

NATIONAL RADIO ASTRONOMY OBSERVATORY

POST OFFICE BOX 2 GREEN BANK, WV 24944-0002 NRQZ OFFICE TELEPHONE (304) 456-2107 HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276 NRQZ@NRAO.EDU

April 29, 2021 Page 1 of 2 NRQZ ID: 12794_23DEC2020

Gray Television Licensee, LLC c/o Joseph M. Davis, P.E. Chesapeake RF Consultants LLC 207 Old Dominion Road Yorktown, VA 23692

Application Reason/Purpose	Pre-coordination Notification
FCC ULS File Number	Shall be provided by Regulatory Department
Call Sign	WHSV Ch 28
Site Name or Location	WHSV-TV DRT2 Big Mtn
N Latitude	38 36 2.700
W Longitude	78 37 57.400
Ground Elevation (m)	899.2
Antenna Height Above Ground (AGL) (m)	40.80
Antenna Model Number	ERI ETU4U12-ETP3C-28
Antenna Gain (dBi)	8.94
Antenna Orientation ° True North (TN)	84.00
AZ Bearing to GBT °True North	260.353
M-DT [Mechanical Downtilt or Tilt Range]	None
E-DT [Electrical Downtilt or Tilt Range]	None
Freq. Low (MHz)	554
Freq. High (MHz)	560
Emission Designator or Bandwidth (MHz)	DTV
Max. Transmit Output Power (W) / ERPd (W)	1696.00
System Configuration (Attachment)	NRAO FEW - Final Engineering Worksheet
SGRS AERPd limit (W) (Special Condition)	No - Meets SGRS power density limits
NRAO AERPd limit (W) (Special Condition)	Yes – See AERPd limit noted below
Current NRAO NRQZ Case ID / Date	12794 23DEC2020

Dear Applicant:

The National Radio Quiet Zone (NRQZ) office has evaluated this facility to determine the interference impact on the highly sensitive NRAO Green Bank Observatory radio astronomy operations.

NRAO Special Condition Statement:

The National Radio Astronomy Observatory (NRAO), Green Bank, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 0.3 Watts at Azimuth 260.3° True North.

The Sugar Grove Research Station has no objections to this frequency assignment as submitted.



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To meet this Special Condition, the Applicant shall:

- 1. Use the final engineering submitted by the applicant or their designated technical representative indicating that all facilities meet the ERP restriction.
- 2. Arrange for the requested site inspection to verify the implementation of this Special Condition.
- 3. Post a copy of this document and associated attachments at the Transmit facility.
- 4. Provide a Construction Notification as defined by the FCC for your specific radio service.

Regulatory

The NRQZ Office requests that:

- 1. The FCC places the Special Condition on the Station License.
- 2. This Letter of Concurrence be attached to the FCC application.
- 3. The applicant provides the NRQZ Office with notice of its official filing with the FCC per section 47CFR1.924 (a) (2).

The National Radio Astronomy Observatory (NRAO) site located at Green Bank, Pocahontas County, WV, has no objection to this frequency assignment provided the special conditions are met.

The Sugar Grove Research Station, the former Naval Radio Research Observatory (NRRO), located at Sugar Grove, Pendleton County, WV has no objections to this frequency assignment.

This letter constitutes coordination of assignment in the National Radio Quiet Zone as required by the FCC Rules and Regulations 47CFR1.924.

If I may be of assistance, please feel free to contact me.

Sincerest regards,

Paulette W. Woody NRQZ Office Administrator PWW:pww

cc: Joe Davis, Chesapeake RF Consultants, LLC

file: 12794.docx

Attachments: NRAO FEW – Final Engineering Worksheet

Due to the Covid-19 pandemic, original signed concurrence letters will not be mailed to the applicant unless a written request has been made to the NRQZ office. These requests will be honored once normal operations resume.

This concurrence remains valid provided the data contained within is consistent with the applicant's filing at the Commission. Any discrepancy in system parameters, such as geographical coordinates (Latitude, Longitude, AMSL), antenna height above ground level (AGL), antenna gains or directivity (orientation), channel (operating frequency or frequency bands), emission type, and power requires re-coordination. If the Commission has questions regarding the validity of this or any concurrence, please direct inquiries to <u>nrgz@nrao.edu</u> or 304-456-2107.

	NPO7# 12704 (12021-03)					12/23/2020	DATE		
	http://www.pddc.poaa.dov/deomad-w/	eb/#declination	Magn	etic Declination Co	orrection	9.8	° West		
	mp.//www.ngue.noaa.gov/geomag/w		magn			(Value only)	West		
						(value enily)			
	Location: WHSV-TV-DRT2 Big Moun	tain Latitude:		38 36 02	7 (ddmm	ss.s)			
		Longitude:		78 37 57.	4 (ddmm	ss.s)			
		Ground Elev.:		899.	2 Meters	2950.1	Ft		
		Antenna Ht.:		40.	8 Meters	133.9	Ft		
		Frequency:		554 - 56	0 MHz	TV Channel 28			
Ν	IRAO AERP (watts)	0.3	_	watts at	260.3	° True (Фd)			
		Diffraction	_	watts at	260.3	° True			
			_	watts at	260.3	° True			
	Conton Nome on Indianton	1 Unal							
~	Sector Name or Indicator		٦		2				
a. h	Maximum Antenna Gain	ERIE104012-ESP3C-28		ERIET04012-ESP3C-28	s '9 dBd				
C.	Antenna Azimuth (° True or "omni")	84	<u>ара</u> 1 °т	8	<u>у</u> ава 4 °т				
0.	Antenna Azimuth (Mag)	93 /	neM° 5	93	neM° 8	Antenna azimut	th nattern sunnlied is already		
d	Az to GBT on Antenna Pattern	260.3	<u>></u> mag	260	<u>3</u> °	rotated to	the desired orientation		
e.	Antenna Gain to GBT (b - $ f $)	-47.98	2 3 dB	-48.0	dB	Patteri	n is centered at 84°T		
f.	Antenna Gain to GBT Below Maximum	-60.00	dB	-54.8	0 dB	i attori			
q.	. Mechanical Downtilt (Φbt)	() •		<u>0</u> °				
h.	. Loss to GBT Due to Mechanical Downt	tilt () dB		0 dB				
i.	Transmitter Output Power	1696	b watts	169	6 watts				
j.	System Losses: Combiner/Duplexer		dB		dB				
	Lightning Arrestor		dB		dB				
	Main Line	-2.554	dB	-2.55	4 dB				
	RF Filter (combiner)		dB		dB				
	Misc. connectors, etc.		_dB		dB				
j.	System Loss	(2.55) dB	(2.5	5) dB				
k.	. Power to Antenna (ix j)	941.95	<u>watts</u>	941.9	5 watts	Total E	RPd Hpol plus Vpol		
Ι.	Main Beam Power (k x b)	14997.74	watts	4498.0	7 watts	0.000	at 260°T		
m	1. ERPa to GBT (1 x (1 + h)) or (1 x (e - (h + h))) or (1 x (e - (J))) 0.013		0.01	5 watts	0.030	Watts Total to GBT		
	Power at output of duplex	er 1696.00)						
		1696.00)						
						4			
							В		
				θd					
	Enter 1st Obstacle Information provided by NRQZ office A								
		Od = Angle to 1st	Obstac	cle					
	44.53 km to 1st Obstacle	A = Distance to 1s	st Obst	acle in Feet		146096	-		
	<u>3083.99</u> TX AMSL (ft)	B = Ant Ht AMSL	minus I	Ht of 1st Obs	•	-921.4104987			
	4005.4 AMSL 1st Obstacle	$\Theta = \arctan(B/A)$	=	-0.3		horizor			
		A -⊖u value inalCai	ies inat	the first obstacle is	above INE	horizon			
	Effective mechanical downtilt adjustment:								
F	Effective Elevation = Od - Obt cos(Od - O	bt) = 0.()	0	0	0.0			
	Effective Elevation Adjustme	ent = 0.0) °	0.	.0 °	0.0	0		
	Definitions:								
	Φd = Azimuth to GBT								
	Φbt = Azimuth of mechanical beam tilt (verticle)								
	Od = Elevation to 1st obstacle (negativ	e above horizon)							
	ept = Elevation of antenna mechanical	beam tilt (neg. above	norizor	1)					
	Note: No adjustments for electrical beam tilt are required because								
	the pattern data already accounts for this								
	-								

Effective azimuth on horizontal pattern = Φd - Antenna Azimuth (True) {If AZ<0, then add 360} Effective elevation on vertical pattern = Θd - $\Theta bt \cos(\Phi d - \Phi bt)$ {IF ELEV<0, then add 360}

Antenna Gain = HPAT(Eff AZ) + VPAT(Eff ELEV) + Max Gain