

EXHIBIT F

FREQUENCY COORDINATION & INTERFERENCE ANALYSIS

IBFS Application Submission ID No. **IB200000082**

HCJB WORLD RADIO - COLORADO SPRINGS TX/RX EARTH STATION

FREQUENCY COORDINATION AND INTERFERENCE
ANALYSIS REPORT

PREPARED FOR
HCJB WORLD RADIO, LLC
COLORADO SPRINGS, CO
SATELLITE 3.8 METER EARTH STATION

PREPARED BY
COMSEARCH
2002 EDMUND HALLEY DRIVE
RESTON, VIRGINIA 20191
December 2, 1999

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1. CONCLUSIONS

AN INTERFERENCE STUDY CONSIDERING ALL EXISTING, PROPOSED AND PRIOR COORDINATED MICROWAVE FACILITIES WITHIN THE COORDINATION CONTOURS OF THE PROPOSED EARTH STATION DEMONSTRATES THAT THIS SITE WILL OPERATE SATISFACTORILY WITH THE COMMON CARRIER MICROWAVE ENVIRONMENT. THE TRANSMIT BAND OF THE PROPOSED EARTH STATION WILL BE RESTRICTED TO AVOID CONFLICT WITH LOCAL 6 GHz TERRESTRIAL MICROWAVE RECEIVERS. THERE WILL BE NO RESTRICTIONS OF ITS OPERATION DUE TO INTERFERENCE CONSIDERATIONS.

2. SUMMARY OF RESULTS

A NUMBER OF GREAT CIRCLE INTERFERENCE CASES WERE IDENTIFIED DURING THE INTERFERENCE STUDY OF THE PROPOSED EARTH STATION. EACH OF THE CASES WHICH EXCEEDED THE INTERFERENCE OBJECTIVE ON A LINE-OF-SIGHT BASIS WAS PROFILED AND THE PROPAGATION LOSSES ESTIMATED USING NBS TN101 (REVISED) TECHNIQUES. THE LOSSES WERE FOUND TO BE SUFFICIENT TO REDUCE THE SIGNAL LEVELS TO ACCEPTABLE MAGNITUDES IN EVERY CASE, WITH THE EXCEPTION OF THOSE CASES THAT WERE CLEARED THROUGH FREQUENCY OFFSET.

THE FOLLOWING COMPANIES REPORTED POTENTIAL GREAT CIRCLE INTERFERENCE CONFLICTS WHICH DID NOT MEET THE OBJECTIVES ON A LINE-OF-SIGHT BASIS. WHEN OVER-THE-HORIZON LOSSES ARE CONSIDERED ON THE INTERFERING PATHS, SUFFICIENT BLOCKAGE EXISTS TO NEGATE HARMFUL INTERFERENCE FROM OCCURRING WITH THE PROPOSED TRANSMIT AND RECEIVE EARTH STATION.

COMPANY

AT&T COMMUNICATIONS
AT&T WIRELESS SERVICES-COLORADO
U.S WEST COMMUNICATIONS, INC
RIO GRANDE TRANSMISSION, INC
VOICESTREAM PCS II LICENSE CORPORATION
WESTERN TELE-COMMUNICATIONS, INC
MICRONET COMMUNICATIONS, INC

NO OTHER CARRIERS REPORTED POTENTIAL INTERFERENCE CASES.

3. SUPPLEMENTAL SHOWING
RE: PART 25.203(C)

PURSUANT TO PART 25.203(C) OF THE FCC RULES AND REGULATIONS,
THE SATELLITE EARTH STATION PROPOSED IN THIS APPLICATION WAS
COORDINATED BY COMSEARCH USING COMPUTER TECHNIQUES AND IN
ACCORDANCE WITH PART 25 OF THE FCC RULES AND REGULATIONS.
COORDINATION DATA FOR THIS EARTH STATION WAS SENT TO THE
BELOW LISTED CARRIERS WITH A LETTER DATED NOVEMBER 11, 1999.

AIRTOUCH COMMUNICATIONS, INC.
ASIA SKYLINK INC
AT&T COMMUNICATIONS
AT&T COMMUNICATIONS OF MOUNTAIN STATES
AT&T WIRELESS SERVICES - COLORADO
AT&T WIRELESS SERVICES - DENVER
BURLINGTON NORTHERN RAILROAD COMPANY
CNG COMMUNICATIONS, INC.
COLORADO INTERSTATE GAS COMPANY
COLORADO SPRINGS UTILITIES-BIS TELECOMMU
COLORADO STATE TELECOMMUNICATIONS SVCS
GREAT PLAINS CABLE TV
MCI WORLDCOM NETWORK SERVICES INC.
N.E. COLORADO CELLULAR
PATHNET, INC.
RIO GRANDE TRANSMISSION INC
SMOKEY HILL CELLULAR OF COLORADO LP
SPECIALTY ANTENNA SITE RESOURCES, INC.
TRI-STATE GENERATION & TRANSMISSION ASSO
UA CABLE OF CENTRAL WYOMING - CASPER
US WEST COMMUNICATIONS, INC.
VOICESTREAM PCS II LICENSE CORPORATION
WESTERN TELE-COMMUNICATIONS, INC.
WWC HOLDING CO., INC.

4. EARTH STATION COORDINATION DATA

THIS SECTION PRESENTS THE DATA PERTINENT TO FREQUENCY COORDINATION OF THE PROPOSED EARTH STATION WHICH WAS CIRCULATED TO ALL COMMON CARRIERS WITHIN ITS COORDINATION CONTOURS.

SATELLITE EARTH STATION
FREQUENCY COORDINATION DATA

| | | |
|--|-------------------------|-------------------------|
| Company | HCJB WORLD RADIO | |
| Owner Code | | |
| Earth Station Name, State | COLORADO SPRINGS, CO | |
| Latitude (DMS) (NAD83) | 38 53 46.0 N | |
| Longitude (DMS) (NAD83) | 104 50 38.0 W | |
| Ground Elevation AMSL (Ft/m) | 6280.00 / 1914.05 | |
| Antenna Centerline AGL (Ft/m) | 25.00 / 7.62 | |
| Receive Antenna Type: | VERTEX MODEL 3.8 DPC | |
| 4 GHz Gain (dBi) / Diameter (m) | 42.6 / 3.8 | |
| 3 dB / 15 dB Half Beamwidth | 0.64 / 1.30 | |
| Transmit Antenna Type: | VERTEX MODEL 3.8 DPC | |
| 6 GHz Gain (dBi) / Diameter (m) | 46.2 / 3.8 | |
| 3 dB / 15 dB Half Beamwidth | 0.42 / 0.87 | |
| Operating Mode | TRANSMIT AND RECEIVE | |
| Modulation | DIGITAL | |
| Receive Band (MHz): | 3700.000 - 4200.000 | |
| Transmit Band (MHz): (1) | 5925.000 - 5929.000 | (2) 5925.000 - 5929.000 |
| | 5961.000 - 6077.000 | 5961.000 - 6137.000 |
| | 6109.000 - 6136.000 | 6168.000 - 6211.000 |
| | 6168.000 - 6210.000 | 6242.000 - 6270.000 |
| | 6242.000 - 6270.000 | 6302.000 - 6425.000 |
| | 6302.000 - 6425.000 | |
| Emission: 280KG7W AND 1M40G7W | | |
| | (1) | (2) |
| Max. Available RF Power (dBW)/4 kHz | -7.70 | -13.50 |
| (dBW)/MHz | 16.30 | 10.50 |
| Max. EIRP (dBW)/4 kHz | 38.50 | 32.70 |
| (dBW)/MHz | 62.50 | 56.70 |
| Max permissible Interference Power | | |
| 4 GHz, 20% (dBW/1 MHz) | -156.0 | |
| 4 GHz, 0.0100% (dBW/1 MHz) | -146.0 | |
| 6 GHz, 20% (dBW/4 kHz) | -154.0 | |
| 6 GHz, 0.0025% (dBW/4 kHz) | -131.0 | |
| Range of Satellite Arc (Geostationary) | | |
| Degrees Longitude | 33.0 W / 143.0 W | |
| Azimuth Range (Min/Max) | 101.6 / 231.4 | |
| Corresponding Elevation Angles | 5.4 / 30.2 | |
| Radio Climate | A | |
| Rain Zone | 2 | |
| Max Great Circle Coordination Distance (Mi/Km) | | |
| 4 GHz | 348.2 / 560.4 | |
| 6 GHz | 174.2 / 280.4 | |
| Precipitation Scatter contour radius (Mi/Km) | | |
| 4 GHz | 380.1 / 611.8 | |
| 6 GHz | 62.1 / 100.0 | |

Table of Earth Station Coordination Values

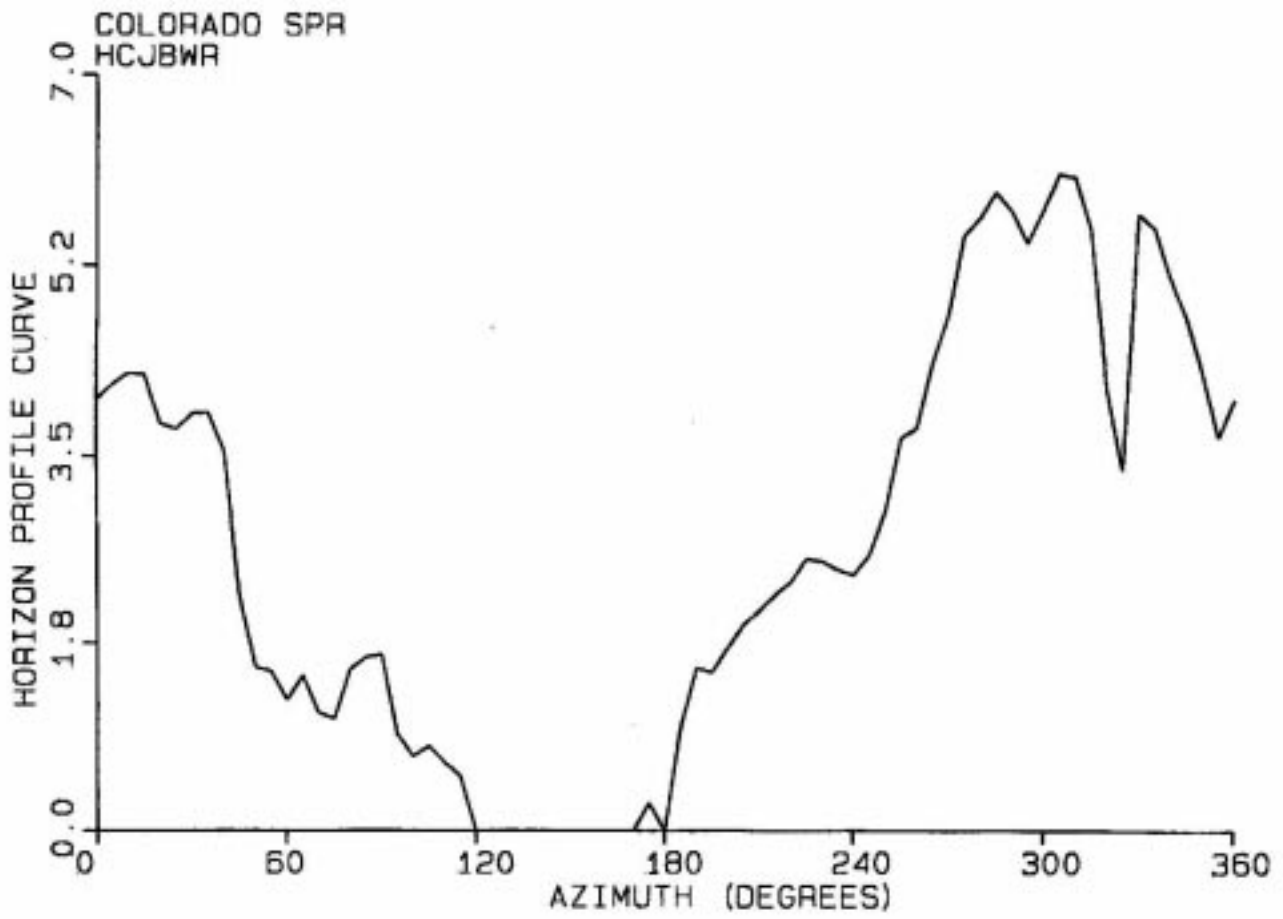
Earth Station Name COLORADO SPRINGS, CO
 Owner HCJB WORLD RADIO
 Latitude (DMS) (NAD83) 38 53 46.0 N
 Longitude (DMS) (NAD83) 104 50 38.0 W
 Ground Elevation (Ft/m) 6280.00 / 1914.05 AMSL
 Antenna Centerline (Ft/m) 25.00 / 7.62 AGL
 Antenna Model VERTEX MODEL, 3.8 DPC
 Objectives: Receive -156.0 (dBW /1 MHz)
 Transmit -154.0 (dBW /4 kHz) TX Power -7.7 (dBW/4 kHz)

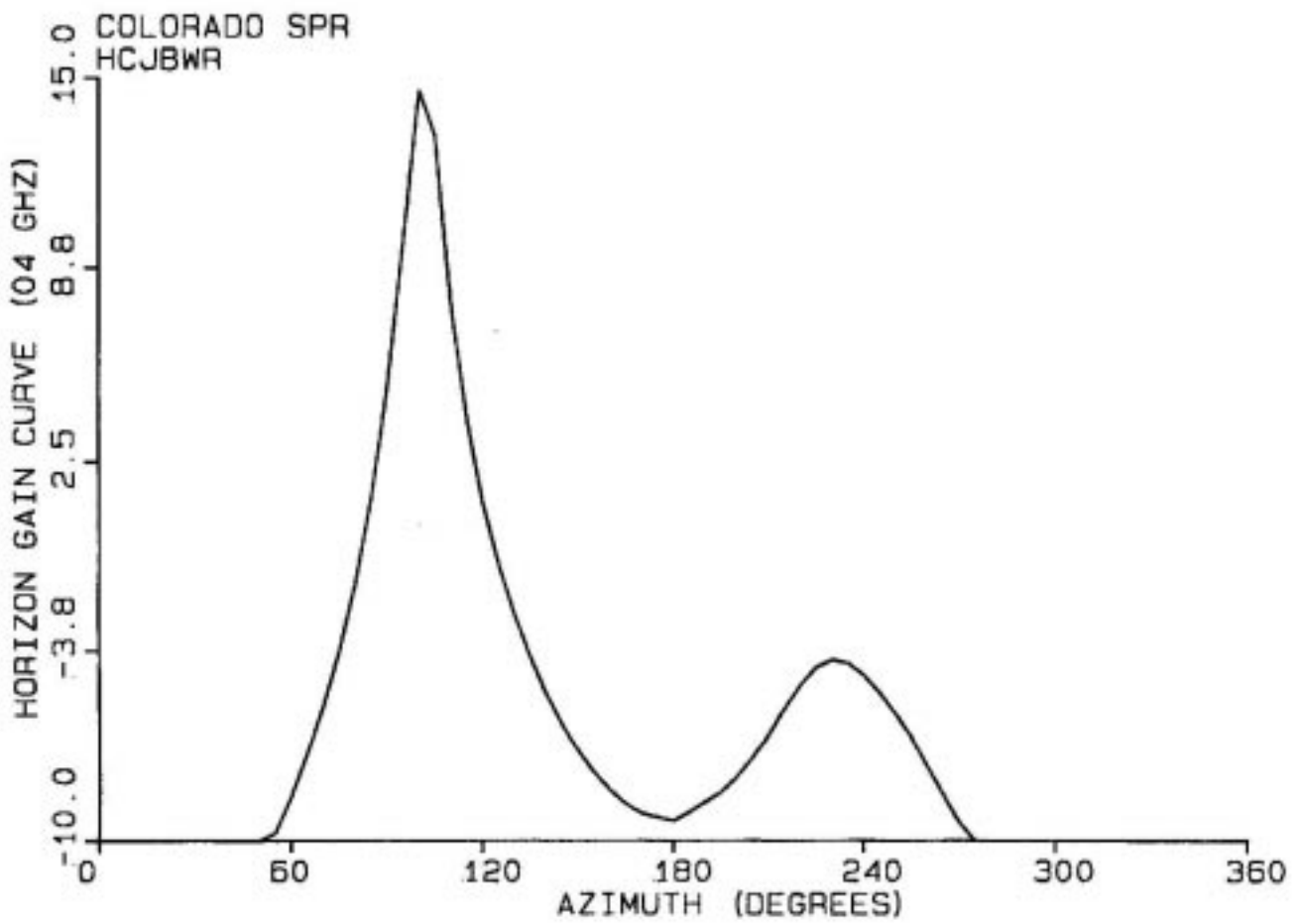
| Azimuth (Deg) | Horizon Elevation Angle (Deg) | Antenna Disc. Angle (Deg) | 4 GHz | | 6 GHz | |
|------------------|--|------------------------------------|--------------------------|----------------------------------|--------------------------|----------------------------------|
| | | | Antenna Gain (dBi) | Coordination Distance (Km) | Antenna Gain (dBi) | Coordination Distance (Km) |
| 0 | 4.02 | 101.63 | -10.00 | 147.6 | -10.00 | 150.6 |
| 5 | 4.15 | 96.64 | -10.00 | 145.6 | -10.00 | 150.6 |
| 10 | 4.25 | 91.64 | -10.00 | 144.0 | -10.00 | 150.6 |
| 15 | 4.24 | 86.65 | -10.00 | 144.1 | -10.00 | 150.6 |
| 20 | 3.80 | 81.67 | -10.00 | 152.0 | -10.00 | 150.6 |
| 25 | 3.75 | 76.70 | -10.00 | 152.9 | -10.00 | 150.6 |
| 30 | 3.89 | 71.72 | -10.00 | 150.1 | -10.00 | 150.6 |
| 35 | 3.90 | 66.75 | -10.00 | 150.0 | -10.00 | 150.6 |
| 40 | 3.55 | 61.77 | -10.00 | 157.3 | -10.00 | 150.6 |
| 45 | 2.20 | 56.80 | -10.00 | 190.0 | -10.00 | 150.6 |
| 50 | 1.52 | 51.84 | -10.00 | 205.0 | -10.00 | 150.6 |
| 55 | 1.48 | 46.88 | -9.75 | 207.3 | -9.77 | 151.3 |
| 60 | 1.21 | 41.92 | -8.53 | 221.1 | -8.56 | 155.6 |
| 65 | 1.44 | 36.98 | -7.15 | 221.1 | -7.20 | 160.5 |
| 70 | 1.09 | 32.04 | -5.59 | 241.5 | -5.64 | 168.1 |
| 75 | 1.03 | 27.14 | -3.77 | 255.0 | -3.84 | 175.1 |
| 80 | 1.50 | 22.26 | -1.54 | 252.2 | -1.69 | 183.4 |
| 85 | 1.61 | 17.46 | 1.21 | 267.4 | 0.95 | 193.6 |
| 90 | 1.64 | 12.80 | 4.83 | 293.8 | 4.32 | 204.8 |
| 95 | 0.88 | 8.53 | 9.41 | 367.8 | 8.72 | 222.8 |
| 100 | 0.68 | 5.62 | 14.59 | 560.4 | 13.26 | 280.4 |
| 105 | 0.77 | 6.34 | 13.10 | 440.0 | 11.95 | 237.4 |
| 110 | 0.62 | 9.84 | 7.64 | 371.4 | 7.18 | 216.2 |
| 115 | 0.50 | 13.56 | 3.97 | 349.2 | 3.70 | 204.1 |
| 120 | 0.00 | 17.22 | 1.10 | 365.1 | 1.10 | 194.2 |
| 125 | 0.00 | 20.78 | -0.94 | 349.4 | -0.94 | 186.3 |
| 130 | 0.00 | 24.24 | -2.62 | 336.9 | -2.62 | 179.9 |
| 135 | 0.00 | 27.57 | -4.01 | 326.7 | -4.01 | 174.5 |
| 140 | 0.00 | 30.74 | -5.19 | 318.3 | -5.19 | 169.9 |
| 145 | 0.00 | 33.70 | -6.19 | 310.6 | -6.19 | 164.4 |
| 150 | 0.00 | 36.42 | -7.03 | 304.8 | -7.03 | 161.2 |
| 155 | 0.00 | 38.86 | -7.74 | 300.0 | -7.74 | 158.5 |
| 160 | 0.00 | 40.95 | -8.31 | 296.2 | -8.31 | 156.5 |
| 165 | 0.00 | 42.66 | -8.75 | 293.3 | -8.75 | 154.9 |
| 170 | 0.00 | 43.92 | -9.07 | 291.2 | -9.07 | 153.8 |
| 175 | 0.26 | 44.70 | -9.19 | 282.3 | -9.26 | 153.1 |
| 180 | 0.00 | 44.96 | -9.32 | 289.6 | -9.32 | 152.9 |

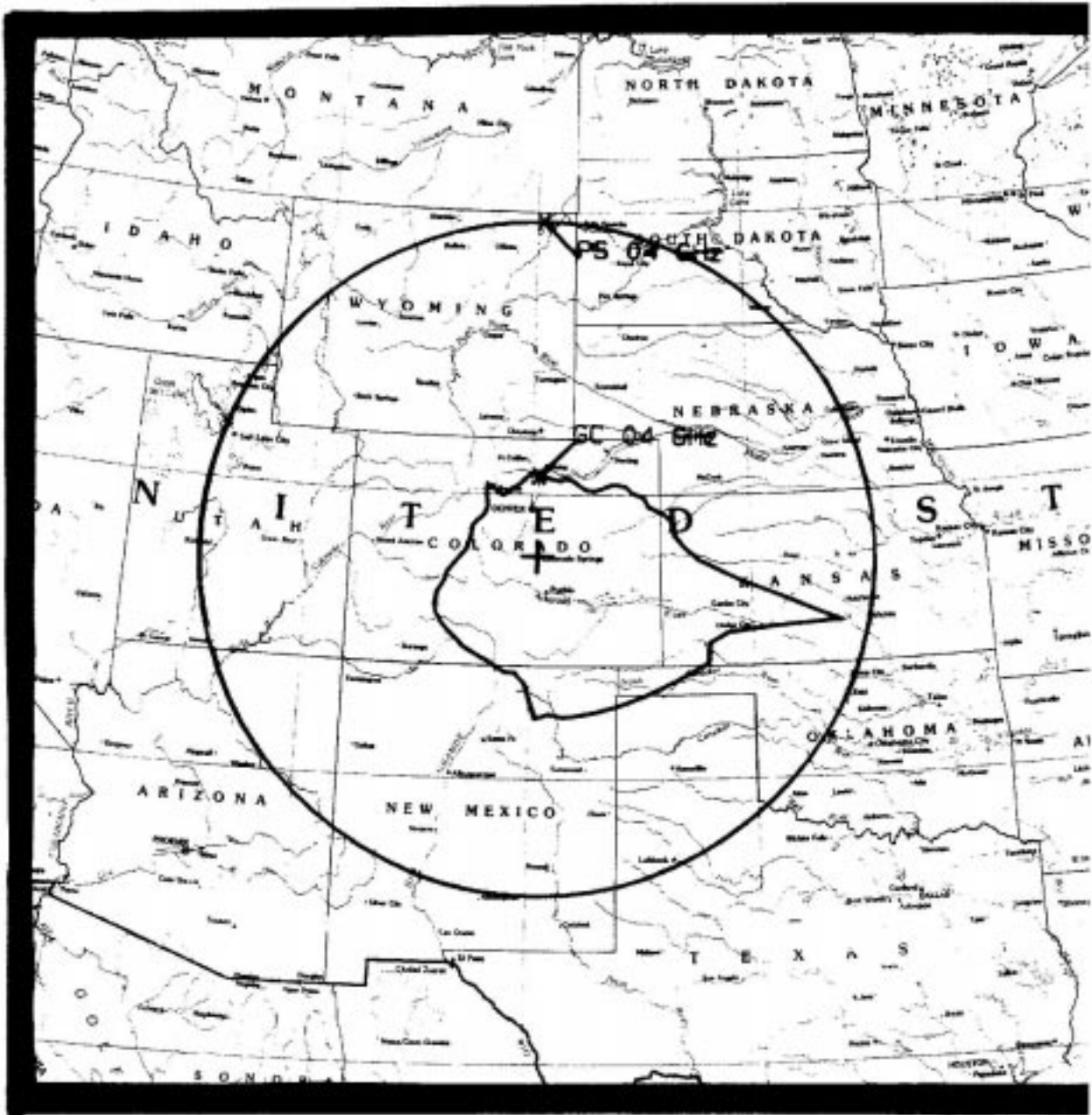
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| Azimuth (Deg) | Horizon Elevation Angle (Deg) | Antenna Disc. Angle (Deg) | 4 GHz | | 6 GHz | |
|------------------|--|------------------------------------|--------------------------|----------------------------------|--------------------------|----------------------------------|
| | | | Antenna Gain (dBi) | Coordination Distance (Km) | Antenna Gain (dBi) | Coordination Distance (Km) |
| 185 | 0.95 | 44.70 | -9.03 | 228.2 | -9.26 | 153.1 |
| 190 | 1.51 | 43.92 | -8.70 | 211.4 | -9.07 | 153.8 |
| 195 | 1.47 | 42.66 | -8.40 | 214.1 | -8.75 | 154.9 |
| 200 | 1.70 | 40.95 | -7.90 | 209.8 | -8.31 | 156.5 |
| 205 | 1.92 | 38.85 | -7.28 | 206.9 | -7.74 | 158.5 |
| 210 | 2.05 | 36.42 | -6.53 | 207.0 | -7.03 | 161.2 |
| 215 | 2.20 | 34.00 | -5.67 | 207.8 | -6.29 | 164.0 |
| 220 | 2.32 | 32.10 | -4.91 | 209.0 | -5.66 | 168.0 |
| 225 | 2.54 | 30.83 | -4.32 | 207.2 | -5.22 | 169.7 |
| 230 | 2.52 | 30.25 | -4.08 | 208.8 | -5.02 | 170.5 |
| 235 | 2.44 | 30.42 | -4.18 | 209.9 | -5.08 | 170.3 |
| 240 | 2.39 | 31.32 | -4.57 | 209.0 | -5.40 | 169.1 |
| 245 | 2.58 | 32.89 | -5.14 | 204.8 | -5.93 | 165.4 |
| 250 | 2.99 | 35.04 | -5.83 | 192.6 | -6.61 | 162.7 |
| 255 | 3.67 | 37.67 | -6.59 | 173.7 | -7.40 | 159.8 |
| 260 | 3.76 | 40.68 | -7.55 | 164.8 | -8.23 | 156.7 |
| 265 | 4.35 | 43.99 | -8.45 | 149.6 | -9.09 | 153.7 |
| 270 | 4.80 | 47.55 | -9.36 | 138.8 | -9.93 | 150.8 |
| 275 | 5.53 | 51.29 | -10.00 | 129.7 | -10.00 | 150.6 |
| 280 | 5.69 | 55.18 | -10.00 | 128.1 | -10.00 | 150.6 |
| 285 | 5.93 | 59.18 | -10.00 | 125.9 | -10.00 | 150.6 |
| 290 | 5.76 | 63.27 | -10.00 | 127.5 | -10.00 | 150.6 |
| 295 | 5.46 | 67.44 | -10.00 | 130.3 | -10.00 | 150.6 |
| 300 | 5.77 | 71.65 | -10.00 | 127.4 | -10.00 | 150.6 |
| 305 | 6.10 | 75.91 | -10.00 | 124.1 | -10.00 | 150.6 |
| 310 | 6.07 | 80.20 | -10.00 | 124.4 | -10.00 | 150.6 |
| 315 | 5.60 | 84.50 | -10.00 | 129.0 | -10.00 | 150.6 |
| 320 | 4.11 | 88.82 | -10.00 | 146.2 | -10.00 | 150.6 |
| 325 | 3.37 | 93.24 | -10.00 | 161.2 | -10.00 | 150.6 |
| 330 | 5.73 | 97.85 | -10.00 | 127.7 | -10.00 | 150.6 |
| 335 | 5.60 | 102.37 | -10.00 | 129.0 | -10.00 | 150.6 |
| 340 | 5.13 | 106.82 | -10.00 | 133.5 | -10.00 | 150.6 |
| 345 | 4.77 | 111.22 | -10.00 | 136.6 | -10.00 | 150.6 |
| 350 | 4.26 | 111.63 | -10.00 | 143.8 | -10.00 | 150.6 |
| 355 | 3.68 | 106.63 | -10.00 | 154.3 | -10.00 | 150.6 |





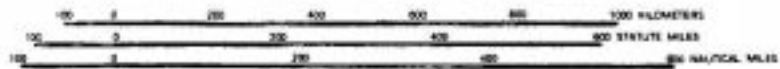


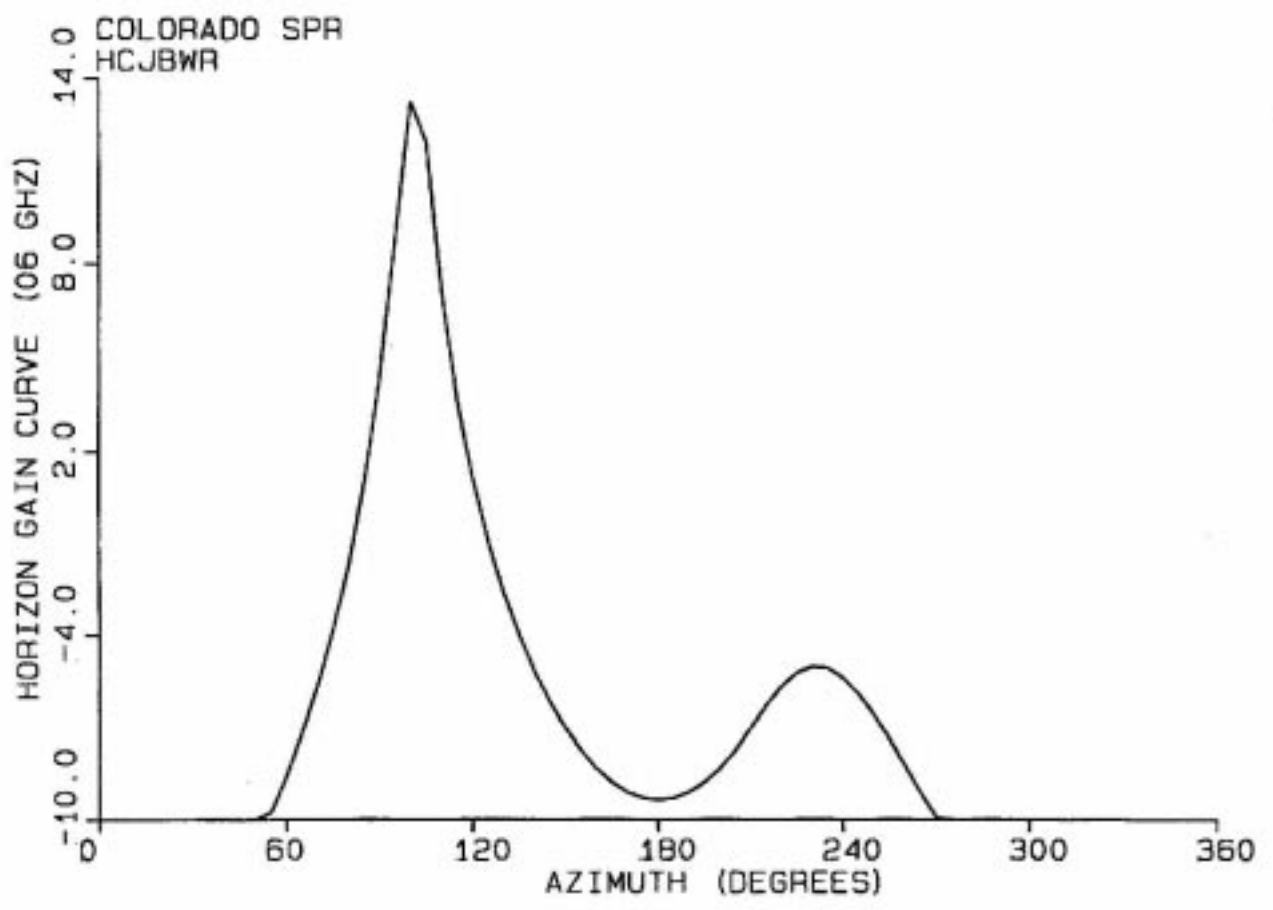
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 Leadership and Diversity for Wireless

2002 Edmund Halley Drive
 Reston, Virginia 20191
 USA
 Tel: 703 620 6300

SCALE 1:10,000,000

1 CENTIMETER ON THE MAP REPRESENTS 100 KILOMETERS ON THE GROUND



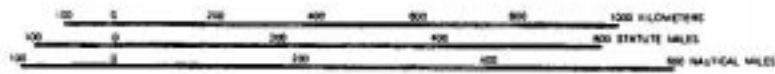


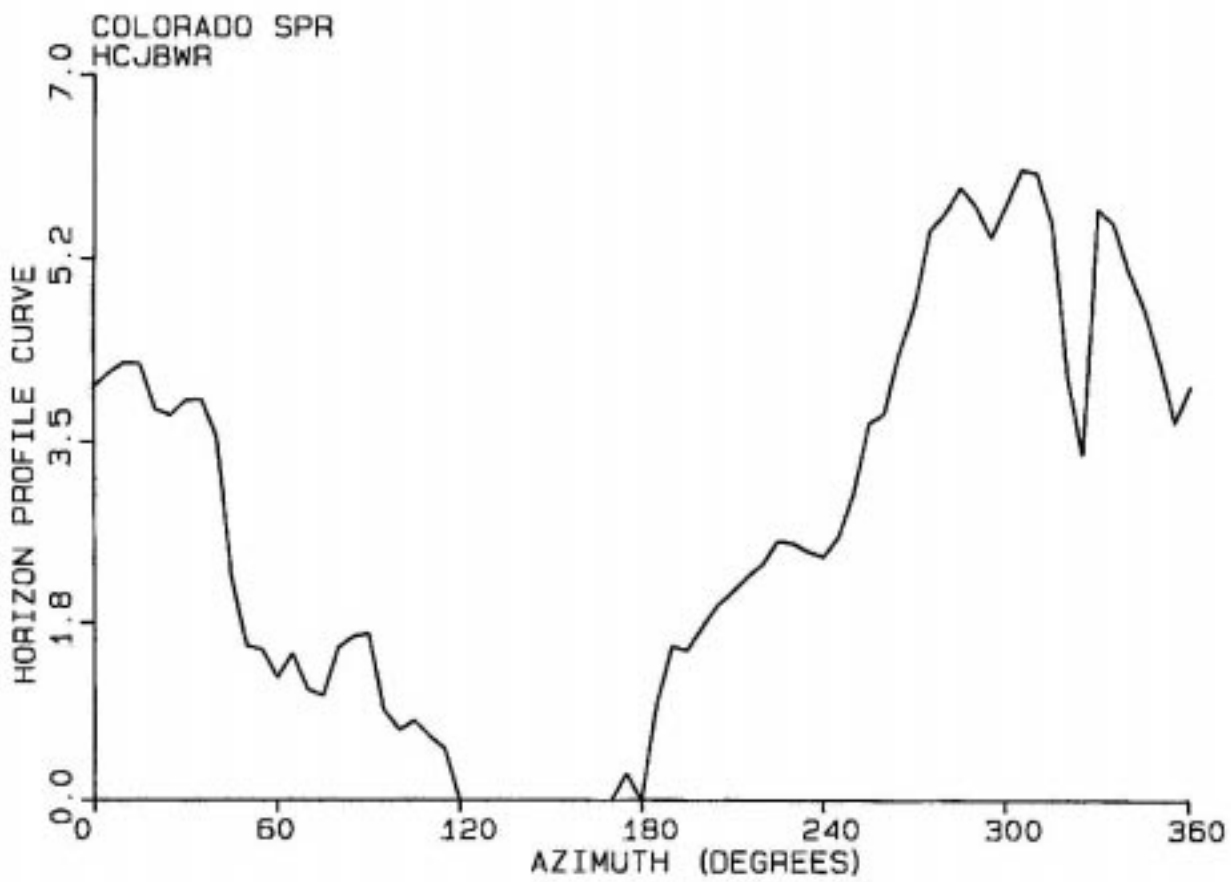


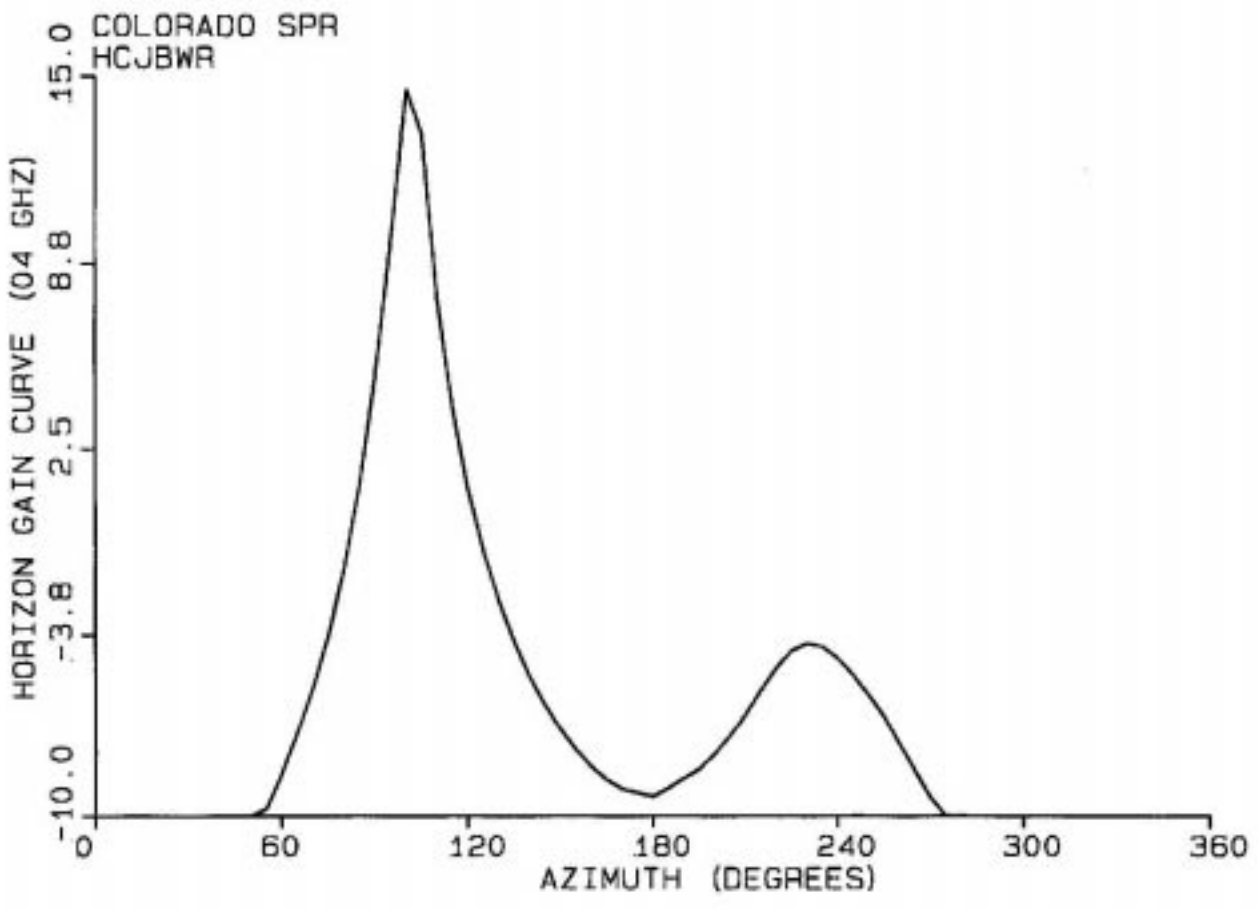
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 USA
 TEL 703.620.6300

SCALE 1:10,000,000
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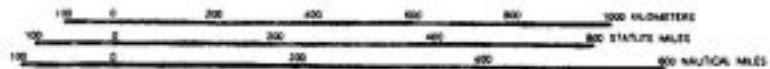


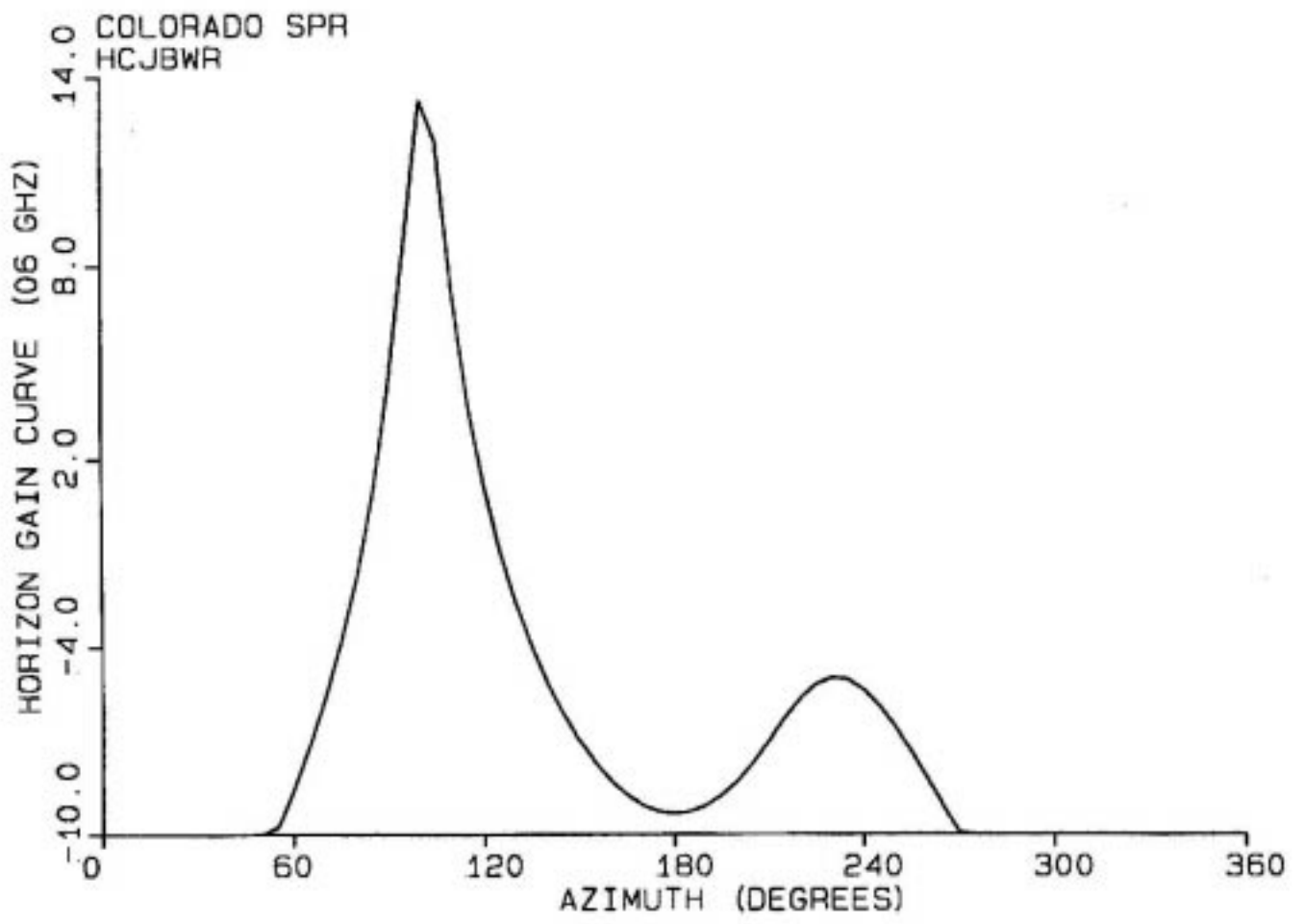


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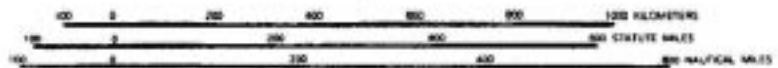




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 fax: 703.496.3607

SCALE 1:10,000,000
 1 CENTIMETER ON THE MAP REPRESENTS 100 KILOMETERS ON THE GROUND



5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

KARUNA NUON
ENGINEER
COMSEARCH
2002 EDMUND HALLEY DRIVE
RESTON, VIRGINIA 20191

DATED: December 2, 1999