ENGINEERING STATEMENT
RE DTV BROADCAST ENGINEERING DATA
APPLICATION FOR
SPECIAL TEMPORARY AUTHORITY
TO INCREASE EFFECTIVE RADIATED POWER
ON BEHALF OF
VIDEOINDIANA, INC.
WTHR-DT, INDIANAPOLIS, INDIANA
CHANNEL 13 42.1 KW MAX DA ERP (H&V) 299 M HAAT

APRIL 2011

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington)
) ss
District of Columbia)

Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 29th day of April, 2011.

Notary Public

My Commission Expires: 2/28/2013

Introduction

This engineering statement has been prepared on behalf of VideoIndiana, Inc. ("VideoIndiana"), licensee of WTHR-DT, Indianapolis, Indiana, in support of its request for special temporary authority to operate with an increase in effective radiated power. VideoIndiana has a requesting pending to modify its pending license in order to maximize its DTV facilities.

Pursuant to the pending license [FCC File No. BLCDT-20100812ABY], VideoIndiana is operating facilities on DTV Channel 13 with a maximum ERP of 30 kW (H&V) and an antenna height above average terrain ("HAAT") of 299 meters (981.0 feet). VideoIndiana hereby proposes to use the same built-out facilities, but increase the ERP from 30 kW to 42.1 kW, utilizing the directionality of the existing nominally omnidirectional antenna.

History

WTHR-DT was authorized to return to its high band VHF channel with 15.08 kW directional and HAAT of 299 meters.[1] Previously, WTHR operated with a DTV facility on Channel 46 with 1000 kW non-directional and an HAAT of 264.8 meters from this site.

Based on the long time experience with reception of its analog Channel 13, 316 kW at an HAAT of 299 meters and subsequent DTV reception with Channel 46, VideoIndiana has found even with step increase to 30 kW the shortfall in reception continues. As demonstrated in Appendix A, this reception shortfall was identified in 2009 by the taking of extensive observations of signal levels and observations of reception by using DTV receivers.

[1] "In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service", MM Docket 87-268, Memorandum Opinion and Order on Reconsideration of the Seventh Report and Order and Eighth Report and Order (FCC 08-72) Released March 6, 2008.

Furthermore, as documented in Appendix A, a member of the Federal Communications Commission observed some of the areas in which replication of neither the analog Channel 13 signal nor the prior Channel 46 DTV coverage was achieved.

The Federal Communications Commission has recognized that both the low-band VHF as well as the high-band VHF digital has not achieved replication.[2] [3]

Proposed Special Temporary Authority

The WTHR-DT Channel 13 DTV antenna is top-mounted on an existing tower. The existing tower has a total overall structure height above ground of 316.8 meters (1039.4 feet). The existing transmitter is located at Ditch Rd, at West 96th Street, Indianapolis, Indiana.

There are no proposed changes to WTHR-DT's antenna or the overall height of its existing tower, and therefore, an FAA aeronautical study is not required. The FCC antenna structure registration number of the existing tower is 1024109. Exhibit E-1 is a vertical sketch of the existing tower and top-mounted transmitting antenna.

The geographic coordinates of the proposed site are as follows:

North Latitude: 39° 55' 43"

West Longitude: 86° 10' 55"

NAD-27

[2] "FCC Broadcast Engineering Forum, How to Improve VHF Reception, Friday, June 25, 2010, 3 PM, Washington, DC", from FCC Advisory dated June 9, 2010.

[3] "Before the FCC, In the Matter of Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements to VHF", ET Docket No. 10-235, Notice of Proposed Rulemaking, Adopted November 30, 2010, Released November 30, 2010.

Equipment Data

Antenna:	RCA, Type TCL-16A13 (or equivalent) Circular Polarized Antenna 0.9° electrical Beam Tilt, Antenna information per Section 73.625 of the FCC Rules is provided in Exhibit E-2.
Transmission Line:	292.6 meters (960 ft) of Dielectric, Type 8863-62A, 6-1/8", 50 ohm or equivalent, attenuation 0.076 dB/100 ft

Power Data

Transmitter Output	5.66 kW	7.53 dBk
Transmission Line Efficiency/Loss	84.5%	0.73 dB
Input Power to the Antenna	4.78 kW	6.80 dBk
Antenna Gain	8.8 ratio	9.44 dB
Effective Radiated Power	42.1 kW (H&V)	16.24 dBk

Elevation Data

Elevation of site above mean sea level	251.1 meters 823.8 feet
Overall height above ground of existing antenna structure (including appurtenances)	316.8 meters 1039.4 feet
Center of radiation of Channel 13 antenna above ground	299.9 meters 983.9 feet
Overall height above mean sea level of existing tower (including beacon)	567.9 meters 1863.2 feet
Center of radiation of Channel 13 antenna above mean sea level	551 meters 1807.7 feet
Antenna height above average terrain	299 meters

Note: Slight height differences may result due to conversion to metric.

Waiver Request

The proposed power exceeds the maximum allowed for Zone I DTV stations specified in Section 73.622(f)(7) of the Commission's Rules. A waiver of this rule is hereby requested as the proposed facilities meet established interference criteria with acceptance agreements. Grant of this waiver request is in the public interest and consistent with the Commission's policy to improve reception for high VHF DTV stations.

International Coordination

The existing WTHR-DT site is 338 km from the Canadian border, and therefore, within the 400 km coordination zone. No interference is predicted to any Canadian station. The nearest Canadian co-channel station is over 600 km distant: CKCO-TV, Kitchener, Ontario. The nearest Canadian adjacent channel is over 440 km distant, Channel 12, Chatham, Ontario. The predicted DTV-to-DTV-22 dBu F(50,10) co-channel interfering contour does not come within 80 km of the Canadian border. All other F(50,10) interfering contours are higher field strength values and also do not reach the Canadian border. Therefore, coordination with Canada is not required.

Interference Analysis

A study of predicted interference (Table I) caused by the proposed WTHR-DT post-transition has been performed using a version of the Longley-Rice program as described in OET Bulletin No. 69 (February 6, 2004) and the Public Notice, "Additional Application Processing Guidelines for Digital Television (DTV)" (August 1998). The FCC's FORTRAN-77 code was modified only to the extent necessary (primarily input/output handling) for the program to run on a Windows XP platform. Comparison of service/interference areas and populations indicates that

this model closely matches the FCC's evaluation program. Best efforts have been made to use data and calculations identical to the FCC's program. Any slight differences are attributable to compiler, operating system and/or processor characteristics. The effect of any variance in calculated population values versus the FCC's program is minimized when differencing a given model's results, such as calculating new interference as total interference less baseline interference. Any variance effect is further reduced when using ratios of calculated population values such as measuring the incremental population affected as a percent of the total population served. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 4 km^2 using 3-second terrain data sampled approximately every 1.0 km at one degree azimuth intervals with 2000 census centroids.

WSYX-DT has changed its post-transition channel from 13 to 48. For this reason, interference to WSYX-DT, Channel 13, Columbus, Ohio has been ignored for this analysis. Also, this analysis excludes masking interference from WSYX to other stations potentially affected by WTHR-DT's proposed power increase. WKYT-TV, Lexington, Kentucky similarly changed its post-transition channel from 13 to 36. WKYT-TV has also been excluded from the interference analysis as described above.

The proposed facilities are predicted to cause 1.24% (0.74% impermissible) interference to WBKO-DT, Ch. 13, CP, Bowling Green, KY [BMPCDT-20110218ABM]. A copy of the agreement accepting this interference is attached to the electronically filed application.

The results of the analysis predict that the proposed directional operation of WTHR-DT will not cause any new interference above the 0.5% threshold criteria to other potentially affected authorized stations.

Additional Broadcast Facilities

There are no AM stations located within 3.2 km and no FM stations within 0.5 km of the existing tower site. The following table lists the authorized and potential TV and DTV facilities located within 0.5 km of the transmitting site according to CDBS.

Call	Status	Service	Ch	ERP kW	RCAMSL Meters	RCAGL Meters	Distance km
WTHR-DT	Prop	DTV	13	42.1	551.0	299.9	0.0
WTHR-DT	STA	DTV	46	1000	521.7	270.7	0.0
WIPX-LP	CP	LD	34	15	488.8	237.7	0.0
WALV-CA	Lic	CA	50	14.9	505.0	253.9	0.0

Coverage

The average elevation data for 3.2 to 16.1 km along each radial has been determined from the NGDC 3-second computerized terrain database. The F(50,90) DTV coverage contours have been computed from reference to the propagation data for Channels 7-13, as published by the FCC in Figure 10 and Figure 10a, Section 73.699 of the FCC Rules and Regulations. Utilizing the formula in Section 73.625(b)(2) of the Rules for the effective heights, it is found that the depression angle, A_h, varies from 0.458 to 0.494 degrees.

Table II includes the distances to the F(50,90) 43 and 36 dBu coverage contours, the average elevation 3.2 to 16.1 km, and the antenna effective heights for each radial spaced 10 degrees in azimuth. Exhibit E-3 provides a map of the computed coverage contours.

FCC Rule, Section 1.1307

The proposed operation based upon the current OET Bulletin No. 65, Edition No. 97-01, dated August 1997 and Supplement A meets the provisions of the FCC radio frequency field ("RFF") guidelines, and thus, complies with Section 1.1307 of the FCC Rules. Provisions will be made to reduce power or to terminate the transmitter emissions, as appropriate, when it is necessary for authorized personnel to be on the tower.

The following equations from OET Bulletin No. 65 have been used to calculate the predicted post-transition radiofrequency fields at 2 meters above ground at the base of the tower:

Television Broadcast Stations
$S = [(33.4)(F^2)(0.4 * ERP_V + ERP_A)]/R^2$

Digital Television Broadcast Stations
$S = [(33.4)(F^2)(ERP^2)]/R^2$

S = Power Density in Microwatts/sq. cm ($\mu W/cm^2$)
F = Relative Field Factor in the downward direction of interest (-60° to -90° elevation)
ERP_V = Total Peak Visual ERP in Watts
ERP_A = Total Aural ERP in Watts
ERP = Power in Watts
R = Distance from 2 meters above ground to center of radiation in meters

Station	Statuts	ERP (kW)	Frequency (MHz)	Ch	RCAGL (m)	Relative Field	S ($\mu W/cm^2$)	RFF (%)
WIPX-LP	CP	15	590-596	34	237.7	0.2	0.36	0.08

WALV-CA	Lic	14.9	686-672	50	253.9	0.3	0.35	0.08
WTHR-DT	**Proposed**	42.1 (H&V)	210-216	13	299.9	0.084	0.22	0.11
WTHR-DT	STA	1000	662-668	46	270.7	0.1	4.63	1.05
							Total	**1.32%**

For the proposed operation, WTHR-DT will use the existing top-mounted RCA, Type TCL-16A13 antenna (or equivalent). The manufacturer's elevation pattern for this antenna indicates a maximum relative downward field of less than 0.084 towards the ground (45° to 90° below the horizontal) in the vicinity of the tower. Using this relative field factor and the procedures prescribed in OET Bulletin 65, the maximum RFF resulting from the proposed operation is less than 0.22 $\mu W/cm^2$. This is less than 0.11% of the 200 $\mu W/cm^2$ maximum human exposure to RFF recommended by the current FCC guidelines for the general population.

The total contribution by authorized and expected broadcast facilities at 2 meters above ground level is less than 1.3% of the current FCC guidelines for maximum permissible exposure ("MPE") for the general population/uncontrolled environment.

Authorized personnel and rigging contractors will be alerted to the potential zone of high field levels on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

Environmental Assessment

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

(a)(1) The existing tower is not located in an officially designated wilderness area.

(a)(2) The existing tower is not located in an officially designated wildlife preserve.

(a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.

(a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.

(a)(4) The proposed facilities are located on a tower which was built prior to the adoption of WT Docket No. 03-128 and therefore grandfathered, and have not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.

(a)(5) The existing tower is not located near any known Indian religious sites.

(a)(6) The existing tower is not located in a flood plain.

(a)(7) The installation of the DTV facilities on an existing guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.

(a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.

(b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A.

APPENDIX A

Donald G. Everist

From: "Mark Lueth" <Mark.Lueth@fcc.gov>
To: "Al Grossniklaus" <alg@wthr.com>
Sent: Tuesday, August 25, 2009 3:52 PM
Subject: RE: Indianapolis Report

Al:

This looks to a very concise and accurate report. I also passed the picture of the deer unto the regional coordinator for DTV. She felt that everyone in the region should see it. It has been e-mailed to all FCC DTV workers in the region.

Mark

From: Al Grossniklaus [mailto:alg@wthr.com]
Sent: Monday, August 24, 2009 4:15 PM
To: Mark Lueth
Subject: Indianapolis Report

Mark,

I've attached the draft report from Indianapolis for your review. I'd appreciate it if you'd look it over and confirm that the narratives and findings are in accordance with your observations – in particular Case 1, Case 2, Case 6, Case 7, Case 8 and Case 9 as they are the field sites you visited with Roberta and me.

Thanks!

Al

Al Grossniklaus
Director of Engineering and Operations
WTHR NBC
Indianapolis
Dispatch Broadcast Group

Since June 12th WTHR has been operating at 22 kW DTV ERP on VHF channel 13. WTHR is using its former NTSC antenna, so is a good comparison of actual high VHF ATSC coverage to replication of NTSC coverage on the same channel.

The Indianapolis market has a high urban density in the center (all broadcast towers referenced here are in the NW quadrant of the urban area within two miles of each other) surrounded by suburban then rural areas. The northern 2/3 of market is flat farmland, the southern 1/3 is flat to rolling, then hilly terrain. The following measurements were taken by WTHR Senior RF Technician Roberta Barmore and WTHR\Dispatch Broadcast Group Director of Engineering Al Grossniklaus (the "WTHR Measurement Team") using an HP 8591 Spectrum Analyzer and a Harris ARX-H100 Reference DTV Receiver with both an RCA ANT 111 consumer dipole/loop antenna and an adjustable consumer dipole antenna. In some cases an Apex DT250A and/or a Magnavox TB100MW9 consumer converter box were also used to check DTV signal lock/decoding/display. On August 11th and 12th FCC Chicago Field Office Electronics Engineer Mark Lueth accompanied the WTHR Measurement team and augmented the measurements with a Rhode & Schwartz FSH3 hand held spectrum analyzer and a calibrated reference dipole antenna. Mr. Lueth's participation is noted in the narratives of the sites he visited.

The detailed site visits and field measurements documented below are a subset of a larger number of more casual site visits where empirical reception checks were made using several consumer DTV converter boxes with a consumer dipole/loop antenna. These casual site visits are documented separately. The detailed site visits were in response to specific viewer complaints.

DISCUSSION:
The field measurements undertaken by WTHR, some accompanied by Mr. Mark Lueth of the Chicago Field Office, highlight the unique causes of DTV reception problems at different locations. For example in addition to low VHF signal levels, interference from a legacy analog set's internal oscillator at one location and multipath from natural or man-made objects at several other locations were some of the causes of reception difficulties that were encountered and diagnosed.

However, one common thread is that many of the site visits showed the absolute levels of the two local VHF DTV signals (WISH RF 9 @ 22.8 kW and WTHR RF 13 @ 22 kW) to be at a distinct disadvantage to local UHF signal levels at comparable distance. At a number of outdoor and, therefore, indoor locations 20+ miles from the broadcast towers, both UHF and VHF signals were found to be significantly below Longley-Rice predicted levels, particularly at the 6' antenna height. At several of these locations the much higher power and relatively higher level UHF signals could still be received while the relatively lower VHF signal levels simply dropped completely below the receivable threshold. At other locations where the VHF signals could be received at certain spots, the significantly higher strength UHF signals stayed above the receiver's threshold at many more spots so were much more consistent and easily found and acquired, while the low VHF signals had little or no fade margin. Many viewers report having had good analog VHF reception but are unable to acquire the corresponding VHF DTV signal. The Franklin, Martinsville and Mooresville measurements, which were taken outdoors and found VHF DTV signal levels to be below the receivable threshold, eliminate indoor anomalies as the sole or primary culprit in these cases. And the set of measurements that were taken indoors at the North Chester Street location underscores that such postulated indoor issues do not appear to likely be a significant cause here of VHF or UHF DTV reception problems when the signal levels are otherwise sufficient for reception.

TREES/FOLIAGE:
While the reason for the unexpectedly low UHF/VHF signal levels encountered at some locations was not the focus of this undertaking, it is worth noting that there emerged a pattern of viewer reports pointing to a

possible cause. One common complaint heard from at least a half dozen viewers using indoor or minimal outdoor antennas was that reception of all DTV signals – UHF as well as VHF – noticeably degraded immediately after June 12th. While at first these reports were dismissed as not making any sense, when combined with the findings of unexpectedly low signal levels the distinct possibility emerges that these viewers had purchased and installed converter boxes in January/February in preparation for the February transition date. Then these viewers shut the converter boxes off and watched analog TV until June 12th when the viewers turned the converter boxes back on, only to find that, in comparison to February, the late Spring/early Summer foliage had significantly reduced DTV signal levels and therefore, reception quality. Even acting Chairman Copps reported this exact effect at his own home, as reported in the June 15, 2009 Broadcast Engineering: "When Copps upgraded his TV set for digital reception in February, he at first got an excellent picture. But now that the leaves have grown back on the trees surrounding his house, he is getting interference." And in fact we have noted some small but noticeable deterioration of ground level DTV reception from June to August corresponding to the Summertime thickening of foliage between those months.

CONCLUSION:
While effective radiated power level is not the sole cause nor is it the sole remedy for all VHF DTV reception problems, it has become clear from these field measurements that insufficient signal strength plays a major role in a significant number of VHF DTV reception problems in the Indianapolis market, particularly at locations 15+ miles from the broadcast towers. Simply put, even though the predicted 36 dBu channel 13 VHF DTV signal contour at 22 kW ERP approximates the former channel 13 VHF analog 56 dBu gradient, the coverage, receivability and reliability of WTHR's 22 kW VHF DTV signal within that contour does not at all replicate the former coverage, receivability and reliability of WTHR's 316 kW peak analog signal. In order to effectively compete, VHF DTV effective radiated power levels in this range must be dramatically increased as soon as possible.

Case 1

WTHR has received a number of complaints of difficulty receiving WTHR digital 13 with indoor antennas, while having no difficulty receiving UHF DTV signals, from viewers in or near Franklin, Indiana – County Seat of Johnson County, which is the county immediately south of Indianapolis. These viewers report they formerly had good reception of WTHR's channel 13 analog signal with indoor antennas. Franklin itself is about 32 miles south of WTHR's tower in relatively flat farming terrain. Initial measurements were taken with a dipole antenna at 6' at the I-65 Franklin exit, at a clear open flat spot near the exit. UHF and VHF signal levels were found to be 5 – 9 dB below the expected L-R level, possibly due to summer leaf density or downtown Indianapolis buildings, so the Harris, Apex and Magnavox receivers all had good lock on all signals, but the two VHF signals had little fade margin.

Then a set of outdoor measurements with a dipole at 6' were taken in a residential area at the intersection of Cincinnati and Johnson Streets in the town of Franklin. Franklin itself is about 50 feet lower in elevation than the interstate exit, with many old full grown trees. This generally added another 5 – 6 dB signal loss which pushed the outdoor VHF signals below the receivable threshold. Another set of dipole measurements was taken with the dipole elevated 30 feet which generally brought the signals up 3 – 5 dB, bringing the signals over the receivable threshold. But it is clear from these measurements that, while the UHF signal levels are sufficient to be reliably received with indoor antennas in Franklin, the VHF signal levels are not.

These locations were again visited on 8/12/2009 by the WTHR measurement team accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth. Again the signal levels at the I-65 Franklin exit 90 location at 6' were again observed to be lower than predicted, but receivable. The WTHR team and Mr. Lueth

moved into Franklin to the Cincinnati Street and Johnson Street location and observed the VHF DTV signal levels to be too low to be useable with a dipole at 6'. At 30' the VHF DTV signal levels increased sufficiently to be receivable with digital lock. This time a set of 6 Mhz channel power measurements were made with the dipole at 6' and at 30'.

I 65 Franklin Exit 90, West of Exit, North of Burger King: 32 mi

7-29 5:15 PM Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100	Apex	Magnavox (on 7-26 @ 5:15 PM)
WRTV Expect -48.8 dBm	25	-56 dBm	-57 dBm	90	55
WHMB Expect -50.9 dBm	16	-58 dBm	-60 dBm	90	43
WXIN Expect -51.8 dBm	45	-59 dBm	-68 dBm (??)	81	46
WFYI Expect -56.5 dBm	21	-60 dBm	-63 dBm	97	40
WISH Expect -61.1 dBm	9	-70 dBm	-68 dBm	40	25
WTHR Expect -63.3 dBm	13	-68 dBm	-66 dBm	72	30

Franklin, IN Cincinnati St. & Johnson St. Across From McGinn Tool & Engineering: 31.2 mi

7-30 3:30 PM Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100	Magnavox (7-26 @ 5:40 PM)
WRTV Expect -47.6 dBm	25	-61 dBm	-66 dBm	40
WHMB Expect -49.9 dBm	16	-64 dBm	-65 dBm	30
WXIN Expect -49.6 dBm	45	- 70 dBm	-77 dBm	24
WFYI Expect -55.2 dBm	21	-64 dBm	-72 dBm	24
WISH Expect -60.4 dBm	9	-76 dBm	-82 dBm	No Lock
WTHR Expect -62.8 dBm	13	-73 dBm	-74 dBm	18 (very intermittent lock, lots of pixelization)

7-30 3:50 PM Comsumer Dipole at 30' (mast up and antenna rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100
WRTV Expect -40.3 dBm	25	-58 dBm	-60 dBm

WHMB Expect -42.8 dBm	16	-63 dBm	-64 dBm
WXIN Expect -43.0 dBm	45	- 74 dBm	-78 dBm
WFYI Expect -48.8 dBm	21	-68 dBm	-70 dBm
WISH Expect -52.7 dBm	9	-68 dBm	-67 dBm
WTHR Expect -55.4 dBm	13	-70 dBm	-71 dBm

8-12 3:15 PM Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz channel power
WRTV Expect -47.6 dBm	25	-54 dBm
WXIN Expect -49.6 dBm	45	-56 dBm
WISH Expect -60.4 dBm	9	below noise – unable to lock DTV reception
WTHR Expect -62.8 dBm	13	-61dBm – unable to lock DTV reception

8-12 3:45 PM Consumer Dipole at 30' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz channel power
WRTV Expect -48.8 dBm	25	-51dBm
WXIN Expect -51.8 dBm	45	-56 dBm
WISH Expect -52.7 dBm	9	-60 dBm
WTHR Expect -55.4 dBm	13	-59 dBm

Case 2

WTHR has received complaints of difficulty receiving WTHR digital 13 with indoor antennas, while having no problem receiving UHF DTV signals, from viewers in the Mooresville, Indiana area. These viewers report formerly having good reception of WTHR's channel 13 analog signal with indoor antennas. Mooresville is a suburban/rural town in gently rolling terrain 23 miles Southwest of WTHR's tower. Measurements were taken in the driveway of and inside one such viewer's home at 8121 Congress Drive, Mooresville. The home is typical in the subdivision, on the RF shaded side of a hill starting to slope down toward a creek, the subdivision and this home's lot are full of large mature trees – as can be seen in the photo of the top of the van. In the driveway with a dipole at 6 feet, UHF and VHF signals were found to be 22 – 30 dB below expected, probably due to a combination of being slightly on the RF shaded side of the hill and the trees. While the UHF signals were still quite receivable, this pushed the VHF signals to or below the DTV receiver's threshold. With the dipole moved, oriented and reoriented in the driveway to obtain the maximum signal that could be had, WTHR DTV 13 barely locked and WISH DTV 9 did not lock. The viewer's DTV set and indoor antenna are in a sunroom at a raised level on the Northeast corner of the home which is in the direction of the towers and thus helped the signal levels we initially found there by 3 – 6 dB over the outdoor driveway location (with the exception of the stronger channel 25 signal which did not improve). The viewer was using an amplified flat antenna in the north facing window and was easily receiving the UHF DTV signals, had a marginal lock on the WISH DTV 9 signal and could not receive the WTHR DTV 13 signal. We substituted the dipole for the viewer's antenna and with the spectrum analyzer we found that the direction to the towers and the signal levels were somewhat better in the east facing window. The dipole and the viewer's antenna were moved to the east window, this improved the signals a bit more. Very careful location and orientation of the dipole by use of the spectrum analyzer finally brought each signal up by another 2 – 3 dB, each at a particular spot. This allowed WTHR DTV 13 to finally be scanned into the viewer's set, but to receive WTHR DTV 13 without significant pixelazation the antenna had to be in one precise spot and orientation. Also, at VHF the flat antenna amplifier's gain made the entire antenna/cable/preamplifier act as the antenna and every time someone touched or got near the antenna, the preamp or a connector, the antenna's characteristics would significantly change, making placement of the antenna very touchy and difficult. Both in the driveway and in the home

the UHF signal levels are sufficient for this viewer to easily lock most anywhere with a dipole or other antenna, while the VHF signals only have sufficient level at a few exact spots to be received. In the viewer's sunroom with WTHR DTV 13 and in the driveway with WISH DTV 9 it took the spectrum analyzer to find that spot – the viewer would have continued to be frustrated by endless repeated antenna moving and rescanning with only a small chance of ever finding that spot.

On 8/11/2009 the WTHR measurement team revisited this location accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth. On this visit the WTHR van and the FCC enforcement vehicle had to be parked in the street in front of the residence due to an electrician's truck being parked in the driveway. Due to the slope of the terrain the house is built on, the street elevation is a bit lower than the driveway. VHF DTV signal levels outdoors at 6' at the street were observed to be very low, below -80 dBm signal level on WTHR's SA and also very low on Mr. Lueth's SA. We were unable to obtain signal lock on either WTHR RF 13 or WISH RF 9 at Mr. Lueth's vehicle, but were able to achieve a slightly pixilated lock on the WISH RF 9 digital signal, but still no lock on WTHR RF 13 at the WTHR van.

Inside the home in the sunroom, the low VHF signal levels and marginal VHF reception was again observed by the measurement team and Mr. Lueth. We then proceeded to a walkout lower level, at the request of the viewer, to check signal levels there. This lower level family room opened to a walkout underdeck sunporch. Mr. Lueth's check of signals there with his portable SA and calibrated dipole showed several spots with VHF signal levels with better than -60 dBm channel power. One such spot was on a table near a window, so the viewer's flat amplified antenna was placed there and marginal, but adequate reception of the VHF signals was obtained and the viewer was very pleased with the assistance the WTHR team and Mr. Lueth had provided. It is important to note that, even though the VHF signals at this particular spot were better and probably a bit easier to find than the upstairs sunroom, it still took the spectrum analyzer to find the spots where sufficient VHF DTV signal levels were present for reception – the viewer would again have had to have the instinct to use the sunporch as an antenna location and then would have faced repeated antenna moving and rescanning to find a useable spot to locate the antenna, while even though the significantly stronger UHF signal levels varied from spot to spot, their average levels were much higher than the VHF levels so the UHF signals were much more easily acquired by the viewer.

8121 Congress Dr., Mooresville: 22.5 mi.

7-28 Noon Outdoors – Consumer Dipole at 6' (on top of Van in driveway with Harris ARX-H100 and HP SA, antenna located and rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100	
WRTV Expect -37.5 dBm	25	-66 dBm	-65 dBm	
WXIN Expect -42.7 dBm	45	- 73 dBm	-76 dBm	
WISH Expect -51.7 dBm	9	-79 dBm	-79 dBm	No Lock
WTHR Expect -54.9 dBm	13	-77 dBm	-77 dBm	

7-28 12:30 PM Indoors – (Consumer Dipole in family room with Harris ARX-H100 and HP SA, antenna located and oriented for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100
WRTV Expect -37.5 dBm	25	-66 dBm	-69 dBm
WXIN Expect -42.7 dBm	45	- 70 dBm	-71 dBm
WISH Expect -51.7 dBm	9	-70 dBm	-68 dBm
WTHR Expect -54.9 dBm	13	-73 dBm	-71 dBm

Case 3

WTHR has received a number of complaints from viewers in the Martinsville, Indiana area having difficulty receiving WTHR digital 13 with indoor antennas, while having no problem receiving UHF DTV signals. Martinsville is the County Seat of Morgan County and is located 37 miles southwest of the WTHR tower. The terrain is hilly and Martinsville is about 175' lower than surrounding terrain in a valley shaded by a significant hill to the North. Historically, many Martinsville viewers have been able to satisfactorily receive Indianapolis stations VHF and UHF analog signals with indoor antennas. To establish the LOS signal levels in that area, a set of initial measurements with a dipole at 6 feet were taken a mile North of Martinsville in the Carpenter Realty parking lot - just over the crest of the hill on the downhill slope towards Martinsville which is the side shaded from the Indianapolis towers. These measurements correspond closely to the expected signal levels so the Harris, Apex and Magnavox receivers all had good lock on all signals. This site provides about 15 – 18 dB reception margin for the current UHF DTV signals and about 6 – 8 dB reception margin for the two current VHF DTV signals. Then a set of outdoor measurements with the dipole at 6 feet were made in the Wal Mart parking lot in Martinsville itself, which is a clear flat area in Martinsville directly South of the Carpenter Realty site. Because of the lower elevation and the hill, the UHF levels were expected to be about 12 – 14 dB lower and the VHF levels expected to be about 11 dB lower than those taken up on the hill, levels which would be expected to provide marginal UHF DTV reception and no VHF DTV reception. Surprisingly the signals in the Martinsville Wal Mart lot did not drop as much as expected – the UHF signals (even more surprisingly) dropped only 3 dB or less and the VHF signals dropped 6 – 8 dB. But the 6 – 8 dB drop in the VHF DTV signals pushed them over the edge of reception, with the Harris ARX-H100, and the Apex and Magnavox consumer receivers only able to achieve occasional intermittent signal lock on the VHF signals while reception of the UHF DTV signal lock held quite steady with close to 10 dB margin to spare. It is clear from these measurements that, while the UHF signal levels are well more than sufficient to be reliably received with indoor antennas at

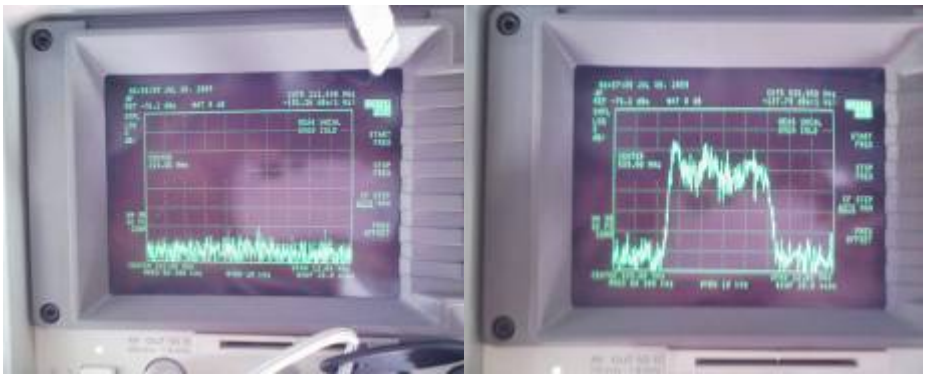
37 miles distance in Martinsville, the VHF signal levels are not sufficient for Martinsville viewers to continue to receive VHF television with indoor antennas.

Martinsville SR 37 Carpenter Realty Parking Lot Across SR 37 From Faith Church: 36 mi.

7-30 1:00 PM Consumer Dipole at 6'

	RF	HP SA Sig Lvl	ARX-H100	Magnavox (on 7-14 @ 8:00 PM)
WRTV Expect -60.4 dBm	25	-61 dBm	-63 dBm	20 Steady
WXIN Expect -64.1 dBm	45	- 64 dBm	-73 dBm	20 Steady
WISH Expect -66.8 dBm	9	-70 dBm	-67 dBm	18 Intermittent Lock/Pixelazation
WTHR Expect -71.0 dBm	13	-68 dBm	-63 dBm	20 Steady

Martinsville Wal-Mart Parking Lot: 37 mi.



7-30 1:30 PM Consumer Dipole at 6'

	RF	HP SA Sig Lvl	ARX-H100	Magnavox (on 7-14 @ 8:20 PM)
WRTV Expect -72.5 dBm	25	-62 dBm	-64 dBm	20 Steady
WXIN Expect -78.2 dBm	45	- 67 dBm	-72 dBm	17 Steady
WISH Expect -77.5 dBm	9	-76 dBm	-81 dBm	Occasional Lock
WTHR Expect -82.9 dBm	13	-76 dBm	-78 dBm	Very Intermittent Brief Lock
WFYI Expect -80.3 dBm	21			15 Steady

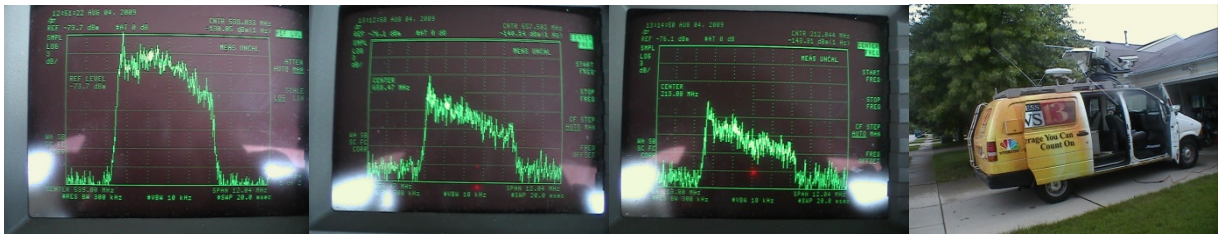
Case 4

WTHR has received several complaints of difficulty receiving WTHR digital 13 with indoor antennas, while having no problem receiving UHF DTV signals, from viewers in the Greenwood, Indiana area. These viewers report formerly having good reception of WTHR's analog signal with indoor antennas. Greenwood is a large suburb immediately on the South side of Indianapolis, straddling southern Marion and northern Johnson counties. The terrain is flat to a few gently rolling hills. Measurements were taken in the driveway of and inside one such viewer's home at 1168 Crescent Drive, Greenwood. The home is a typical single story frame home in the subdivision, closely spaced with other homes and only a few smaller trees on the otherwise flat terrain. In the driveway with a dipole at 6 feet, UHF and VHF signals were found to vary greatly with antenna location, peaking 20 – 30 dB below expected, possibly due to the two story houses to the immediate north or downtown Indianapolis buildings. However, the signals were still strong enough that a hand held battery TV with a monopole could lock the signals at spots in the driveway. And with the dipole elevated to 30 feet, the

signals gained all of the 20 – 30 dB and were at expected levels. In fact this increase was seen once the dipole antenna was elevated only 15 feet. At 5 feet elevation inside the home the UHF signals were only 1 – 2 dB reduced and the VHF signals only 0 – 1 dB reduced from the signal levels measured at 6 feet in the driveway. The viewer was found to be using a thin flat RCA ANT1050 antenna laid on top of her Zenith SF3935W analog set, along with a Magnavox DTV converter box. Both outside in the driveway and inside the home, moving the antenna a few inches in any direction caused both VHF and UHF received signal levels to vary widely. Additionally, a huge CW signal spike was observed at about 213.7 Mhz, completely eliminating reception of WTHR's channel 13 DTV signal. This signal was found to be produced by the Zenith TV set. Moving the antenna about 4 feet from the set reduced the CW signal below the observable threshold and identified a spot with a pretty good -65 dBm signal from WTHR. Further experimentation found that the 213.7 Mhz signal was moved/eliminated by tuning the TV from channel 3 to channel 4. So the Magnavox converter box output and the analog TV's tuner were switched to channel 4 and the 213.7 Mhz signal was gone. Upon advisement, the viewer switched from the ANT1050 to an older Archer brand rabbit ears and loop which further improved and achieved good reception of all DTV channels.

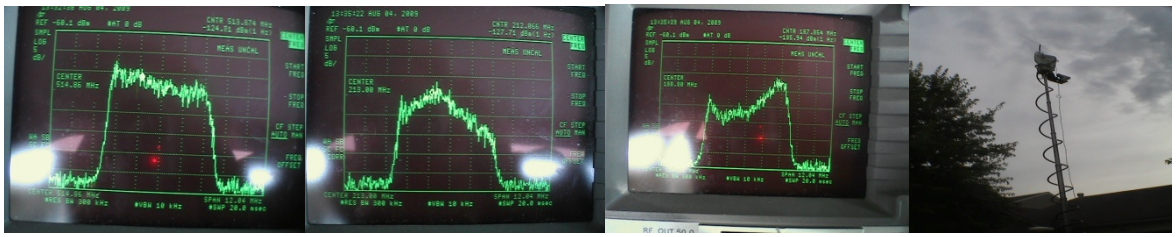
Both in the driveway and in the home the VHF and UHF signal levels vary 10 – 15 dB from spot to spot. Moving the antenna a few inches made a huge difference. At numerous spots the peak signal levels in the home are sufficient for good VHF and UHF DTV reception. However – due to their significantly lower strength – the VHF signals are significantly more difficult for the viewer to find and receive.

1168 Crescent Dr., Greenwood: 22.8 mi.



8-4 5:15 PM Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100
WRTV Expect -29.1 dBm	25	-59 dBm	-58 dBm
WHMB Expect -31.5 dBm	16	-58 dBm	-60 dBm
WXIN Expect -32.5 dBm	45	-59 dBm	-69 dBm (??)
WFYI Expect -34.7 dBm	21	-63 dBm	-68 dBm
WISH Expect -38.4 dBm	9	-65 dBm	-66 dBm
WTHR Expect -41.0 dBm	13	-66 dBm	-68 dBm



8-4 5:45 PM Consumer Dipole at 30' (mast up and antenna rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100 (?? – H100 does not appear to track at these higher levels)
WRTV Expect -29.0 dBm	25	-31 dBm	-56 dBm
WHMB Expect -31.4 dBm	16	-32 dBm	-53 dBm

WXIN Expect -32.5 dBm	45	-35 dBm	-58 dBm
WFYI Expect -34.7 dBm	21	-32 dBm	-54 dBm
WISH Expect -37.0 dBm	9	-37 dBm	-52 dBm
WTHR Expect -40.2 dBm	13	-40 dBm	-52 dBm

8-4 6:30 PM Indoors - RCA ANT1050 at 5' (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl
WRTV Expect -29.1 dBm	25	-60 dBm
WHMB Expect -31.5 dBm	16	-67 dBm
WXIN Expect -32.5 dBm	45	-61 dBm
WFYI Expect -34.7 dBm	21	-64 dBm
WISH Expect -38.4 dBm	9	-65 dBm
WTHR Expect -41.0 dBm	13	-67 dBm (CW 'spike' from analog TV set observed at 213.7 Mhz)

Case 5

WTHR received a complaint of some signal instability and picture breakup with WTHR digital 13 with an indoor antenna, at a location on the north side of Indianapolis, about 5 miles from the WTHR tower. Measurements and observations were taken in the driveway of and inside the viewer's home at 7328 North Chester Drive, Indianapolis. The home is a typical large brick two story home on a moderate sized lot in an approximately 50 year old subdivision thick with mature trees. In the driveway with a dipole at 6 feet, UHF and VHF signals were found to vary somewhat with antenna location, peaking at or within 2 dB of expected signal levels. With the dipole elevated to 30 feet, the signals gained 0 – 1 dB, may have gained a couple more dB if the antenna were raised above the treetops. Walking up to the house and within the house I was able to easily lock channel 13's DTV signal on a hand held battery operated 7" DTV receiver with an extended monopole antenna. At 6 feet elevation inside the home the UHF signals were attenuated about 4 – 9 dB and the VHF signals about 10 dB from the signal levels measured at 6 feet in the driveway. The viewer was found to be using a Terk HDTVa VHF/UHF indoor antenna and actually had excellent DTV reception. In fact WTHR (and most signals) registered a solid "99" on the viewer's Sharp HDTV's "signal meter". As in the driveway at 6 feet, moving the antenna a few inches in any direction caused the received signal levels to vary substantially, but signals were so strong that the viewer had very little trouble obtaining solid reception lock on both VHF and UHF signals. After some discussion I determined that the viewer's complaint had to do with compression artifacts with fast motion video rather than any signal problem. But this home is very instructive as to indoor reception issues (or the lack thereof) in a strong signal density environment.

Both in the driveway and in the home the VHF and UHF signal levels vary significantly from spot to spot. However, with the strong good signals, the viewer had little or no problem finding and optimizing reception of each.

7328 North Chester St., Indianapolis: 5.15 mi.

8-6 3:45 PM Driveway – Consumer Dipole at 6’ (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl
WRTV Expect -16.3 dBm	25	-11 dBm
WXIN Expect -19.2 dBm	45	-23 dBm
WFYI Expect -21.9 dBm	21	-21 dBm
WISH Expect -23.4 dBm	9	-25 dBm
WTHR Expect -23.9 dBm	13	-20 dBm

8-4 4:00 PM Driveway – Consumer Dipole at 30’ (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl	ARX-H100
WRTV Expect -16.3 dBm	25	-12 dBm	-49 dBm
WXIN Expect -19.2 dBm	45	-23 dBm	
WFYI Expect -21.9 dBm	21	-22 dBm	
WISH Expect -23.4 dBm	9	-25 dBm	
WTHR Expect -23.9 dBm	13	-20 dBm	-48 dBm

8-6 3:00 PM Indoors – Consumer Dipole at 6’ (antenna located/rotated for maximum on each signal)

	RF	HP SA Sig Lvl	AX-H100
WRTV Expect -16.3 dBm	25	-15 dBm	-49 dBm
WXIN Expect -19.2 dBm	45	-30 dBm	-54 dBm
WFYI Expect -21.9 dBm	21	-30 dBm	-57 dBm
WISH Expect -23.4 dBm	9	-35 dBm	-49 dBm
WTHR Expect -23.9 dBm	13	-30 dBm	-50 dBm

Case 6

WTHR has received several complaints of difficulty receiving WTHR digital 13 with indoor antennas, while being able to receive UHF DTV signals, from viewers in the Greenwood, Indiana area. Greenwood is a large suburb immediately on the South side of Indianapolis, straddling southern Marion and northern Johnson counties. The terrain is flat to a few gently rolling hills. One such complaint was received from a resident of a retirement community, Crestwood Village South, at 8801 S Madison Avenue. This location is 20.2 miles from WTHR’s tower so the signal strength is predicted to be relatively good at this location.

WTHR’s measurement team was accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth at this location. The viewer resides in a first floor apartment on the south side (the side away from the Indianapolis TV transmitter sites to the north) of a large three story dense concrete and brick apartment building. Initial measurements were taken at 6’ and 30’ in the parking lot immediately south of the apartment building itself, approximately 75 feet south of the viewer’s apartment. Across the board, the UHF and VHF

outdoor signals were found to be at least 20 dB lower than predicted, probably due to attenuation from the concrete/brick apartment building. The signals improved somewhat (5 dB) at 30' but were still attenuated as, at 30', the antenna was still below the roofline of the building.

The viewer had a small flat panel antenna and was able to receive Indianapolis UHF signals by pointing the antenna SSE through the apartment's patio door, aimed at another Crestwood apartment building immediately to the south, and also via a 'rabbit ear and loop' antenna through the bedroom window, also aimed at the building to the south. Signal measurements were then taken inside the apartment with absolutely no signals, VHF or UHF, found to be coming through the building from the transmitter sites to the north. However, useable UHF signals were found to be coming through the patio door and windows from the South/Southeast – apparently reflected from the apartment building to the south. But no VHF signals could be found or measured from any direction inside the apartment. The team was finally able to find weak but useable VHF signals from WTHR (13) and WISH (9) with the calibrated antenna outside of the apartment on the patio at about 8' height. These VHF signals also appeared to be reflected from the building to the south. The viewer repeatedly and firmly insisted that she was formerly able to receive a good channel 13 analog signal from WTHR through the patio door and bedroom window using the 'rabbit ears and loop' antenna. After both Mark and Al thoroughly questioned her several times, it appears that her report of formerly receiving analog channel 13 using the 'rabbit ears and loop' antenna is accurate, and the likely mechanism of receiving analog channel 13 had been signal reflection from the apartment building to the south.

Both in the parking lot and in the apartment the signal levels vary from spot to spot, however strength of the VHF signals inside the apartment is not sufficient to be detected on the spectrum analyzers or by the converter boxes. The level of the higher power UHF signals which are apparently reflected from the apartment building to the south are sufficient inside the viewer's apartment for UHF DTV reception however, due to the lower reflectivity and significantly lower power, the VHF signals are nonexistent inside the apartment, while being weak but receivable in spots immediately outside the apartment. While it is not totally clear that greater transmit power would make the VHF signals receivable inside the apartment, the viewer's convincing insistence that she previously could receive the VHF analog signals inside the apartment suggests that there is a good possibility that significantly increased VHF power would offer indoor VHF DTV reception to this viewer.

As an aside, the measurement team found a master antenna cable in the apartment and the viewer reported that management had recently dismantled and removed the non functional building master antennas. Subsequent to the measurement visit, I spoke with Crestwood Village properties Operations Manager Kimberly Johnson who said that the master antennas had indeed been decommissioned due to age and very little use/demand by residents. After hearing of her resident's problem, Ms. Johnson committed to survey residents as to desire/demand for the master antennas for DTV reception and she indicated that if it would be of benefit to even some residents, Crestwood would refurbish and return the master antennas to service, which would solve this particular viewer's problem.

Crestwood Village Retirement Community, 8801 South Madison Ave., Indianapolis: 20.2 mi.

8-11 10:00 AM Parking Lot 75' South of Viewer's Apartment - Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz channel power
WRTV Expect -27.7 dBm	25	-63 dBm

WISH Expect -35.9 dBm 9 -65 dBm
WTHR Expect -38.6 dBm 13 -63 dBm

8-11 10:45 AM Indoors - Consumer Dipole Inside Viewer's First Floor South Facing Apartment (antenna pointed toward and picking up signals apparently reflected from apartment building immediately to the south)

	RF	HP SA 6 Mhz channel power
WRTV Expect -27.7 dBm	25	-70 dBm
WISH Expect -35.9 dBm	9	no detectable signal
WTHR Expect -38.6 dBm	13	no detectable signal

8-11 11:00 AM Indoors – Using Viewer's Amplified Flat Panel Antenna Inside Viewer's First Floor South Facing Apartment (antenna pointed toward and picking up signals apparently reflected from apartment building immediately to the south)

	RF	HP SA 6 Mhz channel power
WRTV Expect -27.7 dBm	25	-67 dBm
WISH Expect -35.9 dBm	9	no detectable signal
WTHR Expect -38.6 dBm	13	no detectable signal

Case 7

WTHR received a complaint of DTV reception difficulty from a viewer near North Salem, Indiana in northwest Hendricks county, 25 miles due west of WTHR's transmitter site. North Salem is a small rural community in fairly flat farm country west of Indianapolis. This viewer lives in a secluded area outside of town and is using an older unamplified VHF/UHF multichannel Yagi style antenna mounted on a pole about 30' above ground. The viewer reports that he had the cable replaced within the past year and also says that he had good clear analog reception prior to June 12th. He reports that currently he has good reception of WRTV digital (RF channel 25), fair reception of WISH digital (RF 9) and marginal reception of WTHR digital (RF 13) and cannot receive any other DTV signals, even with turning his antenna several feet in either direction. WTHR's measurement team was accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth at this location. The measurement team noted one broken and another bent element in the viewer's obviously weathered antenna. After questioning, the viewer acknowledged that his antenna had suffered damage in a hailstorm.

The team conducted measurements at 6' and observations at 30' in the viewer's driveway near the viewer's antenna. Signals were found as expected with the antenna aimed at the Indianapolis broadcast tower 'farm', 90 degrees true, at a little lower level than predicted (about -7 dB with the exception of WTHR which was +2 dB better than expected), all well more than sufficient for good reception. (the team was even able to obtain some minimal lock on VHF and UHF DTV signals at a couple of spots near the driveway using a 7" hand held DTV with monopole antenna) The measurement team then noted similarly good Indianapolis DTV signals coming from about 45 degrees. After some discussion it was determined that there was a water tower about three miles distant in that direction, in Jamestown, Indiana, and the team, including Mr. Lueth, postulated that the signals seen at 45 degrees were likely being reflected from the Jamestown water tower. There was also some intermittent wideband impulse noise seen on the spectrum analyzer, peaked to the SE and NW, in the direction of the rear of the house and the road. This was thought to be from an electric fence, which the viewer acknowledged having, or a cracked power line insulator, but the noise did not seem to adversely affect DTV reception.

The team then took measurements inside the viewer's home and directly from the viewer's outdoor antenna. Using the tuned dipole inside the home adequate signal levels were found at several spots for reception of WTHR's digital signal a well as several other Indianapolis UHF and VHF digital signals. A check at the cable from the viewer's outdoor antenna showed several more than adequate Indianapolis DTV signals, but the viewer's set and converter box would not lock on several of the signals – most notably WXIN (RF 45). The signals were then checked ahead of a passive signal splitter the viewer was using, with the same results. The measurement team, including Mr. Lueth, determined that the most likely cause of the viewer's reception problem was that the damaged antenna had lost its normal half power beamwidth and was now accepting both the direct signals and the signals reflected from the water tower, causing a significantly long delayed multipath signal which may be near or beyond the range of the receiver's adaptive equalizer. A recommendation for more directional high VHF and UHF antennas was provided to the viewer.

As a sidenote, once inside the home, the intermittent wideband impulse noise seen outside was discovered to be coming from a grandchild's electric train set which the youngster had intermittently run during our visit. Interestingly, the noise did not seem to adversely affect the viewer's or our reception and DTV signal lock, and the viewer explained that the grandchild's family was in the process of moving and was temporarily staying with them so the train set would be gone in a matter of days.

8502 N County Road 725 West, North Salem: 25.5 mi.

8-11 7:45 PM Driveway adjacent to viewer's antenna - Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA Signal Level
WRTV Expect -42.5 dBm	25	-51 dBm
WXIN Expect -43.5 dBm	45	-62 dBm
WISH Expect -56.8 dBm	9	-61 dBm
WTHR Expect -61.9 dBm	13	-59 dBm

8-11 8:30 PM Inside the viewer's family room - Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA Signal Level
WRTV Expect -42.5 dBm	25	-59 dBm
WTHR Expect -61.9 dBm	13	-64 dBm

Case 8

WTHR received a complaint of difficulty receiving WTHR digital 13 with an indoor antenna, while being able to receive UHF DTV signals, from a viewer near Edinburgh, Indiana. The viewer reports having had good analog reception with indoor "rabbit ears" and currently has some reception of WTHR digital on a bedroom set with converter box, but since June 12th has had no reception of WTHR on their large Panasonic HDTV. Both converter box and HDTV are on indoor antennas. Edinburgh is a rural town near Interstate 65 about 42 miles

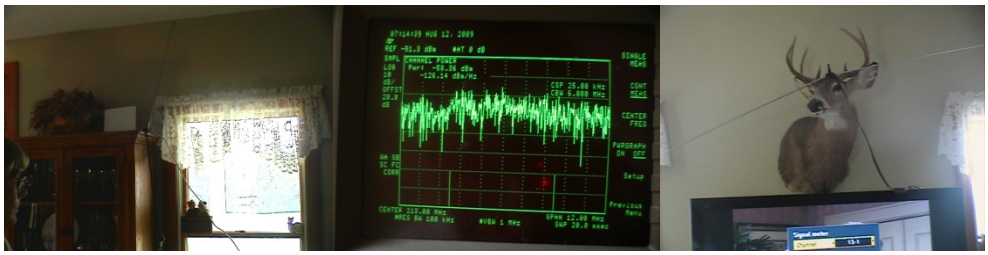
south of WTHR's transmitter site. The terrain is rolling occasionally hilly farm country. This particular viewer is located on a farm at a somewhat elevated location, so is predicted to receive relatively good DTV signals.

WTHR's measurement team was accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth at this location. The viewer's home is located in a clear area with a good view to the north. Initial measurements were taken at 6' and 30' in the viewer's driveway and the UHF and VHF outdoor signals were found to somewhat better (2 – 6 dB) than predicted – probably because of the clear shot from this elevated site to the north. Fair UHF and VHF DTV reception was also acquired in the driveway on a small handheld 7" battery DTV using its monopole antenna.

The viewer's new Panasonic HDTV was located in a room on the south side of the home and had a small flat panel antenna with a preamplifier placed next to the set. We observed this main HDTV set had fairly good reception of the Indianapolis UHF DTV signals, but no reception of VHF signals WISH (9) and WTHR (13). We were able to acquire both UHF and VHF reception at several spots inside the room using the handheld 7" battery DTV with its monopole antenna. The indoor UHF and VHF signal levels were found to vary from spot to spot much more than outside. Measurements were then taken inside the room using a consumer dipole antenna and a calibrated tuned dipole. At the signal peaks both signal and channel power levels were found to be within 1 – 2 dB of the signals found outdoors. The side of the room with a door facing to the north though the kitchen which had north facing windows had particularly good signals. The team substituted a consumer dipole, which demonstrated better VHF performance, for the viewer's amplified flat antenna and set the dipole atop a cabinet where the antenna could be set and the SA showed a VHF signal from WTHR. Several unsuccessful attempts were made to scan WTHR into the viewer's Panasonic set. The set was found to still have the old WTHR UHF channels memorized so these were deleted and with two more scans the set finally found and locked in WTHR on its VHF channel 13. After quite a few further attempts with the antenna moved to a location where a peak channel 9 signal was seen on the SA, the team was finally able to get the set to recognize and scan in WISH VHF channel 9 (something the viewer had also not been able to accomplish). The team then experimented with the viewer's powered flat panel antenna which did produce a signal from WTHR on the spectrum analyzer. But the team found that the viewer's flat panel antenna's preamplifier had too much gain, making the entire antenna/cable/preamplifier act as the antenna and every time someone touched or got near the antenna, the preamp or a connector, the antenna's characteristics would significantly change, making placement of the antenna very touchy and difficult. After a good deal of trial and error and rechecking with the Spectrum Analyzer, the flat panel antenna was finally left in a spot that produced both UHF and VHF reception.

The team then moved on to a bedroom set with converter box which was already marginally receiving WTHR's digital signal on a consumer dipole. We found a spot in a window that improved the VHF signal stability on that converter box and a recommendation for an indoor antenna with better VHF performance or a small outdoor UHF/VHF antenna was provided to the viewer.

While the VHF DTV signals inside the home at several spots were found to be adequate for reception with an indoor antenna (see photo of VHF reception with additional antlers on the deer), without the spectrum analyzer even with a better VHF antenna the viewer would have faced a great deal of antenna moving and rescanning to eventually find one of the spots where the much lower level VHF signals would have finally scanned in, while placing the antenna for and acquiring the higher power higher level UHF signals was relatively quite easy.



7348 West State Route 252, Edinburgh: 41.7 mi.

8-12 11:00 AM Driveway of home - Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz Channel Power
WRTV Expect -50.1 dBm	25	-44 dBm
WISH Expect -58.8 dBm	9	-55 dBm
WTHR Expect -60.9 dBm	13	-57 dBm
WXIN Expect -54.6 dBm	45	-56 dBm

8-12 11:30 AM Indoors - Consumer Dipole Inside Viewer's Family Room on South Side of House (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz Channel Power
WRTV Expect -50.1 dBm	25	-42 dBm
WTHR Expect -60.9 dBm	13	-58 dBm

Case 9

WTHR received a complaint of difficulty receiving WTHR's DTV signal from a viewer residing at 857 Gondola Run on the east side of Greenfield Indiana using an indoor antenna. Greenfield is a suburban community about 25 miles east of WTHR's transmission tower, and is the County Seat of Hancock County, which is the County immediately to the east of Indianapolis. The terrain is relatively flat suburban/farm country and this residence is located in a new subdivision with open areas and only a few small trees, so is expected to enjoy good DTV signals. WTHR's measurement team was accompanied by FCC Chicago Field Office Electronics Engineer Mark Lueth at this location. The measurement team set up in the street in front (to the north) of the residence. Initial outdoor measurements at 6' showed all DTV signal levels to be at or near the expected levels with the exception of WRTV RF 25 which was 10 dB lower than expected, however the spectrum of each signal was extremely distorted indicating severe multipath distortion. Upon conducting 'walk around' measurements with the tuned dipole at 6' and finding that the signals improved when he was shaded from the DTV signals by houses, Mr. Lueth pinpointed the likely cause of the distorted signals. Immediately behind the houses to the north (in the direction of the DTV signals) was a sizeable long retention pond and Mr. Lueth theorized that DTV signals were being reflected by the pond surface, causing a signal null/distortion at the truck and home locations when combined with the direct DTV signals. The WTHR team verified this by rotating the dipole to vertical polarity and observing that WISH DTV 9's horizontally polarized DTV signal was minimized while WTHR DTV 13's circularly polarized DTV signal significantly improved and flattened out. This 'textbook case' confirmed Mr. Lueth's theory since any interfering signals reflected from the pond surface would be horizontally polarized, so rotating the test dipole to vertical polarity nulled out signal reflections from the pond surface and received only the direct vertical component of WTHR's circularly polarized DTV signal. The dipole was then raised to 30' with horizontal polarity – above and out of the theorized retention pond signal reflection zone - and remarkable signal improvement to clean spectrum and better levels was observed, further confirming reflected signals from the pond surface to be the culprit.

The measurement team then entered the viewer's garage where the viewer's flat panel antenna had been located. The viewer reported that since her husband had initially called he had moved the antenna to a garage window and they were now receiving WTHR's DTV signal. Mr. Lueth made some further measurements inside the garage and found good DTV signals near the access to an above garage attic. The team recommended moving the antenna higher and out of the pond signal reflection zone, suggesting the garage attic as a probable good location.

857 Gondola Run, Greenfield: 26.2 mi.

8-12 5:30 PM - Street in Front of Home, Consumer Dipole at 6' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz Channel Power
WRTV Expect -38.5 dBm	25	-49 dBm – Very Distorted Spectrum
WISH Expect -51.8 dBm	9	-51 dBm – Very Distorted Spectrum
WTHR Expect -51.8 dBm	13	-51 dBm – Very Distorted Spectrum

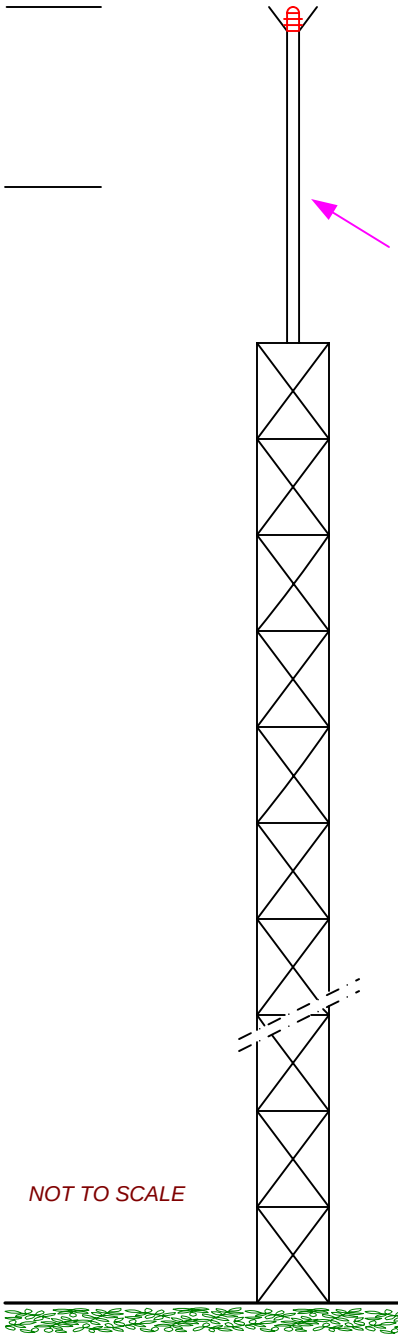
8-12 5:45 PM - Street in Front of Home, Consumer Dipole at 30' (antenna located/rotated for maximum on each signal)

	RF	HP SA 6 Mhz Channel Power
WRTV Expect -31.5 dBm	25	-36 dBm
WISH Expect -43.7 dBm	9	-47.5 dBm
WTHR Expect -43.3 dBm	13	-45 dBm
WXIN Expect -34.6 dBm	45	-40 dBm

ABOVE MEAN SEA LEVEL | **ABOVE GROUND**

567.9 METERS (1862.7') — (1039.1') 316.8 METERS

C/R 551.0 METERS (1807.3') — **(979.7') 298.7 METERS C/R**



EXISTING CHANNEL 13
WTHR-DT ANTENNA

TOWER REGISTRATION
No. 1024109

NOT TO SCALE

251.1 METERS (823.6') — (0') 0.0 METERS

EXHIBIT E-1
VERTICAL SKETCH
FOR THE PROPOSED OPERATION OF
WTHR-DT, INDIANAPOLIS, INDIANA
APRIL 2011

COHEN, DIPPELL AND EVERIST, P.C. Consulting Engineers Washington, D.C.

COHEN, DIPPELL AND EVERIST, P.C.

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

WTHR-DT, INDIANAPOLIS, INDIANA

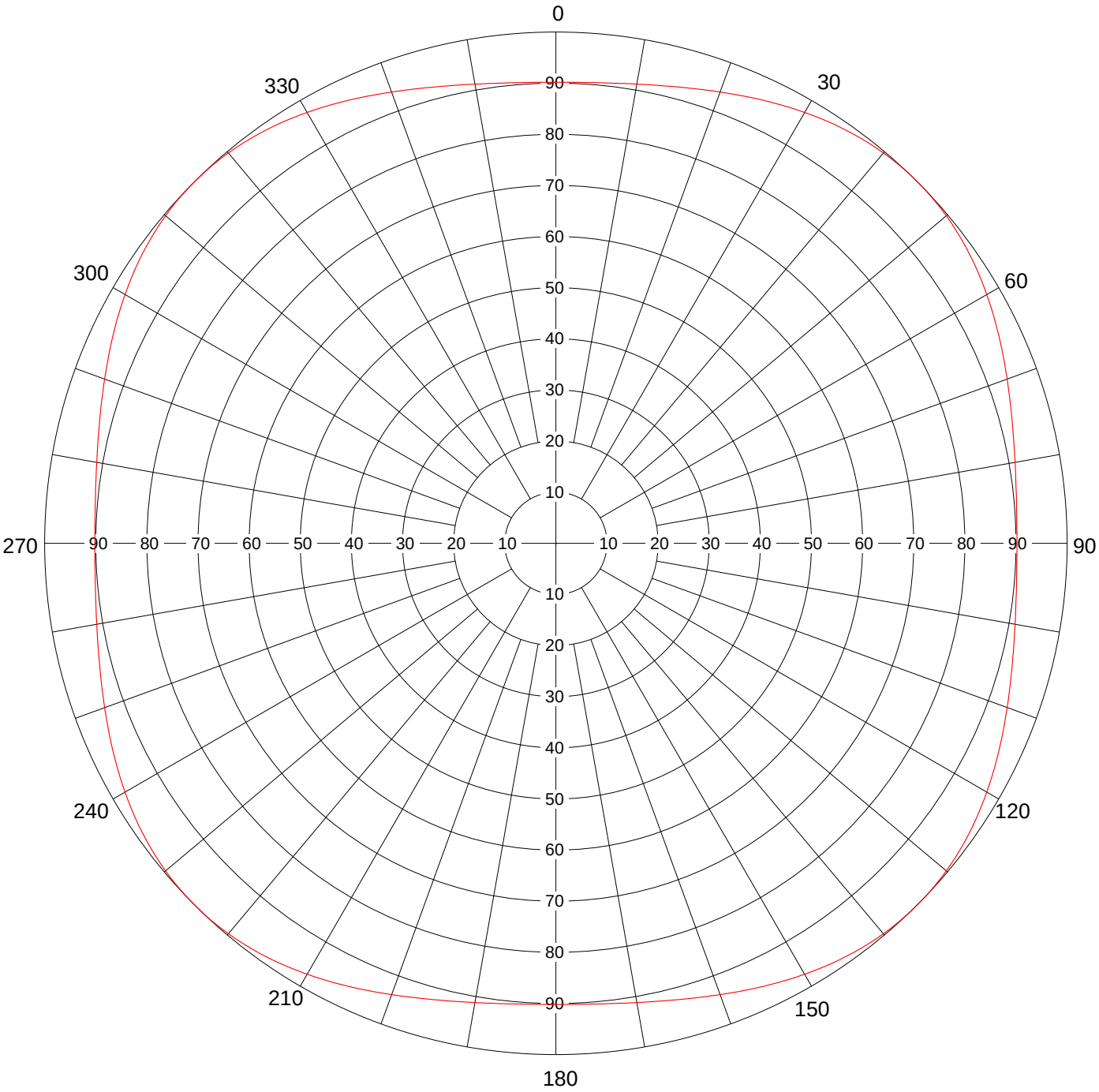
Exhibit No.
E-2

Dielectric

Date	**18 Jan 2011**		
Call Letters	**WTHR**	Channel	**13**
Location	**Indianapolis, IN**		
Customer	**WTHR**		
Antenna Type	**TCL-16A**		

AZIMUTH PATTERN

Gain	**1.10 (0.41 dB)**	Frequency	**213 MHz**
Calculated / Measured	**Calculated**	Drawing #	**TCL-O-HP**



Remarks:

Exhibit No.
E-2

Dielectric

Date	**18 Jan 2011**		
Call Letters	**WTHR**	Channel	**13**
Location	**Indianapolis, IN**		
Customer	**WTHR**		
Antenna Type	**TCL-16A**		

TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing # **TCL-O-HP**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.902	45	1.000	90	0.902	135	1.000	180	0.902	225	1.000	270	0.902	315	1.000
1	0.902	46	1.000	91	0.902	136	1.000	181	0.902	226	1.000	271	0.902	316	1.000
2	0.902	47	0.999	92	0.902	137	0.999	182	0.902	227	0.999	272	0.902	317	0.999
3	0.903	48	0.999	93	0.903	138	0.999	183	0.903	228	0.999	273	0.903	318	0.999
4	0.903	49	0.998	94	0.903	139	0.998	184	0.903	229	0.998	274	0.903	319	0.998
5	0.904	50	0.997	95	0.904	140	0.997	185	0.904	230	0.997	275	0.904	320	0.997
6	0.906	51	0.995	96	0.906	141	0.995	186	0.906	231	0.995	276	0.906	321	0.995
7	0.907	52	0.994	97	0.907	142	0.994	187	0.907	232	0.994	277	0.907	322	0.994
8	0.908	53	0.992	98	0.908	143	0.992	188	0.908	233	0.992	278	0.908	323	0.992
9	0.910	54	0.990	99	0.910	144	0.990	189	0.910	234	0.990	279	0.910	324	0.990
10	0.912	55	0.987	100	0.912	145	0.987	190	0.912	235	0.987	280	0.912	325	0.987
11	0.914	56	0.985	101	0.914	146	0.985	191	0.914	236	0.985	281	0.914	326	0.985
12	0.916	57	0.982	102	0.916	147	0.982	192	0.916	237	0.982	282	0.916	327	0.982
13	0.919	58	0.979	103	0.919	148	0.979	193	0.919	238	0.979	283	0.919	328	0.979
14	0.921	59	0.976	104	0.921	149	0.976	194	0.921	239	0.976	284	0.921	329	0.976
15	0.924	60	0.973	105	0.924	150	0.973	195	0.924	240	0.973	285	0.924	330	0.973
16	0.927	61	0.970	106	0.927	151	0.970	196	0.927	241	0.970	286	0.927	331	0.970
17	0.930	62	0.967	107	0.930	152	0.967	197	0.930	242	0.967	287	0.930	332	0.967
18	0.933	63	0.963	108	0.933	153	0.963	198	0.933	243	0.963	288	0.933	333	0.963
19	0.936	64	0.960	109	0.936	154	0.960	199	0.936	244	0.960	289	0.936	334	0.960
20	0.939	65	0.956	110	0.939	155	0.956	200	0.939	245	0.956	290	0.939	335	0.956
21	0.943	66	0.953	111	0.943	156	0.953	201	0.943	246	0.953	291	0.943	336	0.953
22	0.946	67	0.950	112	0.946	157	0.950	202	0.946	247	0.950	292	0.946	337	0.950
23	0.950	68	0.946	113	0.950	158	0.946	203	0.950	248	0.946	293	0.950	338	0.946
24	0.953	69	0.943	114	0.953	159	0.943	204	0.953	249	0.943	294	0.953	339	0.943
25	0.956	70	0.939	115	0.956	160	0.939	205	0.956	250	0.939	295	0.956	340	0.939
26	0.960	71	0.936	116	0.960	161	0.936	206	0.960	251	0.936	296	0.960	341	0.936
27	0.963	72	0.933	117	0.963	162	0.933	207	0.963	252	0.933	297	0.963	342	0.933
28	0.967	73	0.930	118	0.967	163	0.930	208	0.967	253	0.930	298	0.967	343	0.930
29	0.970	74	0.927	119	0.970	164	0.927	209	0.970	254	0.927	299	0.970	344	0.927
30	0.973	75	0.924	120	0.973	165	0.924	210	0.973	255	0.924	300	0.973	345	0.924
31	0.976	76	0.921	121	0.976	166	0.921	211	0.976	256	0.921	301	0.976	346	0.921
32	0.979	77	0.919	122	0.979	167	0.919	212	0.979	257	0.919	302	0.979	347	0.919
33	0.982	78	0.916	123	0.982	168	0.916	213	0.982	258	0.916	303	0.982	348	0.916
34	0.985	79	0.914	124	0.985	169	0.914	214	0.985	259	0.914	304	0.985	349	0.914
35	0.987	80	0.912	125	0.987	170	0.912	215	0.987	260	0.912	305	0.987	350	0.912
36	0.990	81	0.910	126	0.990	171	0.910	216	0.990	261	0.910	306	0.990	351	0.910
37	0.992	82	0.908	127	0.992	172	0.908	217	0.992	262	0.908	307	0.992	352	0.908
38	0.994	83	0.907	128	0.994	173	0.907	218	0.994	263	0.907	308	0.994	353	0.907
39	0.995	84	0.906	129	0.995	174	0.906	219	0.995	264	0.906	309	0.995	354	0.906
40	0.997	85	0.904	130	0.997	175	0.904	220	0.997	265	0.904	310	0.997	355	0.904
41	0.998	86	0.903	131	0.998	176	0.903	221	0.998	266	0.903	311	0.998	356	0.903
42	0.999	87	0.903	132	0.999	177	0.903	222	0.999	267	0.903	312	0.999	357	0.903
43	0.999	88	0.902	133	0.999	178	0.902	223	0.999	268	0.902	313	0.999	358	0.902
44	1.000	89	0.902	134	1.000	179	0.902	224	1.000	269	0.902	314	1.000	359	0.902

Remarks:

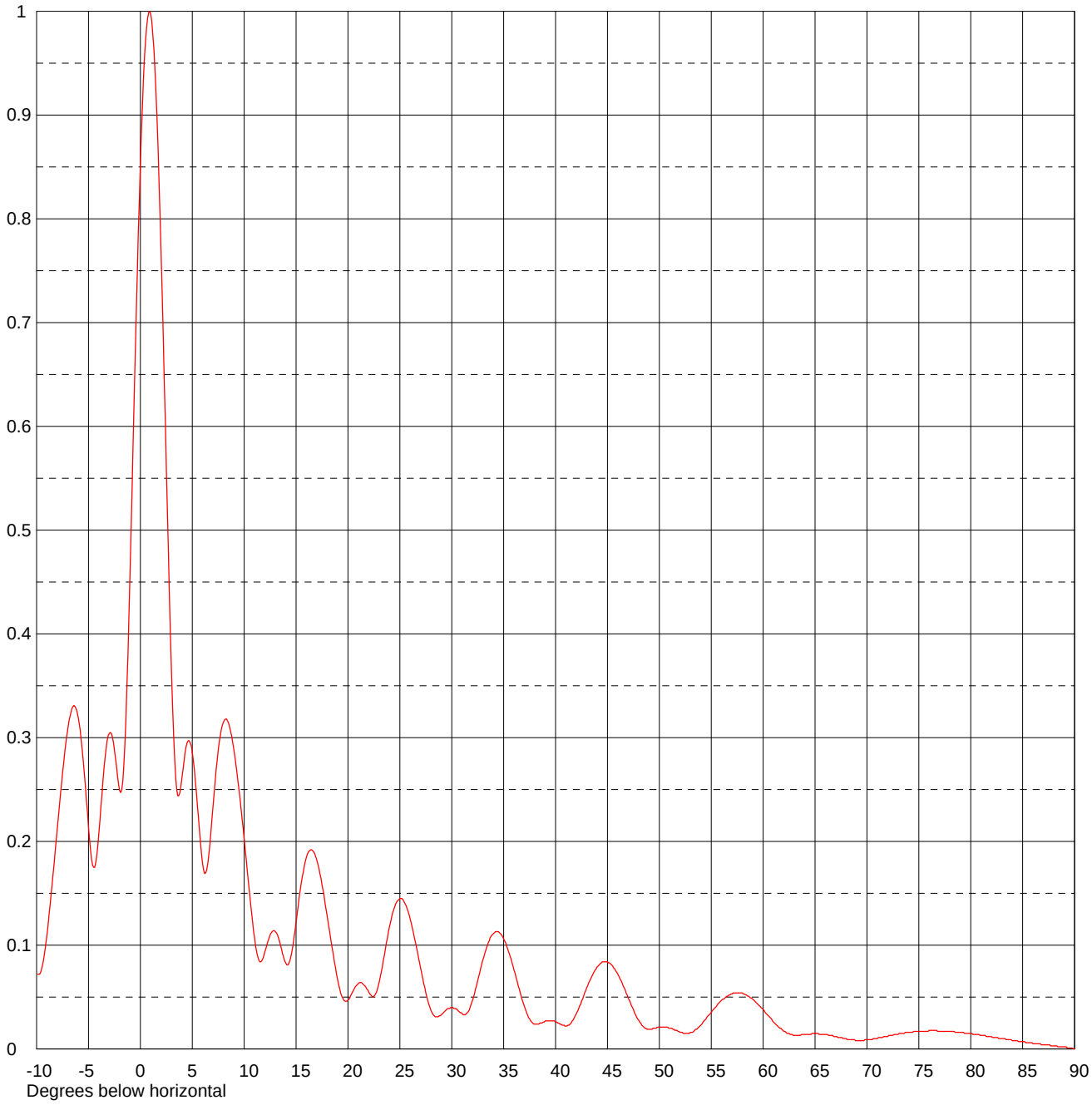
Exhibit No.
E-2

Dielectric

Date	**29 Dec 2010**		
Call Letters	**WTHR**	Channel	**13**
Location	**Indianapolis, IN**		
Customer	**VideoIndiana**		
Antenna Type	**TCL-16A**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**8.0 (9.03 dB)**	Beam Tilt	**0.90 Degrees**
RMS Gain at Horizontal	**5.8 (7.63 dB)**	Frequency	**213.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**03T080090-90**



Remarks:

Exhibit No.
E-2

Dielectric

Date	**29 Dec 2010**		
Call Letters	**WTHR**	Channel	**13**
Location	**Indianapolis, IN**		
Customer	**VideoIndiana**		
Antenna Type	**TCL-16A**		

TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing # **03T080090-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.074	2.4	0.603	10.6	0.142	30.5	0.038	51.0	0.020	71.5	0.011
-9.5	0.078	2.6	0.518	10.8	0.123	31.0	0.034	51.5	0.018	72.0	0.012
-9.0	0.110	2.8	0.436	11.0	0.107	31.5	0.035	52.0	0.016	72.5	0.013
-8.5	0.159	3.0	0.362	11.5	0.084	32.0	0.047	52.5	0.015	73.0	0.014
-8.0	0.213	3.2	0.302	12.0	0.094	32.5	0.066	53.0	0.016	73.5	0.015
-7.5	0.266	3.4	0.262	12.5	0.110	33.0	0.086	53.5	0.019	74.0	0.016
-7.0	0.308	3.6	0.244	13.0	0.113	33.5	0.102	54.0	0.023	74.5	0.017
-6.5	0.330	3.8	0.247	13.5	0.100	34.0	0.111	54.5	0.029	75.0	0.017
-6.0	0.320	4.0	0.261	14.0	0.083	34.5	0.113	55.0	0.035	75.5	0.017
-5.5	0.277	4.2	0.277	14.5	0.089	35.0	0.106	55.5	0.041	76.0	0.018
-5.0	0.214	4.4	0.291	15.0	0.122	35.5	0.093	56.0	0.047	76.5	0.018
-4.5	0.175	4.6	0.297	15.5	0.160	36.0	0.076	56.5	0.051	77.0	0.017
-4.0	0.208	4.8	0.295	16.0	0.185	36.5	0.058	57.0	0.053	77.5	0.017
-3.5	0.271	5.0	0.286	16.5	0.192	37.0	0.041	57.5	0.054	78.0	0.017
-3.0	0.304	5.2	0.269	17.0	0.182	37.5	0.029	58.0	0.054	78.5	0.016
-2.8	0.304	5.4	0.247	17.5	0.158	38.0	0.024	58.5	0.051	79.0	0.016
-2.6	0.295	5.6	0.222	18.0	0.128	38.5	0.025	59.0	0.048	79.5	0.015
-2.4	0.280	5.8	0.197	18.5	0.096	39.0	0.027	59.5	0.043	80.0	0.015
-2.2	0.263	6.0	0.178	19.0	0.067	39.5	0.027	60.0	0.038	80.5	0.014
-2.0	0.249	6.2	0.169	19.5	0.049	40.0	0.026	60.5	0.032	81.0	0.013
-1.8	0.250	6.4	0.173	20.0	0.047	40.5	0.024	61.0	0.026	81.5	0.012
-1.6	0.272	6.6	0.188	20.5	0.056	41.0	0.022	61.5	0.021	82.0	0.012
-1.4	0.317	6.8	0.209	21.0	0.063	41.5	0.025	62.0	0.017	82.5	0.011
-1.2	0.381	7.0	0.234	21.5	0.062	42.0	0.034	62.5	0.015	83.0	0.010
-1.0	0.458	7.2	0.258	22.0	0.055	42.5	0.046	63.0	0.013	83.5	0.009
-0.8	0.541	7.4	0.279	22.5	0.051	43.0	0.059	63.5	0.013	84.0	0.008
-0.6	0.626	7.6	0.296	23.0	0.064	43.5	0.070	64.0	0.014	84.5	0.008
-0.4	0.709	7.8	0.308	23.5	0.090	44.0	0.079	64.5	0.014	85.0	0.007
-0.2	0.786	8.0	0.315	24.0	0.118	44.5	0.084	65.0	0.015	85.5	0.006
0.0	0.854	8.2	0.318	24.5	0.137	45.0	0.084	65.5	0.014	86.0	0.005
0.2	0.911	8.4	0.316	25.0	0.145	45.5	0.080	66.0	0.014	86.5	0.005
0.4	0.956	8.6	0.310	25.5	0.140	46.0	0.072	66.5	0.013	87.0	0.004
0.6	0.985	8.8	0.301	26.0	0.125	46.5	0.061	67.0	0.012	87.5	0.004
0.8	0.999	9.0	0.289	26.5	0.103	47.0	0.049	67.5	0.011	88.0	0.003
1.0	0.997	9.2	0.274	27.0	0.078	47.5	0.038	68.0	0.010	88.5	0.002
1.2	0.978	9.4	0.258	27.5	0.054	48.0	0.028	68.5	0.009	89.0	0.002
1.4	0.945	9.6	0.241	28.0	0.037	48.5	0.021	69.0	0.008	89.5	0.001
1.6	0.897	9.8	0.222	28.5	0.031	49.0	0.019	69.5	0.008	90.0	0.000
1.8	0.836	10.0	0.202	29.0	0.033	49.5	0.020	70.0	0.009		
2.0	0.765	10.2	0.182	29.5	0.038	50.0	0.021	70.5	0.009		
2.2	0.686	10.4	0.162	30.0	0.040	50.5	0.021	71.0	0.010		

Remarks:

COHEN, DIPPELL AND EVERIST, P.C.

TABLE I
LONGLEY-RICE INTERFERENCE
FOR THE OPERATION FOR
WTHR-DT, INDIANAPOLIS, INDIANA
CHANNEL 13 42.1 KW ERP MAX DA (H&V) 299 METERS HAAT
APRIL 2011

Channel	Call	City/State	Dist(km)	Status	FCC File No.	Result
12	WINM	ANGOLA IN	205.6	APP	BPCDT-20090817ACR	No interference
12	WINM	ANGOLA IN	205.6	LIC	BLCDT-20021025AAN	No interference
12	WKRC-TV	CINCINNATI OH	170	LIC	BLCDT-20090622AFI	No interference
13	WREX	ROCKFORD IL	367.2	APP	BPCDT-20091030AGT	0.17%
13	WREX	ROCKFORD IL	367.2	CP MO	BMPCDT-20080619ADW	0.34%
13	WCFN	SPRINGFIELD IL	284.7	CP MO	BMPCDT-20080619AJM	0.48%
13	WBKO	BOWLING GREEN KY	319.2	CP	BPCDT-20110218ABM	1.24%
13	WBKO	BOWLING GREEN KY	319.2	Archived	BMPCDT-20080611AAQ	0.82%
13	WBXV-CA	LOUISVILLE KY	176.2	LIC	BLTVA-20050202ABW	No interference
13	WZZM	GRAND RAPIDS MI	376.5	CP	BPCDT-20091204ACT	0.00%
13	WTVG	TOLEDO OH	303.8	APP	BMPCDT-20110111AAI	0.03%
13	WTVG	TOLEDO OH	303.8	CP MO	BMPCDT-20090507AAD	0.03%
13	WOWK-TV	HUNTINGTON WV	376.9	CP	BMPCDT-20080620AJA	0.00%

TABLE II
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
WTHR, INDIANAPOLIS, INDIANA
CHANNEL 13 42.1 KW ERP 299 METERS HAAT
APRIL 2011

Radial Bearing (N ° E, T)	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle degrees	ERP At Radio Horizon kW	Distance to Contour F(50,90) 43 dBu City Grade km	36 dBu Noise-Limited km
0	277.5	273.5	0.458	34.7	88.3	100.8
10	276.8	274.2	0.459	35.7	88.5	101.1
20	274.4	276.6	0.461	37.7	89.1	101.6
30	265.0	286.0	0.468	40.3	89.9	102.6
40	260.3	290.7	0.472	42.2	90.5	103.2
50	256.1	294.9	0.476	42.7	90.8	103.5
60	251.9	299.1	0.479	42.2	90.9	103.7
70	245.2	305.8	0.484	40.3	91.0	103.9
80	242.2	308.8	0.487	37.7	90.7	103.5
90	241.9	309.1	0.487	35.7	90.3	103.1
100	242.4	308.6	0.487	34.7	90.1	102.8
110	246.0	305.0	0.484	35.7	90.0	102.8
120	245.2	305.8	0.484	37.7	90.5	103.3
130	246.5	304.5	0.483	40.3	90.9	103.8
140	244.8	306.2	0.485	42.2	91.4	104.3
150	243.6	307.4	0.486	42.7	91.6	104.5
160	241.4	309.6	0.487	42.2	91.7	104.6
170	238.6	312.4	0.490	40.3	91.5	104.4
180	233.6	317.4	0.493	37.7	91.4	104.3
190	232.3	318.7	0.495	35.7	91.0	103.9
200	233.0	318.0	0.494	34.7	90.8	103.6
210	237.2	313.8	0.491	35.7	90.7	103.5
220	238.7	312.3	0.490	37.7	91.0	103.8
230	245.3	305.7	0.484	40.3	91.0	103.9
240	253.6	297.4	0.478	42.2	90.8	103.6
250	257.1	293.9	0.475	42.7	90.7	103.5
260	259.9	291.1	0.473	42.2	90.5	103.2
270	262.7	288.3	0.470	40.3	90.0	102.7

TABLE II
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
WTHR, INDIANAPOLIS, INDIANA
CHANNEL 13 42.1 KW ERP 299 METERS HAAT
APRIL 2011

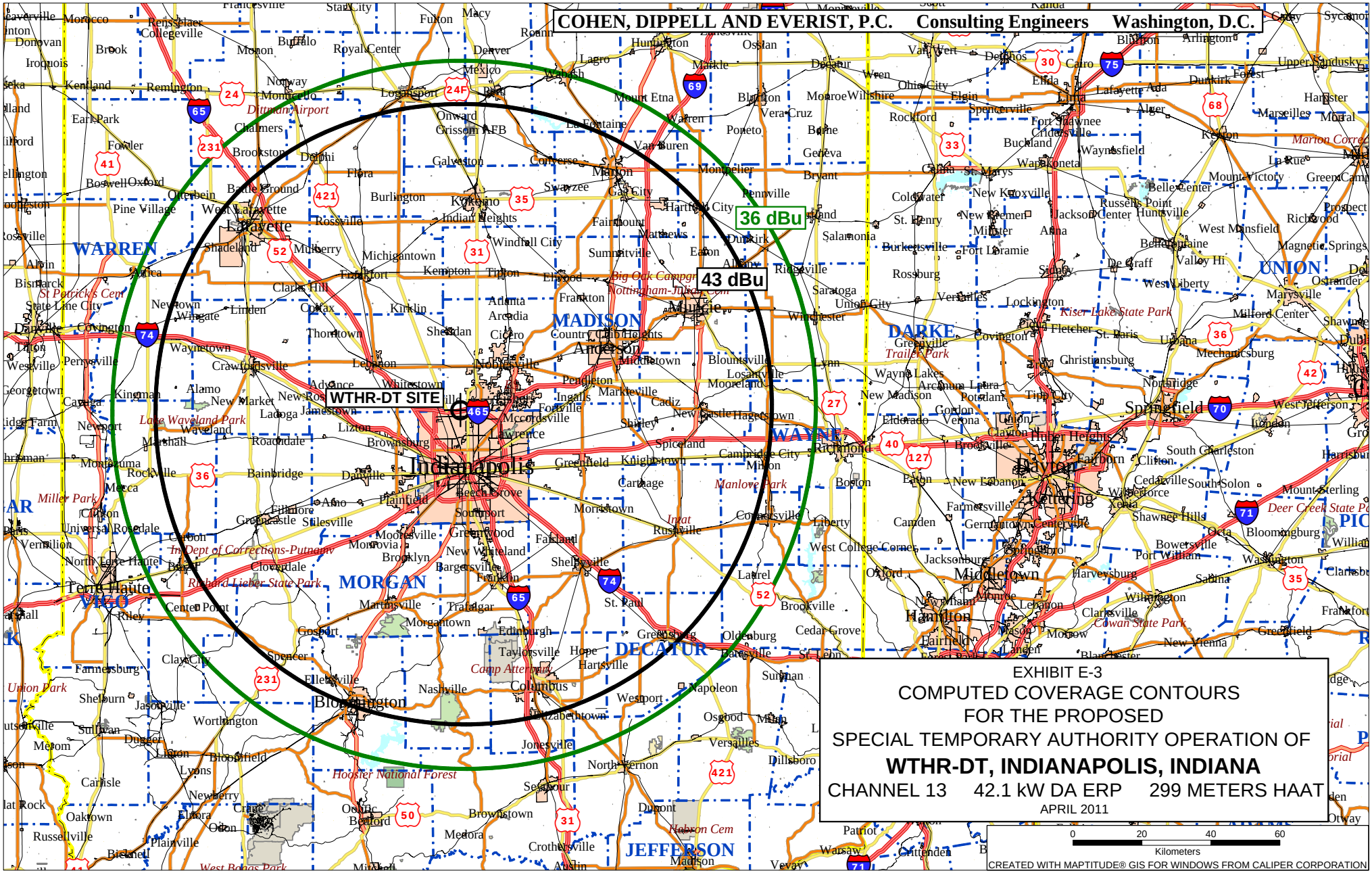
Radial Bearing (N ° E, T)	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle degrees	ERP At Radio Horizon kW	Distance to Contour F(50,90) 43 dBu City Grade km	36 dBu Noise-Limited km
280	268.9	282.1	0.465	37.7	89.3	101.8
290	271.7	279.3	0.463	35.7	88.7	101.3
300	274.3	276.7	0.461	34.7	88.4	100.9
310	275.7	275.3	0.460	35.7	88.6	101.1
320	276.8	274.2	0.459	37.7	89.0	101.5
330	275.8	275.2	0.460	40.3	89.5	102.1
340	272.2	278.8	0.462	42.2	90.0	102.6
350	272.1	278.9	0.463	42.7	90.1	102.7
320	274.7	276.3	0.460	47.129	90.8	103.4
330	276.2	274.8	0.459	45.066	90.4	103.0
340	277.9	273.1	0.458	42.148	89.8	102.4
350	277.9	273.1	0.458	39.848	89.4	101.9

* Based on data from FCC 3-second database

DTV Channel 13 (210-216 MHz)
Average Elevation 3.2 to 16.1 km 257.2 meters AMSL
Center of Radiation 551 meters AMSL
Antenna Height Above Average Terrain 299 meters
Effective Radiated Power 42.1 kW (16.24 dBk) Max.

North Latitude: 39° 55' 43"
West Longitude: 86° 10' 55"

(NAD-27)


COHEN, DIPPELL AND EVERIST, P.C. Consulting Engineers Washington, D.C.
36 dBu
43 dBu
WTHR-DT SITE
EXHIBIT E-3
COMPUTED COVERAGE CONTOURS
FOR THE PROPOSED
SPECIAL TEMPORARY AUTHORITY OPERATION OF
WTHR-DT, INDIANAPOLIS, INDIANA
CHANNEL 13 42.1 kW DA ERP 299 METERS HAAT
APRIL 2011
0 20 40 60
Kilometers
CREATED WITH MAPTITUDE® GIS FOR WINDOWS FROM CALIPER CORPORATION

SECTION III - D - DTV Engineering

Complete Questions 1-5, and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.

Pre-Transition Certification Checklist: An application concerning a pre-transition channel must complete questions 1(a)-(c), and 2-5. A correct answer of "Yes" to all of the questions will ensure an expeditious grant of a construction permit application to modify pre-transition facilities. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.

Post-Transition Expedited Processing. An application concerning a post-transition channel must complete questions 1(a), (d)-(e), and 2-5. A station applying for a construction permit to build its post-transition channel will receive expedited processing if its application (1) does not seek to expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B"); (2) specifies facilities that match or closely approximate those defined in the new DTV Table Appendix B facilities; and (3) is filed on or before March 17, 2008 (45 days of the Report and Order in the Third DTV Periodic Review proceeding, MB Docket No. 07-91).

1. The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:

   (a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622. [X] Yes [ ] No

   (b) It will operate a pre-transition facility from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this station as established in 47 C.F.R. Section 73.622. [ ] Yes [ ] No

   (c) It will operate a pre-transition facility with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622. [ ] Yes [ ] No

   (d) It will operate at post-transition facilities that do not expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B"). [ ] Yes [X] No [ ] N/A

   (e) It will operate at post-transition facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the new DTV Table Appendix B. [X] Yes [ ] No [ ] N/A

2. The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RIF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. [X] Yes [ ] No

   Applicant must **submit the Exhibit** called for in Item 13.

3. Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community. [X] Yes [ ] No

4. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable. [X] Yes [ ] No

5. The antenna structure to be used by this facility has been registered by the Commission and will not require reregistration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7. [X] Yes [ ] No

SECTION III - D DTV Engineering

TECHNICAL SPECIFICATIONS Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.

TECH BOX

1. Channel Number: DTV 13 Analog TV, if any _____

2. Zone: [X] I [ ] II [ ] III

3. Antenna Location Coordinates: (NAD 27)

39 ° 55 ' 43 " [X] N [ ] S Latitude
86 ° 10 ' 55 " [ ] E [X] W Longitude

4. Antenna Structure Registration Number: 1024109

[ ] Not applicable [ ] FAA Notification Filed with FAA

5. Antenna Location Site Elevation Above Mean Sea Level: 251.1 meters

6. Overall Tower Height Above Ground Level: 316.8 meters

7. Height of Radiation Center Above Ground Level: 299.9 meters

8 Height of Radiation Center Above Average Terrain: 299 meters

9. Maximum Effective Radiated Power (average power): 42.1 kW

10 Antenna Specifications:

a. Manufacturer: RCA | Model: TCL-16A13

b. Electrical Beam Tilt: 0.9 degrees [ ] Not Applicable

c. Mechanical Beam Tilt: _____ degrees toward azimuth _____ degrees True [X] Not Applicable

Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c). Exhibit No. E-2

d. Polorization: [ ] Horizontal [X] Circular [ ] Elliptical

TECH BOX

e. Directional Antenna Relative Field Values: ☐ Not applicable (Nondirectional)

Rotation: _____ ° ☒ No rotation

Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	0.902	60	0.972	120	0.972	180	0.902	240	0.972	300	0.972
10	0.914	70	0.940	130	0.994	190	0.914	250	0.940	310	0.994
20	0.940	80	0.914	140	0.944	200	0.940	260	0.914	320	0.994
30	0.972	90	0.902	150	0.972	210	0.972	270	0.902	330	0.972
40	0.994	100	0.914	160	0.940	220	0.994	280	0.914	340	0.940
50	0.994	110	0.940	170	0.914	230	0.994	290	0.940	350	0.914
Additional Azimuths		45	1.000	135	1.000	225	1.000	315	1.000		

If a directional antenna is proposed, the requirements of 47 C.F.R. Section 73.625(c) must be satisfied. **Exhibit required.**

Exhibit No. E-2

11. Does the proposed facility satisfy the pre-transition interference protection provisions of 47 C.F.R. Section 73.623(a) (Applicable only if **Certification Checklist** Items 1(a), (b), or (c) are answered "No.") and/or the post-transition interference protection provisions of 47 C.F.R. Section 73.616?

☒ Yes ☐ No

If "No," attach as an Exhibit justification therefore, including a summary of any related previously granted waivers.

Exhibit No.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefore. (Applicable only if **Certification Checklist** Item 3 is answered "No.")

Exhibit No.

13. **Environmental Protection Act. Submit in an Exhibit** the following:

Exhibit No. E

a. If **Certification Checklist Item** 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radio frequency electromagnetic exposure in excess of FCC guidelines.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R. Section 1.1311.

WTHR-DT STA
42.1 KW

10. **Auction Authorization.** If the application is being submitted to obtain a construction permit for which the applicant was the winning bidder in an auction, then the applicant certifies, pursuant to 47 C.F.R. Section 73.5005(a), that it has attached an exhibit containing the information required by 47 C.F.R. Sections 1.2107(d), 1.2110(i), 1.2112(a) and 1.2112(b), if applicable.

An exhibit is required unless this question is inapplicable.

Exhibit No.

11. **Anti-Drug Abuse Act Certification.** Applicant certifies that neither applicant nor any party to the application is subject to denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862.

☐ Yes ☐ No

12. **Equal Employment Opportunity (EEO).** If the applicant proposes to employ five or more full-time employees, applicant certifies that it is filing simultaneously with this application a Model EEO Program Report on FCC Form 396-A.

☐ Yes ☐ No ☐ N/A

13. **Petition for Rulemaking/Counterproposal to Add New FM Channel to FM Table of Allotments.** If the application is being submitted concurrently with a Petition for Rulemaking or Counterproposal to Amend the FM Table of Allotments (47 C.F.R. Section 73.202) to add a new FM channel allotment, petitioner/counter-proponent certifies that, if the FM channel allotment requested is allotted, petitioner/counter- proponent will apply to participate in the auction of the channel allotment requested and specified in this application.

☐ Yes ☐ No ☐ N/A

I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in 'good faith. I acknowledge that all certifications and attached Exhibits are considered material representations. I hereby waive any claim to the use of any particular frequency as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and request an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.)

Typed or Printed Name of Person Signing	Typed or Printed Title of Person Signing
Signature	Date

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name		Relationship to Applicant (e.g., Consulting Engineer)	
Donald G. Everist		Consulting Engineer	
Signature		Date	
		April 29, 2011	
Mailing Address			
Cohen, Dippell and Everist, PC, 1420 N Street NW, Suite One			
City	State or Country (if foreign address)		ZIP Code
Washington	DC		20005
Telephone Number (include area code)	E-Mail Address (if available)		
202-898-0111	cde@attglobal.net		

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