FINAL AGENCY DECISION

STATEWIDE BROADBAND AVAILABILITY MAP VERSION 4 APPEAL
September 14, 2021

DOCKET NO. 21-1012

A. APPELANT INFORMATION

Company Name	Premier Communications, Inc.
Address	339 1st Ave. NE
City	Sioux Center
State	Iowa
Zip	51250

B. DESIGNATED CONTACT INFORMATION

Contact Name	Ryan Boone
Contact Phone Number	712-722-3451
Contact Email	rboone@mypremieronline.com

C. APPEAL TYPE

- ☐ Resident Challenge
- ☐ First-Party Provider Challenge
- ☑ Third-Party Provider Challenge

D. EVIDENCE CONSIDERED

With respect to the Census Blocks forming the basis of this Appeal, the Office has reviewed the evidence and information submitted by Appellant related thereto (see Appendix B for original submission), in conjunction with the maps and data sources originally utilized in determining the TSA designation of these Census Blocks, and made a determination as to the Census Block TSA Tier designations as set forth in Appendix A.

- ☑ If checked, Appellant submitted a Certification as part of its Appeal, affirming under penalty of perjury whether or not Broadband service was Facilitated, and at which tier level, in Census Blocks as of July 1, 2021.
- ☐ If checked, Appellant submitted additional information in support of its Appeal. This information has been considered by the Office in making its Final Decision.
- ☑ If checked, challenged Census Blocks within this Appeal overlap with other Appeals containing one or more of the same Blocks. The Office considered evidence submitted in connection with any overlapping Appeal in making its final decision for any overlapping Census Block.
- ☑ If checked, the Office sent requests for additional information to Third-Party Provider(s) concerning whether reported broadband service was Facilitated in one or more blocks of this Appeal as reflected on Map V4 as of July 1, 2021. The Office may have received Affirmation(s) and/or other evidence from Third-Party Provider(s) in response to such requests. Refer to Appendix C for a record of these efforts.

Go to https://ocio.iowa.gov/broadband-availability-map-version-4-challenge-process for more information regarding how the Office evaluates evidence and decides tier designations for appealed blocks.

E. TO APPEAL FURTHER

The Office will post its Final Decisions on its website at ocio.iowa.gov/broadband. If an Appellant wishes to appeal the Decision further Appellant must notify the Office in writing within thirty (30) days of the posting of the Decision. Iowa Admin. Code r. 129—20.5(5). A request for a contested case must be filed by mailing a written request to:

Office of the Chief Information Officer

c/o Matt Behrens

200 E. Grand Avenue

Des Moines, Iowa 50309

In so doing, the reason for further appealing this Decision must be stated, specifically identifying the particular aspects of the Decision with which Appellant disagrees and the reasons why, whether factual or legal in nature. The request for a contested case proceeding should state the name and address of the requester; identify the specific Office action which is disputed; and, where the requester is represented by a lawyer, identify the provisions of law or precedent requiring or authorizing the holding of a contested case proceeding in the particular circumstances involved, and include a short and plain statement of the issues of material fact in dispute. Iowa Admin. Code r. 129—6.4.

Upon receipt, the appeal will be forwarded to the Department of Inspections and Appeals where an Administrative Law Judge ("ALJ") will perform an independent review. Iowa Admin. Code r. 129—20.6(1); Iowa Admin. Code r. 129—6.6. At that time, an ALJ will schedule a hearing. If Appellant does not exercise its appeal right within thirty (30) days of the posting of this Decision, this Decision shall become final and no longer subject to challenge. Iowa Admin. Code r. 129—20.5(5).

SIGNED

DATE

Matthew Behrens

Digitally signed by Matthew Behrens
Date: 2021.09.14 12:34:41 -05'00'

Matt Behrens

Deputy Chief Information Officer

State of Iowa

APPENDIX A - FINAL DECISION

DEFINITIONS

Targeted Service Area	A Targeted Service Area (TSA) is a census block within which no communications service provider offers or facilitates broadband service at or above the tier 1, tier 2, or tier 3 download and upload speeds, as applicable.
Tier 1	A maximum download speed of less than 25 megabits per second (Mbps) and a maximum upload speed of less than 3 Mbps.
Tier 2	A minimum download speed of greater than or equal to 25 Mbps but less than 50 Mbps. No minimum upload speed is applicable for Tier 2.
Tier 3	A minimum download speed of greater than or equal to 50 Mbps but less than 80 Mbps. No minimum upload speed is applicable for Tier 3.
Non-TSA	A non-TSA is a census block in which speeds are Facilitated at greater than or equal to 80 Mbps.
Facilitate	A communication service provider's ability to provide broadband service at or above the download and upload speeds defined above to a home, farm, school, or business within a commercially reasonable time and at a commercially reasonable price upon request by a consumer. This does *not* pertain to the Broadband Infrastructure used to facilitate said service; Broadband Infrastructure is *not* a basis for appeal.
Map V4 Designation	The speed tier reflected on the Map as of July 1, 2021.
Decision Basis	The Decision Basis number reflected in this column corresponds to a general explanation for why this Office made its decision regarding the Block. The Decision Bases are posted on the website at https://ocio.iowa.gov/broadband-availability-map-version-4-challenge-process.
Overlapping Appeal	Indicates the Docket Number in which the Census Block has been challenged in another Appeal. The Final Agency Decision may be impacted by additional or alternate information or affirmations received in conjunction with another Appeal for the same Block.
Prior Reporting	The Prior Reporting column reflects information provided by Appellant on the Appeal. The Prior Reporting to FCC or Connected Nation may reflect one of the following:

In Error: Data was reported incorrectly to FCC or Connected Nation	Correct: Data was reported correctly to FCC or Connected Nation	No Response: Data was not reported to FCC or Connected Nation	Unknown: Data is incorrect for unknown reasons

Docket No.	Census Block ID	Prior Reporting	Map V4 Designation	Appellant's Request	Final Agency Decision	Decision Basis	Overlapping Appeal
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21-1012	191499702002027	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499702002016	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499701001000	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499704002095	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499704002039	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499704002040	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499704002041	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499703004124	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004064	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004065	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004066	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004107	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004106	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004105	In Error	Tier 3	Tier 2	Tier 3	3	
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21-1012	191499701001035	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499705003040	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499705003015	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499705003014	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499705003013	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499703004135	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004123	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004136	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703004122	In Error	Tier 3	Tier 2	Tier 3	3	

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21-1012	191499705003109	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
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21-1012	191499705003102	In Error	Tier 3	Tier 2	Tier 3	3	21-1026
21-1012	191499706004111	In Error	Tier 3	Tier 2	Tier 3	3	
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21-1012	191499706004121	In Error	Tier 3	Tier 2	Tier 3	3	
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21-1012	191499705002089	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003133	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003134	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003135	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003101	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003164	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499705003163	In Error	Tier 3	Tier 2	Tier 3	3	
21-1012	191499703003071	In Error	Tier 3	Tier 2	Tier 3	3	

21-1012	191499706004123	In Error	Tier 3	Tier 2	Tier 3	3	

APPENDIX B
CERTIFICATION AND SUPPORTING INFORMATION

Grants, OCIO <ociogrants@iowa.gov>

Formal Challenge to Broadband Map V4

1 message

Ryan Boone <rboone@mypremieronline.com> Thu, Jul 15, 2021 at 9:02 AM
To: "ociogrants@iowa.gov" <ociogrants@iowa.gov>
Cc: Doug Boone <dboone@mypremieronline.com>

To Whom It May Concern:

Premier Communications is submitting the attached Formal Challenge to Broadband Map V4. Please do not hesitate to reach out if there are any questions or if further information is needed to substantiate our challenge.

Sincerely,

Ryan Boone

COO

Premier Communications

Ph: 712-722-3451

Email: rboone@mypremieronline.com

2 attachments

map_v4_provider_challenge_form - Premier (final).xlsx
209K

map_v4_provider_challenge_form - Premier (final).pdf
254K

A. APPELANT INFORMATION	
Company Name	Premier Communications, Inc.
Address	339 1st Ave. NE
City	Sioux Center
State	Iowa
Zip	51250
B. DESIGNATED CONTACT INFORMATION	
Contact Name	Ryan Boone
Contact Phone Number	712-722-3451
Contact Email	rboone@mypremieronline.com
C. CERTIFICATION/ATTESTATION/AFFIRMATION In signing and submitting this form, the above-identified company, and its duly authorized representative signing on behalf thereof, hereby affirms, attests, and certifies under penalty of perjury that, as represented in its submission: Choose one option that describes company/affiliation status.	
Company, consistent with the representations made in this form, and regardless of whether your company's prior reporting to to the FCC or State of Iowa was correct or in error as of July 1, 2021, either: (a.) Facilitated material Broadband service according to the designated Tier speed indicated on the Map; or (b.) Did NOT Facilitate Broadband according to the designated Tier speed in the identified census blocks.	☐
Another unaffiliated company, as of July 1, 2021, consistent with the representations made in this form, either: (a.) Facilitated material Broadband service according to the designated Tier speed indicated on the Map; or (b.) Did NOT Facilitate Broadband according to the designated Tier speed in the identified census blocks.	☑

D. ADDITIONAL EXPLANATION (To the extent you believe additional explanation is required to ensure that you are communicating full and accurate information, please use the below space to further explain, qualify, or substantiate your above certification/attestation/affirmation. To the extent necessary, please feel free to upload additional explanations/supporting documentation.

Premier Communications is challenging the census blocks included in the appeal tab of this document. We believe these census blocks were reported "In Error" as the provider could not facilitate broadband to all locations within the census blocks at the reported speeds of 50 Mbps if those locations requested that level of service; however would more likely be able to deliver speeds of some lower speed threshold.

As part of our due diligence, we received the following statement from a Professional Engineer at Vantage Point Solutions, "Based on the quantity of locations, the tower locations, and the frequencies claimed to be used by the provider on their website, our opinion is that for the locations in the rural portions of the Craig, Struble, Brunsville, Le Mars & Merrill exchanges, it would be very difficult for a majority of these locations to receive a sustained, consistent 50 Mbps download speed on the provider's fixed wireless network using typical customer configurations and site loading."

E. SIGNATURE* By typing your full name you are affixing your signature to this form and attesting to the accuracy of the information submitted herein.	
Authorized Signature:	**Ryan Boone**
Title:	**COO**
Date:	**7/15/2021**

*PLEASE READ BEFORE SIGNING: By signing and submitting this form, I, on my own behalf or as a representative of the company identified above, as applicable, expressly represent that I am authorized to make the above factual representation on behalf of said company and/or myself, as applicable, and under penalty of perjury as authorized by Iowa Code section 622.1 and pursuant to the laws of the state of Iowa, certify the following with respect to this form submitted on behalf of said company and/or myself: any statements, representations, warranties, certifications, or attestations made in this form, including any attachments or enclosures associated therewith, are true and accurate; I, on behalf of said company and/or myself, have not knowingly made any false statements or representations in this form. In addition to any criminal penalties authorized by Iowa Code section 720.2 that may result from any false statements of material fact made herein or any other remedies available at law, equity, or otherwise, if it is subsequently determined that I have made a statement, representation, warranty, certification, or attestation in this form, or any attachments or enclosures associated herewith, that is later proven untrue in any material respect, the company on which I submitted this form on behalf of may be disqualified from current incentive programs administered by the Office or may be ordered to repay the Office the entire amount of any funds previously distributed by the Office to said company in connection with any current incentive programs administered by the Office. OCIO makes no guarantees as to whether the information supplied by you will result in any change to the Broadband Availability Map V4 or the way any incentive decisions are reviewed, scored, or decided. This form, as completed, any attachments hereto, and any other information or materials submitted to the Office in connection with this form or related inquiry, shall be considered public records and shall be made available for public examination and/or disseminated upon request by third parties as required by Iowa Code chapter 22. The Office reserves the right to reject this form and relatedly consider any information communicated through this form as neither credible nor probative if this form is not fully and properly filled out.

Please familiarize yourself with the following terms prior to determining whether a broadband block may be appealed.	
Targeted Service Area	A Targeted Service Area (TSA) is a census block within which no communications service provider offers or facilitates broadband service at or above the tier 1, tier 2, or tier 3 download and upload speeds.
Existing Broadband Speed Tiers	The speed tiers used to determine whether a broadband block qualifies as a Targeted Service Area on the Statewide Broadband Availability Map.
Tier 1	A maximum download speed of less than 25 megabits per second (Mbps) and a maximum upload speed of less than 3 Mbps.
Tier 2	A minimum download speed of greater than or equal to 25 Mbps but less than 50 Mbps. No minimum upload speed is applicable for Tier 2.
Tier 3	A minimum download speed of greater than or equal to 50 Mbps but less than 80 Mbps. No minimum upload speed is applicable for Tier 3.
Non-TSA	A non-TSA is a census block in which speeds are Facilitated at greater than equal to 80 Mbps
Facilitate	A communication service provider's ability to provide broadband service at or above the download and upload speeds defined above to a home, farm, school, or business within a commercially reasonable time and at a commercially reasonable price upon request by a consumer. This does *not* pertain to the Broadband Infrastructure used to facilitate said service; Broadband Infrastructure is *not* a basis for appeal.

CENSUS BLOCK ID	Prior Reporting to FCC or Connected Nation Definitions 1. ***In Error*** means data was reported incorrectly to FCC or Connected Nation. 2. ***Correct*** means data was reported coreectly to FCC or Connected Nation. 3. ***No Response*** means data was not reported to FCC or Connected Nation. 4. ***Unknown*** means data is incorrect for unknown reasons	Speed Tier that is reflected on Map v.4	What do you believe the Map should reflect for Facilitated service as of July1, 2021?
191499703003003	In Error	Tier 3	Tier 2
191499703003000	In Error	Tier 3	Tier 2
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191499704003020	In Error	Tier 3	Tier 2
191499704003017	In Error	Tier 3	Tier 2
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191499704003014	In Error	Tier 3	Tier 2
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191499704003011	In Error	Tier 3	Tier 2
191499703003118	In Error	Tier 3	Tier 2
191499703003119	In Error	Tier 3	Tier 2
191499703003115	In Error	Tier 3	Tier 2
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191499703003031	In Error	Tier 3	Tier 2
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191499706002015	**In Error**	Tier 3	Tier 2
191499706004103	**In Error**	Tier 3	Tier 2
191499706004102	**In Error**	Tier 3	Tier 2
191499706004105	**In Error**	Tier 3	Tier 2
191499706004100	**In Error**	Tier 3	Tier 2
191499706004104	**In Error**	Tier 3	Tier 2
191499706004107	**In Error**	Tier 3	Tier 2
191499706004106	**In Error**	Tier 3	Tier 2
191499705003120	**In Error**	Tier 3	Tier 2
191499705003119	**In Error**	Tier 3	Tier 2
191499705003113	**In Error**	Tier 3	Tier 2
191499705003112	**In Error**	Tier 3	Tier 2
191499705003090	**In Error**	Tier 3	Tier 2
191499705003089	**In Error**	Tier 3	Tier 2
191499705003088	**In Error**	Tier 3	Tier 2
191499705003087	**In Error**	Tier 3	Tier 2
191499705003105	**In Error**	Tier 3	Tier 2
191499705003104	**In Error**	Tier 3	Tier 2
191499705003086	**In Error**	Tier 3	Tier 2
191499705003103	**In Error**	Tier 3	Tier 2
191499705003084	**In Error**	Tier 3	Tier 2
191499706001081	**In Error**	Tier 3	Tier 2
191499706002017	**In Error**	Tier 3	Tier 2
191499706002016	**In Error**	Tier 3	Tier 2
191499706002021	**In Error**	Tier 3	Tier 2
191499706004105	**In Error**	Tier 3	Tier 2
191499706004091	**In Error**	Tier 3	Tier 2
191499706004112	**In Error**	Tier 3	Tier 2

191499706004113	**In Error**	Tier 3	Tier 2
191499706004114	**In Error**	Tier 3	Tier 2
191499705003141	**In Error**	Tier 3	Tier 2
191499705003140	**In Error**	Tier 3	Tier 2
191499705003139	**In Error**	Tier 3	Tier 2
191499705003123	**In Error**	Tier 3	Tier 2
191499705003124	**In Error**	Tier 3	Tier 2
191499705003111	**In Error**	Tier 3	Tier 2
191499705003110	**In Error**	Tier 3	Tier 2
191499705003109	**In Error**	Tier 3	Tier 2
191499705003108	**In Error**	Tier 3	Tier 2
191499705003126	**In Error**	Tier 3	Tier 2
191499705003107	**In Error**	Tier 3	Tier 2
191499705003106	**In Error**	Tier 3	Tier 2
191499705003136	**In Error**	Tier 3	Tier 2
191499705003102	**In Error**	Tier 3	Tier 2
191499706004111	**In Error**	Tier 3	Tier 2
191499706003111	**In Error**	Tier 3	Tier 2
191499706004126	**In Error**	Tier 3	Tier 2
191499706004124	**In Error**	Tier 3	Tier 2
191499706004116	**In Error**	Tier 3	Tier 2
191499706004117	**In Error**	Tier 3	Tier 2
191499706004125	**In Error**	Tier 3	Tier 2
191499706004119	**In Error**	Tier 3	Tier 2
191499706004122	**In Error**	Tier 3	Tier 2
191499706004120	**In Error**	Tier 3	Tier 2
191499706004121	**In Error**	Tier 3	Tier 2
191499705003145	**In Error**	Tier 3	Tier 2
191499705003146	**In Error**	Tier 3	Tier 2
191499705003160	**In Error**	Tier 3	Tier 2
191499705003142	**In Error**	Tier 3	Tier 2
191499706004115	**In Error**	Tier 3	Tier 2
191499706004118	**In Error**	Tier 3	Tier 2
191499705003143	**In Error**	Tier 3	Tier 2
191499705003155	**In Error**	Tier 3	Tier 2
191499705003150	**In Error**	Tier 3	Tier 2

191499705003154	**In Error**	Tier 3	Tier 2
191499705003130	**In Error**	Tier 3	Tier 2
191499705003151	**In Error**	Tier 3	Tier 2
191499705003152	**In Error**	Tier 3	Tier 2
191499705003153	**In Error**	Tier 3	Tier 2
191499705002093	**In Error**	Tier 3	Tier 2
191499705002091	**In Error**	Tier 3	Tier 2
191499705002092	**In Error**	Tier 3	Tier 2
191499705003127	**In Error**	Tier 3	Tier 2
191499705003128	**In Error**	Tier 3	Tier 2
191499705003132	**In Error**	Tier 3	Tier 2
191499705003165	**In Error**	Tier 3	Tier 2
191499705002089	**In Error**	Tier 3	Tier 2
191499705003133	**In Error**	Tier 3	Tier 2
191499705003134	**In Error**	Tier 3	Tier 2
191499705003135	**In Error**	Tier 3	Tier 2
191499705003101	**In Error**	Tier 3	Tier 2
191499705003164	**In Error**	Tier 3	Tier 2
191499705003163	**In Error**	Tier 3	Tier 2
191499703003071	**In Error**	Tier 3	Tier 2
191499706004123	**In Error**	Tier 3	Tier 2

APPENDIX C
THIRD-PARTY AFFIRMATIONS AND SUPPLEMENTAL EVIDENCE

July 28, 2021

Office of the Chief Information Officer of the State of Iowa
c/o Matt Behrens
200 E. Grand Avenue
Des Moines, IA 50309

Evertek Enterprises, Inc.
Roxanne White
rwhite@evertek.net

To whom it may concern:

This is a letter of inquiry concerning your firm's prior reporting to the State of Iowa Office of the Chief Information Officer ("OCIO" or "Office") regarding the availability of Broadband service in certain United States Census Block(s) within Iowa. Our Office received a formal notice of appeal challenging information reported on the Broadband Availability Map Version 4 ("V4") of the Statewide Broadband Availability Map ("Map"). The data reflected on V4 of the Map was either (1) provided by you to the Office's contractor ("Connected Nation") during the data collection window of April 15 through April 30, 2021, (2) gathered from other sources (such as FCC) that collected data from you, or (3) carried forward from prior reporting made to this Office by you under a previous Map version. Map V4 categorizes census blocks according to the facilitated speed offered within the block. The publication of V4 triggered a formal appeal window, as explained in more detail below, during which time we received this appeal. The appeal we received claims that the data reflected on V4 of the Map is inaccurate. This appeal can be found at https://ocio.iowa.gov/broadband-availability-map-version-4-challenge-process (*see* Docket Numbers 21-1012, 21-1026). **To resolve this matter, the Office requests that your firm provide information concerning your service in the affected Census Blocks as further identified and described below by August 11, 2021.**

On July 1, 2021, the Office officially published the final version of V4 of the Map, which identifies where Broadband service was offered or Facilitated at a tier 1, tier 2, or tier 3 speed as of July 1, 2021.[1] V4 of the Map is based primarily on data submitted to Connected Nation and/or FCC by Communication Service Providers concerning their service capabilities in the State of Iowa[2] and on informal comments/feedback supplied by interested parties as part of the informal comment/feedback process described above and in which your firm may have participated. V4 of the Map, and a detailed background of the same, can be found at: https://ocio.iowa.gov/broadband-availability-map-version-4. Overall, the new map reflects Targeted Service Areas defined as a census block within which no communications service provider offers or facilitates broadband service at or above the tier 1, tier 2, or tier 3 download and upload speeds. The tier speeds are defined as follows:

[1]See Iowa Code §§ 8B.1(12), 8B.10. *See also* Iowa Admin. Code r. 129—20.1, 20.3, 20.4.

[2]See Iowa Admin. Code r. 129—20.3.

"Tier 1" means a maximum download speed of less than 25 Mbps and a maximum upload speed of less than three Mbps.

"Tier 2" means a minimum download speed of greater than or equal to 25 Mbps but less than 50 Mbps. No minimum upload speed is applicable for Tier 2.

"Tier 3" means a minimum download speed of greater than or equal to 50 Mbps but less than 80 Mbps. No minimum upload speed is applicable for Tier 3.

"Non-TSA" means a census block in which speeds are facilitated at greater than or equal to 80 Mbps.

Through the official publication of V4 of the Map, the Office triggered the challenge process it is required by law to administer.[3] Pursuant to applicable administrative rules, within 20 days after the Office's official publication of V4 of the Map, "any person or party aggrieved or adversely affected by such determination may challenge the office's finding by filing a notice of appeal with the office" along with all evidence or information supporting their appeal. Iowa Admin. Code r. 129—20.5(1). Specifically, interested parties were permitted to provide the Office with evidence and information of the following: broadband is unavailable from a provider listed for the area (census block); or, that broadband speed is not as advertised.

V4 of the Map currently shows that service is Facilitated at either a tier 1, tier 2, or tier 3 speed per designated census block. As part of the above-outlined process, OCIO received a formal notice of appeal and supporting evidence or information from one or more Iowa residents or Communications Service Provider, claiming that Broadband service is not offered or Facilitated at that speed tier.

At this time, the Office requests your assistance in making an accurate determination as to whether your firm facilitates broadband service at the designated speed tier for 10% or more of the geographic area of each challenged census block as of July 1, 2021 to the Census Blocks identified in Exhibit A. To that end, the Office requests that you:

1) Complete and return the attached Affirmation of Service or Lack of Service in Census Blocks Broadband Grants Program Broadband Availability Map Challenge Process Form (see Exhibit A, Affirmation tab), by **August 11, 2021**. Pursuant to this form, OCIO requests that a representative with legal authority to bind your firm:

    a) Confirm that your firm Facilitated Broadband service to the Census Blocks identified in Exhibit A as of July 1, 2021, and indicate the speeds at which your firm facilitated broadband service in those blocks. For purposes of this representation, "'Facilitate' means a communication service provider's ability to provide broadband service at or above the download and upload speeds specified in the definition of targeted service area in this section to a home, farm, school, or business **within a commercially reasonable time and at a commercially reasonable price upon request by a consumer**." Iowa Code § 8B.1(5) (emphasis added).

    b) Fully complete all other aspects of the Form.

2) In addition to the form, please also submit any other evidence or information in your possession to the Office that supports your prior representations to the Office regarding the Census Blocks identified in Exhibit A. Examples of evidence and information the Office would consider particularly probative include "Bills or invoices provided to or received by customers in the

[3]See Iowa Code § 8B.10(2); Iowa Admin. Code r. 129—20.5.

applicable census block(s) which identify the specific download and upload speeds provided or received as of [July 1, 2021].” Iowa Admin. Code r. 129—20.5(8).

Please return the completed form and any supporting evidence or information to ociogrants@iowa.gov.

Please note that you are under no legal obligation to respond to this request for information. Generally, pursuant to applicable administrative rules, any affected person or party is free to submit evidence or information to the Office in support of or in opposition to an appeal within 20 days after the appeal has been posted to ocio.iowa.gov/broadband. Iowa Admin. Code r. 129—20.5(3). However, this Office is affirmatively reaching out to notify you of the appeal, of the circumstances surrounding the appeal, and to solicit your feedback and position. If this Office does not receive your response via Exhibit A of the Form by **August 11, 2021** (10 business days from the date of this letter), the Office will make a final decision based on the evidence and information currently available to it. Iowa Admin. Code r. 129—20.5(4), (5).

OCIO strives at all times to produce and disseminate accurate information. We appreciate your assistance in helping us achieve our statutory mandate.

Sincerely,

Office of the Chief Information Officer,
State of Iowa

EXHIBIT A

Affirmation of Service or Lack of Service in Census Blocks
Broadband Grants Program Broadband Availability Map Challenge Process

A. RESPONDENT INFORMATION

Company Name	Evertek, Inc.
Address	216 N. Main
City	Everly
State	IA
Zip	51338

B. DESIGNATED CONTACT INFORMATION

Contact Name	Roxanne White
Contact Phone Number	712-834-2255
Contact Email	rwhite@evertekwireless.net

C. AFFIRMATION

In signing and submitting this form, the above-identified company, and its duly authorized representative signing on behalf thereof, hereby affirms under penalty of perjury that, as represented in its submission:
Company, consistent with the representations made in this form, and regardless of whether your company's prior reporting to to the FCC or State of Iowa was correct or in error, meets one of the following criteria in each of the identified census blocks as of July 1, 2021:
1. Company Facilitated service at the indicated speeds on the Affirmation tab as of July 1, 2021 to more than 10% of the census block; or
2. Company did NOT offer or Facilitate material Broadband service.

Please indicate the speeds offered forr each census block on the Affirmation tab.

D. ADDITIONAL EXPLANATION (To the extent you believe additional explanation is required to ensure that you are communicating full and accurate information, please use the below space to further explain, qualify, or substantiate your above affirmation. To the extent necessary, please feel free to upload additional explanations/supporting documentation.

The challenge was presented to Evertek, Inc. but the area is served by N.E.T. Broadband, LLC which is a 50/50 partnership between Evertek and Northwest REC. The propagation maps were produced by Connected Nation. They use EDX Signal Pro for the development of propagation studies. The terrain data generally used is a 1 Arc-second digital elevation model, combined with an adjustable attenuation model to account for foliage. Connected Nation input the parameters provided from Evertek's data sheet showing tower locations, frequencies used, azimuth and tower heights. Some of our tower sites use BRS, CBRS and 5 ghz or all three frequencies depending on location. The CPE placement is using a 15'-20' height with standard antenna gain based on the type of equipment used. We also use high gain antennas and private point to points where needed which is not reflected in the propagation study.

To validate the above we overlayed the propagation maps over the census blocks for Plymouth County. We then placed all our customers

E. SIGNATURE* By typing your full name you are affixing your signature to this form and attesting to the accuracy of the information submitted herein.

Authorized Signature:	**Roxanne White**
Title:	**CEO**
Date:	**8/9/2021**

*PLEASE READ BEFORE SIGNING: By signing and submitting this form, I, on my own behalf or as a representative of the company identified above, as applicable, expressly represent that I am authorized to make the above factual representation on behalf of said company and/or myself, as applicable, and under penalty of perjury as authorized by Iowa Code section 622.1 and pursuant to the laws of the state of Iowa, certify the following with respect to this form submitted on behalf of said company and/or myself: any statements, representations, warranties, certifications, or attestations made in this form, including any attachments or enclosures associated therewith, are true and accurate; I, on behalf of said company and/or myself, have not knowingly made any false statements or representations in this form. In addition to any criminal penalties authorized by Iowa Code section 720.2 that may result from any false statements of material fact made herein or any other remedies available at law, equity, or otherwise, if it is subsequently determined that I have made a statement, representation, warranty, certification, or attestation in this form, or any attachments or enclosures associated herewith, that is later proven untrue in any material respect, the company on which I submitted this form on behalf of may be disqualified from current incentive programs administered by the Office or may be ordered to repay the Office the entire amount of any funds previously distributed by the Office to said company in connection with any current incentive programs administered by the Office. OCIO makes no guarantees as to whether the information supplied by you will result in any change to the Broadband Availability Map V4 or the way any incentive decisions are reviewed, scored, or decided. This form, as completed, any attachments hereto, and any other information or materials submitted to the Office in connection with this form or related inquiry, shall be considered public records and shall be made available for public examination and/or disseminated upon request by third parties as required by Iowa Code chapter 22. The Office reserves the right to reject this form and relatedly consider any information communicated through this form as neither credible nor probative if this form is not fully and properly filled out.

Please familiarize yourself with the following terms prior to determining whether broadband service is being Facilitated to the census block.	
Facilitate	A communication service provider's ability to provide broadband service at or above the download and upload speeds defined above to a home, farm, school, or business within a commercially reasonable time and at a commercially reasonable price upon request by a consumer. This does *not* pertain to the Broadband Infrastructure used to facilitate said service; Broadband Infrastructure is *not* a basis for appeal.

CENSUS BLOCK ID	Do you Facilitate service to more than 10% of the geographic area of the Census Block?	Download Speed	Upload Speed
191499701001000	**Yes**	50	5
191499701001035	**Yes**	50	5
191499701002000	**Yes**	50	5
191499701002001	**Yes**	50	5
191499701002002	**Yes**	50	5
191499701002003	**Yes**	50	5
191499701002020	**Yes**	50	5
191499702001052	**Yes**	50	5
191499702001059	**Yes**	50	5
191499702002016	**Yes**	50	5
191499702002027	**Yes**	50	5
191499702002042	**Yes**	50	5
191499702002043	**Yes**	50	5

191499702002052	**Yes**	50	5
191499703003000	**Yes**	50	5
191499703003003	**Yes**	50	5
191499703003027	**Yes**	50	5
191499703003028	**Yes**	50	5
191499703003029	**Yes**	50	5
191499703003030	**Yes**	50	5
191499703003031	**Yes**	50	5
191499703003032	**Yes**	50	5
191499703003033	**Yes**	50	5
191499703003036	**Yes**	50	5
191499703003037	**Yes**	50	5
191499703003038	**Yes**	50	5
191499703003039	**Yes**	50	5
191499703003040	**Yes**	50	5
191499703003041	**Yes**	50	5
191499703003043	**Yes**	50	5
191499703003044	**Yes**	50	5
191499703003045	**Yes**	50	5
191499703003046	**Yes**	50	5
191499703003047	**Yes**	50	5
191499703003048	**Yes**	50	5
191499703003049	**Yes**	50	5
191499703003050	**Yes**	50	5
191499703003051	**Yes**	50	5
191499703003052	**Yes**	50	5
191499703003057	**Yes**	50	5
191499703003058	**Yes**	50	5
191499703003059	**Yes**	50	5
191499703003069	**Yes**	50	5
191499703003070	**Yes**	50	5
191499703003071	**Yes**	50	5
191499703003072	**Yes**	50	5
191499703003073	**Yes**	50	5
191499703003074	**Yes**	50	5
191499703003075	**Yes**	50	5

191499703003076	**Yes**	50	5
191499703003077	**Yes**	50	5
191499703003078	**Yes**	50	5
191499703003079	**Yes**	50	5
191499703003080	**Yes**	50	5
191499703003081	**Yes**	50	5
191499703003082	**Yes**	50	5
191499703003083	**Yes**	50	5
191499703003084	**Yes**	50	5
191499703003085	**Yes**	50	5
191499703003086	**Yes**	50	5
191499703003087	**Yes**	50	5
191499703003088	**Yes**	50	5
191499703003089	**Yes**	50	5
191499703003090	**Yes**	50	5
191499703003091	**Yes**	50	5
191499703003092	**Yes**	50	5
191499703003093	**Yes**	50	5
191499703003094	**Yes**	50	5
191499703003095	**Yes**	50	5
191499703003096	**Yes**	50	5
191499703003097	**Yes**	50	5
191499703003098	**Yes**	50	5
191499703003099	**Yes**	50	5
191499703003100	**Yes**	50	5
191499703003101	**Yes**	50	5
191499703003102	**Yes**	50	5
191499703003103	**Yes**	50	5
191499703003108	**Yes**	50	5
191499703003109	**Yes**	50	5
191499703003112	**Yes**	50	5
191499703003115	**Yes**	50	5
191499703003116	**Yes**	50	5
191499703003117	**Yes**	50	5
191499703003118	**Yes**	50	5
191499703003119	**Yes**	50	5

191499703003120	**Yes**	50	5
191499703003121	**Yes**	50	5
191499703003122	**Yes**	50	5
191499703003123	**Yes**	50	5
191499703004000	**Yes**	50	5
191499703004001	**Yes**	50	5
191499703004002	**Yes**	50	5
191499703004003	**Yes**	50	5
191499703004004	**Yes**	50	5
191499703004006	**Yes**	50	5
191499703004007	**Yes**	50	5
191499703004008	**Yes**	50	5
191499703004009	**Yes**	50	5
191499703004010	**Yes**	50	5
191499703004011	**Yes**	50	5
191499703004012	**Yes**	50	5
191499703004013	**Yes**	50	5
191499703004014	**Yes**	50	5
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191499703004023	**Yes**	50	5
191499703004024	**Yes**	50	5
191499703004025	**Yes**	50	5
191499703004028	**Yes**	50	5
191499703004029	**Yes**	50	5
191499703004030	**Yes**	50	5
191499703004031	**Yes**	50	5
191499703004032	**Yes**	50	5
191499703004033	**Yes**	50	5
191499703004034	**Yes**	50	5
191499703004035	**Yes**	50	5
191499703004038	**Yes**	50	5
191499703004049	**Yes**	50	5
191499703004050	**Yes**	50	5
191499703004051	**Yes**	50	5
191499703004052	**Yes**	50	5
191499703004064	**Yes**	50	5

191499703004065	**Yes**	50	5
191499703004066	**Yes**	50	5
191499703004067	**Yes**	50	5
191499703004068	**Yes**	50	5
191499703004069	**Yes**	50	5
191499703004070	**Yes**	50	5
191499703004071	**Yes**	50	5
191499703004074	**Yes**	50	5
191499703004084	**Yes**	50	5
191499703004086	**Yes**	50	5
191499703004087	**Yes**	50	5
191499703004088	**Yes**	50	5
191499703004092	**Yes**	50	5
191499703004093	**Yes**	50	5
191499703004095	**Yes**	50	5
191499703004096	**Yes**	50	5
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191499703004098	**Yes**	50	5
191499703004099	**Yes**	50	5
191499703004100	**Yes**	50	5
191499703004101	**Yes**	50	5
191499703004102	**Yes**	50	5
191499703004103	**Yes**	50	5
191499703004104	**Yes**	50	5
191499703004105	**Yes**	50	5
191499703004106	**Yes**	50	5
191499703004107	**Yes**	50	5
191499703004108	**Yes**	50	5
191499703004109	**Yes**	50	5
191499703004110	**Yes**	50	5
191499703004111	**Yes**	50	5
191499703004112	**Yes**	50	5
191499703004118	**Yes**	50	5
191499703004119	**Yes**	50	5
191499703004120	**Yes**	50	5
191499703004121	**Yes**	50	5

191499703004122	**Yes**	50	5
191499703004123	**Yes**	50	5
191499703004124	**Yes**	50	5
191499703004135	**Yes**	50	5
191499703004136	**Yes**	50	5
191499703004138	**Yes**	50	5
191499703004139	**Yes**	50	5
191499704002016	**Yes**	50	5
191499704002017	**Yes**	50	5
191499704002018	**Yes**	50	5
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191499704002020	**Yes**	50	5
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191499704002036	**Yes**	50	5
191499704002037	**Yes**	50	5
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191499704002039	**Yes**	50	5
191499704002040	**Yes**	50	5
191499704002041	**Yes**	50	5
191499704002095	**Yes**	50	5
191499704003011	**Yes**	50	5
191499704003012	**Yes**	50	5
191499704003013	**Yes**	50	5
191499704003014	**Yes**	50	5
191499704003015	**Yes**	50	5
191499704003016	**Yes**	50	5
191499704003017	**Yes**	50	5
191499704003020	**Yes**	50	5
191499704003021	**Yes**	50	5
191499704003023	**Yes**	50	5
191499704003036	**Yes**	50	5
191499704003037	**Yes**	50	5

191499704003038	**Yes**	50	5
191499704003039	**Yes**	50	5
191499704003040	**Yes**	50	5
191499704003041	**Yes**	50	5
191499704003043	**Yes**	50	5
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191499704003099	**Yes**	50	5
191499704003101	**Yes**	50	5
191499704003102	**Yes**	50	5
191499704003105	**Yes**	50	5
191499704003106	**Yes**	50	5
191499704003107	**Yes**	50	5
191499704003108	**Yes**	50	5
191499704003109	**Yes**	50	5
191499704003110	**Yes**	50	5
191499704003111	**Yes**	50	5
191499704003114	**Yes**	50	5
191499704003116	**Yes**	50	5
191499704003117	**Yes**	50	5
191499704003118	**Yes**	50	5
191499704003121	**Yes**	50	5
191499704003122	**Yes**	50	5
191499704003123	**Yes**	50	5
191499704003124	**Yes**	50	5
191499704003125	**Yes**	50	5
191499704003127	**Yes**	50	5
191499704003129	**Yes**	50	5
191499704003134	**Yes**	50	5
191499704003135	**Yes**	50	5
191499704003136	**Yes**	50	5
191499704003137	**Yes**	50	5
191499704003141	**Yes**	50	5
191499704003142	**Yes**	50	5
191499704003144	**Yes**	50	5
191499704003145	**Yes**	50	5

191499704003146	**Yes**	50	5
191499704003148	**Yes**	50	5
191499704003150	**Yes**	50	5
191499704003151	**Yes**	50	5
191499704003152	**Yes**	50	5
191499704003153	**Yes**	50	5
191499704003154	**Yes**	50	5
191499704003157	**Yes**	50	5
191499704003158	**Yes**	50	5
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191499704003160	**Yes**	50	5
191499704003165	**Yes**	50	5
191499704003166	**Yes**	50	5
191499704003167	**Yes**	50	5
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191499704003169	**Yes**	50	5
191499704003171	**Yes**	50	5
191499704003173	**Yes**	50	5
191499704003174	**Yes**	50	5
191499704003208	**Yes**	50	5
191499704003209	**Yes**	50	5
191499704003210	**Yes**	50	5
191499705002091	**Yes**	50	5
191499705002092	**Yes**	50	5
191499705002093	**Yes**	50	5
191499705003013	**Yes**	50	5
191499705003014	**Yes**	50	5
191499705003015	**Yes**	50	5
191499705003033	**Yes**	50	5
191499705003034	**Yes**	50	5
191499705003035	**Yes**	50	5
191499705003036	**Yes**	50	5
191499705003037	**Yes**	50	5
191499705003038	**Yes**	50	5
191499705003040	**Yes**	50	5
191499705003045	**Yes**	50	5

191499705003046	**Yes**	50	5
191499705003047	**Yes**	50	5
191499705003048	**Yes**	50	5
191499705003049	**Yes**	50	5
191499705003050	**Yes**	50	5
191499705003051	**Yes**	50	5
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191499705003053	**Yes**	50	5
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191499705003055	**Yes**	50	5
191499705003056	**Yes**	50	5
191499705003057	**Yes**	50	5
191499705003058	**Yes**	50	5
191499705003059	**Yes**	50	5
191499705003060	**Yes**	50	5
191499705003061	**Yes**	50	5
191499705003062	**Yes**	50	5
191499705003063	**Yes**	50	5
191499705003064	**Yes**	50	5
191499705003065	**Yes**	50	5
191499705003073	**Yes**	50	5
191499705003084	**Yes**	50	5
191499705003086	**Yes**	50	5
191499705003087	**Yes**	50	5
191499705003088	**Yes**	50	5
191499705003089	**Yes**	50	5
191499705003090	**Yes**	50	5
191499705003091	**Yes**	50	5
191499705003101	**Yes**	50	5
191499705003102	**Yes**	50	5
191499705003103	**Yes**	50	5
191499705003104	**Yes**	50	5
191499705003105	**Yes**	50	5
191499705003106	**Yes**	50	5
191499705003107	**Yes**	50	5
191499705003108	**Yes**	50	5

191499705003109	**Yes**	50	5
191499705003110	**Yes**	50	5
191499705003111	**Yes**	50	5
191499705003112	**Yes**	50	5
191499705003113	**Yes**	50	5
191499705003114	**Yes**	50	5
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191499705003117	**Yes**	50	5
191499705003119	**Yes**	50	5
191499705003120	**Yes**	50	5
191499705003121	**Yes**	50	5
191499705003122	**Yes**	50	5
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191499705003124	**Yes**	50	5
191499705003126	**Yes**	50	5
191499705003127	**Yes**	50	5
191499705003128	**Yes**	50	5
191499705003130	**Yes**	50	5
191499705003132	**Yes**	50	5
191499705003133	**Yes**	50	5
191499705003134	**Yes**	50	5
191499705003135	**Yes**	50	5
191499705003136	**Yes**	50	5
191499705003139	**Yes**	50	5
191499705003140	**Yes**	50	5
191499705003141	**Yes**	50	5
191499705003142	**Yes**	50	5
191499705003143	**Yes**	50	5
191499705003145	**Yes**	50	5
191499705003146	**Yes**	50	5
191499705003150	**Yes**	50	5
191499705003151	**Yes**	50	5
191499705003152	**Yes**	50	5
191499705003153	**Yes**	50	5
191499705003154	**Yes**	50	5

191499705003160	**Yes**	50	5
191499705003163	**Yes**	50	5
191499705003164	**Yes**	50	5
191499705003165	**Yes**	50	5
191499705003191	**Yes**	50	5
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191499706001073	**Yes**	50	5
191499706001074	**Yes**	50	5
191499706001081	**Yes**	50	5
191499706002000	**Yes**	50	5
191499706002004	**Yes**	50	5
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191499706002009	**Yes**	50	5
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191499706002015	**Yes**	50	5
191499706002016	**Yes**	50	5
191499706002017	**Yes**	50	5
191499706002018	**Yes**	50	5
191499706002021	**Yes**	50	5
191499706002024	**Yes**	50	5
191499706002030	**Yes**	50	5
191499706003111	**Yes**	50	5
191499706004002	**Yes**	50	5
191499706004004	**Yes**	50	5
191499706004005	**Yes**	50	5
191499706004006	**Yes**	50	5
191499706004007	**Yes**	50	5
191499706004008	**Yes**	50	5
191499706004009	**Yes**	50	5

191499706004010	**Yes**	50	5
191499706004011	**Yes**	50	5
191499706004014	**Yes**	50	5
191499706004015	**Yes**	50	5
191499706004016	**Yes**	50	5
191499706004017	**Yes**	50	5
191499706004018	**Yes**	50	5
191499706004021	**Yes**	50	5
191499706004022	**Yes**	50	5
191499706004023	**Yes**	50	5
191499706004024	**Yes**	50	5
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191499706004026	**Yes**	50	5
191499706004027	**Yes**	50	5
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191499706004030	**Yes**	50	5
191499706004031	**Yes**	50	5
191499706004032	**Yes**	50	5
191499706004033	**Yes**	50	5
191499706004034	**Yes**	50	5
191499706004035	**Yes**	50	5
191499706004036	**Yes**	50	5
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191499706004070	**Yes**	50	5
191499706004080	**Yes**	50	5
191499706004081	**Yes**	50	5
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191499706004088	**Yes**	50	5
191499706004089	**Yes**	50	5
191499706004091	**Yes**	50	5
191499706004096	**Yes**	50	5
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191499706004102	**Yes**	50	5

191499706004103	**Yes**	50	5
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191499706004120	**Yes**	50	5
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191499706004123	**Yes**	50	5
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191499706004127	**Yes**	50	5
191499706004128	**Yes**	50	5
191499704003156	**Yes**	50	5
191499705003092	**Yes**	50	5

Form 22 – Request for Confidentiality

Alterations to the language in this document are prohibited

Confidential Treatment is Requested. Please read and become familiar with Iowa Code Chapter 22 (Examination of Public Records) regarding release of public records and Iowa Administrative Code Chapter 2 (Public Records and Fair Information Practices) before completing this Form.

1. **To request confidential treatment, you must provide the following information in the table below. You may add additional lines if necessary or add additional pages using the same format as the table below.**
   - 1.1. Clearly identify the specific materials or information for which you seek confidential treatment;
   - 1.2. Cite the specific grounds in Iowa Code Chapter 22 or other applicable law which support treatment of the material as confidential;
   - 1.3. Justify why the material should be maintained in confidence;
   - 1.4. Explain why disclosure of the material would not be in the best interest of the public.

SPECIFIC INFORMATION FOR WHICH YOU SEEK CONFIDENTIAL TREATMENT	SPECIFIC LEGAL GROUNDS SUPPORTING SUCH TREATMENT	JUSTIFICATION AS TO WHY MATERIAL SHOULD BE KEPT IN CONFIDENCE	WHY DISCLOSURE OF THE MATERIAL WOULD NOT BE IN THE BEST INTERESTS OF THE PUBLIC
Any/all geospatial data that depicts customer location, or propagation maps that include kmz files and the shapefile.	Iowa Code 22.7 Sub 6	If released, would give advantage to 2-3 existing competitors in various Census blocks.	Serves no public interest and protects existing customer's privacy.
Customer Data Spreadsheet	Iowa Code 22.7 Sub 6	If released, would give advantage to 2-3 existing competitors in various Census blocks.	Serves no public interest and protects existing customer's privacy.

2. **Additional Acknowledgements:**

☑ A request for confidential treatment requires submission of public/redacted copies of the material which are clearly labeled **"REDACTED COPY"** or **"PUBLIC COPY"** at the top of every page of the document, and which has all claimed confidential information excised. ***Check the box to indicate acknowledgement.***

☑ Completion of this Form is the sole means of requesting confidential treatment. ***Check box to indicate acknowledgement.***

☑ Completion of this Form and the Office's acceptance of materials or documents does not guarantee the Office will grant the request for confidentiality. ***Check box to indicate acknowledgement.***

☑ The Office may deny a request for confidential treatment if the request is improper or unfounded pursuant to Iowa Code chapter 22 or Iowa Administrative Code chapter 2. ***Check box to indicate acknowledgement.***

3. Please provide the point of contact for inquiries from the Office concerning the confidential status of information identified as confidential above:

3.1. Name Roxanne White

3.2. Address 216 N. Main, Everly, IA 51338

3.3. Telephone number (712) 834 -2255

3.4. Email address _rwhite@evertekwireless.net_____

Authorized Representative's Signature

_8-9-21_____
Date

__Roxanne White_____
Name (Printed)

_CEO_____
Title

__Evertek, Inc._____
Entity

Faster speeds AND free upgrades coming to Evertek customers

April 8, 2021

Starting May 1st, we will have new/faster Internet speeds, but we will be keeping the same monthly prices. This means most customers will be upgraded to a faster speed and you'll pay the same price you're currently paying! We love being able to bring you added value.

- 10Mb customers will get 15Mb
- 15Mb customers will get 25Mb
- 25Mb customers will get 35Mb

The upgrades will take place on a tower-by-tower basis, so it will take our staff a few months to make all the necessary changes to assure your upgrade happens as it should. We will use our direct messaging system to let you know when your upgrade will occur, so please be watchful for that information.

All of our towers are 35Mb capable and some are now 50Mb capable, so please contact us if you'd like to upgrade your speed further than those spelled out above.

Current Results Status

Stats for LUID: 8 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitation

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	88.73 Mbps	27.08 Mbps	115.81 Mbps, 8396 pps	19670 (1967 pps)	64292 (6429 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
97%	1786367	53335	95%	558294	29268

191499706002015

Link Test ran on 11:20:09 08/05/2021 CDT

Currently transmitting at:

8X/8X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 5 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	67.62 Mbps	23.26 Mbps	90.89 Mbps, 6590 pps	16889 (1688 pps)	49028 (4902 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
98%	1344359	23491	99%	455206	857

191499706002016

Link Test ran on 11:23:16 08/05/2021 CDT

Currently transmitting at:

8X/6X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 12 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	67.75 Mbps	18.76 Mbps	86.52 Mbps, 6213 pps	13637 (1363 pps)	48503 (4850 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1333208	9827	98%	373492	6974

191499706002021

Link Test ran on 11:25:34 08/05/2021 CDT

Currently transmitting at:

8X/5X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 4 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	74.27 Mbps	24.23 Mbps	98.50 Mbps, 7146 pps	17627 (1762 pps)	53841 (5384 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1451586	955	99%	473782	513

191499706004126

Link Test ran on 11:27:17 08/05/2021 CDT

Currently transmitting at:

8X/4X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 17 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	68.14 Mbps	15.25 Mbps	83.39 Mbps, 6046 pps	11069 (1106 pps)	49406 (4940 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1340158	9296	98%	303163	5260

191499703003080

Link Test ran on 08:34:33 08/05/2021 CST

Currently transmitting at:
8X/4X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 11 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	71.94 Mbps	25.88 Mbps	97.82 Mbps, 7082 pps	18757 (1875 pps)	52073 (5207 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
98%	1431285	26160	96%	526702	21127

191499703003075

Link Test ran on 08:38:21 08/05/2021 CST

Currently transmitting at:
8X/7X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 2 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	90.32 Mbps	30.23 Mbps	120.56 Mbps, 8740 pps	21957 (2195 pps)	65457 (6545 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1785232	21006	98%	599704	9096

191499703004138

Link Test ran on 09:41:52 08/05/2021 CDT

Currently transmitting at:

8X/8X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 13 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	68.39 Mbps	21.98 Mbps	90.38 Mbps, 6558 pps	15998 (1599 pps)	49596 (4959 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1337317	1391	97%	442508	13173

191499706004098

Link Test ran on 09:46:39 08/05/2021 CDT

Currently transmitting at:

8X/6X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 20 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	65.59 Mbps	21.77 Mbps	87.37 Mbps, 6339 pps	15868 (1586 pps)	47539 (4753 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
96%	1333171	51927	95%	446042	20768

191499706004118

Link Test ran on 09:51:14 08/05/2021 CDT

Currently transmitting at:

8X/6X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 5 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	66.63 Mbps	21.68 Mbps	88.31 Mbps, 6392 pps	15703 (1570 pps)	48221 (4822 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1312315	10836	96%	439522	16054

191499704002039

Link Test ran on 08:57:45 08/05/2021 CST

Currently transmitting at:

8X/6X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 8 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	68.17 Mbps	18.86 Mbps	87.03 Mbps, 6300 pps	13667 (1366 pps)	49345 (4934 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1334600	3135	99%	371794	3407

191499704003038

Link Test ran on 09:05:10 08/05/2021 CST

Currently transmitting at:

8X/5X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Current Results Status

Stats for LUID: 9 Test Duration: 10 Pkt Length: 1714 Test Direction Bi-Directional

Link Test without Bridging

Please note that since this test included PMP450 hardware, the link test results may be impacted due to PPS limitations

Data Channel Priority	Downlink	Uplink	Aggregate	Packet Transmit	Packet Receive
				Actual	Actual
Low	89.19 Mbps	27.23 Mbps	116.43 Mbps, 8419 pps	19698 (1969 pps)	64504 (6450 pps)

Efficiency

Downlink			Uplink		
Efficiency	Fragments count		Efficiency	Fragments count	
	Actual	Missed		Actual	Missed
99%	1749743	7607	92%	575265	43254

191499704003124

Link Test ran on 08:59:30 08/05/2021 CST

Currently transmitting at:

8X/8X MIMO-B

Current Contention Mode Status: No Piggyback of data in contention

Products & Pricing

High Speed Wireless Internet from Evertek & N.E.T.

50/5Mb* - $99.95
35/5Mb - $87.95
25/3Mb - $67.95
15/2Mb - $56.95

*Only available in 3.65ghz or 5ghz sites

Installation - $99.95

Protection Plan - $5.99
Includes free service calls and repairs. Some restrictions apply
Learn more here . . .

Wireless Router Lease - $9.99
Includes support & replacement if needed

Service Call - $99.95
All customers whether, equipment is leased or owned, are subject to a service call unless they are covered by a Protection Plan.

N.E.T. Broadband

A partnership of North West REC & Evertek

NORTH WEST REC Your Touchstone Energy Cooperative

EVERTEK

Speed/pricing is determined by your location in relation to service towers. We will inform you of exactly what is available to you when your location information is gathered. All listed prices are monthly charges unless otherwise noted. Taxes and regulatory fees may apply.

SIGN UP FOR WIRELESS INTERNET

July 28, 2021

Office of the Chief Information Officer of the State of Iowa
c/o Matt Behrens
200 E. Grand Avenue
Des Moines, IA 50309

Frontier Communications Corporation
Karen Boswell
karen.boswell@ftr.com

To whom it may concern:

This is a letter of inquiry concerning your firm's prior reporting to the State of Iowa Office of the Chief Information Officer ("OCIO" or "Office") regarding the availability of Broadband service in certain United States Census Block(s) within Iowa. Our Office received a formal notice of appeal challenging information reported on the Broadband Availability Map Version 4 ("V4") of the Statewide Broadband Availability Map ("Map"). The data reflected on V4 of the Map was either (1) provided by you to the Office's contractor ("Connected Nation") during the data collection window of April 15 through April 30, 2021, (2) gathered from other sources (such as FCC) that collected data from you, or (3) carried forward from prior reporting made to this Office by you under a previous Map version. Map V4 categorizes census blocks according to the facilitated speed offered within the block. The publication of V4 triggered a formal appeal window, as explained in more detail below, during which time we received this appeal. The appeal we received claims that the data reflected on V4 of the Map is inaccurate. This appeal can be found at https://ocio.iowa.gov/broadband-availability-map-version-4-challenge-process (*see* Docket Numbers 21-1012, 21-1026). **To resolve this matter, the Office requests that your firm provide information concerning your service in the affected Census Blocks as further identified and described below by August 11, 2021.**

On July 1, 2021, the Office officially published the final version of V4 of the Map, which identifies where Broadband service was offered or Facilitated at a tier 1, tier 2, or tier 3 speed as of July 1, 2021.[1] V4 of the Map is based primarily on data submitted to Connected Nation and/or FCC by Communication Service Providers concerning their service capabilities in the State of Iowa[2] and on informal comments/feedback supplied by interested parties as part of the informal comment/feedback process described above and in which your firm may have participated. V4 of the Map, and a detailed background of the same, can be found at: https://ocio.iowa.gov/broadband-availability-map-version-4. Overall, the new map reflects Targeted Service Areas defined as a census block within which no communications service provider offers or facilitates broadband service at or above the tier 1, tier 2, or tier 3 download and upload speeds. The tier speeds are defined as follows:

[1]See Iowa Code §§ 8B.1(12), 8B.10. *See also* Iowa Admin. Code r. 129—20.1, 20.3, 20.4.

[2]See Iowa Admin. Code r. 129—20.3.

"Tier 1" means a maximum download speed of less than 25 Mbps and a maximum upload speed of less than three Mbps.

"Tier 2" means a minimum download speed of greater than or equal to 25 Mbps but less than 50 Mbps. No minimum upload speed is applicable for Tier 2.

"Tier 3" means a minimum download speed of greater than or equal to 50 Mbps but less than 80 Mbps. No minimum upload speed is applicable for Tier 3.

"Non-TSA" means a census block in which speeds are facilitated at greater than or equal to 80 Mbps.

Through the official publication of V4 of the Map, the Office triggered the challenge process it is required by law to administer.[3] Pursuant to applicable administrative rules, within 20 days after the Office's official publication of V4 of the Map, "any person or party aggrieved or adversely affected by such determination may challenge the office's finding by filing a notice of appeal with the office" along with all evidence or information supporting their appeal. Iowa Admin. Code r. 129—20.5(1). Specifically, interested parties were permitted to provide the Office with evidence and information of the following: broadband is unavailable from a provider listed for the area (census block); or, that broadband speed is not as advertised.

V4 of the Map currently shows that service is Facilitated at either a tier 1, tier 2, or tier 3 speed per designated census block. As part of the above-outlined process, OCIO received a formal notice of appeal and supporting evidence or information from one or more Iowa residents or Communications Service Provider, claiming that Broadband service is not offered or Facilitated at that speed tier.

At this time, the Office requests your assistance in making an accurate determination as to whether your firm facilitates broadband service at the designated speed tier for 10% or more of the geographic area of each challenged census block as of July 1, 2021 to the Census Blocks identified in Exhibit A. To that end, the Office requests that you:

1) Complete and return the attached Affirmation of Service or Lack of Service in Census Blocks Broadband Grants Program Broadband Availability Map Challenge Process Form (see Exhibit A, Affirmation tab), by **August 11, 2021**. Pursuant to this form, OCIO requests that a representative with legal authority to bind your firm:

    a) Confirm that your firm Facilitated Broadband service to the Census Blocks identified in Exhibit A as of July 1, 2021, and indicate the speeds at which your firm facilitated broadband service in those blocks. For purposes of this representation, "'Facilitate' means a communication service provider's ability to provide broadband service at or above the download and upload speeds specified in the definition of targeted service area in this section to a home, farm, school, or business **within a commercially reasonable time and at a commercially reasonable price upon request by a consumer**." Iowa Code § 8B.1(5) (emphasis added).

    b) Fully complete all other aspects of the Form.

2) In addition to the form, please also submit any other evidence or information in your possession to the Office that supports your prior representations to the Office regarding the Census Blocks identified in Exhibit A. Examples of evidence and information the Office would consider particularly probative include "Bills or invoices provided to or received by customers in the

[3]See Iowa Code § 8B.10(2); Iowa Admin. Code r. 129—20.5.

applicable census block(s) which identify the specific download and upload speeds provided or received as of [July 1, 2021].” Iowa Admin. Code r. 129—20.5(8).

Please return the completed form and any supporting evidence or information to ociogrants@iowa.gov.

Please note that you are under no legal obligation to respond to this request for information. Generally, pursuant to applicable administrative rules, any affected person or party is free to submit evidence or information to the Office in support of or in opposition to an appeal within 20 days after the appeal has been posted to ocio.iowa.gov/broadband. Iowa Admin. Code r. 129—20.5(3). However, this Office is affirmatively reaching out to notify you of the appeal, of the circumstances surrounding the appeal, and to solicit your feedback and position. If this Office does not receive your response via Exhibit A of the Form by **August 11, 2021** (10 business days from the date of this letter), the Office will make a final decision based on the evidence and information currently available to it. Iowa Admin. Code r. 129—20.5(4), (5).

OCIO strives at all times to produce and disseminate accurate information. We appreciate your assistance in helping us achieve our statutory mandate.

Sincerely,

Office of the Chief Information Officer,
State of Iowa

EXHIBIT A

Affirmation of Service or Lack of Service in Census Blocks
Broadband Grants Program Broadband Availability Map Challenge Process

A. RESPONDENT INFORMATION	
Company Name	Frontier Communications of Iowa
Address	2378 Wilshire Boulevard
City	Mound
State	MN
Zip	55364

B. DESIGNATED CONTACT INFORMATION	
Contact Name	Scott Bohler
Contact Phone Number	(612) 562-7183
Contact Email	scott.bohler@ftr.com

C. AFFIRMATION

In signing and submitting this form, the above-identified company, and its duly authorized representative signing on behalf thereof, hereby affirms under penalty of perjury that, as represented in its submission:
Company, consistent with the representations made in this form, and regardless of whether your company's prior reporting to to the FCC or State of Iowa was correct or in error, meets one of the following criteria in each of the identified census blocks as of July 1, 2021:
1. Company Facilitated service at the indicated speeds on the Affirmation tab as of July 1, 2021 to more than 10% of the census block; or
2. Company did NOT offer or Facilitate material Broadband service.

Please indicate the speeds offered forr each census block on the Affirmation tab.

D. ADDITIONAL EXPLANATION (To the extent you believe additional explanation is required to ensure that you are communicating full and accurate information, please use the below space to further explain, qualify, or substantiate your above affirmation. To the extent necessary, please feel free to upload additional explanations/supporting documentation.

Census blocks denoted as "N/A No locations" do not have any household locations in them, according to Frontier's information.

E. SIGNATURE* By typing your full name you are affixing your signature to this form and attesting to the accuracy of the information submitted herein.

Authorized Signature:	**Allison M. Ellis**
Title:	**Vice President - Regulatory**
Date:	**August 10, 2021**

*PLEASE READ BEFORE SIGNING: By signing and submitting this form, I, on my own behalf or as a representative of the company identified above, as applicable, expressly represent that I am authorized to make the above factual representation on behalf of said company and/or myself, as applicable, and under penalty of perjury as authorized by Iowa Code section 622.1 and pursuant to the laws of the state of Iowa, certify the following with respect to this form submitted on behalf of said company and/or myself: any statements, representations, warranties, certifications, or attestations made in this form, including any attachments or enclosures associated therewith, are true and accurate; I, on behalf of said company and/or myself, have not knowingly made any false statements or representations in this form. In addition to any criminal penalties authorized by Iowa Code section 720.2 that may result from any false statements of material fact made herein or any other remedies available at law, equity, or otherwise, if it is subsequently determined that I have made a statement, representation, warranty, certification, or attestation in this form, or any attachments or enclosures associated herewith, that is later proven untrue in any material respect, the company on which I submitted this form on behalf of may be disqualified from current incentive programs administered by the Office or may be ordered to repay the Office the entire amount of any funds previously distributed by the Office to said company in connection with any current incentive programs administered by the Office. OCIO makes no guarantees as to whether the information supplied by you will result in any change to the Broadband Availability Map V4 or the way any incentive decisions are reviewed, scored, or decided. This form, as completed, any attachments hereto, and any other information or materials submitted to the Office in connection with this form or related inquiry, shall be considered public records and shall be made available for public examination and/or disseminated upon request by third parties as required by Iowa Code chapter 22. The Office reserves the right to reject this form and relatedly consider any information communicated through this form as neither credible nor probative if this form is not fully and properly filled out.

Please familiarize yourself with the following terms prior to determining whether broadband service is being Facilitated to the census block.	
Facilitate	A communication service provider's ability to provide broadband service at or above the download and upload speeds defined above to a home, farm, school, or business within a commercially reasonable time and at a commercially reasonable price upon request by a consumer. This does *not* pertain to the Broadband Infrastructure used to facilitate said service; Broadband Infrastructure is *not* a basis for appeal.

CENSUS BLOCK ID	Do you Facilitate service to more than 10% of the geographic area of the Census Block?	Download Speed	Upload Speed
191499702001059	**N/A No locations**		
191499703003031	**Y**	35.0M	2.0M
191499703003088	**Y**	35.0M	2.0M
191499703003115	**Y**	35.0M	2.0M
191499703003116	**Y**	35.0M	2.0M
191499703003117	**Y**	35.0M	2.0M
191499703003119	**Y**	35.0M	2.0M
191499703003120	**N/A No locations**		
191499703003121	**Y**	35.0M	2.0M
191499703003122	**Y**	35.0M	2.0M
191499703003123	**Y**	35.0M	2.0M
191499703004074	**N/A No locations**		
191499703004084	**N/A No locations**		
191499704003117	**N/A No locations**		
191499704003127	**N/A No locations**		
191499705003050	**N/A No locations**		
191499706004002	**N/A No locations**		
191499706004006	**N/A No locations**		
191499704003155	**Y**	18.0M	1.0M
191499704003156	**N/A No locations**		

Iowa OCIO State Broadband Mapping

Grant Eligibility Challenge Review

Evertek Enterprises

August 11, 2021

Background

Premier Communications is challenging certain census blocks alleging that they were reported "In Error" as Evertek could not facilitate broadband to all locations within the census blocks at 50 Mbps if those locations requested that level of service.

As part of their due diligence, Premier received the following statement from a Professional Engineer at Vantage Point Solutions, "Based on the quantity of locations, the tower locations, and the frequencies claimed to be used by the provider on their website, our opinion is that for the locations in the rural portions of the Craig, Struble, Brunsville, Le Mars & Merrill exchanges, *it would be very difficult for a majority of these locations to receive a sustained, consistent 50 Mbps download speed* on the provider's fixed wireless network using typical customer configurations and site loading."

Discussion

The challenge is premised on whether or not Evertek can deliver "sustained, consistent 50 Mbps download speeds" to "a majority of these locations" using "typical customer configurations and site loading."

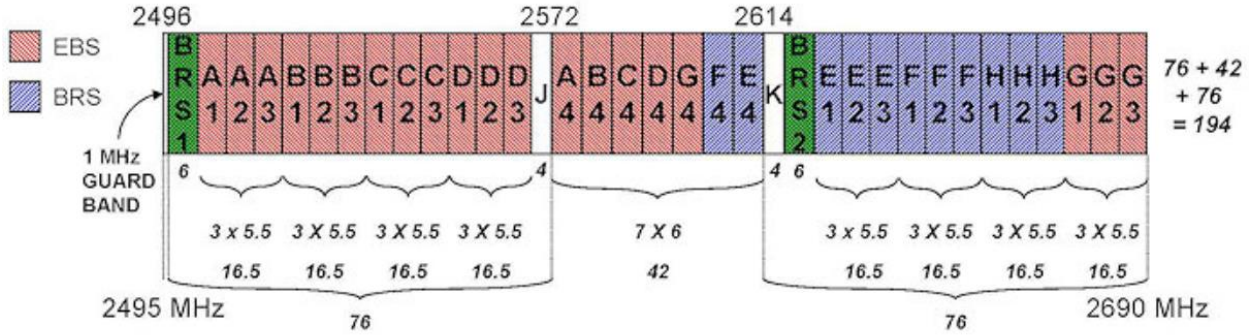
The OCIO's grant program definitions do not include a requirement for sustained, consistent speeds nor do they require (or assume) that such speeds must be achievable using typical customer configurations.

There are variables that can impact the speeds delivered to the end user of a cable, DSL, fiber, or fixed wireless network. These can include, but are not limited to, the radio frequency and/or carrier signal as well as the modulation scheme.

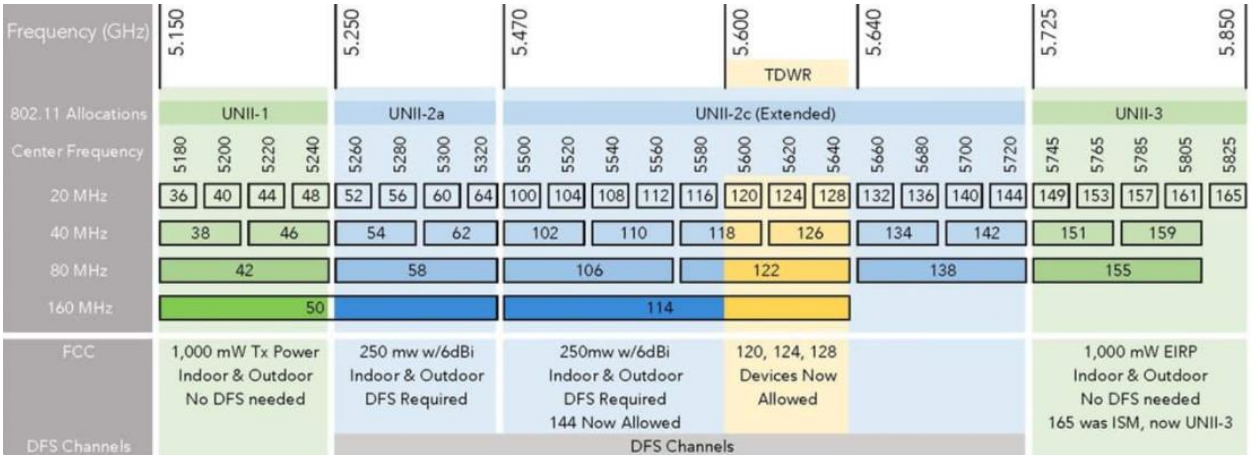
Wireline technologies and fixed wireless all share a common thread; their services are made possible using radio frequencies (RF). Radio frequencies, often referred to as "channels," combined with modulation schemes are the heart of what makes the broadband service speeds possible. Gigabit delivery across fixed wireless (millimeter wave) has already been proven to be achievable as have 100+ Mbps speeds on 5G mobile networks.

It should be noted that Evertek has an ample supply of spectrum, which could be used on their towers, and Evertek is the Federal Communications Commission (FCC) authorization holder for numerous stations. These include 16 FCC licenses for stations such as WRLC690, which may be up to a 100 MHz wide channel, operating on a Priority Access License (PAL) in the Citizens Broadband Radio Service (CBRS) band. Evertek also owns Broadband Radio Service (BRS) spectrum and leases Educational Broadband Service (EBS) spectrum.

As the chart below illustrates, in an ideal market area, Evertek could aggregate an additional 194 MHz of spectrum in addition to their CBRS PAL.



In addition to BRS, CBRS, and EBS, Evertek utilizes 5 GHz spectrum and can bond 20 MHz wide channels together to deliver service, based on certain FCC mandated power restrictions.



The ability to ensure delivery speeds can be controlled or mitigated by the use of certain simple design elements such as advanced frequency reuse, transmit sectorization, the modulation scheme selection of quadrature phase shift keying (QPSK) versus quadrature amplitude modulation (QAM) and the spectral efficiency generated by such modulation schemes as measured by the number of bits per second per hertz (bits/s/Hz).

Connected Nation has developed several propagation studies for Evertek and, therefore, has received confidential data that was used in the propagation model. While the propagation model itself does not rely on whether a base station radio transmits using multiple input-multiple output (MIMO), does not rely on the modulation scheme, or the output bitrate capacity of the radio itself measured in megabits per second (Mbps), CN is confident that the propagation models were properly developed based on the technical parameters provided by Evertek to CN.

Additionally, the EDX software used by Connected Nation allows for the selection on MIMO, although the propagation does not rely on it as mentioned above. Connected Nation typically does not use that setting as it creates a more conservative model and, despite the specification sheets (see attached samples), Connected Nation used a -75 threshold at the receiving customer premise equipment. This also created a more conservative propagation model.

The propagation models are created using parameters such as:

- Coordinates of the transmit location
- Radio frequency for each base station
- Type of transmit antenna (sectorized or omnidirectional)
    - Azimuth of transmit antenna
        - Number of transmit antennae
    - Gain
    - Polarity
    - Beam Tilt
- Line loss
- Transmit output power

Historically, Evertek has advertised its speed packages and pricing of the 50 Mbps/5 Mbps service package with a caveat (see asterisk below):

- 50/5Mb* - $99.95
- 35/5Mb - $87.95
- 25/3Mb - $67.95
- 15/2Mb - $56.95

*Only available in 3.65 GHz or 5 GHz sites

However, Evertek has separately posted a message stating that such service is now available on some 40+ tower sites as of May 2021. See https://www.evertek.net/news/2021/7/2/towers-upgraded-to-50mb5mb-capable.

Conclusion

Connected Nation will attest to the capabilities of today's fixed wireless equipment (see attached examples) and therefore is of the opinion that the speeds advertised by Evertek are achievable, based on their combination of available spectrum, modulation

schemes, and sufficient backhaul capacity. However, it is suggested that conducting field validation, allowing for a third-party verification of the reported speeds, is the most direct form of adjudication. The validation activities should include an RF sweep of targeted tower sites, measuring the width of each operational channel, and collecting independent speed test data, if and where possible. Such tests could be conducted at randomized locations, using equipment provided by Evertek, in a manner that produces a statistically significant sampling across the challenged transmit sites.

UBIQUITI
NETWORKS

airFiber 5

5 GHz Full Duplex Point-to-Point Gigabit Radio

Models: AF-5, AF-5U

USER GUIDE

Table of Contents

Chapter 1: Overview

Introduction

Thank you for purchasing the Ubiquiti Networks® airFiber® 5 GHz Full Duplex Point-to-Point Gigabit Radio. This User Guide is for use with the following models:

Model	Description	Operating Frequency*
AF-5	Supports mid-band frequencies	5470 - 5950 MHz
AF-5U	Supports high-band frequencies	5725 - 6200 MHz

*Refer to **"Specifications" on page 40** for more information.

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 model, AF-5U, which can operate in the 5.7 - 6.2 GHz bands, 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.

The same instructions apply to both models, and the User Guide will refer to both models as the airFiber AF-5.

Package Contents


airFiber AF-5/AF-5U


I-Bracket


Upper Mount Bracket with Elevation Rod


Lower Mount Bracket


Pole Clamps (Qty. 2)


M10x150 Carriage Bolts (Qty. 4)


M10x100 Carriage Bolts (Qty. 2)


M8x14 Serrated Flange Bolts (Qty. 4)


Azimuth Support Brackets (Qty. 2)


M10 Serrated Flange Nuts (Qty. 6)


Cable Ties (Qty. 2)


GigE PoE Adapter (50V, 1.2A)


Power Cord


Quick Start Guide

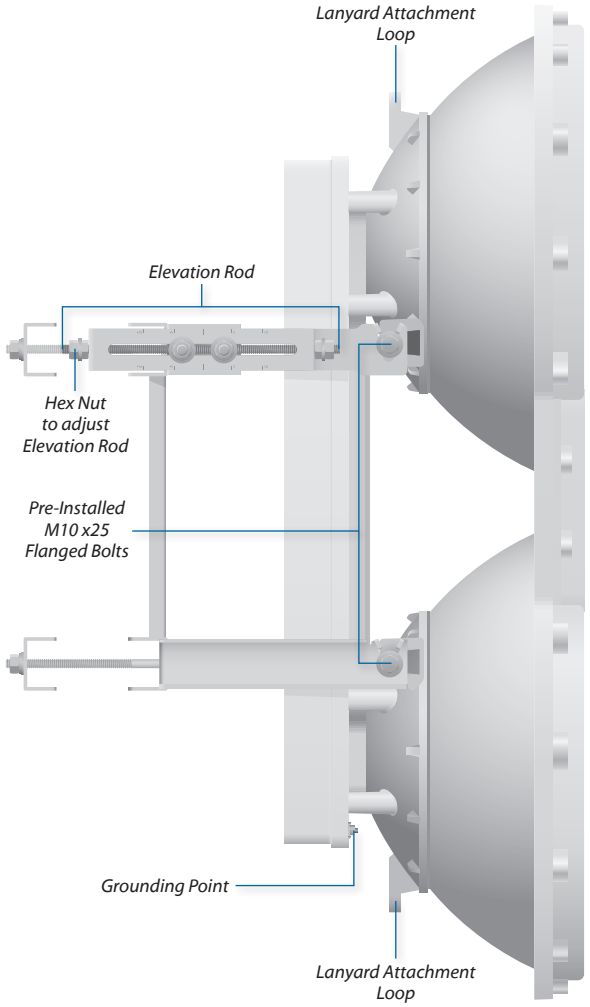
TERMS OF USE: Ubiquiti radio devices must be professionally installed. Shielded Ethernet cable and earth grounding must be used as conditions of product warranty. TOUGHCable™ is designed for outdoor installations. It is the customer's responsibility to follow local country regulations, including operation within legal frequency channels, output power, and Dynamic Frequency Selection (DFS) requirements.

airFiber Configuration Interface System Requirements

- Microsoft Windows Vista, Windows 7, Windows 8, Linux, or Mac OS X
- Java Runtime Environment 1.6 (or above)
- Web Browser: Mozilla Firefox, Apple Safari, Google Chrome, or Microsoft Internet Explorer 8 (or above)

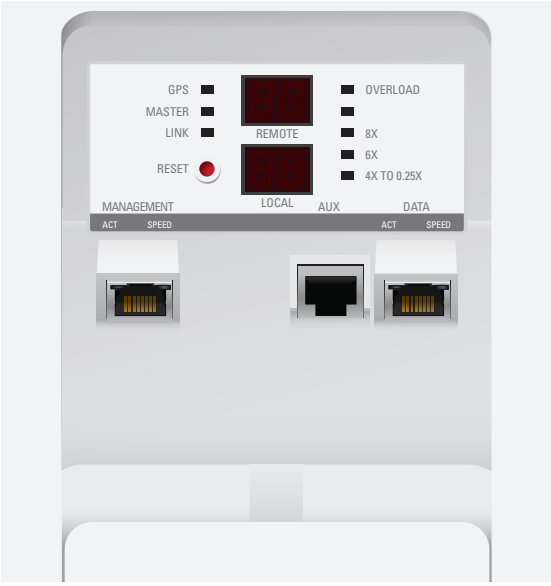
Hardware Overview

Side



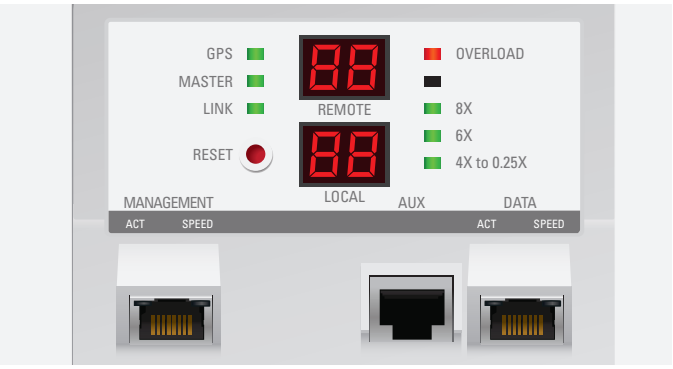
Assembled View

Interfaces



Interface	Description
Reset Button	To reset to factory defaults, press and hold the Reset button for more than five seconds while the unit is already powered on.
Remote Display	Displays the received signal strength in dBm of the remote airFiber radio.
Local Display	Displays the received signal strength in dBm of the local airFiber radio.
Management Port	10/100 Mbps, secured port for configuration. By default, this is the only port that can monitor, configure, and/or update firmware.
Aux Port	Port for audio tone aiming.
Data Port	10/100/1000 Mbps port handles all user traffic.

LEDs



LED	State	Status
GPS	Off	No GPS Synchronization
	On	Operational (Strong Signal)
	Normal Flash*	Non-Operational (Weak Signal)
Master	Off	Slave mode
	On	Master mode
Link Status	Off	RF Off
	Short Flash*	Syncing DFS countries only: • DFS CAC • RADAR Detected
	Normal Flash*	Beaconing
	Long Flash*	Registering
	On	Operational
Remote	On	Displays the received signal strength in dBm of the remote airFiber radio.
Local	On	Displays the received signal strength in dBm of the local airFiber radio.
Overload	Fast Flash	Overload Condition (Identify and eliminate any source of strong in-band interference.)
(Unlabeled)	On	10x (1024QAM MIMO)
8x	On	256QAM MIMO
6x	On	64QAM MIMO
4x to 0.25x	On	16QAM MIMO
	Long Flash*	QPSK MIMO
	Normal Flash*	1x QPSK xRT™**
	Short Flash*	¼x QPSK xRT**

* Short Flash (1:3 on/off cycle)
Normal Flash (1:1 on/off cycle)
Long Flash (3:1 on/off cycle)

** xtreme Range Technology

Port LEDs

	LED	State	Status
Management	Act	Off	No Ethernet Link
		On	Ethernet Link Established
		Random Flashing	Ethernet Activity
	Speed	Off	10 Mbps
		On	100 Mbps
Data	Act	Off	No Ethernet Link
		On	Ethernet Link Established
		Random Flashing	Ethernet Activity
	Speed	Off	10/100 Mbps
		On	1000 Mbps

Chapter 2: Installation

Link Planning

Before you install the airFiber AF-5, consider the following:

- Point-to-Point (PtP), daisy chain, or ring configuration
- Co-Location

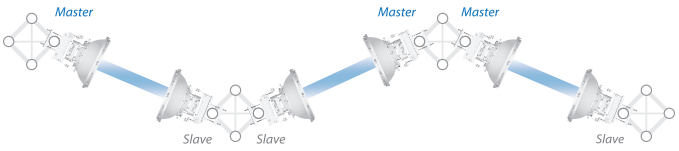
Configuration

There are three typical configurations:

- **PtP backhaul** Uses two airFiber radios, one configured as *Master* and the other configured as *Slave*.

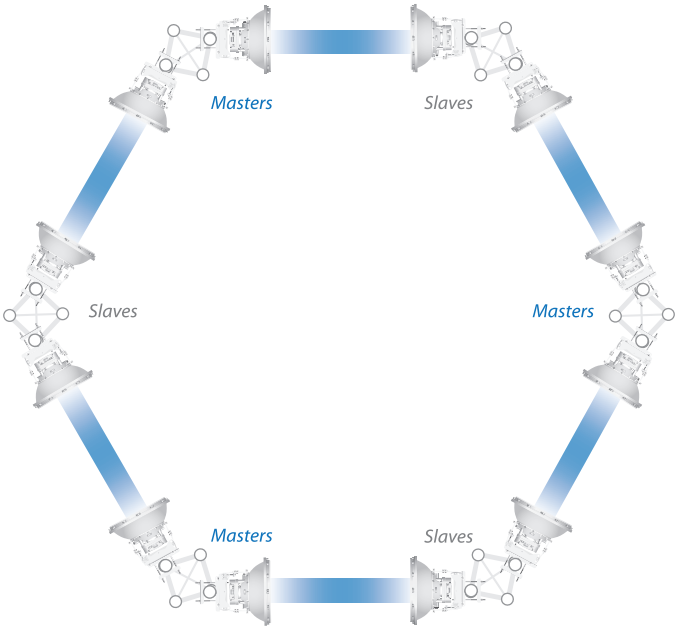
Point-to-Point Backhaul

- **Daisy chain** Uses multiple airFiber radios to extend the distance of a link, like a relay from point to point to point. The airFiber radios in the same node must use the same *Wireless Mode* (*Master* or *Slave*).



Daisy Chain Configuration

- **Ring** Uses multiple airFiber radios to form redundant paths. If one link goes down, the other links have an alternate route available. For each link, configure one airFiber radio as *Master*, and configure the other as *Slave*.



Ring Configuration

Co-Location

You can co-locate multiple airFiber radios if they are pointed in different directions. Co-located airFiber radios must use the same *Wireless Mode* (*Master* or *Slave*). Back-to-back airFiber radios can use the same frequency. We recommend that you use different frequencies for adjacent airFiber radios; however, this is not a strict requirement.

Installation Requirements

Pre-Assembly Tool

- 13 mm (½") wrench

Pole-Mounting Tool

- 17 mm (11⁄16") wrench

Other Requirements

- Clear line of sight between airFiber radios
- Clear view of the sky for proper GPS operation
- Vertical mounting orientation
- Mounting location with < 0.5° displacement due to twist and sway under wind loading
- Mounting point:
  - At least 1 m (3.28 ft) below the highest point on the structure
  - For tower installations, at least 3 m (9.84 ft) below the top of the tower
- Ground wires – min. 10 AWG (5 mm^2) and max. length: 1 m (3.28 ft). As a safety precaution, ground the airFiber radios to grounded masts, poles, towers, or grounding bars.

  WARNING: Failure to properly ground your airFiber units will void your warranty.

- (Recommended) 2 Outdoor GigE PoE surge protectors

  Note: For guidelines about grounding and lightning protection, follow your local electrical regulatory codes.

- Outdoor, shielded Category 6 (or above) cabling and shielded RJ-45 connectors are required for all wired Ethernet connections.

Installation Overview

We recommend that you configure your paired airFiber radios before mounting. Below is an overview of the installation with specific details in the following instructions:

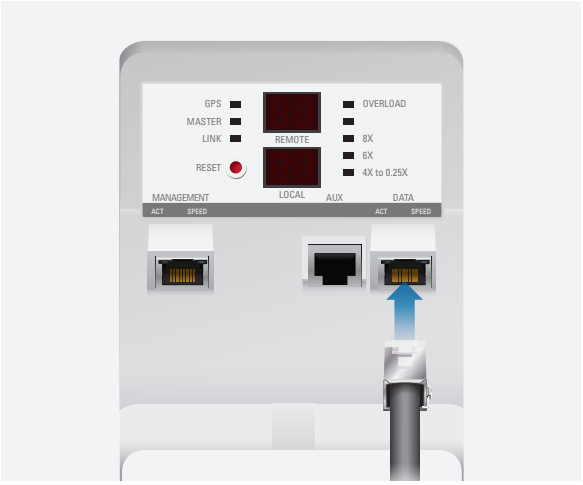
- Connect Power over Ethernet to the Data port, and connect an Ethernet cable between your computer and the Management port.
- Configure the device settings in the airFiber Configuration Interface.
- Once configuration is complete, disconnect the cables to move the airFiber radios.
- Pre-assemble the mounting hardware.
- Install the airFiber radios at the site.
- Establish and optimize the RF link.

Note: The AF-5 and AF-5U models share the same installation and configuration instructions.

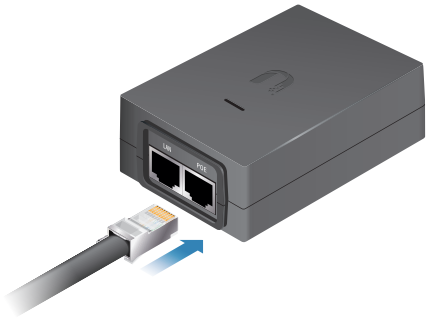
Connecting Power over Ethernet

1. Push the button and slide the port cover down to access cable ports. (The port cover cannot be completely removed.)

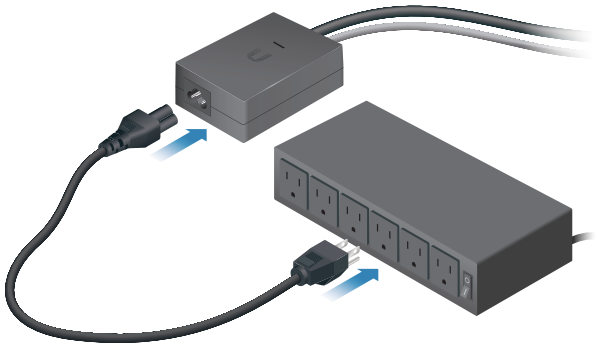
2. Connect an Ethernet cable to the *Data* port.



3. Connect the other end of the Ethernet cable from the *Data* port to the Ethernet port labeled **POE** on the *GigE PoE Adapter*.



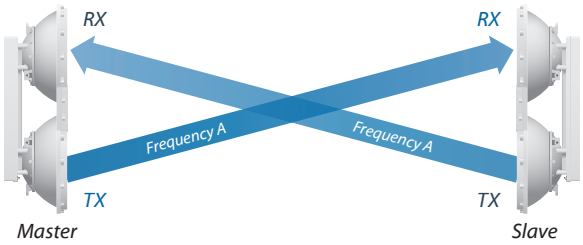
4. Connect the *Power Cord* to the power port on the *GigE PoE Adapter*. Connect the other end of the *Power Cord* to a power source.



airFiber Configuration

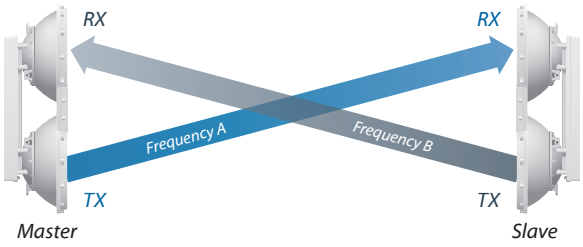
The instructions in this section explain how to access the airFiber Configuration Interface and configure the following settings:

- **Wireless Mode** Configure one airFiber radio as the *Master* and the other as the *Slave*.
- **Duplex** The airFiber radio supports both half-duplex and full-duplex operation. Half-duplex operation provides more frequency planning options at the cost of higher latency and throughput. Full-duplex operation provides the highest throughput and lowest latency; however, you have fewer frequency management options.
  - **Half Duplex (default)** The *TX* and *RX Frequencies* can be the same or different to suit local interference.



Half-Duplex Diagram

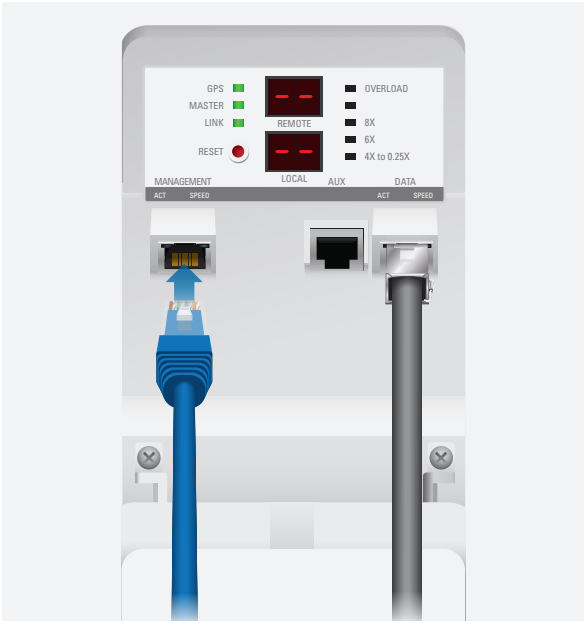
  - **Full Duplex** The *TX* and *RX Frequencies* should be different.



Full-Duplex Diagram

- **TX and RX Frequencies** The *TX Frequency* on the Master must match the RX *Frequency* on the Slave, and vice versa.

1. Connect an Ethernet cable from your computer to the *Management* port on the airFiber radio.



2. Configure the Ethernet adapter on your computer with a static IP address on the 192.168.1.x subnet.
3. Launch your web browser. Type **http://192.168.1.20** in the address field and press enter (PC) or return (Mac).

4. The login screen will appear. Enter **ubnt** in the *Username* and *Password* fields. Select your *Country* and *Language*. You must agree to the *Terms of Use* to use the product. Click **Login**.

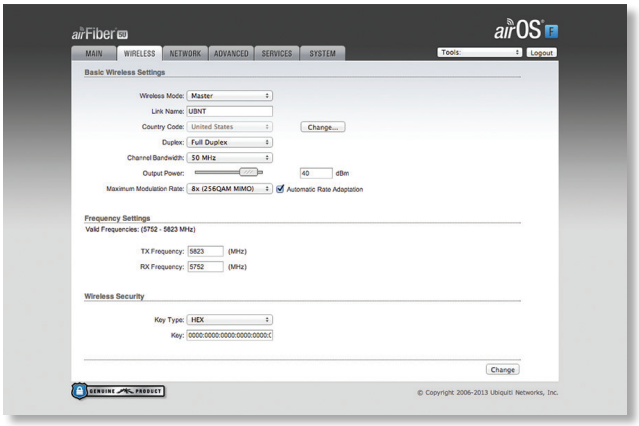
Note: U.S. product versions are locked to the U.S. Country Code to ensure compliance with FCC regulations.

5. The *Main* tab will appear. Click the **Tools** drop-down and select **Link Calculator**. This tool will guide you on how to best minimize bandwidth and power/ interference issues.

Note: If you do not see the *Link Calculator*, then upgrade the firmware on your airFiber radios. Download the firmware at: **downloads.ubnt.com/airfiber**

6. Enter the requirements of your link, and then click **Calculate.** Adjust the values as needed to get the optimal result, and then write down the settings needed for your configuration.

7. Click the **Wireless** tab.



8. Enter the *Basic Wireless Settings*:

a. For one airFiber radio, select **Master** from the *Wireless Mode* drop-down. For the other airFiber radio, keep the default, *Slave*.

b. Enter a name in the *Link Name* field. This should be the same on both the Master and the Slave.

c. For the *Duplex* drop-down:

- **Half Duplex** The default mode. The *TX* and *RX Frequencies* can be the same or different to suit local interference.
- **Full Duplex** The *TX* and *RX Frequencies* should be different.

d. Select a *TX Frequency*. This must match the *RX Frequency* on your other airFiber radio.

e. Select a *RX Frequency*. This must match the *TX Frequency* of your other airFiber radio.

f. If needed, change the *Output Power* and/or *Maximum Modulation Rate* settings.

9. Configure the *Wireless Security*:

a. Select the AES *Key Type*, **HEX** or **ASCII**.

b. For the *Key* field:

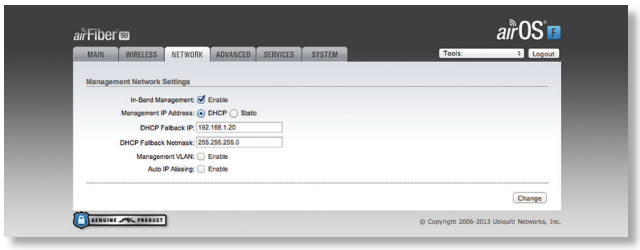
- **HEX** Enter 16 bytes (eight, 16-bit HEX values: 0-9, A-F, or a-f). You can omit zeroes and use colons, similar to the IPv6 format.

Note: The airFiber Configuration Interface supports IPv6 formats excluding dotted quad and "::" (double-colon) notation.

- **ASCII** Enter a combination of alphanumeric characters (0-9, A-Z, or a-z).

10. Click **Change** and then click **Apply**.

11. *In-Band Management* is enabled by default, so each airFiber radio must have a unique *IP Address*. (If the airFiber radios use the same *IP Address*, then you may lose access to the airFiber radios via the Data ports.) Click the **Network** tab.



a. For the *Management IP Address* option:

- **DHCP** Keep the default, *DHCP*, to use DHCP reservation on your router to assign a unique *IP Address*.
- **Static** Change the *IP Address*, *Netmask*, and other settings to make them compatible with your network.

b. Click **Change** and then click **Apply**.

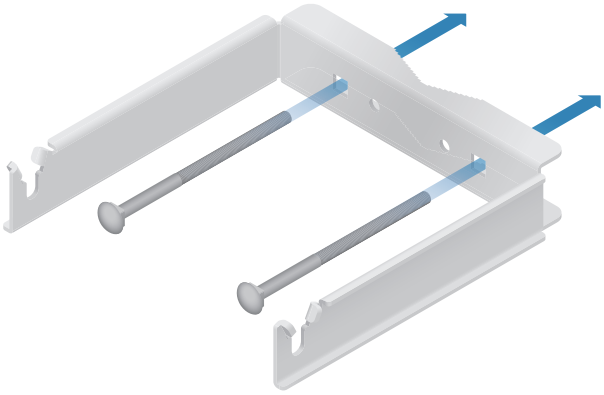
Repeat the instructions in the *airFiber Configuration* section on your other airFiber radio. After you have configured the airFiber radios, disconnect them and move them to your installation site.

Hardware Installation

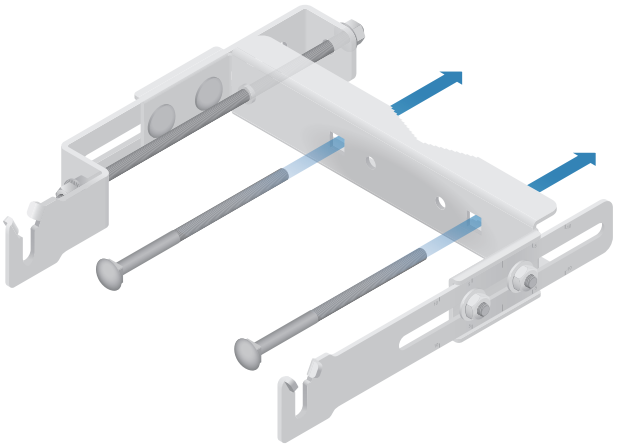
The mounting hardware of the airFiber radio can be pre-assembled before pole-mounting.

Mounting Hardware Pre-Assembly

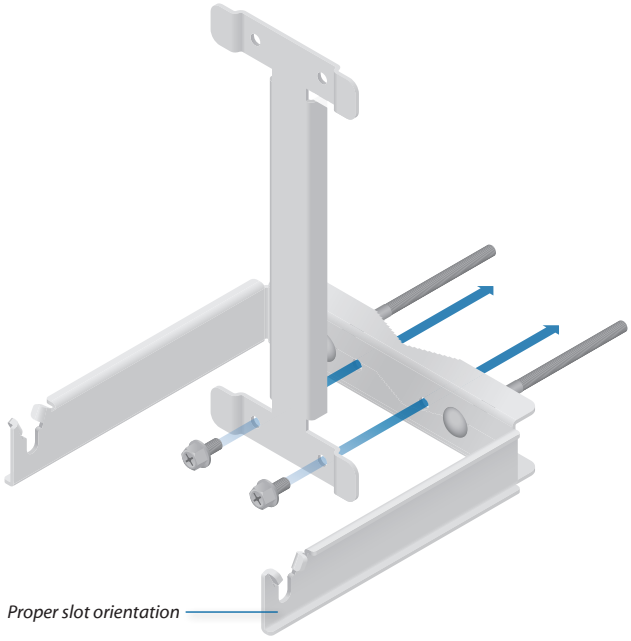
1. Insert two *M10x150 Carriage Bolts* into the *Lower Mount Bracket*.



2. Insert two *M10x150 Carriage Bolts* into the *Upper Mount Bracket with Elevation Rod*.

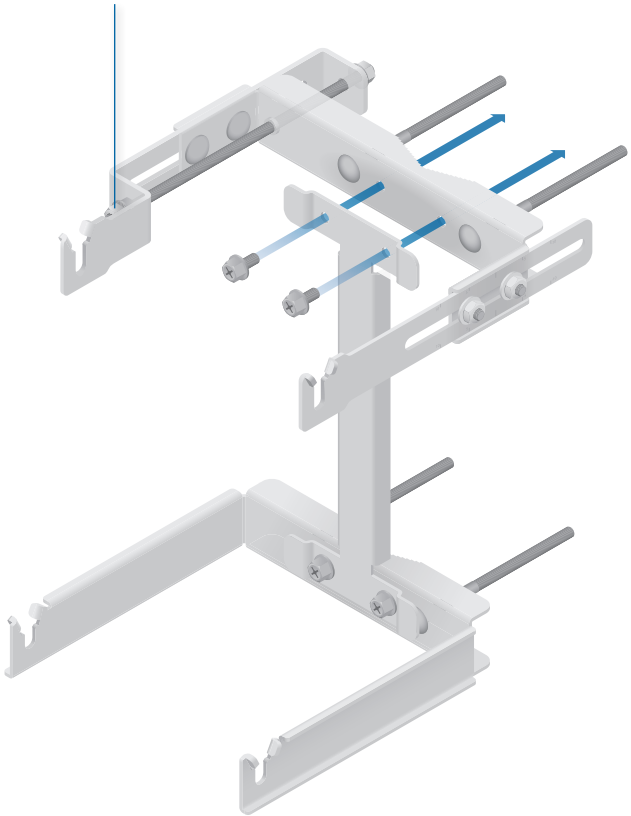


3. Attach the *Lower Mount Bracket* to the *I-Bracket* using two *M8x14 Serrated Flange Bolts*. Ensure that the slots face up and securely tighten the bolts.



4. Attach the *Upper Mount Bracket with Elevation Rod* to the *I-Bracket* using two *M8x14 Serrated Flange Bolts*.

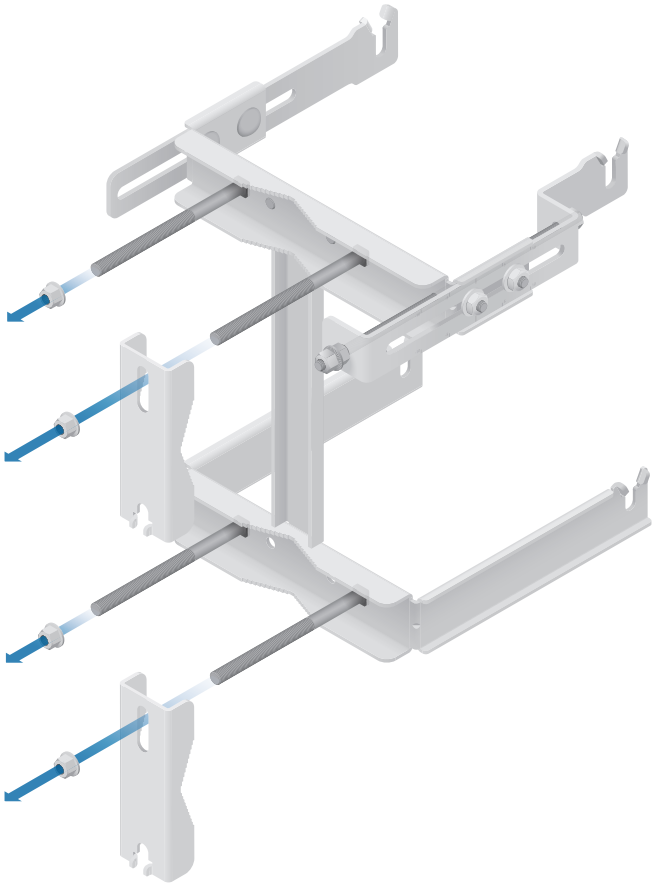
Note: Ensure that the orientation of the *Upper Mount Bracket* matches the illustration below, with the *Elevation Rod* on the correct side.



5. Attach the *Pole Clamps* to the *Mount Brackets*.

a. Slide the slotted hole of each *Pole Clamp* over one upper and one lower *M10x150 Carriage Bolt*.

b. Place one *M10 Serrated Flange Nut* on each *M10x150 Carriage Bolt*.

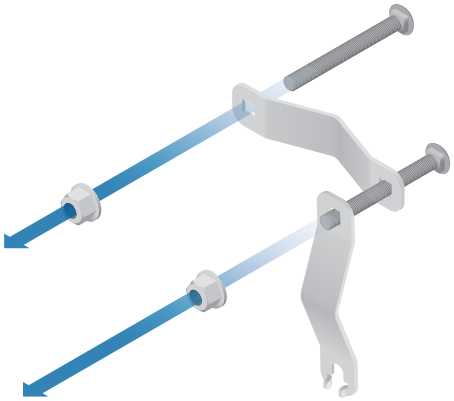


6. Attach the *Azimuth Support Brackets* together.

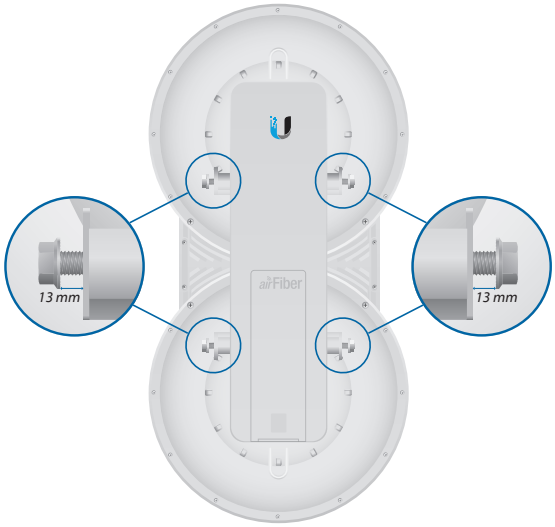
a. Insert the two *M10x100 Carriage Bolts* into the *Azimuth Support Bracket* that has two slotted holes.

b. Slide the slotted hole of the other *Azimuth Support Bracket* over one *M10x100 Carriage Bolt*.

c. Place one *M10 Serrated Flange Nut* on each *M10x100 Carriage Bolt*.



7. Ensure that there is a 13 mm gap between the head of each *Pre-Installed M10x25 Flanged Bolt* and the corresponding trunnion on the airFiber radio.



Pole-Mounting

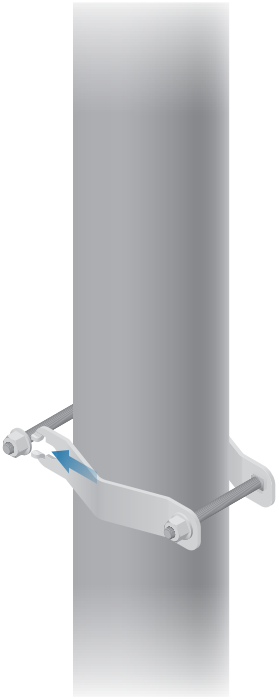
1. Attach the *Azimuth Support Brackets* to the pole just beneath the area where the airFiber radio will be attached.

Note: The mounting assembly can accommodate a Ø 38.1 - 101.6 mm (1.5" - 4.0") pole.

a. Orient the *Azimuth Support Brackets* around the pole so it is aimed in the direction of the other airFiber radio.

b. Slide the open slot of the *Azimuth Support Bracket* over the corresponding *M10x100 Carriage Bolt*.

c. Tighten the *M10 Serrated Flange Nuts* to approximately 50 N-m.

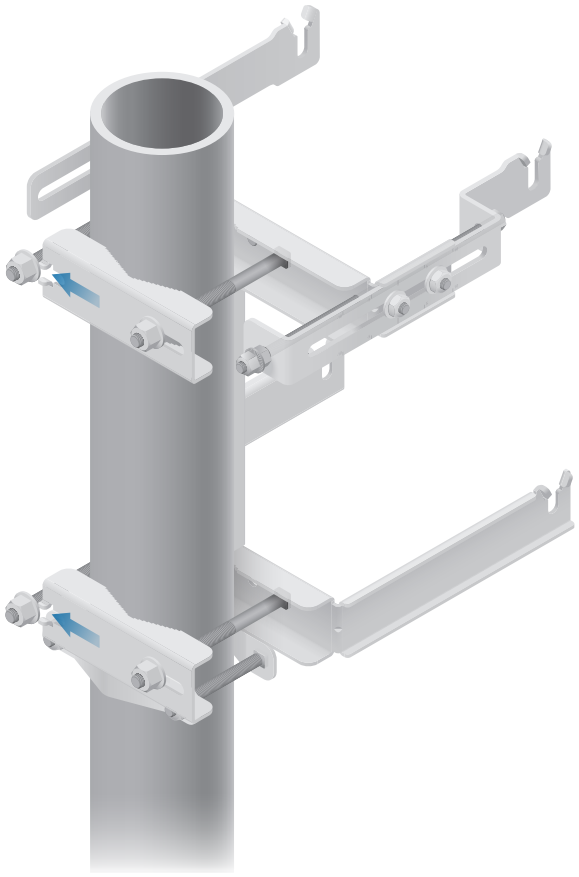


2. Attach the mounting assembly to a pole.

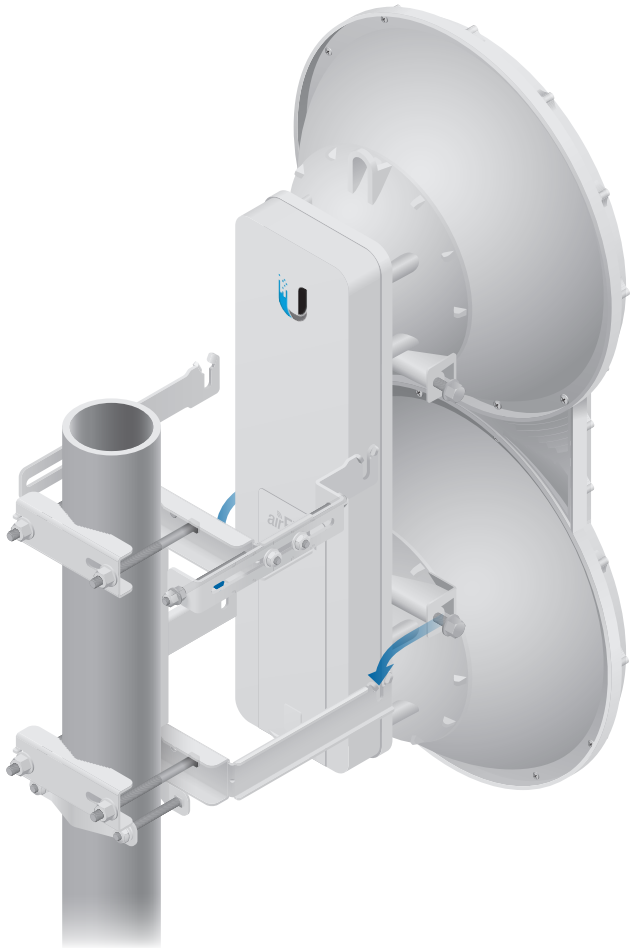
a. Orient the mounting assembly around the pole so it is aimed in the direction of the other airFiber radio.

b. Slide the open slot of each *Pole Clamp* over the corresponding *M10x150 Carriage Bolt*.

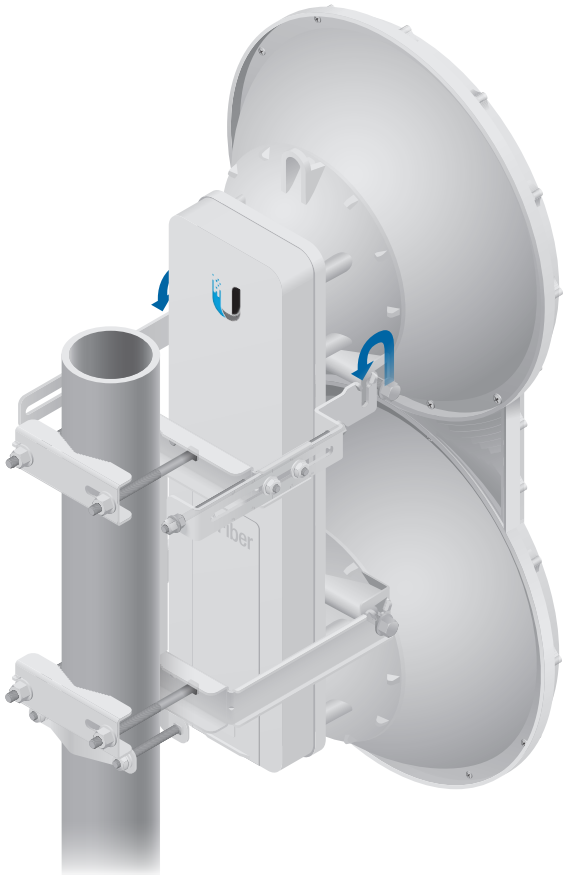
c. Tighten the *M10 Serrated Flange Nuts* of the *M10x150 Carriage Bolts* to secure the mounting assembly to the pole.



3. Lift the airFiber radio and align the two lower *Pre-Installed M10x25 Flanged Bolts* with the slots on the *Lower Mount Bracket*. Seat the bolts in the slots.



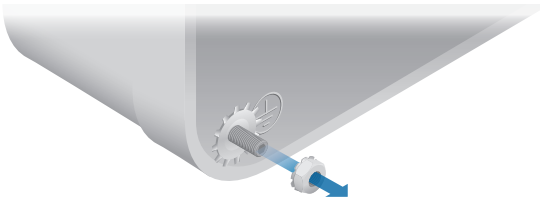
4. Align the two upper *Pre-Installed M10x25 Flanged Bolts* of the airFiber radio next to the slots on the *Upper Mount Bracket*. Lift the airFiber radio and seat the bolts in the slots.



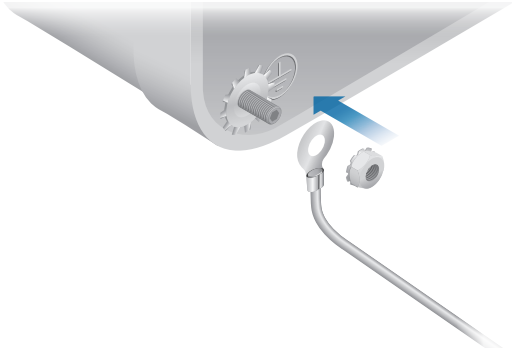
Grounding

To attach a ground wire:

1. Remove the nut from the *Grounding Point*.



2. Attach a ground wire (min. 8 AWG or 10 mm^2) to the lug and replace the nut to secure the wire.



3. Secure the other end of the ground wire to a grounded mast, pole, tower, or grounding bar.

WARNING: Failure to properly ground your airFiber units will void your warranty.

Note: The ground wire should be as short as possible and no longer than one meter in length.

Connecting Ethernet

1. Push the button and slide the port cover down to access cable ports. (The port cover cannot be completely removed.)

2. Connect the Data/PoE Ethernet cable:

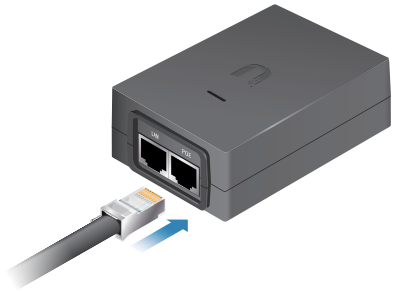
a. Feed an outdoor, shielded CAT6 cable up through the rightmost cable feed slot on the bottom of the port cover.

b. Connect the cable to the *Data* port.

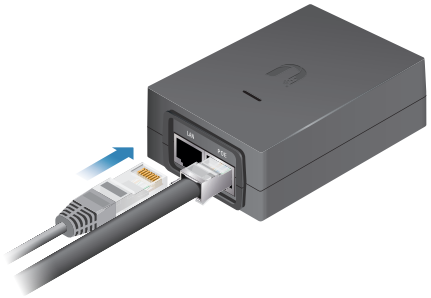
c. Create a strain relief for the Ethernet cable by feeding a *Cable Tie* through the tie slot to the side of the cable.

d. Wrap the *Cable Tie* around the cable and tighten.

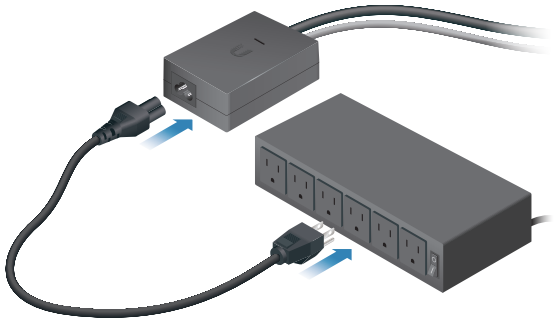
3. Connect the other end of the Ethernet cable from the *Data* port to the Ethernet port labeled **POE** on the *GigE PoE Adapter*.



4. Connect an Ethernet cable from your network to the Ethernet port labeled **LAN** on the *GigE PoE Adapter*.

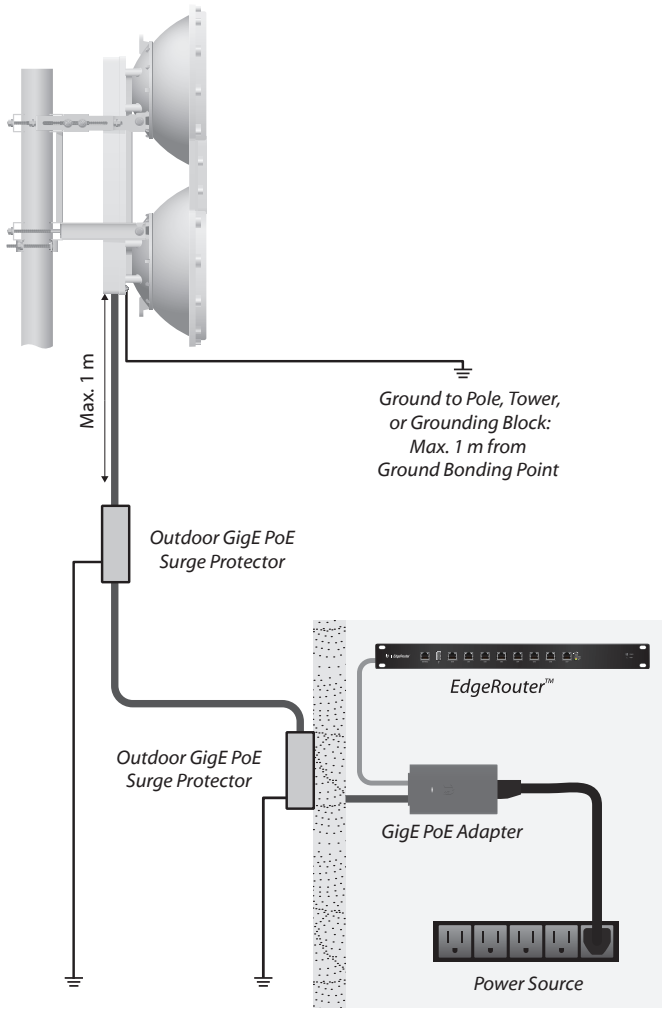


5. Connect the *Power Cord* to the power port on the *GigE PoE Adapter*. Connect the other end of the *Power Cord* to a power source.



Note: For added protection, we recommend installing two GigE PoE surge protectors. Install the first surge protector within one meter of the airFiber *Data* port, and install the second surge protector at the ingress point of the location housing the wired network equipment.

Below is a diagram of a finished installation with recommended surge protectors installed.



Alignment

Tips

- To accurately align the airFiber radios for best performance, you MUST align only one end of the link at a time.
- For more convenient alignment, you may consider using long-range scopes (not included) temporarily attached to your airFiber radios.
- You may need to use additional hardware to compensate for issues such as the improper orientation of a mounting pole or significant elevation differences between airFiber radios.

Determining the Received Signal Level

There are three methods for determining the received signal level:

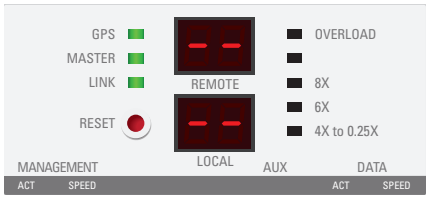
- LED Displays (See the next column.)
- airFiber Configuration Interface (See **"Using the airFiber Configuration Interface" on page 14**.)
- Audio tone (Optional equipment required. See **"Using the Audio Tone" on page 16**.)

Using the LED Displays

Before a link is established, the *Master's LED Display* looks like this:

- *GPS* and *Master* LEDs are solidly lit

  Note: The *GPS* LED may not be lit if there is a weak GPS signal. A GPS signal is not required for alignment.
- *Link Status* LED flashes (Normal Flash 1:1)
- *Remote* and *Local LED Displays* show a double dash



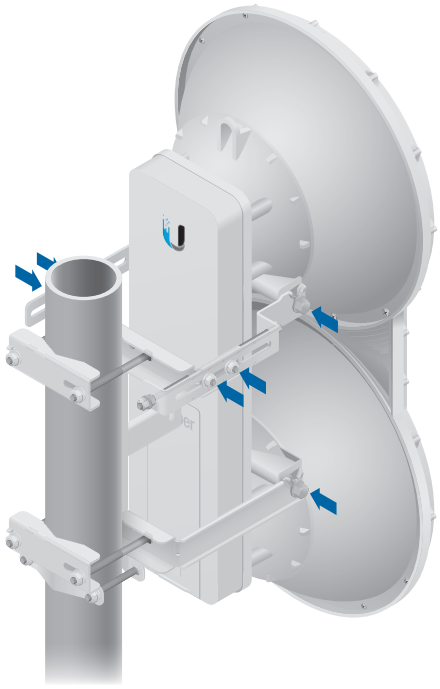
Note: The *Local LED Display* may briefly flash a large number (such as 95) when there is no link.

Establishing a Link

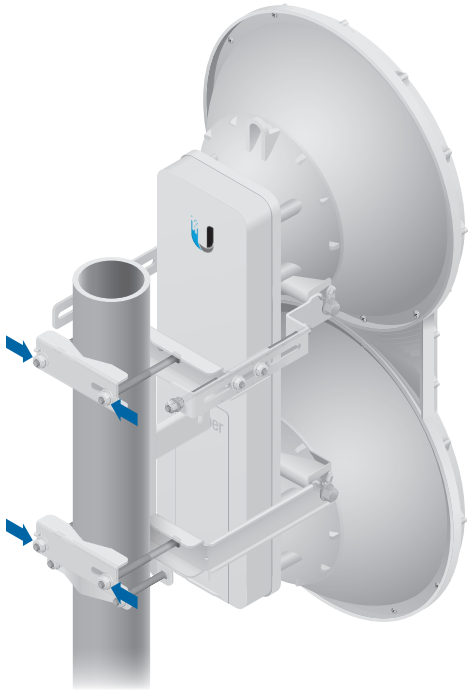
Adjust the positions of the *Master* and the *Slave* to establish a link.

Note: The *Master* must be aimed first at the *Slave* because the *Slave* does not transmit any RF signal until it detects transmissions from the *Master*.

1. Ensure that the following bolts and nuts are loose:
   - Four *Pre-Installed M10x25 Flanged Bolts* on the airFiber radio (two on each side)
   - Four *M10 Hex Nuts* used to lock the elevation alignment on the *Upper Mount Bracket* (two on each side)



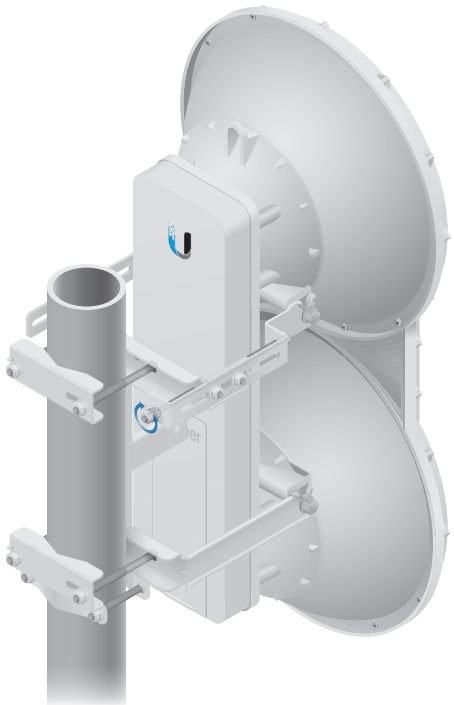
2. Ensure that the pole mount is snug yet the four *M10 Hex Nuts* attaching the *Pole Clamps* are loose enough to allow rotation around the pole for azimuth alignment.



3. Master Visually aim the *Master* at the *Slave*. To adjust the *Master*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.



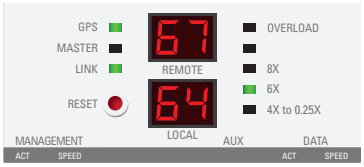
Note: Do NOT make simultaneous adjustments on the *Master* and *Slave*.

4. Slave Visually aim the *Slave* at the *Master*. To adjust the *Slave*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.

5. Check to see if a link is established. Ensure that the *Link Status* LED is solidly lit green and the *Remote* and *Local LED Displays* of the *Slave* are displaying signal levels.



6. Slave Aim the *Slave* at the *Master* to achieve the strongest signal level on the *Remote LED Display* of the *Slave*.

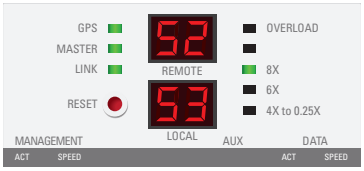
Note: Values on the *LED Displays* are displayed in negative (-) dBm. For example, 67 represents a received signal level of -67 dBm. Smaller numerical values indicate stronger received signal levels. For example, a reading of 49 is stronger than a reading of 55.

Note: Maximum signal strength can best be achieved by iteratively sweeping through both azimuth and elevation.

7. Master Aim the *Master* at the Slave to achieve the strongest signal level on the *Remote LED Display* of the *Master*.

Note: If the Overload LED lights up, identify and eliminate any source of strong in-band interference.

8. Repeat steps 6 and 7 until you achieve a symmetric link, with the signal levels within 1 dB of each other. This ensures the best possible data rate between the airFiber radios.



9. Lock the alignment on both airFiber radios by tightening the nuts and bolts.

10. Observe the *Local* and *Remote LED Displays* of each airFiber radio to ensure that the values remains constant while tightening the nuts and bolts. If any LED value changes during the locking process, loosen the nuts and bolts, finalize the alignment of each airFiber radio again, and retighten the nuts and bolts.

11. For each airFiber radio, close the port cover and ensure that the Ethernet cable stays in the cable feed slot.

Using the airFiber Configuration Interface

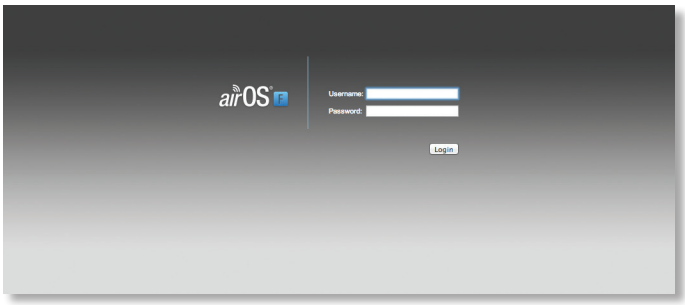
Before You Begin

Note: The instructions in this section assume that you are viewing the *Antenna Alignment* screen of the *Master*; however, you can also use the *Antenna Alignment* screen of the *Slave*.

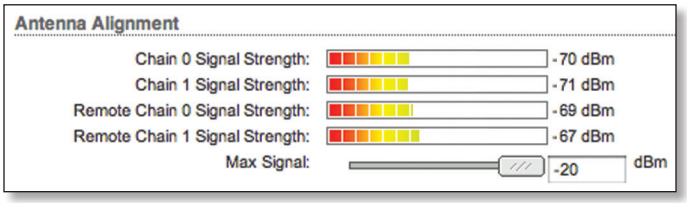
To access the airFiber Configuration Interface:

1. Make sure that your computer is connected to the *Management* port on the airFiber AF-5.
2. Configure the Ethernet adapter on your computer with a static IP address on the 192.168.1.x subnet.
3. Launch your web browser. Type **http://192.168.1.20** in the address field and press **enter** (PC) or **return** (Mac).

4. The login screen will appear. Enter **ubnt** in the *Username* and *Password* fields. Click **Login**.



5. The *Main* tab of the airFiber Configuration Interface appears. Click the **Tools** drop-down list at the top right corner of the page.
6. Click **Align Antenna**. You will use the *Align Antenna* tool to point and optimize the antenna in the direction of maximum link signal. (The *Antenna Alignment* window is designed to refresh every 250 milliseconds. See **"Align Antenna" on page 38** for more details.)
7. The *Antenna Alignment* window appears, displaying the *Signal Strengths* for both airFiber radios. The *Chain Signal Strength* bar graphs display the Signal Strengths for the local airFiber AF-5 you have accessed, while the *Remote Signal Strength* bar graphs display the *Signal Strengths* for the remote airFiber AF-5.

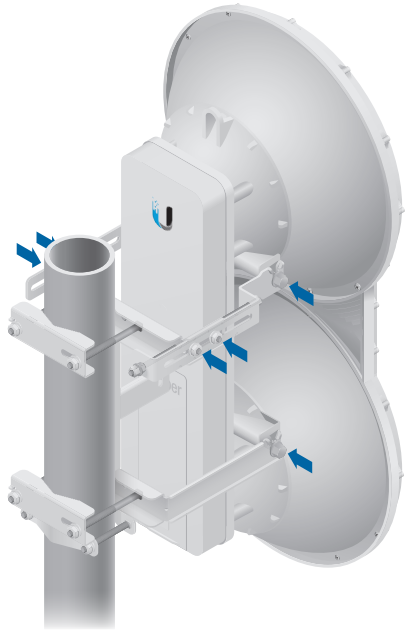


Establishing a Link

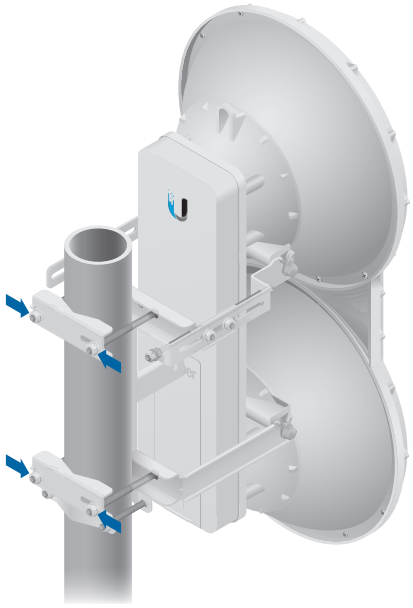
Adjust the positions of the *Master* and the *Slave* to establish a link.

Note: The *Master* must be aimed first at the *Slave* because the *Slave* does not transmit any RF signal until it detects transmissions from the *Master*.

1. Ensure that the following bolts and nuts are loose:
   - Four *Pre-Installed M10x25 Flanged Bolts* on the airFiber radio (two on each side)
   - Four *M10 Hex Nuts* used to lock the elevation alignment on the *Upper Mount Bracket* (two on each side)



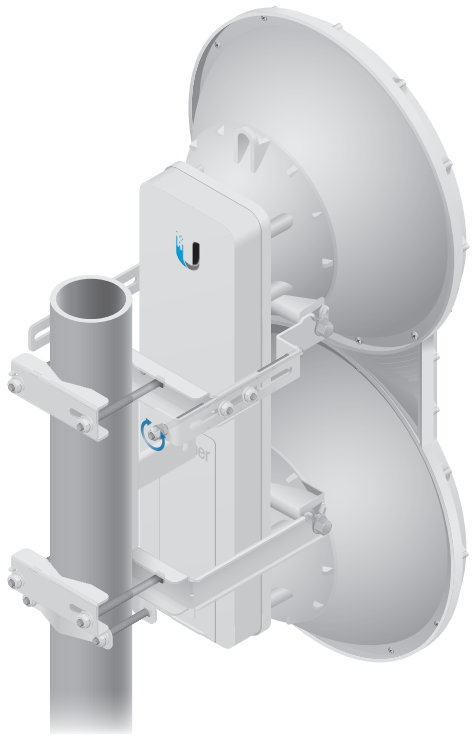
2. Ensure that the pole mount is snug yet the four *M10 Hex Nuts* attaching the *Pole Clamps* are loose enough to allow rotation around the pole for azimuth alignment.



3. Master Visually aim the *Master* at the *Slave*. To adjust the *Master*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.



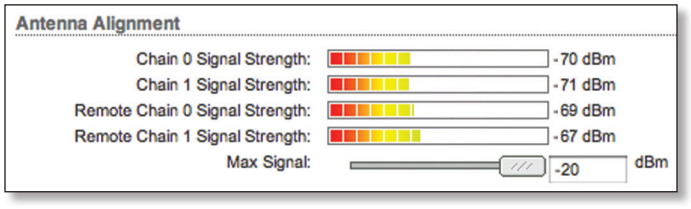
Note: Do NOT make simultaneous adjustments on the *Master* and *Slave*.

4. Slave Visually aim the *Slave* at the *Master*. To adjust the *Slave*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.

5. Check to see if a link is established. Ensure that the local and *Remote Signal Strength* bar graphs are displaying signal levels.



6. Slave Aim the *Slave* at the *Master* to achieve the strongest signal level on the *Remote Signal Strength* bar graph of the *Slave*.

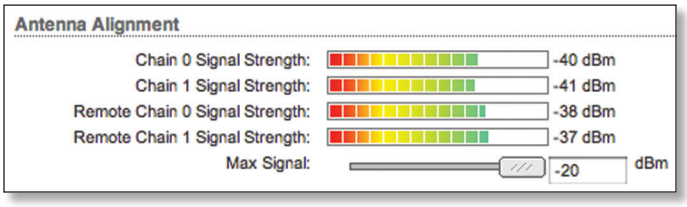
Note: The *Signal Strength* bar graphs display the absolute power level (in dBm) of the received signal for each chain. Smaller numerical values indicate stronger received signal levels. For example, a reading of -49 dBm is stronger than a reading of -55 dBm.

Note: Maximum signal strength can best be achieved by iteratively sweeping through both azimuth and elevation.

7. Master Aim the *Master* at the Slave to achieve the strongest signal level on the local *Signal Strength* bar graph of the *Master*.

Note: If the Overload LED lights up, identify and eliminate any source of strong in-band interference.

8. Repeat steps 6 and 7 until you achieve a symmetric link, with the signal levels within 1 dB of each other. This ensures the best possible data rate between the airFiber radios.



9. Lock the alignment on both airFiber radios by tightening the nuts and bolts.

10. Observe the *Antenna Alignment* window to ensure that the values remains constant while tightening the nuts and bolts. If the values change during the locking process, loosen the nuts and bolts, finalize the alignment of each airFiber radio again, and retighten the nuts and bolts.

11. For each airFiber radio, close the port cover and ensure that the Ethernet cable stays in the cable feed slot.

Using the Audio Tone

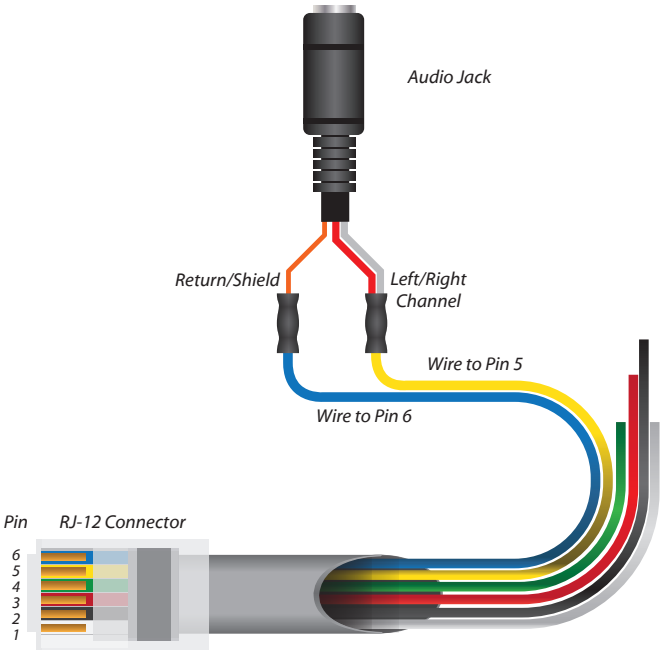
Before You Begin

Create your own cable adapter to connect the *Aux* port to your headphones or other listening device. The cable adapter requires two items:

- An RJ-12 cable with an RJ-12 connector
- A cable with a 3.5 mm, female, stereo phono jack (mono jack is acceptable)

1. Attach the wire from pin 6 of the RJ-12 cable to the return or shield wire of the 3.5 mm jack.
2. Attach the wire from pin 5 of the RJ-12 cable to both the left and right channel wires of the 3.5 mm stereo phono jack.

Note: For a mono jack, connect the wire from pin 5 to the + wire of the mono jack.



Pinouts from RJ-12 to 3.5 mm Stereo Phono Jack

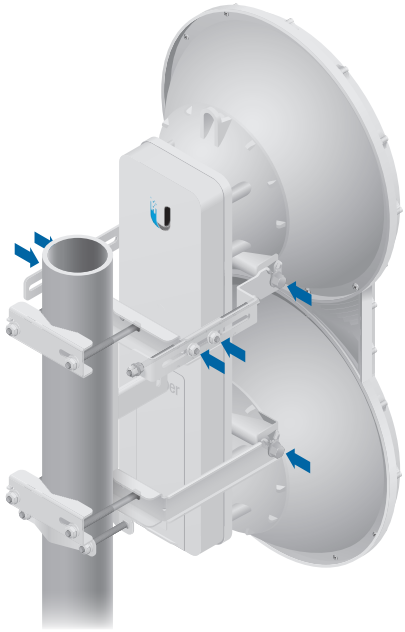
Note: Wire colors may vary on RJ-12 cables.

Establishing a Link

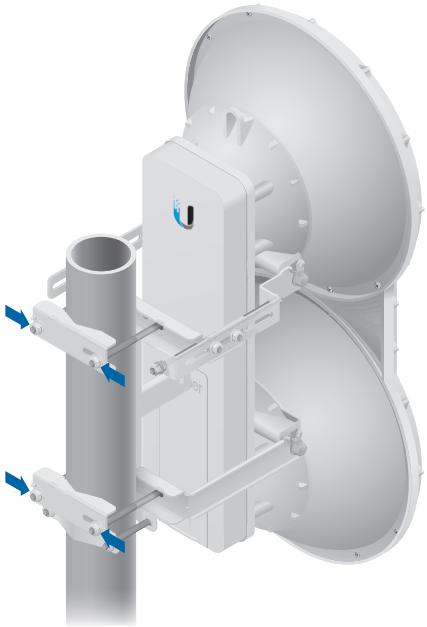
Adjust the positions of the *Master* and the *Slave* to establish a link.

Note: The *Master* must be aimed first at the *Slave* because the *Slave* does not transmit any RF signal until it detects transmissions from the *Master*.

1. Ensure that the following bolts and nuts are loose:
   - Four *Pre-Installed M10x25 Flanged Bolts* on the airFiber radio (two on each side)
   - Four *M10 Hex Nuts* used to lock the elevation alignment on the *Upper Mount Bracket* (two on each side)



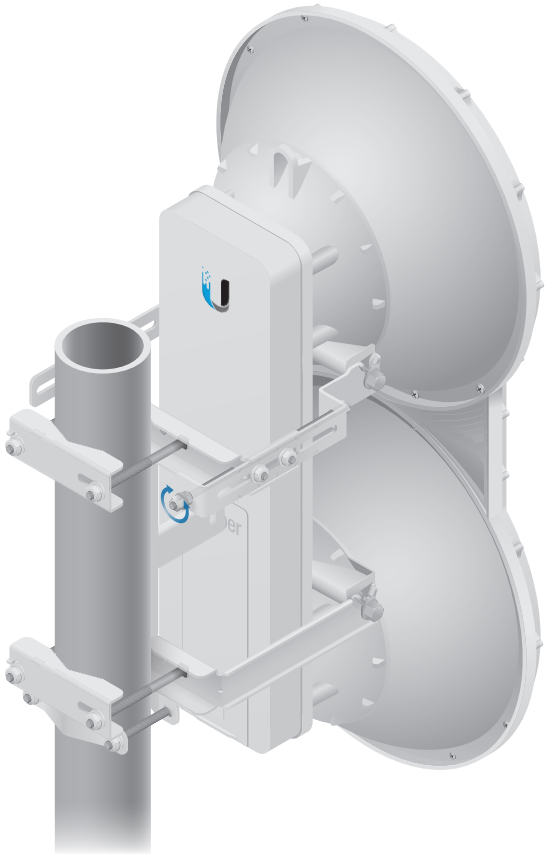
2. Ensure that the pole mount is snug yet the four *M10 Hex Nuts* attaching the *Pole Clamps* are loose enough to allow rotation around the pole for azimuth alignment.



3. Master Visually aim the *Master* at the *Slave*. To adjust the *Master*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.



Note: Do NOT make simultaneous adjustments on the *Master* and *Slave*.

4. Slave Visually aim the *Slave* at the *Master*. To adjust the *Slave*'s position:

a. Rotate the airFiber radio on the pole to align the azimuth.

b. Use the hex nut on the *Elevation Rod* to adjust the elevation.

5. Slave Listen to the audio tone of the *Slave* – the higher the pitch, the stronger the signal strength. Aim the *Slave* at the *Master* to achieve the strongest signal level on the *Slave*.

Note: Maximum signal strength can best be achieved by iteratively sweeping through both azimuth and elevation.

6. Master Aim the *Master* at the Slave to achieve the strongest signal level on the *Master*.

Note: If the Overload LED lights up, identify and eliminate any source of strong in-band interference.

7. Repeat steps 6 and 7 until you achieve a symmetric link, with the signal levels within 1 dB of each other. This ensures the best possible data rate between the airFiber radios.

Note: If you have difficulty discerning whether the link is symmetric, you can use one of the following methods to determine more precise, received signal level readings.

- LED Display (See **"Using the LED Displays" on page 12**.)
- airFiber Configuration Interface (See **"Using the airFiber Configuration Interface" on page 14**.)

8. Lock the alignment on both airFiber radios by tightening the nuts and bolts.

9. Listen to the audio tone for each airFiber radio to ensure that the values remains constant while tightening the nuts and bolts. If the audio tones change during the locking process, loosen the nuts and bolts, finalize the alignment of each airFiber radio again, and retighten the nuts and bolts.

10. For each airFiber radio, close the port cover and ensure that the Ethernet cable stays in the cable feed slot.

Chapter 3: Navigation

The airFiber Configuration Interface is an advanced operating system capable of powerful wireless and routing features, built upon a simple and intuitive user interface foundation.

The airFiber AF-5 uses the airFiber Configuration Interface for easy configuration and management via a web browser.

There are two ways to access the airFiber Configuration Interface:

- **Management Port** Enabled by default. Use a direct connection to the *Management* port for out-of-band management.
- **In-Band Management** Enabled by default. In-band management is available through the local *Data* port or the *Data* port at the other end of the link. You can disable it on the *Network* tab. (See **"Management Network Settings" on page 26** for more details.)

Accessing the airFiber Configuration Interface

Connect to the airFiber Configuration Interface.

1. Make sure that your host machine is connected to the LAN that is connected to the *Management* port on the airFiber AF-5.
2. Configure the Ethernet adapter on your host system with a static IP address on the 192.168.1.x subnet (for example, 192.168.1.100).
3. Launch your web browser. Type **http://192.168.1.20** in the address field and press **enter** (PC) or **return** (Mac).

4. Upon initial login, the *Terms of Use* appear on the login screen. Enter **ubnt** in the *Username* and *Password* fields, and select the appropriate choices from the *Country* and *Language* drop-down lists. Check the box next to *I agree to these terms of use*, and click **Login**.

Note: U.S. product versions are locked to the U.S. Country Code to ensure compliance with FCC regulations.

5. The airFiber Configuration Interface will appear, allowing you to customize your settings as needed.

Product Verification

The airFiber Configuration Interface will verify whether a product is genuine or counterfeit.

For a genuine airFiber AF-5, the airFiber Configuration Interface will display a Genuine Product logo in the lower left corner of the screen.

For any product that is not an official Ubiquiti product, the airFiber Configuration Interface will display a counterfeit warning. Please contact Ubiquiti at **support@ubnt.com** regarding this product.

Note: For product models introduced prior to 2012, the airFiber Configuration Interface will NOT display any logo in the lower left corner of the screen.

Interface Tabs

The airFiber Configuration Interface contains six main tabs, each of which provides a web-based management page to configure a specific aspect of the airFiber AF-5. This User Guide covers each tab with a chapter. For details on a specific tab, refer to the appropriate chapter.

- **Main** The **"Main Tab" on page 20** displays device status, statistics, and network monitoring links.
- **Wireless** The **"Wireless Tab" on page 23** configures basic wireless settings, including the wireless mode, link name, frequency, output power, speed, and wireless security.
- **Network** The **"Network Tab" on page 26** configures the management network settings, Internet Protocol (IP) settings, management VLAN, and automatic IP aliasing.
- **Advanced** The **"Advanced Tab" on page 28** provides more precise wireless interface controls, including advanced wireless settings and advanced Ethernet settings.
- **Services** The **"Services Tab" on page 31** configures system management services: Ping Watchdog, Simple Network Management Protocol (SNMP), servers (web, SSH, telnet), Network Time Protocol (NTP) client, Dynamic Domain Name System (DDNS) client, system log, and device discovery.
- **System** The **"System Tab" on page 35** controls system maintenance routines, administrator account management, location management, device customization, firmware update, and configuration backup. You can also change the language of the web management interface.

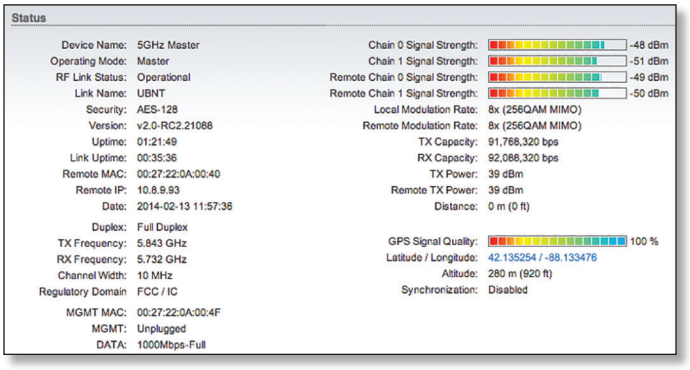
Each page also contains network administration and monitoring tools:

- **"Align Antenna" on page 38**
- **"Discovery" on page 39**
- **"Ping" on page 39**
- **"Traceroute" on page 39**

Chapter 4: Main Tab

The *Main* tab displays a summary of the link status information, current values of the basic configuration settings, network settings and information, and traffic statistics.

Status



Device Name Displays the customizable name or identifier of the device. The Device Name (also known as host name) is displayed in registration screens and discovery tools.

Operating Mode Displays the mode of the airFiber AF-5: *Slave*, *Master*, or *Reset*.

RF Link Status Displays the status of the airFiber AF-5: *RF Off*, *Syncing*, *Beaconing*, *Registering*, *Enabling*, *Listening*, *Operational*, *DFS CAC*, or *RADAR Detected*.

Note: Most of the RF Link Statuses map to specific flash rates of the *Link Status* LED (See **"LEDs" on page 2** for more details.)

Status	Flash Rate of LED
RF Off	Off
Syncing DFS countries only: • DFS CAC • RADAR Detected	Short Flash (1:3 on/off cycle)
Beaconing	Normal Flash (1:1 on/off cycle)
Registering	Long Flash (3:1 on/off cycle)
Operational	On

When the airFiber AF-5 operates in a DFS country, it performs a Channel Availability Check (CAC) before operating. The rules vary by country and frequency, but in general:

- **FCC domains** If the airFiber AF-5 operates in the DFS band (5.4 GHz band), then the following rule applies:
  - If the *TX* and *RX Frequencies* are the same, then the airFiber AF-5 performs a 60-second check on the *Master* only.
  - If the *TX* and *RX Frequencies* are different, then the airFiber AF-5 performs a 60-second check on both the *Master* and *Slave*.
- **ETSI domains** For most frequencies, the airFiber AF-5 performs a 60-second check on the *Master* and *Slave*; however, if it operates in the 5600-5650 MHz range, then the airFiber AF-5 performs a 10-minute check.

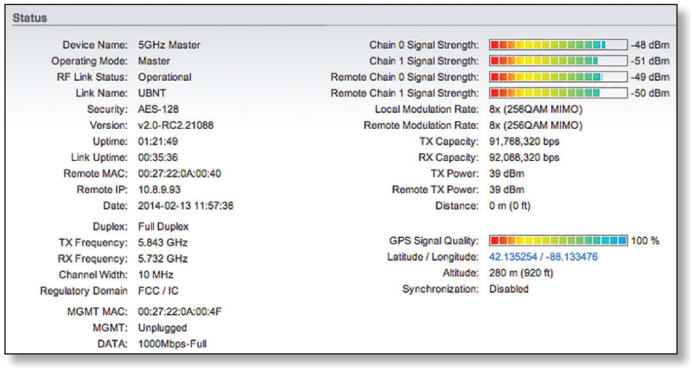
While the airFiber AF-5 is performing this check, the *RF Link Status* displays *DFS CAC*, and the *RF Link Timeout* is displayed.

If radar is detected, the *RF Link Status* displays *RADAR Detected*, and the *RF Link Timeout* is displayed.

RF Link Timeout (Available only if the *RF Link Status* is *DFS CAC* or *RADAR Detected*.) During the *DFS CAC* or *RADAR Detected* state, the *RF Link Timeout* counts down the time remaining before the airFiber AF-5 can move to the next RF link state.

Link Name Displays the name of your link.

Security AES-128 is enabled at all times.



Version Displays the airFiber Configuration Interface software version.

Uptime This is the total time the device has been running since the latest reboot (when the device was powered up) or software upgrade. The time is displayed in days, hours, minutes, and seconds.

Link Uptime This is the total time the airFiber link has been continuously operational. The time is displayed in days, hours, minutes, and seconds.

Remote MAC Displays the Management Ethernet MAC address of the remote airFiber AF-5.

Remote IP Displays the Management Ethernet IP address of the remote airFiber AF-5.

Date Displays the current system date and time. The date and time are displayed in YEAR-MONTH-DAY HOURS:MINUTES:SECONDS format. The system date and time is retrieved from the Internet using NTP (Network Time Protocol). The NTP Client is enabled by default on the *Services* tab. The airFiber AF-5 doesn't have an internal clock, and the date and time may be inaccurate if the NTP Client is disabled or the device isn't connected to the Internet.

Duplex Displays *Full Duplex* or *Half Duplex*. Full-duplex mode allows communication in both directions simultaneously. Half-duplex mode allows communication in one direction at a time, alternating between transmission and reception.

TX Frequency Displays the current transmit frequency. The airFiber AF-5 uses the radio frequency specified to transmit data.

RX Frequency Displays the current receive frequency. The airFiber AF-5 uses the radio frequency specified to receive data.

Channel Width Size of the channel in MHz.

Regulatory Domain Displays the regulatory domain (*FCC/IC*, *ETSI*, or *Other*), as determined by country selection.

MGMT MAC Displays the MAC address of the *Management* port.

MGMT Displays the speed and duplex of the *Management* port.

DATA Displays the speed and duplex of the *Data* port.

Chain 0/1 Signal Strength Displays the absolute power level (in dBm) of the received signal for each chain.

The software calculates the proper signal strength based on the measured distance and power levels, and then it scales the *Signal Strength* bar graphs so that when the link is aimed correctly, the bar graphs are full-scale. If the bar graphs are not full-scale, then they indicate that your link is not optimally aimed.

Remote Chain 0/1 Signal Strength Displays the absolute power level (in dBm) of the received signal for each chain of the remote airFiber AF-5. The bar graphs will display as full-scale once the link is aimed correctly.

Local Modulation Rate Displays the modulation rate:

- 10x (1024QAM MIMO)
- 8x (256QAM MIMO)
- 6x (64QAM MIMO)
- 4x (16QAM MIMO)
- 2x (QPSK MIMO)
- 1x (½ Rate QPSK xRT)
- ¼x (¼ Rate QPSK xRT)

If *Automatic Rate Adaptation* is enabled on the *Wireless* tab, then *Local Modulation Rate* displays the current speed in use and depends on the *Maximum Modulation Rate* specified on the *Wireless* tab and current link conditions.

Remote Modulation Rate Displays the modulation rate of the remote airFiber AF-5:

- 10x (1024QAM MIMO)
- 8x (256QAM MIMO)
- 6x (64QAM MIMO)
- 4x (16QAM MIMO)
- 2x (QPSK MIMO)
- 1x (½ Rate QPSK xRT)
- ¼x (¼ Rate QPSK xRT)

TX Capacity Displays the potential TX throughput, how much the airFiber AF-5 can send, after accounting for the modulation and error rates.

RX Capacity Displays the potential RX throughput, how much the airFiber AF-5 can receive, after accounting for the modulation and error rates.

TX Power Displays the maximum average transmit output power (in dBm) of the airFiber AF-5.

Remote TX Power Displays the maximum average transmit output power (in dBm) of the remote airFiber AF-5.

Distance Displays the distance between the airFiber radios.

GPS Signal Quality Displays Global Positioning System (GPS) signal quality as a percentage value on a scale of 0-100%.

Latitude/Longitude Based on GPS tracking, reports the device's current latitude and longitude. Clicking the link opens the reported latitude and longitude in a browser using Google Maps™ (**http://maps.google.com**).

Altitude Based on GPS tracking, reports the device's current altitude relative to sea level.

Synchronization airFiber uses GPS to synchronize the timing of its transmissions. By default, this option is disabled.

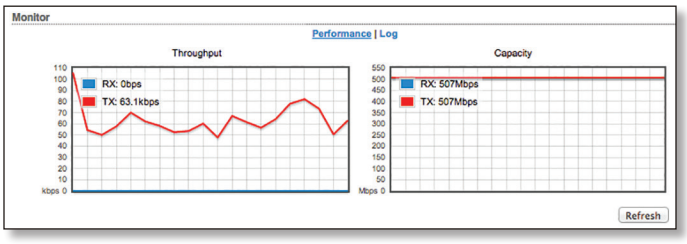
Monitor

There are two monitoring tools accessible via the links on the *Main* tab. The default is *Performance*, which is displayed when you first open the *Main* tab.

Performance

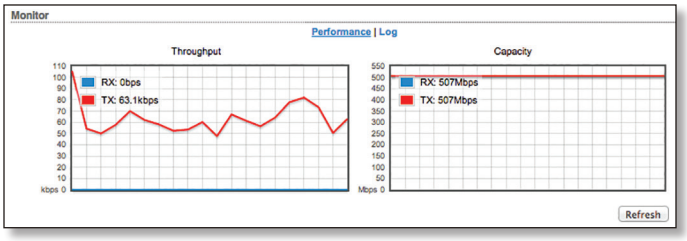
Throughput and *Capacity* charts display the current and potential data traffic.

Throughput



Throughput displays the current data traffic on the *Data* port in both graphical and numerical form. The chart scale and throughput dimension (Bps, Kbps, Mbps) change dynamically depending on the mean throughput value. The statistics are updated automatically.

Capacity

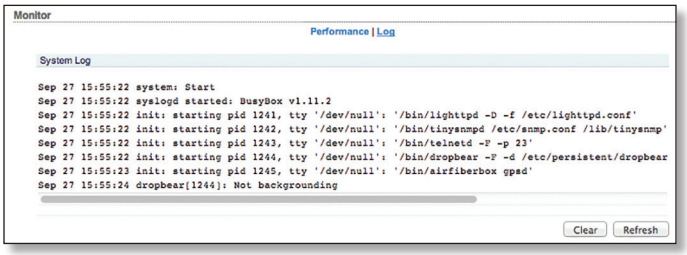


Capacity displays the potential data traffic on the *Data* port in both graphical and numerical form. The chart scale and throughput dimension (Bps, Kbps, Mbps) change dynamically depending on the mean throughput value. The statistics are updated automatically.

Refresh If there is a delay in the automatic update, click **Refresh** to manually update the statistics.

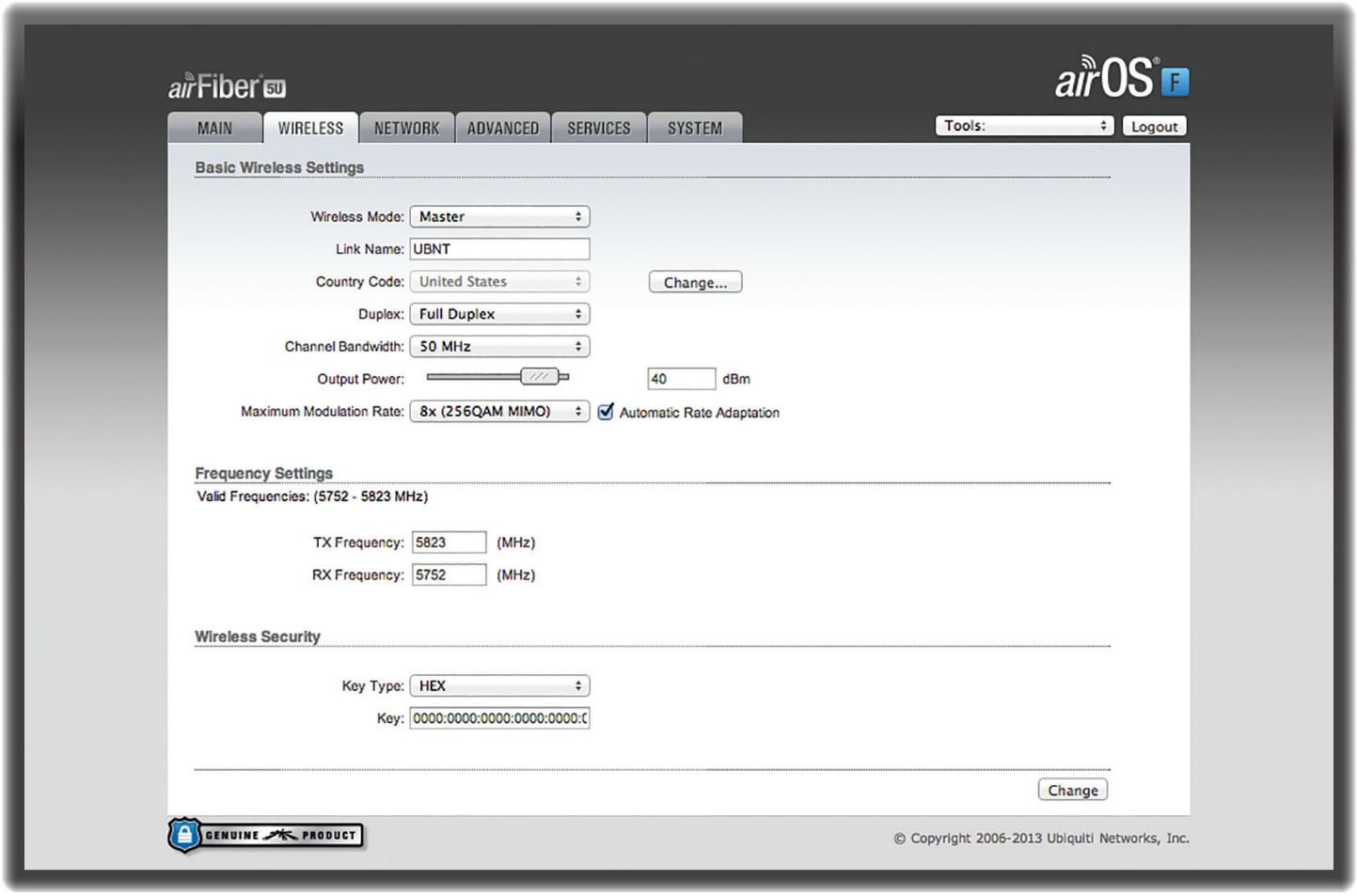
Log

When logging is enabled (see **"System Log" on page 34** to enable logging), this option lists all registered system events. By default, logging is not enabled.



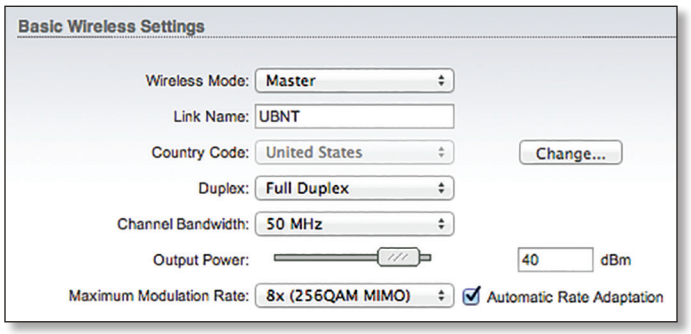
Clear To delete all entries in the system log, click **Clear**.

Refresh To update the log content, click **Refresh**.



Chapter 5: Wireless Tab

The *Wireless* tab contains options to set up the wireless part of the link. This includes wireless mode, link name, frequencies, output power, speed, and wireless security.



Change To save or test your changes, click **Change**.

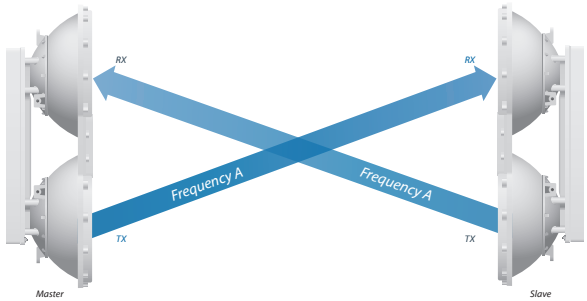
A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click *Apply* within 180 seconds (the countdown is displayed), the airFiber AF-5 times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Write down the settings you configure on the *Wireless* tab. You will need to enter the same settings on the airFiber AF-5 at the other end of your PtP link. The exceptions are as follows:

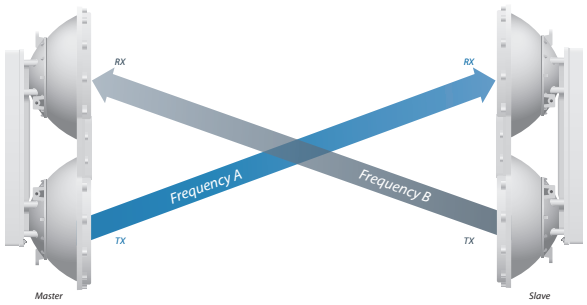
- **Wireless Mode** Configure one airFiber AF-5 as the *Master* and the other as the *Slave*.
- **TX and RX Frequencies** The *TX Frequency* on the Master should be used as the *RX Frequency* on the Slave, and vice versa.

For *Half Duplex* mode (default), the *TX* and *RX Frequencies* can be the same or different to suit local interference.



Half-Duplex Diagram

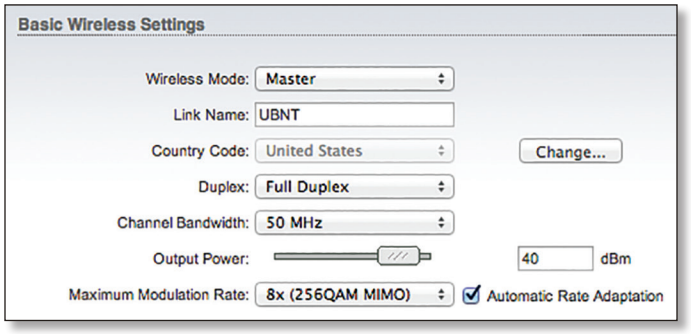
For *Full Duplex* mode, the *TX* and *RX Frequencies* should be different.



Full-Duplex Diagram

Basic Wireless Settings

In this section, configure the basic wireless settings, such as wireless mode, link name, country code, frequencies, output power, speed, and gain.



Wireless Mode By default, the Wireless Mode is *Slave*. You must configure one airFiber AF-5 to **Master** because each PtP link must have one *Master*.

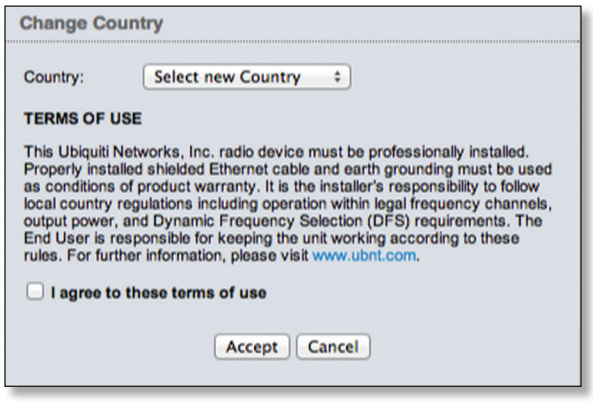
Link Name Enter a name for your PtP link.

Country Code Each country has its own power level and frequency regulations. *To ensure the airFiber AF-5 operates under the necessary regulatory compliance rules, you must select the country where your device will be used*. The frequency settings and output power limits will be tuned according to the regulations of the selected country. For details, refer to this table, **"Frequency Ranges and Power Levels per Country/Region" on page 46**.

This radio is restricted to use with a license and to use only in certain EU countries or geographical areas of EU countries.

- **Change** To select a new country, click **Change**.

  Note: U.S. product versions are locked to the U.S. Country Code to ensure compliance with FCC regulations.



  - **Country** Select the new country.
  - **I agree to these terms of use** Check this box; you must agree to the *Terms of Use* to use the product.
  - **Accept** Saves your change.
  - **Cancel** Discards your change.

Duplex Select **Half Duplex** or **Full Duplex**. Half-duplex operation provides more frequency planning options at the cost of higher latency and throughput. (Half-duplex mode allows communication in one direction at a time, alternating between transmission and reception.) Full-duplex operation provides the highest throughput and lowest latency; however, you have fewer frequency management options. (Full-duplex mode allows communication in both directions simultaneously.)

Note: For *Half Duplex* mode (default), the *TX* and *RX Frequencies* on the same airFiber AF-5 can be the same or different to suit local interference. For *Full Duplex* mode, the *TX* and *RX Frequencies* on the same airFiber AF-5 should be different.

Channel Bandwidth Select the appropriate channel size: **10**, **20**, **30**, **40**, or **50 MHz**.

Output Power Defines the maximum average transmit output power (in dBm) of the airFiber AF-5. To specify the output power, use the slider or manually enter the output power value. The transmit power level maximum is limited according to country regulations.

Maximum Modulation Rate or Modulation Rate Higher modulations support greater throughput but generally require stronger RF signals and a higher Signal-to-Noise Ratio (SNR). By default, *Automatic Rate Adaptation* is enabled, and *Maximum Modulation Rate* is displayed. This allows the airFiber AF-5 to automatically adjust the modulation rate to changing RF signal conditions. Under certain conditions, you may prefer to lock the *Maximum Modulation Rate* to a lower setting to improve link performance.

When *Automatic Rate Adaptation* is disabled, *Modulation Rate* is displayed. Lock the *Modulation Rate* to the setting of your choice.

Select one of the available modulation rates:

- **10x (1024QAM MIMO)**
- **8x (256QAM MIMO)**
- **6x (64QAM MIMO)**
- **4x (16QAM MIMO)**
- **2x (QPSK MIMO)**
- **1x (½ Rate QPSK xRT)**
- **¼x (¼ Rate QPSK xRT)**

Frequency Settings

The *Valid Frequencies* for your *Country Code* selection are displayed. Ensure that you use frequencies that comply with the local country regulations.

TX Frequency Enter a valid transmit frequency. The *Current State* is displayed.

Note: The *TX Frequency* on the Master should be used as the *RX Frequency* on the Slave, and vice versa.

RX Frequency Enter a valid receive frequency.

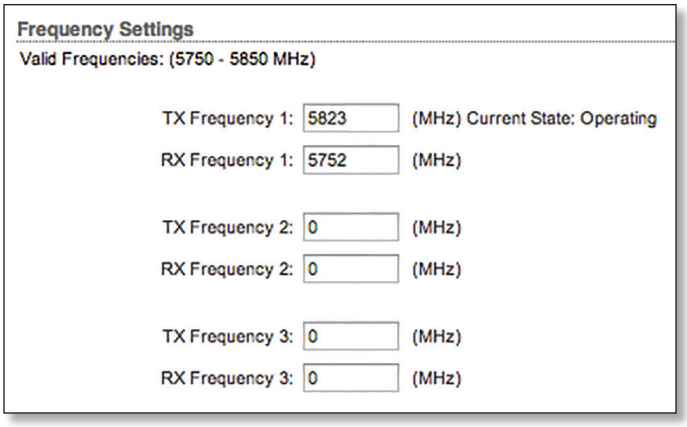
DFS Frequencies

If you have Dynamic Frequency Selection (DFS) frequencies, then you have three sets of *TX* and *RX Frequency* options. The airFiber radio will shut down on the current TX frequency if it detects certain radar pulses.

You can configure alternative TX frequencies as fallback options in case of a radar-induced shutdown. For example, if radar is detected on *TX Frequency 1*, then the airFiber radio will switch to *TX Frequency 2*.

The three *TX Frequencies* of the local airFiber radio should match the three *RX Frequencies* of the remote airFiber radio, and vice versa. This ensures that in the case of radar detection at the remote end, the local airFiber radio will scan all *RX Frequencies* until it finds the *TX Frequency* used by the remote airFiber radio.

Note: If you set *TX Frequency 2* or *3* to *0*, then they will not be used. If there is a DFS event, then the airFiber AF-5 will wait 30 minutes and then use *TX Frequency 1* again.



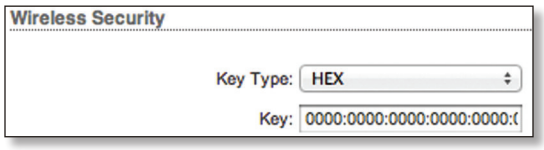
TX Frequency 1-3 Enter a valid transmit frequency. The *Current State* is displayed.

Note: The *TX Frequency* on the Master should be used as the *RX Frequency* on the Slave, and vice versa.

RX Frequency 1-3 Enter a valid receive frequency.

Wireless Security

airFiber uses 128-bit, AES (Advanced Encryption Standard) encryption at all times.



Key Type Specifies the character format.

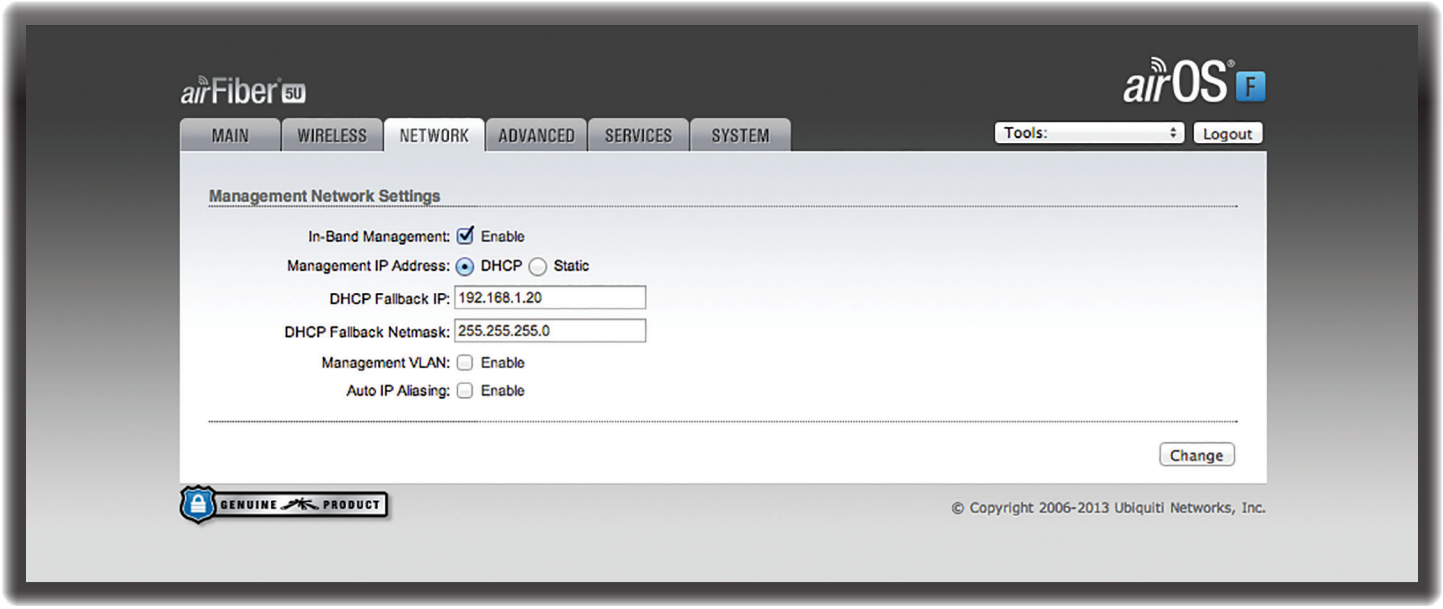
- **HEX** By default, this option uses hexadecimal characters. 0-9, A-F, or a-f are valid characters.
- **ASCII** ASCII uses the standard English alphabet and numeric characters (0-9, A-Z, or a-z).

Key Select the format of the MAC address.

- **HEX** Enter 16 bytes (eight, 16-bit HEX values). You can omit zeroes and use colons, similar to the IPv6 format. The default is: **0000:0000:0000:0000:0000:0000:0000:0000**.

  Note: The airFiber Configuration Interface supports IPv6 formats excluding dotted quad and "::" (double-colon) notation.

- **ASCII** Enter a combination of alphanumeric characters. Using 128-bit, SHA1 (Secure Hash Algorithm 1), the airFiber AF-5 hashes the ASCII key to create a 128-bit key for AES.



Chapter 6: Network Tab

The *Network* tab allows you to configure settings for the management network.

There are two ways to access the airFiber Configuration Interface:

- **Management Port** Enabled by default. Use a direct connection to the *Management* port for out-of-band management.
- **In-Band Management** Enabled by default. In-band management is available through the local *Data* port or the *Data* port at the other end of the link.

The *Management* port and in-band management share the default IP address of *192.168.1.20*.

Change To save or test your changes, click **Change**.

A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click *Apply* within 180 seconds (the countdown is displayed), the airFiber AF-5 times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Management Network Settings

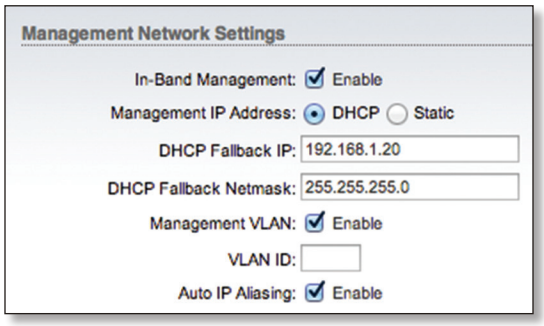
In-Band Management Enabled by default. In-band management is available through the local *Data* port or the *Data* port at the other end of the link.

Note: If *In-Band Management* is enabled, ensure that each airFiber radio of a link has a unique *IP Address*. If the airFiber radios use the same *IP Address*, then you may lose access via the *Data* ports.

Management IP Address The airFiber AF-5 can use a static IP address or obtain an IP address from its DHCP server.

- **DHCP** Keep the default, *DHCP*, to use DHCP reservation on your router to assign a unique *IP Address*. The local DHCP server assigns a reserved IP address, gateway IP address, and DNS address to the airFiber AF-5.

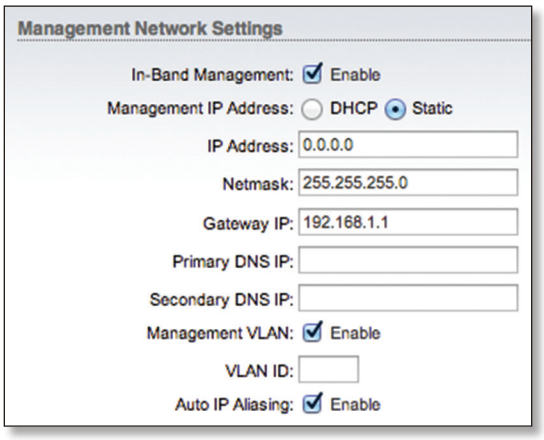
Note: If you select the *DHCP* option, ensure that you use DHCP reservation because if you do not know the IP address, then the only way to manage the airFiber AF-5 is to reset the airFiber AF-5 to its factory default settings. (Press and hold the **Reset** button for more than five seconds.) Its default *Management IP Address* is reset to *192.168.1.20*.



- **DHCP Fallback IP** Specify the IP address the airFiber AF-5 should use if a DHCP server is not found.
- **DHCP Fallback Netmask** Specify the netmask the airFiber AF-5 should use if a DHCP server is not found.

- **Static** Assign static IP settings to the airFiber AF-5.

Note: IP settings should be consistent with the address space of the airFiber AF-5's network segment.



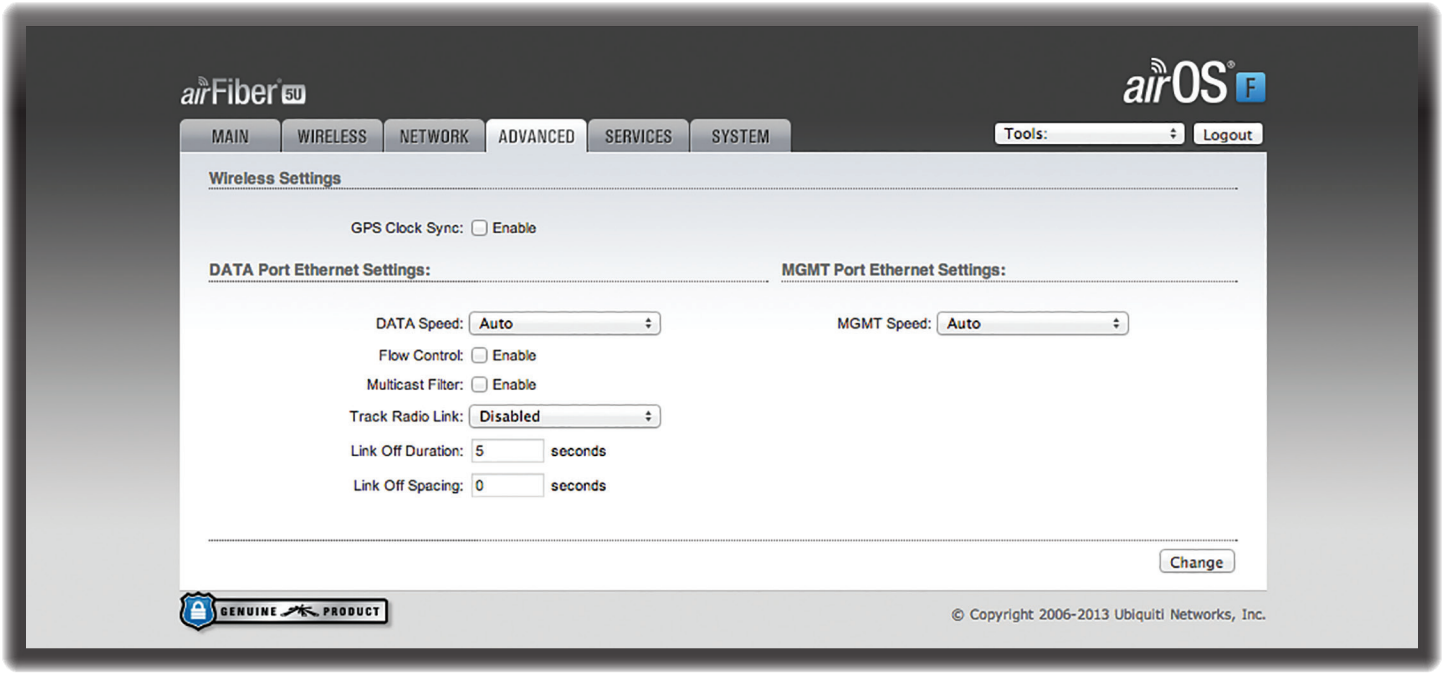
- **IP Address** Specify the IP address of the airFiber AF-5. This IP will be used for device management purposes.
- **Netmask** When the netmask is expanded into its binary form, it provides a mapping to define which portions of the IP address range are used for the network devices and which portions are used for host devices. The netmask defines the address space of the airFiber AF-5's network segment. The 255.255.255.0 (or "/24") netmask is commonly used on many Class C IP networks.
- **Gateway IP** Typically, this is the IP address of the host router, which provides the point of connection to the Internet. This can be a DSL modem, cable modem, or WISP gateway router. The airFiber AF-5 directs data packets to the gateway if the destination host is not within the local network.
- **Primary DNS IP** Specify the IP address of the primary DNS (Domain Name System) server.
- **Secondary DNS IP** Specify the IP address of the secondary DNS server. This entry is optional and used only if the primary DNS server is not responding.

Management VLAN If enabled, automatically creates a management Virtual Local Area Network (VLAN).

- **VLAN ID** Enter a unique VLAN ID from 2 to 4094.

Auto IP Aliasing If enabled, automatically generates an IP address for the corresponding WLAN/LAN interface. The generated IP address is a unique Class B IP address from the 169.254.X.Y range (netmask 255.255.0.0), which is intended for use within the same network segment only. The Auto IP always starts with 169.254.X.Y, with X and Y as the last two octets from the MAC address of the airFiber AF-5. For example, if the MAC address is 00:15:6D:A3:04:FB, then the generated unique Auto IP will be 169.254.4.251. (The hexadecimal value, *FB*, converts to the decimal value, *251*.)

The Auto IP Aliasing setting can be useful because you can still access and manage devices even if you lose, misconfigure, or forget their IP addresses. Because an Auto IP address is based on the last two octets of the MAC address, you can determine the IP address of a device if you know its MAC address.



Chapter 7: Advanced Tab

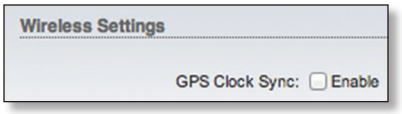
The *Advanced* tab handles advanced wireless and Ethernet settings. These settings should not be changed unless you know the effects the changes will have on the airFiber AF-5.

Change To save or test your changes, click **Change**.

A new message appears. You have three options:

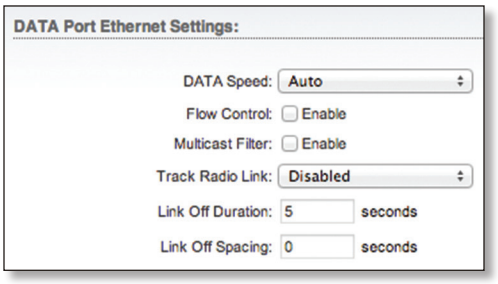
- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click *Apply* within 180 seconds (the countdown is displayed), the airFiber AF-5 times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Wireless Settings



GPS Clock Sync The airFiber uses GPS to synchronize the timing of its transmissions. By default, this option is disabled.

DATA Port Ethernet Settings



DATA Speed This is the speed of the *Data* port. By default, the option is **Auto.** The airFiber AF-5 automatically negotiates transmission parameters, such as speed and duplex, with its counterpart. In this process, the networked devices first share their capabilities and then choose the fastest transmission mode they both support.

To manually specify the maximum transmission link speed and duplex mode, select one of the following options: **100 Mbps-Full**, **100 Mbps-Half**, **10 Mbps-Full**, or **10 Mbps-Half.**

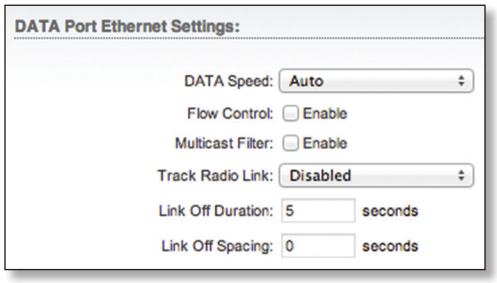
Full-duplex mode allows communication in both directions simultaneously. Half-duplex mode allows communication in one direction at a time, alternating between transmission and reception.

Flow Control If enabled, the airFiber AF-5 generates and responds to Ethernet layer PAUSE frames. The airFiber AF-5 regulates inbound traffic from the customer's network to avoid buffer overflows within the airFiber AF-5. Flow

control has the effect of controlling the inter-packet spacing of packets headed into the airFiber Data interface.

Multicast Filter If enabled, the filter blocks multicast traffic from overloading the CPU when in-band management is enabled. This allows the airFiber AF-5 to be managed in-band when the customer's network is carrying large volumes of multicast traffic, such as IPTV. The filter does not block multicast traffic going over the radio; it simply blocks it from reaching the airFiber's management interface CPU.

Track Radio Link If this option is enabled, the airFiber AF-5 disconnects the Data port's Ethernet link when the RF link is lost (The Management port is never disabled by this option). The *Track Radio Link* option is useful because it quickly indicates a "link lost" condition to the customer's routing equipment (such as a direct connection to OSPF-enabled routers).



- **Disabled** The *Track Radio Link* option is disabled by default. The Data port's Ethernet link will always remain up regardless of the RF link state.
- **Use Timeout Duration** This option is designed for use by operators who are using in-band management. Two timers control the Data port's Ethernet link.

RF Link	Ethernet Link	Notes
Goes down for the first time	The Ethernet link goes down and remains down for the number of seconds specified by the *Link Off Duration* timer. The Ethernet link will then come back up so that the airFiber AF-5 can be managed even when the RF link is down.	Even if the RF link goes back up before the *Link Off Duration* timer elapses, the Ethernet link remains down. The Ethernet link's downtime is long enough to signal to the customer's routing equipment that the path is lost.
Goes down for the second time	The Ethernet link remains up as long as time remains on the *Link Off Spacing* timer. When the *Link Off Spacing* timer elapses, then the Ethernet link goes down again for the number of seconds specified by the *Link Off Duration* timer. (This happens only if the RF link is still down.)	The Ethernet link's uptime is long enough so the operator has enough time to access the airFiber AF-5, make configuration changes, and save those changes. Sufficient Ethernet link uptime is vital when a RF link is constantly up and down.

When the *Use Timeout Duration* option is enabled, then the *Track Radio Link* option and the following timers are enabled:

- **Link Off Duration** The *Link Off Duration* timer controls the length of time the Data port's Ethernet link will be down if the RF link goes down. Enter the number of seconds that the Ethernet link should be offline. For example, if this is set to 10 seconds, then when the RF link goes down, the Ethernet link will go down and remain down for 10 seconds (regardless of the RF link state), and then it will go back up.
- **Link Off Spacing** The *Link Off Spacing* timer controls the length of time the airFiber AF-5 will wait before allowing the Data port's Ethernet link to go down for a second time if the RF link goes down again. Enter the minimum interval (in seconds) between offline events of the Ethernet link, regardless of the RF link status. The value for *Link Off Spacing* should be larger than the value for *Link Off Duration*, and it should be enough time for the operator to access the airFiber AF-5, make any configuration changes, and apply those changes.

Note: If the *Link Off Spacing* timer is set to 0 seconds, then the Ethernet link will only use the *Link Off Duration* timer. If the *Link Off Duration* timer is set to 10 seconds and the RF link goes down, then the Ethernet link will go down for 10 seconds and then go back up regardless of the RF link state. If the RF link is still down, then the Ethernet link will not go down again until the RF link goes back up and then down again.

Here are a couple of examples involving the use of the *Use Timeout Duration* option.

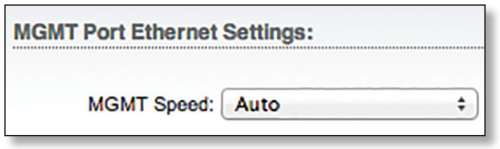
- Example #1
  - **Link Off Duration** *5* seconds
  - **Link Off Spacing** *60* seconds

  The Data port's Ethernet link will be initially disconnected when the RF link first goes down. That event will start a 60-second timer. The Ethernet link will remain offline for 5 seconds (regardless of the RF link status) and then come back online. The Ethernet link will remain online (regardless of the RF link state) until the 60-second timer expires.

- Example #2
  - **Link Off Duration** *20* seconds
  - **Link Off Spacing** *120* seconds

    The Data port's Ethernet link will be initially disconnected when the RF link first goes down. That event will start a 120-second timer. The RF link goes back up after 10 seconds; however, that does not affect the Ethernet link. The Ethernet link will remain offline for 20 seconds and then come back online. The RF link goes down again after 60 seconds; however, that does not affect the Ethernet link. The Ethernet link will then remain online until the 120-second timer expires.
- **Enabled** This option is designed for use by operators who are not using in-band management. The *Track Radio Link* option is enabled without timers, so the Data port's Ethernet link follows the RF link state exactly. If the RF link goes down, then the Ethernet link goes down and remains down until the RF link goes back up.

MGMT Port Ethernet Settings



MGMT Speed This is the speed of the *Management* port. By default, the option is **Auto.** The airFiber AF-5 automatically negotiates transmission parameters, such as speed and duplex, with its counterpart. In this process, the networked devices first share their capabilities and then choose the fastest transmission mode they both support.

To manually specify the maximum transmission link speed and duplex mode, select one of the following options: **100 Mbps-Full**, **100 Mbps-Half**, **10 Mbps-Full**, or **10 Mbps-Half.** If you are running extra long Ethernet cables, a link speed of *10* Mbps could help to achieve better stability.

Full-duplex mode allows communication in both directions simultaneously. Half-duplex mode allows communication in one direction at a time, alternating between transmission and reception.

Chapter 8: Services Tab

The *Services* tab configures system management services: *Ping Watchdog*, *SNMP Agent*, *Web Server*, *SSH Server*, *Telnet Server*, *NTP Client*, *Dynamic DNS*, *System Log*, and *Device Discovery*.

Change To save or test your changes, click **Change**.

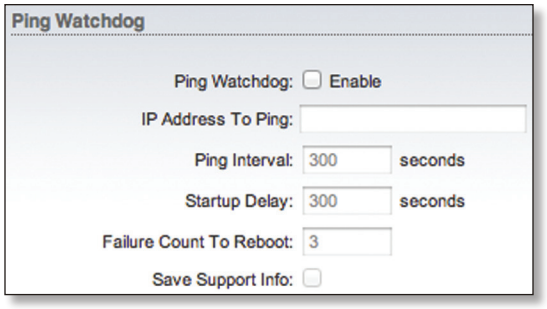
A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click *Apply* within 180 seconds (the countdown is displayed), the airFiber AF-5 times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Ping Watchdog

Ping Watchdog sets the airFiber AF-5 to continuously ping a user-defined IP address (it can be the Internet gateway, for example). If it is unable to ping under the user-defined constraints, then the airFiber AF-5 will automatically reboot. This option creates a kind of "fail-proof" mechanism.

Ping Watchdog is dedicated to continuous monitoring of the specific connection to the remote host using the *Ping* tool. The *Ping* tool works by sending ICMP echo request packets to the target host and listening for ICMP echo response replies. If the defined number of replies is not received, the tool reboots the airFiber AF-5.



Ping Watchdog Enables use of *Ping Watchdog*.

- **IP Address To Ping** Specify the IP address of the target host to be monitored by *Ping Watchdog*.
- **Ping Interval** Specify the time interval (in seconds) between the ICMP echo requests that are sent by *Ping Watchdog*. The default value is *300* seconds.
- **Startup Delay** Specify the initial time delay (in seconds) until the first ICMP echo requests are sent by *Ping Watchdog*. The default value is *300* seconds.

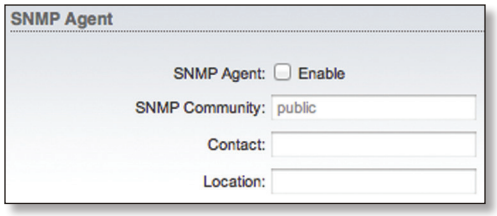
  The Startup Delay value should be at least 60 seconds as the network interface and wireless connection initialization takes a considerable amount of time if the airFiber AF-5 is rebooted.
- **Failure Count to Reboot** Specify the number of ICMP echo response replies. If the specified number of ICMP echo response packets is not received continuously, *Ping Watchdog* will reboot the airFiber AF-5. The default value is *3*.
- **Save Support Info** This generates a support information file.

SNMP Agent

Simple Network Monitor Protocol (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices. Network administrators use SNMP to monitor network-attached devices for issues that warrant attention.

The airFiber AF-5 contains an *SNMP Agent*, which does the following:

- Provides an interface for device monitoring using SNMP
- Communicates with SNMP management applications for network provisioning
- Allows network administrators to monitor network performance and troubleshoot network problems

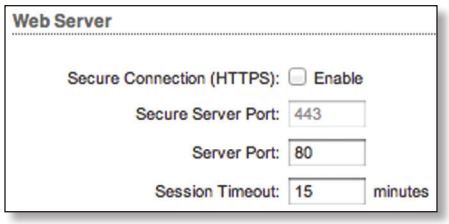


For the purpose of equipment identification, configure the *SNMP Agent* with contact and location information:

SNMP Agent Enables the *SNMP Agent*.

- **SNMP Community** Specify the SNMP community string. It is required to authenticate access to Management Information Base (MIB) objects and functions as an embedded password. The airFiber AF-5 also supports a read-only community string; authorized management stations have read access to all the objects in the MIB except the community strings, but do not have write access. The airFiber AF-5 supports SNMP v1. The default SNMP Community is *public*.
- **Contact** Specify the contact who should be notified in case of emergency.
- **Location** Specify the physical location of the airFiber AF-5.

Web Server



The following *Web Server* parameters can be set:

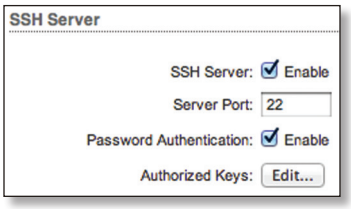
Secure Connection (HTTPS) If enabled, the *Web Server* uses secure HTTPS mode.

- **Secure Server Port** If secure HTTPS mode is used, specify the TCP/IP port of the *Web Server*.

Server Port If HTTP mode is used, specify the TCP/IP port of the *Web Server*.

Session Timeout Specifies the maximum timeout before the session expires. Once a session expires, you must log in again using the username and password.

SSH Server

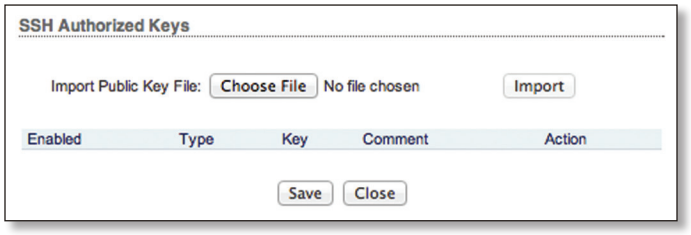


The following *SSH Server* parameters can be set:

SSH Server This option enables SSH access to the airFiber AF-5.

- **Server Port** Specify the TCP/IP port of the *SSH Server*.
- **Password Authentication** If enabled, you must authenticate using administrator credentials to grant SSH access to the airFiber AF-5; otherwise, an authorized key is required.

- **Authorized Keys** Click **Edit** to import a public key file for SSH access to the airFiber AF-5 instead of using an admin password.



  - **Choose File** Click **Choose File** to locate the new key file. Select the file and click **Open**.
  - **Import** Imports the file for SSH access.
  - **Enabled** Enables the specific key. All the added keys are saved in the system configuration file; however, only the enabled keys are active on the airFiber AF-5.
  - **Type** Displays the type of key.
  - **Key** Displays the key.
  - **Comment** You can enter a brief description of the key.
  - **Action** You have the following options:
    - **Add** Adds a public key file.
    - **Edit** Make changes to a public key file. Click **Save** to save your changes.
    - **Del** Deletes a public key file.
  - **Save** Saves your changes.
  - **Close** Discards your changes.

Telnet Server

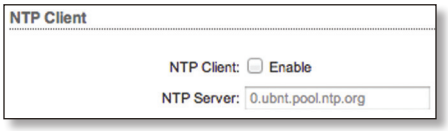
The following *Telnet Server* parameters can be set:

Telnet Server This option activates Telnet access to the airFiber AF-5.

- **Server Port** Specify the TCP/IP port of the *Telnet Server*.

NTP Client

Network Time Protocol (NTP) is a protocol for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. You can use it to set the system time on the airFiber AF-5. If the *Log* option is enabled, then the system time is reported next to every log entry that registers a system event.

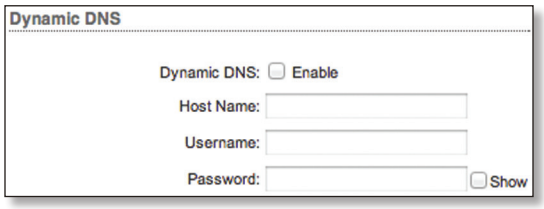


NTP Client Enables the airFiber AF-5 to obtain the system time from a time server on the Internet.

- **NTP Server** Specify the IP address or domain name of the NTP server.

Dynamic DNS

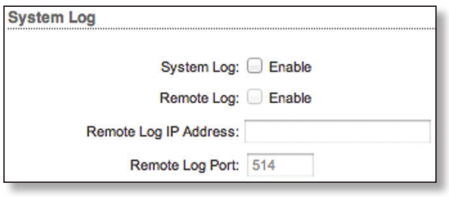
Domain Name System (DNS) translates domain names to IP addresses; Each DNS server on the Internet holds these mappings in its respective DNS database. Dynamic Domain Name System (DDNS) is a network service that notifies the DNS server in real time of any changes in the airFiber AF-5's IP settings. Even if the airFiber AF-5's IP address changes, you can still access the airFiber AF-5 through its domain name.



Dynamic DNS If enabled, the airFiber AF-5 allows communications with the DDNS server.

- **Host Name** Enter the host name of the DDNS server.
- **Username** Enter the user name of the DDNS account.
- **Password** Enter the password of the DDNS account.
- **Show** Check the box to display the password characters.

System Log

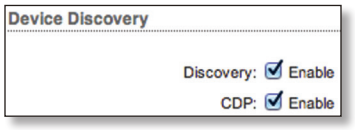


System Log This option enables the registration routine of system log (syslog) messages. By default it is disabled.

- **Remote Log** Enables the syslog remote sending function. System log messages are sent to a remote server, which is specified in the *Remote Log IP Address* and *Remote Log Port* fields.
  - **Remote Log IP Address** The host IP address that receives syslog messages. Properly configure the remote host to receive syslog protocol messages.
  - **Remote Log Port** The TCP/IP port that receives syslog messages. *514* is the default port for the commonly used system message logging utilities.

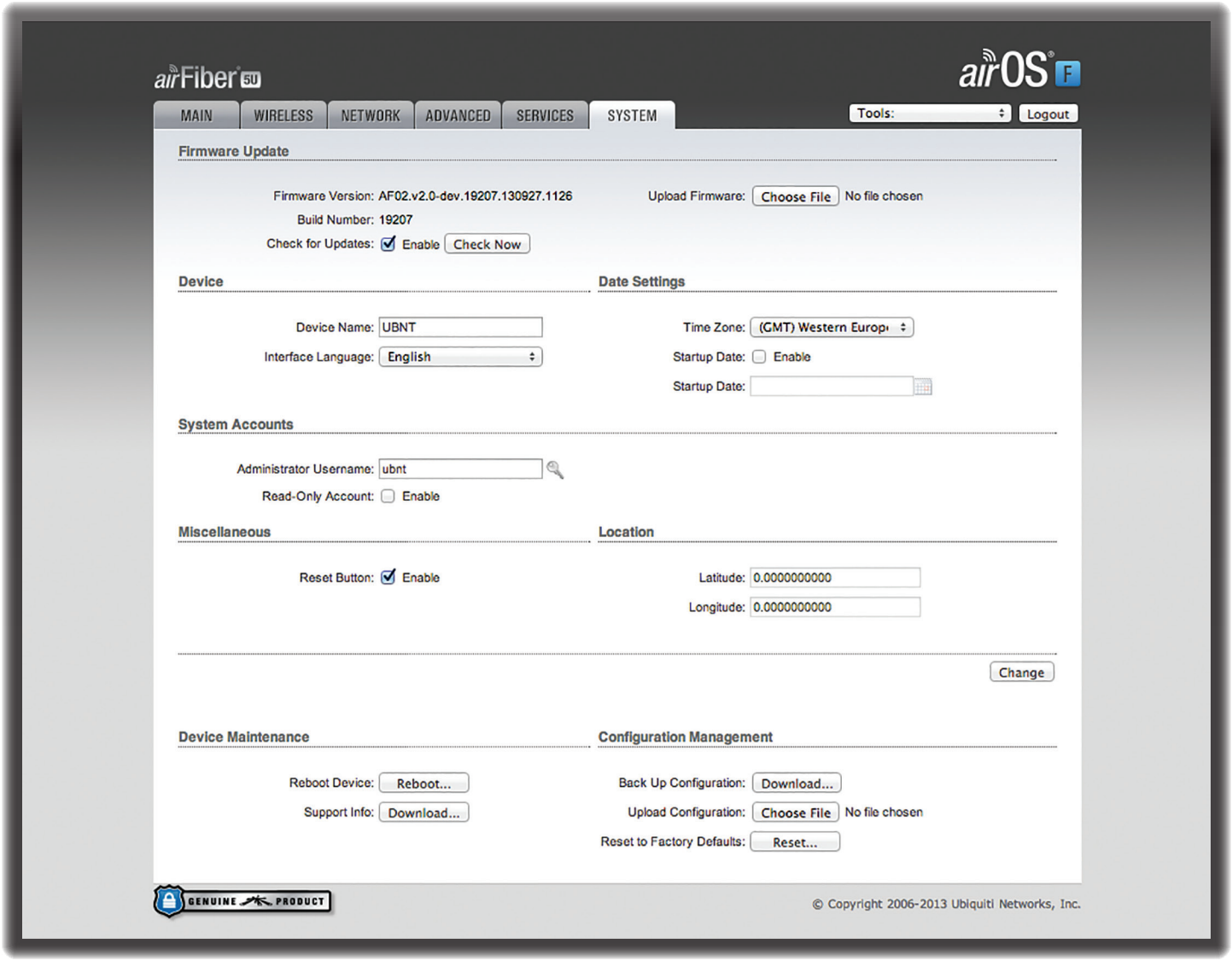
Every logged message contains at least a system time and host name. Usually a specific service name that generates the system event is also specified within the message. Messages from different services have different contexts and different levels of detail. Usually error, warning, or informational system service messages are reported; however, more detailed debug level messages can also be reported. The more detailed the system messages reported, the greater the volume of log messages generated.

Device Discovery



Discovery Enables device discovery, so the airFiber AF-5 can be discovered by other Ubiquiti devices through the *Discovery* tool.

CDP Enables Cisco Discovery Protocol (CDP) communications, so the airFiber AF-5 can send out CDP packets to share its information.



Chapter 9: System Tab

The *System* tab contains administrative options. This page enables the administrator to reboot the airFiber AF-5, reset it to factory defaults, upload new firmware, back up or update the configuration, and configure the administrator account.

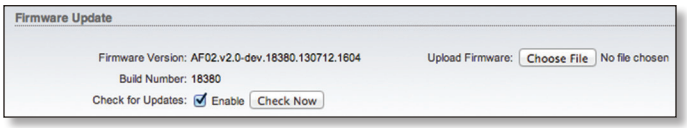
Change To save or test your changes, click **Change**.

A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click *Apply* within 180 seconds (the countdown is displayed), the airFiber AF-5 times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Firmware Update

The controls in this section manage firmware maintenance.



Firmware Version Displays the current firmware version.

Build Number Displays the build number of the firmware version.

Check for Updates By default, the firmware automatically checks for updates. To manually check for an update, click **Check Now**.

Upload Firmware Click this button to update the airFiber AF-5 with new firmware.

The airFiber AF-5 firmware update is compatible with all configuration settings. The system configuration is preserved while the airFiber AF-5 is updated with a new firmware version. However, we recommend that you back up your current system configuration before updating the firmware.

This is a three-step procedure:

1. Click **Choose File** to locate the new firmware file. Select the file and click **Open**.
2. Click **Upload** to upload the new firmware to the airFiber AF-5.
3. The Uploaded Firmware Version is displayed. Click **Update** to confirm.

If the firmware update is in process, you can close the firmware update window, but this does not cancel the firmware update. Please be patient, as the firmware update routine can take three to seven minutes. You cannot access the airFiber AF-5 until the firmware update routine is completed.

WARNING: Do not power off, do not reboot, and do not disconnect the airFiber AF-5 from the power supply during the firmware update process as these actions will damage the airFiber AF-5!

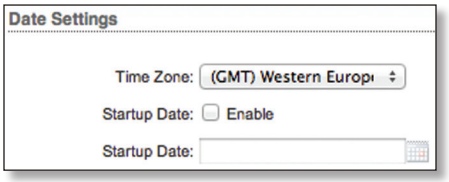
Device

The Device Name (host name) is the system-wide device identifier. The SNMP agent reports it to authorized management stations. The Device Name will be used in popular router operating systems, registration screens, and discovery tools.

Device Name Specifies the host name.

Interface Language Allows you to select the language displayed in the web management interface. *English* is the default language.

Date Settings



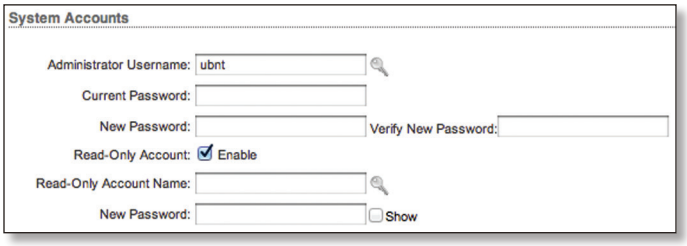
Time Zone Specifies the time zone in relation to Greenwich Mean Time (GMT).

Startup Date When enabled, you are able to change the airFiber AF-5's startup date.

- **Startup Date** Specifies the airFiber AF-5's startup date. Click the **Calendar** icon or manually enter the date in the following format: 2-digit month/2-digit day/4-digit year. For example, for January 5, 2014, enter **01/05/2014** in the field.

System Accounts

You can change the administrator password to protect your device from unauthorized changes. We recommend that you change the default administrator password when initially configuring the device.



Administrator Username Specifies the name of the administrator.

Key button Click this button to change the administrator password.

- **Current Password** Enter the current password for the administrator account. It is required to change the *Password* or *Administrator Username*.
- **New Password** Enter the new password for the administrator account.
- **Verify New Password** Re-enter the new password for the administrator account.

Note: The password length is 8 characters maximum; passwords exceeding 8 characters will be truncated.

Read-Only Account Check the box to enable the read-only account, which can only view the *Main* tab. Configure the username and password to protect your device from unauthorized changes.

- **Read-Only Account Name** Specifies the name of the system user.
- **Key button** Click this button to change the read-only password.
  - **New Password** Enter the new password for the read-only account.
  - **Show** Check the box to display the read-only password characters.

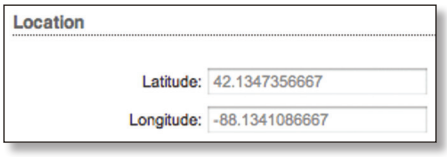
Miscellaneous

Reset Button To allow use of the airFiber AF-5's physical reset button, check the box. To prevent an accidental reset to default settings, uncheck the box.

Note: You can reset the airFiber AF-5 to default settings via the airFiber Configuration Interface. Go to the *System* tab > *Reset to Defaults*.

Location

After the on-board GPS determines the location of the airFiber AF-5, its latitude and longitude are displayed. If the GPS does not have a fix on its location, then "Searching for Satellites" will be displayed.

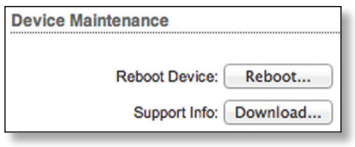


Latitude The latitude of the airFiber AF-5's location is displayed.

Longitude The longitude of the airFiber AF-5's location is displayed.

Device Maintenance

The controls in this section manage the airFiber AF-5 maintenance routines: reboot and support information reports.



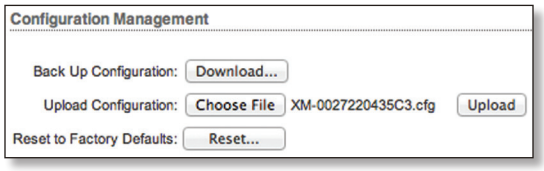
Reboot Device Initiates a full reboot cycle of the airFiber AF-5. Reboot is the same as the hardware reboot, which is similar to the power-off and power-on cycle. The system configuration stays the same after the reboot cycle completes. Any changes that have not been applied are lost.

Support Info This generates a support information file that the Ubiquiti support engineers can use when providing customer support. This file only needs to be generated at their request.

Configuration Management

The controls in this section manage the airFiber AF-5 configuration routines and the option to reset the airFiber AF-5 to factory default settings.

The airFiber AF-5 configuration is stored in a plain text file (.cfg file). You can back up, restore, or update the system configuration file:



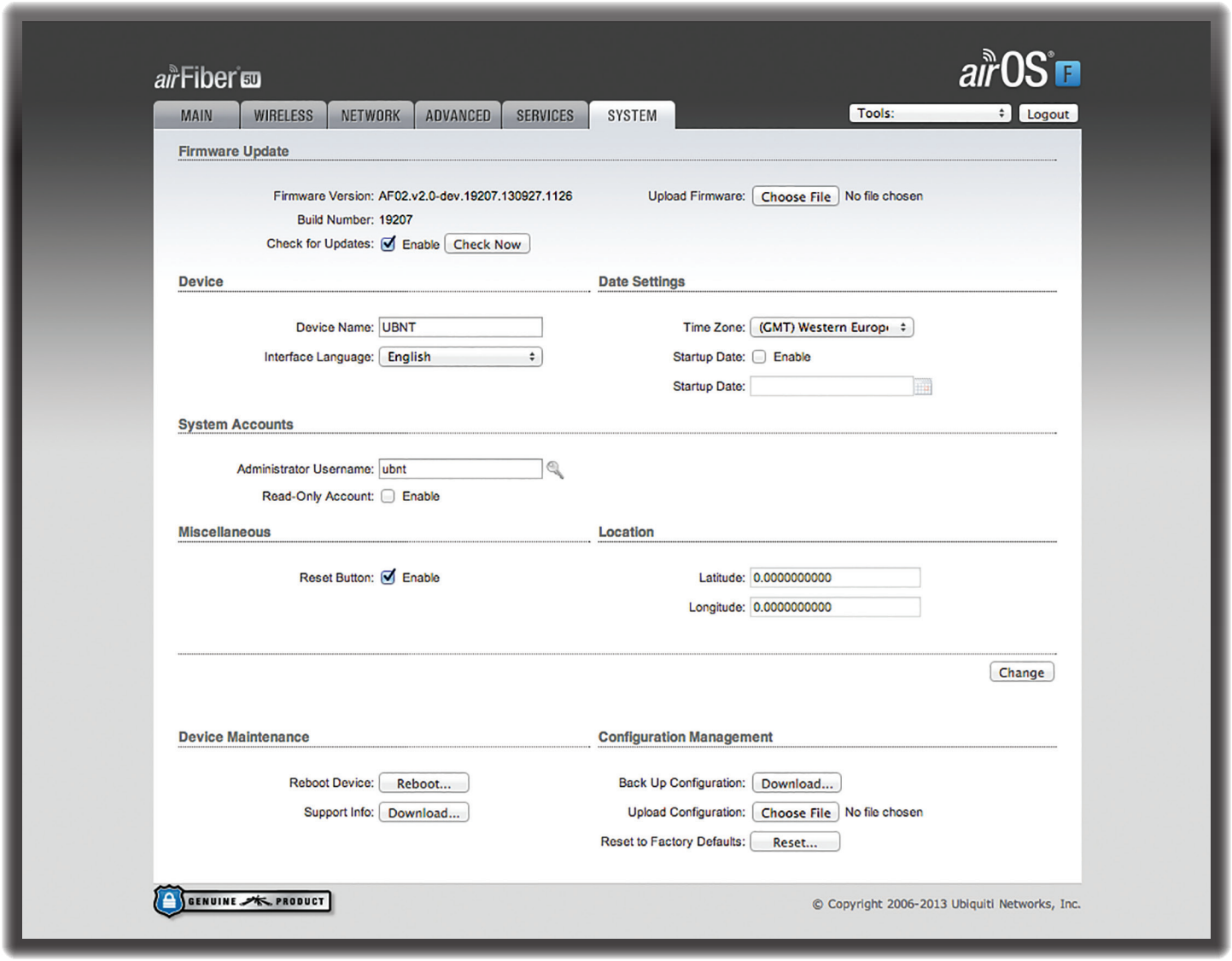
Back Up Configuration Click **Download** to download the current system configuration file.

Upload Configuration Click **Choose File** to locate the new configuration file. Select the file and click **Open**. We recommend that you back up your current system configuration before uploading the new configuration.

Upload Click this button to upload the new configuration file to the airFiber AF-5. Click **Apply** to confirm.

After the airFiber AF-5 reboots, the settings of the new configuration are displayed in the *Wireless*, *Network*, *Advanced*, *Services*, and *System* tabs of the airFiber Configuration Interface.

Reset to Factory Defaults Resets the airFiber AF-5 to the factory default settings. This option will reboot the airFiber AF-5, and all factory default settings will be restored. We recommend that you back up your current system configuration before resetting the airFiber AF-5 to its defaults.

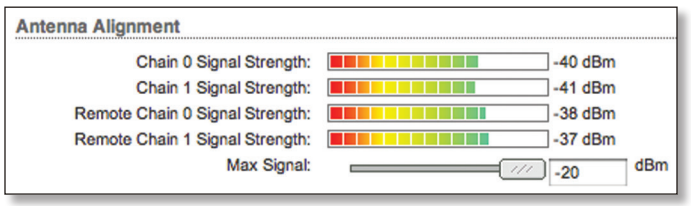


Chapter 10: Tools

Each tab of the airFiber Configuration Interface contains network administration and monitoring tools. Click the **Tools** drop-down list at the top right corner of the page.

Align Antenna

Use the *Align Antenna* tool to point and optimize the antenna in the direction of maximum link signal. (See **"Using the airFiber Configuration Interface" on page 14** for more details.) The *Antenna Alignment* window is designed to refresh every 250 milliseconds.



Chain 0/1 Signal Strength Displays the absolute power level (in dBm) of the received signal for each chain.

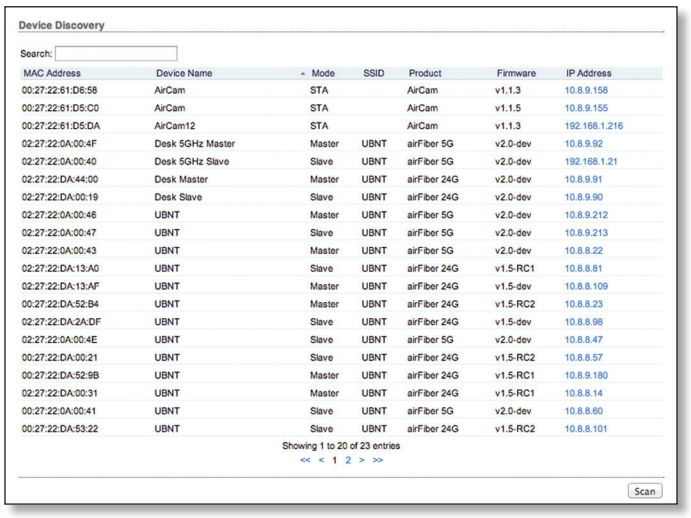
Note: If "Overload" is displayed to indicate an overload condition, identify and eliminate any source of strong in-band interference.

Remote Chain 0/1 Signal Strength Displays the absolute power level (in dBm) of the received signal for each chain of the remote airFiber radio.

Max Signal Displays the maximum signal strength (in dBm). To adjust the range of the *Max Signal* meter, use the slider or manually enter the new value. If you reduce the range, the color change will be more sensitive to signal fluctuations, indicating the offset of the maximum indicator value and the scale itself.

Discovery

The *Device Discovery* tool searches for all Ubiquiti devices on your network. The *Search* field automatically filters devices containing specified names or numbers as you enter them.

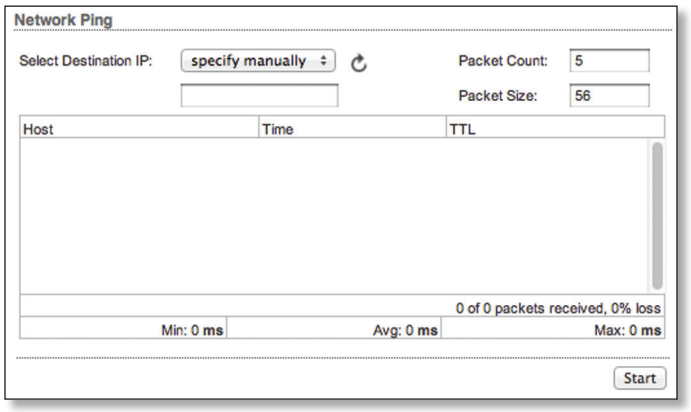


It reports the *MAC Address*, *Device Name*, *Mode*, *SSID*, *Product* type, *Firmware* version, and *IP Address* for each Ubiquiti device. To access a device configuration through its web management interface, click the device's IP address.

To refresh the window, click **Scan**.

Ping

You can ping other devices on the network directly from the airFiber AF-5. The *Ping* tool uses ICMP packets to check the preliminary link quality and packet latency estimation between two network devices.



Network Ping

Select Destination IP You have two options:

- Select a remote system IP from the drop-down list, which is generated automatically.
- Select **specify manually** and enter the IP address in the field displayed below.

Packet Count Enter the number of packets to send for the ping test.

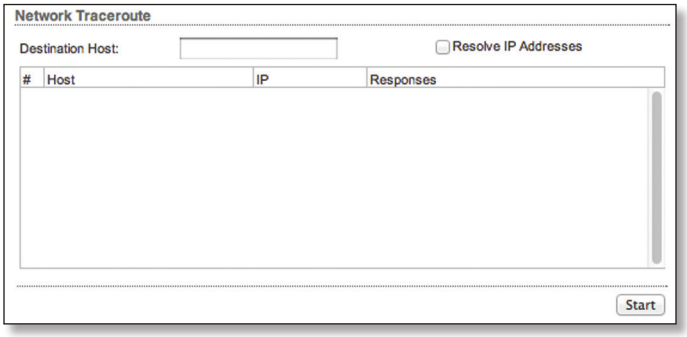
Packet Size Specify the size of the packet.

Start Click this button to start the test.

Packet loss statistics and latency time evaluation are displayed after the test is completed.

Traceroute

The *Traceroute* tool traces the hops from the airFiber AF-5 to a specified outgoing IP address. Use this tool to find the route taken by ICMP packets across the network to the destination host.



Destination Host Enter the IP address of the destination host.

Resolve IP Addresses Select this option to resolve the IP addresses symbolically rather than numerically.

Start Click this button to start the test.

Responses are displayed after the test is completed.

Appendix A: Specifications

airFiber AF-5/AF-5U	
Operating Frequency AF-5 FCC 15.247, 15.407, IC RSS 210 ETSI EN 301 893, EN 302 502 Other Regions AF-5U FCC 15.247, IC RSS 21 ETSI EN 302 502 Other Regions	 5470 - 5600 MHz, 5650 - 5850 MHz 5470 - 5875 MHz 5470 - 5950 MHz 5725 - 5850 MHz 5725 - 5875 MHz 5725 - 6200 MHz
Dimensions	938.4 x 468.4 x 281.4 mm (36.94 x 18.44 x 11.08 in)
Weight Mount Not Included Mount Included	 11.5 kg (25.35 lb) 16 kg (35.27 lb)
Max. Power Consumption	40 W
Power Supply	50V, 1.2A PoE GigE Adapter (Included)
Power Method	Passive Power over Ethernet (42-58VDC)
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)
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 (62.14+ mi) (Dependent on Regulatory Region)
Packets per Second	1+ Million
Encryption	128-Bit AES
Forward Error Correction	164/205
Cyclic Prefix	1/16 Fixed
Uplink/Downlink Ratio	50% Fixed
Radio Frame Synchronization	GPS
Dynamic Frequency Selection AF-5 AF-5U	 CE, FCC/IC CE, (FCC/IC Not Applicable)

airFiber AF-5/AF-5U Receive Sensitivity							
Spatial Streams	Modulation	Sensitivity (10 MHz)	Sensitivity (20 MHz)	Sensitivity (40 MHz)	Sensitivity (50 MHz)	FDD Capacity*	TDD Capacity*
10x	1024QAM	-64 dBm	-61 dBm	-59 dBm	-58 dBm	1280 Mbps	640 Mbps
8x	256QAM	-70 dBm	-67 dBm	-65 dBm	-64 dBm	1024 Mbps	512 Mbps
6x	64QAM	-77 dBm	-74 dBm	-72 dBm	-71 dBm	768 Mbps	384 Mbps
4x	16QAM MIMO	-84 dBm	-81 dBm	-79 dBm	-78 dBm	512 Mbps	256 Mbps
2x	QPSK MIMO	-90 dBm	-87 dBm	-85 dBm	-84 dBm	256 Mbps	128 Mbps
1x	½ Rate QPSK xRT**	-93 dBm	-90 dBm	-88 dBm	-87 dBm	128 Mbps	64 Mbps
¼x	¼ Rate QPSK xRT	-95 dBm	-93 dBm	-92 dBm	-91 dBm	32 Mbps	16 Mbps

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

** xtreme Range Technology

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

Appendix B: Safety Notices

1. Read, follow, and keep these instructions.
2. Heed all warnings.
3. Only use attachments/accessories specified by the manufacturer.

WARNING: Do not use this product in location that can be submerged by water.

WARNING: Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

Electrical Safety Information

1. Compliance is required with respect to voltage, frequency, and current requirements indicated on the manufacturer's label. Connection to a different power source than those specified may result in improper operation, damage to the equipment or pose a fire hazard if the limitations are not followed.
2. There are no operator serviceable parts inside this equipment. Service should be provided only by a qualified service technician.
3. This equipment is provided with a detachable power cord which has an integral safety ground wire intended for connection to a grounded safety outlet.
   a. Do not substitute the power cord with one that is not the provided approved type. Never use an adapter plug to connect to a 2-wire outlet as this will defeat the continuity of the grounding wire.
   b. The equipment requires the use of the ground wire as a part of the safety certification, modification or misuse can provide a shock hazard that can result in serious injury or death.
   c. Contact a qualified electrician or the manufacturer if there are questions about the installation prior to connecting the equipment.
   d. Protective earthing is provided by Listed AC adapter. Building installation shall provide appropriate short-circuit backup protection.
   e. Protective bonding must be installed in accordance with local national wiring rules and regulations.

Appendix C: Warranty

Limited Warranty

UBIQUITI NETWORKS, Inc ("UBIQUITI NETWORKS") warrants that the product(s) furnished hereunder (the "Product(s)") shall be free from defects in material and workmanship for a period of one (1) year from the date of shipment by UBIQUITI NETWORKS under normal use and operation. UBIQUITI NETWORKS' sole and exclusive obligation and liability under the foregoing warranty shall be for UBIQUITI NETWORKS, at its discretion, to repair or replace any Product that fails to conform to the above warranty during the above warranty period. The expense of removal and reinstallation of any Product is not included in this warranty. The warranty period of any repaired or replaced Product shall not extend beyond its original term.

Warranty Conditions

The above warranty does not apply if the Product:

(I) has been modified and/or altered, or an addition made thereto, except by Ubiquiti Networks, or Ubiquiti Networks' authorized representatives, or as approved by Ubiquiti Networks in writing;

(II) has been painted, rebranded or physically modified in any way;

(III) has been damaged due to errors or defects in cabling;

(IV) has been subjected to misuse, abuse, negligence, abnormal physical, electromagnetic or electrical stress, including lightning strikes, or accident;

(V) has been damaged or impaired as a result of using third party firmware; or

(VI) has no original Ubiquiti MAC label, or is missing any other original Ubiquiti label(s).

(VII) has not been received by Ubiquiti within 30 days of issuance of the RMA.

In addition, the above warranty shall apply only if: the product has been properly installed and used at all times in accordance, and in all material respects, with the applicable Product documentation; all Ethernet cabling runs use CAT5 (or above), and for outdoor installations, shielded Ethernet cabling is used, and for indoor installations, indoor cabling requirements are followed.

Returns

No Products will be accepted for replacement or repair without obtaining a Return Materials Authorization (RMA) number from UBIQUITI NETWORKS during the warranty period, and the Products being received at UBIQUITI NETWORKS' facility freight prepaid in accordance with the RMA process of UBIQUITI NETWORKS. Products returned without an RMA number will not be processed and will be returned freight collect or subject to disposal. Information on the RMA process and obtaining an RMA number can be found at: **www.ubnt.com/support/warranty**.

Disclaimer

EXCEPT FOR ANY EXPRESS WARRANTIES PROVIDED HEREIN, UBIQUITI NETWORKS, ITS AFFILIATES, AND ITS AND THEIR THIRD PARTY DATA, SERVICE, SOFTWARE AND HARDWARE PROVIDERS HEREBY DISCLAIM AND MAKE NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, REPRESENTATIONS, GUARANTEES, OR WARRANTIES OF MERCHANTABILITY, ACCURACY, QUALITY OF SERVICE OR RESULTS, AVAILABILITY, SATISFACTORY QUALITY, LACK OF VIRUSES, QUIET ENJOYMENT, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT AND ANY WARRANTIES ARISING FROM ANY COURSE OF DEALING, USAGE OR TRADE PRACTICE IN CONNECTION WITH SUCH PRODUCTS AND SERVICES. BUYER ACKNOWLEDGES THAT NEITHER UBIQUITI NETWORKS NOR ITS THIRD PARTY PROVIDERS CONTROL BUYER'S EQUIPMENT OR THE TRANSFER OF DATA OVER COMMUNICATIONS FACILITIES, INCLUDING THE INTERNET, AND THAT THE PRODUCTS AND SERVICES MAY BE SUBJECT TO LIMITATIONS, INTERRUPTIONS, DELAYS, CANCELLATIONS AND OTHER PROBLEMS INHERENT IN THE USE OF COMMUNICATIONS FACILITIES. UBIQUITI NETWORKS, ITS AFFILIATES AND ITS AND THEIR THIRD PARTY PROVIDERS ARE NOT RESPONSIBLE FOR ANY INTERRUPTIONS, DELAYS, CANCELLATIONS, DELIVERY FAILURES, DATA LOSS, CONTENT CORRUPTION, PACKET LOSS, OR OTHER DAMAGE RESULTING FROM ANY OF THE FOREGOING. In addition, UBIQUITI NETWORKS does not warrant that the operation of the Products will be error-free or that operation will be uninterrupted. In no event shall UBIQUITI NETWORKS be responsible for damages or claims of any nature or description relating to system performance, including coverage, buyer's selection of products (including the Products) for buyer's application and/or failure of products (including the Products) to meet government or regulatory requirements.

WARNING: Failure to properly ground your airFiber units will void your warranty. (Please follow the instructions on **"Grounding" on page 10** for installation of the ground wires.)

Limitation of Liability

EXCEPT TO THE EXTENT PROHIBITED BY LOCAL LAW, IN NO EVENT WILL UBIQUITI OR ITS SUBSIDIARIES, AFFILIATES OR SUPPLIERS BE LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES (INCLUDING LOST PROFIT, LOST DATA, OR DOWNTIME COSTS), ARISING OUT OF THE USE, INABILITY TO USE, OR THE RESULTS OF USE OF THE PRODUCT, WHETHER BASED IN WARRANTY, CONTRACT, TORT OR OTHER LEGAL THEORY, AND WHETHER OR NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Note

Some countries, states and provinces do not allow exclusions of implied warranties or conditions, so the above exclusion may not apply to you. You may have other rights that vary from country to country, state to state, or province to province. Some countries, states and provinces do not allow the exclusion or limitation of liability for incidental or consequential damages, so the above limitation may not apply to you. EXCEPT TO THE EXTENT ALLOWED BY LOCAL LAW, THESE WARRANTY TERMS DO NOT EXCLUDE, RESTRICT OR MODIFY, AND ARE IN ADDITION TO, THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE LICENSE OF ANY SOFTWARE (EMBEDDED IN THE PRODUCT) TO YOU. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to any transactions regarding the sale of the Products.

Appendix D: Compliance Information

Installer Compliance Responsibility

Devices must be professionally installed and it is the professional installer's responsibility to make sure the device is operated within local country regulatory requirements.

FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operations of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada

CAN ICES-3(B)/NMB-3(B)

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-3(B)/NMB-3(B)

Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisies de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie.

Cet appareil est conforme à la norme RSS Industrie Canada exempts de licence norme(s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne peut pas provoquer d'interférences et
2. Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

RF Exposure Warning

The antennas used for this transmitter must be installed to provide a separation distance of at least 126 cm (AF-5) or 123 cm (AF-5U) from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

Les antennes utilisées pour ce transmetteur doivent être installé en considérant une distance de séparation de toute personnes d'au moins 126 cm (AF-5) ou 123 cm (AF-5U) et ne doivent pas être localisé ou utilisé en conflit avec tout autre antenne ou transmetteur.

Australia and New Zealand

Warning: This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

Alert sign! follows CE marking

Alert sign must be indicated if a restriction on use applied to the product and it must follow the CE marking.

The product can be operated in the countries and regions listed in this table: **"Frequency Ranges and Power Levels per Country/Region" on page 46**, within the stated frequency ranges and output power (EIRP) limits.

Frequency Ranges and Power Levels per Country/Region

Each country has its own power level and frequency regulations. To ensure the product operates under the necessary regulatory compliance rules, the country where the device will be used must be selected during installation. The frequency settings and output power (EIRP) limits will be tuned according to the regulations of the selected country/region:

Country/Region	Model	5.4 GHz Frequency Range (Band Edges in MHz)	Max. EIRP (dBm)	5.8 GHz Frequency Range (Band Edges in MHz)	Max. EIRP for 5.7 GHz (dBm)
Argentina	AF5/AF5U	5470-5725	30	5725-5850	36
Australia	AF5/AF5U	5470-5600, 5650-5725	30	5725-5855	36
Bahrain	AF5U			5735-5835	20
Barbados	AF5U			5725-5850	36
Belize	AF5U			5735-5835	30
Bolivia	AF5U			5735-5835	30
Brazil	AF5/AF5U	5470-5725	30	5725-5850	30
Brunei Darussalam	AF5U			5735-5835	20
Canada	AF5/AF5U	5470-5600, 5650-5725	30	5725-5850	50
Chile	AF5U			5735-5835	20
China	AF5U			5735-5835	30
Colombia	AF5U			5735-5835	30
Costa Rica	AF5U			5735-5835	30
Denmark	AF5/AF5U	5470-5725	30	5725-5795, 5815-5850	36
Dominican Republic	AF5U			5735-5835	30
Ecuador	AF5U			5735-5835	30
El Salvador	AF5U			5735-5835	30
Finland	AF5/AF5U	5470-5725	30	5725-5795, 5815-5850	36
Germany	AF5/AF5U	5470-5725	30	5755-5875	36
Greece	AF5/AF5U	5470-5725	30	5725-5795	36
Grenada	AF5/AF5U	5470-5725	30	5725-5850	36
Guatemala	AF5U			5735-5835	30
Honduras	AF5/AF5U	5470-5725	30	5725-5850	36
Hong Kong	AF5/AF5U	5470-5725	30	5725-5850	36
Iceland	AF5/AF5U	5470-5725	30	5725-5875	36
India	AF5U			5825-5875	36
Iraq	AF5U			5735-5835	36
Ireland	AF5/AF5U	5470-5725	30	5725-5875	33
Jamaica	AF5/AF5U	5470-5725	30	5725-5850	36
Kenya	AF5U			5735-5835	30
Korea Republic	AF5/AF5U	5490-5710	30	5735-5815	30
Lebanon	AF5U			5735-5835	30
Liechtenstein	AF5/AF5U	5470-5725	30	5725-5795, 5815-5875	36
Macau	AF5U			5725-5850	36
Malaysia	AF5U			5735-5835	30
Mexico	AF5U			5735-5835	30
Morocco	AF5U			5735-5835	20
Nepal	AF5U			5735-5835	30

Country/Region	Model	5.4 GHz Frequency Range (Band Edges in MHz)	Max. EIRP (dBm)	5.8 GHz Frequency Range (Band Edges in MHz)	Max. EIRP for 5.7 GHz (dBm)
New Zealand	AF5/AF5U	5470-5725	30	5725-5850	36
Norway	AF5/AF5U	5470-5725	30	5725-5795, 5815-5850	50
Oman	AF5/AF5U	5470-5725	30	5725-5850	36
Pakistan	AF5U			5735-5835	30
Panama	AF5U			5735-5835	30
Papua New Guinea	AF5U			5735-5835	30
Peru	AF5/AF5U	5470-5725	30	5725-5850	36
Philippines	AF5/AF5U	5470-5725	30	5725-5850	36
Portugal	AF5/AF5U	5470-5725	30	5725-5875	36
Puerto Rico (U.S. territory)	AF5/AF5U	5470-5600, 5650-5725	30	5725-5850	50
Qatar	AF5U			5735-5835	30
Russia	AF5/AF5U	5470-5725	23	5725-5850	23
Singapore	AF5U			5735-5835	30
South Africa	AF5/AF5U	5470-5725	30	5725-5850	36
Spain	AF5/AF5U	5470-5725	30	5725-5795, 5815-5855	36
Switzerland	AF5/AF5U	5470-5725	30	5725-5795, 5815-5855	36
Taiwan	AF5/AF5U	5490-5710	30	5735-5815	30
Thailand	AF5/AF5U	5470-5725	30	5725-5850	36
Trinidad And Tobago	AF5/AF5U	5470-5725	30	5725-5850	36
United Kingdom	AF5/AF5U	5470-5725	30	5725-5790, 5815-5850	36
United States	AF5/AF5U	5470-5600, 5650-5725	30	5725-5850	50
Uruguay	AF5/AF5U	5470-5725	30	5725-5850	36
Uzbekistan	AF5/AF5U	5470-5725	30	5725-5850	36
Venezuela	AF5U			5735-5835	30

RoHS/WEEE Compliance Statement

English

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Deutsch

Die Europäische Richtlinie 2002/96/EC verlangt, dass technische Ausrüstung, die direkt am Gerät und/oder an der Verpackung mit diesem Symbol versehen ist , nicht zusammen mit unsortiertem Gemeindeabfall entsorgt werden darf. Das Symbol weist darauf hin, dass das Produkt von regulärem Haushaltmüll getrennt entsorgt werden sollte. Es liegt in Ihrer Verantwortung, dieses Gerät und andere elektrische und elektronische Geräte über die dafür zuständigen und von der Regierung oder örtlichen Behörden dazu bestimmten Sammelstellen zu entsorgen. Ordnungsgemäßes Entsorgen und Recyceln trägt dazu bei, potentielle negative Folgen für Umwelt und die menschliche Gesundheit zu vermeiden. Wenn Sie weitere Informationen zur Entsorgung Ihrer Altgeräte benötigen, wenden Sie sich bitte an die örtlichen Behörden oder städtischen Entsorgungsdienste oder an den Händler, bei dem Sie das Produkt erworben haben.

Español

La Directiva 2002/96/CE de la UE exige que los equipos que lleven este símbolo en el propio aparato y/o en su embalaje no deben eliminarse junto con otros residuos urbanos no seleccionados. El símbolo indica que el producto en cuestión debe separarse de los residuos domésticos convencionales con vistas a su eliminación. Es responsabilidad suya desechar este y cualesquiera otros aparatos eléctricos y electrónicos a través de los puntos de recogida que ponen a su disposición el gobierno y las autoridades locales. Al desechar y reciclar correctamente estos aparatos estará contribuyendo a evitar posibles consecuencias negativas para el medio ambiente y la salud de las personas. Si desea obtener información más detallada sobre la eliminación segura de su aparato usado, consulte a las autoridades locales, al servicio de recogida y eliminación de residuos de su zona o pregunte en la tienda donde adquirió el producto.

Français

La directive européenne 2002/96/CE exige que l'équipement sur lequel est apposé ce symbole sur le produit et/ou son emballage ne soit pas jeté avec les autres ordures ménagères. Ce symbole indique que le produit doit être éliminé dans un circuit distinct de celui pour les déchets des ménages. Il est de votre responsabilité de jeter ce matériel ainsi que tout autre matériel électrique ou électronique par les moyens de collecte indiqués par le gouvernement et les pouvoirs publics des collectivités territoriales. L'élimination et le recyclage en bonne et due forme ont pour but de lutter contre l'impact néfaste potentiel de ce type de produits sur l'environnement et la santé publique. Pour plus d'informations sur le mode d'élimination de votre ancien équipement, veuillez prendre contact avec les pouvoirs publics locaux, le service de traitement des déchets, ou l'endroit où vous avez acheté le produit.

Italiano

La direttiva europea 2002/96/EC richiede che le apparecchiature contrassegnate con questo simbolo sul prodotto e/o sull'imballaggio non siano smaltite insieme ai rifiuti urbani non differenziati. Il simbolo indica che questo prodotto non deve essere smaltito insieme ai normali rifiuti domestici. È responsabilità del proprietario smaltire sia questi prodotti sia le altre apparecchiature elettriche ed elettroniche mediante le specifiche strutture di raccolta indicate dal governo o dagli enti pubblici locali. Il corretto smaltimento ed il riciclaggio aiuteranno a prevenire conseguenze potenzialmente negative per l'ambiente e per la salute dell'essere umano. Per ricevere informazioni più dettagliate circa lo smaltimento delle vecchie apparecchiature in Vostro possesso, Vi invitiamo a contattare gli enti pubblici di competenza, il servizio di smaltimento rifiuti o il negozio nel quale avete acquistato il prodotto.

Appendix E: Declaration of Conformity

Česky [Czech]	UBIQUITI NETWORKS tímto prohla uje, e tento UBIQUITI NETWORKS device, je ve shod se základními po adavky a dal ími p íslu n mi ustanoveními sm rnice 1999/5/ES.
Dansk [Danish]	Undertegnede UBIQUITI NETWORKS erklærer herved, at følgende udstyr UBIQUITI NETWORKS device, overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Nederlands [Dutch]	Hierbij verklaart UBIQUITI NETWORKS dat het toestel UBIQUITI NETWORKS device, in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG. Bij deze verklaart UBIQUITI NETWORKS dat deze UBIQUITI NETWORKS device, voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.
English	Hereby, UBIQUITI NETWORKS, declares that this UBIQUITI NETWORKS device, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Eesti [Estonian]	Käesolevaga kinnitab UBIQUITI NETWORKS seadme UBIQUITI NETWORKS device, vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
Suomi [Finnish]	UBIQUITI NETWORKS vakuuttaa täten että UBIQUITI NETWORKS device, tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Français [French]	Par la présente UBIQUITI NETWORKS déclare que l'appareil UBIQUITI NETWORKS, device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE. Par la présente, UBIQUITI NETWORKS déclare que ce UBIQUITI NETWORKS device, est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables.
Deutsch [German]	Hiermit erklärt UBIQUITI NETWORKS, dass sich diese UBIQUITI NETWORKS device, in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet. (BMWi) Hiermit erklärt UBIQUITI NETWORKS die Übereinstimmung des Gerätes UBIQUITI NETWORKS device, mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien)
Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ UBIQUITI NETWORKS ΔΗΛΩΝΕΙ ΟΤΙ UBIQUITI NETWORKS device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1995/5/ΕΚ.
Magyar [Hungarian]	Alulírott, UBIQUITI NETWORKS nyilatkozom, hogy a UBIQUITI NETWORKS device, megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Íslenska [Icelandic]	Hér me l sir UBIQUITI NETWORKS yfir ví a UBIQUITI NETWORKS device, er í samræmi vi grunnkröfur og a rar kröfur, sem ger ar eru í tilskipun 1999/5/EC.
Italiano [Italian]	Con la presente UBIQUITI NETWORKS dichiara che questo UBIQUITI NETWORKS device, è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar o UBIQUITI NETWORKS deklar , ka UBIQUITI NETWORKS device, atbilst Direkt vas 1999/5/EK b tiskaj m pras b m un citiem ar to saist tajiem noteikumiem.
Lietuviškai [Lithuanian]	UBIQUITI NETWORKS deklaruoja, kad šis UBIQUITI NETWORKS įrenginys atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Malti [Maltese]	Hawnhekk, UBIQUITI NETWORKS, jiddikjara li dan UBIQUITI NETWORKS device, jikkonforma mal- ti ijiet essenzjali u ma provvedimenti o rajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Norsk [Norwegian]	UBIQUITI NETWORKS erklærer herved at utstyret UBIQUITI NETWORKS device, er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.
Slovensky [Slovak]	UBIQUITI NETWORKS t mto vyhlasuje, e UBIQUITI NETWORKS device, sp a základné po iadavky a v etky príslu né ustanovenia Smernice 1999/5/ES.
Svenska [Swedish]	Härmed intygar UBIQUITI NETWORKS att denna UBIQUITI NETWORKS device, står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Español [Spanish]	Por medio de la presente UBIQUITI NETWORKS declara que el UBIQUITI NETWORKS device, cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Polski [Polish]	Niniejszym, firma UBIQUITI NETWORKS o wiadcza, e produkt serii UBIQUITI NETWORKS device, spełnia zasadnicze wymagania i inne istotne postanowienia Dyrektywy 1999/5/EC.
Português [Portuguese]	UBIQUITI NETWORKS declara que este UBIQUITI NETWORKS device, está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Română [Romanian]	Prin prezenta, UBIQUITI NETWORKS declară că acest dispozitiv UBIQUITI NETWORKS este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 1999/5/CE.

Appendix F: Contact Information

Ubiquiti Networks Support

Ubiquiti Support Engineers are located around the world and are dedicated to helping customers resolve software, hardware compatibility, or field issues as quickly as possible. We strive to respond to support inquiries within a 24-hour period.

Online Resources

Support: **support.ubnt.com**

Community: **community.ubnt.com**

Downloads: **downloads.ubnt.com**

2580 Orchard Parkway
San Jose, CA 95131
www.ubnt.com

DATASHEET

airPRISM®

5 GHz, 3x30° HD Sector Antenna

Model: AP-5AC-90-HD

Powerful Performance for High-Density Areas

3 x 30° Beamwidth Coverage in a MultiPoint Network

Efficient Footprint for Reduced Tower Costs

UBIQUITI®
NETWORKS

Overview

Ubiquiti Networks introduces an innovative sector antenna for your Point-to-MultiPoint (PtMP) applications, the airPrism® 5 GHz 3x30° HD Sector Antenna.

The airPrism antenna features significant advances in noise isolation and beam performance to complement the Rocket®5ac Prism™ radios (not included) for co-location deployments.

Breakthrough Design

Three Rocket5ac Prism radios mounted on a single airPrism antenna maximizes throughput in an efficient tower footprint, minimizing installation and tower costs.

Powerful Performance

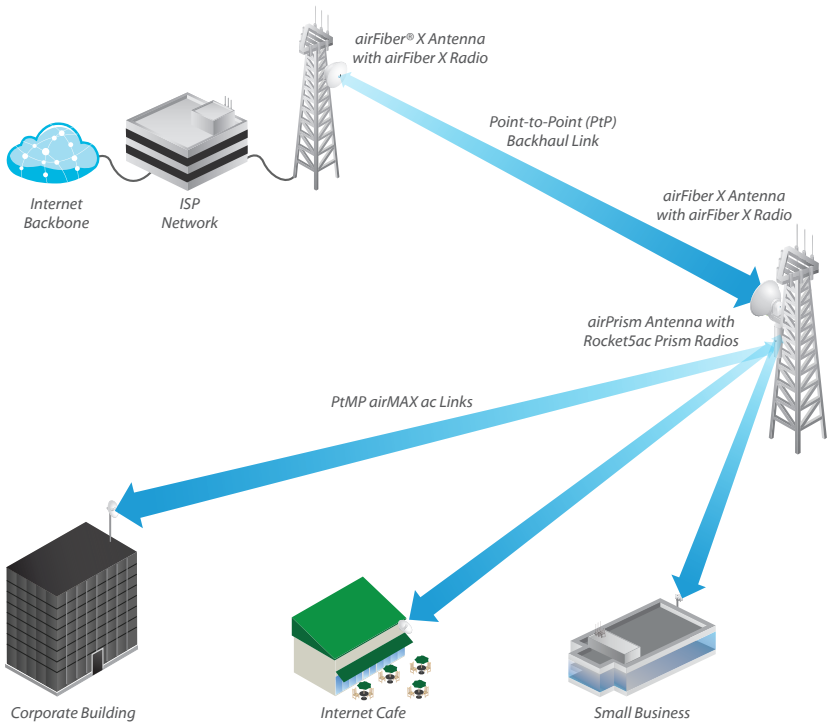
Highly resistant to noise interference, the airPrism antenna provides superior beam performance in high-density areas for high-capacity, multipoint networks.

Plug and Play Integration

The airPrism antenna and Rocket5ac Prism radios have been designed to seamlessly work together. Every airPrism antenna has three built-in Rocket radio mounts, so installation requires no special tools.

Snap the three Rocket5ac Prism radios securely into place and mount the antenna for your PtMP link.

Application Example



Beamwidth

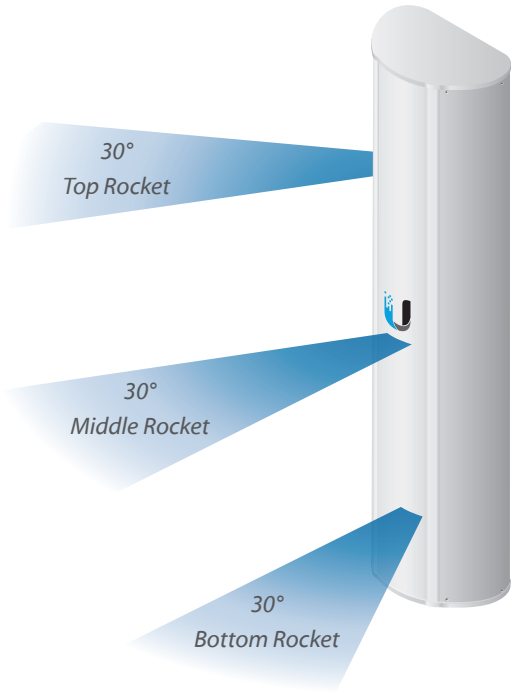
The three Rocket5ac Prism radios are installed at the top, middle, and bottom of the airPrism antenna. Each radio independently transmits and receives within its corresponding 30° beamwidth.

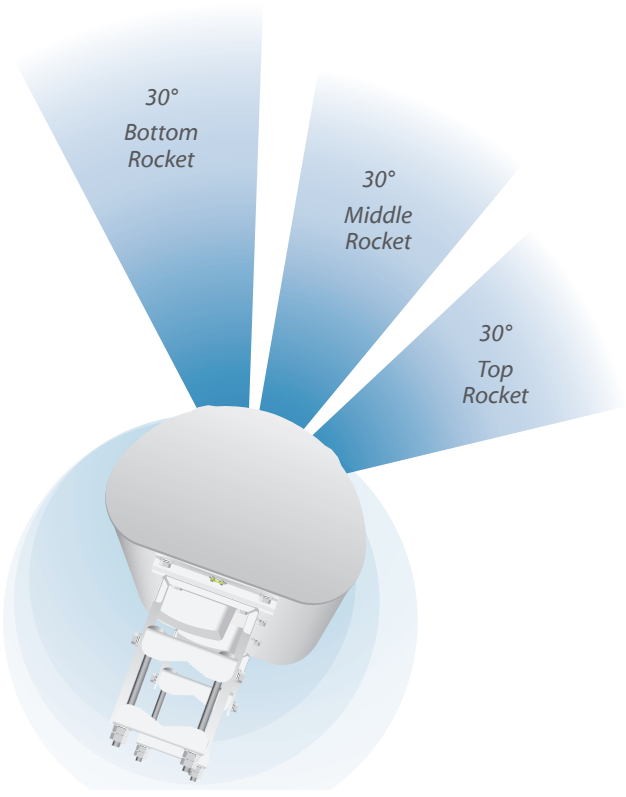
Refer to the diagrams below for a visual representation of the beamwidth coverage.

Channel Offset

The size of the required offset depends on the channel width.

Channel Width	Separation
10 MHz	20 MHz
20 MHz	30 MHz
30 MHz	50 MHz
40 MHz	60 MHz





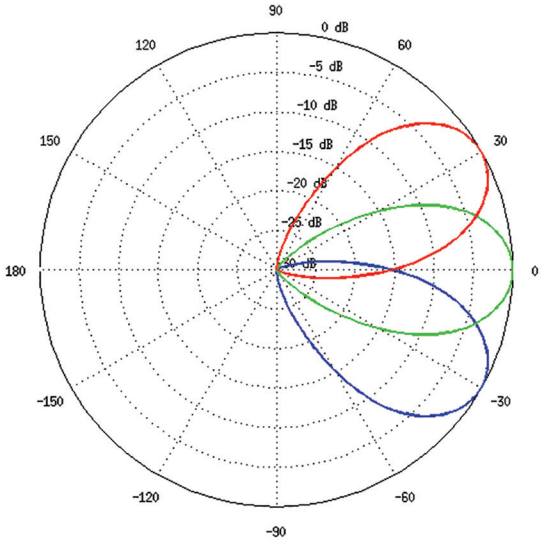
AP-5AC-90-HD Specifications

Antenna Characteristics	
Dimensions*	322.6 x 201.5 x 1300 mm (12.7 x 7.93 x 51.18")
Weight**	13.1 kg (28.9 lb)
Frequency Range	5.15 - 5.85 GHz
Gain	22 dBi
HPOL Beamwidth	3 x 30° (6 dB)
VPOL Beamwidth	3 x 30° (6 dB)
Electrical Beamwidth	8°
Electrical Downtilt	2°
Max. VSWR	1.75:1
Polarization	Dual-Linear
Cross-Polarization Isolation	30 dB Min.
Interfaces	(6) RP-SMA Connectors (Weatherproof)
Compatible Radio	Rocket5ac Prism, model R5AC-PRISM
Wind Loading	534 N @ 200 km/h (120 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
Mounting	Universal Pole Mount, Rocket Bracket, and Weatherproof RF Connectors Included
ETSI Specification	EN 302 326 DN2
Certifications	CE, FCC, IC

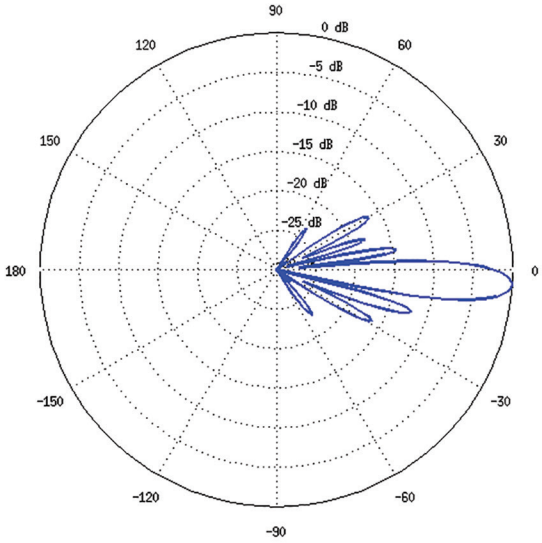
** Dimensions exclude pole mount and Rocket5ac Prism (Rocket5ac Prism sold separately)*

*** Weight includes pole mount and excludes Rocket5ac Prism (Rocket5ac Prism sold separately)*

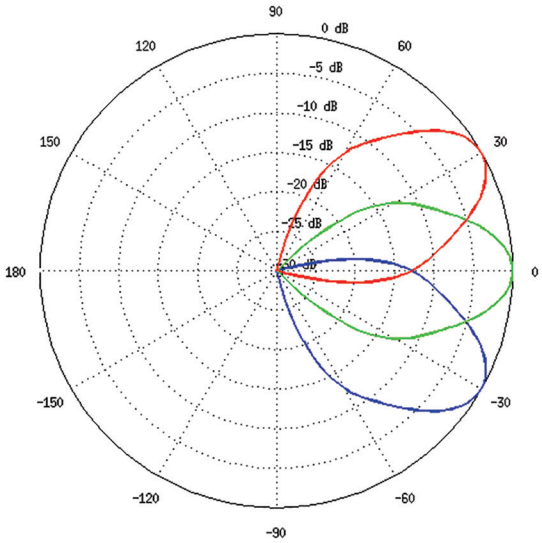
Vertical Azimuth



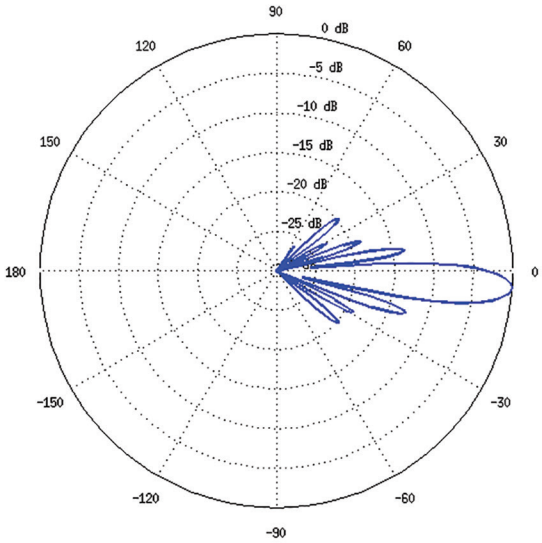
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



www.ubnt.com

Product Excellence

Operational Highlights

- All-in-one modem and radio, in a single box
- Software Defined Radio (SDR) LTE & LTE-Advanced
- TD-LTE Bands: 40 (2.3 GHz), 41 (2.5 GHz), 42 (3.5 GHz), 43 (3.65 GHz)
- 4Tx4Rx Radio
- Flexible mounting options: rooftops, walls & poles
- Diverse antenna support

Feature Highlights

- Carrier aggregation
- Multi-User MIMO
- 4x4 MIMO
- Dual Sector
- Dual Carrier

Telrad
We're on your wavelength.

BreezeCOMPACT 3000

The BreezeCOMPACT 3000 is Telrad's revolutionary software-defined base station that completely disrupts the economics of broadband wireless. From its future-proof ability to uptake dramatic capacity increases as LTE evolves, to its small footprint and outstanding performance & scalability, the BreezeCOMPACT 3000 has no peer in the market.

Affordable EPC - BreezeWAY is an advanced EPC platform designed using hardware accelerators specially-adapted for wireless core packet processing, for deployments either at cell-sites or in network centralized locations. A single BreezeWAY-2020 serves 10K connected subscribers and may easily scale up to hundreds of thousands of subscribers using a unique "cluster" functionality.

Best-in-Class Capacity and Coverage

Optimized Deployment Portfolio

Offering best Indoor coverage with superior high power 4TXx4RX radio technology, this unit is ideal for fixed, high mobility, dense urban & mixed environments.

Product Specifications

BreezeCOMPACT 3000	
Frequency	Band 40 (2.3 GHz), Band 41 (2.5 GHz), Band 42 (3.5 GHz), 3.3 GHz & 3.475-3.7 GHz 43 (3.65 GHz)
Radio Configuration	4TX x 4RX
Max Tx Power Per Port	40 dBm
Weight	19 kg | 42 lbs
Dimensions (HxWxL)	330 x 260 x 400 mm| 13.0 x 10.2 x 15.8 in
Power Consumption	230W
Primary Interfaces	1G - Copper (RJ-45) / Optical SFP 100M- Copper (RJ-45) GPS In/Chaining 48VDC
Standard Compliance	D LTE-Advanced

Best-in-Class Capacity and Coverage

- Ruggedized all-outdoor, high-power LTE base station
- Unique Software Defined Radio (SDR) - supporting LTE & LTE-Advanced
- Best indoor coverage with 4xRx Radio
- Ideal for Fixed, High Mobility, Dense Urban & Mixed Environments

Telrad Networks is a global provider of innovative LTE telecom solutions, boasting over 300 4G deployments in 100 countries. Telrad stands at the forefront of the technology evolution of next-generation TD-LTE solutions in the sub-6 GHz market. Since 1951, the company has been a recognized pioneer in the telecom industry, facilitating the connectivity needs of millions of end-users through operators, ISPs and enterprises around the world.

Compact Form Factor

BreezeCOMPACT is a Macro base station that packs superior performance into a small, single-box, small-footprint package. Never before has the 4G world seen such a revolutionary design – Indoor coverage, above 30km radius with outdoor CPEs, and 20-minute (1-man) installation.

On-Target Deployment Scenarios

BreezeCOMPACT offers the right connectivity with the right coverage and capacity for any deployment scenario. This all-outdoor base station is optimized for fixed, nomadic and mobile wireless access. Whether on a rural water tower or mounted to a tall urban building. BreezeCOMPACT delivers LTE today and an evolution to LTE-Advanced.

Efficiency to the Max

BreezeCOMPACT maximizes cost and energy efficiency. A small footprint, low power consumption, and a quick, easy rollout make it the optimal choice for any deployment. Operators and ISPs of all sizes will benefit from reduced CAPEX and OPEX.

For more, please visit **telrad.com** or email **sales@telrad.com.**

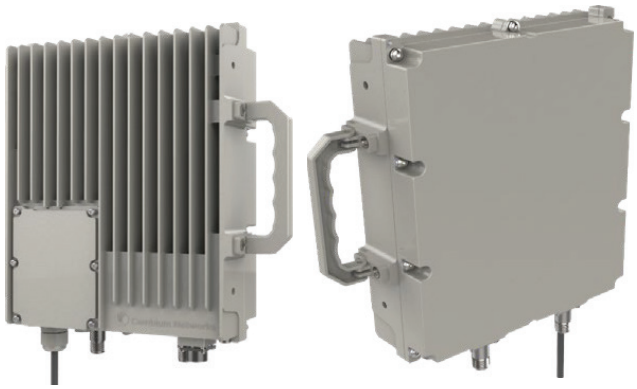
Telrad
We're on your wavelength.

2 GHz and 3 GHz cnRanger Remote Radio Head (RRH)

QUICK LOOK:

The cnRanger™ Fixed LTE wireless platform from Cambium Networks substantially increases range and coverage, while reducing the cost and complexity typically associated with LTE networks.

- **High Power Remote Radio Head (RRH) works through dense foliage where EIRP-limited 5 GHz is not an option.**
- **Fully managed and controlled by Baseband Unit (BBU)**
- **2 LTE carrier support***



Product		
Model	**2 GHz Remote Radio Head (RRH) 220**	**3 GHz Remote Radio Head (RRH) 210**
Model Numbers	LTE-RRH-220	3LTE-RRH-210

Spectrum		
	2 GHz Remote Radio Head (RRH) 220	**3 GHz Remote Radio Head (RRH) 210**
Frequency Range	2300 - 2700 MHz, Bands 38, 40, 41	3400 - 3800 MHz, Bands 42, 43, 48
Channel Width	5 MHz*, 10 MHz, 15 MHz, 20 MHz	5 MHz*, 10 MHz, 15 MHz, 20 MHz

2 GHz and 3 GHz cnRanger SPalisade Remote Radio Head (RRH)

Specifications

Interface

	2 GHz Remote Radio Head (RRH) 220	3 GHz Remote Radio Head (RRH) 210
MAC (Media Access Control) Layer	TDD-LTE Advanced Release 10	TDD-LTE Advanced Release 10
Physical Layer	2x2 MIMO OFDMA, SC-FDMA	2x2 MIMO OFDMA, SC-FDMA
BBU Interface	SFP / CPRI v4.2	SFP / CPRI v4.2

Link Budget

	2 GHz Remote Radio Head (RRH) 220	3 GHz Remote Radio Head (RRH) 210
Transit Power Range	42 dB dynamic range (1 dB step)	42 dB dynamic range (1 dB step)
Maximum Transmit Power	33 dBm per chain, 36 dBm combined	30 dBm per chain, 33 dBm combined

Physical

	2 GHz Remote Radio Head (RRH) 220	3 GHz Remote Radio Head (RRH) 210
Antenna Connection	N-Type	N-Type
Surge Suppression	EN61000-4-5: 1.2us/50us, 500 V voltage waveform	EN61000-4-5: 1.2us/50us, 500 V voltage waveform
Environmental	IP67	IP67
Temperature / Humidity	-40°C to +55°C (-40°F to +131°F), 5 to 95% non-condensing	-40°C to +55°C (-40°F to +131°F), 5 to 95% non-condensing
Weight	6kg (13.2 lbs)	4.75kg (10.5 lbs)
Wind Survival	200 Km/Hr	200 Km/Hr
Dimensions (H x W x Depth)	10 3/4" (H) x 3 3/16" (H) x 12 1/2" (D) (273 mm x 81 mm x 318 mm)	10 3/4" (H) x 3 3/16" (H) x 12 1/2" (D) (273 mm x 81 mm x 318 mm)
Mounting	1.5" to 3.0" (38 to 76 mm)	1.5" to 3.0" (38 to 76 mm)
Power Consumption	55 W nominal, 72 W peak	45 W nominal, 60 W peak
Recommended Power Supply	P/N: N000000L129A - XP Power 120 W PSU	P/N: N000000L129A - XP Power 120 W PSU
Input Voltage	-48V DC	-48V DC

2 GHz and 3 GHz cnRanger SPalisade Remote Radio Head (RRH)

Certifications

	2 GHz Remote Radio Head (RRH) 220	3 GHz Remote Radio Head (RRH) 210
FCC ID	Z8H89FT0045	Z8H89FT0061
ETSI	EN 301 908-1 v11.1.1 EN 50385 / EN 62311 Draft EN 301 489-50 v2.1.0	TBD
Mean Time Between Failure	**Not Measured**	**Not Measured**

ABOUT CAMBIUM NETWORKS

Cambium Networks empowers millions of people with wireless connectivity worldwide. Its wireless portfolio is used by commercial and government network operators as well as broadband service providers to connect people, places and things. With a single network architecture spanning fixed wireless and Wi-Fi, Cambium Networks enables operators to achieve maximum performance with minimal spectrum. End-to-end cloud management transforms networks into dynamic environments that evolve to meet changing needs with minimal physical human intervention. Cambium Networks empowers a growing ecosystem of partners who design and deliver gigabit wireless solutions that just work.

cambiumnetworks.com

04222021

DATASHEET

rocket M

Powerful 2x2 MIMO airMAX® BaseStation

Models: M5, M3, M365, M2, M900

Advanced Software Technology to Maximize Performance

Plug and Play Integration with airMAX Antennas

Frequency and Channel Flexibility

Overview

Featuring mix-and-match industrial design, the Rocket® is a Ubiquiti Networks® airMAX® BaseStation that supports speeds of up to 150+ Mbps real TCP/IP throughput. It is ideal for deployment in Point-to-Point (PtP) bridging or Point-to-MultiPoint (PtMP) airMAX applications.

Flexibility

The Rocket is available in several frequency models: 900 MHz, 2.4 GHz, 3/3.65 GHz, and 5 GHz, to support your specific application. You have the freedom to locate, deploy, and operate the Rocket in these unlicensed bands (subject to local country regulations).

The Rocket allows for a high degree of flexibility in configuring channel bandwidths: 2, 3, 5, 8, 10, 20, 25, 30, and/or 40 MHz, depending on the specific product model and local country regulations.

Plug and Play Integration

Rocket radios and airMAX antennas have been designed to seamlessly work together. Every airMAX Sector, RocketDish™, Omni, or Yagi antenna has a built-in Rocket mount, so installation requires no special tools. Snap the Rocket securely into place and mount the antenna; then you have the optimal combination of Rocket radio and airMAX antenna for your PtP or PtMP application.

airMAX Technology Included

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

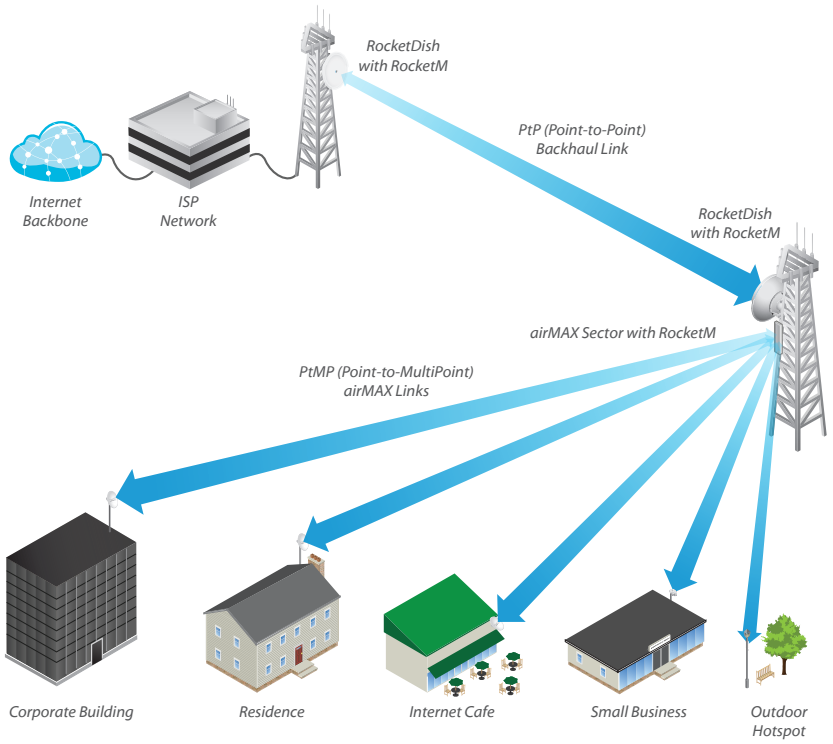
This time slot method eliminates hidden node collisions and maximizes airtime efficiency. It provides many magnitudes of performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

Intelligent QoS Priority is given to voice/video for seamless streaming.

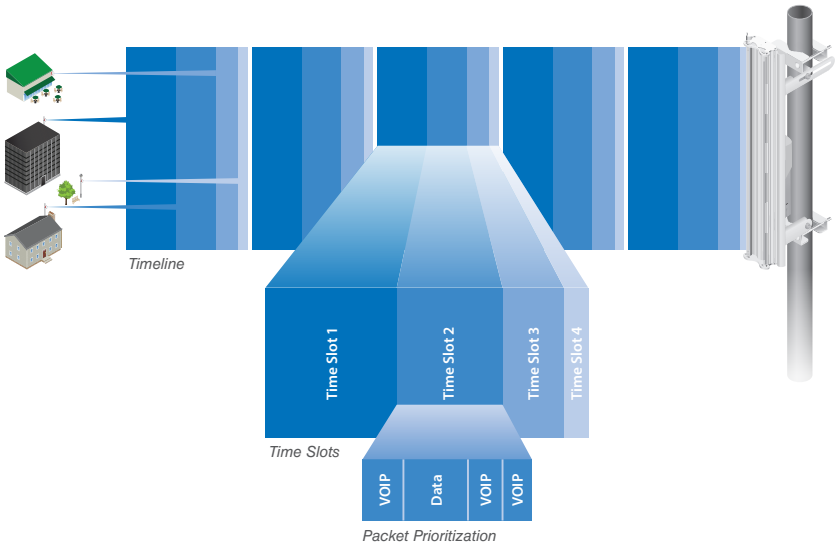
Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Application Example



airMAX TDMA Technology



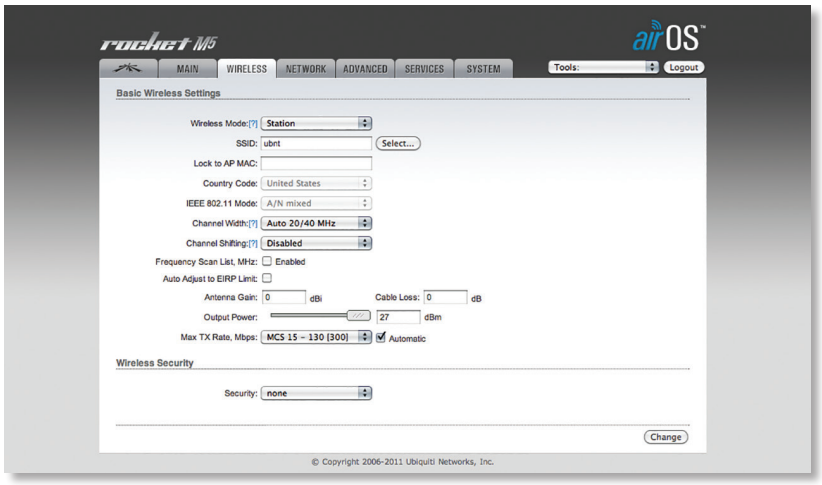
Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.

Software

airOS®

Built upon an intuitive user interface foundation, airOS® 5 is an advanced operating system for Ubiquiti airMAX M Series products.

- airMAX Protocol Support
- Long-Range PtP Link Mode
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Device Statistics
- Diagnostic Tools



airView®

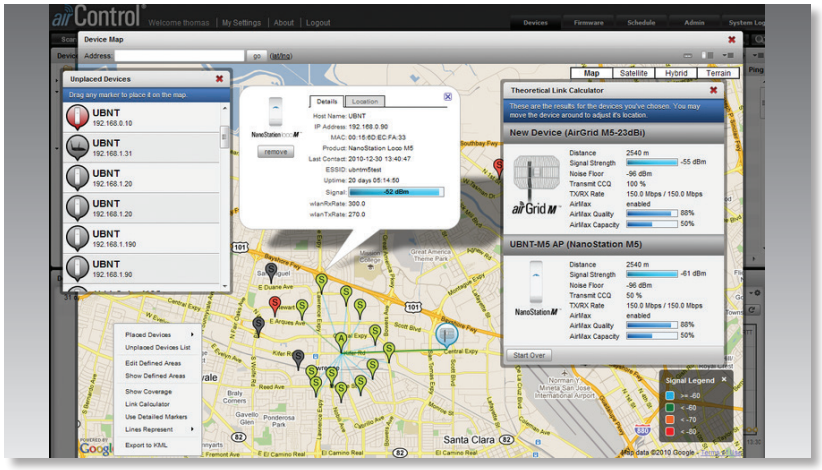
Integrated on all Ubiquiti M products, airView® provides advanced spectrum analyzer functionality: waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown in real time as a function of frequency.
- **Recording** Automate airView to record and report results.

airControl®

airControl® is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling



Models

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.

rocket M5

The 5 GHz frequency band is free to use, worldwide, offers plentiful spectrum, and works well for long-distance links. However, 5 GHz signals have more difficulty passing through obstacles than lower-frequency signals.

rocket M3 / M365

The 3.65 GHz frequency band is noise-free in most areas; however, its use requires a license. There may be additional restrictions on its use depending on local country regulations.

rocket M2

The 2.4 GHz frequency band is free to use, worldwide; however, it is crowded due to interference from other wireless devices. Also, there are only three non-overlapping, 20 MHz channels available for use.

rocket M9

The 900 MHz frequency band has a higher tolerance for obstacles that may obstruct line of sight; however, noise levels are typically higher. Also, its use may require a license in some parts of the world.

Antenna Compatibility

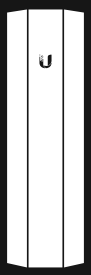
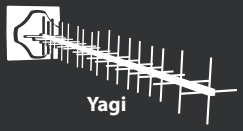
RocketM9

RocketM2

RocketM3
RocketM365

RocketM5

Frequency Band

	900 MHz	2.4 GHz	3/3.65 GHz	5 GHz
 Sector	AM-9M13	AM-V2G-Ti AM-2G15-120 AM-2G16-90	AM-3G18-120	AM-V5G-Ti AM-M-V5G-Ti AM-5G16-120 AM-5G17-90 AM-5G19-120 AM-5G20-90 AM-5AC21-60 AM-5AC22-45
 Rocket Dish		RD-2G24	RD-3G26	RD-5G31-AC RD-5G30-LW RD-5G30 RD-5G34
 Omni		AMO-2G10 AMO-2G13	AMO-3G12	AMO-5G10 AMO-5G13
 Yagi	AMY-9M16			

Specifications

rocket M5

M5	
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	8W
Processor	MIPS 74Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M5 Operating Frequency (MHz)				
Worldwide	5150 - 5875			
USA	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	5150 - 5250*	5250 - 5350*	5470 - 5725*	5725 - 5850*
IC	5470 - 5600, 5650 - 5725, 5725 - 5850			

* Some frequencies may require activation; visit: **https://www.ubnt.com/fcclabelrequest**

M5 Output Power: 27 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	27 dBm	± 2 dB	**802.11a**	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	23 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	22 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	27 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	27 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	27 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	27 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	26 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	27 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	27 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	27 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	27 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	26 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	21 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

Specifications

rocket M3 / M365

M3/M365		
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")	
Weight	500 g (1.1 lb)	
Power Supply	24V, 1A PoE Adapter	
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)	
Max. Power Consumption	6.5W	
Operating Frequency	M3	M365
	3400 - 3730 MHz*	3650 - 3675 MHz
Processor	MIPS 24Kc	
Memory	64 MB SDRAM, 8 MB Flash	
Networking Interface	(1) 10/100 Mbps	
RF Connections	(2) RP-SMA (Waterproof)	
LEDs	Power, Ethernet, (4) Signal Strength	
Enclosure Characteristics	Outdoor UV Stabilized Plastic	
ESD/EMP Protection	± 24KV Air / Contact	
Operating Temperature	-30 to 75° C (-22 to 167° F)	
Operating Humidity	5 to 95% Noncondensing	
Shock and Vibration	ETSI300-019-1.4	
Wireless Approvals	M3	M365
	FCC, IC, CE	FCC Part 90Y
RoHS Compliance	Yes	
Modes	Access Point, Station	
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing	
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test	
Distance Adjustment	Dynamic Ack and Ackless Mode	
Power Adjustment	Software Adjustable UI or CL	
Security	WPA2 AES Only	
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low	
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate	
Other	M3	M365
	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/25/40 MHz Channel Width Support	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/10/20/25 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode	

* RocketM3 not supported in the USA

M3/M365 Output Power: 25 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	25 dBm	± 2 dB	airMAX	MCS0	-94 dBm Min.	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-93 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-90 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-89 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	20 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	25 dBm	± 2 dB		MCS8	-93 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-91 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-89 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	20 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

3 GHz | 3.65 GHz | 25 dBm | 10/100

Specifications

rocket M2

	M2
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6.5W
Operating Frequency	2402 - 2462 MHz
Processor	MIPS 24Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M2 Output Power: 28 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	6 - 24 Mbps	28 dBm	± 2 dB	**802.11g**	6 - 24 Mbps	-97 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	**802.11n/airMAX**	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	27 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	25 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	27 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	25 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	22 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

Specifications

rocket M9

M900	
Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
Max. Power Consumption	6.5W
Operating Frequency	902 - 928 MHz
Processor	MIPS 24Kc
Memory	64 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Enclosure Characteristics	Outdoor UV Stabilized Plastic
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CL
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 3/5/8/10/20 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M900 Output Power: 28 dBm							
TX Power Specifications				**RX Power Specifications**			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	28 dBm	± 2 dB	airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	28 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	28 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
	MCS15	21 dBm	± 2 dB		MCS15	-75 dBm	± 2 dB

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