

## **TECHNICAL REPORT**

This technical report has been developed in support of an application for a minor modification of WMCI(FM) 267B1 at Neoga, IL, FCC file no. BLH-20060320AGA. A change in the community of license to Mattoon, IL with a corresponding increase in ERP are submitted to provide a second licensed service to the community. The following exhibits are provided for the form 301 minor modification:

- E-1 WMCI(FM) Spacing Study
- E-2 WMCI(FM) Reference Site Spacing
- E-3 WMCI(FM) Reference Site 70 dBu Circle Plot
- E-4 WMCI(FM) Reference Site Topographic Map
- E-5 WBAA-FM Reference Site Spacing
- E-6 WBAA-FM Reference Site 70 dBu Circle Plot
- E-7 WBNQ(FM) Reference Site Spacing
- E-8 WBNQ(FM) Reference Site 70 dBu Circle Plot
- E-9 WMCI(FM) Mod. Interference Plot to WBAA-FM 267B1
- E-10 WMCI(FM) Mod. Interference Plot to WBNQ(FM) 268B
- E-11 60, 70 dBu FCC, 73 dBu Longley-Rice Contour Plots
- E-12 Enhanced 73 dBu Longley-Rice Contour Plot
- E-13 73 dBu Longley-Rice Distance to Contour Tabulation
- E-14 HAAT Calculation
- E-15 RF Calculation
- E-16 ASR 1051455

### **WMCI(FM) Modification Analysis:**

A spacing study (exhibit E-1) shows WMCI(FM) is short-spaced to WBAA-FM 267B1 at West Lafayette, IN and WBNQ(FM) 268B at Bloomington, IL. As a result, WMCI(FM) will be designated as a 73.215(c) facility.

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**WMCI fully spaced reference point = N 38-19-00 W 88-20-56 (NAD 27) E2-E4).**

A fully-spaced reference site covering 100% of the Mattoon, IL community is shown in exhibits E-2 to E-4 and requires moving the allotment reference points of WBAA-FM and WBNQ(FM) and will not require any physical change to their facilities or filing an application to effect the reference point changes.

**WBAA-FM modified reference point = N 40-23-16 W 86-51-19 (NAD27) E5-E6).**

Channel study and 70 dBu coverage plot provided in E5 and E6. The reference point is suitable for tower construction.

**WBNQ(FM modified reference point = N 40-33-36 W 88-51-28 (NAD27) E7-E8).**

Channel study and 70 dBu coverage plot provided in E5 and E6. The reference point is suitable for tower construction.

In the Report and Order, *Revision of Procedures Governing Amendments to FM Table of Allotments and Changes to Community of License in the Radio Broadcast Services*, 21 FCC Rcd 14212 (2006) at para. 9, the Commission stated, “we will not count required reference coordinate changes (which are not set out in the Table of Allotments) against the current limit of four contingent minor change applications that may be filed simultaneously.” Since reference point changes do not count against the limit of four applications, there is no requirement for the licensee to file an application for this purpose. In that proceeding, the Commission eliminated the rule making process for these types of channel upgrades in class. In so doing the Commission permitted the previously required

rule making changes (such as reference point changes) to be performed at the application stage. *See e.g. Station WNFN, Franklin, TN (BPH-20170627AAL).*

The purpose of designating a reference point is to demonstrate that the allotment of Channel 267B1 can be made to Mattoon, IL as if there were a two-step procedure. Since there is no longer a two-step procedure, the reference points will not be needed once the WMCI permit is granted. WBAA-FM and WBNW(FM) can continue operating with their license facilities. The locations for each of the reference points are theoretically available for construction of a supporting tower and can provide 70 dBu coverage to their respective communities of license.

Accordingly, there is no need to request that the licensees of WBAA-FM and WBNQ(FM) provide a consent statement to effectuate this change. There is no actual change affecting them. Instead, WMCI has demonstrated that the allotment coordinates comply with Section 73.207 of the Commission's Rules.

**WMCI §73.215 and §73.315 analysis:**

Interference plots to WBAA-FM and WBNQ(FM) are included as E-9 and E-10. Exhibits E-11 and E-12 demonstrate that the facility places a 73 dBu contour over 94.5% of the Mattoon, IL city boundary and 100% of the population using the Longley-Rice propagation model. The predicted 73 dBu contour is used to incorporate 3 dB of "clutter loss" in accordance with OET practice. The 73 dB Longley-Rice exceeds the FCC calculated 70 dBu contour by greater than the required 10% per *Hardinsburg, KY* and is within or limited to the extent of the FCC standard prediction method 60 dBu contour, as

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shown in the exhibit E-13 tabulation. The Longley-Rice “first occurrence” 73 dBu contour was calculated with the V-Soft Communications Probe 4 software and the USGS three (03) second terrain database in accordance with OET practice.

It is noted that the Longley-Rice parameters used for this study were:

**Terrain - USGS 03 second with 30 m sampling**

**Cell size - 2 km (default for LR calculations)**

**Polarization - Vertical**

**Receiver height - 9.1 meters**

## **WMCI(FM) Antenna System:**

The facility is located on the existing tower, ASR 1051455, at coordinates:

**39-15-01N 088-22-46W NAD27.**

A Shively 6813 three bay, full-wavelength-spaced, non-directional antenna is mounted at a COR AGL of 142 meters and will operate at an ERP of 12.0 kW. The 60 dBu contour at 12.0 kW ERP and 146 meters HAAT using 03 second terrain (exhibit E-14) results in a distance to contour of 39.27 km and does not exceed the class B1 maximum of 39 km when rounded.

## **RF Exposure Calculation:**

The RF was calculated using the Commission’s FMMODEL program (exhibit E-15). The maximum RF was calculated to be 24.13  $\mu\text{Watts/cm}^2$  at a distance of 29.2

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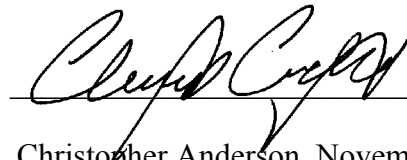
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meters from the tower

The RF contribution of collocated station WHQQ(FM) on channel 255A with 3.2 kW ERP utilizing a two bay Jampro V-type antenna at 132 meters AGL is 2.58  $\mu\text{Watts}/\text{cm}^2$  at a distance of 70.8 meters from the tower. Therefore, the combined RF for the two FM facilities is 26.71  $\mu\text{Watts}/\text{cm}^2$  or 13.4% of the maximum general population exposure limit.

## **Conclusion:**

It is concluded that the minor modification of WMCI(FM) is in full compliance with the Commission rules and policies.



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Christopher Anderson November 07, 2018  
andersce@bham.rr.com

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# Exhibit E-1 WMCI 267B1 Spacing Study

REFERENCE		DISPLAY DATES
39 15 01.0 N.	CLASS = B1	DATA 11-06-18
88 22 46.0 W.	Current Spacings to 3rd Adj.	SEARCH 11-07-18
----- Channel 267 - 101.3 MHz -----		

Call	Channel	Location		Azi	Dist	FCC	Margin
-----							
WMCI	LIC 267B1	Neoga	IL	217.4	0.07	174.5	-174.4
WBAA-FM	LIC-N 267B1	West Lafayette	IN	46.9	171.89	174.5	-2.6

73.215 elected to WBAA-FM.

WBNQ	LIC-N 268B	Bloomington	IL	338.2	143.80	144.5	-0.7
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73.215 elected to WBNQ(FM).

WMGI	LIC 264B	Terre Haute	IN	73.1	80.83	70.5	10.3
WTYE	LIC 269A	Robinson	IL	117.2	58.54	47.5	11.0
WTYE	RSV-A 269B1	Robinson	IL	113.8	61.98	49.5	12.5

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RSV-R = reserved - needs protection, RSV-A = allocation  
 All separation margins include rounding.

## E-2 WMCI(FM) 267B1 Reference Spacing

REFERENCE			DISPLAY DATES
39 19 00.0 N.	CLASS = B1		DATA 10-29-18
88 20 56.0 W.	Current Spacings to 3rd Adj.		SEARCH 10-30-18
----- Channel 267 - 101.3 MHz -----			

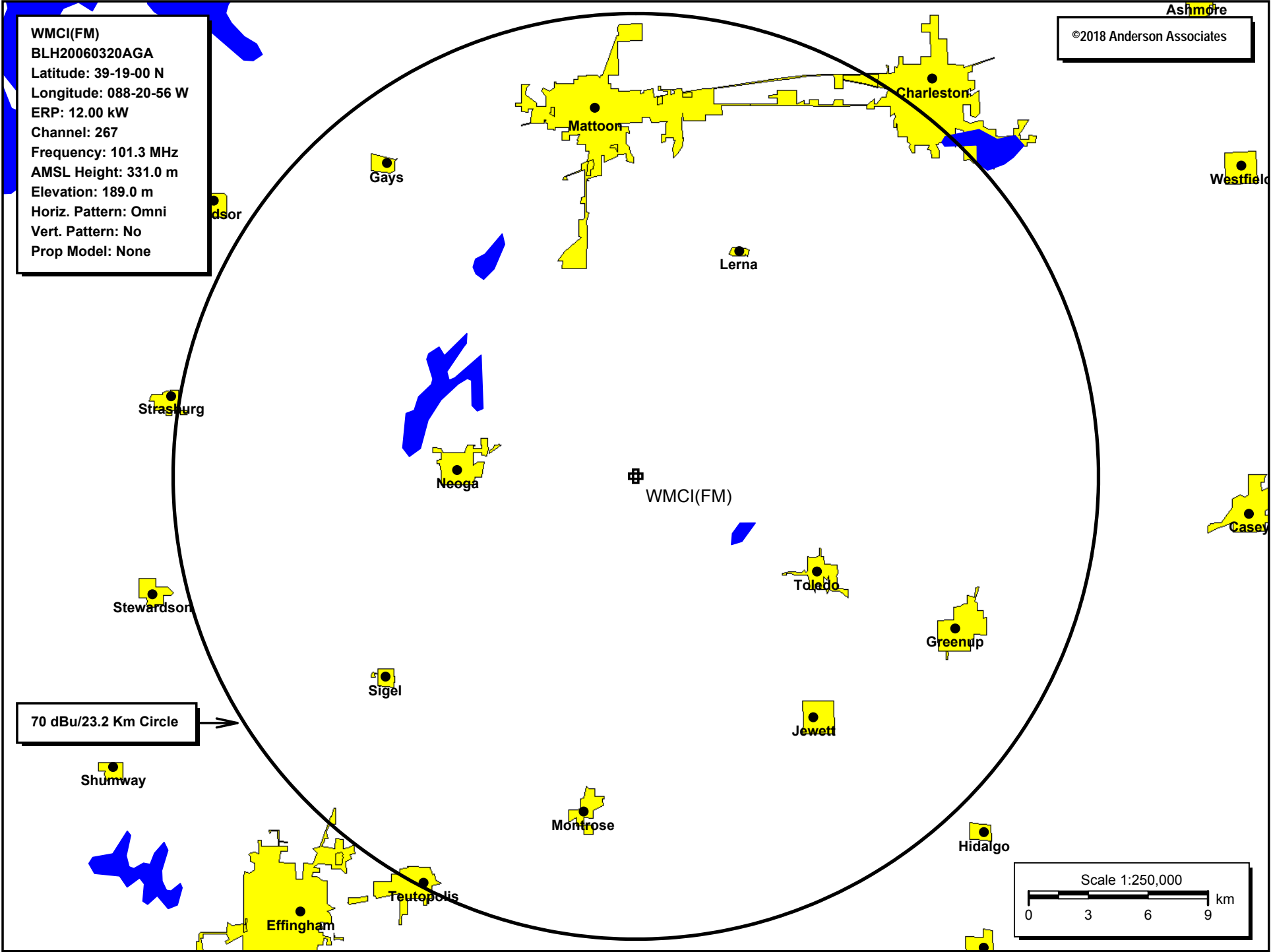
Call	Channel	Location		Azi	Dist	FCC	Margin
WMCI	LIC 267B1	Neoga	IL	199.8	7.90	174.5	-166.6
WBAA-FM	RSV-A 267B1	West Lafayette	IN	46.5	174.59	174.5	0.09
WBNQ	RSV-A 268B	Bloomington	IL	342.7	144.73	144.5	0.23
WMGI	LIC 264B	Terre Haute	IN	77.9	76.43	70.5	5.9
WTYE	LIC 269A	Robinson	IL	124.7	60.06	47.5	12.6
WTYE	RSV-A 269B1	Robinson	IL	120.9	63.02	49.5	13.5
WZUS	LIC 265A	Macon	IL	313.7	75.95	47.5	28.5
WXOS	LIC 266C1	East St. Louis	IL	243.0	200.45	160.5	40.0
WMSK-FM	LIC-N 267A	Sturgis	KY	168.6	186.65	142.5	44.2
WVIL	LIC-N 267A	Virginia	IL	295.2	186.97	142.5	44.5
WDCK	LIC 266A	Bloomfield	IN	99.8	141.21	95.5	45.7
WLFZ	LIC 270B	Springfield	IL	291.9	119.74	70.5	49.2

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 RSV-R = reserved - needs protection, RSV-A = allocation  
 All separation margins include rounding.

**WBAA-FM reference point to N 40-23-16 W 86-51-19 (see E5 and E6).**

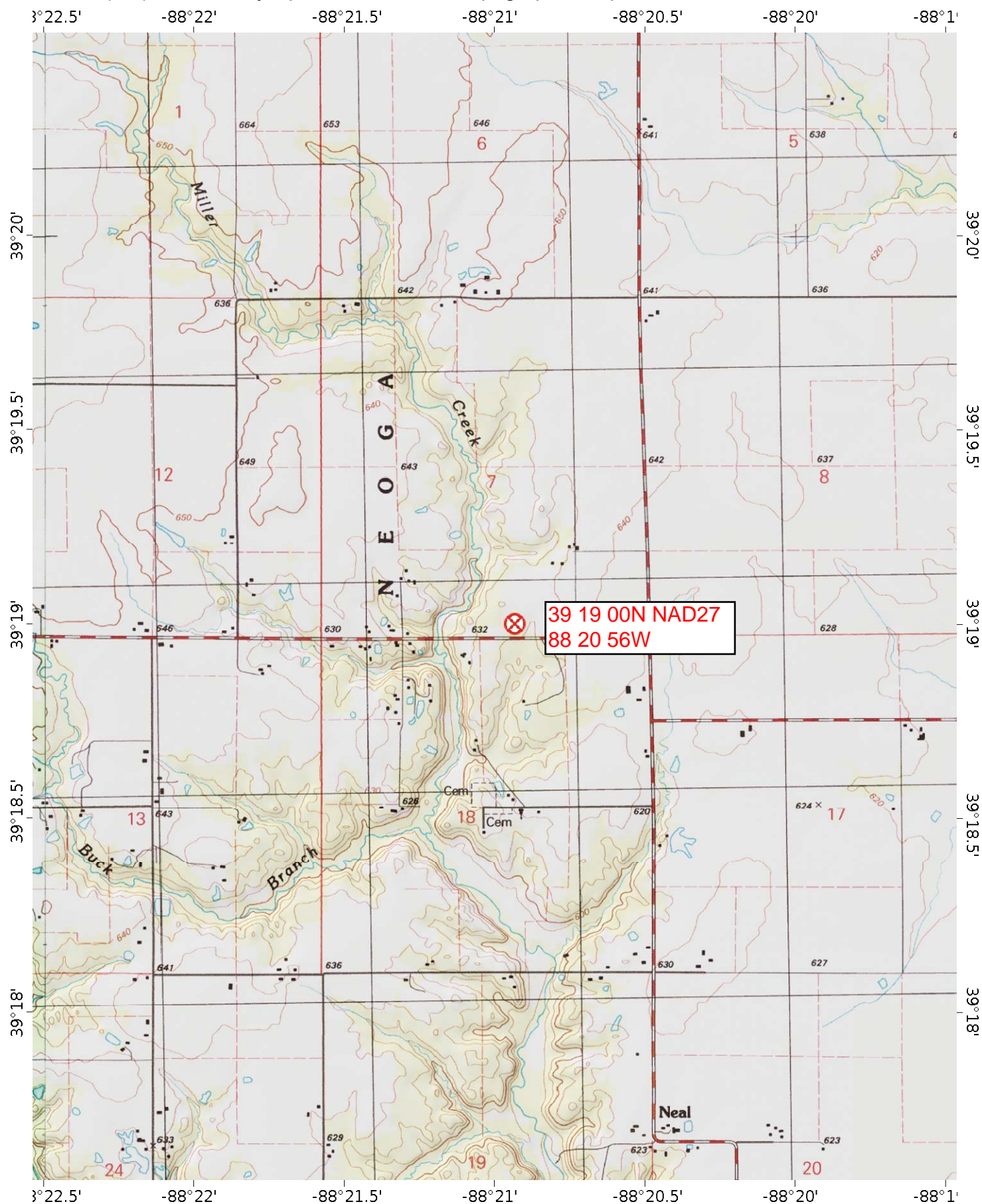
**WBNQ(FM) reference point to N 40-33-36 W 88-51-28 (see E7 and E8).**

E-3 WMCI(FM) 267B1 Reference Site Circle Plot



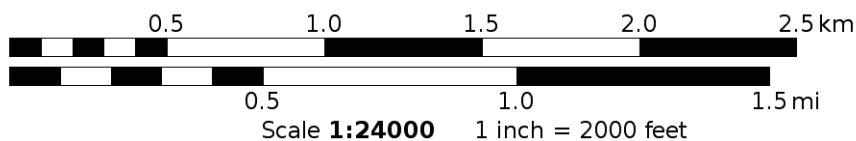


# E-4 WMCI(FM) 267B1 Fully-Spaced Reference Topographic Map



Mercator Projection  
NAD27 Conus  
USNG Zone 16SCJ

CalTopo



# E-5 WBAA-FM 267B1 Reference Spacing

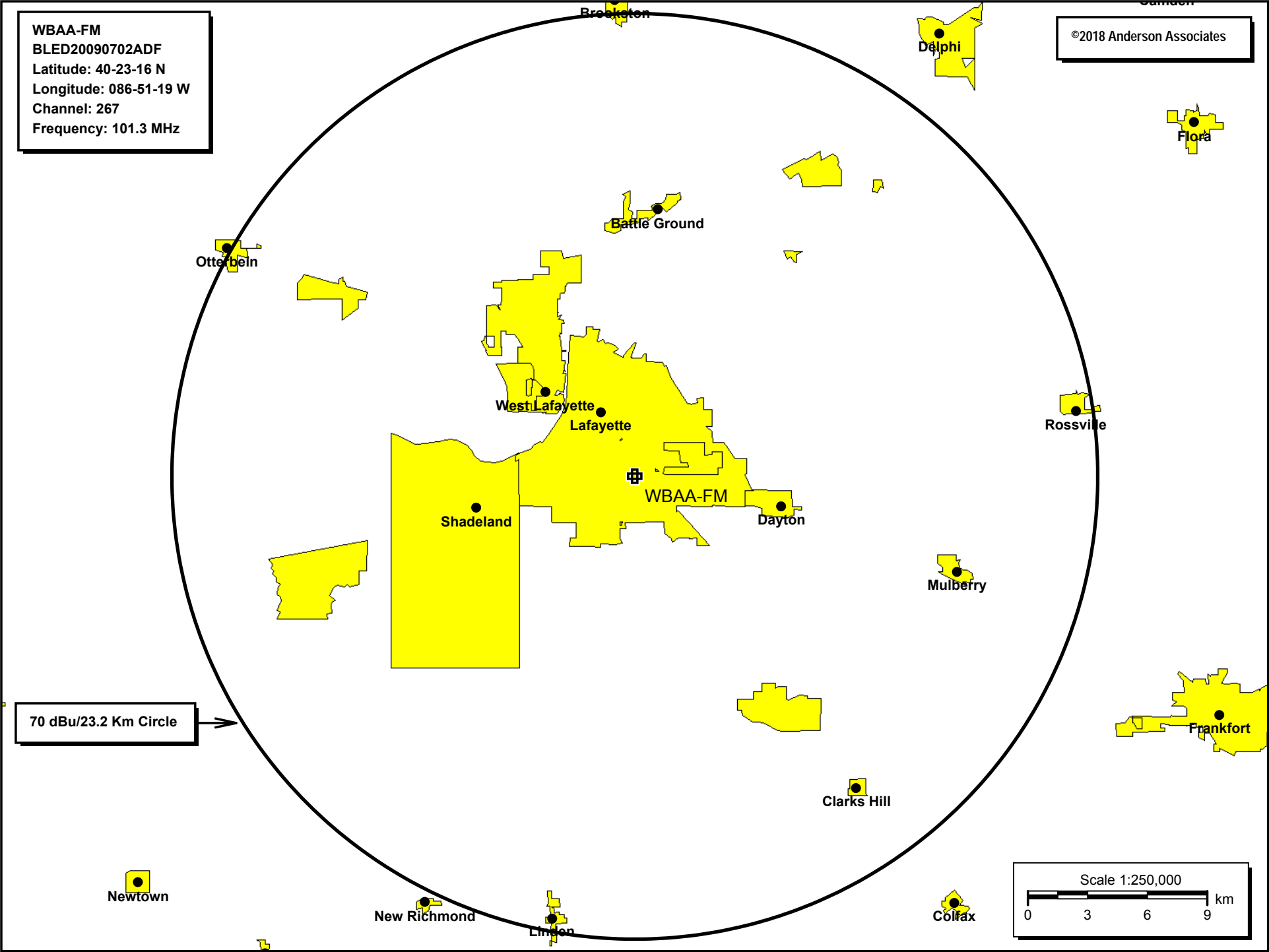
REFERENCE						DISPLAY DATES
40 23 16.0 N.			CLASS = B1			DATA 10-29-18
86 51 19.0 W.			Current Spacings to 3rd Adj.			SEARCH 10-30-18
----- Channel 267 - 101.3 MHz -----						

Call	Channel	Location		Azi	Dist	FCC	Margin
WBAA-FM	LIC-N 267B1	West Lafayette	IN	201.2	10.79	174.5	-163.7
WMCI	RSV-A 267B1	Mattoon	IL	227.4	174.57	174.5	0.07
WFMG	LIC-N 267B1	Richmond	IN	110.2	175.32	174.5	0.8
WNSN	LIC 268B	South Bend	IN	21.2	146.65	144.5	2.2
WKKG	LIC 268B	Columbus	IN	149.6	154.26	144.5	9.8
WQSG	LIC-D 214B1	Lafayette	IN	93.6	29.47	13.5	16.0
WHPO	LIC 265A	Hoopeston	IL	278.2	71.79	47.5	24.3
WIOE	LIC 266A	South Whitley	IN	49.9	123.95	95.5	28.5
WIVR	LIC 269A	Kentland	IN	310.9	81.46	47.5	34.0
WKLU	LIC-N 270A	Brownsburg	IN	144.5	81.85	47.5	34.4
WKQX	LIC 266B	Chicago	IL	339.3	179.76	144.5	35.3
WIKL	LIC-Z 269A	Elwood	IN	98.1	85.30	47.5	37.8
WBNQ	LIC-N 268B	Bloomington	IL	272.9	183.14	144.5	38.6
AL8883	RSV-A 265A	Speedway	IN	142.0	86.98	47.5	39.5
WARU-FM	LIC-Z 270A	Roann	IN	58.7	90.80	47.5	43.3
WNOW-FM	LIC 265A	Speedway	IN	134.4	93.03	47.5	45.5
WMGI	LIC 264B	Terre Haute	IN	207.5	116.27	70.5	45.8
WDCK	LIC 266A	Bloomfield	IN	176.1	144.45	95.5	49.0

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 RSV-R = reserved - needs protection, RSV-A = allocation  
 All separation margins include rounding.

**WMCI fully spaced reference point at N 39-19-00 W 88-20-56 (see E2, 3, 4).**

E-6 WBAA-FM 267B1 70 dBu Reference Circle Plot



# E-7 WBNQ(FM) 268B Reference Spacing

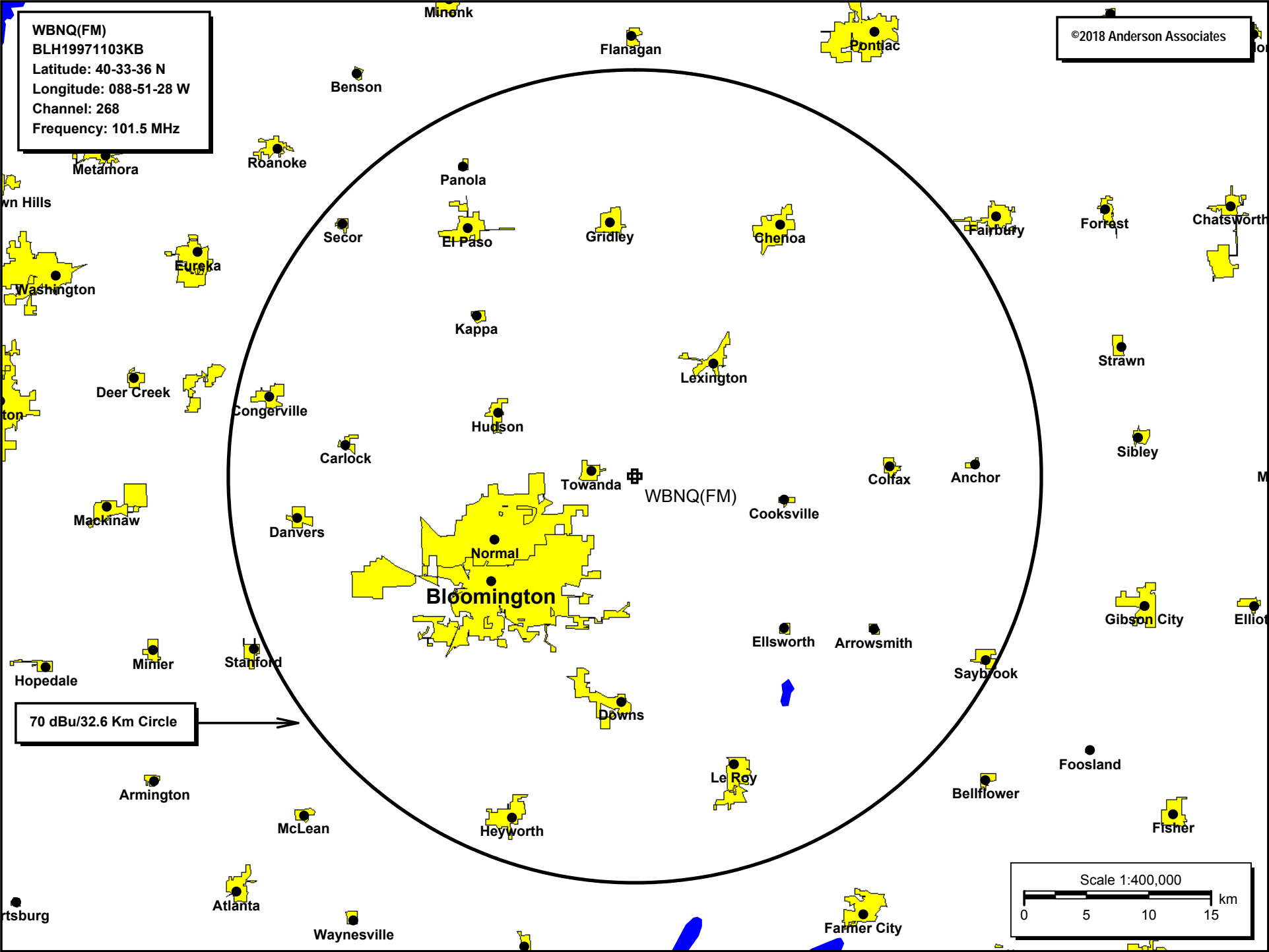
REFERENCE						DISPLAY DATES
40 33 36.0 N.			CLASS = B			DATA 10-29-18
88 51 28.0 W.			Current Spacings to 3rd Adj.			SEARCH 10-30-18
----- Channel 268 - 101.5 MHz -----						

Call	Channel	Location		Azi	Dist	FCC	Margin
WBNQ	LIC-N 268B	Bloomington	IL	226.9	17.84	240.5	-222.7
WIVR	LIC 269A	Kentland	IN	72.0	112.56	112.5	0.06
KUUL	LIC 267B	East Moline	IL	314.8	168.58	168.5	0.08
WMCI	RSV-A 267B1	Mattoon	IL	162.4	144.73	144.5	0.23
WZPN	LIC 266A	Glasford	IL	277.6	78.64	68.5	10.1
WNSN	LIC 268B	South Bend	IN	61.2	251.01	240.5	10.5
WALS	LIC-N 271A	Oglesby	IL	353.6	79.97	68.5	11.5
WZUS	LIC 265A	Macon	IL	187.6	86.64	68.5	18.1
WBZG	LIC 265A	Peru	IL	339.1	88.40	68.5	19.9
WBAA-FM	LIC-N 267B1	West Lafayette	IN	99.4	168.56	144.5	24.1
WVIL	LIC-N 267A	Virginia	IL	244.6	139.22	112.5	26.7
WHPO	LIC 265A	Hoopeston	IL	95.0	99.11	68.5	30.6
KBKB-FM	LIC 269C2	Fort Madison	IA	276.0	201.51	168.5	33.0
WRCV	LIC 269A	Dixon	IL	339.4	150.35	112.5	37.9
WILL-FM	LIC 215B	Urbana	IL	164.5	60.09	19.5	40.6
WDNL	LIC 271B	Danville	IL	113.2	114.11	73.5	40.6
WLFZ	LIC 270B	Springfield	IL	215.6	115.72	73.5	42.2
WIBA-FM	LIC 268B	Sauk City	WI	348.8	282.86	240.5	42.4

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All separation margins include rounding.

**WMCI fully-spaced reference point at N 39-19-00 W 88-20-56 (see E2, 3, 4).**

E-8 WBNQ(FM) 268B Reference 70 dBu Circle Plot



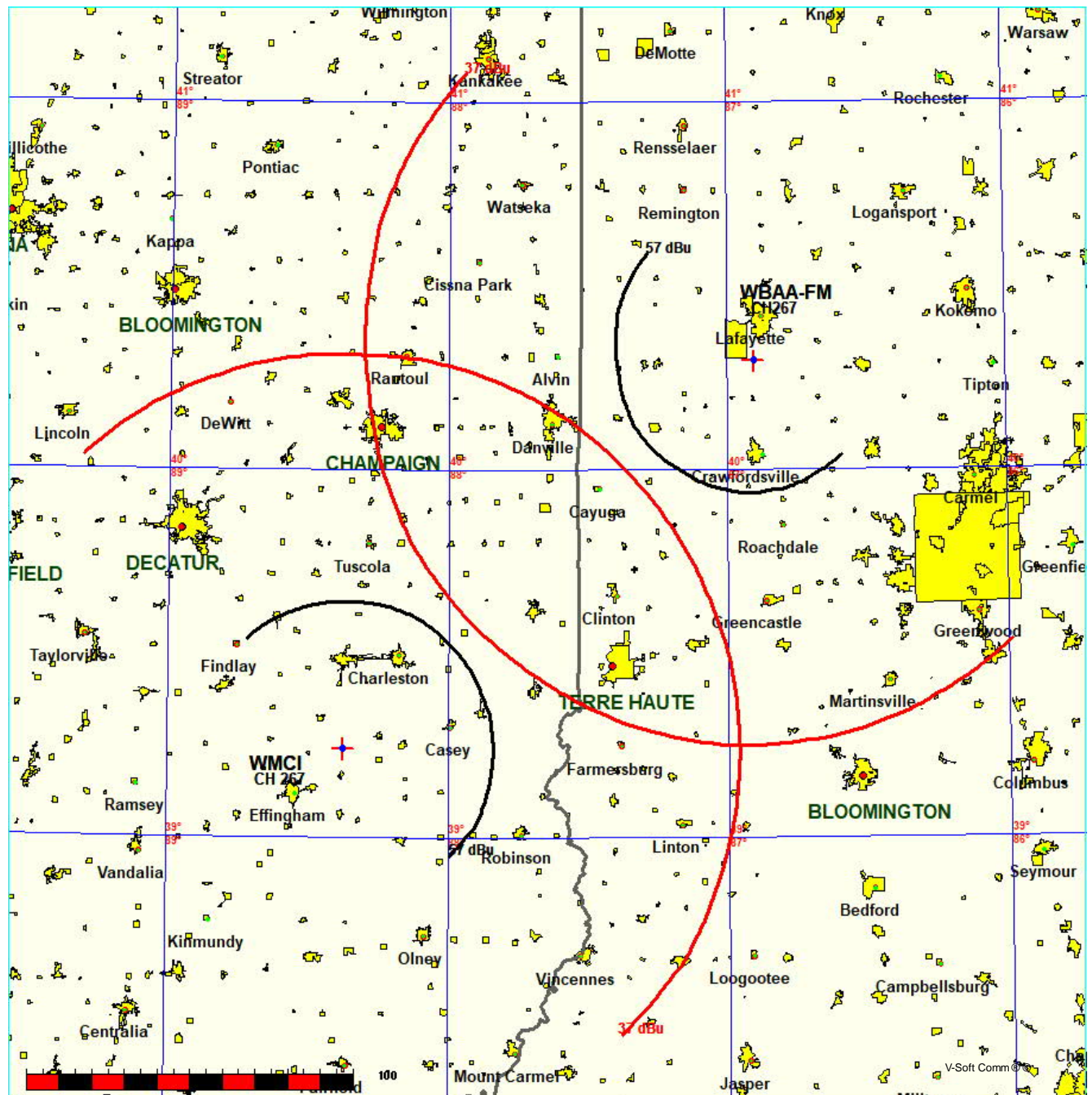


## E-9 WBAA-FM Interference Plot

FMCommander Single Allocation Study - 11-07-2018 - USGS 03 SEC  
WMCI's Overlaps (In= 9.15 km, Out= 10.25 km)

WMCI CH 267 B1 73.215 N  
Lat= 39 15 01.0, Lng= 88 22 46.0  
12.0 kW 145.9 m HAAT, 331 m COR  
Prot.= 57 dBu, Intef.= 37 dBu

WBAA-FM CH 267 B1 73.215 N BLED20090702ADF  
Lat= 40 17 50.0, Lng= 86 54 05.0  
14.0 kW 120 m HAAT, 336 m COR  
Prot.= 57 dBu, Intef.= 37 dBu

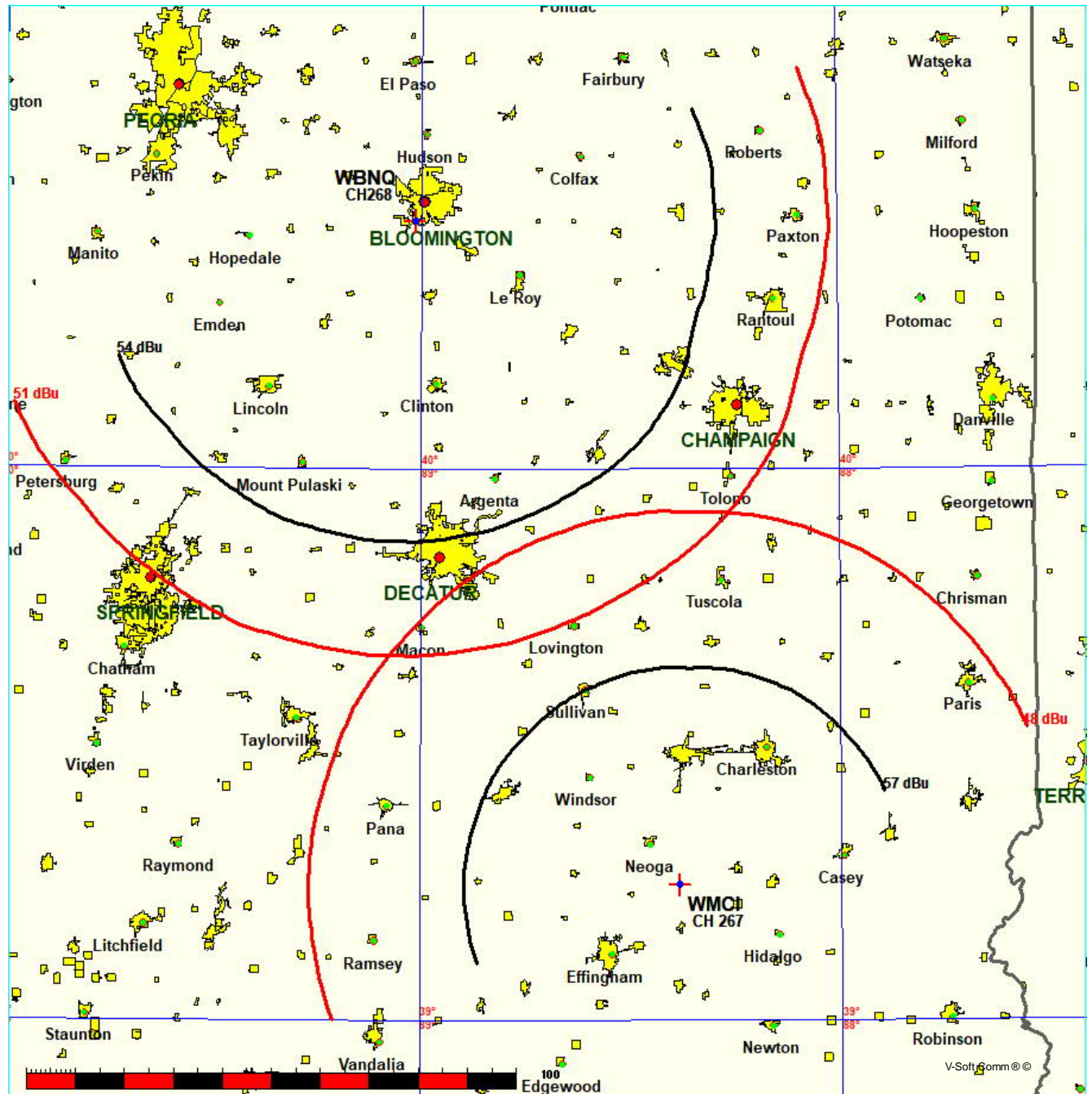


## E-10 WBNQ(FM) Interference Plot

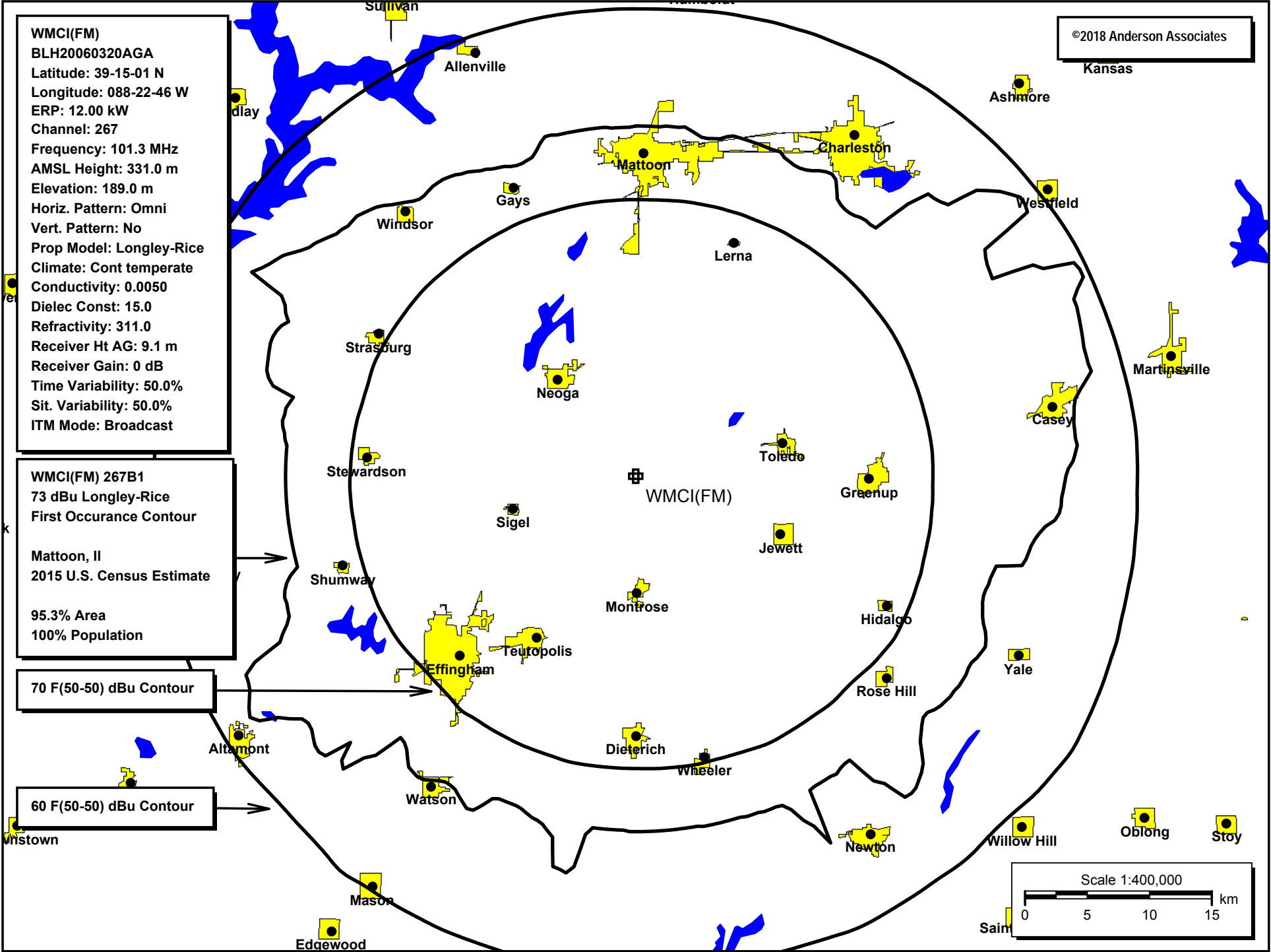
FMCommander Single Allocation Study - 11-07-2018 - USGS 03 SEC  
WMCI's Overlaps (In= 13.89 km, Out= 5.37 km)

WMCI CH 267 B1 73.215 N  
Lat= 39 15 01.0, Lng= 88 22 46.0  
12.0 kW 145.9 m HAAT, 331 m COR  
Prot.= 57 dBu, Intef.= 48 dBu

WBNQ CH 268 B 73.215 N BLH19971103KB  
Lat= 40 27 01.0, Lng= 89 00 42.0  
50.0 kW 142 m HAAT, 375 m COR  
Prot.= 54 dBu, Intef.= 51 dBu

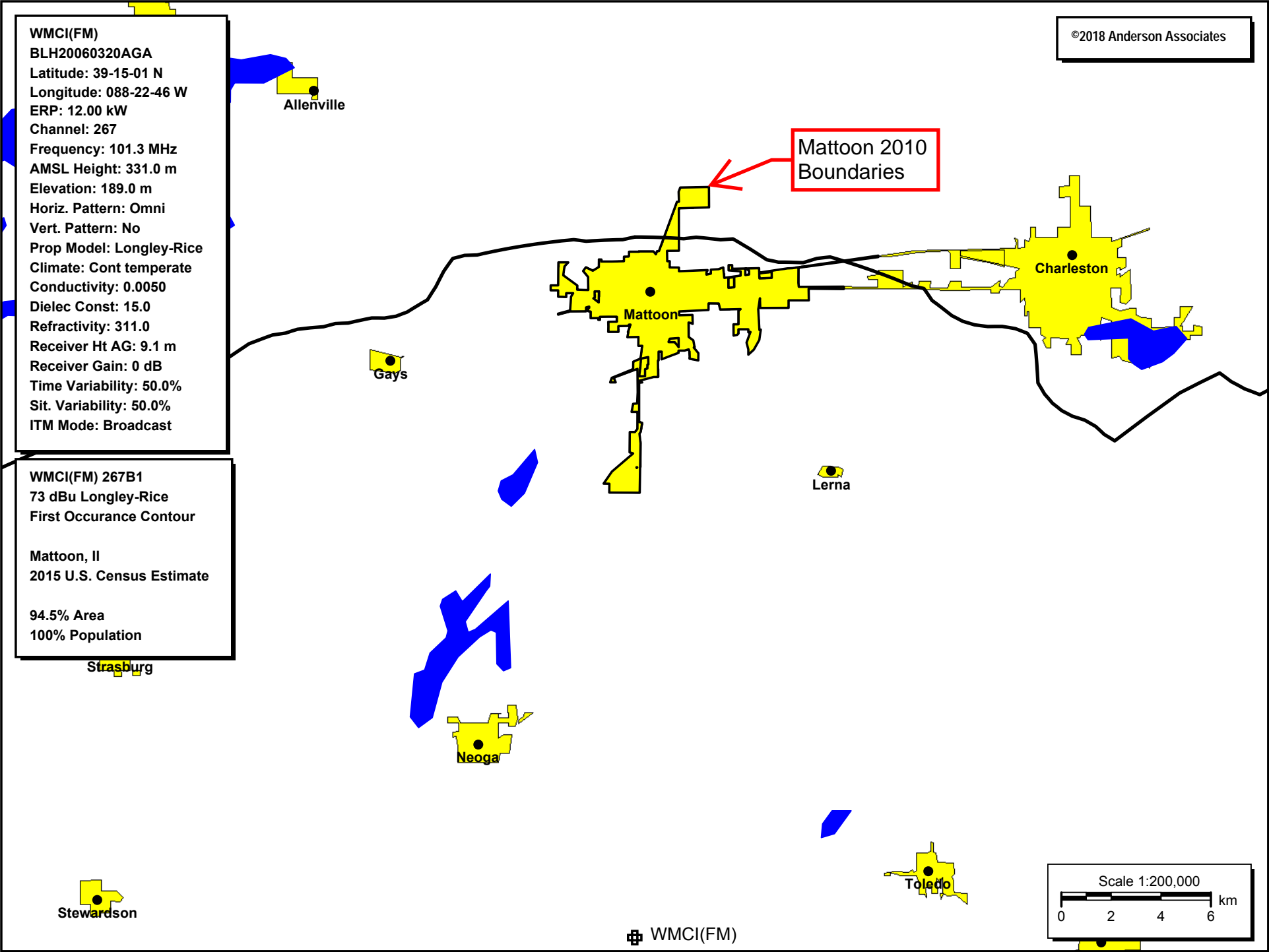


E-11 WMCI(FM) Mod. Contour Plots





E-12 WMCI(FM) Mod. 73 dBu Contour Plot Enhanced



E-13 WMCI(FM) Mod. Longley-Rice Distance to Contour Tabulation

Type of contour: Signal Calculated  
# of Radials Calculated: 360

Using the first occurence method at 73.0 dBu

Transmitter Information:

Call Letters: WMCI(FM) Mod.  
File Number: BLH20060320AGA  
Latitude: 39-15-01 N  
Longitude: 088-22-46 W  
ERP: 12.00 kW  
Channel: 267  
Frequency: 101.3 MHz  
AMSL Height: 331.0 m  
Elevation: 189.0 m  
Horiz. Antenna Pattern: ND  
Vert. Elevation Pattern: No

Azimuth (deg)	FCC 70 dBu (km)	L-R 73 dBu (km)	% Increase
352.0	22.2	28.1	26.6
353.0	22.2	28.1	26.6
354.0	22.2	28.1	26.6
355.0	22.2	28.1	26.6
356.0	22.2	28.0	26.1
357.0	22.2	28.0	26.1
358.0	22.2	28.0	26.1
359.0	22.2	28.0	26.1
000.0	22.2	28.1	26.6
001.0	22.2	28.1	26.6
002.0	22.2	28.1	26.6
003.0	22.2	28.1	26.6
004.0	22.2	28.1	26.6
005.0	22.2	28.2	27.0
006.0	22.3	28.2	26.5
007.0	22.3	28.2	26.5
008.0	22.3	28.3	26.9
009.0	22.3	28.1	26.0
010.0	22.4	27.9	24.6
011.0	22.4	27.7	23.7
012.0	22.4	27.7	23.7
013.0	22.4	27.8	24.1
014.0	22.4	27.9	24.6
015.0	22.5	28.2	25.3
016.0	22.5	28.4	26.2
017.0	22.5	28.4	26.2
018.0	22.6	28.4	25.7
019.0	22.6	28.4	25.7
020.0	22.6	28.4	25.7

All Longley-Rice 73 dBu contour radials which encompass the Mattoon, IL community boundary exceed the FCC 70 dBu contour by more than 10%, as required in *Hardinsburg, KY*.

All calculations were performed using V-Soft Probe 4 software and USGS 3 second terrain data.

## E-14 HAAT Tabulation

N 39-15-01 W 88-22-46

HAAT and Distance to Contour

FCC FM 2-10 Miles 51 points Method - USGS 3 SEC

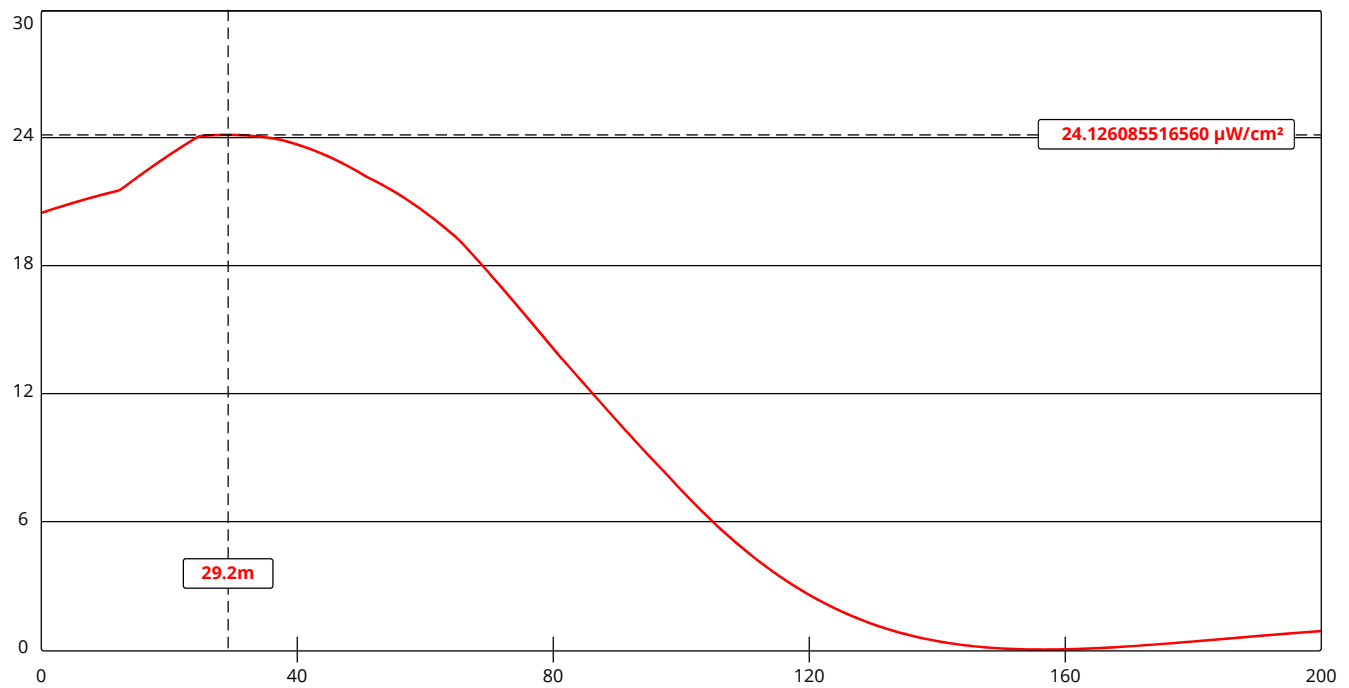
WMCI, The Cromwell Group, Inc. Of I, BLH20060320AGA

Azi.	AV EL	HAAT	ERP kW	dBk	Field	70-F5	60-F5
000	198.3	132.7	12.0000	10.79	1.000	22.29	37.65
045	185.0	146.0	12.0000	10.79	1.000	23.26	39.27
090	175.0	156.0	12.0000	10.79	1.000	23.97	40.48
135	169.6	161.4	12.0000	10.79	1.000	24.34	41.10
180	181.5	149.5	12.0000	10.79	1.000	23.51	39.69
225	184.3	146.7	12.0000	10.79	1.000	23.31	39.36
270	189.5	141.5	12.0000	10.79	1.000	22.93	38.71
315	198.2	132.8	12.0000	10.79	1.000	22.29	37.66

Ave El = 185.18 M HAAT= 145.82 M AMSL= 331 M

## E-15 WMCI(FM) Mod. RF Calculation

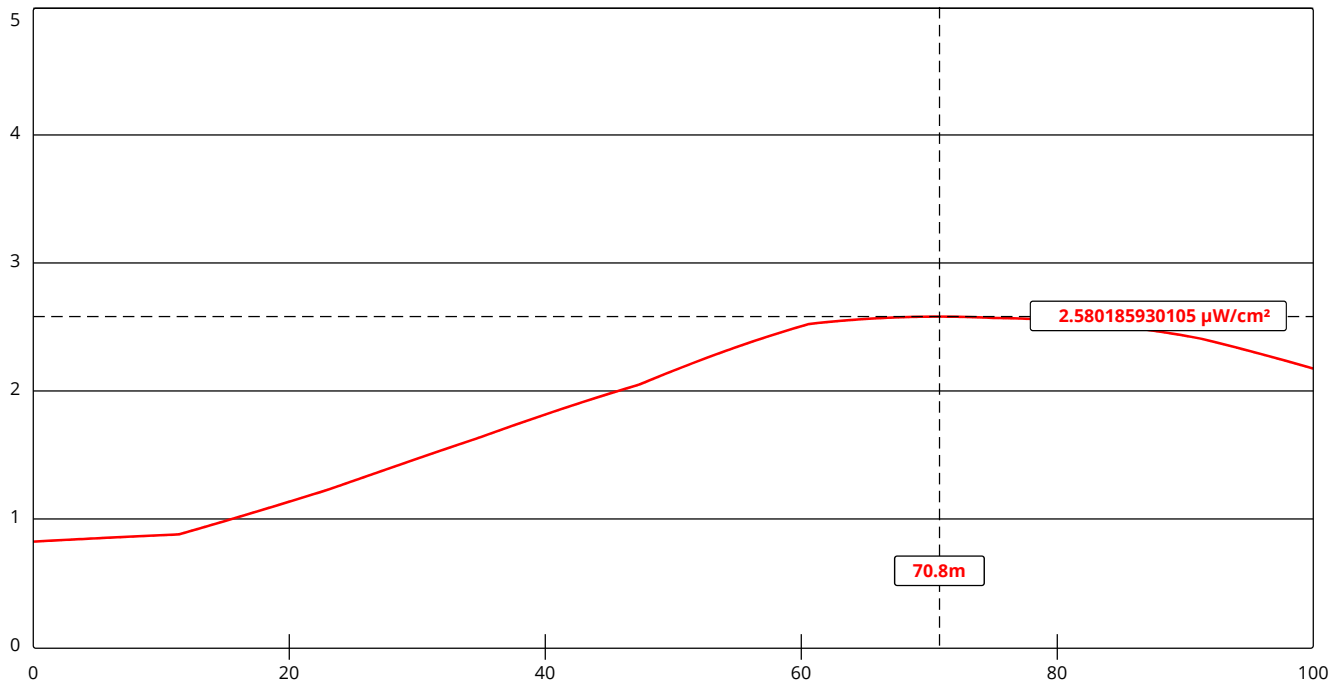
### FM Model



Channel Selection	Channel 267 (101.3 MHz)		
<a href="#">Antenna Type</a> +	EPA Type 1: Ring-and-Stub or "Other"		
Height (m)	142	Distance (m)	200
ERP-H (W)	12000	ERP-V (W)	12000
Num of Elements	3	Element Spacing ( $\lambda$ )	1
Num of Points	500		

E-15 WHQQ(FM) RF Calculation

FM Model



Channel Selection	Channel 255 (98.9 MHz)		
Antenna Type +	EPA Type 4: Two-Piece Spiral		
Height (m)	132	Distance (m)	100
ERP-H (W)	3200	ERP-V (W)	3200
Num of Elements	2	Element Spacing (λ)	1
Num of Points	500		

## ASR Registration 1051455

### Registration Detail

Reg Number	1051455	Status	Constructed
File Number	A1070665	Constructed	04/17/2017
EMI	No	Dismantled	
NEPA	No		

### Antenna Structure

Structure Type GTOWER - Guyed Structure Used for Communication Purposes

#### Location (in NAD83 Coordinates)

Lat/Long	39-15-01.3 N 088-22-46.6 W	Address	2.4 KM SOUTH OF SEVEN MILE CURVE ON RTE 121 AND 2.3 KM NORTH OF ROSLYN
City, State	NEOGA , IL		
Zip	62468	County	CUMBERLAND
Center of AM Array		Position of Tower in Array	

#### Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
189.0	150.0
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
339.0	149.0

### Painting and Lighting Specifications

FAA Chapters 3, 4, 5, 12

Paint and Light in Accordance with FAA Circular Number 70/7460-1L

### FAA Notification

FAA Study	2017-AGL-2041-OE	FAA Issue Date	03/09/2017
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### Owner & Contact Information

FRN	0002844348	Owner Entity	Corporation
		Type	

#### Owner

THE CROMWELL GROUP, INC. OF ILLINOIS	P: (615)361-7560
Attention To: Bayard H. Walters	F: (615)366-4313
1824 Murfreesboro Road	E: budbayard@aol.com
P.O. Box 150846	
Nashville , TN 37215	

#### Contact

Walters , Bayard H	P: (615)361-7560
Attention To: Bayard H. Walters	F: (615)366-4313
1824 Murfreesboro Road	E: budbayard@aol.com
P.O. Box 150846	
Nashville , TN 37215	

### Last Action Status

# Output from NADCON for station WMCI

North American Datum Conversion

NAD 83 to NAD 27

NADCON Program Version 2.11

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Transformation #: 1      Region: Conus

	Latitude	Longitude
NAD 27 datum values:	39 15 1.16087	88 22 46.43755
NAD 83 datum values:	39 15 1.30000	88 22 46.60000
NAD 27 - NAD 83 shift values:	-0.13913	-0.16245(secs.)
	-4.291	-3.895 (meters)
Magnitude of total shift:		5.795(meters)