

Technical Exhibit
Minor Modification of Construction Permit
Minocqua, WI
Channel 204C2
30.5m AGL
50 kW 67m HAAT

Predicted Coverage Contours

The proposed HAAT and the predicted 60 dBu contours were calculated in accordance with Section 47 C.F.R. 73.313. The average terrain elevations were calculated along 8 radials using the NGDC 30 second terrain database.

All contours displayed in exhibits are plotted along 360 radials and in accordance with the propagation prediction curves of Section 73.333.

Interference Compliance

Contour protection, as required by C.F.R. Section 73.509 to co-channel and first, second and third adjacent channels is demonstrated herein by Figures 1 and 2

Raleigh Waiver

WQMN's present antenna site is already located inside the KSPP 60 dBu contour due to a Raleigh Waiver (BPED - 20150602AAB) granted to that station on 6/29/2015.

The present 60 dBu contour of WQMN covers 5,188 people. The instant application would serve 56,669 persons, an increase of 51,481 persons or 992% over WQMN's present coverage.

WQMN's 76 dBu contour encompasses KSPP's transmit site. The 40 dBu ratio would mean an interference contour of 116 dBu. Only 105 persons reside within the 116 dBu F(50,10) contour of KSPP, which is 0.18% of the total WQMN population none of whom can presently hear the station.

International Borders

The proposed site is located 221.8 Km to the Canadian border. We know of no related Canadian facilities.

RF Electromagnetic Exposure Analysis

Using a four-bay opposed V dipole, the maximum downward radiation (F=1.0) of RF exposure at 2m above ground level is 162.64 uW/cm² or 81.3% of the controlled standard. Given minimal radiation on the ground from two-way radio antennas much higher up the tower, altogether the RF safety standard is met.

The tower is fenced with RF warning signs. The power will be reduced or shut off to allow necessary access to the tower.

WQMN

Minocqua, WI

This proposed 50 kW facility will not create new interference with any existing station, except the *de minimus* interference WQMN will receive from KSPP.

FMCommander Contour-to-Contour - HAAT Method= 0 ©V-Soft Communications®

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IX Issue! Canada

NGDC 30 SEC

N. Lat. 45 59 28.70 572 m COR Contours are detailed Minocqua WI M WQMN-2.vsl
W. Lng. 89 35 53.60 50.0 kW CH 204.88.7 C2 B 70.2 m HAAT WQMN-2 10-04-21

Full Service

Call	Type	Ch	Location		Azi	Dist	In	Out
WQMN	LIC	204A	Minocqua	WI	234.3	19.34	---	
KSPP	LIC	206C3	Rhineland	WI	195.3	15.73	-26.3*	-19.2*
WOJB	LIC	205C1	Reserve	WI	265.0	136.04	5.0	11.0
WHJL	LIC-D	201C1	Merrill	WI	183.5	71.19	25.1	8.1
WVRN	LIC	205C2	Wittenberg	WI	157.7	123.11	19.0	15.8
WGNV	LIC-D	203C1	Milladore	WI	187.5	151.09	20.4	26.1
WKIW	LIC	202A	Ironwood	MI	317.9	67.66	26.8	48.5
WMLS	LIC	204C3	Grand Marais	MN	344.2	205.51	47.1	31.4

End of Screen List, Cardinal Radials = 36

WQMN-A_Channel_Study - Notepad

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Minocqua, WI

REFERENCE		CH# 204C2- 88.7 MHz, Pwr= 50 kW, HAAT= 70.0 M, COR= 572 M								DISPLAY DATES	
45 59 28.7 N.		Average Protected F(50-50)= 38.8 km								DATA 10-03-21	
89 35 53.6 W.		Omni-directional								SEARCH 10-04-21	

CH	CALL	TYPE	ANT	AZI.	DIST	LAT.	Pwr(kW)	INT(km)	PRO(km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LONG.	HAAT(M)	COR(M)	LICENSEE	(Overlap in km)	

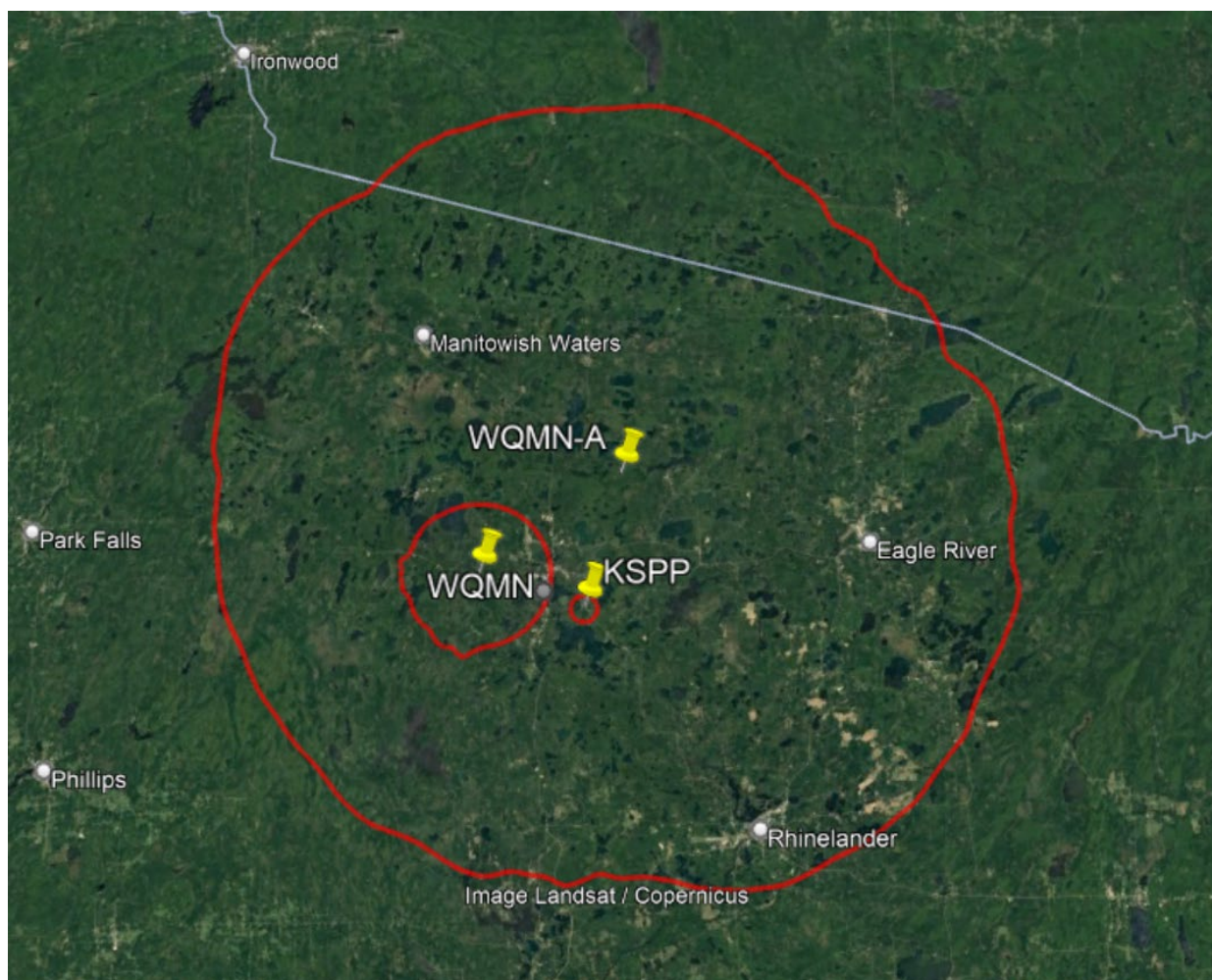
204A	WQMN!	LIC	CN	234.3	19.34	45 53 22.80	0.400		---	Reference---	
Minocqua			WI	54.2	BLED20150515AAN	89 48 04.50	30	514	Radio 74 Internationale		
206C3	KSPP	LIC	VN	195.3	15.73	45 51 17.30	18.000	3.1	30.8	-26.3*	-19.2*
Rhineland			WI	15.2	BLED20170801ADU	89 39 06.20	87	579	Northwoods Catholic Radio		
205C1	WOJB	LIC	CN	265.0	136.04	45 52 15.80	100.000	92.4	60.8	5.0	11.0
Reserve			WI	83.7	BLED19820428AH	91 20 56.60	184	595	Lac Courte Oreilles Ojibwa		
201C1	WHJL	LIC	DCN	183.5	71.19	45 21 07.50	63.000	7.2	58.9	25.1	8.1
Merrill			WI	3.4	BLED201111003ABZ	89 39 13.20	189	642	Wrvm, Inc.		
205C2	WVRN	LIC	CN	157.7	123.11	44 57 53.90	25.000	62.9	41.4	19.0	15.8
Wittenberg			WI	338.2	BLED20080102ABT	89 00 18.40	147	518	Vcy America, Inc.		
203C1	WGNV	LIC	DCN	187.5	151.09	44 38 36.90	100.000	91.5	61.5	20.4	26.1
Milladore			WI	7.3	BLED20181108AAC	89 50 47.40	178	532	The Family Radio Network,		
202A	WKIW	LIC	VN	317.9	67.66	46 26 27.80	0.300	1.2	15.0	26.8	48.5
Ironwood			MI	137.4	BLED20080716AGQ	90 11 26.60	157	600	Educational Media Foundati		
204C3	WMLS	LIC	CN	344.2	205.51	47 46 03.60	6.000	119.3	48.8	47.1	31.4
Grand Marais			MN	163.7	BLED20020411AAK	90 20 47.40	194	537	Minnesota Public Radio		

De minimus interference received

WQMN's present (small circle) and future (large circle) 60 dBu contours.

Notice the tiny area (tiny circle), the 116.11 dBu contour, where just 105 persons reside immediately adjacent to the KSPP transmitting site. None of these persons can presently hear WQMN, thus they will not lose or be deprived of a radio signal they do not presently have.

This small zone is estimated to be about 1/800th of the large area to be served with the improved WQMN facility, a classic *de minimus* situation, which will provide new quality educational radio service to a large area of Northern Wisconsin and a portion of Michigan's Upper Peninsula.



Population effected is de minimus

Here's a closer view of the small area adjacent to the KSPP transmitter site where the KSPP signal is stronger than WQMN by 40 dBu ($76.11 + 40 = 116.11$ dBu) and is expected to cause *de minimus* interference with respect to the wide area WQMN signal.

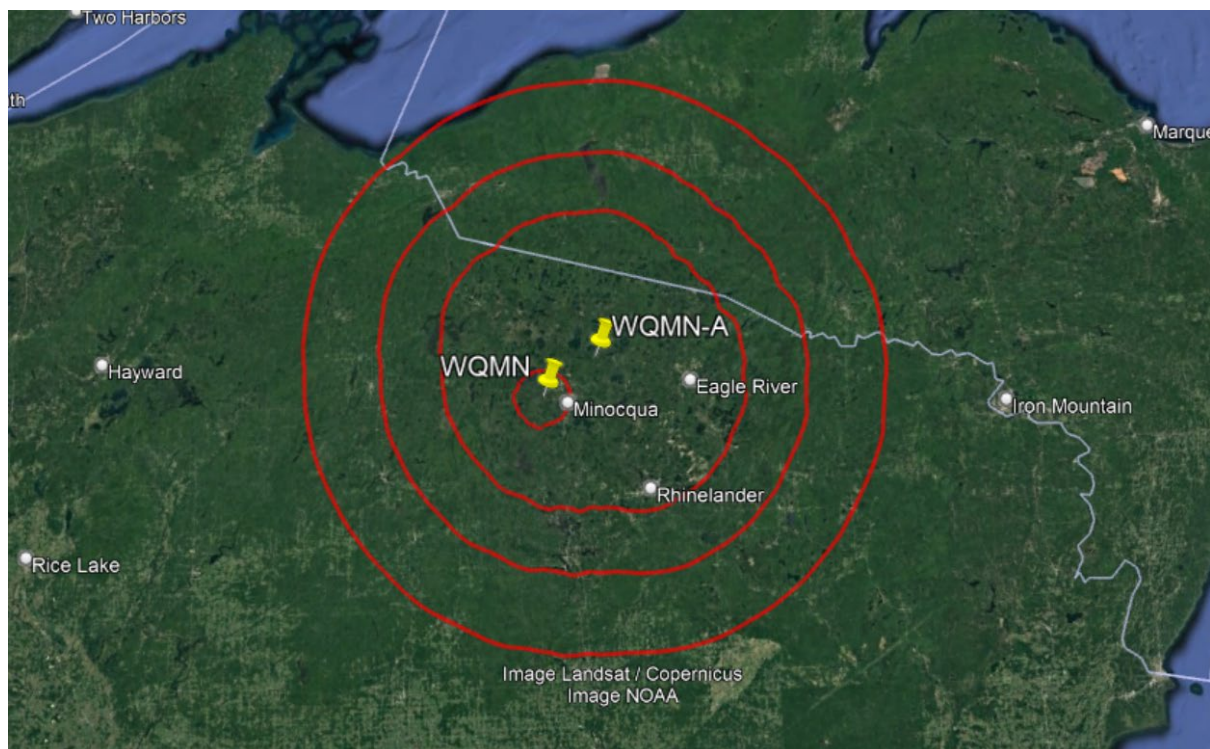
Note the current WQMN 60 dBu contour to the left, which covers the center of town, but only reaches about 2/3 of the Minocqua population. The new facility will make possible full coverage of the community of license.



Extended coverage across this rural area

The proposed modified facility will not only blanket the local cities of Minocqua, Rhinelander and Eagle River, Wisconsin, but will extend out to serve listeners in vehicles traveling through a wider area of this rural, touristic region of woods, lakes and wildlife.

Contours	Population
60 dBu	56,669
54 dBu	78,340
48 dBu	135,215



Canadian and other Protections

Protected zones report for WQMN-A on channel 204C2 10-05-2021
Lat. 45 59 28.7 Lng. 89 35 53.6, ERP= 50 kw, HAAT= 70 m

***** Station must likely coordinate with Canada.** Distance to border = 221.8 km.

Facility is okay with respect to AM station towers.

Closest AM Facility is WLKD, MINOCQUA, WI, L, ND1 at 207.2° at a distance of 21.4 km

Facility is okay with respect to FCC monitoring stations.

Closest FCC Monitoring Station is 475.4 km= Allegan, MI

RF Electromagnetic Exposure Analysis

Predicted radiation at 2 meters above ground level with bottom of antenna at 23 meters above ground level. 162.64 $\mu\text{W}/\text{cm}^2$. The tower is fenced with RF warning signs posted.

