APSW VII

Session III:
Experimenter Status Reports

ON THE ANALYSIS OF FADE DURATION AND SUMMER SCINTILLATIONS

NAPEX XIX and APSW VII
FT. COLLINS, CO
JUNE 14 - 16, 1995

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OUTLINE

I. APT OPERATIONAL STATUS

II. PREPROCESSING STATUS

III. SCINTILLATIONS

IV. FADES
- A. ULTIMATE FADE DEPTH
- B. FADE DURATIONS

V. ATTENUATION RATIO

VI. CONCLUSIONS

PROBLEMS ENCOUNTERED

- WWV CARD ERRONEOUS TIME
  - CONCATENATE FRAGMENTED FILES
  - EDIT CORRECT TIME INTO .RV0 FILES
  - NEED TO RESUBMIT NOVEMBER RAW DATA TAPE TO DATA COLLECTION CENTER AT UT

PROBLEMS ENCOUNTERED, 2

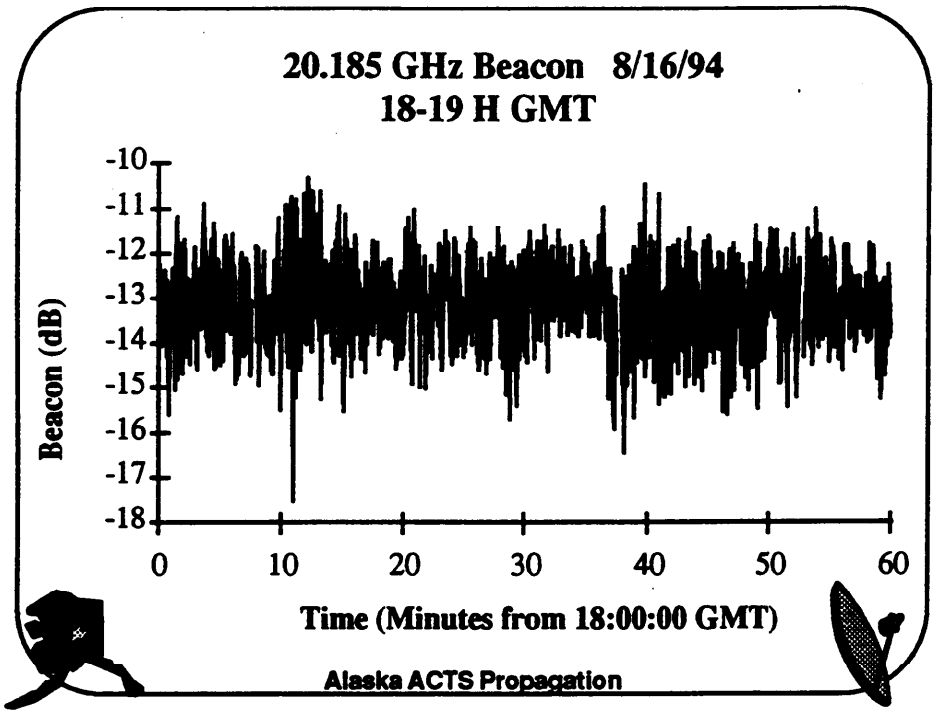
- 20 GHz BEACON DROP-OUTS
  - BEACON DISAPPEARS
  - RADIOMETER STILL PRESENT
  - CTRL-ALT-DEL DOES NOTHING
  - RELOADING DACS DOES NOTHING
  - CYCLING POWER OFF/ON RESTORES BEACON
  - SENT FILES TO DAVE
  - REFERENCE OSCILLATOR CABLE OPEN CIRCUITED
  - STRAIGHTENED ANACONDA CONDUIT TO REDUCE TENSION ON COAXIAL CENTER CONDUCTOR
  - PROBLEM REDUCED BUT STILL PRESENT
  - WE PLAN TO EXAMINE THE SMA CONNECTOR AND EITHER REPAIR OR REPLACE

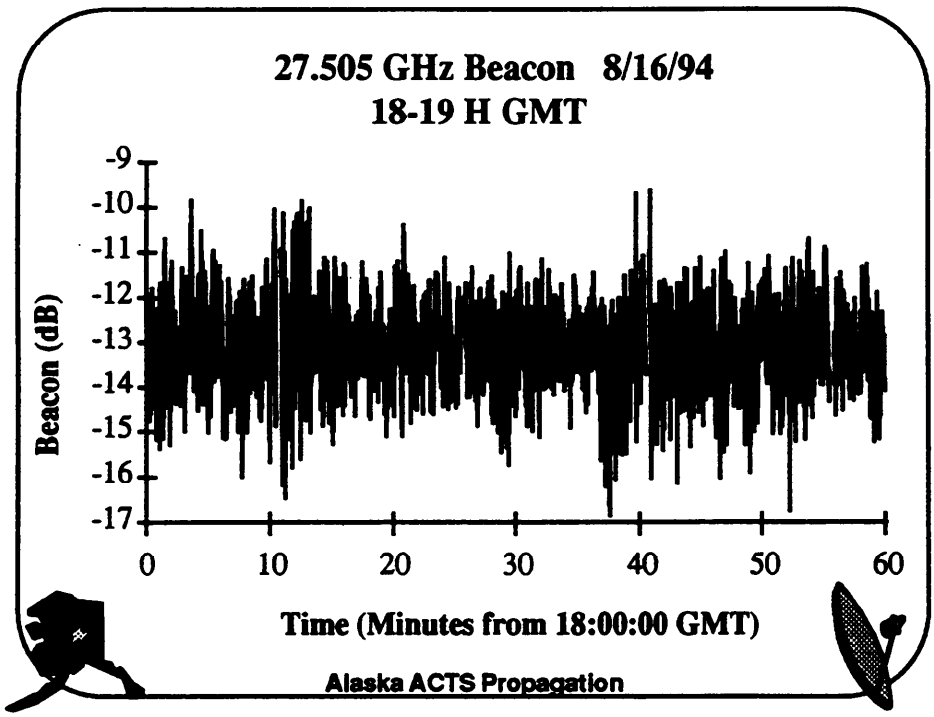
PROBLEMS ENCOUNTERED, 3

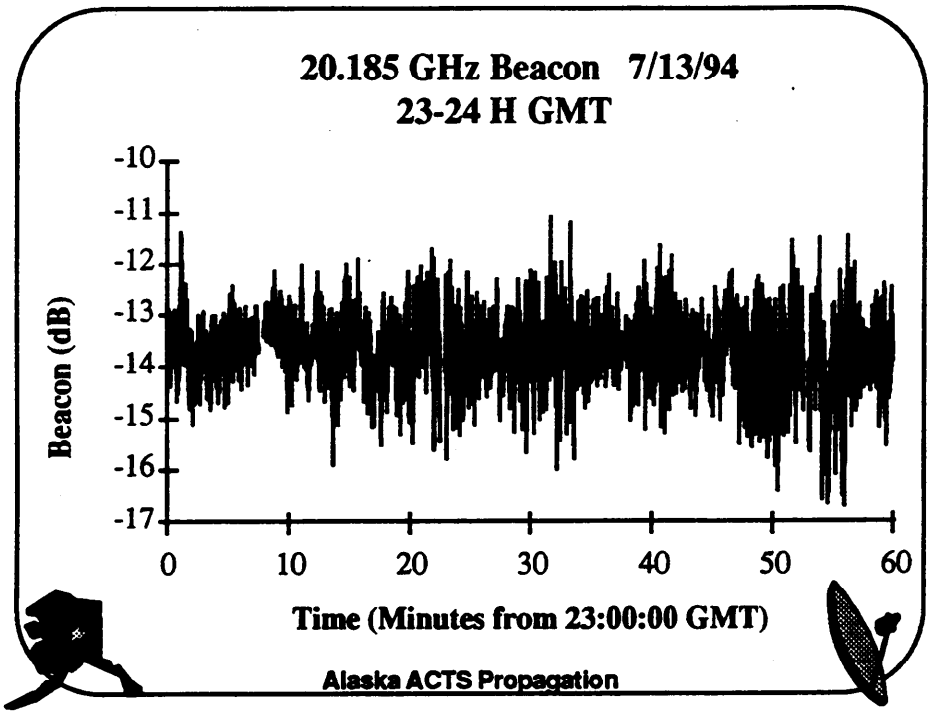
- 27 GHZ MINI-DROP-OUTS
  - CHARACTERIZED BY RAPID VARIATIONS IN BEACON LEVEL
  - MAGNITUDE IS A FEW DB
  - RADIOMETER IS UNCHANGED
  - LIKE THE SIGNAL IS DRIFTING RAPIDLY IN AND OUT OF THE DETECTION PASSBAND
  - OPENED DETECTION BANDWIDTH FROM 20 HZ TO 40 HZ
  - MINI-DROP-OUTS DISAPPEARED
  - BUT THIS GIVES 3 DB LESS DYNAMIC RANGE

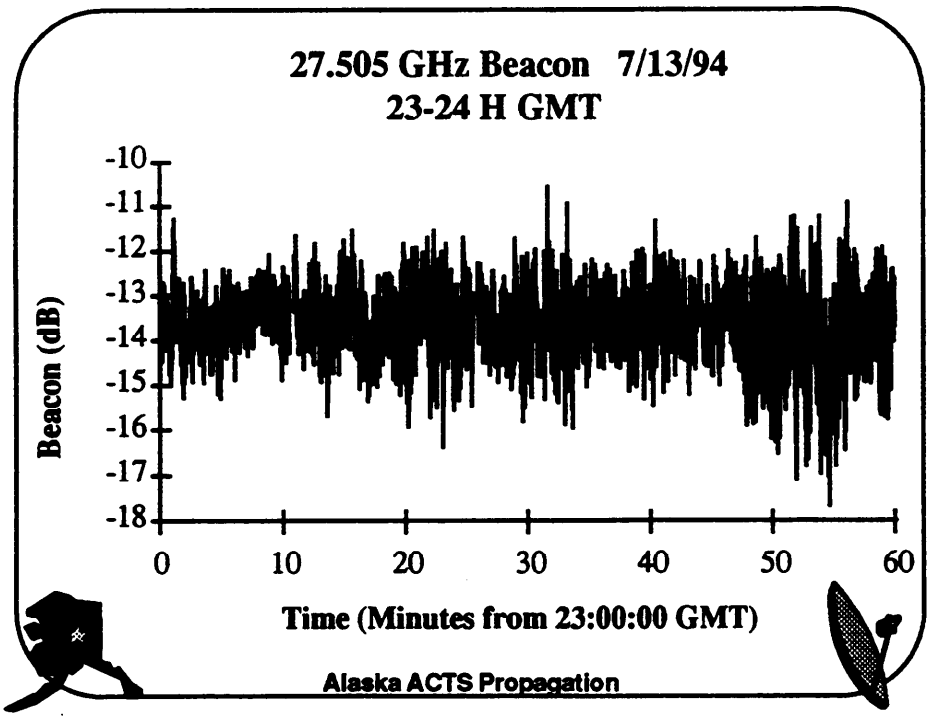
PREPROCESSING STATUS

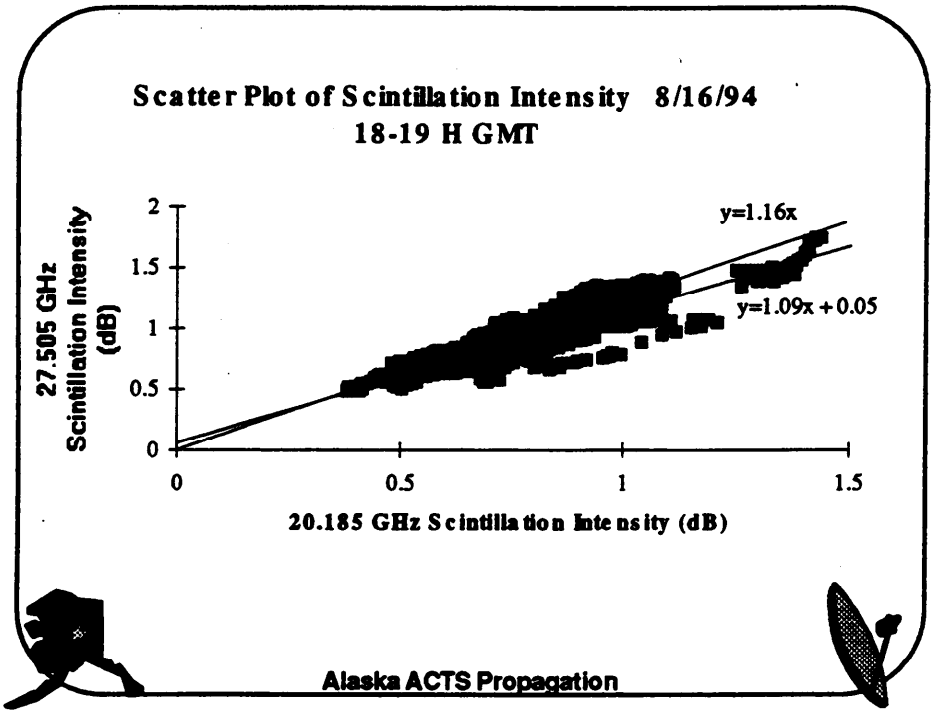
	Jun-94	Jul-94
20 GHz Spillover Temperature	74	74
27 GHz Spillover Temperature	58	58
20 GHz Antenna Efficiency	0.63	0.60
27 GHz Antenna Efficiency	0.63	0.66
20 GHz Std. Bias Error	0.26	0.11
27 GHz Std. Bias Error	0.19	0.13

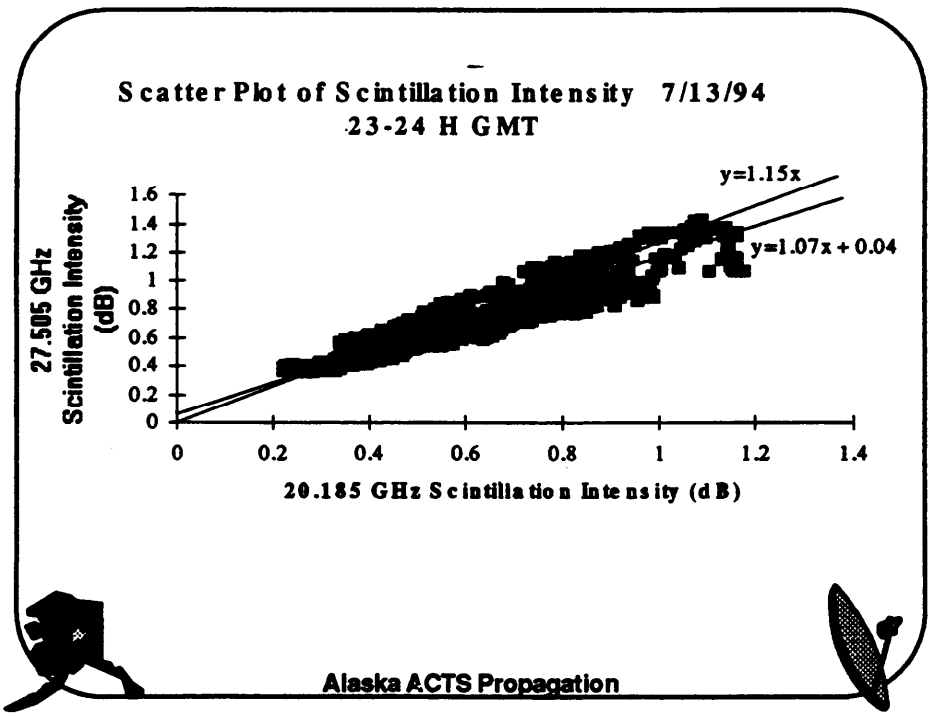

20.185 GHz Beacon 8/16/94
18-19 H GMT
Beacon (dB)
-10
-11
-12
-13
-14
-15
-16
-17
-18
0
10
20
30
40
50
60
Time (Minutes from 18:00:00 GMT)
Alaska ACTS Propagation

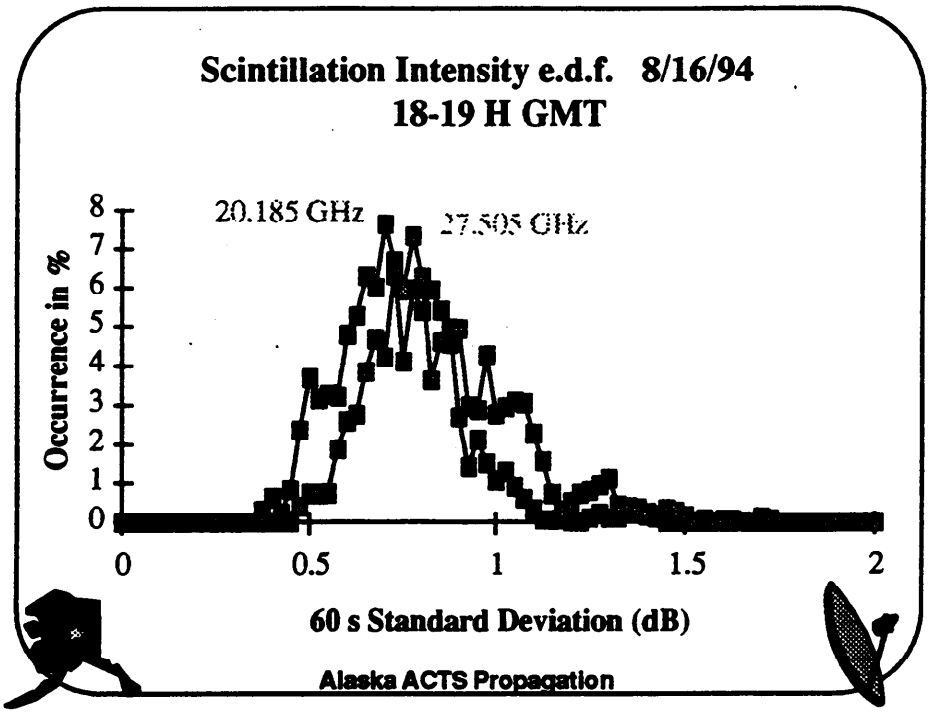

27.505 GHz Beacon 8/16/94
18-19 H GMT
Beacon (dB)
-9
-10
-11
-12
-13
-14
-15
-16
-17
0
10
20
30
40
50
60
Time (Minutes from 18:00:00 GMT)
Alaska ACTS Propagation

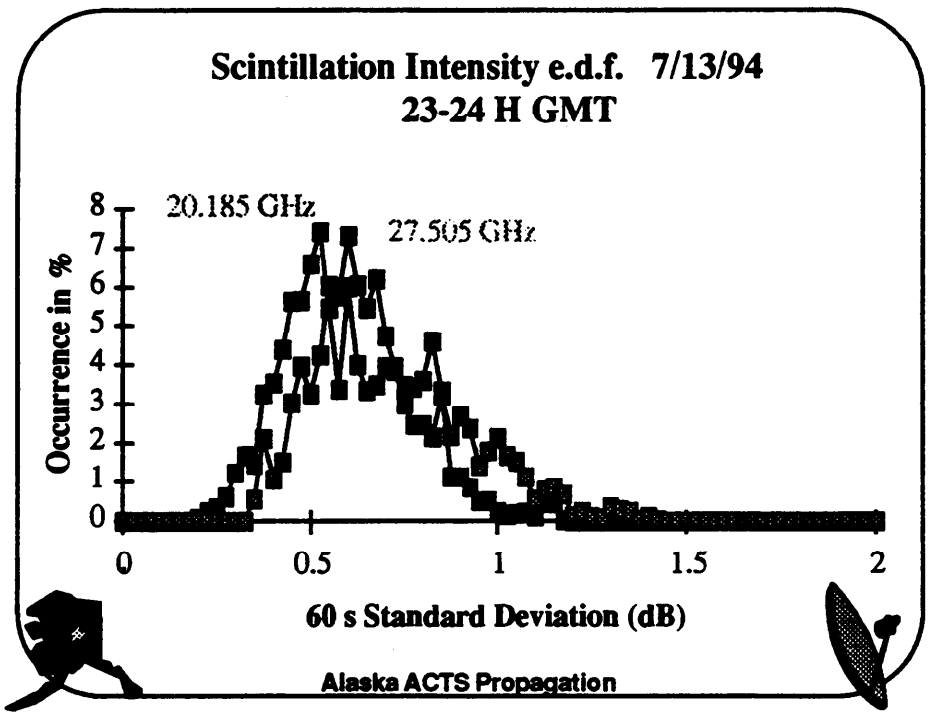

20.185 GHz Beacon 7/13/94
23-24 H GMT
Beacon (dB)
-10
-11
-12
-13
-14
-15
-16
-17
0
10
20
30
40
50
60
Time (Minutes from 23:00:00 GMT)
Alaska ACTS Propagation

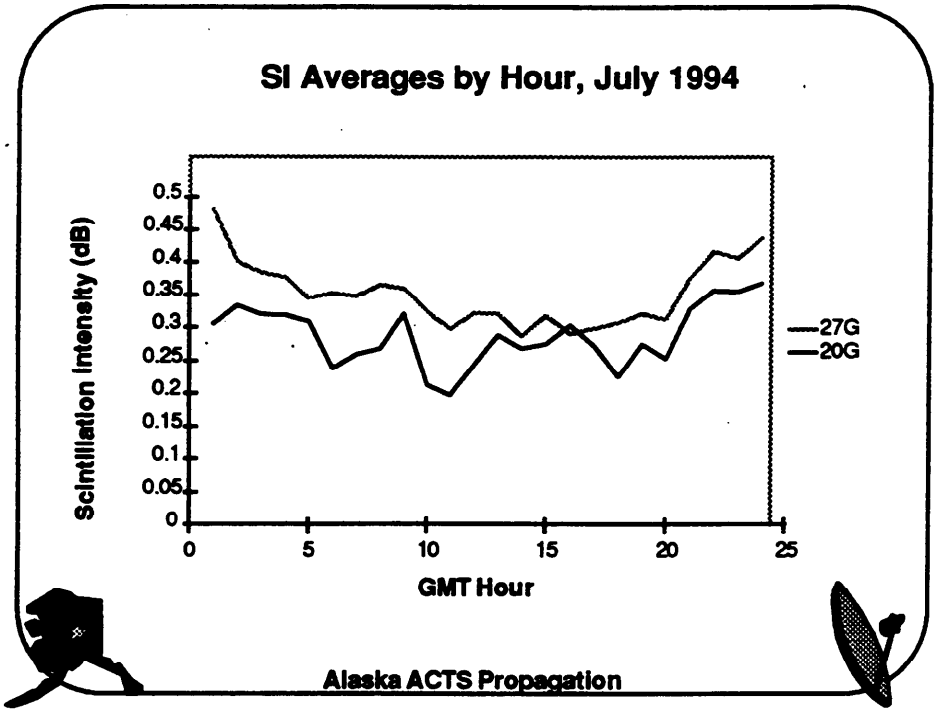

27.505 GHz Beacon 7/13/94
23-24 H GMT
Beacon (dB)
-10
-11
-12
-13
-14
-15
-16
-17
-18
0
10
20
30
40
50
60
Time (Minutes from 23:00:00 GMT)
Alaska ACTS Propagation

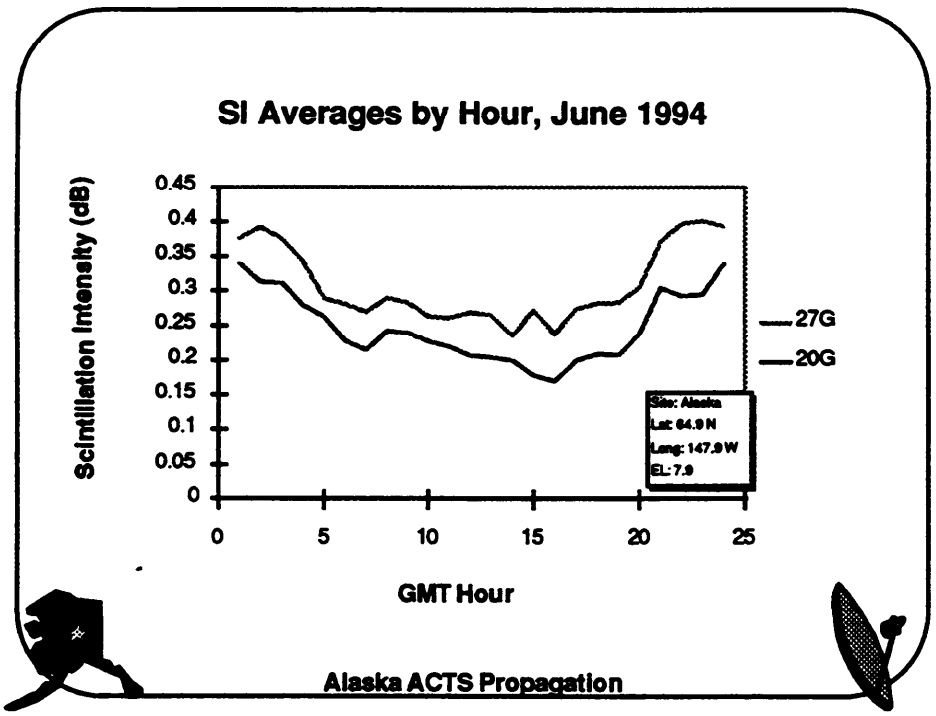

Scatter Plot of Scintillation Intensity 8/16/94
18-19 H GMT
27.505 GHz Scintillation Intensity (dB)
2
1.5
1
0.5
0
0
0.5
1
1.5
y=1.16x
y=1.09x + 0.05
20.185 GHz Scintillation Intensity (dB)
Alaska ACTS Propagation


Scatter Plot of Scintillation Intensity 7/13/94
23-24 H GMT
27.505 GHz Scintillation Intensity (dB)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
y=1.15x
y=1.07x + 0.04
20.185 GHz Scintillation Intensity (dB)
Alaska ACTS Propagation

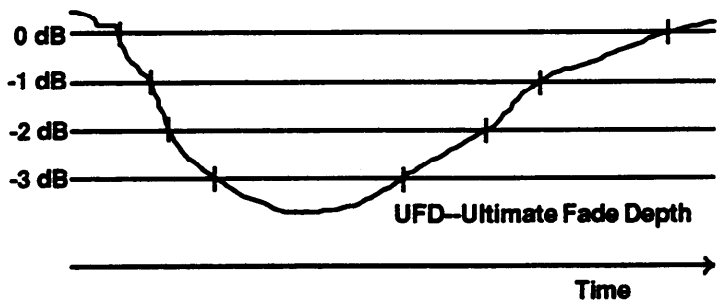

Scintillation Intensity e.d.f. 8/16/94
18-19 H GMT
20.185 GHz
27.505 GHz
Occurrence in %
0
1
2
3
4
5
6
7
8
0
0.5
1
1.5
2
60 s Standard Deviation (dB)
Alaska ACTS Propagation


Scintillation Intensity e.d.f. 7/13/94
23-24 H GMT
20.185 GHz
27.505 GHz
Occurrence in %
0
1
2
3
4
5
6
7
8
0
0.5
1
1.5
2
60 s Standard Deviation (dB)
Alaska ACTS Propagation


SI Averages by Hour, July 1994
Scintillation Intensity (dB)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
GMT Hour
27G
20G
Alaska ACTS Propagation

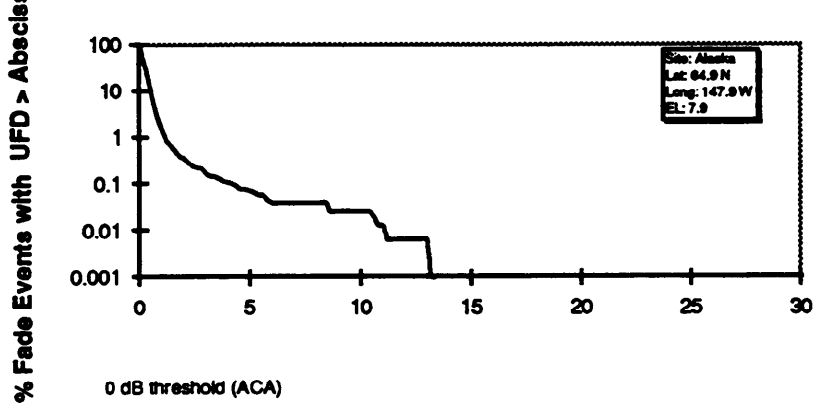

SI Averages by Hour, June 1994
Scintillation Intensity (dB)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
GMT Hour
27G
20G
Alaska ACTS Propagation

THRESHOLDING: 30s BEACON AVERAGE vs. TIME

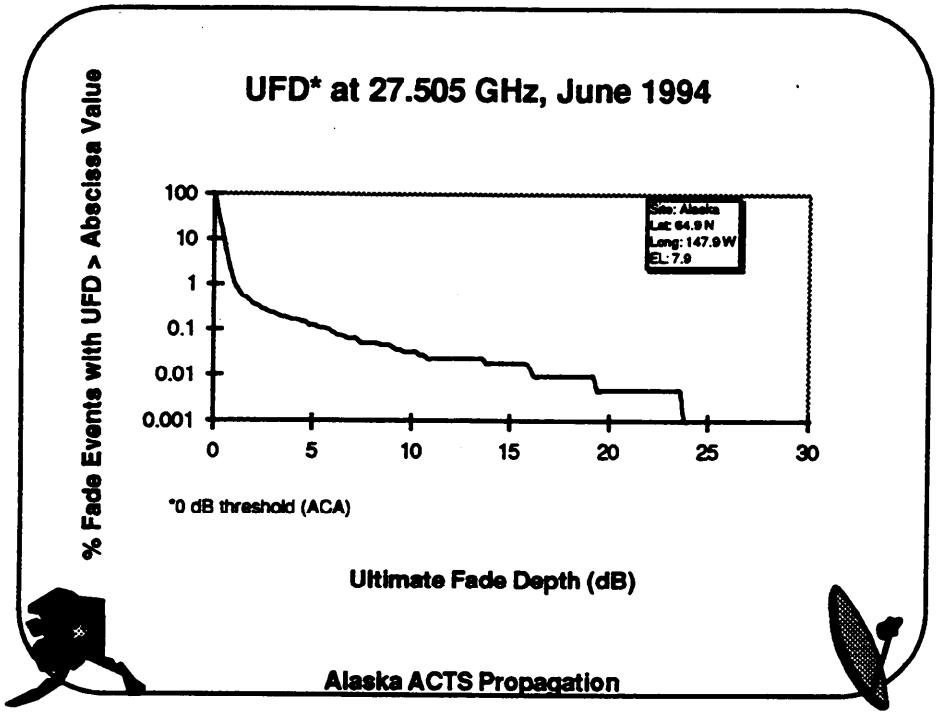


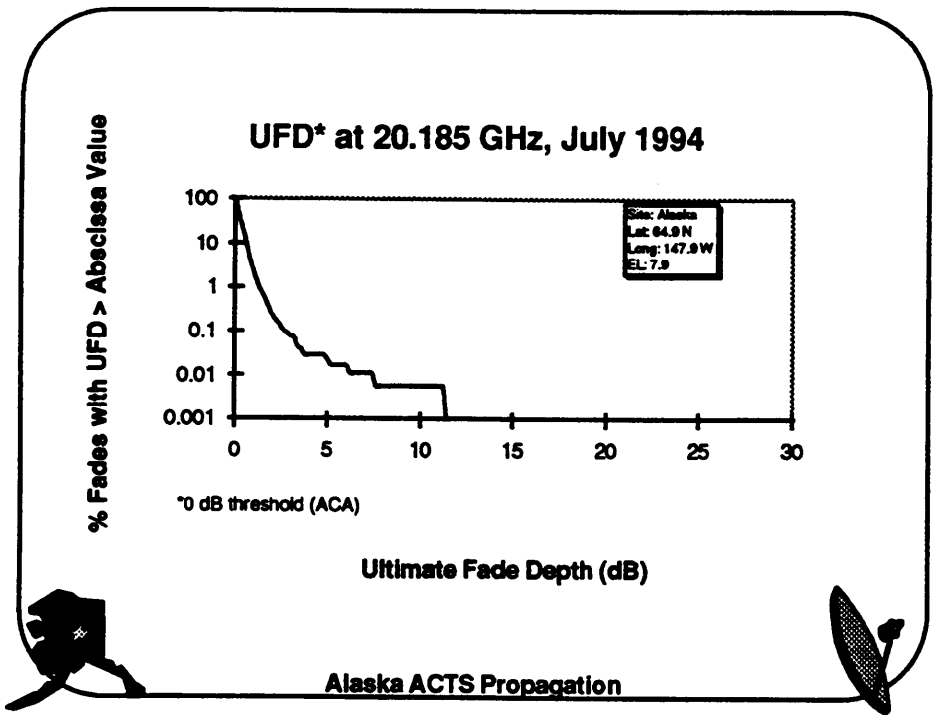
Alaska ACTS Propagation

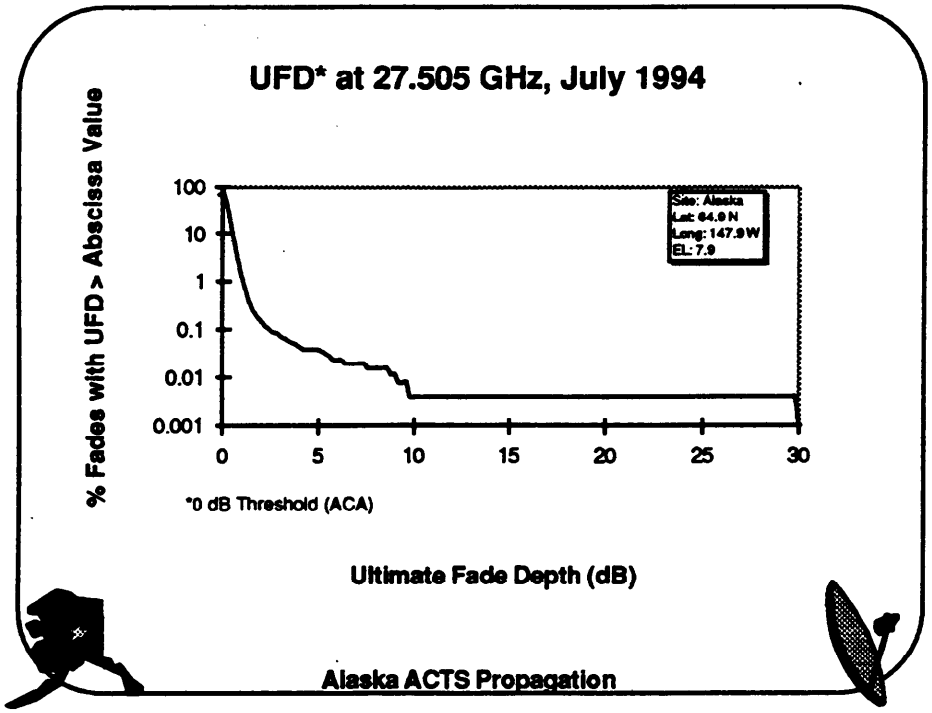
UFD* at 20.185 GHz, June 1994

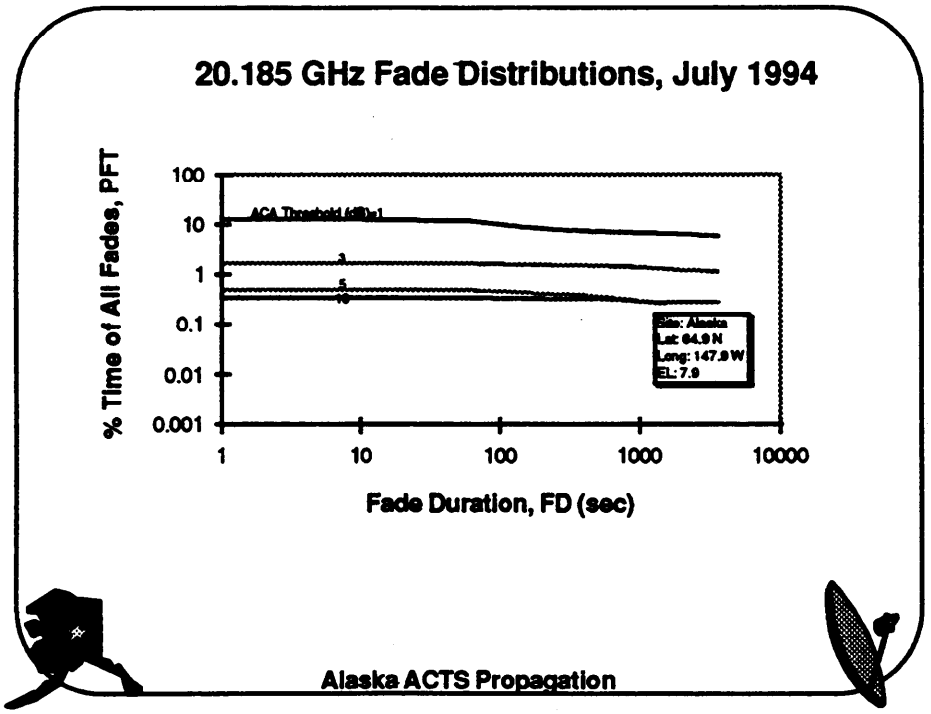


Alaska ACTS Propagation

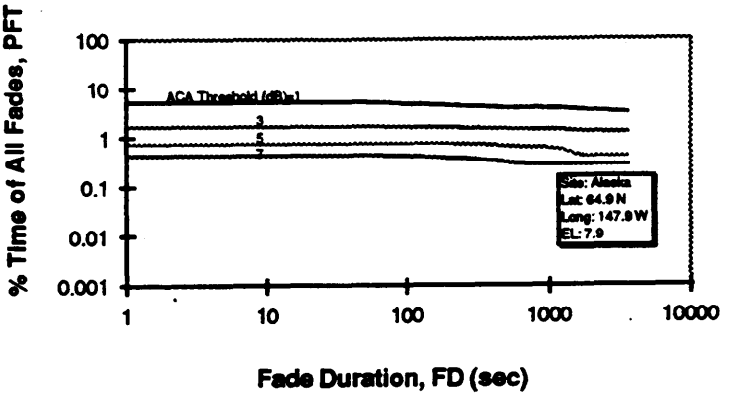

UFD* at 27.505 GHz, June 1994
% Fade Events with UFD > Abscissa Value
100
10
1
0.1
0.01
0.001
0
5
10
15
20
25
30
Site: Alaska
Lat: 64.9 N
Long: 147.9 W
EL: 7.9
*0 dB threshold (ACA)
Ultimate Fade Depth (dB)
Alaska ACTS Propagation


UFD* at 20.185 GHz, July 1994
% Fades with UFD > Abscissa Value
100
10
1
0.1
0.01
0.001
0
5
10
15
20
25
30
Site: Alaska
Lat: 64.9 N
Long: 147.9 W
EL: 7.9
*0 dB threshold (ACA)
Ultimate Fade Depth (dB)
Alaska ACTS Propagation


UFD* at 27.505 GHz, July 1994
% Fades with UFD > Abscissa Value
100
10
1
0.1
0.01
0.001
0
5
10
15
20
25
30
*0 dB Threshold (ACA)
Ultimate Fade Depth (dB)
Alaska ACTS Propagation

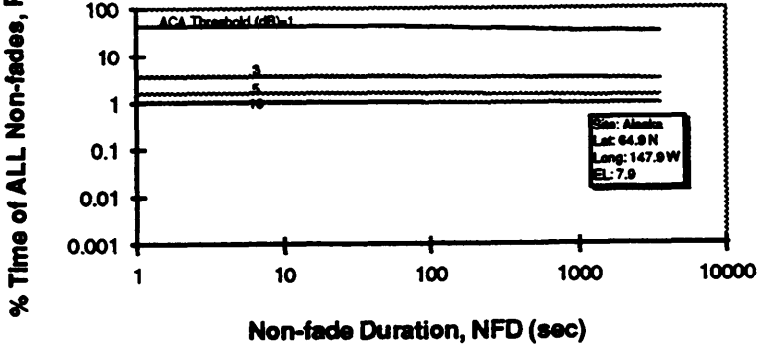

20.185 GHz Fade Distributions, July 1994
% Time of All Fades, PFT
100
10
1
0.1
0.01
0.001
1
10
100
1000
10000
Fade Duration, FD (sec)
Alaska ACTS Propagation

27.505 GHz Fade Distributions, July 1994



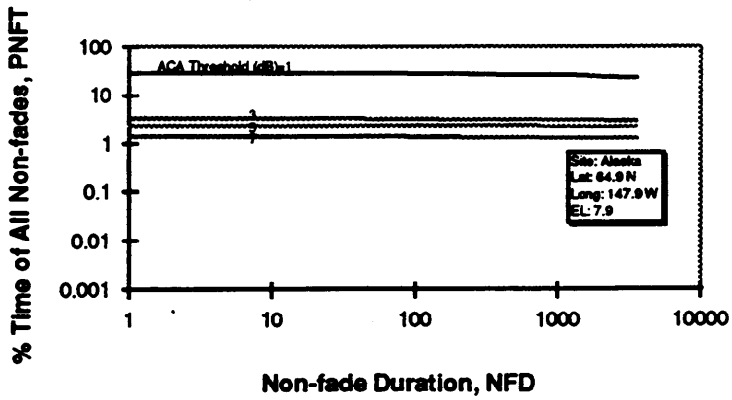
Alaska ACTS Propagation

20.185 GHz Non-fade Distributions, July 1994



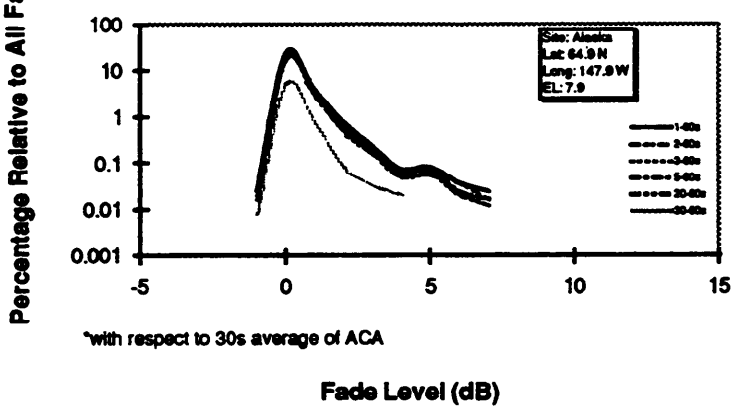
Alaska ACTS Propagation

27.505 GHz Non-fade Distributions, July 1994



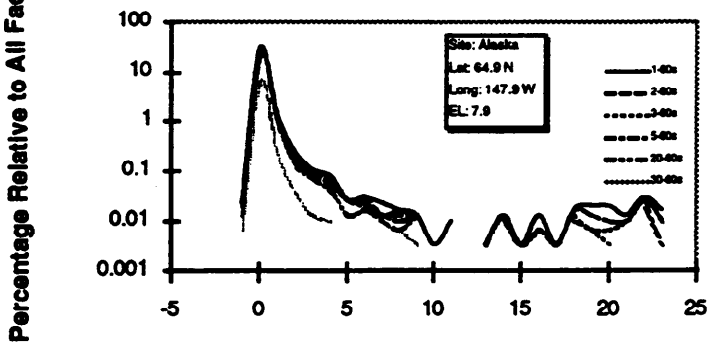
Alaska ACTS Propagation

Fade Durations* at 20.185 GHz, July 1994



Alaska ACTS Propagation

Fade Durations* at 27.505 GHz, July 1994

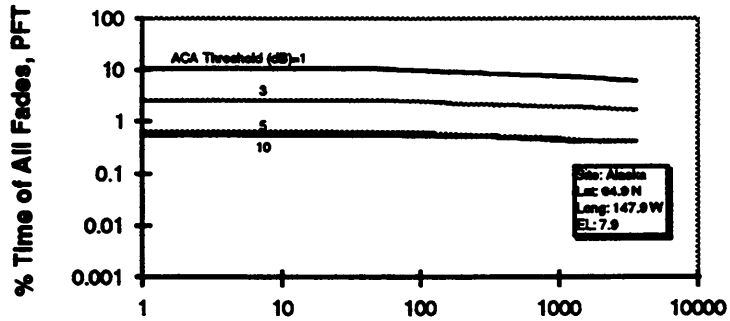


*with respect to 30s average of ACA

Fade Level (dB)

Alaska ACTS Propagation

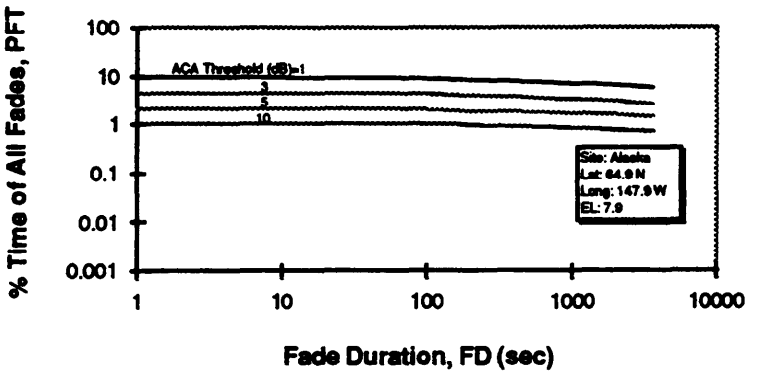
20.185 GHz Fade Distributions, June 1994



Fade Duration, FD (sec)

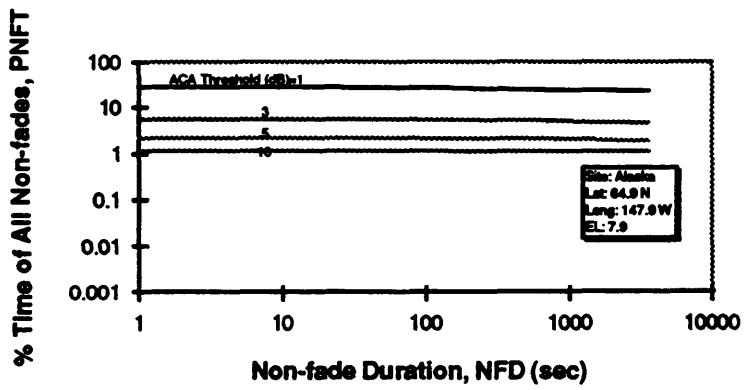
Alaska ACTS Propagation

27.505 GHz Fade Distributions, June 1994



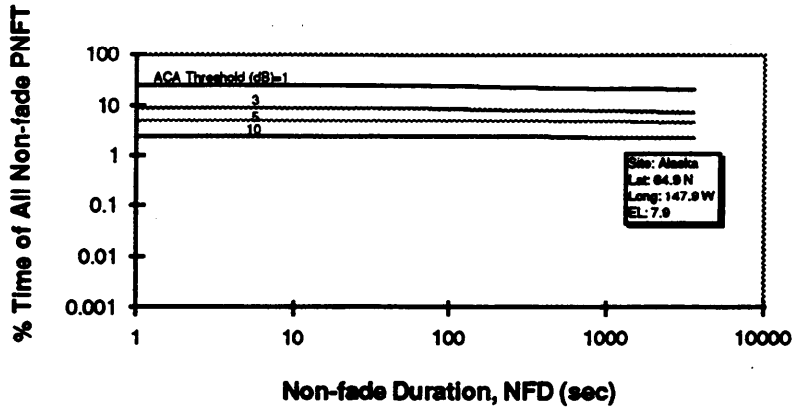
Alaska ACTS Propagation

20.185 GHz Non-fade Distributions, June 1994



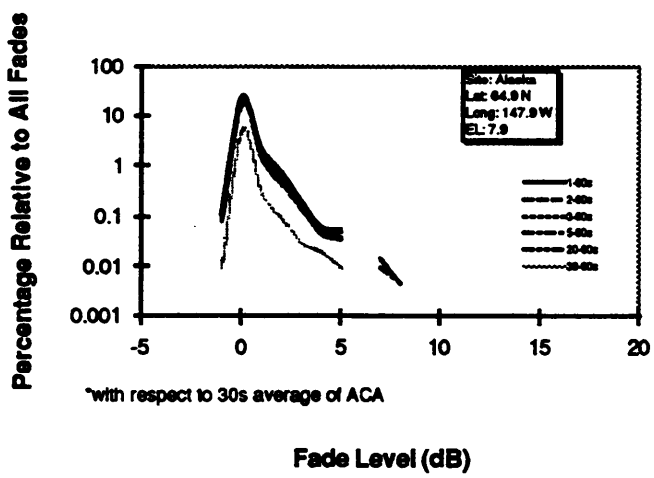
Alaska ACTS Propagation

27.505 GHz Non-fade Distributions, June 1994



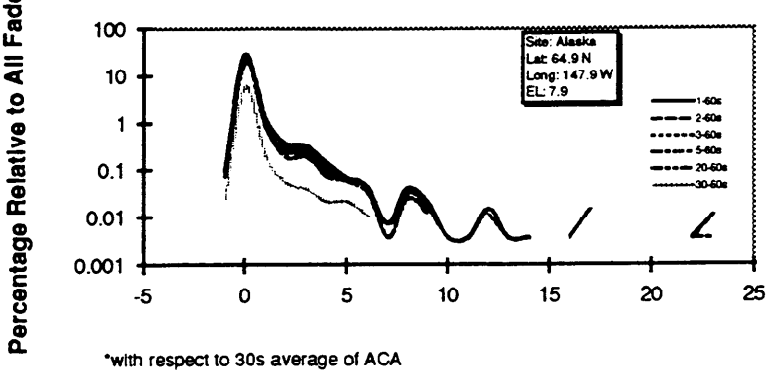
Alaska ACTS Propagation

Fade Durations* at 20.185 GHz, June 1994



Alaska ACTS Propagation

Fade Durations* at 27.505 GHz, June 1994

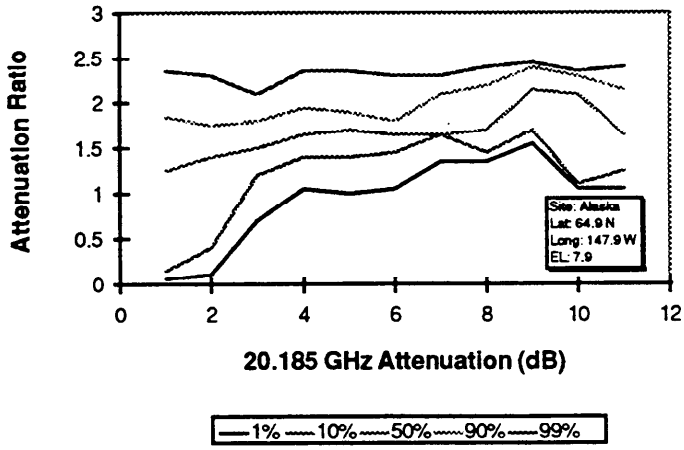


*with respect to 30s average of ACA

Fade Level (dB)

Alaska ACTS Propagation

27/20 Attenuation Ratio Level of Occurances, June 1994



Alaska ACTS Propagation