

Non-Interference Compliance

Regarding Facility id 146071

Channel 284

Description of Exhibit 13 Contents

This exhibit demonstrates that the proposed facility complies with contour overlap and interference protection provisions in all of the applicable rule sections and that this application for a construction permit is in full compliance with 47 C.F.R. § 74.1204.

Let it be noted that should any actual real world interference occur, the applicant acknowledges that it will promptly suspend operation of this translator in accordance with 47 C.F.R. § 74.1203.

Page 2 of this exhibit is an explanation of the method used to demonstrate compliance with contour overlap and interference provisions based on 47 C.F.R. § 74.1204(d), which states:

[A]n application otherwise precluded by this section will be accepted if it can be demonstrated that no actual interference will occur due to intervening terrain, lack of population or such other factors as may be applicable.

Page 3 contains a tabulation of the vertical radiation pattern of the proposed antenna and the minimum ground clearance of the interfering contour based on this pattern.

Pages 4 through 6 include a tabulation of the vertical radiation pattern for the proposed antenna provided by the antenna manufacturer.

Page 7 of this exhibit contains the tabulated data from the interference analysis, which shows all stations whose protected contours come within 50 km of the 34 dBμ F(50,10) contour of the proposed translator. These tabulated values were calculated using data from the FCC's CDBS files and 30 arc second terrain data. The column labeled "Adj" shows the number of channels difference between the entry and the proposed translator. The column labeled "Dist" shows the distance in km. The column labeled "Overlap" shows the area of contour overlap in square kilometers.

Page 8 of this exhibit is a portion of a USGS 1:24,000 scale 7.5 minute quadrangle at full scale with the calculated area of interference overlaid. The sheet includes the quadrangle name and measurement scale at the bottom-left corner (note: "Mt" refers to meters). The area of interference was calculated using the free space equation and 120 radials.

Page 9 of this exhibit is an aerial photo of the vicinity surrounding the proposed translator's tower site.

Compliance with 47 C.F.R. § 74.1204(d)

All authorized second and third adjacent stations with which the proposed translator has contour overlap are tabulated below. Column four show the station's signal level at the proposed translator's tower site, and column five gives the minimum value within the entire standard interfering contour of the proposed translator (100 dBμ for most classes, 94 for class B, 97 for class B1). The minimum second or third adjacent F(50,50) contour within the proposed translator's standard interfering contour was used to calculate the proposed translator's actual "worst-case" interfering contour.

Application_id	File Number	Callsign	Contour at Tower	Min. Contour
1230152	BMLED20080208AE O	WLVE	61.3	61.3
Minimum F(50,50) Contour of Adjacent Station within Proposed Translator's Standard Interfering Contour				61.3

FCC 02-244 at Section II.A.5 states that "when demonstrating that 'no actual interference will occur due to . . . other factors,' pursuant to Section 74.1204(d), an applicant may use the undesired-to-desired signal ratio method." The undesired-to-desired ratio for second and third adjacent stations required by § 74.1204(a) is 40 dB. Since the minimum protected contour strength within the proposed translator's standard interference contour is **61.3 dBμ**, this makes the proposed translator's worst-case interfering contour **101.3 dBμ**. By the free-space equation, this contour is calculated to extend a maximum of **241.6 m** from the transmit antenna.

The maximum horizontal plane of the interfering contour was calculated for 120 radials and plotted on the pertinent portion of a USGS quadrangle (page 8 of this exhibit). However, the field strength of the proposed translator's antenna varies with angle of depression from horizontal. The antenna relative fields are tabulated on the following page at 5 degree increments, starting at 5 degrees below horizontal. Antenna relative field strength data was provided and certified by the manufacturer of the proposed antenna. Using a free-space calculation that neglects any loss due to reflection, the vertical ground clearance of the proposed translator's interference contour has been tabulated. As shown on the following page, the area of interference clears the tower ground level (TGL) by **21.1 m** at the lowest point. The applicant has taken into account USGS quadrangles and relevant aerial photography in stating that no structures, except possibly tower support structures, puncture the area of interference. Hence, in accordance with 47 C.F.R. § 74.1204(d) and the clarification provided by the FCC in the decision *Re: Living Way Ministries* (FCC 02-244), a lack of population has been demonstrated within the area of interference and this application is therefore in full compliance with 47 C.F.R. § 74.1204.

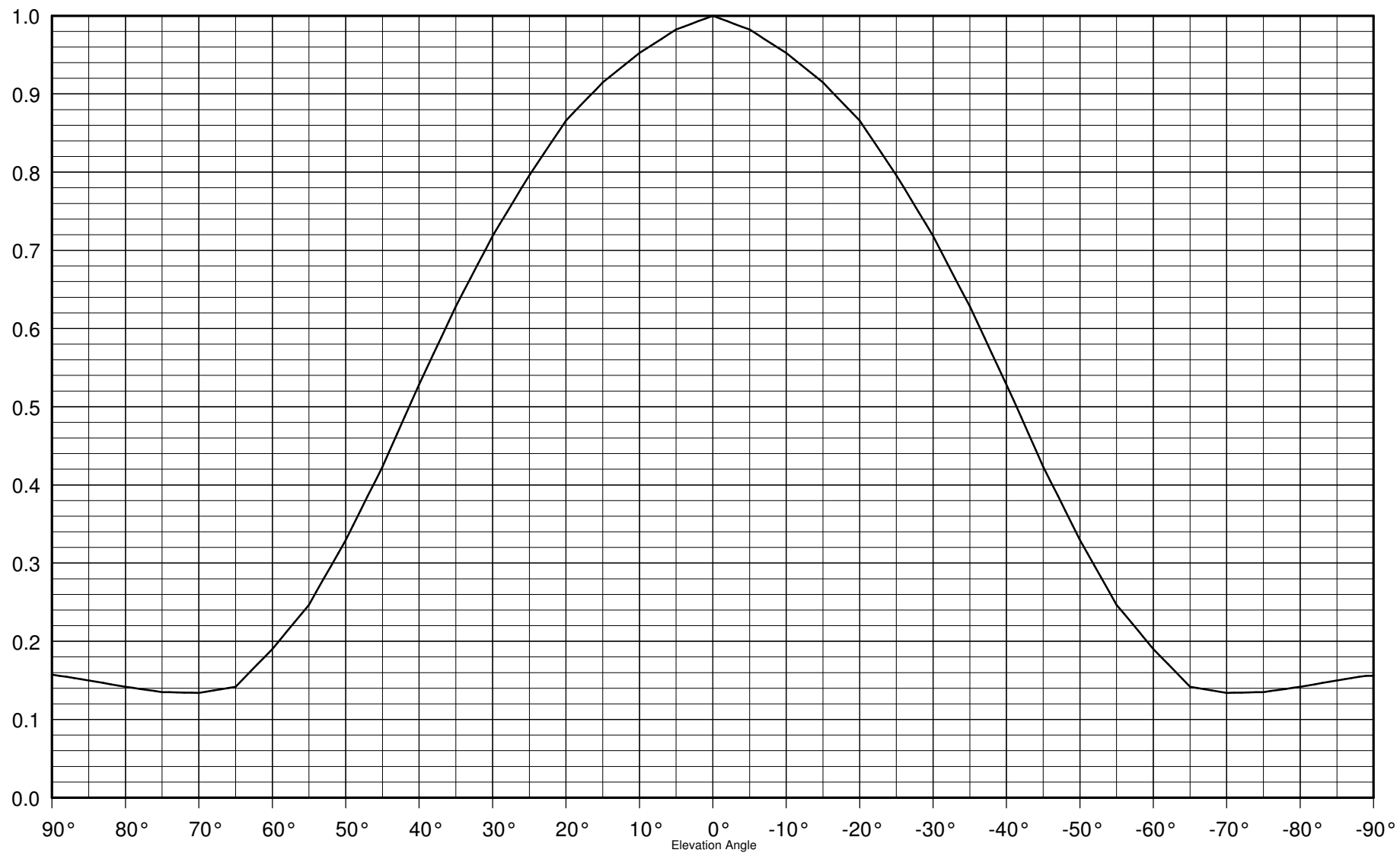
Antenna Manufacturer:	SCA
Antenna Model:	CA5-FM/CP/RM
Antenna Bays:	2
Antenna Bay Spacing:	0.75
CORAGL:	68 m
Maximum ERP:	0.016 kW
Interfering Contour:	101.3 dBμ
Max Int. Contour Distance:	241.6 m
Min Ground Clearance:	21.1 m

The following table shows how the interfering contour ground clearance was calculated.

The formula used to calculate the vertical radiation pattern for the multi-bay antenna array is the exact formula used by the FCC's Office of Engineering and Technology in the FM Model program used to calculate ground-level power density for multi-bay antenna arrays for purposes of compliance with OET65. According to the source code of FM Model, this formula was "derived from Kraus (eqn 4-51 & 5-52), Gailey and Tell, and material from Ben Dawson, Hatfield and Dawson."

- The *Depression Angle* is the angle below horizontal for the radial.
- The *Single-Bay Relative Field* value is the relative field value for the depression angle either provided by the antenna manufacturer or interpolated from the values provided by the manufacturer.
- The *Relative Field Multiplier* is equal to $\text{Sin}(N * \pi \text{Sin}\phi) / (N * \text{Sin}(\pi \text{Sin}\phi))$, where N is the number of antenna elements in the array, S is the spacing between elements, π is the ratio of a circle's circumference to its diameter, and ϕ is the Depression Angle.
- The *Relative Field Value for the Array* is the absolute value of the product of the Relative Field Factor and the Single-Bay Relative Field value for that radial.
- The *ERP on the Radial* is the square of the *Relative Field Value for the Array* multiplied by the maximum ERP.
- The *Contour Direct Distance* is found by using the free space equation.
- The *Horizontal and Vertical Contour Distances* are calculated from the *Direct Distance* using trigonometry.
- The *Contour Ground Clearance* is the *Vertical Contour Distance* subtracted from the overall antenna height above the ground.

Depression Angle (degree)	Single-Bay Relative Field	Relative Field Multiplier	Relative Field for Array	ERP on Radial (W)	Contour Direct Distance (m)	Contour Horizontal Distance (m)	Contour Vertical Distance (m)	Contour Ground Clearance (m)
5	0.982	0.9790	0.961	101.7	426.2	424.6	37.1	74.9
10	0.952	0.9175	0.873	83.9	387.2	381.3	67.2	44.8
15	0.915	0.8197	0.750	61.9	332.5	321.2	86.1	25.9
20	0.866	0.6925	0.600	39.6	265.8	249.8	90.9	21.1
25	0.796	0.5439	0.433	20.6	191.9	173.9	81.1	30.9
30	0.718	0.3827	0.275	8.3	121.8	105.5	60.9	51.1
35	0.628	0.2176	0.137	2.1	60.6	49.6	34.7	77.3
40	0.528	0.0562	0.030	0.1	13.2	10.1	8.5	103.5
45	0.423	-0.0951	0.040	0.2	17.8	12.6	12.6	99.4
50	0.329	-0.2320	0.076	0.6	33.8	21.8	25.9	86.1
55	0.247	-0.3516	0.087	0.8	38.5	22.1	31.5	80.5
60	0.190	-0.4526	0.086	0.8	38.1	19.1	33.0	79.0
65	0.142	-0.5351	0.076	0.6	33.7	14.2	30.5	81.5
70	0.134	-0.5998	0.080	0.7	35.6	12.2	33.5	78.5
75	0.135	-0.6481	0.087	0.8	38.8	10.0	37.5	74.5
80	0.142	-0.6813	0.097	1.0	42.9	7.4	42.2	69.8
85	0.150	-0.7007	0.105	1.2	46.6	4.1	46.4	65.6
90	0.157	-0.7071	0.111	1.4	49.2	0.0	49.2	62.8
Min. Ground Clearance (m):								21.1



CA5-FM/CP/RM FM CP Yagi Antenna

Max Gain: 6.0 dBd

Power-x: 3.98

Circular Polarization

Vertical Plane Pattern

CA5-FM/CP/RM FM CP Yagi Antenna
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Angle	Field	Rel dB	PWR mult	dBd	Angle	Field	Rel dB	PWR mult	dBd
90	.157	-16.06	.10	-10.06	45	.423	-7.47	.71	-1.47
89	.156	-16.14	.10	-10.14	44	.444	-7.05	.79	-1.05
88	.154	-16.23	.09	-10.23	43	.465	-6.64	.86	-.64
87	.153	-16.31	.09	-10.31	42	.486	-6.26	.94	-.26
86	.151	-16.39	.09	-10.39	41	.507	-5.89	1.02	.11
85	.150	-16.48	.09	-10.48	40	.528	-5.54	1.11	.46
84	.148	-16.58	.09	-10.58	39	.548	-5.22	1.20	.78
83	.147	-16.67	.09	-10.67	38	.568	-4.91	1.29	1.09
82	.145	-16.77	.08	-10.77	37	.588	-4.61	1.38	1.39
81	.143	-16.87	.08	-10.87	36	.608	-4.32	1.47	1.68
80	.142	-16.97	.08	-10.97	35	.628	-4.04	1.57	1.96
79	.140	-17.06	.08	-11.06	34	.646	-3.79	1.66	2.21
78	.139	-17.14	.08	-11.14	33	.664	-3.55	1.76	2.45
77	.138	-17.22	.08	-11.22	32	.682	-3.32	1.85	2.68
76	.136	-17.31	.07	-11.31	31	.700	-3.09	1.95	2.91
75	.135	-17.39	.07	-11.39	30	.718	-2.87	2.05	3.13
74	.135	-17.41	.07	-11.41	29	.734	-2.69	2.14	3.31
73	.135	-17.42	.07	-11.42	28	.749	-2.51	2.24	3.49
72	.134	-17.43	.07	-11.43	27	.765	-2.33	2.33	3.67
71	.134	-17.44	.07	-11.44	26	.780	-2.15	2.42	3.85
70	.134	-17.46	.07	-11.46	25	.796	-1.98	2.52	4.02
69	.136	-17.36	.07	-11.36	24	.810	-1.83	2.61	4.17
68	.137	-17.26	.07	-11.26	23	.824	-1.68	2.70	4.32
67	.139	-17.16	.08	-11.16	22	.838	-1.54	2.80	4.46
66	.140	-17.07	.08	-11.07	21	.852	-1.39	2.89	4.61
65	.142	-16.97	.08	-10.97	20	.866	-1.25	2.99	4.75
64	.151	-16.40	.09	-10.40	19	.876	-1.15	3.05	4.85
63	.161	-15.86	.10	-9.86	18	.885	-1.06	3.12	4.94
62	.171	-15.36	.12	-9.36	17	.895	-.96	3.19	5.04
61	.180	-14.88	.13	-8.88	16	.905	-.87	3.26	5.13
60	.190	-14.42	.14	-8.42	15	.915	-.77	3.33	5.23
59	.201	-13.92	.16	-7.92	14	.922	-.70	3.39	5.30
58	.213	-13.45	.18	-7.45	13	.930	-.63	3.44	5.37
57	.224	-13.00	.20	-7.00	12	.937	-.56	3.50	5.44
56	.235	-12.57	.22	-6.57	11	.945	-.49	3.55	5.51
55	.247	-12.16	.24	-6.16	10	.952	-.42	3.61	5.58
54	.263	-11.59	.28	-5.59	9	.958	-.37	3.66	5.63
53	.280	-11.07	.31	-5.07	8	.964	-.32	3.70	5.68
52	.296	-10.57	.35	-4.57	7	.970	-.26	3.75	5.74
51	.313	-10.09	.39	-4.09	6	.976	-.21	3.79	5.79
50	.329	-9.65	.43	-3.65	5	.982	-.15	3.84	5.85
49	.348	-9.17	.48	-3.17	4	.986	-.12	3.87	5.88
48	.367	-8.71	.54	-2.71	3	.989	-.09	3.90	5.91
47	.386	-8.27	.59	-2.27	2	.993	-.06	3.93	5.94
46	.405	-7.86	.65	-1.86	1	.996	-.03	3.95	5.97

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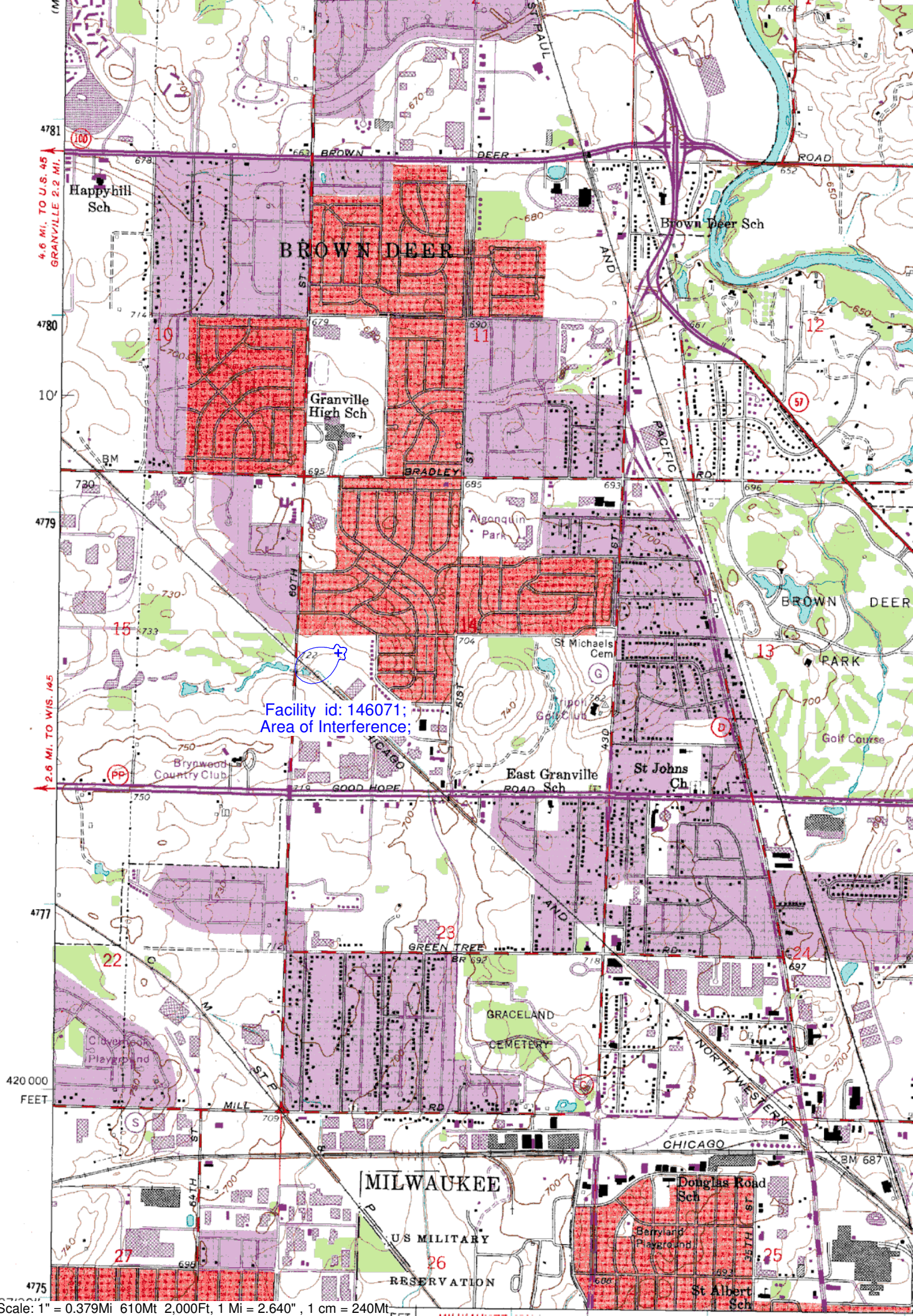


Angle	Field	Rel dB	PWR mult	dBd	Angle	Field	Rel dB	PWR mult	dBd
0	1.000	.00	3.98	6.00	-45	.423	-7.47	.71	-1.47
-1	.996	-.03	3.95	5.97	-46	.405	-7.86	.65	-1.86
-2	.993	-.06	3.93	5.94	-47	.386	-8.27	.59	-2.27
-3	.989	-.09	3.90	5.91	-48	.367	-8.71	.54	-2.71
-4	.986	-.12	3.87	5.88	-49	.348	-9.17	.48	-3.17
-5	.982	-.15	3.84	5.85	-50	.329	-9.65	.43	-3.65
-6	.976	-.21	3.79	5.79	-51	.313	-10.09	.39	-4.09
-7	.970	-.26	3.75	5.74	-52	.296	-10.57	.35	-4.57
-8	.964	-.32	3.70	5.68	-53	.280	-11.07	.31	-5.07
-9	.958	-.37	3.66	5.63	-54	.263	-11.59	.28	-5.59
-10	.952	-.42	3.61	5.58	-55	.247	-12.16	.24	-6.16
-11	.945	-.49	3.55	5.51	-56	.235	-12.57	.22	-6.57
-12	.937	-.56	3.50	5.44	-57	.224	-13.00	.20	-7.00
-13	.930	-.63	3.44	5.37	-58	.213	-13.45	.18	-7.45
-14	.922	-.70	3.39	5.30	-59	.201	-13.92	.16	-7.92
-15	.915	-.77	3.33	5.23	-60	.190	-14.42	.14	-8.42
-16	.905	-.87	3.26	5.13	-61	.180	-14.88	.13	-8.88
-17	.895	-.96	3.19	5.04	-62	.171	-15.36	.12	-9.36
-18	.885	-1.06	3.12	4.94	-63	.161	-15.86	.10	-9.86
-19	.876	-1.15	3.05	4.85	-64	.151	-16.40	.09	-10.40
-20	.866	-1.25	2.99	4.75	-65	.142	-16.97	.08	-10.97
-21	.852	-1.39	2.89	4.61	-66	.140	-17.07	.08	-11.07
-22	.838	-1.54	2.80	4.46	-67	.139	-17.16	.08	-11.16
-23	.824	-1.68	2.70	4.32	-68	.137	-17.26	.07	-11.26
-24	.810	-1.83	2.61	4.17	-69	.136	-17.36	.07	-11.36
-25	.796	-1.98	2.52	4.02	-70	.134	-17.46	.07	-11.46
-26	.780	-2.15	2.42	3.85	-71	.134	-17.44	.07	-11.44
-27	.765	-2.33	2.33	3.67	-72	.134	-17.43	.07	-11.43
-28	.749	-2.51	2.24	3.49	-73	.135	-17.42	.07	-11.42
-29	.734	-2.69	2.14	3.31	-74	.135	-17.41	.07	-11.41
-30	.718	-2.87	2.05	3.13	-75	.135	-17.39	.07	-11.39
-31	.700	-3.09	1.95	2.91	-76	.136	-17.31	.07	-11.31
-32	.682	-3.32	1.85	2.68	-77	.138	-17.22	.08	-11.22
-33	.664	-3.55	1.76	2.45	-78	.139	-17.14	.08	-11.14
-34	.646	-3.79	1.66	2.21	-79	.140	-17.06	.08	-11.06
-35	.628	-4.04	1.57	1.96	-80	.142	-16.97	.08	-10.97
-36	.608	-4.32	1.47	1.68	-81	.143	-16.87	.08	-10.87
-37	.588	-4.61	1.38	1.39	-82	.145	-16.77	.08	-10.77
-38	.568	-4.91	1.29	1.09	-83	.147	-16.67	.09	-10.67
-39	.548	-5.22	1.20	.78	-84	.148	-16.58	.09	-10.58
-40	.528	-5.54	1.11	.46	-85	.150	-16.48	.09	-10.48
-41	.507	-5.89	1.02	.11	-86	.151	-16.39	.09	-10.39
-42	.486	-6.26	.94	-.26	-87	.153	-16.31	.09	-10.31
-43	.465	-6.64	.86	-.64	-88	.154	-16.23	.09	-10.23
-44	.444	-7.05	.79	-1.05	-89	.156	-16.14	.10	-10.14

Adjacent Channel Study
For Station NEW, Facility_id: 146071

Co-channel through third adjacent:

App_id	Fac_id	File_Number	Call	Licensee	Class	City	State	Status	ERP	RCAMSL	Chan	Adj	Dist	Overlap
1230152	88081	BMLED-20080208AEO	WLVE	EDUCATIONAL MEDIA FOUNDATION	A	MUKWONAGO	WI	LIC	1.65	453	287	3	26.7	0.0413
1569037	157544	BNPFT-20130815ACR	NEW	KEVIN J. YOUNGERS	D	MILWAUKEE	WI	APP	0.002	256	286	2	6.9	0
1551604	157544	BNPFT-20030317LFO	NEW	KEVIN J. YOUNGERS	D	MILWAUKEE	WI	APP	0.25	294	286	2	9.6	0
293998	68288	BLED-1802	WCCX	TRUSTEES, CARROLL COLLEGE	D	WAUKESHA	WI	LIC	0.013	282	283	1	26.1	0
1550619	147649	BNPFT-20030314AZR	NEW	SISTER GRACE, INC.	D	PORT WASHINGTON	WI	APP	0.055	246	286	2	26.2	0
983509	53506	BLH-20040317ADF	WDDW	ADELANTE MEDIA OF WISCONSIN LICENSE LLC	A	STURTEVANT	WI	LIC	4.2	315	284	0	35.1	0
172566	34303	BLH-19920413KC	WTKM-FM	TOMSUN MEDIA, LLC	A	HARTFORD	WI	LIC	5.8	396	285	1	35.4	0
1107415	60042	BLH-20060109ACJ	WXER	MIDWEST COMMUNICATIONS, INC.	A	PLYMOUTH	WI	LIC	5.1	401	283	1	63.7	0
179103	60612	BLH-19921125KD	WSLD	WPW BROADCASTING, INC.	A	WHITEWATER	WI	LIC	6	381	283	1	78.4	0
271034	41980	BLH-19980716KB	WZEE	CAPSTAR TX LLC	B	MADISON	WI	LIC	12	602	281	3	122.7	0





70 yds

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