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ACTS Propagation Measurements

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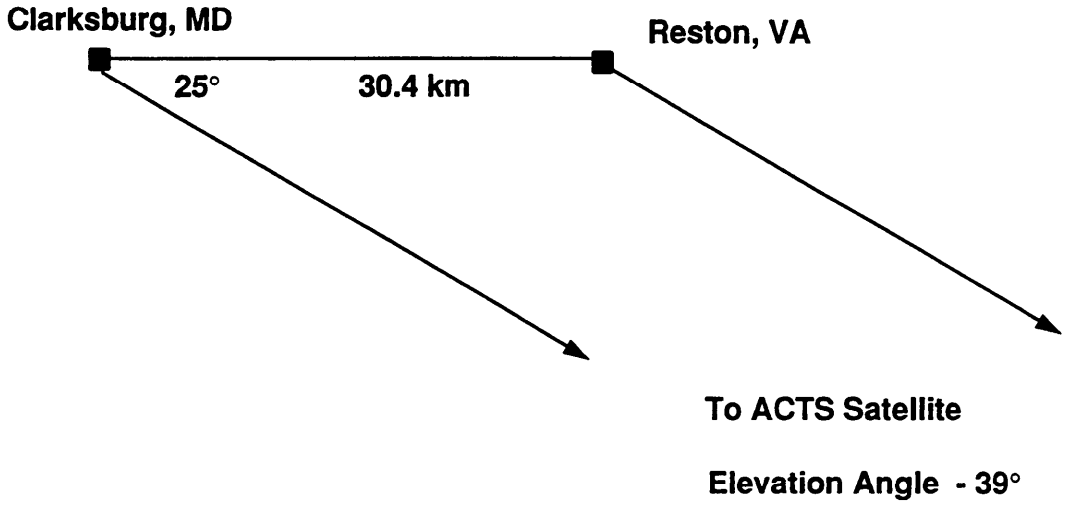
Diversity Geometry



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ACTS Propagation Terminal

- Terminal moved to a new site (Stanford Telecom) approximately 0.5 km from the original site (MITRE).

- Data collection at the new site started on 4/8/95. Approximately three days of down time due to relocation.

- Reasons for relocation: easier access to the terminal and active support of STEL staff in maintaining the terminal.

- Due to the short distance involved data from the two sites can be pooled together without affecting any of the statistical results.

- After the relocation several problems were rectified: installing new DACS software, new rain gauge interface board, new RF temperature control unit, replacement of faulty temperature sensors etc.

- A tipping bucket rain gauge was added to the system.

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ACTS Propagation Terminal

- Un resolved issues: humidity gauge still giving faulty readings, Young rain gauge does not register rain correctly.

- Data Analysis:
  - data from March, 1994 to February, 1995 (12 months) have been analyzed.
  - temperature and humidity data from Washington-Dullas airport were used for the analysis.
  - manual editing carried out to remove anomalous readings due to eclipse operation , 20 GHz radiometer interference, faulty reference load temperature sensor in the 27 GHz radiometer channel.

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COMSAT Propagation Terminal

- Data collection continued with several minor problems:
  - local oscillator in the 20 GHz channel failed causing data loss over 24 hour period in February, 1995.
  - refurbishment work on the terminal was carried out in March, 1995; 2.5 days down time mostly during clear sky conditions.
  - 27 GHz channel suffered gain reduction in the RF stage; repair work caused 2 days of down time in April, 1995.

- Data analysis for the period November, 1993 to April, 1995 have been completed.

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Results

- Almost identical cumulative statistics of attenuation from the two sites; results given for the measurement period from March, 1994 to February, 1995.

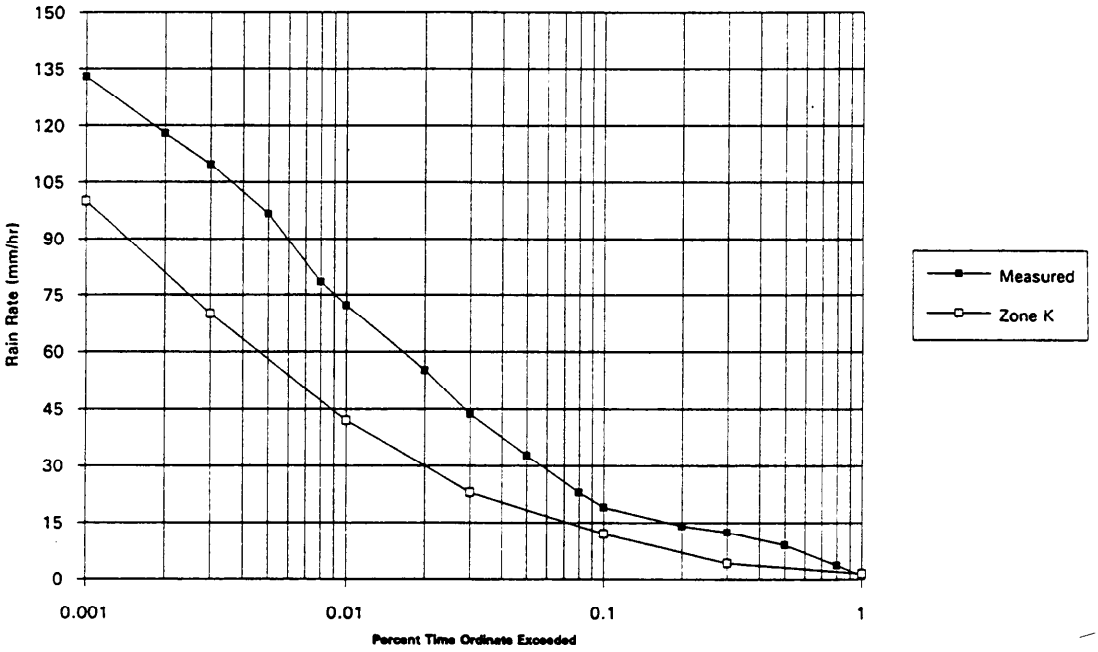
- Results include several snow events.

- Rain zone rain rates are much smaller compared with the measured rain rates.

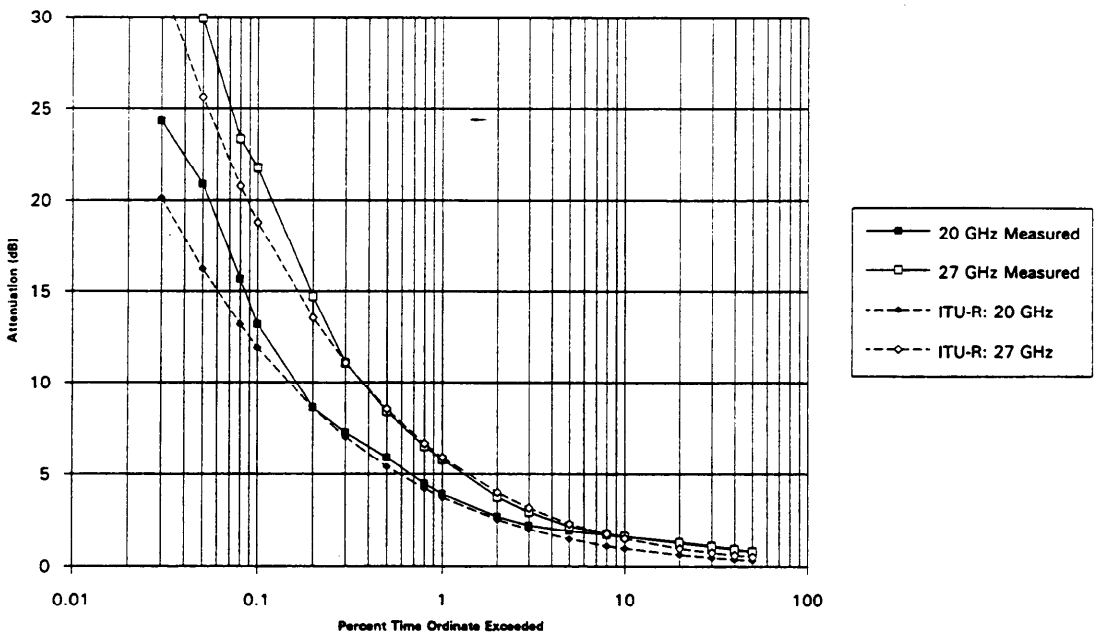
- Attenuation predictions made with the ITU-R model using measured rain rate appear to provide reasonable agreement with measurements;

- Smaller diversity gains predicted by the ITU-R model.

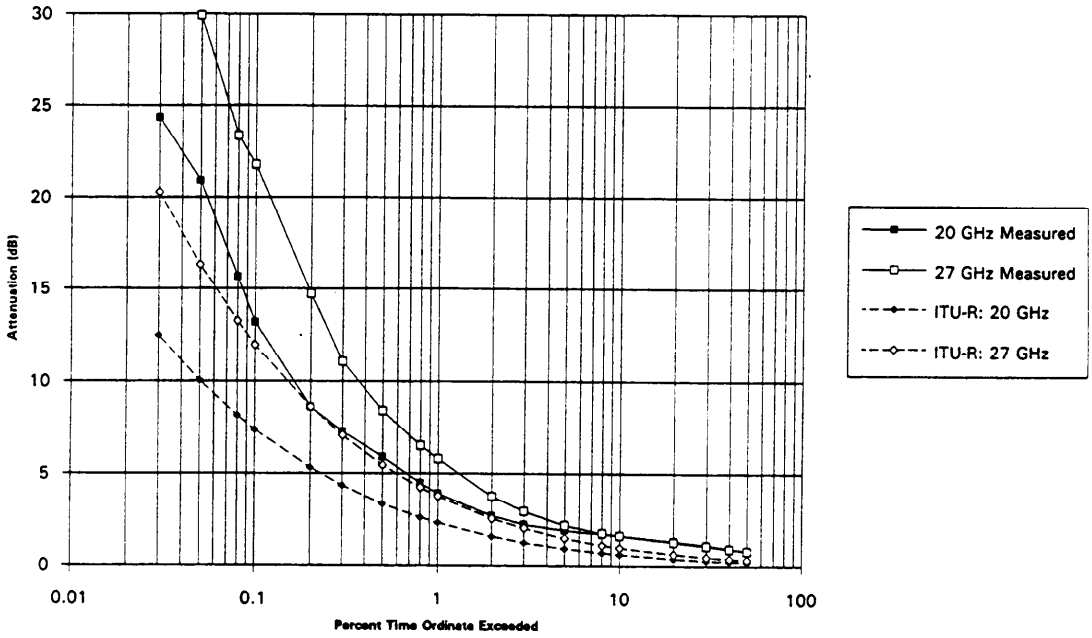
Rain Rate Distribution ; Clarksburg, MD; March,1994 - February,1995



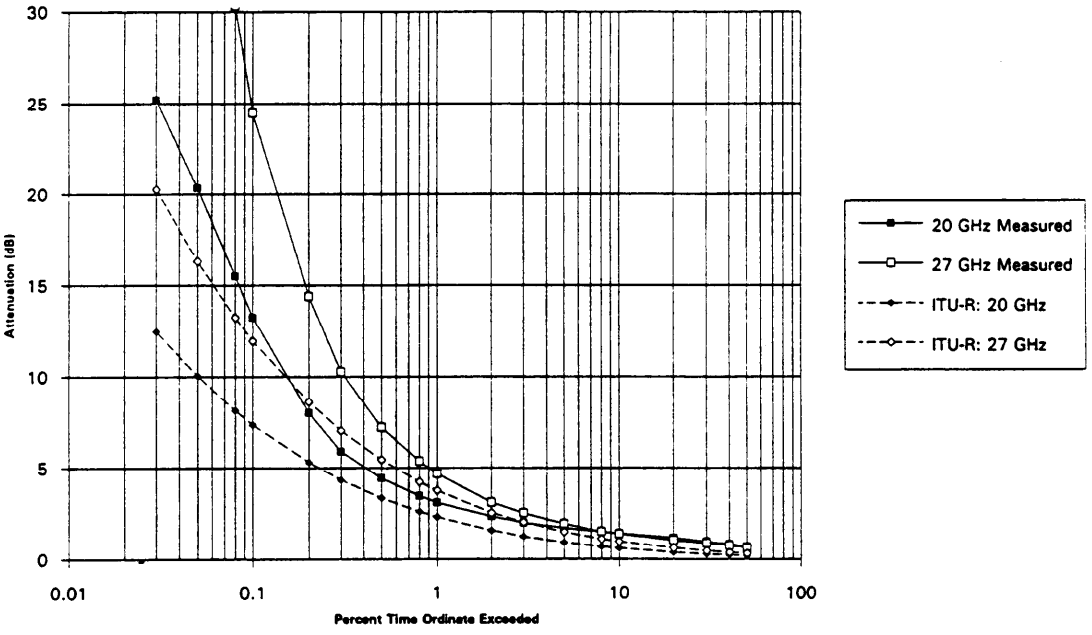
Cumumative Distribution of 20 and 27 GHz Attenuation; Clarksburg, MD: March,1994 - February,1995: ITU-R Prediction Using 0.01% Rain Rate of 72 mm/hr



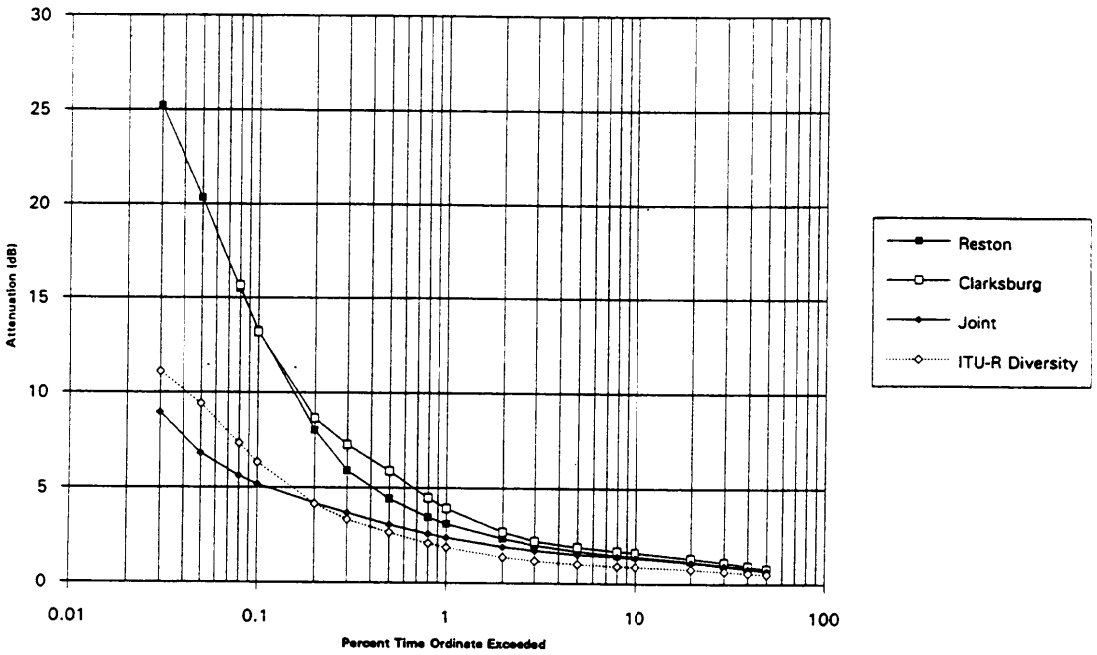
Cumumative Distribution of 20 and 27 GHz Attenuation; Clarksburg, MD; March,1994 - February,1995; ITU-R Prediction Using 0.01% Rain Rate of 42 mm/hr



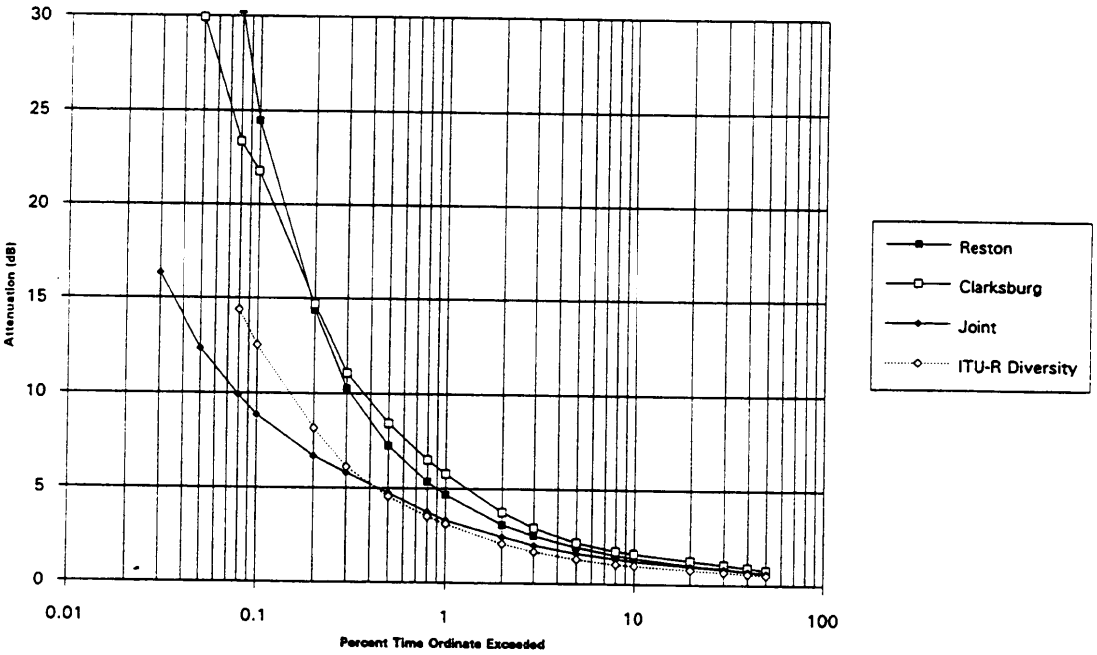
Cumumative Distribution of 20 and 27 GHz Attenuation; Reston, VA; March,1994 - February,1995; ITU-R Prediction Using 0.01% Rain Rate of 42 mm/hr



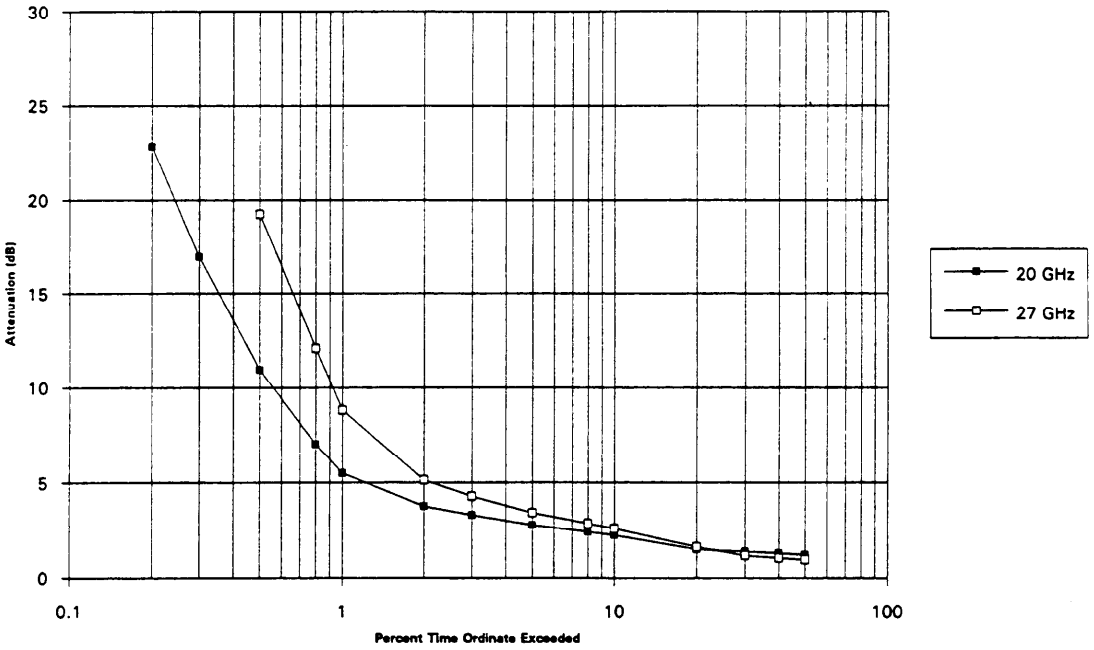
Cumumative Distribution of 20 GHz Attenuation; Reston, VA and Clarksburg, MD; March,1994 - February,1995



Cumumative Distribution of 27 GHz Attenuation; Reston, VA and Clarksburg, MD; March,1994 - February,1995



Worst Month Distribution of 20 and 27 GHz Attenuation; Reston, VA; March,1994 - February,1995



Worst Month Distribution of 20 and 27 GHz Attenuation; Clarksburg, MD; March,1994 - February,1995