Technical Report Supporting a Form 349 Minor Construction Permit Modification Application

Pursuant to 47 C.F.R. Section 74:

for

W237BF.C - Methuen, MA
BPFT-20160729AGM
(Facility ID: 139956)

THIS FORM 349 FILING IS
BEING FILED AS A
FOOTNOTE 22 - 250 MILE
(POST) 2016 WINDOW APPLICATION

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as a

Commercial, Fill-In
AM Translator for
WCCM(AM) - Methuen, MA

June, 2017

Asher Broadcast Consulting, LLC
justinasher@consultant.com
1(202)875-2986

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Explanation of Technical Report 1

EXPLANATION OF PROPOSAL: This Form 349 Filing and accompanying technical report supports a Minor Construction Permit Modification Application for FM Translator authorization W237BF.C (CH287D) - Methuen, MA (Facility ID: 139956), Construction Permit File Number BPFT-20160729AGM. This Construction Permit was a "*250 Mile 2016 AM Fill-In Translator*" grant against underlying FM Translator license W237BF.L - Middlebury, VT (Facility ID: 139956), License Number BLFT-20050930BIZ. This Form 349 Filing is being filed as a "*Footnote 22 - 250 Mile (Post) 2016 Window Application*" in response to the *Revitalization of the AM Radio Service*, First Report and Order (MB Docket No. 13-249 (FCC 15-142), released October 23, 2015; subsequent *Public Notice DA 15-1215*, released October 26, 2015; final *Public Notice DA 1491*, released December 23, 2015; and the *Second Report and Order*, MD Docket No. 13-249, released February 24, 2017; see Footnote 22. Continued operation on the authorized frequency of CH287D (105.3 MHz) with the power of 0.250 kW ERP (circular polarization) is requested. A new site location and new COR of 31 meters AMSL is being proposed. This Form 349 Filing will continue to specify rebroadcast of Class D, AM Primary Station WCCM(AM) - Methuen, MA (1570 kHz); Facility ID No. 22798. The Translator will remain licensed to the community of Methuen, MA.

FACILITY COMPLIANCE SHOWINGS: A map of the proposed 60 dBµ service contour in relation to the present 60 dBµ service contour has been included in ***Exhibit 1***. The minor change proposed service area will NOT overlap a portion of the present service area as noted in the exhibit, however this is permissible under Footnote 22 of the *Second Report and Order*, MD Docket No. 13-249, released February 24, 2017. The proposed 60 dBµ contour of the Translator lies wholly inside the larger of the AM primary daytime 2.0 mV/m contour or a 25 mile radius around the AM site. The primary station service contour relationship has been plotted in ***Exhibit 2***.

The proposed facility will be located on the tower bearing Antenna Structure Registration Number 1004087. In support of this filing, a copy of the existing ASRN has been included in ***Exhibit 3***. A depiction of the tower and antenna configuration has been included in ***Exhibit 4***. Further notification to the FAA or ASR governing authorities is not required as this proposal will not increase the overall tower height.

The applicant would like to note use of the NED 03 second terrain database for all allocation, contour and HAAT showings contained herein. A copy of the proposed HAAT calculation has been included in ***Exhibit 5***.

ALLOCATION COMPLIANCE SHOWINGS: The proposed Translator remains in compliance with C.F.R. 47 Section 74.1204 toward all allocation protection concerns with the exception of WROR-FM - Framingham, MA (CH289B). A general allocation study for this proposal is found in ***Exhibit 6***.

The applicant would like to note the existence of a C.F.R. 47 Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WROR-FM - Framingham, MA (CH289B) as included in ***Exhibit 8***. At the Translator site location, protection of the worst case calculated 143.9 dBµ F(50:10) Interference Contour, corresponding to the worst case protected 103.9 dBµ F(50:50) protected contour, has been demonstrated through a downward radiation study as included herein. Full protection will be afforded the concern 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 a worst case, one bay, isotrophic antenna. Additional antenna manufacturer's data has been included in ***Exhibit 9***.

There are two additional facilities, existing or proposed, close enough to merit further study. Therefore, a supplemental contour protection study has been provided toward each facility as included in ***Exhibit(s) 7(a-b)***. It is believed sufficient clearance exists, precluding the need for additional contour protection showings.

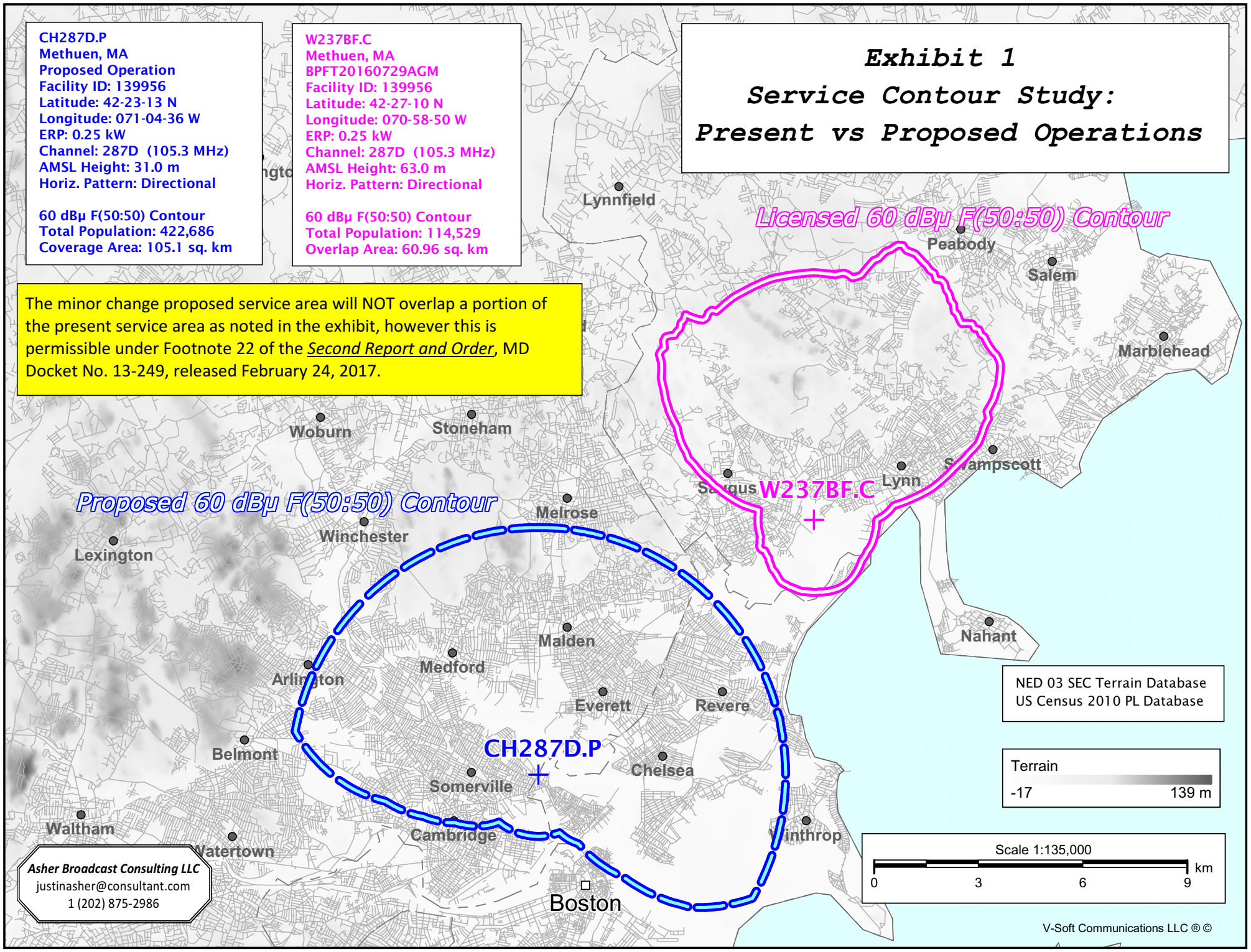
Regarding protection of international concerns, the facility is and will remain within 320 km from the common border between the United States and Canada. However full protection will be afforded all Canadian concerns as noted in ***Exhibit 6***.

ENVIRONMENTAL COMPLIANCE SHOWINGS: The proposed facility complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments as set forth under §1.1310 and/or §1.1307(b)(3) of the Commission's rules and the guidelines for RF radiation protection guidelines as set forth in OET Bulletin No. 65 (Edition 97-01), and the accompanying Supplement A, (Edition 97-01). Compliance has been demonstrated in the attached ***RF Appendix 1*** of this filing. The facility is, or will be, properly marked with signs. Entry is, or will be, restricted by means of fencing with locked doors or gates. In addition, coordination with other users of the site will be secured to reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Regarding compliance with the NEPA, Nationwide Programmatic Agreement and NHPA Section 106 for tower co-location, compliance with the Agreement is not required where no new tower construction is being proposed and the tower is not being substantially altered. Specifically, compliance is not necessary where only an antenna and feed-line are being added to an existing structure, as here. However, should the Commission determine compliance is necessary, upon notification to the applicant, the applicant will file FCC Form 621.

CERTIFICATION OF TECHNICAL CONSULTANT: *I declare, under penalty of perjury, that the contents of this report are true and accurate to the best of my knowledge and belief. I further certify I have over eighteen years of experience as a broadcast technical consultant before the Federal Communications Commission ("the FCC"); and am familiar with the Code of Federal Regulations Title 47 ("the Rules") as pertaining to this report and its contents herein. The underlying data utilized in this report was taken directly from FCC databases or indirectly through third party software vendors securing data directly from FCC databases. This firm cannot be held liable for errors or omissions resulting from the underlying data. The information contained herein is believed accurate to the date reported below.*

Justin W. Asher, Technical Consultant
June 9, 2017


CH287D.P
Methuen, MA
Proposed Operation
Facility ID: 139956
Latitude: 42-23-13 N
Longitude: 071-04-36 W
ERP: 0.25 kW
Channel: 287D (105.3 MHz)
AMSL Height: 31.0 m
Horiz. Pattern: Directional
60 dBμ F(50:50) Contour
Total Population: 422,686
Coverage Area: 105.1 sq. km
W237BF.C
Methuen, MA
BPFT20160729AGM
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: 114,529
Overlap Area: 60.96 sq. km
Exhibit 1
Service Contour Study:
Present vs Proposed Operations
The minor change proposed service area will NOT overlap a portion of the present service area as noted in the exhibit, however this is permissible under Footnote 22 of the Second Report and Order, MD Docket No. 13-249, released February 24, 2017.
Licensed 60 dBμ F(50:50) Contour
Proposed 60 dBμ F(50:50) Contour
W237BF.C
CH287D.P
Lynnfield
Peabody
Salem
Marblehead
Woburn
Stoneham
Melrose
Winchester
Lexington
Lynn
Swampscott
Nahant
Malden
Medford
Arlington
Everett
Revere
Belmont
Somerville
Chelsea
Waltham
Watertown
Cambridge
Winthrop
Boston
NED 03 SEC Terrain Database
US Census 2010 PL Database
Terrain
-17
139 m
Scale 1:135,000
0
3
6
9
km
Asher Broadcast Consulting LLC
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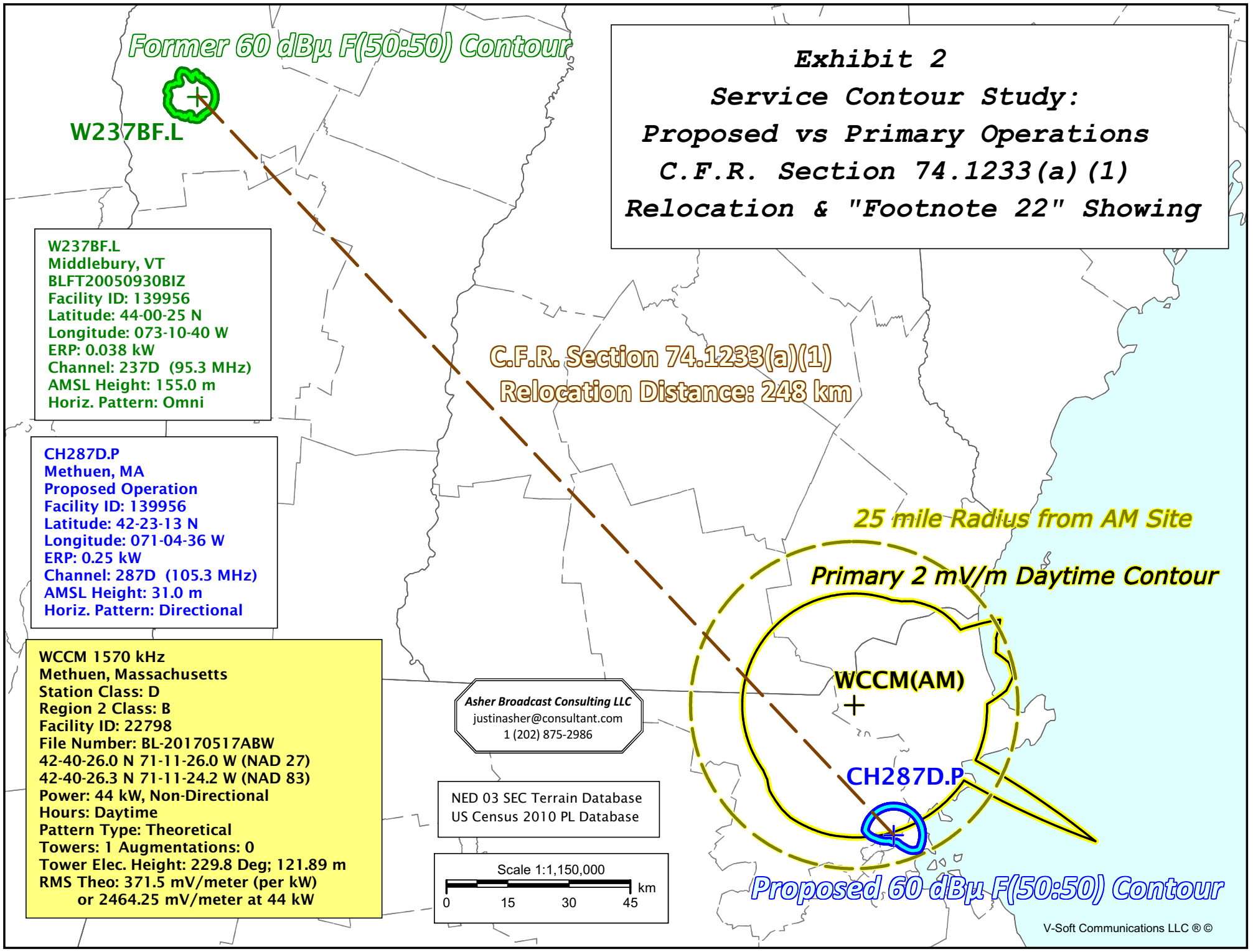
1 (202) 875-2986
V-Soft Communications LLC ® ©


Former 60 dBµ F(50:50) Contour
W237BF.L
Exhibit 2
Service Contour Study:
Proposed vs Primary Operations
C.F.R. Section 74.1233(a)(1)
Relocation & "Footnote 22" Showing
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
C.F.R. Section 74.1233(a)(1)
Relocation Distance: 248 km
CH287D.P
Methuen, MA
Proposed Operation
Facility ID: 139956
Latitude: 42-23-13 N
Longitude: 071-04-36 W
ERP: 0.25 kW
Channel: 287D (105.3 MHz)
AMSL Height: 31.0 m
Horiz. Pattern: Directional
25 mile Radius from AM Site
Primary 2 mV/m Daytime Contour
WCCM(AM)
CH287D.P
WCCM 1570 kHz
Methuen, Massachusetts
Station Class: D
Region 2 Class: B
Facility ID: 22798
File Number: BL-20170517ABW
42-40-26.0 N 71-11-26.0 W (NAD 27)
42-40-26.3 N 71-11-24.2 W (NAD 83)
Power: 44 kW, Non-Directional
Hours: Daytime
Pattern Type: Theoretical
Towers: 1 Augmentations: 0
Tower Elec. Height: 229.8 Deg; 121.89 m
RMS Theo: 371.5 mV/meter (per kW)
or 2464.25 mV/meter at 44 kW
Asher Broadcast Consulting LLC
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NED 03 SEC Terrain Database
US Census 2010 PL Database
Scale 1:1,150,000
km
0
15
30
45
Proposed 60 dBµ F(50:50) Contour
V-Soft Communications LLC ® ©

ASR Registration Search

Registration 1004087

Map Registration

Exhibit 3
Copy of Existing Antenna Structure Registration
(public record copy)

Registration Detail

Reg Number	1004087	Status	Constructed
File Number	A1042764	Constructed	09/27/1994
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type	LTOWER - Lattice Tower

Location (in NAD83 Coordinates)

Lat/Long	42-23-13.2 N 071-04-34.0 W	Address	14 Temple St.
City, State	CHARLESTOWN , MA		
Zip	02129	County	SUFFOLK
Center of AM Array		Position of Tower in Array	

Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
7.3	45.7
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
53.0	45.7

Painting and Lighting Specifications

None

FAA Notification

FAA Study	2006-ANE-925-OE	FAA Issue Date	09/14/2006

Owner & Contact Information

FRN	0004334249	Owner Entity Type	Limited Liability Company

Owner

SBC TOWER HOLDINGS LLC
Attention To: FCC Group
3300 E. Renner Rd., B3132
Richardson , TX 75082

P: (855)699-7073
F: (972)907-1131
E: FCCMW@att.com

Contact

Wilson , Leslie
Attention To: FCC Group
3300 E. Renner Rd., B3132
Richardson , TX 75082

P: (855)699-7073
F: (972)907-1131
E: FCCMW@att.com

Last Action Status

Status	Constructed	Received	07/26/2016
Purpose	Admin Update	Entered	07/26/2016
Mode	Interactive		

Related Applications

07/26/2016	A1042764 - Admin Update (AU)
02/05/2016	A0997764 - Notification (NT)
02/05/2016	A0997763 - Modification (MD)

Related applications (18)

Comments

Comments

None

History

Date	Event
07/27/2016	Registration Printed
07/26/2016	ASR Application receipt email sent: Tower email
07/26/2016	Administrative Update Received

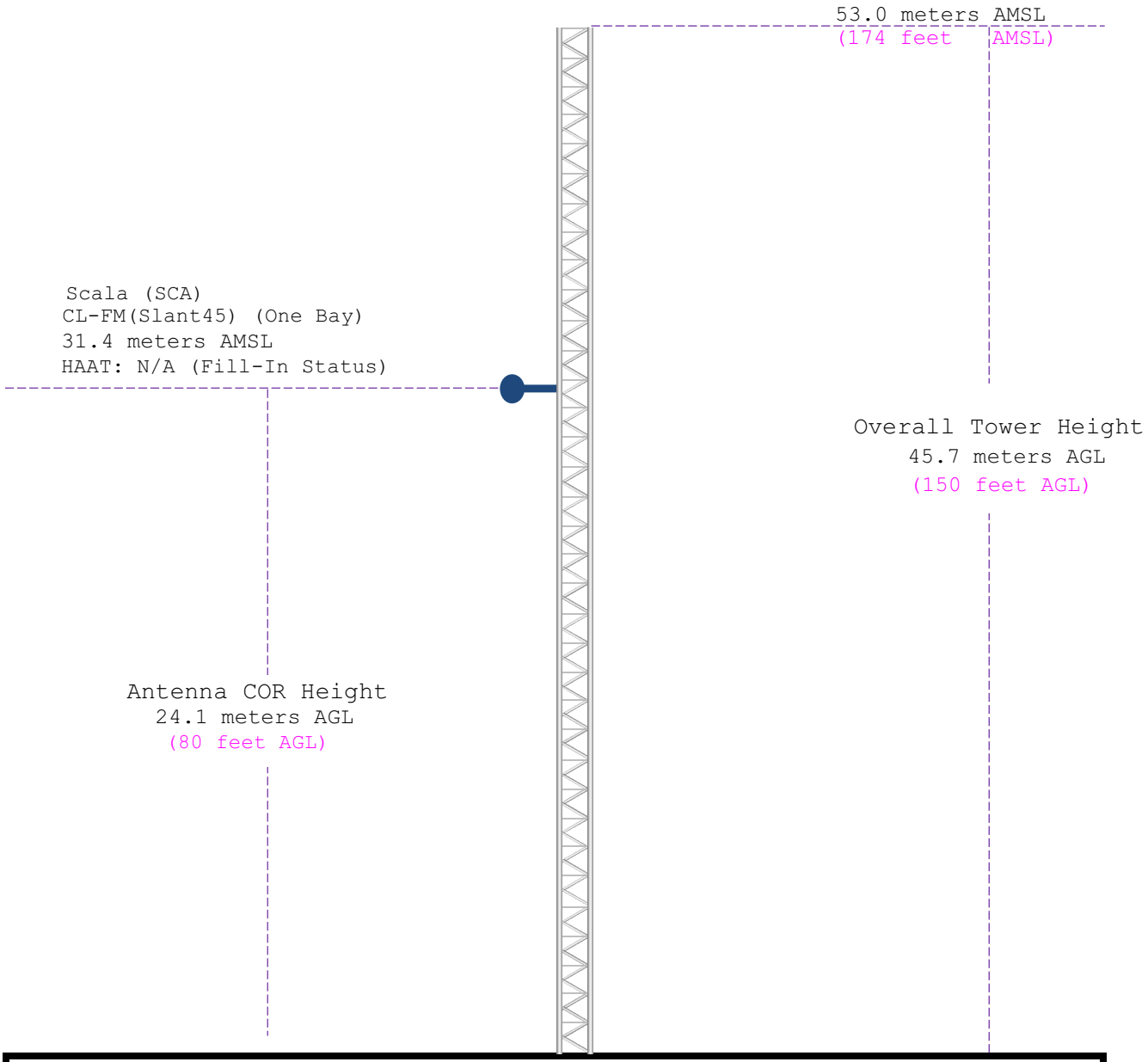
All History (45)

Automated Letters

07/27/2016	Authorization, Reference
02/06/2016	Authorization, Reference
01/31/2014	Authorization, Reference

All letters (16)

Exhibit 4
Vertical Plan of Antenna System



Ground Elevation: 7.3 meters AMSL (24 feet AMSL)

Address: 14 Temple Street
City: Charleston
County: Suffolk
State: MASS

	Latitude (D M S)	Longitude (D M S)
NAD 27 datum values:	42 23 12.85105	71 04 35.81383
NAD 83 datum values:	42 23 13.20000	71 04 34.00000

Antenna Structure Registration
1004087

Drawing Is Not To Scale

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Exhibit 5
HAAT and Miscellaneous Coordinate Information

HAAT Calculation (1927):

N. Lat. = 422313.0 W. Lng. = 710436.0
HAAT and Distance to Contour,
FCC, FM 2-10 Mi, 51 pts Method - NED 03 SEC

Azi.	AV EL	HAAT	ERP kW	dBk	Field	60-F5
000	29.6	1.4	0.2500	-6.02	1.000	7.09
030	26.9	4.1	0.2500	-6.02	1.000	7.09
060	4.3	26.7	0.2500	-6.02	1.000	7.09
090	1.7	29.3	0.2500	-6.02	1.000	7.09
120	1.1	29.9	0.2500	-6.02	1.000	7.09
150	2.1	28.9	0.0025	-26.02	0.100	2.28
180	18.2	12.8	0.0009	-30.46	0.060	1.77
210	33.1	-2.1	0.0009	-30.46	0.060	1.77
240	24.4	6.6	0.0056	-22.50	0.150	2.76
270	30.9	0.1	0.1225	-9.12	0.700	5.93
300	44.1	-13.1	0.2500	-6.02	1.000	7.09
330	31.9	-0.9	0.2500	-6.02	1.000	7.09

Ave El= 20.70 M HAAT= 10.30 M AMSL= 31 M

NAD 1983 to NAD 1927 Conversion:

	Latitude	Longitude
NAD 27 datum values:	42 23 12.85105	71 04 35.81383
NAD 83 datum values:	42 23 13.20000	71 04 34.00000

Various Coordinate Conversion Calculations (NAD 1983):

Position Type	Lat Lon
Degrees Lat Long	42.3870000°, -071.0761111°
Degrees Minutes	42°23.22000', -071°04.56667'
Degrees Minutes Seconds	42°23'13.2000", -071°04'34.0000"
UTM	19T 329103mE 4694833mN
UTM centimeter	19T 329103.68mE 4694833.59mN
MGRS	19TCG2910394833
Grid North	-1.4°
GARS	218MA26
Maidenhead	FN42LJ02UV81
GEOREF	HJDN55432322

Exhibit 6
Tabulation of Proposed Allocation

Blue Text indicates contour protection studies toward select station(s) as included in ***Exhibit(s) 7(a-b).***

Yellow Text denotes the existence of a C.F.R. 47 Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WROR-FM - Framingham, MA (CH289B) as included in ***Exhibit 8***. At the Translator site location, protection of the worst case calculated 143.9 dBµ F(50:10) Interference Contour, corresponding to the worst case protected 103.9 dBµ F(50:50) protected contour, has been demonstrated through a downward radiation study as included herein. Full protection will be afforded the concern 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 a worst case, one bay, isotrophic antenna. Additional antenna manufacturer's data has been included in **Exhibit 9.**

Costa-eagle Radio Ventures Limited Partnership

REFERENCE CH# 287D - 105.3 MHz, Pwr= 0.25 kW DA, HAAT= 10.3 M, COR= 31 M DISPLAY DATES
42 23 13.0 N. Average Protected F(50-50)= 7.09 km DATA 06-08-17
71 04 36.0 W. Standard Directional SEARCH 06-08-17

CH CALL / CITY	TYPE ANT / STATE	AZI / <--	DIST / FILE #	LAT / LNG	PWR(kW) / HAAT(M)	INT(km) / COR(M)	PRO(km) / LICENSEE	*IN* / (Overlap in km)	*OUT*
289B WROR-FM Framingham	LIC _C_ MA	186.8 6.8	4.44 BLH20000223AAP	42 20 50.0 71 04 59.0	23.000 224	5.9 247	65.8 Beasley Media Group, Llc	-3.2*<	-61.5*<
287D W237BF Methuen	CP DC_ MA	47.1 227.2	10.76 BPFT20160729AGM	42 27 10.0 70 58 50.0	0.250	5.4 63	1.7 Costa-eagle Radio Ventures	-1.7<	-14.7*<
286B WWLI Providence	LIC _CX RI	206.8 26.6	72.22 BMLH20070206ABO	41 48 24.0 71 28 13.0	50.000 152	82.1 214	68.5 Radio License Holding Cbc,	-11.7*<	0.3
233B WJMN Boston	LIC _CX MA	234.0 53.9	15.01 BLH20031201AWA	42 18 27.0 71 13 27.0	9.200 353	0.2 394	2.8 Amfm Radio Licenses, L.l.c	14.5R	0.51M
285D WRBB Boston	LIC _CN MA	192.5 12.4	5.50 BLED19831213AB	42 20 19.0 71 05 28.0	0.019 27	1.6 55	4.2 Northeastern University	2.1	1.3
287D W287BT Fitchburg	LIC _C_ MA	290.6 110.1	66.44 BLFT20100408ABZ	42 35 40.0 71 50 12.0	0.150 81	52.7 327	16.3 K-zone Media Group, Llc	6.7	26.4
287A WSHK Kittery	LIC _CN ME	15.3 195.5	90.82 BLH19921030KC	43 10 28.0 70 46 50.0	2.200 113	76.0 142	25.1 Townsquare Media Portsmout	7.7	41.9
285A WBOQ Gloucester	LIC ZCX MA	21.8 201.9	30.24 BLH20130130ACE	42 38 22.0 70 56 22.0	6.000 98	1.8 119	18.9 Westport Communications Li	21.4	10.3
284B WOCN-FM Orleans	LIC _E_ MA	127.1 307.8	110.90 BMLH19991229AAA	41 46 48.0 70 00 36.0	50.000 140	5.9 146	64.5 Cape Cod Broadcasting Lice	98.7	44.8
286L1 WBNH-LP Bedford	LIC ___ NH	330.2 149.9	71.83 BLL20160202ACF	42 56 48.0 71 30 56.0	0.100	109	55.1 Town Of Bedford, New Hamps		55.0
288A WJYY Concord	LIC _CN NH	340.8 160.5	105.17 BLH19871005KD	43 16 46.0 71 30 15.0	1.550 139	38.6 298	25.7 Wbin Media Co., Inc.	59.4	69.4
287L1 WFPC-LP Rindge	LIC ___ NH	299.0 118.3	91.45 BLL20030506AAF	42 46 52.0 72 03 26.0	0.100 18	365	65.8 Franklin Pierce College		62.1
284D W284BA Warwick	LIC _C_ RI	203.5 23.3	76.44 BLFT20140129AHS	41 45 21.6 71 26 41.8	0.099 45	0.7 83	7.9 Educational Media Foundati	74.0	68.5

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

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Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

Costa-eagle Radio Ventures Limited Partnership

FMCommander Single Allocation Study - 06-08-2017 - NED 03 SEC
CH287D.P's Overlaps (In= -11.67 km, Out= 0.32 km)

CH287D.P CH 287 D DA
Lat= 42 23 13.0, Lng= 71 04 36.0
0.25 kW 10.3 m HAAT, 31 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

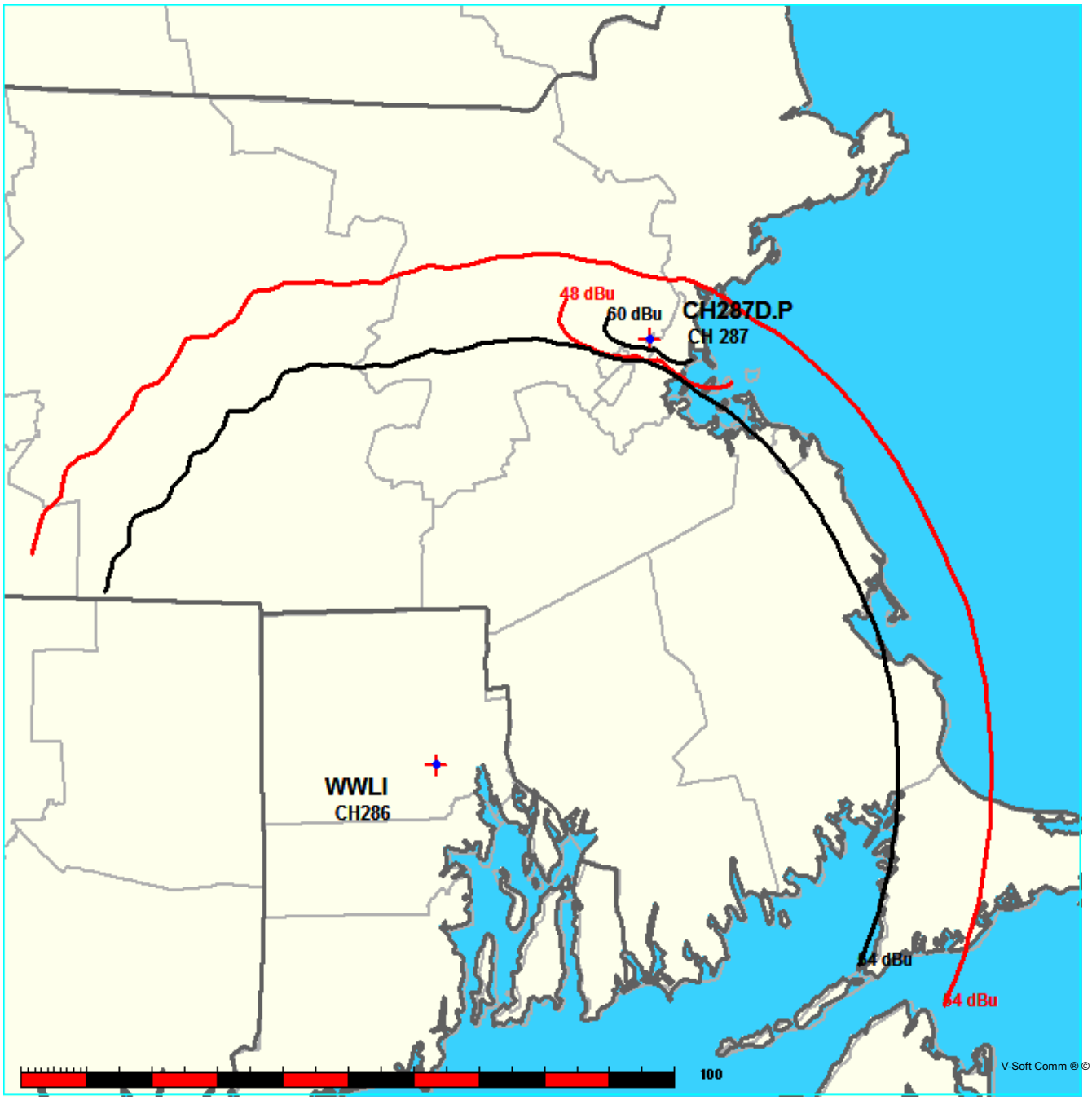

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Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

06-08-2017 Terrain Data: NED 03 SEC FMOver Analysis

CH287D.P

Channel = 287D
Max ERP = 0.25 kW
RCAMSL = 31 m
N. Lat. 42 23 13.0
W. Lng. 71 04 36.0
Protected
60 dBu

WWLI BMLH20070206ABO

Channel = 286B
Max ERP = 50 kW
RCAMSL = 214 m
N. Lat. 41 48 24.0
W. Lng. 71 28 13.0
Interfering
54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
164.0	000.0009	0023.4	001.8	027.6	050.0000	0182.7	070.9	57.78*	11.68
165.0	000.0009	0023.3	001.8	027.5	050.0000	0182.7	070.9	57.79*	11.70
166.0	000.0009	0024.5	001.8	027.5	050.0000	0182.7	070.9	57.79*	11.72
167.0	000.0009	0023.7	001.8	027.5	050.0000	0182.6	070.9	57.80*	11.73
168.0	000.0009	0023.6	001.8	027.5	050.0000	0182.6	070.9	57.80*	11.75
169.0	000.0009	0021.9	001.8	027.5	050.0000	0182.6	070.8	57.81*	11.76
170.0	000.0009	0020.3	001.8	027.4	050.0000	0182.5	070.8	57.81*	11.78
171.0	000.0009	0020.7	001.8	027.4	050.0000	0182.5	070.8	57.82*	11.79
172.0	000.0009	0019.7	001.8	027.4	050.0000	0182.5	070.8	57.82*	11.81
173.0	000.0009	0018.6	001.8	027.4	050.0000	0182.5	070.8	57.83*	11.82
174.0	000.0009	0018.2	001.8	027.4	050.0000	0182.4	070.7	57.83*	11.84
175.0	000.0009	0018.3	001.8	027.3	050.0000	0182.4	070.7	57.84*	11.85
176.0	000.0009	0016.2	001.8	027.3	050.0000	0182.3	070.7	57.84*	11.86
177.0	000.0009	0014.8	001.8	027.3	050.0000	0182.3	070.7	57.84*	11.87
178.0	000.0009	0013.6	001.8	027.3	050.0000	0182.2	070.7	57.85*	11.88
179.0	000.0009	0013.1	001.8	027.3	050.0000	0182.2	070.7	57.85*	11.88
180.0	000.0009	0012.8	001.8	027.2	050.0000	0182.1	070.7	57.85*	11.89
181.0	000.0009	0012.1	001.8	027.2	050.0000	0182.0	070.6	57.85*	11.89
182.0	000.0009	0012.0	001.8	027.2	050.0000	0181.9	070.6	57.85*	11.90
183.0	000.0009	0012.8	001.8	027.2	050.0000	0181.9	070.6	57.85*	11.90
184.0	000.0009	0012.9	001.8	027.1	050.0000	0181.8	070.6	57.86*	11.90
185.0	000.0009	0013.4	001.8	027.1	050.0000	0181.7	070.6	57.86*	11.90
186.0	000.0009	0013.1	001.8	027.1	050.0000	0181.6	070.6	57.86*	11.90
187.0	000.0009	0011.8	001.8	027.1	050.0000	0181.5	070.6	57.86*	11.90
188.0	000.0009	0010.2	001.8	027.0	050.0000	0181.4	070.6	57.86*	11.90
189.0	000.0009	0009.8	001.8	027.0	050.0000	0181.4	070.5	57.86*	11.90
190.0	000.0009	0007.4	001.8	027.0	050.0000	0181.3	070.5	57.85*	11.90
191.0	000.0009	0006.9	001.8	027.0	050.0000	0181.2	070.5	57.85*	11.89
192.0	000.0009	0008.3	001.8	027.0	050.0000	0181.1	070.5	57.85*	11.89
193.0	000.0009	0009.8	001.8	026.9	050.0000	0181.0	070.5	57.85*	11.88
194.0	000.0009	0013.0	001.8	026.9	050.0000	0180.8	070.5	57.85*	11.88
195.0	000.0009	0016.6	001.8	026.9	050.0000	0180.7	070.5	57.84*	11.87
196.0	000.0009	0018.2	001.8	026.9	050.0000	0180.6	070.5	57.84*	11.86
197.0	000.0009	0017.0	001.8	026.8	050.0000	0180.5	070.5	57.84*	11.85

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Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	
198.0	000.0009	0013.9	001.8	026.8	050.0000	0180.3	070.5	57.83*	11.83
199.0	000.0009	0010.2	001.8	026.8	050.0000	0180.2	070.5	57.83*	11.82
200.0	000.0009	0007.8	001.8	026.8	050.0000	0180.0	070.5	57.82*	11.80
201.0	000.0009	0004.9	001.8	026.7	050.0000	0179.8	070.5	57.82*	11.78
202.0	000.0009	0001.5	001.8	026.7	050.0000	0179.7	070.5	57.81*	11.76
203.0	000.0009	0002.2	001.8	026.7	050.0000	0179.5	070.5	57.80*	11.74
204.0	000.0009	0002.2	001.8	026.7	050.0000	0179.3	070.5	57.80*	11.72
205.0	000.0009	0000.1	001.8	026.6	050.0000	0179.2	070.5	57.79*	11.71
206.0	000.0009	-0000.9	001.8	026.6	050.0000	0179.0	070.5	57.79*	11.69
207.0	000.0009	-0000.9	001.8	026.6	050.0000	0178.9	070.5	57.78*	11.67
208.0	000.0009	-0002.4	001.8	026.6	050.0000	0178.8	070.5	57.77*	11.65
209.0	000.0009	-0002.0	001.8	026.5	050.0000	0178.6	070.5	57.77*	11.63
210.0	000.0009	-0002.1	001.8	026.5	050.0000	0178.5	070.5	57.76*	11.62
211.0	000.0009	-0001.6	001.8	026.5	050.0000	0178.4	070.5	57.75*	11.60
212.0	000.0009	-0001.4	001.8	026.5	050.0000	0178.2	070.5	57.75*	11.57
213.0	000.0009	-0002.0	001.8	026.4	050.0000	0178.1	070.5	57.74*	11.55
214.0	000.0009	-0001.5	001.8	026.4	050.0000	0177.9	070.5	57.73*	11.53
215.0	000.0009	-0001.2	001.8	026.4	050.0000	0177.8	070.5	57.72*	11.51
216.0	000.0009	-0001.8	001.8	026.4	050.0000	0177.6	070.5	57.72*	11.48
217.0	000.0009	-0002.2	001.8	026.3	050.0000	0177.5	070.5	57.71*	11.46
218.0	000.0009	-0003.5	001.8	026.3	050.0000	0177.3	070.5	57.70*	11.43
219.0	000.0009	-0004.4	001.8	026.3	050.0000	0177.2	070.5	57.69*	11.41
220.0	000.0009	-0004.5	001.8	026.3	050.0000	0177.0	070.5	57.68*	11.38
221.0	000.0010	-0006.0	001.8	026.2	050.0000	0176.8	070.5	57.69*	11.40
222.0	000.0012	-0008.0	001.9	026.2	050.0000	0176.6	070.4	57.70*	11.42
223.0	000.0013	-0008.2	001.9	026.1	050.0000	0176.4	070.4	57.70*	11.44
224.0	000.0014	-0007.2	002.0	026.1	050.0000	0176.2	070.3	57.70*	11.45
225.0	000.0016	-0005.2	002.0	026.1	050.0000	0175.9	070.3	57.71*	11.45
226.0	000.0018	-0004.2	002.1	026.0	050.0000	0175.7	070.2	57.71*	11.46
227.0	000.0019	-0003.4	002.1	026.0	050.0000	0175.4	070.2	57.71*	11.46
228.0	000.0021	-0004.9	002.2	025.9	050.0000	0175.2	070.2	57.71*	11.46
229.0	000.0023	-0006.4	002.2	025.9	050.0000	0175.0	070.2	57.71*	11.46
230.0	000.0025	-0005.7	002.3	025.9	050.0000	0174.7	070.1	57.70*	11.45
231.0	000.0028	-0005.4	002.3	025.8	050.0000	0174.5	070.1	57.70*	11.45
232.0	000.0030	-0004.4	002.4	025.8	050.0000	0174.3	070.1	57.70*	11.44
233.0	000.0033	-0003.9	002.4	025.7	050.0000	0174.0	070.1	57.70*	11.43
234.0	000.0036	-0003.3	002.5	025.7	050.0000	0173.8	070.0	57.69*	11.42
235.0	000.0039	-0003.3	002.5	025.6	050.0000	0173.5	070.0	57.69*	11.41
236.0	000.0042	-0003.2	002.6	025.6	050.0000	0173.3	070.0	57.69*	11.40
237.0	000.0046	-0002.8	002.6	025.5	050.0000	0173.0	070.0	57.68*	11.38
238.0	000.0049	0001.1	002.7	025.5	050.0000	0172.8	070.0	57.68*	11.37
239.0	000.0053	0004.7	002.7	025.4	050.0000	0172.6	069.9	57.67*	11.35
240.0	000.0056	0006.6	002.8	025.4	050.0000	0172.4	069.9	57.66*	11.33
241.0	000.0064	0005.8	002.8	025.3	050.0000	0172.0	069.9	57.66*	11.33

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Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

06-08-2017 Terrain Data: NED 03 SEC FMOver Analysis

WWLI BMLH20070206ABO	CH287D.P
Channel = 286B	Channel = 287D
Max ERP = 50 kW	Max ERP = 0.25 kW
RCAMSL = 214 m	RCAMSL = 31 m
N. Lat. 41 48 24.0	N. Lat. 42 23 13.0
W. Lng. 71 28 13.0	W. Lng. 71 04 36.0
Protected	Interfering
54 dBu	48 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
342.0	050.0000	0139.3	063.5	265.7	000.0815	0008.8	052.1	24.59	
343.0	050.0000	0137.2	063.2	265.6	000.0810	0008.9	051.0	24.81	
344.0	050.0000	0133.7	062.7	265.3	000.0782	0009.2	049.8	24.92	
345.0	050.0000	0132.1	062.5	265.3	000.0779	0009.2	048.7	25.14	
346.0	050.0000	0131.3	062.4	265.3	000.0785	0009.2	047.6	25.41	
347.0	050.0000	0128.3	061.9	265.0	000.0755	0009.0	046.4	25.51	
348.0	050.0000	0124.4	061.3	264.4	000.0707	0008.8	045.3	25.51	
349.0	050.0000	0123.9	061.2	264.4	000.0710	0008.7	044.2	25.81	
350.0	050.0000	0123.9	061.2	264.5	000.0719	0008.7	043.2	26.15	
351.0	050.0000	0123.3	061.1	264.5	000.0717	0008.7	042.1	26.45	
352.0	050.0000	0121.0	060.8	264.1	000.0683	0008.6	041.0	26.56	
353.0	050.0000	0120.4	060.7	264.0	000.0675	0008.5	040.0	26.84	
354.0	050.0000	0122.6	061.0	264.5	000.0716	0008.7	038.9	27.44	
355.0	050.0000	0124.7	061.3	265.0	000.0756	0009.0	037.8	28.02	
356.0	050.0000	0127.3	061.7	265.6	000.0806	0009.0	036.8	28.67	
357.0	050.0000	0128.5	061.9	265.9	000.0829	0008.3	035.7	29.18	
358.0	050.0000	0131.2	062.3	266.5	000.0883	0006.5	034.6	29.85	
359.0	050.0000	0133.0	062.6	266.9	000.0918	0005.8	033.5	30.43	
000.0	050.0000	0131.4	062.4	266.4	000.0872	0006.8	032.4	30.62	
001.0	050.0000	0130.2	062.2	265.9	000.0830	0008.3	031.3	30.83	
002.0	050.0000	0131.7	062.4	266.1	000.0847	0007.8	030.2	31.42	
003.0	050.0000	0134.0	062.8	266.5	000.0887	0006.4	029.1	32.18	
004.0	050.0000	0135.3	063.0	266.6	000.0896	0006.1	028.0	32.83	
005.0	050.0000	0139.2	063.5	267.5	000.0977	0006.3	026.8	33.90	
006.0	050.0000	0142.8	064.1	268.3	000.1051	0006.3	025.6	34.96	
007.0	050.0000	0144.5	064.3	268.5	000.1070	0006.4	024.5	35.80	
008.0	050.0000	0146.8	064.6	268.8	000.1103	0006.0	023.3	36.75	
009.0	050.0000	0148.1	064.8	268.8	000.1098	0006.1	022.2	37.57	
010.0	050.0000	0150.6	065.1	269.1	000.1128	0005.3	021.0	38.58	

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Exhibit 7a
Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
011.0	050.0000	0153.5	065.5	269.5	000.1172	0003.0	019.8	39.68
012.0	050.0000	0155.3	065.8	269.5	000.1168	0003.2	018.7	40.61
013.0	050.0000	0158.2	066.1	269.7	000.1198	0001.6	017.4	41.72
014.0	050.0000	0159.2	066.3	269.2	000.1143	0004.5	016.3	42.48
015.0	050.0000	0159.4	066.3	268.1	000.1033	0006.0	015.2	43.00
016.0	050.0000	0159.1	066.2	266.5	000.0888	0006.3	014.1	43.57
017.0	050.0000	0160.6	066.4	265.5	000.0802	0009.1	012.9	44.65
018.0	050.0000	0162.5	066.6	264.4	000.0709	0008.7	011.8	45.82
019.0	050.0000	0164.8	066.9	263.2	000.0614	0007.8	010.6	47.10
020.0	050.0000	0164.8	066.9	260.0	000.0402	0011.8	009.6	47.05
021.0	050.0000	0163.8	066.8	255.4	000.0275	0018.8	008.7	47.09
022.0	050.0000	0164.7	066.9	250.9	000.0174	0017.2	007.7	47.03
023.0	050.0000	0166.0	067.1	245.2	000.0102	0006.1	006.8	46.97
024.0	050.0000	0168.2	067.3	238.2	000.0050	0002.2	005.8	46.38
025.0	050.0000	0171.1	067.6	228.9	000.0023	-0006.4	005.0	45.69
026.0	050.0000	0175.5	068.1	216.4	000.0009	-0001.9	004.2	44.57
027.0	050.0000	0181.3	068.7	198.8	000.0009	0010.6	003.6	47.34
028.0	050.0000	0183.7	068.9	179.7	000.0009	0013.2	003.7	46.57
029.0	050.0000	0185.1	069.1	164.7	000.0009	0022.9	004.3	43.90
030.0	050.0000	0186.6	069.2	154.1	000.0018	0028.2	005.2	43.87
031.0	050.0000	0186.5	069.2	148.0	000.0049	0029.0	006.2	45.17
032.0	050.0000	0186.2	069.2	144.1	000.0119	0029.7	007.3	46.18
033.0	050.0000	0185.1	069.1	141.8	000.0175	0029.9	008.5	45.42
034.0	050.0000	0184.1	069.0	140.1	000.0222	0030.5	009.7	44.41
035.0	050.0000	0183.8	068.9	138.6	000.0319	0030.8	010.9	44.05
036.0	050.0000	0184.3	069.0	137.1	000.0434	0030.8	012.0	43.52
037.0	050.0000	0185.9	069.2	135.5	000.0579	0030.2	013.2	42.95
038.0	050.0000	0187.8	069.3	134.1	000.0717	0030.5	014.4	42.43
039.0	050.0000	0189.3	069.5	133.1	000.0824	0030.2	015.6	41.74
040.0	050.0000	0189.4	069.5	132.9	000.0855	0030.1	016.8	40.86
041.0	050.0000	0190.0	069.5	132.6	000.0893	0030.2	018.0	40.05
042.0	050.0000	0190.0	069.5	132.5	000.0900	0030.2	019.2	39.09
043.0	050.0000	0190.4	069.6	132.4	000.0910	0030.2	020.4	38.18
044.0	050.0000	0190.8	069.6	132.4	000.0913	0030.2	021.6	37.25
045.0	050.0000	0191.2	069.7	132.4	000.0910	0030.2	022.8	36.32
046.0	050.0000	0191.7	069.7	132.5	000.0905	0030.2	024.1	35.43
047.0	050.0000	0191.7	069.7	132.7	000.0880	0030.2	025.3	34.47
048.0	050.0000	0191.8	069.7	132.9	000.0853	0030.2	026.5	33.55
049.0	050.0000	0192.0	069.7	133.1	000.0828	0030.2	027.7	32.70
050.0	050.0000	0191.3	069.7	133.5	000.0781	0030.2	028.9	31.78
051.0	050.0000	0191.3	069.7	133.8	000.0750	0030.4	030.1	31.05
052.0	050.0000	0191.2	069.7	134.1	000.0714	0030.5	031.3	30.30
053.0	050.0000	0191.1	069.7	134.5	000.0679	0030.4	032.5	29.58
054.0	050.0000	0191.3	069.7	134.8	000.0648	0030.5	033.7	28.94

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Exhibit 7b
Contour Protection Studies Toward Select Allocation Concern(s)

Costa-eagle Radio Ventures Limited Partnership

FMCommander Single Allocation Study - 06-08-2017 - NED 03 SEC
CH287D.P's Overlaps (In= 2.13 km, Out= 1.26 km)

CH287D.P CH 287 D DA
Lat= 42 23 13.0, Lng= 71 04 36.0
0.25 kW 10.3 m HAAT, 31 m COR
Prot.= 60 dBu, Intef.= 100 dBu

WRBB CH 285 D BLED19831213AB
Lat= 42 20 19.0, Lng= 71 05 28.0
0.019 kW 27 m HAAT, 55 m COR
Prot.= 60 dBu, Intef.= 80 dBu

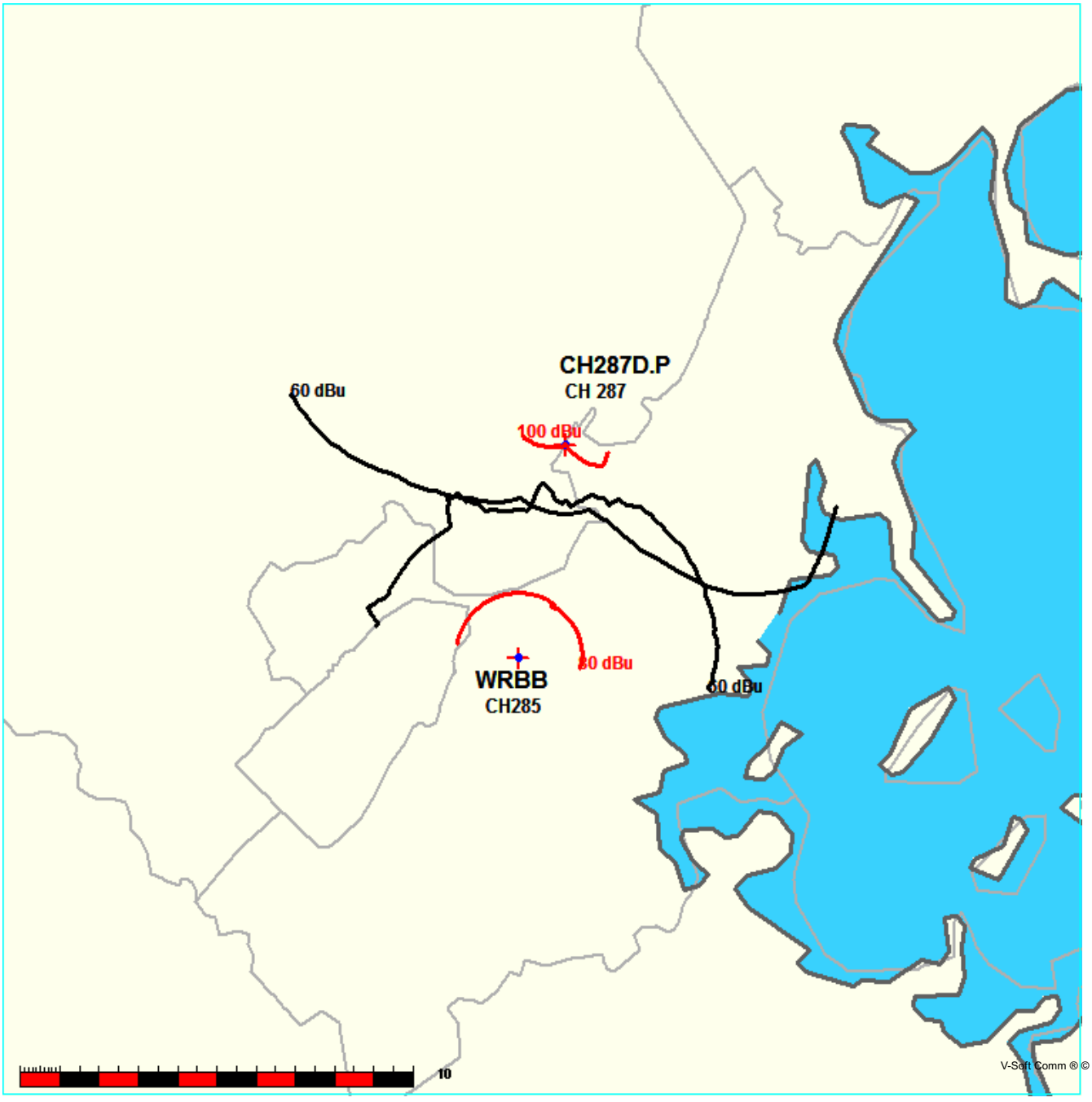

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Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

06-08-2017 Terrain Data: NED 03 SEC FMOver Analysis

CH287D.P	WRBB BLED19831213AB
Channel = 287D	Channel = 285D
Max ERP = 0.25 kW	Max ERP = 0.019 kW
RCAMSL = 31 m	RCAMSL = 55 m
N. Lat. 42 23 13.0	N. Lat. 42 20 19.0
W. Lng. 71 04 36.0	W. Lng. 71 05 28.0
Protected	Interfering
60 dBu	80 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
150.0	000.0025	0028.9	002.3	034.4	000.0190	0047.7	004.1	62.29	
151.0	000.0023	0027.8	002.2	033.7	000.0190	0047.5	004.1	62.32	
152.0	000.0021	0027.9	002.2	032.8	000.0190	0047.7	004.1	62.41	
153.0	000.0019	0027.6	002.1	032.0	000.0190	0046.3	004.1	62.16	
154.0	000.0018	0028.1	002.1	031.1	000.0190	0043.4	004.1	61.55	
155.0	000.0016	0027.5	002.0	030.2	000.0190	0043.5	004.1	61.57	
156.0	000.0014	0027.5	002.0	029.3	000.0190	0045.0	004.1	61.89	
157.0	000.0013	0027.1	001.9	028.5	000.0190	0045.3	004.1	61.95	
158.0	000.0012	0026.4	001.9	027.6	000.0190	0044.3	004.1	61.70	
159.0	000.0010	0025.7	001.8	026.7	000.0190	0043.9	004.1	61.55	
160.0	000.0009	0024.9	001.8	025.8	000.0190	0044.3	004.1	61.54	
161.0	000.0009	0024.1	001.8	025.4	000.0190	0044.3	004.1	61.64	
162.0	000.0009	0023.3	001.8	025.1	000.0190	0044.3	004.1	61.73	
163.0	000.0009	0024.3	001.8	024.8	000.0190	0043.5	004.1	61.65	
164.0	000.0009	0023.4	001.8	024.5	000.0190	0042.9	004.0	61.59	
165.0	000.0009	0023.3	001.8	024.2	000.0190	0042.5	004.0	61.60	
166.0	000.0009	0024.5	001.8	023.8	000.0190	0042.3	004.0	61.64	
167.0	000.0009	0023.7	001.8	023.5	000.0190	0041.9	004.0	61.63	
168.0	000.0009	0023.6	001.8	023.1	000.0190	0041.9	004.0	61.70	
169.0	000.0009	0021.9	001.8	022.7	000.0190	0041.1	003.9	61.58	
170.0	000.0009	0020.3	001.8	022.3	000.0190	0040.3	003.9	61.48	
171.0	000.0009	0020.7	001.8	022.0	000.0190	0039.5	003.9	61.37	
172.0	000.0009	0019.7	001.8	021.6	000.0190	0039.5	003.9	61.43	
173.0	000.0009	0018.6	001.8	021.2	000.0190	0038.5	003.9	61.27	
174.0	000.0009	0018.2	001.8	020.8	000.0190	0037.9	003.9	61.18	
175.0	000.0009	0018.3	001.8	020.4	000.0190	0037.1	003.9	61.04	
176.0	000.0009	0016.2	001.8	019.9	000.0190	0036.7	003.8	61.00	
177.0	000.0009	0014.8	001.8	019.5	000.0190	0036.0	003.8	60.89	
178.0	000.0009	0013.6	001.8	019.1	000.0190	0035.4	003.8	60.79	
179.0	000.0009	0013.1	001.8	018.7	000.0190	0036.5	003.8	61.12	
180.0	000.0009	0012.8	001.8	018.2	000.0190	0036.9	003.8	61.25	
181.0	000.0009	0012.1	001.8	017.8	000.0190	0036.8	003.8	61.29	
182.0	000.0009	0012.0	001.8	017.3	000.0190	0037.0	003.8	61.37	

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Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
183.0	000.0009	0012.8	001.8	016.9	000.0190	0037.3	003.8	61.48
184.0	000.0009	0012.9	001.8	016.4	000.0190	0037.0	003.8	61.45
185.0	000.0009	0013.4	001.8	015.9	000.0190	0035.7	003.8	61.14
186.0	000.0009	0013.1	001.8	015.5	000.0190	0035.9	003.8	61.22
187.0	000.0009	0011.8	001.8	015.0	000.0190	0036.0	003.7	61.27
188.0	000.0009	0010.2	001.8	014.5	000.0190	0035.8	003.7	61.24
189.0	000.0009	0009.8	001.8	014.1	000.0190	0036.1	003.7	61.32
190.0	000.0009	0007.4	001.8	013.6	000.0190	0035.9	003.7	61.27
191.0	000.0009	0006.9	001.8	013.1	000.0190	0036.5	003.7	61.44
192.0	000.0009	0008.3	001.8	012.7	000.0190	0037.6	003.7	61.70
193.0	000.0009	0009.8	001.8	012.2	000.0190	0039.4	003.7	62.14
194.0	000.0009	0013.0	001.8	011.7	000.0190	0039.9	003.7	62.26
195.0	000.0009	0016.6	001.8	011.2	000.0190	0040.5	003.7	62.39
196.0	000.0009	0018.2	001.8	010.8	000.0190	0039.8	003.7	62.22
197.0	000.0009	0017.0	001.8	010.3	000.0190	0040.5	003.7	62.38
198.0	000.0009	0013.9	001.8	009.8	000.0190	0041.1	003.7	62.51
199.0	000.0009	0010.2	001.8	009.4	000.0190	0041.3	003.8	62.51
200.0	000.0009	0007.8	001.8	008.9	000.0190	0042.2	003.8	62.69
201.0	000.0009	0004.9	001.8	008.4	000.0190	0042.4	003.8	62.73
202.0	000.0009	0001.5	001.8	008.0	000.0190	0042.5	003.8	62.71
203.0	000.0009	0002.2	001.8	007.5	000.0190	0042.2	003.8	62.61
204.0	000.0009	0002.2	001.8	007.1	000.0190	0041.8	003.8	62.47
205.0	000.0009	0000.1	001.8	006.6	000.0190	0040.7	003.8	62.17
206.0	000.0009	-0000.9	001.8	006.2	000.0190	0039.0	003.8	61.71
207.0	000.0009	-0000.9	001.8	005.8	000.0190	0036.9	003.8	61.15
208.0	000.0009	-0002.4	001.8	005.3	000.0190	0035.1	003.8	60.65
209.0	000.0009	-0002.0	001.8	004.9	000.0190	0034.1	003.8	60.34
210.0	000.0009	-0002.1	001.8	004.5	000.0190	0032.1	003.9	59.77
211.0	000.0009	-0001.6	001.8	004.1	000.0190	0030.9	003.9	59.39
212.0	000.0009	-0001.4	001.8	003.7	000.0190	0030.1	003.9	59.13
213.0	000.0009	-0002.0	001.8	003.3	000.0190	0029.3	003.9	59.02
214.0	000.0009	-0001.5	001.8	002.9	000.0190	0028.1	003.9	58.95
215.0	000.0009	-0001.2	001.8	002.5	000.0190	0027.0	003.9	58.87
216.0	000.0009	-0001.8	001.8	002.1	000.0190	0027.0	003.9	58.80
217.0	000.0009	-0002.2	001.8	001.8	000.0190	0026.9	004.0	58.72
218.0	000.0009	-0003.5	001.8	001.4	000.0190	0025.8	004.0	58.64
219.0	000.0009	-0004.4	001.8	001.1	000.0190	0025.0	004.0	58.56
220.0	000.0009	-0004.5	001.8	000.7	000.0190	0024.3	004.0	58.47
221.0	000.0010	-0006.0	001.8	359.8	000.0190	0025.7	004.0	58.59
222.0	000.0012	-0008.0	001.9	358.9	000.0190	0026.3	004.0	58.68
223.0	000.0013	-0008.2	001.9	358.0	000.0190	0027.5	004.0	58.76
224.0	000.0014	-0007.2	002.0	357.1	000.0190	0027.3	003.9	58.81
225.0	000.0016	-0005.2	002.0	356.2	000.0190	0027.7	003.9	58.85
226.0	000.0018	-0004.2	002.1	355.3	000.0190	0027.1	003.9	58.88
227.0	000.0019	-0003.4	002.1	354.4	000.0190	0027.1	003.9	58.88
228.0	000.0021	-0004.9	002.2	353.5	000.0190	0026.4	003.9	58.87

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Exhibit 7b
Contour Protection Studies Toward Select Allocation Concern(s)

06-08-2017 Terrain Data: NED 03 SEC FMOver Analysis

WRBB BLED19831213AB	CH287D.P
Channel = 285D	Channel = 287D
Max ERP = 0.019 kW	Max ERP = 0.25 kW
RCAMSL = 55 m	RCAMSL = 31 m
N. Lat. 42 20 19.0	N. Lat. 42 23 13.0
W. Lng. 71 05 28.0	W. Lng. 71 04 36.0
Protected	Interfering
60 dBu	100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
327.0	000.0190	0021.9	003.7	234.6	000.0038	-0003.0	003.9	51.87	
328.0	000.0190	0021.2	003.7	234.5	000.0038	-0003.0	003.9	52.15	
329.0	000.0190	0022.1	003.7	234.5	000.0037	-0003.0	003.8	52.42	
330.0	000.0190	0022.9	003.7	234.4	000.0037	-0003.1	003.7	52.69	
331.0	000.0190	0026.7	003.7	234.3	000.0037	-0003.1	003.7	52.96	
332.0	000.0190	0029.3	003.7	234.1	000.0036	-0003.2	003.6	53.22	
333.0	000.0190	0033.8	003.9	237.4	000.0047	-0001.9	003.5	54.76	
334.0	000.0190	0038.0	004.2	241.3	000.0067	0005.8	003.4	56.75	
335.0	000.0190	0039.8	004.3	243.1	000.0082	0003.9	003.3	58.01	
336.0	000.0190	0043.1	004.4	246.3	000.0113	0008.3	003.3	59.84	
337.0	000.0190	0041.6	004.4	244.8	000.0098	0005.8	003.2	59.61	
338.0	000.0190	0041.7	004.4	244.8	000.0098	0005.8	003.1	60.02	
339.0	000.0190	0042.5	004.4	245.5	000.0105	0006.3	003.0	60.80	
340.0	000.0190	0040.4	004.3	243.1	000.0082	0003.9	003.0	60.12	
341.0	000.0190	0037.8	004.1	240.0	000.0056	0006.6	002.9	58.78	
342.0	000.0190	0038.8	004.2	240.8	000.0063	0006.1	002.8	59.79	
343.0	000.0190	0035.9	004.0	237.0	000.0046	-0002.7	002.8	58.60	
344.0	000.0190	0035.5	004.0	236.2	000.0043	-0003.2	002.8	58.73	
345.0	000.0190	0035.4	004.0	235.6	000.0041	-0003.7	002.7	58.98	
346.0	000.0190	0033.2	003.9	232.7	000.0032	-0003.9	002.7	58.07	
347.0	000.0190	0031.5	003.8	230.2	000.0026	-0005.3	002.6	57.24	
348.0	000.0190	0031.2	003.8	229.3	000.0024	-0006.4	002.6	57.24	
349.0	000.0190	0031.5	003.8	228.9	000.0023	-0006.4	002.5	57.60	
350.0	000.0190	0031.0	003.8	227.6	000.0020	-0004.0	002.5	57.43	
351.0	000.0190	0031.3	003.8	227.1	000.0019	-0003.4	002.4	57.72	
352.0	000.0190	0028.7	003.7	224.7	000.0016	-0005.8	002.4	56.84	
353.0	000.0190	0026.9	003.7	223.8	000.0014	-0007.3	002.4	56.81	
354.0	000.0190	0025.9	003.7	222.8	000.0013	-0008.6	002.3	56.71	
355.0	000.0190	0027.4	003.7	221.7	000.0011	-0007.3	002.3	56.55	
356.0	000.0190	0027.5	003.7	220.5	000.0010	-0005.0	002.2	56.31	
357.0	000.0190	0027.5	003.7	219.3	000.0009	-0004.3	002.2	56.37	
358.0	000.0190	0027.5	003.7	218.0	000.0009	-0003.6	002.1	56.73	
359.0	000.0190	0026.0	003.7	216.7	000.0009	-0001.9	002.1	57.07	

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Exhibit 7b

Contour Protection Studies Toward Select Allocation Concern(s)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
000.0	000.0190	0025.7	003.7	215.2	000.0009	-0001.3	002.1	57.40
001.0	000.0190	0024.9	003.7	213.7	000.0009	-0001.6	002.0	57.71
002.0	000.0190	0027.0	003.7	212.2	000.0009	-0001.5	002.0	58.01
003.0	000.0190	0028.4	003.7	210.5	000.0009	-0001.7	002.0	58.28
004.0	000.0190	0030.6	003.7	209.3	000.0009	-0002.2	001.9	58.82
005.0	000.0190	0034.2	003.9	210.0	000.0009	-0002.1	001.7	60.68
006.0	000.0190	0038.0	004.1	211.1	000.0009	-0001.5	001.5	73.20
007.0	000.0190	0041.5	004.4	211.9	000.0009	-0001.3	001.2	74.60
008.0	000.0190	0042.5	004.4	209.6	000.0009	-0002.2	001.2	75.17
009.0	000.0190	0042.0	004.4	205.5	000.0009	-0000.3	001.2	75.15
010.0	000.0190	0041.0	004.3	201.3	000.0009	0003.9	001.2	74.90
011.0	000.0190	0039.8	004.3	197.4	000.0009	0015.9	001.3	74.49
012.0	000.0190	0039.8	004.3	194.0	000.0009	0012.9	001.3	74.52
013.0	000.0190	0036.7	004.1	190.9	000.0009	0006.8	001.4	73.34
014.0	000.0190	0036.1	004.0	188.2	000.0009	0010.2	001.5	73.09
015.0	000.0190	0036.0	004.0	185.5	000.0009	0013.8	001.5	73.01
016.0	000.0190	0035.8	004.0	183.0	000.0009	0012.8	001.5	62.30
017.0	000.0190	0037.2	004.1	179.5	000.0009	0013.2	001.5	73.23
018.0	000.0190	0037.1	004.1	176.9	000.0009	0014.8	001.5	73.06
019.0	000.0190	0035.6	004.0	175.8	000.0009	0016.5	001.6	61.54
020.0	000.0190	0036.8	004.1	172.4	000.0009	0019.3	001.6	61.87
021.0	000.0190	0038.3	004.2	168.4	000.0009	0023.2	001.5	62.27
022.0	000.0190	0039.6	004.2	164.3	000.0009	0023.1	001.5	72.97
023.0	000.0190	0041.7	004.4	159.0	000.0010	0025.7	001.5	73.77
024.0	000.0190	0042.5	004.4	155.8	000.0015	0027.6	001.5	75.21
025.0	000.0190	0044.0	004.5	151.3	000.0022	0027.7	001.5	77.00
026.0	000.0190	0044.3	004.5	149.2	000.0034	0029.2	001.5	67.79
027.0	000.0190	0043.7	004.5	148.7	000.0040	0029.2	001.6	67.72
028.0	000.0190	0044.9	004.5	145.1	000.0098	0029.6	001.7	71.32
029.0	000.0190	0044.6	004.5	144.5	000.0111	0029.7	001.7	71.15
030.0	000.0190	0043.9	004.5	144.7	000.0107	0029.7	001.8	70.16
031.0	000.0190	0043.2	004.4	144.7	000.0106	0029.7	001.9	69.36
032.0	000.0190	0046.3	004.6	138.8	000.0302	0030.8	001.9	74.04
033.0	000.0190	0047.7	004.7	135.9	000.0539	0030.2	002.0	75.88
034.0	000.0190	0047.6	004.7	135.6	000.0564	0030.1	002.1	75.34
035.0	000.0190	0047.6	004.7	135.1	000.0613	0030.5	002.1	75.11
036.0	000.0190	0048.2	004.7	133.9	000.0735	0030.5	002.2	75.28
037.0	000.0190	0048.9	004.8	132.7	000.0880	0030.2	002.3	75.33
038.0	000.0190	0049.6	004.8	131.5	000.1020	0030.4	002.4	75.39
039.0	000.0190	0050.7	004.9	130.1	000.1210	0030.0	002.5	75.38
040.0	000.0190	0051.3	004.9	129.4	000.1289	0028.7	002.5	75.01
041.0	000.0190	0050.8	004.9	129.9	000.1235	0029.4	002.6	74.20
042.0	000.0190	0051.0	004.9	129.8	000.1242	0029.2	002.7	73.62
043.0	000.0190	0051.8	004.9	129.0	000.1334	0029.0	002.8	73.32
044.0	000.0190	0051.6	004.9	129.4	000.1292	0028.7	002.9	72.63

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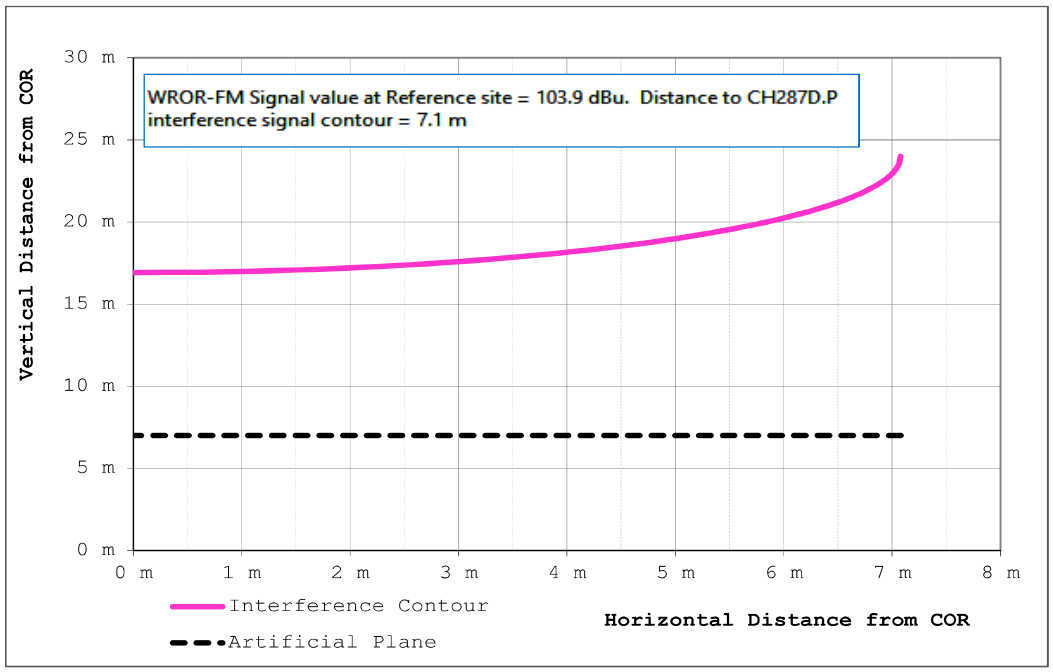
Exhibit 8
C.F.R. Section 74.1204(d) Second / Third Adjacent Given Interference Waiver Request

Yellow Text denotes the existence of a C.F.R. 47 Section 74.1204(d) Second/Third Adjacent Channel Given Interference Waiver Request toward WROR-FM - Framingham, MA (CH289B) as included in ***Exhibit 8***. At the Translator site location, protection of the worst case calculated 143.9 dBµ F(50:10) Interference Contour, corresponding to the worst case protected 103.9 dBµ F(50:50) protected contour, has been demonstrated through a downward radiation study as included herein. Full protection will be afforded the concern 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 a worst case, one bay, isotrophic antenna. Additional antenna manufacturer's data has been included in **Exhibit 9**.



Proposed Antenna: Worst Case 1 Bay Isotrophic Antenna
Proposed Power: 0.250 kW
Antenna Height AGL: 24.0 meters
Protection Plane Height: 7.0 meters
Protected Contour: 103.9 dBµ f(50:50)
Interference Contour: 143.9 dBµ f(50:50)

Field Strength (dBu) Equation
106.92-(20*(LOG10[DistMeters]/1000)))+[ERPin dBk]

Distance (Free Space) Equation:
(10^((106.92-[desired dBu]+[ERP in dBk])/20))*1000

Angle Below Horizon	Vertical Antenna Properties: Relative Field	ERP in kW	ERP in dBk	Meters from Antenna to Int. Contour	Meters from Antenna to Artificial Plane	Meters from Antenna to Ground Level	Field Strength at Protection Plane (dBµ)	Field Strength at Ground Level (dBµ)
0°	1.000	0.250	-6.02	7.08 m				
-5°	1.000	0.250	-6.02	7.08 m	195.05 m	275.37 m	115.10 dBµ	112.10 dBµ
-10°	1.000	0.250	-6.02	7.08 m	97.90 m	138.21 m	121.08 dBµ	118.09 dBµ
-15°	1.000	0.250	-6.02	7.08 m	65.68 m	92.73 m	124.55 dBµ	121.56 dBµ
-20°	1.000	0.250	-6.02	7.08 m	49.70 m	70.17 m	126.97 dBµ	123.98 dBµ
-25°	1.000	0.250	-6.02	7.08 m	40.23 m	56.79 m	128.81 dBµ	125.81 dBµ
-30°	1.000	0.250	-6.02	7.08 m	34.00 m	48.00 m	130.27 dBµ	127.27 dBµ
-35°	1.000	0.250	-6.02	7.08 m	29.64 m	41.84 m	131.46 dBµ	128.47 dBµ
-40°	1.000	0.250	-6.02	7.08 m	26.45 m	37.34 m	132.45 dBµ	129.46 dBµ
-45°	1.000	0.250	-6.02	7.08 m	24.04 m	33.94 m	133.28 dBµ	130.28 dBµ
-50°	1.000	0.250	-6.02	7.08 m	22.19 m	31.33 m	133.98 dBµ	130.98 dBµ
-55°	1.000	0.250	-6.02	7.08 m	20.75 m	29.30 m	134.56 dBµ	131.56 dBµ
-60°	1.000	0.250	-6.02	7.08 m	19.63 m	27.71 m	135.04 dBµ	132.05 dBµ
-65°	1.000	0.250	-6.02	7.08 m	18.76 m	26.48 m	135.44 dBµ	132.44 dBµ
-70°	1.000	0.250	-6.02	7.08 m	18.09 m	25.54 m	135.75 dBµ	132.75 dBµ
-75°	1.000	0.250	-6.02	7.08 m	17.60 m	24.85 m	135.99 dBµ	132.99 dBµ
-80°	1.000	0.250	-6.02	7.08 m	17.26 m	24.37 m	136.16 dBµ	133.16 dBµ
-85°	1.000	0.250	-6.02	7.08 m	17.06 m	24.09 m	136.26 dBµ	133.26 dBµ
-90°	1.000	0.250	-6.02	7.08 m	17.00 m	24.00 m	136.29 dBµ	133.30 dBµ

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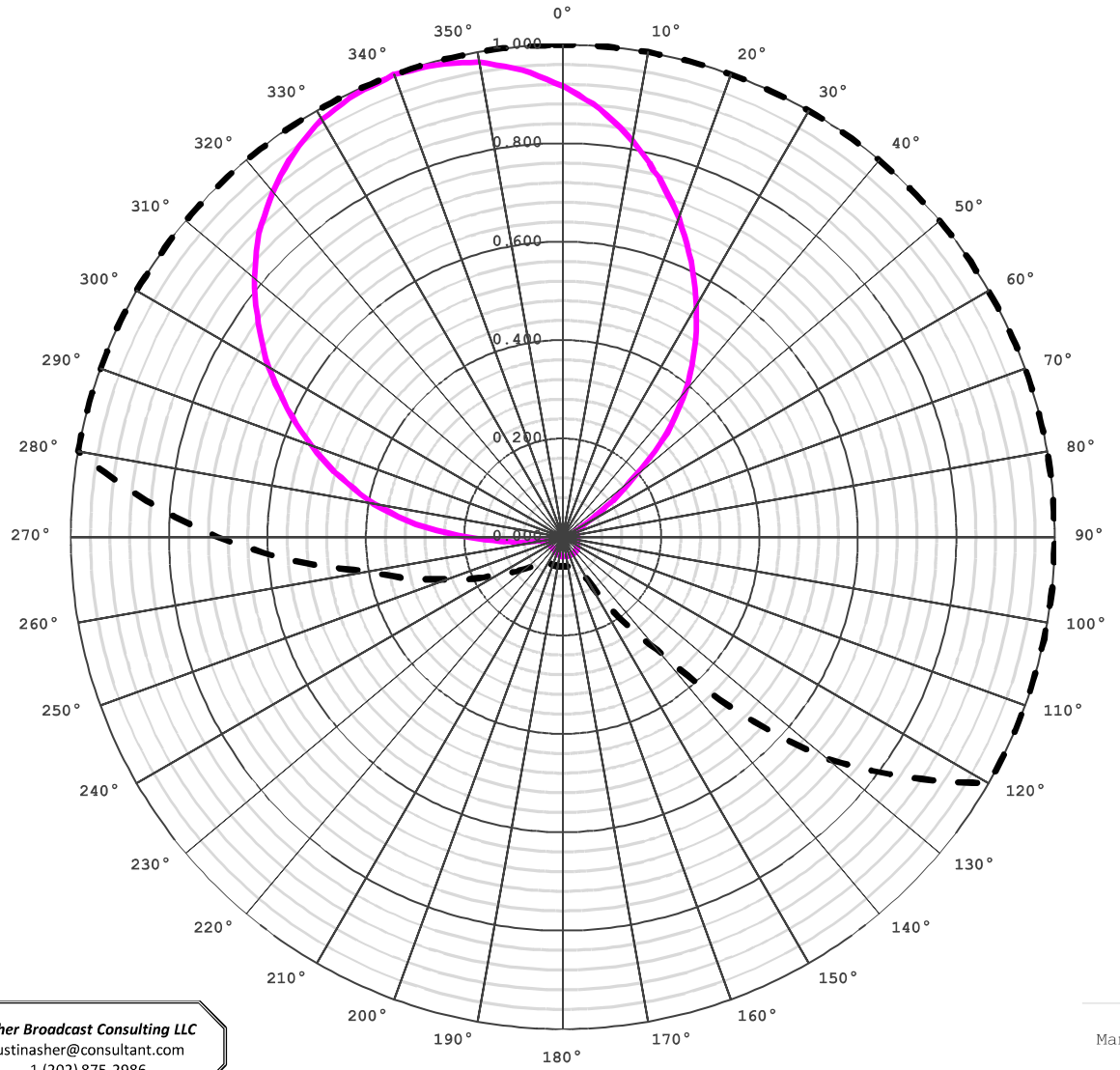
Exhibit 9 - Copy of Manufacturer's Directional Antenna Pattern Data

Manufacturer's	Make/Model	Orientation	Power
Element 1:	CI-FM(Slant45)	340° True	100.0%
Element 2:			
Element 3:			
Element 4:			

Composite Power: 100%



Azimuth ° True	FCC Pattern	Manufacturer's Pattern
0°	1.000	0.916
10°	1.000	0.817
20°	1.000	0.690
30°	1.000	0.544
40°	1.000	0.390
50°	1.000	0.190
60°	1.000	0.050
70°	1.000	0.030
80°	1.000	0.030
90°	1.000	0.030
100°	1.000	0.030
110°	1.000	0.030
120°	1.000	0.034
130°	0.700	0.038
140°	0.300	0.040
150°	0.100	0.040
160°	0.060	0.040
170°	0.060	0.040
180°	0.060	0.040
190°	0.060	0.038
200°	0.060	0.034
210°	0.060	0.030
220°	0.060	0.030
230°	0.100	0.030
240°	0.150	0.030
250°	0.250	0.030
260°	0.400	0.050
270°	0.700	0.190
280°	1.000	0.390
290°	1.000	0.544
300°	1.000	0.690
310°	1.000	0.817
320°	1.000	0.916
330°	1.000	0.980
340°	1.000	1.000
350°	1.000	0.980

FCC Pattern: - - -
Manufacturer's Pattern: ———

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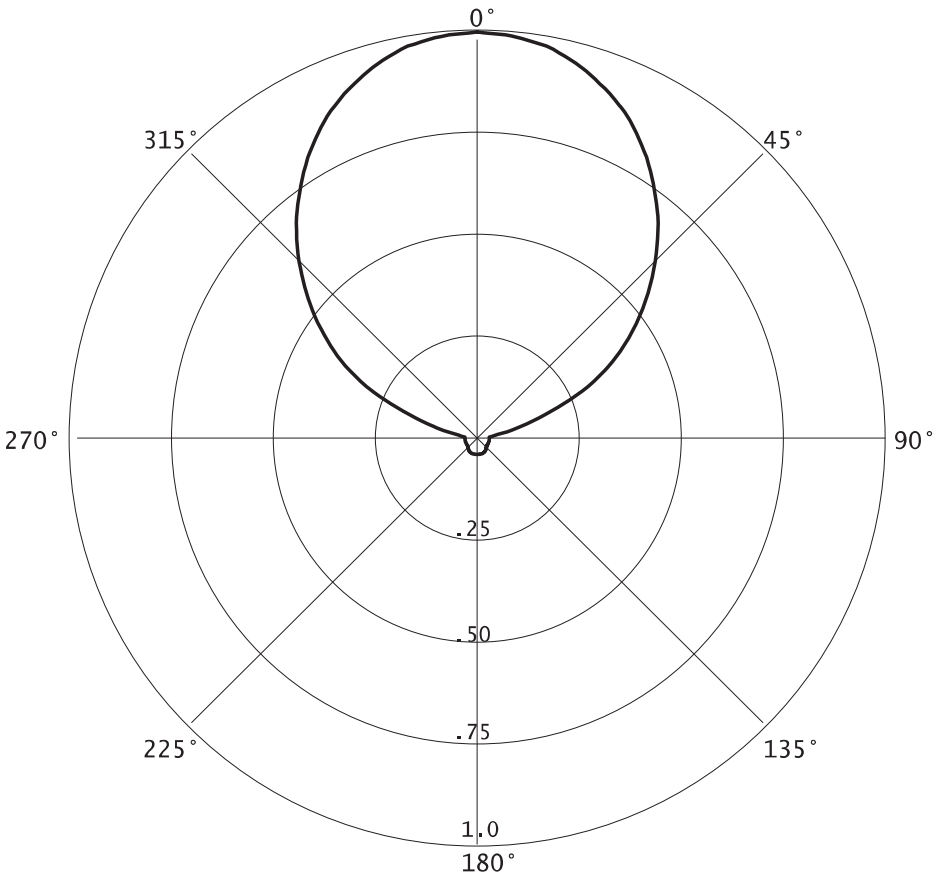
Exhibit 9
Copy of Manufacturer's Directional Antenna Documentation
(Actual Antenna Pattern rotated to 340.0°T) *(public record copy)*

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 9
Copy of Manufacturer's Directional Antenna Documentation
(Actual Antenna Pattern rotated to 340.0°T) *(public record copy)*

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.

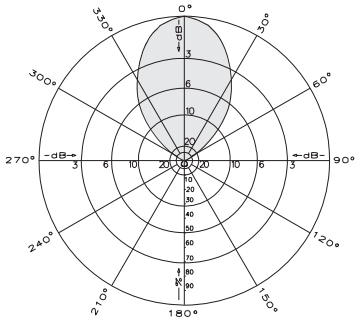
Like all Kathrein Scala Division antennas, the CL-FM is made of the finest materials using state of the art electrical and mechanical designs, resulting in superior performance and long service life.

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

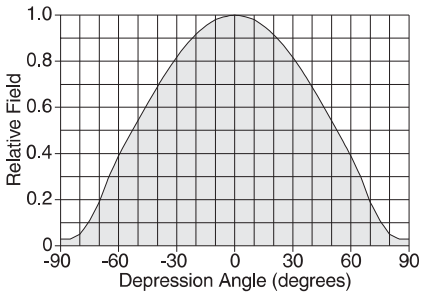
Specifications:

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.

10492-D

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

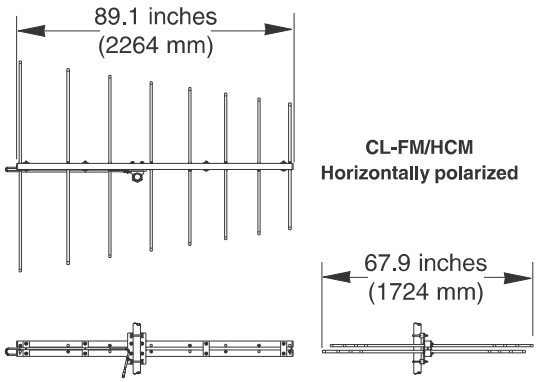
Exhibit 9
Copy of Manufacturer's Directional Antenna Documentation
(Actual Antenna Pattern rotated to 340.0°T) ***(public record copy)***

CL-FM

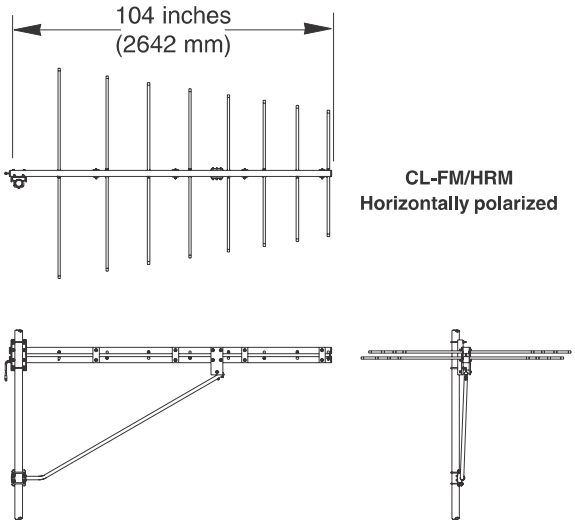
FM LOG-PERIODIC ANTENNA

7 dBd gain

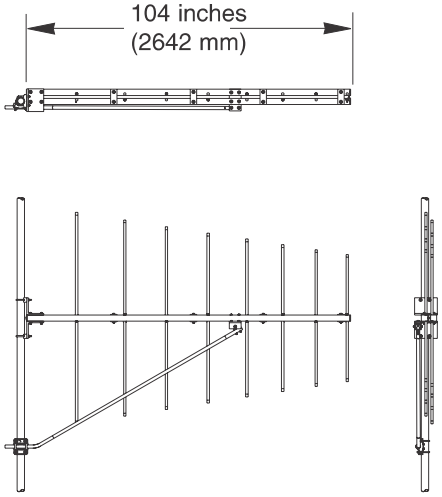
88–108 MHz



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

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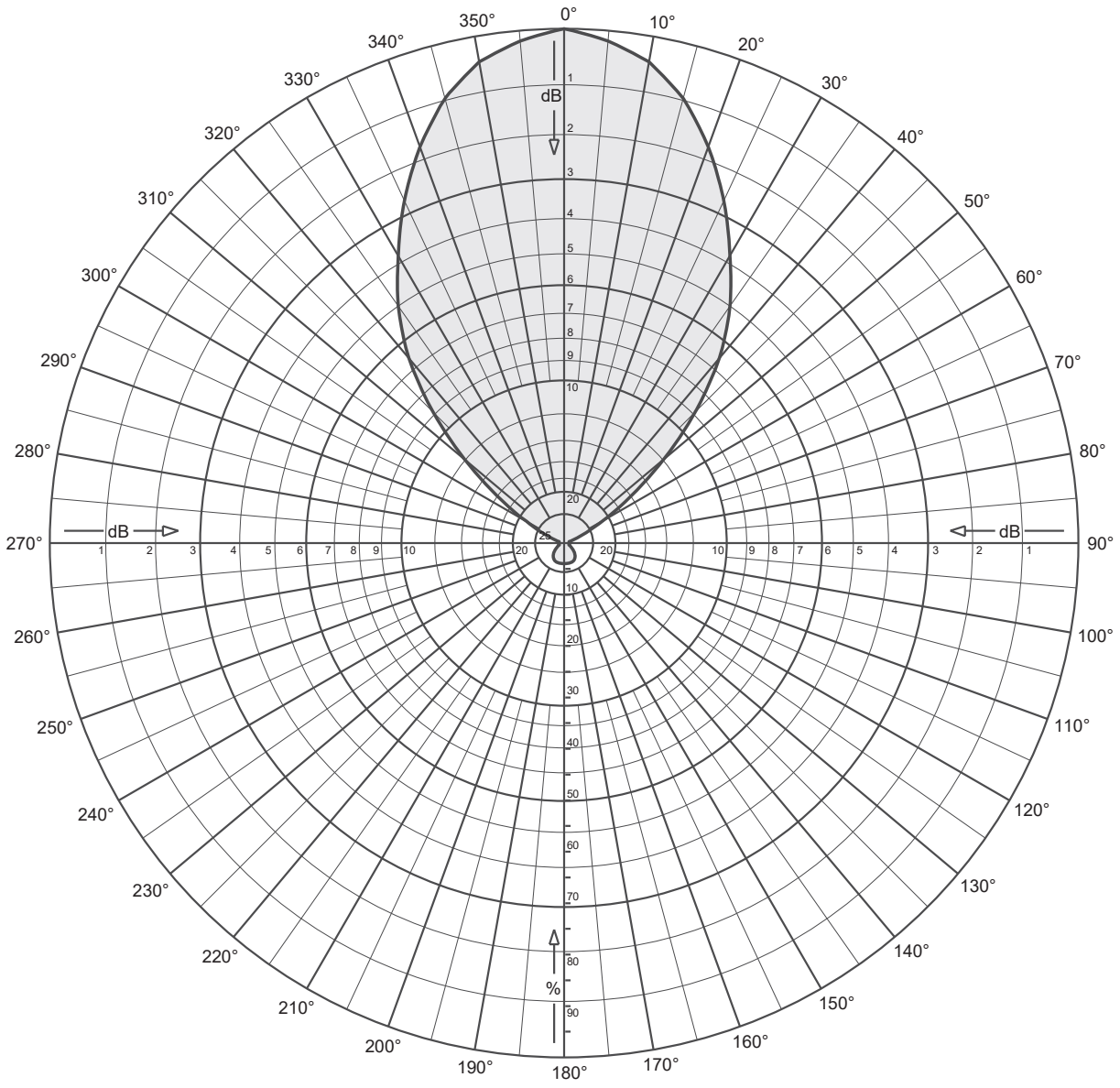

CL-FM
FM
Maximum gain: 7.0 dBd
Horizontal polarization Component
Horizontal radiation pattern
0 degree electrical downtilt

KATHREIN
SCALA DIVISION
Post Office Box 4580
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26-Oct-2011

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SCALA DIVISION

CL-FM
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Maximum gain: 7.0 dBd
Horizontal polarization Component

Horizontal radiation pattern
0 degree electrical downtilt

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

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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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SCALA DIVISION

CL-FM
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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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CL-FM
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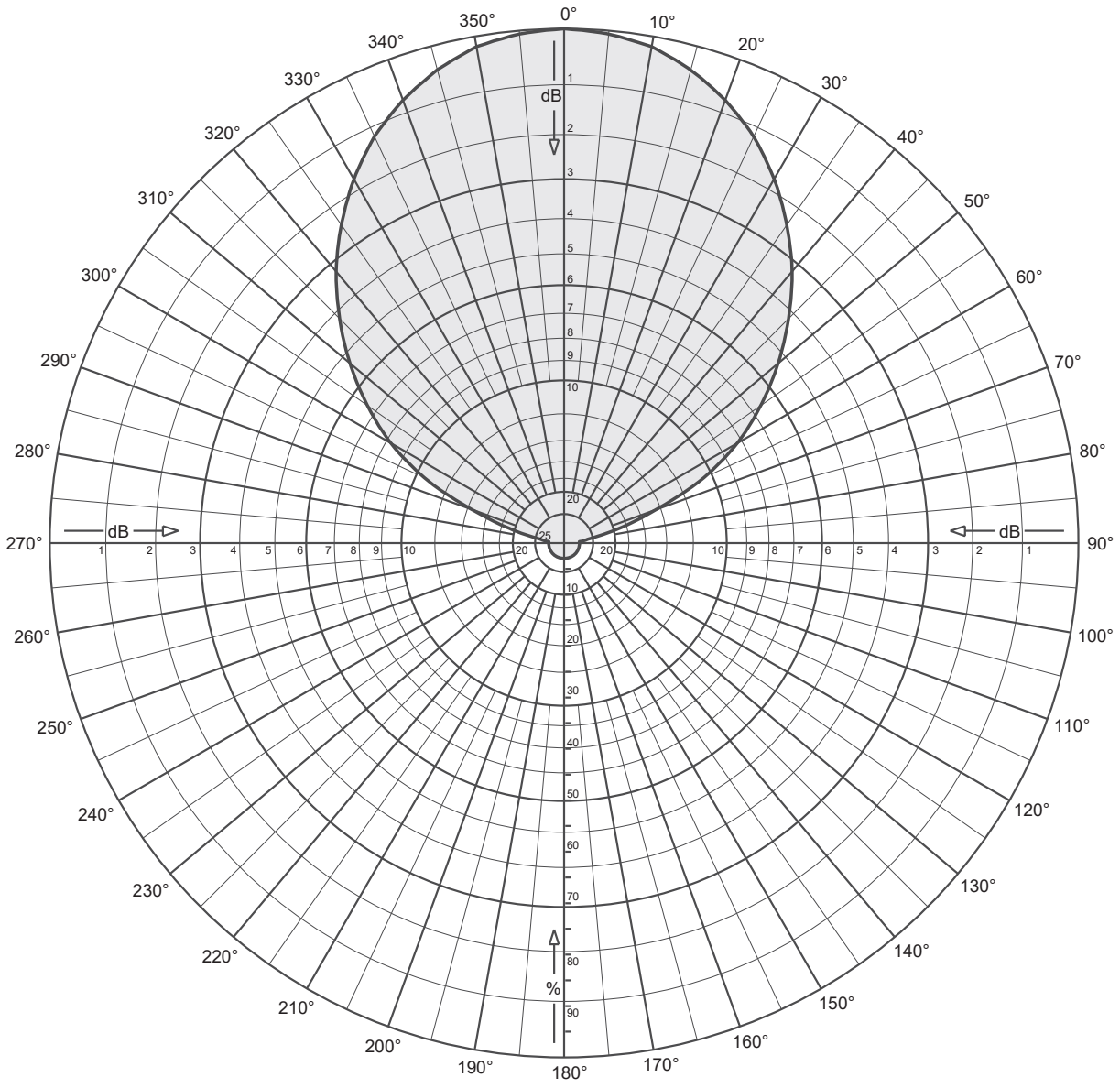
Horizontal polarization Component

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 9
Copy of Manufacturer's Directional Antenna Documentation
(Actual Antenna Pattern rotated to 340.0°T) *(public record copy)*



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
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http://www.kathrein-scala.com

26-Oct-2011

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SCALA DIVISION

CL-FM
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Horizontal radiation pattern
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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 9
Copy of Manufacturer's Directional Antenna Documentation
(Actual Antenna Pattern rotated to 340.0°T) *(public record copy)*

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 9
Copy of Manufacturer's Directional Antenna Documentation
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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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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