September 2020
KMMS-FM Channel 234C3 Bozeman, Montana
KISN Channel 244C3 Belgrade, Montana
KXLB Channel 264C1 Churchill, Montana
KZMY Channel 278C1 Bozeman, Montana
Statement re RF Exposure

The recently-granted construction permits for new auxiliary facilities for KMMS-FM, KISN, and KXLB all include a condition related to the use of a specific antenna model to demonstrate compliance with the FCC radio frequency electromagnetic field exposure guidelines. Each of those conditions specifies a "Kathrein/Sira FMC-06/04 (EPA Type 1), 4 sections, 0.85 wavelength spacing" antenna.

The "0.85 wavelength spacing" specification is erroneous. In the three applications for construction permit for this combined antenna system, the wavelength spacings were specified as they pertained to the individual station frequencies: 0.82 wavelength for KMMS-FM, 0.84 wavelength for KISN, and 0.87 wavelength for KXLB. Attached below for reference is a copy of the RF exposure study included in the construction permit applications. These wavelength spacings are used in the license applications.

June 2020
KMMS-FM Channel 234C3 Bozeman, Montana
KISN Channel 244C3 Belgrade, Montana
KXLB Channel 264C1 Churchill, Montana
KZMY Channel 278C1 Bozeman, Montana
Auxiliary Facility Engineering

Facilities Proposed

Applications are being filed by the four FM stations named above, proposing auxiliary (backup) facility operation from a combined antenna system on the KMMS(AM) tower in Bozeman, Montana. Operation is proposed with a 4-element circularly-polarized omni-directional antenna.

KMMS-FM: The proposed operation will be on Channel 234C3 (94.7 MHz) with an effective radiated power of 4.1 kilowatts.

KISN: The proposed operation will be on Channel 244C3 (96.7 MHz) with an effective radiated power of 4.1 kilowatts.

KXLB: The proposed operation will be on Channel 264C1 (100.7 MHz) with an effective radiated power of 4.1 kilowatts.

KZMY: The proposed operation will be on Channel 278C1 (103.5 MHz) with an effective radiated power of 4.1 kilowatts.

KZMY has a licensed auxiliary antenna at this site, which will be the subject of an application for modification of license. The other stations will be filing for construction permits for new auxiliary facilities.

Antenna Structure Registration (Not Required)

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	45-41-53.5 north
Longitude	111-01-43.7 west
Measurements (Meters)	
Overall Structure Height (AGL)	52
Support Structure Height (AGL)	52
Site Elevation (AMSL)	1441
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.

The proposed combined operation of the KMMS-FM, KISN, KXLB, and KZMY auxiliaries will be with a Kathrein/Sira FMC-06/04 antenna which is nominally 0.85 wavelength spaced between the elements; the actual percentage-of-wavelength spacing varies with the frequency. The Sira antenna is not explicitly recognized as an antenna type in the Commission's FMModel software, and so this study assumes that this is a "Type 1" antenna. Calculations of the power density

produced by the stations proposed and licensed at this transmitter site are summarized in the following table:

Call	Avg or Peak ERP Antenna Model	Relative Field	Height AGL	Calculated Max Exposure	Gen Pub FCC Limit	% of Limit
KMMS-FM 234C3	4.1 kW H 4.1 kW V Sira FMC-06/04 4-bay 0.82-wave	FMModel Type 1	40 m	12.7 μW/cm²	200 μW/cm²	6.4%
KISN 244C3	4.1 kW H 4.1 kW V Sira FMC-06/04 4-bay 0.84-wave	FMModel Type 1	40 m	21.6 μW/cm²	200 μW/cm²	10.8%
KXLB 264C1	4.1 kW H 4.1 kW V Sira FMC-06/04 4-bay 0.87-wave	FMModel Type 1	40 m	38.5 μW/cm²	200 μW/cm²	19.3%
KZMY 278C1	4.1 kW H 4.1 kW V Sira FMC-06/04 4-bay 0.90-wave	FMModel Type 1	40 m	58.1 μW/cm²	200 μW/cm²	29.1%
K262AZ	0.205 kW V NIC BKG1P 1-bay	FMModel Type 1	50 m	2.8 μW/cm²	200 μW/cm²	1.4%

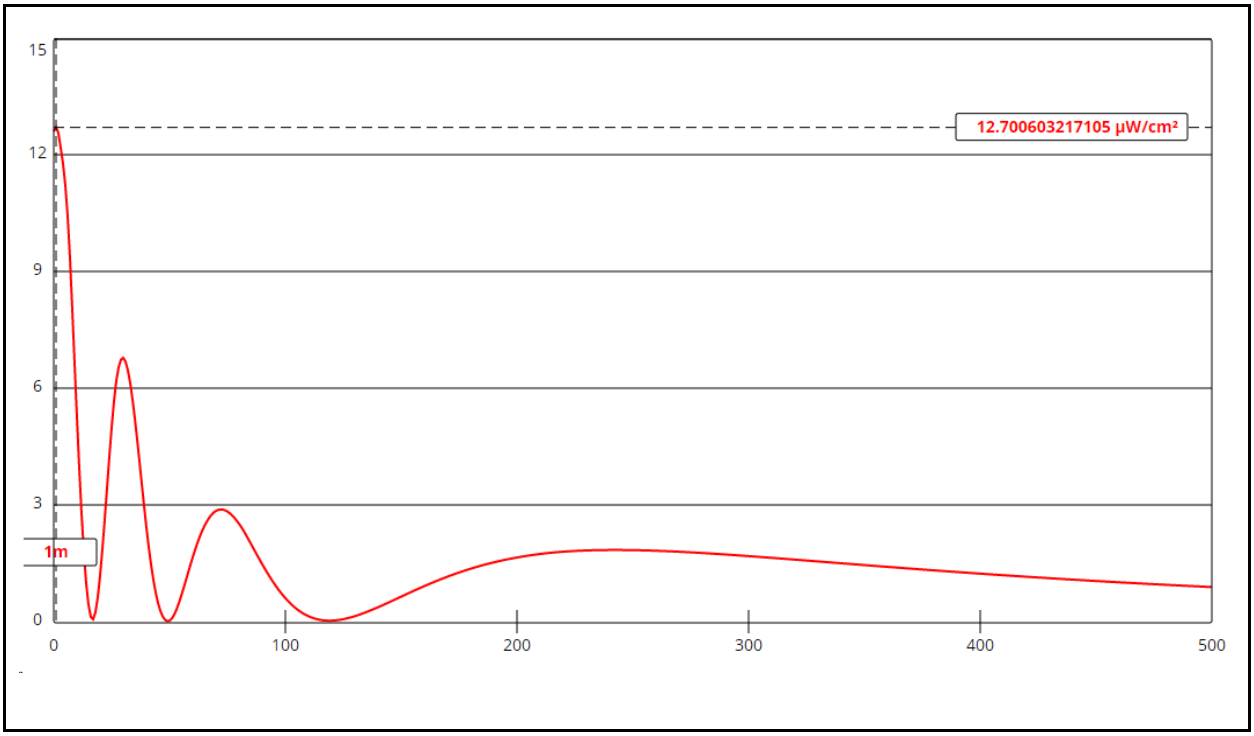
These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of the stations at this site (were all of their maxima to coincide, which they do not) is 133.7 μW/cm², which is 66.9% of the FCC standard for uncontrolled environments.

Public access to the site is or will be restricted by a fence with a locked gate. The site is or will be marked with appropriate warning signs. Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken.

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 MPE guidelines.

AM Station KMMS

The antenna system will be installed on a tower used by AM station KMMS 1450 kHz, and indeed has already been installed on this tower under an engineering STA for KISN (see FCC File No. BSTA-20200326AAI). KMMS operates with 1000 watts nondirectional daytime and 1000 watts nondirectional nighttime. The tower is 90.7 electrical degrees tall, or 25% of the station wavelength. Using Tables 1-4 in OET Bulletin No. 65, the fencing distance requirement for this station is 1 meter from the tower base. The tower is fenced to at least this distance.

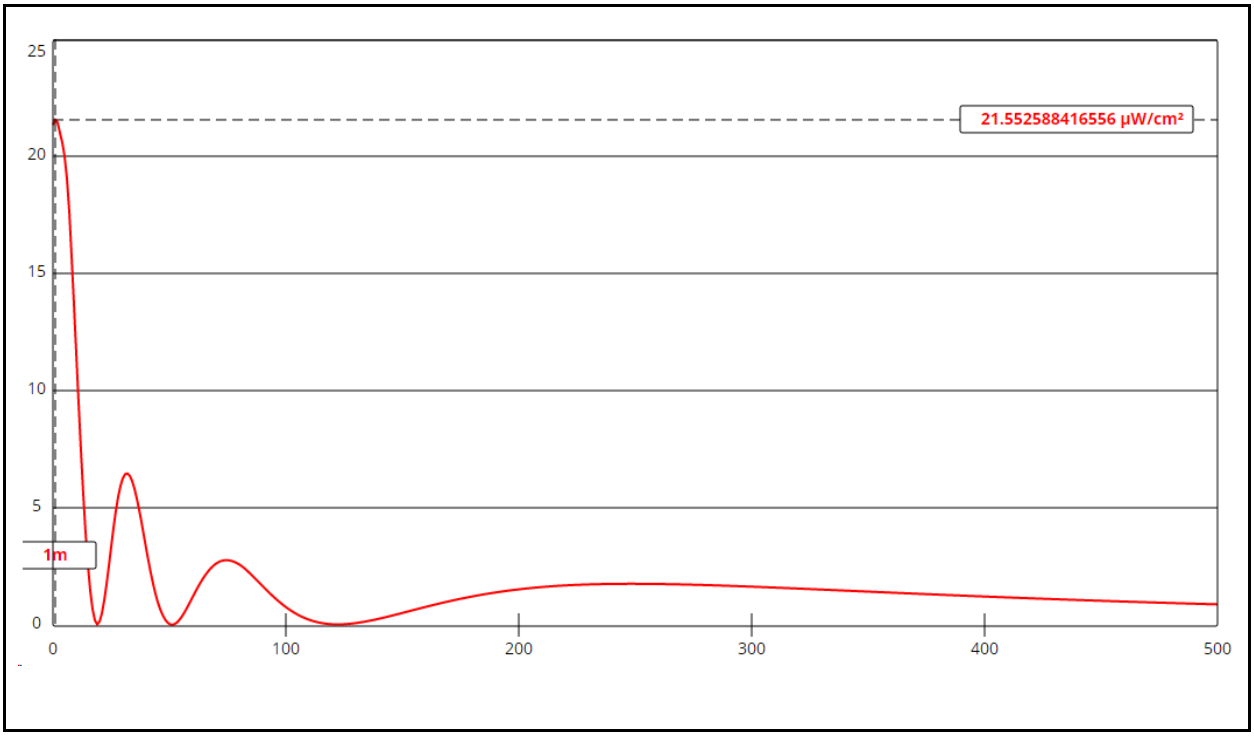


Ground-Level RF Exposure **OET FMModel**

KMMS-FM 234C3 Bozeman

Antenna Type:	Sira FMC-06/04 (Type 1)
No. of Elements:	4
Element Spacing:	0.82 wavelength
Distance:	500 meters
Horizontal ERP:	4.1 kW
Vertical ERP:	4.1 kW
Antenna Height:	40 meters AGL

Maximum Calculated Power Density is 12.7 µW/cm^2 at 20 meters from the antenna structure.

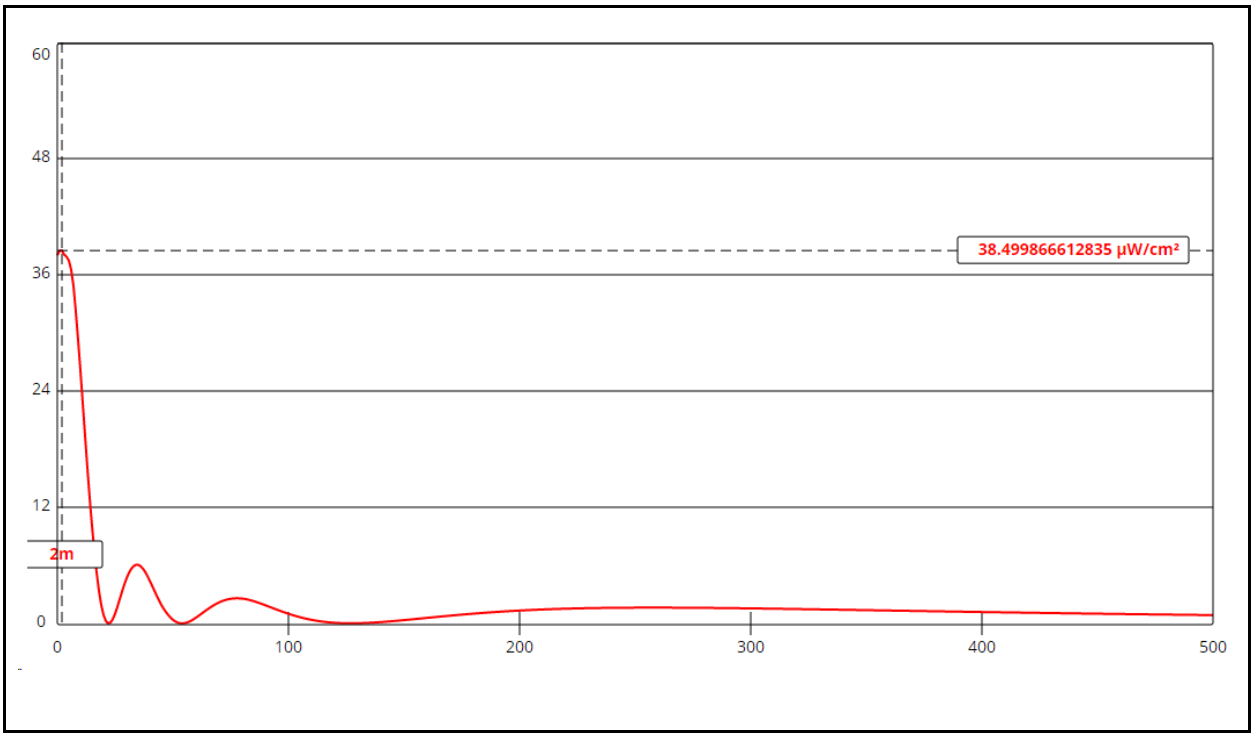


Ground-Level RF Exposure **OET FMModel**

KISN 244C3 Belgrade

Antenna Type:	Sira FMC-06/04 (Type 1)
No. of Elements:	4
Element Spacing:	0.84 wavelength
Distance:	500 meters
Horizontal ERP:	4.1 kW
Vertical ERP:	4.1 kW
Antenna Height:	40 meters AGL

Maximum Calculated Power Density is 21.6 µW/cm^2 at 23 meters from the antenna structure.

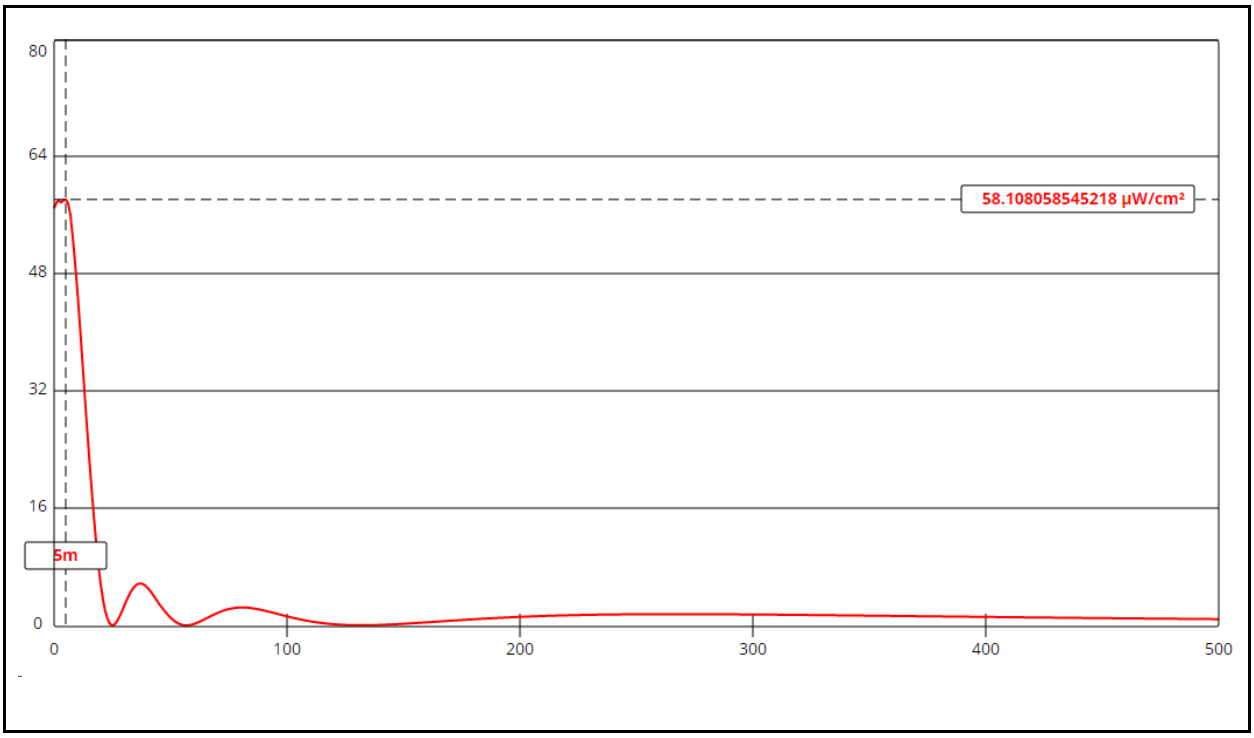


Ground-Level RF Exposure **OET FMModel**

KXLB 264C1 Churchill

Antenna Type:	Sira FMC-06/04 (Type 1)
No. of Elements:	4
Element Spacing:	0.87 wavelength
Distance:	500 meters
Horizontal ERP:	4.1 kW
Vertical ERP:	4.1 kW
Antenna Height:	40 meters AGL

Maximum Calculated Power Density is 38.5 µW/cm^2 at 2 meters from the antenna structure.



Ground-Level RF Exposure **OET FMModel**

KZMY 278C1 Bozeman

Antenna Type:	Sira FMC-06/04 (Type 1)
No. of Elements:	4
Element Spacing:	0.90 wavelength
Distance:	500 meters
Horizontal ERP:	4.1 kW
Vertical ERP:	4.1 kW
Antenna Height:	40 meters AGL

Maximum Calculated Power Density is 58.1 µW/cm^2 at 5 meters from the antenna structure.