

JOB 113102  
COMMUNITY OF LICENSE Seattle, WA  
APPLICANT Hollow Earth Radio

VER 1

# **CONSOLIDATED**

# **ENGINEERING EXHIBIT**

FCC Form 318 - Section VI - LPFM Engineering, Tech Box

**ENGINEERING STATEMENT**  
**PROPOSED NEW LPFM STATION AT SEATTLE, WA**  
**Hollow Earth Radio**

**SUMMARY:**

The applicant seeks a new LPFM station. This proposal is short-spaced to one or more second-adjacent stations. Contour protection is provided by the D/U method, in compliance with 73.807(e)(1). **See Exhibit 11.** A waiver of second-adjacent spacing is hereby requested.

**PERTINENT SPECIFICATIONS NOT INCLUDED IN SECTION VI - TECH BOX:**

HAAT: 77 meters

ERP: 15 watts

DATA SOURCE: V-Soft FMCommander with HAAT Method 0(zero); FCC 30 Second  
Terrain

SUPPORT STRUCTURE: Tower on building

# EXHIBIT 11 INTERFERENCE

REFERENCE		DISPLAY DATES
47 36 48.0 N.	CLASS = L1 Int = L1	DATA 11-04-13
122 18 14.0 W.	Current Spacings to 2nd Adj.	SEARCH 11-06-13
----- Channel 289 - 105.7 MHz -----		

Call	Channel	Location	Azi	Dist	FCC	Margin
KBKS-FM LIC	291C	Tacoma	WA 115.5	28.03	92.5	-64.5
KCMS LIC	287C1	Edmonds	WA 117.4	16.66	72.5	-55.8
K289AK LIC	289D	Orting	WA 169.0	64.04	31.5	32.5
1560209 APP	289A	Sedro-woolley	WA 2.9	99.15	66.5	32.7
AU9410186VAC	289A	Sedro-woolley	WA 2.9	99.15	66.5	32.7
counterproposal						
1565349 APP-N	289A	Sedro-woolley	WA 7.7	102.99	66.5	36.5

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Reference station has protected zone issue:  
All separation margins include rounding

## **PROTECTED ZONES REPORT:**

Protected zones report for NEW on channel 289L1 11-06-2013  
Lat. 47 36 48.0 Lng. 122 18 14.0, ERP= 0.015 kw, HAAT= 77M

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\*\*\* Station must coordinate with Canada. Distance to border = 102.2 km.  
Facility is okay with respect to AM station towers.  
Closest AM Facility is KKDZ, SEATTLE, WA, L, DAN at 217.2° at a distance of 6.9 km  
Facility is okay with respect to FCC monitoring stations.  
Closest FCC Monitoring Station is 150.4 km= Ferndale, WA  
Facility is okay toward West Virginia Quiet Zone. Distance to center = 3638.4 km  
Facility is okay toward Table Mountain. Distance to Center = 1603.6 km, Azimuth = 115.1 Degrees True

## **CONTOUR PROTECTION TO 2<sup>ND</sup>-ADJACENT STATIONS:**

Contour protection to 2nd-adjacent stations KBKS-FM and KCMS is provided using the ratio method. The F(50/50) contour of KBKS-FM is 89.0dBu at the proposed site. The F(50/50) contour of KCMS is 92.2dBu at the proposed site. Using the appropriate U/D ratio of 40dB vs. KBKS-FM, the corresponding “worst-case” interfering contour of the proposed LPFM is 129.0dBu.

The proposed 1-bay, SWR FMEC/1 antenna would be mounted on a 7 meter tower on a 6

**BROWN BROADCAST SERVICES**  
INCORPORATED

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meter building, at 12m AGL. Using elevation pattern data provided by SWR, the distance to the 129.0dBu contour at various depression angles is tabulated in **Exhibit 11a**.

The center of radiation would be 9 meters above the uppermost populated area, the 2nd floor of the building. On the 2nd floor, the worst-case 2<sup>nd</sup> adjacent interfering contour extends no closer than 3.99 meters above the uppermost populated area.

Therefore, there are no populated areas within the interference zone.

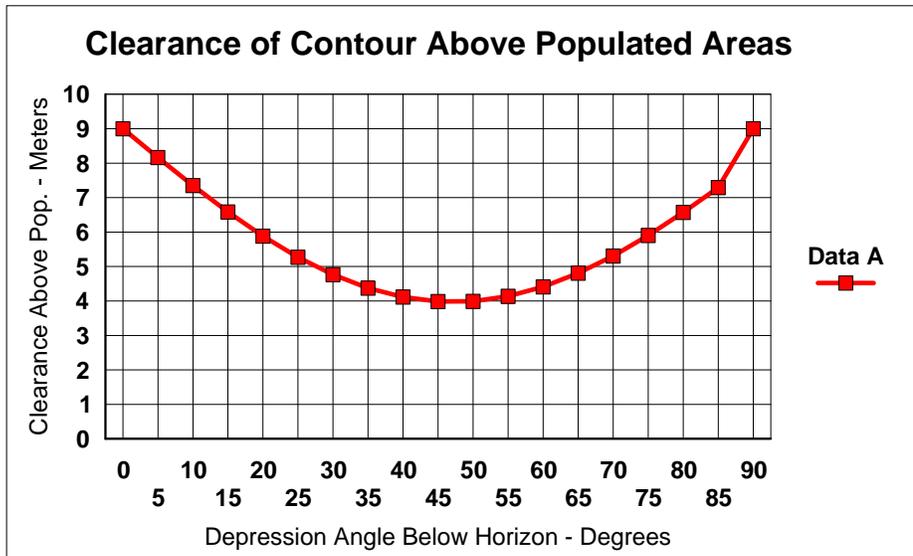
# Exhibit 11a

## SECOND-ADJACENT INTERFERENCE PROTECTION TO POPULATED AREAS

**NEW**  
**SEATTLE**  
**129.00**  
**2.8184**  
**KBKS-FM**  
**15**  
**SWR FMEC/1**

<CALL LETTERS OR FILE NUMBER  
 <PROPOSED COMMUNITY OF LICENSE  
 <INTERFERING CONTOUR OF PROPOSAL - dBu  
 <V/m  
 <2nd-ADJ STN REQUIRING INTERFERENCE PROT. (worst case)  
 <PROP. ERP (W)  
 <ANTENNA MODEL

max ERP (W)	depression angle below horizon (deg)	relative field	ERP (W)	angular distance to contour (m)	vertical distance (below antenna) (m)	horiz distance to contour (m)	vertical distance below antenna required to clear nearest populated level (m)	clearance of interfering contour above nearest populated level (m)
15	0	1	15.00	9.63	0.0	9.6	9	9.00
15	5	0.997	14.91	9.60	0.8	9.6	9	8.16
15	10	0.986	14.58	9.50	1.6	9.4	9	7.35
15	15	0.969	14.08	9.33	2.4	9.0	9	6.58
15	20	0.946	13.42	9.11	3.1	8.6	9	5.88
15	25	0.916	12.59	8.82	3.7	8.0	9	5.27
15	30	0.879	11.59	8.47	4.2	7.3	9	4.77
15	35	0.837	10.51	8.06	4.6	6.6	9	4.38
15	40	0.789	9.34	7.60	4.9	5.8	9	4.11
15	45	0.736	8.13	7.09	5.0	5.0	9	3.99
15	50	0.679	6.92	6.54	5.0	4.2	9	3.99
15	55	0.616	5.69	5.93	4.9	3.4	9	4.14
15	60	0.55	4.54	5.30	4.6	2.6	9	4.41
15	65	0.48	3.46	4.62	4.2	2.0	9	4.81
15	70	0.408	2.50	3.93	3.7	1.3	9	5.31
15	75	0.333	1.66	3.21	3.1	0.8	9	5.90
15	80	0.256	0.98	2.47	2.4	0.4	9	6.57
15	85	0.178	0.48	1.71	1.7	0.1	9	7.29
15	90	0	0.00	0.0	0.0	0.0	9	9.00



## **EXHIBIT 14**

### **ENVIRONMENTAL PROTECTION ACT / NIER ANALYSIS**

The applicant proposes mounting an SWR FMEC/1 single-bay antenna mounted 6 meters above the roof of a 6 meter building on a 7 meter tower. The antenna system would be 9 meters above the highest populated area - the uppermost floor of the building.

The SWR FMEC antenna is a functional equivalent of the Jampro Double-V “Penetrator” antenna. RF exposures were calculated using FM Model for Windows, Version 2.10, using the “Jampro Double-V (EPA) setting. Even without roof attenuation factored in, FM Model predicts a peak exposure of  $5.6\mu\text{W}/\text{cm}^2$  at 7.2 meters from the tower base, for persons on the uppermost populated floor of the building. This represents 2.8 % of the Maximum Permissible Exposure (MPE) of  $200\mu\text{W}/\text{cm}^2$  for uncontrolled environments.

The roof itself is a controlled/occupational area and is only accessed for maintenance. If any roof or tower work becomes necessary, the transmitter power will be reduced or operation will cease, as necessary, so as to not exceed the RF exposure limits. RF warning signs will be posted at the 7 meter tower.