

# COMPREHENSIVE TECHNICAL EXHIBIT

## Discussion

Applicant seeks an LPFM Construction Permit for:

Berlin, MD

Channel 293 (106.5 Mhz) **2<sup>nd</sup> adjacent waiver request, see discussion**

ERP = 0.098 kW (See **Figure 2**)

Ground Elevation = 12 meters

RCAGL = 11.0 meters

RCAMSL = 23 meters

HAAT = 17 meters (Globe terrain data) (See **Figure 1**)

Overall Mast Height (above roof) = 6.1 meters

FAA (TOWAIR study), See **Figure 5**

NAD83 Latitude: 38 18 53.9N; Longitude: 75 13 09.4W

Facility is okay with respect to AM station towers.

Closest AM Facility is WJKI, SALISBURY, MD, L, ND1 at 278.5° at a distance of 35.0 km

Facility is okay with respect to FCC monitoring stations.

Closest FCC Monitoring Station is 168.2 km= Laurel, MD

Facility is okay toward West Virginia Quiet Zone. Distance to center = 374.3 km

Facility is okay toward Table Mountain. Distance to Center = 2600.2 km, Azimuth = 284.0 Degrees True

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## HAAT CALCULATION (FCC HAAT Calculator)

### [Antenna Height Above Average Terrain Calculations -- Results](#)

#### Input Data

Latitude **38° 18' 53.9"** North

Longitude **75° 13' 9.4"** West (NAD 83)

Height of antenna radiation center above mean sea level: **23** meters AMSL

Number of Evenly Spaced Radials = **360** 0° is referenced to True North

#### Results

Calculated HAAT = **17 meters**

Antenna Height Above Average Terrain calculated  
using 1 km [GLOBE terrain data](#)

### FIGURE 1

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**ERP Calculation** (FCC FMPower Calculator)

Choose a U.S. State or Possession:

MD - Maryland

Station Class:

100 watt LPFM

17 meters Antenna Height Above Average Terrain (HAAT)

Results:

Calculated ERP (rounded per Section 73.212) = **0.098 kW**  
 Unrounded ERP = 0.097675 kW

**FIGURE 2**

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**CHANNEL STUDY**

Channel 293 Study

REFERENCE 38 18 53.90 N. CLASS = L1 DISPLAY DATES  
 75 13 09.40 W. Current Spacings to 3rd Adj. DATA 09-11-23  
 ----- Channel 293 - 106.5 MHz ----- SEARCH 09-11-23

Call	Channel	Location	Azi	Dist	FCC	Margin
WYPO	LIC-Z 295A	Ocean City	MD 54.3	2.41	28.5	-26.1*
WRBG-LP	LIC 293L1	Millsboro	DE 345.6	29.27	23.5	5.8
WXDE	LIC-N 290A	Lewes	DE 0.4	36.46	28.5	8.0
WBBX	LIC-N 291A	Pocomoke City	MD 226.5	38.45	28.5	10.0
W293DN	CP 293D	Pocomoke City	MD 226.5	42.25	31.5	10.8
W293DN	STA 293D	Pocomoke City	MD 226.5	38.45	25.5	13.0
WBBX	CP 291A	Pocomoke City	MD 220.6	42.19	28.5	13.7
W293DN	LIC 293D	Pocomoke City	MD 226.5	42.25	25.5	16.8
W294CH	LIC-D 294D	Georgetown	DE 298.7	43.86	20.5	23.4
W294CH	CP -D 294D	Georgetown	DE 318.0	50.86	27.5	23.4
WCEM-FM	LIC-D 292A	Cambridge	MD 292.0	80.97	55.5	25.5
WCEM-FM	CP -N 292A	Cambridge	MD 282.8	86.75	55.5	31.3
WTDK	LIC 296A	Federalburg	MD 317.9	68.03	28.5	39.5
WJSE	LIC-Z 292A	North Cape May	NJ 22.3	97.94	55.5	42.4
WWMX	LIC 293B	Baltimore	MD 312.9	168.11	111.5	56.6
W294BN	LIC 294D	Dover	DE 344.0	101.51	20.5	81.0
WJFK-FM	LIC-D 294B	Manassas	VA 290.3	185.31	96.5	88.8
WTHJ	LIC 293A	Bass River Township	NJ 26.8	164.30	66.5	97.8

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 All separation margins include rounding

\*2<sup>nd</sup> Adjacent waiver requested

**FIGURE 3**

**CHANNEL STUDY DISCUSSION & Waiver Request**

A channel study of the proposed frequency (**FIGURE 3**) reveals 73.807 short-spacing relative to WYPO, Ocean City, MD, for which a 2<sup>nd</sup> adjacent waiver is being requested.

**With respect to WYPO:**

The proposed facility is located within the 60 dBu protected service contour of second-adjacent channel facility WYPO. WYPO is located 2.41 km from the proposed site. WYPO places a 96.47 dBu F[50, 50] service contour at the proposed LPFM site. Using the Undesired-to-Desired method for calculating proposed interference, the proposed interfering contour with respect to WYPO is 136.47 dBu (96.47 + 40) (free space method employed). At 98 watts, the proposed interfering signal would, in the worst case, extend 10.42 meters from the proposed antenna. This “interference zone” would intersect nearby occupied structures. To alleviate this scenario, the applicant proposes use of a Type 2 single bay Nicom BKG-77 antenna which displays reduced downward radiation.

With the RCAGL at 11.0 meters on a 6.1 meter mast atop a 4.9 meter roof, the extent of the interference zone is raised above ground level by at least 5.6 meters (see tabulation, **FIGURE 4**). Adjacent structures are single story.

Based on these findings, the proposed LPFM station will not create any interference to listeners or potential listeners of WYPO. The applicant is requesting a waiver of §73.807 with respect to second adjacent channel short-spaced station WYPO, Ocean City, MD

Freespace Interference Study based on Vertical Radiation Pattern  
Nicom BKG77 single bay

Depression Angle (from COR)	Antenna Relative Field	ERP (watts)	Horiz Dist of Interfering Contour from Tower (m)	Vertical Clearance of Interfering Contour above ground (m)	INT
					Contour = 136.47 dBu
					ERP = 98 watts
					CORAGL = 11 meters
5	0.99	96	10.3	10.0	
10	0.98	94.1	10.0	9.2	
15	0.965	91.3	9.8	8.4	
20	0.95	88.4	9.3	7.6	
25	0.91	81.2	8.6	7.0	
30	0.87	74.2	7.8	6.5	
35	0.83	67.5	7.0	6.1	
40	0.79	61.2	6.3	5.7	
45	0.73	52.2	5.4	5.6	
50	0.67	44	4.5	5.6	
55	0.61	36.5	3.7	5.8	
60	0.55	29.6	2.9	6.1	
65	0.48	22.6	2.1	6.5	

70	0.4	15.7	1.4	7.1
75	0.33	10.7	0.9	7.7
80	0.26	6.6	0.5	8.3
85	0.18	3.2	0.2	9.1
90	0.1	1	0.0	10.0
			Vertical Clearance	5.6

**FIGURE 4**

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**Input protection of any relevant FM Translators or Boosters**

**BERLIN, MD FM TRANSLATORS/BOOSTERS WITHIN 10 KM OF PROPOSED CHANNEL 293**

There are no FM translator authorizations within 10 km of the proposed LPFM transmitter.

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**TOWAIR study**

**DETERMINATION Results**

**Antenna Structures whose total height (AGL) is <= 6.1 meters (20 feet) do not require registration**

**Your Specifications**

**NAD83 Coordinates**

Latitude	38-18-53.9 north
Longitude	075-13-09.4 west

**Measurements (Meters)**

Overall Structure Height (AGL)	6.1
Support Structure Height (AGL)	4.9
Site Elevation (AMSL)	12

**Structure Type**

BMAST - Building with Mast

**Figure 5**

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**RF EXPOSURE** (FCC FMModel)

The proposed 1 bay Type 2 antenna will be mounted on a 6.1 meter mast atop a 4.9 meter building with RCAGL of 11.0 meters above ground level radiating 98 watts H & V (see **FIGURES 6 & 7**). FMModel predicts a worst case maximum ground level exposure of 22.24  $\mu\text{W}/\text{cm}^2$  at 9.2 meters from the base of the supporting mast (at roof level, 107.16  $\mu\text{W}/\text{cm}^2$  4.2 meters from base of mast), well within limits for uncontrolled access. Roof access is restricted and adjacent buildings are single story.



**FIGURE 6**



Concept drawing (not to scale)

**FIGURE 7**