

150 E. GAY STREET, 24^{TH} Floor Columbus, OH 43215-3192 Telephone: (614) 591-5461 Facsimile: (844) 670-6009 http://www.dickinsonwright.com

CHRISTINE M.T. PIRIK CPirik@dickinsonwright.com

April 16, 2019

Ms. Tanowa Troupe, Acting Secretary Ohio Power Siting Board Docketing Division 180 East Broad Street, 11th Floor Columbus, Ohio 43215-3793

> **Re:** Case No. 18-91-EL-BGN - In the Matter of the Application of Paulding Wind Farm IV LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Wind-Powered Electric Generation Facility in Paulding County, Ohio.

Compliance with Certificate Condition 24 – Microwave Study

Dear Ms. Troupe:

On February 21, 2019, Paulding Wind Farm IV LLC ("Applicant") received its Certificate from the Board authorizing it to construct a wind-powered electric generation facility in Paulding County, Ohio, subject to 26 conditions and the requirements in Ohio Administrative Code Rule 4906-4-09.

At this time, the Applicant is filing notice that it has complied with Condition 24 of the Certificate and has submitted the attached Microwave Study to the Board's staff.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

<u>/s/ Christine M.T. Pirik</u> Christine M.T. Pirik (0029759) Terrence O'Donnell (0074213) William V. Vorys (0093479) Dickinson Wright PLLC Email: <u>cpirik@dickinsonwright.com</u> <u>todonnell@dickinsonwright.com</u> <u>wvorys@dickinsonwright.com</u>

Attorneys for Paulding Wind Farm IV LLC

Enclosure Cc: Grant Zeto

COLUMBUS 56242-13 113041v1

Wind Power GeoPlanner™

Microwave Study

Paulding Wind Farm IV LLC



Prepared on Behalf of EDP Renewables NA LLC

February 12, 2019





Table of Contents

1.	Introduction	- 1 -
2.	Project Overview	- 1 -
3.	Two-Dimensional Fresnel Zone Analysis	- 2 -
4.	Conclusion	- 9 -
5.	Contact	- 9 -



1. Introduction

Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services. This report focuses on the potential impact of wind turbines on licensed, proposed and applied non-federal government microwave systems.

2. Project Overview

Project Information Name: Paulding Wind Farm IV LLC County: Paulding State: Ohio

Number of Turbines: 29 Blade Diameter: 150 meters Hub Height: 114 meters



Figure 1: Area of Interest



3. Two-Dimensional Fresnel Zone Analysis

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed, proposed and applied paths from 0.9 - 23 GHz¹. First, we determined all microwave paths that intersect the area of interest² and listed them in Table 1 along with the distances from the edge of the Fresnel Zone to the edge of the closest turbine blade tip. These paths and the area of interest that encompasses the planned turbine locations are shown in Figure 2.



Figure 2: Microwave Paths that Intersect the Area of Interest

¹ Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

² We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.



EDP Renewables NA LLC Wind Power GeoPlanner™ Microwave Study Paulding Wind Farm IV LLC

ID	Status	Callsign 1	Callsign 2	Band	Licensee	Closest Turbine	Dist (Feet)
1	Proposed	ASR12738	ATC51286	11 GHz	Wireless Internetwork LLC	46	2953.45
2	Proposed	ATC27533	ATC51286	11 GHz	Wireless Internetwork LLC	27	10318.34
4	Proposed	GTPIN-52	ATC27533	Lower 6 GHz	Wireless Internetwork LLC	46	3496.99
5	Proposed	GTPIN-52	OH03415-	Lower 6 GHz	Wireless Internetwork LLC	10	2743.91
6	Proposed	GTPIN-52	WQQX660	Lower 6 GHz	Wireless Internetwork LLC	46	14209.94
7	Licensed	KJI65	KYK81	Upper 6 GHz	Panhandle Eastern Pipe Line Company, L.P	90	123.06
11	Licensed	WAZ563	WAZ596	Lower 6 GHz	Norfolk Southern Railway	66	5440.39
12, 13	Licensed	WAZ596	WBB735	Lower 6 GHz	Norfolk Southern Railway	66	4082.63
14	Licensed	WLD621	RXONLY	950 MHz	First Family Broadcasting, Inc.	74	8271.31
15	Licensed	WQOD566	WQOD564	Lower 6 GHz	GTT America LLC	14	2473.82
16	Licensed	WQON426	WQON427	Upper 6 GHz	Fort Wayne Communications Group Company	52	130.75
17	Licensed	WQON427	WQON424	Upper 6 GHz	Fort Wayne Communications Group Company	63	19268.01
19	Licensed	WQOV248	WQOS750	11 GHz	World Class Wireless, LLC	56	126.03
20	Licensed	WQPS490	WMN405	Lower 6 GHz	Verizon Wireless (VAW) LLC - Ohio	46	6624.73
21	Licensed	WQQX658	WQQX660	Lower 6 GHz	Wireless Internetwork LLC	46	14209.94
22	Proposed	WQQX658	WQQX660	Upper 6 GHz	Wireless Internetwork LLC	46	14209.94
23	Licensed	WQQX660	WQQX868	11 GHz	Wireless Internetwork LLC	46	4155.03
24	Proposed	WQQX660	WQQX868	11 GHz	Wireless Internetwork LLC	46	4155.03
25	Licensed	WQRY696	WQRX772	11 GHz	Sprintcom, Inc	54	1995.25
26	Licensed	WQRY696	WQRY695	11 GHz	Sprintcom, Inc	66	59.92
27	Licensed	WQSA894	WQSA779	Lower 6 GHz	Argos Engineering, LLC	56	3682.21
28	Licensed	WQSD967	WQSD966	Lower 6 GHz	Torellco LLC	52	123.37
29	Licensed	WQTF467	WQTF470	Lower 6 GHz	Verizon Wireless (VAW) LLC - Ohio	19	1642.27
30	Licensed	WQTX717	WQWF235	11 GHz	MetaLINK Technologies, Inc.	74	7661.95
31	Licensed	WQUL511	WQUL808	Lower 6 GHz	Torellco LLC	56	3491.64
32	Licensed	WQUT734	WQUU748	11 GHz	Agile Network Builders LLC	19	18842.14
33	Licensed	WQUU748	WQUT739	11 GHz	Agile Network Builders LLC	74	13893.03
34	Licensed	WQVP538	WQNI657	11 GHz	MetaLINK Technologies, Inc.	27	10318.34
35	Licensed	WQVT311	WQVT312	Lower 6 GHz	Paulding-Putnam Electric Cooperative	87	171.04
36	Licensed	WQVT311	WQYJ953	Lower 6 GHz	Paulding-Putnam Electric Cooperative	87	653.12
37	Licensed	WQWC960	WQUU748	11 GHz	Agile Network Builders LLC	27	7201.09
38	Applied	WQWF230	WQWF232	11 GHz	MetaLINK Technologies, Inc.	76	9300.33
39	Licensed	WQWF230	WQYE353	18 GHz	MetaLINK Technologies, Inc.	46	17000.20
40	Licensed	WQWF235	WRAP626	18 GHz	MetaLINK Technologies, Inc.	62	1788.62
42	Licensed	WQXC632	WQUL808	Lower 6 GHz	Torellco LLC	56	2303.58
43	Licensed	WQXW982	WQWF230	11 GHz	MetaLINK Technologies, Inc.	46	17054.82
44	Applied	WQYC934	WQWF232	18 GHz	MetaLINK Technologies, Inc.	76	8868.58
45	Licensed	WQYJ953	WQYI235	11 GHz	Paulding-Putnam Electric Cooperative	19	19097.88
46	Licensed	WRAP626	WRCM880	11 GHz	MetaLINK Technologies, Inc.	63	638.81
47	Applied	WRAP626	WQWF232	11 GHz	MetaLINK Technologies, Inc.	62	1788.52

 Table 1: Summary of Microwave Paths that Intersect the Area of Interest

 (See enclosed mw_geopl.xlsx for more information and

GP_dict_matrix_description.xls for detailed field descriptions)



Verification of Coordinate Accuracy

It is possible that as-built coordinates may differ from those on the FCC license. For this project, 12 paths cross within close proximity of the proposed turbines and the tower locations for these paths will have a critical impact on the result. These 12 paths are highlighted in grey in Table 1. We verified these locations using aerial photography. Some of the towers were found to be slightly off and were moved to their locations based on the aerial photos³.

Next, we calculated a Fresnel Zone for each path based on the following formula:



Where,

- r = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d₁ = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d₂ = Distance from antenna 2 to a specific point in the microwave path, kilometers

In general, this is the area where the planned wind turbines should be avoided, if possible. A depiction of the Fresnel Zones for each microwave path listed can be found in Figure 3 through Figure 6, and is also included in the enclosed shapefiles^{4,5}.

³ See enclosed mw_geopl.shp and mw_geopl_fcc.shp for details.

⁴ The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 16 projected coordinate system.

⁵ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at <u>http://www.comsearch.com/files/data_license.pdf</u>.





Figure 3: Microwave Paths with Fresnel Zones





Figure 4: Microwave Paths with Fresnel Zones





Figure 5: Microwave Paths with Fresnel Zones





Figure 6: Microwave Paths with Fresnel Zones



4. Conclusion

Total Microwave	Paths with Affected	Total Turbines	Turbines intersecting
Paths	Fresnel Zones		the Fresnel Zones
41	0	29	0

Table 2: Fresnel Zone Analysis Result

Our study identified 41 microwave paths intersecting the Paulding Wind Farm IV area of interest. The Fresnel Zones for these microwave paths were calculated and mapped in order to assess the potential impact from the turbines. A total of 29 turbines were considered in the analysis, each with a blade diameter of 150 meters and a hub height of 114 meters. Of those turbines, none were found to have potential obstruction with the microwave systems in the area.

5. Contact

For questions or information regarding the Microwave Study, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	dmeyer@comsearch.com
Web site:	www.comsearch.com

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

4/16/2019 4:16:51 PM

in

Case No(s). 18-0091-EL-BGN

Summary: Notice - Compliance with Certificate Condition 24 – Microwave Study electronically filed by Christine M.T. Pirik on behalf of Paulding Wind Farm IV LLC