

Comprehensive Engineering Exhibit

Minor Change of K237HD

Facility ID 202305

This application requests for K237HD a change in location, elevation, and antenna only. No change in channel is requested.

Antenna Location

The directional antenna with a pattern as depicted in **Figure 0** is to be mounted on the existing tower which is identified by registration number 1053406 at 274 meters above ground. Below as **Figure 1** is an overlap and spacing study from which it can be determined that this proposal is within the licensed contour of **second** adjacent channel station KLTY and **third** adjacent station KFWR.

73.1204 Compliance

We will demonstrate that a lack of population and/or other factors allow this proposal to be compliant with 74.1204. The process commonly called "Living Way", allows for the use of D/U Analysis, also known as "signal strength ratio methodology" to be utilized to demonstrate compliance. In this instant case the facility to be protected is on a second or third adjacent channel and is to be afforded protection from signals 40 dB stronger than the protected facility presents near the proposed translator antenna location.

Concerning KFWR; In **Figure 2** a map showing the predicted 61.2 dBu signal contour of the protected KFWR facility at the proposed translator antenna location is given. This proposal can only cause predicted interference to the protected facility by having a signal exceeding 101.2 dBu ($61.2 + 40$) in a habitable/populated area. Utilizing the line of sight equation shown in **Figure 3** it has been determined that a 101.2 dBu signal developed by 250 watts, as proposed, emitted by the proposed antenna will not reach a habitable area. With examination of the image in **Figure 4** it can be determined that no habitable space extends into the confines of this contour.

Concerning KLTY; In **Figure 2** is a map showing the predicted 84 dBu signal contour of the protected facility at the proposed translator antenna location is given. As this signal is due the same 40 dB protection, and is of higher value than that of KFWR, the demonstrated protection of the weaker KFWR provides for the protection of KLTY.

Fill-In and Minor Change Status This proposal is to serve as a fill-in translator for station KHAVN, Facility ID 63780 Fort Worth, TX. The map of **Figure 5** demonstrates that the proposed 60 dBu contour is contained within that of the 5 mV/m of that facility. Also demonstrated is the required proposed service contour overlap.

RF Fields Statement

The proposed facilities were evaluated in terms of potential radio frequency field exposure at ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio frequency Radiation."

The proposed antenna system is an ERI LP-3E-HW, a three (3) element, half-wave spaced antenna, mounted 274 meters above ground. FM Model RF Fields program has been set to calculate values for an array of "Opposed U Dipole" elements operated with an effective radiated power of 0.25 Kilowatts in the Horizontal and Vertical plane. At 2 meters above the surface, at 798.4 meters from the base of the tower, this proposal will contribute worst case, 0.01 microwatts per square centimeter, or 0.001 percent of the allowable ANSI limit for controlled exposure, and 0.005 percent of the allowable limit for uncontrolled exposure. This figure is less than 5.0% of the applicable FCC exposure limit at all locations extending out from the base of the tower. Section 1.1307(b)(3) excludes applications when the calculated level is predicted to be less than 5.0% of the applicable exposure limit. It is therefore believed that this proposal is in compliance with OET Bulletin Number 65 as required by the Federal Communications Commission.

Further, the applicant will see that signs are posted in the vicinity of the tower, warning of potential radio frequency hazards at the site. The site itself is restricted from public access. 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.

Figure 0. Antenna Pattern

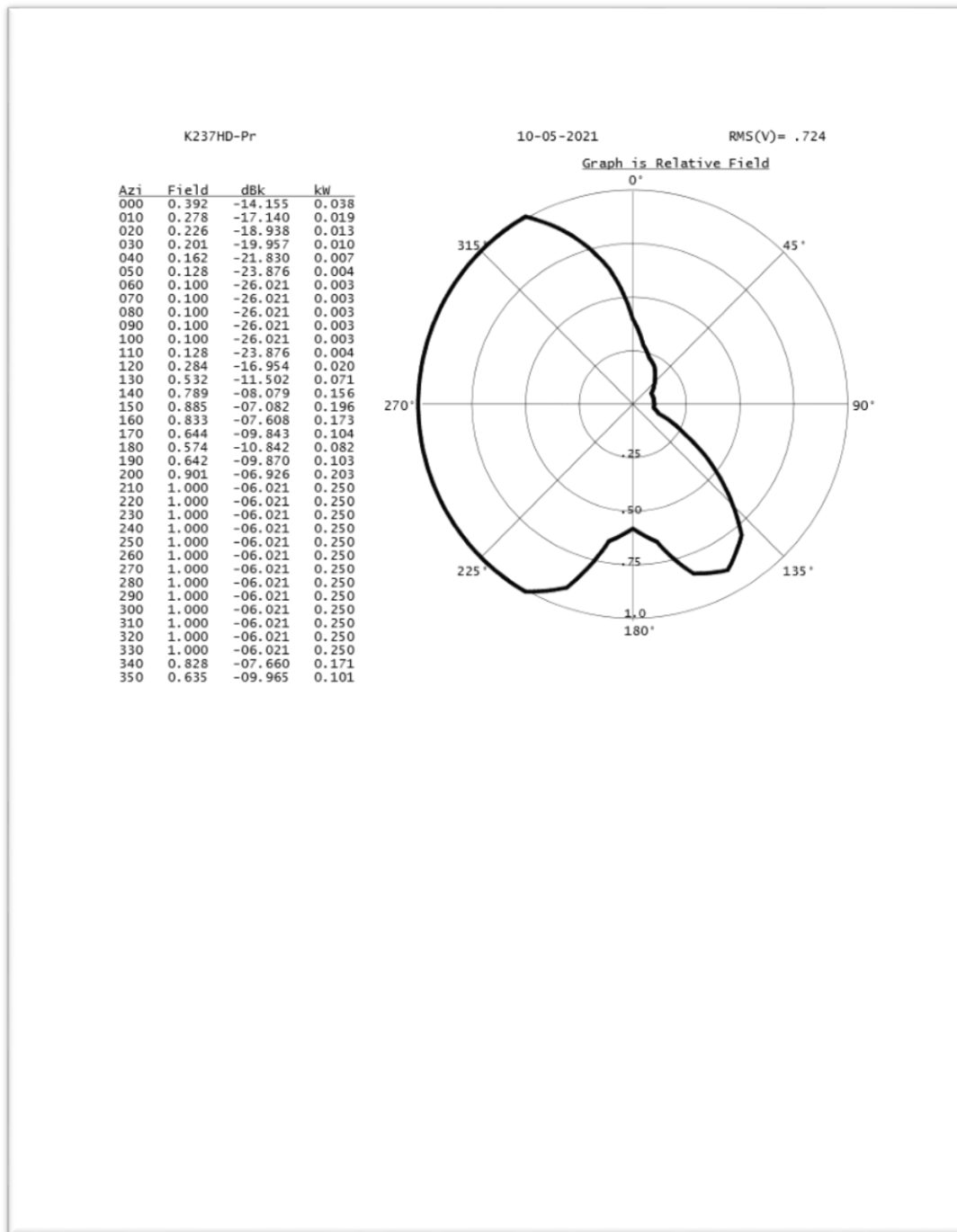


Figure 1. Overlap and Spacing Study

K237HD-PrP Ihm Licenses, LLC											
REFERENCE	CH#	237D	-	95.3 MHz	Pwr= 0.25 kW	DA, HAAT= 280.5 M,	COR= 465 M	32 45 01.00 N.	DATA 09-28-21	SEARCH 09-28-21	DISPLAY DATES
97 16 08.00 W.					Average Protected F(50-50)=	21.84 km					
					Standard Directional						
CH	CALL	TYPE	ANT	AZI	DIST	LAT	PMR(kw)	INT(km)	PRO(km)	*IN*	*OUT*
CITY		STATE		<--	FILE #	LNG	HAAT(M)	COR(M)	LICENSEE	(Overlap in km)	in km)
237D	K237HD	LIC	DCN	335.3	5.96	32 47 56.50	0.150		---	Reference---	
Fort Worth		TX		155.3	0000082452	97 17 44.10		313	Ihm Licenses, LLC		
235C	KLTY	LIC	_CN	122.5	33.37	32 35 19.50	100.000	12.8	88.4	7.6	-55.4*
Arlington		TX		302.6	BLH20020725AAO	96 58 06.00	508	698	Inspiration Media Of Texas		
237C2	KHYI	LIC	NCN	29.1	91.66	33 28 12.40	17.000	129.8	53.9	-48.2*	4.3
Howe		TX		209.3	BLH20140915AAU	96 47 20.00	264	483	Metro Broadcasters - Texas		
240C0	KFMR	LIC	_CN	297.4	77.77	33 04 14.00	100.000	11.7	80.8	44.4	-4.1*
Jacksboro		TX		117.0	BLH20180611AAL	98 00 35.00	425	761	Lkcm Radio Licenses, L.P.		
238L1	KRQP-LP	LIC	_CN	94.3	16.61	32 44 20.50	0.058			3.1	1.9
Arlington		TX		274.4	BLL20170605ACJ	97 05 30.00	40	207	Texas Youth Organization		
239D	K239CC	LIC	DCN	183.4	19.10	32 34 43.50	0.250	0.8	8.0	2.0	10.5
Burleson		TX		3.4	BLFT20150407ABN	97 16 51.10		252	Intelli, LLC		
291C	KHKS	LIC	_CN	122.5	33.40	32 35 19.50	100.000	0.0	0.0	28.5R	4.9M
Denton		TX		302.6	BLH20020320AAE	96 58 06.00	508	698	Ihm Licenses, LLC		
238C3	KOME-FM	CP	NCN	233.5	88.23	32 16 31.90	1.550	61.9	40.8	5.3	16.3
Tolar		TX		53.1	BPH20181228AAD	98 01 23.00	393	720	Chisholm Trail Communicati		
238C3	KOME-FM	LIC	_CN	233.5	88.23	32 16 31.90	1.550	61.9	40.8	5.3	16.3
Tolar		TX		53.1	0000093294	98 01 23.00	393	720	Chisholm Trail Communicati		
237C3	AL6225	RSV-A	___	137.9	141.08	31 48 17.89	25.000	115.6	40.8	6.6	41.2
Teague		TX		318.4		96 16 02.90	100	219	La Gigante Siembra Inc.		
237C3	NEW	APP	_CN	137.9	141.11	31 48 17.30	25.000	115.0	40.3	7.3	41.8
Teague		TX		318.4	0000159016	96 16 02.00	100	216			
237C3	AU9813222	VAC	___	137.5	147.15	31 46 10.60	25.000	116.7	41.7	11.8	46.7
Teague		TX		318.1		96 13 03.90	100	222			
237D	K237HE	CP	DCN	86.3	50.37	32 46 43.50	0.250	17.8	5.5	25.9	21.6
Dallas		TX		266.5	BNPFT20180418ABJ	96 43 52.00		213	Bustos Media Holdings, LLC		
238D	K238CC	LIC	DCN	67.3	34.94	32 52 15.50	0.250	3.6	2.5	24.5	22.3
Dallas		TX		247.5	0000122540	96 55 25.00		264	Decatur Media Land, LLC		
239D	K239DA	LIC	DCN	87.4	36.99	32 45 52.80	0.060	0.5	9.5	29.8	27.4
Richardson		TX		267.6	0000122619	96 52 24.90		252	Claro Communciations Ltd.		
237C2	KHYI-FM1	CP	DCN	54.8	68.23	33 06 09.78	0.800	33.0	9.6	27.8	32.9
Howe		TX		235.1	0000121065	96 40 13.13		227	Metro Broadcasters - Texas		
238L1	KVMR-LP	LIC	_CN	106.5	44.29	32 38 10.00	0.070			29.6	28.4
Dallas		TX		286.8	BLL20170207ABJ	96 48 55.40	36	210	Warning Radio		
238L1	KVMR-LP	CP	_HN	106.5	44.29	32 38 10.00	0.024			31.3	29.6
Dallas		TX		286.8	BPL20181204AAP	96 48 55.40	60	231	Warning Radio		
238L1	KWAH-LP	LIC	_CN	128.7	77.01	32 18 57.50	0.100			53.6	48.2
Ennis		TX		309.0	BLL20180426ABU	96 37 43.90	30	168	Evangelistic Messengers As		
238L1	KSGV-LP	LIC	_CN	100.1	69.19	32 38 19.40	0.027			54.4	53.5
Seagoville		TX		280.5	BLL20160120ABU	96 32 28.90	56	180	Seagoville Chamber Of Comm		
240D	K240DS	LIC	_CN	80.9	66.72	32 50 36.50	0.115	0.8	11.8	59.3	54.9
Garland		TX		261.3	BLFT20080603ACV	96 33 49.00	130	274	Central Park Church Of God		
238C3	KTWF	LIC	_CN	310.1	162.53	33 41 04.00	19.000	60.0	39.6	81.1	91.0
Scotland		TX		129.3	BLH20121231ALF	98 36 47.00	115	419	Lkcm Radio Group, L.P.		
239C2	KBGO	LIC	NCN	177.1	137.58	31 30 51.60	24.000	5.1	47.3	115.9	89.6
Waco		TX		357.1	BLH19980717KG	97 11 44.00	154	309	Ihm Licenses, LLC		
234C3	KWKQ	LIC	_CN	283.4	144.66	33 02 30.40	10.500	4.1	41.2	118.2	102.4
Graham		TX		102.5	BLH20010814AAN	98 46 45.20	148	501	For The Love Of The Game B		
238L1	KFCE-LP	LIC	_CN	91.9	117.93	32 42 32.00	0.050			104.2	103.1
Willis Point		TX		272.6	BLL20170313AAK	96 00 32.10	42	187	Face Creative Education In		

Figure 2. Contour Map

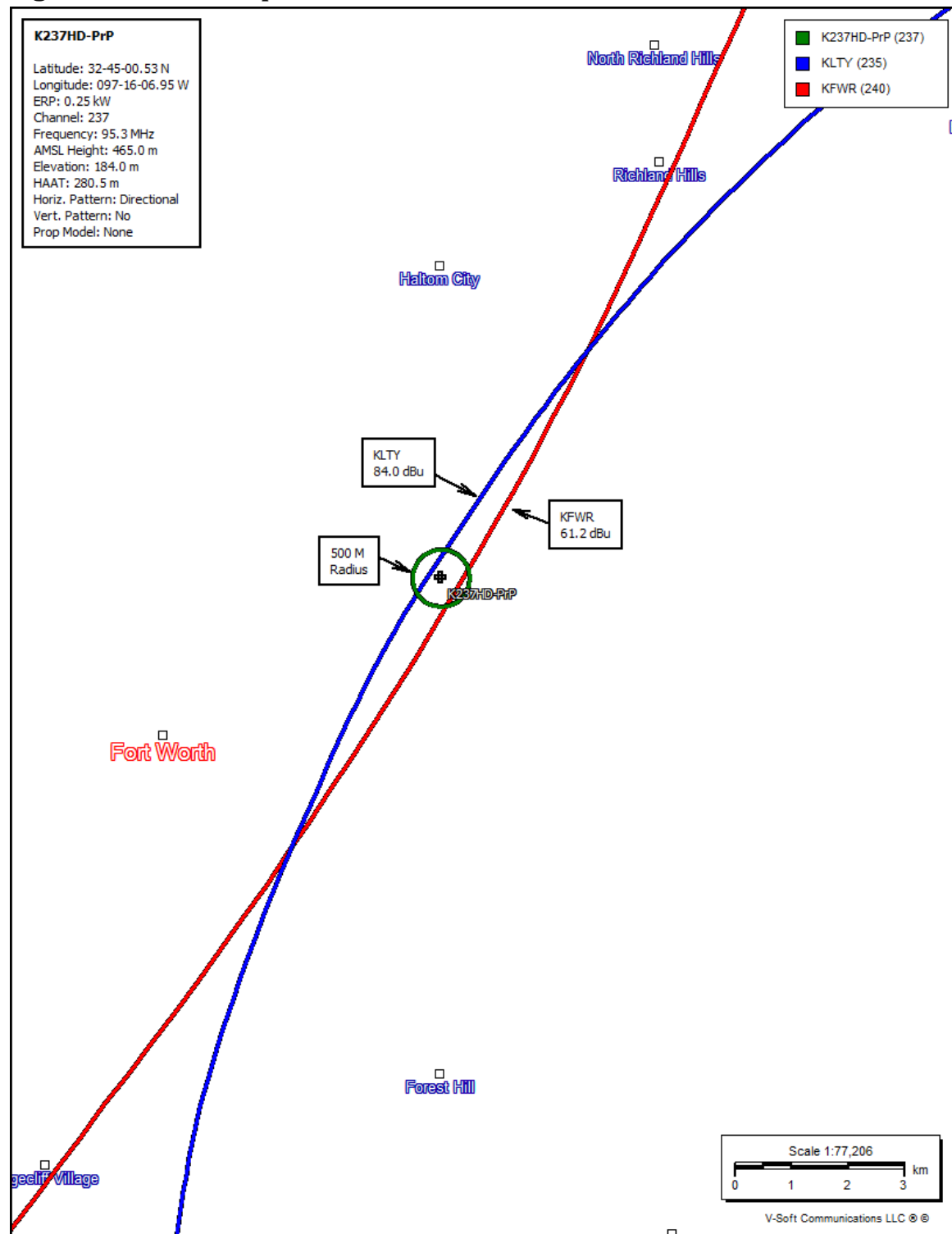


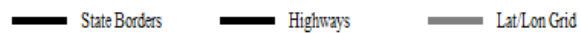
Figure 3. Distance to Interference Signal Level

<div> <div>Proposed Antenna:</div> <div>ERI LP3HW</div> </div> <div> <div>Proposed Power:</div> <div>0.25 kW</div> </div> <div> <div>Antenna Height AGL:</div> <div>274 meters</div> </div> <div> <div>Interference Contour:</div> <div>101 dBu f(50:10)</div> </div> <div> <div>Artificial Rcv Antenna Height:</div> <div>2 meters</div> </div> <div> <div>Distance (Free Space) Equation:</div> <div>$=(10^{((106.92-[\text{desired dBu}]+[\text{ERP in dBk}])/20))})*1000$</div> </div> <div> <div>Field Strength (dBu) Equation</div> <div>$"=106.92-(20*(\text{LOG10}[\text{DistMeters}]/1000)))+[\text{ERP in dBk}]$</div> </div>								
Depression				Distance				
Angle	Antenna			from Ant.	Distance from Ant. to	Field Strength in dBu @	Distance from Ant.	Field Strength in dBu @
Below	Relative	ERP	ERP	to Interf	to	in dBu @	from Ant.	in dBu @
Horizon	Field	in kW	in dBk	Contour	Artificial Plane	Artificial Plane	to Ground Level	Ground Level
0°	1.000	0.250	-6.02	988.48 m	infinite	---	infinite	---
-5°	0.972	0.236	-6.27	960.81 m	3120.85 m	90.77 dBu	3143.80 m	90.70 dBu
-10°	0.892	0.199	-7.01	881.73 m	1566.39 m	96.01 dBu	1577.90 m	95.95 dBu
-15°	0.769	0.148	-8.30	760.14 m	1050.93 m	98.19 dBu	1058.65 m	98.12 dBu
-20°	0.603	0.091	-10.41	596.06 m	795.27 m	98.50 dBu	801.12 m	98.43 dBu
-25°	0.457	0.052	-12.82	451.74 m	643.61 m	97.93 dBu	648.34 m	97.86 dBu
-30°	0.298	0.022	-16.54	294.57 m	544.00 m	95.67 dBu	548.00 m	95.61 dBu
-35°	0.143	0.005	-22.91	141.35 m	474.22 m	90.49 dBu	477.70 m	90.42 dBu
-40°	0.182	0.008	-20.82	179.90 m	423.16 m	93.57 dBu	426.27 m	93.51 dBu
-45°	0.039	0.000	-34.20	38.55 m	384.67 m	81.02 dBu	387.49 m	80.96 dBu
-50°	0.108	0.003	-25.35	106.76 m	355.07 m	90.56 dBu	357.68 m	90.50 dBu
-55°	0.141	0.005	-23.04	139.38 m	332.05 m	93.46 dBu	334.49 m	93.40 dBu
-60°	0.153	0.006	-22.33	151.24 m	314.08 m	94.65 dBu	316.39 m	94.59 dBu
-65°	0.149	0.006	-22.56	147.28 m	300.12 m	94.82 dBu	302.33 m	94.75 dBu
-70°	0.134	0.004	-23.48	132.46 m	289.46 m	94.21 dBu	291.58 m	94.15 dBu
-75°	0.116	0.003	-24.73	114.66 m	281.60 m	93.20 dBu	283.67 m	93.13 dBu
-80°	0.092	0.002	-26.74	90.94 m	276.20 m	91.35 dBu	278.23 m	91.29 dBu
-85°	0.067	0.001	-29.50	66.23 m	273.04 m	88.70 dBu	275.05 m	88.63 dBu
-90°	0.042	0.000	-33.56	41.52 m	272.00 m	84.67 dBu	274.00 m	84.61 dBu

Figure 4. Image of Support Structure



Figure 5. Fill-in and Minor Change Contour Map



Map Scale: 1:436672 1 cm = 4.37 km V/H Size: 70.89 x 71.70 km