January 2022
New FM Channel 234C3
Blue Ridge, AZ
Allocation Study

Background

The instant application amendment is being filed by the winning bidder for the Channel 234C1 allotment at Overgaard, Arizona, offered as Permit MM-FM1180-C1 in FM Auction #109. The original long form application proposed implementation as Channel 234A at Village of Oak Creek, but this amendment makes several changes.

Most significantly, this amendment changes the proposed community of license to Blue Ridge, changes the requested channel from 234A to 234C3, and proposes use of a different transmitter site. All application technical data has been changed and exhibits updated.

Blue Ridge 234C3 Allotment Site Spacing Study

The attached spacing study shows that the proposed allotment site meets the co-channel and adjacent channel spacing requirements for Class C3 stations as prescribed in §73.207 of the Commission's Rules.

The proposed allotment site is located 12 kilometers from the far side of Blue Ridge. The standard 70 dBu contour distance for a Class C3 station is 23.2 kilometers. Therefore, and as demonstrated on the attached map exhibit, the proposed allotment site will provide a 70 dBu contour to 100% of Blue Ridge.

Additionally, the spacing study demonstrates that the proposed Class C3 allotment remains mutually-exclusive with the original Overgaard allotment.

Blue Ridge 234C3 Transmitter Site Spacing Study

The attached spacing study shows that the proposed transmitter site meets the co-channel and adjacent channel spacing requirements for Class C3 stations as prescribed in §73.207 of the Commission's Rules.

Additionally, the spacing study demonstrates that the proposed Class C3 facility remains mutually-exclusive with the original Overgaard allotment.

Channel 234C3 Allotment Site Spacing Study

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SEARCH PARAMETERS FM Database Date: 20220118
Channel: 234C3 94.7 MHz
Latitude: 34 42 16.0 (NAD83)
Longitude: 111 5 42.0
Safety Zone: 32 km
Job Title: BLUE RIDGE 234C3 ALLOT SITE

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KOOL-FM	PHOENIX		233C	100.000	33 20 2.2	210.6	176.33	176
LIC	AZ	BMLH-20021018AAD	94.5	504.0	112 3 44.5		0.33	CLOSE
KOII-LP	FLAGSTAFF		233L1	0.100	35 11 54.0	317.5	74.62	0
LIC	AZ	BLL-20160104AMG	94.5	0.0	111 38 58.6		0.00	LPFM
NEW	OVERGAARD		234C1	0.000	34 45 23.1	82.9	47.63	211
ALC	AZ		94.7	0.0	110 34 43.5		-163.37	SHORT
NOTE:	ORIGINAL AUCTION ALLOTMENT							
NEW	VILLAGE OF OAK CREEK		234A	0.500	34 52 56.0	290.5	57.10	142
APP	AZ	0000159314	94.7	228.6	111 40 50.0		-84.90	SHORT
NOTE:	APPLICATION WHICH IS BEING AMENDED							
K234CF	PRESCOTT		234D	0.250	DA 34 41 15.1	269.1	93.72	0
LIC	AZ	BLFT-20150605AAY	94.7	0.0	112 7 3.6		0.00	TRANS
KOAI	SUN CITY WEST		236C	41.000	34 14 5.1	246.2	128.03	96
LIC	AZ	BLH-20050623AAN	95.1	849.0	112 22 4.6	SS	32.03	CLEAR

==== END OF FM SPACING STUDY FOR CHANNEL 234 ====

Channel 234C3 Transmitter Site Spacing Study

FMSTUDY.EXE Copyright 2021, Hatfield & Dawson, LLC Version 5.10

SEARCH PARAMETERS FM Database Date: 20220118

Channel: 234C3 94.7 MHz

Latitude: 34 41 31.3 (NAD83)

Longitude: 110 50 53.5

Safety Zone: 32 km

Job Title: BLUE RIDGE 234C3 TRANSMIT SITE

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KJNN-LP	HOLBROOK		232L1	0.100	34 52 59.1	70.2	63.44	0
LIC	AZ	BLL-20100729AEO	94.3	0.0	110 11 41.4		0.00	LPFM
KOOL-FM	PHOENIX		233C	100.000	33 20 2.2	216.9	187.80	176
LIC	AZ	BMLH-20021018AAD	94.5	504.0	112 3 44.5		11.80	CLEAR
KOII-LP	FLAGSTAFF		233L1	0.100	35 11 54.0	307.9	92.27	0
LIC	AZ	BLL-20160104AMG	94.5	0.0	111 38 58.6		0.00	LPFM
NEW	OVERGAARD		234C1	0.000	34 45 23.1	73.7	25.69	211
ALC	AZ		94.7	0.0	110 34 43.5		-185.31	SHORT
NOTE:	ORIGINAL AUCTION ALLOTMENT							
NEW	VILLAGE OF OAK CREEK		234A	0.500	34 52 56.0	285.8	79.05	142
APP	AZ	0000159314	94.7	228.6	111 40 50.0		-62.95	SHORT
NOTE:	APPLICATION WHICH IS BEING AMENDED							
K234CF	PRESCOTT		234D	0.250	DA 34 41 15.1	270.1	116.33	0
LIC	AZ	BLFT-20150605AAY	94.7	0.0	112 7 3.6		0.00	TRANS
KSNX	HEBER		288C1	100.000	34 27 43.1	122.0	48.13	24
LIC	AZ	BLH-20101203AAN	105.5	125.0	110 24 12.4	SS	24.13	CLEAR

==== END OF FM SPACING STUDY FOR CHANNEL 234 ====

January 2022
New FM Channel 234C3
Blue Ridge, AZ
RF Exposure Study

Facilities Proposed

The proposed operation will be on Channel 234C3 (94.7 MHz) with an effective radiated power of 3.5 kilowatts. Operation is proposed with a 4-element horizontally-polarized omni-directional antenna. The antenna will be side-mounted on an existing tower on Chevelon Butte.

The proposed antenna support structure does not exceed 60.96 meters (200 feet) above ground and does not require notification to the Federal Aviation Administration. Therefore, this structure does not require an Antenna Structure Registration Number.

DETERMINATION Results	
Structure does not require registration. There are no airports within 8 kilometers (5 miles) of the coordinates you provided.	
Your Specifications	
NAD83 Coordinates	
Latitude	34-41-31.3 north
Longitude	110-50-53.5 west
Measurements (Meters)	
Overall Structure Height (AGL)	30.5
Support Structure Height (AGL)	30.5
Site Elevation (AMSL)	2116
Structure Type	
GTOWER - Guyed Structure Used for Communication Purposes	

RF Exposure Calculations

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

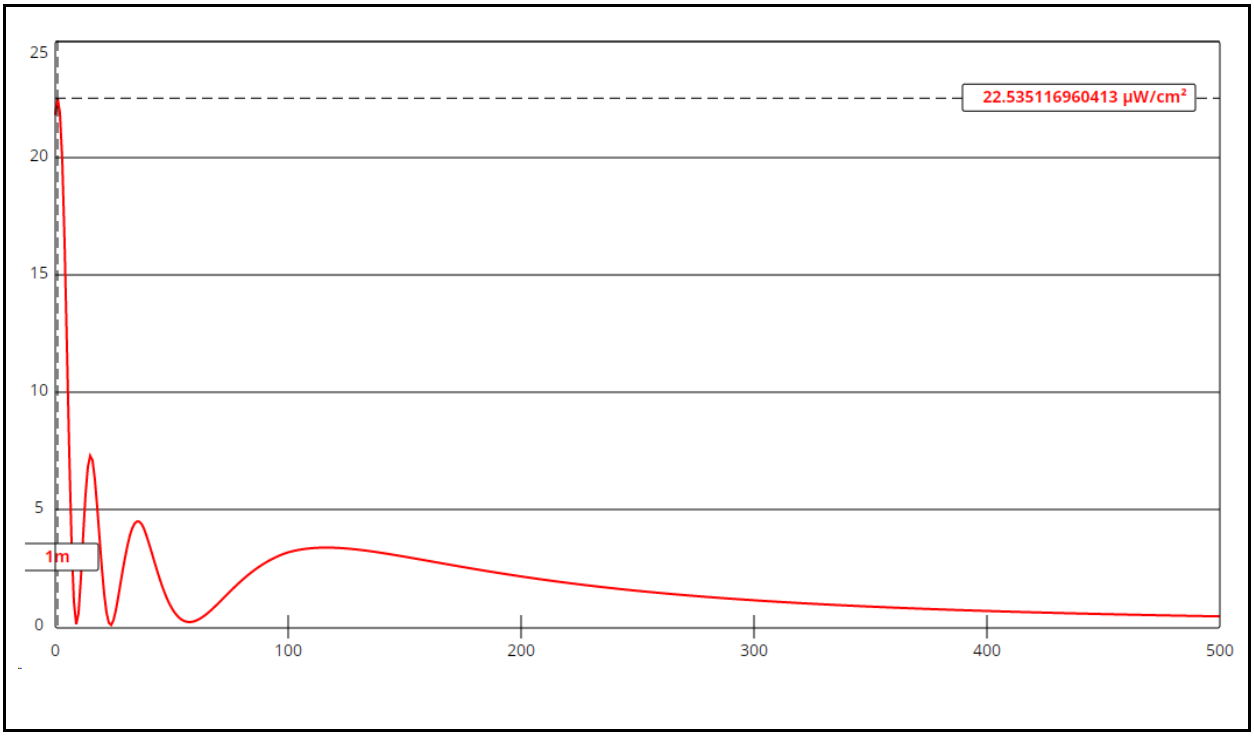
Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Ground level power densities have been calculated for locations extending from the base of the tower to a distance of 500 meters. Values past this point are increasingly negligible.

Calculations of the power density produced by the proposed antenna system assume a Type 1 element pattern, which is the element pattern for the Bext TFLHO-4 antenna proposed for use. The highest calculated ground level power density occurs at a distance of 1 meter from the base of the antenna support structure. At this point the power density is calculated to be 22.5 $\mu W/cm^2$, which is 11.3% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments). There are no other broadcast users of this site.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.

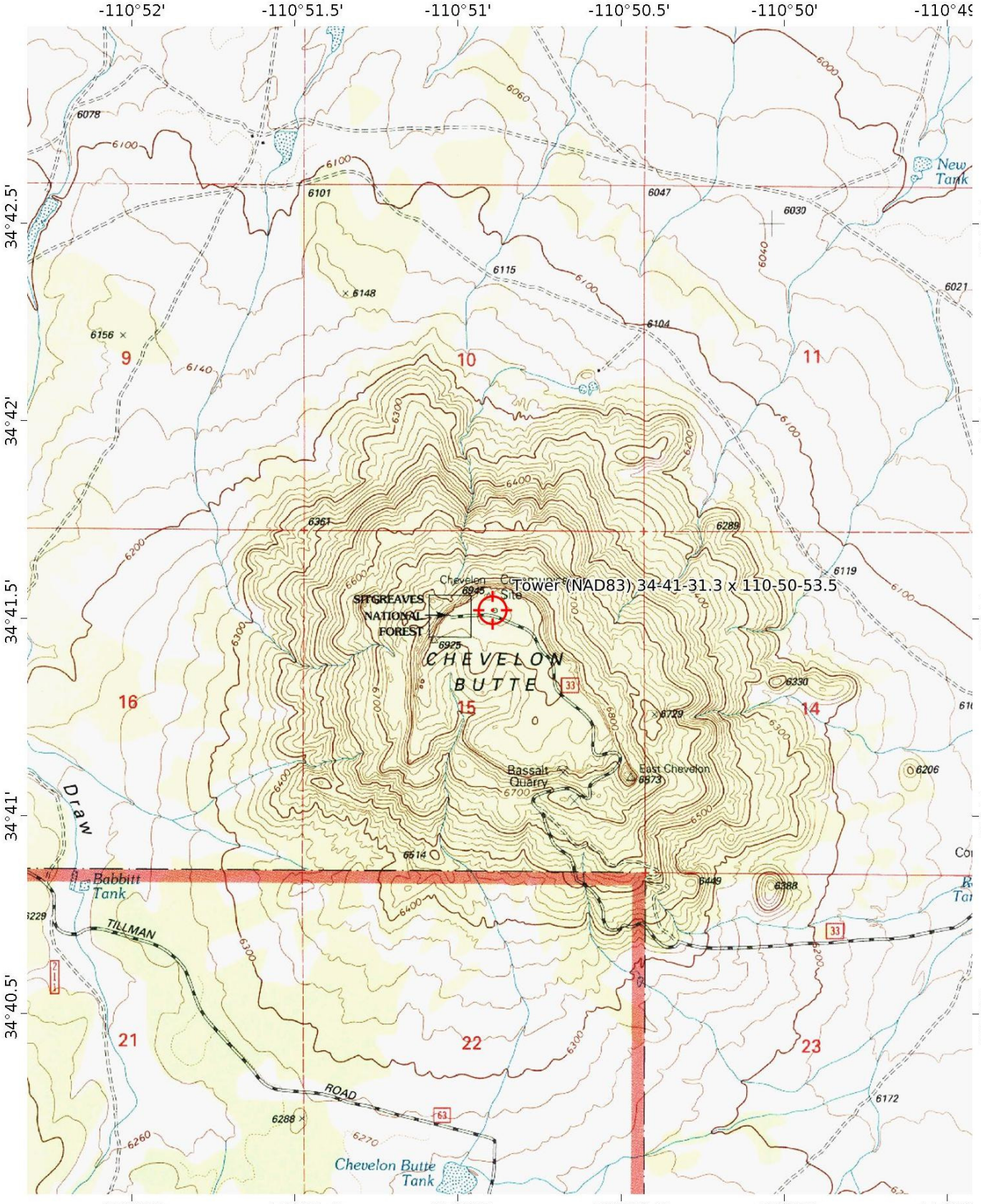


Ground-Level RF Exposure **OET FMModel**

New 234C3 Blue Ridge

Antenna Type:	Bext TFLHO-4 (Type 1)
No. of Elements:	4
Element Spacing:	0.85 wavelength
Distance:	500 meters
Horizontal ERP:	3500 W
Vertical ERP:	zero W
Antenna Height:	19.5 meters AGL

Maximum Calculated Power Density is 22.5 µW/cm^2 at 1 meter from the antenna structure.



Mercator Projection
WGS84
UTM Zone 12S

CALTOPO

0.5 1.0 1.5 2.0 2.5 km
0.5 1.0 1.5 mi

Scale **1:24000** 1 inch = 2000 feet

MN 9.8º

Hatfield & Dawson Consulting Engineers

January 2022
New FM Channel 234C3
Blue Ridge, AZ
Principal Community Coverage Study

Analysis

The 70 dBu contour from the proposed facility, as calculated using the standard contour prediction methodology described in §73.313 of the Commission's Rules, does not encompass the entire community of Blue Ridge. The far corner of Blue Ridge is located approximately 32 kilometers from the proposed transmitter site. The standard 70 dBu contour extends approximately 21 kilometers towards Blue Ridge. However, it is believed that a supplemental showing using alternative contour prediction methodology is justified in this instance in accordance with §73.313(e).

The entire community of Blue Ridge is encompassed by the 60 dBu contour. The attached map exhibits depict the city boundaries of Blue Ridge as taken from 2020 Census.

Longley-Rice

Study has been made of the predicted 70 dBu field strength over Blue Ridge, 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 Blue Ridge to verify the presence of 70 dBu service, using the formula:

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

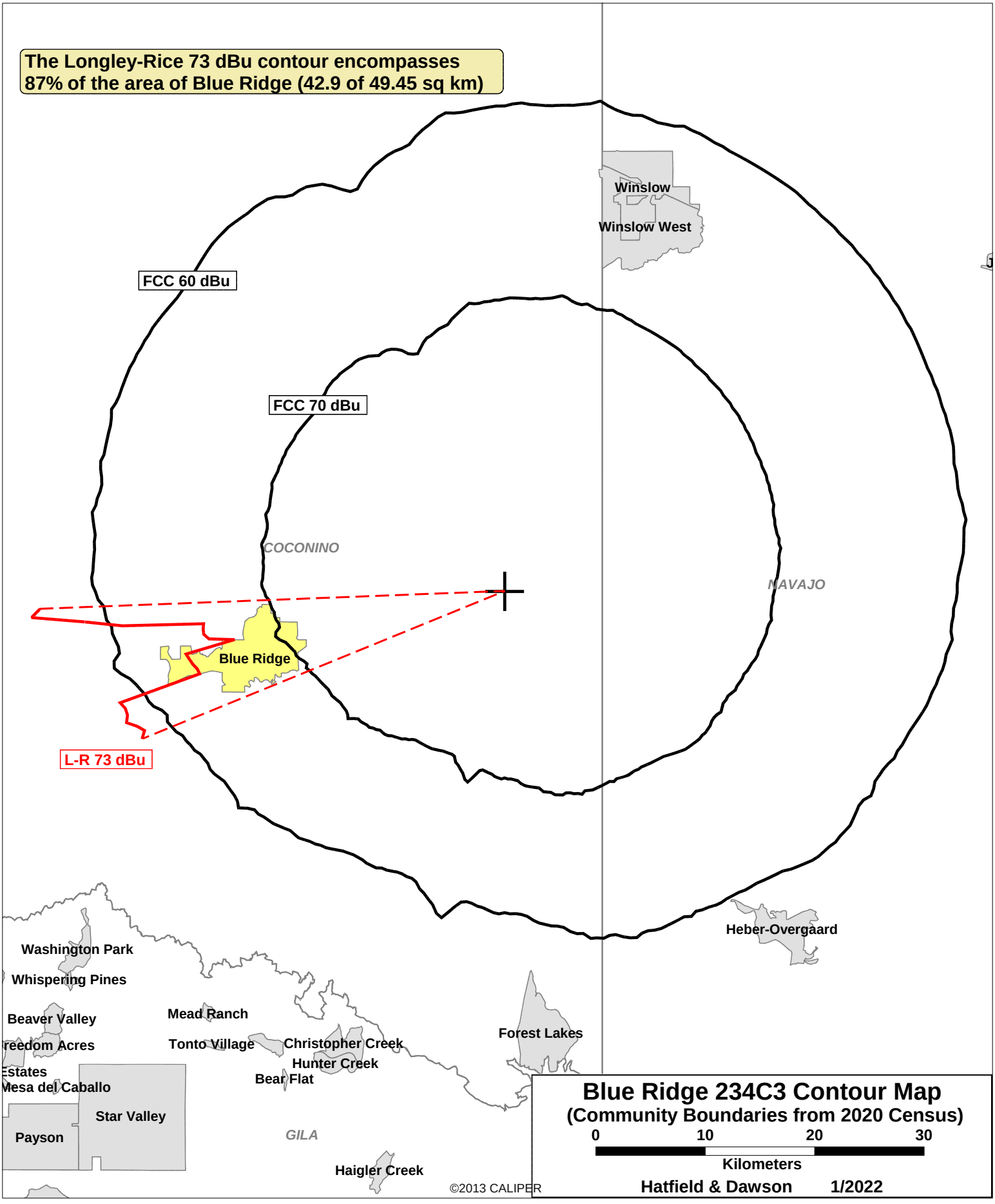
For the path studied (5.44 dBk over a 22.50 km path), the result of this calculation is:

Radial	Free Space Field	Minus Diffraction Loss	Yields
256 deg	85.3 dBu	0.00 dB	85.3 dBu

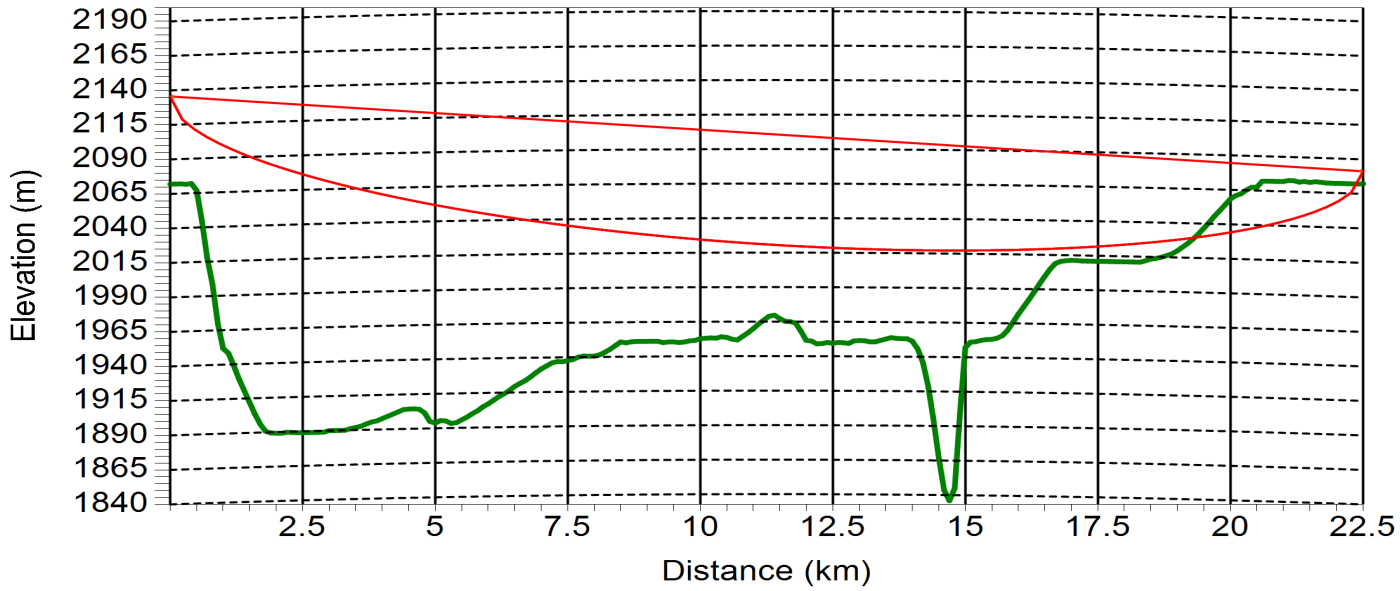
Attached is a plot of the terrain path from the transmitter site to the sample location in Blue Ridge. The attached terrain path plot includes a list of the Longley-Rice study parameters.

The location of the Longley-Rice contour in the direction of Blue Ridge has been determined for 1-degree increment radials passing through Blue Ridge (starting at 248 degrees and ending at 268 degrees). The attached map exhibit depicts the results of this analysis as a 73 dBu (chosen to allow for 3 dB of local clutter loss at the receive locations) contour over the span of 248 to 268 degrees.

Radial	**F(50,50) 70 dBu (km)**	**L-R 73 dBu (km)**	**L-R exceeds F(50,50) by**
248	19.2	35.7	46.2%
249	19.4	35.2	44.9%
250	19.2	35.7	46.2%
251	19.4	36.5	46.8%
252	19.7	36.2	45.6%
253	19.9	36.2	45.0%
254	19.9	36.5	45.5%
255	20.1	28.8	30.2%
256	20.3	28.9	29.8%
257	20.5	29.2	29.8%
258	21.0	29.4	28.6%
259	21.3	29.6	28.0%
260	21.2	25.0	15.2%
261	20.8	27.3	23.8%
262	20.8	27.7	24.9%
263	21.0	27.7	24.2%
264	21.1	27.6	23.6%
265	21.1	35.0	39.7%
266	21.3	38.4	44.5%
267	21.4	43.2	50.5%
268	21.5	42.4	49.3%


The Longley-Rice 73 dBu contour encompasses
87% of the area of Blue Ridge (42.9 of 49.45 sq km)
Winslow
Winslow West
FCC 60 dBu
FCC 70 dBu
COCONINO
NAVAJO
Blue Ridge
L-R 73 dBu
Heber-Overgaard
Washington Park
Whispering Pines
Beaver Valley
Mead Ranch
Tonto Village
Christopher Creek
Hunter Creek
Bear Flat
Forest Lakes
reedom Acres
Estates
Mesa del Caballo
Star Valley
Payson
GILA
Haigler Creek
©2013 CALIPER
Blue Ridge 234C3 Contour Map
(Community Boundaries from 2020 Census)
0
10
20
30
Kilometers
Hatfield & Dawson
1/2022

Sample Path
Link: Tx001 -> Rx001



Transmitter	
Description	Data
Link end 1 ID	Tx001
Site name	New 234C3
Latitude	N34°41'31.30"
Longitude	W110°50'53.50"
Transmitter Frequency	94.7 MHz
Polarization	horizontal
Antenna Height (AGL)	19.50 m
Antenna elevation (AMSL)	2135.50 m
Point az. to link end 2	256.00°
ERPd toward link end 2	5.44 dBkW

Receiver	
Description	Data
Link end 2 ID	Rx001
Site name	Blue Ridge
Latitude	N34°38'34.14"
Longitude	W111°05'13.11"
Received signal level	85.3 dBu
Antenna Height (AGL)	9.10 m
Antenna elevation (AMSL)	2081.47 m
Point az. to link end 1	75.86°

Link Statistics	
Description	Data
Path	Tx001 -> Rx001
Length	22.5076 km
Number of obstacles	0
Excess pathloss	-0.02 dB
Path Fresnel zone clearance	----
K factor	1.333