No. 25-1792

IN THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

LIGADO NETWORKS LLC,

Plaintiff-Appellee,

v.

UNITED STATES,

Defendant-Appellant.

On appeal from the United States Court of Federal Claims
(Edward J. Damich, Judge)

BRIEF OF *AMICUS CURIAE* DENNIS ROBERSON IN SUPPORT OF PLAINTIFF-APPELLEE
(Filed With the Parties' Consent)

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October 6, 2025

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

CERTIFICATE OF INTEREST

Case Number 25-1792

Short Case Caption Ligado Networks LLC v. United States

Filing Party/Entity Amicus Curiae Dennis Roberson

Instructions:

1. Complete each section of the form and select none or N/A if appropriate.
2. Please enter only one item per box; attach additional pages as needed, and check the box to indicate such pages are attached.
3. In answering Sections 2 and 3, be specific as to which represented entities the answers apply; lack of specificity may result in non-compliance.
4. Please do not duplicate entries within Section 5.
5. Counsel must file an amended Certificate of Interest within seven days after any information on this form changes. Fed. Cir. R. 47.4(c).

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

Date: 10/06/2025

Signature: /s/ John R. Grimm

Name: John R. Grimm

1. Represented Entities. Fed. Cir. R. 47.4(a)(1).	**2. Real Party in Interest.** Fed. Cir. R. 47.4(a)(2).	**3. Parent Corporations and Stockholders.** Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities. ☑ None/Not Applicable	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities. ☑ None/Not Applicable
Dennis Roberson		

☐ Additional pages attached

4. Legal Representatives. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

☑ None/Not Applicable ☐ Additional pages attached

5. Related Cases. Other than the originating case(s) for this case, are there related or prior cases that meet the criteria under Fed. Cir. R. 47.5(a)?

☐ Yes (file separate notice; see below) ☐ No ☑ N/A (amicus/movant)

If yes, concurrently file a separate Notice of Related Case Information that complies with Fed. Cir. R. 47.5(b). **Please do not duplicate information.** This separate Notice must only be filed with the first Certificate of Interest or, subsequently, if information changes during the pendency of the appeal. Fed. Cir. R. 47.5(b).

6. Organizational Victims and Bankruptcy Cases. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

☑ None/Not Applicable ☐ Additional pages attached

TABLE OF CONTENTS

Page

Table of Authorities ii

Statement of Interest of *Amicus* 1

Introduction 3

Argument 4

I. Electromagnetic Waves Have Physical Properties and Interact Physically With Matter. 4

A. Electromagnetic Radiation Travels in Waves, Whose Frequency Determines the Wave's Properties. 5

B. Radio Waves Interact Physically With Their Environment and Can Be Affected by Other Radio Waves. 7

C. Radio Communications Are Susceptible to Interference. 9

II. FCC Licenses Prevent Interference From Rendering Wireless Communications Useless. 10

Conclusion 13

Certificate of Compliance 14

Certificate of Service 15

TABLE OF AUTHORITIES

Cases **Page**

Free Access & Broadcasting Telemedia, LLC v. FCC,
865 F.3d 615 (D.C. Cir. 2017) 12

Northstar Wireless, LLC v. FCC,
38 F.4th 190 (D.C. Cir. 2022) 11

Red Lion Broadcasting Co. v. FCC,
395 U.S. 367 (1969) 11

Statutes

Communications Act of 1934, 47 U.S.C. § 301 12

Regulations

47 C.F.R. § 2.106 12

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Jerry Kang et al., *Communications Law and Policy, Cases and Materials* (2024) 4

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Electromagnetic Spectrum—Definition and Explanation, *Science Notes*, https://sciencenotes.org/electromagnetic-spectrum-definition-and-explanation/ 6

STATEMENT OF INTEREST OF *AMICUS*

Amicus Curiae Dennis A. Roberson is President and CEO of Roberson and Associates, a Technology and Management Consultancy with expertise in wireless technology with a particular focus on spectrum management and related issues, telecommunications policy, and FCC regulatory processes. Mr. Roberson was a professor for twenty years at Illinois Institute of Technology serving as its Vice Provost for Research, as an educator teaching wireless communications-oriented classes, and as an active researcher through the wireless and network communications research center that he co-founded and co-directed.

Prior to his academic career, Mr. Roberson was the Executive Vice President and Chief Technology Officer at Motorola and served in a variety of technical leadership and management roles at AT&T, DEC, IBM and NCR. Mr. Roberson served on FCC Technological Advisory Council for twenty-two years, including as its Chairman for the final eight years. He has served for well over a decade on the Department of Commerce's Commerce Spectrum Management Advisory Committee. Mr. Roberson has twenty-two issued patents and is also a published author with numerous journal articles, conference and workshop papers, blogs,

book chapters and the recently released book *The End of Telecoms History*.

Mr. Roberson has a strong interest in assisting this Court in accurately understanding the technical characteristics of electromagnetic spectrum.

No party's counsel authored this brief in whole or in part, or contributed money that was intended to fund preparing or submitting this brief.

Money intended to fund the preparation and submission of this brief will be contributed by two ad hoc groups of Ligado's investors: the Ad Hoc Crossholder Group and the Ad Hoc First Lien Group, represented in Ligado's consolidated Chapter 11 cases, *In re Ligado Networks LLC, et al.,* No. 25-10006 (TMH), in the United States Bankruptcy Court for the District of Delaware. The full lists of entities comprising those groups are found in the groups' Verified Statements filed in that matter (Docket Nos. 113 and 172), which are attached, in relevant part, to this brief as Appendix A and Appendix B

Both the Government and Ligado Networks LLC have consented to the filing of this brief.

INTRODUCTION

At the heart of this case is Ligado Networks LLC's ("Ligado") FCC license. In simple terms, a license from the FCC is permission to use a specific frequency of electromagnetic spectrum. Ligado's particular license is exclusive, meaning it is the only party authorized by the FCC to use the covered spectrum. Spectrum can seem ethereal. (In fact, that word is no coincidence: For a long time, scientists believed that light waves were vibrations of a theoretical substance called "ether.") But the effects of electromagnetic waves—including their usefulness, and the *limitations* on their usefulness, for modern communications—involve real, physical interaction with matter.

Because of the physical characteristics of electromagnetic waves, proper management of spectrum is necessary so that different uses of spectrum do not interfere with one another, undermining the effectiveness of wireless communications as a whole. Unlike wired communications, where each signal can have its own wire, radio waves all compete for space in the same air. Indeed, a hundred years ago, interference from chaotic spectrum use threatened to render wireless communications unusable, and the modern FCC was created in part to ensure that did not happen. A technical understanding of the properties

of electromagnetic radiation can be useful when examining how such interference might occur, and what its consequences might be.

ARGUMENT

I. ELECTROMAGNETIC WAVES HAVE PHYSICAL PROPERTIES AND INTERACT PHYSICALLY WITH MATTER.

The electromagnetic spectrum is the full range of naturally occurring electromagnetic radiation, organized by frequency or wavelength. It is a physical, definable, and, with the proper equipment, observable and measurable phenomenon. In scientific terms, electromagnetic radiation is the "self-sustaining oscillation of perpendicular electric and magnetic fields, which propagate through empty space at the speed of light." Jerry Kang et al., *Communications Law and Policy, Cases and Materials* 4 (2024). And while this definition may sound exotic, examples of electromagnetic radiation are deeply familiar in everyday life. Its major categories include:

1. **Radio waves**—The lowest-energy waves, used for radio, TV, public safety and industrial radios, and cellphones.
2. **Microwaves**—Used for heating food in homes, in industrial environments, and for point-to-point cellphone communications. Most radars are also in this band.
3. **Infrared radiation**—Used for television remote controls and radiating heaters.

4. **Visible light**—The narrow portion of electromagnetic radiation human eyes can see.

5. **Ultraviolet radiation**—Used to sterilize surfaces, and in industrial processing, and responsible for sunburns.

6. **X-rays**—Used in medical and industrial examinations.

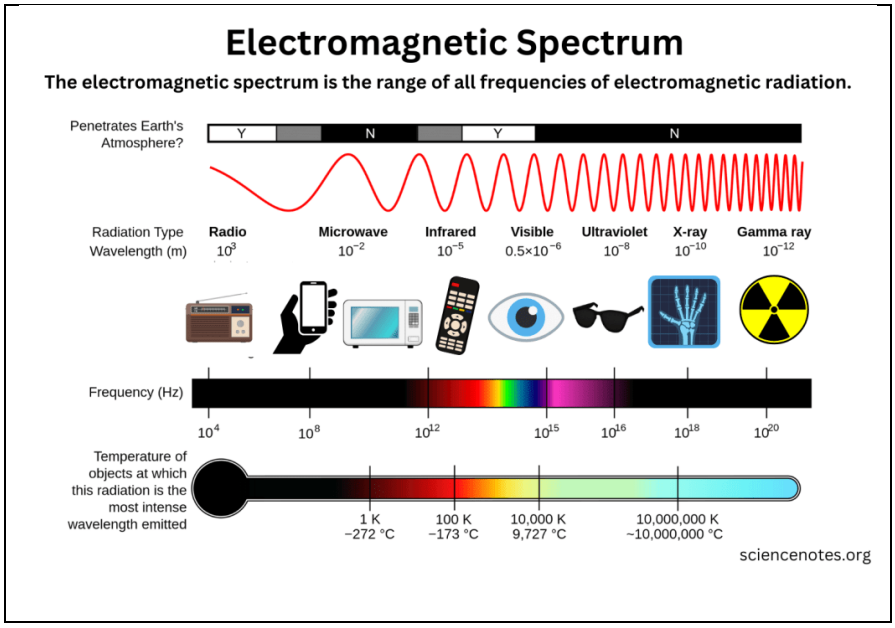
7. **Gamma rays**—The highest-energy waves, used in cancer treatment.

A. Electromagnetic Radiation Travels in Waves, Whose Frequency Determines the Wave's Properties.

Electromagnetic radiation propagates in waves that can be mathematically defined as a sine function. Two important attributes of an electromagnetic wave are its amplitude and its frequency. *Amplitude* can be thought of as the strength of the wave, and *frequency* defines many of the wave's properties: When we think of different kinds of waves—whether visible light, radio, X-rays, etc.—we are thinking of different frequencies.

A wave's frequency is the number of cycles the electric field makes per second, and is measured in cycles per second, or "hertz" (Hz.) A standard FM radio signal, for example, has a frequency of 100 *megahertz* (100 MHz), meaning it oscillates 100 million times per second. A wave can equally be described by its *wavelength*, which is the physical distance the wave traverses in a single cycle. Because the speed of a wave is its

wavelength times its frequency (*i.e.*, the distance it covers per cycle times the number of cycles per second tells you how far it travels per second), and because all electromagnetic waves travel at the speed of light, which is constant, wavelength is inversely related to frequency: Higher-frequency waves have smaller wavelengths. A wave's energy is also related to frequency, with higher-frequency (or shorter-wavelength) waves carrying more energy. Each of the different types of electromagnetic waves corresponds to a range of frequencies laid out along a continuum, illustrated in the figure below.[1]



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[1] *See Electromagnetic Spectrum—Definition and Explanation*, *Science Notes*, https://sciencenotes.org/electromagnetic-spectrum-definition-and-explanation/ (last visited October 6, 2025). *See also* Kang et al., at 7.

B. Radio Waves Interact Physically With Their Environment and Can Be Affected by Other Radio Waves.

Electromagnetic radiation interacts with its environment. This interaction makes wireless communications possible, but also leads to the risk of interference.

The physical nature of electromagnetic radiation is evident when ultraviolet waves cause a sunburn or microwaves heat a meal, but it is equally true—if less readily apparent—when radio waves transmit data. Radio signals are generated by applying voltage at a desired frequency to an antenna, which emits radio waves at that frequency; when those waves reach the recipient, they induce a corresponding voltage in the receiving antenna. So even though radio waves cannot be seen or felt, wireless communications are the result of measurable, physical phenomena: For a cell phone to receive a call, radio waves have to first traverse the physical space between the cell tower and the handset, and then travel close enough to the phone that they are able to excite the electrons within the atoms making up the phone's antenna.

Electromagnetic waves propagate differently depending on their frequency, making some frequencies more useful for certain purposes

than others. Their usefulness as a communications tool can depend on how they travel through the atmosphere, their ability to penetrate obstacles (*e.g.*, the walls of buildings), or how they are absorbed (*e.g.*, some frequencies are absorbed by water and therefore are not useful for communications in a rain storm) or reflected (as opposed to passing through a surface that is encountered).

Lower frequencies (longer wavelengths) travel farther and pass through obstacles but deliver lower data rates, which is why they are good for broadcast radio and television. Very low-frequency signals interact with the Earth's atmosphere in often unpredictable ways. Higher frequencies, in contrast provide greater bandwidth (data-carrying capacity) but are attenuated—meaning they dissipate to the point that their signals cannot be received—more rapidly, and they can be absorbed and blocked by obstacles, including weather (*e.g.*, water vapor in clouds). Higher frequencies therefore require more power and/or denser infrastructure (*e.g.*, more cell towers on a smaller grid) to be usefully

deployed.[2] Some spectrum bands are also "cleaner" in terms of either natural or human-generated interference and noise.

C. Radio Communications Are Susceptible to Interference.

All of these physical properties mean that radio communications are subject to interference from other communications on the same or nearby frequencies. While you can always add more wires to a wireline communication system, wireless communications must all share the same medium: the air and structures between the broadcaster and receiver. And unlike an electrical wire which is usually wrapped in insulation, there is nothing in the air to prevent two signals on the same frequency from interfering with one another. Radio interference can occur when one user broadcasts on the same frequency as another, but it can also happen when a user broadcasts on an *adjacent* frequency.

Interference can be understood by imagining a radio receiver as a person trying to follow a conversation. When two people are talking at the same time, it is difficult to understand what either is saying. (This is

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[2] For an additional description of the different propagation behaviors of various frequencies, see Jonathan E. Nuechterlein & Philip J. Weiser, *Digital Crossroads: Telecommunications Law and Policy in the Internet Age* 90–91 (2013).

called "in-band interference.") Similarly, if you are standing near a loud piece of machinery like a jet engine, you will not be able to understand what someone next to you is saying, even though the sound of the jet is generally very different from the sound of a human voice. (This is called "out-of-band interference.") Radio interference works the same way: When multiple signals exist at the same power level on the same frequency, the receiver cannot tell them apart and the message is lost. Similarly, a powerful enough transmission will "drown out" a signal on a nearby frequency like a jet engine drowning out a nearby interlocutor.

Thus, because wireless communications depend on the physical interactions of electromagnetic waves and are subject to physical constraints, spectrum is a finite resource that must be properly managed to remain useable.

II. FCC LICENSES PREVENT INTERFERENCE FROM RENDERING WIRELESS COMMUNICATIONS USELESS.

Because not all frequencies are equally useable for all purposes, and because one person's use of a frequency can interfere with another's, there is a limited amount of "space" for users in a given frequency band. Consequently, interference has the potential to render the airwaves

useless,[3] and the FCC was created in part to prevent that from happening.

As the Supreme Court has explained,

> Before 1927, the allocation of [radio] frequencies was left entirely to the private sector, and the result was chaos. It quickly became apparent that broadcast frequencies constituted a scarce resource whose use could be regulated and rationalized only by the Government. Without government control, the medium would be of little use because of the cacophony of competing voices, none of which could be clearly and predictably heard.

Red Lion Broadcasting Co. v. FCC, 395 U.S. 367, 375–76 (1969). It was in direct response to the need to regulate this "cacophony of competing voices" that Congress established the Federal Radio Commission—the predecessor to the FCC. *Id.* at 376–77.

The FCC is charged with "regulating all the channels of radio transmission—that is, the electromagnetic spectrum used to send and receive wireless data." *Northstar Wireless, LLC v. FCC*, 38 F.4th 190, 197 (D.C. Cir. 2022) (quotation marks omitted). No one may "use or operate

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[3] For a further description the harms caused by radio interference, see Mark A. McHenry, Dennis Roberson, and Robert J. Matheson, *Phone to Fridge: Shut Up! Our Hyperconnected World Needs Better Protection Against Electronic Noise*, 52 IEEE Spectrum 50 (2015), *available at* https://ieeexplore.ieee.org/document/7226614

any apparatus for the transmission of energy or communications or signals by radio" except in accordance with the Communications Act of 1934, 47 U.S.C. § 301, which in general means with an FCC license. An FCC license "is simply that—permission to use the spectrum at a particular frequency, geographical area, and power level." Kang et al., at 56. Holding a license allows someone to "use spectrum to transmit content such as phone calls and videos." *Northstar Wireless*, 38 F.4th at 197.

One of the ways the FCC protects against interference is to divide up the radio spectrum into different frequency-based "bands," which are allocated for various purposes, and a particular band can only be used for an allocated purpose. *See* 47 C.F.R. § 2.106 (table of frequency allocations). Another is to establish "guard bands" (also called "white spaces") which are unused portions of spectrum between adjacent spectrum assignments. *See* 47 U.S.C. § 1454 (authorizing FCC to create guard bands); *Free Access & Broadcasting Telemedia, LLC v. FCC*, 865 F.3d 615, 616–17 (D.C. Cir. 2017) (discussing guard bands). The use of guard bands is particularly important because, as shown above,

interference can occur not only from operations on the same frequencies but from activity on adjacent frequencies.

* * *

By carefully portioning access to frequency bands and keeping adjacent areas of spectrum clear, FCC licenses ensure that radio communications do not revert to their chaotic state a century ago. The ruling below—denying the Government's motion to dismiss Ligado's takings claim—correctly appreciated that harmful interference on frequencies within, or adjacent to, those covered by an FCC license jeopardizes the utility of the license.

CONCLUSION

The Court should affirm the Court of Federal Claims.

October 6, 2025

Respectfully submitted,

/s/ *John R. Grimm*

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CERTIFICATE OF COMPLIANCE

This document complies with the type-volume limit of Fed. R. App. P. 32(a)(7)(B) because, excluding the parts of the document exempted by Fed. R. App. P. 32(f) and Federal Circuit Rule 32(b), it contains 2,287 words.

This document complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6) because it was prepared in a proportionally spaced typeface using Microsoft Word for Office 365 in 14-point Century Schoolbook.

/s/ *John R. Grimm*
John R. Grimm

CERTIFICATE OF SERVICE

I certify that on October 6, 2025, the foregoing document was filed via the Case Management/Electronic Case Filing (CM/ECF) system and thereby served on all parties entitled to service.

/s/ *John R. Grimm*
John R. Grimm

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **CERBERUS CAPITAL MANAGEMENT L.P.**, or a subsidiary or an affiliate thereof	
Address: 875 Third Avenue 10th Floor New York, NY 10022	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$670,054,025.00
First Lien First Out Term Loans (if any)	$57,598,745.01
First Lien Senior Pari Term Loans (if any)	$33,716,156.19
1.5L Term Loans (if any)	$67,348,438.73
Second Lien Notes (if any)	$344,523,195.00
Existing Series A-0 Preferred Units (if any)	6,492,659.79
Existing Series A-1 Preferred Units (if any)	61,876.64
Existing Series A-2 Preferred Units (if any)	5,457,774.87
Existing Series B Preferred Units (if any)	3,235,019.70
Existing Series C Preferred Units (if any)	50,574.00
Existing Series A Common Units (if any)	810,000.00
Existing Series B Common Units (if any)	

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **FORTRESS CREDIT ADVISORS LLC**, or a subsidiary or an affiliate thereof	
Address: 1345 Avenue of the Americas 16th Floor New York, NY 10105	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$482,483,164.00
First Lien First Out Term Loans (if any)	$45,753,241.40
First Lien Senior Pari Term Loans (if any)	$33,716,156.21
1.5L Term Loans (if any)	$198,605,733.84
Second Lien Notes (if any)	$492,044,057.00
Existing Series A-0 Preferred Units (if any)	6,600,400.12
Existing Series A-1 Preferred Units (if any)	61,094.00
Existing Series A-2 Preferred Units (if any)	5,424,786.12
Existing Series B Preferred Units (if any)	10,481,463.82
Existing Series C Preferred Units (if any)	8,703,976.62
Existing Series A Common Units (if any)	2,620,000.00
Existing Series B Common Units (if any)	

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **HUDSON BAY CAPITAL MANAGEMENT LP**, or a subsidiary or an affiliate thereof	
Address: 290 Harbor Drive 3rd Floor Stamford, CT 06902	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$221,555,512.00
First Lien First Out Term Loans (if any)	$27,791,573.00
First Lien Senior Pari Term Loans (if any)	$5,927,882.00
1.5L Term Loans (if any)	$5,627,326.00
Second Lien Notes (if any)	$91,902,662.00
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Existing Series A-1 Preferred Units (if any)	
Existing Series A-2 Preferred Units (if any)	
Existing Series B Preferred Units (if any)	
Existing Series C Preferred Units (if any)	
Existing Series A Common Units (if any)	
Existing Series B Common Units (if any)	

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **RUBRIC CAPITAL MANAGEMENT LP**, or a subsidiary or an affiliate thereof	
Address: 155 East 44th Street Suite 1630 New York, NY 10017	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$217,962,477.00
First Lien First Out Term Loans (if any)	$10,752,690.80
First Lien Senior Pari Term Loans (if any)	$6,372,473.17
1.5L Term Loans (if any)	$50,779,030.87
Second Lien Notes (if any)	$68,139,193.00
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Existing Series A-2 Preferred Units (if any)	
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Existing Series C Preferred Units (if any)	
Existing Series A Common Units (if any)	
Existing Series B Common Units (if any)	

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **BLACKROCK FINANCIAL MANAGEMENT, INC**, or a subsidiary or an affiliate thereof[3]	
Address: 50 Hudson Yards New York, NY 10001	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$148,288,040.00
First Lien First Out Term Loans (if any)	$18,337,874.31
First Lien Senior Pari Term Loans (if any)	$14,819,705.14
1.5L Term Loans (if any)	$21,807,025.04
Second Lien Notes (if any)	$113,123,768.00
Existing Series A-0 Preferred Units (if any)	520,563.41
Existing Series A-1 Preferred Units (if any)	22,748.00
Existing Series A-2 Preferred Units (if any)	962,152.36
Existing Series B Preferred Units (if any)	
Existing Series C Preferred Units (if any)	
Existing Series A Common Units (if any)	
Existing Series B Common Units (if any)	

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **MSD PARTNERS, L.P.**, or a subsidiary or an affiliate thereof	
Address: One Vanderbilt 26th Floor New York, NY 10017	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$77,322,786.00
First Lien First Out Term Loans (if any)	$5,872,285.51
First Lien Senior Pari Term Loans (if any)	$3,641,413.26
1.5L Term Loans (if any)	$7,562,600.99
Second Lien Notes (if any)	$50,208,084.00
Existing Series A-0 Preferred Units (if any)	438,072.15
Existing Series A-1 Preferred Units (if any)	1,367,952.88
Existing Series A-2 Preferred Units (if any)	
Existing Series B Preferred Units (if any)	
Existing Series C Preferred Units (if any)	
Existing Series A Common Units (if any)	
Existing Series B Common Units (if any)	

[3] Certain other funds and accounts managed or advised by affiliates of BlackRock Financial Management, Inc. may hold equity or debt in the Debtors. Any such funds and accounts are not members of the Ad Hoc Cross-Holder Group represented by Kirkland and Cole Schotz.

Certain funds and/or accounts, or subsidiaries of such funds and/or accounts, managed, advised or controlled by **PHILOSOPHY CAPITAL MANAGEMENT LLC**, or a subsidiary or an affiliate thereof	
Address: 3201 Danville Boulevard Suite 100 Alamo, CA 94507	
Nature and Amount of Disclosable Economic Interests:	
First Lien Notes (if any)	$19,000,000.00
First Lien First Out Term Loans (if any)	
First Lien Senior Pari Term Loans (if any)	
1.5L Term Loans (if any)	
Second Lien Notes (if any)	
Existing Series A-0 Preferred Units (if any)	
Existing Series A-1 Preferred Units (if any)	
Existing Series A-2 Preferred Units (if any)	
Existing Series B Preferred Units (if any)	
Existing Series C Preferred Units (if any)	
Existing Series A Common Units (if any)	
Existing Series B Common Units (if any)	

Exhibit A

Names, Addresses, and Disclosable Economics Interests of the Members of the Ad Hoc First Lien Group

Fund Manager	Address	Aggregate Principal Amount of First Lien Notes	Aggregate Principal Amount of First Lien First Out Term Loans	Aggregate Principal Amount of First Lien Senior Pari Term Loans	Aggregate Principal Amount of 1.5 Lien Term Loans	Aggregate Principal Amount of Second Lien Notes	Aggregate Equity Interests (Warrants)
Apollo	9 West 57th Street, 41st Floor, New York, NY 10019	$298,181,642	$24,656,530	–	–	–	–
Avenue	11 W 42nd Street, 9th Floor, New York, NY 10036	58,337,968	4,882,640	–	–	–	–
Bardin Hill	299 Park Avenue, 24th Floor, New York, NY 10171	37,673,804	–	–	1,791,509	–	–
Bank of America	100 North Tryon Street, Charlotte, NC 28255	14,757,878	–	–	–	–	–
Capital Research	333 South Hope Street, 55th Floor, Los Angeles, CA 90071	129,248,747	15,332,002	–	–	–	–
CastleKnight	888 Seventh Avenue, 24th Floor, New York, NY 10019	75,220,709	4,563,676	–	–	49,894,010	–
HBK	2300 North Field Street, Suite 2200, Dallas, Texas 75201	33,221,890	3,757,224	–	–	–	–
Impax	30 Penhallow Street, Portsmouth, NH 03801	2,202,713	–	–	–	–	–
Oaktree	333 South Grand Avenue, 28th Floor, Los Angeles, CA 90071	394,170,677	23,845,180	5,313,923	11,082,712	59,284,834	321,517
Owl Creek	640 Fifth Avenue, 20th Floor, New York, NY 10019	257,807,818	24,096,166	–	–	–	–
Roystone	767 Third Avenue, 29th Floor, New York, NY 10017	13,826,853	2,656,712	–	–	–	–

Appendix B