THOMAS M. ECKELS, PE
STEPHEN S. LOCKWOOD, PE
DAVID J. PINION, PE
ERIK C. SWANSON, PE

THOMAS S. GORTON, PE
MICHAEL H. MEHIGAN, PE

JAMES B. HATFIELD, PE
BENJAMIN F. DAWSON III, PE
CONSULTANTS

HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
9500 GREENWOOD AVE. N.
SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151
FACSIMILE (206) 789-9834
E-MAIL hatdaw@hatdaw.com

MAURY L. HATFIELD, PE
(1942-2009)
PAUL W. LEONARD, PE
(1925-2011)

Engineering Statement
Minor Modification of WMBC-TV
Channel 18 at Newton, New Jersey
November 2017

Expansion Application

This Engineering Statement has been prepared on behalf of Mountain Broadcasting Corporation, licensee of digital television station WMBC-TV at Newton, New Jersey. This application specifies a minor modification of the licensed WMBC-TV facility, including a transmitter site change.

Compliance with §73.622(f) *DTV maximum power and antenna heights*

Processing is requested pursuant to the provisions of §73.622(f)(5), which allows for technical facilities up to those needed to provide the same geographic coverage as the largest station within the market.

The table below demonstrates that the geographic coverage of the proposed noise limited contour will not exceed that of the largest station within the New York DMA.

	Geographic Coverage (km^2)
WMBC-TV 700 kW at 477m HAAT (Ch18 proposed)	29,966.4
WABC-TV 34 kW at 405m HAAT (Ch7 License)	38,337.9

Interference Study

An interference study has been conducted using the Commission's TVStudy software. The results of the study demonstrate that this proposal will have no additional interference impact on other stations (licenses, permits, and applications) beyond the nominal 0.5% value as permitted by the FCC Rules.

This study has been conducted using a grid cell size of 0.5 kilometers, and a terrain extraction increment of 0.5 kilometers.

While the study results indicate an MX (mutually-exclusive) situation with expansion applications filed by the following repacked stations:

- WEKW Keene, NH (File No. 34357)
- WVVH-CD Southampton, NY (File No. 34689)
- WTVH Syracuse (File No. 34606)

...in connection with the second expansion window, in all scenarios the interference is received by the proposed WMBC-TV facility. No interference in excess of 0.5% is caused to the pending WEKW, WVVH-CD, and WTVH application facilities, and therefore these MX "hits" would not be considered an impediment to grant of the instant application.

Land-Mobile Channels

The TVStudy report indicates a short-spacing to numerous land-mobile licenses on Channel 19. These land-mobile operations were approved under waivers relative to the incumbent operation of WMBC-TV on Channel 18. WMBC-TV has employed sharp-tuned filtering in order to minimize power in the Channel 19 spectrum, and will continue to use sharp-tuned filtering on the proposed facility. Additionally, the proposed facility will operate with horizontal polarization only, in order to provide cross-polarization attenuation to the vertically-polarized land mobile operations.

```
Study created: 2017.11.03 09:35:09

Study build station data: LMS TV 2017-11-02 (64)

    Proposal: WMBC-TV D18 DT APP NEWTON, NJ
 File number: WMBC-WTC-700KW-200EBT
 Facility ID: 43952
Station data: User record
   Record ID: 305
     Country: U.S.
        Zone: I

Stations affected by proposal:

Call      Chan  Svc Status  City, State              File Number            Distance
WPHL-TV   D17   DT  LIC     PHILADELPHIA, PA         BLCDT20090918ABV       127.8 km
WEKW-TV   D18   DT  CP      KEENE, NH                BLANK0000027337        291.7
WEKW-TV   D18   DT  APP     KEENE, NH                BLANK0000034357        291.7
WEKW-TV   D18   DT  BL      KEENE, NH                DTVBL69271             291.7
WVVH-CD   D18   DC  CP      SOUTHAMPTON, NY          BLANK0000026594        150.4
WVVH-CD   D18   DC  APP     SOUTHAMPTON, NY          BLANK0000034689        150.4
WVVH-CD   D18   DC  BL      SOUTHAMPTON, NY          DTVBL70158             150.4
WTVH      D18   DT  APP     SYRACUSE, NY             BLANK0000034606        303.7
WTVH      D18   DT  CP      SYRACUSE, NY             BLANK0000028195        303.7
WTVH      D18   DT  BL      SYRACUSE, NY             DTVBL74151             303.7

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D18
   Latitude:  40 42 46.80 N (NAD83)
  Longitude:  74  0 47.30 W
Height AMSL: 487.8 m
       HAAT: 451.0 m
   Peak ERP: 700 kW
    Antenna: ERI-ATW28HS8-HSC5-18H 0.0 deg
Elev Pattrn: ERI-28SMOOTH-200EBT
  Elec Tilt: 2.0

39.1 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg    235 kW   471.2 m  102.2 km
 45.0       75.8      485.2     93.5
 90.0       22.4      468.1     83.7
135.0       69.2      475.1     92.0
180.0       32.7      479.0     86.8
225.0        113      481.6     96.5
270.0        430      481.1    109.0
315.0        664      477.5    113.0

Database HAAT does not agree with computed HAAT
Database HAAT: 451 m   Computed HAAT: 477 m

ERP exceeds maximum
ERP: 700 kW   ERP maximum: 578 kW

**Proposal service area extends beyond baseline plus 1.0%
Proposal service area population is more than 95.0% of baseline
```

Distance to Canadian border: 397.2 km

Distance to Mexican border: 2670.8 km

Conditions at FCC monitoring station: Laurel MD
Bearing: 235.2 degrees Distance: 294.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 279.0 degrees Distance: 2627.4 km

**Proposal fails distance check to land mobile station: Philadelphia PA ch. 19, 128.8 km
**Proposal fails distance check to land mobile station: BERGEN NJ WIL791 ch. 19, 13.9 km
**Proposal fails distance check to land mobile station: BERGEN NJ WIL824 ch. 19, 12.5 km
**Proposal fails distance check to land mobile station: BERGEN NJ WIL942 ch. 19, 16.3 km
**Proposal fails distance check to land mobile station: BERGEN NJ WIM835 ch. 19, 15.8 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLU548 ch. 19, 15.2 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX446 ch. 19, 19.1 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX446 ch. 19, 19.8 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX446 ch. 19, 19.7 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX616 ch. 19, 12.7 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX623 ch. 19, 17.8 km
**Proposal fails distance check to land mobile station: BERGEN NJ WPLX683 ch. 19, 18.0 km
**Proposal fails distance check to land mobile station: ESSEX NJ WIL429 ch. 19, 21.0 km
**Proposal fails distance check to land mobile station: ESSEX NJ WIL429 ch. 19, 22.1 km
**Proposal fails distance check to land mobile station: ESSEX NJ WIL924 ch. 19, 19.5 km
**Proposal fails distance check to land mobile station: ESSEX NJ WIL924 ch. 19, 19.7 km
**Proposal fails distance check to land mobile station: ESSEX NJ WIM608 ch. 19, 21.9 km
**Proposal fails distance check to land mobile station: HUDSON NJ WIL676 ch. 19, 8.3 km
**Proposal fails distance check to land mobile station: HUDSON NJ WIL676 ch. 19, 12.7 km
**Proposal fails distance check to land mobile station: HUDSON NJ WPLV668 ch. 19, 6.3 km
**Proposal fails distance check to land mobile station: HUDSON NJ WPLV668 ch. 19, 4.8 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIL536 ch. 19, 47.4 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIL536 ch. 19, 44.4 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIL536 ch. 19, 43.0 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIL720 ch. 19, 36.7 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIL720 ch. 19, 37.0 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WIM222 ch. 19, 31.2 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WPGX713 ch. 19, 38.1 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WPGX713 ch. 19, 35.9 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WQPX974 ch. 19, 33.2 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WQPX974 ch. 19, 29.9 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WQPX974 ch. 19, 23.9 km
**Proposal fails distance check to land mobile station: MIDDLESEX NJ WQPX974 ch. 19, 28.2 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIJ783 ch. 19, 60.6 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIJ783 ch. 19, 37.8 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIL678 ch. 19, 54.7 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIL678 ch. 19, 54.7 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIM583 ch. 19, 47.9 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIM583 ch. 19, 48.0 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WIM583 ch. 19, 46.2 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WPMW554 ch. 19, 54.3 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WPMW554 ch. 19, 35.3 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WQGU308 ch. 19, 54.1 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WQLZ558 ch. 19, 64.7 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WQLZ558 ch. 19, 53.6 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WQLZ558 ch. 19, 35.7 km
**Proposal fails distance check to land mobile station: MONMOUTH NJ WQLZ558 ch. 19, 33.2 km
**Proposal fails distance check to land mobile station: MORRIS NJ WQAM754 ch. 19, 35.2 km
**Proposal fails distance check to land mobile station: MORRIS NJ WQAM754 ch. 19, 37.7 km
**Proposal fails distance check to land mobile station: NASSAU NY WPVS875 ch. 19, 26.3 km
**Proposal fails distance check to land mobile station: NASSAU NY WPVS875 ch. 19, 38.7 km
**Proposal fails distance check to land mobile station: NASSAU NY WPVS875 ch. 19, 33.6 km
**Proposal fails distance check to land mobile station: NASSAU NY WPVS875 ch. 19, 46.5 km
**Proposal fails distance check to land mobile station: NASSAU NY WPYR980 ch. 19, 31.9 km
**Proposal fails distance check to land mobile station: NASSAU NY WQEH796 ch. 19, 47.4 km
**Proposal fails distance check to land mobile station: NASSAU NY WQEH959 ch. 19, 47.4 km

```
**Proposal fails distance check to land mobile station: NASSAU NY WQKU273 ch. 19, 34.5 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WIL599 ch. 19, 30.2 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WIL599 ch. 19, 34.5 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WIL636 ch. 19, 25.5 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WIL636 ch. 19, 25.2 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WQMH982 ch. 19, 28.0 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WQMH982 ch. 19, 30.5 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WQMH982 ch. 19, 34.5 km
**Proposal fails distance check to land mobile station: PASSAIC NJ WQMH982 ch. 19, 38.7 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIK841 ch. 19, 42.9 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIK841 ch. 19, 42.6 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIK841 ch. 19, 43.7 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIK841 ch. 19, 47.5 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIK841 ch. 19, 39.6 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 66.0 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 56.0 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 52.9 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 41.9 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 47.9 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WIL900 ch. 19, 47.4 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 59.8 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 39.6 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 36.8 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 51.8 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 49.5 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WPVM588 ch. 19, 47.2 km
**Proposal fails distance check to land mobile station: SOMERSET NJ WQGG391 ch. 19, 52.9 km
**Proposal fails distance check to land mobile station: UNION NJ WIL797 ch. 19, 33.3 km
**Proposal fails distance check to land mobile station: UNION NJ WIL967 ch. 19, 25.1 km
**Proposal fails distance check to land mobile station: UNION NJ WIM531 ch. 19, 18.0 km
**Proposal fails distance check to land mobile station: UNION NJ WIM531 ch. 19, 18.0 km
**Proposal fails distance check to land mobile station: UNION NJ WPGX673 ch. 19, 20.5 km
**Proposal fails distance check to land mobile station: UNION NJ WPIG291 ch. 19, 22.0 km
**Proposal fails distance check to land mobile station: UNION NJ WPMC452 ch. 19, 19.4 km
**Proposal fails distance check to land mobile station: UNION NJ WPMC452 ch. 19, 21.7 km
**Proposal fails distance check to land mobile station: UNION NJ WPMC452 ch. 19, 21.6 km
**Proposal fails distance check to land mobile station: UNION NJ WPMC452 ch. 19, 22.3 km
**Proposal fails distance check to land mobile station: UNION NJ WPMC452 ch. 19, 22.5 km
**Proposal fails distance check to land mobile station: UNION NJ WPXZ581 ch. 19, 32.6 km


Study cell size: 0.50 km
Profile point spacing: 0.50 km

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

NOTE:  THE FOLLOWING ARE ALL WMBC-TV RECEIVED INTERFERENCE, NONE CAUSED

**MX with BLANK0000034606 APP, 1.36% interference, scenario 1
Proposal receives 1.28% interference from scenario 2
Proposal receives 1.28% interference from scenario 3
**MX with scenario 4, receives 1.81% interference
**MX with BLANK0000034606 APP, 1.36% interference, scenario 5
**MX with BLANK0000034357 APP, 1.77% interference, scenario 6
Proposal receives 1.28% interference from scenario 7
**MX with BLANK0000034357 APP, 1.77% interference, scenario 8
Proposal receives 1.28% interference from scenario 9
**MX with scenario 10, receives 1.39% interference
**MX with BLANK0000034606 APP, 1.36% interference, scenario 11
**MX with BLANK0000034689 APP, 1.31% interference, scenario 12
**MX with BLANK0000034689 APP, 1.31% interference, scenario 13
Proposal receives 1.28% interference from scenario 14
Proposal receives 1.28% interference from scenario 15
**MX with scenario 16, receives 1.83% interference
**MX with scenario 17, receives 1.39% interference
```

```
**MX with scenario 18, receives 1.81% interference
**MX with BLANK0000034606 APP, 1.36% interference, scenario 19
**MX with scenario 20, receives 1.78% interference
**MX with BLANK0000034689 APP, 1.31% interference, scenario 21
**MX with scenario 22, receives 1.78% interference
**MX with BLANK0000034689 APP, 1.31% interference, scenario 23
**MX with BLANK0000034357 APP, 1.77% interference, scenario 24
Proposal receives 1.28% interference from scenario 25
**MX with BLANK0000034357 APP, 1.77% interference, scenario 26
Proposal receives 1.28% interference from scenario 27
```

Facilities Proposed

The proposed operation will be on Channel 18 with a maximum lobe effective radiated power of 700 kilowatts (H pol), using an antenna with 2 degrees of electrical beam tilt. Operation is proposed with an ERI model ATW28HS8-HSC5-18H antenna, which will be mounted on the pylon of the One World Trade Center tower. The FCC Antenna Structure Registration Number is 1263701.

Environmental

The proposed WMBC-TV facility is located in the same vicinity as numerous other pre-existing communications antennae. Accordingly, this minor modification application is categorically excluded from environmental processing because it does not involve any matters covered by 47 C.F.R. Section 1.1306(b).

RF Exposure Calculations

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

> When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . .For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed operation will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

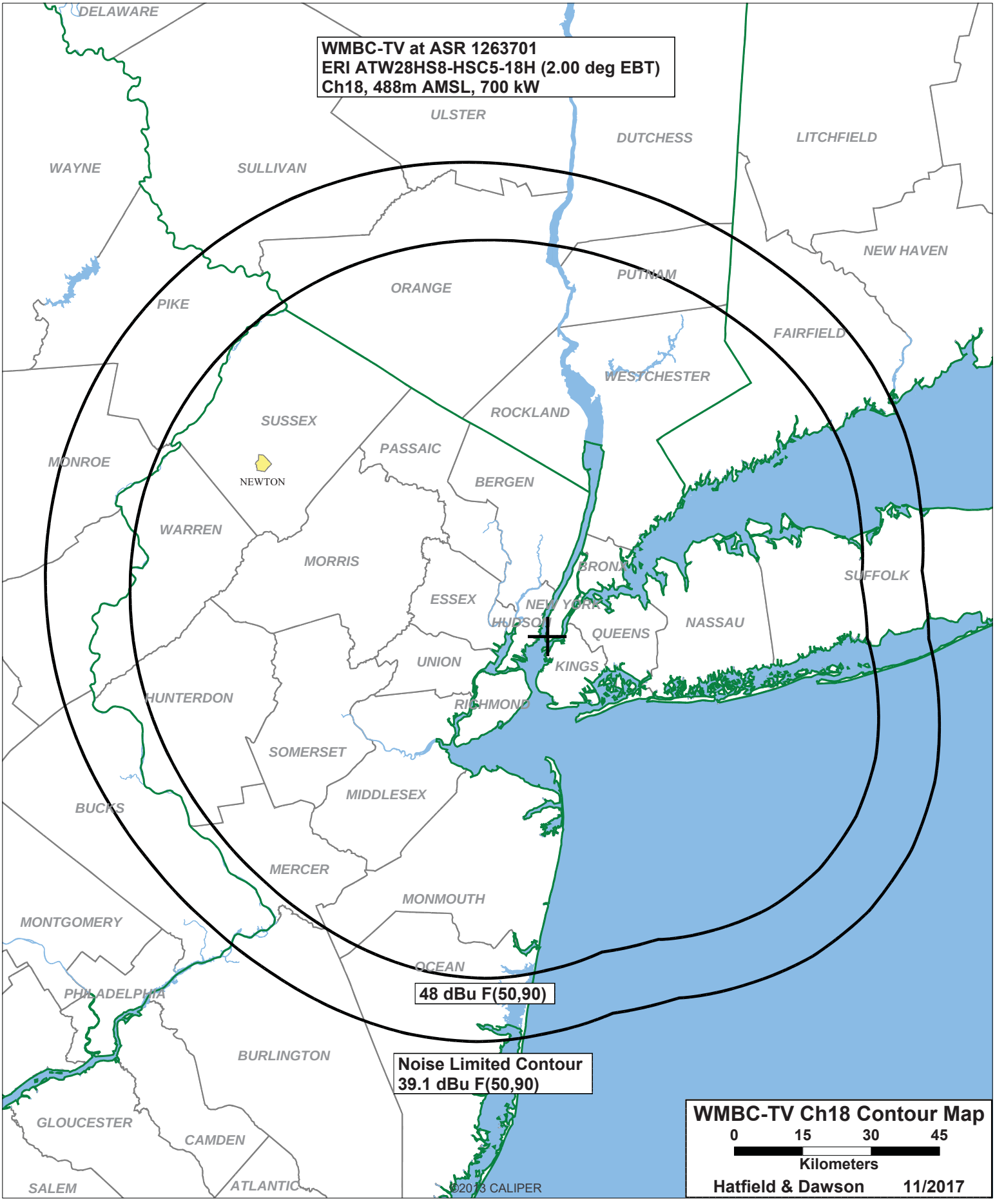
D is the distance in meters from the center of radiation to the calculation point.

Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (486 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.035 at these angles, based on the manufacturer's vertical plane pattern for the ERI model ATW28HS8-HSC5-18H antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 857.5 watts at depression angles between 45 and 90 degrees below the horizontal. Assuming this power and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down), the highest calculated power density from the proposed antenna alone occurs at the base of the antenna support structure. At this point the power density is calculated to be 0.1 μW/cm², which is <0.1% of 329.3 μW/cm² (the FCC maximum for uncontrolled environments at the Channel 18 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 500 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including

reduction in power or discontinuance of operation before any maintenance work is undertaken. The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.


WMBC-TV at ASR 1263701
ERI ATW28HS8-HSC5-18H (2.00 deg EBT)
Ch18, 488m AMSL, 700 kW
DELAWARE
ULSTER
DUTCHESS
LITCHFIELD
WAYNE
SULLIVAN
NEW HAVEN
PUTNAM
ORANGE
PIKE
FAIRFIELD
WESTCHESTER
ROCKLAND
SUSSEX
PASSAIC
MONROE
NEWTON
BERGEN
WARREN
MORRIS
BRONX
SUFFOLK
ESSEX
NEW YORK
HUDSON
QUEENS
NASSAU
UNION
KINGS
HUNTERDON
RICHMOND
SOMERSET
MIDDLESEX
BUCKS
MERCER
MONMOUTH
MONTGOMERY
OCEAN
PHILADELPHIA
48 dBu F(50,90)
BURLINGTON
Noise Limited Contour
39.1 dBu F(50,90)
GLOUCESTER
CAMDEN
SALEM
ATLANTIC
©2013 CALIPER
WMBC-TV Ch18 Contour Map
0 15 30 45
Kilometers
Hatfield & Dawson 11/2017