



# 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

August 28, 2018  
Page 1 of 2  
NRQZ ID: 10736\_13MAR2017

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	Prior coordination notification
File Number	Shall be provided by applicant
Applicant Name	Addressee
Call Sign	WHSV-TV-DRT2
Site Name or Loc	<b>Big Mountain – Channel 28</b>
Nearest City/State	Near Battle Creek, VA
N Latitude	38 36 05
W Longitude	78 37 56
Ground Elevation (m) / AGL (m)	901 / 96
Freq. Band (MHz)	554 – 560
Emission Designator	DTV
System Configuration	See attached "Final Engineering"
Previous NRAO Coordination No.	NRQZ ID None Listed
Current NRAO Coordination No.	NRQZ ID 10736 REV1_13MAR2017

Dear Applicant:

The National Radio Quiet Zone (NRQZ) has evaluated these facilities to determine the interference impact on our highly sensitive radio astronomy operations.

## **Special Condition:**

The National Radio Astronomy Observatory (NRAO), Green Bank, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 0.24 Watts at Azimuth 260.3 degrees True North.

To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by Joseph Davis, Chesapeake RF Consultants, 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.



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Page 2 of 2

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### 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

file: 10736 WHSV-TV-DRT2 Big Mountain Channel 28.docx

Attachments: Final Engineering

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 [nrqz@nrao.edu](mailto:nrqz@nrao.edu) or 304-456-2107.

NRQZ# 10736 REV1

<http://www.ngdc.noaa.gov/geomag-web/#declination>

7/9/2018 DATE

Magnetic Declination Correction 9.8 ° West  
9° 49' W ± 0° 21' changing by 0° 1' W per year

Location: WHSV-TV-DRT2 Big Mountain Latitude: 38 36 05 (ddmmss.s)  
 Longitude: 78 37 56 (ddmmss.s)  
 Ground Elev.: 901 Meters 2956.0 Ft  
 Antenna Ht.: 96 Meters 315.0 Ft  
 Frequency: 554 - 560 MHz **Channel 28**

NRAO AERP (watts) 0.24 watts at 260.3 ° True (Φd)  
 Scatter                      watts at 260.3 ° True  
                     watts at 260.3 ° True

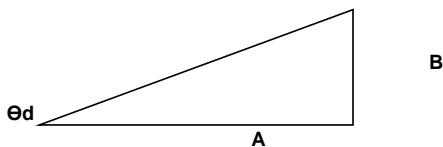
Sector Name or Indicator

1

a. Antenna Type RFS PEPSIL6C-SP-WHSV1 (1.25° ET)  
 b. Maximum Antenna Gain 8.64 dBd  
 c. Antenna Azimuth (° True or "omni") 78 °T  
 Antenna Azimuth (Mag) 87.8 °Mag  
 d. Az to GBT on Antenna Pattern 260.3 °  
 e. Antenna Gain to GBT (b - | f | ) -51.36 dB  
 f. Antenna Gain to GBT Below Maximum -60.00 dB  
 g. Mechanical Downtilt (Φbt) 2 °  
 h. Loss to GBT Due to Mechanical Downtilt -0.3 dB  
 i. Transmitter Output Power 2655 watts  
 j. System Losses: Combiner/Duplexer                      dB  
 Lightning Arrestor                      dB  
 Main Line -1.12 dB  
 RF Filter (combiner)                      dB  
 Misc. connectors, etc.                      dB  
 j. System Loss (1.12) dB  
 k. Power to Antenna (ix j) 2051.47 watts  
 l. Main Beam Power (k x b) 14999.08 watts  
 m. ERPd to GBT (l x (f + h)) or (l x (e - (h + j))) 0.0140 watts \*\*ERP to GBT = 0.001E2\*15000 = 0.015 Watts

**Antenna azimuth patterns supplied  
are already rotated to the desired orientation**

Power at output of duplexer 2655.00  
2655.00



Enter 1st Obstacle Information provided by NRQZ office

44.52 km to 1st Obstacle Θd = Angle to 1st Obstacle  
3271.00 TX AMSL (ft) A = Distance to 1st Obstacle in Feet 146063  
3967.79 AMSL 1st Obstacle B = Ant Ht AMSL minus Ht of 1st Obs -696.7926247  
Θd = arctan(B/A) = -0.27 °

A -Θd value indicates that the first obstacle is above the horizon

A +Θd value indicates that the first obstacle is below the horizon

Effective mechanical downtilt adjustment:

Effective Elevation = Θd - Φbt cos(Φd - Φbt) = 1.7 0.0 0.0  
 Effective Elevation Adjustment = 1.7 ° 0.0 ° 0.0 °

Definitions:

Φd = Azimuth to GBT

Φbt = Azimuth of mechanical beam tilt (verticle)

Θd = Elevation to 1st obstacle (negative above horizon)

Θbt = Elevation of antenna mechanical beam tilt (neg. above horizon)

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&lt;0, then add 360}

Effective elevation on vertical pattern = Θd - Φbt cos(Φd - Φbt) {IF ELEV&lt;0, then add 360}

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