



Interference Analysis
The Viacel Wireless Service
Detroit STA
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As described in our application for experimental license WD2XGP (paper attached), the Viacel Wireless Data broadcasting service uses very low power digital TV transmitters that can operate on any UHF frequency. For our application for an STA to conduct a proof of concept demonstration in Detroit, we analyzed the UHF spectrum utilization around N42 39 15.4 W83 13 47.8. Using the FCC TV query we used the above coordinates to locate a channel that had the least interfering co-channel utilization. Our analysis showed that UHF channel 65 was the clearest with a co-channel licensee located 177km from the above coordinates. We also analyzed adjacent channel licensees to see if we could operate a transmitter without causing perceptible interference. Our analysis shows that we can and that the adjacent channel licensees will suffer no loss of viewership.

The transmitter that we propose to operate with this STA would be located on the roof of a building located at: N42 39 15.4 W83 13 47.8 (NAD88) in Michigan. The following transmission parameters define the transmitter and antenna:

Transmitter: Rhode&Schwarz SV-7100

RF Power: 100W

ERP: 1250W

Requested Frequency: UHF 65 (779MHz)

Bandwidth: 6MHz

Modulating signal: QPSK, 16QAM, 64QAM(8K DVB COFDM)

Emission designator: W7D

Antenna: 4x Katherine CL-1469 directional log periodic antenna 11 dBd gain 52 Degree half power pattern, pattern rotation 225 Degree True. Vertical polarized radiating at 20m HAAT.

The resultant transmitter field strength plot is shown in Figure 1. As no other TV transmitter is within 160 km on channel 65, no other interfering transmitter field strength plot is displayed.

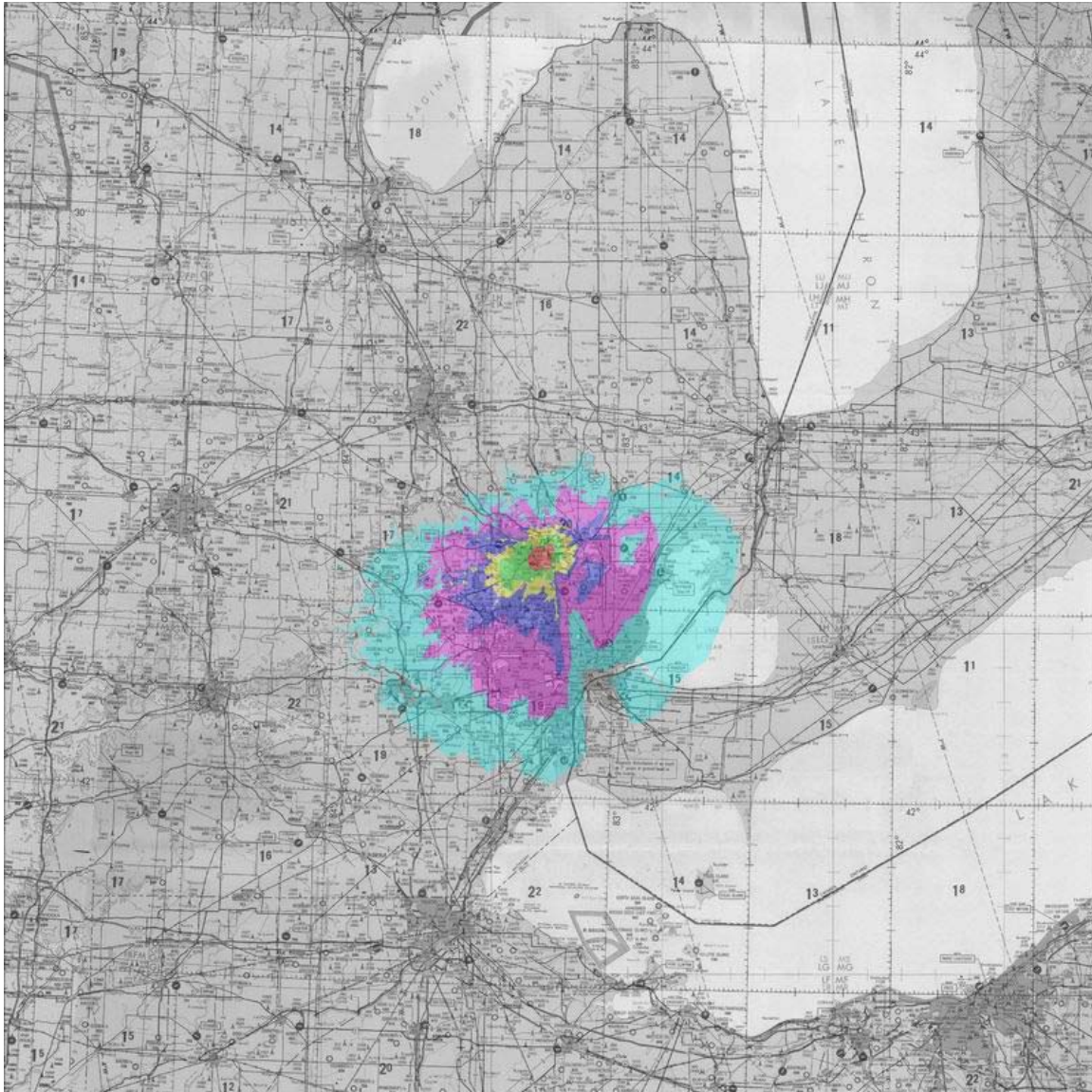


Figure 1 Viacel Transmitter Field Strength Plot

120>■>85 85>■>75 75>■>65 65>■>55 55<■<45 45<■<35 E=dBμV/m

Adjacent Channel Interference:

Lower Adjacent Channel:

There are two lower adjacent channel TV licensees within 160 km of the proposed Viacel transmitter site. These are:

W64BM, a TV translator service owned by Ventana Television Inc, broadcasting on channel 64 out of Toledo Ohio, located 116 km from the proposed Viacel transmitter and, CBLNTV3, a TV translator service owned by the Canadian Broadcasting Corporation broadcasting on channel 64 out of Chatham Ontario, Canada, located 97km from the

proposed Viacel transmitter. Figure 2 shows the composite field strength plot of these two station superimposed over the proposed Viacel transmitter field strength plot operating in the upper adjacent channel.

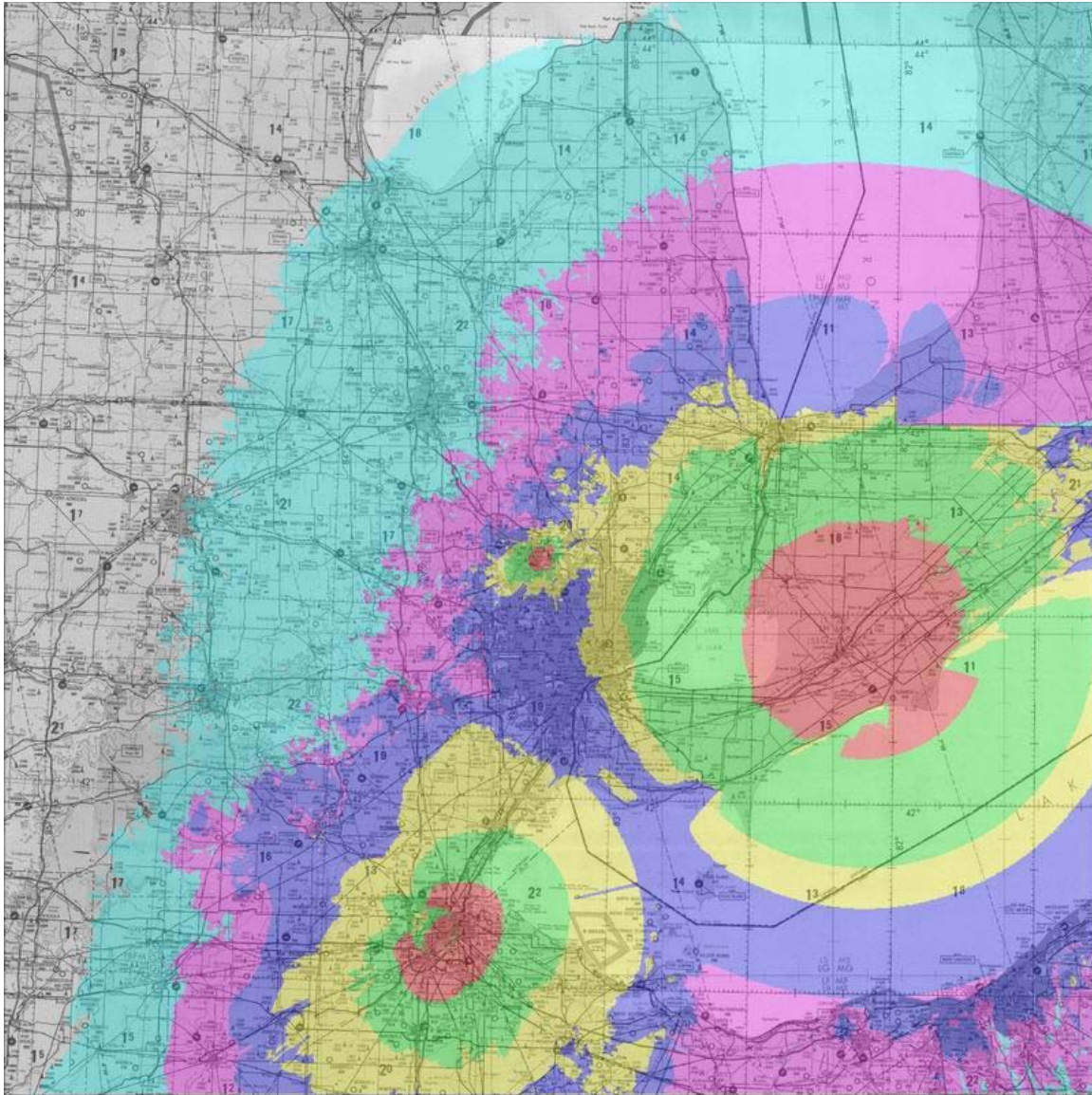


Figure 2 Lower adjacent Channel Licensees Field Strength Plot and Viacel transmitter FS Plot
120>**E**>85 85>**E**>75 75>**E**>65 65>**E**>55 55<**E**<45 45<**E**<35 E=dBμV/m

The red, green and yellow areas show where the field strength of the transmitters is above 64 dBμV/m, or their B-Grade contours. As can be seen the Viacel transmitter is at equal or less field strength in the adjacent channels B contour, hence no perceptible interference will occur.

Upper adjacent channel:

There are two upper adjacent channel TV licensees within 160 km of the proposed Viacel transmitter site. These are:

W66BV, a Low Power TV station owned by the Trinity Broadcasting Network, broadcasting on channel 66 out of Detroit Michigan, located 39 km from the proposed Viacel transmitter and, WSMH, a full power TV station owned by WSMH Licensee broadcasting on channel 66 out of Flint Michigan, located 92km from the proposed Viacel transmitter. Figure 3 shows the composite field strength plot of these two stations operating in the upper adjacent channel.

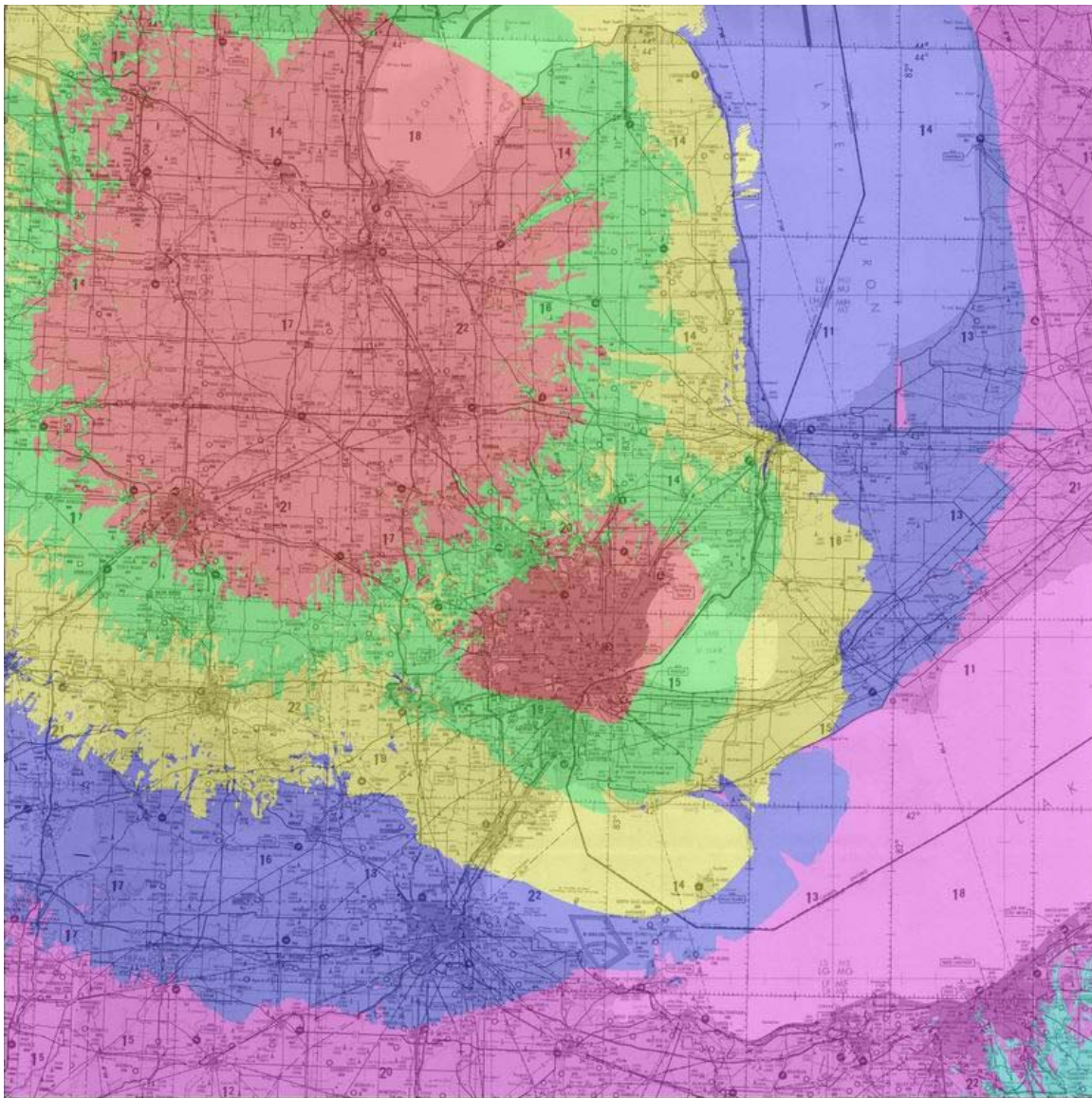


Figure 3 Upper adjacent Channel Licensees Field Strength Plot

120>**E**>85 85>**E**>75 75>**E**>65 65>**E**>55 55<**E**<45 45<**E**<35 E=dBμV/m

The first observation looking at this plot shows how full power TV stations have lived in harmony with low power TV stations around the country. W66BV a low power TV station operating at 19.7kW ERP is able to coexist with a full power TV station, WSMH operating at 1000kW ERP on the same channel using a channel offset and the discrimination afforded by directional antennas.

Lets now analyze the effect of the proposed Viacel transmitter will have on these upper adjacent channel licensees.

First lets look at WSMH and the proposed Viacel transmitter. The WSMH transmitter is located 92km from the Viacel transmitter. Theoretically this is outside the Grade B service contour of 88.5km, however analyzing their field strength plot further, we see that their signal does not drop to the 64 dB μ V/m level up to 125 km distance from the transmitter. Figure 4 shows the Field strength plot of WSMH.

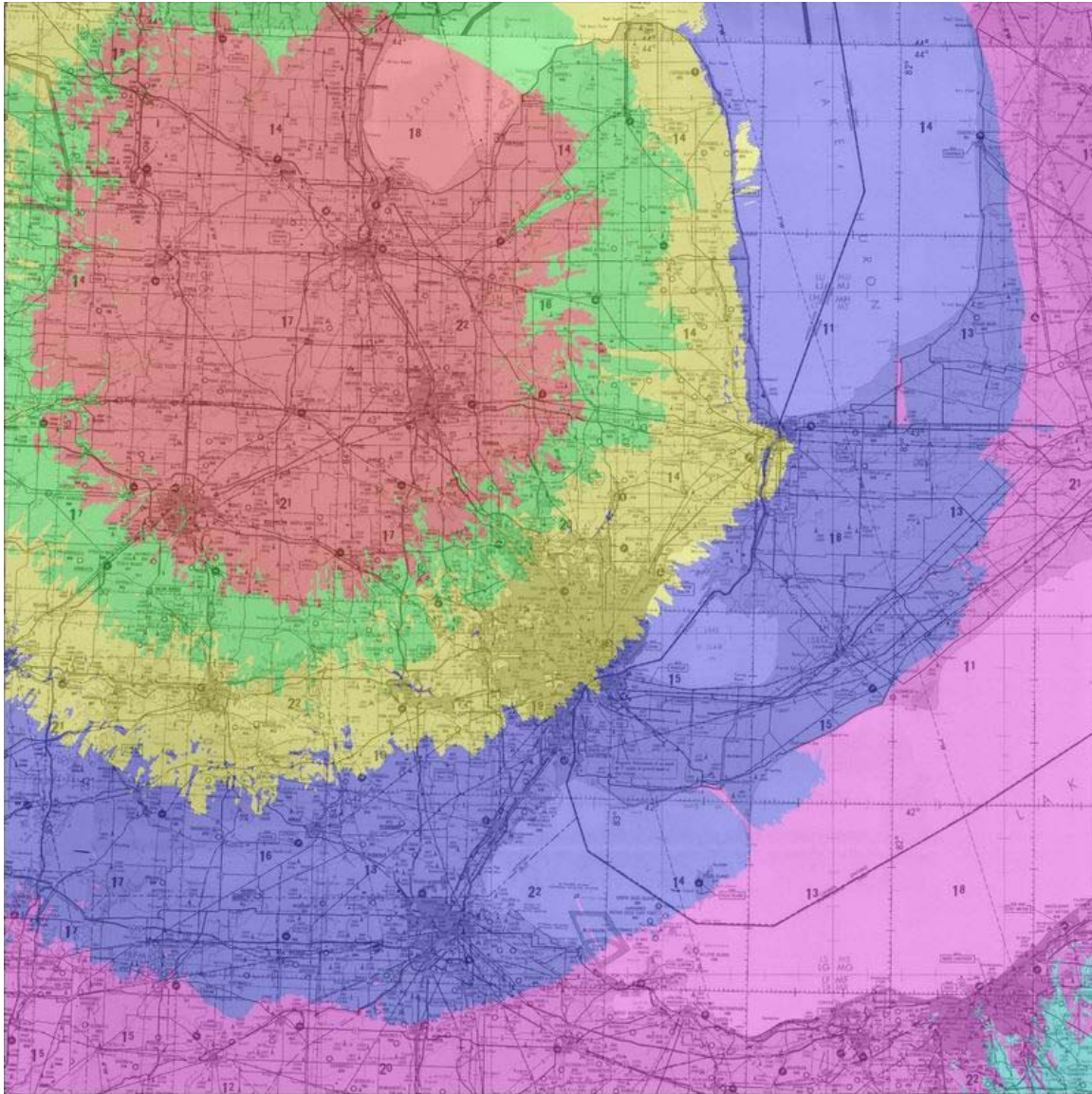


Figure 4 WSMH Field Strength Plot

120>E>85 85>E>75 75>E>65 65>E>55 55<E<45 45<E<35 E=dBμV/m

Next let's analyze the field strength of WSMH to the Viacel transmitter field strength in the lower adjacent channel. As D/U ratios for an 8K COFDM signal into analog TV we will use Table 1 in Appendix-1 as a guideline as established in our detailed analysis presented with our experimental license application for station WD2XGP (Copy attached). The D/U ratio for lower adjacent DTV into Analog TV is given here as -7dB. Figure 5 shows the D/U ratio in reference to -7dB. The color bands indicate the variance of the Viacel transmitter signal from this baseline.

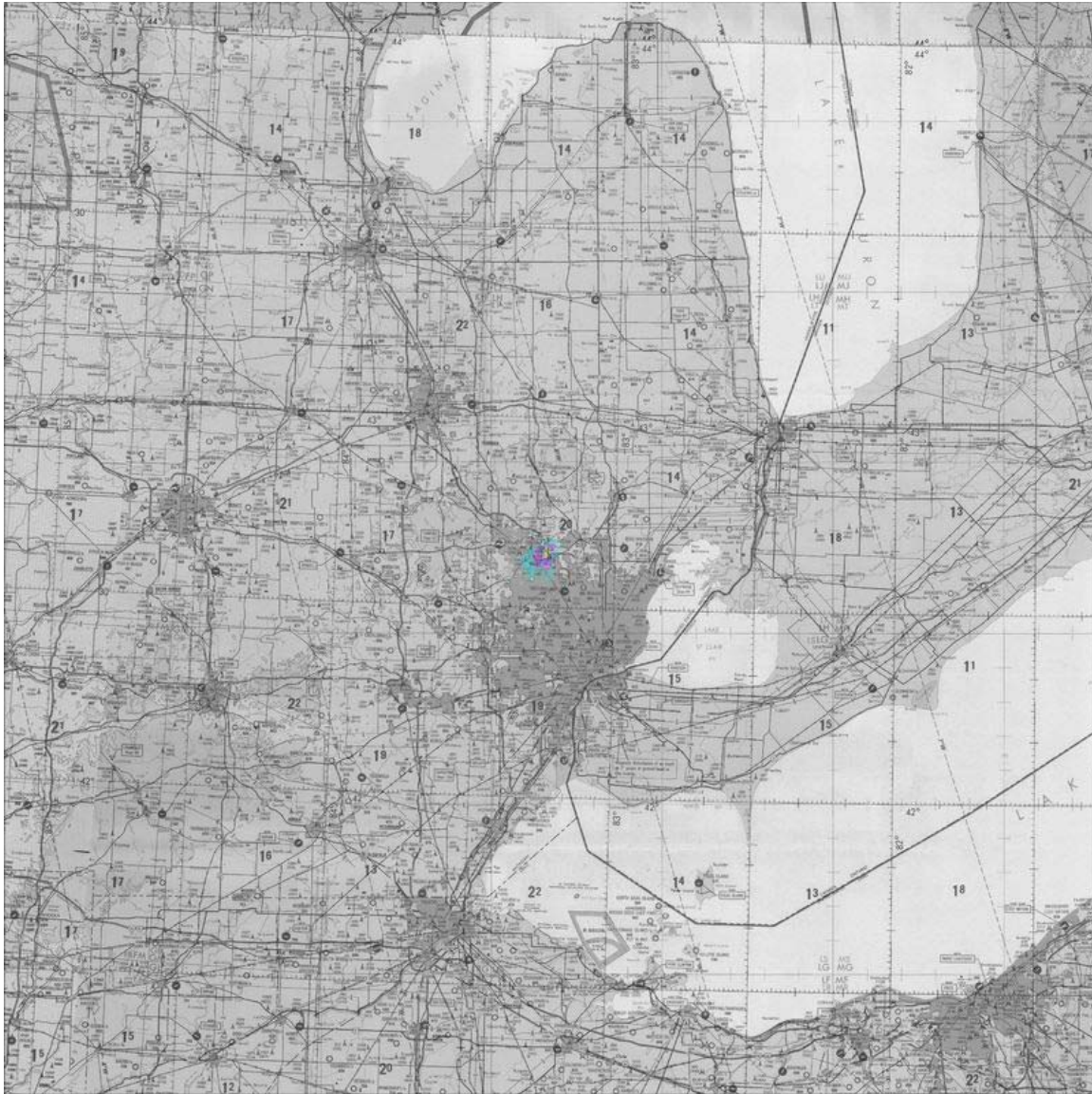


Figure 5 Viacel Transmitter into WSMH D/U ratio in reference to -7dB
 48<D/U<-60 -40<D/U<-48 -32<D/U<-40 -24<D/U<-32 -16<D/U<-24 -8<D/U<-16 D/U=dB
 No Color means a D/U of less then -7 which is a non interfering ratio

As can be seen the Viacel transmitter signal strength is above the -7D/U reference ratio only in areas very close to the Viacel transmitter antenna. Most of this area is located outside the 88.5km B-Grade zone and would not result in any loss in viewership for WSMH.

Figure 6 shows the field strength plot for W66BV.located 39km from the proposed Viacel transmitter.

Figure 6 shows the field strength plot of W66BV.

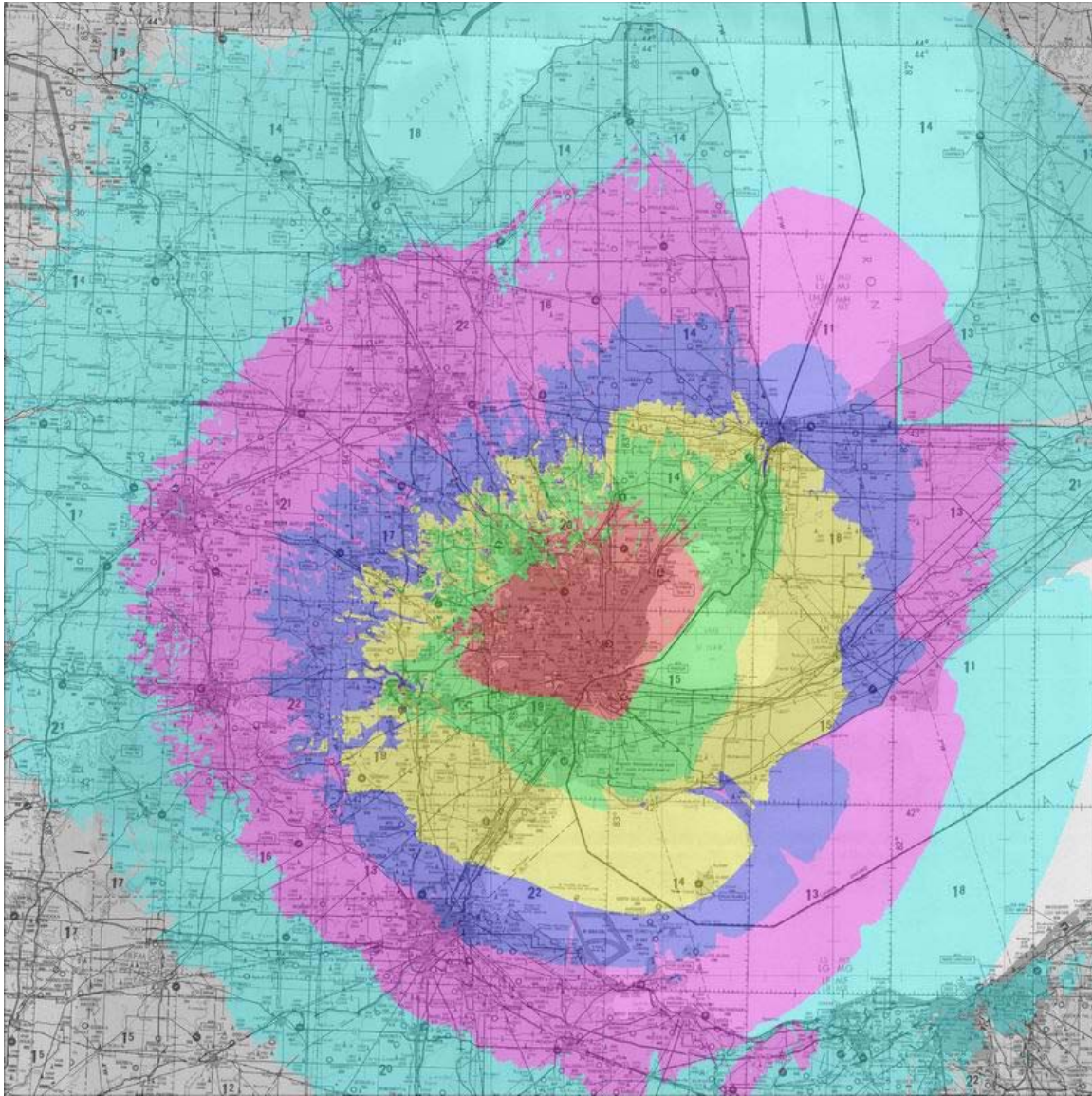


Figure 6 W66BV Field Strength Plot

120>**E**>85 85>**E**>75 75>**E**>65 65>**E**>55 55<**E**<45 45<**E**<35 E=dBμV/m

In figure 7 we compare the field strength of W66BV to the Viacel transmitter field strength in the lower adjacent channel with the same reference of -7dB D/U ratio. The colored areas show the difference in field strength to this reference level. As can be seen only a very small area right in front of the Viacel transmitter shows a stronger signal level compared to the reference “no interference” level. This area would contribute to a loss of viewership in their B grade to substantially less than 0.5%, hence it would be considered non-interfering.

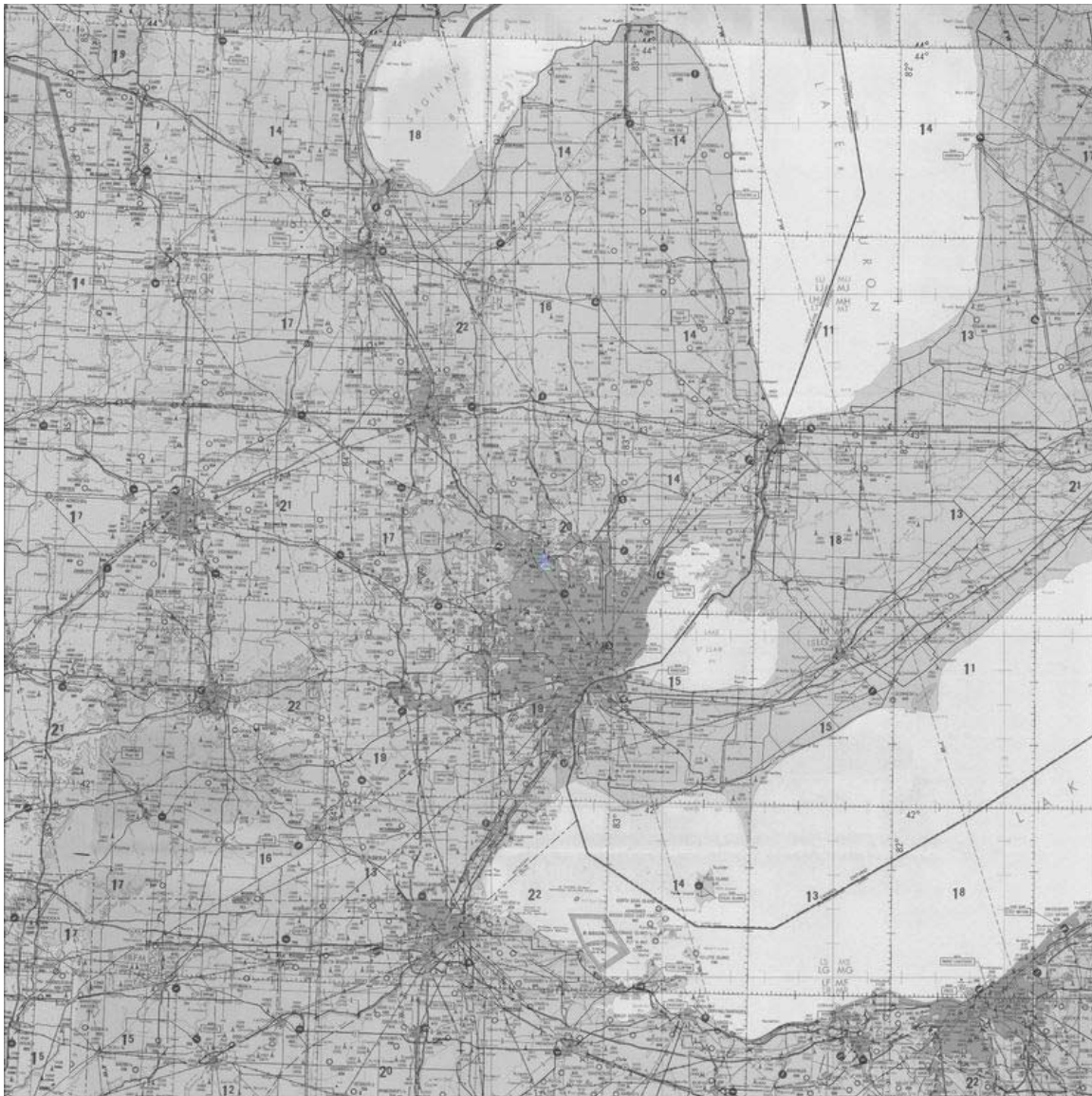


Figure 7 Viacel Transmitter into W66BV D/U ratio in reference to -7dB

48<D/U<-60 -40<D/U<-48 -32<D/U<-40 -24<D/U<-32 -16<D/U<-24 -8<D/U<-16 D/U=dB

No Color means a D/U of less than -7 which is a non interfering ratio

In summary, the proposed Viacel transmitter site would work in harmony with existing co and adjacent channel licensees and not contribute to any significant levels of interference.

Appendix 1

Table 1: Protection Ratios for an 8K COFDM DVB system into Analog NTSC and 8VSB DTV System

Channel Offset	D/U Ratio, dB	
	DTV into Analog	DTV into DTV
-1 (lower adjacent)	-9	-25
0 (co-channel)	+38	+18
+1 (upper adjacent)	-7	-25