

TECHNICAL EXHIBIT  
APPLICATION FOR FM CONSTRUCTION PERMIT  
STATION KJFK-FM  
FACILITY ID 198631  
LLANO, TEXAS  
CH 242C3 25 KW (ND) 94 M

Technical Narrative

1. Proposed Operation: It is proposed to increase KJFK-FM's nondirectional (ND) ERP from 8 kW to 25 kW. No other changes are proposed, including no change in transmitter site (ASRN 1306613), antenna height (RCAMSL 550 meters) or antenna system (Shively model 6842-4, 1/2 wavelength spaced antenna). Specifically, it is proposed to operate on channel 242C3 (96.3 MHz) at Llano, Texas with a ND maximum ERP of 25 kW (H&V) and an HAAT of 94 meters.

2. Compliance with Section 73.207: Figure 1 is a separation study based on Section 73.207 of the FCC's rules for Channel 242C3 operation from the proposed/licensed KJFK-FM site. As shown, the proposed site complies with the minimum distance separation requirements of Section 73.207 for class C3 operation on channel 242 towards all existing, authorized and proposed stations and allotments.

3. Compliance with Section 73.315/Supplemental Showing: Attached is a supplemental showing utilizing the Longley-Rice propagation model which demonstrates that the 70 dBu contour encompasses 100% of Llano ("LR Showing"). The attached LR Showing was included with the application for construction permit (BMPH-20190214AAP) for KJFK-FM's formerly licensed (BLH-20190604AAX) facilities which are identical to the facilities being proposed herein. Therefore, the LR Showing (from BMPH-20190214AAP) is valid for the proposed operation.

4. Compliance with Section 73.3555(a)/Multiple Ownership: Figure 3 is a map of the 70 dBu contours of stations owned by the applicant. As indicated on Figure 3, there is no 70 dBu overlap with any co-owned stations. Therefore, the proposed operation complies with Section 73.3555(a).

5. RFR Compliance: The proposed KJFK-FM facilities were evaluated in terms of potential radio frequency (RF) energy exposure at ground level to workers and the general public based on the FCC's FM Model software. The existing Shively model 6842-4, 4-bay, 1/2 wavelength spaced antenna is side-mounted at the 93 meter level on the existing tower.

The total ERP is 50 kW (horizontal plus vertical polarization). Figure 4 depicts the output of the FM Model program. As indicated, a maximum power density of 5.49  $\mu\text{W}/\text{cm}^2$  will occur at a point located 340 meters from the tower. This is only 2.75% of the FCC's recommended limit of 200  $\mu\text{W}/\text{cm}^2$  for FM channel 242 (96.3 MHz) for an uncontrolled environment. Thus, it is believed that the proposed KJFK-FM facility is in full compliance with the FCC's requirements with regard to radio frequency radiation exposure.

Access to the transmitting site will be restricted and appropriately marked with warning signs. Furthermore, procedures will be in effect in the event that workers or other authorized personnel enter the restricted area to ensure worker safety with respect to radio frequency radiation exposure. Such measures include reducing the average exposure by spreading out the work over a longer period of time, wearing accepted RFR protective clothing and/or RFR exposure monitors or scheduling work when the stations are at reduced power or shut down.

# FM Study LMS

du Treil, Lundin, &amp; Rackley, Inc., Sarasota, Florida



**Station Channel:** 242      **Station Coordinates:** 030-58-50.4 098-41-13.7 (NAD) HD  
**Class:** C3      **Buffer Distance:** 10 km  
**Comment:** Proposed KJFK-FM

Callsign	Status	Channel	Service	Freq.	City		State	Co.	Rec Type	Latitude	Dist. (km)	Sep. (km)	Spacing (km)	
Facility ID	ARN			Class	DA	Ant ID	ERP (kW)	HAAT (m)	73.215	Longitude	Bear. (deg)	73.215 (km)	Comment	
KMPN	L2C	240	FM	95.9	BURNET			TX	US	C	030-53-38.6	44.11	43	1.11
184541	BLD-20160106AAE			C3	NDIR		25	96.9		N	098-14-12	102.52	37	CLOSE
KXXM	L2C	241	FM	96.1	SAN ANTONIO			TX	US	C	029-38-01.8	149.4	144	5.4
28668	BLH-20100510AVZ			C1	NDIR		100	182		N	098-37-55.1	177.96	133	CLOSE
KJFK-FM	L2C	242	FM	96.3	LLANO			TX	US	C	030-58-50.4	0	153	-153
198631	0000190064			C3	NDIR	100664 <sub>R</sub>	8	94		N	098-41-13.7	0	142	SHORT /1
KSCS	L2C	242	FM	96.3	FORT WORTH			TX	US	C	032-34-54	240.39	237	3.39
71201	0000119954			C	NDIR	100671 <sub>A</sub>	100	478		N	096-58-33	41.81	226	CLOSE
KFXE	L2C	243	FM	96.5	INGRAM			TX	US	C	030-07-04.7	107.33	99	8.33
164252	BLH-20070725AAT			C3	NDIR		8.4	131		Y	099-11-41.2	207	89	CLOSE
KQBZ	L2C	245	FM	96.9	BROWNWOOD			TX	US	C	031-42-16.5	85.66	76	9.66
71106	BLH-20060920AAJ			C1	NDIR		100	100.9		N	099-00-06.2	339.72	70	CLOSE

/1 Currently licensed KJFK-FM operation being modified by the instant application.

ATTACHMENT

COMMUNITY COVERAGE SUPPLEMENTAL SHOWING  
USING AN ALTERNATIVE CONTOUR PREDICTION METHOD  
FM BROADCAST STATION KTHE  
LLANO, TEXAS  
CH 242C3 25 KW 94 M

Attached as Figure 2A is a map showing portions of the FCC predicted 70 dBu and 60 dBu coverage contours. As indicated, the FCC predicted 70 dBu contour does not encompass 80% of the principal community of Llano. However, using a terrain sensitive propagation model, the 70 dBu is predicted to encompass 100% of Llano.

Acceptability of Supplemental Showing

It is believed that it is appropriate to use a supplemental showing based on the FCC's policies and decisions for considering supplemental showings in the context of compliance with coverage of the community of license (Section 73.315).<sup>1</sup> Specifically, as indicated below, there is at least a 34 percent difference in the distance to the 70 dBu contour based on the supplemental method compared to the distance provided by the standard prediction method. As such, the terrain along propagation paths from the proposed transmitter site towards the Llano city limits "departs widely" from the 50 meter delta standard, thus satisfying the requirements in the *Minor Changes R&O* that the 70 dBu contour as predicted by the supplemental method be at least 10% larger than the distance based on the standard prediction method.

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<sup>1</sup> See *Amendments of Parts 73 and 74 of the Commission Rules to Permit Certain Minor Changes in Broadcast Facilities Without a Construction Permit*, Report and Order, 12 FCC Rcd 12371, 12401-03 (1997) (the "Minor Changes R&O"); *KNTV Licensee*, 19 FCC Rcd 15479 (2004); *Letter to Christopher Sova, Esq. re KFME(FM) from Peter H. Doyle, Chief, Audio Division, Media Bureau* (March 5, 2004) ("KFME"), affirmed sub nom. *CMP Houston-KC, LLC*, Memorandum Opinion and Order, 23 FCC Rcd 10565 (2008) ("KFME MO&O"); and *Skytower Communications - 94.3, LLC, Request for Determination of Compliance with the Main Studio Location Rule*, 47 CFR 73.1125, Memorandum Opinion and Order and Notice of Apparent Liability for Forfeiture, Facility ID No. 25799, NAL/Acct. No. MB 201041410015, FRN: 0001790724, DA 10-1760.

Longley-Rice Coverage Analysis

The Longley-Rice propagation model<sup>2</sup> was used as more precise alternative to the Commission's standard prediction method to determine the location of the proposed 70 dBu contour. The Llano town limits are located across the arc of azimuths from 170° clockwise to 190° true from the proposed transmitter site. Therefore, for the Longley-Rice analysis terrain profiles were prepared for the following radials: 170°, 175°, 180°, 185° and 190° true. Figure 1A, Sheets 1 thru 5, depicts the 170°, 175°, 180°, 185° and 190° true terrain profiles, respectively. The terrain data was derived from the U.S.G.S. 3-second terrain database. Using these terrain elevations, calculations of the field strength were made at 0.1-km intervals along each radial using the Longley-Rice propagation model. The following parameters were employed in the calculations:

Model	Point-to-point irregular
Location Variability	50%
Time Variability	50%
Situation Variability	50%
Frequency	96.3 MHz
Polarization	Horizontal
Conductivity	0.005 S/m
Dielectric Constant	15.0
Transmitter Antenna Height AMSL	550 m
Transmitting Antenna	Non-directional
Maximum Effective Radiated Power	25000 W
Receive Antenna Height	9.1 m
Clutter Factor	3 dB

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<sup>2</sup> Rice, P.L., A.G. Longley, K.A. Norton, and A.P. Barsis, "Transmission Loss Predictions for Tropospheric Communication Circuits," Technical Note 101 (Issued May 7, 1965, Revised January 1, 1967) National Bureau of Standards, Boulder, Colorado.

See also Longley, A.G., and P.L. Rice, "Prediction of Tropospheric Radio transmission Loss Over Irregular Terrain: A Computer Method-1969," ESSA Technical Report ERL-ITS 67, Institute for Telecommunications Sciences, Boulder, Colorado, July 1968.

As indicated above, a 3 dB clutter factor was used to take into account field strength variations due to local clutter (e.g. trees, buildings).<sup>3</sup> The results of the study are illustrated graphically on Figure 1A. The field strength data along each radial were analyzed to determine the "median" values using polynomial curve fitting (based on the method of least squares).<sup>4</sup> The location of the "median" 70 dBu field strength level is indicated on each radial based on this analysis.

The 70 dBu contour based on the alternate terrain method (Longley-Rice) has been depicted on Figure 2A. Also shown are the legal boundaries of Llano based on the 2020 Census, the proposed transmitter site and the protected 60 dBu contour based on the FCC's standard prediction method [F(50,50)]. It has been determined that the Longley-Rice 70 dBu encompasses 100% of the land area within the Llano town limits.

#### Compliance with 70 dBu Contour 10% Extension Criteria

The following tabulates the distance to the 70 dBu contour along each radial based on the FCC's standard prediction method [F(50,50)] and the Longley-Rice alternate terrain method, the difference and percent change:

Radial	70 dBu Field Strength (km)		Difference	
	FCC F(50,50)	Longley-Rice	Km	Percent
170°T	25.6	34.2	8.6	+34
175°T	26.0	39.8	13.8	+53
180°T	25.7	37.7	12.0	+47
185°T	26.3	35.2	8.9	+34
190°T	26.3	36.3	10.0	+38

<sup>3</sup> Use of a 3 dB clutter factor appears "conservative" for the propagation paths considered here. For instance, a 2 dB clutter factor was used by the FCC to establish that KALF-FM at Red Bluff, California encompassed its main studio location - see Memorandum from William Daniel, Chief, Propagation Analysis Bureau, OET, to Dennis Williams, Chief, FM Branch, MMB, dated Oct. 6, 1992 concerning the supplemental showing of 3.16 mV/m contour of KALF-FM, Red Bluff, CA, File BLH-851125KH. In addition, Bullington indicated that the average loss from surrounding trees for horizontal polarization may be 2 to 3 dB (see Kenneth Bullington, "Radio Propagation at Frequencies Above 30 Megacycles, Proc IRE, October, 1947).

<sup>4</sup> The polynomial equation used for the analysis is shown on each graph as a dashed line along with the R-squared value, which helps determine the line of best fit.

The difference between the distances to the 70 dBu contours exceeds 10 percent.

Sample Calculation

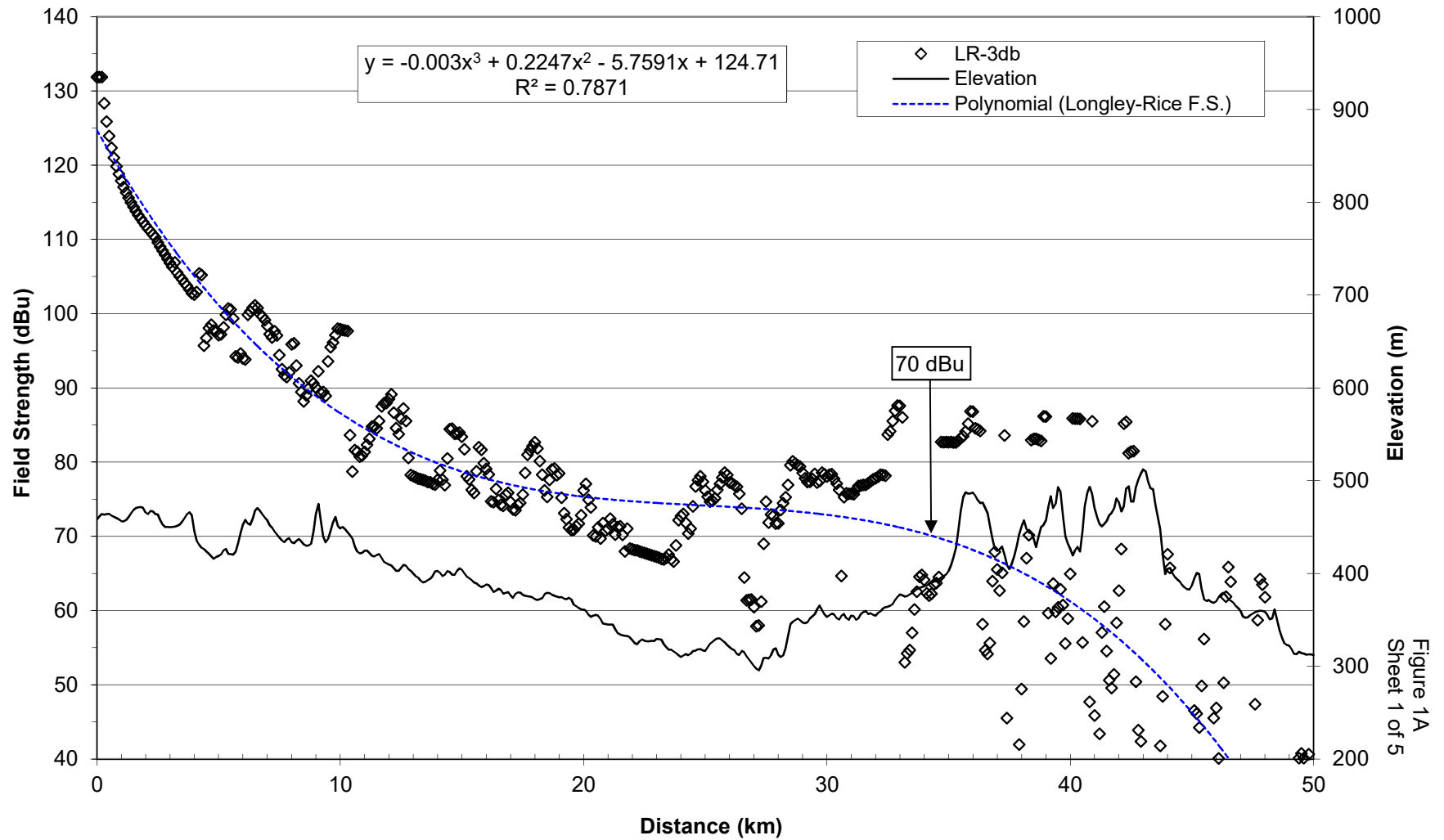
The following provides a sample Longley-Rice calculation along the 180° true radial.

Free Space Field (25 kW @ 30.0 km)	91.4 dBu
Additional estimated transmission loss	8.4 dB
Clutter Loss	3.0 dB
Net received field	80.0 dBu

Conclusion

As demonstrated above, use of a supplemental showing is appropriate based on the FCC's policies and decisions for considering supplemental showings in the context of demonstrating compliance with coverage of the community of license (Section 73.315). In addition, the application complies with the community of license coverage requirements of Section 73.315 based on the supplemental showing.

# 170 Degrees True





# 175 Degrees True

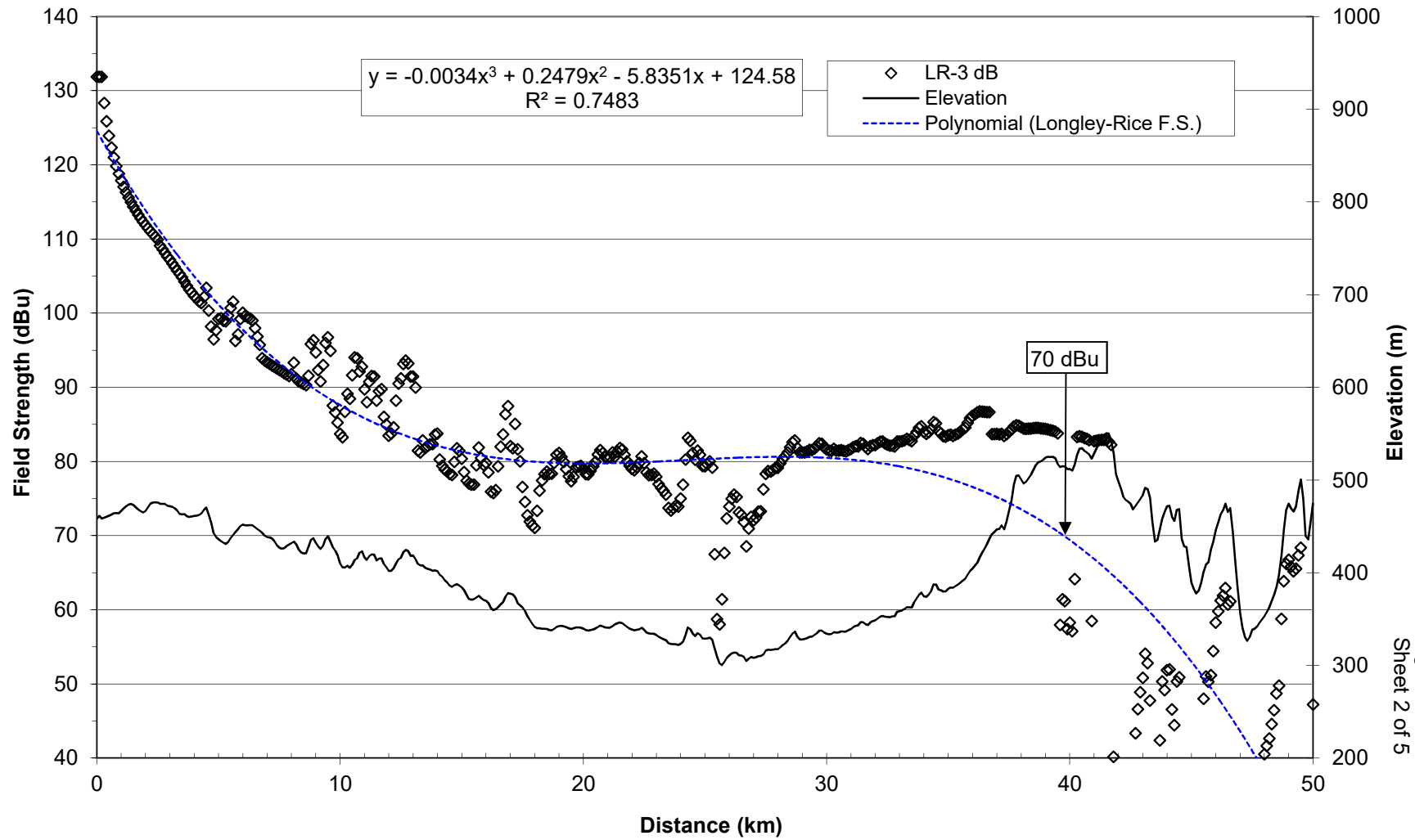
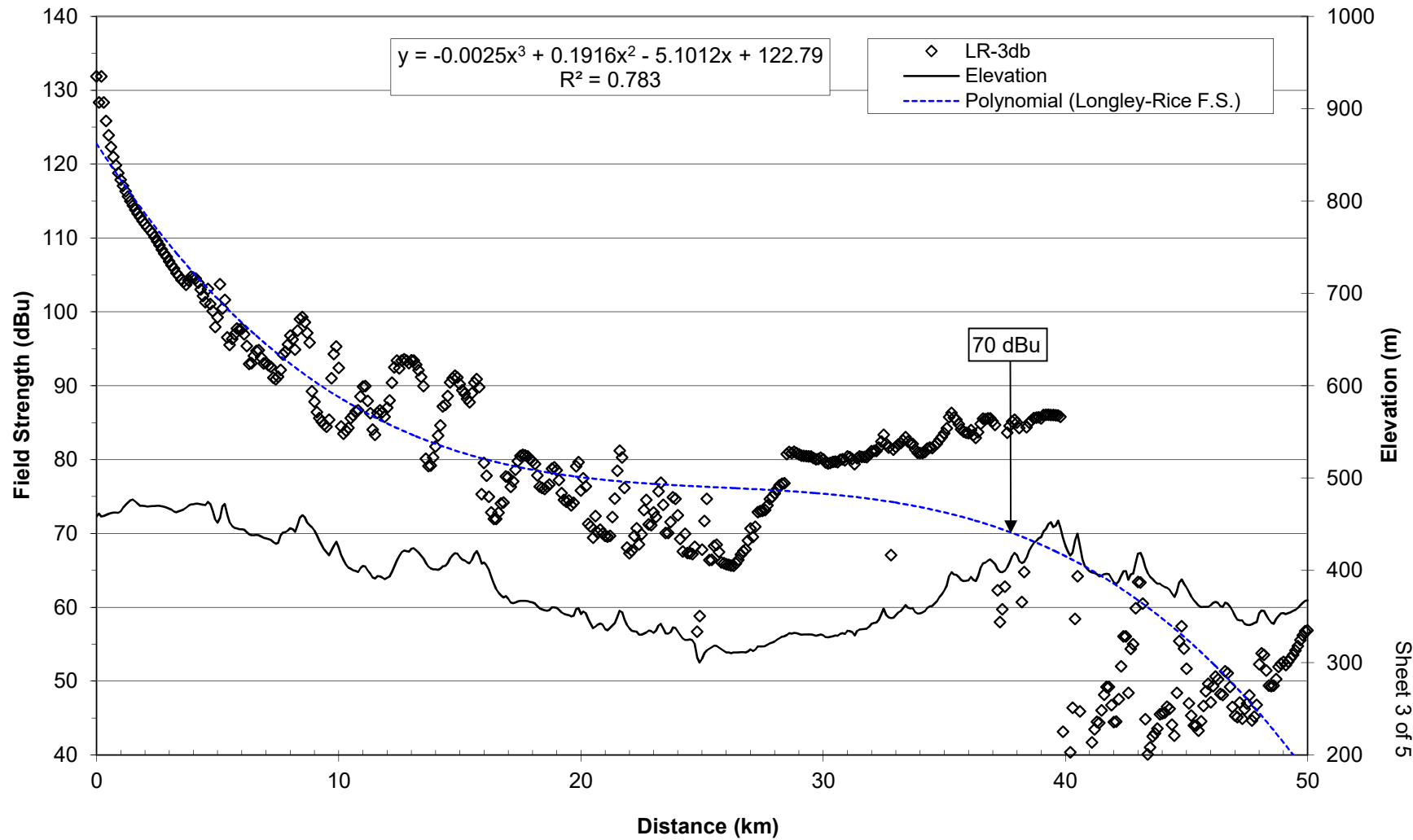


Figure 1A  
Sheet 2 of 5

# 180 Degrees True



# 185 Degrees True

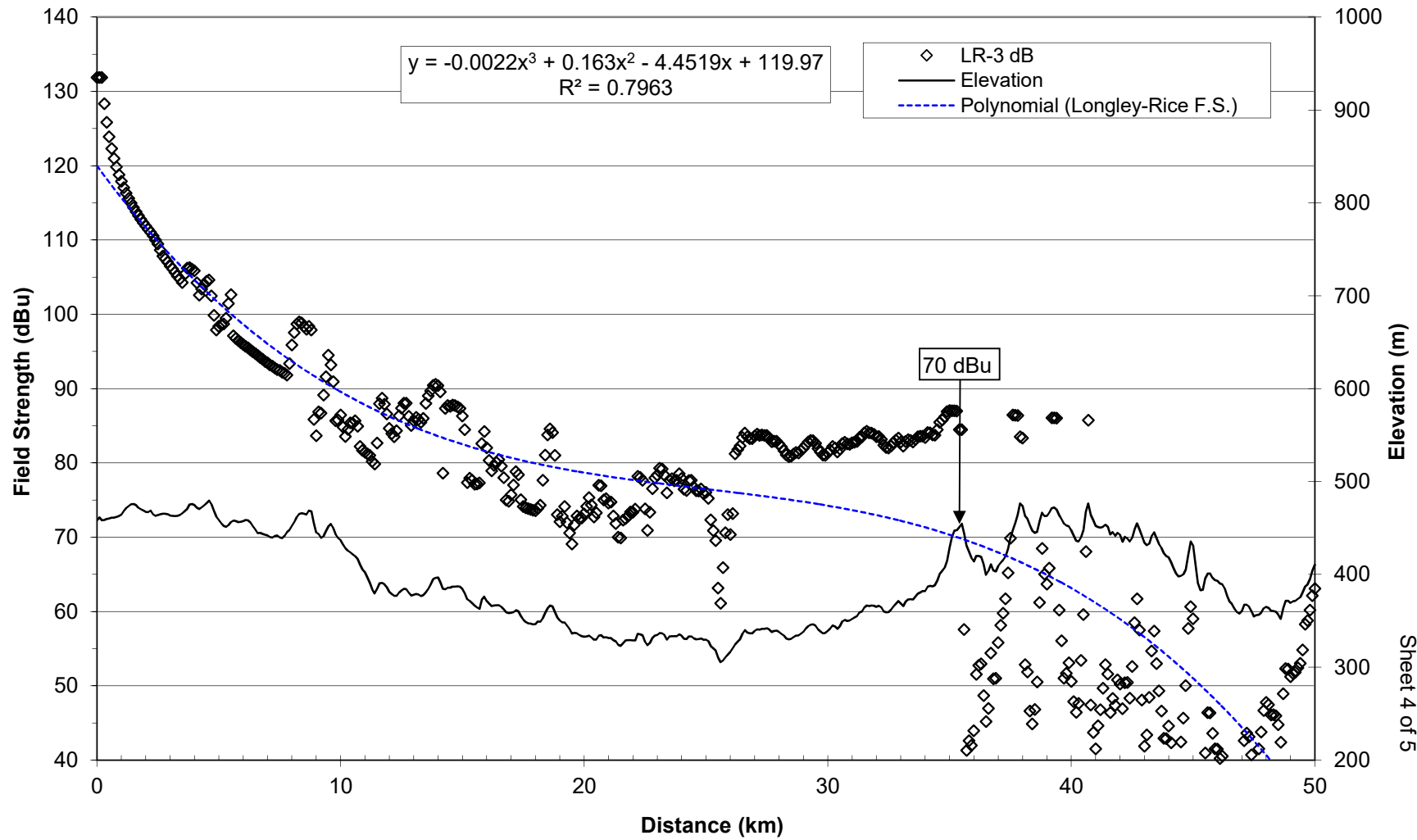


Figure 1A  
Sheet 4 of 5

# 190 Degrees True

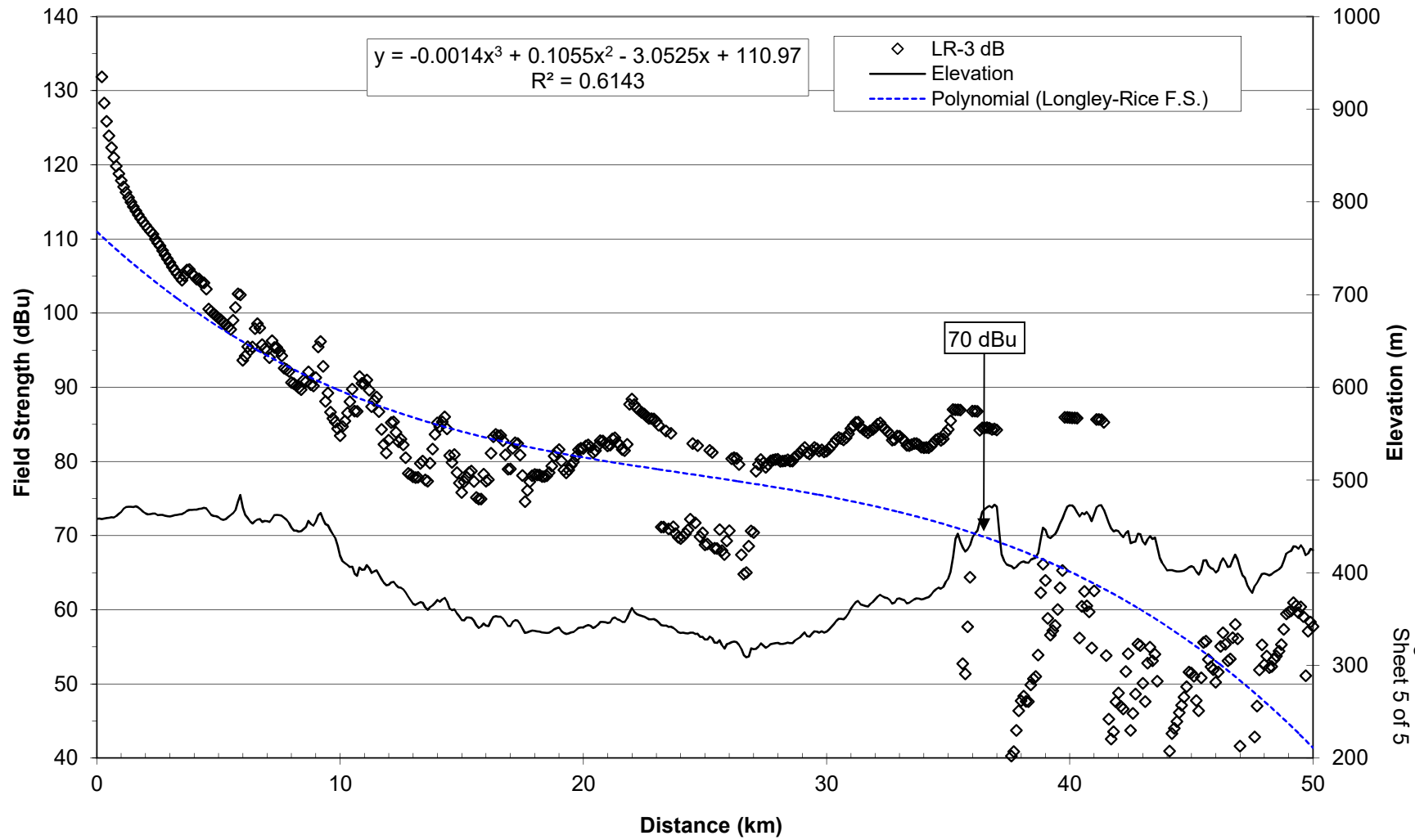
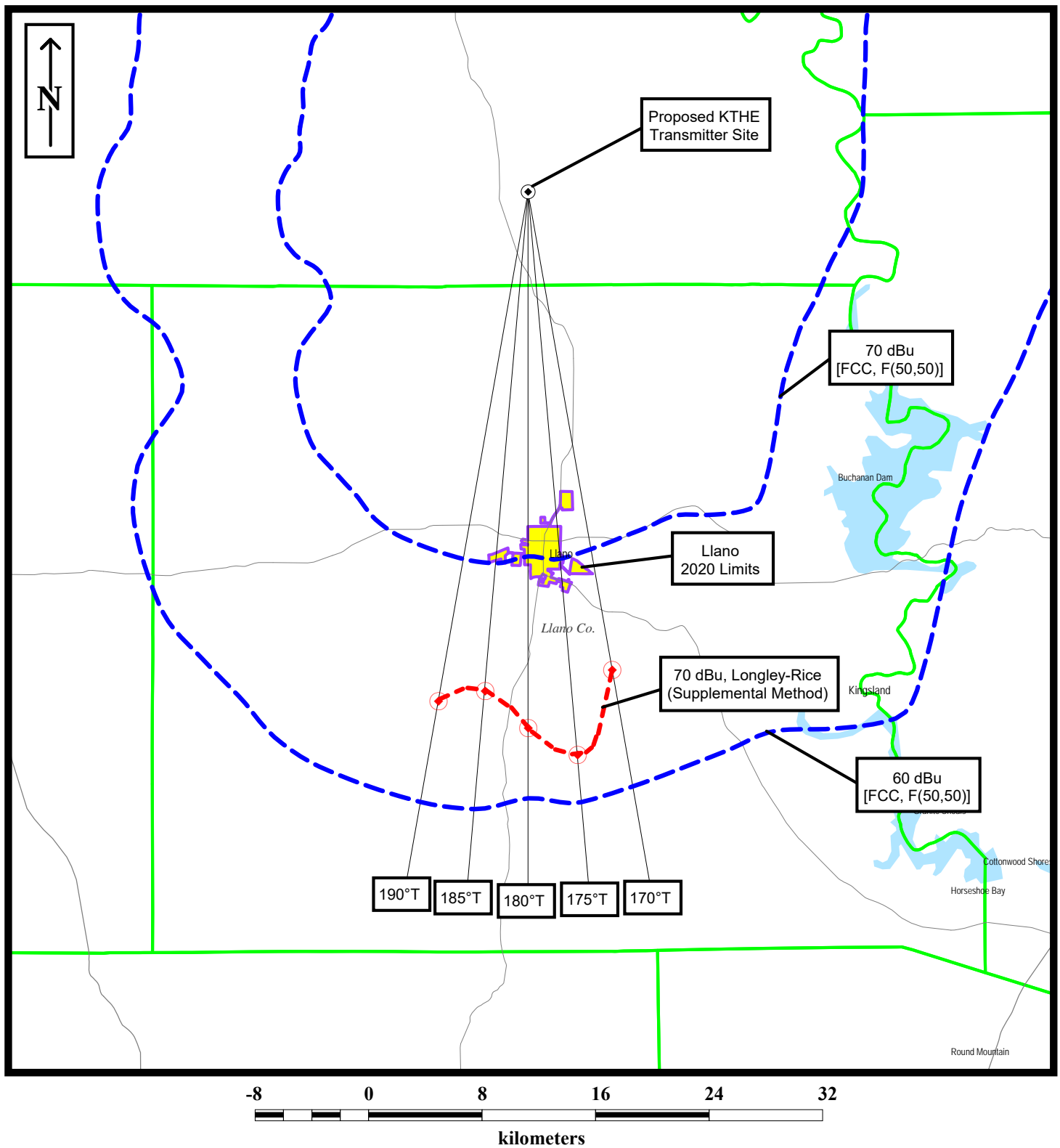


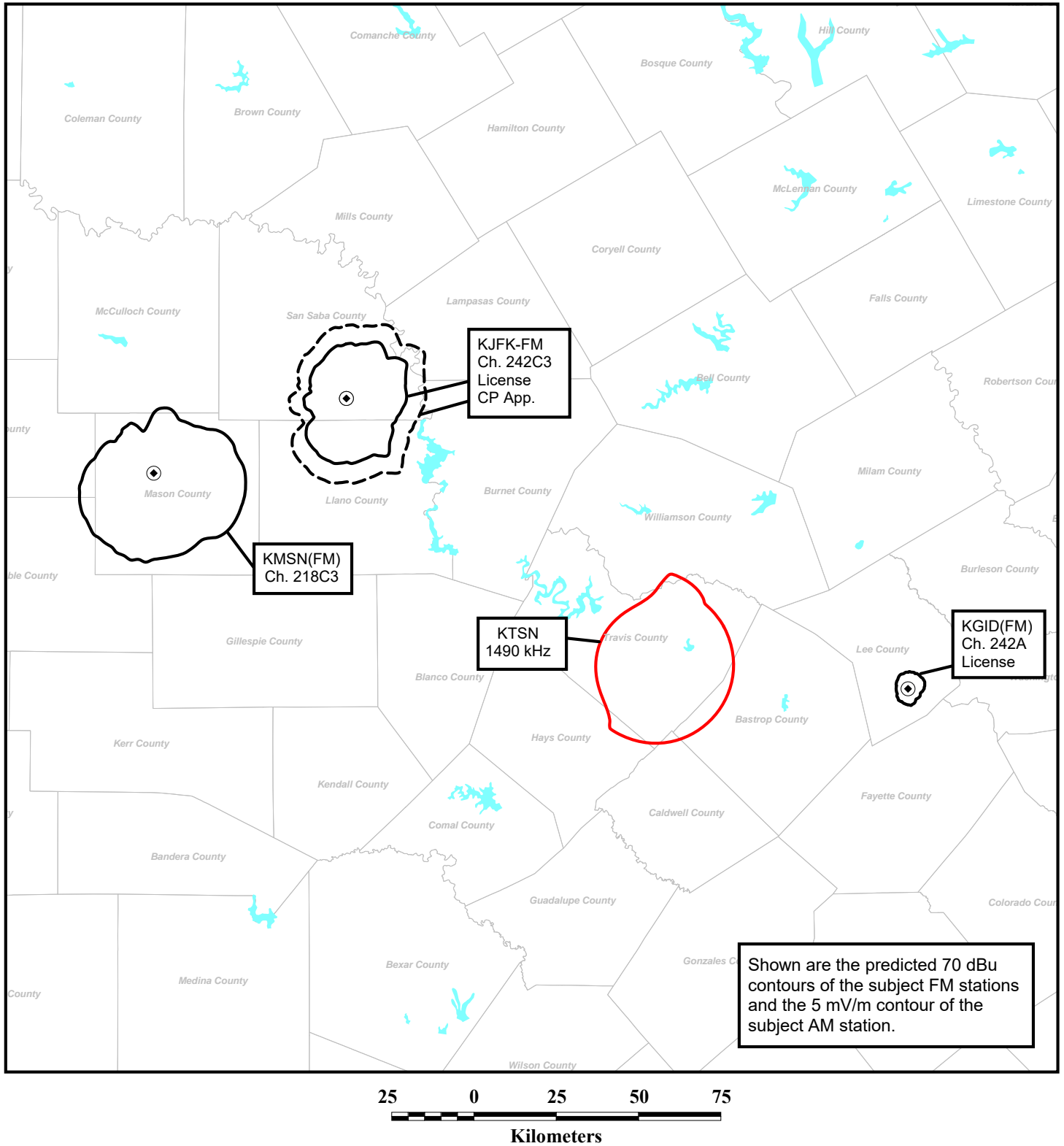
Figure 1A  
Sheet 5 of 5



## 70 DBU - SUPPLEMENTAL SHOWING

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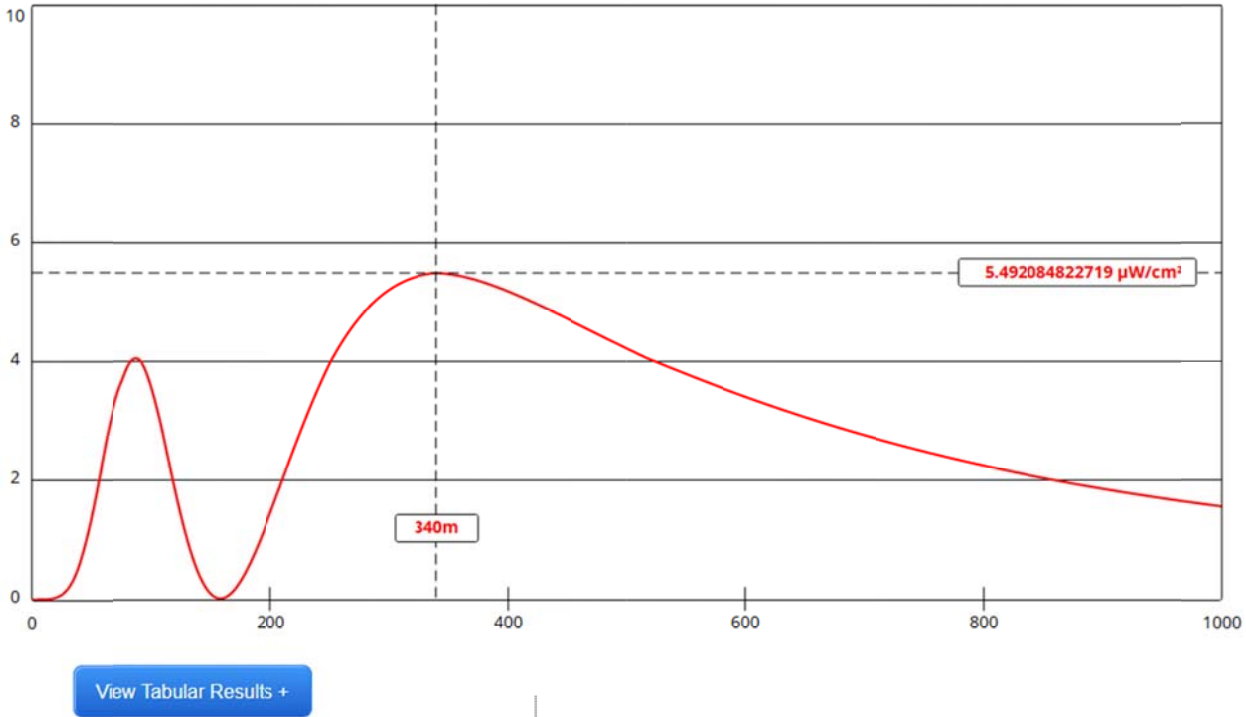
Figure 3



## PRINCIPAL COMMUNITY CONTOURS OF SUBJECT STATIONS

du Treil, Lundin & Rackley, Inc. Sarasota, Florida 34237

Figure 4



Channel Selection	Channel 242 (96.3 MHz) ▾		
Antenna Type +	EPA Type 2: Opposed V Dipole ▾		
Height (m)	<input type="text" value="93"/>	Distance (m)	<input type="text" value="1000"/>
ERP-H (W)	<input type="text" value="25000"/>	ERP-V (W)	<input type="text" value="25000"/>
Num of Elements	<input type="text" value="4"/>	Element Spacing (λ)	<input type="text" value="0.5"/>
Num of Points	<input type="text" value="500"/>	<input type="button" value="Apply"/>	