



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

January 16, 2018
Page 1 of 2
NRQZ ID: 11128_28SEP2017

Virginia Broadcasting LLC
503 East Market Street
Charlottesville, VA 22902-0769

Application Reason/Purpose	Prior coordination notification
File Number	0000032223 / BLDTT-20110110AAC
Applicant Name	Addressee
Call Sign	W22EX-D
Site Name or Loc	Elliot Knob
Nearest City/State	Staunton, VA
N Latitude	38 09 55.5
W Longitude	79 18 43.1
Ground Elevation (m) / AGL (m)	1280 / 15
Freq. Band (MHz)	518 – 524
Emission Designator	DTV
System Configuration	See attached "Final Engineering"
Previous NRAO Coordination No.	NRQZ ID 6219
Current NRAO Coordination No.	NRQZ ID 11128_28SEP2017

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 Statements: NRAO and Sugar Grove Research Station

The **National Radio Astronomy Observatory** (NRAO), Green Bank, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 1415 Watts per 6 MHz unit bandwidth at Azimuth 302.9 degrees True North.

The **Sugar Grove Research Station**, Sugar Grove, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of 5062 Watts per 6 MHz unit bandwidth at Azimuth 4.2 degrees True North.

To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by Donald Everist of Cohen, Dippell and Everist Consulting Engineers, 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.

Reference Copy / Approved with Special Conditions



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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

cc: Donald Everist

file: 11128.docx

Attachments: Final Engineering (2 pages)

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# 11128/6219 Magnetic Declination Correction
<http://www.ngdc.noaa.gov/geomagmodels/IGRFWMM.jsp>
 Location: Elliott Knob, VA Latitude: 38 09 55.5 (ddmmss.s)
 Virginia Broadcasting Longitude: 79 18 43.1 (ddmmss.s)
 Ground Elev.: 4200 Feet AMSL 1280.2 meters
 Antenna Ht.: 49.2 Feet AGL 14.996 meters
 Frequency: 518-524 MHz

Analog _____ watts at 302.9 ° True (Φd)
 DTV Emission limit 1415 watts at 302.9 ° True
 Scatter _____ watts at 302.9 ° True

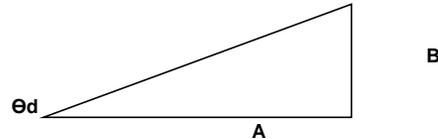
Sector	Configuration: 6219 635-MHz	Configuration: 11128 GBO 518 - 524 MHz
a. Antenna Type	TFU-12DSC-R-C180	Alive Telecom ATC-BCSH8C1R-U1 (1° ET) - Side Mounted
b. Maximum Antenna Gain	12.315 dBd	14.4 dBd
c. Antenna Azimuth (° True or "omni")	124 °T	129 °T
Antenna Azimuth (Mag)	132.5 °Mag	137.5 °Mag
d. Az to GBT* on Antenna Pattern	178.9 °	173.9 °
e. Antenna Gain to GBT (b - f)	12.32 dB	14.40 dB
f. Antenna Gain to GBT Below Maximum	dB	dB
g. Mechanical Downtilt (Φbt)	°	0 °
h. Loss to GBT Due to Mechanical Downtilt	0 dB	dB
i. Transmitter Output Power	880 watts	1208 watts
j. System Losses: Combiner/Duplexer		0
Lightning Arrestor		0
Main Line		-0.563
RF Filter		0
Misc. connectors, etc.		0
j. System Loss	0.00 dB	(0.56) dB
k. Power to Antenna (ix j)	880.00 watts	1061.13 watts
l. Max ERP of System	15000.00 watts	15000.00 watts
m. **ERPd to GBT (l x (f + h)) or (l x (e - (h + j)))	393.00 watts	184.40 watts

6219: RELATIVE FIELD AT 303 DEGREES = 0.162
 **ERP to GBT = (0.162^2)*15,000 = 393 Watts

11128: Relative field at 302 degrees is 0.111
 **ERP to GBT = 0.111e2*15,000 = 184.4 Watts

Power at input to hardline: 880.00 1208.00
 Power at bottom jumper: 880.00 1208.00

* GBT = the Robert C. Byrd Green Bank Telescope



Enter 1st Obstacle Information:

0.19 km to 1st Obstacle
 4249.2 TX AMSL
 4455.54 AMSL 1st Obstacle

Θd = Angle to 1st Obstacle
 A = Distance to 1st Obstacle in Feet 623
 B = Ant Ht AMSL minus Ht of 1st Obs -206.34
 Θd = arctan(B/A) = -18.32 °
 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 - Θbt cos(Φd - Φbt) = 0.0 0.0 0.0
 Effective Elevation Adjustment = 0 ° 0 ° 0 °

Definitions:
 Φd = Azimuth to GBT
 Φbt = Azimuth of mechanical beam tilt
 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

12/8/2017

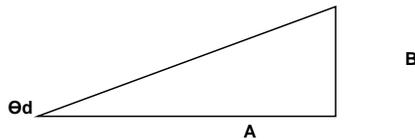
NRQZ# 11128/6219 Magnetic Declination Correction 8.5 ° West
<http://www.ngdc.noaa.gov/geomagmodels/IGRFWMM.jsp>
 Location: Elliott Knob, VA Latitude: 38 09 55.5 (ddmmss.s)
Virginia Broadcasting Longitude: 79 18 43.1 (ddmmss.s)
Ground Elev.: 4200 Feet AMSL 1280.2 meters
Antenna Ht.: 49.2 Feet AGL 14.996 meters
Frequency: 518-524 MHz

DTV Emission limit 5062 watts at 4.2 ° True (Φd)
watts at 4.2 ° True
watts at 4.2 ° True

Sector

518 - 524 MHz	
	Alive Telecom ATC-BCSH8C1R-U1 (1° ET) - Side Mounted
	<u>14.4 dBd</u>
a. Antenna Type	<u>129 °T</u>
b. Maximum Antenna Gain	<u>137.5 °Mag</u>
c. Antenna Azimuth (° True or "omni")	<u>235.2 °</u>
Antenna Azimuth (Mag)	<u>-4.67 dB</u>
d. Az to GBT* on Antenna Pattern	<u>-19.07 dB</u>
e. Antenna Gain to GBT (b - f)	<u>0 °</u>
f. Antenna Gain to GBT Below Maximum	<u>dB</u>
g. Mechanical Downtilt (Φbt)	<u>1208 watts</u>
h. Loss to GBT Due to Mechanical Downtilt	<u>0</u>
i. Transmitter Output Power	<u>0</u>
j. System Losses: Combiner/Duplexer	<u>-0.563</u>
Lightning Arrestor	<u>0</u>
Main Line	<u>0</u>
RF Filter	<u>0</u>
Misc. connectors, etc.	<u>(0.56) dB</u>
j. System Loss	<u>1061.13 watts</u>
k. Power to Antenna (ix j)	<u>15000.00 watts</u>
l. Max ERP of System	<u>4537.50 watts</u>
m. **ERPd to GBT (l x (f + h) or (l x (e - (h + j))))	

Relative field at 4.2 degrees is 0.550
 **ERP to SGRS = 0.550e2*15,000 = 4537.5 Watts
 Power at input to hardline: 1208.00
 Power at bottom jumper: 1208.00



Enter 1st Obstacle Information:

21.6 km to 1st Obstacle
4249.2 TX AMSL
3994.4 AMSL 1st Obstacle

Θd = Angle to 1st Obstacle 70866
 A = Distance to 1st Obstacle in Feet 254.8
 B = Ant Ht AMSL minus Ht of 1st Obs
 Θd = arctan(B/A) = 4.20 °
 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 °

Definitions:

- Φd = Azimuth to GBT
- Φbt = Azimuth of mechanical beam tilt
- Θd = Elevation to 1st obstacle (negative above horizon)
- Θbt = Elevation of antenna mechanical beam tilt (neg. above horizon)

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

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