

## **ENGINEERING EXHIBIT**

### **Application for Minor Modification of Digital Low Power Television Station Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

W22CY Clarksburg, WV

Facility ID 125359

Ch. 22 (digital) 3.5 kW

*Gray Television Licensee, LLC* (“Gray”) is the licensee of analog Low Power Television station W22CY, Channel 22, Clarksburg WV, Facility ID 125359 (BLTTTL-20060120ADM). A Construction Permit (“CP”, 0000068832) authorizes W22CY to flashcut to digital operation on its current Channel 22 at 15 kW effective radiated power (“ERP”) with a nondirectional antenna. *Gray* herein seeks a minor modification of the flashcut CP to specify a decrease in ERP to 3.5 kW and use of a directional transmitting antenna. No change in site location or antenna height is proposed.

As with the current authorization, the W22CY flashcut facility will utilize the tower structure associated with FCC Antenna Structure Registration number 1034466, located 5.0 km from the W22CY licensed analog site. The proposed W22CY antenna will be side-mounted on the tower and no change to the overall structure height will result.

The proposed antenna is a Kathrein model K723147 1x2 having horizontal polarization. The ERP is 3.5 kW using a “full service” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1. Figure 2 depicts the relevant coverage contours of the licensed analog facility (74 dB $\mu$ ) and those of the current flashcut CP and proposed digital facilities (51 dB $\mu$ ), demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69<sup>1</sup> shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. FCC processing of this proposal is requested using a **1.0 km cell size and 0.2 km terrain profile increment**. The results, summarized in Table 1, show that any new interference does not exceed the FCC's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

### **Human Exposure to Radiofrequency Electromagnetic Field**

The proposed facility was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number. 65. Based on OET-65 equation (10) and 20 percent antenna relative field in downward elevations (pattern data shows less than 20 percent relative field at angles 30 to 90 degrees below the antenna), the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is  $10.7 \mu\text{W}/\text{cm}^2$ , which is 3.1 percent of the general population / uncontrolled maximum permissible exposure limit. This is below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field.

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<sup>1</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 1 km cell size, and 0.2 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC's implementation of TVStudy show excellent correlation.

**Engineering Exhibit**  
**Gray Television Licensee, LLC (W22CY)**  
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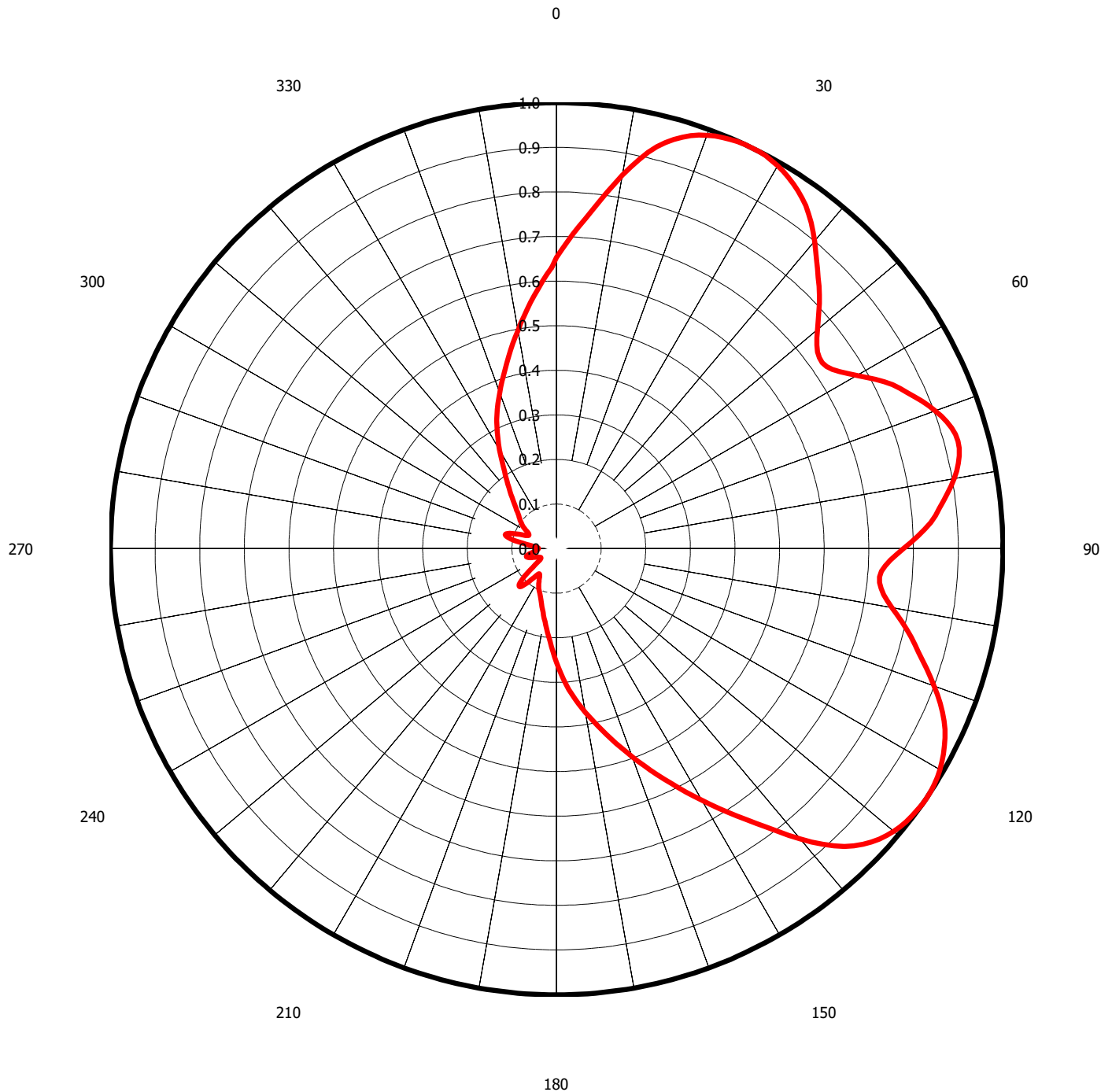
List of Attachments

|           |   |
|-----------|---|
| Figure 1  | Antenna Azimuthal Pattern   |
| Figure 2  | Coverage Contour Comparison   |
| Table 1   | TVStudy Analysis of Proposal  |
| Form 2100 | Saved Version of Engineering Sections from FCC Form at Time of Upload |

**Chesapeake RF Consultants, LLC**

|                       |                    |              |
|-----------------------|--------------------|--------------|
| Joseph M. Davis, P.E. | May 18, 2021       |              |
| 207 Old Dominion Road | Yorktown, VA 23692 | 703-650-9600 |

**Azimuth Pattern - Relative Field  
(True North)**



**Figure 1**  
**Antenna Azimuthal Pattern**  
**W22CY-D Clarksburg, WV**  
**Facility ID 125359**  
**Ch. 22 3.5 kW Directional**

prepared for  
**Gray Television Licensee, LLC**

May, 2021

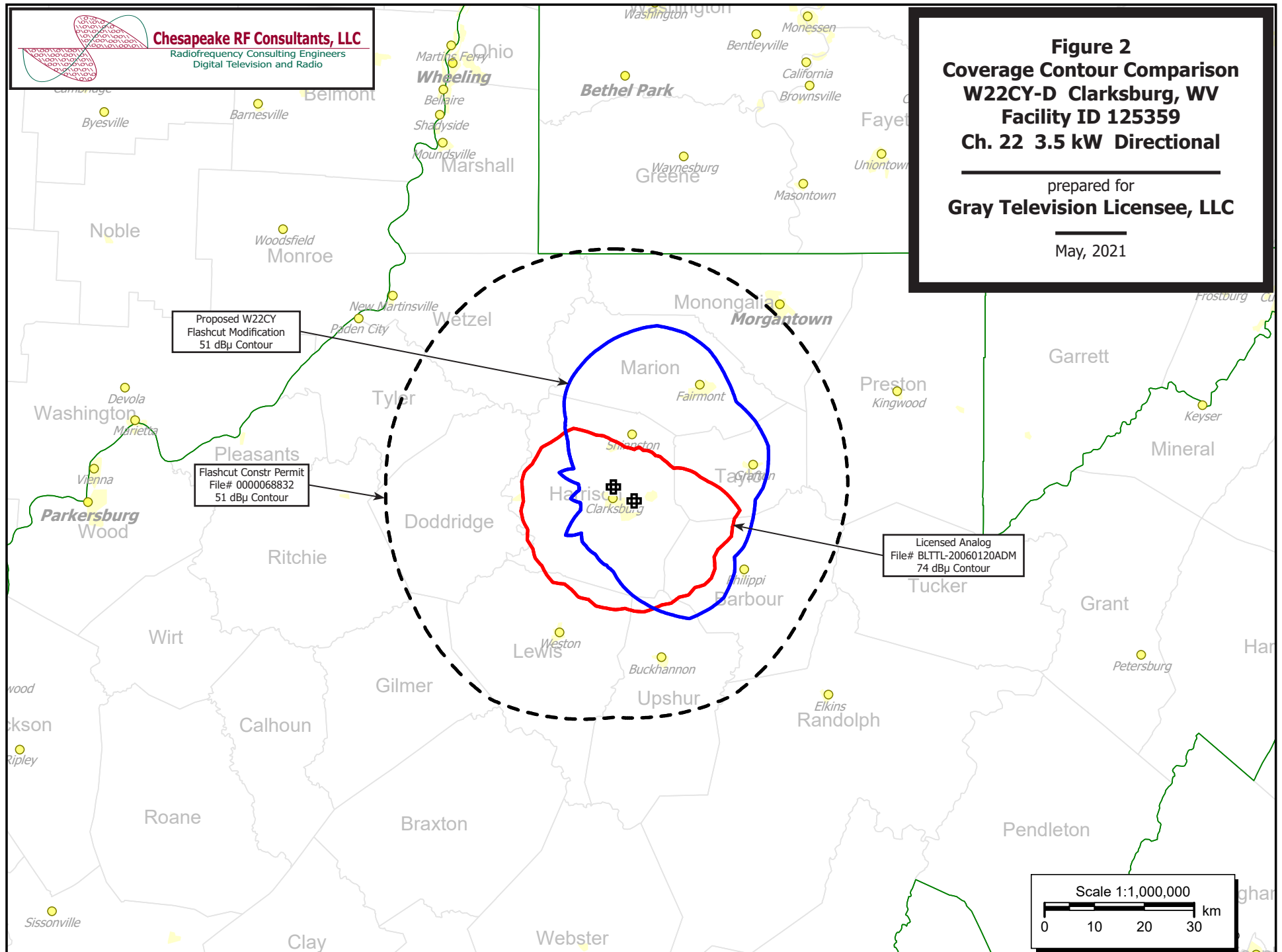


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 2**  
**Coverage Contour Comparison**  
**W22CY-D Clarksburg, WV**  
**Facility ID 125359**  
**Ch. 22 3.5 kW Directional**

prepared for  
**Gray Television Licensee, LLC**

May, 2021



# **Table 1 W22CY TVStudy Analysis of Proposal** (page 1 of 4)



tvstudy v2.2.5 (4uoc83)  
Database: localhost, Study: W22CY prop mod #11290, Model: Longley-Rice  
Start: 2021.05.18 09:29:45

Study created: 2021.05.18 09:29:44

Study build station data: LMS TV 2021-05-14

Proposal: W22CY D22 LD APP CLARKSBURG, WV  
File number: W22CY prop mod  
Facility ID: 125359  
Station data: User record  
Record ID: 3635  
Country: U.S.

Build options:  
Protect pre-transition records not on baseline channel

Search options:  
Baseline record excluded if station has CP

Stations potentially affected by proposal:

| IX  | Call    | Chan | Svc | Status | City, State       | File Number        | Distance |
|-----|---------|------|-----|--------|-------------------|--------------------|----------|
| No  | WJW     | D21  | LD  | CP     | CLEVELAND, OH     | BDRTCDT20101123AOJ | 184.9 km |
| No  | WBNS-TV | D21  | DT  | LIC    | COLUMBUS, OH      | BLCDT20021025ABK   | 241.6    |
| No  | WSSS-LP | D21  | LD  | CP     | STEUBENVILLE, OH  | BDISDTL20121022AAR | 120.3    |
| No  | WPNT    | D21  | DT  | LIC    | PITTSBURGH, PA    | BLANK0000112577    | 135.9    |
| No  | WWCW    | D21  | DT  | LIC    | LYNCHBURG, VA     | BLANK0000080987    | 228.6    |
| Yes | W21EB-D | D21  | LD  | CP     | CLARKSBURG, WV    | BLANK0000072099    | 5.0      |
| No  | WHWV-LD | D21z | LD  | CP     | Huntington, WV    | BLANK0000143752    | 203.3    |
| No  | WHWV-LD | D21z | LD  | LIC    | Huntington, WV    | BLANK0000143055    | 173.8    |
| No  | W24DS-D | D21  | LD  | CP     | PARKERSBURG, WV   | BLANK0000051781    | 105.2    |
| No  | W23DR-D | D21  | LD  | CP     | ROMNEY, WV        | BLANK0000054636    | 139.9    |
| No  | WCVN-TV | D22  | DT  | LIC    | COVINGTON, KY     | BLANK0000087399    | 360.0    |
| No  | WMPB    | D22  | DT  | LIC    | BALTIMORE, MD     | BLANK0000107690    | 306.6    |
| No  | WMPB    | D22  | DT  | CP     | BALTIMORE, MD     | BLANK0000143850    | 306.6    |
| No  | WBOC-LD | D22  | LD  | CP     | Cambridge, MD     | BLANK0000140180    | 416.0    |
| No  | WUVC-DT | D22  | DT  | LIC    | FAYETTEVILLE, NC  | BLANK0000125505    | 438.0    |
| No  | WECY-LD | D22  | LD  | LIC    | CORNING, NY       | BLANK0000024397    | 418.8    |
| No  | WVPX-TV | D22  | DT  | LIC    | AKRON, OH         | BLANK0000080180    | 222.1    |
| No  | WBGU-TV | D22  | DT  | LIC    | BOWLING GREEN, OH | BLANK0000063785    | 364.8    |
| No  | W22DE   | N22+ | TX  | LIC    | DAYTON, OH        | BLTTL20100511AAU   | 339.2    |
| No  | WOCB-CD | D22  | DC  | LIC    | MARION, OH        | BLANK0000072129    | 257.1    |
| No  | WTOO-CD | D22  | DC  | LIC    | BOLIVAR, PA       | BLANK0000099914    | 166.2    |
| No  | W22FJ-D | D22  | LD  | LIC    | DUBOIS, PA        | BLANK0000144215    | 247.2    |
| No  | WOLF-TV | D22  | DT  | LIC    | HAZLETON, PA      | BLANK0000086376    | 433.3    |
| No  | WJAC-TV | D22  | LD  | LIC    | JOHNSTOWN, PA     | BLCDT20110105ABC   | 214.9    |
| No  | WJAC-TV | D22  | LD  | LIC    | JOHNSTOWN, PA     | BLCDT20101105AAU   | 214.6    |
| Yes | WWKH-CD | D22  | DC  | CP     | PITTSBURG, PA     | BLANK0000127565    | 85.2     |
| Yes | WWKH-CD | D22  | DC  | LIC    | PITTSBURG, PA     | BLANK0000079948    | 85.2     |
| No  | WTAE-TV | D22  | LD  | LIC    | PITTSBURGH, PA    | BLANK0000088086    | 131.4    |
| No  | WKPT-CD | D22  | DC  | LIC    | KINGSPORT, TN     | BLDTA20120420ACJ   | 365.7    |
| No  | WCVE-TV | D22  | DT  | LIC    | RICHMOND, VA      | BLANK0000112529    | 310.7    |
| No  | W22EX-D | D22  | LD  | LIC    | STAUNTON, VA      | BLANK0000055155    | 154.6    |
| No  | WSAZ-TV | D22  | DT  | LIC    | HUNTINGTON, WV    | BLANK0000100249    | 184.5    |
| No  | W22CV-D | D22  | LD  | LIC    | MOOREFIELD, WV    | BLDTT20120608ABX   | 128.7    |
| No  | W22ES-D | D22  | LD  | CP     | SUTTON, WV        | BNPDTL20100514AAM  | 81.7     |
| No  | WDVM-TV | D23  | DT  | LIC    | HAGERSTOWN, MD    | BLANK0000080408    | 208.0    |
| No  | WDVM-TV | D23  | DT  | APP    | HAGERSTOWN, MD    | BLANK0000127595    | 216.9    |
| No  | WWHO    | D23  | DT  | LIC    | CHILLICOTHE, OH   | BLANK0000129743    | 239.9    |
| No  | WPXI    | D23  | DT  | LIC    | PITTSBURGH, PA    | BLANK0000080213    | 132.4    |
| No  | W23DR-D | D23  | LD  | LIC    | ROMNEY, WV        | BLDTT20090609AAZ   | 139.9    |
| No  | WIIC-LD | N29+ | TX  | LIC    | PITTSBURGH, PA    | BLTTL19981230JB    | 131.4    |

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D22  
Mask: Full Service

**Table 1 W22CY TVStudy Analysis of Proposal**  
(page 2 of 4)



Latitude: 39 18 2.00 N (NAD83)  
 Longitude: 80 20 36.00 W  
 Height AMSL: 437.4 m  
 HAAT: 0.0 m  
 Peak ERP: 3.50 kW  
 Antenna: KAT-K723147 1X2 (ID 1001019) 75.0 deg  
 Elev Pattn: Generic

49.6 dBu contour:

| Azimuth | ERP     | HAAT   | Distance |
|---------|---------|--------|----------|
| 0.0 deg | 1.51 kW | 88.4 m | 31.5 km  |
| 45.0    | 2.42    | 80.9   | 32.9     |
| 90.0    | 2.18    | 76.5   | 31.7     |
| 135.0   | 3.11    | 93.2   | 35.8     |
| 180.0   | 0.233   | 64.2   | 18.7     |
| 225.0   | 0.050   | 83.5   | 14.2     |
| 270.0   | 0.008   | 57.1   | 7.5      |
| 315.0   | 0.058   | 81.4   | 14.6     |

Database HAAT does not agree with computed HAAT  
 Database HAAT: 0 m Computed HAAT: 78 m

Distance to Canadian border: 316.0 km

Distance to Mexican border: 2138.5 km

Conditions at FCC monitoring station: Laurel MD  
 Bearing: 91.7 degrees Distance: 303.6 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
 Bearing: 280.5 degrees Distance: 2122.2 km

Study cell size: 1.00 km

Profile point spacing: 0.20 km

Maximum new IX to full-service and Class A: 0.50%  
 Maximum new IX to LPTV: 2.00%

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 Interference to BLANK0000072099 CP scenario 1

| Desired:           | Call    | Chan            | Svc | Status          | City, State       | File Number       | Distance       |  |  |
|--------------------|---------|-----------------|-----|-----------------|-------------------|-------------------|----------------|--|--|
|                    | W21EB-D | D21             | LD  | CP              | CLARKSBURG, WV    | BLANK0000072099   |                |  |  |
| Undesireds:        | W22CY   | D22             | LD  | APP             | CLARKSBURG, WV    | W22CY prop mod    | 5.0 km         |  |  |
|                    | W20DY-D | D20             | LD  | CP              | ROANOKE, WV       | BNPDTL20100514AAR | 40.4           |  |  |
|                    | WMPT    | D21             | DT  | LIC             | ANNAPOLIS, MD     | BLANK0000084314   | 319.1          |  |  |
|                    | WBNS-TV | D21             | DT  | LIC             | COLUMBUS, OH      | BLCDT20021025ABK  | 246.4          |  |  |
|                    | WPNT    | D21             | DT  | LIC             | PITTSBURGH, PA    | BLANK0000112577   | 137.8          |  |  |
|                    | WHWV-LD | D21z            | LD  | CP              | Huntington, WV    | BLANK0000143752   | 205.6          |  |  |
|                    | WWKH-CD | D22             | DC  | CP              | PITTSBURGH, PA    | BLANK0000127565   | 84.5           |  |  |
| Service area       |         | Terrain-limited |     | IX-free, before |                   | IX-free, after    | Percent New IX |  |  |
| 5333.2             |         | 195,137         |     | 4976.5          |                   | 179,407           | 0.04 0.14      |  |  |
|                    |         | 5081.9          |     | 181,946         |                   |                   |                |  |  |
| Undesired          |         |                 |     | Total IX        | Unique IX, before | Unique IX, after  |                |  |  |
| W22CY D22 LD APP   |         |                 |     | 2.0             | 252               | 2.0               | 252            |  |  |
| W20DY-D D20 LD CP  |         |                 |     | 8.0             | 64                | 4.0               | 45             |  |  |
| WBNS-TV D21 DT LIC |         |                 |     | 15.9            | 162               | 7.9               | 59             |  |  |
| WPNT D21 DT LIC    |         |                 |     | 93.5            | 2,183             | 81.6              | 2,061          |  |  |

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 Interference to BLANK0000127565 CP scenario 1

| Desired:    | Call    | Chan | Svc | Status | City, State    | File Number     | Distance |
|-------------|---------|------|-----|--------|----------------|-----------------|----------|
|             | WWKH-CD | D22  | DC  | CP     | PITTSBURGH, PA | BLANK0000127565 |          |
| Undesireds: | W22CY   | D22  | LD  | APP    | CLARKSBURG, WV | W22CY prop mod  | 85.2 km  |
|             | WPNT    | D21  | DT  | LIC    | PITTSBURGH, PA | BLANK0000112577 | 77.1     |

**Table 1 W22CY TVStudy Analysis of Proposal**  
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|         |     |    |     |                |                 |       |
|---------|-----|----|-----|----------------|-----------------|-------|
| WMPB    | D22 | DT | LIC | BALTIMORE, MD  | BLANK0000107690 | 250.2 |
| WVPX-TV | D22 | DT | LIC | AKRON, OH      | BLANK0000080180 | 211.4 |
| WTOO-CD | D22 | DC | LIC | BOLIVAR, PA    | BLANK0000099914 | 81.0  |
| WSAZ-TV | D22 | DT | LIC | HUNTINGTON, WV | BLANK0000100249 | 266.7 |
| WPXI    | D23 | DT | LIC | PITTSBURGH, PA | BLANK0000080213 | 73.8  |

| Service area   | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|----------------|-----------------|-----------------|----------------|----------------|
| 6634.5 903,816 | 6335.1 872,654  | 6228.2 837,633  | 6220.2 837,346 | 0.13 0.03      |

| Undesired          | Total IX    | Unique IX, before | Unique IX, after |
|--------------------|-------------|-------------------|------------------|
| W22CY D22 LD APP   | 22.9 1,441  | 8.0 287           |                  |
| WPNT D21 DT LIC    | 37.0 13,347 | 5.0 1,616         |                  |
| WVPX-TV D22 DT LIC | 30.9 7,598  | 5.0 3,240         |                  |
| WTOO-CD D22 DC LIC | 30.9 3,145  | 19.0 2,830        |                  |
| WSAZ-TV D22 DT LIC | 16.0 714    | 3.0 171           |                  |
| WPXI D23 DT LIC    | 61.0 26,019 | 21.0 13,549       |                  |

Interference to BLANK0000079948 LIC scenario 1

| Desired:    | Call    | Chan | Svc | Status | City, State    | File Number     | Distance |
|-------------|---------|------|-----|--------|----------------|-----------------|----------|
|             | WWKH-CD | D22  | DC  | LIC    | PITTSBURGH, PA | BLANK0000079948 |          |
| Undesireds: | W22CY   | D22  | LD  | APP    | CLARKSBURG, WV | W22CY prop mod  | 85.2 km  |
|             | WPNT    | D21  | DT  | LIC    | PITTSBURGH, PA | BLANK0000112577 | 77.1     |
|             | WMPB    | D22  | DT  | LIC    | BALTIMORE, MD  | BLANK0000107690 | 250.2    |
|             | WVPX-TV | D22  | DT  | LIC    | AKRON, OH      | BLANK0000080180 | 211.4    |
|             | WTOO-CD | D22  | DC  | LIC    | BOLIVAR, PA    | BLANK0000099914 | 81.0     |
|             | WSAZ-TV | D22  | DT  | LIC    | HUNTINGTON, WV | BLANK0000100249 | 266.7    |
|             | WPXI    | D23  | DT  | LIC    | PITTSBURGH, PA | BLANK0000080213 | 73.8     |

| Service area   | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|----------------|-----------------|-----------------|----------------|----------------|
| 3707.1 413,986 | 3422.9 391,006  | 3347.7 381,745  | 3345.7 381,740 | 0.06 0.00      |

| Undesired          | Total IX   | Unique IX, before | Unique IX, after |
|--------------------|------------|-------------------|------------------|
| W22CY D22 LD APP   | 3.0 5      | 2.0 5             |                  |
| WPNT D21 DT LIC    | 23.0 4,120 | 3.0 149           |                  |
| WVPX-TV D22 DT LIC | 10.0 742   | 1.0 148           |                  |
| WTOO-CD D22 DC LIC | 45.1 3,673 | 38.1 1,875        |                  |
| WSAZ-TV D22 DT LIC | 4.0 135    | 3.0 131           |                  |
| WPXI D23 DT LIC    | 29.1 6,946 | 7.0 1,470         |                  |

Interference to proposal scenario 1  
7.53% interference received

| Desired:    | Call    | Chan | Svc | Status | City, State    | File Number      | Distance |
|-------------|---------|------|-----|--------|----------------|------------------|----------|
|             | W22CY   | D22  | LD  | APP    | CLARKSBURG, WV | W22CY prop mod   |          |
| Undesireds: | W21EB-D | D21  | LD  | CP     | CLARKSBURG, WV | BLANK0000072099  | 5.0 km   |
|             | WMPB    | D22  | DT  | LIC    | BALTIMORE, MD  | BLANK0000107690  | 306.6    |
|             | WVPX-TV | D22  | DT  | LIC    | AKRON, OH      | BLANK0000080180  | 222.1    |
|             | WJAC-TV | D22  | LD  | LIC    | JOHNSTOWN, PA  | BLCDT20110105ABC | 214.9    |
|             | WWKH-CD | D22  | DC  | CP     | PITTSBURGH, PA | BLANK0000127565  | 85.2     |
|             | WSAZ-TV | D22  | DT  | LIC    | HUNTINGTON, WV | BLANK0000100249  | 184.5    |

| Service area   | Terrain-limited | IX-free        | Percent IX |
|----------------|-----------------|----------------|------------|
| 2035.5 136,068 | 1939.3 131,415  | 1824.4 121,520 | 5.93 7.53  |

| Undesired          | Total IX   | Unique IX  | Prct Unique IX |
|--------------------|------------|------------|----------------|
| W21EB-D D21 LD CP  | 52.6 4,872 | 33.7 4,382 | 1.74 3.33      |
| WVPX-TV D22 DT LIC | 23.8 441   | 7.9 271    | 0.41 0.21      |
| WWKH-CD D22 DC CP  | 28.7 1,953 | 21.7 1,875 | 1.12 1.43      |
| WSAZ-TV D22 DT LIC | 42.6 3,263 | 25.7 2,845 | 1.33 2.16      |

Interference to proposal scenario 2  
6.10% interference received

| Desired:    | Call    | Chan | Svc | Status | City, State    | File Number     | Distance |
|-------------|---------|------|-----|--------|----------------|-----------------|----------|
|             | W22CY   | D22  | LD  | APP    | CLARKSBURG, WV | W22CY prop mod  |          |
| Undesireds: | W21EB-D | D21  | LD  | CP     | CLARKSBURG, WV | BLANK0000072099 | 5.0 km   |



**Table 1 W22CY TVStudy Analysis of Proposal**  
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|              |            |                 |         |                |                  |                 |
|--------------|------------|-----------------|---------|----------------|------------------|-----------------|
| WMPB         | D22        | DT              | LIC     | BALTIMORE, MD  | BLANK0000107690  | 306.6           |
| WVPX-TV      | D22        | DT              | LIC     | AKRON, OH      | BLANK0000080180  | 222.1           |
| WJAC-TV      | D22        | LD              | LIC     | JOHNSTOWN, PA  | BLCDT20110105ABC | 214.9           |
| WSAZ-TV      | D22        | DT              | LIC     | HUNTINGTON, WV | BLANK0000100249  | 184.5           |
|              |            |                 |         |                |                  |                 |
| Service area |            | Terrain-limited |         | IX-free        |                  | Percent IX      |
| 2035.5       | 136,068    | 1939.3          | 131,415 | 1846.1         | 123,395          | 4.81 6.10       |
|              |            |                 |         |                |                  |                 |
| Undesired    |            | Total IX        |         | Unique IX      |                  | Prcnt Unique IX |
| W21EB-D      | D21 LD CP  | 52.6            | 4,872   | 34.7           | 4,382            | 1.79 3.33       |
| WVPX-TV      | D22 DT LIC | 23.8            | 441     | 8.9            | 283              | 0.46 0.22       |
| WSAZ-TV      | D22 DT LIC | 42.6            | 3,263   | 27.7           | 2,855            | 1.43 2.17       |

**Channel and Facility Information**

| Section     | Question      | Response |
|-------------|---------------|----------|
| Facility ID | 125359        |          |
| State       | West Virginia |          |
| City        | CLARKSBURG    |          |
| LPD Channel | 22            |          |

**Antenna Location Data**

| Section                               | Question  | Response                              |
|---------------------------------------|---|---------------------------------------|
| <b>Antenna Structure Registration</b> | Do you have an FCC Antenna Structure Registration (ASR) Number? | Yes                                   |
|                                       | ASR Number  | 1034466                               |
| <b>Coordinates (NAD83)</b>            | Latitude  | 39° 18' 02.0" N+                      |
|                                       | Longitude   | 080° 20' 36.0" W-                     |
|                                       | Structure Type  | TOWER-A free standing or guyed struct |
|                                       | Overall Structure Height  | 192.7 meters                          |
|                                       | Support Structure Height  | 182.9 meters                          |
|                                       | Ground Elevation (AMSL)   | 414.5 meters                          |
| <b>Antenna Data</b>                   | Height of Radiation Center Above Ground Level                   | 22.9 meters                           |
|                                       | Height of Radiation Center Above Mean Sea Level                 | 437.4 meters                          |
|                                       | Effective Radiated Power  | 3.5 kW                                |

## Antenna Technical Data

| Section                        | Question  | Response           |
|--------------------------------|---|--------------------|
| Antenna Type                   | Antenna Type  | Directional Custom |
|                                | Do you have an Antenna ID?  | Yes                |
|                                | Antenna ID  | 1001019            |
| Antenna Manufacturer and Model | Manufacturer:   | KAT                |
|                                | Model   | K723147 1X2        |
|                                | Rotation  | 75 degrees         |
|                                | Electrical Beam Tilt  | Not Applicable     |
|                                | Mechanical Beam Tilt  | Not Applicable     |
|                                | toward azimuth  |                    |
|                                | Polarization  | Horizontal         |
| Elevation Radiation Pattern    | Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt? | No                 |
|                                | Uploaded file for elevation antenna (or radiation) pattern data   |                    |
|                                | Out-of-Channel Emission Mask:   | Full Service       |

### Directional Antenna Relative Field Values (Pre-rotated Pattern)

| Degree | Value | Degree | Value | Degree | Value | Degree | Value |
|--------|-------|--------|-------|--------|-------|--------|-------|
| 0      | .931  | 90     | .431  | 180    | .070  | 270    | .431  |
| 10     | .852  | 100    | .317  | 190    | .045  | 280    | .570  |
| 20     | .727  | 110    | .199  | 200    | .048  | 290    | .743  |
| 30     | .832  | 120    | .129  | 210    | .119  | 300    | .943  |
| 40     | .960  | 130    | .095  | 220    | .069  | 310    | 1.00  |
| 50     | 1.00  | 140    | .069  | 230    | .095  | 320    | .960  |
| 60     | .943  | 150    | .119  | 240    | .129  | 330    | .832  |
| 70     | .742  | 160    | .048  | 250    | .199  | 340    | .727  |
| 80     | .570  | 170    | .045  | 260    | .317  | 350    | .850  |

### Additional Azimuths

| Degree | V <sub>A</sub> |
|--------|----------------|
|--------|----------------|