

**July 2019**  
**KMMS-FM Channel 234C3 Bozeman, Montana**  
**KISN Channel 244C3 Belgrade, Montana**  
**KXLB Channel 264C1 Churchill, Montana**  
**RF Exposure Study**

**Facilities Proposed**

Form 301 applications are being filed by the three stations named above, proposing operation from a combined antenna system at the High Flat communications site, 18 kilometers southwest of central Bozeman, Montana. Operation is proposed with a 5-element circularly-polarized omni-directional antenna.

FM station KBMC 271C2 Bozeman, which is currently located at the High Flat site, will also be on this combined antenna system, which will be installed in place of the existing KBMC antenna. (These applications specify corrected coordinates for the KBMC tower site.)

The existing 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.

**KMMS-FM:** The proposed operation will be on Channel 234C3 (94.7 MHz) with an effective radiated power of 5.3 kilowatts.

**KISN:** The proposed operation will be on Channel 244C3 (96.7 MHz) with an effective radiated power of 5.3 kilowatts.

**KXLB:** The proposed operation will be on Channel 264C1 (100.7 MHz) with an effective radiated power of 40 kilowatts.

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

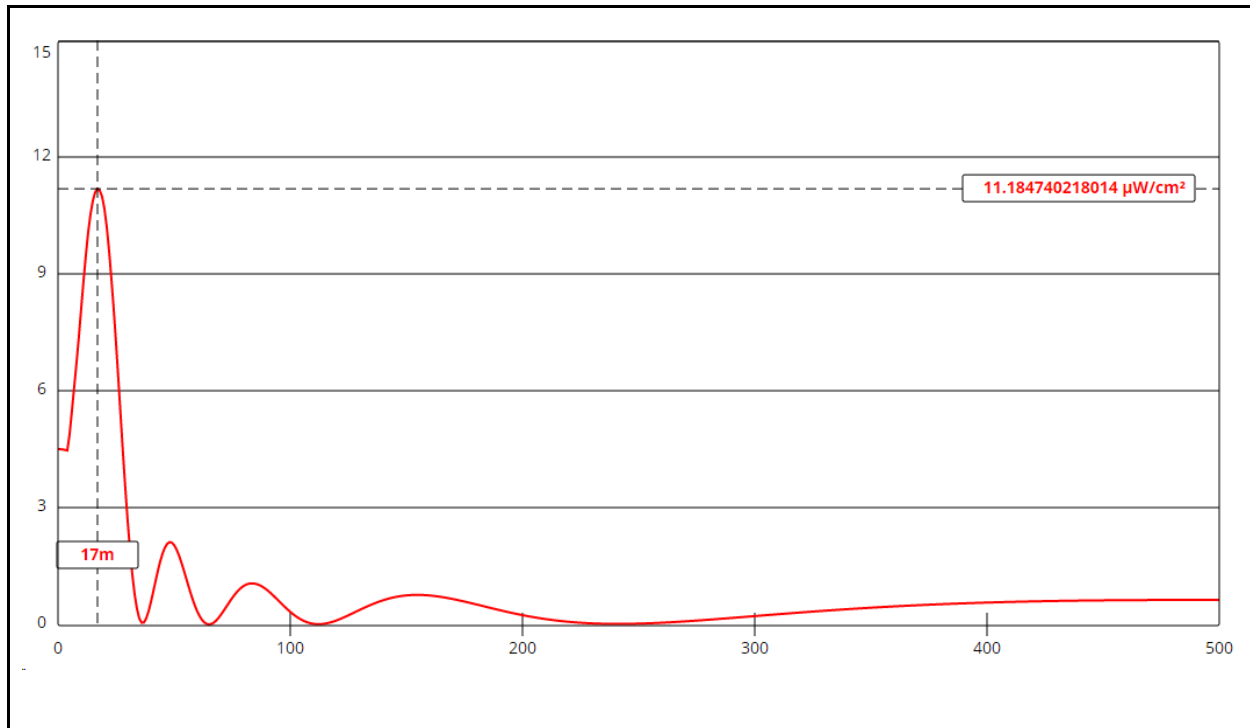
Call	Avg or Peak ERP Antenna Model	Relative Field	Height AGL	Calculated Max Exposure	Gen Pub FCC Limit	% of Limit
KMMS-FM 234C3	5.3 kW H 5.3 kW V ERI rototiller 5-bay full-wave	FMMModel Type 3	51 m	11.2 $\mu W/cm^2$	200 $\mu W/cm^2$	5.6%
KISN 244C3	5.3 kW H 5.3 kW V ERI rototiller 5-bay full-wave	FMMModel Type 3	51 m	11.2 $\mu W/cm^2$	200 $\mu W/cm^2$	5.6%
KXLB 264C1	40 kW H 40 kW V ERI rototiller 5-bay full-wave	FMMModel Type 3	51 m	84.4 $\mu W/cm^2$	200 $\mu W/cm^2$	42.2%
KBMC 271C2	24 kW H 24 kW V ERI rototiller 5-bay full-wave	FMMModel Type 3	51 m	50.6 $\mu W/cm^2$	200 $\mu W/cm^2$	25.3%
KKQX 289C2	12.3 kW H 12.3 kW V SHI 6813-4R-SS 4-bay half-wave	FMMModel Type 1	38 m	20.9 $\mu W/cm^2$	200 $\mu W/cm^2$	10.45%
Total .....						89.15%

(KBMC is currently licensed at 20.5 kW ERP, but is eligible to operate with as much as 24 kW ERP as a fully-spaced Class C2 facility.)

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 their maxima to coincide, which they do not) is 89.15% of the FCC standard for uncontrolled environments.

Public access to the site is restricted by a locked gate and barbed wire fence. 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.



## Ground-Level RF Exposure

OET FMModel

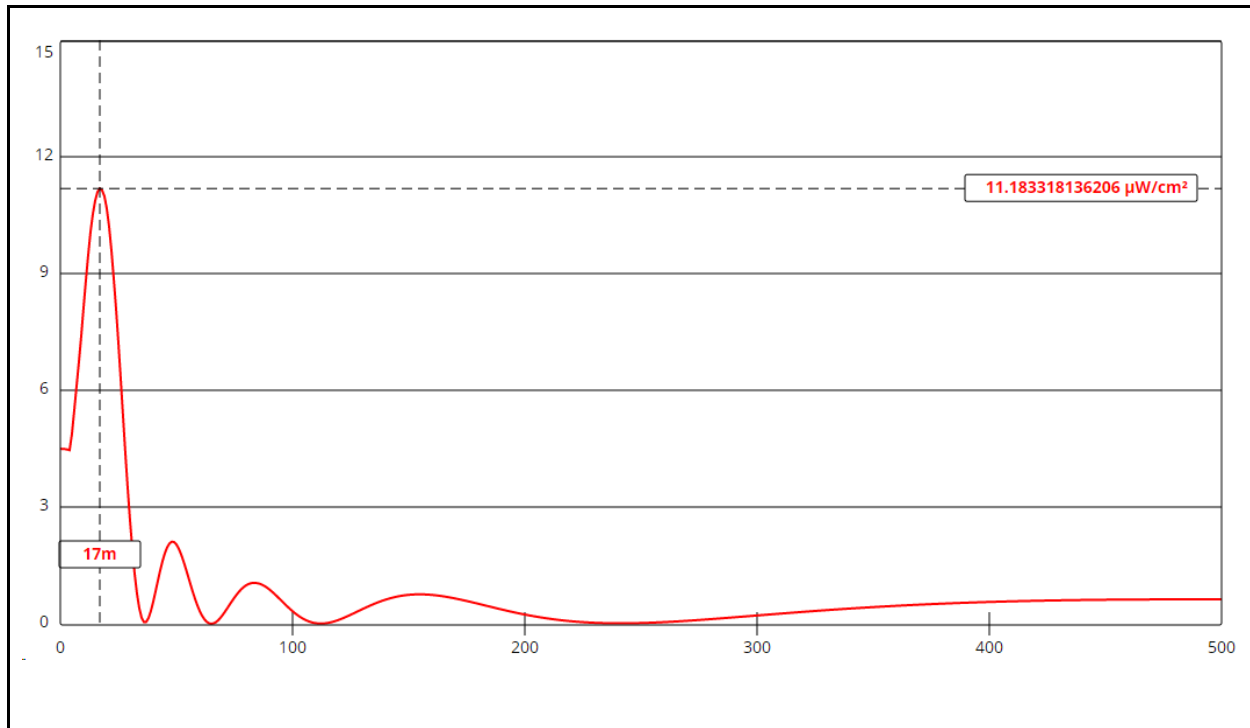
### KMMS-FM 234C3 Bozeman

Antenna Type: ERI "rototiller" (Type 3)  
No. of Elements: 5  
Element Spacing: 1.0 wavelength

Distance: 500 meters  
Horizontal ERP: 5.3 kW  
Vertical ERP: 5.3 kW

Antenna Height: 51 meters AGL

Maximum Calculated Power Density is 11.2  $\mu\text{W}/\text{cm}^2$  at 17 meters from the antenna structure.



## Ground-Level RF Exposure

OET FMModel

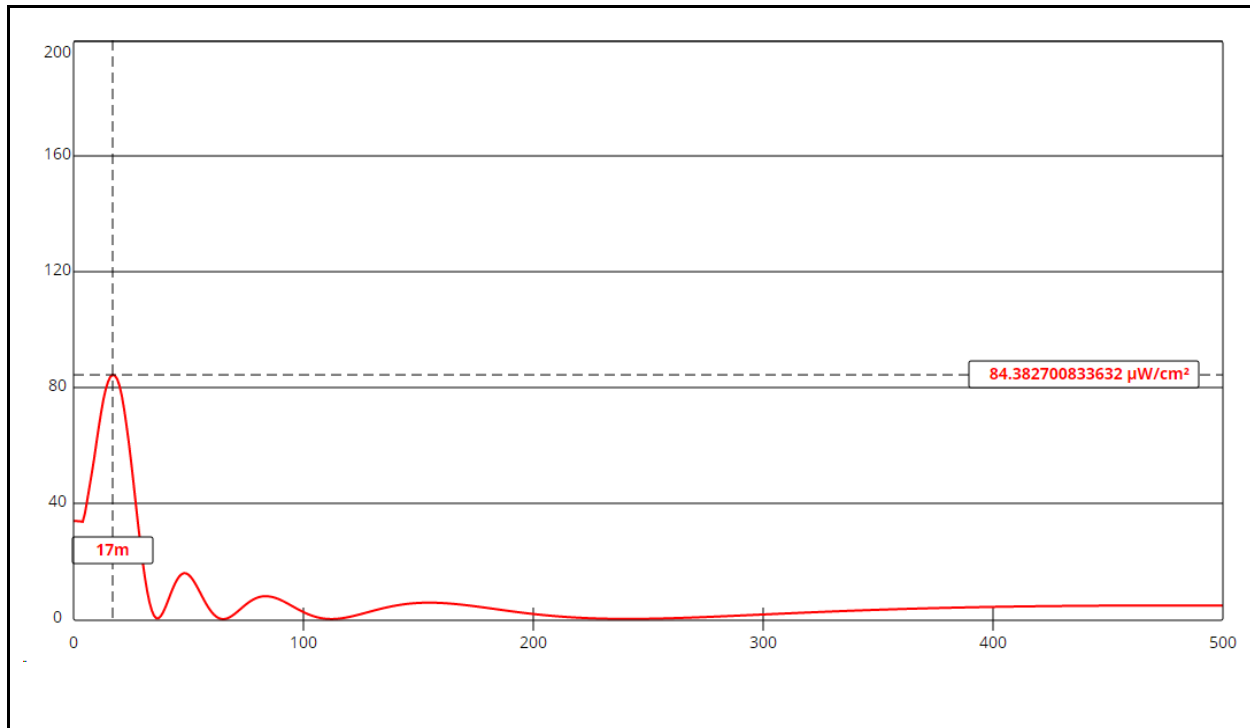
### KISN 244C3 Belgrade

Antenna Type: ERI "rototiller" (Type 3)  
 No. of Elements: 5  
 Element Spacing: 1.0 wavelength

Distance: 500 meters  
 Horizontal ERP: 5.3 kW  
 Vertical ERP: 5.3 kW

Antenna Height: 51 meters AGL

Maximum Calculated Power Density is 11.2  $\mu\text{W}/\text{cm}^2$  at 17 meters from the antenna structure.



## Ground-Level RF Exposure

OET FMModel

### KXLB 264C1 Churchill

Antenna Type: ERI "rototiller" (Type 3)  
No. of Elements: 5  
Element Spacing: 1.0 wavelength

Distance: 500 meters  
Horizontal ERP: 40 kW  
Vertical ERP: 40 kW

Antenna Height: 51 meters AGL

Maximum Calculated Power Density is 84.4  $\mu\text{W}/\text{cm}^2$  at 17 meters from the antenna structure.