

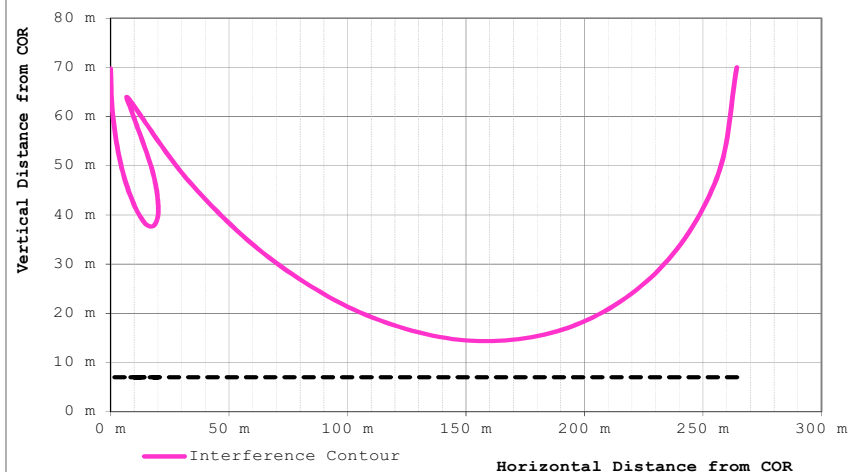
WCSX(FM) - 71.7 dBμ F(50:50) Contour

W231CV.P

Exhibit 13.3 §74.1204(d) 2nd/3rd Adjacent Channel Given Interference Waiver Request WCSX(FM) - Birmingham, MI (CH234B)

W231CV.P
Holly, MI
Proposed Operation
Facility ID: 148503
Latitude: 42-41-25.90 N
Longitude: 083-17-53.20 W
ERP: 0.21 kW
Channel: 231D (94.1 MHz)
AMSL Height: 364.0 m
Horiz. Pattern: Directional

WCSX(FM)
Birmingham, MI
BMLH19981008KA
Facility ID: 25084
Latitude: 42-27-13 N
Longitude: 083-09-50 W
ERP: 13.50 kW
Channel: 234B (94.7 MHz)
AMSL Height: 488.0 m
Horiz. Pattern: Omni



The applicant would like note the existence of a §74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WCSX(FM) - Birmingham, MI (CH234B) as noted in here-in. Protection has been based on the worst case calculated 111.7 dBμ F(50:10) Interference Contour, corresponding to the worst case WCSX(FM) 71.7 dBμ F(50:50) Protected Contour. Protection has been demonstrated through the attached downward radiation study. Full protection will be afforded the facility as the interference area will not reach the ground nor a seven meter artificial plane representing a standard two story home when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the antenna manufacturer specifications has also been included here-in.

Proposed Antenna: 3 Bay, Shivley 68xx-3HW(half-wave) Series Antenna								
Proposed Power: 0.210 kW								
Antenna Height AGL: 70.0 meters				Field Strength (dBμ) Equation				
Protection Plane Height: 7.0 meters				106.92-(20*(LOG10[DistMeters]/1000))]+[ERPin dBk]				
Protected Contour: 71.7 dBμ f(50:50)				Distance (Free Space) Equation:				
Interference Contour: 111.7 dBμ f(50:10)				(10^((106.92-[desired dBμ]+[ERPin dBk])/20))*1000				
Angle Below Horizon	Vertical Relative Field	Antenna Properties ERP in kW	Antenna Properties ERP in dBk	Meters from Antenna to Int. Contour	Meters from Antenna to Artificial Plane	Meters from Antenna to Ground Level	Field Strength at Protection Plane (dBμ)	Field Strength at Ground Level (dBμ)
0°	1.000	0.210	-6.78	264.31 m				
-5°	0.972	0.198	-7.02	256.91 m	722.84 m	803.16 m	102.71 dBμ	101.80 dBμ
-10°	0.891	0.167	-7.78	235.50 m	362.80 m	403.11 m	107.95 dBμ	107.03 dBμ
-15°	0.767	0.124	-9.08	202.72 m	243.41 m	270.46 m	110.11 dBμ	109.20 dBμ
-20°	0.615	0.079	-11.00	162.55 m	184.20 m	204.67 m	110.61 dBμ	109.70 dBμ
-25°	0.451	0.043	-13.69	119.20 m	149.07 m	165.63 m	109.76 dBμ	108.84 dBμ
-30°	0.293	0.018	-17.44	77.44 m	126.00 m	140.00 m	107.47 dBμ	106.56 dBμ
-35°	0.152	0.005	-23.14	40.17 m	109.84 m	122.04 m	102.96 dBμ	102.05 dBμ
-40°	0.037	0.000	-35.41	9.78 m	98.01 m	108.90 m	91.68 dBμ	90.77 dBμ
-45°	0.048	0.000	-33.15	12.69 m	89.10 m	98.99 m	94.77 dBμ	93.85 dBμ
-50°	0.104	0.002	-26.44	27.49 m	82.24 m	91.38 m	102.18 dBμ	101.27 dBμ
-55°	0.133	0.004	-24.30	35.15 m	76.91 m	85.45 m	104.90 dBμ	103.98 dBμ
-60°	0.140	0.004	-23.86	37.00 m	72.75 m	80.83 m	105.83 dBμ	104.91 dBμ
-65°	0.133	0.004	-24.30	35.15 m	69.51 m	77.24 m	105.78 dBμ	104.86 dBμ
-70°	0.114	0.003	-25.64	30.13 m	67.04 m	74.49 m	104.75 dBμ	103.84 dBμ
-75°	0.090	0.002	-27.69	23.79 m	65.22 m	72.47 m	102.94 dBμ	102.02 dBμ
-80°	0.062	0.001	-30.93	16.39 m	63.97 m	71.08 m	99.87 dBμ	98.96 dBμ
-85°	0.032	0.000	-36.67	8.46 m	63.24 m	70.27 m	94.23 dBμ	93.31 dBμ
-90°	0.001	0.000	-66.78	0.26 m	63.00 m	70.00 m	64.16 dBμ	63.24 dBμ

U.S. Census 2010 PL Database

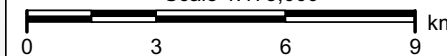
Terrain

175

372 m

+ WCSX(FM)

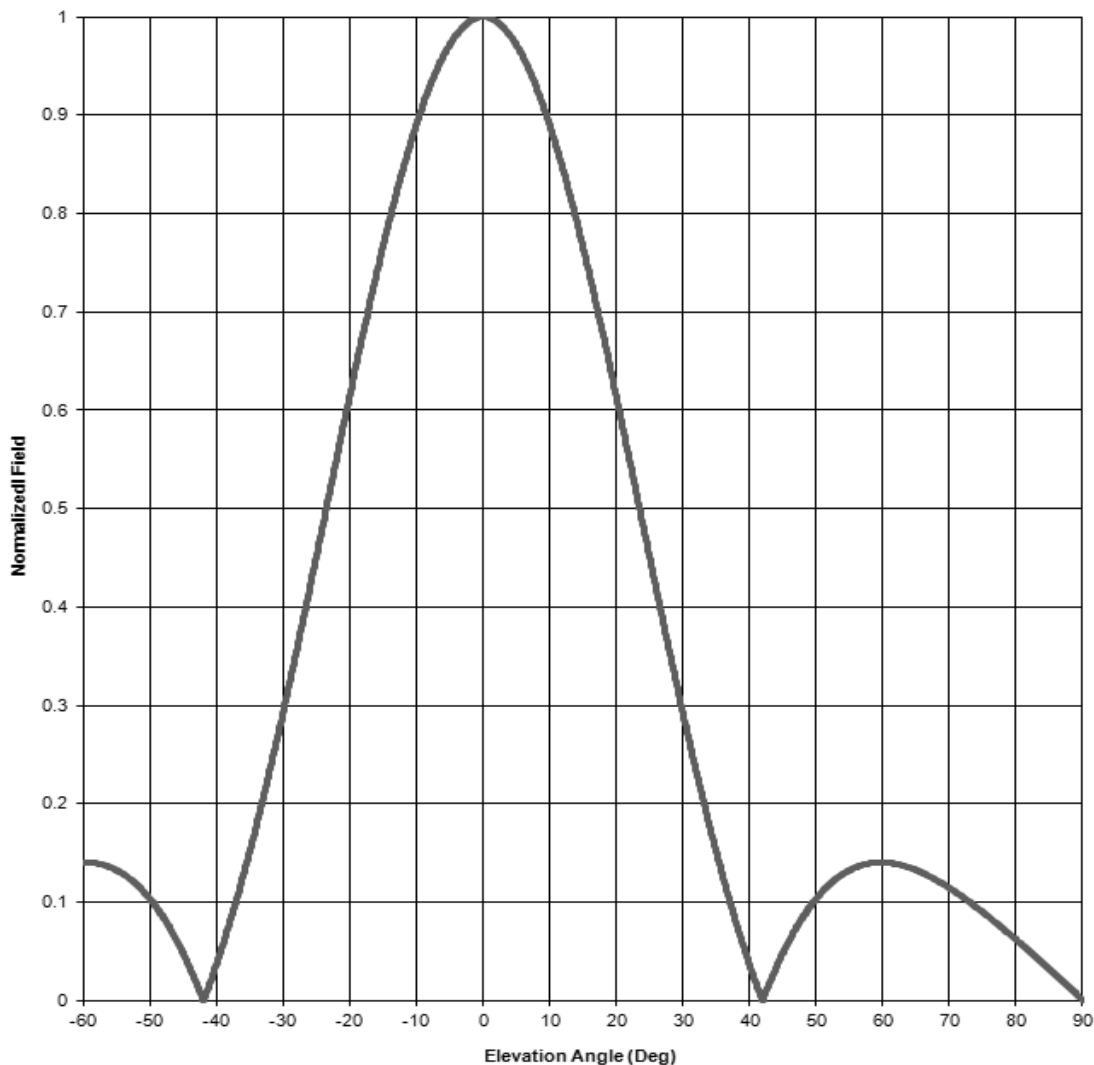
Scale 1:175,000



***Exhibit 13.3 - Copy of Manufacturer's
Vertical Radiation Pattern Documentation
(public record copy)***

Shively Labs®

Elevation pattern



Antenna models: 6014, 6015, 6020, 6510, 6513, 6600, & 68xx except 6832, 3-bay half-wave-spaced

Test frequency: 98.1 MHz

Gain (maximum):

	Power	dB
6014, 6015, 68xx:	1.02	0.08 dB
6510, 6513, 6600:	2.04	3.08 dB

Document No. 68xx 3-bay hw (130701)

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Degrees	Rel. Field	Degrees	Rel. Field	Degrees	Rel. Field	Degrees	Rel. Field	Degrees	Rel. Field
1	0.999	19	0.646	37	0.102	55	0.133	73	0.100
2	0.995	20	0.615	38	0.079	56	0.136	74	0.095
3	0.990	21	0.582	39	0.057	57	0.138	75	0.090
4	0.982	22	0.550	40	0.037	58	0.140	76	0.084
5	0.972	23	0.517	41	0.017	59	0.140	77	0.079
6	0.959	24	0.484	42	0.001	60	0.140	78	0.073
7	0.945	25	0.451	43	0.018	61	0.140	79	0.068
8	0.929	26	0.419	44	0.034	62	0.139	80	0.062
9	0.911	27	0.387	45	0.048	63	0.137	81	0.056
10	0.891	28	0.355	46	0.062	64	0.135	82	0.050
11	0.869	29	0.323	47	0.074	65	0.133	83	0.044
12	0.845	30	0.293	48	0.085	66	0.130	84	0.038
13	0.820	31	0.263	49	0.095	67	0.126	85	0.032
14	0.794	32	0.234	50	0.104	68	0.123	86	0.026
15	0.767	33	0.205	51	0.111	69	0.119	87	0.020
16	0.738	34	0.178	52	0.118	70	0.114	88	0.013
17	0.708	35	0.152	53	0.124	71	0.110	89	0.007
18	0.678	36	0.126	54	0.129	72	0.105	90	0.000

Elevation Pattern Tabulation

Antenna models: 6014, 6015, 6020, 6510, 6513, 6600, & 68xx except 6832, 3-bay half-wave-spaced.

Relative Field at 0° Depression = 1.000