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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 15	)	
of the Commission's Rules to Permit	)	ET Docket No. 94-124
Use of Radio Frequencies Above 40 GHz	)	RM-8308
for New Radio Applications	)	

REPLY COMMENTS OF TELEDESIC CORPORATION

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SUMMARY

Teledesic Corporation, by its attorneys and pursuant to Section 1.415 of the Rules and Regulations of the Federal Communications Commission ("FCC" or "Commission"), respectfully submits the following reply comments in response to the Commission's Notice of Proposed Rulemaking in Amendment of Parts 2 and 15 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, 9 FCC Rcd 7078 (1994) ("40 GHz NPRM").

Teledesic strongly supports, as do the majority of commenters, the FCC's proposal to designate the 40.5 - 42.5 GHz frequency band ("41 GHz band") to a service using millimeter wave technology referred to as local multipoint distribution service ("LMDS"). Teledesic urges the FCC to adopt this proposal in lieu of redesignating any portion of the 27.5 - 30.0 GHz band ("the Ka band") to LMDS in CC Docket No. 92-297. The designation of the 41 GHz band for LMDS is the key to the unresolvable technical incompatibility problems that would exist if any portion of the Ka band were redesignated to LMDS. As Teledesic demonstrated in its comments, the designation of the 41 GHz band instead of a portion of the Ka band for LMDS will enable American companies to deploy global, interactive, broadband satellite systems in the Ka band to assist in fulfilling the United States' vision for a National Information Infrastructure and Global Information Infrastructure ("NII/GII"). At the same time, the orderly development and deployment of terrestrial LMDS in the 41 GHz band will be ensured without interference from the fixed satellite service ("FSS").

Designating the 41 GHz band to LMDS will create a win-win situation for all affected parties by providing LMDS proponents with the amount of spectrum they claim to require to operate their broadcast-type terrestrial service, while preserving the use of the Ka band for global interactive broadband satellite system operation in the FSS. Such action is consistent with the worldwide allocation of the Ka band to FSS. In addition, designating the 41 GHz band to LMDS is consistent with the international table of allocations and would bring the United States into conformance with actions in Europe. By maintaining the compatibility of United States uses of spectrum with international uses, United States terrestrial and satellite equipment providers and satellite and terrestrial service providers will have maximum access to global markets. In short, designation of the 41 GHz band for LMDS in lieu of the Ka band will result in a win-win situation for the American public and for American industry.

As demonstrated by the comments submitted in response to the 40 GHz NPRM, there is compelling support for the FCC's proposal to designate the 41 GHz band for wideband terrestrial services, such as LMDS. As the record unequivocally demonstrates, deployment of LMDS systems in the 41 GHz band will be technically and economically equivalent to operation in the Ka band.

The primary resistance to the proposal to designate the 41 GHz band instead of a portion of the Ka band to LMDS has come from CellularVision of New York, L.P. ("CVNY"). CVNY's opposition is predictable given CVNY's substantial financial stake in

Ka band LMDS technology. Given the substantial economic windfall flowing to CVNY from the FCC's award of a tentative pioneer's preference for 1,000 MHz of spectrum for an LMDS system in either the New York or Los Angeles area, it is no wonder that CVNY ignores public interest concerns and opposes designation of the 41 GHz band to LMDS. The FCC's grant of a tentative pioneer's preference to CVNY's affiliate for an LMDS system has made it all but impossible for CVNY to evaluate in a fair and unbiased manner any proposal to designate spectrum outside of the Ka band for LMDS. The FCC must recognize that any alternative designation for LMDS outside the Ka band will be opposed by CVNY regardless of the technical merits or the public interest rationale for the 41 GHz solution for LMDS because of CVNY's fear that it will lose the substantial financial windfall associated with its pioneer's preference. It is not surprising that CVNY blatantly disregards overwhelming and compelling technical evidence from competent engineering organizations establishing that operation of LMDS in the 41 GHz band is technically and economically equivalent to operation in the Ka band.

Because of the pioneer's preference awarded to CVNY for its technology, CVNY is attempting to make its obsolete analog LMDS system the standard for comparing the technical and economical feasibility of LMDS at the Ka and 41 GHz bands. Because there are more efficient LMDS system architectures that might be used for conducting the comparison, the FCC should not allow CVNY's personal agenda to overcome the overriding public interest benefits of using a more efficient system architecture for the comparison.

CVNY's self-serving comments and appendices contain nothing more than misleading and unsubstantiated assertions concerning the ability of the LMDS to operate in the 41 GHz band. CVNY does not, for example, provide one citation to support its technical and economic arguments. In its comments, CVNY has extrapolated selective performance data in an inaccurate manner in an attempt to justify otherwise insupportable conclusions. A review of the CVNY comments and associated papers indicates that the conclusions are erroneous and insupportable.

For example, the analysis to support CVNY's claim that "[o]peration of the LMDS system above 40 GHz results in a direct increase [of] system cost by a factor of thirty to forty..." is grossly misleading. The initial price differential to deploy an LMDS system at the 41 GHz band versus the Ka band is nominal and will disappear over time.

Over the past few years a tremendous engineering effort has been devoted to the design of a system at the 41 GHz band for a LMDS-type service in Europe referred to as Multipoint Video Distribution System ("MVDS"). Substantial resources have been devoted to performing propagation experiments and developing specific hardware components for MVDS systems. As a result of this effort and the accompanying financial investment, MVDS in the 41 GHz band will be implemented soon in the United Kingdom. The specification for analog MVDS was completed in September of 1993 and the United Kingdom has licensed Eurobell to deploy and operate a MVDS system in Kent, England. Large equipment manufacturers, such as Phillips Microwave, a major investor in CVNY, continue to invest in improving their

existing hardware for MVDS operation in the 41 GHz band and are actively pursuing system implementations. As a result of these engineering efforts, equipment is now available in the United Kingdom which makes the implementation of an LMDS system economically feasible at the 41 GHz band.

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REPLY COMMENTS OF TELEDESIC CORPORATION

To: The Commission

I. INTRODUCTION

Teledesic Corporation, by its attorneys and pursuant to Section 1.415 of the Rules and Regulations of the Federal Communications Commission ("FCC" or "Commission"), 47 C.F.R. § 1.415, respectfully submits the following reply comments in response to the Commission's Notice of Proposed Rulemaking in the above-captioned proceeding.[1]

Teledesic strongly supports, as do the majority of commenters, the FCC's proposal to designate the 40.5 - 42.5 GHz frequency band ("41 GHz band") to a service using millimeter wave technology referred to as local multipoint distribution service ("LMDS"). Teledesic urges the FCC to adopt this proposal in lieu of redesignating any portion of the 27.5 - 30.0 GHz band ("the Ka band") to LMDS in CC Docket No. 92-297. See Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service, 8 FCC

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[1] Amendment of Parts 2 and 15 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, 9 FCC Rcd 7078 (1994) ("40 GHz NPRM").

Rcd 557 (1993) ("First Notice"); Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service, 9 FCC Rcd 1394 (1994) ("Second Notice"). The designation of the 41 GHz band for LMDS is the key to the unresolvable technical incompatibility problems that would exist if any portion of the Ka band were redesignated to LMDS. As Teledesic demonstrated in its comments, the designation of the 41 GHz band instead of a portion of the Ka band for LMDS will enable American companies to deploy global, interactive, broadband satellite systems in the Ka band to assist in fulfilling the United States' vision for a National Information Infrastructure and Global Information Infrastructure ("NII/GII"). At the same time, the orderly development and deployment of terrestrial LMDS in the 41 GHz band will be ensured without interference from the fixed satellite service ("FSS").

Designating the 41 GHz band to LMDS will create a win-win situation for all affected parties by providing LMDS proponents with the amount of spectrum they claim to require to operate their broadcast-type terrestrial service, while preserving the use of the Ka band for global interactive broadband satellite system operation in the FSS. Such action is consistent with the worldwide allocation of the Ka band to FSS. In addition, designating the 41 GHz band to LMDS is consistent with the international table of allocations and would bring the United States into conformance with actions in Europe. By maintaining the compatibility of United States uses of spectrum with international uses, United States terrestrial and satellite equipment providers will have maximum access to global markets. Based on the foregoing, it is clear that designation of the 41 GHz band for LMDS in lieu of the Ka band will result in a

win-win situation for the American public and for American industry.

II. DISCUSSION

A. Compelling Support Exists For Designation of the 41 GHz Band to LMDS

As demonstrated by the comments submitted in response to the 40 GHz NPRM, there is compelling support for the FCC's proposal to designate the 41 GHz band for wideband terrestrial services, such as LMDS.[2] As the record unequivocally demonstrates, deployment of LMDS systems at the 41 GHz band is technically and economically equivalent to operation in the Ka band.[3] Analysis by the National Aeronautics and Space Administration ("NASA") demonstrates that the propagation environment for LMDS operations at the 41 GHz band is similar to that at the nearby Ka band. NASA Comments, at 5-7; see also, Hughes Comments, at 3-8. NASA's propagation analysis proves conclusively that there is virtually no difference in the operation of LMDS at the higher frequency band. NASA Comments, at 5-7. Technical studies performed by Hughes and Teledesic reached the same conclusions. Teledesic Comments, at 13-15; Hughes Comments, at 3-8. Endgate Technology Corporation ("Endgate"), a reputable equipment manufacturer with an interest in supplying equipment to LMDS operators, filed comments confirming that the slight increase in the price of equipment for LMDS systems at 41 GHz versus at the Ka band will become "insignificant" over time.

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[2] See Comments of Hughes Communications Galaxy, Inc., at 1 ("Hughes Comments"); Comments of the National Aeronautics and Space Administration, at 2-3 ("NASA Comments"); Comments of GE American Communications, Inc., at 1-2 ("GE Comments"); Comments of TRW Inc. at 1 ("TRW Comments"); Comments of Rockwell International Corporation, at 2 ("Rockwell Comments"); Comments of Pacific Bell Mobile Services and Telesis Technologies Laboratory, at 2 ("Pacific Bell Comments"); Comments of Hewlett-Packard Co., at 2; Comments of Martin Marietta Space Group, at 1-2 ("Martin Marietta Comments"); see also Comments of Avant-Garde Telecommunication, Inc., at 2; Comments of Hughes Aircraft Company, at 4; Comments of Endgate Technology, Inc., at 1-2 ("Endgate Comments").

[3] See e.g., Hughes Comments, at 1; TRW Comments, at 1; Martin Marietta Comments, at 1-2; and NASA Comments, at 2-3.

Endgate Comments, at 1-2; see also, GE Comments, at 8; TRW Comments at 7-8; Pacific Bell Comments, at 2. The designation of the 41 GHz band to LMDS in lieu of the Ka band is optimal in terms of providing service to the public because it will preserve the existing allocation of spectrum in the Ka band not only for global deployment of FSS satellite networks but for terrestrial fixed point-to-point microwave services.[4]

B. The Primary Objection to the Designation of the 41 GHz Band to LMDS Has Been Lodged By a Party with a Substantial Bias

The primary resistance to the proposal to designate the 41 GHz band instead of a portion of the Ka band to LMDS has come from CellularVision of New York, L.P. ("CVNY"). See Comments of CellularVision of New York, L.P. ("CVNY Comments"). CVNY's opposition is predictable given CVNY's substantial financial stake in Ka band LMDS technology. In order to put CVNY's opposition into perspective, some background information is useful. In 1991, one of CVNY's affiliate companies, Hye Crest Management, Inc., was authorized by the FCC to construct a one cell LMDS system in a portion of the New York Primary Metropolitan Statistical Area to provide one-way video service using 1,000 MHz of spectrum in the Ka band. According to FCC filings submitted by CVNY, CVNY has constructed the LMDS system authorized by the FCC in the Brighton Beach portion of the New York metropolitan area and is presently providing one-way broadcast service to several hundred subscribers there. CVNY has thirty-four applications pending before the FCC seeking authorization to significantly expand its one-way, redundant video entertainment service in the New York metropolitan area.

[4] Unlike the proposed LMDS, Teledesic believes that co-primary use of the Ka band by the FSS and terrestrial fixed point-to-point microwave services is technically compatible.

Several years ago, another affiliated company of CVNY, the Suite 12 Group, identified a technology for LMDS in the Ka band. The Suite 12 Group requested a pioneer's preference and filed a petition for rulemaking to authorize LMDS in the Ka band based on its technology. No party challenged Suite 12 Group's pioneer's preference request. In light of the unopposed request, while recognizing that LMDS was not yet tested in the marketplace, the FCC tentatively concluded that Suite 12 Group should be awarded a pioneer's preference in either the New York or Los Angeles area and initiated a rulemaking proceeding to consider redesignating a substantial portion of the Ka band to LMDS. First Notice, 8 FCC Rcd at 566 (1993).

CVNY's economic self-interest in the FCC's redesignation of the Ka band to LMDS is obvious. Given the substantial economic windfall flowing to CVNY from the award of the pioneer's preference for 1,000 MHz of spectrum for an LMDS system in either the New York or Los Angeles Metropolitan area, it is no wonder that CVNY ignores public interest concerns and opposes designation of the 41 GHz band to LMDS. The FCC's grant of a tentative pioneer's preference to CVNY's affiliate has made it all but impossible for CVNY to evaluate in a fair and unbiased manner any proposal to designate spectrum outside of the Ka band for LMDS. Regardless of the technical merits or the public interest rationale for the 41 GHz solution for LMDS, the FCC must recognize that any alternative designation for LMDS outside the Ka band will be opposed by CVNY because of its fear that it will lose the substantial financial windfall associated with its pioneer's preference. It is not surprising that CVNY blatantly disregards overwhelming and compelling technical evidence from competent engineering organizations establishing that operation of LMDS in the 41 GHz band is

technically and economically equivalent to operation in the Ka band.

CVNY is attempting to make its archaic analog LMDS system the standard for comparing the technical and economic feasibility of LMDS at the Ka and at the 41 GHz bands. However, there are more efficient LMDS system architectures that might be used for conducting the comparison. CVNY's outdated analog FM system is not necessarily the LMDS architecture preferred by LMDS proponents nor the optimal design from a public interest standpoint. Nevertheless, CVNY has devoted its resources to force this architecture on the FCC and the public because of the pioneer's preference awarded to it for this technology. Given the advances in digital technology and compression techniques, the FCC should not allow CVNY's personal agenda to overcome the overriding public interest benefits that may warrant the use of a more advanced and efficient LMDS system architecture.

C. Operation of the Proposed LMDS in the 41 GHz Band is Technically and Economically Equivalent to Operation in the Ka Band

Operation of LMDS at the 41 GHz band is technically and economically equivalent to operation in the Ka band. Teledesic, LMDS is Feasible in the 40.5 - 42.5 GHz Band, (Jan. 25, 1995) ("LMDS Report") (attached as Appendix A to the Teledesic Comments); Teledesic, Apples-to-Apples Comparison Demonstrates the Feasibility of LMDS Above 40 GHz, (March 1, 1994) ("LMDS Feasibility Report") (attached hereto as Appendix A). CVNY's self-serving comments and appendices contain nothing more than misleading and unsubstantiated assertions concerning the ability of the LMDS to operate in the 41 GHz band.[5] The CVNY Paper does not, for example, provide one citation to support its technical and economic

[5] See LMDS is Not Viable in the Frequency Bands Above 40 GHz, (Jan. 30, 1995) ("CVNY Paper") and Bossard, Spectrum Allocation Consideration, (Jan. 30, 1995) ("Bossard Paper").

arguments. In its comments, CVNY has extrapolated selective performance data in an inaccurate manner in an attempt to justify otherwise insupportable conclusions. A review of the CVNY comments and associated papers indicates that the conclusions are erroneous and insupportable. See LMDS Feasibility Report, at 1.

1. CVNY Inaccurately Represents the Technical and Economic Effect of Providing LMDS at the 41 GHz Band Instead of the Ka Band

The analysis to support CVNY's claim that "[o]peration of the LMDS system above 40 GHz results in a direct increase [of] system cost by a factor of thirty to forty..." is grossly misleading. CVNY Paper, at 4. Contrary to CVNY's claim, the initial price differential to deploy an LMDS system at the 41 GHz band versus the Ka band is nominal and will disappear over time. LMDS Feasibility Report, at 3.

First, CVNY's comparison of link budgets for deployment of LMDS at 41 GHz versus the Ka band is based on substantially different assumptions. As demonstrated in Figure 1 below, the CVNY link budget assumes three differences in system architecture between an LMDS system at 41 GHz versus the Ka band. Specifically, CVNY assumes that the transmit power, the transmit antenna coverage and receive antenna diameter will be substantially different for a 41 GHz LMDS system than for a Ka band system. See CVNY Paper, at 5, Table 1.

FIGURE 1

System Parameter	Ka Band	41 GHz Band
Transmit Power for 50 Channels	20 Watts	9 Watts
Transmit Antenna Coverage	5° elevation coverage	6.3° elevation coverage
Receive Antenna Diameter	7.5"	5.5"

Source: CVNY Paper, at 5, Table 1.

The differences in system architecture between Ka band and 41 GHz band LMDS systems incorporated into CVNY's link budget analysis collectively penalizes the 41 GHz band LMDS system by 7.5 dB. LMDS Feasibility Report, at 4. Based on CVNY's link analysis, a 41 GHz LMDS system can only operate with 1.15 mile radius cells as opposed to 3 mile radius cells at the Ka band. Id. This erroneous prediction is the sole basis for CVNY's conclusion that 7.3 times more cells are required for a 41 GHz band LMDS operation then for a Ka band operation. CVNY Paper, at 6.

When a true apples-to-apples comparison is employed, a 41 GHz band LMDS system operating in New York City with the same technical system parameters as those in the Ka band provides a level of availability of 99.75%. LMDS Report, at 4; LMDS Feasibility Report, at 4. In other words, a 99.75% level of system availability can be provided with a 41 GHz band LMDS system using the same hub antenna coverage, transmit power, cell size and subscriber antenna diameters as is presently proposed by CVNY for its LMDS system at the Ka band. Id. A 99.75% availability level is a higher standard of availability than the

standard currently employed for the commercially successful direct broadcast satellite ("DBS") industry and the standard adopted for Europe's LMDS-type system. Id. Hence, when the relevant comparison is made between Ka band and 41 GHz LMDS systems using the same system parameters, it is clear that a technically viable LMDS system can be deployed at the 41 GHz band using exactly the same number of cells as a system operating at the Ka band.

CVNY also attempts to mislead the FCC by arguing that 41 GHz band LMDS transmission equipment will cost double that of Ka band transmission equipment. CVNY Paper, at 6-7. CVNY's claim about the cost of 41 GHz band LMDS equipment is unsubstantiated. In fact, CVNY's contention is contradicted by Endgate, a prospective manufacturer of Ka band LMDS equipment who has advised the FCC that the cost differences between 41 GHz band and Ka band LMDS transmission and receiving equipment are slight and insignificant. According to Endgate:

> Opening the 40 GHz band would result in slightly higher-cost millimeter wave equipment (as compared to 28 GHz equipment)...Initially this will result in 40 GHz transmit and receive equipment on the order of 15% to 20% more expensive than equivalent 28 GHz equipment. Over a period of time this price differential will become insignificant in much the same way as the price differential between C-band and Ku-band systems has declined.

Endgate Comments, at 2.

The critical question in any relevant cost analysis is not the difference in the costs of various hub transmitter components but the difference in the total cost of the LMDS hub transmitter station. LMDS Feasibility Report, at 5. Teledesic's review indicates that there will be no difference in the cost of any of the equipment for the LMDS hub transmitter station except for the 41 GHz transmitter itself. Thus, the modulators, IF equipment, encoders, power supplies, equipment racks, site cost, and equipment required for the hub

transmitter station will be the same for 41 GHz band and Ka band LMDS hub transmitter stations. Id. at 5-6. In evaluating the difference in the total cost of the hub transmitter station under a worst case scenario, Teledesic assumes that the 41 GHz transmitter will account for 10 percent of the total hub transmitter station cost and will use CVNY's unsubstantiated estimate of a 100 percent cost increase for a 41 GHz transmitter. Even under this worse case scenario, the total transmitter station cost would increase by only 10 percent. Id. at 6. Using Endgate's more realistic estimate of a 15 percent to 20 percent increase in cost for the 41 GHz transmitter, there would be an initial total cost increase of only 2 percent for the hub transmitter station. While such an increase clearly is de minimis, even this slight 2 percent increase in cost will disappear over time. Endgate Comments, at 2.

CVNY also attempts to mislead the Commission when discussing the cost of LMDS subscriber receiver units at the 41 GHz band by summarily asserting that a 41 GHz band subscriber unit will cost 75 percent to 100 percent more than a Ka band receiver. CVNY Paper, at 8. By focusing only on the cost of the receiver, CVNY has ignored the relevant comparison -- the difference in the total cost of the subscriber receiver unit. LMDS Feasibility Report, at 6. The cost of only a few of the receiver unit components, specifically the antenna and the low-noise block converter, are impacted when changing from Ka band to 41 GHz band LMDS operation. The IF, demodulators, decoders, power supply, case and user interface are the same for LMDS receiver units at both the Ka and the 41 GHz band. Id. Therefore, any increase in the cost of a 41 GHz subscriber receiver unit will be nominal. Id. Again, using Endgate's more realistic numbers will result in a slight increase (2-3 percent) in the cost of user equipment, which will decrease to 0 percent over time.

2. The European Experience Demonstrates that Operation of LMDS at the 41 GHz Band is Technically and Economically Equivalent to Operation of a Ka Band LMDS System

CVNY alleges that although bands above 40 GHz have been authorized for years in Europe for services similar to LMDS, there is no such system currently operating. CVNY Paper, at 12. This argument is misleading because the relevant issue is not when a new service was allocated spectrum but whether the operation of a system in that band is technically and economically achievable. LMDS Feasibility Report, at 7. Over the past few years a tremendous engineering effort has been devoted to the design of a system at the 41 GHz band for a LMDS-type service in Europe referred to as Multipoint Video Distribution System ("MVDS"). Substantial resources have been devoted to performing propagation experiments and developing specific hardware components for MVDS systems. As a result of this effort and the accompanying financial investment, MVDS in the 41 GHz band will be implemented soon in the United Kingdom. Id. at 8. The specification for analog MVDS was completed in September of 1993 and the United Kingdom has licensed Eurobell to deploy and operate a MVDS system in Kent, England. Id. Large equipment manufacturers, such as Phillips Microwave, a major investor in CVNY, continue to invest in improving their existing hardware for MVDS operation in the 41 GHz band and are actively pursuing system implementations. Id. As a result of these engineering efforts, equipment is now available in the United Kingdom which makes the implementation of an LMDS system economically feasible at the 41 GHz band. Id.

Contrary to CVNY's unsubstantiated claim, the planned architecture and specifications for a 41 GHz LMDS system in Europe will not have any adverse technical impact on

CVNY's ability to be an effective broadband cable competitor in the United States. The attenuation due to rain in Europe is roughly the same as in most areas of the United States at the same level of availability. CVNY Paper, at 12. Thus, the LMDS systems designed for operation in Europe at 41 GHz can be employed in most areas of the United States without adversely affecting the level of availability. LMDS Feasibility Report, at 7-8. Except for a small part of the southeastern portion of the United States, the rain margin allocated to MVDS in Europe is comparable to the rain margin required in the United States at the same level of availability. The confusion in the CVNY analysis arises from the fact that CVNY compares the rain rates in Europe for 99.70% availability with the rain rates in the United States for 99.90% availability. In the United States, a 99.75% level of availability is readily achievable at the 41 GHz band for LMDS without the need to modify the system parameters proposed by CVNY. Id. at 7-9; LMDS Report, at 3-4.

To attempt to support its attack on the utility of MVDS in Europe, CVNY selectively quotes from and mischaracterizes the report of the 40 GHz MVDS Working Group. 40 GHz MVDS Working Group, Multipoint Video Distribution Systems, (1993) ("MVDS Report") (attached hereto as Appendix B). CVNY's reliance on the MVDS Report to attempt to support its claim that two way interactive LMDS is not feasible in the 41 GHz band is misplaced. CVNY Paper, at 14. According to discussions between Teledesic and the 40 GHz MVDS Working Group, the 40 GHz MVDS Working Group initially did not address in detail the design of a back channel because the specification was for a one-way analog MVDS system. Since the publication of the specification for analog MVDS in Europe, the 40 GHz MVDS Working Group has reconvened to address the requirements for a specification for a

digital MVDS system with an interactive back-channel. Values of between 64 kBits/s and 128 kBits/s are being considered by the 40 GHz MVDS Working Group for the back channel to allow for interactive MVDS and telephony. The initial guidelines for analog MVDS equipment specified by the 40 GHz MVDS Working Group was based on state of the art technology in 1991. Id. As a result of recent advancements in technology, the performance of 41 GHz band LMDS components has improved considerably. For example, the transmitter power guideline of 200 mW per channel specified by the 40 GHz MVDS Working Group and criticized by CVNY as inadequate for LMDS is based on solid state and traveling wave tube technology in 1991. Id. While the 200 mW per channel estimate is a value that is achievable and economical today, by 1996 it is estimated that powers of up to 1W per channel are likely to be achievable with 41 GHz transmitters using pseudo-morphic HEMT devices. Id. Similarly, advances in technology have enabled the 9 dB receiver noise figure considered excessive by CVNY to be reduced to 5 dB with the use of pseudo-morphic HEMT low noise preamplifiers. Id. at 10-11.

Ongoing work conducted by the 40 GHz MVDS Working Group also dispels any concerns raised by CVNY regarding limits on frequency reuse for LMDS at the 41 GHz band. CVNY Paper, at 13. The 40 GHz MVDS Working Group suggests that at a rain rate of 25 mm/h, the rain-induced cross-polarization discrimination would be of the order of 25 dB for a 5 km path. MVDS Report, at 6. Thus, polarization discrimination enables a 41 GHz MVDS system to use the same spectrum in adjacent cell without causing interference. Therefore, contrary to CVNY's contention, rain induced cross-polarization discrimination is not expected to pose an impedient for adjacent cell frequency reuse at 41 GHz. LMDS Feasibility Report,

at 11. Teledesic's analysis indicates that frequency reuse for LMDS at the 41 GHz band should be comparable to frequency reuse at the Ka band.

CVNY once again mischaracterizes the facts with respect to the channel spacing employed for MVDS because the propagation characteristics in the 41 GHz band was not a factor in the selection of the channel spacing for MVDS. CVNY Paper, at 14. The specification adopted by the 40 GHz MVDS Working Group for channel spacing is MPT 1550 and was selected for a reason unrelated to propagation losses in the 41 GHz band. LMDS Feasibility Report, at 11. The MVDS specification was adopted to conform with the channel spacing for existing indoor satellite direct-to-home ("DTH") broadcast service receiver units in order to allow consumers to use the same receiver equipment for both MVDS and satellite DTH. MVDS Report, at 11. In this way, a low cost readily available indoor receiver unit would be available for MVDS. Id. at 11-12. The channel spacing, which is the same as DTH, defines the co-polar channel spacing at 29.5 MHz, interleaved with cross-polar channels from the other channel groups to be used in adjacent service areas at 14.75 MHz, with the channel bandwidth set at 26 MHz. Id. at 12.

Since adoption of the specification for analog MVDS, substantial progress has been made in the development of digital compression techniques. LMDS Feasibility Report, at 12. Thus, digital MVDS systems that will be deployed in Europe over the next several years will employ highly efficient channel spacing. It is expected that the majority of direct broadcast satellite and cable television services will adopt the MPEG-2 digital format within the next two years. MVDS Report, at 3. The 40 GHz MVDS Working Group is currently developing the specification for such a digital system. One approach being considered by the 40 GHz

MVDS Working Group is to treat each analog FM channel as a broadband multiplexed datastream. Typical MPEG-2 compression results in data rates of between 2 MBits/s and 6 MBits/s for typical entertainment channels. Id. Hence, 24 MBits/s of data can include from 4 to 12 channels of programming. Id. Transmitting this data using the 29.5 MHz channel spacing results in a total of 128 (4x32) to 384 (12x32) program channels, using 2 GHz of spectrum which can be divided between different service providers. In analyzing a digital specification for MVDS, the 40 GHz MVDS Working Group realizes that an FM MVDS system represents outdated technology and that future systems will be designed to employ spectrum more efficiently through digital techniques.

Teledesic has established that CVNY's proposed LMDS system can be deployed in the 41 GHz band at a level of availability consistent with accepted industry standards. However, there is no basis to accept CVNY's outmoded analog system architecture as the standard by which the technical and economic feasibility of LMDS is to be evaluated. Because LMDS in the 41 GHz band will not necessarily mirror CVNY's outdated, inefficient analog system architecture, such a system design should not dictate FCC action on the use of the 41 GHz band for LMDS. There is nothing inherent in the 41 GHz band that precludes technically and economically feasible LMDS operations in that band. The nominal difference in the cost to deploy LMDS at the 41 GHz band versus the Ka band is more a function of the LMDS system architecture than the difference in the cost for system implementation between the two bands.

III. CONCLUSION

The Ka band is the only band internationally allocated to the FSS that presently can accommodate global, interactive broadband satellite systems. The commercial satellite industry in one where the United States enjoys clear global leadership. Authorizing an incompatible terrestrial service like LMDS in the Ka band would curtail the development of innovative global broadband satellite systems in which the United States enjoys a clear leadership position. Moreover, the redesignation of a portion of the Ka band to LMDS would be unwise as a matter of spectrum management policy not only because such action would render the Ka band unusable for FSS uplinks but also because such action would render unusable the companion spectrum at 17.7 - 19.7 GHz allocated for FSS downlinks.

The United States should preserve the use of the Ka band for global, interactive broadband satellite systems in order to conform with the international table of allocations. In addition, the FCC should maintain consistency with the international table and bring the United States into conformance with actions in Europe by redesignating the 41 GHz band to LMDS. LMDS provides just another redundant broadcast television service to areas of high subscriber density that already have a number of service options. LMDS should not be authorized in a manner that will preclude the deployment in the Ka band of global, interactive broadband satellite systems, which are an essential element to realize the United States' vision

for a NII/GII where access to advanced information services will be available to all members of society.

Respectfully Submitted,

TELEDESIC CORPORATION

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March 1, 1995

CERTIFICATE OF SERVICE

I, Eileen O'Hara, an employee of Akin, Gump, Strauss, Hauer & Feld, L.L.P., certify that copies of the foregoing **REPLY COMMENTS OF THE TELEDESIC CORPORATION** were sent via First Class Mail or by Hand Delivery on this 1st day of March, 1995, to the following parties:

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