ASR Registration Search

Registration 1048243

Map Registration

Exhibit 13.1 - Copy of Existing Antenna Structure Registration

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

Registration Detail

Reg Number	1048243	Status	Constructed
File Number	A0639411	Constructed	01/01/1972
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type: 4TA3 - Antenna Tower Array - 1st N = # towers 2nd N =

Location (in NAD83 Coordinates)

Lat/Long	42-23-31.6 N 076-28-28.7 W	Address	TOWER 3 - TROY RD .75 MI S OF SCHOOLHOUSE RD
City, State	ITHACA , NY		
Zip	14850	County	TOMPKINS
Center of AM Array	42-23-30.7 N 076-28-28.4 W	Position of Tower in Array	

Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
445.0	93.6
Overall Height Above Mean Sea Level	**Overall Height Above Ground w/o Appurtenances**
538.6	92.7

Painting and Lighting Specifications

None

FAA Notification

FAA Study	2009-AEA-631-OE	FAA Issue Date	03/05/2009

Owner & Contact Information

FRN: 0009269424

Owner Entity Type:

Owner

Saga Communications of New England, LLC
Attention To: Gregory Urbiel
73 Kercheval Avenue
Grosse Pointe Farms , MI 48236

P: (313)886-7070
F:
E: gurbiel@sagacom.com

Contact

P:
F:
E:

Last Action Status

Status	Constructed	Received	05/21/2009
Purpose	Notification	Entered	05/21/2009
Mode	Interactive		

Related Applications

05/21/2009	A0639409 - Modification (MD)
05/21/2009	A0639411 - Notification (NT)
02/26/2009	A0626138 - Notification (NT)

Related applications (6)

Comments

Comments

None

History

Date	Event
05/22/2009	Registration Printed
05/21/2009	ASR Application receipt email sent: Tower email
05/21/2009	Construction Notification Received

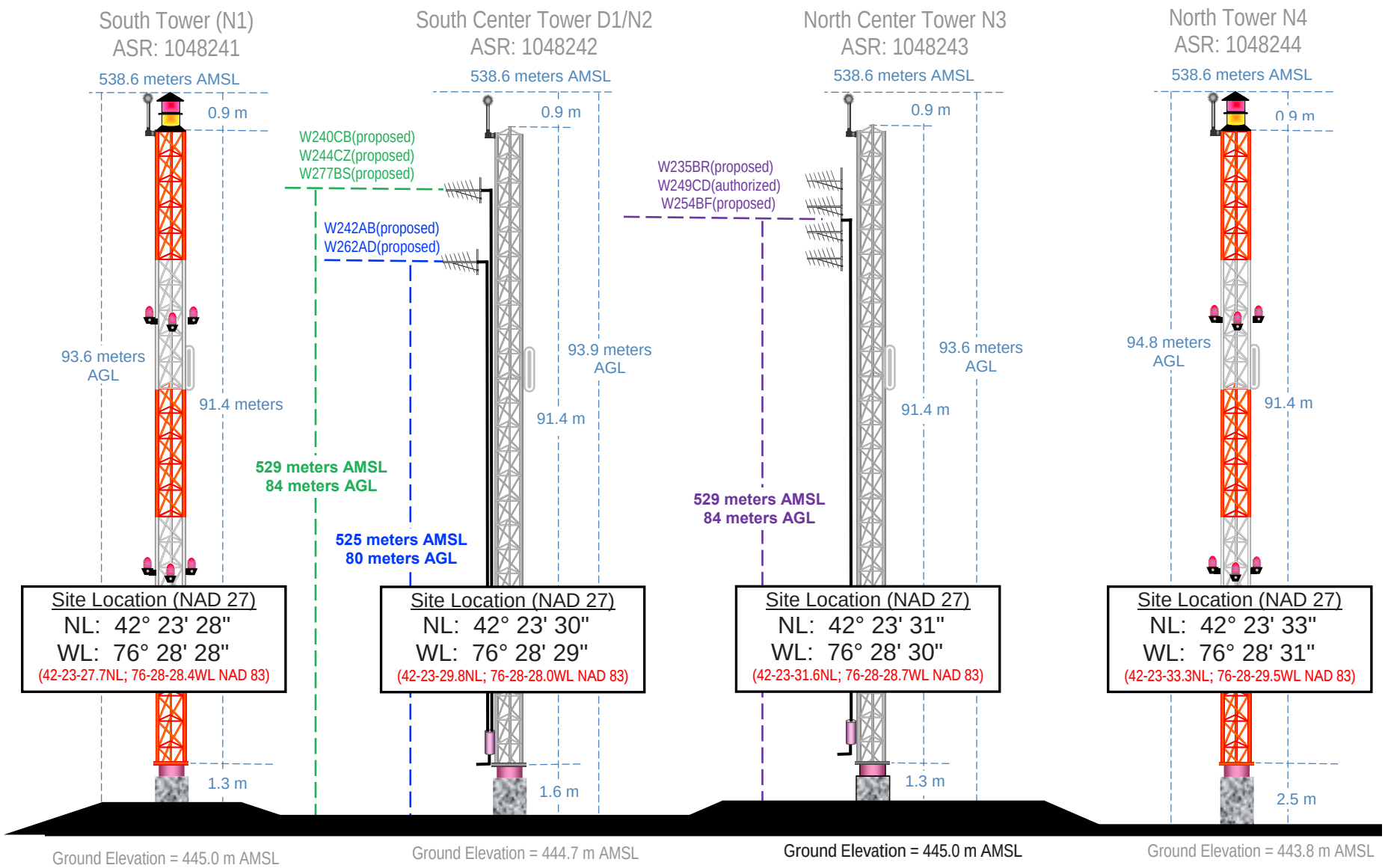
All History (12)

Automated Letters

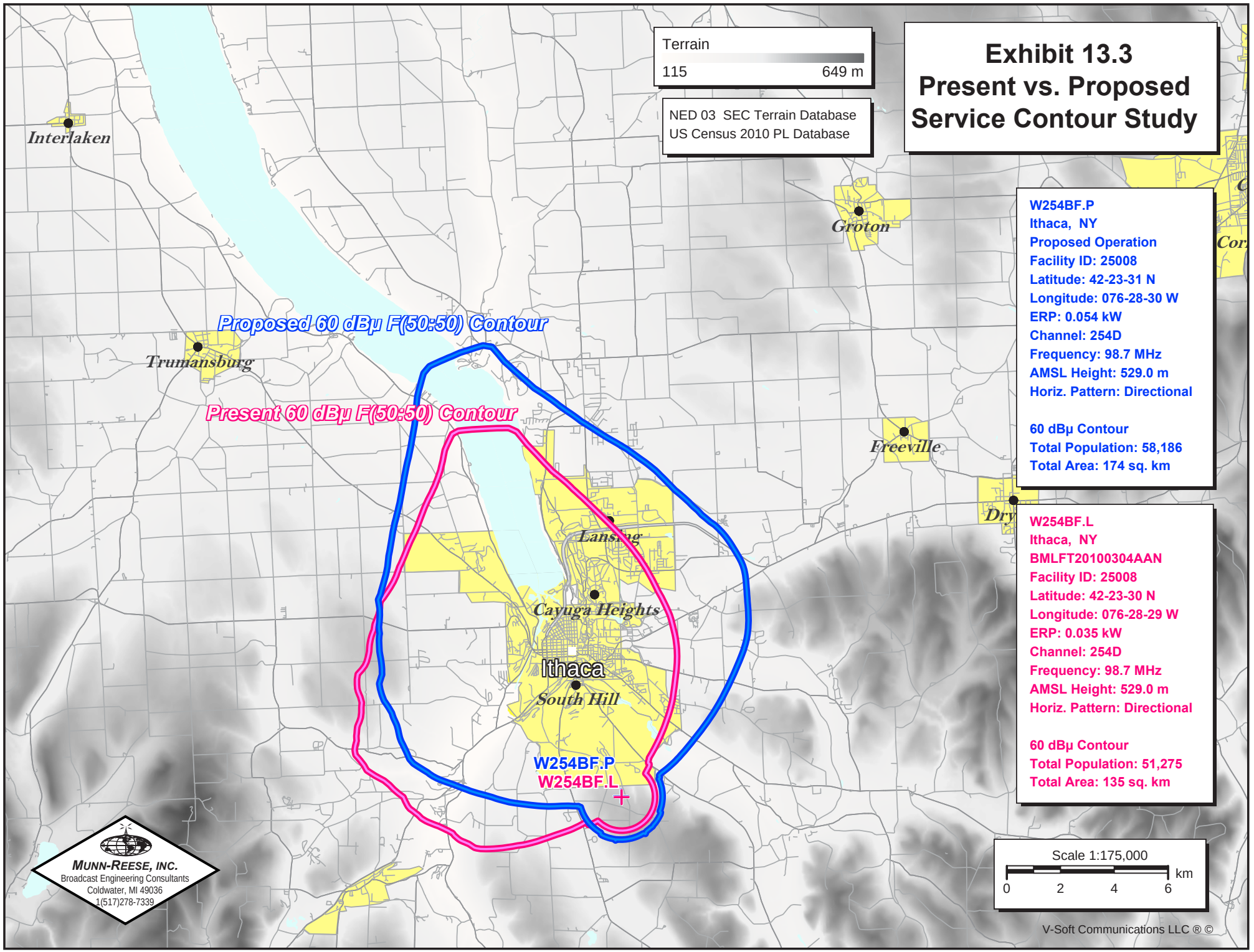
05/22/2009	Authorization, Reference
02/25/2009	Authorization, Reference
01/10/2009	Authorization, Reference

EXHIBIT 13.2
VERTICAL PLAN OF ANTENNA SYSTEM

The site is located on ASR #1048243 of the WNYY(AM) directional array located on Troy Rd., 0.75 mi South of Schoolhouse Rd; the city of Ithaca, Tompkins County, New York.	



MUNN–REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036


Terrain
115
649 m
NED 03 SEC Terrain Database
US Census 2010 PL Database
Exhibit 13.3
Present vs. Proposed
Service Contour Study
W254BF.P
Ithaca, NY
Proposed Operation
Facility ID: 25008
Latitude: 42-23-31 N
Longitude: 076-28-30 W
ERP: 0.054 kW
Channel: 254D
Frequency: 98.7 MHz
AMSL Height: 529.0 m
Horiz. Pattern: Directional
60 dBµ Contour
Total Population: 58,186
Total Area: 174 sq. km
W254BF.L
Ithaca, NY
BMLFT20100304AAN
Facility ID: 25008
Latitude: 42-23-30 N
Longitude: 076-28-29 W
ERP: 0.035 kW
Channel: 254D
Frequency: 98.7 MHz
AMSL Height: 529.0 m
Horiz. Pattern: Directional
60 dBµ Contour
Total Population: 51,275
Total Area: 135 sq. km
Proposed 60 dBµ F(50:50) Contour
Present 60 dBµ F(50:50) Contour
Interlaken
Trumansburg
Groton
Freeville
Lansing
Cayuga Heights
Ithaca
South Hill
W254BF.P
W254BF.L
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339
Scale 1:175,000
0 2 4 6 km
V-Soft Communications LLC ® ©

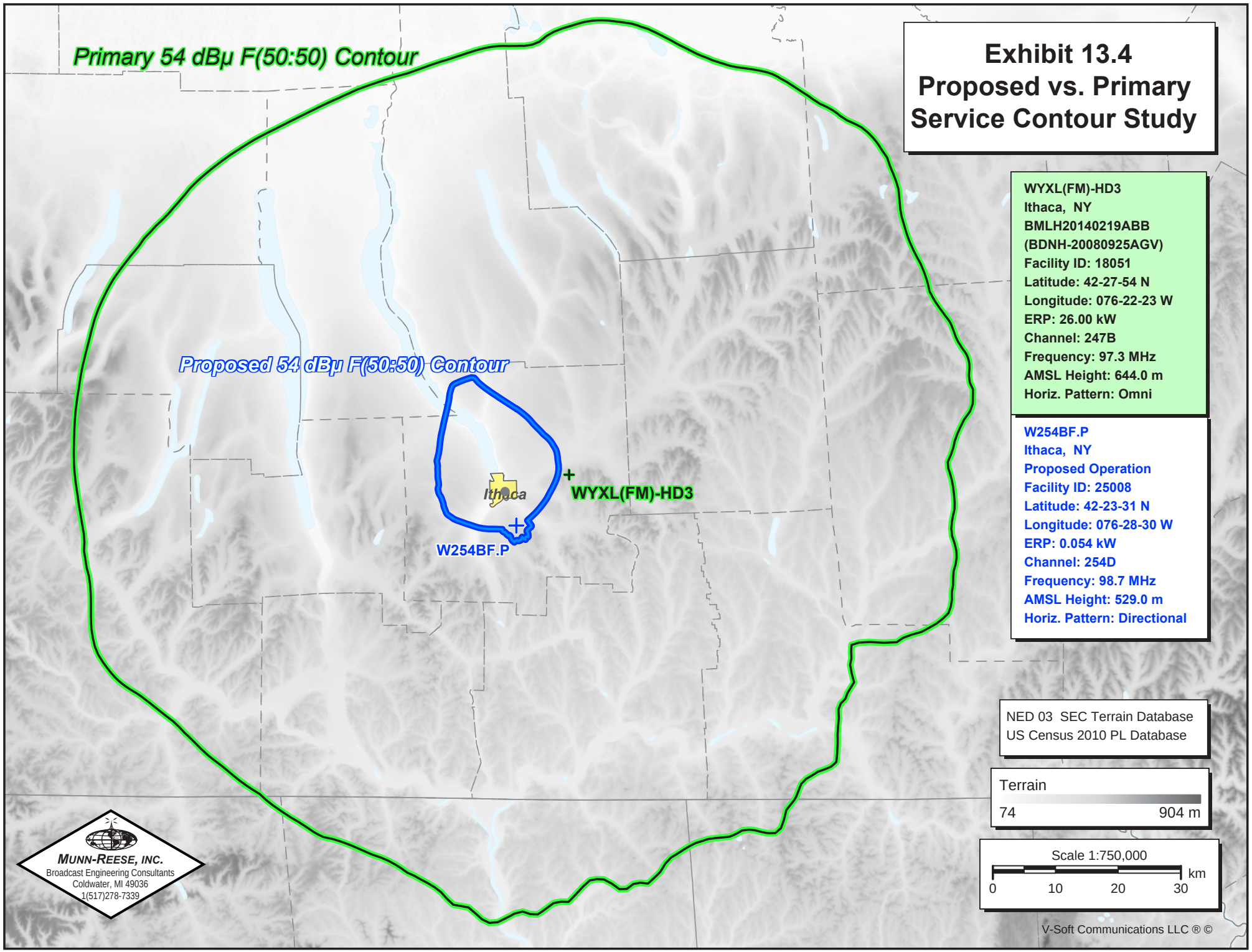

Primary 54 dBµ F(50:50) Contour
Proposed 54 dBµ F(50:50) Contour
Ithaca
WYXL(FM)-HD3
W254BF.P
Exhibit 13.4
Proposed vs. Primary
Service Contour Study
WYXL(FM)-HD3
Ithaca, NY
BMLH20140219ABB
(BDNH-20080925AGV)
Facility ID: 18051
Latitude: 42-27-54 N
Longitude: 076-22-23 W
ERP: 26.00 kW
Channel: 247B
Frequency: 97.3 MHz
AMSL Height: 644.0 m
Horiz. Pattern: Omni
W254BF.P
Ithaca, NY
Proposed Operation
Facility ID: 25008
Latitude: 42-23-31 N
Longitude: 076-28-30 W
ERP: 0.054 kW
Channel: 254D
Frequency: 98.7 MHz
AMSL Height: 529.0 m
Horiz. Pattern: Directional
NED 03 SEC Terrain Database
US Census 2010 PL Database
Terrain
74
904 m
Scale 1:750,000
0
10
20
30
km
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339
V-Soft Communications LLC ® ©

Exhibit 13.5
Tabulation of Proposed Translator Allocation

Saga Communications Of New England, Llc

REFERENCE CH# 254D - 98.7 MHz, Pwr= 0.054 kW DA, HAAT= 159.9 M, COR= 529 M DISPLAY DATES
42 23 31.0 N. Average Protected F(50-50)= 11.22 km DATA 04-16-14
76 28 30.0 W. Standard Directional SEARCH 04-18-14

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)	
254D W254BF	LIC DC_	143.9	0.03	42 23 30.0	0.035 42.6	12.7	-44.1*	-18.7*
Ithaca	NY	323.9	BMLFT20100304AAN	76 28 29.0	160 529	Saga Communications Of New		
254A WGMM	LIC ZCN	240.9	56.85	42 08 31.0	1.200 69.9	23.0	-14.6*<	28.4
Corning	NY	60.5	BLH19990422KF	77 04 40.0	220 626	Sound Communications, Llc		
251B WHWK	LIC DCX	130.0	57.01	42 03 40.0	6.700 4.9	71.2	50.6	-14.2*<
Binghamton	NY	310.4	BLH20040330AAY	75 56 45.0	395 790	Townsquare Media Binghamto		
256B WAAL	LIC _CX	130.5	56.83	42 03 31.0	8.700 5.0	66.4	50.2	-9.6*<
Binghamton	NY	310.9	BLH20040608ABQ	75 57 06.0	291 688	Townsquare Media Binghamto		
254B WLZW	LIC _CX	51.2	134.83	43 08 39.0	25.000 137.8	71.1	-6.6*<	46.4
Utica	NY	232.1	BMLH20120913ABT	75 10 45.0	201 450	Townsquare Media Licensee		
253A WNYR-FM	LIC NC_	326.7	55.17	42 48 22.0	3.200 40.4	26.5	0.3<	6.9
Waterloo	NY	146.4	BLH20000807AFJ	76 50 47.0	136 300	Lake Country Broadcasting,		
254D W251AK	CP DH_	12.7	70.80	43 00 47.0	0.180 17.1	5.2	42.5	28.2
Camillus	NY	192.8	BPFT20130731AQY	76 17 01.0	92 309	Cram Communications, Llc		
252A WVIN-FM	LIC _C_	263.9	72.96	42 19 06.0	4.500 3.3	35.7	66.3	37.2
Bath	NY	83.3	BLH20000802AAD	77 21 27.0	112 576	Pembrook Pines Mass Media,		
254B NEW	PRO ?HN	325.6	234.58	44 07 11.0	19.500 182.2	82.1	39.5	94.8
Peterborough	ON	144.4		78 08 12.0	245 472			
Proposed by Canada 980227-Specially negotiated, short-spaced allotment limited to 8.4kw ERP and 249m HAAT o r the equivalent in the direction of 193 degrees to protect channel 253B in Niagrara Falls, NY and channel 255B in Rochester, NY-Accepted by Commission 980430								
255B WBZA	LIC _CN	311.9	130.57	43 10 14.0	37.000 75.2	63.2	43.5	42.2
Rochester	NY	131.1	BLH19880506KB	77 40 23.0	172 317	Entercom Rochester License		
Special negotiated short-spaced allocation								
251D W251AJ	LIC DV_	349.8	58.47	42 54 34.0	0.250 0.0	1.6	43.4	56.4
Melrose Park	NY	169.7	BLFT20111101AIW	76 36 09.0	51 255	Auburn Broadcasting, Inc.		
257A WLLW	LIC _CX	334.6	74.17	42 59 38.0	5.000 2.7	27.7	54.3	45.9
Seneca Falls	NY	154.3	BLH20050128ALS	76 51 59.0	109 251	Auburn Broadcasting, Inc.		
253B AL0582	RSV-A ___	157.5	143.37	41 11 56.0	50.000 95.2	79.2	46.5	61.1
Freeland	PA	337.9	RM10697	75 49 06.0	150 561			
Chg. of Community from Wilkes-Barre From Channel 253B, Wilkes-Barre, PA, pursuant to R&O, MM Docket 03-140, effective November 17, 2003.								

Terrain database is NED 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
Contour distances are on direct line to and from reference station. Reference zone= East Zone, Co to 3rd adjacent.
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 protected contour.
< = Contour Overlap
Reference station has protected zone issue:

Green Text denotes the W254BF - Ithaca, NY facility to be modified by this Form 349 filing. This facility need not be protected.

Yellow Highlighted Text denotes §74.1204(d) second and third adjacent channel given interference waiver requests toward WHWK(FM) - Binghamton, NY (CH251B) and WAAL(FM) - Binghamton, NY (CH256B). Full protection will be afforded each facility as the calculated interference area will not reach the ground nor a 7 meter artificial plane representing a standard two story building when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. The §74.1204(d) waiver requests have been included in ***Exhibit 13.7***. Copies of the antenna manufacturer's vertical radiation pattern have been included in ***Exhibit 13.8.*** Copies of the manufacturer's directional Antenna Pattern have been included in ***Exhibit 13.9.***

Blue Highlighted Text denotes contour protection studies toward select stations as included in ***Exhibit 13.6***.

Exhibit 13.6
Contour Protection Studies Toward WNYR-FM - Waterloo, NY

Saga Communications Of New England, Llc

FMCommander Single Allocation Study - 04-18-2014 - NED 03 SEC
W254BF.P's Overlaps (In= 0.29 km, Out= 6.89 km)

W254BF.P CH 254 D DA
Lat= 42 23 31.0, Lng= 76 28 30.0
0.054 kW 159.9 M HAAT, 529 M COR
Prot.= 60 dBu, Intef.= 54 dBu

WNYR-FM CH 253 A 73.215 N BLH20000807AFJ
Lat= 42 48 22.0, Lng= 76 50 47.0
3.2 kW 136 M HAAT, 300 M COR
Prot.= 60 dBu, Intef.= 54 dBu

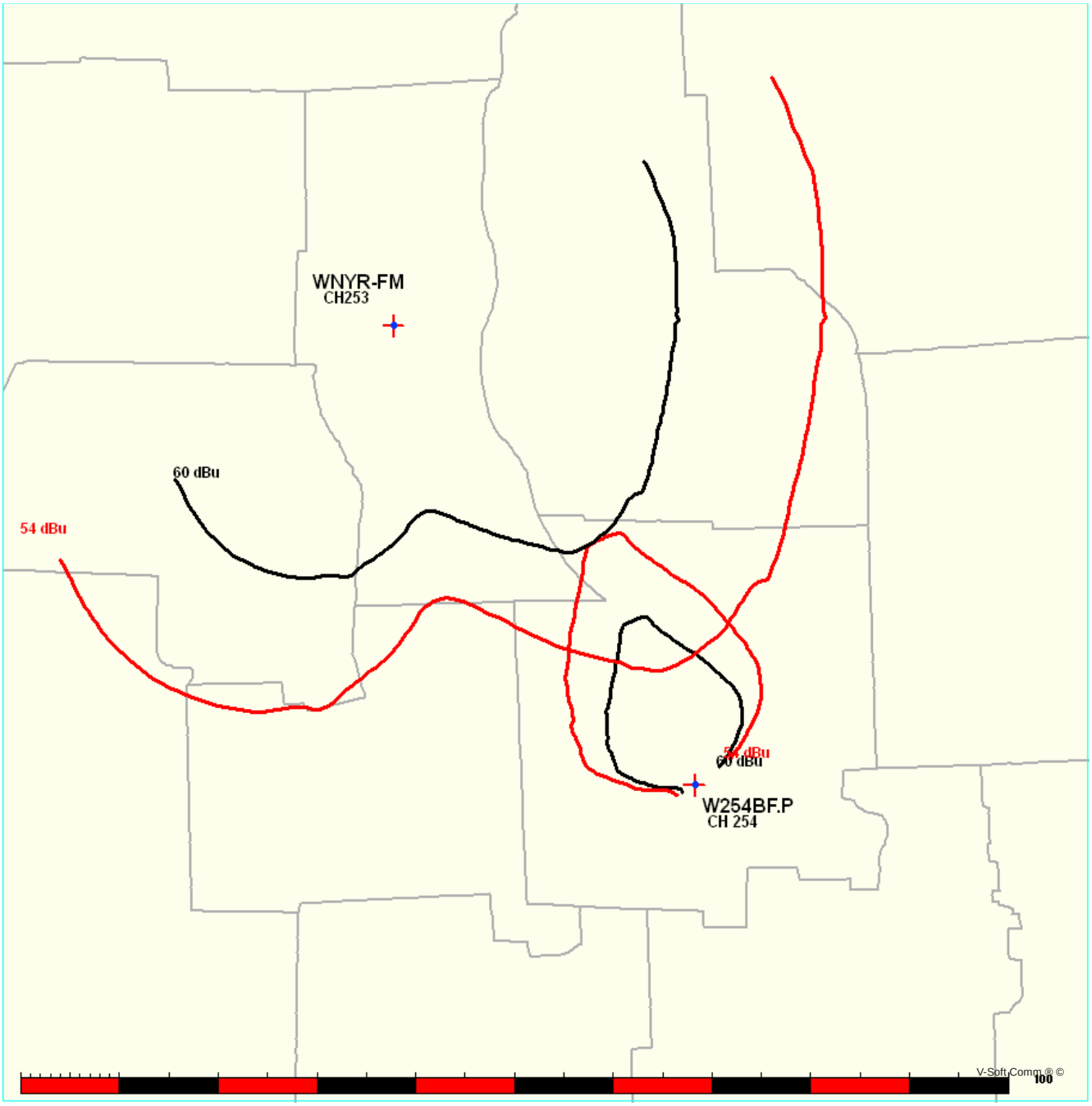


Exhibit 13.6
Contour Protection Studies Toward WNYR-FM - Waterloo, NY

04-18-2014 Terrain Data: NED 03 SEC FMOver Analysis

W254BF.P	WNYR-FM BLH20000807AFJ
Channel = 254D	Channel = 253A
Max ERP = 0.054 kW	Max ERP = 3.2 kW
RCAMSL = 529 M	RCAMSL = 300 M
N. Lat. 42 23 31.0	N. Lat. 42 48 22.0
W. Lng. 76 28 30.0	W. Lng. 76 50 47.0
Protected	Interfering
60 dBu	54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
284.0	000.0540	0198.4	012.5	156.9	003.2000	0081.9	046.8	48.52	
285.0	000.0540	0196.5	012.4	156.6	003.2000	0082.5	046.6	48.63	
286.0	000.0540	0193.0	012.3	156.4	003.2000	0083.2	046.5	48.73	
287.0	000.0540	0190.6	012.2	156.1	003.2000	0083.9	046.4	48.84	
288.0	000.0540	0189.8	012.2	155.9	003.2000	0084.5	046.3	48.95	
289.0	000.0540	0190.3	012.2	155.8	003.2000	0085.0	046.1	49.05	
290.0	000.0540	0189.6	012.2	155.6	003.2000	0085.5	046.0	49.16	
291.0	000.0540	0192.6	012.3	155.5	003.2000	0085.8	045.8	49.27	
292.0	000.0540	0197.4	012.4	155.4	003.2000	0086.1	045.5	49.38	
293.0	000.0540	0199.0	012.5	155.2	003.2000	0086.6	045.3	49.50	
294.0	000.0540	0199.8	012.5	155.1	003.2000	0087.2	045.2	49.62	
295.0	000.0540	0199.5	012.5	154.8	003.2000	0088.0	045.0	49.74	
296.0	000.0540	0196.0	012.4	154.5	003.2000	0089.1	045.0	49.85	
297.0	000.0540	0192.7	012.3	154.2	003.2000	0090.0	044.9	49.96	
298.0	000.0540	0191.9	012.3	154.0	003.2000	0090.8	044.8	50.08	
299.0	000.0540	0192.4	012.3	153.8	003.2000	0091.6	044.7	50.20	
300.0	000.0540	0193.5	012.3	153.6	003.2000	0092.4	044.5	50.32	
301.0	000.0540	0195.6	012.4	153.4	003.2000	0093.0	044.3	50.44	
302.0	000.0540	0197.1	012.4	153.2	003.2000	0093.6	044.2	50.56	
303.0	000.0540	0198.5	012.5	153.0	003.2000	0094.5	044.0	50.69	
304.0	000.0540	0198.5	012.5	152.7	003.2000	0095.1	043.9	50.78	
305.0	000.0540	0201.1	012.5	152.5	003.2000	0095.7	043.8	50.90	
306.0	000.0540	0202.3	012.6	152.3	003.2000	0096.5	043.6	51.02	
307.0	000.0540	0203.5	012.6	152.1	003.2000	0097.2	043.5	51.13	
308.0	000.0540	0206.8	012.7	151.8	003.2000	0097.8	043.3	51.26	
309.0	000.0540	0212.1	012.9	151.7	003.2000	0098.5	043.1	51.40	
310.0	000.0540	0211.4	012.8	151.4	003.2000	0099.5	043.0	51.51	
311.0	000.0540	0212.0	012.9	151.1	003.2000	0100.5	042.9	51.63	
312.0	000.0540	0212.9	012.9	150.8	003.2000	0101.5	042.8	51.76	
313.0	000.0540	0214.0	012.9	150.6	003.2000	0102.5	042.7	51.87	
314.0	000.0540	0215.8	013.0	150.3	003.2000	0103.3	042.6	51.99	
315.0	000.0540	0219.0	013.1	150.0	003.2000	0104.0	042.5	52.11	
316.0	000.0540	0223.4	013.2	149.8	003.2000	0104.9	042.3	52.25	
317.0	000.0540	0227.1	013.3	149.5	003.2000	0105.9	042.1	52.39	

Exhibit 13.6
Contour Protection Studies Toward WNYR-FM - Waterloo, NY

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	
318.0	000.0540	0231.4	013.4	149.2	003.2000	0106.9	042.0	52.54	
319.0	000.0540	0236.2	013.5	148.9	003.2000	0108.1	041.8	52.70	
320.0	000.0540	0241.1	013.7	148.6	003.2000	0109.2	041.6	52.85	
321.0	000.0540	0245.8	013.8	148.3	003.2000	0110.4	041.5	53.01	
322.0	000.0540	0250.6	013.9	148.0	003.2000	0111.8	041.3	53.17	
323.0	000.0540	0256.1	014.1	147.7	003.2000	0113.3	041.1	53.35	
324.0	000.0540	0262.4	014.3	147.4	003.2000	0114.9	040.9	53.54	
325.0	000.0540	0269.3	014.5	147.0	003.2000	0116.3	040.7	53.73	
326.0	000.0540	0277.2	014.7	146.7	003.2000	0117.1	040.5	53.88	
327.0	000.0540	0284.8	014.9	146.3	003.2000	0118.8	040.3	54.08*	0.18
328.0	000.0540	0292.6	015.1	146.0	003.2000	0121.9	040.1	54.36*	0.82
329.0	000.0540	0301.4	015.4	145.6	003.2000	0124.3	039.8	54.60*	1.36
330.0	000.0540	0312.2	015.6	145.1	003.2000	0128.9	039.6	54.99*	2.22
331.0	000.0540	0324.3	016.0	144.7	003.2000	0131.7	039.3	55.28*	2.87
332.0	000.0540	0339.3	016.3	144.2	003.2000	0133.1	038.9	55.52*	3.41
333.0	000.0540	0357.3	016.8	143.7	003.2000	0136.8	038.5	55.92*	4.26
334.0	000.0540	0371.1	017.1	143.2	003.2000	0140.6	038.3	56.26*	5.00
335.0	000.0540	0385.8	017.4	142.7	003.2000	0143.8	038.0	56.56*	5.65
336.0	000.0540	0391.7	017.5	142.2	003.2000	0145.4	038.0	56.68*	5.91
337.0	000.0540	0391.7	017.5	141.7	003.2000	0146.6	038.0	56.70*	5.97
338.0	000.0540	0391.6	017.5	141.3	003.2000	0147.8	038.1	56.73*	6.04
339.0	000.0540	0391.5	017.5	140.8	003.2000	0149.0	038.2	56.75*	6.09
340.0	000.0540	0391.5	017.5	140.4	003.2000	0149.8	038.3	56.75*	6.10
341.0	000.0540	0391.8	017.6	140.0	003.2000	0150.5	038.4	56.75*	6.08
342.0	000.0540	0392.2	017.6	139.5	003.2000	0151.2	038.5	56.73*	6.06
343.0	000.0540	0392.5	017.6	139.1	003.2000	0151.6	038.6	56.70*	5.99
344.0	000.0540	0386.0	017.4	138.8	003.2000	0151.9	038.9	56.60*	5.78
345.0	000.0540	0357.9	016.8	138.8	003.2000	0151.9	039.6	56.27*	5.08
346.0	000.0540	0340.2	016.4	138.7	003.2000	0152.0	040.1	56.04*	4.59
347.0	000.0540	0325.5	016.0	138.6	003.2000	0152.2	040.6	55.83*	4.14
348.0	000.0540	0311.9	015.6	138.5	003.2000	0152.4	041.0	55.64*	3.72
349.0	000.0540	0302.6	015.4	138.3	003.2000	0152.6	041.3	55.49*	3.40
350.0	000.0540	0293.5	015.1	138.2	003.2000	0152.7	041.7	55.34*	3.07
351.0	000.0540	0284.5	014.9	138.1	003.2000	0152.9	042.0	55.19*	2.74
352.0	000.0540	0277.2	014.7	137.9	003.2000	0153.0	042.4	55.06*	2.44
353.0	000.0540	0270.5	014.5	137.8	003.2000	0153.1	042.7	54.93*	2.15
354.0	000.0540	0263.7	014.3	137.7	003.2000	0153.2	043.0	54.80*	1.86
355.0	000.0540	0258.5	014.2	137.5	003.2000	0153.3	043.2	54.69*	1.61
356.0	000.0540	0253.3	014.0	137.4	003.2000	0153.4	043.5	54.58*	1.35
357.0	000.0540	0248.9	013.9	137.2	003.2000	0153.6	043.7	54.48*	1.12
358.0	000.0540	0244.7	013.8	137.1	003.2000	0153.7	044.0	54.38*	0.89
359.0	000.0540	0241.4	013.7	136.9	003.2000	0153.8	044.2	54.29*	0.68
000.0	000.0540	0237.9	013.6	136.8	003.2000	0153.9	044.4	54.20*	0.46
001.0	000.0540	0234.9	013.5	136.6	003.2000	0154.0	044.7	54.11*	0.25
002.0	000.0540	0231.3	013.4	136.5	003.2000	0154.1	044.9	54.01*	0.03
003.0	000.0540	0228.2	013.3	136.4	003.2000	0154.2	045.1	53.92	
004.0	000.0540	0225.0	013.2	136.3	003.2000	0154.3	045.4	53.83	

Exhibit 13.6
Contour Protection Studies Toward WNYR-FM - Waterloo, NY

04-18-2014 Terrain Data: NED 03 SEC FMOver Analysis

WNYR-FM BLH20000807AFJ	W254BF.P
Channel = 253A	Channel = 254D
Max ERP = 3.2 kW	Max ERP = 0.054 kW
RCAMSL = 300 M	RCAMSL = 529 M
N. Lat. 42 48 22.0	N. Lat. 42 23 31.0
W. Lng. 76 50 47.0	W. Lng. 76 28 30.0
Protected	Interfering
60 dBu	54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
101.0	003.2000	0137.8	028.2	356.3	000.0477	0251.8	040.7	42.00	
102.0	003.2000	0138.0	028.2	356.2	000.0478	0252.5	040.2	42.24	
103.0	003.2000	0138.6	028.3	356.0	000.0479	0253.2	039.7	42.50	
104.0	003.2000	0138.8	028.3	355.8	000.0480	0254.3	039.3	42.76	
105.0	003.2000	0139.1	028.3	355.6	000.0481	0255.5	038.8	43.03	
106.0	003.2000	0139.6	028.4	355.4	000.0482	0256.6	038.3	43.30	
107.0	003.2000	0140.4	028.4	355.3	000.0484	0257.4	037.8	43.57	
108.0	003.2000	0141.0	028.5	355.0	000.0485	0258.4	037.3	43.83	
109.0	003.2000	0140.8	028.5	354.7	000.0487	0259.9	036.9	44.11	
110.0	003.2000	0142.5	028.6	354.6	000.0488	0260.3	036.4	44.38	
111.0	003.2000	0142.1	028.6	354.2	000.0491	0262.4	035.9	44.68	
112.0	003.2000	0142.7	028.6	353.9	000.0493	0264.5	035.5	44.99	
113.0	003.2000	0144.0	028.8	353.7	000.0494	0266.0	035.0	45.29	
114.0	003.2000	0145.1	028.9	353.4	000.0496	0268.0	034.5	45.60	
115.0	003.2000	0146.5	029.0	353.1	000.0498	0269.7	034.0	45.91	
116.0	003.2000	0148.1	029.1	352.9	000.0499	0271.4	033.5	46.23	
117.0	003.2000	0149.7	029.3	352.6	000.0501	0273.4	033.0	46.56	
118.0	003.2000	0151.7	029.5	352.3	000.0503	0275.2	032.5	46.89	
119.0	003.2000	0153.2	029.6	352.0	000.0505	0277.5	032.0	47.23	
120.0	003.2000	0154.3	029.7	351.5	000.0508	0280.5	031.5	47.59	
121.0	003.2000	0156.0	029.9	351.1	000.0511	0283.4	031.0	47.97	
122.0	003.2000	0156.7	029.9	350.6	000.0515	0288.4	030.6	48.39	
123.0	003.2000	0158.3	030.1	350.1	000.0518	0292.7	030.1	48.82	
124.0	003.2000	0159.4	030.2	349.6	000.0520	0297.0	029.6	49.22	
125.0	003.2000	0154.2	029.7	348.2	000.0522	0309.6	029.6	49.62	
126.0	003.2000	0152.1	029.5	347.2	000.0525	0322.4	029.4	50.11	
127.0	003.2000	0152.0	029.5	346.4	000.0526	0334.0	029.1	50.64	
128.0	003.2000	0152.7	029.6	345.7	000.0528	0344.9	028.7	51.17	
129.0	003.2000	0153.4	029.6	345.0	000.0529	0359.0	028.3	51.78	
130.0	003.2000	0154.4	029.7	344.2	000.0531	0381.6	028.0	52.61	
131.0	003.2000	0155.0	029.8	343.4	000.0533	0392.3	027.6	53.10	
132.0	003.2000	0156.2	029.9	342.5	000.0535	0392.4	027.3	53.35	
133.0	003.2000	0156.7	029.9	341.6	000.0536	0392.0	027.0	53.54	

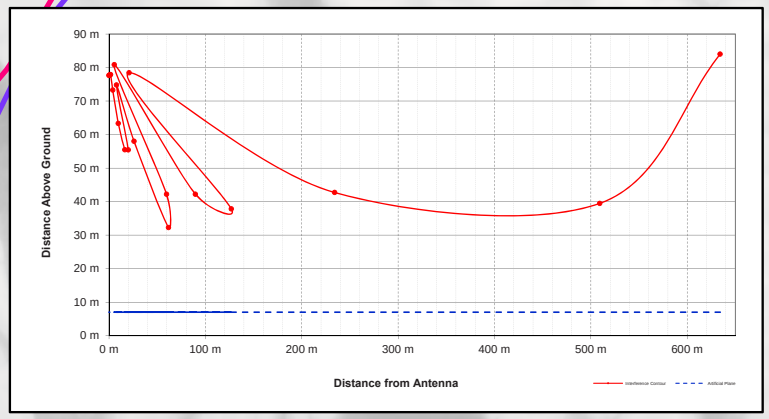
Exhibit 13.6
Contour Protection Studies Toward WNYR-FM - Waterloo, NY

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
134.0	003.2000	0155.9	029.8	340.6	000.0539	0391.7	026.8	53.66
135.0	003.2000	0155.0	029.8	339.5	000.0539	0391.5	026.7	53.76
136.0	003.2000	0154.6	029.7	338.4	000.0537	0391.5	026.5	53.85
137.0	003.2000	0153.7	029.6	337.3	000.0534	0391.7	026.4	53.91
138.0	003.2000	0152.9	029.6	336.2	000.0532	0391.7	026.3	53.96
139.0	003.2000	0151.7	029.5	335.1	000.0529	0386.5	026.2	53.84
140.0	003.2000	0150.5	029.3	333.9	000.0527	0369.9	026.2	53.41
141.0	003.2000	0148.5	029.2	332.7	000.0524	0353.1	026.3	52.91
142.0	003.2000	0145.8	028.9	331.6	000.0522	0332.5	026.4	52.24
143.0	003.2000	0142.0	028.6	330.4	000.0519	0316.7	026.7	51.62
144.0	003.2000	0134.5	027.9	329.2	000.0513	0303.5	027.3	50.79
145.0	003.2000	0130.4	027.6	328.1	000.0506	0293.7	027.6	50.24
146.0	003.2000	0121.5	026.8	327.1	000.0499	0285.7	028.4	49.46
147.0	003.2000	0116.4	026.3	326.2	000.0493	0278.5	028.8	48.91
148.0	003.2000	0112.0	025.9	325.3	000.0487	0271.8	029.3	48.37
149.0	003.2000	0107.8	025.5	324.5	000.0482	0265.7	029.8	47.86
150.0	003.2000	0104.1	025.0	323.8	000.0477	0260.9	030.2	47.40
151.0	003.2000	0100.8	024.7	323.0	000.0472	0256.2	030.6	46.97
152.0	003.2000	0097.3	024.3	322.4	000.0468	0252.6	031.1	46.55
153.0	003.2000	0094.5	023.9	321.7	000.0464	0249.1	031.5	46.18
154.0	003.2000	0090.9	023.5	321.2	000.0461	0246.6	032.1	45.79
155.0	003.2000	0087.4	023.0	320.7	000.0457	0244.2	032.6	45.42
156.0	003.2000	0084.4	022.6	320.2	000.0454	0242.0	033.1	45.07
157.0	003.2000	0081.5	022.3	319.7	000.0450	0239.4	033.5	44.71
158.0	003.2000	0079.0	021.9	319.3	000.0446	0237.3	034.0	44.38
159.0	003.2000	0076.4	021.6	318.9	000.0442	0235.5	034.4	44.04
160.0	003.2000	0073.7	021.2	318.5	000.0439	0233.7	034.9	43.71
161.0	003.2000	0071.9	021.0	318.1	000.0435	0231.9	035.3	43.42
162.0	003.2000	0069.8	020.7	317.8	000.0431	0230.3	035.7	43.12
163.0	003.2000	0067.4	020.3	317.5	000.0429	0229.0	036.1	42.82
164.0	003.2000	0065.3	020.0	317.2	000.0426	0227.8	036.6	42.54
165.0	003.2000	0063.2	019.8	316.9	000.0423	0226.9	037.0	42.28
166.0	003.2000	0061.7	019.5	316.6	000.0420	0225.9	037.3	42.04
167.0	003.2000	0060.7	019.4	316.3	000.0417	0224.6	037.6	41.81
168.0	003.2000	0059.3	019.2	316.0	000.0415	0223.4	038.0	41.56
169.0	003.2000	0058.5	019.1	315.7	000.0412	0222.0	038.3	41.34
170.0	003.2000	0058.4	019.0	315.3	000.0408	0220.3	038.5	41.13
171.0	003.2000	0058.7	019.1	314.8	000.0404	0218.4	038.6	40.92
172.0	003.2000	0059.2	019.2	314.4	000.0400	0216.8	038.8	40.74
173.0	003.2000	0060.4	019.4	313.8	000.0395	0215.5	038.8	40.60
174.0	003.2000	0061.6	019.5	313.3	000.0390	0214.5	038.9	40.45
175.0	003.2000	0064.1	019.9	312.6	000.0383	0213.5	038.9	40.35
176.0	003.2000	0067.1	020.3	311.8	000.0376	0212.5	038.8	40.25
177.0	003.2000	0070.2	020.7	310.9	000.0369	0211.9	038.8	40.16
178.0	003.2000	0073.1	021.1	310.1	000.0362	0211.4	038.8	40.06
179.0	003.2000	0076.1	021.5	309.3	000.0353	0212.1	038.8	39.97
180.0	003.2000	0079.1	021.9	308.5	000.0344	0210.4	038.8	39.76

WHWK(FM) - 59.85 dBµ F(50:50)
WAAL(FM) - 58.20 dBµ F(50:50)

W254BF.P

Exhibit 13.7
§74.1204(d) 2nd & 3rd Adjacent Channel Given Interference Waiver Request Study
WHWK(FM) - Binghamton, NY (CH251B)
WAAL(FM) - Binghamton, NY (CH256B)



W254BF.P
Ithaca, NY
Proposed Operation
Facility ID: 25008
Latitude: 42-23-31 N
Longitude: 076-28-30 W
ERP: 0.054 kW
Channel: 254D
Frequency: 98.7 MHz
AMSL Height: 529.0 m
Horiz. Pattern: Directional

WHWK(FM)
Binghamton, NY
BLH20040330AAY
Facility ID: 72373
Latitude: 42-03-40 N
Longitude: 075-56-45 W
ERP: 6.70 kW
Channel: 251B
Frequency: 98.1 MHz
AMSL Height: 790.0 m
Horiz. Pattern: Directional

Proposed Antenna: CL-FM(Slant-45) 4-Bay (1.0 Spaced)
Proposed Power: 0.054 kW
Antenna Height AGL: 84 meters
Interference Contour: 98.2 dBu f(50:10)
Artificial Ground Plane Height: 7 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	0.054	-12.68	634.16 m	infinite	---	---	---
-5°	0.806	0.035	-14.55	511.13 m	883.48 m	93.45 dBu	963.79 m	92.69 dBu
-10°	0.375	0.008	-21.20	237.81 m	443.43 m	92.79 dBu	483.74 m	92.03 dBu
-15°	0.034	0.000	-42.05	21.56 m	297.51 m	75.40 dBu	324.55 m	74.65 dBu
-20°	0.213	0.002	-26.11	135.08 m	225.13 m	93.76 dBu	245.60 m	93.01 dBu
-25°	0.156	0.001	-28.81	98.93 m	182.20 m	92.90 dBu	198.76 m	92.14 dBu
-30°	0.010	0.000	-52.68	6.34 m	154.00 m	70.49 dBu	168.00 m	69.74 dBu
-35°	0.115	0.001	-31.46	72.93 m	134.25 m	92.90 dBu	146.45 m	92.14 dBu
-40°	0.127	0.001	-30.60	80.54 m	119.79 m	94.75 dBu	130.68 m	94.00 dBu
-45°	0.058	0.000	-37.41	36.78 m	108.89 m	88.77 dBu	118.79 m	88.02 dBu
-50°	0.019	0.000	-47.10	12.05 m	100.52 m	79.77 dBu	109.65 m	79.02 dBu
-55°	0.055	0.000	-37.87	34.88 m	94.00 m	89.59 dBu	102.55 m	88.83 dBu
-60°	0.052	0.000	-38.36	32.98 m	88.91 m	89.58 dBu	96.99 m	88.83 dBu
-65°	0.036	0.000	-41.55	22.83 m	84.96 m	86.79 dBu	92.68 m	86.03 dBu
-70°	0.018	0.000	-47.57	11.41 m	81.94 m	81.08 dBu	89.39 m	80.32 dBu
-75°	0.010	0.000	-52.68	6.34 m	79.72 m	76.21 dBu	86.96 m	75.46 dBu
-80°	0.010	0.000	-52.68	6.34 m	78.19 m	76.38 dBu	85.30 m	75.63 dBu
-85°	0.010	0.000	-52.68	6.34 m	77.29 m	76.48 dBu	84.32 m	75.73 dBu
-90°	0.010	0.000	-52.68	6.34 m	77.00 m	76.51 dBu	84.00 m	75.76 dBu

Terrain
115 648 m

NED 03 SEC Terrain Database
US Census 2010 PL Database

WAAL(FM)
Binghamton, NY
BLH20040608ABQ
Facility ID: 7920
Latitude: 42-03-31 N
Longitude: 075-57-06 W
Channel: 256B
Frequency: 99.1 MHz
AMSL Height: 688.0 m
Horiz. Pattern: Omni

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Broadcast Engineering Consultants
Coldwater, MI 49036
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The Interference Contour corresponding to the WHWK(FM) - Birmingham, NY (CH251B) or WAAL(FM) - Birmingham, NY (CH256B) Protected Contour at the proposed Translator site has been calculated to be no less than the 98.20 dBµ F(50:10) Interference Contour corresponding to the worst case WAAL (FM) 58.20 dBµ F(50:50) Protected Contour. This represents the proposed interference contour which falls wholly within the 40:1 dBu ratio. As seen on the map and associated vertical protection study, full protection will be afforded WHWK(FM) and WAAL(FM) as the calculated interference area will not reach the ground nor a 7 meter artificial plane representing a standard two story building when taking into account the downward radiation characteristics of the antenna as supplied by the antenna manufacturer. A copy of the antenna manufacturer's vertical radiation pattern has been included in ***Exhibit 13.8.***

+ WHWK(FM)
WAAL(FM)

Scale 1:250,000
0 4 8 12 km

Exhibit 13.8 - Copy of Manufacturer's Vertical Radiation Pattern [CL-FM(Slant-45) - 4-Bay 1.0wl)

(to ensure maximum downward protection, the worst case Vertical Radiation Pattern for the Vertical Component has been assumed.)

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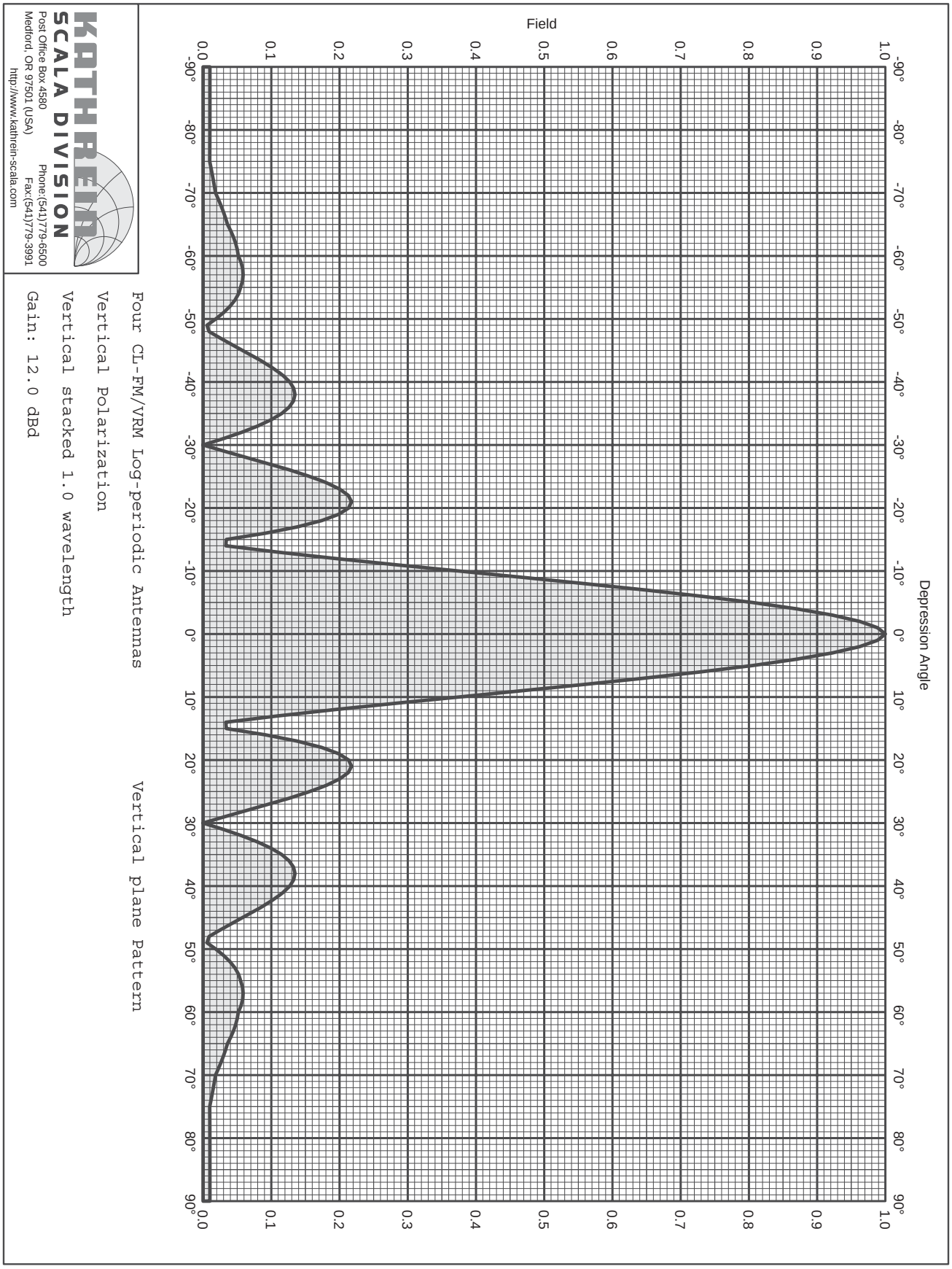

Four CL-FM/VRM Log-periodic Antennas

Vertical Polarization

Vertical stacked 1.0 wavelength

Gain: 12.0 dBd

Vertical plane Pattern

KATHREIN
SCALA DIVISION
Post Office Box 4580
Medford, OR 97501 (USA)
http://www.kathrein-scala.com
Phone:(541)779-6500
Fax:(541)779-3991

Exhibit 13.8 - Copy of Manufacturer's Vertical Radiation Pattern [CL-FM(Slant-45) - 4-Bay 1.0wl)

(to ensure maximum downward protection, the worst case Vertical Radiation Pattern for the Vertical Component has been assumed.)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

Four CL-FM/VRM Log-periodic Antennas Vertical plane Pattern
Vertical Polarization
Vertical stacked 1.0 wavelength
Gain: 12.0 dBd

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
-90	0.010	-40.00	-28.00	0.00	-45	0.058	-24.72	-12.72	0.05
-89	0.010	-40.00	-28.00	0.00	-44	0.075	-22.53	-10.53	0.09
-88	0.010	-40.00	-28.00	0.00	-43	0.091	-20.86	-8.86	0.13
-87	0.010	-40.00	-28.00	0.00	-42	0.105	-19.57	-7.57	0.17
-86	0.010	-40.00	-28.00	0.00	-41	0.117	-18.61	-6.61	0.22
-85	0.010	-40.00	-28.00	0.00	-40	0.127	-17.91	-5.91	0.26
-84	0.010	-40.00	-28.00	0.00	-39	0.133	-17.54	-5.54	0.28
-83	0.010	-40.00	-28.00	0.00	-38	0.135	-17.41	-5.41	0.29
-82	0.010	-40.00	-28.00	0.00	-37	0.133	-17.55	-5.55	0.28
-81	0.010	-40.00	-28.00	0.00	-36	0.126	-17.98	-5.98	0.25
-80	0.010	-40.00	-28.00	0.00	-35	0.115	-18.76	-6.76	0.21
-79	0.010	-40.00	-28.00	0.00	-34	0.100	-20.02	-8.02	0.16
-78	0.010	-40.00	-28.00	0.00	-33	0.080	-21.94	-9.94	0.10
-77	0.010	-40.00	-28.00	0.00	-32	0.056	-24.97	-12.97	0.05
-76	0.010	-40.00	-28.00	0.00	-31	0.030	-30.60	-18.60	0.01
-75	0.010	-40.00	-28.00	0.00	-30	0.010	-40.00	-28.00	0.00
-74	0.012	-38.74	-26.74	0.00	-29	0.032	-30.03	-18.03	0.02
-73	0.013	-37.49	-25.49	0.00	-28	0.064	-23.87	-11.87	0.06
-72	0.015	-36.44	-24.44	0.00	-27	0.097	-20.31	-8.31	0.15
-71	0.017	-35.54	-23.54	0.00	-26	0.128	-17.87	-5.87	0.26
-70	0.018	-34.78	-22.78	0.01	-25	0.156	-16.11	-4.11	0.39
-69	0.022	-33.01	-21.01	0.01	-24	0.181	-14.85	-2.85	0.52
-68	0.026	-31.63	-19.63	0.01	-23	0.200	-13.97	-1.97	0.64
-67	0.030	-30.53	-18.53	0.01	-22	0.213	-13.44	-1.44	0.72
-66	0.033	-29.63	-17.63	0.02	-21	0.218	-13.25	-1.25	0.75
-65	0.036	-28.92	-16.92	0.02	-20	0.213	-13.42	-1.42	0.72
-64	0.040	-27.85	-15.85	0.03	-19	0.199	-14.03	-2.03	0.63
-63	0.044	-27.03	-15.03	0.03	-18	0.174	-15.19	-3.19	0.48
-62	0.048	-26.42	-14.42	0.04	-17	0.138	-17.19	-5.19	0.30
-61	0.050	-25.99	-13.99	0.04	-16	0.091	-20.78	-8.78	0.13
-60	0.052	-25.74	-13.74	0.04	-15	0.034	-29.36	-17.36	0.02
-59	0.056	-25.10	-13.10	0.05	-14	0.033	-29.54	-17.54	0.02
-58	0.058	-24.73	-12.73	0.05	-13	0.109	-19.23	-7.23	0.19
-57	0.059	-24.63	-12.63	0.05	-12	0.193	-14.31	-2.31	0.59
-56	0.058	-24.78	-12.78	0.05	-11	0.282	-11.00	1.00	1.26
-55	0.055	-25.20	-13.20	0.05	-10	0.375	-8.52	3.48	2.23
-54	0.052	-25.68	-13.68	0.04	-9	0.467	-6.61	5.39	3.46
-53	0.047	-26.59	-14.59	0.03	-8	0.559	-5.05	6.95	4.95
-52	0.039	-28.09	-16.09	0.02	-7	0.647	-3.78	8.22	6.64
-51	0.030	-30.47	-18.47	0.01	-6	0.730	-2.73	9.27	8.45
-50	0.019	-34.59	-22.59	0.01	-5	0.806	-1.88	10.12	10.28
-49	0.010	-40.00	-28.00	0.00	-4	0.870	-1.21	10.79	11.99
-48	0.010	-40.00	-28.00	0.00	-3	0.922	-0.70	11.30	13.49
-47	0.025	-32.19	-20.19	0.01	-2	0.962	-0.33	11.67	14.68
-46	0.041	-27.71	-15.71	0.03	-1	0.989	-0.10	11.90	15.49
					0	1.000	0.00	12.00	15.85

Exhibit 13.8 - Copy of Manufacturer's Vertical Radiation Pattern [CL-FM(Slant-45) - 4-Bay 1.0wl)

(to ensure maximum downward protection, the worst case Vertical Radiation Pattern for the Vertical Component has been assumed.)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

Four CL-FM/VRM Log-periodic Antennas Vertical plane Pattern
Vertical Polarization
Vertical stacked 1.0 wavelength
Gain: 12.0 dBd

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	12.00	15.85	45	0.058	-24.72	-12.72	0.05
1	0.989	-0.10	11.90	15.49	46	0.041	-27.71	-15.71	0.03
2	0.962	-0.33	11.67	14.68	47	0.025	-32.19	-20.19	0.01
3	0.922	-0.70	11.30	13.49	48	0.010	-40.00	-28.00	0.00
4	0.870	-1.21	10.79	11.99	49	0.010	-40.00	-28.00	0.00
5	0.806	-1.88	10.12	10.28	50	0.019	-34.59	-22.59	0.01
6	0.730	-2.73	9.27	8.45	51	0.030	-30.47	-18.47	0.01
7	0.647	-3.78	8.22	6.64	52	0.039	-28.09	-16.09	0.02
8	0.559	-5.05	6.95	4.95	53	0.047	-26.59	-14.59	0.03
9	0.467	-6.60	5.40	3.46	54	0.052	-25.68	-13.68	0.04
10	0.375	-8.52	3.48	2.23	55	0.055	-25.20	-13.20	0.05
11	0.282	-11.00	1.00	1.26	56	0.058	-24.78	-12.78	0.05
12	0.193	-14.30	-2.30	0.59	57	0.059	-24.63	-12.63	0.05
13	0.109	-19.22	-7.22	0.19	58	0.058	-24.73	-12.73	0.05
14	0.033	-29.54	-17.54	0.02	59	0.056	-25.10	-13.10	0.05
15	0.034	-29.36	-17.36	0.02	60	0.052	-25.74	-13.74	0.04
16	0.091	-20.78	-8.78	0.13	61	0.050	-26.00	-14.00	0.04
17	0.138	-17.20	-5.20	0.30	62	0.048	-26.42	-14.42	0.04
18	0.174	-15.19	-3.19	0.48	63	0.044	-27.03	-15.03	0.03
19	0.199	-14.03	-2.03	0.63	64	0.040	-27.85	-15.85	0.03
20	0.213	-13.42	-1.42	0.72	65	0.036	-28.92	-16.92	0.02
21	0.218	-13.25	-1.25	0.75	66	0.033	-29.63	-17.63	0.02
22	0.213	-13.44	-1.44	0.72	67	0.030	-30.53	-18.53	0.01
23	0.200	-13.97	-1.97	0.64	68	0.026	-31.63	-19.63	0.01
24	0.181	-14.85	-2.85	0.52	69	0.022	-33.01	-21.01	0.01
25	0.156	-16.11	-4.11	0.39	70	0.018	-34.78	-22.78	0.01
26	0.128	-17.87	-5.87	0.26	71	0.017	-35.54	-23.54	0.00
27	0.097	-20.31	-8.31	0.15	72	0.015	-36.44	-24.44	0.00
28	0.064	-23.87	-11.87	0.07	73	0.013	-37.49	-25.49	0.00
29	0.032	-30.03	-18.03	0.02	74	0.012	-38.74	-26.74	0.00
30	0.010	-40.00	-28.00	0.00	75	0.010	-40.00	-28.00	0.00
31	0.030	-30.60	-18.60	0.01	76	0.010	-40.00	-28.00	0.00
32	0.056	-24.97	-12.97	0.05	77	0.010	-40.00	-28.00	0.00
33	0.080	-21.94	-9.94	0.10	78	0.010	-40.00	-28.00	0.00
34	0.100	-20.03	-8.03	0.16	79	0.010	-40.00	-28.00	0.00
35	0.115	-18.76	-6.76	0.21	80	0.010	-40.00	-28.00	0.00
36	0.126	-17.98	-5.98	0.25	81	0.010	-40.00	-28.00	0.00
37	0.133	-17.55	-5.55	0.28	82	0.010	-40.00	-28.00	0.00
38	0.135	-17.41	-5.41	0.29	83	0.010	-40.00	-28.00	0.00
39	0.133	-17.54	-5.54	0.28	84	0.010	-40.00	-28.00	0.00
40	0.127	-17.91	-5.91	0.26	85	0.010	-40.00	-28.00	0.00
41	0.117	-18.61	-6.61	0.22	86	0.010	-40.00	-28.00	0.00
42	0.105	-19.57	-7.57	0.17	87	0.010	-40.00	-28.00	0.00
43	0.091	-20.86	-8.86	0.13	88	0.010	-40.00	-28.00	0.00
44	0.075	-22.53	-10.53	0.09	89	0.010	-40.00	-28.00	0.00
					90	0.010	-40.00	-28.00	0.00

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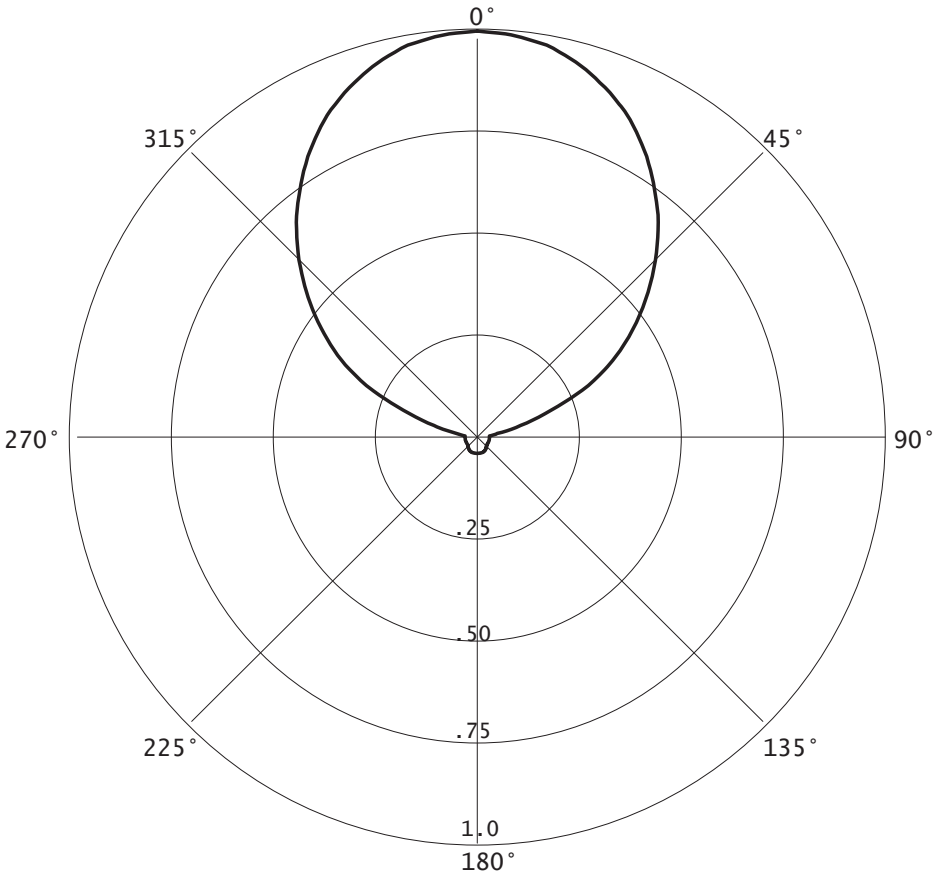
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

CL-FM(Slant-45)
COMPOSITE PATTERN

RMS(V)= .468

Graph is Relative Field



Azi	Field	dBk
000	1.000	00.000
010	0.980	-00.175
020	0.916	-00.762
030	0.817	-01.756
040	0.690	-03.223
050	0.544	-05.288
060	0.390	-08.179
070	0.190	-14.425
080	0.050	-26.021
090	0.030	-30.458
100	0.030	-30.458
110	0.030	-30.458
120	0.030	-30.458
130	0.030	-30.458
140	0.034	-29.370
150	0.038	-28.404
160	0.040	-27.959
170	0.040	-27.959
180	0.040	-27.959
190	0.040	-27.959
200	0.040	-27.959
210	0.038	-28.404
220	0.034	-29.370
230	0.030	-30.458
240	0.030	-30.458
250	0.030	-30.458
260	0.030	-30.458
270	0.030	-30.458
280	0.050	-26.021
290	0.190	-14.425
300	0.390	-08.179
310	0.544	-05.288
320	0.690	-03.223
330	0.817	-01.756
340	0.916	-00.762
350	0.980	-00.175

The directional antenna pattern will be produced by means of a Scala Log Periodic CL-FM broadcast element mounted at a 45° (degree) slant orientation to achieve horizontal and vertical polarization. The CL-FM(Slant-45) Directional Pattern is therefore a maximum composite pattern of the current CL-FM(Horizontal) and CL-FM(Vertical) broadcast patterns as notified by the Scala Division (Kathrein-Scala) of Kathrein, Inc.

The maximum antenna gain for a single CL-FM(Slant-45) element will be 4.0 dBd or the common Horizontal or Vertical maximum antenna gain of 7.0 dBd adjusted by 3 dBd for dual broadcast in the Horizontal and Vertical planes (4.0 dBd = 7.0 dBd - 3.0 dBd). The maximum gain for multiple bay options of the Scala CL-FM(Slant-45) antenna would therefore also be adjusted by -3 dBd to account for operation in the Horizontal and Vertical planes.

The antenna proposed in this application will be mounted in accordance with specific instructions provided by the antenna manufacturer. The directional antenna will be mounted on the tower which is of uniform cross section. No other antennas of any type are or will be mounted on the same tower level as the directional antenna.

No antenna is or will be mounted within any vertical or horizontal distance specified by the antenna manufacturer as being necessary for proper operation of the directional antenna. In addition, the antenna will be assembled under the supervision of a qualified engineer and installed pursuant to the manufacturer's instructions and manufacturer specified antenna orientation.

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM

FM LOG-PERIODIC ANTENNA

7 dBd gain

88–108 MHz

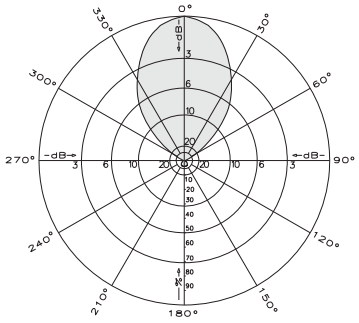
The Kathrein Scala Division CL-FM is a ruggedly built log-periodic antenna, designed for professional FM transmit and receive applications.

Like all Kathrein Scala Division antennas, the CL-FM is made of the finest materials using state of the art electrical and mechanical designs, resulting in superior performance and long service life.

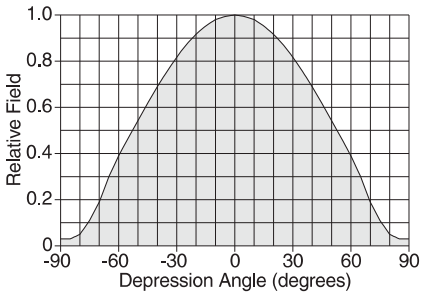
The CL-FM may be used stand-alone or in stacked arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.

Specifications:

Frequency range	88–108 MHz (broadband)
Gain	7 dBd
Impedance	50 or 75 ohms
VSWR	< 1.5:1
Polarization	Horizontal or vertical
Front-to-back ratio	>25 dB
Maximum input power	250 watts, type "N" 75 ohm connector 500 watts, type "N" 50 ohm connector
Azimuth pattern	52 degrees (half-power) horizontal polarization
Elevation pattern	78 degrees (half-power) horizontal polarization
Connector	Female 50Ω or 75Ω N
Weight	45 lb (20.4 kg)
Dimensions	104 x 67.9 inches (2642 x 1724 mm)
Equivalent flat plate area	
CL-FM/HCM	5.31 ft² (0.494 m²)
CL-FM/HRM	5.86 ft² (0.544 m²)
CL-FM/VRM	5.86 ft² (0.544 m²)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	116 x 14.5 x 6 inches (2946 x 369 x 153 mm)
Shipping weight	56 lb (25.4 kg)
Mounting	For masts of 2.375 inches (60 mm) OD.
CL-FM/HCM	Horizontal polarization center-mount
CL-FM/HRM	Horizontal polarization rear-mount
CL-FM/VRM	Vertical polarization rear-mount
See reverse for order information.	



Azimuth pattern (E-plane)



Elevation pattern (H-plane)

* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

TÜV
ISO 9001

10492-D

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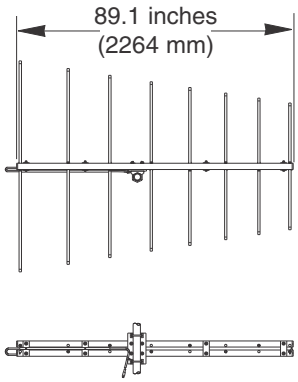
(Actual Pattern Rotated to 340.0°T)

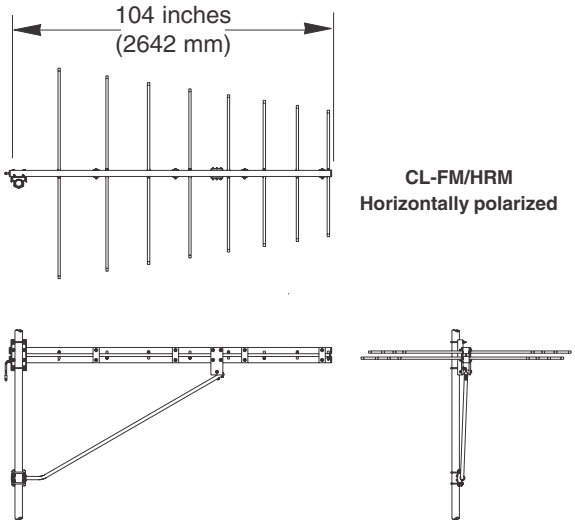
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

CL-FM

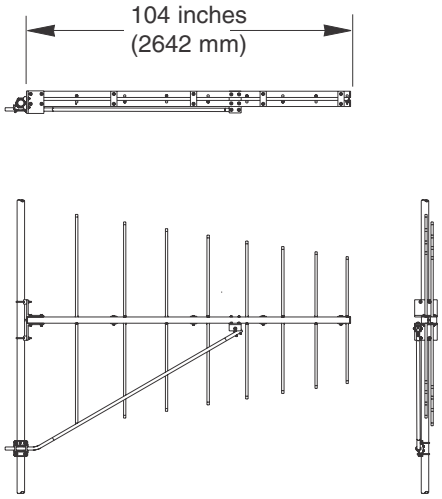
FM LOG-PERIODIC ANTENNA
7 dBd gain
88–108 MHz



CL-FM/HCM
Horizontally polarized



CL-FM/HRM
Horizontally polarized



CL-FM/VRM
Vertically polarized

Vertically polarized antennas require lateral stabilization (not supplied) to prevent the antenna from turning on the mounting pipe.

Order Information:

Model	Description
CL-FM/HCM/50N	Antenna with 50Ω N connector Horizontal polarization center-mount
CL-FM/HCM/75N	Antenna with 75Ω N connector Horizontal polarization center-mount
CL-FM/HRM/50N	Antenna with 50Ω N connector Horizontal polarization rear-mount

Order Information:

Model	Description
CL-FM/HRM/75N	Antenna with 75Ω N connector Horizontal polarization rear-mount
CL-FM/VRM/50N	Antenna with 50Ω N connector Vertical polarization rear-mount
CL-FM/VRM/75N	Antenna with 75Ω N connector Vertical polarization rear-mount

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-6575
Email: broadcast@kathrein.com Internet: www.kathrein-scala.com

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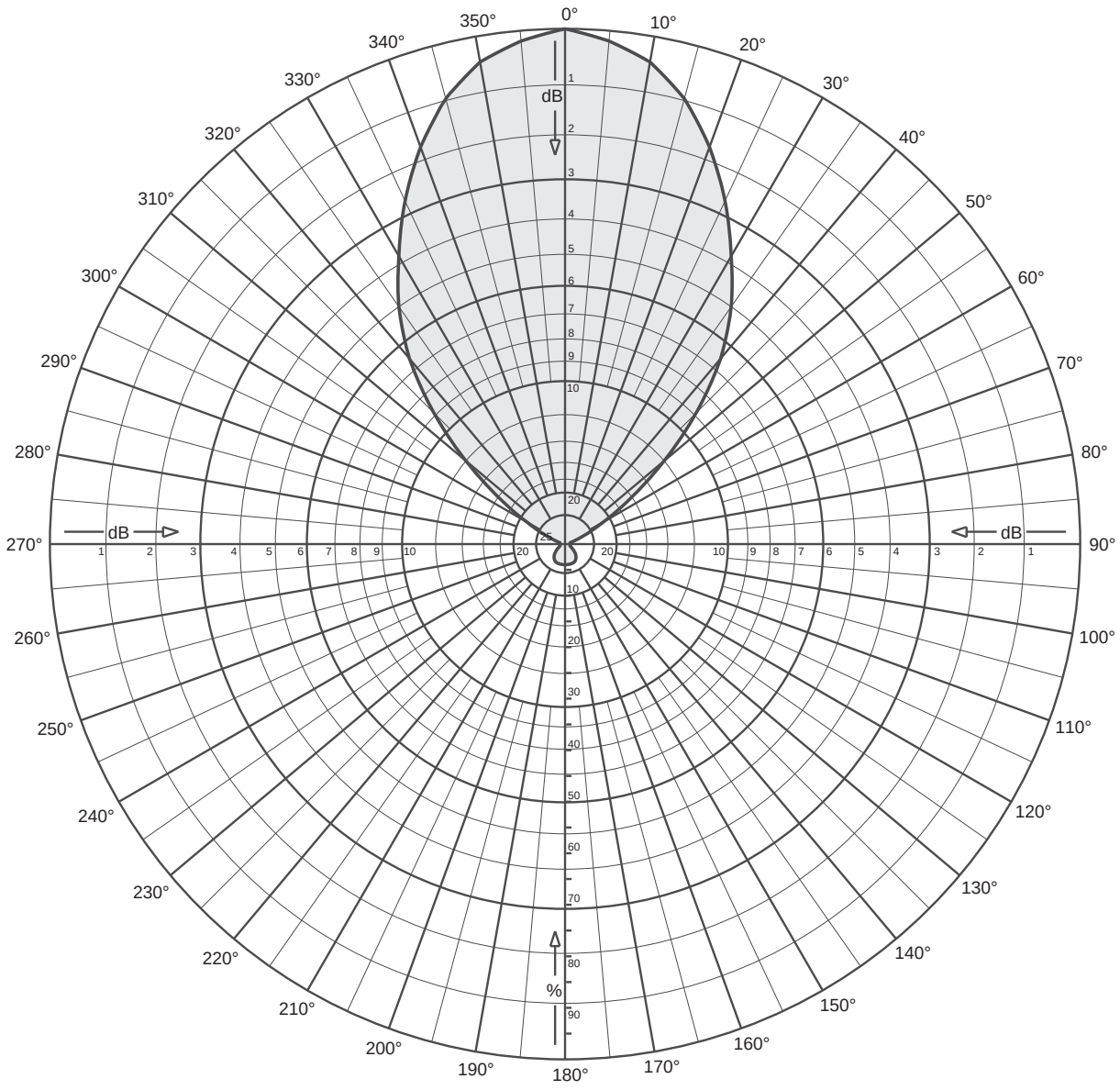

CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component
Horizontal radiation pattern
0 degree electrical downtilt

KATHREIN
SCALA DIVISION
Post Office Box 4580
Medford, OR 97501 (USA)
Phone:(541)779-6500
Fax:(541)779-3991
http://www.kathrein-scala.com

26-Oct-2011

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(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	7.00	5.01	45	0.360	-8.87	-1.87	0.65
1	0.996	-0.03	6.97	4.97	46	0.338	-9.42	-2.42	0.57
2	0.992	-0.07	6.93	4.93	47	0.316	-10.01	-3.01	0.50
3	0.988	-0.10	6.90	4.89	48	0.294	-10.63	-3.63	0.43
4	0.984	-0.14	6.86	4.85	49	0.272	-11.31	-4.31	0.37
5	0.980	-0.18	6.82	4.81	50	0.250	-12.04	-5.04	0.31
6	0.974	-0.23	6.77	4.75	51	0.231	-12.73	-5.73	0.27
7	0.968	-0.28	6.72	4.70	52	0.212	-13.47	-6.47	0.23
8	0.962	-0.34	6.66	4.64	53	0.193	-14.29	-7.29	0.19
9	0.956	-0.39	6.61	4.58	54	0.174	-15.19	-8.19	0.15
10	0.950	-0.45	6.55	4.52	55	0.155	-16.19	-9.19	0.12
11	0.939	-0.55	6.45	4.42	56	0.141	-17.02	-10.02	0.10
12	0.928	-0.65	6.35	4.32	57	0.127	-17.92	-10.92	0.08
13	0.917	-0.75	6.25	4.21	58	0.113	-18.94	-11.94	0.06
14	0.906	-0.86	6.14	4.11	59	0.099	-20.09	-13.09	0.05
15	0.895	-0.96	6.04	4.01	60	0.085	-21.41	-14.41	0.04
16	0.880	-1.11	5.89	3.88	61	0.077	-22.27	-15.27	0.03
17	0.865	-1.26	5.74	3.75	62	0.069	-23.22	-16.22	0.02
18	0.850	-1.41	5.59	3.62	63	0.061	-24.29	-17.29	0.02
19	0.835	-1.57	5.43	3.49	64	0.053	-25.51	-18.51	0.01
20	0.820	-1.72	5.28	3.37	65	0.045	-26.94	-19.94	0.01
21	0.803	-1.91	5.09	3.23	66	0.040	-27.96	-20.96	0.01
22	0.786	-2.09	4.91	3.10	67	0.035	-29.12	-22.12	0.01
23	0.769	-2.28	4.72	2.96	68	0.030	-30.46	-23.46	0.00
24	0.752	-2.48	4.52	2.83	69	0.025	-32.04	-25.04	0.00
25	0.735	-2.67	4.33	2.71	70	0.020	-33.98	-26.98	0.00
26	0.717	-2.89	4.11	2.58	71	0.018	-34.89	-27.89	0.00
27	0.699	-3.11	3.89	2.45	72	0.016	-35.92	-28.92	0.00
28	0.681	-3.34	3.66	2.32	73	0.014	-37.08	-30.08	0.00
29	0.663	-3.57	3.43	2.20	74	0.012	-38.42	-31.42	0.00
30	0.645	-3.81	3.19	2.09	75	0.010	-40.00	-33.00	0.00
31	0.628	-4.03	2.97	1.98	76	0.010	-40.00	-33.00	0.00
32	0.612	-4.26	2.74	1.88	77	0.010	-40.00	-33.00	0.00
33	0.595	-4.50	2.50	1.78	78	0.010	-40.00	-33.00	0.00
34	0.579	-4.75	2.25	1.68	79	0.010	-40.00	-33.00	0.00
35	0.562	-5.00	2.00	1.59	80	0.010	-40.00	-33.00	0.00
36	0.544	-5.29	1.71	1.48	81	0.010	-40.00	-33.00	0.00
37	0.525	-5.59	1.41	1.38	82	0.010	-40.00	-33.00	0.00
38	0.507	-5.90	1.10	1.29	83	0.010	-40.00	-33.00	0.00
39	0.488	-6.22	0.78	1.20	84	0.010	-40.00	-33.00	0.00
40	0.470	-6.56	0.44	1.11	85	0.010	-40.00	-33.00	0.00
41	0.448	-6.97	0.03	1.01	86	0.010	-40.00	-33.00	0.00
42	0.426	-7.41	-0.41	0.91	87	0.010	-40.00	-33.00	0.00
43	0.404	-7.87	-0.87	0.82	88	0.010	-40.00	-33.00	0.00
44	0.382	-8.36	-1.36	0.73	89	0.010	-40.00	-33.00	0.00

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MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
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KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
90	0.010	-40.00	-33.00	0.00	135	0.029	-30.75	-23.75	0.00
91	0.010	-40.00	-33.00	0.00	136	0.030	-30.49	-23.49	0.00
92	0.010	-40.00	-33.00	0.00	137	0.031	-30.23	-23.23	0.00
93	0.010	-40.00	-33.00	0.00	138	0.032	-29.98	-22.98	0.01
94	0.010	-40.00	-33.00	0.00	139	0.033	-29.74	-22.74	0.01
95	0.010	-40.00	-33.00	0.00	140	0.034	-29.50	-22.50	0.01
96	0.010	-40.00	-33.00	0.00	141	0.034	-29.37	-22.37	0.01
97	0.010	-40.00	-33.00	0.00	142	0.034	-29.24	-22.24	0.01
98	0.010	-40.00	-33.00	0.00	143	0.035	-29.12	-22.12	0.01
99	0.010	-40.00	-33.00	0.00	144	0.036	-29.00	-22.00	0.01
100	0.010	-40.00	-33.00	0.00	145	0.036	-28.87	-21.87	0.01
101	0.010	-40.00	-33.00	0.00	146	0.036	-28.75	-21.75	0.01
102	0.010	-40.00	-33.00	0.00	147	0.037	-28.64	-21.64	0.01
103	0.010	-40.00	-33.00	0.00	148	0.038	-28.52	-21.52	0.01
104	0.010	-40.00	-33.00	0.00	149	0.038	-28.40	-21.40	0.01
105	0.010	-40.00	-33.00	0.00	150	0.038	-28.29	-21.29	0.01
106	0.010	-40.00	-33.00	0.00	151	0.039	-28.25	-21.25	0.01
107	0.010	-40.00	-33.00	0.00	152	0.039	-28.20	-21.20	0.01
108	0.010	-40.00	-33.00	0.00	153	0.039	-28.16	-21.16	0.01
109	0.010	-40.00	-33.00	0.00	154	0.039	-28.11	-21.11	0.01
110	0.010	-40.00	-33.00	0.00	155	0.039	-28.07	-21.07	0.01
111	0.010	-39.58	-32.58	0.00	156	0.040	-28.05	-21.05	0.01
112	0.011	-39.17	-32.17	0.00	157	0.040	-28.02	-21.02	0.01
113	0.012	-38.79	-31.79	0.00	158	0.040	-28.00	-21.00	0.01
114	0.012	-38.42	-31.42	0.00	159	0.040	-27.98	-20.98	0.01
115	0.012	-38.06	-31.06	0.00	160	0.040	-27.96	-20.96	0.01
116	0.013	-37.72	-30.72	0.00	161	0.040	-27.96	-20.96	0.01
117	0.013	-37.39	-30.39	0.00	162	0.040	-27.96	-20.96	0.01
118	0.014	-37.08	-30.08	0.00	163	0.040	-27.96	-20.96	0.01
119	0.014	-36.77	-29.77	0.00	164	0.040	-27.96	-20.96	0.01
120	0.015	-36.48	-29.48	0.00	165	0.040	-27.96	-20.96	0.01
121	0.016	-35.92	-28.92	0.00	166	0.040	-27.96	-20.96	0.01
122	0.017	-35.39	-28.39	0.00	167	0.040	-27.96	-20.96	0.01
123	0.018	-34.89	-27.89	0.00	168	0.040	-27.96	-20.96	0.01
124	0.019	-34.42	-27.42	0.00	169	0.040	-27.96	-20.96	0.01
125	0.020	-33.98	-26.98	0.00	170	0.040	-27.96	-20.96	0.01
126	0.021	-33.56	-26.56	0.00	171	0.040	-27.96	-20.96	0.01
127	0.022	-33.15	-26.15	0.00	172	0.040	-27.96	-20.96	0.01
128	0.023	-32.77	-25.77	0.00	173	0.040	-27.96	-20.96	0.01
129	0.024	-32.40	-25.40	0.00	174	0.040	-27.96	-20.96	0.01
130	0.025	-32.04	-25.04	0.00	175	0.040	-27.96	-20.96	0.01
131	0.026	-31.77	-24.77	0.00	176	0.040	-27.96	-20.96	0.01
132	0.027	-31.50	-24.50	0.00	177	0.040	-27.96	-20.96	0.01
133	0.027	-31.24	-24.24	0.00	178	0.040	-27.96	-20.96	0.01
134	0.028	-31.00	-24.00	0.00	179	0.040	-27.96	-20.96	0.01

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
180	0.040	-27.96	-20.96	0.01	225	0.029	-30.75	-23.75	0.00
181	0.040	-27.96	-20.96	0.01	226	0.028	-31.00	-24.00	0.00
182	0.040	-27.96	-20.96	0.01	227	0.027	-31.24	-24.24	0.00
183	0.040	-27.96	-20.96	0.01	228	0.027	-31.50	-24.50	0.00
184	0.040	-27.96	-20.96	0.01	229	0.026	-31.77	-24.77	0.00
185	0.040	-27.96	-20.96	0.01	230	0.025	-32.04	-25.04	0.00
186	0.040	-27.96	-20.96	0.01	231	0.024	-32.40	-25.40	0.00
187	0.040	-27.96	-20.96	0.01	232	0.023	-32.77	-25.77	0.00
188	0.040	-27.96	-20.96	0.01	233	0.022	-33.15	-26.15	0.00
189	0.040	-27.96	-20.96	0.01	234	0.021	-33.56	-26.56	0.00
190	0.040	-27.96	-20.96	0.01	235	0.020	-33.98	-26.98	0.00
191	0.040	-27.96	-20.96	0.01	236	0.019	-34.42	-27.42	0.00
192	0.040	-27.96	-20.96	0.01	237	0.018	-34.89	-27.89	0.00
193	0.040	-27.96	-20.96	0.01	238	0.017	-35.39	-28.39	0.00
194	0.040	-27.96	-20.96	0.01	239	0.016	-35.92	-28.92	0.00
195	0.040	-27.96	-20.96	0.01	240	0.015	-36.48	-29.48	0.00
196	0.040	-27.96	-20.96	0.01	241	0.014	-36.77	-29.77	0.00
197	0.040	-27.96	-20.96	0.01	242	0.014	-37.08	-30.08	0.00
198	0.040	-27.96	-20.96	0.01	243	0.013	-37.39	-30.39	0.00
199	0.040	-27.96	-20.96	0.01	244	0.013	-37.72	-30.72	0.00
200	0.040	-27.96	-20.96	0.01	245	0.012	-38.06	-31.06	0.00
201	0.040	-27.98	-20.98	0.01	246	0.012	-38.42	-31.42	0.00
202	0.040	-28.00	-21.00	0.01	247	0.012	-38.79	-31.79	0.00
203	0.040	-28.02	-21.02	0.01	248	0.011	-39.17	-32.17	0.00
204	0.040	-28.05	-21.05	0.01	249	0.010	-39.58	-32.58	0.00
205	0.039	-28.07	-21.07	0.01	250	0.010	-40.00	-33.00	0.00
206	0.039	-28.11	-21.11	0.01	251	0.010	-40.00	-33.00	0.00
207	0.039	-28.16	-21.16	0.01	252	0.010	-40.00	-33.00	0.00
208	0.039	-28.20	-21.20	0.01	253	0.010	-40.00	-33.00	0.00
209	0.039	-28.25	-21.25	0.01	254	0.010	-40.00	-33.00	0.00
210	0.038	-28.29	-21.29	0.01	255	0.010	-40.00	-33.00	0.00
211	0.038	-28.40	-21.40	0.01	256	0.010	-40.00	-33.00	0.00
212	0.038	-28.52	-21.52	0.01	257	0.010	-40.00	-33.00	0.00
213	0.037	-28.64	-21.64	0.01	258	0.010	-40.00	-33.00	0.00
214	0.036	-28.75	-21.75	0.01	259	0.010	-40.00	-33.00	0.00
215	0.036	-28.87	-21.87	0.01	260	0.010	-40.00	-33.00	0.00
216	0.036	-29.00	-22.00	0.01	261	0.010	-40.00	-33.00	0.00
217	0.035	-29.12	-22.12	0.01	262	0.010	-40.00	-33.00	0.00
218	0.034	-29.24	-22.24	0.01	263	0.010	-40.00	-33.00	0.00
219	0.034	-29.37	-22.37	0.01	264	0.010	-40.00	-33.00	0.00
220	0.034	-29.50	-22.50	0.01	265	0.010	-40.00	-33.00	0.00
221	0.033	-29.74	-22.74	0.01	266	0.010	-40.00	-33.00	0.00
222	0.032	-29.98	-22.98	0.01	267	0.010	-40.00	-33.00	0.00
223	0.031	-30.23	-23.23	0.00	268	0.010	-40.00	-33.00	0.00
224	0.030	-30.49	-23.49	0.00	269	0.010	-40.00	-33.00	0.00

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

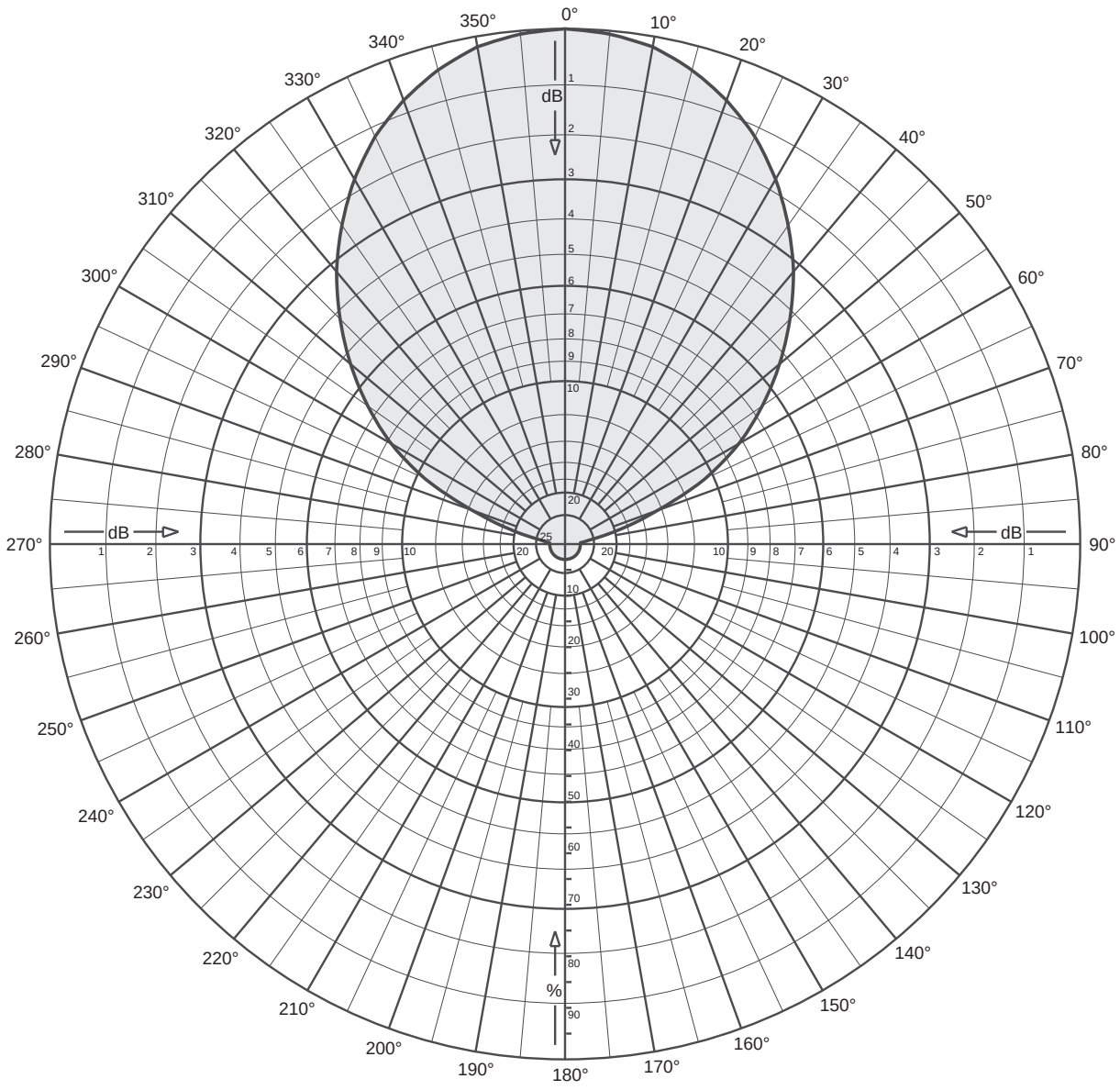
CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
270	0.010	-40.00	-33.00	0.00	315	0.360	-8.87	-1.87	0.65
271	0.010	-40.00	-33.00	0.00	316	0.382	-8.36	-1.36	0.73
272	0.010	-40.00	-33.00	0.00	317	0.404	-7.87	-0.87	0.82
273	0.010	-40.00	-33.00	0.00	318	0.426	-7.41	-0.41	0.91
274	0.010	-40.00	-33.00	0.00	319	0.448	-6.97	0.03	1.01
275	0.010	-40.00	-33.00	0.00	320	0.470	-6.56	0.44	1.11
276	0.010	-40.00	-33.00	0.00	321	0.488	-6.22	0.78	1.20
277	0.010	-40.00	-33.00	0.00	322	0.507	-5.90	1.10	1.29
278	0.010	-40.00	-33.00	0.00	323	0.525	-5.59	1.41	1.38
279	0.010	-40.00	-33.00	0.00	324	0.544	-5.29	1.71	1.48
280	0.010	-40.00	-33.00	0.00	325	0.562	-5.00	2.00	1.59
281	0.010	-40.00	-33.00	0.00	326	0.579	-4.75	2.25	1.68
282	0.010	-40.00	-33.00	0.00	327	0.595	-4.50	2.50	1.78
283	0.010	-40.00	-33.00	0.00	328	0.612	-4.26	2.74	1.88
284	0.010	-40.00	-33.00	0.00	329	0.628	-4.03	2.97	1.98
285	0.010	-40.00	-33.00	0.00	330	0.645	-3.81	3.19	2.09
286	0.012	-38.42	-31.42	0.00	331	0.663	-3.57	3.43	2.20
287	0.014	-37.08	-30.08	0.00	332	0.681	-3.34	3.66	2.32
288	0.016	-35.92	-28.92	0.00	333	0.699	-3.11	3.89	2.45
289	0.018	-34.89	-27.89	0.00	334	0.717	-2.89	4.11	2.58
290	0.020	-33.98	-26.98	0.00	335	0.735	-2.67	4.33	2.71
291	0.025	-32.04	-25.04	0.00	336	0.752	-2.48	4.52	2.83
292	0.030	-30.46	-23.46	0.00	337	0.769	-2.28	4.72	2.96
293	0.035	-29.12	-22.12	0.01	338	0.786	-2.09	4.91	3.10
294	0.040	-27.96	-20.96	0.01	339	0.803	-1.91	5.09	3.23
295	0.045	-26.94	-19.94	0.01	340	0.820	-1.72	5.28	3.37
296	0.053	-25.51	-18.51	0.01	341	0.835	-1.57	5.43	3.49
297	0.061	-24.29	-17.29	0.02	342	0.850	-1.41	5.59	3.62
298	0.069	-23.22	-16.22	0.02	343	0.865	-1.26	5.74	3.75
299	0.077	-22.27	-15.27	0.03	344	0.880	-1.11	5.89	3.88
300	0.085	-21.41	-14.41	0.04	345	0.895	-0.96	6.04	4.01
301	0.099	-20.09	-13.09	0.05	346	0.906	-0.86	6.14	4.11
302	0.113	-18.94	-11.94	0.06	347	0.917	-0.75	6.25	4.21
303	0.127	-17.92	-10.92	0.08	348	0.928	-0.65	6.35	4.32
304	0.141	-17.02	-10.02	0.10	349	0.939	-0.55	6.45	4.42
305	0.155	-16.19	-9.19	0.12	350	0.950	-0.45	6.55	4.52
306	0.174	-15.19	-8.19	0.15	351	0.956	-0.39	6.61	4.58
307	0.193	-14.29	-7.29	0.19	352	0.962	-0.34	6.66	4.64
308	0.212	-13.47	-6.47	0.23	353	0.968	-0.28	6.72	4.70
309	0.231	-12.73	-5.73	0.27	354	0.974	-0.23	6.77	4.75
310	0.250	-12.04	-5.04	0.31	355	0.980	-0.18	6.82	4.81
311	0.272	-11.31	-4.31	0.37	356	0.984	-0.14	6.86	4.85
312	0.294	-10.63	-3.63	0.43	357	0.988	-0.10	6.90	4.89
313	0.316	-10.01	-3.01	0.50	358	0.992	-0.07	6.93	4.93
314	0.338	-9.42	-2.42	0.57	359	0.996	-0.03	6.97	4.97

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339



CL-FM
FM
Maximum gain: 7.0 dBd
Vertical polarization Component
Horizontal radiation pattern
0 degree electrical downtilt

KATHREIN
SCALA DIVISION
Post Office Box 4580
Medford, OR 97501 (USA)
Phone:(541)779-6500
Fax:(541)779-3991
http://www.kathrein-scala.com

26-Oct-2011

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Vertical polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	7.00	5.01	45	0.618	-4.19	2.81	1.91
1	0.998	-0.01	6.99	5.00	46	0.602	-4.40	2.60	1.82
2	0.997	-0.02	6.98	4.99	47	0.588	-4.61	2.39	1.73
3	0.996	-0.03	6.97	4.97	48	0.573	-4.84	2.16	1.65
4	0.995	-0.04	6.96	4.96	49	0.558	-5.06	1.94	1.56
5	0.993	-0.06	6.94	4.95	50	0.544	-5.30	1.70	1.48
6	0.991	-0.08	6.92	4.92	51	0.528	-5.54	1.46	1.40
7	0.988	-0.10	6.90	4.89	52	0.513	-5.80	1.20	1.32
8	0.985	-0.13	6.87	4.87	53	0.498	-6.06	0.94	1.24
9	0.982	-0.15	6.85	4.84	54	0.483	-6.33	0.67	1.17
10	0.980	-0.18	6.82	4.81	55	0.467	-6.60	0.40	1.10
11	0.975	-0.22	6.78	4.76	56	0.452	-6.90	0.10	1.02
12	0.969	-0.27	6.73	4.71	57	0.436	-7.20	-0.20	0.95
13	0.964	-0.32	6.68	4.65	58	0.421	-7.51	-0.51	0.89
14	0.958	-0.37	6.63	4.60	59	0.405	-7.84	-0.84	0.82
15	0.952	-0.42	6.58	4.55	60	0.390	-8.18	-1.18	0.76
16	0.946	-0.49	6.51	4.48	61	0.372	-8.59	-1.59	0.69
17	0.938	-0.56	6.44	4.41	62	0.354	-9.02	-2.02	0.63
18	0.931	-0.62	6.38	4.34	63	0.336	-9.47	-2.47	0.57
19	0.923	-0.69	6.31	4.27	64	0.318	-9.95	-2.95	0.51
20	0.916	-0.76	6.24	4.21	65	0.300	-10.46	-3.46	0.45
21	0.908	-0.84	6.16	4.13	66	0.278	-11.12	-4.12	0.39
22	0.899	-0.92	6.08	4.05	67	0.256	-11.84	-4.84	0.33
23	0.890	-1.01	5.99	3.97	68	0.234	-12.62	-5.62	0.27
24	0.882	-1.10	5.90	3.89	69	0.212	-13.47	-6.47	0.23
25	0.873	-1.18	5.82	3.82	70	0.190	-14.42	-7.42	0.18
26	0.862	-1.29	5.71	3.72	71	0.174	-15.19	-8.19	0.15
27	0.851	-1.41	5.59	3.63	72	0.158	-16.03	-9.03	0.13
28	0.840	-1.52	5.48	3.53	73	0.142	-16.95	-9.95	0.10
29	0.829	-1.63	5.37	3.44	74	0.126	-17.99	-10.99	0.08
30	0.817	-1.75	5.25	3.35	75	0.110	-19.17	-12.17	0.06
31	0.806	-1.88	5.12	3.25	76	0.098	-20.18	-13.18	0.05
32	0.793	-2.02	4.98	3.15	77	0.086	-21.31	-14.31	0.04
33	0.781	-2.15	4.85	3.05	78	0.074	-22.62	-15.62	0.03
34	0.767	-2.30	4.70	2.95	79	0.062	-24.15	-17.15	0.02
35	0.756	-2.44	4.56	2.86	80	0.050	-26.02	-19.02	0.01
36	0.742	-2.59	4.41	2.76	81	0.046	-26.74	-19.74	0.01
37	0.729	-2.74	4.26	2.67	82	0.042	-27.54	-20.54	0.01
38	0.716	-2.90	4.10	2.57	83	0.038	-28.40	-21.40	0.01
39	0.704	-3.05	3.95	2.48	84	0.034	-29.37	-22.37	0.01
40	0.690	-3.22	3.78	2.39	85	0.030	-30.46	-23.46	0.00
41	0.675	-3.41	3.59	2.29	86	0.030	-30.46	-23.46	0.00
42	0.661	-3.60	3.40	2.19	87	0.030	-30.46	-23.46	0.00
43	0.646	-3.79	3.21	2.09	88	0.030	-30.46	-23.46	0.00
44	0.632	-3.99	3.01	2.00	89	0.030	-30.46	-23.46	0.00

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MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Vertical polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
90	0.030	-30.46	-23.46	0.00	135	0.030	-30.46	-23.46	0.00
91	0.030	-30.46	-23.46	0.00	136	0.030	-30.46	-23.46	0.00
92	0.030	-30.46	-23.46	0.00	137	0.030	-30.46	-23.46	0.00
93	0.030	-30.46	-23.46	0.00	138	0.030	-30.46	-23.46	0.00
94	0.030	-30.46	-23.46	0.00	139	0.030	-30.46	-23.46	0.00
95	0.030	-30.46	-23.46	0.00	140	0.030	-30.46	-23.46	0.00
96	0.030	-30.46	-23.46	0.00	141	0.030	-30.46	-23.46	0.00
97	0.030	-30.46	-23.46	0.00	142	0.030	-30.46	-23.46	0.00
98	0.030	-30.46	-23.46	0.00	143	0.030	-30.46	-23.46	0.00
99	0.030	-30.46	-23.46	0.00	144	0.030	-30.46	-23.46	0.00
100	0.030	-30.46	-23.46	0.00	145	0.030	-30.46	-23.46	0.00
101	0.030	-30.46	-23.46	0.00	146	0.030	-30.46	-23.46	0.00
102	0.030	-30.46	-23.46	0.00	147	0.030	-30.46	-23.46	0.00
103	0.030	-30.46	-23.46	0.00	148	0.030	-30.46	-23.46	0.00
104	0.030	-30.46	-23.46	0.00	149	0.030	-30.46	-23.46	0.00
105	0.030	-30.46	-23.46	0.00	150	0.030	-30.46	-23.46	0.00
106	0.030	-30.46	-23.46	0.00	151	0.030	-30.46	-23.46	0.00
107	0.030	-30.46	-23.46	0.00	152	0.030	-30.46	-23.46	0.00
108	0.030	-30.46	-23.46	0.00	153	0.030	-30.46	-23.46	0.00
109	0.030	-30.46	-23.46	0.00	154	0.030	-30.46	-23.46	0.00
110	0.030	-30.46	-23.46	0.00	155	0.030	-30.46	-23.46	0.00
111	0.030	-30.46	-23.46	0.00	156	0.030	-30.46	-23.46	0.00
112	0.030	-30.46	-23.46	0.00	157	0.030	-30.46	-23.46	0.00
113	0.030	-30.46	-23.46	0.00	158	0.030	-30.46	-23.46	0.00
114	0.030	-30.46	-23.46	0.00	159	0.030	-30.46	-23.46	0.00
115	0.030	-30.46	-23.46	0.00	160	0.030	-30.46	-23.46	0.00
116	0.030	-30.46	-23.46	0.00	161	0.030	-30.46	-23.46	0.00
117	0.030	-30.46	-23.46	0.00	162	0.030	-30.46	-23.46	0.00
118	0.030	-30.46	-23.46	0.00	163	0.030	-30.46	-23.46	0.00
119	0.030	-30.46	-23.46	0.00	164	0.030	-30.46	-23.46	0.00
120	0.030	-30.46	-23.46	0.00	165	0.030	-30.46	-23.46	0.00
121	0.030	-30.46	-23.46	0.00	166	0.030	-30.46	-23.46	0.00
122	0.030	-30.46	-23.46	0.00	167	0.030	-30.46	-23.46	0.00
123	0.030	-30.46	-23.46	0.00	168	0.030	-30.46	-23.46	0.00
124	0.030	-30.46	-23.46	0.00	169	0.030	-30.46	-23.46	0.00
125	0.030	-30.46	-23.46	0.00	170	0.030	-30.46	-23.46	0.00
126	0.030	-30.46	-23.46	0.00	171	0.030	-30.46	-23.46	0.00
127	0.030	-30.46	-23.46	0.00	172	0.030	-30.46	-23.46	0.00
128	0.030	-30.46	-23.46	0.00	173	0.030	-30.46	-23.46	0.00
129	0.030	-30.46	-23.46	0.00	174	0.030	-30.46	-23.46	0.00
130	0.030	-30.46	-23.46	0.00	175	0.030	-30.46	-23.46	0.00
131	0.030	-30.46	-23.46	0.00	176	0.030	-30.46	-23.46	0.00
132	0.030	-30.46	-23.46	0.00	177	0.030	-30.46	-23.46	0.00
133	0.030	-30.46	-23.46	0.00	178	0.030	-30.46	-23.46	0.00
134	0.030	-30.46	-23.46	0.00	179	0.030	-30.46	-23.46	0.00

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Vertical polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
180	0.030	-30.46	-23.46	0.00	225	0.030	-30.46	-23.46	0.00
181	0.030	-30.46	-23.46	0.00	226	0.030	-30.46	-23.46	0.00
182	0.030	-30.46	-23.46	0.00	227	0.030	-30.46	-23.46	0.00
183	0.030	-30.46	-23.46	0.00	228	0.030	-30.46	-23.46	0.00
184	0.030	-30.46	-23.46	0.00	229	0.030	-30.46	-23.46	0.00
185	0.030	-30.46	-23.46	0.00	230	0.030	-30.46	-23.46	0.00
186	0.030	-30.46	-23.46	0.00	231	0.030	-30.46	-23.46	0.00
187	0.030	-30.46	-23.46	0.00	232	0.030	-30.46	-23.46	0.00
188	0.030	-30.46	-23.46	0.00	233	0.030	-30.46	-23.46	0.00
189	0.030	-30.46	-23.46	0.00	234	0.030	-30.46	-23.46	0.00
190	0.030	-30.46	-23.46	0.00	235	0.030	-30.46	-23.46	0.00
191	0.030	-30.46	-23.46	0.00	236	0.030	-30.46	-23.46	0.00
192	0.030	-30.46	-23.46	0.00	237	0.030	-30.46	-23.46	0.00
193	0.030	-30.46	-23.46	0.00	238	0.030	-30.46	-23.46	0.00
194	0.030	-30.46	-23.46	0.00	239	0.030	-30.46	-23.46	0.00
195	0.030	-30.46	-23.46	0.00	240	0.030	-30.46	-23.46	0.00
196	0.030	-30.46	-23.46	0.00	241	0.030	-30.46	-23.46	0.00
197	0.030	-30.46	-23.46	0.00	242	0.030	-30.46	-23.46	0.00
198	0.030	-30.46	-23.46	0.00	243	0.030	-30.46	-23.46	0.00
199	0.030	-30.46	-23.46	0.00	244	0.030	-30.46	-23.46	0.00
200	0.030	-30.46	-23.46	0.00	245	0.030	-30.46	-23.46	0.00
201	0.030	-30.46	-23.46	0.00	246	0.030	-30.46	-23.46	0.00
202	0.030	-30.46	-23.46	0.00	247	0.030	-30.46	-23.46	0.00
203	0.030	-30.46	-23.46	0.00	248	0.030	-30.46	-23.46	0.00
204	0.030	-30.46	-23.46	0.00	249	0.030	-30.46	-23.46	0.00
205	0.030	-30.46	-23.46	0.00	250	0.030	-30.46	-23.46	0.00
206	0.030	-30.46	-23.46	0.00	251	0.030	-30.46	-23.46	0.00
207	0.030	-30.46	-23.46	0.00	252	0.030	-30.46	-23.46	0.00
208	0.030	-30.46	-23.46	0.00	253	0.030	-30.46	-23.46	0.00
209	0.030	-30.46	-23.46	0.00	254	0.030	-30.46	-23.46	0.00
210	0.030	-30.46	-23.46	0.00	255	0.030	-30.46	-23.46	0.00
211	0.030	-30.46	-23.46	0.00	256	0.030	-30.46	-23.46	0.00
212	0.030	-30.46	-23.46	0.00	257	0.030	-30.46	-23.46	0.00
213	0.030	-30.46	-23.46	0.00	258	0.030	-30.46	-23.46	0.00
214	0.030	-30.46	-23.46	0.00	259	0.030	-30.46	-23.46	0.00
215	0.030	-30.46	-23.46	0.00	260	0.030	-30.46	-23.46	0.00
216	0.030	-30.46	-23.46	0.00	261	0.030	-30.46	-23.46	0.00
217	0.030	-30.46	-23.46	0.00	262	0.030	-30.46	-23.46	0.00
218	0.030	-30.46	-23.46	0.00	263	0.030	-30.46	-23.46	0.00
219	0.030	-30.46	-23.46	0.00	264	0.030	-30.46	-23.46	0.00
220	0.030	-30.46	-23.46	0.00	265	0.030	-30.46	-23.46	0.00
221	0.030	-30.46	-23.46	0.00	266	0.030	-30.46	-23.46	0.00
222	0.030	-30.46	-23.46	0.00	267	0.030	-30.46	-23.46	0.00
223	0.030	-30.46	-23.46	0.00	268	0.030	-30.46	-23.46	0.00
224	0.030	-30.46	-23.46	0.00	269	0.030	-30.46	-23.46	0.00

Exhibit 13.9 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 340.0°T)

MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM
FM
Maximum gain: 7.0 dBd
Vertical polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
270	0.030	-30.46	-23.46	0.00	315	0.618	-4.19	2.81	1.91
271	0.030	-30.46	-23.46	0.00	316	0.632	-3.99	3.01	2.00
272	0.030	-30.46	-23.46	0.00	317	0.646	-3.79	3.21	2.09
273	0.030	-30.46	-23.46	0.00	318	0.661	-3.60	3.40	2.19
274	0.030	-30.46	-23.46	0.00	319	0.675	-3.41	3.59	2.29
275	0.030	-30.46	-23.46	0.00	320	0.690	-3.22	3.78	2.39
276	0.034	-29.37	-22.37	0.01	321	0.704	-3.05	3.95	2.48
277	0.038	-28.40	-21.40	0.01	322	0.716	-2.90	4.10	2.57
278	0.042	-27.54	-20.54	0.01	323	0.729	-2.74	4.26	2.67
279	0.046	-26.74	-19.74	0.01	324	0.742	-2.59	4.41	2.76
280	0.050	-26.02	-19.02	0.01	325	0.756	-2.44	4.56	2.86
281	0.062	-24.15	-17.15	0.02	326	0.767	-2.30	4.70	2.95
282	0.074	-22.62	-15.62	0.03	327	0.781	-2.15	4.85	3.05
283	0.086	-21.31	-14.31	0.04	328	0.793	-2.02	4.98	3.15
284	0.098	-20.18	-13.18	0.05	329	0.806	-1.88	5.12	3.25
285	0.110	-19.17	-12.17	0.06	330	0.817	-1.75	5.25	3.35
286	0.126	-17.99	-10.99	0.08	331	0.829	-1.63	5.37	3.44
287	0.142	-16.95	-9.95	0.10	332	0.840	-1.52	5.48	3.53
288	0.158	-16.03	-9.03	0.13	333	0.851	-1.41	5.59	3.63
289	0.174	-15.19	-8.19	0.15	334	0.862	-1.29	5.71	3.72
290	0.190	-14.42	-7.42	0.18	335	0.873	-1.18	5.82	3.82
291	0.212	-13.47	-6.47	0.23	336	0.882	-1.10	5.90	3.89
292	0.234	-12.62	-5.62	0.27	337	0.890	-1.01	5.99	3.97
293	0.256	-11.84	-4.84	0.33	338	0.899	-0.92	6.08	4.05
294	0.278	-11.12	-4.12	0.39	339	0.908	-0.84	6.16	4.13
295	0.300	-10.46	-3.46	0.45	340	0.916	-0.76	6.24	4.21
296	0.318	-9.95	-2.95	0.51	341	0.923	-0.69	6.31	4.27
297	0.336	-9.47	-2.47	0.57	342	0.931	-0.62	6.38	4.34
298	0.354	-9.02	-2.02	0.63	343	0.938	-0.56	6.44	4.41
299	0.372	-8.59	-1.59	0.69	344	0.946	-0.49	6.51	4.48
300	0.390	-8.18	-1.18	0.76	345	0.952	-0.42	6.58	4.55
301	0.405	-7.84	-0.84	0.82	346	0.958	-0.37	6.63	4.60
302	0.421	-7.51	-0.51	0.89	347	0.964	-0.32	6.68	4.65
303	0.436	-7.20	-0.20	0.95	348	0.969	-0.27	6.73	4.71
304	0.452	-6.90	0.10	1.02	349	0.975	-0.22	6.78	4.76
305	0.467	-6.60	0.40	1.10	350	0.980	-0.18	6.82	4.81
306	0.483	-6.33	0.67	1.17	351	0.982	-0.15	6.85	4.84
307	0.498	-6.06	0.94	1.24	352	0.985	-0.13	6.87	4.87
308	0.513	-5.80	1.20	1.32	353	0.988	-0.10	6.90	4.89
309	0.528	-5.54	1.46	1.40	354	0.991	-0.08	6.92	4.92
310	0.544	-5.30	1.70	1.48	355	0.993	-0.06	6.94	4.95
311	0.558	-5.06	1.94	1.56	356	0.995	-0.04	6.96	4.96
312	0.573	-4.84	2.16	1.65	357	0.996	-0.03	6.97	4.97
313	0.588	-4.61	2.39	1.73	358	0.997	-0.02	6.98	4.99
314	0.602	-4.40	2.60	1.82	359	0.998	-0.01	6.99	5.00