Kessler and Gehman Associates
Consultants • Broadcast • Wireless

MINOR MODIFICATION TO A CONSTRUCTION PERMITTED NON-COMMERCIAL FM BROADCAST STATION

CALL SIGN: WVBY(FM)
FACILITY ID: 71689
FCC FILE NO.: BPED-20190411AAM
LOCATION: BECKLEY, WV

Prepared For:

West Virginia Educational
Broadcast Authority
600 Capitol Street
Charleston, WV 25301

Prepared By:

Ryan Wilhour
Consulting Engineer
Kessler and Gehman Associates
507 NW 60th Street, Suite D
Gainesville, FL 32607-2055
352-332-3157 Extension 3
ryan@kesslerandgehman.com
www.kesslerandgehman.com

March 26, 2020

1.0 PURPOSE OF FM MODIFICATION APPLICATION

West Virginia Educational Broadcasting Authority ("WVEBA") has a Construction Permit "CP"[1] to operate WVBY(FM) on Channel 219 with an ERP of 14 kW. Upon measuring the azimuth pattern for the new antenna, it was discovered that it fell short of the required 85% RMS threshold relative to the enveloping pattern. It is herein proposed to reduce the enveloping pattern to ensure that an RMS value over 85% is achieved and the measured pattern is still entirely within the envelope. No other changes are proposed.

2.0 ANTENNA AND SITE ELEVATIONS

It is proposed to use the use the existing support structure[2] to mount the new antenna as illustrated in Appendix A. The new antenna shall be mounted such that the center of radiation is the same elevation as the CP antenna.

3.0 EFFECTIVE RADIATED POWER

Pursuant to 47 C.F.R. Section 73.211(b) entitled "Maximum limits", Class B FM stations will be authorized to operate with maximum facilities of 50kW ERP at 150 meters HAAT. An FM station with a HAAT that exceeds 150 meters will not be permitted to operate with an ERP greater than that which would result in a 60 dBu contour of 52 kilometers.

Since the calculated HAAT is 284m as demonstrated in Appendix B, the applicant shall employ 14.0 KW ERP as illustrated in Appendix C in order to keep its contour within the class distance threshold.

[1] FCC File No.: BPED-20190411AAM
[2] Antenna Structure Registration Number: 1035131

4.0 FREQUENCY ALLOCATION STUDY

Appendix E demonstrates compliance with the following sections of the FCC rules:

- 47 CFR § 73.509 – Contour overlap Protection
- 47 CFR § 73.207 – Spacing Requirements
- 47 CFR § 73.525 – Television Channel 6 Protection

All contours were generated in accordance with 47 CFR § 73.333 engineering charts utilizing FCC 30 arc second terrain data.

5.0 FM TRANSMITTER LOCATION AND COVERAGE REQUIREMENTS

Appendix F demonstrates that the transmitter location has been chosen so that, on the basis of the effective radiated power and antenna height above average terrain employed, a minimum field strength of 60 dBµV/m (1- uV/m) will be provided over the entire principal community of Beckley, WV.

6.0 AM STATION PROXIMITY

Pursuant to 47 C.F.R. Section 1.30002(eb), there are no AM Station located within 3km of the proposed facility.

7.0 INTERNATIONAL COORDINATION

The proposed facility is not within 320km of any international borders and is not subject to international coordination.

8.0 RADIO FREQUENCY RADIATION COMPLIANCE AND ENVIRONMENTAL PROCESSING

Appendix H is an RFR analysis which demonstrates that the peak RFR exposure is less than 5% of the most restrictive permissible exposure threshold standing

anywhere at ground level and in any proximity to the proposed support structure. Pursuant to OET Bulletin 65, since the proposed operation does not exceed 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR and other sources of RFR need not be taken into consideration for a net effect. The proposed antenna shall be side mounted to an existing support structure and thus will make no change in overall height, marking specifications, or lighting and thus is categorically excluded from further environmental processing.

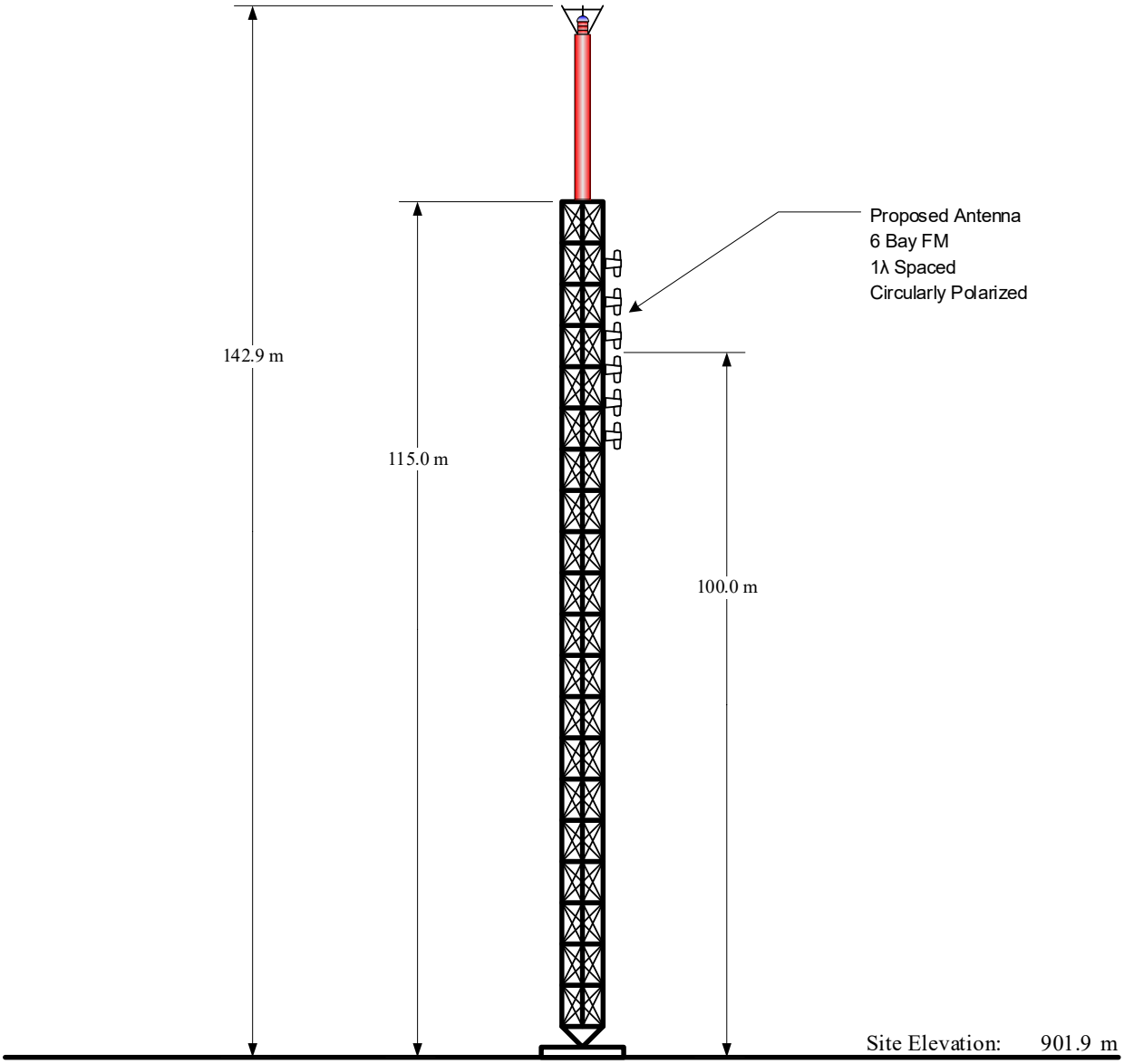
9.0 CERTIFICATION

The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on March 26, 2020.

KESSLER AND GEHMAN ASSOCIATES, INC.

Ryan Wilhour
Consulting Engineer

APPENDIX A – Tower Elevation Profile



Overall Height AGL:	142.9 m
Overall Height AMSL:	1044.8 m
Radiation Center AGL:	100.0 m
Radiation Center AMSL:	1001.9 m
Radiation Center HAAT:	284.0 m

NOTE: NOT TO SCALE

NAD83 Coordinates:

N. Latitude:	37° 53' 46.4"
W. Longitude:	80° 59' 20.3"

ASR No.: 1035131

FAA Study No.: 2009-AEA-3289-OE

APPENDIX B – Height Above Average Terrain Calculation

The Height Above Average Terrain (HAAT) was calculated from the FCC's HAAT Calculator tool:

https://www.fcc.gov/media/radio/haat-calculator
Results are as follows:

Antenna Height Above Average Terrain Calculations -- Results

Input Data

Latitude **37° 53' 46"** North
Longitude **80° 59' 21"** West (NAD 27)

These coordinates convert to NAD 83 coordinates of
37° 53' 46.41", North, 80° 59' 20.34" West (NAD 83).

Height of antenna radiation center above mean sea level: **1002** meters AMSL

Number of Evenly Spaced Radials = **8** 0° is referenced to True North

Results

Calculated HAAT = **284 meters**

Antenna Height Above Average Terrain calculated
using FCC 30 second terrain database (continental USA only)

Individual "Radial HAAT" Values, in meters

0°	293.7 m
45°	169.0 m
90°	114.2 m
135°	250.0 m
180°	249.3 m
225°	345.8 m
270°	398.0 m
315°	455.0 m

APPENDIX C – Class A Equivalent Power Determination

The ERP was calculated from the FCC's "FMPOWER" tool:

https://www.fcc.gov/media/radio/fmpower

Results are as follows:

FMpower Results

Class B facilites for equivalency determination:
Reference ERP = 50.000 kW ERP
Reference HAAT= 150 meters HAAT
F(50,50) 60 dBu protected contour at 52.2 km distance

Equivalent ERP = 14.000 kilowatts (kW)
(rounded per 47 CFR 73.212)

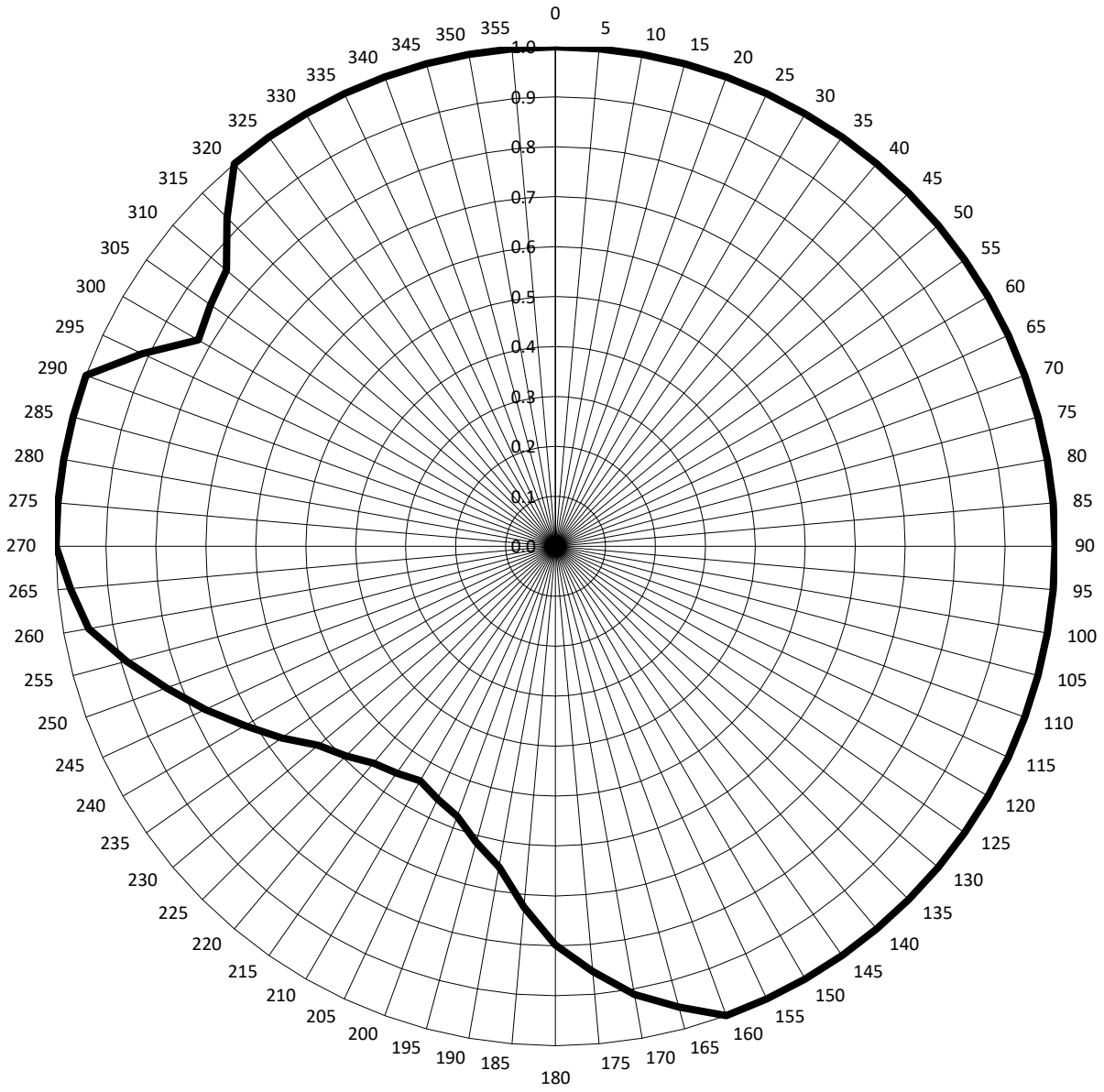
Unrounded ERP = 14.142 kW for 284 meters HAAT

Class B and B1 stations are authorized in WV.

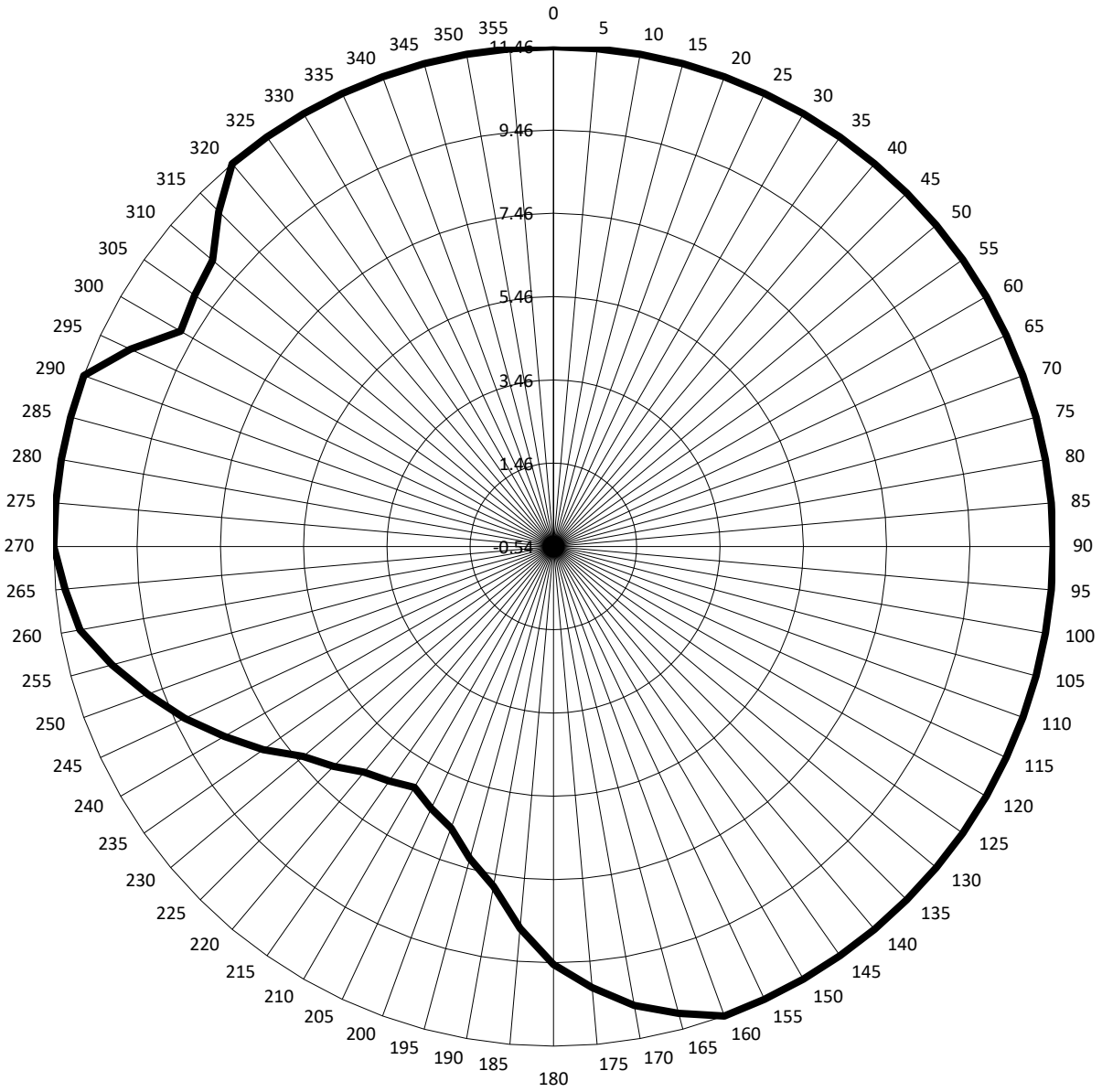
APPENDIX D – Proposed Antenna Azimuth Pattern

AZIMUTH	RELATIVE FIELD	AZIMUTH	RELATIVE FIELD
N000ºE	1.000	N180ºE	0.798
N010ºE	1.000	N190ºE	0.652
N020ºE	1.000	N200ºE	0.575
N030ºE	1.000	N210ºE	0.542
N040ºE	1.000	N220ºE	0.567
N050ºE	1.000	N230ºE	0.620
N060ºE	1.000	N240ºE	0.718
N070ºE	1.000	N250ºE	0.829
N080ºE	1.000	N260ºE	0.949
N090ºE	1.000	N270ºE	1.000
N100ºE	1.000	N280ºE	1.000
N110ºE	1.000	N290ºE	1.000
N120ºE	1.000	N300ºE	0.826
N130ºE	1.000	N310ºE	0.860
N140ºE	1.000	N320ºE	1.000
N150ºE	1.000	N330ºE	1.000
N160ºE	1.000	N340ºE	1.000
N170ºE	0.911	N350ºE	1.000

RELATIVE FIELD AZIMUTH PATTERN



ERP - dBkW


0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
11.46
9.46
7.46
5.46
3.46
1.46
-0.54

APPENDIX E – Allocation Studies and Maps

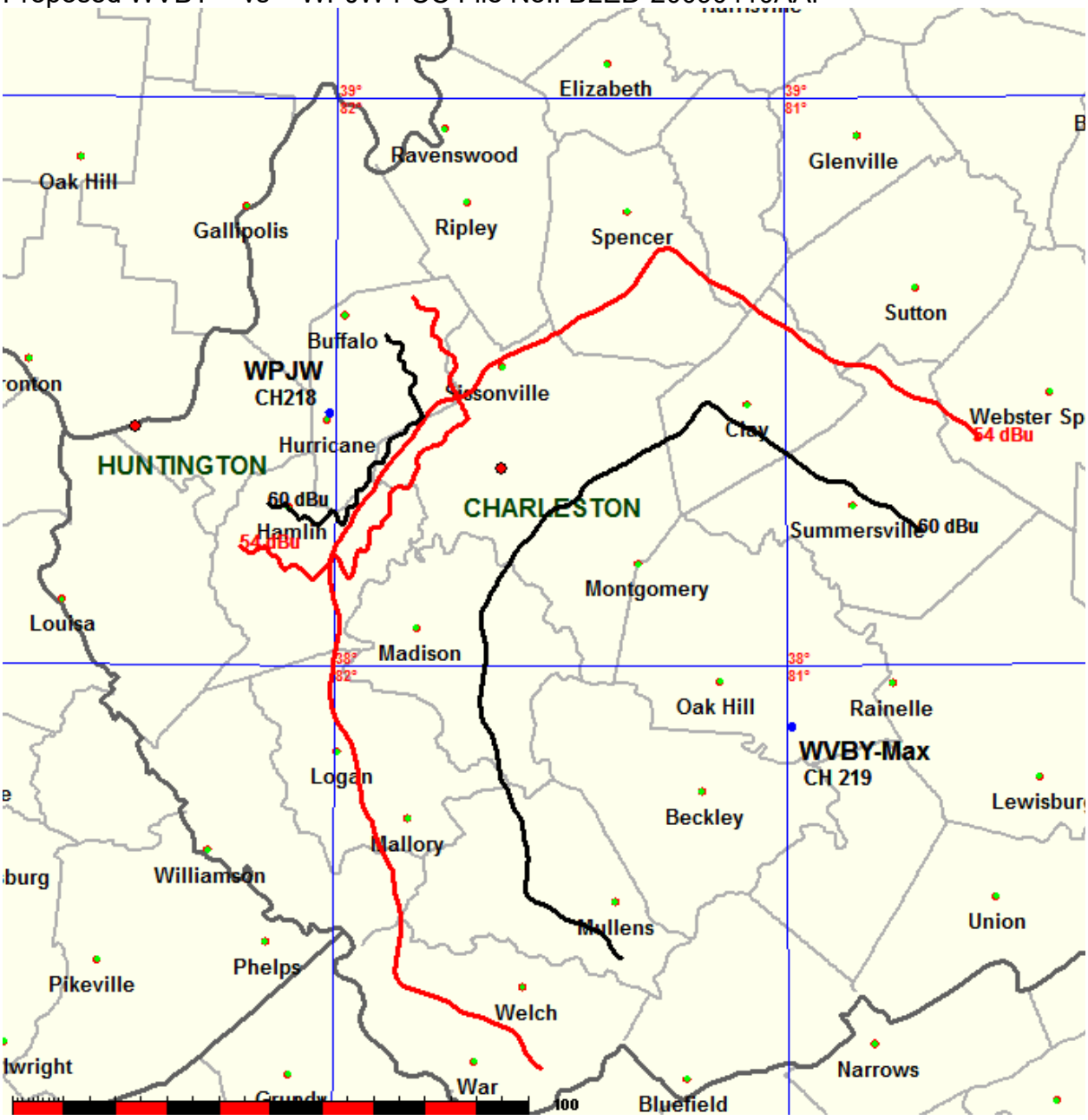
West Virginia Educational Broadcasting Authority

REFERENCE — CH# 219B - 91.7 MHz, Pwr= 14 kW DA, HAAT= 284.0 M, COR= 1002 M — DISPLAY DATES
37 53 46.4 N. — Average Protected F(50-50)= 52.1 km — DATA 03-26-20
80 59 20.3 W. — Standard Directional — SEARCH 03-26-20

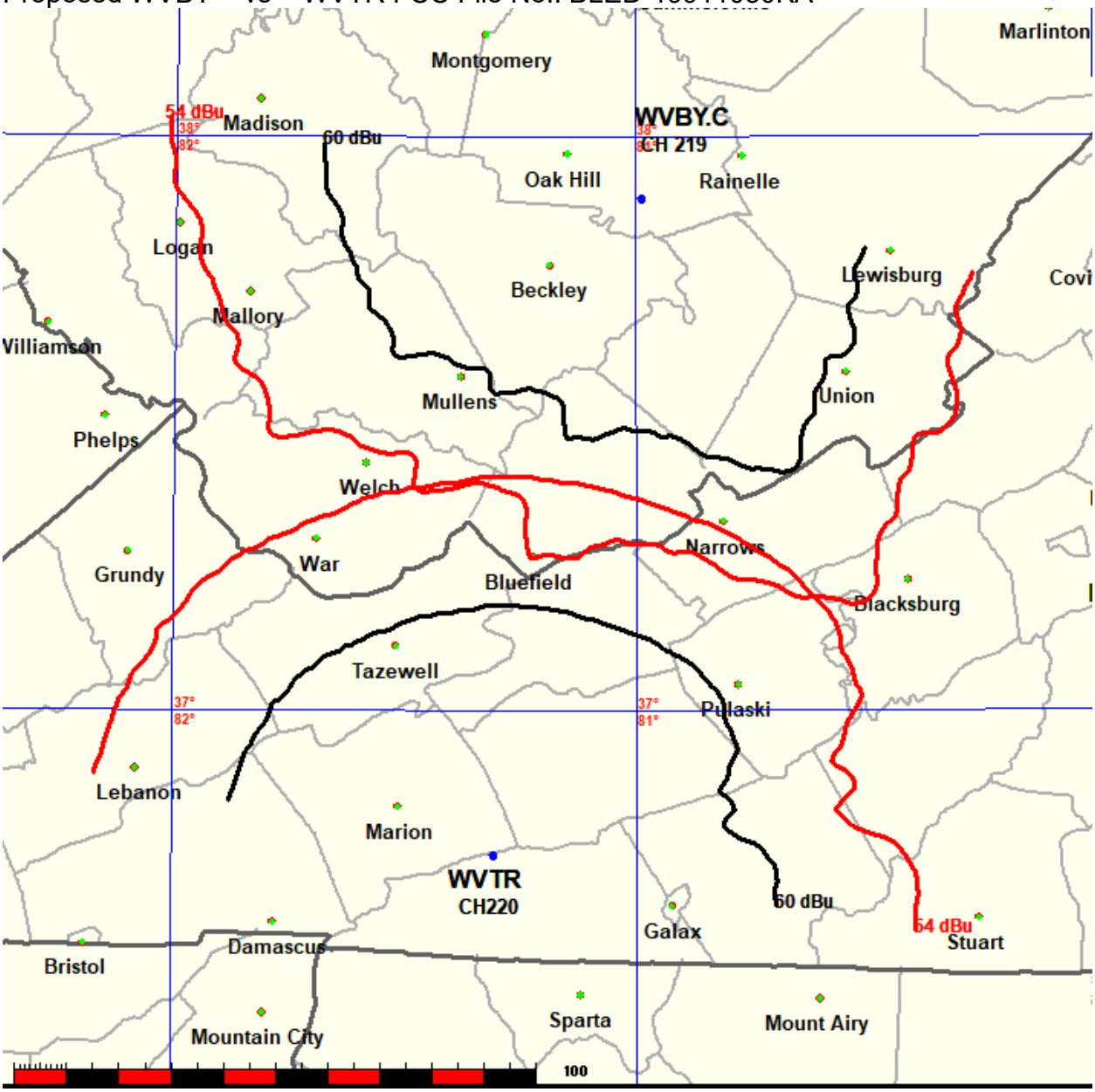
CH CALL / CITY	TYPE	ANT	STATE	AZI. <--	DIST FILE #	LAT. LNG.	Pwr(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT* (Overlap in km)
218A WPJW	LIC	D		304.5	108.58	38 26 41.3	3.000	20.4	13.7	25.3	1.9
Hurricane			WV	123.9	BLED20090410AAI	82 00 53.5	92	324	Positive Alternative Radio		
222C WXLK«	LIC	D		136.2	107.12	37 11 51.4	100.000	14.6	94.9	104.5R	2.6M
Roanoke			VA	316.7	BLH20110722ADP	80 09 09.1	605	1191	Mel Wheeler, Inc.		
219C3 WWJD	LIC			249.8	178.00	37 19 45.3	7.300	104.4	40.8	18.2	4.8
Pippa Passes			KY	68.6	BLED19971028KA	82 52 29.5	166	588	Alice Lloyd College		
218A WPIN-FM	LIC			167.4	99.07	37 01 29.4	0.085	29.2	19.5	19.1	4.9
Dublin			VA	347.6	BLED20011108AAB	80 44 45.2	379	1032	Positive Alternative Radio		
272A WMTD-FM«	LIC			170.9	20.38	37 42 53.4	0.370	9.6	69.7	14.5R	5.9M
Hinton			WV	350.9	BLH19960415KC	80 57 08.3	388	1086	Mountainplex Media II, LLC		
220A WVMR-FM	LIC	D		64.4	77.00	38 11 30.4	0.550	12.3	8.7	24.2	7.8
Hillsboro			WV	244.9	BLED20101012AAH	80 11 43.2	-11	930	Pocahontas Communications		
220C2 WVTR	LIC	D		192.4	130.46	36 44 52.4	4.500	73.8	48.9	8.8	10.2
Marion			VA	12.2	BLED19911030KA	81 18 14.3	454	1355	Virginia Tech Foundation,		
216C1 WPIB	LIC	D		193.3	72.85	37 15 26.4	12.000	5.6	56.0	19.4	12.7
Bluefield			WV	13.2	BLED20020717AAA	81 10 42.3	361	1146	Positive Alternative Radio		
217A WSJE	LIC			30.0	59.64	38 21 38.9	0.240	1.1	21.6	12.8	33.3
Summersville			WV	210.2	BLED20110315AAV	80 38 49.7	250	954	Evangelist Communications,		
220A WHKU	LIC			296.8	139.68	38 27 14.3	3.000	39.5	26.0	36.4	19.3
Proctorville			OH	116.0	BLED19860409KB	82 25 04.6	91	312	Educational Media Foundati		
219A WEQP	LIC			111.5	180.87	37 17 07.5	1.150	76.7	26.2	59.9	41.2
Rustburg			VA	292.7	BLED20071210ABQ	79 05 25.0	228	464	Calvary Chapel Of Lynchbur		
220A WLKP	LIC	Z		344.8	166.95	39 20 46.3	5.200	33.6	22.5	68.5	48.2
Belpre			OH	164.5	BLED20060410ACA	81 29 54.4	99	331	Educational Media Foundati		

Terrain database is USGS 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= , Co to 3rd adjacent.
All separation margins (if shown) include rounding. Call signs with exclamation marks 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.
« = Station meets FCC minimum distance spacing for its class.

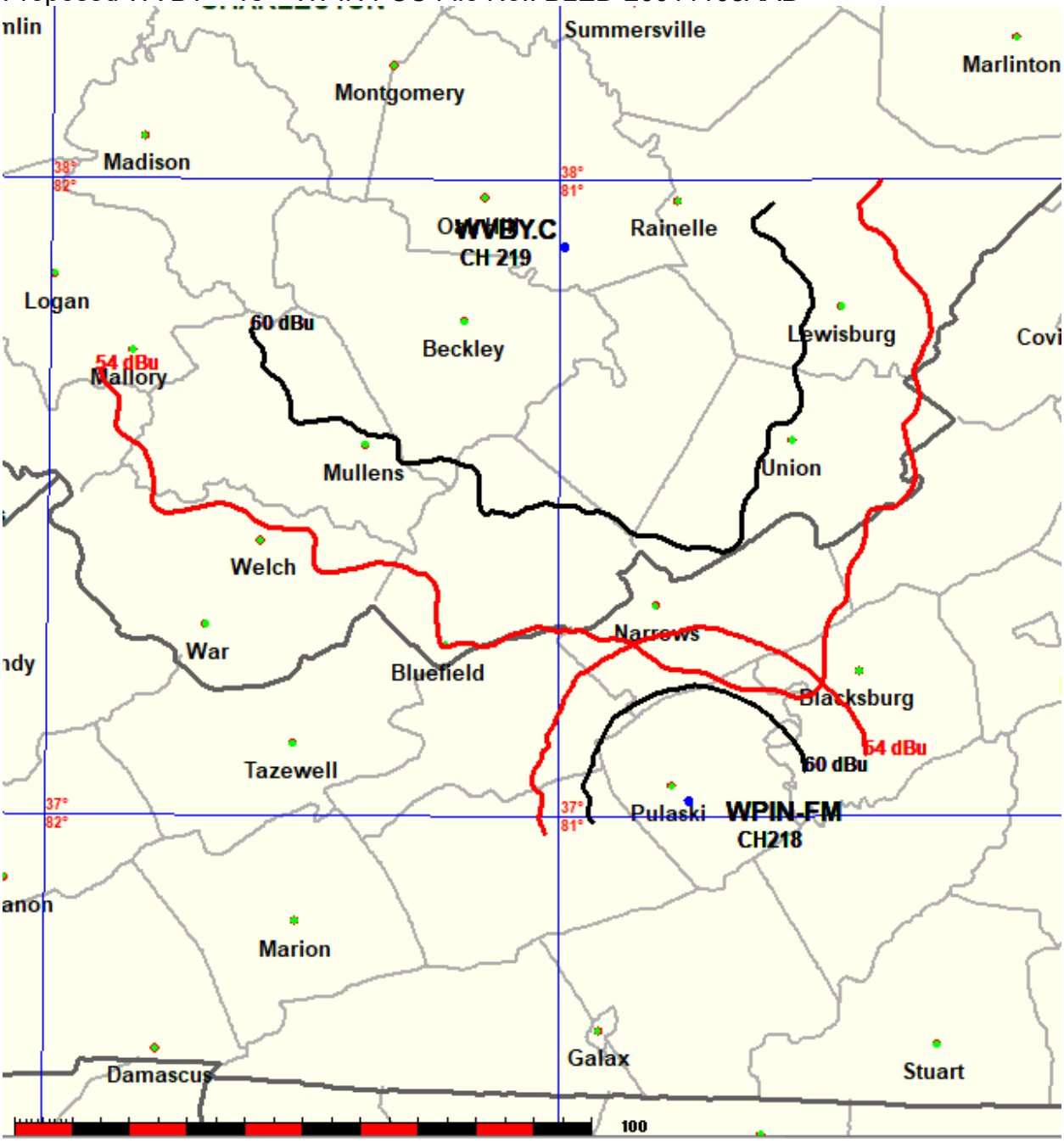
Proposed WVBY – vs – WPJW FCC File No.: BLED-20090410AAI



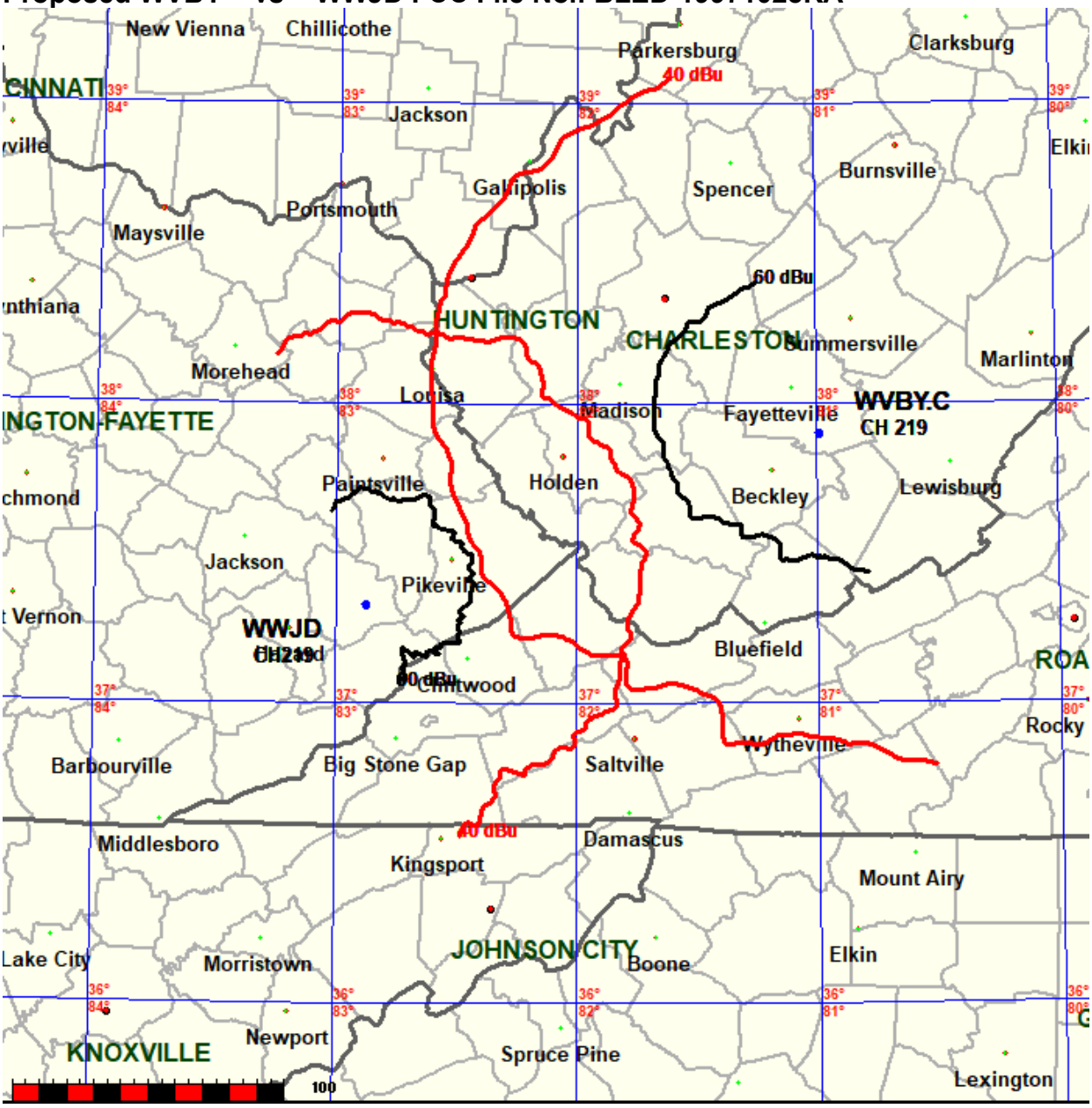
Proposed WVBY – vs – WVTR FCC File No.: BLED-19911030KA



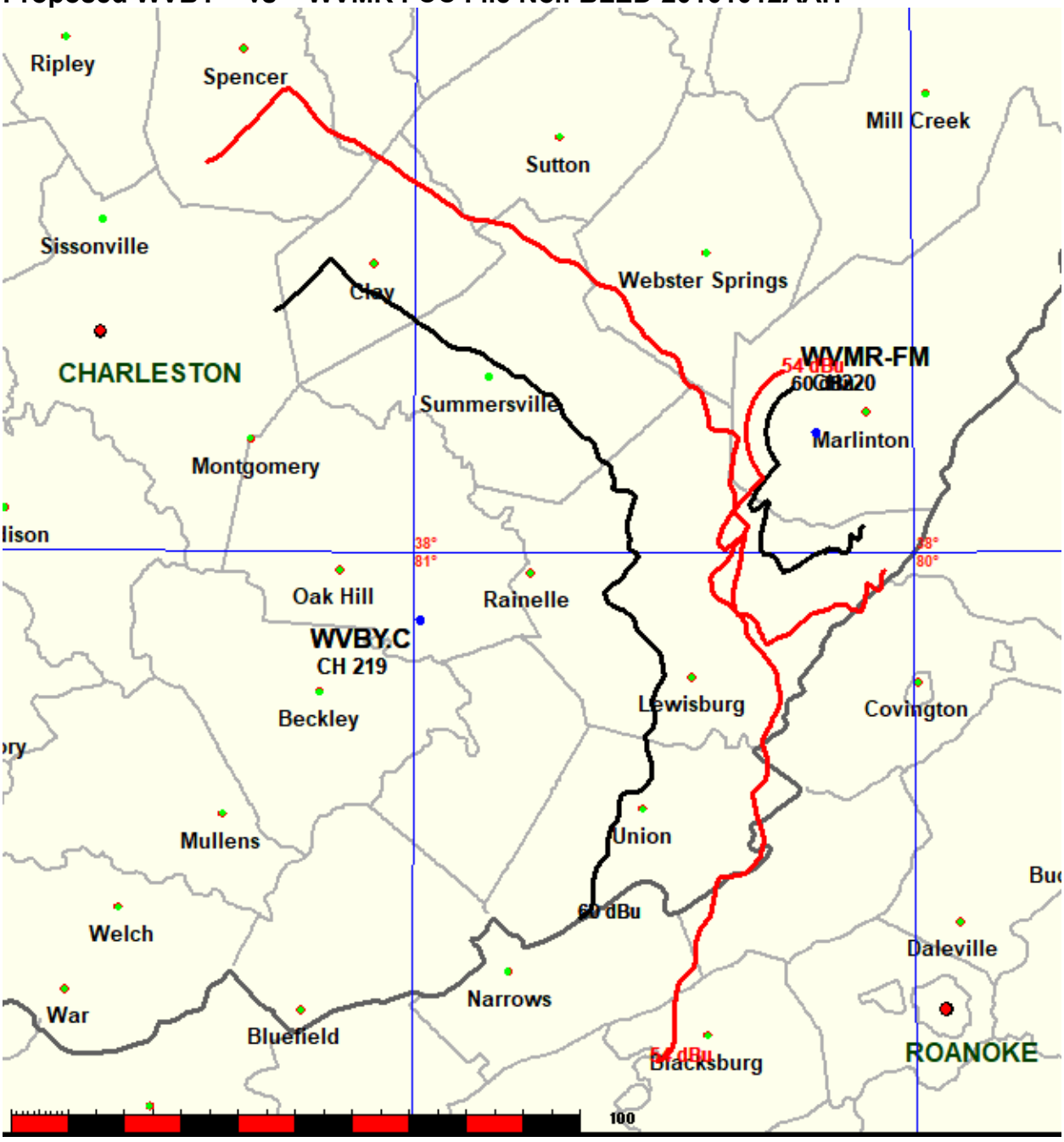
Proposed WVBY – vs – WPIN FCC File No.: BLED-20011108AAB



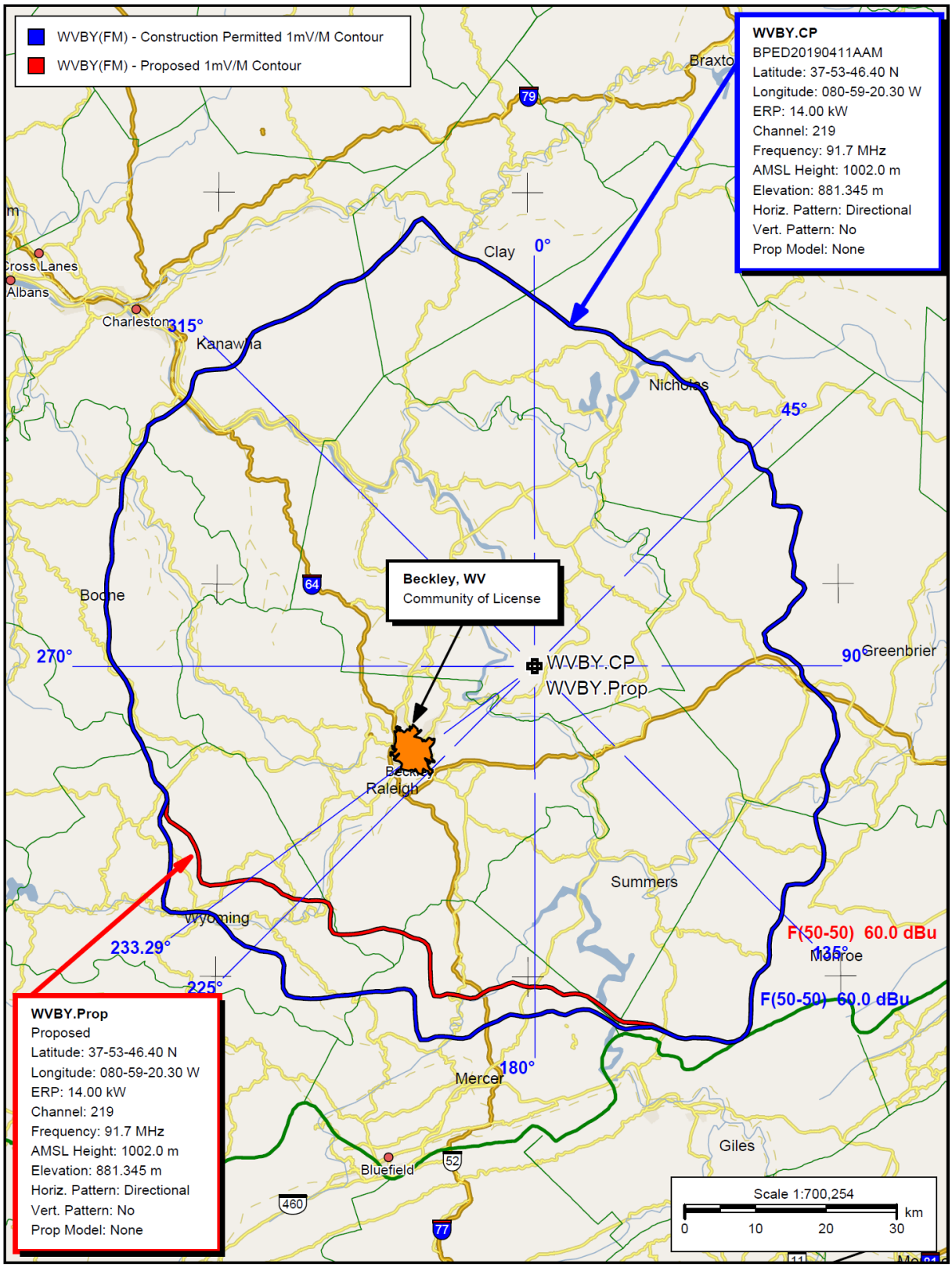
Proposed WVBY – vs – WWJD FCC File No.: BLED-19971028KA



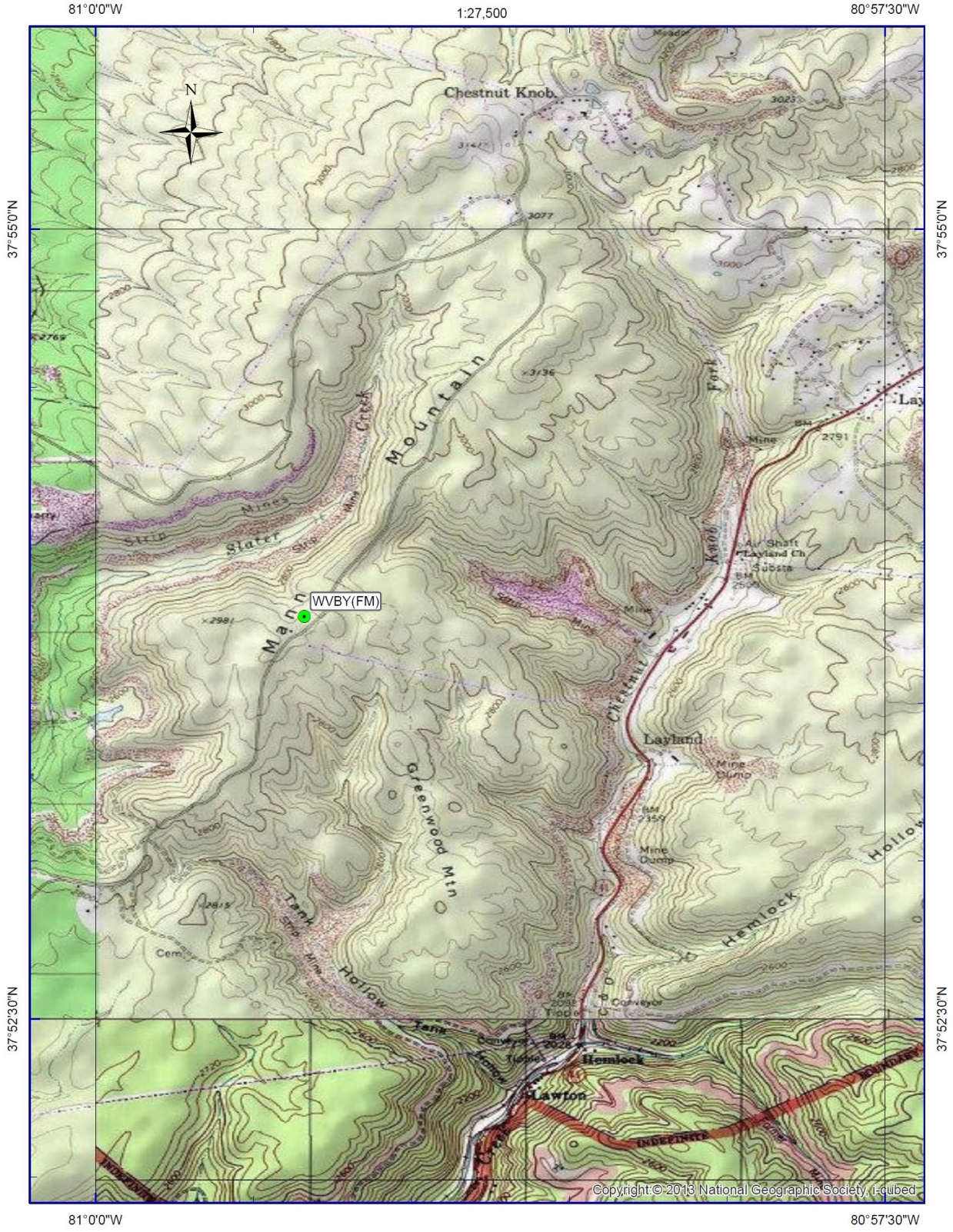
Proposed WVBY – vs – WVMR FCC File No.: BLED-20101012AAH



APPENDIX F – 47 CFR § 73.313 - Prediction of coverage



APPENDIX G – Topographical Site Location Map



APPENDIX H – OET65 Far Field Exposure to RF Emissions

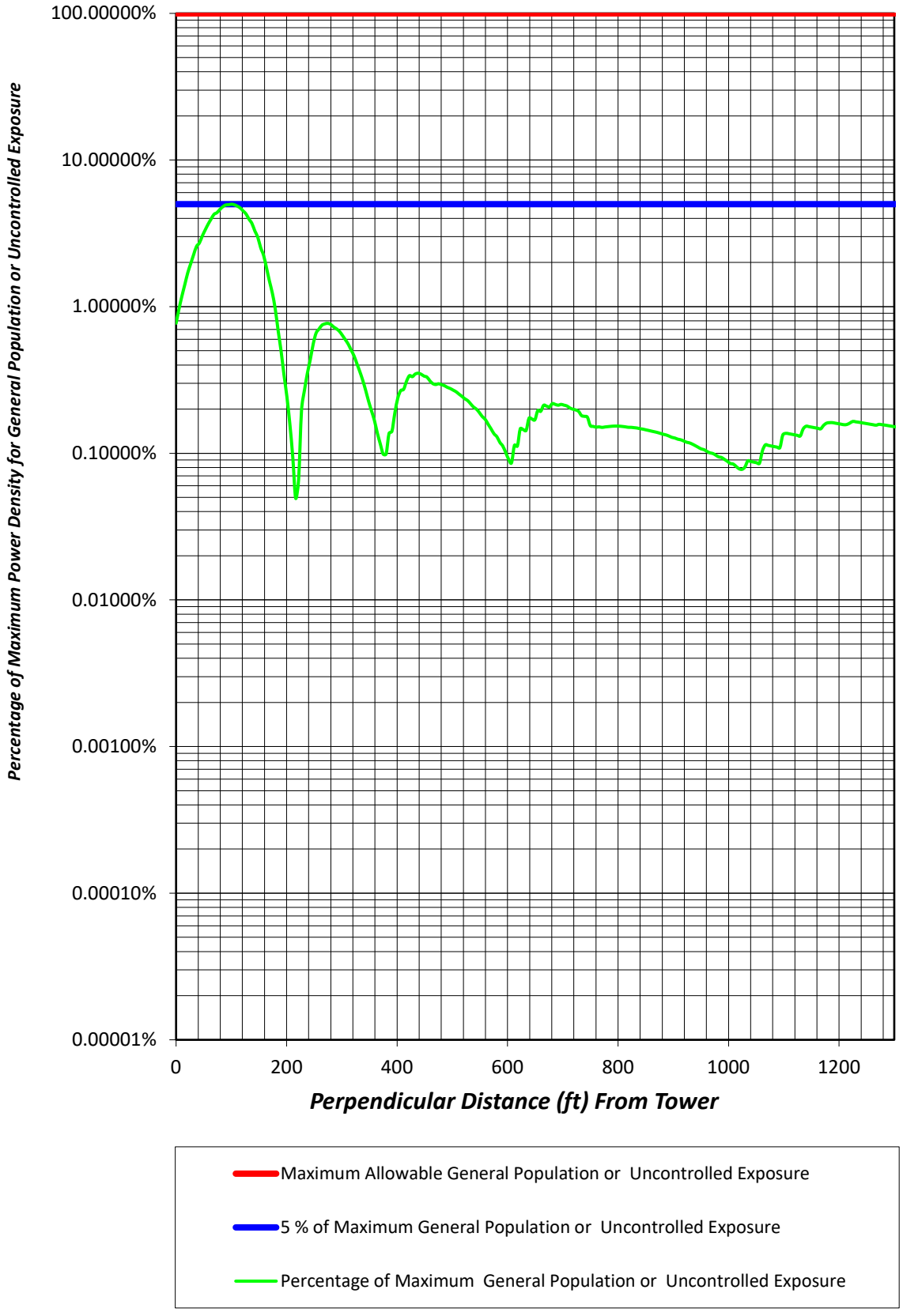
A theoretical analysis has been conducted of the human exposure to radio frequency radiation ("RFR") using the calculation methodology described in OET Bulletin 65, Edition 97-01. The RFR analysis is conducted pursuant to the following methodology:

> Terrain[3] extraction is compiled from the support structure site, if the support structure is on a rooftop with no higher elevations (e.g., elevator shaft) then flat terrain is compiled. Terrain is extracted using radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

> Starting from the origin the maximum calculated RFR value is determined among the 360 degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

[3] Terrain extraction is based upon a 3 arc second point spacing terrain database.


100.00000%
10.00000%
1.00000%
0.10000%
0.01000%
0.00100%
0.00010%
0.00001%
Percentage of Maximum Power Density for General Population or Uncontrolled Exposure
0
200
400
600
800
1000
1200
Perpendicular Distance (ft) From Tower
Maximum Allowable General Population or Uncontrolled Exposure
5 % of Maximum General Population or Uncontrolled Exposure
Percentage of Maximum General Population or Uncontrolled Exposure