

**MINOR CHANGE APPLICATION**  
**WSAA, LLC**  
**WSAA (FM) RADIO STATION**  
**CH 226A - 93.1 MHZ - 3.5 KW**  
**BENTON, TENNESSEE**  
**June 2008**

**EXHIBIT A**

**Compliance with §73.315(a)**  
**Using Supplemental City Grade Analysis**

The proposed tower site for WSAA is located approximately 20.4 kilometers from the extreme community boundary of Benton, Tennessee. From the proposed WSAA facility, the predicted 3.16 mV/m contour, using the Commission's standard method of predicting city grade coverage as outlined in §73.313, does not encompass the community of Benton. However, in this particular case, we find a supplemental method of depicting city grade coverage, as noted in §73.313(e) of the Commission's rules, is appropriate. We have analyzed the terrain in 2° increments from 82° to 90° to determine the terrain variations on each of these radials. §73.313 of the rules notes that the Commission's propagation curves are based on a 50 meter terrain variation ( $\Delta H$ ). Using the NED 30 second terrain database, on the five pertinent radials toward the community of Benton, beginning at a distance of 10.0 kilometers out from the proposed site out to the non-terrain impacted 1.0 mV/m reference distance, the individual radial  $\Delta H$  values were used to determine whether the radial qualified for analysis using the alternative prediction method. For those radials that did not meet the variation standard, the FCC contour distance was used.

The WSAA tower is located in Bradley County, Tennessee, in the city of Cleveland, Tennessee at geographic coordinates North Latitude 35° 09' 54" and West Longitude 84° 51' 13".<sup>1</sup> The community of Benton, Tennessee is located on bearings between 82° and 90° true from the WSAA site. Running individual radials, in 2° increments, from the WSAA site through the community, we have determined the location of the city grade contour based on the standard utilization of the Commission's 50/50 curves (see Exhibit A1). We have alternatively determined the location of the 70 dBu contour, using the Point-to-Point v2 program<sup>2</sup>, which is a variation of the irregular terrain model, taking into consideration diffraction loss over knife edge and rounded obstacle obstructions (for those radials which meet the "varies widely" policy). Further, reductions of calculated signal strength are also made to account for foliage and buildings (Clutter Loss).<sup>3</sup> This model is a more representative prediction of field strength than the standard methodology, under certain terrain conditions.

On the pertinent bearings toward the community of Benton, we have tabulated the distance to the city grade contour using both the FCC method and supplemental method to demonstrate the differences to the contour and find that the supplemental depiction distances are in excess of 10% higher than the distances using the Commission's standard methodology (see Exhibit A2). Based on the Staff's policy, we find that the terrain on these pertinent radials varies widely from the 3.0 to 16.0 kilometer average (as detailed above) and the differences to the contour distances, as determined by the supplemental method, exceed the standard method by

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- 1) NAD 27, rounded to the nearest second of latitude and longitude.
  - 2) As implemented in the Probe 3 computer model from V-Soft Communications.
  - 3) To insure coverage of the proposed community, the Diffcomb model was set at 28.6 kilometers as the point of interest (the distance to the predicted FCC F50/50 60 dBu contour).

more than 10%. Therefore, pursuant to §73.313(e), a supplemental method of depicting the city grade coverage is acceptable. It is noted that at no point does the supplemental city grade distance extend beyond the predicted 60 dBu (50/50) protected contour.

Using the supplemental method calculations, we find that the city grade contour in the direction of Benton, Tennessee in 2° increments between 82° and 90°, extends as far as 28.0 kilometers out from the site on the pertinent radials, extending beyond the community of Benton. As visually demonstrated on Exhibit A3, the predicted 70 dBu signal, as calculated using the Point-to-Point v2 model, covers all of Benton, Tennessee with the predicted city grade contour. There are no terrain obstructions in the path between the proposed transmitter site and the community. Attached as Exhibits A4 through A8 are the terrain profiles for the five radials.

A sample calculation was made, based on the 86° radial, between the site and the community, to verify the location of the city grade, using a free space signal formula:  $106.9 + \text{power in dBk} - 20 \log(\text{distance in kilometers to point of interest})$ . Based on the proposed WSAA facility, the distance to the 70 dBu contour was calculated using the Point-to-Point v2 program and found to extend 28.0 kilometers. The 70 dBu contour, corrected to allow for a 5.0 dB clutter loss (the 75 dBu contour), is being sought.

$$106.9 + 5.44 \text{ dBk} - 20 \log 28.0 = 83.14$$

**Attenuation due to diffracted signal over terrain - 13.4 dB**

**Clutter Loss -5.0**

**Signal at point of interests 70.0 dBu**

Therefore, based on the supplemental depiction, we find the community of Benton, Tennessee to be within the city grade contour of the proposed WSAA facility in compliance with the Commission's rules.

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**EXHIBIT A1**

N. Lat. = 35 09 54 - Tabulated City Grade and Service Contour Data  
W. Lng. = 84 51 13 - WSAA Radio, Benton, Tennessee

HAAT and Distance to Contour - FCC Method - NGDC 30 SEC  
Azi. HAAT ERP kW dBk Field 60-F5 70-F5

Azi.	HAAT	ERP kW	dBk	Field	60-F5	70-F5
000	155.2	3.5000	5.44	1.000	30.41	17.80
045	145.9	3.5000	5.44	1.000	29.54	17.18
090	139.2	3.5000	5.44	1.000	28.92	16.72
135	120.4	3.5000	5.44	1.000	27.23	15.41
180	137.3	3.5000	5.44	1.000	28.75	16.59
225	118.6	3.5000	5.44	1.000	27.06	15.29
270	123.4	3.5000	5.44	1.000	27.50	15.61
315	124.7	3.5000	5.44	1.000	27.61	15.70

Ave El= 256.90 M HAAT= 133.10 M AMSL= 390 M

Additional Radials (Not Considered in Average):

082	136.8	3.5000	5.44	1.000	28.70	16.55
084	137.6	3.5000	5.44	1.000	28.77	16.60
086	137.9	3.5000	5.44	1.000	28.80	16.63
088	138.5	3.5000	5.44	1.000	28.86	16.67
090	139.2	3.5000	5.44	1.000	28.92	16.72

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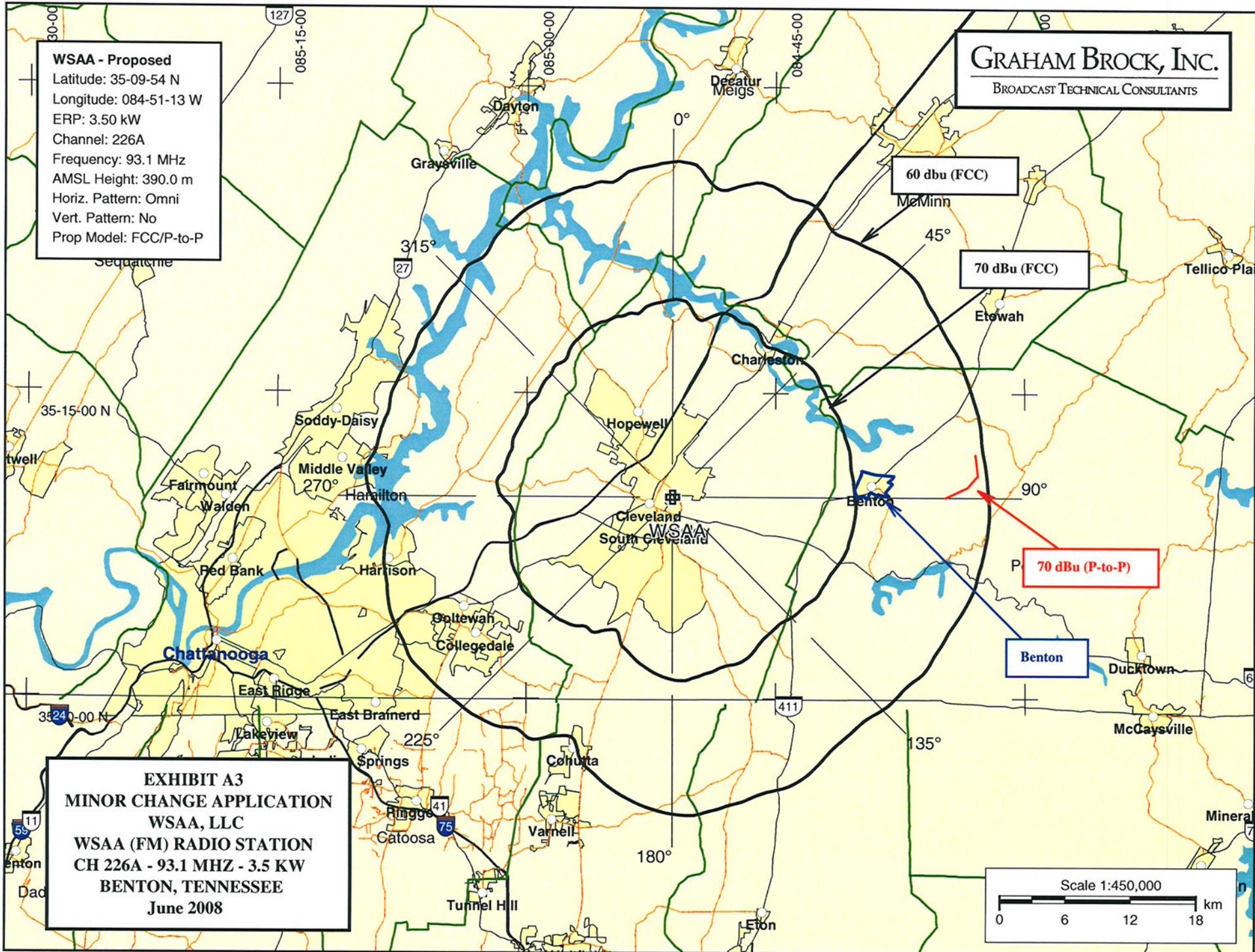
**EXHIBIT A2**

**Tabulation of City Grade Contours**  
**in Arc Toward Benton**

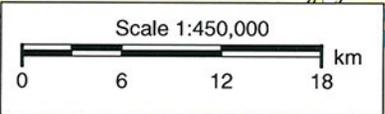
<u>Radial</u> <u>(Bearing)</u>	<u>Delta h</u> <u>meters</u>	<u>Location of 70 dBu</u>		<u>% of Chg</u>	<u>Method</u> <u>Used</u>
		<u>FCC Method (F)</u>	<u>P-to-P (P)</u>		
82°	283.7	16.6	28.0	+ 69.2	P
84°	425.6	16.6	28.0	+ 68.7	P
86°	434.7	16.6	28.0	+ 68.4	P
88	312.8	16.7	27.0	+ 62.0	P
90°	305.5	16.7	25.0	+ 49.5	P

**WSAA - Proposed**  
Latitude: 35-09-54 N  
Longitude: 084-51-13 W  
ERP: 3.50 kW  
Channel: 226A  
Frequency: 93.1 MHz  
AMSL Height: 390.0 m  
Horiz. Pattern: Omni  
Vert. Pattern: No  
Prop Model: FCC/P-to-P

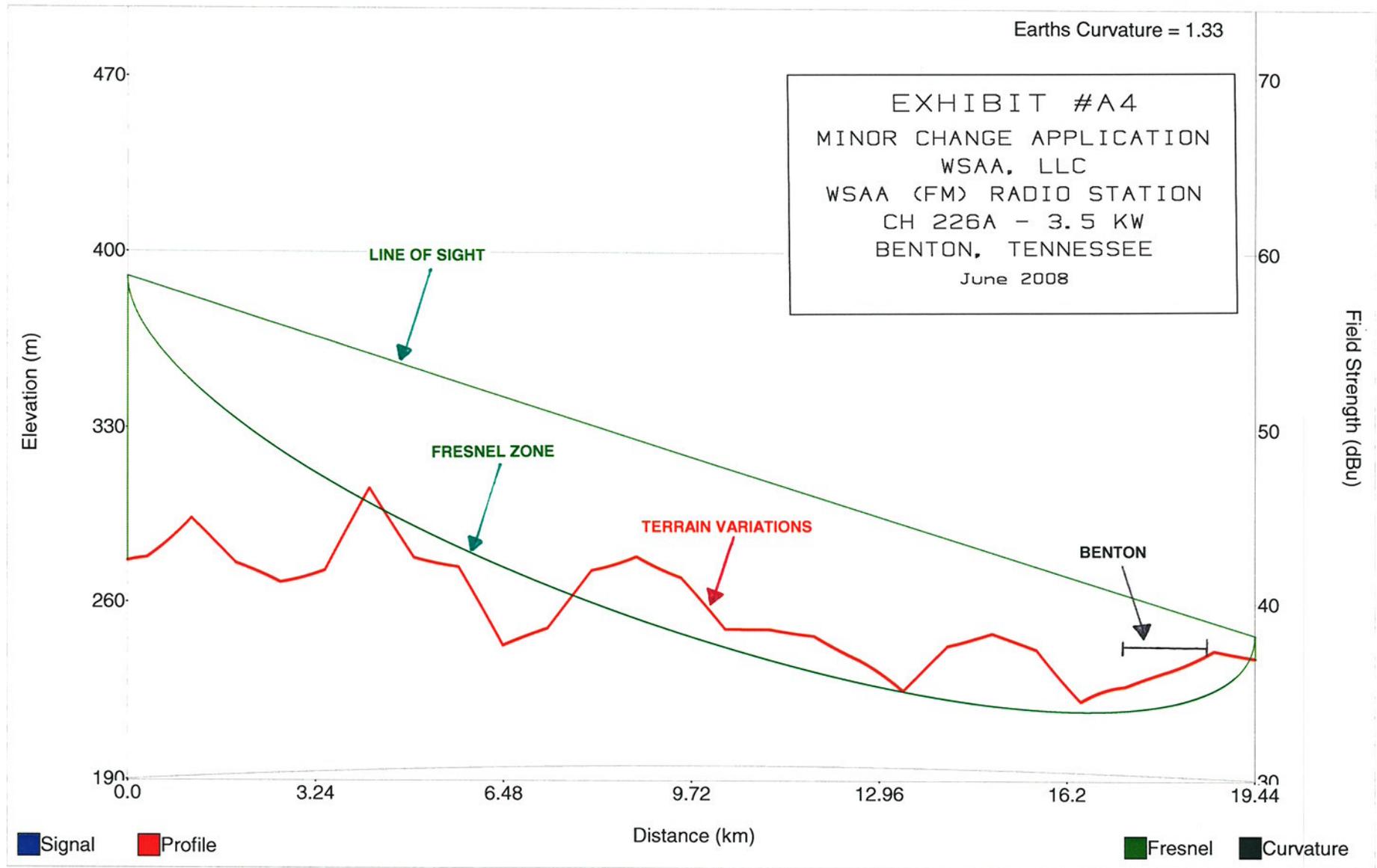
**GRAHAM BROCK, INC.**  
BROADCAST TECHNICAL CONSULTANTS



**EXHIBIT A3**  
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# 82° Radial from WSAA Site to Benton, TN



Starting Latitude: 35-09-54 N  
 Starting Longitude: 084-51-13 W

End Latitude: 35-11-21.54 N  
 End Longitude: 084-38-32.03 W

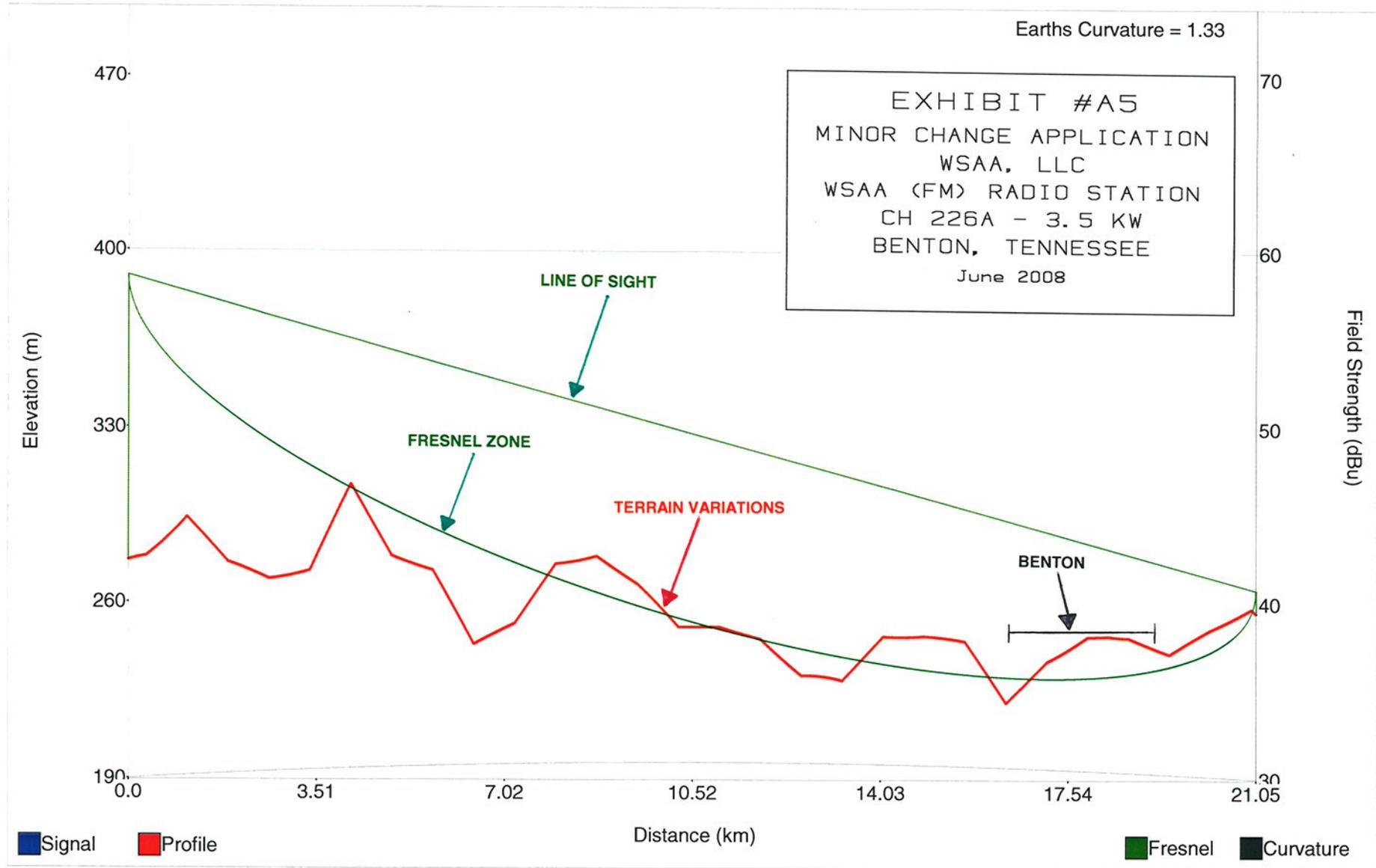
Distance: 19.44 km  
 Bearing: 81.96 deg

Transmitter Height (AG) = 113.2 m  
 Receiver Height (AG) = 9.1 m

Transmitter Elevation = 276.8 m  
 Receiver Elevation = 238.1 m

Frequency = 93.1 MHz  
 Fresnel Zone: 0.6

# 84° Radial from WSAA Site to Benton, TN



Starting Latitude: 35-09-54 N  
 Starting Longitude: 084-51-13 W

End Latitude: 35-11-09.81 N  
 End Longitude: 084-37-26.17 W

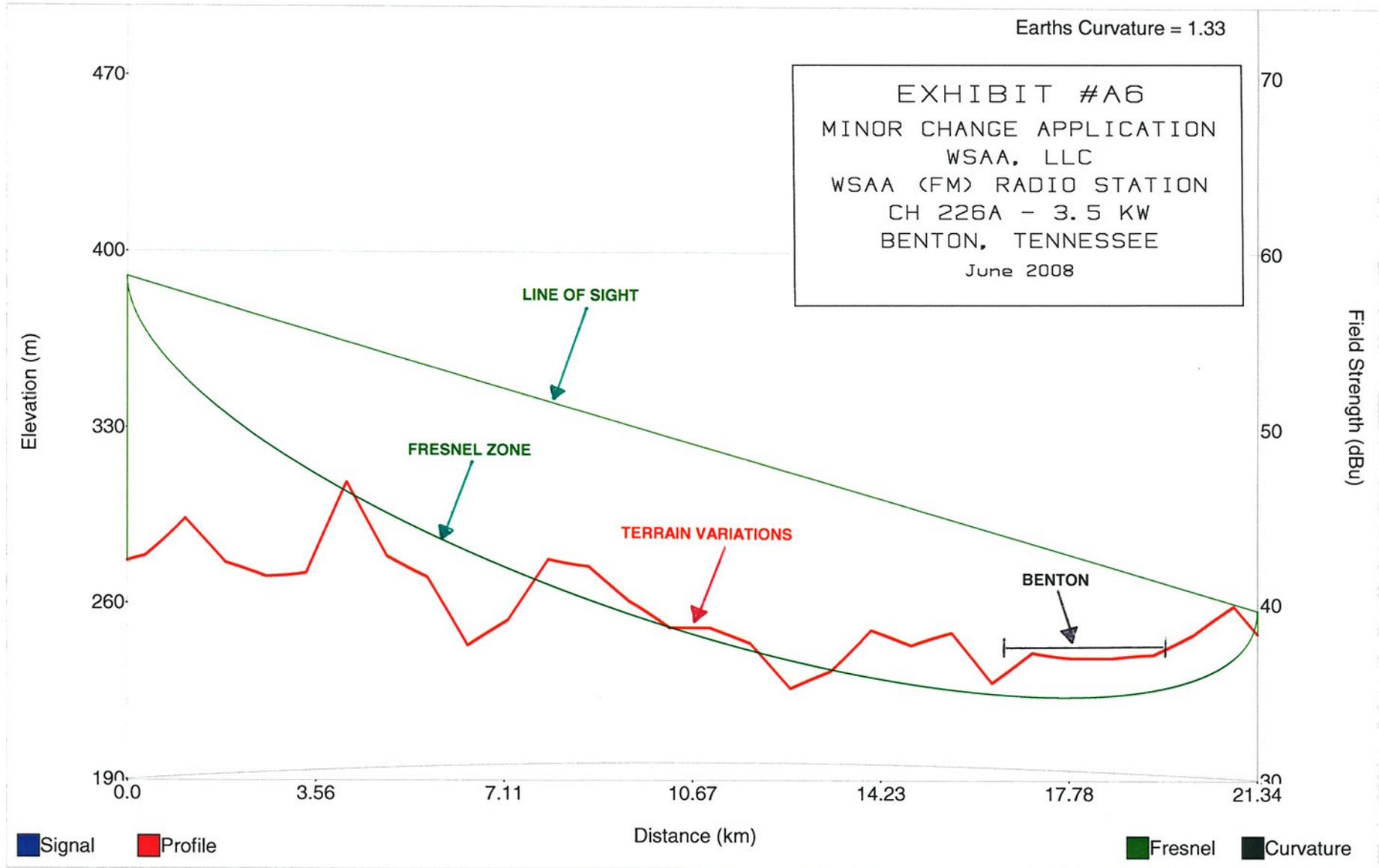
Distance: 21.05 km  
 Bearing: 83.56 deg

Transmitter Height (AG) = 113.2 m  
 Receiver Height (AG) = 9.1 m

Transmitter Elevation = 276.8 m  
 Receiver Elevation = 256.3 m

Frequency = 93.1 MHz  
 Fresnel Zone: 0.6

# 86° Radial from WSAA Site to Benton, TN



Starting Latitude: 35-09-54 N  
 Starting Longitude: 084-51-13 W

End Latitude: 35-10-46.60 N  
 End Longitude: 084-37-12.14 W

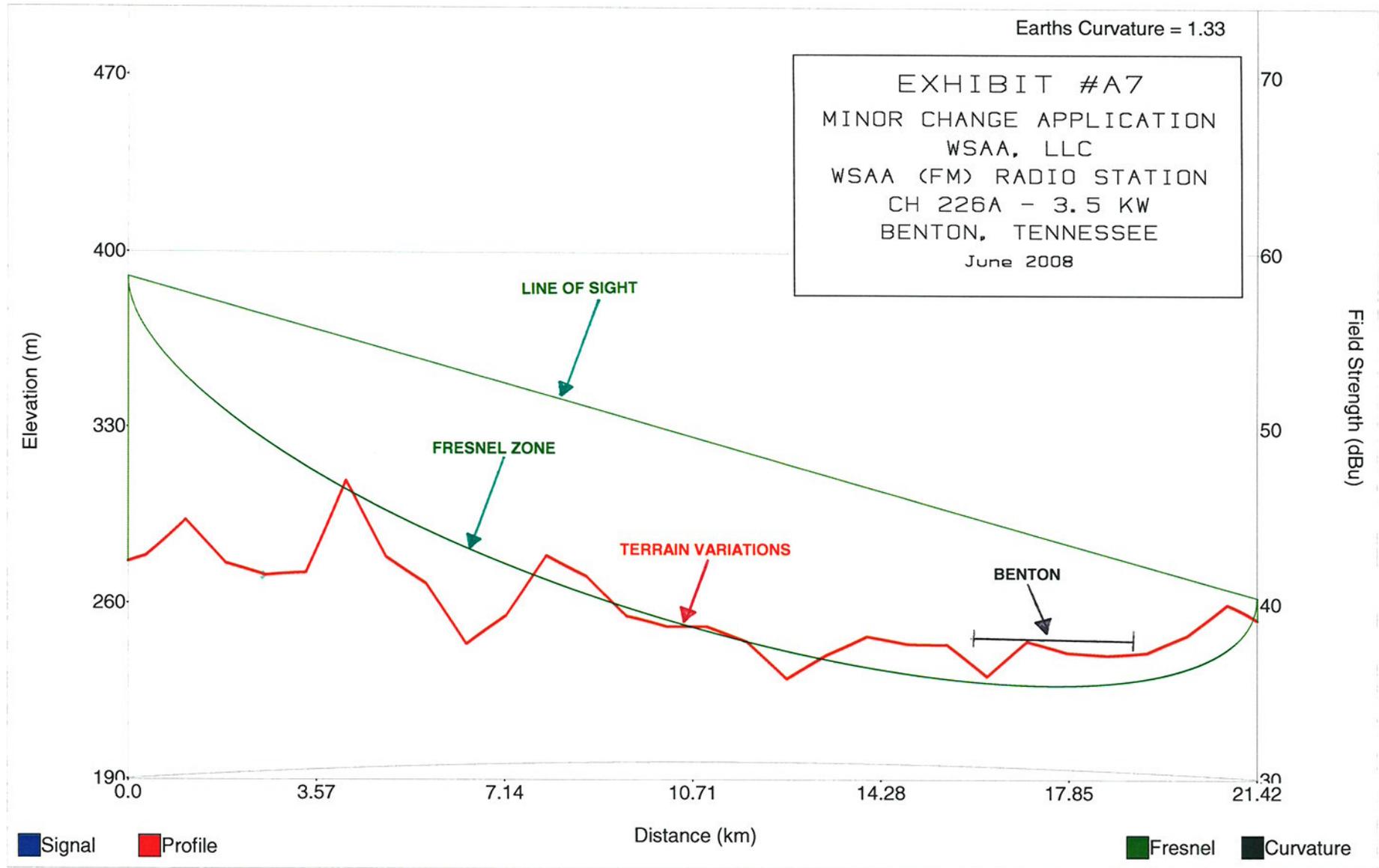
Distance: 21.34 km  
 Bearing: 85.58 deg

Transmitter Height (AG) = 113.2 m  
 Receiver Height (AG) = 9.1 m

Transmitter Elevation = 276.8 m  
 Receiver Elevation = 248.4 m

Frequency = 93.1 MHz  
 Fresnel Zone: 0.6

# 88° Radial from WSAA Site to Benton, TN



Starting Latitude: 35-09-54 N  
 Starting Longitude: 084-51-13 W

End Latitude: 35-10-23.40 N  
 End Longitude: 084-37-07.51 W

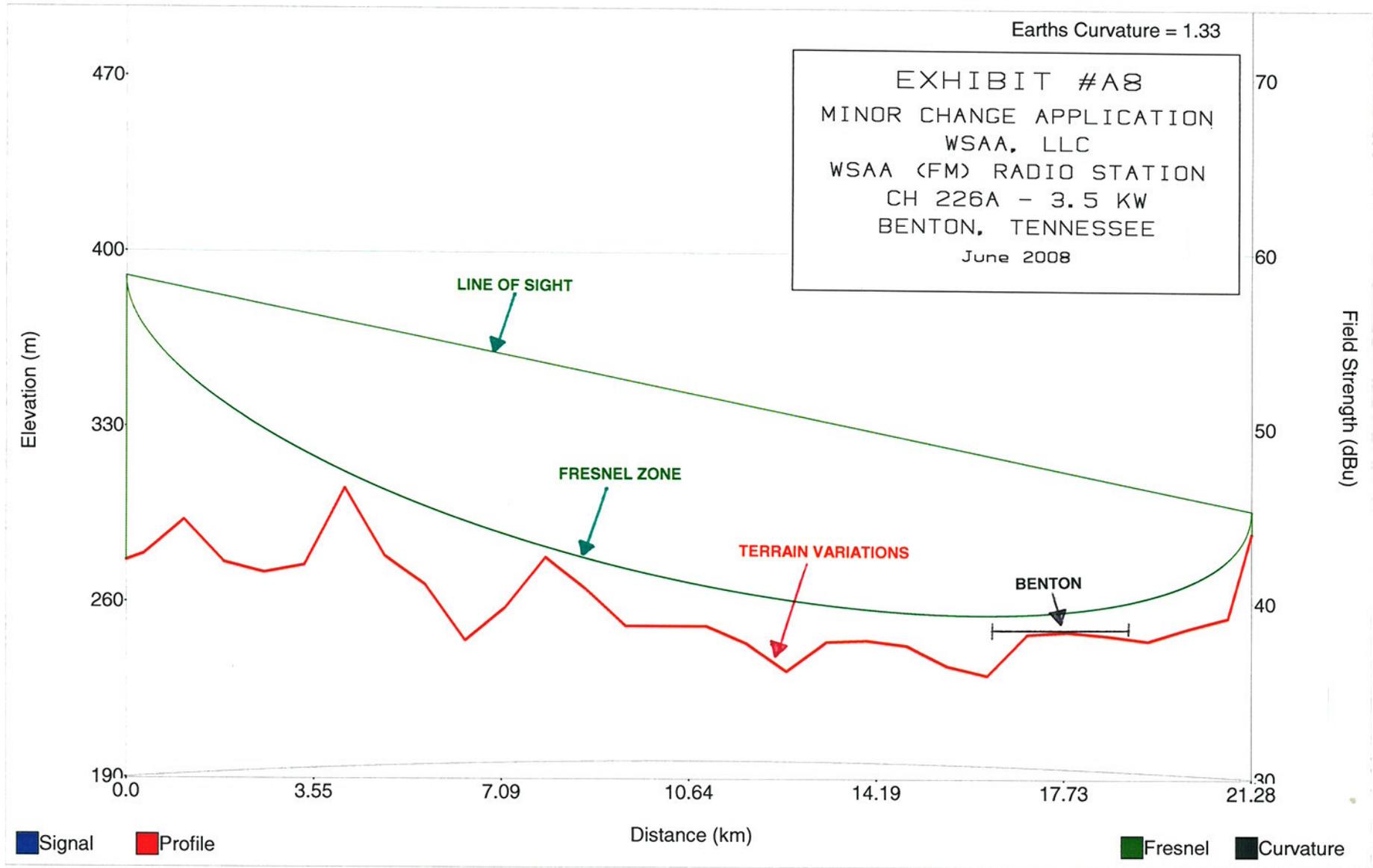
Distance: 21.42 km  
 Bearing: 87.51 deg

Transmitter Height (AG) = 113.2 m  
 Receiver Height (AG) = 9.1 m

Transmitter Elevation = 276.8 m  
 Receiver Elevation = 253.5 m

Frequency = 93.1 MHz  
 Fresnel Zone: 0.6

# 90° Radial from WSAA Site to Benton, TN



Starting Latitude: 35-09-54 N  
 Starting Longitude: 084-51-13 W

End Latitude: 35-09-56.37 N  
 End Longitude: 084-37-12.31 W

Distance: 21.28 km  
 Bearing: 89.74 deg

Transmitter Height (AG) = 113.2 m  
 Receiver Height (AG) = 9.1 m

Transmitter Elevation = 276.8 m  
 Receiver Elevation = 288.3 m

Frequency = 93.1 MHz  
 Fresnel Zone: 0.6