

ENGINEERING EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT
RADIO STATION KELT(FM)
ADELANTO, CALIFORNIA

June 29, 2001

CH 224A 0.28 KW 449 M

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Engineering Statement

This Engineering Exhibit was prepared on behalf of radio station KELT(FM), Adelanto, California in support of an application for construction permit to relocate its transmitter site. This application is being filed in connection with the FCC *Report and Order* in MM Docket No. 99-329, which resulted in the change in city of license of KELT(FM) from Riverside, California to Adelanto.*

Proposed Facilities

The proposed facility will operate on Channel 224A with a nominal non-directional effective radiated power (ERP) of 0.28 kW (circular polarization) and an antenna height above average terrain (HAAT) of 449 m. The proposed transmitter site is located 46.0 km north of the KELT(FM) licensed transmitter site and 16.2 km east of the Channel 224A reference point for Adelanto established in MM Docket No. 99-329.

The proposed antenna will be mounted on an existing tower used for broadcast and non-broadcast transmission facilities. The existing tower structure is 30 m in overall height above ground and it does not require FCC antenna structure registration. The proposed antenna will result in an increase in overall structure height to 31 m AGL. However, the proposed antenna structure does not require FCC antenna

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structure registration. The tower is located on Quartzite Mountain near Oro Grande, California.

Environmental Considerations

The proposed facility is categorically excluded from environmental processing pursuant to Section 1.1306 of the FCC Rules. A conservative calculation of the FM energy in the downward direction indicates an RF level for KELT(FM) of no greater than 2.8% of the FCC uncontrolled standard.[†] Therefore, the proposal complies with the FCC limits for human exposure to RF radiation and it is categorically excluded from environmental processing. The applicant shall reduce power or cease operation as necessary to protect persons having access to the tower from RF energy in excess of the FCC guidelines.

Predicted Coverage Contours

The predicted coverage contours were calculated in accordance with Section 73.313 of the FCC Rules. The average terrain elevations from 3 to 16 km from the proposed site were computed using the U.S.G.S 3-second terrain database.

The distances to the conventional FCC predicted coverage contours were determined using the average elevations of 3-16-km radials spaced every 45-degrees of azimuth. The antenna radiation center HAAT in each radial direction and the ERP were used in conjunction with the propagation prediction curves of Section 73.333 to determine the distances to contours. Figure 2 is a tabulation of average elevations and

* See *Report and Order*, MM Docket No. 99-329, RM-9701, *In the Matter of Amendment of Section 73.202(b) Table of Allotments, FM Broadcast Stations (Avalon, Fountain Valley, Adelanto, Ridgecrest and Riverside, California)*, Released: March 9, 2001.

[†] This is based on the KELT(FM) antenna radiation center height above ground of 31m; effective radiated power in each polarization plane of 0.28 kW; and, a downward relative field factor of 0.5. Calculations were made at 2-m AGL according procedures outlined in FCC OET Bulletin No. 65. Calculated combined RF energy will not exceed 5.6 uW/cm² according to these conservative assumptions. This is 2.8% of the FCC limit of 200 uW/cm² for uncontrolled environments.

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distances to coverage contours. Figure 3 is a map showing the predicted coverage contours.

As indicated in Figure 3, the proposed predicted 70 dBu contour based on the conventional FCC propagation method will not encompass the entire community of Adelanto. The city limits of Adelanto were obtained from the 2000 Census TIGER data files. An area analysis indicates that the proposed facility will provide 70 dBu contour coverage of 98 square kilometers of the Adelanto city limits. This is 71.0% of the total area within the Adelanto city limits of 138 square kilometers.

Pursuant to Section 73.313(e) of the FCC Rules, a supplemental method for contour prediction has been employed. As detailed below, the results of the supplemental analysis demonstrate that 90.6% of the Adelanto city limits will be encompassed by the predicted KELT(FM) 70 dBu contour.

The proposed transmitter site is located on Quartzite Mountain, which is elevated well above the surrounding terrain. The elevation of Quartzite Mountain is 1329 m above mean sea level. The terrain in the valley, in which Adelanto is located, averages about 890 m above mean sea level. Furthermore, the terrain in the valley is smooth and gently rising over most of the Adelanto city limits which results in greater coverage than would be predicted under the conventional FCC terrain averaging method. The Adelanto city limits are located along bearings from approximately 220 to 300 degrees true from the proposed KELT(FM) transmitter site with distances ranging from 10 to 20 km from the site. Terrain profiles graphs were prepared along these bearings at 10-degree intervals. These are included herein at Appendix 2. It is evident from the terrain profiles that the terrain in the area of Adelanto is smooth and gently rising; and that the terrain itself would significantly depart from the terrain average assumed for the f(50,50) curves.

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A propagation analysis was conducted using the well-known and widely accepted Longley-Rice propagation model.[‡] This analysis indicates that the predicted 70 dBu contour for KELT(FM) will extend to as great as 24.5 km over the arc of azimuths from 220 to 300 degrees true. Figure 5 includes a series of graphs showing the predicted Longley-Rice field strength versus distance for KELT(FM) over the arc of azimuths from 220 to 300 degrees true. This analysis includes a clutter factor of 5 dB.[§] The predicted 70 dBu contour for KELT(FM) based on the conventional FCC contour method over the 220-300 arc extends to a nominal 16.5 km. Therefore, the proposed Longley-Rice analysis indicates at least a 48% increase in the distance to the 70 dBu contour using the supplemental method.

As indicated in Figure 3, the predicted 70 dBu contour based on the supplemental method extends beyond the city limits of Adelanto in most directions. In fact, calculations indicate that the predicted 70 dBu contour based on the supplemental method will cover 125 square kilometers of the Adelanto city limits. This is 90.6% of the total area within the Adelanto city limits of 138 square kilometers. Therefore, the proposed facility is believed to be in substantial compliance with Section 73.315 of the FCC Rules based on the supplemental coverage analysis.

The following sample calculations are provided concerning the supplemental Longley-Rice prediction method:

[‡] See, for example, FCC Office of Engineering and Technology Bulletin No. 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, July 2, 1997.

[§] The lack of significant trees, tall vegetation and urban buildup argues for a lesser clutter factor in this case. However, as a conservative estimate of coverage, a 5 dB clutter factor was employed.

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Parameter	Value
Transmitter site coordinates (NAD27)	34-36-44 / 117-17-27
Calculation point coordinates (NAD27)	34-26-22 / 117-27-57
Distance to calculation point (km)	25.0
Bearing to calculation point (degrees true)	220.0
Effective radiated power (kW)	0.28
Calculated free-space field at point (dBu)	73.4
Additional estimated transmission loss (dB)	0.0
Clutter loss factor (dB)	5.0
Net received field (dBu)	68.4
Mode of variability	11 (individual mode)
Confidence	50%
Time / Location variability	50%
Polarization	H
Frequency (MHz)	92.7
Relative permittivity	15
Conductivity (S/m)	0.005
Climate code	5
Surface refractivity	300
Effective earth curvature	1.33
Path	Line-of-sight
Profile	301 points; 0.1 km interval
Path terrain delta-H (m)	158
Antenna heights (m)	TX: 31; REC: 9
Effective antenna heights (m)	TX: 454; REC: 98
Site elevations (m AMSL)	TX: 1329; REC: 1106

Based on the foregoing, it is concluded that the KELT(FM) proposal is compliant with the FCC supplemental contour analysis showing requirements; and that the proposed KELT(FM) facility will, in fact, provide 70 dBu coverage over 90.6% of the principal community of license of Adelanto.

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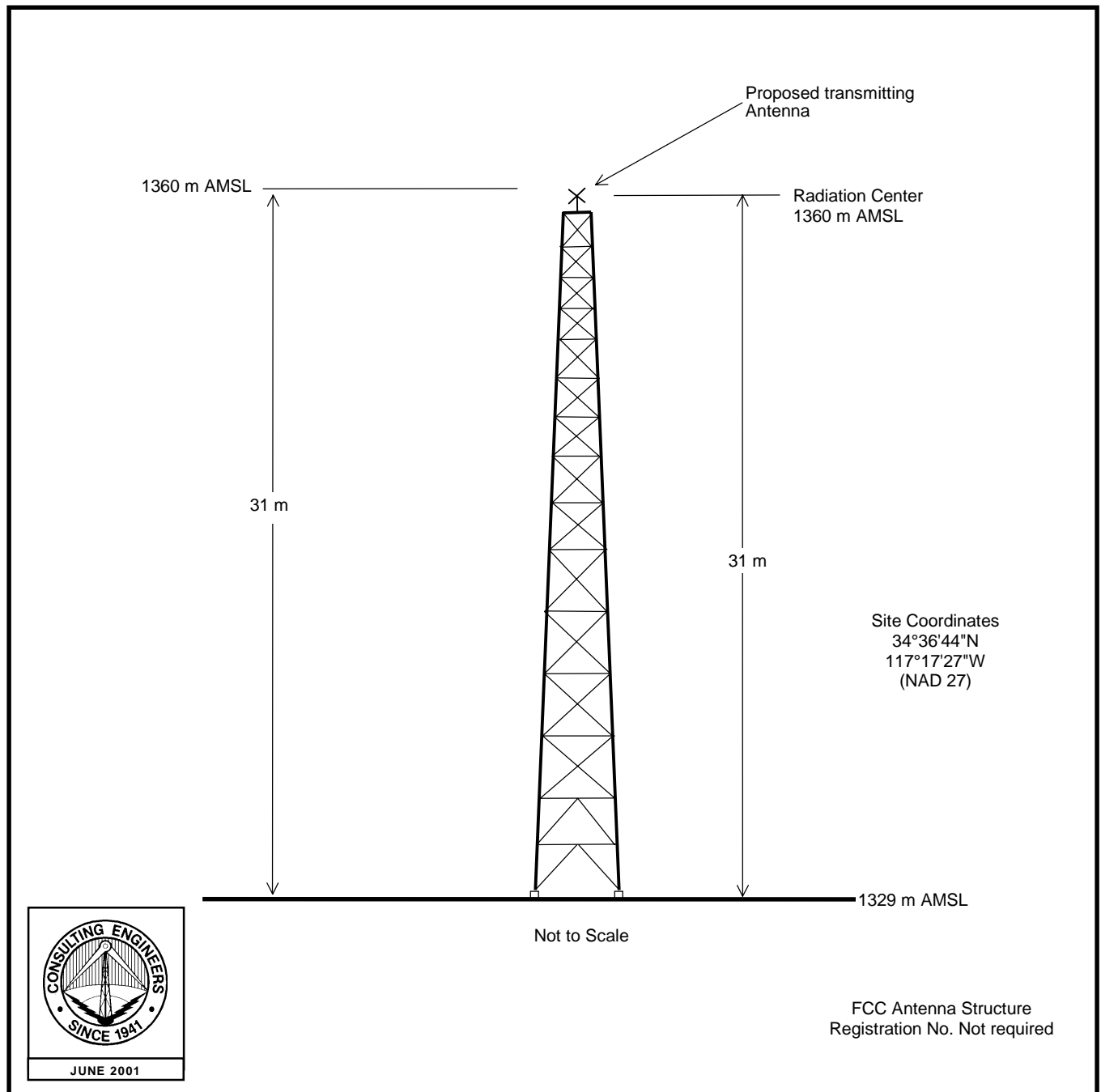
Allocation Considerations

As outlined in Figure 4, the proposed KELT facility meets the separation requirements of Section 73.207 of the FCC Rules with respect to all pertinent allotments and assignments.

Louis Robert du Treil, Jr.

June 29, 2001

Figure 1



PROPOSED ANTENNA AND SUPPORTING STRUCTURE

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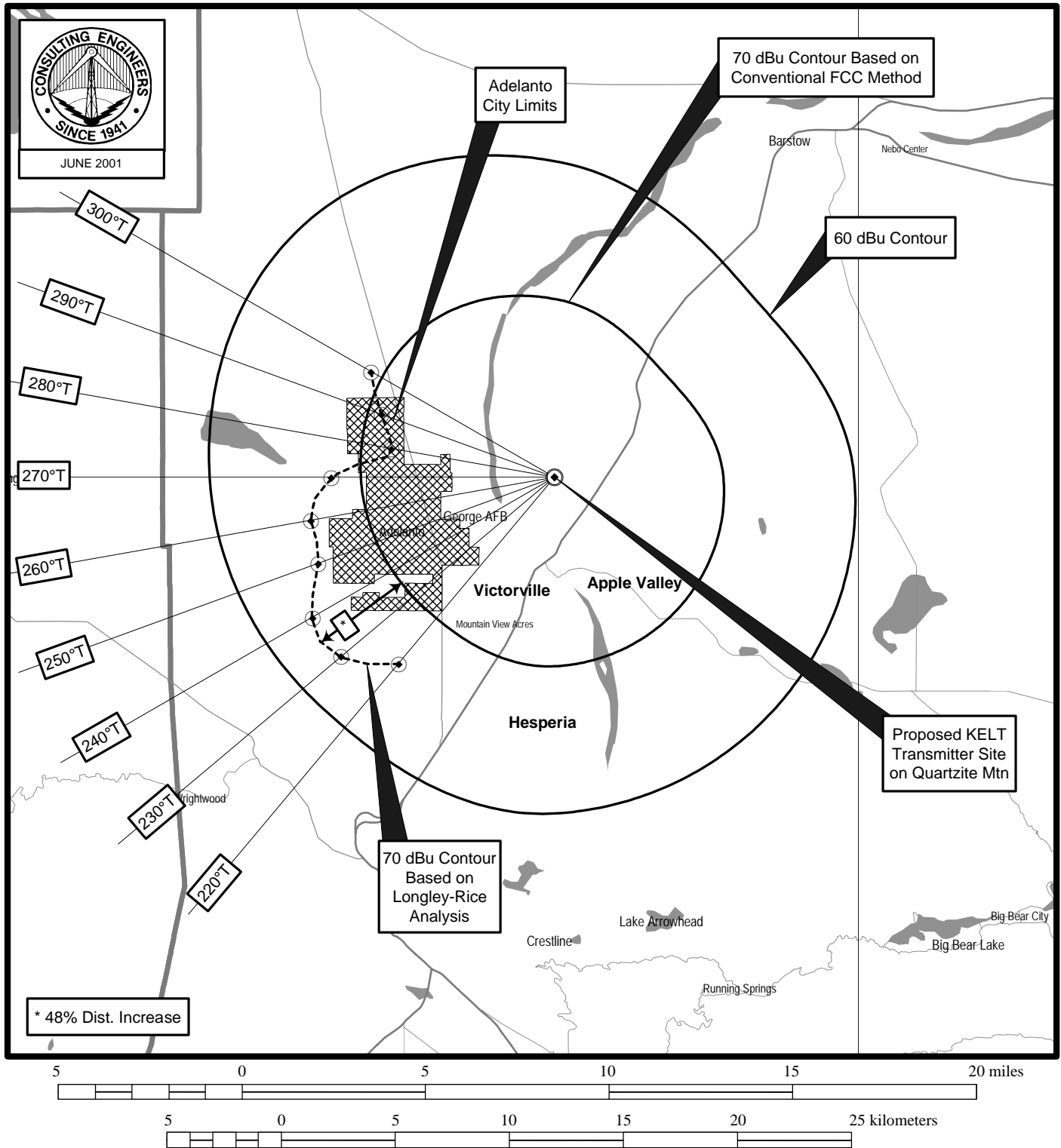
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Tabulation of Average Elevations
and Distances to Coverage Contours

<u>Azimuth</u> (deg.T)	<u>3-16 km</u> <u>Average</u> <u>Terrain</u> (m)	<u>Antenna</u> <u>HAAT</u> (m)	<u>ERP</u> (kW)	<u>Distance to</u> <u>70 dBu</u> <u>Contour</u> (km)	<u>Distance to</u> <u>60 dBu</u> <u>Contour</u> (km)
0	921	439	0.28	15.7	27.8
45	1049	311	0.28	13.3	23.6
90	970	390	0.28	14.8	26.2
135	915	445	0.28	15.8	27.9
180	869	491	0.28	16.6	29.5
225	891	469	0.28	16.2	28.7
270	848	512	0.28	17.0	30.2
315	821	539	0.28	17.5	31.2

Note: The 3-16-km average terrain is 911 m based on the eight conventional radials (0°, 45°, 90°, etc.).
The overall antenna radiation center height above average terrain is 449 m based on the eight conventional radials.

Figure 3



PREDICTED COVERAGE CONTOURS AND PREDICTED 70 DBU COVERAGE BASED ON SUPPLEMENTAL METHOD

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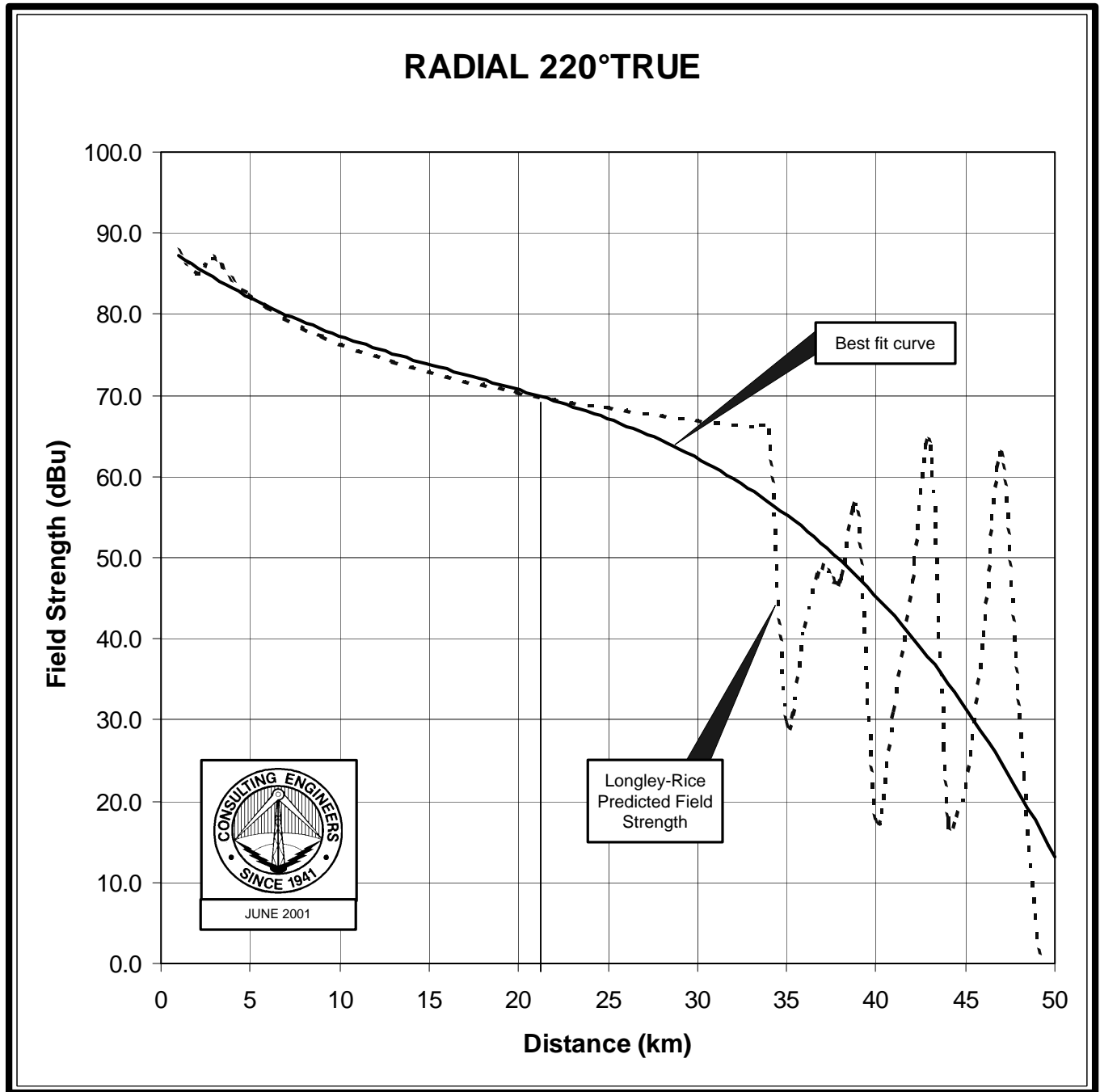
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Figure 4

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Allocation Study

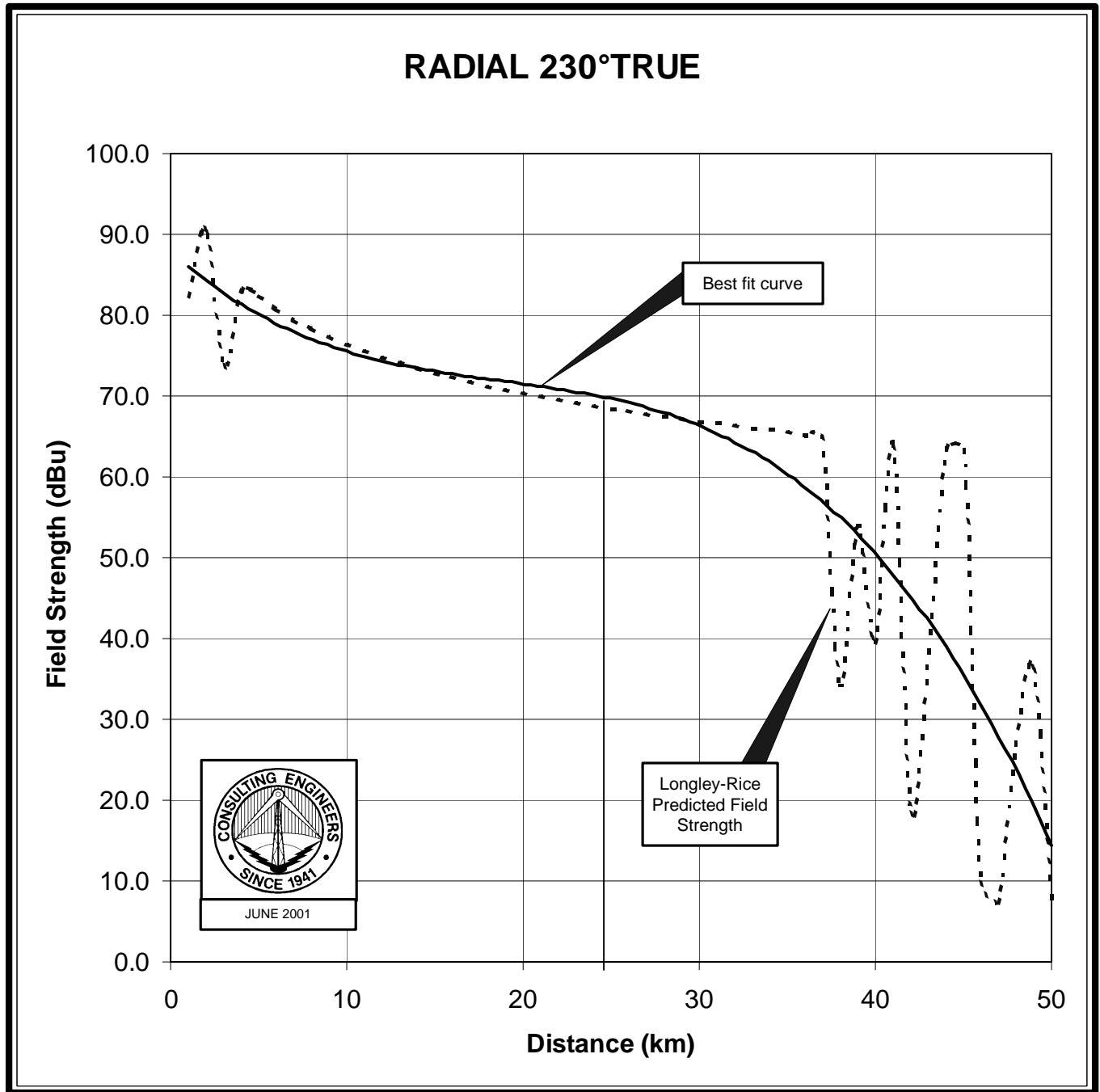
Call Id	City St	File Status Num	Channel Freq	ERP HAAT	DA Id	Latitude Longitude	73 215	Bear	Dist. (km)	Req. (km) min max
KCMG 35022	LOS ANGELES CA	BMLH LIC C 19921021KA	222 B 92.3	43.000 887	N	34-13-36 118-03-57	N	239.1	83.10 14.10	69.0 Close
KELT 0	ADELANTO CA	RM RSV C 9701	224 A 92.7	0.000	N	34-36-11 117-28-01	N	266.4	16.19 -98.81	115.0 Short
<i>(Adelanto Docket 99-329 rule making allotment site.)</i>										
KELT 1244	RIVERSIDE CA	BLH LIC C 19970715KC	224 A 92.7	6.000 100	N	34-11-51 117-17-10	N	179.5	46.01 -68.99	115.0 Short
<i>(Applicant's authorized facility.)</i>										
KZIQ-F 30158	RIDGECREST CA	BLH LIC C 19900403KB	224 B1 92.7	1.500 395	N	35-28-39 117-41-58	N	339.0	102.98 -40.02	143.0 Short
<i>(Pursuant to Docket 99-329 rule making, KZIQ-FM to downgrade to Class A and relocate transmitter site.)</i>										
KZIQ-F 0	RIDGECREST CA	RM RSV C 9701	224 A 92.7	0.000	N	35-37-27 117-41-10	N	342.4	117.91 2.91	115.0 Close
<i>(KZIQ-FM Docket 99-329 rule making allotment site and downgrade to Class A.)</i>										
KZIQ-F 30158	RIDGECREST CA	BLH APP C	224 B1 92.7	3.000 -40	N	35-36-58 117-38-35	N	344.0	115.90 0.90	115.0 Close
<i>(KZIQ-FM application to relocate site and downgrade to Class A.)</i>										
KLIT 9304	FOUNTAIN CA	VA BPH APP C 20010620AAE	224 A 92.7	0.690 293	Y	33-36-20 117-48-35	Y	203.3	121.49 6.49	115.0 Close
<i>(Application to relocate KLIT pursuant to Docket 99-329 rule making.)</i>										
KLIT 0	FOUNTAIN CA	VA RM RSV C 9701	224 A 92.7	0.000	N	33-36-56 117-55-33	N	208.0	125.12 10.12	115.0 Close
<i>(Fountain Valley Docket 99-329 rule making allotment site.)</i>										
KKUU 11658	INDIO CA	BLH LIC C 19971020KE	224 A 92.7	6.000 100	N	33-47-45 116-13-19	N	132.4	133.81 18.81	115.0 Clear
KCBS-F 9612	LOS ANGELES CA	BLH LIC C 19980505KC	226 B 93.1	28.500 1056		34-13-55 118-04-18		239.7	83.26 14.26	69.0 Close
KBHR 51566	BIG BEAR CA	CI BLH LIC C 19960111KP	227 A 93.3	1.500 202	N	34-16-41 116-47-31	Y	128.9	58.96 27.96	31.0 Clear



LONGLEY-RICE ANALYSIS GRAPHS

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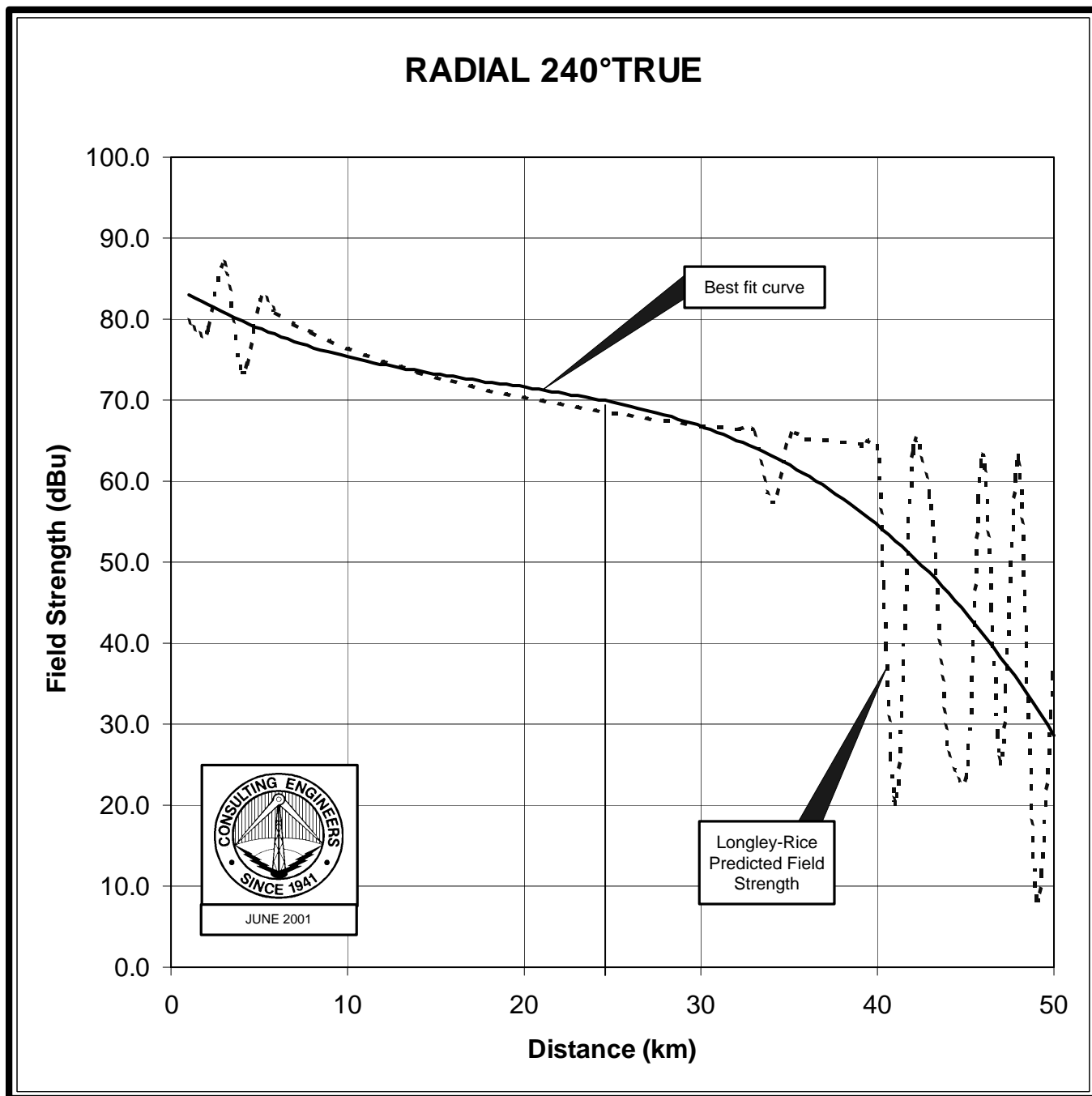
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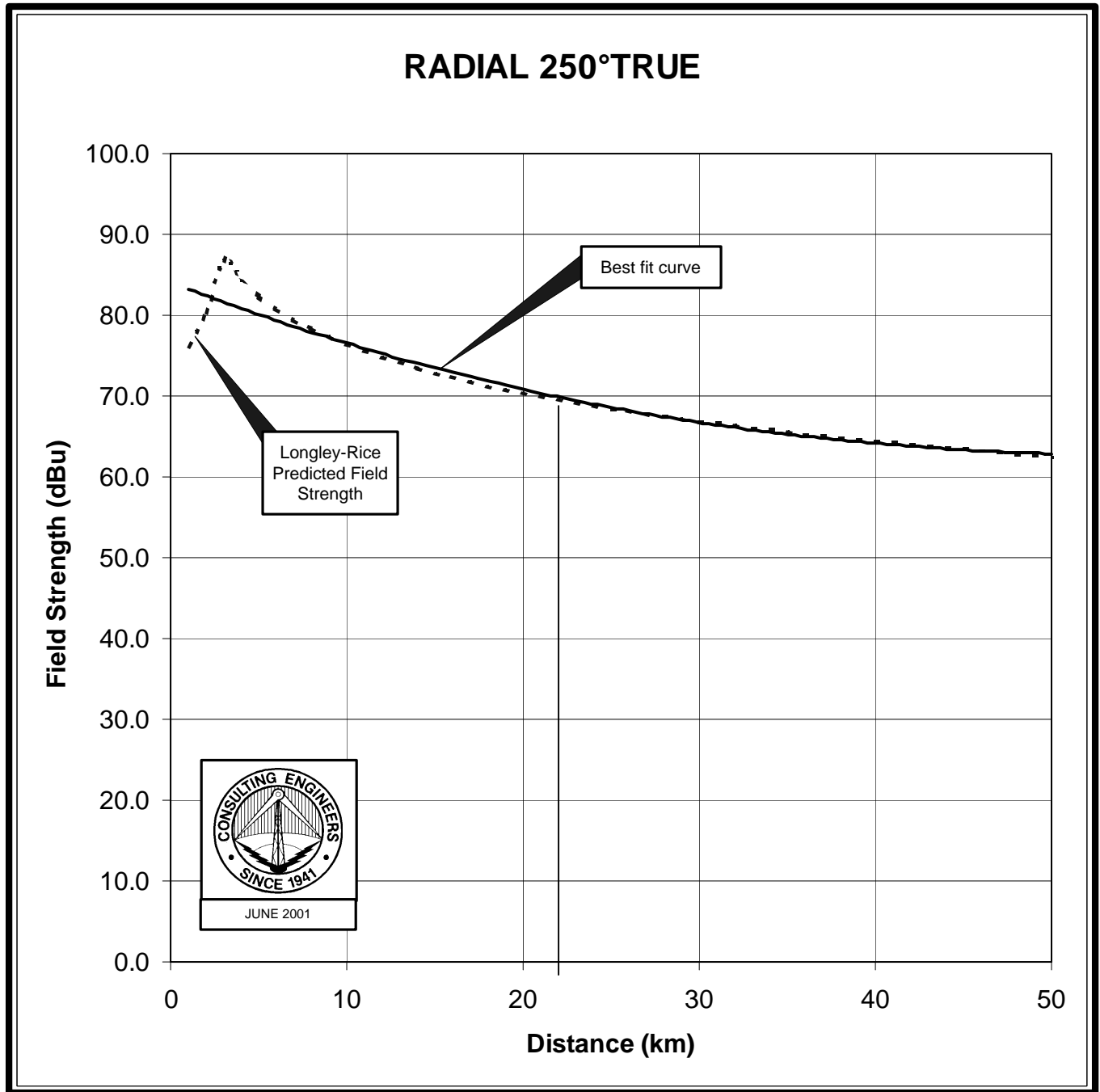
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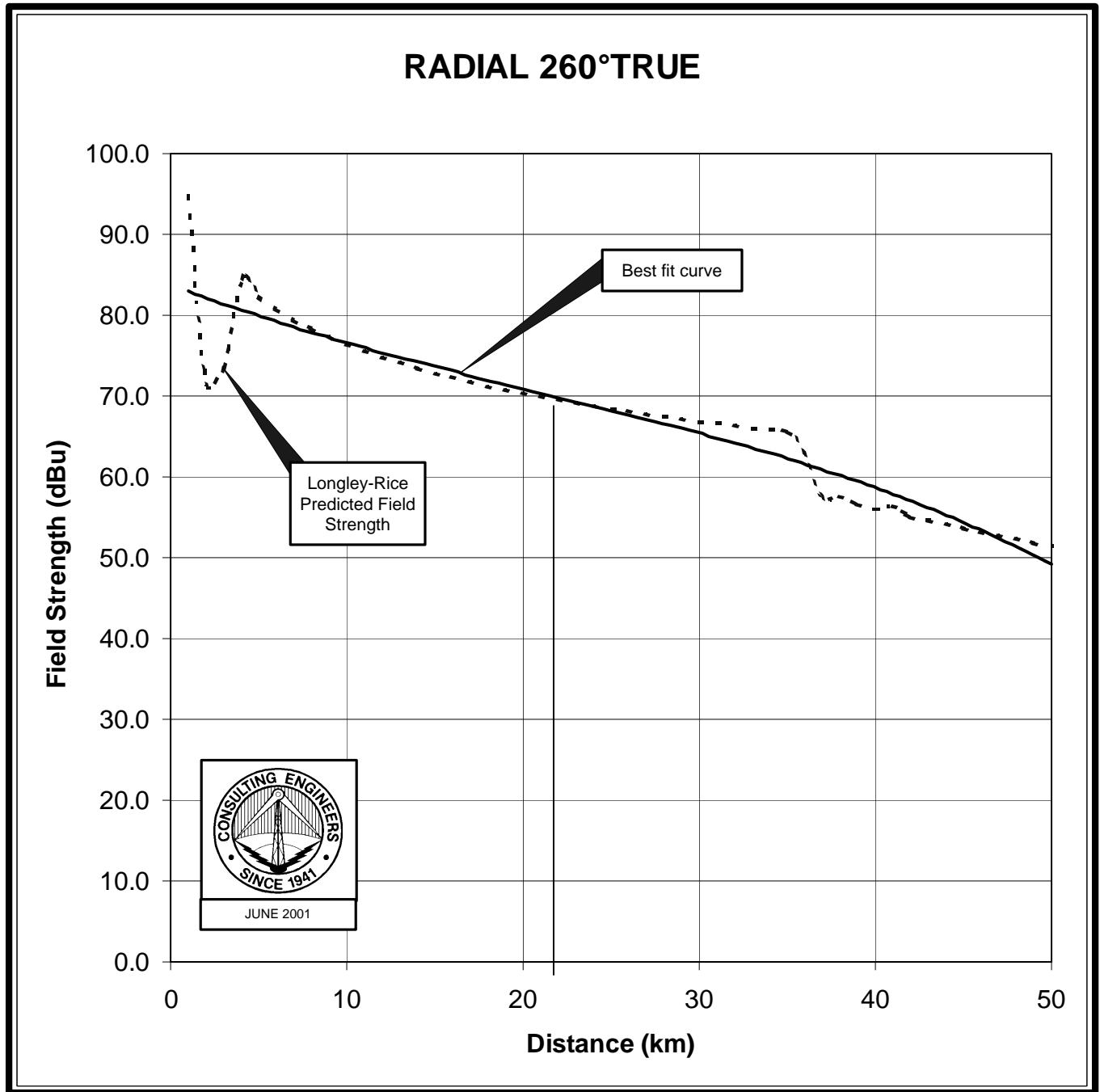
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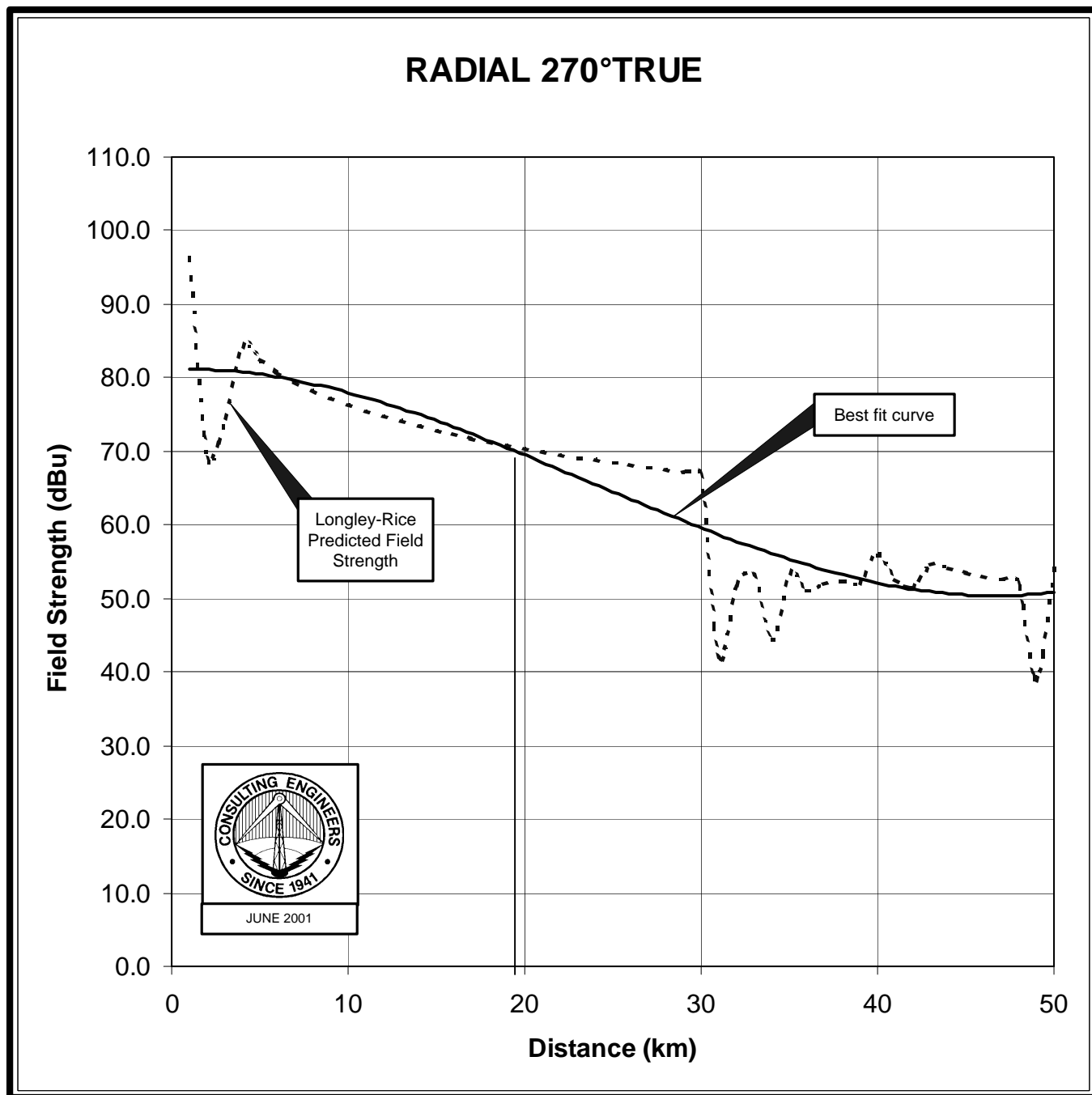
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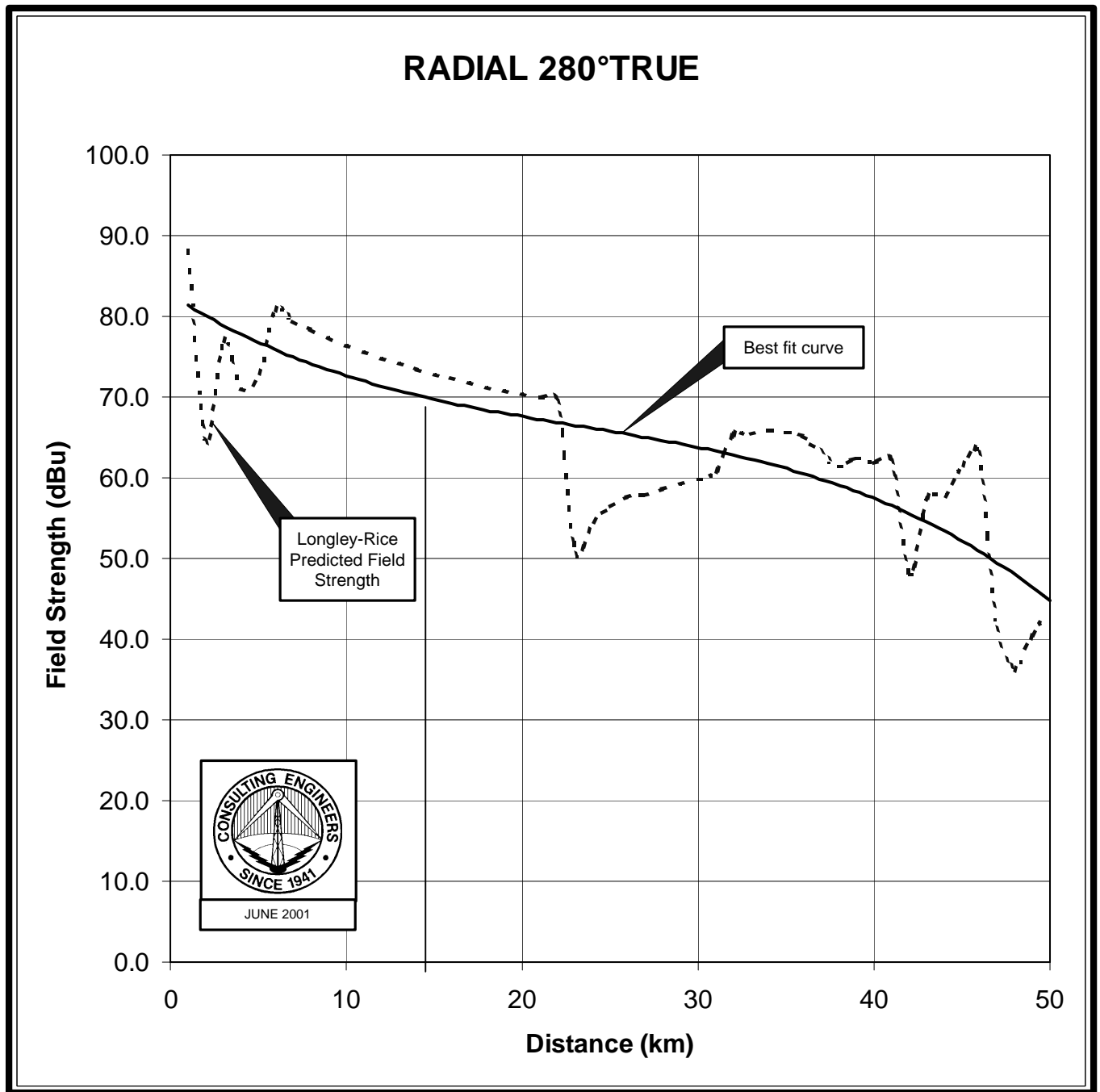
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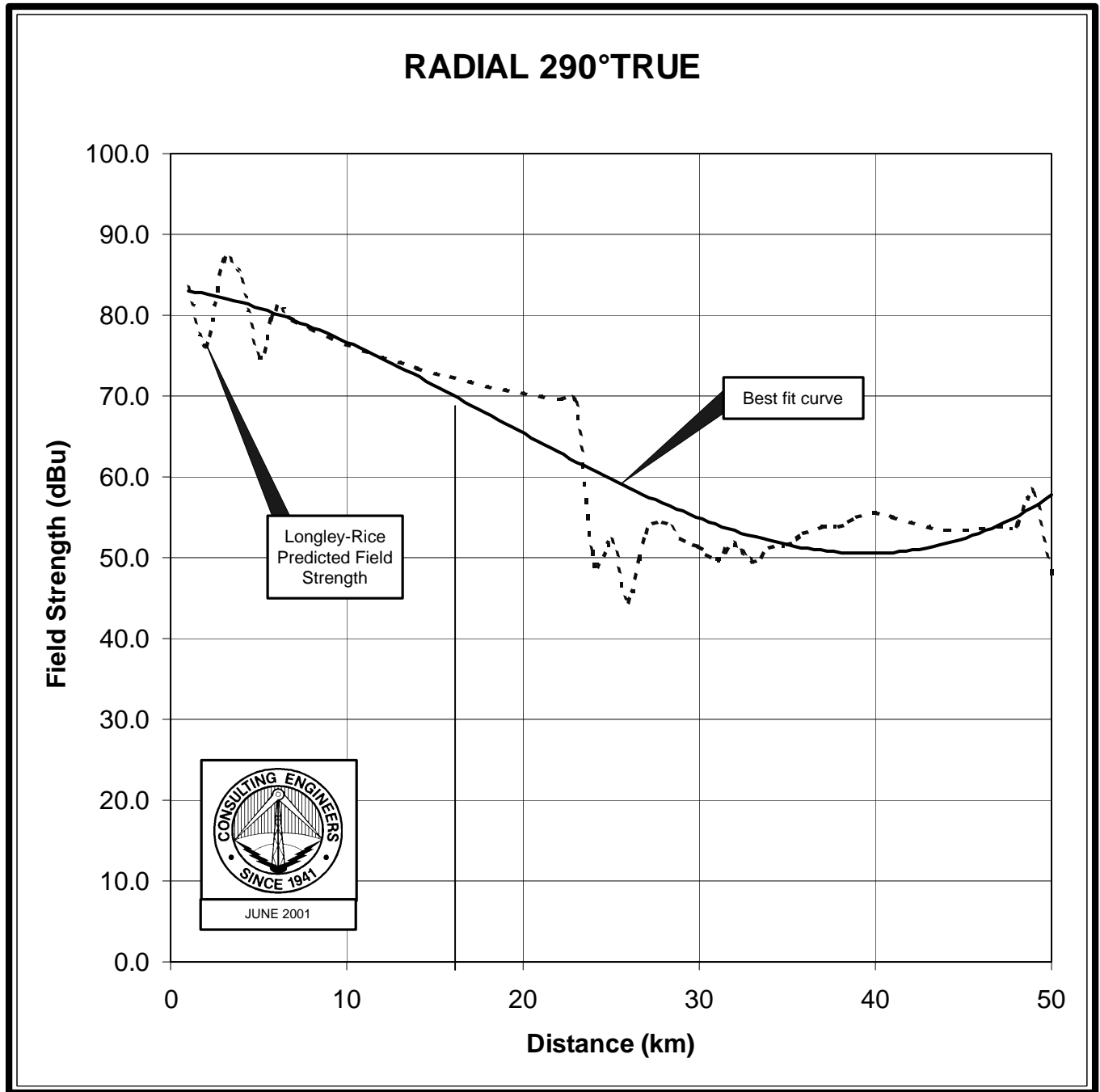
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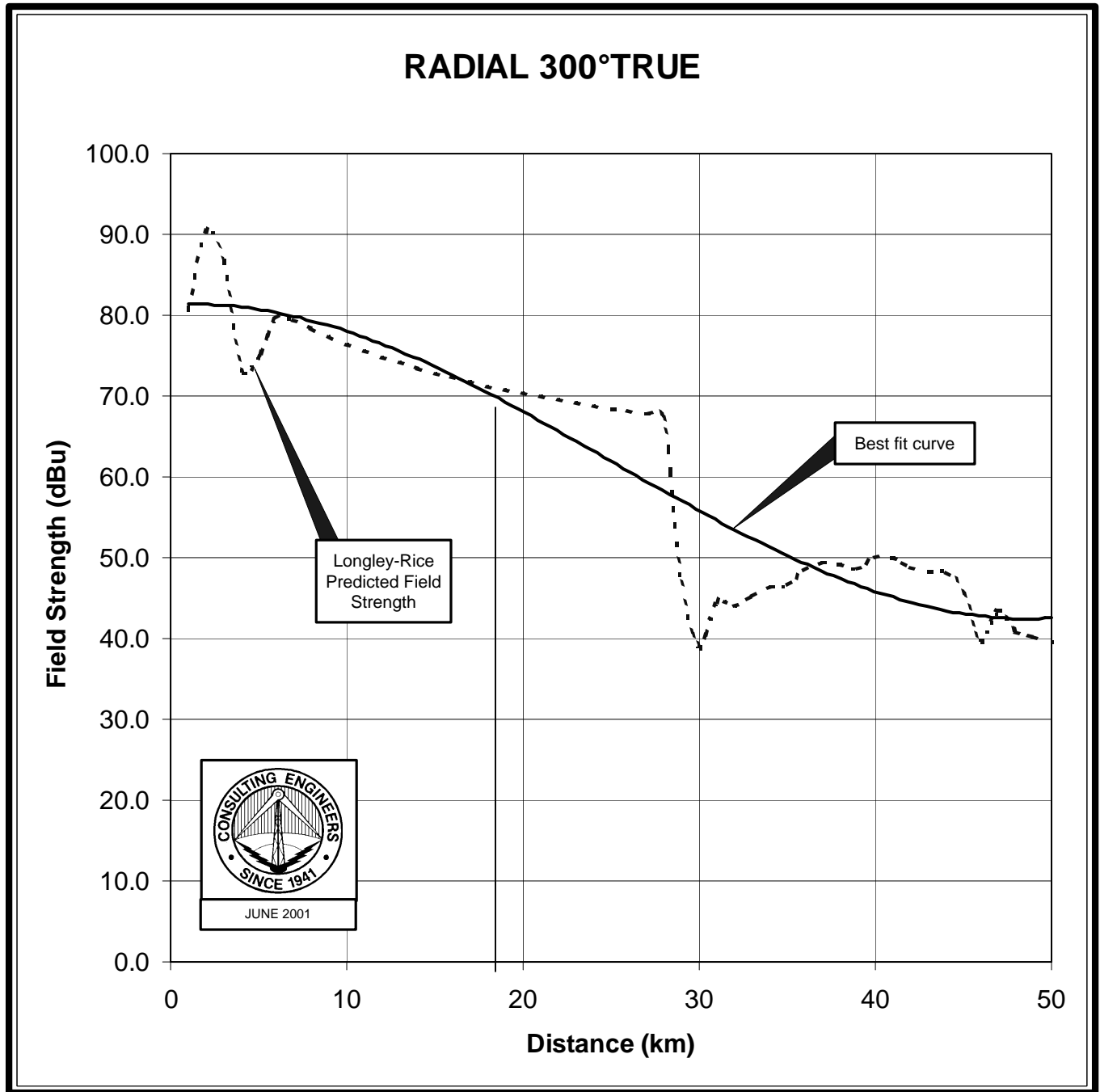
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Vertical Plane Radiation Pattern for Proposed Transmitting Antenna

(see following sheet)

DIELECTRIC COMMUNICATIONS

A UNIT OF GENERAL SIGNAL

Proposal Number: _____

Date: NOVEMBER 5, 1991

Call Letters: _____

Channel: _____

Antenna Type: DCR (1 BAY)

Location: _____

Customer: _____

VERTICAL PATTERN

RMS Gain at Main Lobe: .46 -3.37 dB

Beam Tilt: 0 degrees

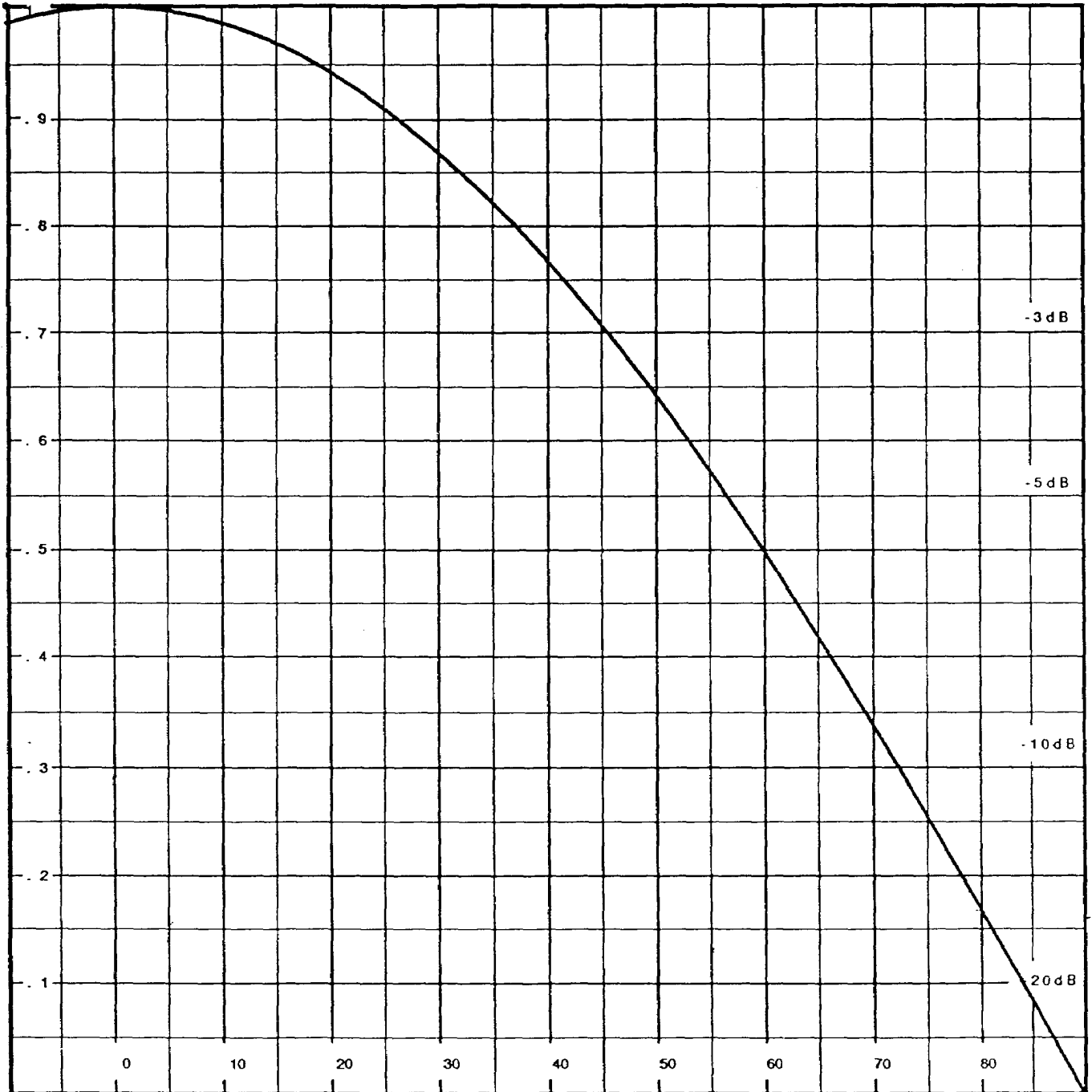
Frequency: FM MHz

RMS Gain at Horizontal: .46 -3.37 dB

Calculated: ☒

Measured: ☐

Drawing #: ELEV-1



DEGREES BELOW HORIZONTAL

NOTE: FROM -85 TO -90 DEGREES, MINIMUM RELATIVE FIELD IS 6% (PER ACTUAL MEASURED PATTERN).

RAYMOND, MAINE

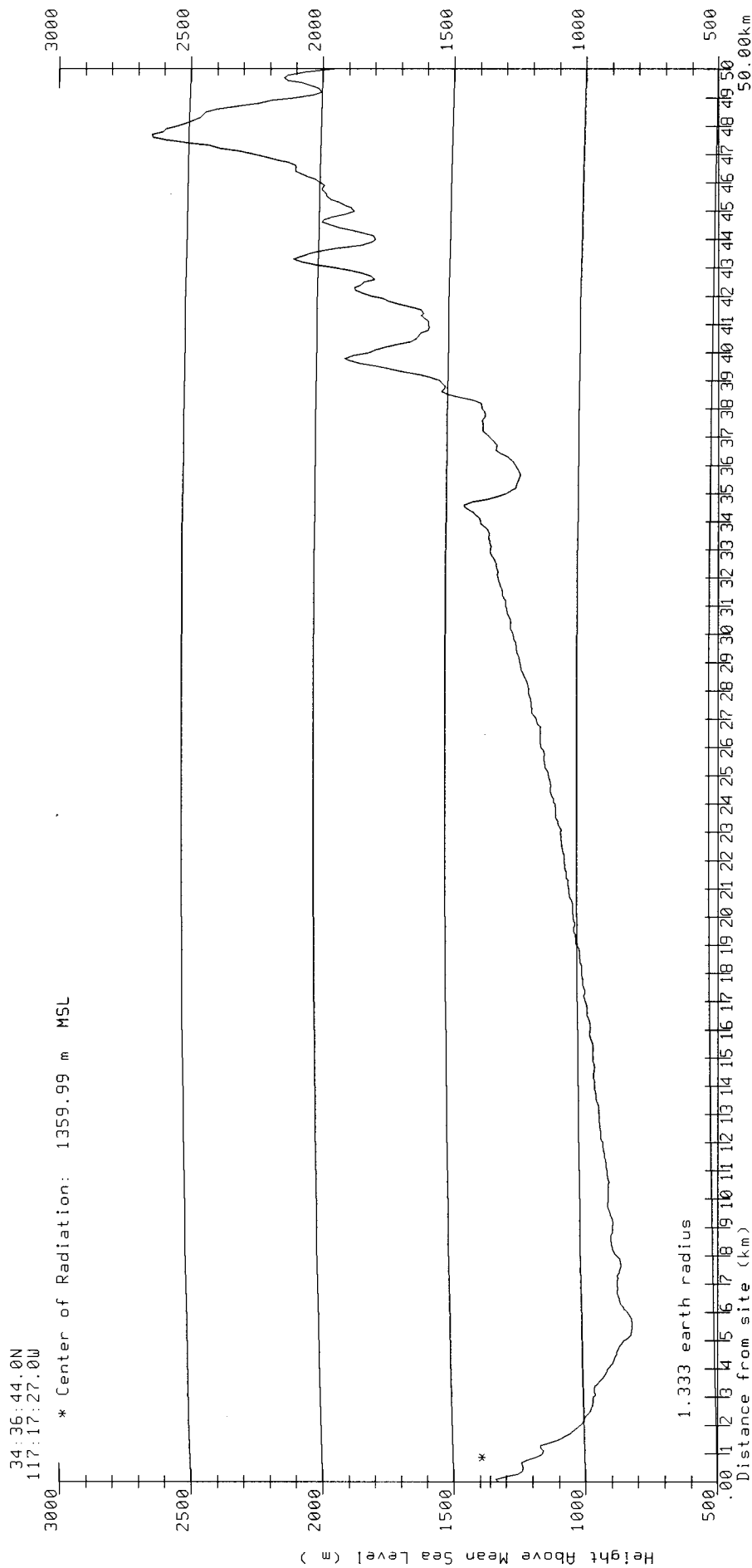
Tel.: 207-655-4555
FAX: 207-655-4669

AJS Form-05

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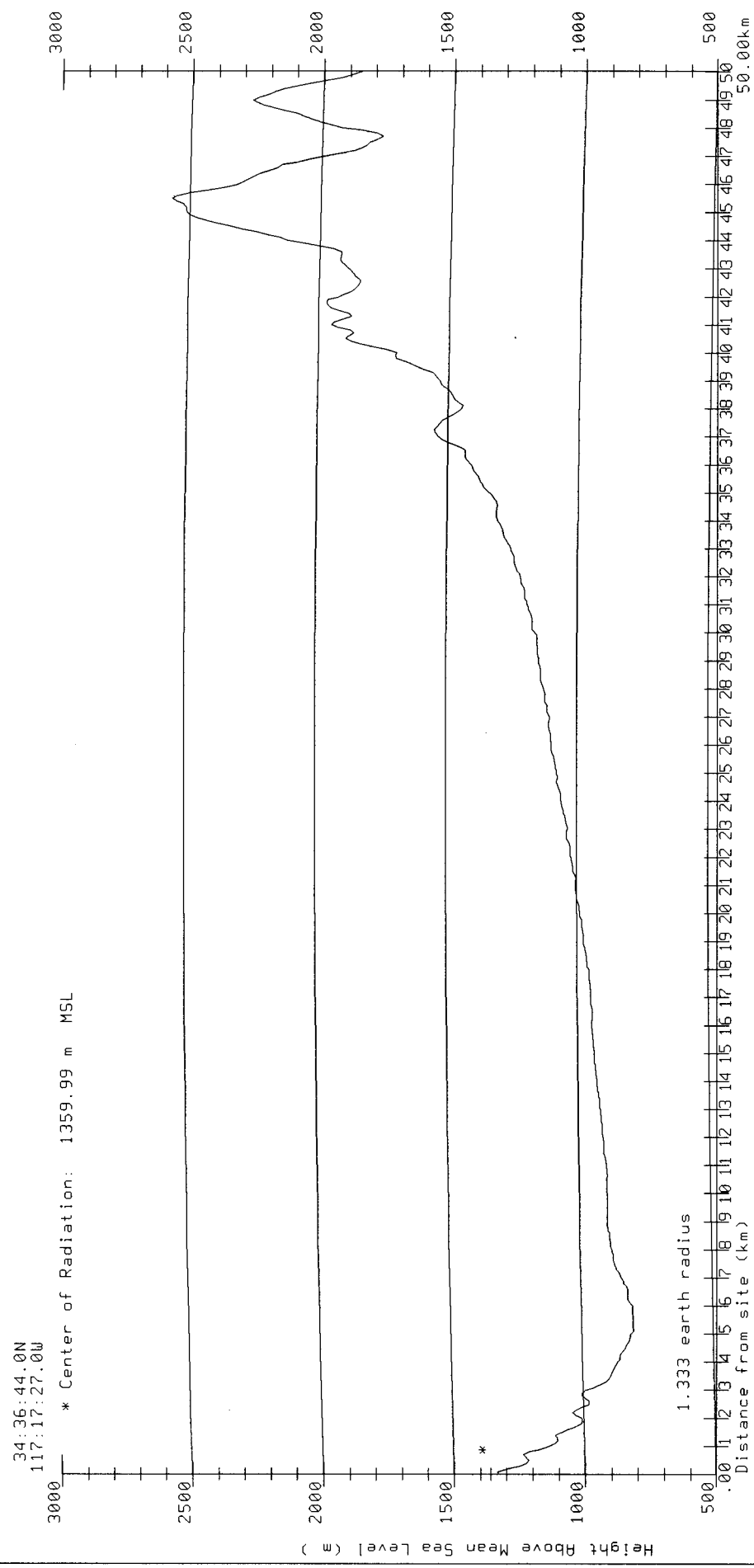
Terrain Profile Data for Longley-Rice Analysis

(Nine sheets follow)



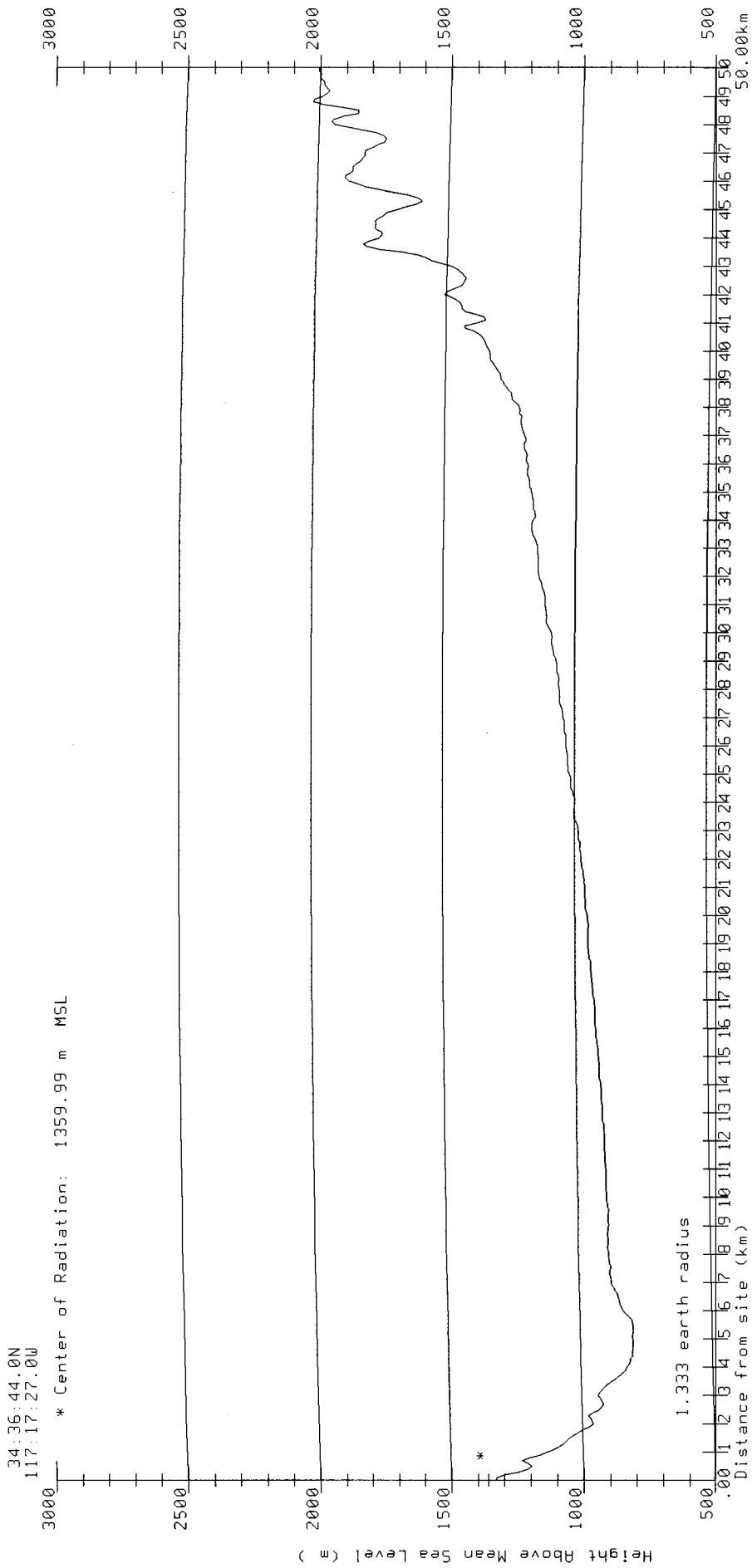
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 Sarasota, Florida



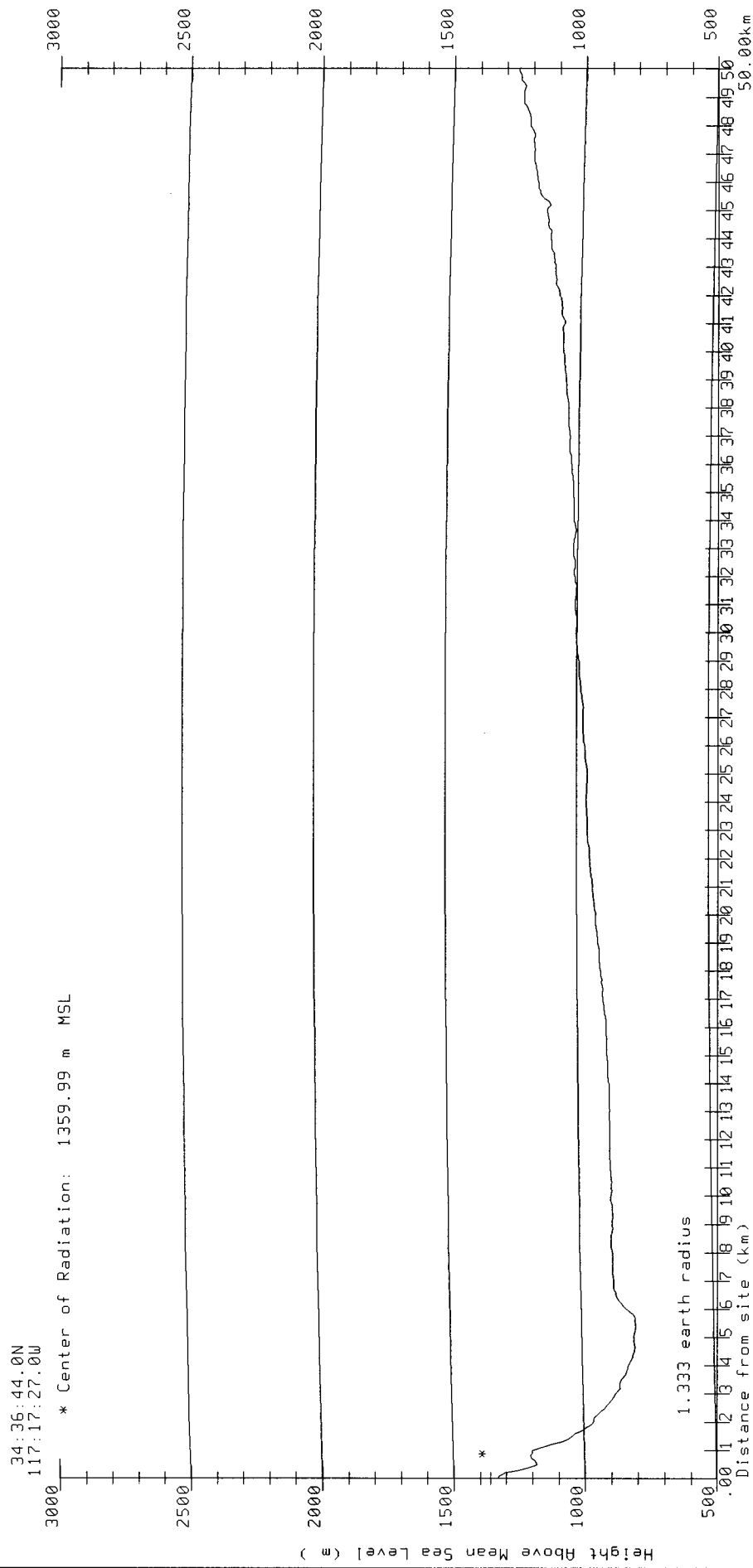
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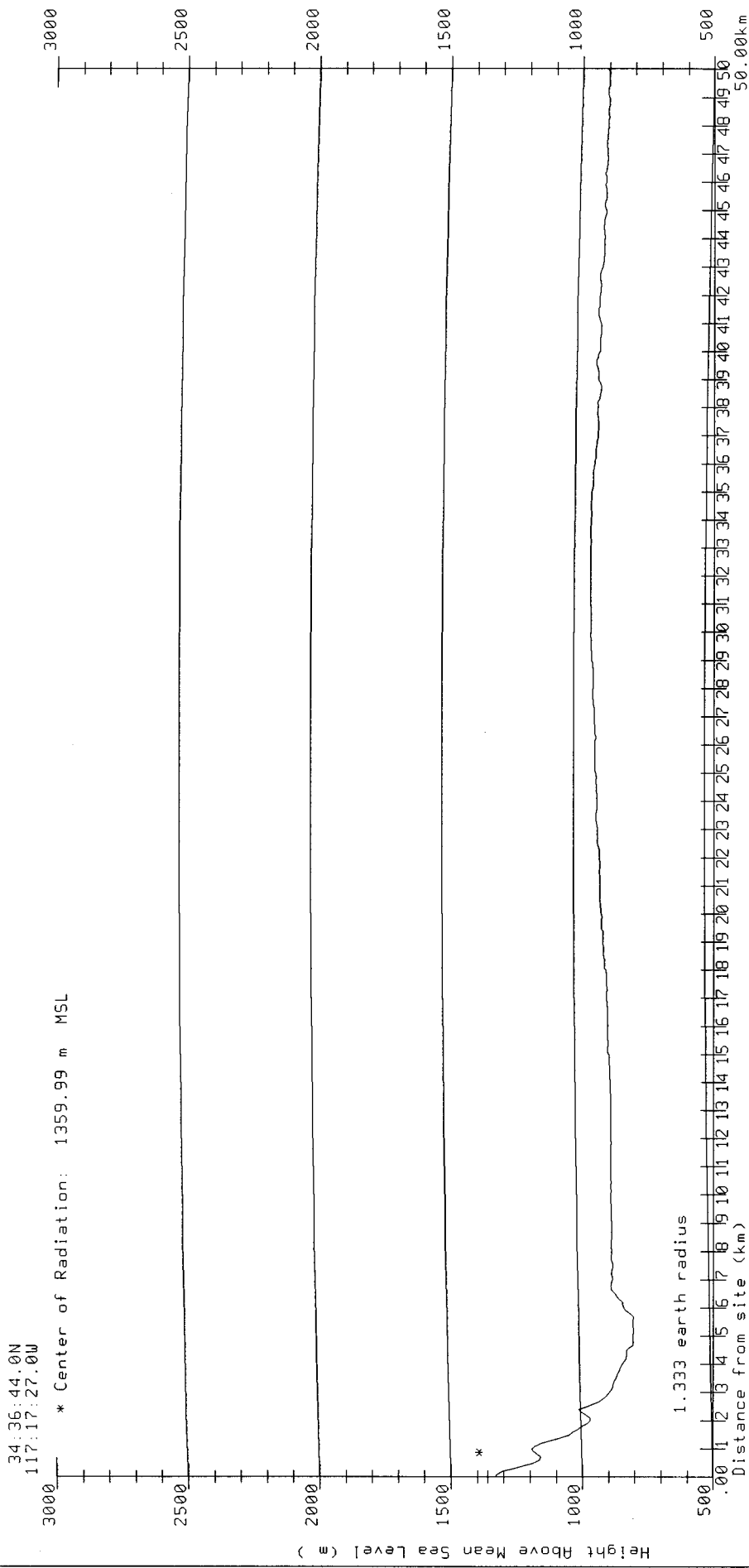
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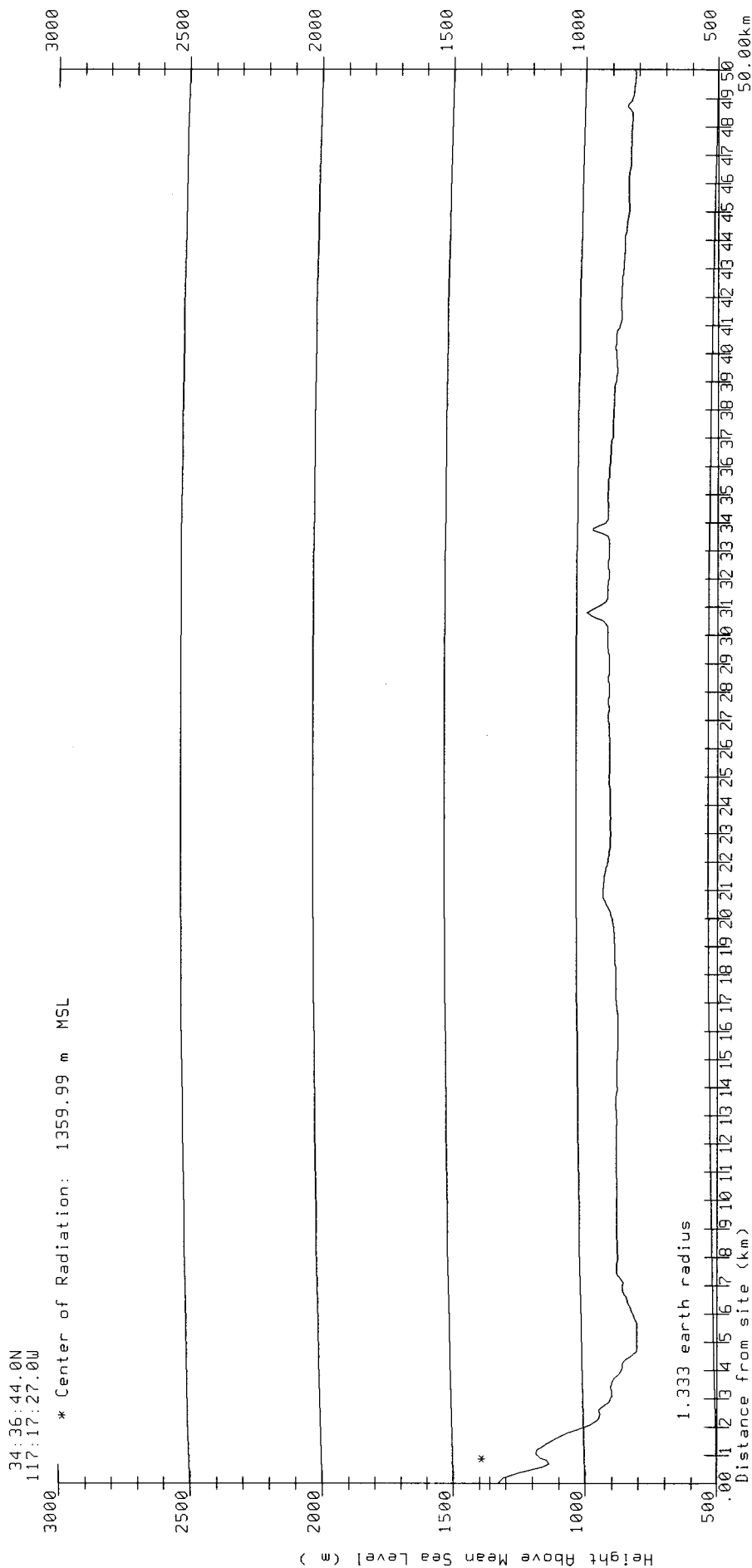
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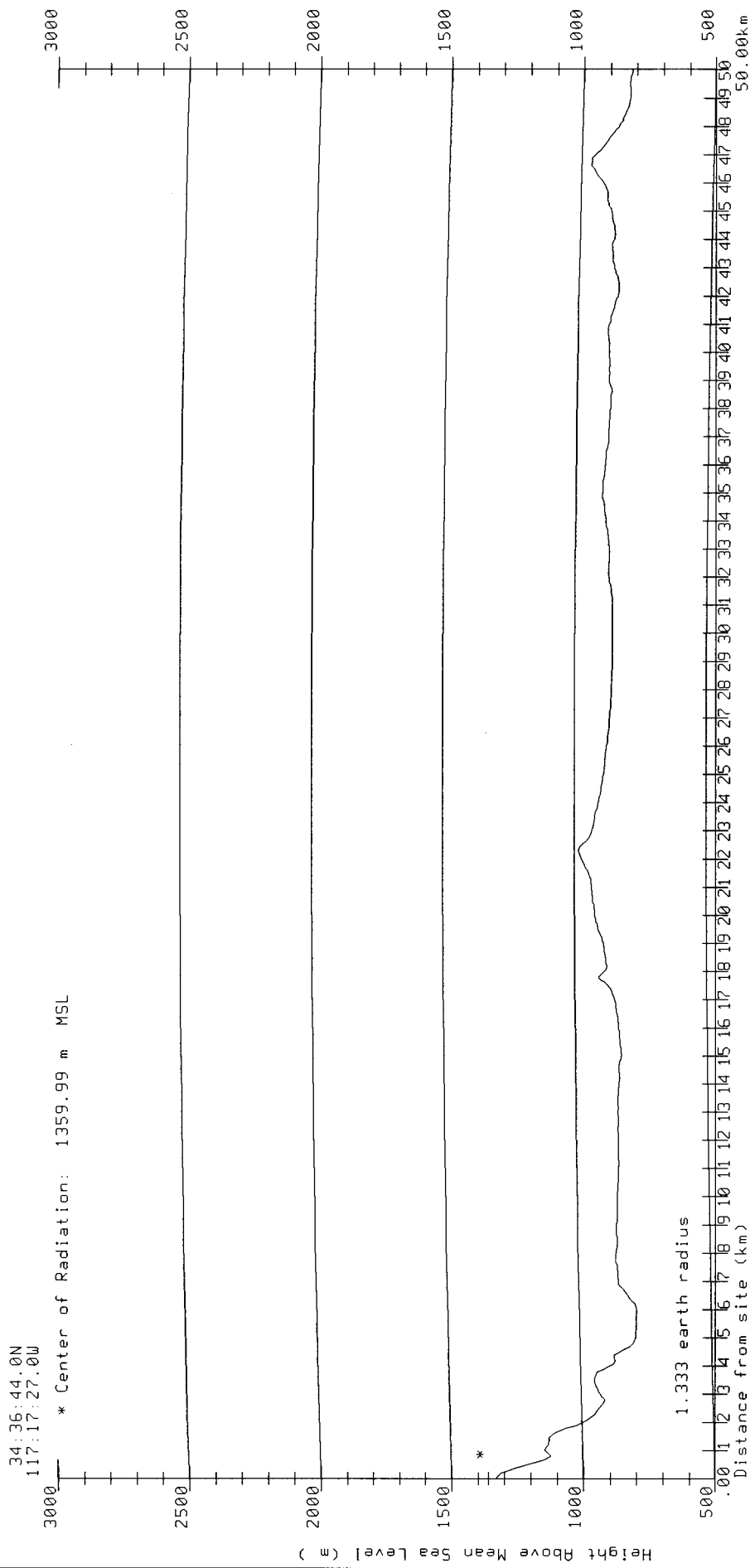
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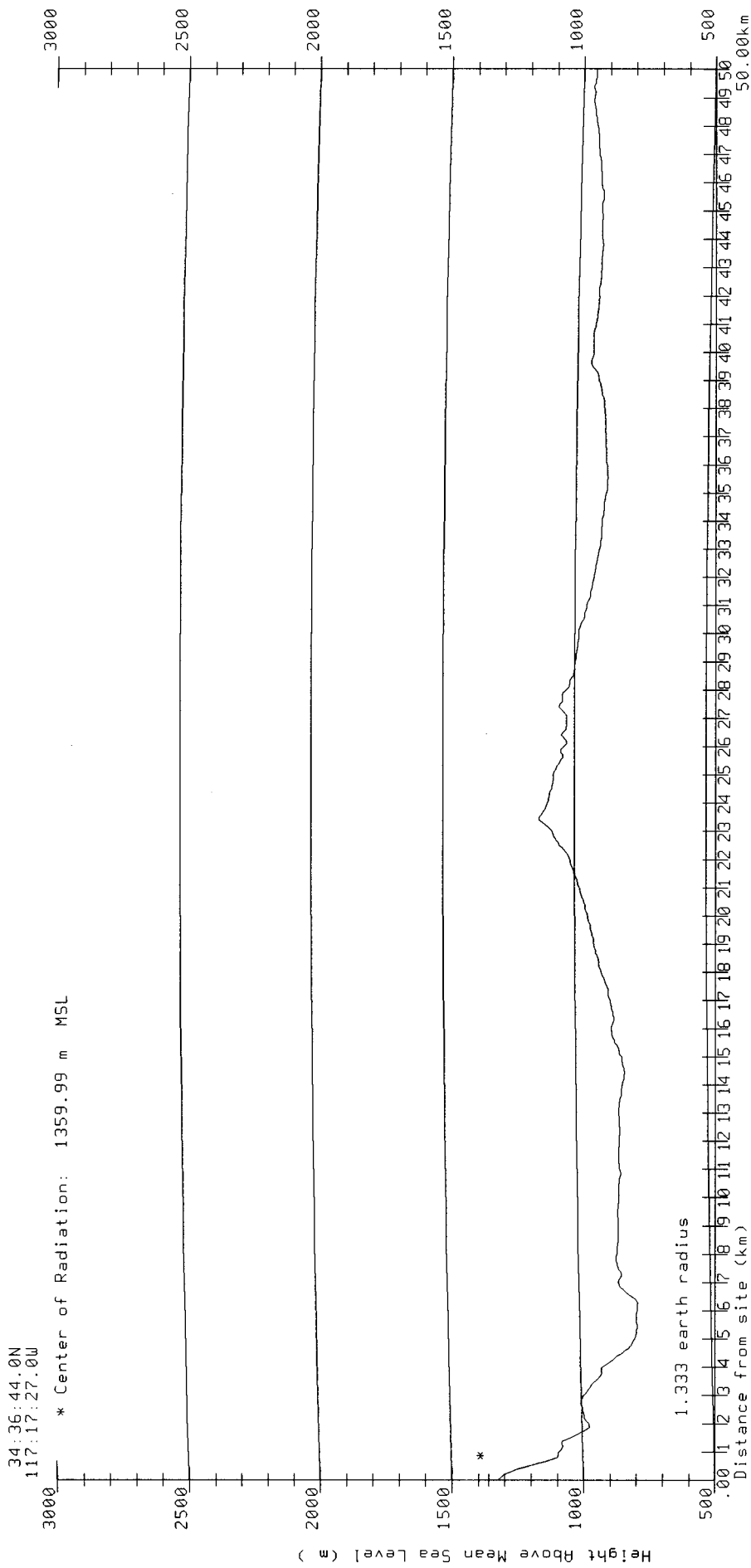
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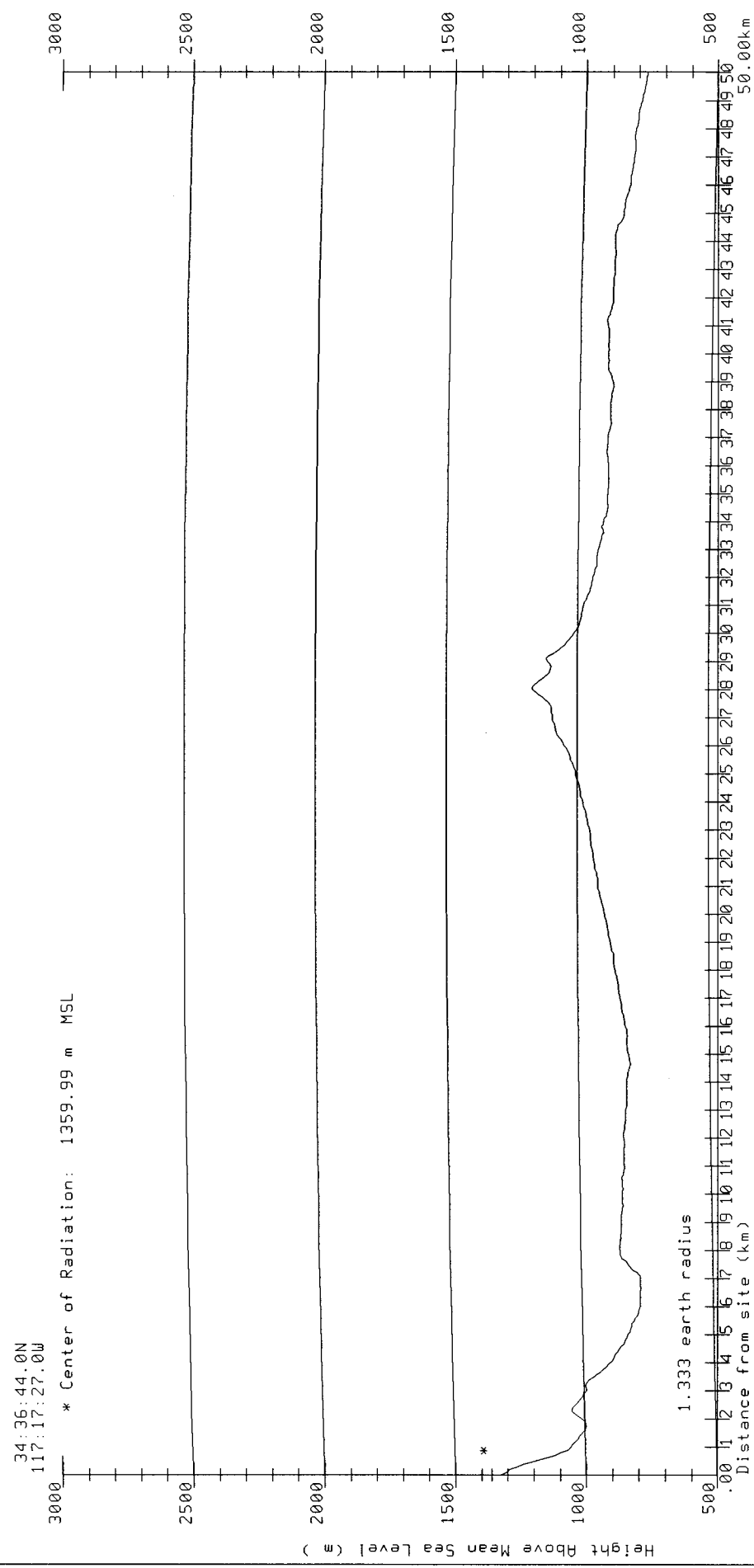
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 3-second elevation data

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