



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

September 29, 2017
Page 1 of 2
NRQZ ID: 10737_13MAR2017

Gray Television Licensee LLC
207 Old Dominion Road
Yorktown, VA 23692

Application Reason/Purpose	Prior coordination notification
File Number	0000025837
Applicant Name	Addressee
Call Sign	WSVF
Site Name or Loc	Massanutten
Nearest City/State	Harrisonburg, VA
N Latitude	38 23 34.5
W Longitude	78 46 12.1
Ground Elevation (m) / AGL (m)	890.6 / 22.6
Freq. Band (MHz)	Channel 36 operating on 602-608 MHz
Emission Designator	DTV
Requested ERPd (W) / Orientation	11.4 kW / ND
Antenna type	ERI AL80 (9.39 dB)
Antenna configuration	Non-directional, Horizontally polarized
System Configuration	Final Engineering is attached
Previous NRAO Coordination No.	NRQZ ID 7965
Current NRAO Coordination No.	NRQZ ID 10737_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 4.2 Watts at Azimuth 273.1° True.

To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by Joseph M. Davis, RF Consultants indicating that all facilities meet the ERP restriction.
2. Arrange for a site inspection to verify the implementation of this Special Condition.
3. Post a copy of this document and associated attachments at the Transmit facility.

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).



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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:ppw

cc: Joseph David, RF Consultants

file: 10737_REV1.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 or 304-456-2107.

NRQZ# 10737/7965<http://www.ngdc.noaa.gov/geomag-web/#declination>8/13/2017

Magnetic Declination Correction

9.7

9° 40' W ± 0° 21' changing by 0° 1' W per year

Location: <u>WSVF</u>	Latitude: <u>38 23 34.5 (ddmmss.s)</u>
<u>Massanutten Mtn</u>	Longitude: <u>78 46 12.1 (ddmmss.s)</u>
<u>Harrisonburg, VA</u>	Ground Elev.: <u>888.4 Meters</u> 2914.7
	Antenna Ht.: <u>22.6 Meters</u> 74.1
	Frequency: <u>602 - 608 MHz</u> Channel 36

NRAO AERP (watts) DTW

4.5

watts at

273.1 ° True (Φd)Scatter

watts at

273.1 ° True

watts at

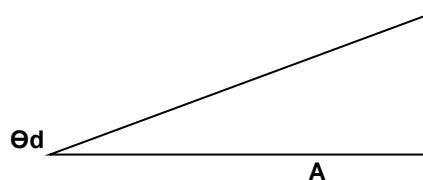
273.1 ° True

Sector Name or Indicator	Configuration
a. Antenna Type	<u>REI AL80</u>
b. Maximum Antenna Gain	<u>9.39 dBd</u>
c. Antenna Azimuth (° True or "omni")	<u>omni °T</u>
Antenna Azimuth (Mag)	<u>omni °Mag</u>
d. Az to GBT on Antenna Pattern	<u>omni °</u>
e. Antenna Gain to GBT (b - f)	<u>9.39 dB</u>
f. Antenna Gain to GBT Below Maximum	<u>0.00 dB</u>
g. Mechanical Downtilt (Φbt)	<u>0 °</u>
h. Loss to GBT Due to Mechanical Downtilt	<u>dB</u>
i. Transmitter Output Power	<u>1988.6 watts</u>
j. System Losses: Combiner/Duplexer	<u>dB</u>
Lightning Arrestor	<u>dB</u>
Main Line	<u>-0.869 dB</u>
RF Filter	<u>dB</u>
Misc. connectors, etc.	<u>dB</u>
j. System Loss	<u>(0.87) dB</u>
k. Power to Antenna (ix j)	<u>1627.97 watts</u>
l. Main Beam Power (k x b)	<u>15000.00 watts</u>
m. ERPd to GBT (l x (f + h)) or (l x (e - (h + j)))	<u>4.18 watts</u>

Power at output of duplexer

1988.601988.60

Note: dBd = dBi - 2.15 dB



Enter 1st Obstacle Information provided by NRQZ office

<u>42.2 km to 1st Obstacle</u>
<u>2988.85 TX AMSL (ft)</u>
<u>4046.51 AMSL 1st Obstacle</u>

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) =

-0.44 °

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

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

138451-1057.664856

Effective mechanical downtilt adjustment:

Effective Elevation = Θd - Φbt cos(Φd - Φbt) =

0.00.00.0

Effective Elevation Adjustment =

0.0 °0.0 °0.0

Definitions:

Φ_d = Azimuth to GBT

Φ_{bt} = Azimuth of mechanical beam tilt (verticle)

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

Θ_{bt} = 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 = Φ_d - Antenna Azimuth (True) {If AZ<0, then add 360}

Effective elevation on vertical pattern = $\Theta_d - \Theta_{bt} \cos(\Phi_d - \Phi_{bt})$ {IF ELEV<0, then add 360}

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

DATE

° West

Ft
Ft

Reference Copy / Approved with Special Conditions

B

°