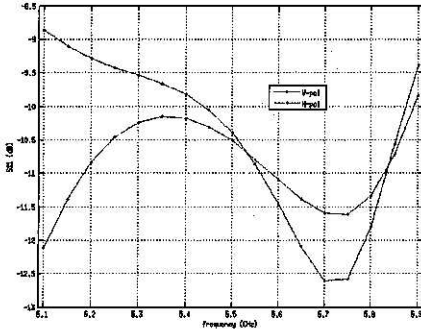


AM-3G18-120 Antenna Information

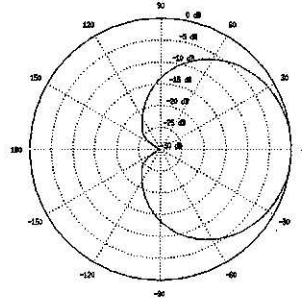


AM-5G16-120 Antenna Information

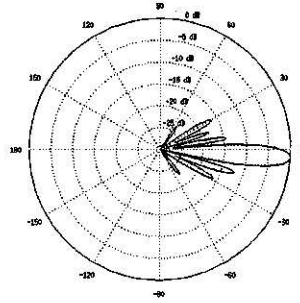
Return Loss



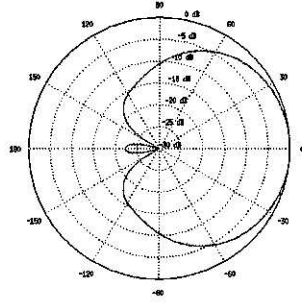
Vertical Azimuth



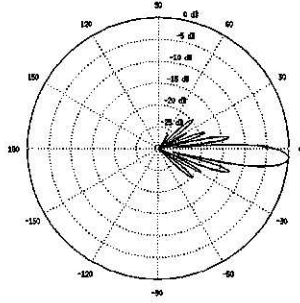
Vertical Elevation



Horizontal Azimuth

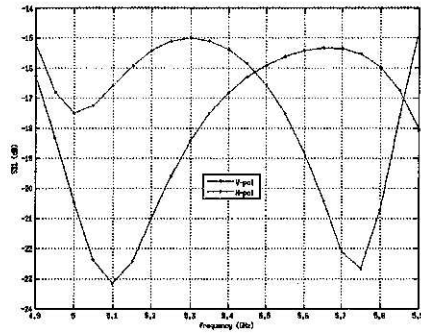


Horizontal Elevation

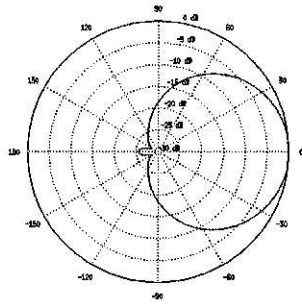


AM-5G17-90 Antenna Information

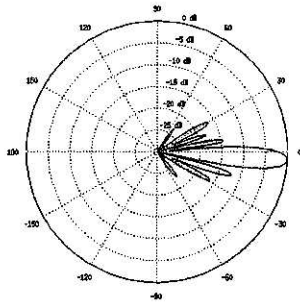
Return Loss



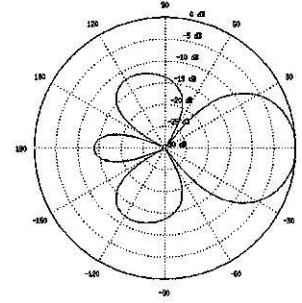
Vertical Azimuth



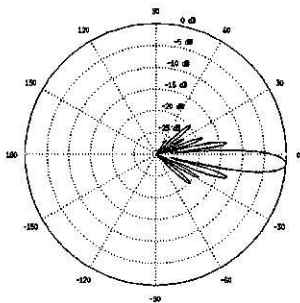
Vertical Elevation



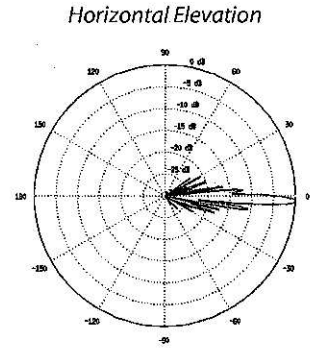
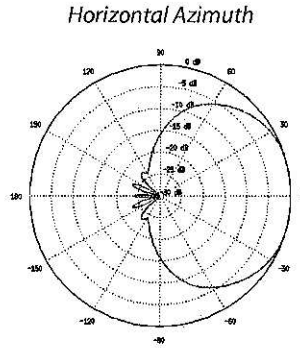
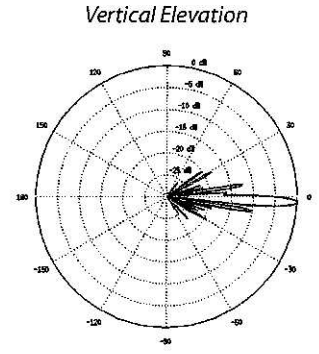
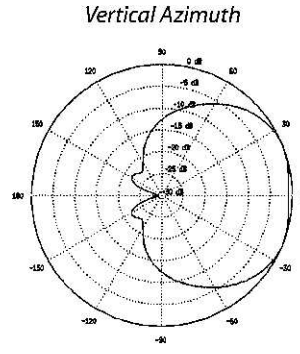
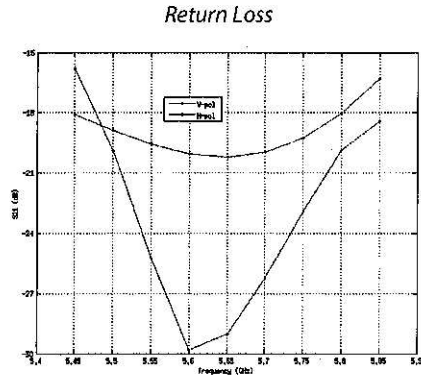
Horizontal Azimuth



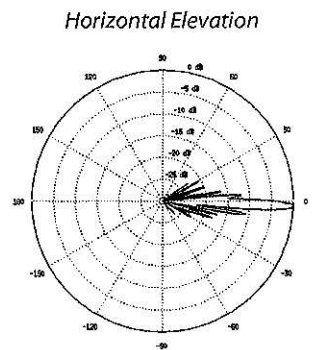
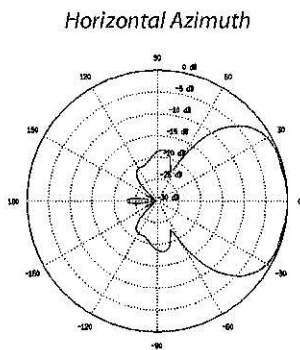
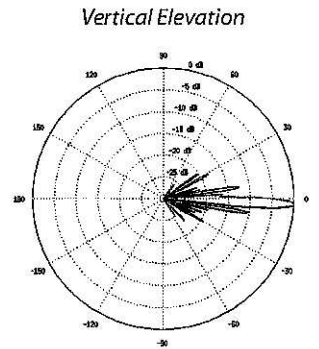
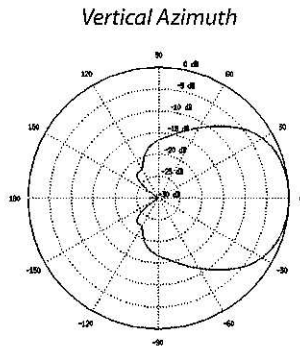
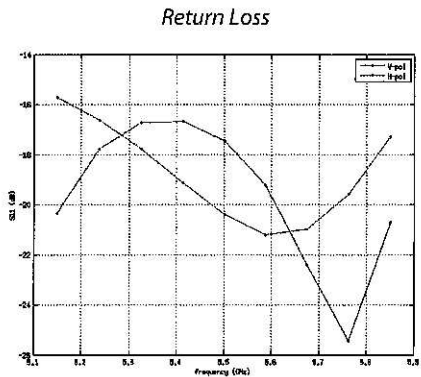
Horizontal Elevation



AM-5G19-120 Antenna Information



AM-5G20-90 Antenna Information



Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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airMAX[®] ac Sector

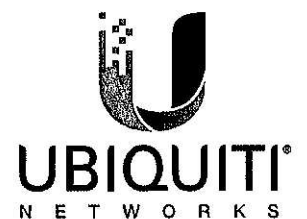
2x2 MIMO BaseStation Sector Antenna

Models: AM-5AC21-60, AM-5AC22-45

Advanced Noise Immunity

Superior Beam Performance

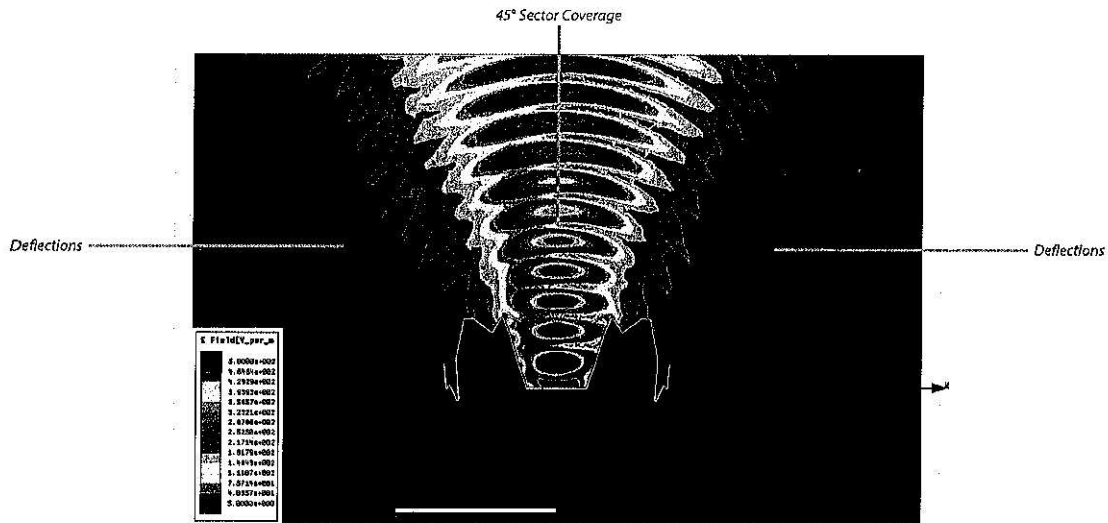
Enhanced Scalability of airMAX[®] Networks



Market-Leading Isolation Performance

The airMAX ac Sector Antennas are designed to provide advanced noise isolation performance. Compare the diagram of the AM-5AC22-45 to the diagram of a standard sector antenna, and note the superior noise immunity and beam performance of the AM-5AC22-45. (Both diagrams use a linear scale.)

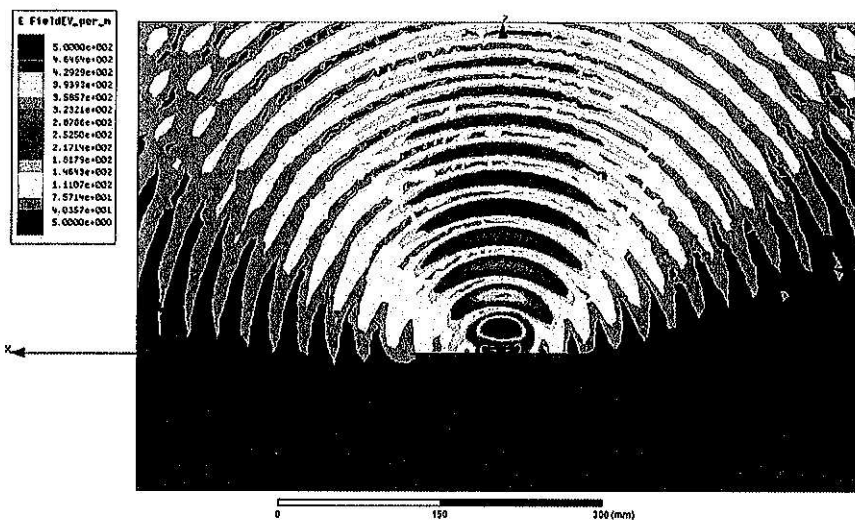
Near Field of AM-5AC22-45 (displayed in watts)



The strength of the electromagnetic field is color-coded.

- Red: Highest strength
- Green: Medium strength
- Indigo: Weakest strength

Near Field of Standard Sector Antenna (displayed in watts)

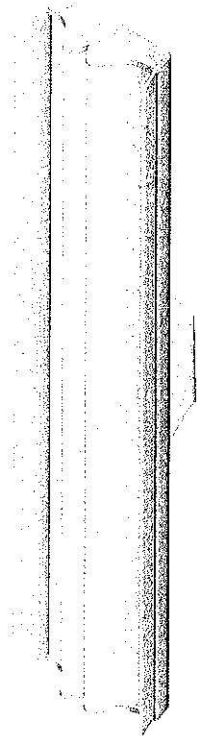


The strength of the electromagnetic field is color-coded.

- Red: Highest strength
- Green: Medium strength
- Indigo: Weakest strength

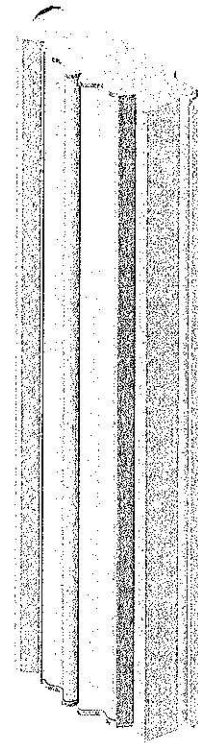
Hardware Overview

The airMAX ac Sector Antenna features robust construction for industrial-strength durability during outdoor use.



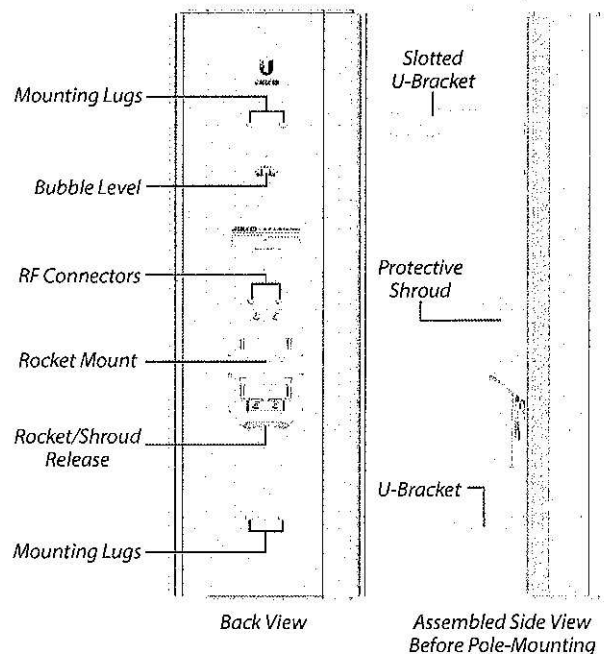
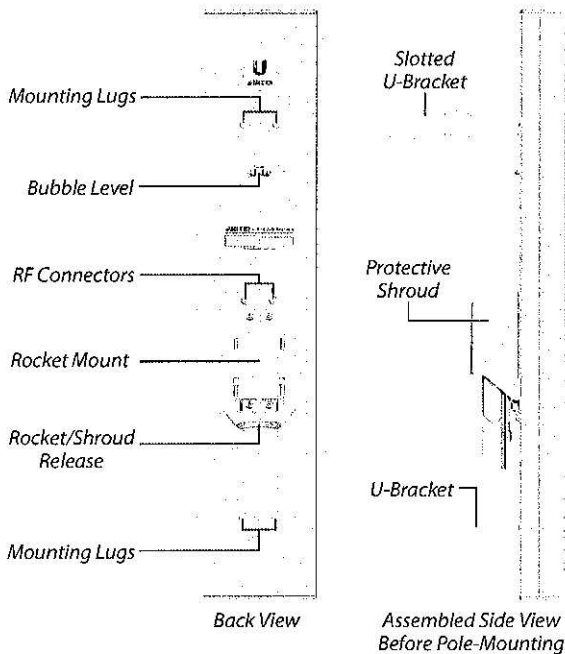
airMAX ac Sector

Model	Frequency	Gain	Beamwidth
AM-5AC21-60	5 GHz	21 dBi	60°



airMAX ac Sector

Model	Frequency	Gain	Beamwidth
AM-5AC22-45	5 GHz	22 dBi	45°

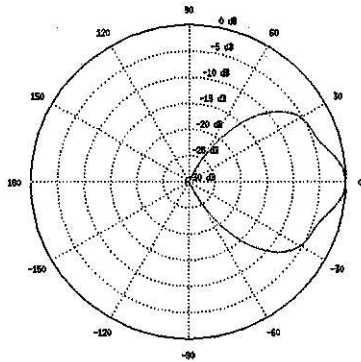


Specifications

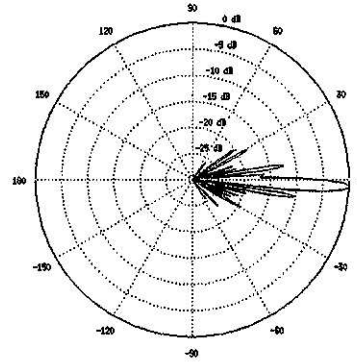
AM-5AC21-60 Antenna Characteristics	
Dimensions*	750 x 173 x 78 mm (29.53 x 6.81 x 3.07")
Weight†	4.8 kg (10.58 lbs)
Frequency Range	5.10 - 5.85 GHz
Gain	21 dBi
HPOL Beamwidth	60° (6 dBi)
VPOL Beamwidth	60° (6 dBi)
Electrical Beamwidth	4°
Electrical Downtilt	2°
Max. VSWR	1.5:1
Wind Survivability	200 km/h (125 mph)
Wind Loading	391 N @ 200 km/h (88 lbf @ 125 mph)
Polarization	Dual-Linear
Cross-Polarization Isolation	25 dB Min.
ETSI Specification	EN 302 326 DN1
Mounting	Universal Pole Mount, Rocket Bracket, and Weatherproof RF Jumpers Included

* Dimensions exclude pole mount and Rocket radio (Rocket sold separately)
 † Weight includes pole mount and excludes Rocket radio (Rocket sold separately)

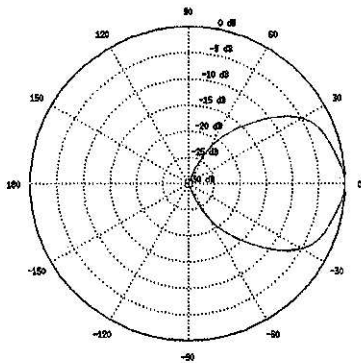
Vertical Azimuth



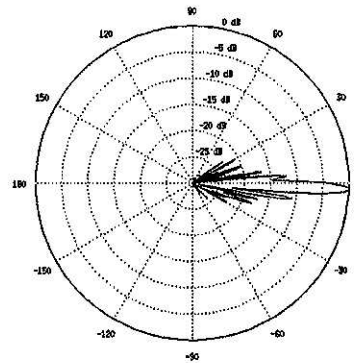
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation

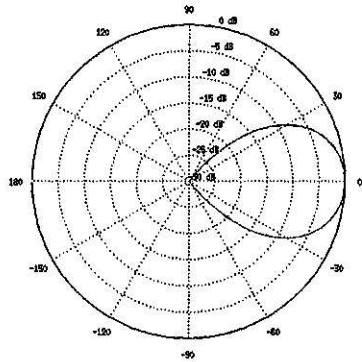


Specifications

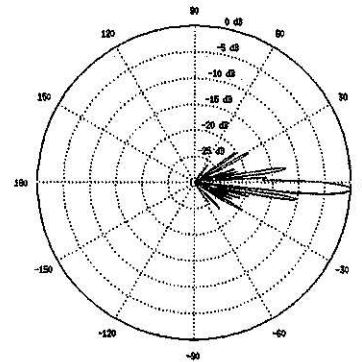
AM-5AC22-45 Antenna Characteristics	
Dimensions*	750 x 215 x 94 mm (29.53 x 8.47 x 3.70")
Weight†	6 kg (13.23 lbs)
Frequency Range	5.10 - 5.85 GHz
Gain	22 dBi
HPOL Beamwidth	45° (6 dBi)
VPOL Beamwidth	45° (6 dBi)
Electrical Beamwidth	4°
Electrical Downtilt	2°
Max. VSWR	1.5:1
Wind Survivability	200 km/h (125 mph)
Wind Loading	347 N @ 200 km/h (78 lbf @ 125 mph)
Polarization	Dual-Linear
Cross-Polarization Isolation	30 dB Min.
ETSI Specification	EN 302 326 DN1
Mounting	Universal Pole Mount, Rocket Bracket, and Weatherproof RF Jumpers Included

* Dimensions exclude pole mount and Rocket radio (Rocket sold separately)
 † Weight includes pole mount and excludes Rocket radio (Rocket sold separately)

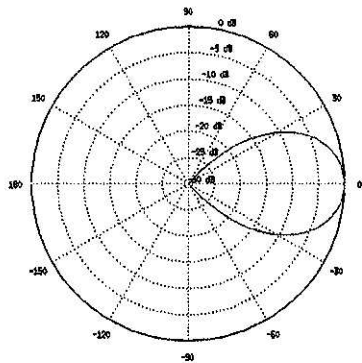
Vertical Azimuth



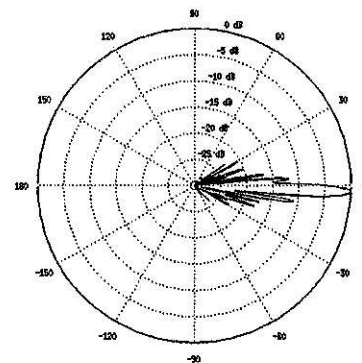
Vertical Elevation



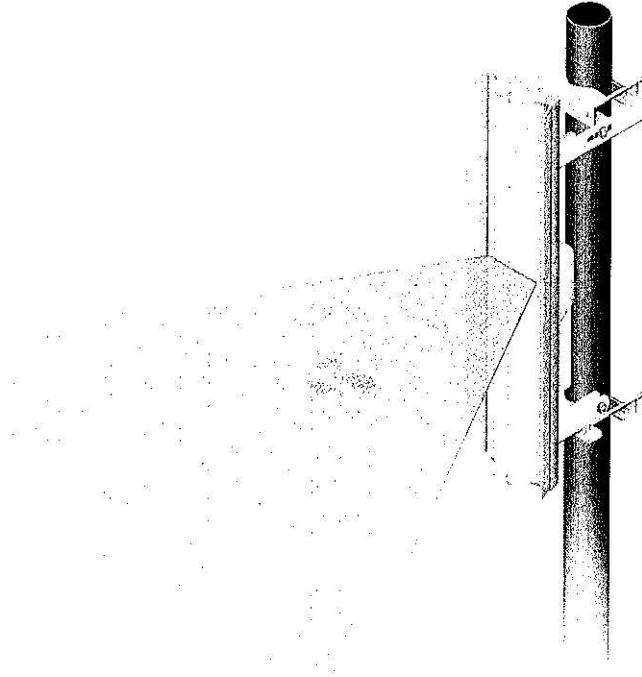
Horizontal Azimuth



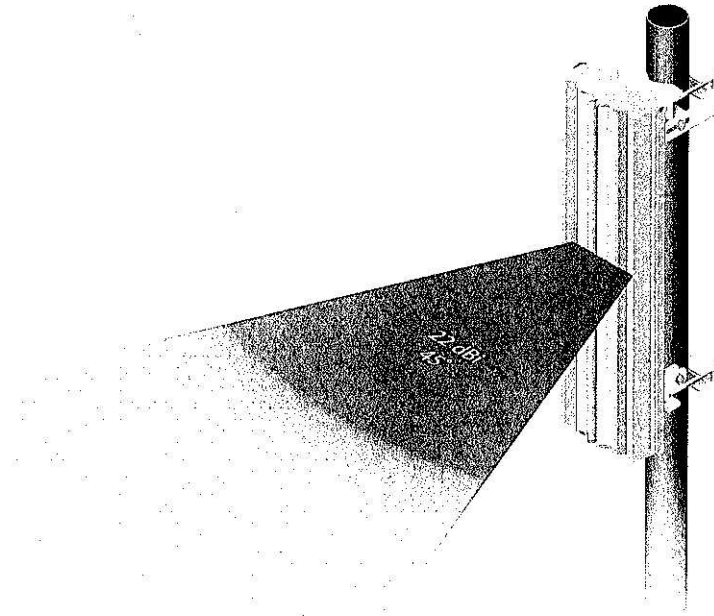
Horizontal Elevation



Beamwidth



AM-5AC21-60



AM-5AC22-45

Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
The limited warranty requires the use of arbitration to resolve disputes on an individual basis, and, where applicable, specify arbitration instead of jury trials or class actions.
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EXHIBIT E
33 NORTH STONE AVENUE
SPECIAL CONDITIONS, FACILITY RULES & REGULATIONS

- I. Licensee must comply with the following special conditions:
- A. Equipment and Antennas Installation:
1. All exterior transmission lines must be grounded at the following locations:
 - a. at the top of the run immediately above the hoisting grip;
 - b. at the bottom of the run above the horizontal transition;
 - c. prior to the point of entry to the shelter; and
 - d. if the vertical run is more than 250', additional hoisting grips and grounding kits are required as per manufacturer's specifications. Only manufacturer's grounding kits will be allowed for attachment. If the cable diameter is 7/8" or less, the cable must enter the shelter through the strike plate.
 2. Transmission lines must be fastened to the rooftop facility's waveguide ladder or banjos using the proper mechanical hanger or snap-in hanger kit except on side arms and up small masts where stainless steel wraplock is permitted. Hoisting grips will be used at 200' vertical intervals, or more often as needed for proper cable support.
 3. All installation, repair and maintenance conducted by licensee shall be in accordance with good engineering standards and in conformity with the requirement of the FCC or any other body having jurisdiction over Licensee.
- B. It is vital that standards for interference protection of systems are used to reduce the possibility of interference. The standards below are minimum and must be installed by Licensee.

Frequency Range	Minimum of Reverse Isolation Required (Isolator)	Band Pass Cavity, Minimum Attenuation At 1 MHz from Tx frequency
25-54 MHz	20dB	30dB
66-88-MHz	25dB	20dB
88-108 MHz	25dB	25dB
130-108 MHz	50dB	25dB
400-512 MHz	50dB	15dB
806-960 MHz	50dB	15dB

Hybrid transmitter combining will have a band pass filter installed on the output with the following attenuation at 1 MHz from the transmit frequency: UHF/800000 MHz – 14dB.

Additional interference and isolation specifications may be required on a case-by-case basis as determined by Licensor at any time. All cavities are to be 3/4 wave length, silver plated type.

Frequencies not included in the list above shall be dealt with on a case-by-case basis as determined within Licensor's reasonable discretions.

- C. All interior cables must be ¼" or ½" superflex or 3/8" value flex manufactured by Andrew corp. or an acceptable equivalent. Kinked, cracked or split cables are prohibited. All antenna lines must have a jacketed, corrugated, solid outer, copper conductor. All transmit interconnection cable and jumpers must be solid copper outer conductor "superflex", hard-line or LMR-400. No braid shield type cable is permitted anywhere under any circumstances. Moreover, all inside cable must be run on cable trays or hangers by the designated route for that location. All lines must be color coded at both ends showing termination points. All AC line cords must be 3-conductor type with grounding plug attached. All outside cables must be run on the transmission ice bridge with appropriate hardware and boots. Additionally, Licensee is prohibited from running cables within the equipment building or the rooftop facility without Licensor's written permission.
- D. Transmitters must meet the original manufacturer's specifications. All shields must remain in place. Transmitters must have a visual indication of transmitter operation and be identified with the following information: owner's name, contact name, contact's phone number, operating frequencies, a copy of Licensee's current FCC/ NTIA License for the equipment and the equipments model/serial number.
- E. All equipment cabinets and racks must be grounded to the designated building grounding point using #6 stranded copper – green jacketed cable. All equipment cabinets and racks must be bolted securely to the floor and include seismic braces at the top of the rack.
- F. Licensor does not provide any warranty against electrical surge. Therefore, Licensor recommends that Licensee install, at Licensee's expense, individual transient surge protection on each circuit used by Licensee.
- G. All antennas installed must be mounted using the proper antenna manufacturer's mounting brackets. Licensee shall pay for all antennas mounts it utilizes at the rooftop facility.
- H. All antennas must be installed according to the antenna manufacturer's and applicable rooftop facility manufacturer's specifications. Moreover, all antenna lines entering the equipment building must have a suitable lightning surge arrestor installed within two feet of the cable entry port. This surge arrestor must be bonded to the site grounding system.
- I. Licensor requires that all equipment that lends itself to rack-mounting be performed to conserve floor space at Licensee's expense.



- J. Licensee will operate its equipment with all shields attached, cabinet doors closed and side panels attached. Furthermore, unsealed batteries are not permitted at the rooftop facility. All external indicator lamps and LEDs must be operational and local speakers must remain off except during maintenance.
- K. Neither Licensee nor any of its representatives shall interfere with any other entity's equipment in the equipment shed. Moreover, Licensee will not trip any electric service breakers for any reason without Licensor's prior approval.
- L. All installations must be maintained in a neat and orderly manner. Doors to the equipment building must remain closed at all times. Access to equipment and antennas shall be by authorized personnel only.
- M. Prior to the activation of its system at the rooftop facility, Licensee must submit a copy of its applicable FCC/NTIA License and all technical information pertaining to the equipment to be installed including accurate block diagrams showing operating frequencies, all system components (active or passive) with gains and losses in dB, and all power levels to Licensor.
- N. Licensee must comply with the following rooftop facility rules and regulations, and access and security procedures for users:
1. Doorways, vestibules and other areas in and around the rooftop facility shall not be used for the disposal of trash or be obstructed by Licensee or used by Licensee for any other purpose than entrance to and exit from the rooftop facility.
 2. The equipment shed shall be used only for the purpose for which it has been designed and no unsuitable materials such as rubbish, rags or sweepings shall be disposed of within. Damage to any such building by Licensee shall be at the liability of Licensee.
 3. Signs, advertisements, graphics or notices are not allowed in or around the Rooftop facility.
 4. Licensee will not make any alterations or physical additions in or to the Rooftop facility without the written permission of Licensor. Licensee will be required to conduct and submit an Interference & Inter-modulation Analysis (IIA), at the Licensee's expense, in addition to requirements outlined in section M above.
 5. Movement in or out of the rooftop facility with any bulky equipment shall be restricted and allowed only at such times as designated by Licensor. Licensor will determine the method and routing of such items so as to ensure the safety of all concerned and that potential harm to the rooftop facility be

minimized. Advance notice of at least 24 hours is required for the movement of equipment.


6. Licensor shall have the authority to prescribe the maximum weight in any area and the manner in which equipment is placed.
 7. Licensee shall not adjust, attempt to adjust or otherwise tamper with any temperature control thermostats in the equipment sheds. Licensor shall adjust thermostats as required to maintain building standard temperature.
 8. At all times, Licensee will comply with all requirements necessary for the security of the rooftop facility.
 9. Notwithstanding any other provisions to the contrary contained herein, no work shall be performed at the rooftop facility, with the exception of routine maintenance work performed strictly by qualified employees of Licensee, without prior written consent of Licensor. Any work involving the presence of Licensor's representative, will be billed to and paid by Licensee at the hourly market rate applicable to said representative at that time. Any violation of this policy will be considered a material breach by Licensee.
 10. All routine service calls are to be scheduled between the hours of 8:00 a.m. and 5:00 p.m. weekdays.
 11. No Cable Terminations or circuit interface equipment is to be installed in any area but the building main distribution frame (basement or roof) and the Licensee's rooftop equipment area. Inclusive of but not limited to: 66 mounting blocks; 110 mounting blocks; modems; net work interface devices; and CSU-DSU units.
- O. Licensor reserves the right to rescind any of these rules and to make other rules if required for the safety and care of the rooftop facility and all licensees. Any changes to the rule and regulation will be done by formal written amendment. Upon notification to Licensee, such rules and regulations shall be binding upon Licensee in a manner as if originally herein prescribed.
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EXHIBIT F
33 NORTH STONE AVENUE
PROCEDURES FOR ACCESS TO PIMA COUNTY ROOFTOP FACILITIES

Access to the Licensor's rooftop communication sites by Licensees is restricted and will only be permitted for authorized purposes by authorized personnel. Prior to requesting access the Licensee must submit to the Licensor the Licensee point of contact to be used for any administrative communications, and Licensee personnel who are approved by the Licensee to access its equipment.

- Licensees will not be permitted to access the Licensor's communications site unless the Procedure for Documenting Administrative and Access Personnel described below is completed. All steps must be strictly followed, including the email notification of time of departure.
- If the Licensee submits a name that is not on the Authorized Access List, the Licensor will deny access to that person. It is the responsibility of the Licensee to exercise due diligence in maintaining a current Authorized Access List with the Licensor.
- Licensee shall NOT "escort" any personnel into Pima County Rooftop facilities who are not documented on their Authorized Access List.
- Access requests submitted via telephone will not be accepted.
- Failure to adhere to any part of the applicable access procedure described below will result in a denial of access by the Licensor.
- Licensor may terminate the lease of any Licensee found to be utilizing the Emergency Access process to bypass the General Maintenance Access process when no emergency exists.
- After-hours access will be policed. If a Licensee is found to have admitted personnel who have not been approved for access, the Licensor may terminate the lease.

The following four procedures are described below:

1. Documenting Administrative and Access Personnel.
2. General Maintenance Weekdays (8:00 a.m. – 5:00 p.m.) - Requires a 24-hour advance notice.
3. General Maintenance After Hours (Weeknights, Weekends, and Holidays) - Requires a 24-hour advance notice.
4. Emergency Access (Weekdays, Weeknights, Weekends, and Holidays) - This process is for true emergencies.

Procedure for Documenting Administrative and Access Personnel:

1. Licensee provides names of Administrative Primary and Secondary Points of Contact to Licensor. This must include the following information items:
 - a. Contact name
 - b. Desk phone number
 - c. Cell phone number
 - d. Email address
2. Licensee provides an approved access list of all approved personnel (including contractors) authorized to access the communications site. Licensees must notify

- the Licensor immediately if personnel are added or deleted. This list shall include the following:
- a. Personnel's name.
 - b. Personnel's cell phone number
3. Licensee submits the above information to rooftops@pima.gov.
 4. Licensor documents the above information in the Authorized Access List for use in access approval.

Procedure for General Maintenance Access - Weekdays (8:00 a.m. – 5:00 p.m.):

1. Licensee submits the communications site access request a minimum of 24 hours in advance, via email to rooftops@pima.gov with the following information items:
 - a. Company name.
 - b. Communications Site address being accessed.
 - c. Date of access including arrival time and planned departure time.
 - d. Contact person and cell phone number.
 - e. Name(s) and cell phone numbers of approved access personnel performing work.
 - f. Type of maintenance work to be performed.
2. If any of the information items a – f above are not provided, the ITD NOC will reply requesting the information. NOTE: This may result in a delay of scheduling access.
3. ITD NOC verifies personnel against the Authorized Access List. If personnel are listed that are not on Authorized Access List, NOC replies notifying the Licensee that the individual(s) will not be allowed access until a written request to is received from the Licensee Administrative Primary Point of Contact.
4. ITD NOC schedules a calendar appointment with Pima County Facilities Management (FM), subject line stating "General Maintenance Access", to include information items a – f, and contact person.
5. Licensee personnel proceed to the lobby at scheduled date/time. Upon arrival, all Licensee personnel must present picture identification and company identification to FM personnel. Any personnel not listed on the calendar appointment will be denied access.
6. Upon completing work, Licensee personnel must notify the Licensor via email to rooftops@pima.gov of departure time from the Licensor's communications site.
7. If Licensee personnel depart the Licensor's communications site at any time during access, Licensee personnel must notify the Licensor via email to rooftops@pima.gov listing the purpose of departure, and scheduled return time.
8. If the Licensee personnel cannot complete the work within Business Hours, the Licensee personnel must notify the Licensor via email to rooftops@pima.gov, detailing all pertinent information related to the access time extension, and perform the Procedure for Emergency Access – Weekdays, Weeknights, Weekends, and Holidays process described below.

Procedure for General Maintenance After Hours Access – Weeknights, Weekends, and Holidays:

1. Licensee submits the communications site access request a minimum of 24 hours in advance, via email to rooftops@pima.gov with the following information items:
 - a. Company name.
 - b. Communications site address being accessed.

- c. Date of access including arrival time and planned departure time.
 - d. Contact person and cell phone number.
 - e. Name(s) and cell phone numbers of approved access personnel performing work.
 - f. Description of maintenance work to be performed.
2. If any of the information items a – f above are not provided, the ITD NOC will reply requesting the information. NOTE: This may result in a delay of scheduling access.
3. ITD NOC verifies personnel against the Authorized Access List. If personnel are listed that are not on Authorized Access List, NOC replies notifying the Licensee that the individual(s) will not be allowed access until a written request to is received from the Licensee Administrative Primary Point of Contact.
4. ITD NOC schedules a calendar appointment with FM, subject line stating “General Maintenance After Hours Access”, to include information items a – f, and contact person.
5. Licensee personnel proceed to the Central Plant at scheduled time. Upon arrival, Licensee personnel must present picture identification and company identification to FM personnel. Any personnel not listed on the calendar appointment will be denied access.
6. Licensee personnel are issued badge and shelter key.
7. If Licensee personnel depart the Licensors communications site at any time during access, Licensee personnel must notify the Licensor via email to rooftops@pima.gov listing the purpose of departure, and scheduled return time, and return the badge and shelter key to the Central Plant. These items can be checked back out upon return.
8. Upon completing work, Licensee personnel returns badge and key to Central Plant.
9. After returning badge and key to Central Plant, Licensee personnel must notify the Licensor via email to rooftops@pima.gov of departure time from the Licensors communications site.
10. NOC personnel update calendar appointment to document time Licensee personnel have departed Licensors communications site.

Procedure for Emergency Access – Weekdays, Weeknights, Weekends, and Holidays:

1. Licensee submits the emergency communications site access request via email a minimum of 2 hours in advance to rooftops@pima.gov with the following information items:
 - a. Company name.
 - b. Communications Site address being accessed.
 - c. Date of access including arrival time and planned departure time.
 - d. Contact person and cell phone number.
 - e. Name(s) and cell phone numbers of approved access personnel performing work.
 - f. Description of the emergency and work to be performed
2. If any of the information items a – f above are not provided, the ITD NOC will reply requesting the information. NOTE: This may result in a delay of scheduling access.
3. ITD NOC verifies personnel against the Authorized Access List. If personnel are listed that are not on Authorized Access List, NOC replies notifying the Licensee

- that the individual(s) will not be allowed access until a written request to is received from the Licensee Administrative Primary Point of Contact.
4. ITD NOC schedules a calendar appointment with FM, subject line stating "Emergency Access", to include information items a – f, contact person, FM physical plant contact person (if applicable), and shelter number (if applicable).
 5. Licensee personnel proceed to the Central Plant. Upon arrival, Licensee personnel must present picture identification and company identification to FM personnel. Any personnel not listed on the calendar appointment will be denied access.
 6. Licensee personnel are issued badge and shelter key.
 7. If Licensee personnel depart the Licensor's communications site at any time during access, Licensee personnel must notify the Licensor via email to rooftops@pima.gov listing the purpose of departure, and scheduled return time, and return the badge and shelter key to the Central Plant. These items can be checked back out upon return.
 8. Licensee personnel completes work and returns badge and key to Central Plant.
 9. After returning badge and key to Central Plant, Licensee personnel must notify the Licensor via email to rooftops@pima.gov of departure time from the Licensor's communications site.
 10. NOC personnel update calendar appointment to document time Licensee personnel have departed Licensor's communications site.

EXHIBIT G
33 NORTH STONE AVENUE
LICENSE FEE SCHEDULE

Site ID	Location	Type	Monthly Fee
BofA	33 N. Stone Avenue	Antennas*	\$688.00
BofA	33 N. Stone Avenue	Shelter B Space <10SF	\$427.00
BofA	33 N. Stone Avenue	Riser Access	\$191.00
TOTAL MONTHLY			\$ 1,306.00**

MONTHLY PAYMENTS DUE

12/10/2022 - 12/09/2023	\$1,345.18***	
12/10/2023 - 12/09/2024	\$1,385.54	(\$1,345.18 plus 3%)
12/10/2024 - 12/09/2025	\$1,427.10	(\$1,385.54 plus 3%)
12/10/2025 - 12/09/2026	\$1,469.91	(\$1,427.10 plus 3%)
12/10/2026 - 12/09/2027	\$1,514.01	(\$1,469.91 plus 3%)

* Rooftop monthly charge - Basic Rates effective 01/01/2021

(5) AM-5AC22-45 29.53" Panel <48" @ \$73.00	=	\$ 365.00 / month
(1) AM-5G19-120 27.55" Panel <48" @ \$73.00	=	\$ 73.00 / month
(1) AF-11G35 3' Dish @ \$90.00	=	\$ 90.00 / month
(2) AF-24HD 2' Dish @ \$80.00	=	\$ 160.00 / month
Total	=	\$ 688.00 / 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 specified monthly fee.

*** New license agreement for transfer of ownership from Sprocket, LLC, to NGX Tech Solutions, LLC. Current monthly rent amount will be transferred to new owner.