

March 2022
KXKR(FM) Channel 266C3
Catalina Foothills, Arizona
Principal Community Coverage Study

Background

The KXKR construction permit 0000179791 includes a condition requiring the submission of an exhibit demonstrating that the measured directional antenna pattern complies with the community coverage provisions of §73.315. The application for construction permit relied upon a Longley-Rice study to demonstrate coverage of Catalina Foothills, and so that study has been updated to incorporate the measured pattern of the Shively SLV-4-SS(0.75)-OFFSET-DA antenna which has been installed.

Longley-Rice

Study has been made of the predicted 70 dBu field strength over Catalina Foothills, using the Longley-Rice v1.2.2 methodology. This study has been conducted using the software program SIGNAL™ from EDX Wireless.

A sample calculation has been made to a location within the community boundary of Catalina Foothills to verify the presence of 70 dBu service, using the formula:

$$\text{Field Strength} = \text{Free Space} - \text{Diffraction Loss} - \text{Clutter}$$

Where Free Space = 106.9 + power in dBk - 20log(distance in km to point of interest)

For the path studied (10.14 dBk over a 14 km path), the result of this calculation is:

Radial	Free Space Field	Minus Diffraction Loss	Yields
0 deg	94.12 dBu	2.31 dB	91.81 dBu

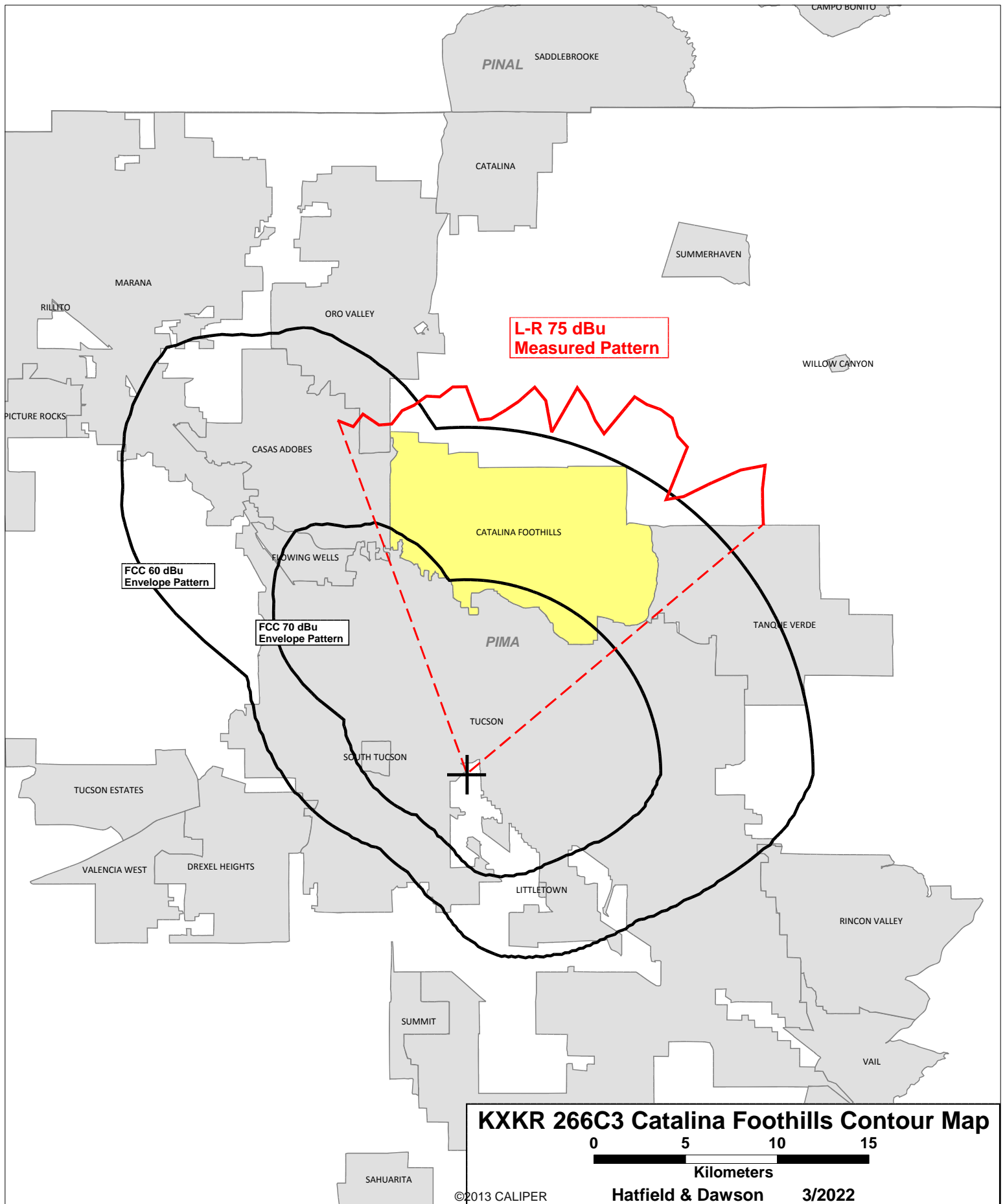
Attached is a plot of the terrain path from the transmitter site to the sample location in Catalina Foothills. The attached terrain path plot includes a list of the Longley-Rice study parameters.

The location of the Longley-Rice contour in the direction of Catalina Foothills has been determined for 2-degree increment radials passing through Catalina Foothills (starting at 340 degrees and ending at 50 degrees). The attached map exhibit depicts the results of this analysis as a 75 dBu

contour (chosen to allow for a full **5 dB** of local clutter loss at the receive locations) over the span of 340 to 50 degrees.

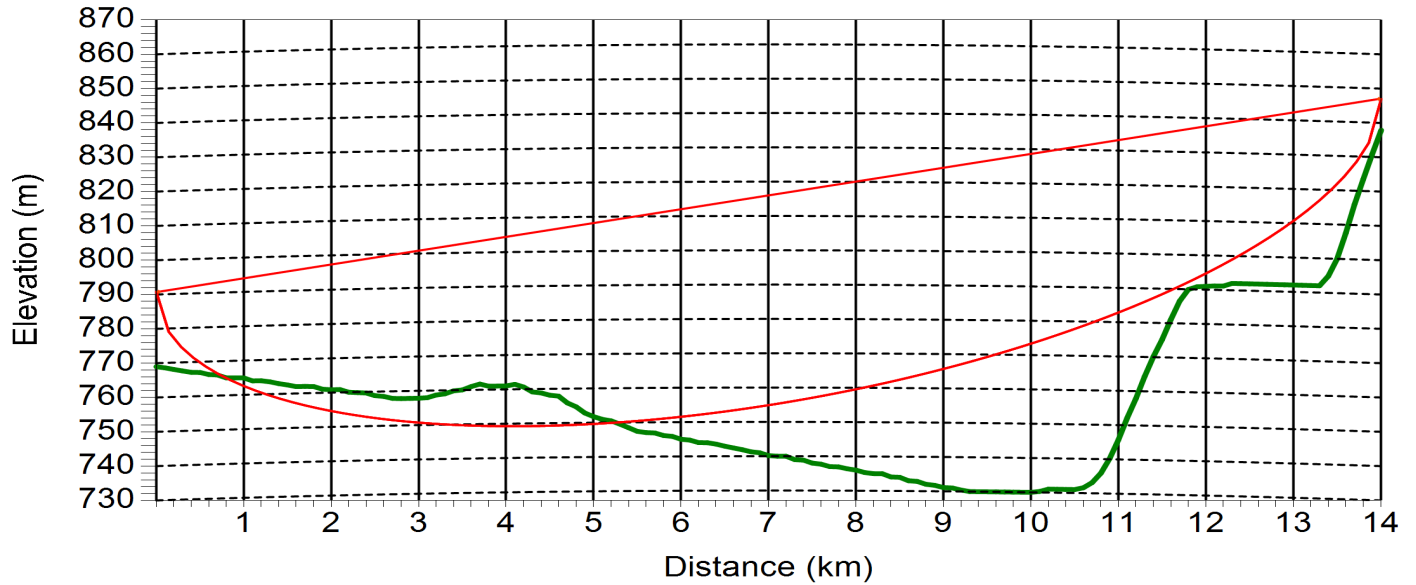
Radial (deg)	FCC 70 dBu F(50,50) envelope pattern	Longley-Rice 75 dBu F(50,50) measured pattern	L-R exceeds F(50,50) by
340	14.6	20.5	40.4%
342	14.2	19.9	40.1%
344	13.7	20.4	48.9%
346	13.2	19.6	48.5%
348	12.8	19.5	52.3%
350	12.2	20.1	64.8%
352	11.6	20.3	75.0%
354	10.9	20.7	89.9%
356	10.6	20.6	94.3%
358	10.6	21.1	99.1%
0	10.6	21.1	99.1%
2	10.6	19.3	82.1%
4	10.6	19.4	83.0%
6	10.6	19.9	87.7%
8	10.6	20.5	93.4%
10	10.6	21.4	101.9%
12	10.6	20.8	96.2%
14	10.6	19.2	81.1%
16	10.6	21.9	106.6%
18	10.6	21.3	100.9%
20	10.6	20.5	93.4%
22	10.6	20.0	88.7%
24	10.6	22.5	112.3%
26	10.6	22.4	111.3%

28	10.6	22.5	112.3%
30	10.6	22.4	111.3%
32	10.6	21.7	104.7%
34	10.6	21.5	102.8%
36	10.6	18.5	74.5%
38	10.6	19.2	81.1%
40	10.6	20.7	95.3%
42	10.6	22.3	110.4%
44	10.6	23.4	120.8%
46	10.6	22.4	111.3%
48	10.6	21.7	104.7%
50	10.6	21.1	99.1%



Sample Path to Community

Link: Tx002 -> Rx002



Transmitter	
Description	Data
Link end 1 ID	Tx002
Site name	KXKR
Latitude	N32°11'12.80"
Longitude	W110°55'00.50"
Transmitter Frequency	101.1 MHz
Polarization	horizontal
Antenna Height (AGL)	15.80 m
Antenna elevation (AMSL)	790.80 m
Point az. to link end 2	0.00°
ERPd toward link end 2	10.14 dBkW

Receiver	
Description	Data
Link end 2 ID	Rx002
Site name	Cat Foothills
Latitude	N32°18'46.31"
Longitude	W110°55'00.50"
Received signal level	91.81 dBu
Antenna Height (AGL)	9.10 m
Antenna elevation (AMSL)	846.99 m
Point az. to link end 1	180.00°

Link Statistics	
Description	Data
Path	Tx002 -> Rx002
Length	14.0048 km
Number of obstacles	0
Excess pathloss	2.31 dB
Path Fresnel zone clearance	----
K factor	1.333