



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

October 24, 2019

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NRQZ ID: 12021-01 29MAR2019

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	WSVF-CD
Site Name or Loc	Massanutten – Channel 36
Nearest City/State	Harrisonburg, VA
N Latitude	38 23 34.8
W Longitude	78 46 11.9
Ground Elevation (m) / AGL (m)	890.6 / 22.6
Freq. Band (MHz)	602 – 608
Emission Designator	DTV
System Configuration	See attached "Final Engineering"
Previous NRAO Coordination No.	NRQZ ID 10737 REV1_13MAR2017
Current NRAO Coordination No.	NRQZ ID 12021-01_29MAR2019

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 4.4 Watts at Azimuth 273.1 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.

Reference Copy - Special Condition Statement



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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: 12021-01 WSVF-CD Massanutten Channel 36.docx

Attachments: Final Engineering Worksheet

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 or 304-456-2107.

Reference Copy - Special Condition Statement

6/7/2019 DATE

NRQZ# 12021-01 / 10737 Massanutten

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

Magnetic Declination Correction

9.7 ° West

(Value only)

Location: WSVF-CD Massanutten Latitude: 38 23 34.8 (ddmmss.s)
 (shared antenna with WHSV-TV DRT1 Ch-34) Longitude: 78 46 11.9 (ddmmss.s)
 Ground Elev.: 890.6 Meters 2921.9 Ft
 Antenna Ht.: 22.6 Meters 74.1 Ft
 Frequency: 602 - 608 MHz **TV Channel 36**

NRAO AERP (watts)

4.4	watts at	273.1 ° True (Φd)
Scatter	watts at	273.1 ° True
	watts at	273.1 ° True

Sector Name or Indicator

	1 - Hpol	2 - Vpol
a. Antenna Type	ERI ETU4U7-ETP40-34/36	ERI ETU4U7-ETP40-34/36
b. Maximum Antenna Gain	11.23 dBd	5.55 dBd
c. Antenna Azimuth (° True or "omni")	93 °T	93 °T
d. Antenna Azimuth (Mag)	102.7 °Mag	102.7 °Mag
e. Az to GBT on Antenna Pattern	260.3 °	260.3 °
f. Antenna Gain to GBT (b - f)	-28.77 dB	-34.45 dB
g. Antenna Gain to GBT Below Maximum	-40.00 dB	-40.00 dB
h. Mechanical Downtilt (Φbt)		
i. Loss to GBT Due to Mechanical Downtilt		
j. Transmitter Output Power	1479 watts	1479 watts
k. System Losses: Combiner/Duplexer	-0.3 dB	-0.3 dB
Lightning Arrestor		
Main Line	-0.868 dB	-0.868 dB
RF Filter		
Misc. connectors, etc.		
System Loss	(1.17) dB	(1.17) dB
l. Power to Antenna (ix j)	1130.23 watts	1130.23 watts
m. Main Beam Power (k x b)	15002.66 watts	4056.66 watts
n. ERPd to GBT (l x (f + h)) or (l x (e - (h + j)))	1.50 watts	0.41 watts

Antenna azimuth pattern supplied is already
rotated to the desired orientation
Pattern is centered at 93°T

Total ERPd Hpol plus Vpol
at 273°T
1.91 Watts Total to GBT

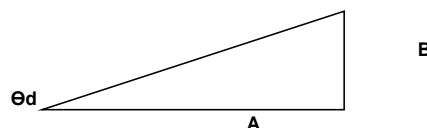
Power at output of duplexer

1380.28

1380.28

1380.28

1380.28



Enter 1st Obstacle Information provided by NRQZ office

Θd = Angle to 1st Obstacle

A = Distance to 1st Obstacle in Feet

B = Ant Ht AMSL minus Ht of 1st Obs

Θd = arctan(B/A) = -0.43 °

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) =

0.0

0.0

0.0

Effective Elevation Adjustment =

0.0 °

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<0, then add 360}

Effective elevation on vertical pattern = Θd - Φbt cos(Φd - Φbt) {If ELEV<0, then add 360}

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