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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

May 1, 2001

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
The Portals, TW-A325
445 12th Street, S.W.
Washington, D.C. 20554

Re: Ex Parte Notification – WT Docket No. 00-258

Dear Ms. Salas:

This letter is being filed on behalf of Motorola, Inc. (Motorola). On April 30, 2001, Steve Sharkey, Jeanine Poltronieri and Rob Kubik of Motorola, met with Bruce Franca, Julius Knapp, Ira Keltz and Geraldine Matise of the Office of Engineering and Technology and Charles Rush of the Wireless Telecommunications Bureau. During the meeting the points raised in the attached presentation were discussed.

Please contact Steve Sharkey at (202) 371-6953 regarding any questions concerning this matter.

Respectfully Submitted,

Steve B. Sharkey
Motorola, Inc.

Attachment

cc:
Bruce Franca
Julius Knapp
Ira Keltz
Geraldine Matise
Charles Rush

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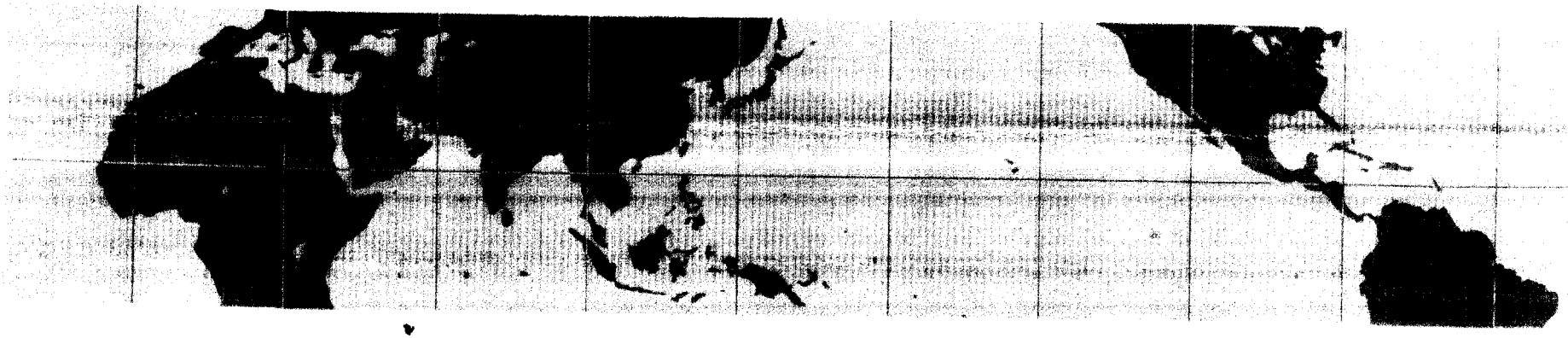
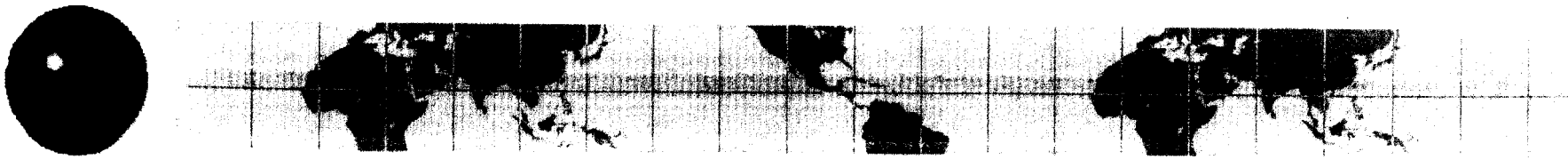
List A B C D E



3G Spectrum

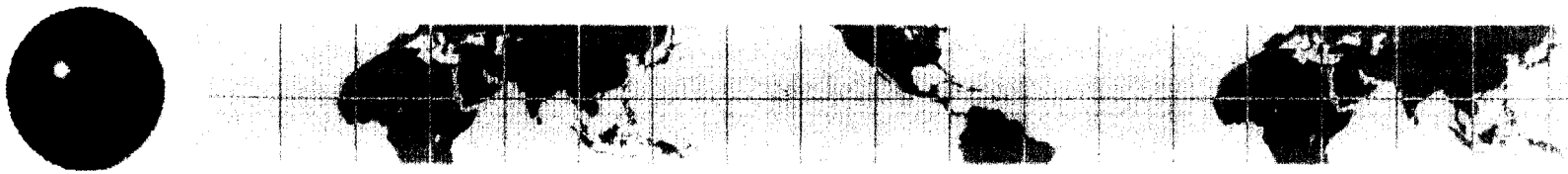
MOTOROLA

April 30, 2001



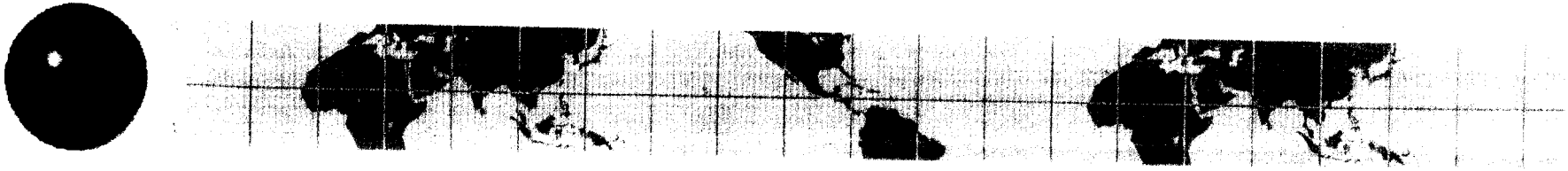
Topics for Discussion

- Global use of 1800 MHz
- Reimbursement for Federal User Relocation
- Sharing and Relocation of DoD Systems
  - Satellite
  - ACTS
  - Fixed and Tactical Radio Relay

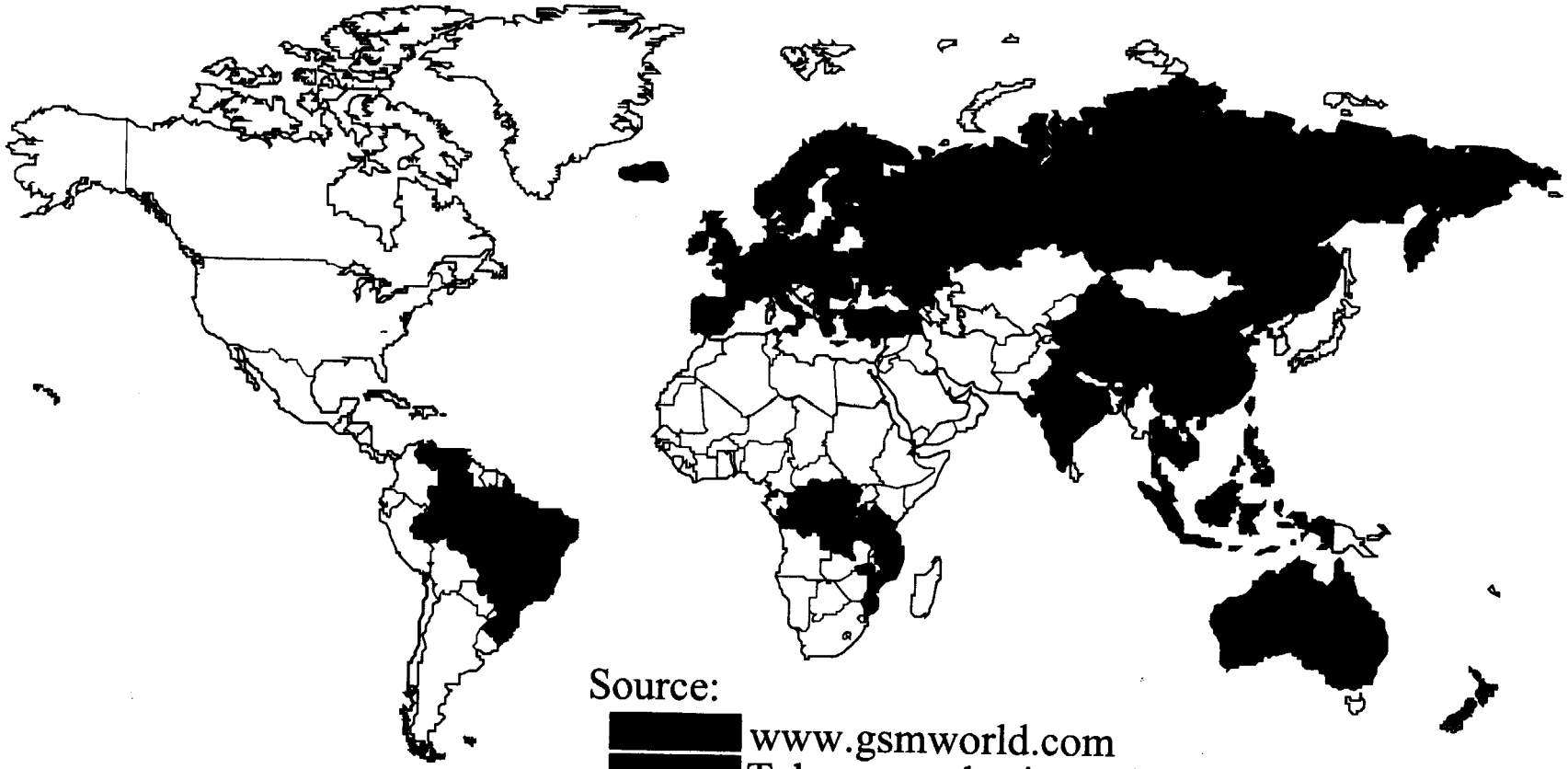


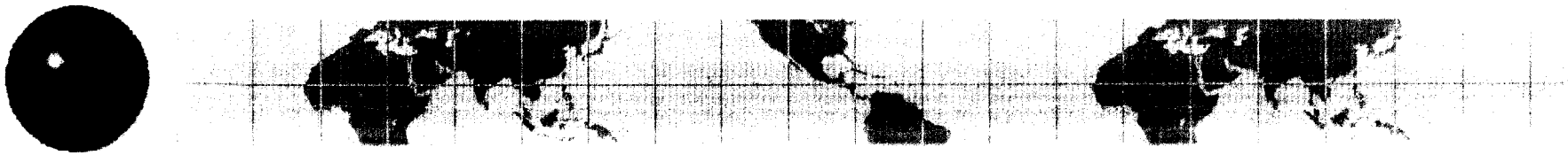
Why 1710-1850 MHz?

- DoD global training and operational requirements are incompatible with global use of the 1710-1850 MHz band for commercial mobile services
- Use of 1710-1850 MHz for 3G in U.S. would provide global spectrum alignment
  - Economies of scale
  - Timely availability of technologies and services



Use of 1710-1885 MHz for GSM

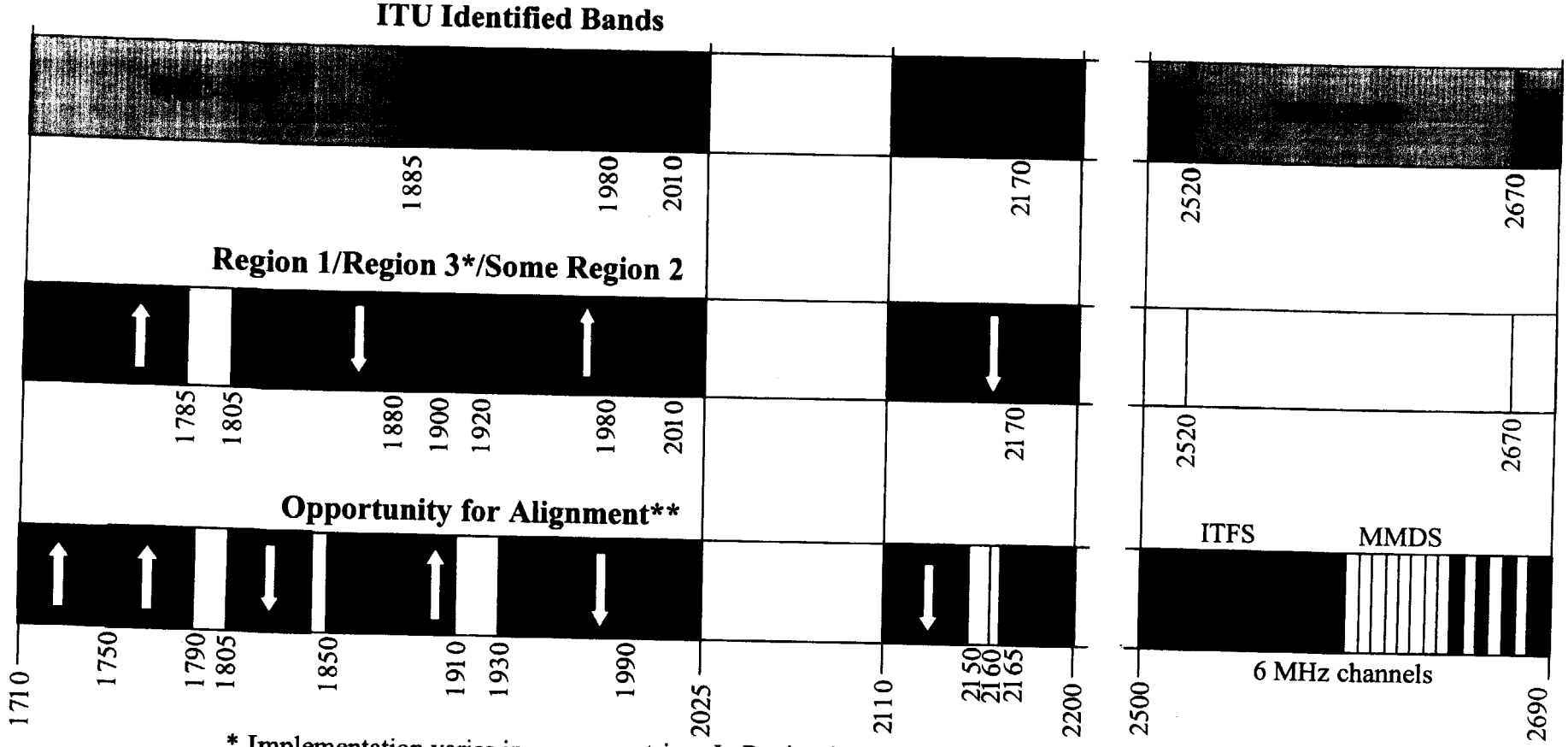




The FCC Should Not Pair 1710-1755 MHz with 2110-2150 MHz

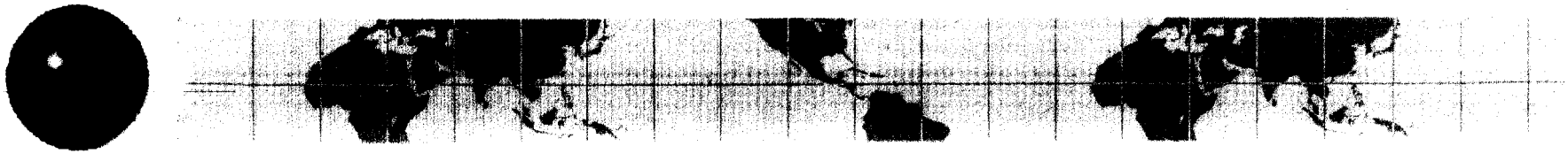
- Does not provide sufficient spectrum
  - 85 MHz of spectrum is insufficient to meet demand through 2010
- Leaves no room for further growth using additional spectrum at 1755-1850 MHz
- Not aligned with Global use
  - Continues the U.S. as a spectrum island
  - Public does not benefit from Global economies of scale and services

Spectrum For IMT-2000



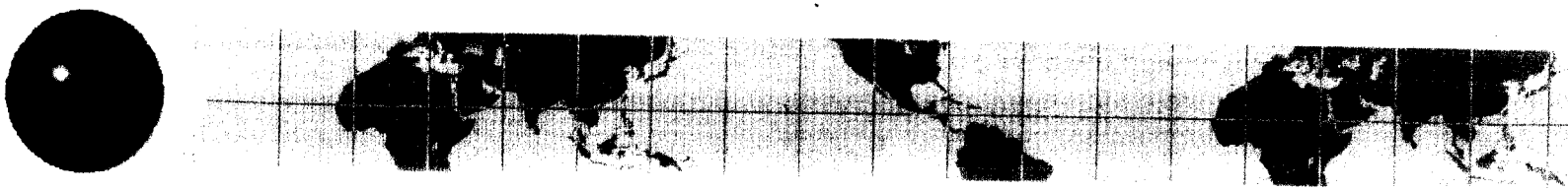
* Implementation varies in some countries. In Region 3 some countries have also implemented some PCS and other variations from Region 1

** Further technical studies are required to validate technical issues with regard to adjacent channel interference



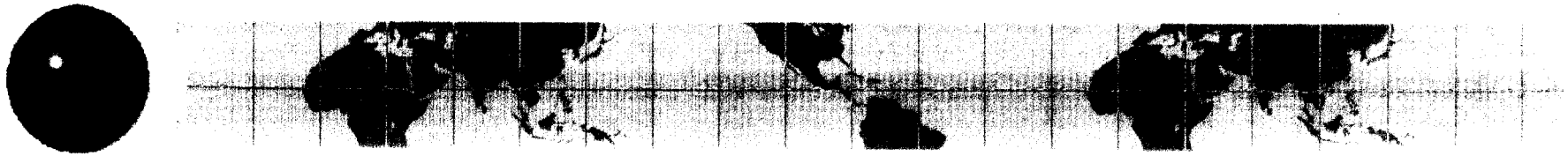
Reimbursement of Federal Users for Relocation

- Current Law provides for reimbursement of Federal Users, <u>but</u>:
  - Subject to Appropriations and Authorizations
  - Cumbersome and difficult negotiation process
- Need streamlined process that benefits Federal Users and Industry
  - Identify costs prior to auction with clear rights for both parties
  - Use auction revenues to directly fund relocation
- Opportunity for Federal Users to upgrade and modernize systems



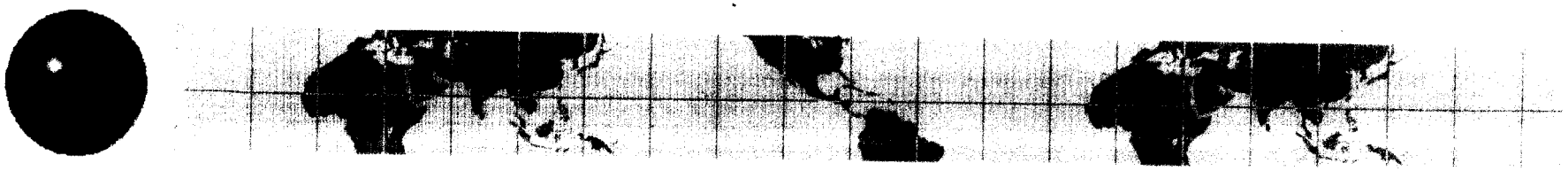
Relocation and Sharing Technical Issues

- Cooperative process will lead to efficient use of spectrum
- DoD does not have to vacate band to make it available for 3G
  - Develop system-by-system solutions for accommodating requirements
  - Solutions consider realistic 3G requirements and DoD requirements



Interference from IMT-2000 into Satellite Receivers

- Two separate analyses indicate that sharing is possible
  - Methodologies are similar to that presented in DoD interim report
  - Difference between Industry and DoD analyses appears to be based on initial assumptions (lack of base station antenna)
- All analyses are based on worst case assumptions
- Existing satellite operations should not be adversely impacted through their life-span.

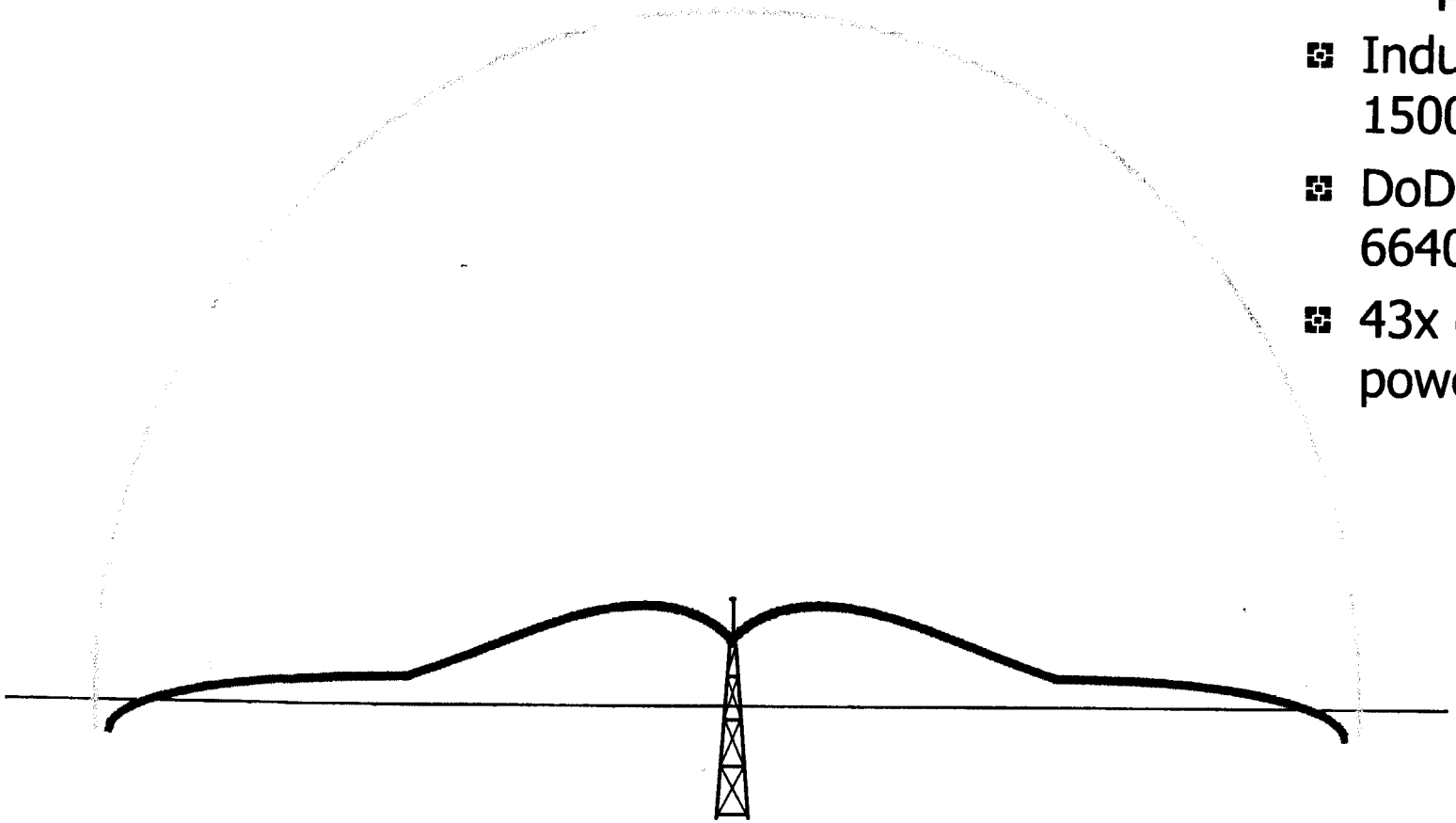


Satellite Sharing Studies

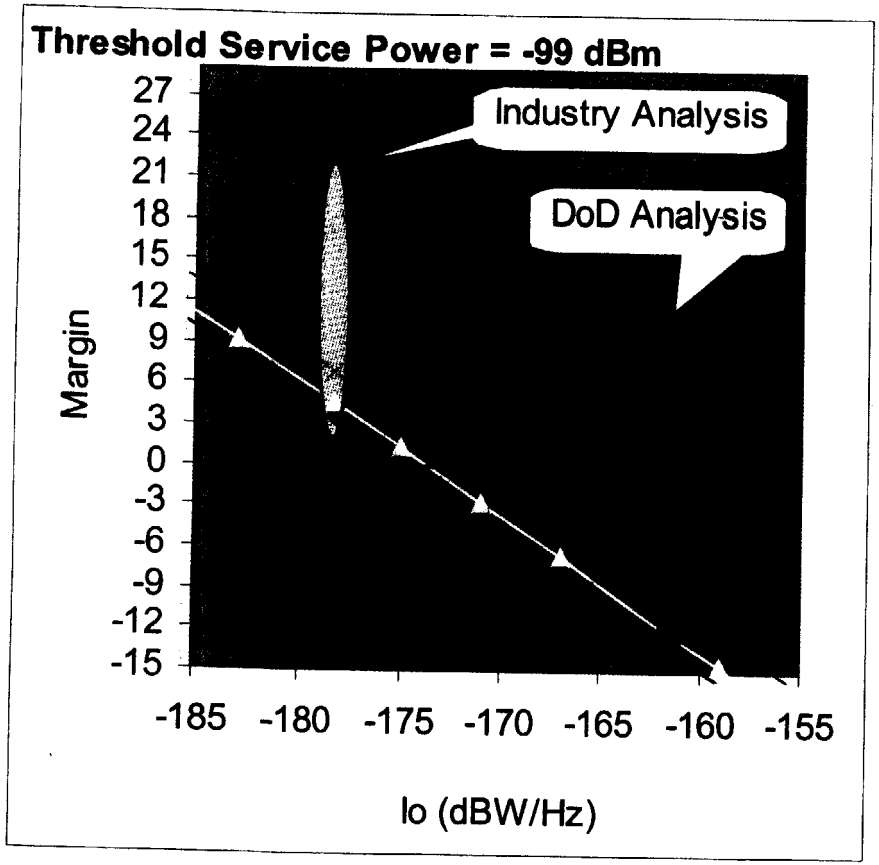
- Both Industry and DoD analysis indicate that no issues with sharing with IMT-2000 mobile equipment
- Major difference in computation of interference power levels is base station transmit antenna pattern
- What is the appropriate threshold service power?
  - Interim DoD report has –113 dBm
  - Final DoD report has –99 dBm

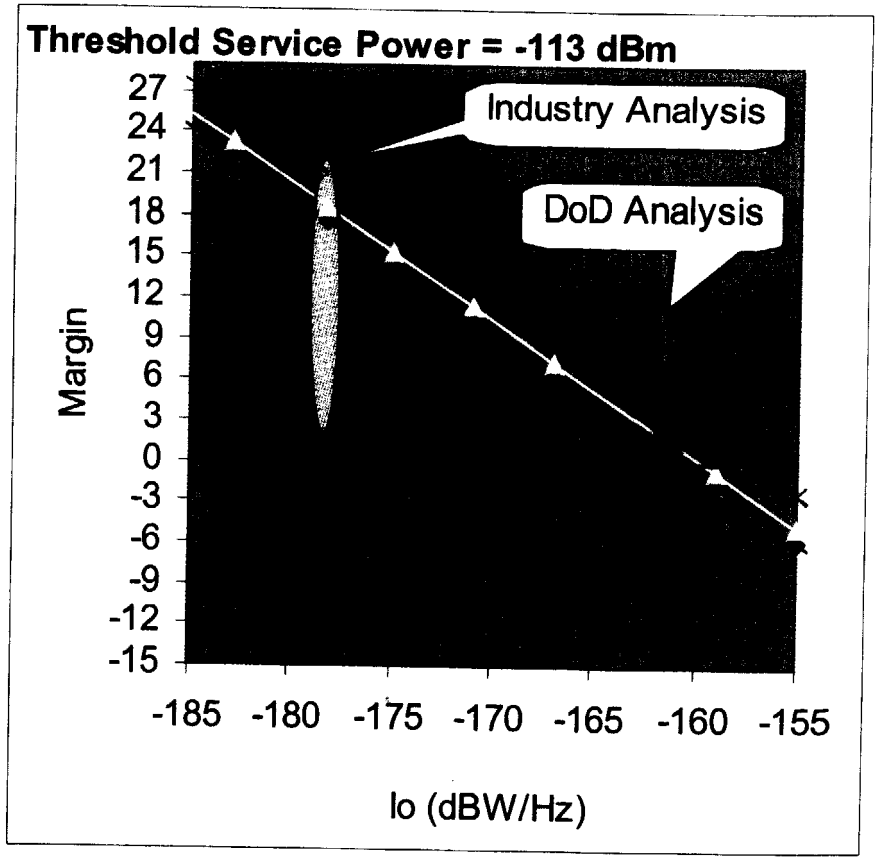
Power Radiated from a 10 km cell

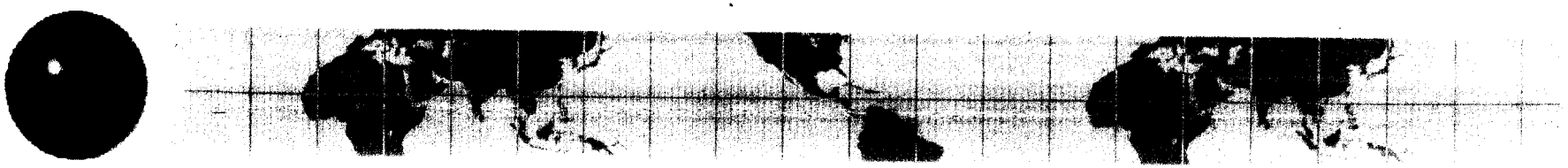
- Total power:
  - Industry
    1500 Watts
  - DoD
    66403 Watts
  - 43x greater
    power (16 dB)



Margin for a satellite at 250 km

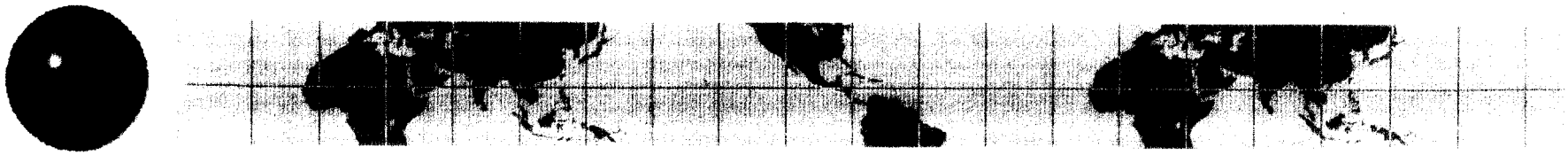






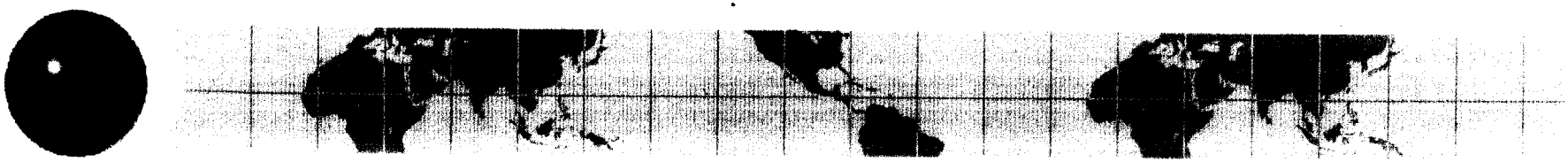
Interference from Satellite Uplink Earth Stations into IMT-2000

- IMT-2000 will suffer interference from Earth stations
  - Actual area of interference depends on parameters, but could be 25-150 km
- Problem if Earth station is located in populated area
  - Report lists 10 Earth stations in U.S.
- In the short-term it is technically feasible to relocate earth stations to remote areas



Interference from Satellite Uplink Earth Stations into IMT-2000

- In the long-term, relocation proposed to 2025-2110 MHz
- DoD use of 1761-1842 MHz differs from ITU standard pairing
  - Standard band pairing is 2025-2110 MHz uplink with 2200-2290 MHz downlink
- DoD operates globally - harmonization prevents spectrum conflicts outside of U.S.
- FCC should review regulatory status with Regard to Electronic News Gathering service
  - Ensure co-primary use



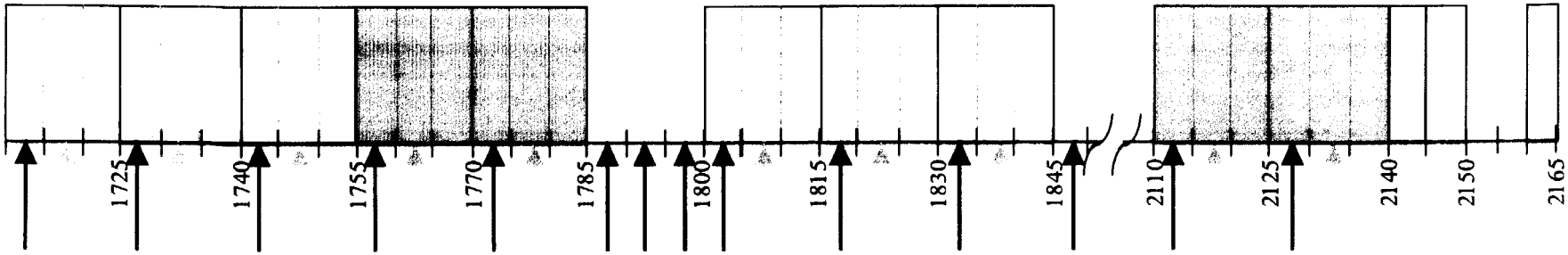
Air Combat Training System

- Interference to and from ACTS is unacceptable
  - Large geographic separation required
- Current TACTS/ACMI System
  - Band segmentation does not appear practicable
- New and Future JTCTS System
  - Band segmentation feasible
    - Filtering on receiver required
    - Narrowband over CONUS
- Migrate TACTS/ACMI to JTCTS

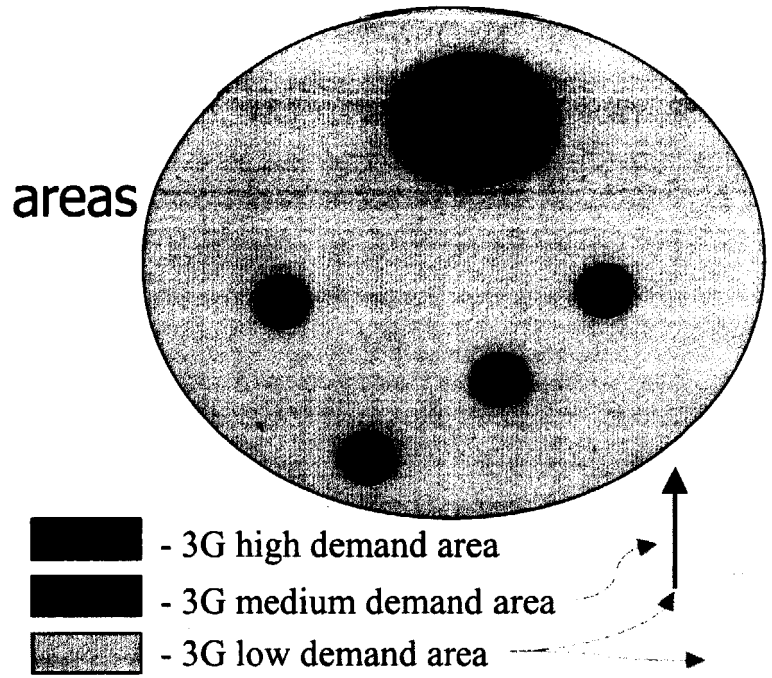
Fixed Point-to-Point

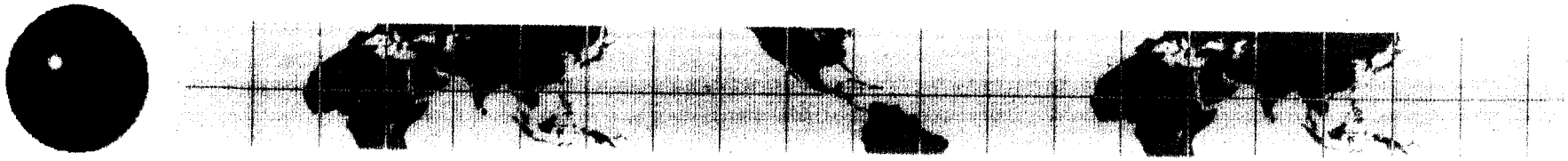
- Sharing between fixed point-to-point and IMT-2000 not feasible
  - Mobile ubiquity precludes sharing at same place, time, and frequency
- Relocation of point-to-point is feasible
  - Similar to relocation for PCS services

Tactical Radio Relay



- Geographic sharing feasible
  - Heaviest DoD demand in rural areas
  - Heaviest IMT-2000 demand in urban areas
- Band segmentation
  - Tailored to operational area
- Access to additional bands
  - Frequency agile equipment





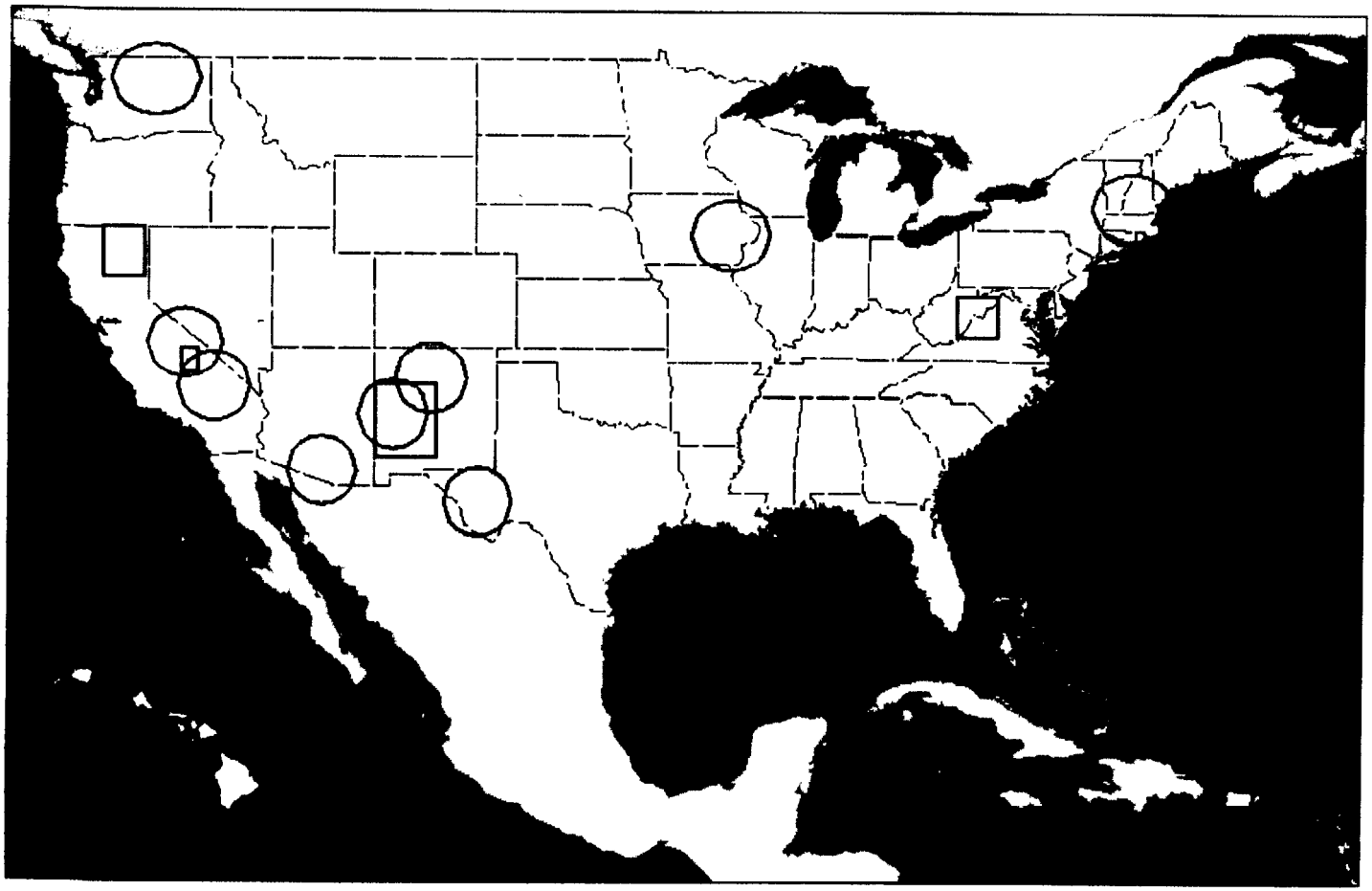
Win-Win for DoD and Industry

- Global alignment of spectrum use will benefit both DoD and Industry
- Use of auction revenue to pay for relocation of federal users provides opportunity for modernization
- Through a cooperative effort, it is feasible to develop a sharing/relocation plan that meets the needs of DoD and Industry

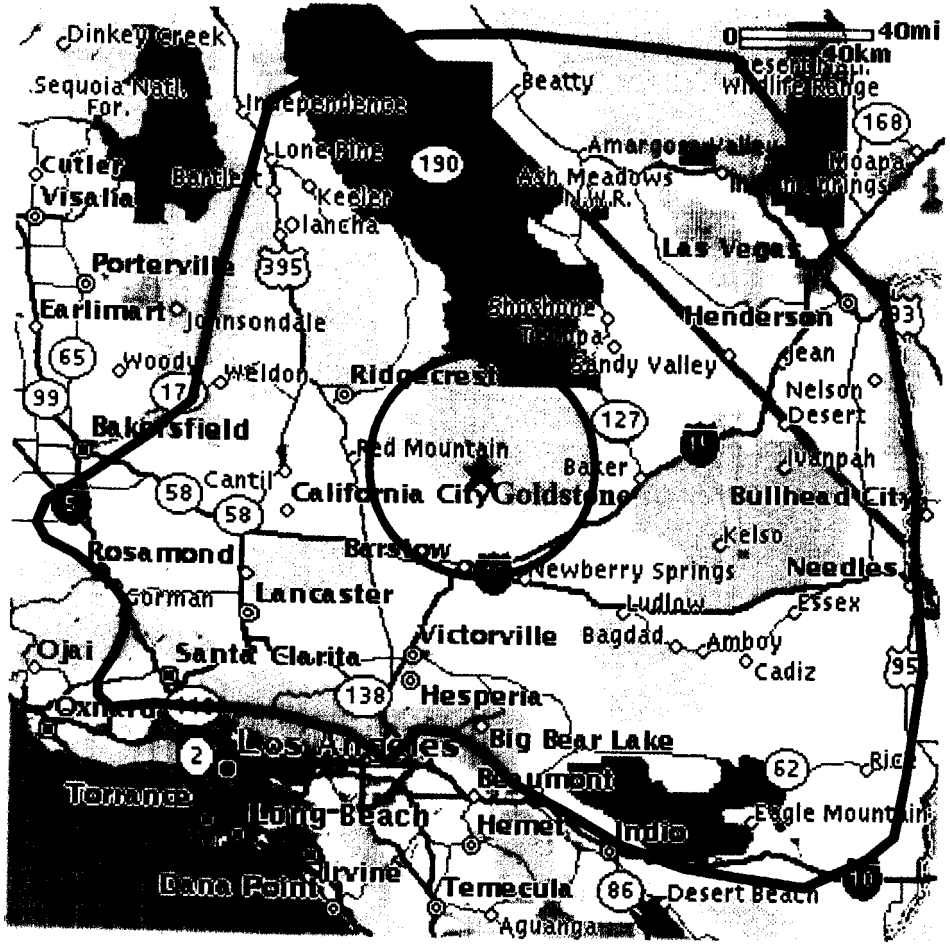
Primary Allocation for Radio Astronomy would Severely Impact IMT-2000

- National Academy of Sciences Committee on Radio Frequencies Propose that zones about Radio Astronomy sites are required in order to provide protection for observation of the Hydroxyl line at 1718-1722 MHz
- Proposes:
  - 11 separate zones where ***NO*** 3G licenses would be given in the 1710-1755 MHz band (see next page)
  - The impact of these zones are "... not significantly burdensome to advanced mobile service licensees..."
- Proposal will severely impact 3G operations in major areas
- Radio astronomy is secondary in 1718.8-1722.2 MHz via US footnote 256 and ITU footnote S5.385 and are not entitled to protection

Proposed Radio Astronomy Zones

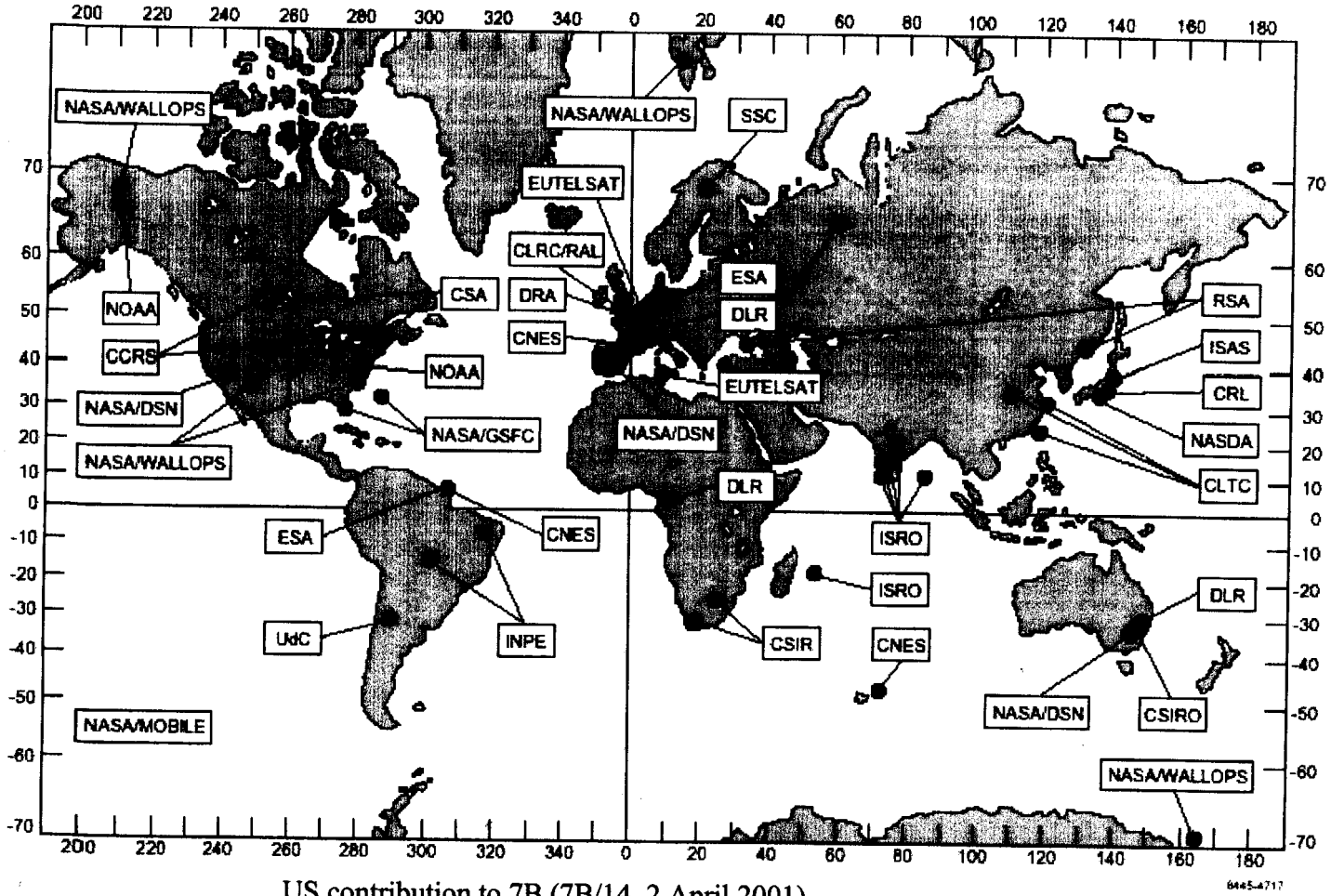


Deep Space Network Operations at 2110-2120 MHz

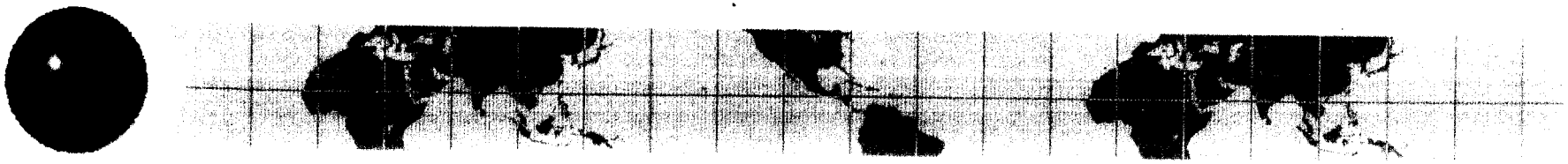


- NASA computations indicate significant area where received power will be –109 dBm (indicated by black line)
  - 20 kW supplied to 62 dBi antenna
- Plane earth computations indicate where –99 dBm level occurs (red line)
- Propagation model used by NASA accounts for rain scatter for small percentages of time (1%)
- Area about tracking stations appear to be smaller

Summary of tracking stations



US contribution to 7B (7B/14, 2 April 2001)



Conclusions for Accommodating 3G

- Solutions for the 1710-1850 MHz band are possible
  - A cooperative process is necessary
  - The FCC should consider regulatory changes to facilitate sharing with and relocation of Federal Government systems
    - Status of Government satellite use in the 2025-2110 MHz band
    - Access by Government users in non-government bands were possible
- Pairing 1710-1755 MHz with 2110-2150 MHz does not service the interests of the wireless industry or the Public good
- Radio Astronomy should not be given primary status in the 1710-1755 MHz band