

**August 2021
New FM Channel 209C3
Challis, Idaho
Baseline NCE Service Study**

A study has been made of the baseline (i.e. existing) NCE service provided to areas within the 60 dBu contour of the proposed NCE FM facility. Population counts are per the 2010 Census, using the block centroid method. The results of that study indicate that the following existing stations provide protected NCE service to this area, as depicted on the attached map exhibit:

Callsign	Channel	Community
none		

The following table lists the population served by the proposed facility, along with the populations which will receive their first and/or second NCE service as a result of the grant of the instant application.

Proposed	Population
60 dBu	2,730
1 st NCE Service	2,730 100%
2 nd NCE Service	0 0%
1 st + 2 nd NCE Service	2,730 100%

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SEARCH PARAMETERS                               FM Database Date: 20210815
Channel: 209C3      89.7 MHz                    Page 1
Latitude: 44 33 8.9 (NAD83)
Longitude: 114 5 24.8
Safety Zone: 50 km
Job Title: CHALLIS 209C3
    
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KTSY LIC	CALDWELL ID	BMLD-20130925AH	208C1 89.5	8.300 791.0	43 45 17.6 116 5 55.4	241.7	183.50 39.50	144 CLEAR
KLRI LIC	RIGBY ID	BLED-20050729DTE	208C0 89.5	78.000 465.5	43 30 3.6 112 39 46.9	135.2	163.53 0.53	163 CLOSE
K209AQ LIC	CHALLIS, ETC. ID	BLFT-19900312TB	209D 89.7	0.190 0.0	DA 44 32 44.7 114 4 53.2	137.1	1.02 0.00	0 TRANS
KQLR LIC	WHITEHALL MT	BMLD-20151029AH	209C2 89.7	1.450 547.0	46 0 21.7 112 26 36.0	38.0	206.87 29.87	177 CLEAR
KAWZ LIC	TWIN FALLS ID	BLED-20060403ANA	210C0 89.9	100.000 302.0	42 43 46.7 114 24 55.1	187.5	204.22 41.22	163 CLEAR
K212FQ LIC	SALMON ID	BMLFT-20120214AB	212D 90.3	0.075 0.0	45 11 1.7 113 52 22.2	13.6	72.23 0.00	0 TRANS

==== END OF FM SPACING STUDY FOR CHANNEL 209 =====

**August 2021
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Challis, Idaho
RF Exposure Study**

Facilities Proposed

The proposed operation will be on Channel 209C3 (89.7 MHz) with an effective radiated power of 100 watts. Operation is proposed with an antenna to be mounted on an existing tower on a mountaintop 12 kilometers northeast of Challis.

The proposed antenna support structure will 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	44-33-08.9 north
Longitude	114-05-24.8 west
Measurements (Meters)	
Overall Structure Height (AGL)	9.1
Support Structure Height (AGL)	9.1
Site Elevation (AMSL)	2598
Structure Type	
LTOWER - Lattice Tower	

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 Challis 209C3 antenna system assume a Type 2 element pattern, which is the element pattern for the Nicom BKG77-2 antenna proposed for use. The highest calculated ground level power density occurs at a distance of 3 meters from the base of the antenna support structure. At this point the power density is calculated to be 43.2 $\mu W/cm^2$.

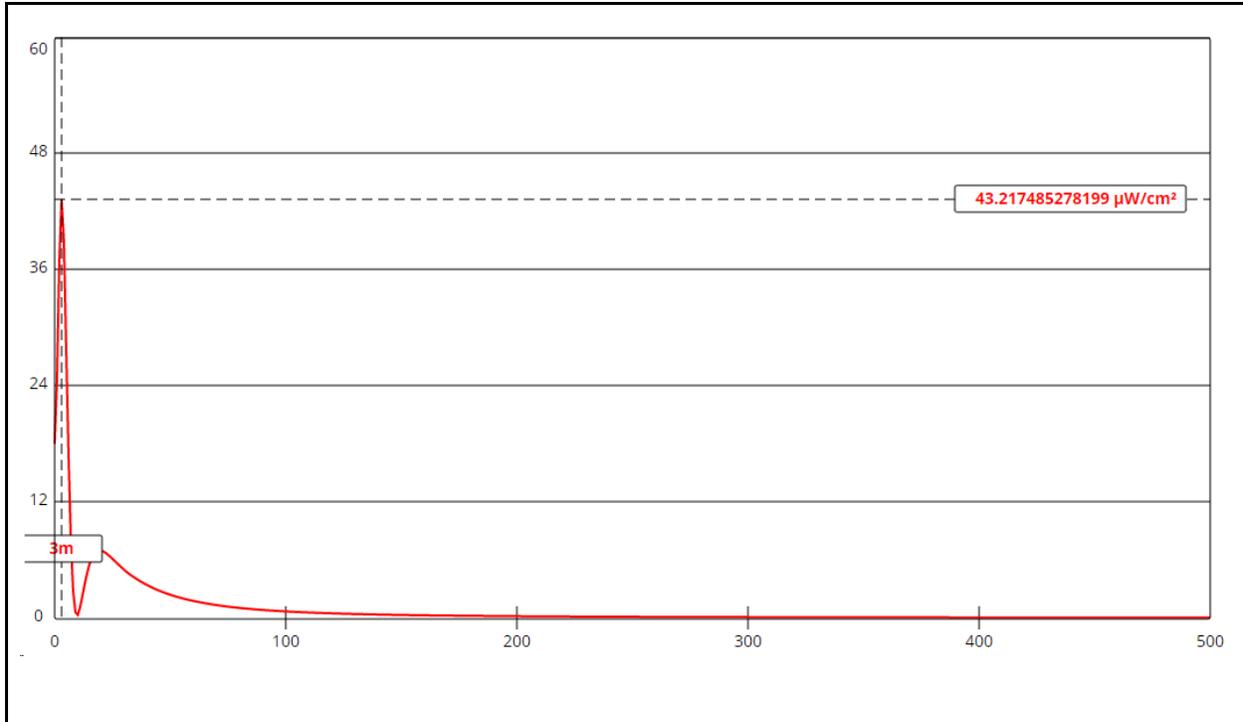
This antenna system will be shared with a second station, another full-power FM as proposed in a separate application. While there will be slight differences in the calculated ground-level exposure levels from different frequencies on this antenna system, these calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of two 100 watt stations is approximately 87 $\mu W/cm^2$, which is 43.5% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

TV translator K12LS-D is also located at this site. Calculations of the power density produced by the K12LS-D antenna system have been made assuming that the antenna will radiate 100% power straight down to a point 2 meters above ground at the base of the tower (6.2 meters below the antenna). Under this worst-case assumption, the highest calculated ground level power density from K12LS-D occurs at the base of the antenna support structure. At this point the power density is calculated to be 20.0 $\mu W/cm^2$, which is 10% of 200 $\mu W/cm^2$ (the FCC standard for uncontrolled environments).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of the two proposed Challis FM stations and the present operation of K12LS-D (were their maxima to coincide, which they do not) is 53.5% of the FCC

standard for uncontrolled environments.

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

Challis 209C3

Antenna Type: Nicom BKG77-2 (Type 2)
 No. of Elements: 2
 Element Spacing: 1.0 wavelength

Distance: 500 meters
 Horizontal ERP: 100 watts
 Vertical ERP: 100 watts

Antenna Height: 7.6 meters AGL

Maximum Calculated Power Density is 43.2 $\mu\text{W}/\text{cm}^2$ at 3 meters from the antenna structure.

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Area and Population Calculation Methodology

Calculation of the area within the 60 dBu contour was performed by the mapping program Maptitude, which includes a function which automatically calculates the area within irregular polygons. In cases where the 60 dBu contour included any large water areas, those were excluded by using a related tool in the program which allows the user to outline an irregular polygon. The software returns the area of that polygon, and that area was then subtracted from the total area within the contour.

Total area inside 60 dBu contour:	2,774 sq km
Water area excluded:	0 sq km
Total land area inside 60 dBu contour:	2,774 sq km

Population was calculated by summing the individual populations of each of the census blocks from the 2010 Census whose centroids are encompassed by the proposed 60 dBu contour.

Population inside 60 dBu contour:	2,730
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**August 2021
New FM Channel 209C3
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First Aural Reception Service Study**

A study has been made of the existing aural service provided to areas within the 60 dBu contour of the proposed NCE FM facility, and which confirms that this application will provide a first aural reception service. This study was conducted consistent with the methodology described in *Rural Radio*.¹ The results of that study indicate that the following existing stations provide aural service to this area, as depicted on the attached map exhibit:

Callsign	Channel/Freq	Community
none ²		

The following table lists the population served by the proposed facility, along with the area and population which will receive its first aural reception service as a result of the grant of the instant application. Population counts are per the 2010 Census, using the block centroid method.

Proposed	Area & Population
60 dBu	2,774 sq km 2,730 pop
First Aural Service	2,774 sq km 2,730 pop

¹ In determining reception service provided by non-reserved band FM stations, the service contour used is that which is set forth for the class of station in §73.215(a)(1) of the Rules. The service contour has been calculated based on the facility's authorized effective radiated power and height above average terrain, taking into account actual terrain. Vacant FM allotments have not been counted. In determining reception service provided by reserved band FM stations, the service contour used is the 60 dBu contour.

In determining reception service provided by AM stations, the service contour used is the daytime 2.0 mV/m ground wave contour, calculated from the current transmitter coordinates using authorized facilities.

In the case of stations with granted, but unbuilt construction permits for modifications to their currently licensed or permitted facilities, the authorized but unbuilt modified facilities have been used.

Rural Radio 2nd Order on Recon at paragraphs 15-17, including Footnote 65.

² Nearby KSRA-FM 224A Salmon was approved in Docket 06-72 for an upgrade to Channel 225C0 at Salmon. The Report & Order in this proceeding was released on July 25, 2008, but KSRA-FM has never filed for a construction permit to implement that upgrade. Consistent with *Rural Radio*, the KSRA-FM upgrade is excluded from study because there is no granted construction permit.

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Proposed	Area & Population
60 dBu	2,774 sq km 2,730 pop
First Aural Service	4069 sq km 820 pop

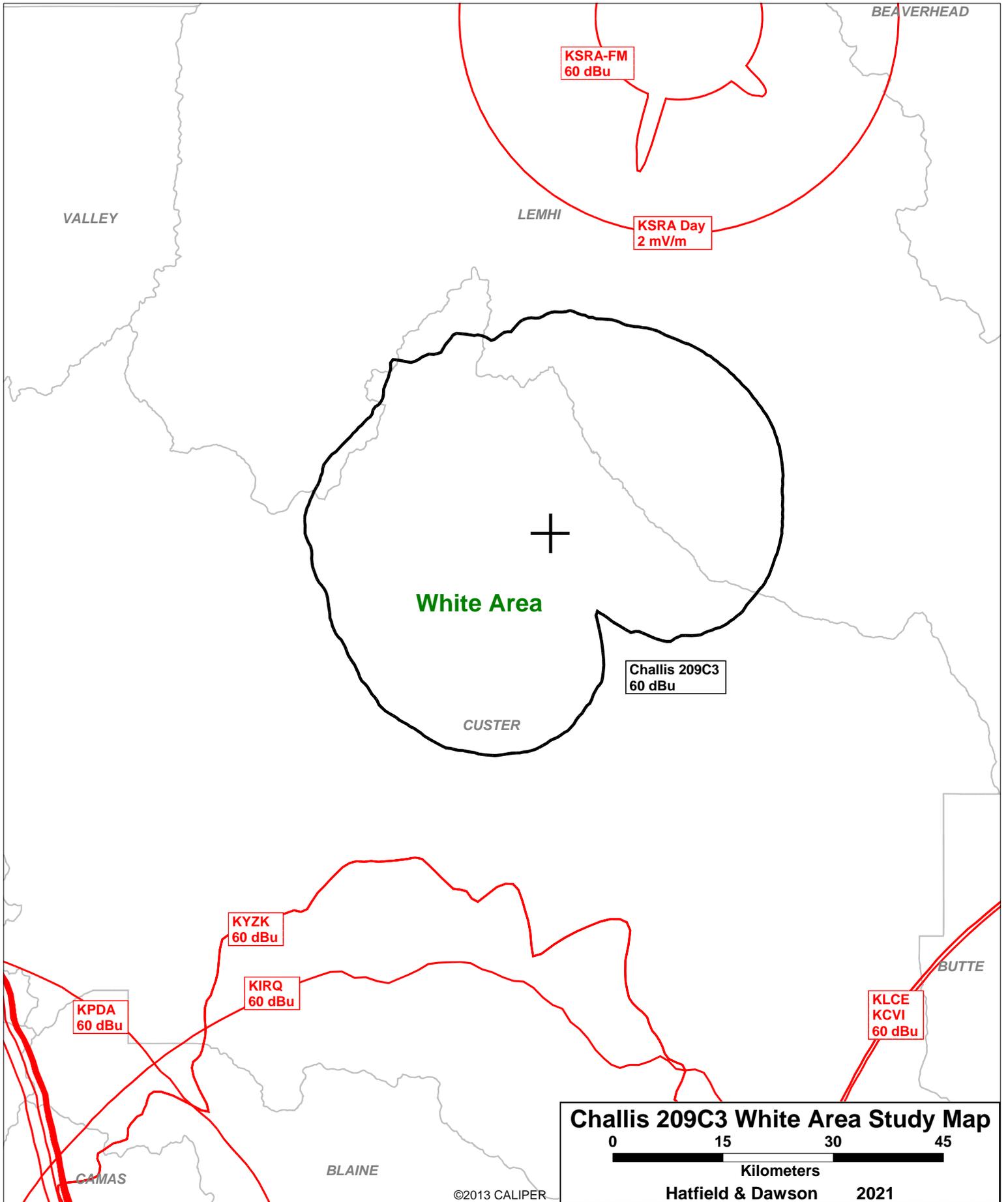
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Challis 209C3 White Area Study Map

0 15 30 45

Kilometers

Hatfield & Dawson 2021

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