

**Modify W221CI FM Translator Station
CH 221D (92.1 MHz) - 0.084 kW Goose Creek, SC
to
Proposed CH221D (92.1) - 0.250 kW Goose Creek, SC**

June 16, 2020

TECHNICAL NARRATIVE

This Technical Narrative and attached exhibits were prepared on behalf of Kirkman Broadcasting, Inc., (“Kirkman”), licensee of FM translator station W221CI, Channel 221D, Facility ID No. 91551, Goose Creek, SC. Kirkman herein proposes to modify W221CI by relocating to a new tower site and operating with 250 watts ERP non-directional with circular polarization at 90 meters above ground and 90 meters HAAT. The modified W221CI will be used as a fill-in translator for WJNI, Channel 292A (106.3 MHz) Facility ID No. 66798, licensed to Ladson, SC. Kirkman has written consent to retransmit WJNI for Thomas B. Daniels, Licensee.

An exhibit showing compliance with Section 74.1201(g) Fill-In Translator is included. A channel study using Section 73.207 separation distances for Class A FM stations is included as an exhibit. This channel study is provided as a courtesy to FCC staff to help identify potential contour overlap issues. Section 74.1204 contour protection exhibits are included for WYMB Channel 221C1, Myrtle Beach, SC, WCKN Channel 223C1 Moncks Corner, SC, WBHC-FM Channel 221A, Hampton, SC, W220CN Channel 220D, Charleston, SC and WWOS-FM Channel 220A, St. George, SC. An exhibit demonstrates compliance with Section 74.1233(a) Common Overlap.

A study has been undertaken to show the proposed W221CI facility is in compliance with the Commission’s radio frequency emission limits and are attached as exhibits.

W221CI Class A FM Channel Study

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REFERENCE                                     DISPLAY DATES
32 55 43.0 N.                               CLASS = A   Int = AA   DATA   06-15-20
80 06 12.0 W.                               Current Spacings to 3rd Adj.  SEARCH 06-15-20
----- Channel 221 - 92.1 MHz -----
Call      Channel  Location      Azi      Dist      FCC      Margin
  Lat.      Lng.      Ant      Power
-----
W221CI    LIC    221D    Goose Creek      SC    9.3      8.8      84.5      -75.7
33 00 23.6    80 05 17.3      0.084 kW    0 M
      Kirkman Broadcasting, Inc.      BLFT20170215AAT

WMYB      LIC-N 221C1  Myrtle Beach      SC    52.8     122.7     199.5     -76.8
33 35 27.6    79 02 54.1    N      94.000 kW    263 M
      Dick Broadcasting Company,      BMLH20081006AAK
Note: See Section 73.1204 Contour Protection Exhibit - WMYB & WBHC-FM

WKCL      LIC    218C1  Ladson      SC    9.4      8.8      74.5     -65.7
33 00 24.6    80 05 16.3      100.000 kW    93 M
      Chapel Holy Spirit Church      BLED19900227KA
Note: See Section 73.1204 Contour Protection Exhibit - WKCL & WCKN

WCKN      LIC    223C1  Moncks Corner      SC   116.1     27.9      74.5     -46.6
32 49 04.6    79 50 07.3      100.000 kW    237 M
      Saga South Communications,      BMLH20081014AAU
Note: See Section 73.1204 Contour Protection Exhibit - WKCL & WCKN

WBHC-FM   LIC    221A    Hampton      SC   264.7     96.1     114.5     -18.4
32 50 38.6    81 07 31.4      6.000 kW     100 M
      Bocock Communications, LLC      BLH19980814KE
Note: See Section 73.1204 Contour Protection Exhibit - WMYB & WBHC-FM

W220CN    LIC    220D    Charleston      SC   123.3     28.4      33.5      -5.1
32 47 16.6    79 50 58.3      0.010 kW     173 M
      Radio Training Network, In      BLFT20060913AAB
Note: See Section 73.1204 Contour Protection Exhibit - W220CN & WWOS-FM

WWOS-FM   LIC-N 220A    St. George      SC   311.8     72.5      71.5       1.0
33 21 42.0    80 41 05.0    N      6.000 kW     77 M
      Grace Baptist Church Of Or      BLED20120830ABC
Note: See Section 73.1204 Contour Protection Exhibit - W220CN & WWOS-FM

WBEI-LP   LIC    275L1  Charleston      SC   154.5     19.1       5.5      13.6
32 46 24.4    80 00 55.7      0.100 kW     30 M
      Bishop England High School      BLL20150810ADW

WCFJ      LIC-Z 221C3  Irmo      SC   323.8     159.4     141.5     17.9
34 04 55.5    81 07 35.3    Z      15.000 kW    130 M
      Radio Training Network, In      BMLED20160419ABA

WLFS      LIC-Z 220C3  Port Wentworth  GA   224.4     119.4      88.5     30.9
32 09 28.7    80 59 27.4    Z      23.500 kW    103 M
      Radio Training Network, In      BMLED20150612AAU
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WJNI

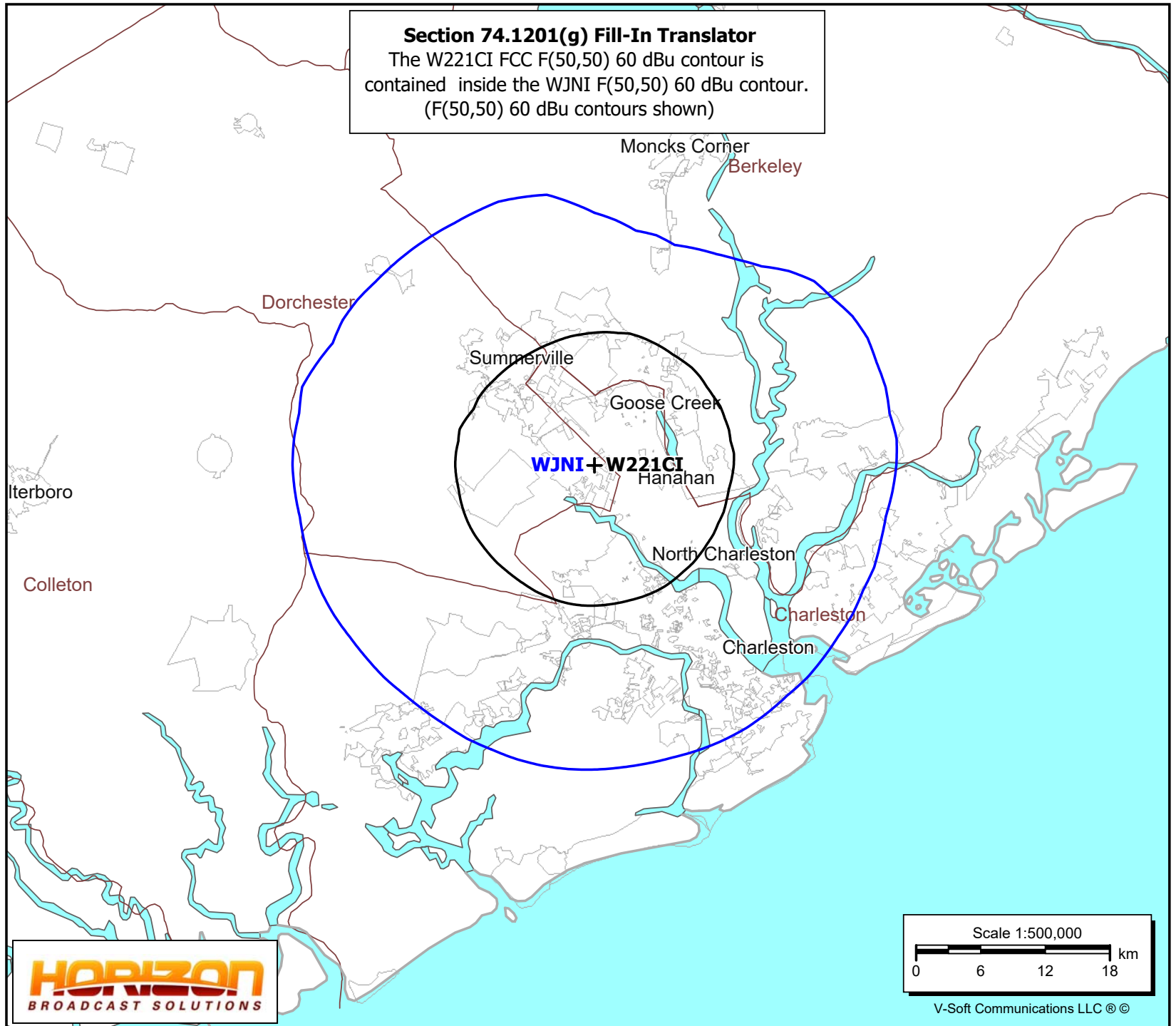
Ladson, SC
BLH20010608AAF
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 6.00 kW
Channel: 292
Frequency: 106.3 MHz
AMSL Height: 105.0 m
Elevation: 10.0 m
Horiz. Pattern: Directional
Vert. Pattern: No
Prop Model: None

W221CI

Goose Creek, SC
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 0.25 kW
HAAT: 90 m
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 100.0 m
Elevation: 10.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Section 74.1201(g) Fill-In Translator

The W221CI FCC F(50,50) 60 dBu contour is contained inside the WJNI F(50,50) 60 dBu contour.
(F(50,50) 60 dBu contours shown)



W221CI

Goose Creek, SC
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 0.25 kW
HAAT: 90 m
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 100.0 m
Elevation: 10.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

WMYB

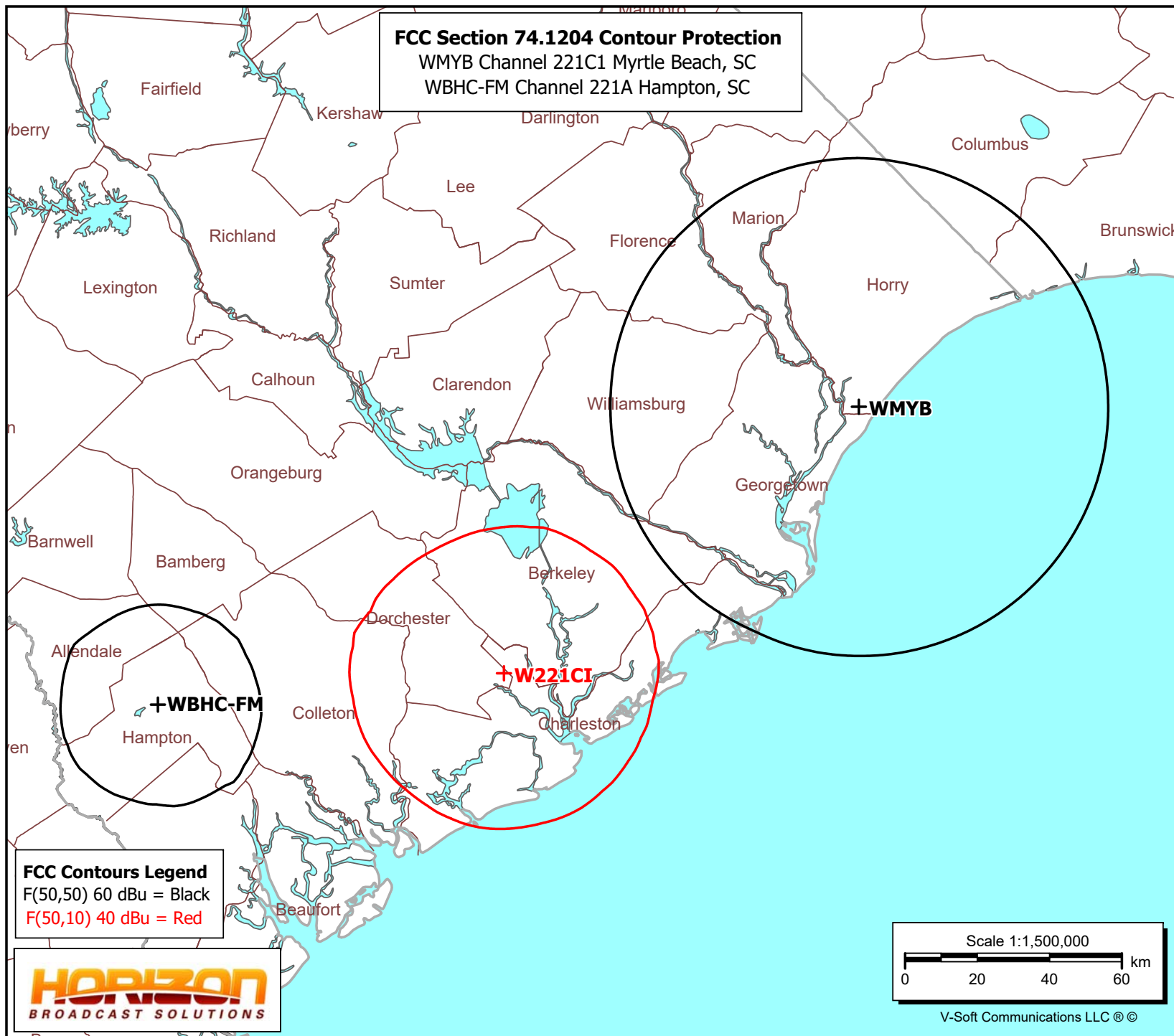
Myrtle Beach, SC
BMLH20081006AAK
Latitude: 33-35-27.60 N
Longitude: 079-02-54.10 W
ERP: 94.00 kW
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 267.0 m
Elevation: 6.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

WBHC-FM

Hampton, SC
BLH19980814KE
Latitude: 32-50-38.60 N
Longitude: 081-07-31.40 W
ERP: 6.00 kW
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 127.0 m
Elevation: 25.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

FCC Section 74.1204 Contour Protection

WMYB Channel 221C1 Myrtle Beach, SC
WBHC-FM Channel 221A Hampton, SC



Section 74.1204 Contour Protection WKCL & WCKN

This comprehensive exhibit has been prepared to demonstrate that the proposed W221CI modification will not cause prohibited interference to WKCL, Channel 218C1, Ladson, SC and WCKN Channel 223C1, Moncks Corner, SC.

This statement demonstrates that a lack of population and/or other factors allow this proposal to be compliant with Section 74.1204. The process commonly called “Living Way,” allows for the use of U/D Analysis, also known as “signal strength ratio methodology.” In this instant case the facilities to be protected are second and third adjacent and are to be afforded protection from signals 40 dB stronger than they present in the location of the proposed antenna location.

The FCC F(50,50) contour at the proposed W221CI application site for WKCL is 92.4 dBu and for WCKN is 80.0 dBu. Therefore, the proposed FCC F(50,10) interfering contour with respect to WCKN will extend furthest and will be used to demonstrate Section 74.1204 contour protection. The FCC F(50,10) interfering contour with respect to WCKN is the 120.0 dBu. The attached FCC FM and TV Propagation Curves calculation shows the 120.0 dBu interfering contour will extend 111 meters from the antenna. A copy of the Bext TFC2K one bay antenna vertical elevation pattern is attached. Using the data provided in the vertical elevation pattern, the ERP was calculated for every ten degrees of elevation. The respective contour distance for the W221CI interfering contour was then calculated using the FCC's FM propagation curves program. The contour distance ranges from 111 meters at 0 degrees to 4 meters at 90 degrees. The attached spreadsheet then plotted the interfering curve from the antenna into free space. The interfering contour does not reach the ground. The proposed W221CI interfering contour comes to within

approximately 30 meters (98.4 feet) of ground level at a point approximately 70 meters (229.6 feet) from the tower. The ground level elevation varies by no more than two meters in the area around the tower base. There are no high rise buildings in the area around the tower.

Therefore, it is believed that the proposed modification of W221CI will not cause prohibited interference to WKCL or WCKN as no interference reaches the ground.

This Javascript calculator uses the FM or TV television propagation curves to find the distance to a service or interfering contour, or the corresponding field strength at a given contour distance. [More after the form.](#)

Select Contour Type:	F(50,50) Service Contour -- FM and NTSC (analog) TV F(50,10) Interfering Contour F(50,90) Digital TV Service Contour	
Select Channel Range: (not TV Virtual Channel)	FM Radio or TV Transmit Channels 2-6 TV Transmit Channels 7-13 TV Transmit Channels 14-69	
Find This:	Field Strength, given a Distance (in km) Distance, Given a Field Strength (in dBu) FM ERP, given Distance and Field Strength [F(50,50) Service Contour]	
<input type="text" value=".25"/> ERP (kW)	<input type="text"/>	Distance (km)
<input type="text" value="90"/> HAAT (meters)	<input type="text" value="120.0"/>	Field (dBu)
<input type="button" value="Find Result"/>	<input type="button" value="Clear Form"/>	
Results:		
<div>Calculated Distance = 0.111 km Free Space equation used to compute distance.</div>		

This function uses the FCC's CURVES program to make calculations of the F(50,50) FM and NTSC (analog) TV service curves, the F(50,10) interfering signal curves, and the F(50,90) digital TV service curves. Printable copies of these propagation curves are available at [FM and TV Propagation Curves Graphs \(/media/radio/fm-and-tv-propagation-curves-graphs\)](#).

W221CI

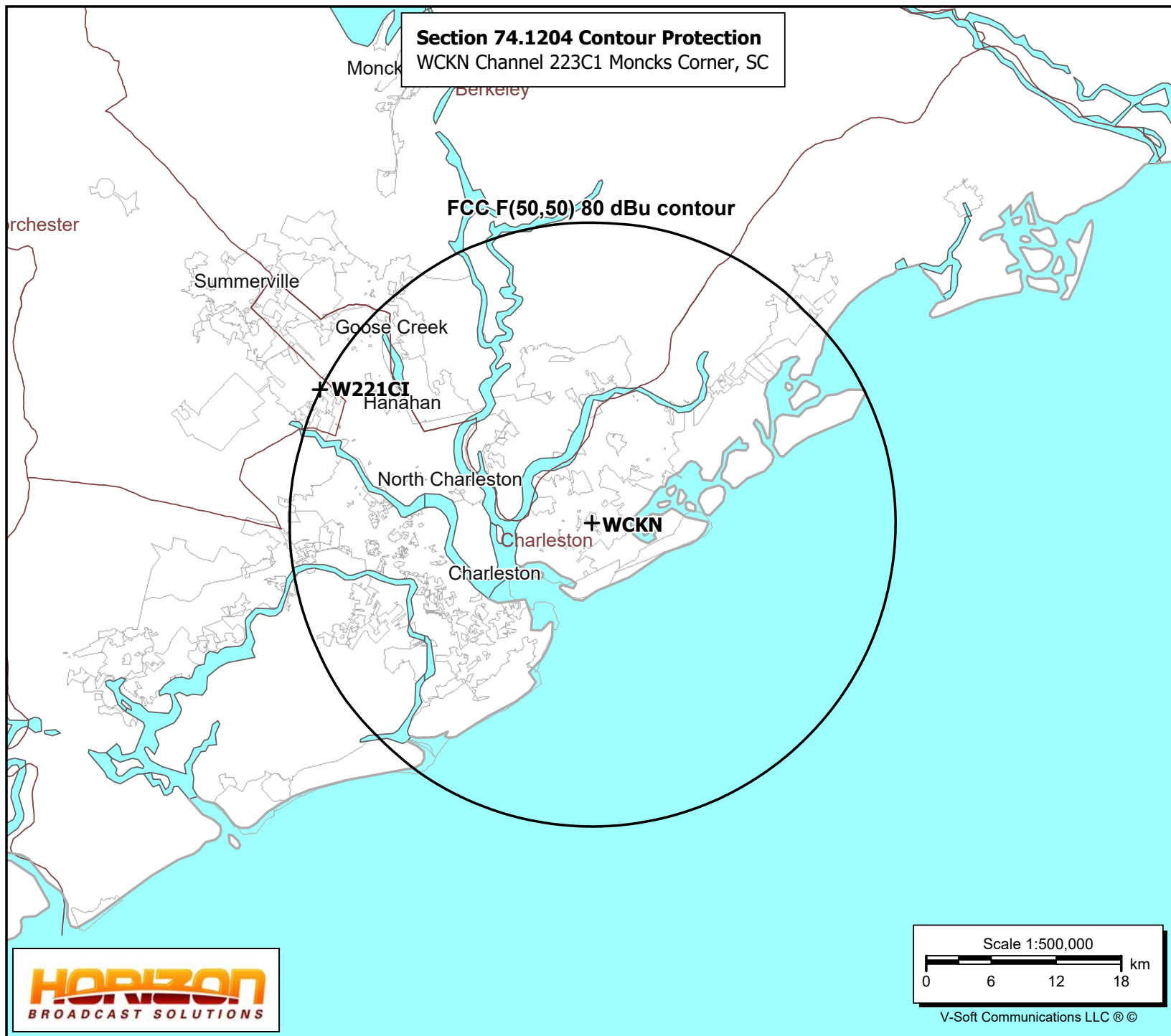
Goose Creek, SC
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 0.25 kW
HAAT: 90.0 m
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 100.0 m
Elevation: 10.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

WCKN

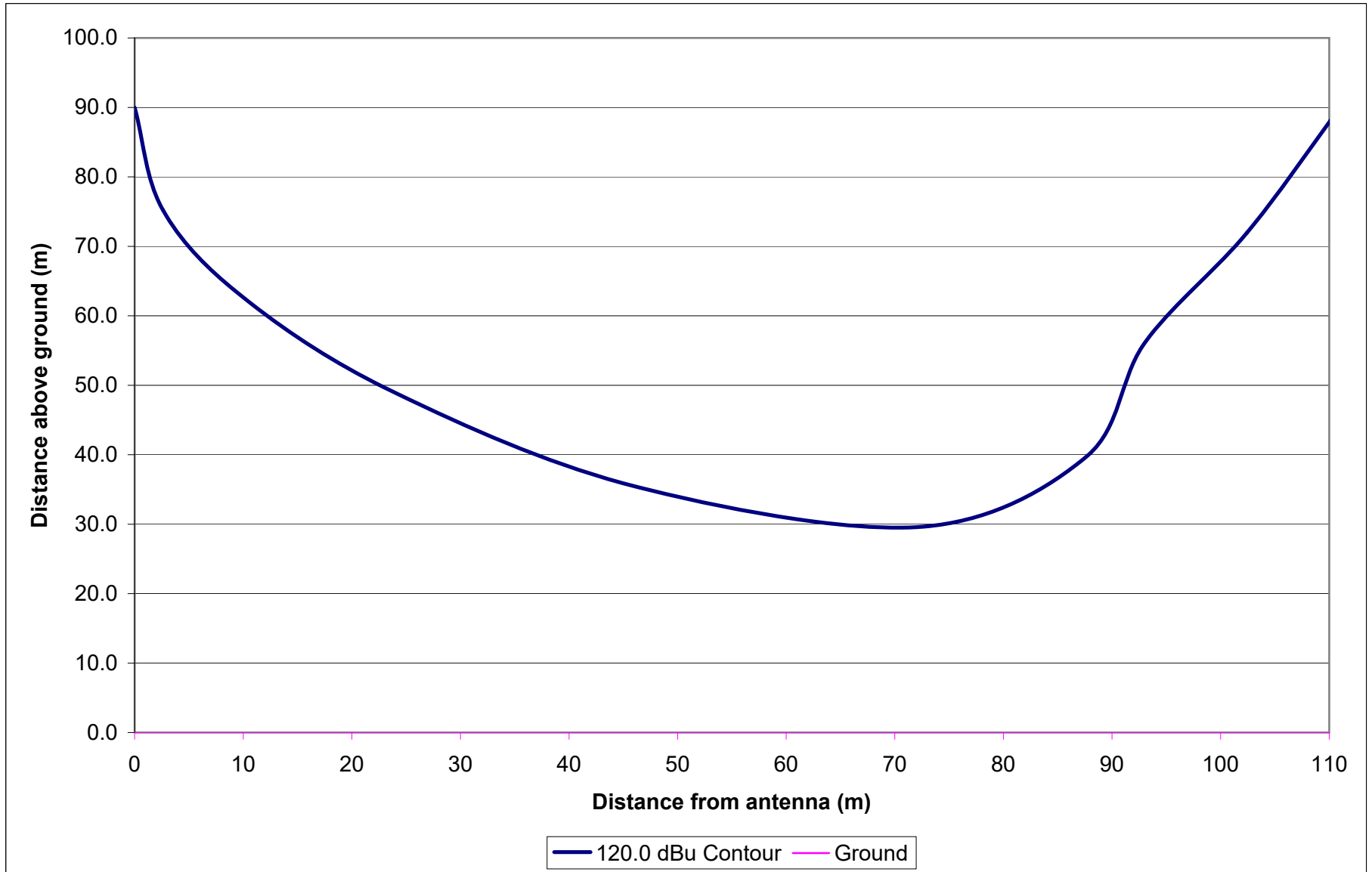
Moncks Corner, SC
BMLH20081014AAU
Latitude: 32-49-04.60 N
Longitude: 079-50-07.30 W
ERP: 100.00 kW
HAAT: 237 m
Channel: 223
Frequency: 92.5 MHz
AMSL Height: 239.0 m
Elevation: 4.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Section 74.1204 Contour Protection

WCKN Channel 223C1 Moncks Corner, SC



W221CI - Goose Creek, SC
Section 74.1204 Contour Protection
to
WCKN Channel 223C1, Moncks Corner, SC



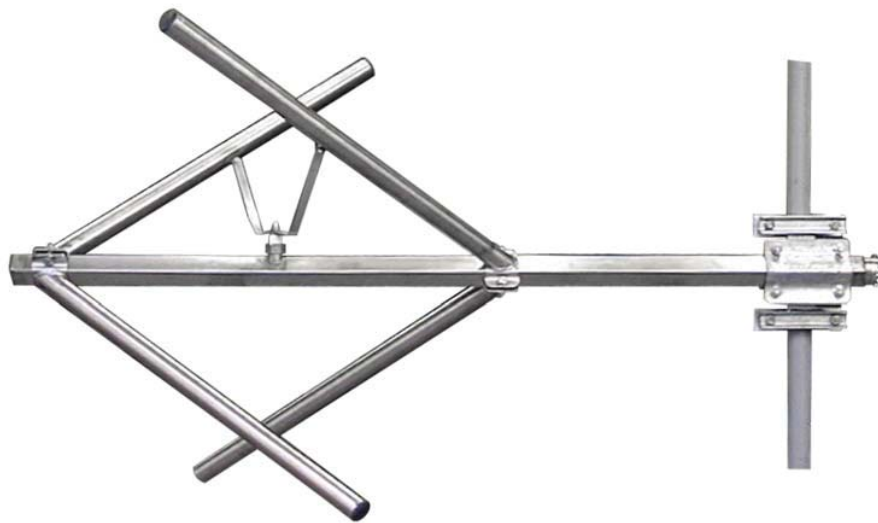
The W221CI interfering contour with respect to WCKN does reach the ground.

Angle of				120.0 dBu
Elevation	Relative	ERP	ERP	Contour
(Degrees)	Field	(watts)	(dBk)	(Meters)
0	1.000	250.0	-6.021	111
10	0.934	218.1	-6.614	104
20	0.89	198.0	-7.033	99
30	0.914	208.8	-6.802	101
40	0.844	178.1	-7.494	94
50	0.644	103.7	-9.843	71
60	0.423	44.7	-13.494	47
70	0.26	16.9	-17.721	29
80	0.134	4.5	-23.479	15
90	0.034	0.3	-35.391	4

Θ (°)	Θ (radians)	R (m)	x'	y'	y = 90 - y'	Gnd
0	0	111	111	0	90.0	0
10	0.175	104	102.4	18.1	71.9	0
20	0.349	99	93.0	33.9	56.1	0
30	0.524	101	87.5	50.5	39.5	0
40	0.698	94	72.0	60.4	29.6	0
50	0.873	71	45.6	54.4	35.6	0
60	1.047	47	23.5	40.7	49.3	0
70	1.222	29	9.9	27.3	62.7	0
80	1.396	15	2.6	14.8	75.2	0
90	1.571	4	0.0	4	90	0

TFC2K 98.1MHz

October 2015



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General data of antenna System

TX station	
Site Name	
System of coordinates	WGS84
Longitude	
Latitude	
Ground level a.s.l. (m)	1.0
Antenna system height (m)	20.0
Transmitter power(Watt)	1.000
Carrier wave frequency (MHz)	98.100
Antenna system central frequency (MHz)	98.100
Antenna base diagrams type 1	TFC2K
Antenna base Electrical Tilt type 1	
Mechanical Tilt	0
Azimuth (°):	0.0
Polarization (H/V/C/X)	C
Transmitting cable attenuation (dB)	0.0
Additional attenuations(dB)	0.0
Base diagrams sectors (T = All, F = Front)	T
Velocity factor of cables to Antennas (0÷1)	1.00
Coordinate System(C = cartesian, P = polar)	P
Mast side / diameter(cm)	0.0
Mast cross section (T/Q/C)	Q
Structure rotation w.r.t. North (°)	0.0
Mast rotation w.r.t. North (°)	0.0

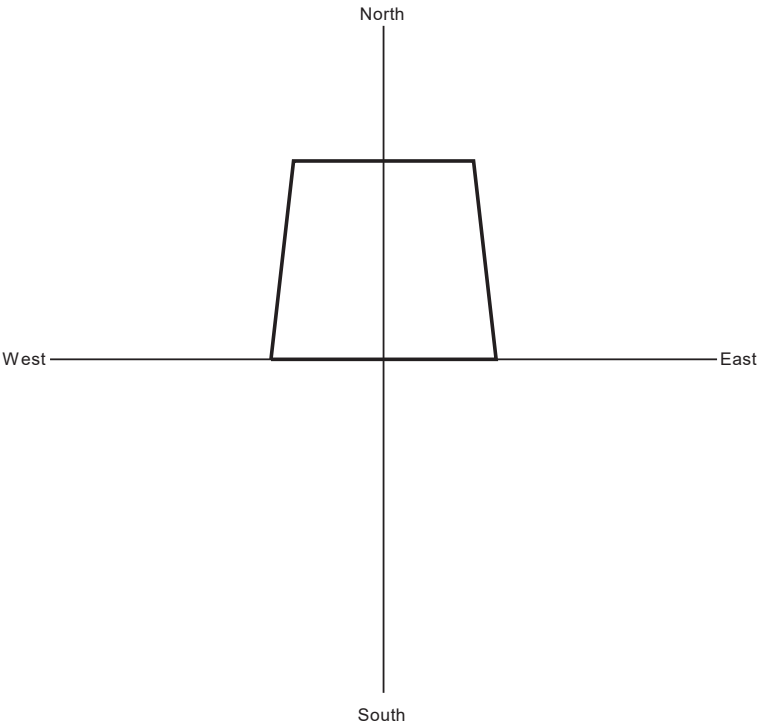
Information about antennas used in the System

	Antenna
Manufacturer	Telecom
Antenna model	TFC2K
Band start(MHz)	87
Band stop(MHz)	108
diagrams Frequency(MHz)	98.1
Polariz (H/V/C/X)	C
Vertical dist (cm)	320
Height (cm)	250
Width (cm)	170
Thickness (cm)	150
Weight (Kg)	80
Maximum power (KW)	4
Gain (dBd)	-3.4
North E.C. (cm)	70
East E.C. (cm)	0
Return loss (dB)	0
R.C.Phase (°)	0

Geometrical and electrical data of antenna System

	<i>Power</i> (%)	<i>Tilt</i> (°)	<i>Az.</i> (°/N)	<i>Phase</i> (°)	<i>V dist.</i> (m)	<i>Scr-d</i> (cm)	<i>Scr-Az</i> (°/N)	<i>Rot.</i> (1÷4)	<i>Type</i> (1÷2)	<i>L cables</i> (cm)	<i>Car. phase</i> (°)
1	100.000	0	0	0 +0.0	0.00	0.0	0.0	1	1	0.0	0.0

Plan of antenna system



Side of antenna system



Antennas arrays data

Note: calculation of single antennas arrays data (without taking into account mutual effects)

A. Antennas array azimuth (°/N)	0
B. Number of antennas	1
C. Nominal power supply (W)	1.00
D. Losses (addit. + cables) (dB)	0.0
E. Effective power supply (W)	1.00
F. Theor. maximum gain (dBd)	-3.40
G. Distribution losses (dB)	0.00
H. Nominal max gain F - G (dBd)	-3.40
I. Compensation losses (dB)	0.00
J. Effec. max gain H - I (dBd)	-3.40
K. Effec. max gain (times)	0.46
L. Effec. max power E * K (KW)	0.0005
M. Max power depr. angle (°)	-2.0
N. Max power az. angle (°)	66

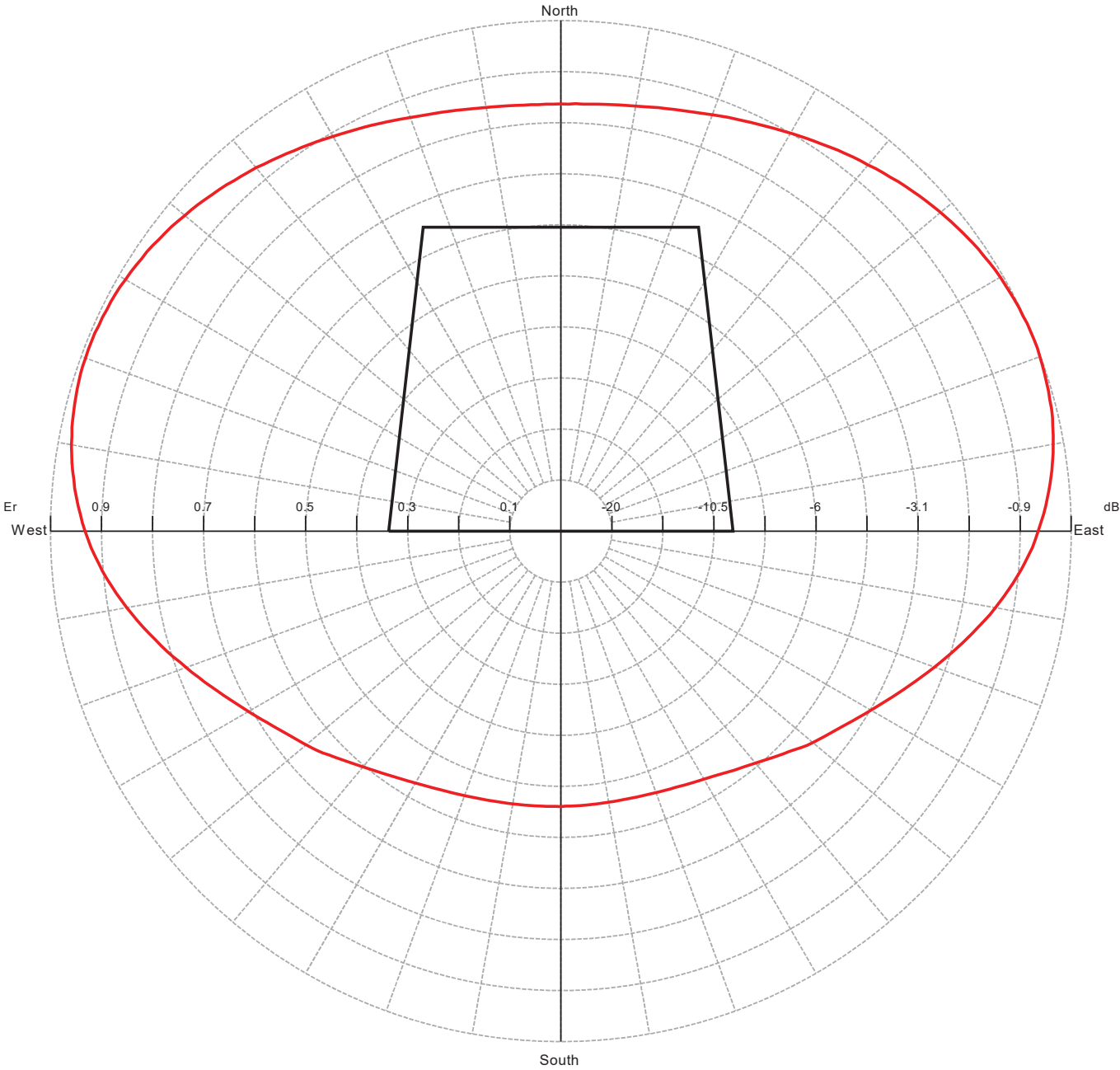
Diagram in dBK calculated at horizon

Az. (°/N)	dBK	Az. (°/N)	dBK	Az. (°/N)	dBK	Az. (°/N)	dBK
0	-35.0	90	-34.0	180	-38.8	270	-34.0
10	-34.9	100	-34.7	190	-38.7	280	-33.6
20	-34.6	110	-35.6	200	-38.6	290	-33.5
30	-34.3	120	-36.5	210	-38.3	300	-33.5
40	-34.0	130	-37.2	220	-37.8	310	-33.8
50	-33.7	140	-37.9	230	-37.1	320	-34.1
60	-33.5	150	-38.4	240	-36.4	330	-34.4
70	-33.4	160	-38.7	250	-35.6	340	-34.7
80	-33.6	170	-38.8	260	-34.7	350	-34.9

Diagram in dBK calculated at horizon (without -20dB's lower limit vs maximum power)

Az. (°/N)	dBK	Az. (°/N)	dBK	Az. (°/N)	dBK	Az. (°/N)	dBK
0	-35.0	90	-34.0	180	-38.8	270	-34.0
10	-34.9	100	-34.7	190	-38.7	280	-33.6
20	-34.6	110	-35.6	200	-38.6	290	-33.5
30	-34.3	120	-36.5	210	-38.3	300	-33.5
40	-34.0	130	-37.2	220	-37.8	310	-33.8
50	-33.7	140	-37.9	230	-37.1	320	-34.1
60	-33.5	150	-38.4	240	-36.4	330	-34.4
70	-33.4	160	-38.7	250	-35.6	340	-34.7
80	-33.6	170	-38.8	260	-34.7	350	-34.9

Horizontal diagram at 0.0° tilt (Total Antenna)



0.0° Tilt (Total Antenna), Gain (dBd): -3.41

ERP T.Max(KW): 0 ERP E.Max(KW): 0

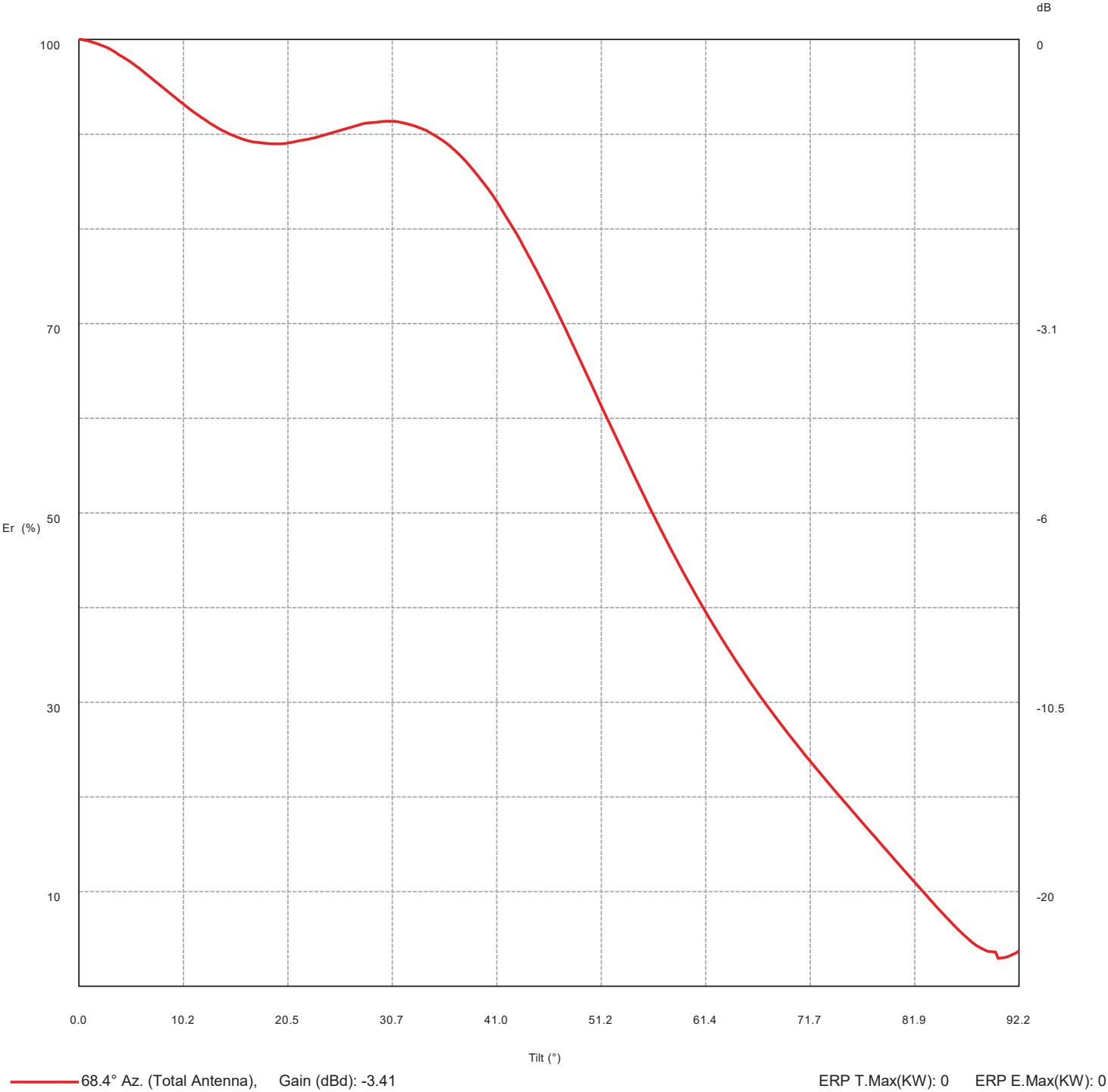
Horizontal diagram at 0.0° tilt (Total Antenna)

Az (°)	Er (%)	ERP (W)	Az (°)	Er (%)	ERP (W)	Az (°)	Er (%)	ERP (W)
0.0	83.7	0.3	60.0	99.4	0.5	120.0	70.2	0.2
1.0	83.7	0.3	61.0	99.5	0.5	121.0	69.5	0.2
2.0	83.8	0.3	62.0	99.7	0.5	122.0	68.8	0.2
3.0	83.8	0.3	63.0	99.8	0.5	123.0	68.2	0.2
4.0	83.8	0.3	64.0	99.9	0.5	124.0	67.6	0.2
5.0	83.9	0.3	65.0	99.9	0.5	125.0	67.0	0.2
6.0	84.0	0.3	66.0	100.0	0.5	126.0	66.5	0.2
7.0	84.1	0.3	67.0	100.0	0.5	127.0	66.0	0.2
8.0	84.2	0.3	68.0	100.0	0.5	128.0	65.4	0.2
9.0	84.4	0.3	69.0	100.0	0.5	129.0	64.9	0.2
10.0	84.5	0.3	70.0	99.9	0.5	130.0	64.5	0.2
11.0	84.7	0.3	71.0	99.8	0.5	131.0	63.9	0.2
12.0	84.9	0.3	72.0	99.7	0.5	132.0	63.3	0.2
13.0	85.1	0.3	73.0	99.5	0.5	133.0	62.8	0.2
14.0	85.3	0.3	74.0	99.4	0.5	134.0	62.2	0.2
15.0	85.5	0.3	75.0	99.2	0.4	135.0	61.7	0.2
16.0	85.7	0.3	76.0	99.1	0.4	136.0	61.2	0.2
17.0	86.0	0.3	77.0	98.9	0.4	137.0	60.7	0.2
18.0	86.2	0.3	78.0	98.5	0.4	138.0	60.2	0.2
19.0	86.5	0.3	79.0	98.3	0.4	139.0	59.7	0.2
20.0	86.8	0.3	80.0	97.9	0.4	140.0	59.3	0.2
21.0	87.1	0.3	81.0	97.6	0.4	141.0	58.9	0.2
22.0	87.4	0.3	82.0	97.3	0.4	142.0	58.5	0.2
23.0	87.7	0.4	83.0	96.9	0.4	143.0	58.2	0.2
24.0	88.0	0.4	84.0	96.5	0.4	144.0	57.9	0.2
25.0	88.3	0.4	85.0	96.1	0.4	145.0	57.5	0.2
26.0	88.6	0.4	86.0	95.6	0.4	146.0	57.2	0.1
27.0	88.9	0.4	87.0	95.2	0.4	147.0	56.9	0.1
28.0	89.3	0.4	88.0	94.6	0.4	148.0	56.6	0.1
29.0	89.6	0.4	89.0	94.1	0.4	149.0	56.3	0.1
30.0	90.1	0.4	90.0	93.5	0.4	150.0	56.1	0.1
31.0	90.4	0.4	91.0	93.0	0.4	151.0	55.9	0.1
32.0	90.7	0.4	92.0	92.4	0.4	152.0	55.7	0.1
33.0	91.1	0.4	93.0	91.8	0.4	153.0	55.5	0.1
34.0	91.4	0.4	94.0	91.1	0.4	154.0	55.3	0.1
35.0	91.8	0.4	95.0	90.4	0.4	155.0	55.1	0.1
36.0	92.3	0.4	96.0	89.6	0.4	156.0	55.0	0.1
37.0	92.6	0.4	97.0	88.9	0.4	157.0	54.9	0.1
38.0	93.0	0.4	98.0	88.1	0.4	158.0	54.8	0.1
39.0	93.3	0.4	99.0	87.3	0.3	159.0	54.6	0.1
40.0	93.6	0.4	100.0	86.4	0.3	160.0	54.5	0.1
41.0	94.1	0.4	101.0	85.6	0.3	161.0	54.4	0.1
42.0	94.4	0.4	102.0	84.8	0.3	162.0	54.3	0.1
43.0	94.7	0.4	103.0	83.9	0.3	163.0	54.3	0.1
44.0	95.2	0.4	104.0	83.0	0.3	164.0	54.2	0.1
45.0	95.5	0.4	105.0	82.2	0.3	165.0	54.1	0.1
46.0	95.8	0.4	106.0	81.3	0.3	166.0	54.1	0.1
47.0	96.2	0.4	107.0	80.5	0.3	167.0	54.0	0.1
48.0	96.5	0.4	108.0	79.6	0.3	168.0	54.0	0.1
49.0	96.8	0.4	109.0	78.8	0.3	169.0	53.9	0.1
50.0	97.2	0.4	110.0	77.9	0.3	170.0	53.9	0.1
51.0	97.4	0.4	111.0	77.0	0.3	171.0	53.9	0.1
52.0	97.7	0.4	112.0	76.2	0.3	172.0	53.9	0.1
53.0	97.9	0.4	113.0	75.4	0.3	173.0	53.9	0.1
54.0	98.2	0.4	114.0	74.6	0.3	174.0	53.9	0.1
55.0	98.5	0.4	115.0	73.8	0.2	175.0	53.9	0.1
56.0	98.7	0.4	116.0	73.1	0.2	176.0	53.9	0.1
57.0	98.9	0.4	117.0	72.3	0.2	177.0	53.9	0.1
58.0	99.1	0.4	118.0	71.5	0.2	178.0	53.9	0.1
59.0	99.3	0.4	119.0	70.8	0.2	179.0	53.9	0.1

Horizontal diagram at 0.0° tilt (Total Antenna)

Az (°)	Er (%)	ERP (W)	Az (°)	Er (%)	ERP (W)	Az (°)	Er (%)	ERP (W)
180.0	54.0	0.1	240.0	70.7	0.2	300.0	98.5	0.4
181.0	54.0	0.1	241.0	71.3	0.2	301.0	98.4	0.4
182.0	54.0	0.1	242.0	72.0	0.2	302.0	98.2	0.4
183.0	54.0	0.1	243.0	72.7	0.2	303.0	97.9	0.4
184.0	54.0	0.1	244.0	73.5	0.2	304.0	97.8	0.4
185.0	54.1	0.1	245.0	74.2	0.3	305.0	97.6	0.4
186.0	54.1	0.1	246.0	75.0	0.3	306.0	97.3	0.4
187.0	54.1	0.1	247.0	75.8	0.3	307.0	97.1	0.4
188.0	54.1	0.1	248.0	76.5	0.3	308.0	96.8	0.4
189.0	54.2	0.1	249.0	77.4	0.3	309.0	96.5	0.4
190.0	54.3	0.1	250.0	78.1	0.3	310.0	96.2	0.4
191.0	54.3	0.1	251.0	78.9	0.3	311.0	95.9	0.4
192.0	54.4	0.1	252.0	79.8	0.3	312.0	95.6	0.4
193.0	54.4	0.1	253.0	80.6	0.3	313.0	95.3	0.4
194.0	54.5	0.1	254.0	81.5	0.3	314.0	95.0	0.4
195.0	54.6	0.1	255.0	82.2	0.3	315.0	94.6	0.4
196.0	54.7	0.1	256.0	83.1	0.3	316.0	94.3	0.4
197.0	54.8	0.1	257.0	84.0	0.3	317.0	93.9	0.4
198.0	54.9	0.1	258.0	84.8	0.3	318.0	93.5	0.4
199.0	55.0	0.1	259.0	85.6	0.3	319.0	93.2	0.4
200.0	55.1	0.1	260.0	86.4	0.3	320.0	92.9	0.4
201.0	55.3	0.1	261.0	87.2	0.3	321.0	92.5	0.4
202.0	55.5	0.1	262.0	88.0	0.4	322.0	92.2	0.4
203.0	55.6	0.1	263.0	88.7	0.4	323.0	91.7	0.4
204.0	55.7	0.1	264.0	89.4	0.4	324.0	91.4	0.4
205.0	55.9	0.1	265.0	90.2	0.4	325.0	91.0	0.4
206.0	56.1	0.1	266.0	90.8	0.4	326.0	90.7	0.4
207.0	56.3	0.1	267.0	91.4	0.4	327.0	90.4	0.4
208.0	56.5	0.1	268.0	92.1	0.4	328.0	89.9	0.4
209.0	56.7	0.1	269.0	92.7	0.4	329.0	89.6	0.4
210.0	57.0	0.1	270.0	93.2	0.4	330.0	89.3	0.4
211.0	57.3	0.1	271.0	93.8	0.4	331.0	88.9	0.4
212.0	57.5	0.2	272.0	94.2	0.4	332.0	88.6	0.4
213.0	57.8	0.2	273.0	94.7	0.4	333.0	88.3	0.4
214.0	58.1	0.2	274.0	95.2	0.4	334.0	88.0	0.4
215.0	58.5	0.2	275.0	95.6	0.4	335.0	87.7	0.4
216.0	58.8	0.2	276.0	95.9	0.4	336.0	87.4	0.3
217.0	59.1	0.2	277.0	96.4	0.4	337.0	87.1	0.3
218.0	59.5	0.2	278.0	96.7	0.4	338.0	86.8	0.3
219.0	59.9	0.2	279.0	97.1	0.4	339.0	86.5	0.3
220.0	60.3	0.2	280.0	97.4	0.4	340.0	86.2	0.3
221.0	60.7	0.2	281.0	97.6	0.4	341.0	86.0	0.3
222.0	61.2	0.2	282.0	97.9	0.4	342.0	85.7	0.3
223.0	61.6	0.2	283.0	98.2	0.4	343.0	85.5	0.3
224.0	62.1	0.2	284.0	98.3	0.4	344.0	85.3	0.3
225.0	62.6	0.2	285.0	98.5	0.4	345.0	85.1	0.3
226.0	63.1	0.2	286.0	98.7	0.4	346.0	84.9	0.3
227.0	63.7	0.2	287.0	98.9	0.4	347.0	84.7	0.3
228.0	64.2	0.2	288.0	99.0	0.4	348.0	84.5	0.3
229.0	64.7	0.2	289.0	99.1	0.4	349.0	84.4	0.3
230.0	65.1	0.2	290.0	99.1	0.4	350.0	84.2	0.3
231.0	65.6	0.2	291.0	99.2	0.4	351.0	84.1	0.3
232.0	66.1	0.2	292.0	99.2	0.4	352.0	84.0	0.3
233.0	66.5	0.2	293.0	99.2	0.4	353.0	83.9	0.3
234.0	67.1	0.2	294.0	99.1	0.4	354.0	83.8	0.3
235.0	67.6	0.2	295.0	99.1	0.4	355.0	83.8	0.3
236.0	68.2	0.2	296.0	99.0	0.4	356.0	83.8	0.3
237.0	68.8	0.2	297.0	99.0	0.4	357.0	83.7	0.3
238.0	69.4	0.2	298.0	98.9	0.4	358.0	83.7	0.3
239.0	70.0	0.2	299.0	98.7	0.4	359.0	83.7	0.3

Vertical diagram at an azimuth of 68.4°



Vertical diagram at an azimuth of 68.4°

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
0.0	100.1	0.5	15.4	89.8	0.4	30.7	91.4	0.4
0.3	100.0	0.5	15.6	89.6	0.4	31.0	91.4	0.4
0.5	99.9	0.5	15.9	89.5	0.4	31.2	91.3	0.4
0.8	99.9	0.5	16.1	89.4	0.4	31.5	91.3	0.4
1.0	99.8	0.5	16.4	89.4	0.4	31.7	91.2	0.4
1.3	99.7	0.5	16.6	89.3	0.4	32.0	91.1	0.4
1.5	99.6	0.5	16.9	89.2	0.4	32.3	91.1	0.4
1.8	99.6	0.5	17.2	89.2	0.4	32.5	91.0	0.4
2.0	99.5	0.5	17.4	89.1	0.4	32.8	90.9	0.4
2.3	99.3	0.4	17.7	89.1	0.4	33.0	90.8	0.4
2.6	99.2	0.4	17.9	89.1	0.4	33.3	90.7	0.4
2.8	99.1	0.4	18.2	89.1	0.4	33.5	90.6	0.4
3.1	99.0	0.4	18.4	89.0	0.4	33.8	90.5	0.4
3.3	98.8	0.4	18.7	89.0	0.4	34.0	90.4	0.4
3.6	98.6	0.4	18.9	89.0	0.4	34.3	90.2	0.4
3.8	98.5	0.4	19.2	89.0	0.4	34.6	90.1	0.4
4.1	98.3	0.4	19.5	89.0	0.4	34.8	89.9	0.4
4.4	98.1	0.4	19.7	89.0	0.4	35.1	89.7	0.4
4.6	97.9	0.4	20.0	89.0	0.4	35.3	89.6	0.4
4.9	97.8	0.4	20.2	89.0	0.4	35.6	89.4	0.4
5.1	97.6	0.4	20.5	89.1	0.4	35.8	89.2	0.4
5.4	97.4	0.4	20.7	89.1	0.4	36.1	89.0	0.4
5.6	97.2	0.4	21.0	89.2	0.4	36.4	88.8	0.4
5.9	97.0	0.4	21.2	89.2	0.4	36.6	88.5	0.4
6.1	96.8	0.4	21.5	89.3	0.4	36.9	88.3	0.4
6.4	96.5	0.4	21.8	89.3	0.4	37.1	88.0	0.4
6.7	96.3	0.4	22.0	89.4	0.4	37.4	87.7	0.4
6.9	96.1	0.4	22.3	89.4	0.4	37.6	87.5	0.3
7.2	95.8	0.4	22.5	89.5	0.4	37.9	87.2	0.3
7.4	95.6	0.4	22.8	89.5	0.4	38.1	86.9	0.3
7.7	95.4	0.4	23.0	89.6	0.4	38.4	86.5	0.3
7.9	95.2	0.4	23.3	89.7	0.4	38.7	86.2	0.3
8.2	94.9	0.4	23.6	89.8	0.4	38.9	85.9	0.3
8.4	94.7	0.4	23.8	89.8	0.4	39.2	85.5	0.3
8.7	94.5	0.4	24.1	89.9	0.4	39.4	85.2	0.3
9.0	94.3	0.4	24.3	90.0	0.4	39.7	84.8	0.3
9.2	94.1	0.4	24.6	90.1	0.4	39.9	84.5	0.3
9.5	93.8	0.4	24.8	90.2	0.4	40.2	84.1	0.3
9.7	93.6	0.4	25.1	90.2	0.4	40.4	83.7	0.3
10.0	93.4	0.4	25.3	90.3	0.4	40.7	83.3	0.3
10.2	93.2	0.4	25.6	90.4	0.4	41.0	82.9	0.3
10.5	93.0	0.4	25.9	90.5	0.4	41.2	82.5	0.3
10.8	92.7	0.4	26.1	90.6	0.4	41.5	82.0	0.3
11.0	92.5	0.4	26.4	90.6	0.4	41.7	81.5	0.3
11.3	92.3	0.4	26.6	90.7	0.4	42.0	81.1	0.3
11.5	92.1	0.4	26.9	90.8	0.4	42.2	80.6	0.3
11.8	91.9	0.4	27.1	90.9	0.4	42.5	80.2	0.3
12.0	91.8	0.4	27.4	91.0	0.4	42.8	79.7	0.3
12.3	91.6	0.4	27.6	91.0	0.4	43.0	79.3	0.3
12.5	91.4	0.4	27.9	91.1	0.4	43.3	78.8	0.3
12.8	91.2	0.4	28.2	91.2	0.4	43.5	78.3	0.3
13.1	91.0	0.4	28.4	91.2	0.4	43.8	77.8	0.3
13.3	90.8	0.4	28.7	91.2	0.4	44.0	77.2	0.3
13.6	90.7	0.4	28.9	91.2	0.4	44.3	76.7	0.3
13.8	90.5	0.4	29.2	91.3	0.4	44.5	76.2	0.3
14.1	90.4	0.4	29.4	91.3	0.4	44.8	75.7	0.3
14.3	90.2	0.4	29.7	91.3	0.4	45.1	75.2	0.3
14.6	90.1	0.4	30.0	91.4	0.4	45.3	74.6	0.3
14.8	90.0	0.4	30.2	91.4	0.4	45.6	74.1	0.2
15.1	89.9	0.4	30.5	91.4	0.4	45.8	73.5	0.2

Vertical diagram at an azimuth of 68.4°

Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)	Dep (°)	Er (%)	ERP (W)
46.1	73.0	0.2	61.4	39.5	0.1	76.8	17.3	0.0
46.3	72.4	0.2	61.7	39.0	0.1	77.1	17.0	0.0
46.6	71.9	0.2	62.0	38.6	0.1	77.3	16.6	0.0
46.8	71.3	0.2	62.2	38.1	0.1	77.6	16.3	0.0
47.1	70.8	0.2	62.5	37.7	0.1	77.8	16.0	0.0
47.4	70.2	0.2	62.7	37.2	0.1	78.1	15.7	0.0
47.6	69.6	0.2	63.0	36.8	0.1	78.3	15.4	0.0
47.9	69.0	0.2	63.2	36.3	0.1	78.6	15.1	0.0
48.1	68.4	0.2	63.5	35.9	0.1	78.8	14.8	0.0
48.4	67.9	0.2	63.7	35.5	0.1	79.1	14.4	0.0
48.6	67.3	0.2	64.0	35.0	0.1	79.4	14.1	0.0
48.9	66.7	0.2	64.3	34.6	0.1	79.6	13.8	0.0
49.2	66.1	0.2	64.5	34.2	0.1	79.9	13.5	0.0
49.4	65.5	0.2	64.8	33.8	0.1	80.1	13.2	0.0
49.7	64.9	0.2	65.0	33.4	0.1	80.4	12.9	0.0
49.9	64.3	0.2	65.3	33.0	0.0	80.6	12.6	0.0
50.2	63.7	0.2	65.5	32.6	0.0	80.9	12.2	0.0
50.4	63.1	0.2	65.8	32.2	0.0	81.2	11.9	0.0
50.7	62.5	0.2	66.0	31.8	0.0	81.4	11.6	0.0
50.9	61.9	0.2	66.3	31.4	0.0	81.7	11.3	0.0
51.2	61.3	0.2	66.6	31.0	0.0	81.9	11.0	0.0
51.5	60.7	0.2	66.8	30.6	0.0	82.2	10.7	0.0
51.7	60.1	0.2	67.1	30.2	0.0	82.4	10.4	0.0
52.0	59.5	0.2	67.3	29.8	0.0	82.7	10.1	0.0
52.2	59.0	0.2	67.6	29.4	0.0	82.9	9.7	0.0
52.5	58.4	0.2	67.8	29.1	0.0	83.2	9.4	0.0
52.7	57.8	0.2	68.1	28.7	0.0	83.5	9.1	0.0
53.0	57.2	0.1	68.4	28.3	0.0	83.7	8.8	0.0
53.2	56.6	0.1	68.6	28.0	0.0	84.0	8.5	0.0
53.5	56.0	0.1	68.9	27.6	0.0	84.2	8.2	0.0
53.8	55.5	0.1	69.1	27.2	0.0	84.5	7.9	0.0
54.0	54.9	0.1	69.4	26.9	0.0	84.7	7.6	0.0
54.3	54.3	0.1	69.6	26.5	0.0	85.0	7.3	0.0
54.5	53.7	0.1	69.9	26.2	0.0	85.2	7.0	0.0
54.8	53.1	0.1	70.1	25.8	0.0	85.5	6.7	0.0
55.0	52.5	0.1	70.4	25.5	0.0	85.8	6.4	0.0
55.3	52.0	0.1	70.7	25.1	0.0	86.0	6.2	0.0
55.6	51.4	0.1	70.9	24.8	0.0	86.3	5.9	0.0
55.8	50.9	0.1	71.2	24.5	0.0	86.5	5.6	0.0
56.1	50.3	0.1	71.4	24.1	0.0	86.8	5.4	0.0
56.3	49.7	0.1	71.7	23.8	0.0	87.0	5.1	0.0
56.6	49.2	0.1	71.9	23.4	0.0	87.3	4.9	0.0
56.8	48.6	0.1	72.2	23.1	0.0	87.6	4.7	0.0
57.1	48.1	0.1	72.4	22.8	0.0	87.8	4.4	0.0
57.3	47.6	0.1	72.7	22.4	0.0	88.1	4.2	0.0
57.6	47.0	0.1	73.0	22.1	0.0	88.3	4.1	0.0
57.9	46.5	0.1	73.2	21.8	0.0	88.6	3.9	0.0
58.1	46.0	0.1	73.5	21.4	0.0	88.8	3.8	0.0
58.4	45.5	0.1	73.7	21.1	0.0	89.1	3.7	0.0
58.6	44.9	0.1	74.0	20.8	0.0	89.3	3.7	0.0
58.9	44.4	0.1	74.2	20.5	0.0	89.6	3.6	0.0
59.1	43.9	0.1	74.5	20.2	0.0	89.9	3.6	0.0
59.4	43.4	0.1	74.8	19.8	0.0	90.1	2.9	0.0
59.6	42.9	0.1	75.0	19.5	0.0	90.4	3.0	0.0
59.9	42.4	0.1	75.3	19.2	0.0	90.6	3.0	0.0
60.2	41.9	0.1	75.5	18.9	0.0	90.9	3.1	0.0
60.4	41.5	0.1	75.8	18.5	0.0	91.1	3.2	0.0
60.7	41.0	0.1	76.0	18.2	0.0	91.4	3.3	0.0
60.9	40.5	0.1	76.3	17.9	0.0	91.6	3.4	0.0
61.2	40.0	0.1	76.5	17.6	0.0	91.9	3.6	0.0

W221CI

Goose Creek, SC
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 0.25 kW
HAAT: 90 m
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 100.0 m
Elevation: 10.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

W220CN

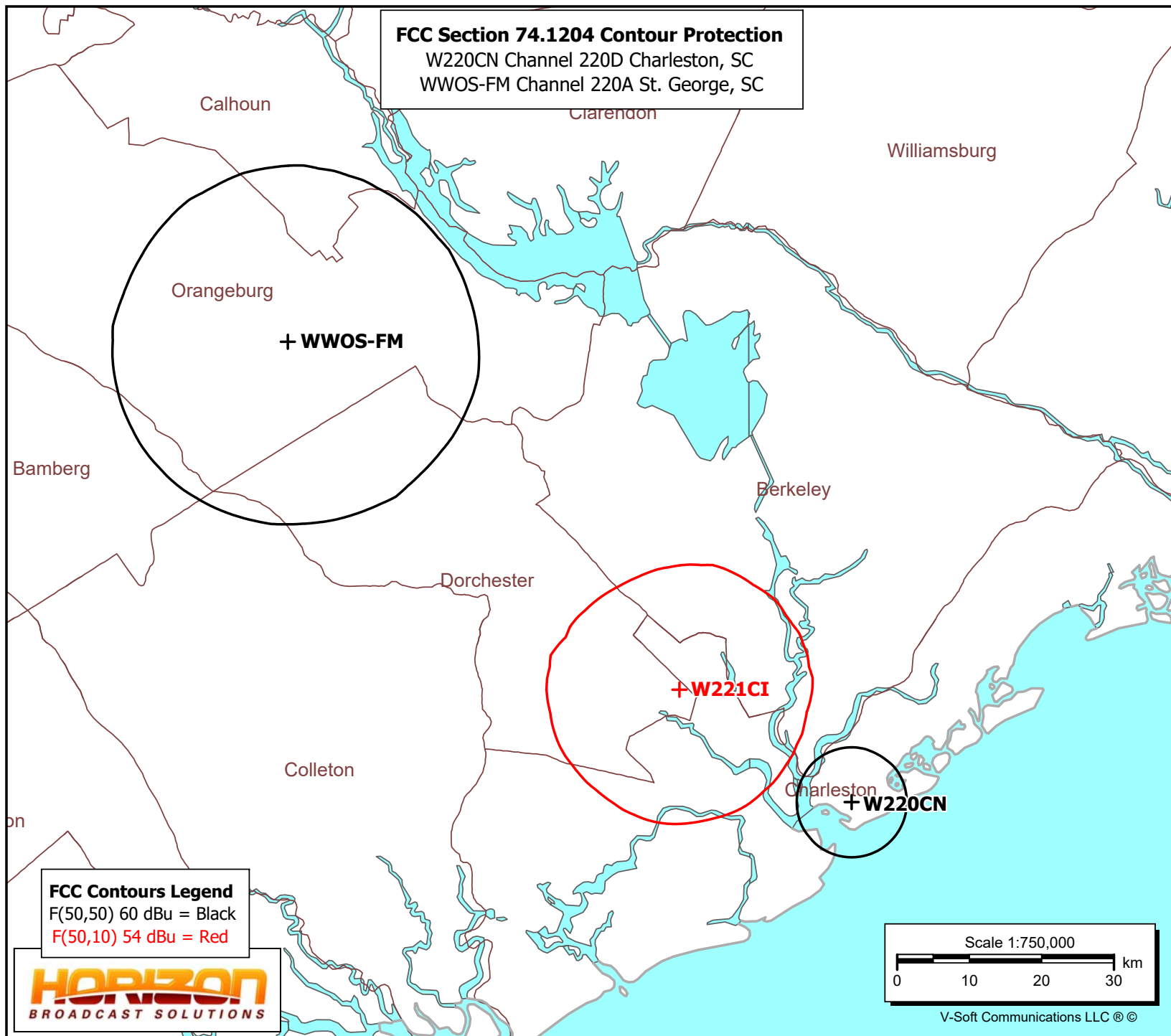
Charleston, SC
BLFT20060913AAB
Latitude: 32-47-16.60 N
Longitude: 079-50-58.30 W
ERP: 0.01 kW
Channel: 220
Frequency: 91.9 MHz
AMSL Height: 173.0 m
Elevation: 2.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

WWOS-FM

Saint George, SC
BLED20120830ABC
Latitude: 33-21-42 N
Longitude: 080-41-05 W
ERP: 6.00 kW
Channel: 220
Frequency: 91.9 MHz
AMSL Height: 118.5 m
Elevation: 37.5 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

FCC Section 74.1204 Contour Protection

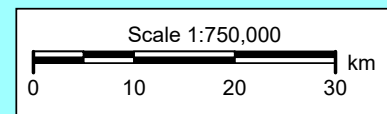
W220CN Channel 220D Charleston, SC
WWOS-FM Channel 220A St. George, SC

**FCC Contours Legend**

F(50,50) 60 dBu = Black

F(50,10) 54 dBu = Red

HORIZON
BROADCAST SOLUTIONS



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W221CI Appl.

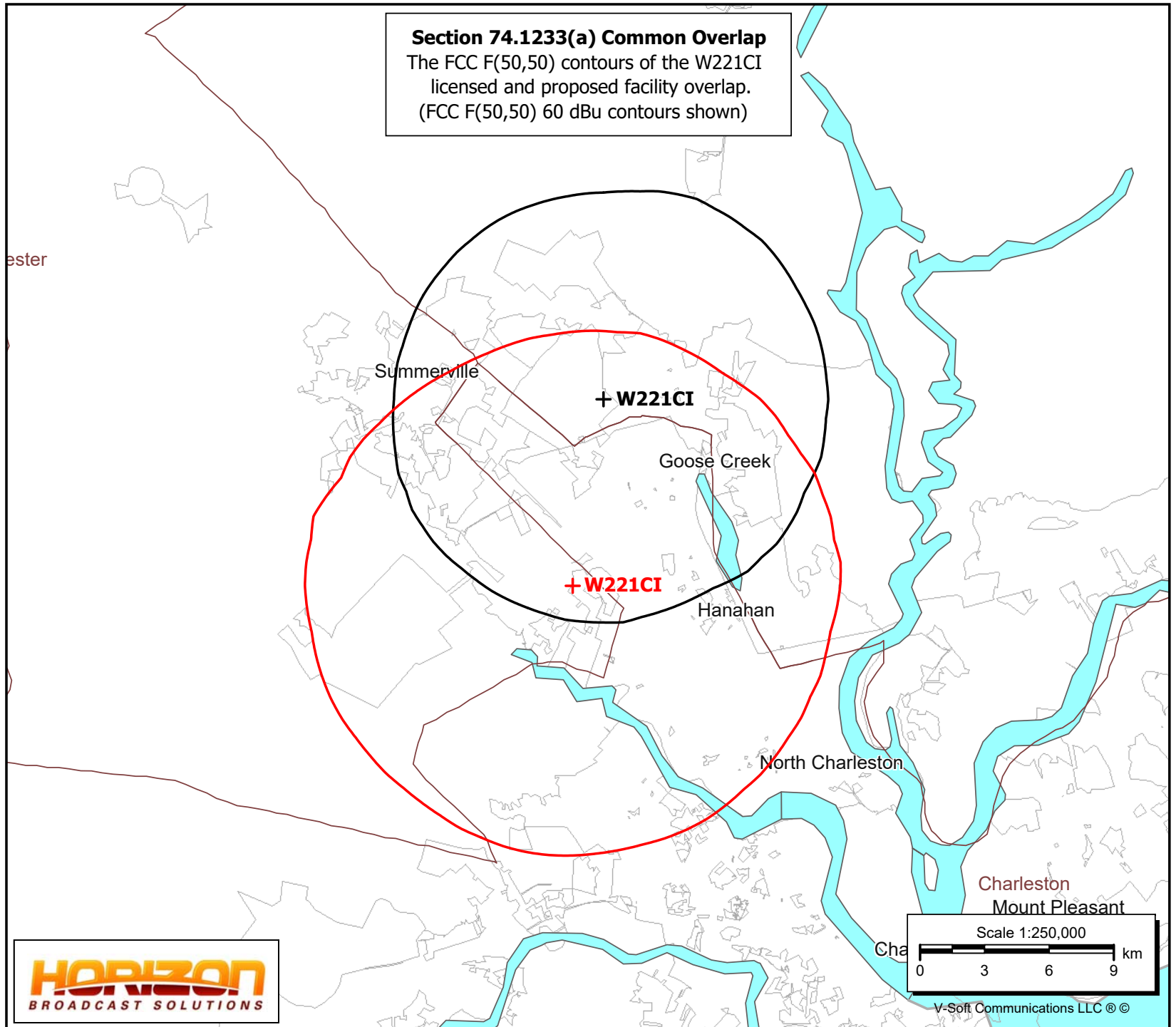
Goose Creek, SC
Latitude: 32-55-42.60 N
Longitude: 080-06-12.30 W
ERP: 0.25 kW
HAAT: 90 m
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 100.0 m
Elevation: 10.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

W221CI

BLFT20170215AAT
Latitude: 33-00-23.60 N
Longitude: 080-05-17.30 W
ERP: 0.084 kW
Channel: 221
Frequency: 92.1 MHz
AMSL Height: 119.0 m
Elevation: 11.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: None

Section 74.1233(a) Common Overlap

The FCC F(50,50) contours of the W221CI
licensed and proposed facility overlap.
(FCC F(50,50) 60 dBu contours shown)



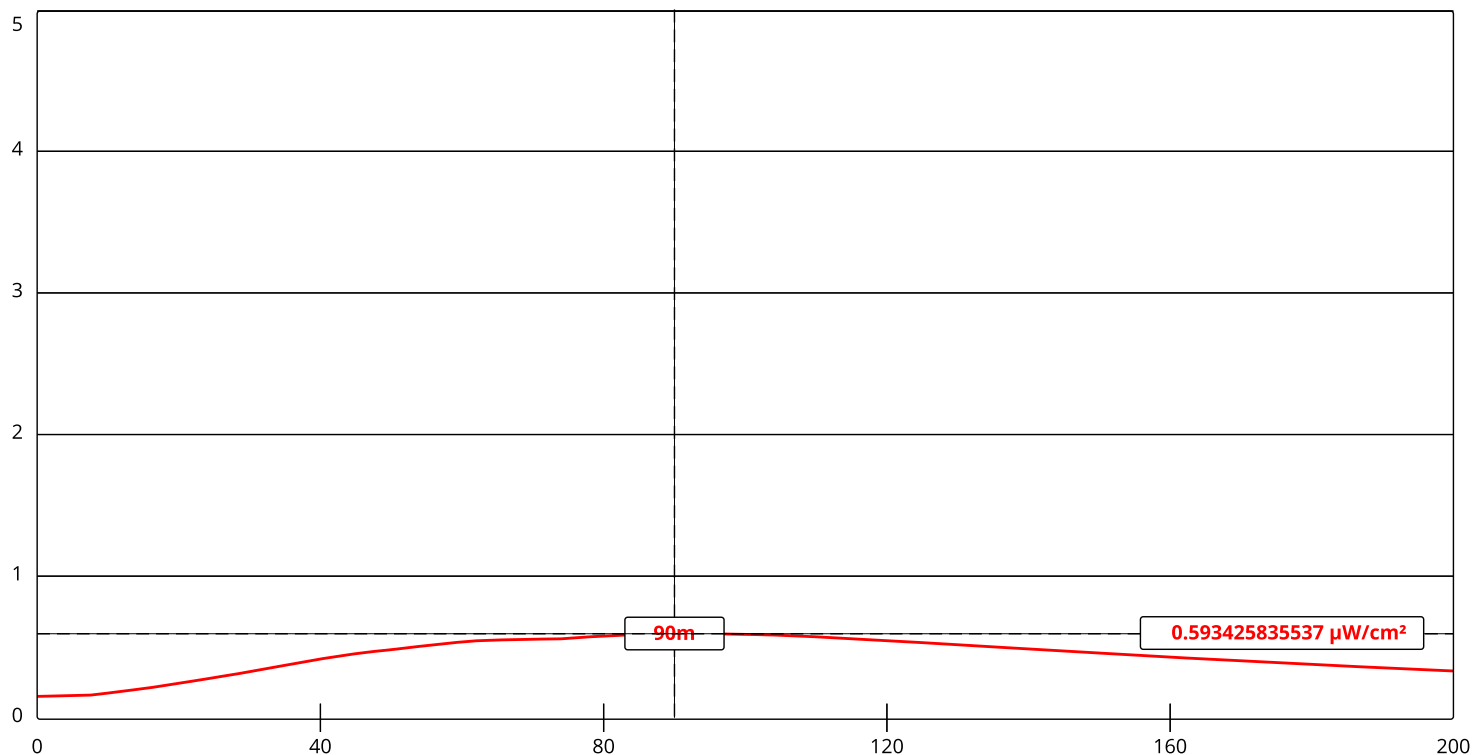
Human Exposure to Radiofrequency Electromagnetic Field & Section 106 Compliance (Environmental)

A study has been made to determine whether this proposal is in compliance with 47 C.F.R. 1.1307 of the Commission's rules and with OET Bulletin #65, dated August 1997, regarding human exposure to radio frequency radiation in the vicinity of broadcast towers. Kirkman Broadcasting Inc. ("Kirkman"), licensee of FM translator W221CI seeks to modify the license of W221CI, Facility ID No. 91551 licensed to Goose Creek, South Carolina by relocating to a different tower site. The transmitting site is an existing tower 100 meters in overall height and is registered with FCC Antenna Structure Registration (ASR) number 1054307. The tower is located at 32° 55' 43" N ~ 80° 06' 12" W (NAD 83). The proposed antenna is a side mounted Bext TFC2K one bay circularly polarized antenna. The proposed W221CI facility would operate with 250 watts ERP non-directional at 90 meters above ground level and 90 meters HAAT. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of § 1.1306 of the FCC Rules. Because W221CI proposes to operate from an existing tower and antenna and no changes are being made to the tower, it is believed to be exempt from a Section 106 review by the SHPO/THPO.

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. The recently revised FM Model Program does include the Bext TFC2K antenna under Type Two, Opposed V dipole. Using this antenna type, the maximum calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $0.593 \mu\text{W}/\text{cm}^2$ at 90 meters, which is 0.297 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in 1.1307(b) regarding sites with multiple emitters, which excludes applicant from responsibility for taking any corrective action in areas where the proposal's contribution is less than five percent.

The applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The applicant will cooperate with other users of the tower to reduce power of the facility, or discontinue operation, as necessary to limit human exposure to levels less than specified by the Federal Communications Commission should anyone be required to climb the tower for maintenance or inspection.

The FM Model calculator determines the potential exposure from radiofrequency (RF) electromagnetic fields produced by FM broadcast station antennas at ground level. The FM Model software was originally developed by the FCC in 1997 as a standalone executable program and this improved version provides more precise predictions and runs via a JavaScript enabled web browser. The FM Model is originally based on measured data [▼ Show More....](http://nepis.epa.gov/Exe/ZyNET.exe/2000ED2W.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1981+Thru+1985&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A\zyfiles\Index%20Data\81thru85\Txt\00000003\2000ED2W.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p|f&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL). <a href=)


[View Tabular Results +](#)

Channel Selection	Channel 221 (92.1 MHz) ▼		
Antenna Type +	EPA Type 2: Opposed V Dipole ▼		
Height (m)	<input type="text" value="90"/>	Distance (m)	<input type="text" value="200"/>
ERP-H (W)	<input type="text" value="250"/>	ERP-V (W)	<input type="text" value="250"/>
Num of Elements	<input type="text" value="1"/>	Element Spacing (λ)	<input type="text" value="1"/>
Num of Points	<input type="text" value="500"/>	Apply	

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Updated:

Friday, June 8, 2018