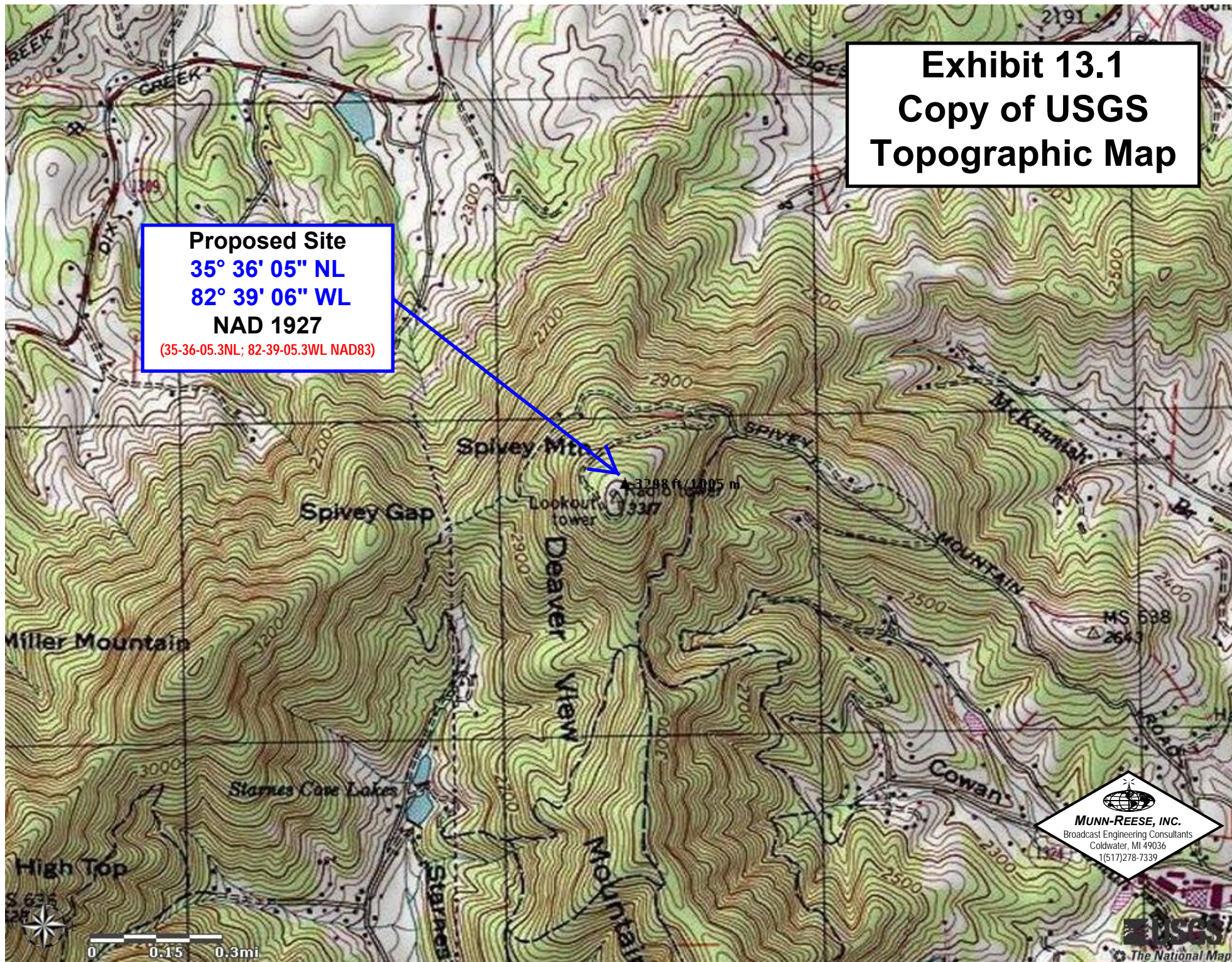


**Exhibit 13.1**  
**Copy of USGS**  
**Topographic Map**

**Proposed Site**  
**35° 36' 05" NL**  
**82° 39' 06" WL**  
**NAD 1927**  
(35-36-05.3NL; 82-39-05.3WL NAD83)



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

**USGS**  
The National Map



# Exhibit 13.2 Copy of USGS Aerial Photograph

**Proposed Site**

**35° 36' 05" NL**

**82° 39' 06" WL**

**NAD 1927**

(35-36-05.3NL; 82-39-05.3WL NAD83)



## Exhibit 13.3

### Vertical Plan of Antenna System

The site is located on top of Spivey Mountain  
at the end of Spivey Mountain Road  
the city of Asheville, Buncombe County, North Carolina.

#### Site Location (NAD 27)

NL: 35° 36' 05"

WL: 82° 39' 06"

(35-36-05.3NL; 82-39-05.3WL NAD 1983)

#### NOTE: Existing Tower Construction

Antenna Structure Registration No.

**Not Required**

W288CQ.CP - Asheville, NC  
BMPFT-20150318AAU  
COR: 1029 meters AMSL  
max HAAT: N/A (Fill-In Status)  
COR: 24 meters AGL

W247BV.P - Asheville, NC  
Proposed Operation  
COR: 1023 meters AMSL  
max HAAT: N/A (Fill-In Status)

18 meters AGL  
(59 feet)

1038.7 meters AMSL

(3408 feet AMSL)

33.5 meters AGL  
(110 feet)

Ground Elevation = 1005.2 m AMSL  
(3298 feet)

Drawing is not to Scale

**MUNN-REESE, INC.**

Broadcast Engineering Consultants  
Coldwater, MI 49036



Terrain  
254 2031 m

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

632628.A  
(Auction 83  
Original Short-Form)  
Canton, NC  
BNPFT20030317AHL  
Facility ID: 141108  
Latitude: 35-31-58 N  
Longitude: 082-51-58 W  
ERP: 0.105 kW  
Channel: 247D  
Frequency: 97.3 MHz  
AMSL Height: 933.0 m  
Horiz. Pattern: Omni

Original Auction 83  
Short-Form 60 dBu F(50:50)

Proposed 60 dBu F(50:50) Contour

Present 60 dBu F(50:50) Contour

W247BV.P  
W247BV.C  
+

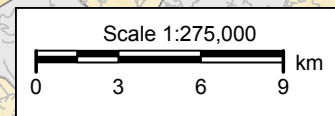
## Exhibit 13.4 Present vs Proposed Service Contour Study

W247BV.P  
Asheville, NC  
Proposed Operation  
Facility ID: 141108  
Latitude: 35-36-05 N  
Longitude: 082-39-06 W  
ERP: 0.099 kW  
Channel: 247D  
Frequency: 97.3 MHz  
AMSL Height: 1023.0 m  
Horiz. Pattern: Directional

60 dBu Contour  
Total Population: 161,667  
Coverage Area: 893 sq. km

W247BV.C  
Asheville, NC  
BMPFT20131119BEK  
Facility ID: 141108  
Latitude: 35-36-04 N  
Longitude: 082-39-07 W  
ERP: 0.099 kW  
Channel: 247D  
Frequency: 97.3 MHz  
AMSL Height: 1028.0 m  
Horiz. Pattern: Directional

60 dBu Contour  
Total Population: 112,439  
Coverage Area: 368 sq. km





**Primary 60 dBμ F(50:50) Contour**

**Proposed 60 dBμ F(50:50) Contour**

**W247BV.P  
WOXL-FM** +

**Asheville**

## Exhibit 13.5 Proposed vs. Primary Service Contour Study

**W247BV.P**  
Asheville, NC  
Proposed Operation  
Facility ID: 141108  
Latitude: 35-36-05 N  
Longitude: 082-39-06 W  
ERP: 0.099 kW  
Channel: 247D  
Frequency: 97.3 MHz  
AMSL Height: 1023.0 m  
Horiz. Pattern: Directional

**WOXL-FM**  
Biltmore Forest, NC  
BLH20101130AJQ  
Facility ID: 37242  
Latitude: 35-36-04 N  
Longitude: 082-39-07 W  
ERP: 2.10 kW  
Channel: 243C3  
Frequency: 96.5 MHz  
AMSL Height: 1064.0 m  
Horiz. Pattern: Directional

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

Terrain  
183 ————— 2029 m

Scale 1:450,000  
0 6 12 18 km



# Exhibit 13.6

## Tabulation of Proposed Allocation

Saga Communications Of North Carolina, Llc											
REFERENCE	CH#	247D	-	97.3 MHz, Pwr= 0.099 kW DA, HAAT= 314.8 M, COR= 1023 M	DISPLAY DATES						
35 36 05.0 N.	Average Protected F(50-50)= 18.42 km				DATA 06-04-15						
82 39 06.0 W.	Standard Directional				SEARCH 06-04-15						
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)	
247D W247BV Asheville	CP	DC_		219.9	0.04	35 36 04.0	0.099	61.8	19.3	-79.6*	-76.0*
		NC		39.9	BMPFT20131119BEK	82 39 07.0		1028	Saga Communications Of Nor		
247C WKBC-FM North Wilkesboro	LIC	DE_		68.5	147.06	36 04 34.0	100.000	168.7	70.9	-40.1*	17.7
		NC		249.4	BLH19970711KA	81 07 43.0	403	803	Wilkes Broadcasting Compan		
249D W249AR Asheville	LIC	C_		237.2	2.39	35 35 23.0	0.100	0.7	19.8	-14.7*	-18.1*
		NC		57.2	BLFT20000811AAU	82 40 26.0	358	1089	Entercom License, Llc		
248C WJXB-FM Knoxville	LIC	_CY		291.8	124.10	36 00 36.0	100.000	121.4	81.7	-13.3	18.3
		TN		111.1	BLH19890928KC	83 55 57.0	395	706	Midwest Communications, In		
247L1 WFHC-LP Hendersonville	LIC			147.4	26.98	35 23 48.3	0.100			-10.1*	0.7
		NC		327.5	BLL20120611ACF	82 29 28.8	30	735	Jbn Inc.		
245C WXBQ-FM Bristol	LIC	DCN		26.5	103.42	36 25 59.0	75.000	13.6	94.0	69.2	8.7
		VA		206.8	BLH19950914KB	82 08 11.0	683	1308	Bristol Broadcasting Compa		
248D W248CI Brevard Translator for WLFJ, Greenville, SC	CP	DC_		183.1	46.94	35 10 47.0	0.008	15.6	10.8	15.1	11.8
		NC		3.1	BNPFT19970915TG	82 40 47.0		1134	Radio Training Network, In		
247L1 WZVZ-LP Six Mile	CP			189.2	86.55	34 49 58.0	0.002			55.9	28.4
		SC		9.1	BNPL20131115ASJ	82 48 12.0	215	494	Battle Of Central Sc Comit		
246L1 WICE-LP Hendersonville	LIC			147.6	42.76	35 16 35.0	0.100			29.2	29.7
		NC		327.7	BLL20090805ACL	82 23 57.0	30	689	Ebenezer Pentecostal Radi o		
249D W249CY Lake Toxaway	CP	DH_		210.0	60.23	35 07 55.0	0.009	0.0	2.3	41.5	57.2
		NC		29.9	BNPFT20130828ADI	82 58 60.0	539	1465	Charisma Radi o Corp.		
246C WSRV Gainesville	LIC	_CY		214.2	197.61	34 07 32.0	100.000	126.7	85.1	52.6	85.3
		GA		33.5	BLH19980825KB	83 51 32.0	483	797	Cox Radi o, Inc.		
250C WPEG Concord	LIC	DEX		100.7	138.05	35 21 44.0	95.000	11.5	82.7	106.4	54.6
		NC		281.5	BMLH20121024AAF	81 09 19.0	491	727	Wpow License Limited Partn		
245D W245CH Travelers Rest	LIC	DC_		163.4	76.55	34 56 29.0	0.250	0.7	20.4	69.6	56.0
		SC		343.5	BLFT20141219ABG	82 24 41.0		725	Caron Broadcasting, Inc.		

Terrain database is NGDC 30 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. Call signs with strikeout need not be protected.  
 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.

Green Text denotes the W247BV.C (Facility ID: 141108) facility to be modified by this Form 349 Long-Form filing. This facility need not be protected.

Blue Highlighted Text denotes supplemental contour protection studies toward select facilities as included in **Exhibit(s) 13.7**.

Yellow Highlighted Text denotes a §74.1204(d) Second Adjacent Channel Given Interference Waiver Requests toward W249AR - Asheville, NC (CH249D) as included in **Exhibit 13.8**. The Protected Contour at the proposed Translator site has been calculated to be no less than than the 128.60 dBu F(50:10) Interference Contour corresponding to the worst case W249AR 88.60 dBu F(50:50) Protected Contour. This represents the proposed interference contour which falls wholly within the 40:1 dBu ratio. As seen in the **Exhibit 13.8** USGS Topographic Photo-Map, there is a lack of population, housing, buildings or major roads within this 128.60 dBu F(50:10) interference area. The applicant would like to note the existence of several dedicated transmitter buildings located within this restricted access Spivey Mountain, mountain top antenna farm complex. However, structures of this nature have been exempt as a matter of FCC Policy.

## Exhibit 13.7

### Contour Protection Studies Toward WFHC-LP - Hendersonville, NC

Saga Communications Of North Carolina, LLC

FMCommander Single Allocation Study - 06-04-2015 - NGDC 30 SEC

W247BV.P's Overlaps (In= -10.12 km, Out= 0.75 km)

W247BV.P CH 247 D DA

Lat= 35 36 05.0, Lng= 82 39 06.0

0.099 kW 314.8 M HAAT, 1023 M COR

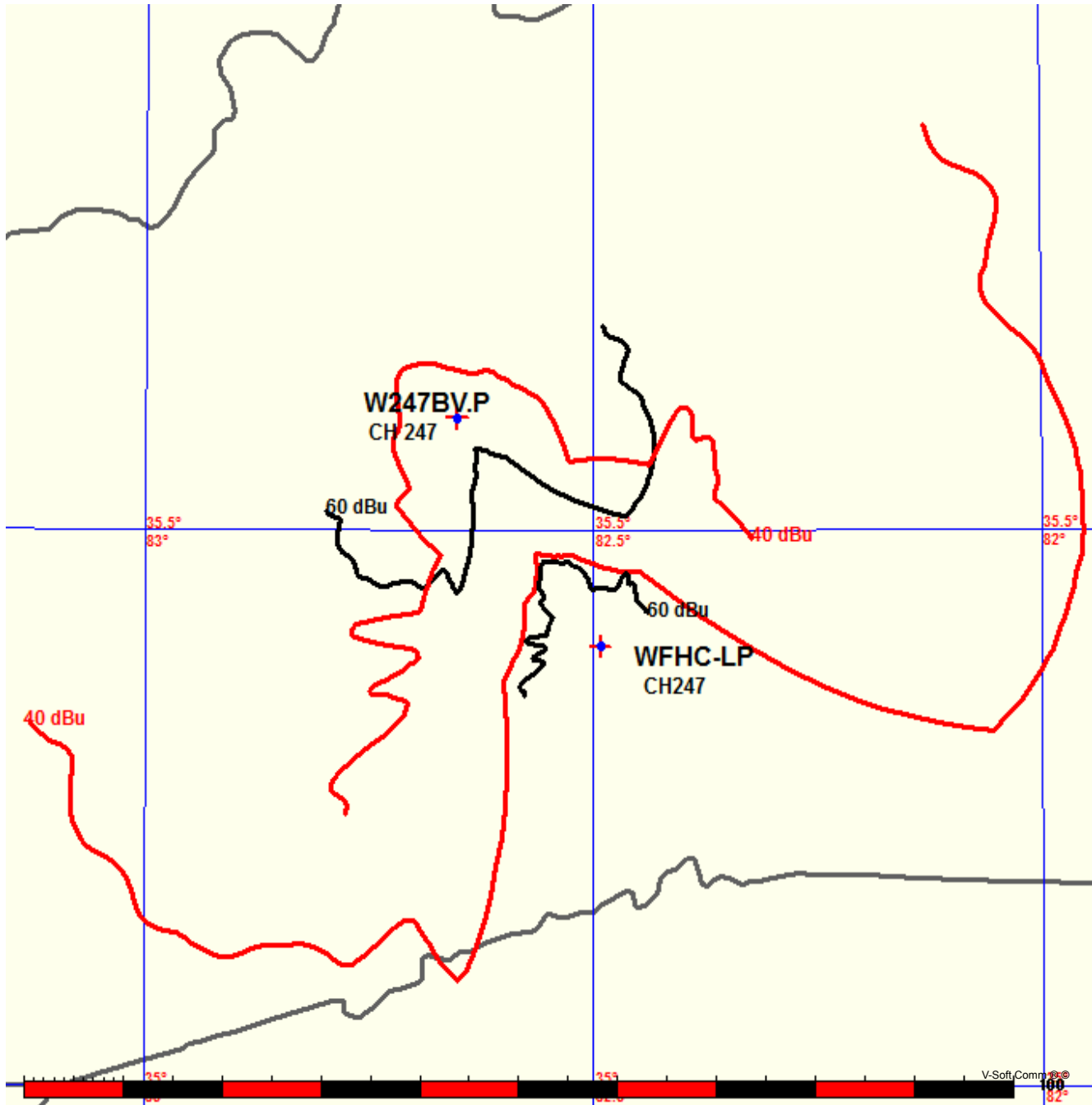
Prot.= 60 dBu, Intef.= 40 dBu

WFHC-LP CH 247 L1 BLL20120611ACF

Lat= 35 23 48.3, Lng= 82 29 28.8

0.1 kW 30 M HAAT, 735 M COR

Prot.= 60 dBu, Intef.= 40 dBu



## Exhibit 13.7

### Contour Protection Studies Toward WFHC-LP - Hendersonville, NC

06-04-2015

Terrain Data: NGDC 30 SEC

FMOver Analysis

W247BV.P

WFHC-LP BLL20120611ACF

Channel = 247D  
Max ERP = 0.099 kW  
RCAMSL = 1023 M  
N. Lat. 35 36 05.0  
W. Lng. 82 39 06.0  
Protected  
60 dBu

Channel = 247L1  
Max ERP = 0.1 kW  
RCAMSL = 735 M  
N. Lat. 35 23 48.3  
W. Lng. 82 29 28.8  
Interfering  
40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
087.0	000.0990	0332.2	018.9	010.5	000.1000	0013.0	024.1	35.76	
088.0	000.0990	0337.1	019.0	011.0	000.1000	0012.5	023.8	35.97	
089.0	000.0990	0341.9	019.2	011.5	000.1000	0010.6	023.5	36.18	
090.0	000.0990	0346.8	019.3	011.9	000.1000	0008.6	023.2	36.39	
091.0	000.0990	0351.4	019.4	012.4	000.1000	0008.4	022.9	36.62	
092.0	000.0990	0355.5	019.5	012.8	000.1000	0009.5	022.6	36.85	
093.0	000.0990	0359.6	019.6	013.2	000.1000	0011.5	022.3	37.08	
094.0	000.0990	0363.7	019.7	013.6	000.1000	0014.3	022.0	37.32	
095.0	000.0990	0367.1	019.8	014.0	000.1000	0017.7	021.6	37.57	
096.0	000.0990	0369.6	019.9	014.3	000.1000	0020.6	021.3	37.82	
097.0	000.0990	0371.9	019.9	014.6	000.1000	0023.5	021.0	38.08	
098.0	000.0990	0374.5	020.0	014.9	000.1000	0026.5	020.6	38.35	
099.0	000.0990	0377.4	020.1	015.2	000.1000	0029.4	020.3	38.61	
100.0	000.0990	0380.8	020.2	015.6	000.1000	0032.4	020.0	39.49	
101.0	000.0990	0383.1	020.2	015.8	000.1000	0034.6	019.6	40.30*	0.37
102.0	000.0990	0384.2	020.2	016.0	000.1000	0035.9	019.3	40.89*	1.11
103.0	000.0990	0384.4	020.2	016.1	000.1000	0036.5	018.9	41.34*	1.66
104.0	000.0990	0383.9	020.2	016.1	000.1000	0036.6	018.6	41.64*	2.02
105.0	000.0990	0383.9	020.2	016.1	000.1000	0036.8	018.2	41.99*	2.45
106.0	000.0990	0384.1	020.2	016.1	000.1000	0037.0	017.9	42.33*	2.85
107.0	000.0990	0384.0	020.2	016.1	000.1000	0036.9	017.5	42.59*	3.16
108.0	000.0990	0384.0	020.2	016.1	000.1000	0036.6	017.1	42.84*	3.44
109.0	000.0990	0384.0	020.2	016.0	000.1000	0036.2	016.8	43.04*	3.68
110.0	000.0990	0384.2	020.2	016.0	000.1000	0035.8	016.4	43.23*	3.90
111.0	000.0990	0383.9	020.2	015.8	000.1000	0034.7	016.1	43.27*	3.93
112.0	000.0990	0382.5	020.2	015.6	000.1000	0032.5	015.7	43.02*	3.61
113.0	000.0990	0380.1	020.1	015.2	000.1000	0029.2	015.4	42.67*	3.18
114.0	000.0990	0377.7	020.1	014.8	000.1000	0025.2	015.1	42.97*	3.51
115.0	000.0990	0375.8	020.0	014.3	000.1000	0020.9	014.7	43.32*	3.85
116.0	000.0990	0373.3	020.0	013.8	000.1000	0015.8	014.4	43.71*	4.18
117.0	000.0990	0370.1	019.9	013.2	000.1000	0011.3	014.1	44.10*	4.50
118.0	000.0990	0366.5	019.8	012.5	000.1000	0008.5	013.8	44.50*	4.81
119.0	000.0990	0363.7	019.7	011.8	000.1000	0009.1	013.5	44.91*	5.12
120.0	000.0990	0360.5	019.6	011.0	000.1000	0012.4	013.2	45.32*	5.42
121.0	000.0825	0356.3	018.7	006.5	000.1000	0006.2	013.2	45.25*	5.37
122.0	000.0674	0352.6	017.7	002.0	000.1000	0003.8	013.4	44.99*	5.18

**MUNN-REESE, INC.**

Broadcast Engineering Consultants  
COLDWATER, MI 49036



**Exhibit 13.7****Contour Protection Studies Toward WFHC-LP - Hendersonville, NC**

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
123.0	000.0539	0351.7	016.6	357.7	000.1000	0006.2	013.7	44.60* 4.89
124.0	000.0418	0353.8	015.6	353.7	000.1000	0012.3	014.1	44.09* 4.49
125.0	000.0313	0357.6	014.6	350.0	000.1000	0028.7	014.6	43.48* 3.99
126.0	000.0223	0362.3	013.5	346.5	000.1000	0051.7	015.2	47.76* 9.50
127.0	000.0148	0367.6	012.3	343.1	000.1000	0060.4	016.0	48.39* 10.63
128.0	000.0089	0373.8	010.9	339.8	000.1000	0068.2	017.1	48.42* 11.14
129.0	000.0045	0380.0	009.0	336.3	000.1000	0076.1	018.6	48.01* 11.21
130.0	000.0015	0384.6	006.2	332.6	000.1000	0080.4	021.1	46.49* 9.68
131.0	000.0014	0386.8	006.1	332.2	000.1000	0081.4	021.2	46.50* 9.76
132.0	000.0013	0387.0	005.9	331.7	000.1000	0082.3	021.4	46.50* 9.83
133.0	000.0012	0386.1	005.7	331.3	000.1000	0083.2	021.5	46.49* 9.89
134.0	000.0011	0384.6	005.5	330.9	000.1000	0084.0	021.6	46.47* 9.93
135.0	000.0010	0382.5	005.3	330.5	000.1000	0085.0	021.8	46.44* 9.97
136.0	000.0009	0380.2	005.1	330.2	000.1000	0085.9	022.0	46.41* 10.00
137.0	000.0008	0378.5	004.9	329.8	000.1000	0086.8	022.2	46.37* 10.03
138.0	000.0007	0378.0	004.7	329.5	000.1000	0087.8	022.3	46.32* 10.05
139.0	000.0006	0378.3	004.5	329.2	000.1000	0088.6	022.5	46.26* 10.04
140.0	000.0006	0378.7	004.3	328.9	000.1000	0089.4	022.7	46.19* 10.01
141.0	000.0005	0378.5	004.2	328.7	000.1000	0090.0	022.8	46.19* 10.05
142.0	000.0005	0377.6	004.1	328.5	000.1000	0090.4	022.9	46.21* 10.12
143.0	000.0005	0377.2	004.1	328.3	000.1000	0090.8	022.9	46.22* 10.16
144.0	000.0005	0378.0	004.0	328.1	000.1000	0091.2	023.0	46.19* 10.15
145.0	000.0005	0379.2	004.0	327.9	000.1000	0091.5	023.0	46.20* 10.18
146.0	000.0004	0380.0	003.9	327.8	000.1000	0091.8	023.1	46.16* 10.15
147.0	000.0004	0379.9	003.8	327.6	000.1000	0092.0	023.2	46.12* 10.12
148.0	000.0004	0379.0	003.7	327.4	000.1000	0092.3	023.3	46.11* 10.12
149.0	000.0004	0378.0	003.6	327.3	000.1000	0092.5	023.4	46.05* 10.05
150.0	000.0004	0377.5	003.6	327.1	000.1000	0092.6	023.4	46.03* 10.03
151.0	000.0004	0377.3	003.8	326.9	000.1000	0092.8	023.2	46.19* 10.26
152.0	000.0005	0377.5	004.0	326.7	000.1000	0093.0	023.0	46.34* 10.49
153.0	000.0005	0377.3	004.1	326.5	000.1000	0093.2	022.9	46.49* 10.71
154.0	000.0006	0376.4	004.3	326.3	000.1000	0093.5	022.7	46.64* 10.92
155.0	000.0006	0373.9	004.5	326.0	000.1000	0093.8	022.6	46.79* 11.14
156.0	000.0007	0369.5	004.6	325.7	000.1000	0094.2	022.4	46.94* 11.36
157.0	000.0008	0362.4	004.8	325.5	000.1000	0094.6	022.3	47.07* 11.57
158.0	000.0008	0352.2	004.9	325.2	000.1000	0094.9	022.2	47.18* 11.74
159.0	000.0009	0342.1	005.0	324.9	000.1000	0095.3	022.1	47.27* 11.89
160.0	000.0010	0335.9	005.1	324.6	000.1000	0095.6	022.0	47.38* 12.05
161.0	000.0012	0335.3	005.5	324.1	000.1000	0095.9	021.7	47.66* 12.44
162.0	000.0014	0336.2	005.8	323.6	000.1000	0095.7	021.4	47.88* 12.71
163.0	000.0017	0334.8	006.2	323.0	000.1000	0095.1	021.1	48.03* 12.85
164.0	000.0019	0330.0	006.5	322.5	000.1000	0094.0	020.9	48.10* 12.86
165.0	000.0022	0323.6	006.7	321.9	000.1000	0092.6	020.7	48.12* 12.76
166.0	000.0025	0315.7	006.9	321.3	000.1000	0091.1	020.5	48.09* 12.59
167.0	000.0029	0309.1	007.2	320.8	000.1000	0089.4	020.4	48.03* 12.38
168.0	000.0032	0306.5	007.4	320.1	000.1000	0087.3	020.2	47.94* 12.07
169.0	000.0036	0305.6	007.6	319.5	000.1000	0085.0	020.1	47.81* 11.70
170.0	000.0040	0303.7	007.9	318.8	000.1000	0082.2	020.0	47.61* 11.22
171.0	000.0078	0301.4	009.5	315.8	000.1000	0074.9	018.7	47.85* 10.93
172.0	000.0128	0299.0	010.8	312.9	000.1000	0070.7	017.8	48.14* 10.98
173.0	000.0192	0295.2	011.8	310.2	000.1000	0056.4	017.1	46.89* 8.71

## Exhibit 13.7

### Contour Protection Studies Toward WFHC-LP - Hendersonville, NC

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
174.0	000.0268	0289.7	012.7	307.6	000.1000	0052.3	016.6	46.61* 8.22
175.0	000.0356	0287.7	013.5	304.8	000.1000	0053.4	016.2	47.14* 8.87
176.0	000.0458	0289.8	014.4	301.7	000.1000	0042.9	015.9	45.38* 6.52
177.0	000.0572	0292.2	015.3	298.5	000.1000	0024.7	015.6	42.49* 2.97
178.0	000.0699	0295.2	016.3	295.0	000.1000	-0014.3	015.4	42.67* 3.18
179.0	000.0838	0298.1	017.1	291.5	000.1000	-0028.4	015.3	42.77* 3.29
180.0	000.0990	0289.5	017.6	289.5	000.1000	-0010.7	015.4	42.67* 3.18
181.0	000.0990	0277.0	017.2	290.5	000.1000	-0020.0	015.8	42.31* 2.75
182.0	000.0990	0264.6	016.8	291.6	000.1000	-0028.8	016.2	41.94* 2.33
183.0	000.0990	0249.4	016.2	293.0	000.1000	-0031.1	016.7	41.56* 1.87
184.0	000.0990	0237.2	015.8	294.1	000.1000	-0024.3	017.1	41.21* 1.46
185.0	000.0990	0225.2	015.4	295.1	000.1000	-0013.4	017.5	40.88* 1.06
186.0	000.0990	0225.4	015.4	294.8	000.1000	-0016.9	017.8	40.67* 0.81
187.0	000.0990	0233.4	015.7	293.7	000.1000	-0027.8	017.9	40.53* 0.64
188.0	000.0990	0244.2	016.1	292.3	000.1000	-0031.4	018.1	40.39* 0.47
189.0	000.0990	0257.3	016.5	290.6	000.1000	-0021.0	018.3	40.25* 0.30
190.0	000.0990	0271.6	017.0	288.9	000.1000	-0007.2	018.5	40.08* 0.10
191.0	000.0990	0283.3	017.4	287.6	000.1000	-0000.3	018.7	39.88
192.0	000.0990	0285.2	017.5	287.3	000.1000	0001.0	019.0	39.64
193.0	000.0990	0281.5	017.4	287.6	000.1000	-0000.3	019.3	39.39
194.0	000.0990	0276.8	017.2	288.0	000.1000	-0002.4	019.6	39.13
195.0	000.0990	0273.7	017.1	288.3	000.1000	-0003.8	020.0	38.89
196.0	000.0990	0272.1	017.1	288.4	000.1000	-0004.3	020.3	38.65
197.0	000.0990	0274.3	017.1	288.1	000.1000	-0003.1	020.5	38.42
198.0	000.0990	0279.1	017.3	287.7	000.1000	-0000.7	020.8	38.19
199.0	000.0990	0283.5	017.4	287.3	000.1000	0001.1	021.2	37.95
200.0	000.0990	0287.6	017.6	287.0	000.1000	0002.4	021.5	37.71
201.0	000.0990	0294.8	017.8	286.4	000.1000	0004.0	021.8	37.46
202.0	000.0990	0305.5	018.1	285.6	000.1000	0005.7	022.1	37.20
203.0	000.0990	0315.1	018.4	285.0	000.1000	0007.6	022.5	36.94
204.0	000.0990	0319.8	018.6	284.8	000.1000	0008.2	022.8	36.69
205.0	000.0990	0321.9	018.6	284.8	000.1000	0008.2	023.2	36.45
206.0	000.0990	0322.3	018.6	284.9	000.1000	0007.9	023.5	36.22



## Exhibit 13.7

### Contour Protection Studies Toward WFHC-LP - Hendersonville, NC

06-04-2015

Terrain Data: NGDC 30 SEC

FMOVer Analysis

WFHC-LP BLL20120611ACF

W247BV.P

Channel = 247L1

Max ERP = 0.1 kW

RCAMSL = 735 M

N. Lat. 35 23 48.3

W. Lng. 82 29 28.8

Protected

60 dBu

Channel = 247D

Max ERP = 0.099 kW

RCAMSL = 1023 M

N. Lat. 35 36 05.0

W. Lng. 82 39 06.0

Interfering

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
268.0	000.1000	0024.7	005.6	158.8	000.0009	0343.8	024.6	36.15	
269.0	000.1000	0032.3	005.8	159.1	000.0009	0340.8	024.5	36.31	
270.0	000.1000	0040.1	006.5	160.5	000.0011	0335.1	024.1	37.08	
271.0	000.1000	0048.0	007.1	161.8	000.0014	0336.1	023.8	38.38	
272.0	000.1000	0054.0	007.6	162.8	000.0016	0335.5	023.5	39.24	
273.0	000.1000	0054.4	007.6	162.7	000.0016	0335.6	023.4	39.31	
274.0	000.1000	0053.5	007.5	162.4	000.0015	0336.0	023.3	39.21	
275.0	000.1000	0052.2	007.4	162.1	000.0014	0336.2	023.2	39.03	
276.0	000.1000	0046.8	007.0	161.0	000.0012	0335.4	023.3	38.15	
277.0	000.1000	0041.3	006.6	159.9	000.0010	0336.2	023.4	37.25	
278.0	000.1000	0037.5	006.2	159.1	000.0009	0340.9	023.4	37.06	
279.0	000.1000	0034.0	006.0	158.4	000.0009	0348.1	023.5	36.94	
280.0	000.1000	0030.3	005.7	157.6	000.0008	0356.1	023.5	36.82	
281.0	000.1000	0026.2	005.6	157.5	000.0008	0358.1	023.5	36.85	
282.0	000.1000	0019.5	005.6	157.3	000.0008	0359.5	023.4	36.89	
283.0	000.1000	0013.4	005.6	157.2	000.0008	0360.8	023.3	36.93	
284.0	000.1000	0010.2	005.6	157.0	000.0008	0362.1	023.2	36.96	
285.0	000.1000	0007.5	005.6	156.9	000.0008	0363.4	023.1	36.99	
286.0	000.1000	0004.8	005.6	156.7	000.0007	0364.6	023.1	37.02	
287.0	000.1000	0002.2	005.6	156.6	000.0007	0365.7	023.0	37.04	
288.0	000.1000	-0002.5	005.6	156.4	000.0007	0366.8	022.9	37.06	
289.0	000.1000	-0007.7	005.6	156.3	000.0007	0367.9	022.8	37.08	
290.0	000.1000	-0015.2	005.6	156.1	000.0007	0369.0	022.8	37.09	
291.0	000.1000	-0024.3	005.6	155.9	000.0007	0369.9	022.7	37.09	
292.0	000.1000	-0030.7	005.6	155.7	000.0007	0370.9	022.6	37.09	
293.0	000.1000	-0031.2	005.6	155.6	000.0007	0371.7	022.6	37.09	
294.0	000.1000	-0025.1	005.6	155.4	000.0007	0372.5	022.5	37.08	
295.0	000.1000	-0014.7	005.6	155.2	000.0006	0373.3	022.4	37.06	
296.0	000.1000	-0002.6	005.6	155.0	000.0006	0373.9	022.4	37.04	
297.0	000.1000	0009.2	005.6	154.8	000.0006	0374.6	022.3	37.02	
298.0	000.1000	0020.0	005.6	154.6	000.0006	0375.2	022.3	36.99	
299.0	000.1000	0028.7	005.6	154.4	000.0006	0375.7	022.2	36.96	
300.0	000.1000	0034.7	006.0	154.7	000.0006	0374.8	021.8	37.37	

**Exhibit 13.7****Contour Protection Studies Toward WFHC-LP - Hendersonville, NC**

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
301.0	000.1000	0039.5	006.4	155.1	000.0006	0373.6	021.4	37.79
302.0	000.1000	0044.1	006.8	155.4	000.0007	0372.4	021.1	38.18
303.0	000.1000	0048.9	007.2	155.7	000.0007	0371.2	020.7	38.56
304.0	000.1000	0052.4	007.4	155.8	000.0007	0370.6	020.4	38.83
305.0	000.1000	0053.5	007.5	155.6	000.0007	0371.6	020.3	38.87
306.0	000.1000	0053.4	007.5	155.3	000.0006	0373.0	020.2	38.81
307.0	000.1000	0052.6	007.4	154.9	000.0006	0374.4	020.2	38.69
308.0	000.1000	0052.2	007.4	154.5	000.0006	0375.4	020.1	38.58
309.0	000.1000	0052.9	007.5	154.2	000.0006	0376.0	020.0	38.55
310.0	000.1000	0055.7	007.7	154.1	000.0006	0376.2	019.8	38.72
311.0	000.1000	0060.8	008.0	154.2	000.0006	0376.1	019.4	39.03
312.0	000.1000	0066.7	008.4	154.2	000.0006	0376.0	019.0	39.38
313.0	000.1000	0071.1	008.7	154.1	000.0006	0376.2	018.7	39.60
314.0	000.1000	0073.4	008.9	153.8	000.0006	0376.6	018.5	39.63
315.0	000.1000	0074.5	008.9	153.5	000.0005	0377.0	018.4	39.55
316.0	000.1000	0075.0	009.0	153.0	000.0005	0377.3	018.3	39.42
317.0	000.1000	0076.2	009.0	152.6	000.0005	0377.4	018.2	39.31
318.0	000.1000	0078.9	009.2	152.3	000.0005	0377.5	018.0	39.30
319.0	000.1000	0082.9	009.4	151.9	000.0005	0377.4	017.7	39.34
320.0	000.1000	0086.9	009.6	151.6	000.0004	0377.4	017.5	39.35
321.0	000.1000	0090.2	009.8	151.1	000.0004	0377.3	017.3	39.29
322.0	000.1000	0093.0	010.0	150.6	000.0004	0377.4	017.1	39.16
323.0	000.1000	0095.1	010.1	150.1	000.0004	0377.5	017.0	38.97
324.0	000.1000	0095.9	010.1	149.5	000.0004	0377.6	016.9	39.04
325.0	000.1000	0095.1	010.1	148.9	000.0004	0378.1	016.9	39.13
326.0	000.1000	0093.8	010.0	148.3	000.0004	0378.7	017.0	39.27
327.0	000.1000	0092.7	009.9	147.7	000.0004	0379.4	017.0	39.36
328.0	000.1000	0091.4	009.9	147.1	000.0004	0379.8	017.1	39.40
329.0	000.1000	0089.2	009.8	146.6	000.0004	0380.0	017.2	39.43
330.0	000.1000	0086.3	009.6	146.0	000.0004	0380.0	017.4	39.44
331.0	000.1000	0083.9	009.5	145.5	000.0004	0379.7	017.5	39.44
332.0	000.1000	0081.7	009.3	145.1	000.0005	0379.2	017.7	39.45
333.0	000.1000	0079.5	009.2	144.6	000.0005	0378.7	017.8	39.38
334.0	000.1000	0077.5	009.1	144.1	000.0005	0378.1	018.0	39.30
335.0	000.1000	0076.4	009.0	143.7	000.0005	0377.6	018.1	39.31
336.0	000.1000	0076.1	009.0	143.2	000.0005	0377.3	018.1	39.38
337.0	000.1000	0075.6	009.0	142.7	000.0005	0377.2	018.2	39.41
338.0	000.1000	0073.6	008.9	142.4	000.0005	0377.3	018.3	39.33
339.0	000.1000	0070.6	008.7	142.1	000.0005	0377.6	018.6	39.19
340.0	000.1000	0067.6	008.5	141.8	000.0005	0377.8	018.8	39.04
341.0	000.1000	0064.9	008.3	141.6	000.0005	0378.0	019.0	38.91
342.0	000.1000	0062.7	008.2	141.3	000.0005	0378.2	019.2	38.80
343.0	000.1000	0060.6	008.0	141.1	000.0005	0378.4	019.4	38.69
344.0	000.1000	0058.4	007.9	140.9	000.0005	0378.6	019.6	38.58
345.0	000.1000	0056.0	007.7	140.7	000.0005	0378.7	019.8	38.45
346.0	000.1000	0053.3	007.5	140.6	000.0005	0378.7	020.0	38.29
347.0	000.1000	0049.4	007.2	140.6	000.0005	0378.7	020.3	38.02
348.0	000.1000	0043.2	006.7	141.0	000.0005	0378.5	020.8	37.56
349.0	000.1000	0036.0	006.1	141.4	000.0005	0378.2	021.4	37.05
350.0	000.1000	0028.5	005.6	141.8	000.0005	0377.8	021.9	36.63
351.0	000.1000	0021.3	005.6	141.5	000.0005	0378.0	021.9	36.63



**Exhibit 13.7****Contour Protection Studies Toward WFHC-LP - Hendersonville, NC**

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
352.0	000.1000	0015.0	005.6	141.3	000.0005	0378.2	022.0	36.62
353.0	000.1000	0012.4	005.6	141.1	000.0005	0378.4	022.0	36.61
354.0	000.1000	0012.5	005.6	140.9	000.0005	0378.6	022.1	36.62
355.0	000.1000	0011.2	005.6	140.7	000.0005	0378.7	022.1	36.63
356.0	000.1000	0008.2	005.6	140.5	000.0005	0378.7	022.2	36.64
357.0	000.1000	0004.6	005.6	140.3	000.0005	0378.8	022.3	36.64
358.0	000.1000	0006.8	005.6	140.1	000.0006	0378.8	022.3	36.64
359.0	000.1000	0008.9	005.6	139.9	000.0006	0378.7	022.4	36.69
000.0	000.1000	0010.0	005.6	139.7	000.0006	0378.6	022.4	36.75
001.0	000.1000	0006.9	005.6	139.5	000.0006	0378.5	022.5	36.81
002.0	000.1000	0003.6	005.6	139.3	000.0006	0378.5	022.6	36.86
003.0	000.1000	-0002.0	005.6	139.1	000.0006	0378.4	022.6	36.91
004.0	000.1000	-0003.0	005.6	138.9	000.0006	0378.3	022.7	36.95
005.0	000.1000	0002.1	005.6	138.8	000.0007	0378.2	022.8	36.99
006.0	000.1000	0006.0	005.6	138.6	000.0007	0378.1	022.8	37.03
007.0	000.1000	0006.0	005.6	138.4	000.0007	0378.0	022.9	37.06
008.0	000.1000	0005.2	005.6	138.3	000.0007	0378.0	023.0	37.08
009.0	000.1000	0007.5	005.6	138.1	000.0007	0378.0	023.1	37.11
010.0	000.1000	0012.4	005.6	138.0	000.0007	0378.0	023.1	37.13
011.0	000.1000	0012.4	005.6	137.8	000.0007	0378.0	023.2	37.15
012.0	000.1000	0008.4	005.6	137.7	000.0007	0378.1	023.3	37.16
013.0	000.1000	0010.3	005.6	137.5	000.0008	0378.1	023.4	37.18
014.0	000.1000	0017.5	005.6	137.4	000.0008	0378.2	023.5	37.18
015.0	000.1000	0027.5	005.6	137.3	000.0008	0378.3	023.5	37.19
016.0	000.1000	0036.1	006.1	136.1	000.0009	0380.0	023.4	37.92
017.0	000.1000	0043.3	006.7	134.7	000.0010	0383.1	023.2	38.74
018.0	000.1000	0049.3	007.2	133.5	000.0011	0385.4	023.1	39.37
019.0	000.1000	0052.9	007.5	132.8	000.0012	0386.4	023.1	39.68
020.0	000.1000	0053.7	007.5	132.5	000.0013	0386.7	023.2	39.72
021.0	000.1000	0053.2	007.5	132.5	000.0013	0386.7	023.3	39.64
022.0	000.1000	0051.4	007.4	132.7	000.0012	0386.5	023.5	39.44
023.0	000.1000	0047.8	007.1	133.2	000.0012	0385.8	023.7	39.06
024.0	000.1000	0044.3	006.8	133.7	000.0011	0385.1	023.9	38.67
025.0	000.1000	0043.3	006.7	133.8	000.0011	0384.9	024.1	38.53
026.0	000.1000	0044.6	006.8	133.5	000.0011	0385.4	024.1	38.63
027.0	000.1000	0046.0	006.9	133.1	000.0012	0385.9	024.2	38.71

**Exhibit 13.8**  
**§74.1204(d) 2nd Adjacent Channel**  
**Given Interference Waiver Request**  
**W249AR - Asheville, NC (CH249D)**



*W249AR - 88.60 dBμ F(50:50) Contour*

**W249AR**  
 Asheville, NC  
 BLFT20000811AAU  
 Facility ID: 66403  
 Latitude: 35-35-23 N  
 Longitude: 082-40-26 W  
 ERP: 0.10 kW  
 Channel: 249D  
 Frequency: 97.7 MHz  
 AMSL Height: 1089.0 m  
 Horiz. Pattern: Omni

**W247BV.P**  
 Asheville, NC  
 Proposed Operation  
 Facility ID: 141108  
 Latitude: 35-36-05 N  
 Longitude: 082-39-06 W  
 ERP: 0.099 kW  
 Channel: 247D  
 Frequency: 97.3 MHz  
 AMSL Height: 1023.0 m  
 Horiz. Pattern: Directional

**W249AR**



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

Terrain  
 661 1070 m

Scale 1:12,000  
 0 0.17 0.33 0.5 km

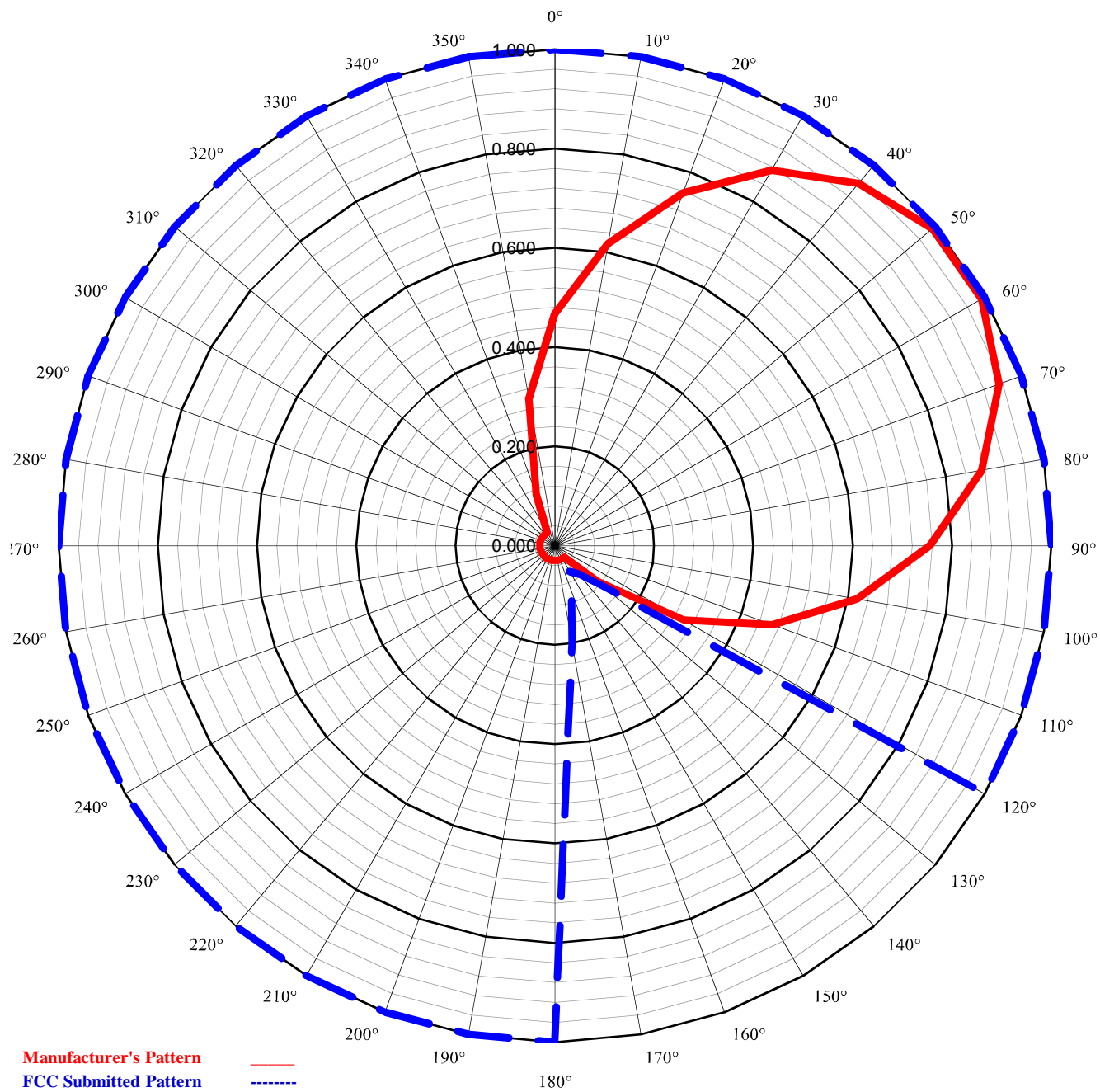
The Interference Contour corresponding to the W249AR - Asheville, NC (CH249D) Protected Contour at the proposed Translator site has been calculated to be no less than the 128.60 dBμ F(50:10) Interference Contour corresponding to the worst case W249AR 88.60 dBμ F(50:50) Protected Contour. This represents the proposed interference contour which falls wholly within the 40:1 dBu ratio. As seen on the map, there is a lack of population, housing, buildings or major roads within this 128.60 dBμ F(50:10) interference area. The applicant would like to note the existence of several dedicated transmitter buildings located within this restricted access Spivey Mountain, mountain top antenna farm complex. However, structures of this nature have been exempt as a matter of FCC Policy.



# Exhibit 13.9

## Directional Antenna Documentation

Measured Composite Pattern in Relative Field



Call Sign: W247BV

Channel: 247D

Max ERP: 0.099 kW (V)  
--- kW (H)

Antenna Make: Kathrein Scala

Model: CL-FM(Vertical Only)

Licensee: Saga Communications of North Carolina, LLC

**Munn-Reese, Inc.**  
Broadcast Engineering Consultants  
Coldwater, MI 49036

# Exhibit 13.9

## Directional Antenna Documentation

MEASURED PATTERN (from manufacturer)								SUBMITTED PATTERN (to FCC)							
Enter	Measured	Calculated				Measured	Relative	Enter	Submitted	Calculated				Submitted	Relative
Max ERP	Relative	dB		Equiv		Relative	Field	Max ERP	Relative	dB		Equiv		Relative	Field
(kW)	° True	Field	Change	Suppression	Power	Field <sup>2</sup>	RMS	(kW)	° True	Field	Change	Suppression	Power	Field <sup>2</sup>	RMS
0.099	0°	0.467	3.84	-6.61	0.022	0.22	0.468	0.099	0°	1.000	0.00	0.00	0.099	1.00	0.929
	10°	0.618	2.43	-4.18	0.038	0.38			10°	1.000	0.00	0.00	0.099	1.00	
	20°	0.756	1.75	-2.43	0.057	0.57			20°	1.000	0.00	0.00	0.099	1.00	
	30°	0.873	1.25	-1.18	0.075	0.76			30°	1.000	0.00	0.00	0.099	1.00	
	40°	0.952	0.75	-0.43	0.090	0.91			40°	1.000	0.00	0.00	0.099	1.00	
	50°	0.993	0.37	-0.06	0.098	0.99			50°	1.000	0.00	0.00	0.099	1.00	
	60°	0.993	0.00	-0.06	0.098	0.99			60°	1.000	0.00	0.00	0.099	1.00	
	70°	0.952	-0.37	-0.43	0.090	0.91			70°	1.000	0.00	0.00	0.099	1.00	
	80°	0.873	-0.75	-1.18	0.075	0.76			80°	1.000	0.00	0.00	0.099	1.00	
	90°	0.756	-1.25	-2.43	0.057	0.57			90°	1.000	0.00	0.00	0.099	1.00	
	100°	0.618	-1.75	-4.18	0.038	0.38			100°	1.000	0.00	0.00	0.099	1.00	
	110°	0.467	-2.43	-6.61	0.022	0.22			110°	1.000	0.00	0.00	0.099	1.00	
	120°	0.300	-3.84	-10.46	0.009	0.09			120°	1.000	0.00	0.00	0.099	1.00	
	130°	0.110	-8.71	-19.17	0.001	0.01			130°	0.125	-18.06	-18.06	0.002	0.02	
	140°	0.030	-11.29	-30.46	0.000	0.00			140°	0.075	-4.44	-22.50	0.001	0.01	
	150°	0.030	0.00	-30.46	0.000	0.00			150°	0.060	-1.94	-24.44	0.000	0.00	
	160°	0.030	0.00	-30.46	0.000	0.00			160°	0.100	4.44	-20.00	0.001	0.01	
	170°	0.030	0.00	-30.46	0.000	0.00			170°	0.200	6.02	-13.98	0.004	0.04	
	180°	0.030	0.00	-30.46	0.000	0.00			180°	1.000	13.98	0.00	0.099	1.00	
	190°	0.030	0.00	-30.46	0.000	0.00			190°	1.000	0.00	0.00	0.099	1.00	
	200°	0.030	0.00	-30.46	0.000	0.00			200°	1.000	0.00	0.00	0.099	1.00	
	210°	0.030	0.00	-30.46	0.000	0.00			210°	1.000	0.00	0.00	0.099	1.00	
	220°	0.030	0.00	-30.46	0.000	0.00			220°	1.000	0.00	0.00	0.099	1.00	
	230°	0.030	0.00	-30.46	0.000	0.00			230°	1.000	0.00	0.00	0.099	1.00	
	240°	0.030	0.00	-30.46	0.000	0.00			240°	1.000	0.00	0.00	0.099	1.00	
	250°	0.030	0.00	-30.46	0.000	0.00			250°	1.000	0.00	0.00	0.099	1.00	
	260°	0.030	0.00	-30.46	0.000	0.00			260°	1.000	0.00	0.00	0.099	1.00	
	270°	0.030	0.00	-30.46	0.000	0.00			270°	1.000	0.00	0.00	0.099	1.00	
	280°	0.030	0.00	-30.46	0.000	0.00			280°	1.000	0.00	0.00	0.099	1.00	
	290°	0.030	0.00	-30.46	0.000	0.00			290°	1.000	0.00	0.00	0.099	1.00	
	300°	0.030	0.00	-30.46	0.000	0.00			300°	1.000	0.00	0.00	0.099	1.00	
	310°	0.030	0.00	-30.46	0.000	0.00			310°	1.000	0.00	0.00	0.099	1.00	
	320°	0.030	0.00	-30.46	0.000	0.00			320°	1.000	0.00	0.00	0.099	1.00	
	330°	0.030	0.00	-30.46	0.000	0.00			330°	1.000	0.00	0.00	0.099	1.00	
	340°	0.110	11.29	-19.17	0.001	0.01			340°	1.000	0.00	0.00	0.099	1.00	
	350°	0.300	8.71	-10.46	0.009	0.09			350°	1.000	0.00	0.00	0.099	1.00	

# Exhibit 13.9 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)



## 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:

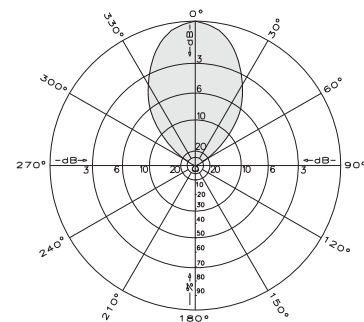
Frequency range	88–108 MHz (broadband)
Gain	7 dBd
Impedance	50 or 75 ohms
VSWR	< 1.5:1
Polarization	Horizontal or vertical
Front-to-back ratio	>25 dB
Maximum input power	250 watts, type "N" 75 ohm connector 500 watts, type "N" 50 ohm connector
Azimuth pattern	52 degrees (half-power) horizontal polarization
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	
<b>CL-FM/HCM</b>	5.31 ft <sup>2</sup> (0.494 m <sup>2</sup> )
<b>CL-FM/HRM</b>	5.86 ft <sup>2</sup> (0.544 m <sup>2</sup> )
<b>CL-FM/VRM</b>	5.86 ft <sup>2</sup> (0.544 m <sup>2</sup> )
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.
<b>CL-FM/HCM</b>	Horizontal polarization center-mount
<b>CL-FM/HRM</b>	Horizontal polarization rear-mount
<b>CL-FM/VRM</b>	Vertical polarization rear-mount

See reverse for order information.

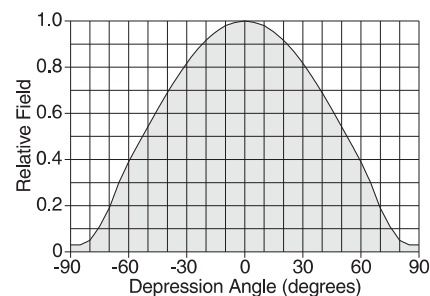
\* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.



10492-D



Azimuth pattern (E-plane)



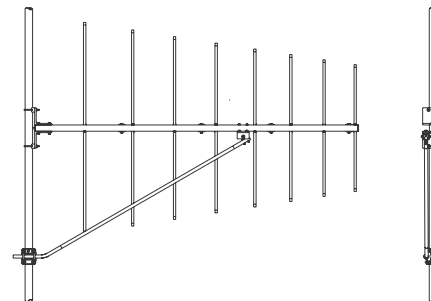
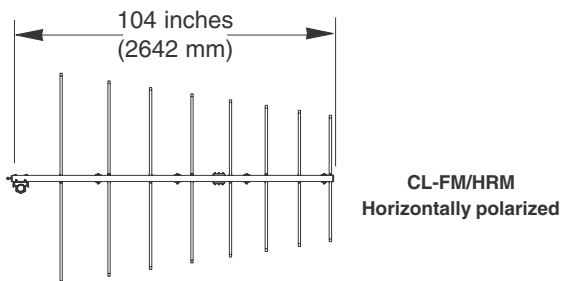
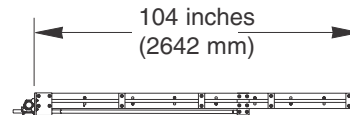
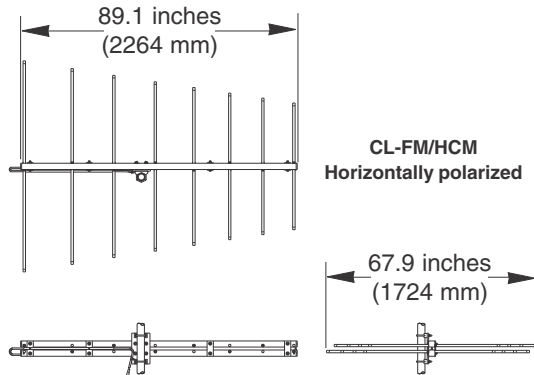
Elevation pattern (H-plane)



# Exhibit 13.9 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)

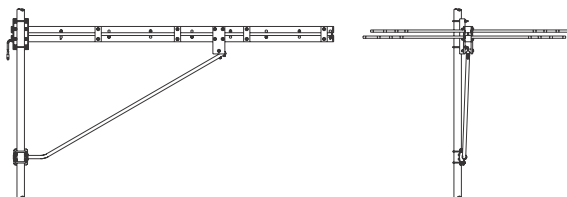


## CL-FM FM LOG-PERIODIC ANTENNA 7 dBd gain 88–108 MHz



**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:

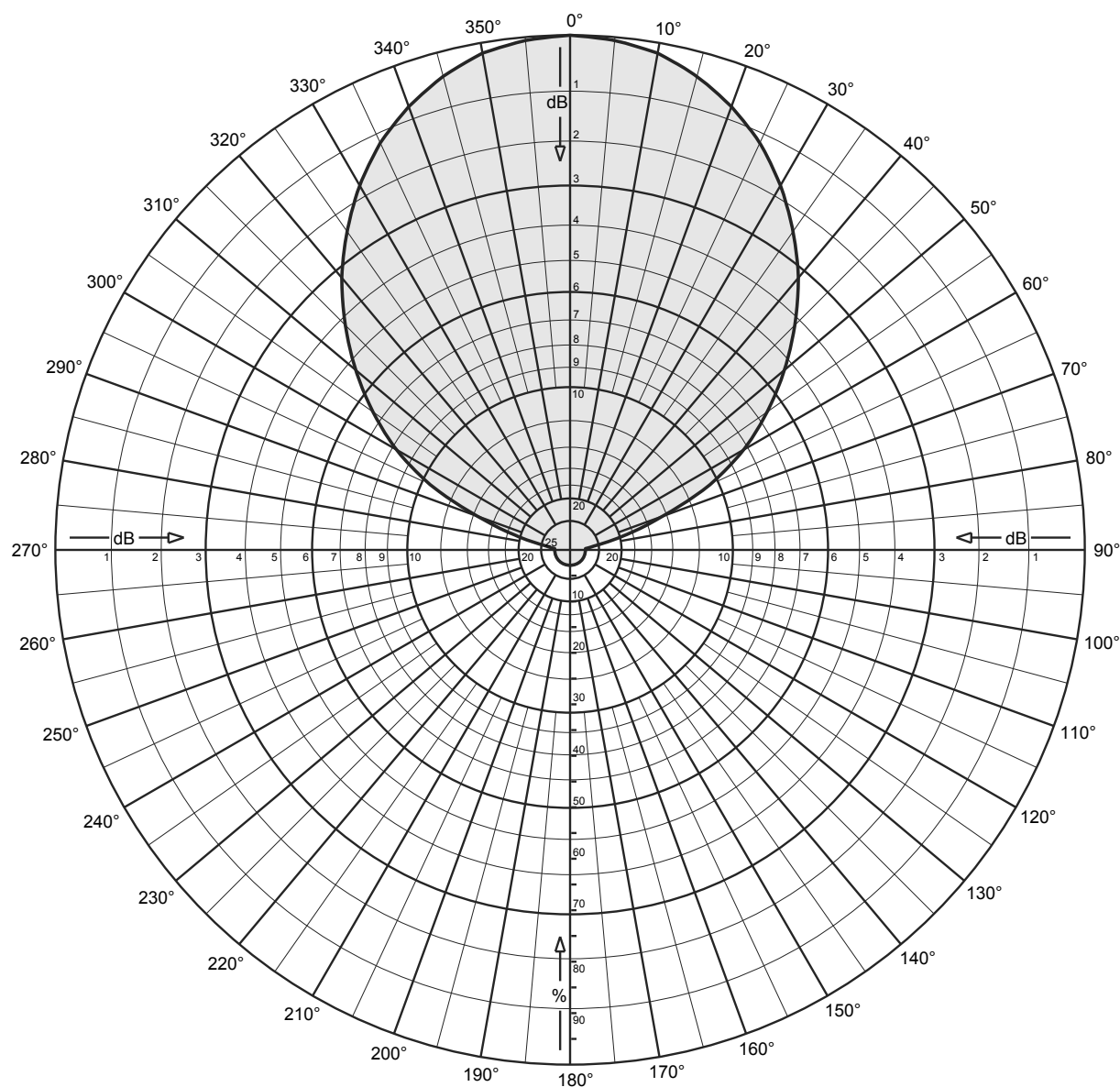
Model	Description
CL-FM/HCM/50N	Antenna with 50Ω N connector Horizontal polarization center-mount
CL-FM/HCM/75N	Antenna with 75Ω N connector Horizontal polarization center-mount
CL-FM/HRM/50N	Antenna with 50Ω N connector Horizontal polarization rear-mount

### 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

**Exhibit 13.9 - Raw Manufacturer's  
Directional Antenna Pattern Data  
(Actual Pattern Rotated to 055.0°T)**



CL-FM

FM

Maximum gain: 7.0 dBd

Vertical polarization Component

Horizontal radiation pattern

0 degree electrical downtilt



# Exhibit 13.9 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)



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



# Exhibit 13.9 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)



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 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)



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 - Raw Manufacturer's Directional Antenna Pattern Data (Actual Pattern Rotated to 055.0°T)



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