ENGINEERING REPORT

FM Translator
Minor Change
Permit Application

for

K207ES
Fac ID: 49769

as a Translator for

KLBF(FM) – Lincoln, ND

MUNN–REESE
Broadcast Engineering Consultants
Coldwater, MI 49036

Discussion

This firm has been retained to prepare the required engineering report in support of a Minor Change Application for an FM Translator K207ES – Hibbing, MN. Presently K207ES is licensed to operate with 12 watts ERP at 500 meters AMSL operating on CH207D. Operation at a different site with 27 watts ERP at 507 meters AMSL operating at CH202D is proposed.

The Translator as proposed will be mounted on a tower which does not require Tower Registration.

A map of the present and proposed service area has been included in ***Exhibit 1.0.***

It has been determined the Translator may be used in the area without interference to any existing FM broadcast station or facility. The present and proposed allocation details are found in ***Exhibits 2.0.*** It is believed sufficient clearance exists precluding the need for additional contour protection showings. Per §74.133(a)((1)((i)(A)(2) upon a showing of interference to or from any other broadcast station, remedial changes to any same band frequency are permissible. The present and proposed allocations are provided in ***Exhibits 2.0*** and demonstrate the reduction in interference with the proposed move to CH202D.

The applicant would like to note the existence of a §74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WHPJ(FM) – Hibbing, MN (CH204A) as noted in ***Exhibit 2.1.*** Protection has been based on the worst case calculated 115.21 dBµ F(50:10) Interference Contour, corresponding to the worst case 75.21 dBµ F(50:50) Protected Contour. Protection has been demonstrated through a downward vertical radiation study. Full protection will be afforded the facility as the interference that reaches the ground occurs within a 50 meter radius of the proposed location when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. The downward radiation study and aerial photograph of the proposed facility are also included in ***Exhibit 2.1***.

The applicant certifies the proposed translator 34 dBu F(50:10) Interference contour does not enter Canadian territory. Documentation of the proposed 34 dBu F(50:10) Interference contour will be supplied upon request.

This translator is not within the affected distance of any TV Channel 6 stations.

The applicant would like to note use of the NED 03 second terrain database for terrain-based showings contained here-in.

Exhibit 1.0 K207ES Present and Proposed

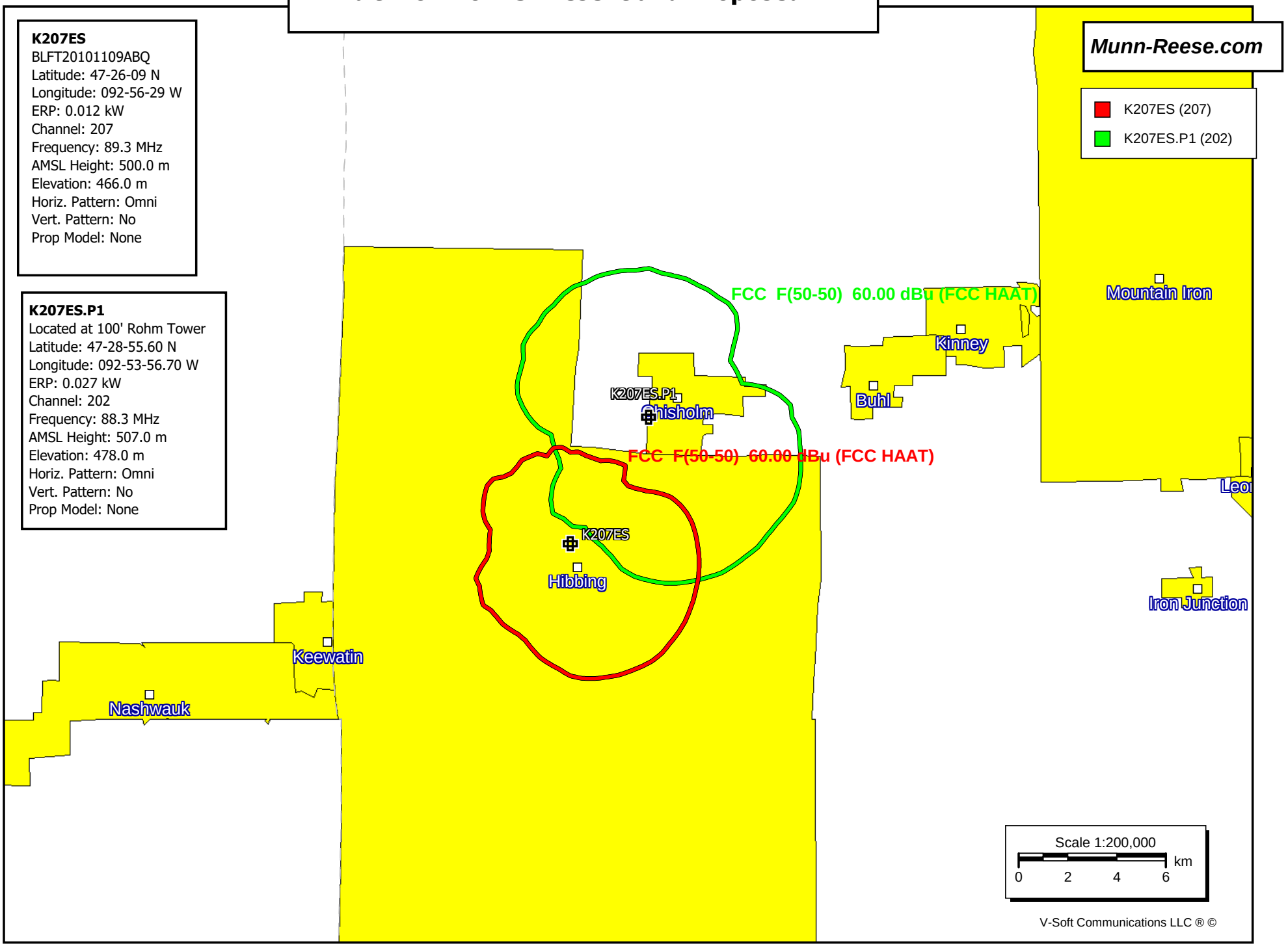


Exhibit 2.0: K207ES Present Allocation
University Of Northwestern-St. Paul

REFERENCE CH# 207D - 89.3 MHz, Pwr= 0.012 kW, HAAT= 57.2 M, COR= 500 M DISPLAY DATES
47 26 08.70 N. Average Protected F(50-50)= 4.63 km DATA 12-31-19
92 56 29.60 W. Omni-directional SEARCH 01-07-20

CH	CALL	TYPE	ANT	AZI	DIST	LAT	PWR(kW)	INT(km)	PRO(km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LNG	HAAT(M)	COR(M)	LICENSEE	(Overlap in km)	
204A	WHPJ	LIC	___	190.2	0.47	47 25 53.70	6.000	1.6	15.8	-6.0*	-15.5*
Hibbing		MN		10.2	BLED20101101AAS	92 56 33.60	41	485	We Have This Hope Christia		
207D	K207ES	LIC	___	0.0	0.00	47 26 08.70	0.012		---Reference---		
Hibbing		MN		0.0	BLFT20101109ABQ	92 56 29.60	57	500	University Of Northwestern		
207C3	WIRC	LIC	___	58.4	96.21	47 53 00.70	18.500	106.6	35.6	-15.1*	45.1
Ely		MN		239.2	BLED20110915AAK	91 50 31.50	116	553	Minnesota Public Radio		
206C2	WGZS	LIC	___	164.7	69.05	46 50 10.80	50.000	76.1	50.4	-12.7*	10.8
Cloquet		MN		344.9	BLED20110907ABL	92 42 08.70	135	536	Fond Du Lac Band Of Lake S		
209C3	KGRP	LIC	___	245.5	42.12	47 16 39.00	8.900	3.5	35.4	34.4	6.4
Grand Rapids		MN		65.1	BLED20130313ABB	93 26 59.10	157	558	Minnesota Public Radio		
207C1	KOPJ	LIC	___	233.5	162.64	46 33 07.90	100.000	150.2	54.6	8.1	94.3
Sebeka		MN		52.2	BLED20051005AAI	94 39 04.00	143	560	We Have This Hope Christia		
208C1	WJRF	APP	D__	139.0	95.33	46 47 07.00	40.000	65.3	41.8	24.3	45.5
Duluth		MN		319.6	0000093015	92 07 14.00	223	521	University Of Northwestern		
205C3	WQRN	LIC	D__	22.5	54.19	47 53 08.70	16.000	2.2	22.2	48.5	30.9
Cook		MN		202.7	BLED20091020AAS	92 39 47.60	70	484	Vcy AMerica Inc.		
210A	KBFT	LIC	___	351.3	75.78	48 06 33.70	1.000	1.6	11.1	70.3	64.3
Nett Lake		MN		171.2	BLED20110705ABJ	93 05 47.50	38	445	Bois Forte Tribal Council		
206B	CKSB9F	LIC	D__	336.9	145.87	48 38 21.80	50.000	77.8	64.7	64.4	73.5
Fort Frances		ON		156.3		93 43 14.60	142	495			
208A	WJRF	LIC	___	139.0	95.34	46 47 06.80	1.650	24.1	16.2	65.5	71.0
Duluth		MN		319.6	0000086708	92 07 13.70	181	488	University Of Northwestern		
208A	WJRF	CP	___	139.0	95.34	46 47 06.80	1.650	24.1	16.2	65.5	71.0
Duluth		MN		319.6	BPED20190802AAK	92 07 13.70	181	488	University Of Northwestern		
208C3	WJRF	LIC	___	138.8	95.07	46 47 20.80	2.850	20.8	14.0	68.5	72.8
Duluth		MN		319.4	BMLED20050204ABB	92 07 09.70	156	463	University Of Northwestern		
206B1	R15509	VAC	___	336.9	145.88	48 38 21.83	25.000	61.2	51.0	81.0	87.5
Fort Frances		ON		156.3		93 43 15.58	100	453			
208C3	WYNJ	CP	D__	285.1	135.11	47 44 20.80	10.000	46.5	29.7	84.8	99.8
Blackduck		MN		103.8	BPED20171229ABB	94 41 10.90	100	509	We Have This Hope Christia		
210C1	WHSA	LIC	D__	135.4	149.99	46 27 59.90	92.000	6.1	53.7	138.1	94.4
Brule		WI		316.4	BLED20120920ADG	91 33 59.50	157	519	State Of Wisconsin - Educa		

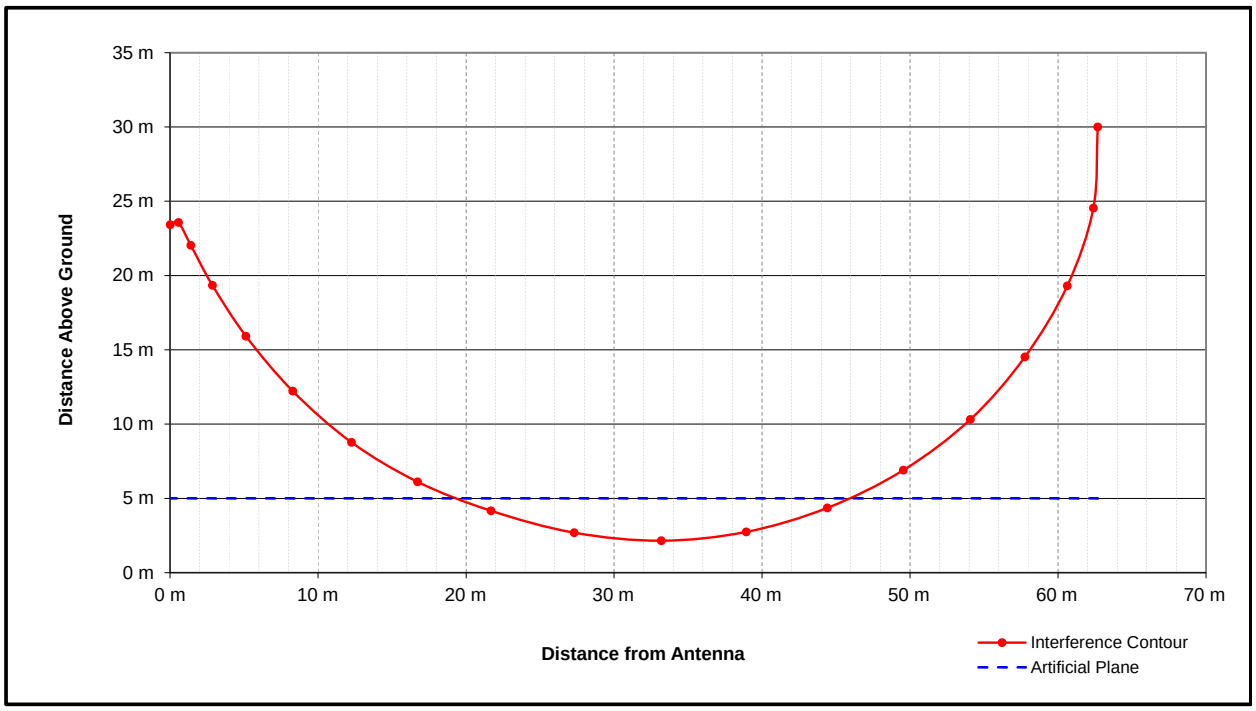
Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
In & Out distances between contours are shown at closest points. Reference zone= East Zone, Co to 3rd adjacent.
All separation margins (if shown) include rounding.
Ant Column: (D= DA Standard, 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.

Exhibit 2.0: K207ES - Proposed Allocation
University Of Northwestern-St. Paul

REFERENCE CH# 202D - 88.3 MHz, Pwr= 0.027 kW, HAAT= 55.5 M, COR= 507 M DISPLAY DATES
47 28 55.60 N. Average Protected F(50-50)= 5.57 km DATA 12-31-19
92 53 56.70 W. Omni-directional SEARCH 01-07-20

CH CALL / CITY	TYPE ANT / STATE	AZI <--	DIST / FILE #	LAT / LNG	PWR(kW) / HAAT(M)	INT(km) / COR(M)	PRO(km) / LICENSEE	*IN* (Overlap in km)	*OUT*
204A WHPJ	LIC ___	210.3	6.50	47 25 53.70	6.000	1.6	15.8	-0.7	-9.6*
Hibbing	MN	30.2	BLED20101101AAS	92 56 33.60	41	485	We Have This Hope Christia		
203C1 KCRB-FM	LIC ___	282.4	121.55	47 42 20.80	83.000	102.8	70.8	13.2	43.2
Bemidji	MN	101.2	BLED20030429AAO	94 29 09.90	301	720	Minnesota Public Radio		
205C3 WQRN	LIC D__	21.4	48.22	47 53 08.70	16.000	2.2	22.1	40.5	24.8
Cook	MN	201.6	BLED20091020AAS	92 39 47.60	70	484	Vcy AMerica Inc.		
202A KITF	LIC ___	343.8	114.83	48 28 23.80	5.800	73.6	18.6	35.3	75.5
International Falls	MN	163.5	BMLED20130214ACA	93 19 59.50	47	397	Minnesota Public Radio		
201D K201IX	LIC ___	239.2	56.97	47 13 05.80	0.250	13.6	9.7	38.6	41.2
Grand Rapids	MN	58.8	BLFT20161031ADP	93 32 50.80		458	University Of Northwestern		
202C3 KBPN	LIC ___	225.8	167.15	46 25 20.90	5.000	100.9	39.2	61.2	112.5
Brainerd	MN	44.6	BLED20030722ACJ	94 27 42.00	204	597	Minnesota Public Radio		
201A WWEN	LIC ___	148.8	122.62	46 32 07.80	1.800	46.9	31.1	68.8	81.6
Wentworth	WI	329.4	BLED20180426AAJ	92 04 07.70	139	438	Real Presence Radio		
203A WSSU	LIC ___	142.1	97.29	46 47 20.10	0.950	14.0	10.0	76.4	77.5
Superior	WI	322.7	BLED20120712ABW	92 06 49.70	100	403	State Of Wisconsin - Educa		

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= East Zone, Co to 3rd adjacent.
All separation margins (if shown) include rounding.
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.



Proposed Antenna: 1 Bay Nicom BKG77-1 (One Bay Fully Spaced)
Proposed Power: 0.027 kW
Antenna Height AGL: 30 meters
Interference Contour: 115.29 dBu f(50:10)
Artificial Ground Plane Height: 5 meters
Distance (Free Space) Equation: =(10^((106.92-[desired dBu]+[ERP in dBk])/20))*1000
Field Strength (dBu) Equation "=106.92-(20*(LOG10[DistMeters]/1000)))+[ERPin dBk]

Depression Angle Below Horizon	Antenna Relative Field	ERP in kW	ERP in dBk	Distance from Ant. to Interference Contour	Distance from Ant. to Artificial Plane	Field Strength in dBu @ Artificial Plane	Distance from Ant. to Ground Level	Field Strength in dBu @ Ground Level
0°	1.000	0.027	-15.69	62.69 m	infinite	---	---	---
-5°	0.999	0.027	-15.70	62.62 m	286.84 m	102.07 dBu	344.21 m	100.49 dBu
-10°	0.982	0.026	-15.84	61.56 m	143.97 m	107.91 dBu	172.76 m	106.33 dBu
-15°	0.954	0.025	-16.10	59.80 m	96.59 m	111.13 dBu	115.91 m	109.54 dBu
-20°	0.918	0.023	-16.43	57.55 m	73.10 m	113.21 dBu	87.71 m	111.63 dBu
-25°	0.872	0.021	-16.88	54.66 m	59.16 m	114.60 dBu	70.99 m	113.02 dBu
-30°	0.818	0.018	-17.43	51.28 m	50.00 m	115.51 dBu	60.00 m	113.93 dBu
-35°	0.758	0.016	-18.09	47.52 m	43.59 m	116.04 dBu	52.30 m	114.46 dBu
-40°	0.691	0.013	-18.90	43.32 m	38.89 m	116.23 dBu	46.67 m	114.64 dBu
-45°	0.616	0.010	-19.89	38.62 m	35.36 m	116.06 dBu	42.43 m	114.47 dBu
-50°	0.538	0.008	-21.07	33.73 m	32.64 m	115.58 dBu	39.16 m	113.99 dBu
-55°	0.465	0.006	-22.34	29.15 m	30.52 m	114.89 dBu	36.62 m	113.31 dBu
-60°	0.391	0.004	-23.84	24.51 m	28.87 m	113.87 dBu	34.64 m	112.29 dBu
-65°	0.313	0.003	-25.78	19.62 m	27.58 m	112.33 dBu	33.10 m	110.75 dBu
-70°	0.239	0.002	-28.12	14.98 m	26.60 m	110.30 dBu	31.93 m	108.72 dBu
-75°	0.176	0.001	-30.78	11.03 m	25.88 m	107.88 dBu	31.06 m	106.30 dBu
-80°	0.129	0.000	-33.47	8.09 m	25.39 m	105.35 dBu	30.46 m	103.77 dBu
-85°	0.103	0.000	-35.43	6.46 m	25.10 m	103.50 dBu	30.11 m	101.91 dBu
-90°	0.105	0.000	-35.26	6.58 m	25.00 m	103.70 dBu	30.00 m	102.11 dBu

Exhibit 2.1 - Waiver request of 74.1204(d). Aerial photograph demonstrating no population around the tower within a 60 meter radius circle.