

# Exhibit 11

## Engineering Statement

Thomas Dale District 7 Planning Council  
St. Paul, MN

Form 318 minor modification to construction permit  
BNPL-20131114BFV  
Fac. 195511

Channel 231-L1 (94.1 MHz)  
44°57'22" N x 93°07'33" W  
0.1 kW H/V ERP  
23 meters HAAT  
22 meters HAGL  
293 meters RCAMSL

June 13, 2016

Prepared by Jeff Sibert

**Exhibit 11 – Engineering Statement  
Thomas Dale District 7 Planning Council  
Minor modification to construction permit  
BNPL-20131114BFV  
June 13, 2016**

**A. Overview:**

This Form 318 minor modification to construction permit application is filed by Thomas Dale District 7 Planning Council (“Thomas Dale”) to change transmitter location for WFNU-LP. Water damage and leaking was discovered on the roof of the intended transmitter site, and the landlord will require a significant amount of time to repair this damage. Due to this uncertainty, Thomas Dale is requesting FCC permission to construct on an alternate site about 1.3 km East.

**B. 73.807 interference:**

This proposal meets contour clearance for all applications and authorizations on co-channel and first-adjacent frequencies at the present time.

Waiver of interference to second adjacent stations KSTP-FM and KXXR are requested. A detailed explanation is provided in the next two sections. There are no third-adjacent stations that are impacted by this proposal. There are no subcarriers on adjacent frequencies which need protection.

**C. Second-adjacent waiver requested to KXXR:**

This proposal is short-spaced to second-adjacent station KXXR on channel 229 (93.7 MHz), therefore we request a second-adjacent channel waiver using the desired to undesired method. KXXR operates at 100 kW non-directional from a location 11.4 km to the north. KXXR's HAAT towards the direction of the proposed transmitter site (181 degrees) is 317 meters<sup>1</sup>. The service contour of KXXR is approximately 98.4 dBu at the proposed transmitter site<sup>2</sup>. Using a 40 dBu U/D ratio, the corresponding undesired interference contour is 138.4 dBu. A 100 watt signal would place a 138.4 dBu contour approximately 9 meters from the antenna.

Other than the structure the antenna is mounted on, there are no other structures within 9 meters of the antenna that would be impacted. Also the antenna is mounted more than 22 meters above ground, so no listeners on the ground will be impacted.

As far as the building the antenna is mounted on, the antenna is to be mounted at the top of an elevator penthouse, 6 meters above the main roof and any occupied level. Neither the penthouse nor the roof is accessible to the general population so it is excluded. The chosen antenna (BKG-77) limits downward radiation. Using the manufacturer's specifications<sup>3</sup> we've determined that no angles would have a vertical component exceeding 5 meters<sup>4</sup> therefore the interference would not touch any occupied areas of the building.

---

<sup>1</sup> <https://www.fcc.gov/media/radio/haat-calculator>

<sup>2</sup> <https://www.fcc.gov/media/radio/fm-and-tv-propagation-curves>

<sup>3</sup> Data sheets published at manufacturer's web site: <http://nicomusa.com>

<sup>4</sup> Sine of vertical height (6 meters) divided by the interfering contour or 'hypotenuse' (9 meters) is approximately 50 degrees. For all angles of depression (between 0 and 90 degrees) the vertical component is less than 5 meters and would therefore not intersect any occupied areas.

Because there is no population within the interference distance, we believe this proposal will not cause any prohibited second-adjacent interference to KXXR using the criteria established in the 'Living Way' decision.

**Second-adjacent waiver requested to KSTP:**

This proposal is short-spaced to a second-adjacent station KSTP-FM on channel 233 (94.5 MHz), therefore we request a second-adjacent channel waiver using the desired to undesired method. KSTP-FM operates at 100kW from a location 11.8 km north. The radial height (181 degrees) is approximately 360 meters. The service contour of KSTP-FM is approximately 99.9 dBu at the proposed transmitter site. Using a 40 dBu U/D ratio, the corresponding undesired interference contour is 139.9 dBu. Since the undesired signal strength is higher than KXXR, the interference potential will be less.

Because there is no population within the interference distance based on the calculation done to KXXR, we believe this proposal will not cause any prohibited second-adjacent interference to KSTP-FM using the criteria established in the 'Living Way' decision.

**Time-Share with Center for Hmong Arts and Talent:**

Thomas Dale entered into a time-share with Hmong Arts and Talent (CHAT), and had intended to share an antenna with CHAT. However, CHAT's permit expired unbuilt. We request the Commission issue an authorization to WFNU for unlimited time so that full use of the frequency can be made.

**Calculation of height above average terrain and power limits:**

The FCC's HAAT tool was used to calculate the effective height above average terrain of this proposal. For a radiation center of 22 meters above ground, the effective height above average terrain equals 23 meters. The maximum permissible effective radiated power for this height is 100 watts. Thomas Dale requests an authorization for this power.

**Interference to translators and booster signals:**

There are no translators or boosters that would be affected by this proposal on any adjacent frequency within the required cutoff distances.

**Channel 6:**

Applicant proposes a channel above 220 so the channel six interference procedures do not apply.

**FAA requirements:**

The antenna is mounted 6 meters above the building, therefore no FAA registration is required.

**AM coordination:**

There are no AM stations within 3.2 km of the proposed transmitter site.

**Environmental Impact Assessment:**

The proposed tower does not appear to create a significant environmental impact. The applicant answers no to each of the questions under “WORKSHEET 2 - GENERAL ENVIRONMENTAL WORKSHEET” on page 25 of the published form 318 instructions. There are no other transmissions located at the same site or near this site.

We were not able to use the simplified worksheet found in the form 318 instructions to determine RF radiation compliance because the antenna is not more than 6.5 meters above the roof (it is only 6 meters). We instead used the “RF WORKSHEET 1” found in form 340, which covers additional scenarios. Using this form the proposed WFNU operation is in full compliance with both controlled and uncontrolled limits. Thomas Dale will ensure that workers on or near the antenna are protected from excessive RF radiation exposure.

**Conclusion:**

Grant of this application will allow Thomas Dale to move forward with remaining construction activities for WFNU-LP and bring a new localized low power FM radio service to residents in St. Paul.

**Certification:**

I, Jeff Sibert, have prepared the technical exhibits in this application for modification of WFNU-LP. I certify and declare, under penalty of perjury, that the information in this application has been prepared in good faith and that this application is believed to fully comply with all commission rules and regulations, except in limited cases where waivers of said rules have been requested.

Jeff Sibert

(electronically signed)

June 13, 2016

Power vs. angle of depression for single Nicom BKG-77 antenna.

Critical angles only are calculated. Depression angles below 50 degrees would not have a vertical component greater than 5 meters for a hypotenuse of 9 meters

Depression angles			138 dbu distances (m)		
Degrees	Radians	Field	ERP (W)	Distance	
90	1.571	0.105	1.1025		1
88	1.536	0.102	1.0404		1
86	1.501	0.102	1.0404		1
84	1.466	0.105	1.1025		1
82	1.431	0.115	1.3225		1
80	1.396	0.129	1.6641		1
78	1.361	0.145	2.1025		1
76	1.326	0.166	2.7556		1
74	1.292	0.188	3.5344		2
72	1.257	0.211	4.4521		2
70	1.222	0.239	5.7121		2
68	1.187	0.268	7.1824		2
66	1.152	0.297	8.8209		3
64	1.117	0.329	10.8241		3
62	1.082	0.361	13.0321		3
60	1.047	0.391	15.2881		3
58	1.012	0.421	17.7241		4
56	0.977	0.45	20.25		4
54	0.942	0.479	22.9441		4
52	0.908	0.508	25.8064		4
50	0.873	0.538	28.9444		5

Formulas and data used:

- Depression angle      90 degrees is directly underneath the antenna  
                                  0 degrees is along the horizon
- Field                      Taken from the data sheets located at nicomusa.com
- ERP                        100 watts \* field \* field
- Distance                 Distance to the 138 dBu interfering contour at specified ERP