

September 2017
FM Translator K277CZ
Shelton, Washington Channel 277D
Allocation Study

The attached spacing study shows the spacing between the proposed translator site and the location of cochannel and adjacent channel stations and proposals. This study was made with the Commission's Class A spacing requirements, and individual situations were examined to determine the lack of prohibited contour overlap per the requirements of §74.1204 of the Rules. The attached allocation study map demonstrates compliance with the Commission's Rules for protection of FM broadcast stations and FM translators as outlined in §74.1204.

The attached spacing study demonstrates compliance with §73.207 of the Commission's Rules regarding spacing restrictions to stations which are 53 or 54 channels removed from the proposed operation.

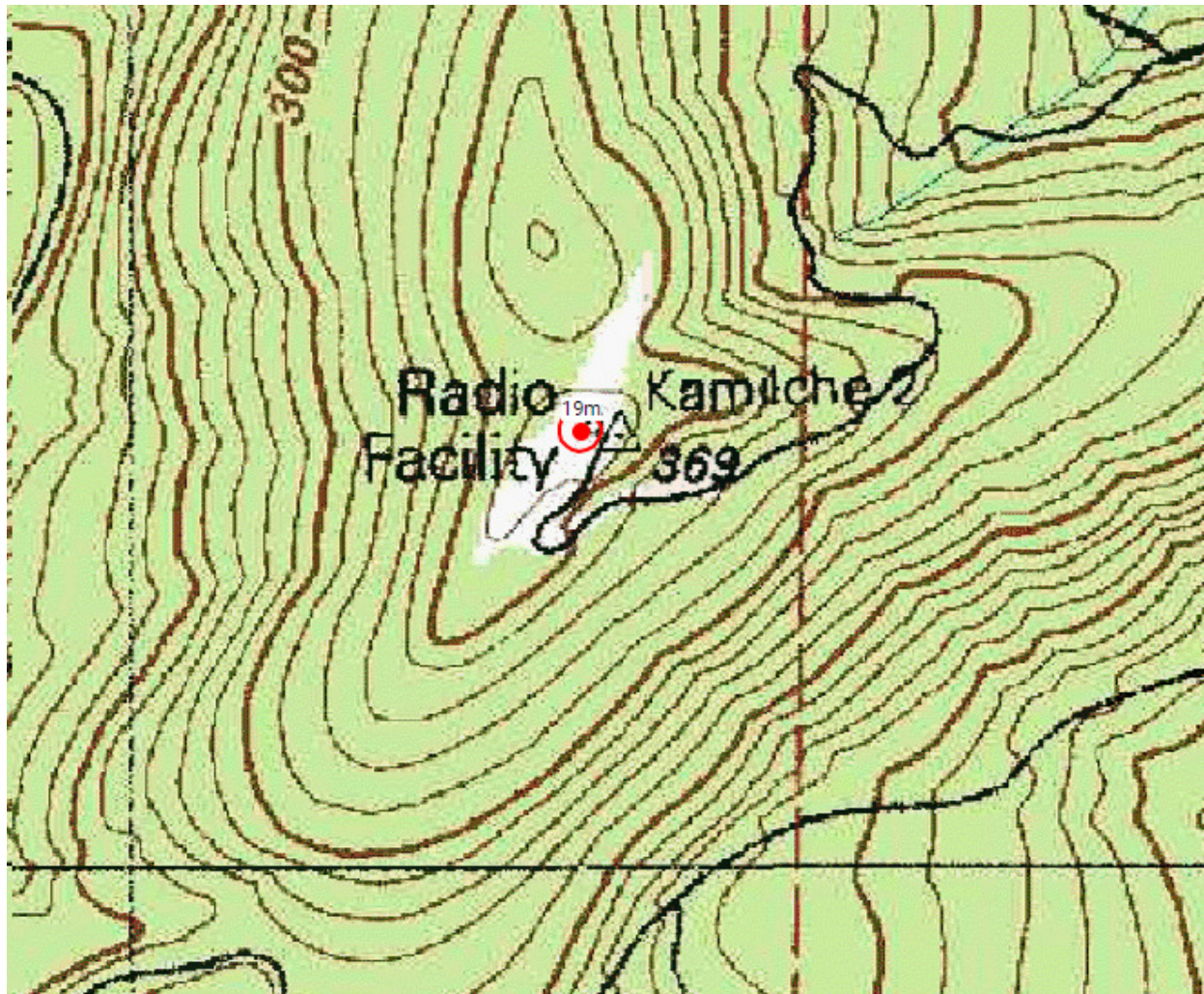
KFOO 275C Centralia

The proposed translator transmitter site is located within the 60 dBu protected contour of second-adjacent channel station KFOO 275C Centralia. The following calculation, performed using the *Living Way* methodology, demonstrates interference protection to that station.

| Protected Station | Distance & Bearing to Proposal | Station ERP and HAAT on that azimuth | Station Field Strength at Proposal | Corresponding Translator Interfering Contour | Distance to Translator Interfering Contour |
|--------------------------|---|---|---|---|---|
| KFOO 275C | 18.19 km 0 deg True | 70 kW 667 meters | 95.3 dBu F(50,50) | 135.3 dBu | 19 meters Free Space |

The interfering contour extends just 19 meters from the tower. There is no population within this contour. Therefore, the proposed facility is believed to satisfy the requirements of §74.1204(d) with respect to KFOO.

Map showing 19 meter radius from tower - This area is unpopulated



Hatfield & Dawson Consulting Engineers

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SEARCH PARAMETERS

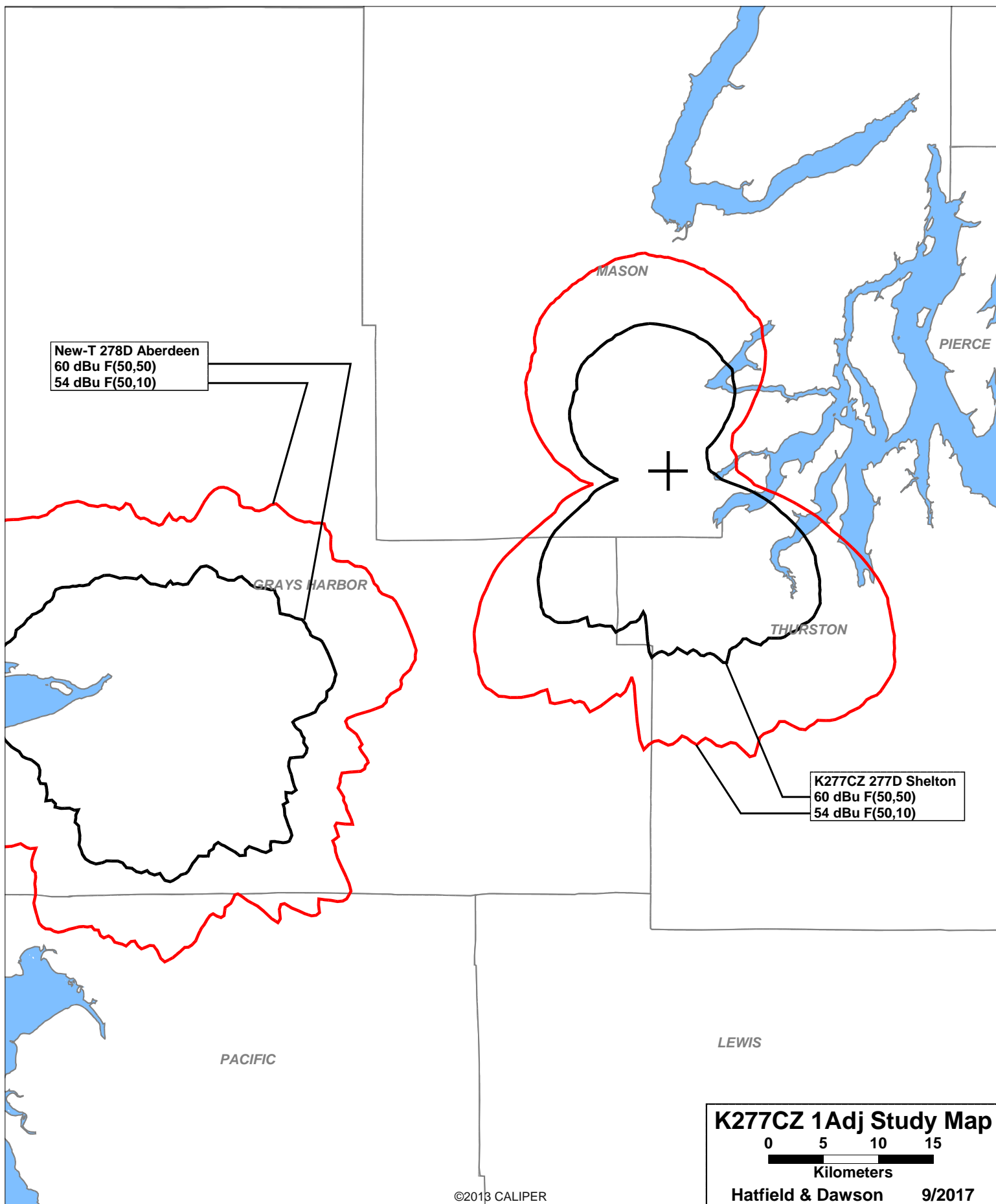
FM Database Date: 170919

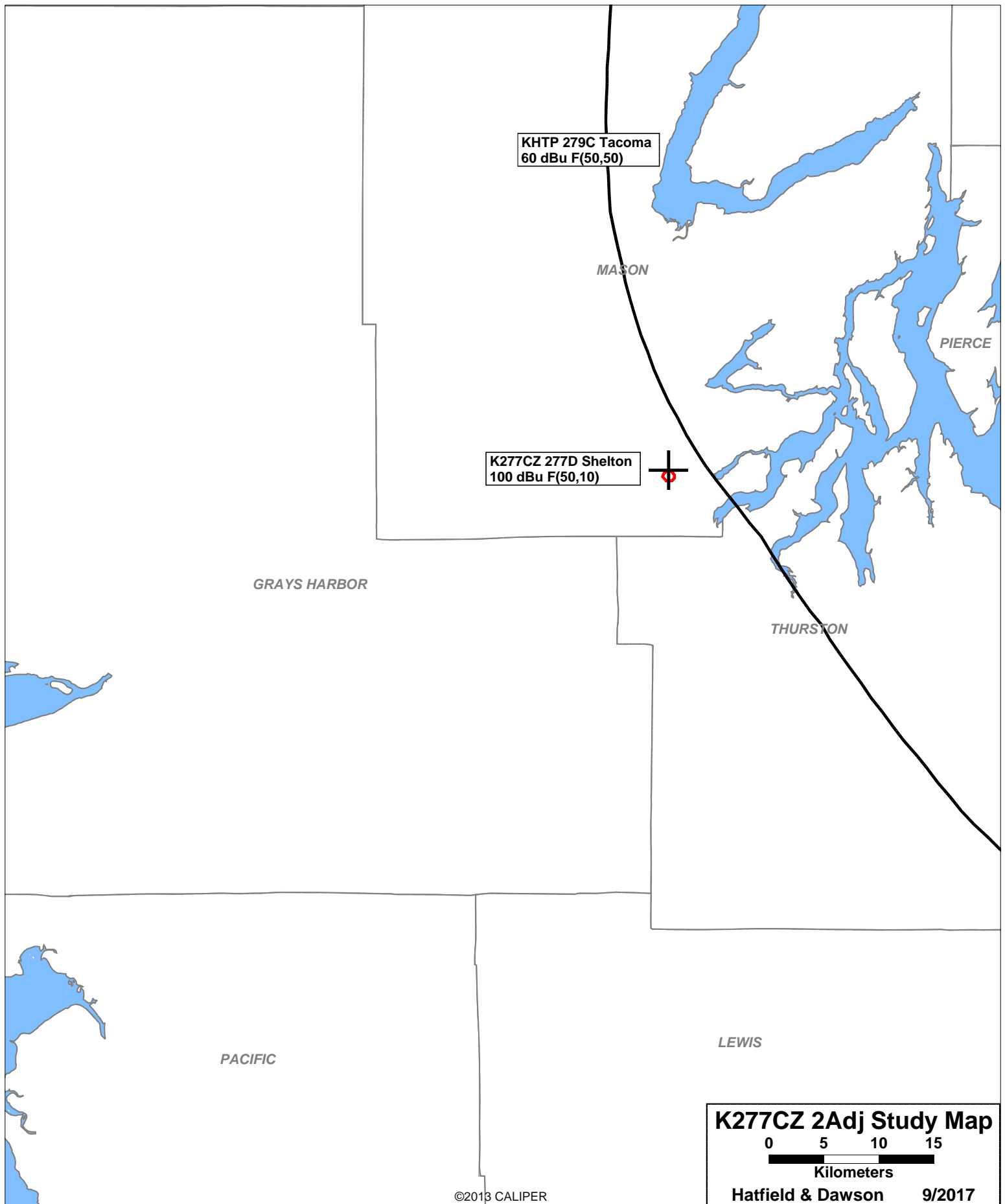
Channel: 277A 103.3 MHz
 Latitude: 47 8 20
 Longitude: 123 8 23
 Safety Zone: 50 km
 Job Title: K277CZ SHELTON

Page 1

| Call Status | City St | FCC File No. | Channel Freq. | ERP(kW) HAAT(m) | Latitude Longitude | Bearing deg-True | Dist (km) | Req (km) |
|----------------|------------------|----------------|------------------|--------------------|-----------------------|---------------------|------------------|--------------|
| K224DR LIC | ABERDEEN WA | BLFT-91221AGF | 224D 92.7 | 0.115 179.0 | 46-55-55 123-44-04 | 243.2 | 50.72 0.00 | 0 TRANS |
| KFOO LIC | CENTRALIA WA | BLH-50126ABD | 275C 102.9 | 70.000 668.0 | 46-58-31 123-08-16 | 179.5 | 18.19 -76.81 | 95 SHORT |
| | VICTORIA BC | - | 276B 103.1 | 0.000 0.0 | 48-25-07 123-30-36 | 349.1 | 144.97 7.97 | 137 CLOSE |
| | VICTORIA BC | RM- | 276D 103.1 | 0.000 0.0 | 48-26-52 123-19-19 | 354.7 | 146.17 48.17 | 98 CLEAR |
| KKCW LIC | BEAVERTON OR | BLH-11214AAF | 277C 103.3 | 100.000 470.0 | 45-31-21 122-44-45 | 170.3 | 182.22 -43.78 | 226 SHORT |
| KMCQ LIC | OAK HARBOR WA | BLH-60511ABF | 277C3 103.3 | 1.400 DA 414.0 | 48-21-55 122-16-03 | 25.2 | 151.23 9.23 | 142 CLOSE |
| K277AE LIC | SEATTLE WA | BLFT-70307AMN | 277D 103.3 | 0.250 DA 133.0 | 47-36-59 122-19-45 | 48.7 | 81.03 0.00 | 0 TRANS |
| K277AE CP | SEATTLE WA | BPFT-70421AAM | 277D 103.3 | 0.250 DA 231.0 | 47-36-21 122-19-46 | 49.3 | 80.25 0.00 | 0 TRANS |
| K277CZ LIC | SHELTON WA | BLFT-51002ADI | 277D 103.3 | 0.250 DA 0.0 | 47-08-20 123-08-23 | 0.0 | 0.00 0.00 | 0 TRANS |
| NEW-T APP | ABERDEEN WA | BNPFT-70726ALZ | 278D 103.5 | 0.250 0.0 | 46-55-55 123-43-59 | 243.1 | 50.63 0.00 | 0 TRANS |
| KHTP LIC | TACOMA WA | BLH-80730AKI | 279C 103.7 | 68.000 DA 707.0 | 47-30-14 121-58-29 | 64.8 | 96.97 1.97 | 95 CLOSE |
| K280GE LIC | ABERDEEN WA | BLFT-41014AAT | 280D 103.9 | 0.160 0.0 | 46-56-00 123-43-57 | 243.3 | 50.52 0.00 | 0 TRANS |
| K280FF LIC | CHEHALIS WA | BLFT-50906ABY | 280D 103.9 | 0.040 86.0 | 46-36-43 122-57-15 | 166.4 | 60.26 0.00 | 0 TRANS |

===== END OF FM SPACING STUDY FOR CHANNEL 277 =====





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Facilities Proposed

The proposed operation will be on Channel 277D (103.3 MHz) with a maximum lobe effective radiated power of 250 watts. Operation is proposed with a directional antenna array to be mounted on an existing tower on Kamilche Hill, the site of the licensed K277CZ operation.

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.

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.

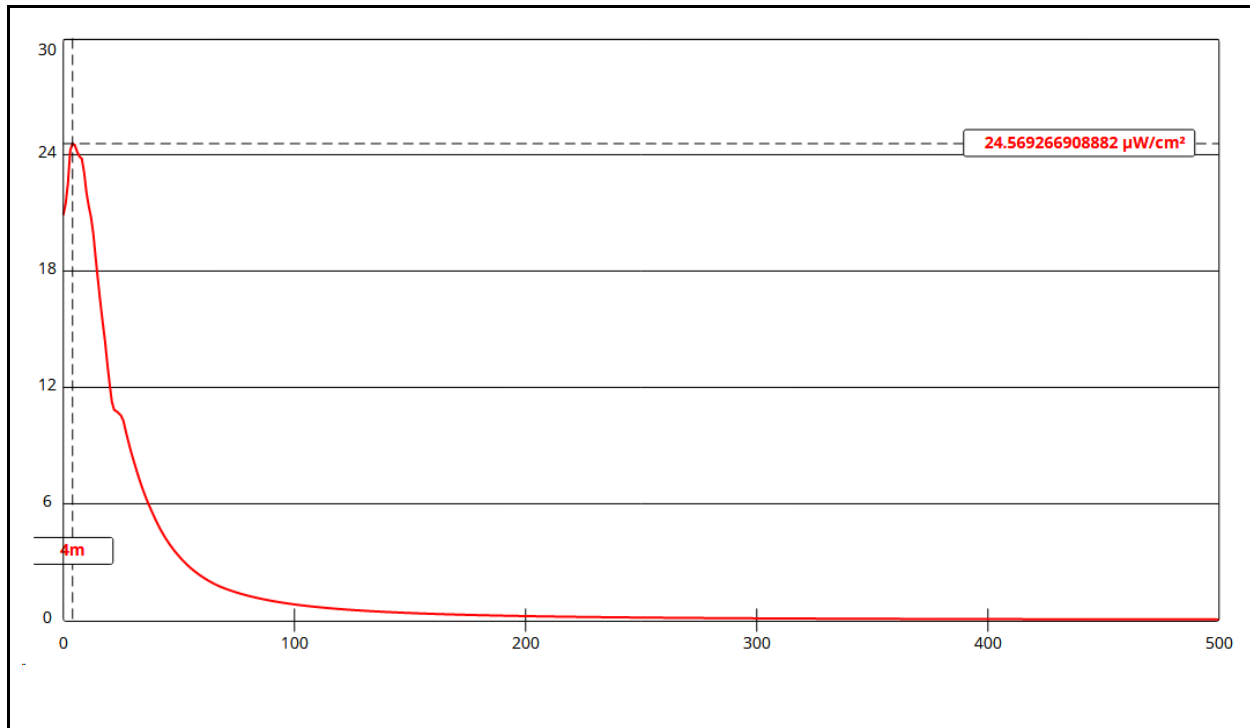
Calculations of the power density produced by the proposed antenna system assume a Type 1 element pattern, which is the "worst case" element pattern in the Commission's FMModel software. The highest calculated ground level power density occurs at a distance of 4 meters from the base of the antenna support structure. At this point the power density is calculated to be 24.6 $\mu W/cm^2$.

Calculations of the power density produced by K277CZ and the other stations 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 |
|--------------------|--|--------------------|---------------|--------------------------------|-------------------------------|------------|
| K277CZ | 0.250 kW V Scala CL-FMV array | FMMModel Type 1 | 20 m | 24.6 $\mu\text{W}/\text{cm}^2$ | 200 $\mu\text{W}/\text{cm}^2$ | 12.3% |
| K221DV | 0.019 kW H 0.019 kW V Bext TFC2K | FMMModel Type 2 | 17 m | 1.6 $\mu\text{W}/\text{cm}^2$ | 200 $\mu\text{W}/\text{cm}^2$ | 0.8% |
| KRXY 233A | 0.830 kW H 0.830 kW V ERI LP-2E-HW | FMMModel Type 3 | 20 m | 15.2 $\mu\text{W}/\text{cm}^2$ | 200 $\mu\text{W}/\text{cm}^2$ | 7.6% |
| K225BY Ch262 CP | 0.250 kW V Sitco ODD | FMMModel Type 1 | 13 m | 65.6 $\mu\text{W}/\text{cm}^2$ | 200 $\mu\text{W}/\text{cm}^2$ | 32.8% |
| K270CJ | 0.250 kW V Bext LOG-4-FM-V X2 120 DEG SPLAY | FMMModel Type 1 | 20 m | 24.6 $\mu\text{W}/\text{cm}^2$ | 200 $\mu\text{W}/\text{cm}^2$ | 12.3% |

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation of K277CZ and the present operation of the other stations at this site (were their maxima to coincide, which they do not) is 131.6 $\mu\text{W}/\text{cm}^2$, which is 65.8% of 200 $\mu\text{W}/\text{cm}^2$ (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

K277CZ Shelton

Antenna Type: Scala CL-FM(V) (Type 1 assumed)

No. of Elements: 1

Element Spacing: 1.0 wavelength

Distance: 500 meters

Horizontal ERP: 0 W

Vertical ERP: 250 W

Antenna Height: 20 meters AGL

Maximum Calculated Power Density is 24.6 $\mu\text{W}/\text{cm}^2$ at 4 meters from the antenna structure.