

Observation of Anomalous Propagation of Radio Waves in the MW Band

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In this short article I want to tell about my observations of the anomalous propagation on MW Band. These observations were done during 2019-2021 in Niagara Falls, Ontario and Buffalo, NY.

It is because I live in Niagara Falls, Ontario and I work in Buffalo, NY. As it is known, the frequency for a MW radio station is allocated so that the radio station does not interfere with other broadcasting radio in the nearby area. But my observation a little bit disproves this statement.

So, every morning (beside weekend and holidays), at 6.0 am, in the kitchen, in breakfast time, I turn on my old AM radio. This is an old analog CANDLE AM radio made in 1981, so it is 40 years old in 2021. But this radio still works well and has great sound on the AM band.

The answer, why do I turn on the radio in the morning, is simple. I listen to the NIAGARA news. At 610 kHz, CKTB Radio (Radio Niagara) gives me a lot of useful information. This is information about the weather, the current traffic on the highway on which I drive to work, local and international news. When I drive to work in Buffalo, I also listen to this radio in my car. My commute to work is 50 km and near 40- minutes and all the way I listen to CKTB Radio.

When I drive back to home from my work, after 4 pm, I again turn on the CKTB Radio. So I am an operator who twice a day observes the propagation of radio waves at a frequency of 610 kHz on the path of 50 km, for 40-60 minutes, depending on traffic.

It seems to me that nothing can interfere with the local radio station, because in my area at the 610 kHz I should receive only the CKTB Radio. [Picture 2](#) shows a screen shot from www.radio-locator.com - what is heard in Buffalo and of course in Niagara Falls at 610-680 kHz. It should be received only three radio stations there.



Picture 1 CANDLE AM Radio



VA3ZNW Car



Picture 2 Screen Shot from www.radio-locator.com – What Is Heard in Buffalo

First is the CKTB Radio, which is located in Saint Catharines, and has 10 kW power and it is located at 25 km away from me. Second radio stations it is the CFMJ Radio, operating at 640 kHz, antenna located 150 km from Niagara Falls and has 50 kW power. The third station it is the CFTR Radio, operating at 680 kHz with 50 kW and the antenna located 50 km from Niagara Falls.

However, sometimes, when in the morning I turn on my CANDLE receiver to listen to the CKTB Radio, I have noticed the presence of another radio station on the frequency. Sometimes this radio station produced so strong signals that jammed out the CKTB Radio. Through some time I recognize the radio- it was WTVN Radio from Columbus, Ohio. It was very unusual because the radio station has 5 kW power and located in 500 km away from my home.

CKTB	St. Catharines, Ontario	10	5		43.036667°N 79.166389°W
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Picture 3 CKTB 610 kHz Radio

CFMJ	Richmond Hill, Ontario	50	50		43.179167°N 79.433056°W
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Picture 4 CFMJ 640 kHz Radio

CFTR	Toronto, Ontario	50	50		43.214167°N 79.608611°W
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Picture 5 CFTR 680 kHz Radio

I could receive the radio station in my car parked near my house. However, when I drive away from my house just only in 200 meters, the jamming radio station disappeared. It is another mystery of the reception of the WTVN.

On my way to work, I found several anomalous spots where I could again observe the reception of WTVN Radio together with CKTB Radio and at some places the WTVN Radio sometimes completely jammed the CKTB Radio. So, that is, only WTVN Radio is received.

WTVN	Columbus, Ohio	11269	B	5	5		39.876111°N 82.980278°W
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Picture 6 WTVN 610 kHz Radio

I began to investigate this strange phenomenon. It was found that during the anomalous propagation on the MW, I could perfectly receive the VE3UBL/B beacon. The beacon operates in the 6 meter band at 50.059 MHz, and located 87 km away from my house. The beacon operates on a turnstile antenna and has the 8 watts power. I usually hear this beacon with S1 level. But when anomalous propagation on the MW is present, I hear this beacon with S 2- S4. I used to an ICOM IC-7410 on the 6- meter band.

I decided to check the propagation of other radio stations on the MW band at the time when WTVN Radio jammed the CKTB Radio. I checked frequencies from 610 to 680 kHz where I usually received only three radio station. It is CKTB (610- kHz), CFMJ (640- kHz) and CFTR (680- kHz) It was found that at the time I may receive two new radio stations. First was WEJL Radio, Pennsylvania, which is located at 350 km away from me and has power of 2 kW. The second one was CFCO Radio, Chatham, Ontario. This radio station has power of 10 kW and is located 320 km from Niagara Falls. The radio stations I received on my auto car radio receiver. On the road to work I heard both of these radios with varying success. However in anomalous areas where WTVN Radio jammed the CKTB Radio, these radios were received very loud.



Picture 7 VE3UBL/B Beacon

WEJL	Scranton, Pennsylvania	66363	D	2	0.032	41.409444°N 75.666944°W
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Picture 8 WEJL 630 kHz Radio

CFCO	Chatham, Ontario	10		6		42.334167°N 82.281389°W
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Picture 9 CFCO 670 kHz Radio

Existing of the anomalous reception of radio stations at the MW band occurs at some conditions. Usually it happens from November to March. The strongest anomalous propagation occurs from December to January. Very good anomalous propagation occurs in the fog, light snowfall, light rain. Super Moon, meteor showers, flares on the sun- these circumstances affected the anomalous propagation in good side.

Usually, the anomalous propagation exits when the air temperature is from plus 5 to minus 10 C degrees (or 41 to 14 F). When it is very cold (more than minus 10 C (14 F) - minus 15 C (5 F) degrees) the anomalous propagation usually is absence. The anomalous propagation usually not exits at temperatures above plus 10 C degree (50 F). So it is finished at warm weather- in spring and summer time.

However, several times I observed the anomalous propagation in the summer time. It was at the morning at Super Moon, meteor showers or at sharp changing of the atmospheric pressure. As usual I observed the abnormal propagation at morning time before sunrise. In the period from December to January, anomalous propagation is also observed in the evening, after 4 pm, when I am driving home, it is time before and after sunset.

Spot of the anomalous propagation

Spots where I observed the anomalous propagation are located in constant places. On my way to work I have observed three spots at the QUEEN ELIZABETH WAY highway and four spots in Buffalo. What is interesting, in Buffalo there are churches near all of the four spots. However, there are lots churches in Buffalo and may be it is not related to anomalous propagation of the MW Band...

On the QUEEN ELIZABETH WAY highway, two spots of the anomalous propagation are located on bridges and in places at a distance of 200-300 meters from these bridges. These ones are the Welland River Bridge and the Niagara River Bridge (Peace Bridge).

Peace Bridge located one side in Canada and other side in the USA. Peace Bridge is the place where the QUEEN ELIZABETH WAY highway ended.

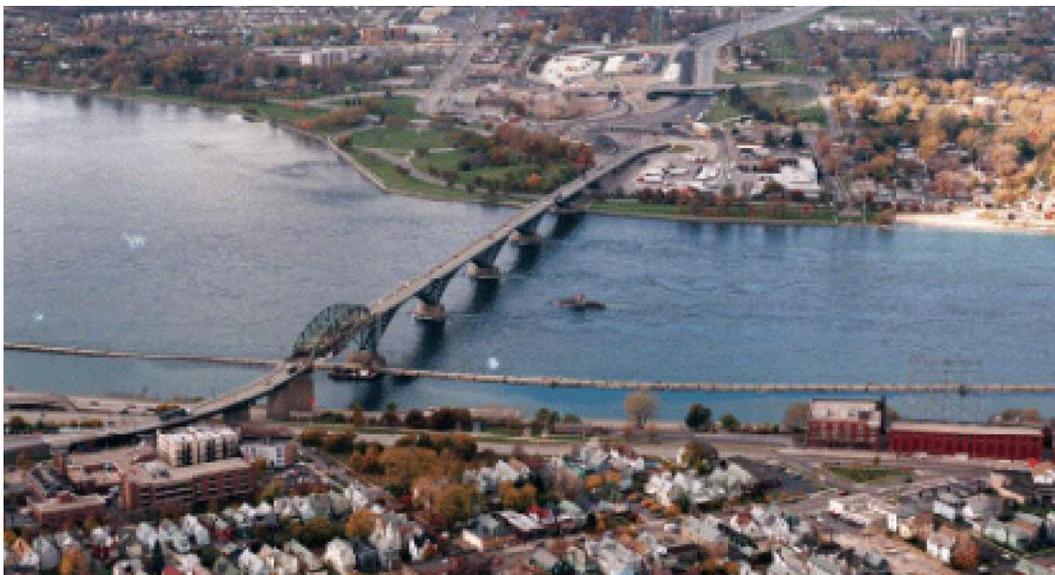
One spot on QUEEN ELIZABETH WAY highway is a really interesting spot. The temperature there (I measured the temperature by my car thermometer) is usually lower to 1-3 degrees than the temperature before and after the spot. The lower the temperature in the spot is (compare to before and after the spot) the better the reception of the far radio stations at frequencies of 630 and 670-kHz are and Radio WTVN Radio does more jamming to Radio CKTB Radio . The spot is located near exit 25. It is exit to Netherby Road.

I have no explanation for the anomalous reception on the MW Band. Especially I have no explanation for the great improvement in radio propagation in in certain permanent spots. I just listen to the radio in my car and share my experience with you. However, this confirms the presence of spots where the anomalous radio reception exists.

Some reading on the thematic:

http://www.antentop.org/book/c_propagation_mysterious.htm

73! de VA3ZNW



Peace Bridge