

## Exhibit 20.1

### Tabulation of Spacings for Commercial (Non-Reserved) Portion of Allocation

West Central Michigan Media Ministries

REFERENCE		DISPLAY DATES
44 16 33.0 N.	CLASS = C3 Int = B1	DATA 07-18-11
85 42 48.0 W.	Current Spacings to 3rd Adj.	SEARCH 07-20-11
----- Channel 220 - 91.9 MHz -----		

Call	Channel	Location	Azi	Dist	FCC	Margin
WGCP	LIC-Z 220A	Cadillac	MI 86.5	17.9	141.5	-123.6
WTWS	LIC-N 221A	Houghton Lake	MI 88.6	77.5	88.5	-11.0
WBNZ	LIC-Z 222C2	Frankfort	MI 316.5	51.5	55.5	-4.0
1222209	APP 274A	Evart	MI 129.5	43.1	11.5	31.6
One Step Application						
AL5656	VAC 274A	Evart	MI 129.5	43.1	11.5	31.6
Drop In						
1224786	RSV-A 274A	Evart	MI 129.5	43.1	11.5	31.6
One Step Application						
WGHN-FM	LIC 221A	Grand Haven	MI 197.6	142.0	88.5	53.5
WMOM	LIC 274A	Pentwater	MI 229.0	68.7	11.5	57.2
WFDX	LIC 223C1	Atlanta	MI 52.1	135.7	75.5	60.3
WLTU	LIC 221A	Manitowoc	WI 264.4	154.0	88.5	65.5
WLAW	LIC 223A	Newaygo	MI 188.5	108.5	41.5	67.0
AL4884	AL 221C	Sault Ste Marie	ON 22.9	281.2	194.5	86.7
SPEC. NEGTD SHORT-SPACED ALLOC. - LTD TO 100KW/300M OR EQUIV.						

-----  
RSV-R = reserved and needs protection, RSV-A = allocation

*Blue Text indicates the facility to be modified by this Form 340 filing.  
This facility need not be protected.*

**Yellow Highlighted Text indicates \$73.215 short-spaced contour protections toward WTWS(FM) - Houghton Lake, MI CH221A and WBNZ(FM) - Frankfort, MI CH222C2 as included in Exhibit(s) 20.2 and 20.3. As both WTWS(FM) and WBNZ(FM) are presently licensed under the provisions of \$73.215, protection has been afforded each facility at the present operating parameters.**

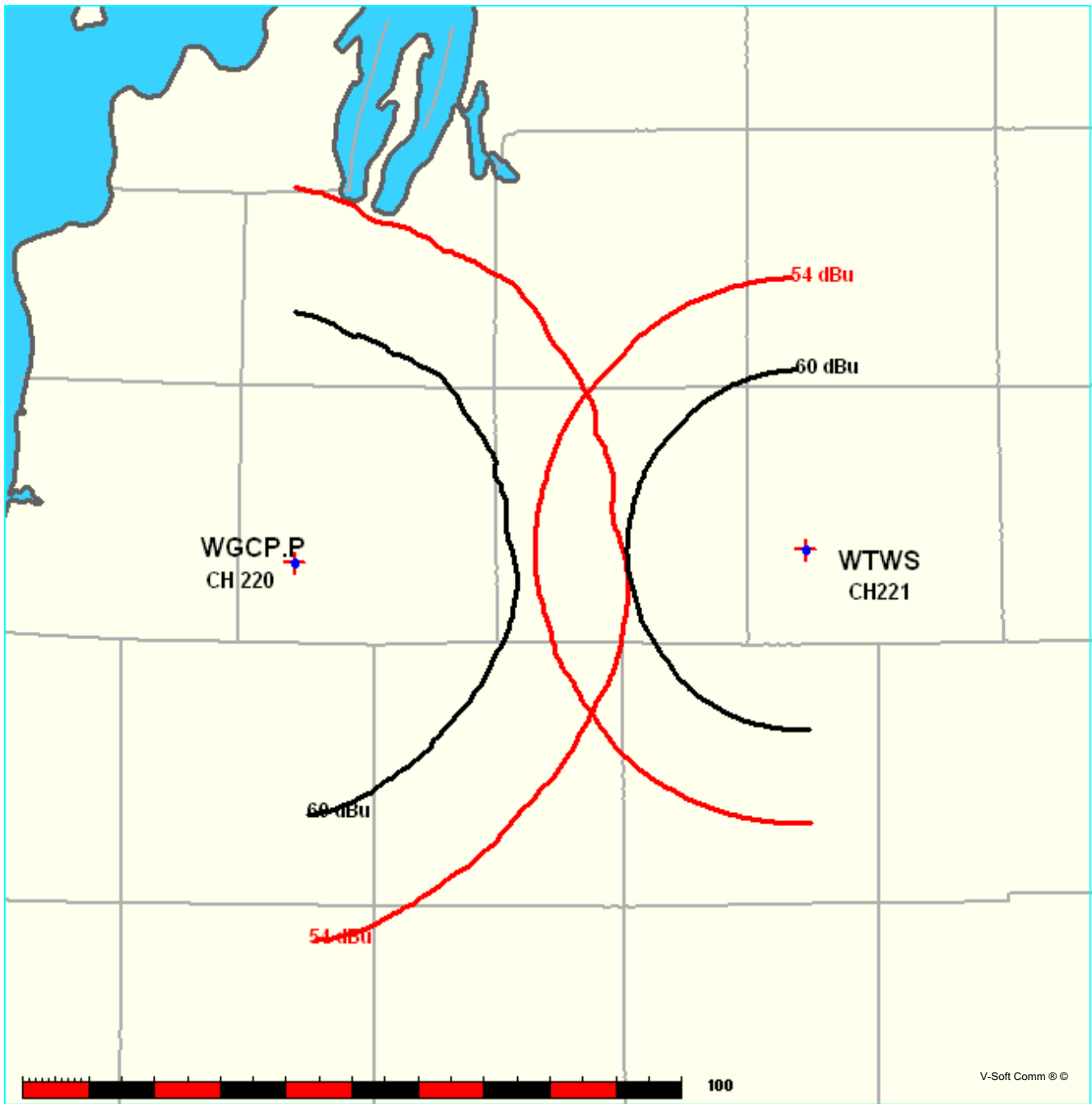
# Exhibit 20.2 - §73.215 Short-Spaced Contour Protection Study Toward WTWS(FM) - Houghton Lake, MI CH221A (Present Facilities)

West Central Michigan Media Ministries

FMCommander Single Allocation Study - 07-20-2011 - NED 03 SEC  
WGCP.P's Overlaps (In= 3.26 km, Out= 0.53 km)

WGCP.P CH 220 C3  
Lat= 44 16 33.0, Lng= 85 42 48.0  
2.1 kW 311.2 M HAAT, 659 M COR  
Prot.= 60 dBu, Intef.= 54 dBu

WTWS CH 221 A 73.215 N BLH20080919AFJ  
Lat= 44 17 21.0, Lng= 84 44 32.0  
0.92 kW 228 M HAAT, 576.7 M COR  
Prot.= 60 dBu, Intef.= 54 dBu



# Exhibit 20.2 - §73.215 Short-Spaced Contour Protection Study Toward WTWS(FM) - Houghton Lake, MI CH221A (Present Facilities)

07-20-2011

Terrain Data: NED 03 SEC

FMOver Analysis

WGCP.P

WTWS BLH20080919AFJ

Channel = 220C3  
Max ERP = 2.1 kW  
RCAMSL = 659 M  
N. Lat. 44 16 33.0  
W. Lng. 85 42 48.0  
Protected  
60 dBu

Channel = 221A  
Max ERP = 0.92 kW  
RCAMSL = 576.7 M  
N. Lat. 44 17 21.0  
W. Lng. 84 44 32.0  
Interfering  
54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
045.0	002.1000	0262.1	034.8	294.0	000.9200	0230.7	057.5	47.13	
046.0	002.1000	0260.8	034.7	293.7	000.9200	0230.7	056.9	47.34	
047.0	002.1000	0257.1	034.5	293.2	000.9200	0230.7	056.5	47.52	
048.0	002.1000	0253.4	034.3	292.7	000.9200	0230.7	056.0	47.70	
049.0	002.1000	0250.7	034.1	292.3	000.9200	0230.7	055.6	47.88	
050.0	002.1000	0250.1	034.1	292.0	000.9200	0230.8	055.1	48.09	
051.0	002.1000	0249.0	034.0	291.6	000.9200	0230.9	054.6	48.29	
052.0	002.1000	0250.4	034.1	291.4	000.9200	0231.0	054.0	48.51	
053.0	002.1000	0250.8	034.1	291.1	000.9200	0231.0	053.5	48.72	
054.0	002.1000	0251.1	034.1	290.7	000.9200	0231.0	053.0	48.93	
055.0	002.1000	0250.1	034.1	290.3	000.9200	0231.0	052.6	49.11	
056.0	002.1000	0250.7	034.1	290.0	000.9200	0230.9	052.1	49.31	
057.0	002.1000	0250.3	034.1	289.5	000.9200	0230.9	051.6	49.49	
058.0	002.1000	0248.9	034.0	289.1	000.9200	0230.7	051.2	49.65	
059.0	002.1000	0247.9	033.9	288.6	000.9200	0230.6	050.8	49.81	
060.0	002.1000	0247.9	033.9	288.1	000.9200	0230.6	050.3	49.99	
061.0	002.1000	0249.2	034.0	287.7	000.9200	0230.6	049.9	50.19	
062.0	002.1000	0249.3	034.0	287.3	000.9200	0230.6	049.4	50.36	
063.0	002.1000	0248.6	034.0	286.7	000.9200	0230.5	049.1	50.51	
064.0	002.1000	0246.8	033.9	286.1	000.9200	0230.5	048.7	50.63	
065.0	002.1000	0241.2	033.5	285.3	000.9200	0230.5	048.6	50.68	
066.0	002.1000	0236.2	033.2	284.5	000.9200	0230.7	048.5	50.73	
067.0	002.1000	0232.7	032.9	283.8	000.9200	0230.7	048.4	50.79	
068.0	002.1000	0233.9	033.0	283.3	000.9200	0230.7	048.0	50.96	
069.0	002.1000	0236.4	033.2	282.9	000.9200	0230.8	047.5	51.15	
070.0	002.1000	0237.0	033.2	282.3	000.9200	0230.9	047.2	51.29	
071.0	002.1000	0236.4	033.2	281.7	000.9200	0231.0	046.9	51.40	
072.0	002.1000	0237.1	033.2	281.1	000.9200	0231.2	046.6	51.55	
073.0	002.1000	0238.1	033.3	280.5	000.9200	0231.4	046.2	51.69	
074.0	002.1000	0238.3	033.3	279.8	000.9200	0231.7	046.0	51.81	
075.0	002.1000	0237.5	033.3	279.2	000.9200	0231.9	045.8	51.91	
076.0	002.1000	0235.5	033.1	278.4	000.9200	0232.2	045.7	51.96	
077.0	002.1000	0233.1	032.9	277.7	000.9200	0232.5	045.6	51.99	
078.0	002.1000	0230.7	032.8	276.9	000.9200	0232.6	045.6	52.01	
079.0	002.1000	0228.3	032.6	276.2	000.9200	0232.5	045.6	52.01	

**Munn-Reese, Inc.**

Broadcast Engineering Consultants  
Coldwater, MI 49036

# Exhibit 20.2 - §73.215 Short-Spaced Contour Protection Study Toward WTWS(FM) - Houghton Lake, MI CH221A (Present Facilities)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
080.0	002.1000	0226.3	032.5	275.4	000.9200	0232.4	045.6	52.01
081.0	002.1000	0225.1	032.4	274.7	000.9200	0232.5	045.5	52.03
082.0	002.1000	0224.9	032.4	274.0	000.9200	0232.7	045.4	52.09
083.0	002.1000	0225.4	032.4	273.3	000.9200	0233.0	045.3	52.15
084.0	002.1000	0226.7	032.5	272.6	000.9200	0233.2	045.1	52.24
085.0	002.1000	0228.5	032.6	271.9	000.9200	0233.3	044.9	52.33
086.0	002.1000	0230.9	032.8	271.2	000.9200	0233.5	044.7	52.44
087.0	002.1000	0233.3	033.0	270.5	000.9200	0233.5	044.5	52.53
088.0	002.1000	0235.5	033.1	269.8	000.9200	0233.6	044.3	52.60
089.0	002.1000	0236.8	033.2	269.0	000.9200	0233.6	044.2	52.64
090.0	002.1000	0239.3	033.4	268.3	000.9200	0233.6	044.0	52.71
091.0	002.1000	0241.1	033.5	267.5	000.9200	0233.5	044.0	52.74
092.0	002.1000	0242.8	033.6	266.7	000.9200	0233.4	043.9	52.76
093.0	002.1000	0244.5	033.7	265.9	000.9200	0233.4	043.9	52.78
094.0	002.1000	0245.6	033.8	265.2	000.9200	0233.3	043.9	52.77
095.0	002.1000	0246.4	033.8	264.4	000.9200	0233.5	043.9	52.75
096.0	002.1000	0246.9	033.9	263.6	000.9200	0233.4	044.0	52.71
097.0	002.1000	0247.2	033.9	262.9	000.9200	0232.9	044.1	52.63
098.0	002.1000	0246.8	033.9	262.2	000.9200	0232.5	044.3	52.54
099.0	002.1000	0246.3	033.8	261.4	000.9200	0232.4	044.5	52.45
100.0	002.1000	0246.4	033.8	260.7	000.9200	0231.7	044.7	52.34
101.0	002.1000	0246.3	033.8	260.0	000.9200	0231.5	044.9	52.24
102.0	002.1000	0246.7	033.8	259.3	000.9200	0231.0	045.1	52.14
103.0	002.1000	0247.4	033.9	258.6	000.9200	0230.7	045.3	52.03
104.0	002.1000	0247.8	033.9	257.9	000.9200	0230.4	045.6	51.93
105.0	002.1000	0248.3	033.9	257.2	000.9200	0230.1	045.8	51.81
106.0	002.1000	0248.3	033.9	256.6	000.9200	0229.6	046.1	51.67
107.0	002.1000	0248.0	033.9	256.0	000.9200	0229.0	046.4	51.51
108.0	002.1000	0248.4	034.0	255.3	000.9200	0228.3	046.7	51.36
109.0	002.1000	0248.0	033.9	254.8	000.9200	0227.9	047.1	51.20
110.0	002.1000	0247.5	033.9	254.2	000.9200	0227.9	047.4	51.05
111.0	002.1000	0246.5	033.8	253.7	000.9200	0228.0	047.8	50.89
112.0	002.1000	0245.4	033.8	253.2	000.9200	0228.3	048.3	50.73
113.0	002.1000	0243.6	033.6	252.7	000.9200	0228.5	048.7	50.55
114.0	002.1000	0242.1	033.6	252.3	000.9200	0228.4	049.2	50.36
115.0	002.1000	0241.6	033.5	251.8	000.9200	0229.0	049.6	50.22
116.0	002.1000	0241.9	033.5	251.3	000.9200	0229.6	050.0	50.08
117.0	002.1000	0241.9	033.5	250.9	000.9200	0230.1	050.4	49.93
118.0	002.1000	0241.9	033.5	250.4	000.9200	0230.2	050.9	49.76
119.0	002.1000	0241.5	033.5	250.0	000.9200	0230.7	051.3	49.60
120.0	002.1000	0242.3	033.6	249.5	000.9200	0231.1	051.7	49.44
121.0	002.0665	0242.1	033.4	249.2	000.9200	0231.2	052.3	49.23
122.0	002.0333	0242.2	033.3	249.0	000.9200	0231.4	052.8	49.02
123.0	002.0004	0243.4	033.3	248.6	000.9200	0231.6	053.3	48.82
124.0	001.9678	0244.8	033.2	248.3	000.9200	0232.0	053.8	48.64
125.0	001.9354	0243.1	033.0	248.2	000.9200	0232.1	054.4	48.39

# Exhibit 20.2 - §73.215 Short-Spaced Contour Protection Study Toward WTWS(FM) - Houghton Lake, MI CH221A (Present Facilities)

07-20-2011

Terrain Data: NED 03 SEC

FMOver Analysis

WTWS BLH20080919AFJ

WGCP.P

Channel = 221A

Max ERP = 0.92 kW

RCAMSL = 576.7 M

N. Lat. 44 17 21.0

W. Lng. 84 44 32.0

Protected

60 dBu

Channel = 220C3

Max ERP = 2.1 kW

RCAMSL = 659 M

N. Lat. 44 16 33.0

W. Lng. 85 42 48.0

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
224.0	000.9200	0236.1	027.3	107.0	002.1000	0248.0	061.2	49.91	
225.0	000.9200	0235.6	027.3	106.8	002.1000	0247.9	060.8	50.05	
226.0	000.9200	0234.7	027.2	106.5	002.1000	0247.9	060.5	50.20	
227.0	000.9200	0233.8	027.2	106.2	002.1000	0248.1	060.1	50.35	
228.0	000.9200	0232.8	027.1	106.0	002.1000	0248.3	059.7	50.51	
229.0	000.9200	0231.7	027.1	105.7	002.1000	0248.5	059.3	50.65	
230.0	000.9200	0231.6	027.0	105.4	002.1000	0248.4	058.9	50.80	
231.0	000.9200	0230.4	027.0	105.1	002.1000	0248.3	058.6	50.93	
232.0	000.9200	0229.7	026.9	104.8	002.1000	0248.3	058.2	51.07	
233.0	000.9200	0229.4	026.9	104.5	002.1000	0248.2	057.9	51.21	
234.0	000.9200	0230.8	027.0	104.3	002.1000	0248.1	057.4	51.37	
235.0	000.9200	0231.1	027.0	104.0	002.1000	0247.8	057.1	51.51	
236.0	000.9200	0230.7	027.0	103.7	002.1000	0247.7	056.7	51.64	
237.0	000.9200	0229.7	026.9	103.3	002.1000	0247.5	056.4	51.76	
238.0	000.9200	0229.1	026.9	102.9	002.1000	0247.3	056.1	51.88	
239.0	000.9200	0228.1	026.9	102.6	002.1000	0247.0	055.8	51.98	
240.0	000.9200	0227.8	026.8	102.2	002.1000	0246.8	055.5	52.10	
241.0	000.9200	0228.0	026.8	101.8	002.1000	0246.6	055.2	52.22	
242.0	000.9200	0229.4	026.9	101.5	002.1000	0246.4	054.8	52.36	
243.0	000.9200	0231.3	027.0	101.2	002.1000	0246.3	054.4	52.51	
244.0	000.9200	0231.3	027.0	100.8	002.1000	0246.3	054.1	52.63	
245.0	000.9200	0232.2	027.1	100.4	002.1000	0246.3	053.8	52.76	
246.0	000.9200	0232.5	027.1	100.0	002.1000	0246.4	053.5	52.88	
247.0	000.9200	0232.5	027.1	099.6	002.1000	0246.4	053.3	52.99	
248.0	000.9200	0232.2	027.1	099.2	002.1000	0246.3	053.0	53.08	
249.0	000.9200	0231.3	027.0	098.7	002.1000	0246.4	052.8	53.17	
250.0	000.9200	0230.7	027.0	098.2	002.1000	0246.7	052.6	53.26	
251.0	000.9200	0230.1	027.0	097.8	002.1000	0246.9	052.4	53.35	
252.0	000.9200	0228.7	026.9	097.3	002.1000	0247.1	052.3	53.41	
253.0	000.9200	0228.4	026.9	096.8	002.1000	0247.3	052.1	53.49	
254.0	000.9200	0227.9	026.8	096.3	002.1000	0247.1	052.0	53.55	
255.0	000.9200	0228.0	026.8	095.8	002.1000	0246.9	051.8	53.61	
256.0	000.9200	0229.0	026.9	095.4	002.1000	0246.5	051.6	53.69	

**Munn-Reese, Inc.**

Broadcast Engineering Consultants

Coldwater, MI 49036

## Exhibit 20.2 - §73.215 Short-Spaced Contour Protection Study Toward WTWS(FM) - Houghton Lake, MI CH221A (Present Facilities)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
257.0	000.9200	0229.9	027.0	094.9	002.1000	0246.4	051.4	53.77
258.0	000.9200	0230.4	027.0	094.4	002.1000	0246.0	051.2	53.83
259.0	000.9200	0230.8	027.0	093.9	002.1000	0245.5	051.0	53.87
260.0	000.9200	0231.5	027.0	093.4	002.1000	0245.1	050.9	53.92
261.0	000.9200	0231.9	027.1	092.9	002.1000	0244.3	050.7	53.94
262.0	000.9200	0232.5	027.1	092.4	002.1000	0243.3	050.6	53.96
263.0	000.9200	0232.9	027.1	091.9	002.1000	0242.6	050.5	53.98
264.0	000.9200	0233.5	027.2	091.3	002.1000	0241.7	050.4	53.99
265.0	000.9200	0233.4	027.2	090.8	002.1000	0240.7	050.3	53.97
266.0	000.9200	0233.4	027.2	090.2	002.1000	0239.8	050.3	53.95
267.0	000.9200	0233.4	027.2	089.7	002.1000	0238.5	050.3	53.92
268.0	000.9200	0233.5	027.2	089.2	002.1000	0237.2	050.2	53.88
269.0	000.9200	0233.6	027.2	088.6	002.1000	0236.2	050.2	53.84
270.0	000.9200	0233.5	027.2	088.1	002.1000	0235.6	050.2	53.82
271.0	000.9200	0233.5	027.2	087.5	002.1000	0234.6	050.3	53.77
272.0	000.9200	0233.3	027.1	087.0	002.1000	0233.3	050.3	53.70
273.0	000.9200	0233.1	027.1	086.5	002.1000	0232.0	050.4	53.63
274.0	000.9200	0232.8	027.1	085.9	002.1000	0230.7	050.4	53.55
275.0	000.9200	0232.5	027.1	085.4	002.1000	0229.4	050.5	53.46
276.0	000.9200	0232.5	027.1	084.9	002.1000	0228.3	050.6	53.38
277.0	000.9200	0232.6	027.1	084.4	002.1000	0227.3	050.7	53.30
278.0	000.9200	0232.3	027.1	083.8	002.1000	0226.5	050.8	53.22
279.0	000.9200	0232.0	027.1	083.3	002.1000	0225.8	050.9	53.14
280.0	000.9200	0231.6	027.1	082.8	002.1000	0225.2	051.1	53.05
281.0	000.9200	0231.2	027.0	082.3	002.1000	0224.9	051.2	52.97
282.0	000.9200	0230.9	027.0	081.8	002.1000	0224.9	051.4	52.90
283.0	000.9200	0230.8	027.0	081.3	002.1000	0225.0	051.6	52.84
284.0	000.9200	0230.7	027.0	080.9	002.1000	0225.1	051.8	52.77
285.0	000.9200	0230.6	027.0	080.4	002.1000	0225.6	052.0	52.72
286.0	000.9200	0230.5	027.0	079.9	002.1000	0226.4	052.2	52.67
287.0	000.9200	0230.6	027.0	079.5	002.1000	0227.1	052.4	52.61
288.0	000.9200	0230.6	027.0	079.0	002.1000	0228.3	052.6	52.58
289.0	000.9200	0230.7	027.0	078.5	002.1000	0229.5	052.8	52.54
290.0	000.9200	0230.9	027.0	078.1	002.1000	0230.5	053.0	52.49
291.0	000.9200	0231.0	027.0	077.7	002.1000	0231.5	053.3	52.42
292.0	000.9200	0230.8	027.0	077.3	002.1000	0232.6	053.5	52.36
293.0	000.9200	0230.7	027.0	076.8	002.1000	0233.4	053.8	52.28
294.0	000.9200	0230.7	027.0	076.4	002.1000	0234.5	054.1	52.21
295.0	000.9200	0230.7	027.0	076.0	002.1000	0235.4	054.4	52.13
296.0	000.9200	0230.6	027.0	075.7	002.1000	0236.4	054.7	52.05
297.0	000.9200	0230.4	027.0	075.3	002.1000	0237.1	055.0	51.95
298.0	000.9200	0230.1	027.0	074.9	002.1000	0237.6	055.3	51.84
299.0	000.9200	0230.1	027.0	074.6	002.1000	0238.0	055.6	51.72
300.0	000.9200	0229.9	027.0	074.3	002.1000	0238.3	056.0	51.60
301.0	000.9200	0229.7	026.9	073.9	002.1000	0238.3	056.3	51.46
302.0	000.9200	0229.3	026.9	073.6	002.1000	0238.3	056.7	51.32
303.0	000.9200	0228.8	026.9	073.3	002.1000	0238.3	057.1	51.17
304.0	000.9200	0228.3	026.9	073.1	002.1000	0238.2	057.4	51.02

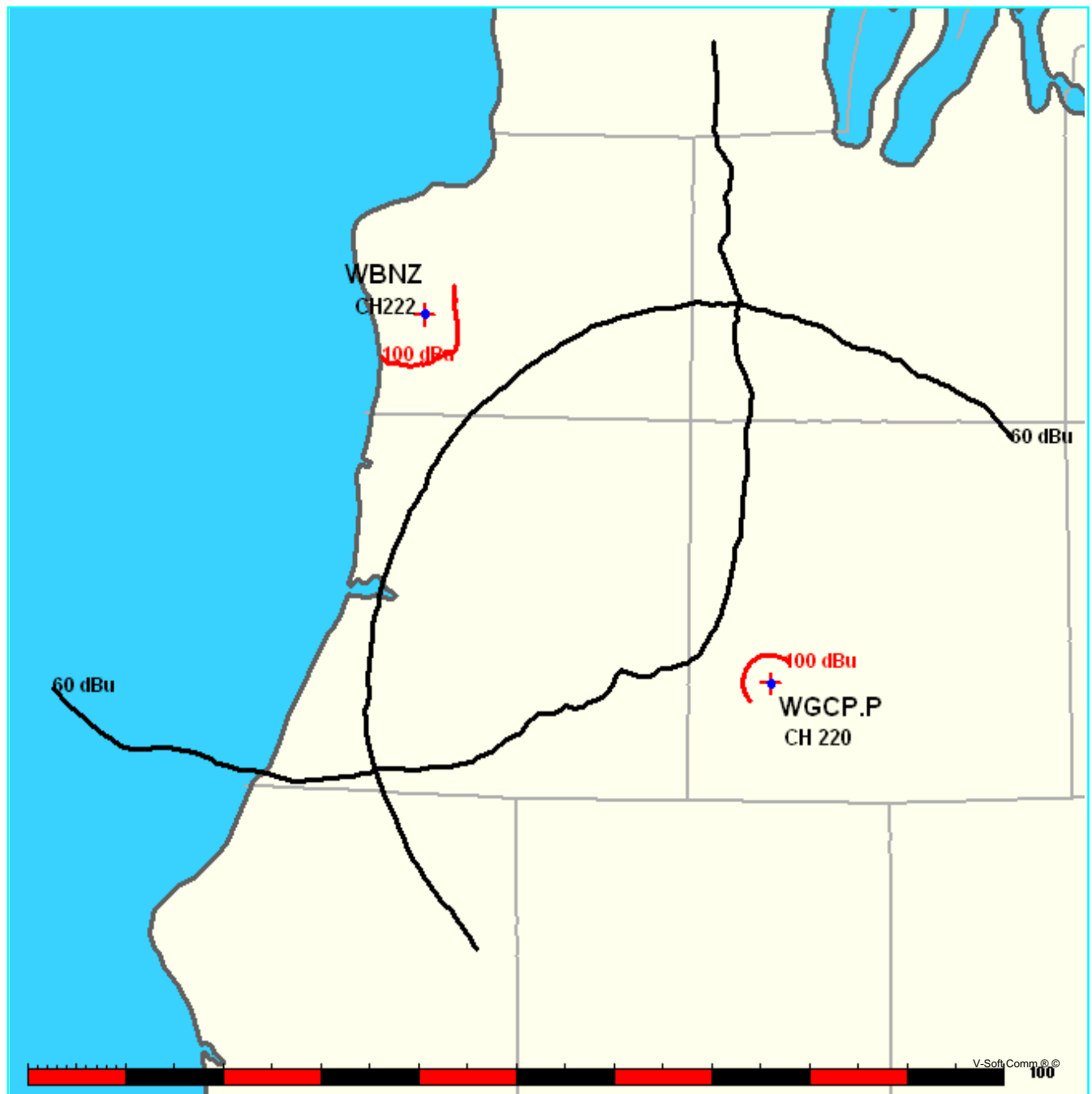
## Exhibit 20.3 - §73.215 Short-Spaced Contour Protection Study Toward WBNZ(FM) - Frankfort, MI - CH222C2 (Present Facilities)

West Central Michigan Media Ministries

FMCommander Single Allocation Study - 07-20-2011 - NED 03 SEC  
WGCP.P's Overlaps (In= 6.28 km, Out= 5.33 km)

WGCP.P CH 220 C3  
Lat= 44 16 33.0, Lng= 85 42 48.0  
2.1 kW 311.2 M HAAT, 659 M COR  
Prot.= 60 dBu, Intef.= 100 dBu

WBNZ CH 222 C2 73.215 Z BLH20110224AAK  
Lat= 44 36 38.0, Lng= 86 09 38.0  
50.0 kW 136 M HAAT, 346 M COR  
Prot.= 60 dBu, Intef.= 100 dBu



**Munn-Reese, Inc.**

Broadcast Engineering Consultants  
Coldwater, MI 49036

# Exhibit 20.3 - §73.215 Short-Spaced Contour Protection Study Toward WBNZ(FM) - Frankfort, MI - CH222C2 (Present Facilities)

07-20-2011

Terrain Data: NED 03 SEC

FMOver Analysis

WGCP.P

WBNZ BLH20110224AAK

Channel = 220C3  
Max ERP = 2.1 kW  
RCAMSL = 659 M  
N. Lat. 44 16 33.0  
W. Lng. 85 42 48.0  
Protected  
60 dBu

Channel = 222C2  
Max ERP = 50 kW  
RCAMSL = 346 M  
N. Lat. 44 36 38.0  
W. Lng. 86 09 38.0  
Interfering  
100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
272.0	002.1000	0381.6	041.2	188.8	050.0000	0115.7	036.2	67.65	
273.0	002.1000	0380.5	041.1	188.9	050.0000	0116.0	035.5	68.00	
274.0	002.1000	0379.8	041.1	188.9	050.0000	0116.2	034.8	68.35	
275.0	002.1000	0379.6	041.1	189.0	050.0000	0116.4	034.0	68.71	
276.0	002.1000	0379.6	041.1	189.1	050.0000	0116.5	033.3	69.06	
277.0	002.1000	0381.3	041.2	189.3	050.0000	0117.0	032.6	69.44	
278.0	002.1000	0380.9	041.1	189.3	050.0000	0117.0	031.9	69.80	
279.0	002.1000	0382.4	041.2	189.4	050.0000	0117.5	031.2	70.20	
280.0	002.1000	0380.6	041.1	189.3	050.0000	0117.0	030.5	70.56	
281.0	002.1000	0377.6	041.0	189.0	050.0000	0116.3	029.8	70.91	
282.0	002.1000	0377.8	041.0	189.0	050.0000	0116.3	029.0	71.32	
283.0	002.1000	0378.9	041.1	189.0	050.0000	0116.3	028.3	71.76	
284.0	002.1000	0378.1	041.0	188.8	050.0000	0115.6	027.6	72.15	
285.0	002.1000	0379.3	041.1	188.8	050.0000	0115.4	026.9	72.61	
286.0	002.1000	0378.1	041.0	188.5	050.0000	0114.3	026.2	72.99	
287.0	002.1000	0375.7	040.9	188.0	050.0000	0113.4	025.5	73.39	
288.0	002.1000	0374.8	040.9	187.6	050.0000	0113.2	024.8	73.87	
289.0	002.1000	0374.1	040.8	187.2	050.0000	0113.3	024.1	74.37	
290.0	002.1000	0373.8	040.8	186.8	050.0000	0112.8	023.4	74.84	
291.0	002.1000	0373.7	040.8	186.4	050.0000	0111.2	022.7	75.22	
292.0	002.1000	0372.0	040.7	185.8	050.0000	0109.1	022.1	75.55	
293.0	002.1000	0372.4	040.8	185.2	050.0000	0109.1	021.4	76.08	
294.0	002.1000	0371.8	040.7	184.6	050.0000	0108.8	020.7	76.57	
295.0	002.1000	0374.4	040.9	184.2	050.0000	0108.9	020.0	77.14	
296.0	002.1000	0372.5	040.8	183.2	050.0000	0107.8	019.4	77.55	
297.0	002.1000	0371.0	040.7	182.2	050.0000	0109.0	018.7	78.16	
298.0	002.1000	0368.9	040.6	180.9	050.0000	0108.8	018.1	78.62	
299.0	002.1000	0368.2	040.6	179.8	050.0000	0107.3	017.5	79.00	
300.0	002.1000	0372.2	040.7	179.1	050.0000	0106.6	016.8	79.53	
301.0	002.1000	0374.4	040.9	178.1	050.0000	0106.3	016.2	80.06	
302.0	002.1000	0375.8	040.9	176.9	050.0000	0106.9	015.5	80.63	
303.0	002.1000	0376.3	040.9	175.4	050.0000	0105.5	015.0	80.90	
304.0	002.1000	0377.7	041.0	173.8	050.0000	0104.8	014.4	81.51	
305.0	002.1000	0377.5	041.0	171.9	050.0000	0101.7	013.8	81.88	
306.0	002.1000	0377.2	041.0	169.7	050.0000	0097.1	013.3	82.12	
307.0	002.1000	0377.2	041.0	167.4	050.0000	0094.5	012.8	82.53	

**Munn-Reese, Inc.**

Broadcast Engineering Consultants  
Coldwater, MI 49036



## Exhibit 20.3 - §73.215 Short-Spaced Contour Protection Study Toward WBNZ(FM) - Frankfort, MI - CH222C2 (Present Facilities)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
308.0	002.1000	0376.7	041.0	164.8	050.0000	0087.2	012.4	82.45
309.0	002.1000	0376.3	040.9	162.0	050.0000	0088.6	012.0	83.17
310.0	002.1000	0377.7	041.0	159.2	050.0000	0088.8	011.6	83.86
311.0	002.1000	0379.6	041.1	156.2	050.0000	0088.9	011.2	84.51
312.0	002.1000	0377.4	041.0	152.6	050.0000	0085.0	011.0	84.44
313.0	002.1000	0375.5	040.9	148.9	048.3310	0091.0	010.9	85.11
314.0	002.1000	0374.0	040.8	145.2	042.6064	0102.1	010.8	85.72
315.0	002.1000	0370.9	040.7	141.3	037.1143	0114.3	010.8	86.02
316.0	002.1000	0369.7	040.6	137.6	032.0930	0117.1	010.8	85.58
317.0	002.1000	0367.5	040.5	133.8	027.4955	0117.7	010.9	84.76
318.0	002.1000	0366.7	040.5	130.2	023.3267	0117.3	011.0	83.86
319.0	002.1000	0366.9	040.5	126.6	020.1375	0115.4	011.1	82.90
320.0	002.1000	0368.0	040.6	123.0	017.2340	0116.5	011.2	82.10
321.0	002.1000	0367.9	040.5	119.7	014.7831	0117.3	011.5	81.12
322.0	002.1000	0368.3	040.6	116.4	013.1756	0119.2	011.7	80.35
323.0	002.1000	0365.8	040.4	113.7	011.8859	0120.3	012.2	79.33
324.0	002.1000	0363.7	040.3	111.1	010.7479	0119.8	012.6	78.21
325.0	002.1000	0365.5	040.4	108.3	009.9543	0121.9	012.9	77.57
326.0	002.1000	0365.1	040.4	106.0	009.5398	0122.5	013.4	76.83
327.0	002.1000	0364.4	040.4	103.8	009.1728	0123.5	013.9	76.10
328.0	002.1000	0364.9	040.4	101.7	008.8148	0119.5	014.4	75.09
329.0	002.1000	0364.5	040.4	099.9	008.5268	0115.8	014.9	74.09
330.0	002.1000	0364.5	040.4	098.2	008.4917	0112.1	015.4	73.44
331.0	002.1000	0362.8	040.3	096.9	008.4648	0110.3	016.0	72.77
332.0	002.1000	0363.1	040.3	095.5	008.4349	0109.2	016.6	72.20
333.0	002.1000	0365.9	040.5	093.8	008.4006	0108.1	017.1	71.66
334.0	002.1000	0363.0	040.3	093.0	008.3850	0107.9	017.8	71.07
335.0	002.1000	0359.2	040.1	092.5	008.3742	0107.8	018.5	70.48
336.0	002.1000	0358.8	040.1	091.6	008.3558	0108.8	019.1	70.05
337.0	002.1000	0357.9	040.1	090.8	008.3405	0110.1	019.8	69.62
338.0	002.1000	0356.4	040.0	090.3	008.3285	0109.9	020.5	69.07
339.0	002.1000	0355.0	039.9	089.7	008.3243	0110.0	021.1	68.55
340.0	002.1000	0354.0	039.9	089.2	008.3264	0110.7	021.8	68.09
341.0	002.1000	0352.7	039.8	088.8	008.3281	0111.0	022.5	67.60
342.0	002.1000	0349.4	039.6	088.7	008.3286	0111.3	023.2	67.09
343.0	002.1000	0347.7	039.5	088.4	008.3297	0112.1	023.9	66.65
344.0	002.1000	0344.2	039.4	088.4	008.3297	0112.1	024.6	66.15
345.0	002.1000	0341.2	039.2	088.4	008.3298	0112.2	025.3	65.66
346.0	002.1000	0341.2	039.2	088.0	008.3312	0112.8	026.0	65.25
347.0	002.1000	0342.4	039.3	087.6	008.3330	0112.9	026.6	64.82
348.0	002.1000	0343.3	039.3	087.2	008.3344	0112.7	027.3	64.37
349.0	002.1000	0342.3	039.3	087.1	008.3349	0112.6	028.0	63.93
350.0	002.1000	0336.0	038.9	087.6	008.3329	0112.9	028.7	63.51
351.0	002.1000	0333.2	038.8	087.7	008.3325	0112.9	029.4	63.09
352.0	002.1000	0331.9	038.7	087.7	008.3325	0112.9	030.0	62.70
353.0	002.1000	0329.6	038.6	087.8	008.3321	0112.8	030.7	62.33
354.0	002.1000	0330.3	038.6	087.7	008.3328	0112.9	031.4	61.98
355.0	002.1000	0329.6	038.6	087.7	008.3328	0112.9	032.1	61.64

**Munn-Reese, Inc.**

Broadcast Engineering Consultants  
Coldwater, MI 49036

# Exhibit 20.3 - §73.215 Short-Spaced Contour Protection Study Toward WBNZ(FM) - Frankfort, MI - CH222C2 (Present Facilities)

07-20-2011

Terrain Data: NED 03 SEC

FMOVer Analysis

WBNZ BLH20110224AAK

WGCP.P

Channel = 222C2

Max ERP = 50 kW

RCAMSL = 346 M

N. Lat. 44 36 38.0

W. Lng. 86 09 38.0

Protected

60 dBu

Channel = 220C3

Max ERP = 2.1 kW

RCAMSL = 659 M

N. Lat. 44 16 33.0

W. Lng. 85 42 48.0

Interfering

100 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
091.0	008.3436	0110.1	032.0	354.4	002.1000	0331.1	036.8	62.64	
092.0	008.3640	0108.1	031.7	353.9	002.1000	0329.9	036.3	62.85	
093.0	008.3845	0107.9	031.7	353.7	002.1000	0329.5	035.8	63.09	
094.0	008.4050	0108.3	031.8	353.7	002.1000	0329.5	035.2	63.35	
095.0	008.4255	0108.8	031.9	353.6	002.1000	0329.4	034.7	63.62	
096.0	008.4460	0109.5	032.0	353.6	002.1000	0329.4	034.1	63.90	
097.0	008.4666	0110.4	032.1	353.6	002.1000	0329.5	033.5	64.18	
098.0	008.4872	0111.8	032.3	353.8	002.1000	0329.7	032.9	64.47	
099.0	008.5078	0113.3	032.6	353.9	002.1000	0330.0	032.3	64.78	
100.0	008.5284	0116.0	032.9	354.3	002.1000	0331.1	031.7	65.14	
101.0	008.6944	0118.2	033.4	354.7	002.1000	0330.3	031.0	65.47	
102.0	008.8621	0119.8	033.7	355.0	002.1000	0329.4	030.3	65.81	
103.0	009.0312	0122.1	034.1	355.4	002.1000	0327.1	029.6	66.13	
104.0	009.2020	0123.8	034.5	355.7	002.1000	0325.1	028.9	66.48	
105.0	009.3744	0122.6	034.5	355.4	002.1000	0327.7	028.4	66.90	
106.0	009.5485	0122.6	034.6	355.2	002.1000	0328.6	027.8	67.31	
107.0	009.7241	0122.5	034.8	355.0	002.1000	0329.6	027.1	67.73	
108.0	009.9012	0122.1	034.9	354.7	002.1000	0330.4	026.6	68.15	
109.0	010.0801	0121.3	034.9	354.2	002.1000	0331.0	026.0	68.55	
110.0	010.2605	0120.0	034.9	353.6	002.1000	0329.4	025.4	68.88	
111.0	010.6907	0119.8	035.2	353.6	002.1000	0329.3	024.7	69.36	
112.0	011.1298	0119.7	035.5	353.5	002.1000	0329.2	024.1	69.85	
113.0	011.5777	0120.1	035.9	353.6	002.1000	0329.3	023.3	70.38	
114.0	012.0344	0120.0	036.2	353.4	002.1000	0329.1	022.6	70.89	
115.0	012.5000	0120.1	036.5	353.3	002.1000	0329.2	021.9	71.43	
116.0	012.9744	0119.7	036.7	352.9	002.1000	0329.8	021.3	71.96	
117.0	013.4577	0118.4	036.8	352.2	002.1000	0331.3	020.7	72.47	
118.0	013.9498	0117.1	037.0	351.4	002.1000	0332.8	020.1	72.98	
119.0	014.4507	0117.2	037.3	351.0	002.1000	0333.3	019.4	73.55	
120.0	014.9604	0117.4	037.6	350.4	002.1000	0334.9	018.7	74.15	
121.0	015.6968	0117.1	037.9	349.9	002.1000	0336.3	018.0	74.78	
122.0	016.4508	0117.7	038.3	349.5	002.1000	0338.0	017.2	75.48	
123.0	017.2226	0116.5	038.6	348.5	002.1000	0343.4	016.5	76.13	

**Munn-Reese, Inc.**

Broadcast Engineering Consultants

Coldwater, MI 49036

## Exhibit 20.3 - §73.215 Short-Spaced Contour Protection Study Toward WBNZ(FM) - Frankfort, MI - CH222C2 (Present Facilities)

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
124.0	018.0120	0117.9	039.1	348.1	002.1000	0343.4	015.7	76.85
125.0	018.8191	0117.4	039.4	347.0	002.1000	0342.3	015.0	77.42
126.0	019.6439	0116.0	039.6	345.3	002.1000	0340.9	014.4	78.07
127.0	020.4864	0114.9	039.7	343.6	002.1000	0346.6	013.9	78.94
128.0	021.3466	0115.9	040.2	342.3	002.1000	0348.7	013.1	80.03
129.0	022.2244	0116.7	040.6	340.7	002.1000	0353.4	012.3	81.21
130.0	023.1200	0117.3	041.0	338.7	002.1000	0355.8	011.6	82.29
131.0	024.2208	0117.2	041.4	336.3	002.1000	0358.2	011.0	83.33
132.0	025.3472	0117.9	041.9	333.7	002.1000	0364.2	010.3	84.54
133.0	026.4992	0117.9	042.2	330.4	002.1000	0363.6	009.7	85.44
134.0	027.6768	0117.7	042.6	326.5	002.1000	0364.3	009.2	86.25
135.0	028.8800	0118.1	043.0	322.2	002.1000	0367.9	008.6	87.14
136.0	030.1088	0117.5	043.2	317.3	002.1000	0366.8	008.3	87.63
137.0	031.3632	0118.0	043.6	311.8	002.1000	0377.6	007.9	88.38
138.0	032.6432	0116.4	043.8	306.2	002.1000	0377.5	007.9	88.38
139.0	033.9488	0115.5	044.0	300.5	002.1000	0374.0	007.9	88.32
140.0	035.2800	0115.6	044.3	294.4	002.1000	0372.0	007.9	88.34
141.0	036.6368	0115.0	044.5	288.7	002.1000	0374.2	008.1	88.10
142.0	038.0192	0112.4	044.5	284.6	002.1000	0379.2	008.6	87.38
143.0	039.4272	0109.8	044.4	281.2	002.1000	0377.2	009.1	86.47
144.0	040.8608	0106.1	044.1	278.9	002.1000	0382.3	009.9	85.42
145.0	042.3200	0102.8	043.8	277.1	002.1000	0381.3	010.6	84.30
146.0	043.8048	0098.1	043.3	276.4	002.1000	0380.6	011.5	82.94
147.0	045.3152	0097.1	043.4	273.8	002.1000	0379.9	012.0	82.17
148.0	046.8512	0095.5	043.4	271.8	002.1000	0382.0	012.7	81.33
149.0	048.4128	0090.7	042.8	272.2	002.1000	0381.3	013.6	80.02
150.0	050.0000	0085.3	042.0	273.2	002.1000	0380.3	014.7	78.69
151.0	050.0000	0081.6	041.3	274.1	002.1000	0379.8	015.7	77.73
152.0	050.0000	0083.5	041.7	271.5	002.1000	0382.6	016.1	77.45
153.0	050.0000	0086.4	042.2	268.5	002.1000	0381.7	016.5	77.11
154.0	050.0000	0088.8	042.7	266.1	002.1000	0392.7	017.0	76.98
155.0	050.0000	0089.7	042.9	264.7	002.1000	0393.8	017.6	76.48
156.0	050.0000	0089.6	042.9	263.9	002.1000	0394.6	018.3	75.93
157.0	050.0000	0089.6	042.8	263.3	002.1000	0395.4	019.0	75.37
158.0	050.0000	0090.8	043.1	262.1	002.1000	0395.1	019.7	74.84
159.0	050.0000	0089.4	042.8	262.3	002.1000	0395.0	020.5	74.22
160.0	050.0000	0086.7	042.3	263.2	002.1000	0395.4	021.3	73.57
161.0	050.0000	0087.4	042.4	262.5	002.1000	0394.9	022.0	73.04
162.0	050.0000	0088.6	042.7	261.6	002.1000	0394.4	022.7	72.51
163.0	050.0000	0086.9	042.3	262.1	002.1000	0395.1	023.5	71.95
164.0	050.0000	0086.4	042.2	262.0	002.1000	0395.1	024.2	71.41
165.0	050.0000	0087.4	042.4	261.4	002.1000	0394.3	025.0	70.90
166.0	050.0000	0089.9	042.9	260.1	002.1000	0393.4	025.6	70.39
167.0	050.0000	0093.8	043.6	258.5	002.1000	0390.2	026.4	69.83
168.0	050.0000	0094.5	043.8	258.1	002.1000	0389.1	027.1	69.30
169.0	050.0000	0095.8	044.0	257.7	002.1000	0388.1	027.9	68.79
170.0	050.0000	0097.6	044.3	257.1	002.1000	0386.8	028.7	68.28