Before the
UNITED STATES COPYRIGHT ROYALTY BOARD
LIBRARY OF CONGRESS
Washington, D.C.

In The Matter Of:	:	
	:	Docket No. 2006-1 CRB DSTRA
Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	:	

Testimony of

JOHN WOODBURY

Vice President, CRA International

Public Version

XM Exhibit 8

Witness for Sirius Satellite Radio Inc. and XM Satellite Radio Inc.

PUBLIC VERSION

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Expert Report of Dr. John R. Woodbury
October 30, 2006

As Amended May 14, 2007

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I Qualifications

My name is John R. Woodbury and I am a vice president at CRA International, an economics and business consulting firm, where I have been employed since 1992. I received my B.A. from the College of the Holy Cross (*summa cum laude*) and my M.A. and Ph.D. in Economics from Washington University (St. Louis). Among other positions, I have served as a Brookings Economics Policy Fellow at the Civil Aeronautics Board, as a Senior Economist on the Network Inquiry Special Staff of the Federal Communications Commission, as Vice President for Research and Policy Analysis at the National Cable Television Association (now the National Cable and Telecommunications Association), and as Associate Director for Special Projects in the Bureau of Economics of the Federal Trade Commission.

I have been involved in numerous matters regarding intellectual property. During my tenure at the National Cable Television Association, I served as staff liaison to the Association's Copyright Committee, charged with overseeing economic initiatives and proceedings before the Copyright Royalty Tribunal. In that capacity, I was responsible for analyzing the empirical basis for the then 3.74% distant signal compulsory license fee and for estimating the appropriate inflation adjustment for distant signal payments made by cable operators and for presenting those findings to various claimant groups. In addition, I was part of a small negotiating team that included the Association's President and the Chairman of its Executive Committee whose purpose was to determine whether an agreement could be reached with the Motion Picture Association of America ("MPAA") on simplifying the copyright royalty payment scheme.

I have testified a number of times before the Copyright Royalty Tribunal and before the Copyright Arbitration Royalty Panel ("CARP") as a rebuttal witness on behalf of MPAA addressing issues dealing with the distribution of distant signal license payments. I provided both direct and rebuttal testimony on behalf of Music Choice (formerly known as DCR) and DMX in the first CARP under the Digital Performance Right in Sound Recordings Act of 1995. I (along with my colleague, Jane Murdoch) also provided written direct and rebuttal testimony on behalf of the Corporation for

Public Broadcasting and National Public Radio addressing reasonable license fees for the public performance of sound recordings by public radio entities on their Internet sites. Most recently, I provided both direct and rebuttal testimony on behalf of Music Choice regarding the appropriate rate to be paid to BMI for performances of musical compositions. My *curriculum vitae* is attached as Exhibit 1 to this report.

II Overview

I have been asked by Sirius and XM to estimate a reasonable rate to be paid for the sound recording performance right ("SRPR") when these services transmit performances of sound recordings to subscribers of satellite radio. I understand that in this regard, Sirius and XM satisfy the definition of pre-existing services in the Digital Performance Right in Sound Recordings Act of 1995 ("Act").[1] From that same Act, I understand that the Copyright Royalty Board ("CRB") must choose a rate that satisfies four statutory objectives ("801(b) objectives"):

(A) To maximize the availability of creative works to the public;

(B) To afford the copyright owner a fair return for his creative work and the copyright user a fair income under existing economic conditions;

(C) To reflect the relative roles of the copyright owner and the copyright user in the product made available to the public with respect to relative creative contribution, technological contribution, capital investment, cost, risk, and contribution to the opening of new markets for creative expression and media for their communication;

(D) To minimize any disruptive impact on the structure of the industries involved and on generally prevailing industry practices.[2]

As a general matter, there are a number of avenues available to an economist (and the CRB) for identifying an appropriate price for a good or service. In some cases, factors that identify the demand for and the supply of a good or service are readily available and can be used to estimate a market-clearing price, i.e., a price at which the

[1] Pub. L. No. 104-39, 109 Stat. 336 (1995).

[2] 17 U.S.C. 801(b)(1).

quantity demanded and supplied are equated. Numerous transactions across buyers and sellers or across time enable the use of this approach. Another common approach to identifying a price is to search for a comparable product whose price can be used as a benchmark. For example, suppose a policy maker was concerned that a price of a good or service reflected market or monopoly power on the part of the seller. An economist could look to the sale of similar goods or services being sold but under more competitive conditions and compare that price to the price in the market of concern. While these comparisons are not perfect, economists are usually able to account for the relevant differences in the good or service in question to permit an "apples to apples" comparison.

In conducting previous analyses of appropriate royalties, I have sought benchmark rates associated with services that are generally analogous to the services and the rights for which the rate is being determined. In these kinds of rate-setting proceedings, the identification of useful benchmarks provides a sound starting point for determining the appropriate payment between the parties for the sound recording performance right in accordance with section 801(b) of the Act. I, like other economists, would regard rates negotiated at arms-length as a promising start to developing the rate in question. Similarly, a useful start would be rates that have been determined by a third party, such as the CRB and the courts.

The benchmark approach to rate-setting for performance rights is also a familiar one in these kinds of proceedings. For example, the Librarian of Congress, in the 1998 rate setting proceeding concerning the sound recording statutory license for non-exempt digital transmission services, quoted a 1980 proceeding for coin-operated phonorecord players, in which the Tribunal wrote, "While acknowledging that our rate cannot be directly linked to marketplace parallels, we find that they serve as an appropriate benchmark to be weighed together with the entire record and the statutory criteria."[3] However, courts recognize that the benchmark may need to be adjusted based on contrasts between the benchmark and the target settings. In its recent Music Choice—BMI decision, the Second Circuit, quoting an earlier decision, stated, "In choosing a

[3] Library of Congress, Copyright Office 37 CFR Part 260, Docket No. 96-5 CARP DSTRA, Determination of Reasonable Rates and Terms for the Digital Performance of Sound Recordings, Federal Register, Volume 63, No 89, May 8, 1998 ("Librarian Decision 1998") at 25404, quoting 1980 Adjustment of the Royalty Rate for Coin-Operated Phonorecord Players, 46 FR 884, 888 (1981).

benchmark and determining how it should be adjusted, a rate court must determine 'the degree of comparability of the negotiating parties to the parties contending in the rate proceeding, the comparability of the rights in question, and the similarity of the economic circumstances affecting the earlier negotiators and the current litigants.'"[4]

I have concluded that one possible benchmark is the rate paid by the pre-existing subscription services ("PSS")—Music Choice, DMX, and Muzak—for the SRPR after suitable adjustments and after accounting for the 801(b) factors as they apply to XM and Sirius. As discussed below, this rate was originally established in the 1998 proceeding at 6.5% and then renegotiated in 2003 to 7.25%.

Upon consideration of the nature of the service provided by the PSS on one hand, and XM and Sirius on the other, I have identified a number of substantive differences between the services that result in adjustments to the 7.25% rate. One difference stems from the end-to-end functionality of XM and Sirius, another from the mobility of the XM and Sirius services, and still another from the suite of music and non-music channels offered by the services. Music Choice, for example, offers a suite of commercial-free music channels sold to third-party providers, who in turn deliver the service to consumers as part of a bundle of services for in-home listening. By contrast, XM and Sirius provide both music and non-music channels in a complete, end-to-end package for mobile, nationwide listening (including in-vehicle and in-home listening) directly to subscribers. The importance of these kinds of differences in the services was acknowledged in the earlier appellate ruling in the Music Choice—BMI litigation cited above: "If it were demonstrated that retail purchasers were motivated to pay more because of advantages that resulted from a particular mode of delivery, such as better quality, better accessibility or whatever, this might justify a conclusion that retail price of the service purchased by the customer exceeded the fair market value of the music."[5] My analysis incorporates this insight.

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[4] United States v. Broad. Music, Inc., 04-3444-CV, 2d Cir., Oct. 6, 2005 at p. 8, quoting United States v. ASCAP (Application of Buffalo Broad. Co., Inc.), No. 13-95 (WCC), 1993 U.S. Dist. LEXIS 2566, at *61 (S.D.N.Y. Mar. 1, 1993).

[5] United States v. Broad. Music, Inc., 316 F.3d 189 (2d Cir. 2003) at 196 n.3.

A second benchmark is the payments made by XM and Sirius to ASCAP, BMI, and SESAC for the musical works rights that underlie the public performance of a sound recording, the proceeds of which are distributed to music publishers and composers. The acquisition of both the musical works rights and the SRPR are necessary for a user to provide a public performance of the sound recording.

The analyses of these two benchmarks lead to rate estimates ranging from 0.88% to 2.35% of the gross revenues of XM and Sirius.

I have also evaluated how accounting for the 801(b) factors would affect where in this range the rate should be set. Among other conclusions, it is my opinion that XM and Sirius generally outperform the PSS with respect to enhancing the availability of music, have made more significant creative contributions (e.g., in the creation of enhancements to the music channels as well as original non-music programming), technological contributions (e.g., the development of a mobile, end-to-end satellite system), and investments. They have incurred greater costs and risk than the PSS, and they have done (and will continue to do) more to open new markets in providing their services, relative to the PSS. I make similar observations with respect to XM and Sirius relative to the record labels. As a result, I conclude that a fair rate under the Act is one that would be at the lower end of the range.

In forming my opinions, I have reviewed a variety of materials. In particular, I have reviewed XM's and Sirius' financial statements and the results of market surveys conducted by XM and Sirius, as well as various analyst reports. I have interviewed business people at XM and Sirius to better understand the nature of their business. At XM, these executives include Eric Logan, Executive Vice President of Programming; Mark Vendetti, Senior Vice President of Corporate Finance; John Kramer, Vice President of Corporate Finance; Stephen Cook, Executive Vice President, Automotive (previously Executive Vice President of Sales and Marketing); John Dealy, Senior Advisor to the CEO; and Tony Masiello, Senior Vice President of Operations. At Sirius, these executives include David Frear, Chief Financial Officer; Michelle McKinnon, Director of Investor Relations; and Douglas Kaplan, Senior Vice President, Business Affairs and Development, Entertainment and Sports. I have also reviewed previous decisions relating to the determination of reasonable fees paid by Music Choice to BMI and to the

Recording Industry Association of America ("RIAA"), as well as my own expert reports in these matters. In addition, I have reviewed publicly available information on the promotional value of satellite radio to recording artists and record labels as well as internal information provided by XM and Sirius. I have compiled a list of these materials contained in Exhibit 2.

The analysis that I present in this report has been performed by me or under my direction. As additional evidence becomes available prior to trial, I reserve the right to refine my analysis.

In the next section, I provide a description of the XM and Sirius services. In Section IV, I discuss the benchmark approach and introduce the potential benchmark rates available for my analysis of the SRPR fee to be paid by XM and Sirius. In Section V, I discuss the first potential benchmark, the SRPR rate paid by the PSS, and the adjustments to this benchmark that are required to make the analogy appropriate. In Sections VI to IX, I present the conceptual framework, the implementation of the various adjustments, as well as a summary of the rate estimates based on the PSS rate. In Section X, I discuss the second potential benchmark – the rates paid by XM and Sirius to the Performance Rights Organizations ("PROs"). In Section XI, I address the 801(b) factors as they apply to XM and Sirius. The final section summarizes my conclusions.

III The XM and Sirius Services

Sirius and XM compete with each other, as well as with terrestrial radio and other ways of spending discretionary time, to attract and retain subscribers to their subscription radio services. These services are designed primarily for listening in a car or other vehicles and can also be used for in-home listening. Because they are satellite delivered, each service is available throughout the United States, for a monthly subscription fee that is currently $12.95.[6] Sirius' service consists of nearly 130 digital channels, including 66 commercial-free music channels, 3 comedy channels, 2 kids' channels, and 56 non-music

[6] Both companies also offer subscription fee discounts for purchases of additional radios or commitments to annual or other longer-term subscriptions. XM Service & Subscription at http://www.xmradio.com/service_subscription/service_subscription.jsp?refsrc=hp_gs. Sirius Plans, at http://www.sirius.com/servlet/ContentServer?pagename=Sirius/CachedPage&c=Page&cid=1150907696769.

1 channels.[7] Similarly, XM's service consists of more than 170 digital channels, including
2 69 commercial-free music channels, 4 comedy channels, 2 kids' channels, the 5 music
3 channels programmed by Clear Channel, and 93 non-music channels.[8] (See Exhibits 3
4 and 4, which present the complete list of XM and Sirius channels, respectively.)
5 Channels that use commercially released sound recordings include the commercial-free
6 music, the comedy channels, and the kids channels; and, in the case of XM, they also
7 include the channels programmed by Clear Channel. In the analysis that follows, I refer
8 to "music channels" as all channels that use commercially released sound recordings.
9 For Sirius, this represents a total of 71 channels, and for XM, 80 channels.
10 The services that Sirius and XM provide require a license from the FCC, a
11 process that took 5 years from the start of the FCC license proceeding to the time the
12 licenses were awarded in 1997.[9] Indeed, I understand that Sirius had begun efforts to
13 persuade the FCC to issue a license as early as 1990.
14 In order to provide an end-to-end mobile service with a national footprint, Sirius
15 and XM each undertook substantial infrastructure investments. For example, I
16 understand that each firm had to develop or assist in the development of a suitable audio
17 compression system to "fit" the channels into a single encrypted signal while maintaining
18 the audio quality of the service. XM and Sirius also had to develop their own uplink
19 systems that transmit the service signal to the satellite and (in this case) authorize the
20 receipt of the signal by a subscriber. These systems were not off-the-shelf systems.
21 In addition to developing a customized uplink to the satellite, Sirius and XM were
22 each responsible for building, launching, and tracking their own satellites. Each service
23 has developed its own satellite system to provide a service that would permit radios in
24 cars (and other moving vehicles) to receive a satellite signal within a nationwide
25 footprint. My understanding is that a signal by a conventional satellite would be too weak

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[7] Reported channel counts were compiled by CRA and are based upon a complete listing of Sirius' channels, obtained from the Sirius website as of September 26, 2006.

[8] As with Sirius, reported channel counts were compiled by CRA and are based upon a complete listing of XM's channels, obtained from the XM website as of September 26, 2006. The five Clear Channel transmissions include commercials.

[9] See FCC News Report No. IN 97-4, "FCC Announces Plan for Satellite DARS," at http://www.fcc.gov/Bureaus/International/News_Releases/1997/nrin7004.txt.

to be received by anything but an earth station of substantial size, likely too large to fit on the roof of a car. The satellites developed by the two services were designed to be powerful enough to be received by a small antenna on a moving vehicle anywhere in the country.

Sirius owns and operates three satellites—launched in 2000—in a highly inclined elliptical orbit above North America, meaning that the Sirius satellites rise and set over the United States.[10] Once a satellite moves below the horizon, its transmission cannot be received. Accordingly, two of Sirius' satellites are always above the country, beaming their signal from that orbit. In addition, the Sirius satellites are positioned in such a way that the signal travels to the earth at a steep angle, thus reducing most of the interference from tall buildings, trees, and other obstacles. To handle the remaining reception difficulties, Sirius has constructed a network of 140 terrestrial repeaters that receive the Sirius signal and retransmit the signal to subscribers.[11]

XM owns and operates three satellites, each covering the continental United States from widely separated positions in geostationary orbit over the equator.[12,13] Two satellites were launched in March and May of 2001 (and are currently co-located in one orbital slot due to faster than expected equipment degradation) and the third was launched in February, 2005. One replacement satellite (XM-4) is scheduled to be launched this year, and another new satellite (XM-5) will serve as a ground spare.[14] XM

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[10] Sirius also maintains a fourth satellite on the ground, ready to be launched in the event that one of its three active satellites fails. See 2005 Form 10-K, Sirius Satellite Radio Inc, p. 7.

[11] 2005 Form 10-K, Sirius Satellite Radio Inc, p. 8.

[12] Telesat Canada monitors and controls the satellites for XM. Sea Launch provided launch services. XM Fast Facts, at http://www.xmradio.com/corporate_info/fast_facts.html; 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 28.

[13] Like Sirius, one of XM's satellites broadcasts 4.7 seconds ahead of the other, providing a memory buffer. (I understand that the third XM satellite is a spare in the event that either one of its other two satellites fail.) "About Sirius," at http://www.sirius.com/servlet/ContentServer?pagename=Sirius/CachedPage&c=Page&cid=1018209032792. Heltzel, Paul, "Tuning In to Satellite Radio," January 25, 2002, Technology Review, at http://www.technologyreview.com/read_article.aspx?id=12736&ch=infotech. I understand that a fourth XM satellite will be launched shortly; see 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 12.

[14] See 2003 Form 10-K, XM Satellite Radio Holdings Inc., pp. 12, 14; 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 12; and Satellite Radio Outlook, Kagan Research, LLC, July 2005, p. 21.

uses an extensive network of approximately 800 terrestrial repeaters located throughout the continental United States.[15]

My understanding is that the repeaters of both services were again not off-the-shelf, but were designed to provide the subscriber with a seamless listening experience.

Because traditional AM/FM radios cannot receive satellite signals, XM and Sirius had to develop their own radios, with customized chipsets that allow the requisite functionality. I understand that XM's proprietary chipset consists of two custom integrated circuits that process satellite and repeater signals and decode audio and data streams, enabling channel tuning and providing for the display of information. I also understand that Sirius has undertaken similar efforts. These radios receive and decrypt the digital data signal from specially-designed satellite transponders and repeaters. In addition to the encoded sound, these devices can also unscramble additional information transmitted by the services—such as the song title, the artist, and the genre of music and other information—for display on the radio. Finally, I understand that both companies have developed algorithms to minimize signal interruption where the signal may be weak.

XM and Sirius expend substantial resources in attracting and retaining subscribers. Each service has third-party arrangements for the sale of radios. One significant sales channel for both companies is the automotive original equipment manufacturer ("OEM"). XM and Sirius have arrangements with numerous car manufacturers for the installation of XM and Sirius radios in the OEM's vehicles. These OEMs include GM, Toyota, Honda, and Nissan for XM, and they include Ford, Chrysler, BMW, Audi/VW, and KIA for Sirius.[16] Both services subsidize the cost of the radio, the design of the space in the vehicle where the radio is located, its installation in the vehicle, and the training of OEM salespeople with respect to the services. The OEMs also generally receive a share of subscription revenues for all car buyers who activate a regular subscription to the services after the free trial period. This revenue share provides incentives to the OEMs to advertise the subscription radio service and, ultimately, to increase sales of cars with preinstalled receivers.

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[15] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 13.

[16] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 2; 2005 Form 10-K, Sirius Satellite Radio Inc, pp. 2-3.

In addition, XM and Sirius have third-party deals with a number of retailers, such as Wal-Mart, Best Buy, and Target, for the sale of the radios and the monthly service.[17] The services pay these retailers for shelf space, provide them with sales training, and offer a commission on sales. The radios can also be purchased online directly from XM and Sirius.

Of course, the cost of the radio can represent a significant deterrent to subscription sales. To lower this cost to subscribers, Sirius and XM engage in a variety of subsidies and revenue sharing arrangements. For example, XM subsidizes its radio manufacturers on a per radio basis, in an effort to reduce the wholesale cost borne by retailers and car manufacturers, and ultimately to place downward pressure on equipment prices paid by subscribers. Sirius does the same with its manufacturers.

In addition, Sirius and XM have state-of-the-art broadcast studio facilities located in New York City and Washington D.C., respectively, used for live performances and for the production of original programs. The XM broadcast center covers 150,000 square feet and includes some 80 programming and broadcast studios.[18] XM's state-of-the-art network storage and server infrastructure is capable of broadcasting more than two million recorded tracks. Besides the main studio in Washington, XM has additional broadcast studios in New York City, Chicago, and Nashville.[19]

Similarly, Sirius has state of the art, all digital studio facilities around the country, including New York City, Houston, Memphis, Nashville, and Los Angeles.[20] These studios allow Sirius to record and broadcast live performances as well as to produce original programming for the various channels. It also has a network server infrastructure comparable to that of XM. These are two of the largest broadcasting facilities in the world.

Exhibit 5 presents a simplified illustration of how the XM and Sirius system works. The programming is prepared at services' studio and production facilities and then "uplinked" or transmitted by each service to its satellite system. The signal is then

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[17] 2005 Form 10-K, XM Satellite Radio Holdings Inc., pp. 5, 37; 2005 Form 10-K, Sirius Satellite Radio Inc, p. 5.

[18] "XM Studios," at http://www.xmradio.com/how_it_works/xm_studios.html.

[19] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 10.

[20] 2005 Form 10-K, Sirius Satellite Radio Inc, p. 8.

beamed back down to earth for reception by a radio or to a repeater which then retransmits the signal to the subscriber's radio.

IV Identifying a Benchmark Rate

The ideal benchmark rate would be a competitively-negotiated, arms-length rate for a right perfectly analogous to the SRPR by a service that is perfectly analogous to XM and Sirius and reflects the application of 801(b) factors. While perfect analogies are not usually available, there nonetheless may be services and rates sufficiently comparable to those being examined that they can provide useful benchmarks. With respect to a generally analogous service, economists look to services that are similar to those whose rates are at issue, making adjustments where appropriate to account for any significant differences. With respect to an analogous rate, economists look to fees paid for rights that are comparable to those at issue, making adjustments where appropriate to account for any significant differences in the rights.

In subsequent sections of this report, I discuss two rates that can be used as starting points to estimate a reasonable rate for XM and Sirius. One benchmark is the current rate paid by the PSS for the SRPR. The advantage of this benchmark is that the services are generally analogous and the rights in question are the same as those in this proceeding, and the rate was recently re-negotiated in the shadow of the 801(b) factors, at least as applicable to the PSS. Another benchmark is the collection of rates paid by XM and Sirius for musical composition performance rights. The advantage of this benchmark is that the services are those in this proceeding (and so perfectly analogous) and the rights are for the use of inputs comparable to the SRPR.

While both benchmarks have their appeal, neither is perfectly analogous in all respects. In the next sections, I describe the relevant differences and suggest modifications to these candidate benchmark rates to account for the differences. I discuss each benchmark in turn.

V Appropriately Adjusted, the SRPR Rate Paid by the PSS is a Useful Benchmark Rate

a. *XM and Sirius offer services generally analogous to those offered by the PSS*

Like XM and Sirius, the PSS provide a subscription music service for use by consumers. They all offer digital quality sound, and most of their music channels are commercial-free. The PSS, XM, and Sirius each offer a large number of musical genres and a large number of music channels within each genre. Exhibit 6 presents the number of music channels provided by each of XM, Sirius, and Music Choice (which I treat as a typical PSS), by genre.[21] XM and Sirius offer more music channels than does Music Choice. XM has a total of 80 music channels, 69 of which are commercial-free.[22] By comparison, Sirius has 71 music channels, 66 of which are commercial-free, and Music Choice has 58 music channels, all of which are commercial-free. I understand, however, that the number of Music Choice channels received by most cable subscribers is much lower than that. For example, I understand that the number of Music Choice channels offered as part of Comcast cable packages ranges from 40 to 47.

The PSS are currently paying a SRPR rate of 7.25%, a rate that I understand was based on an agreement between Music Choice and SoundExchange, the organization representing the holders of the SRPR in this proceeding.[23] In particular, I understand that in 2003, Music Choice agreed to pay SoundExchange 7% of its gross revenues in 2002 and 2003 and 7.25% in 2004 through 2007. I understand that this negotiated rate

[21] To create this comparison of channels by genre, I assigned Sirius and XM channel groupings (as presented in Exhibits 3 and 4) to the Music Choice defined genres. In doing so, I relied upon channel descriptions available on the XM and Sirius websites.

[22] Recall that I define "music channels" to include all channels that use commercially released sound recordings.

[23] I understand that a number of record labels have a significant ownership interest in Music Choice. I am assuming for purposes of this discussion that the financial interests of the other non-label owners of Music Choice will ensure that any negotiated rate between Music Choice and SoundExchange is one that is arms-length.

1 was the first rate change for a pre-existing service following the proceeding that
2 established the initial rate of 6.5% in 1998.[24]
3 In addition to being an outcome of an agreement, a key advantage of the PSS
4 7.25% rate as a benchmark rate is that the Music Choice/SoundExchange negotiations
5 took place in the shadow of a rate-setting proceeding to which either of the parties could
6 have resorted in the event of a negotiation failure. Because any rate setting proceeding
7 would have been based upon the 801(b) statutory factors, the negotiated rate presumably
8 reflects those factors as well.
9 Still, for at least three reasons, the PSS rate needs to be tailored to the XM and
10 Sirius services before it can be applied to XM and Sirius. First, the PSS offer only music
11 audio services without any embellishment. In contrast, XM and Sirius offer substantial
12 non-music programming to their subscribers, including that on the music channels. As I
13 discuss in greater detail below, the services have made investments in acquiring exclusive
14 talent (such as Howard Stern and Oprah) for non-music channels. And on their music
15 channels, both services have hired programmers with substantial and acknowledged
16 expertise in particular musical genres. In addition, both services employ experienced
17 on-air talent for their music services, including experienced music programmers and
18 well-known artists.
19 Second, XM and Sirius provide an end-to-end service with a national footprint
20 directly to subscribers and incur all of the costs of providing the end-to-end service. As
21 noted above, these costs included the design, building, and launch of the satellite system
22 capable of providing a mobile service, the design and development of the radios, and all
23 of the marketing associated with attracting and retaining individual subscribers to the
24 service as well as the billing and collections costs, all required for a direct-to-the-
25 consumer business. By contrast, the PSS provide a service that it hands off to a cable
26 operator. The cable operator then incurs the costs of distributing the service to cable
27 subscribers, the costs of billing, and the costs of fee collection.

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[24] See Library of Congress, Copyright Office 37 CFR Part 260, Docket No. 2001-1 CARP DSTRA2, Determination of Reasonable Rates and Terms for the Digital Performance of Sound Recordings by Preexisting Subscription Services, *Federal Register*, Volume 68, No 128, July 3, 2003 at 39840.

1 Third, the XM and Sirius services are not only end-to-end services, they are end-
2 to-end mobile services with a national footprint—the subscriber can listen to the services
3 in a vehicle, at home, or (depending on the radio) while walking about. The PSS
4 services are available only for in-home listening.
5 All of the above-referenced differences between XM/Sirius on the one hand and
6 the PSS on the other require adjustments to the 7.25% SRPR fee paid by the PSS before it
7 can be applied to the revenues of XM and Sirius.[25] In addition (but discussed separately
8 below), the application of the statutory factors in the XM and Sirius rate determination
9 may be different from that encompassed in the PSS rate.

10 b. ***Use of the 7.25% PSS rate***

11 I understand that the SRPR rate paid by the PSS services will be determined as
12 part of this proceeding and the PSS may be recommending a downward adjustment to
13 that rate. Thus, my use of the 7.25% rate may be misplaced. In particular, the same
14 methodology adopted by the CARP and the Librarian in setting the prior 6.5% rate could
15 today yield a lower rate for the PSS.
16 The original PSS rate of 6.5% of gross revenues for the use of the SRPR by pre-
17 existing services appears to have been based on the DMX/Music Choice – ASCAP rate
18 that was being adjudicated at the time.[26] Recognizing that this benchmark rate itself was
19 being decided and that the ultimate ASCAP rate paid by DMX/Music Choice would not
20 be as low as the then interim rates, both the Librarian and the CARP based the SRPR rate
21 on "an upper limit on the value of the performance right for the musical compositions."[27]
22 The numerical range used by the CARP has been redacted from the public versions of the
23 Librarian's and CARP's decisions. However, based upon the discussion by the
24 Librarian, it is reasonable to assume (at least in principle) that the upper bound would
25 reflect an offer from ASCAP to the PSS.

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[25] While my discussion focuses on modifying the PSS rate that will be applied to the Sirius and XM revenues, I could have equivalently modified the revenues of XM and Sirius to account for the described differences, and then applied the PSS rate to the adjusted XM and Sirius revenues.

[26] Librarian Decision 1998 at 25404, 25414.

[27] Librarian Decision 1998 at 25403.

In the Music Choice – BMI proceeding, which was taking place contemporaneously, BMI offered Music Choice a rate of 3.75%.[28] To the extent that this offer was similar to the offer made by ASCAP to Music Choice, the rate of 3.75% may reflect the "upper limit" of the Librarian's and the CARP's original range. I understand that ultimately, however, Music Choice and BMI reached agreement on a 2.75% rate for past payments (and 2.5% for payments going forward). Had the CARP and the Librarian known of the ultimate 2.75% rate, they would have likely started with a lower rate at the top end of the range and then adjusted that rate downwards upon applying the logic of the 801(b) factors.

To see this, if the upper bound in the original pre-existing PSS proceeding was based on a 3.75% rate and if SESAC payments amounted to 6% the ASCAP and BMI payments, then the sum of PRO rates would be 7.95% (i.e., 2 x 3.75% x 1.06).[29] After accounting for the 801(b) factors, the actual rate was set at 6.5% by the Librarian. This suggests that the 801(b) factors had the effect of setting the SRPR rate 18.2% below the upper bound. The subsequently negotiated PSS rate of 7.25% then represented an increase of 11.5% over the 6.5% rate.

However, I understand that today the now-finalized BMI rate is not 3.75% but 2.75%. If the Librarian followed the same logic as in the original PSS proceeding, the upper bound for that rate would have been 5.83% (i.e. 2 x 2.75 x 1.06). Accounting for the effect of the 801(b) factors would have resulted in a rate of 4.77% (i.e., 5.83% times the (100%-18.2%). The subsequent rate increase of 11.5% would have resulted in a current PSS rate of 5.32%, not 7.25%.

While my discussion of the PSS benchmark focuses on the 7.25% rate, I note what the implications would be if the 5.32% rate were used instead. More generally, the methodology described below can be used to derive a rate for the XM and Sirius services even if the CRB were to determine a PSS rate different from the 7.25% rate or the 5.32% rate. That derivation would be a calculation that simply replaces the 5.32% rate with the CRB-determined rate, absent any other mitigating factors.

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[28] United States v. Broad. Music, Inc., No. 64 Civ. 3787 (LLS), 2001 U.S. Dist. LEXIS 10368 (S.D.N.Y. July 23, 2001) at pp. 5-6.

[29] I understand that historically, XM and Sirius payments to SESAC for their subscription radio service have equaled about 6% of their combined payments to ASCAP and BMI.

c. ***Some revenues earned by XM and Sirius are attributable to non-music services and need to be accounted for in setting the SRPR rate***

A key difference between XM and Sirius on the one hand and the PSS on the other is in the broader suite of channels offered by XM and Sirius. Music Choice and the other PSS offer no non-music audio services. By contrast, Sirius offers its subscribers 56 non-music channels and XM as many as 93 non-music channels, in addition to their music channel offerings.[30] (See Exhibit 7.) Indeed, non-music programming has become an increasingly central element of the Sirius and XM services. In 2001, the year its service was launched, XM offered non-music programming on 27% of its channels (27 out of 101). By 2005, non-music channels had increased to 46% of channels (61 out of 133), while the number of music channels had actually decreased slightly.[31] For Sirius, the percentage of non-music channels has grown from 39% (39 out of 101) in 2002, the first year of operation, to 44% (59 out of 133) last year.[32] (See Exhibits 8.a and 8.b.)

But simple channel counts understate the significance of non-music programming in the efforts of the two services to attract and retain subscribers. Both services have made substantial investments in original, exclusive and non-exclusive brand-name non-music content. These investments are intended to attract subscribers to Sirius' and XM's subscription radio services and to distinguish the one service from the other and from other competing services like Music Choice and over-the-air radio.[33] Sirius has signed exclusive contracts with individual celebrities, such as Howard Stern, Martha Stewart, Jerry Rice, Barbara Walters, and Deepak Chopra, as well as with the National Football League, the National Basketball Association, the National Collegiate Athletic Association's Mens Division I Basketball Championship, and Wimbledon – where these exclusives are relative to XM.[34]

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[30] A large portion of XM's non-music channels consist of play-by-play sports channels that subscribers receive as part of the Sports Package. For example, there are 15 major league baseball play-by-play channels and 5 NHL hockey channels.

[31] In these counts, multiple play-by-play channels are counted as a single channel.

[32] Information on historical channel lineups from 2001-2005 is taken from XM and Sirius Form 10-Ks.

[33] "Satellite Radio Outlook," *op. cit.*, p. 63.

[34] 2005 Form 10-K, Sirius Satellite Radio Inc., p. 5; "Sirius Reports Strong Second Quarter 2006 Results, " August 1, 2006, at http://investor.sirius.com/releaseprint.cfm?releaseid=205864

1 Similarly, XM has signed exclusive contracts with celebrities such as Oprah, Opie
2 and Anthony, Bob Dylan, Ellen Degeneres, and Bob Edwards, as well as with Major
3 League Baseball and NASCAR.[35] Indeed, MLB is carried on 16 XM channels during
4 the baseball season.[36] In addition, XM and Sirius have non-exclusive content deals that
5 include: ABC News and Talk; BBC World Service News; Bloomberg News; CNBC;
6 CNN; C-Span; E! Entertainment; ESPN; ESPNEWS; Fox News; Radio Disney; and The
7 Weather Channel, among others.[37] All of these services represent well-known consumer
8 brands and represent an investment by the two services in accumulating their own brand
9 equity.
10 This growth in the role of non-music programming has been accompanied by
11 substantial expenditures on those programs. For example, based on the contractual
12 obligations for non-music programming at XM, it is clear that the increases in
13 programming expenses on the non-music side have been dramatic. In 2004, **[[**
14 **]]** of XM's total programming costs, were dedicated to non-music
15 programming contractual payments. In 2005, that number had risen to **[[**
16 **]]** of programming costs.[38] The Sirius story is even more dramatic. In 2004, its
17 non-music expenditures accounted for **[[** **]]** of programming costs.
18 By 2006, those expenditures had increased to **[[** **]]** of programming
19 costs. See Exhibit 9.
20 A number of investments in non-music programming are particularly noteworthy.
21 In October 2004, Sirius signed a five year, $500 million deal to broadcast Howard Stern
22 programming on two dedicated channels.[39] In addition to the Howard Stern deal, Sirius
23 has acquired broadcast rights for other celebrity hosts, such as Martha Stewart.[40] Earlier
24 this year, XM announced a three year, $55 million deal to broadcast the Oprah & Friends

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[35] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 1-2. NASCAR will move to Sirius starting in 2007. See 2005 Form 10-K, Sirius Satellite Radio Inc., p. 4.

[36] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 8.

[37] "Satellite Radio Outlook," *op. cit.*, p. 63.

[38] Note that these numbers are a lower bound of the share of programming costs attributed to non-music programming, since some of the non-contractual programming expenditures were for non-music programming as well.

[39] "Satellite Radio Outlook," op. cit., p. 63.

[40] 2005 Form 10-K, Sirius Satellite Radio Inc., p. 3.

1 channel.[41] In addition, XM has additional deals for rights to other celebrity broadcasts,
2 such as The Opie & Anthony Show.[42]
3 Similarly, in October 2004, XM agreed to an eleven year, $650 million deal with
4 Major League Baseball.[43] Through this year, NASCAR had been broadcast on XM,
5 costing XM about $3 million per year. However, Sirius has acquired the rights to
6 broadcast NASCAR starting in 2007 for about $22 million per year.[44] In addition, XM
7 and Sirius have bid against each other for the rights to broadcast other sports leagues and
8 events as well.[45]
9 Various industry sources attest to the value of these deals in attracting new
10 subscribers. In describing the Oprah & Friends deal, industry analyst Tom Eagan of
11 Oppenheimer stated that, "On a per-subscriber basis, XM can break even on this deal if
12 they add 145,000 subscribers over the three-year period. That should be very easy for
13 them to do."[46] Regarding the Howard Stern deal, Business Week wrote, "It can't be
14 denied: Howard Stern is earning his keep at Sirius Satellite Radio ("SIRI"). Since the
15 talk-radio star announced he would join Sirius, its subscriber rolls have jumped to more
16 than 4 million, with more than 1 million net additions attributable to Stern, analysts
17 say."[47]
18 Advertising revenues provide an additional measure of the increasing role of non-
19 music programming. These revenues are driven by non-music channels since the music
20 channels are predominantly commercial-free. The advertising revenues of both Sirius
21 and XM are now beginning to reflect that importance. In 2005, the advertising revenues
22 of XM were $20.1 million while those of Sirius were $6.1 million. In just the first half of
23 2006, following the launch of the Stern programming, I understand that Sirius' ad

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[41] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p.1.
[42] 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 9.
[43] "Major League Baseball Partners with XM Satellite Radio for 11-Year, $650 Million Broadcast and Marketing Agreement," at http://xmradio.mediaroom.com/index.php?s=press_releases&item=1209.
[44] "NASCAR Selects Sirius as New Home on Satellite Radio," February 22, 2005, http://investor.sirius.com/ReleaseDetail.CFM?ReleaseID=156582.
[45] "Satellite Radio Outlook," op. cit., p. 70.
[46] Quoted at http://www.orbitcast.com/archives/oprah-joins-xm-satellite-radio.html. visited on 8/29/06.
[47] "Stern Is the Draw At Sirius Satellite Radio", *Business Week*, April 10, 2006, p. 104. See also "Is Howard Stern Worth It?", *Business Week*, January 23, 2006, p. 38; "Can Stern Make Satellite Radio Hum?", *CNNMONEY.com,* December 21, 2005.

revenues totaled $15.5 million. By contrast, both services had relatively trivial advertising revenues in the first year of operation.[48]

The platform for advertising growth is comprised in large part of the talent and other non-music programming that has been acquired by the two services. For example, I noted above the expectations regarding the effect of Howard Stern's exclusive relationship with Sirius on increasing Sirius' subscribership. The same is true for the subscriber effect of XM's exclusive relationship with Oprah. These and other programming investments discussed above are expected to generate greater listenership in the future, to these particular services as well as to other ad-supported services.

As a final measure of the significance of non-music programming to satellite radio revenues, survey results suggest that talk and other non-music channels disproportionately drive subscriber decisions. In a 2006 survey, Sirius listeners were asked which channels they had listened to in the past week.[49] For each channel they had listened to, they were then asked whether they would cancel their subscription if that channel were no longer offered.

Using these data, I created a "channel-attachment" index to measure the cancellation responses for music relative to non-music programming. Specifically, for each Sirius channel, I multiplied the fraction of the surveyed Sirius subscribers listening to the channel in the last week by the fraction of those subscribers who indicated that they would cancel their service if the channel were deleted from the Sirius lineup. This calculation produces a weighted cancellation rate, where the weight is the fraction of surveyed subscribers listening to the channel. I then sum these weighted cancellation rates over all channels and calculate the fraction of that sum accounted for by music and non-music channels.

For example, suppose that 20% of Sirius subscribers listened to a particular music channel in the past week and 20% of those indicated that they would cancel the Sirius service if the channel were withdrawn from the Sirius lineup. Further suppose that 40%

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[48] See 2003 and 2005 Form 10-K, XM Satellite Radio Holdings Inc.; 2003 and 2005 Form 10-K, Sirius Satellite Radio Inc. Note that Kagan Research forecasts that Sirius' ad revenues will continue to grow as a fraction of total revenues, reaching 11.5% in 2014 versus 2.5% in 2005 (*Satellite Radio Outlook*, Kagan Research, LLC, July 2005, p. 74.)

[49] *Sirius Satellite Radio Listener Study – Wave 2,* June 2006, pp. 37-61. The number of useable responses was 24,339.

of Sirius subscribers listened to a particular non-music channel in the previous week and 50% of those indicated that they would cancel the Sirius service if Sirius stopped offering that channel. The weighted cancellation rate for the music service is 0.04 (i.e. 0.2 x 0.2), and the weighted cancellation rate for the non-music service is 0.2 (i.e. 0.5 x 0.4). The sum of the weighted cancellation rates in this example is 0.24, and 83% of these total 0.24 "points" are accounted for by the non-music channel.

Overall, **[[ ]]** of the channels listened to during the survey period were music channels.[50] However, music channels accounted for only **[[ ]]** of total weighted cancellation rates. (See Exhibit 10.) Non-music channels accounted for the remainder.[51] This suggests that listenership may overstate the significance of music channels to subscribers. This does not seem particularly surprising, as suggested by the apparently substantial advertising efforts undertaken by the two services to promote (e.g.) Howard Stern and Oprah.

In short, the benchmark PSS SRPR rate must be adjusted to reflect the significance of non-music programming in generating the revenues of XM and Sirius, before it can be applied to the XM and Sirius revenues. Note that this package of non-music programming benefits SRPR holders: it attracts more subscribers than would otherwise be the case and diverts their music listening from over-the-air radio that pays no SRPR fee to XM and Sirius that do pay that fee. Indeed, another survey conducted by Sirius indicates that after subscribing to Sirius, in-vehicle listenership to AM and FM stations dropped from **[[ ]]** of the time spend in the vehicle to **[[ ]]**. (See Exhibit 11.)

d. ***Some revenues incurred by XM and Sirius are due to enhanced music programming***

XM and Sirius use a variety of talent, including experienced music programmers with genre-specific expertise, to program most of their various music channels in order to

[50] This survey only asks about which channels were listened to and not how much time was spent listening to each channel.

[51] If the Howard Stern channels are excluded, **[[ ]]** of the channels listened to were music channels, but music still accounted for less **[[ ]]** of the total weighted cancellation rates than would be suggested by the listenership data.

make those channels more attractive to subscribers. In particular, I understand that both XM and Sirius have hired program directors that have extensive experience in each genre of focus. For example, XM has hired Robert Aubrey Davis and Martin Goldsmith to oversee the XM classical music offerings. Similarly, Sirius has contracted with classic rocker Little Stevie Van Zandt to program its Underground Garage music channel offering a variety of alternative rock music.

In addition, both services offer individual artists the opportunity to lead specific programs in their lineup. For example, Bob Dylan hosts a weekly XM show where he reminisces and chooses what music to play and what kind of theme to offer listeners. Similarly, Tom Petty is host of a weekly XM show playing classic rock and roll. Eminem created the channel Shade 45 on Sirius, which is dedicated to uncensored hip-hop music, and Shooter Jennings hosts his own show on Sirius' Outlaw Country channel.

Both services also host live performances and other programs to highlight individual performers. Sirius' *The Who* channel plays a full recent concert recording by The Who every night, and every concert on Jimmy Buffett's "Party at the End of the World Tour" will air live on Sirius' *Radio Margaritaville*. On XM, "Then…Again…Live" offers classic rock artists the chance to perform their music again, likely exposing some listeners to performers of whom they might otherwise not have been aware. XM has also broadcast live from various musical events. For example, in 2005, I understand that the service carried more than 55 hours of Live 8 performances held in London, Paris, Rome, Berlin, Philadelphia, and Toronto.

Like non-music programming, enhanced music programming generates subscribership for XM and Sirius over and above that for a service such as Music Choice that is primarily continuous music. Enhanced music programming also provides benefits to SRPR holders to the extent that it results in more listening to music, diverting listeners from terrestrial radio that does not pay a SRPR fee to a service that does.

e. ***XM and Sirius incur higher costs than Music Choice because they provide a mobile service delivered directly to ultimate subscribers***

I understand that services like Music Choice and other PSS use their own facilities and personnel to program and store the music for various music channels. The

1 PSS then "uplink" (or transmit) the music channels to a conventional for-lease satellite.
2 The signal is then "handed off" to a purchasing cable operator who receives the signal via
3 its own earth stations at its head-end. The cable operator pays a fee to the "hand-off"
4 provider for its service that reflects the value of the audio music service to the cable
5 operator's subscribers and then distributes the music service via its cable infrastructure to
6 the homes of its subscribers. The cable operator is also responsible for attracting and
7 retaining the subscriber, billing the subscriber, and collecting the subscriber payments, a
8 portion of which are effectively used to offset the cable operator's payment to the music
9 service provider.[52] Thus, the hand-off provider incurs the costs to the point of hand-off,
10 and the cable operator incurs the remainder of the costs as well as the cost of the hand-off
11 service itself. A simplified version of this kind of two-part distribution system is
12 depicted in Exhibit 12.

13 Like a hand-off provider, XM and Sirius create a programming package that is
14 uplinked to a satellite system, and as such, incur the same general categories of costs as
15 does a hand-off provider. These costs include the uplink costs as well as the costs of
16 compiling the programming package. For convenience, I refer to these costs as "hand-
17 off provider costs."

18 But unlike the hand-off provider (or the PSS), the core business of XM and Sirius
19 is to provide an end-to-end, mobile service directly to subscribers. Accordingly, XM
20 and Sirius also incur substantial additional costs, on top of the hand-off provider costs.
21 These costs include the cost of distribution, including the design, building, and launch of
22 a customized satellite system to provide a mobile service as well as the radios that receive
23 and decode the XM and Sirius transmissions; the cost of marketing the services directly
24 to subscribers; the cost of subscriber acquisition and retention; as well as the cost of
25 billing and collection of fees from their subscribers. For convenience, I describe all of
26 these additional costs borne by an end-to-end, mobile service provider as "subscriber
27 distribution and acquisition costs."

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[52] Both XM and Sirius (and, at one point, Music Choice) also sell their service to the direct broadcast satellites, DirecTV and Dish. The discussion in the text focusing on the "hand-off" to cable operators is for ease of exposition only. My focus here is on the core business of XM and Sirius—the provision of a direct-to-subscriber mobile audio service.

In sum, XM and Sirius incur subscriber distribution and acquisition costs not incurred by a hand-off provider to deliver their programming to final subscribers. Those greater costs are driven by both the mobile characteristic of the XM and Sirius service and the accompanying added cost responsibility borne by XM and Sirius for delivering the service directly to consumers (costs that are borne by the cable operator in the case of the PSS).[53] As with the need to adjust the PSS rate to account for the non-music channels provided by XM and Sirius, that rate must be adjusted to reflect these greater costs incurred by XM and Sirius for the mobility characteristic and for the end-to-end cost responsibility before the PSS rate can be applied to the revenues of the two services. If the 7.25% rate were applied to the XM and Sirius revenues without adjustment, the payments to SoundExchange would be excessive—even if the music offerings of XM and Sirius were identical to those of the PSS. The SRPR fee paid by XM and Sirius would be higher only because of the added revenue (reflecting the higher costs) attributable to providing an end-to-end mobile service, not necessarily because of any inherently higher value of the music.[54]

In what follows, I describe the kinds of adjustments that would account for these differences in costs and in the subsequent section, I implement those adjustments.

VI The Conceptual Framework for Accounting for the Functional Differences between XM and Sirius and a Hand-Off Provider

To explain the practical importance of the functional differences between XM and Sirius and a hand-off provider in calculating an appropriate SRPR fee, I provide a simple example. Suppose a hand-off provider offers an audio music-only service like the PSS, hands off its service to a cable operator for in-home listening, and earns $1000 from the

[53] To be sure, many XM and Sirius listeners who have portable radios listen to the services at home as well as in a vehicle. But I understand that only a small fraction of listening is solely within the home. For example, a survey conducted by Sirius reports that only [[ ]] of its subscribers listen to the service only in non-vehicle locations. *Sirius Customer Satisfaction Monitor 2Q '06 Results*, August 28, 2006, p. 20. The total number of respondents was [[ ]].

[54] Of course, to the extent that mobility results in more music listening, SRPR holders will directly benefit, even with the adjustments described below.

cable operator. Suppose as well that that service must pay 7.25% of its revenues for the use of the SRPR, and so pays $72.50 to SoundExchange (i.e., 7.25% of $1000).

Now suppose the cable operator charges its cable subscribers that $1000 plus another $2000 to recoup the costs for final distribution, marketing, billing, and fee collection, for total subscriber payments of $3000. Thus, the total payments made by cable subscribers for the music service recoup not just the costs of the hand-off provider service alone, but also the costs of delivering that music to ultimate subscribers. If instead the hand-off provider paid the cable operator for the use of its infrastructure and performed the billing and fee collection services itself at a cost of $2000, the hand-off provider would charge its subscribers a total of $3000.

Since the ultimate service that subscribers purchase is, by assumption, exactly the same in both cases, the SRPR fee should be the same in both cases, $72.50. If the rate for the SRPR were to be levied on the hand-off provider's total revenues (because the hand-off provider now provides an end-to-end service), the appropriate rate would be 2.42%, which, when applied to revenues of $3000, would also yield $72.50 for the use of the SRPR. In this example, the only, but key, difference between the two scenarios is whether the hand-off provider or the cable operator is responsible for final distribution, marketing, billing, and fee collection, leading to a difference in the revenues against which the rate is assessed.[55]

That key difference provides yet another way of reaching the same result. That is, we could have adjusted the 7.25% rate to account for the relative difference in the cost of providing the hand-off provider service and the end-to-end service. It is that cost difference that drives the revenue difference in the two scenarios. The appropriate rate to be levied on the end-to-end version of the service would be 7.25% times ($1000/$3000), or 2.42%.

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[55] Suppose the hand-off provider had always provided the end-to-end service and the SRPR rate had been levied on the end-to-end revenues of the (now misnamed) hand-off provider to begin with, i.e., the original SRPR rate was 2.42%. If this provider now decided to hand off its service to the cable operator, letting the cable operator incur the final distribution costs, marketing costs, and the costs of billing and collection, the firm's revenues would be $1000. It would not be any more appropriate to apply the 2.42% to the new revenues of $1000 than it would be to apply the 7.25% to the revenues of $3000. The music delivered is exactly the same, so the payment for the SRPR should be the same (i.e., $72.50). Thus the "new" SRPR rate would have to be adjusted upwards from 2.42% to 7.25%.

1 This example suggests one way of accounting for the fact that XM and Sirius
2 offer subscribers an end-to-end service and not a hand-off provider service: Determine
3 the dollar payment that would be made by XM and Sirius for the SRPR if they offered
4 only a hand-off provider service. In principle, this could be done by applying the 7.25%
5 rate to the revenues earned by XM and Sirius if they provided a hand-off provider
6 service. To then calculate the SRPR rate that would be applied to the end-to-end
7 revenues of XM and Sirius, I would divide the dollar payment made to SoundExchange
8 for the hand-off provider service of XM and Sirius by the end-to-end revenues of XM
9 and Sirius, just as in the example above.
10 Of course, I do not know directly what the hand-off provider revenues of XM and
11 Sirius would be since they do not offer that more limited service as a core business.
12 However, one way to meter revenues, as suggested above, is through costs. The relative
13 revenues earned by a hand-off provider service hypothetically provided by XM and Sirius
14 and by the end-to-end services actually provided by XM and Sirius would reflect the
15 relative costs of the two types of services. Thus, if I could estimate what a hand-off
16 provider service would cost XM and Sirius and if I knew the costs of the end-to-end
17 service, I could use that information to adjust the 7.25% rate so as to apply the adjusted
18 rate to the end-to-end revenues of XM and Sirius.
19 Any translation of the 7.25% rate to one that could be levied on the end-to-end
20 revenues of XM and Sirius must also reflect other key differences between the XM and
21 Sirius service and the PSS service above and beyond the end-to-end nature of the XM
22 and Sirius services. XM and Sirius have incurred considerable costs to develop and
23 deploy a mobile service as well as to provide substantial non-music components to the
24 audio package provided. Applying the PSS rate to Sirius and XM revenues when both
25 of these services provide significant attributes unavailable on a PSS would overstate the
26 payment due to SoundExchange. That is, it is not the music that drives the higher per-
27 subscriber revenues earned by XM and Sirius. Rather, it is in large part the mobility
28 characteristic, along with the non-music offerings and the enhancements to the music
29 offerings of XM and Sirius, that drives those revenues. That conclusion is consistent
30 with the inability of Music Choice, DMX, and Muzak to financially sustain a standalone
31 in-home, music-only premium cable service. Apparently, not enough consumers valued

1 an à la carte audio service consisting of multiple channels of continuous music streams in
2 the home to render an à la carte service profitable. The difference between XM and
3 Sirius on the one hand and the PSS on the other is the mobility of the service (along with
4 the non-music programming, and the music enhancements offered by the satellite radio
5 services).

6 To develop a way of estimating the costs of a more limited hand-off provider
7 service offered by XM and Sirius, consider the following thought experiment. Suppose
8 it were possible to divide XM and Sirius into two parts. One part would be the
9 functional equivalent of a hand-off provider, compiling the audio programming and
10 uplinking the programming to third parties (which would be the "other" part of XM and
11 Sirius) using conventional satellite technology. The third parties would then be
12 responsible for injecting the service with the mobility characteristic and for the ultimate
13 distribution to the consumer (including advertising, promotion, the sale of radios,
14 customer service, and billing). And the third parties would have the customer
15 relationship. If I knew the costs of the hand-off provider service of XM and Sirius, I
16 could then calculate what fraction of the costs of the end-to-end mobile service actually
17 incurred by XM and Sirius was accounted for by the hand-off provider service of XM
18 and Sirius (including the SRPR payment that would be made by levying the 7.25% rate
19 on the hand-off provider revenues for XM and Sirius). Just as in the example above, that
20 fraction could be used to translate the 7.25% rate into a rate that could be applied directly
21 to the end-to-end revenues of XM and Sirius. This functional adjustment to the 7.25%
22 rate for XM and Sirius would then account for the mobile as well as the end-to-end
23 component of the XM and Sirius service, and would be the equivalent of the PSS rate in
24 terms of the fees that it would generate for SoundExchange (because the lower rate is
25 applied to greater revenues) for a hand-off provider service provided by XM and Sirius.
26 (Of course, I also need to consider programming adjustments to that rate, as discussed
27 later.)

VII Accounting for the Functional Differences between XM and Sirius and a Hand-Off Provider Service

The framework developed in the previous section suggests a mechanism for translating the 7.25% rate into one that can be levied on end-to-end revenues of XM and Sirius. I would expect that the higher revenues earned on the end-to-end mobile service relative to the hypothetical hand-off provider service will reflect the higher costs of the end-to-end mobile service relative to the hand-off provider service. This is a matter of simple economics: Higher costs require that the firm generate higher revenues if it is to remain financially viable.

One translation mechanism is to adjust the PSS rate to account for the relative difference between costs that would be incurred by Sirius and XM if they offered their core business service as only a hand-off provider and their actual end-to-end costs.[56] That translation of the 7.25% rate could then be levied on the end-to-end revenues of XM and Sirius because that rate would then have accounted for the higher costs on the end-to-end mobile service relative to their hand-off provider service. The translation would result in XM and Sirius paying SoundExchange the same dollar amount it would have been paid if XM and Sirius offered only the hand-off provider service in the same functional manner as Music Choice, DMX, or Muzak.

The first step in the translation process is to generate a functional adjustment to the 7.25% PSS rate that will account for the mobility characteristic of the XM and Sirius service as well as for other end-to-end services provided by the two companies. This functional adjustment requires an estimate of which of the end-to-end costs incurred by XM and Sirius would fall into the hand-off provider category. Of course, an important question is what the "hand-off provider" service would be for XM and Sirius. I define the hand-off provider to include the entire audio package (both music and non-music programming) offered by Sirius and XM, because it is that package that would generate the demand for the service by third parties in turn that would reflect ultimate demand for the XM and Sirius services by consumers, not just the music component of the package.[57]

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[56] As noted previously, I account for the non-music programming of XM and Sirius below.

[57] Of course, as I have noted a number of times, I must still account for the differences in the programming offered by XM and Sirius and that of the PSS.

1 The subscriber distribution and acquisition costs that would be incurred by the third-party
2 distributors (i.e., the "other" part of XM and Sirius) would include the additional end-to-
3 end costs as well as the costs of injecting the XM and Sirius services with the mobility
4 characteristic.

5 a. ***Cost assignment for XM***

6 My decomposition of costs between hand-off provider costs and subscriber
7 distribution and acquisition costs begins with an analysis of XM's costs, by line item.
8 Exhibit 13 details a set of cost line items provided by XM, averaged over the fiscal years
9 2005 and the first two quarters of 2006. Because unanticipated costs can vary from year
10 to year, I use average costs over this period. The Appendix describes the XM line items
11 in Exhibit 13 and the reasons for categorizing them as either hand-off provider costs or
12 subscriber distribution and acquisition costs.
13 Some cost line items, even at a detailed level, cannot be categorized as a hand-off
14 provider cost or as a subscriber distribution and acquisition cost. In such cases, I
15 allocate that cost line item according to the ratio of hand-off provider costs to end-to-end
16 costs for the other assignable cost line items.[58] Additionally, I exclude certain cost line
17 items which are not relevant to this calculation (for example, XM's share of the earnings
18 or losses of its Canadian affiliate). Exhibit 13 reports each of the "baseline" line items
19 provided to me by XM and how those items were assigned to the hand-off provider or
20 subscriber distribution and acquisition category, as well as indicating which line items
21 were allocated between the two cost categories.

22 b. ***Cost assignment for Sirius***

23 I repeat this categorization of baseline cost data as hand-off provider or subscriber
24 distribution and acquisition costs for Sirius in Exhibit 14, with the detailed line items
25 described in the Appendix. Like XM, Sirius provided data for fiscal year 2005 and the

[58] I have allocated some of the cost components that could not be directly assigned to the hand-off provider or to the subscriber distribution and acquisition cost category because it did not seem reasonable to assign all of the, for example, G&A expenditures to either the hand-off provider or to the subscriber distribution and acquisition level. Against that background, allocation of these unassigned costs to the hand-off provider level by the ratio of the assignable hand-off provider costs to the end-to-end costs seemed reasonable.

first half of fiscal year 2006. However, a key cost component for Sirius programming—the Howard Stern deal—is not reflected in the 2005 data. To ensure that going forward the Stern costs were appropriately counted, I assigned the 2006 Stern costs to 2005 as well. As with XM, costs that could not be obviously assigned to the hand-off provider or subscriber distribution and acquisition category were allocated to the hand-off provider category by the ratio of assignable hand-off provider costs to end-to-end costs.

c. ***Imputing the payment for the use of SRPR***

The second step in estimating the cost ratio is to impute what the payments to SoundExchange would be based upon the fraction of total Sirius and XM costs that are accounted for by the hand-off provider costs.[59] Based on the current end-to-end revenues of XM and Sirius, I use the ratio of the hand-off provider costs to end-to-end costs to estimate what the hand-off provider revenues of XM and Sirius would be. This assumes that the relative difference between the revenues of providing the hand-off provider service and the end-to-end service reflects the relative difference in costs between the hand-off provider service and the end-to-end service (both cost components including the SRPR fee itself).[60] I then use the PSS rate of 7.25% to determine what the payments to SoundExchange would be based upon hand-off provider revenues for XM and Sirius, and incorporate those payments as part of both the hand-off provider and end-to-end costs.

The assumption that the hand-off provider revenues relative to the end-to-end revenues directly reflects the hand-off provider costs relative to the end-to-end costs is reasonable. In competitive markets, revenues tend to be driven to costs and the services offered by XM and Sirius (at both the hand-off provider level and the end-to-end level)

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[59] Of course, these estimated payments will be excessive because (e.g.) the calculations do not account for the distinction between music and non-music services, a distinction we address in the next section, or the application of the 801(b) factors.

[60] To be precise, I assumed that $(R_{\text{hand-off provider}}/R_{ee}) = (C_{\text{hand-off provider}}/C_{ee})$ where "ee" refers to the end-to-end service, R refers to revenues, and C refers to costs. In the baseline case being developed here, XM's estimated payments to SoundExchange are equal to the 7.25% PSS rate applied to the ratio of hand-off provider costs to end-to-end costs, multiplied by XM's actual revenue. The estimated payment to SoundExchange is also a component of the hand-off provider and end-to-end costs, which means that the estimated payment to SoundExchange can be determined by rearranging this equation and solving for the payments to SoundExchange.

are competitive, as I discuss in greater detail below. But for my purposes here, revenues do not have to be equal to costs or approximately so for my analysis to be valid: All that is necessary is that the revenues at both the hand-off provider and the end-to-end levels be in the same proportion to costs. Below, I address factors that support my conclusion that deviations from equality do not seem to be a significant issue in the sense that such deviations would lead to a systematic underestimate of the applicable SRPR rate.

d. ***Calculating the PSS rate using the functional adjustment***

I now have the data to apply a functional adjustment to the PSS SRPR rate, i.e., an adjustment to account for the fact that, unlike the PSS, XM and Sirius provide a nationwide mobile end-to-end service. To determine the SRPR rate that would be applied to the end-to-end revenues of XM and Sirius to account for this functional difference, I multiplied the 7.25% rate by the ratio of hand-off provider costs to end-to-end costs.[61] Using the baseline data and allocations in Exhibits 13 and 14 for XM and Sirius, respectively, that ratio for XM is about 18.8% and for Sirius, that ratio is about 25.7%. That exercise results in a functionally-adjusted rate of 1.37% for XM and 1.86% for Sirius, i.e., one that is now consistent with the end-to-end service provided by XM and Sirius. (See Exhibit 15.) Of course, this functionally-adjusted rate cannot be the final rate because it fails to account for the non-music programming components of XM and Sirius, programming which is unavailable on Music Choice, DMX, and Muzak. I make this adjustment in a subsequent section.

e. ***Other considerations***

There are a number of issues that might be raised in using this approach to estimate a functionally-adjusted rate. First, my calculations rely upon a categorization of cost line items maintained by XM and Sirius in the normal course of business, and as such, these cost categories were not created inherently to distinguish between hand-off provider and end-to-end functions. I adopted an approach that is reasonable, which is to

[61] Of course, I could have obtained this same result by dividing the imputed SoundExchange payments by the end-to-end revenues earned by XM and Sirius. However, the discussion in the text retains the fundamental intuition of the approach here—that the PSS rate needs to be adjusted for the fact that XM and Sirius incur end-to-end costs and the PSS services do not.

allocate these costs that I could not assign to the hand-off provider level by the ratio of assignable costs at that level to assignable end-to-end costs.

A second issue is that some of the accounting costs may not accurately reflect economic costs. Most obviously, the interest cost of debt is a component of both the hand-off provider and the end-to-end costs and is included in the analysis, but I have not accounted for the cost of equity. Because the end-to-end costs encompass some of the riskiest components of the XM and Sirius business—such as those arising from the need to design and develop a satellite transmission infrastructure quite different than an off-the-shelf satellite system and associated receivers—the end-to-end costs may be substantially understated. Similarly, I have not accounted for the over $3 billion of losses already incurred by each of XM and Sirius in offering their services, losses that would (if amortized) likely increase the end-to-end costs of XM and Sirius relative to the hand-off provider costs. In short, I have no reason to believe that accounting biases would result in a systematic understatement of the cost ratio, and many of those biases result in an overstatement of the cost ratio, and so result in an excessive rate.[62]

Of course, these functionally-adjusted rates for the SRPR are excessive because (among other things) they fail to account for the extent to which non-music components of the XM and Sirius service generates revenues for the two services. We turn to those additional adjustments now.

VIII Accounting for Revenues Generated by Non-Music Programming on XM and Sirius

In addition to the functional adjustment of the PSS rate, the PSS rate also needs to be adjusted for the fact that unlike the PSS, XM and Sirius both offer non-music channels and music channels to their subscribers. As I have already explained, those services appear to have a significant impact on attracting and retaining subscribers. Accordingly, a

[62] A third possibility is that the relationship of relative revenues and relative costs may not be one-to-one because many of the end-to-end costs are being incurred in anticipation of future subscribers. That is, because those end-to-end costs are intended to support future as well as current subscribers, the ratio of hand-off provider-equivalent costs to end-to-end costs will appear artificially low and as a result, so may the corresponding imputed SoundExchange payments. However, there is no particular reason to believe that the fraction of hand-off provider-level costs that are undertaken in anticipation of future revenues would differ from the analogous end-to-end fraction.

portion of XM and Sirius revenues are generated not by music but by non-music services. Without accounting for the effect of non-music programming on revenues, the application of the adjusted PSS rate to the end-to-end revenues of the two services will result in an overpayment to SoundExchange. In this section, I consider a number of methods to account for the availability and importance of non-music services to XM and Sirius subscribers.

a. ***Programming adjustment using listenership data***

Listenership data collected by both XM and Sirius provide one way to account for the importance of non-music programming to subscribers. XM collects channel-specific listenership through Arbitron, where listening is measured using Arbitron's average-quarter-hour listening.[63] Sirius conducted a survey of its subscribers that asked, among other things, how many hours they spent listening to music and non-music programming in the last week prior to the survey.[64]

A key limitation with the listenership data is that its correlation with the value consumers place on music and non-music is uncertain. There may well be some non-music channels (or music channels) that are highly valued but not listened to for any extended period of time (e.g., the NFL or local weather and traffic channels). Thus, listenership is very likely an imperfect indicator of the value that consumers place on non-music services relative to music services. Nonetheless, a listenership adjustment is an obvious one to consider. The listenership data indicates that [[ ]] of all of XM's listenership is accounted for by music. For Sirius, the corresponding figure is [[ ]]. If the functionally-adjusted rates are modified to account for these listenership patterns, then this programming adjustment results in a corrected rate for XM of [[ ]] and [[ ]] for Sirius.

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[63] XM Arbitron Custom Study, Fall 2005. The average quarter hour measure is for Monday to Sunday, 6 AM through midnight.

[64] *Sirius Customer Satisfaction Monitor 2Q '06 Results*, August 28, 2006, p. 22. The survey polled [[ ]] Sirius subscribers, who on average listened to music for [[ ]] of listening to all Sirius channels.

b. ***Programming adjustment using a channel attachment index***

The channel attachment index I discussed previously provides another way to account for the importance of non-music programming to subscribers. Data on those consumers who are prepared to cancel the service if any particular channel is withdrawn provide an indication of the intensity of their demand for a particular channel: Notwithstanding the availability of other channels on the services, these consumers are prepared to forego the entire service if a particular channel is unavailable. These data are similar to survey data often compiled in antitrust matters to identify the products that are close substitutes for the product under antitrust scrutiny. The consumer is asked what product he/she would choose if a preferred product was unavailable. Here, the question is analogously informative: Is the channel in question so important to the subscriber that he/she would choose to cancel the Sirius subscription if this channel were eliminated from Sirius' channel lineup, notwithstanding the array of other channels available on the service. In this way, the Sirius cancellation data provide useful information on the importance to consumers of music versus non-music channels.[65]

As I explained previously, for each Sirius channel, I calculate the fraction of Sirius subscribers responding that they would cancel their Sirius subscription if the channel were dropped. Because listenership varies across channels, I weight these cancellation percentages by the fraction of subscribers who responded that they had listened to the channel in the previous week. Finally, I calculate the sum of these weighted cancellation percentages for music channels, and then take that sum and divide by total of the weighted cancellation percentages across all channels (music and non-music channels). In this way, I create an index of the attachment of subscribers to music channels relative to non-music channels.[66]

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[65] Of course, a consumer who cancels his/her Sirius subscription as a result of withdrawal of a particular channel on Sirius may choose to subscribe to another service (like XM) that does offer a channel comparable to that lost on Sirius. However, there is no reason to conclude that there is a differential availability of attractive music channels on alternative services relative to attractive non-music services. Thus, there is no reason to believe that the differences in cancellation rates more likely reflect the relative availability of alternatives to Sirius for the withdrawn service rather than the relative intensity of demand for those services.

[66] As in the other adjustments for non-music programming, here I treat Sirius' comedy and kids channels as music programming.

Because I only have cancellation data for Sirius, I use the same data for XM as well. However, in the case of XM, I exclude Howard 100 and Howard 101 (channels with high cancellation percentages and high listenership). This assumes that the other music and non-music programming of the two services is roughly comparable in terms of listeners' attachment.

Including the Stern channels produces an index of the importance of music programming of [[ ]], while excluding the Stern channels increases the index to [[ ]]. If the functionally-adjusted rate is modified using these indices (I apply the with-Stern index to Sirius' functionally-adjusted rate and the without-Stern index to XM's functionally adjusted rate), this programming-adjusted rate would be [[ ]] for Sirius and [[ ]] for XM.

c. ***Programming adjustment using program expenditure data***

One natural way of accounting for the significance of music relative to all programming on XM and Sirius is to apply a programming adjustment based on the ratio of music programming expenditures to total programming expenditures, which would reflect the relative importance of music programming and non-music programming for the Sirius and XM services. I understand that the two services have spent a substantial amount of money for non-music programming because they expect that these expenditures will lead directly to increased subscribers and subscription revenue.

For XM, we estimate music programming expenditures as [[ ]] and total programming expenditures as [[ ]] (including the imputed SoundExchange payment), the resulting ratio of music to total programming expenditures being [[ ]].[67] Similarly, for Sirius, we estimate music programming expenditures as [[ ]] and total programming expenditures as [[ ]]. In the case of Sirius, the resulting ratio of music to total programming expenditures is [[ ]]. This programming adjustment leads to a rate of [[ ]] for XM and [[ ]] for Sirius.

[67] Music programming expenditures include the payment for the SRPR, which is determined as the result of this computation. For the sake of simplicity in calculating this adjustment, I use the estimated SRPR payment from the baseline case, which is conservative insofar as it will result in a higher programming-adjusted rate.

The obvious appeal of this approach is that it highlights the important role that non-music programming plays in the packaging of the two services. In particular, this approach can be thought of as identifying the value that consumers place on the programming containing sound recordings of the audio package compiled by XM and Sirius relative to the value they place on the non-music programming.

However, the approach does have limitations. Roughly speaking, the adjustment may not fully "meter" the revenues associated with music programming. Some consumers who subscribe to the services largely because of the non-music programming services will nonetheless listen to some music and that additional listening will not be captured in this adjustment. So this particular programming adjustment may understate the SRPR rate. However, to the extent that some consumers subscribe to the services because of the music, some of those will also listen to the non-music programming, and this adjustment approach would fail to account for the additional revenues associated with resulting from the availability of non-music programming to subscribers.

Nonetheless, because the programming expenditure-based adjustment may understate what a reasonable rate should be, I have not included those rates in my consideration of the reasonable range of rates. However, this rate calculation does underscore the importance of non-music to the services and their view of what programming is necessary to attract additional subscribers. In so doing, it provides me comfort that the lower bound I do include is reasonable.

IX Summary of Rate Estimates Based on the 7.25% PSS Rate

It is my opinion that the PSS 7.25% rate paid by a hand-off provider service offering an audio package like that of XM and Sirius provides a useful benchmark rate to determine royalties payable to SoundExchange. Upon consideration of the differences between XM and Sirius on the one hand and the PSS on the other, I have identified the need for three significant adjustments (two of which are feasible given data limitations). The first is the functionality adjustment, accounting for the end-to-end mobile service provided by XM and Sirius in contrast to the more limited service offered by the PSS.

The second is a programming adjustment accounting for the importance of non-music programming to XM and Sirius.

Exhibit 16 summarizes the complete analysis. As is obvious, the program-adjusted rates for XM and Sirius fall within a narrow range and given the similarity between the estimated rates of the two services, the use of the same rate for both seems reasonable. Thus, based on the PSS rate, a reasonable range for the SRPR rate for XM and Sirius is between 0.88% and 1.04%.

Instead of the 7.25% starting rate, it may be more appropriate to consider a lower starting rate of 5.32% for a PSS. This lower rate, the derivation of which is explained above, reflects the logic of the original PSS decision but is based on the actual PRO benchmark rate that was used in that proceeding. Applying the adjustments to this lower rate results in a range of rates between 0.65% and 0.76% for the two services. (See Exhibit 17.) (Of course, the rates in Exhibits 16 and 17 do not account for the 801(b) factors.)

Finally, the third adjustment stems from the value-added contributions made by XM and Sirius to music programming. To the extent that these enhancements result in a higher subscription price for the XM and Sirius services, then the SRPR holders may be overcompensated because I have not accounted for these enhancements in my analysis. Suppose, for example, that after adding the enhanced music, the number of sound recording performances remained unchanged but the price that consumers were willing to pay for the service increased. Under a per-listener/performance fee, the payments for the use of the SRPR would not change. But because the fee here is based on a percentage of revenue, the payments to the SRPR holders will increase even though the number of sound recording performances has not changed.

X Appropriately Adjusted, the Payments Made by XM and Sirius to the Performance Rights Organizations May Provide a Useful Upper Bound to the SRPR Rate for XM and Sirius

Another useful benchmark for the SRPR royalty rate is the set of royalty payments made to the performance rights organizations: ASCAP, BMI, and SESAC.

These payments are the royalties received by composers and publishers for the use of the musical works public performance rights underlying the sound recording performance.

The appropriate SRPR payment should be no larger than the PRO payment. A buyer of the sound recording performance rights needs both rights in order to render a public performance of the sound recording. Thus, the buyer is in exactly the same position with regard to the two broadcast rights: Both are needed to broadcast sound recordings, and the benefit received by the buyer applies to both rights jointly. In addition, each seller of the sound recording performance right is in the same position as the seller of the musical works performance right for that sound recording. From the seller's perspective, the direct cost of using either right for additional performances of a sound recording is the same (zero).

The characterization that the sellers of the sound recording performance rights and the musical works rights face zero incremental costs seems a good one as an empirical matter. To see this, consider the fact that record companies earned a total of $24.4 billion from worldwide sales of recorded music in 2005.[68] Even supposing that XM and Sirius both paid a PSS rate of 7.25%, (a completely inappropriate rate for the reasons I have already explained), the combined payments by XM and Sirius to SoundExchange would still account for less than 0.24% of recorded music revenues. Accordingly, a reasonable conclusion is that the fees received by SoundExchange for the use of the SRPR from XM and Sirius would not have any detectable effect on the sound-recording production decisions of the labels. Thus, the assumption that the cost of extending the SRPR to XM and Sirius is effectively zero seems appropriate. Hence (based on the direct costs and benefits of the transaction) whatever bargaining process is used to determine one royalty rate would arrive at the same result for the SRPR royalty rate as well. As I will discuss shortly, consideration of indirect promotional benefits suggests that the SRPR royalty would be somewhat less than the musical works performance royalty.

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[68] I estimate worldwide record company sales of $24.4 billion by dividing Warner Music Group's $2.924 billion in worldwide recorded music sales by its 12.0% share of retail record sales. See Warner Music Group, 2005 Annual Report, p. 2; International Federation of the Phonographic Industry, as reported in *Market Share Reporter*, 2007, Volume1, "Top Music Firms Worldwide, 2006," p. 446.

1 I understand that XM has negotiated a final rate with ASCAP of 1.44% of its
2 adjusted gross revenues for the next five years for the use of the musical works
3 performance right to the music in the ASCAP library. In addition, I understand that
4 payments to SESAC are about 6% of the payments made to ASCAP and BMI.[69] While
5 XM has not yet negotiated a final rate with BMI, my understanding is that ASCAP and
6 BMI typically have the same rates.
7 As noted, the XM-ASCAP rate applies to adjusted revenues, where these
8 adjustments include certain deductions such as 15% of subscriber acquisition costs. I
9 understand that the XM-ASCAP rate of 1.44% of adjusted gross revenues accounts for
10 about 1.11% of gross revenues. Accordingly, the total payment to the PROs made by
11 XM would be 2.35% of gross revenues (i.e. 2 x 1.11 x 1.06). I also understand that
12 Sirius has not yet negotiated any final rates with the PROs; for purposes of this
13 discussion, I am assuming that the rates Sirius ultimately pays will be comparable if not
14 identical to those paid by XM.[70]
15 For a number of reasons, the sum of these PRO rates is likely to be an upper
16 bound on the rate to be levied for the use of the SRPR. First, the PRO rates themselves
17 are negotiated in the shadow of the courts that administer the Department of Justice's
18 consent decrees for BMI and ASCAP. In order to become the sole agents for the
19 musical works performance rights in their respective libraries, ASCAP and BMI each had
20 to agree to terms embodied in the consent decree, which were designed by the Justice
21 Department to constrain the exercise of monopoly or market power by each monopoly
22 rights agent.[71] In the event that the rights user believed the negotiated rates would be too
23 high, it could incur the costs of litigation to ask the courts administering the consent
24 decree to determine a reasonable rate for the use of the musical works in the library of
25 each PRO. However, the incentive to incur litigation costs may be different for a user of

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[69] XM's payments to SESAC were 6.05% of the payments to ASCAP and BMI over 2005 and the first two quarters of 2006. (XM financials.) The corresponding figure for Sirius was 5.80%. (Sirius financials.)

[70] However, I do understand that Sirius views the rates paid by XM as excessive and so believes that basing an upper bound on the PRO rates of XM is equally excessive.

[71] See, for example, the discussion of the earlier decrees in the Department of Justice press releases describing more recent decree modifications: http://www.usdoj.gov/opa/pr/2000/September/517at.htm and http://www.usdoj.gov/atr/public/press_releases/1994/211869.htm.

rights than for the PRO. For the user, the rates are set for that particular use, while for the PRO the rates can serve as a precedent for other ratemaking negotiations and proceedings involving other uses, i.e., they could serve as benchmarks for rates in those other uses. Because the benefit of a successful litigation is higher for a PRO than for a user, the PRO will be prepared to bargain harder with the user for a higher rate. Thus, the current ASCAP and BMI rates may be well in excess of that which would be forthcoming in a more competitive market.

Second, the payments to the PROs do not reflect consideration of the 801(b) factors and should be considered an upper bound for the SRPR rate to be levied on the revenues of XM and Sirius. While I discuss the 801(b) factors below, some of that discussion is worth foreshadowing here.

When a sound recording is performed on XM and Sirius, it generates a promotional benefit to the SRPR holders in that some listeners who hear the performance (and see the artist name and song title displayed on their receiver) may go out and purchase a copy of that recording via a CD or download. As discussed below, this promotional benefit spans the range of genres played on Sirius and XM, and applies to both new and old recordings. While both the PRO and the SRPR holder benefit from the additional sales of sound recordings, the incremental return on the sale of a sound recording is likely to be greater than that for the holder of the musical works right because the price of the CD itself is designed to recoup all of the costs borne by the producer of the sound recording. Moreover, the increased exposure of artists will likely increase the sales from concert tours, some of which will no doubt be contractually captured by the labels. While we discuss these benefits in detail below, the effort exerted by the labels to obtain airplay from terrestrial radio suggests that the flow of payments in a more competitive market may well be from the SRPR holders to the SRPR users.

A third factor which leads to the conclusion that the use of the PRO rates as a benchmark is an upper bound stems from the fact that the PRO rate is levied on the use of all of the music in the PRO libraries. By contrast, it is my understanding that under the Act, performances of pre-1972 recordings are exempt from the payment of the SRPR. Thus, because the library of sound recordings is smaller than the entire library, if the

PRO rate were used as the starting point for setting the SRPR rate, one would have to reduce that rate to reflect the reduction in the library of relevant recordings. In addition, the services are not required to pay a SRPR fee for live performances and archival performances, while payments to the PROs are required. This would require yet another downward adjustment in the PRO rate before being applied to the revenues of XM and Sirius as a SRPR rate.

An additional factor is the broader scope of the PRO license compared to the SRPR license. The SRPR licensee is subject to the sound recording complement rule that (unless granted an exception by the record companies, which may require additional compensation) limits the number of songs played from a particular album to no more than two in a row, or three in any three hour period. In addition, no more than three songs in a row, or four in any three hour period, can be played from the same artist or boxed set.[72] There is no such limitation on the scope of the PRO license.

Finally, I note that Sirius has not as yet accepted the rate of 1.44% of adjusted revenues of the XM-ASCAP agreement. To the extent that Sirius and ASCAP agree upon a lower rate, the upper bound of the range estimated here should be adjusted to reflect this change. I understand that Sirius will be testifying regarding its view as to why the ASCAP rate is excessive. I also understand that XM agreed to this rate with ASCAP in light of other consideration.

XI Consideration of the 801(b) Factors Suggests that the SRPR Rate to be Paid by XM and Sirius Should Be Towards the Low End of the Range

As noted at the outset, the rates ultimately established for the SRPR payment by XM and Sirius must reflect the Section 801 (b) factors:

(A) To maximize the availability of creative works to the public;

(B) To afford the copyright owner a fair return for his creative work and the copyright user a fair income under existing economic conditions;

(C) To reflect the relative roles of the copyright owner and the copyright user in the product made available to the public with respect to relative creative

[72] For the complement rule see http://www.copyright.gov/fedreg/1997/62fr34035.html.

contribution, technological contribution, capital investment, cost, risk, and contribution to the opening of new markets for creative expression and media for their communication;

(D) To minimize any disruptive impact on the structure of the industries involved and on generally prevailing industry practices.[73]

Using the rates estimated above, a range of estimates for the reasonable rate of the SRPR can vary from 0.88% (based on the 7.25% PSS rate) to 2.35% (based on the PRO rates). However, the estimates based on payments to the performance rights organizations do not account for the 801(b) factors. As I understand it, those rates are subject to a willing buyer/willing seller standard. The rates based upon the PSS rate do reflect the 801(b) factors, but as they apply to Music Choice and (perhaps) DMX and Muzak, not to XM and Sirius.

What follows is my assessment of the performance of XM and Sirius in fostering objectives A, C, and D relative to the record companies (who I identify for shorthand purposes as the holder of the SRPR) and Music Choice, as a representative PSS. I conclude that based on these factors, the rate for XM and Sirius should be towards the lower end of the range of estimated rates. In satisfying these objectives, such a rate would provide a fair return to the holder of the SRPR because it accounts for these and marketplace factors.

a. ***Evaluating the role of XM and Sirius in promoting the availability of music***

In evaluating the XM and Sirius contribution to the "availability" of music, "availability" can be interpreted in terms of music distribution, i.e., transmitting more music and more types of music to more listeners, or in terms of the supply of music, i.e., the creation of more music.

I understand that in previous decisions, the Librarian has interpreted "availability" to mean only the production of sound recordings.[74] However, an economist would naturally interpret "availability" to encompass both distribution and production. And

[73] 17 U.S.C. 801(b)(1).

[74] See Librarian Decision 1998 at 25406.

given the nexus between the two described below, that interpretation is key to understanding how distribution affects the production of sound recordings. I discuss each of these in turn.

i. Availability interpreted as music distribution

The XM and Sirius services currently encourage the more widespread availability of music in a number of ways. First, the services offer subscribers a substantially wider array—in terms of formats or stations within a format—than do over-the-air radio and Music Choice. Sirius and XM both provide more music channels than are found in even the largest terrestrial radio markets, and those channels cover a more diverse set of genres. While Sirius has 71 music channels and XM has 80, the five largest radio markets, as measured by BIA, have an average of 43 music stations.[75] Of these music stations in the largest terrestrial radio markets, 52% are in the rock or pop genres. In contrast, pop and rock stations at XM and Sirius account for only 39% and 45%, respectively, of the music channels.

The remaining channels span a wider array of formats than are found even in the top five radio markets. For example, the top five radio markets have no stations dedicated to playing kids music and only one station (in San Francisco) using a dance music format. Both Sirius and XM have multiple channels in each of those formats.

Moreover, even within the common genres, there is a greater diversity in the satellite radio offerings. For example, four of the top five terrestrial radio markets have only one station in the jazz and blues genre. The fifth, San Francisco, has two, but both offer a smooth jazz format.[76] In contrast, both Sirius and XM have five channels in the jazz and blues genre, with each channel focused on a different subgenre (classic jazz, modern jazz, blues, etc.). The contrast between the number and range of choices for music available on Sirius and XM and what is available on terrestrial radio in smaller markets would be even more pronounced.

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[75] Information on terrestrial radio markets is from the 2006 BIA Investing In Radio Market Report; see Exhibit 18. See Exhibits 3 and 4 for the channel lineups on XM and Sirius.

[76] See 2006 BIA Investing In Radio Market Report, p. 2.

Similarly, both XM and Sirius offer more music channels than Music Choice, indicating that the contribution of XM and Sirius to music distribution is greater than that of Music Choice. (See Exhibit 6.)

Second, the labels do not expend any incremental effort to provide music to XM and Sirius that will enhance the transmission of the music provided by the two services. The labels are not involved in those transmission decisions and so do not enhance the availability of music in terms of its distribution.

ii. Availability interpreted as the supply of new music

I earlier observed that availability can also be interpreted to mean the supply of sound recordings. To be sure, the recording companies, the performers, and composers are directly involved in the production of music, unlike XM/Sirius. But as I noted above, even if XM and Sirius were to pay SRPR fees at the inappropriate and excessive rate of the PSS, those payments would likely have an undetectable effect on increasing the supply of sound recordings.[77] Moreover, the fees paid by XM and Sirius for the SRPR may represent fees that record companies would not otherwise accrue. As shown in Exhibit 11, most of the listening to Sirius is diverted from over-the-air radio which pays performers and the holders of the SRPR nothing for airplay. SoundExchange benefits directly from this conversion of over-the-air listeners to XM and Sirius subscribers because terrestrial radio does not pay a SRPR fee.

In addition, there is normally a tension in simultaneously attempting to increase both the distribution of a product and the supply of a product. A lower price charged by the distributor for the product will increase the number of consumers to whom the product is available, but can reduce the earnings of the product supplier and so reduce the supply of the product.

Here, the tension between these two goals is muted if not completely absent. A lower SRPR fee leading to more widespread distribution of the XM and Sirius services will expose listeners to artists, songs, and genres more or more effectively than would

[77] Indeed, it appears that nearly a third of the revenues collected by SoundExchange are not distributed to the responsible artists, further diminishing any effect of the SRPR fee on encouraging the supply of new musical works. See http://soundexchange.com/news/documents/SoundExchange_PR_6_14_05.pdf.

otherwise be the case. That exposure, in turn, will tend to encourage the sale of music (CDs, downloads) to final consumers, thus benefiting the artists and recording companies and thereby encouraging the production of new sound recordings. While the SRPR payments themselves by XM and Sirius may have no measurable effect on encouraging new sound recordings, that does not mean that the services do not contribute to expanding the supply of sound recordings. The evidence certainly suggests that the recording industry values the promotional impact of XM and Sirius (or services like them) on sales of sound recordings and concert tickets.

Record companies engage in numerous promotional practices to increase airplay for their artists. Some of the practices used to influence terrestrial radio airplay have recently received considerable notoriety in the investigation carried out by the New York State Attorney General. As the AG's office noted in the press release announcing a settlement with Universal Records, "Radio airplay is the single most effective driver of music sales."[78] Among the practices documented in that investigation are payments to radio stations and programmers, sponsorship of events and listener contests, and use of independent promoters, all efforts intended to increase the airplay of the label's sound recordings.[79]

While promotion on terrestrial radio is an important and ongoing component of the marketing strategy of record companies, the effectiveness of that component is limited by the range of programming carried over broadcast radio. A 2001 article from Billboard begins by stating the problem: "While labels have increased the amount of new product coming through the pipeline, radio has tightened its playlists. It's like trying to pour a gallon of water into a pintsized container."[80] The article concludes quoting Fred Mills, a promotion representative from DreamWorks: "'Maybe we will have to find other avenues to expose product, whether it be through more fragmentation of formats, the Internet, satellite radio, or visual mediums.'" Thus this article, written

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[78] http://www.oag.state.ny.us/press/2006/may/may11a_06.html

[79] See "Executive fired amid charges of payoffs", *New York Times,* January 12, 2005; "Sony BMG settles radio payola probe", *Washington Post*, July 26, 2005; "Music labels say it costs too much to get songs on the radio," *The Wall Street Journal,* June 10, 2002, p. B1.

[80] "Radio and labels at odds again," *Billboard*, May 12, 2001, p. 135.

1 shortly before satellite radio service was launched, had already begun envisioning a role
2 for satellite radio in expanding the promotional reach of record labels.
3 From the inception of service, an element of the strategic plan for satellite radio
4 was to develop promotion opportunities for record companies, taking advantage of the
5 scale economies and national coverage of satellite radio.[81] This has been accomplished
6 by the breadth of musical styles covered among the music channels as well as specific
7 opportunities to feature and promote artists.[82] For example, XM has an Artist
8 Confidential series in which an artist from somewhere across the spectrum of musical
9 genres gives a live performance from XM's performance theater, which is broadcast on
10 the appropriate music channel.[83] Numerous shows anchored by celebrity hosts on both
11 Sirius and XM provide opportunities to expose devotees of particular music formats to
12 new or less well known artists.[84] XM produces a program called "Then...Again...Live"
13 that features classic rock performers giving live renditions of their classic rock and
14 another called "Offstage" in which XM visits a performer at his or her home and
15 broadcasts a show from that home.[85] Sirius also broadcasts a number of live shows, both
16 from its own studios and from remote locations such as those hosting various winter
17 extreme-sports events. These efforts go beyond anything undertaken by the PSS audio
18 services.
19 Satellite radio has also provided a forum for airplay for veteran artists who, while
20 no longer listed on the top of the charts essential for terrestrial radio playlists,
21 nevertheless are able to reach potential buyers among devoted fans listening to the
22 targeted musical formats on satellite radio.[86] Emails received from subscribers[87] and

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[81] See 2001 Form 10-K, XM Satellite Radio Holdings Inc., p. 4

[82] See "Start Me Up: satcasters go early on new artists," *Billboard*, March 17, 2006, p. 135.

[83] See 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 8; *Satellite Radio Outlook*, Kagan Research, LLC, July 2005, p. 74.

[84] Among the hosts of music shows on Sirius are Eminem, Tony Hawk, and Jimmy Buffett; XM hosts include Snoop Dogg, Bob Dylan, Tom Petty, and Ludacris. See http://www.sirius.com/servlet/ContentServer?pagename=Sirius/Page&c=Page&cid=1065475754125 and http://www.xmradio.com/exclusivemusic/.

[85] See http://www.xmradio.com/exclusivemusic/offstage.jsp

[86] See "Stymied by radio, veteran acts try new outlets," *Billboard*, January 29, 2005, p. 30; "XM credited for band's worldwide exposure," *Richmond Times Dispatch*, August 10, 2006, p. F-11.

1 artists[88] attest to the value of airplay on satellite radio in increasing CD and download
2 sales.

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[87] For example, "Where can I purchase your music? I was listening to it on XM and fell in love with it! I work at a top 40 station and need a change of music for the drive home---yours was perfect!!!" (3/17/2006, p. 8); "A station like the Loft has been sorely missing for years in Southern California and your station is the reason I became an XM subscriber. Now I have three radios. I have found that since I started listening, I am actually buying more music than before....I listen at home and in the car ... weekdays and weekends ... and I'm a total cheerleader for the format. Thanks for making me enthusiastic about radio again." (9/12/05 p. 3); "If it only had channel 74 that would be enough for me to keep paying my subscription to xm radio. Since I got the new car (and xm radio) I have heard so many new (and old artists). For the first time in a long time I'm buying music and attending live shows. For example, I heard Sonny Landreth's 'Congo Square' for the first time on XM....(not much Louisianna Music here in Boston). I bought the album and as good luck would have it learned he would be performing nearby. My son, an aspiring guitarist (at 16 he has no interest in the blues) went to the show and had a ball." (3/21/06 p. 23). "I'm trying to find a good Download Site that carries the music played on XM-31 since i-tunes and Napster don't carry a lot of the music you play. Can you recommend anywhere on the Web that offers these tunes and others you play for download? Pay, of course ....." (3/20/06, p. 25); "Thank god I opted for XM so I could discover what you are putting together. I am one of the pickiest people when it comes to music. I have not listenned to radio music for about ten years, online or local. I could never find something to hit my exact taste. Not only do you play the indie rock titles that I am addicted to but you also play many up and coming r and b, rap groups. I thought if I had satellite radio, I would not have to buy so many cd's. Now that i have XMU, I have doubled my catalog. Thanks for all of the hard work." (11/26/05, p.27) "Thank you for a great station and some incredible new music. Because of U-POP I have been purchasing the artists I hear you play (some are very hard to find in U.S. even from ITunes). My music collection is now back to the levels when I was in high school 10 years ago." (12/13/04, p. 31) "The fact that I can REAL music that I have not heard before, and see who is actually playing it to buy the album is AWESOME. You guys are great for the record industry." (7/14/03, p. 66); "When I bought my XM, the salesman told me I would no longer need my CD's. With the variety of music, I would listen to the XM radio all the time. My purchases have actually increased because I hear songs I haven't heard in years. I also buy music I would never have heard on commercial radio I LOVE XM!!!!!!" (11/15/02, p. 70); "This is the best service that I have ever bought, and I have never looked back on it. Furthermore, I never bought too many CD's in the past, but now with artists names and titles being shown, I am going out and buying CD's of bands that I have never heard before. Thanks again for the awesome service you provide." (1/21/03, p. 71); "i love this radio station more and more each day. i have bought more cds from hearing them on your station, than i ever have. i would do anything to have my band heard on this station even if it is the only station we are ever heard on again." (2/22/06, p. 100)

[88] For example, "Our long-form John McEuen special last week caused a massive uptick in sales for various Dirt Band projects" (6/14/2005, p. 10); "Mitch's website is receiving a noticeable increase in traffic on the days XM plays Mitch Fatel tracks, and more importantly a noticeable spike in CD sales." (10/1/04, p. 11); "Tommy has actually made money the first time on a record, and it was all possible because of you folks at XM." (3/16/04, p. 12); "Needless to say, we owe a lot to you and XM for bringing us a bunch of new fans - Emails and orders from people who heard us on your show." (9/7/03, p. 14); "I wanted to let you know that I have been getting so many people telling me they've heard me on XM and really enjoyed what they heard. Just the other day I had a gentleman email me because he and his son were driving along and suddenly my tune "Four on the Floor" came on and his son was instantly hooked to find out what that was. They loved the music, did a Google search on my name and bought a 3 CD Set from me. Now his son is hooked on jazz. I've been getting stories like that all the time. I can't thank you enough for playing my music." (4/13/06 p. 17); "First off, thank you so much for playing our most recent cd "Live & On Fire" on XM. We've received emails from all over the country from folks saying they've heard our music on XM, and we've sold many cds to listeners who otherwise would probably never have heard of us. As a regional band on an independent label, the exposure you've given us has been invaluable!" (4/14/06 p. 18); "thanks so much for getting the Hellhounds some spins on Bluesville! They are starting to notice an increase in

1 Furthermore, there is no evidence to support the proposition that satellite radio
2 listenership displaces any CD or download sales, let alone by a large enough amount to
3 offset the substantial promotional benefits.[89] In addition, the sound recording
4 complement rule described previously further limits the ability of XM and Sirius listening
5 to substitute for purchasing recorded music.
6 Moreover, accounting for the effect of satellite radio listenership on CD purchase
7 or downloading habits (and associated consequences to SRPR holders) would require
8 systematic review of potential changes in all of the other ways in which subscribers may
9 use their discretionary time (e.g. DVD watching, video game playing, use of iPODs,
10 listening to over-the-air radio, etc.), making the empirical effort difficult at best.
11 In short, the transmission of music by XM and Sirius is unlikely to reduce, and in
12 fact is likely to enhance, the production of music by the recording artists and the record
13 labels. Application of this factor to XM and Sirius suggests that a reasonable rate would
14 be at the lower end of the range.

15 b. ***Evaluating the role of XM and Sirius in "creative contribution,***
16 ***technological contribution, capital investment, cost, risk, and***
17 ***contribution to the opening of new markets for creative expression"***

18 In this section, I review the role of XM and Sirius in advancing the objectives of
19 the 801(b) factor (C), relating to creative contribution, technological contribution, capital

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their CD sales since you've been playing their stuff." (4/12/06 p. 19); "Thank you, thank you, thank you! Everywhere Ron goes, he hears, "They are playing you all the time on Bluesville XM." It must be true, too, because we are selling a significant amount of CDs online and people who buy the CD through CD Baby say they heard the music on your station." (5/31/05 p. 22)

[89] While not directly relevant, it is instructive to note that there is a growing literature on the effect of music downloading on CD sales and concert revenues. On music downloading, there is no clear consensus on the direction or magnitude of the effect of downloading on CD sales. For example, a 2005 study by Oberholzer and Strumpf finds no statistically significant effect of file-sharing on CD sales. (See Oberholzer and Strumpf, "The Effect of File Sharing on Record Sales: An Empirical Analysis," Working Paper, 2005.) A 2004 study by Blackburn finds that file-sharing has a negative impact on the sales of an average CD, though it has a positive effect for relatively unknown artists and a negative effect for popular artists. (See Blackburn, "On-line Piracy and Recorded Music Sales," Harvard University Dissertation Thesis, 2004.) On concert revenues, Mortimer and Sorenson find that music downloading has eroded CD sales, but that the loss of these revenues is more than offset by increases in the number of live concert performances and the profitability of those performances. (See Mortimer and Sorenson, "Supply Responses to Digital Distribution: Recorded Music and Live Performances, Working Paper, 2005.) If downloading has no clear displacement effect or effect on artists' incomes, then it seems even less likely that listening to satellite radio would lead to displacement.

investment, cost, risk, and contribution to the opening of new markets for creative expression and media for their communication. I discuss each in turn.

i. Creative Contribution

With respect to "creative contribution," it is certainly true that record labels and performers (along with composers and publishers) are directly involved in the music production process. Nonetheless, I am unaware of any evidence that the labels expend any incremental effort to create new music for XM and Sirius. This is not surprising since as previously noted, any fees paid by XM and Sirius for the SRPR would be a very small fraction of their overall revenues.

However, both XM and Sirius have invested in the creation of attractive non-music content, including music-related programs (such as Willie's Place hosted by Willie Nelson) and other programs (including Oprah, Martha Stewart, and MLB). In addition, both services have incurred costs to refine the music experience by using experienced music programmers and personalities to make those channels more attractive to listeners. XM and Sirius offer more of such enhancements than Music Choice.

The non-music focus of XM and Sirius has likely increased the number of subscribers to these services. For example, as noted previously, the skew of XM and Sirius towards non-music programming and the apparently substantial attachment that subscribers have to the non-music program offerings have likely attracted subscribers who may have been "talk-focused" but still listened to some extent to music on terrestrial radio. Some, if not all, of these subscribers will switch their music listening from terrestrial radio to the music services of XM and Sirius and so will contribute to the SRPR payments being made to performers. Moreover, the addition of the non-music services may result in greater promotion of the sale of sound recordings by these new subscribers to the extent that these subscribers either increase their music listening above what it was prior to subscribing to XM or Sirius or because they take advantage of the other promotional aspects of the XM and Sirius services, namely, song and singer identification.

ii. Technological Contribution

The technological contribution of XM and Sirius to music distribution is substantial and one in which the recording industry played no role. As noted above, both Sirius and XM developed their own satellite systems to provide a mobile service and developed the chipsets required for the satellite radios themselves. With respect to the radios in particular, I understand that XM initially had contacted a number of electronics manufacturers to design and produce the radios. However, I understand that in fact, notwithstanding the pedigree of some of these manufacturers, they did not have the in-house capability to design the radios. That was an effort undertaken by XM. In addition, the antenna for the vehicle installation needed to be as unobtrusive as possible—a design effort that was also undertaken by XM. I understand that the first XM antennas were quite bulky, but now are about the size of a quarter, which has enhanced the ability of XM to attract OEM partners.

My understanding is that Sirius also faced many of these same technological hurdles in developing its service. Sirius developed a chipset with the assistance of Lucent that was capable of receiving and playing the satellite signals, and built into these chipsets the ability for its radios to choose the strongest signal source (either of two satellites or terrestrial repeaters) and buffer the signal so that, for example, the broadcast is uninterrupted when driving through an underpass. Sirius also incurred the costs associated with developing unobtrusive (so that they can easily be installed on the roof of a vehicle) antennas capable of receiving its programming (in contrast, satellite television services like DirecTV require antennas greater than a foot and a half in diameter). Sirius also works with consumer electronics companies and OEM partners to subsidize the development of new radios and the integration of Sirius radios into new automobiles.

Both XM and Sirius have received patents for a number of their innovations. XM has 42 patents, with 8 more pending, while Sirius has 12 patents and 2 pending. As an example, XM has more than 10 patents related to the design of mobile antennas that can access satellite signals, while Sirius was awarded several patents related to using the elliptical geosynchronous orbit of its satellites. A complete listing of the patents can be found in Exhibit 19.

Investments in R&D have totaled [[ ]] over the past 3 years for XM. Sirius, which tracks expenditures on engineering, design, and development, has spent [[ ]] in the past 3 years. (See Exhibit 20.) There is no corresponding incremental contribution by the recording companies in expanding and improving upon the innovations in satellite radio.

Similarly, the innovations of XM and Sirius are not matched by those of Music Choice. Music Choice has relied on conventional distribution schemes (transponder leases on conventional satellites and use of the existing cable infrastructure) while XM and Sirius created an entirely new music distribution system. The number of patents received by Music Choice is significantly less than that of XM and is also smaller than that of Sirius. Among the innovative features pioneered by XM and Sirius are the plug-and-play satellite radio concept that allows the same radio to be used in a home docking station or in an automobile; the development of a portable/wearable radio, including the miniaturization of the antenna, that allows subscribers to receive live satellite radio broadcasts; the initial chipset development for satellite radios and the subsequent reduction in size, reduction in power consumption, and improvements in signal reliability; and work with automobile manufacturers to integrate satellite radio antennas into their vehicles. (See Exhibit 19.)

iii. Capital Investment, Cost, and Risk

XM and Sirius have expended considerable funds on both capital investments and R&D investments to deploy a satellite radio service—the design and production of receivers, the acquisition of the land rights and the positioning of repeaters, the satellite design itself, all done well in advance of service launch. These investments have totaled [[ ]] since inception for XM and [[ ]] million for Sirius, or more than [[ ]] dollars combined across the two services. (See Exhibit 21. Exhibit 22 details the services' satellite expenditures.) They also have invested in developing innovative content for both the music and non-music services (which in turn, attracts more listeners to the service). By contrast, the recording companies have not incurred any incremental investment or any other costs with respect to the development and deployment of satellite radio service or programming on that service.

1 Similarly, XM and Sirius have likely expended far more in capital investments
2 and other costs than Music Choice. Music Choice relied on standard satellite
3 transmission technology and cable infrastructure for the deployment of its service and
4 provides only all-music channels. XM and Sirius developed a customized satellite radio
5 service for mobility in a nationwide footprint.
6 The same higher level of expenditures associated with satellite radio service also
7 represents highly risky investments on the part of the two services. They deployed new
8 satellite technology, bought and launched their own satellites, invested in the chipset and
9 other aspects of the satellite radio itself, invested in the development of non-music
10 content for both the music and non-music channels, and invested in the promotion of a
11 new service that still has no guarantee of ultimate success.
12 The only possible risk that the recording labels incur is that of displacement of
13 CD or download sales, but as discussed above, there is no credible reason to believe that
14 such displacement is either significant or indeed exists at all. In fact, to the extent that
15 XM and Sirius provide another avenue of exposure promoting the artists, CD sales,
16 downloads, and concerts, the overall risk of recording and distributing CDs and
17 downloads to the recording companies and of selling concert tickets may be reduced.
18 Moreover, to the extent that XM and Sirius subscriptions come at the expense of
19 terrestrial radio, the recording artists and labels will earn fees for the SRPR that they
20 would otherwise not receive.
21 It is also likely that the risk incurred by XM and Sirius is greater than that
22 incurred by Music Choice, both at the outset and today as well. As noted, XM and
23 Sirius developed their own satellite and radio technology while Music Choice relied
24 largely on existing technology. In addition, the size of the financial stake—the
25 magnitude of the investments that are at risk for XM and Sirius—is likely much more
26 substantial for Sirius and XM.

27 iv. Opening New Markets

28 As noted previously, the development of satellite radio has provided a mobile
29 service that offers more music and non-music services than is available via traditional
30 radio. XM and Sirius both overcame substantial obstacles in order to obtain licenses from

the FCC. In 1990, Sirius first approached the FCC regarding the possibility of allocating satellite spectrum for a satellite-based radio service. The services (or their corporate predecessors) applied to the FCC for licenses in 1992. It wasn't until 1997 that XM and Sirius were awarded the licenses.[90] Chief among the obstacles confronted by XM and Sirius in seeking the licenses was the persistent objections by what I have understood to be one of the most powerful lobbying organizations in the country, the National Association of Broadcasters whose members include commercial over-the-air radio stations. As the above discussion suggests, there has been no effort by the recording companies to assist either the initial acquisition of the licenses or in the development of a mobile satellite radio service.

The key contrast with the contributions of Music Choice and other PSS to opening new markets is the development of the mobile satellite radio service. The PSS introduced cable operators and their subscribers to a new way of receiving in-home music without commercials. XM and Sirius went substantially beyond the efforts of the PSS by providing an end-to-end mobile service. This effort, unlike the efforts of the PSS, required the development of complex technology required to support that service. In addition, XM and Sirius both offer subscribers more channels of music and more music diversity than the PSS, providing an increased opportunity for subscriber exposure to new artists and different music genres. This discussion suggests that the contribution of XM and Sirius to opening new markets is more substantial than that of the PSS, particularly in light of the required new technology development by XM and Sirius. Indeed, while XM and Sirius appear several times in one compilation of a list of important events in radio history, Music Choice does not appear at all.[91]

c. ***Evaluating the potential for a SRPR rate that could prove disruptive to the satellite radio business***

Under Section 801(b), the statute requires that the chosen SRPR rate "minimize any disruptive impact on the structure of the industries involved and on generally prevailing industry practices." XM and Sirius clearly have not turned the corner on the

[90] See FCC News Report No. IN 97-4, "FCC Announces Plan for Satellite DARS," at http://www.fcc.gov/Bureaus/International/News_Releases/1997/nrin7004.txt.
[91] See http://beradio.com/features/radio_today_radio_history/ .

1 profitability of their service. As shown in Exhibit 23, XM lost $667 million last year,
2 while Sirius lost $863 million. The cumulative losses to date for each company are well
3 over $3 billion. Indeed, analyst reports suggest that it will take several years before XM
4 and Sirius have positive net income. These projections rely on the assumption that both
5 companies will at least double the number of subscribers over that time frame; if these
6 additional subscribers do not materialize, then the companies will not turn a profit.[92]
7 And of course even if things play out according to the projections, total accumulated
8 losses will have risen by another billion dollars or more by the time these companies
9 reach the break even point.[93] This suggests that for some time to come, both XM and
10 Sirius will remain financially fragile. That fragility is underscored by the sea of
11 competition faced by Sirius and XM. Most obviously, every vehicle produced (as far as
12 I know) has as standard equipment an AM-FM radio by which consumers can listen to
13 music and talk "channels." As noted earlier, in the five largest radio markets, free over-
14 the-air radio provides listeners on average with 43 music channels and 74 channels in all.
15 (See Exhibit 18.)
16 Because terrestrial radio pays no SRPR fee for its over-the-air service, that tilts
17 the competition towards terrestrial radio. When considering adding more music to their
18 services, terrestrial radio, XM and Sirius will consider the costs and benefits of adding
19 that music. But in performing that calculus, over-the-air radio will not account for a
20 SRPR fee that it does not have to pay, and thus has a greater incentive at the margin to
21 play more music.
22 In the near term, the competition provided by terrestrial radio to XM and Sirius is
23 likely to become more intense as radio goes digital. One website notes that as a result,
24 radio will offer more genres of music, more non-music programming, real-time traffic
25 reports and stock prices, and real-time song, singer, and album identification. The site
26 notes that these services will be provided "**free of charge** like radio should be" (emphasis
27 in the original) and with "no subscription costs, no plans, and no monthly bills."[94]
28 Moreover, competition with over-the-air radio may be becoming more intense in
29 other dimensions as well. I understand that some large group owners of radio stations

[92] See "Satellite Radio Outlook," op. cit., pp. 5-15.
[93] See "Satellite Radio Outlook," op. cit., p 15.
[94] See http://www.hdradio.com/what_is_hd_digital_radio.php .

have begun reducing the number of commercials on air or to make those commercials less intrusive.[95]

In addition, XM and Sirius are not likely to be less financially fragile than Music Choice. Indeed, the financial stake in success or failure is much greater for XM and Sirius than for Music Choice. In 2005, the revenues of Music Choice were only 0.9% of the total operating expenses of XM and 1.0% of the total operating expenses of Sirius.[96]

These circumstances suggest that the established SRPR should be set towards the lower end of the range. In considering where to set that rate, an economist would also consider the asymmetric effect of making a mistake in setting the SRPR rate. If the rate is set too low, the recording companies will not exit the industry nor will there be any measurable effect on the companies' incentives to create new sound recordings. If the rate is mistakenly set too high, XM and Sirius will likely confront a substantial increase in financial risk which in turn will result in a curtailment of their services offered and a reduction in their ongoing investments in innovation.

d. *Providing a fair return to both the copyright owner and copyright user under existing economic conditions*

A rate towards the lower end of the range described above satisfies the statutory requirement that the rate be fair to both the copyright owner and copyright user. First, the Music Choice benchmark used here is a negotiated rate and so must be viewed by both parties as "fair" in light of all of the statutory standards. The rate is "fair" to the copyright owner precisely because it is based on that benchmark and is consistent with the music works rates that are market-driven. That rate (or a rate towards the lower end of the range) will also permit satellite radio to remain competitive with the numerous competitive alternatives to satellite radio.

Similarly, the rate "fairly" compensates the copyright holder for the use of the SRPR by XM and Sirius. Indeed, to the extent that satellite radio acquires its subscribers because it attracts them from over-the-air radio, the holders of the SRPR will clearly

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[95] See "Fewer commercials on the horizon?" CNNMoney.com, August 15, 2005; "Satellite option forces traditional radio to alter format" *Newsday*, December 11, 2005.

[96] Music Choice earned $10.3 million in fiscal 2005. See Hoover's Company Record – Basic Record, Music Choice, 8.22.06; 2005 Form 10-K, XM Satellite Radio Holdings Inc., p. 35; 2005 Form 10-K, Sirius Satellite Radio Inc., p. F-4.

benefit. Subscribers are being diverted from a medium (over-the-air radio) that has no obligation to compensate performers and SRPR holders to one that does (satellite radio).

XII Conclusion

Based on the foregoing analysis, I conclude that a reasonable range for the SRPR fee to be paid by XM and Sirius should be between 0.88% and 2.35%. This rate range is based on rates paid by analogous services or for analogous rights. Consideration of the 801(b) factors leads me to the conclusion that the rate should be set at the lower end of the range. I understand that XM and Sirius are proposing a rate of 0.88% and such a rate would be consistent with the analysis I have conducted.

Given the data available, there are a number of reasons to regard this estimated range as generally conservative. First, I have not accounted for the value to subscribers of the enhancements that each service creates for its music channels. Thus, some of the payments to SoundExchange will be excessive in that they reflect the subscriber value of the enhancements rather than the value of the underlying music. This means that programming adjustments based on listenership and subscriber cancellation rates may overstate the value of the underlying sound recording performances on the music channels. In particular, the listenership adjustment counts all music listening without counting the effect of the music programming enhancements on music listening. Thus, I may be giving credit to the sound recording performance that in fact is attributable to the programming enhancements. While the attachment index based on cancellation rates may be a better indicator than listenership of the value that consumers place on music and non-music programming, those subscribers who indicate that they are prepared to cancel the Sirius service if a favored music channel is pulled from the Sirius lineup may be doing so at least in part because of the music channel enhancements. This index, then, may also overstate the significance of the sound recording performance for rate-making purposes.

Second, in tallying the costs of the end-to-end level, I have not accounted for the cost of equity capital acquired by both services. Given the substantial inherent riskiness of the two services, as indicated by their cumulative losses, this is a significant omission and likely results in a substantial overstatement of the hand-off provider costs relative to

1 the end-to-end costs. Nor have I accounted for the cumulative losses that the two
2 services have already incurred.
3 Third, the PRO rates likely overstate the "true" upper bound of the range of
4 reasonable rates. Those rates may be excessive because of the incentive of the PROs to
5 harden their bargaining stance in light of the possible precedental value of the rates. In
6 addition, I have not accounted for the fact that pre-1972 sound recordings, live
7 performances, and archival performances are not subject to the SRPR while all musical
8 works performances result in payments to the PROs. That failure results in an
9 overstatement of the upper bound. Moreover, the sound recording performance license is
10 more restrictive than the musical works license because of the sound recording
11 performance complement. Thus, other things equal, the PRO right would be more
12 valuable than the sound recording performance right.
13 Fourth, neither the PRO upper bound rate nor the rates that derive from my use of
14 the PSS rate as a benchmark reflect the 801(b) factors. I have concluded that the
15 application of the factors to XM and Sirius would result in a rate towards the lower bound
16 of the range. But I have not suggested that those factors should be lower than that lower
17 bound even though had I been able to quantify those factors, that might well be the case.
18 I have recommended the lower end of the range because as a general matter, XM and
19 Sirius appear to outperform the recording labels and the PSS with respect to these factors.
20 As one obvious example, the importance of airplay could lead competing record labels to
21 pay compensation to the services to encourage sound recording performances, not the
22 reverse.
23 It is certainly possible that there are reasons why my estimates understate the
24 "true" SRPR rate. For example, it's possible that the amortization schedules for the up-
25 front content payments by XM and Sirius are excessive, but I have no reason to believe
26 that that would be the case. It's also possible that a refined study would better reveal
27 subscriber valuation of the music and non-music programming, and in particular reveal
28 that I have overstated the importance of non-music programming. But based on my
29 analysis here, I have no reason to believe that such a study would contradict my
30 conclusions and in fact could indicate a greater significance to non-music programming
31 than I have assumed. As a final example, it is possible that I have understated the

likelihood that listening to satellite radio displaces CD and download sales, but that too seems unlikely based on my previous discussion.

In short, while there are certainly assumptions embedded within my analysis that could result in an understatement of the rate, I conclude on balance that given the data available, my approach more likely than not overstates that rate.

Appendix

This Appendix describes the particular line items in the data provided to me by XM and by Sirius, and their categorization as hand-off provider costs and subscriber distribution and acquisition costs. Sirius and XM each reviewed the categorization of these various line items.

Assignment of XM Costs[97]

- **Cost of merchandise and equipment** includes the costs of radios and accessories—including hardware manufacturing subsidies and related fulfillment costs—associated with the direct sale of merchandise through XM's online store, XM-owned kiosks, and other direct sales programs. I categorize these costs as subscriber distribution and acquisition costs because a hand-off provider would not incur the costs (or accrue revenues) associated with the sale of radios to subscribers (since it is a cost associated with the distribution of the service to subscribers).

- **Innovation center royalties** are royalties paid to radio technology providers that are associated with technology royalty payments for the manufacturing of XM's radios and a technology agreement for satellite transmission. The manufacturing royalties also include payments for licensing the audio compression technology used by XM. I categorize these as hand-off provider costs because a hand-off provider version of the XM service would likely license audio compression technology, although in the case of a hand-off provider the royalty payments for this technology would not be based on the manufacture of radios as they are here. I also note that the audio compression costs incurred by XM may well overstate the costs that would be incurred by a hand-off provider because XM's broadcasts use less bandwidth than would be available on a commercial satellite. I categorize payments for the technology agreement for satellite transmission as subscriber distribution and acquisition

[97] The description of these line items may be found in XM's 2005 10-K, pp. 38-42.

costs because they are related to XM's operation of a proprietary satellite constellation.

- **Distribution channel revenue share** payments comprise revenue share payments associated with XM's distribution partners, such as Best Buy, Circuit City, Toyota, and General Motors. As an example of revenue-share payments by XM, when a subscriber activates an XM radio sold at Circuit City, Circuit City receives some of the ongoing subscription revenue paid to XM by that subscriber. I categorize these costs as subscriber distribution and acquisition costs because they are costs incurred by XM associated with the distribution of its radio hardware to subscribers, which a hand-off provider would not incur.

- **Content provider revenue share** payments include advertising revenue generated on third-party channels carried by XM, revenue-share payments made to third-party content providers (primarily for non-music programming), and revenue share payments for premium data services offered by XM, such as XM Satellite Weather and XM NavTraffic. I categorize the revenue-share payments for third-party advertising and content providers as hand-off provider costs because they are costs associated with XM's programming, which a hand-off provider version of XM would also incur. I exclude the revenue share payments for the premium data service because they are costs associated with XM that are not part of the standard radio service offered by XM.

- **Performance rights royalties** include royalty payments to composers, artists, and copyright owners for public performances of their works broadcast on XM, which include royalty payments to ASCAP, BMI, SESAC, and SoundExchange for music broadcast on XM's SDARS service. I exclude royalty payments for XM's non-SSDARS services, such as XM's Internet streaming audio service, music programming provided to DirecTV, music programming provided to United Airlines, and music provided to commercial establishments. It is my understanding that some of XM's payments to the BMI and SESAC may be based on interim rates or rates set under agreements that will soon expire. As such, I replace XM's actual payments to BMI with payments estimated by

applying a rate of 1.11% to XM's actual revenues.[98] XM's payments to SESAC are estimated by multiplying the estimated payments to ASCAP and BMI by 6%. I have imputed the fee for the sound recording copyright owners for the hand-off provider version of XM, assuming that that service would pay 7.25% of its gross revenues to SoundExchange.[99]

- **Advertising sales expense** are expenses related to supporting XM's efforts to sell advertising on its various audio channels. The costs include the salary and benefits and costs associated with XM's advertising sales staff, XM's marketing budget for potential advertisers, and bad debt expense related to advertisers on XM. These costs are categorized as hand-off provider costs because a hand-off provider would also have to incur the costs of selling advertising on its service.

- **Customer care and billing operations** are costs related to XM's customer care functions. I categorize XM's call center expenses, billing expenses, and customer care and billing operations and marketing expenses (marketing directed towards XM's call center representatives, such as promotions or discounted radios so that the representatives develop a better sense of the XM service) as subscriber distribution and acquisition costs because a hand-off provider would not incur the costs associated with providing customer care and billing to the subscribers of its service. The salary, benefits, and travel expenses for XM personnel and consultants hired by XM to manage customer care and billing operations are categorized as allocated because a hand-off provider would incur some costs associated with customer care and billing. However, the allocation of these costs is likely to substantially overstate the customer care and billing costs for a hand-off provider because it would have

[98] It is my understanding that XM and ASCAP currently have negotiated a rate equivalent to 1.11% of XM's revenues. I assume that XM's payments to BMI would be identical to its payments to ASCAP.

[99] In the baseline case, XM's estimated payments to SoundExchange are equal to the ratio of hand-off provider costs to end-to-end costs, multiplied by XM's actual revenue. The estimated payment to SoundExchange is also a component of the hand-off and end-to-end costs, which means that the estimated payment to SoundExchange can be determined by rearranging this equation and solving for the payment to SoundExchange.

significantly fewer customers (i.e., third-party distributors) than XM has direct subscribers. (In the case of the PSS, for example, their customers are a handful of satellite and cable providers; Sirius and XM have more than eleven million subscribers combined.)

- **IT Front Office** costs are internal information technology costs associated with XM's customer care functions. These front office costs include the salary, benefits, and travel expenses for XM personnel and consultants hired by XM to manage the customer care or subscriber management systems. I categorize these costs as subscriber distribution and acquisition costs because, as I described above, a hand-off provider would not incur the costs (including information technology costs) associated with providing customer care and billing to the subscribers of its service. To the extent that a hand-off provider would incur some information technology costs associated with customer care of third-party distributors, I understand that those costs would likely be minimal.

- **Satellite and terrestrial** includes operating costs (but not depreciation expenses) related to telemetry, tracking and control of XM's three satellites (the fourth satellite is scheduled to be launched later this year); in-orbit satellite insurance and incentive payments to the satellite manufacturers; satellite uplink; and the operating costs associated with XM's terrestrial repeater network (for example, power, maintenance, and operating lease payments).

As generally discussed above, these are expenses incurred by XM to provide a mobile service to their subscribers. Because XM's expenses associated with operating a fleet of proprietary satellites exceed what a hand-off provider would pay to lease bandwidth to broadcast its programming on a commercial satellite, I replace XM's satellite operating expense with an estimate of these costs. The estimate of the hand-off provider's satellite lease costs is included as a hand-off provider cost, while the difference between XM's actual satellite operating expenditures and the estimated hand-off provider satellite cost is included as a subscriber distribution and acquisition cost. I estimate the hand-

off provider satellite lease costs using data on what Sirius pays to transmit its programming over a commercial satellite to its network of terrestrial repeaters.[100]

I categorize XM's satellite and terrestrial research and development costs as subscriber distribution and acquisition cost because this category consists of satellite incentive payments made by XM to Boeing (which a hand-off provider that leased bandwidth on a commercial satellite would not incur). The operating costs of the terrestrial repeater network are also categorized as subscriber distribution and acquisition costs because a hand-off provider would not need to operate a network of terrestrial repeaters, which are necessary only to inject the service with mobility. Finally, the satellite and terrestrial general and administrative costs are treated as subscriber distribution and acquisition costs because they include the salary, benefits, and travel expenses of XM personnel responsible for XM's infrastructure beyond the satellite uplink, which a hand-off provider would not incur (the service offered by the hand-off provider would end at the satellite uplink). Satellite and terrestrial costs related to XM's Canadian affiliate are excluded.

- **Broadcast and operations** includes costs associated with the management and maintenance of broadcast facilities and systems (hardware and software), as well as production costs and performance studios used in the creation and distribution of both XM-original and third-party content. These costs also include broadcast and operations costs associated with XM programming distributed via platforms other than satellite radio, including XM Radio Online and XM programming distributed to DirecTV subscribers, and the cost of XM's advertising scheduling and insertion functions. I categorize these as hand-off provider costs because a hand-off provider offering an XM-type service would also incur broadcast and operations expense associated with the production of the programming it uplinks to the third-party responsible for the distribution of

[100] I understand that because Sirius satellites are in an elliptical orbit, it leases space on a commercial geostationary satellite to feed its signal to terrestrial repeaters, whose antennas cannot track Sirius' own geosynchronous satellites.

the programming to subscribers. However, the categorization of broadcast and operations expense as hand-off provider costs may be an overstatement because broadcast and operations costs include expenses associated with programming delivered to DirecTV, XM Radio Online and AOL, and United Airlines, which a hand-off provider would not incur in the context of service ultimately sold to individuals.

- **Information technology back office** costs include operating expenses for information technology systems that are not related to subscriber management system, such as XM's financial management system and human resources systems. These costs were allocated.

- **Information technology infrastructure** expenses include the costs of operating XM's information technology physical plant, servers, and computer hardware. These expenses include costs associated with XM personnel managing hardware for other departments, such as customer care and billing operations (for example, the costs of maintaining the computer servers used by the customer care and billing department are included in this line item, although the expense associated with the billing software running on those servers is reported in customer care and billing costs). These costs were allocated.

- **Corporate information technology** expenses include the costs associated with XM's computer help desk, mobile telephones and BlackBerries, and software for computers used by XM personnel. A hand-off provider would incur some of these costs, although the hand-off provider-equivalent costs would be substantially lower than XM's actual costs because the hand-off provider would lack the subscriber distribution and acquisition functions of XM (for example, the infrastructure costs associated with the servers used for customer care and billing). Nonetheless, I categorize these costs as allocated.

- **Administrative groups (facilities)** costs include the expenses associated with the maintenance, repairs, and upkeep of all XM locations, including the salaries and benefits associated with XM's maintenance employees. These costs also include property tax paid by XM. I categorize these expenses as allocated

because the facilities costs include maintenance expenses associated both with XM's facilities for its strictly end-to-end services, including XM's satellite operations, customer care and billing, sales and marketing, and research and development facilities, and with XM's facilities for its hand-off provider services, such as broadcast and operations and programming and content.

- **Programming and content** expenses include the creative, production, and licensing costs associated with XM's original and third-party content. It includes both the cost of programming staff (programming directors, administrative staff, programming staff for XM-produced talk stations, readers for XM's traffic channels, and so on), on-air talent, and fixed payments for third-party content. These last two categories include expenses associated with music and non-music talent (for example, Bob Dylan and Bob Edwards, respectively) and payments to Major League Baseball, the National Hockey League, Oprah Winfrey, Fox News, and so on. I categorize these as hand-off provider costs because a hand-off provider would be solely responsible for the costs associated with the creation of its programming and content.

- **Research and development** costs include expenses associated with XM's in-house Innovation Center and certain engineering payments made to XM's automobile, electronics, and technology partners. XM's Innovation Center develops new applications (for example, the XM NavTraffic application, which integrates traffic data delivered by XM satellites with automobile navigation systems) and hardware devices. Research and development costs for XM also include expenses associated with assistance provided to automobile manufacturers with the installation and design of factory-installed XM radios (sometimes referred to as non-recurring engineering expenses), chipset development, and improvement of XM's audio compression technology. I categorize research and development costs as subscriber distribution and acquisition costs because they are incurred almost exclusively as a result of XM's direct-to-subscriber functions (for example, the design of radios) or development of new applications (for example, NavTraffic), neither of which

would be incurred by a hand-off provider. Research and development related to XM's Canadian affiliate is excluded.

- **General and administrative** costs include management's salaries and benefits, professional fees, general business insurance, as well as other corporate expenses (for example, recruiting and relocation fees, outside legal fees, and public company expenses). These costs include expenses associated with XM's human resources, finance, and legal and regulatory departments. My understanding is that XM's general and administrative costs are predominantly determined by personnel costs and infrastructure expenses needed to support the growing subscriber base. I categorize general and administrative expenses as allocated because a hand-off provider would incur similar costs, albeit on a significantly smaller scale than XM (reflecting the hand-off provider's lower subscriber responsibility relative to that of an end-to-end service).

- **Retention and support** costs are administrative and overhead costs associated with XM's sales and marketing departments; these costs consist primarily of the salaries and benefits of sales and marketing personnel and related overhead expenses. I categorize these costs as allocated, although this allocation may overstate the extent to which a hand-off provider would incur costs of marketing its programming and content. Whereas an end-to-end provider like XM requires significant sales and marketing departments to attract individual subscribers, a hand-off provider would incur marketing expense only to the extent required to market its programming to the third parties responsible for distributing the programming to subscribers. For example, XM's sales and marketing expenses include marketing to potential subscribers, automotive partners, large retail distributors (which have more that 10,000 retail outlets), and small retail distributors. In contrast, a hand-off provider of an XM and Sirius type of service would only market to a handful of third-party distributors.

- **Subsidies and distribution** costs include subsidies paid by XM to support the manufacturing of radios, commissions to retail and automobile manufacturers for the sale and activation of radios, and certain other promotional costs.

Distribution commissions and loyalty payments consist of one-time payments made by XM to retail stores and automobile manufacturers related to the sale of XM radios or automobiles with factory-installed XM radios. Aftermarket subsidies include payments made by XM to retail radio manufacturers that are intended to reduce the retail price of radio hardware. Promotional expenses include costs associated with mail-in rebates and price discounts for XM radio hardware. These subsidy and distribution costs are primarily determined by the volume of XM-equipped automobiles sold, sales and activation of radios through retail stores, and XM's promotional activities.[101] I categorize these subsidy and distribution costs as subscriber distribution and acquisition costs because they are costs associated with the sale of hardware capable of receiving XM programming. These costs would be incurred by the third party distributing the hand-off provider's programming, but not by the hand-off provider itself.

- **Advertising and marketing** expenses include four broad categories of costs: aftermarket, automobile, media, and other costs. Aftermarket costs include the costs of signage and displays in retail stores such as Best Buy and Circuit City, as well as the cost of advertising in store circulars. Automobile-related costs are advertising costs intended to promote activation of radios in XM-equipped automobiles. These costs also include automobile dealer training expenses for factory- or dealer-installed XM radios. Media costs include expenses associated with XM advertising on television, in magazine and newspapers, commercial production costs, and agency fees. Finally, other advertising and marketing costs include racing sponsorships with XM's automotive partners such as General Motors and Honda, marketing with sports partners such as MLB or the NHL, event or public relations marketing, trade shows, customer communications, market research, and corporate website expenses. To the extent that a hand-off provider would incur some advertising and marketing

[101] This category does not include the distribution channel revenue share payments discussed above, which are ongoing payments (based on subscription revenue) made by XM to retail stores and automobile manufacturers.

costs associated with marketing its programming to third-party distributors, I assume that cost is included in the hand-off provider-equivalent portion of the retention and support costs (discussed previously). Accordingly, and because XM's advertising and marketing costs are directed towards potential subscribers, I categorize these costs as subscriber distribution and acquisition costs.

- **Amortization of GM liability** are costs associated with guaranteed payments made by XM to GM as part of the agreement between XM and GM to offer factory-installed XM radios in certain GM models. Because this cost is associated with acquiring subscribers to XM's service by offering XM-subsidized radios in GM automobiles, I categorize it as a subscriber distribution and acquisition cost.

- **Depreciation and amortization** include costs associated with nineteen line items that I discuss in turn below. Broadcast facilities depreciation and programming-related depreciation (for equipment purchased to manage XM's programming) are categorized as hand-off provider costs for reasons similar to those described in my previous discussion of XM's broadcast and operations and programming and content operating expenses (respectively). I also categorize the amortization of general goodwill as a hand-off provider cost. System development depreciation (capitalized professional services and labor, mostly related to XM's information technology systems) is allocated for reasons similar to those described in my previous discussion of XM's information technology operating expenses. I categorize the costs associated with the depreciation of XM's satellite system and spacecraft control facilities as subscriber distribution and acquisition costs because, as I described above in the discussion of XM's satellite and terrestrial operating expenses, I have assumed for the purpose of this calculation that the hand-off provider would lease bandwidth on a commercial satellite. Accordingly, a hand-off provider would incur none of the depreciation costs associated with constructing a fleet of proprietary satellites. Depreciation costs for XM's network of terrestrial

repeaters are also categorized as subscriber distribution and acquisition for reasons outlined in my description of XM's terrestrial repeater operating expenses; depreciation costs for research and development test equipment (primarily hardware used by the Innovation Center) are categorized as subscriber distribution and acquisition costs for reasons outlined in my description of XM's research and development expenses. Receiver agreement amortization costs are treated as subscriber distribution and acquisition costs.[102] The remaining depreciation and amortization costs are related to XM's buildings, leased property, furniture and fixtures, computer hardware, computer software, office equipment, leased equipment, automobiles, and leasehold improvements. I allocate these costs because a hand-off provider would incur many of the same costs (for facilities, for example).

- **Other income and expense** includes interest income, interest expense, other income or expense, and equity in the net losses (or income) of XM's affiliates. I allocate XM's interest income and interest expense because a hand-off provider may incur some interest expense (for financing the construction of its broadcast studios, for example) but to a lesser degree than XM as an end-to-end service. Instead of allocating these costs by the ratio of hand-off provider to end-to-end costs across all assignable cost line items, I allocate them according to the ratio of hand-off provider depreciation expenses to end-to-end depreciation expenses. These interest expenses were incurred by XM primarily as a result of its capital investments, and so the hand-off provider portion of these costs is likely best reflected by XM's depreciation schedule. Other income or expense includes net costs associated with XM's financing activities (for example, debt conversion expense) and is allocated. I exclude XM's equity in the net losses of its affiliates.

[102] XM also has a line item called "license amortization cost" but it is zero in 2005 and 2006.

Assignment of Sirius' Costs[103]

- **Satellite and transmission** expenses include the operating costs associated with the operation and maintenance of Sirius' satellite telemetry, tracking and control system, terrestrial repeater network, satellite uplink facility, and broadcast studios. (In previous years, in-orbit satellite insurance had also been included in satellite and transmission costs, but Sirius has discontinued this policy.) As with XM, because Sirius' expenses associated with operating a fleet of proprietary satellites exceed what a hand-off provider would pay to lease bandwidth to broadcast its programming on a commercial satellite, I do not include Sirius' satellite operating expenses as a hand-off provider cost. Instead, I understand that the uplink line item in Sirius' satellite and transmission costs includes commercial satellite lease expenses incurred by Sirius to broadcast its programming and content to its network of terrestrial repeaters. These costs are similar to what I understand a hand-off provider would pay to broadcast its programming and content over a commercial satellite for distribution to third parties using audio compression comparable to that of Sirius. I categorize the uplink line item as a hand-off provider cost to reflect the uplink costs that a hand-off provider would have to incur to deliver the service to a third-party distributor.

  I categorize the satellite line item as subscriber distribution and acquisition cost because it represents additional costs (above the lease payments included in the uplink line item) incurred by Sirius in connection with the distribution of its signal to subscribers, which a hand-off provider would not incur.[104] I categorize broadcast engineering costs as hand-off provider costs because a hand-off provider would also incur broadcast engineering operating costs associated with the production of its programming and content of its audio package.

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[103] The description of these line items may be found in Sirius' 2005 10-K, pp. 28-29.

[104] In 2006, Sirius reported satellite expenses that included a $10.917 million loss on the disposal of satellite parts. I excluded this amount from the strictly end-to-end costs because I was told by Sirius that it was a non-recurring operating expense.

The telecommunications transmission line item includes the cost of transmitting Sirius' programming and content from its New York studios to its satellite uplink in New Jersey, as well as the costs of transmitting Sirius-original programming produced outside of its New York studios to its satellite uplink. A hand-off provider would also incur the costs associated with transmission of its programming to its satellite uplink, so I categorize these as hand-off provider costs. I categorize the operating costs associated with Sirius' network of terrestrial repeaters as subscriber distribution and acquisition costs because a hand-off provider would not need to operate a network of terrestrial repeaters, which are necessary only to inject Sirius' service with mobility. Finally, the royalties line item includes technology royalty payments to third-parties, which I categorize as hand-off provider costs.

- **Programming and content** expenses include costs to acquire, create and produce content, on-air talent costs, and broadcast royalties. In addition to Sirius-original programming and content, Sirius has agreements with third parties for music and non-music programming, which require Sirius to pay license fees, share advertising revenue, and make guaranteed payments to those third parties.[105] Sirius has provided programming and content expense separately for music programming, talk and sports programming, music-related royalty payments (to SoundExchange, ASCAP, BMI, and SESAC), non-SDARS programming expense, and other programming and content expense. Talk and sports programming and content expenses reported in the first half of 2006 include approximately $39.9 million associated with Howard Stern's Sirius broadcasts, costs that were not incurred in 2005. To put the Sirius financials for 2005 on an equivalent basis (and recognizing that Sirius will incur these Stern-related operating expenses going forward), I add $79.8 million to the 2005 talk and sports programming and content operating expenses. I categorize music and sports and talk programming expenses as

[105] Certain of these third-party programming and content deals also require Sirius to purchase advertising on media properties owned or controlled by the third-party, the costs of which are recorded as a sales and marketing expense.

hand-off provider costs because a hand-off provider would be solely responsible for the costs associated with the creation of its programming and content.

The SoundExchange, ASCAP, BMI, and SESAC line items include royalty payments to composers, artists, and copyright owners for public performance of their works broadcast on Sirius satellite radio. I categorize these payments as hand-off provider costs because a hand-off provider would also incur costs associated with music performance rights. As with XM's payments to SoundExchange, I replace Sirius' actual payments to SoundExchange with an estimate of these payments based on my analysis of hand-off provider and end-to-end costs as discussed previously.

It is my understanding that some of Sirius' payments to ASCAP, BMI, and SESAC may be based on interim rates or rates set under agreements that will soon expire. As such, I replace Sirius' actual payments to ASCAP and BMI each with payments estimated by applying a rate of 1.11% to Sirius' actual revenues, the going-forward ASCAP rate with XM.[106] Sirius' payments to SESAC are estimated by multiplying the estimated payments to ASCAP and BMI by 6%. I exclude non-SDARS programming expense (e.g., the distribution of their service to Sprint), and I categorize other programming and content costs as ones that would be incurred by a hand-off provider offering the Sirius package of services.

- **Customer service and billing** expenses include costs associated with the operation of Sirius' customer service centers, credit card transaction fees, and subscriber management system. Sirius has reported customer service and billing expenses separately for its subscriber management system operating expenses, other subscriber management systems related information technology costs, and non-subscriber management related costs. In 2006, approximately

[106] It is my understanding that XM and ASCAP negotiated a rate equivalent to 1.11% of XM's revenues, and so I assume that Sirius and ASCAP would come to a similar agreement (although this may overstate the final rate between Sirius and ASCAP for reasons discussed elsewhere). I further assume that Sirius' payments to BMI would be identical to its payments to ASCAP.

1 two million dollars of expenses related to Sirius' subscriber management
2 system were reported in general and administrative expenses; to maintain
3 comparability with 2005, I subtracted two million dollars from Sirius' 2006
4 general and administrative expenses and added the two million dollars to the
5 subscriber management systems operating expense line item. I categorize
6 Sirius' customer service and billing expenses as subscriber distribution and
7 acquisition costs because these costs are incurred as a result of Sirius'
8 relationships with more than 5 million subscribers. Although I recognize that a
9 hand-off provider would also incur some customer service and billing costs
10 associated with its third-party distributors, allocating Sirius' customer service
11 and billing costs by the ratio of assignable hand-off provider costs to assignable
12 end-to-end costs would likely substantially overstate the customer service and
13 billing costs of a hand-off provider.

14 • **Cost of equipment** includes costs for Sirius radios and accessories sold through
15 Sirius' direct to consumer distribution channel, such as sales through Sirius'
16 website. I categorize these costs as subscriber distribution and acquisition
17 costs because a hand-off provider would not incur the costs (or accrue
18 revenues) associated with the sale of radios to subscribers (since it is a cost
19 associated with the distribution of the service to subscribers).

20 • **Sales and marketing** expenses include advertising, media and production
21 costs, and distribution costs. Advertising, media and production costs primarily
22 include the costs of promotional events, sponsorships, media, advertising,
23 production, and market research. Distribution costs primarily include the costs
24 of residuals (monthly fees paid to retail stores based on the number of
25 subscribers using a Sirius radio purchased from the retail store), market
26 development funds (payments to reimburse retail stores and radio
27 manufacturers for the cost of advertising and marketing), revenue share
28 payments, and in-store merchandising. Although the majority of these
29 advertising and marketing costs are directed towards potential subscribers (so
30 that a hand-off provider would not incur similar costs), I recognize that a hand-

1 off provider would incur some expenses associated with marketing its service to
2 third-party distributors. David Frear, the CFO of Sirius, has estimated that the
3 hand-off provider portion of sales and marketing for the sale of an audio
4 package like that of Sirius would be less than $5 million annually, and so I
5 allocate $5 million of Sirius' sales and marketing costs as hand-off provider
6 costs and the remainder as subscriber distribution and acquisition costs.

7 • **Subscriber acquisition costs** include hardware subsidies paid to radio
8 manufacturers, distributors and automobile manufacturers (including subsidies
9 paid to manufacturers that include a Sirius radio and a prepaid subscription in
10 the price of their automobiles); subsidies paid to chipset manufacturers; and
11 commissions paid to retailers and automobile manufacturers. These costs do
12 not include sales and marketing distribution costs discussed above. I
13 categorize these costs as subscriber distribution and acquisition costs because
14 they are costs associated with the sale of hardware capable of receiving Sirius
15 programming (either through the retail or automotive distribution channels),
16 and so would not be incurred by a hand-off provider.

17 • **General and administrative** expenses include rent and occupancy costs; the
18 costs associated with Sirius' finance, legal, human resources, and investor
19 relations departments; information technology expenses; and bad debt expense.
20 I categorize general and administrative expenses as allocated because a hand-
21 off provider would incur similar costs, albeit on a smaller scale than the Sirius
22 end-to-end service (reflecting the hand-off provider's reduced operations
23 relative to Sirius).

24 • **Engineering, design and development** expenses include costs to develop
25 Sirius' radio chipsets and new hardware devices (for example, the Sirius
26 Stiletto 100 portable radio). These expenses also include costs associated with
27 assistance provided to automobile manufacturers with the incorporation of
28 Sirius radio (non-recurring engineering expenses). I categorize engineering,
29 design, and development costs as subscriber distribution and acquisition costs

because they appear to be incurred as a result of Sirius' direct-to-subscriber functions, which would not be incurred by a hand-off provider.

- **Depreciation** costs for Sirius include depreciation associated with Sirius' satellites and launch vehicles, network of terrestrial repeaters, customer care and billing infrastructure, broadcast studios, leasehold improvements, and other depreciation costs. I categorize the satellite and launch vehicle depreciation cost as strictly end-to-end because, as I described above in the discussion of Sirius' satellite operating expenses, I have assumed for the purpose of this calculation that the hand-off provider would lease bandwidth on a commercial satellite. Accordingly, a hand-off provider would incur none of the depreciation costs associated with constructing or launching a fleet of proprietary satellites. Depreciation costs for Sirius' network of terrestrial repeaters and customer care and billing infrastructure are categorized as subscriber distribution and acquisition costs for reasons outlined in my description of Sirius' terrestrial repeater and customer service and billing operating expenses, respectively. I categorize depreciation costs for Sirius' broadcast studios as hand-off provider costs because a hand-off provider would also incur depreciation expenses associated with its broadcast studios. I categorize leasehold improvements and other depreciation costs as allocated.

- **Equity granted to third parties and employees** expense includes the costs associated with warrants, stock options, restricted stock, restricted stock units, and other stock-based awards granted to third parties pursuant to programming, sales and marketing and distribution agreements; employees; members of Sirius' board of directors; consultants; and employee benefit plans. Sirius has divided these expenses into programming related (separately for third-party music, third-party non-music, and Sirius employees) and non-programming related (separately for Sirius employees, the board of directors, and other parties). The third-party non-music expense in the first half of 2006 includes a one-time charge of $225,843,750 in equity granted to Howard Stern. Although this equity grant was expensed by Sirius in the first quarter of 2006 in

accordance with accounting guidelines, this payment was made by Sirius to cover the duration of Stern's five year deal with Sirius. To amortize the value of this payment over the duration of the deal, I allocate one fifth of the expense to each year between 2006 and 2010. In addition, as with the programming and content operating costs associated with the Stern channels, I include in Sirius' 2005 third-party non-music equity expense one-fifth of the $225.8 million to make the talk and sports programming equity costs in 2005 and 2006 comparable. I categorize all programming-related equity expenses as hand-off provider costs insofar as these are expenses related to the creation of Sirius' programming and content. I allocate the non-programming related equity expense for Sirius employees and the board of directors because a hand-off provider may incur some of these costs, albeit on a smaller scale than Sirius. The non-programming related equity expense to other parties is categorized as subscriber distribution and acquisition costs because it is related to sales and marketing and distribution agreements.

- **Total other expense** includes interest and investment income and interest expense. Interest and investment income includes realized gains and losses on investments, dividends, and interest income. Interest expense includes interest on outstanding debt and debt conversion costs. These costs are allocated between hand-off provider and end-to-end costs.

Before the
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LIBRARY OF CONGRESS
Washington, D.C.

In the Matter of	)	
ADJUSTMENT OF RATES AND TERMS FOR PREEXISTING SUBSCRIPTION SERVICES AND SATELLITE DIGITAL AUDIO RADIO SERVICES	)	Docket No. 2006-1 CRB DSTRA

DECLARATION OF JOHN R. WOODBURY

I, John R. Woodbury, declare under penalty of perjury that the statements contained in my Written Direct Testimony, as amended, in the above-captioned matter are true and correct to the best of my knowledge, information and belief. Executed this 14th day of May 2007 at Washington, D.C.

John R. Woodbury

37 CFR 351.10(c) Statement For Exhibits to Testimony of **John Woodbury**:

Exhibit 1	John Woodbury Curriculum Vitae
Exhibit 2	List of Documents and Materials Reviewed
Exhibit 3	XM Radio Channels by Format
Exhibit 4	Sirius Radio Channels by Format
Exhibit 5	Diagram of "How Satellite Radio Works"
Exhibit 6	Music Choice, XM, and Sirius Music Channels by Format
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Exhibit 18	Music Channels by Format for XM, Sirius, and the Five Largest Over-the-Air Radio Markets
Exhibit 19	a) List of XM Patents b) List of Sirius Patents c) List of Music Choice Patents
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Exhibit 22	Sirius and XM Expenditures on Satellites
Exhibit 23	Sirius and XM Net Losses Since Inception

Exhibit 1

INTERNATIONAL

JOHN R. WOODBURY
Vice President

Ph.D. Economics,
Washington University

M.A. Economics,
Washington University

B.A. Economics,
College of the Holy Cross

Dr. Woodbury's principal fields of expertise are industrial organization, regulation, antitrust, law, and economics. He is an expert in and has published on the economics of antitrust and regulation in broadcasting, cable, telecommunications, and other industries.

PRIOR PROFESSIONAL EXPERIENCE

1989–1992 *Principal*, Microeconomic Consulting and Research Associates, Inc. (formerly Competitive Analysis Group, ICF Consulting Associates)

- Responsible for providing antitrust and regulatory advice to clients.

1989 *Research Associate*, Analysis Group

- Responsible for providing antitrust and regulatory advice to clients.

1985–1989 Federal Trade Commission

Associate Director for Special Projects, Office of the Bureau Director, Bureau of Economics

- Responsible for initiating, conducting, and reviewing economic studies on Commission and other regulatory policies (including telecommunications); drafting speeches for the chairman; and reviewing Bureau participation in Federal Trade Commission cases.

Assistant Director for Rulemaking, Division of Policy and Evaluation, Bureau of Consumer Protection

- Responsible for managing the Commission's rulemaking agenda and drafting recommendations to the Commission from the Bureau director. Rules reviewed include holder-in-due-course, vocational schools, cooling-off, and funeral rules.

Deputy Assistant Director, Regulatory Analysis, Bureau of Economics

- Responsible for conducting or supervising studies or filings before regulatory agencies, including the Federal Communications Commission, the International Trade Commission, and the National Highway Traffic Safety Administration.

1983–1985 *Vice President*, Department of Research and Policy Analysis, National Cable Television Association

- Responsible for conduct or supervision of studies related to cable television, including consumer costs of the franchising process, deregulation of cable prices, effects of copyright fees on consumers, and the extent of competition with cable television.

1982–1983 *Senior Economist*, Regulatory Analysis Division, Bureau of Economics, Federal Trade Commission

- Responsible for broadcasting and telecommunications.

1979–1982 Federal Communications Commission

Chief, Economics Division, Common Carrier Bureau

- Senior economic advisor to Bureau and Commission on common carrier policy. Directed 25 subordinates in policy analysis.

Industry Economist, Network Inquiry Special Staff

- Responsible for the analysis of the program supply industry and the competitive impact of new broadcast technology.

1978–1979 *Assistant Chief, Policy Analysis Division, Brookings Economic Policy Fellow,* assigned to Office of Economic Analysis, Civil Aeronautics Board

- Responsible for the development of merger policy, international aviation policy, and service to small communities.

1977–1978 *Assistant Professor of Economics*, State University of New York at Albany

1975–1977 *Economist*, International Research Department, Federal Reserve Bank of New York

- Responsible for assessing bank-reported capital flows and exchange-rate movements.

1974–1975 *Lecturer*, Southern Illinois University, Carbondale

EXPERT WITNESS ACTIVITIES

Expert witness in a BMI rate setting proceeding on behalf of Music Choice, Second District Court of New York (expert report, supplemental report, direct case report, data affidavit, deposition testimony, and trial testimony), November 2003-April 2004.

Expert witness in a conspiracy/monopolization matter on behalf of IBEW Local No. 3. Expert report and deposition testimony. October–December 2002.

Expert witness before the Copyright Arbitration Royalty Panel, Direct and rebuttal testimony, regarding the determination of reasonable license fees for digital performance right in sound recordings and ephemeral recordings of music performed on public radio websites. Prepared on behalf of National Public Radio/Corporation for Public Broadcasting. April and October 2001.

Expert witness before the Illinois Commerce Commission, regarding the proposed SBC/Ameritech merger. Prepared on behalf of Sprint Communications Company, L.P. July 1999.

Expert witness before the Commonwealth of Virginia State Corporation Commission, regarding the proposed Bell Atlantic/GTE merger. Prepared on behalf of Sprint Communications Company, L.P. March 1999.

Expert witness before the Ohio Public Utilities Commission, regarding the proposed SBC/Ameritech merger. Prepared on behalf of Sprint Communications Company, L.P. December 1998.

Expert witness before the Illinois Commerce Commission, regarding the proposed SBC/Ameritech merger. Prepared on behalf of Sprint Communications Company, L.P. October and December 1998.

Expert witness to Copyright Arbitration Royalty Panel, Direct and Rebuttal Testimony, regarding the determination of reasonable rates for the digital performance of sound recordings. Prepared on behalf of Music Choice and DMX. June and July 1997.

Expert witness to Copyright Arbitration Royalty Panel, Rebuttal Testimony, regarding the shares of royalties due copyright claimants. Prepared on behalf of the Motion Picture Association of America. March 1996.

Expert witness before the Copyright Royalty Tribunal, rebuttal testimony on the value of distant signal sports programming. Prepared on behalf of the Motion Picture Association of America, December 1991.

Expert witness preparation in five antitrust investigations, 1988–1992, on behalf of the FTC.

Expert witness, FTC v. Elders Grain, Preliminary Injunction Proceeding, Sixth District Court. Testimony prepared on behalf of the FTC, June 1988.

Expert witness before the International Trade Commission and Department of Commerce, imports of Japanese semiconductors. Testimony prepared on behalf of the FTC, 1986.

Expert witness, Texas International/National/Pan American Acquisition Case and Continental/ Western acquisition case. Testimony prepared on behalf of the Civil Aeronautics Board, 1978–1979.

Expert witness, iPCS Wireless Inc. v. Sprint Corporation, Circuit Court of Cook County, Illinois, on behalf of Sprint Nextel Corporation, January 2006.

Expert witness, Horizon Personal Communications and Bright Personal Communications v. Sprint Corporation and UbiquiTel Inc. v. Sprint Corporation, Court of Chancery of the State of Delaware In and For New Castle County. Testimony on behalf of Sprint Nextel Corporation, April-May 2006.

OTHER SELECTED CONSULTING ACTIVITIES

Submitted a report, "In the Matter of Implementation of Section 621 (a) of the Cable Communications Policy Act of 1984 as Amended by the Cable Television Consumer Protection and Competition Act of 1992, MB Docket No. 05-311." With Stanley M. Besen. To the Federal Communications Commission on behalf of the National Cable & Telecommunications Association, 2006.

Submitted a report, "Attachment B to, In re Applications of Nextel Communications, Inc., Transferor, and Sprint Corporation, Transferee, for Consent to the Transfer of Control of Entities Holding Commission Licenses and Authorizations Pursuant to Sections 214 and 310 (d) of the Communications Act." With Stanley M. Besen and Steven C. Salop. To the Federal Communications Commission on behalf of Sprint Nextel Corporation, 2005.

Submitted a report, "Economic Analysis of the DOT's NPRM Proposals—Reply Comments." With Professor Steven C. Salop. To the Department of Transportation on behalf of Sabre, Inc., 2003.

Submitted a report, "Economic Analysis of DOT's NPRM Proposals." With Professor Steven C. Salop. To the Department of Transportation on behalf of Sabre, Inc., 2003.

Submitted a report, "Cable Television Subscriber Limits: A Critique." With Carl Shapiro. To the Federal Communications Commission on behalf of National Cable and Telecommunications Association, 2002.

Submitted a report to the Justice Department regarding unilateral effects related to a merger in the personal care industry, 2001.

Submitted a report to the European Commission on the effect of partial ownership interests in the luxury goods industry, 2001.

Submitted a report, "The Incentives of Cable Operators to Carry Multiple ISPs." With Stanley M. Besen and Patrick J. DeGraba. To the Federal Communications Commission on behalf of The National Cable Television Association, 2000.

Submitted a report on a media merger to the European Commission, 2000.

Submitted a report, "The Staff's Flawed Economic Analysis of Harm from Control Over 'Inactive' Programs" With Steven C. Salop. To the Federal Communications Commission on behalf of CBS Corporation and Viacom, Inc., 2000.

Submitted a report, "An Economic Analysis of the Effects of the AT&T-MediaOne Merger on Competition in the Supply and Distribution of Video Program Services: Response to the Critics." With Stanley M. Besen and Serge X. Moresi. To the Federal Communications Commission on behalf of AT&T, 1999.

Submitted a report, "An Economic Analysis of the proposed Bell Atlantic/GTE Merger." With Stanley M. Besen and Padmanabhan Srinagesh. To the Federal Communications Commission on behalf of Sprint Communications Company, L.P., 1998.

Submitted a report, "An Economic Analysis of the proposed SBC/Ameritech Merger." With Stanley M. Besen and Padmanabhan Srinagesh. To the Federal Communications Commission on behalf of Sprint Communications Company, L.P., 1998.

Submitted a report, "An Economic Analysis of the FCC's Cable Ownership Restrictions." With Stanley M. Besen. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1998.

Submitted a report, "Comments on Dertouzos and Wildman, 'Programming Access and Effective Competition in Cable Television.'" With Stanley M. Besen. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1998.

Submitted a report, "An Economic Analysis of the Effects of Partial Ownership Interests in Cable Systems." With Stanley M. Besen, Daniel P. O'Brien, and Serge X. Moresi. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1998.

Submitted a report, "A Response to Ameritech's New Media's 'Allegations of a Price Squeeze' by Vertically Integrated Cable Operators." With Stanley M. Besen. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1998.

Submitted a report, "A Further Analysis of the Effects of Cable Diversion, Premium Service Buy Rates, and Volume Discounts on Primestar's Competitive Incentives: A Response to Dr. Rosston." With Steven C. Salop, Stanley M. Besen, and E. Jane Murdoch. To the Federal Communications Commission on behalf of PRIMESTAR Partners, L.P., 1998.

Submitted a report, "An Economic Analysis of the Impact of the WorldCom-MCI Merger on the Provision of Internet Backbone Services." With Stanley M. Besen and Padmanabhan Srinagesh. To the Federal Communications Commission and the European Commission on behalf of Sprint Corporation, 1998.

Submitted a report, "A Comparison of Primestar's Costs with Those of a Standalone Entrant." With Steven C. Salop, Stanley M. Besen, and E. Jane Murdoch. To the Federal Communications Commission on behalf of PRIMESTAR Partners, L.P., 1998.

Submitted a report, "An Economic Analysis of Primestar's Competitive Behavior and Incentives: Reply to the Oppositions." With Steven C. Salop, Stanley M. Besen, and E. Jane Murdoch. To the Federal Communications Commission on behalf of PRIMESTAR Partners, L.P., 1998.

Submitted a report, "An Economic Analysis of Primestar's Competitive Behavior and Incentives." With Steven C. Salop, Stanley M. Besen, and E. Jane Murdoch. To the Federal Communications Commission on behalf of PRIMESTAR Partners, L.P., 1998.

Conducted statistical and other analyses of anticompetitive allegations surrounding a major media merger and submitted to the Federal Trade Commission, 1996.

Submitted a report, "Competitive Market Considerations in the Licensing of the 37-40 GHz Band." With Steven R. Brenner. To the Federal Communications Commission on behalf of WinStar Wireless, Inc., 1996.

Conducted statistical and other analyses of anticompetitive allegations surrounding a major media acquisition and submitted to the Justice Department, 1995.

Assisted in the preparation of testimony for the D.C. District Court regarding the competitive effects of the "must-carry" rules imposed on cable systems, 1996.

Submitted a report, "A Competitive Markup Approach to Establishing Rates When Adding Cable Program Services." With Stanley M. Besen. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1994.

Submitted a report, "Exclusivity and Differential Pricing for Cable Program Services." With Stanley M. Besen and Steven R. Brenner. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1993.

Submitted a report, "An Analysis of Cable Television Rate Regulation." With Stanley M. Besen and Steven R. Brenner. To the Federal Communications Commission on behalf of Tele-Communications, Inc., 1993.

Evaluated the prospects for Direct Broadcast Satellites on behalf of a potential investor, 1992.

Assisted in the preparation of testimony on the value of distant signal programming to earth station owners on behalf of the Motion Picture Association of America, 1992.

Prepared estimates of the supply elasticity of crude oil production and a paper, with F. Warren-Boulton and K. Baseman, on the alternatives to traditional pipeline regulation for a pipeline client, 1991–1992.

Prepared analyses of liability and damage estimates, with F. Warren-Boulton, on behalf of NEC in a bid-rigging allegation and presented those analyses to Justice Department officials, 1991.

Prepared a report, "Economic Analysis and Policy Implications of the Financial Interest and Syndication Rule." With F. Warren-Boulton. On behalf of the Motion Picture Association of America, 1990.

Submitted a report, "Assessing The Effect of Rate Deregulation on Cable Subscribers." With Sherman and Baseman. To the Federal Communications Commission on behalf of the National Cable Television Association, 1990.

Submitted an affidavit, "Economic Implications of the Pac Tel/Chicago Waiver Request." To the Department of Justice on behalf of the National Cable Television Association, January 1990.

Submitted an analysis of sham litigation allegations to the Justice Department on behalf of a software client, 1989.

PUBLICATIONS

"Analyzing Vertical and Horizontal Cross Ownership in Cable Television: the Time Warner–Turner Merger (1996)," in J.E. Kwoka and L.J. White, *The Antitrust Revolution: Economics, Competition, and Policy*, Scott, Foresman. With S. Besen, E. Murdoch, D. O'Brien, and S. Salop. Third Edition; Oxford University Press, 1999.

"Telecommunications in the U.S.: Evolution to Pluralism." With S. Besen and S. Brenner. In B. Lange (ed.), *ISDN in the USA, Japan, Singapore and Europe*, 1996.

"Market Structure, Program Diversity, and Radio Audience Size." With R. Rogers. *Contemporary Economic Policy* 1996.

"Rate Regulation, Effective Competition, and the Cable Act of 1992." With S. Besen. *Hastings Communications and Entertainment Law Journal*, 1994.

"Assessing Competition and Deregulation in Telecommunications: Some Observations on Methodology." In B. Cole (ed.), *After the Breakup: Assessing the New Post-AT&T Divestiture Era*. New York: Columbia University Press, 1991.

"Deterrence and Justice." With J. Bilmes. *Research in Law and Economics*, 1991.

"The First Amendment, Cable MTV, and the Must-Carry Rule: Towards a Cost-Benefit Analysis." *Proceedings of the Airlie House Conference on Telecommunications*, 1987.

"Video Competition and Consumer Welfare." In E. Noam (ed.), *Proceedings of the Arden House Conference on Video Competition*. New York: Columbia University Press, 1986.

Misregulating Television. With S. Besen, R. Metzger, and T. Krattenmaker. Chicago: University of Chicago Press, 1984.

"Regulation, Deregulation, and Antitrust in Telecommunications." With S. Besen. *Antitrust Bulletin*, Spring 1983.

"Determinants of Network Television Program Prices: Implicit Contracts, Regulation, and Bargaining Power." With S. Besen and G. Fournier. *Bell Journal of Economics*, Autumn 1983.

"Advertising, Price Competition, and Market Structure." With A. Arterburn. *Southern Economic Journal*, January 1981.

"Exchange Rate Stability and Monetary Policy." With B. Putnam. Albany Discussion Paper #95 in *Review of Economics and Business Research*, Winter 1980.

"Capital Market Integration Under Fixed and Floating Exchange Rates: An Empirical Analysis." *Journal of Money, Credit, and Banking*, May 1980.

OTHER COMPLETED RESEARCH

"Empirical Evidence on Efficiencies in the Common Ownership of Broadcast Stations." With K. Anderson. Comments on FCC Proceeding, 1991.

"Do Government-Imposed Ownership Restrictions Inhibit Efficiency?" *Working Paper of the Bureau of Economics*, No. 169, 1988.

"Over-the-Air Television and Cable Prices: An Econometric Inquiry." With M. Bykowsky. Served as basis of FCC decision deregulating cable prices, 1985.

"The Effect of Rate Regulation and Franchise Delay on Program Availability." With D. Koran. Comments on FCC Proceeding, 1985.

"Pricing Flexibility and Consumer Welfare: The Deregulation of Basic Cable Rates." NCTA White Paper, 1984.

"Economic Assessment of the Financial Interest and Syndication Rules." With K. Anderson. Comments on FCC Proceeding, 1983.

"Domestic Fixed Satellite Transponders Sales." Comments on FCC Proceeding, 1982.

An Analysis of Television Program Production, Acquisition, and Distribution. With R. Metzger. Network Inquiry Special Staff, Preliminary Report, Federal Communications Commission, June 1990.

"Production Abroad: Theoretical Considerations and Empirical Analysis." Mimeo, 1978.

"Scale Economies in the Airline Industry: A Survey." Mimeo, 1978.

PRESENTED PAPERS

"Market Structure, Program Diversity, and Radio Audience Size." With R. Rogers. Meetings of the Western Economics Association, July 1993.

"The Effects of Rate Deregulation on Cable Subscribers." With K. Baseman. Policy Approaches to the Deregulation of Network Industries: An American Enterprise Institute Conference, October 1990.

"Economic Analysis and Policy Implications of the Financial Interest and Syndication Rule." Telecommunications Policy Research Conference, Airlie House, October 1990.

"The Design and Evaluation of Competitive Rules Joint Ventures for Mergers and Natural Monopolies." With F. Warren-Boulton. American Economic Association Meetings, December, October 1990.

"Do Media Ownership Restrictions Reduce Economic Efficiency?" Telecommunications Policy Research Conference, Airlie House, November 1989.

"The Conflict Between Spectrum Efficiency and Economic Efficiency." With R. Rogers. Telecommunications Policy Research Conference, Airlie House, November 1989.

"Regulation versus Antitrust." Annenberg Conference: The Divestiture Five Years Later." March 1989.

"Regulating Cable Television." Telecommunications Policy Research Conference, Airlie House, September 1987.

"An Empirical Analysis of Television Program Prices." With S. Besen and G. Fournier. Meetings of the Southern Economic Association, November 1981.

"Flexible Exchange Rates and Market Integration." With B. White. Federal Reserve System Conference on Financial Market Research, June 1979.

"Advertising, Price Competition, Market Structure." With A. Arterburn. Meetings of the Southern Economic Association, November 1978.

"The Effects of Exchange Rate Systems on International Capital Market Integration." With B. White. Federal Reserve System Conference on International Research, November 1977.

OTHER PROFESSIONAL ACTIVITIES

Chair, "Competition between Cable Television and Telephone Companies." Telecommunications Policy Research Conference, September 1991.

Discussant, "Competition and Ownership in the Media." Telecommunications Policy Research Conference, September 1991.

Chair, "Spectrum Management Session." Telecommunications Policy Research Conference, Airlie House, September 1988.

Book Review, *Productivity in the United States* by John Kendrick and Elliot Grossman, *Southern Economic Journal*, April 1981.

Discussant, "Deregulation of Telecommunications." Meetings of the Western Economic Association, July 1981.

Referee, *Southern Economic Journal*, *RAND Journal of Economics*, Harvard University Press.

AWARDS

- Award for Excellence in Economics (FTC), 1988
- Competition Advocacy Award (FTC), 1987
- Brookings Economic Policy Fellow, 1978–1979
- SUNY Faculty Research Grant, 1978
- NSF Traineeship, 1973–1974
- *Finalist*, Woodrow Wilson Fellowship Competition, 1971

Exhibit 2: List of Documents and Materials Reviewed

I. Prior Decisions and Codes of Law

1 17 U.S.C. 801(b)(1)
2 "Digital Performance Right in Sound Recordings Act of 1995," Pub. L. No. 104-39, 109 Stat. 336 (1995)
3 Copyright Office 37 CFR Part 260, Docket No 96-5 CARP DSTRA, "Determination of Reasonable Rates and Terms for the Digital Perfomance of Sound Recordings," *Federal Register*, Volume 63, No 89, May 8, 1998
4 Copyright Office 37 CFR Part 260, Docket No. 2001-1 CARP DSTRA2, "Determination of Reasonable Rates and Terms for the Digital Perfomance of Sound Recordings by Preexisting Subscription Services," *Federal Register*, Volume 68, No 128, July 3, 2003
5 Copyright Office 37 CFR Chapter II, Docket No. RM 96-3A, "Notice and Recordkeeping for Subscription Digital Transmissions," *Federal Register*, Volume 62, No. 121, June 24, 1997
6 United States, Music Choice v Broadcast Music, Inc , 04-3444-CV (2d Cir., Oct. 6, 2005)
7 United States, Music Choice v. Broadcast Music, Inc., Docket No 01-6183 (2d Cir. 2003)
8 United States, Music Choice v. Broadcast Music, Inc., No 64 Civ. 3787 (LLS), 2001 U.S. Dist. LEXIS 10368 (S.D.N.Y. July 23, 2001)

II. Email

1 Promotion Emails from Artists
2 Promotion Emails from Subscribers
3 Promotion Emails from Record Labels

III. Sirius and XM Internal Documents

1 Sirius Financial Data
2 Sirius Satellite Radio Listener Study – Wave 2, June 2006
3 Sirius Satellite Radio Listener, Customer Satisfaction Monitor, 2Q'06 Results, August 28, 2006 - Final
4 Sirius Satellite Radio 2005 Annual Report and Proxy Statement
5 XM Financial Data
6 Arbitron Custom Study 2005, Commissioned by XM
7 Market Segmentation Study of XM Subscribers by Data Development Corporation, May 2005
8 National Brand Tracking for XM Satellite Radio by Brandware, February 2005
9 What's the XM Nation Listening to, 2006
10 XM Radio Listener Segmentation Report by OTX, Fall 2005

IV. Publicly Available Data

1 2006 BIA Investing In Radio Market Report

V. News Articles and Press Releases

1 "FCC Announces Plan for Satellite DARS," *FCC News Report* No. IN 97-4
2 "Stern Is the Draw At Sirius Satellite Radio," *Business Week*, April 10, 2006
3 "Is Howard Stern Worth It?" *Business Week*, January 23, 2006
4 "Can Stern Make Satellite Radio Hum?" *CNNMONEY.com*, December 21, 2005
5 "Justice Department Agrees to Modify Broadcast Music Inc. 1966 Consent Decree," *DOJ Press Release*, June 30, 1994
6 "Justice Department Announces Agreement to Modify ASCAP Consent Decree," *DOJ Press Release*, September 5, 2005
7 "Sound Exchange Board Meets, Extends Deadlines for Artists/Labels to Receive Royalties from First Distribution, Votes on New Board Members and Receives Word on Latest Distribution," *Soundexchange Press Release*, June 4, 2005
8 "Universal Music Settles Payola Probe," *Office of New York State Attorney General Press Release*, May 11, 2006
9 "Executive fired amid charges of payoffs," *New York Times*, January 12, 2005
10 "Sony BMG settles radio payola probe," *Washington Post*, July 26, 2005
11 "Music labels say it costs too much to get songs on the radio," *The Wall Street Journal*, June 10, 2002
12 "Radio and labels at odds again," *Billboard*, May 12, 2001
13 "Start Me Up: satcasters go early on new artists," *Billboard*, March 17, 2006
14 "Stymied by radio, veteran acts try new outlets," *Billboard*, January 29, 2005
15 "XM credited for band's worldwide exposure," *Richmond Times Dispatch*, August 10, 2006
16 "Fewer commercials on the horizon?" *CNNMoney.com*, August 15, 2005
17 "Satellite option forces traditional radio to alter format," *Newsday*, December 11, 2005
18 "Tuning In To Satellite Radio," *Technology Review*, January 25, 2002
19 "Major League Baseball Partners With XM Satellite Radio for 11-Year, $650 Million Broadcast and Marketing Agreement," *XM News Release*, October 20, 2004
20 "NASCAR Selects SIRIUS As New Home on Satellite Radio," *Sirius News Release*, February 22, 2005
21 "Sony BMG Music Settles Spitzer's Payola Probe," *MSNBC.com*, July 27, 2005

VI. Academic Articles

1 Blackburn, D. (2004) "On-line Piracy and Recorded Music Sales," Harvard University Ph.D. Dissertation
2 Mortimer, J H. and A. Sorenson (2005) "Supply Responses to Digital Distribution: Recorded Music and Live Performances," Working Paper
3 Oberholzer, F. and K. Strumpf (2005) "The Effect of File Sharing on Record Sales. An Empirical Analysis," Working Paper

VII. 10-Ks and other SEC Filings

1 Forms 10-K, XM Satellite Radio Holdings Inc., 1999-2005
2 Form 10-K Amendment, Sirius Satellite Radio Inc., 1996, 1998, 2001
3 Forms 10-K, Sirius Satellite Radio Inc., 1996-2005
4 Form 10-Q, XM Satellite Radio Holdings Inc., June 2006
5 Form 10-Q, Sirius Satellite Radio Inc., June 2006

VIII. Websites (as viewed on October 29, 2006)

1 http://www.sirius.com
2 http://www.sirius.com/servlet/ContentServer?pagename=Sirius/Page&c=Page&cid=1065475754125
3 http://www.sirius.com/servlet/ContentServer?pagename=Sirius/CachedPage&c=Page&cid=1150907696769
4 http://investor.sirius.com/releaseprint.cfm?releaseid=205864
5 http://www.sirius.com/servlet/ContentServer?pagename=Sirius/CachedPage&c=Page&cid=1018209032792
6 http://www.xmradio.com
7 http://www.xmradio.com/exclusivemusic/
8 http://www.xmradio.com/exclusivemusic/offstage.jsp
9 http://www.xmradio.com/service_subscription/service_subscription.jsp?refsrc=hp_gs
10 http://www.xmradio.com/corporate_info/fast_facts.html
11 http://www.xmradio.com/how_it_works/xm_studios.html
12 http://beradio.com/features/radio_today_radio_history/
13 http://www.musicchoice.com/
14 http://www.orbitcast.com/archives/oprah-joins-xm-satellite-radio.html
15 http://www.hdradio.com/what_is_hd_digital_radio.php
16 http://www.stateofthenewsmedia.org/2005/narrative_radio_contentanalysis.asp?cat=2&media=8
17 http://patft.uspto.gov/netahtml/PTO/search-bool.html
18 http://appft1.uspto.gov/netahtml/PTO/search-bool.html

IX. Testimony

1 Testimony of Adam B. Jaffe, in the matter of Digital Performance Right Sound Recordings and Ephemeral Recordings on behalf of Digital Media Association
2 Direct and Rebuttal Testimony of Erik Brynjolfsson, in the matter of Digital Performance Right Sound Recordings and Ephemeral Recordings, on behalf on SoundExchange
3 Testimony of Michael Pelcovits, in the matter of Digital Performance Right Sound Recordings and Ephemeral Recordings, on behalf of SoundExchange
4 Direct and Rebuttal Testimony of John R. Woodbury in re: Determination of Statutory License Terms and Rates for Certain Digital Subscription Transmissions of Sound Recordings on behalf of DCR and DMX
5 Direct and Rebuttal Testimony of John R. Woodbury in BMI rate setting proceeding on behalf of Music Choice
6 Direct and Rebuttal Testimony of E. Jane Murdoch and John R. Woodbury before CARP on reasonable license fees for digital performance right in sound recordings and ephemeral recordings of music performed on public radio websites on behalf on NPR/Corporation for Public Broadcasting

X. Interviews

1 Interviews with Eric Logan, Executive Vice President of Programming, XM
2 Interviews with Mark Vendetti, Senior Vice President of Corporate Finance, XM
3 Interviews with John Kramer, Vice President of Corporate Finance, XM
4 Interviews with Stephen Cook, Executive Vice President, Automotive, XM
5 Interviews with Tony Masiello, Senior President of Operations, XM
6 Interviews with John Dealy, Senior Advisor to the CEO, XM
7 Interviews with David Frear, Chief Financial Officer, Sirius
8 Interviews with Michelle McKinnon, Director of Investore Relations, Sirius
9 Interviews with Douglas Kaplan, Senior Vice President, Business Affairs and Development, Entertainment and Sports, Sirius

XI. Other Materials Reviewed

1 Satellite Radio Outlook, Kagan Research, LLC, July 2005
2 Warner Music Group, 2005 Annual Report
3 Market Share Reporter, 2007, Volume 1, "Top Music Firms Worldwide, 2006
4 Hoovers Company records - Basic records, Music Choice, August 22, 2006
5 Morgan Stanley Analyst Reports
6 Bernstein Analyst Reports
7 Lehman Brother Analyst Reports

Exhibit 3: XM Radio Channels by Format

Non-Music Content	Music Content
Especially for Women (2 channels)	*Christian (3 channels)*
Take Five	The Message
Oprah & Friends	Spirit
	enLighten
News (13 channels)	*Classical (3 channels)*
ABC News & Talk	XM Classics
BBC World Service	Vox
CNN Headline News	XM Pops
CNN	
Quoi de Neuf	*Comedy (4 channels)*
Canada 360	Laugh USA
XM Public Radio	XM Comedy
FOX News	Laugh Attack
The Weather Channel	National Lampoon Comedy Radio
C-SPAN Radio	
CNN en Español	*Country (7 channels)*
Bloomberg Radio	US Country
CNBC	Willie's Place
	Bluegrass Junction
Talk & Entertainment (13 channels)	America
E! Entertainment	The Village
The Power	Highway 16
FamilyTalk	X Country
XM Live	
Open Road	*Dance (5 channels)*
FOX News Talk	Chrome
High Voltage	The System
Extreme XM	XM-Chill
Talk Radio	BPM
Air America Radio	The Move
Radio Classics	
America Right	*Decades (6 channels)*
Sonic Theater	The 40s
	The 50s
Regional Talk, News & Music (1 channel)	The 60s
WLW	The 70s
	The 80s
	The 90s
	Jazz & Blues (5 channels)
	Beyond Jazz
	Real Jazz
	Watercolors
	Frank's Place
	Bluesville

(Exhibit 3 Continued)

(Exhibit 3 Continued)

Non-Music Content	Music Content
Traffic & Weather (22 channels)	*Pop & Hits (8 channels)*
Miami/Ft. Lauderdale, FL	Top 20 on 20
Washington, DC	On Broadway
Dallas/Ft. Worth, TX	Cinemagic
Chicago, IL	U Pop
Tampa / St. Petersburg, FL	The Blend
Boston, MA	XM Hitlist
St. Louis, MO	Flight 26
Seattle, WA	The Heart
San Francisco, CA	
Pittsburgh, PA	*Kids (2 channels)*
XM Emergency Alert	Radio Disney
Atlanta, GA	XM Kids
Los Angeles, CA	
Houston, TX	*Latin (4 channels)*
Detroit, MI	Caliente
Phoenix, AZ	Aguila
Philadelphia, PA	Viva
Orlando, FL	Fuego
New York, NY	
Baltimore, MD	*Lifestyle (4 channels)*
San Diego, CA	Audio Visions
Minneapolis/St. Paul, MN	Escape
	Hear Music™
Sports (42 channels)	Fine Tuning
XM Sports Guide	
NASCAR Radio	*Regional News & Talk (5 channels)*
FOX Sports Radio	Nashville (Today's Country)
ESPNEWS	KISS
ESPN Radio	WSIX (Nashville Country)
XM Sports Nation	MIX
XM Deportivo	Sunny
Home Ice	
NHL Hockey Play-by-Play (5 channels)	*Rock (14 channels)*
College Sports - PAC-10 (3 channels)	Bone Yard
MLB Play-by-Play Channels (14 channels)	Deep Tracks
College Sports - Big Ten (3 channels)	Fred
College Sports - ACC (3 channels)	Top Tracks
MLB Play-by-Play en Español	XM Cafe
PGA TOUR Network	XMU
Sport Plus	The Verge
IndyCar Series Racing	XM Liquid Metal
MLB Home Plate™	Big Tracks
Big East Football/Basketball	Lucy
	Fungus
	Squizz
	The Loft
	Ethel

(Exhibit 3 Continued)

(Exhibit 3 Continued)

Non-Music Content	Music Content
	Hip-Hop & Urban (7 channels)
	RAW
	The Heat
	Soul Street
	The City
	The Groove
	The Rhyme
	Suite 62
	World (3 channels)
	Sur La Route
	The Joint
	Air Musique

Note:
Reported channel counts are based upon a complete listing of channels obtained from XM's website as of September 27, 2006. The channel formats in this exhibit reflect the channel classifications used by XM. The channels in the music, commedy, and kids formats are assigned to "music" content because they all use commercially released music.

Source:
XM website.

Exhibit 4: Sirius Radio Channels by Format

Non-Music Content	Music Content
Family & Kids (2 channels)	*Christian (3 channels)*
RadioClassics	Revolution
Discovery Radio Channel	Praise
	Spirit
Financial News (2 channels)	*Classical (3 channels)*
CNBC	Symphony Hall
Bloomberg Radio	Classical Voices
	SIRIUS Pops
International News (6 channels)	*Comedy (3 channels)*
BBC Mundo	Blue Collar Comedy
CBC Radio One	Raw Dog
Première Plus	Laugh Break
BBC World Service News	
Radio Korea	*Electronic and Dance (5 channels)*
World Radio Network	Area 33
	Boombox
Public Radio (3 channels)	Chill
NPR Talk	The Beat
PRI Public Radio International	The Strobe
C-SPAN Radio	
Religion (2 channels)	*Family & Kids (2 channels)*
Christian Talk	Radio Disney
EWTN Global Catholic Network	Kids Stuff
Talk (13 channels)	*Jazz & Blues (5 channels)*
Howard 100	Planet Jazz
Howard 101	Jazz Café
SIRIUS Stars	Pure Jazz
E! Entertainment Radio	Spa 73
Maxim Radio	SIRIUS Blues
Court TV Radio	
SIRIUS Patriot	*Latin & International (5 channels)*
FOX News Talk	Universo Latino
SIRIUS Left	Rumbón
Road Dog Trucking	Bande Á Part
SIRIUS OutQ	CBC Radio 3
Playboy Radio	Iceberg Radio
The Roadhouse	
US News (5 channels)	*Country (5 channels)*
FOX News Channel	The Roadhouse
CNN	Outlaw Country
CNN Headline News	New Country
NPR Now	Prime Country
ABC News & Talk	Bluegrass

(Exhibit 4 Continued)

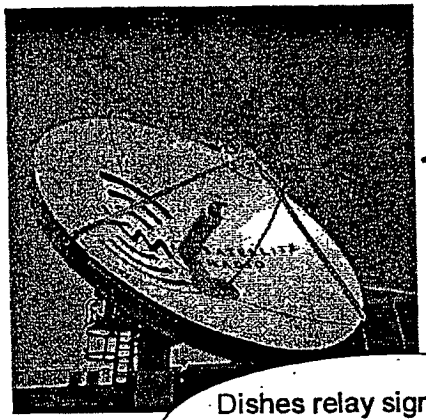
(Exhibit 4 Continued)

Non-Music Content	Music Content
Traffic & Weather (12 channels)	*Rock (19 channels)*
New York	Classic Rewind
Boston/Philadelphia	The Vault
Los Angeles	Jam_ON
Chicago/St. Louis	The Spectrum
Washington DC/Baltimore	Buzzsaw
Atlanta/Miami	Octane
Dallas/Houston	Alt Nation
Detroit/Pittsburgh	First Wave
San Francisco/Seattle	Hair Nation
Phoenix/San Diego	SIRIUS Disorder
Orlando/Tampa-St. Petersburg	Underground Garage
SIRIUS Weather & Emergency	Left Of Center
	Hard Attack
Lifestyles (3 channels)	Faction
Martha Stewart Living Radio	The Coffee House
LIME	Radio Margaritaville
Cosmo Radio	Reggae Rhythms
	Rolling Stones Radio
NBA (1 channel)	Classic Vinyl
NBA Radio on SIRIUS	
	Standards (2 channels)
NFL (1 channel)	Standard Time
SIRIUS NFL Radio	Broadway's Best
Sports News & Talk (6 channels)	*Hip-Hop/R&B (6 channels)*
Sports Play-by-Play 1	Backspin
ESPN Radio	Shade 45
ESPNEWS	Hot Jamz
Sports Byline USA	Heart & Soul
SIRIUS Sports Action	Soul Town
ESPN Deportes	Hip-Hop Nation
	Pop (13 channels)
	SIRIUS Hits 1
	Star Lite
	SIRIUS Love
	Movin' Easy
	SIRIUS Gold
	'60s Vibrations
	Totally '70s
	Big '80s
	The Pulse
	The Bridge
	BBC Radio 1
	Super Shuffle
	Elvis Radio

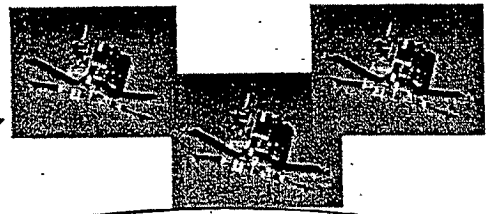
Note:
Reported channel counts are based upon a complete listing of channels obtained from Sirius' website as of September 27, 2006. The channel formats in this exhibit reflect the channel classifications used by Sirius. The channels in the music, commedy, and kids formats are assigned to "music" content because they all use commercially released music.

Source:
Sirius website.

Exhibit 5: How Satellite Radio Works

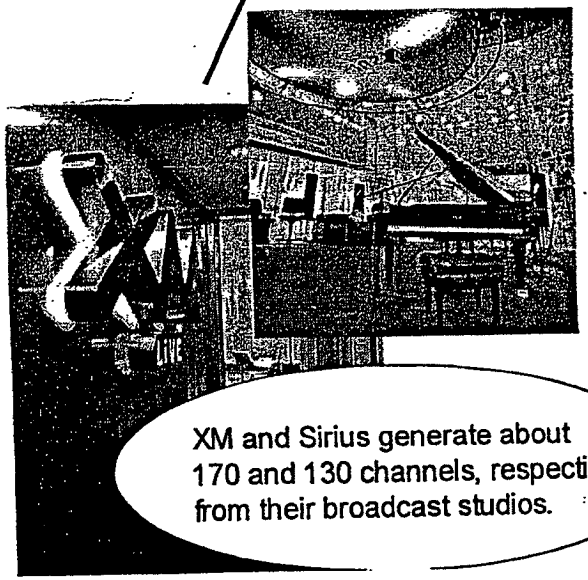


Dishes relay signals to fleets of satellites owned by the satellite radio companies.



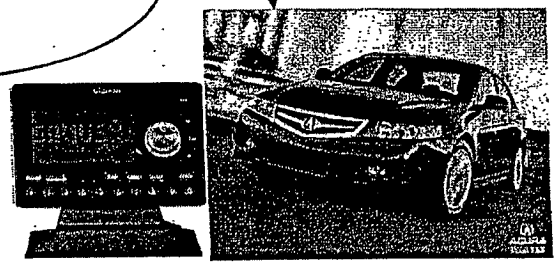
The XM satellites are in stationary orbit. The Sirius satellites are in an inclined elliptical orbit.

Some consumers receive signals directly, others via a ground repeater.



XM and Sirius generate about 170 and 130 channels, respectively, from their broadcast studios.

XM operates 800 repeaters and Sirius operates 140 repeaters.



Consumers can listen to their satellite radios in the car or at home.

SDARS-Woodbury Ex. 5

Exhibit 6: Music Choice, XM Satellite Radio, and Sirius Satellite Radio Music Channels by Format

Format[1]	Music Choice (Audio Content Only)	XM Radio	Sirius Radio
Urban[2]	7	7	6
Rock	8	14	19
Pop[3]	9	17	13
Dance[4]	3	5	5
Country[5]	4	9	5
Jazz & Blues	3	5	5
Classical	3	3	3
Religious[6]	2	3	3
Kids[7]	1	2	2
Comedy[8]	0	4	3
Standards and Theatrical[9]	3	0	2
Latin and International[10]	10	7	5
Lifestyle[11]	0	4	0
Other Genres[12]	5	0	0
TOTAL[13]	58	80	71

Notes:

1. These formats reflect CRA's categorization of the formats used by Music Choice, XM, and Sirius. Except where otherwise noted, CRA format classifications follow those used by Music Choice, XM, and Sirius.
2. Urban includes Sirius' Hip-Hop and R&B formats, and XM's Hip-Hop & Urban format
3. Pop includes Music Choice's Pop format and Party Favorites channel within its Variety format; XM's Hits, Decades, and parts of its Regional N&T formats.
4. Dance includes Sirius' Electronic and Dance formats.
5. Country includes XM's Country format and the two country channels from the Regional N&T format.
6. Religious includes the Christian format for both XM and Sirius.
7. Kids includes Radio Disney from Music Choice's Variety format; Sirius' channels within the Family and Kids format (depending on whether they were music or talk centered); and Radio Disney on XM and XM Children. These channels are treated as "music" channels because they use commerically released music.
8. The comedy channels are treated as "music" channels because they use commercially released music.
9. Standards and Theatrical includes Music Choice's Vocal/Theatrical format and its Big Band and Swing channel in its Variety format. Also includes Sirius' Standards format.
10. Latin and International includes Music Choice's Latin format and its Reggae channel from its Variety format. Also includes XM's Latin and World formats and Sirius' Latin & International format.
11. Lifestyle format is split depending on whether the channels are music or talk oriented. Music Choice carries no channels in the Lifestyles format. XM's channels in the Lifestyle format are music and Sirius' channels in the Lifestyle format are talk.
12. Other Genres include Music Choice's Instrumentals format and Showcase and Sounds of the Seasons from the Variety format.
13. XM's Regional N&T channels are not commercial free. The number of commercial-free XM music channels is 69.

Sources:

XM website.
Sirius website.
Music Choice website.

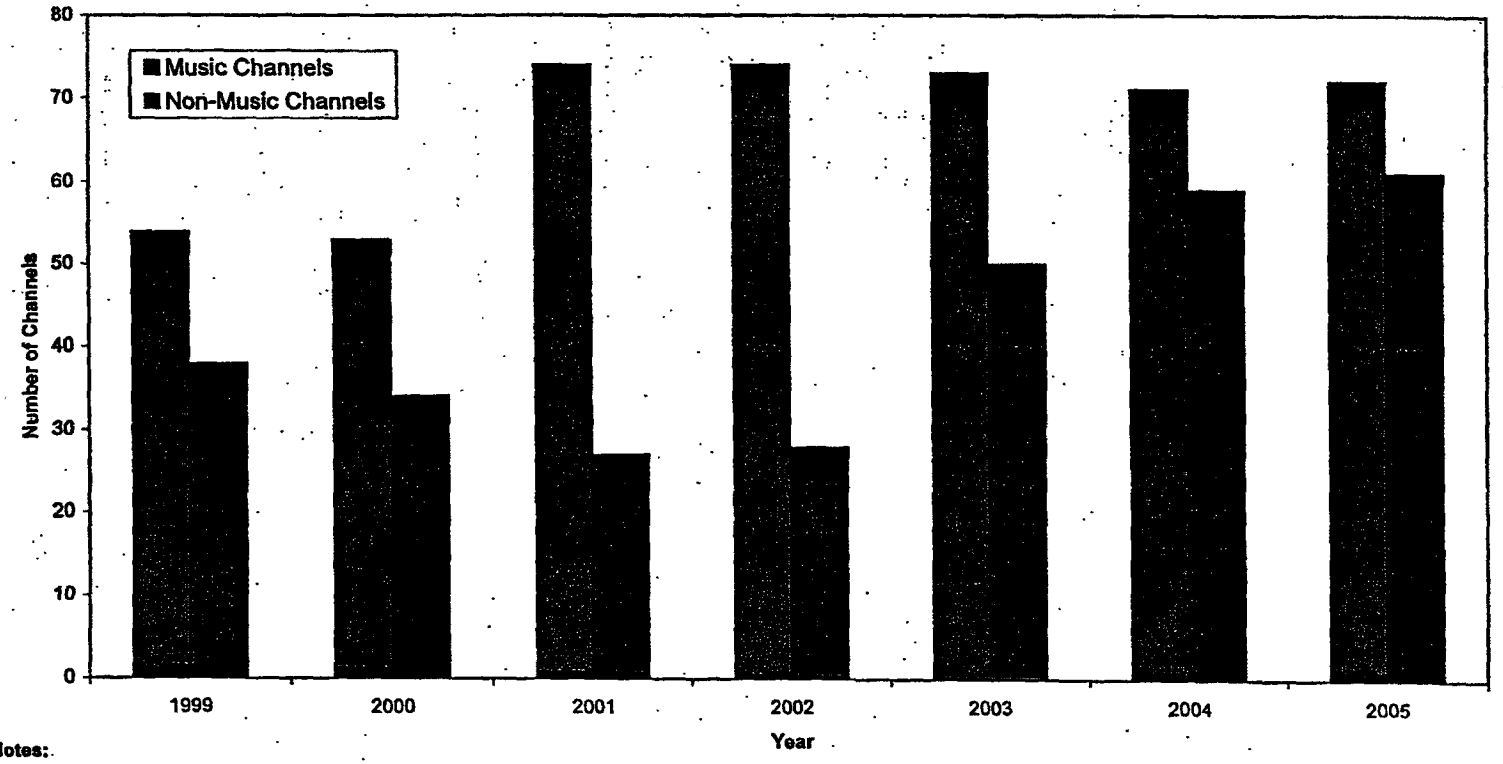
Exhibit 7: Music Choice, XM Satellite Radio, and Sirius Satellite Radio Non-Music Channels by Format

Genre[1]	Music Choice (Audio Content Only)	XM Radio	Sirius Radio
Sports[2]	0	42	8
News[3]	0	14	16
Traffic & Weather	0	22	12
Talk[4]	0	14	13
Kids[5]	0	0	2
Religious[6]	0	1	2
Lifestyle	0	0	3
TOTAL	0	93	56

Notes:
1. These formats reflect CRA's categorization of the formats used by XM and Sirius. Except where otherwise noted, CRA format classifications follow those used by XM and Sirius.
2. Sports includes Sirius' NBA, NFL, and Sports News & Talk formats.
3. News includes Sirius' Financial News, International News, Public Radio and US News formats; and XM's News format as well as the WLW channel within the Regional News & Talk format.
4. Talk includes XM's Talk (except for the Christian Talk channel), Entertainment, and Especially for Women formats.
5. Kids includes Sirius' channels within the Family and Kids formats (depending on whether they were music or talk centered).
6. Religious includes Sirius' Religion format and the Christian Talk channel from XM's Talk format.

Sources:
XM website.
Sirius website.
Music Choice website.

Exhibit 8.a: Number of Music and Non-Music Channels on XM, 1999-2005

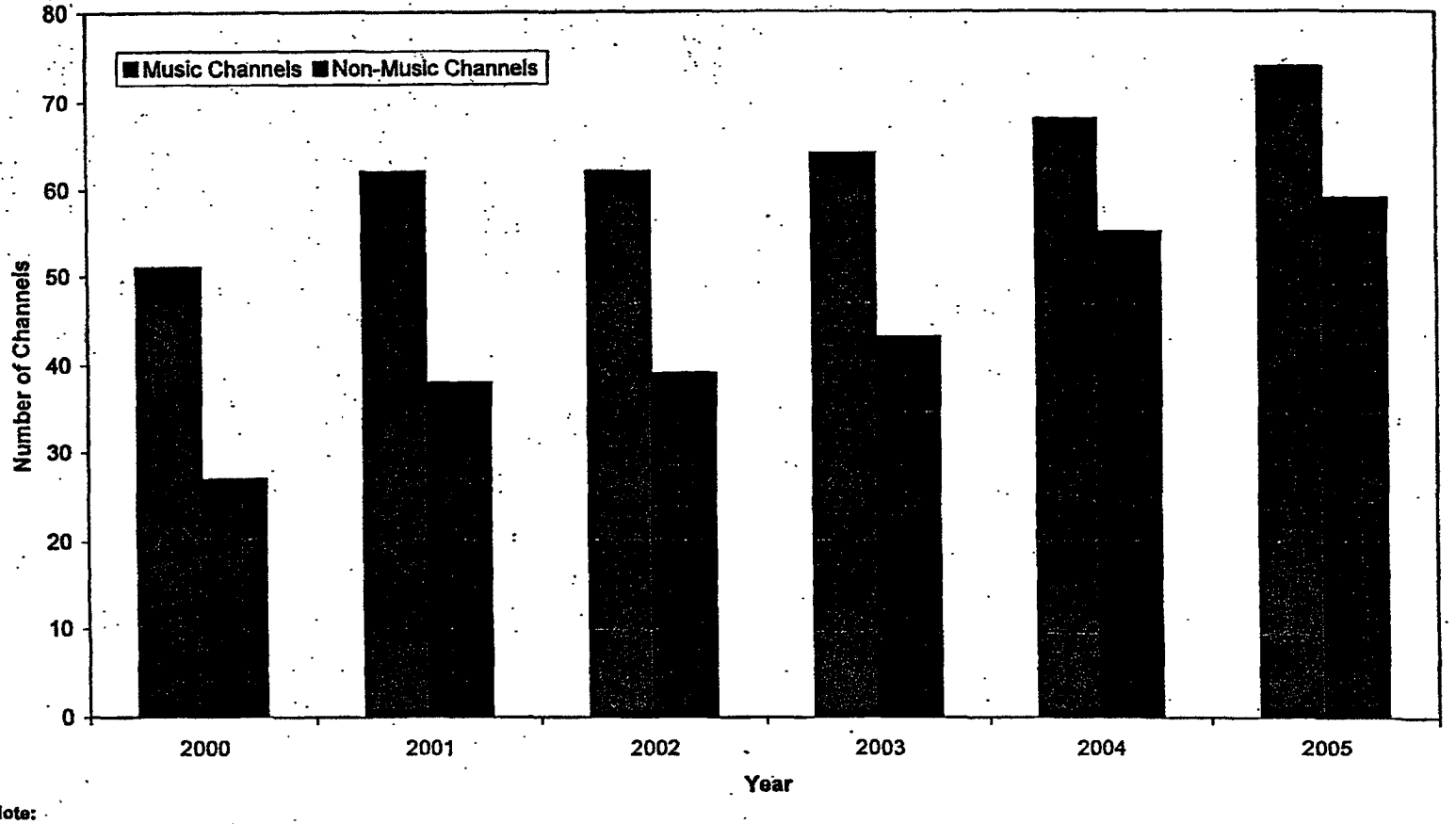


Notes:

1. 1999 and 2000 channel lineups were representative of what XM planned to offer at the time for future programming. These channel lineups included "Reserved Channels" for Special / Events programming.
2. XM channel lineups in 2001 and 2005 include the Preview channel as a non-music channel.
3. Play-by-Play channels are reported as one channel.
4. Kids and Comedy channels are counted as music channels.

Sources: XM Form 10-K's, 1999-2005.

Exhibit 8.b: Number of Music and Non-Music Channels on Sirius, 2000-2005



Note:
Kids and Comedy channels are counted as music channels.
Sources: Sirius Form 10-K's, 1999-2005

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

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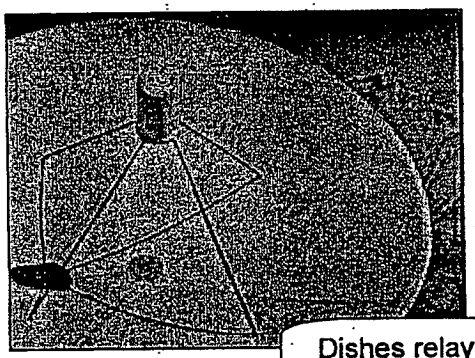
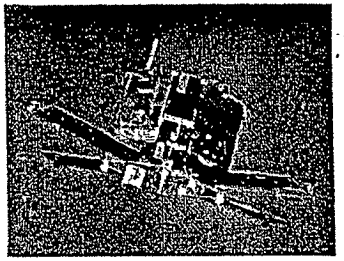
THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

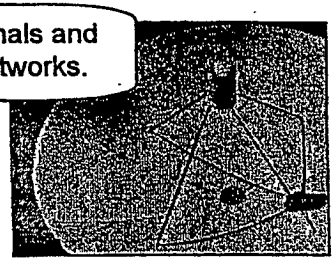
Exhibit 12: How Music Choice Works

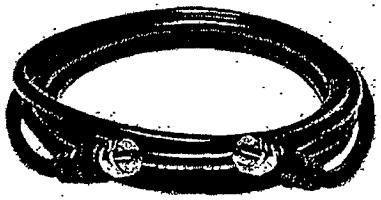


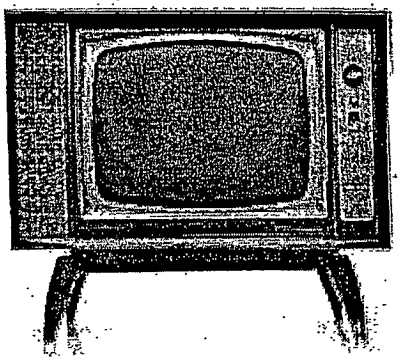
Dishes relay signals to third-party satellites.



Cable providers receive signals and transmit them over their networks.







Music Choice programs approximately 58 music channels.

MUSIC CHOICE

SDARS-Woodbury Ex. 12

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

Exhibit 15: Functionality Adjustments for Sirius and XM Based on 7.25% PSS Rate

Sirius Functionality Adjusted Rate	XM Functionality Adjusted Rate
1.86%	1.37%

Note:
See Section VII for a discussion of the functionality adjustments.

Sources:
XM and Sirius financial data, 2005 and first-half 2006.

Exhibit 16: Functionality and Programming Adjustments for Sirius and XM Based on 7.25% PSS Rate

	Rate Based On	
Programming Adjustment	Sirius Functionality Adjusted Rate	XM Functionality Adjusted Rate
Programming Adjustment Based on Listenership	1.04%	0.99%
Programming Adjustment Based on Cancellation	0.88%	0.92%
Programming Adjustment Based on Programming Expenses	0.33%	0.41%

Note:
See Sections VII and VIII for a discussion of the functionality and programming adjustments.

Sources:
XM and Sirius financial data, 2005 and first-half 2006.
XM Arbitron Custom Study.
Sirius Customer Satisfaction Monitor, 2Q '06 Results, August 28, 2006, Slide 22.
Sirius Satellite Radio Listener Study - Wave 2.

Exhibit 17: Functionality and Programming Adjustments for Sirius and XM Based on 5.32% PSS Rate

	Rate Based On	
Programming Adjustment	Sirius Functionality Adjusted Rate	XM Functionality Adjusted Rate
No Programming Adjustment	1.36%	0.99%
Programming Adjustment Based on Listenership	0.76%	0.72%
Programming Adjustment Based on Cancellation	0.65%	0.67%
Programming Adjustment Based on Programming Expenses	0.23%	0.29%

Note:
See Sections VII, VIII, and IX for a discussion of the functionality and programming adjustments using a 5.32% PSS rate.

Sources:
XM and Sirius financial data, 2005 and first-half 2006.
XM Arbitron Custom Study.
Sirius Customer Satisfaction Monitor, 2Q '06 Results, August 28, 2006, Slide 22.
Sirius Satellite Radio Listener Study - Wave 2.

Exhibit 18: Music Channels by Format for XM, Sirius, and the Five Largest Over-the-Air Radio Markets

			Over-the-Air Radio Markets[15]				
Format[1]	XM	Sirius	New York	Los Angeles	Chicago	San Francisco	Dallas-Ft. Worth
Urban[2]	7	6	5	4	4	3	6
Rock[3]	14	19	10	4	9	11	3
Pop[4]	17	13	16	15	22	13	10
Dance[5]	5	5	0	0	0	1	0
Country[6]	9	5	0	0	3	2	11
Jazz & Blues[7]	5	5	1	1	1	2	1
Classical	3	3	1	1	1	1	1
Religious[8]	3	3	1	1	4	1	5
Kids[9]	2	2	0	0	0	0	0
Comedy[10]	4	3	0	0	0	0	0
Standards and Theatrical[11]	0	2	7	3	5	1	2
Latin and International[12]	7	5	4	3	4	3	5
Lifestyle[13]	4	0	3	0	0	2	0
Total Music Channels[14]	80	71	48	32	53	40	44
Total Channels	173	127	73	75	86	68	67

Notes:

1. These formats reflect CRA's categorization of the formats used by BIA, XM, and Sirius. Except where otherwise noted, CRA format classifications follow those used by BIA, XM, and Sirius.
2. Urban includes Sirius' Hip-Hop and R&B formats; XM's Hip-Hop & Urban format; and BIA's Urban format (excluding Blues).
3. Rock includes BIA's Rock and Album Oriented Rock/Classic Rock formats.
4. Pop includes XM's Hits, Decades and parts of its Regional N&T formats; BIA's Oldies, Adult Contemporary, and Contemporary Hit Radio/Top 40 (excluding Dance) formats.
5. Dance includes Sirius' Electronic and Dance formats; and Dance in BIA's Contemporary Hit Radio/Top 40 format.
6. Country includes XM's Country format and the two country channels from the Regional N&T format.
7. Jazz & Blues includes BIA's Jazz/New Age format and Blues in its Urban format.
8. Religious includes the Christian format for both XM and Sirius and BIA's Religion format.
9. Kids includes Sirius' channels within the Family and Kids format (depending on whether they were music or talk centered); and Radio Disney on XM and XM Children. These channels are treated as "music" channels because they use commerically released music.
10. The comedy channels are treated as "music" channels because they use commercially released music.
11. Standards and Theatrical includes Sirius' Standards format; BIA's Nostalgia/Big Bands and Middle of the Road (excluding full services) formats.
12. Latin and International include: XM's Latin and World formats; Sirius' Latin & International format; and BIA's music stations under the Spanish format.
13. Lifestyle format is split depending on whether the channels are music or talk oriented. XM's channels in the Lifestyle format are music; Sirius' channels in the Lifestyle format are talk. Lifestyle also includes BIA's Easy Listening/Beautiful Music format.
14. Over-the-air radio stations with talk format or mixed format are not included in the count.
15. Largest markets determined by metro area population.

Sources:

Sirius website.
XM website.
2006 BIA Investing In Radio Market Report.

Exhibit 19.a: XM Patents

Patent Number	Filing Date	Patent Title
6,493,546	March 5, 1999	System for providing signals from an auxiliary audio source to a radio receiver using a wireless link
6,272,328	May 12, 1999	System for providing audio signals from an auxiliary audio source to a radio receiver via a DC power line
6,823,169	May 25, 1999	Low cost interoperable satellite digital audio radio service (SDARS) receiver architecture
6,735,416	May 25, 1999	Receiver architecture for SDARS full band signal reception having an analog conversion to baseband stage
6,724,827	May 25, 1999	Low cost interoperable satellite digital audio radio service (SDARS) receiver adapted to receive signals in accordance with advantageous frequency plan
6,295,033	May 25, 1999	Vehicle antenna assembly for receiving satellite broadcast signals
6,154,452	May 26, 1999	Method and apparatus for continuous cross-channel interleaving
6,640,085	September 1, 1999	Electronically steerable antenna array using user-specified location data for maximum signal reception based on elevation angle
6,564,003	November 4, 1999	Method and apparatus for composite data stream storage and playback
6,549,774	November 4, 1999	Digital audio service satellite receiver having switchable operating modes for stationary or mobile use
6,510,317	November 4, 1999	Satellite digital audio radio service tuner architecture for reception of satellite and terrestrial signals
6,442,385	November 4, 1999	Method and apparatus for selectively operating satellites in tundra orbits to reduce receiver buffering requirements for time diversity signals
6,347,216	November 4, 1999	Method and system for providing geographic specific services in a satellite communications network
6,229,824	November 4, 1999	Method and apparatus for concatenated convolutional endcoding and interleaving
7,020,217	November 4, 1999	Satellite digital audio radio receiver with instant replay capability
7,123,875	November 4, 1999	System and method for multipoint distribution of satellite digital audio radio service
6,563,805	November 5, 1999	Digital radio prepaid music recording system
6,397,076	November 5, 1999	Method and apparatus for dispatch communications in a broadcast radio system
6,229,499	November 5, 1999	Folded helix antenna design
6,232,926	November 10, 1999	Dual coupled vehicle glass mount antenna system
7,010,263	December 14, 1999	System and method for distributing music and data
6,614,767	October 17, 2000	Method and apparatus for continuous cross-channel interleaving
6,876,835	October 25, 2000	Method and apparatus for providing on-demand access of stored content at a receiver in a digital broadcast system
6,834,156	October 25, 2000	Method and apparatus for controlling user access and decryption of locally stored content at receivers in a digital broadcast system
6,686,880	October 25, 2000	Method and apparatus for prompting a reverse channel response from receiver in a digital broadcast system
6,970,565	December 22, 2000	Apparatus for and method of securely downloading and installing a program patch in a processing device
6,538,609	April 30, 2001	Glass-mountable antenna system with DC and RF coupling
7,058,086	May 7, 2001	Method and apparatus for concatenated convolutional encoding and interleaving
6,785,656	June 5, 2001	Method and apparatus for digital audio playback using local stored content
6,483,471	June 6, 2001	Combination linearly polarized and quadrifilar antenna
6,470,058	June 11, 2001	System for and method of jointly optimizing the transmit antenna patterns of two geostationary satellites in a satellite broadcasting system
6,553,077	July 31, 2001	Method and apparatus for customized selection of audio channels

Patent Number	Filing Date	Patent Title
7,010,264	August 17, 2001	System and method for detecting the connections of two antennae to a radio receiver
6,421,020	September 17, 2001	Vehicle antenna assembly for receiving satellite broadcast signals
7,075,946	October 2, 2001	Method and apparatus for audio output combining
6,535,179	October 2, 2001	Drooping helix antenna
6,686,882	October 19, 2001	Apparatus and method for transferring DC power and RF energy through a dielectric for antenna reception
7,035,628	December 31, 2001	Method and apparatus for content blocking
6,661,386	March 29, 2002	Through glass RF coupler system
6,621,458	April 2, 2002	Combination linearly polarized and quadrifilar antenna sharing a common ground plane
6,806,838	August 14, 2002	Combination satellite and terrestrial antenna (Patent Jointly Held with Delphi-D Antenna Systems)
6,810,233	November 7, 2002	System for providing signals from an auxiliary audio source to a radio receiver using a wireless link
Pending	April 30, 2001	Glass-mountable antenna system with DC and RF coupling
Pending	May 7, 2001	Method and apparatus for concatenated convolutional encoding and interleaving
Pending	June 14, 2004	Antenna diversity system
Pending	December 15, 2004	Digital remodulation
Pending	January 14, 2005	Automatic on/off switch for vehicle power outlets
Pending	January 14, 2005	Method and system for converting streaming digital data to FM modulated data
Pending	April 22, 2005	Method and system for hierarchical modulation and demodulation for digital radio
Pending	September 22, 2005	Wireless satellite digital audio radio service (SDARS) head unit with portable subscription and cell phone abilities (Joint Filing with Interoperable Technologies and Sirius)

Note:
The Patent and Trademark Office's Patent Application Full-Text and Image Database only includes pending patents filed since 2001.

Sources:
United States Patent and Trademark Office, Patent Full-Text and Image Database, available at <http://patft.uspto.gov/netahtml/PTO/search-bool.html>.
United States Patent and Trademark Office, Patent Application Full-Text and Image Database, available at <http://appft1.uspto.gov/netahtml/PTO/search-bool.html>.

Exhibit 19.b: Sirius Patents

Patent Number	Filing Date	Patent Title
5,278,863	April 10, 1992	Radio frequency broadcasting systems and methods using two low-cost geosynchronous satellites
5,319,673	April 16, 1993	Radio frequency broadcasting systems and methods using two low-cost geosynchronous satellites
5,485,485	April 13, 1994	Radio frequency broadcasting systems and methods using two low-cost geosynchronous satellites and hemispherical coverage antennas
5,592,471	May 4, 1995	Mobile radio receivers using time diversity to avoid service outages in multichannel broadcast transmission systems
5,745,839	September 1, 1995	Satellite multiple access system with distortion cancellation and compression compensation
5,864,579	July 25, 1996	Digital radio satellite and terrestrial ubiquitous broadcasting system using spread spectrum modulation
5,720,039	November 1, 1996	Satellite multiple access system with distortion cancellation and compression compensation
5,794,138	February 26, 1997	Satellite broadcast system receiver
6,023,616	March 10, 1998	Satellite broadcast receiver system
6,223,019	May 20, 1998	Efficient high latitude service area satellite mobile broadcasting systems
6,564,053	October 19, 2000	Efficient high latitude service area satellite mobile broadcasting systems
6,892,987	July 25, 2003	Predicting, bounding and mitigating satellite attitude disturbances arising from infrared earth sensors for satellites in inclined, elliptical orbits
Pending	July 9, 2001	System and method for creating and receiving personalized broadcasts
Pending	September 22, 2005	Wireless satellite digital audio radio service (SDARS) head unit with portable subscription and cell phone abilities (Joint Filing with Interoperable Technologies and XM)

Note:
The Patent and Trademark Office's Patent Application Full-Text and Image Database only includes pending patents filed since 2001.

Sources:
United States Patent and Trademark Office, Patent Full-Text and Image Database, available at <http://patft.uspto.gov/netahtml/PTO/search-bool.html>.
United States Patent and Trademark Office, Patent Application Full-Text and Image Database, available at <http://appft1.uspto.gov/netahtml/PTO/search-bool.html>.

Exhibit 19.c: Music Choice Patents

Patent Number	Filing Date	Patent Title
6,879,963	April 12, 2000	Cross channel delivery system and method
7,028,082	March 8, 2001	Personalized audio system and method
7,076,561	March 18, 2002	Personalized audio system and method
Pending	April 12, 2006	Media content delivery systems and methods

Note:
The Patent and Trademark Office's Patent Application Full-Text and Image Database only includes pending patents filed since 2001.

Sources:
United States Patent and Trademark Office, Patent Full-Text and Image Database, available at <http://patft.uspto.gov/netahtml/PTO/search-bool.html>.
United States Patent and Trademark Office, Patent Application Full-Text and Image Database, available at <http://appft1.uspto.gov/netahtml/PTO/search-bool.html>.

Exhibit 20: Sirius Expenditures on Engineering, Design, and Development and XM Expenditures on Research and Development

Year	Sirius Engineering, Design, and Development[1] ('000s)	XM Research and Development[2] ('000s)
1994 to 1997	$1,390	N/A
1998	$2,150	$7,311
1999	$33,134	$6,510
2000	$70,690	$11,948
2001	$58,453	$13,689
2002	$30,087	$10,843
2003	$24,534	$12,285
2004	$30,520	$23,513
2005	$44,745	$31,218
First and Second Quarters 2006	$35,166	$19,499
Cumulative Expenditures Since 1994[3]	$330,869	$136,816
Cumulative Expenditures Since 2003	$134,965	$86,515

Notes:
1. Expenditures reported for Sirius from 1994 to 1996 are for research and development. Expenditures for 1997 to 2006 are for engineering, design, and development.
2. XM research and development expenditures exclude depreciation and amortization.
3. Research and development expenditures for XM were not available prior to 1998.

Sources:
XM Form 10-Ks, 1999-2005; XM Form 10-Q, June 2006.
Sirius Form 10-Ks, 1996-2005; Sirius Form 10-K Amendment, 1996; Sirius Form 10-Q, June 2006.

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

Exhibit 23: Sirius and XM Net Losses Since Inception[1]

Year	Sirius Net Losses ('000s)	XM Net Losses ('000s)
Prior to 1997	-$18,536	N/A
1997[2]	-$4,737	-$1,659
1998	-$48,396	-$16,167
1999	-$62,822	-$36,896
2000	-$134,744	-$51,873
2001[3]	-$235,763	-$284,379
2002[4]	-$422,481	-$495,012
2003	-$226,215	-$584,535
2004	-$712,162	-$642,368
2005	-$862,997	-$666,715
First and Second Quarters 2006	-$696,372	-$378,330
Cumulative Net Losses Since 2003	-$2,497,746	-$2,271,948
Cumulative Net Losses Since Inception	-$3,425,225	-$3,157,934

Notes:

1. Sirius' inception was in May 1990 (as Satellite CD Radio), followed by an initial public offering (as CD Radio) in September 1994. XM's inception was in June 1992 (as American Mobile Radio), followed by an initial public offering was in October 1999.
2. Sirius and XM received licenses from the FCC in October 1997 to construct and operate satellite radio services.
3. XM service became available nationwide in November 2001.
4. Sirius service became available nationwide in July 2002.

Sources:

XM Form 10-Ks, 1999-2005. XM Form 10-Q, June 2006.
Sirius Form 10-Ks, 1996-2005. Sirius Form 10-K Amendment, 1996. Sirius Form 10-Q, June 2006.