ELECTRONICS RESEARCH, INC. ERI

Radio Frequency Radiation Study

Lexington, KY.

ERI Antenna 1091-4CP-DA

WRFL – 88.1 MHz.

ERI Project # 25719

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Submitted By:

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Jeff Taylor and Mike Ahlert of Electronics Research, Inc. were retained by University of Kentucky to conduct power density measurements on the Patterson Building located in Lexington, KY., University of Kentucky campus. A new ERI antenna Model 1091-4CP-DA was installed and field tuned June 3, 2010 on the roof top of the Peterson Building. The radio station operating from the antenna is WRFL operating at 88.1 MHz. The tower structure the antenna is mounted to is 47' in length with an antenna array length of 24'. The bottom element of the antenna array is approximately 23' from the roof top.

Before any measurements were taken I verified that the transmitter was operating at 100% power. (1.65 kW) A 5'x 5' grid was laid out on the roof top and the 20th floor with columns running the length of the building while rows run the width of the building. Refer to Appendix "A" for the measurements. Using a Narda Electromagnetic Survey Meter Model# 8718B, Serial# 7123 with a Narda Isotropic, Shaped Frequency Response Electric Field Probe Model# A8742D, Serial# 02801 (certificate attached and calibrated on June 6, 2010). The probe conforms to the following standards: FCC 1997 Regulation Occupational Environments 300 kHz. – 3.0 GHz., NCRP Report 86 Occupational Environments 300 kHz. – 3.0 KHz., IEEE C95.1-1991 Controlled Environments 300 kHz. – 1.5 GHz.

Measurements were taken North, South, East, and West at each intersecting point of the grid for each floor using spatial averaging for 10 seconds in each direction from average body height (6') to ground. There were no readings using the Narda Meter that exceeded 13.5% of the allowable limit for occupational exposure on the roof top (21st floor). Measurements of the 20th floor indicate that there are no readings that exceeded 6% of the allowable limit for occupational exposure. There are air conditioners located on the northwest corner of the 20th floor where four measurement points could not be conducted due to the size of the unit. Points surrounding these units did not exceed 6%. The mechanical room located below the rooftop was measured in areas that were accessible and all levels measured 0% of standard. For general public the allowable is one-fifth of the allowable level for occupied workers.

The other area of concern was the 18th floor where the university conducts board meetings. The boardroom, area adjacent to the boardroom, hallways, and all other areas on the 18th floor measured were 0%. Both the rooftop and 20th floor are accessible to building maintenance technicians only while the 18th floor is accessible to the public.

In summary, from the measurements taken on July 6-8, 2010 in Lexington, KY. Using the above methods, there were no electromagnetic field measurements that exceed the maximum allowable level for RF exposure ANSI/IEEE C95.1-1992 Standard.
Attached is Appendix "A" of the measurements taken at this transmitting facility along with basic layout of rooftop and 20th floor. Appendix "B" includes pictures of the A/C units where measurements could not be performed. Appendix "C" includes documentation of exposure limits, ANSI/IEE Standard C95.1, Spatial Averaged Measurement explanation, and Certificate of Calibration of the Narda instrument used to conduct the measurements.

Appendix "A"

Rooftop Measurements

These numbers are in percentages of allowable occupational exposure.

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	1	0.1687	0	0.0562	0.6375	0.2156
2	1	0	0	0	0	0
3	1	0.2812	0.3	0.375	0.5812	0.38435
4	1	0.9187	1.068	0.9652	0.8625	0.9536
5	1	0.8437	1.368	1.912	1.95	1.518425
6	1	1.593	1.725	1.368	1.05	1.434
7	1	1.256	1.387	1.312	1.218	1.29325
8	1	1.275	1.293	1.2	1.256	1.256
9	1	1.875	1.743	2.418	1.725	1.94025
10	1	1.987	1.593	1.275	1.068	1.48075
11	1	1.968	2.306	2.212	2.137	2.15575
12	1	4.425	2.643	3.262	2.493	3.20575
13	1	4.612	3.225	3.056	3.806	3.67475
14	1	6.45	6.506	4.65	5.006	5.653
15	1	7.816	6.675	5.775	6.225	6.62275
16	1	7.575	5.212	4.218	5.362	5.59175
17	1	3.975	3.393	2.118	2.831	3.07925

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	2	0.075	0.1687	0.0187	0.1312	0.0984
2	2	0	0.675	0.1312	0.1875	0.248425
3	2	0.225	0.3937	0.1687	0.2625	0.262475
4	2	0.525	0.75	0.8437	0.5812	0.674975
5	2	0.6937	0.7312	0.5062	0.825	0.689025
6	2	1.218	1.518	1.481	1.05	1.31675
7	2	1.331	1.556	1.706	1.537	1.5325
8	2	1.443	1.556	1.612	1.312	1.48075
9	2	1.425	1.256	1.65	1.387	1.4295
10	2	2.437	2.268	2.25	1.725	2.17
11	2	3.581	2.868	3.187	2.85	3.1215
12	2	4.443	5.287	3.843	3.375	4.237
13	2	5.4	6.318	5.325	6.3	5.83575
14	2	7.312	7.462	5.625	7.481	6.97
15	2	10.76	8.475	6.843	8.456	8.6335
16	2	9.018	8.4	7.687	9.487	8.648
17	2	6.093	5.718	5.231	6.675	5.92925

These numbers are in percentages of allowable occupational exposure.

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	3	0.1875	0.8812	0.075	0.0562	0.299975
2	3	0	0.3937	0.525	0.675	0.398425
3	3	0.0937	0.1687	0.0562	0.3	0.15465
4	3	0.5062	1.181	0.8062	1.087	0.8951
5	3	1.593	2.381	1.5	2.025	1.87475
6	3	2.006	3.026	1.912	2.118	2.2655
7	3	2.418	2.943	2.325	2.268	2.4885
8	3	2.437	2.643	2.206	2.7	2.4965
9	3	1.481	1.181	1.406	0.9562	1.25605
10	3	1.593	1.181	0.6187	0.6937	1.0216
11	3	1.818	2.081	1.237	1.931	1.76675
12	3	3.937	2.981	2.193	2.812	2.98075
13	3	5.175	4.743	3.9	4.425	4.56075
14	3	6.975	5.625	4.518	6.581	5.92475
15	3	8.493	6.337	5.156	7.2	6.7965
16	3	7.106	4.968	4.781	6.693	5.887
17	3	4.087	3.243	2.737	3.937	3.501

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	4	0.1687	0.0937	0	0.3187	0.145275
2	4	0.6437	0.8602	0.525	0.5437	0.64315
3	4	0.1875	0.1687	0.0562	0.0375	0.112475
4	4	0.7312	0.9187	0.7125	0.675	0.75935
5	4	0.225	1.106	0.5437	0.6187	0.62335
6	4	1.181	0.9375	0.8625	0.5062	0.8718
7	4	1.2	1.518	1.087	1.218	1.25575
8	4	1.331	1.406	1.368	1.481	1.3965
9	4	1.012	0.6562	1.012	1.068	0.93705
10	4	1.368	1.368	0.9	0.9562	1.14805
11	4	2.212	2.118	1.5	1.425	1.81375
12	4	3.562	2.156	1.725	1.987	2.3575
13	4	5.737	3.806	3.637	4.087	4.31675
14	4	8.018	5.587	6.093	6.112	6.4525
15	4	10.63	7.181	7.312	8.156	8.31975
16	4	9.543	6	7.05	7.575	7.542
17	4	8.212	5.306	5.493	5.962	6.24325

These numbers are in percentages of allowable occupational exposure.

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	5	1.5	0.2625	0.0375	0.7312	0.6328
2	5	0	0	0.375	0	0.09375
3	5	0.3562	0.2625	0.1687	0.2437	0.257775
4	5	0.8062	1.012	0.6937	0.825	0.834225
5	5	0.375	0.3	0.2062	0.2062	0.27185
6	5	0.7687	0.7125	0.525	0.5812	0.64685
7	5	0.975	0.9562	1.2	1.143	1.06855
8	5	1.5	1.706	2.006	1.912	1.781
9	5	Tower	Tower	Tower	Tower	
10	5	1.987	1.687	1.218	1.181	1.51825
11	5	1.65	1.818	1.518	1.65	1.659
12	5	3.056	2.568	2.493	3.825	2.9855
13	5	6.487	4.2	4.875	6.618	5.545
14	5	10.781	7.275	9.543	10.63	9.55725
15	5	14.9	8.212	9.201	12.58	11.22325
16	5	13.1	7.537	9.412	11.7	10.43725
17	5	8.981	5.493	8.306	9.131	7.97775

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	6	0	0	0.375	0.4875	0.215625
2	6	0.5812	0.5437	0.1875	0.225	0.38435
3	6	0.225	0.3375	0.2812	0.3375	0.2953
4	6	0.2437	0.2625	0.4875	0.1687	0.2906
5	6	0.1687	0.15	0.2437	0.3937	0.239025
6	6	0.2812	0.15	0.6937	0.4125	0.38435
7	6	0.8437	0.9187	0.8812	0.8062	0.86245
8	6	1.143	1.387	1.256	1.481	1.31675
9	6	2.268	2.418	2.175	2.418	2.31975
10	6	1.837	2.193	1.556	1.875	1.86525
11	6	1.856	2.231	1.818	2.118	2.00575
12	6	2.981	2.437	3.618	3.093	3.03225
13	6	6.093	4.256	5.962	5.981	5.573
14	6	8.718	5.756	8.493	9.675	8.1605
15	6	1.08	6.843	10.29	11.41	7.40575
16	6	9.825	5.362	9.956	10.08	8.80575
17	6	7.818	5.025	7.818	7.218	6.96975

These numbers are in percentages of allowable occupational exposure.

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	7	0.4125	0.3187	0.5062	0.675	0.4781
2	7	0.2437	0.2625	0.1687	0.1312	0.201525
3	7	0.7687	0.3187	0.7312	0.2625	0.520275
4	7	0.3187	0.2062	0.1875	0.2812	0.2484
5	7	0.2437	0.2812	0.15	0.1687	0.2109
6	7	0.3937	0.3562	0.1312	0.225	0.276525
7	7	0.4125	0.5062	0.45	0.525	0.473425
8	7	0.6	0.6	0.5625	0.75	0.628125
9	7	0.6937	0.6937	0.4687	0.9187	0.6937
10	7	0.7125	0.8062	0.6562	0.8062	0.745275
11	7	1.293	1.312	1.293	1.762	1.415
12	7	2.756	1.706	1.912	3.225	2.39975
13	7	4.256	3.093	3.6	5.231	4.045
14	7	5.981	3.787	7.106	7.256	6.0325
15	7	8.587	6.581	9.712	9.206	8.5215
16	7	10.23	5.7	9.731	9.375	8.759
17	7	8.025	4.473	7.256	6.562	6.579

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	8	0.8062	0.9187	0.6937	0.675	0.7734
2	8	0.3937	0.2812	0.1312	0.1312	0.234325
3	8	0	0	0	0	0
4	8	0.4312	0.6	0.4312	0.3375	0.449975
5	8	0.3	0.45	0.2625	0.4687	0.3703
6	8	0.75	0.5625	0.4312	0.7312	0.618725
7	8	1.012	0.6187	0.7312	0.7312	0.773275
8	8	1.143	0.8437	0.8062	0.9375	0.9326
9	8	1.087	0.9562	0.825	1.181	1.0123
10	8	0.7875	0.825	0.975	0.975	0.890625
11	8	2.25	2.512	2.043	2.306	2.27775
12	8	3.45	2.906	2.437	3.975	3.192
13	8	5.062	3.543	3.637	5.718	4.49
14	8	4.162	4.275	4.781	5.043	4.56525
15	8	7.856	4.556	6.525	7.743	6.67
16	8	8.118	4.556	5.287	7.687	6.412
17	8	5.831	3.431	4.425	5.4	4.77175

These numbers are in percentages of allowable occupational exposure.

Rooftop						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	9	0.6187	0.8625	0.525	0.7312	0.68435
2	9	0.1125	0.1687	0.15	0.3187	0.187475
3	9	1.275	1.275	0.9937	1.256	1.199925
4	9	2.156	0.9937	1.95	1.162	1.565425
5	9	2.006	1.143	1.687	1.387	1.55575
6	9	2.212	1.331	1.687	1.331	1.64025
7	9	1.481	1.652	1.275	1.181	1.39725
8	9	1.443	1.368	0.9187	1.781	1.377675
9	9	2.625	1.481	1.856	3.393	2.33875
10	9	2.231	2.775	2.231	3.037	2.5685
11	9	2.55	1.5	3.843	2.775	2.667
12	9	5.043	4.406	5.381	4.668	4.8745
13	9	5.156	6.168	7.8	7.331	6.61375
14	9	5.381	6.018	7.443	8.85	6.923
15	9	5.793	5.343	5.381	6.656	5.79325
16	9	7.556	5.681	5.343	7.987	6.64175
17	9	6.112	3.693	4.875	6.937	5.40425

20th Floor Measurements
These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	1	0	0.6562	0.8062	0	0.3656
2	1	0	0.5437	0.6562	0.6	0.449975
3	1	0	0.5437	0.5062	0.7125	0.4406
4	1	0	0.7687	0.2812	0.3	0.337475
5	1	0	0.225	0.2062	0.2625	0.173425
6	1	0	0.1875	0.2812	0.1875	0.16405
7	1	0	0.6375	0.6187	0.5625	0.454675
8	1	0	0.6375	0.6187	0.6187	0.468725
9	1	0	0.7125	0.8625	0.6562	0.5578
10	1	0	0.6	0.8625	0.675	0.534375
11	1	0	0.5625	0.5812	0.6187	0.4406
12	1	0	1.05	1.331	0.9187	0.824925
13	1	0	1.218	1.05	1.275	0.88575
14	1	Camera	1.368	1.537	1.631	1.512
15	1	Camera	1.556	1.143	1.237	1.312
16	1	0	1.106	1.75	0.9937	0.962425
17	1	0	1.237	1.012	1.237	0.8715
18	1	0	1.162	0.8625	1.087	0.777875
19	1	0	1.35	0.8062	1.068	0.80605
20	1	0	1.368	0.7875	0.8812	0.759175
21	1	0	1.312	0.825	0.9	0.75925
22	1	0	1.2	0.7875	0.9187	0.72655
23	1	0	1.218	0.825	0.8062	0.7123
24	1	0	0.7312	0.9187	0.75	0.599975
25	1	0	0.8812	0.5437	0.7687	0.5484
26	1	0	0.6187	0.5437	0.7875	0.487475
27	1	0	0.6187	0.675	0.525	0.454675
28	1	0	0.525	0	0.45	0.24375

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	2	1.35	1.406	1.518	0	1.0685
2	2	1.593	1.481	1.612	1.725	1.60275
3	2	2.025	1.518	1.5	1.537	1.645
4	2	2.062	1.781	1.8	1.8	1.86075
5	2	1.743	1.612	1.781	1.593	1.68225
6	2	1.893	1.706	1.443	1.762	1.701
7	2	1.818	1.931	1.8	1.837	1.8465
8	2	2.175	1.893	1.931	2.175	2.0435
9	2	1.537	1.912	2.156	1.668	1.81825
10	2	3.225	2.25	1.837	2.25	2.3905
11	2	1.187	0.9562	2.381	1.706	1.55755
12	2	0.9	1.781	1.331	2.231	1.56075
13	2	1.106	0.9187	0.8812	1.143	1.012225
14	2	1.256	1.05	0.8625	0.9937	1.04055
15	2	1.425	1.293	0.9	1.275	1.22325
16	2	0.5625	0.675	0.4875	0.6937	0.604675
17	2	0.7875	0.8625	0.5062	0.6375	0.698425
18	2	0.8437	0.6937	0.4125	0.6562	0.651525
19	2	1.087	0.5437	0.375	0.4687	0.6186
20	2	1.031	0.6562	0.375	0.5625	0.656175
21	2	1.237	0.9375	0.525	0.7875	0.87175
22	2	1.143	0.7687	0.675	0.8437	0.8576
23	2	1.275	0.7312	0.9	0.6937	0.899975
24	2	0.825	0.825	0.7125	0.5437	0.72655
25	2	1.312	0.0937	0.2062	0.3937	0.5014
26	2	0.3187	0.0187	0	0	0.08435
27	2	0	0	0	0.5437	0.135925
28	2	0.0187	0.4125	0	0.0187	0.112475

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	3	0	0	0	0	0
2	3	0	0	0	0	0
3	3	0	0	0	0	0
4	3	0	0	0	0	0
5	3	0	0	0	0	0
6	3	0	0	0	0	0
7	3	0	0	0	0	0
8	3	0.3	0.225	0.0937	0.0187	0.15935
9	3	0.0187	0.1687	0.2062	0.225	0.15465
10	3	0.4125	0.4125	0.6	0.3562	0.4453
11	3	0.7687	0.7687	1.031	1.331	0.97485
12	3	0.6	0.525	0.5437	0.2625	0.4828
13	3	0.3937	0.6187	0.3187	0.2625	0.3984
14	3	0.4687	0.7125	0.375	0.5062	0.5156
15	3	0.6375	0.75	0.525	0.4687	0.5953
16	3	0.4125	0.525	0.3	0.3562	0.398425
17	3	0.6	0.6187	0.5062	0.6375	0.5906
18	3	0.4687	0.3187	0.225	0.325	0.33435
19	3	0.3562	0.4875	0.1895	0.3	0.3333
20	3	0.675	0.8062	0.2437	0.4312	0.539025
21	3	0.9937	1.106	0.525	0.7125	0.8343
22	3	0.9187	0.9562	0.5437	0.6937	0.778075
23	3	1.087	1.162	0.825	0.7875	0.965375
24	3	0.8812	0.675	0.5625	0.6187	0.68435
25	3	0.45	0.375	0.2812	0.4312	0.38435
26	3	0.2812	0.2437	0.2437	0.225	0.2484
27	3	0.1312	0.1687	0.1875	0.2062	0.1734
28	3	0.2437	0.2812	0	0.2812	0.201525

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	4	1.312	1.387	1.387	0	1.0215
2	4	1.218	1.237	1.275	1.368	1.2745
3	4	1.181	1.2	1.218	1.237	1.209
4	4	1.087	1.406	1.237	1.181	1.22775
5	4	1.068	1.162	1.125	1.162	1.12925
6	4	0.8625	0.9937	0.9937	1.087	0.984225
7	4	1.087	1.012	0.9937	0.675	0.941925
8	4	0.7125	1.05	1.106	0.9187	0.9468
9	4	0.8062	0.7312	0.8062	0.8812	0.8062
10	4	0.975	0.9187	0.825	0.9937	0.9281
11	4	1.125	1.05	1.237	1.106	1.1295
12	4	0.6375	0.6187	0.6187	0.6375	0.6281
13	4	0.9	0.9	0.7687	0.825	0.848425
14	4	0.9375	0.9	1.012	1.087	0.984125
15	4	0.7687	0.8062	0.8062	0.825	0.801525
16	4	1.293	1.593	1.05	1.237	1.29325
17	4	0.975	0.9187	0.8062	0.75	0.862475
18	4	0.6187	0.6	0.5625	0.6	0.5953
19	4	0.7687	0.8437	0.675	0.675	0.7406
20	4	1.05	1.368	0.9	1.031	1.08725
21	4	1.331	1.5	1.05	1.327	1.302
22	4	1.406	1.368	1.143	1.331	1.312
23	4	1.462	1.425	1.275	1.35	1.378
24	4	1.218	1.068	1.05	1.106	1.1105
25	4	1.162	1.087	1.068	0.9937	1.077675
26	4	1.05	1.05	1.05	0.9937	1.035925
27	4	0.8437	0.9	0.9	0.9187	0.8906
28	4	0.4125	0.4875	0	0.7125	0.403125

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	5	1.337	1.2	1.462	0	0.99975
2	5	1.143	1.143	1.125	1.143	1.1385
3	5	1.106	1.162	1.181	1.143	1.148
4	5	1.2	1.2	1.181	1.237	1.2045
5	5	1.368	1.237	1.181	2.418	1.551
6	5	1.256	1.237	1.2	1.237	1.2325
7	5	1.331	1.237	1.331	1.35	1.31225
8	5	1.331	1.312	1.256	1.275	1.2935
9	5	1.575	1.556	1.612	1.575	1.5795
10	5	1.687	1.481	1.425	1.518	1.52775
11	5	1.35	1.425	1.312	1.35	1.35925
12	5	1.256	1.181	1.312	1.275	1.256
13	5	2.137	2.137	1.931	2.1	2.07625
14	5	1.762	1.818	2.568	1.612	1.94
15	5	1.893	1.743	1.687	1.781	1.776
16	5	1.8	1.8	1.5	1.612	1.678
17	5	1.481	1.368	1.462	1.331	1.4105
18	5	1.181	1.031	1.031	1.031	1.0685
19	5	1.162	1.275	1.181	1.237	1.21375
20	5	1.556	1.537	1.5	1.462	1.51375
21	5	1.8	1.668	1.575	1.556	1.64975
22	5	1.781	1.743	1.406	1.556	1.6215
23	5	1.481	1.406	1.425	1.275	1.39675
24	5	1.218	1.2	1.181	1.181	1.195
25	5	1.087	2.681	1.837	1.162	1.69175
26	5	1.106	1.181	1.162	1.181	1.1575
27	5	1.2	1.518	1.5	1.218	1.359
28	5	0.8437	0.8062	0	0.8437	0.6234

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	6	0	0	0	0	0
2	6	0.0187	0.1875	0.0375	0.2437	0.12185
3	6	0	0.0375	0.75	0.15	0.234375
4	6	0	0	0.1312	0.1687	0.074975
5	6	0.1875	0.225	0.2062	0.1687	0.19685
24	6	0.0375	0	0.0562	0	0.023425
25	6	0.0187	0	0	0	0.004675
26	6	0	0	0	0	0
27	6	0.6187	0.3	0.3562	0	0.318725
28	6	0	0.3562	0	0	0.08905

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	7	0.9	1.368	0.9937	0	0.815425
2	7	0.9937	0.75	1.987	0	0.932675
3	7	0.0375	0.0375	0.0562	0.1312	0.0656
4	7	0.1125	0.1312	0.15	0.1875	0.1453
5	7	0.3357	0.375	0.3375	0.3375	0.346425
24	7	0	0	0	0	0
25	7	0	0	0.1687	0.4312	0.149975
26	7	0.8437	0.3375	0.5437	0.5625	0.57185
27	7	0.7687	0.825	0.0187	0.0187	0.407775
28	7	0.1687	0.0937	0	0.3937	0.164025

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	8	0.8437	1.05	0.8812	0	0.693725
2	8	0.8437	0.9	0.9375	0.975	0.91405
3	8	1.012	0.9	1.068	0.825	0.95125
4	8	0.9187	0.9187	0.8437	0.8812	0.890575
5	8	0.8062	0.8062	0.8812	0.7687	0.815575
24	8	1.031	0.9562	0.8265	0	0.703425
25	8	0.7875	0.6937	0.9937	0.7312	0.801525
26	8	0.6	0.7687	0.9187	0.8062	0.7734
27	8	0.9187	0.1012	0.825	0.75	0.648725
28	8	1.256	0.975	0	1.218	0.86225

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	9	0.8437	1.162	1.875	0	0.970175
2	9	1.143	0.975	0.7312	1.331	1.04505
3	9	1.087	0.7875	0.9375	0.9937	0.951425
4	9	0.7687	0.9562	0.825	0.9937	0.8859
5	9	1.068	1.05	1.031	1.087	1.059
24	9	0.8437	0.8812	0.9375	0	0.6656
25	9	0.9937	0.9	0.9187	0.8265	0.909725
26	9	0.9375	1.031	1.068	0.9937	1.00755
27	9	1.162	1.237	1.237	1.35	1.2465
28	9	1.443	1.481	0	1.218	1.0355

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	10	1.068	1.218	1.162	0	0.862
2	10	1.162	1.331	1.181	1.387	1.26525
3	10	1.087	1.181	1.087	0.9375	1.073125
4	10	1.162	1.125	1.012	1.012	1.07775
5	10	1.65	1.012	1.031	1.068	1.19025
24	10	0.9937	1.012	0.9187	0	0.7311
25	10	0.9187	0.9562	0.9	0.9562	0.932775
26	10	0.9375	1.012	0.9375	1.031	0.9795
27	10	1.012	0.9937	0.975	1.143	1.030925
28	10	1.087	1.162	0	1.031	0.82

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	11	0.0187	0	0	0	0.004675
2	11	0	0.0187	0.075	0.0375	0.0328
3	11	0.1312	0	0.0562	0.0187	0.051525
4	11	0.057	0	0	0.075	0.033
5	11	0	0.2812	0.1125	0.1125	0.12655
24	11	0.9562	0.9187	1.068	0	0.735725
25	11	0.975	1.181	0.8062	1.125	1.0218
26	11	0.9187	0.9937	0.9937	1.031	0.984275
27	11	1.2	1.218	1.312	1.237	1.24175
28	11	1.312	1.35	0	1.406	1.017

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	12	0.1312	0.0937	0.0562	0	0.070275
2	12	0.0562	0.225	0.0937	0.1875	0.1406
3	12	0.1875	0	0.0875	0.2812	0.13905
4	12	0.525	0.0375	0.037	0.3562	0.238925
5	12	0.2625	0.057	0.1312	0.075	0.131425
24	12	0.0375	0.1312	0.1312	0	0.074975
25	12	0	0.0937	0	0	0.023425
26	12	0.0187	0	0	0.0375	0.01405
27	12	0.0187	0.0375	0	0.1125	0.042175
28	12	0.3562	0.375	0	0.2062	0.23435

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	13	0.0375	0.2812	0.0375	0	0.08905
2	13	0	0	0.15	0.2062	0.08905
3	13	0.0562	0.0937	0.1687	0.1125	0.107775
4	13	0.0937	0.3	0.075	0.0562	0.131225
5	13	0	0.3875	0.1125	0.0187	0.129675
24	13	A/C Units				
25	13	A/C Units				
26	13	0	0.0187	0.0562	0.0187	0.0234
27	13	0.1125	0.075	0.15	0.1125	0.1125
28	13	0.1312	0	0	0.1807	0.077975

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	14	0.225	0.2265	0.2437	0	0.1738
2	14	0.1875	0.0937	0.075	0.225	0.1453
3	14	0.0937	0.0187	0.1312	0.057	0.07515
4	14	0.0375	0	0.075	0.1312	0.060925
5	14	0.0937	0.2625	0.0937	0.0375	0.12185
24	14	A/C Unit				
25	14	A/C Unit				
26	14	0.0187	0.1125	0.4312	0.0562	0.15465
27	14	0.375	0.075	0.0187	0.0187	0.12185
28	14	0.2062	0.2437	0.2625	0	0.1781

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	15	0.0375	0.0375	0.0562	0	0.0328
2	15	0.2062	0.3	0.5812	0.4687	0.389025
3	15	0.15	0.1125	0.4312	0.2062	0.224975
4	15	0.075	0.2812	0.3	0.3937	0.262475
5	15	0.3562	0.1875	0.5437	0.45	0.38435
24	15	A/C Unit				
25	15	A/C Unit				
26	15	0.1687	0.1687	0	0.225	0.1406
27	15	0.2437	0.2062	0.1875	0.1312	0.19215
28	15	0.5812	0.075	0	0.1875	0.210925

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	16	0.3937	1.743	1.312	0	0.862175
2	16	0.15	0.1687	0	0.0937	0.1031
3	16	0.1687	0.0187	0.0187	0.0562	0.065575
4	16	0.0937	0.1875	0.075	0.0562	0.1031
5	16	0.225	0.1125	0.1562	0.075	0.142175
6	16	0.3375	0.075	0.0562	0.4312	0.224975
7	16	0.075	0	0.1875	0	0.065625
8	16	0.0187	0.1875	0.1312	0.0187	0.089025
9	16	0	0.1875	0.225	0.3375	0.1875
10	16	0.15	0.45	0.1312	0.3562	0.27185
11	16	0.2812	0.3	0.375	0.2062	0.2906
12	16	0.2812	0.0187	0.2812	0.225	0.201525
13	16	0	0.1125	0.225	0.1312	0.117175
14	16	0.2625	0.1875	0.75	0.45	0.4125
15	16	0.4875	0.2812	0.2062	0.3562	0.332775
16	16	0.6	0.225	0.1687	0.4687	0.3656
17	16	0.7125	0.2812	0.6187	0.675	0.57185
18	16	0.4687	0.75	0.525	0.3	0.510925
19	16	0.525	0.525	0.45	0.3	0.45
20	16	0.1687	0.45	0.4875	0.225	0.3328
21	16	0.3	0.6187	0.4875	0.6187	0.506225
22	16	0.3372	0.4312	0.3187	0.7125	0.4499
23	16	0.6187	0.4312	0.5437	0.3927	0.496575
24	16	0.5812	0.4312	0.6562	0.3562	0.5062
25	16	0.5437	0.4875	0.3187	0.8625	0.5531
26	16	0.7875	0.8625	0.8062	0.5625	0.754675
27	16	1.218	0.6187	0.7312	0.75	0.829475
28	16	1.031	0.8062	0	1.162	0.7498

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	**COLUMN**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**AVG**
1	**17**	3.506	3.468	3.412	0	2.5965
2	**17**	3.206	3.506	3.3	3.093	3.27625
3	**17**	3.037	3.243	3.318	3.168	3.1915
4	**17**	3.243	3.131	3.187	2.981	3.1355
5	**17**	3.112	3.056	3	3.056	3.056
6	**17**	3.243	3	3.131	3.281	3.2245
7	**17**	3.168	3.225	3.281	3.337	3.25275
8	**17**	3.318	3.281	3.318	3.337	3.3135
9	**17**	3.581	3.506	3.356	3.356	3.44975
10	**17**	3.412	3.506	3.543	3.431	3.473
11	**17**	VENT				
12	**17**	2.168	2.793	3.037	3.037	2.75875
13	**17**	2.812	2.868	2.962	2.7	2.8355
14	**17**	2.887	2.887	3.018	3	2.948
15	**17**	2.906	2.925	2.775	2.718	2.831
16	**17**	2.906	2.756	3.056	2.718	2.859
17	**17**	3.056	2.606	2.943	2.85	2.86375
18	**17**	2.643	2.643	2.587	2.418	2.57275
19	**17**	2.793	2.756	2.118	2.006	2.41825
20	**17**	2.137	2.025	1.95	2.025	2.03425
21	**17**	0.375	0.2812	0.2812	0.6187	0.389025
22	**17**	A/C Unit				
23	**17**	A/C Unit				
24	**17**	0.3	0.4687	0	0.5812	0.337475
25	**17**	0.7687	0.1312	0.1687	0.1687	0.309325
26	**17**	1.181	0.975	0.3187	1.106	0.895175
27	**17**	0.9187	0.9375	1.031	0.7687	0.913975
28	**17**	1.218	0.9937	0	1.125	0.834175

These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	18	3.525	3.487	3.506	0	2.6295
2	18	3.656	3.468	3.487	3.562	3.54325
3	18	3.487	3.581	3.675	3.6	3.58575
4	18	3.618	3.618	3.375	3.543	3.5385
5	18	3.393	3.375	3.356	3.356	3.37
6	18	3.3	3.337	3.281	3.262	3.295
7	18	3.243	3.093	3.168	3.131	3.15875
8	18	3	2.962	2.431	3	2.84825
9	18	3.018	3.112	3.037	3	3.04175
10	18	3.093	3.067	3.168	3.018	3.0865
11	18	3.206	3.243	3.281	3.187	3.22925
12	18	3.375	3.375	3.337	3.281	3.342
13	18	3.506	3.525	3.487	3.3	3.4545
14	18	3.693	3.562	3.506	3.637	3.5995
15	18	3.675	3.581	3.712	3.543	3.62775
16	18	4.125	3.975	4.068	3.787	3.98875
17	18	3.983	3.862	3.825	3.862	3.883
18	18	4.368	4.068	3.993	4.162	4.14775
19	18	3.768	3.825	3.693	3.75	3.759
20	18	3.6	3.806	3.6	3.618	3.656
21	18	3.318	2.906	3.281	3.956	3.36525
22	18	3.468	3.393	3.318	3.393	3.393
23	18	3.506	3.468	3.431	3.45	3.46375
24	18	3.112	2.718	2.981	3.187	2.9995
25	18	2.85	2.713	2.7	2.812	2.76875
26	18	2.625	3.637	2.493	2.587	2.8355
27	18	2.812	2.625	2.681	2.587	2.67625
28	18	2.85	2.737	0	2.868	2.11375

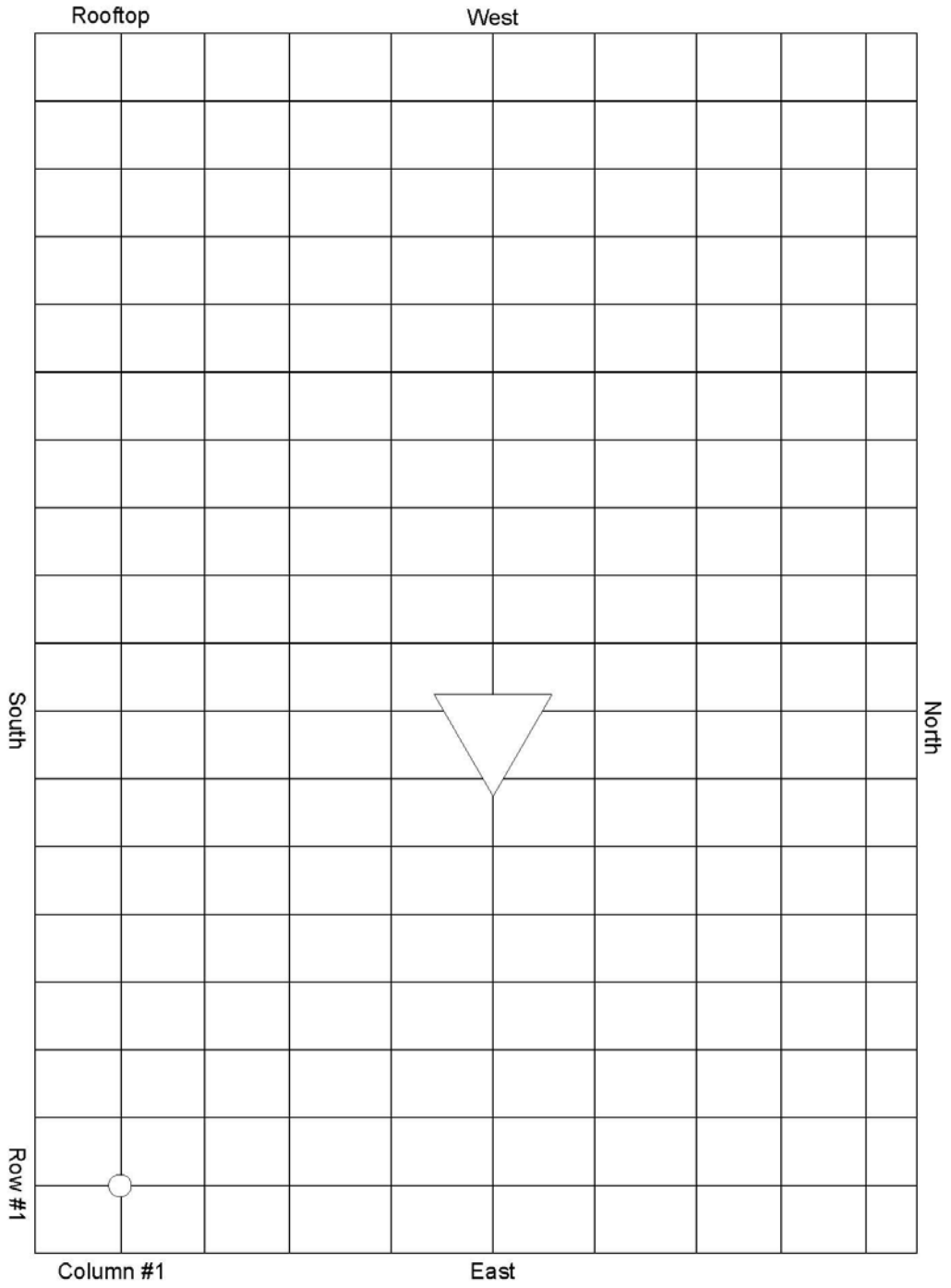
These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	19	0.9375	0.6187	0.8437	0	0.599975
2	19	0.975	1.087	0.3	0.9	0.8155
3	19	1.012	2.737	2.381	2.568	2.1745
4	19	2.887	2.718	2.85	3	2.86375
5	19	3.337	2.589	3.712	2.662	3.075
6	19	2.868	2.737	2.812	2.812	2.80725
7	19	2.737	2.775	2.812	2.737	2.76525
8	19	2.775	2.962	2.775	3.093	2.90125
9	19	3	3.056	2.962	3.056	3.0185
10	19	3.189	3.693	3.6	3.525	3.50175
11	19	3.281	3.562	3.562	3.45	3.46375
12	19	3.243	3.581	3.731	3.75	3.57625
13	19	3.187	3.618	3.806	2.325	3.234
14	19	3.15	3.543	2.568	2.493	2.9385
15	19	3.525	3.806	2.812	2.587	3.1825
16	19	3.9	3.9	3.018	2.906	3.431
17	19	4.087	4.143	3.168	3.206	3.651
18	19	4.143	4.256	3.337	3.018	3.6885
19	19	4.237	4.387	3.618	3.337	3.89475
20	19	3.918	4.125	3.168	3.168	3.59475
21	19	2.493	1.462	2.25	1.312	1.87925
22	19	2.456	2.125	2.85	2.175	2.4015
23	19	2.1	1.931	1.931	2.043	2.00125
24	19	1.875	1.256	1.818	1.893	1.7105
25	19	1.612	1.406	1.818	1.368	1.551
26	19	1.368	1.443	1.443	1.425	1.41975
27	19	2.756	2.887	2.775	2.925	2.83575
28	19	2.793	2.756	0	2.925	2.1185

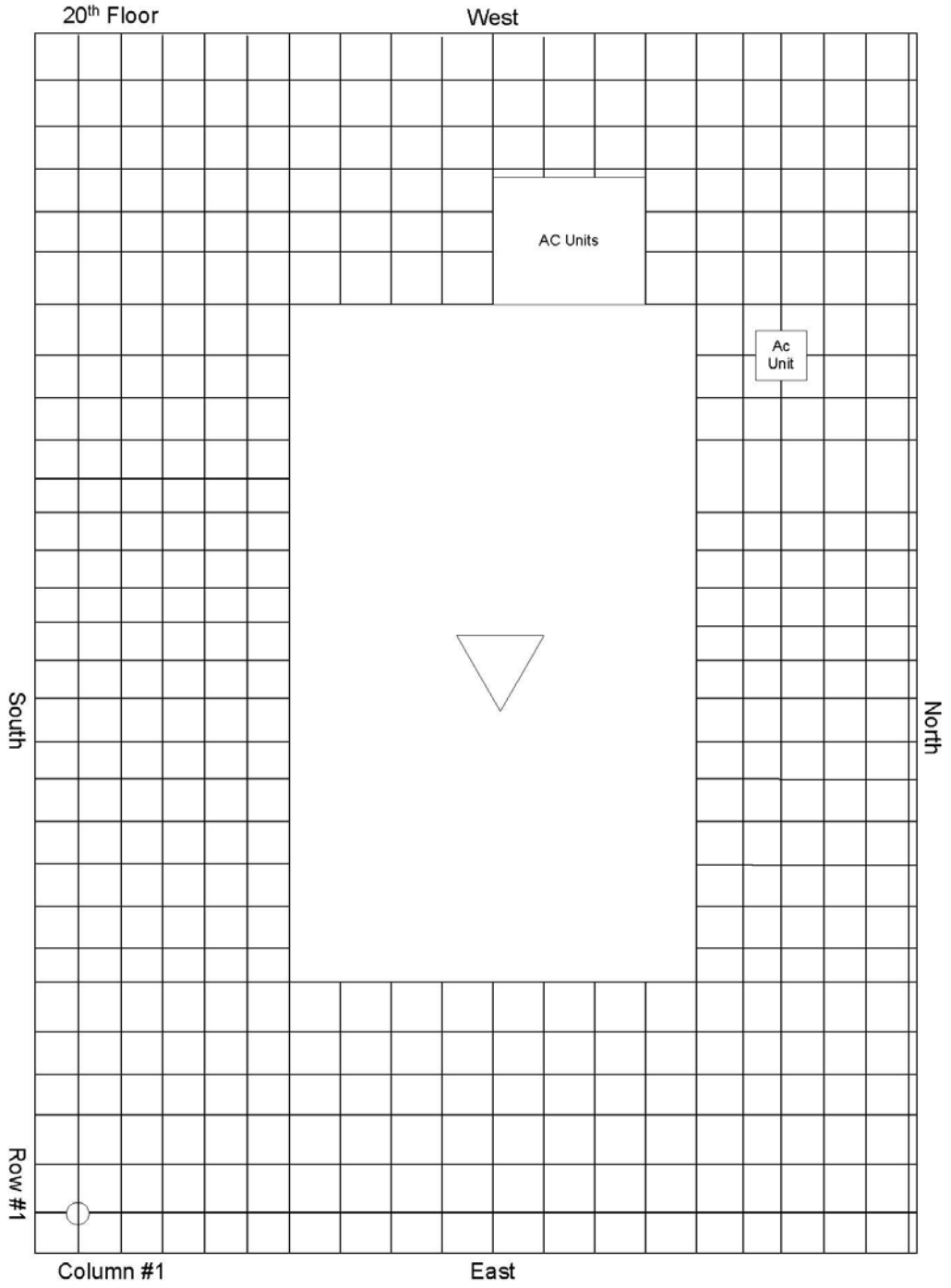
These numbers are in percentages of allowable occupational exposure.

20th Floor						
ROW	COLUMN	NORTH	SOUTH	EAST	WEST	AVG
1	20	3.637	0	1.256	0	1.22325
2	20	3.056	0	2.943	4.237	2.559
3	20	2.868	0	2.775	2.812	2.11375
4	20	2.962	0	2.812	2.756	2.1325
5	20	3.018	0	2.868	2.85	2.184
6	20	2.85	0	3	2.943	2.19825
7	20	2.231	0	2.887	2.925	2.01075
8	20	2.887	0	2.868	2.943	2.1745
9	20	3.131	0	3.356	3.037	2.381
10	20	3.525	0	3.15	3.512	2.54675
11	20	3.562	0	3.037	2.212	2.20275
12	20	3.506	0	3.075	2.7	2.32025
13	20	3.487	0	3.093	3.093	2.41825
14	20	3.693	0	3.731	3.093	2.62925
15	20	3.806	0	3.637	3.506	2.73725
16	20	4.087	0	3.712	3.037	2.709
17	20	4.106	0	3.9	3.337	2.83575
18	20	4.631	0	3.975	3.693	3.07475
19	20	4.556	0	4.331	3.731	3.1545
20	20	4.481	0	4.143	3.037	2.91525
21	20	3.637	0	3.356	3.15	2.53575
22	20	3.618	0	3.581	3.225	2.606
23	20	3.487	0	2.831	2.718	2.259
24	20	1.65	0	3.005	2.681	1.834
25	20	3.3	0	3.225	2.775	2.325
26	20	2.943	0	2.793	2.85	2.1465
27	20	3.018	0	3.093	2.85	2.24025
28	20	2.887	0	0	3.056	1.48575

Rooftop Drawing



20th Floor Drawing



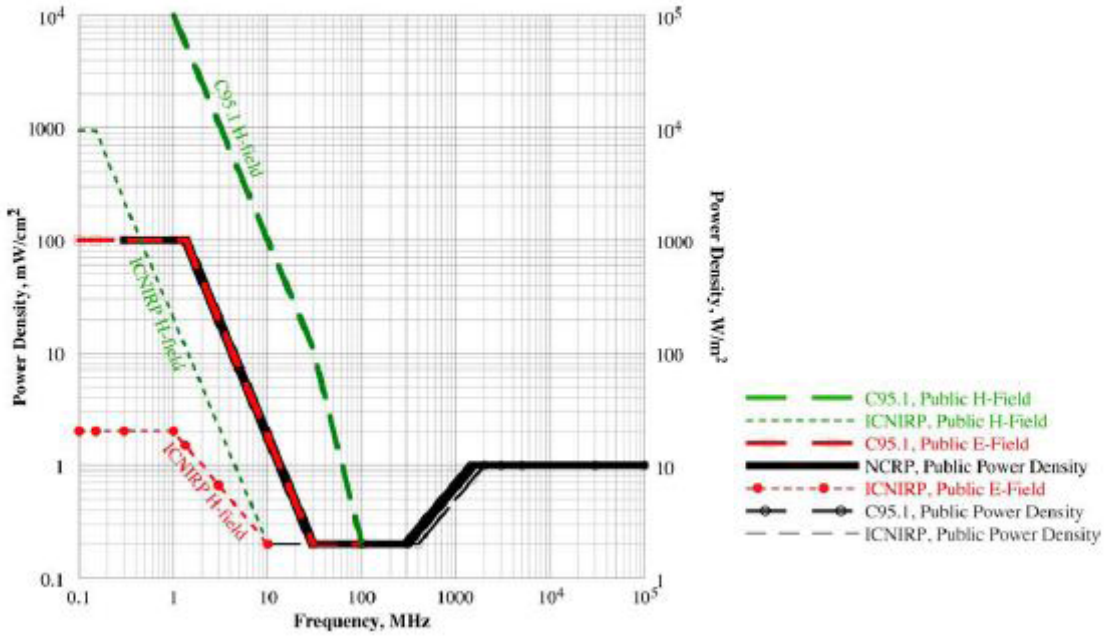
Appendix "B"

Pictures of 20th Floor Air Conditioning Units

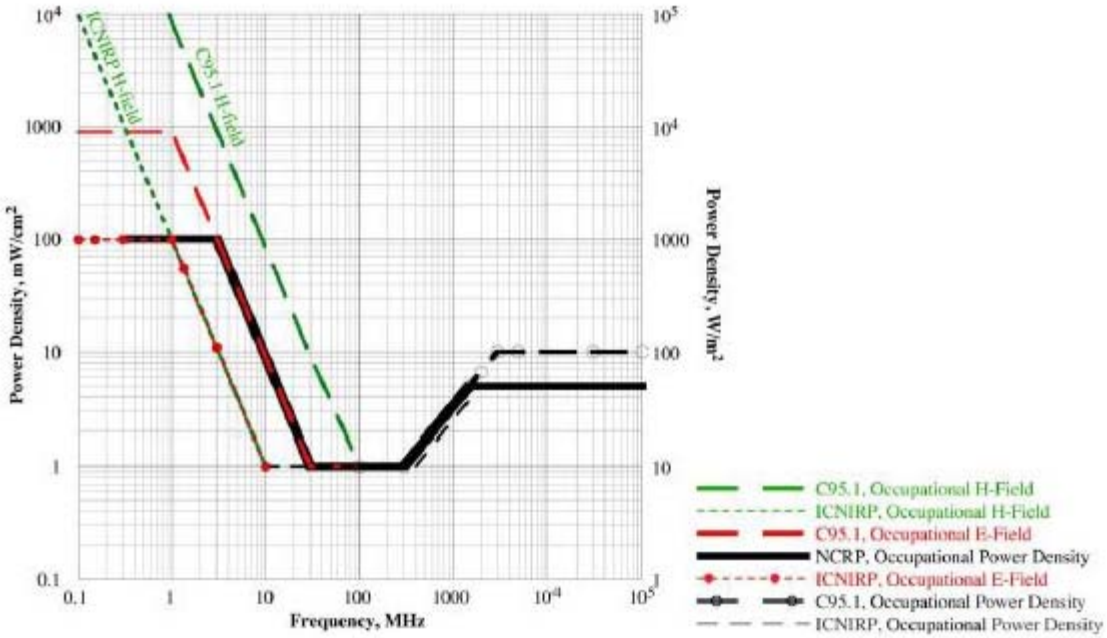
A/C Units Located on the West Side of 20th Floor

A/C Unit Located on the North Side of 20th Floor

Appendix "C"
Public Exposure Limits



Occupational Exposure Limits



Note: The tables on this page were taken from the National Association of Broadcasters Engineering Handbook 10th Edition.

ANSI/IEEE Standard C95.1

The C95.1 standard is part of a family of standards (including techniques of measurement, terminology, RF safety programs, and extremely low frequency (ELF) and static field exposure safety levels) developed by the International Committee on Electromagnetic Safety (ICES), under sponsorship of the Institute of Electrical and Electronics Engineers (IEEE) [3]. Standard C95.1 covers 3 kHz to 300 GHz. Although the current edition was published in 2005, the federal OSHA applies the 1991 edition (including revisions dated 1999) of the IEEE standard (also recognized by the American National Standards Institute, or ANSI) to workplace situations, including radio stations and tower sites. Under IEEE policy, standards must be reaffirmed, rewritten, or cancelled every 6 years, so the 2005 edition will likely be current until at least 2011.

Note: The ANSI/IEEE Standard C95.1 paragraph was taken from the National Association of Broadcasters Engineering Handbook 10th Edition.

7 Spatially Averaged Measurements

Understanding Spatial Averaging

The major standards concerned with human exposure to radio frequency radiation specify maximum exposure levels averaged over the whole body. The co-linear dipole antenna arrays that are very common in modern wireless communications systems, for example, have multiple lobes close to the antenna. The field strength typically varies by 6-7 dB along the length of an array. Therefore, the measured value is highly dependent on not only the distance from the antenna but the height above the ground.

The traditional method of making spatially-averaged measurements is to use a "storypole". A storypole is a non-conductive pole , often wooden, equal in height to an average adult with distance marks equally spaced along its length. Measurements are made alongside the storypole at each height and then mathematically averaged. The height and spacing of each measurement varies from standard-to-standard. For example, the IEEE C95.1-1999 standard specifies measurements from 0 centimeters (ground level) to 200 centimeters in 20 centimeter increments. Some exposure standards, such as Canada's Safety Code 6, require that measurements be averaged across two dimensions – vertically and horizontally. Modern wireless communications sites make this manual technique more difficult than ever since field levels at many sites, particularly multi-user sites, are constantly varying. For example, paging systems go on and off and the number of cellular channels in use is constantly changing. Thus, a series of measurements made at varying heights can vary more as a function of time than location.

Note: The Spatial Averaged Measurements paragraphs were taken from the Model 8718B Narda User's Guide.

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L3 communications
Narda Microwave-East

Certificate of Calibration

L-3 Communications, Narda Microwave-East, hereby certifies that the referenced instrument has been calibrated by qualified personnel to Narda's approved test procedures.

Furthermore, the instrument meets, or exceeds, all published specifications and the calibration has been performed with test instrumentation that, where applicable, is traceable to the National Institute of Standards and Technology.

Narda's calibration measurements are traceable to the National Institute of Standards and Technology to the extent allowed by the bureau's calibration facilities.

Customer: ELECTRONICS RESEARCH INC.
CHANDLER, IN 47610

Certificate #: 105076 1

Model #: 8718B

Serial #: 07123

Description: METER

PO #: 92030

Date Calibrated: 06/01/2010

R.O. #: 105076

Hugh Saunders
Hugh Saunders
Test

Ken Peck
Quality Assurance

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