EFM/DSL Rates/Range

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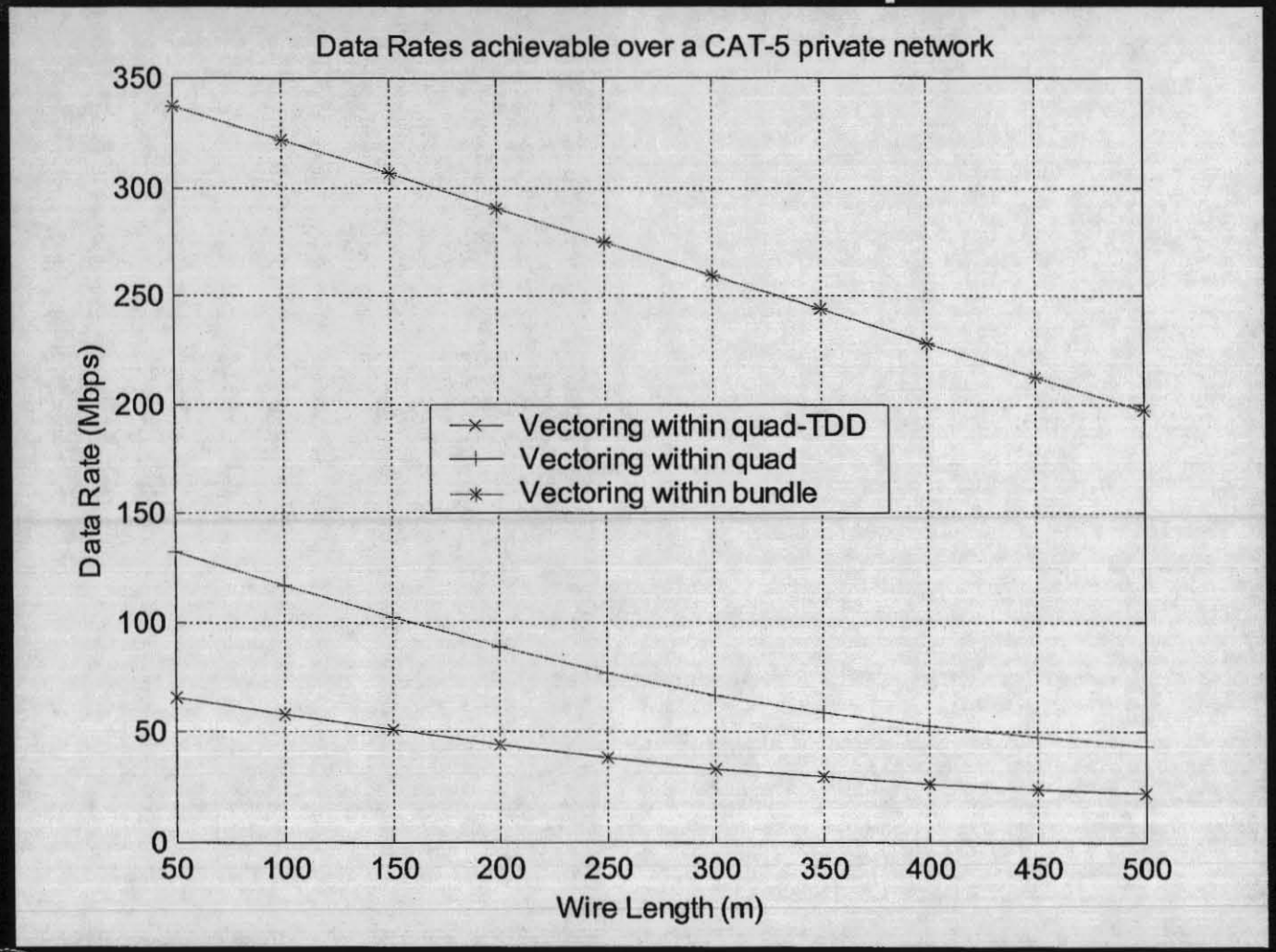
Vectored EFM

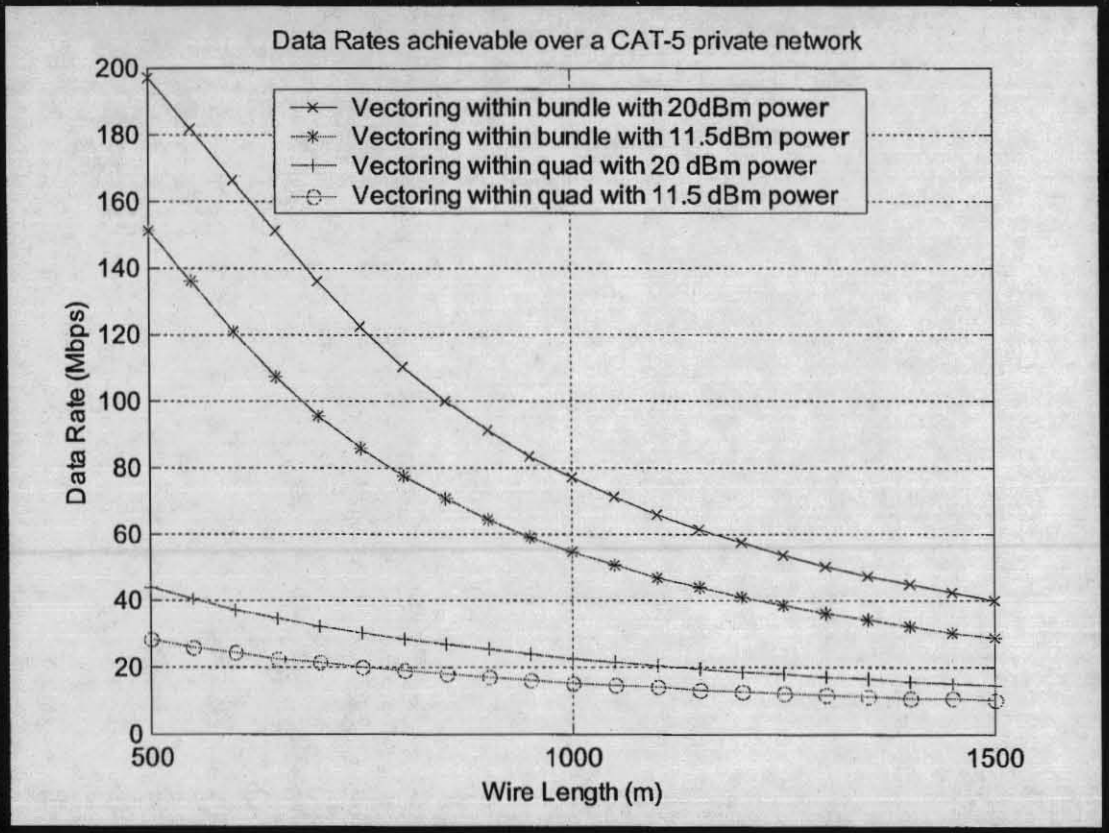
- 4 lines in quad are coordinated at one end, or possibly all 50 are coordinated in telco network
- Allows use of vectored transmitter and receiver
  - Higher rates
  - Lower power/cost as coordination allows simpler signal processing per line
- Following are simulated results based on vectored DMT VDSL model at Stanford

EFM Examples



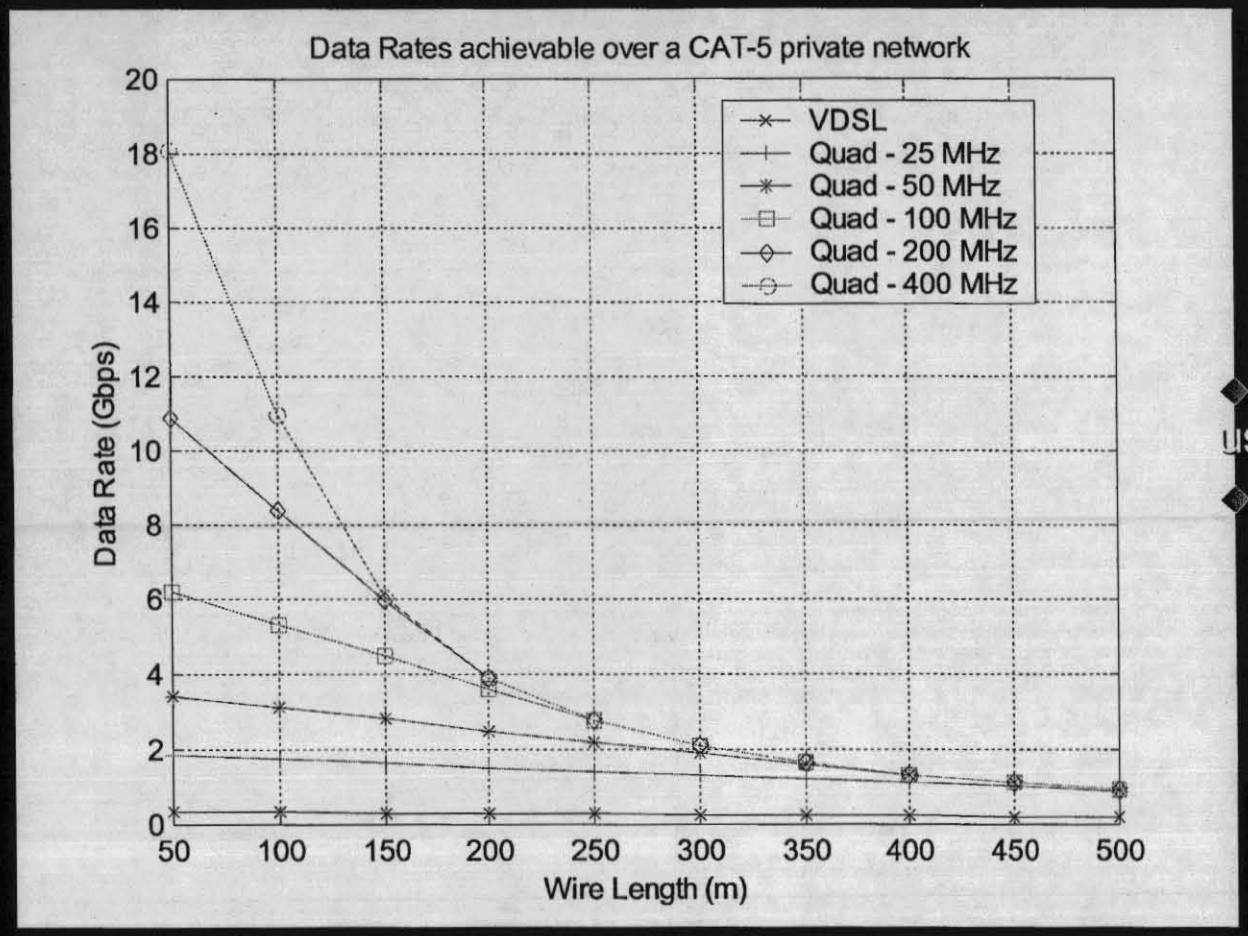
- Per line data rates

EFM Range



- 2 lines, 100BT at 1 km
- 10BT at 1 km on one line is easy
- 4 lines, 100BT at 2 km

Ethernet Examples



- Greater than VDSL band used
- 4 lines combined

Copper has more bw than fiber?

- 50 line bundle in last segment of phone network (500 meters of cat 3 tp)
  - 50 lines (200 Mbps/line) = 10 Gbps
  - FTTH shares 2.5 Gbps among several homes in PON architecture
- Network/Metro fiber is actual BW constraint
  - Copper in last mile has more BW than system can handle
- 100BT/100 Mbps to everyone, everywhere a phone line goes, is possible in the next decade.

Conclusions

- Enormous wireline opportunity for multiuser
  - Gains may be even larger than for wireless
  - Relatively stationary environment
- The real broadband
  - At least 100 BT to everyone anywhere over a twisted pair
    - Data
    - Voice, voice, voice
    - Video
  - Welcome to the DSL/EFM broadband age in this century

EXHIBIT C

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

June 30, 2005

M-05-16

MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

FROM: Joshua B. Bolten
Director

SUBJECT: Regulation on Maintaining Telecommunication Services During a Crisis or Emergency in Federally-owned Buildings

On June 29, 2005, the President assigned the Director of Management and Budget (OMB) the authority to issue a regulation on certain telecommunications functions under Section 414 of the Transportation, Treasury, Independent Agencies, and General Government Appropriations Act, 2005 (Division H of Public Law 108-447).

Effective July 1, 2005, in accordance with the Presidential Memorandum ("Assignment of Certain Functions Relating to Telecommunications") and Section 414, this regulation requires each agency to initiate a review of its telecommunication capabilities in the context of planning for contingencies and continuity of operations (COOP) situations. Through the agency's initiation and conduct of this review (and the agency's follow-up implementation of the results of this review), the agency will be in compliance with the requirements of Section 414 with respect to the provision after July 1, 2005, of telecommunications services for Federally-owned buildings.

Each agency is responsible for ensuring, in the context of contingencies and COOP situations, the continued availability of its mission essential and national security/emergency preparedness telecommunications services. Each agency's review shall be directed to this objective. First, your agency's review shall confirm that the agency, in its planning for contingencies and COOP situations, has appropriately addressed the agency's need for viable, risk-based and cost-effective methods for ensuring the availability of mission essential and national security/emergency telecommunications services. These methods may include, when determined by the agency to be appropriate in the context of the agency's circumstances, the use of redundant and physically separate telecommunications service entry points into buildings and the use of physically diverse local network facilities. Second, your agency shall review and confirm that it is complying with directives issued by the National Communications System and guidance issued in the Federal Emergency Management Agency's (FEMA) Federal Preparedness Circular 65 (FPC 65), as appropriate. Additional information on these directives and FPC 65 guidance is provided in the attachment.

Section 414 is directed solely at telecommunications services for Federally-owned buildings. However, an agency's planning for contingencies and COOP situations must also address those

agency operations that are carried out in leased buildings. Thus, as a matter of Executive Branch policy regarding the planning for contingencies and COOP situations, your review should also *include the agency's activities in leased buildings as well as owned buildings. However, as just* noted, Section 414 is limited to telecommunications services for Federally-owned buildings; therefore your agency's review of such services for its activities in Federally-owned buildings will satisfy the requirements of Section 414.

Finally, when your agency initiates new telecommunications procurements, the agency shall determine the appropriate level of availability, performance and restoration that is required, in accordance with the agency's contingencies and COOP plans and programs.

Please have your agency's staff report to OMB on the status of the agency's review by August 1, 2005. Send your responses via email to telecomguidance@omb.eop.gov. Questions concerning this regulation may be addressed to Kim A. Johnson at Kim_A._Johnson@omb.eop.gov or via telephone at (202) 395-7232.

This regulation is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by a party against the United States, its departments, agencies, entities, officers, employees, or agents, or any other person.

Attachments

Attachment

Federal Preparedness Circular 65 (FPC 65)[1]

FPC 65 provides guidance to Federal Executive Branch departments and agencies for use in developing contingency plans and programs for continuity of operations (COOP). COOP planning facilitates the performance of department/agency essential functions following the disruption of normal operations.

An important part of COOP planning is the selection as appropriate of an alternate operating facility and the provisioning of interoperable communications with all essential internal and external organizations, customers and the public. In accordance with FPC 65, agencies should have already considered locating alternate operating facilities in areas where power, telecommunications, and internet grids would be distinct from those of the primary site. Agencies should also have taken advantage of existing agency field infrastructures and give consideration to options such as telecommuting locations. FEMA recommends telecommunications circuits at alternate facilities be tested on a regular basis.

National Communication System Directives

National Communications System directives establish policies and procedures for national security/emergency preparedness (NS/EP) telecommunications. NS/EP telecommunications services are defined as those services that are used to maintain a state of readiness or to respond to and manage any event or crisis (local, national, or international) that causes or could cause injury or harm to the population, damage to or loss of property, or degrade or threaten the national security or emergency preparedness posture of the United States.

National Communications System directives require participation in programs such as the Telecommunications Service Priority System which establishes precedence for vendor restoration of critical government telecommunications circuits.

The National Communications System has recently developed a methodology for assessing a facility's route diversity and also an accompanying methodology to assess the risk of not having route diversity. Please contact mailto:routediversity@dhs.gov for additional information.

[1] Department of Homeland Security Federal Preparedness Circular 65: Federal Executive Branch Continuity of Operations, June 15, 2004, http://www.fema.gov/onsc/docs/fpc_65.pdf.

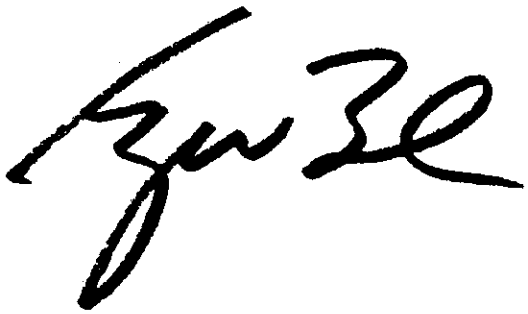
THE WHITE HOUSE

WASHINGTON

June 29, 2005

MEMORANDUM FOR THE DIRECTOR OF THE OFFICE OF MANAGEMENT AND BUDGET

SUBJECT: Assignment of Certain Functions Relating to Telecommunications

By virtue of the authority vested in me by the Constitution and the laws of the United States, including section 301 of title 3, United States Code, I hereby assign to you the functions of the President under section 414 of the Transportation, Treasury, Independent Agencies, and General Government Appropriations Act, 2005 (Division H of Public Law 108-447), and the authority to issue regulations to which section 414 refers.

You are authorized and directed to publish this memorandum in the Federal Register.