

***COMPREHENSIVE TECHNICAL EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT***

NCE FM STATION WWHN-FM
IRONDALE, ILLINOIS
88.9 MHz / CHANNEL 205A / FACILITY ID: 177414

HAWKINS COMMUNICATIONS COMPANY

FEBRUARY, 2015

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Hawkins Communications Company** ("Hawkins"), licensee of NCE FM station WWHN-FM at Irondale, Illinois, and are in support of their application for construction permit.¹ This application proposes a relocation of the licensed facility, which is to be considered a minor change to that authorization.²

Hawkins has been advised by the owner of the land utilized for the licensed WWHN-FM site that their lease has been terminated. This termination is due to a change in the plans required for the demolition and reconfiguration of the adjacent State Line Generating Plant. Additionally, in December 2014, high winds caused damage to the licensed WWHN-FM antenna system, and since that time, Hawkins has been operating the facility pursuant to a special temporary authority.³ Due to these two factors, Hawkins has sought, identified, and received reasonable site assurance to relocate the facility.

The proposed facility would continue to operate with a maximum effective radiated power of 0.1 kW utilizing a directional antenna. The new site location is 3.6 kilometers at an azimuth of 208 degrees true from the licensed site. As a result of this location change, the directional pattern envelope proposed under this application will differ from that currently licensed for the facility. This new directional pattern envelope complies with the appropriate provisions of the Commission's Rules.

¹ The Facility ID for WWHN-FM at Irondale, Illinois is 177414.

² The licensed facility is authorized under FCC File No. BLED-20141001CDE.

³ See FCC File No. BSTA-20141209ABT.

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The proposed facility would operate with a center of radiation of 28.4 meters AGL. The site elevation is 178.3 meters AMSL, thus the proposed center of radiation is 206.7 meters AMSL. Due to apparent inconsistencies and the proximal nature of Lake Michigan, all terrain-based exhibits in this application were created through the sampling of the NED 3-second linearly interpolated terrain database. The proximity of Lake Michigan to the site also requires additional consideration in the determination of average terrain for the proposed facility.

Exhibit E-1 illustrates the proposed site location, the proposed 34 dBu F(50,10) contour, and site radii of three and sixteen kilometers. As this map demonstrates, portions of the 0, 45, and 90 degree true radials between 3 and 16 kilometers from the proposed site extend over Lake Michigan. The 34 dBu F(50,10) contour, however, does not encompass any land area of the United States beyond the adjacent shoreline on these radials. As a result, only the portion of the land area of the United States within the 3 to 16 kilometer radii is to be considered per Section 73.1313(d)(2) of the Commission's Rules.

Through the use of satellite imagery, it was determined that along the 0 degree true radial, the segment encompassing United States land area extends out to 8.9 kilometers from the proposed site. Thus, the segment of 3 to 8.9 kilometers is to be considered. In the case of the 45 degree radial, land extends out to 3.3 kilometers from the site, and on the 90 degree true radial out to 8.2 kilometers from the site. In Exhibit E-2, a tabulation is provided of the terrain elevations at 0.1 kilometer increments from the proposed site out to the extent of land. These terrain elevations were then averaged, which is the bottom entry in each column.

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The remaining five radials, the 135, 180, 225, 270, and 315 degree true radials are located entirely on United States land area in the 3-16 kilometer segment, and were therefore sampled in their entirety across this range. The following table lists each of the eight azimuths, the average terrain on each, and the proposed center of radiation above average terrain.

Azimuth	Average Terrain (m)	COR Average Terrain (m)
0	178.5	28.2
45	178.3	28.4
90	177.9	28.8
135	180.0	26.7
180	182.7	24.0
225	184.7	22.0
270	185.2	21.5
315	180.8	25.9
Average:	181.0	25.7

As was previously discussed, the proposed site location is approximately 3.6 kilometers from the licensed site. Exhibit E-3 illustrates the licensed 60 dBu service contour along with the proposed 60 dBu service contour. As this map demonstrates, overlap between the two service contours exists in a substantial area.

The main studio would comply with the provisions of Section 73.1125 of the Commission's Rules. The location of the main studio will be within twenty-five miles of the reference coordinates of the community of license. Exhibit E-4 illustrates the location of the main studio, and demonstrates that the entire community of Irondale is located within twenty-five miles of the main studio.

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The proposed facility would continue to comply with the provisions of Section 73.515 of the Commission's Rules. Exhibit E-5 is a map illustrating the predicted 60 dBu service contour of the proposed facility along with the limits of the community of Irondale, Illinois. By inspection, it can be inferred that the 60 dBu service contour encompasses at least fifty percent of Irondale.

The proposed facility would comply with the interference protection requirements of the applicable sections of the Commission's Rules. In this instance, sections 73.509, 73.207, and 73.525 are applicable. Sections 73.213(a) and 73.215(a) are not applicable to the facility.

Exhibit E-6 is a tabular allocation study for the proposed facility. This study demonstrates that the proposed facility would comply with all of the contour overlap requirements of Section 73.509 of the Commission's Rules. In the case of WARG and WGVE-FM, no overlap is indicated; however, the incoming overlap values are listed in red to denote the tangential nature of the relevant contours. The subsequent allocation study maps will demonstrate this fact.

Graphical allocation study maps begin at Exhibit E-7, which provides an overview of the allocation situation. On this map, the contours for the proposed facility along several other facilities of relevance are indicated. Only a portion of the facilities considered in the tabular study has been depicted on this map. The reduced number of facilities depicted is to reduce map clutter and density. Facilities omitted from the map have large distance clearances between the relevant contours making their graphical depiction unnecessary. Due to the contour proximity between the proposed facility and both WARG and WGVE-FM, additional exhibits will be provided relative to those two facilities.

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Exhibit E-8 illustrates graphical detail between the proposed WWHN-FM facility and WARG(FM) at Summit, Illinois.⁴ This map illustrates the 40 dBu F(50,10) contour from WARG(FM) is at worst tangential to the proposed WWHN-FM 60 dBu F(50,50) service contour. The arc of interest for WWHN-FM is across the span of 250 to 315 degrees true, and for WARG(FM) from 110 to 125 degrees true. Exhibits E-9 and E-10 provide tabulations of the contour distances and center of radiation above average terrain on these arcs. As Exhibits E-6 and E-7 demonstrate, there is substantial clearance between the 40 dBu F(50,10) contour of WWHN-FM and the WARG(FM) 60 dBu F(50,50) contour.

Exhibit E-11 illustrates graphical detail between the proposed facility, and the other facility of concern, WGVE-FM at Gary, Indiana.⁵ This map illustrates the 54 dBu F(50,10) contour from WGVE-FM and the proposed 60 dBu F(50,50) contour from WWHN-FM. As this map demonstrates, these contours are at worst tangential to each other. The arc of interest for WWHN-FM is from 90 to 155 degrees true and for WGVE-FM from 300 to 315 degrees true. Exhibits E-12 and E-13 provide tabulations of the contour distances and center of radiation above average terrain along these arcs. Exhibits E-6 and E-7 demonstrate that there is substantial clearance between the 54 dBu F(50,10) contour of WWHN-FM and the WGVE-FM 60 dBu F(50,50) contour.

Exhibit E-14 is a single channel spacing study for the proposed facility. This study demonstrates that the proposed facility would comply with all of the intermediate frequency spacing requirements under Section 73.207 of the Commission's Rules to relevant facilities.

⁴ The Facility ID for WARG(FM) at Summit, Illinois is 12921.

⁵ The Facility ID for WGVE-FM at Gary, Indiana is 23278.

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Additionally, this study does not identify any television channel six facilities within the affected distance for FM channel 205. Therefore, the proposed facility would also comply with Section 73.525 of the Commission's Rules.

The proposed facility would comply with the relevant international agreements. Exhibit E-15 illustrates the proposed site along with a 320 kilometer site radius. As this map demonstrates, the proposed site is not located within 320 kilometers of the border between the United States and Canada or within 320 kilometers of the border between the United States and Mexico.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The site location does not involve any of the site locations specified in Section 1.1307(a)(1)-(7) of the Commission's Rules. Additionally, the proposed facility would not utilize high-intensity obstruction lighting. The proposed facility is located in a former industrial area.

In addition, the proposed facility would not constitute a radiofrequency radiation exposure hazard to persons in the vicinity of the structure. Under a worst case scenario, utilizing the equations in Appendix A of *OET Bulletin 65*, the calculated power density at two meters above ground is $24.0 \mu\text{W}/\text{cm}^2$. This value complies with the uncontrolled environment condition of the applicable safety standard. Hawkins certifies that it will coordinate with all other users of the site to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of applicable safety standards. Such coordination will include, but is not necessarily limited to, a reduction in transmitter power or cessation of operation.

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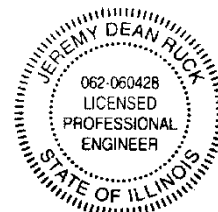
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The tower proposed for use by the facility does not require registration based on a study performed by *Towair*. That utility indicates that there are no airports within 8 kilometers of the proposed site.

No change in the community of license is proposed under this application. The original WWHN-FM application was part of NCE MX Group 90. Neither of the two applicants in the MX Group was entitled to any points as of the close of the NCE filing window. Rather, the issuance of the construction permit for WWHN-FM was based on a tiebreaker analysis relying on the number of authorizations issued to each applicant. The original WWHN-FM construction permit was therefore not based on coverage, and the proposed modification to the license due to site loss would not have affected the outcome of the MX Group proceeding.

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature
License Expires November 30, 2015

Jeremy D. Ruck, PE
February 6, 2015

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2.06.2015

WWHN-FM.X

BLED20141001CDE

Latitude: 41-40-48.11 N

Longitude: 087-32-37.21 W

ERP: 0.10 kW

Channel: 205

Frequency: 88.9 MHz

AMSL Height: 206.7 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

WWHN-FM Proposed
Site 3 km Radius

Jeremy Ruck & Associates, Inc.

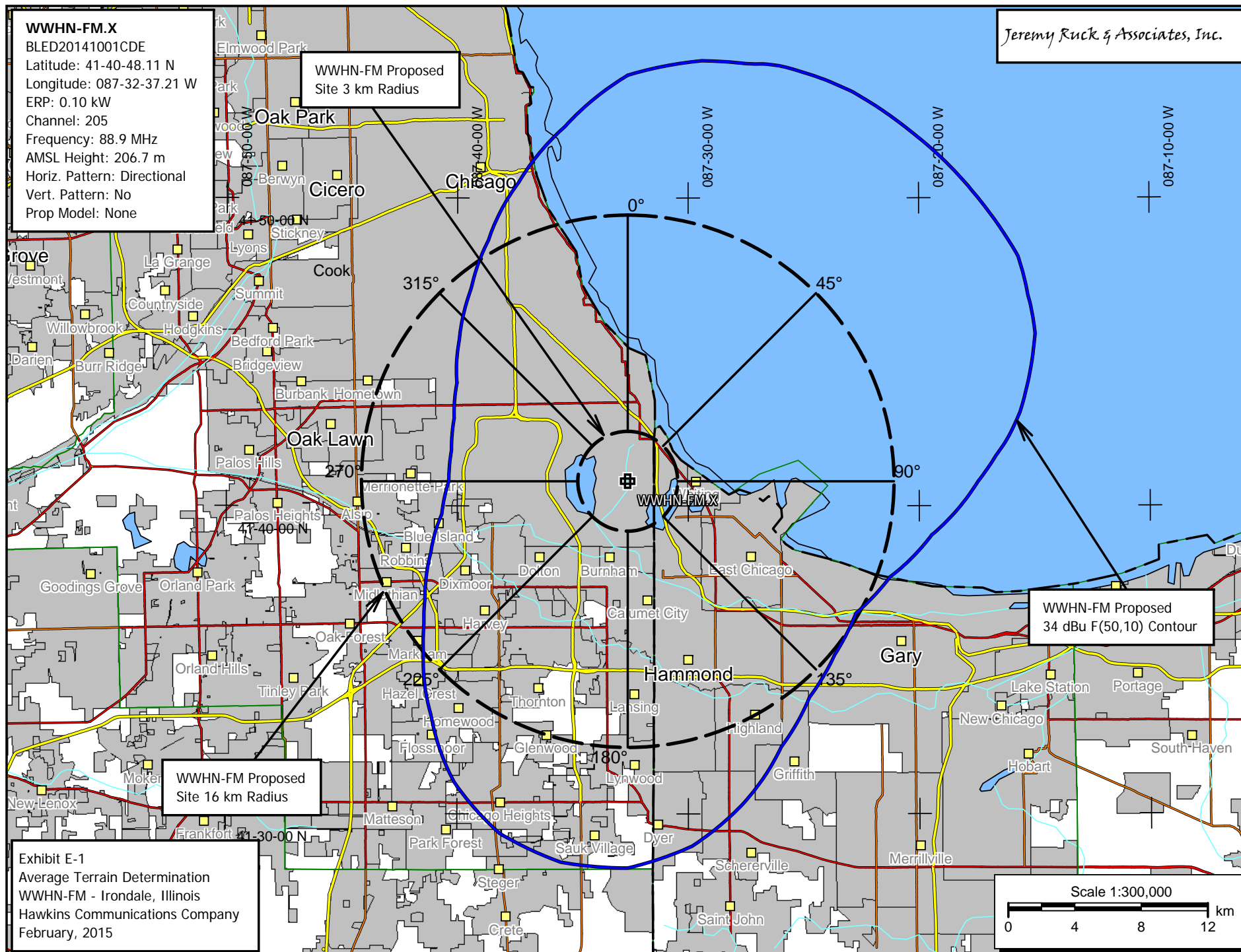


Exhibit E-2 - Determination of Average Terrain on 0, 45, and 90 Degree True Radials.**Terrain Sample Obtained from NED 3-Second Linearly Interpolated Terrain Database.**

Distance in kilometers	0 Degree True Elevation (m)	45 Degree True Elevation (m)	90 Degree True Elevation (m)
3.0	178.0	180.0	178.0
3.1	178.0	179.9	178.0
3.2	177.7	177.2	178.0
3.3	177.1	176.0	178.1
3.4	177.0		178.0
3.5	177.0		178.0
3.6	177.0		178.0
3.7	177.4		178.9
3.8	177.4		179.0
3.9	177.4		179.0
4.0	177.0		179.0
4.1	177.0		179.0
4.2	177.2		179.1
4.3	179.9		180.0
4.4	178.9		180.0
4.5	177.0		180.0
4.6	177.0		180.0
4.7	177.0		180.0
4.8	178.0		179.1
4.9	177.0		176.8
5.0	177.0		176.0
5.1	177.5		176.0
5.2	178.2		176.0
5.3	179.3		176.0
5.4	179.8		176.0
5.5	179.7		176.0
5.6	179.7		176.0
5.7	179.2		176.0
5.8	179.3		176.0
5.9	179.5		176.0
6.0	179.5		176.0
6.1	179.5		176.0
6.2	179.5		176.0
6.3	179.5		176.0
6.4	179.1		176.0
6.5	179.5		176.0
6.6	179.5		176.0
6.7	179.8		176.0
6.8	180.0		176.0
6.9	180.0		176.0
7.0	180.0		176.4
7.1	179.6		180.3
7.2	179.9		180.2
7.3	180.5		181.0
7.4	181.0		180.1
7.5	181.1		180.7
7.6	181.5		181.0
7.7	181.4		181.0
7.8	181.0		181.0
7.9	180.1		180.6
8.0	177.9		180.8
8.1	176.7		176.0
8.2	176.1		176.0
8.3	176.0		
8.4	176.7		
8.5	177.9		
8.6	178.0		
8.7	176.9		
8.8	176.4		
8.9	176.0		
Radial Average:	178.5	178.3	177.9

WWHN-FM.X

BLED20141001CDE
Latitude: 41-40-48.11 N
Longitude: 087-32-37.21 W
ERP: 0.10 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 206.7 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

WWHN-FM

BLED20141001CDE
Latitude: 41-42-30 N
Longitude: 087-31-25 W
ERP: 0.10 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 209.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Licensed WWNH-FM
Transmitter Site

Proposed WWNH-FM
Transmitter Site

Licensed WWNH-FM
60 dBu Service Contour

Proposed WWNH-FM
60 dBu Service Contour

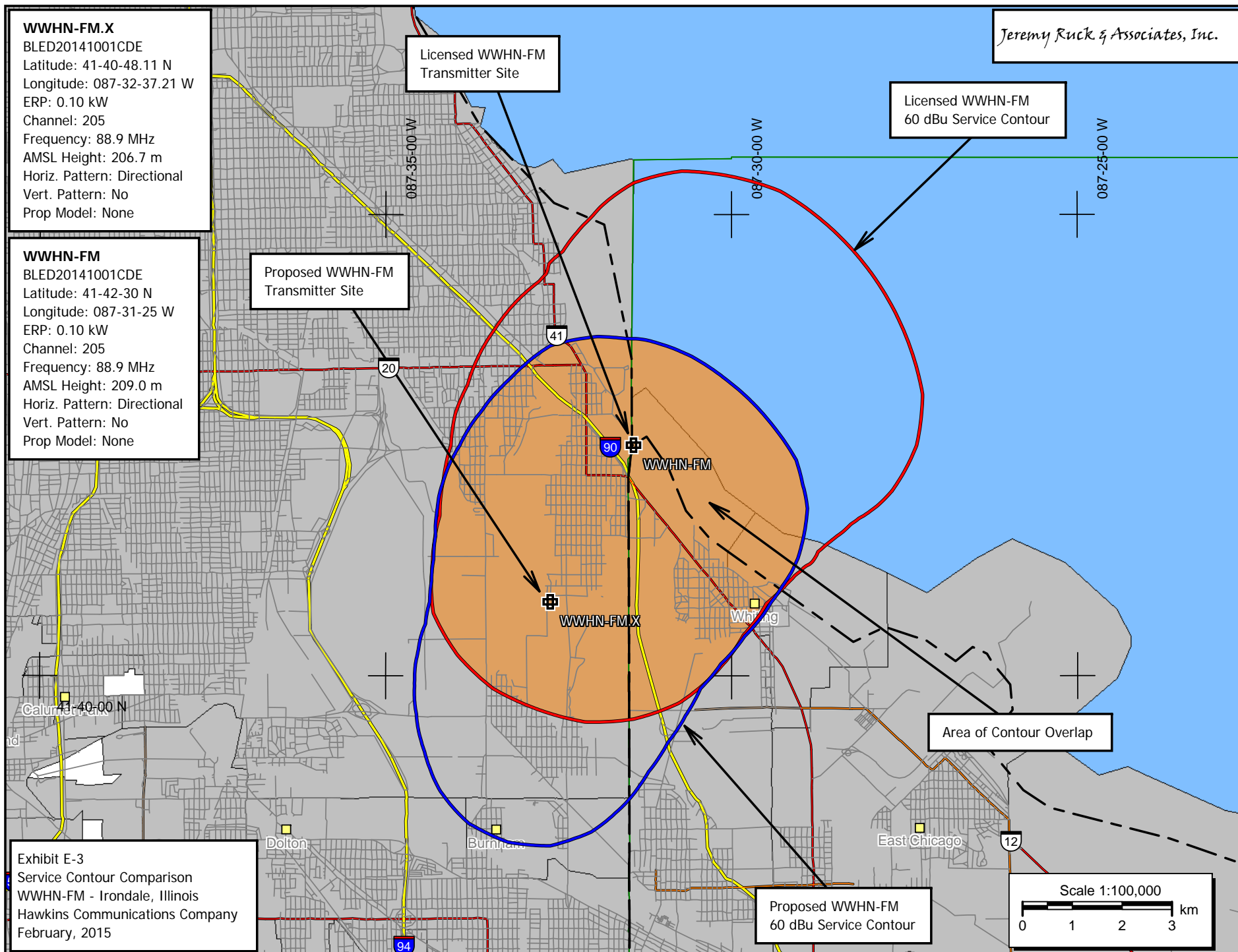
Area of Contour Overlap

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Exhibit E-3

Service Contour Comparison
WWNH-FM - Irondale, Illinois
Hawkins Communications Company
February, 2015

Scale 1:100,000



WWHN-FM.X
BLED20141001CDE
Latitude: 41-40-48.11 N
Longitude: 087-32-37.21 W
ERP: 0.10 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 206.7 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

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25 mile radius centered
on the main studio

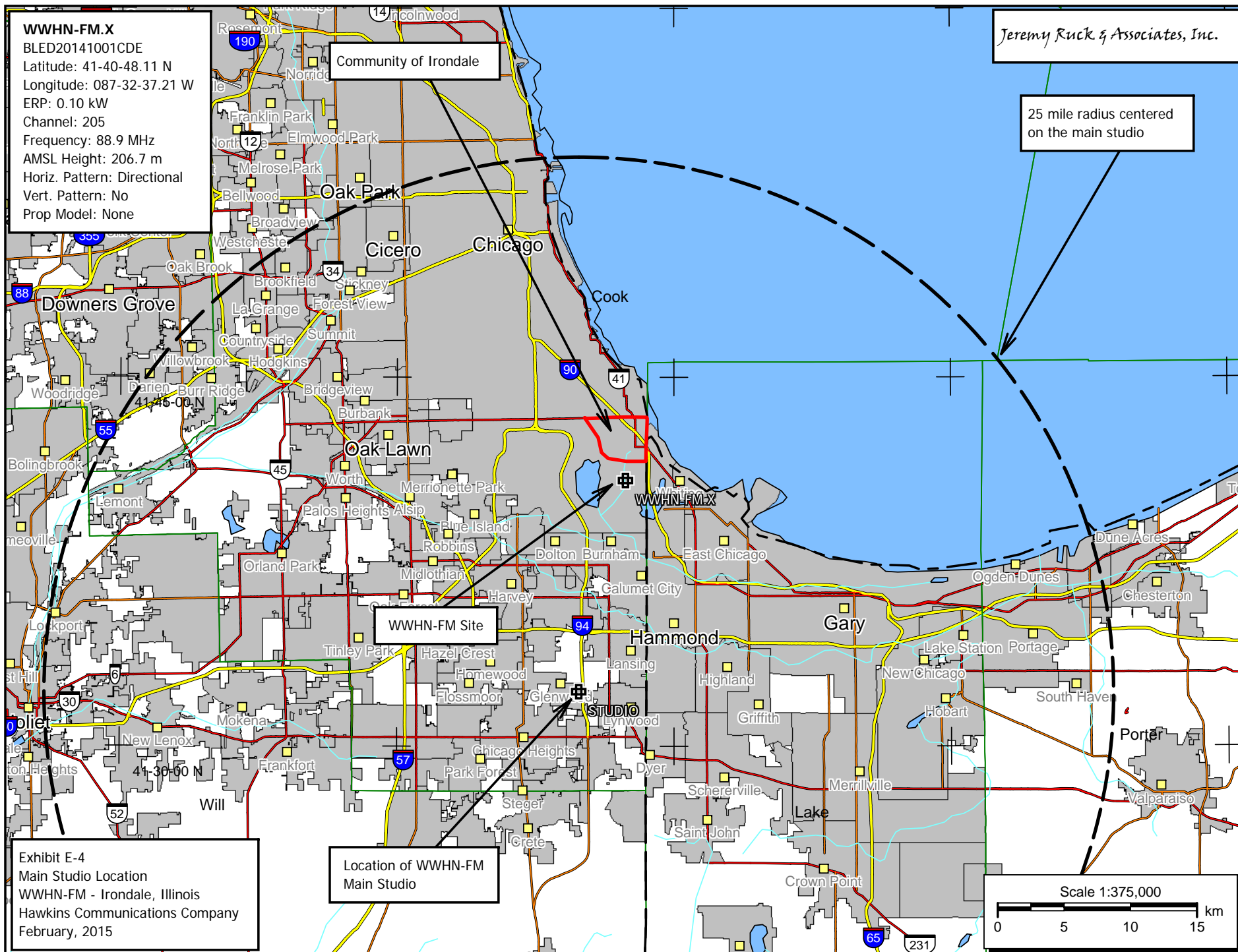


Exhibit E-4
Main Studio Location
WWNH-FM - Irondale, Illinois
Hawkins Communications Company
February, 2015

Location of WWNH-FM
Main Studio

Scale 1:375,000

0 5 10 15 km

WWHN-FM.X

BLED20141001CDE

Latitude: 41-40-48.11 N

Longitude: 087-32-37.21 W

ERP: 0.10 kW

Channel: 205

Frequency: 88.9 MHz

AMSL Height: 206.7 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

Irondale, IL
Community Boundary

Jeremy Ruck & Associates, Inc.

Proposed WWNH-FM
60 dBu Service Contour

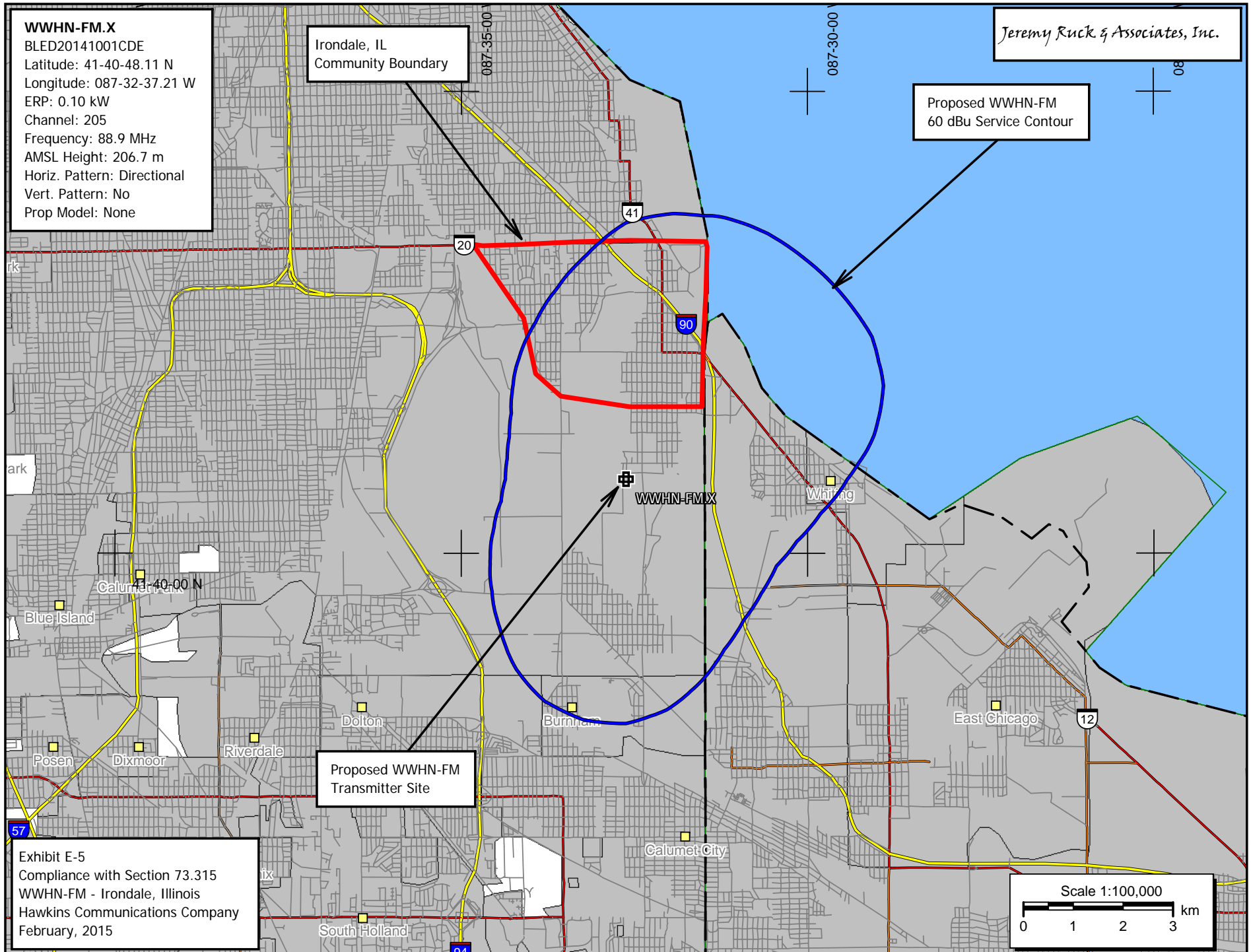
WWHN-FM.X

Proposed WWNH-FM
Transmitter Site

Exhibit E-5
Compliance with Section 73.315
WWHN-FM - Irondale, Illinois
Hawkins Communications Company
February, 2015

Scale 1:100,000

0 1 2 3 km



Jeremy Ruck & Associates, Inc.
Consulting Engineers - Canton, Illinois

Exhibit E-6 - Tabular Allocation Study
WWHN-FM - Irondale, Illinois
CH# 205A - 88.9 MHz, Pwr= 0.1 kW DA, HAAT= 26.2 M, COR= 206.7 M
Average Protected F(50-50)= 5.64 km
Standard Directional

REFERENCE
41 40 48.1 N.
87 32 37.2 W.

DISPLAY DATES
DATA 02-06-15
SEARCH 02-06-15

CH CITY	CALL	TYPE STATE	ANT AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
205A Irondale	WWHN-FM	LIC DCX IL	27.9 207.9	3.56 BLED20141001CDE	41 42 30.0 87 31 25.0	0.100 28	18.6 209	5.6 Hawkins	-20.7*	-20.8*
205A Summit	WARG	LIC DEN IL	296.5 116.3	24.17 BLED19851106KC	41 46 36.0 87 48 17.0	0.500 25	21.2 218	6.5 Community	0.0	9.5 High School Dist
204A Gary	WGVE-FM	LIC _HN IN	126.7 306.8	23.39 BLED714	41 33 15.0 87 19 05.0	2.100 28	19.9 219	13.4 Gary Community	0.0	5.0 School Corp
205D Chicago	WTTW	LIC _HN IL	337.7 157.7	18.55 BLED19910204KB	41 50 04.0 87 37 43.0	0.017 27	11.5 206	3.6 Illinois Institute	2.4	1.9 Of Tech
205A Monee	WGEN-FM	LIC _VX IL	212.2 32.1	35.01 BLED20080125ACC	41 24 47.9 87 46 02.8	0.100 54	25.2 275	7.6 Life On The Way	5.2	13.4 Communicat
207A Chicago	WKKC	LIC DEX IL	323.2 143.2	13.88 BLED20070925AHP	41 46 48.0 87 38 38.0	0.280 34	0.9 216	7.2 Board Of Trustees	9.1	6.4 Communit
203A Chicago	WHPK-FM	LIC _CN IL	340.3 160.3	13.51 BLED19850611KC	41 47 40.0 87 35 55.0	0.100 37	0.7 220	6.5 University Of	8.1	6.6 Chicago
203A Chicago	WHPK-FM	CP DCX IL	338.0 157.9	12.52 BPED20130618ABI	41 47 03.9 87 36 01.0	0.125 48	0.4 228	5.5 University Of	7.6	6.6 Chicago
205B Battle Ground	WFRW	CP DCX IN	155.0 335.5	138.76 BPED20140313ABO	40 32 48.0 86 50 59.0	50.000 131	127.6 329	45.5 Christian Radio	6.9	78.8 Friends, I
203A Flossmoor	WHFH	CP DCX IL	219.6 39.5	19.37 BPED20130515ABL	41 32 44.0 87 41 31.0	1.500 33	1.6 236	10.6 Community High	13.4	7.7 School Dist
203A Flossmoor	WHFH	LIC DHN IL	219.4 39.3	19.38 BLED19800513AE	41 32 43.0 87 41 30.0	1.500 28	1.6 236	10.6 Community High	13.4	7.7 School Dist
202A Chicago	WXAV	LIC DCN IL	283.4 103.2	14.61 BLED19910819KB	41 42 37.0 87 42 54.0	0.150 39	0.6 224	6.2 St. Xavier College	11.5	8.0
206A Lowell	WLPR-FM	LIC _C_ IN	158.4 338.6	42.62 BLED20130320ACC	41 19 24.0 87 21 22.0	1.100 112	28.5 323	19.4 Northwest Indiana	9.5	17.1 Public B
207D University Park	W207D1	LIC DC_ IL	240.2 60.1	13.23 BLFT20021119ABT	41 37 15.0 87 40 55.0	0.013 118	0.1 309	3.4 Best Media, Inc.	9.6	9.6
258B Chicago	WUSN«	LIC _CX IL	344.9 164.8	25.18 BLH20030611AAT	41 53 56.0 87 37 23.0	5.700 425	6.6 606	4.7 Cbs Radio Of	14.5R	10.7M Chicago Lic
208B1 Chesterton	WBEW	LIC DCX IN	96.8 277.1	41.33 BLED20081027AAD	41 38 06.0 87 02 59.0	4.000 182	2.1 380	26.5 Chicago Public	34.4	13.2 Media Inc
205A River Grove	WRRG	LIC DCN IL	317.3 137.1	35.71 BLED19860926KC	41 54 56.0 87 50 12.0	0.100 39	15.9 234	4.8 Triton College	16.2	20.1
204A Chicago	WLWU	LIC _CN IL	344.9 164.9	36.97 BLED19840904CR	42 00 04.0 87 39 36.0	0.100 70	12.7 253	8.9 Loyola University	19.4	21.7 Of Chi ca
207B1 Evanston	WNUR-FM	LIC _CN IL	345.3 165.2	42.92 BLED1609	42 03 12.0 87 40 33.0	7.200 30	2.0 218	19.3 Northwestern University	36.0	23.0
205A Notre Dame	WSND-FM	LIC _CN IN	93.9 274.7	110.91 BLED19980812KB	41 36 19.0 86 12 45.0	3.400 110	80.5 348	26.5 Voice Of The	25.4	70.6 Fighting Iris
203A Hinsdale	WHSD	LIC DEN IL	290.5 110.3	34.54 BLED19860522KA	41 47 18.0 87 56 02.0	0.125 40	0.3 254	5.3 Hinsdale Twp.	31.4	28.5 High Sch. D
205B1 Ottawa	WWGN	LIC _E_ IL	250.7 69.8	124.69 BLED20051122AAT	41 18 05.0 88 57 11.0	4.100 148	92.1 332	34.0 Family Worship	29.2	81.7 Center Chur
202A Chesterton	WDSO	LIC _CX IN	101.1 281.4	40.95 BMLD20050107ABH	41 36 29.0 87 03 37.0	0.400 41	1.4 241	11.2 Duneland School	34.9	29.3 Corp.
202A Chicago	WZRD	LIC _CN IL	336.7 156.6	36.59 BLED19850221KP	41 58 56.0 87 43 07.0	0.100 22	0.7 209	5.6 Northeastern Illinois	31.2	30.6 University
204A Elmhurst	WRSE	LIC DCX IL	305.9 125.6	41.09 BLED20080812ACW	41 53 46.0 87 56 45.0	0.320 29	6.0 236	4.4 Bd. Of Trustees,	31.8	32.7 Elmhurst

CH CITY	CALL	TYPE STATE	ANT	AZI <--	DI ST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
206A Naperville	WONC	LIC_CN IL		281.4 101.0	55.06 BLED19940809KC	41 46 34.0 88 11 41.0	1.500 50	19.6 264	13.1 North Central College	32.9	38.3
202A Downers Grove	WDGC-FM	LIC_DHN IL		289.7 109.4	41.25 BLED1271	41 48 16.0 88 00 44.0	0.250 40	0.2 258	4.0 Wdgc-fm, School District #	38.3	36.4
205A Elgin	WEPS	LIC_CX IL		303.4 122.9	72.44 BLED20111221ADC	42 02 11.0 88 16 34.0	0.740 13	32.1 261	9.4 Board Of Education School	37.1	54.2
204A Joliet	WCSF	LIC_CN IL		250.6 70.3	48.93 BLED19880916KB	41 31 58.0 88 05 54.0	0.100 39	8.0 230	5.6 College Of St. Francis	37.6	39.3
205A Lake Forest	WMXM	LIC_C_ IL		339.7 159.5	67.58 BLED20100322ABP	42 14 59.0 87 49 44.0	0.295 29	25.0 233	7.5 Lake Forest College	37.8	44.4
204A Kankakee	WEGN	LIC_DCX IL		214.4 34.1	63.56 BMLED20111003AEK	41 12 26.5 87 58 21.6	5.000 65	20.1 256	13.2 The Power Foundation	39.0	43.4
206D Mount Prospect	W206DL	LIC_DC_ IL		318.8 138.5	51.94 BLFT20051024AAU	42 01 51.0 87 57 29.0	0.120 38	8.7 248	6.1 Best Media, Inc.	39.4	41.2
203A Wanatah	WTMK	CP_DCX IN		133.9 314.2	60.09 BMPED20140210AAL	41 18 15.0 87 01 30.0	3.400 110	1.0 318	12.5 Olivet Nazarene University	55.2	45.8
203A Glenview	WGBK	LIC_DC_ IL		333.6 153.4	53.52 BLED19990913AAD	42 06 39.0 87 49 56.0	0.185 32	0.9 226	6.8 Glenbrook High School Dist	48.1	46.1

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM.
In & Out distances between contours are shown at closest points. Reference zone= - Zone 1, Co to 3rd adjacent.
All separation margins (if shown) include rounding. Call signs with strikeout need not be protected.

Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
""affixed to 'IN' or 'OUT' values = site inside restricted contour.

« = Station meets FCC minimum distance spacing for its class.

WWHN-FM.X

BLED20141001CDE

Latitude: 41-40-48.11 N

Longitude: 087-32-37.21 W

ERP: 0.10 kW

Channel: 205

Frequency: 88.9 MHz

AMSL Height: 206.7 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

Jeremy Ruck & Associates, Inc.

- 60 dBu F(50,50) Service Contour
- 40 dBu F(50,10) Interference Contour
- 54 dBu F(50,10) Interference Contour
- 100 dBu F(50,10) Interference Contour

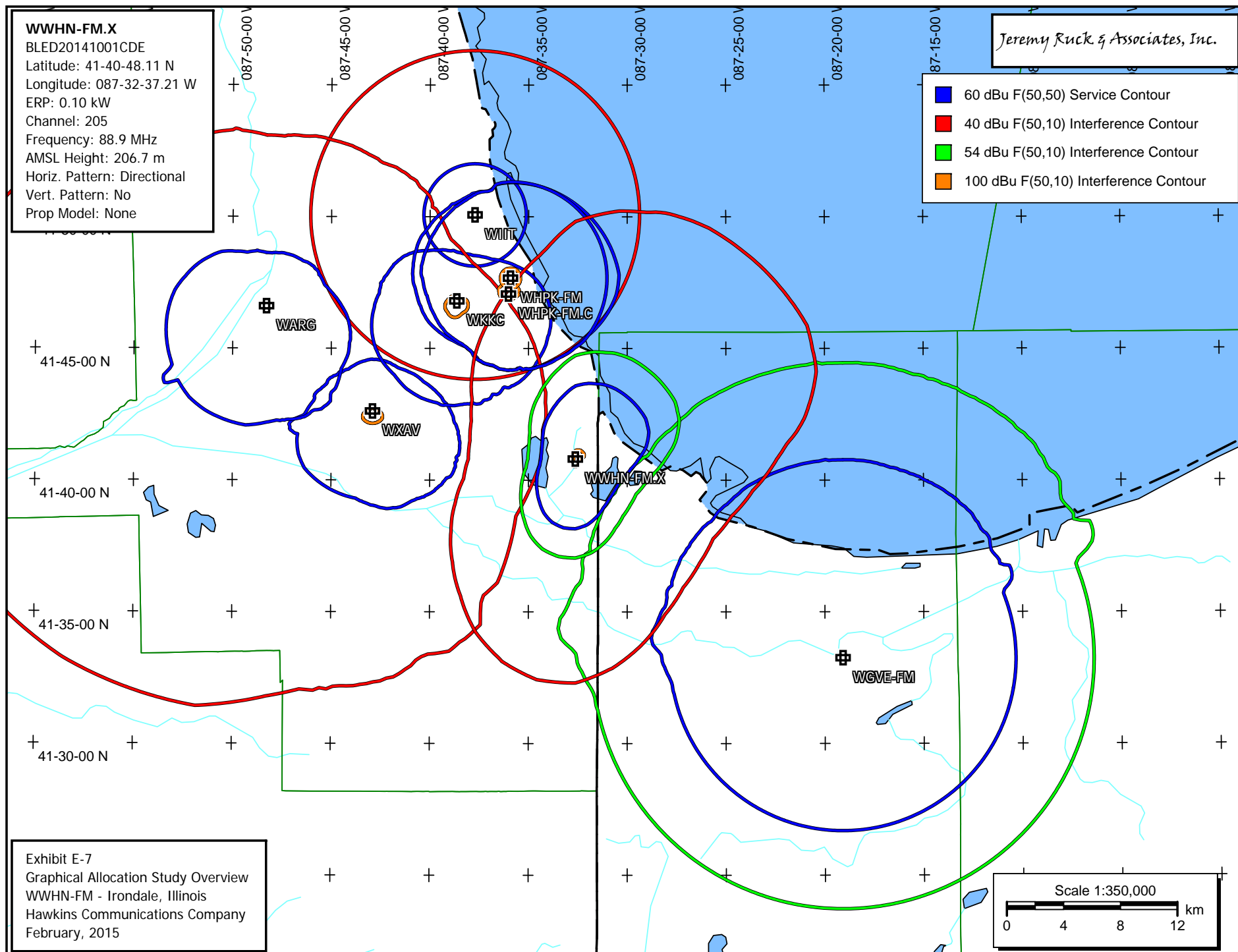
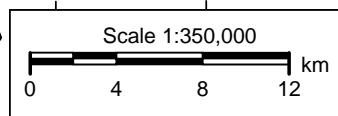


Exhibit E-7
Graphical Allocation Study Overview
WWHN-FM - Irondale, Illinois
Hawkins Communications Company
February, 2015



WWHN-FM.X
BLED20141001CDE
Latitude: 41-40-48.11 N
Longitude: 087-32-37.21 W
ERP: 0.10 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 206.7 m
Elevation: 178.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

WARG
BLED19851106KC
Latitude: 41-46-36 N
Longitude: 087-48-17 W
ERP: 0.50 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 218.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

- WWHN-FM Proposed 60 dBu F(50,50) Contour
- WARG 40 dBu F(50,10) Contour

WARG 110 Degree
True Radial

WARG 125 Degree
True Radial

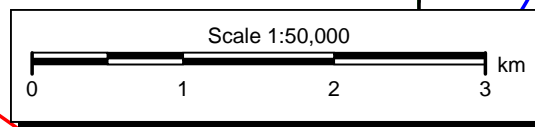
WWHN-FM 315
Degree True Radial

WWHN-FM 250
Degree True Radial

WWHN-FM 60 dBu
Service Contour

WARG 40 dBu
F(50,10) Contour

Exhibit E-8
Graphical Allocation Study Detail
WWHN-FM - Irondale, Illinois
Hawkins Communications Company
February, 2014



umet Park

WWHN-FM.X

Exhibit E-9 - WWHN-FM 60 dBu F(50,50) Contour Tabulation

Distance to Contour Report
Type of contour: FCC
Location Variability: 50.0 %
Time Variability: 50.0 %
of Radials Calculated: 360
FCC Matching HAAT Calculation Used
Field Strength: 60.00 dBuV/m
Primary Terrain: NED 3 Second US Terrain
Secondary Terrain: FCC 30 Second US Database

Transmitter Information:
Call Letters: WWHN-FM.X
File Number: BLED20141001CDE
Latitude: 41-40-48.11 N
Longitude: 087-32-37.21 W
ERP: 0.10 kW
EIRP: 0.164 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 206.7 m
Elevation: 178.0 m
HAAT: 25.7 m
Horiz. Antenna Pattern: Directional
Vert. Elevation Pattern: No

Azimuth (deg)	Distance (km)	HAAT (m)
-----	-----	-----
250.0	2.82	24.4
251.0	2.79	25.0
252.0	2.77	26.1
253.0	2.74	25.7
254.0	2.72	25.9
255.0	2.69	25.3
256.0	2.66	24.8
257.0	2.63	24.4
258.0	2.60	23.9
259.0	2.57	23.5
260.0	2.54	23.5
261.0	2.53	23.4
262.0	2.52	22.7
263.0	2.51	22.0
264.0	2.50	21.8
265.0	2.48	21.8
266.0	2.47	21.9
267.0	2.46	22.0
268.0	2.45	22.0
269.0	2.43	21.7
270.0	2.42	21.5
271.0	2.42	21.3
272.0	2.42	21.1
273.0	2.42	20.9
274.0	2.42	20.6
275.0	2.42	20.3
276.0	2.42	20.1
277.0	2.42	20.0

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02.06.2015

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Exhibit E-9 - WWHN-FM 60 dBu F(50,50) Contour Tabulation

278.0	2.42	19.8
279.0	2.42	19.6
280.0	2.42	19.5
281.0	2.43	19.5
282.0	2.43	19.4
283.0	2.44	19.3
284.0	2.45	19.3
285.0	2.46	19.3
286.0	2.46	19.2
287.0	2.47	19.2
288.0	2.48	19.2
289.0	2.49	19.1
290.0	2.49	19.2
291.0	2.51	19.3
292.0	2.52	19.3
293.0	2.54	19.5
294.0	2.56	19.5
295.0	2.57	19.7
296.0	2.59	19.7
297.0	2.61	19.9
298.0	2.62	20.2
299.0	2.64	21.0
300.0	2.66	21.9
301.0	2.69	21.8
302.0	2.72	21.7
303.0	2.75	22.2
304.0	2.78	22.8
305.0	2.81	23.1
306.0	2.84	23.4
307.0	2.86	23.7
308.0	2.89	23.9
309.0	2.93	24.4
310.0	2.96	24.7
311.0	2.99	25.0
312.0	3.03	25.1
313.0	3.06	25.5
314.0	3.10	25.7
315.0	3.13	25.9

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Exhibit E-10 - WARG(FM) 40 dBu F(50,10) Contour Tabulation

Distance to Contour Report
Type of contour: FCC
Location Variability: 50.0 %
Time Variability: 10.0 %
of Radials Calculated: 360
FCC Matching HAAT Calculation Used
Field Strength: 40.00 dBuV/m
Primary Terrain: NED 3 Second US Terrain
Secondary Terrain: FCC 30 Second US Database

Transmitter Information:

Call Letters: WARG
File Number: BLED19851106KC
Latitude: 41-46-36 N
Longitude: 087-48-17 W
ERP: 0.50 kW
EIRP: 0.82 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 218.0 m
Elevation: 188.0 m
HAAT: 25.0 m
Horiz. Antenna Pattern: Directional
Vert. Elevation Pattern: No

Azimuth (deg)	Distance (km)	HAAT (m)
-----	-----	-----
110.0	20.91	30.9
111.0	21.06	30.8
112.0	21.18	30.7
113.0	21.20	30.3
114.0	21.27	29.5
115.0	21.42	29.2
116.0	21.58	28.6
117.0	21.73	28.3
118.0	21.89	28.0
119.0	22.04	27.5
120.0	22.19	27.3
121.0	22.26	27.2
122.0	22.34	27.2
123.0	22.41	26.9
124.0	22.49	26.8
125.0	22.56	26.9

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WWHN-FM.X
BLED20141001CDE
Latitude: 41-40-48.11 N
Longitude: 087-32-37.21 W
ERP: 0.10 kW
Channel: 205
Frequency: 88.9 MHz
AMSL Height: 206.7 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

WGVE-FM
BLED714
Latitude: 41-33-15 N
Longitude: 087-19-05 W
ERP: 2.10 kW
Channel: 204
Frequency: 88.7 MHz
AMSL Height: 219.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Jeremy Ruck & Associates, Inc.

■ WWHN-FM Proposed 60 dBu F(50,50) Contour
■ WGVE-FM 54 dBu F(50,10) Contour

WWHN-FM 60 dBu
F(50,50) Contour

WGVE-FM 54 dBu
F(50,10) Contour

WWHN-FM 155
Degree True Radial

WWHN-FM 90
Degree True Radial

WGVE-FM 300
Degree True Radial

WGVE-FM 315
Degree True Radial

Exhibit E-11
Graphical Allocation Study Detail
WWHN-FM - Irondale, Illinois
Hawkins Communications Company
February, 2015

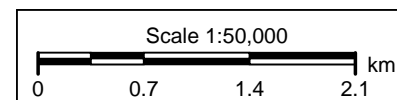


Exhibit E-12 - WWHN-FM 60 dBu F(50,50) Contour Tabulation

Distance to Contour Report

Type of contour: FCC

Location Variability: 50.0 %

Time Variability: 50.0 %

of Radials Calculated: 360

FCC Matching HAAT Calculation Used

Field Strength: 60.00 dBuV/m

Primary Terrain: NED 3 Second US Terrain

Secondary Terrain: FCC 30 Second US Database

Transmitter Information:

Call Letters: WWHN-FM.X

File Number: BLED20141001CDE

Latitude: 41-40-48.11 N

Longitude: 087-32-37.21 W

ERP: 0.10 kW

EIRP: 0.164 kW

Channel: 205

Frequency: 88.9 MHz

AMSL Height: 206.7 m

Elevation: 178.0 m

HAAT: 26.17 m

Horiz. Antenna Pattern: Directional

Vert. Elevation Pattern: No

Azimuth (deg)	Distance (km)	HAAT (m)
-----	-----	-----
90.0	4.43	29.1
91.0	4.39	29.0
92.0	4.34	29.0
93.0	4.30	29.0
94.0	4.25	28.8
95.0	4.20	28.8
96.0	4.15	28.7
97.0	4.10	28.6
98.0	4.06	28.6
99.0	4.01	28.4
100.0	3.96	28.5
101.0	3.93	28.5
102.0	3.90	28.4
103.0	3.86	28.6
104.0	3.83	28.8
105.0	3.80	29.0
106.0	3.77	29.2
107.0	3.74	29.2
108.0	3.71	29.2
109.0	3.67	29.0
110.0	3.64	29.1
111.0	3.62	28.5
112.0	3.61	27.7
113.0	3.59	27.2
114.0	3.58	27.1
115.0	3.56	27.1
116.0	3.54	27.0
117.0	3.53	27.2

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Exhibit E-12 - WWHN-FM 60 dBu F(50,50) Contour Tabulation

118.0	3.51	26.9
119.0	3.49	26.7
120.0	3.48	26.7
121.0	3.48	26.7
122.0	3.49	26.8
123.0	3.50	27.0
124.0	3.50	27.1
125.0	3.51	27.3
126.0	3.52	27.4
127.0	3.52	27.0
128.0	3.53	27.1
129.0	3.54	27.2
130.0	3.54	27.1
131.0	3.56	26.9
132.0	3.57	27.0
133.0	3.58	26.8
134.0	3.60	26.5
135.0	3.61	26.7
136.0	3.62	26.9
137.0	3.64	26.5
138.0	3.65	26.1
139.0	3.66	26.0
140.0	3.67	25.7
141.0	3.70	25.8
142.0	3.73	25.7
143.0	3.75	25.8
144.0	3.78	25.8
145.0	3.80	26.0
146.0	3.83	26.0
147.0	3.86	26.1
148.0	3.89	26.2
149.0	3.91	26.2
150.0	3.94	25.9
151.0	3.98	25.7
152.0	4.02	25.6
153.0	4.06	25.4
154.0	4.10	25.4
155.0	4.14	25.1

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Exhibit E-13 - WGVE-FM 54 dBu F(50,10) Contour Tabulation

Distance to Contour Report
Type of contour: FCC
Location Variability: 50.0 %
Time Variability: 10.0 %
of Radials Calculated: 360
FCC Matching HAAT Calculation Used
Field Strength: 54.00 dBuV/m
Primary Terrain: NED 3 Second US Terrain
Secondary Terrain: FCC 30 Second US Database

Transmitter Information:
Call Letters: WGVE-FM
File Number: BLED714
Latitude: 41-33-15 N
Longitude: 087-19-05 W
ERP: 2.10 kW
EIRP: 3.444 kW
Channel: 204
Frequency: 88.7 MHz
AMSL Height: 219.0 m
Elevation: 186.0 m
HAAT: 28.0 m
Horiz. Antenna Pattern: Omni
Vert. Elevation Pattern: No

Azimuth (deg)	Distance (km)	HAAT (m)
300.0	19.73	37.0
301.0	19.80	37.2
302.0	19.87	37.5
303.0	19.81	37.3
304.0	19.80	37.2
305.0	19.86	37.4
306.0	19.80	37.2
307.0	19.89	37.5
308.0	19.90	37.6
309.0	19.89	37.5
310.0	19.92	37.6
311.0	19.91	37.6
312.0	19.93	37.7
313.0	19.96	37.8
314.0	19.90	37.6
315.0	19.89	37.5

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02.06.2015

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Jeremy Ruck & Associates, Inc.
Consulting Engineers - Canton, Illinois
Exhibit E-14 - Single Channel Spacing Study
WWHN-FM - Irondale, Illinois

REFERENCE		DISPLAY DATES
41 40 48.1 N.	CLASS = A Int = A	DATA 02-06-15
87 32 37.2 W.	Current Spacings to 3rd Adj.	SEARCH 02-06-15
----- Channel 205 - 88.9 MHz -----		

Call	Channel	Location		Azi	Dist	FCC	Margin
<hr/>							
WWHN-FM	LIC-D 205A	Irondale	IL	27.9	3.55	114.5	-111.0
WARG	LIC-D 205A	Summit	IL	296.5	24.22	114.5	-90.3
WGEN-FM	LIC 205A	Monee	IL	212.2	35.01	114.5	-79.5
WRRG	LIC-D 205A	River Grove	IL	317.3	35.74	114.5	-78.8
WIIT	LIC 205D	Chicago	IL	337.7	18.54	84.5	-66.0
WGVE-FM	LIC 204A	Gary	IN	126.7	23.43	71.5	-48.1
WMXM	LIC 205A	Lake Forest	IL	339.7	67.54	114.5	-47.0
WEPS	LIC 205A	Elgin	IL	303.4	72.56	114.5	-41.9
WFRW	CP -D 205B	Battle Ground	IN	155.0	138.70	177.5	-38.8
WLUW	LIC 204A	Chicago	IL	344.9	36.94	71.5	-34.6
WRSE	LIC-D 204A	Elmhurst	IL	305.9	41.15	71.5	-30.4
WLPR-FM	LIC 206A	Lowell	IN	158.4	42.59	71.5	-28.9
WCNM	CP -D 205B1	Harvard	IL	313.0	119.67	142.5	-22.8
WCSF	LIC 204A	Joliet	IL	250.6	49.04	71.5	-22.5
WHPK-FM	CP -D 203A	Chicago	IL	338.0	12.51	30.5	-18.0
WWGN	LIC 205B1	Ottawa	IL	250.7	124.98	142.5	-17.5
WHPK-FM	LIC 203A	Chicago	IL	340.3	13.50	30.5	-17.0
WKKC	LIC-D 207A	Chicago	IL	323.2	13.88	30.5	-16.6
WONC	LIC 206A	Naperville	IL	281.4	55.21	71.5	-16.3
WXAV	LIC-D 202A	Chicago	IL	283.4	14.65	30.5	-15.9
W207BI	LIC-D 207D	University Park	IL	240.2	13.26	25.5	-12.2
WHFH	CP -D 203A	Flossmoor	IL	219.6	19.38	30.5	-11.1
WHFH	LIC-D 203A	Flossmoor	IL	219.4	19.39	30.5	-11.1
WEGN	LIC-D 204A	Kankakee	IL	214.4	63.56	71.5	-7.9
WBEW	LIC-D 208B1	Chesterton	IN	96.8	41.44	47.5	-6.1
WNUR-FM	LIC 207B1	Evanston	IL	345.3	42.89	47.5	-4.6
WFRW	LIC 205B1	Battle Ground	IN	155.0	138.70	142.5	-3.8
WSND-FM	LIC 205A	Notre Dame	IN	93.9	111.21	114.5	-3.3
WSRI	LIC-D 204A	Sugar Grove	IL	272.4	74.16	71.5	2.7
WHSD	LIC-D 203A	Hinsdale	IL	290.5	34.62	30.5	4.1
WZRD	LIC 202A	Chicago	IL	336.7	36.57	30.5	6.1
WSIS	CP -D 204B	Riverside	MI	57.0	118.69	112.5	6.2
WCNM	LIC 205A	Harvard	IL	313.3	120.82	114.5	6.3
WDSO	LIC 202A	Chesterton	IN	101.1	41.05	30.5	10.6
WUSN	LIC 258B	Chicago	IL	344.9	25.18	14.5	10.7
WDGC-FM	LIC-D 202A	Downers Grove	IL	289.7	41.35	30.5	10.9
WYMS	LIC 205B1	Milwaukee	WI	349.6	159.36	142.5	16.9
WOKL	LIC-D 206A	Round Lake Beach	IL	333.9	88.40	71.5	16.9
W205CC	LIC 205D	Dekalb	IL	287.6	102.36	84.5	17.9
W206BL	LIC-D 206D	Mount Prospect	IL	318.8	51.98	33.5	18.5
WGBK	LIC-D 203A	Glenview	IL	333.6	53.50	30.5	23.0
WSIS	LIC 204B1	Riverside	MI	57.0	118.69	95.5	23.2
WTKM	CP -D 203A	Wanatah	IN	133.9	60.15	30.5	29.7

Call	Channel	Location		Azi	Dist	FCC	Margin
WCLR	LIC-D 202A	Arlington Heights	IL	323.1	60.29	30.5	29.8
WHCM	LIC 202A	Palatine	IL	315.7	62.61	30.5	32.1
WMNK	LIC 203A	Minooka	IL	252.2	66.19	30.5	35.7
W203AJ	LIC 203D	Michigan City	IN	90.9	61.45	25.5	36.0
WAWF	LIC 202A	Kankakee	IL	194.9	69.23	30.5	38.7
WTKM	LIC-D 203A	Lowell	IN	155.3	72.95	30.5	42.5
W207CL	LIC 207D	Kankakee	IL	205.3	68.43	25.5	42.9

All separation margins include rounding

WWHN-FM.X

BLED20141001CDE

Latitude: 41-40-48.11 N

Longitude: 087-32-37.21 W

ERP: 0.10 kW

Channel: 205

Frequency: 88.9 MHz

AMSL Height: 206.7 m

Horiz. Pattern: Directional

Vert. Pattern: No

Prop Model: None

320 km WWHN-FM
Site Radius

Jeremy Ruck & Associates, Inc.

WWHN-FM.X

Exhibit E-15

International Agreement Compliance

WWHN-FM - Irondale, Illinois

Hawkins Communications Company

February, 2015

Scale 1:8,000,000

0 110 220 330 km