



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

December 04, 2020
Page 1 of 2
NRQZ ID: 12720_22OCT2020

Jerry Warren
Dominion Energy
707 E Main Street
Richmond, VA 23219

Application Reason/Purpose	Pre-coordination Notification
FCC ULS File Number	N/A
Call Sign	N/A
Site Name or Location	Rockbridge Office and Lexington Substation
Antenna Model Number	Commscope RR-65B-R2
Antenna Gain (dBi)	15.80
Antenna Orientation ° True North (TN)	0, 120, 240
M-DT [Mechanical Downtilt or Tilt Range]	0
E-DT [Electrical Downtilt or Tilt Range]	2
Freq. Low (MHz)	937.6000
Freq. High (MHz)	939.0000
Emission Designator or Bandwidth (MHz)	1.4
Max. Transmit Output Power (W) / ERPd (W)	40
TX (W)/port, Ports/Sector, No. of Sectors	40 / 40, 2, 3
System Configuration (Attachment)	Site Specific Data

SGRS AERPd limit (W) (Special Condition)	None - Meets SGRS power density limits
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NRAO AERPd limit (W) (Special Condition)	Rockbridge Office @ 3165 Watts
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Current NRAO NRQZ Case ID / Date	12720 / 22OCT2020
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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: Rockbridge Office (NRQZ ID 12720-01)

The National Radio Astronomy Observatory (NRAO), Green Bank, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 3165 Watts per 1.4 MHz unit bandwidth at Azimuth 332.3 degrees True North.

The NRAO has no objection to the Lexington Substation facility as submitted and reviewed

The **Sugar Grove Research Station has no objections** to either facility as submitted and reviewed.

Reference Copy - NRAO Special Condition Statement



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To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by Ali Kuzehkanani, FCC Law, indicating that the Rockbridge Office facility meet the ERP restriction.
2. Cellular carriers shall provide MCN and eNB codes for each frequency/technology.
3. Arrange for the requested site inspection to verify the implementation of this Special Condition.
4. Post a copy of this document and associated attachments at the Transmit facility.
5. 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: Ali Kuzehkanani and Liz Sachs, FCC Law

file: .docx

Attachments: Site Specific Data for two (2) facilities

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 - NRAO Special Condition Statement

Reference Copy - NRAO Special Condition Statement

NRQZ#

NRQZ ID 12720-01

11/12/2020 DATE of submission

Declination Date

11/12/2020

Magnetic Declination Correction

9 ° West (Value Only)

Declination

8° 57' W ± 0° 21' changing by 0° 2' W per year

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

Site Name

Rockbridge Office

Location

City/State

East Lexington, VA

Latitude:

37 48 29.8 (dd mm ss.s)

Longitude:

79 25 18.8 (dd mm ss.s)

Ground Elev.:

315.47 Meters (1035.0 FT)

Antenna Ht.:

45.72 Meters (150.0 FT)

Frequency:

937.6 - 939.0 MHz

MCN

eNB

NRAO AERP (watts)

3165

Bandwidth

1.4

Dominant path

Diffraction

watts at

332.3 ° True (Φd)

watts at

332.3 ° True

watts at

332.3 ° True

3165.00 Watts

413.49 Watts

65.0 dBm

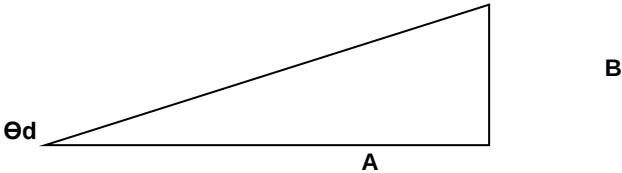
56.2 dBm

8.8 Underlimit

Sector	1A @ +45°	2A @ +45°	3A @+45°	1B @-45°	2B @-45°	3B @- 45°	
a. Antenna Type: Model Number/Port	Commscope RR-65B-R2	Commscope RR-65B-R2	Commscope RR-65B-R2	Commscope RR-65B-R2	Commscope RR-65B-R2	Commscope RR-65B-R2	
Antenna Type: Electrical Downtilt Range	2	2	2	2	2	2	
b. Maximum Antenna Gain	13.25 dBd	13.25 dBd	13.25 dBd	13.42 dBd	13.42 dBd	13.42 dBd	
c. Antenna Azimuth (° True or "omni")	0 °T	120 °T	240 °T	0 °T	120 °T	240 °T	
Antenna Azimuth (Mag)	9.0 °Mag	129.0 °Mag	249.0 °Mag	9.0 °Mag	129.0 °Mag	249.0 °Mag	
d. Az to GBT on Antenna Pattern	332.3 °	212.3 °	92.3 °	332.3 °	212.3 °	92.3 °	
e. Antenna Gain to GBT (b - f)	11.05 dB	-19.25 dB	-9.45 dB	11.12 dB	-18.08 dB	-6.78 dB	
f. Antenna Gain to GBT Below Maximum	-2.20 dB	-32.50 dB	-22.70 dB	-2.30 dB	-31.50 dB	-20.20 dB	
g. Mechanical Downtilt (Φbt)	0 °	0 °	0 °	0 °	0 °	0 °	
h. Loss to GBT Due to Mechanical Downtilt	dB	dB	dB	dB	dB	dB	
i. Transmitter Output Power	20 watts	20 watts	20 watts	20 watts	20 watts	20 watts	
j. System Losses: Combiner/Duplexer							
Lightning Arrestor							
Main Line							
RF Filter	-1	-1	-1	-1	-1	-1	
Misc. connectors, etc.							
j. System Loss	(1.00) dB	(1.00) dB	(1.00) dB	(1.00) dB	(1.00) dB	(1.00) dB	
k. Power to Antenna (ix j)	15.89 watts	15.89 watts	15.89 watts	15.89 watts	15.89 watts	15.89 watts	
l. Main Beam Power (k x b)	335.76 watts	335.76 watts	335.76 watts	349.16 watts	349.16 watts	349.16 watts	
m. ERPd to GBT (l x (f + h)) or (l x (e - (h + j)))	202.32 watts	0.19 watts	1.80 watts	205.60 watts	0.25 watts	3.33 watts	413.49
POLARIZATION Dual polarization							
POLARIZATION Dual polarization							
Power at output of duplexer	15.89	15.89	15.89	15.89	15.89	15.89	
	20.00	20.00	20.00	20.00	20.00	20.00	

NRQZ# NRQZ ID 12720-01

Site Name Rockbridge Office
Location 0
City/State East Lexington, VA



Enter 1st Obstacle Information provided by NRQZ office

11.35 Distance to 1st Obstacle (km)	Θd = Angle to 1st Obstacle	
1185.01 TX AMSL (ft)	A = Distance to 1st Obstacle in Feet	37238
3382.48 AMSL of 1st Obstacle (Ft)	B = Ant Ht AMSL minus Ht of 1st Obs	-2197.473438
	Θd = arctan(B/A) =	-3.38 °
	A -Θd value indicates that the first obstacle is above the horizon	
	A +Θd value indicaes that the first obstacle is below the horizon	

Effective mechanical downtilt adjustment:

Effective Elevation = Θd - Θbt 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 - Θbt cos(Φd - Φbt) {IF ELEV<0, then add 360}

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

3165.00 Watts	65.0 dBm
413.49 Watts	56.2 dBm
	8.8 Underlimit

NRQZ ID	Site Name		Lat N NAD83	Lon W NAD83	MSL (m)		Max TX Pwr (W)	No TX per sector	No TX per facility		Freq Low (MHz)	Freq High (MHz)	Bandwidth BW (MHz)		Max Gain (dBi)	Antenna Model	AGL (m)	AZ ° True	Mechanical-DT	Electrical-DT		Max ERPd of facility (W)	NRAO ERPd Limit (W)
12720-01	Rockbridge Office		37 48 29.8	79 25 18.8	315.47		40	2	6		937.60	939.00	1.4		15.80	Commscope RR-65B-R2	45.72	0, 120, 240	0	2		5561.7	3165
12720-02	Lexington Substation		37 52 02.5	79 25 12.9	351.13		40	2	6		937.60	939.00	1.4		15.80	Commscope RR-65B-R2	36.58	0, 120, 240	0	2		5561.7	None