ASR Registration Search
Registration 1005298

Map Registration

Exhibit 13.1 - Copy of Existing Antenna Structure Registration

Registration Detail

Reg Number	1005298	Status	Constructed
File Number	A0861554	Constructed	01/01/1983
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type: TOWER - Free standing or Guyed Structure used for Commu

Location (in NAD83 Coordinates)

Lat/Long	42-27-10.0 N 070-58-48.0 W	Address	1147 REAR WESTERN AVE
City, State	LYNN , MA		
Zip	01905	County	ESSEX
Center of AM Array		Position of Tower in Array	

Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
1.8	117.0
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
118.8	116.0

Painting and Lighting Specifications

FCC Paragraphs 1, 3, 12, 21

FAA Notification

FAA Study	91-ANE-241-OE	FAA Issue Date	09/25/1991

Owner & Contact Information

FRN	0003759016	Owner Entity Type	Corporation

Owner

The ADD Radio Group, Inc.
P.O. Box 1306
East Greenwich , RI 02818

P: (401)203-1160
F:
E: peterarpin@msn.com

Contact

McCormick , Matthew H Esq
1300 N 17th Sreet
11th Floor
Arlington , VA 22209

P: (703)812-0438
F: (703)812-0486
E: mccormick@fhhlaw.com

Last Action Status

Status	Constructed	Received	10/21/2013
Purpose	Admin Update	Entered	10/21/2013
Mode	Interactive		

Related Applications

10/21/2013	A0861554 - Admin Update (AU)
01/25/2006	A0490251 - Change Owner (OC)
10/24/1996	A0006217 - New (NE)

Comments

Comments

12/17/1996	CORRECTED GROUND ELEVATION, SUBMITTED ROUNDED TO THE NEAREST WHOLE NUMBER, TO INCLUDE THE TENTHS. CLEARED STRUCTURE WITH FCC PARAGRAPHS BASED ON OLD TOWER FILE RECORD 064907, FAA 91-ANE-241-OE.

History

Date	Event
10/22/2013	ASR Application receipt email sent: Tower email
10/22/2013	Registration Printed
10/21/2013	Administrative Update Received

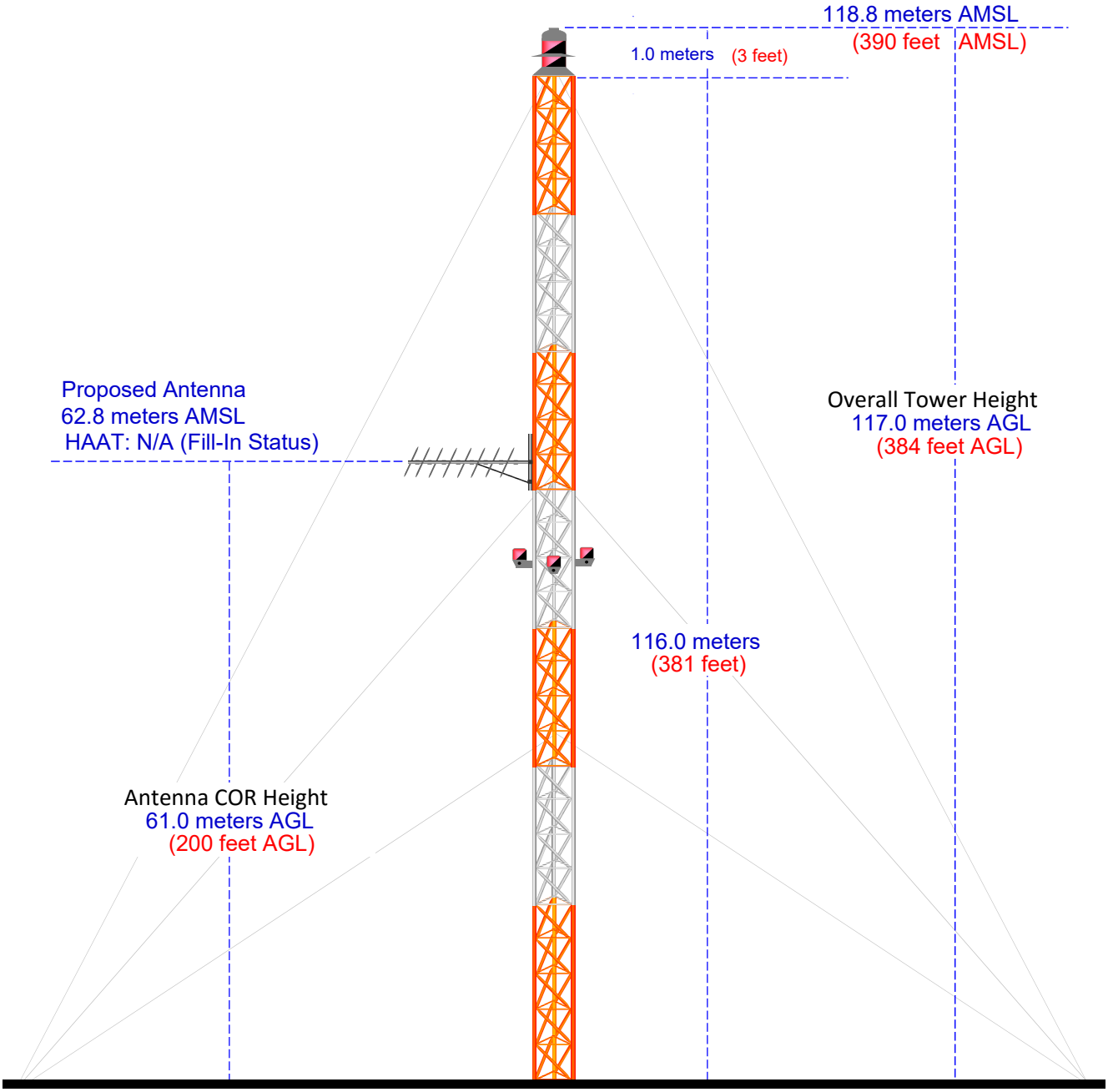
All History (9)

Automated Letters

10/22/2013	Authorization, Reference
01/25/2006	Ownership Change, Reference 483913
01/25/2006	Authorization, Reference 484020

Exhibit 13.2
Vertical Plan of Antenna System

THE SITE IS LOCATED AT 1147 REAR WESTERN AVE; THE CITY OF LYNN; ESSEX COUNTY; THE STATE OF MASSACHUSETTS.	
Antenna Structure Registration No. **1005298**	**Latitude (D M S)** **Longitude (D M S)** NAD 27 datum values: 42 27 9.65308 70 58 49.81979 NAD 83 datum values: 42 27 10.00000 70 58 48.00000



Drawing is not to Scale

Munn–Reese, Inc.
Broadcast Engineering Consultants
Coldwater, MI 49036

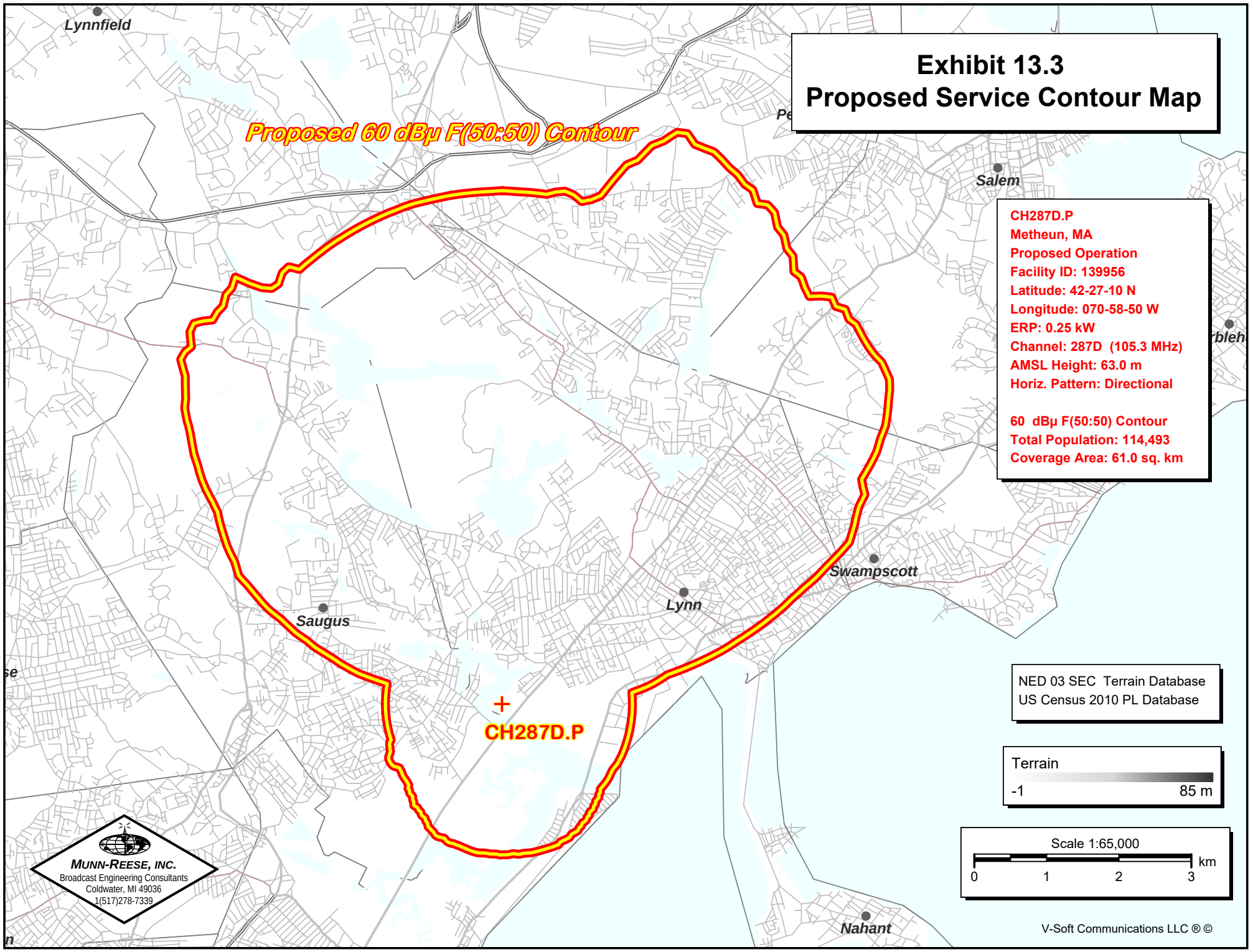


Exhibit 13.3
Proposed Service Contour Map
Proposed 60 dBµ F(50:50) Contour
CH287D.P
Metheun, MA
Proposed Operation
Facility ID: 139956
Latitude: 42-27-10 N
Longitude: 070-58-50 W
ERP: 0.25 kW
Channel: 287D (105.3 MHz)
AMSL Height: 63.0 m
Horiz. Pattern: Directional
60 dBµ F(50:50) Contour
Total Population: 114,493
Coverage Area: 61.0 sq. km
Lynnfield
Salem
Swampscott
Lynn
Saugus
Nahant
CH287D.P
NED 03 SEC Terrain Database
US Census 2010 PL Database
Terrain
-1
85 m
Scale 1:65,000
0
1
2
3
km
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339
V-Soft Communications LLC ® ©

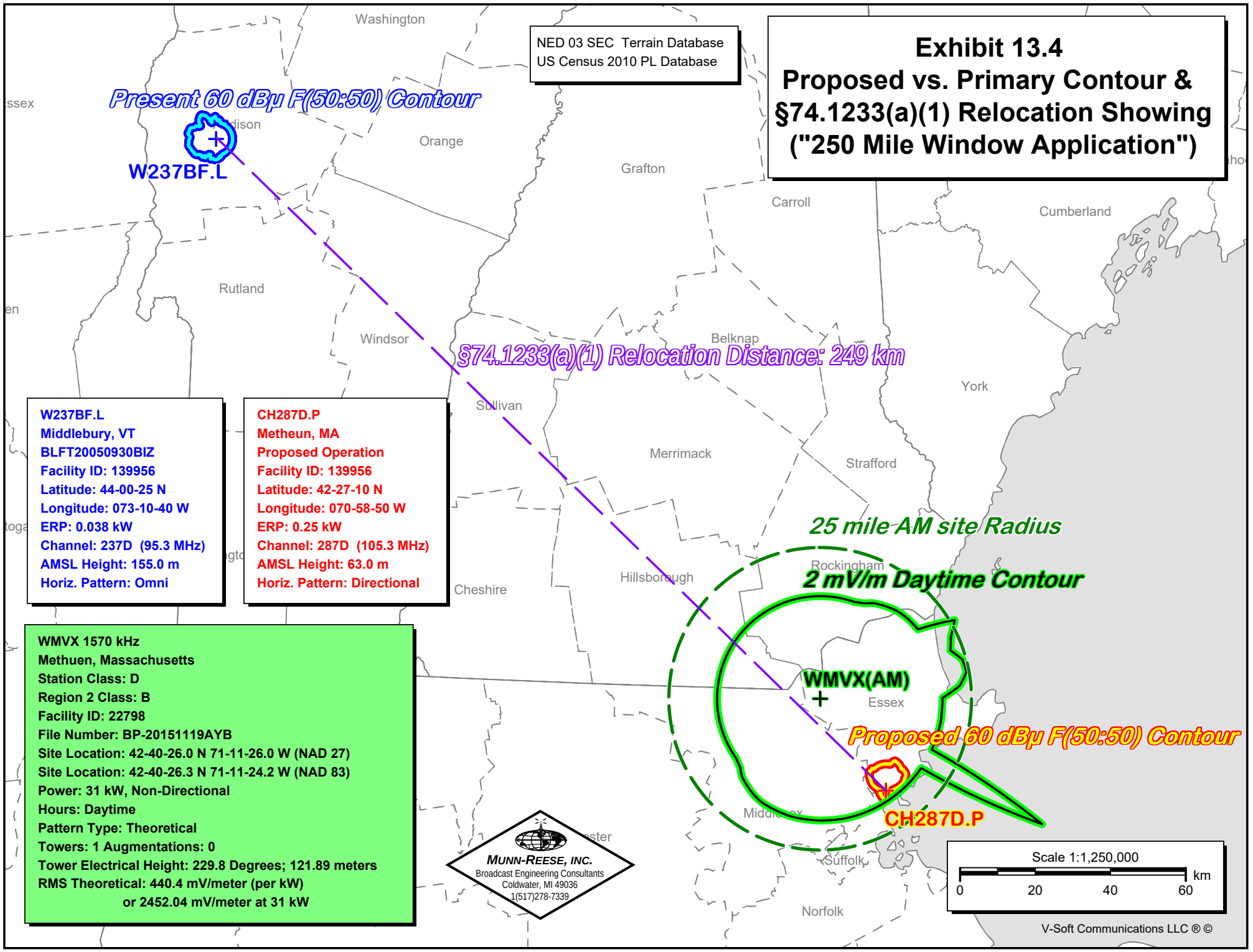


Exhibit 13.4
Proposed vs. Primary Contour &
§74.1233(a)(1) Relocation Showing
("250 Mile Window Application")
NED 03 SEC Terrain Database
US Census 2010 PL Database
Present 60 dBμ F(50:50) Contour
W237BF.L
§74.1233(a)(1) Relocation Distance: 249 km
W237BF.L
Middlebury, VT
BLFT20050930BIZ
Facility ID: 139956
Latitude: 44-00-25 N
Longitude: 073-10-40 W
ERP: 0.038 kW
Channel: 237D (95.3 MHz)
AMSL Height: 155.0 m
Horiz. Pattern: Omni
CH287D.P
Metheun, MA
Proposed Operation
Facility ID: 139956
Latitude: 42-27-10 N
Longitude: 070-58-50 W
ERP: 0.25 kW
Channel: 287D (105.3 MHz)
AMSL Height: 63.0 m
Horiz. Pattern: Directional
25 mile AM site Radius
2 mV/m Daytime Contour
WMVX(AM)
Proposed 60 dBμ F(50:50) Contour
CH287D.P
WMVX 1570 kHz
Methuen, Massachusetts
Station Class: D
Region 2 Class: B
Facility ID: 22798
File Number: BP-20151119AYB
Site Location: 42-40-26.0 N 71-11-26.0 W (NAD 27)
Site Location: 42-40-26.3 N 71-11-24.2 W (NAD 83)
Power: 31 kW, Non-Directional
Hours: Daytime
Pattern Type: Theoretical
Towers: 1 Augmentations: 0
Tower Electrical Height: 229.8 Degrees; 121.89 meters
RMS Theoretical: 440.4 mV/meter (per kW)
or 2452.04 mV/meter at 31 kW
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339
Scale 1:1,250,000
km
0 20 40 60
V-Soft Communications LLC ® ©
Washington
Orange
Grafton
Carroll
Cumberland
Rutland
Windsor
Belknap
York
Sullivan
Merrimack
Strafford
Rockingham
Hillsborough
Cheshire
Essex
Suffolk
Norfolk

Exhibit 13.5
Tabulation of Proposed Allocation

```
REFERENCE            CH#  287D  - 105.3 MHz, Pwr= 0.25 kW DA,  HAAT= 46.8 M,  COR= 63 M      DISPLAY DATES
42 27 10.0 N.                        Average Protected F(50-50)= 8.93 km                    DATA   07-28-16
70 58 50.0 W.                              Standard Directional                             SEARCH 07-28-16
-------------------------------------------------------------------------------------------------------------
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)
-------------------------------------------------------------------------------------------------------------
289B  WROR-FM     LIC _C_    215.7   14.44             42 20 50.0  23.000    6.0    66.5      6.6      -52.1*<
Framingham          MA        35.6  BLH20000223AAP    71 04 59.0    224     247    Greater Boston Radio, Inc.

286B  WWLI        LIC _CX    209.5   82.40             41 48 24.0  50.000   83.0    69.1     -2.5*<     9.4
Providence          RI        29.2  BMLH20070206ABO    71 28 13.0    152     214    Radio License Holding Cbc,

287A  WSHK        LIC _CN     11.4   81.87             43 10 28.0   2.200   76.1    25.2     -1.4<     32.6
Kittery             ME       191.6  BLH19921030KC      70 46 50.0    113     142    Townsquare Media Portsmout

285A  WBOQ        LIC ZCX      9.2   21.02             42 38 22.0   6.000    1.8    19.1     12.2       0.8
Gloucester          MA       189.2  BLH20130130ACE     70 56 22.0     98     119    Westport Communications Li

285D  WRBB        LIC _CN    215.6   15.60             42 20 19.0   0.019    1.6     4.7     12.1      10.9
Boston              MA        35.5  BLED19831213AB     71 05 28.0      27      55    Northeastern University

233B  WJMN        LIC _CX    231.2   25.74             42 18 27.0   9.200    0.0     0.0     14.5R     11.2M
Boston              MA        51.0  BLH20031201AWA     71 13 27.0     353     394    Amfm Radio Licenses, L.l.c

287D  W287BT      LIC _C_    282.9   71.89             42 35 40.0   0.150   52.1    16.1     17.6      49.1
Fitchburg           MA       102.4  BLFT20100408ABZ    71 50 12.0      81     327    K-zone Media Group, Llc

284B  WOCN-FM     LIC _E_    132.7  109.55             41 46 48.0  50.000    5.9    64.5    101.8      45.0
Orleans             MA       313.4  BMLH19991229AAA    70 00 36.0     140     146    Cape Cod Broadcasting Lice

286L1 WBNH-LP     LIC ___    321.7   70.18             42 56 48.0   0.100                    55.1      54.6
Bedford             NH       141.3  BLL20160202ACF     71 30 56.0                109    Town Of Bedford, New Hamps

288A  WJYY        LIC _CN    335.3  101.32             43 16 46.0   1.550   38.5    25.6     56.2      66.3
Concord             NH       154.9  BLH19871005KD      71 30 15.0     139     298    Wbin Media Co., Inc.

287L1 WFPC-LP     LIC ___    292.9   95.35             42 46 52.0   0.100                    73.2      78.2
Rindge              NH       112.1  BLL20030506AAF     72 03 26.0      18     365    Franklin Pierce College

287C2 WJEN        LIC NCN    311.8  200.36             43 38 22.0   1.250  118.1    46.7     76.4     134.4
Killington          VT       130.5  BLH19940829KC      72 50 12.0     683    1213    6 Johnson Road Licenses, I

284D  W284BA      LIC _C_    206.5   86.42             41 45 21.6   0.099    0.7     8.2     83.7      78.2
Warwick             RI        26.2  BLFT20140129AHS    71 26 41.8      45      83    Educational Media Foundati

284A  WHTP        LIC _CN     22.5  114.66             43 24 16.0   6.000    2.7    27.7    103.9      86.0
Kennebunkport       ME       202.9  BLH19950607KB      70 26 15.0      87     100    Mainestream Media, Llc

288A  WWEI        LIC ZEX    260.8  139.10             42 14 29.0   0.720   43.8    29.0     93.7     108.4
Easthampton         MA        79.7  BMLH20141103AER    72 38 57.0     280     377    Entercom License, Llc

285A  WLKZ        LIC _CX    345.2  125.76             43 32 45.3   0.560    1.6    25.7    117.2      99.0
Wolfeboro           NH       165.0  BLH20110228ABN     71 22 42.8     325     560    Great Eastern Radio, Llc

285A  WYRY        LIC DC_    287.1  125.84             42 46 33.0   4.100    2.2    24.0    121.0     101.6
Hinsdale            NH       106.1  BLH20010402AAV     72 27 17.0     122     344    Tri-valley Broadcasting Co

-------------------------------------------------------------------------------------------------------------
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.
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.
< = Contour Overlap
Reference station has protected zone issue: AM tower
```

Blue Highlighted Text denotes supplemental contour protection studies toward select facilities as included in ***Exhibit(s) 13.6(a-c)***.

Yellow Highlighted Text denotes the existence of a §74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WROR-FM - Framingham, MA (CH289B) as noted in ***Exhibit 13.7***. Protection has been based on the worst case calculated 125.3 dBµ F(50:10) Interference Contour, corresponding to the worst case 85.3 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 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 in ***Exhibit 13.8***.

Exhibit 13.6(a)
Contour Protection Studies Toward Select Station(s)

FMCommander Single Allocation Study - 07-28-2016 - NED 03 SEC
CH287D.P's Overlaps (In= -2.53 km, Out= 9.43 km)

CH287D.P CH 287 D DA
Lat= 42 27 10.0, Lng= 70 58 50.0
0.25 kW 46.8 m HAAT, 63 m COR
Prot.= 60 dBu, Intef.= 48 dBu

WWLI CH 286 B BMLH20070206ABO
Lat= 41 48 24.0, Lng= 71 28 13.0
50.0 kW 152 m HAAT, 214 m COR
Prot.= 54 dBu, Intef.= 54 dBu

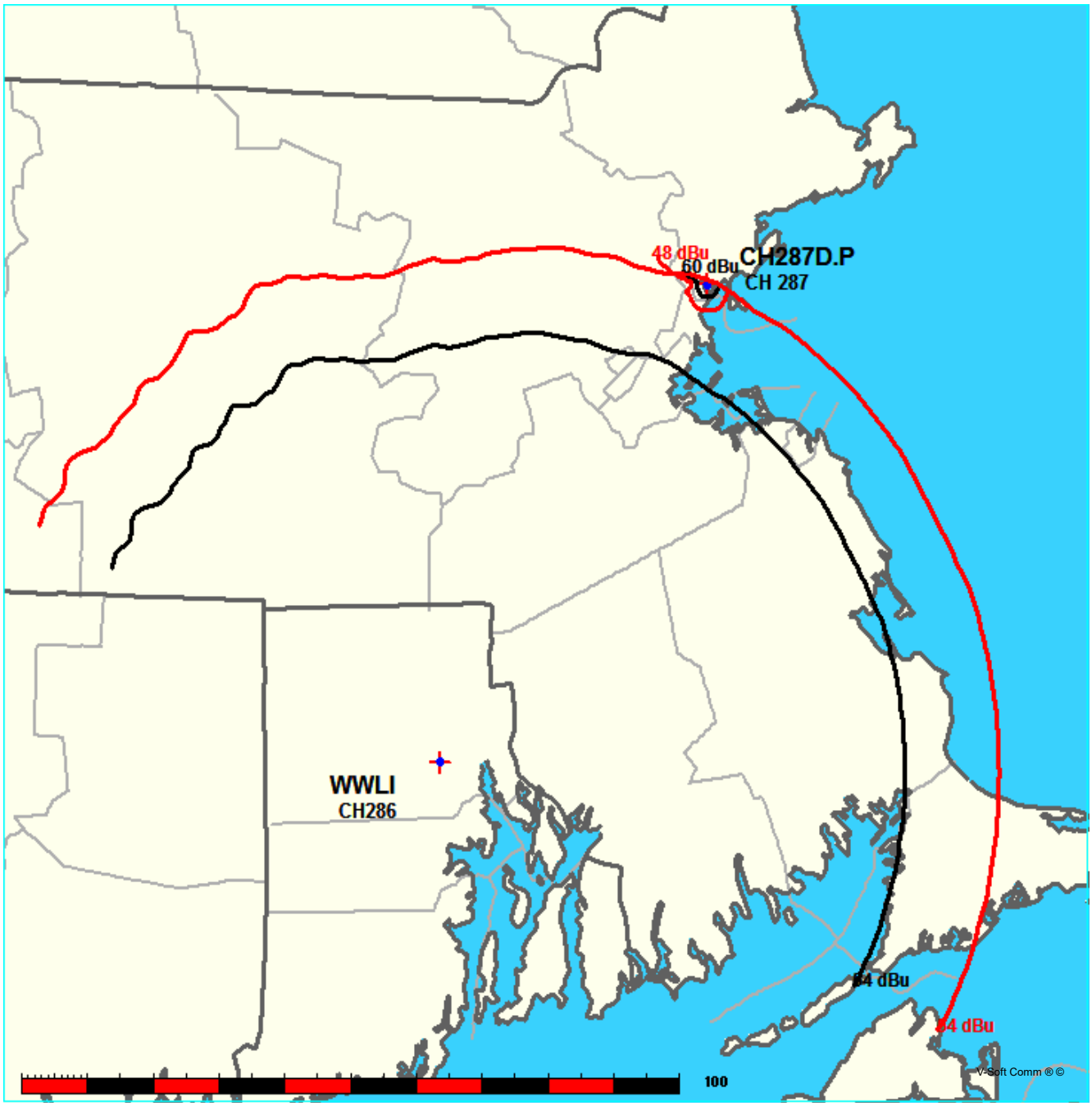


Exhibit 13.6(b)
Contour Protection Studies Toward Select Station(s)

FMCommander Single Allocation Study - 07-28-2016 - NED 03 SEC
CH287D.P's Overlaps (In= -1.41 km, Out= 32.57 km)

CH287D.P CH 287 D DA
Lat= 42 27 10.0, Lng= 70 58 50.0
0.25 kW 46.8 m HAAT, 63 m COR
Prot.= 60 dBu, Intef.= 40 dBu

WSHK CH 287 A BLH19921030KC
Lat= 43 10 28.0, Lng= 70 46 50.0
2.2 kW 113 m HAAT, 142 m COR
Prot.= 60 dBu, Intef.= 40 dBu

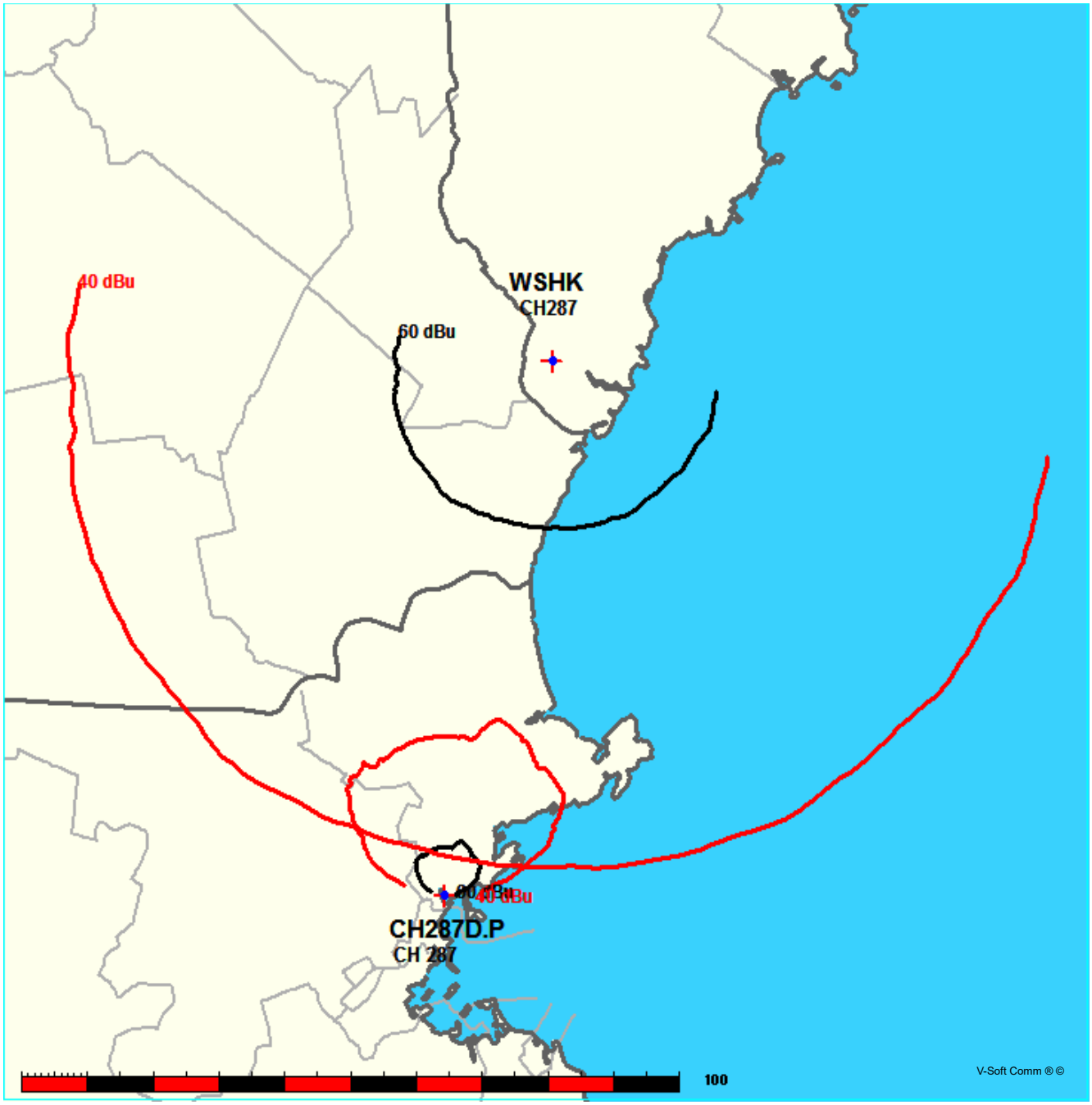


Exhibit 13.6(c)
Contour Protection Studies Toward Select Station(s)

FMCommander Single Allocation Study - 07-28-2016 - NED 03 SEC
CH287D.P's Overlaps (In= 12.23 km, Out= 0.82 km)

CH287D.P CH 287 D DA
Lat= 42 27 10.0, Lng= 70 58 50.0
0.25 kW 46.8 m HAAT, 63 m COR
Prot.= 60 dBu, Intef.= 100 dBu

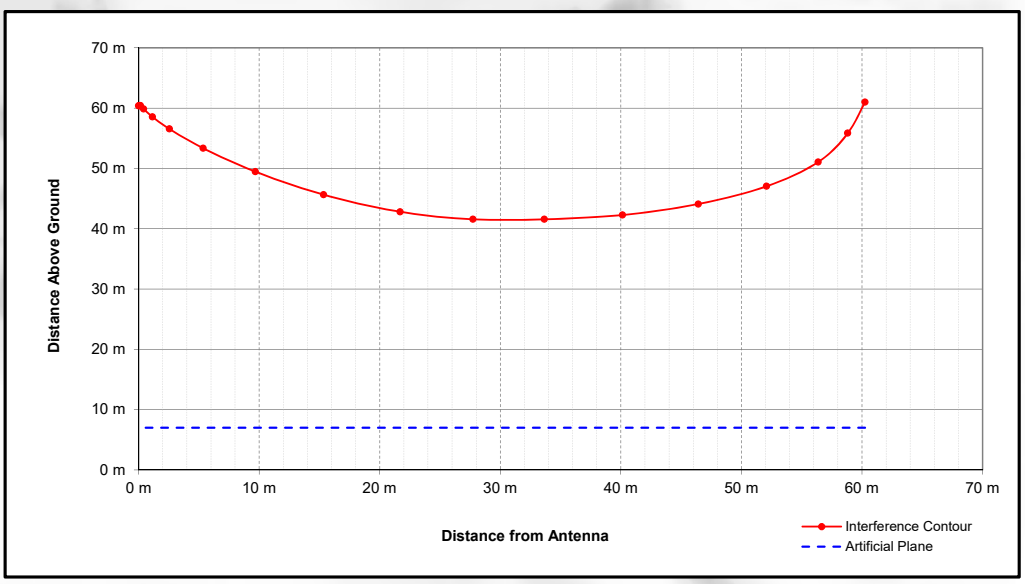
WBOQ CH 285 A 73.215 Z BLH20130130ACE
Lat= 42 38 22.0, Lng= 70 56 22.0
6.0 kW 98 m HAAT, 119 m COR
Prot.= 60 dBu, Intef.= 100 dBu

Exhibit 13.7
§74.1204(d) 2nd/3rd Adjacent Channel Given Interference Waiver Request
WROR(FM) - Framingham, MA (CH289B)

NGDC 30 SEC Terrain Database
U.S. Census 2010 PL Database

WROR-FM - 85.3 F(50:50)dBµ Contour

CH287D.P



CH287D.P
Metheun, MA
Proposed Operation
Facility ID: 139956
Latitude: 42-27-10 N
Longitude: 070-58-50 W
ERP: 0.25 kW
Channel: 287D (105.3 MHz)
AMSL Height: 63.0 m
Horiz. Pattern: Directional

Proposed Antenna: 1-Bay CL-FM(Slant45)
Proposed Power: 0.25 kW
Antenna Height AMSL: 61 meters
Interference Contour: 125.3 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	0.250	-6.02	60.25 m	infinite	---	---	---
-5°	0.980	0.240	-6.20	59.05 m	619.58 m	104.88 dBu	699.90 m	103.82 dBu
-10°	0.950	0.226	-6.47	57.24 m	310.97 m	110.60 dBu	351.28 m	109.54 dBu
-15°	0.895	0.200	-6.98	53.93 m	208.64 m	113.55 dBu	235.69 m	112.49 dBu
-20°	0.820	0.168	-7.74	49.41 m	157.89 m	115.21 dBu	178.35 m	114.15 dBu
-25°	0.735	0.135	-8.69	44.29 m	127.77 m	116.10 dBu	144.34 m	115.04 dBu
-30°	0.645	0.104	-9.83	38.86 m	108.00 m	116.42 dBu	122.00 m	115.36 dBu
-35°	0.562	0.079	-11.03	33.86 m	94.15 m	116.42 dBu	106.35 m	115.36 dBu
-40°	0.470	0.055	-12.58	28.32 m	84.01 m	115.85 dBu	94.90 m	114.80 dBu
-45°	0.360	0.032	-14.89	21.69 m	76.37 m	114.37 dBu	86.27 m	113.31 dBu
-50°	0.250	0.016	-18.06	15.06 m	70.49 m	111.90 dBu	79.63 m	110.84 dBu
-55°	0.155	0.006	-22.21	9.34 m	65.92 m	108.33 dBu	74.47 m	107.27 dBu
-60°	0.085	0.002	-27.43	5.12 m	62.35 m	103.59 dBu	70.44 m	102.53 dBu
-65°	0.045	0.001	-32.96	2.71 m	59.58 m	98.46 dBu	67.31 m	97.40 dBu
-70°	0.020	0.000	-40.00	1.21 m	57.47 m	91.73 dBu	64.91 m	90.67 dBu
-75°	0.010	0.000	-46.02	0.60 m	55.90 m	85.95 dBu	63.15 m	84.89 dBu
-80°	0.010	0.000	-46.02	0.60 m	54.83 m	86.12 dBu	61.94 m	85.06 dBu
-85°	0.010	0.000	-46.02	0.60 m	54.21 m	86.22 dBu	61.23 m	85.16 dBu
-90°	0.010	0.000	-46.02	0.60 m	54.00 m	86.25 dBu	61.00 m	85.19 dBu

WROR-FM
Framingham, MA
BLH20000223AAP
Facility ID: 20438
Latitude: 42-20-50 N
Longitude: 071-04-59 W
ERP: 23.00 kW
Channel: 289B (105.7 MHz)
AMSL Height: 247.0 m
Horiz. Pattern: Omni

+
WROR-FM

The applicant would like to note the existence of a §74.1204(d) Second/ Third Adjacent Channel Given Interference Waiver Request toward WROR-FM - Framingham, MA (CH289B) as noted in ***Exhibit 13.7***. Protection has been based on the worst case calculated 125.3 dBµ F(50:10) Interference Contour, corresponding to the worst case 85.3 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 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 in ***Exhibit 13.8***.

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

Terrain
-2 92 m

Scale 1:66,107
0 1 2 3 km

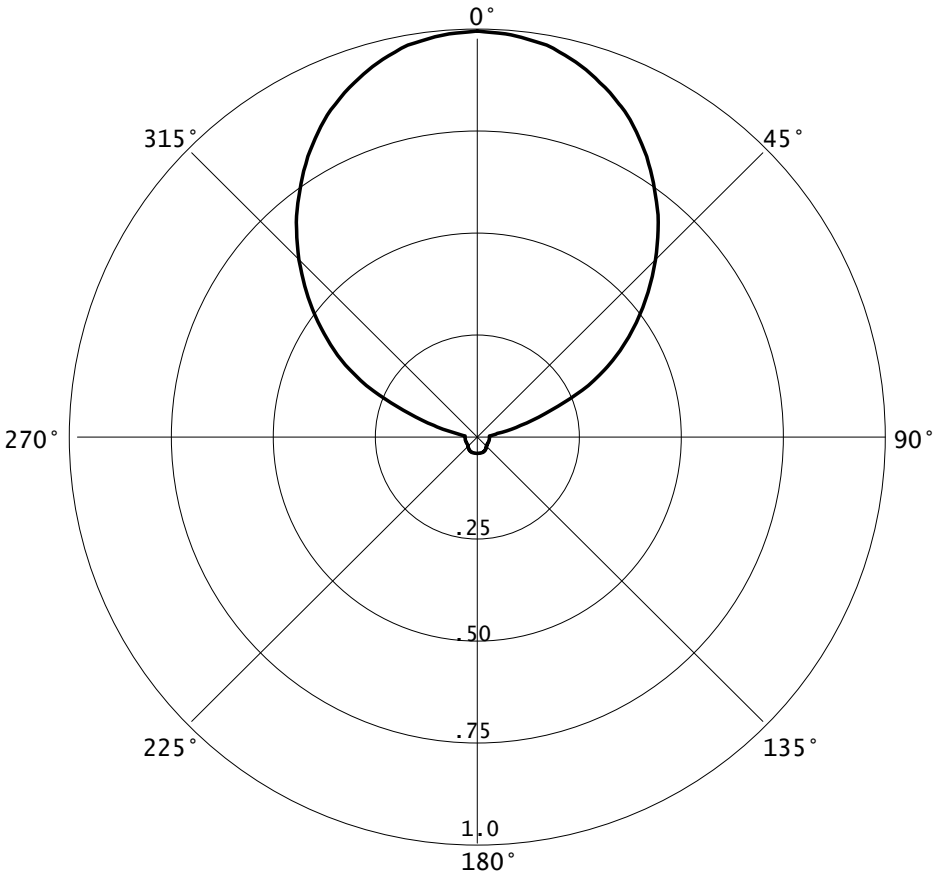
Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°T)

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 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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

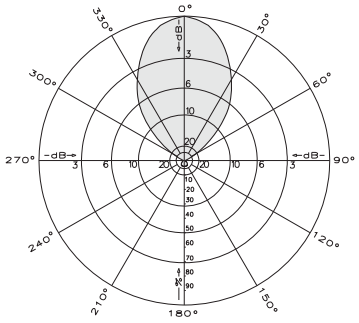
The Kathrein Scala Division CL-FM is a ruggedly built log-periodic antenna, designed for professional FM transmit and receive applications.

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.

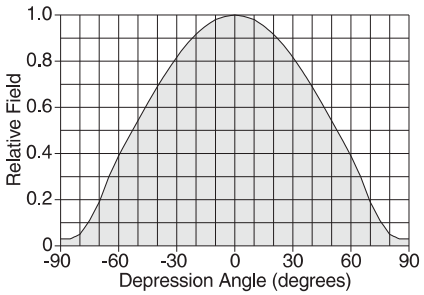
The CL-FM may be used stand-alone or in stacked arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.

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

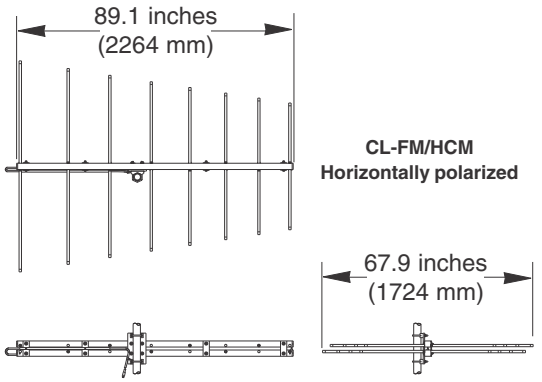
10492-D

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°T)

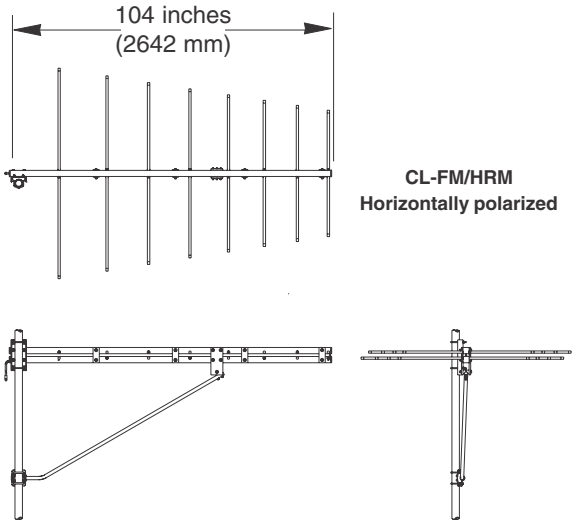
MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

CL-FM

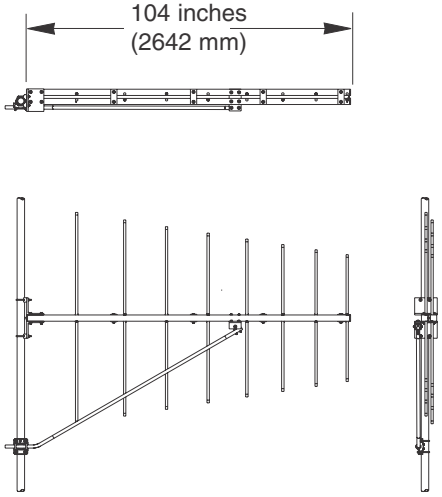
FM LOG-PERIODIC ANTENNA
7 dBd gain
88–108 MHz



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

All specifications are subject to change without notice

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

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°T)

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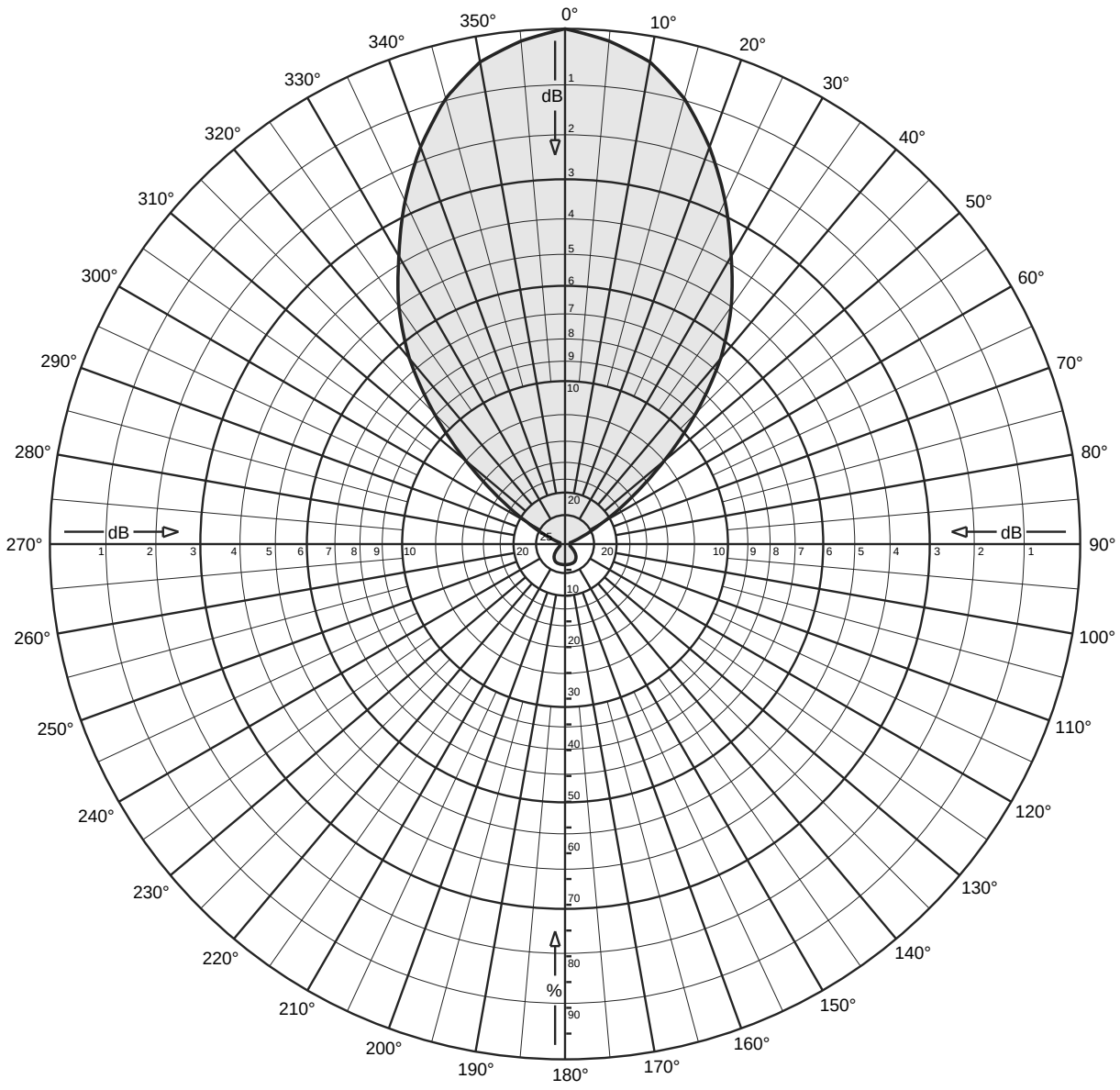
Coldwater, MI 49036
1(517)278-7339



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

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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
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

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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
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

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MUNN-REESE, INC.
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1(517)278-7339

KATHREIN
SCALA DIVISION

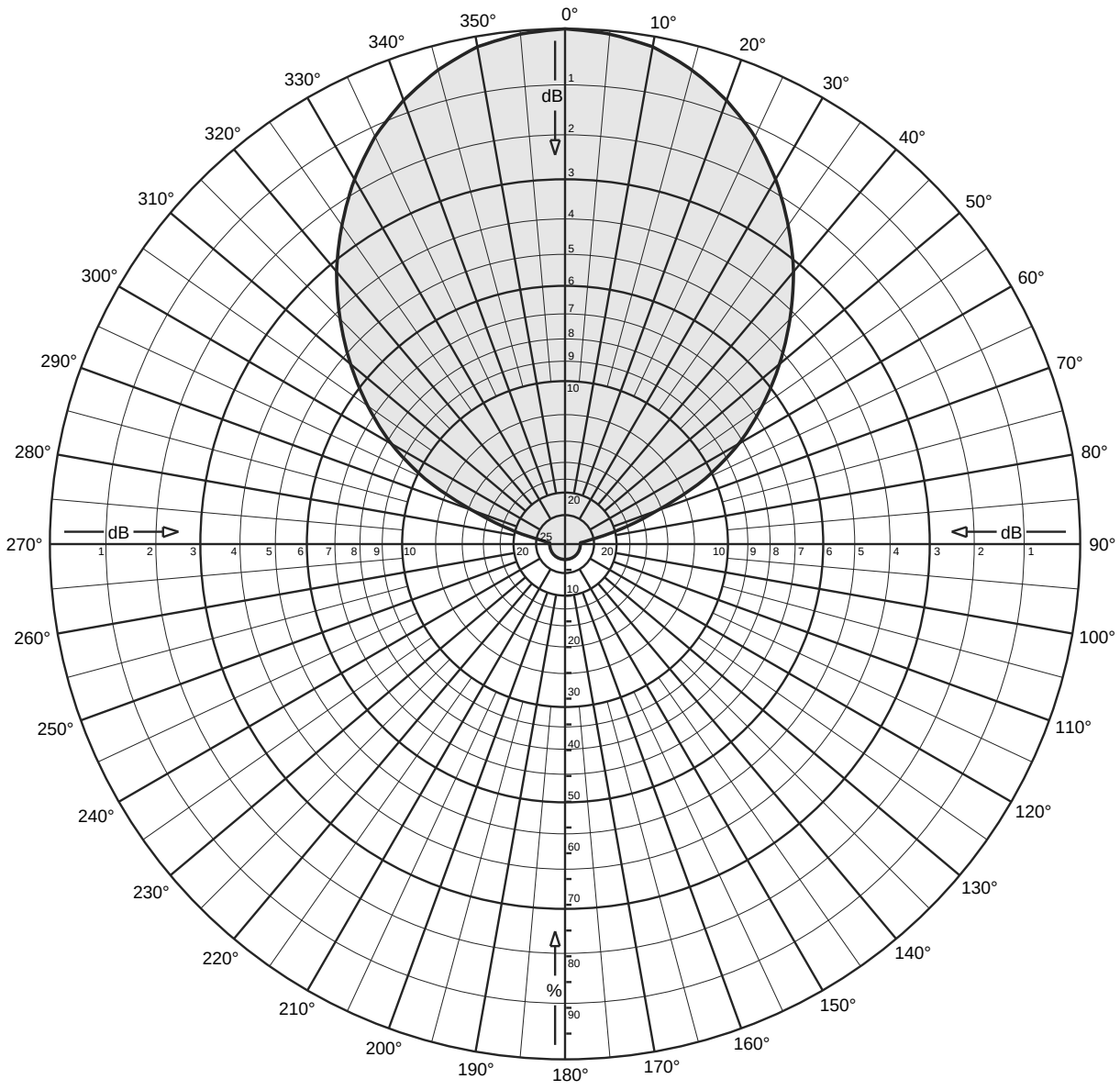
CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component

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 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
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MUNN-REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036
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KATHREIN
SCALA DIVISION

CL-FM
FM
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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

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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
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 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°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

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CL-FM
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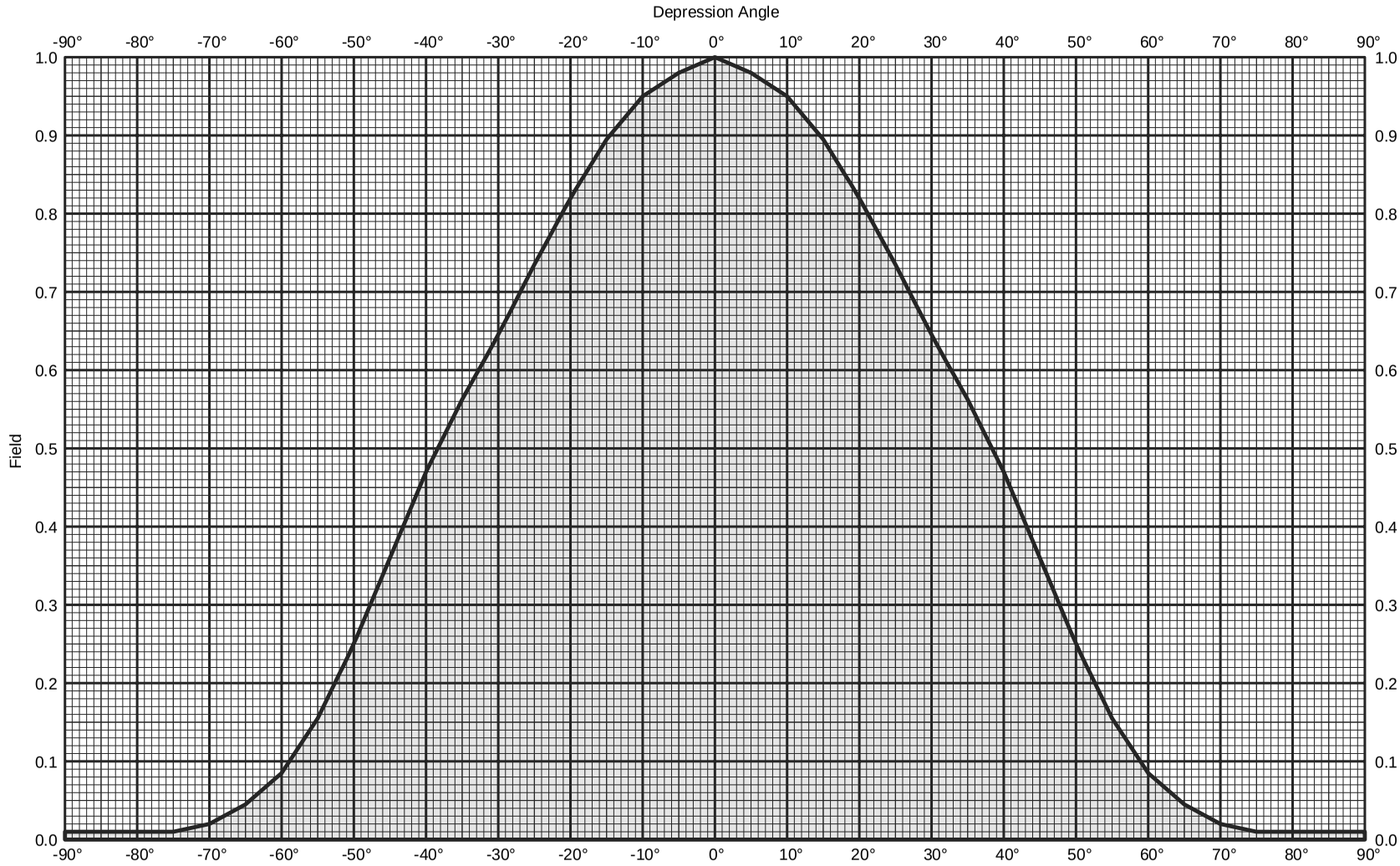
Maximum gain: 7.0 dBd
Vertical polarization Component

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

Exhibit 13.8 - Copy of Manufacturer's Directional Antenna Pattern Data
(Actual Pattern Rotated to 000°T)

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



CL-FM Log-periodic

FM

Vertical radiation pattern

0 degree electrical downtilt

KATHREIN
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18-Sep-2008

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KATHREIN
SCALA DIVISION

CL-FM Log-periodic
FM

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

18-Sep-2008

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Broadcast Engineering Consultants
Coldwater, MI 49036
1(517)278-7339

KATHREIN
SCALA DIVISION

CL-FM Log-periodic
FM

Vertical 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
					90	0.010	-40.00	-33.00	0.00